FILE NO. SVM-24051

TOSHIBA

Carrier

SERVICE MANUAL

AIR-CONDITIONER

(SPLIT TYPE)

INDOOR UNIT
<4-way cassette type>

RAV-HB121UTP-UL
RAV-HB181UTP-UL
RAV-HB241UTP-UL
RAV-HB301UTP-UL
RAV-HB361UTP-UL
RAV-HB421UTP-UL
RAV-HB481UTP-UL

R454B

November, 2024

Original instruction

Adoption of R454B Refrigerant

This Air Conditioner an environmentally friendly refrigerant.

CONTENTS

Thank you for purchasing this air conditioner.
Please read carefully through these instructions that contain important information and ensure that you understand them.
After completing the installation work, hand over this Installation Manual as well as the Owner's Manual provided with the outdoor unit to the user, and ask the user to keep them in a safe place for future reference.

Generic Denomination: Air Conditioner

Definition of Qualified Installer or Qualified Service Person
The air conditioner must be installed, maintained, repaired and removed by a qualified installer or qualified service person. When any of these jobs is to be done, ask a qualified installer or qualified service person to do them for you. A qualified installer or qualified service person is an agent who has the qualifications and knowledge described in the table below.

Agent	Qualifications and knowledge which the agent must have
Qualified installer	• The qualified installer is a person who installs, maintains, relocates and removes the air conditioners. He or she has been trained to install, maintain, relocate and remove the air conditioners he or she has been instructed in such operations by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to these operations. • The qualified installer who is allowed to do the electrical work involved in installation, relocation and removal has the qualifications pertaining to this electrical work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to electrical work on the air conditioners he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work. • The qualified installer who is allowed to do the refrigerant handling and piping work involved in installation, relocation and removal has the qualifications pertaining to this refrigerant handling and piping work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to refrigerant handling and piping work on the air conditioners he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work. • The qualified installer who is allowed to work at heights has been trained in matters relating to working at heights with the air conditioners he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work.
Qualified service person	• The qualified service person is a person who installs, repairs, maintains, relocates and removes the air conditioners. He or she has been trained to install, repair, maintain, relocate and remove the air conditioners he or she has been instructed in such operations by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to these operations. • The qualified service person who is allowed to do the electrical work involved in installation, repair, relocation and removal has the qualifications pertaining to this electrical work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to electrical work on the air conditioners he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work. • The qualified service person who is allowed to do the refrigerant handling and piping work involved in installation, repair, relocation and removal has the qualifications pertaining to this refrigerant handling and piping work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to refrigerant handling and piping work on the air conditioners he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work. • The qualified service person who is allowed to work at heights has been trained in matters relating to working at heights with the air conditioners he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work.

Definition of Protective Gear

When the air conditioner is to be transported, installed, maintained, repaired or removed, wear protective gloves and 'safety' work clothing.
In addition to such normal protective gear, wear the protective gear described below when undertaking the special work detailed in the table below.
Failure to wear the proper protective gear is dangerous because you will be more susceptible to injury, burns, electric shocks and other injuries.

Work undertaken	Protective gear worn
All types of work	Protective gloves 'Safety' working clothing
Electrical-related work	Gloves to provide protection for electricians and from heat Insulating shoes Clothing to provide protection from electric shock
Work done at heights (19.7"(50 cm) or more)	Helmets for use in industry
Transportation of heavy objects	Shoes with additional protective toe cap
Repair of outdoor unit	Gloves to provide protection for electricians and from heat

The important contents concerned to the safety are described on the product itself and on this Service Manual.
Please read this Service Manual after understanding the described items thoroughly in the following contents (Indications / Illustrated marks), and keep them.

[Explanation of indications]

Indication	Explanation
⚠ **DANGER**	Indicates contents assumed that an imminent danger causing a death or serious injury of the repair engineers and the third parties when an incorrect work has been executed.
⚠ **WARNING**	Indicates possibilities assumed that a danger causing a death or serious injury of the repair engineers, the third parties, and the users due to troubles of the product after work when an incorrect work has been executed.
⚠ **CAUTION**	Indicates contents assumed that an injury or property damage (*) may be caused on the repair engineers, the third parties, and the users due to troubles of the product after work when an incorrect work has been executed.

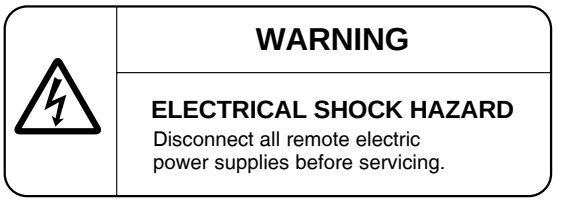
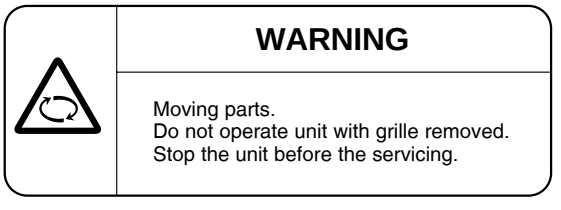
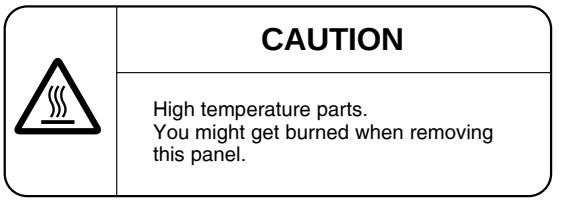
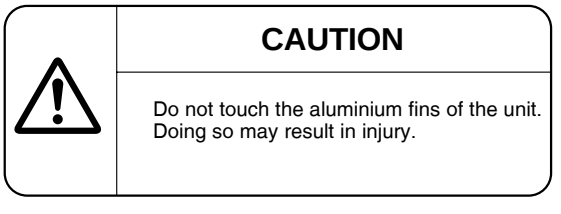
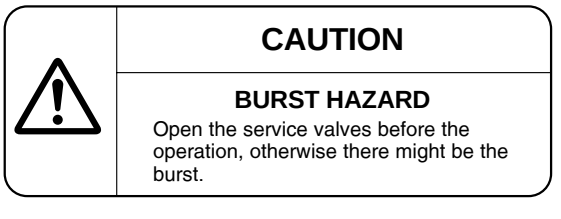
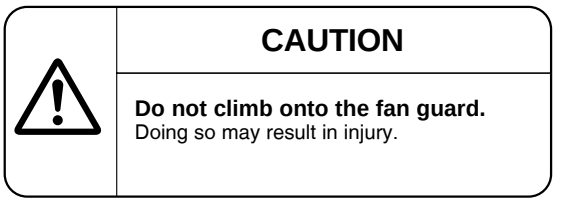
* Property damage: Enlarged damage concerned to property, furniture, and domestic animal / pet

[Explanation of illustrated marks]

Indication	Explanation
	Indicates prohibited items (Forbidden items to do) The sentences near an illustrated mark describe the concrete prohibited contents.
	Indicates mandatory items (Compulsory items to do) The sentences near an illustrated mark describe the concrete mandatory contents.
	Indicates cautions (Including danger / warning) The sentences or illustration near or in an illustrated mark describe the concrete cautious contents.

■ Warning indications on the Air Conditioner Unit

	**WARNING** (Risk of fire)	This mark is for R454B refrigerant only. Refrigerant type is written on nameplate of outdoor unit. In case that refrigerant type is R454B, this unit uses a flammable refrigerant. If refrigerant leaks and comes in contact with fire or heating part, it will create harmful gas and there is risk of fire.
	Read the OWNER'S MANUAL carefully before operation.	
	Service personnel are required to carefully read the OWNER'S MANUAL and INSTALLATION MANUAL before operation.	
	Further information is available in the OWNER'S MANUAL, INSTALLATION MANUAL, and the like.	

Warning indication	Description
	**WARNING** **ELECTRICAL SHOCK HAZARD** Disconnect all remote electric power supplies before servicing.
	**WARNING** Moving parts. Do not operate unit with grille removed. Stop the unit before the servicing.
	**CAUTION** High temperature parts. You might get burned when removing this panel.
	**CAUTION** Do not touch the aluminium fins of the unit. Doing so may result in injury.
	**CAUTION** **BURST HAZARD** Open the service valves before the operation, to avoid unnecessary pressure built up which could lead to explosion.
	**CAUTION** **Do not climb onto the fan guard.** Doing so may result in injury.

PRECAUTIONS FOR SAFETY

The manufacturer shall not assume any liability for the damage caused by not observing the description of this manual.

⚠ DANGER

 Turn off braeaker	Before carrying out the installation, maintenance, repair or removal work, be sure to set the circuit breaker for both the indoor and outdoor units to the OFF position. Otherwise, electric shocks may result.
	Before opening the electrical box cover of the indoor unit or service panel of the outdoor unit, set the circuit breaker to the OFF position. Failure to set the circuit breaker to the OFF position may result in electric shocks through contact with the interior parts. Only a qualified installer or qualified service person is allowed to remove the intake grille of the indoor unit or service panel of the outdoor unit and do the work required.
	Before starting to repair the outdoor unit fan or fan guard, be absolutely sure to set the circuit breaker to the OFF position, and place a “Work in progress” sign on the circuit breaker.
	When cleaning the filter or other parts of the indoor unit, set the circuit breaker to OFF without fail, and place a “Work in progress” sign near the circuit breaker before proceeding with the work.
	When you have noticed that some kind of trouble (such as when an error display has appeared, there is a smell of burning, abnormal sounds are heard, the air conditioner fails to cool or heat or water is leaking) has occurred in the air conditioner, do not touch the air conditioner yourself but set the circuit breaker to the OFF position, and contact a qualified service person. Take steps to ensure that the power will not be turned on (by marking “out of service” near the circuit breaker, for instance) until qualified service person arrives. Continuing to use the air conditioner in the trouble status may cause mechanical problems to escalate or result in electric shocks or other failure.
 Electric shock hazard	When you access inside of the service panel to repair electric parts, wait for about five minutes after turning off the breaker. Do not start repairing immediately. Otherwise you may get electric shock by touching terminals of high-voltage capacitors. Natural discharge of the capacitor takes about five minutes.
	When checking the electric parts, removing the cover of the electric parts box of Indoor Unit and/or service panel of Outdoor Unit inevitably to determine the failure, use gloves to provide protection for electricians, insulating shoes, clothing to provide protection from electric shock and insulating tools. Be careful not to touch the live part. Electric shock may result. Only “Qualified service person” is allowed to do this work.
 Prohibition	Place a “Work in progress” sign near the circuit breaker while the installation, maintenance, repair or removal work is being carried out. There is a danger of electric shocks if the circuit breaker is set to ON by mistake.
	When checking the electric parts, removing the cover of the electric parts box of Indoor Unit and/or front panel of Outdoor Unit inevitably to determine the failure, put a sign “Do not enter” around the site before the work. Failure to do this may result in third person getting electric shock.
	Before operating the air conditioner after having completed the work, check that the electrical parts box cover of the indoor unit and service panel of the outdoor unit are closed, and set the circuit breaker to the ON position. You may receive an electric shock if the power is turned on without first conducting these checks.
 Stay on protection	If, in the course of carrying out repairs, it becomes absolutely necessary to check out the electrical parts with the electrical parts box cover of one or more of the indoor units and the service panel of the outdoor unit removed in order to find out exactly where the trouble lies, wear insulated heat-resistant gloves, insulated boots and insulated work overalls, and take care to avoid touching any live parts. You may receive an electric shock if you fail to heed this warning. Only qualified service person is allowed to do this kind of work.

⚠ WARNING

General	Before starting to repair the air conditioner, read carefully through the Service Manual, and repair the air conditioner by following its instructions.
	Only qualified service person is allowed to repair the air conditioner. Repair of the air conditioner by unqualified person may give rise to a fire, electric shocks, injury, water leaks and / or other problems.
	Do not use any refrigerant different from the one specified for complement or replacement. Otherwise, abnormally high pressure may be generated in the refrigeration cycle, which may result in a failure or explosion of the product or an injury to your body.
	Only a qualified installer or qualified service person is allowed to carry out the electrical work of the air conditioner. Under no circumstances must this work be done by an unqualified individual since failure to carry out the work properly may result in electric shocks and / or electrical leaks.
	When the air conditioner is to be transported, installed, maintained, repaired or removed, wear protective gloves and 'safety' work clothing.
	To connect the electrical wires, repair the electrical parts or undertake other electrical jobs, wear gloves to provide protection for electricians, insulating shoes and clothing to provide protection from electric shocks. Failure to wear this protective gear may result in electric shocks.
	Electrical wiring work shall be conducted according to law and regulation in the community and installation manual. Failure to do so may result in electrocution or short circuit.
	Use wiring that meets the specifications in the Installation Manual and the stipulations in the local regulations and laws. Use of wiring which does not meet the specifications may give rise to electric shocks, electrical leakage, smoking and/or a fire.
	Only a qualified installer or qualified service person is allowed to undertake work at heights using a stand of (19.7"(50 cm)) or more or to remove the intake grille of the indoor unit to undertake work.
	When working at heights, use a ladder which complies with the ISO 14122 standard, and follow the procedure in the ladder's instructions. Also wear a helmet for use in industry as protective gear to undertake the work.
	Before working at heights, put a sign in place so that no-one will approach the work location, before proceeding with the work. Parts and other objects may fall from above, possibly injuring a person below. While carrying out the work, wear a helmet for protection from falling objects.
	When executing address setting, test run, or troubleshooting through the checking window on the electric parts box, put on insulated gloves to provide protection from electric shock. Otherwise you may receive an electric shock.
	Do not touch the aluminum fin of the outdoor unit. You may injure yourself if you do so. If the fin must be touched for some reason, first put on protective gloves and safety work clothing, and then proceed.
	Do not climb onto or place objects on top of the outdoor unit. You may fall or the objects may fall off of the outdoor unit and result in injury.
	Use forklift to carry in the air conditioner units and use winch or hoist at installation of them.
	When transporting the air conditioner, wear shoes with protective toe caps, protective gloves and other protective clothing.
	When transporting the air conditioner, do not take hold of the bands around the packing carton. You may injure yourself if the bands should break.
	Be sure that a heavy unit (22lbs(10 kg) or heavier) such as a compressor is carried by two persons.
	This air conditioner has passed the pressure test as specified in UL 60335-2-40 Annex EE.
Check earth wires.	Before troubleshooting or repair work, check the earth wire is connected to the earth terminals of the main unit, otherwise an electric shock is caused when a leak occurs. If the earth wire is not correctly connected, contact an electric engineer for rework.
	After completing the repair or relocation work, check that the ground wires are connected properly.
	Be sure to connect earth wire. (Grounding work) Incomplete grounding causes an electric shock. Do not connect ground wires to gas pipes, water pipes, and lightning rods or ground wires for telephone wires.

 Prohibition of modification.	Do not modify the products. Do not also disassemble or modify the parts. It may cause a fire, electric shock or injury.
 Use specified parts.	When any of the electrical parts are to be replaced, ensure that the replacement parts satisfy the specifications given in the Service Manual (or use the parts contained on the parts list in the Service Manual). Use of any parts which do not satisfy the required specifications may give rise to electric shocks, smoking and / or a fire.
 Do not bring a child close to the equipment.	If, in the course of carrying out repairs, it becomes absolutely necessary to check out the electrical parts with the electrical parts box cover of one or more of the indoor units and the service panel of the outdoor unit removed in order to find out exactly where the trouble lies, put a sign in place so that no-one will approach the work location before proceeding with the work. Third-party individuals may enter the work site and receive electric shocks if this warning is not heeded.
 Insulating measures	Connect the cut-off lead wires with crimp contact, etc., put the closed end side upward and then apply a watercut method, otherwise a leak or production of fire is caused at the users' side.
 No fire	When performing repairs using a gas burner, replace the refrigerant with nitrogen gas because the oil that coats the pipes may otherwise burn. When repairing the refrigerating cycle, take the following measures. 1) Be attentive to fire around the cycle. When using a gas stove, etc., be sure to put out fire before work; otherwise the oil mixed with refrigerant gas may catch fire. 2) Do not use a welder in the closed room. When using it without ventilation, carbon monoxide poisoning may be caused. 3) Do not bring inflammables close to the refrigerant cycle, otherwise fire of the welder may catch the inflammables.
 Refrigerant	The refrigerant used by this air conditioner is the R454B.
	Check the used refrigerant name and use tools and materials of the parts which match with it. For the products which use R454B refrigerant, the refrigerant name is indicated at a position on the outdoor unit where is easy to see.
	Do not use any refrigerant different from the one specified for complement or replacement. Otherwise, abnormally high pressure may be generated in the refrigeration cycle, which may result in a failure or explosion of the product or an injury to your body.
	For an air conditioner which uses R454B, never use other refrigerant than R454B. For an air conditioner which uses other refrigerant (R22, etc.), never use R454B. If different types of refrigerant are mixed, abnormal high pressure generates in the refrigerating cycle and an injury due to breakage may be caused.
	When the air conditioner has been installed or relocated, follow the instructions in the Installation Manual and purge the air completely so that no gases other than the refrigerant will be mixed in the refrigerating cycle. Failure to purge the air completely may cause the air conditioner to malfunction.
	Do not charge refrigerant additionally. If charging refrigerant additionally when refrigerant gas leaks, the refrigerant composition in the refrigerating cycle changes resulted in change of air conditioner characteristics or refrigerant over the specified standard amount is charged and an abnormal high pressure is applied to the inside of the refrigerating cycle resulted in cause of breakage or injury. Therefore if the refrigerant gas leaks, recover the refrigerant in the air conditioner, execute vacuuming, and then newly recharge the specified amount of liquid refrigerant. In this time, never charge the refrigerant over the specified amount.
	When recharging the refrigerant in the refrigerating cycle, do not mix the refrigerant or air other than R454B into the specified refrigerant. If air or others is mixed with the refrigerant, abnormal high pressure generates in the refrigerating cycle resulted in cause of injury due to breakage.
	After installation work, check the refrigerant gas does not leak. If the refrigerant gas leaks in the room, poisonous gas generates when gas touches to fire such as fan heater, stove or cocking stove though the refrigerant gas itself is innocuous.
	Never recover the refrigerant into the outdoor unit. When the equipment is moved or repaired, be sure to recover the refrigerant with recovering device. The refrigerant cannot be recovered in the outdoor unit; otherwise a serious accident such as breakage or injury is caused.

 Assembly / Wiring	After repair work, surely assemble the disassembled parts, and connect and lead the removed wires as before. Perform the work so that the cabinet or panel does not catch the inner wires. If incorrect assembly or incorrect wire connection was done, a disaster such as a leak or fire is caused at user's side.
 Insulator check	After the work has finished, be sure to use an insulation tester set (500 V Megger) to check the resistance is 1 MΩ or more between the charge section and the non-charge metal section (Earth position). If the resistance value is low, a disaster such as a leak or electric shock is caused at user's side.
 Ventilation	When the refrigerant gas leaks during work, execute ventilation. If the refrigerant gas touches to a fire, poisonous gas generates. A case of leakage of the refrigerant and the closed room full with gas is dangerous because a shortage of oxygen occurs. Be sure to execute ventilation.
	If refrigerant gas has leaked during the installation work, ventilate the room immediately. If the leaked refrigerant gas comes in contact with fire, noxious gas may generate.
	After installation work, check the refrigerant gas does not leak. If the refrigerant gas leaks in the room, poisonous gas generates when gas touches to fire such as fan heater, stove or cocking stove though the refrigerant gas itself is innocuous.
 Compulsion	When the refrigerant gas leaks, find up the leaked position and repair it surely. If the leaked position cannot be found up and the repair work is interrupted, pump-down and tighten the service valve, otherwise the refrigerant gas may leak into the room. The poisonous gas generates when gas touches to fire such as fan heater, stove or cocking stove though the refrigerant gas itself is innocuous. When installing equipment which includes a large amount of charged refrigerant such as a multi air conditioner in a sub-room, it is necessary that the density does not the limit even if the refrigerant leaks. If the refrigerant leaks and exceeds the limit density, an accident of shortage of oxygen is caused.
	Tighten the flare nut with a torque wrench in the specified manner. Excessive tighten of the flare nut may cause a crack in the flare nut after a long period, which may result in refrigerant leakage.
	Nitrogen gas must be used for the airtight test.
	The charge hose must be connected in such a way that it is not slack.
	For the installation / moving / reinstallation work, follow to the Installation Manual. If an incorrect installation is done, a trouble of the refrigerating cycle, water leak, electric shock or fire is caused.
 Check after repair	Once the repair work has been completed, check for refrigerant leaks, and check the insulation resistance and water drainage. Then perform a trial run to check that the air conditioner is running properly.
	After repair work has finished, check there is no trouble. If check is not executed, a fire, electric shock or injury may be caused. For a check, turn off the power breaker.
	After repair work (installation of front panel and cabinet) has finished, execute a test run to check there is no generation of smoke or abnormal sound. If check is not executed, a fire or an electric shock is caused. Before test run, install the front panel and cabinet.
	Be sure to fix the screws back which have been removed for installation or other purposes.
 Do not operate the unit with the valve closed.	Check the following matters before a test run after repairing piping. • Connect the pipes surely and there is no leak of refrigerant. • The valve is opened. Running the compressor under condition that the valve closes causes an abnormal high pressure resulted in damage of the parts of the compressor and etc. and moreover if there is leak of refrigerant at connecting section of pipes, the air is sucked and causes further abnormal high pressure resulted in burst or injury.
 Check after reinstallation	Only a qualified installer or qualified service person is allowed to relocate the air conditioner. It is dangerous for the air conditioner to be relocated by an unqualified individual since a fire, electric shocks, injury, water leakage, noise and / or vibration may result.
	Check the following items after reinstallation. 1) The earth wire is correctly connected. 2) The power cord is not caught in the product. 3) There is no inclination or unsteadiness and the installation is stable. If check is not executed, a fire, an electric shock or an injury is caused.
	When carrying out the pump-down work shut down the compressor before disconnecting the refrigerant pipe. Disconnecting the refrigerant pipe with the service valve left open and the compressor still operating will cause air, etc. to be sucked in, raising the pressure inside the refrigeration cycle to an abnormally high level, and possibly resulting in reputing, injury, etc.

 Cooling check	When the service panel of the outdoor unit is to be opened in order for the compressor or the area around this part to be repaired immediately after the air conditioner has been shut down, set the circuit breaker to the OFF position, and then wait at least 10 minutes before opening the service panel. If you fail to heed this warning, you will run the risk of burning yourself because the compressor pipes and other parts will be very hot to the touch. In addition, before proceeding with the repair work, wear the kind of insulated heat-resistant gloves designed to protect electricians.
	Take care not to get burned by compressor pipes or other parts when checking the cooling cycle while running the unit as they get heated while running. Be sure to put on gloves providing protection for heat.
	When the service panel of the outdoor unit is to be opened in order for the fan motor, reactor, inverter or the areas around these parts to be repaired immediately after the air conditioner has been shut down, set the circuit breaker to the OFF position, and then wait at least 10 minutes before opening the service panel. If you fail to heed this warning, you will run the risk of burning yourself because the fan motor, reactor, inverter heat sink and other parts will be very hot to the touch. In addition, before proceeding with the repair work, wear the kind of insulated heat-resistant gloves designed to protect electricians.
 Installation	Only a qualified installer or service person is allowed to do installation work. Inappropriate installation may result in water leakage, electric shock or fire.
	Before starting to install the air conditioner, read carefully through the Installation Manual, and follow its instructions to install the air conditioner.
	Be sure to use the company-specified products for the separately purchased parts. Use of non-specified products may result in fire, electric shock, water leakage or other failure. Have the installation performed by a qualified installer.
	Do not supply power from the power terminal block equipped on the outdoor unit to another outdoor unit. Capacity overflow may occur on the terminal block and may result in fire.
	Do not install the air conditioner in a location that may be subject to a risk of expire to a combustible gas. If a combustible gas leaks and becomes concentrated around the unit, a fire may occur.
	Install the indoor unit at least 8'2"(2.5 m) above the floor level since otherwise the users may injure themselves or receive electric shocks if they poke their fingers or other objects into the indoor unit while the air conditioner is running.
	Install a circuit breaker that meets the specifications in the installation manual and the stipulations in the local regulations and laws.
	Install the circuit breaker where it can be easily accessed by the qualified service person.
	If you install the unit in a small room, take appropriate measures to prevent the refrigerant from exceeding the limit concentration even if it leaks. Consult the dealer from whom you purchased the air conditioner when you implement the measures. Accumulation of highly concentrated refrigerant may cause an oxygen deficiency accident.
	Do not place any combustion appliance in a place where it is directly exposed to the wind of air conditioner, otherwise it may cause imperfect combustion.

Explanations given to user

If you have discovered that the fan grille is damaged, do not approach the outdoor unit but set the circuit breaker to the OFF position, and contact a qualified service person to have the repairs done.
Do not set the circuit breaker to the ON position until the repairs are completed.

Relocation

- Only a qualified installer or qualified service person is allowed to relocate the air conditioner.
  It is dangerous for the air conditioner to be relocated by an unqualified individual since a fire, electric shocks, injury, water leakage, noise and / or vibration may result.
- When carrying out the pump-down work shut down the compressor before disconnecting the refrigerant pipe.
  Disconnecting the refrigerant pipe with the service valve left open and the compressor still operating will cause air, etc. to be sucked in, raising the pressure inside the refrigeration cycle to an abnormally high level, and possibly resulting in reputing, injury, etc.

• Refrigerant (R454B)

This air conditioner adopts HFC type refrigerant (R454B) which does not deplete the ozone layer.

1. Safety Caution Concerned to Refrigerant

The pressure of R454B is higher than of that of the former refrigerant (R22).

Accompanied with change of refrigerant, the refrigerating oil has been also changed.

Therefore, be sure that water, dust, the former refrigerant or the former refrigerating oil is not mixed into the refrigerating cycle of the air conditioner with refrigerant during installation work or service work.

If an incorrect work or incorrect service is performed, there is a possibility to cause a serious accident. Use the tools and materials exclusive to R454B to purpose a safe work.

2. Cautions on Installation/Service

1) Do not mix the other refrigerant or refrigerating oil.
   For the tools exclusive to R454B, shapes of all the joints including the service port differ from those of the former refrigerant in order to prevent mixture of them.
2) As the use pressure of the refrigerant is high, use material thickness of the pipe and tools which are specified for R454B.
3) In the installation time, use clean pipe materials and work with great attention so that water and others do not mix in because pipes are affected by impurities such as water, oxide scales, oil, etc.
   Use the clean pipes.
   Be sure to brazing with flowing nitrogen gas. (Never use gas other than nitrogen gas.)
4) For the earth protection, use a vacuum pump for air purge.
5) R454B refrigerant is azeotropic mixture type refrigerant.
   Therefore use liquid type to charge the refrigerant. (If using gas for charging, composition of the refrigerant changes and then characteristics of the air conditioner change.)

3. Pipe Materials

For the refrigerant pipes, copper pipe and joints are mainly used.

It is necessary to select the most appropriate pipes to conform to the standard.

Use clean material in which impurities adhere inside of pipe or joint to a minimum.

1) Copper pipe

<Piping>

The pipe thickness, flare finishing size, flare nut and others differ according to a refrigerant type.
When using a long copper pipe for R454B, it is recommended to select “Copper or copper-base pipe without seam” and one with bonded oil amount 0.0001/lbs 32'10" (40mg/10m) or less.

Also do not use crushed, deformed, discolored (especially inside) pipes.(Impurities cause clogging of expansion valves and capillary tubes.)

<Flare nut>

Use the flare nuts which are attached to the air conditioner unit.

2) Joint

The flare joint and socket joint are used for joints of the copper pipe.

The joints are rarely used for installation of the air conditioner. However clear impurities when using them.

4. Tools

1. Required Tools for R454B
   Mixing of different types of oil may cause a trouble such as generation of sludge, clogging of capillary, etc. Accordingly, the tools to be used are classified into the following three types.
   1) Tools exclusive for R454B (Those which cannot be used for conventional refrigerant (R22))
   2) Tools exclusive for R454B, but can be also used for conventional refrigerant (R22)
   3) Tools commonly used for R454B and for conventional refrigerant (R22)

   The table below shows the tools exclusive for R454B and their interchangeability.
   4) Joint preparation are recommend to double-flare fitting accordance to ASHRAE15 requirements.

Tools exclusive for R454B (The following tools for R454B are required.)

Tools whose specifications are changed for R454B and their interchangeability

No.	Used tool	Usage	R454B air conditioner installation		Conventional air conditioner installation
			Existence of new equipment for R454B	Whether conventional equipment can be used	Whether conventional equipment can be used
①	Flare tool	Pipe flaring	Yes	∗(Note)	Yes
②	Copper pipe gauge for adjusting projection margin	Flaring by conventional flare tool	Yes	∗(Note)	∗(Note)
③	Torque wrench	Tightening of flare nut	Yes	No	No
④	Gauge manifold	Evacuating, refrigerant charge, run check, etc.	Yes	No	No
⑤	Charge hose				
⑥	Vacuum pump adapter	Vacuum evacuating	Yes	No	Yes
⑦	Electronic balance for refrigerant charging	Refrigerant charge	Yes	Yes	Yes
⑧	Leakage detector	Gas leakage check	Yes	No	Yes

(Note) When flaring is carried out for R454B using the conventional flare tools, adjustment of projection margin is necessary. For this adjustment, a copper pipe gauge, etc. are necessary.

General tools (Conventional tools can be used.)

In addition to the above exclusive tools, the following equipments which serve also for R22 are necessary as the general tools.

1) Vacuum pump. Use vacuum pump by attaching vacuum pump adapter.
2) Torque wrench
3) Pipe cutter
4) Reamer
5) Pipe bender
6) Level vial
7) Screwdriver (+, –)
8) Spanner or Monkey wrench
9) Hole core drill
10) Hexagon wrench (Opposite side 0.2"(4mm))
11) Tape measure
12) Metal saw

Also prepare the following equipments for other installation method and run check.

1) Clamp meter
2) Thermometer
3) Insulation resistance tester (Megger)
4) Electroscope

1. SPECIFICATIONS

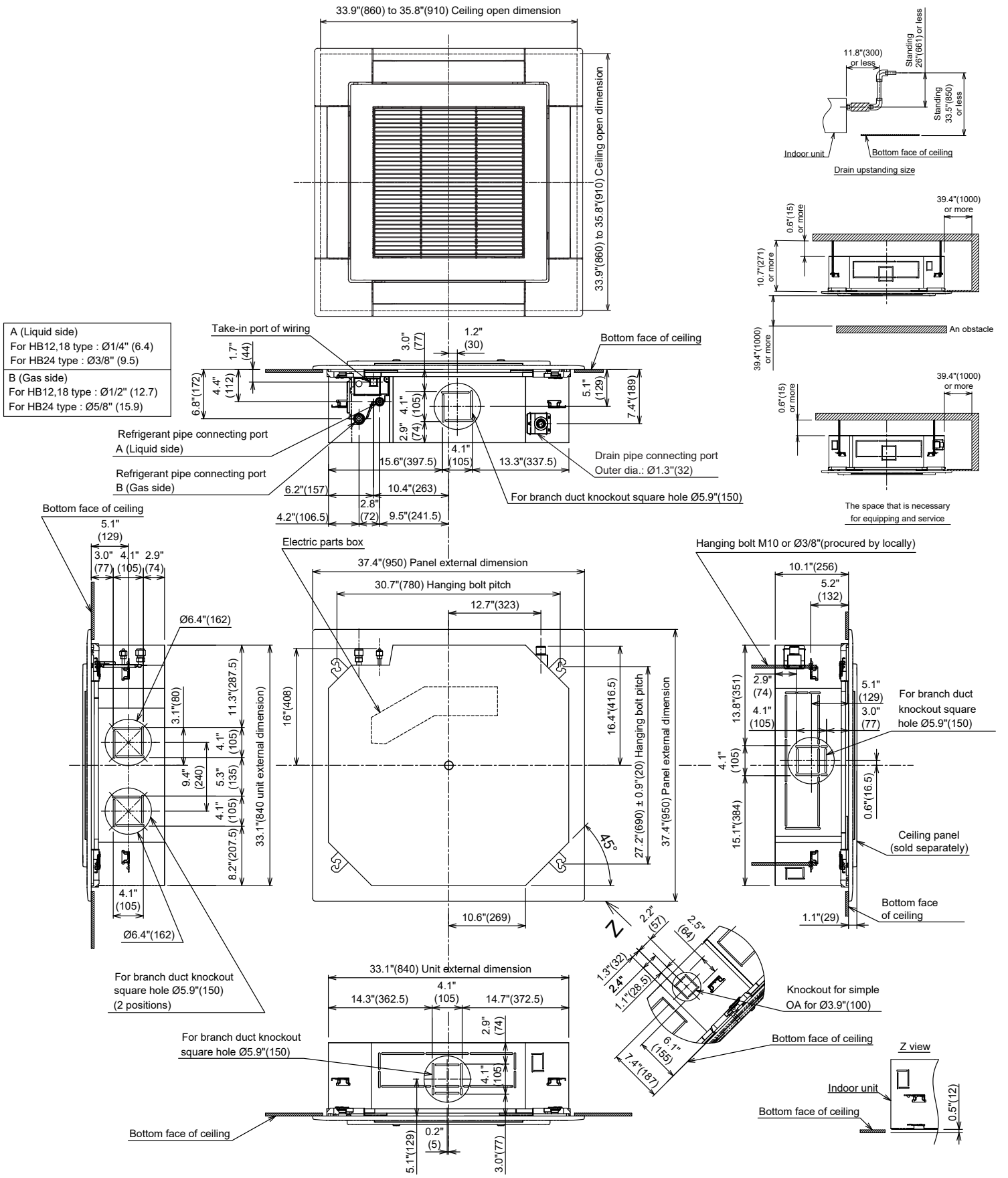
4Way Cassette type

System	Size			012	018	024	030	036	042	048
	Indoor Model		RAV-	HB121UTP-UL	HB181UTP-UL	HB241UTP-UL	HB301UTP-UL	HB361UTP-UL	HB421UTP-UL	HB481UTP-UL
	Outdoor Model		RAV-	BP121AT2P-UL	BP181AT2P-UL	BP241AT2P-UL	BP301AT2P-UL	BP361AT2P-UL	BP421AT2P-UL	BP481AT2P-UL
Performance	Cooling Rated Capacity (Btu/h)			12000	18000	24000	30000	36000	42000	48000
	SEER2			26.0	25.50	24.2	24.5	24.8	22.60	22.40
	EER2			16.0	13.6	13.8	14.1	13.40	12.00	10.60
	Heating Rated Capacity (Btu/h)			14000	20000	27000	34000	40000	47000	54000
	HSPF2			12.0	11.30	11.1	11.8	11.3	11.2	10.8
	COP2			16.0	13.6	12.6	14.2	13.0	12.0	10.9
Operating Range	Cooling	Indoor Min - Max DB (^{o}F)		70 to 89	70 to 89	70 to 89	70 to 89	70 to 89	70 to 89	70 to 89
		Outdoor Min - Max DB (^{o}F)		5 to 115	5 to 115	5 to 115	5 to 115	5 to 115	5 to 115	5 to 115
		Outdoor Min - Max DB (^{o}F) with wind buffels		5 to 115	5 to 115	5 to 115	-13 to 115	-13 to 115	-13 to 115	-13 to 115
	Heating	Indoor Min - Max DB (^{o}F)		59 to 86	59 to 86	59 to 86	59 to 86	59 to 86	59 to 86	59 to 86
		Outdoor Min - Max DB (^{o}F)		-13 to 59	-13 to 59	-13 to 59	-13 to 59	-13 to 59	-13 to 59	-13 to 59
Piping	Standard Piping Length		(ft)	24'7''	24'7''	24'7''	24'7''	24'7''	24'7''	24'7''
	Min. Piping Length		(ft)	16'5''	16'5''	16'5''	16'5''	16'5''	16'5''	16'5''
	Max. Piping Length		(ft)	164'1"	164'1"	164'1"	246'1"	246'1"	246'1"	246'1"
	Lift (Outdoor below Indoor)		(ft)	98'5"	98'5"	98'5"	98'5"	98'5"	98'5"	98'5"
	Lift (Outdoor above Indoor)		(ft)	98'5"	98'5"	98'5"	98'5"	98'5"	98'5"	98'5"
	Gas Pipe (size/connection type)			1/2"	1/2"	5/8"	5/8"	5/8"	5/8"	5/8"
	Liquid Pipe (size/connection type)			1/4"	1/4"	3/8"	3/8"	3/8"	3/8"	3/8"
	Additional refrigerant charge under long piping connection			0.22oz/ft (65'7" to 164'1")	0.22oz/ft (65'7" to 164'1")	0.376oz/ft (98'5" to 164'1")	0.376oz/ft (98'5" to 246'1")	0.376oz/ft (98'5" to 246'1")	0.376oz/ft (98'5" to 246'1")	0.376oz/ft (98'5" to 246'1")
Electrical	Voltage				1Ph, 208-230V ~ 60Hz.					
	Cooling Power Consumption		(W)	750	1324	1739	2128	2687	3500	4530
	Cooling Running Current		(A)	3.44	5.88	8.04	10.05	12.43	16.0	20.5
	Heating Power Consumption		(W)	875	1475	2140	2400	3080	3930	4970
	Heating Running Current		(A)	3.92	6.55	9.90	11.22	14.25	18.00	22.20
	Minimum Current Amps		(A)	14	14	17	31	31	31	31
	Maximum Overcurrent Protection Device Amps		(A)	20	20	25	40	40	40	40
	Breaker		(A)	15	15	20	32	32	32	32
Outdoor	Dimensions	Height	(in)	21.7	21.7	35.0	52.8	52.8	52.8	52.8
		Width	(in)	30.7	30.7	35.4	35.4	35.4	35.4	35.4
		Depth	(in)	11.4	11.4	12.6	12.6	12.6	12.6	12.6
	Weight-Net/Gross		(lbs)	82/89	82/89	60/65	218/232	218/232	234/247	234/247
	Refrigerant charged		(lbs)	3.31	3.31	4.63	5.84	5.84	6.61	6.61
Indoor	Dimensions	Height	(in)	10.1	10.1	10.1	12.6	12.6	12.6	12.6
		Width	(in)	33.1	33.1	33.1	33.1	33.1	33.1	33.1
		Depth	(in)	33.1	33.1	33.1	33.1	33.1	33.1	33.1
	Weight-Net/Gross		(lbs)	46/55	46/55	46/55	55/66	55/66	55/66	55/66
	Sound Pressure at Different Speed (H/M/L)		(dBA)	35/33/31	38/33/31	41/37/34	43/38/34	45/39/35	46/40/36	48/44/41
	Air flow DRY (H/M/L)		(CFM)	550/480/440	670/540/470	730/630/510	1150/840/630	1200/850/650	1250/870/650	1300/1080/880
Grille	Model name			RBC-U32PGP-UL	RBC-U32PGP-UL	RBC-U32PGP-UL	RBC-U32PGP-UL	RBC-U32PGP-UL	RBC-U32PGP-UL	RBC-U32PGP-UL
	Dimensions	Height	(in)	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Width	(in)	37.4	37.4	37.4	37.4	37.4	37.4	37.4
		Depth	(in)	37.4	37.4	37.4	37.4	37.4	37.4	37.4
	Weight-Net/Gross		(lbs)	10/16	10/16	10/16	10/16	10/16	10/16	10/16

2. DIMENSIONAL DRAWING

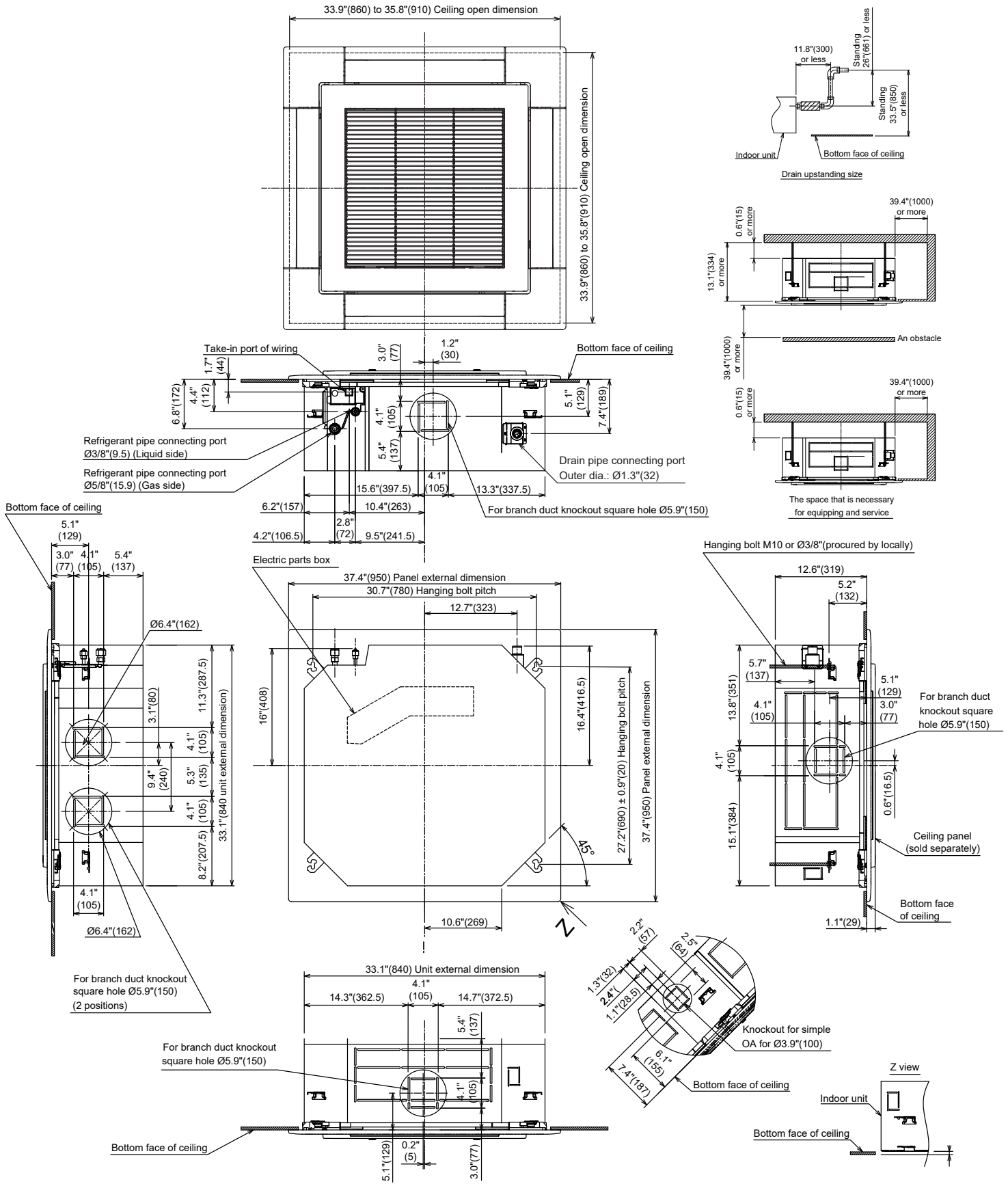
RAV-HB121UTP-UL, RAV-HB181UTP-UL, RAV-HB241UTP-UL

Unit : in (mm)



RAV-HB301UTP-UL, RAV-HB361UTP-UL, RAV-HB421UTP-UL, RAV-HB481UTP-UL

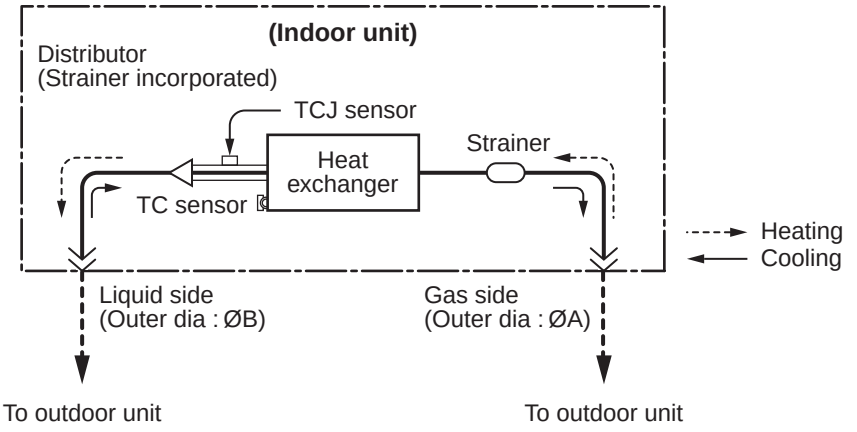
Unit : in (mm)



3. SYSTEMATIC REFRIGERATING CYCLE DIAGRAM

Indoor Unit

- **Single type (Combination of 1 indoor unit and 1 outdoor unit)**



Dimension table

Unit : in (mm)

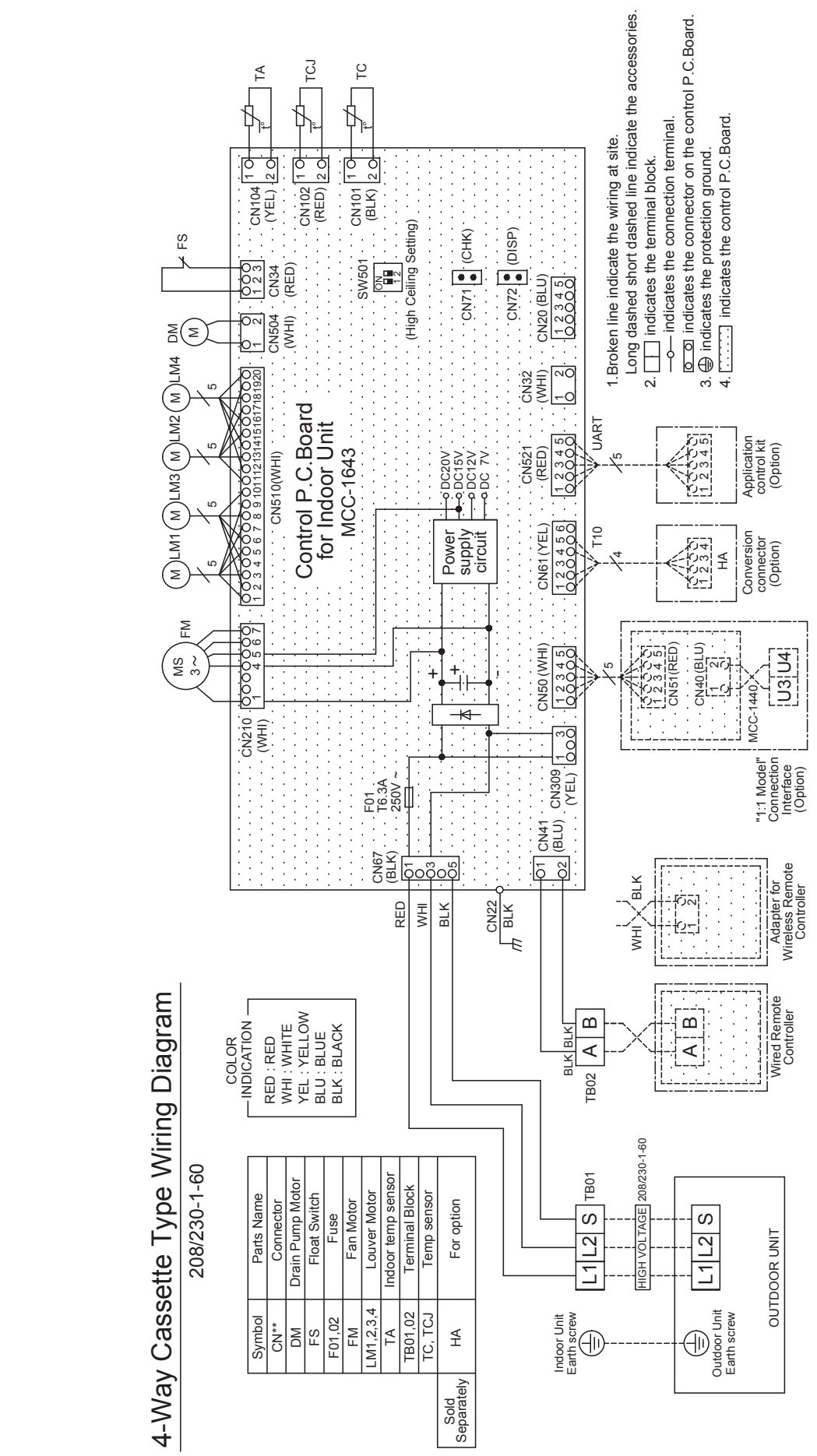
Indoor unit	Outer diameter of refrigerant pipe	
	Gas side ØA	Liquid side ØB
HB12, 18 type	1/2"(12.7)	1/4"(6.4)
HB24, 30, 36, 42, 48 type	5/8"(15.9)	3/8"(9.5)

Capillary tube specifications

Unit : in (mm)

Model RAV-HB∗∗∗UTP	Inner dia. × Length × Q'ty
HB12,18 type	Ø0.1"(2) × 9.8"(250) × 2 Ø0.1"(2) × 13.8"(350) × 1 Ø0.1"(2) × 27.5"(700) × 1
HB24 type	Ø0.1"(2) × 9.8"(250) × 3 Ø0.1"(2) × 19.7"(500) × 1
HB30,36,42,48 type	Ø0.1"(2) × 7.9"(200) × 1 Ø0.1"(2) × 11.8"(300) × 2 Ø0.1"(2) × 13.8"(350) × 2 Ø0.1"(2) × 27.5"(700) × 1

4. WIRING DIAGRAM



5. SPECIFICATIONS OF ELECTRICAL PARTS

Indoor Unit

RAV-HB121UTP-UL, RAV-HB181UTP-UL, RAV-HB241UTP-UL

No.	Parts name	Type	Specifications
1	Fan motor	LDF-340-60AA1	Output (Rated) 60 W
2	Thermo. sensor (TA-sensor)	12.9" (328 mm)	10 kΩ at 77°F(25°C)
3	Heat exchanger sensor (TCJ-sensor)	Ø0.24"(6mm), 39.4" (1000mm)	10 kΩ at 77°F(25°C)
4	Heat exchanger sensor (TC-sensor)	Ø0.24"(6mm), 39.4" (1000mm)	10 kΩ at 77°F(25°C)
5	Float switch	FS-1A-31-3	—
6	Drain pump motor	MDP-1401	—

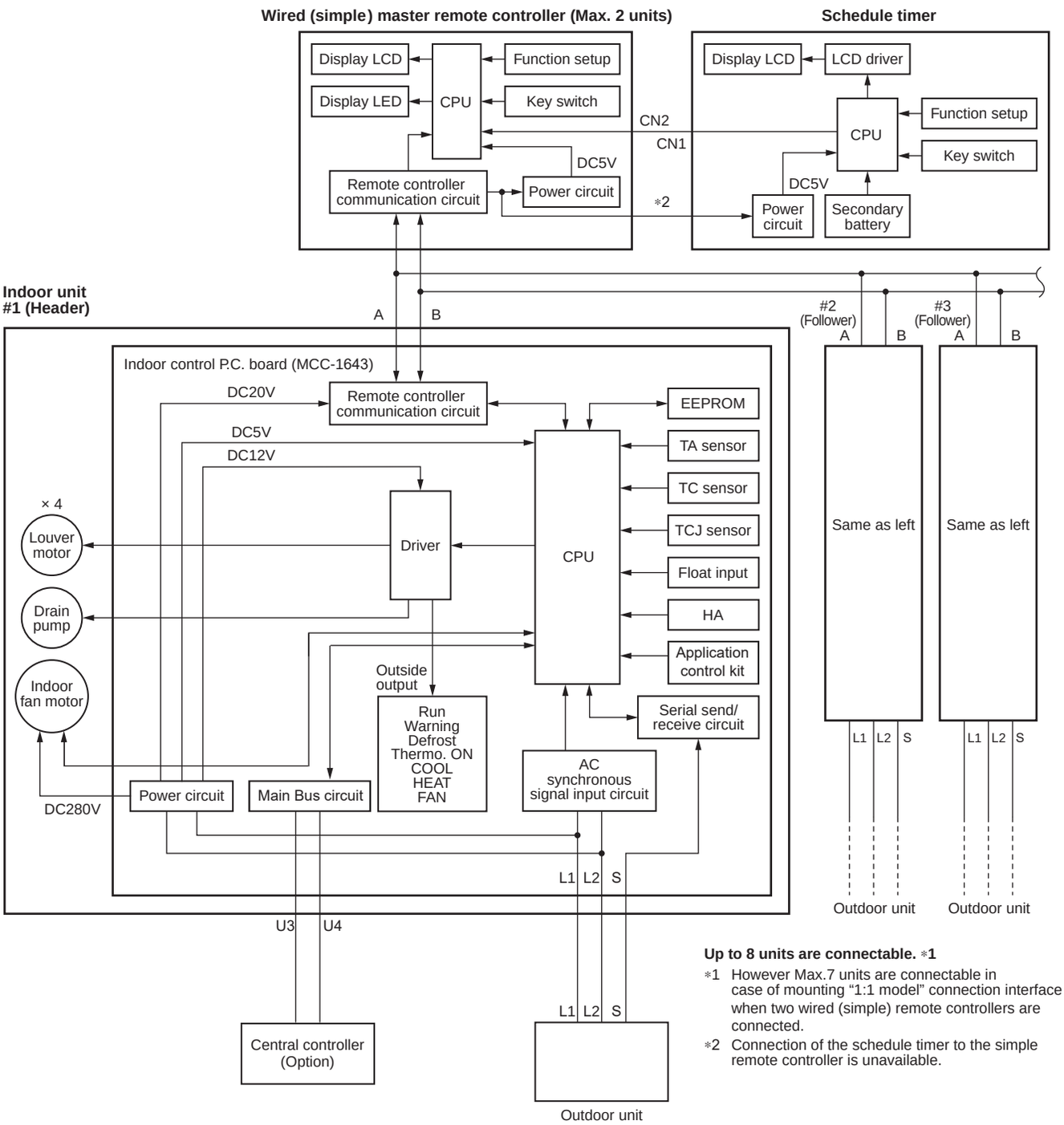
RAV-HB301UTP-UL, RAV-HB361UTP-UL, RAV-HB421UTP-UL, RAV-HB481UTP-UL

No.	Parts name	Type	Specifications
1	Fan motor	LDF-340-130AA1	Output (Rated) 130 W
2	Thermo. sensor (TA-sensor)	12.9" (328 mm)	10 kΩ at 77°F(25°C)
3	Heat exchanger sensor (TCJ-sensor)	Ø0.24"(6mm), 39.4" (1000mm)	10 kΩ at 77°F(25°C)
4	Heat exchanger sensor (TC-sensor)	Ø0.24"(6mm), 39.4" (1000mm)	10 kΩ at 77°F(25°C)
5	Float switch	FS-1A-31-3	—
6	Drain pump motor	MDP-1401	—

6. INDOOR CONTROL CIRCUIT

6-1. Indoor Controller Block Diagram

Connection of Wired (Simple) Remote Controller



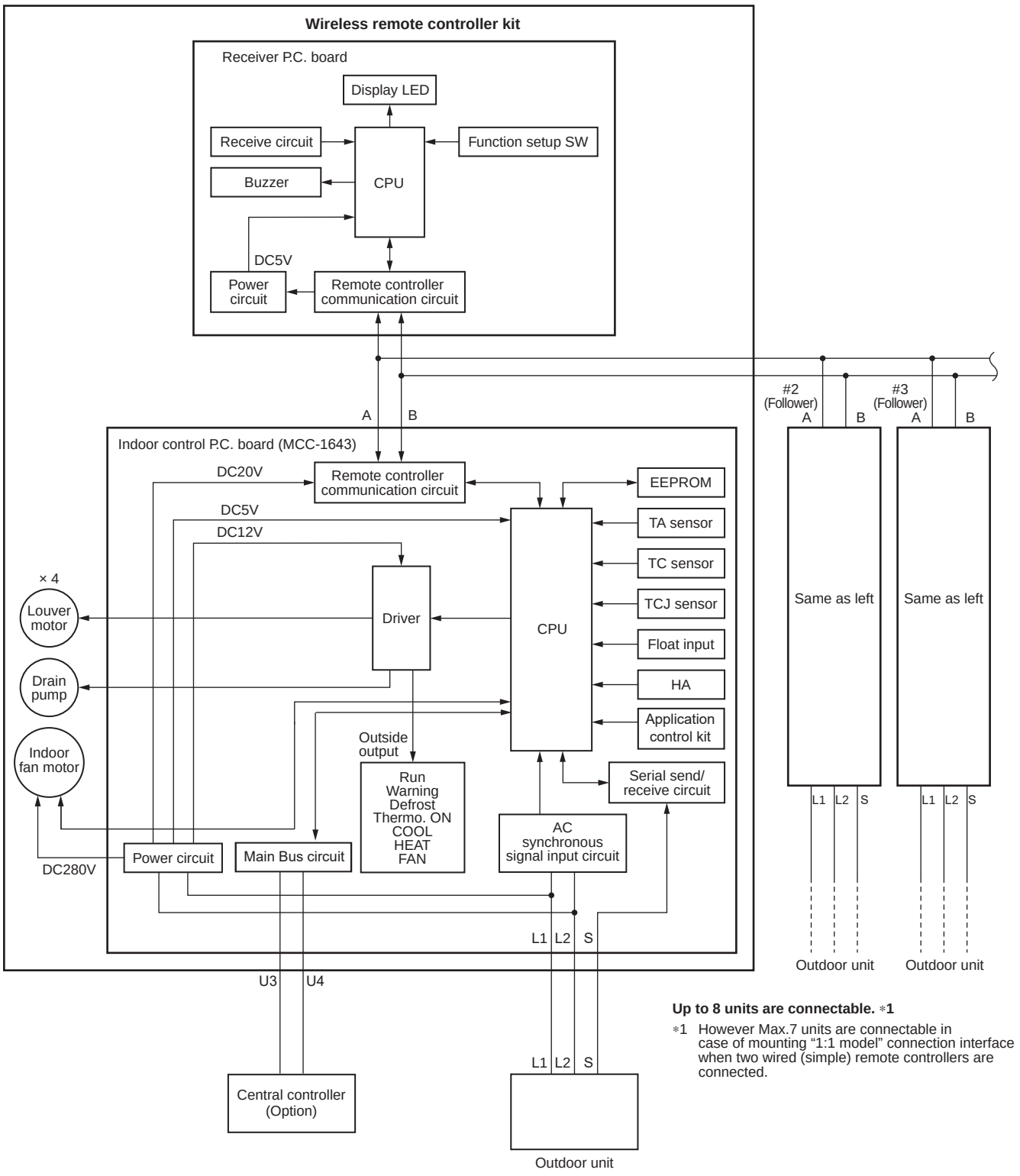
Up to 8 units are connectable. *1

*1 However Max.7 units are connectable in case of mounting "1:1 model" connection interface when two wired (simple) remote controllers are connected.

*2 Connection of the schedule timer to the simple remote controller is unavailable.

Connection of Wireless Remote Controller Kit

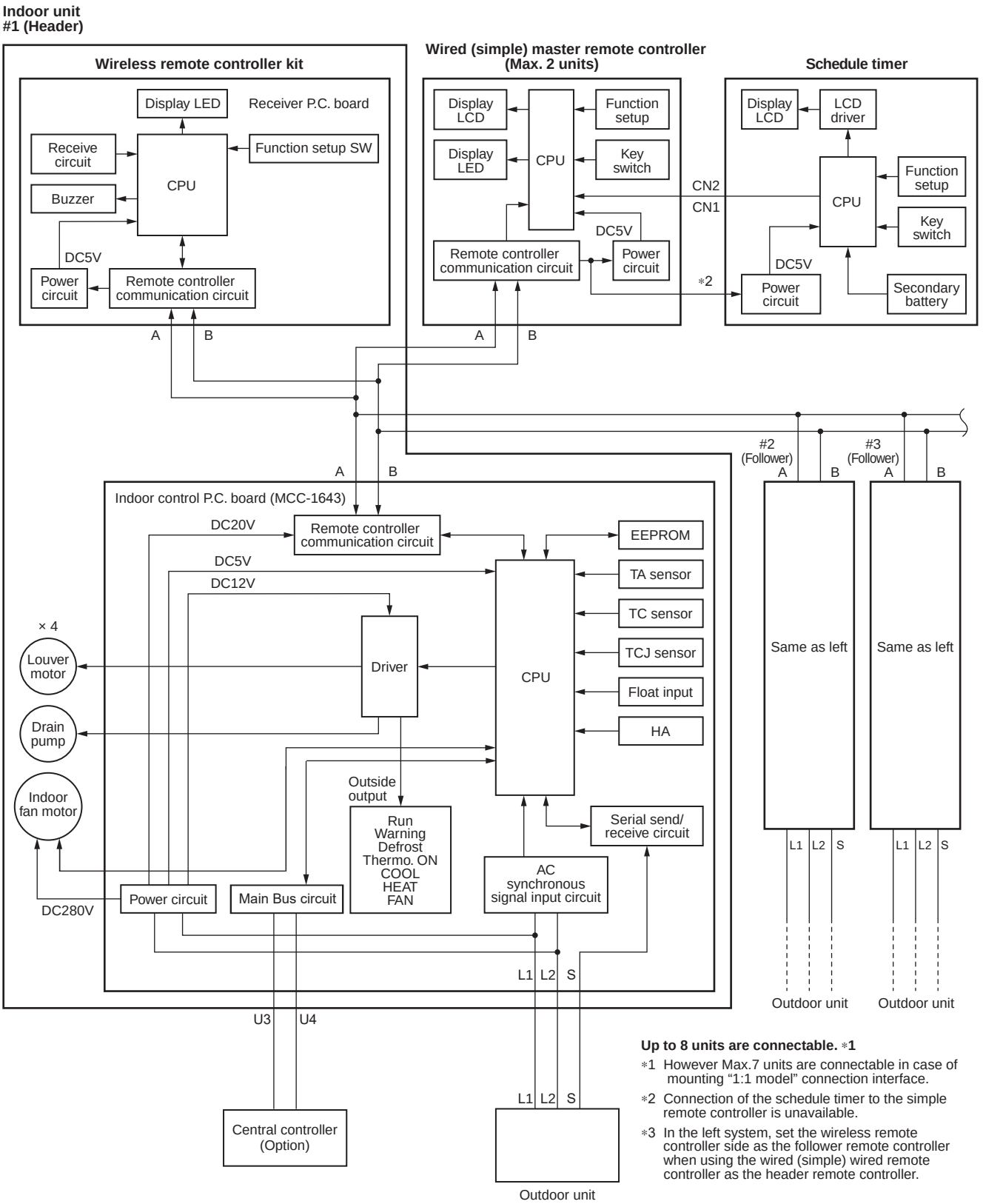
Indoor unit
#1 (Header)



Up to 8 units are connectable. ∗1

∗1 However Max.7 units are connectable in case of mounting “1:1 model” connection interface when two wired (simple) remote controllers are connected.

Connection of Both Wired (Simple) Remote Controller and Wireless Remote Controller Kit



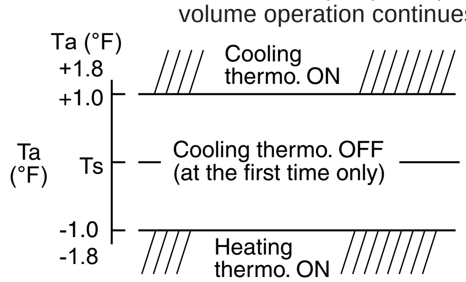
Up to 8 units are connectable. *1

*1 However Max.7 units are connectable in case of mounting “1:1 model” connection interface.

*2 Connection of the schedule timer to the simple remote controller is unavailable.

*3 In the left system, set the wireless remote controller side as the follower remote controller when using the wired (simple) wired remote controller as the header remote controller.

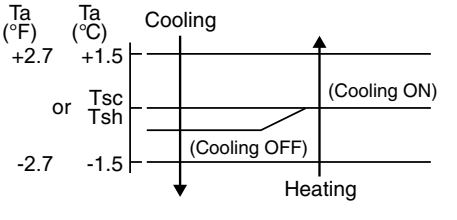
6-2. Control Specifications

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>1</td><td>When power supply is reset</td><td>1) Distinction of outdoor unit
When the power supply is reset, the outdoors are distinguished and the control is selected according to the distinguished result.
2) Setting of indoor fan speed and existence of air direction adjustment
Based on EEPROM data, select setting of the indoor fan speed and the existence of air direction adjustment.</td><td>Air speed (rpm)/
Air direction adjustment</td></tr>
<tr><td>2</td><td>Operation mode selection</td><td>1) Based on the operation mode selecting command from the remote controller, the operation mode is selected.
<table>
<tr><th>Remote controller command</th><th>Control outline</th></tr>
<tr><td>STOP</td><td>Air conditioner stops.</td></tr>
<tr><td>FAN</td><td>Fan operation</td></tr>
<tr><td>COOL</td><td>Cooling operation</td></tr>
<tr><td>DRY</td><td>Dry operation</td></tr>
<tr><td>HEAT</td><td>Heating operation</td></tr>
<tr><td>AUTO</td><td>• COOL/HEAT operation mode is automatically selected by Ta, Ts and To for operation.
• The operation is performed as shown in the following figure according to Ta value at the first time only. ((In the range of Ts - 1.8°F (-1°C) < Ta < Ts +1.8°F (+1°C) , Cooling thermo. OFF (Fan)/Setup air volume operation continues.)</td></tr>
</table>


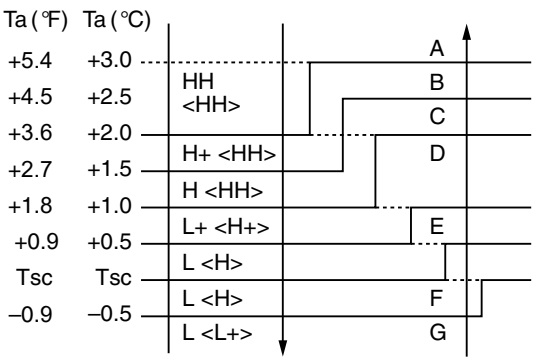
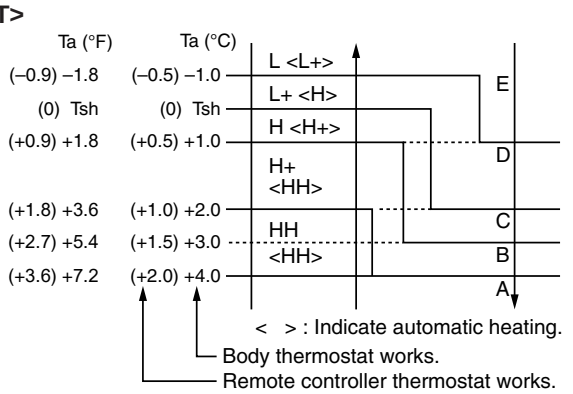
• α is corrected according to the outside temperature.
<table>
<tr><th>Outside temp.</th><th>Correction value (α)</th></tr>
<tr><td>No To</td><td>0K</td></tr>
<tr><td>To≥ 75.2°F [24°C]</td><td>–1K</td></tr>
<tr><td>75.2°F [24°C] > To ≥ 64.4°F [18°C]</td><td>0K</td></tr>
<tr><td>To < 64.4°F [18°C]</td><td>+1K</td></tr>
<tr><td>To error</td><td>0K</td></tr>
</table></td><td>Ta: Room temp.
Ts: Setup temp.
To: Outside temp.

k = deg</td></tr>
<tr><td>3</td><td>Room temp. control</td><td>1) Adjustment range: Remote controller setup temperature (°F[°C])
<table>
<tr><th></th><th>COOL/DRY</th><th>HEAT</th></tr>
<tr><td>Wired type</td><td>64°F [18°C] to 84°F [29°C]</td><td>64°F [18°C] to 84°F [29°C]</td></tr>
<tr><td>Wireless type</td><td>63°F [17°C] to 86°F [30°C]</td><td>63°F [17°C] to 86°F [30°C]</td></tr>
</table></td><td></td></tr>
</table>

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>3</td><td>Room temp. control (Continued)</td><td>2) Using the CODE No. 06, the setup temperature in heating operation can be corrected.
<table><tr><td>SET DATA</td><td>0</td><td>2</td><td>4</td><td>6</td></tr><tr><td>Temperature setting adjustment</td><td>+0 ˚F [+0˚C]</td><td>+3.6 ˚F [+2˚C]</td><td>+7.2 ˚F [+4˚C]</td><td>+10.8 ˚F [+6˚C]</td></tr></table>Setting at shipment
<table><tr><td>Setup data</td><td>2</td></tr></table></td><td>Shift of suction temperature in heating operation</td></tr>
<tr><td>4</td><td>Automatic capacity control

(GA control)</td><td>1) Based on the difference between Ta and Ts, the operation frequency is instructed to the outdoor unit.
2) Cooling operation
Every 90 seconds, the room temperature difference between temperature detected by Ta and Ts and the varied room temperature value are calculated to obtain the correction value of the frequency command and then the present frequency command is corrected.
Ta (n) – Ts (n) : Room temp. difference
n : Counts of detection
Ta (n-1) – Ts (n) : Varied room temp. value
n – 1 : Counts of detection of 90 seconds before
3) Heating operation
Every 1 minute (60 sec.), the room temperature difference between temperature detected by Ta and Ts and the varied room temperature value are calculated to obtain the correction value of the frequency command and then the present frequency command is corrected.
Ts (n) – Ta (n) : Room temp. difference
n : Counts of detection
Ta (n) – Ta (n – 1) : Varied room temp. value
n – 1 : Counts of detection of 1 minute before
4) Dry operation
The frequency correction control is same as those of the cooling operation.
However the maximum frequency is limited to approximately “S6”.
Note) When LOW is set up, the maximum frequency is limited to approximately “SB”.</td><td></td></tr>
<tr><td>5</td><td>Automatic cooling/heating control</td><td>1) The judgment of selecting COOL/HEAT is carried out as shown below. When +2.7°F (+1.5°C) exceeds against Tsh 10 minutes and after thermo.-OFF, heating operation (Thermo. OFF) exchanges to cooling operation. Description in the parentheses shows an example of cooling ON/OFF.
 

When -2.7°F (-1.5°C) lowers against Tsc 10 minutes and after thermo. OFF, cooling operation (Thermo. OFF) exchanges to heating operation.
2) For the automatic capacity control after judgment of cooling/heating, see Item 4.
3) For temperature correction of room temp. control in automatic heating, see Item 3.</td><td>Tsc: Setup temp. in cooling operation
Tsh: Setup temp. in heating operation + temp. correction of room temp. control</td></tr>
</table>

No.	Item	Outline of specifications	Remarks
6	Air speed selection	1) Operation with (HH), (H), (L) or [AUTO] mode is carried out by the command from the remote controller. 2) When the air speed mode [AUTO] is selected, the air speed varies by the difference between Ta and Ts. **<COOL>**  • Controlling operation in case when thermo of remote controller works is same as a case when thermo of the body works. • If the air speed has been changed once, it is not changed for 3 minutes. However when the air volume is exchanged, the air speed changes. • When cooling operation has started, select a downward slope for the air speed, that is, the high position. • If the temperature is just on the difference boundary, the air speed does not change. • Mode in the parentheses indicates one in automatic cooling operation. **<HEAT>**  Value in the parentheses indicates one when thermostat of the remote controller works. Value without parentheses indicates one when thermostat of the body works. • If the air speed has been changed once, it is not changed for 1 minute. However when the air speed I exchanged, the air speed changes. • When heating operation has started, select an upward slope for the air speed, that is, the high position. • If the temperature is just on the difference boundary, the air speed does not change. • Mode in the parentheses indicates one in automatic heating operation. • In Tc ≥ 140°F[60°C], the air speed increases by 1 step.	HH > H+ > H > L+ > L > UL Tc: Indoor heat exchanger sensor temperature

No.	Item	Outline of specifications	Remarks
6	Air speed selection (Continued):		Selection of high ceiling type CODE No.: [5d] or selection of high ceiling on P.C. board SW501

CODE No. [5d]	Standard		Type 1		Type 3		Type 6	
	0		1		3		6	
SW501 (1)/(2)	OFF/OFF		ON/OFF		OFF/ON		ON/ON	
Tap	COOL	HEAT	COOL	HEAT	COOL	HEAT	COOL	HEAT
F1					HH	HH	HH	HH
F2			HH	HH				
F3				H+	H+, H	H+, H	H+, H L+, L	H+, H L+, L
F4			H+					
F5		HH		H				
F6	HH		H		L+	L+		
F7	H+	H+			L	L		
F8		H		L+				
F9	H		L+	L				
FA		L+	L					
FB	L+	L						
FC	L							
FD		UL		UL		UL		UL

Tap	121	181	241	301	361	421	481
	Revolution speed (rpm)						
F1	610	630	630	700	730	730	760
F2	550	590	590	670	730	730	730
F3	500	530	550	660	690	690	720
F4	450	470	530	640	690	690	710
F5	400	450	490	620	650	670	700
F6	390	440	480	610	640	660	690
F7	370	410	470	550	550	590	640
F8	350	380	440	490	490	520	590
F9	340	370	430	480	480	510	580
FA	330	350	390	450	450	480	550
FB	320	330	370	420	420	430	520
FC	310	320	360	400	400	410	500
FD	250	250	250	300	300	300	300

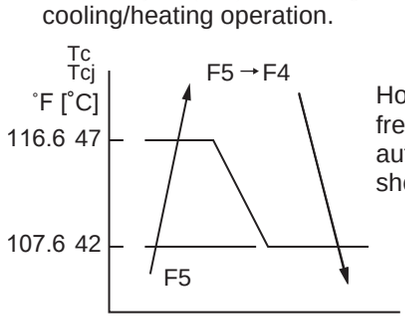
3) In heating operation, the mode changes to [UL] if thermostat is turned off.

4) If Ta ≥ 77°F(25°C) when heating operation has started and when defrost operation has been cleared, the air conditioner operates with (H) mode or higher mode for 1 minute after Tc entered in E zone of cool air discharge preventive control (Item 7).

Tcj: Indoor heat exchanger sensor temperature

5) In automatic cooling/heating operation, the revolution frequency of (HH) is set larger than that in the standard cooling/heating operation.

However only when the high ceiling selection is set to [Standard]

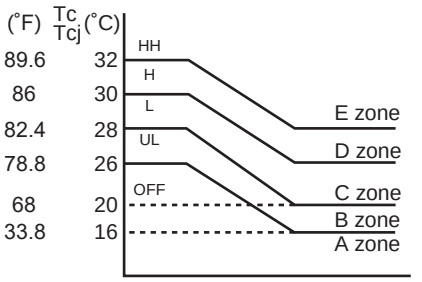
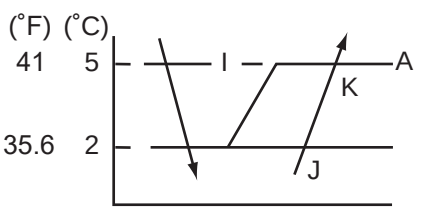


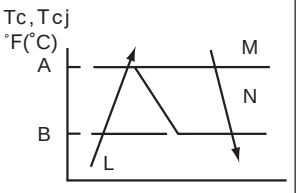
However the revolution frequency is restricted in the automatic heating operation as shown in the following figure.

6) Self-clean operation

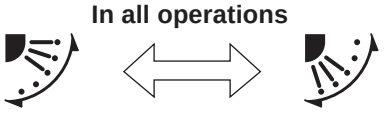
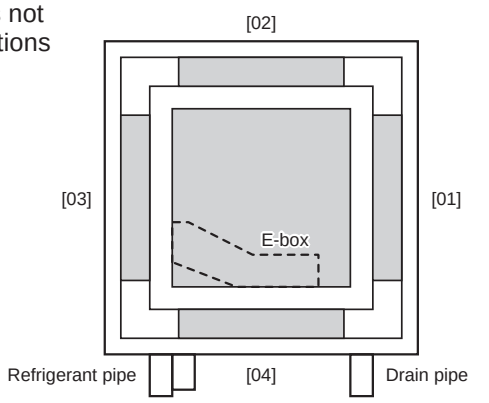
When performing self-clean operation after stopping the cooling operation, the mode becomes [UL] (210 rpm).

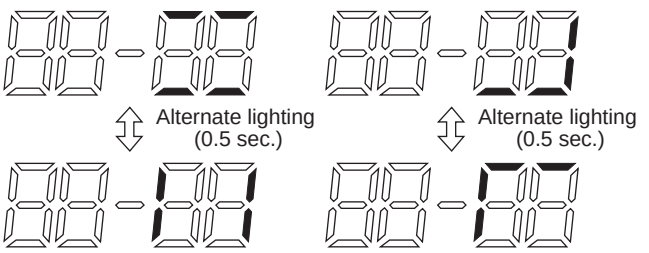
[Self-clean ⟲] is displayed.

No.	Item	Outline of specifications	Remarks
7	Cool air discharge preventive control	1) In heating operation, the indoor fan is controlled based on the detected temperature of Tc sensor or Tcj sensor. As shown below, the upper limit of the revolution frequency is restricted. However B zone is assumed as C zone for 6 minutes and after when the compressor activated. In defrost operation, the control value of Tc is shifted by 42.8°F(6°C). 	In D and E zones, the priority is given to air volume selection setup of remote controller. In A zone while thermo is ON, [PRE-HEAT ❋ (Heating ready)] is displayed.
8	Freeze preventive control (Low temperature release)	1) The cooling operation (including Dry operation) is performed as follows based on the detected temperature of Tc sensor or Tcj sensor. When [J] zone is detected for 6 minutes (Following figure), the commanded frequency is decreased from the real operation frequency. After then the commanded frequency changes every 30 seconds while operation is performed in [J] zone. In [K] zone, time counting is interrupted and the operation is held. When [I] zone is detected, the timer is cleared and the operation returns to the normal operation. If the commanded frequency becomes S0 because the operation continues in [J] zone, the return temperature A is raised from 41°F(5°C) to 53.6°F(12°C) until [I] zone is detected and the indoor fan operates with [L] mode.  In heating operation, the freeze-preventive control works if 4-way valve is not exchanged and the following conditions are satisfied. (However the temperature for J zone dashing control is changed from 35.6°F(2°C) to 23°F(–5°C). **<Conditions>** • When ① or ② is established 5 minutes after activation. ① Tcn ≤ Tc (n – 1) – 5 ② Tcn < Tc (n – 1) – 1 and Tcn ≤ Ta < 41°F(5°C)	Tcj: Indoor heat exchanger sensor temperature **Tcn:** Tc temperature when 5 minutes elapsed after activation **Tc (n – 1):** Tc temperature at start time

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>9</td><td>High-temp. release control</td><td>1) The heating operation is performed as follows based on the detected temperature of Tc sensor or Tcj sensor.
• When [M] zone is detected, the commanded frequency is decreased from the real operation frequency. After then the commanded frequency changes every 30 seconds while operation is performed in [M] zone.
• In [N] zone, the commanded frequency is held.
• When [L] zone is detected, the commanded frequency is returned to the original value by approx. 6Hz every 60 seconds.
Setup at shipment
<table><tr><td></td><td colspan="2">Control temp. °F(°C)</td></tr><tr><td></td><td>A</td><td>B</td></tr><tr><td>R454B</td><td>131(55) (127.4(54))</td><td>123.8(51) (123.8(51))</td></tr></table> 
NOTE:
When the operation has started or when Tc or Tcj < 86°F (30°C) at start of the operation or after operation start, temperature is controlled between values in parentheses of A and B.</td><td>However this control is ignored in case of the follower unit of the twin.

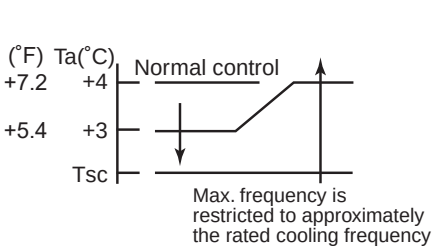
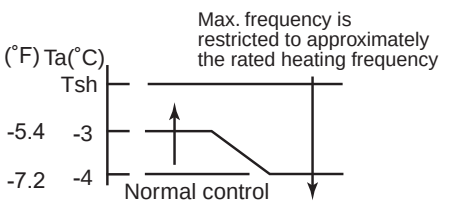
Same status as that when “thermostat-OFF” (status that the air conditioner enters in the room temp. monitor mode when the temperature reached the setup temperature on the remote controller)</td></tr>
<tr><td>10</td><td>Drain pump control</td><td>1) In cooling operation (including Dry operation), the drain pump is usually operated.
2) If the float switch works while drain pump drives, the compressor stops, the drain pump continues the operation, and a check code is output.
3) If the float switch works while drain pump stops, the compressor stops and the drain pump operates. If the float switch keeps operating for approx. 4 minutes, a check code is output.
4) The drain pump doesn't stop immediately to decrease the drain water in the drain pan when the cooling operation (including Dry operation) was stopped and drive the drain pump for five minutes.</td><td>Check code [P10]</td></tr>
<tr><td>11</td><td>After-heat elimination</td><td>When heating operation stops, in some cases, the indoor fan operates with (L) for approx. 30 seconds.</td><td>is displayed.</td></tr>
</table>

No.	Item	Outline of specifications	Remarks
12	Louver control	1) Louver position setup • When the louver position is changed, the position moves necessarily to downward discharge position once to return to the set position. • The louver position can be set up in the following operation range. **In cooling/dry operation** **In heating/fan operation**  • In group twin/triple operation, the louver positions can be set up collectively or individually. 2) Swing setup • [SWING] is displayed and the following display is repeated. **In all operations**  (Repeats) • In group twin/triple operation, the louver positions can be set up collectively or individually. 3) When the unit stopped or the warning was output, the louver is automatically set to full closed position. 4) When PRE-HEAT (Heating ready) is displayed (Heating operation started or defrost operation is performed), heating thermo is off or self-cleaning is performed, the louver is automatically set to horizontal discharge position. ∗ The louver which air direction is individually set or the locked louver closes fully when the unit stops and the louver is automatically set to horizontal discharge position when PRE-HEAT (Heating ready) is displayed, heating thermo is off or self-cleaning is performed. **<<Individual air direction setup>>** • Pushing UNIT LOUVER Louver select button enables every discharge port to set up the air direction. • In case of no input (key operation) for approx. 5 seconds during setting of individual air direction (during displaying of louver No. on the remote controller screen), the remote controller screen returns to the normal display screen. • For the air direction illustration during normal operation, the air direction of the least No. among the louvers which are block-set is displayed. • While individual air direction is being set, the remote controller operation (Illustration of air direction) and operation of the real machine are linked. • When selecting a case, UNIT LOUVER Louver select button is not pushed or louver No. is not displayed, the air directions of all the louvers are collectively set up.  	The louver position at horizontal discharge position at under SM24 differs from that at over SM30. The swinging louver moves usually up to the ceiling side from the louver position of the set time. Setup from the remote controller without UNIT LOUVER button is unavailable. For the setup operation, refer to “How to set up louver individually” of Item “Setup at local site/Others”.

No.	Item	Outline of specifications	Remarks
12	Louver control (Continued)	**<<Selection of Swing mode>>** • For the Swing mode, the following three types of modes are selectable and settable by keeping Swing/Direction SWING/FIX button pushed for 4 seconds or more on the remote controller. ① Standard (4 pieces: same phase) swing → Data: [0001 (At shipment)] When Swing operation is selected, four louvers align at the horizontal discharge position and then start the Swing operation at the same time. ② Dual swing → Data: [0002] When operation is selected, the louvers of louver No. [01] and [03] move to the horizontal discharge position, the louvers of louver No. [02] and [04] move to the downward discharge position and then start the Swing operation at the same time. ③ Cycle swing → Data: [0003] When operation is selected, the louver No. [01] moves to the horizontal discharge position, [03] to the downward discharge position, [02] and [04] to the middle position and then start the Swing operation at the same time. • Three types of the swing modes can be also selected and set by the setup data of CODE No. (DN) [F0]. • In case of selecting the Swing mode, “Dual swing” or “Cycle swing”, the following numerals is displayed at the center of the remote controller screen for approx. 3 seconds when SWING/FIX button was pushed to select [SWING]. (No display for the standard swing)  **Dual swing** **Cycle swing** **<<Louver lock (Louver fix)>>** • For the air direction setup for each discharge port, the louver position can be locked during the normal operation. • An arbitrary air direction of an arbitrary louver can be registered and set by keeping UNIT LOUVER button pushed for 4 seconds or more on the remote controller. • The louver lock can be set by registering the setup data to CODE No. (DN) [F1] to [F4] according to the following table. **CODE No.** / **Objective louver No.** / **Setup data** F1 / 01 / 0000: Release (At shipment) F2 / 02 / 0001: Horizontal discharge position F3 / 03 / ~ F4 / 04 / 0005: Downward discharge position	Carry out setting operation during stop of the unit; otherwise the unit stops operation. The standard swing performs the same swing operation as the present operation (2 series). For the setting operation, refer to [How to set up type of the swings] in Item “Setup at local site/Others”. Carry out setting operation during stop of the unit; otherwise the unit stops operation.

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>12</td><td>Louver control (Continued)</td><td>• If there is the locked louver in the unit, [⊕] goes on the remote controller screen.
• While the following controls are performed, the louvers operate even if executing the louver lock.
<table><tr><th></th><th>Control which ignores lock</th><th>Objective louver No.</th></tr><tr><td>①</td><td>Operation stop</td><td>Full-close position</td></tr><tr><td>②</td><td>When heating operation started</td><td>Horizontal discharge position</td></tr><tr><td>③</td><td>Heating thermo. OFF</td><td>Horizontal discharge position</td></tr><tr><td>④</td><td>During defrost operation</td><td>Horizontal discharge position</td></tr><tr><td>⑤</td><td>Initialize operation</td><td>Full-close position</td></tr><tr><td>⑥</td><td>Self-clean operation</td><td>Horizontal discharge position</td></tr></table>• The real louver corresponding to the louver No. displayed on the remote controller screen during setting of louver lock operates swinging.</td><td>For the setting operation, refer to [How to set louver lock] of Installation Manual.

It is position check operation and it does not link with the real louver and air direction setup (Illustration on the remote controller screen).</td></tr>
<tr><td>13</td><td>HA control</td><td>1) This control is connected to TV control or remote start/stop I/F, etc, and start/stop are available by HA signal input from the remote position.
2) This control outputs start/stop status to HA output terminal.
3) I/O specifications conform to JEMA regulations.
4) This control outputs [Operation OFF (STOP) signal] to HA output terminal while self-cleaning works. However selection of [Operation ON (Operating) signal] is possible by changing [0000 (At shipment)] of CODE No. (DN) [CC] to [0001]. In this case, if HA is input during self-clean operation during operation of the air conditioner, the self-clean operation is not performed. (Unit stops.)</td><td>In the group operation, use this control by connecting to either header or follower indoor unit.</td></tr>
<tr><td>14</td><td>Frequency fixed operation (Test run)</td><td><In case of wired remote controller>
1) When pushing [TEST] button for 4 seconds or more, [TEST] is displayed on the display screen and the mode enters in Test run mode.
2) Push [ON/OFF] button.
3) Using [MODE] button, set the mode to [COOL] or [HEAT].
• Do not use other mode than [COOL]/[HEAT] mode.
• During test run operation, the temperature cannot be adjusted.
• An error is detected as usual.
• A frequency fixed operation is performed.
4) After the test run, push [ON/OFF] button to stop the operation. (Display in the display part is same as the procedure in Item 1.)
5) Push [TEST] button to clear the test run mode. ([TEST] display in the display part disappears and the status returns to the normal stop status.)</td><td>Command frequency is approximately [S7]</td></tr>
<tr><td>15</td><td>Filter sign display (Except wireless type)</td><td>1) The operation time of the indoor fan is calculated, the filter reset signal is sent to the remote controller when the specified time (2500H) has passed, and it is displayed on LCD.
2) When the filter reset signal has been received from the remote controller, time of the calculation timer is cleared.
In this case, the measurement time is reset if the specified time has passed, and display on LCD disappears.</td><td>[FILTER ▦] goes on.</td></tr>
</table>

No.	Item	Outline of specifications	Remarks
16	Central control mode selection	1) Setting at the centerl controller side enables to select the contents which can be operated on the remote controller at indoor unit side. 2) Setup contents • 64 line central controller (TCB-SC642TLE2) [Individual]: Operated on the remote controller (Priority to second pushing) [Central 1]: ON/OFF operation cannot be operated on the remote controller. [Central 2]: ON/OFF, mode selection, temp. setup operations cannot be operated on the remote controller. [Central 3]: Mode selection and temp. setup operations cannot be operated on the remote controller. [Central 4]: Mode selection cannot be operated on the remote controller. * In case of the wireless type, the display lamp does not change but the contents are same. If operating an item which is prohibited by the central control mode from the remote controller, it is notified with the receive sound, Pi, Pi, Pi, Pi, Pi (5 times).	Display at remote controller side (No display) [Central] goes on [Central] goes on [Central] goes on [Central] goes on
17	Energy-saving control	1) Selecting [AUTO] mode enables an energy-saving to be operated. 2) The setup temperature is shifted (corrected) in the range not to lose the comfort ability according to input values of various sensors. 3) Data (Input value room temp. Ta, Outside temp. To, Air volume, Indoor heat exchanger sensor temp. Tc) for 20 minutes are taken the average to calculate correction value of the setup temperature. 4) The setup temperature is shifted every 20 minutes, and the shifted range is as follows. In cooling time: +1.5 to – 1.0K In heating time: –1.5 to +1.0K	
18	Max. frequency cut control	1) This control is operated by selecting [AUTO] operation mode. 2) COOL operation mode: It is controlled according to the following figure if To < 82.4°F(28°C). 3) HEAT operation mode: It is controlled according to the following figure if To > 59°F(15°C).  	

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>19</td><td>DC motor</td><td>1) When the fan operation has started, positioning of the stator and the rotor are performed.
(Moves slightly with tap sound)
2) The motor operates according to the command from the indoor controller.

Notes)
• When the fan rotates while the air conditioner stops due to entering of outside air, etc, the air conditioner may operate while the fan motor stops.
• When a fan lock is found, the air conditioner stops, and an error is displayed.</td><td>

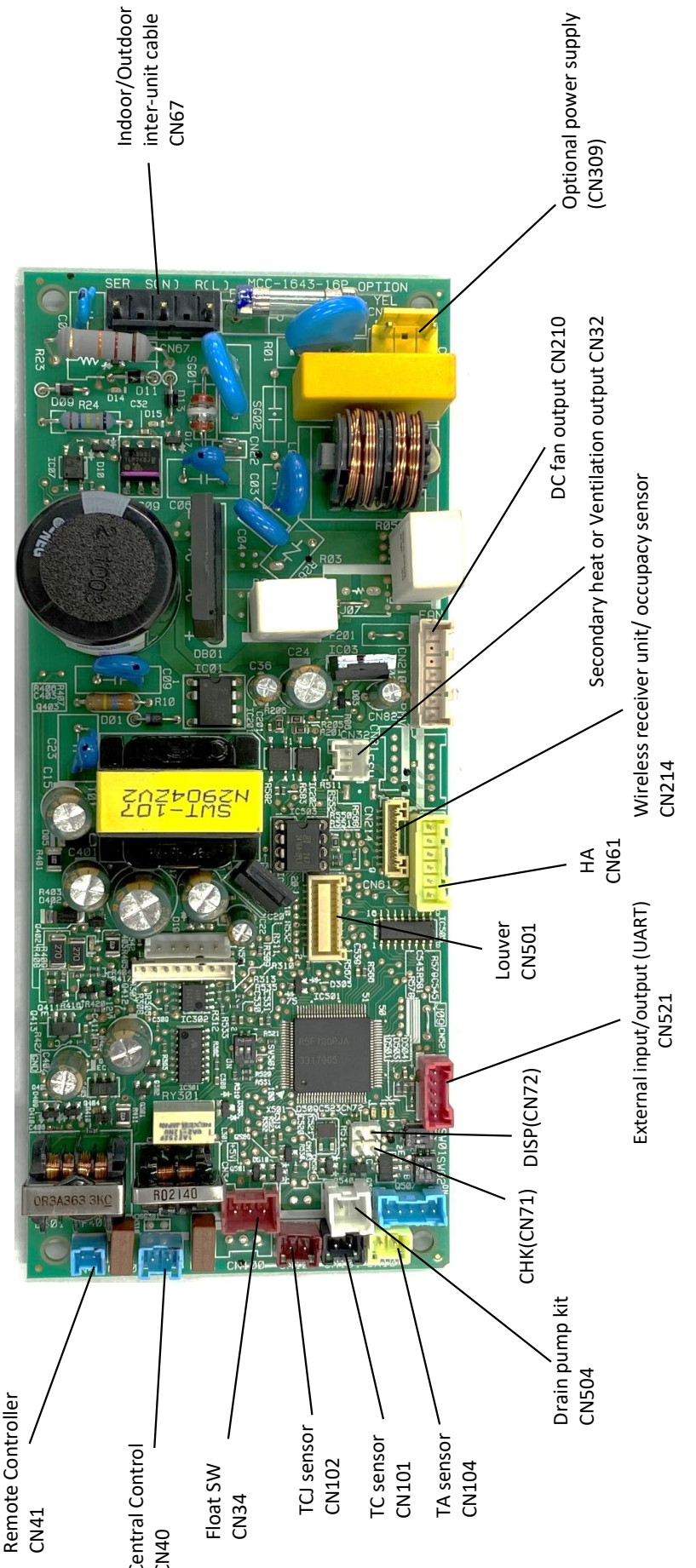
Check code [P12]</td></tr>
<tr><td>20</td><td>Self-clean operation (Dry operation)</td><td>1) When cooling operation mode (AUTO COOL, COOL, DRY) stopped, the following three self-clean operations are performed.
<table>
<tr><th>Compressor ON period</th><th>Self-clean operation period</th><th>FAN</th><th>Drain pump</th><th>Louver</th></tr>
<tr><td>0 to 10 min.</td><td>None</td><td rowspan="3">Fan only (UL)</td><td rowspan="3">STOP</td><td rowspan="3">Horizontal discharge position</td></tr>
<tr><td>10 to 60 min.</td><td>1 hour</td></tr>
<tr><td>60 min. to</td><td>2 hours</td></tr>
</table>
2) During operation of self-clean, ⟲ lights on the wired remote controller screen. However the operation lamp (Green LED) goes off.
3) To stop the self-clean operation, push twice the [ON/OFF] button on the remote controller continuously. (Stop the operation as compressor ON time in the table above: 10 minutes or below.)
4) When the follower unit executes self-clean operation in the group connection, the segment of ⟲ is displayed on the wired remote controller screen via master unit.
∗ If self-clean operation is not used, set invalidity (does not use) of the self-clean operation by changing [0001 (At shipment) of CODE No. (DN) [D3] to [0000].
∗ To erase the ⟲ display during operation of self-clean, change CODE No. [D4] from [0000: Display (At shipment)] to [0001: Non-display].</td><td>It is recognized as [STOP] from the remote monitor side.</td></tr>
<tr><td>21</td><td>Save operation</td><td>1) Turn on SAVE button on the remote controller.
2) During operation of save operation, SAVE lights on the wired remote controller.
3) During save operation, the current release control is performed with the restriction ratio set in EEPROM on the outdoor unit.
4) The restriction ratio can be set by keeping SAVE button pushed for 4 seconds or more on the remote controller.
5) When validating the save operation, the next operation starts with save operation valid because contents are held even when operation stops, operation mode changes or power supply is reset.
6) The restriction ratio can be set by changing the setup data of CODE No. (DN) [C2] in the range of 50 to 100% (every 1%, Setting at shipment: 75%).</td><td>

Carry out setting operation during stop of the unit; otherwise the unit stops operation.
For the setup operation, refer to “How to set up contents of save operation” of Installation Manual.</td></tr>
</table>

No.	Item	Outline of specifications	Remarks
22	46.4°F(8°C) heating/Frost protective operation	1) This functional is intended for the cold latitudes and performs objective heating operation (46.4°F(8°C) heating operation). 2) This function is valid only for combination with the outdoor units (Super Digital Inverter (SDI) 4-series outdoor units). 3) Using the indoor DN code [D1] (1 bit), Valid/Invalid of this function is set up at the customer's side. ∗ The setup by DN code is Invalid [0]/Valid [1] and Invalid [0] has been set at the shipment. 4) This operation is the heating operation which sets 46.4°F(8°C) as the setup temperature of the target. 5) This function starts operation by pushing temperature button (▼) during heating operation; besides by pushing (▼) button for 4 seconds or more after temperature reached the minimum set temperature. 6) To stop/release this operation, select and execute one from the following operations. ① Push (▲) button: Heating operation (64.4°F(18°C) setting) continues. ② Push [START/STOP] button: Air conditioner stops. (Heating 64.4°F(18°C) operation at the next start) ③ Push MODE : Other operation mode is selected and the operation continues. 7) As the setup temperature is 46.4°F(8°C) and the human heating is not targeted, the cold air discharge preventive control (Item 7) is made invalid to suppress the intermittent operation. 8) The settings of the air direction and air volume are changeable during this operation. 9) The indoor fan stops to protect the compressor for 2 minutes after start of heating operation (Thermo-ON) by this function.	In a group connection, if there is even one combination with other unit, "This function is not provided." is displayed. The setup temperature jumps from [18] to [8].

6-3. Indoor Print Circuit Board

<MCC-1643>



Optional Connector Specifications of Indoor P.C. Board

Function	Connector No.	Pin No.	Specifications	Remarks
Ventilation output	CN32	1	DC12V	Setting at shipment: Interlock of ON by indoor unit operation, with OFF by stop operation * The single operation setting by FAN button on the remote controller is performed on the remote controller (DN [31] = 0000 → 0001)
		2	Output (Open collector)	
HA	CN61	1	ON/OFF input	HA ON/OFF input (J01: YES/NO=Pulse (At shipment from factory) /Static input selection)
		2	0V	
		3	Remote controller prohibited input	Permission/Prohibition of remote controller operation stop is performed by input.
		4	Operation output (Open collector)	Operation ON (Answer back of HA)
		5	DC12V	
		6	Warning output (Open collector)	Warning output ON
CHK Operation check	CN71	1		This check is used to check indoor operation. (Performs operation of indoor fan "H", Louver horizontal and Drain pump ON without communication with outdoor and remote controller)
		2	0V	
DISP Exhibition mode	CN72	1		Communication is available by indoor unit and remote controller only.
		2	0V	

7. TROUBLESHOOTING

7-1. Summary of Troubleshooting

<Wired remote controller type>

1. Before troubleshooting

1) Required tools/instruments
   - ⊕ and ⊖ screwdrivers, spanners, radio cutting pliers, nippers, push pins for reset switch
   - Tester, thermometer, pressure gauge, etc.
2) Confirmation points before check
   a) The following operations are normal.
      1. Compressor does not operate.
         - Is not 3-minutes delay (3 minutes after compressor OFF)?
         - Is not the outdoor unit in standby status though the remote controller reached the setup temperature?
         - Does not timer operate during fan operation?
         - Is not an overflow error detected on the indoor unit?
         - Is not outside high-temperature operation controlled in heating operation?
      2. Indoor fan does not rotate.
         - Does not cool air discharge preventive control work in heating operation?
      3. Outdoor fan does not rotate or air volume changes.
         - Does not high-temperature release operation control work in heating operation?
         - Does not outside low-temperature operation control work in cooling operation?
         - Is not defrost operation performed?
      4. ON/OFF operation cannot be performed from remote controller.
         - Is not the control operation performed from outside/remote side?
         - Is not automatic address being set up?
           (When the power is turned on at the first time or when indoor unit address setting is changed, the operation cannot be performed for maximum approx. 5 minutes after power-ON.)
         - Is not being carried out a test run by operation of the outdoor controller?
   b) Did you return the cabling to the initial positions?
   c) Are connecting cables of indoor unit and remote controller correct?

2. Troubleshooting procedure

When a trouble occurred, check the parts along with the following procedure.

Trouble → **Confirmation of check code display** → **Check defective position and parts.**

NOTE :

For cause of a trouble, power conditions or malfunction/erroneous diagnosis of microcomputer due to outer noise is considered except the items to be checked. If there is any noise source, change the cables of the remote controller to shield cables.

<Wireless remote controller type>

1. Before troubleshooting

1) Required tools/instruments
   - ⊕ and ⊖ screwdrivers, spanners, radio cutting pliers, nippers, etc.
   - Tester, thermometer, pressure gauge, etc.
2) Confirmation points before check
   a) The following operations are normal.
      1. Compressor does not operate.
         - Is not 3-minutes delay (3 minutes after compressor OFF)?
         - Is not the outdoor unit in standby status though the remote controller reached the setup temperature?
         - Does not timer operate during fan operation?
         - Is not an overflow error detected on the indoor unit?
         - Is not outside high-temperature operation controlled in heating operation?
      2. Indoor fan does not rotate.
         - Does not cool air discharge preventive control work in heating operation?
3) Outdoor fan does not rotate or air volume changes.
   - Does not high-temperature release operation control work in heating operation?
   - Does not outside low-temperature operation control work in cooling operation?
   - Is not defrost operation performed?
4) ON/OFF operation cannot be performed from remote controller.
   - Is not forced operation performed?
   - Is not the control operation performed from outside/remote side?
   - Is not automatic address being set up?
   - Is not being carried out a test run by operation of the outdoor controller?

   a) Did you return the cabling to the initial positions?

   b) Are connecting cables between indoor unit and receiving unit correct?

2. Troubleshooting procedure

(When the power is turned on at the first time or when indoor unit address setting is changed, the operation cannot be performed for maximum approx. 5 minutes after power-ON.)

When a trouble occurred, check the parts along with the following procedure.

1) Outline of judgment

   The primary judgment to check where a trouble occurred in indoor unit or outdoor unit is performed with the following method.

Method to judge the erroneous position by flashing indication on the display part of indoor unit (sensors of the receiving unit)

The indoor unit monitors operating status of the air conditioner, and the blocked contents of self-diagnosis are displayed restricted to the following cases if a protective circuit works.

7-2. Troubleshooting

7-2-1. Outline of judgment

The primary judgment to check whether a trouble occurred in the indoor unit or outdoor unit is carried out with the following method.

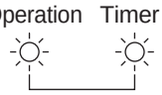
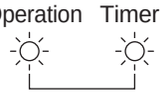
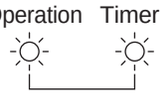
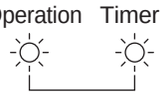
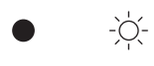
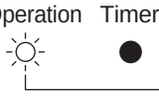
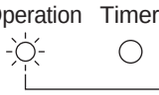
Method to judge the erroneous position by flashing indication on the display part of the indoor unit (sensors of the receiving part)

The indoor unit monitors the operating status of the air conditioner, and the blocked contents of self-diagnosis are displayed restricted to the following cases if a protective circuit works.

● : Go off, ○ : Go on, ☼ : Flash (0.5 sec.)

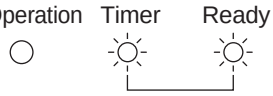
Lamp indication	Check code	Cause of trouble occurrence
Operation ● Timer ● Ready ● No indication at all	—	Power supply OFF or miswiring between receiving unit and indoor unit
Operation ☼ Timer ● Ready ● Flash	E01	Receiving error / Sending error } Receiving unit } Miswiring or wire connection error between receiving unit and indoor unit
	E02	
	E03	Communication stop } Receiving unit } Miswiring or wire connection error between receiving unit and indoor unit
	E08	Duplicated indoor unit No. / Duplicated master units of remote controller } Setup error
	E09	
	E10	Communication error between CPUs on indoor unit P.C. board
	E18	Wire connection error between indoor units, Indoor power OFF (Communication stop between indoor master and follower or between main and sub indoor twin)
Operation ● Timer ● Ready ☼ Flash	E04	Miswiring between indoor unit and outdoor unit or connection erorr (Communication stop between indoor and outdoor units)
Operation ● Timer ☼ Ready ☼ Alternate flash	P10	Overflow was detected. / Indoor DC fan error } Protective device of indoor unit worked.
	P12	
Operation ☼ Timer ● Ready ☼ Alternate flash	P03	Outdoor unit discharge temp. error / Outdoor high pressure system error } Protective device of outdoor unit worked. ∗1
	P04	
	P05	Negative phase detection error / Heat sink overheat error / Gas leak detection error } Outdoor unit error
	P07	
	P15	
	P19	4-way valve system error (Indoor or outdoor unit judged.)
	P20	Outdoor unit high pressure protection
	P22	Outdoor unit: Outdoor unit error / Outdoor unit: Inverter Idc operation / Outdoor unit: Position detection error } Protective device of outdoor unit worked. ∗1
	P26	
	P29	
	P31	Stopped because of error of other indoor unit in a group (Check codes of E03/L03/L07/L08)

∗1: These are representative examples and the check code differs according to the outdoor unit to be combined.

Lamp indication	Check code	Cause of trouble occurrence
Operation Timer Ready  Alternate flash	F01 F02 F10	Heat exchanger sensor (TCJ) error Heat exchanger sensor (TC) error Heat exchanger sensor (TA) error } Indoor unit sensor error
Operation Timer Ready  Alternate flash	F04 F06 F07 F08 F12 F13 F15	Discharge temp. sensor (TD) error Temp. sensor (TE) error Temp. sensor (TL) error Temp. sensor (TO) error Temp. sensor (TS) error Temp. sensor (TH) error Temp. Sensor miswiring (TE, TS) } Sensor error of outdoor unit ∗1
Operation Timer Ready  Simultaneous flash	F29	Indoor EEPROM error
Operation Timer Ready  Simultaneous flash	F31	Outdoor EEPROM error
Operation Timer Ready  Flash	H01 H02 H03 H04 H06	Compressor break down Compressor lock Current detection circuit error Case thermostat worked. } Outdoor compressor system error ∗1 Outdoor unit low pressure system error
Operation Timer Ready  Simultaneous flash	L03 L07 L08 L09	Duplicated master indoor units There is indoor unit of group connection in individual indoor unit. } → AUTO address * If group construction and address are not normal when power supply turned on, automatically goes to address setup mode. Unsetting of group address Missed setting (Unset indoor capacity)
Operation Timer Ready  Simultaneous flash	L10 L20 L29 L30 L31	Unset model type (Service board) Duplicated indoor central addresses Outdoor unit and other error Outside interlock error Negative phase error } Others

∗1: These are representative examples and the check code differs according to the outdoor unit to be combined.

7-2-2. Others (Other than Check Code)

Lamp indication	Check code	Cause of trouble occurrence
Operation Timer Ready  Simultaneous flash	—	During test run
Operation Timer Ready  Alternate flash	—	Disagreement of cool/heat (Automatic cool/heat setting to automatic cool/heat prohibited model, or setting of heating to cooling-only model)

7-2-3. Check Code List (Indoor)

○ : Go on, ◎ : Flash, ● : Go off ALT (Alternate): Alternate flashing when there are two flashing LED SIM (Simultaneous): Simultaneous flashing when there are two flashing LED

(Indoor unit detected)

Check code indication	Lamp indication				Representative defective position	Explanation of error contents	Air conditioner operation	
TCC-LINK central & Wired remote controller	Block indication						Automatic reset	Operation continuation
	Operation	Timer	Ready	Flash				
E03	◎	●	●		Regular communication error between indoor and remote controller	No communication from remote controller and network adapter (Also no communication from central control system)	○	×
E04	●	●	◎		Indoor/Outdoor serial error	There is error on serial communication between indoor and outdoor units	○	×
E08	◎	●	●		Duplicated indoor addresses ✧	Same address as yours was detected.	○	×
E10	◎	●	●		Communication error between indoor MCU	MCU communication error between main motor and micro computer	○	×
E18	◎	●	●		Regular communication error between indoor master and follower units	Regular communication between indoor header and follower units is impossible, Communication between twin header (main) and follower (sub) units is impossible.	○	×
F01	◎	◎	●	ALT	Indoor unit, Heat exchanger (TCJ) error	Open/short was detected on heat exchanger (TCJ).	○	×
F02	◎	◎	●	ALT	Indoor unit, Heat exchanger (TC) error	Open/short was detected on heat exchanger (TC).	○	×
F10	◎	◎	●	ALT	Indoor unit, Room temp. sensor (TA) error	Open/short was detected on room temp. sensor (TA).	○	×
F29	◎	◎	●	SIM	Indoor unit, other indoor P.C. board error	EEPROM error (Other error may be detected. If no error, automatic address is repeated.	×	×
L03	◎	●	◎	SIM	Duplicated setting of indoor group master unit ✧	There are multiple master units in a group.	×	×
L07	◎	●	◎	SIM	There is group cable in individual indoor unit. ✧	When even one group connection indoor unit exists in individual indoor unit.	×	×
L08	◎	●	◎	SIM	Unset indoor group address ✧	Indoor group address is unset.	×	×
L09	◎	●	◎	SIM	Unset indoor capacity	Capacity of indoor unit is unset.	×	×
L20	◎	○	◎	SIM	Duplicated central control system address	Duplicated setting of central control system address	○	×
L30	◎	○	◎	SIM	Outside error input to indoor unit (Interlock)	Abnormal stop by outside error (CN80) input	×	×
P01	●	◎	◎	ALT	Indoor unit, AC fan error	An error of indoor AC fan was detected. (Fan motor thermal relay worked.)	×	×
P10	●	◎	◎	ALT	Indoor unit, overflow detection	Float switch worked.	×	×
P12	●	◎	◎	ALT	Indoor unit, DC fan error	Indoor DC fan error (Over-current/Lock, etc.) was detected.	×	×
P19	◎	●	◎	ALT	4-way valve system error	In heating operation, an error was detected by temp. down of indoor heat exchanger sensor.	○	×
P31	◎	●	◎	ALT	Other indoor unit error	Follower unit in group cannot operate by warning from [E03/L03/L07/L08] of header unit.	○	×

✧ When this warning was detected before group construction/address check finish at power supply was turned on, the mode shifts automatically to AUTO address setup mode.

(Remote controller detected)

Check code indication	Lamp indication				Representative defective position	Explanation of error contents	Air conditioner operation	
Wired remote controller	Block indication						Automatic reset	Operation continuation
	Operation	Timer	Ready	Flash				
E01	◎	●	●		No master remote controller, Remote controller communication (Receive) error	Signal cannot be received from indoor unit. Master remote controller was not set. (including 2 remote controllers)	—	—
E02	◎	●	●		Remote controller communication (Send) error	Signal cannot be sent to indoor unit.	—	—
E09	◎	●	●		Duplicated master remote controller	In 2-remote controller control, both were set as master. (Indoor master unit stops warning and follower unit continues operation.)	×	△

(Central control devices detected)

Check code indication	Lamp indication				Representative defective position	Explanation of error contents	Air conditioner operation	
TCC-LINK central	Block indication						Automatic reset	Operation continuation
	Operation	Timer	Ready	Flash				
C05	Is not displayed. (Common use of wired remote controller, etc.)				Central control system communication (send) error	Signal sending operation of central control system is impossible. There are multiple same central devices. (AI-NET)	—	—
C06					Central control system communication (receive) error	Signal receiving operation of central control system is impossible.	—	—
C12	—				General-purpose device control interface batched warning	An error on device connected to general-purpose device control interface of exclusive to TCC-LINK/AI-NET	—	—
P30	By warning unit (Above-mentioned)				Group follower unit is defective.	Group follower unit is defective. (For remote controller, above-mentioned [**] details are displayed with unit No.	—	—

NOTE: Even for the same contents of error such as communication error, the display of check code may differ according to detection device.
When wired remote controller or central controller detects an error, it is not necessarily related to operation of the air conditioner. In this list, the check codes that outdoor unit detects are not described.

Error mode detected by indoor unit

Operation of diagnostic function				Judgment and measures
Check code	**Cause of operation**	**Status of air conditioner**	**Condition**	
E03	No communication from remote controller (including wireless) and communication adapter	Stop (Automatic reset)	Displayed when error is detected	1. Check cables of remote controller and communication adapters. • Remote controller LCD display OFF (Disconnection) • Central remote controller [97] check code
E04	The serial signal is not output from outdoor unit to indoor unit. • Miswiring of inter-unit wire • Defective serial sending circuit on outdoor P.C. board • Defective serial receiving circuit on indoor P.C. board	Stop (Automatic reset)	Displayed when error is detected	1. Outdoor unit does not completely operate. • Inter-unit wire check, correction of miswiring • Check outdoor P.C. board. Correct wiring of P.C. board. 2. When outdoor unit normally operates Check P.C. board (Indoor receiving / Outdoor sending).
E08	Duplicated indoor unit address	Stop	Displayed when error is detected	1. Check whether remote controller connection (Group/Individual) was changed or not after power supply turned on (Finish of group construction/Address check). * If group construction and address are not normal when the power has been turned on, the mode automatically shifts to address setup mode. (Resetting of address)
L03	Duplicated indoor master unit			
L07	There is group wire in individual indoor unit.			
L08	Unset indoor group address			
L09	Unset indoor capacity	Stop	Displayed when error is detected	1. Set indoor capacity (DN=11)
L30	Abnormal input of outside interlock	Stop	Displayed when error is detected	1. Check outside devices. 2. Check indoor P.C. board.
P10	Float switch operation • Float circuit, Disconnection, Coming-off, Float switch contact error	Stop	Displayed when error is detected	1. Trouble of drain pump 2. Clogging of drain pump 3. Check float switch. 4. Check indoor P.C. board.
P12	Indoor DC fan error	Stop	Displayed when error is detected	1. Position detection error 2. Over-current protective circuit of indoor fan driving unit operated. 3. Indoor fan locked. 4. Check indoor P.C. board.
P19	4-way valve system error • After heating operation has started, indoor heat exchangers temp. is down.	Stop (Automatic reset)	Displayed when error is detected	1. Check 4-way valve. 2. Check 2-way valve and check valve. 3. Check indoor heat exchanger (TC/TCJ). 4. Check indoor P.C. board.
P31	Own unit stops while warning is output to other indoor units.	Stop (Follower unit) (Automatic reset)	Displayed when error is detected	1. Judge follower unit while master unit is [E03], [L03], [L07] or [L08]. 2. Check indoor P.C. board.
F01	Coming-off, disconnection or short of indoor heat exchanger temp. sensor (TCJ)	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor heat exchanger temp. sensor (TCJ). 2. Check indoor P.C. board.
F02	Coming-off, disconnection or short of indoor heat exchanger temp. sensor (TC)	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor heat exchanger temp. sensor (TC). 2. Check indoor P.C. board.
F10	Coming-off, disconnection or short of indoor heat exchanger temp. sensor (TA)	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor heat exchanger temp. sensor (TA). 2. Check indoor P.C. board.
F29	Indoor EEPROM error • EEPROM access error	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor EEPROM. (including socket insertion) 2. Check indoor P.C. board.
E10	Communication error between indoor MCU • Communication error between fan driving MCU and main MCU	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor P.C. board.
E18	Regular communication error between indoor aster and follower units and between main and sub units	Stop (Automatic reset)	Displayed when error is detected	1. Check remote controller wiring. 2. Check indoor power supply wiring. 3. Check indoor P.C. board.

Error mode detected by remote controller or central controller (TCC-LINK)

Operation of diagnostic function				Judgment and measures
Check code	**Cause of operation**	**Status of air conditioner**	**Condition**	
Not displayed at all (Operation on remote controller is impossible.)	No communication with master indoor unit • Remote controller wiring is not correct. • Power of indoor unit is not turned on. • Automatic address cannot be completed.	Stop	—	Power supply error of remote controller, Indoor EEPROM error 1. Check remote controller inter-unit wiring. 2. Check remote controller. 3. Check indoor power wiring. 4. Check indoor P.C. board. 5. Check indoor EEPROM. (including socket insertion) → Automatic address repeating phenomenon generates.
E01 ∗2	No communication with master indoor unit • Disconnection of inter-unit wire between remote controller and master indoor unit (Detected by remote controller side)	Stop (Automatic reset) ∗ If center exists, operation continues.	Displayed when error is detected	Receiving error from remote controller 1. Check remote controller inter-unit wiring. 2. Check remote controller. 3. Check indoor power wiring. 4. Check indoor P.C. board.
E02	Signal send error to indoor unit (Detected by remote controller side)	Stop (Automatic reset) ∗ If center exists, operation continues.	Displayed when error is detected	Sending error of remote controller 1. Check sending circuit inside of remote controller. → Replace remote controller.
E09	There are multiple main remote controllers. (Detected by remote controller side)	Stop (Follower unit continues operation.)	Displayed when error is detected	1. In 2-remote controllers (including wireless), there are multiple header units. Check that there are 1 main remote controller and other sub remote controllers.
L20 Central controller L20	Duplicated indoor central addresses on communication of central control system (Detected by indoor/central controller side)	Stop (Automatic reset)	Displayed when error is detected	1. Check setting of central control system network address. (Network adapter SW01) 2. Check network adapter P.C. board.
— ∗3 Central controller (Send) C05 (Receive) C06	Communication circuit error of central control system (Detected by central controller side)	Continues (By remote controller)	Displayed when error is detected	1. Check communication wire / miswiring 2. Check communication (U3, U4 terminals) 3. Check network adapter P.C. board. 4. Check central controller (such as central control remote controller, etc.) 5. Check terminal resistance. (TCC-LINK)
— Central controller P30	Indoor Gr sub unit error (Detected by central controller side)	Continuation/Stop (According to each case)	Displayed when error is detected	Check the check code of the corresponding unit from remote controller.

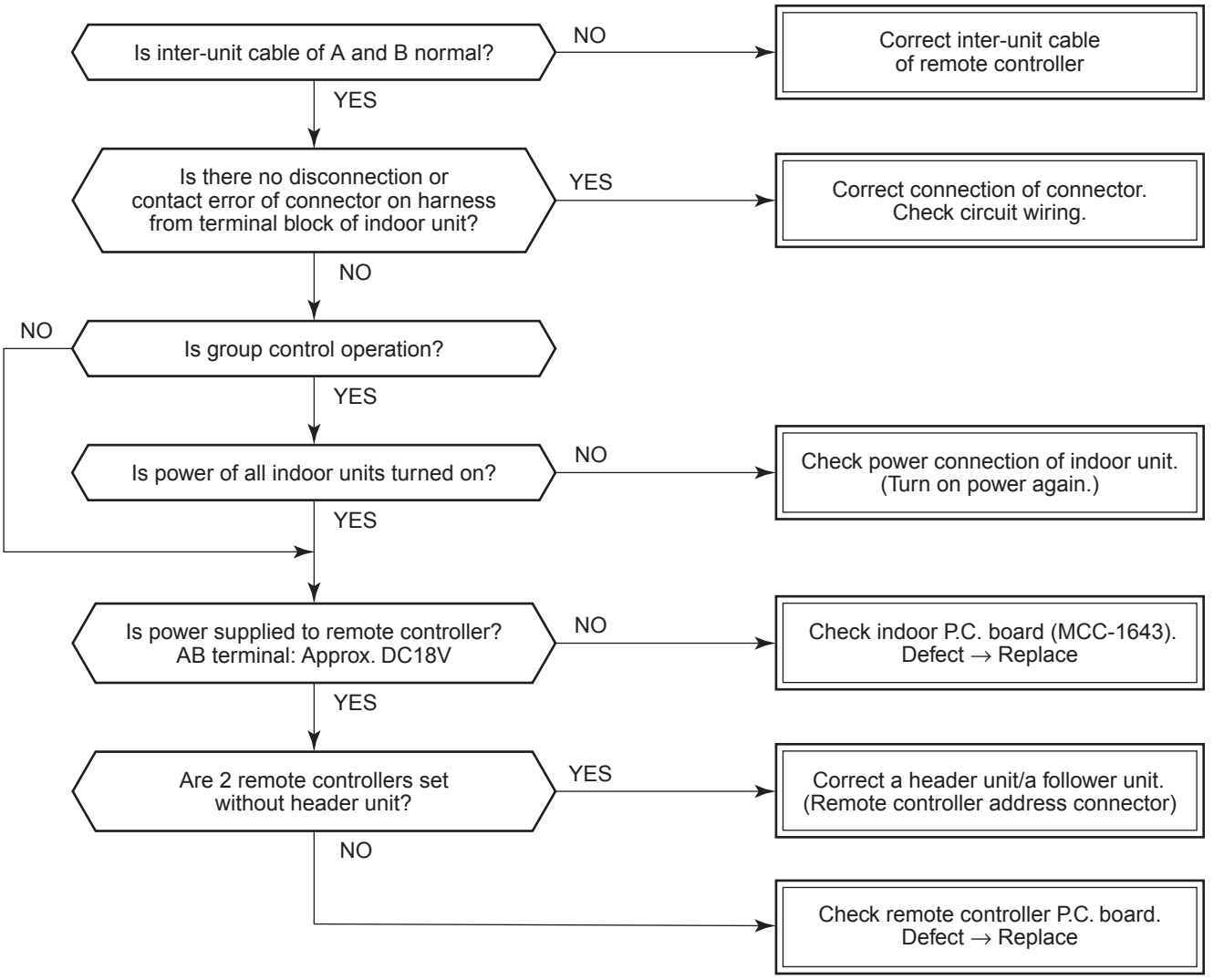
∗2 The check code cannot be displayed by the wired remote controller. (Usual operation of air conditioner becomes unavailable.)
For the wireless models, an error is notified with indication lamp.

∗3 This trouble is related to communication of remote controller (A, B), central system (TCC-LINK U3, U4), and [E01], [E02], [E03], [E09] or [E18] is displayed or no check display on the wired remote controller according to the contents.

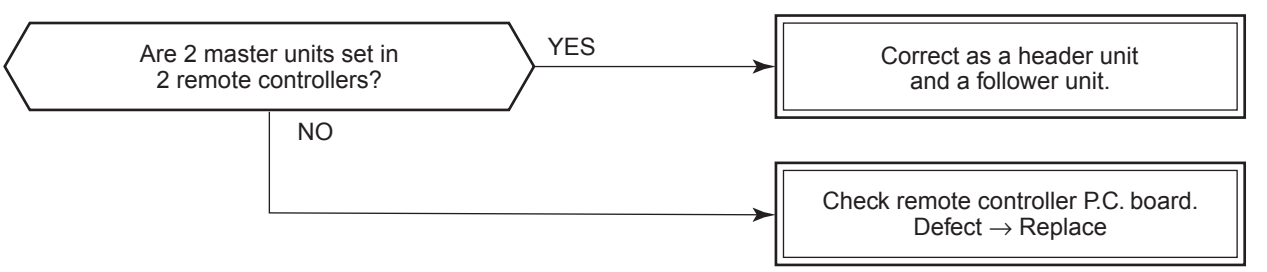
7-2-4. Diagnostic Procedure for Each Check Code (Indoor Unit)

Check code

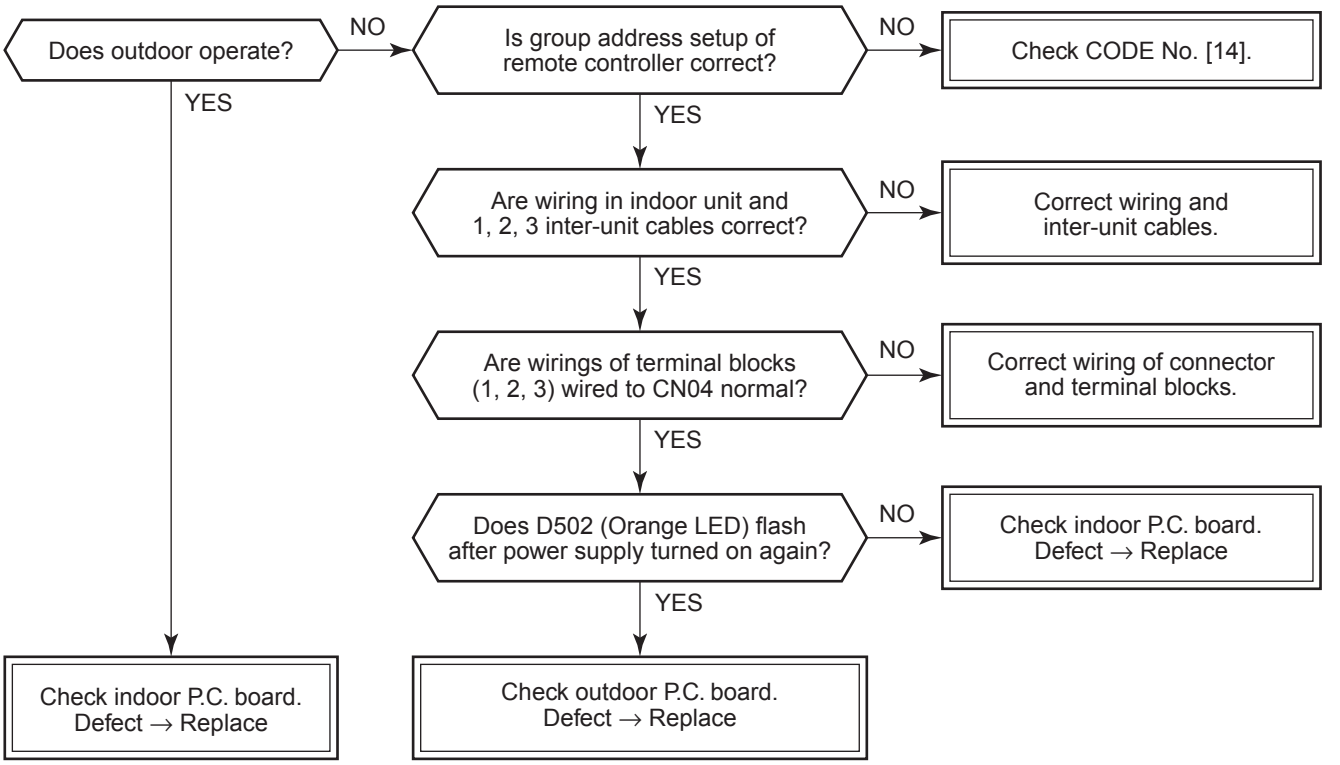
[E01 error]



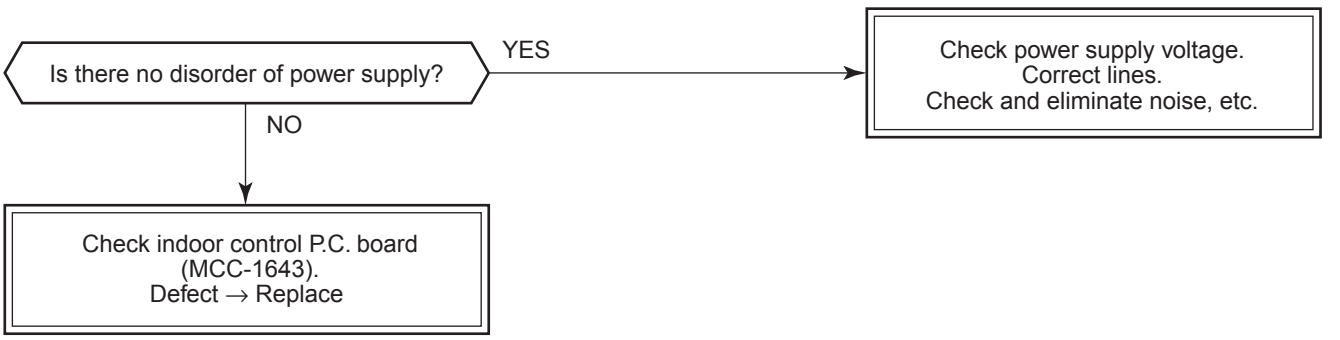
[E09 error]



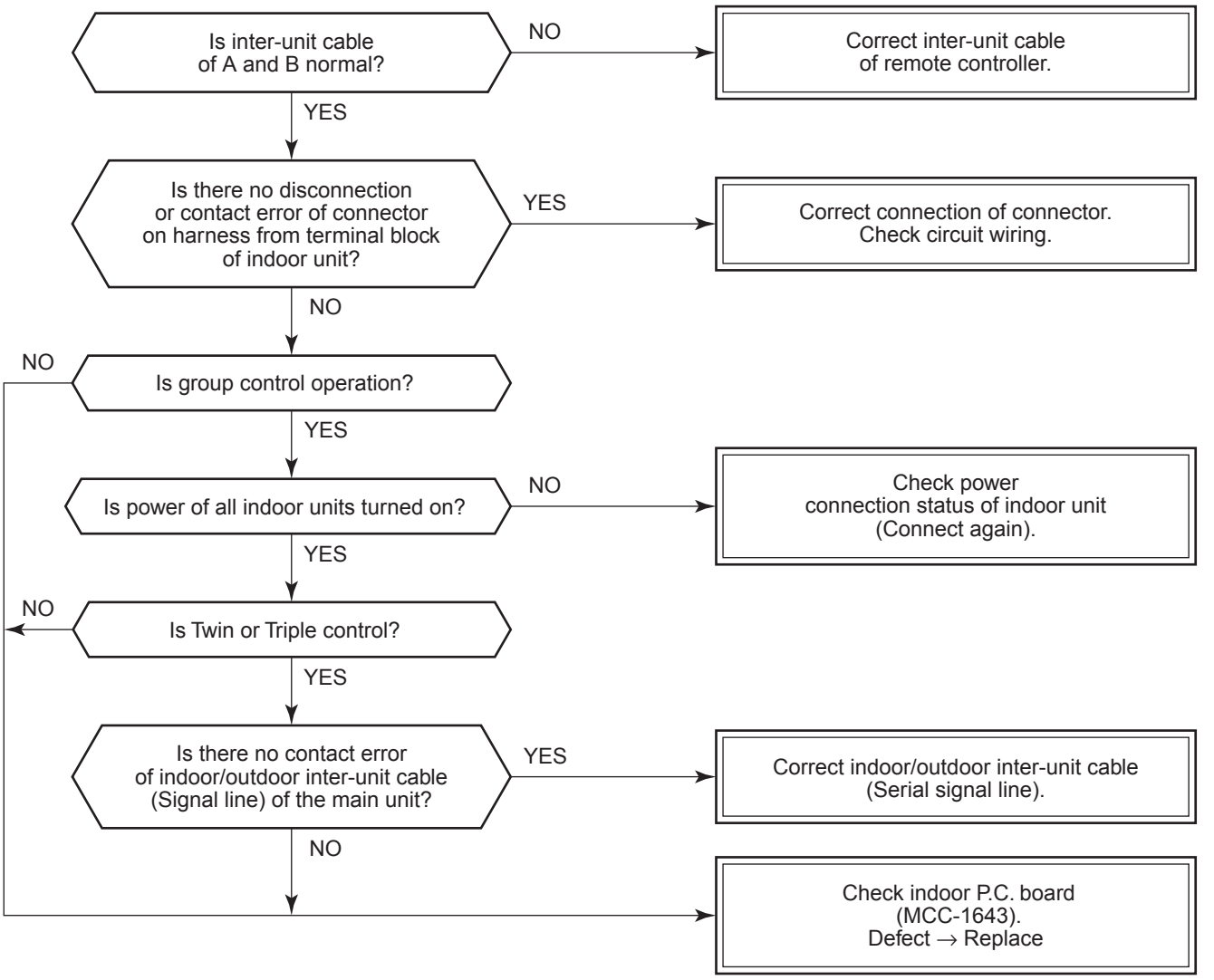
[E04 error]



[E10 error]



[E18 error]



[E08, L03, L07, L08 error]

E08: Duplicated indoor unit No.

L03: There are 2 or more master units in a group control.

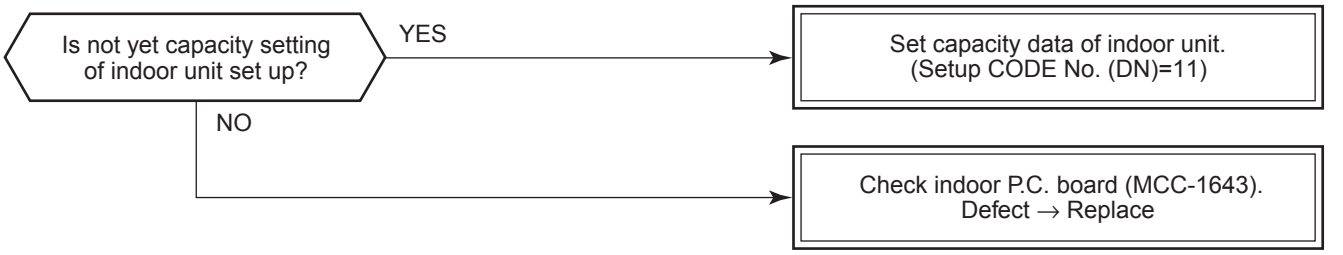
L07: There is 1 or more group address [Individual] in a group control.

L08: The indoor group address is unset. (**10. ADDRESS SETUP**)

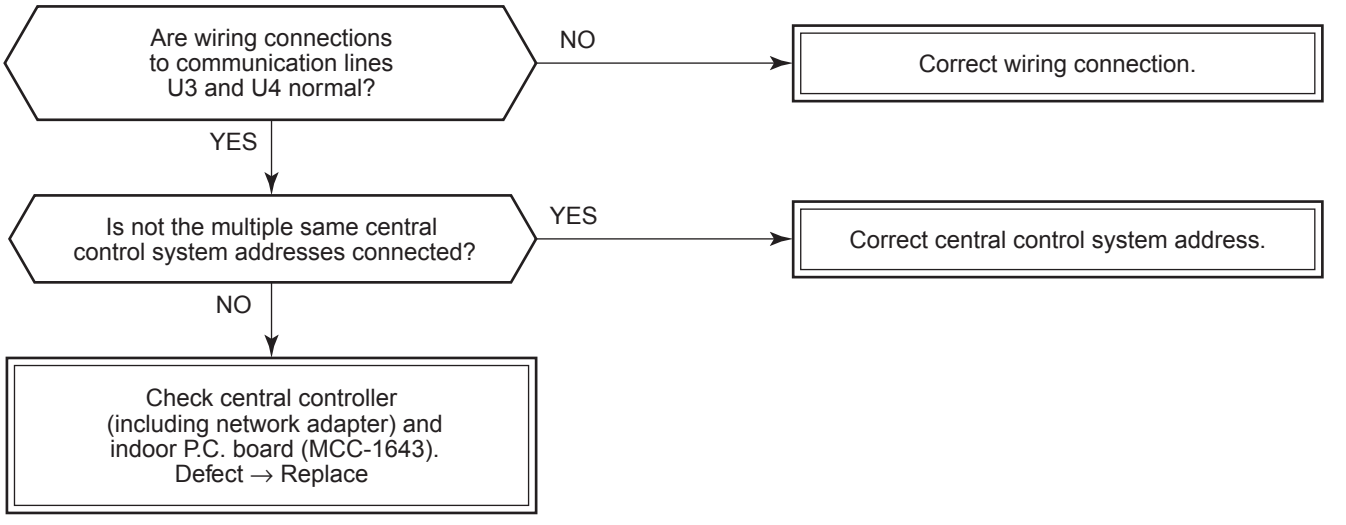
If the above error is detected when power supply turned on, the mode enters automatically in the automatic address set mode. (Check code is not output.)

However, if the above error is detected during the automatic address set mode, a check code may be output.

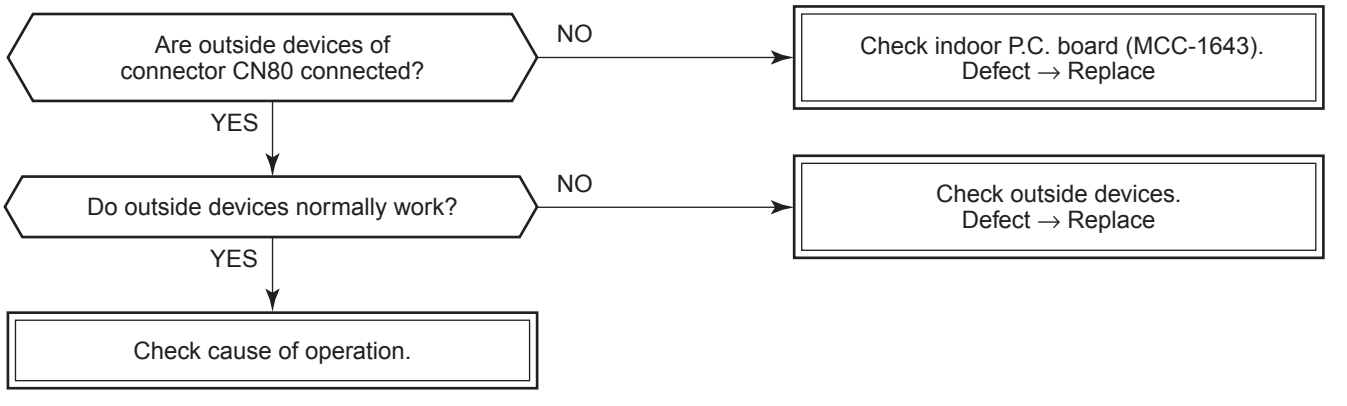
[L09 error]



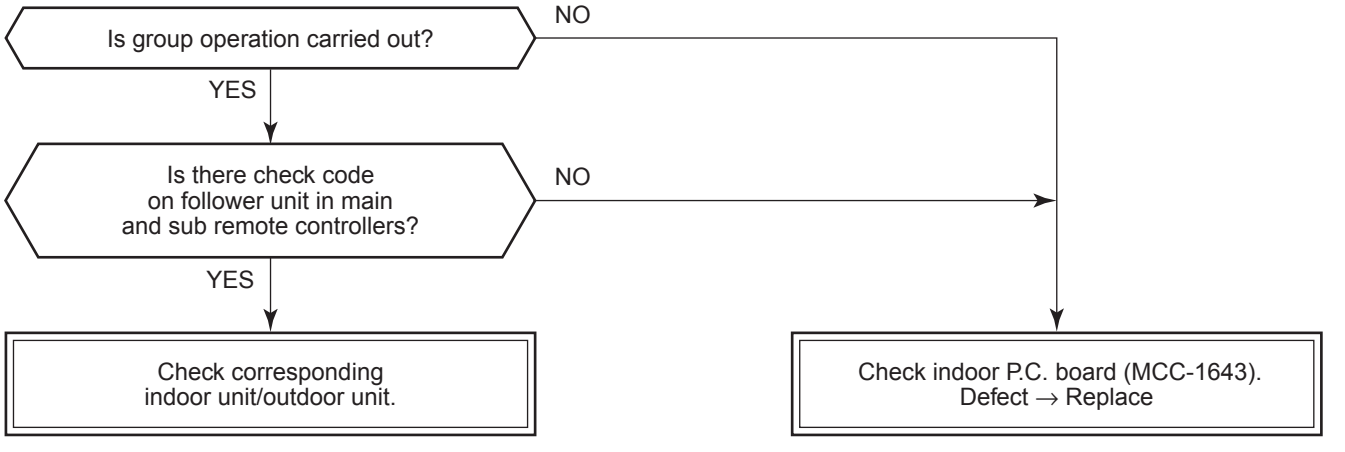
[L20 error]



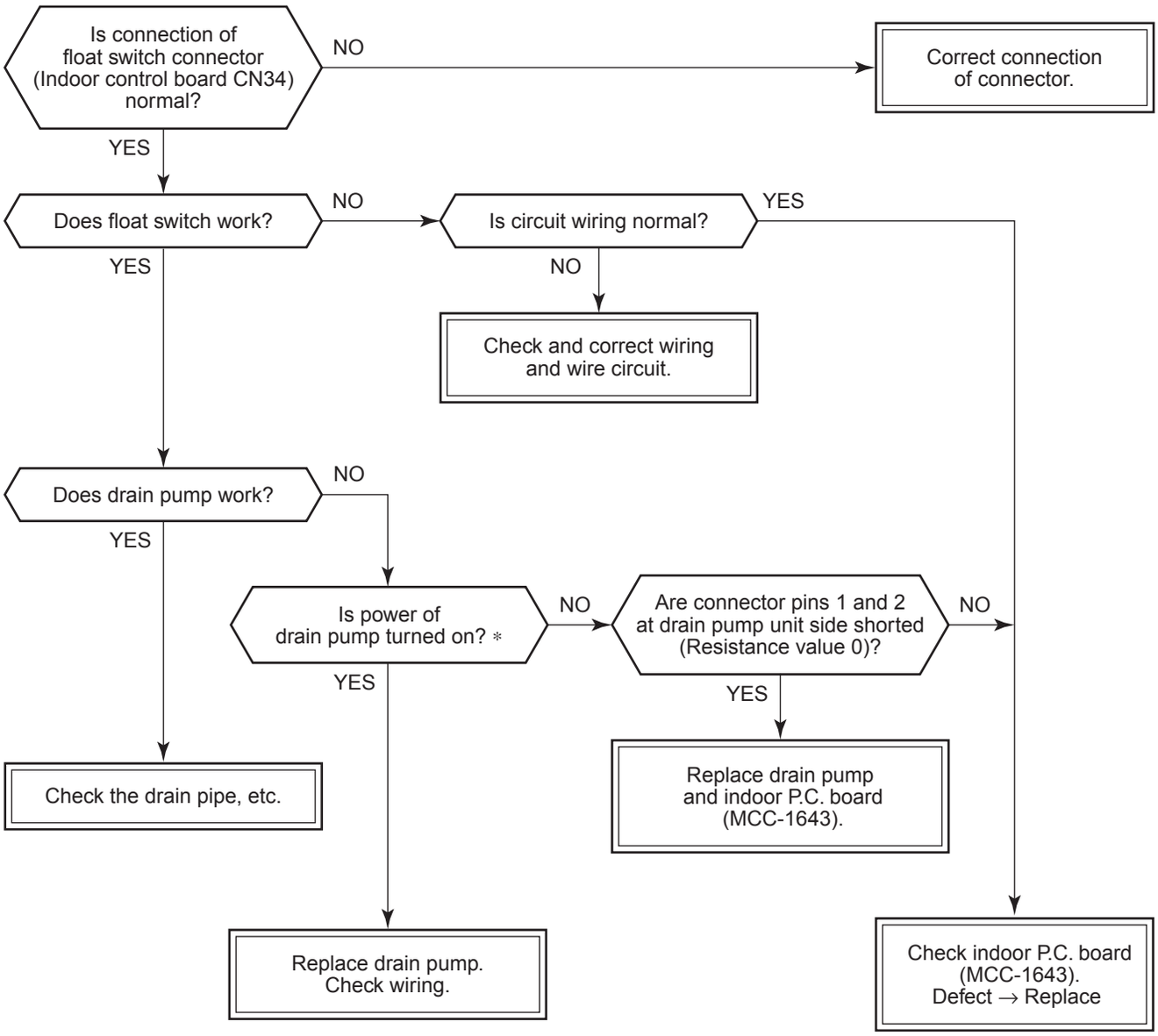
[L30 error]



[P30 error] (Central controller)

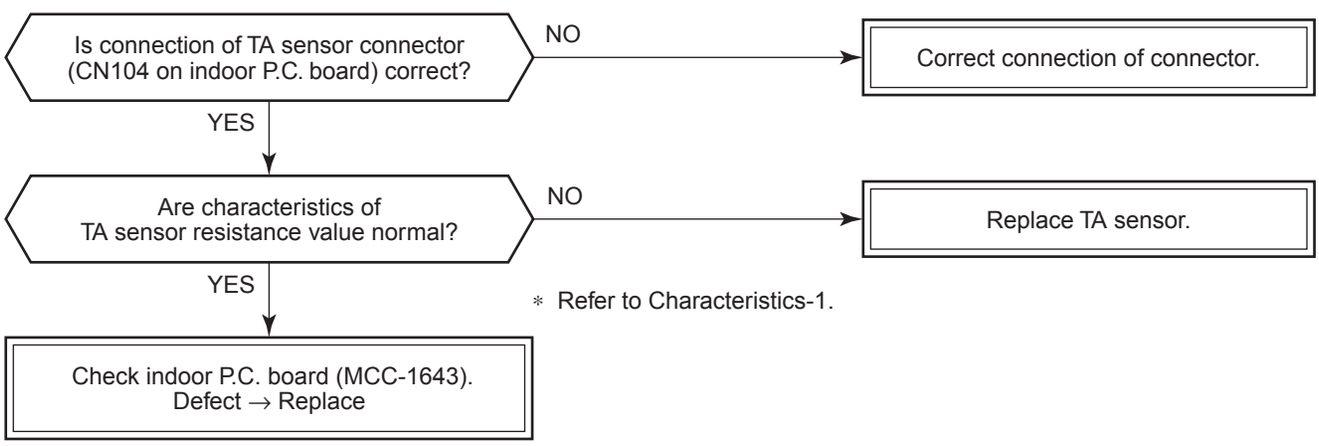


[P10 error]

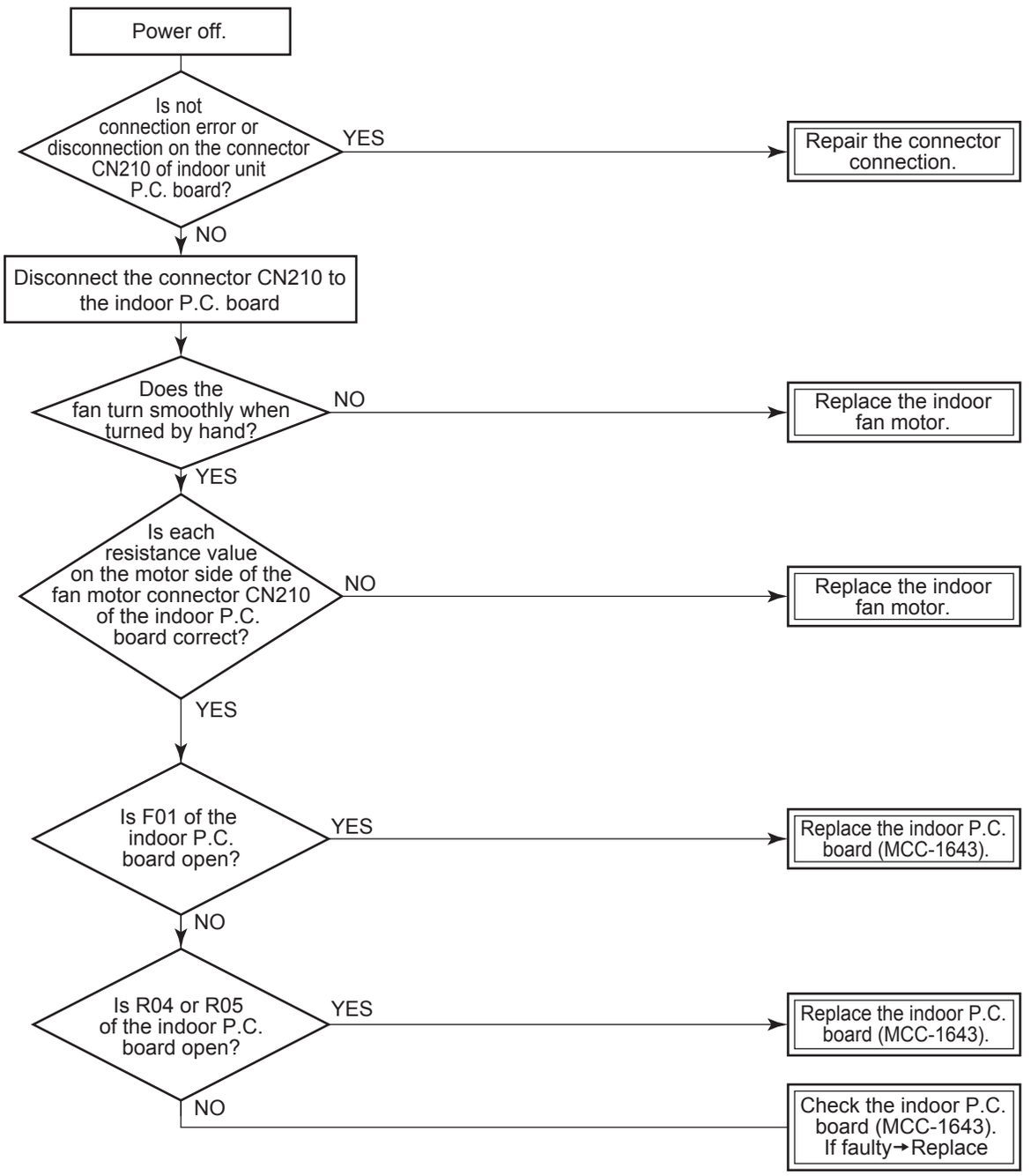


∗ Check that voltage of 1-2 pin of CN504 on the indoor P.C. board is +12V. (1 pin is plus (+).)

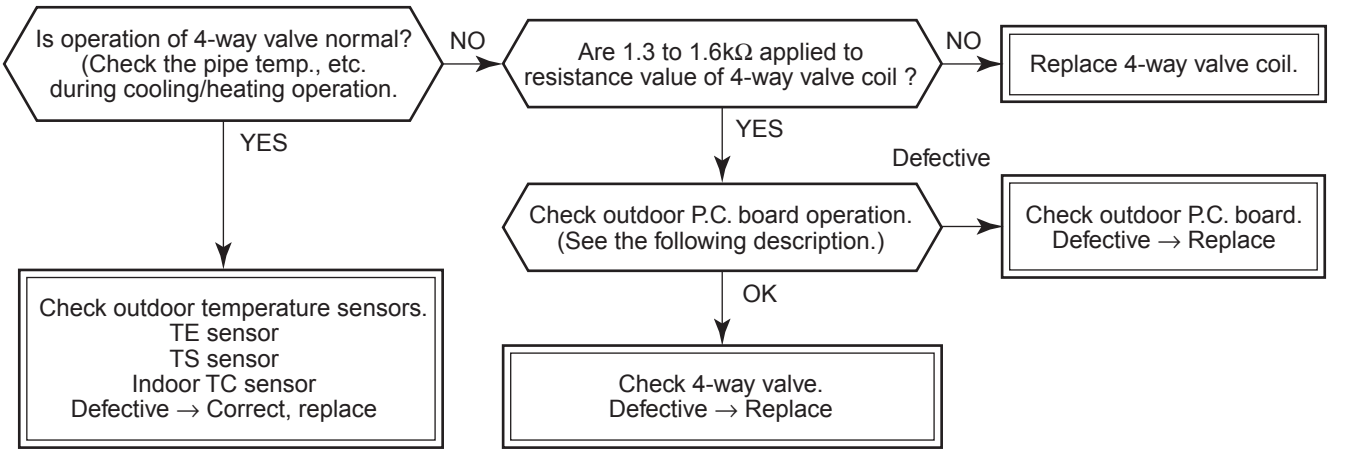
[F10 error]



[P12 error]


Power off.
Is not connection error or disconnection on the connector CN210 of indoor unit P.C. board?
YES
Repair the connector connection.
NO
Disconnect the connector CN210 to the indoor P.C. board
Does the fan turn smoothly when turned by hand?
NO
Replace the indoor fan motor.
YES
Is each resistance value on the motor side of the fan motor connector CN210 of the indoor P.C. board correct?
NO
Replace the indoor fan motor.
YES
Is F01 of the indoor P.C. board open?
YES
Replace the indoor P.C. board (MCC-1643).
NO
Is R04 or R05 of the indoor P.C. board open?
YES
Replace the indoor P.C. board (MCC-1643).
NO
Check the indoor P.C. board (MCC-1643). If faulty→Replace

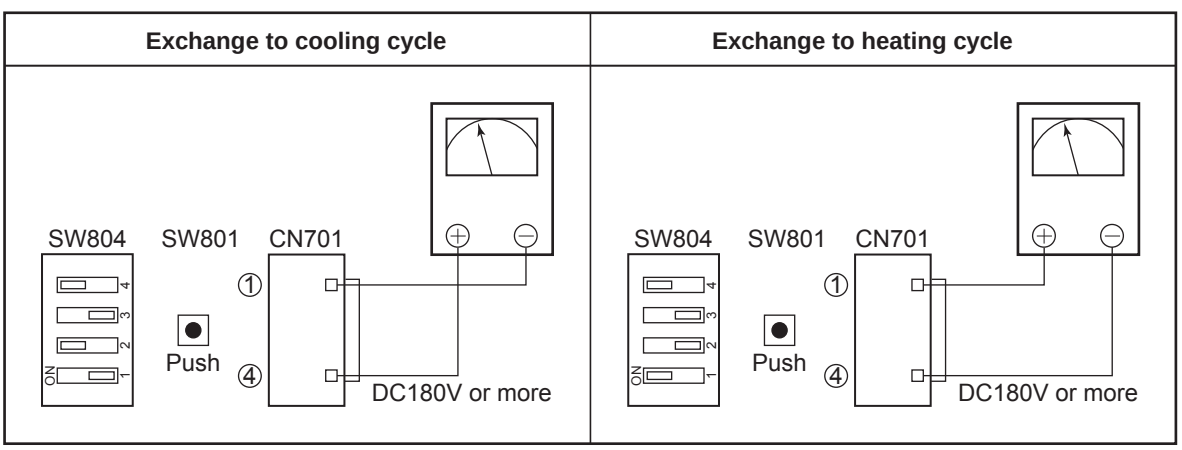
[P19 error]



Operation check direction of the outdoor P.C. board (In case of self-preservation valve)

1) Set the Dip switch SW804 as same as the following table and push SW801 for approx. 1 second. It enables you to check the exchange operation to cooling cycle or heating cycle.
   - Only for approx. 10 seconds, the power is turned on.
   - As the heat value of part (coil: resistance R700) is large, when checking the operation continuously, wait 1 minute or more until the next check. (There is no problem if a coil is not connected.)

2) After check, turn off all the Dip switches SW804.

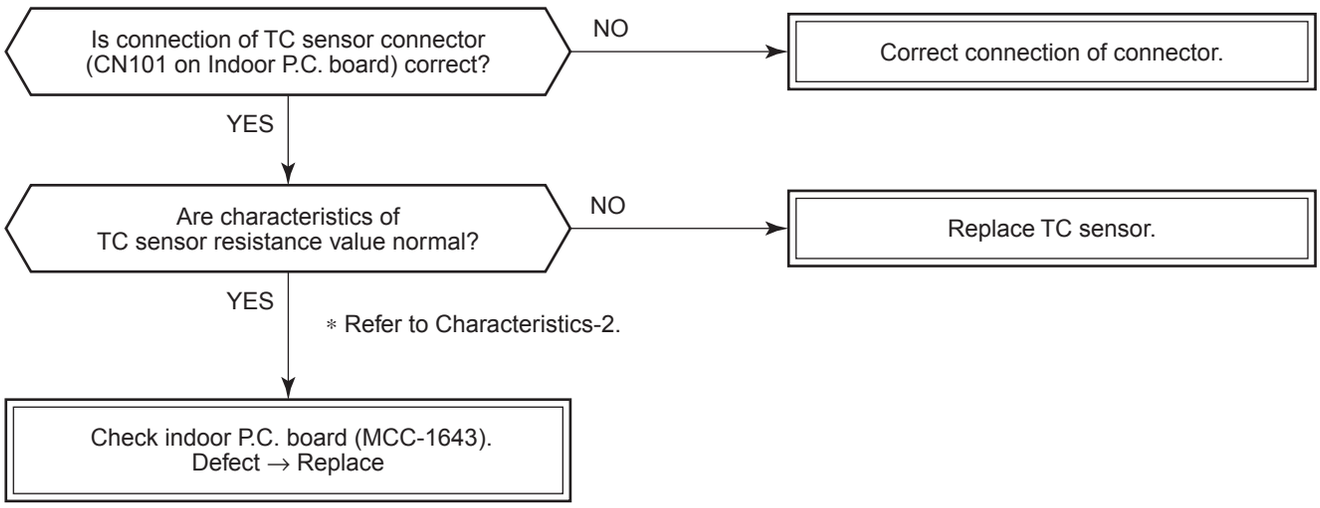


Check by tester

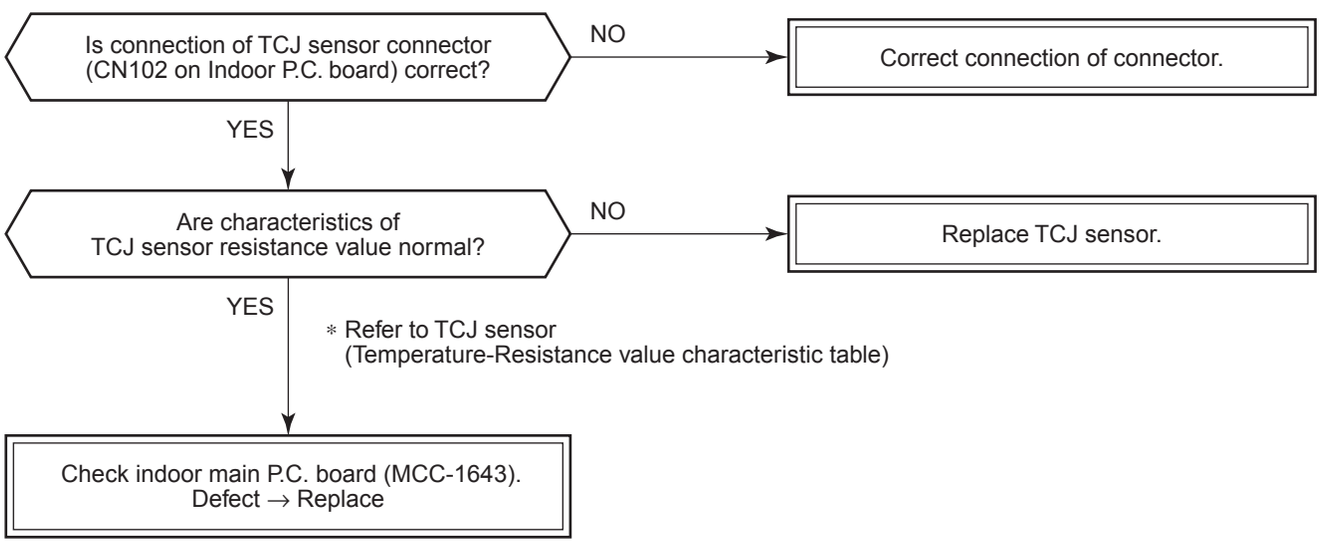
Analog tester: Good article if over DC180V

Digital tester: Although in some cases, the value varied and indicated. If the maximum value is DC180V or more, it is good article.

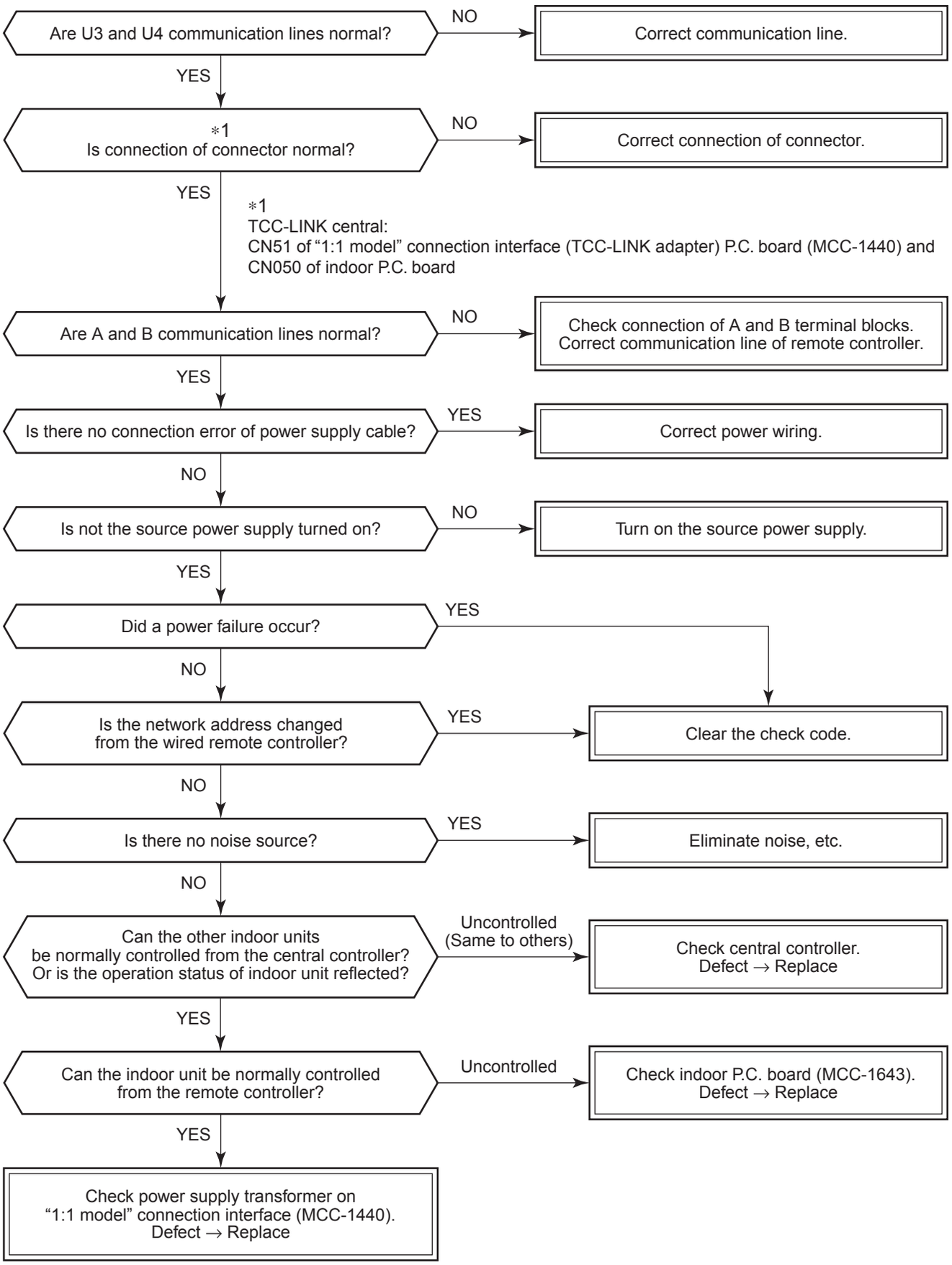
[F02 error]



[F01 error]



[C06 error] (“1:1 model” connection interface)



[E03 error] (Header indoor unit)

[E03 error] is detected when the indoor unit cannot receive a signal from the remote controller (also central controller).

Check A and B remote controllers and communication lines of the central control system U3 and U4.

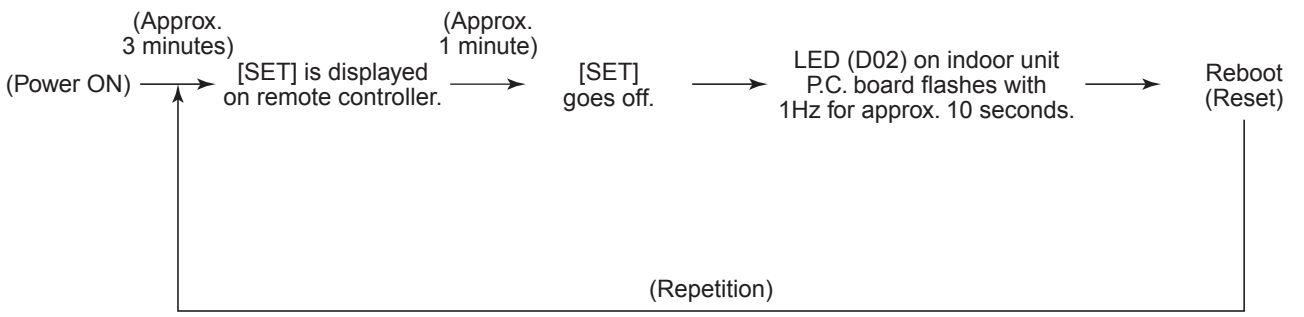
As communication is impossible, this check code [E03] is not displayed on the remote controller and the central controller. [E01] is displayed on the remote controller and [C06 error] is displayed on the central controller.

If these check codes generate during operation, the air conditioner stops.

[F29 error]

This check code indicates a detection error of IC10 non-volatile memory (EEPROM) on the indoor unit P.C. board, which generated during operation of the air conditioner. Replace the service P.C. board.

* When EEPROM was not inserted when power supply turned on or when the EEPROM data read/write operation is impossible at all, the automatic address mode is repeated. In this time, [97 error] is displayed on the central controller.



[P31 error] (Follower indoor unit)

When the header unit of a group operation detected [E03], [L03], [L07] or [L08] error, the follower unit of the group operation detects [P31 error] and then the unit stops.

There is no display of the check code or alarm history of the wired remote controller. (In this model, the mode enters in automatic address set mode when the header unit detected [L03], [L07] or [L08] error.)

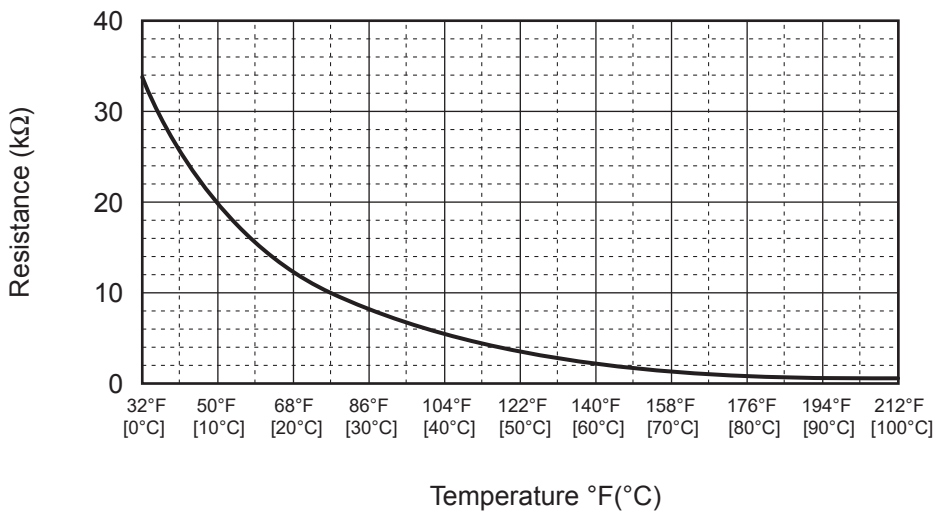
Temperature sensor — Temperature – Resistance value characteristic table

TA, TC, TCJ sensors

Representative value

Temperature °F [°C]	Resistance value (kΩ)		
	(Minimum value)	(Standard value)	(Maximum value)
32 [0]	32.33	33.80	35.30
50[10]	19.63	20.35	21.09
68[20]	12.23	12.59	12.95
77[25]	9.75	10.00	10.25
86[30]	7.764	7.990	8.218
104[40]	5.013	5.192	5.375
122[50]	3.312	3.451	3.594
140[60]	2.236	2.343	2.454
158[70]	1.540	1.623	1.709
176[80]	1.082	1.146	1.213
194[90]	0.7740	0.8237	0.8761
212[100]	0.5634	0.6023	0.6434

TA, TC, TCJ sensors



∗ As TH sensor (Outdoor unit heat sink temp. sensor) is incorporated in the outdoor control P.C. board, the resistance value cannot be measured.

8. REPLACEMENT OF SERVICE P.C. BOARD

⚠ CAUTION

<Model name: RAV-HB∗∗∗UTP∗>
For the above models, set the CODE No. “E0” and the setting data “0000” (initial) to “0001”.

<Note: when replacing the P.C. board for indoor unit servicing>
The nonvolatile memory (hereafter called EEPROM, IC503) on the indoor unit P.C. board before replacement includes the model specific type information and capacity codes as the factory-set value and the important setting data which have been automatically or manually set when the indoor unit is installed, such as system/indoor/group addresses, high ceiling select setting, etc.

When replacing the P.C. board for indoor unit servicing, follow the procedures below.

After replacement completes, confirm whether the settings are correct by checking the indoor unit No., Group header unit/follower unit settings and perform the cooling cycle confirmation through the trial operation.

<Replacement procedures>

CASE 1

Before replacement, the indoor unit can be turned on and the setting data can be read out by wired remote control operation.

EEPROM data read out **[1]**

⇩

Replacement of P.C. board for Indoor unit servicing and power on **[2]**

⇩

Writing the read out EEPROM data **[3]**

⇩

Power reset
(for all indoor units connected to the remote control when the group operation control is performed.)

CASE 2

The EEPROM before replacement is trouble and the setting data cannot be read out.

EEPROM data read out **[2]**

⇩

Writing the setting data to EEPROM, such as optional connection setting, etc., based on the customer information. **[3]**

⇩

Power reset
(for all indoor units connected to the remote control whn the group operation control is performed.)

[1] Setting data read out from EEPROM

(Stop the operation of the unit.)

Step 1 Push [☰ Menu] to open the “Menu”.

Step 2 Push and hold [☰ Menu] and [∨] at the same time to open “Field setting menu”.
• Push and hold 4 second .

Step 3 Push [∧] and [∨] to select “DN setting”, and then push [▢ Set/Fix].

Step 4 Select “Indoor unit” , and the push [▢ Set/Fix]

Step 5 For group operation, all connected rooms in the system are displayed.
Select the unit whose EEPROM contents you want to read and push [▢ Set/Fix].
→ The fan of the selected indoor unit operates and the flap swings.

1. Push [<] to black highlight the code (DN), and then push [∧] and [∨] to set the code No. to 1.
   (This is the setting for the filter sign lighting time.)
   At this time, be sure to write down the setting data displayed.
2. Change the CODE No. (DN) by pushing ∧ / ∨ buttons.
   Similarly, be sure to write down the setting data displayed.
3. Repeat the step 2 to set the other settings in the same way and write down the setting data in the manual that comes with the P.C. board.

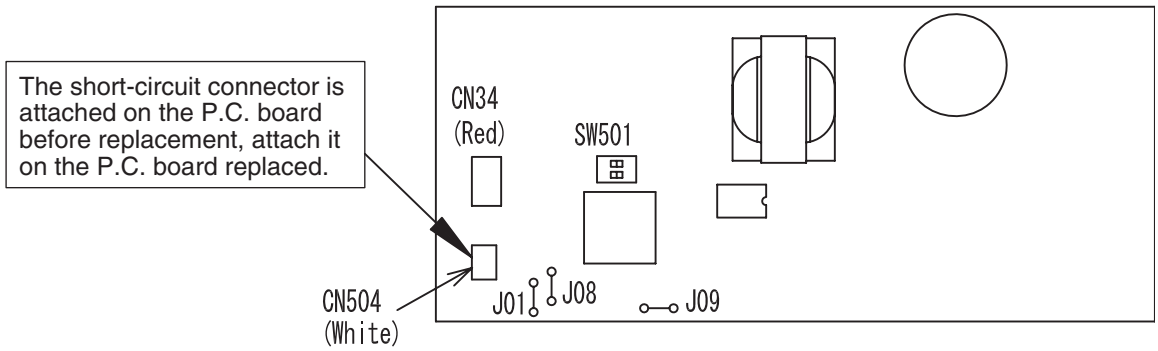
CODE No. required at least

DN	Contents
0010	Type
0011	Indoor unit capacity
0012	System address
0013	Indoor unit address
0014	Group address

1. The CODE No. for the Indoor unit type and Indoor unit capacity are required to set the rotation number setting of the fan.
2. If the system/indoor/group addresses are different from those before replacement, the auto-address setting mode starts and the manual resetting may be required again.
   (when the multiple units group operation including twin system.)

[2] P.C. Board for indoor unit servicing replacement procedures

Step 1 Replace the P.C. board to the P.C. board for indoor unit servicing.
At this time, perform the same setting of the jumper wire (J01, J08, J09) setting (cut), switch SW501, (short-circuit) connector CN34 as the setting of the P.C. board before replacement.



Step 2 According to the system configuration, turn on the indoor unit following to the either methods shown below.

a) Single operation (Indoor unit is used as standalone.)
Turn on the indoor unit.

1. After completion of the auto-address setting mode (required time: approx. 5 min.), proceed to [3]. (System address = 1, Indoor unit address = 1, Group address = 0 (standalone) are automatically set.)
2. Interrupt the auto-address setting mode, and proceed to [3].

b) Group operation (including twin triple and double twin system)
Turn on the indoor unit(s) with its P.C. board replaced to the P.C. board for indoor unit servicing, according to either methods 1 or 2 shown below.

1. Turn on only the indoor unit with its P.C. board replaced. (Be sure to confirm the remote controller is surely connected. If not, the operation [3] cannot be performed.)
   Perform either methods 1 or 2 described in item a) above.
2. Turn on the multiple indoor units including the indoor unit with its P.C. board replaced.
   - Twin or triple or double twin 1 system only
   - All group connections

After completion of the auto-address setting mode (required time: approx. 5 min.), proceed to **[3]**.

* The header unit of the group may be changed by performing the auto-address setting.
  Also, the system address/Indoor unit address of the indoor unit with its P.C. board replaced may be assigned to the addresses (not used) other than those of the indoor units without its P.C. board replaced.
  It is recommended to keep the information in advance, which refrigerant system the indoor unit belongs to or whether the indoor unit works as the header unit or the follower unit in the group control operation.

[3] Writing the setting data to EEPROM

The settings stored in the EEPROM of the P.C. board for indoor unit servicing are the factory-set values.

Step 1 Push [Menu] to open the “Menu”.

Step 2 Push and hold [Menu] and [ ] at the same time to open “Field setting menu”.
• Push and hold 4 seconds.

Step 3 Push [ ] and [ ] to select “DN setting”, and then push [Set/Fix].

Step 4 Select “Indoor unit” , and the push [Set/Fix]

Step 5 For group operation, all connected rooms in the system are displayed.
Select the unit whose EEPROM contents you want to read and push [Set/Fix].
→The fan of the selected indoor unit operates and the flap swings.

Step 6 Push [ ] to black highlight the code (DN), and then push [ ] and [ ] to set the code.
• Set the indoor unit type and capacit .
The factory-set values shall be written to the EEPROM by changing the type and capacity.

1. Set the CODE No. (DN) to 10 . (without change)
2. Push [ ] to black highlight the data, and then push [ ] and [ ] to set the type.
   (Refer to Type DN code “10” on page 60.)
3. After finishing setting the data of the code (DN), push [Set/Fix]
   → “Continue?” is displayed.
4. To set the data of other codes (DN), push [Set/Fix]
5. Push [ ] to black highlight the code (DN), and then push [ ] and [ ] to set the code No. to 11.
6. Push [ ] to black highlight the data, and then push [ ] and [ ] to set the capacity.
   (Refer to Indoor Unit Capacity DN code “11” on page 60.)
7. After finishing setting the data of the code (DN), push [Set/Fix]
   → “Continue?” is displayed.
8. Push [Return]
   When doing group connections:
   → Push [Return] to open the unit selection screen. In the unit selection screen, push [Return] to briefly display “ ”, and then return to the “Field setting menu” screen.

Step 7 Write the on-site setting data to the EEPROM, such as address setting, etc.
Perform the steps 1 and 4 above again.

Step 8 Push [ ] to black highlight the code (DN), and then push [ ] and [ ] to set the code No. to 1.
(This is the setting for the filter sign lighting time.)

Step 9 Check the setting data displayed at this time with the setting data put down in [1].

1. If the data is different, push [ ] to highlight the data in black and white, push [ ] and [ ] to change the data to what you wrote down, and push [Set/Fix].
2. If the data is the same, proceed to next step.

Step 10 Push [ ] to black highlight the code (DN), and then push [ ] and [ ] to set the code.
As described above, check the setting data and modify to the data put down in [1].

Step 11 Repeat the steps 8 and 9.

Step 12 After the setting completes, push [Return]
When doing group connections:
→ Push [Return] to open the unit selection screen. In the unit selection screen, push [Return] to briefly display “ ”, and then return to the “Field setting menu” screen.

Even after modifying the data wrongly and pushing [Set/Fix] it is possible to return to the data before modification by pushing [Return] if the CODE No. (DN) is not changed.

<Fig. 2 EEPROM layout diagram>

The EEPROM (IC503) is attached to the IC socket. When detaching the EEPROM, use a tweezers, etc. Be sure to attach the EEPROM by fitting its direction as shown in the figure.

* Do not bend the IC lead when replacing.

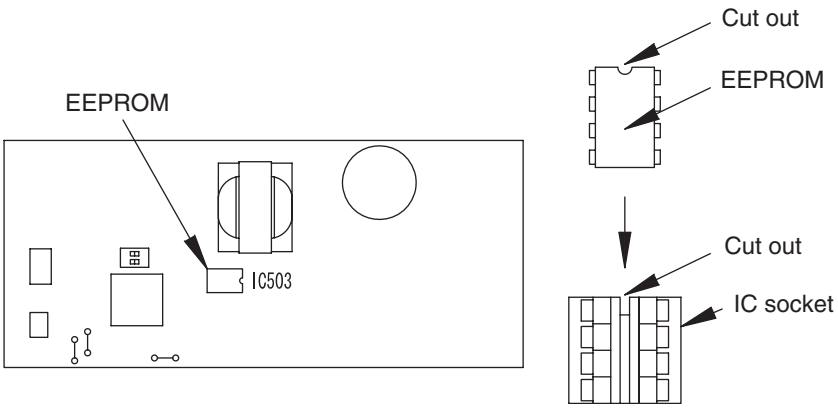


Table 1. Setting data (Code No. table (example))

DN	Item	Setting data	Factory-set value
01	Filter sign lighting time		Depending on Type
02	Filter pollution level		0000:standard
03	Central control address		0099:Not determined
06	Heating suction temperature shift		0002:+35.6°F[3.6°C] (Flooring installation type: 0)
0F	Cooling Only		0000:Heat pump
10	Type		Depending on model type
11	Indoor unit capacity		Depending on model type
12	System address		0099:Not determined
13	Indoor unit address		0099:Not determined
14	Group address		0099:Not determined
1E	Temperature range of cooling/heating Automatic SW control point		003:3 deg(Ts±1.5)
28	Power failure automatic recovery		0001:Provided
2A	Option/Abnormal input (CN70)SW		0002:Humidifier
2B	Thermo output SW(T10③)		0000:Thermo ON
31	Ventilation fan (standalone)		0000:Not available
32	Sensor SW		0000:Body sensor
33	Temperature unit select		0001 : °F
40	Humidifier control (+ drain pump control)		0003:Humidifier ON + Pump OFF
5D	External static pressure		Depending on capacity type
60	Timer setting (Wired remote controller)		0000:Available
7A	Change unit 0.9°F[0.5°C] or 1.8°F[1.0°C] on remote		0001 : 0.9°F[0.5°C]
C2	Demand setting (outdoor unit current demand)		0075:75%
E0	Region		0001:North America
D0	Remote controller operation save function		0001:Enable
D1	Frost protection function		0000:None
D6	Fan speed tab		0001:5 tab

Table 2. Type: Code No.10

Setting data	Type	Model
0001*1	4-Way Air Discharge Cassette Type	RAV-HB**1UTP-UL

*1 EEPROM initial value on the P.C. board for indoor unit servicing

Table 3. Indoor unit capacity: Code No.11

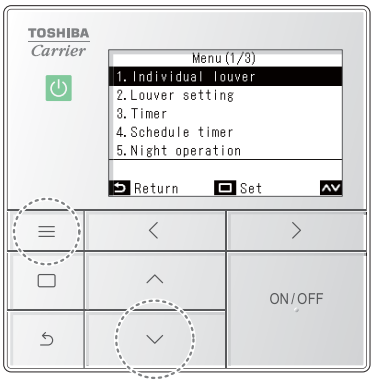
Setting data	Model
00*	Disable
06	12
09	18
12	24
13	30
15	36
17	42
18	48

9. SETUP AT LOCAL SITE AND OTHERS

9-1. Indoor Unit

9-1-1. Test Run Setup on Remote Controller

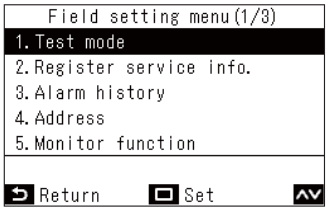
<Wired remote controller>

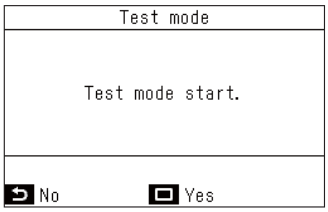


1 **Push [Menu] to open the "Menu"**

2 **Push and hold [Menu] and [ ] at the same time to open "Field setting menu"**

→Push and hold 4 seconds.

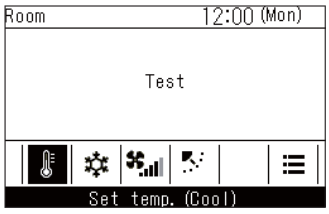




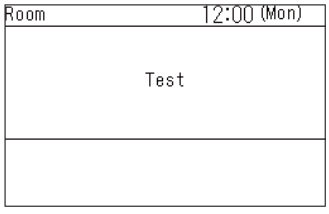
3 **In the "Field setting menu" screen, push [ ] and [ ] to select "Test mode", and then push [Set/Fix]**

→Test mode is set, and returns to the "Field setting menu" screen. push the [Return] button 2 times, to open screen (2).

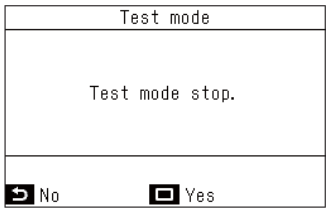
(1)



(2)



(3)



4 **push [ON/OFF ON/OFF]**

→Operation starts, and in test mode screen (1) opens. (While stopped, it is screen (2))

→Test mode is done while the operating mode is set to "Cool" or "Heat".

→The temperature cannot be set in test mode.

→Check codes are displayed in the normal way.

5 **After completing test mode, in the "Field setting menu" screen, push [ ] and [ ] to select "Test mode", and then push [Set/Fix]**

→Screen (3) appears.

→Push [Set/Fix] to end test mode and do normal operation.

<Wireless remote controller>

◆ In case of wireless remote controller

1 Turn on the power of the air conditioner.
When power is turned on for the first time after installation, it takes approx. 5 minutes until the remote controller becomes available. In the case of subsequent power-on, it takes approx. 1 minute until the remote controller becomes available.
Execute a test run after the predetermined time has passed.

2 Push “ON/OFF” button on the remote controller, select [Cool] or [Heat] with “MODE” button, and then select [HIGH] with “FAN” button.

3

Cooling test run	Heating test run
Set the temperature to 62°F with the temp. setup buttons.	Set the temperature to 86°F with the temp. setup buttons.

4

Cooling test run	Heating test run
After confirming a signal receiving sound “beep” immediately set the temperature to 64°F with the temp. setup buttons.	After confirming a signal receiving sound “beep” immediately set the temperature to 84°F with the temp. setup buttons.

5

Cooling test run	Heating test run
After confirming a signal receiving sound “beep” Immediately set the temperature to 62°F with the temp. setup buttons.	After confirming a signal receiving sound “beep” immediately set the temperature to 86°F with the temp. setup buttons.

6 Repeat procedures ***4 → 5 → 4 → 5***.
Indicators “Operation” (green), “Timer” (green), and “Ready” (orange) in the wireless receiver section flash in approx. 10 seconds, and the air conditioner starts operation. If any of these indicators does not flash, repeat procedures 2 to 5.

7 Upon completion of the test run, push “ON/OFF” button to stop operation.

<Overview of test run operations using the wireless remote controller>

▼ Cooling test run:
ON/OFF → 62 °F → 64 °F → 62 °F → 64 °F → 62 °F → 64 °F → 62 °F → (test run) → ON/OFF

▼ Heating test run:
ON/OFF → 86 °F → 84 °F → 86 °F → 84 °F → 86 °F → 84 °F → 86 °F → (test run) → ON/OFF

9-1-2. Forced Defrost Setup of Remote Controller (For wired remote controller only)

(Preparation in advance)
Forced Defrost Setup

1 **Push the [MENU] button to display the menu screen.**

2 **Push and hold the [MENU] button and the [ ] button at the same time to display the "Field setting menu".**

→ Push and hold the buttons for more than 4 seconds.

3 **Push the [ ] / [ ] button to select "7. DN setting" on the "Field setting menu" screen, then push the [Set/Fix].**

→ The fan and louver of the indoor unit operate.
When the group control is used, the fan and louver of the selected indoor unit operate.

→ Move the cursor to select "Code(DN)" with the the " [ ] button, then set **"008C"** with [ ] / [ ] button.

→ Move the cursor to select "Data" with the [ ] button, then set **"0001"** with the [ ] / [ ] button.

4 **Push the [MENU] button to set the other Code(DN) and Data. After "Continue?" is displayed on the screen, push the [Set/Fix].**

5 **Push the [Set/Fix]. to finish the setting operation. " Setting" appears on the screen for a while, then the screen returns to the "Field setting menu" screen.**

→ Pushing the " **[Set/Fix].** No" displays the unit selection screen when the group control is used. Push the [CANCEL] button on the unit selection screen to finish the setting operation. " Setting" appears on the screen for a while, then the screen returns to the "Field setting menu" screen.

(Practical operation)

- Push [ON/OFF] button.
- Select the HEAT mode.
- After a while, the forced defrost signal is sent to the outdoor unit and then the outdoor unit starts defrost operation. (The forced defrost operation is performed for Max. 12 minutes.)
- After defrost operation finished, the operation returns to the heating operation.

To execute the defrost operation again, start procedure from above item *1* .
(If the forced defrost operation was executed once, setting of the above forced defrost operation is cleared.)

9-1-3. LED Display on P.C. Board

1. D501 (Red)

- It goes on (Goes on by operation of the main microcomputer) at the same time when the power supply is turned on.
- It flashes with 1-second interval (every 0.5 second): When there is no EEPROM or writing-in operation fails.
- It flashes with 10-seconds interval (every 5 second): During DISP mode
- It flashes with 2-seconds interval (every 1 second): While setting of function select (EEPROM)

2. D403 (Red)

- It goes on when power supply of the remote controller is turned on. (Lights on hardware)

3. D14 (Orange)

- It flashes while receiving the serial signal from the outdoor unit. (Hardware)

4. D15 (Green)

- It flashes while sending the serial signal to the outdoor unit. (Hardware)

Function selection CODE No. (DN) list

DN	Item	Contents	At shipment from factory
01	Filter sign lighting time	0000: None 0001: 150H 0002: 2500H 0003: 5000H 0004: 10000H 0005: Clogging sensor used	According to type
02	Filter stain level	0000: Standard 0001: Heavy stain (Half of standard time)	0000: Standard
03	Central control address	0001: No.1 unit to 0064: No.64 unit 0099: Undecided	0099: Undecided
06	Heating suction temp. shift	0000: No shift 0001: +1.8°F(+1°C) 0002: +3.6°F(+2°C) to 0010: +18°F(+10°C) (Up to +6 is recommended.)	0002: +3.6°F(+2°C) (Floor type 0000: 0°C)
0F	Cooling-only	0000: Heat pump 0001: Cooling only (No display for [AUTO] [HEAT])	0000: Heat pump
10	Type	0000: 1-way cassette type 0001: 4-way cassette type	According to model type
11	Indoor unit capacity	0000: Undecided 0001 to 0034	According to capacity type
12	Line address	0001: No.1 unit to 0030: No.30 unit	0099: Undecided
13	Indoor unit address	0001: No.1 unit to 0064: No.64 unit	0099: Undecided
14	Group address	0000: Individual 0001: Master unit in group 0002: Follower unit in group	0099: Undecided
19	Louver type (Adjustment of air direction)	0000: No louver model 0001: Swing only (0002:1-way) (0003:2-way) 0004: 4-way	According to model type
1E	In automatic cooling/heating, temp. width of cool → heat, heat → cool mode selection control point	0000: 0 deg to 0010: 10 deg (Cool/heat are reversed with ± (Data value) / 2 against the set temperature)	0003: 3 deg (Ts±1.5)
28	Automatic reset of power failure	0000: None 0001: Provided	0001: Provided
2A	Selection of option / error input (CN70)	0000: Filter input 0001: Alarm input 0002: Humidifier input (Air cleaner, etc.)	0002: Humidifier
2b	Selection of thermostat output (T10 ③)	0000: Indoor thermostat ON 0001: ON receiving output of outdoor compressor	0000: Thermostat ON
2E	Selection of HA (T10) terminal	0000: Normal (JEMA) 0001: Card input 0002: Fire alarm input (Forgotten to be off)	0000: Normal (HA terminal)
31	Vent fan (Single operation)	0000: Impossible 0001: Possible	0000: Impossible
32	Sensor selection	0000: Body TA sensor 0001: Remote controller sensor	0000: Body sensor
33	Temperature unit select	0000: °C 0001: °F	0001: °F
5d	High ceiling selection (SW)		0000: Standard
60	Timer setting (Wired remote controller)	0000: Operable 0001: Operation prohibited	0000: Operable
7A	Change unit +0.9°F(0.5°C) or +1.8°F (1.0°C) on remote	0000 : 1.8°F(1.0°C) 0001 : +0.9°F(0.5°C)	0001 : +0.9°F(0.5°C)

DN	Item	Contents	At shipment from factory
42	Self-clean operation time	0000: None 0000: 0.5 h to 0.012: 0 h Set when compressor-ON time is 10 to 60 minutes. When ON-time is 60 minutes or more, the double of this operation time setting is set.	0002: 1 hour
45	Selection of louver horizontal discharge position	0000: Smudging-less setting 0002: Cold draft preventive setting	0000: Smudging-less setting
C2	Current demand X% to outdoor unit	0050: 50% to 0100: 100%	0075: 75%
CC	Setting of self-clean operation forced stop	0000: No • Clean operation is performed in case of stop by HA input. • HA operation output OFF during clean operation in case of stop by remote controller 0001: Yes • Clean operation is not performed in case of stop by HA input. • HA operation output ON during clean operation in case of stop by remote controller	0000: None
CD	Clean operation stop function when [ON/OFF] operation is prohibited.	The air conditioner stops (including fire alarm such as remote monitor system) while setup of [ON/OFF] operation prohibited (Central 1, 2) is performed from the central controller side. 0000: Valid (Clean operation) 0001: Invalid (No clean operation)	0000: Valid
D0	Existence of remote controller save function	0000: Invalid (Impossible) 0001: Valid (Possible)	0001: Valid (Possible)
D1	Existence of 46.4°F(8°C) heating operation function	0000: Invalid (Impossible) 0001: Valid (Possible)	0001: Valid (Possible)
D3	Revolution frequency of self clean operation	0000: Invalid (Self clean operation is not carried out.) 0001: Valid (Self clean operation is practiced with 210 rpm.)	0001: Valid (210 rpm / operation)
D4	Display / No display of [Dry operation] during self clean operation	0000: Display 0001: No display	0000: Display
E0	Region	0000: Domestic 0001: North America	0001: North America
F0	Louver swing mode	0000: No synchronization 0001: 4-way synchronization 0002: Dual 0003: Cycle	0001: 4-way synchronization
F1	Louver No.1 fixed position	0000: Release (Free) 0001 to 0005: Horizontal discharge position to Downward discharge position	0000: Release
F2	Louver No.2 fixed position	0000: Release (Free) 0001 to 0005: Horizontal discharge position to Downward discharge position	0000: Release
F3	Louver No.3 fixed position	0000: Release (Free) 0001 to 0005: Horizontal discharge position to Downward discharge position	0000: Release
F4	Louver No.4 fixed position	0000: Release (Free) 0001 to 0005: Horizontal discharge position to Downward discharge position	0000: Release

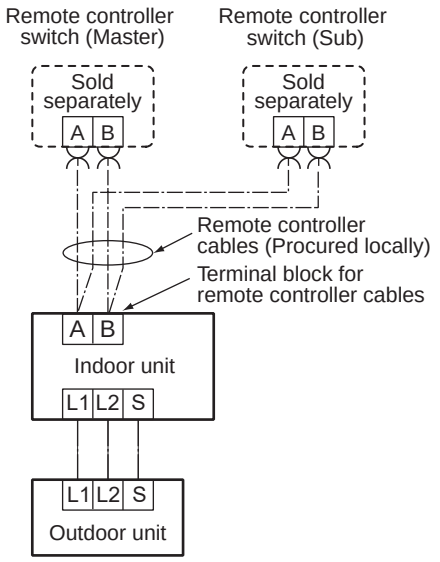
* The swing mode selection (DN code No. [F0]), louver fix (DN code No. [F1] to [F4]) and restriction ratio setting for save operation (DN code No. [C2]) can be set/changed from the normal DN setup (Detail DN setup).

9-1-4. Wiring and Setting of Remote Controller Control

2-remote controller control (Controlled by 2 remote controllers)

This control is to operate 1 or multiple indoor units are operated by 2 remote controllers.
(Max. 2 remote controllers are connectable.)

- **When connected 2 remote controllers operate an indoor unit**

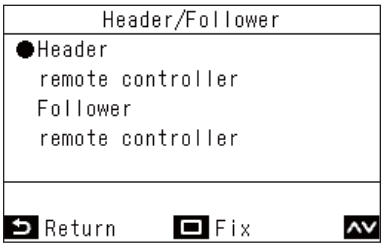


[Operation]

1. The operation contents can be changed by Last-push-priority.
2. Use a timer on either Master remote controller or Sub remote controller.

Set the remote controller as ”Header remote controller (Master)” or “Follower remote controller (Sub)” when the dual remote controller system is used.

Carry out the setting operation while the indoor unit is stopped. (Turn off the air conditioning unit before starting the setting operation.)



1 **In the “Initial setting” screen, press [^] and [v] to select “Header/Follower”, and then press [▭ Set/Fix]**

2 **Press [^] and [v] to select “Header remote controller” or “Follower remote controller”**

3 **Press [▭ Set/Fix]**

→ When “⧖” appears, return to the “Initial setting” screen.

Note for the Header/Follower setting

- Set the RBC-AWSU52-UL remote controller as the Header remote controller when the dual remote controller system is used.
- The RBC-AWSU52-UL remote controller can be used as the Follower remote controller when the dual remote controller system is used that consists of two RBC-AWSU52-UL remote controllers.
- The following functions are not available when the remote controller is set as the Follower remote controller:

  Schedule timer / Off reminder timer / Night operation / Energy saving operation / Return back / Saving operation / Power consumption / Reset power consumption data.

NOTE

- Some functions are not available when the remote controller is set as the Follower remote controller.
- In the dual remote controller system, the latter operation overrides the former.
- The remote controller is set as “Header remote controller” as factory default.
- If the Header (Master) / Follower (Sub) remote controller settings are not set correctly, the “E01,” “E03,” or “E09” check code is displayed.

9-1-5. Monitor Function of Remote Controller Switch

■ Calling of sensor temperature display

The sensor temperature or operational status of indoor unit, outdoor unit, or remote controller can be monitored.

Indoor unit data	
Code	**Data name**
01	Room temperature (remote controller)
02	Indoor unit intake air temperature (TA)
03	Indoor unit heat exchanger (coil) temperature (TCJ)
04	Indoor unit heat exchanger (coil) temperature (TC)
F3	Indoor unit fan cumulative operating hours (x1 h)
E2	Indoor unit refrigerant leak detection sensor output*

Outdoor unit data	
Code	**Data name**
60	Outdoor unit heat exchanger (coil) temperature (TE)
61	Outside air temperature (TO)
62	Compressor discharge temperature (TD)
63	Compressor suction temperature (TS)
65	Heatsink temperature (THS)
6A	Operating current (x1/10)
6D	Outdoor heat exchange (coil) temperature (TL)
F1	Compressor cumulative operating hours (x100 h)

* Display and the contents
- - - - : Sensor function is not available.
0000 : Normal
0001 : Sensor has been used for 5 years.
0002 : Sensor trouble or exceeding the life of the product for sensor
0003 : Sensor is detecting refrigerant leak

1 **Push [☰ Menu] to open the “Menu”.**

2 **Push and hold [☰ Menu] and [∨] at the same time to open “Field setting menu”.**
• Push and hold 4 seco .

3 **Push [∧] and [∨] to select “Monitor function”, and then push [▭ Set/Fix].**
→ In a group connection, after a selection in the unit selection screen, move to the “Monitor function” screen.

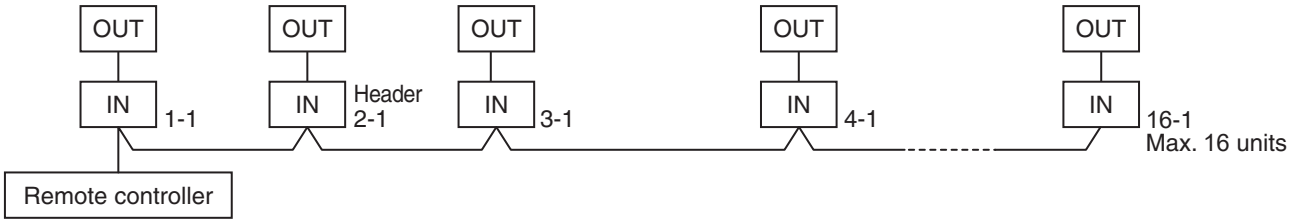
4 **Push [<] to black highlight the code (DN), and then push [∧] and [∨] to change to CODE No. of the item to monitor. Refer to the next page for CODE No..**

5 **Push [⮌ Return]**
→ Return to the “Field setting menu” screen.

(Group control operation)

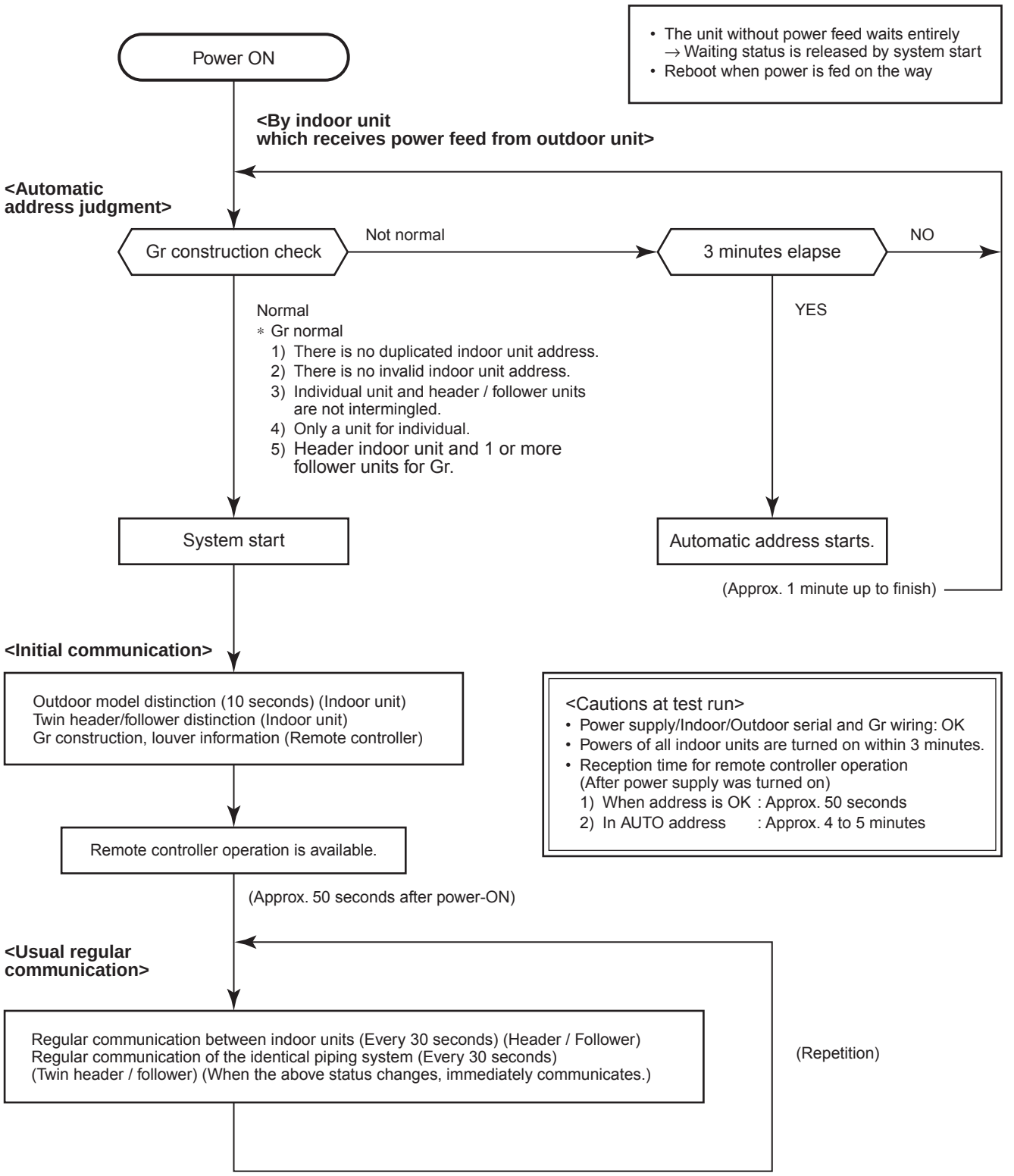
In a group control, operation of maximum 16 indoor units can be controlled by a remote controller.
The indoor unit connected with outdoor unit (Individual) controls room temperature according to setting on the remote controller.

<System example>



1. Display range on remote controller
   The setup range (Operation mode/Fan speed select/Setup temp) of the indoor unit which was set to the header unit is reflected on the remote controller.
2. Address setup
   Turn on power of the indoor unit to be controlled in a group within 3 minutes after setting of automatic address. If power of the indoor unit is not turned on within 3 minutes (completion of automatic address setting), the system is rebooted and the automatic address setting will be judged again.
   1) Connect indoor/outdoor connecting wire surely.
   2) Check line address/indoor address/group address of the unit one by one.
   3) The unit No. (line/indoor group address) which have been set once keep the present status as a rule if the unit No. is not duplicated with one of another unit.

■ Indoor unit power-ON sequence



- In a group operation, if the indoor unit which was fed power after judgment of automatic address cannot receive regular communication from the header unit and regular communication on identical pipe within 120 seconds after power was turned on, it reboots (system reset).

  → The operation starts from judgment of automatic address (Gr construction check) again.
  (If the address of the header unit was determined in the previous time, the power fed to the header unit and reboot works, the header unit may change though the indoor unit line address is not changed.)

9-2. How to Set up Central Control Address Number

When connecting the indoor unit to the central control remote controller using it is necessary to set up the central control address number.

- The central control address number is displayed as the line No. of the central control remote controller.

How to set up from indoor unit side by remote controller

<Procedure> Perform setup while the unit stops.

1 **Push the [MENU] button to display the menu screen.**

2 **Push and hold the [MENU] button and the [ ] button at the same time to display the "Field setting menu".**

→ Push and hold the buttons for more than 4 seconds.

3 **Push the [ ] / [ ] button to select "7. DN setting" on the "Field setting menu" screen, then push the [Set/Fix].**

→ The fan and louver of the indoor unit operate.
When the group control is used, the fan and louver of the selected indoor unit operate.

→ Move the cursor to select "Code(DN)" with the **[Set/Fix].** button, then set **"0003"** with the [ ] / [ ] button.

→ Move the cursor to select "Data" with the **[Set/Fix].** button, then set **"Data"** with the [ ] / [ ] button. **The setup data is shown in the table below (Table 1).**

4 **Push the [MENU] button to set the other Code(DN) and Data. After "Continue?" is displayed on the screen, push the [Set/Fix].**

"⧖ Setting" appears on the screen for a while, then the screen returns to the "Field setting menu" screen.

(Table 1)

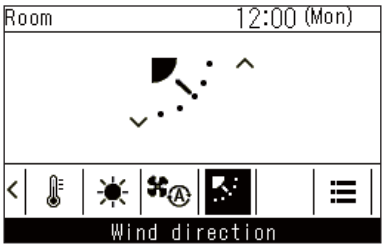
SET DATA	Central control address No.
0001 0002 0003 : 0064	1 2 3 : 64
0099	Unset (Setup at shipment from factory)

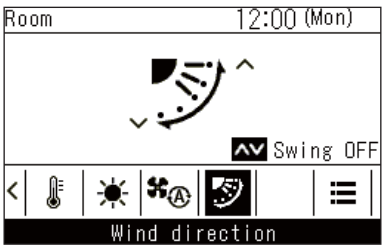
9-3. How to set up type of swing

- If the connected indoor units have louvres, then the horizontal louvre icon is displayed on the air conditioner main screen.
- If the connected indoor units have vertical louvres, then the vertical louvre icon is displayed on the air conditioner main screen.

* For models that have only left-right directional louvres, they are operated as horizontal louvres on the remote controller.

Up / down direction: Horizontal louvres

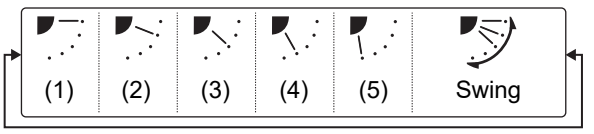




* Display while swinging

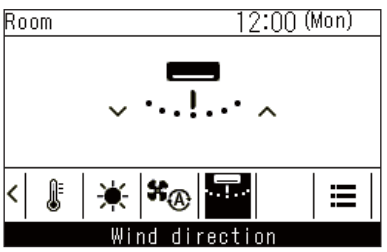
1 **Press [〈] and [〉] to switch to the "Wind direction" screen (horizontal louvres)**

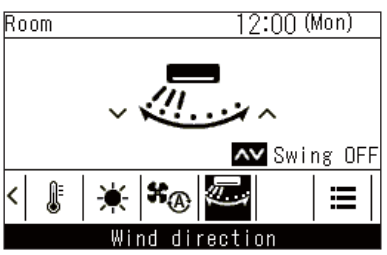
2 **Press [∧] and [∨] to select wind direction**



Operation mode	Settable angles
Heat, Fan, Auto (Heat)	(1), (2), (3), (4), (5), Swing
Cool, Dry, Auto (Cool)	(1), (2), (3), Swing

Left / right direction: Vertical louvres

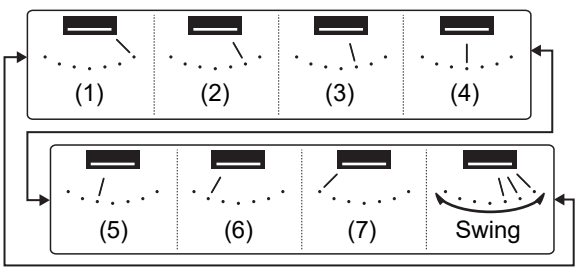




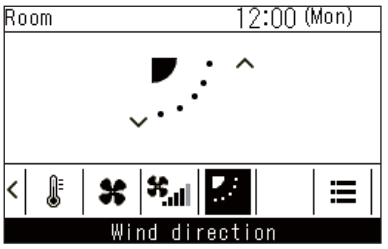
* Display while swinging

1 **Press [〈] and [〉] to switch to the "Wind direction" screen (vertical louvres)**

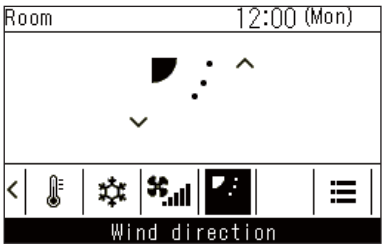
2 **Press [∧] and [∨] to select wind direction**



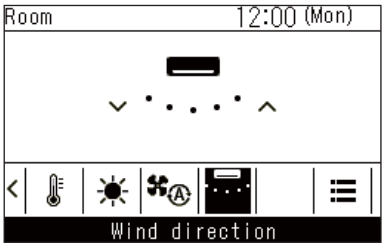
Cancelling swing



* Display when swinging (up / down) is cancelled “Fan”, “Heat”



* Display when swinging (up / down) is cancelled “Cool”, “Dry”



* Display when swinging (left / right) is cancelled

1 **During swing operation, press [〈] and [〉] to switch to the “Wind direction” screen**

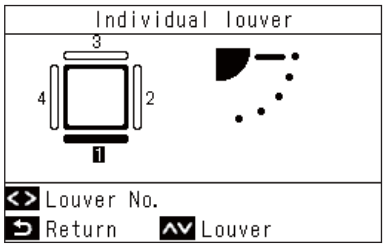
2 **Press [∧] or [∨]**

→ The louvres stop at the position when [∧] or [∨] is pressed.

→ When [∨] is pressed in the display when swing was cancelled, the louvres go to wind direction position (1), when [∧] is pressed, the louvres go to position (3) during “Cool” or “Dry” operation, and go to position (5) during “Fan” or “Heat” operation, and vertical louvres go to position (7).

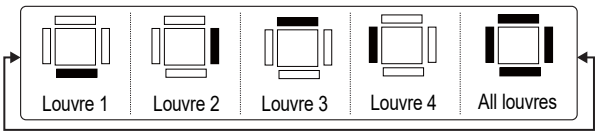
■ Individual louver

* For 4-way cassette types, the wind direction and swing operation of each louver can be set individually.



1 **In “Menu” (Page 17), select “Individual louver”, and press [Set/Fix]**

2 **Press [ ] and [ ] to select louvres**



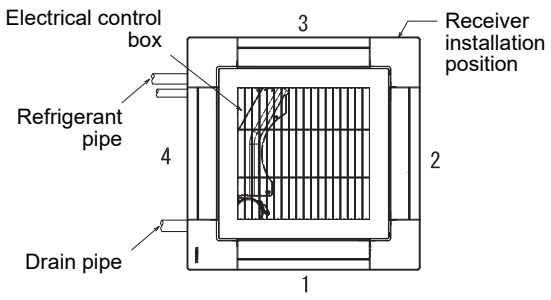
3 **Press [ ] and [ ] to select wind direction**

→ For details, refer to <Changing the wind direction>. (Page 13)

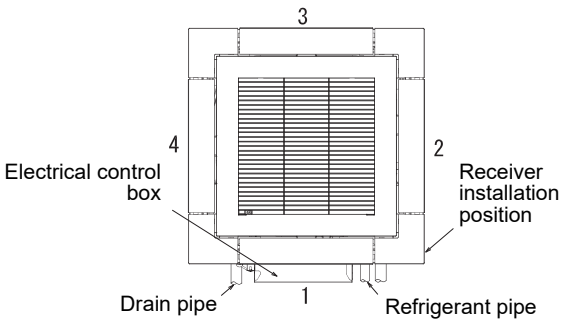
4 **Press [Return]**

→ Return to “Menu”.

▼ 4-way air discharge type



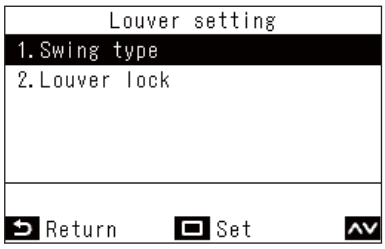
▼ Compact 4-way air discharge type

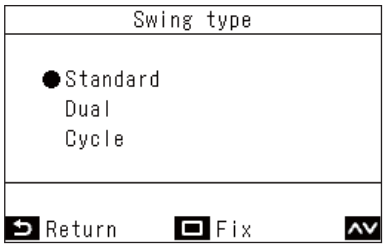


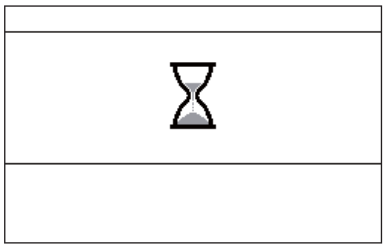
■ Louver setting

Swing type

You can select from 3 types of swing operation: “Standard”, “Dual”, or “Cycle”.







1 **In “Menu” (Page 17), select “Louver setting”, and press [Set/Fix]**

2 **Press [ ] and [ ] to select “Swing type”, and then press [Set/Fix]**

3 **In the “Swing type” screen, press [ ] and [ ] to select a mode**

→ Regarding “Swing type”, refer to the Owner’s Manual of the indoor unit.

4 **Press [Set/Fix]**

→ Return to the “Louver setting” screen.

5 **Press [Return]**

→ “⌛” is displayed.

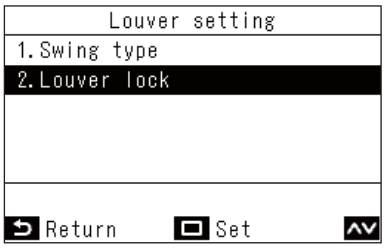
→ When doing group connections, the screen for selecting units is displayed, so press [Return] to display “⌛”.

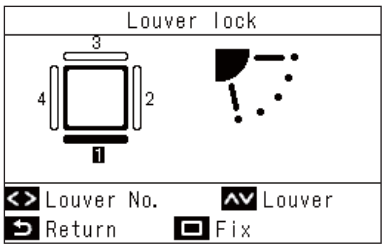
NOTE

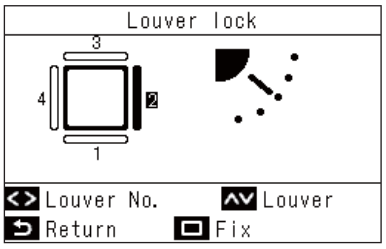
- For models that “Louver setting” is not available, the message “No function” is displayed.
- Press [Return] to not fix the changes, so conditions are as before changes, and return to the “Louver setting” screen.
- For group connections, refer to <When multiple indoor units are connected as a group (group connection)>.

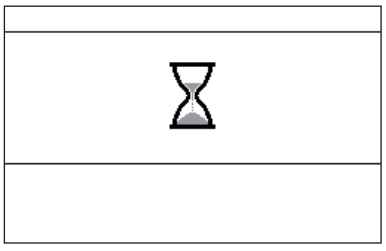
Louver lock (Fixing the angle of the louvres)

You can set and fix the angle of louvres individually for each air outlet.





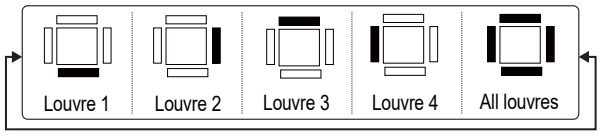




1 **In “Menu” (Page 17), select “Louver setting”, and press [Set/Fix]**

2 **Press [ ] and [ ] to select “Louver lock”, and then press [Set/Fix]**

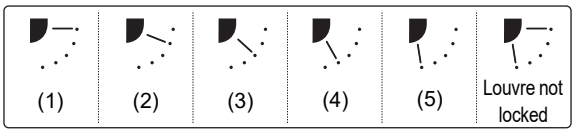
3 **Press [ ] and [ ] to select louvres**



→For louvre numbers of each indoor unit, refer to <Individual louver (Select wind direction for each air outlet)>. (Page 20)

4 **Press [ ] and [ ] to select a louvre angle (wind direction)**

→Press [ ] to raise a louvre and press [ ] to lower a louvre.



5 **Press [Set/Fix]**

→Return to the “Louver setting” screen.

6 **Press [Return]**

→“⧖” is displayed.

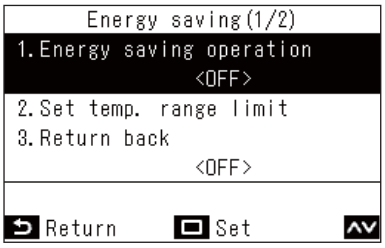
→When doing group connections, the screen for selecting units is displayed, so press [Return] to display “⧖”.

NOTE

- For models that “Louver setting” is not available, the message “No function” is displayed.
- Press [Return] to not fix the changes, so conditions are as before changes, and return to the “Louver setting” screen.
- To cancel “Louver lock”, press [ ] and [ ] to set louvre not locked for the louvre angle of each louvre.
- When the operation mode is “Cool” or “Dry”, performing “Louver lock” at position (4) or (5) may cause condensation.
- For group connections, refer to <When multiple indoor units are connected as a group (group connection)>.
- “” is displayed when “Louver lock” is set.

Energy saving

Set for the energy saving operation: Energy saving operation, Set temp. range limit, Return back and Saving operation.



1 **In “Menu” (Page 17), select “Energy saving”, and press [Set/Fix]**

2 **Press [ ] and [ ] to select an item**

3 **Press [Set/Fix]**

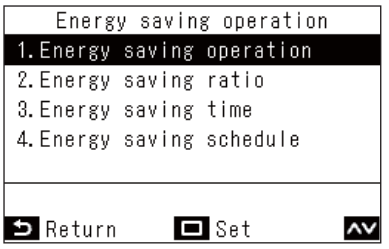
Item	Description
1. Energy saving operation	Operates the air conditioners with suppressed performance.
2. Set temp. range limit	Limits the range of temperatures that can be set by the remote controller.
3. Return back	Sets to automatically return to a set temperature after the temperature setting is changed at the remote controller.
4. Saving operation	Operates to suppress excessive heating and excessive cooling. * For models that “Saving operation” is not available, the message “No function” is displayed.

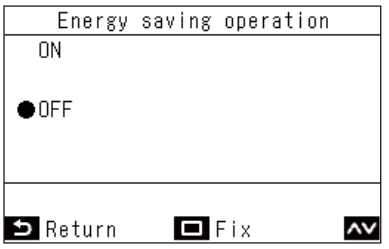
⚠ CAUTION

For “Energy saving operation”, refer to the Owner’s Manual of the device being used.

Energy saving operation

You can set this to save energy.





1 **In the “Energy saving” screen, press [ ] and [ ] to select “Energy saving operation”, and then press [Set/Fix]**

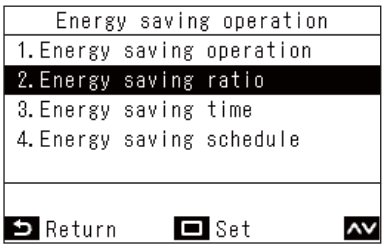
2 **Press [ ] and [ ] to select “Energy saving operation”, and then press [Set/Fix]**

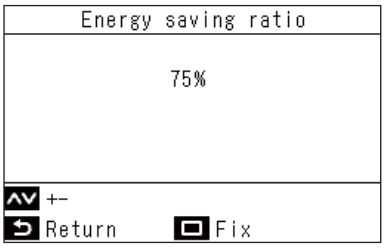
3 **Press [ ] and [ ] to select “ON” or “OFF”**

→To start “Energy saving operation”, set “Energy saving ratio”, “Energy saving time”, and “Energy saving schedule”.

4 **Press [Set/Fix]**

▼Energy saving ratio





1 **In the “Energy saving operation” screen, press [ ] and [ ] to select “Energy saving ratio”, and then press [Set/Fix]**

2 **Press [ ] and [ ] to change the values**

→An optional saving ratio can be set within a range of 50 to 100% in 1% increments. The lower the value, the higher the energy-saving effect on operations.

3 **Press [Set/Fix]**

→When “⧖” appears, return to the “Energy saving operation” screen.

NOTE

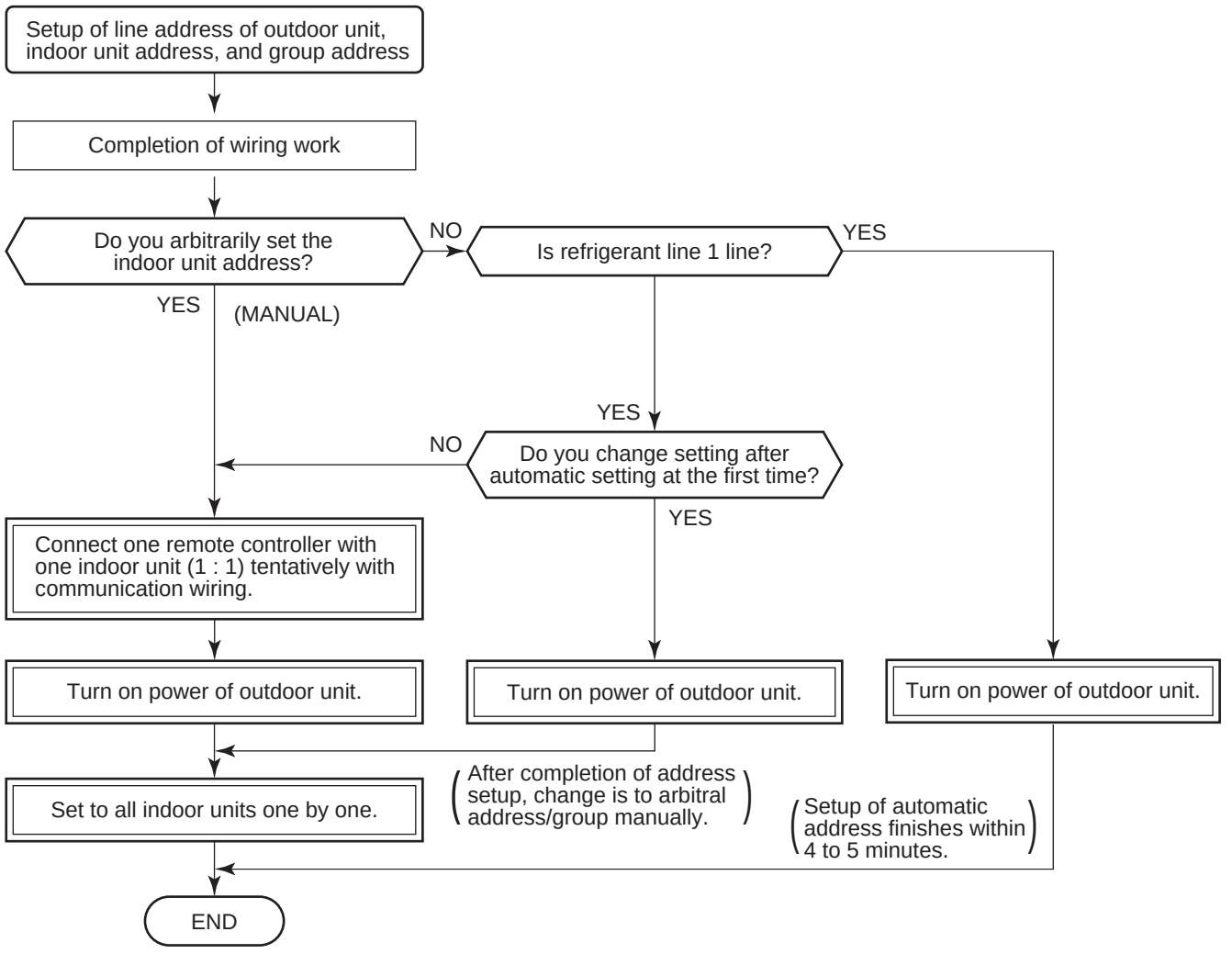
- With “Energy saving operation”, operation is done by suppressing the performance of the air conditioners, so cooling (warming) may be insufficient.
- When 2 remote controllers are connected, settings cannot be done on the “Follower remote controller”.
- Before setting “Energy saving operation”, do “Clock”.
- This setting may not be possible by using the remote controller, depending on the settings of the outdoor unit or central control device.
- Energy saving schedule operation is not done if the clock is flashing (not set).
- An optional saving ratio of 100% is normal operation.
- When “Energy saving operation” is being done, “ ” is displayed on the screen.

10. ADDRESS SETUP

10-1. Address Setup

<Address setup procedure>

When an outdoor unit and an indoor unit are connected and they are twin-triple, or when an outdoor unit is connected to each indoor unit respectively in the group operation even if multiple refrigerant lines are provided, the automatic address setup completes with power-ON of the outdoor unit. The operation of the remote controller is not accepted while automatic address works. (Approx. 4 to 5 minutes)



- When the following addresses are not stored in the neutral memory (IC10) on the indoor P.C. board, a test run operation cannot be performed. (Unfixed data at shipment from factory)

	CODE No.	Data at shipment	SET DATA range
Line address	12	0099	0001 (No. 1 unit) to 0030 (No. 30 unit)
Indoor unit address	13	0099	0001 (No. 1 unit) to 0064 (No. 64 unit) Max. value of indoor units in the identical refrigerant line (Double twin = 4)
Group address	14	0099	0000 : Individual (Indoor units which are not controlled in a group) 0001 : Header unit (1 indoor unit in group control) 0002 : Follower unit (Indoor units other than header unit in group control)

10-2. Address Setup & Group Control

<Terminology>

Indoor unit No. : N – n = Outdoor unit line address N (Max. 30) – Indoor unit address n (Max. 64)

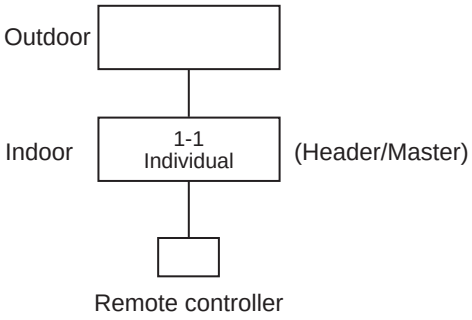
Group address : 0 = Single (Not group control)
1 = Header unit in group control
2 = Follower unit in group control

Header unit (= 1) : The representative of multiple indoor units in group operation sends/receives signals to/from the remote controllers and follower indoor units.
(*It has no relation with an indoor unit which communicates serially with the outdoor units.)
The operation mode and setup temperature range are displayed on the remote controller LCD. (Except air direction adjustment of louver)

Follower unit (= 2) : Indoor units other than header unit in group operation
Basically, follower units do not send/receive signals to/from the remote controllers.
(Except errors and response to demand of service data)

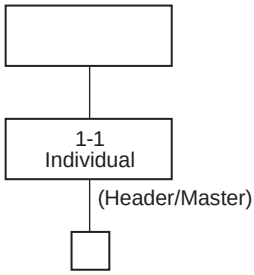
10-2-1. System configuration

1. Single



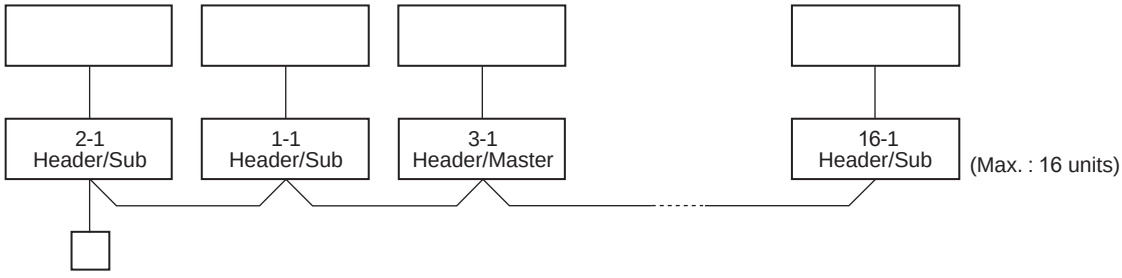
10-2-2. Automatic Address Example from Unset Address (No miswiring)

1. Standard (One outdoor unit)



Only turning on source power supply (Automatic completion)

2. Group operation
(Multiple outdoor units = Multiple indoor units with serial communication only, without twin)

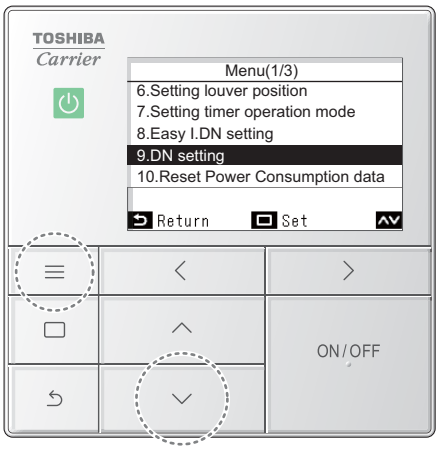


Only turning on source power supply (Automatic completion)

10-3. Add Setup (Manual address setting using the remote controller)

In case that addresses of the indoor units will be determined prior to piping work after wiring work

- Set an indoor unit per a remote controller.
- Turn on power supply.



1 **Push [Menu] to open the “Menu”.**

2 **Push and hold [Menu] and [ ] at the same time to open “Field setting menu”.**

→ Push and hold 4 seconds.

3 **In the “Field setting menu” screen, push [ ] and [ ] to select “DN setting”, and then push [Set/Fix].**

4 **Push [ ] and [ ] to select “Indoor unit”, and the push [Set/Fix].**

→ “Indoor unit” was selected, the fans and louvres of the indoor units operate.

<Line (system) address>

5 **Push [ ] to black highlight the code (DN), and then push [ ] and [ ] to set the code number to 12.**

6 **Push [ ] to black highlight the data, and then push [ ] and [ ] to set a system address.**

(Match the address with the address on the interface P.C. board of the header outdoor unit in the same refrigerant line.)

7 **After finishing setting the data of the code (DN), push [Set/Fix].**

→ “Continue?” is displayed.

<Indoor unit address>

8 **To set the data of Indoor unit address, push [Set/Fix].**

9 **Push [<] to black highlight the code (DN), and then push [^] and [v] to set the code number to 13.**

10 **Push [>] to black highlight the data, and then push [^] and [v] to set a Indoor unit address.**

11 **After finishing setting the data of the code (DN), push [Set/Fix].**

→ "Continue?" is displayed.

<Group address>

12 **To set the data of Indoor unit address, push [Set/Fix].**

13 **Push [<] to black highlight the code (DN), and then push [^] and [v] to set the code number to 14.**

14 **Push [>] to black highlight the data, and then push [^] and [v] to set a group address.**
If the indoor unit is individual, set the address to 0000 ; header unit, 0001 ; follower unit, 0002.

Individual : 0000
Header unit : 0001
Follower unit : 0002
} In case of group control

15 **After finishing setting the data of the code.**
(DN), push [Set/Fix].

→ "Continue?" is displayed.

16 **To not do other settings, push [Return].**

→ If the "Indoor unit" or "Outdoor unit" selection screen is displayed before " ⧗ " is displayed, push [**Return**].

→ " ⧗ "appears while data is changing.

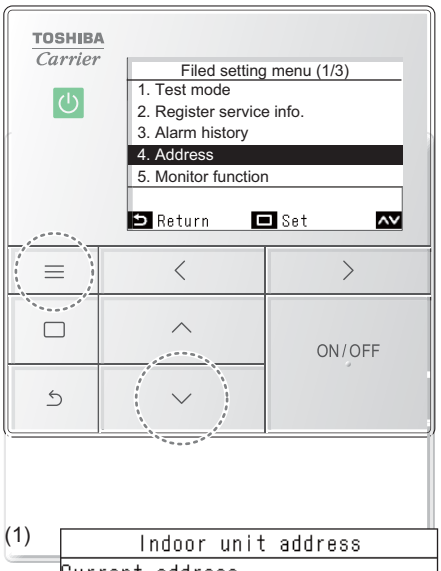
→ The changes are fixed, and the "Field setting menu" screen returns.

10-4. Confirmation of Indoor Unit No. Position

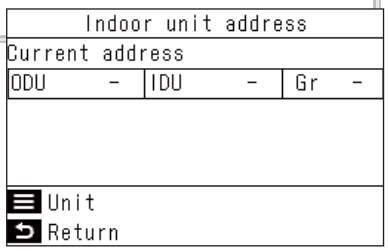
Procedure to know the position of indoor unit body by address while indoor unit No. is known.

• Confirm each indoor unit address while indoor unit is stopped. (Be sure to stop air conditioner.)

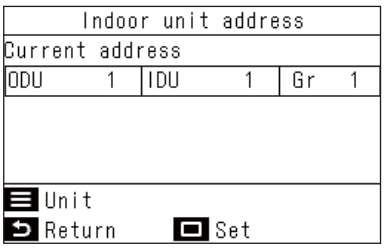
▼ When the unit is individual (the indoor unit is paired with a wired remote controller one-to-one), or it is a group-controlled one.



(1)



(2)



1 **Push [Menu] to open the "Menu"**

2 **Push and hold [Menu] and [ ] at the same time to open "Field setting menu"**

→Push and hold 4 seconds.

3 **Select "Indoor unit address" from "Address" in the "Field setting menu", and push [Set/Fix]**

→Screen (1) is displayed, the fans and louvres of all indoor units in the group operate.

→The indoor unit that is operating is connected in a group.

4 **In screen (1), push [Menu]**

→Each push of [Menu] displays in order: Entire group → Header unit → Follower unit 1 ...

5 **Check the position of the indoor unit**

→Screen (2) is displayed, the fans and louvres of the selected indoor units operate, the other units stop.

6 **After checking, push [Return]**

→Return to the "Address" screen.

<Maintenance/Check list>

Aiming in environmental preservation, it is strictly recommended to clean and maintain the indoor/outdoor units of the operating air conditioning system regularly to secure effective operation of the air conditioner.

It is also recommended to maintain the units once a year regularly when operating the air conditioner for a long time.

Check periodically signs of rust or scratches, etc. on coating of the outdoor units.
Repair the defective position or apply the rust resisting paint if necessary.

If an indoor unit operates for approx. 8 hours or more per day, usually it is necessary to clean the indoor/outdoor units once three months at least.

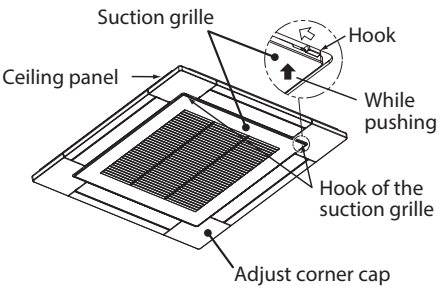
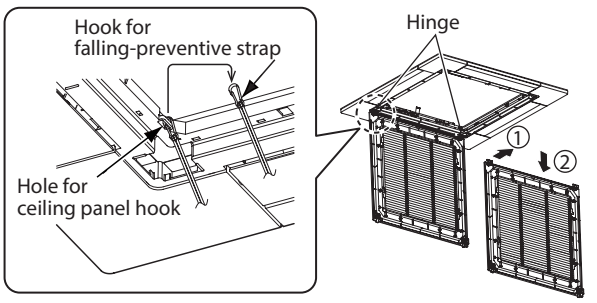
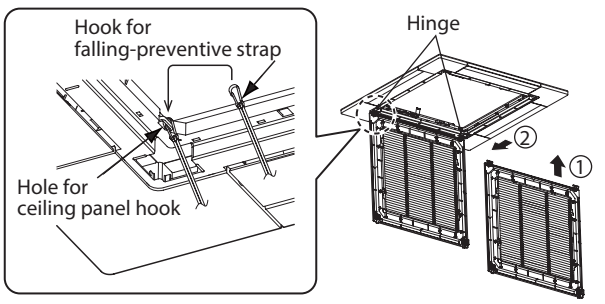
These cleaning and maintenance should be carried out by a qualified dealer.

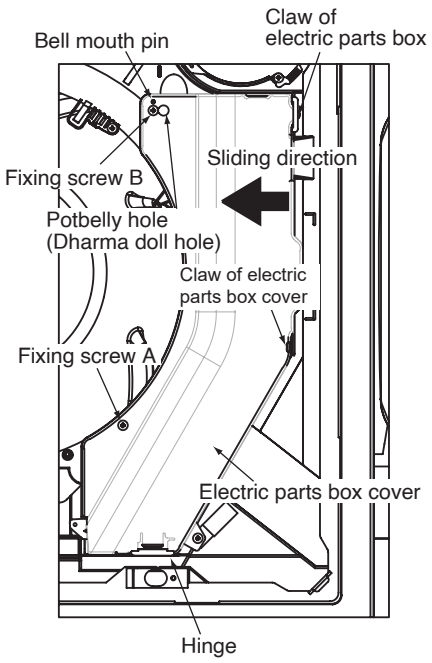
Although the customer has to pay the charge for the maintenance, the life of the unit can be prolonged.
Failure to clean the indoor/outdoor units regularly will cause shortage of capacity, freezing, water leakage or trouble on the compressor

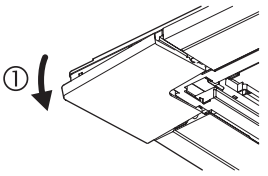
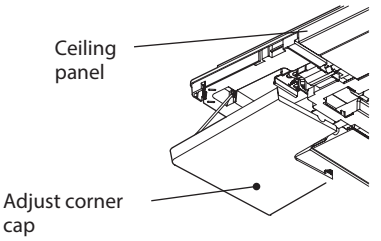
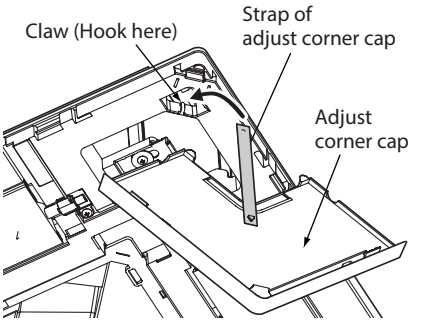
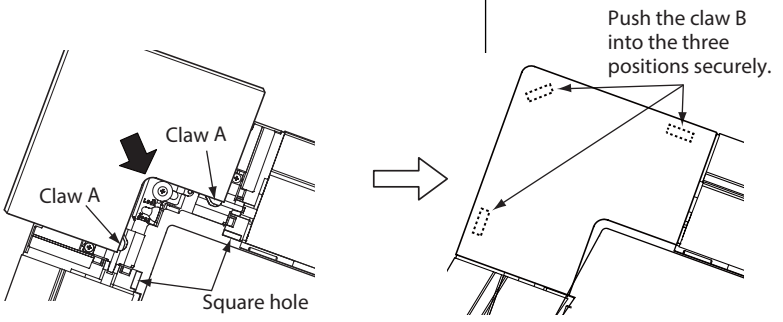
Part name	Object		Contents of check	Contents of maintenance
	Indoor	Outdoor		
Heat exchanger	○	○	• Blocking with dust, damage check	• Clean it when blocking is found.
Fan motor	○	○	• Audibility for sound	• When abnormal sound is heard
Filter	○	—	• Visual check for dirt and breakage	• Clean with water if dirty • Replace if any breakage
Fan	○	○	• Visual check for swing and balance • Check adhesion of dust and external appearance.	• Replace fan when swinging or balance is remarkably poor. • If a large dust adheres, clean it with brush or water.
Suction/ Discharge grille	○	—	• Visual check for dirt and scratch	• Repair or replace it if deformation or damage is found.
Drain pan	○	—	• Check blocking by dust and dirt of drain water.	• Clean drain pan, Inclination check
Face panel, Louver	○	—	• Check dirt and scratch.	• Cleaning/Coating with repair painting
External appearance	—	○	• Check rust and pealing of insulator • Check pealing and floating of coating film	• Coating with repair painting

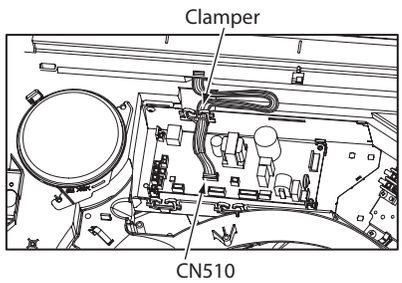
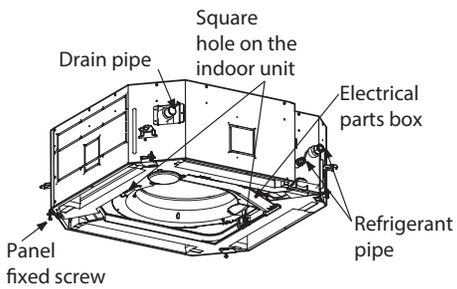
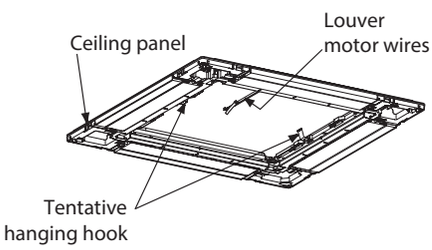
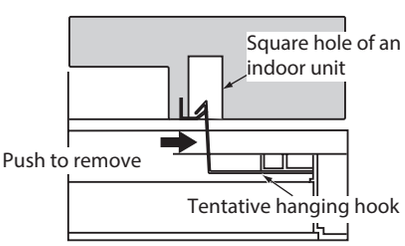
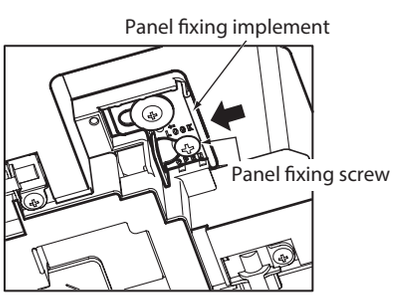
11. DETACHMENTS

Indoor Unit

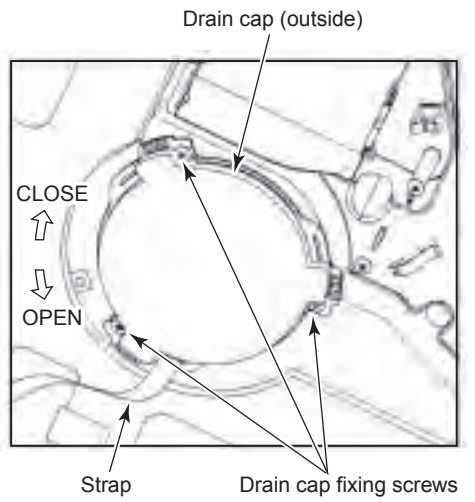
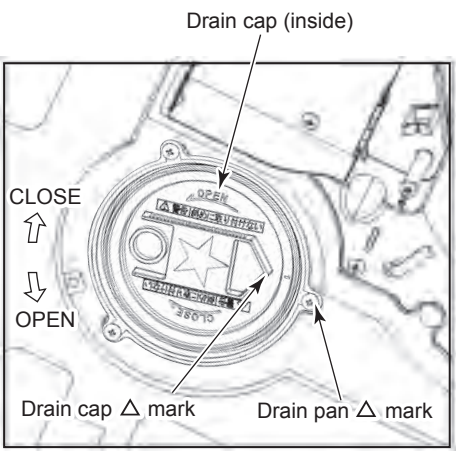
No.	Part name	Procedure	Remarks
①	Suction grille	**1. Detachment** 1) Stop operation of the air conditioner and then turn off switch of the breaker. 2) Slide the 2 knobs of the suction grille inward and then hang down the suction grille. 3) Remove a strap connecting the panel and the suction grille and then remove the suction grille.	
			
		2. Attachment 1) Hook the suction grille to the panel. 2) Attach strap of the suction grille to the panel as before. 3) Close the suction grille, slide the knobs outward and then fix the panel.	
			

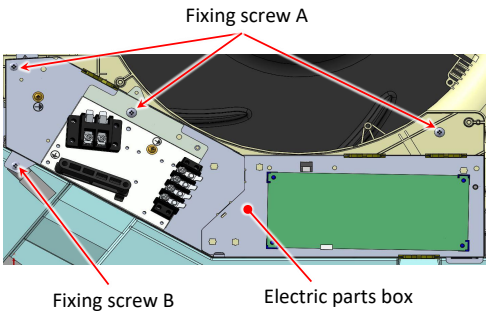
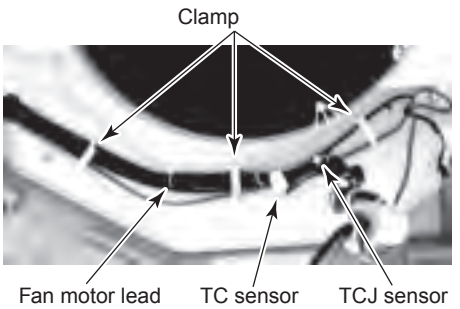
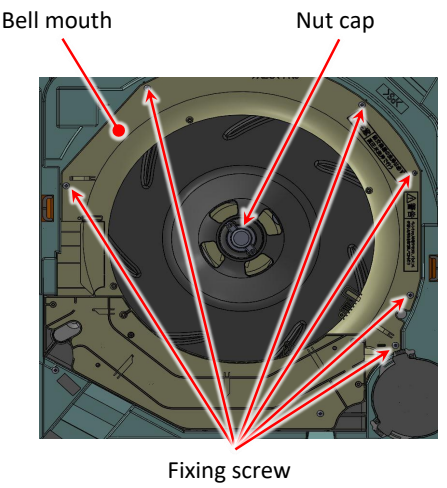
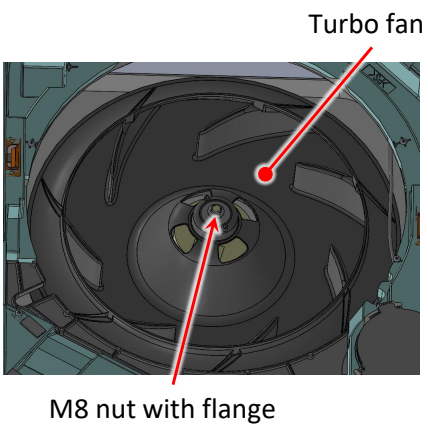
No.	Part name	Procedure	Remarks
②	Electric parts cover	**1. Detachment** 1) Carry out work of item 1. of ①. 2) Remove the fixing screw A which fix the electric parts cover and loosen the fixing screw B 3) Pull down the electric parts cover, remove pin of the bell mouth and then slide it to the arrow direction in order to open the claws and the electric parts box cover. **2. Attachment** 1) Close the electric parts cover and slide it, hook claw of the electric parts box, claw of the electric parts box cover and the Dharma doll hole, and then insert pin of the bell mouth into hole of the electric parts box cover. 2) Tighten the fixing screws A and B an then fix the electric parts box cover 3) Following to work of item 2 of ①, mount the suction grille as before.	

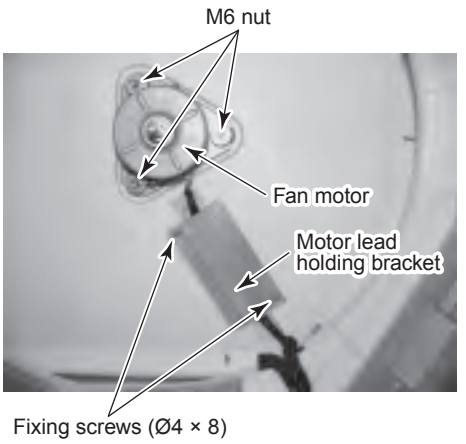
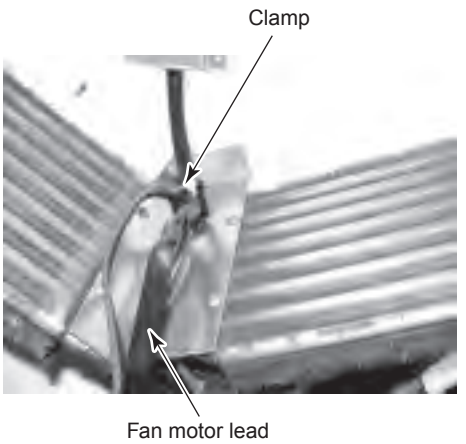
No.	Part name	Procedure	Remarks
③	Adjust corner cap	**1. Detachment** 1) Pull the knob of the adjust corner cap to the arrow direction. ①  **NOTE :** The adjust corner cap will bekept being hung with a falling-preventive st rap.	
		2. Attachment 1) Hook the fall-prevention strap securely to the claw of the ceiling panel if it remain being removed. 2) Insert claw of the adjust corner cap with the arrow direction into the square hole of the panel.(2 positions) 3) Push claws of the adjust corner cap into the positions indicated with arrow marks so that they fit in 3 positions.	 

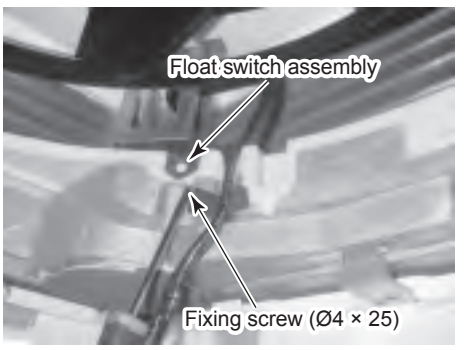
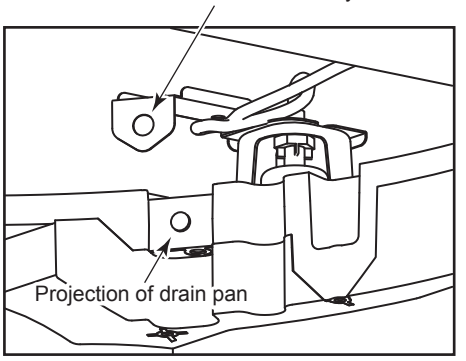
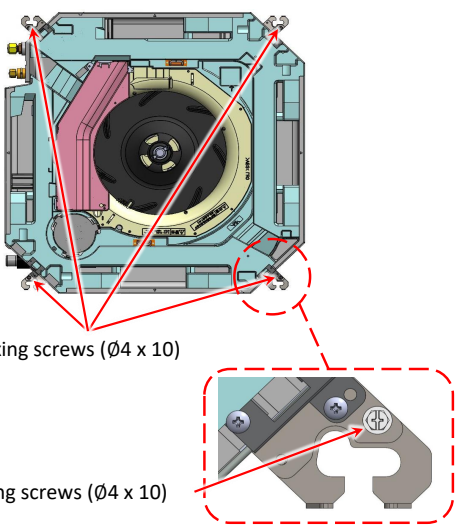
No.	Part name	Procedure	Remarks
④	Ceiling panel	**1. Detachment** 1) Carry out works of item 1 of ② and item 1 of ③. 2) Remove the flap connector (CN510, White, 20P) connected to the control P.C. board and then remove the lead wire from the clamp. **NOTE :** Unlock the lock of the housing part and then remove the connector. 3) Slide the panel fixing brackets(4 positions) outward. (Loosen the panel fixing 4 screws when the panel fixing brackets do not move.) 4) Push the tentative bracket outward and then remove the ceiling panel. **2. Attachment** 1) Insert the tentative brackets (2 positions) of the ceiling panel into square holes of the indoor unit and then hook the panel tentatively. **NOTE :** The ceiling panel has the directional properties against the indoor unit. Direct the louver motor wire to the electric parts box side of the indoor unit. 2) Pass the head of the panel fixing screw through hole of the panel fixing bracket and then slide the panel fixing bracket inward. 3) Tighten in the panel fixing screw to fix the ceiling panel. 4) Following to work of item 2 of ③, attach the adjust corner cap as before. 5) Connect the louver connector (CN510, White, 20P) as before and then fix the lead wire with clamp. 6) Following to work of item 2 of ②, mount the electric parts box cover and the suction grille as before.	    

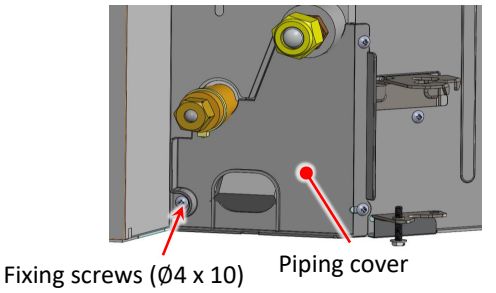
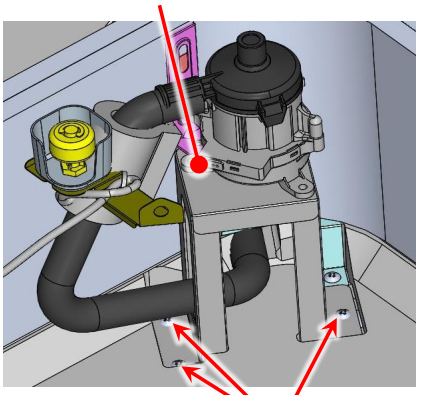
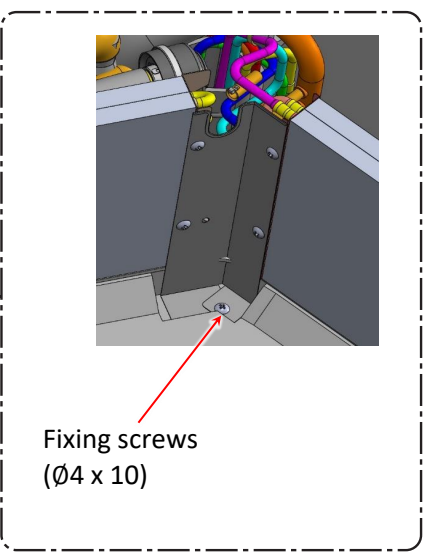
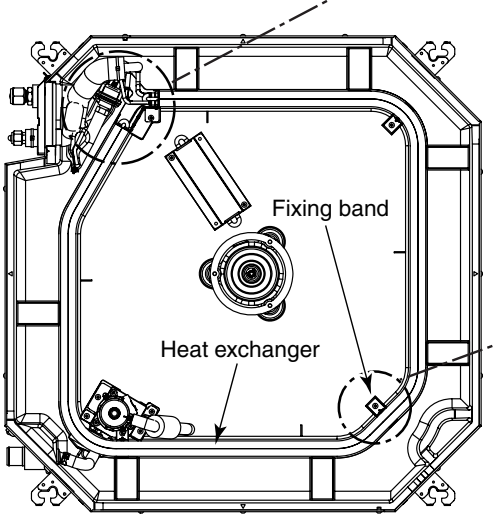
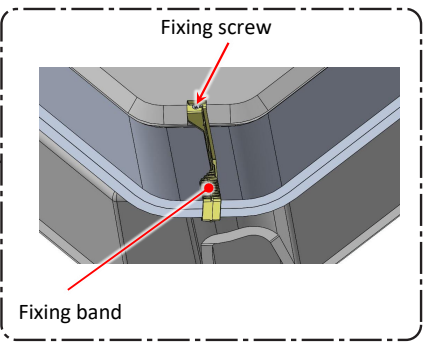
No.	Part name	Procedure	Remarks
⑤	Control P.C. board	**1. Detachment** 1) Carry out work of item 1 of ②. 2) Remove connectors which are connected from the control P.C. board to the other parts and then remove wiring from the clamp. CN510 : Louver motor (20P, White) CN214 : Signal receiving unit (9P, White) CN34 : Float switch (3P, Red) CN504 : Drain pump (2P, White) CN101 : TC sensor (2P, Black) CN102 : TCJ sensor (2P, Red) CN104 : Room temp. Sensor (2P, Yellow) CN210 : Fan motor (7P, White) **NOTE :** Unlock the lock of the housing part and then remove the connector. 3) Unlock the locks of the card edge spacer (4 positions) and then remove the control P.C. board. **2. Attachment** 1) Fix the control P.C. board to the card edge spacer (6 positions) 2) Connect the connector removed in item 1 as before and then fix the wiring with the clamp. 3) Following to work of item 2 of ②, mount the electric parts box cover and the suction grille as before.	

No.	Part name	Procedure	Remarks
⑥	Drain cap	**1. Detachment** 1) Carry out work of item 1 of ①. 2) Loosen screws (3 positions) fixing th drain cap (outside) and then turn the drain cap to the arrow mark direction to remove it. **NOTE :** The drain cap is hung down because a strap is attached to it (outside). 3) Loosen the cap by turn the drain cap (inside) for approx. 1 turn to OPEN → direction and then drain the drain water accumulated in the drain pan. **NOTE :** Be sure to catch drain water using a bucket, etc. when loosening the drain cap. The insulating materials are adhered to the drain cap (outside) and opening part of the drain pan; be careful that they are not come off. If they are come off, stick them as before using double-faces tape, etc. 4) Turn the drain cap once again to OPEN → direction to remove it. **2. Attachment** 1) Insert the drain cap (inside), turn it to CLOSE → direction until the position where “Clashed sound” is heard and it cannot be turned more over (Position where △ mark of the drain pan matches with △ mark of the drain cap (inside)) and then fix it **NOTE :** When attaching the drain cap (inside), remove dirt attached to the packing. And tighten in it noting so that the cap is not slantingly set. If attaching the drain cap as dust or dirt is attached or the cap is set slantingly, water leakage is caused. 2) Turn the drain cap (outside) to → direction and then attach it using the fixing screw as original 3) Following to work of item 2 of ①, mount the suction grille as before.	 

No.	Part name	Procedure	Remarks
⑦	Fan motor	**1. Detachment** 1) Carry out work of item 1 of ②. 2) Remove connectors which are connected from the control P.C. board to the other parts and then remove each wiring from the clamp. CN510 : Louver motor (20P, White) CN34 : Float switch (3P, Red) CN504 : Drain pump (2P, White) CN101 : TC sensor (2P, Black) CN102 : TCJ sensor (2P, Red) CN104 : Room temp. Sensor (2P, Yellow) CN333 : Fan motor power supply (5P, White) CN334 : Fan motor position detection (3P, White) **NOTE :** Unlock the lock of the housing part and then remove the connector. 3) Remove the fixing screws A and B, an then remove the electric parts box. (Fixing screw A: ∅4 × 10, 3 pcs, Fixing screw B: ∅4 × 8, 1 pc.) 4) Remove the fan motor lead, TC sensor and TCJ sensor from clamp of the bell mouth. 5) Remove the fixing screws and the remove the bell mouth. (∅4 × 10, 8 pcs.) 6) Remove the fixing screws and the remove the nut cap. (∅4 × 10, 2 pcs.) 7) Remove the fixing nut and then remov the turbo fan. (M8 nut with flange, 1 pc. 8) Remove the fixing screws and the remove the motor lead holding bracket. (∅4 × 8, 2 pcs.) 9) Cut the bundling band and then remove it from the clamp. 10) Remove the fixing nut and then remov the fan motor. (∅6 nut, 3 pcs.) **2. Attachment** 1) Fix the parts as before in order of fan motor → motor lead holding bracket → turbo fan → nut cap → bell mouth. **NOTE :** Fix the motor lead to the clamp without slack as before using bundling band. When fixing the turbo fan, be sure to match the D-cut of the fan boss with D-cut of the motor shaft. Using a torque wrench, fix the turbo fan and tighten it to 5.4 $^{+0.5}_{-0.2}$ Nm.	   

No.	Part name	Procedure	Remarks
⑦	Fan motor (Continued)	**2. Attachment** 2) Fix the fan motor lead, TC sensor and TCJ sensor with the clamp of the bell mouth. 3) Mount the electric parts box with the fixing screws A and B (∅4 × 10, 3 pcs. ∅4 × 8, 1 pc.) 4) Connect the connector removed in item 1 as before and then fix wiring with th clamp. 5) Following to work of item 2 of ②, mount the electric parts box cover and the suction grille as before.	 

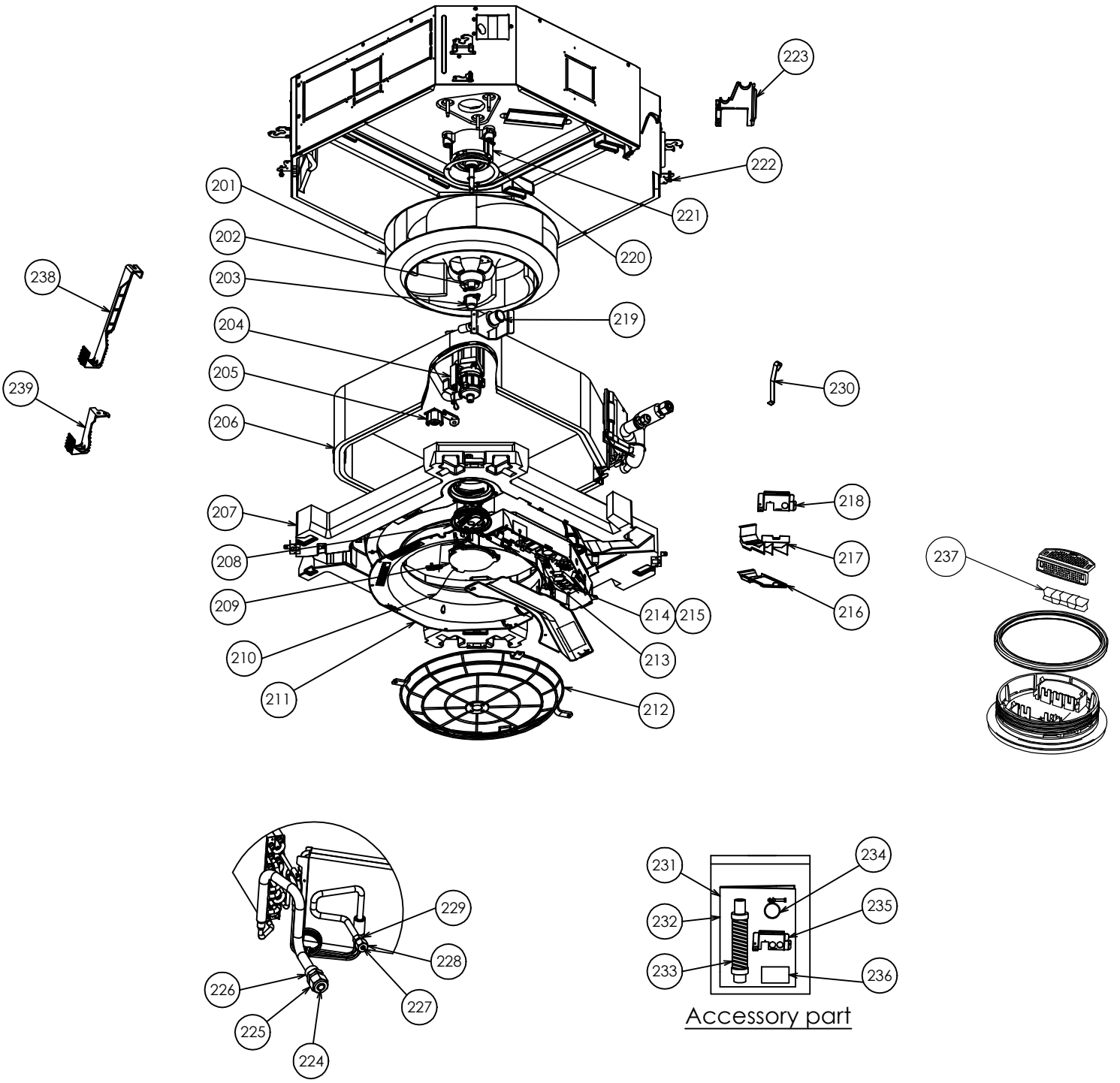
No.	Part name	Procedure	Remarks
⑧	Float switch assembly	**1. Detachment** 1) Carry out works of item 1 of ⑦ and works from 1) to 5). 2) Remove the fixing screw and the remove the float switch assembly (Ø4 × 25, 1 pc.) **2. Attachment** 1) Mount the float switch assembly a before with the fixing screw **NOTE :** When mounting, match hole of the float switch assembly with projection of the drain pan. 2) Mount the bell mouth as before. (Ø4 × 10, 8 pcs.) 3) Following to works of item 2 of ⑦ and works from 2) to 5), attach the parts as before.	 Hole of float switch assembly 
⑨	Drain pan	**1. Detachment** 1) Carry out works of item 1 of ④, item 1 of ⑥, item 1 of ⑦ and works from 2) to 5). 2) Remove the fixing screws to remove th drain pan. (Ø4 × 10, 4 pcs.) **2. Attachment** 1) Fix parts as before in order of drain cap → drain pan → bell mouth. 2) Following to works of item 2 of ⑦ and works from 2) to 5), attach parts as before.	

No.	Part name	Procedure	Remarks
⑩	Heat exchanger	**1. Detachment** 1) Recover the refrigerant gas. 2) Carry out work of item 1 of ⑩. 3) Remove refrigerant pipe at indoor unit side. 4) Remove the fixing screws and the remove the piping cover. (Ø4 × 10, 3 pcs.) 5) Remove the drain hose from the drain pump and remove the fixing screws to remove the drain pump stand.(Ø4 × 8, 3 pcs.) 6) While pushing the heat exchanger, remove the fixing band, fixing scre and the heat exchanger. (Ø4 × 8, 3 pcs.) **2. Attachment** 1) Mount the heat exchanger with the fixing band and the fixing screw (Ø4 × 8, 3 pcs.) 2) Fix the parts as before in order of drain pump stand → piping cover. 3) Connect the refrigerant pipe as before and then apply vacuuming. 4) Following to work of item 2 of ⑩, attach the parts as before.	 Drain pump stand    

12. EXPLODED VIEWS AND PARTS LIST

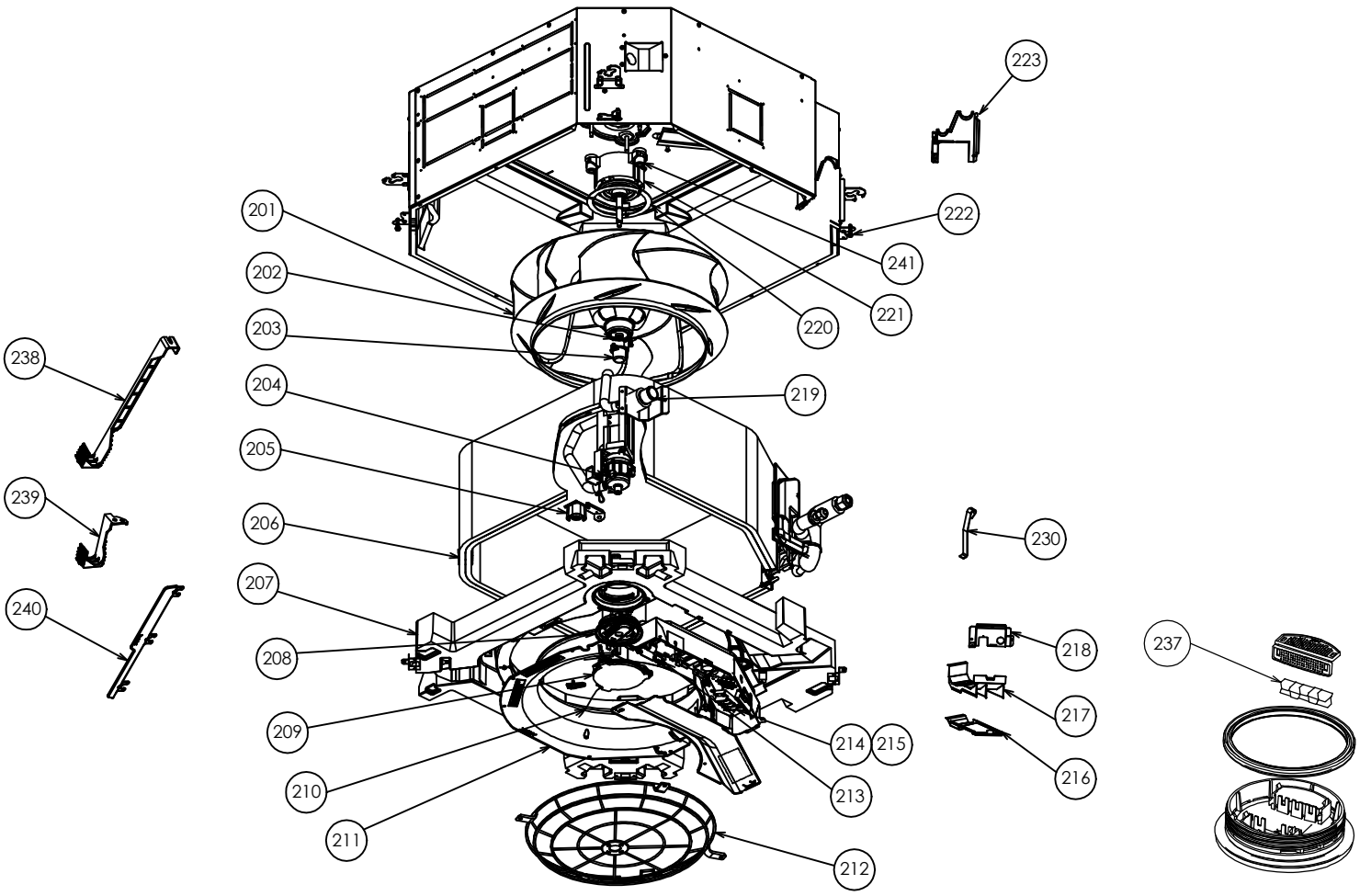
12-1. Indoor Unit

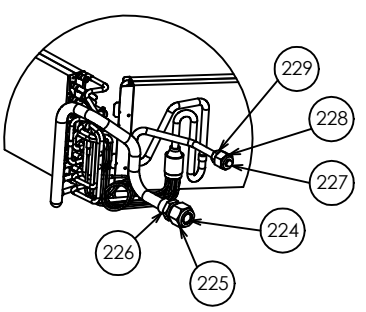
RAV-HB121UTP-UL, RAV-HB181UTP-UL, RAV-HB241UTP-UL

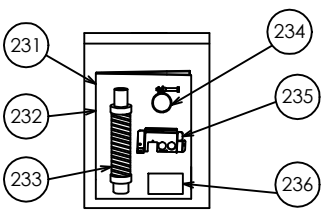


Location No.	Part No.	Description	Model name		
			RAV-HB121UTP-UL	RAV-HB181UTP-UL	RAV-HB241UTP-UL
201	43T20335	FAN,ASSY TURB	1	1	1
202	43T97001	NUT	1	1	1
203	43T39353	CAP,NUT	1	1	1
204	43T77301	PUMP ASSY	1	1	1
205	43T51314	SWITCH ASSY FLOAT	1	1	1
206	43T44609	REFRIGERANT CYCLE ASSEMBLY	1	1	-
206	43T44610	REFRIGERANT CYCLE ASSEMBLY	-	-	1
207	43T72362	PAN ASSY, DRAIN	1	1	1
208	43T79317	LID ASSY, INSIDE	1	1	1
209	43T79319	LID ASSY, OUTSIDE	1	1	1
210	43T83312	STRING	1	1	1
211	43T22322	BELL MOUTH	1	1	1
212	43T19357	GUARD,FAN	1	1	1
213	43T63347	CLAMP, WIRE	4	4	4
214	43T63348	CLAMP, DOWN	1	1	1
215	43T63349	CLAMP, UP	1	1	1
216	43T62389	COVER WIRE BOX ASSY	1	1	1
217	43T62390	WIRE BOX ASSY	1	1	1
218	43T62391	PLATE CONDUIT ASSY	1	1	1
219	43T71306	SOCKET-DRAIN	1	1	1
220	43T97316	WASHER	1	1	1
221	43T21545	FAN-MOTOR	1	1	1
222	43T97315	SCREW, FIX PANEL	4	4	4
223	43T04454	COVER ASSY	1	1	1
224	43T49407	PLASTIC BONNET 12.7DIA	1	1	-
224	43T49412	PLASTIC BONNET 15.88DIA	-	-	1
225	43T82338	SOCKET	1	1	-
225	43T82339	SOCKET	-	-	1
226	43T97322	NUT, FLARE, 3/8 IN	1	1	-
226	43T97323	NUT, FLARE, 5/8 IN	-	-	1
227	43T49405	PLASTIC BONNET 6.35DIA	1	1	-
227	43T49406	PLASTIC BONNET 9.52DIA	-	-	1
228	43T82336	SOCKET	1	1	-
228	43T82337	SOCKET	-	-	1
229	43T97320	NUT, FLARE, 1/4 IN	1	1	-
229	43T97321	NUT, FLARE, 3/8 IN	-	-	1
230	43T19333	HOLDER, SENSOR	2	2	2
231	43T85956	INSTR-INST	1	1	1
232	43T85957	MANUAL	1	1	1
233	43T70326	HOSE, DRAIN	1	1	1
234	43T83311	BAND, HOSE	1	1	1
235	43T62392	PLATE CONDUIT ASSY	1	1	1
237	43T79318	ASM-GLASS (Anti Bacterial)	1	1	1
238	43T39462	BAND-FIX-EVA(A)	2	2	2
239	43T39464	BAND-FIX-EVA(C)	1	1	1

RAV-HB301UTP-UL, RAV-HB361UTP-UL, RAV-HB421UTP-UL, RAV-HB481UTP-UL



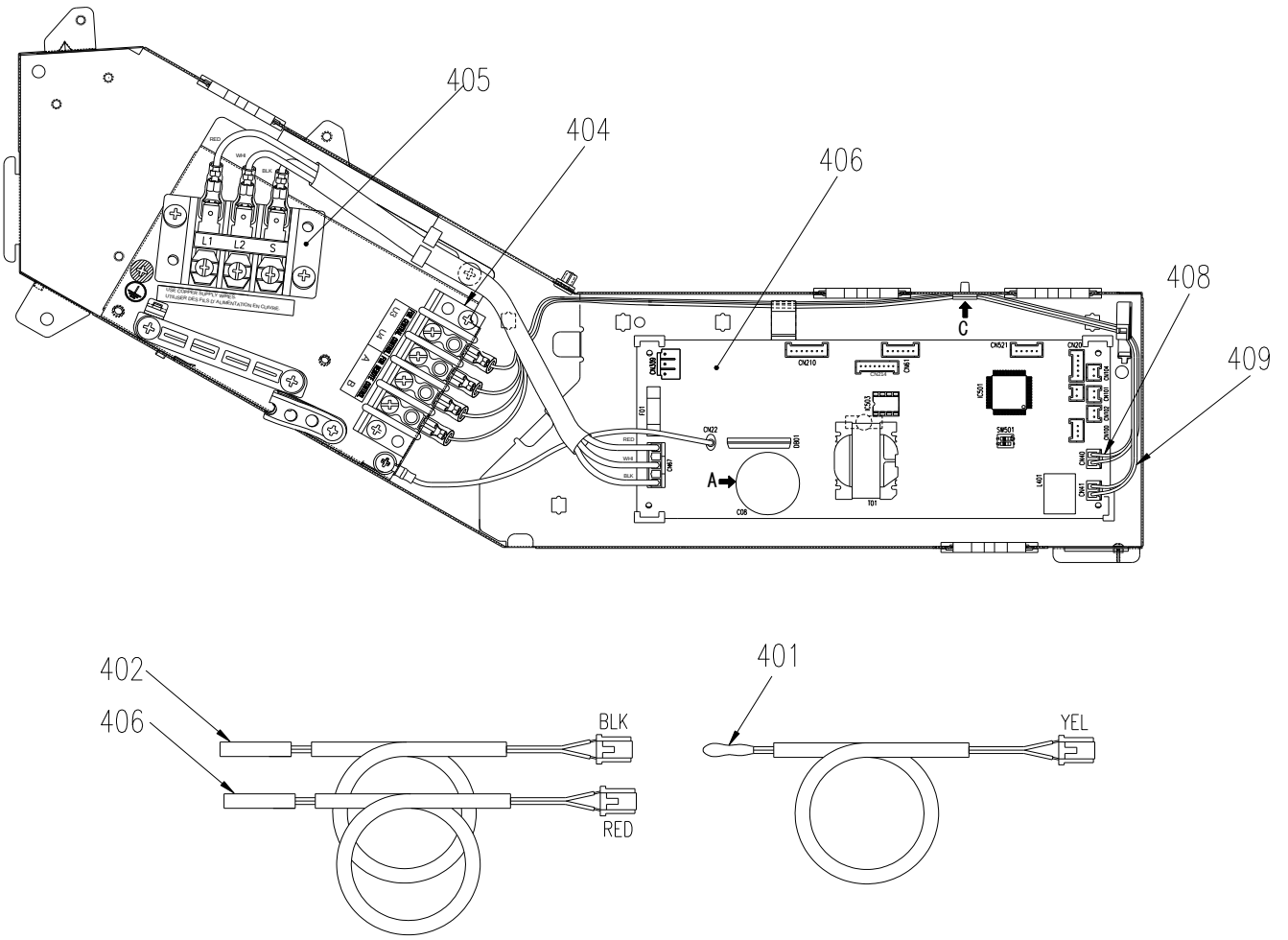




Accessory part

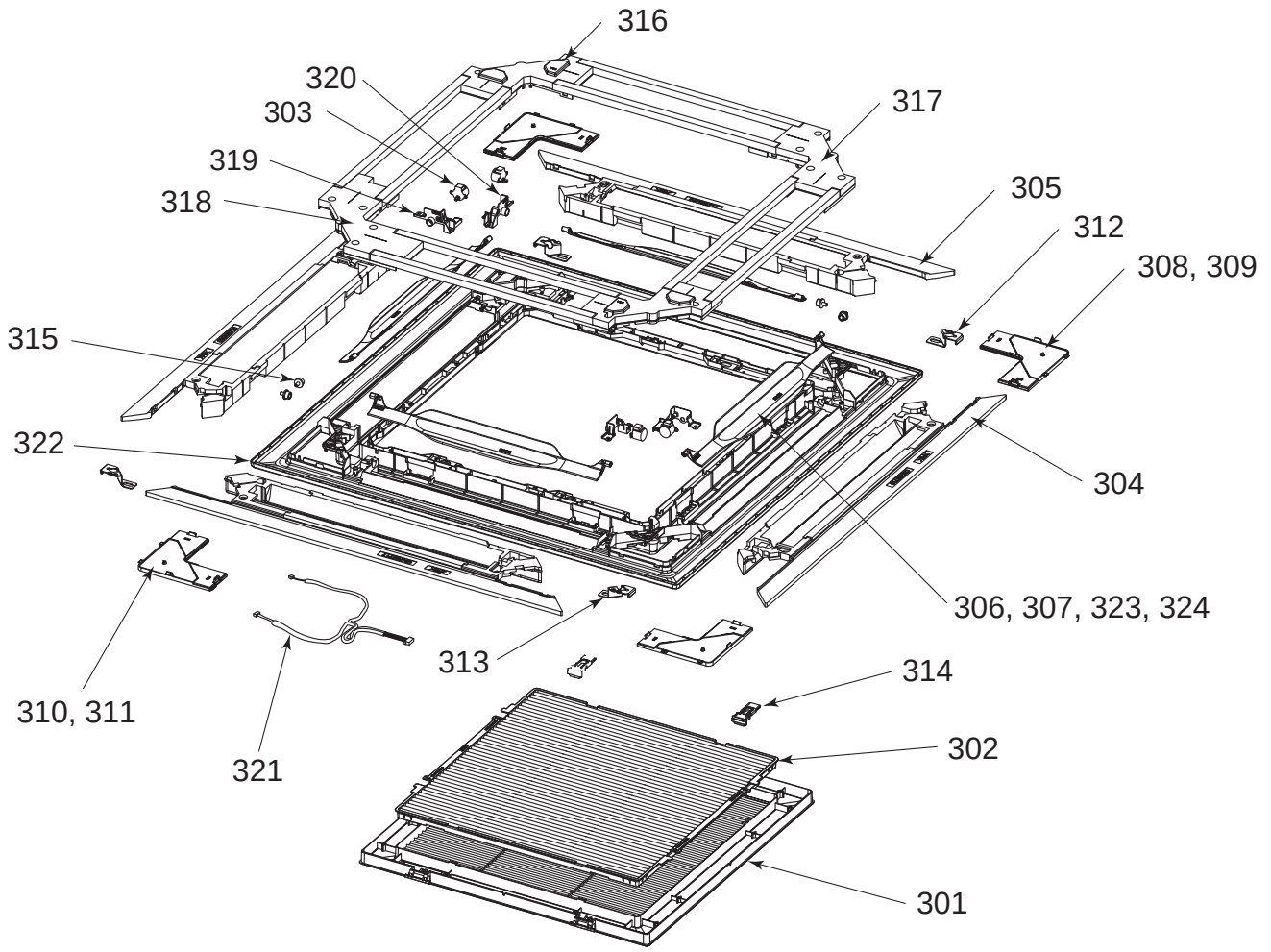
Location No.	Part No.	Description	Model name			
			RAV-HB301UTP-UL	RAV-HB361UTP-UL	RAV-HB421UTP-UL	RAV-HB481UTP-UL
201	43T20334	FAN,ASSY TURB	1	1	1	1
202	43T97001	NUT	1	1	1	1
203	43T39353	CAP,NUT	1	1	1	1
204	43T77301	PUMP ASSY	1	1	1	1
205	43T51314	SWITCH ASSY FLOAT	1	1	1	1
206	43T44611	REFRIGERANT CYCLE ASSEMBLY	1	1	1	1
207	43T72363	PAN ASSY, DRAIN	1	1	1	1
208	43T79317	LID ASSY, INSIDE	1	1	1	1
209	43T79319	LID ASSY, OUTSIDE	1	1	1	1
210	43T83312	STRING	1	1	1	1
211	43T22322	BELL MOUTH	1	1	1	1
212	43T19357	GUARD,FAN	1	1	1	1
213	43T63347	CLAMP, WIRE	4	4	4	4
214	43T63348	CLAMP, DOWN	1	1	1	1
215	43T63349	CLAMP, UP	1	1	1	1
216	43T62389	COVER WIRE BOX ASSY	1	1	1	1
217	43T62390	WIRE BOX ASSY	1	1	1	1
218	43T62391	PLATE CONDUIT ASSY	1	1	1	1
219	43T71306	SOCKET-DRAIN	1	1	1	1
220	43T97316	WASHER	1	1	1	1
221	43T21550	FAN-MOTOR (LDF-340-130AA1)	1	1	1	1
222	43T97315	SCREW, FIX PANEL	4	4	4	4
223	43T04454	COVER ASSY	1	1	1	1
224	43T49412	PLASTIC BONNET 15.88DIA	1	1	1	1
225	43T82339	SOCKET	1	1	1	1
226	43T97323	NUT, FLARE, 5/8 IN	1	1	1	1
227	43T49406	PLASTIC BONNET 9.52DIA	1	1	1	1
228	43T82337	SOCKET	1	1	1	1
229	43T97321	NUT, FLARE, 3/8 IN	1	1	1	1
230	43T19333	HOLDER, SENSOR	2	2	2	2
231	43T85956	INSTR-INST	1	1	1	1
232	43T85957	MANUAL	1	1	1	1
233	43T70326	HOSE, DRAIN	1	1	1	1
234	43T83311	BAND, HOSE	1	1	1	1
235	43T62392	PLATE CONDUIT ASSY	1	1	1	1
237	43T79318	ASM-GLASS (Anti Bacterial)	1	1	1	1
238	43T39463	BAND-FIX-EVA(B)	2	2	2	2
239	43T39464	BAND-FIX-EVA(C)	1	1	1	1

12-2. Electric parts



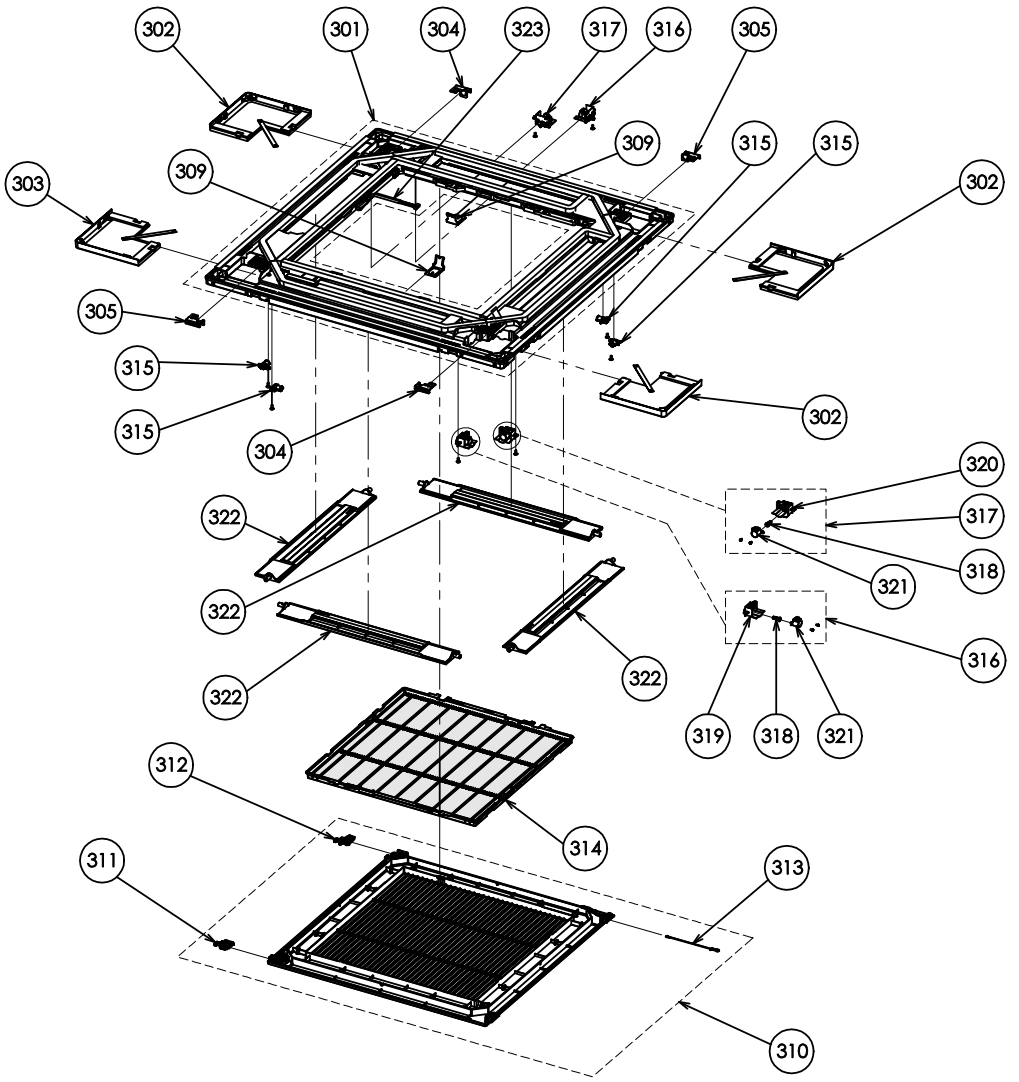
Location No.	Part No.	Description	Model name RAV-HB						
			121UTP-UL	181UTP-UL	241UTP-UL	301UTP-UL	361UTP-UL	421UTP-UL	481UTP-UL
401	43T50388	TA-SENSOR (YEL)	1	1	1	1	1	1	1
402	43T50420	TC-SENSOR (BLK)	1	1	1	1	1	1	1
403	43T60402	TERMINAL:3P	1	1	1	1	1	1	1
404	43T60362	TERMINAL	1	1	1	1	1	1	1
405	43TNV572	PC BOARD ASSY (MCC-1643)	1	-	-	-	-	-	-
405	43TNV573	PC BOARD ASSY (MCC-1643)	-	1	-	-	-	-	-
405	43TNV574	PC BOARD ASSY (MCC-1643)	-	-	1	-	-	-	-
405	43TNV575	PC BOARD ASSY (MCC-1643)	-	-	-	1	-	-	-
405	43TNV576	PC BOARD ASSY (MCC-1643)	-	-	-	-	1	-	-
405	43TNV577	PC BOARD ASSY (MCC-1643)	-	-	-	-	-	1	-
405	43TNV578	PC BOARD ASSY (MCC-1643)	-	-	-	-	-	-	1
406	43T50386	TCJ SENSOR (RED)	1	1	1	1	1	1	1
407	43T60582	ASM-HOUSING(PW)	1	1	1	1	1	1	1
408	43T60584	ASM-HOUSING(REM)	1	1	1	1	1	1	1
409	43T60543	ASM-HOUSING(BUS)	1	1	1	1	1	1	1

RBC-U32PGP-UL



Location No.	Part No.	Description	Model name
			RBC-U32PGP-UL
301	43T09533	GRILLE AINL	1
302	43T80350	AIR FILTER	1
303	43T21434	STEPPING-MOTOR	4
304	43T07317	AIR OUTLET FOAM (A)	2
305	43T07318	AIR OUTLET FOAM (B)	2
307	43T09531	LOUVER	4
308	43T01317	PANEL-COVER-ASSEMBLY	3
310	43T01332	ASM-COVER-PANEL	1
312	43T07320	PANEL FIX PLATE (A)	2
313	43T07321	PANEL FIX PLATE (B)	2
314	43T07324	HOOK	2
315	43T07319	AXIS CAP	4
316	43T03403	COVER(MOTOR)-ASSEMBLY	2
317	43T03401	COVER ASSEMBLY	1
318	43T03402	COVER ASSEMBLY	1
319	43T07322	MOTOR FIXURE	2
320	43T07323	MOTOR FIXURE	2
321	43T60530	LEAD-MOTOR	1
322	43T00714	PANEL	1

RBC-U33P-UL



Location No.	Part No.	Description	Model name
			RBC-U33P-UL
301	43T00885	PANEL, INSULATOR ASSY	1
302	43T01338	PANEL, COVER ASSY	3
303	43T01343	PANEL,COVER,ASSY; TOSHIBA CARRIER	1
304	43T07330	PLATE, FIX PANEL (A)	2
305	43T07331	PLATE, FIX PANEL (B)	2
309	43T07332	HANGER FIXTURE	2
310	43T09625	GRILLE AIR INLET ASSY	1
311	43T07333	GRILLE HOOK LEFT	1
312	43T07334	GRILLE HOOK RIGHT	1
313	43T19390	STRING	1
314	43T80369	AIR FILTER	1
315	43T07335	AXIS CAP	4
316	43T07336	MOTOR FIXTURE ASSY	2
317	43T07337	MOTOR FIXTURE ASSY	2
318	43T07338	AXIS COVER	4
319	43T07339	MOTOR FIXTURE	2
320	43T07340	MOTOR FIXTURE	2
321	43T21434	STEPPING-MOTOR	4
322	43T22390	HORIZONTAL LOUVER ASSY	4
323	43T60587	LEAD MOTOR	1

WARNINGS ON REFRIGERANT LEAKAGE

Check of Concentration Limit

The room in which the air conditioner is to be installed requires a design that in the event of refrigerant gas leaking out, its concentration will not exceed a set limit.

The refrigerant R454B which is used in the air conditioner is safe, without the toxicity or combustibility of ammonia, and is not restricted by laws to be imposed which protect the ozone layer. However, since it contains more than air, it poses the risk of suffocation if its concentration should rise excessively. Suffocation from leakage of R454B is almost non-existent.

If a conditioner system is to be installed in a small room, select a suitable model and installation procedure so that if the refrigerant accidentally leaks out, its concentration does not reach the limit (and in the event of an emergency, measures can be made before injury can occur).
In a room where the concentration may exceed the limit, create an opening with adjacent rooms, or install mechanical ventilation combined with a gas leak detection device.

The concentration is as given below.

$$\frac{\text{Total amount of refrigerant (kg)}}{\text{Min. volume of the indoor unit installed room (m}^3\text{)}} \leq \text{Concentration limit (kg/m}^3\text{)}$$

Refrigerant Concentration limit shall be in accordance with local regulation.

CARRIER AIR CONDITIONING (THAILAND) CO., LTD.

144/9 MOO 5, BANGKADI INDUSTRIAL PARK, TIVANON ROAD, TAMBOL BANGKADI,
AMPHUR MUANGPATHUMTHANI, PATHUMTHANI 12000, THAILAND