TOSHIBA

Carrier

FILE No. A10-1606

SERVICE MANUAL

AIR-CONDITIONER
(MULTI TYPE)

INDOOR UNIT

<SUPER DIGITAL INVERTER>

Concealed Duct Type

RAV-SP181BT-UL

RAV-SP241BT-UL

RAV-SP301BT-UL

RAV-SP361BT-UL

RAV-SP421BT-UL

HFC

R410A

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Adoption of New Refrigerant

This Air Conditioner is a new type which adopts a new refrigerant HFC (R410A) instead of the conventional refrigerant R22 in order to prevent destruction of the ozone layer.

WARNING

Cleaning of the air filter and other parts of the air filter involves dangerous work in high places, so be sure to have a service person do it. Do not attempt it yourself.
The cleaning diagram for the air filter is there for the service person, and not for the customer.

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SAFETY CAUTION

The important contents concerned to the safety are described on the product itself and on this Service Manual. Please read this Service Manual and understand the described items thoroughly in the following contents (Indications/Illustrated marks), and keep the manual for reference. The manufacturer shall not assume any liability for the damage caused by not observing the description of this manual.

[Explanation of indications]

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

∗ Property damage : Enlarged damage concerned with property, furniture, and domestic animal/pet

[Explanation of illustrated marks]

Mark	Explanation
	Indicates prohibited items (Forbidden to do) The sentences near an illustrated mark describe the concrete prohibited contents.
	Indicates mandatory items (Compulsory 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.

[Confirmation of warning label on the main unit]

Confirm that labels are indicated on the specified positions
(Refer to the Parts disassembly diagram (Outdoor unit).)
If removing the label when parts are being replaced, stick it back on the original location.

⚠ DANGER	
 Turn off breaker.	**Turn "OFF" the breaker before removing the front panel and cabinet, otherwise an electric shock is caused by high voltage which may result in death or injury.** During operation, a high voltage with 400V or higher of circuit (∗) at secondary circuit of the high-voltage transformer is applied. If touching a high voltage with the naked hands or body, an electric shock is caused even if using an electric insulator. ∗ : For details, refer to the electric wiring diagram.
 Execute discharge between terminals.	**When removing the front panel or cabinet, execute short-circuit and discharge between high-voltage capacitor terminals.** If discharge is not executed, an electric shock is caused by high voltage which could result in death or injury. After turning off the breaker, high voltage is kept on the high-voltage capacitor.
 Prohibition	**Do not turn on the breaker under condition that the front panel and cabinet are removed.** An electric shock is caused by high voltage which could result in death or injury.

⚠ WARNING	
Check ground wires.	**Before troubleshooting or repair work, check the ground wire is connected to the ground terminals of the main unit, otherwise an electric shock is caused when a leak occurs.** If the ground wire is not correctly connected, contact an electrician for rework.
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.	**For spare parts, use those specified (∗).** If unspecified parts are used, a fire or electric shock may be caused. ∗: For details, refer to the parts list.
Do not bring a child close to the equipment.	**Before troubleshooting or repair work, do not bring a third party (a child, etc.) except the repair engineers close to the equipment.** It causes an injury with tools or disassembled parts. Please inform the users so that the third party (a child, etc.) does not approach the equipment.
Insulating measures	**Connect the cut-off lead wires with crimp contact, etc, put the closed end side upward and then apply a water-cut method, otherwise a leak or fire is caused at the users' side.**
No fire	**When repairing the refrigeration 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	**Check the used refrigerant name and use tools and materials of the parts which match with it.** For the products which use R410A refrigerant, the refrigerant name is indicated at a position on the outdoor unit where is easy to see. To prevent miss-charging, the route of the service port is changed from one of the former R22. **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 R410A, never use other refrigerant than R410A.** **For an air conditioner which uses other refrigerant (R22, etc.), never use R410A.** If different types of refrigerant are mixed, abnormal high pressure generates in the refrigeration cycle and an injury due to breakage may be caused. **Do not charge additional refrigerant.** If charging additional refrigerant when refrigerant gas leaks, the refrigerant composition in the refrigerating cycle changes results 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 R410A 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 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/Cabling	**After repair work, 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.

⚠ WARNING	
Insulator check	**After the work has finished, be sure to use an insulation tester set (500V Megger) to check the resistance is 2MΩ or more between the charge section and the non-charge metal section (Ground 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 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.
Be attentive to electric shock	**When checking the circuit with the power-ON, use rubber gloves and do not touch the charging section.** If touching to the charging section, an electric shock may be caused. **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.
Compulsion	**When the refrigerant gas leaks, find the leaked position and repair it.** If the leaked position cannot be found 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 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. **For the installation/moving/reinstallation work, follow to the Installation Manual.** If an incorrect installation is done, a trouble on the refrigerating cycle, water leak, electric shock or fire is caused.
Check after repair	**After repair work has been 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.
Check after reinstallation	**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.
	Check the following items after reinstallation. 1) The ground 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.

⚠ CAUTION	
Put on gloves	**Be sure to put on the gloves (*) and a long sleeved shirt: otherwise an injury may be caused with the parts, etc.** (*) Heavy gloves such as work gloves
Cooling check	**When the power is turned on, start to work after the equipment has been sufficiently cooled.** As temperature of the compressor pipes and others became high due to cooling/heating operation, a burn may be caused.

• Refrigerant (R410A)

This air conditioner adopts a HFC type refrigerant (R410A) which does not deplete the ozone layer.

1. Safety Caution Concerned to Refrigerant (R410A)

The pressure of R410A is high 1.6 times of that of the previous refrigerant (R22).
Accompanied with change of refrigerant, the refrigerating oil has been also changed.
Therefore, be sure that water, dust, the previous refrigerant or the previous refrigerating oil is not mixed into the refrigerating cycle of the air conditioner with refrigerant (R410A) installation work or service work.
If an incorrect work or incorrect service is performed, there is a possibility of a serious accident.
Use the tools and materials exclusive to R410A to ensure a safe work.

2. Cautions on Installation/Service

1) Do not mix other refrigerant or refrigerating oil.
   For the tools exclusive to R410A, shapes of all the joints including the service port differ from those of the previous refrigerant in order to prevent mixture of them.
2) As the use pressure of the refrigerant (R410A) is high, use material thickness of the pipe and tools which are specified for R410A.
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 clean pipes.
   Be sure to braze with flowing nitrogen gas. (Never use any other gas except for nitrogen.)
4) For the ground protection, use a vacuum pump for air purge.
5) R410A 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 is minimal.

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 R410A, 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 R410A

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 R410A (Those which cannot be used for conventional refrigerant (R22))
2) Tools exclusive for R410A, but can be also used for conventional refrigerant (R22)
3) Tools commonly used for R410A and for conventional refrigerant (R22)

The table below shows the tools exclusive for R410A and their interchangeability.

Tools exclusive for R410A (The following tools for R410A are required.)

Tools whose specifications are changed for R410A and their interchangeability

No.	Used tool	Usage	R410A air conditioner installation		Conventional air conditioner installation
			Existence of new equipment for R410A	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	Refrigerant cylinder	Refrigerant charge	Yes	No	No
⑨	Leakage detector	Gas leakage check	Yes	No	Yes

(Note) When flaring is carried out for R410A 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 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

Concealed Duct Type

RAV-SP181BT-UL, SP241BT-UL, SP301BT-UL, SP361BT-UL, SP421BT-UL

System	Size			018	024	030	036	042
	Outdoor Model		RAV-	SP180AT2-UL	SP240AT2-UL	SP300AT2-UL	SP360AT2-UL	SP420AT2-UL
	Indoor Model		RAV-	SP181BT-UL	SP241BT-UL	SP301BT-UL	SP361BT-UL	SP421BT-UL
Performance	Cooling Rated Capacity *1		(Btu/h)	18,000	24,000	30,000	36,000	42,000
	SEER			17.0	18.2	20.0	19.7	18.7
	EER			8.6	9.6	13.0	12.5	10.6
	Heating Rated Capacity *1		(Btu/h)	20,000	27,000	34,000	40,000	47,500
	HSPF			10.8	9.6	11.8	11.5	12.0
Operation Range	Cooling	Outdoor Min. - Max DB *2	(°F)	23 to 109.4				
		Indoor Min. - Max DB	(°F)	69.8 to 89.6				
		Indoor Min. - Max WB	(°F)	59 to 75.2				
	Heating	Outdoor WB Min. - Max	(°F)	-4 to 59				
		Indoor DB Min. - Max	(°F)	59 to 86				
Piping	Standard Piping Length		(ft.)	25				
	Min. Piping Length		(ft.)	16'5"	16'5"	9'8"	9'8"	9'8"
	Max. Piping Length		(ft.)	164'1"	164'1"	246' 1"	246' 1"	246' 1"
	Lift (Outdoor below Indoor)		(ft.)	98' 5"				
	Lift (Outdoor above Indoor)		(ft.)	98' 5"				
	Gas Pipe (Size / connection type)			1/2"	5/8"	5/8"	5/8"	5/8"
	Liquid Pipe (Size / connection type)			1/4"	3/8"	3/8"	3/8"	3/8"
	Additional refrigerant charge under long piping connection			0.22 oz / ft (65'7"ft to 164'1"ft)	0.43 oz / ft (98'5"ft to 164'1"ft)	0.43 oz / ft (98'5"ft to 246'1"ft)		
Electrical	Voltage			208V / 230 V-1-60Hz				
	Cooling Power Consumption		(W)	2093	2500	2308	2870	3962
	Heating Power Consumption		(W)	2060	2740	2660	3180	4280
	Cooling Running Current (208V/230V)		(A)	10.3/9.3	12.6/11.4	11.6/10.5	14.4/13.0	19.4/17.5
	Heating Running Current (208V/230V)		(A)	10.1/9.1	13.7/12.4	13.4/12.1	15.8/14.3	20.9/18.9
	Maximum Running Current Amps		(A)	17	24	24	24	24
	Breaker		(A)	20	25	25	25	25
	Fuse Rating *3			30	40	40	40	40
Indoor	Dimensions	Width	(in.)	27.6	39.4	53.2	53.2	53.2
		Height	(in.)	12.6	12.6	12.6	12.6	12.6
		Length	(in.)	31.5	31.5	31.5	31.5	31.5
	Weight - Gross / Net		(lbs.)	82/73	104/93	135/119	135/119	135/119
	Appearance			Zin hot dipping steel plate				
	Sound Pressure at Different Speeds		(dBa) (H/M/L)	36-33-30	36-34-32	39-36-33	40-37-34	40-37-34
	Air flow DRY		(CFM) (H/M/L)	459/406/341	706/618/529	953/853/765	1,165/1,041/929	1,165/1,041/929

*1 Rated conditions

Cooling : Indoor air temperature 80°F (27°C) DB / 67 (19°C) WB, Outdoor air temperature 95°F (35°C) DB

Heating : Indoor air temperature 70°F (21°C) DB, Outdoor air temperature 47°F (8°C) DB/43°F (6°C) WB

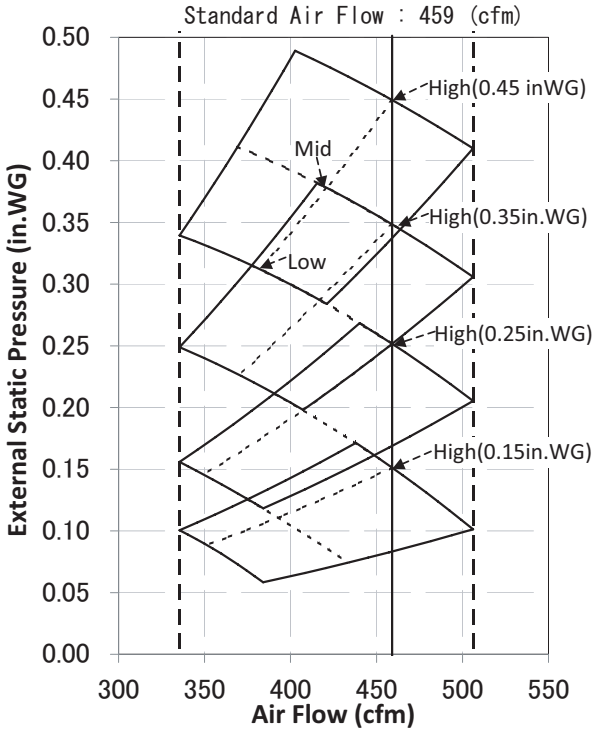
*2 When installed a duct or wind shield so that it is not affected by the wind.
The minimum outside temperature will be 5°F.

*3 UL value

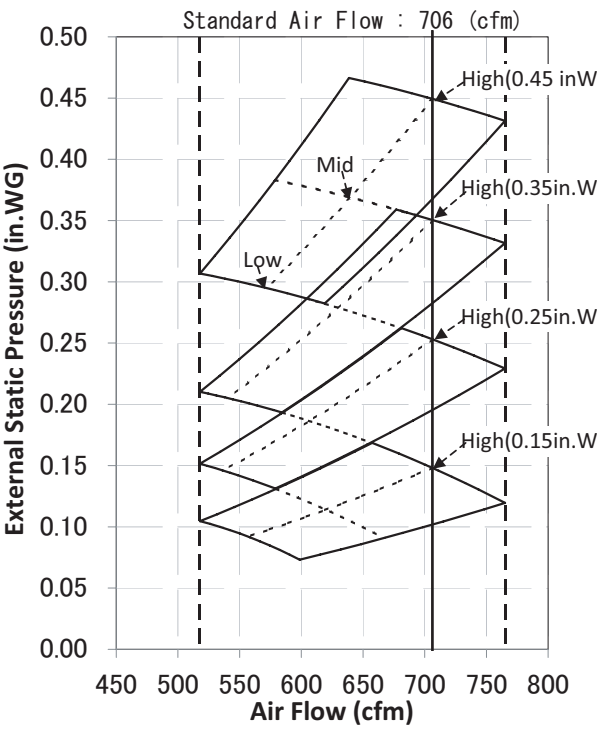
2. FAN CHARACTERISTICS

■ Back air intake

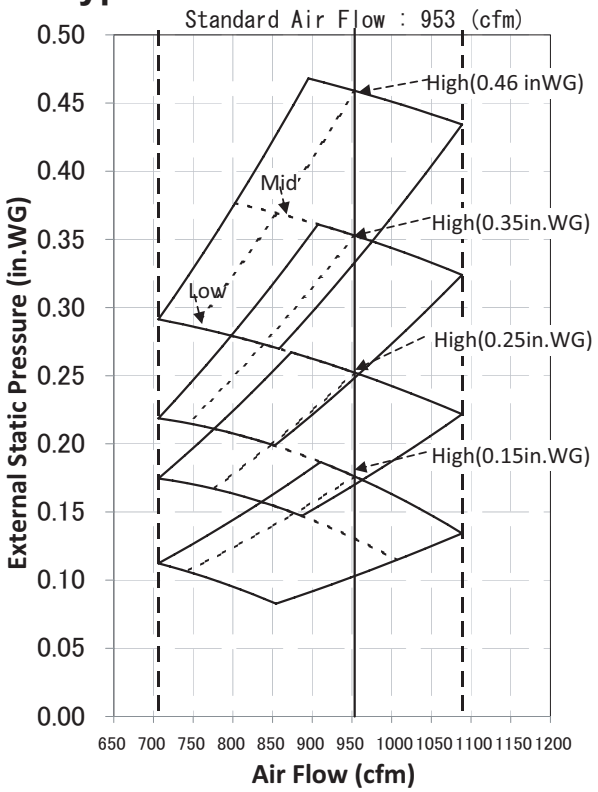
181 type



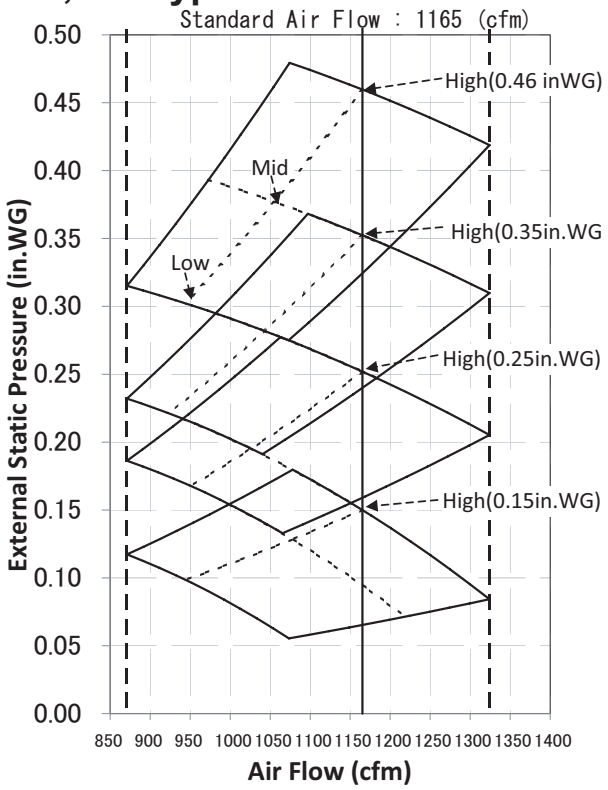
241 type



301 type

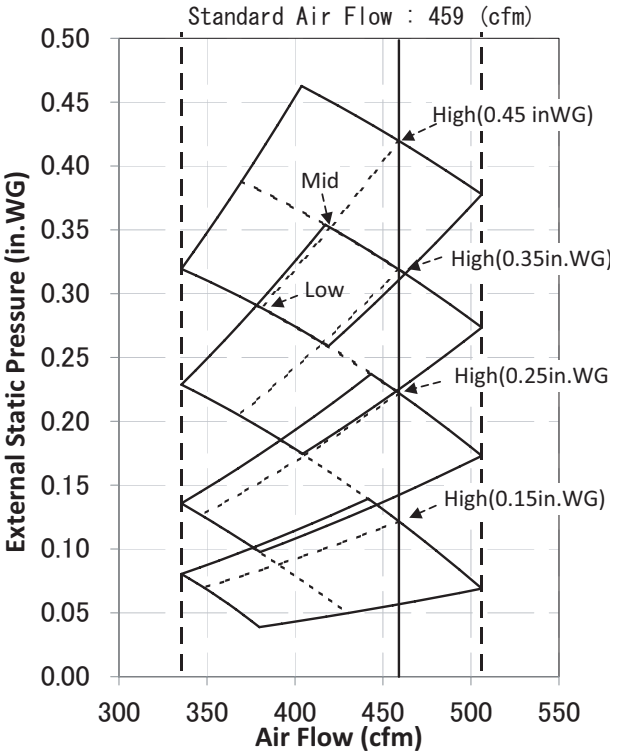


361, 421 type



■ Under air intake

181 type



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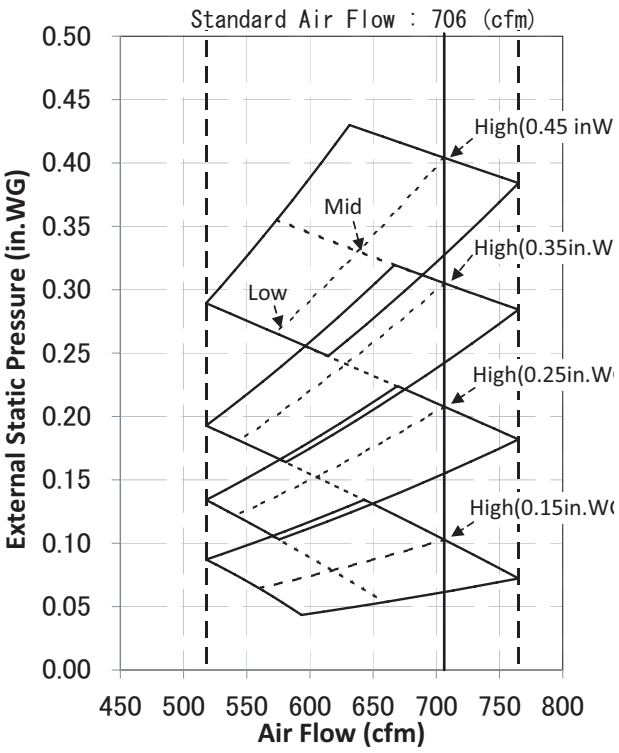

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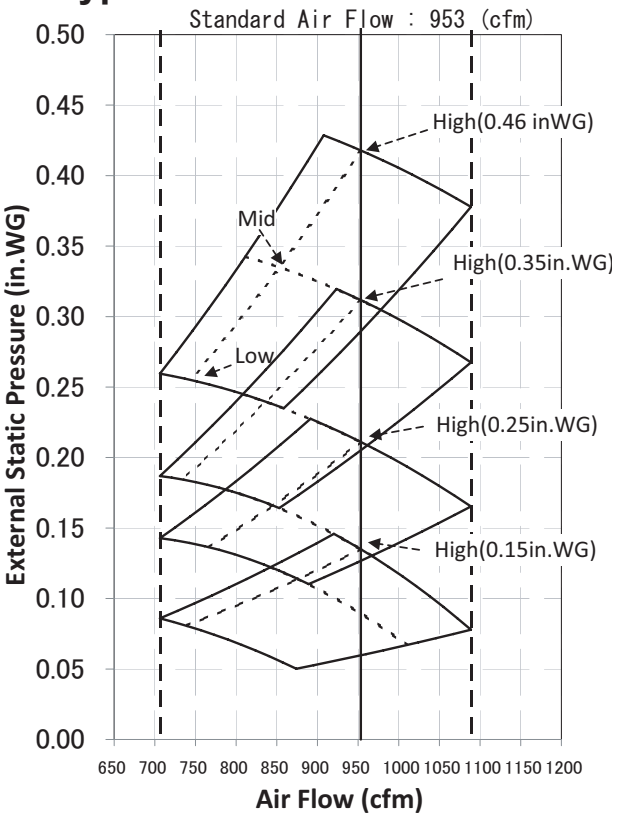
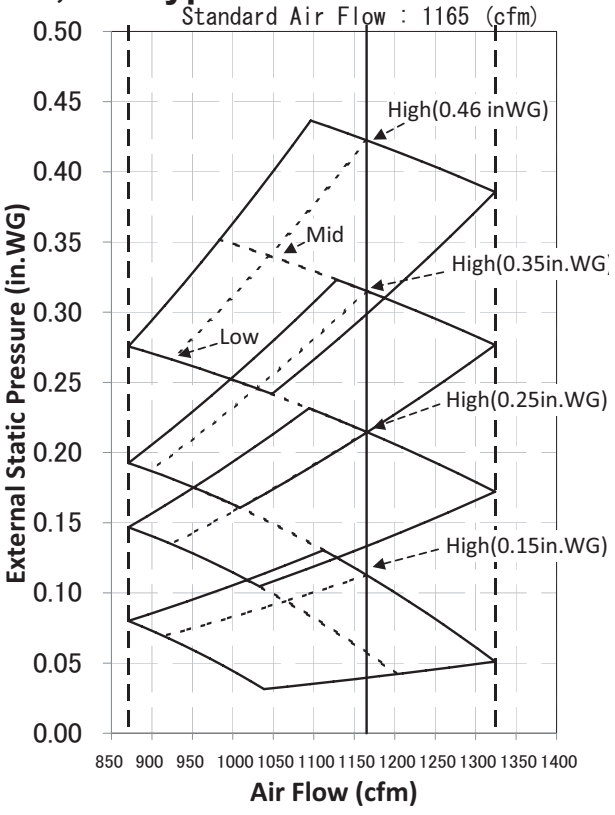


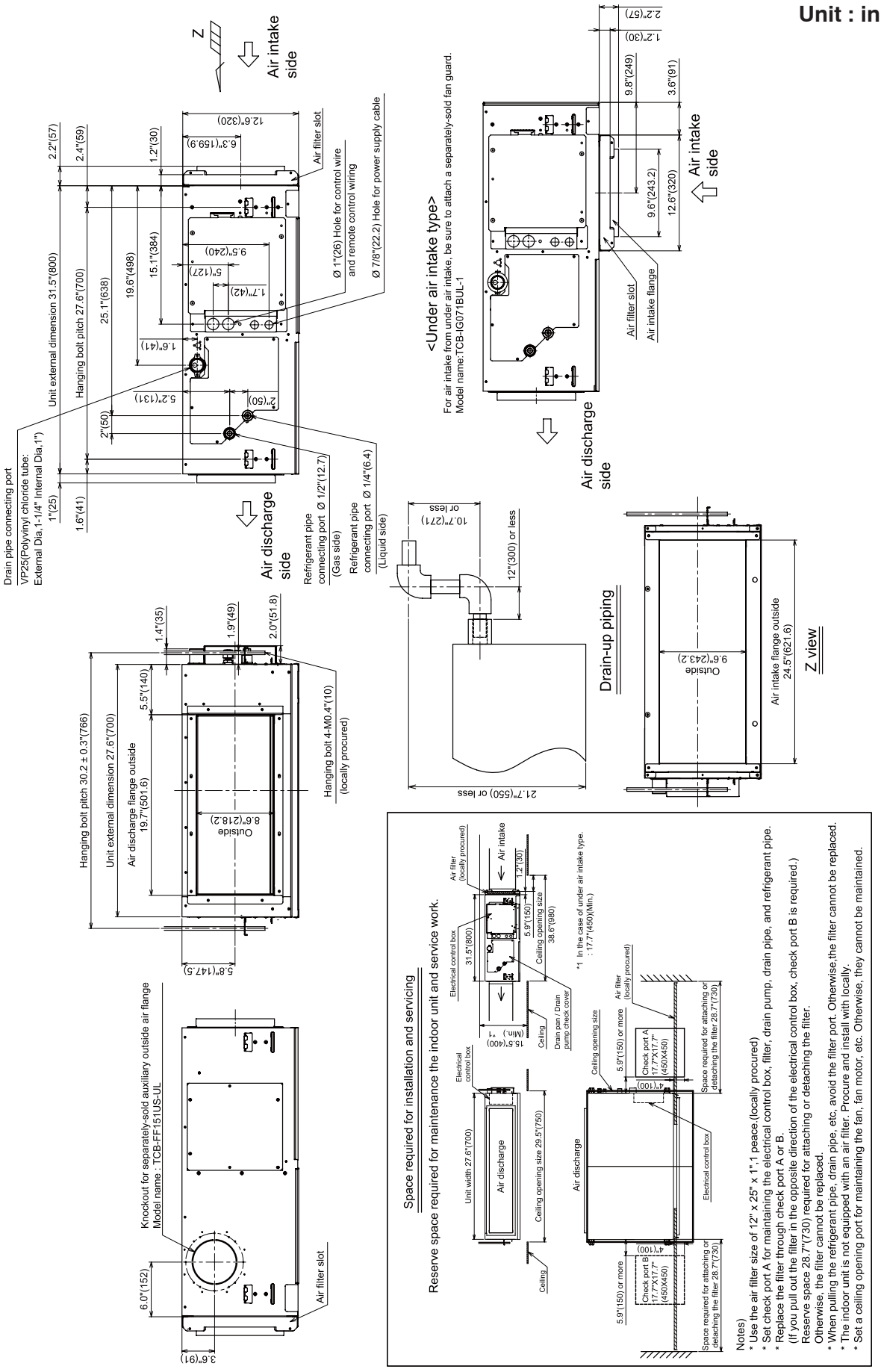
361, 421 type



3. CONSTRUCTION VIEWS (EXTERNAL VIEWS)

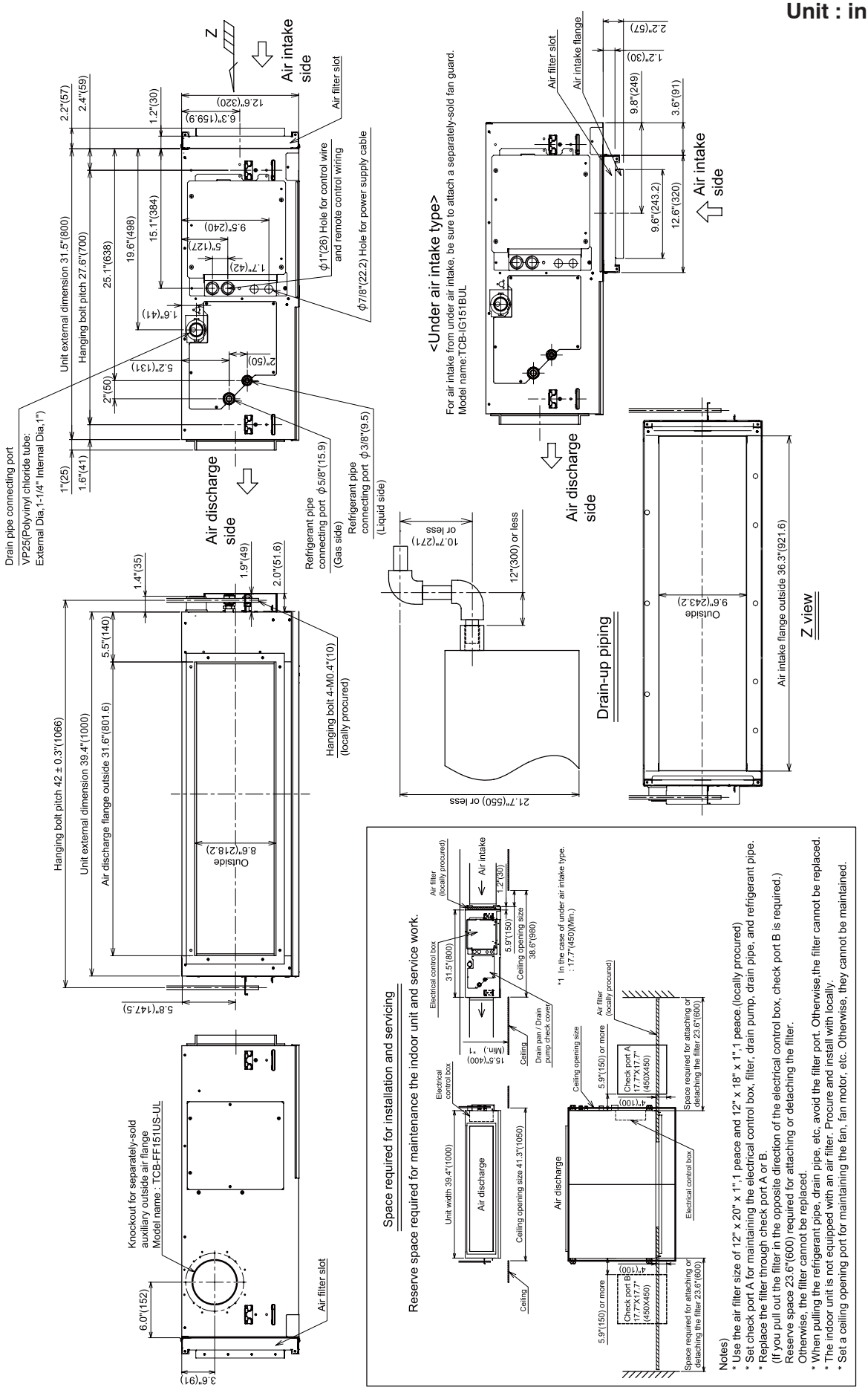
RAV-SP181BT-UL

Unit : in (mm)



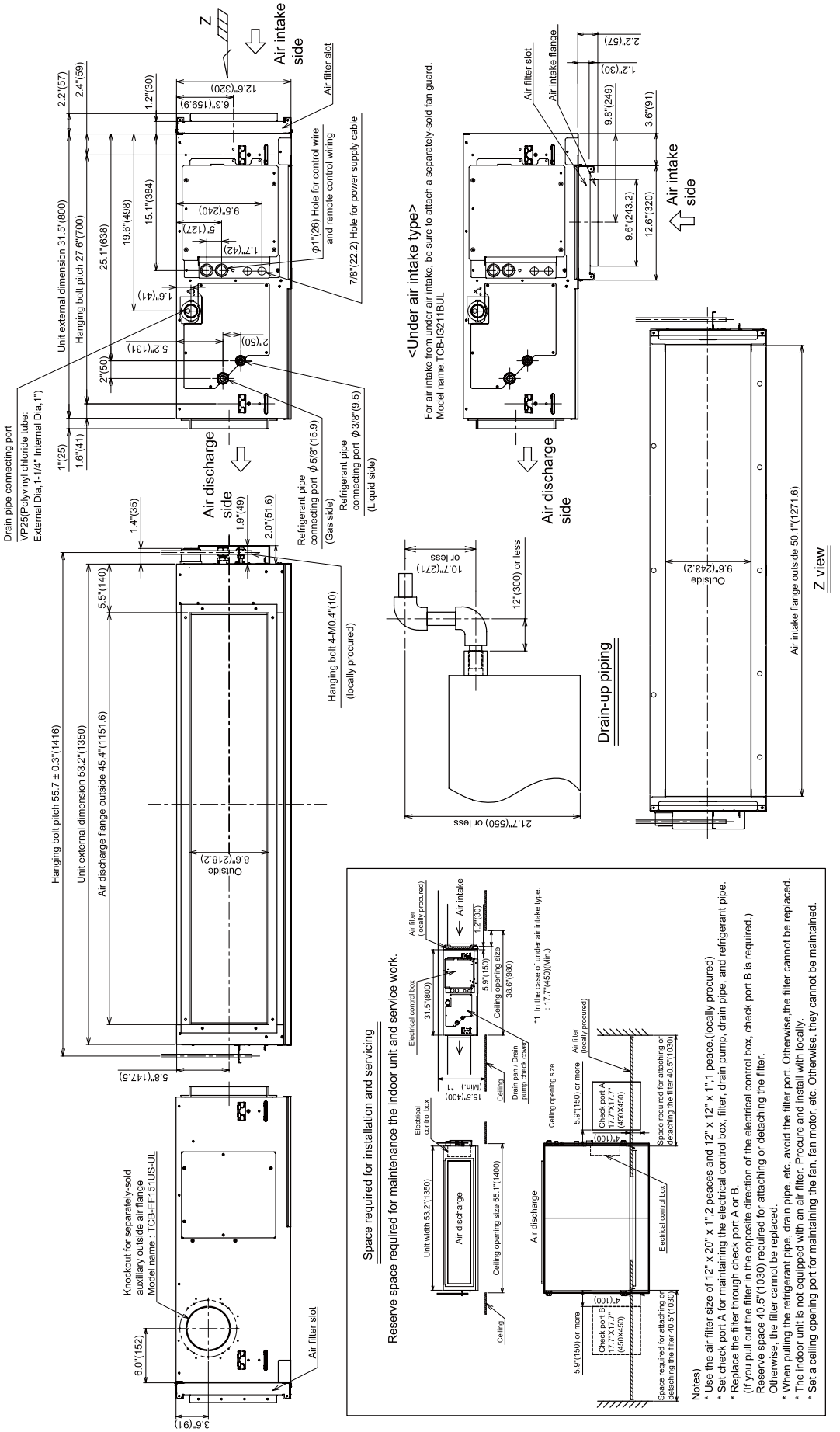
RAV-SP241BT-UL

Unit : in (mm)



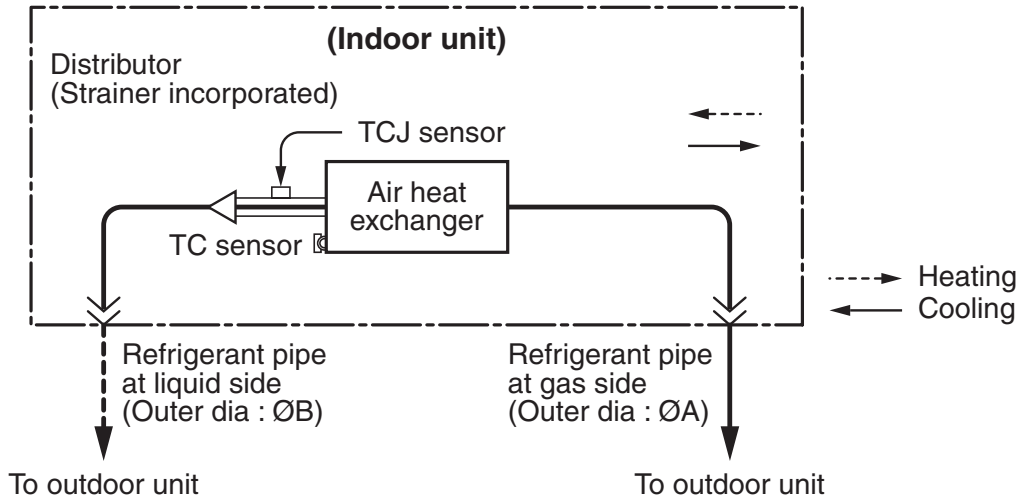
RAV-SP301BT-UL, RAV-SP361BT-UL, RAV-SP421BT-UL

Unit : in (mm)



4. SYSTEMATIC REFRIGERATING CYCLE DIAGRAM

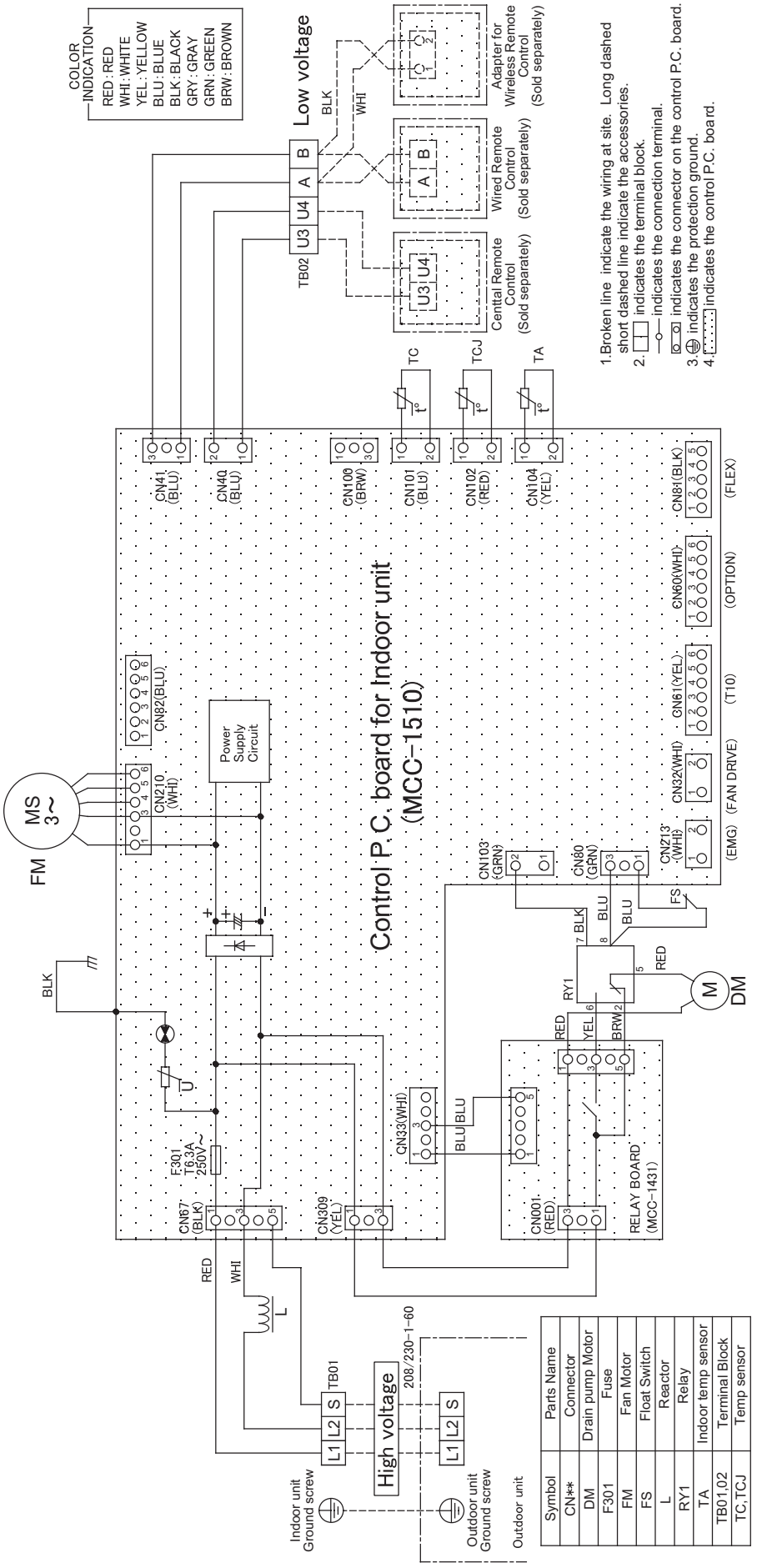
• Single type (Combination of 1 indoor unit and 1 outdoor unit)



Dimension table

Indoor unit	Outer diameter of refrigerant pipe (In (mm))	
	Gas side ØA	Liquid side ØB
RAV-SP18 type	1/2” (12.7)	1/4” (6.4)
RAV-SP24, 30, 36, 42 type	5/8” (15.9)	3/8” (9.5)

5. WIRING DIAGRAM



Symbol	Parts Name
CN**	Connector
DM	Drain pump Motor
F301	Fuse
FM	Fan Motor
FS	Float Switch
L	Reactor
RY1	Relay
TA	Indoor temp sensor
TB01,02	Terminal Block
TC,TCJ	Temp sensor

6. PARTS RATING

Model RAV-	SP181BT-UL	SP241BT-UL
Fan motor	MF-240U150-2A	MF-240U150-1A
Drain pump motor	ADP-1406	
Float switch	FS-0218-102	
Reactor	CH-43-2Z-T	
TA sensor	Lead wire length : 24.3 in (618mm)	
TC sensor	Ø6, Lead wire length : 47.2 in (1200mm), Vinyl tube (Black)	
TCJ sensor	Ø6, Lead wire length : 47.2 in (1200mm), Vinyl tube (Red)	

Model RAV-	SP301BT-UL	SP361BT-UL	SP421BT-UL
Fan motor	MF-240U150-2A		
Drain pump motor	ADP-1406		
Float switch	FS-0218-102		
Reactor	CH-43-2Z-T		
TA sensor	Lead wire length : 24.3 in (618mm)		
TC sensor	Ø6, Lead wire length : 47.2 in (1200mm), Vinyl tube (Black)		
TCJ sensor	Ø6, Lead wire length : 47.2 in (1200mm), Vinyl tube (Red)		

7. REFRIGERANT R410A

This air conditioner adopts the new refrigerant HFC (R410A) which does not damage the ozone layer.
The working pressure of the new refrigerant R410A is 1.6 times higher than conventional refrigerant (R22).
The refrigerating oil is also changed in accordance with change of refrigerant, so be careful that water, dust, and existing refrigerant or refrigerating oil are not entered in the refrigerant cycle of the air conditioner using the new refrigerant during installation work or servicing time.
The next section describes the precautions for air conditioner using the new refrigerant.
Conforming to contents of the next section together with the general cautions included in this manual, perform the correct and safe work.

7-1. Safety During Installation/Servicing

As R410A's pressure is about 1.6 times higher than that of R22, improper installation/servicing may cause a serious trouble. By using tools and materials exclusive for R410A, it is necessary to carry out installation/servicing safely while taking the following precautions into consideration.

1. Never use refrigerant other than R410A in an air conditioner which is designed to operate with R410A.
   If other refrigerant than R410A is mixed, pressure in the refrigeration cycle becomes abnormally high, and it may cause personal injury, etc. by a rupture.
2. Confirm the used refrigerant name, and use tools and materials exclusive for the refrigerant R410A.
   The refrigerant name R410A is indicated on the visible place of the outdoor unit of the air conditioner using R410A as refrigerant.
   To prevent mischarging, the diameter of the service port differs from that of R22.
3. If a refrigeration gas leakage occurs during installation/servicing, be sure to ventilate fully.
   If the refrigerant gas comes into contact with fire, a poisonous gas may occur.
4. When installing or removing an air conditioner, do not allow air or moisture to remain in the refrigeration cycle.
   Otherwise, pressure in the refrigeration cycle may become abnormally high so that a rupture or personal injury may be caused.
5. After completion of installation work, check to make sure that there is no refrigeration gas leakage.
   If the refrigerant gas leaks into the room, coming into contact with fire in the fan-driven heater, space heater, etc., a poisonous gas may occur.
6. When an air conditioning system charged with a large volume of refrigerant is installed in a small room, it is necessary to exercise care so that, even when refrigerant leaks, its concentration does not exceed the marginal level.
   If the refrigerant gas leakage occurs and its concentration exceeds the marginal level, an oxygen starvation accident may result.
7. Be sure to carry out installation or removal according to the installation manual.
   Improper installation may cause refrigeration trouble, water leakage, electric shock, fire, etc.
8. Unauthorized modifications to the air conditioner may be dangerous. If a breakdown occurs please call a qualified air conditioner technician or electrician.
   Improper repair may result in water leakage, electric shock and fire, etc.

7-2. Refrigerant Piping Installation

7-2-1. Piping Materials and Joints Used

For the refrigerant piping installation, copper pipes and joints are mainly used.
Copper pipes and joints suitable for the refrigerant must be chosen and installed.
Furthermore, it is necessary to use clean copper pipes and joints whose interior surfaces are less affected by contaminants.

1. Copper Pipes
   It is necessary to use seamless copper pipes which are made of either copper or copper alloy and it is desirable that the amount of residual oil is less than 0.0001 lbs / 32' 10" (40 mg/10 m).
   Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface).
   Otherwise, the expansion valve or capillary tube may become blocked with contaminants.
   As an air conditioner using R410A incurs pressure higher than when using R22, it is necessary to choose adequate materials.
   Thicknesses of copper pipes used with R410A are as shown in Table 7-2-1. Never use copper pipes thinner than 0.03" (0.8mm) even when it is available on the market.

Table 7-2-1 Thicknesses of annealed copper pipes

	Thickness (In (mm))	
Outer diameter (In (mm))	**R410A**	**R22**
1/4" (6.4)	0.03" (0.80)	0.03" (0.80)
3/8" (9.5)	0.03" (0.80)	0.03" (0.80)
1/2" (12.7)	0.03" (0.80)	0.03" (0.80)
5/8" (15.9)	0.04" (1.00)	0.04" (1.00)

1. Joints

   For copper pipes, flare joints or socket joints are used. Prior to use, be sure to remove all contaminants.

   a) Flare Joints

   Flare joints used to connect the copper pipes cannot be used for pipings whose outer diameter exceeds 20 mm. In such a case, socket joints can be used.
   Sizes of flare pipe ends, flare joint ends and flare nuts are as shown in Tables 7-2-3 to 7-2-5 below.

   b) Socket Joints

   Socket joints are such that they are brazed for connections, and used mainly for thick pipings whose diameter is larger than 0.79" (20 mm). Thicknesses of socket joints are as shown in Table 7-2-2.

Table 7-2-2 Minimum thicknesses of socket joints

Reference outer diameter of copper pipe jointed (In (mm))	Minimum joint thickness (In (mm))
1/4" (6.4)	0.02" (0.50)
3/8" (9.5)	0.02" (0.60)
1/2" (12.7)	0.03" (0.70)
5/8" (15.9)	0.03" (0.80)

7-2-2. Processing of Piping Materials

When performing the refrigerant piping installation, care should be taken to ensure that water or dust does not enter the pipe interior, that no other oil other than lubricating oils used in the installed air conditioner is used, and that refrigerant does not leak. When using lubricating oils in the piping processing, use such lubricating oils whose water content has been removed. When stored, be sure to seal the container with an airtight cap or any other cover.

1. Flare Processing Procedures and Precautions

   a) Cutting the Pipe

   By means of a pipe cutter, slowly cut the pipe so that it is not deformed.

   b) Removing Burrs and Chips

   If the flared section has chips or burrs, refrigerant leakage may occur.
   Carefully remove all burrs and clean the cut surface before installation.

c) Insertion of Flare Nut

d) Flare Processing

Make certain that a clamp bar and copper pipe have been cleaned.
By means of the clamp bar, perform the flare processing correctly.
Use either a flare tool for R410A or conventional flare tool.
Flare processing dimensions differ according to the type of flare tool.
When using a conventional flare tool, be sure to secure “dimension A” by using a gauge for size adjustment.

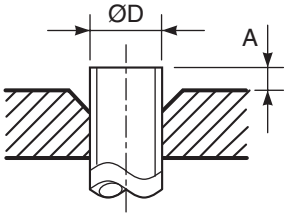


Fig. 7-2-1 Flare processing dimensions

Table 7-2-3 Dimensions related to flare processing for R410A / R22

Outer diameter (In (mm))	Thickness (In (mm))	A (In (mm))		
		Flare tool for R410A, R22clutch type	Conventional flare tool (R410A)	
			Clutch type	Wing nut type
1/4” (6.4)	0.03” (0.8)	0 – 0.02” (0 – 0.5)	0.04” – 0.06” (1.0 – 1.5)	0.06” – 0.08” (1.5 – 2.0)
3/8” (9.5)	0.03” (0.8)	0 – 0.02” (0 – 0.5)	0.04” – 0.06” (1.0 – 1.5)	0.06” – 0.08” (1.5 – 2.0)
1/2” (12.7)	0.03” (0.8)	0 – 0.02” (0 – 0.5)	0.04” – 0.06” (1.0 – 1.5)	0.08” – 0.10” (2.0 – 2.5)
5/8” (15.9)	0.04” (1.0)	0 – 0.02” (0 – 0.5)	0.04” – 0.06” (1.0 – 1.5)	0.08” – 0.10” (2.0 – 2.5)

Table 7-2-4 Flare and flare nut dimensions for R410A

Outer diameter (In (mm))	Thickness (In (mm))	Dimension (In (mm))				Flare nut width (In (mm))
		A	B	C	D	
1/4” (6.4)	0.03” (0.8)	0.36” (9.1)	0.36” (9.2)	0.26” (6.5)	0.51” (13)	0.67” (17)
3/8” (9.5)	0.03” (0.8)	0.52” (13.2)	0.53” (13.5)	0.38” (9.7)	0.79” (20)	0.87” (22)
1/2” (12.7)	0.03” (0.8)	0.65” (16.6)	0.63” (16.0)	0.51” (12.9)	0.91” (23)	1.02” (26)
5/8” (15.9)	0.04” (1.0)	0.78” (19.7)	0.75” (19.0)	0.63” (16.0)	0.98” (25)	1.14” (29)

Table 7-2-5 Flare and flare nut dimensions for R22

Outer diameter (In (mm))	Thickness (In (mm))	Dimension (In (mm))				Flare nut width (In (mm))
		A	B	C	D	
1/4” (6.4)	0.03” (0.8)	0.36” (9.1)	0.36” (9.2)	0.26” (6.5)	0.51” (13)	0.67” (17)
3/8” (9.5)	0.03” (0.8)	0.51” (13.0)	0.53” (13.5)	0.38” (9.7)	0.79” (20)	0.87” (22)
1/2” (12.7)	0.03” (0.8)	0.64” (16.2)	0.63” (16.0)	0.51” (12.9)	0.79” (20)	0.94” (24)
5/8” (15.9)	0.04” (1.0)	0.76” (19.4)	0.75” (19.0)	0.63” (16.0)	0.91” (23)	1.06” (27)
3/4” (19.0)	0.04” (1.0)	0.92” (23.3)	0.94” (24.0)	0.76” (19.2)	1.34” (34)	1.42” (36)

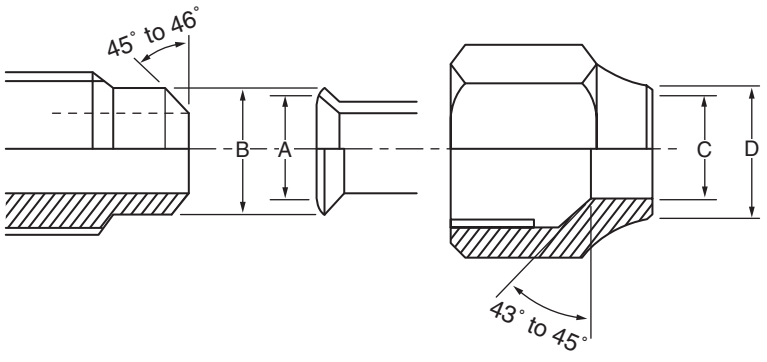


Fig. 7-2-2 Relations between flare nut and flare seal surface

2. Flare Connecting Procedures and Precautions
   a) Make sure that the flare and union portions do not have any scar or dust, etc.
   b) Correctly align the processed flare surface with the union axis.
   c) Tighten the flare with designated torque by means of a torque wrench.
   The tightening torque for R410A is the same as that for conventional R22.
   Incidentally, when the torque is weak, the gas leakage may occur.
   When it is strong, the flare nut may crack and may be made non-removable.
   When choosing the tightening torque, comply with values designated by manufacturers.
   Table 7-2-6 shows reference values.

NOTE:

When applying oil to the flare surface, be sure to use oil designated by the manufacturer.
If any other oil is used, the lubricating oils may deteriorate and cause the compressor to burn out.

Table 7-2-6 Tightening torque of flare for R410A [Reference values]

Outer diameter (In (mm))	Tightening torque (ft • lbs (N • m))
1/4” (6.4)	10 – 13 (14 – 18)
3/8” (9.5)	24 – 31 (33 – 42)
1/2” (12.7)	37 – 46 (50 – 62)
5/8” (15.9)	50 – 60 (68 – 82)

7-3. Tools

7-3-1. Required Tools

Refer to the "**4. Tools**" (Page 8)

7-4. Recharging of Refrigerant

When it is necessary to recharge refrigerant, charge the specified amount of new refrigerant according to the following steps.

Recover the refrigerant, and check no refrigerant remains in the equipment.

↓

Connect the charge hose to packed valve service port at the outdoor unit's gas side.

↓

Connect the charge hose of the vacuum pump adapter.

↓

Open fully both packed valves at liquid and gas sides.

↓

Place the handle of the gauge manifold Low in the fully opened position, and turn on the vacuum pump's power switch. Then, evacuating the refrigerant in the cycle.

↓

When the compound gauge's pointer has indicated –101 kpa (–76 cmHg), place the handle Low in the fully closed position, and turn off the vacuum pump's power switch.

↓

Keep the status as it is for 1 to 2 minutes, and ensure that the compound gauge's pointer does not return.

↓

Set the refrigerant cylinder to the electronic balance, connect the connecting hose to the cylinder and the connecting port of the electronic balance, and charge **liquid refrigerant.**

(For refrigerant charging, see the figure below.)

---

1) Never charge refrigerant exceeding the specified amount.
2) If the specified amount of refrigerant cannot be charged, charge refrigerant bit by bit in COOL mode.
3) Do not carry out additional charging.
   When additional charging is carried out if refrigerant leaks, the refrigerant composition changes in the refrigeration cycle, that is characteristics of the air conditioner changes, refrigerant exceeding the specified amount is charged, and working pressure in the refrigeration cycle becomes abnormally high pressure, and may cause a rupture or personal injury.

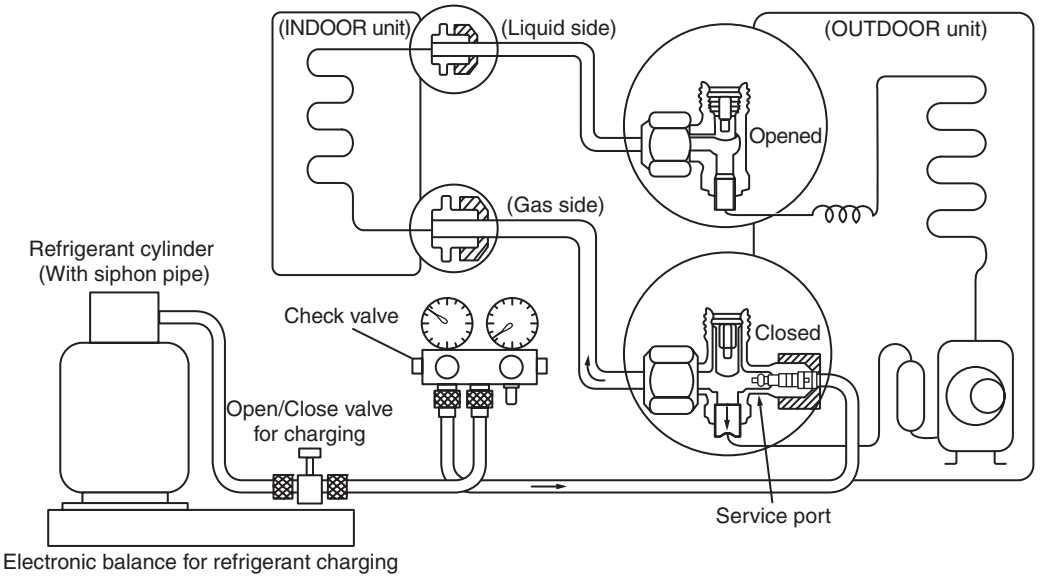
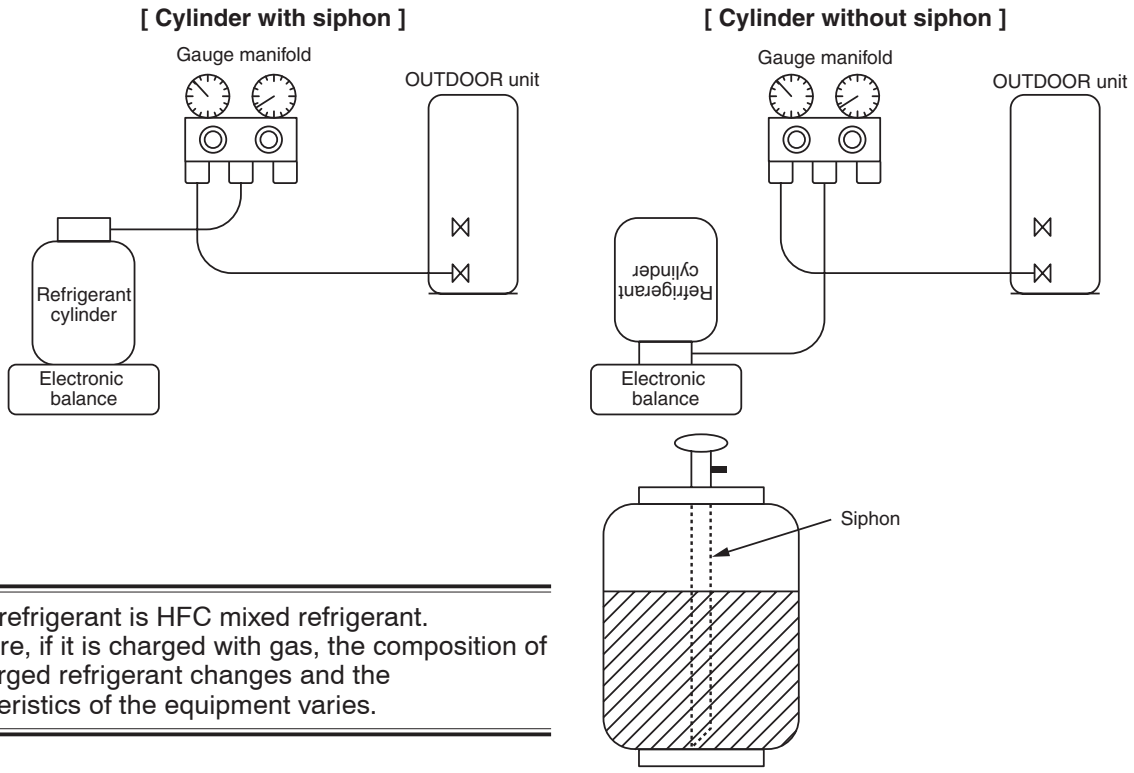


Fig. 7-4-1 Configuration of refrigerant charging

1) Be sure to make setting so that liquid can be charged.
2) When using a cylinder equipped with a siphon, liquid can be charged without turning it upside down.

It is necessary for charging refrigerant under condition of liquid because R410A is mixed type of refrigerant. Accordingly, when charging refrigerant from the refrigerant cylinder to the equipment, charge it turning the cylinder upside down if cylinder is not equipped with siphon.



R410A refrigerant is HFC mixed refrigerant.
Therefore, if it is charged with gas, the composition of the charged refrigerant changes and the characteristics of the equipment varies.

Fig. 7-4-2

7-5. Brazing of Pipes

7-5-1. Materials for Brazing

1. Silver brazing filler

Silver brazing filler is an alloy mainly composed of silver and copper.
It is used to join iron, copper or copper alloy, and is relatively expensive though it excels in solderability.

2. Phosphor bronze brazing filler

Phosphor bronze brazing filler is generally used to join copper or copper alloy.

3. Low temperature brazing filler

Low temperature brazing filler is generally called solder, and is an alloy of tin and lead.
Since it is weak in adhesive strength, do not use it for refrigerant pipes.

1) Phosphor bronze brazing filler tends to react with sulfur and produce a fragile compound water solution, which may cause a gas leakage. Therefore, use any other type of brazing filler at a hot spring resort, etc., and coat the surface with a paint.
2) When performing brazing again at time of servicing, use the same type of brazing filler.

7-5-2. Flux

1. Reason why flux is necessary

- By removing the oxide film and any foreign matter on the metal surface, it assists the flow of brazing filler.
- In the brazing process, it prevents the metal surface from being oxidized.
- By reducing the brazing filler's surface tension, the brazing filler adheres better to the treated metal.

2. Characteristics required for flux

- Activated temperature of flux coincides with the brazing temperature.
- Due to a wide effective temperature range, flux is hard to carbonize.
- It is easy to remove slag after brazing.
- The corrosive action to the treated metal and brazing filler is minimum.
- It excels in coating performance and is harmless to the human body.

As the flux works in a complicated manner as described above, it is necessary to select an adequate type of flux according to the type and shape of treated metal, type of brazing filler and brazing method, etc.

3. Types of flux

- **Noncorrosive flux**

  Generally, it is a compound of borax and boric acid.
  It is effective in case where the brazing temperature is higher than 1472°F (800°C).

- **Activated flux**

  Most of fluxes generally used for silver brazing are this type.
  It features an increased oxide film removing capability due to the addition of compounds such as potassium fluoride, potassium chloride and sodium fluoride to the borax-boric acid compound.

4. Piping materials for brazing and used brazing filler/flux

Piping material	Used brazing filler	Used flux
Copper - Copper	Phosphor copper	Do not use
Copper - Iron	Silver	Paste flux
Iron - Iron	Silver	Vapor flux

1) Do not enter flux into the refrigeration cycle.
2) When chlorine contained in the flux remains within the pipe, the lubricating oil deteriorates. Therefore, use a flux which does not contain chlorine.
3) When adding water to the flux, use water which does not contain chlorine (e.g. distilled water or ion-exchange water).
4) Remove the flux after brazing.

7-5-3. Brazing

As brazing work requires sophisticated techniques, experiences based upon a theoretical knowledge, it must be performed by a person qualified.
In order to prevent the oxide film from occurring in the pipe interior during brazing, it is effective to proceed with brazing while letting dry Nitrogen gas flow.

Never use gas other than Nitrogen gas.

1. Brazing method to prevent oxidation

1) Attach a reducing valve and a flow-meter to the Nitrogen gas cylinder.
2) Use a copper pipe to direct the piping material, and attach a flow-meter to the cylinder.
3) Apply a seal onto the clearance between the piping material and inserted copper pipe for Nitrogen in order to prevent backflow of the Nitrogen gas.
4) When the Nitrogen gas is flowing, be sure to keep the piping end open.
5) Adjust the flow rate of Nitrogen gas so that it is lower than 0.05 m³/Hr or 2.9 psi (0.02 MPa) by means of the reducing valve.
6) After performing the steps above, keep the Nitrogen gas flowing until the pipe cools down to a certain extent (temperature at which pipes are touchable with hands).
7) Remove the flux completely after brazing.

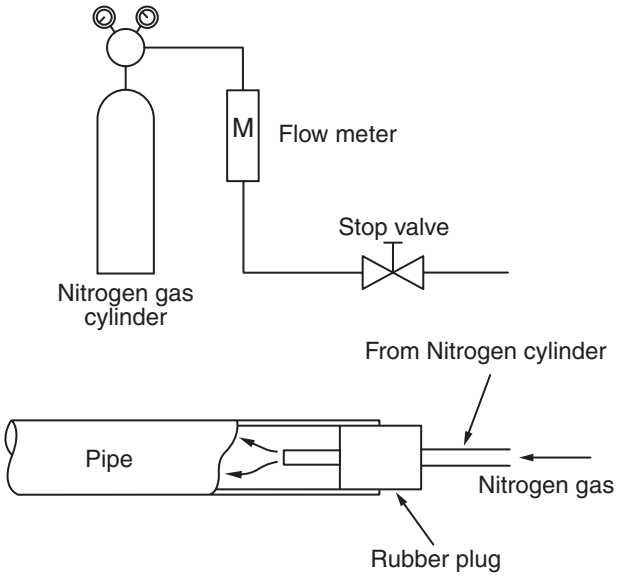
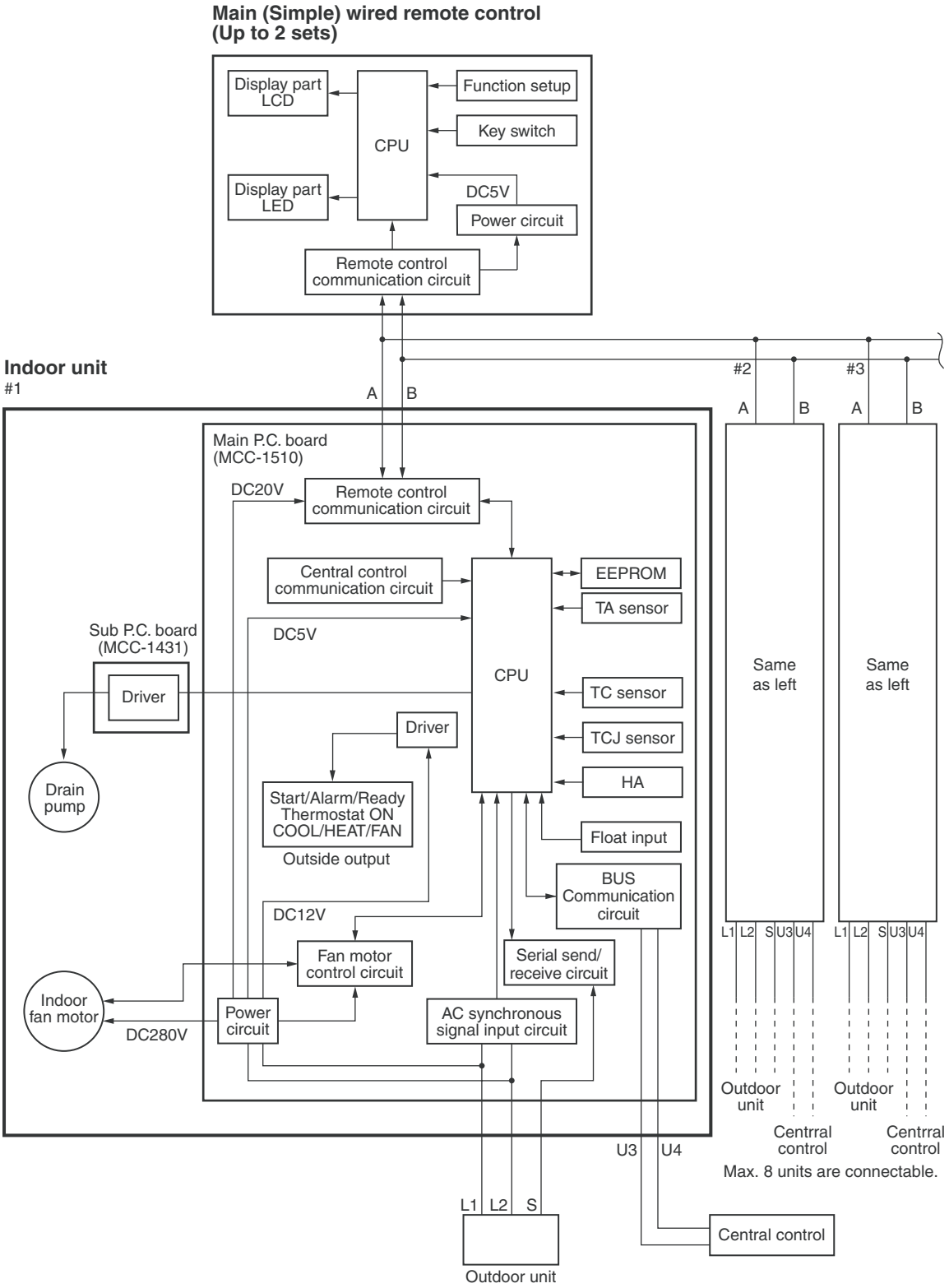


Fig. 7-5-1 Prevention of oxidation during brazing

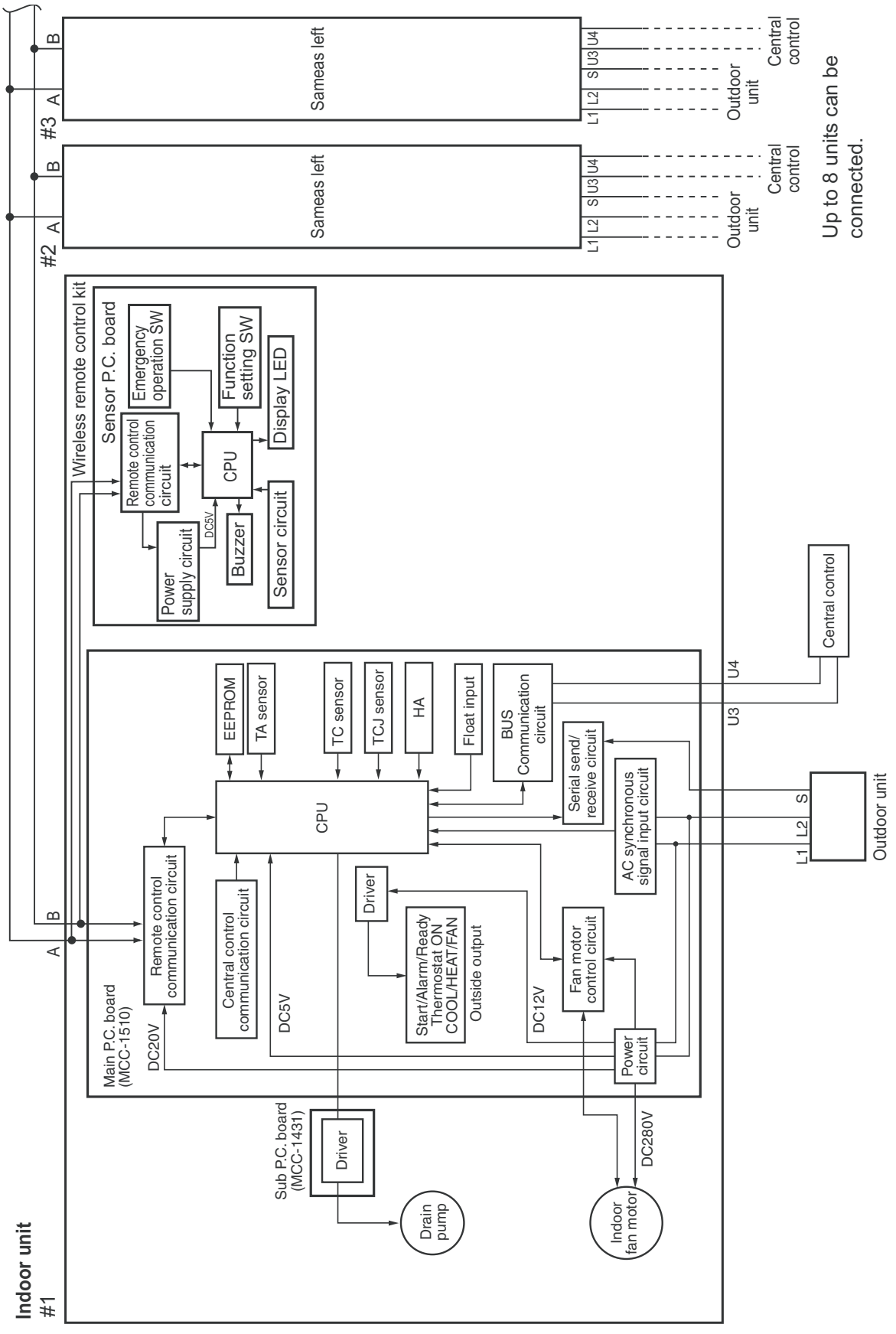
8. INDOOR CONTROL SUMMARY

8-1. Indoor Control Block Diagram

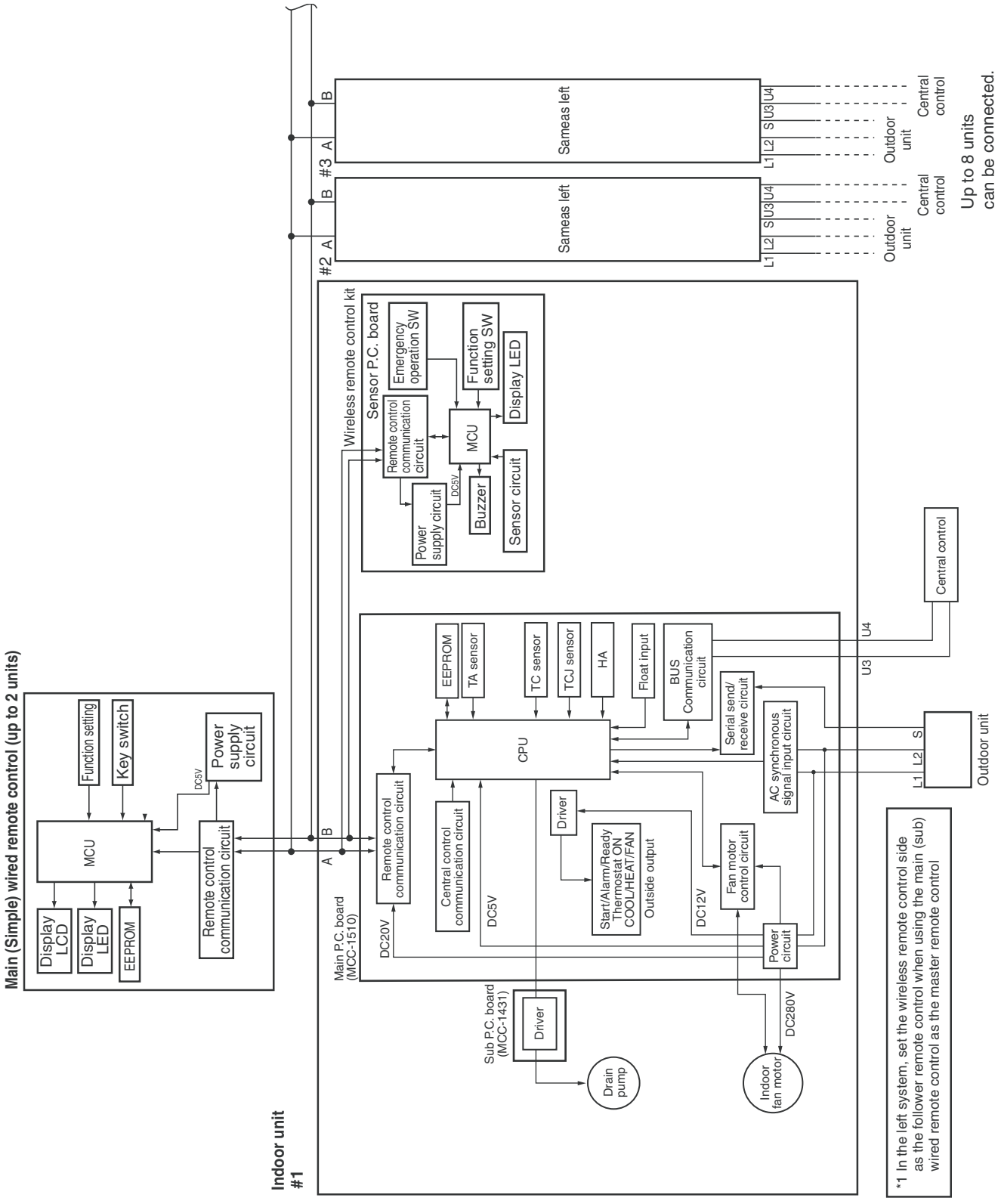
8-1-1. Connection of Wired Remote Control



8-1-2. Connection of Wireless Remote Control Kit

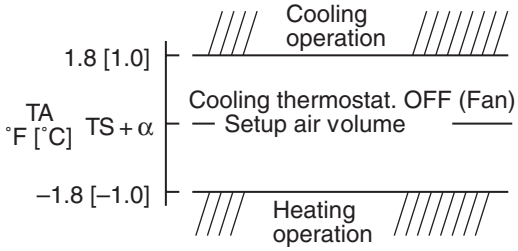


8-1-3. Connection of Both Wired Remote Control and Wireless Remote Control Kit



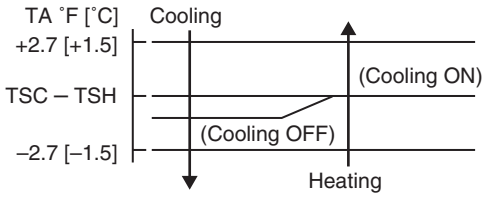
8-2. Control Outline

<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 outdoor unit is 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>

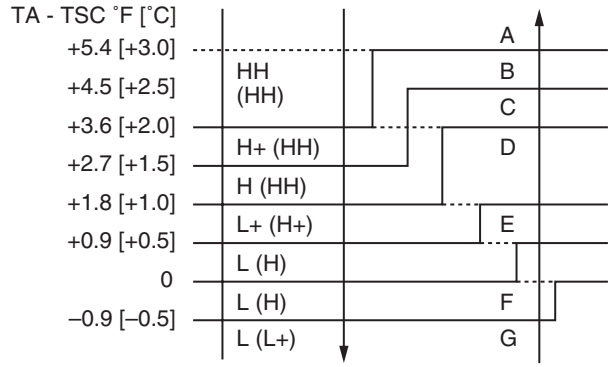
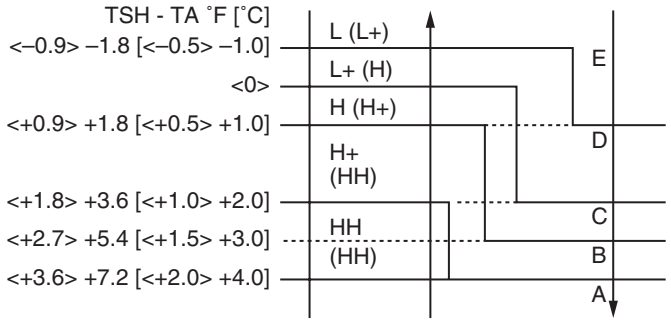
Fan speed (rpm)/
Air direction adjustment</td></tr>
<tr><td>2</td><td>When power supply is reset</td><td>1) The operation mode is selected based on the operation mode command on the remote control.
<table>
<tr><th>Remote control command</th><th>Control outline</th></tr>
<tr><td>STOP</td><td>Air conditioner 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 + α –1 < TA < TS + α + 1: Cooling thermostat. 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 trouble</td><td>0K</td></tr>
</table></td><td>TA: Room temp.
TS: Setup temp.
TO: Outside temp.

<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><th>SET DATA</th><th>0</th><th>2</th><th>4</th><th>6</th></tr>
<tr><td>Setup temp. correction</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>
Default setting
<table>
<tr><th>SET DATA</th><td>2</td></tr>
</table></td><td>Unless the sensor of the remote control is controlled, there is a shift in the suction temperature during heating operation.</td></tr>
<tr><td>4</td><td>Automatic capacity control

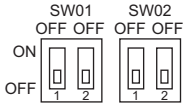
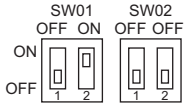
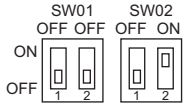
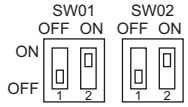
(GA control)</td><td>1) Based on the difference between TA and TS, the operation frequency is instructed to the outdoor unit.
2) Cooling operation
Every 90 seconds, GA calculates TA-TS, the fluctuation, and the correction amount of compressor frequency.
TA (n) – TS (n) : Room temp. difference
n : Detecting counts
TA (n-1) – TS (n): Room temp. fluctuation
n – 1 : Detecting counts of 90 seconds before
3) Heating operation
Every 1 minute (60 sec.), GA calculates TA-TS, the fluctuation, and the correction amount of compressor frequency.
TS (n) – TA (n) : Room temp. difference
n : Detecting counts
TA (n) – TA (n – 1) : Room temp. fluctuation
n – 1 : Detecting counts 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 Cooling/Heating mode is carried out as shown below. When TA exceeds TSH +2.7°F(+1.5°C) after 10 minutes at thermostat off, the operation mode changes HEAT to COOL mode
 

When TA is lower TSC-2.7°F(-1.5°C) after 10 minutes at thermostat off, the operation mode changes COOL to HEAT mode.
2) For the automatic capacity control after judgment of cooling/heating, see Item 4.
3) For temperature correction of room temp. control at 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	Fan speed control	1) Operation with (HH), (H), (L) or [AUTO] mode is carried out by the command from the remote control. **<COOL>**  2) When the fan speed mode [AUTO] is selected, the fan speed varies by the difference between TA and TS. • Controlling works using thermostat of remote control is same as the case of using body thermostat. • If the fan speed has changed automatically, it is not changed for 3 minutes. However when the air volume changes, the fan speed changes. • When cooling operation starts, the fan speed will be selected along a down arrow in figure. • When "TA-TSC" is just on boundary, the fan speed won't change. • ( ) indicates the fan speed at aouotmatic cooling operation. **<HEAT>**  The value with < > indicates the temperature at using remote control thermostat. The value without < > indicates the temperature at using body thermostat of indoor unit. • If the fan speed has changed automatically, it is not changed for 1 minute. • When heating operation starts, the fan speed will be selected along an up arrow in figure. • When "TSH-TA" is just on margin, the fan speed won't change. • ( ) indicates the fan speed at automatic heating operation. • In TC ≥ 140°F (60°C), the fan speed increases clarify 1 step.	HH > H+ > H > L+ > L > UL TC: Indoor heat exchanger sensor temperature

No.	Item	Outline of specifications	Remarks
6	Fan speed control (Continued)		

<Concealed Duct Type>

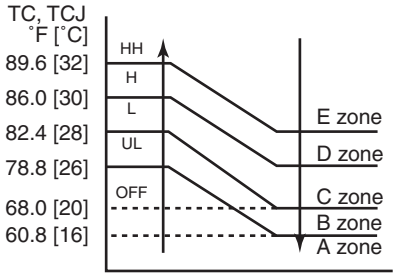
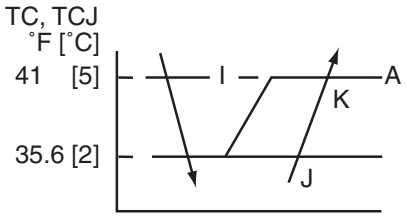
CODE No.	0.25 in.WG(62Pa)		0.35 in.WG(87Pa)		0.45 in.WG(112Pa)		0.15 in.WG(37Pa)	
DN : [5d]	0000 (Factory default)		0001		0003		0006	
DISP switch Position								
TAP	**HEAT**	**COOL**	**HEAT**	**COOL**	**HEAT**	**COOL**	**HEAT**	**COOL**
F1						HH		
F2					HH			
F3				HH		H+,H		
F4			HH		H+,H			
F5		HH		H+,H		L+,L		
F6	HH		H+,H		L+,L			
F7		H+,H		L+,L				HH
F8	H+,H		L+,L				HH	
F9		L+,L						H+,H
FA	L+,L						H+,H	
FB								L+,L
FC							L+,L	
FD	LL	LL	LL	LL	LL	LL	LL	LL

TAP	SP18	SP24	SP30	SP36, 42
	Fan speed (rpm)			
F1	1160	1160	1140	1140
F2	1160	1160	1140	1140
F3	1100	1060	1000	1080
F4	1100	1060	1000	1080
F5	1000	960	900	960
F6	1000	960	900	960
F7	900	850	780	860
F8	900	850	780	860
F9	780	740	720	760
FA	780	740	720	760
FB	700	670	630	680
FC	700	670	630	680
FD	210	210	210	210

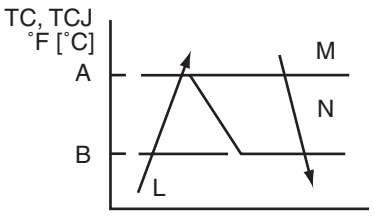
Selection of high ceiling type

CODE No.: [5d] or selection of high ceiling on P.C. board SW01 and SW02

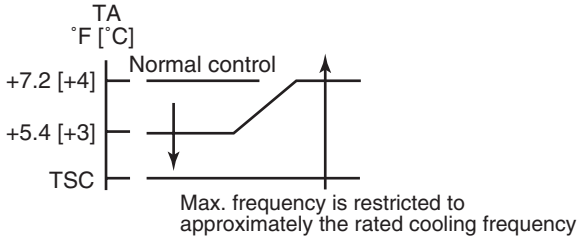
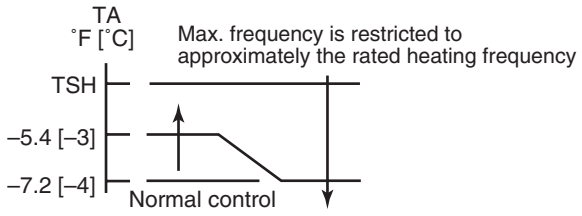
3) In heating operation, the fan speed changes to [UL] if thermostat is turned off.
4) If TA ≥ 77°F (25°C) when heating operation has started or defrost operation has been cleared, the air conditioner operates with (H) mode or higher modefor 1 minute after TC entered in E zone of cold air draft preventive control (No. 7).

No.	Item	Outline of specifications	Remarks
7	Cool air draft 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 fan speed is restricted in spite of the fan speed set on remote control. However B zone is assumed as C zone for 6 minutes after the compressor has started. In defrost operation, the control value of TC is shifted +10.8°F (+6°C).  	In A zone while thermostat is ON, [PRE-HEAT ✳ (Heating ready)] isdisplayed.
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 of compressor is decreased. 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 speed is operated with L tap.  In the heating operation, if the 4-way valve cannot be reversed due to a trouble, etc. and keeps operation with the cooling cycle, the freeze preventive control works when 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. 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><th colspan="2">Control temp. °F [°C]</th></tr><tr><th>A</th><th>B</th></tr><tr><td>132.8 [56] (129.2 [54])</td><td>125.6 [52] (125.6 [52])</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, The release temperature is controlled between values in parentheses of A and B.Same status as that when “thermostat-OFF”</td><td></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.</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></td></tr>
</table>

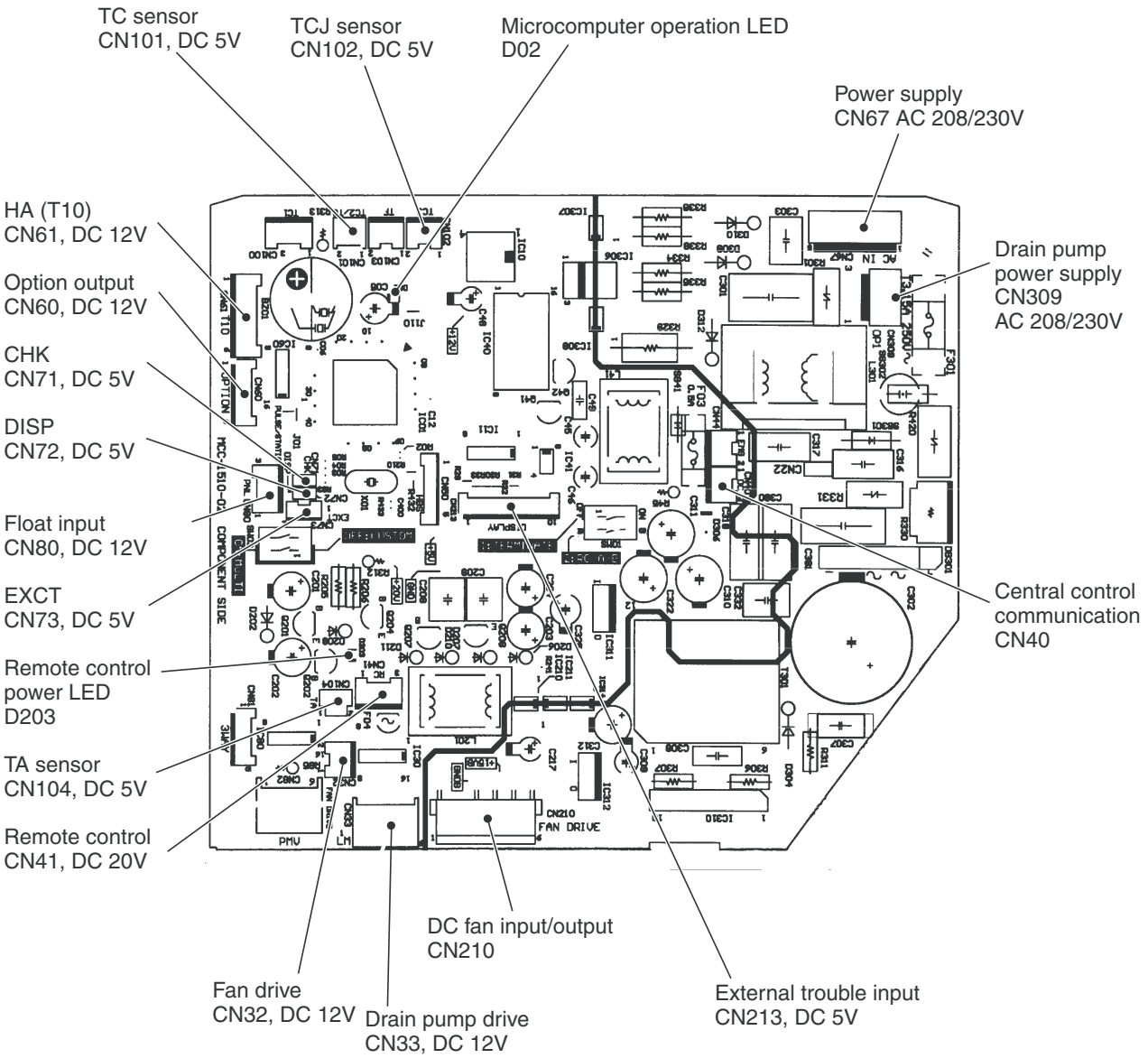
No.	Item	Outline of specifications	Remarks
12	Frequency fixed operation (Test run)	**<In case of wired remote control>** 1) When pushing [CHK] button for 4 seconds or more, [TEST] is displayed on the display screen and the mode enters in Test run mode. 2) Push [ON/OFF] button. 3) Using [MODE] button, 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. • Trouble 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 [CHK] button to clear the test run mode. ([TEST] display in the display part disappears and the status returns to the normal stop status.)	Command frequency is approximately [S7] For the Test run with the wireless remote control, refer to P 58.
13	Filter sign display (Except wireless type) ∗ It is provided on the separately sold type TCB-AX21UL.	1) The filter sign is displayed with LC by sending the filter-reset signal to the remote control when the specified time (2500H) elapsed as a result of integration of the operation time of the indoor fan. 2) When the filter reset signal has been received from the remote control, 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.	[FILTER ▦] goes on.
14	Saving operation	1) Selecting [AUTO] mode enables a saving operation 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, Airvolume, Indoor heat exchanger sensor temp. TC) for20 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	

No.	Item	Outline of specifications	Remarks
15	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).  	
16	DC motor	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 control. **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 trouble is displayed. • If static pressure of the used duct does not match with the setup value of static pressure, which was decided in the static pressure setting code No. [5D], the air conditioner may stop or a check code may be displayed.	Check code [P12]

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>17</td><td>Energy saving operation</td><td>1) Turn on SAVE button on the remote control.
2) During energy saving operation, SAVE lights on the wired remote control.
3) During energy saving 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 control.
5) When validating the energy saving operation, the next operation starts with energy saving 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 contents of save operation” in Sction “10. SETUP AT LOCAL SITE AND OTHERS”.</td></tr>
<tr><td>18</td><td>AUTO restart</td><td>1) Object
It restarts the operation automatically after resetting the unexpected stop of power supply such as power failure.
2) Contents
After returning from a power failure, the AUTO restart function reads the operation status from EEPROM and then restarts the operation automatically according to the operation contents.
3) Setup of function exchange by wired remote controller CODE No. (DN): 28
<table>
<tr><th>SET DATA</th><th>0000</th><th>0001</th></tr>
<tr><td>AUTO restart</td><td>None</td><td>Factory default</td></tr>
</table></td><td></td></tr>
</table>

8-3. Indoor Printed Circuit Board

MCC-1510



P.C. Board Optional Switch/Connector Specifications

<table>
<tr><th>Function</th><th>Connector No.</th><th>Pin No.</th><th>Specifications</th><th>Remarks</th></tr>
<tr><td rowspan="4">External static pressure</td><td rowspan="2">SW01</td><td>Bit 1</td><td>No use</td><td rowspan="4">Turn the switch to ON, when using the external static pressure function.
<table><tr><td>SW01 <Bit 2></td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td></tr><tr><td>SW02 <Bit 2></td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr><tr><td>External static pressure</td><td>0.25 in.WG (62Pa) (Default)</td><td>0.35 in.WG (87Pa)</td><td>0.45 in.WG (112Pa)</td><td>0.15 in.WG (37Pa)</td></tr></table></td></tr>
<tr><td>Bit 2</td><td>Input</td></tr>
<tr><td rowspan="2">SW02</td><td>Bit 1</td><td>No use</td></tr>
<tr><td>Bit 2</td><td>Input</td></tr>
<tr><td rowspan="2">Fan output</td><td rowspan="2">CN32</td><td>1</td><td>DC12 V</td><td rowspan="2">Setup at shipment: Linked operation of ON with operation of indoor unit and OFF with stop
* The setup of single operation by FAN button on remote control is executed from remote control. (DN = 31)</td></tr>
<tr><td>2</td><td>Output</td></tr>
<tr><td rowspan="6">HA</td><td rowspan="6">CN61</td><td>1</td><td>Start / stop input</td><td>Start / stop input for HA (J01: In place / Removed = Pulse input (factory default) / Step input)</td></tr>
<tr><td>2</td><td>0 V (COM)</td><td></td></tr>
<tr><td>3</td><td>Remote control disabling input</td><td>Enables / disables start / stop control via remote control</td></tr>
<tr><td>4</td><td>In-operation output</td><td>ON during operation (HA answerback signal)</td></tr>
<tr><td>5</td><td>DC 12 V (COM)</td><td></td></tr>
<tr><td>6</td><td>Alarm output</td><td>ON while alarm ON</td></tr>
<tr><td rowspan="6">Optional output</td><td rowspan="6">CN60</td><td>1</td><td>DC12 V (COM)</td><td></td></tr>
<tr><td>2</td><td>Defrost output</td><td>ON during defrosting of outdoor unit</td></tr>
<tr><td>3</td><td>Thermostat-ON output</td><td>ON when Real thermostat-ON (Comp. ON)</td></tr>
<tr><td>4</td><td>Cooling output</td><td>ON when operation mode is cooling line (Cool, Dry, Cooing/Heating AUTO cooling)</td></tr>
<tr><td>5</td><td>Heating output</td><td>ON when operation mode is heating line (Heat, Cooling/Heating AUTO heating)</td></tr>
<tr><td>6</td><td>Fan output</td><td>ON when indoor fan is ON</td></tr>
<tr><td rowspan="2">External trouble input</td><td rowspan="2">CN213</td><td>1</td><td>DC5 V (COM)</td><td rowspan="2">Generates test code “L30” and automatically shuts down air conditioner (only if condition presists for 1 minute) (DN:2A = 2, at shipment from factory)</td></tr>
<tr><td>2</td><td>External troublr input</td></tr>
<tr><td rowspan="2">CHK
Operation check</td><td rowspan="2">CN71</td><td>1</td><td>Check mode input</td><td rowspan="2">This check is used for operation check of indoor unit.
(The specified operation such as indoor fan “H”, drain pump ON, etc. is executed without communication with outdoor unit or remote control.)</td></tr>
<tr><td>2</td><td>0 V</td></tr>
<tr><td rowspan="2">DISP
Display mode</td><td rowspan="2">CN72</td><td>1</td><td>Display mode input</td><td rowspan="2">Display mode, communication is enabled by indoor unit and remote control only.
(When power supply is turned on.)
Timer short (Usual)</td></tr>
<tr><td>2</td><td>0 V</td></tr>
<tr><td rowspan="2">EXCT
Demand</td><td rowspan="2">CN73</td><td>1</td><td>Demand input</td><td rowspan="2">Indoor unit forced thermostat-OFF operation</td></tr>
<tr><td>2</td><td>0 V</td></tr>
</table>

8-4. TCC-LINK

This indoor unit which has TCC-LINK adapter does not need “1:1” Model Connection Interface (TCBPCNT31TLUL) (sold separately).
(Use terminals (U3, U4) for central control in the electrical box.)

9. TROUBLESHOOTING

9-1. Summary of Troubleshooting

<Wired remote control 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 control reached the setup temperature?
   - Does not timer operate during fan operation?
   - Is not an overflow trouble 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 control.
   - 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 control?

b) Did you return the wiring to the initial positions?

c) Are connecting wires of indoor unit and remote control correct?

2. Troubleshooting procedure

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

Trouble → **Confirmation of check code display** → **Check trouble location or trouble part**

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 control to shield cables.

<Wireless remote control 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 control reached the setup temperature?
         - Does not timer operate during fan operation?
         - Is not an overflow trouble 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 control.
         - 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 control?
   b) Did you return the wiring to the initial positions?
   c) Are connecting wires 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.

Trouble → **Confirmation of lamp display (wireless remote control is connected)** → **Check trouble location or trouble part**

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.

9-2. Troubleshooting

9-2-1. 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.

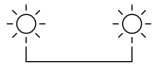
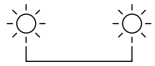
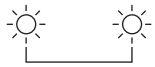
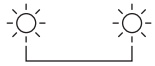
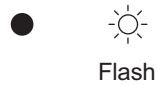
Method to judge the erroneous position by flashing indication on the display part of the indoor unit (sensors of the receiving part)

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.)

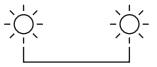
Lamp indication	Check code	Cause of trouble occurrence
Operation ● Timer ● Ready ● No indication at all	—	Power supply OFF or miswiring between receiving unit and indoor unit
Operation ☼ Timer ● Ready ● Flash	E01	Receiving trouble } Receiving unit Sending trouble Communication stop } Miswiring or wire connection trouble between receiving unit and indoor unit
	E02	
	E03	
	E08	Duplicated indoor unit No. Duplicated master units of remote control } Setup trouble
	E09	
	E10	Communication trouble between CPUs on indoor unit P.C. board
	E18	Wire connection trouble between indoor units, Indoor power OFF (Communication stop between indoor header and follower)
Operation ● Timer ● Ready ☼ Flash	E04	Miswiring between indoor unit and outdoor unit or connection trouble (Communication stop between indoor and outdoor units)
Operation ● Timer ☼ Ready ☼ Alternate flash	P10	Overflow was detected. Indoor DC fan trouble } Protective device of indoor unit worked.
	P12	
Operation ☼ Timer ● Ready ☼ Alternate flash	P03	Outdoor unit discharge temp. trouble Outdoor high pressure system trouble } Protective device of outdoor unit worked. ∗1
	P04	
	P05	Negative phase detection trouble Heat sink overheat trouble Gas leak detection trouble } Outdoor unit trouble
	P07	
	P15	
	P19	4-way valve system trouble (Indoor or outdoor unit judged.)
	P20	Outdoor unit high pressure protection
	P22	Outdoor unit: Outdoor unit trouble Outdoor unit: Inverter Idc operation Outdoor unit: Position detection trouble } Protective device of outdoor unit worked. ∗1
	P26	
	P29	
	P31	Stopped because of trouble 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) trouble Heat exchanger sensor (TC) trouble Heat exchanger sensor (TA) trouble } Indoor unit sensor trouble
Operation Timer Ready  Alternate flash	F04 F06 F07 F08 F12 F13 F15	Discharge temp. sensor (TD) trouble Temp. sensor (TE) trouble Temp. sensor (TL) trouble Temp. sensor (TO) trouble Temp. sensor (TS) trouble Temp. sensor (TH) trouble Temp. Sensor miswiring (TE, TS) } Sensor trouble of outdoor unit ∗1
Operation Timer Ready  Simultaneous flash	F29	Indoor EEPROM trouble
Operation Timer Ready  Simultaneous flash	F31	Outdoor EEPROM trouble
Operation Timer Ready  Flash	H01 H02 H03 H04 H06	Compressor break down Compressor lock Current detection circuit trouble Case thermostat worked. } Outdoor compressor system trouble ∗1 Outdoor unit low pressure system trouble
Operation Timer Ready Simultaneous flash	L03 L07 L08 L09	Duplicated master indoor units There is indoor unit of group connection in individual indoor unit. Unsetting of group address } → AUTO address Missed setting (Unset indoor capacity) * If group construction and address are not normal when power supply turned on, automatically goes to address setup mode.
Operation Timer Ready Simultaneous flash	L10 L20 L29 L30 L31	Unset model type (Service board) Duplicated indoor central addresses Outdoor unit and other trouble Outside interlock trouble Negative phase trouble } Others

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

9-2-2. 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)

9-2-3. 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	Sensor lamp indication				Representative defective position	Explanation of trouble contents	Air conditioner operation	
TCC-LINK central & Wired remote control	Block indication						Automatic reset	Operation continuation
	Operation	Timer	Ready	Flash				
E03	◎	●	●		Regular communication trouble between indoor and remote control	No communication from remote control and network adapter (Also no communication from central control system)	○	×
E04	●	●	◎		Indoor/Outdoor serial toruble	There is trouble on serial communication between indoor and outdoor units	○	×
E08	◎	●	●		Duplicated indoor addresses ✧	Same address as yours was detected.	○	×
E10	◎	●	●		Communication trouble between indoor MCU	MCU communication trouble between main motor and micro computer	○	×
E18	◎	●	●		Regular communication trouble between indoor master and follower units	Regular communication between indoor header and follower units is impossible, Communication between twin master (main) and follower (sub) units is impossible.	○	×
F01	◎	◎	●	ALT	Indoor unit, Heat exchanger (TCJ) trouble	Open/short was detected on heat exchanger (TCJ).	○	×
F02	◎	◎	●	ALT	Indoor unit, Heat exchanger (TC) trouble	Open/short was detected on heat exchanger (TC).	○	×
F10	◎	◎	●	ALT	Indoor unit, Room temp. sensor (TA) trouble	Open/short was detected on room temp. sensor (TA).	○	×
F29	◎	◎	●	SIM	Indoor unit, other indoor P.C. board trouble	EEPROM trouble (Other trouble may be detected. If no trouble, automatic address is repeated.	×	×
L03	◎	●	◎	SIM	Duplicated setting of indoor group header unit ✧	There are multiple header 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 trouble input to indoor unit (Interlock)	Abnormal stop by outside trouble (CN80) input	×	×
P01	●	◎	◎	ALT	Indoor unit, AC fan trouble	An trouble 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 trouble	Indoor DC fan trouble (Over-current/Lock, etc.) was detected.	×	×
P19	◎	●	◎	ALT	4-way valve system trouble	In heating operation, an trouble was detected by temp. down of indoor heat exchanger sensor.	○	×
P31	◎	●	◎	ALT	Other indoor unit trouble	Follower unit in group cannot operate by warning from [E03/L03/L07/L08] of master 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 control detected)

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

(Central control devices detected)

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

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

Trouble 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 control (including wireless) and communication adapter	Stop (Automatic reset)	Displayed when trouble is detected	1. Check cables of remote control and communication adapters. • Remote control LCD display OFF (Disconnection) • Central remote control [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 trouble 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 trouble is detected	1. Check whether remote control 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 trouble is detected	1. Set indoor capacity (DN=11)
L30	Abnormal input of outside interlock	Stop	Displayed when trouble is detected	1. Check outside devices. 2. Check indoor P.C. board.
P10	Float switch operation • Float circuit, Disconnection, Coming-off, Float switch contact trouble	Stop	Displayed when trouble 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 trouble	Stop	Displayed when trouble is detected	1. Position detection trouble 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 trouble • After heating operation has started, indoor heat exchangers temp. is down.	Stop (Automatic reset)	Displayed when trouble 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 trouble 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 trouble 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 trouble 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 trouble is detected	1. Check indoor heat exchanger temp. sensor (TA). 2. Check indoor P.C. board.
F29	Indoor EEPROM trouble • EEPROM access trouble	Stop (Automatic reset)	Displayed when trouble is detected	1. Check indoor EEPROM. (including socket insertion) 2. Check indoor P.C. board.
E10	Communication trouble between indoor MCU • Communication trouble between fan driving MCU and main MCU	Stop (Automatic reset)	Displayed when trouble is detected	1. Check indoor P.C. board.
E18	Regular communication trouble between indoor aster and follower units and between main and sub units	Stop (Automatic reset)	Displayed when trouble is detected	1. Check remote control wiring. 2. Check indoor power supply wiring. 3. Check indoor P.C. board.

Trouble detected by remote control or central control

Operation of diagnostic function				Judgment and measures
Check code	Cause of operation	Status of air conditioner	Condition	
Not displayed at all (Operation on remote control is impossible.)	No communication with master indoor unit • Remote control wiring is not correct. • Power of indoor unit is not turned on. • Automatic address cannot be completed.	Stop	—	Power supply trouble of remote control, Indoor EEPROM trouble 1. Check remote control inter-unit wiring. 2. Check remote control. 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 control and master indoor unit (Detected by remote control side)	Stop (Automatic reset) * If center exists, operation continues.	Displayed when trouble is detected	Receiving trouble from remote control 1. Check remote control inter-unit wiring. 2. Check remote control. 3. Check indoor power wiring. 4. Check indoor P.C. board.
E02	Signal send trouble to indoor unit (Detected by remote control side)	Stop (Automatic reset) * If center exists, operation continues.	Displayed when trouble is detected	Sending trouble of remote control 1. Check sending circuit inside of remote control. → Replace remote control.
E09	There are multiple main remote controls. (Detected by remote control side)	Stop (Sub unit continues operation.)	Displayed when trouble is detected	1. In 2-remote controls (including wireless), there are multiple main units. Check that there are 1 main remote control and other sub remote control.
L20 Central control L20	Duplicated indoor central addresses on communication of central control system (Detected by indoor/central control side)	Stop (Automatic reset)	Displayed when trouble is detected	1. Check setting of central control system network address. (Network adapter SW01) 2. Check network adapter P.C. board.
— *3 Central control (Send) C05 (Receive) C06	Communication circuit trouble of central control system (Detected by central control side)	Continues (By remote control)	Displayed when trouble is detected	1. Check communication wire / miswiring 2. Check communication (U3, U4 terminals) 3. Check P.C. board. (MCC-1510) 4. Check central control (such as central control remote control, etc.) 5. Check terminal resistance. (TCC-LINK) (SW01 bit 1 on PCB is on or not)
— Central control P30	Indoor Gr sub unit trouble (Detected by central control side)	Continuation/Stop (According to each case)	Displayed when trouble is detected	Check the check code of the corresponding unit from remote control.

*2 The check code cannot be displayed by the wired remote control.
(Usual operation of air conditioner becomes unavailable.)
For the wireless models, a trouble is notified with indication lamp.

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

Trouble detected by outdoor unit

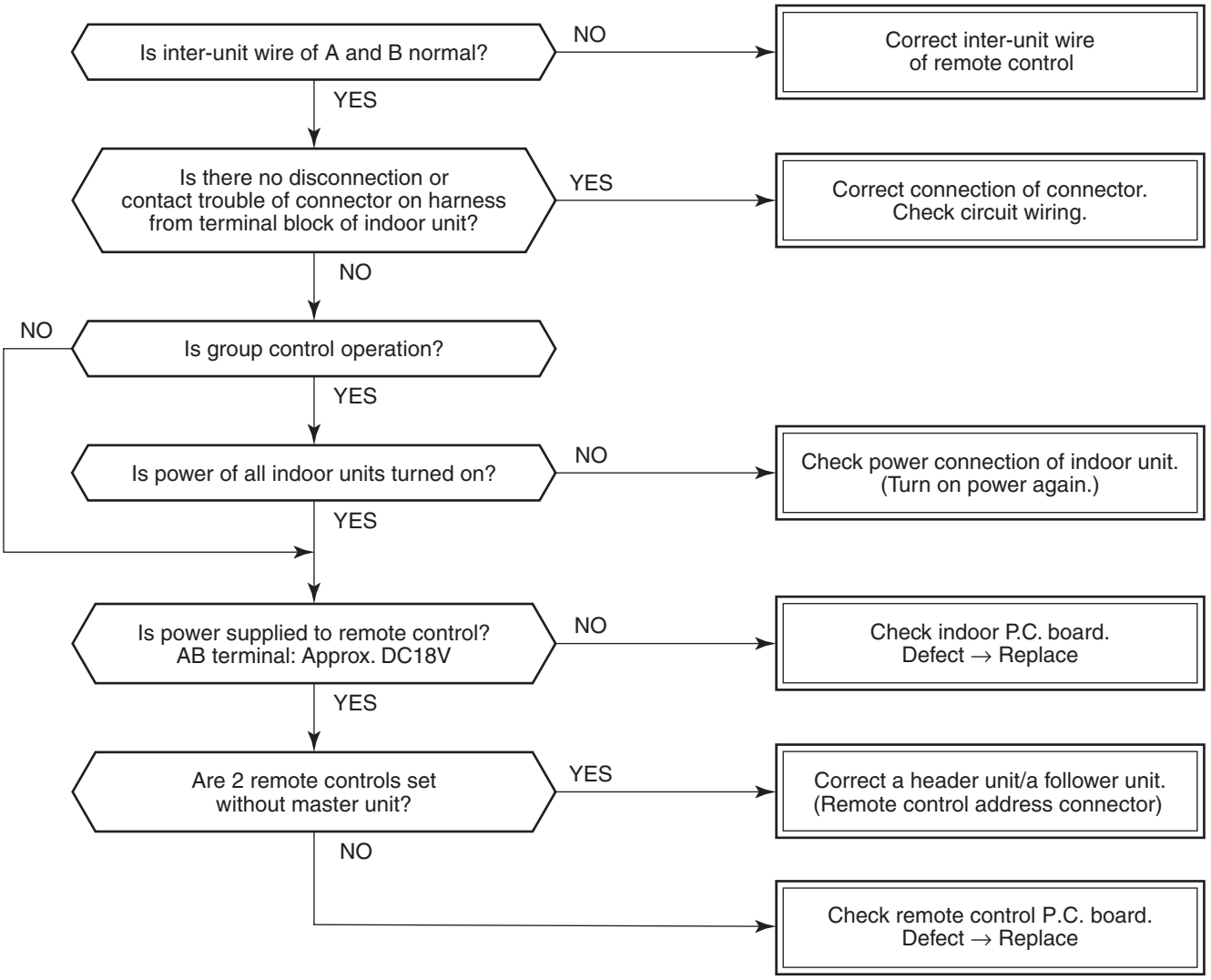
Operation of diagnostic function				Judgment and measures
Check code	Cause of operation	Status of air conditioner	Condition	
F04	Disconnection, short of discharge temp. sensor (TD)	Stop	Displayed when trouble is detected	1. Check discharge temp. sensor (TD). 2. Check outdoor P.C. board.
F06	Disconnection, short of outdoor temp. sensor (TE)	Stop	Displayed when trouble is detected	1. Check temp. sensor (TE). 2. Check outdoor P.C. board.
F07	Disconnection, short of outdoor temp. sensor (TL)	Stop	Displayed when trouble is detected	1. Check temp. sensor (TL). 2. Check outdoor P.C. board.
F12	Disconnection, short of suction temp. sensor (TS)	Stop	Displayed when trouble is detected	1. Check suction temp. sensor (TS). 2. Check outdoor P.C. board.
F15	Miss-mounting of outdoor temp. sensor (TE, TS)	Stop	Displayed when trouble is detected	1. Check temp. sensor (TE, TS). 2. Check outdoor P.C. board.
F08	Disconnection, short of outside temp. sensor (TO)	Continue	Displayed when trouble is detected	1. Check outside temp. sensor (TO). 2. Check outdoor P.C. board.
F13	Disconnection, short of heat sink temp. sensor (TH)	Stop	Displayed when trouble is detected	1. Check outdoor P.C. board.
F31	Outdoor P.C. EEPROM trouble	Stop	Displayed when trouble is detected	1. Check outdoor P.C. board.
L10	Unset jumper of service P.C. board	Stop	Displayed when trouble is detected	1. Outdoor service P.C. board Check model type setting jumper wire.
L29	Communication trouble between outdoor P.C. board MCU	Stop	Displayed when trouble is detected	1. Check outdoor P.C. board.
P07	Heat sink overheat trouble ∗ Heat sink temp. sensor detected over specified temperature.	Stop	Displayed when trouble is detected	1. Check screw tightening between PC. Board and heat sink and check radiator grease. 2. Check heat sink blast path.
P15	Detection of gas leak ∗ Discharge temp. sensor (TD), Suction temp. sensor (TS) detected temperature over specified temp.	Stop	Displayed when trouble is detected	1. Check gas leak, recharge 2. Check full open of service valve. 3. Check PMV (Pulse Motor Valve). 4. Check broken pipe. 5. Check discharge temp. sensor (TD), suction temp. sensor (TS).
P19	4-way valve inverse trouble ∗ After heating operation has started, indoor heat exchanger temp. lowers under the specified temp. ∗ After heating operation has started, outdoor heat exchanger / suction temp. rises over the specified temp.	Stop	Displayed when trouble is detected	1. Check operation of 4-way valve. 2. Check outdoor heat exchanger (TE), suction temp. sensor (TS). 3. Check indoor heat exchanger sensor (TC). 4. Check 4-way valve coil. 5. Check PMV (Pulse Motor Valve).
H01	Compressor break down ∗ Although operation has started, operation frequency decreases and operation stops.	Stop	Displayed when trouble is detected	1. Check power supply voltage. (AC208V / 230V ± 10%) 2. Overload operation of refrigerating cycle
H02	Compressor lock ∗ Over-current detection after compressor start-up	Stop	Displayed when trouble is detected	1. Trouble of compressor (Lock, etc.): Replace compressor. 2. Wiring trouble of compressor (Open phase)
H03	Current detection circuit trouble	Stop	Displayed when trouble is detected	1. Check outdoor P.C. board. (AC current detection circuit)

Operation of diagnostic function				Judgment and measures
Check code	**Cause of operation**	**Status of air conditioner**	**Condition**	
P03	Discharge temp. trouble * Discharge temp. (TD) over specified value was detected.	Stop	Displayed when trouble is detected	1. Check refrigerating cycle (Gas leak) 2. Trouble of electronic expansion valve 3. Check discharge temp. sensor (TD).
H04	Case thermostat operation * Abnormal overheat of compressor	Stop	Displayed when trouble is detected	1. Check case thermostat and connector. 2. Check gas leak, recharge 3. Check full open of service valve. 4. Check PMV (Pulse Motor Valve). 5. Check broken pipe.
P04	High-pressure SW trouble	Stop	Displayed when trouble is detected	• Check full-open of service valve. • Check outdoor fan trouble • Check outdoor fan motor trouble • Check clogging of outdoor PMV. • Check loading of indoor/outdoor heat exchangers. • Short-circuit of outdoor discharge/suction air • Check outdoor P.C. board (I/F) trouble. • Check trouble of fan system (air volume drop) at indoor side. • Check miswiring of communication line between indoor and outdoor. • Check overcharge of refrigerant.
P05	Power supply voltage trouble	Stop	Displayed when trouble is detected	1. Check power supply voltage. (AC208V / 230V ± 10%)
P20	High pressure protective operation • During cooling operation, outdoor temp. sensor (TL) detected temperature over specified temp. • During heating operation, indoor temp. sensor (TC, TCJ) detected temperature over specified temp.	Stop	Displayed when trouble is detected	1. Check outdoor heat exchanger sensor (TL). 2. Check indoor heat exchanger sensor (TC, TCJ). 3. Check full open of service valve. 4. Check indoor/outdoor fan. 5. Check PMV (Pulse Motor Valve). 6. Check clogging and short circuit of indoor/outdoor heat exchanger. 7. Overcharge of refrigerant. Recharge
P22	Outdoor fan system trouble	Stop	Displayed when trouble is detected	1. Check lock of fan motor. 2. Check power supply voltage. (AC208V / 230V ± 10%) 3. Check outdoor P.C. board.
P26	Short-circuit trouble of compressor driving element	Stop	Displayed when trouble is detected	1. When performing operation while taking-off compressor wire, P26 trouble occurs. Check control P.C. board. 2. When performing operation while taking-off compressor wire, an trouble does not occur. (Compressor rare short)
P29	Position detection circuit trouble	Stop	Displayed when trouble is detected	1. Check control P.C. board.

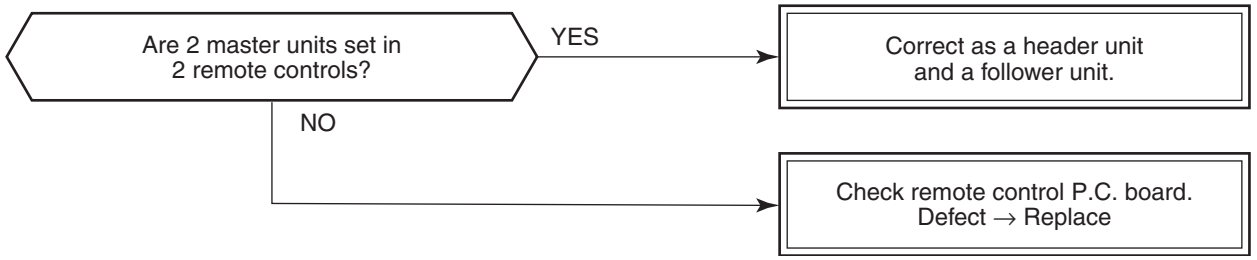
9-2-4. Diagnostic Procedure for Each Check Code (Indoor Unit)

Check code

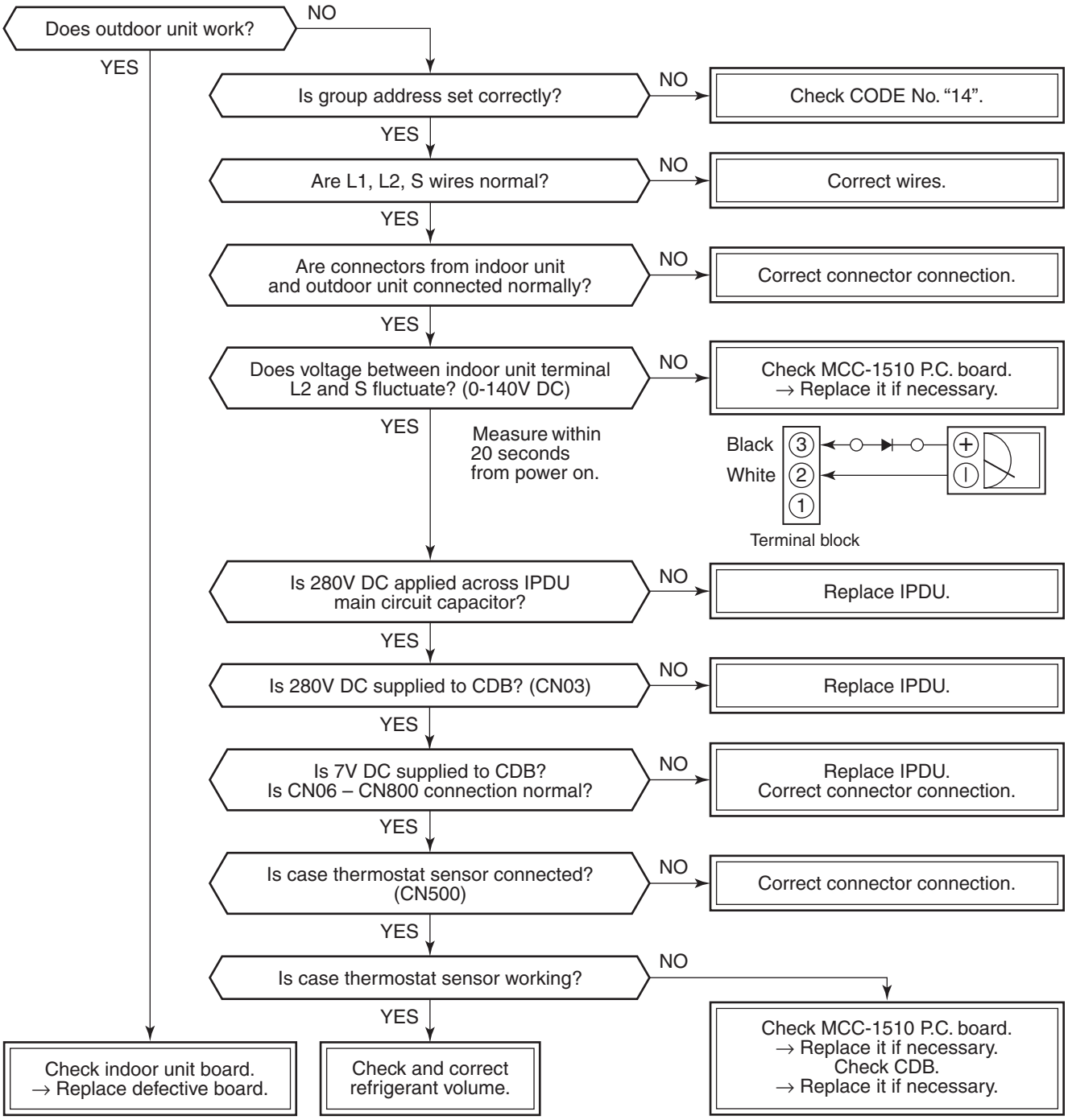
[E01]



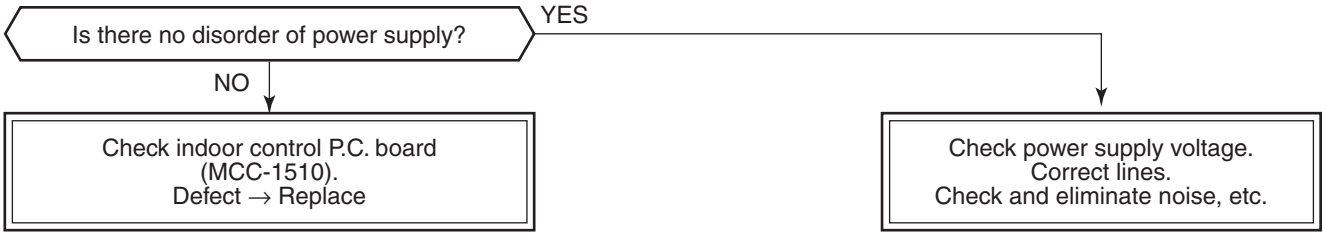
[E09]



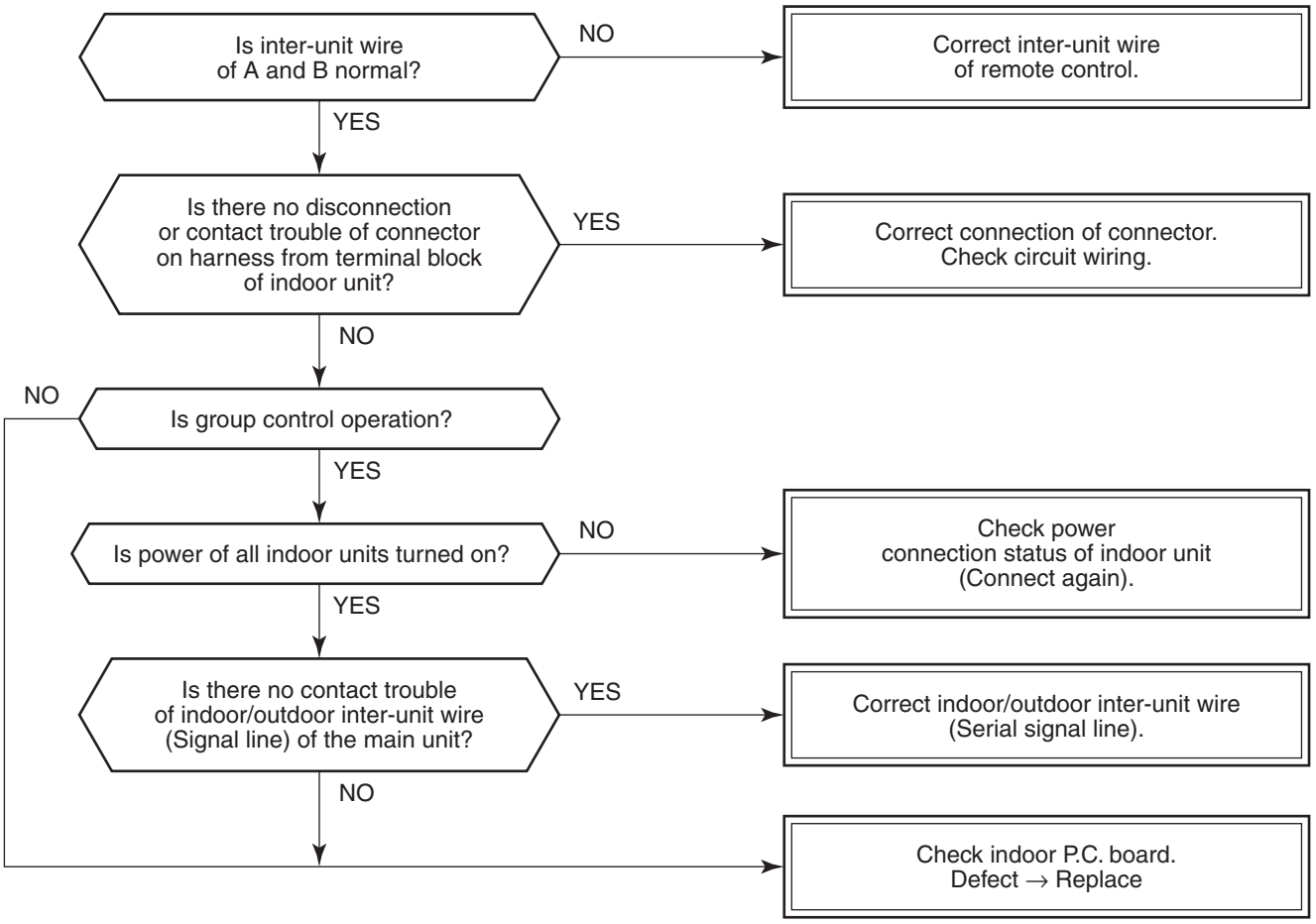
[E04]


Does outdoor unit work?
NO
YES
Is group address set correctly?
NO
Check CODE No. “14”.
YES
Are L1, L2, S wires normal?
NO
Correct wires.
YES
Are connectors from indoor unit and outdoor unit connected normally?
NO
Correct connector connection.
YES
Does voltage between indoor unit terminal L2 and S fluctuate? (0-140V DC)
NO
Check MCC-1510 P.C. board.
→ Replace it if necessary.
YES
Measure within 20 seconds from power on.
Black
White
3
2
1
Terminal block
Is 280V DC applied across IPDU main circuit capacitor?
NO
Replace IPDU.
YES
Is 280V DC supplied to CDB? (CN03)
NO
Replace IPDU.
YES
Is 7V DC supplied to CDB?
Is CN06 – CN800 connection normal?
NO
Replace IPDU.
Correct connector connection.
YES
Is case thermostat sensor connected? (CN500)
NO
Correct connector connection.
YES
Is case thermostat sensor working?
NO
YES
Check indoor unit board.
→ Replace defective board.
Check and correct refrigerant volume.
Check MCC-1510 P.C. board.
→ Replace it if necessary.
Check CDB.
→ Replace it if necessary.

[E10]


Is there no disorder of power supply?
YES
NO
Check indoor control P.C. board (MCC-1510).
Defect → Replace
Check power supply voltage.
Correct lines.
Check and eliminate noise, etc.

[E18]

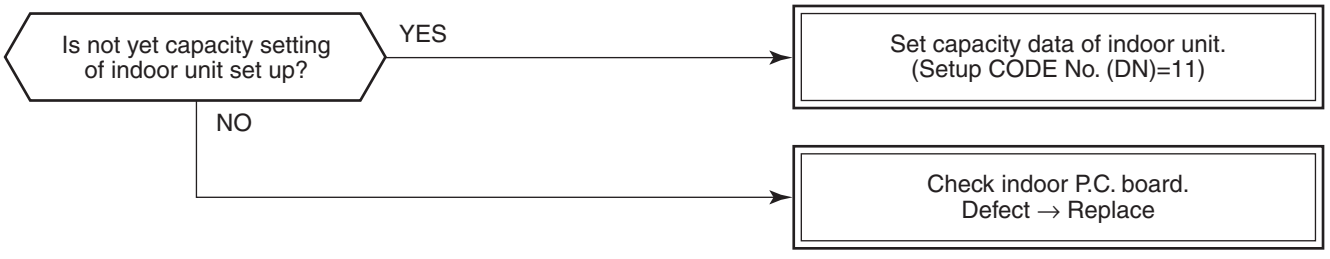


[E08, L03, L07, L08]

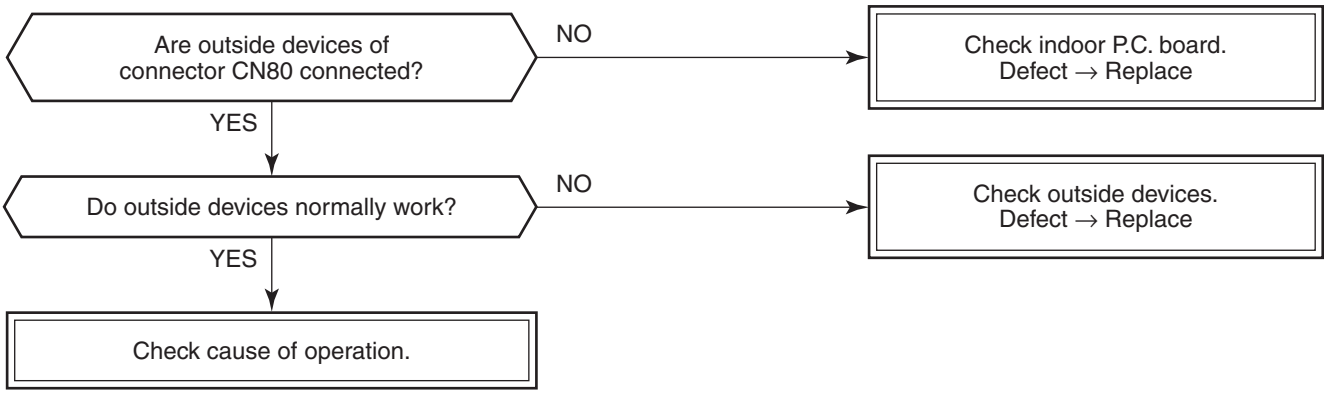
E08: Duplicated indoor unit No.
L03: There are 2 or more header units in a group control.
L07: There is 1 or more group address [Individual] in a group control.
L08: The indoor group address is unset. (**11. ADDRESS SETUP**)

If the above trouble 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 trouble is detected during the automatic address set mode, a check code may be output.

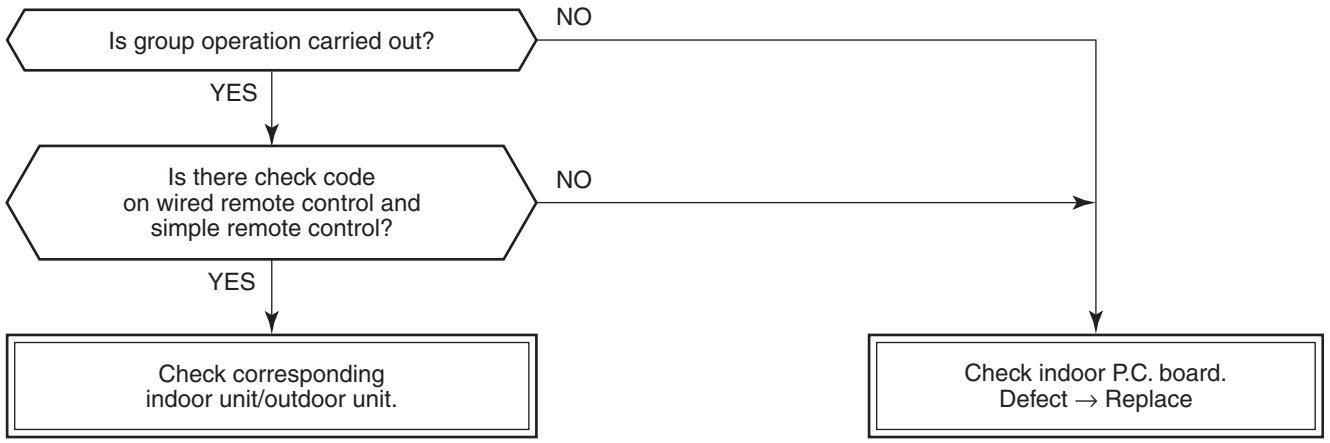
[L09]



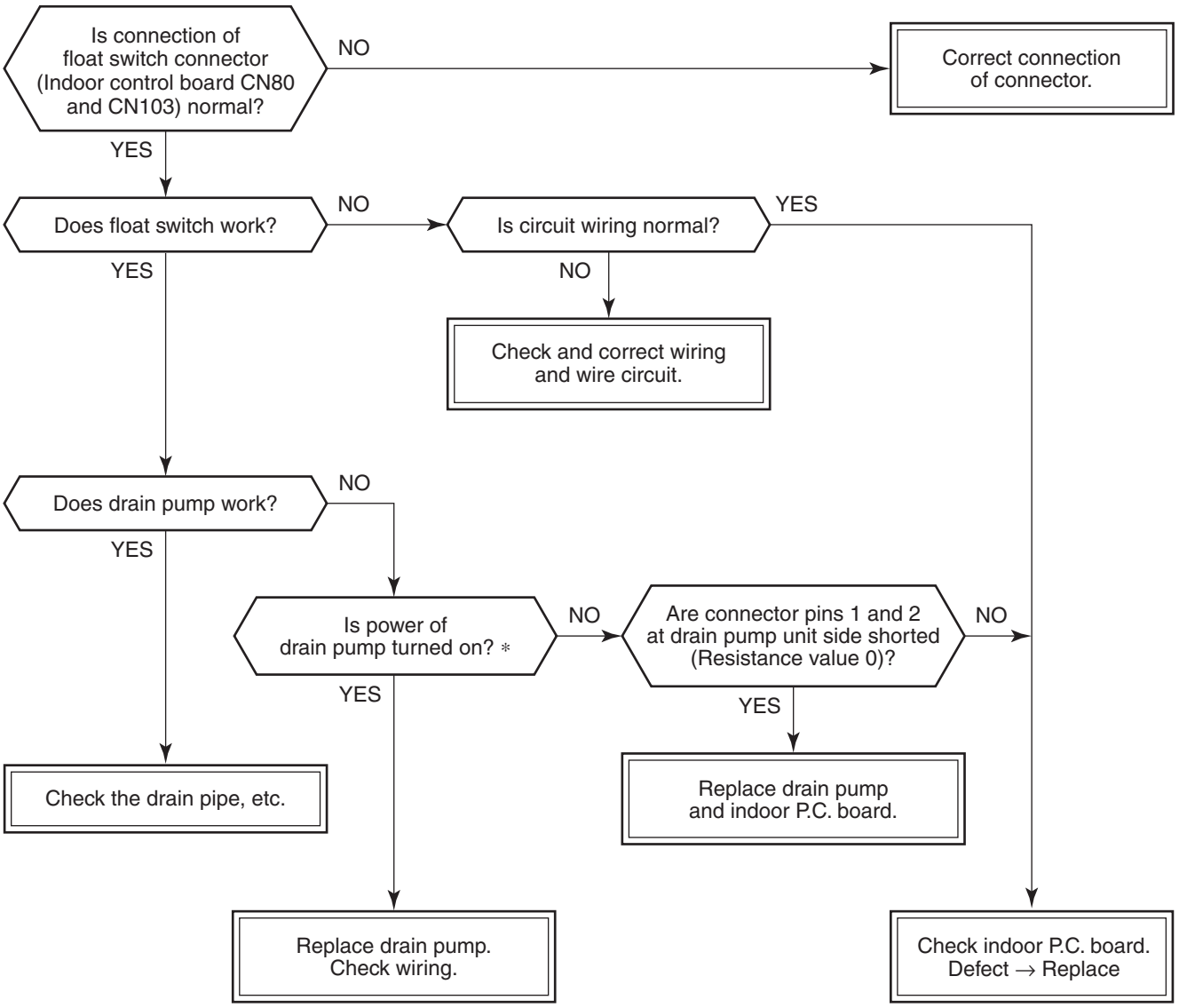
[L30]



[P30] (Central control)

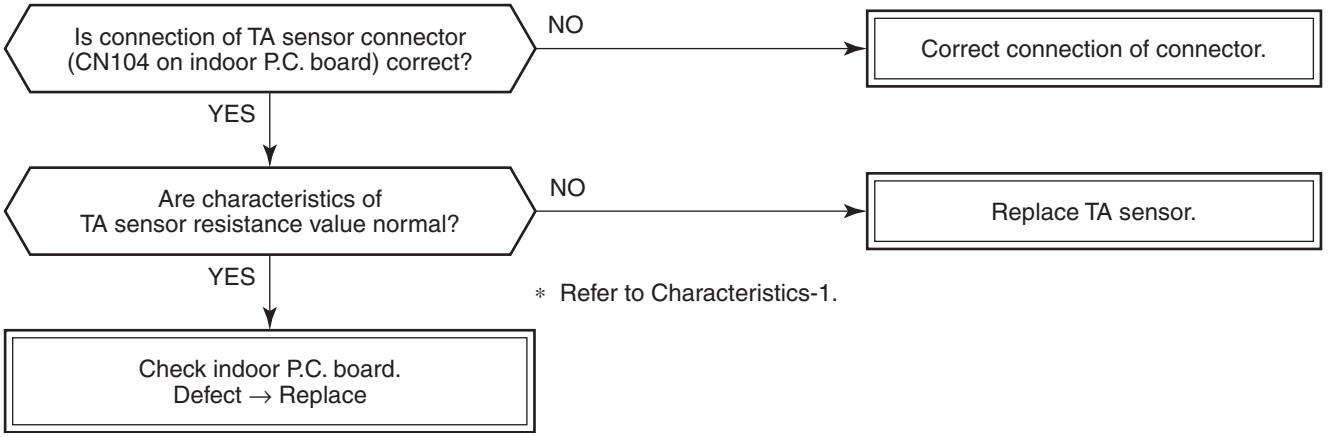


[P10]



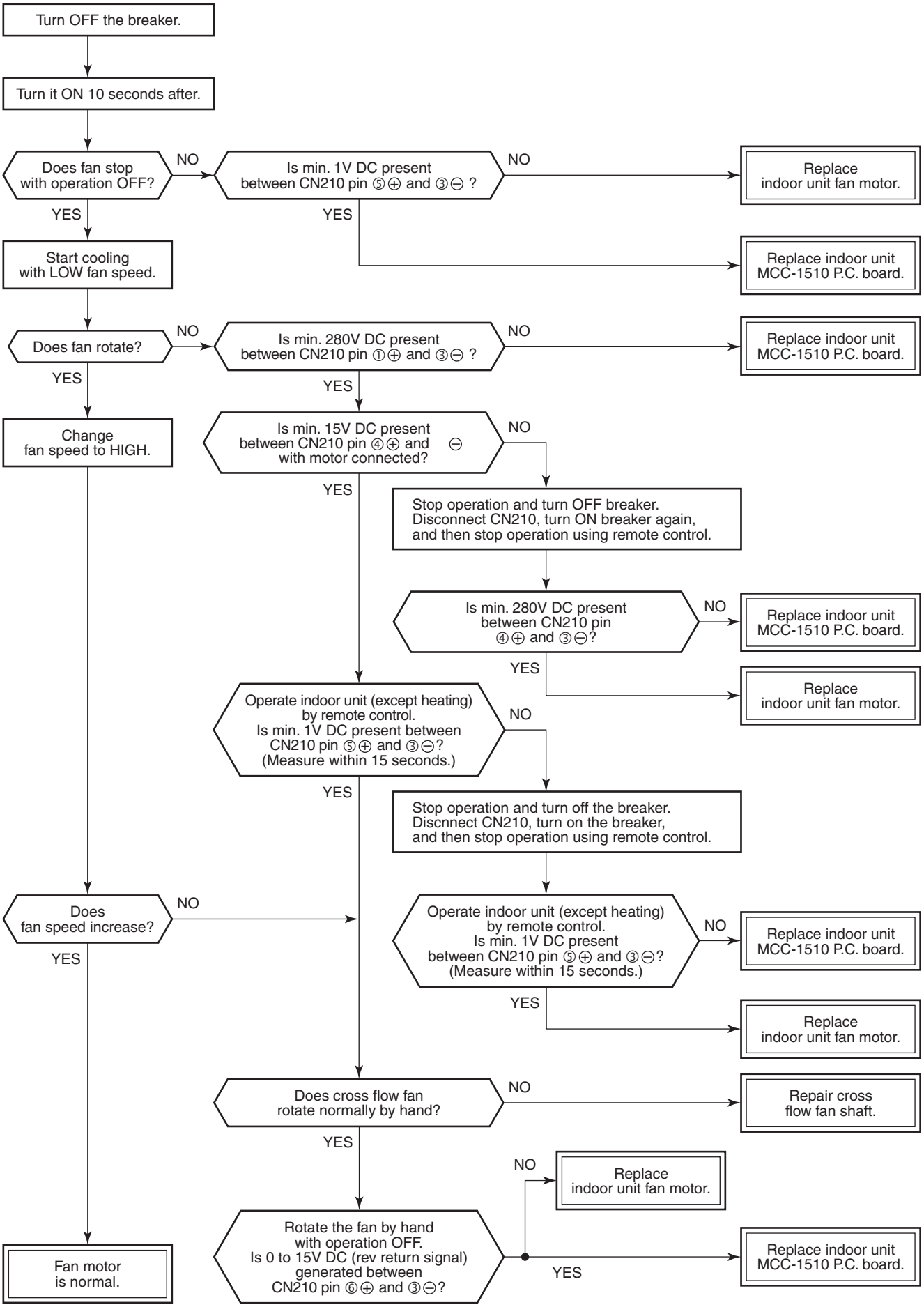
* Check that voltage of 1-3 pin of connector which are connected to relay and CN10 on MCC-1431 is same with power supply. (1 pin is plus (+).)

[F10]

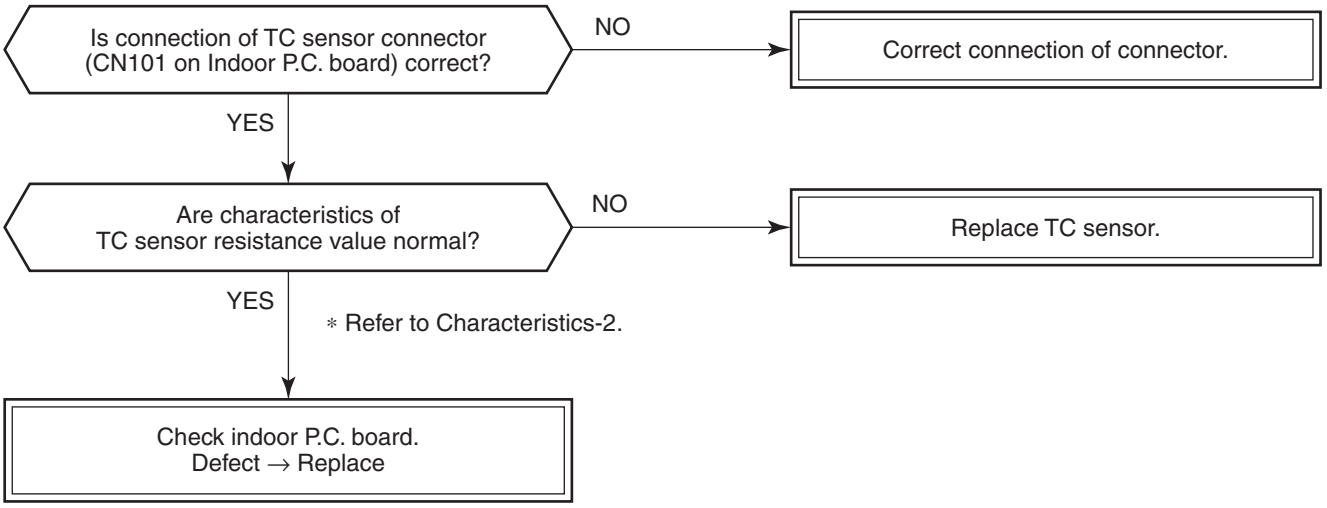


* Refer to Characteristics-1.

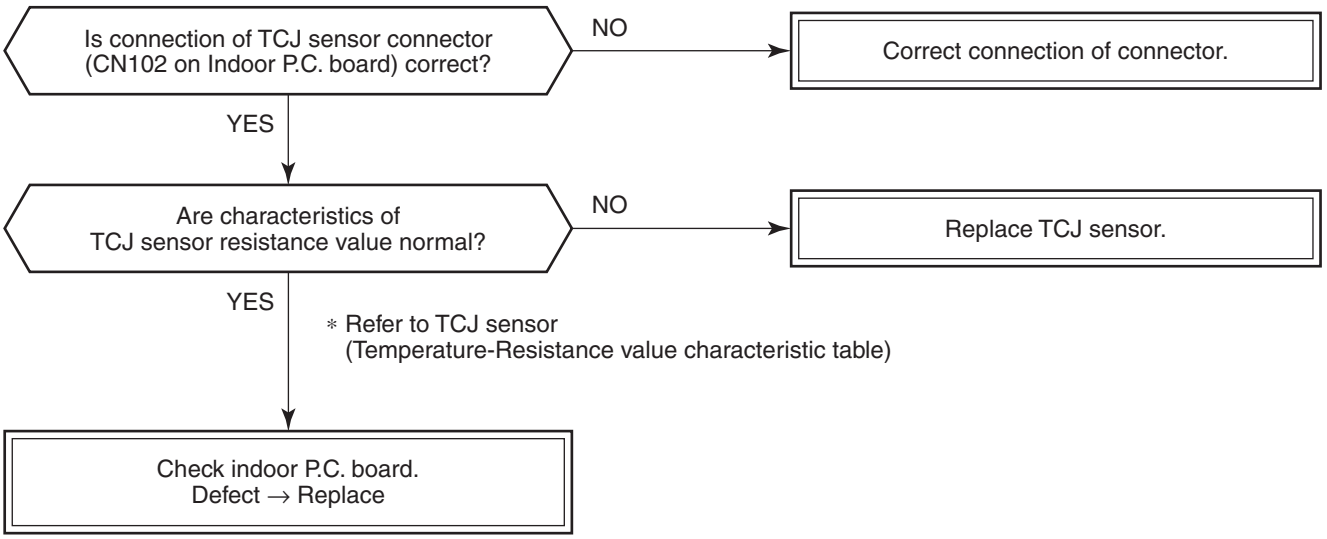
[P12]


Turn OFF the breaker.
Turn it ON 10 seconds after.
Does fan stop with operation OFF?
NO
Is min. 1V DC present between CN210 pin ⑤⊕ and ③⊖ ?
NO
Replace indoor unit fan motor.
YES
YES
Replace indoor unit MCC-1510 P.C. board.
Start cooling with LOW fan speed.
Does fan rotate?
NO
Is min. 280V DC present between CN210 pin ①⊕ and ③⊖ ?
NO
Replace indoor unit MCC-1510 P.C. board.
YES
YES
Change fan speed to HIGH.
Is min. 15V DC present between CN210 pin ④⊕ and ⊖ with motor connected?
NO
YES
Stop operation and turn OFF breaker. Disconnect CN210, turn ON breaker again, and then stop operation using remote control.
Is min. 280V DC present between CN210 pin ④⊕ and ③⊖?
NO
Replace indoor unit MCC-1510 P.C. board.
YES
Replace indoor unit fan motor.
Operate indoor unit (except heating) by remote control. Is min. 1V DC present between CN210 pin ⑤⊕ and ③⊖? (Measure within 15 seconds.)
NO
YES
Stop operation and turn off the breaker. Discnnect CN210, turn on the breaker, and then stop operation using remote control.
Does fan speed increase?
NO
Operate indoor unit (except heating) by remote control. Is min. 1V DC present between CN210 pin ⑤⊕ and ③⊖? (Measure within 15 seconds.)
NO
Replace indoor unit MCC-1510 P.C. board.
YES
YES
Replace indoor unit fan motor.
Does cross flow fan rotate normally by hand?
NO
Repair cross flow fan shaft.
YES
NO
Replace indoor unit fan motor.
Rotate the fan by hand with operation OFF. Is 0 to 15V DC (rev return signal) generated between CN210 pin ⑥⊕ and ③⊖?
YES
Replace indoor unit MCC-1510 P.C. board.
Fan motor is normal.

[F02]


Is connection of TC sensor connector (CN101 on Indoor P.C. board) correct?
NO
Correct connection of connector.
YES
Are characteristics of TC sensor resistance value normal?
NO
Replace TC sensor.
YES
∗ Refer to Characteristics-2.
Check indoor P.C. board.
Defect → Replace

[F01]


Is connection of TCJ sensor connector (CN102 on Indoor P.C. board) correct?
NO
Correct connection of connector.
YES
Are characteristics of TCJ sensor resistance value normal?
NO
Replace TCJ sensor.
YES
∗ Refer to TCJ sensor
(Temperature-Resistance value characteristic table)
Check indoor P.C. board.
Defect → Replace

[E03] (Header indoor unit)

[E03] is detected when the indoor unit cannot receive a signal from the remote control.

Check A and B remote controls.

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

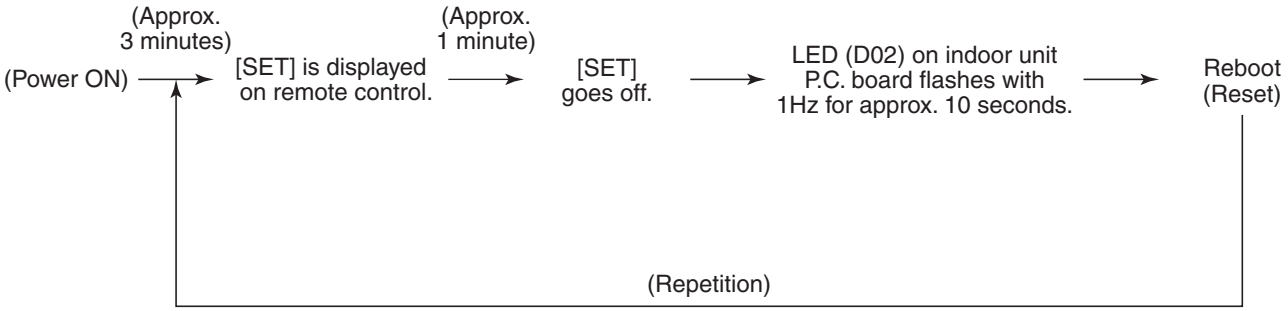
If these check codes generate during operation, the air conditioner stops.

[F29]

This check code indicates a detection trouble 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] is displayed on the central control.



[P31] (Follower indoor unit)

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

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

Temperature sensor Temperature – Resistance value characteristic table

TA, TC, TCJ, TE, TS, TO sensors

Representative value

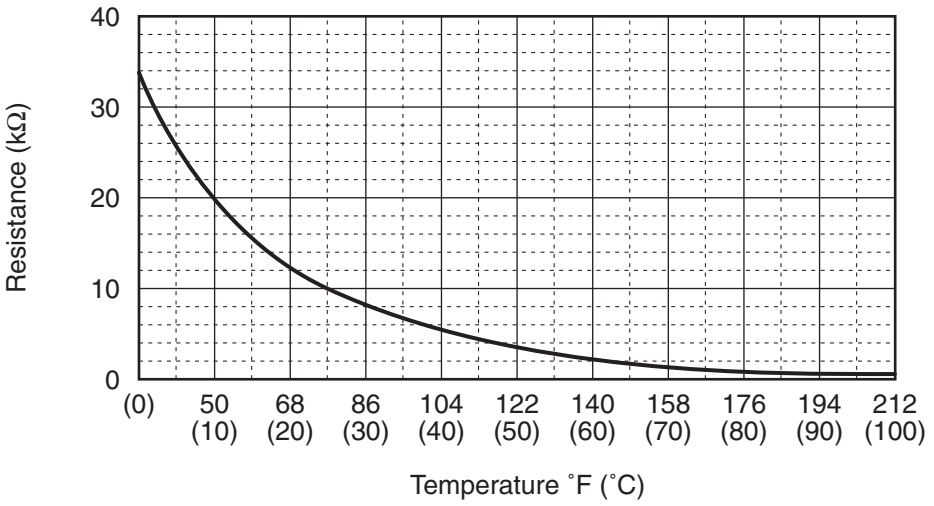
Temperature °F (°C)	Resistance value (kΩ)		
	(Minimum value)	(Standard value)	(Maximum value)
32 (0)	32.33	33.80	35.30
50 (10)	19.63	20.35	21.09
68 (20)	12.23	12.59	12.95
77 (25)	9.75	10.00	10.25
86 (30)	7.764	7.990	8.218
104 (40)	5.013	5.192	5.375
122 (50)	3.312	3.451	3.594
140 (60)	2.236	2.343	2.454
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

TD, TL sensors

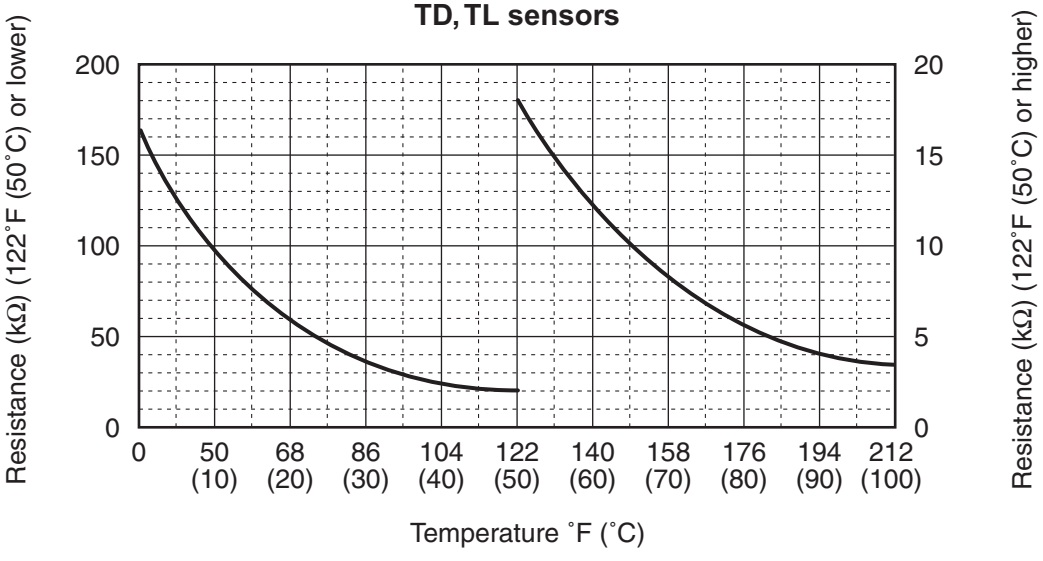
Representative value

Temperature °F (°C)	Resistance value (kΩ)		
	(Minimum value)	(Standard value)	(Maximum value)
32 (0)	150.5	161.3	172.7
50 (10)	92.76	99.05	105.6
68 (20)	58.61	62.36	66.26
77 (25)	47.01	49.93	52.97
86 (30)	37.93	40.22	42.59
104 (40)	25.12	26.55	28.03
122 (50)	17.00	17.92	18.86
140 (60)	11.74	12.34	12.95
158 (70)	8.269	8.668	9.074
176 (80)	5.925	6.195	6.470
194 (90)	4.321	4.507	4.696
212 (100)	3.205	3.336	3.468

TA, TC, TCJ, TE, TS, TO sensors



TD, TL 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.

10. SETUP AT LOCAL SITE AND OTHERS

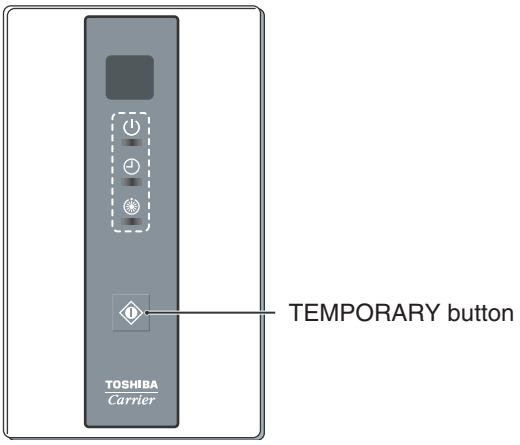
10-1. Test Run Setup on Remote Control

<Wired remote control>

1. When pushing TEST button on the remote control for 4 seconds or more, “TEST” is displayed on LC display. Then push ON / OFF button.
   - “TEST” is displayed on LC display during operation of Test Run.
   - During Test Run, temperature cannot be adjusted but air volume can be selected.
   - In heating and cooling operation, a command to fix the Test Run frequency is output.
   - Detection of trouble is performed as usual. However, do not use this function except case of Test Run because it applies load on the unit.
2. Use either heating or cooling operation mode for [TEST].
   NOTE : The outdoor unit does not operate after power has been turned on or for approx. 3 minutes after operation has stopped.
3. After a Test Run has finished, push TEST button again and check that [TEST] on LC display has gone off. (To prevent a continuous test run operation, 60-minutes timer release function is provided to this remote control.)

<wireless remote control (TCB-AX32-UL)>

1. When TEMPORARY button is pushed for 10 seconds or more, “Pi!” sound is heard and the operation changes to a forced cooling operation. After approx. 3 minutes, a cooling operation is forced to start. Check if cool air starts blowing. If the operation does not start, check wiring again.
2. To stop a test operation, push TEMPORARY button once again (Approx. 1 second).
   - Check wiring / piping of the indoor and outdoor units in forced cooling operation.



10-2. Forced Defrost Setup of Remote Control (For wired remote control only)

(Preparation in advance)

1 **Push TEST + SET + CL buttons simultaneously for 4 seconds or more on the remote control. (Push buttons while the air conditioner stops.)**

The first displayed unit No. is the master indoor unit address in the group control.

2 **Every pushing UNIT LOUVER button (button of left side), the indoor unit No. in the group control is displayed one after the other.**

Select a main indoor unit (outdoor unit is connected) which is to be defrosted. In this time, fan and louver of the selected indoor unit operate.

3 **Using the set temperature TEMP. buttons, specify the CODE No. (DN) 8C.**

4 **Using the timer time TIME buttons, set time to data 0001. (0000 at shipment)**

5 **Push SET button. (OK if indication lights)**

6 **Pushing TEST button returns the status to the normal stop status.**

(Practical operation)

- Push ON/OFF ON / OFF button.
- Select the HEAT mode.
- After 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.)

10-3. LED Display on P.C. Board

1. D02 (Red)

- Lights up by the control of main microcomputer when the indoor unit is powered ON.
- Flashes at intervals of 1 second (0.5-scond ON and OFF) when EEPROM is not mounted or write trouble occurs.
- Flashes at intervals of 10 seconds (5-scond ON and OFF) in the DISP mode.
  (CN72 shout-circuited at power ON)
- Flashes at intervals of 2 seconds (1-scond ON and OFF):
  Applicable unit in the EEPRPM setting (address, function selection, etc.) mode.

2. D203 (Red)

- Lights up by hardware control when power is supplied to remote control.

10-4. Function Selection Setup

<Procedure> Perform setting while the air conditioner stops.

1 **Push TEST + SET + CL buttons simultaneously for 4 seconds or more.**

The first displayed unit No. is the header indoor unit address in the group control.
In this time, fan of the selected indoor unit operate.

⇩

2 **Every pushing UNIT LOUVER button (button of left side), the indoor unit No. in the group control is displayed one after the other.**
In this time, fan of the selected indoor unit only operate.

⇩

3 **Using the set temperature TEMP. buttons, specify the CODE No. (DN).**

⇩

4 **Using the timer time TIME buttons, select the SET DATA.**

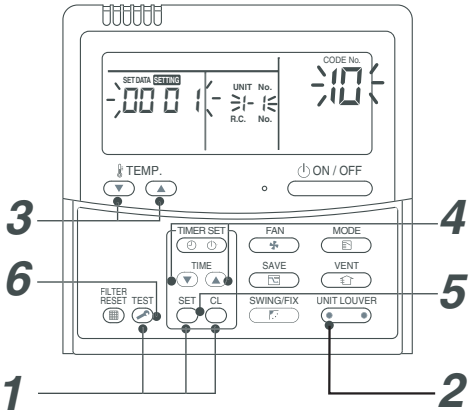
⇩

5 **Push SET button. (OK if indication lights)**

- To change the selected indoor unit, proceed to Procedure ***2*** .
- To change item to be set up, proceed to Procedure ***3*** .

⇩

6 **Pushing TEST button returns the status to the normal stop status.**



<Operation procedure>

1 → ***2*** → ***3*** → ***4*** → ***5*** → ***6*** END

Function selection CODE No. (DN) list

CODE No. (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]
0F	Cooling-only	0000: Heat pump 0001: Cooling only (No display for [AUTO] [HEAT])	0000: Heat pump
10	Type	0004 : Concealed Duct	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: Header 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	Auto restart	0000: None 0001: Provided	0001: Provided
2A	Selection of option / trouble 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	Fan (Single operation)	0000: Impossible 0001: Possible	0000: Impossible
32	Sensor selection	0000: Body TA sensor 0001: Remote control sensor	0000: Body sensor
33	Temperature display SW	0000: °C 0001: °F	0001: °F
5d	External static pressure	0000 : Standard (Factory default) 0001 : High static pressure 1 0003 : High static pressure 2 0006 : Low static pressure	0000: Standard
60	Timer setting (Wired remote control)	0000: Operable 0001: Operation prohibited	0000: Operable
77	Dual set point	0000: Unavailable 0001: Available	0000: Unavailable
b3	Soft cooling	0000: Unavailable 0001: Available	0001: Available
C2	Power saving (Current demand X% to outdoor unit)	0050: 50% to 0100: 100%	0075: 75%
C6	Secondary Heating off outside temperature	5°F (-15°C) to 59°F (15°C)	0000: +32°F (0°C)
C7	Secondary Heating off outside temperature differential	0000: Unavailable 0001: -1.8°F (-1°C) to 0010: -18°F (-10°C)	0000: Unavailable
d0	Existence of remote control save function	0000: Invalid (Impossible) 0001: Valid (Possible)	0001: Valid (Possible)
db	Secondary Heating ON/OFF differential temperature	0001: +0.9°F (+0.5°C) to 0010: +9°F (+5°C)	0006: +5.4°F (+3°C)
dC	Secondary Heating operate start differential temperature	0000: Unavailable 0001: +0.9°F (+0.5°C) to 0010: +9°F (+5°C)	0000: Unavailable

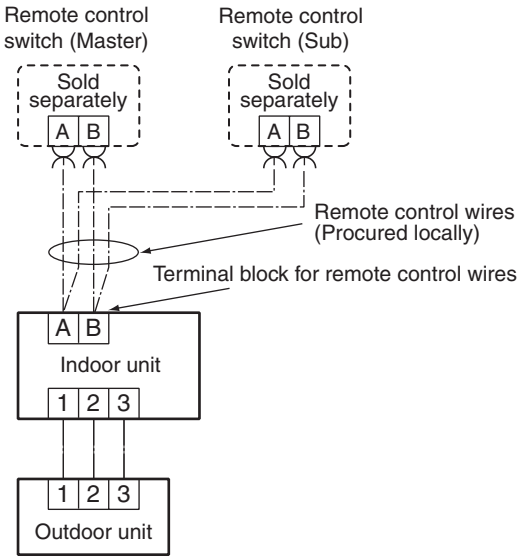
* Restriction ratio setting for save operation (DN code No. [C2] can be set/change from the normal DN setup (Detail DN setup).

10-5. Wiring and Setting of Remote Control Control

2-remote control control (Controlled by 2 remote controls)

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

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



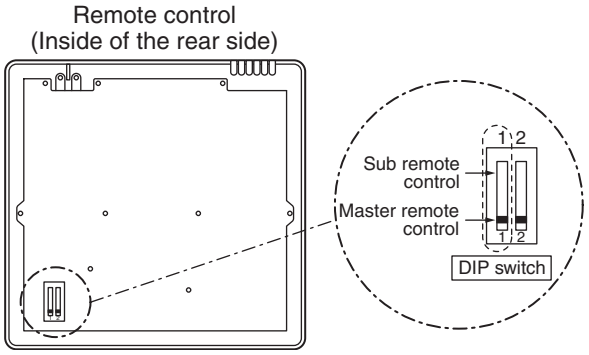
(Setup method)

One or multiple indoor units are controlled by 2 remote controls.
(Max. 2 remote controls are connectable.)

<Wired remote control>

How to set wired remote control as sub remote control

Change DIP switch inside of the rear side of the remote control switch from remote control master to sub.



[Operation]

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

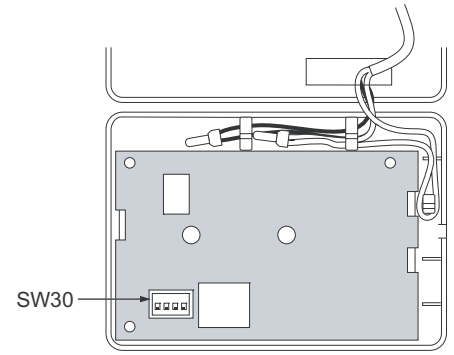
<Wireless remote control>

Remote control address (A-B selection) setting

- When two or more signal receiving units are installed in a room, a unique address can be set for each signal receiving unit to prevent interference.
- Address (A-B selection) must be changed on both signal receiving unit and wireless remote control.

Turn off the indoor unit power supply. Turn on the bit 3 of DIP switch SW30 on the signal receiving unit P.C. board.

The setting change is shown below.



DIP-Switch [SW30]

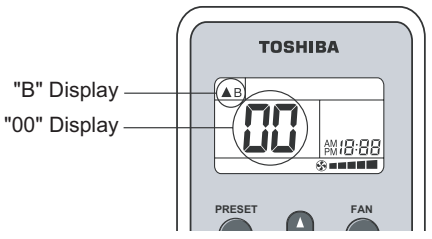
4	ON=Follower	OFF=Header
3	ON=B	OFF=A
2	Not used	
1	Not used	

Wireless remote control (A-B selection)

Using 2 wireless remote controls for the respective air conditioners, when the 2 air conditioners are closely installed.

Wireless remote control B setup

1. Start the air conditioner.
2. Point the wireless remote control at the indoor unit.
3. Push and hold CHK● button on the wireless remote control by the tip of the pencil.
   "00" will be shown on the display.
4. Push MODE button during CHK● pushing .
   "B" will be shown on the display and "00" will be disappear and the air conditioner will turn OFF.
   The wireless remote control B is memorized.



NOTE

- Repeat above step to reset wireless remote control to be A.
- The wireless remote controls do not display "A".
- The factory default of the wireless remote controls is "A".
- A-B selection can be set with signal receiving unit.

10-6. Monitor Function of Remote Control Switch

■ Calling of sensor temperature display

<Contents>

Each data of the remote control, indoor unit and outdoor unit can be understood by calling the service monitor mode from the remote control.

<Procedure>

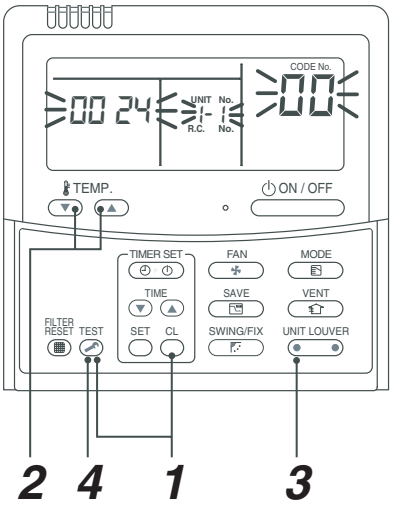
1 Push TEST + CL buttons simultaneously for 4 seconds to call the service monitor mode.

The service monitor goes on, the header indoor unit No. is displayed at first and then the temperature of CODE No. 00 is displayed.

⇩

2 Push temperature set TEMP. buttons and then change the CODE No. of data to be monitored.

The CODE No. list is shown below.



<Operation procedure>

1→ 2→ 3→ 4

Returned to usual display

	CODE No.	Data name	Unit
Indoor unit data	01	Room temperature (Remote control)	°C
	02	Indoor suction temperature (TA)	°C
	03	Indoor heat exchanger (Coil) temperature (TCJ)	°C
	04	Indoor heat exchanger (Coil) temperature (TC)	°C
	* 07	Indoor fan revolution frequency	rpm
	F3	Filter sign time	×1h

	CODE No.	Data name	Unit
Outdoor unit data	60	Outdoor heat exchanger (Coil) temperature (TE)	°C
	61	Outside temperature (TO)	°C
	62	Compressor discharge temperature (TD)	°C
	63	Compressor suction temperature (TS)	°C
	65	Heat sink temperature (THS)	°C
	6A	Operation current (× 1/10)	A
	* 6d	Outdoor heat exchanger (Coil) temperature (TL)	°C
	* 70	Compressor operation frequency	rps
	* 72	Outdoor fan revolution frequency (Lower)	rpm
	* 73	Outdoor fan revolution frequency (Upper)	rpm

⇩

3 Push UNIT LOUVER button (button of left side), to select the indoor unit to be monitored.

Each data of the indoor unit and its outdoor units can be monitored.

⇩

4 Pushing TEST button returns the status to the usual display.

*1 The indoor discharge temperature of CODE No. [F8] is the estimated value from TC or TCJ sensor. Use this value to check discharge temperature at test run. (A discharge temperature sensor is not provided to this model.)

- The data value of each item is not the real time, but value delayed by a few seconds to ten-odd seconds.

10-7. Calling of trouble history

<Contents>

The trouble history in the past can be called.

<Procedure>

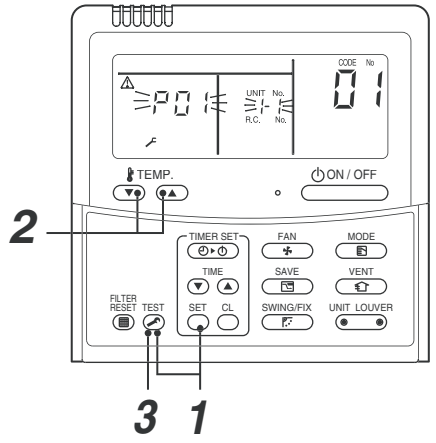
1 **Push SET + TEST buttons simultaneously for 4 seconds or more to call the service check mode.**

Service Check goes on, the **CODE No. 01** is displayed, and then the content of the latest alarm is displayed. The number and trouble contents of the indoor unit in which a problem occurred are displayed.

2 **In order to monitor another trouble history, push the set temperature / buttons to change the trouble history No. (CODE No.).**
CODE No. 01 (Latest) → CODE No. 04 (Old)

NOTE : 4 trouble histories are stored in memory.

3 **Pushing TEST button returns the display to usual display.**



<Operation procedure>

1 → ***2*** → ***3***

Returned to usual display

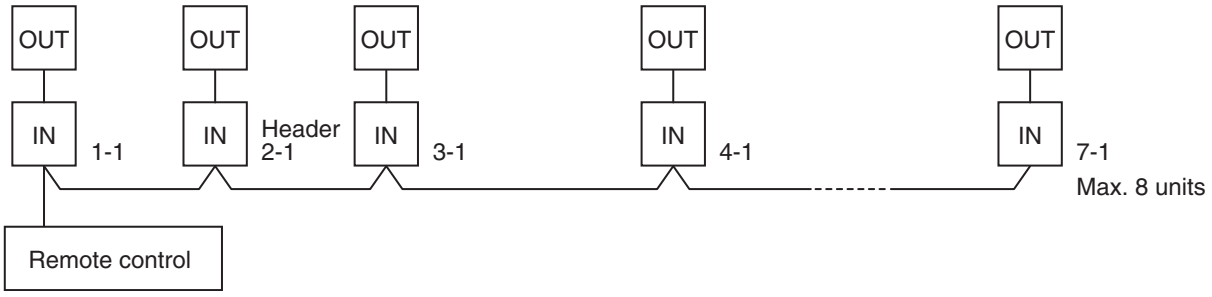
REQUIREMENT

Do not push CL button, otherwise all the trouble histories of the indoor unit are deleted.

10-8. Group control operation)

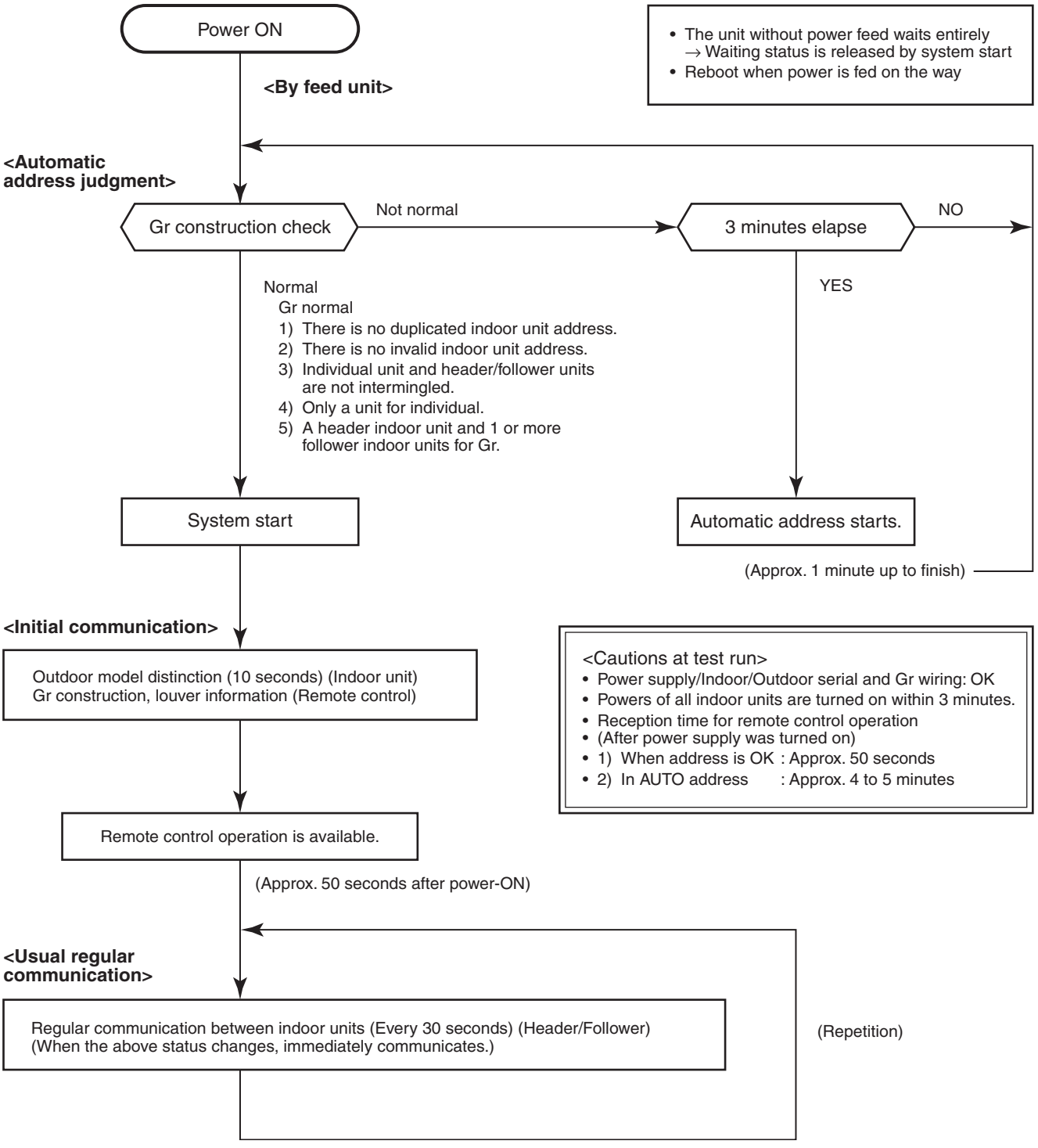
In a group control, operation of maximum 8 indoor units can be controlled by a remote control.
The indoor unit connected with outdoor unit controls room temperature according to setting on the remote control.

<System example>



1. Display range on remote control
   The setup range (Operation mode/Air volume select/Setup temp) of the indoor unit which was set to the header unit is reflected on the remote control.
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 wires.
   2) Check line address/indoor address/group address of the unit one by one.
   3) The unit No. (line/indoor gout 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



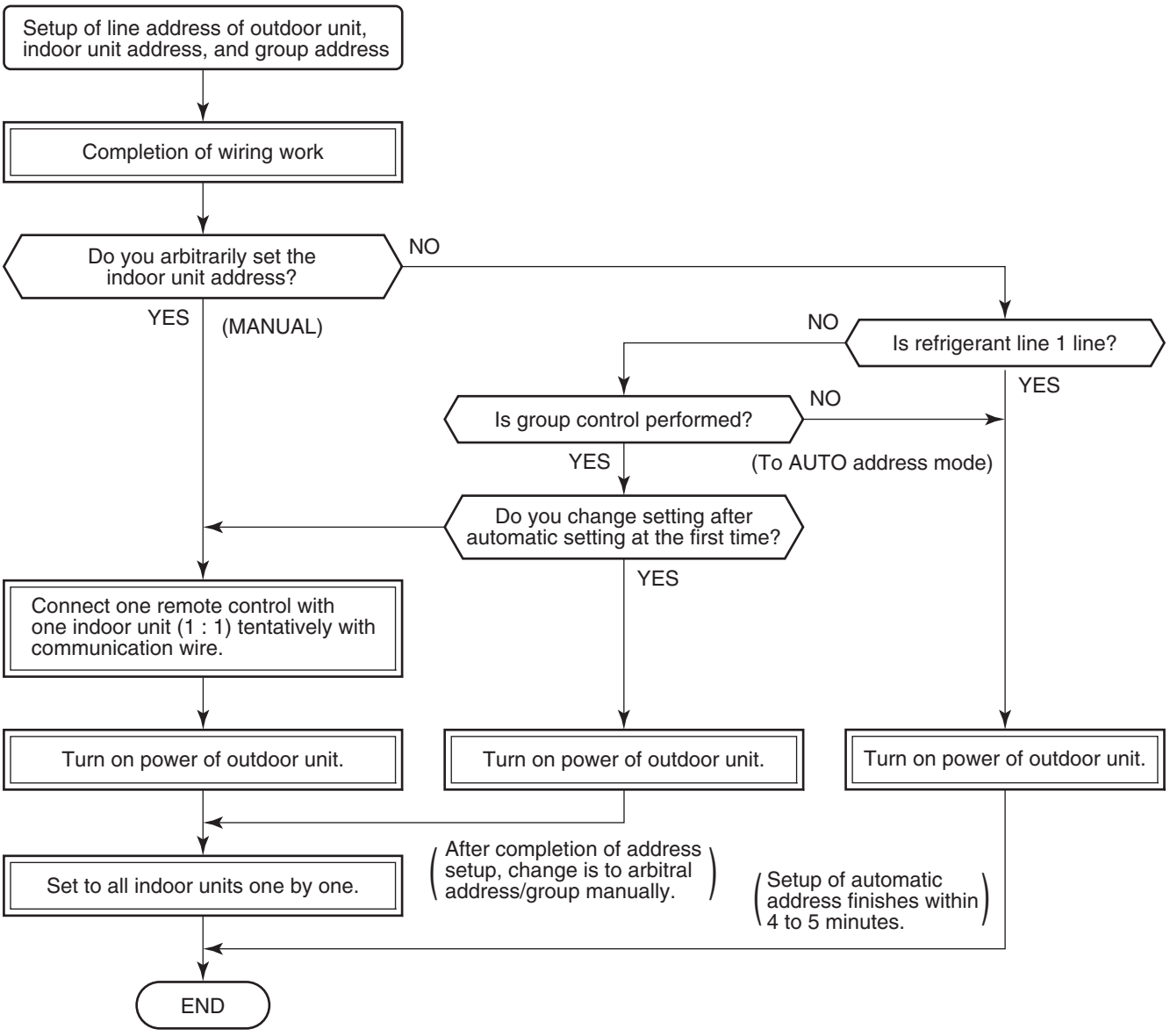
- In a group operation, if the indoor unit which was fed power after judgment of automatic address cannot receive regular communication from the header unit and regular communication on identical pipe within 120 seconds after power was turned on, it reboots (system reset).
  → The operation starts from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

11. ADDRESS SETUP

11-1. Address Setup Procedure

When an outdoor unit and an indoor unit are connected, 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 control is not accepted while automatic address works. (Approx. 4 to 5 minutes)



- When the following addresses are not stored in the neutral memory (4-Way: IC503, Under Ceiling: 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 0064 (No. 64 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
Group address	14	0099	0000 : Individual (Indoor units which are not controlled in a group) 0001 : Master unit (1 indoor unit in group control) 0002 : Follower unit (Indoor units other than header unit in group control)

11-2. Address Setup & Group Control

<Terminology>

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

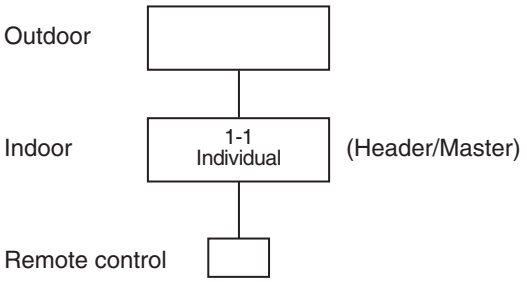
Group address : 0 = Single (Not group control)
1 = Header unit in group control
2 = Follower unit in group control

Heade unit (= 1) : The representative of multiple indoor units in group operation sends/receives signals to/from the remote controls 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 control LCD.
(Except air direction adjustment of louver)

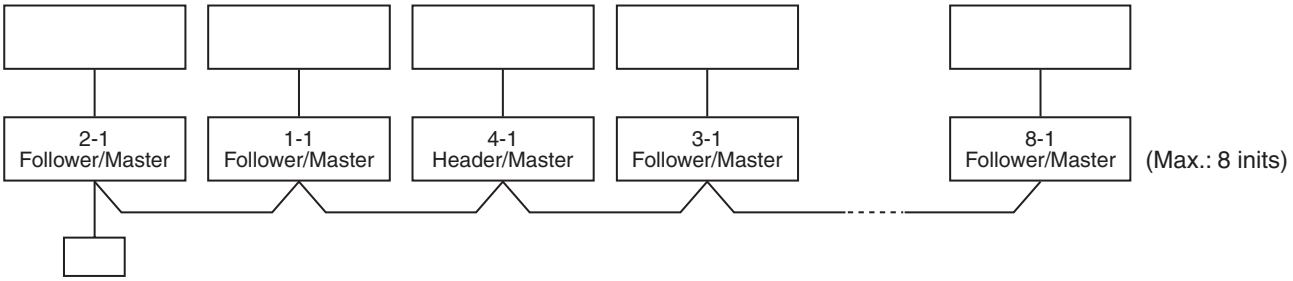
Follower unit (= 2) : Indoor units other than header unit in group operation
Basically, follower units do not send/receive signals to/from the remote controls.
(Except troubles and response to demand of service data)

11-2-1. System Configuration

1. Single

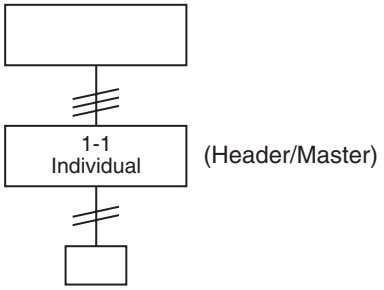


2. Single group operation

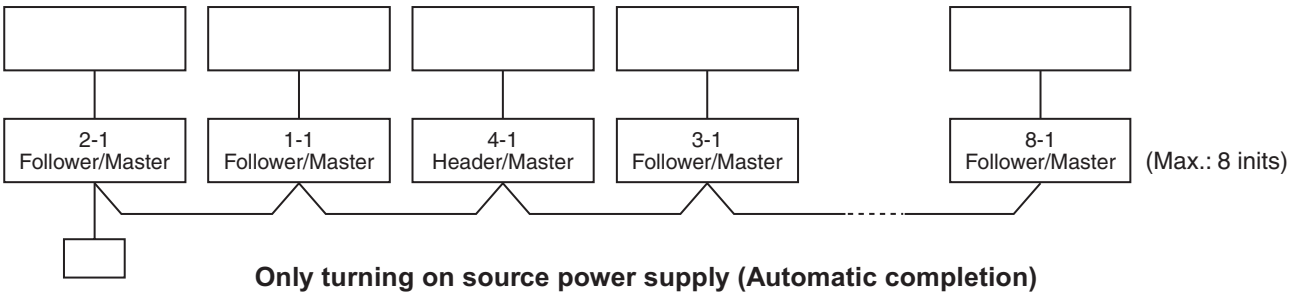


11-2-2. Automatic Address Example from Unset Address (No miswiring)

1. Standard (One outdoor unit)
   1) Single



   2) Group operation



Only turning on source power supply (Automatic completion)

■ Changing of settings for Celsius display

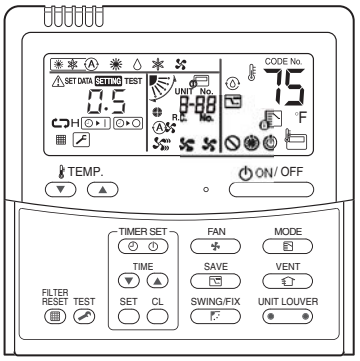
- When you use this air conditioner for the first time, it takes approx. 5 minutes until the remote control becomes available after power-on.

Procedure *1*

Push simultaneously TEST + SET + CL buttons for 4 seconds or more.

After a while, the display part flashes as shown right. Check the displayed CODE No. is [10].

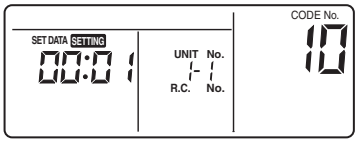
- When the CODE No. is other than [10], push TEST button to erase the display and repeat procedure from the first step.
  (After pushing TEST button, operation of the remote control is not accepted for approx. 1 minute.) (For a group control, No. of the firstly displayed indoor unit becomes the header unit.)



Procedure *2*

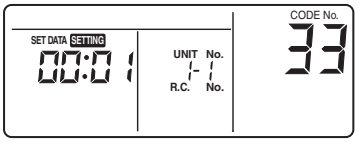
Every time the button is pushed, UNIT LOUVER (button of left side), the indoor unit No. in the group control is displayed in order. Select the indoor unit of which setup is changed.

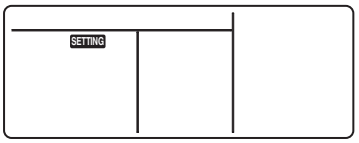
In this time, the position of the indoor unit of which setup is changed can be confirmed because fan of the selected indoor unit will operate.



Procedure *3*

1. Using temp. setup TEMP. buttons, specify CODE No. [33].
   (CODE No. [33]: Celsius display)
2. Using timer TIME buttons, change the line address from [1] to [0].
3. Push SET button. In this time, the setup finishes when the display changes from flashing to lighting.





Procedure *4*

After verifying the content change, push TEST button. (Setup is determined.)

When pushing TEST button, the display disappears and the status becomes the usual stop status.

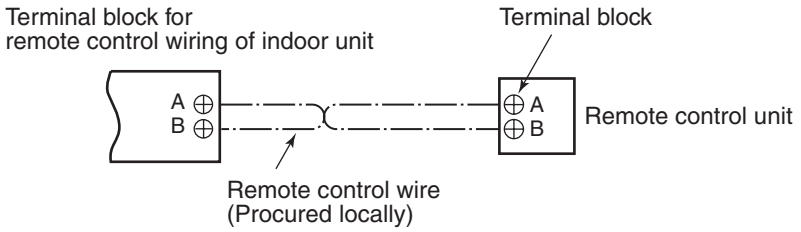
(When pushing TEST button the operation from the remote control is not accepted for approx. 1 minute.)

- If the operation from the remote control is not accepted after 1 minute of pushing the TEST button, it is considered that the address setup is incorrect.
  In this case, the automatic address must be set up again.
  Therefore repeat procedure of the setup change from the **Procedure *1***.

11-3. Remote Control Wiring

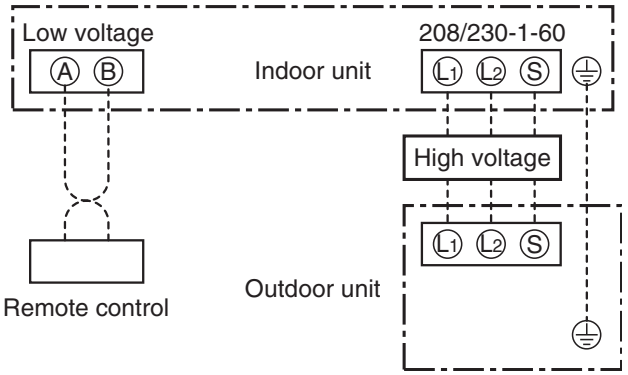
- Strip off approx. 0.4” (9 mm) the wire to be connected.
- For single system, use non polarity, 2 core wire is used for wiring of the remote control. (2 x AWG20 wires)
- For the synchronous twin, triple system, use 2-conre shield wire (2 x AWG20) to conform to the EMC standard.

Wiring diagram



* For details of wiring/installation of the remote control, refer to the Installation Manual enclosed with the remote control.

<Single system>

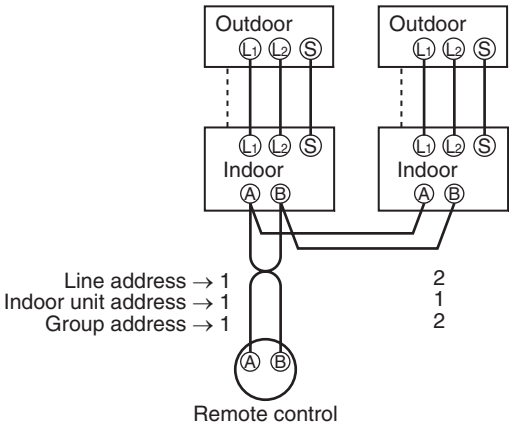


11-4. Address Setup (Manual setting from remote control)

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 control.
- Turn on power supply.

(Example of 2-lines wiring)
(Real line: Wiring,
Broken line: Refrigerant pipe)



For the above example, perform setting by connecting singly the wired remote control without remote control inter-unit wire.

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

1 **Push SET + CL + TEST buttons simultaneously for 4 seconds or more.**

2 **(← Line address)**
Using the temperature setup ▼ / ▲ buttons, set 12 to the CODE No.

3 **Using timer time ▼ / ▲ buttons, set the line address.**

4 **Push SET button.** (OK when display goes on.)

5 **(← Indoor unit address)**
Using the temperature setup ▼ / ▲ buttons, set 13 to the CODE No.

6 **Using timer time ▼ / ▲ buttons, set 1 to the line address.**

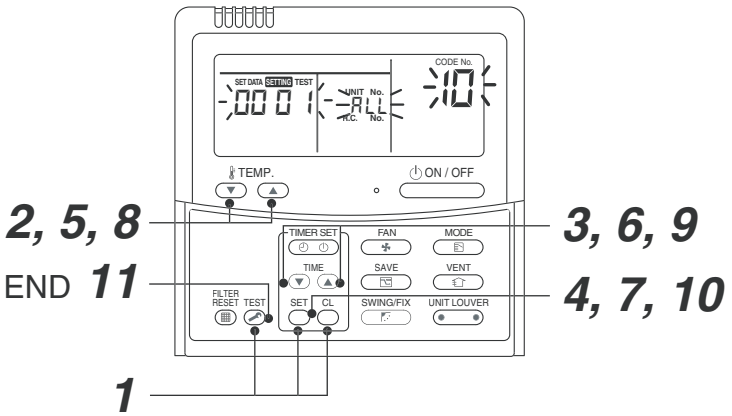
7 **Push SET button.** (OK when display goes on.)

8 **(← Group address)**
Using the temperature setup ▼ / ▲ buttons, set 14 to the CODE No.

9 **Using timer time ▼ / ▲ buttons, set 0000 to Individual, 0001 to Header unit, and 0002 to Follower unit.**

10 **Push SET button.** (OK when display goes on.)

1 **Push TEST button.**
Setup completes. (The status returns to the usual stop status.)



<Operation procedure>

1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 9 → 10 → 11 END

11-5. Confirmation of Indoor Unit No. Position

1. To know the indoor unit addresses though position of the indoor unit body is recognized

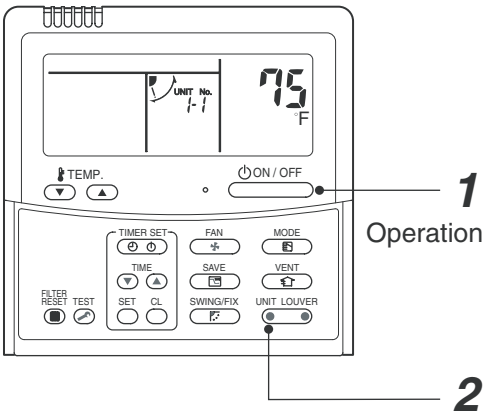
- In case of individual operation (Wired remote control : indoor unit = 1 : 1)
  (Follow to the procedure during operation)

<Procedure>

1 Push ON / OFF button if the unit stops.

2 Push UNIT LOUVER button (button of left side) .

Unit No. 1-1 is displayed on LCD.
(It disappears after several seconds.)
The displayed unit No. indicate line address and indoor unit address.
(When other indoor units are connected to the identical remote control (Group control unit), other unit numbers are also displayed every pushing UNIT LOUVER button (button of left side).



<Operation procedure>

1 → 2 END

2. To know the position of indoor unit body by address

- To confirm the unit No. in the group control
  (Follow to the procedure during operation) (in this procedure, the indoor units in group control stop.)

<Procedure>

The indoor unit numbers in the group control are successively displayed, and fan, louver, and drain pump of the corresponding indoor unit are turned on.
(Follow to the procedure during operation)

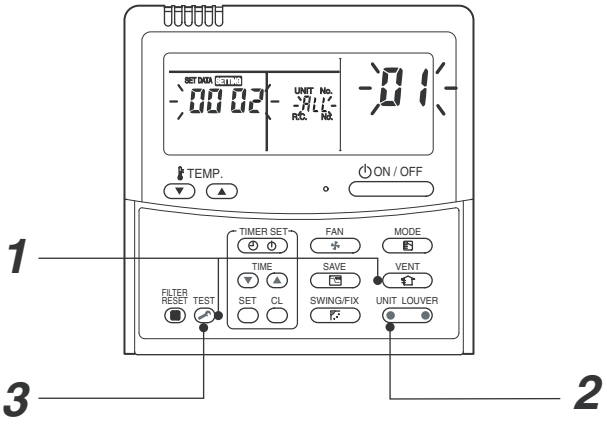
1 Push VENT and TEST buttons simultaneously for 4 seconds or more.

- Unit No. ALL is displayed.
- Fans of all the indoor units in the group control operate.

2 Every pushing UNIT LOUVER button (button of left side), the unit numbers in the group control are successively displayed.

- The unit No. displayed at the first time indicates the header unit address.
- Fan of the selected indoor unit only operate.

3 Push TEST button to finish the procedure.
All the indoor units in the group control stop.



<Operation procedure>

1 → 2 → 3 END

<Maintenance>

Periodic Maintenance - periodic maintenance is recommended to ensure proper operation of the unit. Recommended maintenance intervals may vary depending on the installation environment, e.g. dusty zones, etc. Refer to table below.

Periodic Maintenance

INDOOR UNIT	EVERY MONTH	EVERY 4 MONTHS	EVERY YEAR
Clean Air Filter ∗1	1		
Clean Drain Pan		1	
Clean indoor heat exchanger ∗2			1
Clean fan ∗2			1
Change Remote Control Batteries			1
OUTDOOR UNIT	**EVERY MONTH**	**EVERY 4 MONTHS**	**EVERY YEAR**
Clean Outdoor heat exchanger from Outside		1	
Clean Outdoor heat exchanger from Inside ∗2			1
Blow Air Over Electric Parts ∗2			1
Check Electric Connection Tightening ∗2			1
Clean Fan Wheel ∗2			1
Check Fan Tightening ∗2			1
Clean Drain Pans ∗2			1

∗: Increase frequency in dusty zones.

∗: Maintenance to be carried out by qualified service personal.

REQUIREMENT

Be sure to clean the heat exchanger with pressurized water.

If a commercially available detergent (strong alkaline or acid) cleaning agent is used, the surface treatment of the heat exchanger will be marred, which may degrade the self cleaning performance.
For further details, contact the dealer.

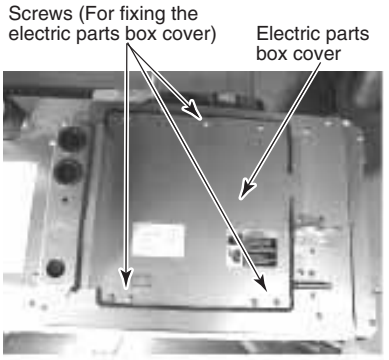
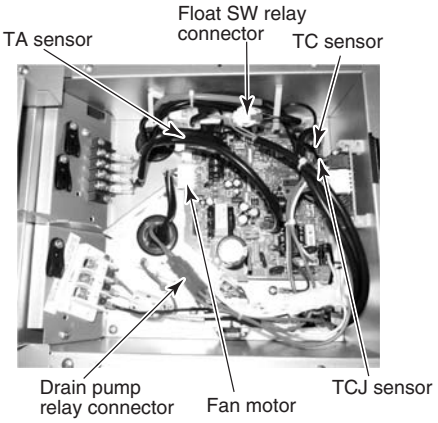
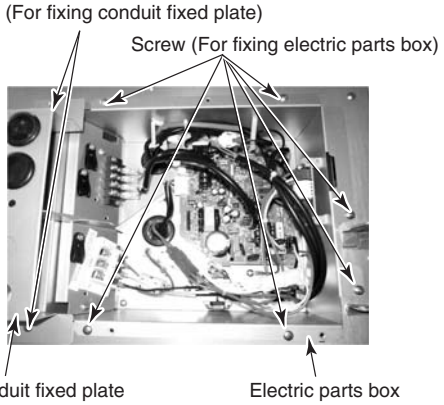
12. DETACHMENTS

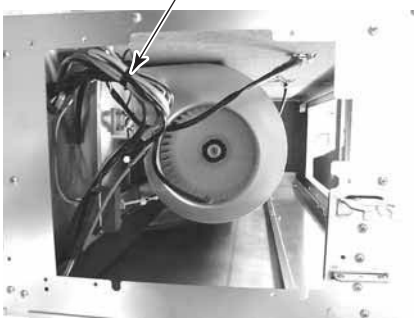
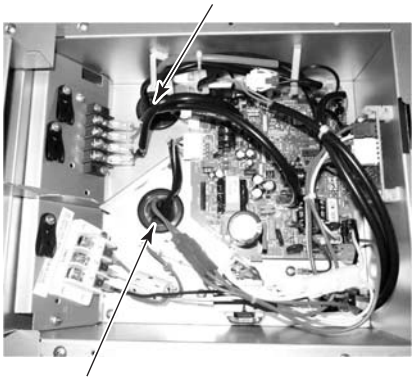
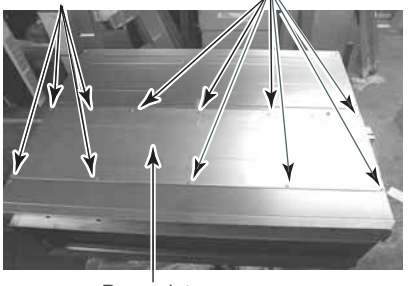
⚠ WARNING

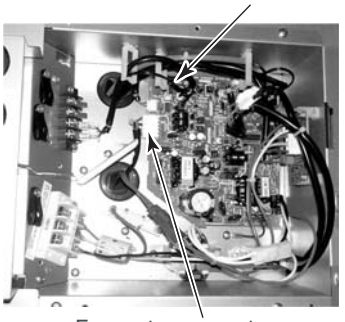
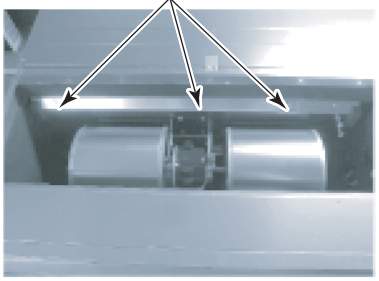
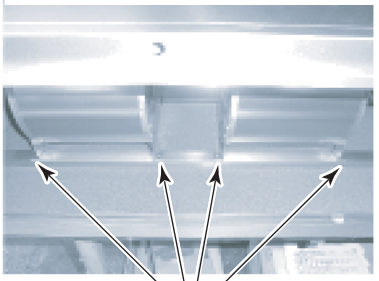
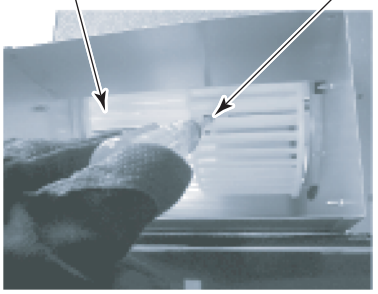
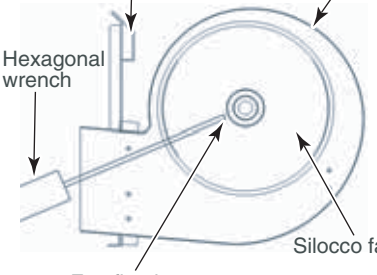
Be sure to turn off the power supply and the breaker and then start a work.

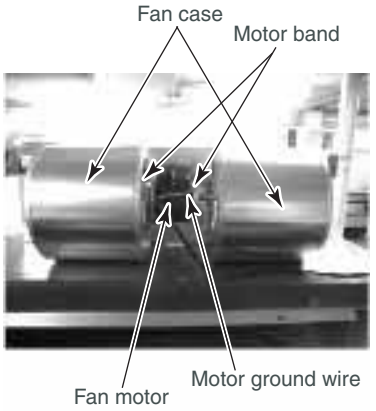
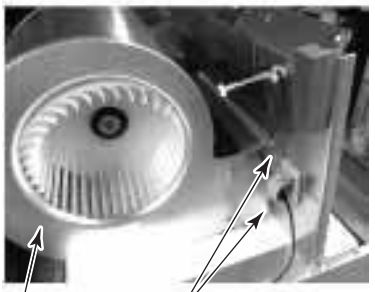
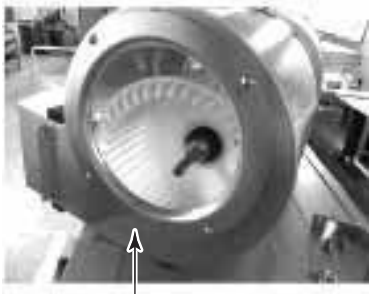
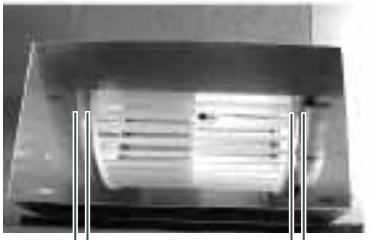
⚠ CAUTION

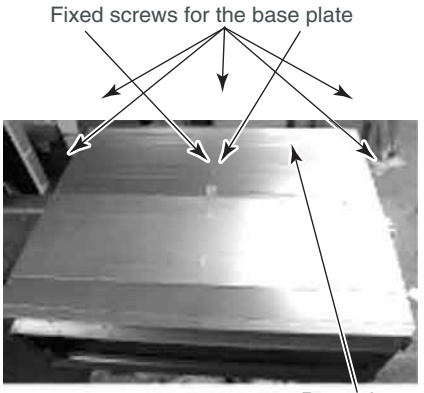
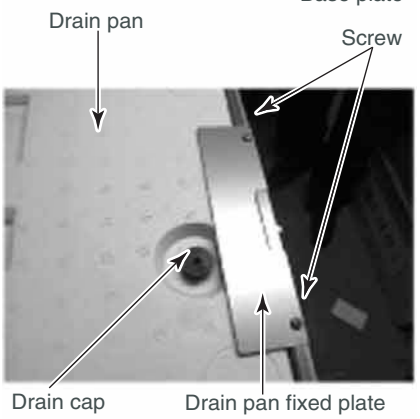
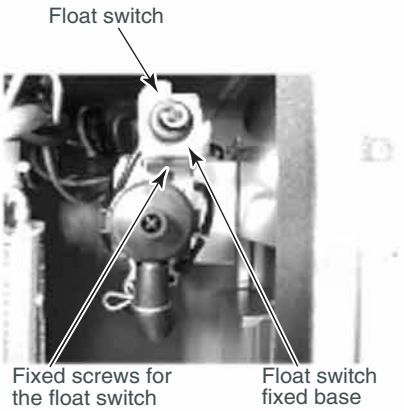
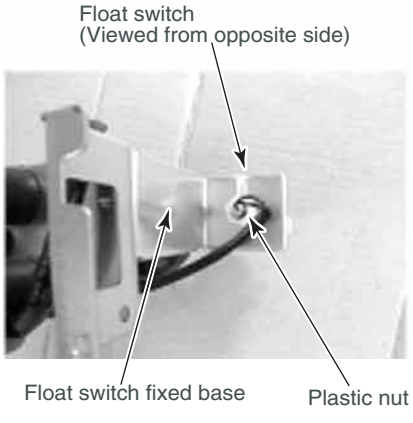
Be sure to put on the gloves at disassembling work; otherwise an injury will be caused by a part, etc.

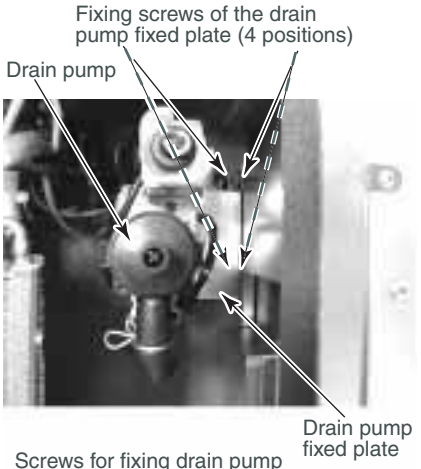
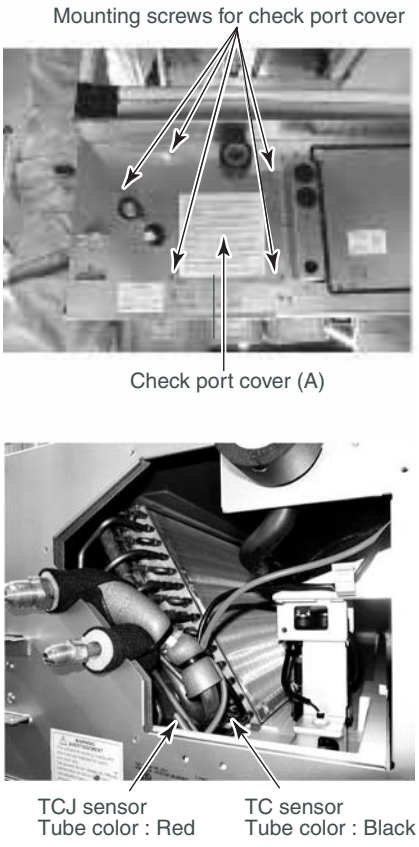
No.	Part name	Procedure	Remarks
①	Electric parts box	**1. Detachment** 1) Take off screws of the electric parts box cover to remove the electric parts box cover. Close the claw of the electric parts box cover to notch side of the electric parts box once and then pull out the claw. 2) Remove power supply wire, indoor/ outdoor connecting wire, remote control wires from each terminal blocks. 3) Remove connectors of the fan motor, TC, TCJ and TA sensor leadwires from the control P.C. board. Remove relay connectors of the drain pump, float SW. **NOTE :** First unlock the housing and then remove the connectors. CN210: Fan motor CN101: TC sensor CN102: TCJ sensor CN104: TA (Room temperature) sensor 4) Take off screw of the conduit fixed plate and then remove the conduit fixing plate. 5) Take off fixing screws of the electric parts box and then remove the electric parts box.	  

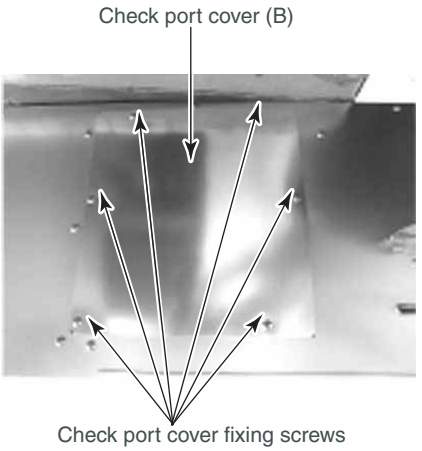
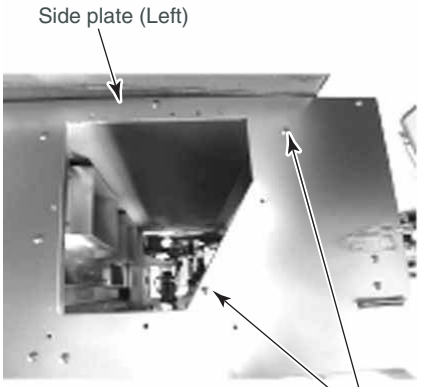
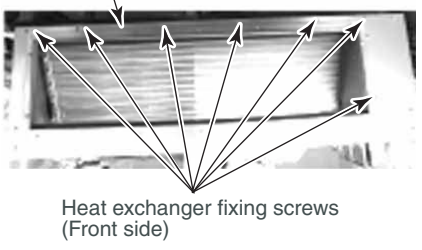
No.	Part name	Procedure	Remarks
①	Electric parts box (Continued)	＊ **Cautions when attaching the electric parts box** Using cable clamp, bundle each extra lead wire so that it is not caught in the fan and then attach the electric parts box. After attaching the electric parts box, pull the extra wire in the electric parts box and bundle it with clamp, etc.	Cable clamp  Cable clamp Cord clamp(For fan motor lead wire) Intake port of float SW, TC, TCJ and TA sensor lead wires  Intake port of fan motor and drain pump lead wires
②	Silocco fan, fan motor	**1. Detachment** 1) Take off fixed screws and then remove the base plate.	Base plate fixed screw Base plate fixed screw  Base plate

No.	Part name	Procedure	Remarks
②	Silocco fan, fan motor (Continued)	2) Remove cover of the electric parts box. (Refer to No.①)	TA sensor connector  Fan motor connector
		3) Remove connectors of the fan motor and TA sensor from P.C. board.	
		4) Take off hexagonal screws which fix the fan assembly and the main unit.	Hexagonal screws (For fixing the fan assembly and the main unit) 
		* For SP30 to SP42, take off also screws which fix the fan case to the top plate	*** For SP30 to SP42 only**  Fan case fixed screws
		5) Remove the fan assembly from the main unit. The fan assembly is fixed by the hooking claw at the upper side of the main unit. Lift up it once and pull downward to remove the hooking claw.	Silocco fan Fan fixed screw 
		6) Insert the hexagonal wrench as shown in the right figure and loosen the fixed screw of the Silocco fan.	Fan base Fan case Hexagonal wrench  Silocco fan Fan fixed screw

No.	Part name	Procedure	Remarks
②	Silocco fan, fan motor (Continued)	7) Take off screws of the motor band and the motor ground wire.	
		8) Take off the fan case fixed screws and then pull out the fan case from the fan base.	
		9) Remove cover of the fan case.	
		10) Remove the Silocco fan.	
		＊ Cautions when attaching the Silocco fan **Attach the Silocco fan in the reverse procedure of detachment**	
		1) Place the Silocco fan in the arrow direction → as shown in the right figure.	 **Attaching direction of Silocco fan**
		2) Adjust position so that clearance between the Silocco fan and the fan case becomes even and then fix the fan.	

No.	Part name	Procedure	Remarks
③	Drain pan	**1. Detachment** 1) Take off fixed screws for the base plate to remove the base plate from the main unit. 2) Prepare a water receiver; take off the drain cap and then extract drain water accumulated in the drain pan. **NOTE :** When taking-off the drain cap, be sure receive drain water using a bucket, etc. 3) Take off screws of the drain pan fixed plate to remove the drain pan fixed plate. SP18 : none SP24 : 1 position SP30 to SP42 : 2 positions 4) Remove the drain pan from the main unit.	 
④	Float switch	**1. Detachment** 1) Remove the drain pan. (Refer to No.③) 2) Take off screws of the float switch fixed plate. 3) Remove the plastic nut for fixing the float switch. 4) Remove the float switch.	 

No.	Part name	Procedure	Remarks
⑤	Drain pump	**1. Detachment** 1) Remove the drain pan.(Refer to No.③) 2) Take off screws for the fixed plate of the main unit and the pump. (4 positions) 3) Take off screws of the drain pump fixed plate to remove the drain pump.	
⑥	TC, TCJ sensors	**1. Detachment** 1) Take off fixing screw for the check port cover at right side. (5 positions) 2) Pull and take off the sensors from the sensor holder of piping.	

No.	Part name	Procedure	Remarks
⑦	Heat exchanger	**1. Detachment** **NOTE :** Recover refrigerant gas and then remove the refrigerant piping of the indoor unit.Remove the indoor unit and carry out the work on the floor. etc. 1) Remove the drain pan.(Refer to No.③) Remove TC sensor and TCJ sensor from the sensor holder. 2) Remove the check port cover (A). (Refer to No.⑥) 3) Take off fixing screw and remove cover (B). 4) Take off the heat exchanger fixing screws (2 positions) which fix the side plate (Left) and the heat exchanger. 5) Take off screws which fix the main unit (Front side) and the heat exchanger to remove the heat exchanger.	  

13. P.C. BOARD EXCHANGE PROCEDURES

In the non-volatile memory (Hereinafter said EEPROM, IC10) installed on the indoor P.C. board before replacement, the type and capacity code exclusive to the corresponding model have been stored at shipment from the factory and the important setup data such as refrigerant line /indoor unit /group address in (AUTO/ MANUAL) mode have been stored at installation.

Part code	Model type	P.C. board model
4316V603	RAV-SP∗∗∗BT-UL	MCC-1510

Replace the service indoor P.C. board assembly according to the following procedure.

After replacement, make sure that the indoor unit address is set correctly and also the refrigerant cycle is working correctly by test operation.

<Replacement procedure>

Method 1

Before replacement, power of the indoor unit can be turned on and the setup data can be readout by the wired remote control.

Read EEPROM data : **Procedure 1**

⇩

Replace service P.C. board & power ON : **Procedure 2**

⇩

Write the read data to EEPROM : **Procedure 3**

⇩

Power reset

(If in group operation, reset the power for all indoor units which are connected to the remote control.)

Method 2

Before replacement, the setup data can not be read out by the wired remote control.

Replace service P.C. board & power ON : Procedure 2

⇩

Write the data such as “option input selection” setup to EEPROM : Procedure 3
(According to the customers’ information)

⇩

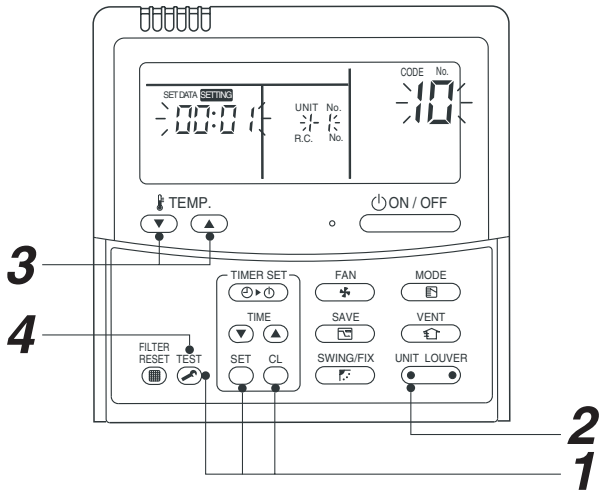
Power reset

Procedure1: Readout of the setup data from EEPROM

(Data in EEPROM contents, which have been changed at the local site, are read out together with data in EEPROM set at shipment from the factory.)

1. Push SET, CL and TEST buttons of the remote control at the same time for 4 seconds or more. ***1***
   (Corresponded with No. in Remote control as shown below picture)
   * When group operation, the header indoor unit address is displayed at the first time. In this time, the CODE No. (DN) 10 is displayed. The fan of the second indoor unit operates.

2. Every pushing UNIT LOUVER button (button of left side), the indoor unit address in the group are displayed successively. **2**
   Specify the indoor unit No. to be replaced.
3. Using the set temperature TEMP. buttons, the CODE No. (DN) can be moved up and down one by one. **3**
4. First change the CODE No. (DN) from 10 to 01. (Setting of filter sign lighting time)
   Make a note of the set data displayed in this time.
5. Next change the CODE No. (DN) using the set temperature TEMP. buttons.
   Also make a note of the set data.
6. Repeat item 5. and made a note of the important set data as shown in the below table.
   "01 to RR are provided in the CODE No. (DN). On the way of operation, DN No. may skip.
7. After finishing making a note, push TEST button to return to the usual stop status. **4**
   (Approx. 1 minute is required to be able to use the remote control.)



Minimum requirements for CODE No.

DN	Contents
11	Indoor unit capacity
12	Refrigerant line address
13	Indoor unit address
14	Group address

Capacity of the indoor unit is necessary to set the revolutions of the fan.

Procedure2: Replacement of service P.C. board

1. Replace the P.C. board with a service P.C. board.
   In this time, setting of jumper line (cut) or setting of DIP switch on the former P.C. board should be reflected on the service P.C. board. Refer to the following table about DIP switch setting and drawing of P.C. board parts layout.
2. It is necessary to set Indoor unit to be exchanged : Remote control = 1 : 1
   Based upon the system configuration, turn on power of the indoor unit with one of the following items.
   1) Single (Individual) operation
      Turn on power of the indoor units and proceed to **Procedure 3**
   2) Group operation
      A) In case that power of the exchanged indoor unit only can be turned on.
         Turn on power of the exchanged indoor unit only and proceed to **Procedure 3**
      B) In case that power of the indoor units cannot be turned on individually. (***CASE 1***)
         a) Remove temporarily the group wire connected to the terminal blocks A and B of the exchanged indoor unit.
         b) After connecting the remote control wire only to the removed terminal block, turn on power of the indoor units and proceed to **Procedure 3**
         ***** When the above methods cannot be used, follow at the ***CASE 2*** below.

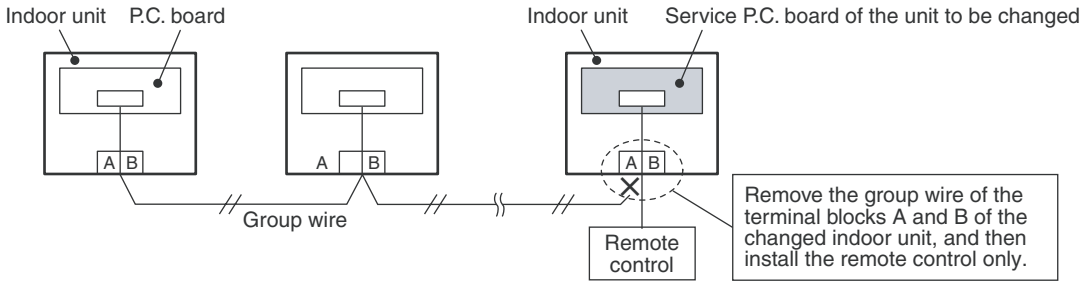
C) In case that power of the indoor units cannot be turned in individually. (***CASE 2***)

a) Remove all CN41 connectors of the indoor units in the same group except those of the exchanged indoor unit.

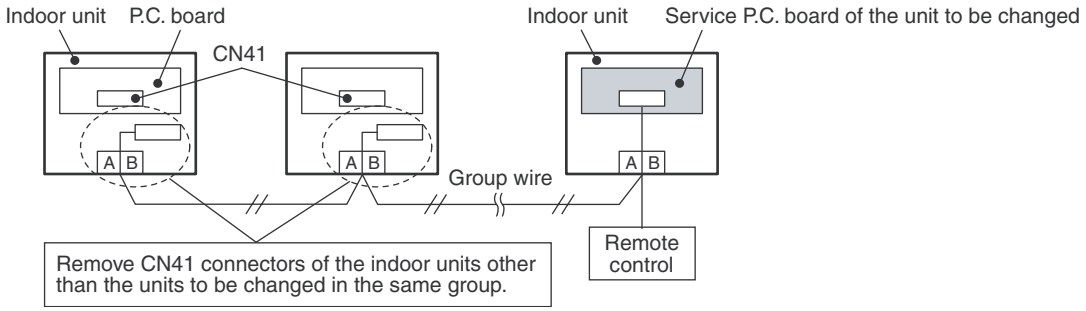
b) Turn on power of the indoor units and proceed to **Procedure 3**

∗ After **Procedure 3** operation has finished, be sure to return the temporarily removed group wire or CN41 connector to the original connection.

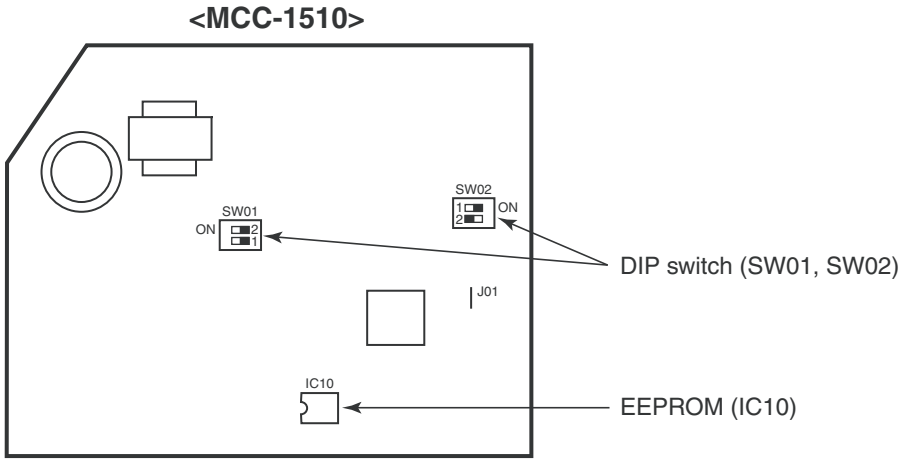
(Case 1)



(Case 2)



P.C. board parts layout drawing



Method of DIP switch setting

		Selected content	RAV-SP∗∗∗BT-UL	At shipment
SW01	Bit 1	Termination resistance	∗2	OFF
	Bit 2	Setup of external static pressure	∗1	OFF
SW02	Bit 1	No use	OFF	OFF
	Bit 2	Setup of external static pressure	∗1	OFF

∗1 : Match to set up contents of P.C. board before replacement.

∗2 : When central control will be connected to this unit, please turn on.

Procedure2: 3 Writing of the setup contents to EEPROM

(The contents of EEPROM installed on the service P.C. board have been set up at shipment from the factory.)

1. Push SET, CL and TEST buttons of the remote control at the same time for 4 seconds or more. ***1***
   (Corresponded with No. in remote control as shown below picture) (The UNIT No. ALL is displayed.)
   In this time, the CODE No. (DN) 10 is displayed.
   The fan of the indoor unit operates.
2. Using the set temperature TEMP. buttons, the CODE No. (DN) can be moved up and down one by one. ***2***
3. First, set the type, capacity codes and High IEER setting of the indoor unit.
   (Changing the the type, capacity codes and High IEER setting in EEPROM overwrites the factory default settings.)
   1) Set the CODE No. (DN code) to 10 (no change)
   2) Use the TIME button to select the type. ***3***
      (Medium static ducted type : "0004 ")
   3) Push the SET button. (The display should change from flashing to steady.) ***4***
   4) Use the TEMP. button to set the CODE No. (DN code) to 11. ***2***
   5) Use the TIME button to select the capacity code. ***3***
      (For example, "00 12" for RAV-SP214BT-UL) Refer to the attached table 2.
   6) Push the SET button. (The display should change from flashing to steady.) ***4***
      (High IEER type : "0001 ")
   7) Push the SET button. (The display should change from flashing to steady.) ***4***
   8) Push TEST button to return to usual stop status. ***5***
      (Approx. 1 minute is required to start handling of the remote control.)
4. Next write the contents that have been written at the installation such as the address data into EEPROM.
   Repeat the above **procedure *1***.
5. Using the set temperature TEMP. buttons, set 01 to the CODE No. (DN). ***2***
   (Setup of lighting time of filter sign)
6. The contents of the displayed setup data in this time should be agreed with the contents in the previous memorandum in ❑**1**.
   1) If data disagree, change the displayed setup data to that in the previous memorandum by the timer time TIME buttons, and then push SET button. (OK when the display goes on.)
   2) There is nothing to do when data agrees.
7. Using the set temperature TEMP. buttons, change the CODE No. (DN).
   As same as the above 6., check the contents of the setup data and then change them to data contents in the previous memorandum in ❑**1**.
8. Then repeat the **procedure *6*. and *7***.
9. After completion of setup, push TEST button to return the status to the usual stop status. ***5***
   In a group operation, turn off the power supply once, return the group wires between indoor units and CN41 connectors as before, and then turn on power of all the indoor units.
   (Approx. 1 minute is required to be able to use of the remote control.)
   * 01 to AA are provided in the CODE No. (DN). On the way of operation, DN No. may skip.
     When data has been changed by mistake and SET button has been pushed, the data can be returned to the data before change by pushing CL button if the CODE No. (DN) was not yet changed.

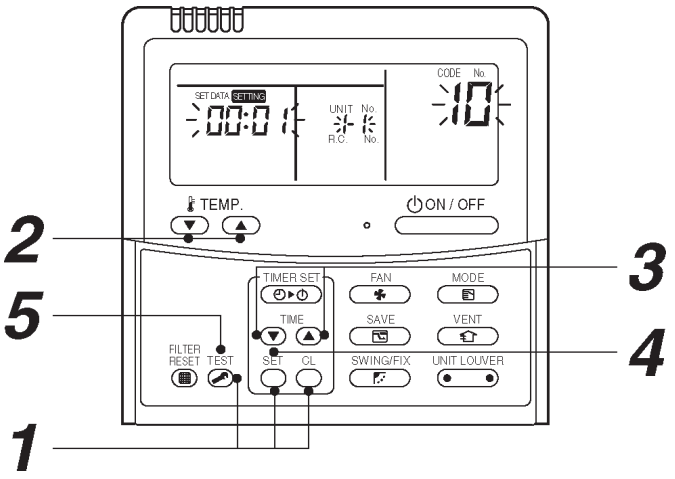


Table 2
CODE No. table (Please record the objective unit data at field)

DN	Item	Memo	At shipment
01	Filter sign lighting time		0002: 2500 hour
02	Dirty state of filter		0000: Standard
03	Central control address		0099: Unfixed
06	Heating suction temp shift		0002: + 3.6 ˚F (+2 ˚C)
0C	PRE-DEF indication selection		0000: Standard
0F	Cooling only		0000: Heat pump
10	Type	Be sure to set as 0004	0004: Concealed Duct
11	Indoor unit capacity (See below table)		According to capacity type
12	Refrigerant line address		0099: Unfixed
13	Indoor unit address		0099: Unfixed
14	Group address		0099: Unfixed
2A	Option input selection (CN80)		0002: External emergency input
2b	Thermostat output selection (T10 ③)		0000: Thermostat-ON
2E	Input selection (T10 ①)		0000: Operation input
32	Sensor selection		0000: Available
60	Timer set (Wired remote control)		0000: Available
77	Dual set point		0000: Unavailable
b3	Soft cooling		0001: Available
C6	Secondary Heating off outside temperature		0000: +32 ˚F (0 ˚C)
C7	Secondary Heating off outside temperature differential		0000: Unavailable
db	Secondary Heating ON/OFF differential temperature		0006: +5.4 ˚F (+3 ˚C)
dC	Secondary Heating operate start differential temperature		0000: Unavailable

Type
DN code “10”

Value	Type	Model
0004	Concealed Duct	RAV-SP∗∗∗BT-UL

*1 Default value stored in EEPROM mounted on service P.C. board

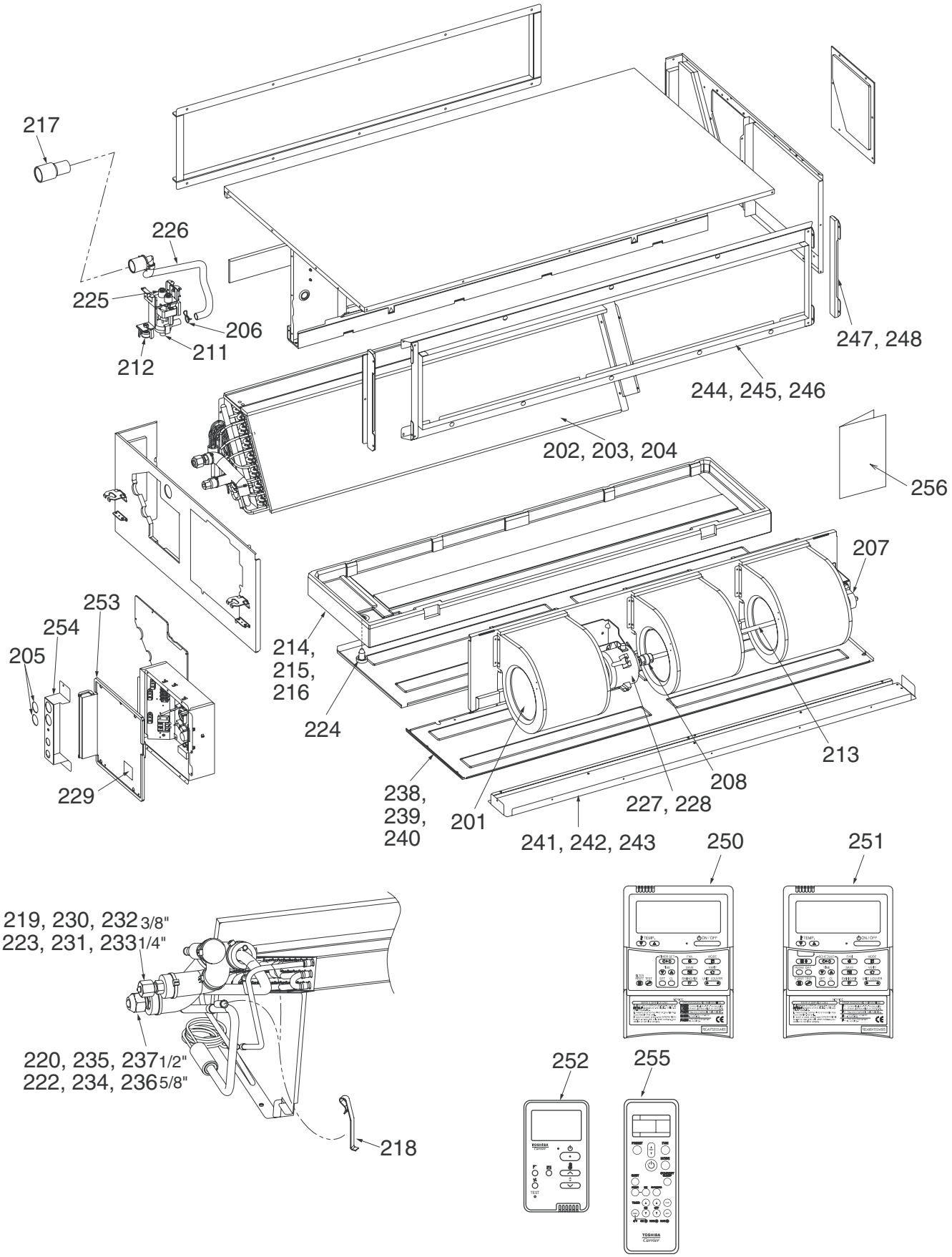
Indoor unit capacity
(CODE No. [11])

Setup data	Model
0000*	Disable
0009	180
0012	240
0015	300
0017	360, 420

* Initial value of EEPROM installed on the supplied service P.C. board

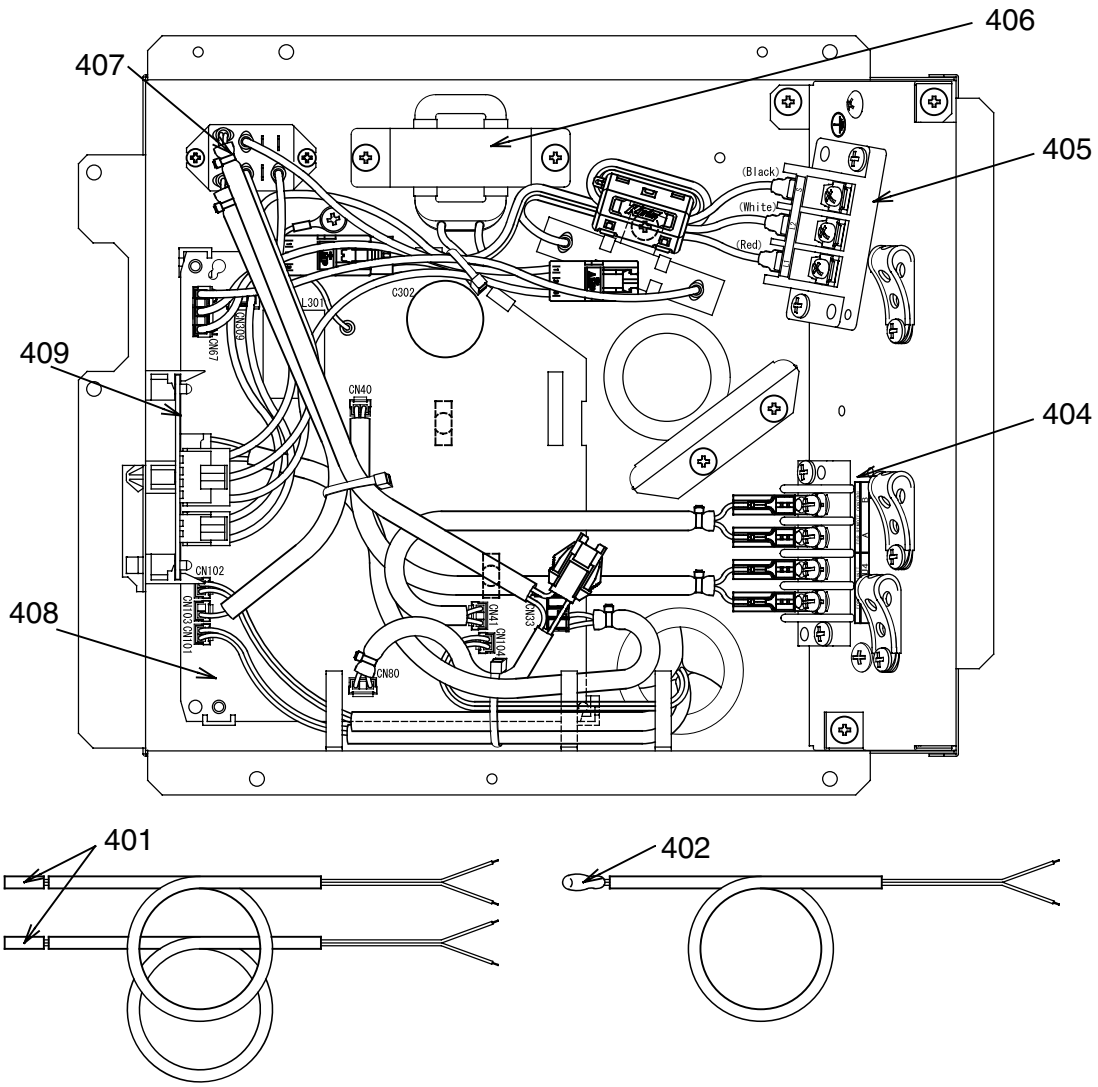
14. EXPLODED VIEWS AND PARTS LIST

14-1. Concealed Duct Type



Location No.	Part No.	Description	Q'ty/Set RAV-SP				
			181BT-UL	241BT-UL	301BT-UL	361BT-UL	421BT-UL
201	43120239	FAN, MULTI BLADE	1	2	3	3	3
202	4314J545	REFRIGERATION CYCLE ASSY	1				
203	4314J546	REFRIGERATION CYCLE ASSY		1			
204	4314J547	REFRIGERATION CYCLE ASSY			1	1	1
205	43196012	BUSHING	2	2	2	2	2
206	43079249	BAND, HOSE	1	1	1	1	1
207	43125131	BEARING, SHAFT			1	1	1
208	43125162	COUPLING			1	1	1
211	43177019	PUMP, DRAIN	1	1	1	1	1
212	43151294	SWITCH, FLOAT, FS-0218-102	1	1	1	1	1
213	43125163	SHAFT			1	1	1
214	43172221	PAN ASSY, DRAIN			1	1	1
215	43172222	PAN ASSY, DRAIN		1			
216	43172257	PAN ASSY, DRAIN	1				
217	43171080	SOCKET, PAN DRAIN	1	1	1	1	1
218	43F19904	HOLDER, SENSOR (TS)	2	2	2	2	2
219	43F47609	BONNET, 3/8 IN		1	1	1	1
220	43147195	BONNET, 1/2 IN	1				
222	43194029	BONNET, 5/8 IN		1	1	1	1
223	43F49697	BONNET, 1/4 IN	1				
224	43179110	PLUG	1	1	1	1	1
225	43179126	RUBBER, PUMP DRAIN	3	3	3	3	3
226	43170233	HOSE, DRAIN	1	1	1	1	1
227	4312C092	MOTOR, FAN, MF-240U150-2A	1		1	1	1
228	4312C091	MOTOR, FAN, MF-240U150-1A		1			
229	431S8299	LABEL, WARNING	1	1	1	1	1
230	43149355	NUT, FLARE, 3/8 IN		1	1	1	1
231	43F47685	NUT, FLARE, 1/4 IN	1				
232	43049776	SOCKET, 3/8 IN			1	1	1
233	43149351	SOCKET, 1/4 IN	1				
234	43149352	NUT, FLARE, 5/8 IN		1	1	1	1
235	43047688	NUT, FLARE, 1/2 IN	1				
236	43149354	SOCKET, 5/8 IN		1	1	1	1
237	43149353	SOCKET, 1/2 IN	1				
238	43104208	PLATE, SHIELD, UNDER			1	1	1
239	43104221	PLATE, SHIELD, UNDER	1				
240	43104209	PLATE, SHIELD, UNDER		1			
241	43104211	PLATE, SHIELD, UNDER			1	1	1
242	43104222	PLATE, SHIELD, UNDER	1				
243	43104212	PLATE, SHIELD, UNDER		1			
244	43109431	FLANGE, ASSY			1	1	1
245	43109440	FLANGE, ASSY	1				
246	43109432	FLANGE, ASSY		1			
247	43104214	PLATE ASSY, SHIELD		2	2	2	2
248	43104223	PLATE, ASSY, SHIELD	2				
250	43166013	REMOTE CONTROLLER, SX-TA01UE	1	1	1	1	1
251	43166014	REMOTE CONTROLLER, SX-TB01UE	1	1	1	1	1
252	43166026	REMOTE CONTROLLER, SIMPLE, SX-U01EQ	1	1	1	1	1
253	43162074	COVER, E-PARTS	1	1	1	1	1
254	43119523	PLATE	1	1	1	1	1
255	43166029	REMOTE CONTROLLER	1	1	1	1	1
256	431S8319	OWNER'S MANUAL	1	1	1	1	1

Electric Parts



Location No.	Part No.	Description	Q'ty/Set RAV-SP				
			181BT-UL	241BT-UL	301BT-UL	361BT-UL	421BT-UL
401	43050425	SENSOR ASSY, SERVICE, TC	2	2	2	2	2
402	43F50426	SENSOR, SERVICE, TA	1	1	1	1	1
404	43160574	TERMINAL, 4P	1	1	1	1	1
405	43160607	TERMINAL BLOCK, 3P, 20A	1	1	1	1	1
406	43158193	REACTOR, CH-43-2Z-T	1	1	1	1	1
407	43054107	RELAY, LY1F	1	1	1	1	1
408	4316V603	PC BOARD ASSY, MCC-1510	1	1	1	1	1
409	4316V484	PC BOARD ASSY, MCC-1431	1	1	1	1	1

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