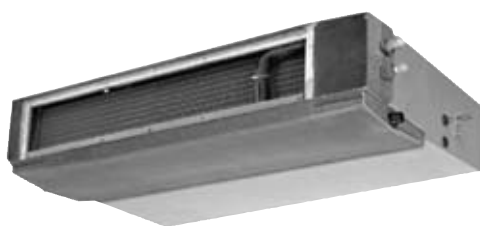




Installation, operating and maintenance **DUCTAIR™ II**



- • • Providing indoor climate comfort



DUCTAIR™ II

INSTALLATION - OPERATION - MAINTENANCE MANUAL

Ref : DUCTAIR II-IOM-0808-E

INSTALLATION

Installation information	2
Accessories	2
Remote controller & its frame	2
Caution on remote controller installation	2
Installation place	3
The indoor unit	3
The outdoor unit	3
Indoor unit installation	4
Install the main body	4
Panel installation	7
Outdoor unit installation	8

COMMISSIONING

Install the connecting pipe	10
Expel the air	11
Vacuum dry and leakage checking	12
Check the leakage	14
Connect the drain pipe	14
Water drainage	14
Insulation work	17
Wiring	19
The outdoor unit	23
Test operation	23

SELF-DIAGNOSIS AND TROUBLESHOOTING

Indoor unit's LED indication of trouble	24
LED's for the indication of outdoor trouble	24
Clean	27
Troubles and solutions	27
Troubles and solutions concerning the remote controller	28
Appendix 1: Indoor temperature and pipe temperature sensor resistance value table	29

Lennox have been providing environmental solutions since 1895, our range of DUCTAIR™ II continues to meet the standards that have made LENNOX a household name. Flexible design solutions to meet YOUR needs and uncompromising attention to detail. Engineered to last, simple to maintain and Quality that comes as standard. Information on local contacts at www.lennox europe.com.

All the technical and technological information contained in this manual, including any drawing and technical descriptions provided by us, remain the property of Lennox and must not be utilised (except in the operation of this product), reproduced, issued to or made available to third parties without the prior written agreement of Lennox.





The specifications and technical characteristics in this booklet are given for information purposes. The manufacturer reserves the right to modify them without prior notice or obligation to modify in a similar manner, the equipments previously supplied.

INSTALLATION INFORMATION

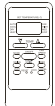



- To install properly, please read this manual at first.
- The air conditioner must be installed by qualified persons.
- When installing the indoor unit or its tubing, please follow this manual as strictly as possible.
- When all the installation work is finished, please turn on the power only after a thorough check.
- No further announcement if there is any change of this manual caused by product improvement.
- The appliance shall be installed in accordance with national wiring regulations.
- The temperature of refrigerant circuit will be high, please keep the interconnection cable away from the copper tube.

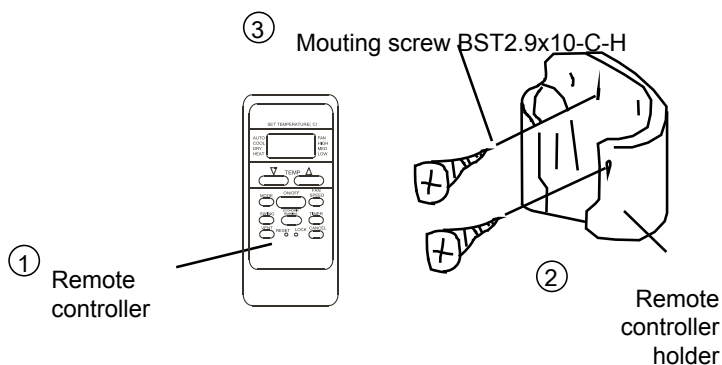
Note: The installer should illustrate to users how to correctly use and maintain the air-conditioner, as well as remind users to carefully read and keep both Installation Manual and Owner's Manual well.

ACCESSORIES

Name of Accessories	Q'ty	Outline	Usage
Owner's manual	1	-	-
Installation manual	1	(This manual)	-
Pipe insulating material	2		(Heat resisting)
Drain elbow	1		To connect drain
Seal	1		To connect drain
Signal receiver display board	1		Receive Signal

REMOTE CONTROLLER & ITS FRAME

1. Remote controller	1
	
2. Frame	1
	
3. Mounting screw (BST2.9x10-C-H)	2
	
4. Alkaline dry batteries (AM4)	2
	
5. Remote controller manual	1



CAUTION ON REMOTE CONTROLLER INSTALLATION

- Never throw or beat the controller.
- Before installation, operate the remote controller to determine its location in a reception range.
- Keep the remote controller at least 1m apart from the nearest TV set or stereo equipment. (It is necessary to prevent image disturbances or noise interferences.)
- Do not install the remote controller in a place exposed to direct sunlight or close to a heating source, such as a stove.
- Note that the positive and negative poles are in right positions when loading batteries.

INSTALLATION PLACE

THE INDOOR UNIT

- There is enough room for installation and maintenance.
- The ceiling is horizontal, and its structure can endure the weight of the indoor unit.
- The air outlet and the air inlet are not impeded, and the influence of external air is the least.
- The air flow can reach throughout the room.
- The appliance must be installed 2,3m above floor.
- The connecting pipe and drainpipe could be extracted out easily.
- There is no direct radiation from heaters.

THE OUTDOOR UNIT

- There is enough room for installation and maintenance.
- The air outlet and the air inlet are not impeded, and can not be reached by strong wind.
- The place is dry and ventilative.
- The support is flat and horizontal and can stand the weight of the outdoor unit. And no additional noise or vibration.
- Your neighborhood will not feel uncomfortable with the noise or expelled air.
- There is no leakage of combustible gas.
- It is easy to install the connecting pipe or cables.



CAUTION

Location in the following places may cause malfunction of the machine. (If unavoidable, please consult your local dealer.)

- There exists petrolatum.
- There is salty air surrounding (near the coast).
- There is caustic gas (the sulfide, for example) existing in the air (near a hot spring).
- The Volt vibrates violently (in the factories).
- In buses or cabinets.
- In kitchen where it is full of oil gas.
- There is strong electromagnetic wave existing.
- There are inflammable materials or gas.
- There is acid or alkaline liquid evaporating.
- The appliance shall not be installed in the laundry.
- Other special conditions.

NOTES BEFORE INSTALLATION

1. Select the correct carry-in path.
2. Move this unit as originally packaged as possible.
3. If the air conditioner is installed on a metal part of the building, it must be electrically insulated according to the relevant standards to electrical appliances.

NOTE - REMARK PER EMC DIRECTIVE 89/336/EEC

To prevent flicker impressions during the start of the compressor (technical process), following installation conditions apply:

1. The power connection for the air conditioner has to be done at the main power distribution. The distribution has to be of a low impedance, normally the required impedance reaches at a 32A fusing point.
2. No other equipment has to be connected with this power line.
3. For detailed installation acceptance, please refer to your contract with the power supplier if restrictions do apply for products like washing machines, air conditioners or electrical ovens.
4. For power details of the air conditioner, refer to the rating plate of the product.
5. For any question contact your local dealer.

INDOOR UNIT INSTALLATION

INSTALL THE MAIN BODY

Installing Ø10 hanging screw bolts. (4 bolts)

- Please refer to the following figure for the distance measurement between the screw bolts.
 - Please install with f10 hanging screw bolts.
 - The handling to the ceiling varies from the constructions, consult the construction personnels for the specific procedures.
1. The size of the ceiling to be handled. Do keep the ceiling flat. Consolidate the roof beam for possible vibration.
 2. Cut off the roof beam.
 3. Strengthen the place cut off, and consolidate the roof beam.
- Carry out the pipe and line operation in the ceiling after finishing the installation of the main body. While choosing where to start the operation, determine the direction of the pipes to be drawn out. Especially in case there is a ceiling, position the refrigerant pipes, drain pipes, indoor & outdoor lines to the connection places before hanging up the machine.
 - The installation of hanging screw bolts.

Wooden construction

Put the square timber transversely over the roof beam, then install the hanging screw bolts. (Refer to Chart 1)

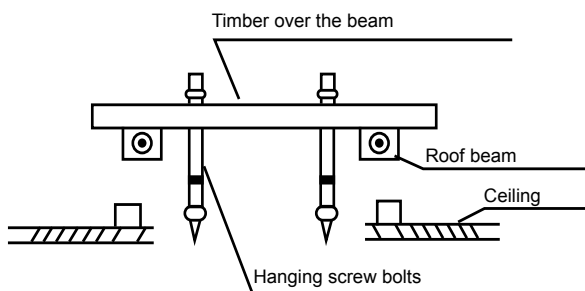
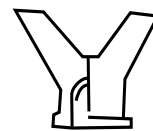


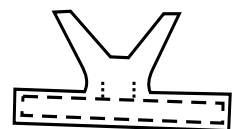
Chart 1

New concrete bricks

Inlaying or embedding the screw bolts. (Refer to Chart 2)



Blade shape insertion



Slide insertion

Chart 2

For original concrete bricks

Use embedding screw bold, crock and stick harness. (Refer to Chart 3)

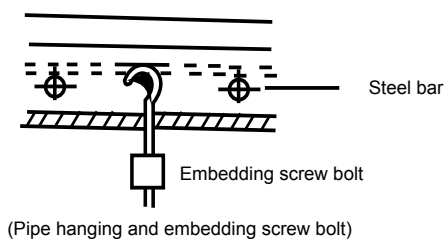


Chart 3

Steel roof beam structure

Install and use directly the supporting angle steel. (Refer to chart 4)

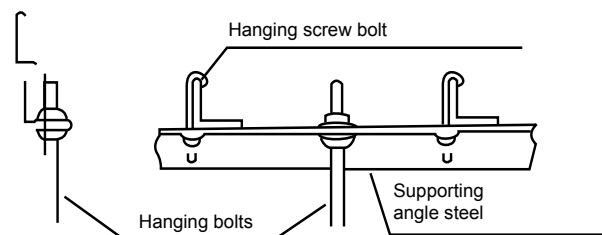


Chart 4

Overhanging the indoor unit

1. Overhang the indoor unit onto the hanging screw bolts with block.
2. Position the indoor unit in a flat level by using the level indicator, unless it may cause leakage.

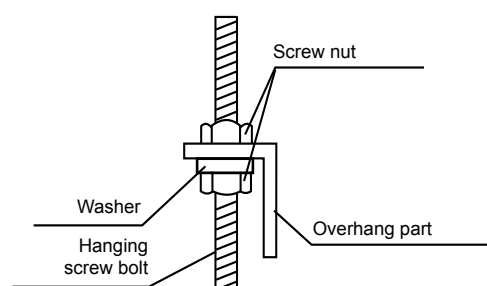


Chart 5

Installing the dust proof net and canvas air passage

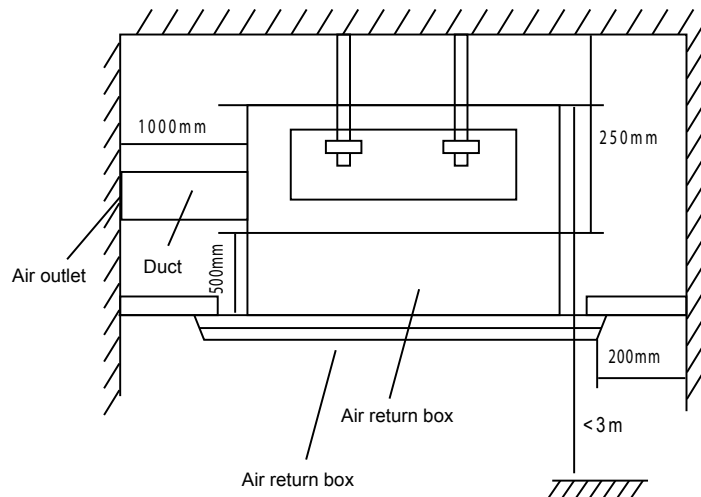
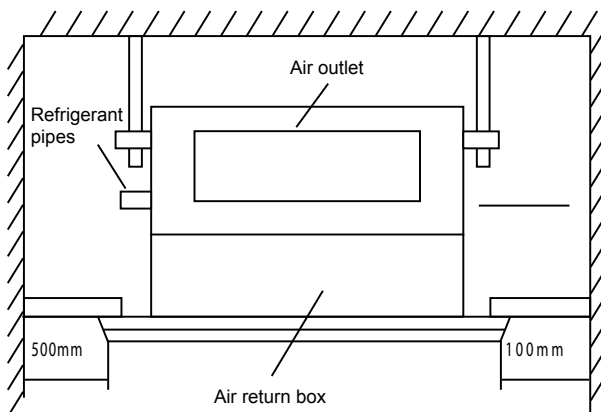
1. Install the dust proof net according to the installation manual;
2. Install the canvas air passage underneath the dust proof net.

Pipe connection

The static pressure in the outside of the unit is 39.2Pa (maximum 98Pa), the length of the air pipe attached is determined by this parameter.

Size 12 installation location

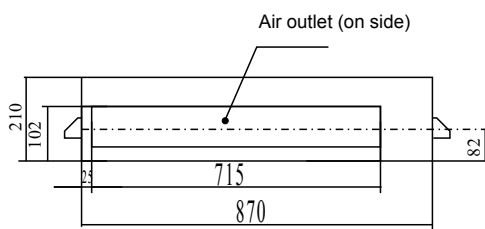
- Enough room for installation and maintenance.



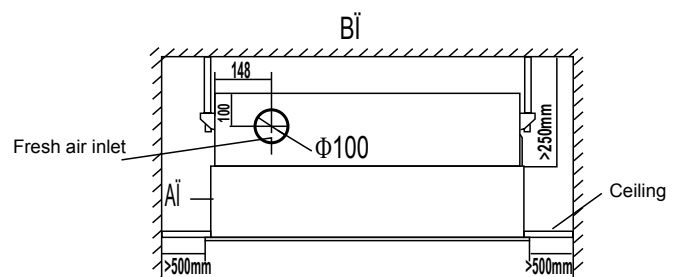
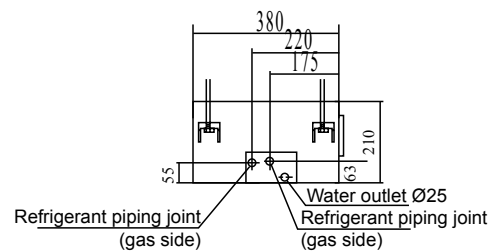
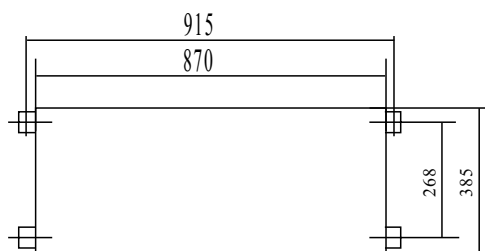
- The ceiling is horizontal and it can afford the weight of the indoor unit.
- The air inlet and outlet are not impeded and does not affected by outdoor air too much.
- The air flow can reach every part of the room.
- The connecting pipe and drainpipe can be easily extracted out.
- There is no direct radiation from heat source.

Size 12 The position fo hanging bolts

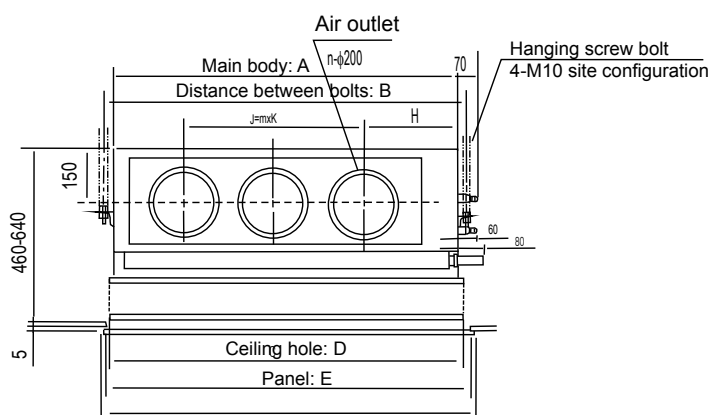
- Enough room for installation and maintenance.



Air outlet sketch map



Size 18 to 60: The positioning of ceiling hole and indoor unit and hanging screw bolts



(Take size 36 as example)

Chart 6

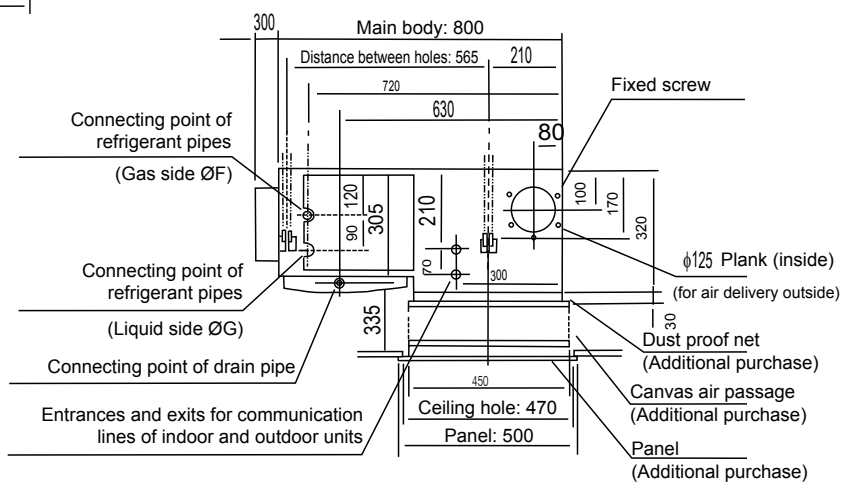


Chart 7

When using a back-air installation, please refer to the following:

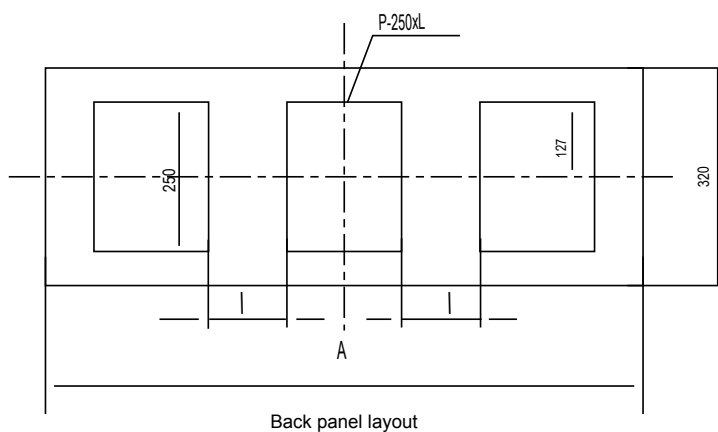


Chart 8

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P
18	1000	1050	1030	1050	1080	12,7	6,4	252	24,4	580	290	293,8	2	3	3
24 - 30	1000	1050	1030	1050	1080	15,9	9,5	252	24,4	580	290	293,8	2	3	3
30 - 60	1350	1400	1380	1400	1430	19,1	12,7	252	35	930	310	293,8	3	4	4

Note:

- The dimension of sizes 24 and 36 (3 phases) are the same
- The dimension of sizes 30 and 36 (1 phase) are the same

PANEL INSTALLATION

1. Unload inner frame: Slide the knob, release the buckle from the outside frame hole, then unload the inner frame (Chart 9)
2. Hang the outside frame on the main body with face down. (4 places at 4 corners): Hang the belt on the hook of the main body. (Charts 10 & 11)

Note: The signal wire of the remote control receiver must be drawn out through the canvas air passage.

3. Fix the outside frame and the canvas air passage with screws: screw must be fixed on from the bottom to the top (Chart 12)

4. Hang up the outside frame until it sticks to the ceiling tightly. (Chart 13)

5. Fix the main body and the outside frame with the fix board of waist-shape hole (in two places) (Chart 14):

- Hang one side of the fix board of the waist-shaped hole on the hook of the main body.
- Tighten the other side of the board with screw to the outside frame.
- Cut off the surplus part of the board with pliers.
- Bend the top of the broken end.

Note: when hanging up the outside frame with the fix board of waist-shaped hole and the belt, stick the outside frame tightly to the ceiling and fix it.

6. Install the inner frame on the outside frame (the inverse sequence of unloading the inner frame) (Chart 14)

Note: Connect the remote control receiver with the indoor unit signal wires and fix it.

7. Install remote controller.

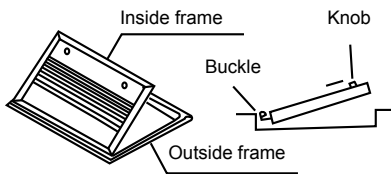


Chart 9

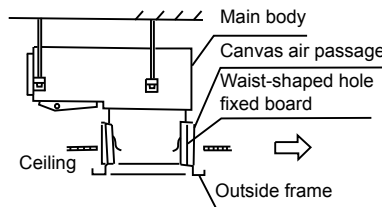


Chart 10

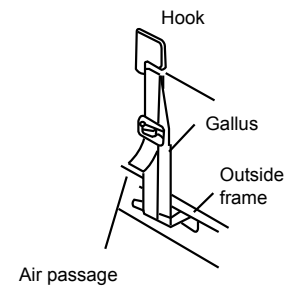


Chart 11

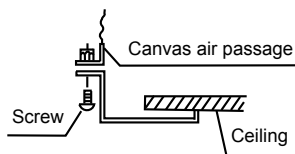


Chart 12

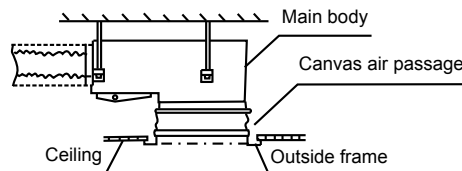


Chart 13

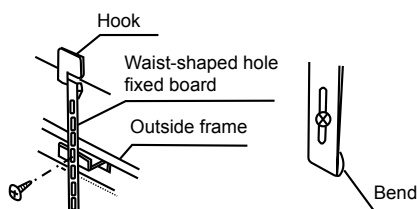


Chart 14

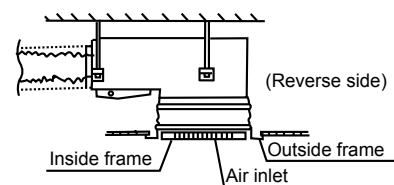


Chart 15

OUTDOOR UNIT INSTALLATION

SIDE AIR OUTLET OUTDOOR UNIT

⚠ CAUTION

- Keep this unit away from direct radiation of the sun or other heaters. If unavoidable, please cover it with a shelter.
- In places near coast or with a high attitude where the wind is strong, please install the outdoor unit against the wall to ensure normal performance.
- Use a baffle when necessary.
- In the case of extremely strong wind, please prevent the air from flowing backwards into the outdoor unit. (Refer to chart 16)
- Locate the outdoor unit as close to the indoor unit as possible.
- The minimum distance between the outdoor unit and obstacles described in the installation chart does not mean that the same is applicable to the situation of an airtight. Leave open two of three directions A , B, C.

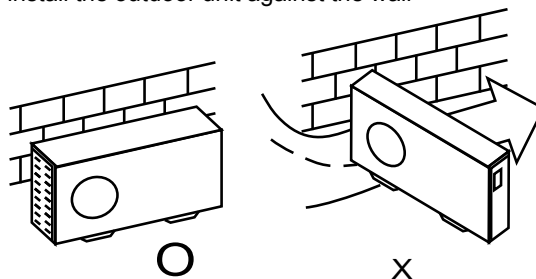


Chart 16

Size of outdoor unit

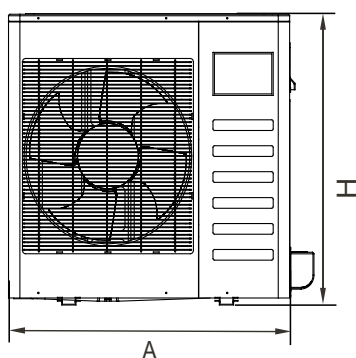


Chart 17

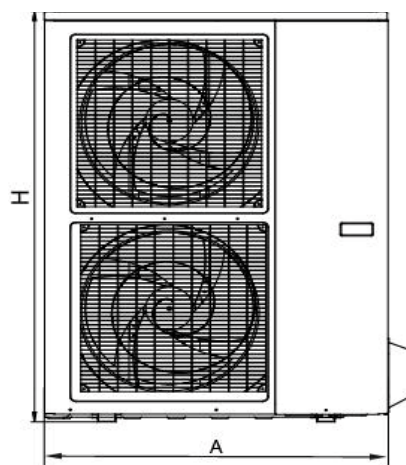


Chart 18



Chart 19

Model	A	B	C	D	E	F	H
18	842	560	335	360	312	324	695
24	895	590	333	355	302	313	862
30	990	624	366	396	340	354	966
36	990	624	366	396	340	354	966
48	940	600	376	400	340	360	1245
60	940	600	376	400	340	360	1245

Necessary room for installation and maintenance

If possible, please remove the obstacles nearby to prevent the performance from being impeded by too little of air circulation. Leave open two of the three directions(A,B,C).

Moving and installing

- Since the gravity center of this unit is not at its physical center, so please be careful when lifting it with a sling.
- Never hold the air-in of the outdoor unit to prevent it from deforming.
- Do not touch the fan with hands or other objects.
- Do not lean it more than 45°, and do not lay it sidelong.
- Please fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind.
- Make concrete foundation. (Refer to chart 21)

Concrete foundation

- 1.Foundation could be on flat and is recommended be 100-300mm higher than ground level.
- 2.Install a drainage around foundation for smooth drain
- 3.When installing the outdoor unit fix the unit by anchor bolts of M10
- 4.When installing the unit on a roof or a veranda, drain water sometimes turns to ice on a cold morning. Therefore, avoid draining in an area that people often use because it is slippery.

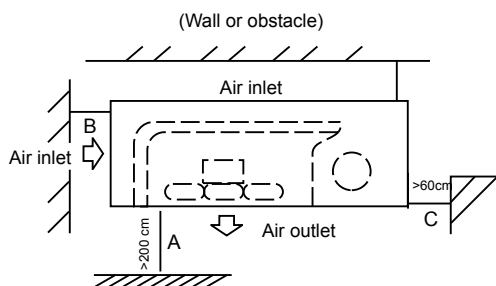


Chart 20

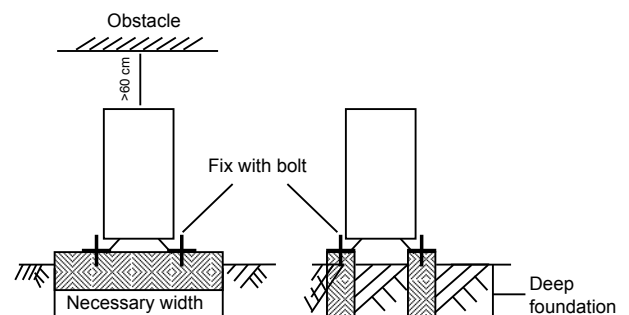


Chart 21

INSTALL THE CONNECTING PIPE

Check whether the height drop between the indoor unit and outdoor unit, the length of refrigerant pipe, and the number of the bends meet the following requirements:

The max height drop --> 20m

(If the height drop is more than 10m, you had better put the outdoor unit over above the indoor unit.)

The length of refrigerant pipe --> less than 30m

The number of bends --> Less than 15

- Do not let air, dust, or other impurities fall in the pipe system during the time of installation.
- The connecting pipe should not be installed until the indoor and outdoor units have been fixed already.
- Keep the connecting pipe dry, and do not let moisture in during installation.

The procedure of connecting pipes

Measure the necessary length of the connecting pipe, and make it by the following way:

1. Connect the indoor unit at first, then the outdoor unit.
- Bend the tubing in proper way. Don't harm them.



Cautions

- Daub the surfaces of the flare pipe and the joint nuts with frozen oil, and wrench it for 3~4 rounds with hands before fasten the flare nuts. (Refer to chart 30)
 - Be sure to use two wrenches simultaneously when you connect or disconnect the pipes.
2. The stop valve of the outdoor unit should be closed absolutely (as original state). Every time you connect it, first loosen the nuts at the part of stop valve, then connect the flare pipe immediately (in 5 minutes). If the nuts have been loosened for a long time, dusts and other impurities may enter the pipe system and may cause malfunction later. So please expel the air out of the pipe with refrigerant before connection.
 3. Expel the air (refer to the ¡Expel The Air¡) after connecting the refrigerant pipe with the indoor unit and the outdoor unit. Then fasten the nuts at the repair-points.

Notice for Benable pipe

- The bending angle should not exceed 90°C
- Bending position is preferably in the bendable pipe. The larger the better it is .
- Do not bend the pipe more than three times.

Bend the connecting pipe of small wall thickness

- Cut out a desired concave at the bending part of the insulating pipe.
- Then expose the pipe(cover it with tapes after bending).
- To prevent collapsing of deforming, please bend the pipe at its biggest radius.
- Use bender to get a small radius pipes.

Use the market brass pipe

1. Be sure to use the same insulating materials when you buy the brass pipe.(More than 9mm thick)
2. Locate the pipe
 - i. Drill a hole in the wall (suitable just for the size of the wall conduit, 90mm in general), then set on the fittings such as the wall conduit and its cover.
 - ii. Bind the connecting pipe and the cables together tightly with binding tapes. Do not let air in, which will cause water leakage by condensation.
 - iii. Pass the bound connecting pipe through the wall conduit from outside. Be careful of the pipe allocation to do no damage to the tubing.
3. Connect the pipes.
4. Then open the stem of stop valves of the outdoor unit to make the refrigerant pipe connecting the indoor unit with the outdoor unit fluently flow.
5. Be sure of no leakage by checking it with leak detector or soap water.
6. Cover the joint of the connecting pipe to the indoor unit with the soundproof/insulating sheath (fittings), and bind it well with the tapes to prevent leakage.

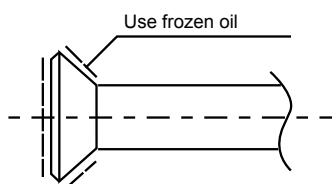


Chart 30

Bend the pipe with thumb



Chart 31

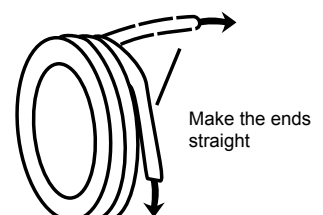


Chart 32

EXPEL THE AIR

Flaring

1. Cut a pipe with a pipe cutter.
2. Insert a flare nut into a pipe and flare the pipe.

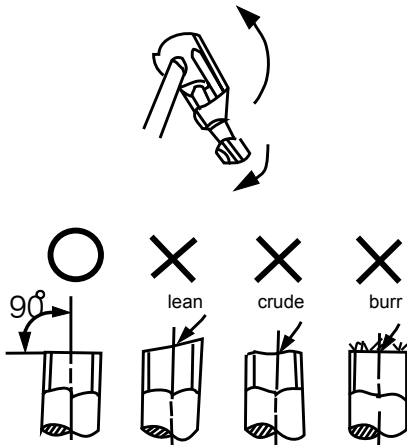


Chart 33

Outside diameter	A (mm)	
	Max	Min
Ø 6,4 mm	8,7	8,3
Ø 9,5 mm	12,4	12
Ø 12,7 mm	15,8	15,4
Ø 15,9 mm	19	18,6
Ø 19,1 mm	23,3	22,9

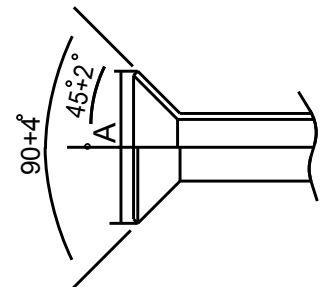


Chart 34

3. Remove the Cycle Service Panel and the Cover Board, unscrewing the screws which secure it to the structure.
4. Remove the protection cover of stop valve.

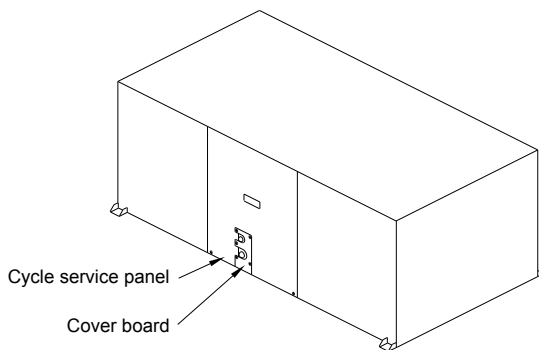


Chart 35

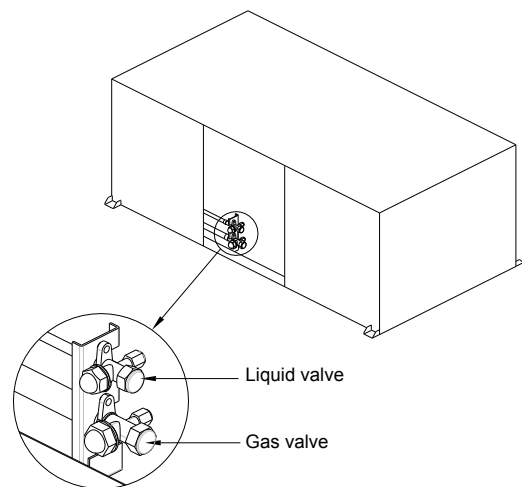


Chart 36

Fasten the nut

- Put the connecting tubing at the proper position, wrench the nuts with hands then fasten it with a wrench. (Refer to Chart 37)

Caution

Too large torque will harm the bellmouthing and too small will cause leakage. Please determine the torque according to table beside.

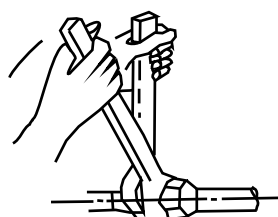


Chart 37

Tubing size	Torque
Ø 6,4 mm	1420~1720N.cm (144~176 kgf.cm)
Ø 9,5 mm	32700~3990N.cm (333~407 kgf.cm)
Ø 12,7 mm	4950~6030N.cm (504~616 kgf.cm)
Ø 15,9 mm	61800~7540N.cm (630~770 kgf.cm)
Ø 19,1 mm	9720~11860N.cm (990~1210 kgf.cm)

The necessary filling amount of refrigerant

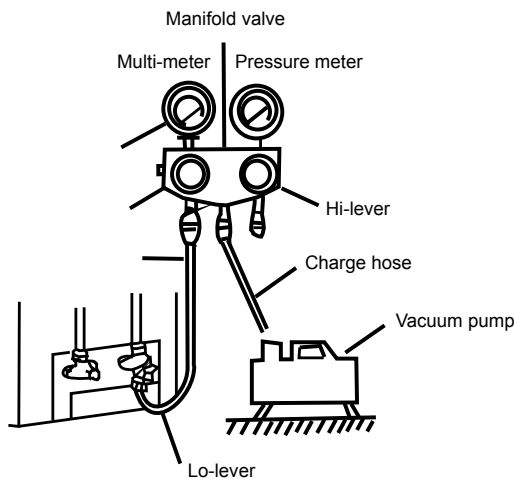
Please record the quantity added and store it carefully for future maintenance.

Model	12	18	24	30-60
Less than 5 m (one-way)	-	-	-	-
Added refrigerant when over 5 m (one-way)	30g x (L-5)	11g x (L-5)	30g x (L-5)	60g x (L-5)

Expel the air with a vacuum pump (refer to chart 38)

(Please refer to its manual for the way of using manifold valve)

1. Loosen and remove the maintenance nuts of stop valves A and B, and connect the charge hose of the manifold valve with the maintenance terminator of stop valve A. (Be sure that stop valves A and B are both closed)
2. Connect the joint of the charge hose with the vacuum pump.
3. Open the Lo-lever of the manifold valve completely.
4. Turn on the vacuum pump. At the beginning of pumping, loosen the maintenance terminator nut of stop valve B a little to check whether the air comes in (the sound of the pump changes, and the indicator of compound meter turns below zero). Then fasten the nut.
5. When the pumping has finished, close the Lo-lever of the manifold valve completely and turn off the vacuum pump.
 - When you have pumped for over 15 minutes, please confirm that the indicator of multimeter is on $-1.0 \times 10^{-5} \text{Pa}$ (-76cmHg)
6. Loosen and remove the quadrangle cover of stop valves A and B to open stop valve A and B completely, then fasten them.
7. Disassemble the charge hose from the repair-mouth of stop valve A, and fasten the nut.



(Take size 24 as example)

Chart 38

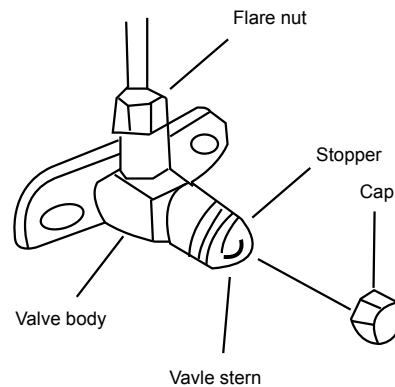


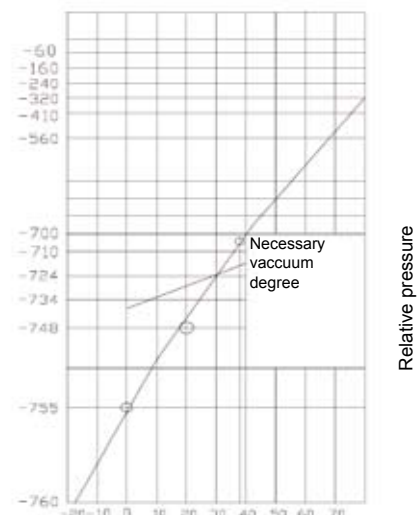
Chart 39

⚠ Cautions

All the stop valves should be opened before test operation. Each air conditioner has two stop valves of different sizes on the side of the outdoor unit which operate as Lo-stop value, respectively. (Refer to Chart 39)

Vacuum dry and leakage checking

1. Vacuum Dry: use vacuum pump to change the moisture (liquid) into steam (gas) in the pipe and discharge it out of the pipe to make the pipe dry. Under one atmospheric pressure, the boiling point of water(steam temperature) is 100. Use vacuum pump to make the pressure in the pipe near vacuum state, the boiling point of water falls relatively. When it falls under outdoor temperature, the moisture in the pipe will be vaporized.

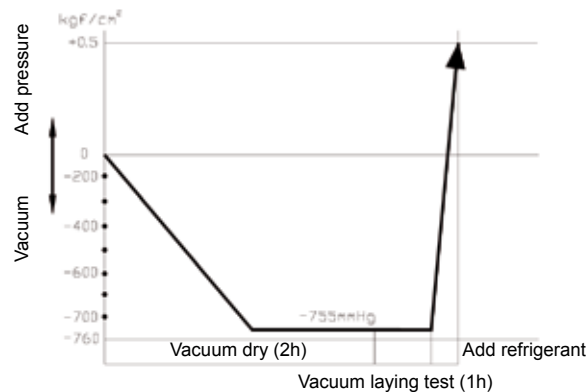


2. Vacuum dry procedure

There are two methods of vacuum dry due to different construction environment: common vacuum dry, special vacuum dry.

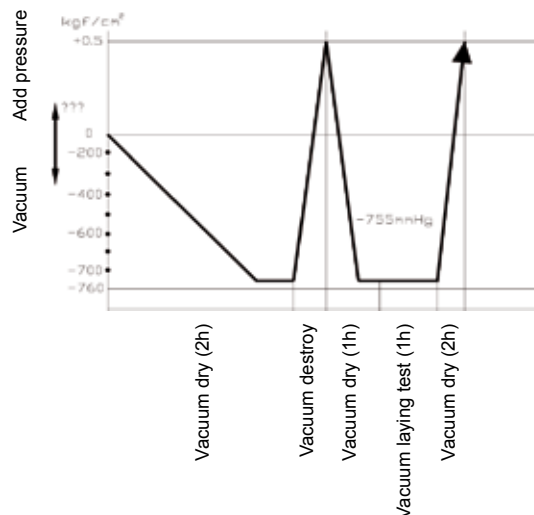
a. Common vacuum dry procedure

- Vacuum dry (for the first time)---connect the all-purpose detector to the inlet of liquid pipe and gas pipe, and run the vacuum pump more than two hours (the vacuum pump should be below -755mmHg)
- If the pump can't achieve below -755mmHg after pumping 2 hours, moisture or leakage point will still exist in the pipe. At this time, it should be pumped 1 hour more.
- If the pump can't achieve -755mmHg after pumping 3 hours, please check if there are some leakage points.
- Vacuum placement test: place 1 hour when it achieves -755mmHg, pass if the vacuum watch shows no rising. If it rises, it shows there's moisture or leakage point.
- Vacuuming from liquid pipe and gas pipe at the same time.
- Sketch map of common vacuum dry procedure.



b. Special vacuum dry procedure

- This vacuum dry method is used in the following conditions:
 - * There's moisture when flushing the refrigerant pipe.
 - * Rainwater may enter into the pipe.
 - Vacuum dry for the first time 2h pumping
 - Vacuum destroy for the second time Fill nitrogen to 0.5Kgf/cm²
- Because nitrogen is for drying gas, it has vacuum drying effect during vacuum destroy. But if the moisture is too much, this method can't dry thoroughly. So, please pay more attention to prevent water entering and forming condensation water.
- Vacuum dry for the second time.....1h pumping
- Determinant: Pass if achieving below -755mmHg. If -755mmHg can't be achieved in 2h, repeat procedure
- Vacuum placing test 1h
 - Sketch map of special vacuum dry procedure



CHECK THE LEAKAGE

Check all the joints with the leak detector or soap water. (See Chart 40 as a reference illustration)

Note:

- A --> Lo-stop valve
- B --> Hi-stop valve
- C,D --> Joints of the connecting pipe to the indoor unit.

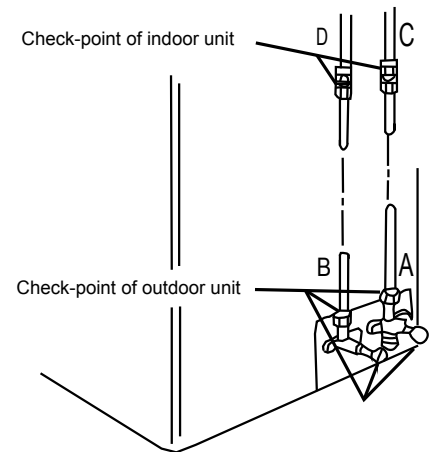


Chart 40

CONNECT THE DRAIN PIPE

1. Install indoor unit drain pipe

The outlet has PTI screw thread, Please use sealing materials and pipe sheath (fitting) when connecting PVC pipes.

Caution

- The drain pipe of indoor unit must be heat insulated, or it will condense dew, as well as the connections of the indoor unit.
- Hard PVC binder must be used for pipe connection, and make sure there is no leakage.
- With the connection part to the indoor unit, please be noted not to impose pressure on the side of indoor unit pipes.
- When the declivity of the drain pipe downwards is over 1/100, there should not be any winding.
- The total length of the drain pipe when pulled out transversely shall not exceed 20m, when the pipe is over long, a prop stand must be installed to prevent winding.
- Refer to the figures on the right for the installation of the pipes.

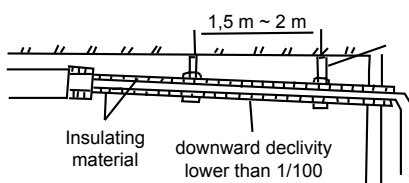


Chart 41

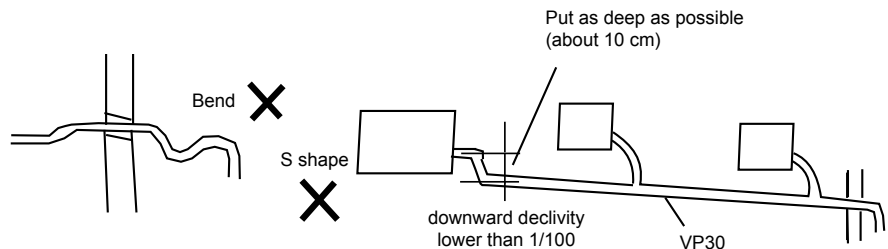


Chart 42

Water drainage

I. Gradient and Supporting

1. Keep the drainpipe sloping downwards at a gradient of at least 1/100. Keep the drainpipe as short as possible and eliminate the air bubble.
2. The horizontal drainpipe should be short. When the pipe is too long, a prop stand must be installed to keep the gradient of 1/100 and prevent bending. Refer to the following table for the specification of the prop stand.

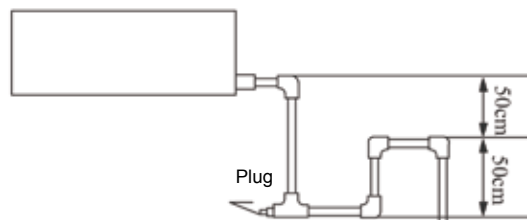
	Diameter	Distance between the prop stands
Hard PVC pipe	25~40 mm	1,5~2 m

3. Precautions

- The diameter of drainpipe should meet the drainage requirement at least.
- The drainpipe should be heat-insulated to prevent atomization.
- Drainpipe should be installed before installing indoor unit. After powering on, there is some water in water-receiver plate. Please check if the drain pump can operate correctly.
- All connection should be firm.
- Wipe color on PVC pipe to note connection.
- Climbing, horizontal and bending conditions are prohibited.
- The dimension of drainpipe can't less than the connecting dimension of indoor drainpipe.
- Heat-insulation should be done well to prevent condensation.
- Indoor units with different drainage type can't share one convergent drainpipe.

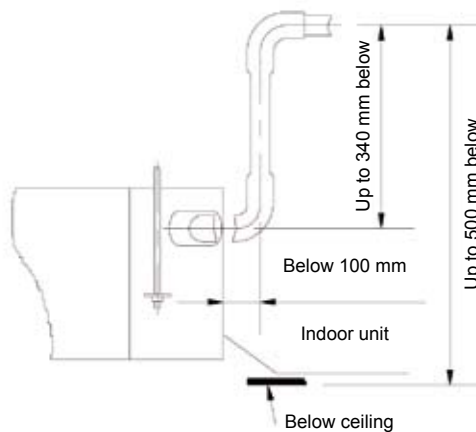
II. Drainpipe Trap

1. If the pressure at the connection of the drainpipe is negative, it needs to design drainpipe trap.
2. Every indoor unit needs one drainpipe trap.
3. A plug should be designed to do cleaning.



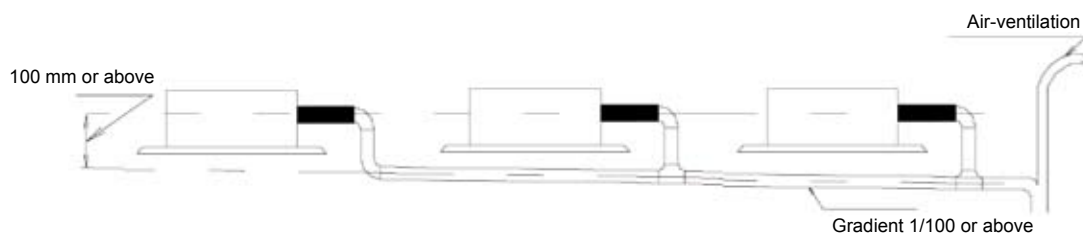
III. Upwards drainage (drain pump)

1. To ensure the gradient 1/100, the drainpipe can be lifted to 340mm. After upwards, place downwards, or it will cause malfunction to drain pump.



IV. Convergent drainage

1. The number of indoor units should be as small as possible to prevent the traverse main pipe overlong.
2. Indoor unit with drain pump and indoor unit without drain pump should be in different drainage system.



3. Selecting the diameter

Number of connecting indoor units → Calculate drainage volume → Select the diameter

Calculate allowed volume = Total cooling capacity of indoor units(HP)×2 (l/ hr)

	Allowed volume (lean 1/100) (l/h)	I.D. (mm)	Thick
Hard	$\xi \leq 14$	$\phi 25$	3,0
Hard	$14 < \xi \leq 88$	$\phi 30$	3,5
Hard	$88 < \xi \leq 334$	$\phi 40$	4,0
Hard	$175 < \xi \leq 334$	$\phi 50$	4,5
Hard	$334 < \xi$	$\phi 80$	6,0

V. Drainage test

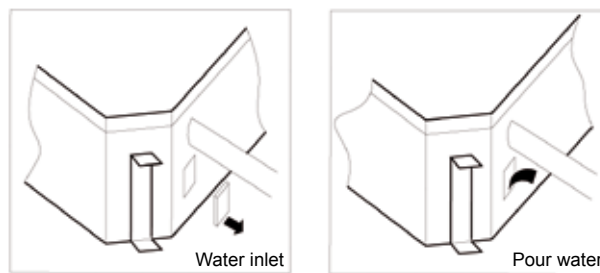
- Check whether the drainpipe is unhindered
- New built house should have this test done before paving the ceiling.
- Remove the test cover, and stow water of about 2000ml to the water receiver through the stow tube. (Refer to chart 43)

1. Drainage without drain pump

After finishing drainpipe installation, pour some water into the water receiver plate to check if the water flows smoothly.

2. Drainage with drain pump

Poke the Water Level Switch , remove the cover, use water pipe to pour 2000ml water into the water receipt plate through the water inlet.



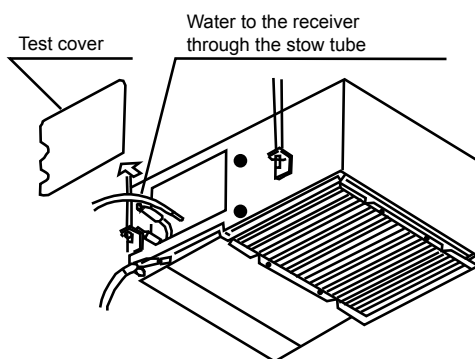
a. Turn on the power to Cooling operation. Check the pump's operation and switch on the Water Level Switch. Check the pump's sound and look into the transparent hard pipe in the outlet at the same time to check if the water can discharge normally.

b. Stop the air conditioner running, turn off the power, and put back the cover.

• Stop the air conditioner. After 3 minutes, check if it has abnormity. If the collocation of drainpipes is illogical, the water will flow back overfull, which will cause the alarm lamp flashes, even overflow from the water receipt plate.

• Keep on pouring water until it gives an alarm signal for high water level, check if the pump drains water at once. If the water level can't fall below the alarmed water level after 3 minutes, the air conditioner will stop. Turn off the power and drain the remained water, then turn on the air conditioner.

Note: the drain stuff in the main water receipt plate is for maintenance. Stuff up the drain stuff to prevent water leakage.



(Take size 36 as example)

Chart 42

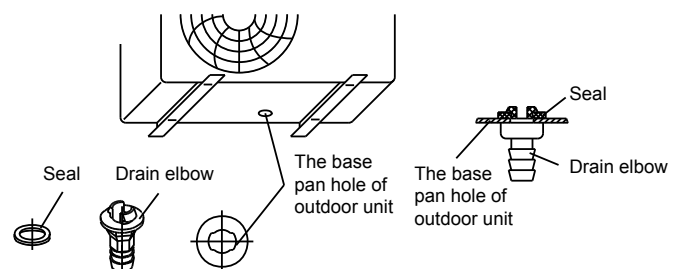


Chart 43

Drain elbow installation (cooling only type without)

Fit the seal into the drain elbow, then insert the drain elbow into the base pan hole of outdoor unit, rotate 90° to securely assemble them. Connect the drain elbow with an extension drain hose (Locally purchased), in case of the condensate draining off the outdoor unit during the heating mode. (Refer to Chart 43)

Insulation work

- Be sure to with insulating materials cover all the exposed parts of the flare pipe joints and refrigerant pipe on the liquid-side and the gas-side. Ensure that there is no gap between them.
- Incomplete insulation may cause water condensation.

I. Insulation material and thickness

1. Insulation material

Insulation material should adopt the material which is able to endure the pipe's temperature: no less than 70°C in the high-pressure side, no less than 120°C in the low-pressure side (For the cooling type machine, no requirements at the low-pressure side.)

Example: Heat pump type----Heat-resistant Polyethylene foam (withstand above 120°C)

Cooling only type---- Polyethylene foam (withstand above 100°C)

2. Thickness choice for insulation material

Insulation material thickness is as follows:

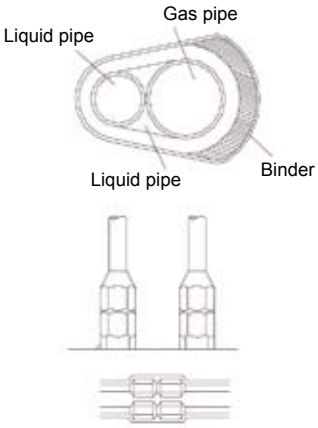
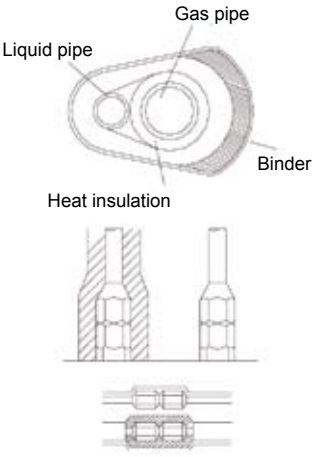
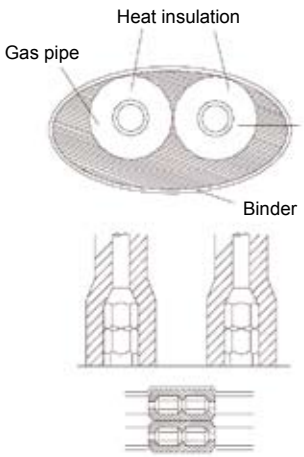
	Pipe diameter (mm)	Adiabatic material thickness
Refrigerant pipe	Ø 6,4 - Ø 25,4	10 mm
	Ø 28,6 - Ø 38,1	15 mm
Drainage pipe	Inner diameter Ø 20 - Ø 32	6 mm

II. Refrigerant pipe insulation

1. Work procedure

- Before laying the pipes, the non-jointing parts and non-connection parts should be heat insulated.
- When the gas proof test is eligible, the jointing area, expanding area and the flange area should be heat insulated.

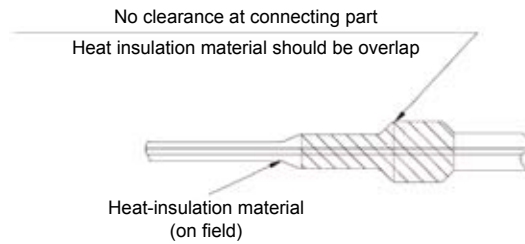
2. Insulation for non-jointing parts and non-connection parts

Wrong	Right	
Gas pipe and liquid pipe should not be put together to insulate	Insulate the pipe (cooling only)	Insulate the pipe and liquid pipe
		

For construction convenience, before laying pipes, use insulation material to insulate the pipes to be deal with, at the same time, at two ends of the pipe, remain some length not to be insulated, in order to be welded and check the leakage after laying the pipes.

3. Insulate for the jointing area, expanding area and the flange area

- a. Insulate for the jointing area, expanding area and the flange area should be done after checking leakage of the pipes
- b. Make sure there's no clearance in the joining part of the accessorial insulation material and local preparative insulation material.

**III. Drainage pipe insulation**

The connection part should be insulated, or else water will be condensing at the non-insulation part.

IV. Note

1. The jointing area, expanding area and the flange area should be heat insulated after passing the pressure test
2. The gas and liquid pipe should be heat insulated individually, the connecting part should be heat insulated individually.
3. Use the attached heat-insulation material to insulate the pipe connections (pipes' tie-in ,expand nut) of the indoor unit

WIRING

Attaching wiring

1. The air conditioner should use separate power supply with rated voltage
2. The external power supply to the air conditioner should have ground wiring, which is linked to the ground wiring of the indoor and outdoor unit.
3. The wiring work should be done by qualified persons according to circuit drawing.
4. A leakage protector should be installed according to the National Standard concerning electrical appliance.
5. Be sure to locate the power wiring and the signal wiring well to avoid cross-disturbance and their contact with connecting pipe or stop valve body.
6. The wiring attached to this air conditioner is 10m long. Be sure to prolong it with wiring of the same type and proper length if necessary. Generally, do not twist two wiring together unless the joint is soldered well and covered with insulator tape.
7. Do not turn on the power until you have checked carefully after wiring.
8. An all-pole disconnection device which has at least 3mm separation distance in all pole and a residual current device(RCD)with the rating of above 10mA shall be incorporated in the fixed wiring according to the national rule

The specification fo power (for side air outlet outdoor unit)

Size		12	18	24	30	30	36	48	60
Power	Phase	1 Ph	1 Ph	1 Ph	1 Ph	3 Ph	3 Ph	3 Ph	3 Ph
	Frequency and voltage	220-240V ~, 50 Hz				380V 3N ~, 50 Hz			
Circuit breaker/fuse (A)		20/10	40/25	40/25	40/25	20/15	20/15	20/15	20/15
Indoor unit power wiring (mm ²)		2,0	3x2,0	3x2,5	3x3,5	5x1,5	5x2,5	5x2,5	5x2,5
indoor/ outdoor connecting wiring (mm ²)	Ground wiring	2,0	2,0	2,5	3,5	1x5	2,5	2,5	2,5
	Outdoor unit power wiring	2,0	-	3x2,5	3x3,5	5x1,5	5x2,5	5x2,5	5x2,5
	Strong electric signal	2,0	5x2,0	3x1,0	3x2,5	5x1,0	3x1,0 3-core shield wire		
	Weak electric signal	0,5	1-core shield wire 1x0,5 mm ²			2-core shield wire 2x0,5 mm ²	-	-	-



Caution

A disconnection device having an air gap contact separation in all active conductors should be incorporated in the fixed wiring according to the National Wiring Regulation.

If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to avoid a hazard.

Wiring chart (for side air outlet outdoor unit)

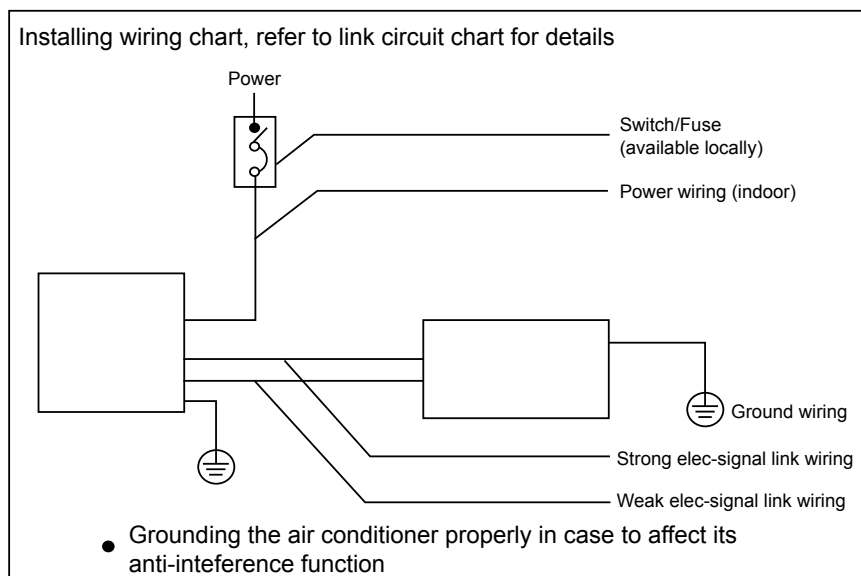
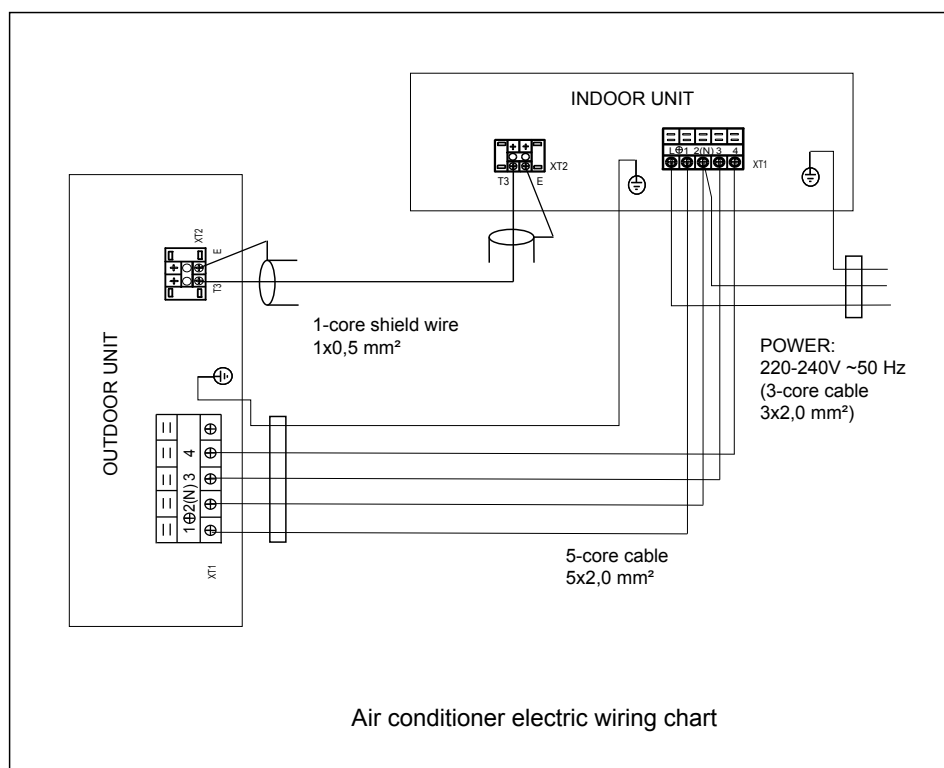


Chart 47

⚠ Caution: The wiring chart of both cooling only type and cooling& heating type are shown as follows. When wiring, please choose the corresponding chart, or it may cause damage.

Size 12



Size 18

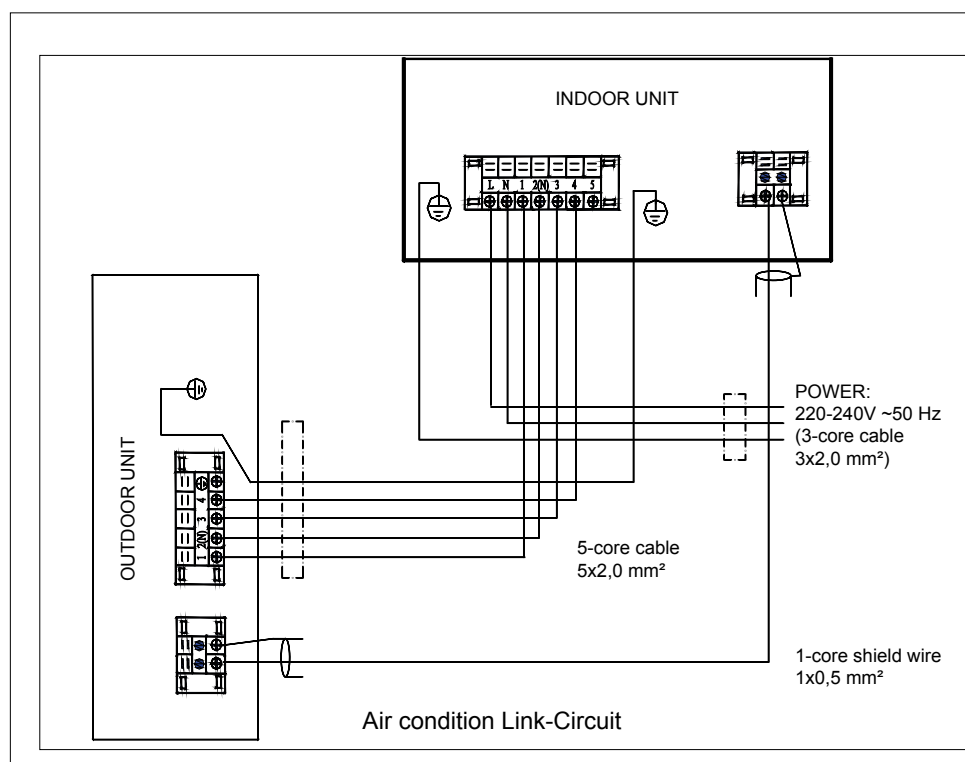


Chart 48

Size 24

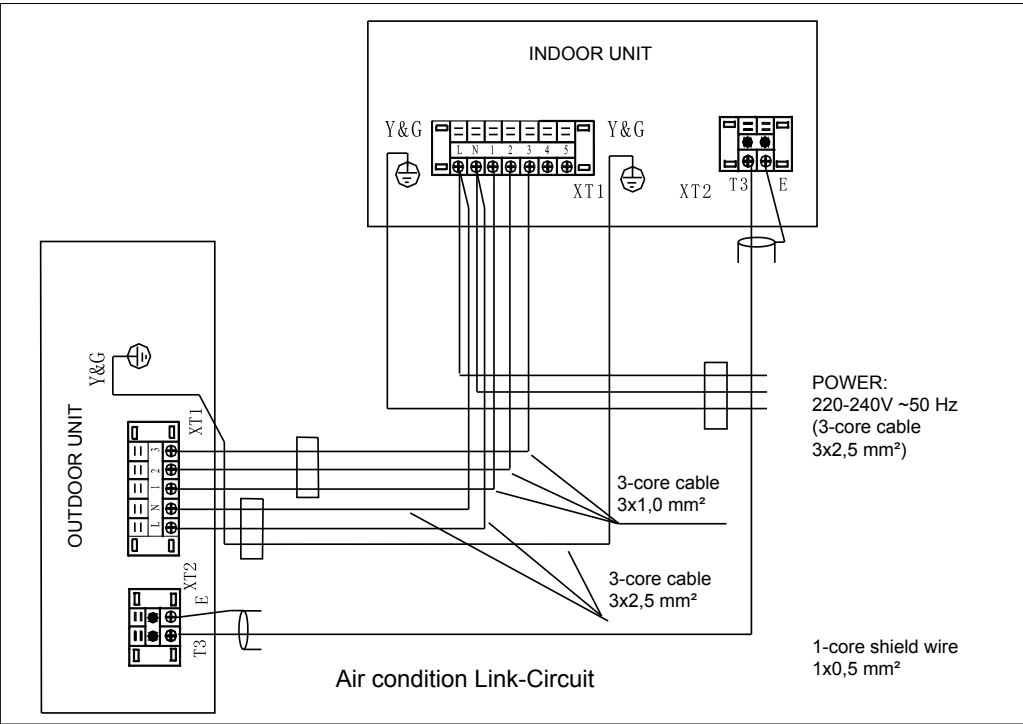


Chart 49

Size 30 - 1 Phase

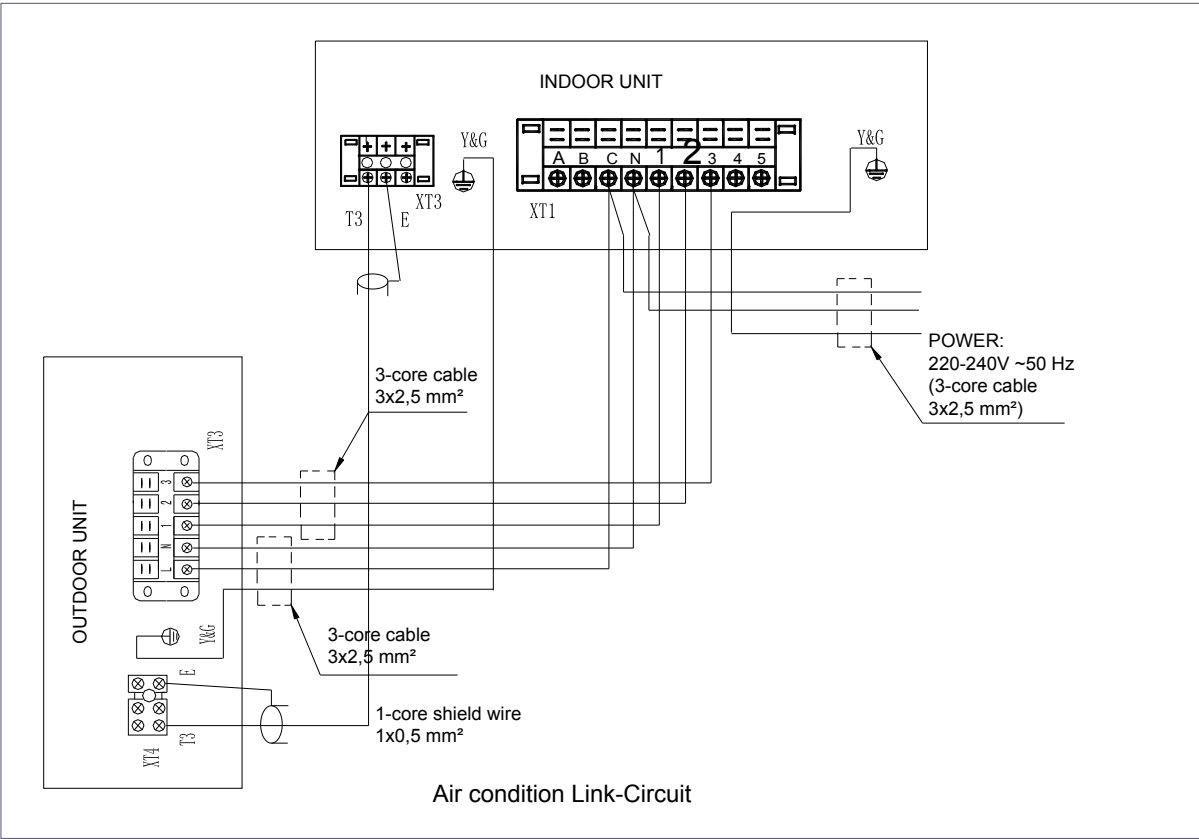


Chart 51

Size 30 - 3 Phases

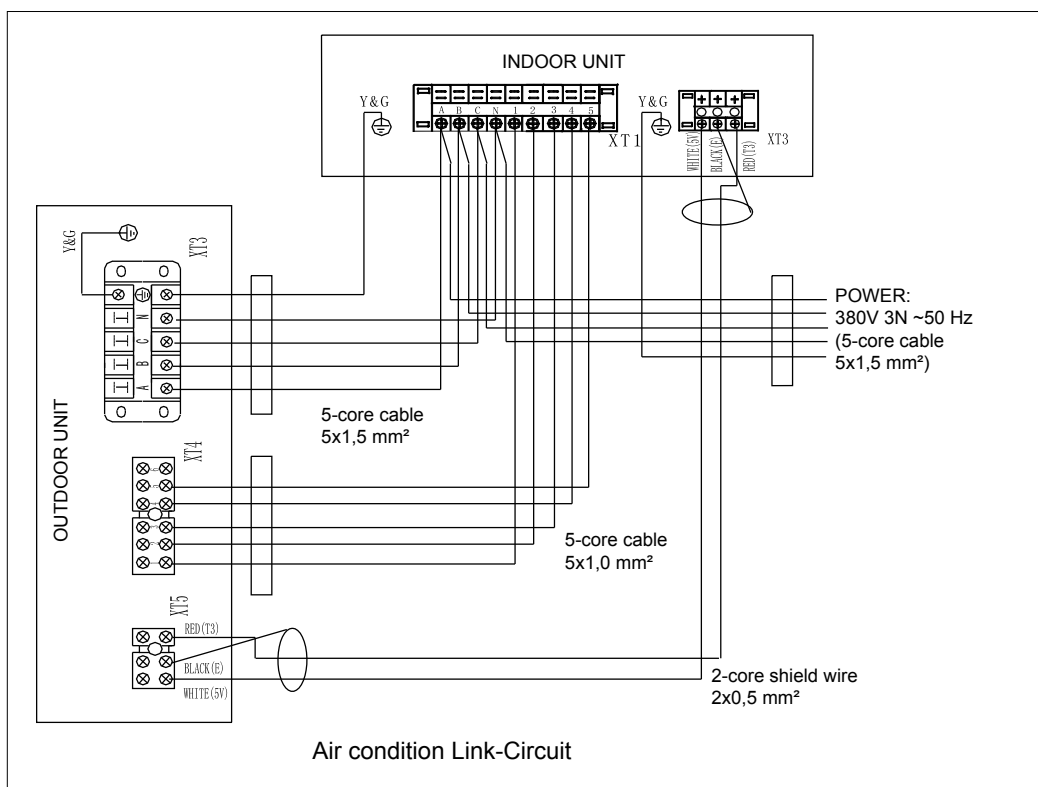


Chart 50

Sizes 36 to 60 - 3 Phases

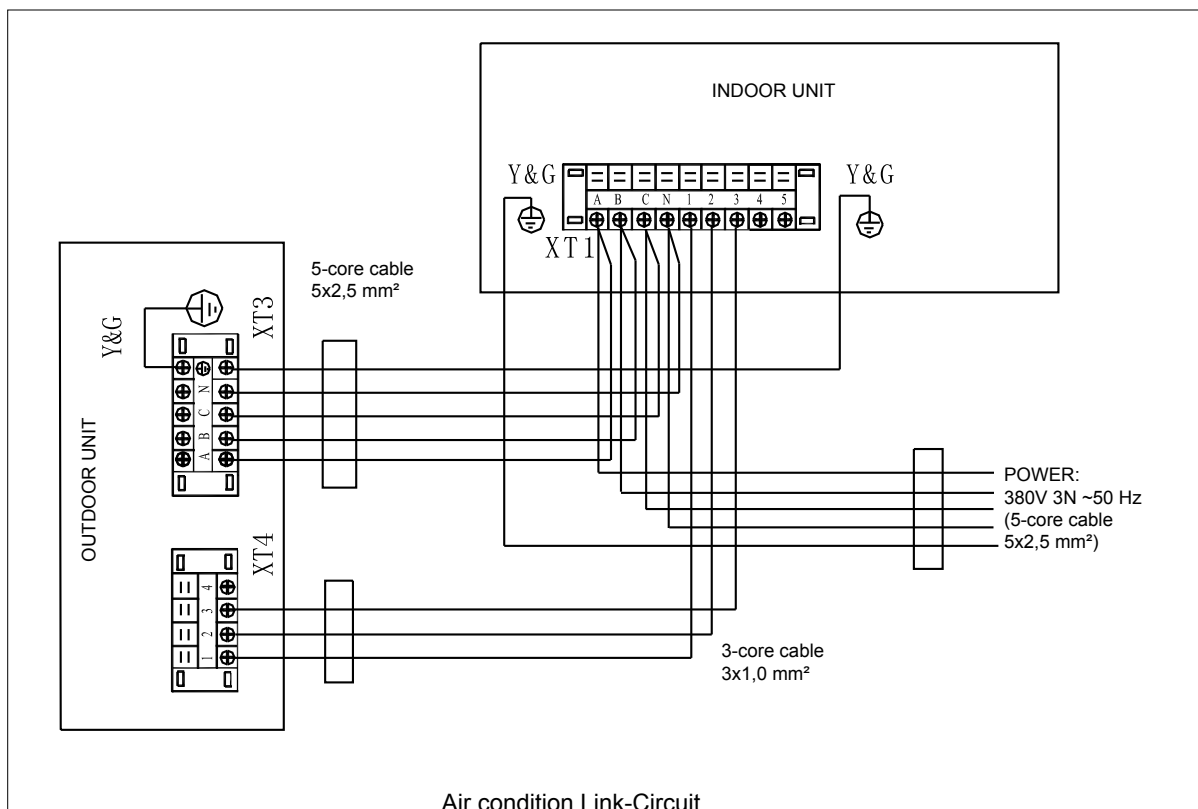


Chart 52

THE OUTDOOR UNITS

Disassemble the bolts from the maintenance board, and pull it in the direction of the arrow to remove the protection board.

Notice: Do not scratch the surface during operation.

⚠ Caution: Chart 59 is based on one type of outdoor units, which may look different from your own outdoor unit.

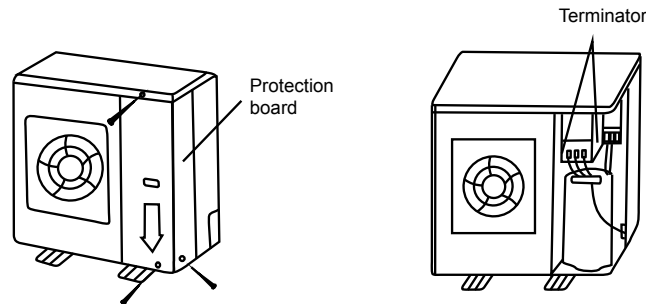


Chart 59

TEST OPERATION

1. The test operation must be carried out after the entire installation has been completed.
2. Please confirm the following points before the test operation:
 - The indoor unit and outdoor unit are installed properly.
 - Tubing and wiring are correctly completed.
 - The refrigerant pipe system is leakage-checked.
 - The drainage is unimpeded.
 - The heating insulation works well.
 - The ground wiring is connected correctly.
 - The length of the tubing and the added stow capacity of the refrigerant have been recorded.
 - The power voltage fits the rated voltage of the air conditioner.
 - There is no obstacle at the outlet and inlet of the outdoor and indoor and indoor units.
 - The gas-side and liquid-side stop valves are both opened.
 - The air conditioner is pre-heated by turning on the power.
3. According to the user's requirement, install the remote controller frame where the remote controller's signal can reach the indoor unit smoothly.
4. Test operation:

Set the air conditioner under the mode of ¡COOLING¡ with the remote controller, and check the following points per the "Owner's Manual". If there is any malfunction, please resolve it through chapter "Troubles And Causes" in the "Owner's Manual".

 - i. The indoor unit
 - a. Whether the switch on the remote controller works well.
 - b. Whether the buttons on the remote controller works well.
 - c. Whether the air flow louver moves normally.
 - d. Whether the room temperature is adjusted well.
 - e. Whether the indicator lights normally.
 - f. Whether the temporary buttons works well.
 - g. Whether the drainage is normal.
 - h. Whether there is vibration or abnormal noise during operation.
 - i. Whether the air conditioner heats well in the case of the HEATING/COOLING type.
 - ii. The outdoor unit
 - a. Whether there is vibration or abnormal noise during operation.
 - b. Whether the generated wind, noise, or condensed water by the air conditioner have influenced your neighborhood.
 - c. Whether any of the refrigerant is leaked.

⚠ Cautions:

A protection feature prevents the air conditioner from being activated for approximately 3 minutes when it is restarted immediately after shut off.

INDOOR UNIT'S LED INDICATION OF TROUBLE

N°	Protection or malfunction	Operation lamp	Timer lamp	Defrosting lamp	Water level alarm lamp	Auto recover
1	Indoor temperature sensor abnormal	x	••	x	x	Yes
2	Indoor heat exchanger sensor abnormal	••	x	x	x	Yes
3	Outdoor heat exchanger sensor abnormal	x	x	••	x	Yes
4	Water pump temperature sensor abnormal	••	x	x	••	Yes
5	Outdoor abnormal	••	••	••	••	Yes
6	EEPROM abnormal	••	••	x	x	No
7	Water level warning	x	x	x	••	Yes or No

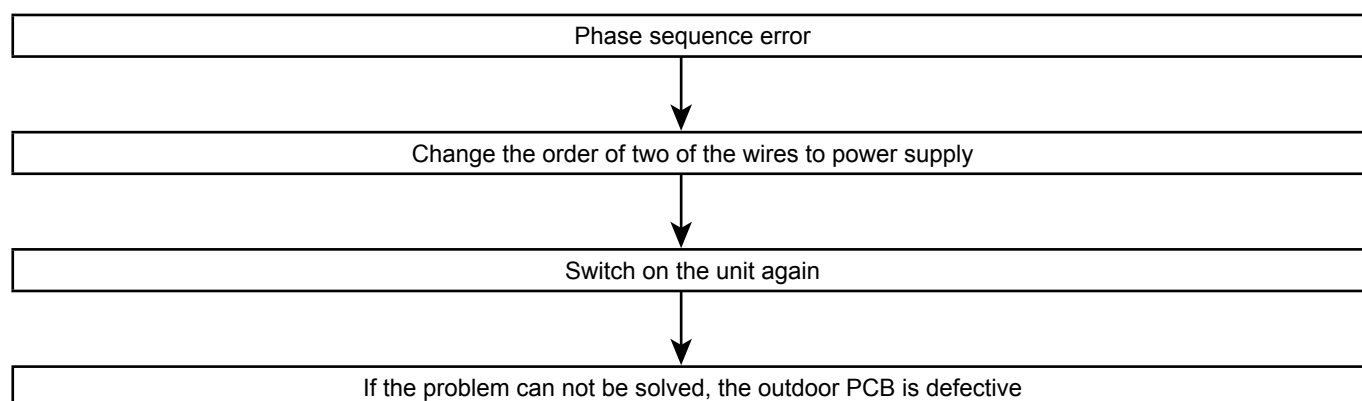
x: Extinguish

••: Flash at 5 Hz

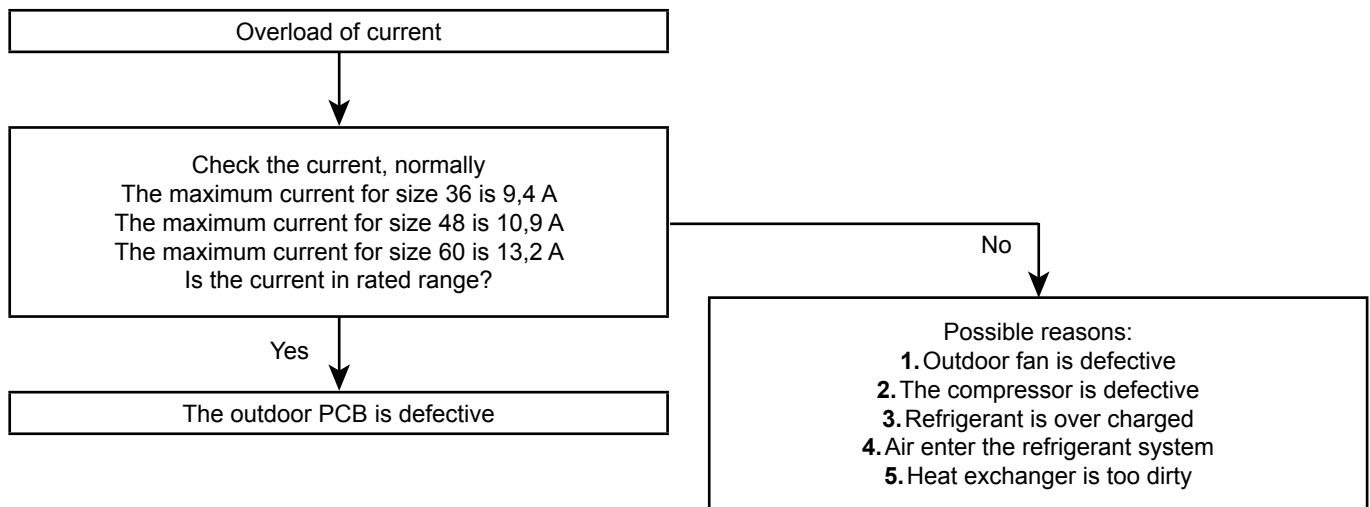
LEDs' FOR THE INDICATION OF OUTDOOR TROUBLE

For sizes 30 to 60, 380-415V, 3 phase

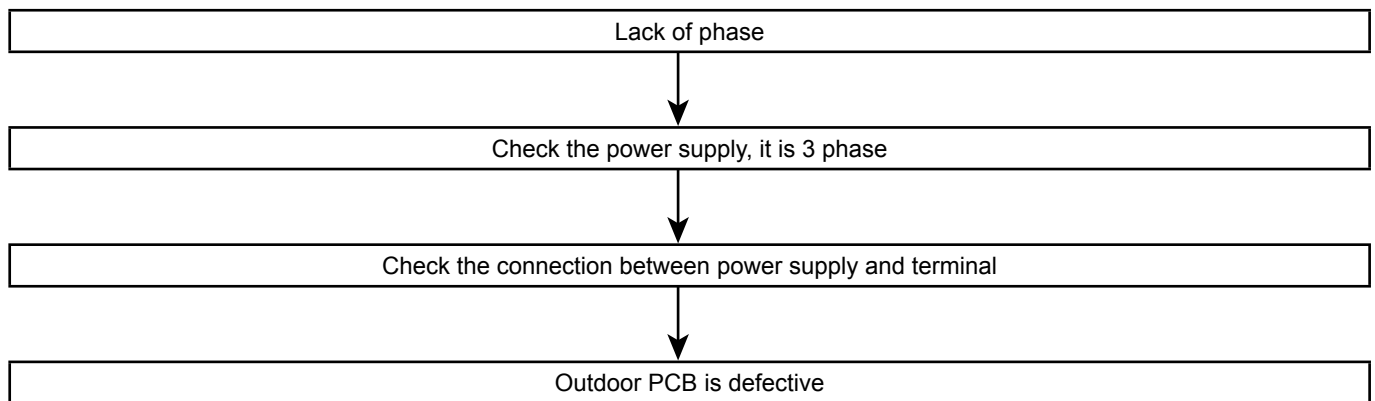
Type	Contents	LED1	LED2	LED3
Protection	Phase sequence	Flash	Off	Off
Protection	Overload of current	Off	Off	Flash
Protection	Lack of phase	Flash	Off	Off
Protection	Protection of pressure	Flash	Flash	Off
Protection	Open circuit and short-circuit trouble of T3	Off	Flash	Flash
Protection	Open circuit and short-circuit trouble of T4	Off	Flash	Off
Protection	High temperature protection of condenser	Flash	Flash	Flash

PHASE SEQUENCE ERROR


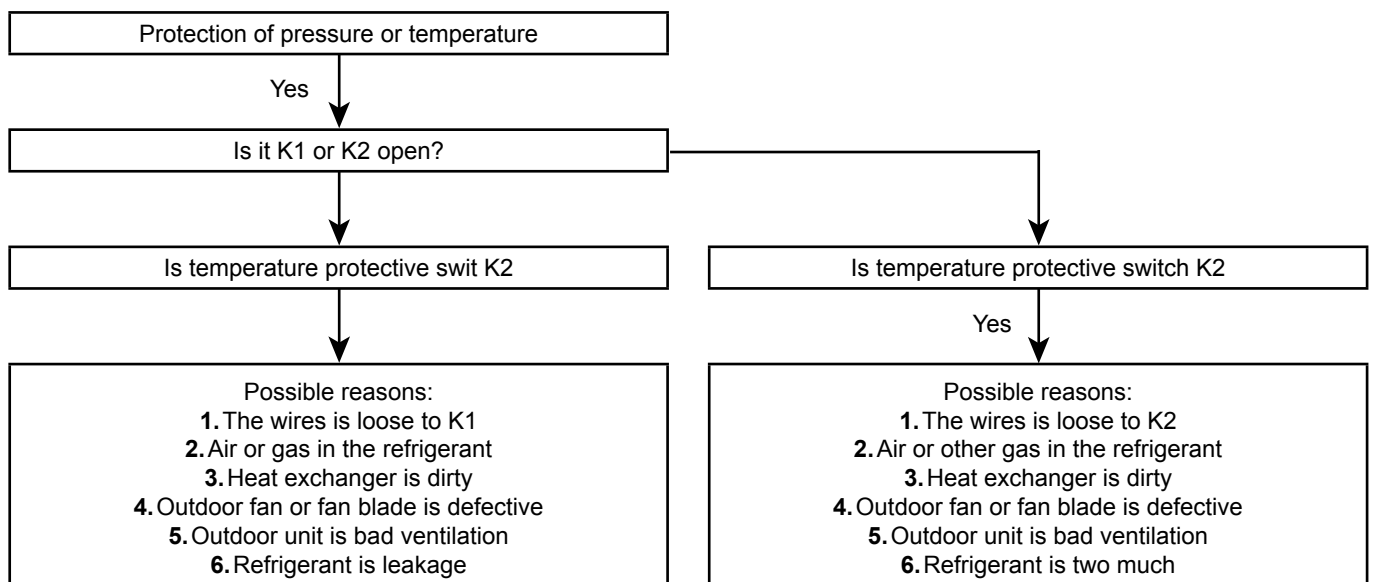
OVERLOAD OF CURRENT



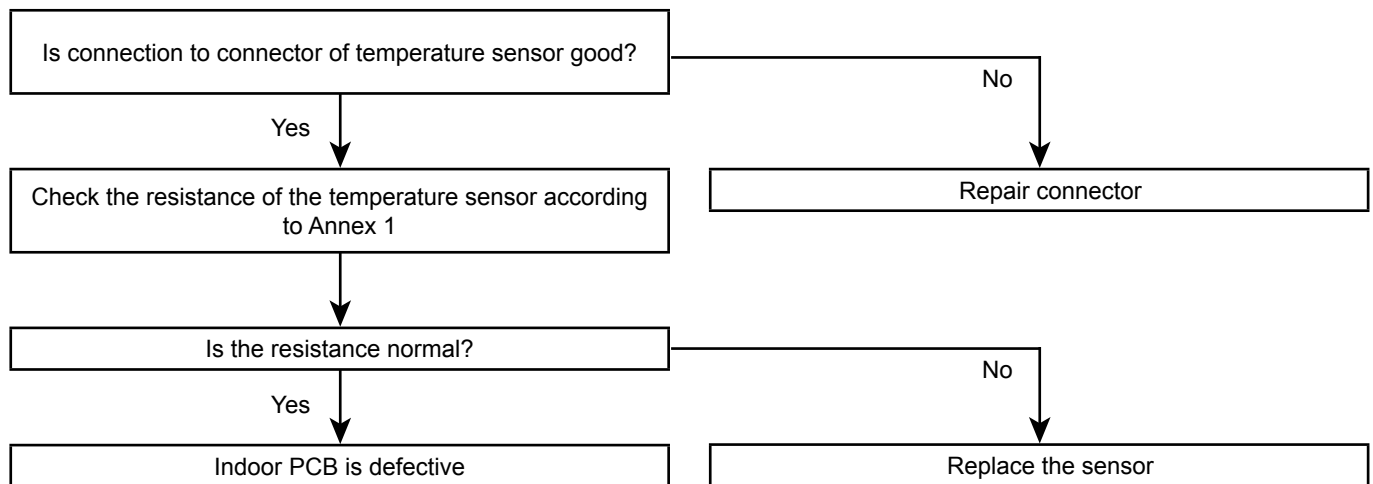
LACK OF PHASE



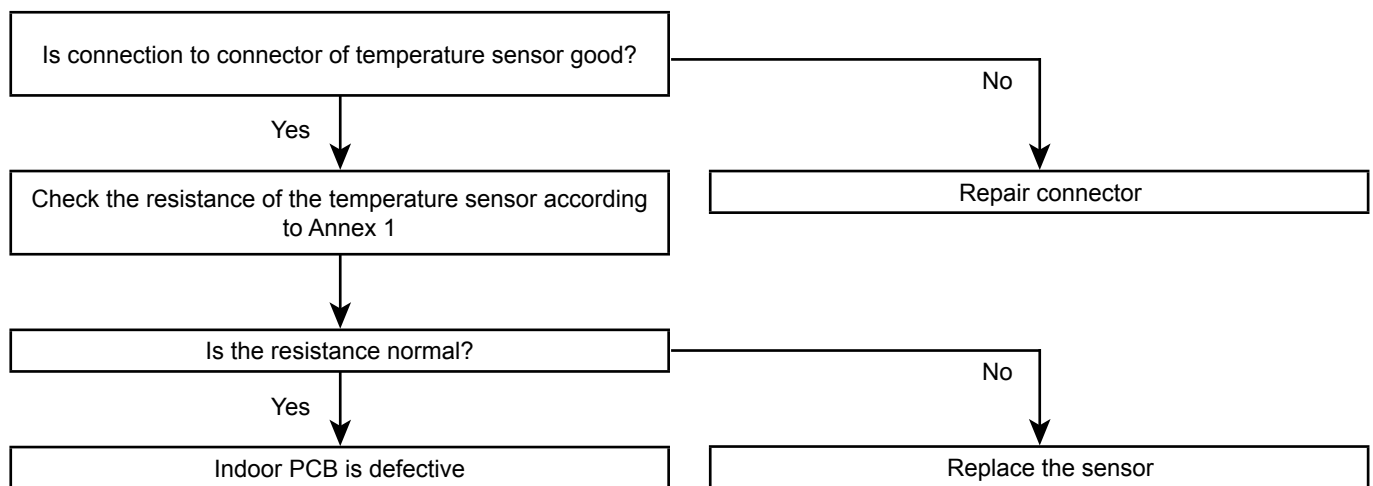
PROTECTION OF PRESSURE OR TEMPERATURE



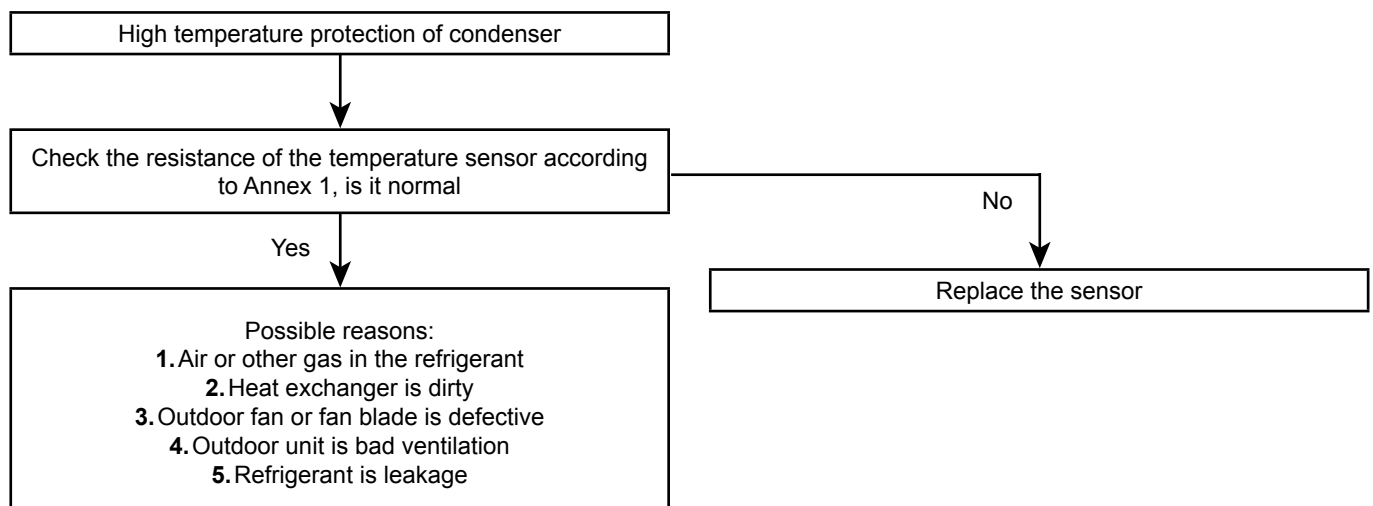
OPEN-CIRCUIT AND SHORT-CIRCUIT TROUBLE OF T3



OPEN-CIRCUIT AND SHORT-CIRCUIT TROUBLE OF T4



HIGH TEMPERATURE PROTECTION OF CONDENSER



CLEAN



Caution: Please turn off your air conditioner and disconnect power supply before cleaning.

CLEANING INDOOR UNIT

- Use a dry to wipe the indoor unit.
 - A cloth dampened with cold water may be used if the indoor unit is too dirty.
 - It is allowed to remove the front panel of indoor unit and clean it with water, and ensure to wipe it up with a dry rag.
- Note:** Do not use a chemically treated duster for wiping or leave such materials near the unit for long.
- Do not use benzene, thinner, polishing powder, or similar solvents for cleaning.

CLEANING AIR FILTER

- The air filter in unit can filter dust and other granules in air. It may reduce the cooling effect that the air filter is covered with dust. So clean the air filter often.

TROUBLES AND SOLUTIONS

If any the following abnormal conditions occur, turn off the power supply immediately. Please contact our dealer.

TROUBLES	Indicator lamps flash rapidly, after your disconnecting and connecting the unit, the situation is the same.
	Fuse or circuit breaker work frequently.
	Foreign matter or water has fallen into the unit.
	Remote controller is disabled or the switch is out of hand.
	Any other unusual conditioner is observed.

If any the following abnormal conditions occur, check your unit and resolve corresponding problems referring to given remediation. If the trouble can't be settled, contact our dealer.

Trouble	Cause	Solutions
Unit does not start	Power failure	Wait for the comeback of power
	Power switch is open.	Switch on the power
	Fuse of power switch may have blown	Replace the fuse
	Batteries of remote controller are exhausted	Replace the batteries
	The time si not start-up time you have set.	Wait or cancel the time set
Air flowing normally with low cooling (heating) effect	Temperature is not set correctly	Set the temperature properly
	Door or window is open	Close door or window
	Air filter is blocked with dust or dirtiness	Clean the air filter
	Inlet/outlet of indoor/outdoor units are blocked	Clear all blockages, the restart the operation
	Be in 3 minutes protection of compressor	Wait

Note: Do not replace electric wire or repair the air conditioner by yourself to avoid possible danger

TROUBLES AND SOLUTIONS CONCERNING THE REMOTE CONTROLLER

Please make the following check before asking for repair or maintenance:

Trouble	Cause	Solutions
Can not change the fan speed setting	Check if the mode display on the LCD is AUTO	The Indoor unit will select fan speed automatically when AUTO mode is selected.
	Check if the mode display on the LCD is DRY	The Indoor unit will select fan speed automatically when the unit is on DRY mode.

The transmission symbol does not flash		
Symptom	Checking items	Cause
Press ON/OFF button, the remote controlling signals can not be transmitted	Check if the remote controller has run out of power	When the battery was out, transmission signals can not be sent.

Temperature display disappear		
Symptom	Checking items	Cause
Temperature display does not light	Check if the mode display on the LCD is FAN ONLY	You can not set the temperature when the unit is on FAN ONLY mode.

The display goes off		
Symptom	Checking items	Cause
The indication on the display disappears after a lapse of time.	Check whether the timer operation has come to an end when OFF TIMER is indicated on the display.	The air conditioner operations stops since the set time elapsed.
The ON TIMER indicators go off after a lapse of certain time	Check whether the timer operation is started when the ON TIMER is indicated on the display.	When the time set to start the air conditioner is reached, the air conditioner will automatically start and the appropriate indicator will go off.

The signal receiving tone does not sound		
Symptom	Checking items	Cause
No receiving tone sounds from the indoor unit even when the ON/OFF button is pushed.	Check whether the signal transmitter of the remote controller is properly directed to the receiver of the indoor unit when the ON/OFF button is pushed.	Direct the signal transmitter of the remote controller to the receiver of the indoor unit, and then repeatedly push the ON/OFF button twice.
Buttons on the remote controller don't work.		Press reset button.

APPENDIX 1: INDOOR TEMPERATURE AND PIPE TEMPERATURE SENSOR RESISTANCE VALUE TABLE

-20	115.266	20	12.6431	60	2.35774	100	0.62973
-19	108.146	21	12.0561	61	2.27249	101	0.61148
-18	101.517	22	11.5000	62	2.19073	102	0.59386
-17	96.3423	23	10.9731	63	2.11241	103	0.57683
-16	89.5865	24	10.4736	64	2.03732	104	0.56038
-15	84.2190	25	10.0000	65	1.96532	105	0.54448
-14	79.3110	26	9.55074	66	1.89627	106	0.52912
-13	74.5360	27	9.12445	67	1.83003	107	0.51426
-12	70.1698	28	8.71983	68	1.76647	108	0.49989
-11	66.0898	29	8.33566	69	1.70547	109	0.48600
-10	62.2756	30	7.97078	70	1.64691	110	0.47256
-9	58.7079	31	7.62411	71	1.59068	111	0.45957
-8	56.3694	32	7.29464	72	1.53668	112	0.44699
-7	52.2438	33	6.98142	73	1.48481	113	0.43482
-6	49.3161	34	6.68355	74	1.43498	114	0.42304
-5	46.5725	35	6.40021	75	1.38703	115	0.41164
-4	44.0000	36	6.13059	76	1.34105	116	0.40060
-3	41.5878	37	5.87359	77	1.29078	117	0.38991
-2	39.8239	38	5.62961	78	1.25423	118	0.37956
-1	37.1988	39	5.39689	79	1.21330	119	0.36954
0	35.2024	40	5.17519	80	1.17393	120	0.35982
1	33.3269	41	4.96392	81	1.13604	121	0.35042
2	31.5635	42	4.76253	82	1.09958	122	0.3413
3	29.9058	43	4.57050	83	1.06448	123	0.33246
4	28.3459	44	4.38736	84	1.03069	124	0.32390
5	26.8778	45	4.21263	85	0.99815	125	0.31559
6	25.4954	46	4.04589	86	0.96681	126	0.30754
7	24.1932	47	3.88673	87	0.93662	127	0.29974
8	22.5662	48	3.73476	88	0.90753	128	0.29216
9	21.8094	49	3.58962	89	0.87950	129	0.28482
10	20.7184	50	3.45097	90	0.85248	130	0.27770
11	19.6891	51	3.31847	91	0.82643	131	0.27078
12	18.7177	52	3.19183	92	0.80132	132	0.26408
13	17.8005	53	3.07075	93	0.77709	133	0.25757
14	16.9341	54	2.95896	94	0.75373	134	0.25125
15	16.1156	55	2.84421	95	0.73119	135	0.24512
16	15.3418	56	2.73823	96	0.70944	136	0.23916
17	14.6181	57	2.63682	97	0.68844	137	0.23338
18	13.9180	58	2.53973	98	0.66818	138	0.22776
19	13.2631	59	2.44677	99	0.64862	139	0.22231



www.lennox europe.com

BELGIUM, LUXEMBOURG
www.lennoxbelgium.com

CZECH REPUBLIC
www.lennox czech.com

FRANCE
www.lennoxfrance.com

GERMANY
www.lennox deutschland.com

NETHERLANDS
www.lennox nederland.com

POLAND
www.lennox polska.com

PORTUGAL
www.lennoxportugal.com

RUSSIA
www.lennoxrussia.com

SLOVAKIA
www.lennox distribution.com

SPAIN
www.lennoxspain.com

UKRAINE
www.lennoxukraine.com

UNITED KINGDOM AND IRELAND
www.lennoxuk.com

OTHER COUNTRIES
www.lennox distribution.com

Due to Lennox's ongoing commitment to quality, the Specifications, Ratings and Dimensions are subject to change without notice and without incurring liability.

Improper installation, adjustment, alteration, service or maintenance can cause property damage or personal injury.

Installation and service must be performed by a qualified installer and servicing agency.



DUCTAIR II-IOM-0808-E