

**AKIRA**  
makes life better

---

# Air Conditional Service Manual



Большая библиотека технической документации

<https://splitsystema48.ru/instrukcii-po-ekspluatácii-kondicionerov.html>

каталоги, инструкции, сервисные мануалы, схемы.

# MODEL: AC-FR30CM

## CONTENTS

|                                   |    |
|-----------------------------------|----|
| SPECIFICATION .....               | 4  |
| INSTALLATION INSTRUCTION .....    | 6  |
| EXPLODED VIEW AND PART LIST ..... | 20 |
| CIRCUIT DIAGRAM .....             | 24 |

## SPECIFICATION

|                        |                                |          |                       |
|------------------------|--------------------------------|----------|-----------------------|
| Power supply           |                                | Ph-V-Hz  | 220-240V~, 50Hz       |
| Cooling                | Capacity                       | Btu/h    | 24000                 |
|                        | Input                          | W        | 2650                  |
|                        | Rated current                  | A        | 12.3                  |
|                        | EER                            | Btu /w.h | 9.1                   |
| Moisture removal       |                                | L /h     | 2.7                   |
| Max. input consumption |                                | W        | 3800                  |
| Max current            |                                | A        | 19                    |
| Compressor             | Model                          |          | ZR34KH-PFJ-522        |
|                        | Type                           |          | Scroll                |
|                        | Brand                          |          | Copeland              |
|                        | Capacity                       | Btu /h   | 28000                 |
|                        | Input                          | W        | 2520                  |
|                        | Rated current (RLA)            | A        | 12.1                  |
|                        | Locked rotor Amp (LRA)         | A        | 76                    |
|                        | Thermal protector              |          | Internal              |
|                        | Capacitor                      | uF       | 50                    |
|                        | Refrigerant oil                | ml       | 1242                  |
| Indoor fan motor       | Model                          |          | YDK72-10Q             |
|                        | Input                          | W        | 132/107               |
|                        | Capacitor                      | uF       | 2.5                   |
|                        | Speed (hi /mi /lo)             | r/min    | 470 /370              |
| Indoor coil            | Number of rows                 |          | 2                     |
|                        | Tube pitch (a) x row pitch (b) | mm       | 21 x 13.37            |
|                        | Fin spacing                    | mm       | 1.3                   |
|                        | Fin type (code)                |          | Hydrophilic aluminium |
|                        | Tube outside dia and type      | mm       | Φ7, Innergroove tube  |
|                        | Coil length x height x width   | mm       | 382 x 777 x 26.74     |
|                        | Number of circuit              |          | 6                     |
| Indoor air flow        |                                | M3/h     | 1000                  |
| Indoor noise level     |                                | dB(A)    | 45                    |
| Indoor unit            | Dimension (w x h x d)          | mm       | 500 x 1665 x 273      |
|                        | Packing (w x h x d)            | mm       | 585 x 1805 x 380      |
|                        | Net /Gross weight              | Kg       | 46 /57                |

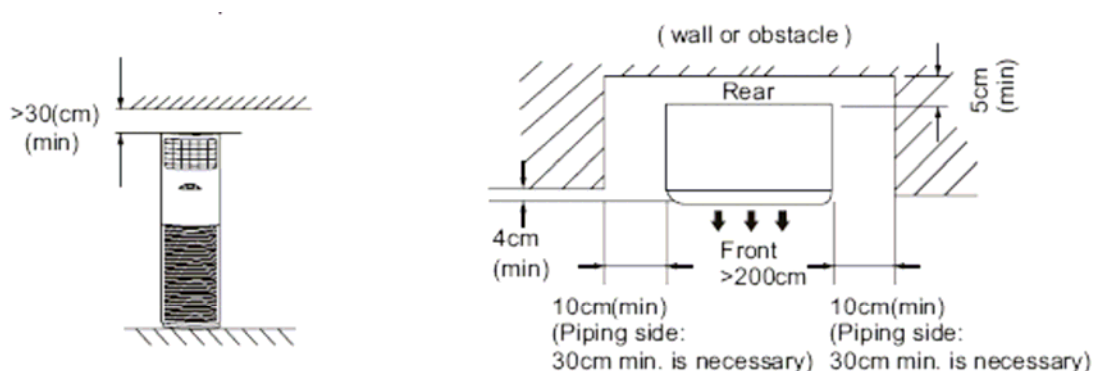
|                       |                              |           |                           |
|-----------------------|------------------------------|-----------|---------------------------|
| Outdoor fan motor     | Model                        |           | YDK53-6K                  |
|                       | Input                        | W         | 130 / 124 / 127 /133      |
|                       | Capacitor                    | uF        | 3                         |
|                       | Speed                        | r/min     | 750                       |
| Outdoor coil          | Number of rows               |           | 2                         |
|                       | Tube pitch x row pitch       | mm        | 25.4 x 22                 |
|                       | Fin spacing                  | mm        | 1.7                       |
|                       | Fin type (code)              |           | Non-hydrophilic aluminium |
|                       | Tube outside dia and type    | mm        | Φ9.53, Innergroove tube   |
|                       | Coil length x height x width | mm        | 797 x 660 x 44            |
|                       | Number of circuits           |           | 4                         |
| Outdoor air flow      |                              | M3/h      | 2400                      |
| Outdoor noise level   |                              | dB(A)     | 52                        |
| Outdoor unit          | Dimension (w x h x d)        | mm        | 845 x 695 x 335           |
|                       | Packing (w x h x d)          | mm        | 965 x 772 x 395           |
|                       | Net /gross weight            | Kg        | 63 /67                    |
| Refrigerant type R22  |                              | g         | R22 /1550                 |
| Design pressure       |                              | MPa       | 2.6                       |
| Refrigerant pipe      | Liquid side /gas side        | Mm (inch) | Φ9.53 / Φ16.0             |
|                       | Max. refrigerant pipe length | m         | 15                        |
|                       | Max. difference in level     | m         | 8                         |
| Connecting wiring     |                              |           | No                        |
| Plug type             |                              |           | No                        |
| Thermostat type       |                              |           | Electronic control        |
| Operation temp        |                              | oC        | 17-30                     |
| Ambient temp          |                              | oC        | 18-45                     |
| Application area      |                              | M2        | 40~56                     |
| Qty per 20' & 40' Fcl |                              | Pieces    | 43 /87 /97                |

## INSTALLATION INSTRUCTION

### Selection installation place

#### 1. Indoor unit

- a. A place which provides the spaces around the indoor unit as required above in the diagram.
- b. A place where is no obstacle near the inlet and outlet area.
- c. A place which can bear the weight of the indoor unit.
- d. A place which allows the air filter to be removed downward.
- e. A place where the reception range is not exposed to direct sunlight.
- f. In the center the room where possible.
  - i. Please stand the unit in hard and flat ground.
  - ii. Please reserve space for installation and maintenance.



- iii. Please check the elevation difference between the indoor unit and the outdoor unit, the length of the refrigerant pipe and the curved places (bend) of the pipe are no more than the following number.

Elevation difference: No more than 10M (if the elevation difference between indoor and outdoor unit is more than 10 meters, it is recommended that the outdoor unit be placed above the indoor unit.)

Pipe length: No more than 20M

Bends: No more than 5 places

#### 2. Outdoor unit

- a. Before installing the outdoor unit,
  - i. Select a place where no direct sunlight or other heat-radioactivity may reach. A sunshade is needed if it is unavoidable.
  - ii. Select a place that is easy to connect indoor unit's pipe and electric wires.
  - iii. Avoid a place where combustible gas may leak or stay.
  - iv. Keep it in mind that water may drain out of the outdoor unit while in "Heat" mode.

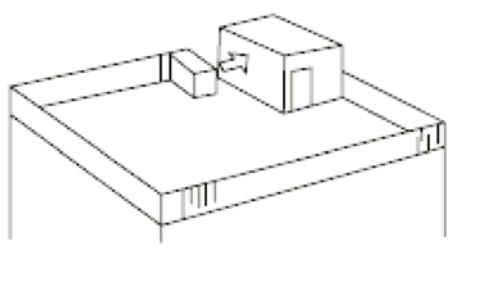
**Caution**

Installation in the following places may cause trouble. If it is unavoidable to use in such places:

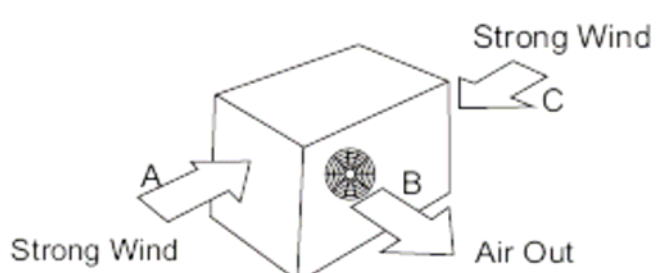
- A place full of machine oil.
  - A saline place such as coast.
  - Hot-spring resort.
  - A place full of sulfide gas.
  - A place where there are high frequency machines such as wireless installation, welding machine, medical facility.
  - A place of special environmental condition.
- b. If the outdoor unit is to be installed on a roof or where no constructions are around, you should avoid hard wind blows directly to the outlet because it may cause trouble for air-flow shortage.

For example:

Let the air outlet face a wall (if there is one) with a distance about 300 centimeters between them.

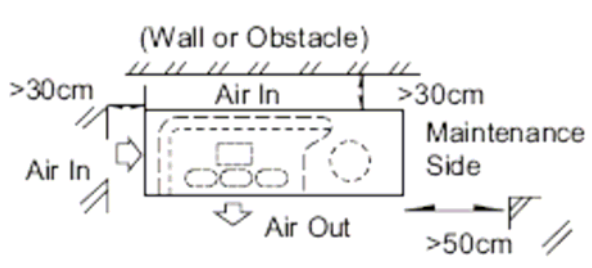


Try to make the air outlet vertical to wind direction if it is known in the season you use the system. In directions A, B, C leave open two of the three directions.

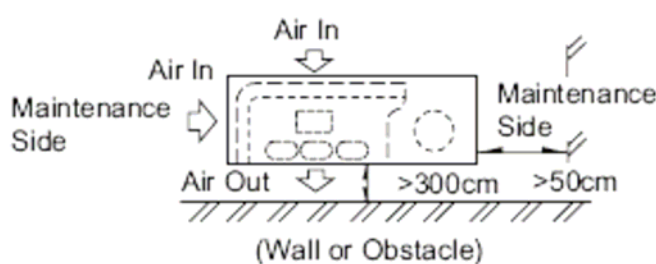


- c. Reserve enough space for installation, maintenance and unit-functioning.  
Remove as many obstacles as possible nearby.

When the air-in surface is facing a wall.



When the air out surface is facing a wall.






## Installation

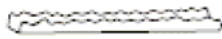

### 1. Indoor Unit


#### a. Accessories

Before installing, please check the available accessories according to the list given below.

| Accessories for installing |  |     |   |
|----------------------------|--|-----|---|
| No                         | Part name                                | Qty | Illustrations   |
| 1                          | Installing board<br>(for wall mounting)  | 1   |  |
| 2                          | 3.9 x 25 screw<br>(for fixing the board) | 2   |  |
| 3                          | Plain washer                             | 4   |  |



| Accessories for pipe-connecting |                                |     |  |
|---------------------------------|--------------------------------|-----|--|
| No                              | Part name                      | Qty | Illustrations  |
| 4                               | Pip-hole-protection ring       | 1   |   |
| 5                               | Sound /heat insulation sleeves | 2   | Outer Diam: 52mm<br>Inner Diam: 36mm<br>Length: 100cm<br> |
| 6                               | Water receiver                 | 1   |  |
| 7                               | Seal                           | 1   |  |
| 8                               | Drain joint                    | 1   |  |

| Accessories for wire-connecting |                             |     |   |
|---------------------------------|-----------------------------|-----|---|
| No                              | Part name                   | Qty | Illustrations   |
| 9                               | Sleeves for wire-connecting | 2   |  |
| 10                              | Band                        | 3   |   |

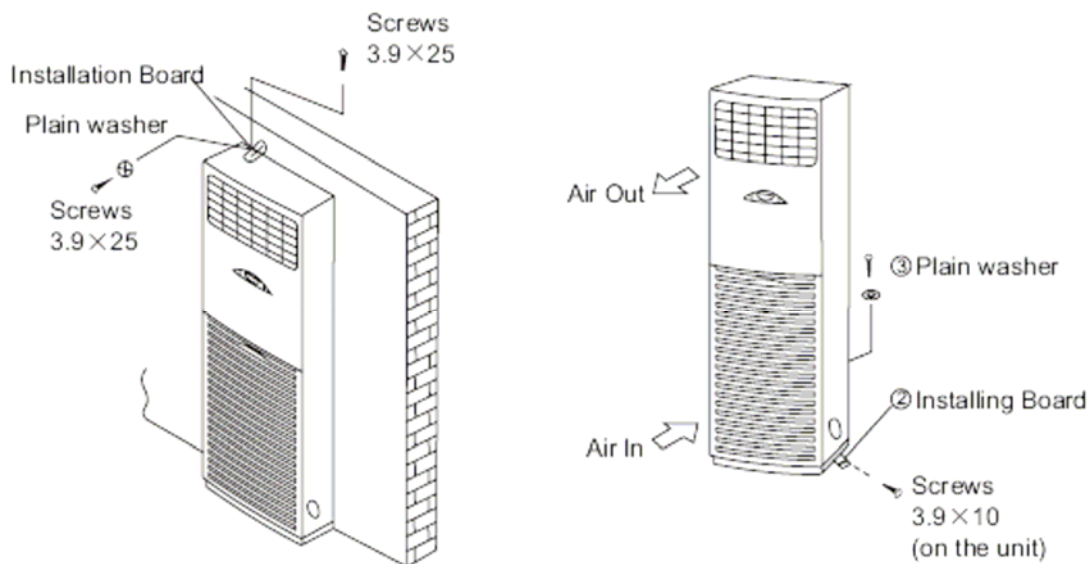
| Refrigerant pipe (optional) |                  |                  |              |
|-----------------------------|------------------|------------------|--------------|
| No                          | Name             | capacity (Btu/h) |              |
|                             |                  |                  | 20000~30000  |
|                             |                  |                  | 30000~55000  |
| 11                          | Liquid side size |                  | Diam: 9.53mm |
|                             |                  |                  | Diam: 12.7mm |
| 12                          | Gas side size    |                  | Diam: 16mm   |
|                             |                  |                  | Diam: 19mm   |

If there is any difference between the above table and packing list, the packing list shall prevail.

**b. Anti-falling**

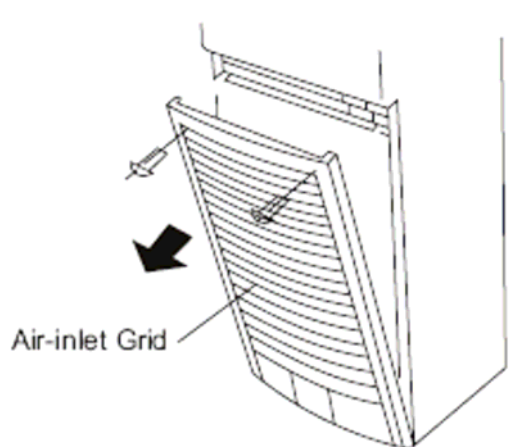
To prevent the indoor unit from falling, you must:-

- i. Pay full attention to the unit because its long outer shape makes it easy to fall.
- ii. Firmly fix the unit to the wall and in the ground to avoid accidental falling.

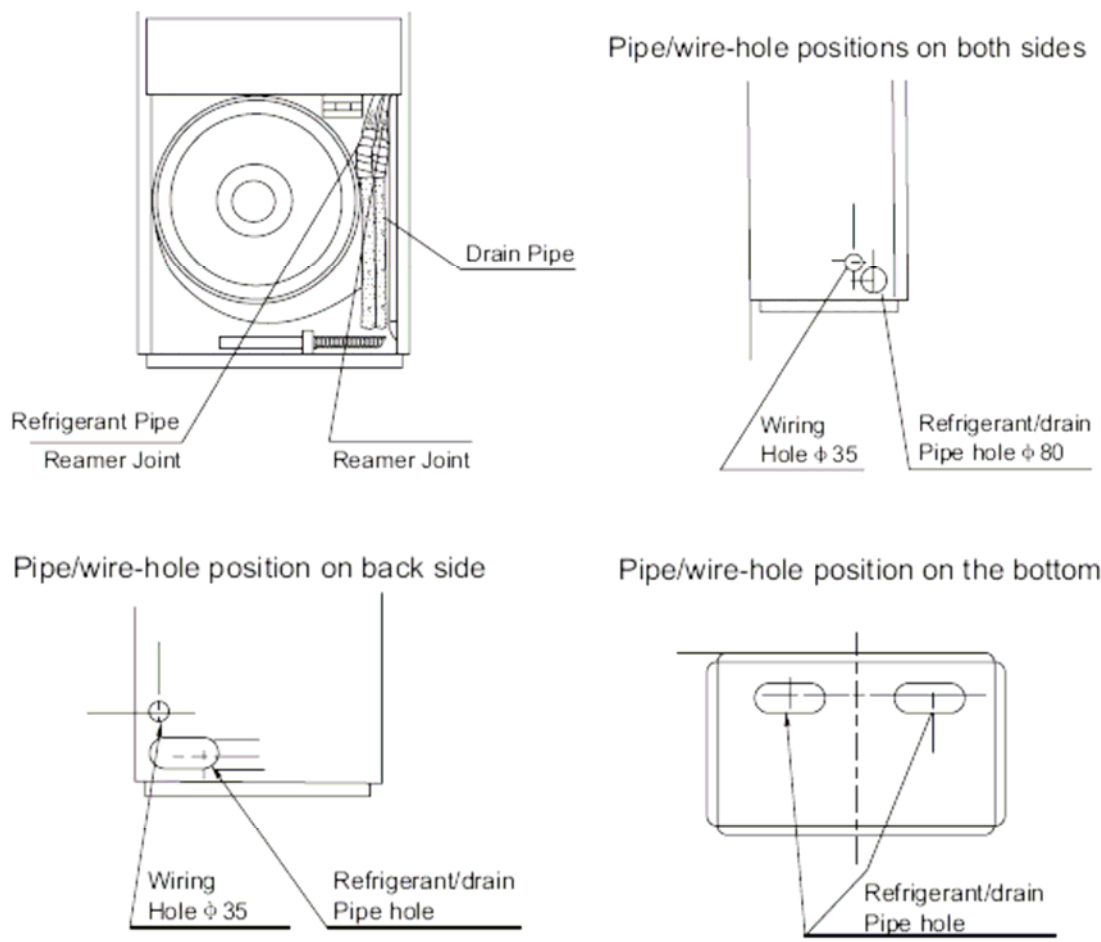
**c. Dismounting the air-inlet grid**

Please take off the air-inlet grid before connecting the pipes /wires.

Pull down the two knobs on the grid, take off the two screws, then the air-inlet grid goes free.

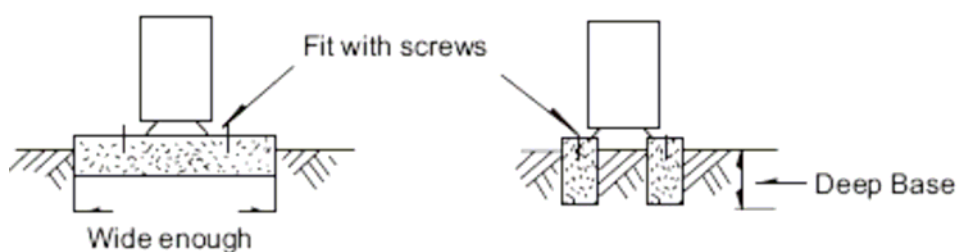


- d. Take the pipe clip off before connecting the pipes and wiring. Fit it when these finished. Use accessories 4 and 9 to connect the pipes /wires on both sides and back side.



## 2. Outdoor Unit

- Ship the a/c to the installation place originally packed.
- Be careful while hanging the unit because the center of gravity of the unit is not centralized.
- Do not make the angle of inclination more than 45 degrees while shipping. (Avoid horizontal storage).
- Be sure the electric insulation work is well done if installed on metal ceiling /wall.



- e. Fix the unit feet with bolts (M10/M8). Be sure the unit is fixed strongly enough to against blast or earthquake.
- f. Make a concrete basement to the unit by the above references.

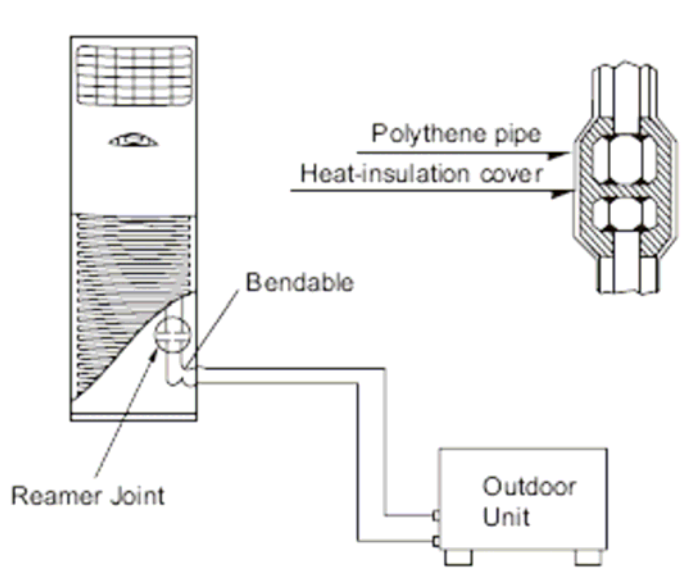
## Refrigerant pipe

The refrigerant pipe and the drain pipe should be heat-insulated to avoid condensing and water-dropping.

A reamer joint is adopted to connect the indoor unit with the outdoor unit.

The refrigerant pipe is used to connect indoor and outdoor units, showed as below.

Note: The bendable pipe must not be curved for more than 3 times.



Note: Cover all exposed reamer joint pipes and refrigerant pipes with heat-insulation material.

1. Connecting of refrigerant pipe
  - a. Only the correctly installation of indoor and outdoor unit done, can the refrigerant pipe be connected.
  - b. The cut-off valves are completely close before ex-work. Before connecting the refrigerant pipe, be careful to check whether the valve are completely close.
  - c. The connecting procedure of refrigerant pipe; first, unscrew the two valves on the outdoor unit and the pipe-jointing nut on the indoor unit (please keep them care fully). Please connect the refrigerant pipe according to the manual, the pipe-jointing nut should be screw tightly and no leakage.

Note: you need two wrenches to make balance.

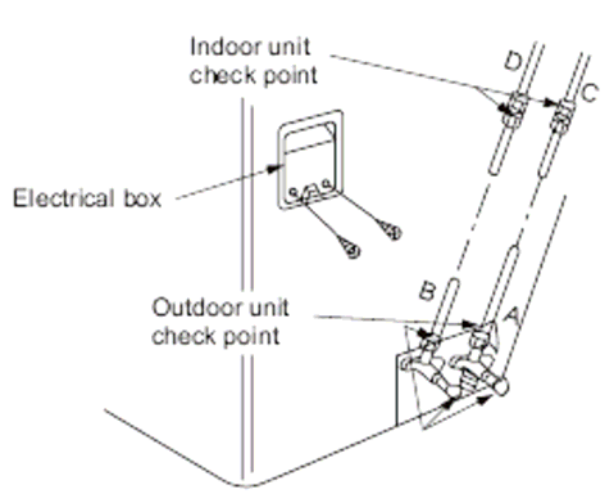
- d. When the connecting of refrigerant pipe is finished, before power on the system, you should vacuum the indoor unit through the maintenance port in the cut-off valves, or open the high-pressure valve (closed). It will take about ten seconds. Then screw tightly the maintenance port. (When supplement the refrigerant, fill through the maintenance port of the low-pressure valves on the outdoor unit).
- e. Open all the valves completely before power on the system or it will be sick for low efficiency.
- f. Gas leak check. Make sure no gas from connections with leak detector or soap water.

**Caution**

A: Lo packed valve

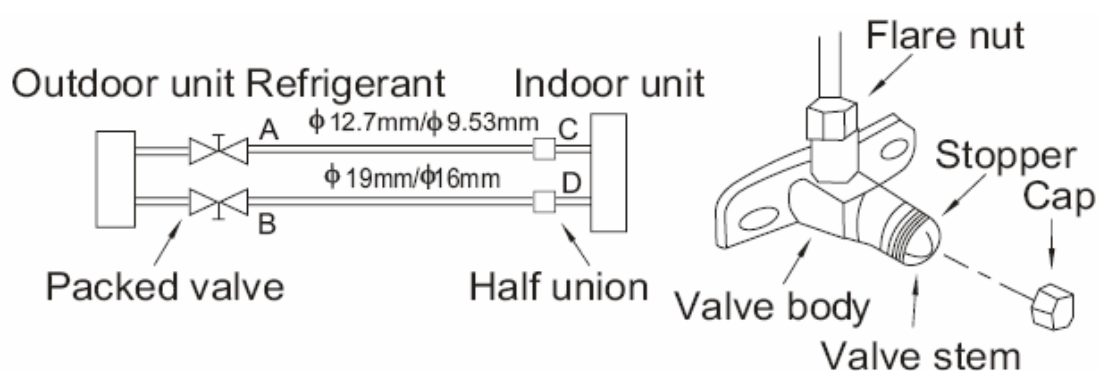
B: Hi packed valve

C and D are ends of indoor unit connection.



**Caution in handling the packed valve**

- Open the valve stem until it hits against the stopper. Do not try to open it further.
- Securely tighten the valve stem cap with a spanner or the link.

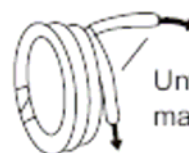


- Notes for the bendable pipe
  - i. The bendable pipe should be used on the indoor side.
  - ii. Bend angle may not exceed 90 degrees.
  - iii. The bend location should be made on the center of the pipe if possible, as for bend radius, the bigger the better.
  - iv. The bendable pipe may not be bent for more than 3 times.
- Bend the thin pipe
  - i. While bending, expose the pipe by cutting the concave gap on the bending heat-insulation pipe (roll it with soft band after bent).
  - ii. To avoid pipe deformation, the radius is the bigger the better.
  - iii. Use a pipe-bending device to make the compact bending pipe.

Use thumb to curve the pipe



Min. Radius 100 mm



Untie the pipe,  
make it straight

## 2. Using bronze pipe selling in market

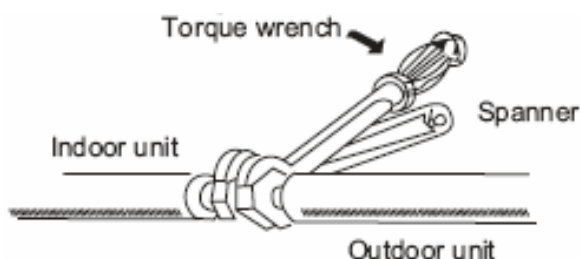
Completely shut the cut-off valves of the outdoor unit (as ex-work status). After the refrigerant pipe has been connected with both the indoor and outdoor unit, let the air exhaust out from the maintenance gap on the low-pressure cut-off valve of the outdoor unit. Screw the nuts tightly on the maintenance gap after the air has been drained.

## 3. To make the refrigerant pipe unblocked completely.

Should keep the cut-off valves of the outdoor unit completely open after finished the above steps (step 1 or step 2).

Note:

- Before screwing the reamer nut, smear the pipe and the connecting surface with refrigerant oil.
- Check and make sure there is no leakage by soap-water or leakage-checker after connecting.
- Be sure the connecting joint on the indoor side is insulated.
- Use two wrenches to connecting the pipe.



4. Filling refrigerant.

The correct refrigerant quantity filled in the 5-meter-long pipe of the outdoor unit is marked on the Product Data Plate. If you have to use longer pipe for every meter plus pipe, the refrigerant should be added according to the following calculation.

| Connective pipe length | Air purging method | Additional amount of refrigerant to be charged |                         |
|------------------------|--------------------|--|-------------------------|
| Less than 5m           | Use vacuum pump    | -  |                         |
| 5~20m                  | Use vacuum pump    | Liquid side $\Phi$ 9.53                        | Liquid side $\Phi$ 12.7 |
|                        |                    | $(L-5) \times 65g$                             | $(L-5) \times 90g$      |

Note:

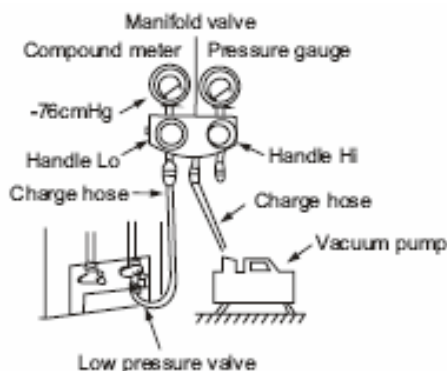
If you are using pipe purchased in the market, please make sure the heat-insulation material is the same as what we supply. (At least 12 millimeters in thickness).

5. Air purging

When using the vacuum pump

- a. Completely tighten the flare nuts A, B, C, D connect the manifold valve charge hose to a charge port of the low-pressure valve on the gas pipe side.
- b. Connect the charge hose connection to the vacuum pump.
- c. Fully open the handle Lo of the manifold valve.
- d. Operate the vacuum pump to evacuate. After starting evacuation, slightly loose the flare nut of the Lo valve on the gas pipe side and check that the air is entering. (operation noise of the vacuum pump charges and a compound meter indicates 0 instead of minus).
- e. After the evacuation is complete, fully close the handle Lo of the manifold valve and stop the operation of the vacuum pump.

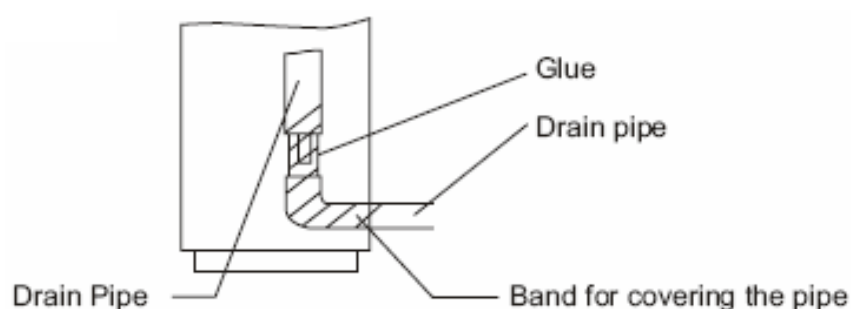
Make evacuation for 15 minutes or more and check that the compound meter indicates – 76cmHg ( $-10 \times 10^6 Pa$ ).



- f. Turn the stem of the packed valve B about 45o counter clockwise for 6~7 seconds after the gas coming out, then tighten the flare nut again. Make sure the pressure display in the pressure indicator is a little higher than the atmosphere pressure.
- g. Remove the charge hose from the Low pressure charge hose.
- h. Fully open the packed valve stems B and A.
- i. Securely tighten the cap of the packed valve.

## Drain pipe

Drain pipe of the indoor unit



1. Make sure the drain pipe is connected to the outdoor side downward.
2. The hard polyvinyl chloride (PVC) plastic pipe (external diameter 26 mm) sold is the market is suitable for the attached soft drain pipe.
3. Please connect the Soft Drain Pipe with the Drain Pipe, then fix it with band.
4. If you have to connect the Drain Pipe indoors to avoid condensing caused by air intake, you must cover the pipe with heat-insulation material (polyethylene with specific Gravity of 0.03, at least 9 mm in thickness) and use glue band to fix it.
5. After the Drain Pipe has been connected, please check if the water drains out of the pipe efficiently and has no leakage.
  - Refrigerant Pipe and Drain Pipe should be heat-insulated to avoid condensing and water dropping later on.

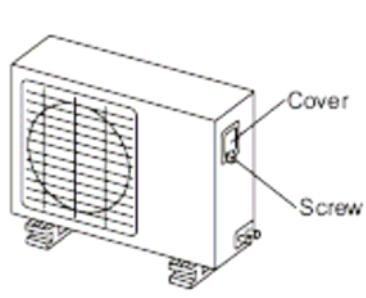
## Connecting the electric system

1. Wire connecting

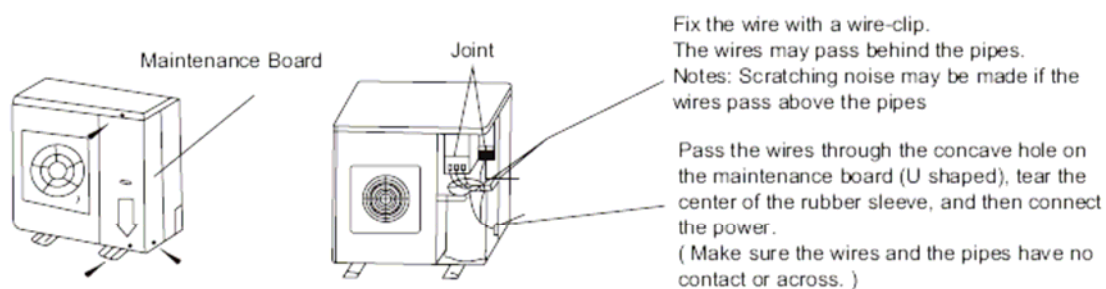
The outdoor unit will look one of the following:

- a. Outdoor unit
  - i. Remove the electric parts cover from the outdoor unit.
  - ii. Connect the connective cables to the terminals as identified with their respective matched numbers on the terminal block of indoor and outdoor units.





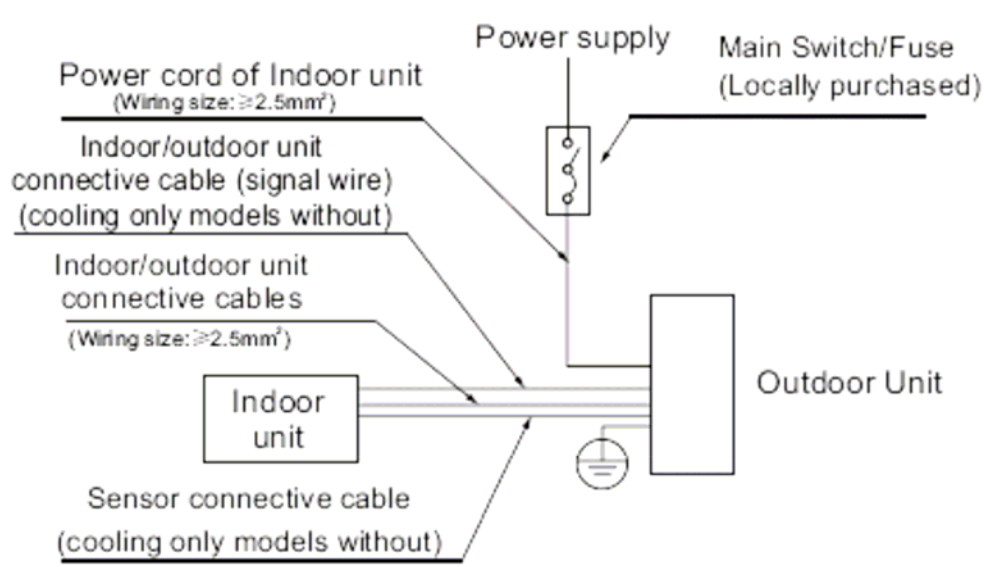
- iii. To prevent the ingress of water, form a loop of the connective cable as illustrated in the installation diagram of indoor and outdoor units.
  - iv. Wiring connection must be done strictly according to the “Wiring Diagram” located on the panel of air conditioner.
  - v. Follow the instruction of wiring connection in this manual, never attempt to modify the wiring by yourself.
- b. Outdoor unit
- i. Unscrew the maintenance board. Pull it down as the signal shown.  
(Be careful not to scratch the crust.)



**Caution**

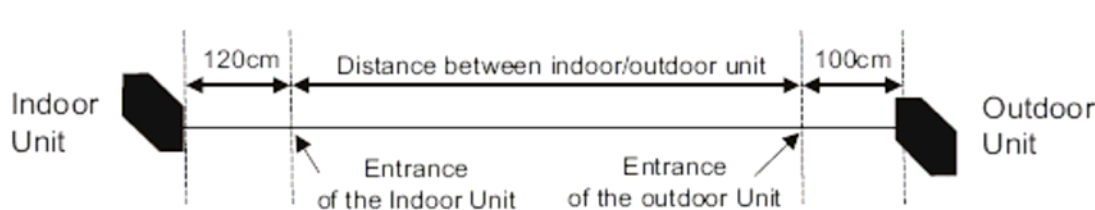
Wrong wiring connections may cause some electrical parts to malfunction.  
The air conditioner must be grounded well.

2. Wire-connecting brief diagram (for details refer to wire-connecting diagram)



Note:

- i. Some models is equipped with a cord having a plug. So a wall outlet shall be properly installed.
  - ii. Please remember the surroundings (environmental temperature, direct sunlight, rain etc.)
  - iii. We consider the minimal size of the metal core as the wire size. So it is recommended you adopt a thicker one as the power conducting wire so as the wire size. So it is recommended you adopt a thicker one as the power conducting wire so as to avoid power decrease.
  - iv. Connect the grounded wire to both indoor and outdoor units.
  - v. This table is just an on-site wire-connecting example.
- The length of the power wire and connecting-wire which connects the indoor unit to the outdoor unit. (The figure given below shows a suitable length).



### 3. Electrical safety check

Perform the electric safe check after completing installation:

#### a. Insulated resistance

The insulated resistance must be more than 2M  $\Omega$ .

#### b. Grounding work

After finishing grounding work, measure the grounding resistance by visual detection and grounding resistance tester. Make sure the grounding resistance is less than 4 $\Omega$ .

#### c. Electrical leakage check (performing during test running)

During test operation after finishing installation, use the electroprobe and multimeter to perform the electrical leakage check. Turn off the unit immediately if leakage happens. Check and find out the solution ways till the unit operate properly.

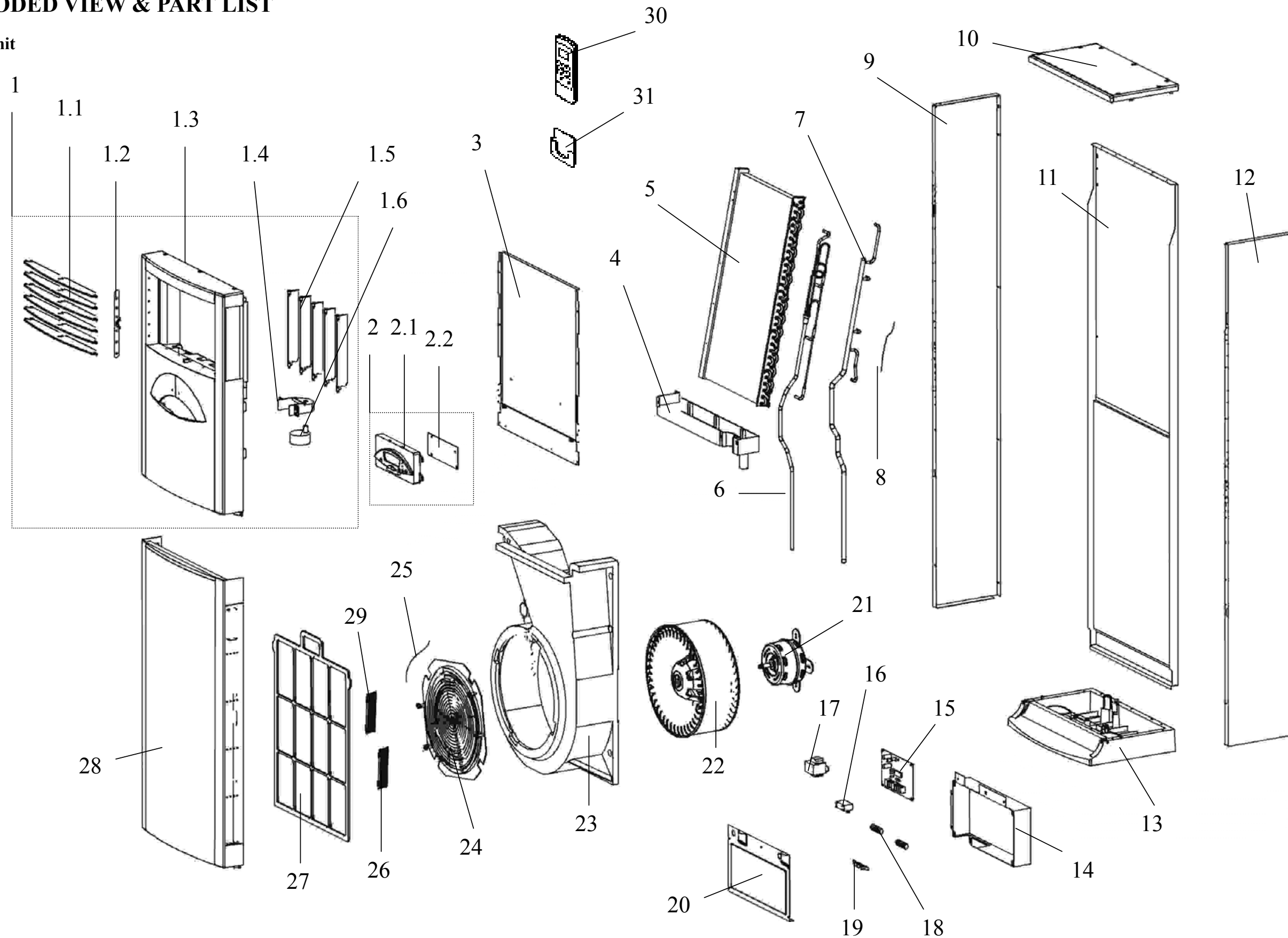
## Test run

Perform test operation after completing gas leak and electrical safety check. The test operation time should last more than 30 minutes.

1. Open the panel and lift the panel up to angle which remains fixed. Do not lift the panel any further when it stops with a “click” sound.
2. Press the manual switch button twice until the operation indicator lights, the unit will operate on Manual Cool mode.
3. Check if all the functions works well while testing the air conditioner. Especially check whether the drainage of indoor unit is smooth or not.
4. Press the manual switch button again till the operation indicator turns dark after finishing the test operation and the unit stops operation.

## EXPLODED VIEW & PART LIST

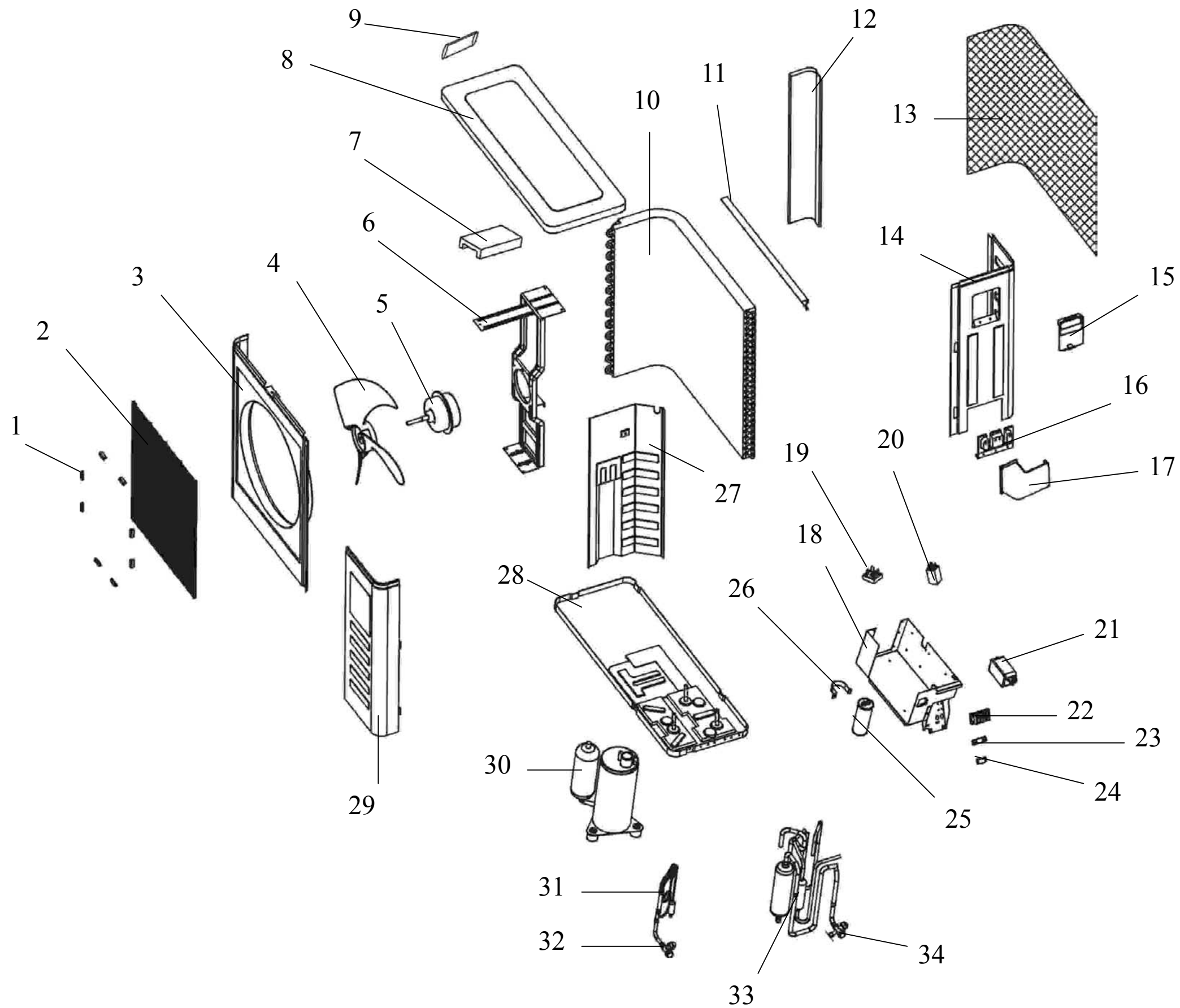
### Indoor unit



**Part list for indoor unit**

| No  | Part name                    | Qty |
|-----|------------------------------|-----|
| 1   | Air out frame assy           | 1   |
| 1.1 | Horizontal louver            | 6   |
| 1.2 | Horizontal louver holder     | 1   |
| 1.3 | Front panel                  | 1   |
| 1.4 | Holder for louver motor      | 1   |
| 1.5 | Vertical louver              | 5   |
| 1.6 | Louver motor                 | 1   |
| 2   | Display box, assy            | 1   |
| 2.1 | Display box cover            | 1   |
| 2.2 | Display box assy             | 1   |
| 3   | Front cover                  | 1   |
| 4   | Water collector assy         | 1   |
| 5   | Evaporator                   | 1   |
| 6   | Outlet pipe for evaporator   | 1   |
| 7   | Inlet pipe for evaporator    | 1   |
| 8   | Evaporator temp sensor       | 1   |
| 9   | Left cover                   | 1   |
| 10  | Top cover                    | 1   |
| 11  | Rear cover                   | 1   |
| 12  | Right cover                  | 1   |
| 13  | Chassis                      | 1   |
| 14  | E-Parts box                  | 1   |
| 15  | Main control board           | 1   |
| 16  | Fan motor capacitor          | 1   |
| 17  | Transformer                  | 1   |
| 18  | Wire joint                   | 1   |
| 19  | Wire clamp                   | 1   |
| 20  | E-part box cover             | 1   |
| 21  | Fan motor                    | 1   |
| 22  | Centrifugal fan              | 1   |
| 23  | Volute shell                 | 1   |
| 24  | Wind inlet guide             | 1   |
| 25  | Indoor temp sensor           | 1   |
| 26  | Formaldehyde cleaner         | 1   |
| 27  | Air filter                   | 1   |
| 28  | Grille                       | 1   |
| 29  | Air cleaner holder           | 1   |
| 30  | Remote controller            | 1   |
| 31  | Holder for remote controller | 1   |
| 32  | Copper nut, TLM-B02          | 1   |
| 33  | Copper nut, TLM-D04          | 1   |

**Outdoor Unit**

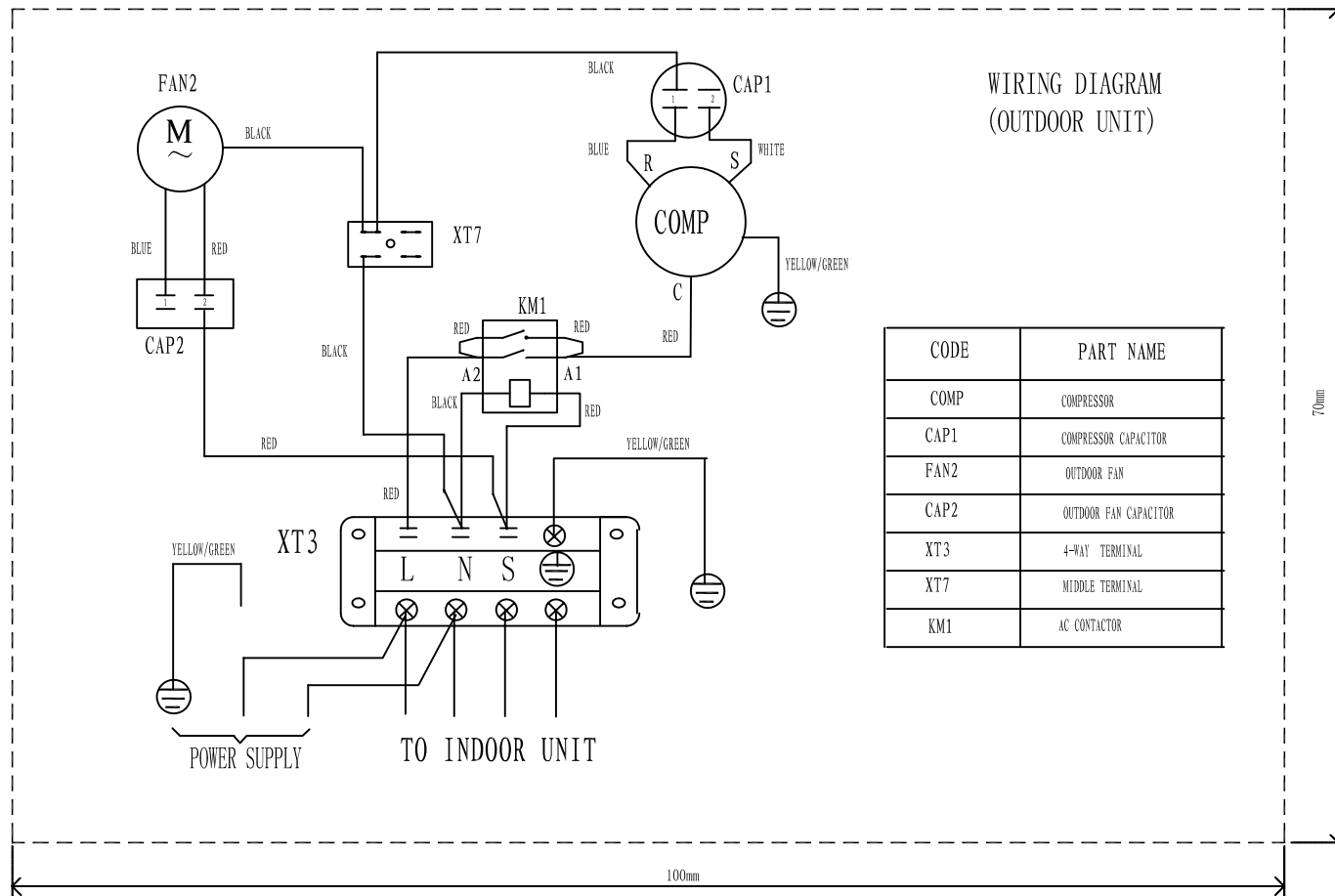


**Part list for Outdoor unit**

| No | Part name                      | Qty |
|----|--------------------------------|-----|
| 1  | Clamp for front net            | 8   |
| 2  | Front net                      | 1   |
| 3  | Front clapboard                | 1   |
| 4  | Propeller fan                  | 1   |
| 5  | Fan motor                      | 1   |
| 6  | Holder for fan motor           | 1   |
| 7  | Foam over holder for motor     | 1   |
| 8  | Cover                          | 1   |
| 9  | Little handle                  | 1   |
| 10 | Condenser                      | 1   |
| 11 | Support board for motor holder | 1   |
| 12 | Left clapboard                 | 1   |
| 13 | Rear net                       | 1   |
| 14 | Rear right clapboard           | 1   |
| 15 | Big handle                     | 1   |
| 16 | Installation plate for valves  | 1   |
| 17 | Water collector                | 1   |
| 18 | Installation board for E-parts | 1   |
| 19 | Fan motor capacitor            | 1   |
| 20 | Wire joint for multiplexer     | 1   |
| 21 | Contactora                     | 1   |
| 22 | Wire joint                     | 1   |
| 23 | Washer for wire joint          | 1   |
| 24 | Clamp for wiring               | 1   |
| 25 | Compressor capacitor           | 1   |
| 26 | Capacitor clamp                | 1   |
| 27 | Separating board               | 1   |
| 28 | Chassis                        | 1   |
| 29 | Front right clapboard          | 1   |
| 30 | Compressor                     | 1   |
| 31 | Liquid valve assy              | 1   |
| 32 | Liquid pipe valve              | 1   |
| 33 | Gas valve assy                 | 1   |
| 34 | Gas pipe valve                 | 1   |
| 35 | Copper nut, TLM-B02            | 1   |
| 36 | Copper nut, TLM-D04            | 1   |

## CIRCUIT DIAGRAM

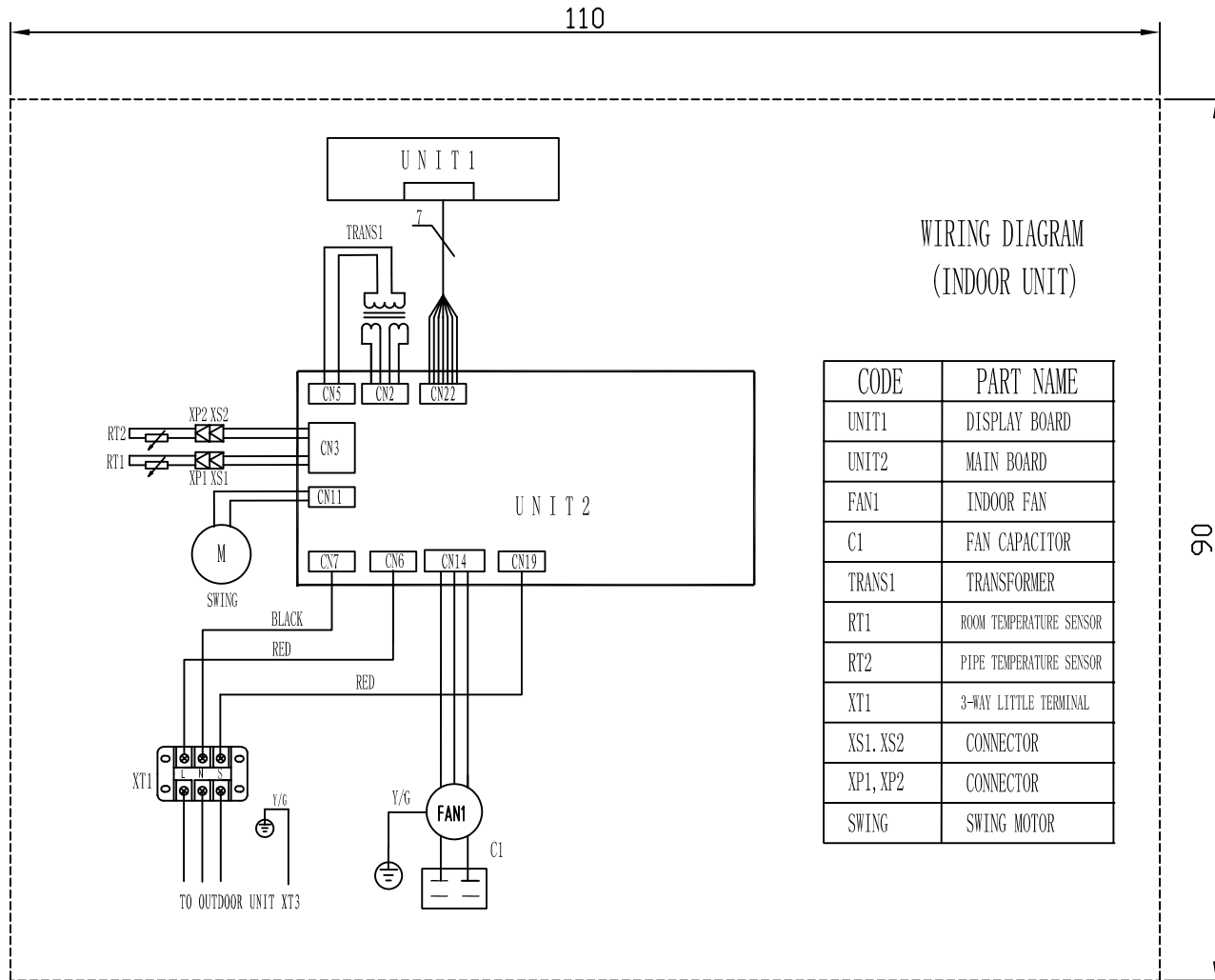
### OUTDOOR UNIT



Model No.: AC-FR30CM  
Version: 1.0



**INDOOR UNIT**



Model No.: AC-FR30CM  
Version: 1.0



**Большая библиотека технической документации**  
<https://splitsystema48.ru/instrukcii-po-ekspluatacii-kondicionerov.html>  
**каталоги, инструкции, сервисные мануалы, схемы.**