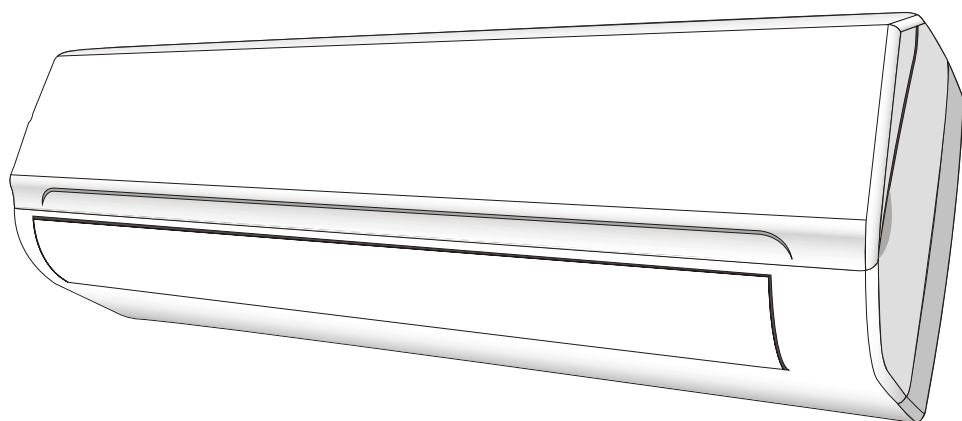




SERVICE MANUAL

Inverter T-series Split System Air Conditioner



- **T70-R410i** 7.5kW Split System Inverter

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Important notice

This service manual is intended for use by individuals possessing adequate backgrounds of electrical, electronic and mechanical experience. Any attempt to repair the appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

The information, specifications and parameter are subject to change due to technical modification or improvement without any prior notice. The accurate specifications are presented on the nameplate label.

How to order spare parts

To have your order filled promptly and correctly, please furnish the following information:

1. Model number with indoor or outdoor
2. Number in the explosion view
3. Part name
4. The quantity you require

Technical specifications

Model No.

T70-R410i

| | | | |
|-------------------------------|----------|-------|----------|
| Compressor | | | Inverter |
| Control type | | | Remote |
| Rated cooling capacity | W | 7,000 | |
| Rated heating capacity | W | 7,500 | |
| EER for cooling | W/W | 3.00 | |
| COP for heating | W/W | 3.10 | |
| Moisture removal | Litres/h | 2.5 | |
| Indoor noise level at cooling | High | dB(A) | 47 |
| | Med. | dB(A) | 45 |
| | Low | dB(A) | 42 |
| Outdoor sound power level | dB(A) | 74 | |

Electrical Data

| | | | |
|---------------|---------|---------|---------------|
| Power supply | | | 220-240V~50Hz |
| Voltage range | V | 155~265 | |
| Rated current | Cooling | A | 10.0 |
| | Heating | A | 10.2 |
| Rated input | Cooling | W | 2,300 |
| | Heating | W | 2,340 |

Refrigerating system

| | | | |
|-------------------|--|--|--|
| Refrigerant | R410A | | |
| Evaporator | Louver fin and grooved tube type (φ7) | | |
| Condenser | Corrugated fin and grooved tube type (φ9.52) | | |
| Expansion device | Capillary tube | | |
| Defrosting system | Microcomputer controlled reverse system | | |

Fan System

| | | | |
|----------------------------|-------------------|-----------|---------------|
| Indoor air circulation (H) | m ³ /h | 1100/1100 | |
| Indoor fan type | Cross Flow | | |
| Indoor fan speed H/M/L | Cooling | rpm | 1400/1240/990 |
| | Heating | rpm | 1400/1240/990 |
| | Dry | rpm | 990 |
| | Sleep | rpm | 990 |
| Indoor fan motor output | W | 35 | |
| Outdoor fan type | Propeller fan | | |
| Outdoor fan speed | rpm | 860 | |
| Outdoor fan motor output | W | 160 | |

Connections

| | | | |
|----------------------|--------------------|-----------------------|------------|
| Refrigerant coupling | | | Flare type |
| Connecting pipe | Gas | Inches | 5/8" |
| | Liquid | Inches | 3/8" |
| Connecting wiring | Size x Core number | 4x0.75, 2x0.75, 2x0.2 | |
| Drainage pipe | O.D 16mm | | |

Others

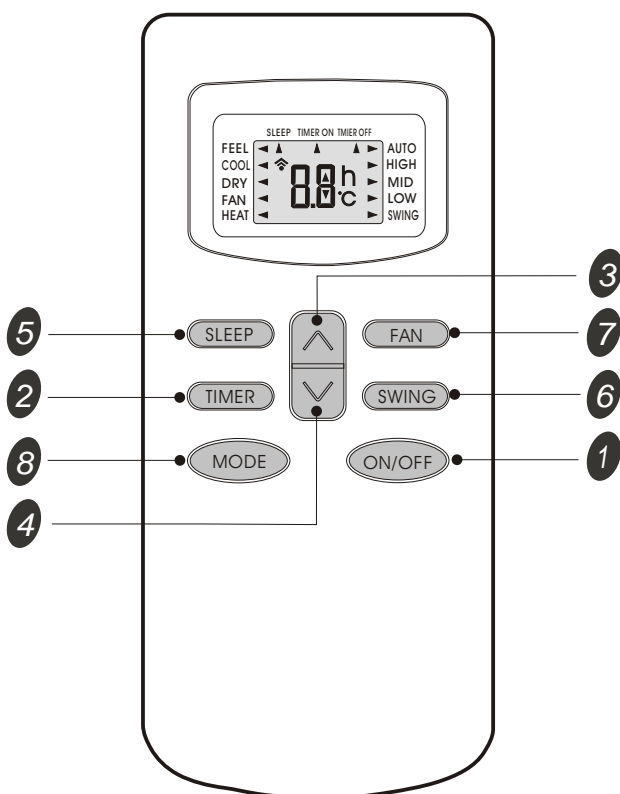
| | | | |
|--------------------------------|----------------|-------|--------------|
| Suitable area | m ² | 30-50 | |
| Net dimensions (W x H x D) | Indoor | mm | 1033×313×202 |
| | Outdoor | mm | 900×805×360 |
| Net weight | Indoor | kg | 14 |
| | Outdoor | kg | 56 |
| Packing dimensions (W x H x D) | Indoor | mm | 1103×400×300 |
| | Outdoor | mm | 1031×835×447 |
| Gross weight | Indoor | kg | 17 |
| | Outdoor | kg | 62 |

Operation Details

Remote controller

Remote controller

The remote controller transmits signals to the system.



- 1 ON/OFF button**
Used to start and stop operation when pressed.
- 2 TIMER button**
Used to select TIMER operation.
- 3 UP button (TOO COOL button)**
Used to increase the set room temperature and time.
- 4 DOWN button (TOO WARM button)**
Used to decrease the set room temperature and time.
- 5 SLEEP button**
Used to set or cancel sleep mode operation.
- 6 VANE control button**
Used to adjust airflow direction.
- 7 FAN SPEED control button**
Used to select the indoor fan motor speed: Auto, High, Mid and Low.
- 8 MODE button**
Used to select the type of operation mode: Feel, Cooling, Dry, Fan and Heating(Only for Heat Pump).

Note: Each mode and relevant function will be further specified in following pages.

Remote Control

The remote controller is not preset as Cooling Only Air Conditioner or Heat Pump by manufacturer. Each time after the remote controller replace batteries or is energized, the arrowhead will flashes on the front of Heat or Cool on LCD of the remote controller.

User can preset the remote controller type depending on the air conditioner type you have purchased as follows:

Press any button when the arrowhead flashes on the front of Cool, Cooling Only is set.

Press any button when the arrowhead flashes on the front of "Heat", Heat Pump is set.

If you don't press any button within 10 seconds, the remote controller is preset as Heat Pump automatically.

Note :

If the air conditioner you purchased is a Cooling Only one, but you preset the remote controller as Heat Pump, it doesn't bring any matter. But if the air conditioner you purchased is a Heat Pump one, and you preset the remote controller as Cooling Only, then you CAN NOT preset the Heating operation with the remote controller.

Electronic Controller

1. Safety Protection

(1) Time Delay for Safety protection

- 3 minutes delay for compressor ---The compressor is ceased for 3minutes before restarting to balance the pressure in the refrigeration cycle in order to protect the compressor.
- 2 minutes delay for 4-way valve---The 4-way valve will be ceased for 2 minutes late after compressor to prevent the refrigerant-gas abnormal noise when the HEATING operation is OFF or switch to the other operation mode.

(2) Discharge temperature protection

There is a temperature sensor on top of compressor, when temperature on top of compressor exceeded the limit, system control will shut down the compressor and the display board will show the error code.

(3) lower voltage protection

When AC voltage $\leq 158V$ and keep it for 10 seconds, unit will be shut down for protection.

(4) Over voltage protection

When AC voltage $\geq 260V$, unit will be shut down and recover while $AC \leq 255V$.

(5) Over current protection

When the current of outdoor unit is overload, controller shut down the unit immediately and show error code.

(6) Compressor abnormality protection

When compressor start on or in the process of running, if there is no feedback to controller or load of compressor is abnormality, the air conditioner will shut down, and show error code.

(7) IPM module protection

IPM module has high temperature & over current protection itself, if there is signal feedback to IPM, the outdoor unit will shut down, LED on outdoor PCB will show the error code.

2. "I Feel" Mode Operation

- (1) When the "I Feel" mode is selected, the operation mode and initial temperature set are determined by the initial room temperature at start-up of the operation except to turn off the air conditioner and operates it again.
- (2) If the mode is change to "I Feel" from other mode, the "I Feel" mode doesn't operate until compressor stop for more than 3 minutes.

| Mode | Initial Room Temperature | Initial Set Temperature |
|---|-------------------------------------|-------------------------|
| COOLING | $RT \geq 26^{\circ}C$ | $23^{\circ}C$ |
| DRY | $26^{\circ}C > RT \geq 20^{\circ}C$ | $RT - 2^{\circ}C$ |
| HEATING for Heat Pump FAN for Cooling Only | $RT < 20^{\circ}C$ | - |

- In the "I Feel" mode, when the controller receives the up or down signal of temperature, the set temperature can adjust by $1^{\circ}C$ upper or lower. The biggest you can adjust by $2^{\circ}C$ upper or lower.

3. "COOLING" Mode Operation

(1) Compressor frequency control

According to difference room temperature and set temperature ($\delta t = RT - ST$), running frequency of compressor is controlled by electronic controller. When room temperature is much higher than set temperature, compressor will start at a high frequency, and as room temperature goes down, compressor running frequency will go down. When room temperature is lower than set temperature, compressor will run at very low frequency. In general, unit will change its running frequency according to δt to make room temperature closing to set temperature.

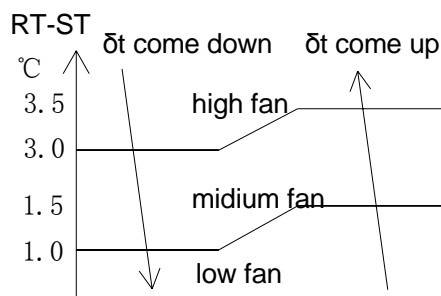
(2) Outdoor temperature affects running frequency of compressor

Outdoor temperature affect compressor's running frequency. Difference inlet temperature of outdoor unit is adapted by difference compressor running frequency. While outdoor temperature is about 30°C, the compressor will run in high frequency.

If unit run in "cooling" mode and outdoor temperature is less than -1°C, controller will shut down compressor and show error code, while the ambient temperature is over 0°C, the compressor will run automatically.

(3) Auto fan control in cooling mode

In cooling mode (include cooling in "I feel" mode), fan speed is determined by δt , as the following diagram:



4. "DRY" Mode Operation

- (1) The system for DRY operation used the same refrigerant circle as the cooling one.
- (2) When the system operates in DRY mode, at first it operates in cooling mode at 16°C or 18°C for 3 minutes. After that, the system will operate in cooling mode with lowest fan speed, meanwhile the set temperature (ST) is "RT-2°C" which means that the ST is room temperature at then minus 2. During the course of this mode, the fan speed set operation and room temperature set are restricted, except the vane motor adjusting.

5. "HEATING" Mode Operation (available for Heat Pump only)

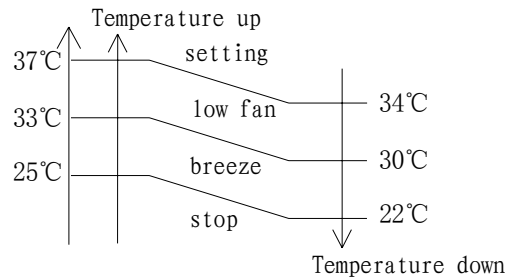
(1) Frequency control

The same as the frequency control in cooling mode, running frequency of compressor is controlled by controller. Unit change its running frequency according to δt to make room temperature closing to the set temperature.

(2) Indoor fan motor control

1. Cold Air Prevention Control

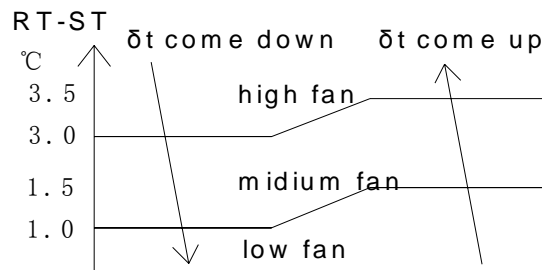
- The function is intended to prevent cold air from being discharged when the heating operation starts or when defrosting.
- The indoor fan speed will be controlled as following.



- In the heating operation, if the air conditioner is turned off, the indoor fan motor will run most for 30 seconds since the stop of compressor.

2. Auto fan control (heating)

In heating mode(include in "I feel" mode) , fan speed is determined by δt , as the following:



(3) 4-way valve control

In heating mode, 4-way valve will power on ahead of compressor for 5 seconds, and cut off for 2 minutes later than compressor's stop. 4-way valve will not power off unless the machine is switched off, mode changed or on the process of defrosting.

(4) Defrosting

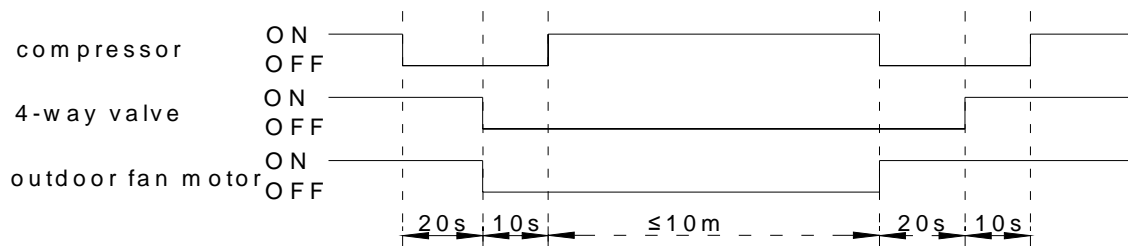
Defrosting is controlled by the microprocessor.

When one of the following conditions is satisfied, unit will come into defrosting:

- Outdoor heat exchanger Temperature (OPT) is continuously less than 3°C while the unit runs for more than 40 minutes, and OPT is keeping under -6°C for more than 3 minutes.
- Outdoor heat exchanger Temperature (OPT) is continuously less than 3°C meanwhile the unit runs for more than 80 minutes, and OPT is keeping under -4°C for more than 3 minutes.
- Outdoor heat exchanger Temperature (OPT) is continuously less than 3°C while the unit runs for more than 120 minutes, and OPT is keeping below -2°C for more than 3 minutes.

Before the air con come into defrosting, compressor running frequency drop down to a lower frequency firstly, then the compressor shuts down.

In defrosting, the max. frequency of compressor is F9 (a little less than the highest frequency). In this period all protection function are available.



In defrosting, LED showing by winking.

Come into or out of defrosting, indoor fan motor speed is the same as Cold Air Prevention Control.

One of the following conditions is satisfied, unit come out of defrosting and shift to heating mode:

- a. Outdoor coil Temperature (OPT) $\geq 15^{\circ}\text{C}$
- b. Defrost time keep time for more than 10 minutes.

(5) Indoor exchanger overheat protection

When Indoor exchanger Temperature(IPT) is higher than 55°C , unit come into indoor exchanger overheat protection. Compressor drop its frequency toward to F1 level until $\text{IPT} \leq 52^{\circ}\text{C}$; If $\text{IPT} \leq 52^{\circ}\text{C}$ and keep for 5 minutes, control system don't limit running frequency.

If $\text{IPT} > 62^{\circ}\text{C}$, control system shut down compressor, and recover when IPT drop less than 50°C .

6. "SLEEP" mode

When the SLEEP button is pressed, the SLEEP mode is selected as following:

- The indoor fan speed is set at low speed, the power lamp and the sleep lamp is on, the display of temperature will be close after 5 minutes.
- When selecting COOLING/DRY operation with SLEEP mode, the set temperature will be raised by 1°C 1 hour later and by 2°C 2 hour later.
- When selecting HEATING operation with SLEEP mode, the set temperature will be dropped by 1°C 1 hour later and 2°C 2hour later.
- After the System operates in SLEEP mode for 8 hours, it will stop automatically.

7. EMERGENCY Operation

When the EMERGENCY Operation switch is pressed once, COOLING mode is selected and if in 3 seconds the EMERGENCY Operation switch is pressed again, mode is selected. Then pressed once again, the unit is switch off.

When the remote controller is missing, has failed or the batteries run down, press the EMERGENCY Operation switch on the front of the indoor unit. The unit will start.

The first 30 minutes of operation will be the test run operation. The operation is for servicing. The indoor fan runs at high speed and the system is in continuous operation. The thermostat is ON and the timer is reset to normal.

After 30 minutes of test run operation the system shifts to AUTO COOLING/HEATING mode, and the indoor fan runs in automatic speed. The operation continues unit the EMERGENCY operation switch is pressed or a button on the remote controller is pressed, the normal operation will start.

NOTE: Do not press the EMERGENCY Operation switch during normal operation.

8. AUTO-RESTART Function (Option)

1. When air conditioner is operating in one mode, all of its operation data, such as working mode and temperature of setup would be memorized into IC by main PCB. If power cuts due to

some reason, when power supply come back again, the AUTO-RESTART function will set synchronously and automatically to work. So the air conditioner would work at the same mode before.

Auto-restart Pre-setting (optional):

If Auto-restart function is needed, follow the steps below to activate this function:

- 1) Pulling the air-con's plug out of socket.
- 2) Pressing and holding the Emergency button (ON/OFF) on the indoor, then insert the plug into the socket again.
- 3) Keep pressing the Emergency button for more than 10 seconds until three short beeps are heard. The **Auto-restart** function has been started.

9. Protection and Failure Display

- When protection display is available, controller will show error code, digital LED shows error code and setting temperature by turns.
- If there is more than one failure, it will show at first that in front of the error list.
- Protection display function can be selected in hardware, and the default don't display;
- To insure of in and out communist is credibility, the failures relate to outdoor unit will remain failure state for 2 minutes max after recovered.
- In all failures, only sensor failures don't have to repower to cancel.

● **Error list**

| Failure type | LED CODE | DIGITAL LED CODE |
|--------------------------------------|-------------------------|------------------|
| In and out communication failure | RUN、TIMER –both winking | E0 |
| Outdoor communication failure | RUN、TIMER –both winking | EC |
| Outdoor sensor | RUN-1 time/8s | E1 |
| Indoor coil temperature sensor | RUN-2 times /8s | E2 |
| Outdoor coil temperature sensor | RUN-3 times /8s | E3 |
| System abnormity | RUN-4 times /8s | E4 |
| Type mismatch | RUN-5 times /8s | E5 |
| Indoor fan motor | RUN-6 times /8s | E6 |
| Outdoor temperature sensor | RUN-7 times /8s | E7 |
| Discharge temperature sensor | RUN-8 times /8s | E8 |
| Invert module abnormity | RUN-9 times /8s | E9 |
| Outdoor fan motor (DC) | RUN-10 times /8s | EF |
| Current sensor | RUN— 11 times /8s | EA |
| EEPROM failure | RUN-12 times /8s | EE |
| Top of compressor temperature switch | RUN-13 times /8s | EP |
| Voltage sensor | RUN-14 times /8s | EU |

Protection display code list:

| Protection type | LED CODE | DIGITAL LED CODE |
|-------------------------------------|--------------------------------|------------------|
| higher or lower voltage | RUN-winking,TIMER-1 time/8s | P1 |
| Over current | RUN- winking,TIMER-2 times /8s | P2 |
| Discharge temperature | RUN- winking,TIMER-4 times /8s | P4 |
| Over cooling in cooling mode | RUN-light,TIMER-5 times /8s | P5 |
| Over heating in cooling mode | RUN- light,TIMER-6 times /8s | P6 |
| Over heating in heating mode | RUN- light,TIMER-7 times /8s | P7 |
| Outdoor temperature too high or low | RUN- light,TIMER-8 times /8s | P8 |
| Drive protection(Overload) | RUN- winking,TIMER-9 times/8s | P9 |
| Module self protection | RUN- winking,TIMER-10 times/8s | P0 |

- Outdoor failure display

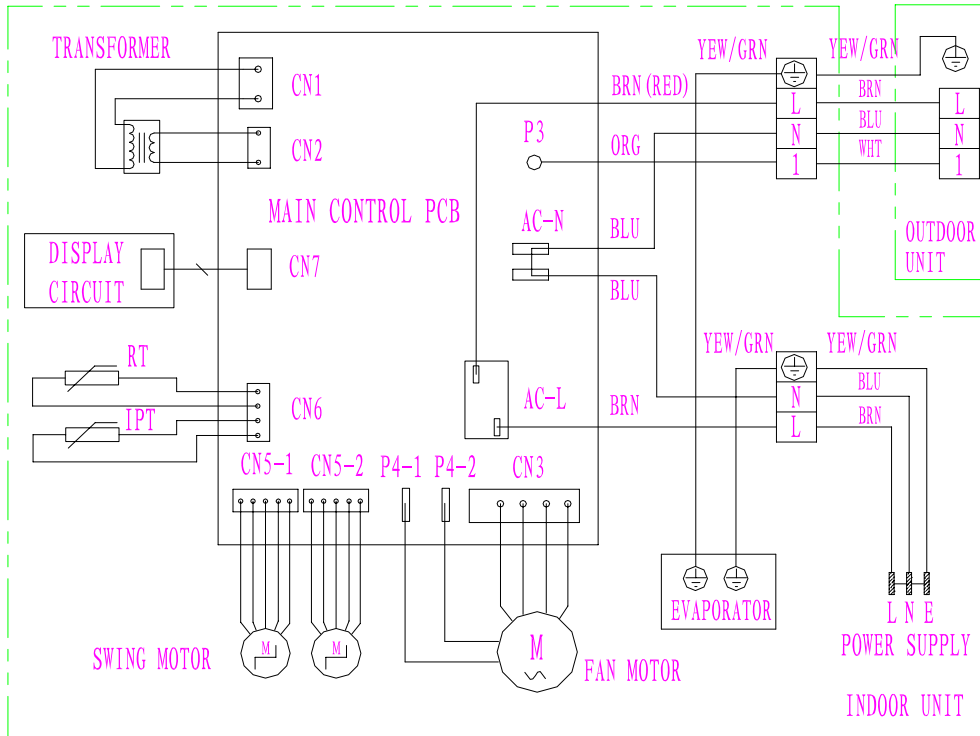
There is a LED on outdoor power board, when compressor is running; it is normally light; when no feedback of signal to power board from compressor, it will wink by lighting 1s and going out 1s. If failures happened, it will light 0.5s, go out 0.5s, winking several times and go out 3s for a cycle to indicate failures. The failure list is the follow:

| Wink time | Failure |
|-----------|--|
| 1 | IPM protection |
| 2 | higher or lower voltage |
| 3 | Over current |
| 4 | Discharge temperature too high |
| 5 | Outdoor coil temperature too high |
| 6 | Drive abnormality |
| 7 | Communication abnormality with indoor unit |
| 8 | Compressor over heat (switch on top of compressor) |
| 9 | Outdoor air temperature sensor failure |
| 10 | Outdoor coil temperature sensor failure |
| 11 | Outdoor discharge pipe temperature sensor failure |
| 12 | Voltage sensor failure |
| 13 | Current sensor failure |
| 14 | IPM abnormality |
| 15 | Outdoor communication abnormality |
| 16 | DC fan motor no feedback |
| 17 | defrosting |

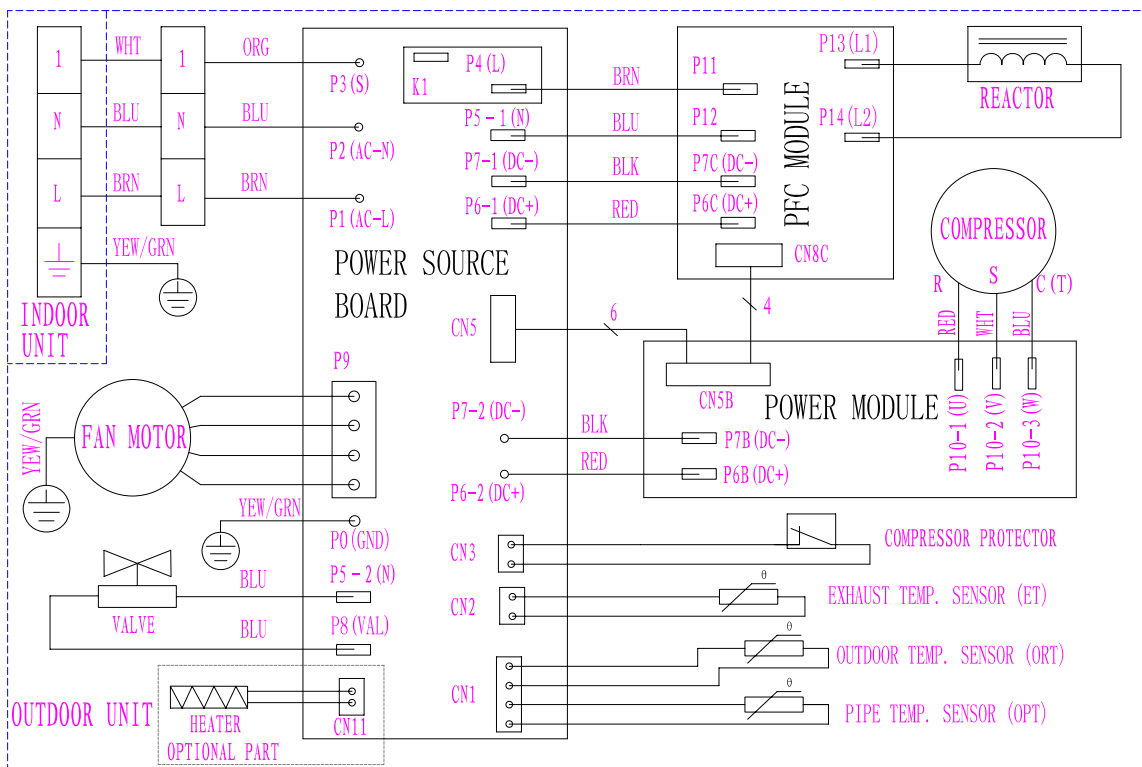
WIRING DIAGRAM

MODEL: T92/T632k

INDOOR UNIT:



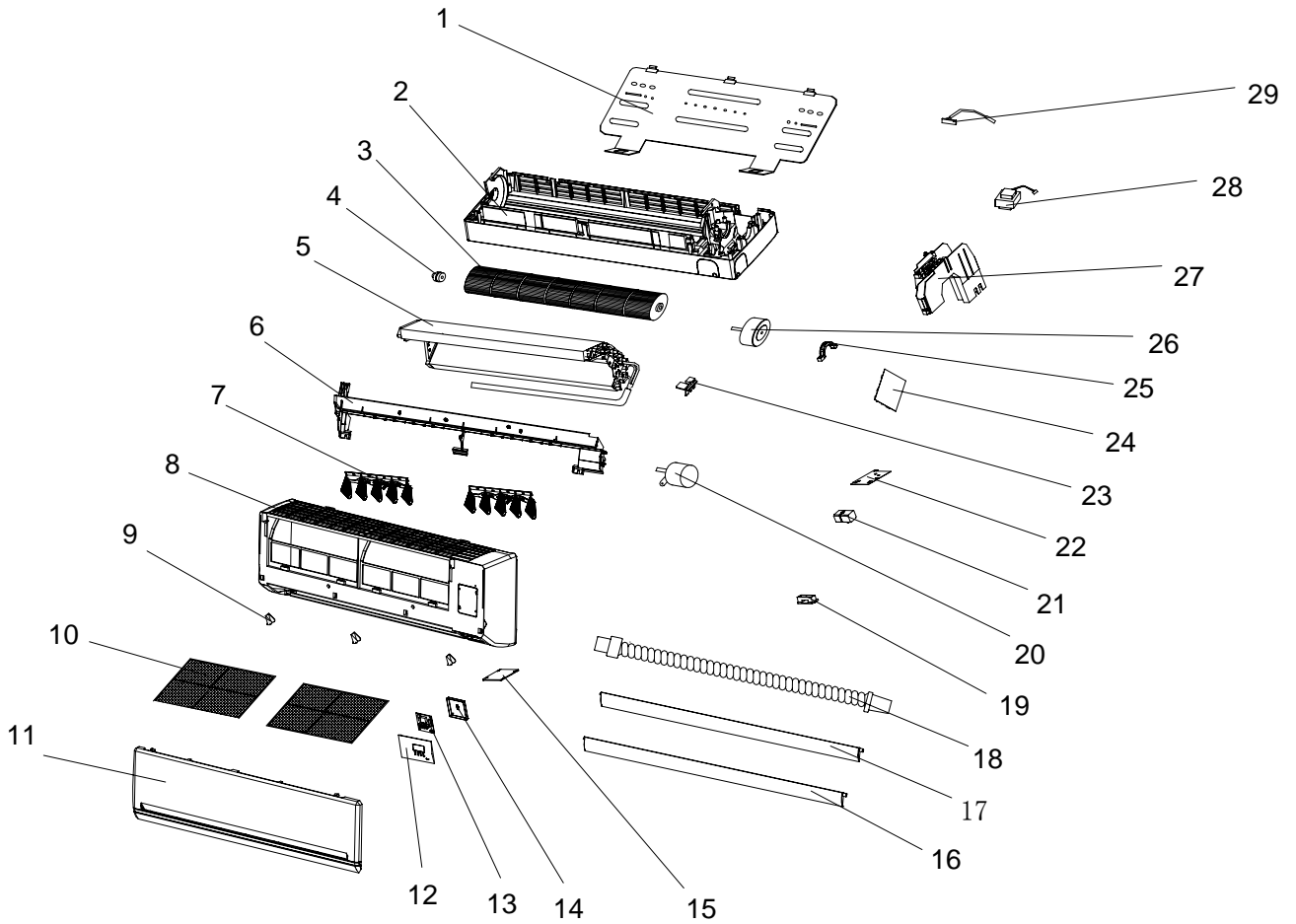
OUTDOOR UNIT:



EXPLOSION VIEW

MODEL: V92/T632K'

INDOOR UNIT:



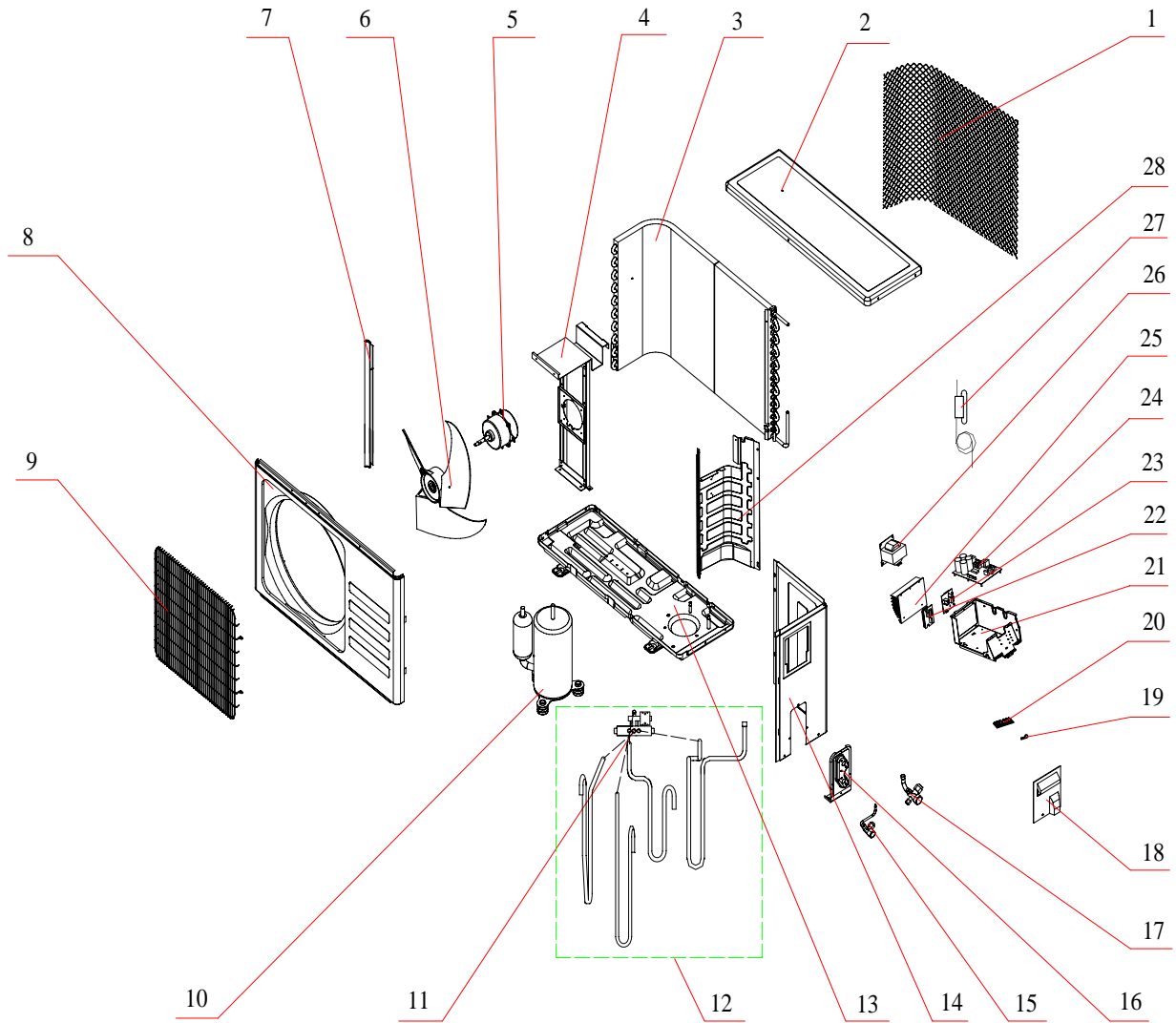
Indoor Unit-V92/T632K'

| No. | Part No. | Part Name | Q'ty | Remark |
|-----|----------|-----------------------------|------|-----------------------------|
| 1 | | Installation Plate | 1 | |
| 2 | | Base | 1 | |
| 3 | | Cross Fan | 1 | |
| 4 | | Bearing Mount | 1 | |
| 5 | | Evaporator | 1 | |
| 6 | | Water Drainage Assembly | 1 | |
| 7 | | Vertical Vane Assembly A | 1 | |
| | | Vertical Vane Assembly B | 1 | |
| 8 | | Face Frame | 1 | |
| 9 | | Screw Cover | 3 | |
| 12 | | Left Air Filter | 1 | |
| | | Right Air Filter | 1 | |
| 13 | | Front Panel | 1 | |
| 14 | | Display PCB Cover | 1 | |
| 15 | | Display PCB (digital) | 1 | |
| 16 | | Electrical Box Cover | 1 | |
| 17 | | Vane A | 1 | |
| 18 | | Vane B | 1 | |
| 19 | | Drainage Hose | 1 | |
| 20 | | Cable Clamp (ϕ 10) | 1 | |
| | | Cable Clamp (ϕ 8) | | |
| 21 | | Vane Motor | 2 | |
| 22 | | Terminal1 | 1 | |
| | | Terminal2 | 1 | |
| 23 | | Terminal Fixing Board | 1 | |
| 24 | | Sensor Holder | 1 | |
| 25 | | Main PCB(digital) | 1 | |
| 26 | | Indoor Motor Cover | 1 | |
| 27 | | Indoor Motor | 1 | |
| 28 | | Electrical Box | 1 | |
| 29 | | Transformer | 1 | |
| 30 | | Indoor Sensor Assembly | 1 | |
| 31 | | Remote Controller | 1 | Not shown in Explosion view |
| 32 | | Remote Controller Supporter | 1 | |
| 33 | | Indoor Carton | 1 | |
| 34 | | Left Foaming | 1 | |
| 35 | | Right Foaming | 1 | |
| 36 | | Middle Pasteboard Supporter | 1 | |
| 37 | | Middle Foaming Supporter | 1 | |

EXPLOSION VIEW

MODEL: V92/T632k

OUTDOOR UNIT:



Outdoor Unit- V92/T632k

| No. | Part Name | Q'ty | Remark |
|-----|--|------|-----------------------------|
| 1 | Grille | 1 | |
| 2 | Top Cover | 1 | |
| 3 | Condenser | 1 | |
| 4 | Outdoor Motor Supporter | 1 | |
| 5 | Outdoor Motor | 1 | |
| 6 | Propeller Fan | 1 | |
| 7 | Left Grille Supporter | 1 | |
| 8 | Front Plate | 1 | |
| 9 | Fan Guard | 1 | |
| 10 | Compressor And It Accessories | 1 | |
| 11 | 4-way Valve | 1 | |
| 12 | 4-way Valve Assembly | 1 | |
| 13 | Base | 1 | |
| 14 | Right Plate | 1 | |
| 15 | Two-way Valve | 1 | |
| 16 | Valve Supporter | 1 | |
| 17 | Three-way Valve | 1 | |
| 18 | Electrical Box Cover | 1 | |
| 19 | Cable Clamp(ϕ 10) | 1 | |
| 20 | Terminal | 1 | |
| 21 | Electrical Parts Box | 1 | |
| 22 | PFC Board | 1 | |
| 23 | Inverter module | 1 | |
| 24 | Power source board | 1 | |
| 25 | Radiator | 1 | |
| 26 | Inductor | 1 | |
| 27 | Capillary assembly | 1 | |
| 28 | Partition plate | 1 | |
| 29 | Pipe Temp. sensor and outdoor Temp. sensor | 1 | Not shown in Explosion view |
| 30 | Discharge Temp. sensor | 1 | |
| 31 | Base Carton | 1 | |
| 32 | Cabinet Carton | 1 | |
| 33 | Cover Forming | 1 | |
| | | | |