

Technical Service Manual

Ducted type unit (2.3KW-16KW)

Version One



GREE ELECTRIC APPLIANCES.INC.OF ZHUHAI



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Section One A series small ducted type unit

Overview of chapter one

1.1, Product summary

The ducted type unit means that the outdoor unit and the indoor unit are connected by a copper pipe and the air-supply pipe leads to each room from the indoor. That is why it is called the ducted pipe unit. The detailed working method is that: the indoor heat exchangers gather in an indoor unit, the cool air produced by the indoor unit is sent to each room from the system air duct, then is sent back to the indoor unit via the air duct, after it is cooled and mixed with some fresh air, it is sent out again. This is a central air conditioner with the complete air system.

Gree’s A series of air conditioner unit with the air supplied by the small air duct combines the advantages of the central air conditioner which are being comfortable and top-grade and the advantages of the small type of separated home air conditioner which are being convenient and flexible in installation, etc. It is highly efficient, energy-saving with a long air supply distance and good indoor air quality. It is reliable in operation and convenient in usage and is widely applied to various small supermarkets, chain stores, families with multiple living rooms, hotels, restaurants, offices, meeting rooms and villa families.

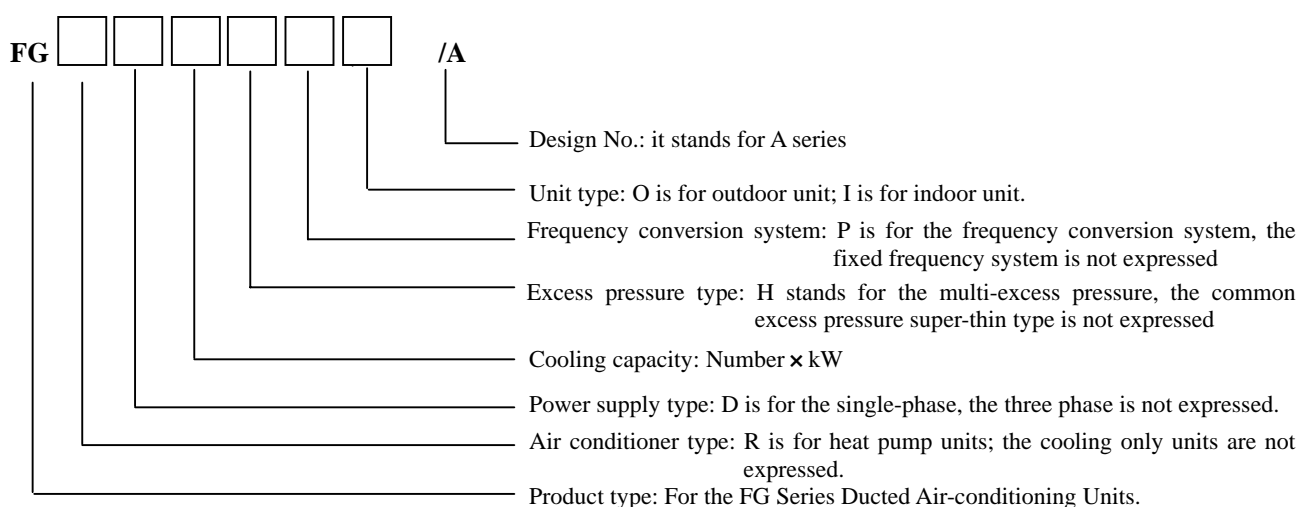
The existing models of the A series of small ducted type units are shown in Table 1.1-1.

Table 1.1-1

Item	Cooling only		Heat pump	
Multi-excess pressure unit	FG2.6H/A FG5H/A FG7.5H/A FG10H/A	FG3.5H/A FG6.5H/A FGD10H/A FG12H/A	FGR2.6H/A FGR3.5H/A FGR5H/A FGR7.5H/A FGRD10H/A	FGR6.5H/A FGR10H/A FGR12H/A
Common excess pressure unit	FG6.5/A FG10/A	FG7.5/A FG12/A	FGR6.5/A FGR7.5/A FGR10/A	FGR12/A

1.1, Expression method and example of unit model

1.2.1 Product expression



1.2.2 Example

FGRD10H/A: Referring to the one-way-electricity, multi-excess-pressure ducted air-conditioning (heat pump) unit with a nominal cooling capacity of 10kW.

FG6.5/A: Referring to the cooling-only, common-excess-pressure ducted air-conditioning unit with a nominal cooling capacity of 6.5kW.



1.1, Unit outline drawing and combination example

1.3.1 Outline drawing:

Indoor unit with round air supply port



Indoor unit with rectangle air supply port



Outdoor unit





FG Series wind pipe blowing air-conditioning unit

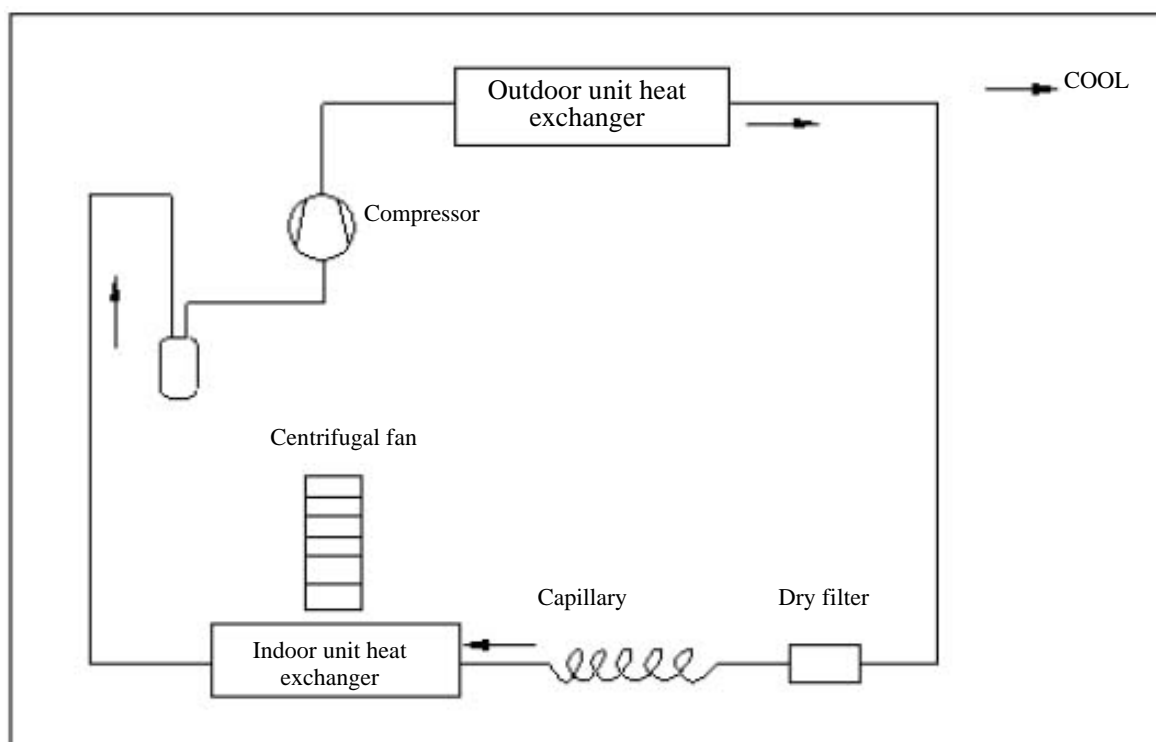
1.3.2 Example

Combination of small ducted type unit and indoor and outdoor units



1.1, Unit working principle and system drawing

(a) working principle drawing of cooling only unit



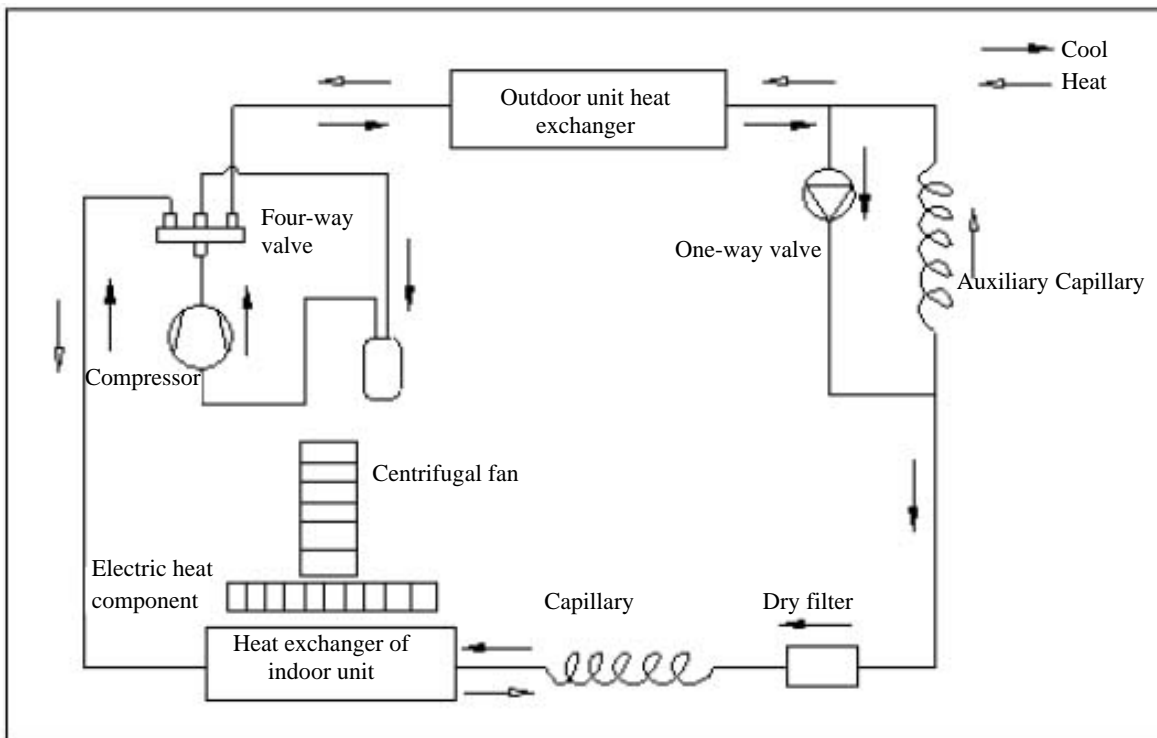
Cooling circle: The compressor sucks the steam of the low-temperature and low-pressure cooling agent inside the evaporator into the compressor. After it is compressed, it becomes the high-temperature and high-pressure gas and is discharged into the condenser. Inside the condenser, the high-temperature and high-pressure gas of the cooling



System principle

agent performs the heat exchange with the outdoor air and passes the heat to the air, then it is condensate and becomes the liquid of the high-temperature and high-pressure cooling agent. After its temperature and pressure are lowered by the capillary throttle, it enters the evaporator. The gas-liquid 2 phase cooling agent in the evaporator completely vaporizes and thus cools the indoor air. The steam from the evaporator is again sucked in by the compressor and is compressed. It continuously circles this way. The cooled air which is operated by the fan, is continuously sent to the air conditioning area from the air duct.

Heating circle: The heating circle is the reverse cycle of the cooling circle. At this time the four-way valve changes the direction. That is, the steam discharged from the compressor enters the indoor heat exchanger to become condensate. The condensate cooling agent passes the capillary throttle and then vaporizes in the outdoor heat exchanger. After it vaporizes, it is again sucked in by the compressor and is compressed. It continuously circles this way. The heated air which is operated by the fan, is continuously sent to the air conditioning area from the air duct.





Technical parameter

1.1, Product specifications and technical parameters

1.6.1 Performance parameter table for common excess pressure unit

Item		Model	FG6.5/	FGR6.5/	FG7.5/	FGR7.5/	FGD10/	FGRD10/	FG10/	FGR10/	FG12/	FGR12/
			A	A	A	A	A	A	A	A	A	A
Cooling capacity		W	6500	6500	7500	7500	10000	10000	10000	10000	12000	12000
Heating capacity (Heat pump/auxiliary heat)		W	-	7000 (1200)	-	8000 (2100)	-	11000 (3600)	-	11000 (3600)	-	13000 (3600)
Dry capacity		kg/h	1.85	1.85	2.9	2.9	3.9	3.9	3.9	3.9	5.4	5.4
Air volume		m ³ /h	1250				1700					
The static pressure of out unit		Pa	39				50					
Noise	Indoor	dB(A)	43				45					
	Outdoor	dB(A)	59				62					
Current	Cooling	A	11.7	12.2	13.8	14.0	15.8	16.2	6.7	7.0	8.2	8.4
	Heat pump (auxiliary electricity)	A	-	10.4 (9.55)	-	12.9 (9.55)	-	15.3 (16.36)	-	6.7 (5.45)	-	8.1 (5.45)
Starting current		A	56	56	70	70	90	90	45	45	55	55
Power	Cooling	W	2400	2420	2600	2630	3370	3400	3600	3620	4530	4550
	Heat pump/Auxiliary heat	W	-	2050 (2100)	-	2450 (2100)	-	3228 (3600)	-	3728 (3600)	-	4400 (3600)
Max. power		W	3000	4300	3600	4600	4420	7820	4300	7400	5800	8300
Power supply			~220V 50Hz						3N~380V 50Hz			
Compressor			Entirely close rotary			Entirely close rotary						
Refrigerant			R22									
Charge volume		kg	1.85	2.1	2.4	2.4	3.5	3.5	3.4	3.5	3.6	3.8
Indoor unit	Width	mm	1074				1395					
	Depth	mm	736									
	Height	mm	260									
	Net weight	kg	37				49					
	Dimension of air outlet	Length	mm	918				1155				
Width		mm	207									
Outdoor unit	Width	mm	950									
	Depth	mm	412									
	Height	mm	700		700		1250					
	Net weight	kg	59		59		112					
Connection pipe	Diameter of gas pipe	mm	16				19					
	Diameter of liquid pipe	mm	9.52				12					
Diameter of water drainage pipe (inside diameter × wall thickness)		mm	30 × 1.5									

Note: 1. The applicable standard for this unit design is GB/T18836-2002

2. The cooling/heating capacity in the above table is measured under the nominal operation condition when the static pressure outside the unit is zero. The parameters will change as the products are improved. The parameters on the unit nameplate shall prevail.
3. The size of the (lower) air return port is the same as that of the air supply port.
4. The noise is the measured value tested in the half silencing room. The real value of running will be slightly higher due to the environment change.



FG Series wind pipe blowing air-conditioning unit

1.6.2 Performance parameter of multi-excess pressure unit

Item		model		Cooling only				Heat pump			
				FG2.6H/A	FG3.5H/A	FG5H/A	FG6.5H/A	FG2.6H/A	FG3.5H/A	FG5H/A	FG6.5H/A
Cooling capacity		W	2650	3500	5000	6500	2650	3500	5000	6500	
Heating capacity (Heat pump/auxiliary heat)		W	-	-	-	-	2900(300)	3700(800)	5300(1500)	7200(2100)	
Current	Cooling	A	4.2	5.6	8.9	12.0	4.5 5.0(3.7)	6.8	8.9	12	
	Heat pump/Auxiliary heat	A	-	-	-	-		6.1(3.7)	8.54(6.82)	10.9(9.55)	
Power	COOL	W	900	1320	1935	2550	930	1340	1935	2550	
	Heat pump/Auxiliary heat	W	-	-	-	-	998(800)	1217(800)	1849(1500)	2200/2100	
Power supply		~ 220V 50Hz									
Compressor		Entirely close rotary									
Fan capacity l		m ² /h	450	520	840	1400	450	520	840	1400	
Static pressure of out unit		pa	25-15		60-40	120-70	25-15		60-40	120-70	
Noise	Indoor	dB(A)	37	40	42	46	37	40	44	46	
	Outdoor	dB(A)	55	56	56	59	55	56	57	59	
Refrigerant		R22									
Filling volume of cooling agent (kg)			0.9	1.1	1.5	1.85	0.94	1.15	1.7	2.1	
Connection pipe	Diameter of liquid pipe	mm	6	6	6	9.52	6	6	6	9.52	
	Diameter of gas pipe	mm	9.52	12	12	16	9.52	12	12	16	
Indoor unit	Width	mm	913		980	1108	913		980	1108	
	Depth	mm	680		736	756	680		736	756	
	height	mm	220		276	300	220		276	300	
	weight	kg	27		36	55	27		36	55	
	Dimension of air outlet	Length	mm	515		738	918	515		738	918
		Width	mm	102		125	207	102		125	207
Dimension of air returning	Length	mm	750		738	918	750		738	918	
	Width	mm	172		207	250	172		207	250	
Outdoor unit	Width	mm	760		760	950	760		760	950	
	Depth	mm	250		250	412	250		250	412	
	height	mm	530		530	700	530		530	700	
	weight	kg	32		40	59	32		40	59	
Diameter of water drainage pipe(Outer X inner)		mm	20 × 1.5		30 × 1.5		20 × 1.5		30 × 1.5		

Note:1, The applicable standard for this unit design is GB/T18836-2002

- The air quantity is measured under the excess pressure outside the corresponding standard unit.
- The cooling/heating capacity in the above table is measured under the nominal operation condition when the static pressure outside the unit is zero. The parameters will change as the products are improved. The parameters on the unit nameplate shall prevail.
- The static pressure of out unit is high static pressure--- standard static pressure could be changed by the wires of the electric box, the setting is standard static pressure of leaving factory.
- The noise is the measured value tested in the half silencing room, the real value of running will be slightly higher due to the environment change.



Technical parameter

Continuous table

Item		model	Cooling only					Heat pump					
			FGT.6H/ A	FGD20H/ A	FGD20H/ A	FG12H/ A	FG1G/ C	FGT.6H/ A	FGD20H/ A	FGD20H/ A	FG12H/ A	FG1G/ C	
Cooling capacity		W	7500	10000	10000	12000	16000	7500	10000	10000	12000	16000	
Heating capacity (Heat pump/auxiliary heat)		W	-	-	-	-	-	2200 (2100)	11000 (5600)	11200 (5600)	15200 (5600)	12000 (5600)	
Current	Cooling	A	13.7	17.8	6.9	8.3	10.5	13.9	18.2	6.9	8.3	10.3	
	Heat pump/auxiliary heat	A	-	-	-	-	-	12.7 (9.55)	17.3 (16.36)	6.6/12.1	8.0 (5.45)	10.9 (5.5)	
Power	Cooling capacity	W	2800	3550	3800	4800	5200	2850	3580	3900	4800	5200	
	Heat pump/Auxiliary heat	W	-	-	-	-	-	2555 (2100)	3400 (3600)	3500 (3600)	4475 (3600)	5350 (3600)	
Power supply			~ 220V 50Hz		3 ~ 330V 50Hz			~ 220V 50Hz		3 ~ 330V 50Hz			
Compressor			Entirely close scroll compressor										
Air volume		m ² /h	1400	2000			1400	2000		2500			
Static pressure of out unit		pa	High static pressure 120pa Standard static pressure 70pa										
Noise	Indoor	dB(A)	46	48			53	46	48		53		
	Outdoor	dB(A)	59	62			64	59	62		64		
Refrigerant			R22										
Charge volume (kg)			2.4	3.5	3.4	3.6	5.0	2.4	3.5	3.5	3.8	5.0	
Connecti on pipe	Diameter of liquid pipe	mm	9.52	12			12	9.52	12			12	
	Diameter of gas pipe	mm	16	19			22	16	19			22	
Indoor unit	Width	mm	1106	1463			1463	1106	1463			1463	
	Depth	mm	756	756			756	756	756			756	
	Height	mm	300	300			370	300	300			370	
	Net weight	kg	55	72			95	55	72			95	
	Dimension of air outlet	Length	mm	918	1155			1155	918	1155			1155
		Width	mm	207	207			273	207	207			273
Dimension of air returning	Length	mm	1006	1278			1278	1006	1278			1278	
	Width	mm	250	250			320	250	250			320	
Outdoor unit	Width	mm	950	950			950	950	950				
	Depth	mm	412	412			412	412	412				
	Height	mm	700	1250			1250	700	1250				
	Net weight	kg	59	112			120	59	112				
Diameter of water drainage pipe(Outer X inner)		mm	30 × 1.5										

Operation condition of conditioner:

Temp Condition	Indoor side status		Outdoor side status	
	Dry bulb temp.	Wet bulb temp.	Dry bulb temp.	Wet bulb temp.
Nominal cooling	27	19	35	24
Nominal heating	20	- -	7	6
Max. cooling	32	23	43	26
Min. cooling	18	14	18	- -
Max. heating	24	18	27	- -
Low temp. heating	15	- -	- 7	- 8



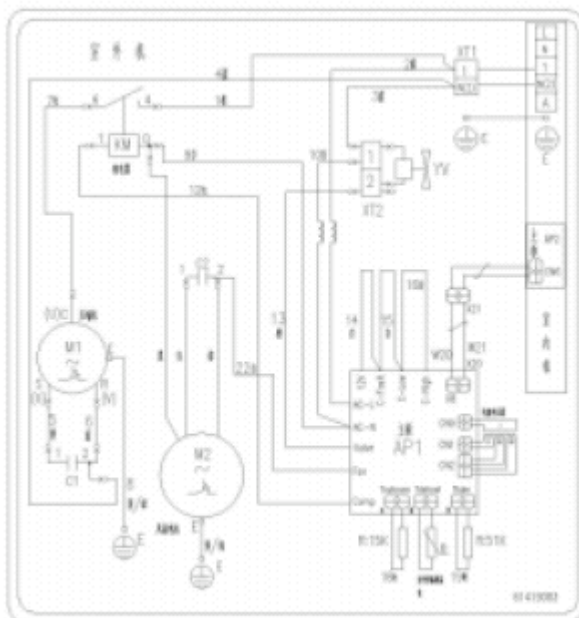
FG Series wind pipe blowing air-conditioning unit

Chapter 2 Electricity and control

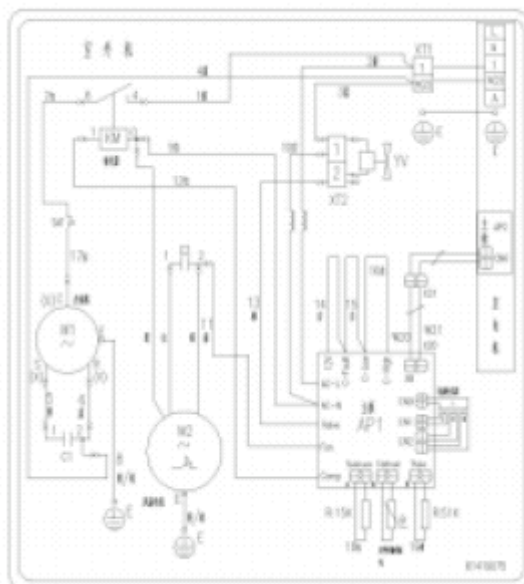
2. Light current

2.1.1 Circuit diagram

FGR2.6H/A(0) circuit diagram



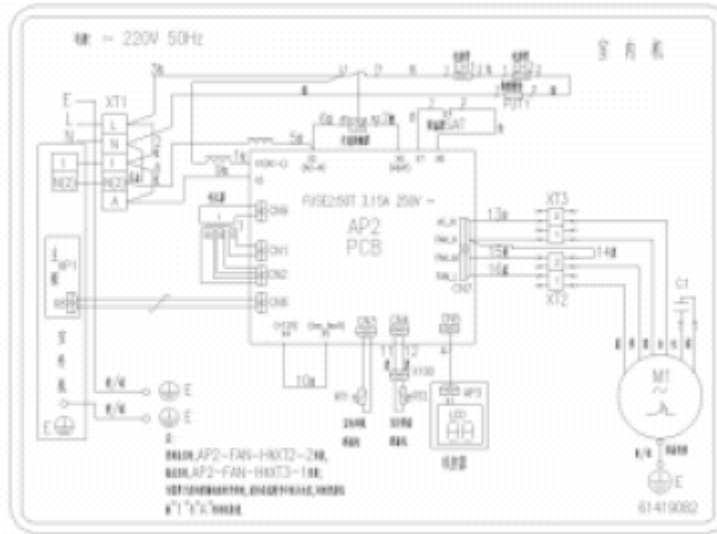
FGR3.5H/A(0) circuit diagram



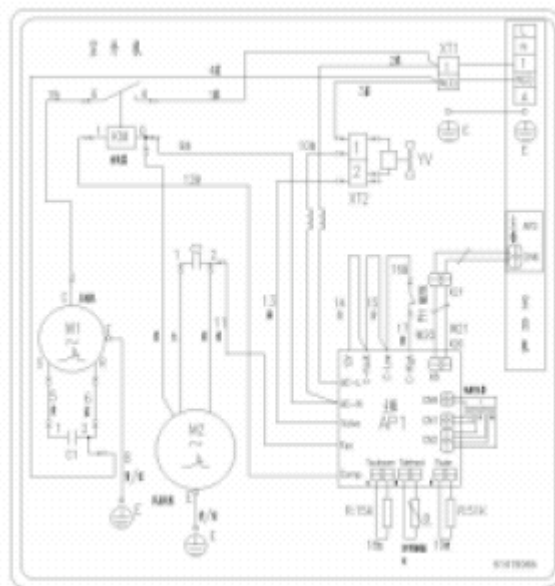


Circuit diagram

FGR2.6H/A(I); FGR3.5H/A(I) circuit diagram



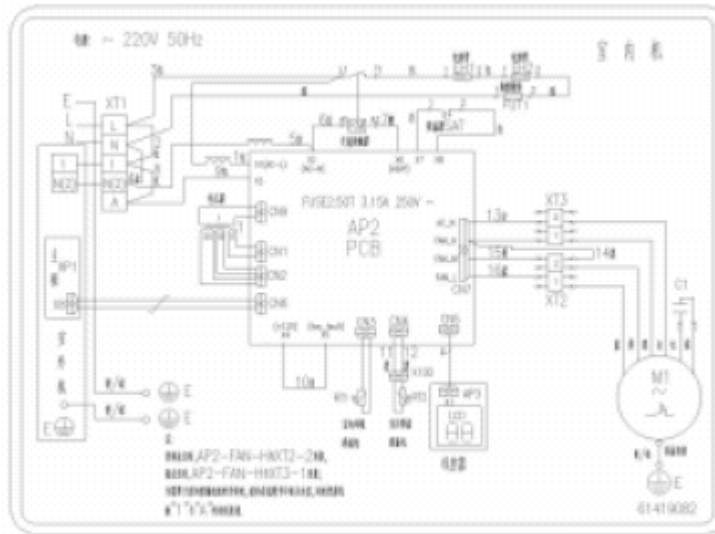
FGR5H/A(0) circuit diagram



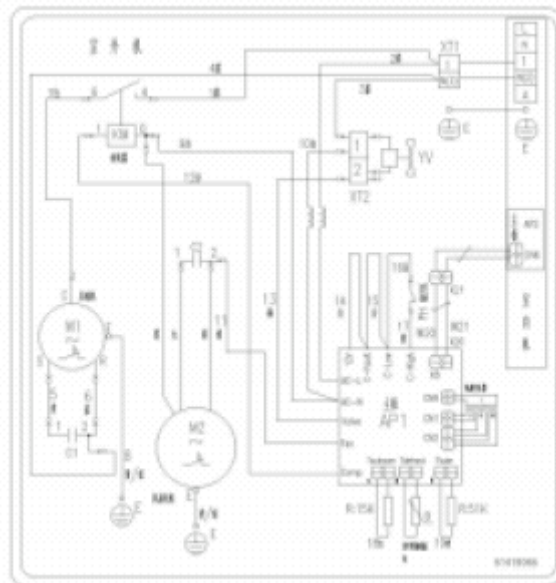


FG Series wind pipe blowing air-conditioning unit

FGR5H/A (I) circuit diagram



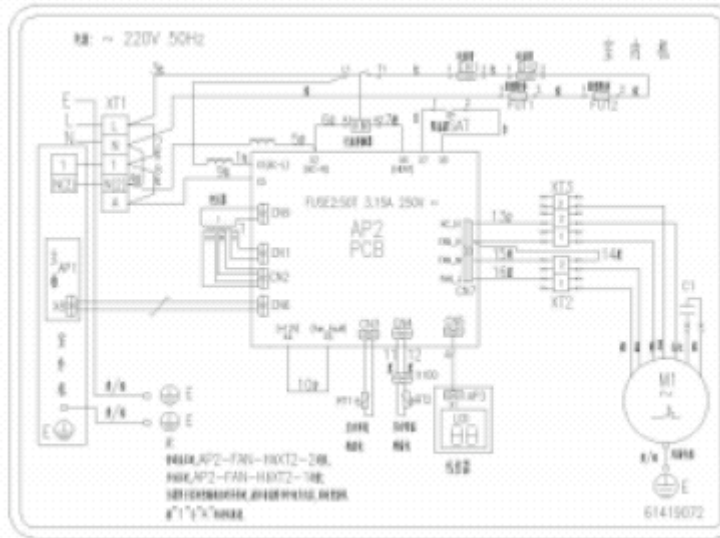
FGR6.5H/A (0); FGR7.5HA (0): circuit diagram



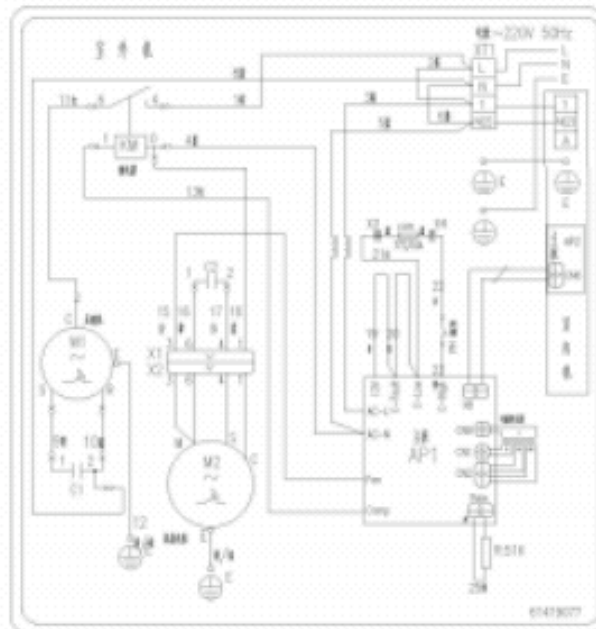


Circuit diagram

FGR6.5H/A(I);FGR7.5H/A(I) circuit diagram



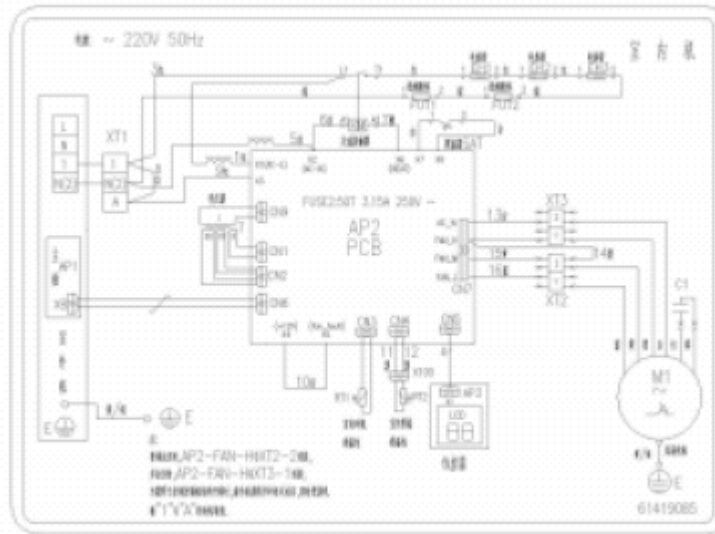
FG6.5/A(0); FG6.5H/A (0)



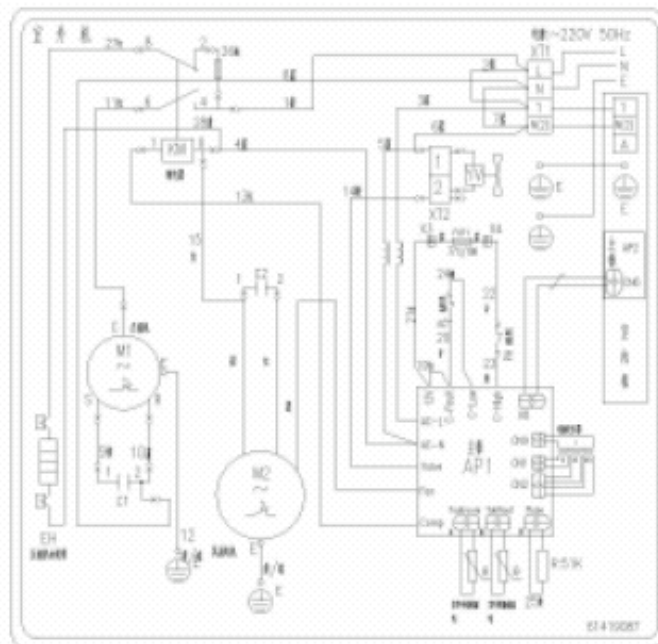


FG Series wind pipe blowing air-conditioning unit

FG6.5H/A(I); FG7.5H/A(I) circuit diagram



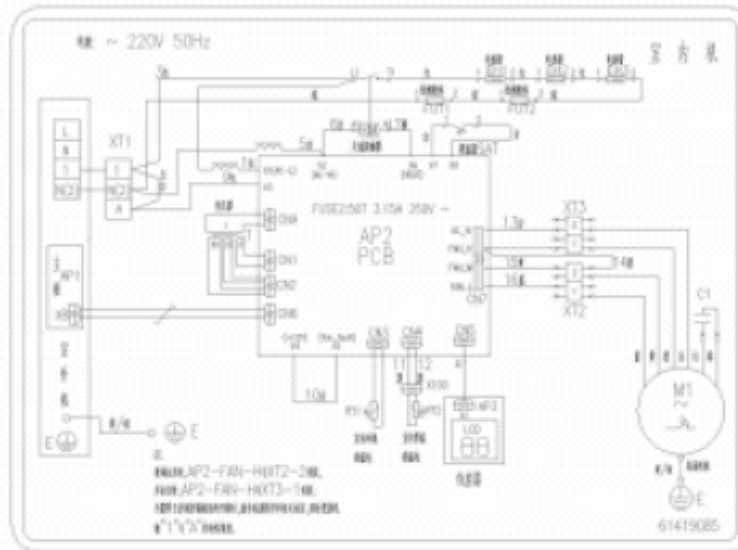
FGR7.5/A(0); FGR7.5H/A(0) circuit diagram



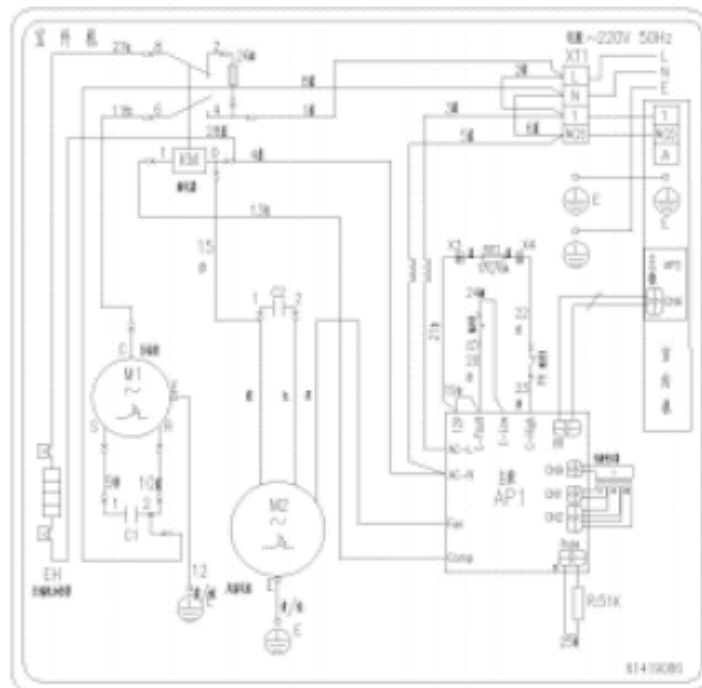


Circuit diagram

FGR6.5/A(I);FGR7.5/A(I) circuit diagram



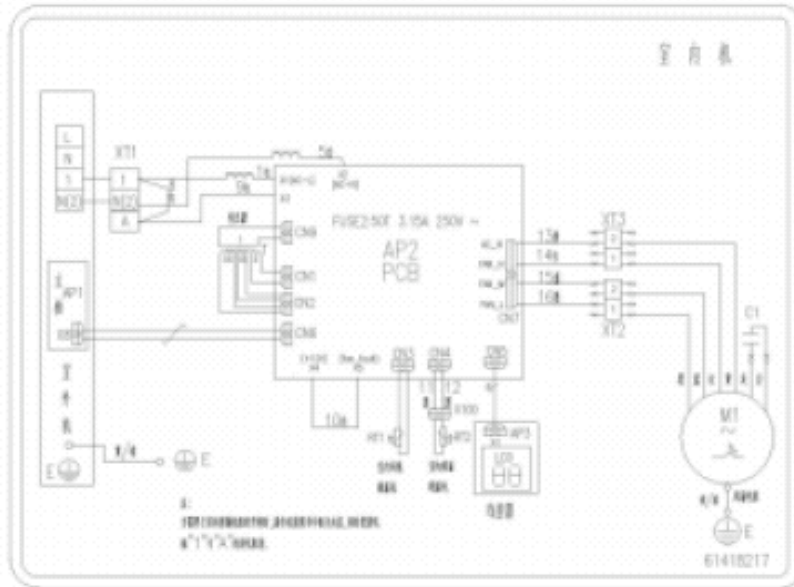
FG7.5/A(0);FG7.5H/A(0) circuit diagram



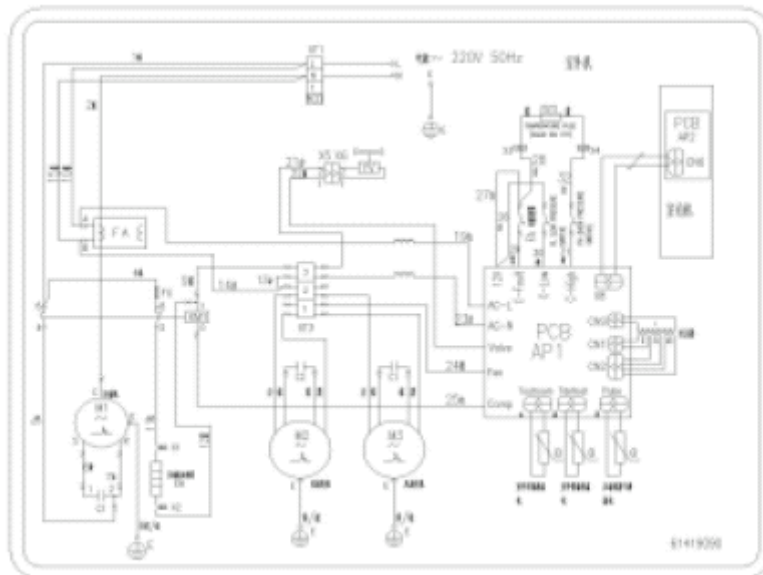


FG Series wind pipe blowing air-conditioning unit

FG7.5/A(I);FG6.5/A(I) circuit diagram



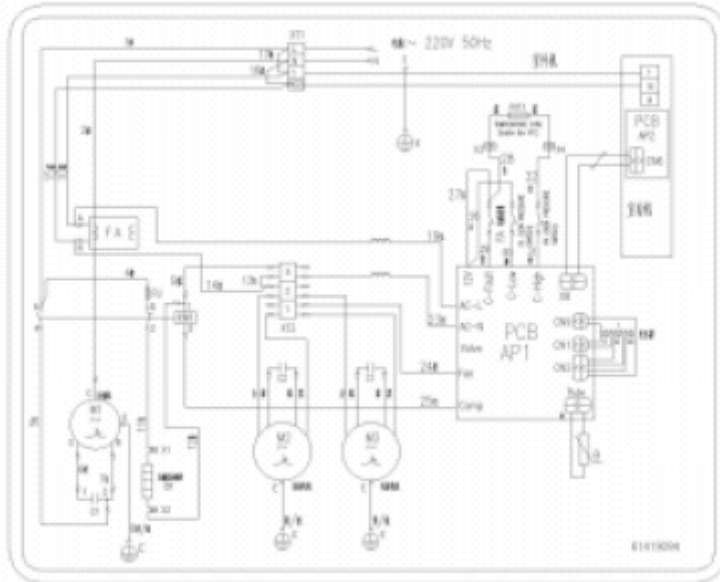
FGRD10/A(0);FGRD10H/A(0) circuit diagram



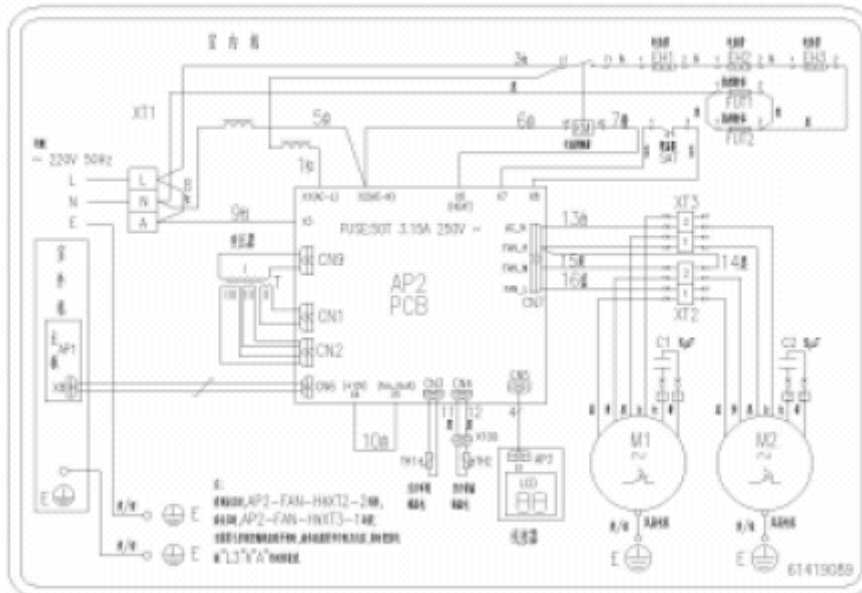


Circuit diagram

FGD10/A(0);FGD10H/A(0) circuit diagram



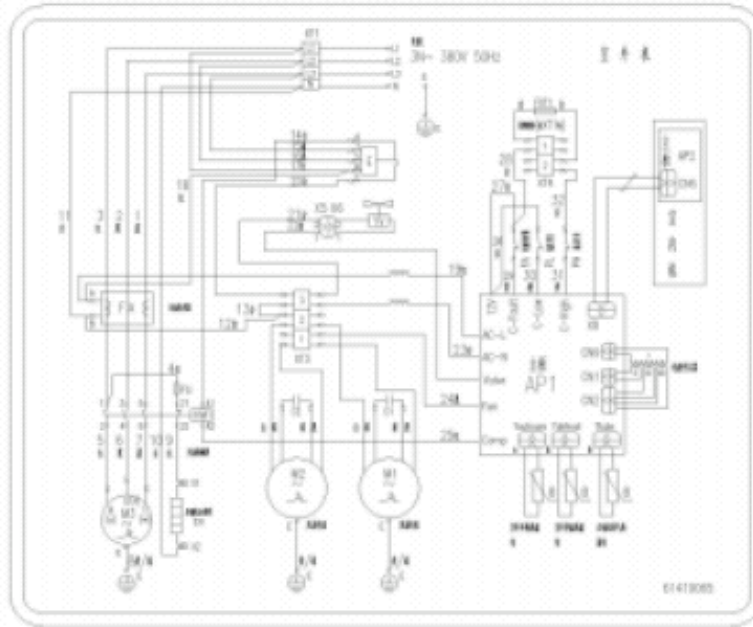
FGRD10H/A(I);FGRD10/A(I) circuit diagram



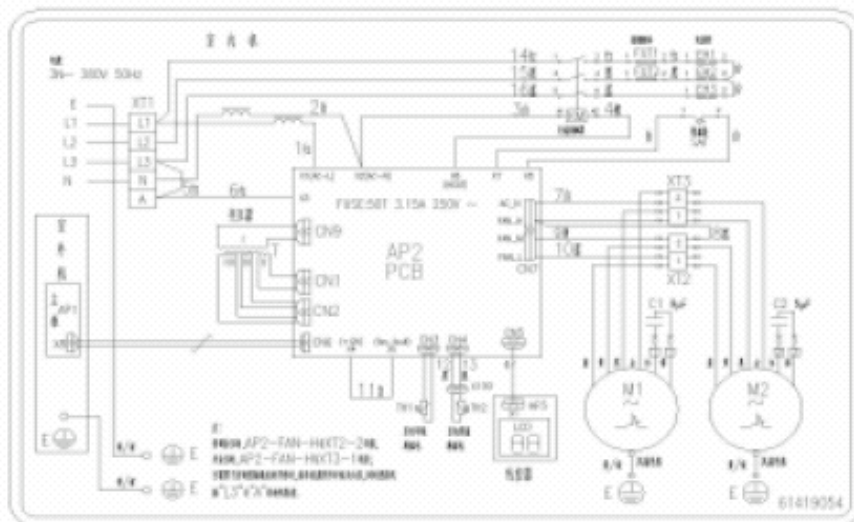


FG Series wind pipe blowing air-conditioning unit

FGR12/A(0);FGR10/A(0);FGR12H/A(0); FGR10H/A(0) circuit diagram



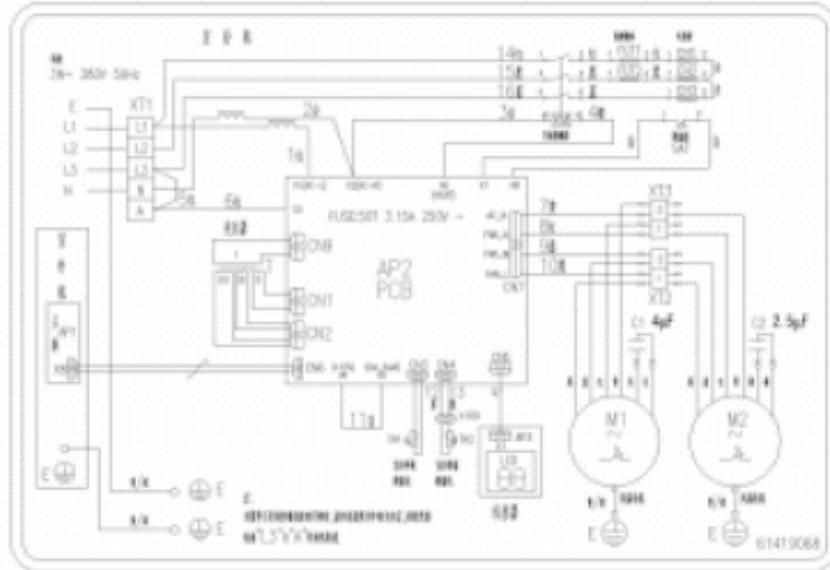
FGR12H/A(I);FGR10H/A(I) circuit diagram



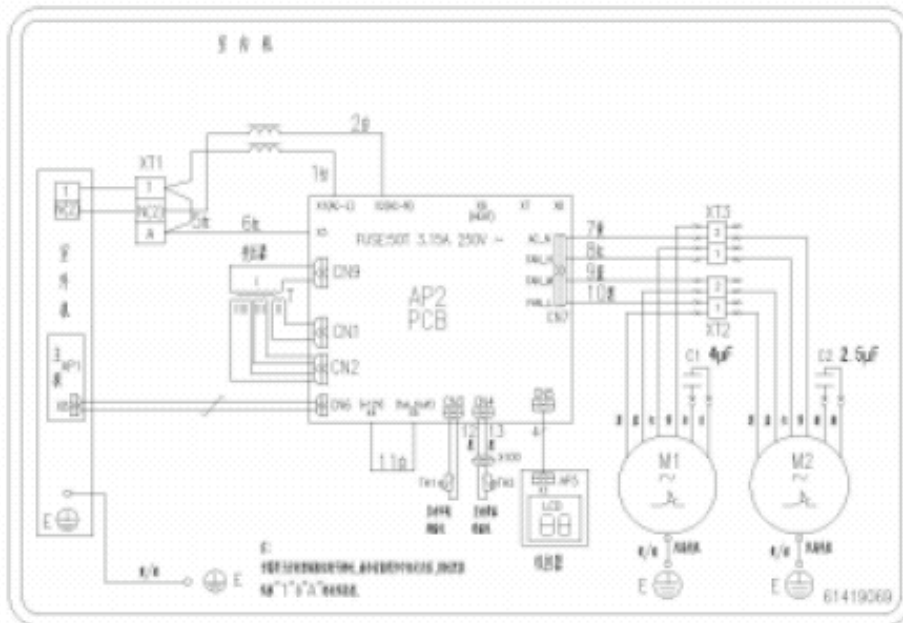


Circuit diagram

FGR12/A(I);FGR10/A(I) circuit diagram



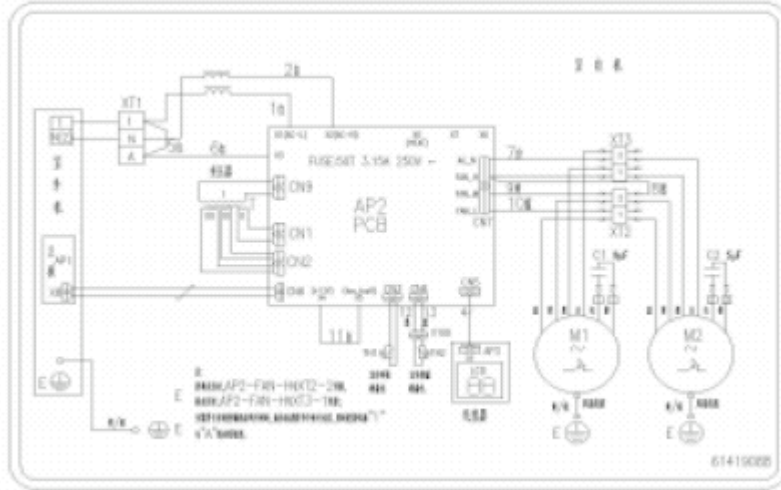
FG12/A(O);FG10/A(O); FG12H/A(O); FG10H/A(O) circuit diagram



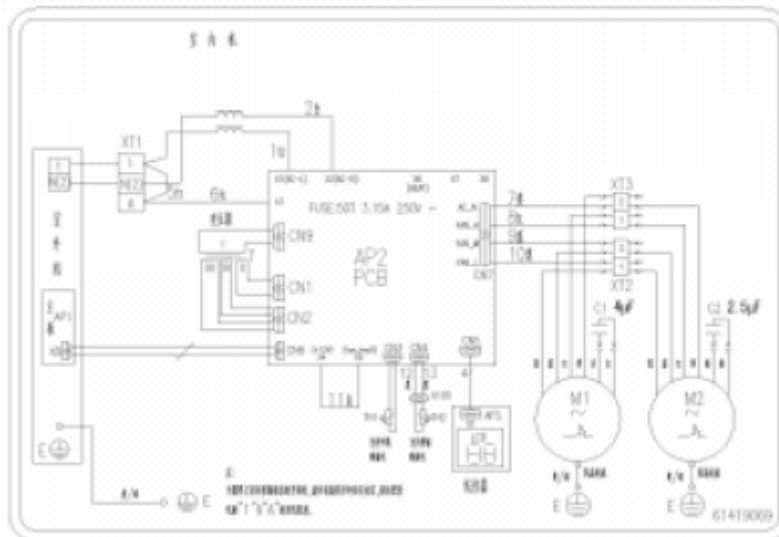


FG Series wind pipe blowing air-conditioning unit

FG12H/A(I);FGD10H/A(I);FG10H/A(I) circuit diagram



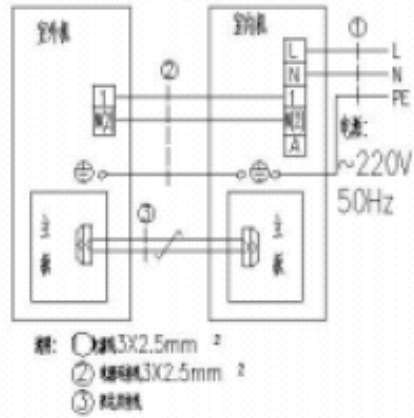
FG12/A(I);FG10/A(I) circuit diagram`



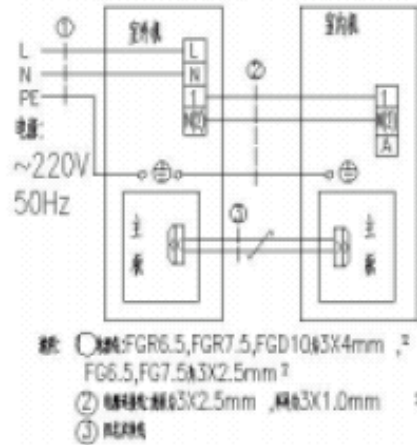


List of wiring

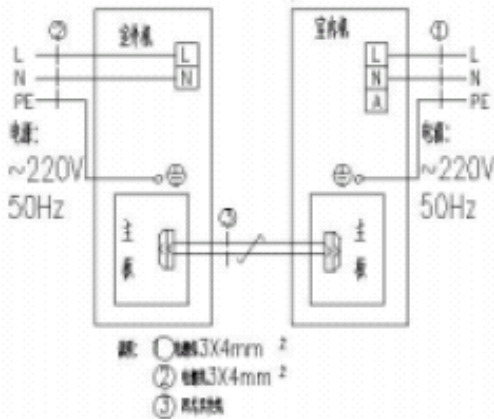
FG(R)2.6H/A,FG(R)3.5H/A,FG(R)5H/A



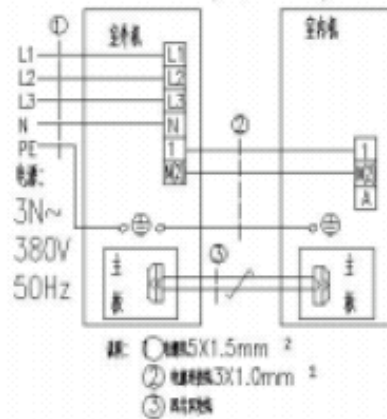
FG(R)6.5H/A,FG(R)7.5H/A,FGD10H/A



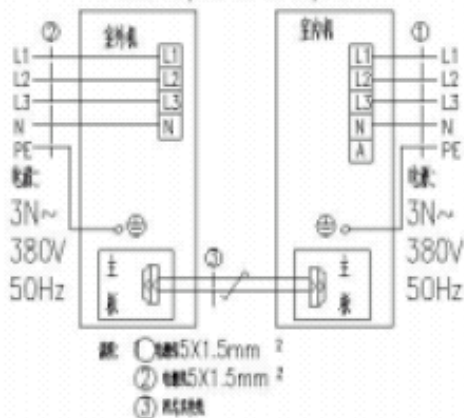
FGRD10H/A



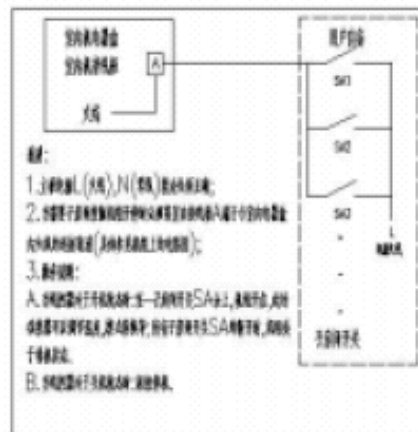
FG10H/A,FG12H/A



FGR10H/A,FG12H/A



子母开关接线示意图:



Please note: The length of all signal cables and power cables must be within 15 meters.



FG Series wind pipe blowing air-conditioning unit

2.2 Light current

2.2.1 Operation mode

1. Temperature parameter
 - (1) The room ambient temperature T_{amb}
 - (2) The evaporator tube temperature T_{tube}
 - (3) The condenser tube temperature $T_{defrost}$
 - (4) Outdoor environment temperature $T_{outdoor}$
 - (5) Air discharge pipe temperature T_{dis}

2. Basic function

After the power is on, no matter when compressor is started, the time span between the startups cannot be less than 3 minutes. When it is powered for the first time, the compressor does not have the time delay of 3 minutes. Once the compressor starts up, it will not shut down due to the temperature change within 6 minutes.

2.1 COOL mode

2.1.1 Cooling condition and process

If $T_{amb} > T_{set}$, COOL mode will act, compressor and external fan will run, the indoor fan will run at the set speed.

If $T_{amb} < T_{set}$, the unit will stop, it is cooling now, compressor and external fan will stop, the indoor fan will run at the set speed.

If $T_{amb} = T_{set}$, the compressor and external fan will keep running in the old mode, the indoor fan will run at the set speed.

The setting temp. range is 16 ~30 . The indoor fan will run at the set speed and there are three air speeds to be selected. All malfunctions are checked during the operation of the compressor. Corresponding treatments will be provided for any malfunctions.

2. 1.2 Antifreezing Protection

When the antifreezing protection is detected (LCD displays E2), the compressor and the external fan will stop, the indoor fan will run at the set speed. when antifreezing protection is eliminated and compressor has stopped for 3min, the whole unit will run at the original status.

2.2 dry mode

If $T_{amb} > T_{set} + 2$, the cooling and drying mode will act, compressor and external fan will run, indoor fan will run at low speed

If $T_{set} = T_{amb}$, after the external fan and compressor running for 6mins, it will stop about 4 mins, The processes are shown as the above cycle. indoor fan will run at the low speed.

If $T_{amb} < T_{set}$, the compressor and the external fan will stop

The setting temp. range:16 ~30 . indoor fan will run at the set speed. All malfunctions are checked during the operation of the compressor. Corresponding treatments will be provided for any malfunctions.

2.2.1 Anti-frost protection (same as cooling) .

2.3 air supply mode



The indoor fan will run at the set speed and there are three air speeds to be selected. The speed of the air supply in the automatic mode is the intermediate speed.

In the air supply mode, when there are fan malfunction and communication malfunction, the unit will shut down. Other malfunctions will be display without the shutdown of the unit.

2.4 HEAT Mod(The cooling only unit does not have the heating mode. If the cooling only unit does not respond to the remote control heating signal, then it is still in the air supply mode.)

2.4.1 Conditions and processes of heating

1 If $T_{amb} < T_{set}$, the heating operation will begin and the change valve, the external fan and the compressor are respectively powered and put into operation. The indoor fan operates based on the set air speed and the cool air condition.

1 If $T_{amb} = T_{set}$, the compressor, external fan and reversing valve will keep running in the old mode. Indoor fan will run at the set speed

1 If $T_{amb} > T_{set}$, Compressor and external fan will stop, reversing valve will keep working, indoor fan will blow, after 60secs it will stop.

1 The setting temp. range:16 ~30

2.4.2 Anti-cool-air operation protection

When the compressor restarts after it stops or when the defrosting ends, the internal fan will begin to run after the compressor runs for some time. If the compressor does not start up, the internal fan will stop operation.

2.4.3 Indoor anti-high-temperature protection

During the heating operation, when the pipe temperature of the evaporator is detected to be too high, the external fan will stop operation. When the pipe temperature of the evaporator is normal, the external fan will resume operation.

During the indoor high-temperature protection period, other protections (if any) will be treated as the normal protection. However, if the over current of the compressor or the high temperature of the air discharge pipe is detected and these two protections can resume operation themselves, then after resuming, if the anti-high-temperature does not quit, then the indoor high-temperature protection shall continue.

2.4.4 Conditions and processes of defrosting

After the heating operation, when the frost of the condenser is detected, the system enters the defrosting status. At this time, the four-way valve, the external fan and the auxiliary electric heating stop operation. The compressor performs the forced operation and the internal fan operates based on the anti-cool-air condition. When it is detected that the frost on the condenser has been removed, the four-way valve and the external fan begin to operate and then the internal fan begin to operate.

For defrosting, the defrosting time will be adjusted based on the frosting condition on the condenser. If there is much frost, the defrosting time is long (maximum of 10 minutes) . If there is not much frost, then the defrosting time is short. When it is detected that the defrosting has ended, quit the defrosting mode.

2.5 AUTO mode.

In this mode, the system can select the mode automatically according to the ambient temperature

3. Other control

3.1 Timing Control.

TIMER OFF: Set the timer for turning off function when the unit is turned on, the PCB will act in the set mode ,when it is time to turn off, the unit will be switched off.

TIMER ON: The unit is stopped when the timer for turning on acts. When it is time to turn on, the PCB will act in the set mode.



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The time range is 0.5-24 hours.

3.2 Energy saving

For heating, press the ENERGY SAVE button, after half an hour, the T set will decrease by 1 . After 1 hour, the T set will decrease by 2 .

For cooling, press the ENERGY SAVE button, after half an hour, the T set will increase by 1 . After 1 hour, the T set will increase by 2 .

3.3 Test function

In the first power-on status, press the temperature selection button (TEMP) to enter the heating status. The compressor is on, the four-way valve is on, the internal fan runs at high speed and the auxiliary electric heating is on. After the operation for 5 minutes, the unit automatically shuts down. You may also press the ON/OFF button to stop the test.

In the first power-on status, press the temperature selection button (TEMP) to enter the cooling status. The compressor is on, the four-way valve is on, the internal fan runs at high speed and the auxiliary electric heating is on. After the operation for 5 minutes, the unit automatically shuts down. You may also press the ON/OFF button to stop the test.

3.4 Remote control function

The wire controller may receive the remote control instruction. When the remote control receiving is made, the buzzer will sound to make indication. The remote controller will screen the useless buttons. The wire controller only receives the four remote control instructions from the remote controller, i.e. ON/OFF, mode, air speed and temperature setting. The remote controller does not receive the shutdown instruction when the system has any malfunction and the ON/OFF button on the wire control panel must be pressed in order to shut down the unit.

3.5 Communication function

The communication distance between the mainboard and the wire control panel may reach 20 meters(the standard distance provided is 8 meters) .

3.6 Key lock function of manual controller

The function should be similar to that of the cellphone. Press the temperature selection button (TEMP) and the temperature selection button (TEMP) and the key will be locked. The screen will display EE. Press them again to release the lock.

3.7 High temperature protection for air discharge pipe of compressor

After the compressor starts up, if it is detected that the air discharge temperature of the compressor is too high, then shut down the compressor and the external fan and the unit enters the protection status.

When it is detected that the air discharge temperature is normal, then the compressor restarts the operation. From the detection of the first malfunction, if the high temperature protection for the air discharge pipe is consecutively detected for 3 times within 30 minutes, the high temperature protection E4 for the compressor will be displayed and the buzzer will sound the alarm. The unit can not be automatically resumed. Press the NO/OFF button to shut down the unit and clear the sound alarm.

3.8 Communication Malfunction

1 After it is powered, if the outdoor unit does not receive the feedback from the mainboard of the indoor unit, it



will be regarded as a communication malfunction of the indoor unit. The compressor and the external fan stop and the malfunction codes are displayed. At the same time, if the indoor unit does not receive the information from the outdoor unit, then the indoor unit stops the auxiliary electric heating and the internal fan. If the manual controller does not receive the information from the outdoor unit, the malfunction E6 will be displayed and the unit does not run.

- 1 After the communication is back to normal, the system will operate according to the previous operation status.

3.9 Temperature sensor malfunction

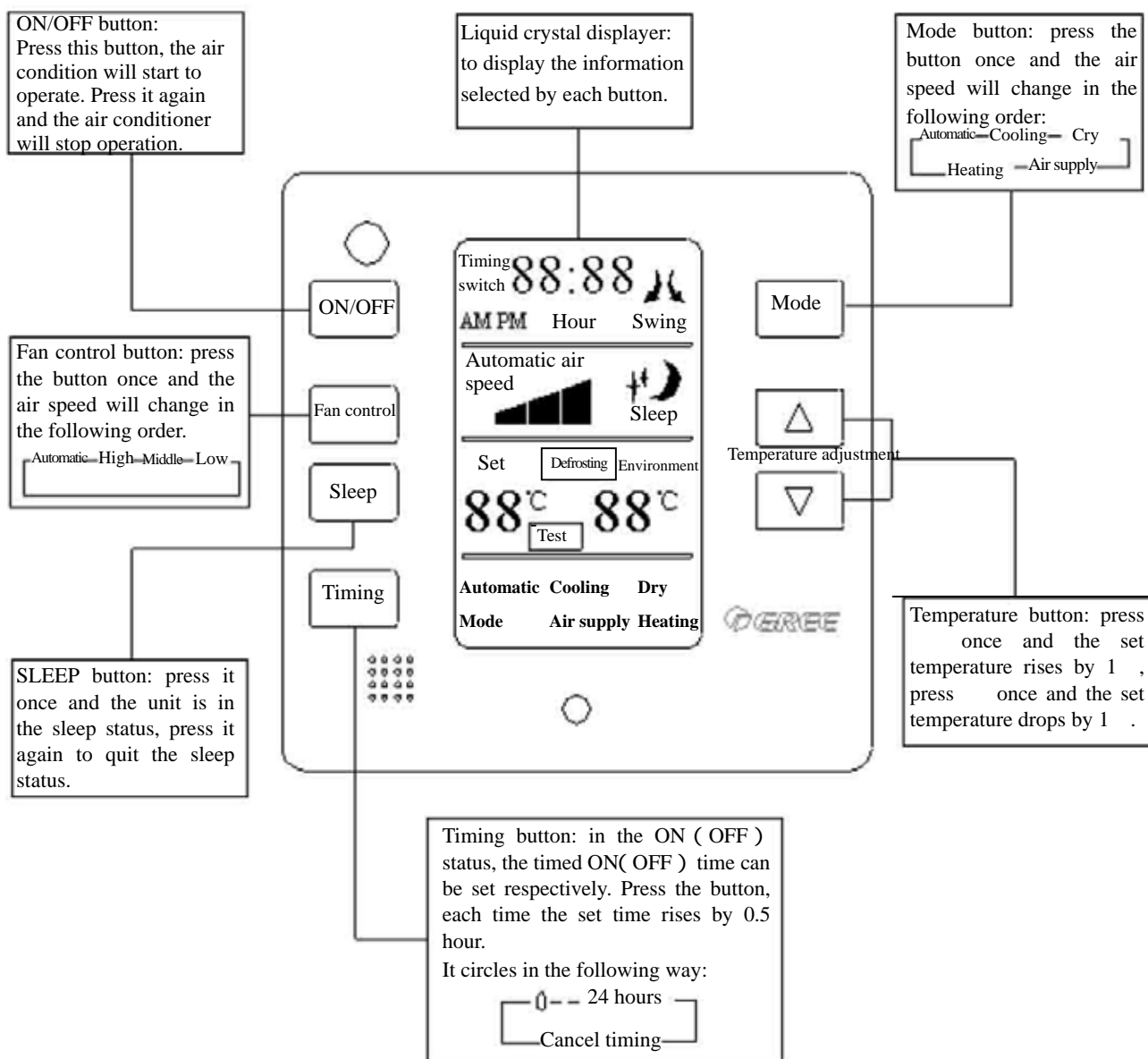
- 1 3.9.1 Indoor environmental sensor: If there is any open circuit or short circuit for the indoor temperature sensor, " F0 " will be displayed. After the malfunction is eliminated, the unit will automatically resumes the operation. In the air supply mode, only the malfunction code is displayed and the internal fan operates normally. After the malfunction is cleared, the malfunction code disappears.
- 1 3.9.2 Indoor evaporator sensor: If there is any open circuit or short circuit for the evaporator temperature sensor, " F1 " will be displayed. After the malfunction is eliminated, the unit will automatically resume the operation and clear the malfunction code. In the air supply mode, only the malfunction code is displayed and the internal fan operates normally. After the malfunction is cleared, the malfunction code disappears.
- 1 3.9.3 Condenser temperature sensor: If there is any open circuit or short circuit for the condenser temperature sensor, " F2 " will be displayed. After the malfunction is eliminated, the unit will automatically resumes the operation and clears the malfunction code. In the air supply mode, only the malfunction code is displayed and the internal fan operates normally. After the malfunction is cleared, the malfunction code disappears.
- 1 3.9.4 Malfunction of outdoor environmental sensor: No matter the unit is on or it stands by, if the malfunction of the outdoor temperature sensor is detected, then no treatment is made to the outdoor temperature sensor and only the temperature sensor malfunction code F3 is displayed.
- 1 3.9.5 Air discharge temperature sensor malfunction : If there is any open circuit or short circuit for the air discharge temperature sensor, the malfunction code " F4 " will be displayed and the buzzer will sound the alarm. After the malfunction is cleared, the unit will automatically resumes the operation and clear the malfunction code.



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2.2.2 Description and usage instruction for manual controller

2.2.2.1 Name and function of each button of wire controller As shown in Fig 2.2.2:1-1



2.2.2.2 Wire controller operation:

1) Cooling operation method, as shown in Fig 2.2.2-1

The microcomputer will decide whether to start up cooling or not based on the difference value between the temperature sensed by the room temperature sensor and the set temperature.

When the temperature sensed by the indoor temperature sensor is higher than the set temperature, the cooling operation begins.

When the temperature sensed by the indoor temperature sensor is lower than the set temperature, the cooling operation stops and the indoor fan blows.

The setting temp. range is 16 ~30

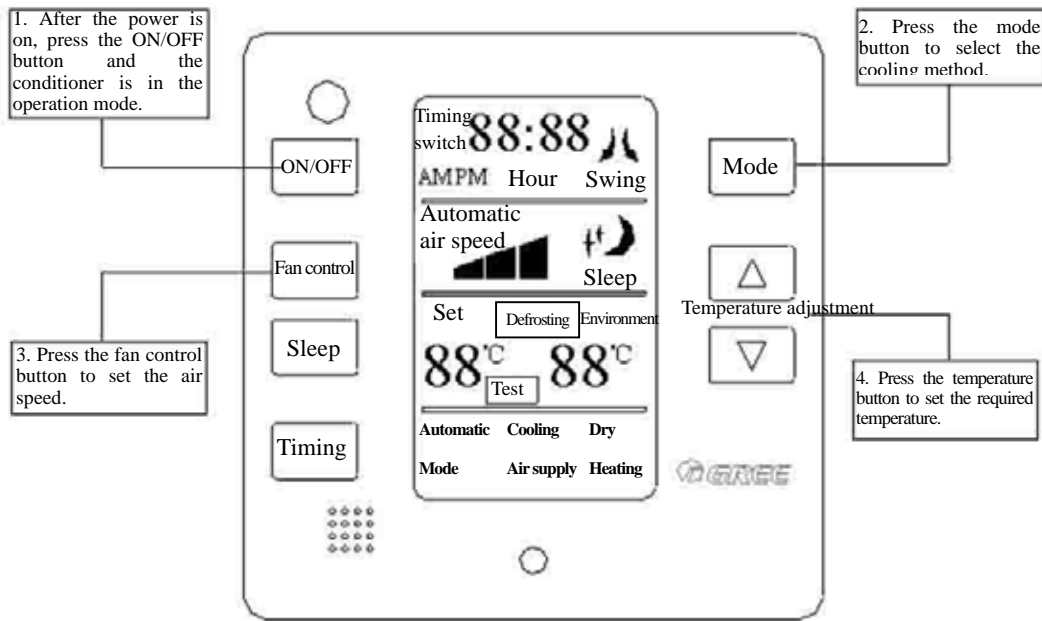


Fig 2.2.2.2-1

2) Heating operation, as shown in Fig 2. 2. 2. 2-2

When the temperature sensed by the indoor temperature sensor is lower than the set temperature, the compressor begins to run and the heating operation begins.

When the temperature sensed by the indoor temperature sensor is higher than the set temperature, the compressor and the outdoor fan stop and the indoor fan blows.

In heating, when the outdoor temperature is low but the humidity is high, the outdoor unit will frost and leads to the low efficiency of the heat supply. At this time, the controller will automatically begin the defrosting circle and display defrosting.

The setting temp. range is 16 ~30

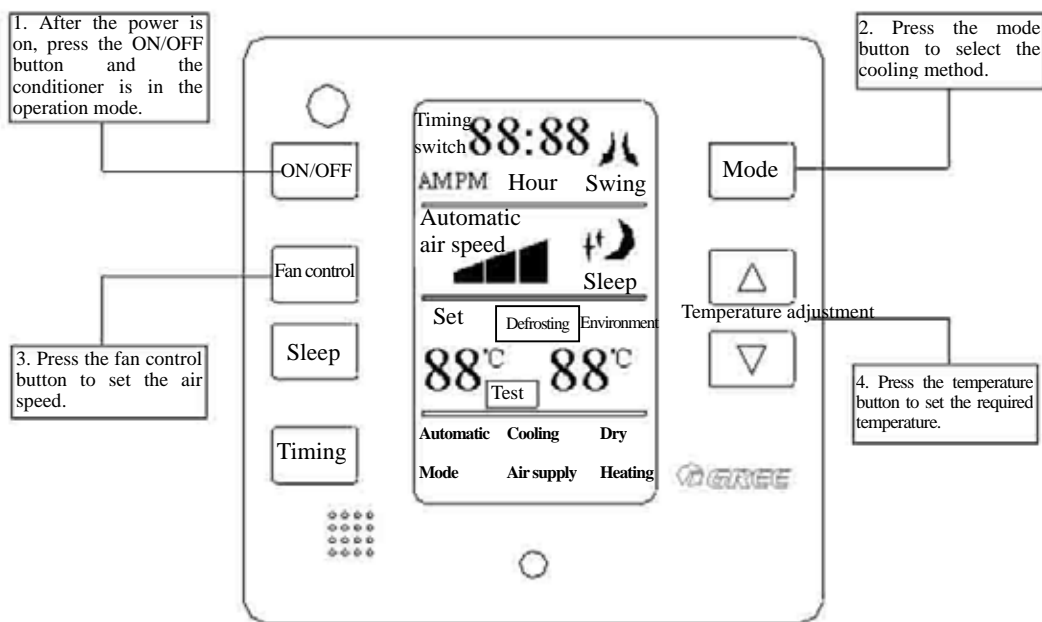


Fig 2.2.2.2-2



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3) Dry operation, as shown in Fig 2. 2. 2. 2-3

When the temperature sensed by the indoor temperature sensor is between ± 2 , the unit enters the dry operation. When the temperature sensed by the indoor temperature sensor is higher than the set temperature, the unit begins the cooling operation. The indoor air speed is adjustable and the outdoor fan operates with a low air speed.

The setting temp. range is 16 ~30

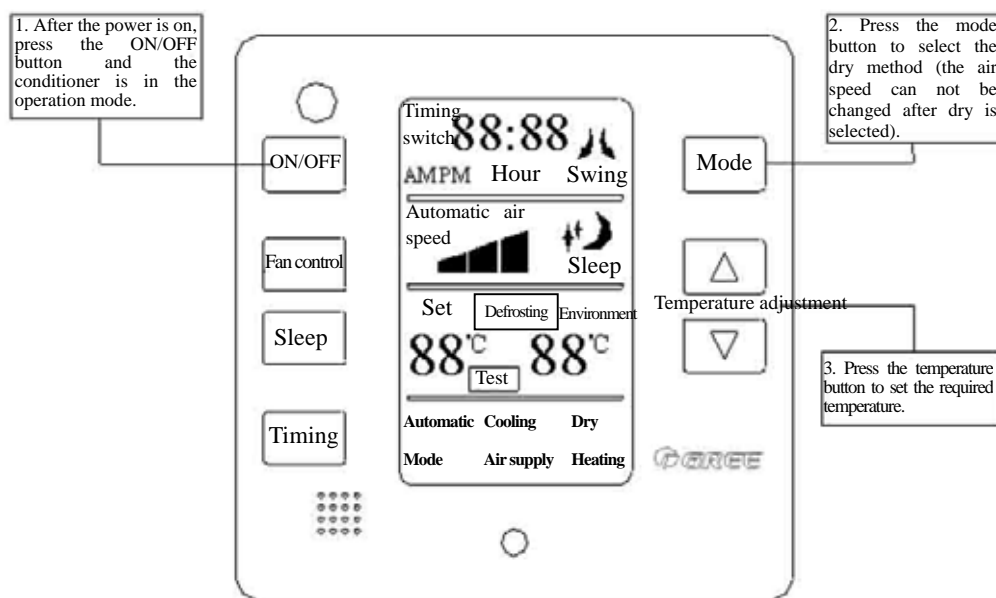


Fig 2.2.2.2-3

4) Automatic operation, as shown in Fig 2. 2. 2. 2-4

In the automatic mode, the standard cooling set temperature is 26 . The standard heating set temperature is 20 .

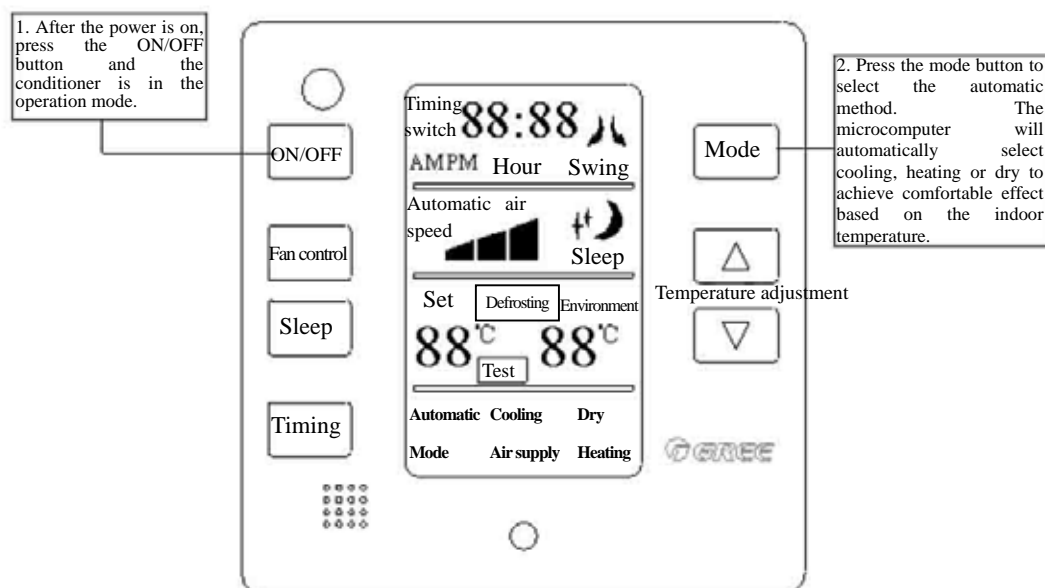


Fig 2.2.2.2-4



5) SLEEP mode operation, as shown in Fig 2. 2. 2. 2-5

In COOL and DRY mode, setting the SLEEP mode, the setting temp. will be increased

1 in the first hour, and it will be increased 2 in the second hour. In HEAT mode, setting the SLEEP mode, the setting temp. will be decreased 1 in the first hour, it will be decreased 2 in the second hour.

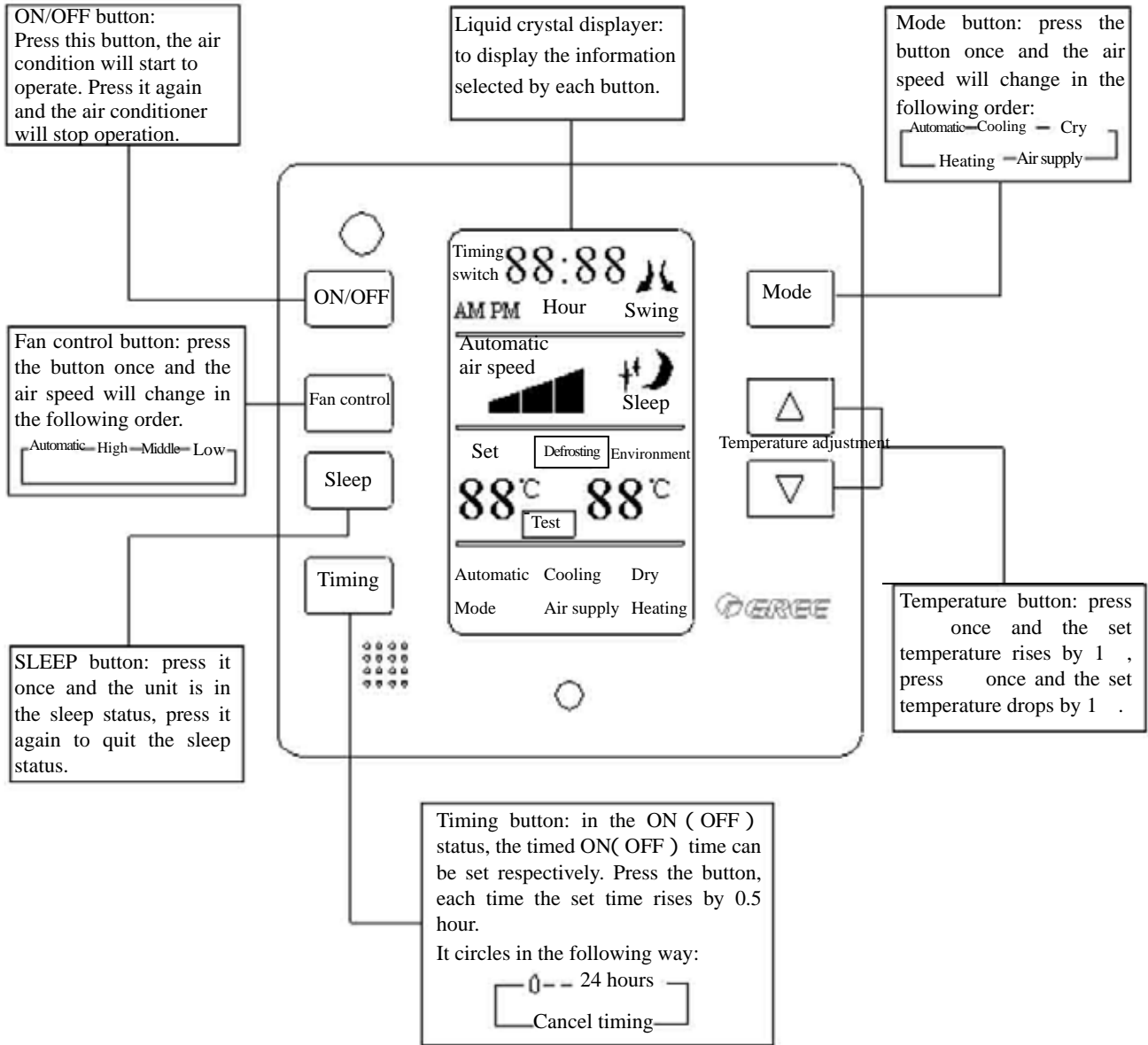
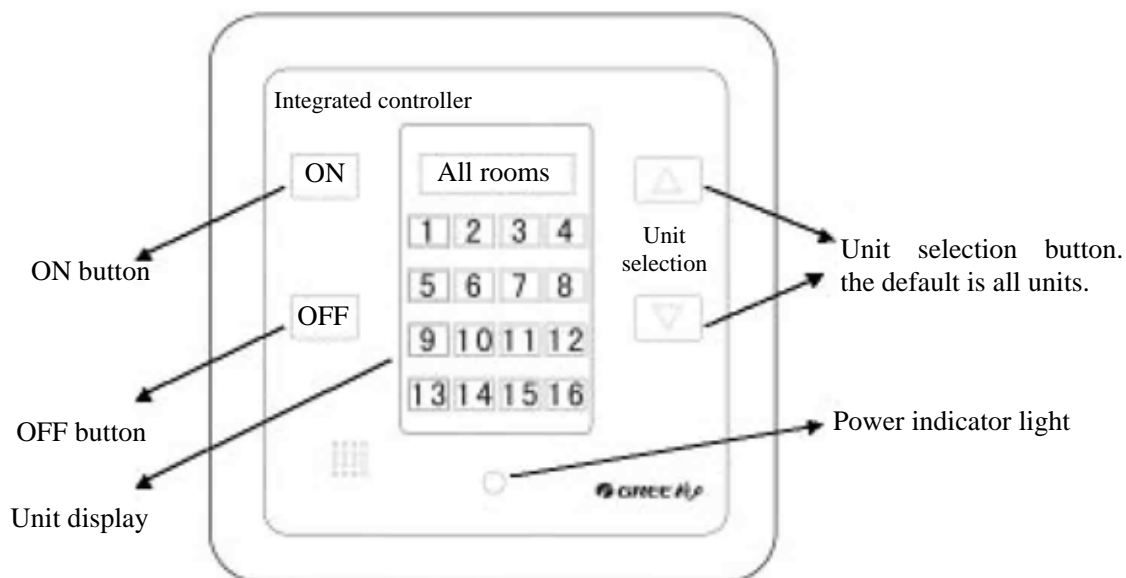


Fig 2. 2. 2. 2-5

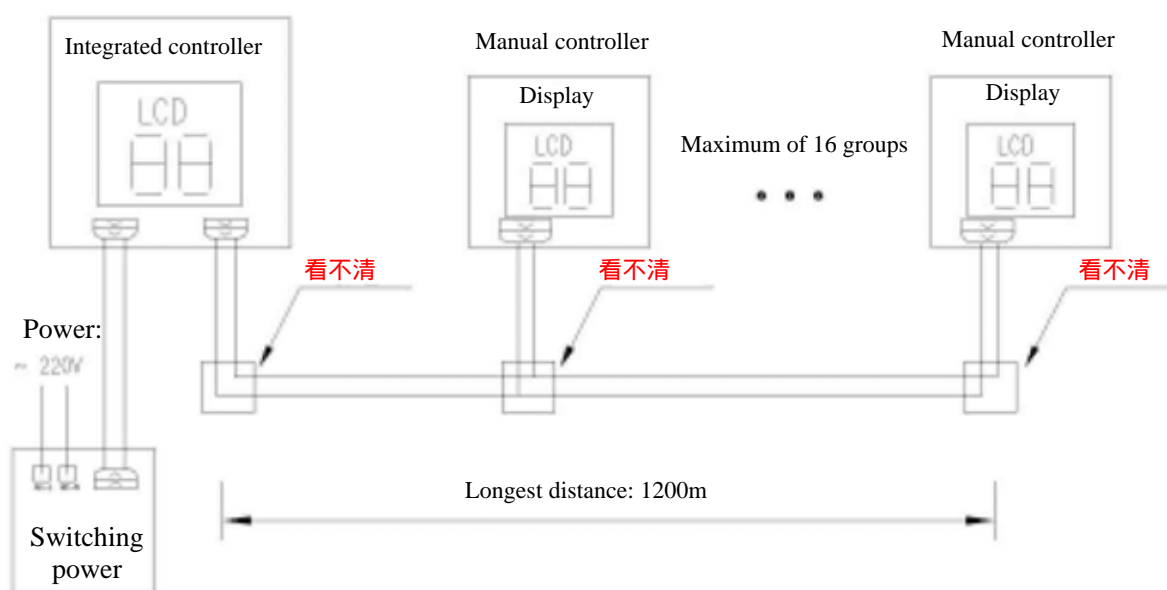


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This centralized controller (upper unit) adopts the 485 method and the ducted type unit (lower unit) manual controller for the communication. It has a maximum of 16 units and the longest control distance is 1200m. The upper unit automatically detects the lower unit. If the lower unit is detected, the digit of the corresponding unit number will be displayed, others are not displayed.

1. Use or buttons to select the unit to be controlled. There are 17 selections, i.e. 1~16 and all units.
2. If a certain unit(or all units) is selected, then the corresponding number will flash. Press the ON button and the unit starts up. At this time the frame of the corresponding number is displayed.
3. Press the “OFF” button to shut down the corresponding unit. At this time the frame of the corresponding number is not displayed.
4. The connection between this integrated controller and the manual controller is shown in the following figure.





Function note:

If the “ all selection ” is selected, the lower units will be started up by pressing the ON button. Considering the interference to the electric network, if more than one unit are started up, there is a time delay of 10 seconds for the starting up of each unit. Press the “ OFF ” button to shut down all the lower units. There is no time delay for the shutdown.

If “ 1 ” or those above the single unit is selected, pressing the “ON/OFF” button will start up and shut down the corresponding lower units. Note: Because the upper unit keeps enquiring the 16 lower units, there is a time delay of 16 seconds from pressing the button to the response of the unit.

Relation between dial code switch position and unit No.

Position	No.	Position	No.	Position	No.	Position	No.
0000	1	0100	5	1000	9	1100	13
0001	2	0101	6	1001	10	1101	14
0010	3	0110	7	1010	11	1110	15
0011	4	0111	8	1011	12	1111	16

Note: If this control function is needed, instruction must be made before ordering goods.



FG Series wind pipe blowing air-conditioning unit

Chapter 3 Operation debugging and malfunction diagnosis

3.1 List of unit operation conditions and check items

No.	Items to be checked	
1	Please refer to the installation manual and check whether the machine is placed at the appropriate position, whether the surrounding space is reasonable and whether the unit needs the shock-absorption treatment.	
2	Check whether the caliber of the air duct is appropriate (the air speed of the air duct is not more than 3.5m/s) , whether it affects the installation at the air port.	
3	Check whether there is any filter screen for the air return box, whether the size and the quality of the filter screen are correct, whether it is clean and at the right position.	
4	Check whether the opening size and the position of the air outlet and the air return port comply with the requirement (air return port must be repairable) and make the record.	
5	Check whether the condensation water basin has any dirt and clean it if any	
6	Check whether the slope of the condensation water pipe complies with the requirement, whether the water flow is smooth (water need to be poured to test it)	
7	Check whether the fixing screws between the indoor unit motor and the fan are loose, whether the fan blade can rotate freely without any friction or touch	
8	Understand the installation soldering techniques for the secondary refrigerant, check whether the dirt produced by the soldering are cleaned, whether the diameter, thickness, heat insulation and waterproofness of the copper pipe are correct	
9	Check the nitrogen gas pressure of the outdoor unit and make the record. The outdoor temperature is _____ , the nitrogen gas pressure is _____kg/cm2(bar). If the nitrogen gas pressure is not normal, the installation personnel must be requested to check the leakage point.	
10	If the nitrogen gas pressure is normal, slowly release the nitrogen gas of the connection pipe and the indoor unit until it is all released. Connect the vacuum pump to the thimble valve (if any) of the liquid pipe and the gas pipe, and vacuumize them simultaneously from the liquid pipe side and the gas pipe side	
11	Check whether the connection of the indoor and outdoor units comply with the wiring diagram of the unit, whether the wire path is appropriate, whether the connection terminal is fastened	
12	Check whether the power distribution facilities such as the wire path, the model of the shutdown/air switch of the indoor and outdoor units and _____are reasonable	
13	Check whether the embedded terminal box of the temperature controller is elegant and complies with the switch box, whether it complies with the specifications	
14	Install the temperature controller and check whether the wiring of the temperature controller is correct, whether the position is appropriate and turn the temperature controller at the OFF position	
15	Cover the temperature controller with the protection bag to avoid any decoration damage or pollution of the temperature controller	
16	The vacuumizing time is about 25-30 minutes. Check whether there is any air discharge at the air discharge port of the vacuum pump (use the hand to plug up the air discharge port for 3 minutes and no air should be discharged, no air bubble shall appear in the oil of the vacuum pump and at the outlet) .	
17	Use the hexagon ring spanner to open the maintenance valve of the liquid pipe for 2-3 seconds and then shut it immediately to see whether there is any gas out. If there is, it indicates that the connection of the liquid adding pipe with the maintenance valve and the vacuum pump is smooth without any block. Continue vacuumizing for 5 minutes.	
18	If the vacuum pump always has air bubbles, check the sealing of the vacuum pump or check for leakage, causes must be found before the next step is taken.	
19	Calculate the adding volume of the secondary refrigerant, for the air conditioner which has been filled with the secondary refrigerant by the factory, {actual pipe length____-5m(the factory-filled secondary refrigerant has included the secondary refrigerant of the 5-meter pipe length)} × ____ g/m = secondary refrigerant supplementation volume____gram For the unit model with unknown secondary refrigerant filling volume, please refer to the unit nameplate and use a small filling volume as the operation test to record the final filling volume.	
20	Shut the manual valve connected by the liquid adding pipe (maintenance tool) . Connect the steel bottle of the secondary refrigerant (at this time the steel bottle of the secondary refrigerant in placed on the electronic scale) , slightly open the steel bottle valve, screw and tighten screw thread of the other side of the liquid adding pipe that connects to the steel bottle to discharge the air in the liquid adding pipe. Record the readings on the electronic scale. The reading is _____gram.	



Attached table

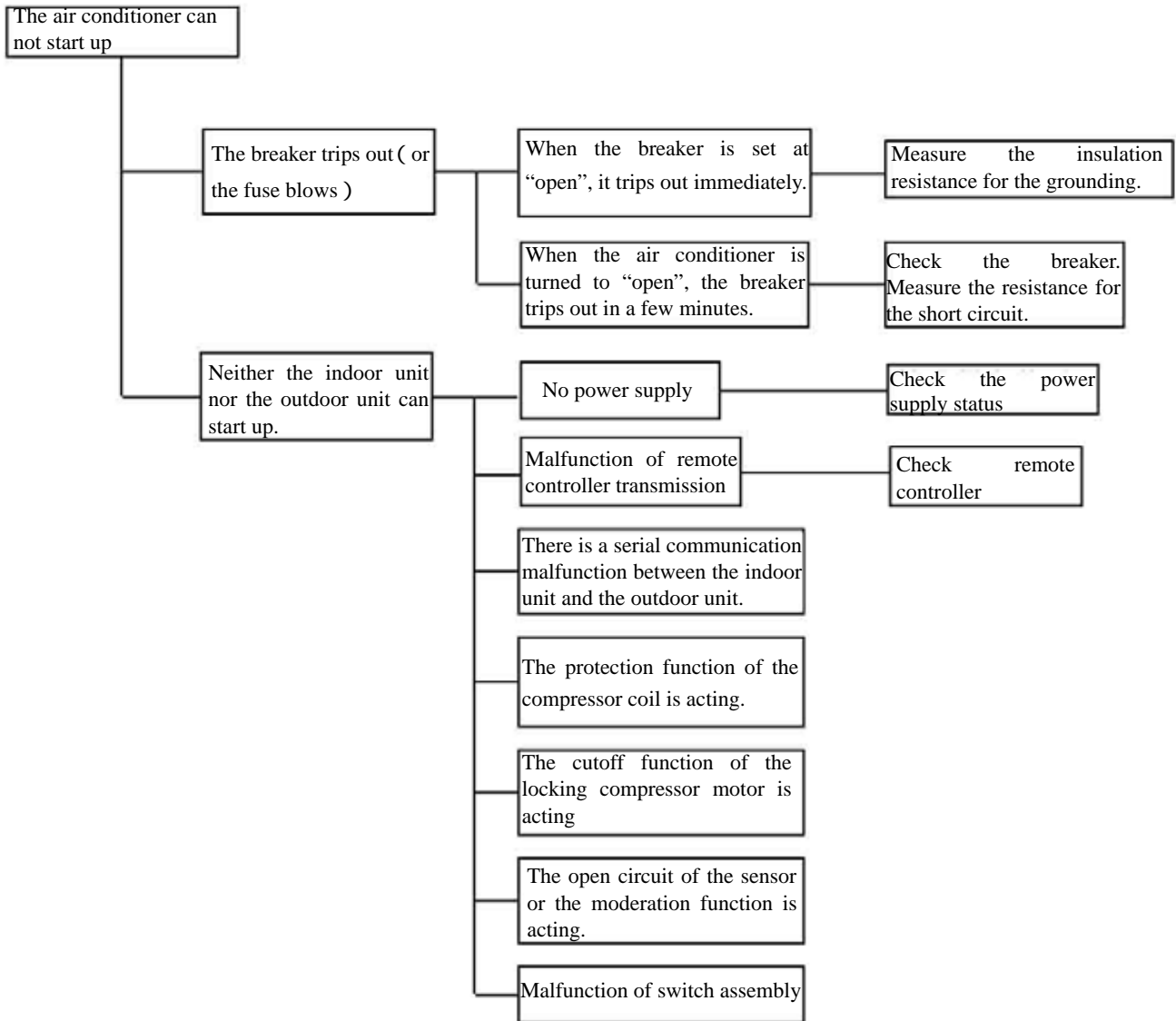
No.	Items to be checked	
21	Final reading of the electronic scale calculated = initial reading of the electronic scale__gram - supplementation volume of secondary refrigerant__gram = __gram	
22	Open the valve of the secondary refrigerant steel bottle and the manual valve of the liquid adding pipe, observe the reading of the electronic scale. When the reading of the electronic scale is close to the final reading calculated, tighten the manual valve of the liquid adding pipe and record the actual added liquid volume. Actual supplementation volume of secondary refrigerant__gram	
23	Connect the outdoor unit power cable and the plug, but do not supply power.	
24	Use the resistance level of the universal meter to measure the resistance between the power plugs L, N and E (grounding) and use it as the basis to judge whether there is any short circuit of the power and make the record Single-phase power L and N__, L and E__, N and E__. If it is the three-phase power, then measure the resistance between A and B__, B and C__, A and C__ A and N__, B and N__, C and N__ and the resistance between A, B, C and the ground A and E__, B and E__, C and E__	
25	Measure the supply voltage of the power socket and make the record. The single-phase power L and N__V, The three-phase power A and B__V,B and C__V. A and C__V, A and N__V, B and N__V, C and N__V	
26	Check whether the position of the air volume adjustment valve on the air port and the air duct of the indoor unit is appropriate	
27	Check whether the main supply voltage is normal and make the record Supply voltage__V	
28	Measure whether the voltage supplied from the main power to the terminal of the indoor and outdoor unit is normal and make the record Supply voltage on the terminal__V	
29	Unit operation cooling test, indoor temperature__ , outdoor ambient temperature__	
30	Unit operation heating test, indoor temperature__ , outdoor ambient temperature__	



FG Series wind pipe blowing air-conditioning unit

3. 2 List of malfunction analysis

3. 2. 1 Flow of malfunction analysis





Malfunction analysis

3.2.2 Malfunction analysis as shown in table 3.2.2-1

Phenomenon	Possible causes	Recovery method	Phenomenon	Possible causes	Recovery method		
Neither the indoor unit nor the outdoor unit can operate	Power failure	Resume the power	The heating effect is not good	Four-way valve malfunction	Replace four-way valve		
	The fuse blows.	Short circuit		Eliminate the short circuit and replace the fuse	Local block of the capillary	Replace capillary	
		Circuit grounding malfunction (insulation damage)		Eliminate the grounding malfunction or replace the conducting wire	Leakage between the internal high and low pressure of the compressor	Replace compressor	
	The power plug is not well inserted or has bad contact	Eliminate the bad contact Firmly insert it into the socket		The pipeline valve is not adjusted to be sufficient	Adjust the valve to be sufficient	Secondary refrigerant leakage	Check the leakage source and supplement the secondary refrigerant
	The connection between the indoor unit and the outdoor unit is wrong.	Check the circuit based on the electric diagram and make the correct connection		The thermal insulation of the connection pipe between the indoor and the outdoor unit is bad	The thermal insulation for the strong pipe and the slim pipe are separated	The heating load is too big	Check the predicted heating load
	The protector tube of the controller blows.	Replace the protector tube of the controller		The set temperature is too low	Increase the set temperature	The installation position of the outdoor unit is not appropriate	Good ventilation must be provided at the outdoor side
The controller is burned out.	Replace the controller	The filter screen of the indoor unit is blocked.	Clean the filter screen regularly	The heat exchanger of the outdoor unit is blocked.	Clean the heat exchanger of the outdoor unit		
The switch is at the air supply position, but the fan does not run	The indoor fan and the motor are burned out or disconnected.	Repair or replace the fan motor	The air that passes the indoor heat exchanger is little	Increase the rotation speed of the motor	Compressor malfunction	Replace the compressor	
	Remote controller malfunction	Eliminate the malfunction or replace the remote controller	Four-way valve malfunction	Replace the four-way valve	Leakage of the one-way valve of the outdoor unit	Replace the one-way valve	
The operation mode is at the "cool" or "hot" position, neither the outdoor fan nor the compressor operates	Relay malfunction	Coil disconnection	Replace the relay	The capillary is blocked	Replace the capillary		
		Bad contact		Defrosting is not thorough	Replace the defrosting temperature sensor		
The operation mode is at the "cold" or "hot" position, the compressor operates but the outdoor fan does not operate.	Malfunction of the outdoor fan motor	Replace the motor	Abnormal sound and vibration	The pipe valve is not adjusted to be sufficient	Adjust the valve to be sufficient		
	Outdoor unit relay malfunction	Replace the relay		Insufficient secondary refrigerant	Find out the leakage source and supplement the secondary refrigerant		
	Bad contact between the defrosting temperature sensor and the pipe temperature sensor	Replace the defrosting temperature sensor and the pipe temperature sensor		The thermal insulation of the connection pipe between the indoor and the outdoor unit is bad.	The thermal insulation for the strong pipe and the slim pipe are separated		
The operation mode is at the "cold" or "hot" position, the outdoor fan operates but the compressor does not operate.	Compressor malfunction	Replace the compressor	The indoor unit fan touches other objects	Adjust the fan position			
	The capacitor is burned out during the compressor operation	Replace the capacitor	The compressor vibrates too much.	Adjust the supporting pad of the compressor and fasten the loosened bolts			
The cooling effect is not good in the cooling mode	The cooling load is too large.	Check the predicted cooling load	Abnormal sound and vibration	There are foreign matters in the indoor unit	Eliminate the foreign matter		
		The set temperature is too high.		Lower the set temperature	Much resonance is produced when the air conditioner indoor unit is installed on the panel wall or the thin wall	Avoid direct installation on the steel window Install it on a thick wall with appropriate strength Take appropriate shock-absorption measures	
	The installation position of the cooling machine is inappropriate.	Good ventilation must be provided at the outdoor side and weatherproof and solarization-proof board must be appropriately provided.		The pipes of the outdoor unit touch each other	Separate the pipes that touch each other Screw down the fitting screw		
	The filter screen of the indoor unit is blocked.	Clean the filter screen regularly		Metals inside the unit touch each other	Affix the adhesive between the metal boards		
	The heat exchanger of the indoor unit is blocked	Clean the heat exchanger		The outdoor unit fan blade touches the shell	Adjust fan position		
	The fan rotation speed set is too low	Set it to be high speed or middle speed		There is abnormal sound in the compressor	Replace the compressor		
			In heating, there is electromagnetic sound in the four-way valve	There is short circuit in the magnet valve. Replace the magnet valve			



FG Series wind pipe blowing air-conditioning unit

3 Check list of malfunction code

When there is malfunction existing in system running, malfunction code will be displayed on the wire controller. The meanings of the malfunction codes are in table 3.3.1.



Malfunction Code	Malfunction
E1	Protection of compressor high pressure, etc
E2	Indoor anti freezing protection
E3	Compressor low-pressure protection
E4	Compressor discharge temperature protection
E5	Compressor overload protection
E6	Communication malfunction
F0	Indoor temperature sensor malfunction
F1	Evaporator sensor malfunction
F2	Condenser sensor malfunction
F3	Outdoor sensor malfunction
F4	Air outlet sensor malfunction



Chapter 4 Maintenance

4.1 Explosive view and spare parts list

4.1.1 Indoor unit parts breakdown and check list

As shown in Fig 4.1.1-1

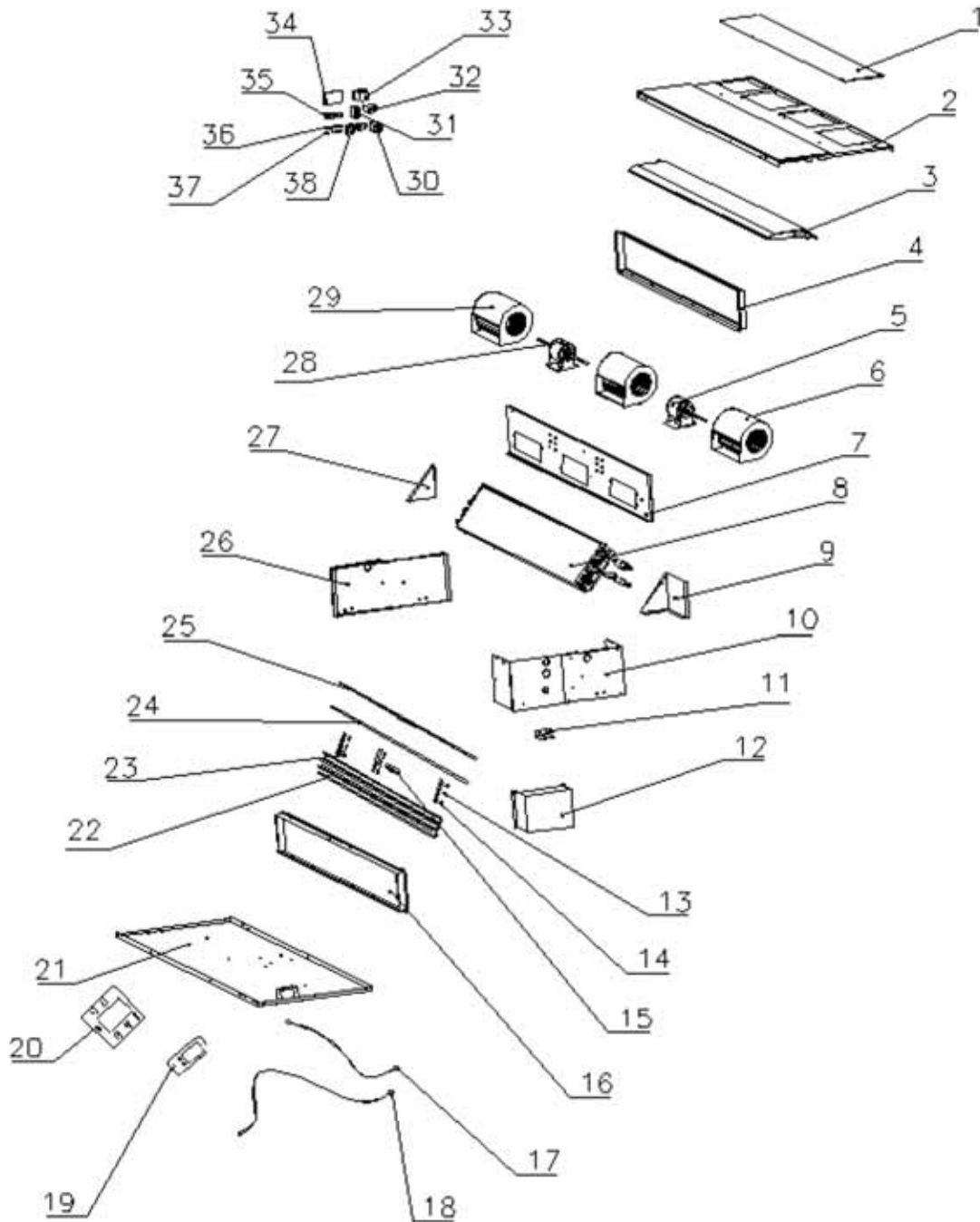


Fig 4.1.1-1 Indoor unit parts breakdown



FG Series wind pipe blowing air-conditioning unit

FG(R)2.6H/A,FG(R)3.5H/A Indoor unit parts breakdown

No.	Code	Name	Fig No.	Quantity	
				FG(R)2.6H/A	FG(R)3.5H/A
1	01259056	Cover board of air return	FGR2I 02000002	1	1
2	0129054	Lower cover plate assy	FGR2I 02000000	1	1
3	12579051	Water container parts	FGR2I 08000000	1	1
4	01499055	Air return port side plate assy	FGR2I 06000000	1	1
5	15019053	Motorfg20c	FG3HAI 02010001	1	1
6	15002401	Fan motor (left type)	GST4238LAI 03000000	1	1
7	01339062	Fan mounting plate	FGR3HAI 03010000	1	1
8	01008704	Evaporator parts	VJ25P 04000000	1	1
	01009058		FGR3HAI 10000000	1	1
9	01079055	Evaporator left bracket	FGR3I 11000002	1	1
10	01309051	Left side plate parts	FGR2I 04000000	1	1
11	02112446	Hook	(2641PA)05010007	4	4
12	01408627	Electric box assy	FGR5I 07010000	1	1
13	01222024	Heating element locking parts	(3551PA)1000106	2(used by heat pump)	2(used by heat pump)
14					
15	460124051	Thermal protector assy	(2551PA010090200b(01)	1	1
16	01492476	Air return port side plate assy	(2641PA)09000000	1	1
17	390000451	Indoor ambient temperature sensor	TY13.02.82(01)	1	1
18	3900018717	Indoor pipe temperature sensor	TY13.04.03(17)	1	1
19	305050021	Remote controller ZY502A	30505.0021MX	1	1
20	30294401	Display board Z4415_M	30294.401MX	1 (used by cooling only type)	1 (used by cooling only type)
	30294010	Display board Z4435_M	30294.010MX	2(used by heat pump)	2(used by heat pump)
21	01259051	Upper cover plate parts	FGR2I 01000000	1	1
22	32012005	Electric heater	(3551PA).10090105	2(used by heat pump)	2(used by heat pump)
23	01222024	Heating element locking parts II	(3551PA).10090106	2(used by heat pump)	2(used by heat pump)
24	01738702	Heating element bracket 2	VJ25P03000002	1(used by heat pump)	1(used by heat pump)
25	01738701	Heating element bracket 1	VJ25P.03000001	1(used by heat pump)	1(used by heat pump)
26	01309054	Right side plate parts	FGR2I 05000000	1	1
27	01079056	Evaporator right bracket	FGR3I 11000001	1	1
28			/		
29	15002401	Fan motor (right type)	GST4238LAI 03000000	1	1
30	44010234	AC contactor GC8-30		1	1
31	33010020	Capacitor CBB611.5 μ F/450V	QJ/GD.53.12	1	1
32			/		
33	43000209	Power transformer SC39	TY.11:01.37	1	1
34	30224403	Mainboard Z4415_M	30224403MX	1 (used by cooling only type)	1 (used by cooling only type)
	30224001	Mainboard Z4035	30224001MX	1(used by heat pump)	1(used by heat pump)
35	420111562	Terminal board (5 positions)	TY.14.04.02(02)	1	1
36	70410524	Insulation spacer F	TY.00.84a	1	1
37	71010102	Electric wire holder	LF7.5WB.06000001	3	3
38	42011103	Terminal board 2-8	TY.00.205	2	2



Explosive view and list

FG(R)5H/A, Indoor unit parts breakdown

No.	Code	Name	Fig No.	Quantity
				FG(R)5H/A
1	01258650	Cover board of air return	FGR5I.00000006	1
2	01258649	Lower cover plate assy	FGR5I 02000001	1
3	01278633	Water container parts	FGR5I 06010000	1
4	01499061	Air return port assy	FGR5HAI.09010000	1
5	15018322	Motor FG70B	FGR5I 00000003a	1
6	15002401	Fan motor (left type)	GST4238LAI.03000000 0	1
7	01339058	Fan mounting plate assy	FGR5HAI 03020000	1
8	01339058	Evaporator parts	FGR5I 08000000	1
9	01078626	Evaporator left supporting bracket	FGR5I 00000005	1
10	01308668	Left side plate parts	FGR5I 04010000	1
11	02112466	Hook	KFR80PN A1A 06000000	4
12	01408627	Electric box assy	FGR5I 07010000	1
13	02115001	Heating element locking parts I	RFD12WA1-7	2(used by heat pump)
14	01228631	Electric heating pipe fixing bar	FGR5I 10000002	3(used by heat pump)
15	46018601	Thermal protector assy	FGR5I 10020000	1(used by heat pump)
16	01498641	Air return port assy	FGR5I 09000000	1
17	390000451	Indoor ambient temperature sensor	TY.13.02.82(01)	1
18	3900018717	Indoor pipe temperature sensor	TY 13.04.03(17)	1
19	305050021	Remote controller ZY502A	305050021MX	1
20	30294401	Display board Z4415_M	30294 401MX	1 (used by cooling only type)
	30294010	Display board Z4435_M	30294 010MX	1(used by heat pump)
21	01259064	Upper cover plate assy	FGR5HAI 01010000	1
22	32018613	Electric heater	FGR5I 10000004	2(used by heat pump)
23	01224255	Heating element locking parts II	(7050L)01000003	4(used by heat pump)
24	01228628	Heating element lower mounting rack	FGR5I 10000001	1(used by heat pump)
25	01228630	Heating element upper mounting rack	FGR5I 10010001	1(used by heat pump)
26	01308670	Right side plate assy	FGR5I 05010000	1
27	01078625	Evaporator right supporting bracket	FGR5I 00000004	1
28	/			
29	15002401	Fan motor (right type)	GST4238LAI 03000000	1
30	44010234	AC contactor GC8-30		1
31	33010011	Capacitor CBB61 4 μ F/450V	QJ/GD.53.12	1
32	/			
33	43110209	Power transformer SC39	TY.11:01.37	1
34	30224403	Mainboard 2Z4415_M	30224.403MX	1 (used by cooling only type)
	30224204	Mainboard 2Z4435	30224.204MX	1(used by heat pump)
35	42010007	Terminal board (4 positions)	TY.14.03.03	1
36	70410525	Insulation spacer D	TY.00.166	1
37	71010102	Electric wire holder	LF7.5WB.06000001	2
38	42011103	Terminal board 2-8	TY.00.205	2



FG Series wind pipe blowing air-conditioning unit

FG(R) 6.5H/A, FG(R)7.5H/A Indoor unit parts breakdown

No.	Code	Name	Fig No.	Quantity	
				FG (R6.5H/A)	FG(R)7.5H/A
1	01258614	Cover board of air return	FGR7I.0000003	1	1
2	01258612	Lower cover plate parts	FGR7I.0200000	1	1
3	01278612	Water container parts	FGR7I.0800000	1	1
4	01498609	Air return port side plate assy	FGR7I.0700000	1	1
5	15018612	Motor FG150B	FGRD10I.01010008a	1	1
6	15018603	Fan motor (left type)	FGRD10I.03010003	1	1
7	01338631	Fan mounting plate assy	FGR7I.0300000	1	1
8	01008501	Evaporator parts	FGR6L.0900000	1	/
	01008628		FGR7I.0900000	/	1
9	01078603	Evaporator left bracket	FGRD10I.09010005	1	1
10	01308678	Left side plate parts	FGRD10I.0400000	1	1
11	02118504	Hook	FGRD10I.0000009	4	4
12	01408628	Electric box assy	FGRD10I.12010000	1	1
13	02115001	Heating element locking parts 1	RFD12WA.1-7	3 (used by heat pump)	3 (used by heat pump)
14	01222401	Electric heating pipe fixing bar	(1252PA).0100001	3 (used by heat pump)	3 (used by heat pump)
15	46018501	Thermal protector assy	FGR7I.1000001	1 (used by heat pump)	1 (used by heat pump)
16	01498612	Air outlet assy	FGR7I.06010000	1	1
17	3900018710	Indoor ambient temperature sensor	TY.13.04.03(10)	1	/
	390000451		TY.13.02.82(01)	/	1
18	3900018711	Indoor pipe temperature sensor	TY.13.04.03(11)	1	/
	3900018717		TY.13.04.03(17)	/	1
19	30505002	Remote controllerzy502a	30505.002MX	1	1
20	30294002	Display board Z4015	30294.002MX	1 (used by cooling only type)	/
	30294001	Display board Z4035	30294.001MX	/	1 (used by heat pump)
	30294401	Display board Z4415_M	30294.401MX	1 (used by cooling only type)	/
	30294010	Display board Z4435_M	30294.010MX	/	1 (used by heat pump)
21	01258651	Upper cover plate parts	FGR7I.0100000	1	1
22	32012402	Electric heater	(8052PA),01000003	3 (used by heat pump)	3 (used by heat pump)
23	01224255	Heating element bracket II	(7050L).01000003	6 (used by heat pump)	6 (used by heat pump)
24	01228632	Heating element bracket 1	FGRD10I.10010001	2 (used by heat pump)	2 (used by heat pump)
	01228637	Heating element bracket 2	FGR7I.10010001	1 (used by heat pump)	1 (used by heat pump)
25	01228638	Heating element bracket 3	FGR7I.10010002	1 (used by heat pump)	1 (used by heat pump)
26	01308679	Right side plate parts	FGRD10I.0500000	1	1
27	01078604	Evaporator right bracket	FGRD10I.09010006	1	1
28			/		
29	15018604	Fan motor (right type)	FGRD10I.03010003	1	1
30	44010234	AC contactor GC8-30	44010234	1	1
31	33010014	Capacitor CBB61 8F/450V		1	1
32					
33	43110168	Power transformer SC25A	TY.11.01.12	1	/
	43110209	Power transformer SC39	TY.11.01.37	/	1
34	30224002	Mainboard Z4015	30224.002MX	1 (used by cooling only type)	/
	30224001	Mainboard Z4035	30224.001MX	/	1 (used by heat pump)
	30224403	Mainboard 2 Z4415_M	30224.403MX	1 (used by cooling only type)	/
	30224405	Mainboard 2 Z4435_M	30024.405MX	/	1 (used by heat pump)
35	42011117	Six-position terminal board	TY.00.57	1	1
	420111591	Terminal board (3 positions)	TY.14.02.13(01)	1	1
36	70410524	Insulation spacer F	TY.00.84a	1	1
37	71010102	Electric wire holder	LF7.5WB.06000001	3	3
38	42011103	Terminal board 2-8	TY.00.205	2	2



Explosive view and list

FG(R) 10H/A, FG(R)12H/A FGD(R) 10H/A Indoor unit parts breakdown

No.	Code	Name	Fig No.	Quantity		
				FG (R) 10H/A	FG (R) 12H/A	FG (R) 10H/A
1	01258602	Cover board of air return	FGRD10I.02010002	1	1	1
2	01258603	Lower cover plate parts	FGRD10I.02000000	1	1	1
3	01278603	Water container parts	FGRD10I.08000000	1	1	1
4	01498604	Air return port side plate assy	FGRD10I.07010000	1	1	1
5	15018612	Motor FG150B	FGRD10I.0101008a	1	1	1
6	15018603	Fan motor (left type)	FGRD10I.03010003	2	2	2
7	01338630	Fan mounting plate assy	FGRD10I.03010000	1	1	1
8	01008627	Evaporator parts	FGRD10I.09000000	1	1	1
9	01078603	Evaporator left bracket	FGRD10I.09010005	/	/	/
10	01308678	Left side plate parts	FGRD10I.04000000	1	1	1
11	02118504	Hook	FGRD10I.00000009	4	4	4
12	01408628	Electric box assy	FGRD10I.12010000	1	1	1
13	02115001	Heating element locking parts I	RFD12WA.1-7	3	3	3
14	01222401	Electric heating pipe fixing bar	(1252PA).01000001	3	3	3
15	46012402	Thermal protector assy	(1252PA).01030000	1	1	1
16	01498608	Air outlet side plate assy	FGRD10I.06000000	1	1	1
17	3900018710	Indoor ambient temperature sensor	TY.13.04.03(10)	1	1	1
18	3900018711	Indoor pipe temperature sensor	TY.13.04.03(11)	1	1	1
19	30505002	Remote controllerzy502a	30505.002MX	1	1	1
20	30294002	Display board Z4015	30294.002MX	1 (used by cooling only type)	1 (used by cooling only type)	1 (used by cooling only type)
	30294001	Display board Z4035	30294.001MX	1 (used by heat pump)	1 (used by heat pump)	1 (used by heat pump)
21	01258607	Upper cover plate parts	FGRD10I.01000000	1	1	1
22	32018614	Electric heater	FGRD10I.10000001	3 (used by heat pump)	3 (used by heat pump)	/
	32018612	Electric heater	FGRD10I.10000001	/	/	3 (used by heat pump)
23	01224255	Heating element locking parts II	(7050L).01000003	6 (used by heat pump)	6 (used by heat pump)	6 (used by heat pump)
24	01228632	Heating element bracket 1	FGRD10I.10010001	2 (used by heat pump)	2 (used by heat pump)	2 (used by heat pump)
	01228633	Heating element bracket 2	FGRD10I.10010002	1 (used by heat pump)	1 (used by heat pump)	1 (used by heat pump)
25	01228634	Heating element bracket 3	FGRD10I.10010003	1 (used by heat pump)	1 (used by heat pump)	1 (used by heat pump)
26	01308679	Right side plate parts	FGRD10I.05000000	1	1	1
27	01078604	Evaporator right bracket	FGRD10I.09010006	1	1	1
28	15018613	Motor FG75B	FGRD10I.0100009a	1	1	1
29	15018604	Fan motor (right type)	FGRD10I.03010003	1	1	1
30	44010199	AC contactor LCIK0910M7	44010199	1	1	/
	44010234	AC contactor GC8-30		/	/	1
31	33010014	Capacitor CBB61 8 μ F/450V		1	1	1
32	33010064	Capacitor CBB61 5 μ F/450V	QJ/GD.53.12	1	1	1
33	43110168	Power transformer SC25A	TY.11.01.12	1	1	1
34	30224002	Mainboard Z4015	30224.002MX	1 (used by cooling only type)	1 (used by cooling only type)	1 (used by cooling only type)
	30224001	Mainboard Z4035	30224.001MX	1 (used by heat pump)	1 (used by heat pump)	1 (used by heat pump)
35	42011143	Nine-position terminal board	TY.14.01.76	1	1	1
	42011143	Nine-position terminal board	TY.14.01.76	1	1	1
	42011133	Eight-position terminal board	TY.14.01.66	1	1	1
36	70410524	Insulation spacer F	TY.00.84a	1	1	1
37	71010102	Electric wire holder	LF7.5WB.06000001	3	3	3
38	42011103	Terminal board 2-8	TY00.205	2	2	2



FG Series wind pipe blowing air-conditioning unit

FG(R) 6.5/A, FG(R)7.5/A Indoor unit parts breakdown

No.	Code	Name	Fig No.	Quantity	
				FG(R)6.5/A	FG(R)7.5/A
1	01252463	Cover board of air return	KFR80PNA1A.02000002	1	1
2	01252461	Lower cover plate	KFR80PNA1A.02000001	1	1
3	01272458	Water container parts	KFR80PNA1A.08000000	1	1
4	01499064	Air return port side plate assy	FGR6AI.09010000	1	1
5	15012456	Motor FG90B	(7642P).03000003	1	1
6	15012454	Fan motor (left type) SYP-160/200J	KFR80PNA1A.03000002	2	1
7	01339060	Fan mounting plate assy	FGR6AI.03010000	1	1
8	01002463	Evaporator parts	(8042PA).10000000	1	1
9	01072483	Evaporator left bracket	KFR80PNA1A.12000000	1	1
10	01309057	Left side plate assy	FGR12AI.04010000	1	1
11	02112466	Hook	KFR80PNA1A.06000000	4	4
12	01408628	Electric box assy	FGRD10I.12010000	1	1
13	02115001	Heating element locking parts I	RFD12WA.1-7	3 (used by cooling only type)	3 (used by cooling only type)
14	01222401	Electric heating pipe fixing bar	(1252PA).01000001	3 (used by heat pump)	3 (used by heat pump)
15	46012402	Thermal protector assy	(1252PA).01030000	1	1
16	01492458	Air return port side plate assy	KFR80PNA1A.09000000	1	1
17	390000451	Indoor ambient temperature sensor	TY.1302.82(01)	1	1
18	3900018717	Indoor pipe temperature sensor	TY.13.04.03(17)	1	1
19	305050021	Remote controllerzy502a	30505.0021MX	1	1
20	30294401	Display board Z4415_M	30294.401MX	1 (used by cooling only type)	1 (used by cooling only type)
	30294010	Display board Z4435_M	30294010MX	1 (used by heat pump)	1 (used by heat pump)
21	1252457	Upper cover plate parts	KFR80PNA1A.01000000	1	1
22	32012402	Electric heater	(8052PA).01000003	3 (used by heat pump)	3 (used by heat pump)
23	01224255	Heating element locking parts II	(7050L).01000003	6 (used by heat pump)	6 (used by heat pump)
24	01222407	Electric heating pipe upper mounting rack	(8052PA).01010001	1 (used by heat pump)	1 (used by heat pump)
25	01222405	Electric heating pipe lower mounting rack	(8052PA).10000002	1 (used by heat pump)	1 (used by heat pump)
26	01302471	Right side plate parts	(1242PA).05000000	1	1
27	01072482	Evaporator right bracket	KFR80PNA1A.11000000	1	1
28			/		
29	15012458	Fan motor (right type)	KFR80PNA1A.11000000	1	1
30	44010234	AC contactor GC8-30		1	1
31	33010011	Capacitor CBB61 4 μ F/450V	QJ/GD.53.12	1	1
32			/		
33	43110209	Power transformer SC39	TY.11.01.37	1	1
34	30224403	Mainboard 2Z4415_M	30224.403MX	1 ((used by cooling only type)	1 (used by cooling only type)
	30224405	Mainboard 2Z4435_M	30224.405MX	1 (used by heat pump)	1 (used by heat pump)
35	420111591	Terminal board (3 positions)	TY.14.02.13(01)	1	1
36	70410524	Insulation spacer F	TY.00.84a	1	1
37	71010102	Electric wire holder	LF7.5WB.06000001	3	3
38	42011103	Terminal board 2-8	TY.00.205	2	2



Explosive view and list

FG(R)10/A, FG(R)12/A indoor unit parts breakdown

No.	Code	Name	Fig No.	Quantity	
				FG(R)10/A	FG(R)12/A
1	01252474	Cover board of air return	(1242PA)02000002	1	1
2	01259063	Lower cover plate	FG12AI.02000001	1	1
3	01272459	Water container parts	(1242PA)08000000	1	1
4	01499059	Air return port side plate assy	FGR12AI.09010000	1	1
5	15012456	Motor FG90B	(7642P).03000003	1	1
6	15012454	Fan motor (left type)	KFR80PNA1A.03000002	2	1
7	01339056	Fan mounting plate assy	FGR12AI.03010000	1	1
8	01002468	Evaporator parts	(1232PA).10000000	1	/
	01032453	Evaporator parts	(1242PA).10000000	/	1
9	01072483	Evaporator left bracket	KFR80PNA1A.12000000	1	1
10	01309057	Left side plate assy	FGR12AI.04010000	1	1
11	02112466	Hook	KFR80PNA1A.06000000	4	4
12	01408628	Electric box assy	FGRD10I.12010000	1	1
13	02115001	Heating element locking parts I	RFD12WA.1-7	3 (used by cooling only type)	3 (used by cooling only type)
14	01222401	Electric heating pipe fixing bar	(1252PA).01000001	3(used by heat pump)	3 (used by heat pump)
15	46012402	Thermal protector assy	(1252PA).01030000	1(used by heat pump)	1 (used by heat pump)
16	01492463	Air return port side plate assy	(1242PA).09000000	1	1
17	390000198	Indoor ambient temperature sensor	TY.13.04.09	1	1
18	3900018717	Indoor pipe temperature sensor	TY.13.04.03(17)	1	1
19	305050021	Remote controllerzy502a	30505.0021MX	1	1
20	30294401	Display board Z4415_M	30294.401MX	1 (used by cooling only type)	1 (used by cooling only type)
	30294010	Display board Z4435_M	30294010MX	1(used by heat pump)	1 (used by heat pump)
21	1259061	Upper cover plate parts	FGR12AI 01010000	1	1
22	32012401	Electric heater 1200W/220V	(1252PA).01000003	3(used by heat pump)	3 (used by heat pump)
23	01224255	Heating element locking parts II	(7050L).01000003	6(used by heat pump)	6 (used by heat pump)
24	01222404	Electric heating pipe upper mounting rack	(8052PA).01010001	1(used by heat pump)	1 (used by heat pump)
25	01222402	Electric heating pipe lower mounting rack	(8052PA).10000002	1(used by heat pump)	1 (used by heat pump)
26	01302471	Right side plate parts	(1242PA).05000000	1	1
27	01072482	Evaporator right bracket	KFR80PNA1A.11000000	1	1
28	15012457	Motor FG45B	(1242PA).05000000		
29	15012458	Fan motor (right type)	KFR80PNA1A.03000002	1	1
30	44010199	AC contactor LC1K0910M7		1	1
31	33010011	Capacitor CBB61 4 μ F/450V	QJ/GD.53.12	1	1
32	33010026	Capacitor CBB61 2.5 μ F/450V	QJ/GD.53.12	1	1
33	43110209	Power transformer SC39	TY.11.01.37	1	1
34	30224405	Mainboard 2 Z4435_M	30224.403MX	1 ((used by cooling only type)	1 (used by cooling only type)
	30224403	Mainboard 2 Z4415_M	30224.405MX	1(used by heat pump)	1 (used by heat pump)
35	420111563	Terminal board (5 positions)	TY.14.02.13(03)	1	1
36	70410525	Insulation spacer D	TY.00.166	1	1
	70410524	Insulation spacer F	TY.00.84a	/	/
37	71010102	Electric wire holder	LF7.5WB.06000001	2	2
38	42011103	Terminal board 2-8	TY.00.205	2	2



FG Series wind pipe blowing air-conditioning unit

4.2.2 Parts breakdown for outdoor unit as shown in Fig 4.2.2-1

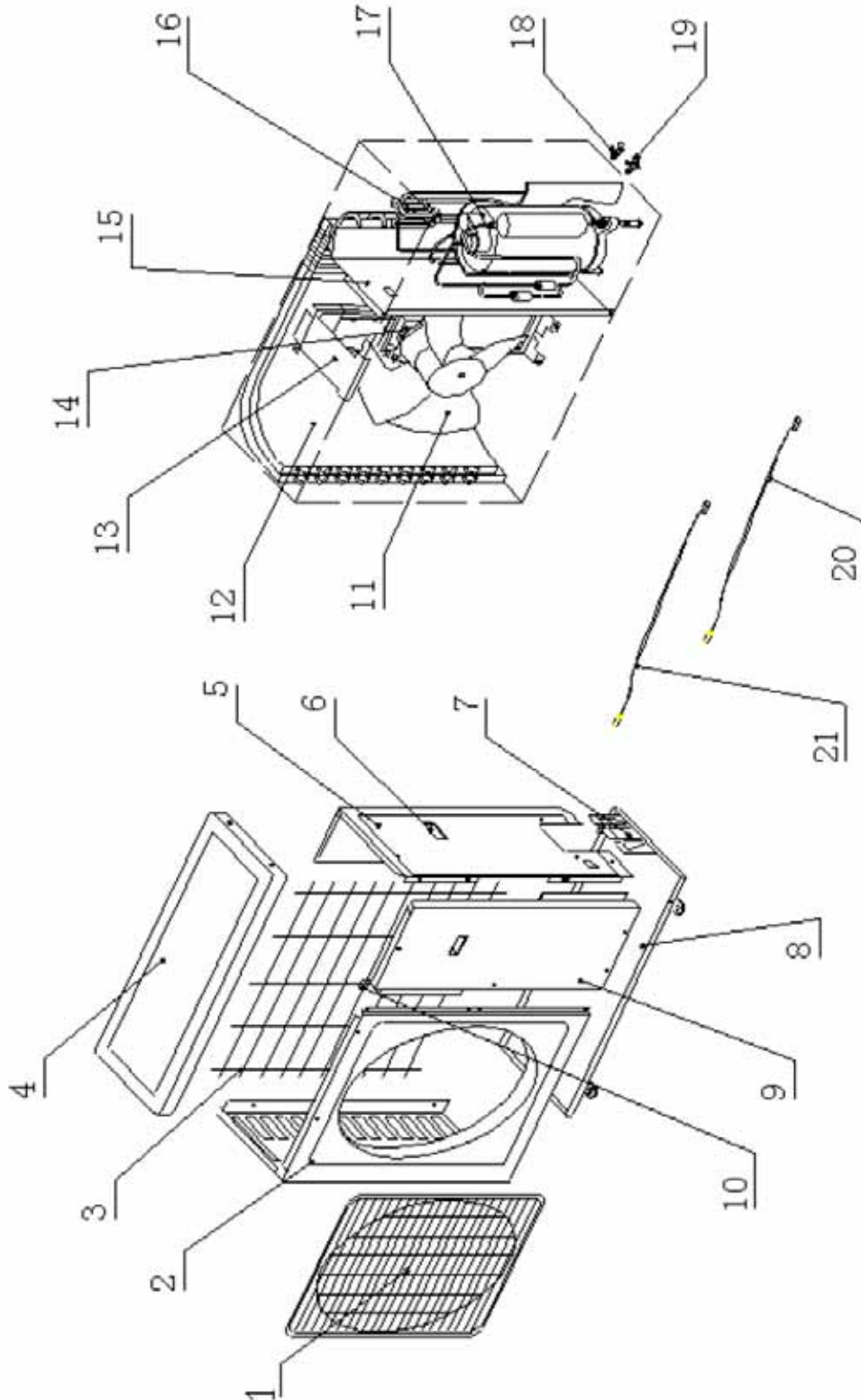


Fig 4.2.2-1



Explosive view and list

FG(R)2.6 H/A FG (R) 3.5H/A FG (R) 5H/A Outdoor unit parts breakdown

No.	Code	Name	Fig No.	Quantity		
				FG(R)2.6H/A	FG(R)3.5H/A	FG(R)5H/A
1	22413431	Panel grid (module A)	KF35WF 08000002	1	1	1
2	20002041	Front panel	KA110W 09000001	1	1	1
3	11123404	Rear grill	KF35WF 07000001a	1	1	1
4	01253261	Top cover assy	KF35WF 10000000	1	1	1
5	01302000	Right side plate assy	KF35WF 09000000	1	1	/
	01302001	Right side plate assy	KF35WF 09000000a	/	/	1
6	26233431	Big handle	KF35WF 11000001	1	1	1
7	01713413	Valve bracket assy	KF101W 05000000	1	/	/
	01713039	Valve bracket assy	KF20WF 05010000	/	1	/
	01713424	Valve bracket	KF35WF 05010001	/	/	1
8	01303324	Base plate assy	KF25WE 01000000b	/	1	1
	01303008	Base plate assy	KA200W 01000000m	/	1	/
	01205014	Base plate assy (Hitachi)	KG411W 01000000			
9			/			
10	76313102	Net cover pad	KF35WF 070000004a	1	1	1
11	10333412	Axial flow fan	KF35WF 02000002	1	1	1
12	01109057	Condenser parts	KGR2HAO 01000000	1	/	/
	01109054	Condenser parts	KG3HAO 01000000	/	1	/
	01103470	Condenser parts	KFR50WpK 03000000	/	/	1
13	01703069	Motor bracket	KFR25WA12F 02000001a	1	1	/
	01703391	Motor bracket	KF35WF 02010001	/	/	1(used by cooling only type)
	01703067	Motor bracket	Kfr25wa12f 02000001	/	/	1(used by heat pump)
14	15013153	Motor FW30E	KF35WF 02000001	1	/	/
	15013039	Motor FW48C	Ka101W 00000002c	/	1	1
15	01239052	Separator assy	FGR5HAO 04010000	1	1	1
16	03029055	Four-way valve assy	FGR2HAO 14000000	1(used by heat pump)	/	/
	03029054	Four-way valve assy	FGR5HAO 02010000	/	1(used by heat pump)	/
	43005003	Four-way valve assy	KG411CW 10000000	/	/	1(used by heat pump)
17	00120078	Compressor RH174VHAC		1	/	/
	00100131	Compressor C-RV222H1AA		/	1	/
	07100025	Compressor SHW33TC4-U		/	/	1
18	07100145	Valve 1/4"	TY.00.285B	1	1	1
19	07100145	Valve 3/8"	TY.01.53A	1	/	/
	07100153	Valve 1/2"	TY.01.53B	/	1	1
20	3900012125	Sensor	TY.13.02 19(25)	1(used by heat pump)	1(used by heat pump)	1(used by heat pump)



FG Series wind pipe blowing air-conditioning unit

FG(R)2.6 H/A FG (R) 6.5H/A FG (R) 7.5H/A Outdoor unit parts breakdown

No.	Code	Name	Fig No.	Quantity			
				FG(R)6.5H/A	FG(R)6.5/A	FG(R)7.5H/A	FG(R)7.5/A
1	22265251	Face cover(apricot color)	LF7.5WB 10000001	1	1	1	1
2	01433031	Outer cover	KFR25 × 2WE.02000001a	1	1	1	1
3	01473028	Net cover	KFR25 × 2WE.06000001a	1	1	1	1
4	01255262	Top cover	LF7.5WB.09000001	1	1	1	1
5	01305002	Rear side plate	KF50W1B 00000001	1	1	1	1
6	26235253	Handle	LF7.5WB.00000005a	1	1	1	1
7	01715001	Valve bracket assy	KF501B 01010000	1	1	1	1
8	01205107	Base plate parts	KF60W1ED 10000000a	1	/	/	/
	01205032	Base plate parts	KF601ED 10000000a(01)	/	1	/	/
	01205264	Base plate parts	LF7.5WB.01010000(02)	/	/	1	1
9	01303023	Front side plate	KFR25 × 2WE.03000001	1	1	1	1
10	76315252	Net cover pad	LF7.5WB.00000010a	1	1	1	1
11	10335253	Axial flow fan	LF7.5WB 00000003	1	1	/	/
	10335257	Axial flow fan	KFR60W1ED 00000008	/	/	1	1
12	01108503	Condenser parts	FGR6(O).01000000	1	1	/	/
	01109058	Condenser parts	FGR7A(O).01000000	/	/	1	/
	01105226	Condenser parts	KF76W1E.01000000	/	/	/	1
13	01703041	Motor bracket assy	KA110W.08000000(03)	1	1	/	/
	01705103	Motor bracket assy	KF60W1ED.20000000	/	/	1	1
14	15013302	Motor FW68T	KFR120WtB.03000001	1	1	/	/
	15015201	Motor LW80F	KF70W1EX.00000002	/	/	1	1
15	01233024	Middle separator assy	KFR25 × 2WE.05000000	1	1	1	1
16	03025002	Four-way valve assy	KFR501ED.05000000a	1(used by heat pump)	/	/	/
	03029056	Four-way valve assy	FGR6AO.05010000	/	1(used by heat pump)	/	/
	43005210	Four-way valve assy	KFR70W1EW.03000000	/	/	1(used by heat pump)	1(used by heat pump)
17	00100140	Compressor SHV33YE6UG		1	1	/	/
	00100065	Compressor ZR34KH-PFJ-522		/	/	1	1
18	07105256	Small valve assy	LF7.5WB.13000000(01)	1	1	/	/
	07105255	Small valve assy	LF7.5WB.13000000	/	/	1	1
19	071052521	Big valve assy	LF7.5WB.12000000(01)	1	1	/	/
	07105251	Big valve assy	LF7.5WB.12000000	/	/	1	1/
20	3900012125	Sensor	TY.13.02.19(25)	/	/	1	1
21	3900012126	Sensor	TY.13.02.19(26)	1(used by heat pump)	1(used by heat pump)	1	1



Explosive view and list

FG(R) D10H/A FG(R) 10H/A FG(R)10/A FG(R)12H/A Outdoor unit parts breakdown

No.	Code	Name	Fig No.	Quantity				
				FG(R)D10H/A	FG(R)10H/A	FG(R)10/A	FG(R)12H/A	FG(R)12/A
1	22265251	Face cover	LF7.5WB.10000001	2	2	2	2	2
2	01435433	Outer cover	KFR120W1B.00000001	1	1	1	1	1
3	01475432	Net cover	KFR120W1B.00000002a	1	1	1	1	1
4	01255262	Top cover	KFR120W1B.09000001	1	1	1	1	1
5	01305434	Rear side plate	KFR120W1B.07000001	1	1	1	1	1
6	26235252	Handle	LF7.5WB.00000005	3	3	3	3	3
7	01715001	Valve bracket assy	KF50WB.01010000	1	1	1	1	1
8	01205011	Base plate assy	LF7.5WB.01010000(01)	1	/	/	/	/
	01205264	Base plate assy	KFR120WB.01010000(02)	/	1	/	/	/
	01205433	Base plate assy	KFR120W1E.11010000	/	/	1	/	/
	01205250	Base plate assy	KF70W1B.03000000	/	/	/	1	1
9	01305431	Front side plate	KFR120W1B.06000001	1	1	1	1	1
10	76315252	Net cover pad	LF7.5WB.00000010a	1	1	1	1	1
11	10335253	Axial flow fan	LF7.5WB.00000003	2	2	2	2	2
12	01108630	Condenser parts	FGRD10(O).01000000	1	/	/	/	/
	01108054	Condenser parts	FGR10(O).01000000	/	1	/	/	/
	01103456	Condenser parts	KFR100WpK.01000000	/	/	1	/	/
	01108604	Condenser parts	FGR12(O)01000000	/	/	/	1	/
	01103455	Condenser parts	KFR120WpK.01000000	/	/	/	/	1
13	01705432	Motor bracket	KFR120W1B.03000000	1	1	1	1	1
14	15015421	Motor LW68A	KFR120W1B.00000001	2	2	2	2	2
15	01235440	Separator assy	KFR120W1B.04000000	1	1	1	1	1
16	43008630	Four-way valve parts	FGRD10(O).03000000	1(used by heat pump)	/	/	/	/
	43003453	Four-way valve parts	KFR120WpK.03000000	/	1(used by heat pump)	/	/	/
	03025440	Four-way valve parts	KFR120WLE.03000000a	/	/	1(used by heat pump)	/	/
	43003454	Four-way valve parts	KFR120WLE.03000000a	/	/	/	1(used by heat pump)	/
	43009052	Four-way valve parts	FGR12AO.03010000	/	/	/	/	1(used by heat pump)
17	00100068	Compressor		1	/	/	/	/
	00120043	Compressor		/	1	1	/	/
	00100330	Compressor		/	/	/	1	1
18	07103701	Small valve assy	KF120WtB.01000001	1	1	1	1	1
19	07105435	Big valve assy	KFR120W1B.13000000	1	1	1	1	1
20	390001291	Outdoor ambient temperature sensor	TY.13.02.18(01)	1	1	/	1	/
	3900012125	Outdoor ambient temperature sensor	TY.13.02.19(25)	1	1	/	1	/
	3900012126	Outdoor ambient temperature sensor	TY.13.02.19(26)	/	/	/	/	1
21	390001211	Outdoor pipe temperature sensor	TY.13.02.19(01)	/	/	/	1	/
	3900012126	Outdoor pipe temperature sensor	TY.13.02.19(26)	/	/	1	/	/
	3900012129	Outdoor pipe temperature sensor	TY.13.02.19(29)	/	/	/	/	1



FG Series wind pipe blowing air-conditioning unit

4.1 Disassembly Procedures

4.2.1 Disassembly procedures for indoor unit

1) Disassemble electric box

- Screw off the fastening screws of the electric box cover, remove the electric box cover (as shown in Fig 4.2.1-1) .
- Loosen the power cable and the control wire on the connection terminal, pull out the power cable and the control wire.
- Screw off the fastening screws of the electric box, remove the electric box (as shown in Fig 4.2.1-2)

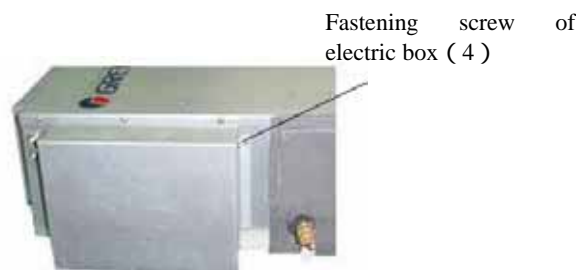


Fig 4.2.1-1

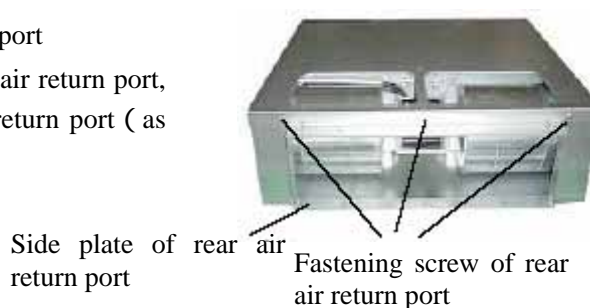
Fastening screw of electric box (4)



Fig 4.2.1-2

2) Disassembly of side plate of rear air return port

- Screw off the fastening screw of the rear air return port, take down the side plate of the rear air return port (as shown in Fig 4.2.1-3)





3) Disassembly of side plate of air supply port

- Screw off the fastening screw of the air supply port, take down the side plate of the air supply port (as shown in Fig 4.2.1-4)

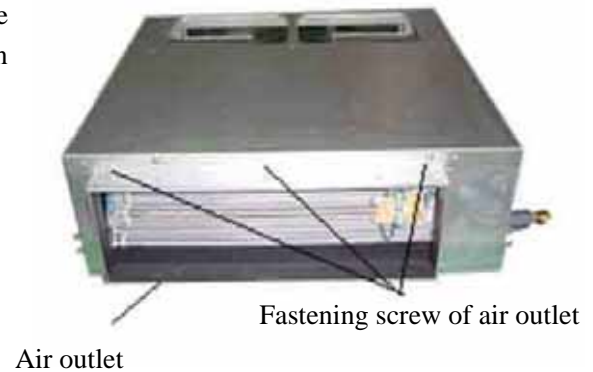


Fig 4.2.1-4

4) Disassembly of lower cover plate

- Screw off the fastening screw of the lower cover plate, take down the lower cover plate
(As shown in Fig 4.2.1-5)

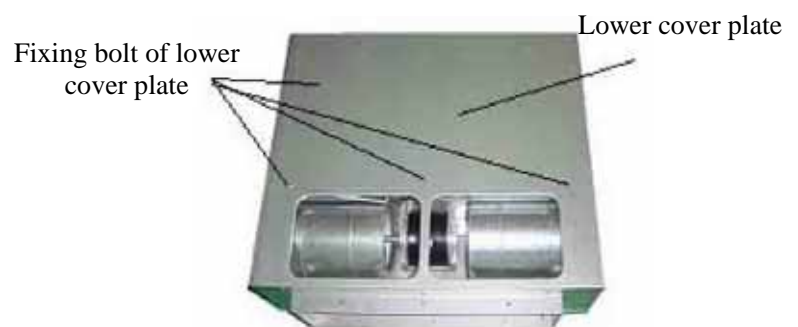


Fig.4.2.1-5

5) Disassembly of right side plate

- Screw off the bolts of the right side plate, and take off the right side plate
(As shown in Fig 4.2.1-6)

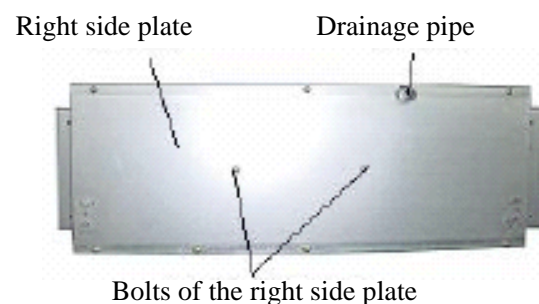


Fig.4.2.1-6



FG Series wind pipe blowing air-conditioning unit

6) Disassembly of water-tray

Take out the water-tray assy (As shown in Fig 4.2.1-7)



Fig 4.2.1-7

7) Disassembly of left side plate

- Screw off the fastening screw of the air port plate of left side plate, take down the air port plate of the left side plate (As shown in Fig 4.2.1-8)

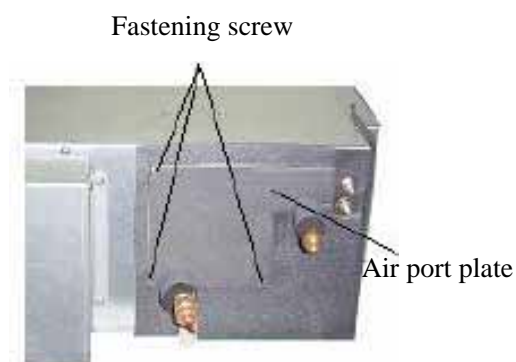


Fig 4.2.1-8

- Screw off the bolts of the left side plate, and take off the left side plate (As shown in Fig 4.2.1-9)

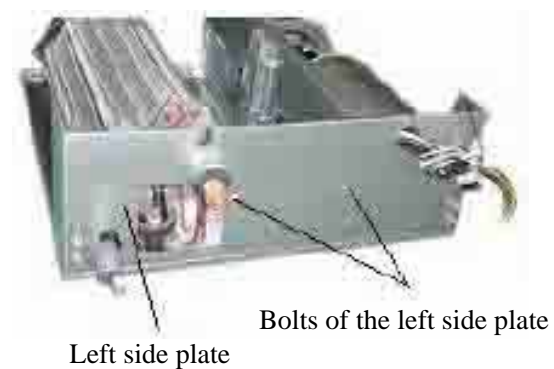


Fig 4.2.1-



8) Disassembly of electric heating pipe

- Screw off the fixing bolt of the electric heating locking parts.
- Loosen the connection wire of the high temperature protection assy, take down the electric heating pipe (As shown in Fig 4.2.1-10)

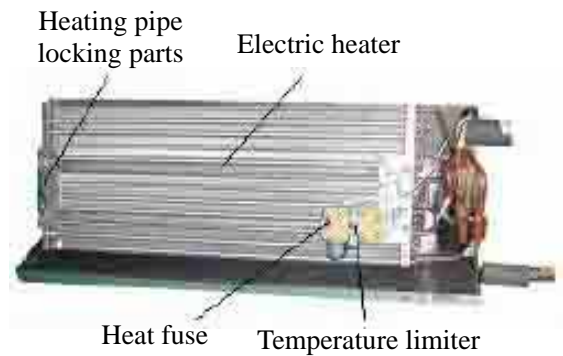


Fig 4.2.1-10

9) Disassemble evaporator

- Screw off the bolts of the evaporator
- Disconnect the connection between the pipe inlet and outlet and other pipes.

(As shown in Fig 4.2.1-11)

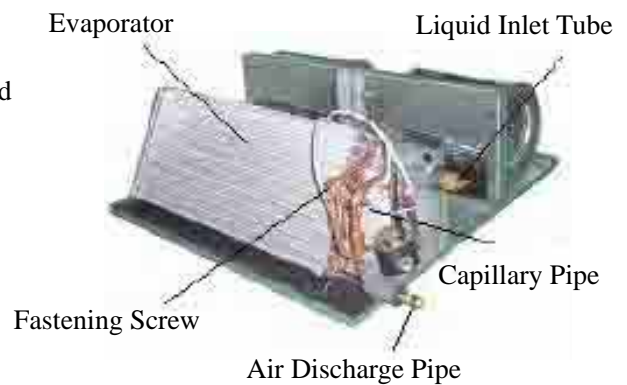


Fig 4.2.1-11

10) Disassembly of evaporator supporter

- Screw off the tapping screw of the evaporator bracket, take away the evaporator bracket

(As shown in Fig 4.2.1-12)

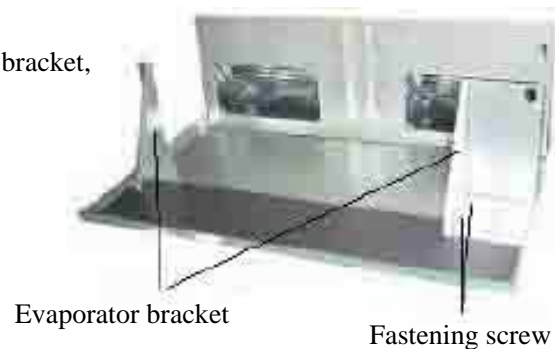


Fig 4.2.1-12



FG Series wind pipe blowing air-conditioning unit

11) Disassembly of fan

- Screw off the fastening bolts between the fan and the motor.
- Screw off the fastening screw of the fan and take down the fan .

(As shown in Fig 4.2.1-13)

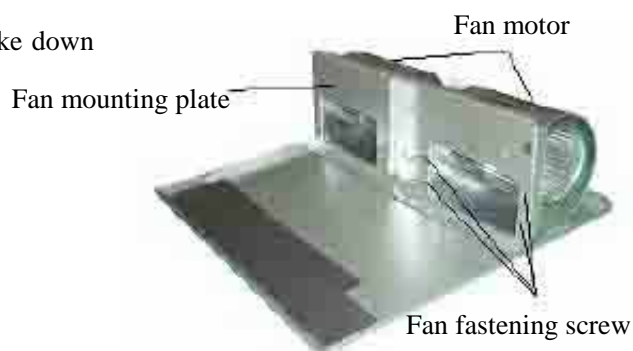


Fig 4.2.1-13

12) Disassembly of fan motor

- Loosen the connection plug of the motor wire, lead the motor wire through the wire hole.
- Screw off the fixing bolt of the motor and take down the motor

(As shown in Fig 4.2.1-14)

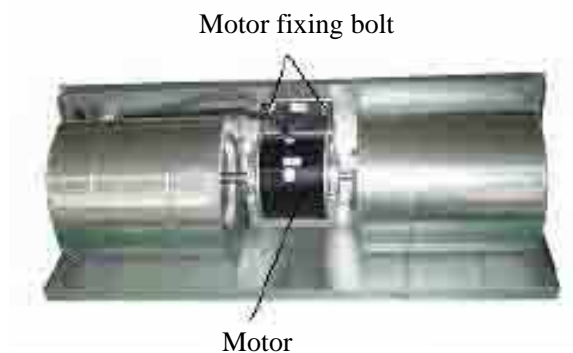


Fig 4.2.1-14



4.2.2 Disassembly procedures of the outdoor unit

1) Disassembly of front side plate

- Screw off the fastening screw of the front side plate (As shown in Fig 4.2.2-1)
- Grasp the handle and push the front side plate downwards.

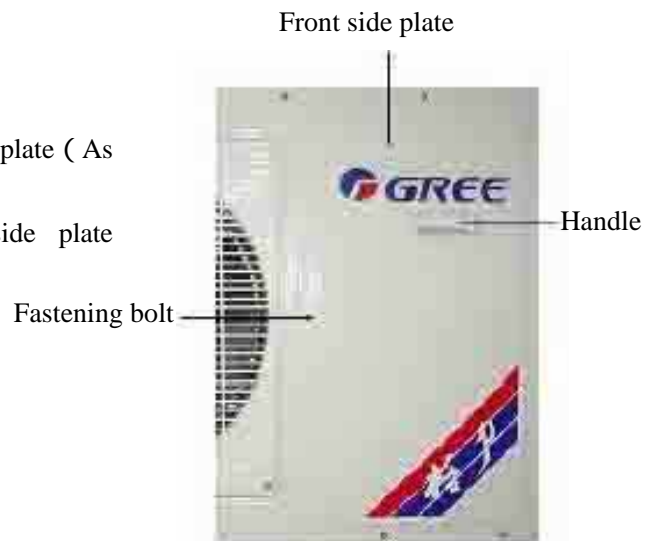


Fig 4.2.2-1

2) Disassembly of rear side plate

- Loosen the power cable and the control on the connection terminal and pull out the power cable and the control wire.
- Screw off the fastening screws of the electric box and those of the rear side plate.
- Grasp the handle and pull out the front side plate upwards (as shown in Fig 4.2.2-2) .

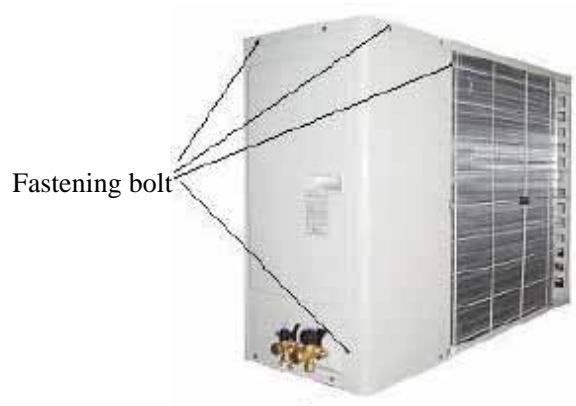


Fig 4.2.2-2



FG Series wind pipe blowing air-conditioning unit

3) Disassembly of electric box

- Screw off the fastening screw of the electric box, pull it upwards by hand and disassemble the electric box.
(as shown in Fig 4.2.2-3)

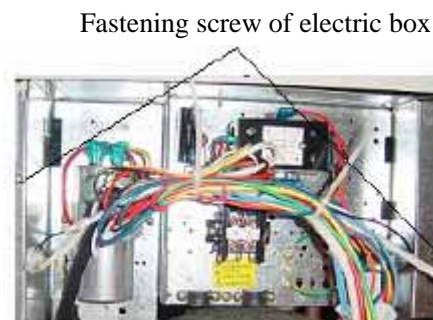


Fig 4.2.2-3

4) Disassembly of the compressor

- Screw off the patchcord on the electric connector of the compressor.
- Solder and open the air suction pipe and the air discharge pipe of the compressor.
(as shown in Fig 4.2.2-4)
- Screw off the fixing nut of the compressor and take out the compressor.



Fig 4.2.2-4

5) Disassembly of four-way valve

- Screw off the fastening screws on the four-way valve which are used to fasten the electromagnetic coil.
- Take down the electromagnetic coil.
- Unsolder the soldering points between the four-way valve and other pipes.
- Take off the four-way valve. (As shown in Fig.4.2.2.5)

Note: To unsolder the soldering points, do not let flames touch other parts. The valve body must be completely wrapped by wet cloth to avoid damages caused by the high temperature.

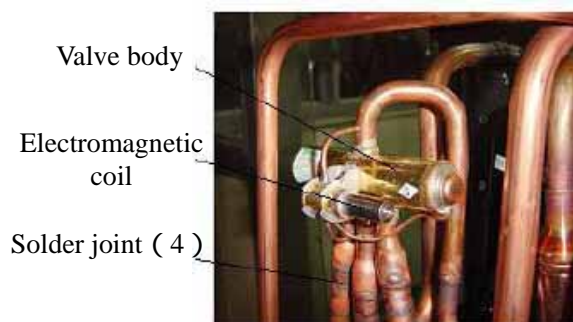


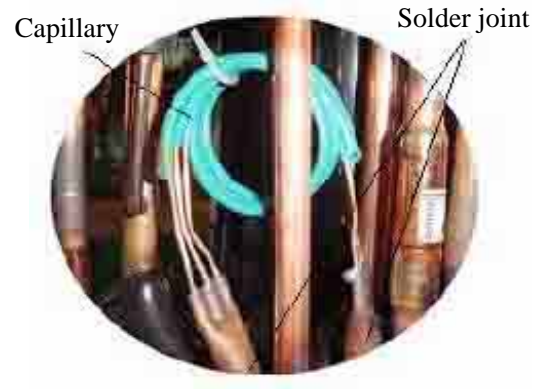
Fig 4.2.2-5



Disassembly procedure

6) Disassembly of the capillary

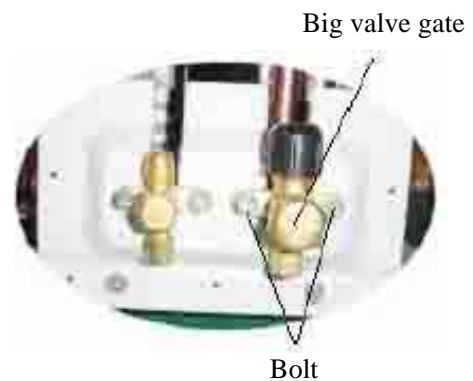
- Unsolder the two soldering points between the capillary and other pipes.
- Take off the capillary.
(as shown in Fig 4.2.2-6)



7) Disassembly of the big valve gate

- Screw off the 2 bolts that fasten the big valve gate
- Unsolder the soldering points between the big valve and the air return pipe, take down the big valve (as shown in Fig 4.2.2-7) .

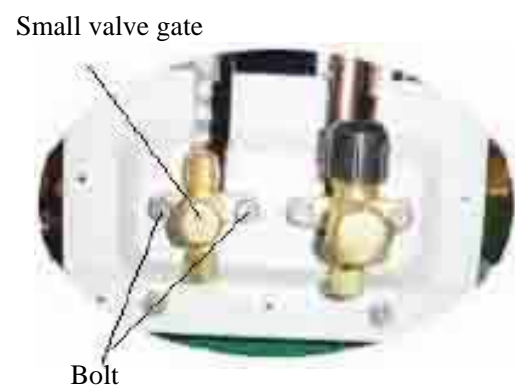
Note: To unsolder the soldering points, the valve body must be completely wrapped by wet cloth to avoid damages caused by the high temperature.



8) Disassembly of the small valve gate

- Screw off the 2 bolts fastening the small valve gate
- Unsolder the soldering point between the small valve and the air return pipe, take down the small valve (as shown in Fig 4.2.2-8)

Note: To unsolder the soldering points, do not let flames touch other parts. The valve body must be completely wrapped by wet cloth to avoid damages caused by the high temperature.





FG Series wind pipe blowing air-conditioning unit

9) Disassembly of axial flow fan

- Screw off the two tapping screws fastening the face cover (as shown in Fig 4.2.2-9)
- Pull out the face cover downwards (locks on the back of the face cover) .

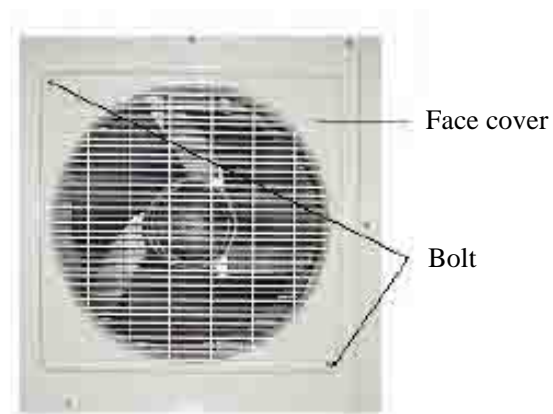


Fig 4.2.2-9

- Screw off the spherical nut that fastens the axial flow fan, take down the external teeth lock washer.
- Pull out the axial flow fan (as shown in Fig 4.2.2-10)

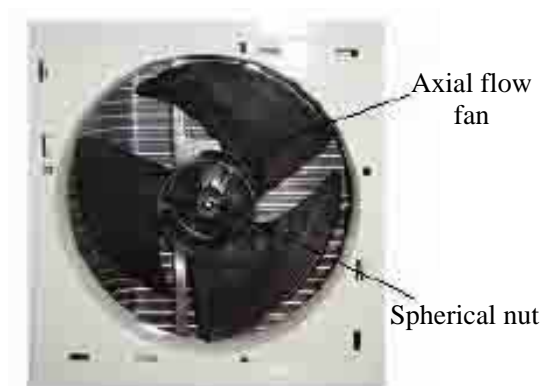


Fig 4.2.2-10

10) Disassembly of the top cover

- Screw off the screws which fix the top cover around, take off the top cover(As shown in Fig.4.2.2-11)

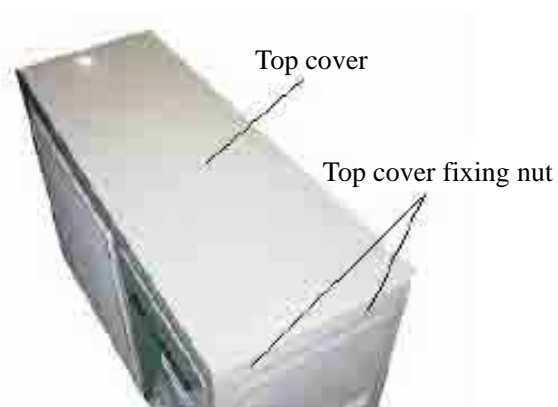
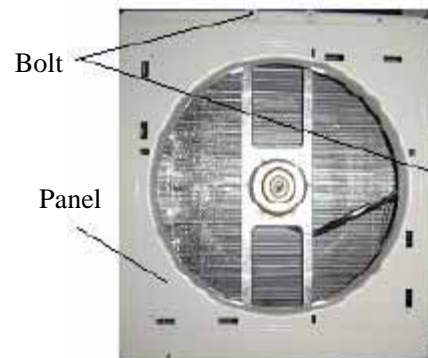


Fig 4.2.2-



11) Disassembly of panel

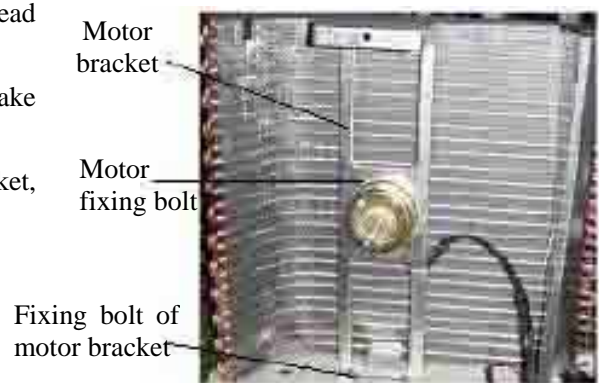
- Screw off the panel fixing bolt and take down the panel.
(as shown in Fig 4.2.2-12)



12) Disassembly of motor and fan motor

- Loosen the connection plug of the motor wire and lead the motor wire through the wire hole.
- Screw off the fixing bolt of the motor bracket and take out the motor bracket.
- Screw off the motor fixing bolt on the motor bracket, then pull out the motor backwards.

(as shown in Fig 4.2.2-13)





FG Series wind pipe blowing air-conditioning unit

More than 20% of the air conditioner malfunctions are caused by the electrical installation. Therefore, the quality of the electrical installation directly affects the application, or even affects whether the system can start up and operate reliably. So enough attention must be paid to the electrical installation of the ducted type unit. Now the structure of the electric box of the ducted type unit is introduced as follows:



Indoor electric box



Outdoor unit electric box



4.3 Maintenance item

4.3.1 Cleaning the air filters

- 1) Do not disassemble the air filter when cleaning is carried out, otherwise malfunctions may occur.
- 2) When the application environment of the air conditioner is dusty, the air filter must be cleaned many times (normally it is cleaned once every two weeks) .

Note: Please pay attention to the following before you begin to clean the air conditioner:

- a) Cut off all the power before you touch any connection devices.
- b) The air conditioner can not be cleaned until the unit is shut and power is cut off, otherwise there may be electric shock or hurt.
- c) Do not use water to clean the air conditioner, otherwise there may be electric shock.
- d) Special attention must be paid to the cleaning of the air conditioner and the stable and robust stand shall be used.

4.3.2 Maintenance in usage season

- 1) Check whether there is any block at the air inlet and the air outlet of the indoor and outdoor units;
- 2) Check whether the grounding wire is sound and complete;
- 3) Check whether the wire connection is sound and complete;
- 4) Check whether there are any texts on the display of the wire controller after the power is on.

Note: If there is anything abnormal, please ask the after-sale service personnel to provide instructions.

4.3.3 Maintenance after usage season

- 1) When it is fine, operate the unit in the air supply mode for half a day to dry the inside of the unit;
- 2) If the air conditioner is not used for a long time, shut down the power to save energy. After the power is shut, texts on the wire controller display will disappear.



Section Two B series small ducted type unit

Chapter 1 Summary

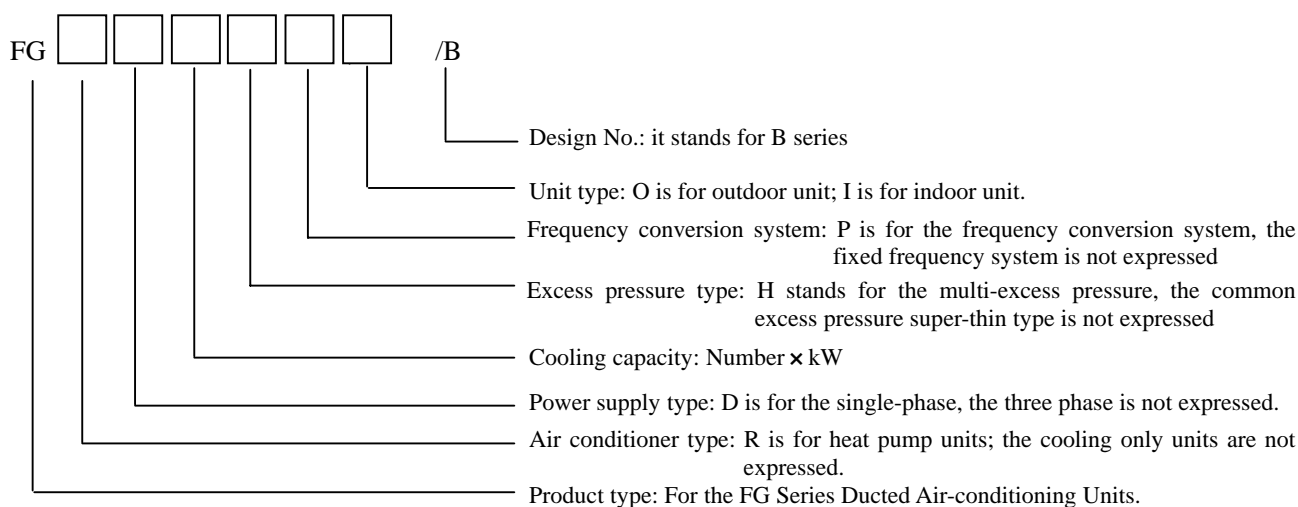
1.1, Product summary

Gree’s B series small ducted type unit is the super-thin ducted type unit independently developed by the company itself. The unit combines the advantages of the A series and meanwhile has the features of being convenient and flexible in installation and maintenance. It has been accepted and favored by a large number of users. The application of the new intelligent defrosting mode enables the unit to operate more efficiently and reliably. It may be widely applied to various small supermarkets, chain stores, families with multiple living rooms, hotels, restaurants, offices, meeting rooms and villa families.

Item	Cooling only		Heat pump	
Zero static pressure unit	FG2.3/B	FG2.6/B	FGR2.3/B	FGR2.6/B
	FG3.5/B	FG5/B	FGR3.5/B	FGR5/B

The current models of B series small ducted type units are in table 1. 1-1.

Table 1.1-1



1.2, Unit model expression method and example

1.2.1 Model expression method

1.2.2 Example:

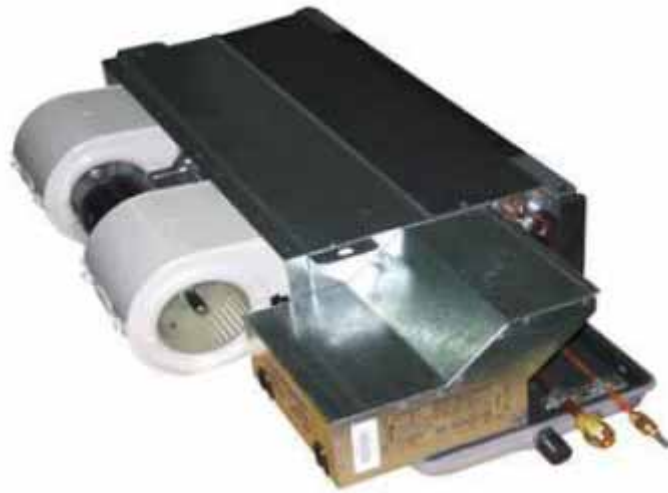
FG6.5/B: It refers to the zero-static-pressure, air-duct-air-supply, cooling only and super-thin air conditioner unit with the nominal cooling capacity of 6.5KW.



1.3. Unit outline drawing and combination example

1.3.1 Outline drawing

Outdoor unit



Indoor unit





FG Series wind pipe blowing air-conditioning unit

1.3.2 Combination example



1.4. Unit working principle and system diagram (same as A series)

1.5. Unit installation space (same as A series)



Technical parameter

1.6 Product specification and technical parameter (see the following table)

Performance parameter table of super-thin ducted type unit (zero static pressure)

item		Model	Cooling only					Heat pump					
			FG2.3/B	FG2.6/B	FG3.5/B	FG5/B	FG6.5/B	FGR2.3/B	FGR2.6/B	FGR3.5/B	FGR5/B	FGR6.5/B	
Cooling capacity		W	2300	2600	3500	5000	6500	2300	2600	3500	5000	6500	
HEATING capacity (heat pump/heat conversion)		W	-	-	-	-	-	2550(500)	2800(500)	3700(800)	5600(1500)	7000(2100)	
Current	COOLING	A	3.7	4.2	5.7	8.9	10.5	3.7	4.2	5.7	8.9	10.5	
	heat pump/转热	A	-	-	-	-	-	4.6(2.3)	5.0(3.7)	6.1(3.7)	8.54(6.82)	10.9(9.55)	
Startup current		A	19	21	31	49	56	19	21	31	49	56	
Power	Cooling	W	820	840	1250	1800	2250	820	840	1250	1800	2250	
	heat pump/heat conversion	W	-	-	-	-	-	800(500)	920(500)	1217(800)	1849(1500)	2200(2109)	
Max. Power		W	1000	1200	1850	2750	3000	1300	1700	2300	3600	4300	
Power supply		220V-50Hz											
Compressor		Fully-closed rotation type											
Air quantity	m ³ /h		420		540	840	1400	420		540	840	1400	
noise	indoor	dB(A)	36		38	42	46	36		38	42	46	
	outdoor	dB(A)	51	55	56	56	59	51	55	56	56	59	
Cooling 剂 Name		R22											
Filling amount of cooling agent (kg)		0.73	0.94	1.15	1.50	2.34	0.73	0.94	1.15	1.5	2.34		
Connection pipe	Diameter of liquid pipe	mm	6		6		9.52	6		6		9.52	
	Diameter of gas pipe	mm	9.52		12		16	9.52		12		16	
Indoor unit	Width	mm	1007		1367		1607	1007		1367		1637	
	Depth	mm	510		510		510	510		510		510	
	Height	mm	185					185					
	Net weight	kg	20		20	22	30	20		20	22	30	
	Air outlet	Length	mm	642			922	1242	642			922	1242
	Dimension	Width	mm	108			108	108	108			108	108
Outdoor unit	Width	mm	660	760		950	660	760		950			
	Depth	mm	250	250		412	250	250		412			
	Height	mm	430	530		700	430	530		700			
	Net weight	kg	25	32		59	25	32		59			
Water drainage pipe (outer diameter x measured thickness)		mm	G3/4"										

- Note:1. The cooling only unit does not have the auxiliary electric heater. Only the heat pump unit had the auxiliary electric heater.
2. The noise is measured under the half-silencing indoor condition. In actual operation, due to the change of environment, the noise will be slightly louder.
3. The specifications and parameters will change due to product improvement. The specific parameters shall refer to those on the nameplate of the unit.
4. The above unit model will change due to product improvement and production management requirements. The specific models shall refer to those that leave the factory.
5. This series of units do not apply to air duct connection. The air duct connection will affect the normal usage of the unit.

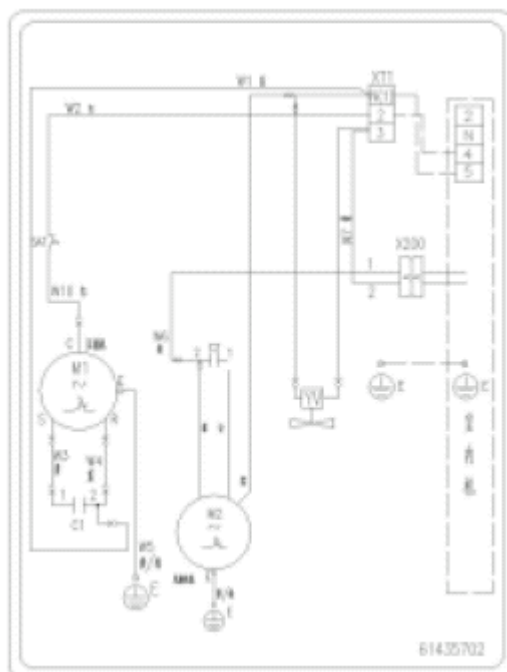


Chapter 2 Electricity and control

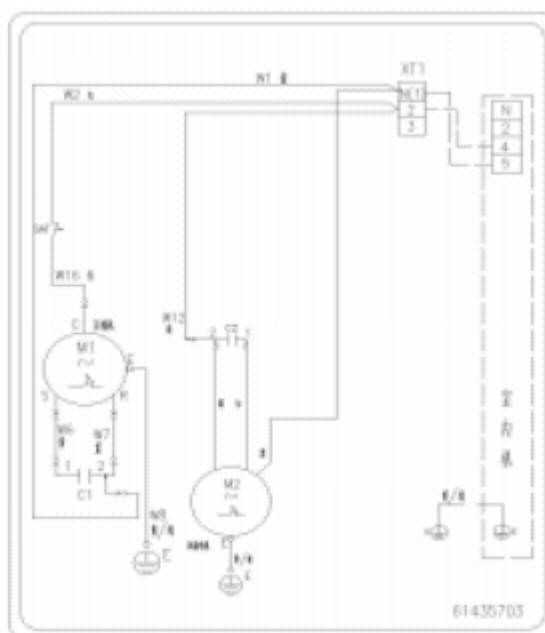
2.1 Light current

2.1.1 circuit diagram

FGR2.3/B(0) circuit diagram

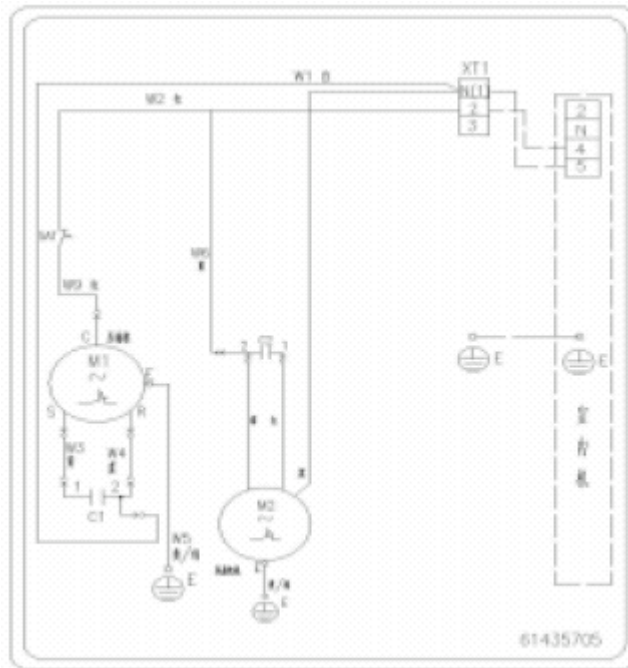


FG2.3/(B0) circuit diagram

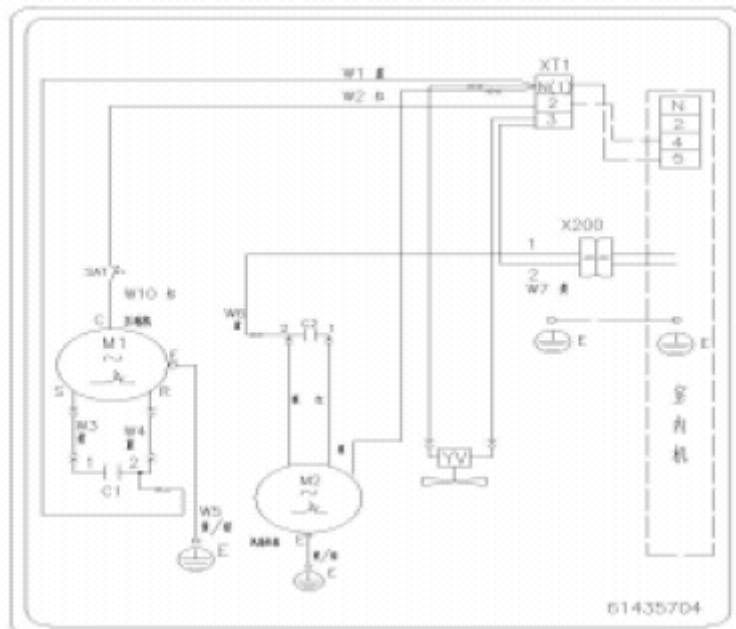




FG3.5/B(0) circuit diagram



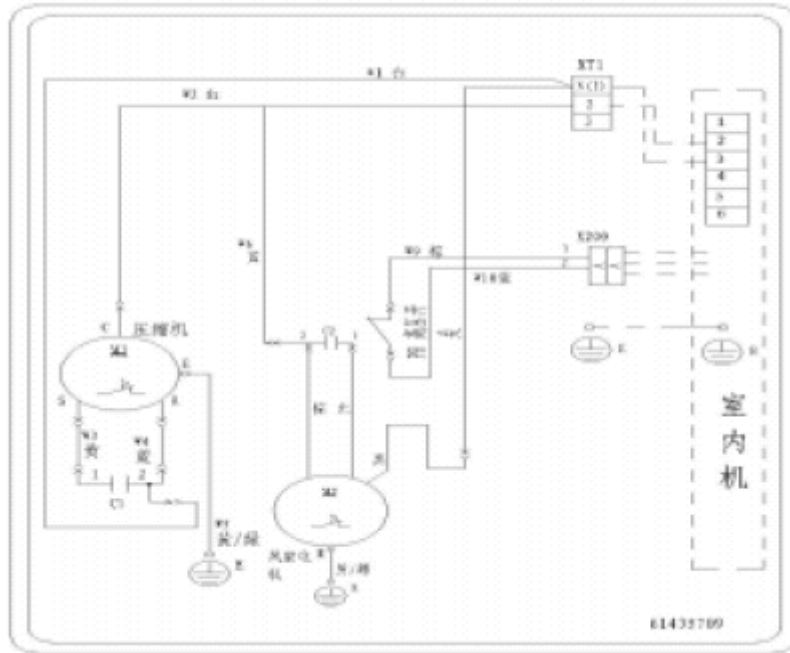
FGR3.5/B(0) circuit diagram



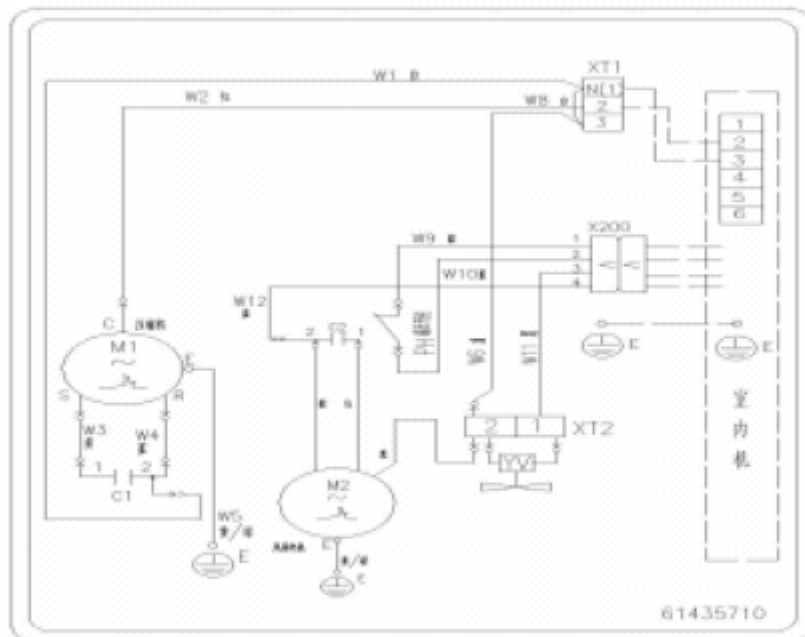


FG Series wind pipe blowing air-conditioning unit

FG5/B (0) circuit diagram

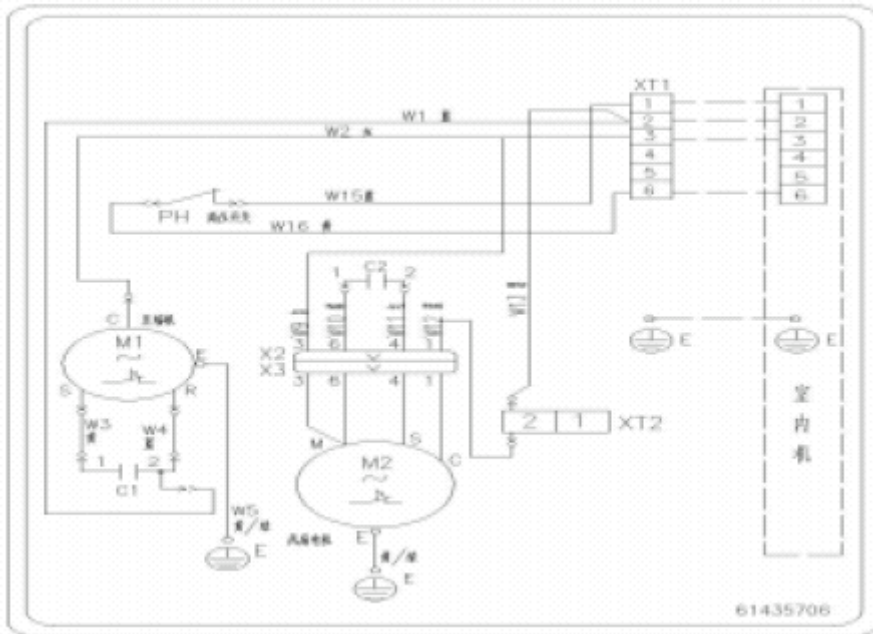


FGR5/B(0) circuit diagram

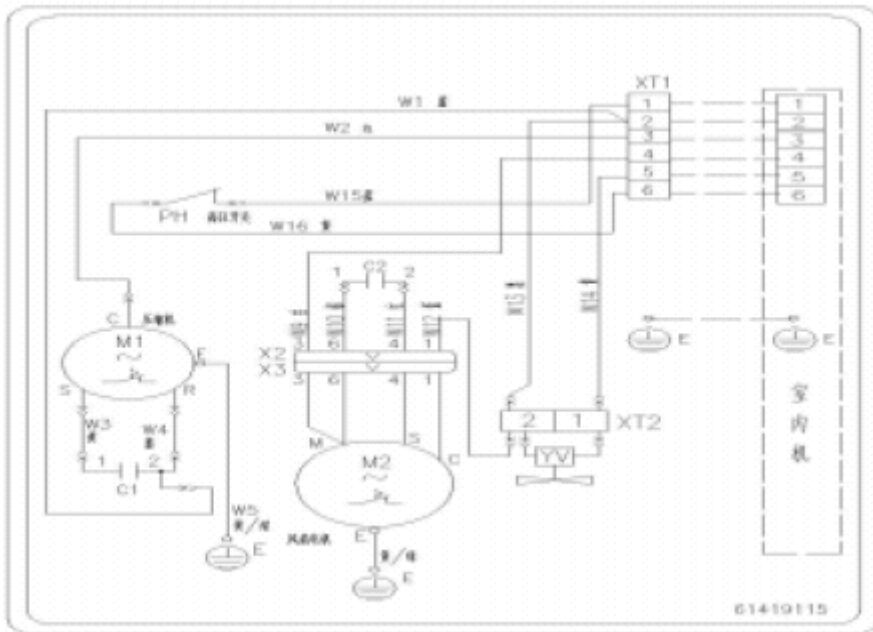




FG6.5/B (0) circuit diagram



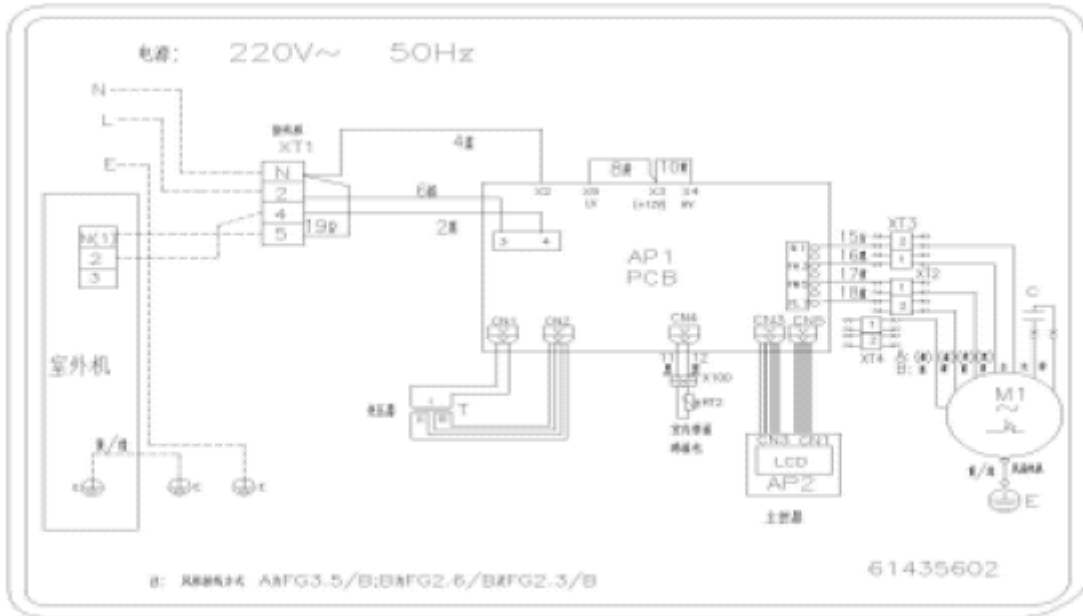
FGR6.5/B (0) circuit diagram



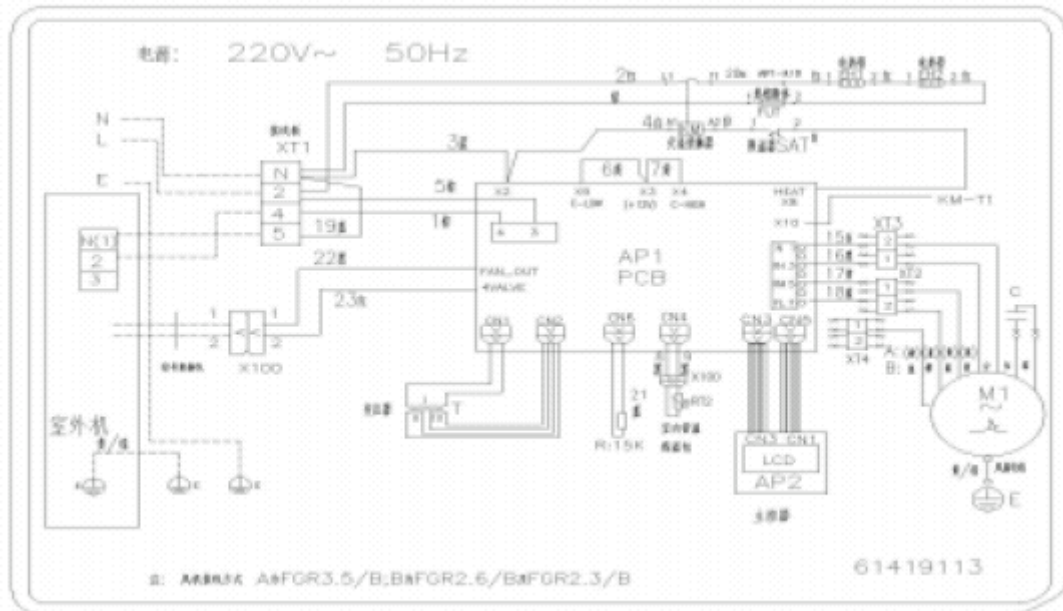


FG Series wind pipe blowing air-conditioning unit

FG2.3 / B (I); FG2.6/B (I); FG3.5/B (3.5) circuit diagram

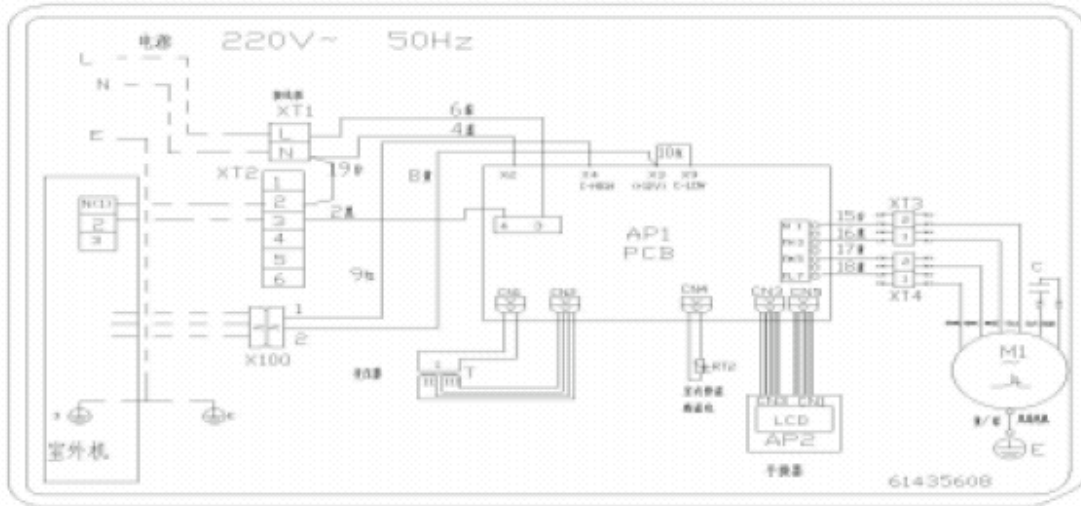


FGR2.3/B (I); FGR2/6/B(I); FGR3.5/B(I) circuit diagram

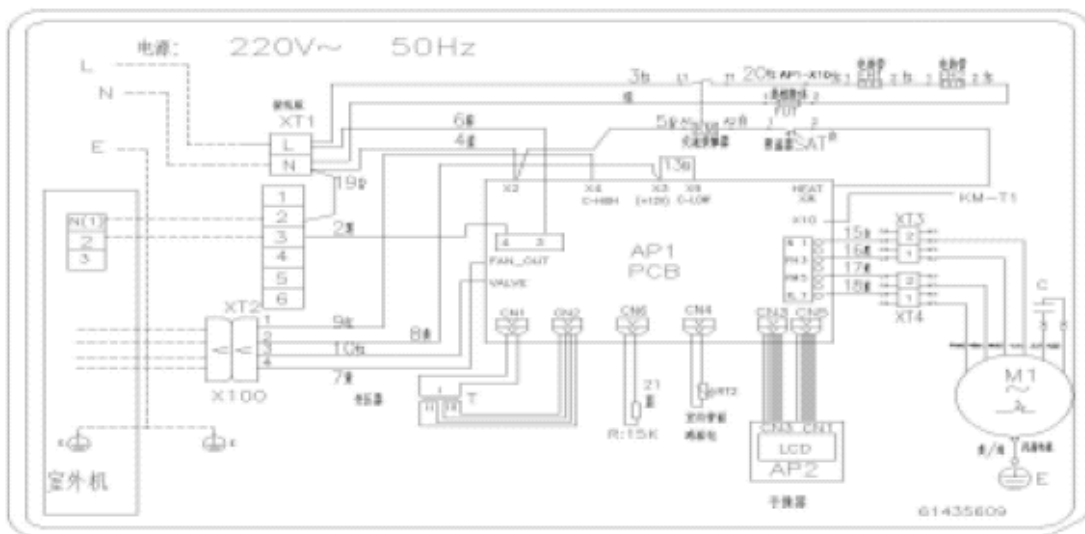




FG5/B (I) circuit diagram



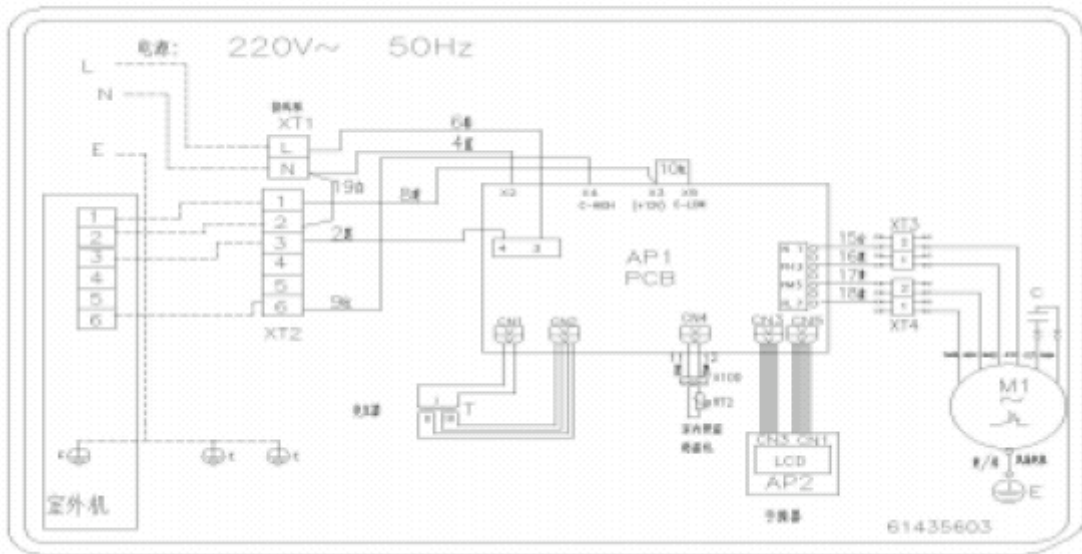
FGR5/B (I) circuit diagram



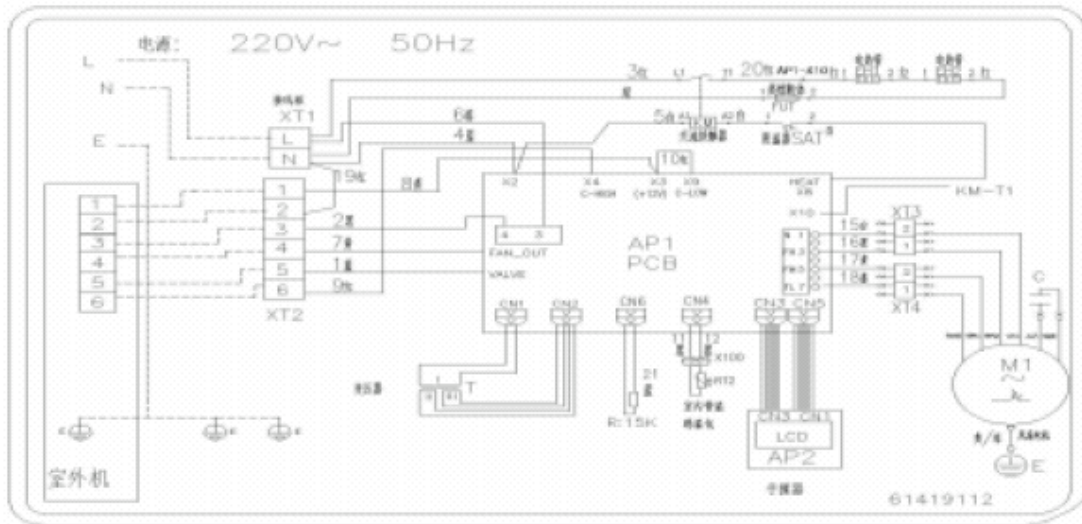


FG Series wind pipe blowing air-conditioning unit

FG6.5/B (I) circuit diagram



FGR6.5/B (I) circuit diagram

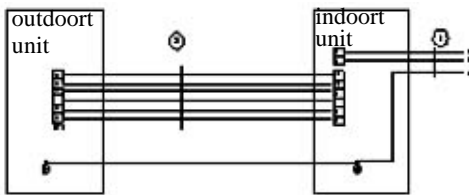




2.1.2 List of wiring

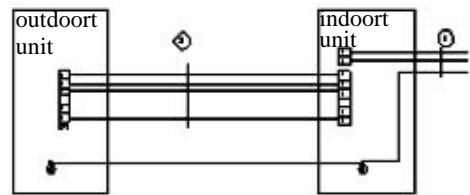
Please note: The length of all signal wires and power cables of the super-thin ducted type unit must be within 15 meters.

FGR 6.5/B



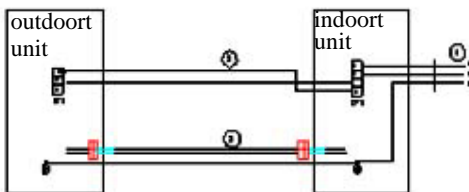
Power connection cord $3 \times 2.5\text{mm}$
Power connection cord $6 \times 2.5\text{mm}$

FG 6.5/B



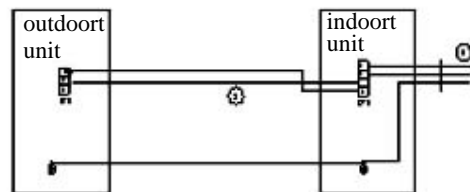
Power connection cord $3 \times 2.5\text{mm}$
Power connection cord $4 \times 2.5\text{mm}$

FGR2.3/B FGR2.6/B FGR3.5/B



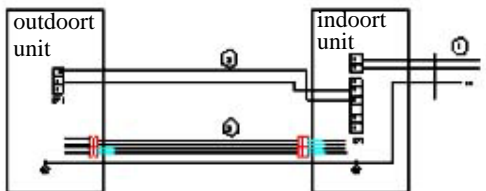
Power connection cord $3 \times 2.5\text{mm}$
Power connection cord $2 \times 2.5\text{mm}$
Power connection cord $3 \times 2.5\text{mm}$

FG 2.3/B FG 2.6/B FG 3.5/E



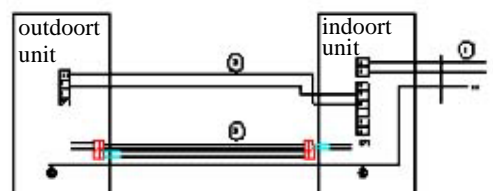
Power connection cord $3 \times 2.5\text{mm}$
Power connection cord $3 \times 2.5\text{mm}$

FGR5/B



Power connection cord $3 \times 2.5\text{mm}$
Power connection cord $2 \times 2.5\text{mm}$
Power connection cord $4 \times 2.5\text{mm}$

FG5/B



Power connection cord $3 \times 2.5\text{mm}$
Power connection cord $2 \times 2.5\text{mm}$
Power connection cord $4 \times 2.5\text{mm}$



FG Series wind pipe blowing air-conditioning unit

2.2 Light current

2.2.1 Operation mode

1. Temperature parameter

Indoor ambient temperature T_{amb}

Outdoor ambient temperature T_{amb}

Evaporator middle temperature T_{eva}

2. Basic function

After the power is on, no matter when compressor is started, the time span between the startups cannot be less than 3 minutes. When it is powered for the first time, the compressor does not have the time delay of 3 minutes. Once the compressor starts up, it will not shut down due to the temperature change within 6 minutes.

2.1 COOL mode

2.1.1 Cooling condition and process

If $T_{amb} > T_{set}$, COOL mode will act, compressor and external fan will run, the indoor fan will run at the set speed.

If $T_{amb} < T_{set}$, the unit will stop, compressor and external fan will stop, the indoor fan will run at the set speed.

If $T_{amb} = T_{set}$, the compressor and external fan will keep running in the old mode, the indoor fan will run at the set speed.

The setting temp. range is $16 \sim 30$.

2.1.2 Antifreezing Protection

When the antifreezing protection is detected, the compressor and external fan will stop, the indoor fan will run in the old mode and the LCD displays E2. When antifreezing protection is eliminated and the compressor has stopped for 3min, the whole unit will be put into the normal operation.

2.2 dry mode

If $T_{amb} > T_{set}$, the cooling and drying mode will act, compressor and external fan will run, indoor fan will run at low speed

If $T_{set} = T_{amb}$, after the external fan and compressor running for 6 mins, it will stop about 4 mins, The processes are shown as the above cycle. The indoor fan will run at the low speed.

If $T_{amb} < T_{set}$, the compressor and the external fan will stop.

The setting temp range is : $16 \sim 30$.

During the period, the antifreezing protection is treated as the cooling mode.

2.3 HEAT mode

2.3.1 Conditions and processes of heating

If $T_{amb} < T_{set}$, the heating operation will begin and the change valve, the external fan and the compressor are respectively powered and put into operation. The indoor fan operates based on the set air speed and the cool air condition.

If $T_{amb} = T_{set}$, the compressor, the external fan and the reversing valve will keep running in the old mode. The indoor fan will run at the set speed and in the anti-cold-air condition.

If $T_{amb} > T_{set}$, the compressor will stop, after 15 seconds the external fan will stop, and the reversing valve will keep working, the indoor fan will blow, after 60secs it will stop.

The setting temp. range is $16 \sim 30$



2.3.2 Anti-cool-air operation protection

When the compressor restarts after it stops or when the defrosting ends, the internal fan will begin to run after the compressor runs for some time. If the compressor does not start up, the internal fan will stop operation.

2.4 Auto Defrosting

2.4.1 Conditions and processes of defrosting

After the heating operation, when the frost of the condenser is detected, the system enters the defrosting status. At this time, the four-way valve, the external fan and the auxiliary electric heating stop operation. The compressor performs the forced operation and the internal fan operates based on the anti-cool-air condition. When it is detected that the frost on the condenser has been removed, the four-way valve and the external fan begin to operate and then the internal fan begins to operate.

The first defrosting time when the power is on is 9 minutes. Later, the defrosting time will be adjusted based on the frosting condition on the condenser. If there is much frost, the defrosting time is long. If there is not much frost, then the defrosting time is short. When it is detected that the defrosting has ended, quit the defrosting mode.

2.5 SWING mode

The internal fan will run at the set air speed and there are several air speeds to be selected:

2.6 Auto mode

In this mode, the system can select the mode automatically according to the ambient temperature

3. Other control

3.1 Timing Control.

TIMER OFF: Set the timer for turning off function when the unit is turned on, the PCB will act in the set mode, when it is time to turn off, the unit will be switched off.

TIMER ON: The unit is stopped when the timer for turning on acts. When it is time to turn on, the PCB will act in the set mode.

3.2 Protection measure

3.2.1 High pressure protection

When the high pressure is detected, all the loads of the system are closed and E1 is displayed. After the ON/OFF button is closed, the sound alarm is removed. Press the ON/OFF button to resume the operation.

3.2.2 Low pressure protection

When the low pressure is detected, all the loads of the system are closed. After the low pressure is eliminated, it automatically resumes the operation. If there are 3 consecutive low pressure protection, E3 is displayed and the system can not automatically resume. After the ON/OFF button is pressed to shut down the unit, the sound alarm is removed. Press the ON/OFF button again to resume the operation.

3.2.3 Indoor antifreezing protection

When the antifreezing protection is detected, the compressor and external fan will stop, the indoor fan will run in the old mode and the LCD displays E2. When antifreezing protection is eliminated and the compressor has stopped for 3min, the whole unit will be put into the normal operation.

3.2.4 Indoor super-high temperature protection

In the heating operation, when it is detected that the temperature of the evaporator is too high, the external fan will stop operation. When the pipe temperature of the evaporator is normal, the external fan will resume operation.

3.2.5 Indoor environmental sensor protection



FG Series wind pipe blowing air-conditioning unit

If there is any open circuit or short circuit for the indoor environmental sensor, all the loads will be shut in the cooling, dry and heating modes and “F0” will be displayed. The default indoor ambient temperature is 24 °C. After the malfunction is eliminated, the unit will automatically resume the operation and clear the malfunction code. In the air supply mode, only the malfunction code is displayed and the internal fan operates normally. After the malfunction is cleared, the malfunction code disappears.

3.2.6 Evaporator sensor protection

If there is any open circuit or short circuit for the evaporator temperature sensor, “ F1 ” will be displayed. After the malfunction is eliminated, the unit will automatically resume the operation and clear the malfunction code. In the air supply mode, only the malfunction code is displayed and the internal fan operates normally. After the malfunction is cleared, the malfunction code disappears.

3.2.7 Outdoor environmental sensor protection

If there is any open circuit or short circuit for the outdoor environmental sensor, all the loads will be shut only in the heating mode and “F3” will be displayed. After the malfunction is eliminated, the unit will automatically resume the operation and clear the malfunction code. In the air supply mode, only the malfunction code is displayed and the internal fan operates normally. After the malfunction is cleared, the malfunction code disappears.

3.3 Sleep function

In heating, press the button SLEEP, after 1 hour the set temperature drops by 1 °C. After 2 hours the set temperature drops by 2 °C. Afterwards, this temperature is kept and the sleep sign is cleared.

In cooling, press the button SLEEP, after 1 hour the set temperature rises by 1 °C. After 2 hours the set temperature rises by 2 °C. Afterwards, this temperature is kept and the sleep sign is cleared.

3.4 Test function

In the power-off status, press the temperature selection button (TEMP) to enter the heating status. The compressor is on, the four-way valve is on, the internal fan runs at high speed and after the operation for 5 minutes, the unit automatically shuts down. You may also press the ON/OFF button to stop the test.

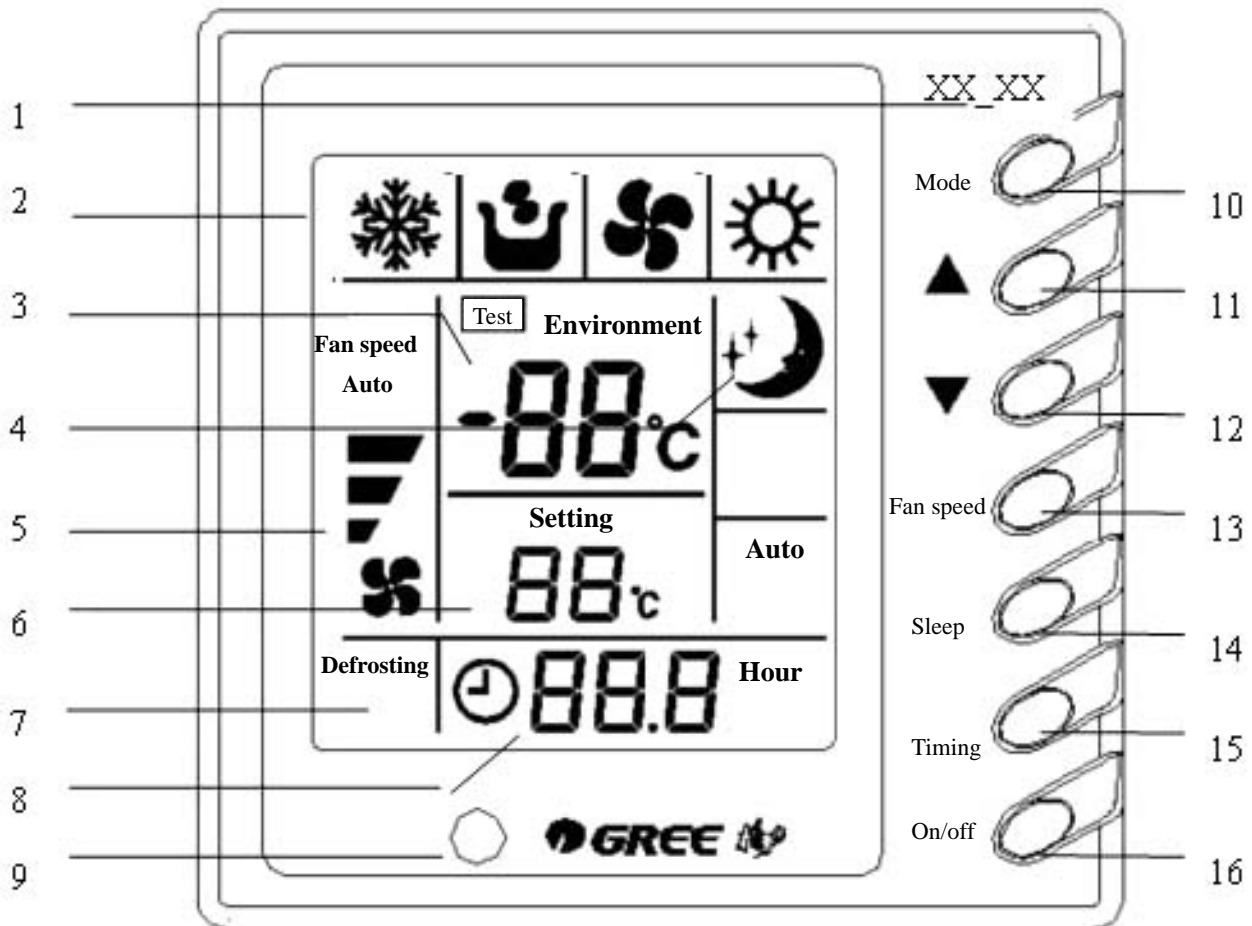
In the power-off status, press the temperature selection button (TEMP) to enter the cooling status. The compressor is on, the four-way valve is on, the internal fan runs at high speed after the operation for 5 minutes, the unit automatically shuts down. You may also press the ON/OFF button to stop the test.



2.2.2 Description and usage method of manual controller

Note !

- Do not install the wire controller at the position where there is water leakage.
- Avoid knocking, throwing and frequent disassembly and installation of the wire controller.



Integral parts of wire controller			
1	Display board identification code (the cooling only unit is FG-05 and the cooling and heating unit is FG-06)	9	Remote controll receiver
2	Mode display (cooling, dry ❄️, air supply 👑, heating 🌀, automatic ☀️)	10	MODE button
3	Ambient temperature display	11	Set temperature increase button
4	Sleep display	12	Set temperature decrease button
5	Air speed display (automatic, high speed, middle speed, low speed)	13	Fan speed button
6	Set temperature display	14	Sleep button
7	Defrosting status display	15	Timing button
8	Timing display	16	ON/OFF button



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1) ON/OFF (Fig 2)

- ❖ Press the button, the unit will start working
- ❖ Repress the On/Off button, the unit stops working.

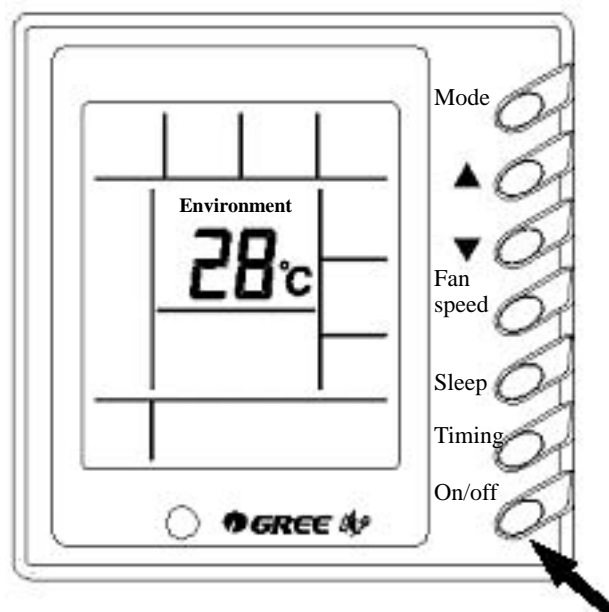


Fig 2

2) Fan control (Fig 3) [The content shown in the figure are the relevant display areas and are as follows]

- ❖ Press the fan control button once and the fan speed will change in the order of:

low speed middle speed high speed automatic

- ❖ In the dry mode: The fan speed will be automatically set to be the low speed.

Temperature adjustment (Fig 4)

- ❖ Press the temperature adjustment button,
 - : To set the increase of the temperature
 - : To set the decrease of the temperature.

(Press this button once and the temperature will increase or decrease by 1 .)

- ❖ The temperature set range in different modes:

HEAT——16 ~30

COOL——16 ~30

DRY ——16 ~30



4) Sleep function setup (Fig 5)

- ❖ In COOL and DRY mode, press the SLEEP mode, the setting temp. will be increased 1 in the first hour, and it will be increased 2 in the second hour. Indoor fan will run at the low speed, then the unit will run accord to the setting temperature.
- ❖ In HEAT mode, setting the SLEEP mode, the setting temp. will be decreased 1 in the first hour, it will be decreased 2 in the second hour. then the unit will run accord to the setting temperature.
- ❖ There is no SLEEP function in FAN mode.

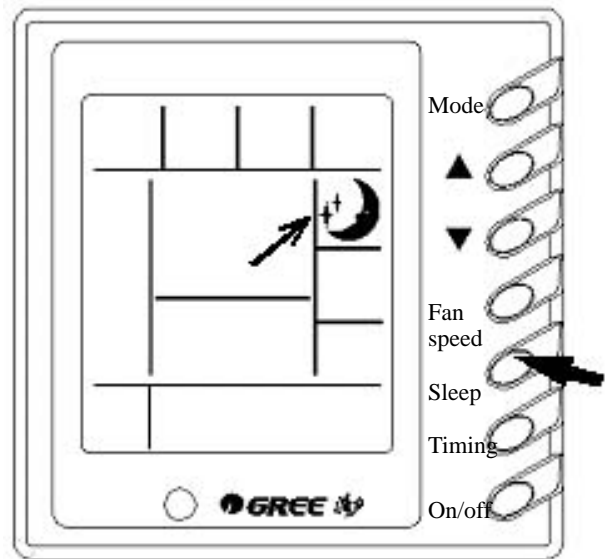


Fig 5

5) The running mode setting (Fig.6)

- ❖ When pressing MODE button each time, the mode will be changed as following:

COOL DRY FAN HEAT AUTO

- ❖ At “COOL” mode, the COOL display ❄️ will be light on, the temperature of setting should be lower than the room temperature. If the setting temperature is higher than the room sensor, the unit will not run at cool mode operation.
- ❖ At “DRY” mode, the DRY display 🏠 will be light on. Fan motor will run at low fan speed in the definite temperature range. The dehumidifying effect of this mode is better than that in COOL mode and more energy saving.

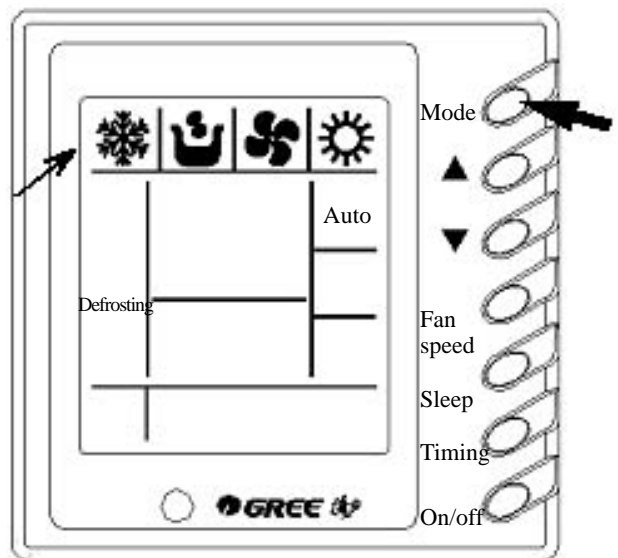


Fig 6

- ❖ At “HEAT” mode, the HEAT display ☀️ will be light on. The temperature should be set higher than the room temperature; If the setting temperature is lower than the room temperature, the unit will not run at HEAT mode operation.
- ❖ A t”FAN” mode, the FAN display 🌀 will light on. The room temperature is displayed on the LCD of the controller.
- ❖ In the automatic mode, the automatic display ”automatic” will light on. At this time, the entire unit will select the mode automatically based on the indoor ambient temperature. In cooling, the temperature is automatically set to be 26 . In the dry mode, the temperature is automatically set to be 24 . In heating, the temperature is automatically set to be 20 .

Note: The automatic heating mode of the cooling only unit is replaced by the automatic air supply mode.

- ❖ In heating, when the outdoor temperature is low and the humidity is high, the outdoor unit will frost and lead to the low heating efficiency. In this case, the controller will automatically begin the defrosting circle and display ”defrosting”.

Note: The cooling only unit does not have the heating mode.



FG Series wind pipe blowing air-conditioning unit

6) timing setup (Fig 7)

In the power-off mode, the startup time can be set. In the power-on mode, the shutdown time can be set. Press the timing button once and the set time increases by 0.5 hour. Keep pressing the timing button and the set time increases rapidly by 0.5 hour. When the time is set to be 24 hours, press the timing button again to eliminate the timing (the remote controller may also be used to eliminate the timing)

The set range is 0.5~24 hours.

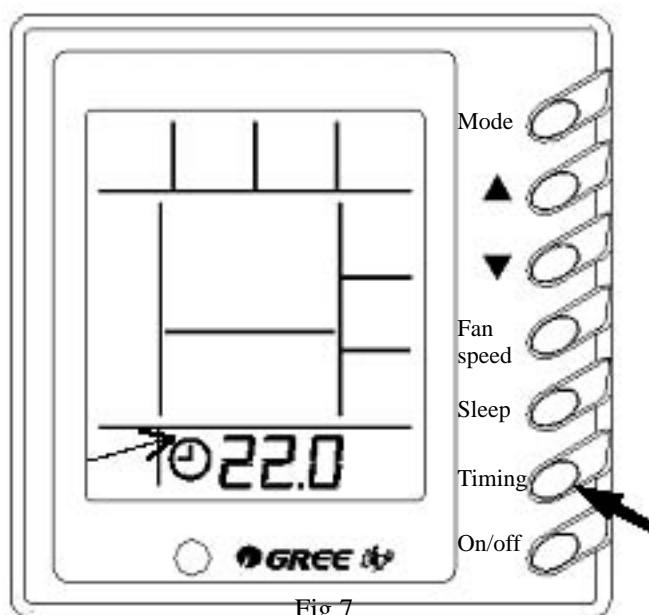


Fig 7

7) When there is malfunction in the system, the malfunction code will be displayed on the wire controller. As shown in Fig 8, the indoor ambient temperature sensor malfunction is displayed.

Meanings of the malfunction codes are as follows:

Malfunction Code	Malfunction
E1	Compressor high pressure protection
E2	Indoor Anti-freeze protection
E3	Compressor low pressure protection
F0	Indoor environment sensor malfunction
F1	Evaporator sensor malfunction
F3	Outdoor environment sensor malfunction
EH	Malfunction of auxiliary electric heating

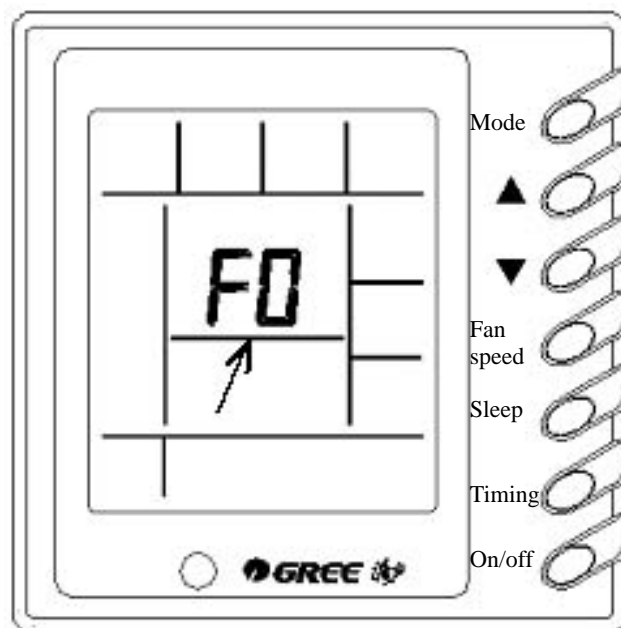


Fig 8

If the wire controller displays the malfunction, the unit may be shut down to stop the malfunction display and the professional personnel are to be asked to eliminate the malfunction.

8) Power down memory function:

When the air conditioner is in the operation mode and the power is cut off, the controller will memorize the last ON/OFF mode, the air speed, the set temperature and the timing operation status.



Note!

When there is a "EH" malfunction, please immediately cut off the unit power and ask the professional personnel for repair!



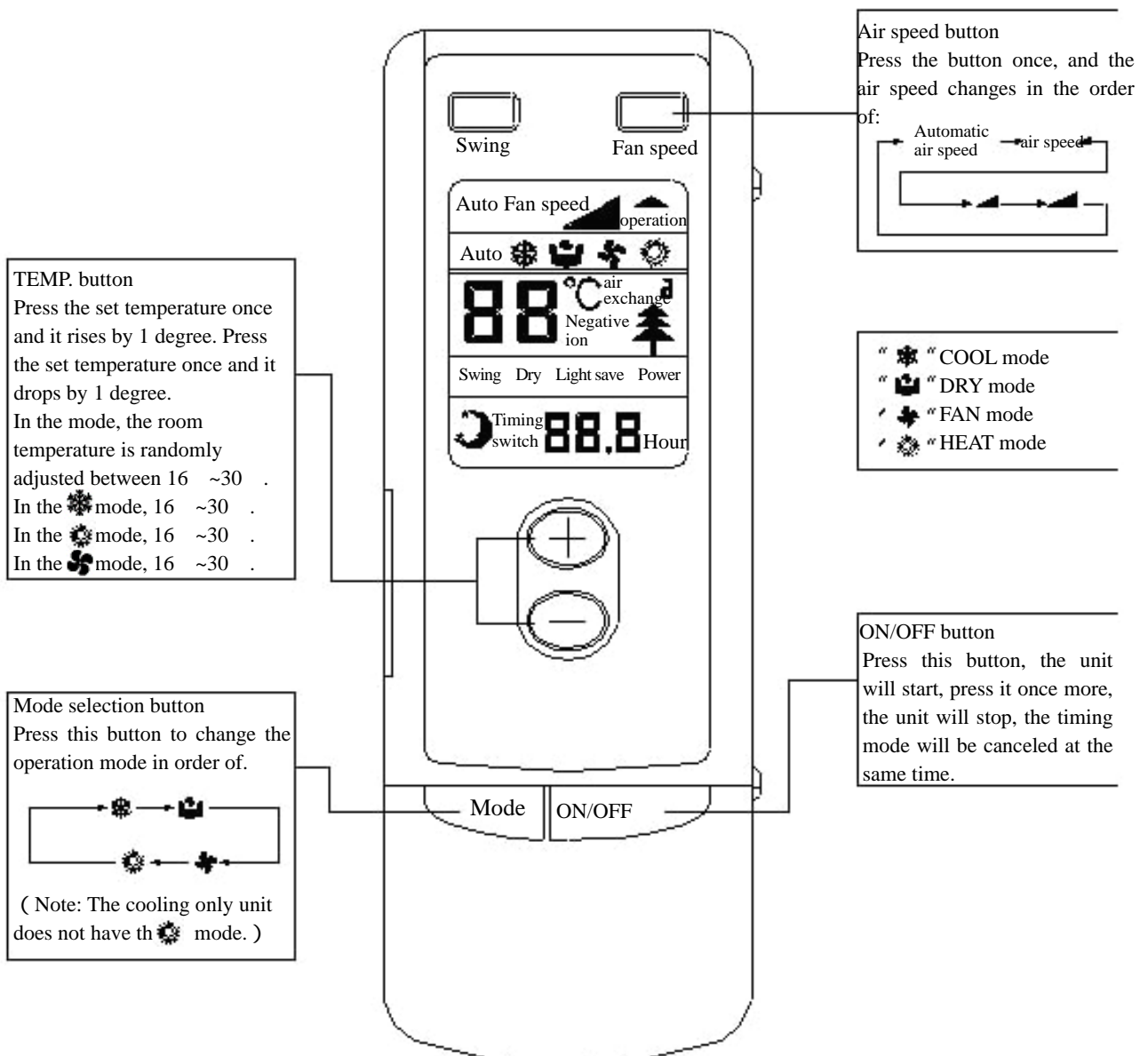
Names and functions of each part of the remote controller

For the air-duct indoor unit, the remote controller is optional.



NOTE:

- Be sure that there are no obstructions.
- The reception distance of the signal of the remote controller may reach about 10 meters.
- Do not drop or throw the remote controller.
- Avoid any liquid flowing into the remote controller.
- Do not place the remote controller in a location exposed to direct sunlight or extra heat.



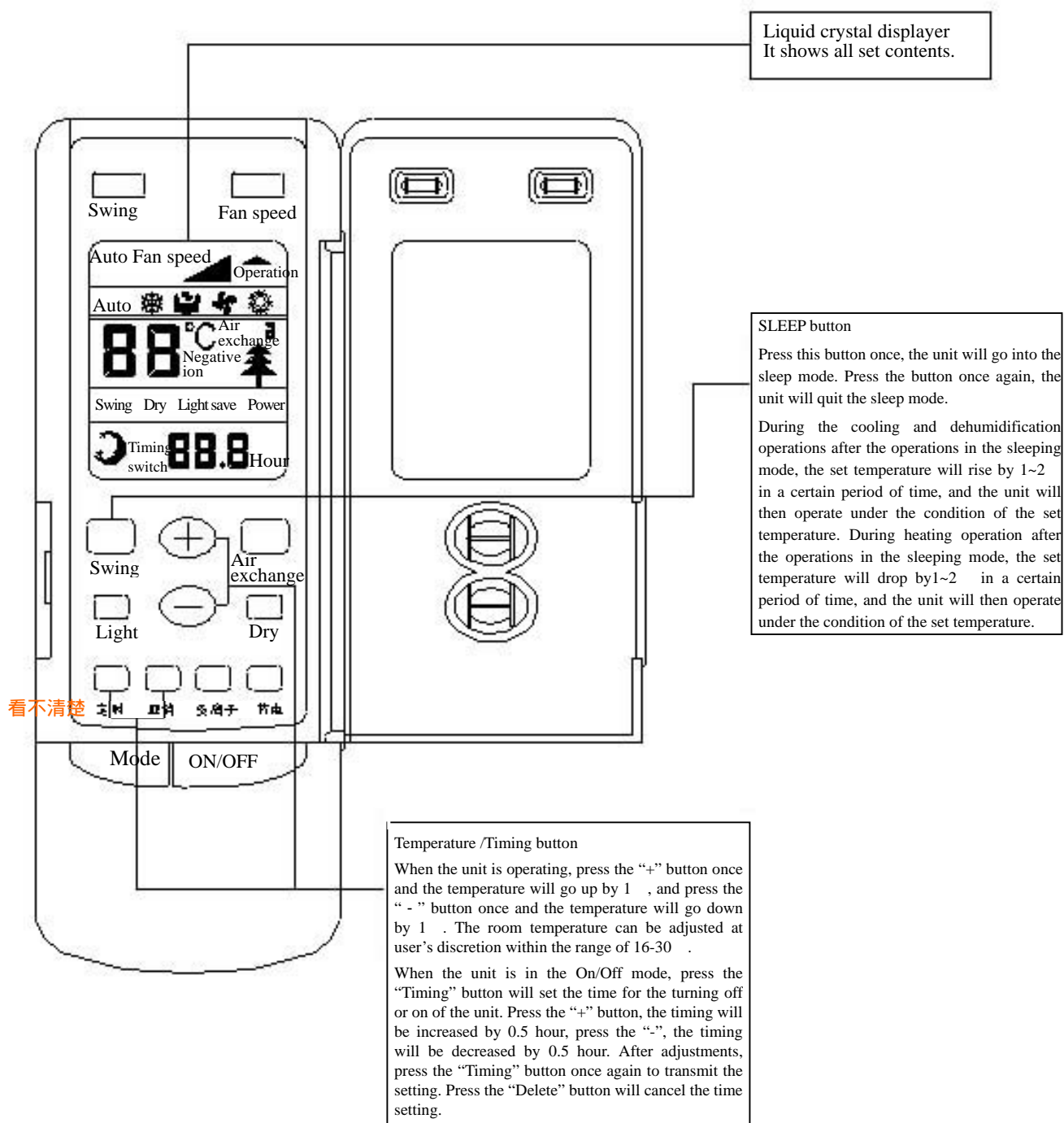


FG Series wind pipe blowing air-conditioning unit

Names and function of remote controller (Remove the cover)

NOTE!

This model is a general-purpose remote controller, which can be applied to varieties of air conditioning systems (various types and performances). No descriptions will be made on the functions and buttons that are not applied in this air conditioning system.





Guide to operational controls

General steps:

1. After connecting to the power supply, press the ON/OFF button and the air conditioner unit is ready for operation.
2. Press the MODE button to select the needed operational mode.
3. Set the fan speed by pressing the FAN button.
4. Press +/- button to select the needed temperature.

Optional steps:

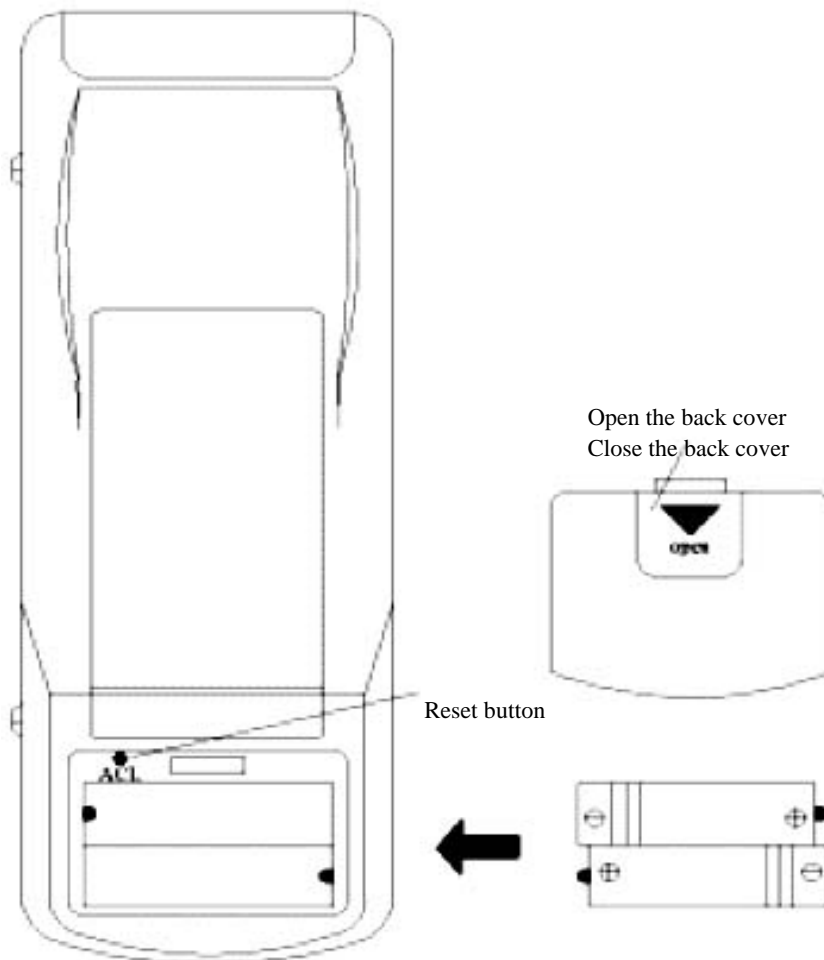
5. Press the SLEEP mode button to set the unit in the sleeping mode.
6. Press the TIMER button and press the +/- button as well to set the desired operation time.
7. Press the ON / OFF button again, the air conditioner unit stops operation. The air conditioner supplies the remaining coldness or heat for 20~70 seconds.

NOTE: When the selected operational mode of the indoor units contradicts the operational mode of the outdoor unit, the fault alarming light of the indoor unit will flash in 1 second and the indoor unit will stop operating. In this case, you may shift the operational mode of the indoor unit to the operational mode not contradictory to that of the outdoor unit; and the unit will restore its normal operation. The cooling mode and the dehumidification mode are not contradictory to each other. The air delivery mode is not conflicting to any other modes.

Installation of batteries into the remote controller

The remote controller uses two NO.7 alkali batteries

1. Slide downward the back cover of the remote controller and take out the used batteries, and then replace with two new ones (in correct polarities).
2. Close the back cover of the remote controller.



1. After batteries are installed, the screen will display figures and letter codes of all functions. After 10 seconds the operation can begin.
2. The lifespan of the battery is about one year.
3. Please do not mix the new and old batteries of different types in the application.
4. Please take out the batteries when they are not used for a long time in order to avoid malfunctions caused by liquid leakage.
5. The remote controller shall be more than one meter away from TV or audio equipments.
6. The operation of the remote controller shall be within the reception area (the reception range is 10 meters) .
7. In case of the replacement of batteries, etc, and the remote controller is unable to control, please take down the back cover and press the "ACL (resume) " button to resume it to normal.



Chapter 3 Operation debugging and malfunction diagnosis

3.1 Check list of unit operation conditions and check items

Refer to check items of A series

3.2 List of parameter changes of unit operation

Refer to the list of parameter changes of A series

Malfunction	Possible cause
The air conditioner can not start up.	<ol style="list-style-type: none">1. Power is not on.2. The air conditioner has electric leakage and causes the switch tripping.3. The wire voltage is too low.4. The working button is closed5. The control circuit has malfunction.
The air conditioner operates but soon stops.	<ol style="list-style-type: none">1. There are obstacles ahead of the condenser.2. The control circuit is abnormal.3. When the outdoor ambient temperature is higher than 43 , the cooling operation begins.
The cooling effect is bad.	<ol style="list-style-type: none">1. The air strainer has dirt or is blocked.2. There is heating source in the room or there are too many people3. Doors or windows are opened.4. There is obstacle at the air inlets and outlets.5. The set temperature is too high and causes the secondary refrigerant leakage6. The performance of the room temperature sensor becomes bad.
The heating effect is bad.	<ol style="list-style-type: none">1. The air strainer has dirt or is blocked.2. Doors or windows are not tightly closed.3. The set room temperature is too low.4. Leakage of cooling agent5. The outdoor ambient temperature is lower than -56. The control wire is abnormal.
In heating, the internal fan does not start up.	<ol style="list-style-type: none">1. The installation position of the pipe temperature sensor is not appropriate.2. The pipe temperature sensor is not properly inserted.3. The wire connection of the pipe temperature sensor is broken.4. Leakage of capacitor

3.3 List of malfunction analysis

Note: If the above checks and treatments are carried out and the conditioner still can not operate normally, please stop the operation of the air conditioner immediately and contact the local maintenance office and ask the professional maintenance personnel to repair it.



3.4 Check list of malfunction code

Malfunction Code	Malfunction
E1	Compressor high pressure protection
E2	Indoor Anti-freeze protection
E3	Compressor low pressure protection
FO	Indoor environment sensor malfunction
F1	Evaporator sensor malfunction
F3	Outdoor environment sensor malfunction
EH	Malfunction of auxiliary electric heating

If the wire controller displays the malfunction, the unit may be shut down to stop the malfunction display and the professional personnel are to be asked to eliminate the malfunction.

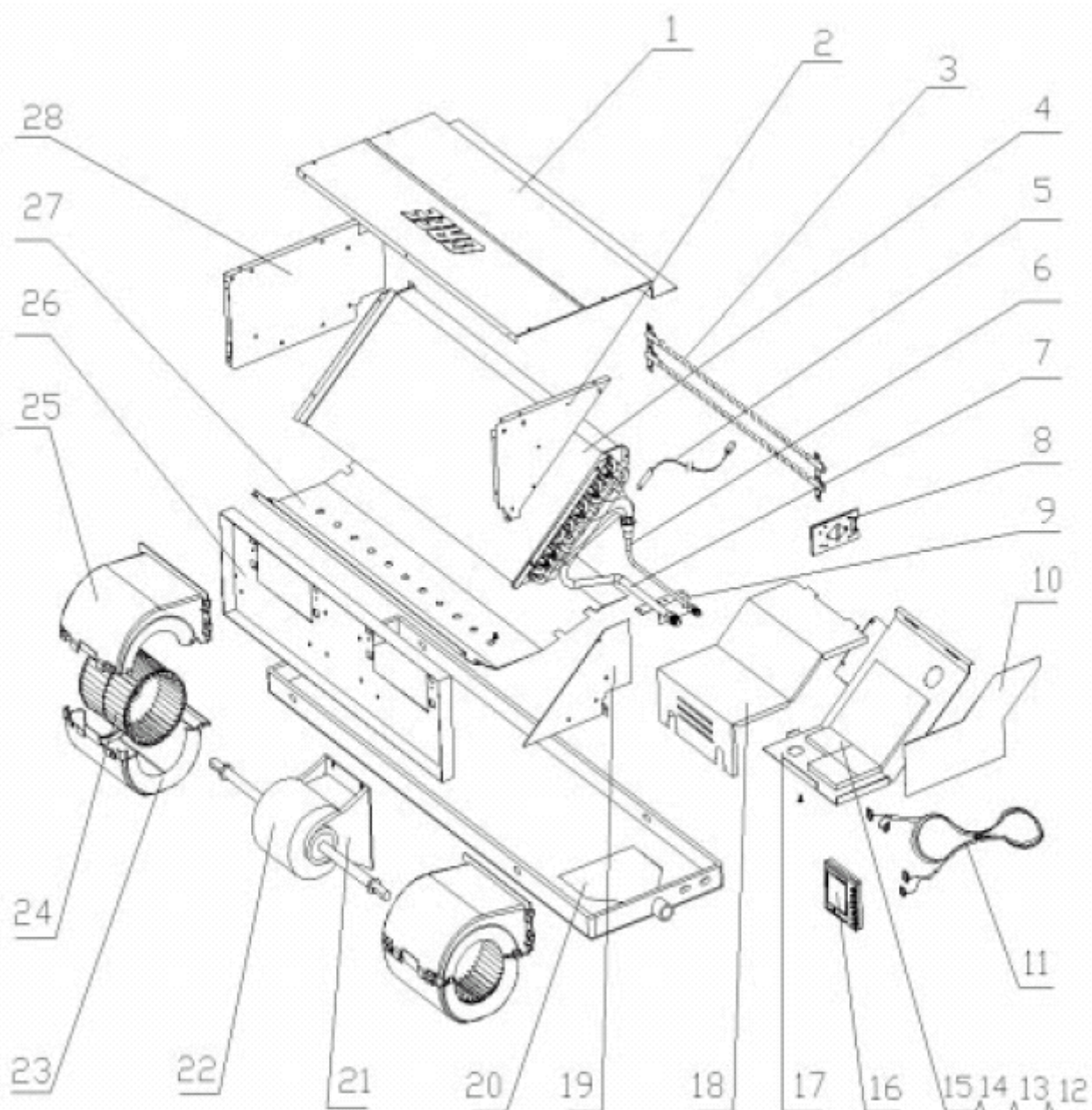


Chapter 4 Care and Maintenance

4.1 Explosive view and spare parts list

1.1.1 Explosive view and spare parts list of indoor unit

4.1.1 Explosive view and spare parts list of indoor unit





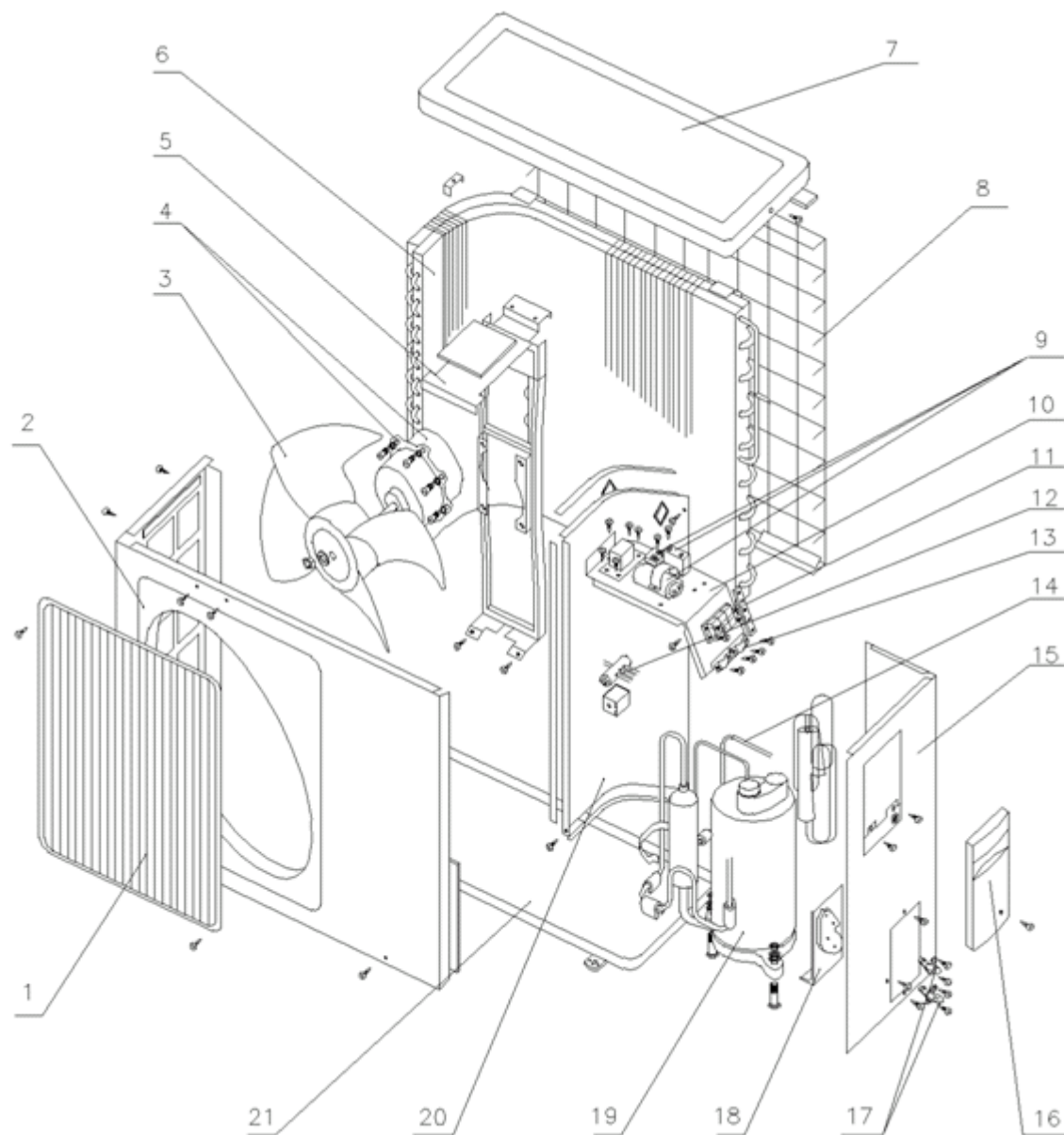
Explosive view and list

No.	Material name	Material Code	Quantity				
			FG(R) 2.3-B(I)	FG(R) 2.6-B (I)	FG(R) 3.5-B(I)	FG 5-B (I)	FG 6.5-B (I)
1	Upper cover plate	01258766	1	1	1	-	-
		01258763	-	-	-	1	-
		01258765	-	-	-	-	1
2	Left terminal plate 2	01498767	1	1	1	1	1
3	Electric heater	320120051	1	1	-	-	-
		32012005	-	-	1	-	-
		3200187611	-	-	-	1	-
		32018761	-	-	-	-	1
4	Evaporator assy (1.6. water)	01039063	1	1	-	-	-
		01039068	-	-	1	-	-
		01039073	-	-	-	1	-
		01008784	-	-	-	-	1
5	Sensor	3900018717	1	1	1	1	1
6	Liquid distribution pipe assy	03239114	1	1	-	-	-
		03239121	-	-	1	-	-
		03239144	-	-	-	1	-
	Liquid inlet pipe assy	03239117	-	-	-	-	1
7	Gas collector assy	03639092	1	1	-	-	-
		03639097	-	-	1	-	-
		03639104	-	-	-	1	-
		03638777	-	-	-	-	1
8	Thermal protector assy	46012405	1	1	1	1	1
9	Fixing plate of pipe clamp	017990583	1	1	-	-	-
		17990582	-	-	1	-	-
		017990584	-	-	-	1	-
		01799058	-	-	-	-	1
10	Sealing plate	01499082	-	-	-	-	-
11	Connection wires between plates (14 cores)	400102542	1	1	1	1	1
12	Mainboard 1 Z4735	30224701	1	1	1	1	1
13	Capacitor CBB61 1.5uf-450V	33010020	1	1	1	-	-
	Capacitor CBB61 4.5uf-450V	33010012	-	-	-	1	1
14	AC contactor (GC8-30-D10)	44010246	1	1	1	1	1
15	Power supply transformer 48*26F	43110226	1	1	1	1	1
16	Display board Z4735 (heat pump)	30294701	1	1	1	1	1
	Display board Z4715 (cooling only)	30294702	1	1	1	1	1
17	Electric box	01419080	1	1	1	1	1
18	Electric box cover	01419085	1	1	1	1	1
19	Left terminal plate 1	01498780	1	1	1	1	1
20	Base plate	01218767	1	1	1	-	-
		01218710	-	-	-	1	-
		01218766	-	-	-	-	1
21	Bracket (95)	01708763	1	1	1	1	1
22	Motor FG20D	15018323	1	1	1	-	-
	Motor PG40E	15019524	-	-	-	1	1
23	Rear spiral case	22202031	2	2	2	3	4
24	Centrifugal fan	10312401	2	2	2	3	4
25	Front spiral case	22202032	2	2	2	3	4
26	Fan mounting plate	01338794	1	1	1	-	-
		01338790	-	-	-	1	-
		01338793	-	-	-	-	1
27	Base plate	01218767	1	1	1	-	-
		01218710	-	-	-	1	-
		01218766	-	-	-	-	1
28	Right terminal plate	01498776	1	1	1	1	1



FG Series wind pipe blowing air-conditioning unit

4.1.2 Explosive view and spare parts list of outdoor unit





Explosive view and list

No.	Material name	Material Code	Quantity									
			FG(R)2.3-B(0)		FG(R)2.6-B(0)		FG(R)3.5-B(0)		FG 5-B(0)		FG 6.5-B(0)	
			heat pump	cooling only	heat pump	cooling only	heat pump	cooling only	heat pump	cooling only	heat pump	cooling only
1	Face cover	22263002	1	1	-	-	-	-	-	-	-	-
	Panel bar rack	22413431	-	-	1	1	1	1	1	1	-	-
	Face cover (apricot color)	22265251	-	-	-	-	-	-	-	-	1	1
2	Panel	01533013	1	1	-	-	-	-	-	-	-	-
	Outer cover	01433031	-	-	-	-	-	-	-	-	1	1
3	Electric heater	10333002	1	1	-	-	-	-	-	-	-	-
		01703069	-	-	1	1	1	1	-	-	-	-
		01703067	-	-	-	-	-	-	1	1	-	-
		01703027	-	-	-	-	-	-	-	-	1	1
4	Motor FW20F	15013156	1	1	-	-	-	-	-	-	-	-
	Motor FW30K	15013067	-	-	1	1	-	-	-	-	-	-
	Motor FW48G	15013066	-	-	-	-	1	1	-	-	-	-
	Motor FW48C	15013039	-	-	-	-	-	-	1	1	-	-
	Motor FW68T	15013302	-	-	-	-	-	-	-	-	1	1
5	Motor bracket	01703029	1	1	-	-	-	-	-	-	-	-
		01703069	-	-	1	1	1	1	-	-	-	-
		01703067	-	-	-	-	-	-	1	1	-	-
		01703027	-	-	-	-	-	-	-	-	1	1
6	Condenser parts	011032532	1	-	-	-	-	-	-	-	-	-
		011032561	-	1	-	-	-	-	-	-	-	-
		011090571	-	-	1	-	-	-	-	-	-	-
		011090561	-	-	-	1	-	-	-	-	-	-
		011090551	-	-	-	-	1	-	-	-	-	-
		011090541	-	-	-	-	-	1	-	-	-	-
		011031694	-	-	-	-	-	-	1	-	-	-
		011037533	-	-	-	-	-	-	-	1	-	-
7	Top cover plate	01253026	1	1	-	-	-	-	-	-	-	-
		01253442	-	-	1	1	1	1	1	1	-	-
		01255261	-	-	-	-	-	-	-	-	1	1
8	Rear grill	11123201	1	1	-	-	-	-	-	-	-	-
		01473030	-	-	1	1	1	1	1	1	-	-
		01473028	-	-	-	-	-	-	-	-	-	1
9	Capacitor CBB65 20uf/450V	33010044	1	1	-	-	-	-	-	-	-	-
	Capacitor CBB65 25uf/450V	33000017	-	-	1	1	-	-	-	-	-	-
	Capacitor CBB65 30uf/450V	33000018	-	-	-	-	1	1	-	-	-	-
	Capacitor CBB65 50uf/440V	33000001	-	-	-	-	-	-	1	1	1	1
	Capacitor CBB61 1.5uf/450V	330010020	1	1	-	-	-	-	-	-	-	-
	Capacitor CBB61 2.5uf/450V	33010026	-	-	1	1	-	-	-	-	-	-
	Capacitor CBB61 3uf/450V	33010027	-	-	-	-	1	1	1	1	-	-
Capacitor CBB61 3.5uf/450V	33010010	1	1	-	-	-	-	-	-	1	1	



FG Series wind pipe blowing air-conditioning unit

No.	Material name	Material Code	Quantity									
			FG(R)2.3/B(0)		FG(R)2.6/B(0)		FG(R)3.5/B(0)		FG(R)5/B(0)		FG(R)6.5/B(0)	
			heat pump	cooling only	heat pump	cooling only	heat pump	cooling only	heat pump	cooling only	heat pump	cooling only
10	Electric box assy	01403012	1	1	-	-	-	-	-	-	-	-
		01403016	-	-	-	-	-	-	-	-	1	1
	Electric box assy(riveting)	01403117	-	-	1	1	1	1	1	1	-	-
11	Insulation spacer D	70410525	2	2	2	2	2	2	2	2	-	-
	Insulation spacer C	70410523	-	-	-	-	-	-	-	-	1	1
12	Four-way valve (1 P) (SHF-4/STF-0108/DHF-2 F/DSF-4)	43000402	1	-	1	-	1	-	-	-	-	-
	Four-way valve (2 P) (SHF-7/STF-0223/DHF-3 F/DSF-9)	43000403	-	-	-	-	-	-	1	-	1	-
13	Tension disc	24253002	1	1	-	-	-	-	-	-	-	-
	Electric wire holder	71010103	-	-	2	2	2	2	2	2	-	-
		71010102	-	-	-	-	-	-	-	-	2	2
14	Right side plate	01303010	1	1	-	-	-	-	-	-	-	-
		01303410	-	-	1	1	1	1	-	-	-	-
		01303405	-	-	-	-	-	-	1	1	-	-
	Rear side plate	01305001	-	-	-	-	-	-	-	-	1	1
15	Big handle	26233101	1	1	-	-	-	-	-	-	-	-
	Big handle	26233431	-	-	1	1	1	1	1	1	-	-
	Handle	26235253	-	-	-	-	-	-	-	-	1	1
16	Valve 1/4	07100125	1	1	1	1	1	1	1	1	-	-
	Valve 3/8	07100143	1	1	-	-	-	-	-	-	-	-
	Small valve assy	07105256	-	-	-	-	-	-	-	-	1	1
	Valve 3/8	07100145	-	-	1	1	-	-	-	-	-	-
	Valve 1/2	07100147	-	-	-	-	1	1	1	1	-	-
	Big valve assy 5/8	07105251	-	-	-	-	-	-	-	-	1	1
17	Valve bracket	01713424	1	1	1	1	1	1	-	-	-	-
		01713423	-	-	-	-	-	-	1	1	-	-
		01715256	-	-	-	-	-	-	-	-	-	1
18	Compressor and its fittings SD145cv-heau	00100091	1	1	-	-	-	-	-	-	-	-
	Compressor and its fittings. 2p17s225ana	00120110	-	-	1	1	-	-	-	-	-	-
	Compressor and its fittings C-rv232BH1AA	00100339	-	-	-	-	1	1	-	-	-	-
	Compressor and its fittings Shn33TC4-U	00100131	-	-	-	-	-	-	1	1	-	-
	Compressor and its fittings SHV33YE6UG	00100140	-	-	-	-	-	-	-	-	1	1
19	Separator	01233382	1	1	-	-	-	-	-	-	-	-
		01233419	-	-	1	1	1	1	1	1	-	-
	Middle separator	01233023	-	-	-	-	-	-	-	-	1	1
20	Base plate	01203153	1	1	-	-	-	-	-	-	-	-
		01213429	-	-	1	1	1	1	1	1	-	-
		01215251	-	-	-	-	-	-	-	-	-	1



Disassembly procedure

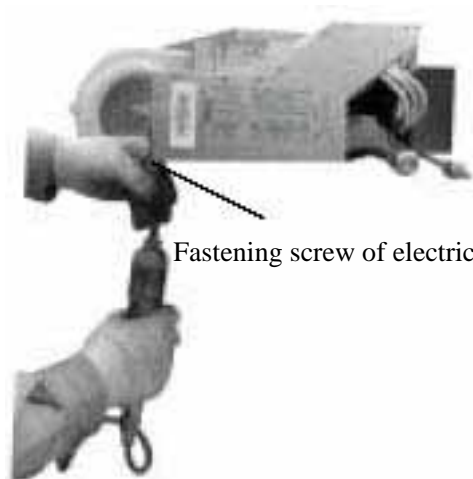


- 1) Disassembly of top cover plate
 - Screw off the screws which fix the top cover around, take off the top cover plate (As shown in Fig.4.2-1)



Fig 4.2-1

- 2) Disassembly of electric box assy
 - Screw off the fastening screws of the electric box cover. (as shown in Fig 4.2-2)



Fastening screw of electric box (1)

Fig 4.2-2

- Disassembly of electric box cover (as shown in Fig 4.2-3)

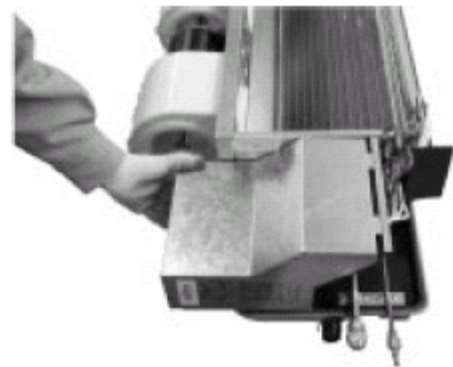


Fig 4.2-3



FG Series wind pipe blowing air-conditioning unit

- 4) Disassembly of fan motor
 - Screw off the fastening screw of the fan scroll case. (as shown in Fig 4. 2-4)

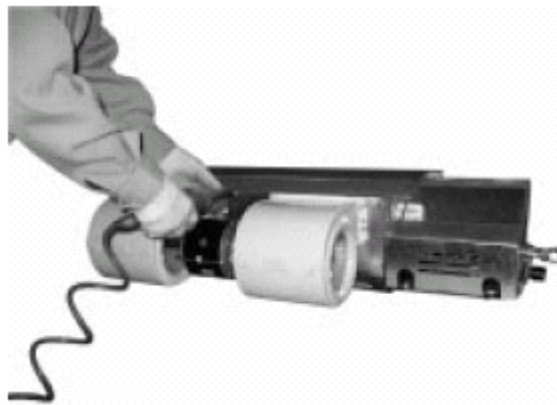


Fig 4.2.-4

- Take down the fan scroll case. (as shown in Fig 4. 2-5) (as shown in Fig 4.2-6)



Fig 4.2-5

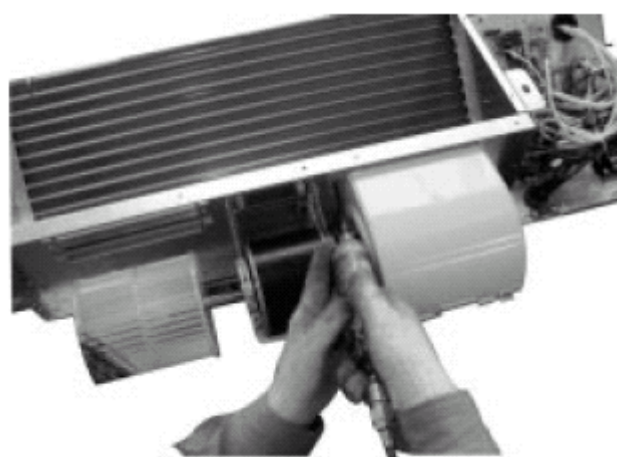


Fig 4.2-6



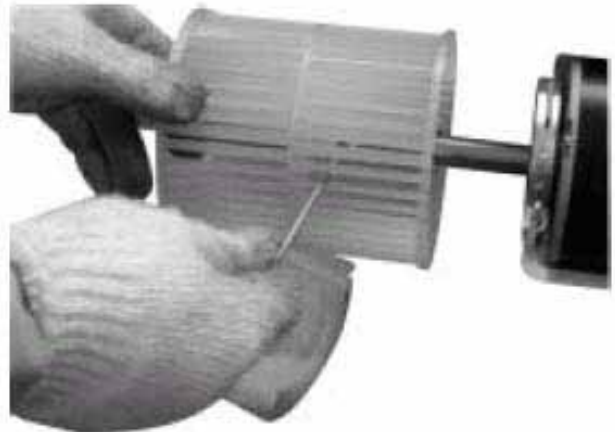
5) Disassembly of fan motor

- Screw off the motor fastening screw. (Fig 4. 2-7)



(Fig 4. 2-7)

- Screw off the hexagonal fixing bolt of the motor, take down the fan. (Fig 4.2-8)



(Fig 4.2-8)

- Screw off the fixing bolt of the motor (as shown in Fig 4. 2-9) .

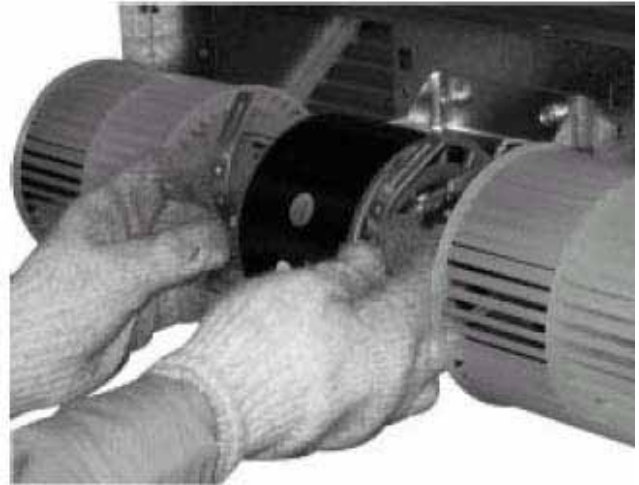


(Fig 4. 2-9)



FG Series wind pipe blowing air-conditioning unit

- Take down the fixing clamp of the motor (as shown in Fig 4.2-10)



(Fig 4.2-10)

- 6) Disassembly of electric heating pipe assy
- Screw off the fixing bolts of the locking parts of the electric heating pipe.
 - Loosen the connection of the high temperature protection assy, take down the electric heating pipe (as shown in Fig 4.2-11)



(Fig 4.2-11)

- 7) Disassembly of pipe temperature sensor
- Take down the pipe temperature sensor from the evaporator temperature sensor sleeve.
 - Pull outwards the connection faucet between the temperature sensor and the electric box. (as shown in Fig 4.2-12)



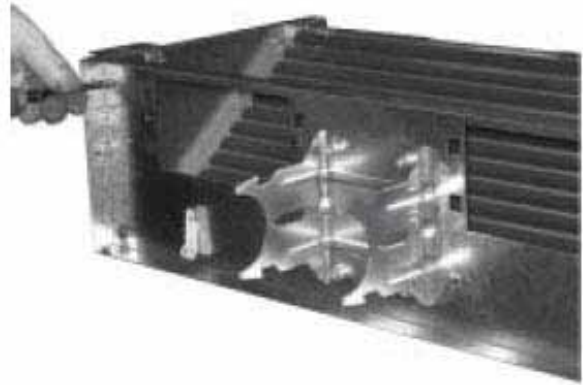
(Fig 4.2-12)



Disassembly procedure

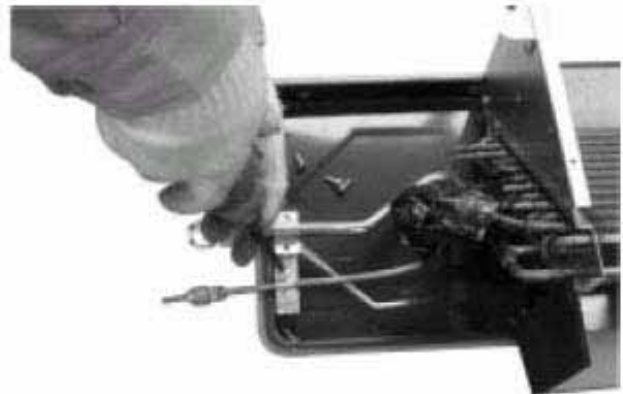


- 8) Disassembly of fan mounting plate
- Screw off the fastening bolts between the fan mounting plate and the side plate. (as shown in Fig 4.2-13)



(Fig 4.2-13)

- 9) Disassembly of evaporator assy
- Take down the fixing pipe clamp of the liquid feeding pipe and the air pipe (Fig 4.2-14)



(Fig 4.2-14)

- Take down the evaporator . (as shown in Fig 4.2-15)



(Fig 4.2-15)



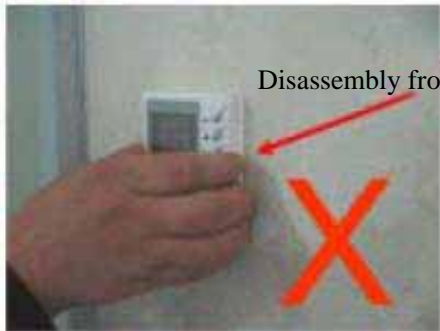
Wrong disassembly methods



Disassembly from the top



Disassembly from the bottom



Disassembly from the left



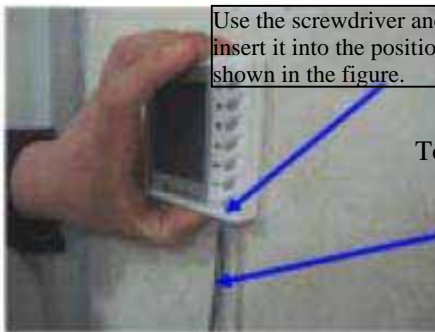
Disassembly from the right

Such disassembly methods will lead to the break of the clamp. Tools must be used to disassemble the manual controller.

Correct disassembly method (one)

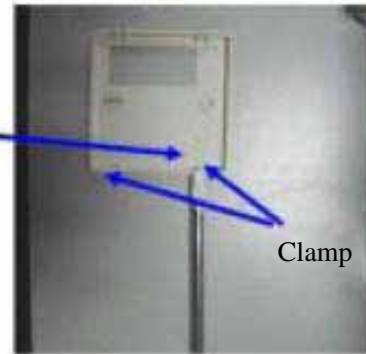
This figure is just for a clear expression.

Step 1



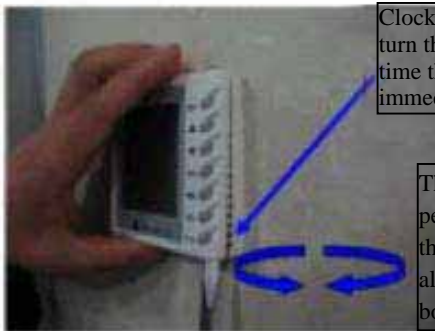
Use the screwdriver and slightly insert it into the position as shown in the figure.

Tool: screwdriver



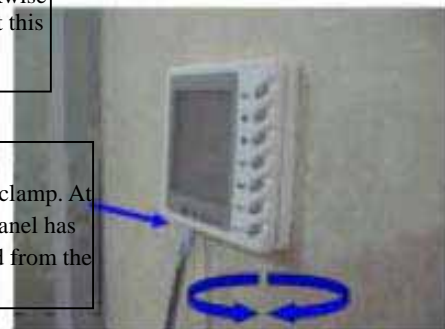
Clamp

Step 2



Clockwise or counterclockwise turn the screwdriver and at this time the clamp will loosen immediately.

Step 3



The same operation is performed on another clamp. At this time the display panel has already been separated from the bottom case.



Correct disassembly method (two)

Step 4



Step 5



Step 6 (the display board is completely separated from the bottom case)





FG Series wind pipe blowing air-conditioning unit

3.2 Design of air duct

The design of the air duct mainly includes the confirmation of the air duct size and the calculation of the resistance loss of the air duct, while the confirmation of the air duct air speed has something to do with the both. Therefore the air speed shall be first confirmed. The confirmation of the air speed is related to the initial investment, the system operation costs and the air flow noise. To design the air duct, the air supply in the air duct shall not be too strong and shall be controlled between 2-4m/s. The air speed at the air port must be controlled between 0.8~1.6m/s. The air speed in the air duct may refer to Table 4. The ratio of width and height of the rectangle shall not be more than 4: 1. To design the air duct, the connection point of the air duct must not appear inside the wall for the installation convenience of the air duct.

Air speed selection for air duct

Indoor allowed noise (Db(A))	Air speed of main air duct (m/s)	Air speed of branch air duct (m/s)	Air speed at air port (m/s)
25~35	3~4	2	2
35~50	4~7	2~3	2~3
50~60	6~9	2~5	2~3

COP of the unit

The air-duct air conditioner unit belongs to the direct cool system. From the point of the cooling principle, as the evaporation temperature of the ducted type unit is 7℃, while the evaporation temperature of the cold water unit is 2℃. When other conditions are certain, the increase of the evaporation temperature may increase the efficiency and the COP of the unit. For example, the COPs of the ducted type unit and the cold water unit with the cooling volume of 18kW are respectively 2.45 and 3.07 [3]. While for the ducted type unit and the cold water unit that adopt the same compressor, the cool volume provided by the ducted type unit is 1.2 times the cold water unit. Therefore, we may say that when the cooling supply capacity of the units are the same, the air-duct air conditioner saves 15%~20% energy more than the cold water unit. Refer to Table 1 for the COP of the ducted type unit and the cold water unit with different capacities stipulated by the national standard. From Table 1, it is obvious that the COP of the ducted type unit is higher than that of the cold water unit 「4」 [5].

Table of COP between cool-air ducted type unit and cool-air cold water unit

Unit capacity (kW)	Q ≤ 4.5	4.5 < Q ≤ 7	7 < Q ≤ 8	8 < Q ≤ 16	16 < Q ≤ 28
Ducted type unit	2.65	2.55	2.50	2.50	2.50
Cold water unit	2.30	2.30	2.30	2.35	2.40



Typical defective project case and maintenance

However, we must be aware of the fact that the household central air conditioner is a systematic project and is greatly different from the ordinary air-conditioner. The air conditioner unit produced by the enterprise is just a half-finished product. A unit with excellent performance must combine the excellent design and construction in order to bring its advantages into full play. For the ducted type unit, as the price of the unit is relatively low, it is impossible for the manufacturers to consider the energy adjustment issue of the unit when they manufacture the ducted type unit. And the feature of the ducted type unit is “if one part is opened, all is opened”. In the application, this make the ducted type unit waste energies. It can not bring into play its advantage which is to have a higher energy efficiency than the cold water unit and on the contrary, it wastes the power sources. If during the engineering, the model selection, design, construction and other steps for the units are not well handled, this problem will become more serious. If these steps are well handled, the advantages of the ducted type unit used as the household air conditioner will be brought into full play.

Coefficient of correction of the influence on cooling volume by indoor and outdoor temperature

Indoor wet bulb temperature()		17	18	19	20	21	22	23
Outdoor dry bulb temperature()	25	1.036	1.091	1.114	1.135	1.152	1.166	1.177
	30	1.000	1.034	1.064	1.091	1.114	1.135	1.152
	35	0.921	0.963	1.000	1.034	1.064	1.091	1.114
	40	0.826	0.876	0.921	0.963	1.000	1.034	1.064
	43	0.760	0.821	0.867	0.913	0.966	0.993	1.028

Coefficient of correction of the influence on cooling volume by indoor air quantity

Air quantity ratio (%)	80	90	100	110	120
Coefficient of correction of cooling	0.89	0.95	1	1.05	1.09



FG Series wind pipe blowing air-conditioning unit

The reasonable and standard installation to a great extent determines whether the function of the ducted type unit can be normally realized, whether it is convenient to use, whether the equipment operation is safe, stable and reliable and whether the future maintenance and check is easy. More than 50% of the air conditioner malfunctions are caused by installation. Therefore, the installation quality directly affects the application, or even affects whether the system can operate stably and reliably for a long time. So enough attention must be paid to the installation of the ducted type unit.

Common malfunctions of ducted type unit air conditioning system

One, The cooling and heating loads of the air conditioner are not sufficiently allocated.

- 1 Allocation of cooling and heating loads of air conditioner solely based on the air conditioner usage area.

Due to the activity requirements of the indoor personnel and for the sake of convenience, doors adjacent to each other are often opened. If rooms with opened doors are not equipped with air conditioners (e.g : kitchen, washing room, dressing room) , the cooling and heating loads of such rooms will form the corresponding air conditioning loads for the air conditioning system and thus will lead to the insufficient allocation of cooling and heating loads of air conditioners. As a result, the temperature inside the room is not comfortable enough to meet people's requirements.

- 2 Allocation of sample house is the same as that of the actual cooling and heating loads

In order to sell the houses out, the developer will fully decorate a house or several houses as sample houses for demonstration purpose before the construction of the whole building is completed. However, in the allocation of the cooling and heating loads of air conditioners, they neglect the differences between the sample houses and the actual houses after the completion.

In a A type house in a certain project, the 3-P heat pump ducted type unit is used in the design based on the calculation of the heating and cooling loads. As a result, it is found that when the outdoor temperature is -2 in winter, the indoor temperature can not meet the design requirement, but the air quantity has met the requirement. So the customer is not satisfied. Upon checking, it is found that the upper floor and the lower floor and the neighbouring rooms in the sample room are not equipped with doors and windows. The enclosing construction of the entire sample house (hexahedron) is outdoor. Upon recalculation of the heating load of the air conditioner, it is found that 30% more of the air conditioner heating volume is needed in order to meet the requirements of the original design. The real estate developers must note that when they provide the sample houses, they shall pay attention and see whether the allocation of heating and cooling loads of air conditioners repeat the above mentioned case.

Two, The cooling and heating loads of air conditioners are sufficient, but do not have good effects.

- 1 If the air quantity of the air return system of the ducted type unit air conditioner is not sufficient, it will make this problem be more serious. The main cause is that the area of the air duct and the air return port are not enough (unreasonable design) . The correction proposal is that the size of the air return duct and the air return port shall be enlarged or that the number of the air duct pipe and the air return port shall be increased.
- 2 The short circuit of the air supply and the air return flow means that the air from the air supply port flows back to the nearby air return area before it completely reaches the air conditioning area of the room. This problem will not only lead to the bad adjustable effect of the room, but also lead to the system malfunction sometimes.

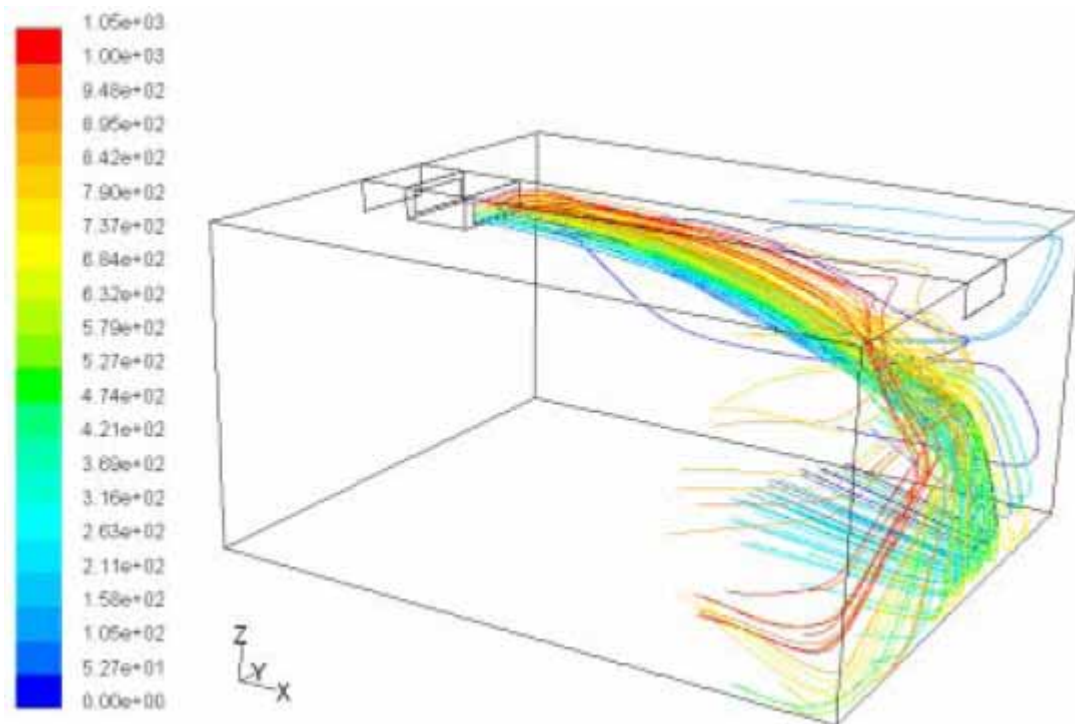


Typical defective project case and maintenance

- 3 For convenience and cost-saving purpose, the air duct adopts the flexible metal hose which is too long. When the air speed inside the flexible metal hose exceeds 3m/s, the air resistance inside the pipe will rapidly increase, while the air pressure of the indoor unit fan of household central air conditioner is rather small. If the available air pressure cannot overcome the resistance which is too strong, then its actual air quantity will be greatly less than the rated air quantity.
- 4 Some story heights are rather high and this often makes it difficult for the hot air to be blown down in winter. In order to avoid this, it is suggested that for the story height which is more than 3.5 meters, the design of the air conditioner shall adopt the spout with adjustable diffuser angles. In winter, the zero diffuser angle is adopted. In summer, the diffuser angle is adjusted to be large. If the above proposal is adopted in the air conditioner design, the problem that the hot air cannot be sent out in winter can be effectively solved and the air flow can be evenly distributed.

The following pictures show the distribution of the air flow and the temperature field under the cooling and heating conditions.

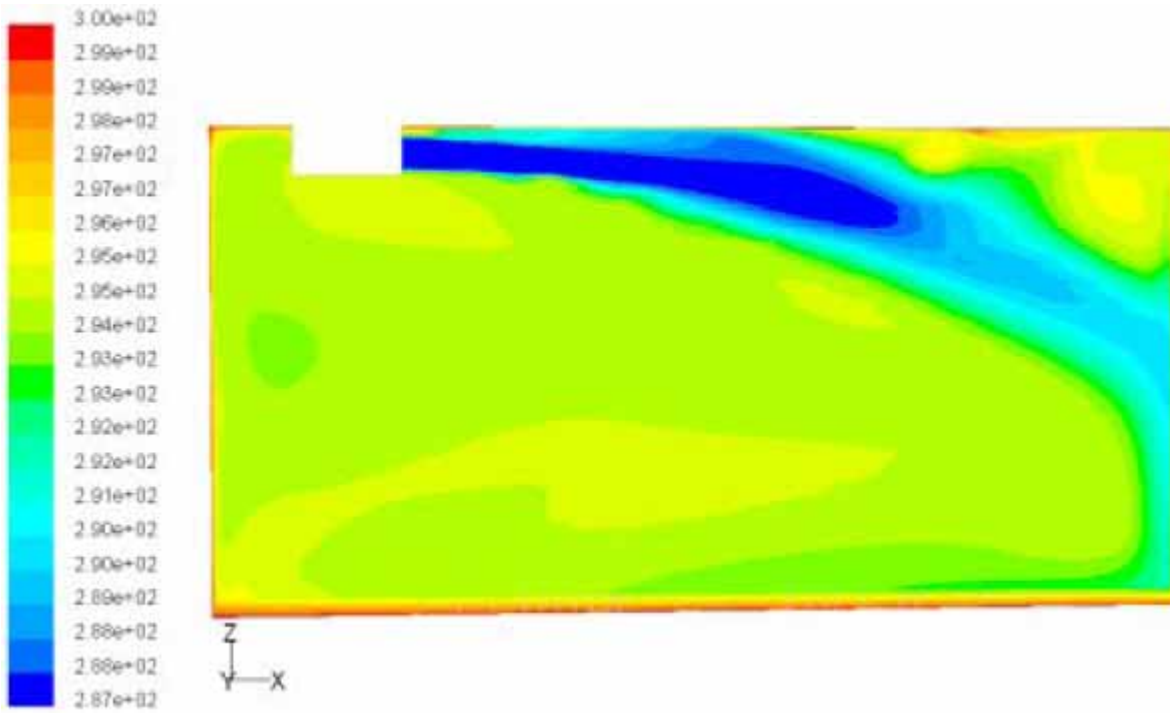
Air supply flow by ducted type unit under the cooling condition in summer



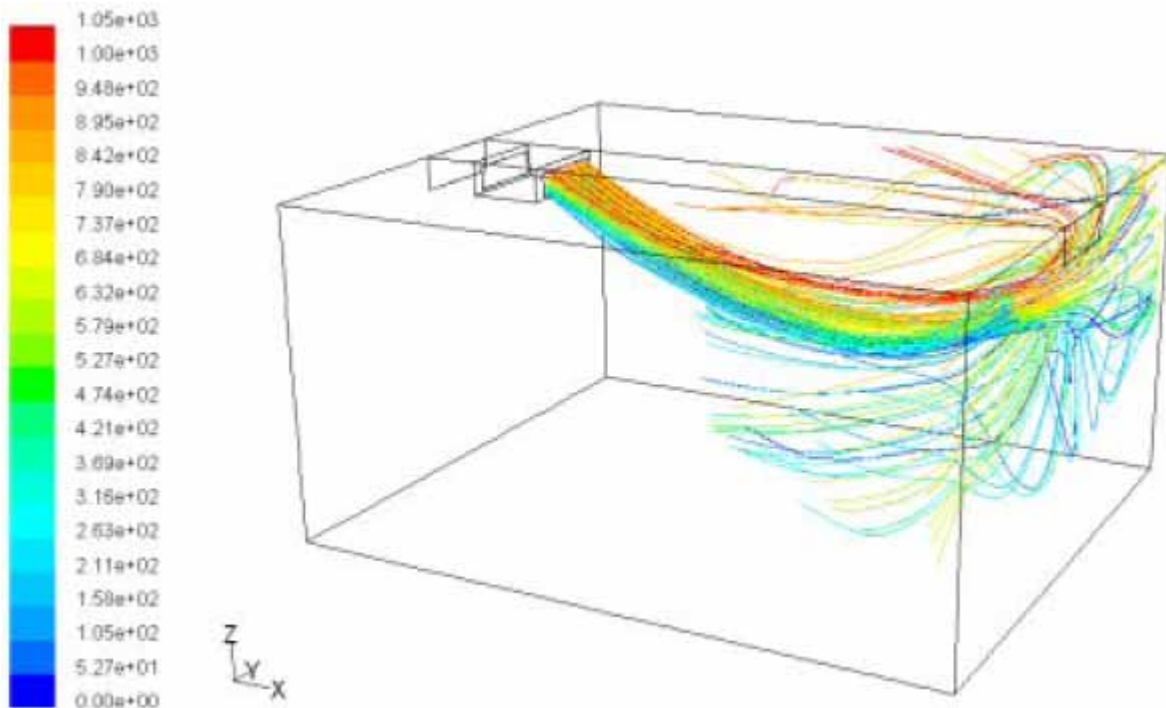


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Room temperature distribution under the cooling condition in summer

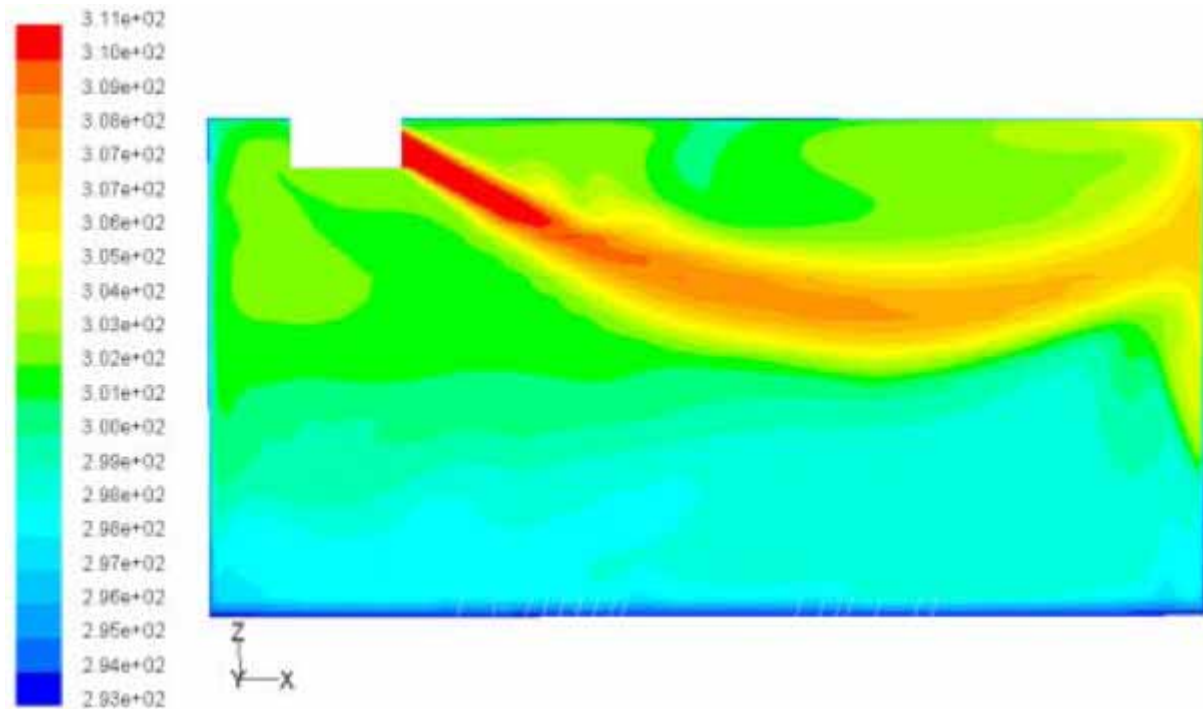


Air supply flow by ducted type unit under the heating condition in winter





Room temperature distribution under the cooling condition in summer



From the above pictures, we can see that in winter, due to the low density, the hot air is not easily blown down. As a result, the temperature of the upper space is high while the temperature of the lower space is low in the winter heating.

Three. During installation, the test condenser tube system of the indoor unit is smooth, but during operation or after operation for some time, there is water drop in the system.

- 1 In the suspension installation of the indoor unit, spring washers are not provided for the upper and lower nuts of the suspender. During the operation of the equipment, the nuts are loosened and fall off due to vibration, then the indoor unit inclines to the reverse direction of the condenser basin. As a result, the condensate water directly overflows from the water drop basin.
- 2 The space between the brackets and hangers of the condenser pipe is too large and the strength of the suspender is not sufficient. Particularly, brackets and hangers are not proved at the elbow where the horizontal pipe is connected downwards to the standpipe or the distance between the brackets and hangers and the elbows is too large. In the indoor installation, the standpipe is pushed upwards and leads to the reverse slope of the condenser pipe. Therefore, enough attention must be paid to the stiffness of the pipe and the reliability of the slope during the installation of the condenser pipe of the air conditioner.



FG Series wind pipe blowing air-conditioning unit

Typical defective case analysis

3.1 Case 1

3.1.1 Unit application site: a certain hotel

3.1.2 Model used: FGR12H/A

3.1.3 Phenomenon: There is a drone in the lobby and users complain that it is too noisy.

3.1.4 Problem analysis: The noise is from the air return port.

3.1.5 Observation: The air return port is located under the unit and no silencing facilities are provided. So the noise of the unit directly comes in the lobby.

3.1.7 Final result: After the treatment, the noise can be reduced by about 8dB.

3.1.6 On-site treatment: The position of the air return port must be adjusted to be at least 1.5 meters away from the unit and silencing materials must be affixed around the unit. The air return port must be connected by the air duct and connect to the unit. The static pressure case must be installed at the air supply section.

3.2 Case 2:

3.2.1 Unit application site: a certain family

3.2.2 Model used: FG12H/A

3.2.3 Phenomenon: It is very cold at the side near the equipment, but the temperature of the room is up to 26-28

3.2.4 Problem analysis: The air quantity at each air supply port is extremely uneven and the air distribution is bad.

3.2.5 Observation: Upon survey, it is found that the user does not carefully calculated the water power before the air return duct is laid out. The pressure difference of each parallel loop exceeds 15%.

3.2.7 Final result: After the treatment, the air quantity at each position is evenly distributed and the air flow condition is sound.

3.2.6 On-site treatment: Recalculation is made to design the air duct based on the excess pressure value outside the unit. The entire air duct is reinstalled and valves are added to each branch pipe.

3.3 Case 3:

3.3.1 Unit application site: a certain family

3.3.2 Model used: FG12/A

3.3.3 Phenomenon: there is water drop at the air supply port.

3.3.4 Problem analysis: The air supply temperature is low and so the surface temperature of the air port is low too. The outdoor air directly encounters the cold surface and thus condensation is produced.

3.3.5 Observation: The air return port is made of the aluminium-alloy. The outdoor air directly encounters the cold surface and thus condensation is produced.

3.3.6 Final result: After the treatment, there is no condensation produced.

3.3.7 On-site treatment: There are two methods: (1) To increase the air supply temperature and to keep the temperature difference between the condensation temperature of the indoor air and the dry bulb temperature of the air supply to be 2-3 .

(1) Heat insulation materials are affixed to the inside of the air supply port to increase the surface temperature of the air supply port. A layer of the heat insulation material with thickness of 5mm can be affixed.



Typical defective project case and maintenance

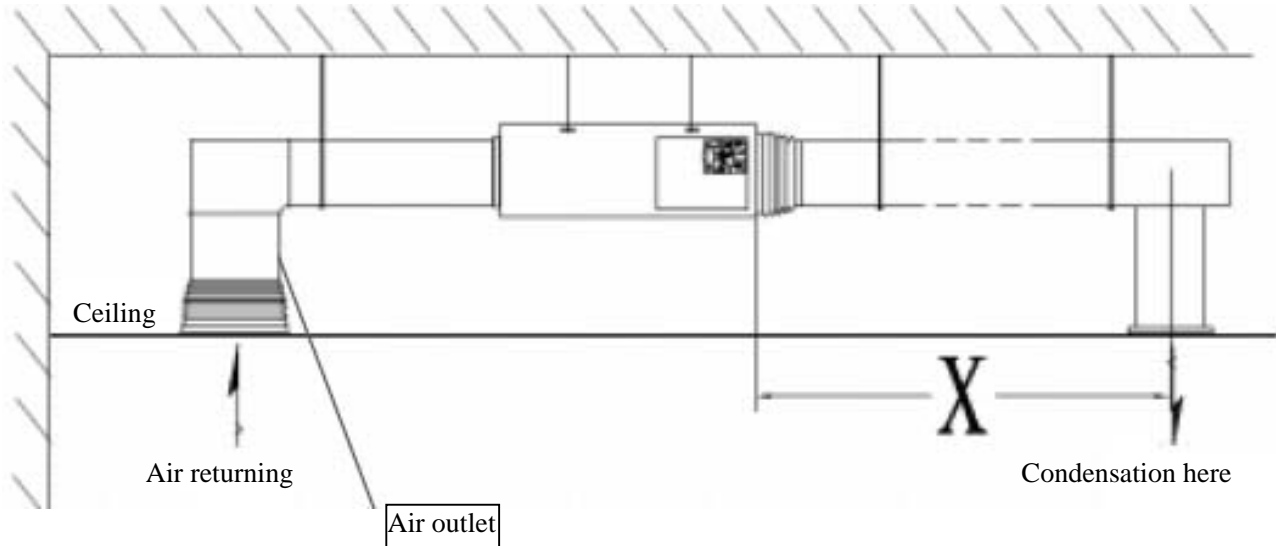
3.4 Case 4:

3.4.1 unit application site: a certain office

3.4.2 Model used: FGR7.5H/A

3.4.3 Phenomenon: There is condensation in the air duct during the operation and as result there is water drop on the ceiling.

3.4.4 Problem analysis: Heat is not preserved for the air duct.



3.4.5 Observation: Condensation appears not at the air outlet, but at the air return port. The inspection opening is opened and it is found that heat is not preserved for the air duct. The temperature inside the ceiling is high (more than 30 degrees) and the indoor temperature is just about 20 degrees. The return air cools the air inside the ceiling via the air return duct which is without any heat preservation and thus condensation appears on the outerwall of the air return duct.

3.4.6 On-site treatment: Heat insulation materials are added onto the air duct.

3.4.7 Final result: Condensation disappears.

3.5 Case 5

3.5.1 Unit application site: a certain office

3.5.2 Model used: FGR12/A

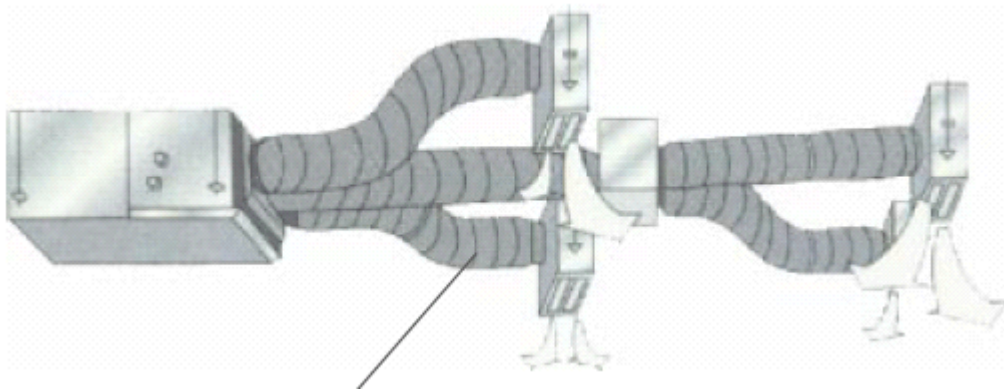
3.5.3 Phenomenon: High temperature protection appears during heating.

3.5.4 Problem analysis: The main cause for the high temperature protection during heating is that the hot air can not be sent out.

3.5.5 Observation: After the heating operation for some time, the unit displays E1 which means the high temperature protection. Upon measurement, it is found that the temperature at the air outlet is rather high. Use the hand and you can feel that the air speed at the air outlet is rather low. Even if it is switched to a high level, the air quantity is obviously insufficient. Open the inspection opening, remove the filter screen of the ducted type unit, move away the air return duct and enable the heating operation of the unit. The air speed at the air outlet is slightly higher, but after some time, the unit again displays E1 which means the high temperature protection. However, the interval between two protections is prolonged. Upon analysis, this must be caused by the unsmooth air out. The air out duct is checked and it is found that it is the air hose. The installation of the connection pipe of the air duct is not appropriate and the hot air can not be sent down.



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The resistance of this hose is stronger than that of the iron-sheet ducted type unit. Too strong resistance disables the air to be sent out.

3.5.6 On-site treatment: Adjust the switchover port and make the air hose shorter.

3.5.7 Final result: The E1 high temperature malfunction disappears.



Typical defective project case and maintenance

□ **Phase sequence error**

Phenomenon: After the three-phase unit is powered and operates, the internal and external fans of the unit operate normally, but the compressor does not operate.

Cause: This is the phase sequence error. The anti-phase protector acts and disconnects the AC contactor of the compressor.

Solution: Check whether there is any voltage for the three-phase input of the anti-phase protector. If any, then measure whether its contacts are connected. If they are separated, then it can be confirmed that the phase sequence is wrong. The solution is to exchange any two wires of the three-phase power.

□ **The power cable is too long and thus the pressure drop is too large**

Phenomenon: The unit stops once it starts up.

Cause: The power cable is too long. When the unit starts up, the current is strong and this makes the pressure drop between the power terminal to the unit be too large, and thus the instant voltage of the unit is too low and leads to the power down of the controller and the shutdown of the unit.

Solution: Increase the sizes of the corresponding power cables.

□ **When the high static pressure and the common static pressure are converted to each other, there is a wire connection error with the motor terminal pin**

Phenomenon: The motor current is too strong and the protector tube of the main board blows.

Cause: When the high static pressure and the common static pressure are converted to each other, the terminal pin of the motor is short-circuited when the rotation speed of the motor is changed and thus leads to the short circuit of the motor.

Solution: When the high static pressure and the common static pressure are converted to each other, short-circuit the high and middle levels of the motor control wire of the main board when changing the rotation speed of the motor. Do not short-circuit the terminal pin of the motor. For details, please refer to the description in the circuit diagram.