SERVICE MANUAL

MATRIX SERIE

ASH-09AIM2 PT, ASH-13AIM2 PT



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Part | : Technical Information

1. Summary

Indoor Unit

ASH-09AIM2 PT ASH-13AIM2 PT



Outdoor Unit

ASH-09AIM2 PT ASH-13AIM2 PT



Remote Controller

YAA1FB



2. Specifications

2.1 Specification Sheet

Model			ASH-09AIM2 PT	ASH-13AIM2 PT
Product Code			CB304002600_L31222	CB304002700_L31222
_	Rated Voltage	V~	220-240	220-240
Power	Rated Frequency	Hz	50	50
Supply	Phases		1	1
Power Suppl			Outdoor	Outdoor
Cooling Capa	acity	W	2600(600~3200)	3500(600~3900)
Heating Cap	acity	W	3000(800~3600)	4000(880~4400)
Cooling Pow	er Input	W	870(185~1300)	1170(185~1400)
Heating Pow	er Input	W	900(220~1400)	1200(250~1550)
Cooling Pow	er Current	A	3.80	5.20
Heating Pow	er Current	A	3.92	5.30
Rated Input		W	1400	1550
Rated Currer	nt	A	6.69	7.80
Air Flow Volu	ime(SH/H/M/L/SL)	m³/h	600/500/400/300/-	600/500/400/300/-
Dehumidifyin	ig Volume	L/h	0.8	1.2
EER		W/W	2.99	2.99
COP		W/W	3.33	3.33
SEER		W/W	6.10	6.10
HSPF		W/W	4.00	4.00
Application A	rea	m ²	12-18	16-24
	Model of indoor unit		ASH-09AIM2 PT	ASH-13AIM2 PT
	Indoor Unit Product Code		CB304N02600_L31222	CB304N02700_L31222
	Fan Type		Cross-flow	Cross-flow
	Diameter Length(DXL)	mm	Ф92X645	Ф92Х645
	Fan Motor Cooling Speed(SH/H/M/L/SL)	r/min	1260/1050/950/750/-	1290/1070/900/730/-
	Fan Motor Heating Speed(SH/H/M/L/SL)	r/min	1320/1150/1050/950/-	1320/1150/1050/920/-
	Output of Fan Motor	W	20	20
	Fan Motor RLA	A	0.10	0.10
	Fan Motor Capacitor	μF	1	1
	Evaporator Form		Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
	Pipe Diameter	mm	Φ7	Φ7
Indoor Unit	Row-fin Gap	mm	2-1.4	2-1.4
	Coil Length (LXDXW)	mm	636X25.4X267	636X25.4X267
	Swing Motor Model		MP24AA	MP24AA
	Output of Swing Motor	W	2	2
	Fuse	A	3.15	3.15
	Sound Pressure Level (SH/H/M/L/SL)	dB (A)	42/39/34/28/-	42/40/35/30/-
	Sound Power Level (SH/H/M/L/SL)	dB (A)	52/49/44/38/-	52/50/45/40/-
	Dimension (WXHXD)	mm	848X274X189	848X274X189
	Dimension of Carton Box (LXWXH)	mm	923X356X264	923X356X264
	Dimension of Package (LXWXH)	mm	926X359X279	926X359X279
	Net Weight	kg	9.5	9.5
	Gross Weight	kg	11.5	11.5

	Model of Outdoor Unit		ASH-09AIM2 PT	ASH-13AIM2 PT
	Outdoor Unit Product Code		CB404W03600_L31222	CB404W03500_L31222
	Compressor Manufacturer/Trademark		ZHUHAI LANDA COMPRESSOR CO., LTD.	ZHUHAI LANDA COMPRESSOR CO., LTD
	Compressor Model		QXA-A091zE190A	QXA-A091zE190A
	Compressor Oil		RB68EP	RB68EP
	Compressor Type		Rotary	Rotary
	L.R.A.	А	16.5	16.5
	Compressor RLA	А	4.5	4.5
	Compressor Power Input	W	942	942
	Overload Protector		1NT11L-6233	1NT11L-6233
	Throttling Method		Electron expansion valve	Electron expansion valve
	Operation Temp	°C	16~30	16~30
	Ambient Temp (Cooling)	°C	-15~48	-15~48
	Ambient Temp (Heating)	°C	-20~24	-20~24
	Condenser Form		Aluminum Fin-copper Tube	Aluminum Fin-copper Tub
	Pipe Diameter	mm	Φ7	Φ7
	Rows-fin Gap	mm	1-1.4	2-1.4
	Coil Length (LXDXW)	mm	710X19.05X508	695X38.1X506
	Fan Motor Speed	rpm	900/650	900/650
	Output of Fan Motor	W	30	30
tdoor Unit	tFan Motor RLA	A	0.15	0.15
	Fan Motor Capacitor	μF	/	/
	Air Flow Volume of Outdoor Unit	m ³ /h	1600	1600
	Fan Type	111 /11	Axial-flow	Axial-flow
	Fan Diameter	mm	Φ400	Φ400
		11111	Automatic Defrosting	Automatic Defrosting
	Defrosting Method			
	Climate Type		T1	T1
	Isolation			·
	Moisture Protection Permissible Excessive Operating Pressure for		IP24	IP24
	the Discharge Side	MPa	4.3	4.3
	Permissible Excessive Operating Pressure for			
	the Suction Side	MPa	2.5	2.5
	Sound Pressure Level (H/M/L)	dB (A)	51/-/-	53/-/-
	Sound Power Level (H/M/L)	dB (A)	61/-/-	63/-/-
	Dimension (WXHXD)	mm	776X540X320	776X540X320
	Dimension of Carton Box (LXWXH)	mm	848X360X580	848X360X580
	Dimension of Package (LXWXH)	mm	851X363X595	851X363X595
	Net Weight	kg	28	29
	Gross Weight	kg	31	32
	Refrigerant		R410A	R410A
	Refrigerant Charge	kg	0.70	0.85
	Length	m	5	5
	Gas Additional Charge	g/m	20	20
	Outer Diameter Liquid Pine	g/m mm	<u></u> Φ6	<u></u> Φ6
onnection	Outer Diameter Gas Pipe	mm	Φ9.52	Φ9.52
Pipe	Max Distance Height	m	10	10
	max biotarios rieigni	111	10	

The above data is subject to change without notice; please refer to the nameplate of the unit.



2.2 Operation Characteristic Curve

2.3 Capacity Variation Ratio According to Temperature





2.4 Cooling and Heating Data Sheet in Rated Frequency

Cooling:

Rated o conditio (DB/	on(°C)	Model	Pressure of gas pipe connecting indoor and outdoor unit	temperatu	outlet pipe ure of heat anger	Fan speed of indoor unit	Fan speed of outdoor unit	Compressor frequency (Hz)
Indoor	Outdoor		P (MPa)	T1 (°C)	T2 (°C)			(112)
27/19	35/24	ASH-09AIM2 PT	0.8 to 1.0	12 to 15	65 to 38	Super High	High	54
21/10		ASH-13AIM2 PT	0.0101.0	11 to 14	64 to 37	Super High	High	60

Heating:

Rated heating condition(°C) (DB/WB)		Model	Pressure of gas pipe connecting indoor and outdoor unit	temperatu	outlet pipe ure of heat anger	Fan speed of indoor unit	Fan speed of outdoor unit	Compressor frequency (Hz)
Indoor	Outdoor		P (MPa)	T1 (°C)	T2 (°C)			(112)
20/15	7/6	ASH-09AIM2 PT		35 to 63	2 to 5	Super High	High	62
20/15		ASH-13AIM2 PT	2.2 to 2.4	35 to 65	2 to 5	Super High	High	66

Instruction:

T1: Inlet and outlet pipe temperature of evaporator

T2: Inlet and outlet pipe temperature of condenser

P: Pressure at the side of big valve

Connection pipe length: 5 m.

2.5 Noise Curve



Technical Information

3. Outline Dimension Diagram

3.1 Indoor Unit







Unit:mm

3.2 Outoor Unit



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510

60

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Unit:mm

4. Refrigerant System Diagram



Connection pipe specification: Liquid pipe:1/4" (6mm) Gas pipe:3/8" (9.52mm)

5. Electrical Part

5.1 Wiring Diagram

• Instruction

Symbol	Symbol Color	Symbol	Symbol Color	Symbol	Name
WH	White	GN	Green	CAP	Jumper cap
YE	Yellow	BN	Brown	COMP	Compressor
RD	Red	BU	Blue		Grounding wire
YEGN	Yellow/Green	BK	Black	/	/
VT	Violet	OG	Orange	1	/

Note: Jumper cap is used to determine fan speed and the swing angle of horizontal lover for this model.

• Indoor Unit



Outdoor Unit



These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

5.2 PCB Printed Diagram

Indoor Unit

• Top view



No.	Name
1	Interface of live wire
2	Interface of live wire for outdoor control
3	Fuse
4	Interface of neutral wire
5	Interface of neutral wire for health function
6	Control interface of PG motor
7	Interface of live wire for health function
8	Interface of indoor unit and outdoor unit communication
9	Auto button
10	Up & down swing
11	Feedback interface of indoor fan
12	Jump
13	Interface of display
14	Ambient temperature sensor interface
15	Indoor tube temperature sensor interface

• Bottom view



Outdoor Unit

• Top view



No.	Name
1	Inductance pin2
2	Inductance pin1
3	Four-wayvalve
4	Compressor electric heater
5	Chassis electric heater
6	Fan neilsbed
7	Electric expansion valve
8	Temp. sensor
9	Main chip
10	EEPROM

• Bottom view



6. Function and Control

6.1 Remote Controller Introduction

Buttons on Remote Controller



Introduction for Icons on Display Screen



Introduction for Buttons on Remote Controller

Note:

• After putting through the power, the air conditioner will give out a sound. Operation indictor " " is ON (red indicator). After that, you can operate the air conditioner by using remote controller.

• Under on status, pressing the button on the remote controller, the signal icon " "on the display of remote controller will blink once and the air conditioner will give out a "de" sound, which means the signal has been sent to the air conditioner.

• Under off status, set temperature and clock icon will be displayed on the display of remote controller (If timer on, timer off and light functions are set, the corresponding icons will be displayed on the display of remote controller at the same time); Under on status, the display will show the corresponding set function icons.

1. ON/OFF Button

Press this button to turn on the unit. Press this button again to turn off the unit.

2. - Button

Press this button to decrease set temperature. Holding it down above 2 seconds rapidly decreases set temperature. In AUTO mode, set temperature is not adjustable.

3. + Button

Press this button to increase set temperature. Holding it down above 2 seconds rapidly increases set temperature. In AUTO mode, set temperature is not adjustable.

4. MODE Button

Each time you press this button, a mode is selected in a sequence that goes from AUTO, COOL, DRY, FAN, and HEAT*, as the following:



*Note:Only for models with heating function.

After energization, AUTO mode is defaulted. In AUTO mode, the set temperature will not be displayed on the LCD, and the unit will automatically select the suitable operation mode in accordance with the room temperature to make indoor room comfortable.

(As for cooling only unit, it won't have any action when it receives the signal of heating operation.)

5. FAN Button

This button is used for setting Fan Speed in the sequence that goes from AUTO, ___, __fto__ft, then back to Auto.





6. SWING Button

Press this button to set up &down swing angle, which circularly changes as below:



7. I FEEL Button

Press this button to turn on I FEEL function. The unit automatically adjust temperature according to the sensed temperature. Press this button again to cancel I FEEL function.

8. 추 / 幻 Button

Press this button to achieve the on and off of healthy and scavenging functions in operation status. Press this button for the first time to start scavenging function; LCD displays "?". Press the button for the second time to start healthy and scavenging functions simultaneously; LCD displays "?" and "?". Press this button for the third time to quit healthy and scavenging functions simultaneously. Press the button for the fourth time to start healthy function; LCD display "?". Press this button for the third time to quit healthy and scavenging functions simultaneously. Press the button for the fourth time to start healthy function; LCD display "?". Press this button again to repeat the operation above. (This function is applicable to partial of models)

9. SLEEP Button

Press this button to go into the SLEEP operation mode. Press it again to cancel this function. This function is available in COOL, HEAT (Only for models with heating function) mode to maintain the most comfortable temperature for you.

10. TEMP Button

Press this button can see indoor set temperature, indoor ambient temperature or outdoor ambient temperature on indoor unit's display. Temperature is set circularly by remote controller as below:



When selecting " ① " by remote controller or no display, temperature indicator on indoor unit displays set temperature.

When selecting "

When selecting " _____ by remote controller, temperature indicator on indoor unit displays outdoor ambient temperature.

Outdoor ambient temperature display may can't be selected for some models.When indoor unit receives " 🗋 " signal, it displays indoor set temperature.

Only for the model whose indoor unit has dual-8 display.

11. TIMER-ON Button

Press this button to initiate the auto-ON timer. To cancel the auto-timer program, simply press this button again.

After press of this button, Odisappears and "ON" blinks. 00:00 is displayed for ON time setting. Within 5 seconds, press + or - button to adjust the time value. Every press of either button changes the time setting by 1 minute. Holding down either button rapidly changes the time setting by 1 minute and then 10 minutes. Within 5 Seconds after setting, press TIMER ON button to confirm.

12. CLOCK Button

Press CLOCK button, blinking. Hit is seconds, pressing + or - button adjusts the present time. Holding down either button above 2 seconds increases or decreases the time by 1 minute every 0.5 second and then by 10 minutes every 0.5 second. During blinking after

setting, press CLOCK button again to confirm the setting, and Θ then will be constantly displayed.

13. TIMER-OFF Button

Press this button to initiate the auto-off timer. To cancel the auto-timer program, simply press the button again. TIMER OFF setting is the same as TIMER ON.

14. TURBO Button

Press this button to activate / deactivate the Turbo function which enables the unit to reach the preset temperature in the shortest time. In COOL mode, the unit will blow strong cooling air at super high fan speed. In HEAT mode, the unit will blow strong heating air at super high fan speed.

15. LIGHT Button

Press LIGHT button to turn on the display's light and press this button again to turn off the display's light. If the light is turned on, displayed. If the light is turned off, disppears.

16. X-FAN Button

Pressing X-FAN button in COOL or DRY mode, the icon bis displayed and the indoor fan will continue operation for 2 minutes in order to dry the indoor unit even though you have turned off the unit.

After energization, X-FAN OFF is defaulted. X-FAN is not available in AUTO, FAN or HEAT mode.

Combination of "+" and "-" buttons: About lock

Press "+" and "-" buttons simultaneously to lock or unlock the keypad. If the remote controller is locked, bis displayed. In this case, pressing any button, bits three times.

Combination of "MODE" and "-" buttons: About switch between Fahrenheit and centigrade

At unit OFF, press "MODE" and "-" buttons simultaneously to switch between °C and °F.

Combination of "TEMP" and "CLOCK" buttons: About Energy-saving Function

Press "TEMP" and "CLOCK" simultaneously in COOL mode to start energy-saving function.Nixie tube on the remote controller displays "SE". Repeat the operation to guit the function.

Combination of "TEMP" and "CLOCK" buttons: About 8°C Heating Function

Press "TEMP" and "CLOCK" simultaneously in HEAT mode to start 8°C Heating Function Nixie tube on the remote controller displays

"(\$)" and a selected temperature of "8°C".(46°F if Fahrenheit is adopted). Repeat the operation to quit the function.

About Back-lighting Function

The unit lights for 4s when energizing for the first time, and 3s for later press.

About HEALTH function (COLD PLASMA)

Turn on the unit, start up the fan (Breezing and X-FAN are excluded) and press HEATLTH button on remote controller to start health function (If there is not HEALTH button on remote controller, the unit defaults health function ON.)

Operation guide

1. After putting through the power, press "ON/OFF" button on remote controller to turn on the air conditioner.

- 2. Press "MODE" button to select your required mode: AUTO, COOL, DRY, FAN, HEAT.
- 3. Press "+" or "-" button to set your required temperature. (Temperature can't be adjusted under auto mode).
- 4. Press "FAN" button to set your required fan speed: auto, low, medium and high speed.
- 5. Press "SWING" button to select fan blowing angle.

Replacement of Batteries in Remote Controller

1.Press the back side of remote controller marked with" 👼 "as shown in the fig, and then push out the cover of battery box along the arrow direction.

2. Replace two 7# (AAA 1.5V) dry batteries, and make sure the position of "+" polar and "-" polar are correct.

3. Reinstall the cover of battery box.

Note:

• During operation, point the remote control signal sender at the receiving window on indoor unit.

• The distance between signal sender and receiving window should be no more than 8m, and there should be no obstacles between them.

• Signal may be interfered easily in the room where there is fluorescent lamp or wireless telephone; remote controller should be close to indoor unit during operation.

• Replace new batteries of the same model when replacement is required.

• When you don't use remote controller for a long time, please take out the batteries.

• If the display on remote controller is fuzzy or there's no display, please replace batteries.



6.2 Brief Description of Modes and Functions

1. Temperature Parameters

- Indoor preset temperature (T_{preset})
- ◆ Indoor ambient temperature (T_{amb.})

2. Basic Functions

Once energized, in no case should the compressor be restarted within less than 3 minutes. In the situation that memory function is available, for the first energization, if the compressor is at stop before de-energization, the compressor will be started without a 3-minute lag; if the compressor is in operation before de-energization, the compressor will be started with a 3-minute lag; and once started, the compressor will not be stopped within 6 minutes regardless of changes in room temperature;

(1)COOL Mode

(1) The condition and process of cooling

If T_{amb.}≥T_{preset} COOL mode will act, the compressor and outdoor fan will run, and the indoor fan will run at the set speed.

If T_{amb}.≤T_{preset}-2°C, the compressor will stop, the outdoor fan will delay 30 seconds to stop, and the indoor fan will run at the set speed.

If T_{preset} -2°C≤ T_{amb} .≤ T_{preset} , the unit will keep running in the previous mode.

In this mode, the reversal valve will not be powered on and the temperature setting range is 16~30°C.



2 Protection function

Overcurrent protection

If total current is high, the compressor will run in limited frequency. If total current is too high, the compressor will stop, the outdoor fan will delay 30 seconds to stop, indoor unit will display E5 and outdoor yellow light will blink 5 times.

Antifreezing protection

When the antifreezing protection is detected, the compressor will stop, the outdoor fan will stop after 30 seconds, and the indoor fan and swing motor will keep running in the original mode. When antifreezing protection is eliminated and the compressor has stopped for 3 minutes, the compressor will resume running in the original mode.



(2)Dehumidifying Mode

(1) Working conditions and process of dehumidifying

If T_{amb.}>T_{preset}, the unit will enter cooling and dehumidifying mode, in which case the compressor and the outdoor fan will operate and the indoor fan will run at low speed.

If T_{preset} -2°C≤ T_{amb} ≤ T_{preset} , the compressor remains at its original operation state.

If $T_{amb.} < T_{preset} - 2^{\circ}C$, the compressor will stop, the outdoor fan will stop with a time lag of 30s, and the indoor fan will operate at low speed. (2) Protection

Protection is the same as that under the cooling mode.

(3) HEAT Mode

 $(\ensuremath{\underline{1}})$ The condition and process of heating

If $T_{amb} \leq T_{preset} + 2^{\circ}C$, HEAT mode will act, the compressor, outdoor fan and reversal valve will run, the indoor fan will delay 3min to stop at the latest.

If T_{preset} +2°C<T_{amb}< T_{preset} +5°C ,the unit will keep running in the original mode.

If $T_{amb.} \ge T_{preset} +5^{\circ}C$, the compressor will stop, the outdoor fan will delay 30sec to stop and indoor fan will blow 60S at low speed, the fan speed cannot be shifted within blow residual heat.

- ◆ In this mode, the temperature setting range is 16~30°C.
- The air conditioner will adjust the running frequency of the compressor automatically according to the change of ambient temperature.
- When the unit is turned off in HEAT mode, or switched to other mode from HEAT mode, the four-way valve will be powered off after

Technical Information

the compressor stops.

When compressor is running (not including each malfunction and protection):

a.When outdoor ambient temperature ≥20°C and indoor fan speed is low or medium, the fan speed will turn to high; if indoor fan speed is high or super high, it will keep the same.

b.When outdoor ambient temperature≤18°C, the fan speed will resume set fan speed.

c. When $18^{\circ}C <$ outdoor ambient temperature $< 20^{\circ}C$, it will run at present fan speed (set fan speed or high fan speed); but when first exiting cold air prevention after entering heating mode, it will run in set fan speed.



2 The condition and process of defrosting

When frost is detected in the condenser, the system will enter into defrosting state. When defrosting starts, the compressor and indoor fan will stop, and the outdoor fan and four-way valve will delay 30 seconds to stop. The compressor will start after 15 seconds and then defrosting will be started. When the compressor has run for 7 minutes or defrosting is finished, the compressor will stop. After 30 seconds the four-way valve opens and after another 60 seconds, the compressor and outdoor fan resume running. Theindoor fan will delay 3 minutes to run at the latest .The Heat indicator will be off for 0.5 second in each 10 seconds during defrosting.



③ Protection function

Anti-cold-wind protection

In HEAT mode, in order to prevent the indoor unit from blowing out cold wind, each time the compressor starts, the indoor fan will delay 3 minutes after the compressor to run at the latest and it can adjust fan speed automatically when temperature is low.

Cold air prevention

The unit is started under heating mode (the compressor is ON):

① In the case of $T_{indoor amb.} < 24^{\circ}C$: if $T_{tube} \le 40^{\circ}C$ and the indoor fan is at stop state, the indoor fan will begin to run at low speed with a time lag of 2 minutes. Within 2 minutes, if $T_{tube} > 40^{\circ}C$, the indoor fan also will run at low speed; and after1-minute operation at low speed, the indoor fan will be converted tooperation at preset speed. Within 1-minute low speed operation or 2-minute non-operation, if $T_{tube} \le 42^{\circ}C$, the fan will run at present speed.

② In the case of $T_{indoor amb.} \ge 24^{\circ}C$: if $T_{tube} \le 42^{\circ}C$, the indoor fan will run at low speed, and afterone minute, the indoorfan will be converted to preset speed. Within one-minute low speed operation, if $T_{tube} > 42^{\circ}C$, the indoor fan will be converted to preset speed.

Note: T indoor amb. indicated in ① and ② refers to, under initially heating mode, the indoor ambient temperature before the command to start the compressor is performed according to the program, or after the unit is withdrawn from defrost, the indoor ambient temperature before the defrost symbol is cleared.

◆ Total current up and frequency down protection

If the total current $I_{total} \leq W$, frequency rise will be allowed; if $I_{total} \geq X$, frequency rise will not be allowed; if $I_{total} \geq Y$, the compressor will run at reduced frequency; and if $I_{total} \geq Z$, the compressor will stop and the outdoor fan will stop with a time lag of 30s.

(4) Fan Mode

Under the mode, the indoor fan will run at preset speed and the compressor, the outdoor fan, the four-way valve and the electric heater will stop.

Under the mode, temperature can be set within a range of 16~30°C.

(5) AUTO Mode

① Operation way of AUTO mode

a.When $T_{ambient} \ge 26^{\circ}C$, it will run in cooling mode. The implied set temperature is 25°C (note: the set temperature sending to outdoor unit is 25°C).

b.For heating and cooling unit, when $T_{ambient} \leq (19^{\circ}C+T_{supplementary})$, it will run in heating mode. The implied set temperature is 20°C; for cooling only unit, when $T_{ambient} \leq 22^{\circ}C$, it will run in fan mode and the displayed set temperature is 25°C.

c.For heating and cooling unit, when $(19^{\circ}C+T_{supplementary}) < T_{indoor ambient} < 26^{\circ}C$ (for cooling only unit, $22^{\circ}C < T_{indoor ambient} < 26^{\circ}C$), it will keep the original running mode. If the unit is energized for the first time, it will run in fan mode.

2 Protection

a. In cooling operation, protection is the sam e as that under the cooling mode;

b. In heating operation, protection is the same as that under the heating mode;

c. When ambient temperature changes, operation mode will be converted preferentially. Once started, the compressor will remain unchanged for at least 6 minutes.

(6) Common Protection Functions and Fault Display under COOL, HEAT, DRY and AUTO Modes

① Overload protection

Ttube: measured temperature of outdoor heat exchanger under cooling mode; and measured temperature of indoor heat exchanger under heating mode.

1) Cooling overload

a.If T_{tube}≤52°C, the unit will return to its original operation state.

b.If T_{tube}≥55°C, frequency rise is not allowed.

c.lf T_{tube}≥58°C, the compressor will run at reduced frequency.

d.If T_{tube}≥62°C, the compressor will stop and the indoor fan will run at preset speed.

2) Heating overload

a.lf T_{tube}≤50°C, the unit will return to its original operation state.

b.If T_{tube}≥53°C, frequency rise is not allowed.

c.lf T_{tube} \geq 56°C, the compressor will run at reduced frequency.

d.If T_{tube}≥60°C, the compressor will stop and the indoor fan will blow residue heat and then stop.

② Exhaust temperature protection of compressor

If exhaust temperature≥98°C, frequency is not allowed to rise.

If exhaust temperature≥103°C, the compressor will run at reduced frequency.

If exhaust temperature≥110°C, the compressor will stop.

If exhaust temperature≤90°C and the compressor has stayed at stop for at least 3 minutes, the compressor will resume its operation. ③ Communication fault

If the unit fails to receive correct signals for durative 3 minutes, communication fault can be justified and the whole system will stop. ④ Module protection

Under module protection mode, the compressor will stop. When the compressor remains at stop for at least 3 minutes, the compressor will resume its operation. If module protection occurs six times in succession, the compressor will not be started again.

⑤ Overload protection

If temperature sensed by the overload sensor is over 115°C, the compressor will stop and the outdoor fan will stop with a time lag of 30 seconds. If temperature is below 95°C, the overload protection will be relieved.

(6) If voltage on the DC bus is below 150V or over 420V, the compressor will stop and the outdoor fan will stop with a time lag of 30 seconds. When voltage on the DC bus returns to its normal value and the compressor has stayed at stop for at least 3 minutes, the compressor will resume its operation.

 \bigcirc Faults of temperature sensors

Designation of sensors	Faults
Indoor ambient temperature	The sensor is detected to be open-circuited or short-circuited for successive 5 seconds
Indoor tube temperature	The sensor is detected to be open-circuited or short-circuited for successive 5 seconds
Outdoor ambient temperature	The sensor is detected to be open-circuited or short-circuited for successive 30 seconds
Outdoor tubo tomporaturo	The sensor is detected to be open-circuited or short-circuited for successive 30 seconds, and no
Outdoor tube temperature	detection is performed within 10 minutes after defrost begins.
Exhaust	After the compressor has operated for 3 minutes, the sensor is detected to be open-circuited or short-
Exhaust	circuited for successive 30 seconds.
Overload	After the compressor has operated for 3 minutes, the sensor is detected to be open-circuited or short-
Ovendau	circuited for successive 30 seconds.

3. Other Controls

(1) ON/OFF

Press the remote button ON/OFF: the on-off state will be changed once each time you press the button.

(2) Mode Selection

Press the remote button MODE, then select and show in the following ways: AUTO, COOL, DRY, FAN, HEAT, AUTO.

(3) Temperature Setting Option Button

Each time you press the remote button TEMP+ or TEMP-, the setting temperature will be up or down by 1. Regulating Range: 16~30°C, the button is useless under the AUTO mode.

(4) Time Switch

You should start and stop the machine according to the setting time by remote control.

(5) SLEEP State Control

a. When the air conditioner is under the mode of COOL, and the SLEEP mode has been set well, after the SLEEP state keeps about 1 hour, the pre-setting T will raise 1°C, and it will raise 1°C again after 2 hours, so it raise 2°C in 2 hours, then it will run on at the setting temperature and wind speed.

b. When the air conditioner is under the mode of HEAT, and the Timer has been set well, after the SLEEP state keeps about 1 hour, the pre-setting T will reduce 1°C, and it will reduce 1°C again after 2 hours, so it reduce 2°C in 2 hours, then it will run on at the setting temperature and wind speed.

c. The setting temperature keeps the same under the FAN mode and AUTO mode.

(6) Indoor Fan Control

Indoor fan could be set at ultra-high, high, medium, low speed by wireless remote controller and operated as that speed.

Auto fan speed could be set as well, indoor fan will operate under auto fan speed as following:

① Under heating mode: auto speed under heating or auto heating mode:

- a. When T_{amb.} \leq T_{preset}+1°C, indoor fan will operate at high speed;
- b. When T_{preset} +1°C < $T_{amb.}$ < T_{preset} +3°C, indoor fan will operate at medium speed;
- c. When T_{amb.}≥T_{preset}+3°C, indoor fan will operate at low speed;

There should be at least 180s operation time during switchover of each speed.

2 Under cooling mode: auto speed under cooling or auto cooling mode:

a. When T_{amb.} < T_{preset}+2°C, indoor fan will operate at high speed;

b. When $T_{preset} < T_{amb.} < T_{preset}$ +2°C, indoor fan will operate at medium speed;

c. When T_{amb.} \leq T_{preset}, indoor fan will operate at low speed;

There should be at least 180s operation time during switchover of each speed.

(7) Buzzer Control

The buzzer will send a "Di" sound when the air conditioner is powered up or received the information sent by the remote control or there is a button input, the single tube cooler doesn't receive the remote control ON signal under the mode of heating mode.

(8) Auto Button

If the controller is on, it will stop by pressing the button, and if the controller is off, it will be automatic running state by pressing the button, swing on and light on, and the main unit will run based on the remote control if there is remote control order.

(9) Up-and-Down Swinging Control

When power on, the up-and-down motor will firstly move the air deflector to o counter-clockwise, close the air outlet. After starting the machine, if you don't set the swinging function, heating mode and auto-heating mode, the up-and-down air deflector will move to D clockwise; under other modes, the up-and-down air deflector will move to L1. If you set the swinging function when you start the machine, then the wind blade will swing between L and D. The air deflector has 7 swinging states: Location L, Location A, Location B, Location C, Location D, Location L to Location D, stop at any location between L-D (the included angle between L~D is the same). The air deflector will be closed at 0 Location, and the swinging is effectual only on condition that setting the swinging order and the inner fan is running. The indoor fan and compressor may get the power when air deflector is on the default location.



(10) Display

① Operation pattern and mode pattern display

All the display patterns will display for a time when the power on, the operation indication pattern will display in red under standby status. When the machine is start by remote control, the indication pattern will light and display the current operation mode (the mode light includes: Cooling, heating and dehumidify). If you close the light key, all the display patterns will close.

② Double-8 display

According to the different setting of remote control, the nixie light may display the current temperature (the temperature scope is from 16~30°C) and indoor ambient temperature. The heating and air supply temperature will display 25°C under auto-mode, the temperature will display 20°C under the auto-heating mode, and the temperature will display H1 under the defrosting mode. (If you set the fahrenheit temperature display, the nixie light will display according to fahrenheit temperature)

(11) Protection Function and Failure Display

- E2: Freeze-proofing protection
- E4: Exhausting protection
- E5: Overcurrent protection
- E6: Communication failure
- F1: Indoor ambient sensor start and short circuit (continuously measured failure in 5s)
- F2: Indoor evaporator sensor start and short circuit (continuously measured failure in 5s)

F3: Outdoor ambient sensor start and short circuit (continuously measured failure in 30s)

F4: Outdoor condenser sensor start and short circuit (continuously measured failure in 30s, and don't measure within 10 minutes after defrosted)

F5: Outdoor exhausting sensor start and short circuit (continuously measured failure in 30s after the compressor operated 3 minutes)

H3: Overload protection of compressor

H5: Module protection

PH: High-voltage protection

PL: Low-voltage protection

P1: Nominal cooling and heating test

P2: Maximum cooling and heating test

P3: Medium cooling and heating test

P0: Minimum cooling and heating test.

(12) Drying Function

You may start or stop the drying function under the modes of cooling and dehumidify at the starting status (The modes of automatism, heating and air supply do not have drying function). When you start the drying function, after stop the machine by pressing the switch button, you should keep running the inner fans for 2 minutes under low air damper (The swing will operate as the former status within 2 minutes, and other load is stopped), then stop the entire machine; When you stop the drying function, press the switch button will stop the machine directly.

When you start the drying function, operating the drying button will stop the inner fans and close the guide louver.

(13)Memory Function

When interrupting the power supply memory content: mode, swing function, light, set temperature and wind speed. After interrupted the power supply, the machine will start when recovering the power according to the memory contentautomatically.

(14)Electric heating band control of outdoor unit

① Compressor electric heating band control:

a) Start condition: the compressor is in off status and the T_{outdoor ambient temperature} ≤-5°C.

b) Stop condition: the band is off when either of the below condition is met:

1. The compressor is in on status;

2. The compressor is in off status and the $T_{outdoor ambient temperature} \ge -5^{\circ}C$.

c) When outdoor ambient temperature sensor is in malfunction status, the electric heating band stops operation.

2 Condenser electric heating band control:

1.When T_{outdoor ambient}≤1°C, the electric heating band starts working;

2. When enter defrosting and defrosting is finished, the chassis electric heating band starts working for 3min as the compressor

starts. After the compressor starts for 3min and T_{outdoor ambien}≥3°C, the electric heating band stops operation.

3.When $T_{outdoor ambient} \ge 3^{\circ}C$, the condenser electric heating band doesn't work.

4.When 1°C<T_{outdoor ambient}<3°C, the condenser electric heating band keeps the previous status.

When outdoor ambient temperature sensor is in malfunction status, the electric heating band stops operation; the electric heating band can work again after 2min of last stop.

(15)Compulsory defrosting function

① Start up compulsory defrosting function

Under ON status, set heating mode with remote controller and adjust the temperature to 16°C. Press "+, -, +, -, +,-" button successively within 5s and the complete unit will enter into compulsory defrosting status. Meanwhile, heating indicator will ON 10s and OFF 0.5s successively. (Note: If complete unit has malfunction or stops operation due to protection, compulsory defrosting function can be started up after malfunction or protection is resumed.

2 Exit compulsory defrosting mode

After compulsory defrosting is started up, the complete unit will exit defrosting operation according to the actual defrosting result, and the complete unit will resume normal heating operation.

(16)Refrigerant recovery function (applicable for moving the unit or maintaining the unit)

(1) Start up refrigerant recovery function

Set cooling mode with remote controller within 5min after energization, adjust temperature at 16°C and press light button on remote controller for 3 times successively to any one indoor unit within 3s and then the complete unit will enter into refrigerant recovery status. All indoor units display Fo. Maintenance person close all liquid valves. After 5min, withstand the thimble of all checking valves with tools one by one. If there's no refrigerant spraying out, close corresponding valve immediately, turn off the unit with remote controller and then remove the connection pipe.

2 Exit refrigerant recovery function

During refrigerant recovery process, if any one indoor unit receives any remote control signal or refrigerant recovery function has operates for about 25min, refrigerant recovery function will be exited automatically. If the complete unit is at standby status before refrigerant recovery, the complete unit will still at standby status after refrigerant recovery. If the complete unit is at ON status, the unit will operate according to original operation mode.

Part II: Installation and Maintenance

7. Notes for Installation and Maintenance

Safety Precautions: Important!

Please read the safety precautions carefully before installation and maintenance.

The following contents are very important for installation and maintenance.

Please follow the instructions below.

•The installation or maintenance must accord with the instructions.

•Comply with all national electrical codes and local electrical codes.

•Pay attention to the warnings and cautions in this manual.

•All installation and maintenance shall be performed by distributor or qualified person.

•All electric work must be performed by a licensed technician according to local regulations and the instructions given in this manual.

•Be caution during installation and maintenance. Prohibit incorrect operation to prevent electric shock, casualty and other accidents.



Electrical Safety Precautions:

1. Cut off the power supply of air conditioner before checking and maintenance.

2. The air condition must apply specialized circuit and prohibit share the same circuit with other appliances.

3. The air conditioner should be installed in suitable location and ensure the power plug is touchable.

4. Make sure each wiring terminal is connected firmly during installation and maintenance.

5. Have the unit adequately grounded. The grounding wire can't be used for other purposes.

6. Must apply protective accessories such as protective boards, cable-cross loop and wire clip.

7. The live wire, neutral wire and grounding wire of power supply must be corresponding to the live wire, neutral wire and grounding wire of the air conditioner.

8. The power cord and power connection wires can't be pressed by hard objects.

9. If power cord or connection wire is broken, it must be replaced by a qualified person.

10. If the power cord or connection wire is not long enough, please get the specialized power cord or connection wire from the manufacture or distributor. Prohibit prolong the wire by yourself.

11. For the air conditioner without plug, an air switch must be installed in the circuit. The air switch should be all-pole parting and the contact parting distance should be more than 3mm.

12. Make sure all wires and pipes are connected properly and the valves are opened before energizing.

13. Check if there is electric leakage on the unit body. If yes, please eliminate the electric leakage.

14. Replace the fuse with a new one of the same specification if it is burnt down; don't replace it with a cooper wire or conducting wire.

15. If the unit is to be installed in a humid place, the circuit breaker must be installed.

Installation Safety Precautions:

1. Select the installation location according to the requirement of this manual.(See the requirements in installation part)

2. Handle unit transportation with care; the unit should not be carried by only one person if it is more than 20kg.

3. When installing the indoor unit and outdoor unit, a sufficient fixing bolt must be installed; make sure the installation support is firm.

4. Ware safety belt if the height of working is above 2m.

5. Use equipped components or appointed components during installation.

6. Make sure no foreign objects are left in the unit after finishing installation.

Refrigerant Safety Precautions:

1. Avoid contact between refrigerant and fire as it generates poisonous gas; Prohibit prolong the connection pipe by welding.

2. Apply specified refrigerant only. Never have it mixed with any other refrigerant. Never have air remain in the refrigerant line as it may lead to rupture or other hazards.

3. Make sure no refrigerant gas is leaking out when installation is completed.

4. If there is refrigerant leakage, please take sufficient measure to minimize the density of refrigerant.

5. Never touch the refrigerant piping or compressor without wearing glove to avoid scald or frostbite.

Improper installation may lead to fire hazard, explosion, electric shock or injury.

Main Tools for Installation and Maintenance

1. Level meter, measuring tape	2. Screw driver	3. Impact drill, drill head, electric drill
e 0		
4. Electroprobe	5. Universal meter	6. Torque wrench, open-end wrench, inner hexagon spanner
7. Electronic leakage detector	8. Vacuum pump	9. Pressure meter
10. Pipe pliers, pipe cutter	11. Pipe expander, pipe bender	12. Soldering appliance, refrigerant container
	RAD CONTRACTOR	

8. Installation

8.1 Installation Dimension Diagram



Installation procedures



Note: this flow is only for reference; please find the more detailed installation steps in this section.

8.2 Installation Parts-checking

No.	Name	No.	Name
1	Indoor unit	8	Sealing gum
2	Outdoor unit	9	Wrapping tape
3	Connection pipe	10	Support of outdoor
3	Connection pipe	10	unit
4	Drainage pipe	11	Fixing screw
5	Wall-mounting	12	Drainage plug(cooling
5	frame	12	and heating unit)
6	Connecting		Owner's manual,
0	cable(power cord)	13	remote controller
7	Wall pipe		

<u>∧ Note:</u>

1.Please contact the local agent for installation.

2.Don't use unqualified power cord.

8.3 Selection of Installation Location

1. Basic Requirement:

Installing the unit in the following places may cause

malfunction. If it is unavoidable, please consult the local dealer: (1) The place with strong heat sources, vapors, flammable or explosive gas, or volatile objects spread in the air.

(2) The place with high-frequency devices (such as welding machine, medical equipment).

(3) The place near coast area.

(4) The place with oil or fumes in the air.

(5) The place with sulfureted gas.

(6) Other places with special circumstances.

2. Indoor Unit:

(1) There should be no obstruction near air inlet and air outlet.

(2) Select a location where the condensation water can be

dispersed easily and won't affect other people.

(3) Select a location which is convenient to connect the outdoor unit and near the power socket.

(4) Select a location which is out of reach for children.

(5) The location should be able to withstand the weight of indoor unit and won't increase noise and vibration.

(6) The appliance must be installed 2.5m above floor.

(7) Don't install the indoor unit right above the electric appliance.

(8) The appliance shall not be installed in the laundry.

3. Outdoor Unit:

(1) Select a location where the noise and outflow air emitted by the outdoor unit will not affect neighborhood.

(2) The location should be well ventilated and dry, in which the outdoor unit won't be exposed directly to sunlight or strong wind.

(3) The location should be able to withstand the weight of outdoor unit.

(4) Make sure that the installation follows the requirement of installation dimension diagram.

(5) Select a location which is out of reach for children and far away from animals or plants. If it is unavoidable, please add fence for safety purpose.

8.4 Electric Connection Requirement

1. Safety Precaution

(1) Must follow the electric safety regulations when installing the unit.

(2) According to the local safety regulations, use qualified power supply circuit and air switch.

(3) Make sure the power supply matches with the requirement of air conditioner. Unstable power supply or incorrect wiring may result in electric shock,fire hazard or malfunction. Please install proper power supply cables before using the air conditioner.

Air-conditioner	Air switch capacity				
ASH-09AIM2 PT	10.4				
ASH-13AIM2 PT	10A				

(4) Properly connect the live wire, neutral wire and grounding wire of power socket.

(5) Be sure to cut off the power supply before proceeding any work related to electricity and safety.

(6) Do not put through the power before finishing installation.

(7) For appliances with type Y attachment, the instructions shall contain the substance of the following. If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

(8) The temperature of refrigerant circuit will be high, please keep the interconnection cable away from the copper tube.

2. Grounding Requirement:

(1) The air conditioner is first class electric appliance. It must be properly grounding with specialized grounding device by a professional. Please make sure it is always grounded effectively, otherwise it may cause electric shock.

(2) The yellow-green wire in air conditioner is grounding wire, which can't be used for other purposes.

(3) The grounding resistance should comply with national electric safety regulations.

(4) The appliance must be positioned so that the plug is accessible.

(5) An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be connected in fixed wiring.(6) Including an air switch with suitable capacity, please note the following table. Air switch should be included magnet buckle and heating buckle function, it can protect the circuit-short and overload. (Caution: please do not use the fuse only for protect the circuit)

8.5 Installation of Indoor Unit

1. Choosing Installation location

Recommend the installation location to the client and then confirm it with the client.

2. Install Wall-mounting Frame

(1) Hang the wall-mounting frame on the wall; adjust it in horizontal position with the level meter and then point out the screw fixing holes on the wall.

(2) Drill the screw fixing holes on the wall with impact drill (the specification of drill head should be the same as the plastic expansion particle) and then fill the plastic expansion particles

in the holes.

(3) Fix the wall-mounting frame on the wall with tapping screws (ST4.2X25TA) and then check if the frame is firmly installed by pulling the frame. If the plastic expansion particle is loose, please drill another fixing hole nearby.

3. Install Wall-mounting Frame

(1) Choose the position of piping hole according to the direction of outlet pipe. The position of piping hole should be a little lower than the wall-mounted frame.(As show in Fig.1)



(2) Open a piping hole with the diameter of Φ 55mm on the selected outlet pipe position.In order to drain smoothly, slant the piping hole on the wall slightly downward to the outdoor side with the gradient of 5-10°.(As show in Fig.2)



▲ Note:

(1) Pay attention to dust prevention and take relevant safety measures when opening the hole.

(2) The plastic expansion particles are not provided and should be bought locally.

4. Outlet Pipe

(1) The pipe can be led out in the direction of right, rear right, left or rear left.(As show in Fig.3)

(2) When selecting leading out the pipe from left or right, please cut off the corresponding hole on the bottom case.(As show in Fig.4)





5. Connect the Pipe of Indoor Unit

(1) Aim the pipe joint at the corresponding bellmouth.(As show in Fig.5)

(2) Pretightening the union nut with hand.

(3) Adjust the torque force by referring to the following sheet. Place the open-end wrench on the pipe joint and place the torque wrench on the union nut. Tighten the union nut with torque wrench.(As show in Fig.6)

(4) Wrap the indoor pipe and joint of connection pipe with insulating pipe, and then wrap it with tape.(As show in Fig.7)





Refer to the following table for wrench moment of force:

Hex nut diameter(mm)	Tightening torque(N·m)
Ф6	15~20
Ф9.52	30~40
Φ12	45~55
Ф16	60~65
Ф19	70~75

6. Install Drain Hose

(1) Connect the drain hose to the outlet pipe of indoor unit.(As show in Fig.8)

(2) Bind the joint with tape.(As show in Fig.9)



▲ Note:

(1) Add insulating pipe in the indoor drain hose in order to prevent condensation.

(2) The plastic expansion particles are not provided. (As show in Fig.10)



7. Connect Wire of Indoor Unit

(1) Open the panel, remove the screw on the wiring cover and then take down the cover.(As show in Fig.11)



(2) Make the power connection wire go through the cable-cross hole at the back of indoor unit and then pull it out from the front side.(As show in Fig.12)



(3) Remove the wire clip; connect the power connection wire to the wiring terminal according to the color; tighten the screw and then fix the power connection wire with wire clip.(As show in Fig.13)



Note: The wiring connect is for reference only, please refer to the actual one.

Fig.13

(4) Put wiring cover back and then tighten the screw.(5) Close the panel.

∧ Note:

(1) All wires of indoor unit and outdoor unit should be connected by a professional.

(2) If the length of power connection wire is insufficient, please contact the supplier for a new one. Avoid extending the wire by yourself.

(3) For the air conditioner with plug, the plug should be reachable after finishing installation.

(4) For the air conditioner without plug, an air switch must be installed in the line. The air switch should be all-pole parting and the contact parting distance should be more than 3mm.

8. Bind up Pipe

(1) Bind up the connection pipe, power cord and drain hose with the band.(As show in Fig.14)

(2) Reserve a certain length of drain hose and power cord for installation when binding them. When binding to a certain degree, separate the indoor power and then separate the drain hose.(As show in Fig.15)

(3) Bind them evenly.

(4) The liquid pipe and gas pipe should be bound separately at the end.





A Note:

(1) The power cord and control wire can't be crossed or winding.

(2) The drain hose should be bound at the bottom.

9. Hang the Indoor Unit

(1) Put the bound pipes in the wall pipe and then make them pass through the wall hole.

(2) Hang the indoor unit on the wall-mounting frame.

(3) Stuff the gap between pipes and wall hole with sealing gum.

(4) Fix the wall pipe. (As show in Fig.16)

(5) Check if the indoor unit is installed firmly and closed to the wall.(As show in Fig.17)



▲ Note:

Do not bend the drain hose too excessively in order to prevent blocking.

8.6 Installation of Outdoor Unit

1. Fix the Support of Outdoor Unit(select it according to the actual installation situation)

(1) Select installation location according to the house structure.(2) Fix the support of outdoor unit on the selected location with expansion screws.

▲ Note:

(1) Take sufficient protective measures when installing the outdoor unit.

(2) Make sure the support can withstand at least four times the unit weight.

(3) The outdoor unit should be installed at least 3cm above the floor in order to install drain joint.(As show in Fig.18)

(4) For the unit with cooling capacity of 2300W~5000W, 6 expansion screws are needed; for the unit with cooling capacity of 6000W~8000W, 8 expansion screws are needed; for the unit with cooling capacity of 10000W~16000W, 10 expansion screws are needed.



Fig.18

Fig.19

Chassis Outdoor drain joirt

2. Install Drain Joint(Only for cooling and heating unit)

(1) Connect the outdoor drain joint into the hole on the chassis.

(2) Connect the drain hose into the drain vent.

(As show in Fig.19)

3. Fix Outdoor Unit

(1) Place the outdoor unit on the support.

(2) Fix the foot holes of outdoor unit with bolts.(As show in Fig.20)



4. Connect Indoor and Outdoor Pipes

(1) Remove the screw on the right handle of outdoor unit and then remove the handle.(As show in Fig.21)

(2) Remove the screw cap of valve and aim the pipe joint at the bellmouth of pipe.(As show in Fig.22)



(3) Pretightening the union nut with hand.

(4) Tighten the union nut with torque wrench .

Refer to the following table for wrench moment of force:

U	
Hex nut diameter(mm)	Tightening torque(N·m)
Ф6	15~20
Φ9.52	30~40
Φ12	45~55
Φ16	60~65
Ф19	70~75

5. Connect Outdoor Electric Wire

(1) Remove the wire clip; connect the power connection wire and power cord to the wiring terminal according to the color; fix them with screws.(As show in Fig.23)



Fig.23

(2) Fix the power connection wire with wire clip.

▲ Note:

(1) After tightening the screw, pull the power cord slightly to check if it is firm.

(2) Never cut the power connection wire to prolong or shorten the distance.

6. Neaten the Pipes

(1) The pipes should be placed along the wall, bent reasonably and hidden possibly. Min. semidiameter of bending the pipe is 10cm.

(2) If the outdoor unit is higher than the wall hole, you must set a U-shaped curve in the pipe before pipe goes into the room, in order to prevent rain from getting into the room.(As show in Fig.24)



▲ Note:

(1) The through-wall height of drain hose shouldn't be higher than the outlet pipe hole of indoor unit.(As show in Fig.25)(2) Slant the drain hose slightly downwards. The drain hose can't be curved, raised and fluctuant, etc.(As show in Fig.26)

(3) The water outlet can't be placed in water in order to drain smoothly.(As show in Fig.27)



8.7 Vacuum Pumping and Leak Detection

1. Use Vacuum Pump

(1) Remove the valve caps on the liquid valve and gas valve and the nut of refrigerant charging vent.

(2) Connect the charging hose of piezometer to the refrigerant charging vent of gas valve and then connect the other charging hose to the vacuum pump.

(3) Open the piezometer completely and operate for 10-15min to check if the pressure of piezometer remains in -0.1MPa.

(4) Close the vacuum pump and maintain this status for 1-2min to check if the pressure of piezometer remains in -0.1MPa. If the pressure decreases, there may be leakage.

(5) Remove the piezometer, open the valve core of liquid valve and gas valve completely with inner hexagon spanner.

(6) Tighten the screw caps of valves and refrigerant charging vent. (As show in Fig.28)



2. Leakage Detection

(1) With leakage detector:

Check if there is leakage with leakage detector.

(2) With soap water:

If leakage detector is not available, please use soap water for leakage detection. Apply soap water at the suspected position and keep the soap water for more than 3min. If there are air bubbles coming out of this position, there's a leakage.

8.8 Check after Installation and Test Operation

1. Check after Installation

Check according to the following requirement after finishing installation.

NO.	Items to be checked	Possible malfunction				
4	Has the unit been	The unit may drop, shake or				
1	installed firmly?	emit noise.				
2	Have you done the	It may cause insufficient cooling				
2	refrigerant leakage test?	(heating) capacity.				
3	Is heat insulation of	It may cause condensation and				
5	pipeline sufficient?	water dripping.				
4	Is water drained well?	It may cause condensation and				
		water dripping.				
	Is the voltage of power					
5	supply according to the	It may cause malfunction or				
Ŭ	voltage marked on the	damage the parts.				
	nameplate?					
	Is electric wiring and	It may cause malfunction or				
6	pipeline installed	damage the parts.				
	correctly?					
7	Is the unit grounded	It may cause electric leakage.				
	securely?					
8	Does the power cord	It may cause malfunction or				
	follow the specification?	damage the parts.				
9	Is there any obstruction	It may cause insufficient cooling				
	in air inlet and air outlet?	(heating).				
	The dust and					
10	sundries caused	It may cause malfunction or				
	during installation are	damaging the parts.				
	removed?					
	The gas valve and liquid	It may cause insufficient cooling (heating) capacity.				
11	valve of connection pipe					
	are open completely?					

2. Test Operation

(1) Preparation of test operation

- The client approves the air conditioner installation.
- Specify the important notes for air conditioner to the client.
- (2) Method of test operation

• Put through the power, press ON/OFF button on the remote controller to start operation.

- Press MODE button to select AUTO, COOL, DRY, FAN and HEAT to check whether the operation is normal or not.
- \bullet If the ambient temperature is lower than 16 $^\circ\!\mathrm{C}$, the air conditioner can't start cooling.

9. Maintenance

9.1 Error Code List

		Disp	Display Method of Indoor Unit				Method of Unit	Outdoor		
NO.	Malfunction Name	Dual-0	Indicator Display (during blinking, ON 0.5s and OFF 0.5s) Operation Cool Heating			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s Yellow Red Green Indicator Indicator Indicator			A/C status	Possible Causes
1	High pressure protection of system	E1	Indicator	Indicator	Indicator	Indicator	Indicator	Indicator	During cooling and drying operation, except indoor fan operates, all loads stop operation. During heating operation, the complete unit stops.	Possible reasons: 1. Refrigerant was superabundant; 2. Poor heat exchange (including filth blockage of heat exchanger and bad radiating environment); Ambient temperature is too high.
2	Antifreezing protection	E2				OFF 1S and blink 3 times			During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates.	 Poor air-return in indoor unit; Fan speed is abnormal; Evaporator is dirty.
3	In defect of refrigerant	F0					OFF 1S and blink 9 times		The Dual-8 Code Display will show F0 and the complete unit stops.	 In defect of refrigerant; Indoor evaporator temperature sensor works abnormally; The unit has been plugged up somewhere.
4	High discharge temperature protection of compressor	E4				OFF 1S and blink 7 times			During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation, all loads stop.	Please refer to the malfunction analysis (discharge protection, overload).
5	Overcurrent protection	E5				OFF 1S and blink 5 times			During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation, all loads stop.	 Supply voltage is unstable; Supply voltage is too low and load is too high; Evaporator is dirty.
6	Communi- cation Malfunction	E6				Always on			During cooling operation, compressor stops while indoor fan motor operates. During heating operation, the complete unit stops.	Refer to the corresponding malfunction analysis.
7	High temperature resistant protection	E8				OFF 1S and blink 6 times			During cooling operation: compressor will stop while indoor fan will operate. During heating operation, the complete unit stops.	Refer to the malfunction analysis (overload, high temperature resistant).
8	EEPROM malfunction	EE				OFF 1S and blink 11 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
9	Limit/ decrease frequency due to high temperature of module	EU							All loads operate normally, while operation frequency for compressor is decreased	Discharging after the complete unit is de-energized for 20mins, check whether the thermal grease on IPM Module of outdoor control panel AP1 is sufficient and whether the radiator is inserted tightly. If its no use, please replace control panel AP1.
10	Malfunction protection of jumper cap	C5							Wireless remote receiver and button are effective, but can not dispose the related command	 No jumper cap insert on mainboard. Incorrect insert of jumper cap. Jumper cap damaged. Abnormal detecting circuit of mainboard.

NO.		Dis	play Metho	d of Indoc	or Unit	Display Method of Outdoor Unit				
	Malfunction Name	Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s) Operation Cool Heating			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s Yellow Red Green			A/C status	Possible Causes
11	Gathering refrigerant	Fo				OFF 1S and blink 17 times			When the outdoor unit receive signal of Gathering refrigerant ,the system will be forced to run under cooling mode for gathering refrigerant	Nominal cooling mode
12	Indoor ambient temperature sensor is open/short circuited	F1							During cooling and drying operation, indoor unit operates while other loads will stop; during heating operation, the complete unit will stop operation.	 Loosening or bad contact of indoor ambient temp. sensor and mainboard terminal. Components in mainboard fell down leads short circuit. Indoor ambient temp. sensor damaged.(check with sensor resistance value chart) Mainboard damaged.
13	Indoor evaporator temperature sensor is open/short circuited	F2							AC stops operation once reaches the setting temperature. Cooling, drying: internal fan motor stops operation while other loads stop operation; heating: AC stop operation	 Loosening or bad contact of Indoor evaporator temp. sensor and mainboard terminal. Components on the mainboard fall down leads short circuit. Indoor evaporator temp. sensor damaged.(check temp. sensor value chart for testing) Mainboard damaged.
14	Outdoor ambient temperature sensor is open/short circuited	F3					OFF 1S and blink 6 times		During cooling and drying operating, compressor stops while indoor fan operates; During heating operation, the complete unit will stop operation	Outdoor temperature sensor hasnt been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor)
15	Outdoor condenser temperature sensor is open/short circuited	F4					OFF 1S and blink 5 times		During cooling and drying operation, compressor stops while indoor fan will operate; During heating operation, the complete unit will stop operation.	Outdoor temperature sensor hasnt been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor)
16	Outdoor discharge temperature sensor is open/short circuited	F5					OFF 1S and blink 7 times		During cooling and drying operation, compressor will sop after operating for about 3 mins, while indoor fan will operate; During heating operation, the complete unit will stop after operating for about 3 mins.	 Outdoor temperature sensor hasnt been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor) The head of temperature sensor hasnt been inserted into the copper tube
17	Limit/ decrease frequency due to overload	F6					OFF 1S and blink 3 times		All loads operate normally, while operation frequency for compressor is decreased	Refer to the malfunction analysis (overload, high temperature resistant)
18	Decrease frequency due to overcurrent	F8					OFF 1S and blink once		All loads operate normally, while operation frequency for compressor is decreased	The input supply voltage is too low; System pressure is too high and overload

		Disp	olay Methoo	d of Indoo	r Unit	Display Method of Outdoor Unit					
NO.	Malfunction Name	Dualo	Indicator Display (during blinking, ON 0.5s and OFF 0.5s) Operation Cool Heating		Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s Yellow Red Green			A/C status	Possible Causes		
19	Decrease frequency due to high air discharge	F9	Indicator	Indicator	Indicator	Indicator	OFF 1S and blink twice	Indicator	All loads operate normally, while operation frequency for compressor is decreased	Overload or temperature is too high; Refrigerant is insufficient; Malfunction of electric expansion valve (EKV)	
20	Limit/ decrease frequency due to antifreezing	FH					OFF 1S and blink 4 times		All loads operate normally, while operation frequency for compressor is decreased	Poor air-return in indoor unit or fan speed is too low	
21	Voltage for DC bus-bar is too high	PH				OFF 1S and blink 13 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	1. Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 265VAC, turn on the unit after the supply voltage is increased to the normal range. 2.If the AC input is normal, measure the voltage of electrolytic capacitor C on control panel (AP1), if its normal, theres malfunction for the circuit, please replace the control panel (AP1)	
22	Voltage of DC bus-bar is too low	PL				OFF 1S and blink 12 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	 Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 150VAC, turn on the unit after the supply voltage is increased to the normal range. If the AC input is normal, measure the voltage of electrolytic capacitor C on control panel (AP1), if its normal, theres malfunction for the circuit, please replace the control panel (AP1) 	
23	Compressor Min frequence in test state	P0								Showing during min. cooling or min. heating test	
24	Compressor rated frequence in test state	P1								Showing during nominal cooling or nominal heating test	
25	Compressor maximum frequence in test state	P2								Showing during max. cooling or max. heating test	
		Dis	play Metho	d of Indoo	r Unit	Display Method of Outdoor Unit		Outdoor			
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NO.	Malfunction Name	Dual-8 Code	Dual-8 Code	0.5s)	N 0.5s ar	-	display st	has 3 kind tatus and ON 0.5s a Red	during	A/C status	Possible Causes
					Ĭ	Indicator	Indicator	Indicator			
26	Compressor intermediate frequence in test state	P3								Showing during middle cooling or middle heating test	
27	Overcurrent protection of phase current for compressor	Ρ5							During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.	
28	Charging malfunction of capacitor	PU							During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Refer to the part three—charging malfunction analysis of capacitor	
29	Malfunction of module temperature sensor circuit	P7							During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1	
30	Module high temperature protection	P8							During cooling operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	After the complete unit is de- energized for 20mins, check whether the thermal grease on IPM Module of outdoor control panel AP1 is sufficient and whether the radiator is inserted tightly. If its no use, please replace control panel AP1.	
31	Decrease frequency due to high temperature resistant during heating operation	HO							All loads operate normally, while operation frequency for compressor is decreased	Refer to the malfunction analysis (overload, high temperature resistant)	
32	Static dedusting protection	H2									
33	Overload protection for compressor	НЗ				OFF 1S and blink 8 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	1. Wiring terminal OVC-COMP is loosened. In normal state, the resistance for this terminal should be less than 10hm. 2.Refer to the malfunction analysis (discharge protection, overload)	

		Display Method of Indoor Unit			Display Method of Outdoor Unit						
NO.	Malfunction Name	Dual-8 Code	Indicator E blinking, C 0.5s) Operation	0N 0.5s ar	-	Indicator display si blinking, 0.5s Yellow		during	A/C status	Possible Causes	
			-	Indicator	-	Indicator		Indicator			
34	System is abnormal	H4				OFF 1S and blink 6 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (overload, high temperature resistant)	
35	IPM protection	H5				OFF 1S and blink 4 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.	
36	Module temperature is too high	H5				OFF 1S and blink 10 times					
37	Internal motor (fan motor) do not operate	H6							Internal fan motor, external fan motor, compressor and electric heater stop operation,guide louver stops at present location.	 Bad contact of DC motor feedback terminal. Bad contact of DC motor control end. Fan motor is stalling. Motor malfunction. Malfunction of mainboard rev detecting circuit. 	
38	Desynchro- nizing of compressor	H7							During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction	
39	PFC protection	HC				OFF 1S and blink 14 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis	
40	Outdoor DC fan motor malfunction	L3					OFF 1S and blink 14 times		Outdoor DC fan motor malfunction lead to compressor stop operation,	DC fan motor malfunction or system blocked or the connector loosed	
41	power protection	L9				OFF 1S and blink 9 times			compressor stop operation and Outdoor fan motor will stop 30s latter , 3 minutes latter fan motor and compressor will restart	To protect the electronical components when detect high power	
42	Indoor unit and outdoor unit doesn't match	LP				OFF 1S and blink 16 times			compressor and Outdoor fan motor can't work	Indoor unit and outdoor unit doesn't match	
43	Failure start- up	LC							During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis	

		Disp	olay Methoo	d of Indoo	r Unit	Display	Method of Unit	Outdoor		
NO.	Malfunction Name	Dual-8 Code	Indicator Display (during ual-8 blinking, ON 0.5s and OFF code 0.5s)		Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s		during	A/C status	Possible Causes	
		Display	Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
44	Malfunction of phase current detection circuit for compressor	U1							During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
45	Malfunction of voltage dropping for DC bus-bar	U3							During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Supply voltage is unstable
46	Malfunction of complete units current detection	U5							During cooling and drying operation, the compressor will stop while indoor fan will operate; During heating operating, the complete unit will stop operation.	Theres circuit malfunction on outdoor units control panel AP1, please replace the outdoor units control panel AP1.
47	The four-way valve is abnormal	U7							If this malfunction occurs during heating operation, the complete unit will stop operation.	 Supply voltage is lower than AC175V; Wiring terminal 4V is loosened or broken; 4V is damaged, please replace 4V.
48	Zero- crossing malfunction of outdoor unit	U9							During cooling operation, compressor will stop while indoor fan will operate; during heating,the complete unit will stop operation.	Replace outdoor control panel AP1
49	Malfunction of zero-cross detection circuit	U8							The complete unit stops	1.Power supply is abnormal; 2.Detection circuit of indoor control mainboard is abnormal.
50	Compressor running					OFF 1S and blink once				
51	The temperature for turning on the unit is reached						OFF 1S and blink 8 times			
52	Frequency limiting (module temperature)						OFF 1S and blink 11 times			

NO.	Malfunction Name	Dual-8 Code	lay Method Indicator D blinking, O 0.5s) Operation	Display (du N 0.5s an Cool	iring d OFF Heating	Indicator status an 0.5s and Yellow	has 3 kind d during b OFF 0.5s Red	Dutdoor Unit s of display linking, ON Green	A/C status	Possible Causes
53	Normal communica- tion		Indicator	Indicator	Indicator	Indicator	Indicator	OFF 0.5S and blink once		
54	Defrosting				OFF 3S and blink once (during blinking, ON 10s and OFF 0.5s)	OFF 1S and blink			Defrosting will occur in heating mode. Compressor will operate while indoor fan will stop operation.	Its the normal state
55	Frequency limiting (power)						OFF 1S and blin 13 times			

9.2 Procedure of Troubleshooting

Indoor Unit

1. Malfunction of Temperature Sensor F1, F2

Main detection points:

- Is the wiring terminal between the temperature sensor and the controller loosened or poorly contacted?
- Is there short circuit due to trip-over of the parts?
- Is the temperature sensor broken?
- Is mainboard broken?



2. Malfunction of Blocked Protection of IDU Fan Motor H6

Main detection points:

- SmoothlyIs the control terminal of PG motor connected tightly?
- SmoothlyIs the feedback interface of PG motor connected tightly?
- The fan motor can't operate?
- The motor is broken?

• Detectioncircuit of the mainboard is defined abnormal?



3. Malfunction of Protection of Jumper Cap C5

Main detection points:

- Is there jumper cap on the mainboard?
- Is the jumper cap inserted correctly and tightly?
- The jumper is broken?
- The motor is broken?
- Detection circuit of the mainboard is defined abnormal?
- Malfunction diagnosis process:



4. Malfunction of Zero-crossing Inspection Circuit Malfunction of the IDU Fan Motor U8 Main detection points:

- Instant energization afte de-energization while the capacitordischarges slowly?
- The zero-cross detectioncircuit of the mainboard is defined abnormal?



Outdoor Unit

1. Capacity charging malfunction (outdoor unit malfunction) (AP1 below means control board of outdoor unit) Main detection points:

• Detect if the voltage of L and N terminal of XT wiring board is between 210VAC-240VAC by alternating voltage meter;

• Is reactor (L) well connected? Is connection wire loosened or pulled out? Is reactor (L) damaged?



2. IPM protection(H5), desynchronizing malfunction(H7), overcurrent of compressor phase current (P5) (AP1 below means control board of outdoor unit)

Main detection points:

- Is voltage input within the normal range
- If the control board AP1 is well connected with compressor COMP? If they are loosened? If the connection sequence is correct?
- Heat exchange of unit is not good (heat exchanger is dirty and unit radiating environment is bad);
- If the system pressure is too high?
- If the refrigerant charging amount is appropriate?
- If coil resistance of compressor is normal? Is compressor coil insulating to copper pipe well?
- If the work load of unit is heavy? If radiating of unit is good?

Malfunction diagnosis process:



End

3. High temperature and overload protection (E8)(AP1 below means control board of outdoor unit) E8 Main detection points:

- If the outdoor ambient temperature is in normal range;
- If the indoor and outdoor fan are running normally;
- If the radiating environment of indoor and outdoor unit is good.
- Malfunction diagnosis process:



Installation and Maintenance

4. Start-up failure (LC) (AP1 below means control board of outdoor unit)

Main detection points:

- If the compressor wiring is correct?
- If the stop time of compressor is sufficient?
- If the compressor is damaged?
- If the refrigerant charging amount is too much?



5. Overload and high discharge temperature malfunction H3/E4

Main detection points:

- If the electronic expansion valve is connected well? Is the electronic expansion valve damaged?
- If the refrigerant is leaked?
- The compressor overload protection terminal is not connected well with the mainboard?
- If the overload protector is damaged?
- Heat exchange of unit is not good? (heat exchanger is dirty and unit radiating environment is bad)
- Too much load of the system causes high temperature of compressor after working for a long time?
- Malfunction of discharge temperature sensor?



6. PFC (correction for power factor) malfunction (outdoor unit malfunction)

Main detection points:

- Check if power plug is connected well with the socket
- Check if the reactor of outdoor unit is damaged?



7. Communication malfunction (E6)

Main detection points:

- Check if the connection wire and the built-in wiring of indoor and outdoor unit are connected well and without damage;
- If the communication circuit of indoor mainboard is damaged? If the communication circuit of outdoor mainboard (AP1)

is damaged?



8. Malfunction of Overcurrent Protection E5

Main detection points:

- Is the supply voltage unstable with big fluctuation?
- Is the supply voltage too low with overload?
- Hardware trouble?



9. Flow chart for outdoor communitcation circuit detecting:

(1) Test the voltage between N point of wiring board and communication cable with universal meter. The voltage shall be variable. Otherwise, it might be malfunction of mainboard of indoor unit, or malfunction of mainboard of outdoor unit, or wrong wire connection of indoor and outdoor unit. Please ensure that there is no malfunction of mainboard of indoor unit, or wrong wire connection of indoor and outdoor unit. After removing the malfunction of indoor unit, remove the malfunction of outdoor unit.

(2) Test the voltage of pin 1 and pin 2 of U132 with universal meter (voltage of both sides of R135). The voltage should be variable. (Test 10) Test the voltage of pin 3 and pin 4 of U132 with universal meter (voltage of both sides of R1312). The voltage should be variable. (Test 15) Otherwise, there is malfunction of mainboard of outdoor unit.



(3) Test the voltage of pin 3 and pin 4 of U131 with universal meter (voltage of both sides of R134). The voltage should be variable. (test 11) Test the voltage of pin 1 and pin 2 of U132 with universal meter (voltage of both sides of C134). The voltage should be variable. (test 12) Otherwise, there is malfunction of mainboard of outdoor unit.

(4) Test the voltage between pin 1 of R135 (white) and pin 1 of U4. The voltage should be variable. Test voltage between pin1 of R131 (white) and pin 1 of U4 with universal meter. The voltage should be variable. Otherwise, there is malfunction of mainboard of outdoor unit.





Installation and Maintenance

9.3 Troubleshooting for Normal Malfunction

1. Air Conditioner Can't be Started Up

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
	After energization, operation indicator isn't bright and the buzzer can't give out sound	Confirm whether it's due to power failure. If yes, wait for power recovery. If not, check power supply circuit and make sure the power plug is connected well.
Wrong wire connection between indoor unit and outdoor unit, or poor connection for wiring terminals	onder normal power supply circumstances,	Check the circuit according to circuit diagram and connect wires correctly. Make sure all wiring terminals are connected firmly
Electric leakage for air conditioner	After energization, room circuit breaker trips off at once	Make sure the air conditioner is grounded reliably Make sure wires of air conditioner is connected correctly Check the wiring inside air conditioner. Check whether the insulation layer of power cord is damaged; if yes, place the power cord.
Model selection for air switch is improper	After energization, air switch trips off	Select proper air switch
	While no display on remote controller or humons	Replace batteries for remote controller Repair or replace remote controller

2. Poor Cooling (Heating) for Air Conditioner

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Set temperature is improper	Observe the set temperature on remote controller	Adjust the set temperature
Rotation speed of the IDU fan motor is set too low	Small wind blow	Set the fan speed at high or medium
Filter of indoor unit is blocked	Check the filter to see it's blocked	Clean the filter
Installation position for indoor unit and outdoor unit is improper	Check whether the installation postion is proper according to installation requirement for air conditioner	Adjust the installation position, and install the rainproof and sunproof for outdoor unit
Refrigerant is leaking	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit's pressure is much lower than regulated range	Find out the leakage causes and deal with it. Add refrigerant.
Malfunction of 4-way valve	Blow cold wind during heating	Replace the 4-way valve
Malfunction of capillary	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit't pressure is much lower than regulated range. If refrigerant isn't leaking, part of capillary is blocked	Replace the capillary
Flow volume of valve is insufficient	The pressure of valves is much lower than that stated in the specification	Open the valve completely
Malfunction of horizontal louver	Horizontal louver can't swing	Refer to point 3 of maintenance method for details
Malfunction of the IDU fan motor	The IDU fan motor can't operate	Refer to troubleshooting for H6 for maintenance method in details
Malfunction of the ODU fan motor	The ODU fan motor can't operate	Refer to point 4 of maintenance method for details
Malfunction of compressor	Compressor can't operate	Refer to point 5 of maintenance method for details

3. Horizontal Louver Can't Swing

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Wrong wire connection, or poor connection	diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Stepping motor is damaged	Stepping motor can't operate	Repair or replace stepping motor
	Others are all normal, while horizontal louver can't operate	Replace the main board with the same model

4. Air Conditioner is Leaking

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Drain pipe is blocked	ivvater leaking from indoor unit	Eliminate the foreign objects inside the drain pipe
Drain pipe is broken		Replace drain pipe
Wrapping is not tight	Water leaking from the pipe connection place of indoor unit	Wrap it again and bundle it tightly

5. Abnormal Sound and Vibration

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
When turn on or turn off the unit, the panel and other parts will expand and there's abnormal sound	There's the sound of "PAPA"	Normal phenomenon. Abnormal sound will disappear after a few minutes.
When turn on or turn off the unit, there's abnormal sound due to flow of refrigerant inside air conditioner	Water-running sound can be heard	Normal phenomenon. Abnormal sound will disappear after a few minutes.
Foreign objects inside the indoor unit or there're parts touching together inside the indoor unit	There's abnormal sound fro indoor unit	Remove foreign objects. Adjust all parts' position of indoor unit, tighten screws and stick damping plaster between connected parts
Foreign objects inside the outdoor unit or there're parts touching together inside the outdoor unit	There's abnormal sound fro outdoor unit	Remove foreign objects. Adjust all parts' position of outdoor unit, tighten screws and stick damping plaster between connected parts
Short circuit inside the magnetic coil	During heating, the way valve has abnormal electromagnetic sound	Replace magnetic coil
Abnormal shake of compressor	Outdoor unit gives out abnormal sound	Adjust the support foot mat of compressor, tighten the bolts
Abnormal sound inside the compressor	Abnormal sound inside the compressor	If add too much refrigerant during maintenance, please reduce refrigerant properly. Replace compressor for other circumstances.

10. Exploded View and Parts List

10.1 Indoor Unit



NO.	Description	Part Code				
	Description	ASH-09AIM2 PT	ASH-13AIM2 PT	Qty		
	Product Code	CB304N02600_L31222	CB304N02700_L31222	1		
1	Front Panel Assy	20012948_L31222	20012948_L31222	1		
2	Display Board	30565159	30565159	1		
3	Filter Sub-Assy	1112220403	1112220403	2		
4	Screw Cover	242520179	242520179	1		
5	Front Case Sub-assy	2001279001	2001279001	1		
6	Air Louver 1	1051215603	1051215603	1		
7	Air Louver 2	1051215503	1051215503	1		
8	Helicoid tongue	2611216302	2611216302	1		
9	Left Axile Bush	10512037	10512037	1		
10	Rear Case assy	22202467	22202467	1		
11	Rubber Plug (Water Tray)	76712012	76712012	1		
12	Ring of Bearing	26152022	26152022	1		
13	O-Gasket of Cross Fan Bearing	76512203	76512203	1		
14	O-Gasket sub-assy of Bearing	7651205102	7651205102	1		
15	Cross Flow Fan	10352017	10352017	1		
16	Cold Plasma Generator	1114001602	1114001602	1		
17	Evaporator Support	24212091	24212091	1		
18	Evaporator Assy	01100100128	01100100129	1		
19	Wall Mounting Frame	01252021	01252021	1		
20	Motor Press Plate	26112161	26112161	1		
21	Fan Motor	150120874	150120874	1		
22	Connecting pipe clamp	2611216401	2611216401	1		
23	Drainage hose	0523001401	0523001401	1		
24	Stepping Motor	1521212901	1521212901	1		
25	Crank	10582070	10582070	1		
26	Guide Louver	1051220301	1051220301	1		
27	Axile Bush	10542036	10542036	1		
28	Electric Box	2011208201	2011208201	1		
29	Terminal Board	42011233	42011233	1		
30	Electric Box Cover2	2012207512	2012207512	1		
31	Main Board	30138000784	30138000784	1		
32	Shield cover of Electric Box sub-assy	01592072	01592072	1		
33	Electric Box Cover1	22242135	22242135	1		
34	Jumper	4202300130	4202300119	1		
35	Electric Box Assy	10000201605	10000201606	1		
36	Power Cord	/	/	/		
37	Connecting Cable	4002052317	4002052317	1		
38	Temperature Sensor	390000453	390000453	1		
39	Remote Controller	30510125_L31222	30510125_L31222	1		
40	Temperature Sensor	39000 <u>0</u> 591	390000591	1		
41	Pipe Connection Nut accessories	06320020	06320020	1		

Above data is subject to change without notice.

10.2 Outdoor Unit



	Description	Part Code					
NO.	Description	ASH-09AIM2 PT	ASH-13AIM2 PT	Qty			
	Product Code	CB404W03600_L31222	CB404W03500_L31222	1			
1	Front Grill	22413043	22413043	1			
2	Front Panel Assy	0153304810	0153304810	1			
3	Axial Flow Fan	10333004	10333004	1			
4	Chassis Sub-assy	0280330401P	02803304P	1			
5	Clapboard Sub-Assy	0123338502	0123338502	1			
6	Drainage Connecter	06123401	06123401	1			
7	Compressor Gasket	76710302	76710302	3			
8	4-Way Valve Assy	03073151	03073198	1			
9	Valve Support	0171314201P	0171314201P	1			
10	Cut off Valve Assy	07133474	07133474	1			
11	Valve	07100003	07100003	1			
12	Valve Support Block	26113017	26113017	2			
13	Right Side Plate Sub-Assy	0130317801	0130317801	1			
14	Big Handle	262334332	262334332	1			
15	Magnet Coil	4300040050	4300040050	1			
16	Electric Expand Valve Fitting	4300876701	4300876701	1			
17	Rear Grill	01473009	01473009	1			
18	Temperature Sensor	3900030805	3900030805	1			
19	Magnetic Ring	49010109	49010109	1			
20	Reactor	43130184	43130184	1			
21	Wire Clamp	71010003	71010003	1			
22	Terminal Board	42010313	42010313	1			
23	Electric Box Assy	10000100126	10000100127	1			
24	Main Board	30138000581	30138000583	1			
25	Electric Box	20113032	20113032	1			
26	Electric Box Sub-Assy	10000500040	10000500042	1			
27	Top Cover Sub-Assy	0125307002	0125307002	1			
28	Condenser Assy	01100200141	01100200142	1			
29	Motor Support	01703104	0170310401	1			
30	Fan Motor	1501308506	1501308506	1			
31	Compressor and Fittings	0010389601	0010389601	1			
32	Small Handle	26233100	26233100	1			

Above data is subject to change without notice.

11. Removal Procedure

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Warning: Be sure to wait for a minimum of 20 minutes after turning off all power supplies and discharge the refrigerant completely before removal.

11.1 Removal Procedure of Indoor Unit

Steps		Procedure
1. Remo	ve filter	
a	Open the panel.	panel
b	Loosen the clasp shown in the fig and then pull the left filter and right filer outwards to remove them.	clasp
		left filter and right filer
2. Remo	ve horizontal louver	
	Push out the axile bush on horizontal louver. Bend the horizontal louver with hand and then separate the horizontal louver from the crankshaft of step motor to remove it.	horizontal louver location of step motor axile bush





ve evaporator assy	
At the back of the unit, remove the screw fixing connection pipe clamp and then remove the connection pipe clamp.	pipe clamp
Remove 3 screws fixing evaporator assy.	evaporator
Adjust the position of connection pipe on evaporator slightly and then lift the evaporator upwards to remove it.	connection pipe
ve stepping motor	
Remove the screw fixing step motor and then remove the step motor.	Screws
	At the back of the unit, remove the screw fixing connection pipe clamp and then remove the connection pipe clamp. Remove 3 screws fixing evaporator assy. Adjust the position of connection pipe on evaporator slightly and then lift the evaporator upwards to remove it. ve stepping motor Remove the screw fixing step motor and then

Steps		Procedure
10. Rem	ove motor and cross flow blade	
а	Remove the screws fixing motor clamp and then remove the motor clamp.	motor clamp
b	Remove the screws at the connection place of cross flow blade and motor; lift the motor and cross flow blade upwards to remove them.	cross flow screws
С	Remove the bearing holder sub-assy.	holder screw motor sub-assy

11.2 Removal Procedure of Outdoor Unit

Steps		Procedure
1.Rei	move big handle	
	Before disassamble.	
	Remove 1 connection screw fixing big handleand then removethe big handle.	Bighandle
2. Re	emove top cover	
	Remove 3 connection screws among top cover plate, front panel and right sideplate. Then remove top cover plate.	Top cover

Steps	Proce	dure
3.Remo	ve grille and front panel	
	Remove connection screws between the front grille and the front panel. Then remove the front grille. Remove connection screws connecting the front panel with the chassis and the motor support, and then remove the front panel.	r Grile Panel
4.Remo	ve axial flow blade	
	Remove the nut fixing the blade and then remove the axial flow blade.	Axial flow blade
5.Remo	ve right side plate	
	Remove connection screws connecting the right side plate with the valve support and the electric box. Then remove the right side plate.	Right side plate

Steps	Proced	ure
6.Remov	e electric box assy	
	Remove the 2 screws fixing the cover of elec- tric box. Lift to remove the cover. Loosen the wire and disconnect the terminal. Lift to re- move the electric box assy.	Electric box assy
7.Remov	ve 4-way valve assy	
	Unscrew the fastening nut of the 4-way Valve Assy coil and remove the coil. Wrap the 4- way Valve Assy with wet cotton and unsolder the 4 weld spots connecting the 4-way Valve Assy to take it out.(Note: Refrigerant should be discharged firstly.) Welding process should be as quickly as possible and keep wrapping cotton wet all the time. Be sure not to burn out the lead-out wire of compressor.	4-way Valve Assy
8.Remov	ve capillary sub-assy	
	Unsolder weld point of capillary Sub-assy, valve and outlet pipe of condensator. Then remove the capillary Sub-assy. Do not block the capillary when unsoldering it. (Note: be- fore unsoldering,discharge refrigerants completely)	Capillary Sub-assy



Steps	Pro	ocedure
11.Remo	ve Compressor	
а	Remove the 2 screws fixing the gas valve. Unsolder the welding spot connecting gas valve and air return pipe and remove the gas valve. (Note: it is necessary to warp the gas valve when unsoldering the welding spot.) Remove the 2 screws fixing liquid valve. Unsolder the weld- ing spot connecting liquid valve and remove the liquid valve.	Liquid valve
b	Remove the 3 footing screws of the compressor and remove the compressor.	Gas valve Compressor

Appendix:

Appendix 1: Reference Sheet of Celsius and Fahrenheit

Conversion formula for Fahrenheit degree and Celsius degree: Tf=Tcx1.8+32

Set temperature

•									
Fahren displa tempera (°F)	y Fahrenheit	Celsius(°C)		Fahrenheit display temperature (°F)	Fahrenheit	Celsius(°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius(°C)
61	60.8	16		69/70	69.8	21	78/79	78.8	26
62/63	3 62.6	17		71/72	71.6	22	80/81	80.6	27
64/6	5 64.4	18		73/74	73.4	23	82/83	82.4	28
66/67	7 66.2	19		75/76	75.2	24	84/85	84.2	29
68	68	20	1	77	77	25	86	86	30

Ambient temperature

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius(°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius(°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius(°C)
32/33	32	0	55/56	55.4	13	79/80	78.8	26
34/35	33.8	1	57/58	57.2	14	81	80.6	27
36	35.6	2	59/60	59	15	82/83	82.4	28
37/38	37.4	3	61/62	60.8	16	84/85	84.2	29
39/40	39.2	4	63	62.6	17	86/87	86	30
41/42	41	5	64/65	64.4	18	88/89	87.8	31
43/44	42.8	6	66/67	66.2	19	90	89.6	32
45	44.6	7	68/69	68	20	91/92	91.4	33
46/47	46.4	8	70/71	69.8	21	93/94	93.2	34
48/49	48.2	9	72	71.6	22	95/96	95	35
50/51	50	10	73/74	73.4	23	97/98	96.8	36
52/53	51.8	11	75/76	75.2	24	99	98.6	37
54	53.6	12	77/78	77	25			

Appendix 2: Configuration of Connection Pipe

1.Standard length of connection pipe

• 5m, 7.5m, 8m.

2.Min. length of connection pipe is 3m.

3.Max. length of connection pipe and max. high difference.

4. The additional refrigerant oil and refrigerant charging required after prolonging connection pipe

• After the length of connection pipe is prolonged for 10m at the basis of standard length, you should add 5ml of refrigerant oil for each additional 5m of connection pipe.

• The calculation method of additional refrigerant charging amount (on the basis of liquid pipe):

• When the length of connection pipe is above 5m, add refrigerant according to the prolonged length of liquid pipe. The additional refrigerant charging amount per meter is different according to the diameter of liquid pipe. See the following sheet.

• Additional refrigerant charging amount = prolonged length of liquid pipe X additional refrigerant charging amount per meter

Additional refr	Additional refrigerant charging amount for R22, R407C, R410A and R134a									
Diameter of con	nection pipe	Outdo	or unit throttle							
Liquid pipe(mm)	Gas pipe(mm)	Cooling only(g/m)	Cooling and heating(g/m)							
Ф6	Φ9.5 or Φ12	15	20							
Φ6 or Φ9.5	Φ16 or Φ19	15	20							
Φ12	Φ19 or Φ22.2	30	120							
Φ16	Φ25.4 or Φ31.8	60	120							
Ф19	/	250	250							
Φ22.2	/	350	350							

Cooling capacity	Max length of connection pipe	Max height difference
5000 Btu/h(1465 W)	15 m	5 m
7000 Btu/h(2051 W)	15 m	5 m
9000 Btu/h(2637 W)	15 m	10 m
12000 Btu/h(3516 W)	20 m	10 m
18000 Btu/h(5274 W)	25 m	10 m
24000 Btu/h(7032 W)	25 m	10 m
28000 Btu/h(8204 W)	30 m	10 m
36000 Btu/h(10548 W)	30 m	20 m
42000 Btu/h(12306 W)	30 m	20 m
48000 Btu/h(14064 W)	30 m	20 m

Appendix 3: Pipe Expanding Method

<u>∧</u> Note:

Improper pipe expanding is the main cause of refrigerant leakage.Please expand the pipe according to the following steps:

A:Cut the pip

- Confirm the pipe length according to the distance of indoor unit and outdoor unit.
- Cut the required pipe with pipe cutter.

B:Remove the burrs

• Remove the burrs with shaper and prevent the burrs from getting into the pipe.

C:Put on suitable insulating pipe







• Remove the union nut on the indoor connection pipe and outdoor valve; install the union nut on the pipe.

D:Put on the union nut

E:Expand the port

• Expand the port with expander.

▲ Note:

• "A" is different according to the diameter, please refer to the sheet below:

Outor diamotor(mm)	A(mm)				
Outer diameter(mm)	Max	Min			
Φ6 - 6.35 (1/4")	1.3	0.7			
Ф9.52 (3/8")	1.6	1.0			
Φ12 - 12.70 (1/2")	1.8	1.0			
Φ16 - 15.88 (5/8")	2.4	2.2			

F:Inspection

• Check the quality of expanding port. If there is any blemish, expand the port again according to the steps above.





Appendix 4: List of Resistance for Temperature Sensor

Resistance Table of Ambient Temperature Sensor for Indoor and Outdoor(15K)

Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)
-19	138.1	20	18.75	59	3.848	98	1.071
-18	128.6	21	17.93	60	3.711	99	1.039
-17	121.6	22	17.14	61	3.579	100	1.009
-16	115	23	16.39	62	3.454	101	0.98
-15	108.7	24	15.68	63	3.333	102	0.952
-14	102.9	25	15	64	3.217	103	0.925
-13	97.4	26	14.36	65	3.105	104	0.898
-12	92.22	27	13.74	66	2.998	105	0.873
-11	87.35	28	13.16	67	2.896	106	0.848
-10	82.75	29	12.6	68	2.797	107	0.825
-9	78.43	30	12.07	69	2.702	108	0.802
-8	74.35	31	11.57	70	2.611	109	0.779
-7	70.5	32	11.09	71	2.523	110	0.758
-6	66.88	33	10.63	72	2.439	111	0.737
-5	63.46	34	10.2	73	2.358	112	0.717
-4	60.23	35	9.779	74	2.28	113	0.697
-3	57.18	36	9.382	75	2.206	114	0.678
-2	54.31	37	9.003	76	2.133	115	0.66
-1	51.59	38	8.642	77	2.064	116	0.642
0	49.02	39	8.297	78	1.997	117	0.625
1	46.6	40	7.967	79	1.933	118	0.608
2	44.31	41	7.653	80	1.871	119	0.592
3	42.14	42	7.352	81	1.811	120	0.577
4	40.09	43	7.065	82	1.754	121	0.561
5	38.15	44	6.791	83	1.699	122	0.547
6	36.32	45	6.529	84	1.645	123	0.532
7	34.58	46	6.278	85	1.594	124	0.519
8	32.94	47	6.038	86	1.544	125	0.505
9	31.38	48	5.809	87	1.497	126	0.492
10	29.9	49	5.589	88	1.451	127	0.48
11	28.51	50	5.379	89	1.408	128	0.467
12	27.18	51	5.197	90	1.363	129	0.456
13	25.92	52	4.986	91	1.322	130	0.444
14	24.73	53	4.802	92	1.282	131	0.433
15	23.6	54	4.625	93	1.244	132	0.422
16	22.53	55	4.456	94	1.207	133	0.412
17	21.51	56	4.294	95	1.171	134	0.401
18	20.54	57	4.139	96	1.136	135	0.391
19	19.63	58	3.99	97	1.103	136	0.382

Resistance Table of Tube Temperature Sensors for Indoor and Outdoor (20K)

Temp(°C)	Resistance(kΩ)	 Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	 Temp(°C)	Resistance(kΩ)
-19	181.4	20	25.01	59	5.13	98	1.427
-18	171.4	21	23.9	60	4.948	99	1.386
-17	162.1	22	22.85	61	4.773	100	1.346
-16	153.3	23	21.85	62	4.605	101	1.307
-15	145	24	20.9	63	4.443	102	1.269
-14	137.2	25	20	64	4.289	103	1.233
-13	129.9	26	19.14	65	4.14	104	1.198
-12	123	27	18.13	66	3.998	105	1.164
-11	116.5	28	17.55	67	3.861	106	1.131
-10	110.3	29	16.8	68	3.729	107	1.099
-9	104.6	30	16.1	69	3.603	108	1.069
-8	99.13	31	15.43	70	3.481	109	1.039
-7	94	32	14.79	71	3.364	110	1.01
-6	89.17	33	14.18	72	3.252	111	0.983
-5	84.61	34	13.59	73	3.144	112	0.956
-4	80.31	35	13.04	74	3.04	113	0.93
-3	76.24	36	12.51	75	2.94	114	0.904
-2	72.41	37	12	76	2.844	115	0.88
-1	68.79	38	11.52	77	2.752	116	0.856
0	65.37	39	11.06	78	2.663	117	0.833
1	62.13	40	10.62	79	2.577	118	0.811
2	59.08	41	10.2	80	2.495	119	0.77
3	56.19	42	9.803	81	2.415	120	0.769
4	53.46	43	9.42	82	2.339	121	0.746
5	50.87	44	9.054	83	2.265	122	0.729
6	48.42	45	8.705	84	2.194	123	0.71
7	46.11	46	8.37	85	2.125	124	0.692
8	43.92	47	8.051	86	2.059	125	0.674
9	41.84	48	7.745	87	1.996	126	0.658
10	39.87	49	7.453	88	1.934	127	0.64
11	38.01	50	7.173	89	1.875	128	0.623
12	36.24	51	6.905	90	1.818	129	0.607
13	34.57	52	6.648	91	1.736	130	0.592
14	32.98	53	6.403	92	1.71	131	0.577
15	31.47	54	6.167	93	1.658	132	0.563
16	30.04	55	5.942	94	1.609	133	0.549
17	28.68	56	5.726	95	1.561	134	0.535
18	27.39	57	5.519	96	1.515	135	0.521
19	26.17	58	5.32	97	1.47	136	0.509

Resistance Table of Discharge Temperature Sensor for Outdoor(50K)

Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C) Resistance(kΩ)	Temp(°C)	Resistance(kΩ)
-29	853.5	10	98	49	18.34	88	4.75
-28	799.8	11	93.42	50	17.65	89	4.61
-27	750	12	89.07	51	16.99	90	4.47
-26	703.8	13	84.95	52	16.36	91	4.33
-25	660.8	14	81.05	53	15.75	92	4.20
-24	620.8	15	77.35	54	15.17	93	4.08
-23	580.6	16	73.83	55	14.62	94	3.96
-22	548.9	17	70.5	56	14.09	95	3.84
-21	516.6	18	67.34	57	13.58	96	3.73
-20	486.5	19	64.33	58	13.09	97	3.62
-19	458.3	20	61.48	59	12.62	98	3.51
-18	432	21	58.77	60	12.17	99	3.41
-17	407.4	22	56.19	61	11.74	100	3.32
-16	384.5	23	53.74	62	11.32	101	3.22
-15	362.9	24	51.41	63	10.93	102	3.13
-14	342.8	25	49.19	64	10.54	103	3.04
-13	323.9	26	47.08	65	10.18	104	2.96
-12	306.2	27	45.07	66	9.83	105	2.87
-11	289.6	28	43.16	67	9.49	106	2.79
-10	274	29	41.34	68	9.17	107	2.72
-9	259.3	30	39.61	69	8.85	108	2.64
-8	245.6	31	37.96	70	8.56	109	2.57
-7	232.6	32	36.38	71	8.27	110	2.50
-6	220.5	33	34.88	72	7.99	111	2.43
-5	209	34	33.45	73	7.73	112	2.37
-4	198.3	35	32.09	74	7.47	113	2.30
-3	199.1	36	30.79	75	7.22	114	2.24
-2	178.5	37	29.54	76	7.00	115	2.18
-1	169.5	38	28.36	77	6.76	116	2.12
0	161	39	27.23	78	6.54	117	2.07
1	153	40	26.15	79	6.33	118	2.02
2	145.4	41	25.11	80	6.13	119	1.96
3	138.3	42	24.13	81	5.93	120	1.91
4	131.5	43	23.19	82	5.75	121	1.86
5	125.1	44	22.29	83	5.57	122	1.82
6	119.1	45	21.43	84	5.39	123	1.77
7	113.4	46	20.6	85	5.22	124	1.73
8	108	47	19.81	86	5.06	125	1.68
9	102.8	48	19.06	87	4.90	126	1.64