Haier

Domestic Air Conditioner

SERVICE MANUAL

Models

HSU-12H03/R2（DB）

HSU-09H03/R2（DB）

- **Features**

- **Comfortable:wide-angle airflow**
- **health air purifying**
- **quiet operation**
- **energy efficient**

Serial Number: 0010540329 **Version:00.00** **Edition: 2004-9-15**

Content

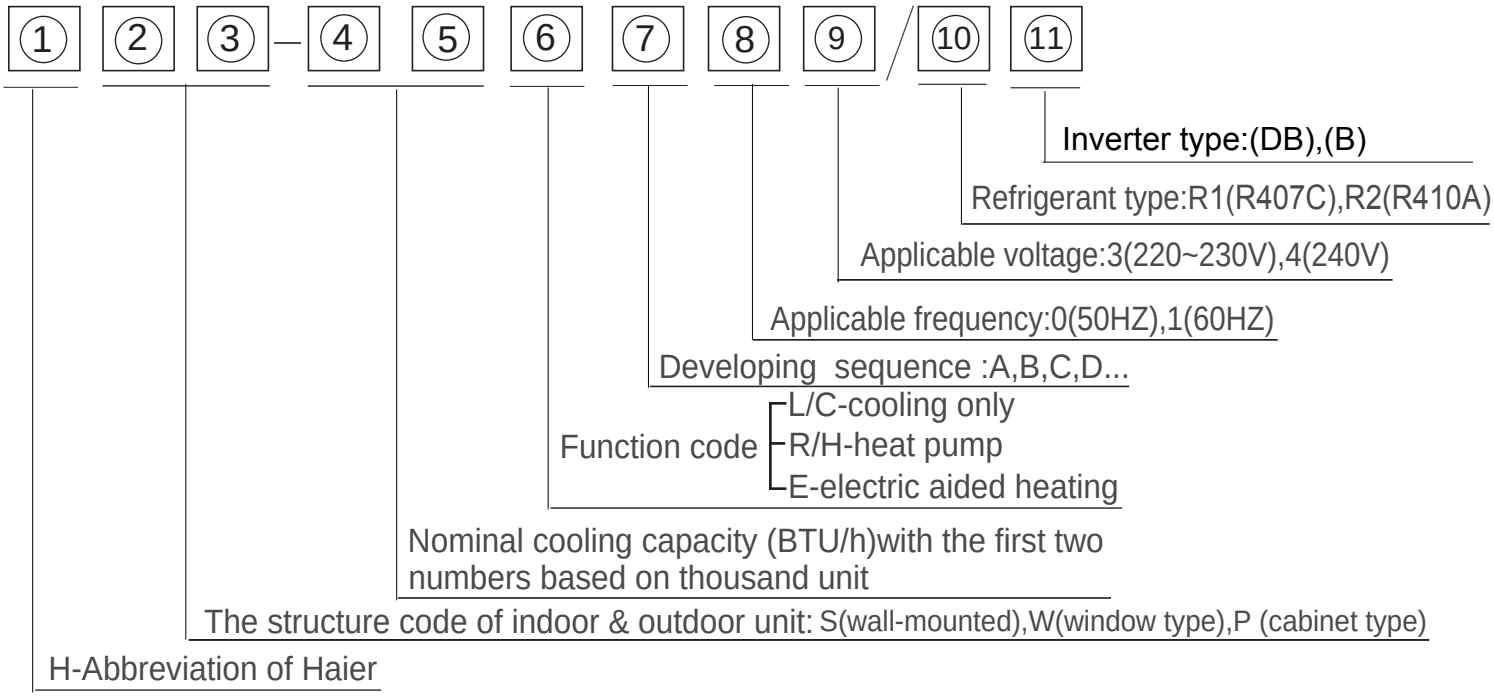
DESCRIPTION OF

PRODUCT MODEL CODING

& SERIES INTRODUCTION

Introductory Remarks

Description of coding rules of unit model
Coding rules and descriptions are as follows:



Examples:
HSU-12H03/R2(DB),It represents wall-mounted split type heat pump DC inverter air conditioner. The cooling capacity is 12000BTU/h,and the power supply is 220-230V/50Hz, and "R2" means the refrigerant is R410A.

Standard Situation/Conditions

No.	Operating condition	indoor air status		outdoor air status	
		DB°C	WB°C	DB°C	WB°C
1	Norminal cooling	27°C	19°C	35°C	24°C
2	Norminal heating	20°C	Not control	7°C	6°C
3	Norminal electrical heating	---	---	---	---

C.Series brief introduction

1.comfortable:wide-angle airflow
The vertical dual-flap and horizontal wide-angle louvers ensure the cool(warm) air reaches every corner of the room.

2.Health air purifying
An air purifying filter with deodorizing and disinfecting functions keeps the air clean and users healthy.

3.Quiet operation
Fan With Random-pitched Blades.
Random-pitched blades help reduce operating noise while maintaining a high airflow rate.

4.Engergy efficient
The design of inner-grooved copper tube greatly increases the refrigerant contact area and the efficiency of cooling/heating functions.

5.Convenience
Auto restart and washable panel:
The grille can be removed easily and washed when necessary.Any series have the function then even if the power falls when the unit is operating unit will automatically return to the operating settings in use before the power failure when power is restored.

6.Wide variety of functions
24-Hour Timer:
24-hour timer allows users to select the exact time they would like the air conditioner to turn on and to turn off.Timers on previous models operation based on the number of hours of desired operation.

7.Night-set models
When the air conditioner is operationg on the timer-off circuit.The preset room temperature gradually rises(going down in heating)before the unit stops as shown delow.Users can sleep comfortably without sudden change in temperature.

8.Program”dry”
This function automatically reduces the level of humidity while maintaining the preset indoor temperature.

Specifications

Specification:

Model:	(HSU-12H03/R2(DB))	Appearance color (indoor/outdoor):	White/White
Cooling capacity:	3450(460-3920)W	Heating capacity:	3900(720-5100)W
Cooling coefficient:	3.22	Heating coefficient:	3.22
Cooling power input:	1070(185-1420)W	Heating power input:	1210(690-1540)W
Moisture removal	1.5X10^{-3}m^3/h	Frequency range	30~106 Hz
Operating voltage range	1PH, 220-230V~,50Hz	Refrigerant type	R410A
Operating temp. range	-7°C-43°C	Air sending angle/distance	60°
Variation of temp. adjust	±1°C	Fan type/quantity	Cross flow fan(indoor unit) Axial fan(outdoor unit)
Climate type:	T1	Class of electric shock protection:	I
Indoor unit noise (cooling)	40/37/30dB(A)	outdoor unit noise (cooling)	55/48dB(A)
Indoor unit noise (heating)	41/38/32dB(A)	outdoor unit noise (heating)	56/49dB(A)
net dimensions	795x265x182mm	net dimensions	780 x245x540mm
Packaging dimensions (indoor unit)	865 x272x330 mm	Packaging dimensions (outdoor unit)	903x343x614mm
weight(indoor unit)	7.6/10.6(net/gross)kg	Piling layers for indoor/outdoor unit	8/4
Max. mounting height difference:	10m	Outdoor unit net/gross weights:	36/41(net/gross) kg
Refrigerant charge	R410A 940g	Current entering side (indoor/outdoor)	indoor
Frequency of filter cleaning	Once/2 weeks	Max. refrigerant charge	----------
Compressor model	C-6RZ092H1A	Compressor manufacturer	SANYO
Compressor oil charge	320ml	Compressor protector type	INTERNAL
Maxi. length of connecting pipe:	15m	model of 4-way valve:	----------
Cap. tube type muffle model:	TP_2Y copper tube	Length/diameter of drain hose	2000mm/ϕ16mm
Fan speed: (r/min)	1350/1150/950 (indoor) 860/500 (outdoor)	Type/size of evaporator and condenser	Internal treaded pipe ϕ7/ϕ7mm
Max. operating pressure at warm side:	4.15MPa	Max. operating pressure at cool side:	4.15MPa
cut-off valve:	1/4",1/2"	Appearance features	Indoor unit:Plastic Outdoor unit: Metal

Specification:

Model:	(HSU-09H03/R2(DB))	Appearance color (indoor/outdoor):	White/White
Cooling capacity:	2630(440-3500)W	Heating capacity:	3120(700-4400)W
Cooling coefficient:	3.21	Heating coefficient:	3.22
Cooling power input:	820(165-1200)W	Heating power input:	970(666-1320)W
Moisture removal	1.2X10^{-3}m^3/h	Frequency range	30~106 Hz
Operating voltage range	1PH, 220-230V~,50Hz	Refrigerant type	R410A
Operating temp. range	-7°C-43°C	Air sending angle/distance	60°
Variation of temp. adjust	±1°C	Fan type/quantity	Cross flow fan(indoor unit) Axial fan(outdoor unit)
Climate type:	T1	Class of electric shock protection:	I
Indoor unit noise (cooling)	38/35/30dB(A)	outdoor unit noise (cooling)	54dB(A)
Indoor unit noise (heating)	39/36/32dB(A)	outdoor unit noise (heating)	55dB(A)
net dimensions	795x265x182mm	net dimensions	780 x245x540mm
Packaging dimensions (indoor unit)	865 x272x330 mm	Packaging dimensions (outdoor unit)	903x343x614 mm
weight(indoor unit)	7.2/10.2(net/gross)kg	Piling layers for indoor/outdoor unit	8/4
Max. mounting height difference:	10m	Outdoor unit net/gross weights:	30/35(net/gross) kg
Refrigerant charge	R410A 640g	Current entering side (indoor/outdoor)	indoor
Frequency of filter cleaning	Once/2 weeks	Max. refrigerant charge	----------
Compressor model	DA89X1C-20FZ	Compressor manufacturer	TOSHIBA
Compressor oil charge	370ml	Compressor protector type	INTERNAL
Maxi. length of connecting pipe:	15m	model of 4-way valve:	----------
Cap. tube type muffle model:	TP_2Y copper tube	Length/diameter of drain hose	2000mm/ϕ16mm
Fan speed: (r/min)	1250/1100/950 (indoor) 730 (outdoor)	Type/size of evaporator and condenser	Internal treaded pipe ϕ7/ϕ7mm
Max. operating pressure at warm side:	4.15MPa	Max. operating pressure at cool side:	4.15MPa
cut-off valve:	1/4",3/8"	Appearance features	Indoor unit:Plastic Outdoor unit: Metal

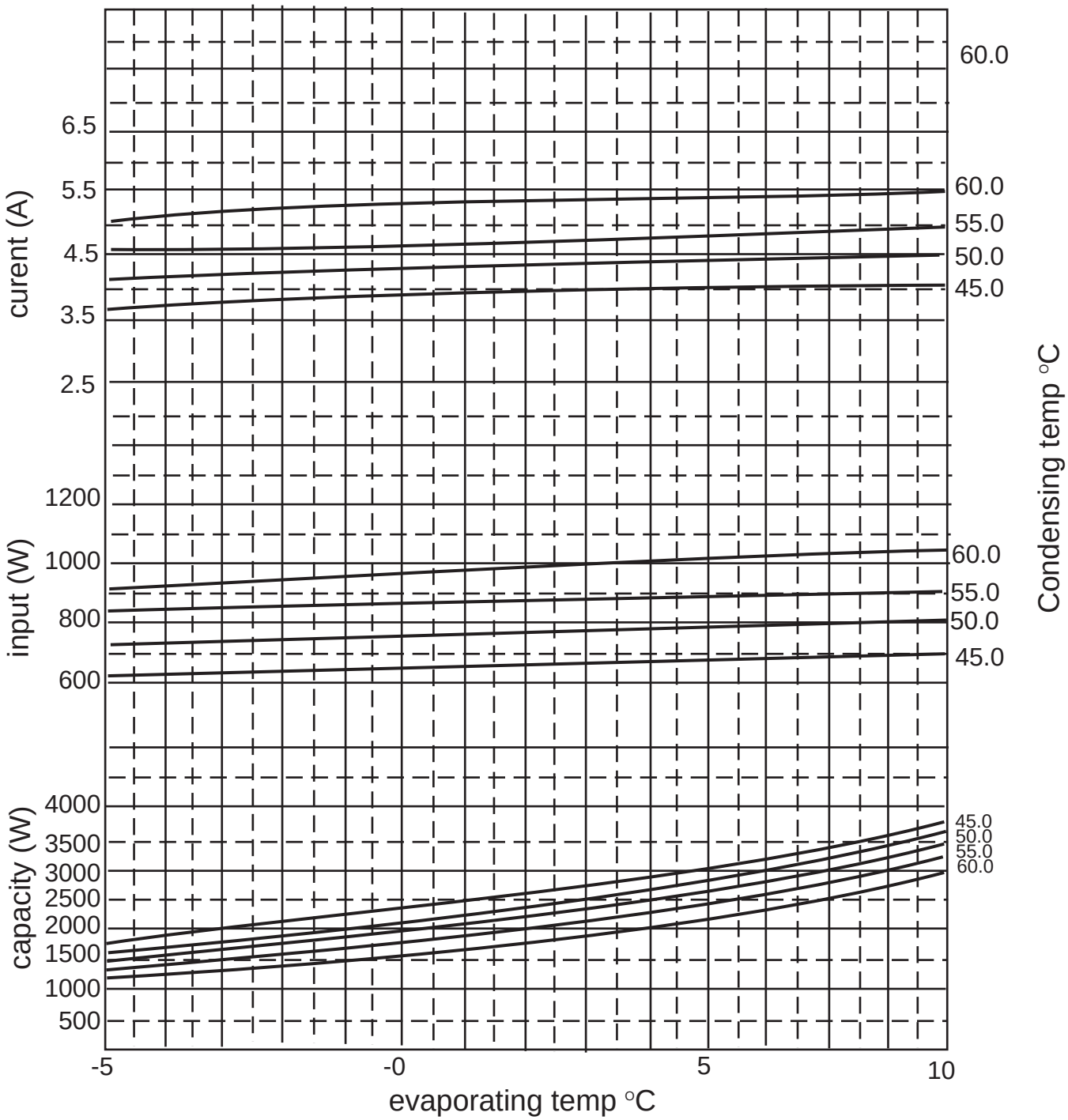
Curves of performance of compressor

Curves of compressor performance

Compressor:DA89X1C-20FZ

Model:HSU-09H03/R2(DB)

SUCTION GAS TEMP °C	35
UNDER COOL °C	8.3
Ambient temp °C	35

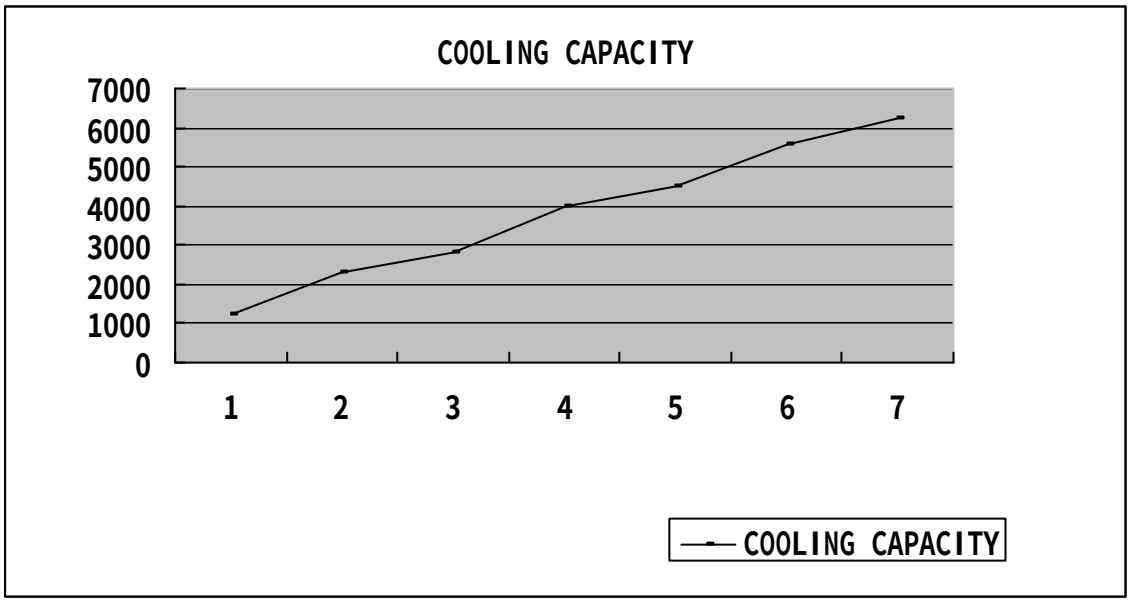


Curves of compressor performance

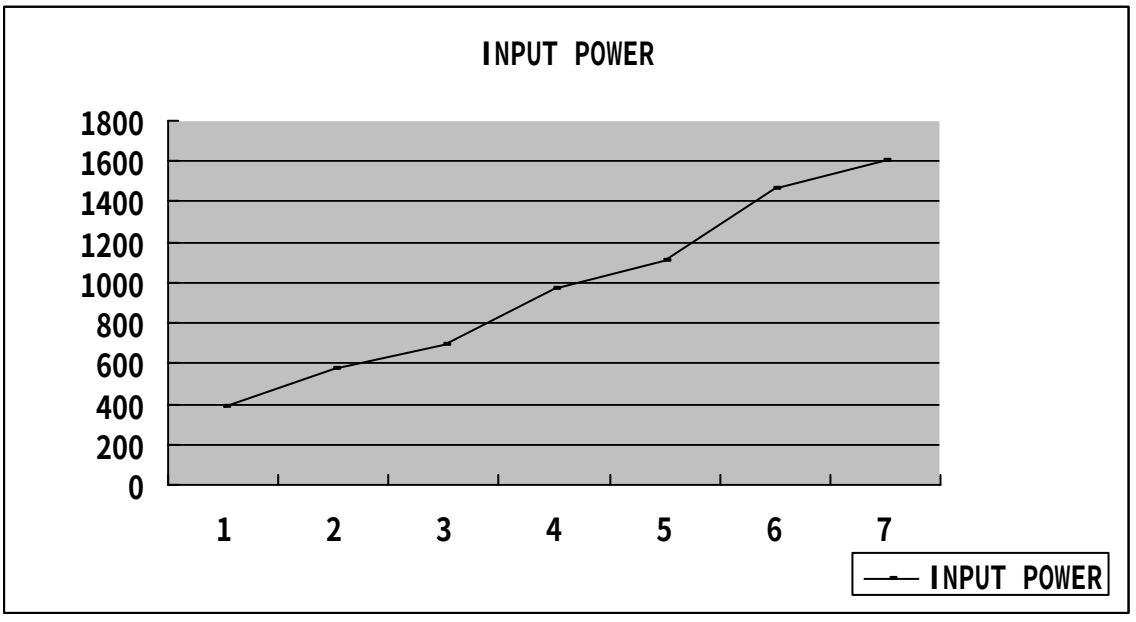
Model:HSU-12H03/R2(DB)

COMPRESSOR:C-6RZ092H1A

SERIAL NUMBER	1	2	3	4	5	6	7
FREQUENCY	30	50	60	80	90	110	120
INPUT POWER	1244	2321	2833	3983	4502	5565	6246

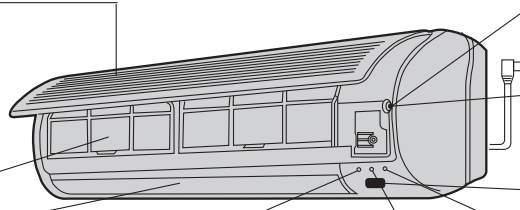


SERIAL NUMBER	1	2	3	4	5	6	7
FREQUENCY	30	50	60	80	90	110	120
INPUT POWER	387	570	691	973	1109	1465	1605



Description,dimension and function of main components and accessories

Indoor unit



Inlet grille

Air filter

Test running switch(manual)
Used only for test running in cooling when room temp. is below 16°C. Don't use it in normal operation.

Emergency switch(manual)
Used when remote controller is lost or defective. Unit will run temporarily.

Remote signal receiver
A beeping sound is generated when a signal from remote controller is received.

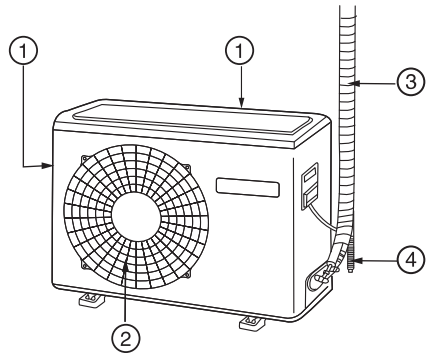
Vertical flap
Use remote controller to adjust up and down air flow. (Don't adjust it manually.)

Power indicator
Lights up when unit starts.

Timer mode indicator
Lights up when Timer operation is selected.

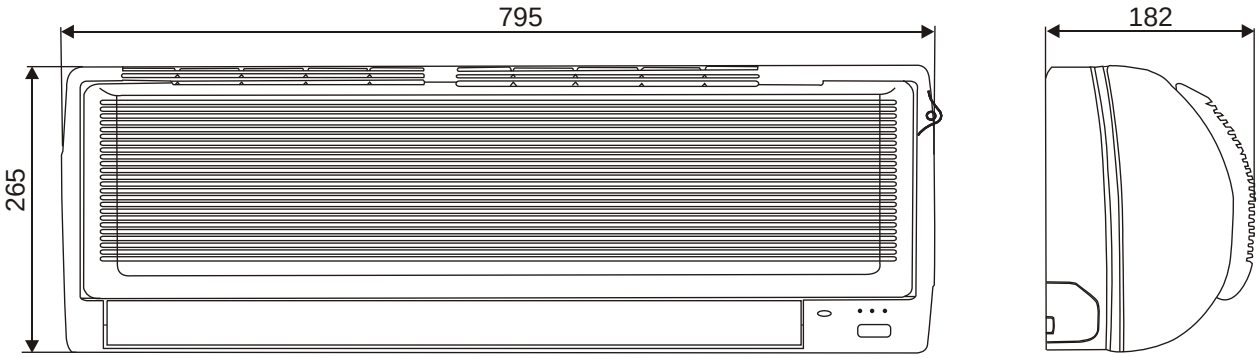
Operation mode indicator
Lights up during compressor running.

Outdoor unit

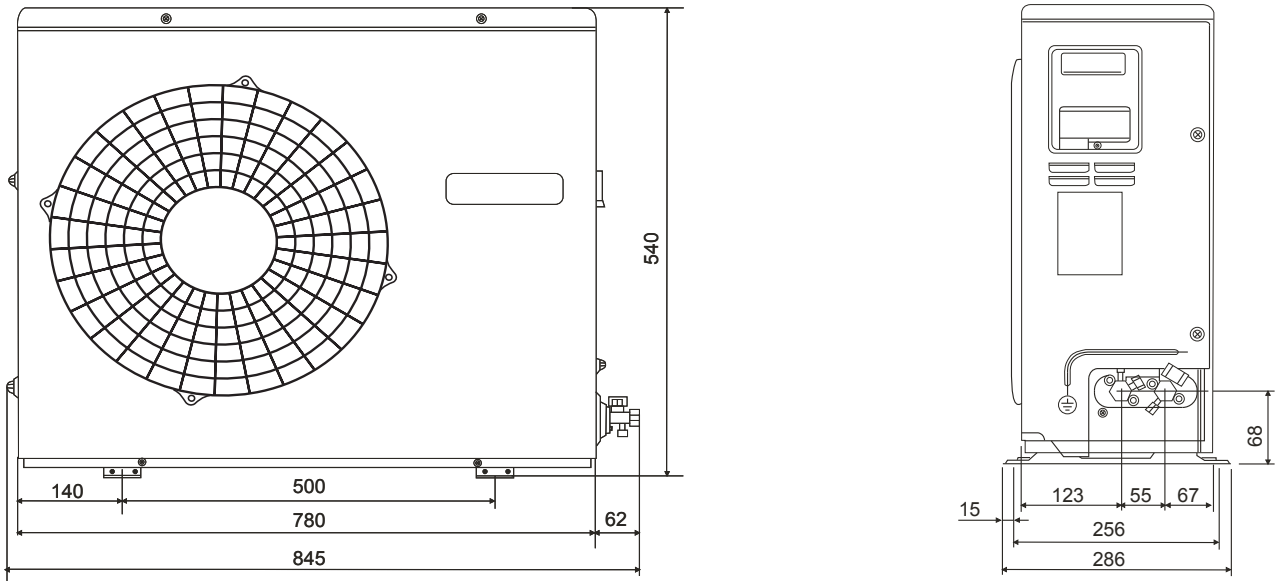


① INLET
② OUTLET
③ CONNECTING PIPING AND ELECTRICAL WIRING
④ DRAIN HOSE

NET DIMENSIONS(INDOOR UNIT):

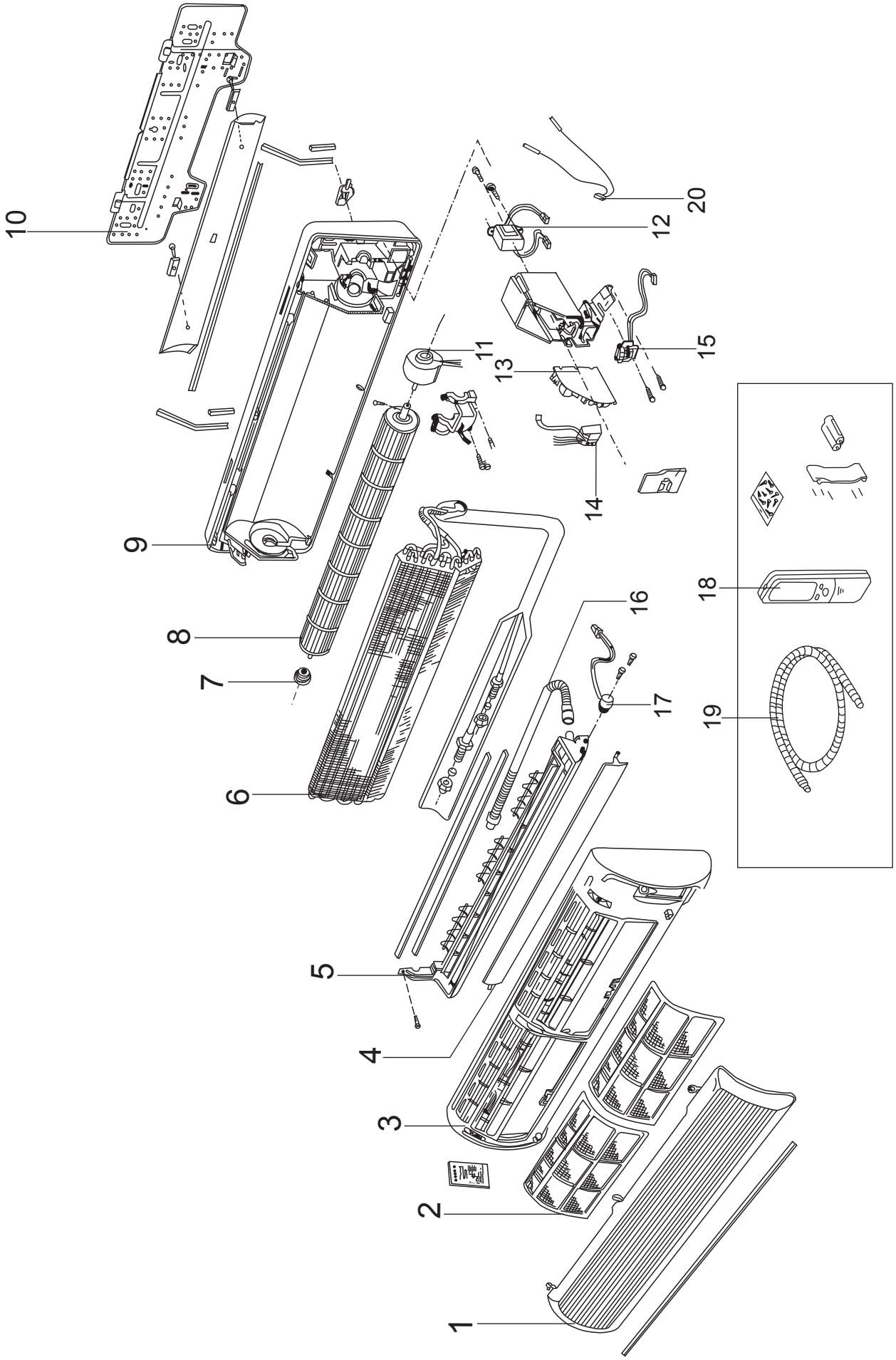


NET DIMENSIONS(OUTDOOR UNIT):



Knock-down drawings

KNOCK-DOWM DRAWINGS FOR INDOOR UNIT(HSU-09/12H03/R2(DB))



No. in exploded view	Spare parts number	Spare parts description in english	Model	Qty	Price list	Failure rate	The proportion of the spare part stock	Remark
1	001A1232075	Front grille	HSU-09H03/R2(DB)	1				
2	001A2400058	Air filter	HSU-09H03/R2(DB)	2				
3	001A0100945	Front panel assy.	HSU-09H03/R2(DB)	1				
4	001A1232077	Flap	HSU-09H03/R2(DB)	1				
5	001A0900107	Drain pan assy.	HSU-09H03/R2(DB)	1				
6	0010705494	Heat exchanger	HSU-09H03/R2(DB)	1				
7	001A0300005	Bearing	HSU-09H03/R2(DB)	1				
8	0010202415	Cross flow fan	HSU-09H03/R2(DB)	1				*
9	001A0100199	Rear case assy.	HSU-09H03/R2(DB)	1				
10	0010101275	Mounting plate	HSU-09H03/R2(DB)	1				
11	001A3000051	Fan motor	HSU-09H03/R2(DB)	1				*
12	001A38000032	Tansformer	HSU-09H03/R2(DB)	1				*
13	0010403516	PCB	HSU-09H03/R2(DB)	1				*
14	001A4000091	Terminal block	HSU-09H03/R2(DB)	1				
15	001A0600287	PCB(receiver)	HSU-09H03/R2(DB)	1				*
16	001A1434039	Drain tube	HSU-09H03/R2(DB)	1				
17	001A3000072	Swing motor	HSU-09H03/R2(DB)	1				*
18	0010401642	Remote controller	HSU-09H03/R2(DB)	1				*
19	001A1434039	Drain tube	HSU-09H03/R2(DB)	1				
20	001A3900059	Sensor	HSU-09H03/R2(DB)	1				*

1,The failer rate and the proportion of the spare-part stock are regarded as the reference of the stock for spare-parts;The first time should be stocked accroded with the proportion of the spare-parts,and it should be adjusted with the actual quantity 3 months later.

2,easy-damaged;The spare-part which is often damaged and the customer must stock in the spare-parts warehouse,and should be marked with"*"

3,possible damaged:The spare-part which is not often damaged like the easy damaged one and the customer may stock in the spare-part warehouse accord with the actual case,should be marked with " ".

4,not need provided :The spare-part which is seldom damaged or the maintenance man could not maitmains.The spare parts may be air freighted by the factory if they were damaged.The customer nees not stock in the spare-part warehouse,should be marked with " x ".

5,Above should be improved accord with the reply of the market half a year per time.

6.The spare parts price on net is FOB Qingdao term.

7.The price of Front grille inside Front panel assy.

No. in exploded view	Spare parts number	Spare parts description in english	Model	Qty	Failure rate	The proportion of the spare part stock	Remark
1	001A1232075	Front grille	HSU-12H03/R2(DB)	1			
2	001A2400060 001A2400061	Air filter	HSU-12H03/R2(DB)	1\1			
3	001A0100945	Front panel assy.	HSU-12H03/R2(DB)	1			
4	001A1232077	Flap	HSU-12H03/R2(DB)	1			
5	001A0900107	Drain pan assy.	HSU-12H03/R2(DB)	1			
6	0010702078	Heat exchanger	HSU-12H03/R2(DB)	1			
7	001A0300005	Bearing	HSU-12H03/R2(DB)	1			
8	0010202415	Cross flow fan	HSU-12H03/R2(DB)	1			*
9	001A0100206	Rear case assy.	HSU-12H03/R2(DB)	1			
10	0010101275	Mounting plate	HSU-12H03/R2(DB)	1			
11	001A3000052	Fan motor	HSU-12H03/R2(DB)	1			*
12	001A3800032	Tansformer	HSU-12H03/R2(DB)	1			*
13	0010403516	PCB	HSU-12H03/R2(DB)	1			*
14	001A4000091	Terminal block	HSU-12H03/R2(DB)	1			
15	001A0600287	PCB(receiver)	HSU-12H03/R2(DB)	1			*
16	001A1434039	Drain tube	HSU-12H03/R2(DB)	1			
17	001A3000072	Swing motor	HSU-12H03/R2(DB)	1			*
18	0010401642	Remote controller	HSU-12H03/R2(DB)	1			*
19	001A1434039	Drain tube	HSU-12H03/R2(DB)	1			
20	001A3900059	Sensor	HSU-12H03/R2(DB)	1			*

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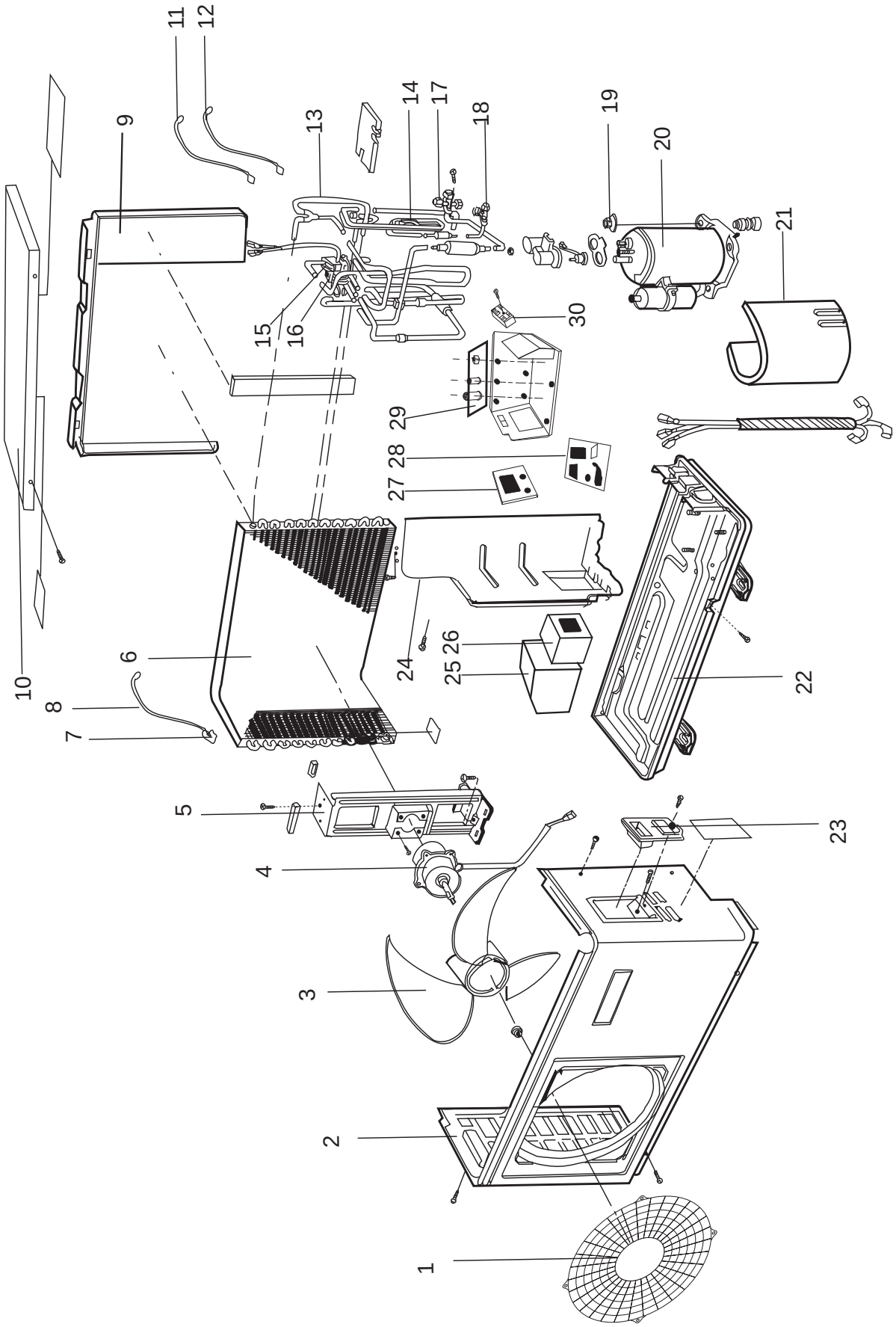
7.The price of Front grille inside Front panel assy.

KNOCK-DOWN DRAWINGS FOR OUTDOOR UNIT(HSU-09/12H03/R2(DB))



No. in exploded view	Spare parts number	Spare parts description in english	Model	QTY.	Failure rate	The proportion of the spare part stock	remark
1	001A0100017	Front grille	HSU-09H03/R2(DB)	1			
2	001A1101009	Front panel	HSU-09H03/R2(DB)	1			
3	0010203662	Fan	HSU-09H03/R2(DB)	1			*
4	0010403487	Motor	HSU-09H03/R2(DB)	1			*
5	0010100419	Frame for motor	HSU-09H03/R2(DB)	1			
6	0010706498	Heat exchanger	HSU-09H03/R2(DB)	1			
7	001A5736055	Fixed clip forenviroment temp. sensor	HSU-09H03/R2(DB)	1			
8	001A3800082	Temperature sensor	HSU-09H03/R2(DB)	1			*
9	0010101388	Back panel	HSU-09H03/R2(DB)	1			
10	001A1101010	Top panel	HSU-09H03/R2(DB)	1			
11	001A3900056	Compressor temperature sensor	HSU-09H03/R2(DB)	1			*
12	001A3900055	Tube temperature sensor	HSU-09H03/R2(DB)	1			*
13	0010706509	Entering gas pipe	HSU-09H03/R2(DB)	1			
14	0010706497	Capillary Tube	HSU-09H03/R2(DB)	1			
15	0010403022	4-way valve coil	HSU-09H03/R2(DB)	1			*
16	0010704488	4-way valve	HSU-09H03/R2(DB)	1			
17	0010705988	Stop valve	HSU-09H03/R2(DB)	1			
18	0010705255	Stop valve	HSU-09H03/R2(DB)	1			
19	001A5102050	Flange Nut	HSU-09H03/R2(DB)	3			
20	0010706492	Compressor	HSU-09H03/R2(DB)	1			*
21	001A17621544	Cushion	HSU-09H03/R2(DB)	1			
22	001A1101014	Bottom plate	HSU-09H03/R2(DB)	1			
23	001A1436042	Service cover	HSU-09H03/R2(DB)	1			
24	0010804196	Separating plate	HSU-09H03/R2(DB)	1			
25	001A0100427	Reactor box	HSU-09H03/R2(DB)	1			
26	0010403365	Reactor	HSU-09H03/R2(DB)	1			*
27	0010403368	Power Module	HSU-09H03/R2(DB)	1			*
28	0010403521	PCB	HSU-09H03/R2(DB)	1			*
29	0010403520	Capacitor board	HSU-09H03/R2(DB)	1			*
30	001A4000105	Terminal Block	HSU-09H03/R2(DB)	1			

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No. in exploded view	Spare parts number	Spare parts description in english	Model	QTY.	Failure rate	The proportion of the spare part stock	remark
1	001A0100017	Front grille	HSU-12H03/R2(DB)	1			
2	001A1101009	Front panel	HSU-12H03/R2(DB)	1			
3	0010203662	Fan	HSU-12H03/R2(DB)	1			*
4	0010403508	Motor	HSU-12H03/R2(DB)	1			*
5	0010100419	Frame for motor	HSU-12H03/R2(DB)	1			
6	0010706505	Heat exchanger	HSU-12H03/R2(DB)	1			
7	001A5736055	Fixed clip forenviroment temp. sensor	HSU-12H03/R2(DB)	1			
8	001A3800082	Temperature sensor	HSU-12H03/R2(DB)	1			*
9	0010101388	Back panel	HSU-12H03/R2(DB)	1			
10	001A1101010	Top panel	HSU-12H03/R2(DB)	1			
11	001A3900056	Compressor temperature sensor	HSU-12H03/R2(DB)	1			*
12	001A3900055	Tube temperature sensor	HSU-12H03/R2(DB)	1			*
13	0010706502	Entering gas pipe	HSU-12H03/R2(DB)	1			
14	0010706504	Capillary Tube	HSU-12H03/R2(DB)	1			
15	001A2500076	4-way valve coil	HSU-12H03/R2(DB)	1			*
16	0010703501	4-way valve	HSU-12H03/R2(DB)	1			
17	0010705256	Stop valve	HSU-12H03/R2(DB)	1			
18	0010705255	Stop valve	HSU-12H03/R2(DB)	1			
19	001A5102050	Flange Nut	HSU-12H03/R2(DB)	3			
20	0010706499	Compressor	HSU-12H03/R2(DB)	1			*
21	001A17621544	Cushion	HSU-12H03/R2(DB)	1			
22	001A1101014	Bottom plate	HSU-12H03/R2(DB)	1			
23	001A1436042	Service cover	HSU-12H03/R2(DB)	1			
24	0010804196	Separating plate	HSU-12H03/R2(DB)	1			
25	001A0100427	Reactor box	HSU-12H03/R2(DB)	1			
26	0010403365	Reactor	HSU-12H03/R2(DB)	1			*
27	0010403368	Power Module	HSU-12H03/R2(DB)	1			*
28	0010403519	PCB	HSU-12H03/R2(DB)	1			*
29	0010403520	Capacitor board	HSU-12H03/R2(DB)	1			*
30	001A4000105	Terminal Block	HSU-12H03/R2(DB)	1			

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Brief introduction to electrical control functions

INDOOR UNIT PART

1. Application Range

This function guide can be used for the HSU-09H03/R2(DB) air-conditioners and other frequency-convertings made by Headquarters of Qingdao Haier Air-conditioner Co.,Ltd

Indexes in this guide (symblised by parameters) refer to the indexes stored in the EEPROM. Please refer to the EEPROM index chart.

2. Temperature Ajusting function

. This function will decide the outdoor-set's running speed according to the domestic temperature and the set temperature.

. Control the domestic blower fan according to the need for temperature adjusting when the wind rate is automatic

. Control the domestic blower fan according to the disc-tube temperature when it's running for heating.

2.1.1 Indoor environment temperature sensor specification

Under the conditions of short circuit or open circuit, the indicative light will flash an alarm and the indoor blower fan stops. When it returns to normal condtions, the operation will come back to normal.

Short circuit

Temperature: over 126℃. Sixteen scales: over F8H. Resistance value: below 0.65 K. Voltage: over 4.85 V

Normal temperature

Temperature: 25 ℃. Sixteen scale: 40H Resistance value: 23K . Voltage: 2.33 V

Disconnection

Temperature : below minus 31 ℃. Sixteen scale: below 08H . Resistance value: below 620K. Voltage: below 0.15 V

.B index=4200 R(25℃)=23K

2.1.2 During the time when the heat running starts and indoor blower fan stops or when the warm boot starts and within 30 seconds after the indoor blower fan starts, the resistance value for indoor environment temperature sensor will be neglected.

2.2 The frequency kept when the frequency rises.

. When the operation enters into the work mode, in order to insure the full oil-returning, some frequency should be kept for some time.

Indication time			Indication frequency
Cooling & moisture removing	Heating	Heating & Frost removing	Frequency kept
60 seconds	60 seconds	30 seconds	58 Hz

When the unit is switched on and the forcible running is over, the temperature level control starts.

2.3 Modify the set temperature

The set temperature can be modified according to the unit's operation mode, wind volume or whether it is under forceful running condition.

The modification of wind volume is only limited within the switch between weak

and medium of wind volume when it is under heating mode.

Modification index table for set temperature

Mode	Content of modification	Modified variable	Modified parameter
Heating	Operation mode modi hp fication	ETBL0	
	Forceful operation modification	ETBL1	
	Weak wind volume modification	ETBL2	
	Medium wind volume modification	ETBL3	
Cooling & moisture removing	Operation mode modification	ETBL4	
	Forceful operation modification	ETBL5	

2.4 temperature level control

2.4.1 Deviation

Work out the deviation of temperature level as follows:

In heating mode: E=(Remote-control set temperature+ modified value)-room temperature

In cooling & moisture removing mode: E= room temperature -(Remote-control set temperature + modified value)

2.4.2 Compressor OFF

E is minus and |E|> ΔT

	Heating		Cooling	
ΔT	TCHAHL		TCHACL	
after ΔT changes	TCHAHH		TCHACH	
condition for ΔT changes				

The compressor stops after 120 seconds of continuous detection

When the operation starts,according to the table above, the unit will operate according to the after-the-ΔT-change parameters before the compressor stops for the first time.

From the time the compressor stops to the time it starts again, the operation will follow the ΔT (except the moisture removing mode)

When the operation starts and the operation modes change (except when the idle mode is over) and the deviation is bigger than –ΔT, the compressor starts.

When the compressor is working and the remote-controller set temperature falls below –ΔT, the compressor stops.

2.4.3 Compressor operation

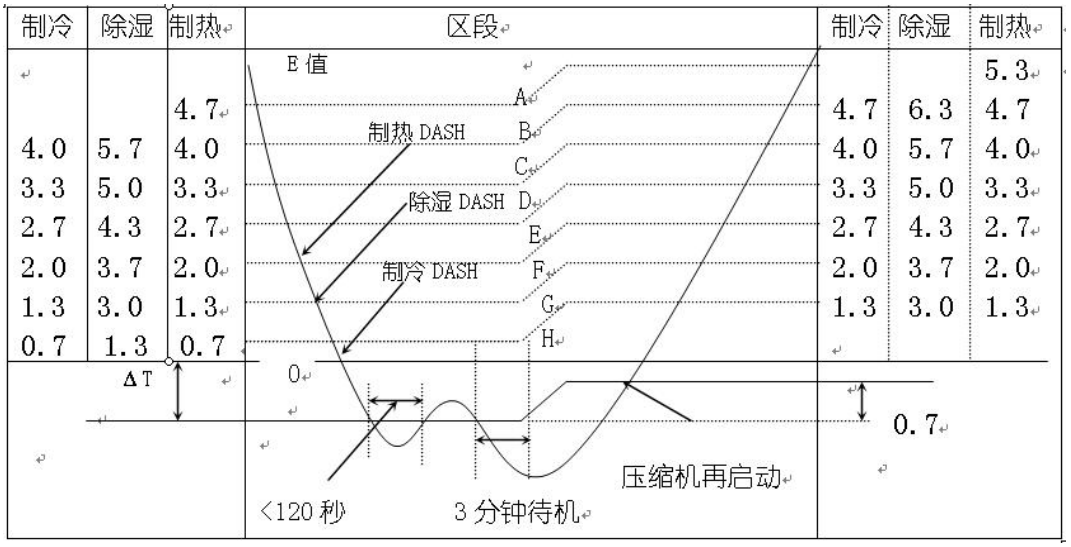
When the compressor is kept idle for 3 minutes, the deviation E will be higher than -△T+0.67℃ and the compressor will start working.

2.4.4 DASH operation

When the operation starts or the operation mode changes (except when the compressor is switched on after being off), the compressor is on and the indicated maximum frequency should be as follows:

Cooling deviation to zero
Moisture removing deviation to level G
Heating deviation to level F
There will be no DASH operation under trial operation, emergency operation and silent operation modes.
2.4.5 Temperature adjusting of different levels. (DASH operation conditions under different modes)

cooling 制冷/ moisture removing 除湿 /heating 制热 /level 区段/ cooling 制冷/ moisture removing 除湿/heating 制热/Value E E值/<120 seconds/ 3-minute idle mode 3 分钟待机/compressor resta`1rt 压缩机再启动



2.4.6 Frequencies for different levels
Within different levels, the indicated frequencies are(the frequency the indoor unit transmits to the outdoor unit) as follows；
Under the cooling & moisture-removing mode, level A and B have the same frequency.
Under the silent mode, levels A-E have the same frequency with level F

	Indicated frequency	Frequency range	Temperature change level
Heating	FQHOT [0—7]		A—H
Silent heating	FQSHOT [0—2]		F—H
Moisture removing	FQDRY [0—7]		B—H
Cooling	FQCOOL [0—7]		B—H
Silent cooling	FQSCOOL [0—2]		F—H

The maximum frequency value refers to the max value listed above.
The maximum and minimum values for cooling and heating are the maximum and minimum values for correspondent items.
2.4.7 Controlled frequency for the same level
The indicated frequency when a level remains unchanged after the compressor operates with the same frequency for 3 minutes.
The timing will start again when there is a different frequency input. If the temperature level remains unchanged for 3 minutes, the indicated frequency will change again (add FQUPH or FQUPL)
Controlling form for the same level

	Levels of temperature change							
	A	B	C	D	E	F	G	H
Heating								
Cooling moisture removing								

2-4-8. Select the wind volume when it is set automatic
When the wind volume is automatic, it can be switched between strong, medium and weak according to the temperature adjusting levels.
Wind volume under the automatic wind volume mode

	Temperature adjusting levels								
	A	B	C	D	E	F	G	H	I
Heating	Strong	Strong	Strong	Strong	Strong	Medium	Weak	Weak	SLO
cooling		Strong	Strong	Strong	Medium	Medium	Weak	Weak	Weak
Moisture removing		Strong	Medium	Medium	Medium	Weak	Weak	SLO	SLO

2-5. Frost removing
Under the intensive-running protection mode, the protection control will be in priority
The compressor does not stop
Under heating operation mode, the outdoor unit sends a frost-removing signal (I21=10) and the indoor unit will start the frost-removing control until the outdoor unit transmits the signal to end the frost-removing. Then the indoor unit starts the heating operation, indication levels and wind volume control will operate following the heating temperature levels.
2-6. Wind volume limit
. When the compressor is working and the max setting for indoor blower fan is medium , the upper limit of indicated frequency is as follows:

Frequency control form for wind volume

	Limited frequency variables	Limited frequency
Medium wind volume	FQLIMMD	
Weak wind volume	FQLIMLO	

When judging the conditions for frequency limit under the heating mode, first judge if the unit has been set to weak wind volume mode. If it has been set to one mode, then follow the table below for the limit modification.

Outdoor temperature condition	Indicated frequency	
011(Below 20℃)	Limited frequency for weak	
010(15-20℃)	Limited frequency for weak	
001(10-15℃)	Limited frequency for weak	
000(below10℃)	Normal frequency	

3. Indoor blower fan control

3-0-1. Targeted running speed

Model 09

			Running speed variable	running speed (rpm)
Heating	Slightly weak		FRPMTBL00	
	SSLO silent SSLO		FRPMTBL01	
	Weak		FRPMTBL02	
	Strong		FRPMTBL05	
	Automatic	Weak	FRPMTBL04	
		Strong	FRPMTBL05	
Cooling	Slightly weak		FRPMTBL06	
	SSLO silentSSLO		FRPMTBL07	
	Weak		FRPMTBL08	
	Strong		FRPMTBL11	
	Automatic	Weak	FRPMTBL10	
		Strong	FRPMTBL11	
Ventilation	Weak		FRPMTBL12	
	Strong		FRPMTBL13	
Quota	Cooling		FRPMTBL09	
	Heating		FRPMTBL03	

. When the wind volume is manually medium, the running speed is (strong+weak)/2.

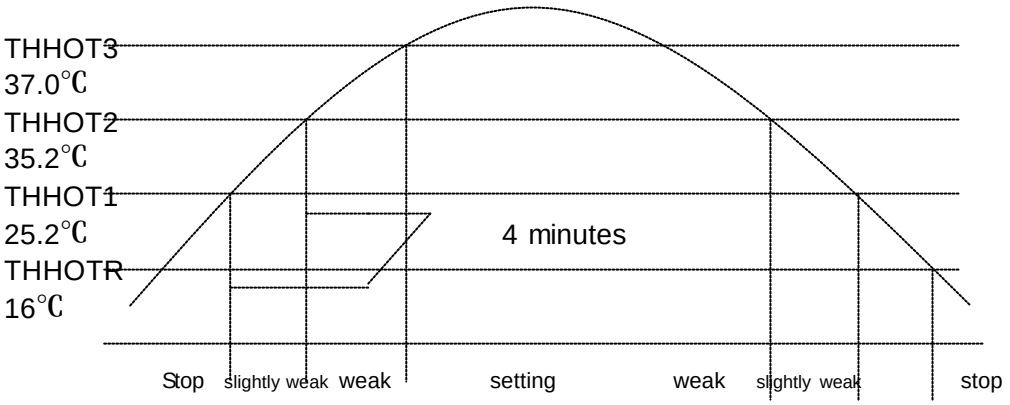
When it is automatically medium, the running speed is (strong automatic+ weak automatic)/2(not counted if it is not up to 10rpm)

3-1.heat running

3-1-1. Warm boot

When the heat running starts or the frost removing ends and the compressor starts again, in order to avoid cold wind, warm boot wind volume control should be done.

Heat exchange temperature



To control the indoor blower fan as shown in the table above according to the heat exchange temperature

When the heat exchange temperature rises to the level between THHOT1 and THHOT2 and even after 4 minutes it cannot reach the level between THHOT2 and THHOT3, enter into the next level without referring to the heat exchange temperature.

the blower fan stops when the heat exchange temperature is below 25℃

the blower fan is working slightly weak when he heat exchange temperature is above 25 ℃ and below 35℃

the blower fan is working weak if the he heat exchange temperature remains 35℃ for less than 4 minutes.

The blower fan works as set if the he heat exchange temperature remains 35℃ for more than 4 minutes

the blower fan works as set if the he heat exchange temperature remains above 37℃

3-1-2. When the compressor stops and remains idle for 3 minutes

20 seconds after the compressor stops, the wind volume is weak(switching to SSLO in silent running mode)and then slightly weak.

If the compressor stops when the heat running starts, the wind volume is weak

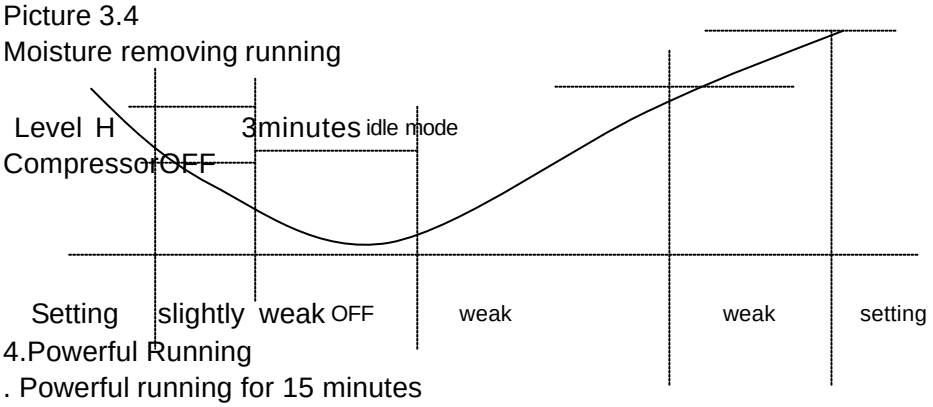
3-1-3. Restart of the compressor

The wind volume is set by the remote-controler after the warm boot.

.select the wind volume by the temperature in the automatic wind volume mode。

Refer to the temperature level control function

3-1-4. Frost-removing operation
. The blower stops after 20 seconds
. When receiving the I21=11 signal from the outdoor unit in the heat frost-removing mode, warm boot will be done according to the hear exchange sensor. The wind volume control is the same with 3.1.1
When the frost-removing process if over, if the compressor is on,the wind volume control will be warm-booted; if the compressor if switched off, the wind volume will be weak.
3-2 cooling running
. The wind volume can be set to strong, medium and weak.
Automatica wind volume function will decide the wind volume according to the temperature
Picture3.3
3-3. Moisture removing running
3-3-1. Compressor off, idle mode for 3 minutes
. The blower fan stops as the compressor stops
. The operation is wead after 3 minutes' idle mode
. After 3 minutes' ilde mode, the compressor is on.
3-3-2. Compressors on
The compressor operates as the set wind volume when the wind volume is set to be strong, medium or weak
. The wind volume is decided according to the temperature adjusting when the wind volume is set to be automatic.
Picture 3.4
Moisture removing running



4.Powerful Running
. Powerful running for 15 minutes
. The running stops or ends the powerful running after 15 minutes
. The mode switch ends the powerful running
. Enter into the silent mode, normal running mode or timed switching on mode to end the powerful running
. When in automatic mode, there are powerful and silent functions for your choice. When the main unit is in cooling mode, it operates with powerful cooling or silent cooling. When the main unit is in heating mode, it operates with powerful heating or silent heathing. When the main unit is in wind-sending mode, there are no powerful or silent modes.
4-0-1. Powerful heating

. Change the set temperature. With temperature adjusting function
. The wind volume is the automatic medium
. When in frost removing mode, the outdoor unit does not accept the communication signal for powerful running
. After 15 minutes of powerful running, the compressor can not be off within 10 minutes
4-0-2. Powerful cooling
Change the set temperature. With temperature adjusting function
. The wind volume is the automatic strong
. After the compressor starts, there will be no low-intense running protection within 3 minutes
4-0-3. There is no powerful mode for wind-sending and moisture removing
5.Silent running
. Send the silent running signal to the outdoor unit
5-0-1. Silent hearing
The wind volume is SSLO after the compressor is on
The wind volume will be kept SSLO within 20 seconds after the compressor stops and then changes to weak
5-0-2. Silent cooling
The wind volume is SSLO
5-0-3. There is no silent mode for moisture removing and wind-sending.

6. Timed running

. Set the time duration according to the time difference between the clock for timing and the current clock
. In timing mode, the display panel will flash the light at fixed times
6-0-1. Timed OFF
When this function is set, operation modes on the panel display will not change. The timing icon will show and the operation stops when the set time comes.
6-0-2. Timed ON
When this function is on, the panel display will only show a timing icon. The unit will operate as the set mode when the time comes.
6-0-3. Timed ON/OFF
The unit will start operating or stop according to the order of your setting.

7. Automatic running
7-1. Automatic running mode
Under this mode, the MCU will choose the work mode according to the room temperature so as to keep the set termperature (set 23℃ for heating mode and 26℃ for cooling mode)
When the unit is powered on for the first time and the the room termperature is equal to or below 23℃, it will start the heating mode or the cooling mode when the room temperature is higher than 23℃
Enter into the heating mode and follow the heating process(supposed temperature 23℃). When the temperature is high enough to stop the compressor, the compressor stops and there

will 3 minutes of idle mode. If the compressor senses the incoming wind temperature is higher than 23℃ after it stops for 15 minutes, the unit will switch to cooling mode. Otherwise it will keep the heating mode.

Enter into the cooling mode and follow the cooling process(supposed temperature 26℃). Compensation temperature difference will be cancelled automatically. When the temperature is high enough to stop the compressor, the compressor stops and there will be 3 minutes for idle mode. If the compressor senses the incoming wind temperature is equal to or below 23℃ after it stops for 15 minutes, the unit will switch to heating mode. The compensation temperature will be added automatically. Otherwise it will keep the cooling mode.

When the unit switches from other modes to automatic mode, if the work state changes (judge first and then work), there will be 3 minutes for idle mode. Ant then the temperature will change to the judged level according to the incoming wind temperature.

8. Trial running

The indicated frequency for trial running is 58Hz, wind volume is strong.

The trial running will last for 30 minutes and then the unit will be powered off. The unit will exit the trial running if it receives any remote-control signal during the trial running period.

There is no low work-intense running protection.

9. Low Work-intense protection control

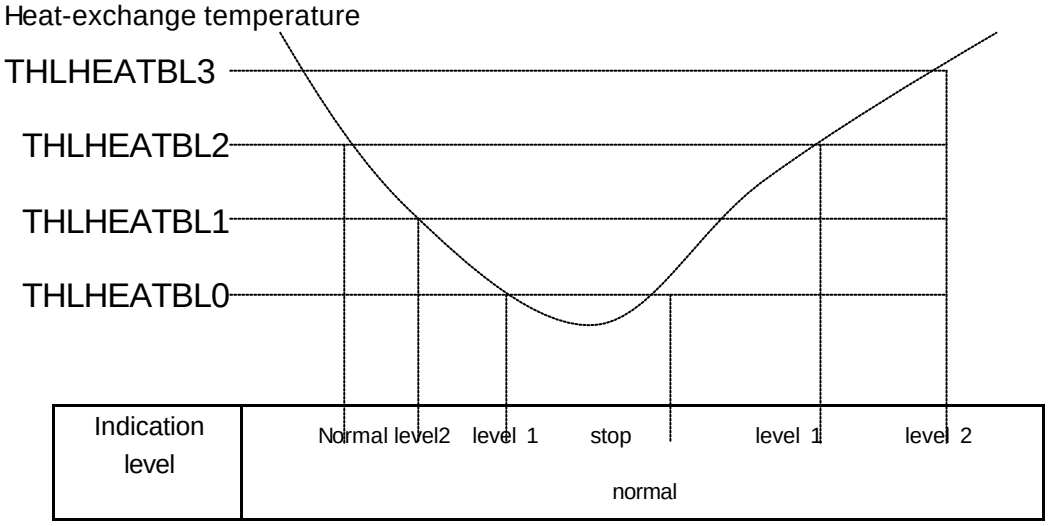
Specification for heat-exchange termperature sensor

B fixed number=3700 R(25℃)= 10KO

Under the cooling /moisture removing modes,the low work-intense protection will be carried out according to the heat-exchange temperatures as shown in the table below.

Low Work-intense protection control

Picture 11.1



Low Work-intense protection control will be neglected in the trial running.

Low Work-intense protection control will be cancelled for 3 minutes temporarily after the powerful cooling starts for 1 minute

(THLH[3，2，1，0]= 7℃ ，4.6℃，2.2℃，-0.5℃)

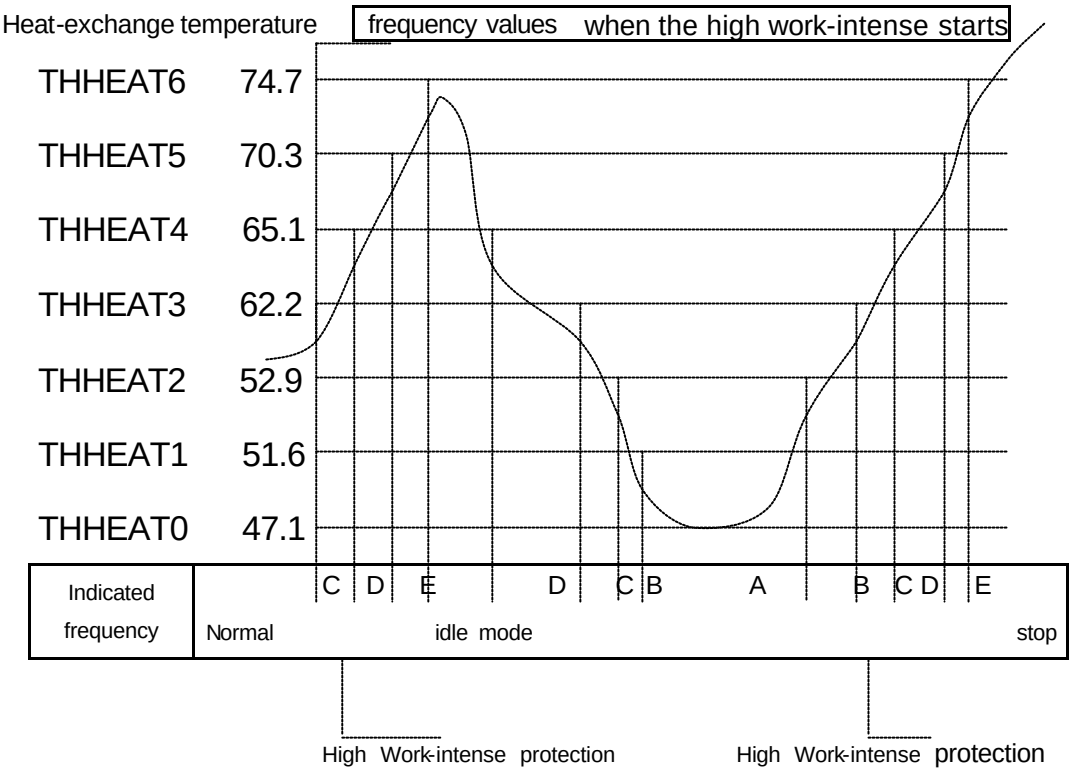
10. High Work-intense protection control

Under the heating mode, the high work-intense protection will be carried out

according to the heat-exchange temperatures as shown in the table below.

High Work-intense protection control:

Picture 12.1



alarm

. High Work-intense protection alarm will start if there are two times of high work-intense protection within 30 minutes.

. If the heat-exchange temperature does not reach THHEAT [2], it will resume to the normal temperature level control

. The smaller one of the high work-intense frequency and level frequency will be the operation data.

11. Low-temperture treatment for Heating mode

If the four-way valve can not switch or when the none-frost-removing compressor starts again under the heating mode if the heat-exchange temperature remains under"THHOTLTH" (-4.5℃) for 90 seconds, the compressor will start 3 minutes of idle mode and start again when the heat-exchange temperature is above " THHOTLTH " (-4.5℃)

12. Remote control

. Start or stop running with the remote-control signals.

. Only OFF signal is accepted when there are emergencies or malfunctions.

1 second delay: Starting, stopping and signals except the wind direction signal all begins 1 second after the receiption of the signal.

13.EEPROM control

. EEPROM is wrong when the EEPROM parameter sum does not accord with the check sum after the outdoor unit is powered on.

. The outdoor unit EEPROM is wrong will be displayed when the indoor unit

receives wrong EEPROM signals from the outdoor unit.

. In this case the control and emergency operation are not allowed.

. Power-off to disarm.

14 .Trouble Records

. There are no lists if there are no error code records.

. The malfunction display will automatically disappear after 10 seconds.

The remote control accepts stop signal only. The malfunction record may end according to the ON/OFF or remote-control's stop signal

. Models with EEPROM can store the records when they are replugged to the power.

15. Special functions

1、The indoor unit operates only

a. To enter into this function please press the sleep key 6 times with 6 beeps in 7 seconds under the none-power-failure-compensation mode.

b. ：The indoor unit operates as follows after entering into the function.

The indoor unit operates and communicates according to the setting without processing the signals from the outdoor unit but needs to send signals to the outdoor unit without stop.

c. To exit this function please press the OFF key of the remote-controller or the emergency key to power off the unit. You can also unplug the machine to exit this function.

When the indoor unit operates independently, it imitates the outdoor unit to send the following signals to the indoor unit.

Output frequency 58 Hz ,error frost removing state: 17654=0001,13=0,121=01 ,external temperature level K54=00, the indoor heat-exchange temperature is fixed at 47℃

OUTDOOR UNIT PART

Chapter I: Indoor Unit and Main board for Outdoor Unit

Notice:

During operations under any mode, if short circuit, open circuit and other malfunctions of the temperature sensors are detected, the main engine should come to a halt immediately.

1. Outdoor-board:

1.1.Forced cooling operation switch:

Short circuit this switch before electrifying, data communication to indoor unit will be ignored:

Forced cooling will function, the 3-minute delay will be cancelled, and the following output will be ON simultaneously:

High wind volume (H) for outdoor fan motor;

Compressor operates at the frequency of 80Hz.

1.2.Forced heating operation switch:

Short circuit this switch before electrifying, data communication to indoor unit will be ignored:

Forced heating will function, the 3-minute delay will be cancelled, and the following output will be ON simultaneously:

High wind volume (H) for outdoor fan motor;

Compressor operates at the frequency of 80Hz.

CPU checks all A/D ports

B. When safeguarding action happens outdoors, the actions in A should be OFF, and other inputs are independent of the actions in A.

C. LED output: Goes along even if safeguarding action happens outdoors; Cut this switch and go back to the original state. (The out-door safeguarding action will continue)

Chapter II: Basic Functions

3. Cooling mode

3.1.The four-way valve does not work (not electrified)

3.2.The discharge temperature sensor will not be tested within five minutes after the compressor is started

3.3.Outdoor fan motor control: The fan motor starts five seconds after the compressor starts, switching conditions for the two gears of wind volume are as follows: T ambient temp. <21℃, Low wind volume

T ambient temp. >21℃, High wind volume When the fan motor starts up, and the ambient temperature is at the return difference (±2℃), it runs at the low wind volume.

3.4.Compressor control: Frequency range: 30HZ---------120HZ

T ambient temp. <16℃, the maximum frequency is 65HZ

16℃≤T ambient temp.≤30℃, the maximum frequency is 90HZ

30℃≤T ambient temp.≤41℃, the maximum frequency is 110HZ

T ambient temp.≥41℃, the maximum frequency is 85HZ

Actual temperature and frequency maybe adjusted through EEPROM

4.Heating mode

4.1.The four-way valve is electrified 2 seconds after the compressor is electrified

4.2.Malfunctions of the discharge temperature sensor will not be tested within five minutes after the compressor is started

4.3.Outdoor fan motor control: The fan motor starts five seconds after the compressor starts, switching conditions for the two gears of wind volume are as follows: T ambient temp. <16℃, High wind volume T ambient temp. ≥16℃, Low wind volume When the fan motor starts up, and the ambient temperature is at the return difference (±2℃), it runs at the low wind volume.

4.4.Compressor control: Frequency range: 30HZ---------120HZ

T ambient temp. >22℃, the maximum frequency is 70HZ

9℃≤T ambient temp.≤22℃, the maximum frequency is 90HZ

2℃≤T ambient temp.≤9℃, the maximum frequency is 100HZ

T ambient temp. <2℃, the maximum frequency is 110HZ

Actual temperature and frequency can be adjusted through EEPROM

4.5.Conditions to enter into the defrosting stage:

A. Conditions to enter into the defrosting stage

After the heating operation has begun, and the operation time of the compressor adds up to 45 minutes (The total operation time of the compressor will be reset to zero after defrosting or the operating mode switched into cooling), through examining the defrosting sensor TE (Examining the frosting status of the outdoor heat exchanger) and the ambient temperature sensor TA, if the following conditions are met continuously up to 5 minutes, then defrosting operation is entered:

$$TE \leq C \times TA - \alpha$$

Of which：C：TA＜0℃, C=0.8

TA≥0℃, C=0.3

α maybe adjusted through EEPROM

For places easy to frost, set α as H; For places not easy to frost, set α as L; It is set as M when leaving factory.

Temperature limit to enter into the defrosting stage $-15℃ E \leq C \times TA - \alpha \leq 2℃ E$

B. Time interval of defrosting

- While the calculated data of $C \times TA - \alpha$ fall within the range of $-15℃ E \leq C \times TA - \alpha$, the time interval between two defrosting operation is 45 minutes
- While the calculated data of $C \times TA - \alpha$ fall within the range of $C \times TA - \alpha \leq -15℃ E$, the time interval between two defrosting operation is 55 minutes

C. Defrosting operation

- When defrosting begins, the compressor and the outdoor fan motor stops, and the four-way valve turns OFF 50 seconds later.
- The compressor starts and stays at the frequency of 60HZ for 30 seconds, then operates towards the target frequency (Can be adjusted through EEPROM)
- The current safeguard and the compressor discharge safeguard and other means of safeguard remain valid while defrosting. If the compressor

halts during the defrosting stage, remain still for 30 seconds, then conducts defrosting operation if it is still within the defrosting stage, the compressor starts according to the demand of the startup of the defrosting compressor.

- Entering into the defrosting stage, it must be guaranteed that the minimum operation time of the compressor should amount at least to 2 minutes before exit defrosting.

D. Conditions to exit the defrosting stage

The defrosting operation will return to heating operation if any of the following conditions is met.

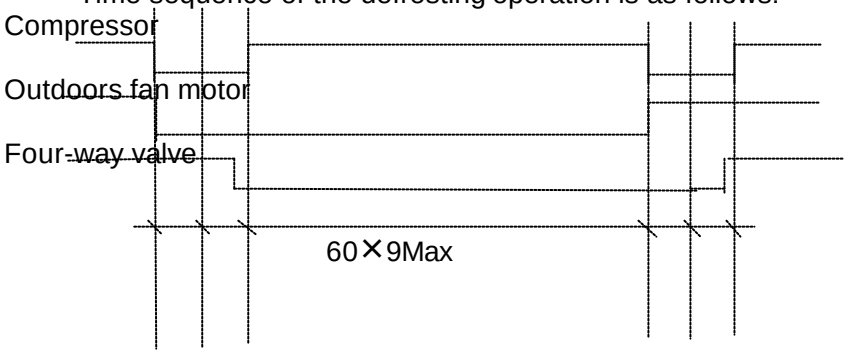
（1）：The temperature of the outdoor heat exchanger remains above 7℃ (Can be adjusted through EEPROM) for over 80 seconds continuously.

（2）：Keep defrosting operation for 9 minutes (Can be adjusted through EEPROM) continuously.

E． After the condition to exit defrosting operation is met, work as follows.

The compressor stops, the outdoor fan motor stops 50 seconds later, the four-way valve turns on, the compressor starts according to the starting process.

Time sequence of the defrosting operation is as follows:



5.Outdoor condensation temperature control while cooling:

5.1.When the operation frequency F＜40HZ, if the temperature of the outdoor coiled pipe $T_{outdoor\ coil}$≥52℃, decrease the operation frequency of the compressor by 2Hz，then examine the temperature of the outdoor coiled pipe at 10-second intervals, if $T_{outdoor\ coil}$≥52℃, decrease the operation frequency further by 2Hz， until the frequency is the lowest;

During the frequency-decreasing operation, if 47℃≤$T_{outdoor\ coil}$＜52℃, the compressor and the fan motor keep their original states;

the compressor runs at the normal operating frequency, and the outdoor fan motor returns to its original state,

5.2.When the operation frequency F≥40HZ, if the temperature of the outdoor coiled pipe $T_{outdoor\ coil}$≥57℃, decrease the operation frequency of the compressor by 2Hz，then examine the temperature of the outdoor coiled pipe at 10-second intervals, if $T_{outdoor\ coil}$≥57℃, decrease the operation frequency further by 2Hz， until the frequency is the lowest;

During the frequency-decreasing operation, if 52℃≤$T_{outdoor\ coil}$＜57℃, the compressor and the fan motor keep their original states;

When $T_{outdoor\ coil}$≤51℃, the compressor runs at the normal operating frequency,

and the outdoor fan motor returns to its original state;

The above temperature points, frequency-decreasing step and time interval can all be adjusted through EEPROM

Ⅲ. Anti over-loading operation while heating:

5.3.When the operation frequency F＜40HZ, if the temperature of the outdoor coiled pipe $T_{outdoor\ coil}$≥52℃, the outdoor fan motor performs forced high-speed operation and the operation frequency of the compressor should be decreased by 2Hz，then examine the temperature of the outdoor coiled pipe at 10-second intervals, if $T_{outdoor\ coil}$≥52℃, decrease the operation frequency further by 2Hz，until the frequency is the lowest;

During the frequency-decreasing operation, if 47℃≤$T_{outdoor\ coil}$＜52℃, the compressor and the fan motor keep their original states;

When $T_{outdoor\ coil}$≤46℃, the compressor runs at the normal operating frequency, and the outdoor fan motor returns to its original state;

5.4.When the operation frequency F≥40HZ, if the temperature of the outdoor coiled pipe $T_{outdoor\ coil}$≥57℃, the outdoor fan motor performs forced high-speed operation and the operation frequency of the compressor should be decreased by 2Hz，then examine the temperature of the outdoor coiled pipe at 10-second intervals, if $T_{outdoor\ coil}$≥57℃, decrease the operation frequency further by 2Hz，until the frequency is the lowest;

During the frequency-decreasing operation, if 52℃≤$T_{outdoor\ coil}$＜52℃, the compressor and the fan motor keep their original states

When $T_{outdoor\ coil}$≤51℃, the compressor runs at the normal operating frequency, and the outdoor fan motor returns to its original state;

The above temperature points, frequency-decreasing step and time interval can all be adjusted through EEPROM

6.. Compressor discharge safeguard:

5 minutes after the compressor starts, when the compressor temperature rises above 105℃, decrease the compressor frequency by 2HZ/stop for 10 seconds, until the compressor temperature falls below 90℃, the compressor returns to normal operation;

When the compressor temperature rises above 115℃, the compressor should stop at once, wait until the compressor temperature falls below 90℃ and the waiting time period exceeds 3 minutes, the compressor returns to normal operation;

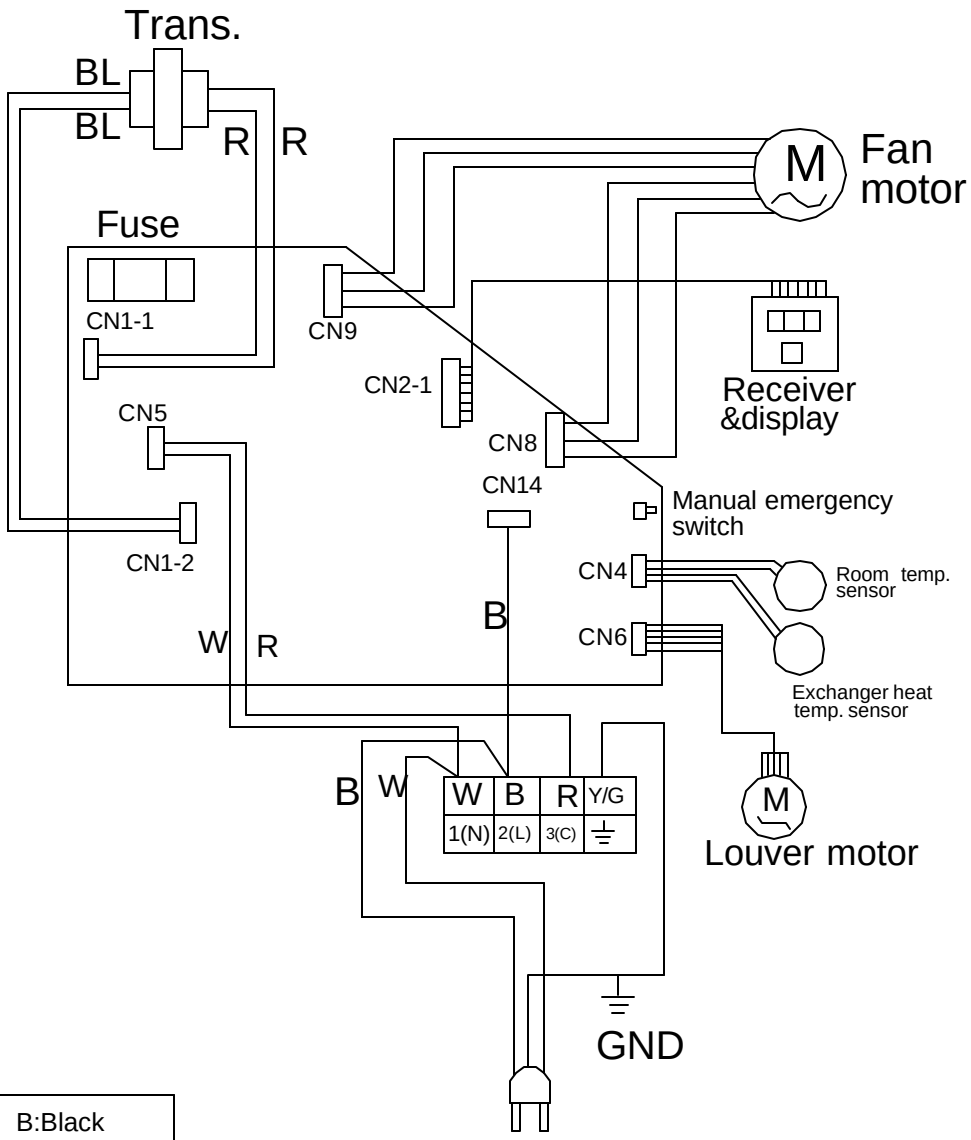
After the compressor restarts, if the compressor temperature rises above 115℃ once more within 15 minutes, the compressor should stop at once and give an alarm.

The temperature points are stored in EEPROM

Wiring diagram

0010552093

WIRING DIAGRAM OF INDOOR UNIT

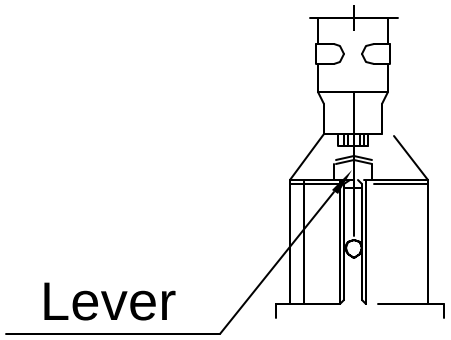


R:Red	B:Black
W:White	BL:Blue
Y:Yellow	BR:Brown
Y/G:Yellow/Green	

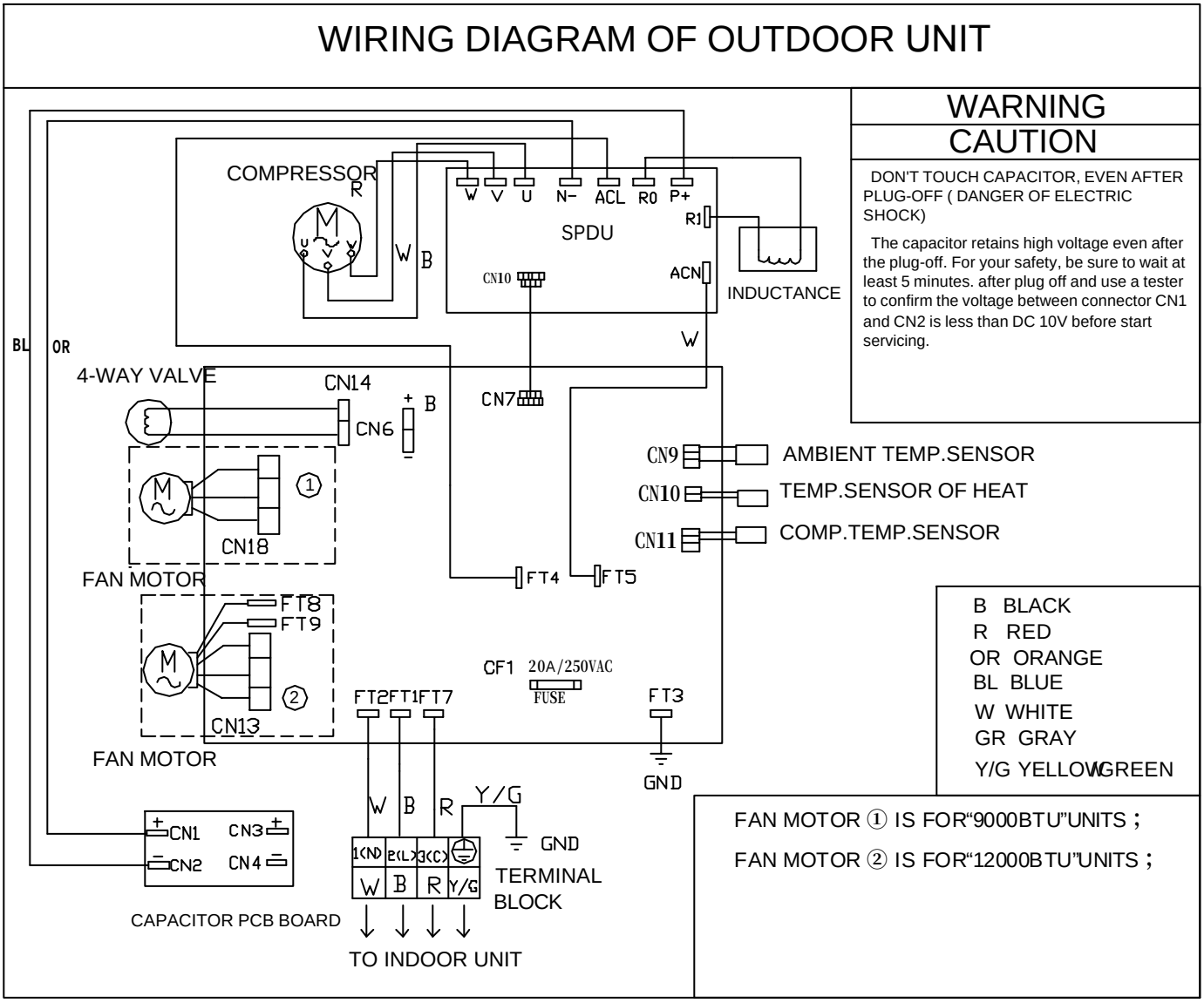
Removal of locking terminal contact

Terminal contact(mark) ※ comes with locking structure.

Please press the front lever to release the locking and pull the cable out.

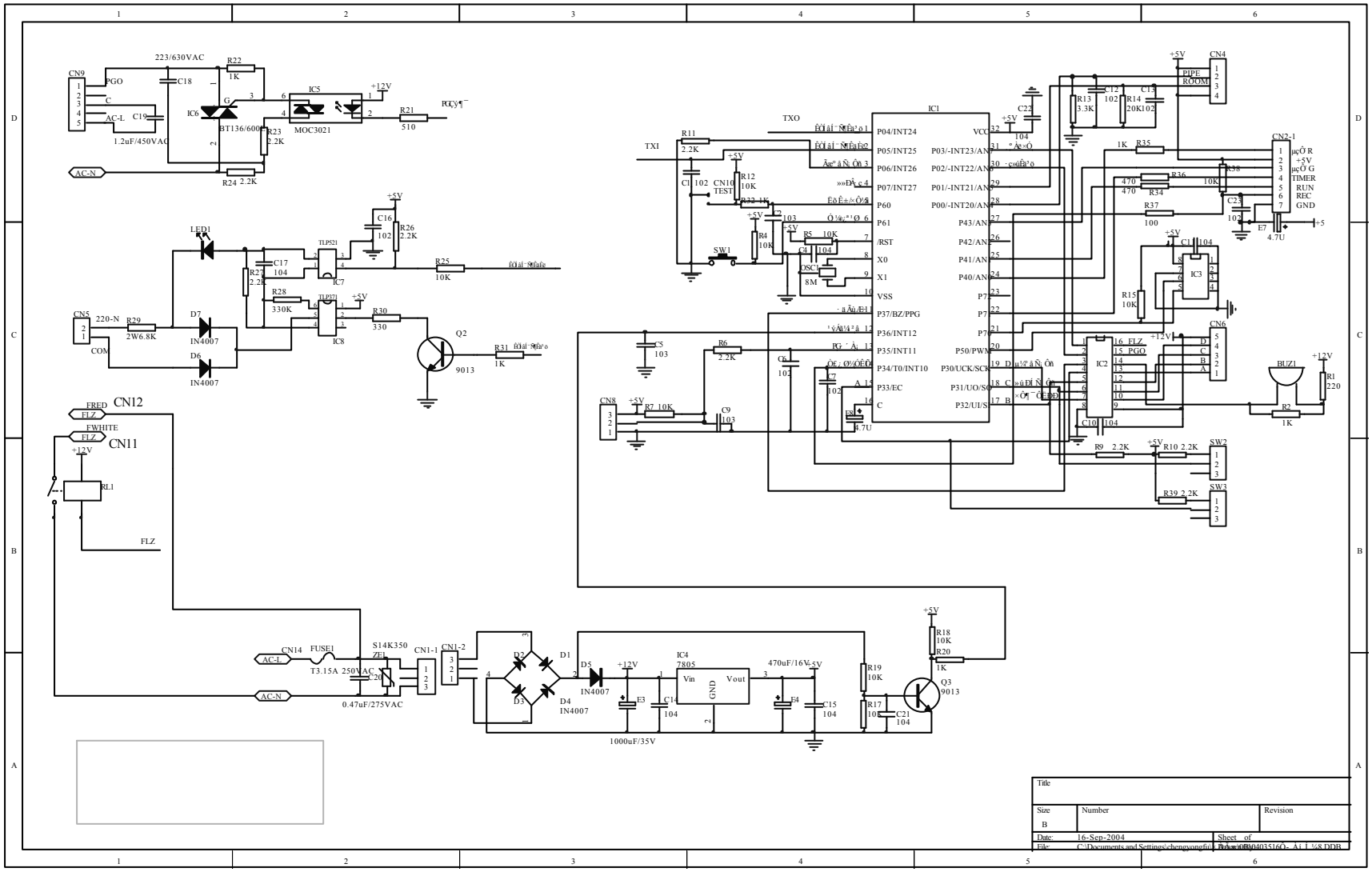


WIRING DIAGRAM OF OUTDOOR UNIT

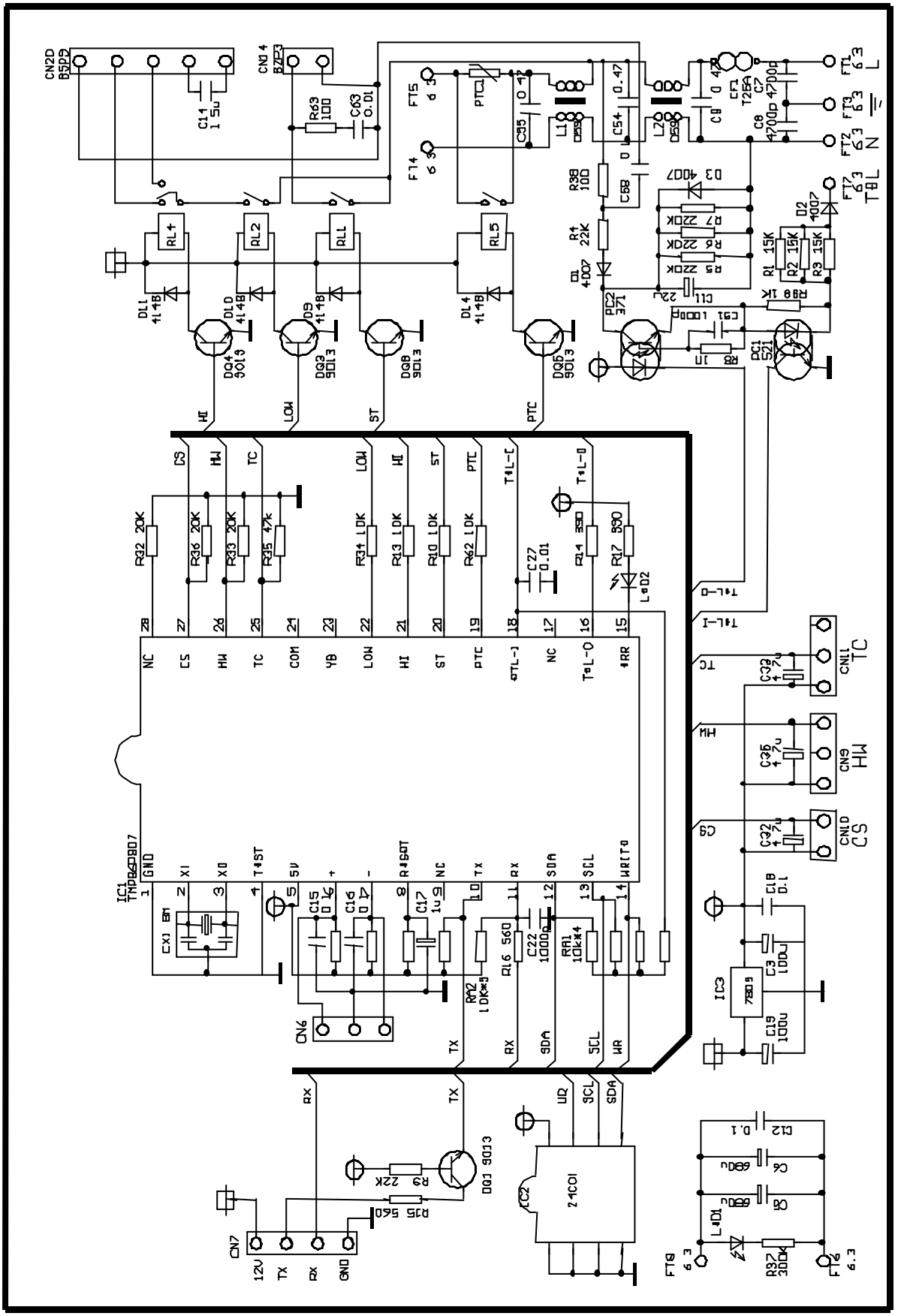


CIRCUIT DIAGRAM

INDOOR UNIT:


223/630VAC
CN9
PGO
C
AC-L
AC-N
C18
C19
1.2uF/450VAC
R22
1K
R23
2.2K
R24
2.2K
IC6
BT136/600E
IC5
MOC3021
+12V
R21
510
LED1
C16
102
R26
2.2K
C17
104
R27
2.2K
TLP521
IC7
R25
10K
R28
330K
TLP521
IC8
+5V
R30
330
CN5
220-N
R29
2W6.8K
COM
D7
IN4007
D6
IN4007
Q2
9013
R31
1K
CN12
FRED
FLZ
FWHITE
FLZ
CN11
+12V
RL1
FLZ
AC-L
AC-N
CN14
FUSE1
T3.15A 250VAC
S14K350
ZE1
C20
0.47uF/275VAC
CN1-1
CN1-2
D2
D3
D1
D4
IN4007
D5
IN4007
+12V
E3
1000uF/35V
C14
104
IC4
7805
Vin
GND
Vout
470uF/16V
+5V
E4
C15
104
R19
10K
R17
10K
C21
104
R18
10K
R20
1K
Q3
9013
IC1
P04/INT24
P05/INT25
P06/INT26
P07/INT27
P60
P61
/RST
X0
X1
VSS
P37/BZ/PPG
P36/INT12
P35/INT11
P34/T0/INT10
P33/EC
C
VCC
P03/-INT23/AN7
P02/-INT22/AN6
P01/-INT21/AN5
P00/-INT20/AN4
P43/AN3
P42/AN2
P41/AN1
P40/AN0
P72
P71
P70
P50/PWM
P31/UO/SO
P32/UI/S
TXO
TXI
R11
2.2K
C1
102
CN10
TEST
R12
10K
SW1
R32
1K
C2
103
R4
10K
R5
10K
C4
104
OSC1
8M
C5
103
R6
2.2K
C6
102
C7
102
E1
4.7U
CN8
R7
10K
C9
103
C22
104
R13
3.3K
C12
102
R14
20K
C13
102
CN4
PIPE
ROOM
1K
R35
CN2-1
R38
10K
470
R36
470
R34
R37
100
C25
102
E7
4.7U
C11
104
IC3
R15
10K
CN6
IC2
16 FLZ
15 PGO
C10
104
R9
2.2K
R10
2.2K
SW2
R39
2.2K
SW3
BUZ1
R1
220
R2
1K
Title
Size
B
Number
Revision
Date:
16-Sep-2004
Sheet of
File:
C:\Documents and Settings\chengyongfu\

OUTDOOR UNIT:



ABNORMITY DIAGNOSE

INDOOR UNIT PART

Malfunction explanation

Anomaly	Error symbals			Indoor	Outdoor	Automatic restore	Causes
	Power	Timing	Running				
Indoor thermister anomaly	★	¦	¦	*		*	1. Poor connection of the connectors or bad control base plate
Heat-exchange thermister anomaly	★	?	?	*		*	1. Poor connection of the connectors or bad control base plate
Frost-removing thermister anomaly	?	?	★		*	*	1. Poor connection of the connectors or bad control base plate
Output thermister anomaly	★	?	¦		*	*	1. Poor connection of the connectors or bad control base plate
Base plate thermister anomaly	?	¦	★		*	*	1. Poor connection of the connectors or bad control base plate
Module thermister anomaly	?	★	?		*	*	1. Poor connection of the connectors or bad control base plate
Outdoor thermister anomaly	?	★	¦		*	*	1. Poor connection of the connectors or bad control base plate
Transmition error	¦	¦	★	*			1. Poor connection of the connectors or bad control base plate
					*		2. Wrong wiring or bad base plate
Anomaly of compressor running	★	¦	?		*		1. If there is any seize of the compressor 2. If there are any damages of power module

Overheat protection for exhaust temperature	¦ ★ ¦		*		1. The system is lack of air or overloaded with air 2. The voltage is too high (over 242V)or too low (below 187V) 3. The capillary tubes may be blocked. 4. Check if the sensor or the controlling base plate parts are wrong 5. The indoor&outdoor temperature could be too high
AC electricity protection	★ ★ ¦		*		1. Check if the system is overloaded with air 2. Check if the voltage is too low(below 187V) 3. Check if the CT or the base plate parts are all right
DC electricity protection	★ ★ ?		*		1. Check if there are seizes in the compressor 2. Check if there are damages of the power modules 3. The voltage is too high (over 242V)or too low (187V)
Low power protection	¦ ★ ?		*		1. Check if the voltage is too low 2. Check if the base plate is damaged.
Outdoor base plate temperature temperature	¦ ★ ★		*		1. Check if the base plate is all right 2. The outdoor environment temperature could be too high
Module temperature increase protection	? ★ ★		*		1. Check if there are seizes in the compressor 2. 。 3. If there are any damages of power module 4. Check if the heat dispersion glue is even 5. The voltage is too high (over 242V)or too low (below 187V) 6.

High work-intense protection	★ ★ ★	*			1. Check if the filter net is blocked 2. The indoor&outdoor temperature could be too high 3. Check if the system is overloaded with air 4. Check if the base plate is damaged. 5. The voltage is too high (over 242V)or too low (below 187V)
CT wire breakage protection	★ ¦ ★		*		1. Check if the base plate is damaged or not 2. The system is lack of air 3. The direction changing of the 4-way valve is not proper
EEPROM anomaly	★ ? ★	*			1. Check if the base plate is damaged or not
			*		1. Check if the base plate is damaged.
Inner blower fan anomaly	¦ ? ★	*			
Explanation	?bright★flashing¦ turn-off	* Represents there is this function			

OUTDOOR UNIT PART

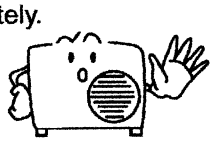
.LED output:

Twinkling times of LED	Possible cause of the malfunction
1	Outdoor temperature sensor abnormity
2	Outdoor defrosting sensor abnormity
3	Compressor discharge temperature abnormity
4	High compressor discharge temperature
5	Indoor-outdoor communication abnormity
6	Abnormal communication to IPDU module
7	E2PROM data abnormity
8	IPDU abnormity: Maximum revolving rate exceeded
9	IPDU abnormity: Vibration
10	IPDU abnormity: Displaced
11	IPDU abnormity: Speeding up abnormity
12	IPDU abnormity: G-TR short circuit
13	IPDU abnormity: Position-testing loop abnormity
14	IPDU abnormity: Current sensor abnormity
15	IPDU abnormity: Compressor locked
16	IPDU abnormity: Compressor damaged
17	IPDU abnormity: Case thermo action

TROUBLE SHOOTING

Trouble Shooting

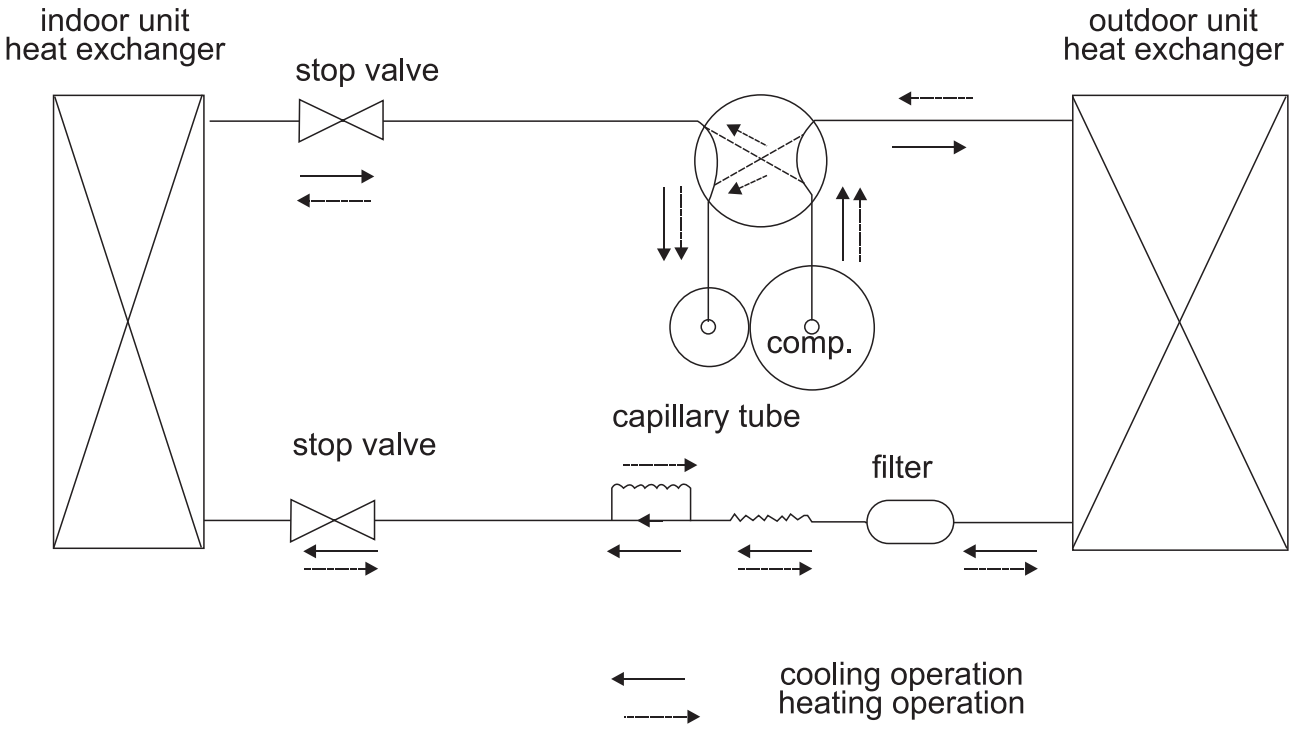
Before asking for service, check the following first.

	Phenomenon	Cause or check points
Normal Performance inspection	The system does not restart immediately. 	• When unit is stopped, it won't restart immediately until 3 minutes have elasped to protect the system. • When the electric plug is pulled out and reinserted, the protection circuit will work for 3 minutes to protect the air conditioner.
	Noise is heard. 	• During unit operation or at stop, a swishing or gurgling noise may be heard. At first 2-3 minutes after unit start, this noise is more noticeable. (This noise is generated by refrigerant flowing in the system.) • During unit operation, a cracking noise may be heard. This noise is generated by the casing expanding or shrinking because of temperature changes. • Should there be a big noise from air flow in unit operation, air filter may be too dirty.
	Smells are generated.	• This is because the system circulates smells from the interior air such as the smell of furniture, cigarettes.
	Mist or steam are blown out. 	• During COOL or DRY operation, indoor unit may blow out mist. This is due to the sudden cooling of indoor air.
Multiple check	Does not work at all. 	• Is power plug inserted? • Is there a power failure? • Is fuse blown out?
	Poor cooling 	• Is the air filter dirty? Normally it should be cleaned every 15 days. • Are there any obstacles before intel and outlet? • Is temperature set correctly? • Are there some doors or windows left open? • Is there any direct sunlight through the window during the cooling operation?(Use curtain) • Are there too much heat sources or too many people in the room during cooling operation?

Application temp. range of air conditioner -7℃~43℃.

REFRIGERATING CYCLE DIAGRAM

Refrigerating cycle diagram

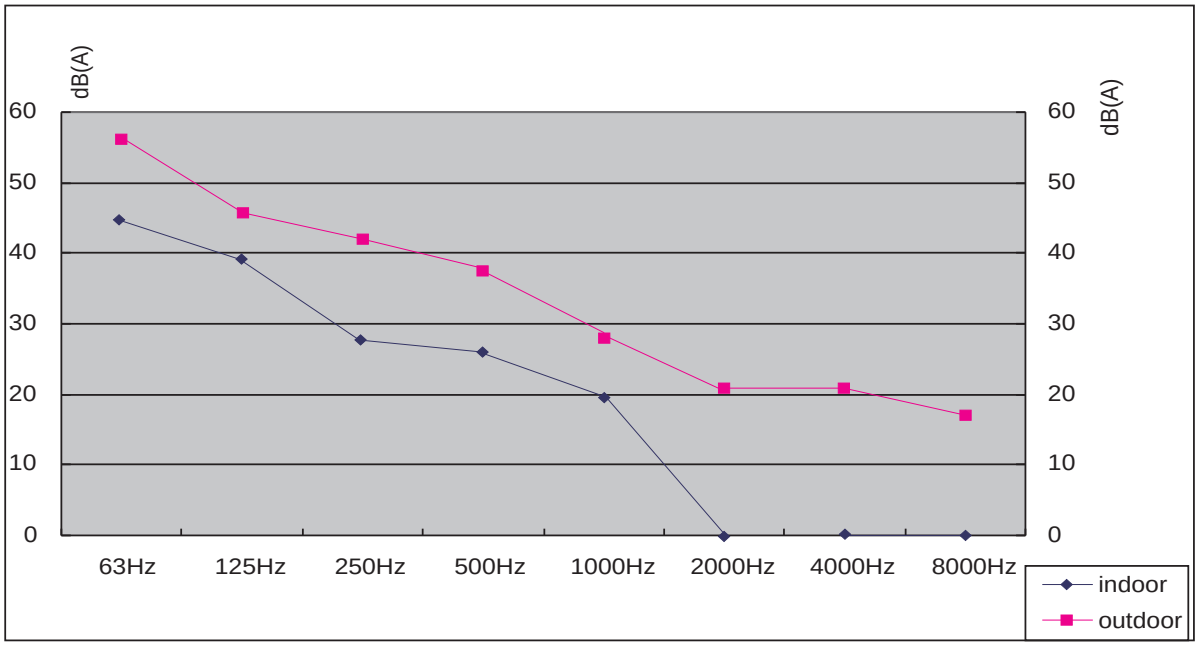


Noise level test chart and air velocity distribution

Noise level test chart and air velocity distribution

Noise level test chart

MODEL: HSU-12HT03/R2(DB) HSU-10HT03/R2(DB)



Noise level test chart and air velocity distribution

Air velocity distribution

MODEL: HSU-12HT03/R2(DB) HSU-10HT03/R2(DB)

Air velocity distribution

Fig 1
top view
flow control panel horizal
lourer:center

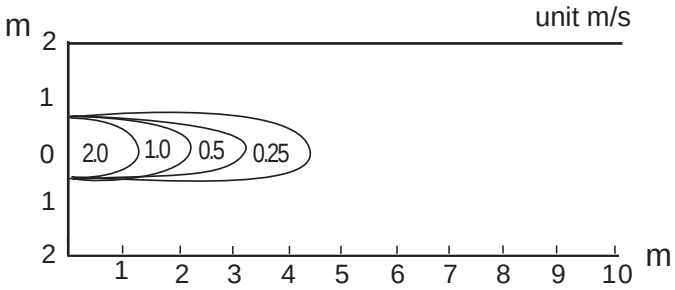


Fig 2
top view
flow control panel horizal
lourer:right and left

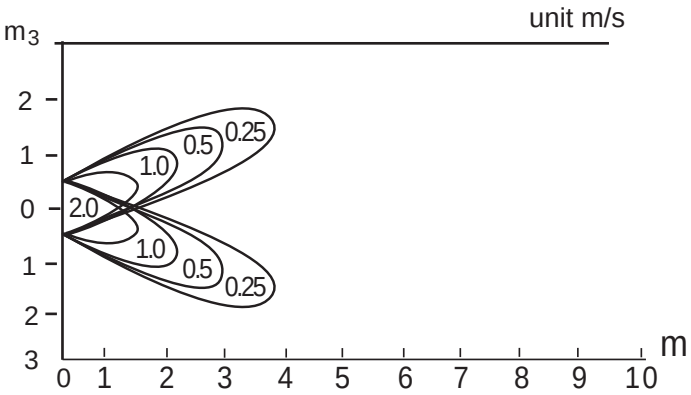


Fig 3
top view
flow control panel horizal
lourer:center

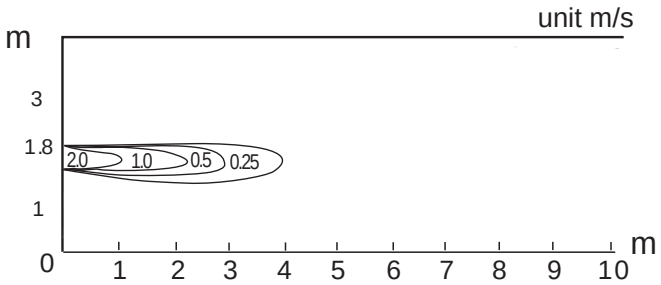
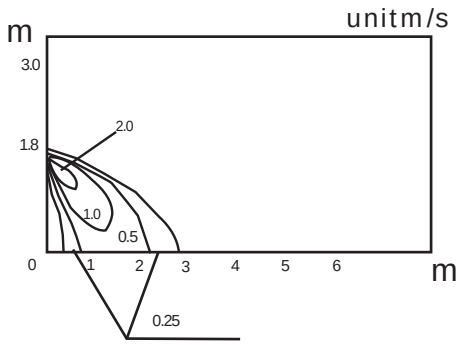


Fig 4
top view
flow control panel vertical
lourer:center



Condition
Fan speed:high
Operation mode:fan
Voltage:230V,50Hz

Installation manual

Installation Manual of Room Air Conditioner

- Read this manual before installation.
- Explain sufficiently the operating means to the user according to this manual.

Necessary Tools for Installation

1.Driver
2.Hacksaw
3.Hole core drill
4.Spanner(17,19 and 26mm)
5.Torque wrench (17mm,22mm,26mm)
6.Pipe cutter
7.Flaring tool
8.Knife
9.Nipper
10.Gas leakage detector or soap-and-water solution
11.Measuring tape
12.Reamer

Drawing for the installation of indoor and outdoor units

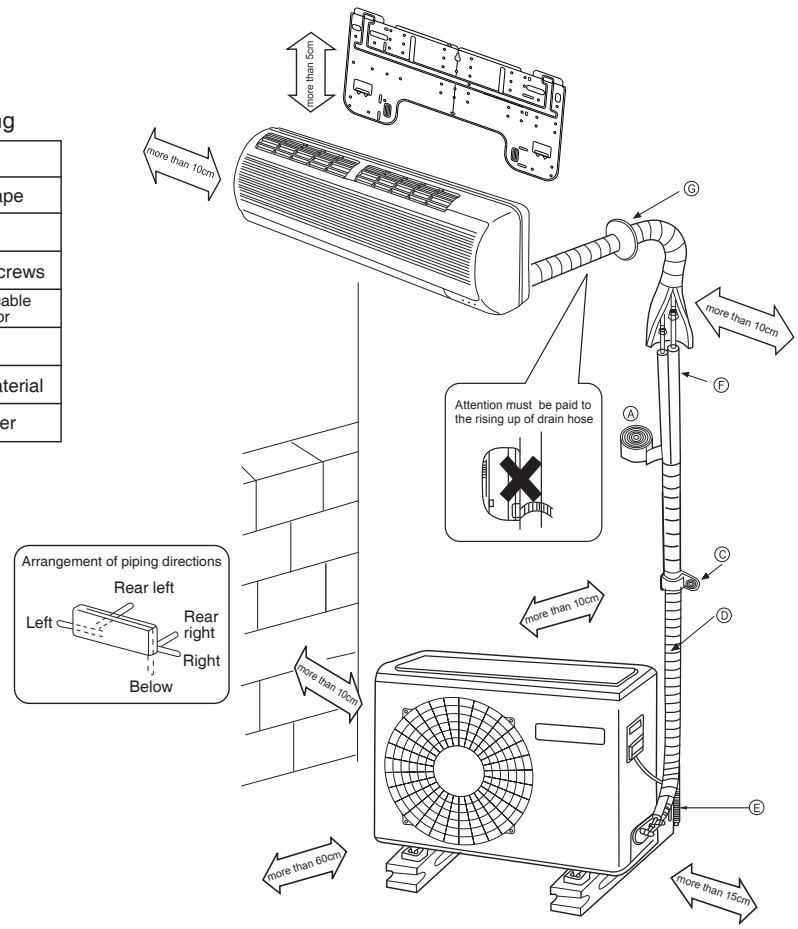
※ The modes adopt HFC free refrigerant R410A

Accessory parts

No.	Accessory parts	Number of artides
①	Remote controller	1
②	R-03 dry battery	2
③	Mounting plate	1
④	Drain hose	1
⑤	ϕ4X50 Steel nail,cement	6
⑥	ϕ 4X25 Screw, Plastic cap	4
⑦	Drain-elbow	1
⑧	Cover	1
⑨	Cushion	4
⑩	Connecting cable	1
⑪	Pipe supporting plate	1

Optional parts for piping

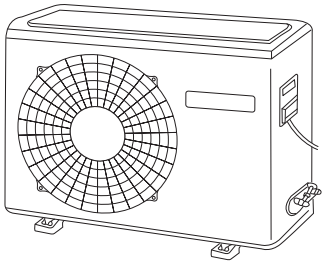
Mark	Parts name
Ⓐ	Non-adhesive tape
Ⓑ	Adhesive tape
Ⓒ	Saddle(L.S) with screws
Ⓓ	Connecting electric cable for indoor and outdoor
Ⓔ	Drain hose
Ⓕ	Heat insulating material
Ⓖ	Piping hole cover

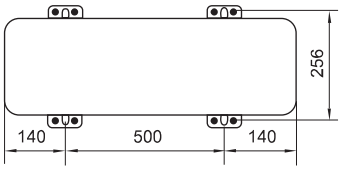


※The marks from Ⓐto Ⓖin the figure are the parts' numbers

※ The distance between the indoor unit and the floor should be more than 2mm

No.





Floor fixing dimensions
of the outdoor unit
(Unit:mm)

Fixing of outdoor unit

- Fix the unit to concrete or block with bolts (ϕ10mm) and nuts firmly and horizontally.
- When fitting the unit to wall surface, roof or rooftop, fix a supporter surely with nails or wires in consideration of earthquake and strong wind.
- If vibration may affect the house, fix the unit by attaching a vibration-proof mat.

Indoor Unit Selection of Installation Place Outdoor Unit

- Place, robust not causing vibration, where the body can be supported sufficiently.
- Place, not affected by heat or steam generated in the vicinity, where inlet and outlet of the unit are not disturbed.
- Place, possible to drain easily, where piping can be connected with the outdoor unit.
- Place, where cold air can be spread in a room entirely.
- Place, nearby a power receptacle, with enough space around. (Refer to drawings).
- Place where the distance of more than 1m from televisions, radios, wireless apparatuses and fluorescent lamps can be left.
- In the case of fixing the remote controller on a wall, place where the indoor unit can receive signals when the fluorescent lamps in the room are lightened.
- Place, which is less affected by rain or direct sunlight and is sufficiently ventilated.
- Place, possible to bear the unit, where vibration and noise are not increased.
- Place, where discharged wind and noise do not cause a nuisance to the neighbors.
- Place, where a distance marked ⇔ is available as illustrated in the above figure.

Power Source

- Before inserting power plug into receptacle, check the voltage without fail. The power source is the same as the corresponding name plate.
- Install an exclusive branch circuit of the power.
- A receptacle shall be set up in a distance where the power cable can be reached. Do not extend the cable by cutting it.

Selection of Pipe

- To this unit, both liquid and gas pipes shall be insulated as they become low temperature in operation.
- Use optional parts for piping set or pipes covered with equivalent insulation material.
- The thickness of the pipe must be 0.8mm at least.

	For 07,09	For 12
Liquid pipe(ϕ)	6.35mm (1/4")	6.35mm (1/4")
Gas pipe(ϕ)	9.52mm (3/8")	12.7mm (1/2")

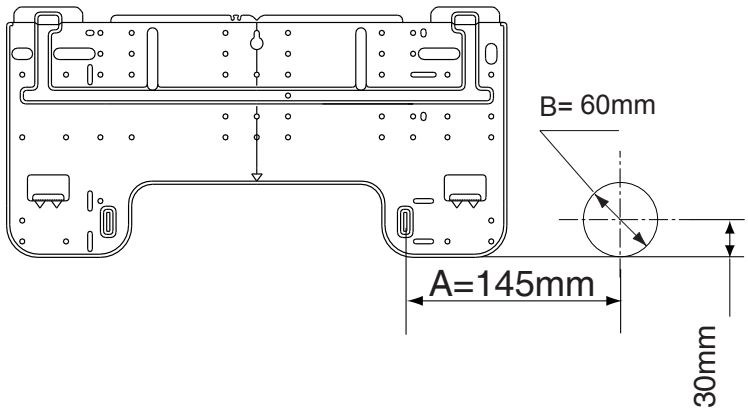
1 Fitting of the Mounting Plate and Positioning of the Wall Hole

When the mounting plate is first fixed

1 Carry out, based on the neighboring pillars or lintels, a proper leveling for the plate to be fixed against the wall, then temporarily fasten the plate with one steel nail.

2 Make sure once more the proper level of the plate, by hanging a thread with a weight from the central top of the plate, then fasten securely the plate with the attachment steel nail.

3 Find the wall hole location A using a measuring tape.

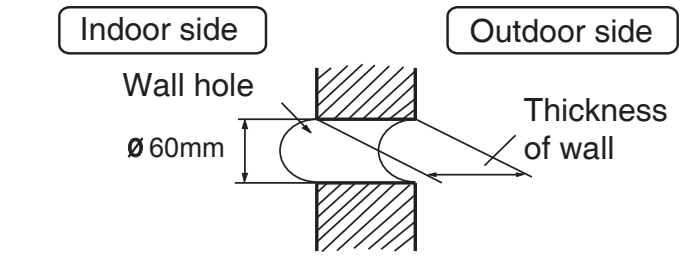


When the mounting plate is fixed to side bar and lintel

- Fix to side bar and lintel a mounting bar, Which is separately sold, and then fasten the plate to the fixed mounting bar.
- Refer to the previous article, "When the mounting plate is first fixed", for the position of wall hole.

2 Making a Hole on the Wall and Fitting the Piping Hole Cover

- Make a hole of 60mm in diameter, slightly descending to outside the wall.
- Install piping hole cover and seal it off with putty after installation.



(Section of wall hole) Ⓖ Piping hole pipe

3 Installation of the Indoor Unit

Drawing of pipe

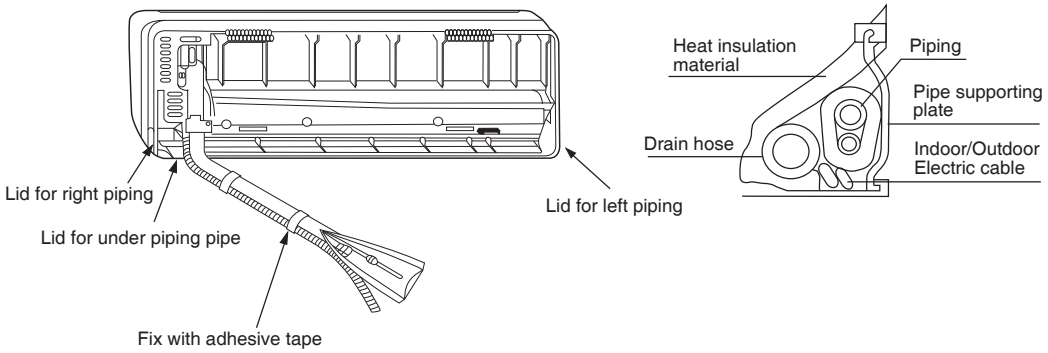
[Rear piping]

- Draw pipes and the drain hose, then fasten them with the adhesive tape

[Left • Left-rear piping]

- In case of left side piping, cut away, with a nipper, the lid for left piping.
- In case of left-rear piping, bend the pipes according to the piping direction to the mark of hole for left-rear piping which is marked on heat insulation materials.

1. Insert the drain hose into the dent of heat insulation materials of indoor unit.
2. Insert the indoor/outdoor electric cable from backside of indoor unit, and pull it out on the front side, then connect them.
3. Coat the flaring seal face with refrigerant oil and connect pipes.
   Cover the connection part with heat insulation materials closely, and make sure fixing with adhesive tape.



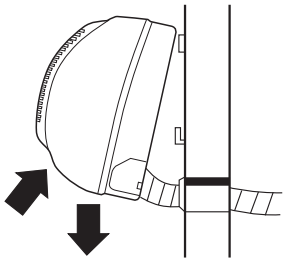
- Indoor/outdoor electric cable and drain hose must be bound with refrigerant piping by protecting tape.

[Other direction piping]

- Cut away, with a nipper, the lid for piping according to the piping direction and then bend the pipe according to the position of wall hole. When bending, be careful not to crash pipes.
- Connect beforehand the indoor/outdoor electric cable, and then pull out the connected to the heat insulation of connecting part specially.

Fixing the indoor unit body

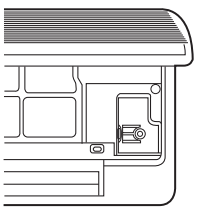
- Hang surely the unit body onto the upper notches of the mounting plate. Move the body from side to side to verify its secure fixing.
- In order to fix the body onto the mounting plate, hold up the body aslant from the underside and then put it down perpendicularly.



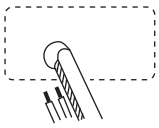
4 Connecting the indoor/outdoor Electric Cable

Removing the wiring cover

- Remove terminal cover at right bottom corner of indoor unit, then take off wiring cover by removing its screws.



When connecting the cable after installing the indoor unit



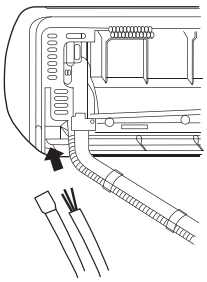
1. Insert from outside the room cable into left side of the wall hole, in which the pipe has already existed.
2. Pull out the cable on the front side, and connect the cable making a loop.

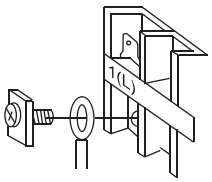
When connecting the cable before installing the indoor unit

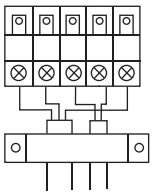
- Insert the cable from the back side of the unit, then pull it out on the front side.
- Loosen the screws and insert the cable ends fully into terminal block, then tighten the screws.
- Pull the cable slightly to make sure the cables have been properly inserted and tightened.
- After the cable connection, never fail to fasten the connected cable with the wiring cover.

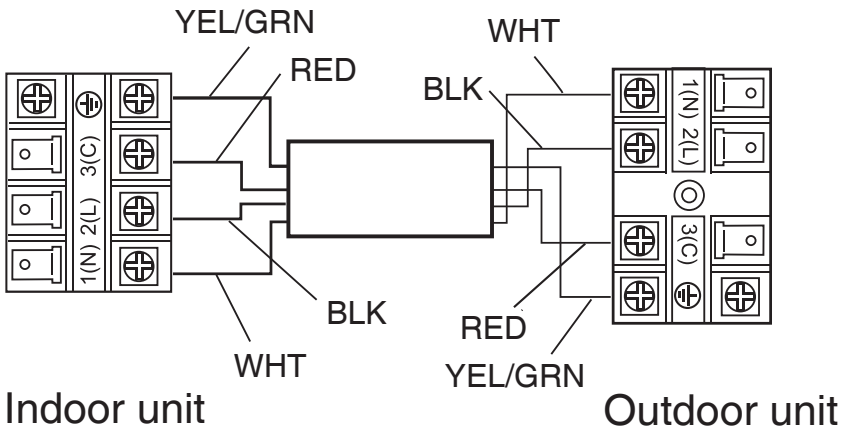
Note: When connecting the cable, confirm the terminal number of indoor and outdoor units carefully. If wiring is not correct, proper operation can not be carried out and will cause defect.

1. If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similar qualified person. The type of connecting wire is H05RN-F or H07RN-F.
2. If the fuse on PC board is broken please change it with the type of T.3.15A/250V.
3. The wiring method should be in line with the local wiring standard.
4. After installation, the power plug should be easily reached.









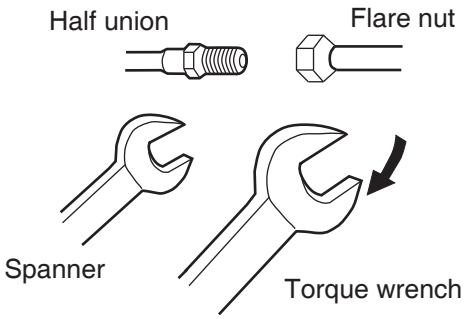
Outdoor Unit

1 Installation of Outdoor Unit

Install according to (Drawing for the installation of indoor and outdoor units)

2 Connection of Pipes

- To bend a pipe, give the roundness as large as possible not to crush the pipe, and the bending radius should be 30 to 40 mm or longer.
- Connecting the pipe of gas side first make working easier.
- The connection pipe is specialized for R410A.
- The max length of connection pipe of 12 series is 15m and the max length of 07,09 series is 7m.
- The max vertical distance between the indoor unit and the outdoor unit is 5m



Forced fastening without careful centering may damage the threads and cause a leakage of gas.

Pipe Diameter(ϕ)	Fastening Torque
Liquid Side 6.35mm(1/4")	18N.m
Gas Side 6.35mm(3/8")	42N.m
Gas Side 12.7mm(1/2")	55N.m

Be careful that matters, such as wastes of sands, etc. shall not enter the pipe.
The standard pipe length is 5m, If it is over 5m, the function of the unit will be affected.
If the pipe has to be lengthened, the refrigerant should be charged, according to 20g/m.
But the charge of refrigerant must be conducted by professional air conditioner engineer.
Before adding additional refrigerant, perform air purging from the refrigerant pipes and indoor unit using a vacuum pump, then charge additional refrigerant.

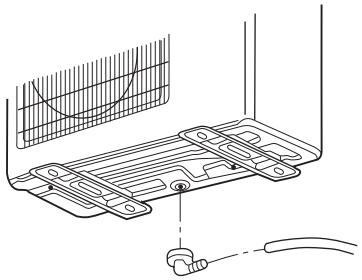
3 Connection

- Use the same method on indoor unit. Loosen the screws on terminal block and insert the plugs fully into terminal block, then tighten the screws
- Insert the cable according to terminal number in the same manner as the indoor unit.
- If wiring is not correct, proper operation can not be carried out and controller may be damaged.
- Fix the cable with a clamp.

4 Attaching Drain-Elbow

- If the drain-elbow is used, please attach it as figure.

Note: Only for heat pump unit.

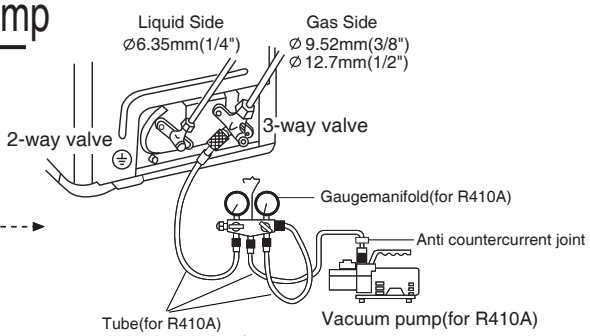


Drain hose

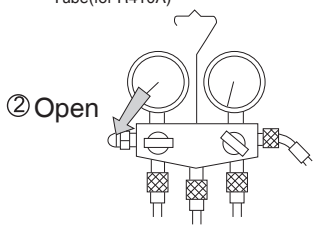
Outdoor Unit

5 Purging Method: To use vacuum pump

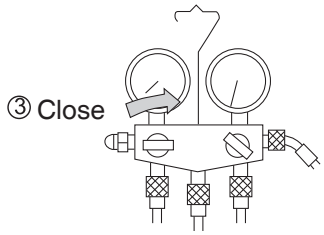
① Detach the service port's cap of 3-way ,the valve rod's cap for 2-way valve and 3-way's, connect the service port into the projection of change hose (low) for gaugemanifold. Then connect the projection of change hose (center) for gaugemanifold into vacuum pump.



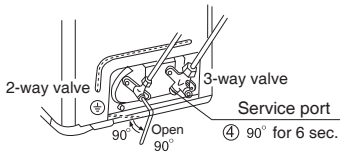
② Open the handle at low in gaugemanifold, operate vacuum pump. If the scale-moves of gause (low) reach vacuum condition in a moment, check ① again.



③ Vacuumize for over 15min. And check the level gauge which should read -0.1MPa (-76cmHg) at low pressure side. After the completion of vacuumizing. close the handle 'Lo' in gaugemanifold and stop the operation of the vacuum pump.
Check the condition of the scale and hold it for 1-2min. If the scale-moves back in spite of tightening, make flaring work again, the return to the beginning of ③.



④ Open the valve rod for the 2-way valve to an angle of anti-clockwise 90 degrees.
After 6 seconds, close the 2-way valve and make the inspection of gas leakage.

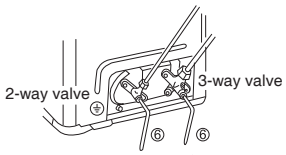


⑤ No gas leakage?

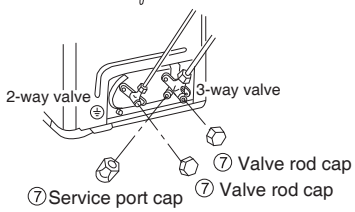
In case of gas leakage, tighten parts of pipe connection. If leakage stops, then proceed ⑥ steps.

If it does not stop gas leakage, discharge whole refrigerants from the service port. After flaring work again and vacuumize, fill up prescribed refrigerant from the gas cylinder.

⑥ Detach the charge hose from the service port, open 2-way valve and 3-way. Turn the valve rod anti-clockwise until hitting lightly.



⑦ To prevent the gas leakage, turn the service port's cap, the valve rod's cap for 2-way valve and 3-way's a little more than the point where the torque increases suddenly.



⑧ After attaching the each caps, check the gas leakage around the caps.

CAUTION:

1.If the refrigerant of the air conditioner leaks, it is necessary to discharge the refrigerant out. Vacuumize first, then charge the liquid refrigerant into air conditioner according to the amount marked on the name plate.

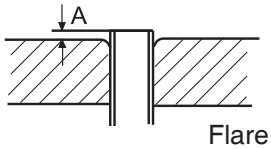
2.Please do not let other cooling medium, except specified one (R410A), or air enter into the cooling circulation system. Otherwise, there will be abnormal high pressure in the system to make it crack and lead to personal injuries.

1 Power Source Installation

- The power source must be exclusively used for air conditioner. (Over 10A)
- In the case of installing an air conditioner in a moist place. please install an earth leakage breaker.
- For installation in other places, use a circuit breaker as far as possible.

2 Cutting and Flaring Work of Piping

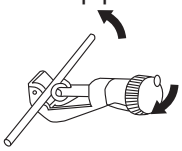
- Pipe cutting is carried out with a pipe cutter and burs must be removed.
- After inserting the flare nut, flaring work is carried out.



Flare tooling die

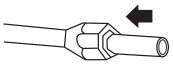
	Flare tool for R410A	Conventional flare tool	
	Clutch-type	clutch-type(Rigid-type)	Wing-nut type (Imperial-type)
A	0~0.5mm	1.0~1.5mm	1.5~2.0mm

1.Cut pipe

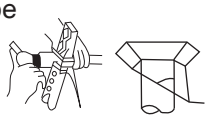


2.Remove burs

3.Insert the flare nut



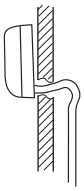
4.Flare pipe



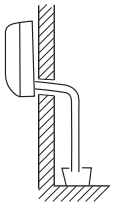
Correct	Incorrect				
					
	Lean	Damage of flare	Crack	Partial	Too outside

3 On Drainage

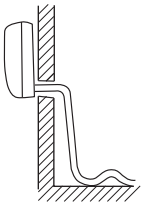
- Please install the drain hose so as to be downward slope without fail.
- Please don't do the drainage as shown below.



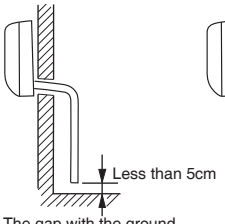
It becomes high midway.



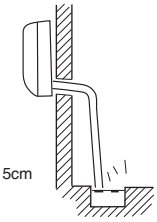
The end is immersed in water.



It waves.



The gap with the ground is too small.



There is the bad smell from a ditch.

- Please pour water in the drain pan of the indoor unit, and confirm that drainage is carried out surely to outdoor.
- In case that the attached drain hose is in a room, please apply heat insulation to it without fail.

Check for Installation and Test Run

- Please kindly explain to our customers how to operate through the instructio manual.

Check Items for Test Run

☐ Put check mark ✓ in boxes

☐ Gas leak from pipe connecting?
☐ Heat insulation of pipe connecting?
☐ Are the connecting wirings of indoor and outdoor firmly inserted to the terminal block?
☐ Is the connecting wiring of indoor and outdoor firmly fixed?
☐ Is drainage securely carried out?
☐ Is the earth line securely connected?
☐ Is the indoor unit securely fixed?
☐ Is power source voltage abided by the code?
☐ Is there any noise?
☐ Is the lamp normally lighting?
☐ Are cooling and heating(when in heat pump) performed normally?
☐ Is the operation of room temperature regulator normal?

Sincere Forever

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