Technical Manual

Metropolis 10HP
Metropolis 12HP

Zymbo Zhongshan Electrical Mfg. Co. Ltd.

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1.Main features

Double ducted machine is different with the normal split type air conditioner, and there is no outdoor unit, and installed with high wall. It is a special solution for commercial and residential buildings.

The twin-duct system eliminates security breaches and offers a great look to the building, as only 2x162mm holes are required.

The benefits of no outdoor unit are: no sleeve, no louvers and no rust, ensuring low cost installation and maintenance. The heat pump provides low operating costs when in heating mode.

- R410a gas, friendly refrigerant with high efficiency ozone.
- Auto water evaporation in cooling and heating mode
- Intelligent control technology.
- High-efficiency cooling and heating performance.
- Silent operation
- Full function LCD remote control

2. Certificatin

2.1 CE-EMC

SGS

SGS-CSTC Standards Technical Services Co., Ltd.
Guangzhou Branch

198 Kezhu Road, Scientech Park, Guangzhou Economic & Technological
Development District, Guangzhou, China 510663
Telephone: +86 (0) 20 82 155555
Fax: +86 (0) 20 82075059
Email: ee.guangzhou@sgs.com

VERIFICATION OF EMC COMPLIANCE

Verification No.:	GZEM160100040701V
Applicant:	Zymbo (Zhong Shan) Electrical Mfg., Co., Ltd.
Address of Applicant:	Guang Feng Industrial Estate, Sha Lang, Xi Qu, Zhong Shan City, Guang Dong, China.
Manufacturer:	The same as applicant
Address of Manufacturer:	The same as address of applicant
Factory:	The same as applicant
Address of Factory:	The same as address of applicant
Product Description:	Double Duct Air Conditioner
Model No.:	10HP, 12HP.
Trade Mark:	ZYMBO

Sufficient samples of the product have been tested and found to be in conformity with

Test Standard:	EN 55014-1:2006+A1:2009+A2:2011, EN 55014-2:2015, EN 61000-3-2:2014, EN 61000-3-3:2013.
As shown in the Test Report Number(s):	GZEM160100040701

This verification of EMC Compliance has been granted to the applicant based on the results of the tests, performed by laboratory of SGS-CSTC Standards Technical Services Co., Ltd. on the sample of the above-mentioned product in accordance with the provisions of the relevant specific standards under Directive 2004/108/EC. The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives.

The current EMC (ElectroMagnetic Compatibility) Directive (2004/108/EC) will be replaced with EMC Directive 2014/30/EU that will come effective on 20th April 2016. The testing samples of the product are in accordance with technical requirements of the new EMC Directive (2014/30/EU). The Technical documentation, Declaration of Conformity, markings etc. shall be brought into line with EMC Directive (2014/30/EU). The manufacturer shall be aware about obligations of the manufacturer as stated in the Chapter 2 Article 7 of the EMC Directive (2014/30/EU). The affixing of the CE marking presumes in addition that the conditions in annexes II and III of the directive are fulfilled and proven with the Declaration of Conformity signed by the manufacturer.

Kobe Jian
Manager

CE

Date: 2016-04-07

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2.2 CE-LVD

VERIFICATION OF COMPLIANCE

No.:	LVD GZES1601001024HS
Applicant:	Zymbo (Zhongshan) Electrical Mfg., Co., Ltd Guangfeng Industrial Estate, Shalang, Xiqu, Zhongshan, Guangdong, China
Manufacturer:	Same as applicant
Product Name:	Double Duct Air Conditioner
Product Description:	Air Conditioner
Model No.:	10HP, 12HP
Trade Mark:	ZYMBO
Rating:	230 V; 50 Hz; 10HP: Cooling: 862 W; 3,9 A; Heating: 750 W; 3,3 A; Heater: 1100 W 12HP: Cooling: 1050 W; 4,6 A; Heating: 800 W; 3,7 A; Heater: 1100 W
Protection against Electric Shock:	Class I
Additional Information (if any):	Refrigerant: R410A
Sufficient samples of the product have been tested and found to be in conformity with Test Standard:	EN 60335-2-40: 2003 + A11: 2004 + A12: 2005 + A1: 2006 + A2: 2009 + A13: 2012 EN 60335-1: 2012 + A11: 2014 EN 62233: 2008
as shown in the Test Report Number(s):	GZES160100102401

This Verification of LVD Compliance has been granted to the applicant based on the results of tests, performed by Laboratory of SGS-CSTC Standards Technical Services Co., Ltd. on sample of the above-mentioned product in accordance with the provisions of the relevant specific standards and the Low Voltage Directive 2014/35/EU. The CE marking as shown below can be affixed, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The affixing of the CE marking presumes in addition that the conditions in annexes III and IV of the Directive are fulfilled.

CE

Anson Luo
Laboratory Manager
SGS-CSTC

2016-05-31

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Member of SGS Group (Société Générale de Surveillance)

2.3 RoHS

DNV·GL

VERIFICATION OF PRODUCT DECLARATIONS

Certificate No:
2006-SZ-RoHS-0052

Initial certification date:
11 October, 2006

Valid:
6 December, 2015 - 5 December, 2017

Application of the Council Directive 2011/65/EU on the restriction of the use of certain hazardous substances in the electrical and electronic equipment

This is to certify that the following products:

Heat Exchanger, Vehicle Air Conditioner, Double Duct Type Air Conditioner, Rooftop Air Conditioner, Fan-coil

热交换器, 车载空调器, 双管式空调器, 顶置房车空调,风机盘管

(As listed on Appendix of this certificate)
Manufactured by

Zymbo (Zhongshan) Electrical Mfg. Co., Ltd.

中山深宝电器制造有限公司

Guangfeng Industrial Estate, Shalang, Xiqu, Zhongshan, Guangdong, P.R. China
中国广东省中山市西区沙朗广丰工业区

are found to be in compliance with the requirements of the directive

Place and date:
Shanghai, 7 December, 2015

For the issuing office:
DNV GL – Business Assurance

Chen Yi
Management Representative

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.
ACCREDITED UNIT: DNV GL BUSINESS ASSURANCE (CHINA) CO., LTD. SUITE A, BUILDING 9, NO.1591, HONGQIAO ROAD, CHANGNING DISTRICT, SHANGHAI 200336, P.R.CHINA TEL: +86 21 32084518 www.dnvba.com

DNV·GL

Certificate No.: 2006-SZ-RoHS-0052
Place and date: Shanghai, 7 December , 2015

1. This certificate is subject to that:
   - The products are manufactured in accordance with the procedures and processes as stipulated in the management system assessed by DNV during site audit.
   - Clients have provided accurate data and information in the assessed product declaration forms.
   - Clients shall inform DNV the changes in the management system and product declaration forms timely.

2. This certificate is based on initial audit and annual audit of the implementation of management system, the sampled product declaration forms and relevant records.

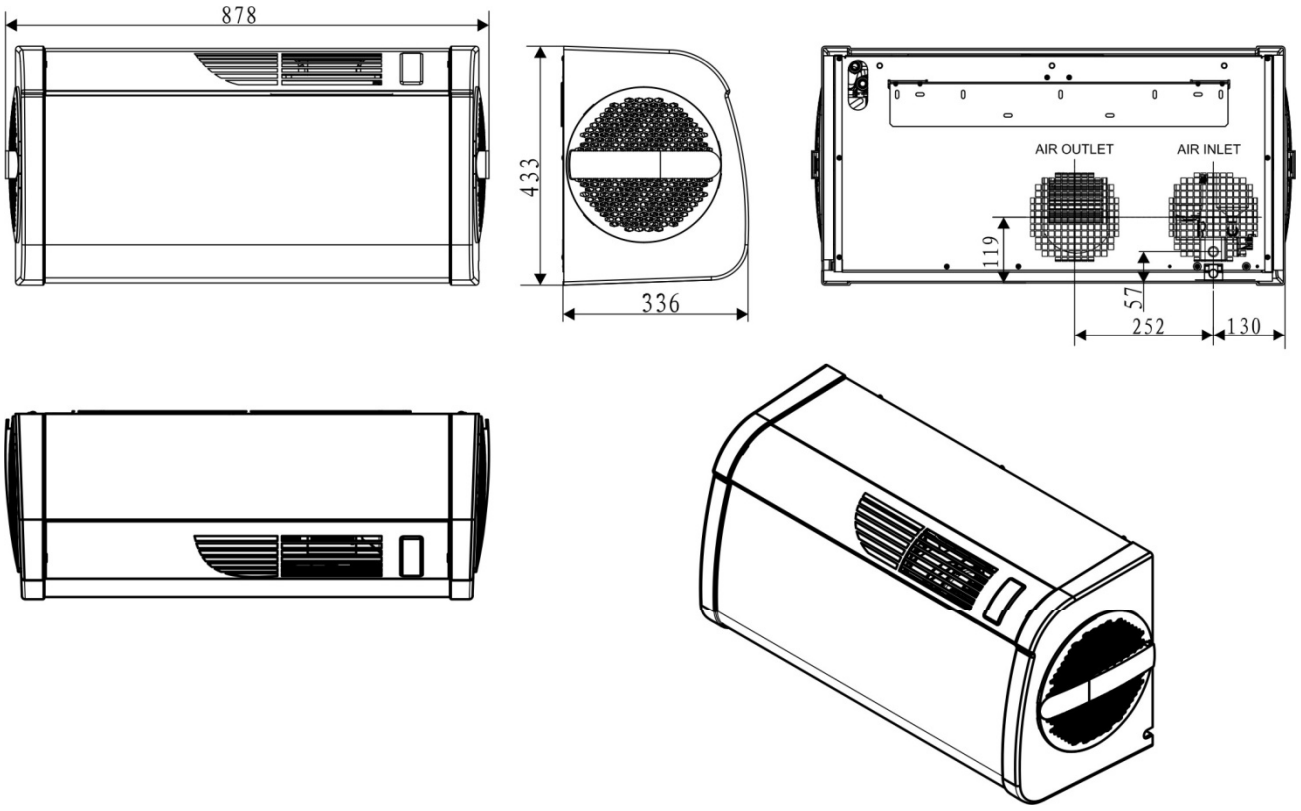
3. All the relevant Directives must be complied.

4. Applicable Product Series:

Product Categories 产品类别	**Model Name** 对应的产品型号*(1)
Heat Exchanger 热交换器	Evaporator, Condenser
Vehicle Air Conditioner 车载空调器	HB2500, HB9000
Double Duct Type Air Conditioner 双管式空调器	WZ-20,WZ-21,WZ-25,WZ-28EC, WZ-28EC polar,WZ-32 polar, WZ-X,WZ-XEC,WZ-XEC polar,WZ-X polar X:Cooling Capacity
	iCOOL, iWARM
	10HP,12HP
Rooftop Air Conditioner 顶置房车空调	RTL2-135
Fan-coil 风机盘管	RX-200, RX-400

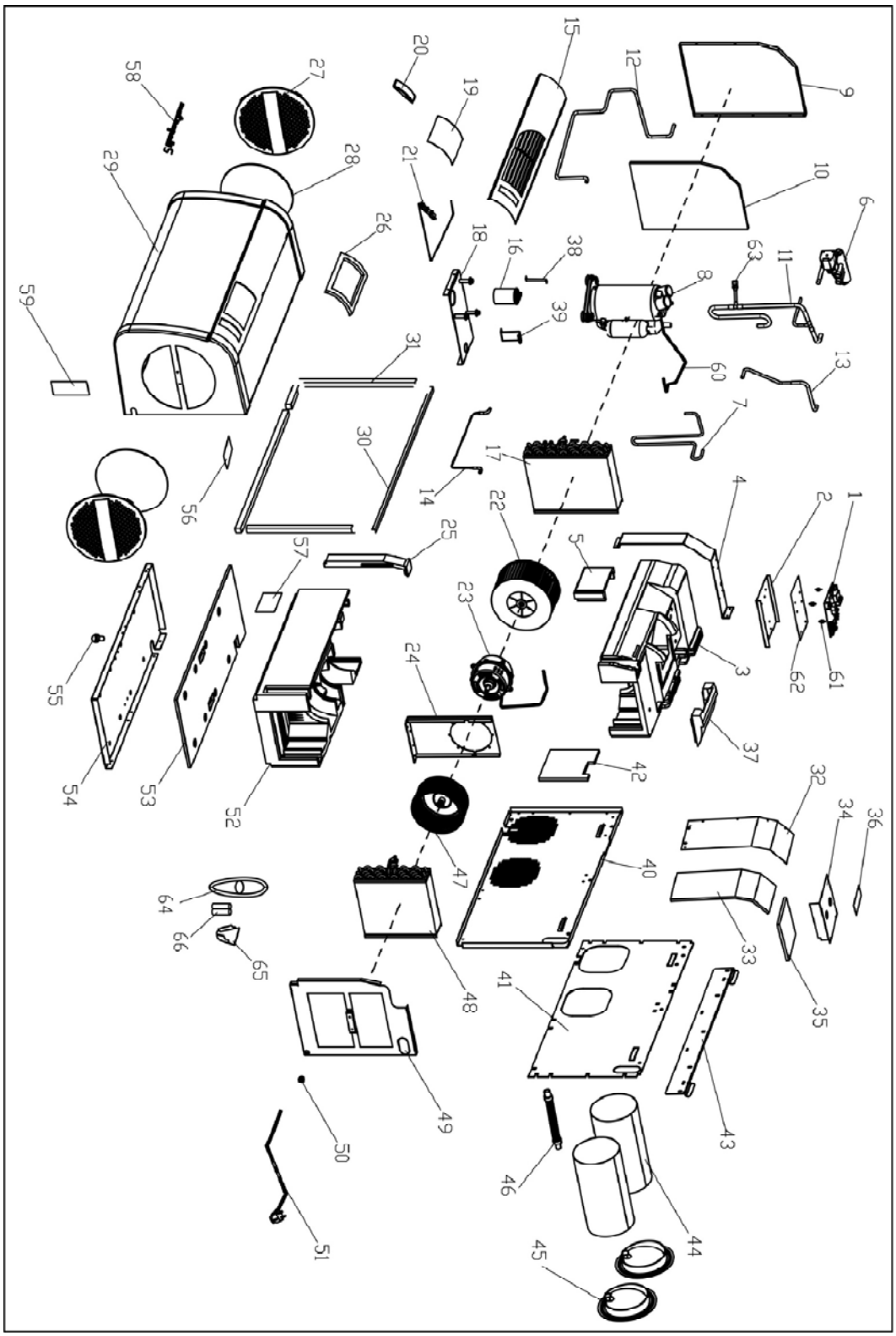
The above products are made from the components and material which are in compliance to RoHS Directives.

3. Overall Dimensions



4. Explosion view and parts list

4.1 10HP Explosion view



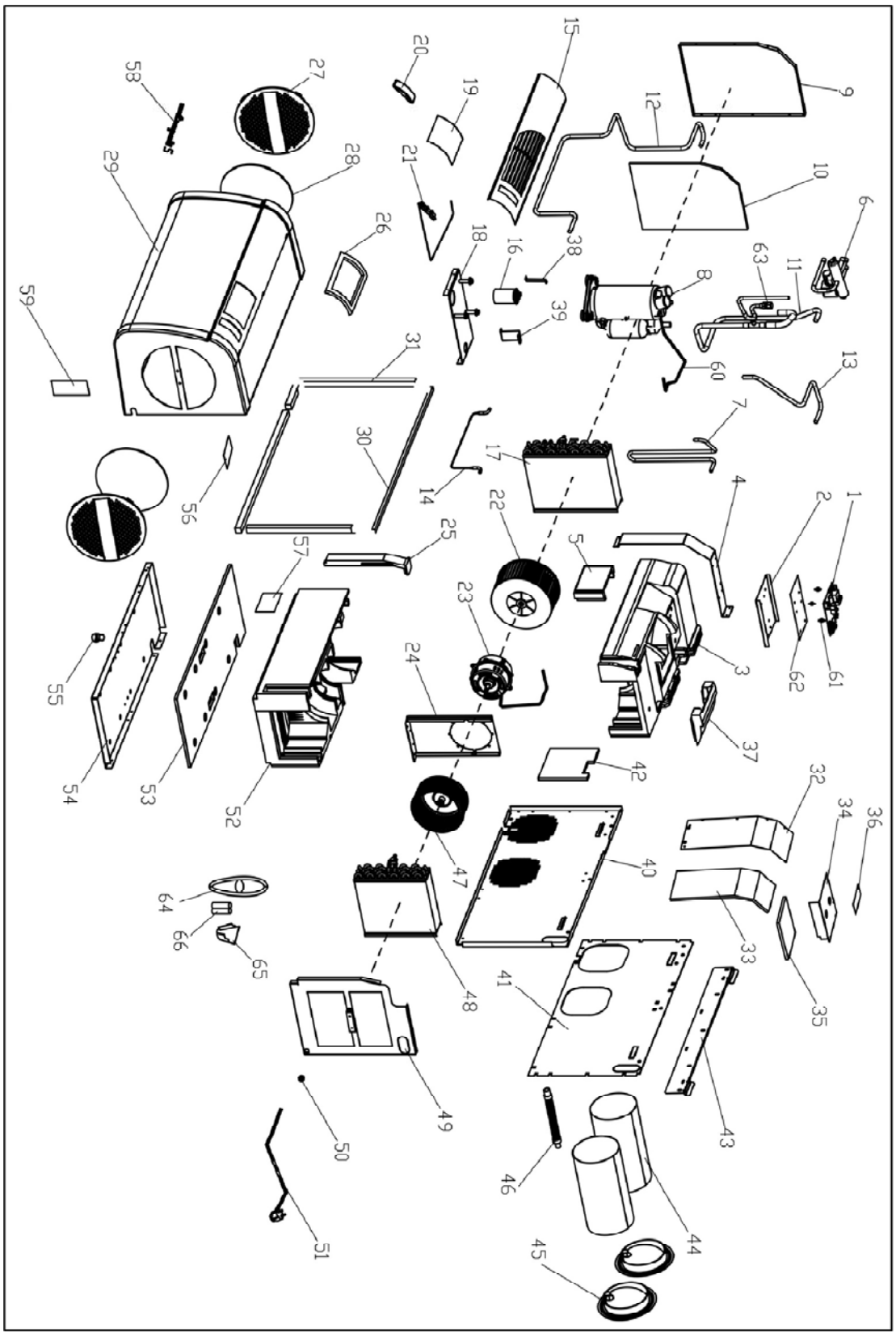
10HP Parts list

Metropolis unit(10HP)

No.	Part code	Description	Qty
1	R122070585	Main PCB	1 set
2	R127030672	PCB bracket	1
3	R128060538	Top EPP cover	1
4	R127041987	Metal fixing plate	1
5	R128060540	EPP insert EPP	1
6	R129150022/ R132080233	4-way valve assy.	1
7	R129161958	Discharge pipe	1
8	R133060011	Compressor assy.	1
9	R122190149	Left metal cover	1
10	R138141352	Insulation for left cover	1
11	R129161959/60/61	Suction pipe	1
12	R129161962	Evaporator connection pipe	1
13	R129161963/ R129161964	Condenser connection pipe	1
14	R122060172	Capillary assy	1
15	R127041996	Air outlet grille	1
16	R131160035	Compressor capacitor	1
17	R121050276	Condenser assy.	1
18	R122160877	Compressor bracket assy.	1
19	R138141358	Air outlet insulation1	1
20	R128040491	LED cover	1
21	R131020119	Display PCB	1
22	R128050064	Condenser blade	1
23	R131040179	Motor	1
24	R127030670	Motor bracket	1
25	R128060541	EPP front cover	1
26	R138141357	Air outlet insulation2	1
27	R128020551	Air inlet grille	2
28	R128020552	Air filter	2
29	R128060542	Thermoforming case	1
30	R138141347	Thermoforming sponge(Long)	2

31	R138141348	Thermoforming sponge(Short)	2
32	R127041994	Front cover	1
33	R138141355	Insulation for front cover	1
34	R127041995	Top cover	1
35	R138141356	Insulation for top cover	1
36	R134151011	Fresh air label	1
37	R128060539	EPP outlet cover	1
38	R127030671	Compressor capacitor fixing plate	1
39	R127041988	EPP fixing plate	1
40	R127041993	Back metal cover	1
41	R138141354	Back metal insulation	1
42	R138141353	Compressor insulation	1
43	R127080074	Installation bracket	1
44	R128060524	Flexible pipe	2
45	R128030692/93/94	Outside grille	2
46	R128070006	Drain pipe	1
47	R128050065	Evaporator blade	1
48	R122010285	Evaporator assy.	1
49	R122190150	Right metal cover	1
50	R139010101	Clip for power cable	1
51	R132040218	Power cable	1
52	R128060537	Bottom EPP	1
53	R138141351	Bottom insulation	1
54	R140060015	Metal base	1
55	R139010183	Rubber cup	1
56	R134151012	Drain water label	1
57	R134110393	Wring diagram	1
58	R134070405	Metropolis logo	1
59	R134052052	Rating label	1
60	R132080755	General cable	1
61	R127030587	PCB nylon support	4
62	R128040490	PCB protection film	1
63	E129090127/ E129150031	Recharge valve	1
64	R131170148	Remote control	1
65	R128040261	Remote control bracket	1
66	R131100001	Battery	2

4.2 12HP Explosion view



12HP Parts list

Metropolis unit(12HP)

No.	Part code	Description	Qty
1	R122070585	Main PCB	1 set
2	R127030672	PCB bracket	1
3	R128060538	Top EPP cover	1
4	R127041987	Metal fixing plate	1
5	R128060540	EPP insert EPP	1
6	R129150022/ R132080233	4-way valve assy.	1
7	R129162073	Discharge pipe	1
8	R133150011	Compressor assy.	1
9	R122190149	Left metal cover	1
10	R138141352	Insulation for left cover	1
11	R129162077/78	Suction pipe	1
12	R129162075	Evaporator connection pipe	1
13	R129162076 /R129161964	Condenser connection pipe	1
14	R122060181	Capillary assy	1
15	R127041996	Air outlet grille	1
16	R131160007	Compressor capacitor	1
17	R121050276	Condenser assy.	1
18	R122160899	Compressor bracket assy.	1
19	R138141358	Air outlet insulation1	1
20	R128040491	LED cover	1
21	R131020119	Display PCB	1
22	R128050064	Condenser blade	1
23	R131040179	Motor	1
24	R127030670	Motor bracket	1
25	R128060541	EPP front cover	1
26	R138141357	Air outlet insulation2	1
27	R128020551	Air inlet grille	2
28	R128020552	Air filter	2
29	R128060542	Thermoforming case	1
30	R138141347	Thermoforming sponge(Long)	2

31	R138141348	Thermoforming sponge(Short)	2
32	R127041994	Front cover	1
33	R138141355	Insulation for front cover	1
34	R127041995	Top cover	1
35	R138141356	Insulation for top cover	1
36	R134151011	Fresh air label	1
37	R128060539	EPP outlet cover	1
38	R127030733	Compressor capacitor fixing plate	1
39	R127041988	EPP fixing plate	1
40	R127041993	Back metal cover	1
41	R138141354	Back metal insulation	1
42	R138141353	Compressor insulation	1
43	R127080074	Installation bracket	1
44	R128060524	Flexible pipe	2
45	R128030692/93/94	Outside grille	2
46	R128070006	Drain pipe	1
47	R128050065	Evaporator blade	1
48	R122010285	Evaporator assy.	1
49	R122190150	Right metal cover	1
50	R139010101	Clip for power cable	1
51	R132040218	Power cable	1
52	R128060537	Bottom EPP	1
53	R138141351	Bottom insulation	1
54	R140060015	Metal base	1
55	R139010183	Rubber cup	1
56	R134151012	Drain water label	1
57	R134110393	Wring diagram	1
58	R134070405	Metropolis logo	1
59	R134052052	Rating label	1
60	R132080755	General cable	1
61	R127030587	PCB nylon support	4
62	R128040490	PCB protection film	1
63	E129090127/ E129150031	Recharge valve	1
64	R131170148	Remote control	1
65	R128040261	Remote control bracket	1
66	R131100001	Battery	2

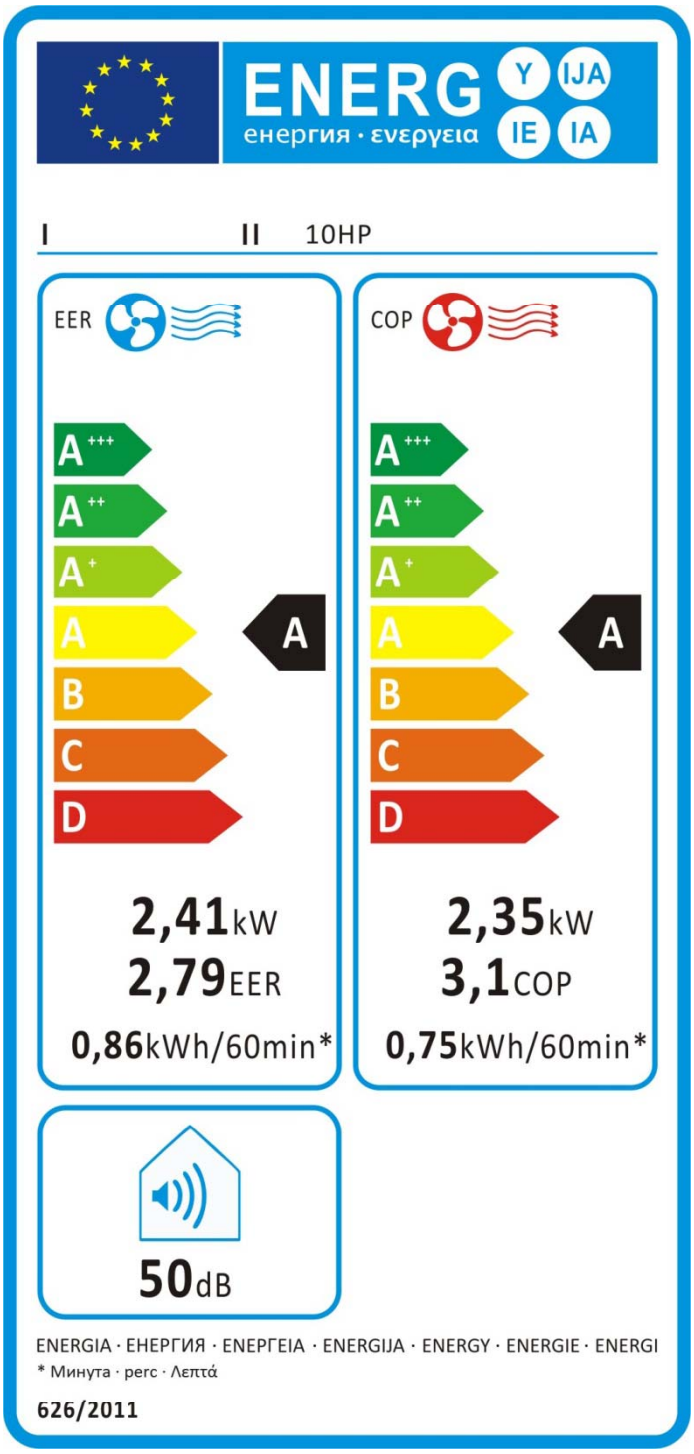
5.Rated technical data

Descriptions	Unit	10HP	12HP
Cooling capacity	W (Btu/h)	2410 (8300)	2750(9377)
Heating capacity	W (Btu/h)	2350(8050)	2550(8700)
Rated voltage	V	230	230
Frequency	Hz	50	50
Electrical heater	W (Btu/h)	1000(3500)	1000 (3500)
Absorbed power in cooling	W	862	1050
Absorbed current in cooling	A	3.9	4.6
Absorbed power in heating	W	750	800
Absorbed current in heating	A	3.3	3.5
EER label (Cooling Mode)	ABCDEFG	A	A
COP lable (Heating Mode)	ABCDEFG	A	A
Indoor Air low	m3/h	400	450
Outdoor Air low	m3/h	480	550
Noise lever (SPL)	dB(A)	50	50
Dehumidification capacity	L/24h	21.6	25.2
Optional temperature (remote control)	℃	18-30	18-30
Maximum external temperature ***	° C	43	43
Minimum external temperature HP ****	° C	-5	-5
Fuse (T3,15L)	V	250	250
Refrigerant / R410a	g	520	540
Dimension H/W/D	cm	87x43x33	87x43x33
Net Weight	Kg	41	42

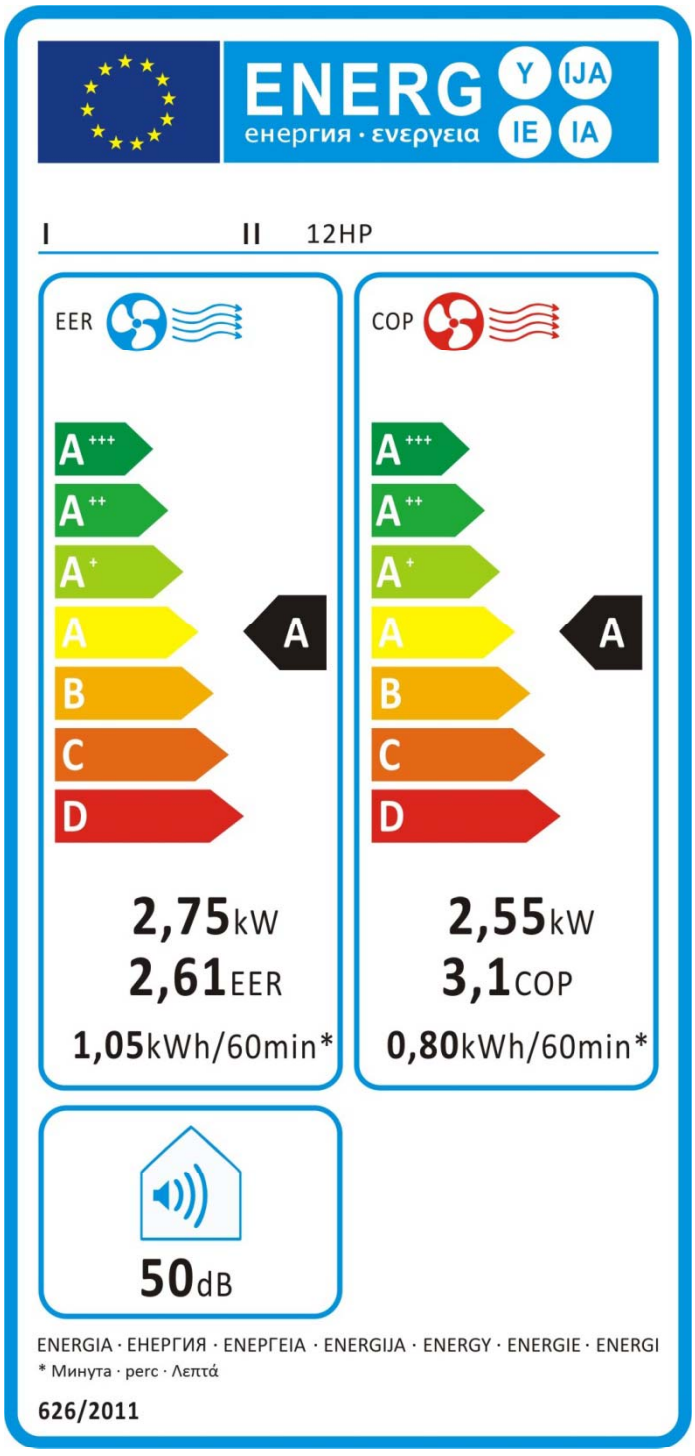
**The above data could be changed in order to improve the performance.
*** The machine can work at T3 condition , with max out door temperature 52 ° C but the cooling performance will be reduced .
**** The machine can work at -15 ° C , but the Heating performance will be reduced .

6. Energy label

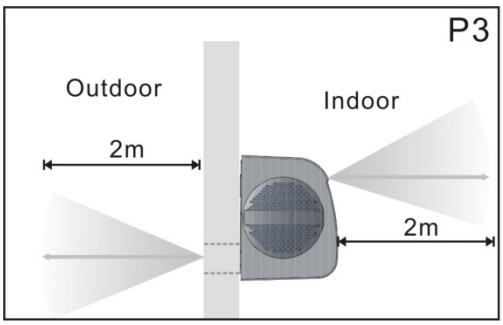
10HP Energy label

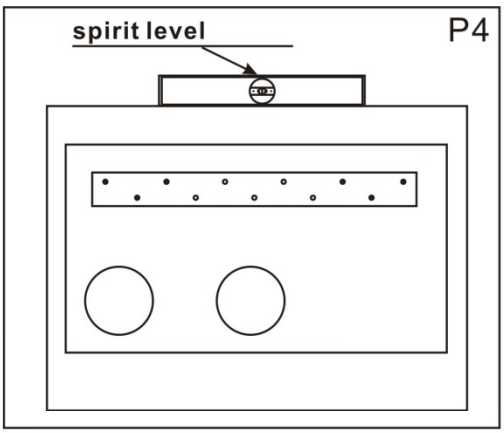


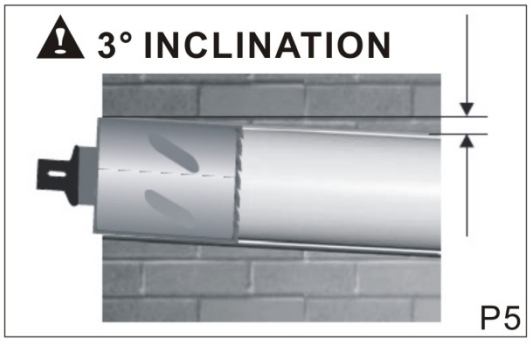
12HP Energy label



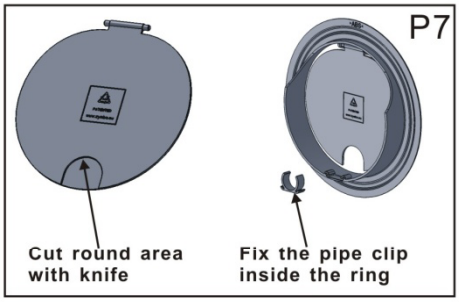
7. Installation

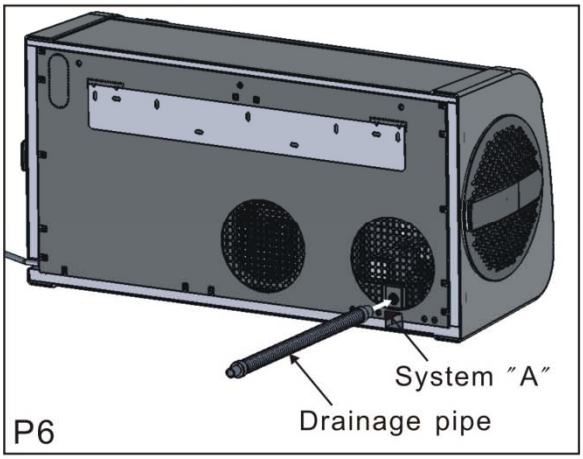


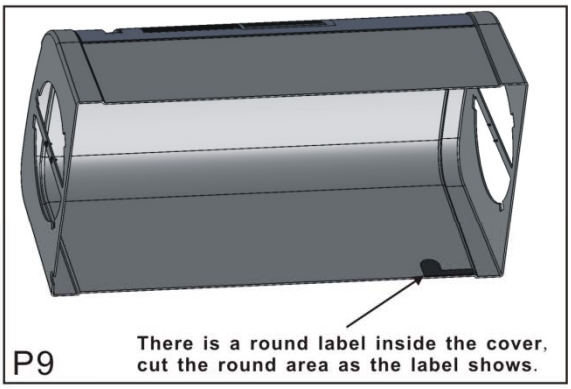


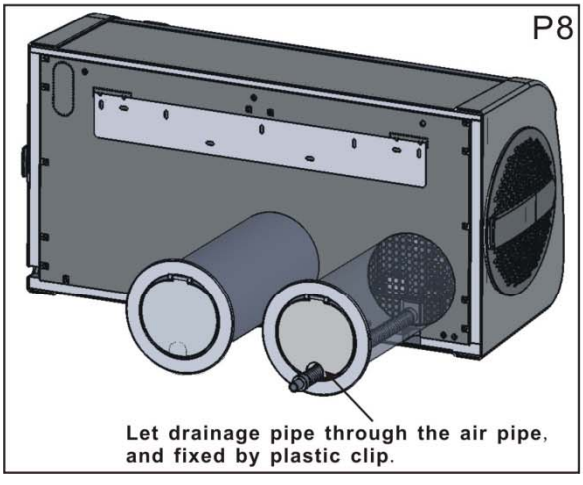


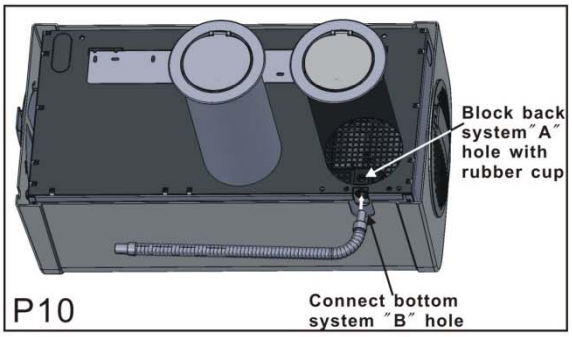
Indoor Outdoor

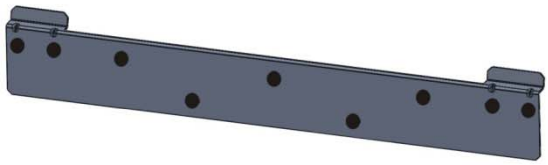












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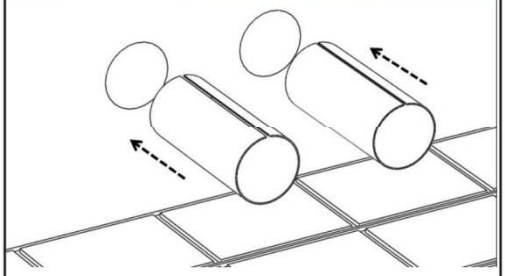

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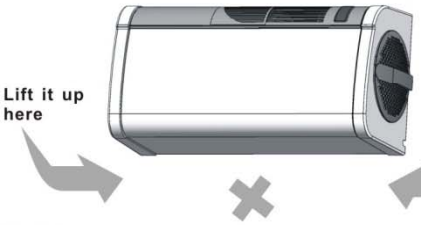

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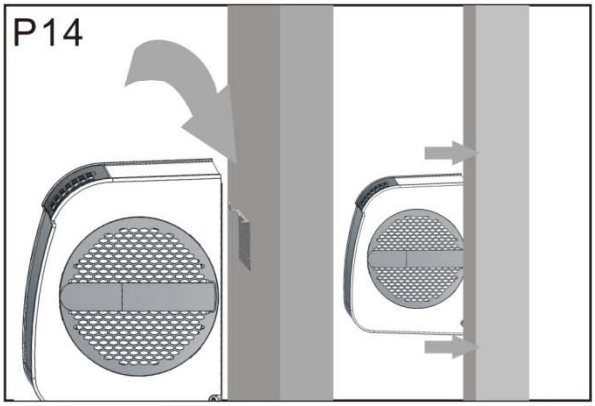
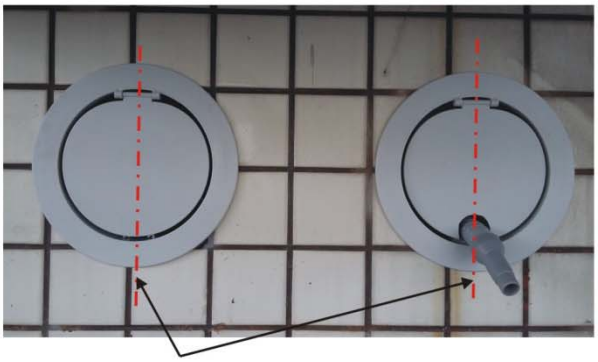
P14



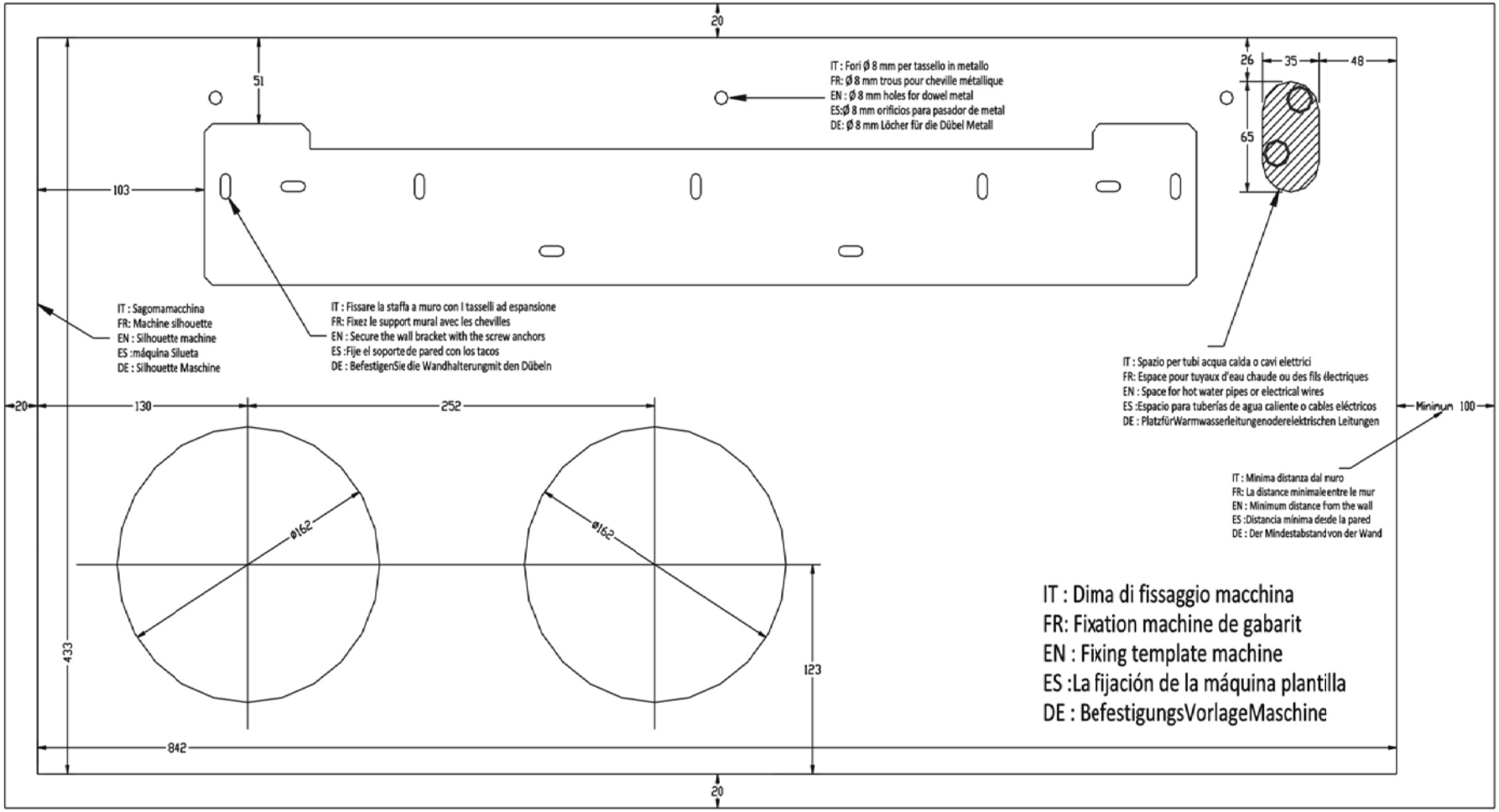
Put silicon glue
around the ring

Fix drainage pipe
with clip



Keep the flap with
vertical position

P15


20
51
IT : Fori Ø 8 mm per tassello in metallo
FR: Ø 8 mm trous pour cheville métallique
EN : Ø 8 mm holes for dowel metal
ES:Ø 8 mm orificios para pasador de metal
DE: Ø 8 mm Löcher für die Dübel Metall
26
35
48
65
103
IT : Sagomamacchina
FR: Machine silhouette
EN : Silhouette machine
ES :máquina Silueta
DE : Silhouette Maschine
IT : Fissare la staffa a muro con I tasselli ad espansione
FR: Fixez le support mural avec les chevilles
EN : Secure the wall bracket with the screw anchors
ES :Fije el soporte de pared con los tacos
DE : BefestigenSie die Wandhalterungmit den Dübeln
IT : Spazio per tubi acqua calda o cavi elettrici
FR: Espace pour tuyaux d'eau chaude ou des fils électriques
EN : Space for hot water pipes or electrical wires
ES :Espacio para tuberías de agua caliente o cables eléctricos
DE : PlatzfürWarmwasserleitungenoderelektrischen Leitungen
20
130
252
Minimum 100
IT : Minima distanza dal muro
FR: La distance minimale entre le mur
EN : Minimum distance from the wall
ES :Distancia mínima desde la pared
DE : Der Mindestabstand von der Wand
Ø162
Ø162
433
123
842
20
IT : Dima di fissaggio macchina
FR: Fixation machine de gabarit
EN : Fixing template machine
ES :La fijación de la máquina plantilla
DE : BefestigungsVorlageMaschine

7.1 Positioning the air conditioner (P3)

To maintain the best performance from your air conditioner, prevent breakdowns or hazards, you must position it correctly.Please follow the guidelines and instruction below in full, as failure to do so could cause potential installation problems.

The air conditioner must be installed on an exterior wall that has access to the out side with a minimum of 2 meters clearance to the outside.(See image P3)

The air conditioner must be fitted leaving room all around as illustrated in the paper template.

The wall on which the air conditioner is installed must be sturdy and able to withstand the weight for the air conditioner.

After determining the best place for installation as described above. Please check to ensure that the wall can be drilled in the chosen area without interfering with other structures or installations (beams, piers, pipes, wires, etc.).

Please also ensure that there are no obstacles on the outside of the wall, which may obstruct air circulation through the drilled holes, for example:(plants and their leaves, slats or panelling, drain pipes, overflows and gratings,etc.). Any obstruction could interfere with the correct performances of the air conditioner.

7.2 Paper template (P4)

Fasten the template to the wall once the following guidelines have been thoroughly checked.

• Do not drill any holes until you are completely confident that there are no obstacles in the area you wish to drill and there are no obstructions, which could be hidden by the construction of the wall, for example: electrical wiring, water&gas pipes or supporting lintels or beams.

• Ensure that a spirit level is used, as the air conditioner must be level.

• Follow the installation instructions in full.

•Fasten the template to the wall taking care to check the distance from the floor or ceiling.

•Use a pilot drill to mark the centre of each core hole to be drilled.

7.3 Drilling the wall(P5)

Please note:If you are drilling the hole above ground floor level, please ensure that an area has been secured and while the holes are drilled the outside area is supervised, until drilling has been completed.

Intake and outlet holes

• This operation should be carried out using the proper tools (diamond tip or core borers drills with high twisting torque and adjustable rotation speed).

•Find the holes center drilled before, use a core boring head having a diameter of 162mm to drill the two holes for intake and outlet the air.

•This operation should be carried out using the proper tools (diamond tip or core borers drills with high twisting torque and adjustable rotation speed).

Note: It is recommended that the holes must have a slightly downward inclination of 3-5 degree to prevent any backflow of water from the pipes.

Drainage hole (P6,P7,P8,P9,P10)

This air conditioner has a double drainage system to drain the condensate moisture automatically. Before install the air conditioner, choose which one is the suitable system for your installation. Please read carefully the following instructions.

System "A": (P6,P7,P8)

Connect the drain pipe (from rubber terminal) to the back side of air conditioner. System "A" is more common use, and the discharge pipe go outside where there is no problem to connect or to discharge it, this solution is ok for hot country and normal cold temperature outside. With this solution, you can drain the condensate moisture to a suitable place, do not cause any problem to your neighbors. If use system "A", please do not unplug the bottom rubber cup from system "B".

System "B": (P9.P10)

In case of impossibility to install the drainage pipe as showed on "A" system, please use system "B" to drain the condensate moisture to a suitable place. If use system "B", please block the black rubber cup from system "A". Take out the cover from the unit, and cut the cover as the label shows, then connect the drainage pipe from the bottom system "B" hole. (Later will show how to remove and fix the cover accordingly) Usually "B" holes is used in the installation when the outside temperature is very low, and in this way we prevent no ice in the discharge water pipe. This solution is used also to be much easy for the installer to connect the internal drainage pipe when he does not want to see the pipe from outside.

7.4 Fastening the bracket (P11)

-Drill the holes for anchoring the fastening bracket to the wall using preferably the 9 holes showed in black on the paper template.
-The anchor bolts provided require a 8mm hole. The wall should be inspected to determine if provided bolts are useful or if it is necessary to use a different anchorage. The manual facture is not liable in case of underestimation of the structural consistency of the anchorage made at the time of installation.

7.5 Installation of the pipes (P12)

- After drilling the holes, the plastic sheet supplied with the air conditioner need to be fitted through them.
- Measure the depth of the wall and cut supplied plastic sheet.
- Roll the sheet and insert it into the hole, paying attention to the joint line, which must be always upper position. Remember that the sheet must have the same inclination of the holes(min 3°).

7.6 Fitting the air conditioner on bracket (P13，P14)

After checking again that the fastening bracket is securely fastened to the wall, and that any necessary preparations for electric connection and condensate drainage (if it needs) have been made, fasten the air conditioner to its supporting bracket.
Lift it up by holding the sides at the bottom. Tilt the air conditioner slightly toward you to facilitate the operation of fastening it to the bracket. The air conditioner can now be pushed firmly against the wall. Inspect carefully the installation to make sure that the insulating back panel must fit firmly against the wall and there are no fissures at the back of the air conditioner.

Remark:
--The appliance shall not be installed the laundry.
--The appliance must be positioned so that the plug is accessible.
--The appliance shall be installed in accordance with national wiring regulations.

7.7 Fitting the gratings (P15)

To fit the external two gratings, please proceed as following:

-Put the silicon glue around the ring, and fix the two gratings from outside.
-Pay attention the flap direction, always keep the shaft side with upper direction.
-With system “A” water drainage solution, open a round hole with the flap, and try to fix the drainage pipe inside the plastic clip.
-Try to open and close the flap, should be no any interference with the drainage pipe.
-For gratings surface, we could paint them like the wall if necessary.

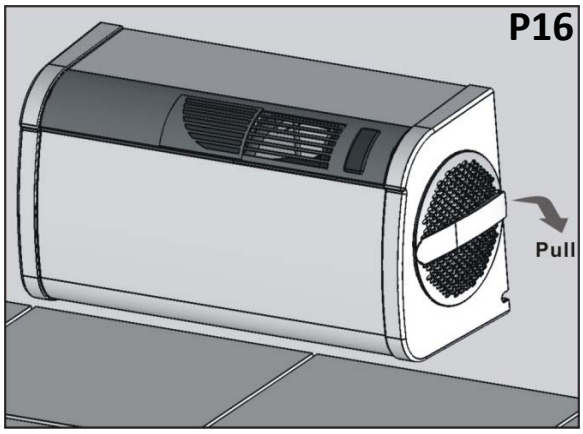
8. Metropolis accessory

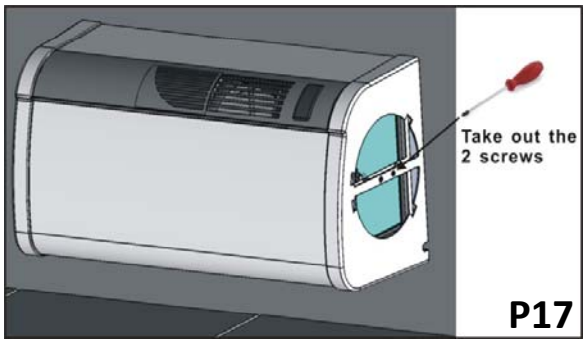
Metropolis 10 HP and 12 HP , is equipped with some standard accessories and some optional accessories .

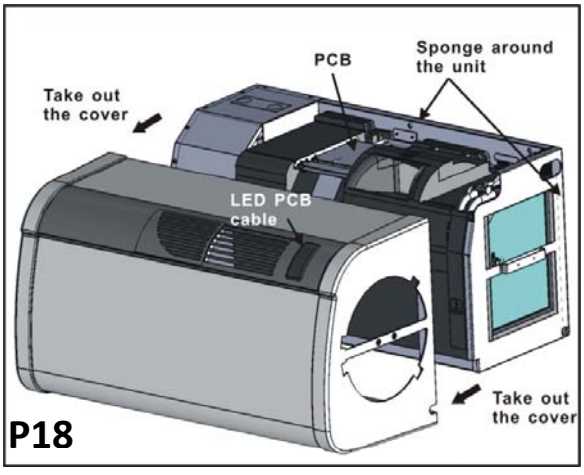
STANDARD ACCESSORIES :

To have access inside the machine please proceed in this way:

Proceed to open the plastic cover like below:
-Move the both sides filter gratings(P16)
-Take out the 2pcs screws by screw driver. (P17)
-Move the plastic cover from unit as arrow direction. Just take care and disconnect the LED display cable, also sponge around the unit cover.(P18)



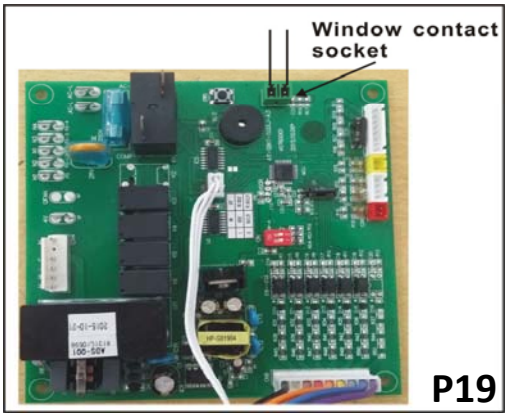




8.1 Clean contact function(Window or key card)

This unit has CLEAN CONTACT function on the main PCB, mainly used for hotel, office .
This function could be used for window contact or key card contact .

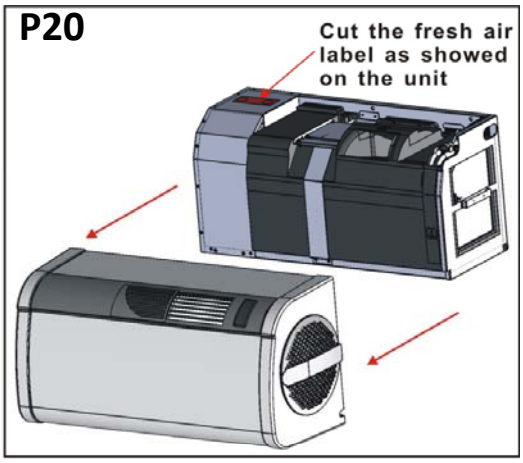
With connection of WINDOW CONTACT, when the contact (window or card) opens for 60 seconds, the air conditioner would stop running until window close again.
The PCB is located on the top of the unit, please take out plastic cover and connect the window contact socket.



8.2 Fresh air system

Fresh air system is studied to reduce CO2 inside room . This function is necessary for Hotel guest room but also to reduce CO2 inside room where there are many peoples inside .
When the fresh air system is open, the air conditioner will change the room air automatically. In this way new clean and fresh air will intake to the room.
There is two air fresh level 25 m/3 and 50 m3/h .

See 4.1 to take out the plastic cover, cut the label and the insulating below the label for the air fresh volume required .



OPTIONAL ACCESSORIES

For the Optional accessory ask them to your installer or your professional reseller .

8.3 Wall pad function

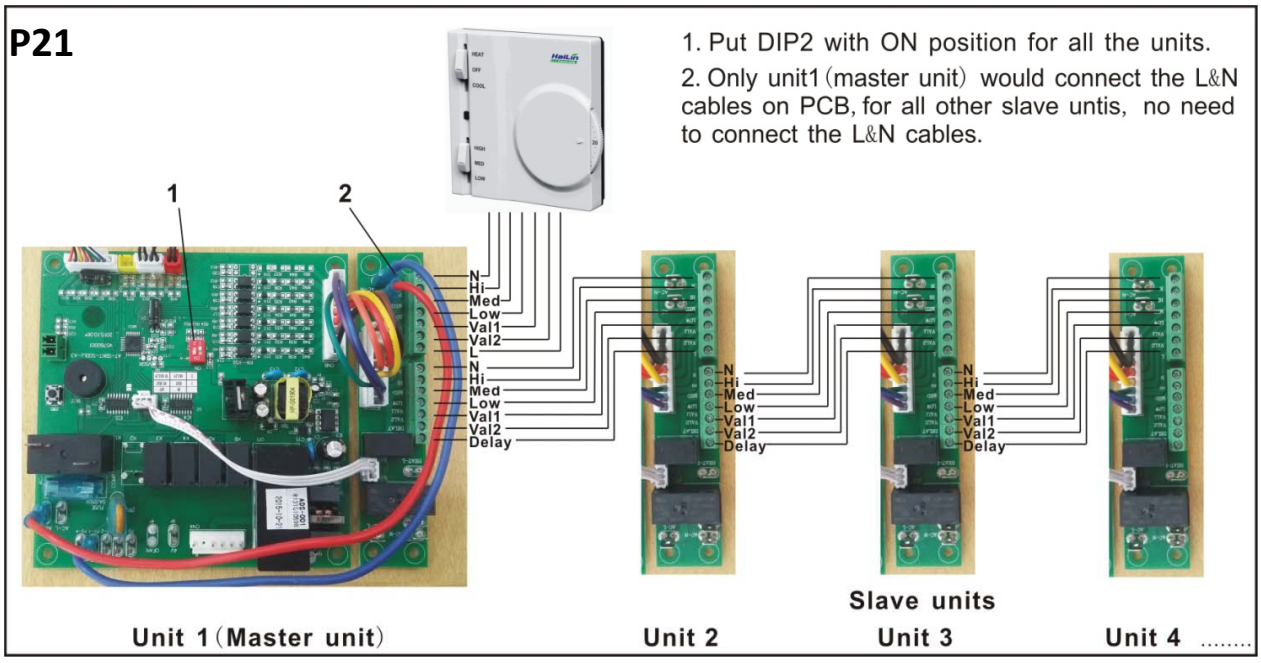
This unit could be connected with wall pad, our factory propose our models HL109FCV2 like the picture showed but similar models are available in the market . With wall pad connection, we could unite a net with several units, and one wall pad can control one unit but also all the units connected same time.
There are temperature adjusting knob and graduation mark on the panel. There are also the switch of fan speed HIGH-MED-LOW and the switch of HEAT-OFF-COOL on the panel.

The operation steps as follows:

-Turn ON/OFF: Push the switch to HEAT when heating, or push the switch to COOL when cooling. When push the switch to the OFF position, the wall pad will be turned off.
–Temperature setting: Turn the temperature adjusting knob to the desired temperature.
–Fan speed selection: Push the fan speed selecting switch to one of HIGH-MED-LOW.
–LED indicates operation state: in RED shows the power is on, in Orange shows under heating or cooling.
Note: When you use wall pad connected the machine or net of machines , the room sensor active is only the wall pad room sensor .

8.4 Wall pad installation

-The main PCB is on the top of the unit.
- It's possible to connect one wall pad for one machine like below scheme or is possible to connect the a small net system (20-30 machines)
- When you connect a net, and turn on the air conditioner by wall pad, unit 1 would start immediately, and unit 2 would delay 5 seconds, unit 3 would delay 5 seconds from unit 2...The 5 seconds delay is important for the electrical system to avoid over pick current .
- Put DIP2 with ON position, PCB is selected with wall pad function. Unit would work only with wall pad, remote control is invalid, and Auto-restart function is available with wall pad mode.



8.5 Hot water exchanger installation

Hot water exchanger is useful optional to replace water radiator below the window, improving machine performance and energy saving for your room installation .

-To install this you must remove the insulation sponge and EPP cover. (P22)

-Remove indoor temperature sensor (NTC) to outside first. (P22)

-Insert the hot water exchanger inside the unit, and fix it well with right position. (P23)

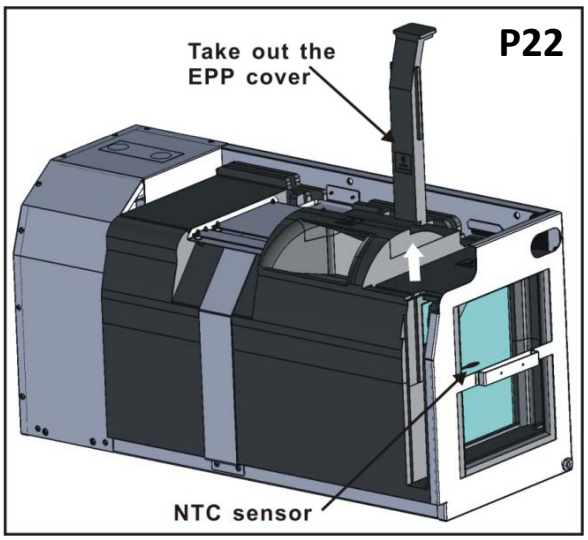
-Connect inlet & outlet water pipe well.

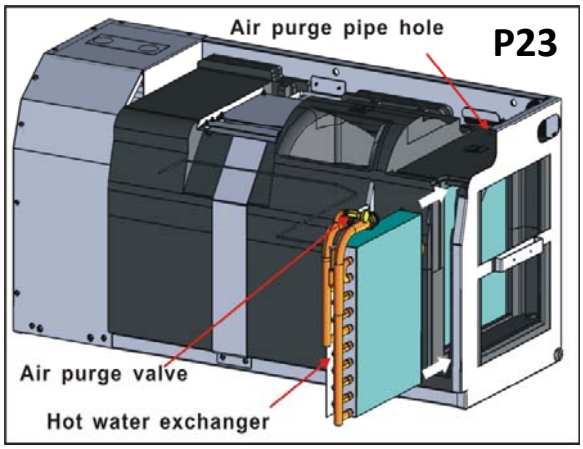
-Connect the hot water coil sensor to main PCB with yellow socket and fix the cable well on EPP.

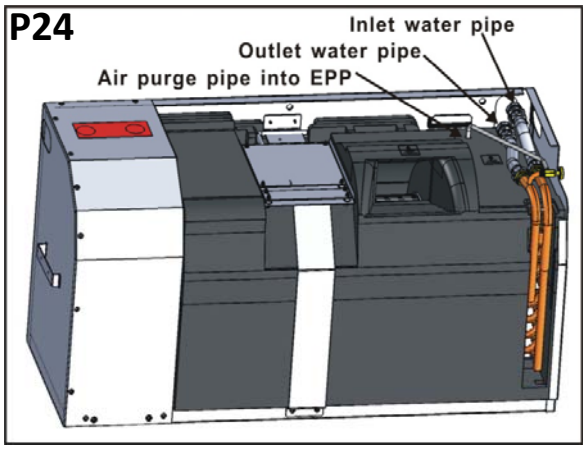
-Insert the air purge pipe into the EPP hole. (P24)

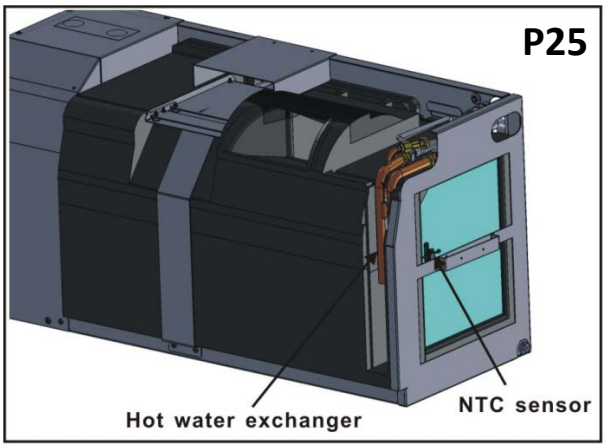
-Fix the NTC sensor on hot water exchanger again. (P25)

-Open the water system device. Open the air purge valve to release the air inside the exchanger. If there is no air inside the air purge pipe, close the valve. And check the hydraulic seal of the gasket.









8.6 Electrical heat installation

When it is very cold in winter, and need good heating performance with temperature lower than zero°C. So, electrical heat is suggested to use inside the air conditioner to improve in automatic way the performance .

-Remove the insulation sponge and EPP cover. (P26)

-Remove indoor temperature sensor(NTC) to outside. (P26)

-Open the accessory box, there are electrical heat, additional connection PCB and 4pcs plastic bracket. (P27)

-Insert the electrical heat inside the unit, and fix it well with right position.(P28)

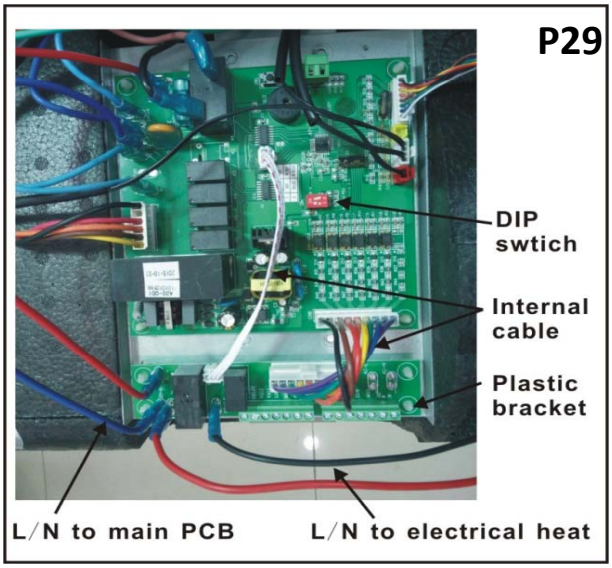
-Fix the connection PCB on the unit with 4pcs plastic bracket. (P4)

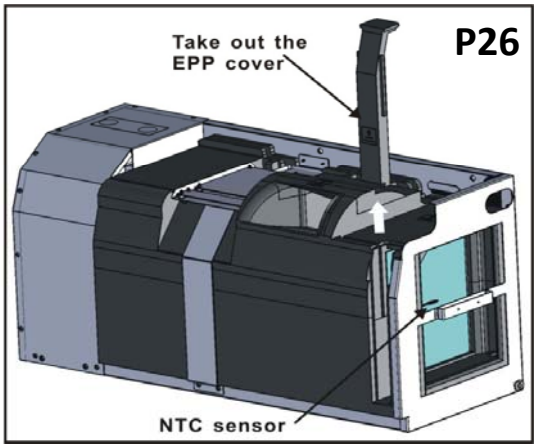
-Connect the cables between electrical heat & connection PCB and main PCB. (P29)

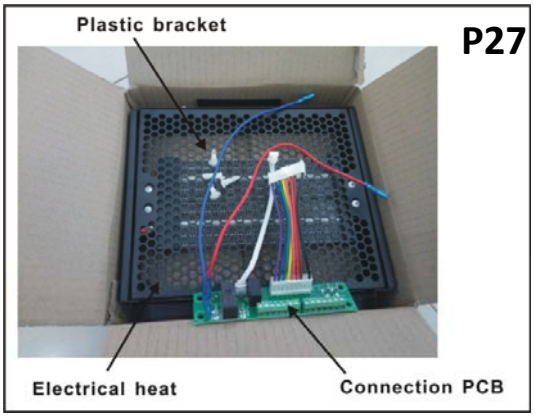
- Put DIP1 with ON position, PCB is selected with extra electrical heat function, electrical heat would work automatically when outdoor temperature is very low.

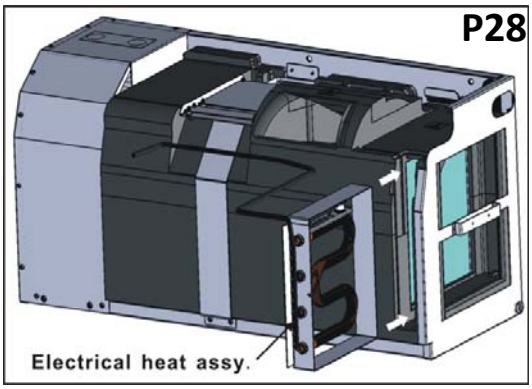
-Fix the NTC sensor with outside metal frame. (P30)

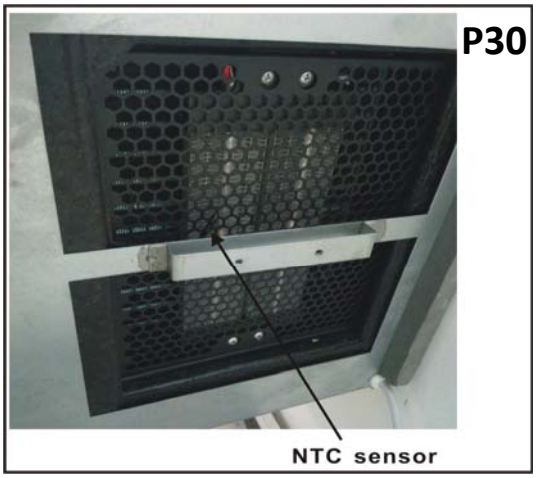
-Fix the out cover, and unit is ready for running.





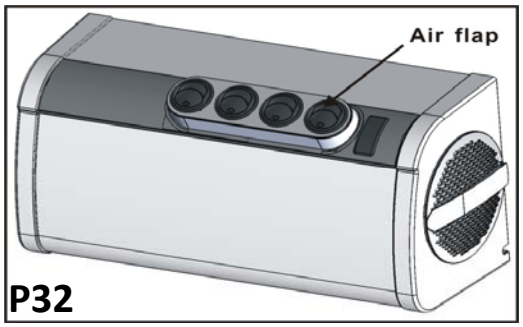


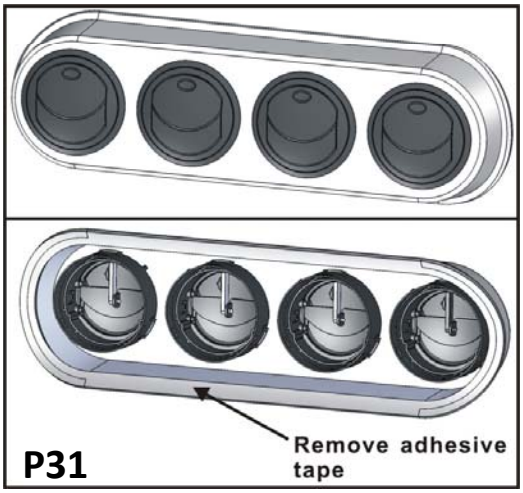




8.7 Multidirectional air system

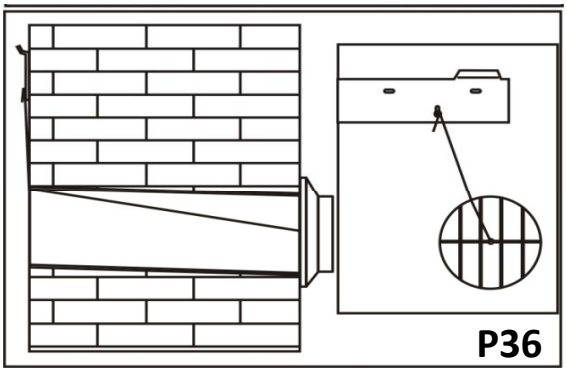
This accessory is studied to control air direction at 360 °C . To install it is easy .
Remove the adhesive tape from the back of the sponge, and fix the accessory on the top of the unit. (P31,P32)
Rotate the round air flap and control it to the specified direction as you like.

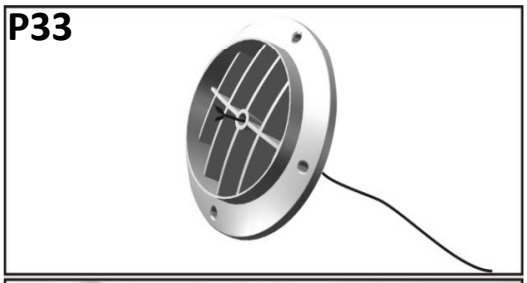


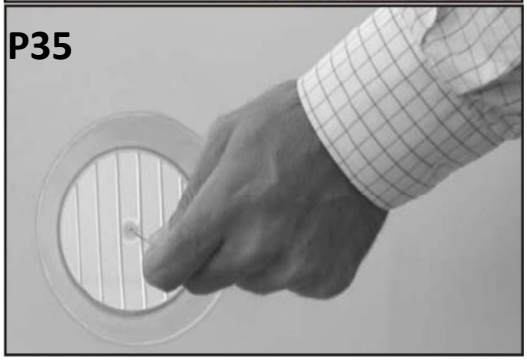


8.8 Soft gratings installation

To fix the external two soft gratings, please proceed as following:
Familiarize yourself with the fitting of the grating to the tube before installation. Insert the cords through the centre hole of grating. Fold the outer grating in half grasping the cord with your free hand. Insert your arm inside the pipe with the grating and push all the way to the outside. Let the grating unfold and pull the cord toward you. Both gratings fit on the inside of the tube. With a little patience and manipulation the 2 gratings will fit the end of the tubes. Grasping the cord, insert our fingers between the fins and pull the grating toward you until the same is properly slipped in the pipe, keeping the fins in vertical position.
If the external grating is accessible to prevent its removal, it is recommended to fasten it to the wall with wall plugs and screws with a diameter of 6mm. Tighten the cord and fasten it to the dent on the internal flanges.







8.9 Outside grille installation

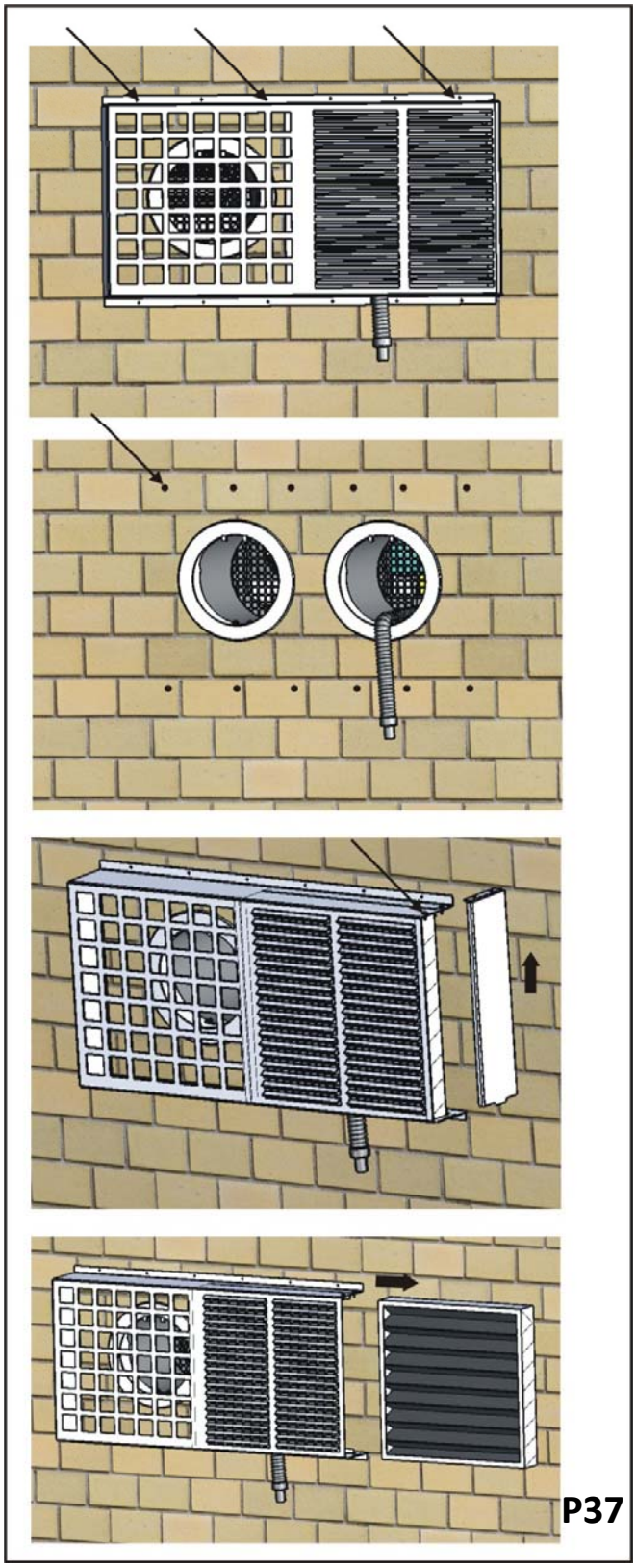
This accessory is studied to protect the inlet & outlet air holes.

--Put the cover on the wall, and keep the air holes in the middle of the grille. Then, mark the screw holes on the wall.

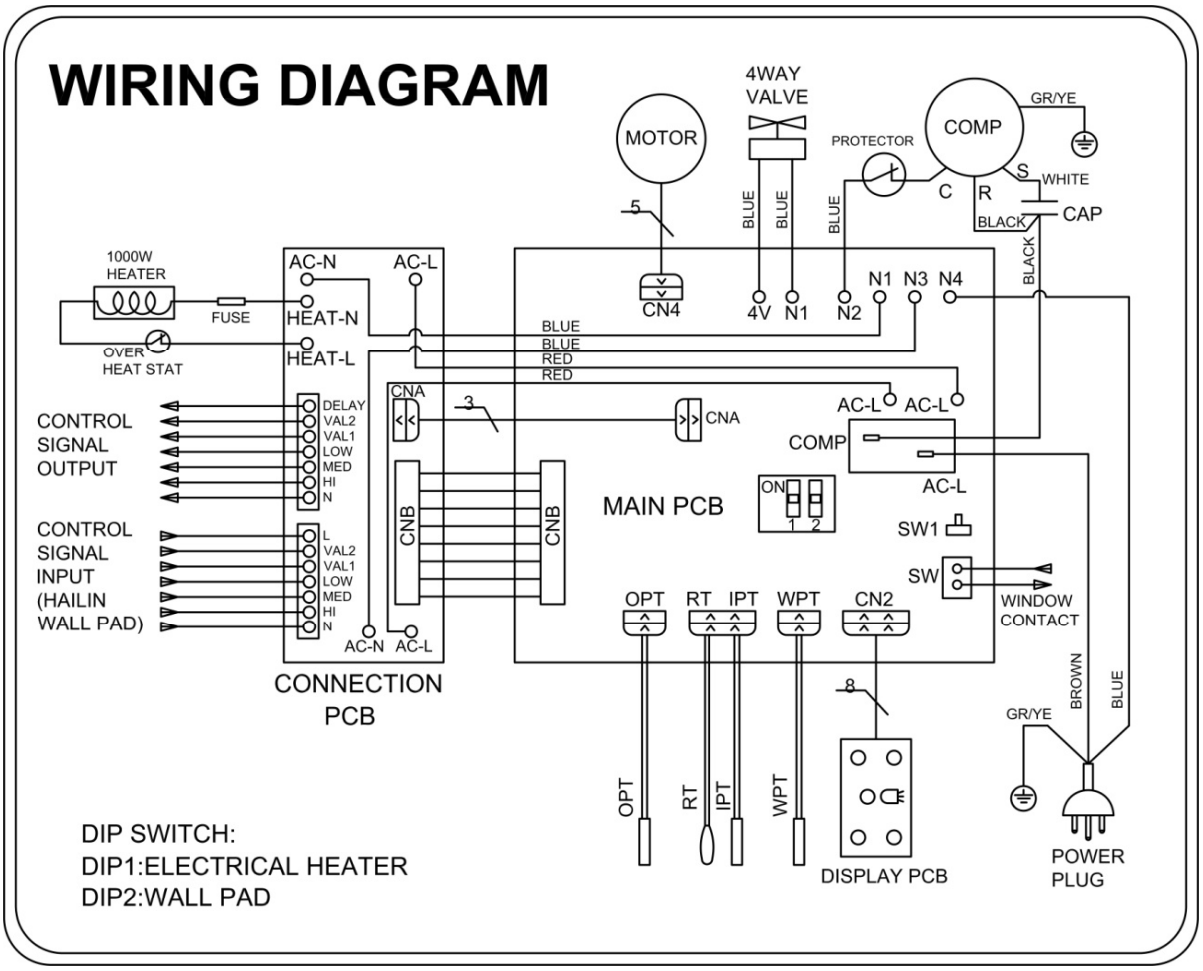
--Drill the screw holes on the wall with correct position, and fix the cover with screws. Keep the drainage pipe out from the bottom.

--There is air filter in the right side of the cover, and it should be washed regularly. Remove 2 screws on the top of the cover, and lift the right metal plate, we can take out the metal cover.

--Slide the air filter inside and wash it with water. After dry, put it back and fix the metal cover again.



9. 10HP, 12HP Electric wiring



Important Note :

• Main PCB is used on 100 % of the machines

• Connection PCB is a solution to avoid extra cost on Main PCB , because additional heater and additional wall pad are accessory and used on 10 % of the total production . When we install extra heater or wall pad accessory is necessary to install also Connection PCB and connect it to Main PCB.

• Control has one additional hot water sensor (WPT) supplied like accessory + window contact and transformer on board ; display LED is more easy and more simple .

10. Description of software operation

10.1 Main technical index

PCB should meet the following requirements:

• Measured from the receiver，receiving distance of remote control should be no less than 8 m，receiving angle ≥ 60° cone angle；

• Discrepancy of temperature control ≤±1℃；

• Discrepancy of time control ≤1min/24h；

• Discrepancy of motor speed ±10rpm

• Rated power supply：AC230±20%，～50Hz；

• PCB should conform to CE LVD and RoHS.

• Consumption power with standby condition:<0.8w

10.2 Definition

• RT：room temperature, white socket on main , with 900mm length.

• IPT：indoor coil temperature, white socket on main, with 900mm length.

• WPT : water coil temperature, red socket on main PCB, with 750mm length.

• ST：setting temperature，range 18～30℃ (from remote control)

• OPT：outdoor coil temperature, yellow socket on main PCB, with 650mm length

• NTC data：R25=5.0KΩ±1% B25/50=3470±1%

• Window contact NO (normally open contact)

• FAN (indoor and outdoor fans only one motor)

• Buzzer (one Bit) when machine receive signal from remote control

10.3 Mode introduction

• Is possible to switch ON and OFF machine trough remote control or Wall pad

• Display description: Green LED: Power supply. Blue LED: Cooling mode. White LED: Dry mode. Red LED: Heating mode. Yellow LED: Fan mode.

• When machine is OFF only Green LED is ON and all other LEDs are Off

• When machine is turn On , for All mode , the green LED is OFF and ON the LED concerning the function .

• Machine operating mode are : Cooling – Heating – Dry – Fan – Auto

• Auto restart Function

10.3.1 Auto mode

After running the unit by ON/OFF key or choose the auto running mode by remote control, it will fix its running mode by judging room temperature (see below table):

Indoor temp.	**Indoor temp.≤20℃**	**20℃＜indoor＜25℃**	**indoor≥25℃**
Running mode	heating	fan	cooling
Standard fixed setting temperature	20℃	22℃	25℃

Note:

1. When Auto mode is selected, unit would check room temperature first and work with fixed mode as above accordingly.
2. If working mode is changed by remote control, unit has 3 minutes delay protection for compressor.
3. Fan speed selection: For Dry mode, fan speed is fixed with low speed. For Cooling, Heating and Fan mode, fan would work with set speed.
4. Unit has protection function, including 3 minutes delay function, Anti-cold function before heating, Over heating protection during heating function, Anti-frozen during cooling mode.

10.3.2 Cooling mode (Blue LED is ON)

1. Setting temperature range：18℃-30℃。

2. Compressor working conditions： a. Compressor works when RT≥ST+1℃；

b. Compressor stops when RT ≤ST-1℃；

c. -1℃＜RT-ST＜+1℃，compressor maintains the original state。

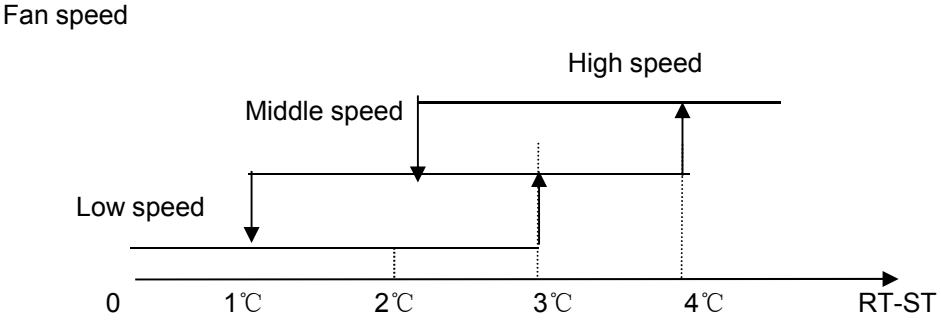
(RT: room temperature, ST: setting temperature)

3. Four-way valve working conditions: no power supply.

4. Fan speed control:

a. Fan will work as Auto speed, low speed, middle speed or high speed.

b. For Auto speed, fan will work as following chart:



10.3.3 Dry mode (White LED is ON)

1. Setting temperature range：18℃-30℃。

2. Working conditions：unit would work according to indoor temperature and setting temperature.

NO.	Conditions	Fan motor	Compressor	Four-way valve
1	RT≥ST	Fixed with low speed	Keep running	no power supply
2	RT<ST		Works for 10 minutes, then stops for 6 minutes	

Note: In dry mode, after unit goes into dry cycle, it will not change the working cycle when indoor temperature changed.

1) When RT≤14℃，dry mode no works, indoor fan works with low speed. When RT>16℃, unit would work normally.

2) Four-way valve：no power supply.

(RT: room temperature, ST: setting temperature)

10.3.4 Heating mode (Red LED is ON)

1. Setting temperature range：18℃-30℃。

2. Compressor working conditions：

First check the WPT, water coil temperature, when WPT ≤38℃, or no signal

a. Compressor starts condition: RT≤ST-1℃.

b. Compressor stops condition: RT＞ST+1℃；

c. -1℃＜ST-RT≤+1℃，compressor keeps original working state.

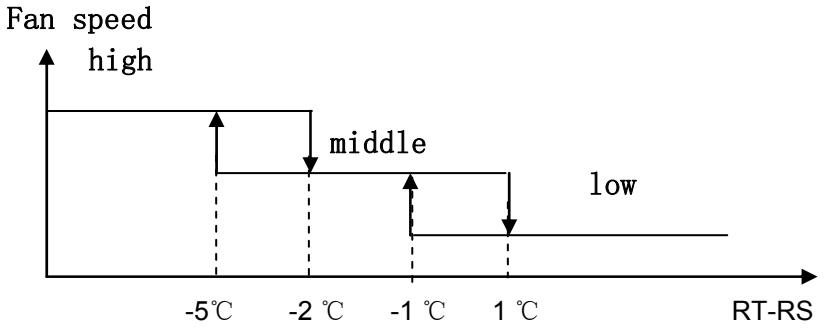
(RT: room temperature, ST: setting temperature)

3. Four-way valve working condition ： In heating mode, four-way valve keeps opening (including turning off when unit reaches setting temperature, but except defrost course). When unit is turned into heating mode or turned on, four-way valve will open after compressor is on. When heating mode is changed or unit is turned off, four-way valve will close 2 minutes later than compressor.

4. Indoor fan speed control:

a. Indoor fan will work as Auto speed, low speed, middle speed or high speed.

b. For Auto speed, it will work as following chart:



c. If compressor does not work after turn on the unit, fan will work as low speed. And fan will work as setting speed after the compressor starts running. When compressor stops working after reach the setting temperature, fan will work as low speed again.

5. Defrost function in heating mode:

Defrost conditions:
1). unit goes into heating pump or works after defrost cycle for 30 minutes
2). compressor continuously runs over 5 minutes,
3). when OPT≤-5℃ for one minute
if meet the above 3 conditions together, unit would begin defrost cycle.

Defrost procedure is as following:
1). Compressor and fan stop working, and 1 minute later stop 4-way valve.
2). Compressor will start again after 90 seconds.

Defrost relieving conditions:
After compressor running for 5 minutes, when OPT (outdoor coil temperature) rises up to 15℃, defrost cycle will be relieved automatically, and unit goes into normal heating mode. For each defrost cycle, the time is no more than 12 minutes (include the compressor close time), even OPT (outdoor coil temperature) is less than 15℃. Each defrost cycle time is 5-12 minutes.

Defrost relieving procedure is as following:
1). compressor and fan close.
2). Four-way valve will work after 1 minute.
3). Compressor and fan will work again after 30 seconds. Defrost cycle is over.

Note:
1). In heating mode, unit will check the OPT every 1 minute, to decide if unit will work with defrost cycle.
2). If there is over-temperature protection, unit will calculate the time again.
3). During defrost cycle, red LED will flash with 1Hz frequency.
4). Temperature detection is valid only when compressor is working.

10.3.5. Optional electric heater function (Red LED is ON)

Additional 1000 Watt Electric heater is connected with Optional PCB. There is DIP switch on main PCB, 0-no heater. 1-with heater.

Working logic is as below:
1). In heating mode, when OPT ≤ -1 ℃ for more than 2 minutes (120 sec) , stop compressor.
2). Heater will be ON after 30 seconds compressor OFF.
3). Fan remains in the setting speed.
4). Four-way valve will be OFF after 120 seconds compressor OFF.
5). Heater works when RT ≤ ST-1℃
6). Heater stops when RT ＞ ST+1℃；

Indoor fan speed control:
a. Indoor fan will work as Auto speed, low speed, middle speed or high speed.
b. For Auto speed, it will work as above Heating chart:
c. When electric heater is close when RT is same as ST, fan will work as min speed.

Note:
a. When electric heater mode is activated, the mode will be fixed. In order to turn on heating mode with compressor , we must switch off the machine and on again .
b. Not possible to install hot water exchanger and extra heater same time.

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10.3.6. Optional hot water function (Red LED is ON)

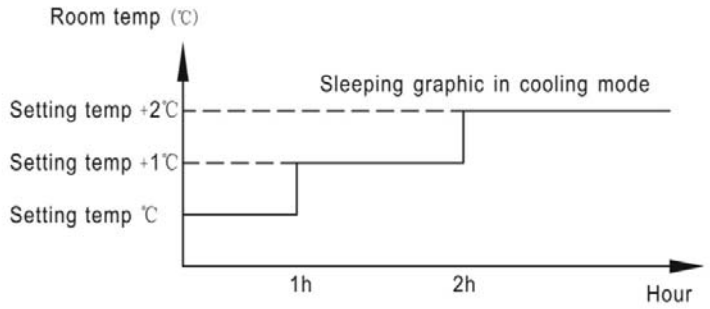
When unit is working in heating mode, and if water coil temperature WPT ≥ 38 ° C (it means there is hot water inside water exchanger) , unit will work as below logic:

1). Compressor does not work.
2). Fan works with setting speed.
Fan works when RT ≤ ST-1℃;
Fan stops when RT ＞ ST+1℃;
(RT: room temperature, ST: setting temperature)
3). Four-way valve : no power supply.

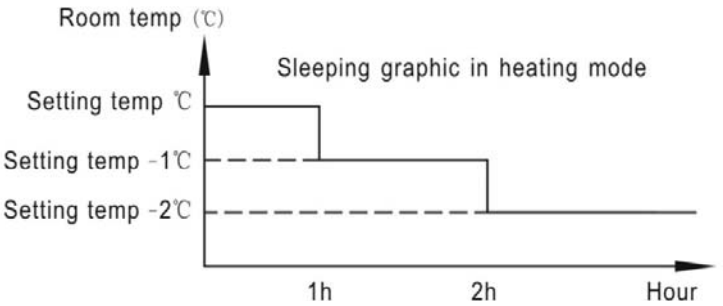
Indoor fan speed control:
a. Indoor fan will work as Auto speed, low speed, middle speed or high speed.
b. For Auto speed, it will work as above Heating chart:

10.3.7 Fan mode (Yellow LED is ON)
1. Compressor working state: stop
2. Four-way valve: no electrical power
3. Fan motor speed : Has auto, low, middle and high speed, and auto speed control is same as cooling mode.

10.3.8 Sleeping mode
1. Sleeping mode only works in Heating or Cooling mode, or cooling/heating under Auto function.
2. At the beginning of sleeping running in Cooling mode, if room temperature＞ setting temperature, the compressor and motor will work, and four-way valve will be close, till go into sleeping working fluctuation. If room temperature≤ setting temperature, it will directly go into sleeping working fluctuation (see below graphic). Fan speed will be fixed with low speed.



3. At the beginning of sleeping running in Heating mode, if room temperature ＜ setting temperature, the compressor, fan motor and four-way valve will work, till go into sleeping working fluctuation. If room temperature ≥setting temperature, it will directly go into sleeping working fluctuation (see below graphic). Fan speed will be fixed with low speed.



Note: When setting Timer and Sleeping function same time, unit will work with Timer function.

10.3.9 Timer function

1. Pressing Timer button on remote control to set Timer Off during unit is working, and set Timer On during unit is close.
2. Temperature rising key in the remote control is hour setting, each pressing will increase one hour, and every cycle is 24 hours. Temperature dropping key is minute setting, each pressing will increase 10 minutes, and every cycle is 60 minutes.

Clock setting: Pressing clock key on the remote control, screen would display time signal with flashing. Then pressing temperature rising and dropping keys, time could be adjusted. Temperature rising key is hour setting, each pressing will increase one hour, and every cycle is 24 hours. Temperature dropping key is minute setting, each pressing will increase 10 minutes, and every cycle is 60 minutes.

10.3.10 Emergency function (Not available for the user)

1. There is an emergency button on the main PCB inside the unit. When remote control is lost or damaged, unit would work with Auto mode by pressing this button, indoor fan motor would work with auto speed.
2. During the unit is working, pressing this button can close the machine immediately.
3. During the unit is working with emergency function, the unit would follow remote control instruction once receiving any signal from remote control.

10.4 Protection function

10.4.1 Compressor 3 minutes delay protection.

a. The compressor will run immediately when it works with first time.

b. Compressor must stops for 3 minutes and reworks again (Except defrost function in heating mode).

c. Compressor will work for 3 minutes if it is necessary to stop working.

10.4.2 Anti-frozen protection in cooling and dry mode.

a. If indoor coil temperature ≤-1℃ for 2 minutes, compressor will stop, fan motor will keep working state and unit goes into anti-frozen protection.

b. When indoor coil temperature ≥8℃, compressor will rework again if the 3 minutes delay protection is over, and unit would exit anti-frozen protection function.

Note: If indoor coil sensor is damaged, anti-frozen protection is no use.

10.4.3 Over-heat protection in heating mode.

In heating mode:

a. When indoor coil temperature ≥64℃， compressor will stop.

b. When indoor coil temperature ≤48℃， proceed normal working (when compressor 3 minutes delay protection is over, compressor would work immediately.).

In this case, four-way valve always opens and fan motor always runs with setting speed.

Note: If indoor coil sensor is damaged, over-heat protection is no use.

c. When Hot water coil temperature WPT ≥90℃, fan works with high speed, and red LED flash with 1hz.

d. When Hot water coil temperature WPT ≤-80℃, fan works with setting speed, and red LED is on.

10.4.4 Sensor damage protection

Note: When one or several sensors are damaged, Green LED will flash with 1hz for 10 seconds when unit starts working.

1. Room temperature sensor RT damage:

If room temperature is lower than -30℃ or higher than 90℃，room temperature sensor is supposed to be damaged, unit goes into protection mode as below:

a. Compressor will work normally in cooling and heating mode.

b. Compressor will work with 10 minutes on and 6 minutes off in dry mode.

c. Unit will work with fan function if unit is in auto mode.

2. Indoor coil temperature sensor IPT damage:

If indoor coil temperature is lower than -30℃ or higher than 90℃，indoor coil temperature sensor is supposed to be damage, and there is no anti-frozen protection in cooling or dry mode, no over-heat protection in heating mode.

3. Outdoor coil temperature sensor OPT damage:

If outdoor coil temperature is lower than -30℃ or higher than 120℃，outdoor coil temperature sensor is supposed to be damage, and unit will work with auto-defrost cycle. If there is electric heater, heater will not start, unit will work with heat pump mode.
For the OPT sensor, it is used for the defrost function in heating mode. If OPT sensor works well, the unit will check the data from OPT sensor, then decide if go to defrost function.

If there is failure with OPT sensor, the unit would work with automatic defrost function. See as below:

Automatic defrost function start condition:
Heating mode, and compressor continuously works for 25 minutes, if IPT-RT≤18℃, the unit would go to defrost function.
Automatic defrost function stop condition:
When the compressor works for 12 minutes, unit would stop defrost function.

4. Hot water coil temperature sensor WPT damage:

If water coil temperature is lower than -30℃ or higher than 100℃，water coil temperature sensor is supposed to be damage, and unit will work with heat pump mode.

5. When OPT sensor is damaged, RT or IPT sensor is damaged same time, or RT and IPT sensor was damaged same time, in the heating mode, every time compressor runs total for 30 minutes, and then defrosts 5 minutes.

10.4.5 Fan speed
Fan speed : Hi/Med/Low: 1350rpm/1200rpm/950rpm

10.5 Auto restart function

Unit has auto restart function. When power supply is off during unit working time, then if power supply gets back, unit will work with previous working mode. Compressor have 3 minutes protection function.

10.6 Window contact function

Unit has window contact function, with normal OPEN status.

If window contact is close for 60 seconds, compressor, fan and electric heater(optional) stop, no change with mode LED, green LED flashes with 1hz.

During window contact close period, unit could not be controlled by remote control or wall pad.

When window contact is open, compressor, fan and electric heater(optional) will work with previous mode. Compressor follows 3 minutes delay protection. Green LED is off.

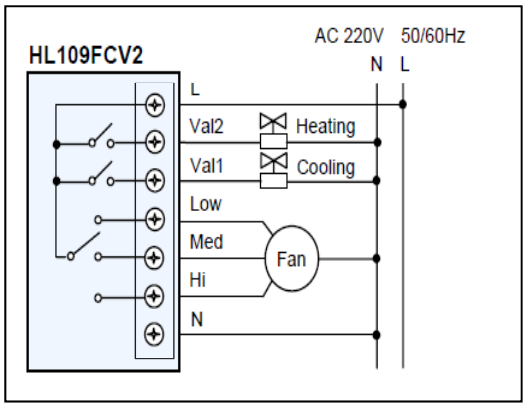
10.7 Wall pad function

This unit could be connected with wall pad, we propose the models HL109FCV2 like the picture showed but similar models are available in the market .

There are temperature adjusting knob and graduation mark on the panel.

There are also the switch of fan speed HIGH-MED-LOW and the switch of HEAT-OFF-COOL on the panel.

-Wall pad could be installed only with extra connection PCB.
Put DIP2 with ON position, PCB is selected with wall pad function.
- It's possible to connect one wall pad for one machine like below scheme or is possible to connect the a small net system (20-30 machines)
-When you connect a net, and turn on the air conditioner by wall pad, unit 1 would start immediately, and unit 2 would delay 5 seconds, unit 3 would delay 5 seconds from unit 2...The 5 seconds delay is important for the electrical system to avoid over pick current .
-Unit would work only with wall pad, remote control is invalid, and Auto-restart function is available with wall pad mode.

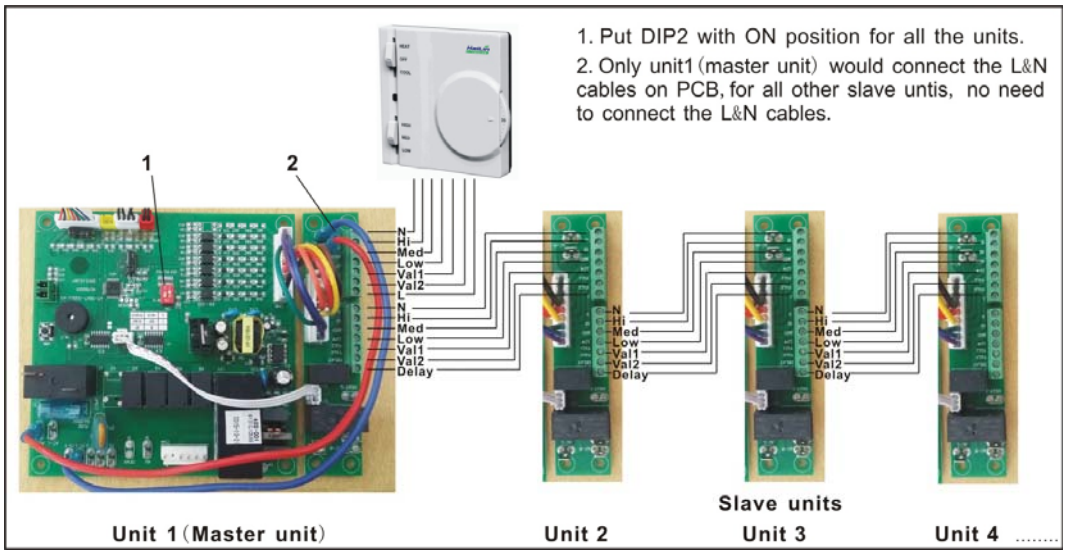


When wall pad is installed, machine could be managed only from wall pad, and not from remote control, so some function logic will be little changed.

Working mode:
Cooling mode, Heating mode(including heat pump, electric heater and hot water)
Fan speed:
High speed, middle speed, low speed.

A small net would be united accordingly, one wall pad can control different units ON or OFF.

Remarks:
1). The window contact from master unit could control all the slave units. Slave unit would not be fixed with the window contact separately.
2). Connection PCB has 5 seconds delay function.
3). When unit stop cooling or heating, the unit will check again the cooling or heating command after 3 minutes.
4). When unit works with cooling or heating mode first time, compressor will delay 3 minutes.



11. Precaution

When using electrical appliances, basic safety precaution should always be followed:

• Do not place objects on the product or allow objects to obstruct the inlet or outlet openings. Extreme care should be taken when any product is used by, or near children and pets, and whenever the product is left operating and unattended.

Please note:

Before operating the product, remove the air conditioner from its package and check it is in good condition.

• Do not let children play with the packaging, for example plastic bags.

• Do not operate any product with a damaged cord or plug, or after the air conditioner malfunctions, has been dropped, or damaged in any manner.

• Always operate the product from a power source of the same voltage, frequency and rating as indicated on the product identification plate.

• This air conditioner is not intended for use in wet or damp locations.

• Do not place the air conditioner near an open flame, cooking or heating appliance, or hot surface.

• Do not let the power cord hang over the edge of a table or counter. Arrange the power cord away from an area where it may be tripped over.

• Never place the power cord under a carpet or rug. Do not operate the air conditioner in areas where petrol, paint, or other flammable liquids are used or stored.

• Do not carry out any cleaning or maintenance or access internal parts until the air conditioner has been disconnected from the mains electricity supply.

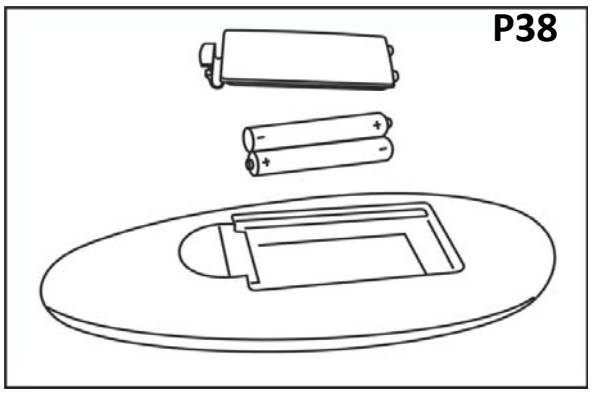
• Avoid prolonged direct contact with the flow of the air from the air conditioner and the room being closed with no ventilating for a long period of time.

R25=5.0K 1%							
Temp° C	Resistance value	Temp° C	Resistance value	Temp° C	Resistance value	Temp° C	Resistance value
-1	14.8903	27	4.6300	55	1.7216	83	0.733
0	14.2293	28	4.4569	56	1.6663	84	0.713
1	13.6017	29	4.2912	57	1.6131	85	0.693
2	13.0055	30	4.1327	58	1.5618	86	0.674
3	12.4391	31	3.9808	59	1.5123	87	0.655
4	11.9008	32	3.8354	60	1.4647	88	0.638
5	11.3890	33	3.6961	61	1.4188	89	0.620
6	10.9023	34	3.5626	62	1.3746	90	0.604
7	10.4393	35	3.4346	63	1.3319	91	0.587
8	9.9987	36	3.3120	64	1.2908	92	0.572
9	9.5794	37	3.1943	65	1.2511	93	0.556
10	9.1801	38	3.0815	66	1.2128	94	0.542
11	8.7999	39	2.9733	67	1.174	95	0.527
12	8.4377	40	2.8694	68	1.139	96	0.514
13	8.0925	41	2.7697	69	1.105	97	0.500
14	7.7635	42	2.6740	70	1.072	98	0.487
15	7.4498	43	2.5821	71	1.040	99	0.475
16	7.1506	44	2.4939	72	1.009	100	0.462
17	6.8652	45	2.4091	73	0.980	-2	15.5800
18	6.5928	46	2.3276	74	0.951	-3	16.3200
19	6.3328	47	2.2493	75	0.923	-4	17.0000
20	6.0846	48	2.1740	76	0.897	-5	17.9030
21	5.8475	49	2.1017	77	0.871	-6	18.7603
22	5.6210	50	2.0320	78	0.846	-7	19.6703
23	5.4046	51	1.9651	79	0.822	-8	20.6300
24	5.1978	52	1.9007	80	0.798	-9	21.6403
25	5.0000	53	1.8387	81	0.776	-10	22.7103
26	4.8109	54	1.7790	82	0.754	-11	23.7103

12. Ordinary maintenance

12.1 Install and change the battery

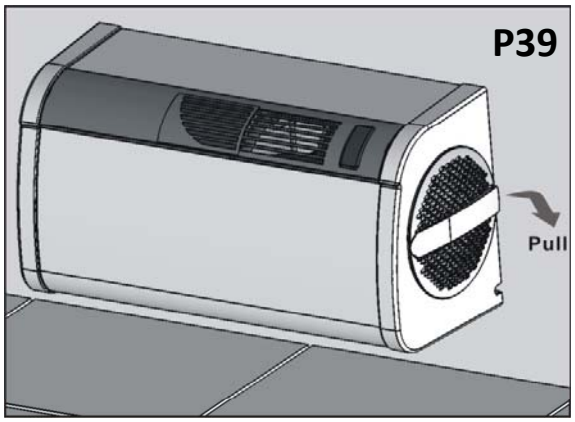
-Open the cover of battery, hold the hook and lightly pull up.
-Insert the battery (AAA,2pcs), the positive must be same with the mark on the plastic surface.
-Reinstall the cover of battery.
-Inspection: if press **ON/OFF** button “”, no icons are displayed, please install the battery again.



12.2 Maintenance

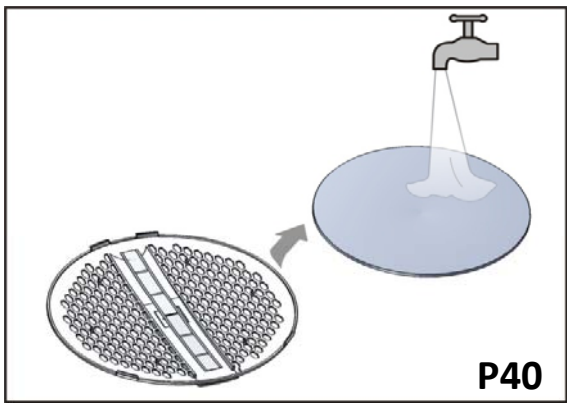
Filter cleaning:

The filter should be regularly cleaned to keep the air conditioner running efficiently. Clean the filter every two weeks.
How to proceed:
-Disconnect the air conditioner from the electrical supply.
-Extract the filter grating. (P34) on the same direction of the arrow.
-Take out the filter as shown. (P35)
-Proceed to wash it (not use hot water) and only when they are dried replace them in the same way.
ATTENTION: Do not use the air conditioner without filter as it could seriously damage the air conditioner.



External cleaning:

-Disconnect the air conditioner from the electrical supply.
-Wipe external surfaces clean with a damp cloth only.
-Do not use an abrasive cloth and/or solvents, as this may damage the surfaces.
-Do not use excessively wet cloth or sponges, as water stagnation could damage the air conditioner and compromise safety.



13. Problem and solution

Anomaly	Possible cause	Solution
The appliance doesn't switch on	No power supply	Check the voltage (by turning the light on, for example). Check that the exclusive magneto-thermic switch that protects the appliance hasn't intervened (if it has, reset it). If the problem repeats immediately, please call the Service Centre and avoid trying to make the appliance work
	Batteries ran out	Substitute the batteries inside remote control
The appliance doesn't switch on and Green LED flash 1Hz	Window or key contact is open	Close the window or insert key card
The appliance does not cool or heat enough.	The set temperature is too high or too low	Check and adjust the temperature on the remote control
	The air filter is clogged	Check the air filter and clean it if necessary
	Check that there are no other obstacles of the air flow both inside and outside	Remove anything that might block the air flow
	The thermal refrigeration load has increased (for example, a door or a window has been left open or an appliance has been installed in the room, generating a lot of heat).	Try to reduce the thermal refrigeration load of the room with the following advice: Cover large windows exposed to sunlight with curtains or with external maskings (blinds, porches, reflecting films, etc.); The room must remain closed for as long as possible; Avoid turning on halogen lamps or other high energy consumption appliances such as small ovens, steam irons, cooking plates etc.
The appliance work but BLUE LED flash 1Hz	temperature sensor is damaged	Machine can work but is better to contact service as soon as you have time
RED LED flash 1Hz	Water coils is connected but water temperature is too high	Reduce water temperature

-If the supply cord damaged, it must be replaced by manufacture or its service agent or a similar qualified person in order to avoid a hazard.

- The unit has Auto-restart function. When electrical current is switched off during working mode, the unit would stop working. When electrical current is switched on, unit would work with former working mode automatically, no need to Turn ON the unit by remote control.
-The max operation temperature for the air conditioner (max cooling: outdoor DB43℃/WB26℃, indoor DB32℃/WB23℃; min heating: outdoor DB-5℃/WB-6℃, indoor DB20℃).
-This appliance is not intended for use by person(including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
-Children should be supervised to ensure that they do not play with the appliance.