

# ENGINEERING MANUAL

PTTW-10-EC SERIES

THROUGH THE WALL  
AIR CONDITIONERS



2010 EU-V.1.1



## **INVESTING IN QUALITY, RELIABILITY & PERFORMANCE.**

### **ISO 9001 QUALITY**



Every product is manufactured to meet the stringent requirements of the internationally recognized ISO 9001 standard for quality assurance in design, development and production.

### **ETL SAFETY STANDARDS**



This product conforms to ETL product safety standards.

### **WEEE MARK**



All products conform to the “weee” directive to guarantee correct standards of environmental solutions.

**ALWAYS MAKE SURE THAT THIS  
MANUAL REMAINS WITH THE  
PTTW THROUGH THE WALL UNIT.  
READ THIS MANUAL BEFORE  
PERFORMING ANY OPERATION ON  
PTTW THROUGH THE WALL UNIT.**

## **World Leading Design and Technology**

Equipped with the latest CAD/CAM computer aided design and manufacturing technology, our factories in China and Thailand produce over 2,000,000 air conditioning units each year, all conforming to the highest international standards of quality and safety.

## **The Highest Standards of Manufacturing**

In order to guarantee the very highest standards and performance, we manage every stage in the manufacturing of our products. Throughout the production process we maintain strict control, originating with our extensive resources in research and development through to the design and manufacture of almost every individual component, from molded plastics to the assembly of units and controllers.

## **Quality Controlled from Start to Finish**

Our highly trained staff and strict quality control methods enable us to produce products with an exceptional reputation for reliability and efficiency, maintained over many years. As well as full CE certification and ISO 9001, several products have UL/CSA (NRTL) safety approval plus ARI Certification in the USA, ROHS compliance for Europe, giving you the confidence of knowing our company is the right choice when selecting air conditioning equipment.

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### PTTW SERIES

### THROUGH THE WALL UNIT

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PTTW THROUGH THE WALL UNIT MODEL ASSIGNMENTS

PTTW - 10 - EC

<b>EC</b>	ELECTRONICALLY COMMUTATED MOTOR
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UNIT NOMINAL CAPACITY	
<b>10</b>	NOMINAL 12,000 BTU/H

<b>PTTW</b>	THROUGH THE WALL UNIT
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# THROUGH THE WALL UNIT

## STANDARD SPECIFICATION

DESCRIPTIONS			UNIT	PTTW-10-EC
AIRFLOW		H	m <sup>3</sup> /h	450
		M		400
		L		350
COOLING CAPACITY			kW	2.90
HEATING CAPACITY			kW	2.95
ELECTRIC HEATER CAPACITY – Onboard			kW	0.5
ELECTRIC HEATER CAPACITY – 2x E.H. speakers			kW	2.1
EER			kW / kW	3.27
			Energy class	A
COP			kW / kW	3.54
			Energy class	A
NOISE LEVEL @ 1m	INDOOR	H	dB / A	48.2
		M		46.0
		L		43.7
	OUTDOOR*	H	dB / A	58.1(54.6*)
		M		-
		L		46.6 (43.1*)
ELECTRICAL INSULATION PROTECTION CLASS				I
WATER PROOF CLASS				IPX4
DEHUMIDIFICATION			L / h	0.82
POWER SUPPLY			V / Ph / Hz	230 / 1 / 50
POWER INPUT	COOLING		W	885
	HEATING		W	830
RUNNING CURRENT	COOLING		A	4.1
	HEATING		A	3.88
START CURRENT	COOLING		A	12.3
	HEATING		A	11.6
ELECTRIC HEATER RUNNING CURRENT - onboard			A	2.24
ELECTRIC HEATER RUNNING CURRENT - 2x E.H. speakers			A	9.1
COMPRESSOR				ROTARY
REFRIGERANT CONTROL				CAPILLARY
REFRIGERANT CHARGE			g	650
REFRIGERANT TYPE				R410A
DIMENSIONS	WIDTH		Mm	1000 (1095**)
	HEIGHT			580
	DEPTH			250
GROSS WEIGHT			kg	45

All capacities are based on:

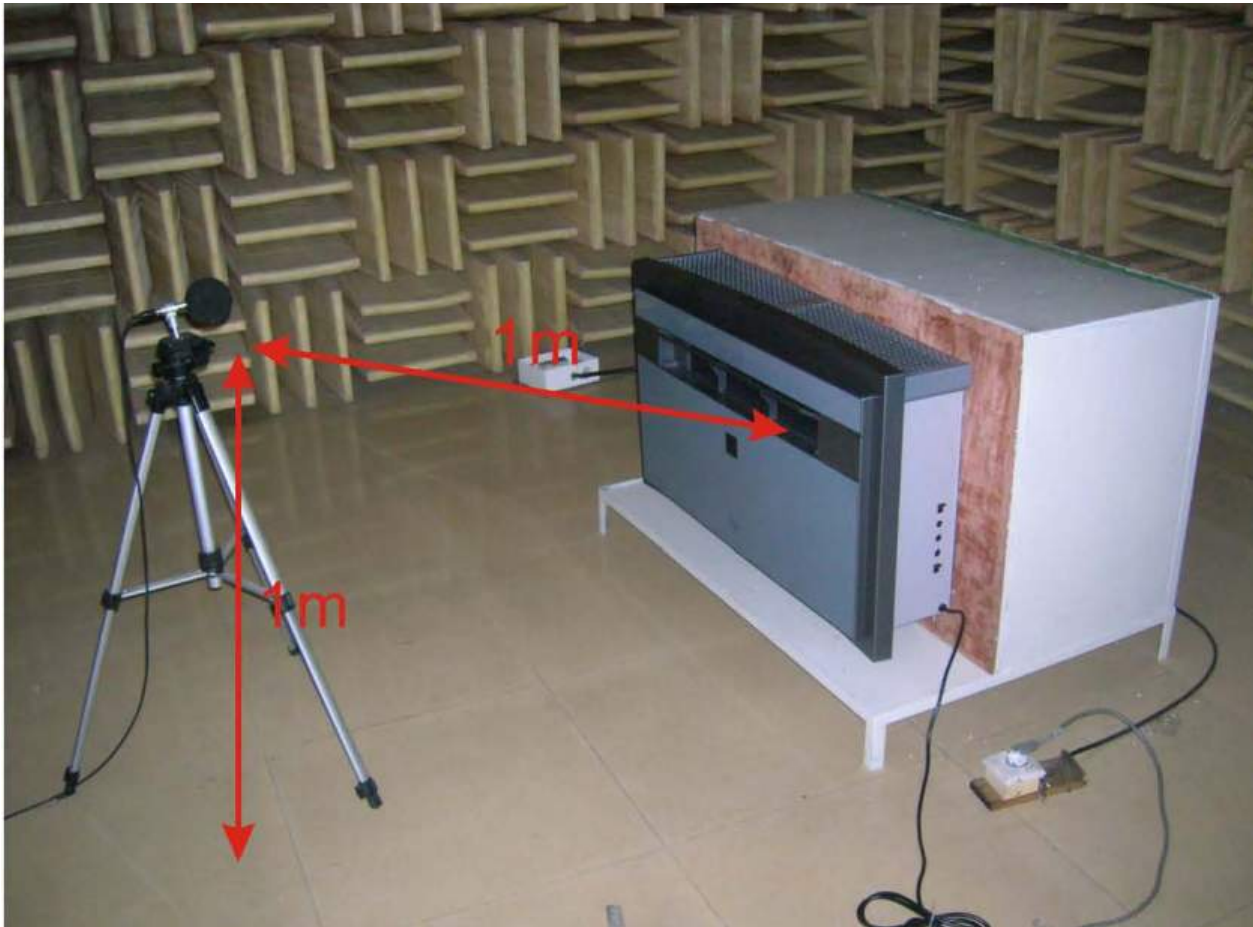
cooling: indoor 27°C DB, 19°C WB, outdoor 35°C DB, 24°C WB

heating: indoor 20°C DB, outdoor 7°C DB, 6°C WB

\*Values in parentheses refer to outdoor sound pressure levels with optional sound attenuation device installed

\*\*Values in parentheses refer to unit width with 2x electric heater module.

**PTTW-10 NOISE LEVEL TESTING RESULT**



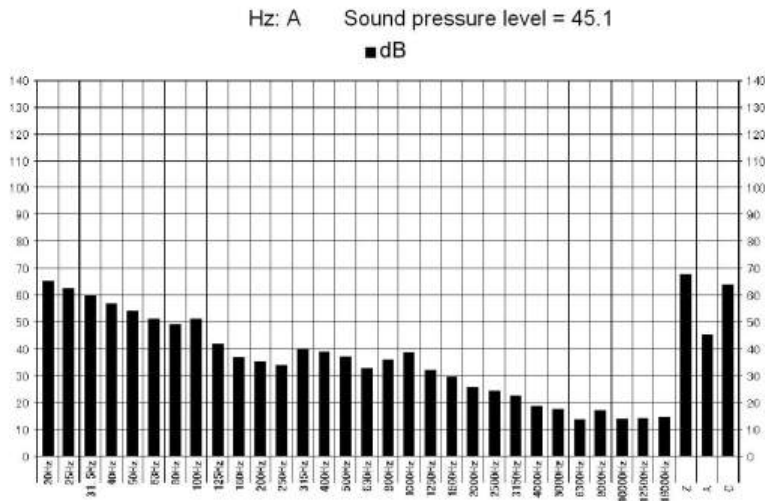
\*\*The Noise test is done in semi reverberant room , with ambient noise level 23.2 dB(A) , the structure is not perfectly appropriate for the double ducted machine , for this reason the indoor noise level is corrected by - 4 dB(A) and outdoor noise level is corrected by – 5 dB(A) calculated.

<b>SPL ( Sound Pressure Level ) dB(A)</b>	<b>MIN Speed</b>	<b>MED Speed</b>	<b>Max Speed</b>
<b>Indoor Fan Mode</b>	41.1	44.4	47.6
<b>Indoor Cooling / Heating Mode</b>	43.7	46.0	48.2
<b>Outdoor pipes</b>	46.6	-	58.1

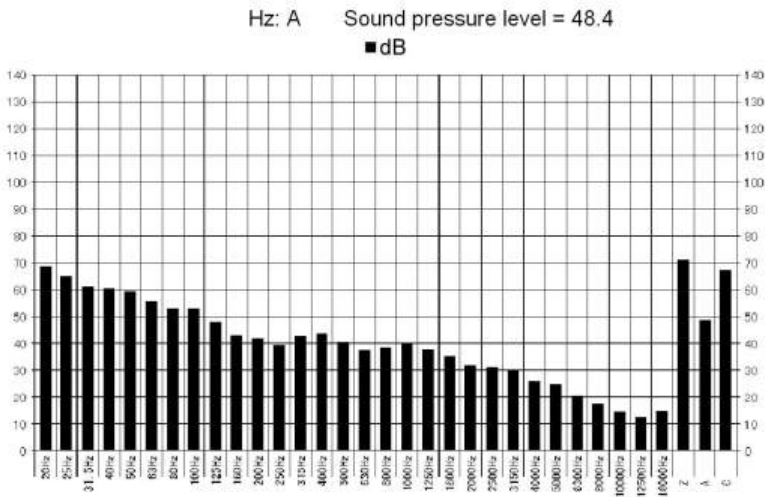
# THROUGH THE WALL UNIT

## Noise Level (Indoor Fan Mode)

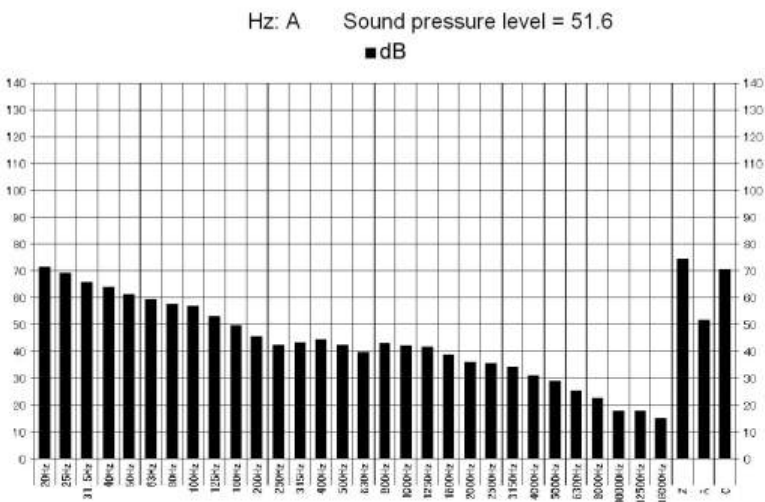
### Indoor noise test in fan mode



Low fan speed



Middle fan speed

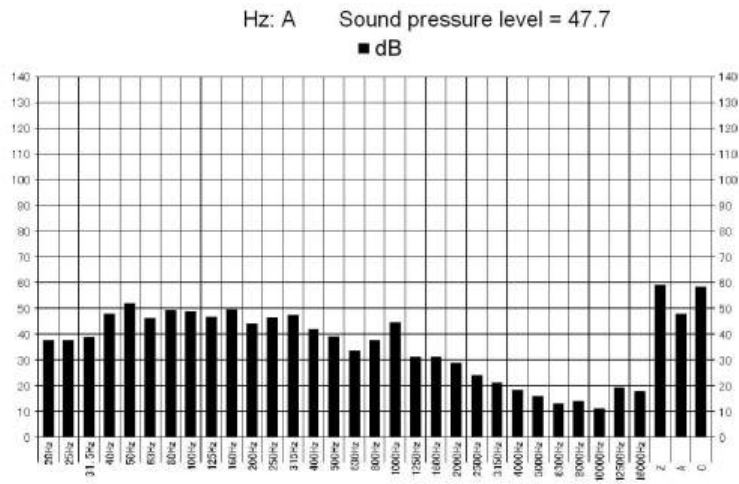


High fan speed

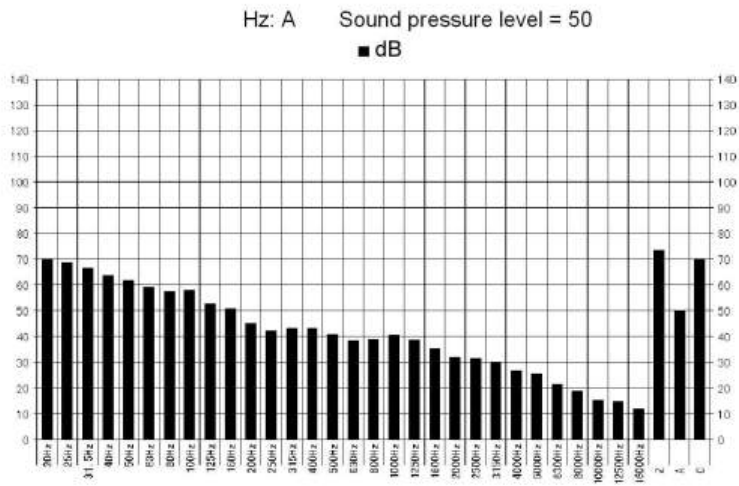
# THROUGH THE WALL UNIT

## Noise Level (Indoor Cooling Mode)

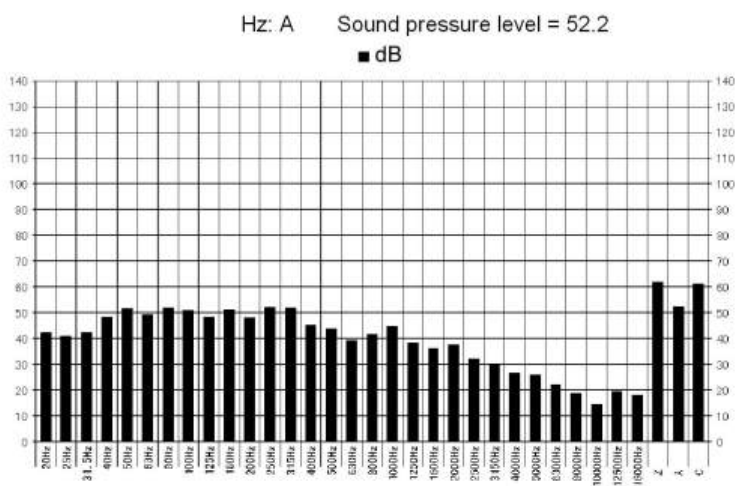
### Indoor noise test in cooling mode



Low fan speed



Middle fan speed



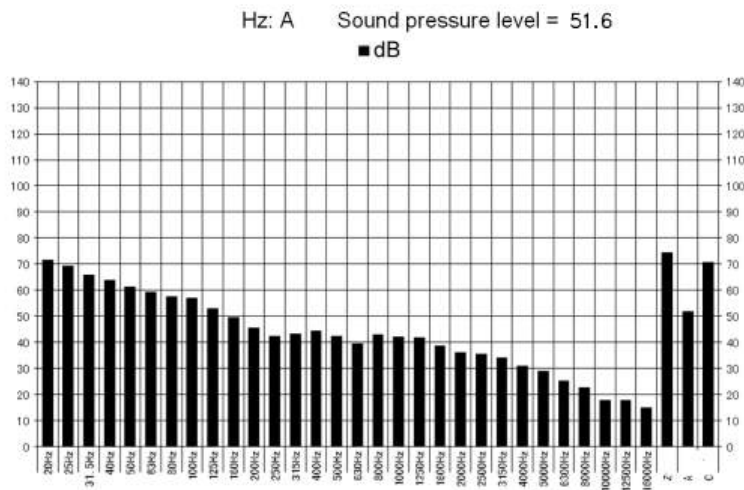
High fan speed



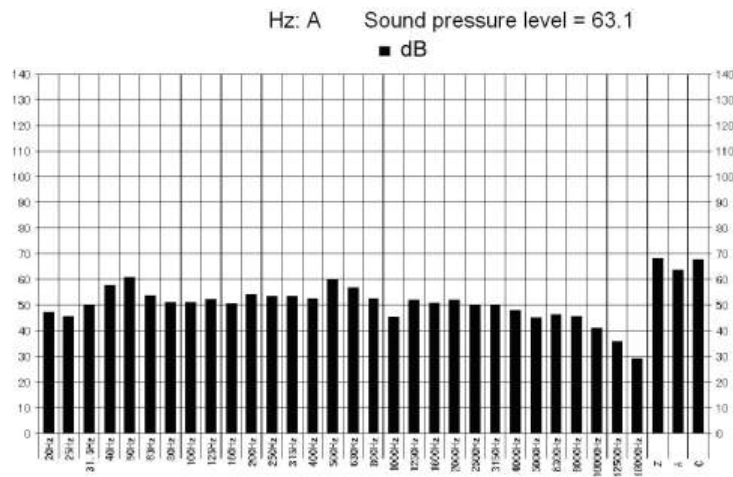
# THROUGH THE WALL UNIT

## Noise Level (Outdoor Cooling Mode)

### Outdoor noise test in cooling mode



Low fan speed



High fan speed

# THROUGH THE WALL UNIT

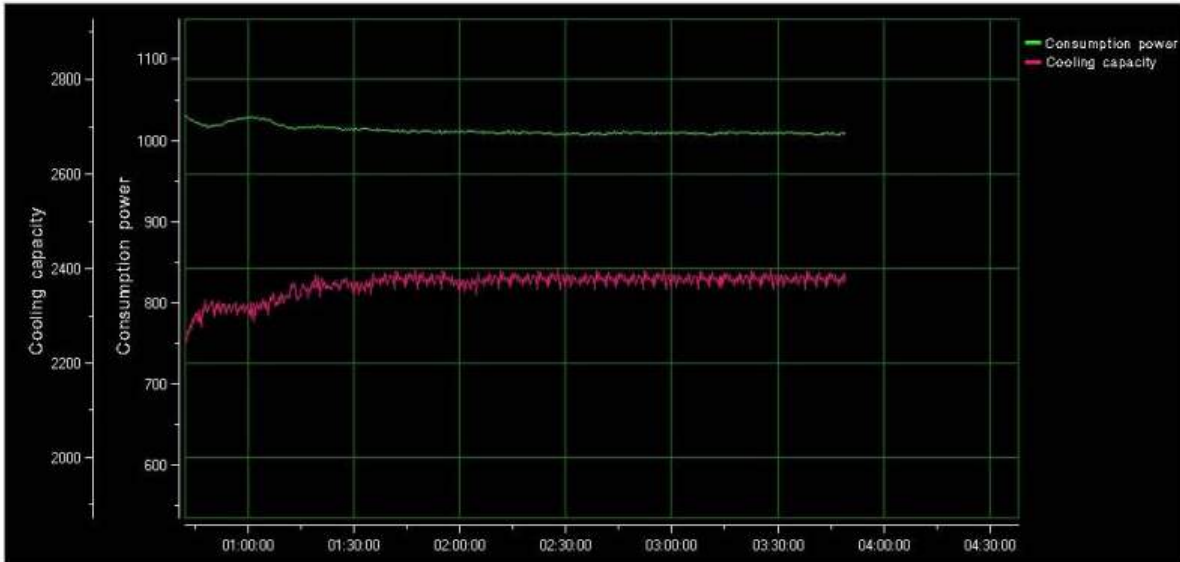
## OPERATION TEST

### PTTW-10 Cooling test

Test Condition:

Indoor: (dry bulb/wet bulb) 32°C/23°C

Outdoor: (dry bulb/wet bulb) 43°C/26°C



Test Condition:

Indoor: (dry bulb/wet bulb) 32°C/23°C

Outdoor: (dry bulb/wet bulb) 52°C/31°C

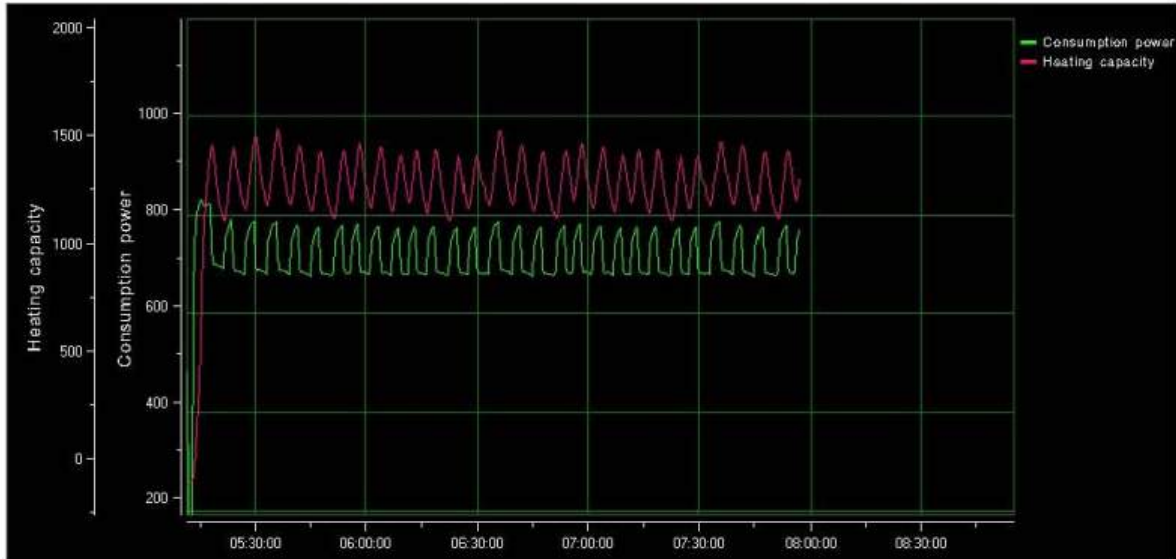


## PTTW-10 Heating test

Test Condition:

Indoor: (dry bulb/wet bulb) 20°C/12°C

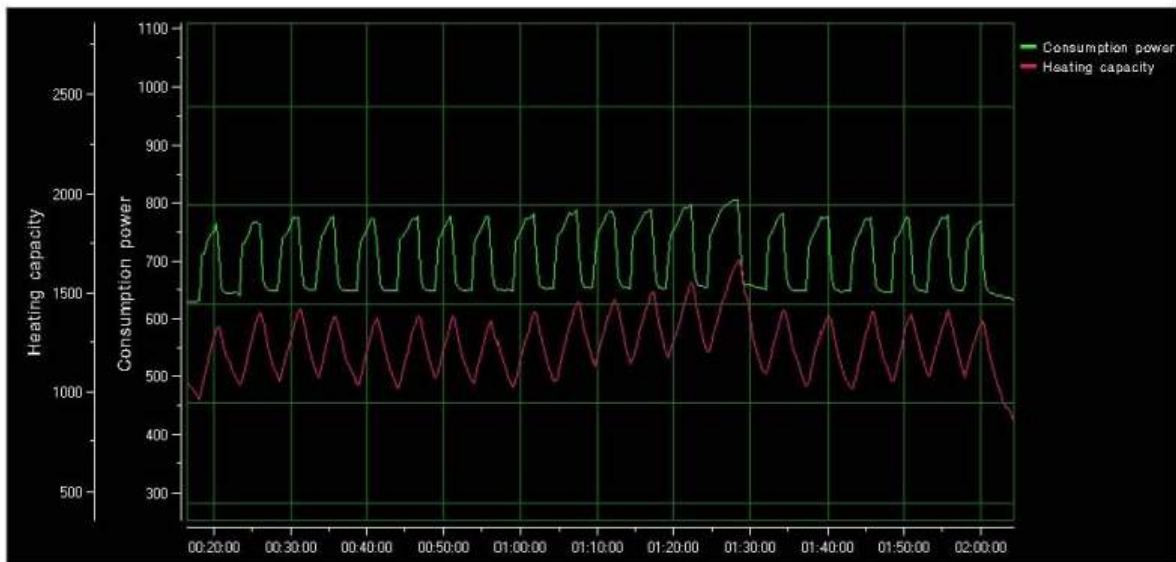
Outdoor: (dry bulb/wet bulb) 2°C/1°C



Test Condition:

Indoor: (dry bulb/wet bulb) 20°C/12°C

Outdoor: (dry bulb/wet bulb) 0°C/0°C

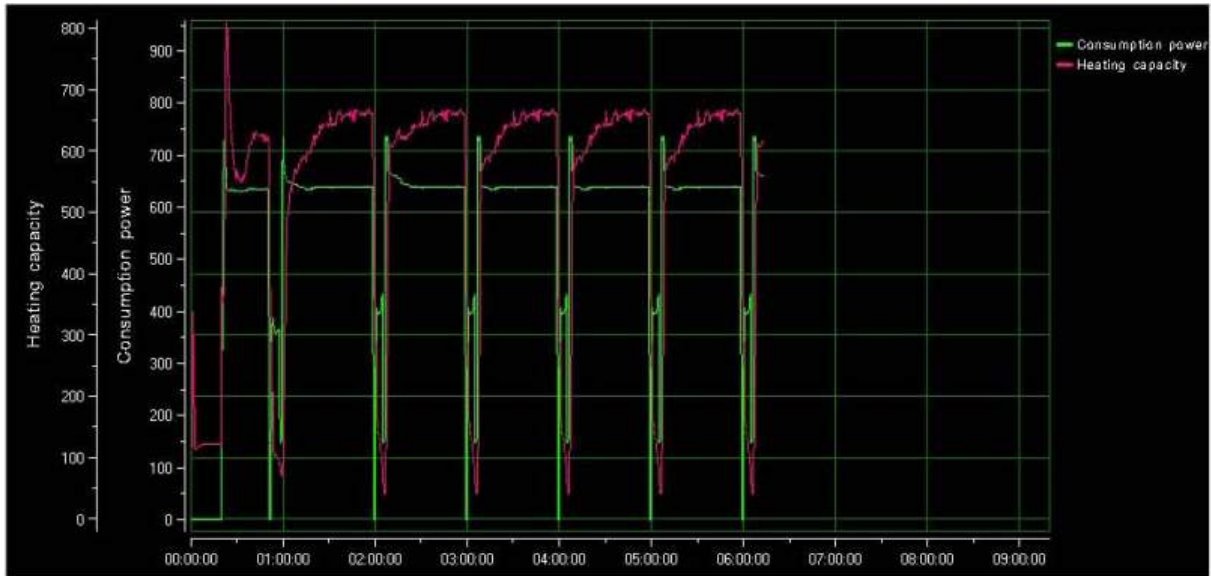


## PTTW-10 Heating test

Test Condition:

Indoor: (dry bulb/wet bulb) 20°C/12°C

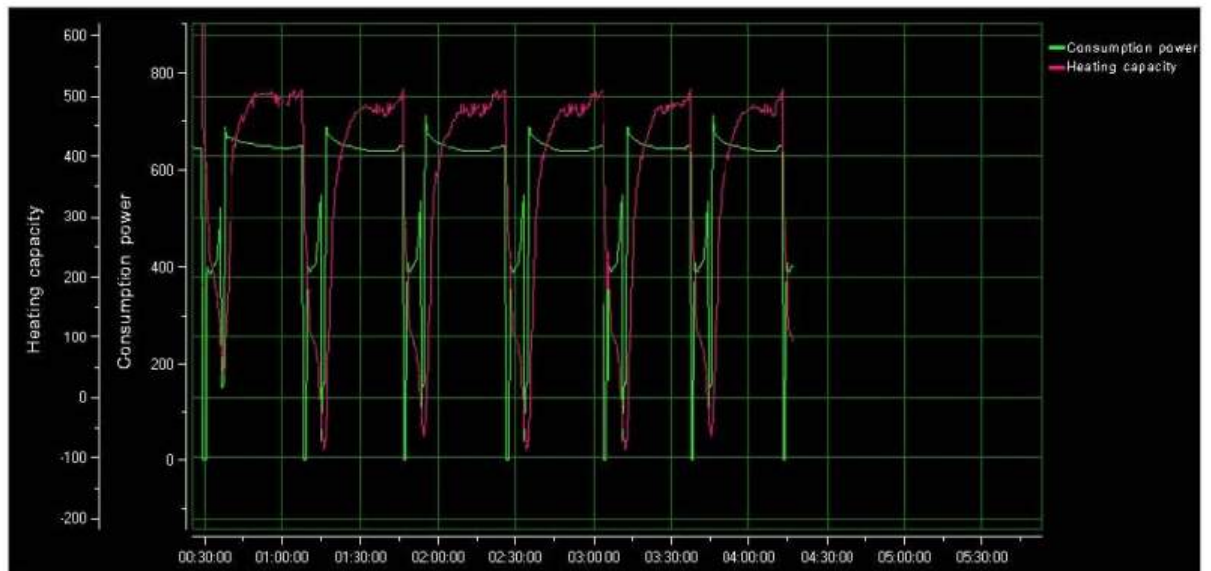
Outdoor: (dry bulb/wet bulb) -5°C



Test Condition:

Indoor: (dry bulb/wet bulb) 20°C/12°C

Outdoor: (dry bulb/wet bulb) -10°C

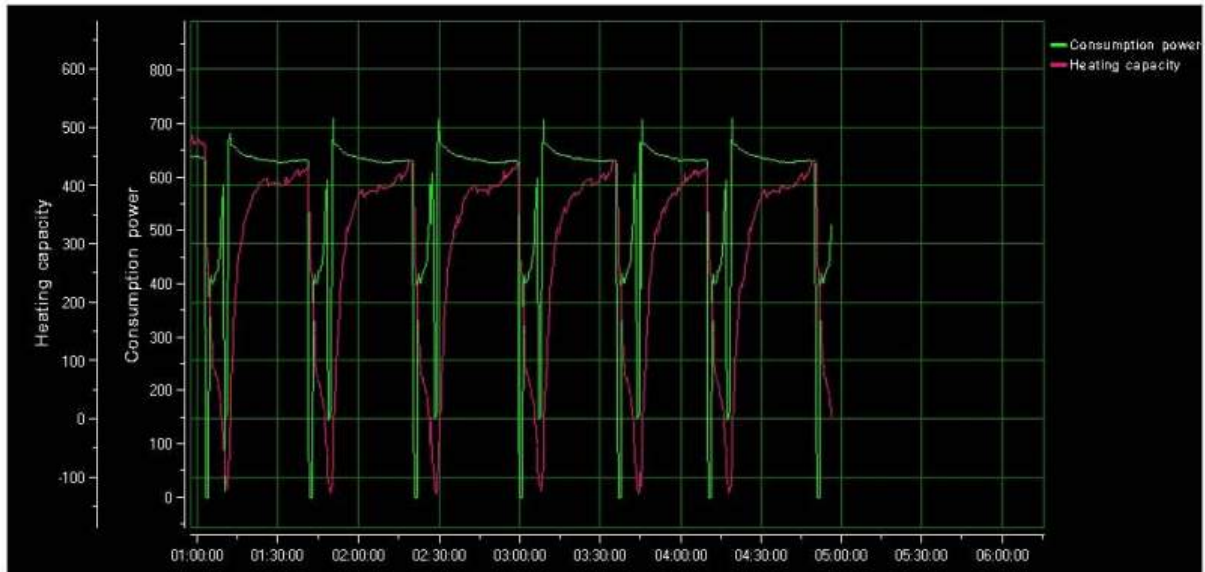


## PTTW-10 Heating test

Test Condition:

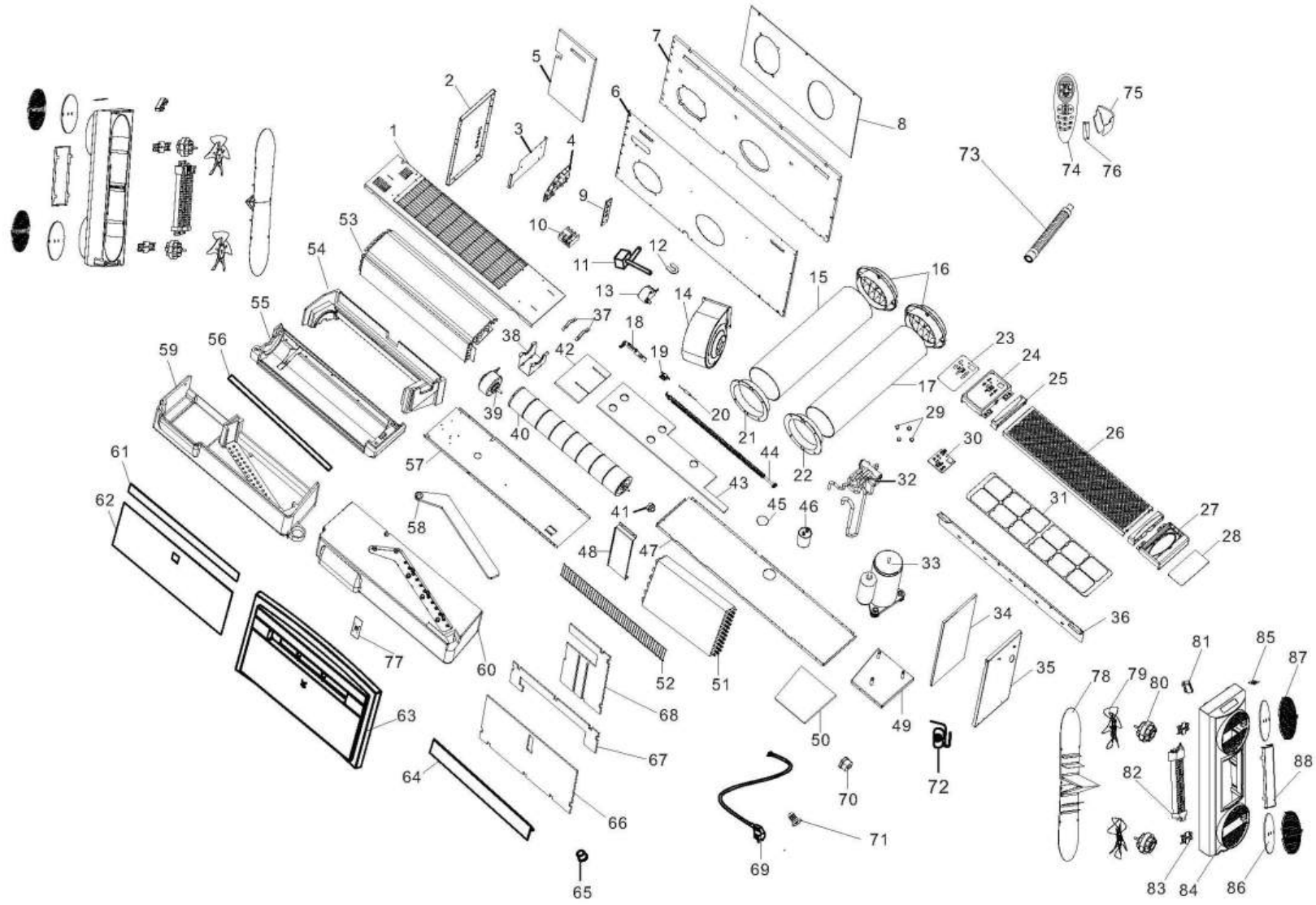
Indoor: (dry bulb/wet bulb) 20°C/12°C

Outdoor: (dry bulb/wet bulb) -15°C



# THROUGH THE WALL UNIT

## EXPLODED DRAWING



# THROUGH THE WALL UNIT

Item	BOM Code	Description	QTY
1	R122160373	Top cover assy.	1
2	R127040646	Left cover	1
3	R127030204	Fixture for PCB	
4	R131010493	PCB EC	1
5	R138140570	Back insulation material (comp side)	1
6	R127020524	Back cover	1
7	R138140568	Back insulation material (outside)	1
8	R138140569	Back insulation material (inside)	1
9	R128060314	Fresh air adjustor	1
10	R131030006	Terminal connector	1
11		By pass valve	1
12	R128040313	Inside cable plastic ring	3
13	R131060051	Step motor	1
14	R131050083	Condenser EC fan motor	1
15	R128060347	Air inlet pipe	2
16	R128030437	Grille	1
17	R128060348	Air outlet pipe	1
18	R127020528	Electrical heater bracket	1
19	R131080033	Thermostat	1
20	R131190064	Fuse	1
21	R128060394	O-ring for air inlet pipe	1
22	R128060395	O-ring for outlet pipe	1
23	R128040312	On board control box film	1
24	R128040310	On board control box	1
25	R128060387	Handle	2
26	R127040631	Air inlet grille	1
27	R131170143	Remote control box	1
28	R131170145	Remote control box cover	1
29	R137010073	Rubber support	4
30	R131190061	On board control PCB	1
31	R128020483	Filter	1
32	R122120274	Reversing valve and tubes assy.	1

# THROUGH THE WALL UNIT

Item	BOM Code	Description	QTY
33	R133020062	Compressor assy.	1
34	R138140685	Right cover insulation material	1
35	R127040951	Right cover	1
36	R127080054	Mounting sheet	1
37	R127020534	Indoor motor cover	1
38	R127020643	Indoor EC motor bracket	1
39	R131040170	Indoor EC motor	1
40	R128050017	Cross fan	1
41	R139050004	Bearing	1
42	R138140572	Top cover insulation material	1
43	R138140566	Basic pan insulation material	1
44	R131190062	Electrical heater assy.	1
45	R138140573	Compressor capacitor insulation material	1
46	R131160007	Capacitor for compressor	1
47	R140140068	Basic pan	1
48	R127020536	Link plate	1
49	R127020641	Compressor mounting sheet	1
50	R138140567	Compressor bottom insulation material	1
51	R121050205	Condenser assy.	1
52	R127020373	Air outlet grille	1
53	R121010203	Evaporator assy.	1
54	R128060392	Evaporator top EPP	1
55	R128060393	Evaporator down EPP	1
56	R138140395	Evaporator insulation material	1
57	R127020558	Partition	1
58	R128060391	Condenser top EPP closer	1
59	R128060390	Condenser lower EPP	1
60	R128060389	Condenser top EPP	1
61	R128030435	Acrylic panel (upper)	1
62	R128030436	Acrylic panel (lower)	1
63	R128030455	Front panel	1
64	R128030456	Louver	1

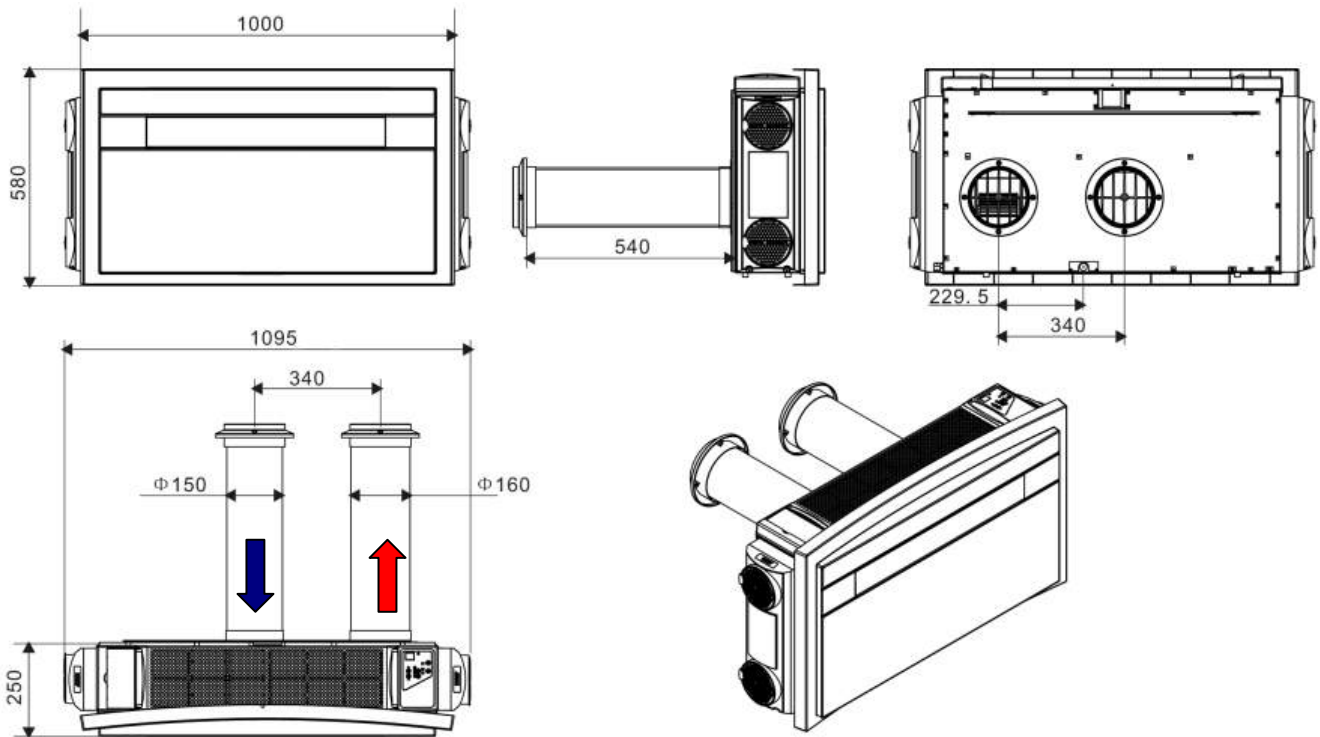


# THROUGH THE WALL UNIT

<b>Item</b>	<b>BOM Code</b>	<b>Description</b>	<b>QTY</b>
65	R128030286	Axis sleeve	1
66	R138140383	Front panel bottom insulation material	1
67	R138140382	Front panel top insulation material	1
68	R138140565	Front panel insulation material 3	1
69	R132040216	Power cable	1
70	R139010035	Cable plastic ring	1
71	R139010076	Stoppie	2
72	R122060132	Capillary assy.	1
73	R128070006	Drain pipe	1
74	R131170067	Remote control	1
75	R128040261	Remote control seat	1
76	R131100001	Battery	2
77	R131020097	LED display PCB	1
78	R127040967	Speaker back plate	2
79	R127030275	Speaker fan	4
80	R131050087	Speaker fan motor (60Hz)	4
81	R131030088	Speaker terminal block	2
82	R122230020	Speaker PTC heater	2
83	R127040964	Speaker fan motor bracket	4
84	R128040366	Speaker cover	2
85		Speaker warning label	2
86	R128020508	Speaker filter	4
87	R128020509	Speaker inlet grille	4
88	R127090111	Speaker outlet grille	2

# THROUGH THE WALL UNIT

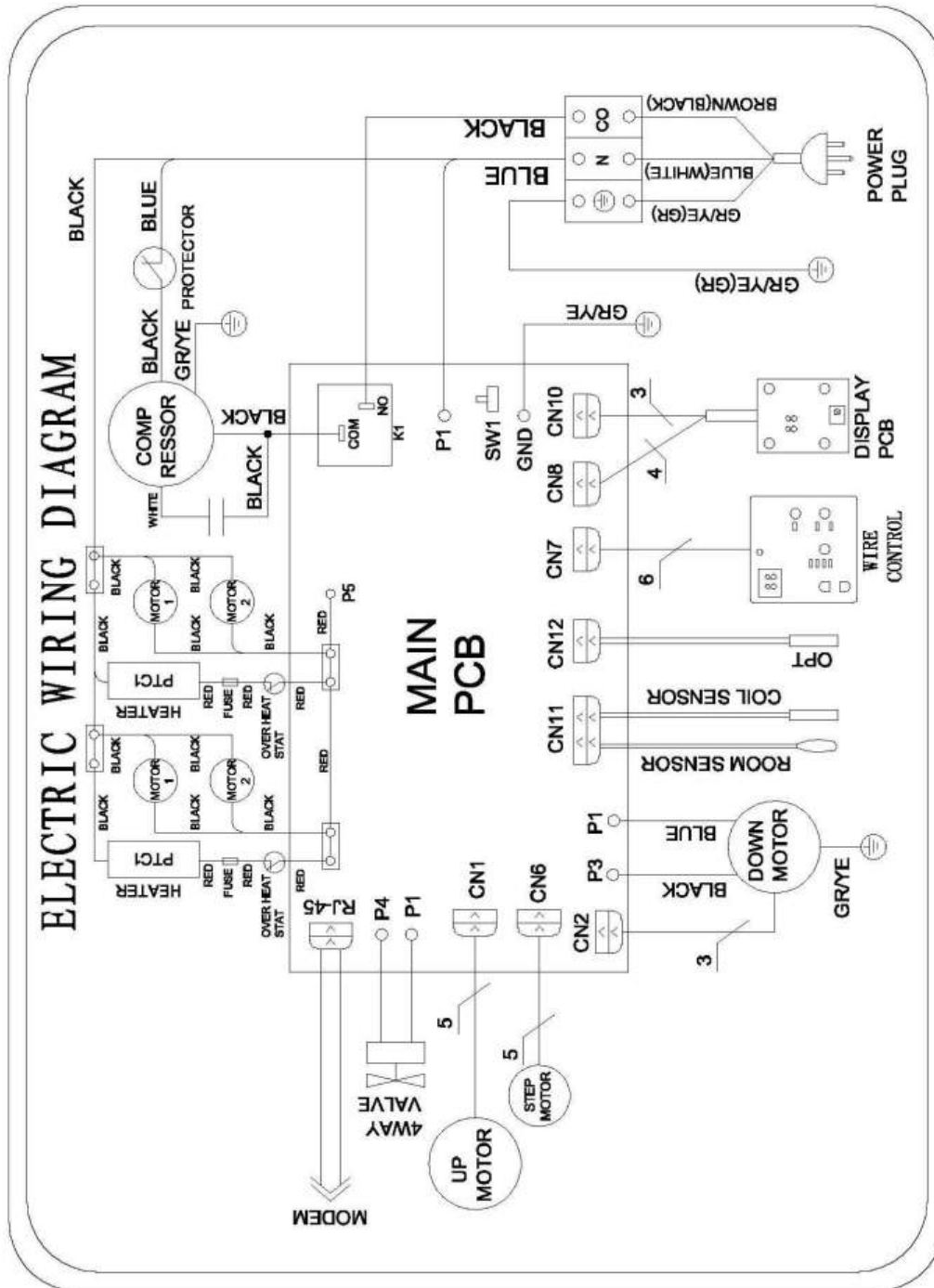
## DIMENSIONAL DRAWING



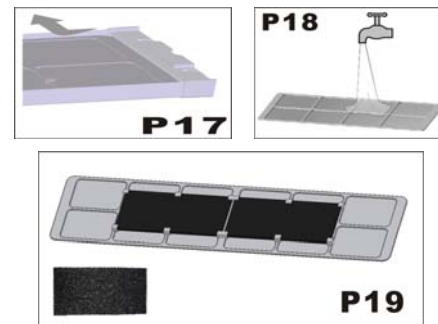
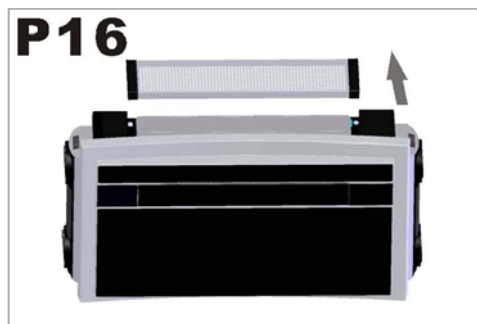
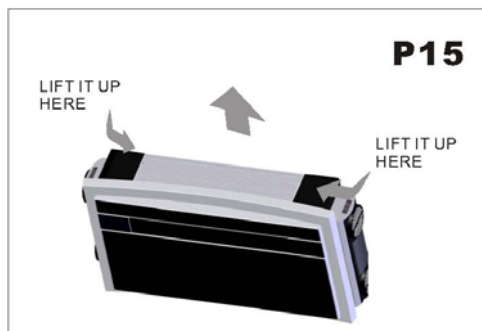
**Note :** The external pipes have two different diameters , use  $\text{Ø}160$  mm for air outlet side ( see red arrow ) and  $\text{Ø}150$  mm for air inlet side ( see blue arrow ) .

# THROUGH THE WALL UNIT ELECTRIC WIRING DIAGRAM

For PTTW-10



## MAINTENANCE



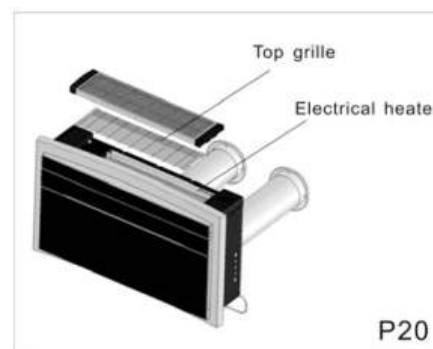
See pictures P15-P20

### 13.1 Standard filter cleaning:

The filters should be cleaned every two weeks to keep the air conditioner running efficiently.

#### How to proceed:

- Disconnection the air conditioner from the electrical supply.
- Extract the filter grating (P15); on the same direction as the arrow. Remove the filter along the slot shown on P17. Proceed to wash them (do not use hot water) and only when they are dry replace them in the same way.



#### ATTENTION:

Do not use the air conditioner without filters as it could seriously damage the air conditioner.

### 13.2 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 an excessively wet cloth or sponges, as water stagnation could damage the air conditioner and compromise safety.

### 12.3 Activated carbon filter

The unit includes activated carbon filter, which not only has the function of eliminating suspended particles the standard filter has, but also eliminates smaller particles such as free chlorine, odors, colors and toxic particles that are too small to filter out by using standard filter. The activated carbon filter should be changed every three months. It is not possible to wash or clean them.

### 12.4 Position of electrical heater

Electrical heater is positioned in the top of the machine, protected by the top grille. Do not try to touch it when it is working.

## PRECAUTIONS

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.

# THROUGH THE WALL UNIT

## PTTW CONTROL SPECIFICATIONS

### 1. ABBREVIATIONS

ST	= Setting temperature
RT	= Room air temperature
IPT	= Indoor coil temperature
OPT	= Outdoor coil temperature
PTC data	= R25-5.00KOhm $\pm$ 1% B25/50=3470K $\pm$ 1%

### 2. CONTROL SYSTEM OPERATION

#### 2.1. REMOTE HANDSET AND ON-BOARD PANEL OPERATION

##### 2.1.1. REMOTE HANDSET FUNCTIONS

Remote handset functions are Unit ON/OFF, Mode, Fan Speed, Set Temperature, Swing Function, Timer ON, Timer OFF, Electric heater and Sleep Function

##### 2.1.2. ON-BOARD PANEL FUNCTIONS

On-board panel functions are Unit ON/OFF, Mode, Fan Speed, Set Temperature and Electric heater.

### 2.2. MODE INTRODUCTION

#### 2.2.1 AUTO MODE

After turning the unit on, select the auto mode. The unit will select its operation mode by judging room temperature (see below table):

Indoor temp.	Indoor $\leq 20^{\circ}\text{C}$	$20^{\circ}\text{C} < \text{indoor} < 25^{\circ}\text{C}$	Indoor $\geq 25^{\circ}\text{C}$
Operating mode	HEATING	FAN	COOLING
Standard fixed setting temperature	$20^{\circ}\text{C}$	$22^{\circ}\text{C}$	$25^{\circ}\text{C}$

#### 2.2.2 COOLING MODE

2.1.2.1 Setting temperature :  $18^{\circ}\text{C}$ - $30^{\circ}\text{C}$ .

2.1.2.2 Working conditions of compressor :

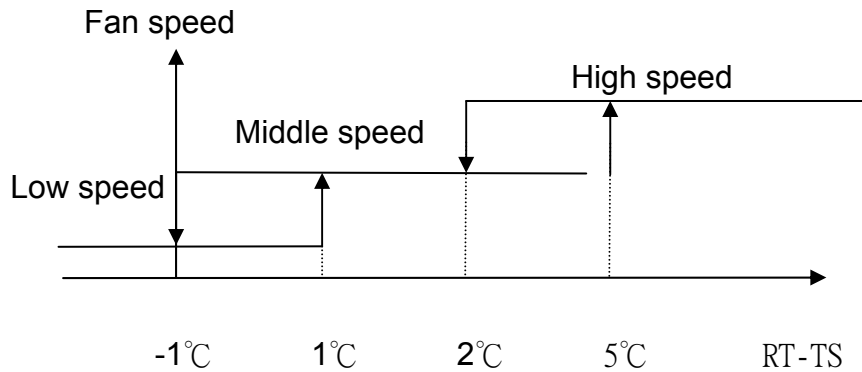
a. Compressor works when  $\text{RT} \geq \text{ST} + 1^{\circ}\text{C}$  ;

- b. Compressor stops when  $RT \leq ST - 1^\circ\text{C}$  ;
- c.  $-1^\circ\text{C} < RT - ST < +1^\circ\text{C}$  , compressor maintains the original state.

2.2.2.3 The working condition of four-way valve : Power off.

2.2.2.4 The working condition of outdoor unit fan motor: Starts and stops at the same time as the compressor.

2.2.2.5 Indoor auto fan speed selection.



## 2.2.3 DEHUMIDIFICATION MODE

2.2.3.1 Setting temperature :  $18^\circ\text{C} - 30^\circ\text{C}$  .

2.2.3.2 Functions according to the indoor temperature and the setting temperature.

NO.	conditions	Indoor fan motor	Outdoor fan motor	compressor	Four-way valve
1	$RT \geq ST$	Low speed fan	Continues running	Continues running	No power supply
2	$RT < ST$	Low speed fan	WORKS FOR 10 MINUTES AND THEN STOPS FOR 6 MINUTES REPEATEDLY		

**Note:** during dehumidification, it will not judge again according to the RT and reset program.

2.2.3.3 When  $RT \leq 14^\circ\text{C}$  , dehumidification function will not start, indoor fan speed continues in low speed. When  $RT > 16^\circ\text{C}$  , dehumidification starts.

2.2.3.4 Four-way valve : Power off.

2.2.3.5 Fan motor of outdoor unit : Starts and stops at the same time as the compressor.

## 2.2.4 HEATING MODE

2.2.4.1 Setting temperature :  $18^\circ\text{C} - 30^\circ\text{C}$  .

## 2.2.4.2 Conditions of compressor working :

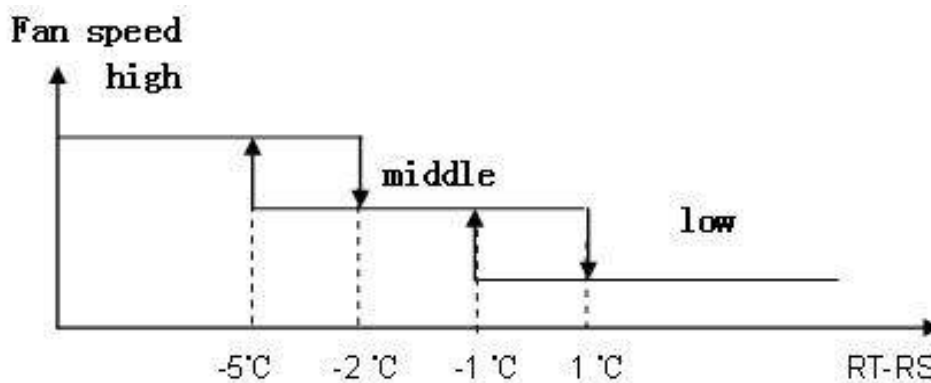
- a. Compressor starts:  $RT \leq ST + 1^{\circ}\text{C}$  ;
- b. Compressor stops:  $RT > ST + 3^{\circ}\text{C}$  ;
- c.  $+1^{\circ}\text{C} < ST - RT \leq +3^{\circ}\text{C}$  , compressor maintains the original state.

2.2.4.3 The first time the unit is turned on, there will be a 3 minute delay for compressor protection before temperature starts to rise.

2.2.4.4 Operation of four-way valve : In heating mode, the four-way valve remains open (except when defrosting). When heating mode is selected or unit is turned on, the four-way valve will open 5 minutes before compressor starts. When mode is changed from heating mode or unit is turned off, four-way valve will close after compressor has stopped for 2 minutes.

2.2.4.5 Operation of outdoor motor: Starts and stops at the same time as the compressor (Except when system goes into the defrost function or over heat protection).

2.2.4.6 Indoor auto fan speed selection.



2.2.4.7 Pre-heat control: After selecting heating mode, when  $IPT \geq 38^{\circ}\text{C}$  , indoor fan motor will run according to the setting. When  $IPT < 38^{\circ}\text{C}$  , indoor fan motor will delay starting until compressor runs for 60 seconds.

In heating mode, when the unit has been heating for 30 minutes or more and the compressor is continuously running for 5 minutes, the outdoor coil temperature sensor starts detecting the outdoor coil temperature. When the sensor detects  $< -5$  degree for 1 minute, and above 2 conditions are met, the unit will begin to defrost.

When defrosting, if the compressor has run for 5 minutes and OPT rises to  $15^{\circ}\text{C}$  , defrosting will stop automatically and normal heating will resume.



Maximum defrosting time is 12 minutes (including compressor stoppage). If defrosting time is greater than 12 minutes and the OPT temperature is still below 15°C, the defrost cycle is stopped and normal heating resumes.

## 2.2.5 FAN MODE

2.2.5.1 Compressor status: Stopped.

2.2.5.2 Four-way valve: No power supply.

2.2.5.3 Outdoor unit fan motor: Stopped.

2.2.5.4 Indoor unit fan motor: Auto, low, middle and high fan speeds may be selected.

## 2.2.6 PTC ELECTRIC HEATER

### 2.2.6.1 ON-BOARD ELECTRIC HEATER

#### 2.2.6.1.1 Auto electrical heater function.

When unit is in heating mode, on-board electric heater functionality will be activated automatically. System will check the room temperature RT after the compressor has been working for 10 minutes

- a. When  $RT \leq 18^{\circ}\text{C}$ , on-board electrical heater is ON.
- b. When  $RT \geq 22^{\circ}\text{C}$ , on-board electrical heater is OFF.
- c. The on-board electrical heater will turn on again when  $RT \leq 18^{\circ}\text{C}$ .

#### 2.2.6.1.2 Manual electrical heater function

When unit is in heating mode, change the on-board electric heater from automatic to manual by pressing the electric heater power button from on-board control panel or IR-handset (electric heater LED indicator will light up). Press the same button again to disable the electric heater function.

On board electric heater will turns on when following conditions are fulfilled:

- a. When compressor has been run for 4 minutes.
- b. Indoor fan is on.
- c. Unit is not in defrost function.
- d. Room temperature  $RT < 25^{\circ}\text{C}$ .

Note: Once on-board electric heater change from auto to manual, it is not possible to change to auto unless the unit is switch off and switch on again.

## 2.2.6.1.3 On-board electric heater protection

- a. On-board electric heater, when the indoor fan or compressor stops working, the electrical heater cannot be turned on.
- b. When there is a problem with the room temperature sensor, auto electrical heater will not work.

## 2.2.6.1.4 On-board electric heater overheat protection

When indoor coil temperature  $\geq 55^{\circ}\text{C}$ , electrical heater turns off. It turns on again until indoor coil temperature  $\leq 48^{\circ}\text{C}$ .

## 2.2.6.2 PTC ELECTRIC HEATER SPEAKER

### 2.2.6.2.1 Manual PTC electrical heater function (manual ON/OFF)

When the unit is under heating mode, press the electric heater power button from on-board control panel or IR-handset to activate the electric heater functionality (electric heater LED indicator will light up). Press the same button again to disable the electric heater function.

PTC electric heater will turn-on when the following conditions are fulfilled:

- a. Room temperature  $RT \leq 26^{\circ}\text{C}$
- b. When  $RT \leq T_s + 1^{\circ}\text{C}$ , PTC would be on after 1 second delay.  
When  $RT > T_s + 3^{\circ}\text{C}$ , PTC would be off.
- c. Indoor coil temperature  $< 55^{\circ}\text{C}$

Note: if any of the above condition is not fulfill, PTC electric heater will turns off. It will turns on again until a,b,c conditions fulfilled unless the PTC electric heater function is disabled..

### 2.2.6.2.2 PTC electrical heater speakers overheat protection:

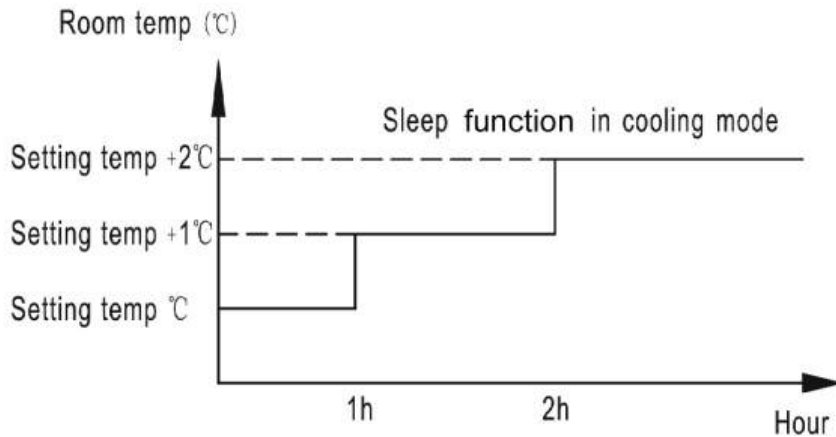
When indoor coil temperature  $\geq 55^{\circ}\text{C}$ , electrical heater turns off. It turns on again until indoor coil temperature  $\leq 48^{\circ}\text{C}$ .

**IMPORTANT NOTE:** Select either On-board electric heater or PTC electric heater speakers. On-board electric heater and PTC electric heater speakers cannot be presented at the same time.

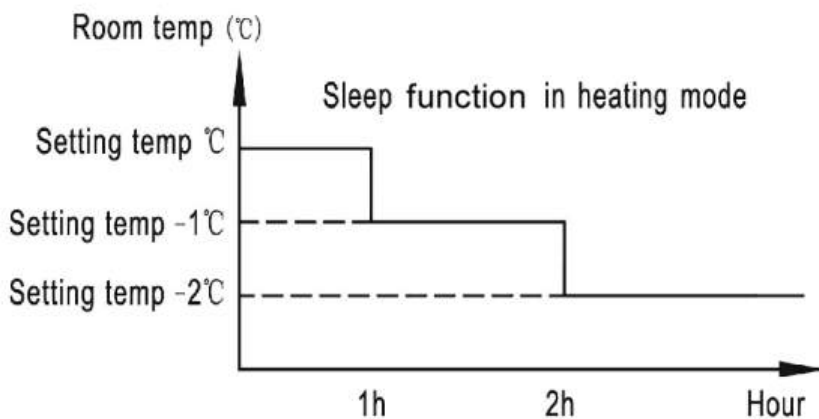
## 2.2.7 SLEEP MODE

2.2.7.1 Sleep mode will only function under heating, cooling, and auto heat/cool modes.

2.2.7.2 In cooling mode, at the beginning of sleep function, if room temperature > setting temperature, the compressor and outdoor fan will start normally. Indoor fan motor will run in low speed. The four-way valve will be closed. If room temperature ≤ setting temperature, the unit will start sleep mode. Fan speed will be set at low speed. Air flow direction can be adjusted or stay in one position.



2.2.7.3 In heating mode, at the beginning of sleep function, if room temperature < setting temperature, the compressor, outdoor fan and four-way valve will start normally. Indoor fan motor will run in low speed. If room temperature ≥ setting temperature, the unit will start sleep mode. Fan speed will be set at low speed. Air flow direction can be adjusted or stay in one position.



NOTE: When Timer and Sleeping function are set at the same time, the unit will work with Timer function

## 2.3 TIMER FUNCTION

2.3.1 When the air conditioner is on, press the control to set the timer to turn off. When the unit is off, press the control to set the timer to turn on.

2.3.2 The temperature rising button is for one hour, press it and it will increase in one hour steps. The temperature reducing button is for minutes, press it and it will increase in 10 minute steps.

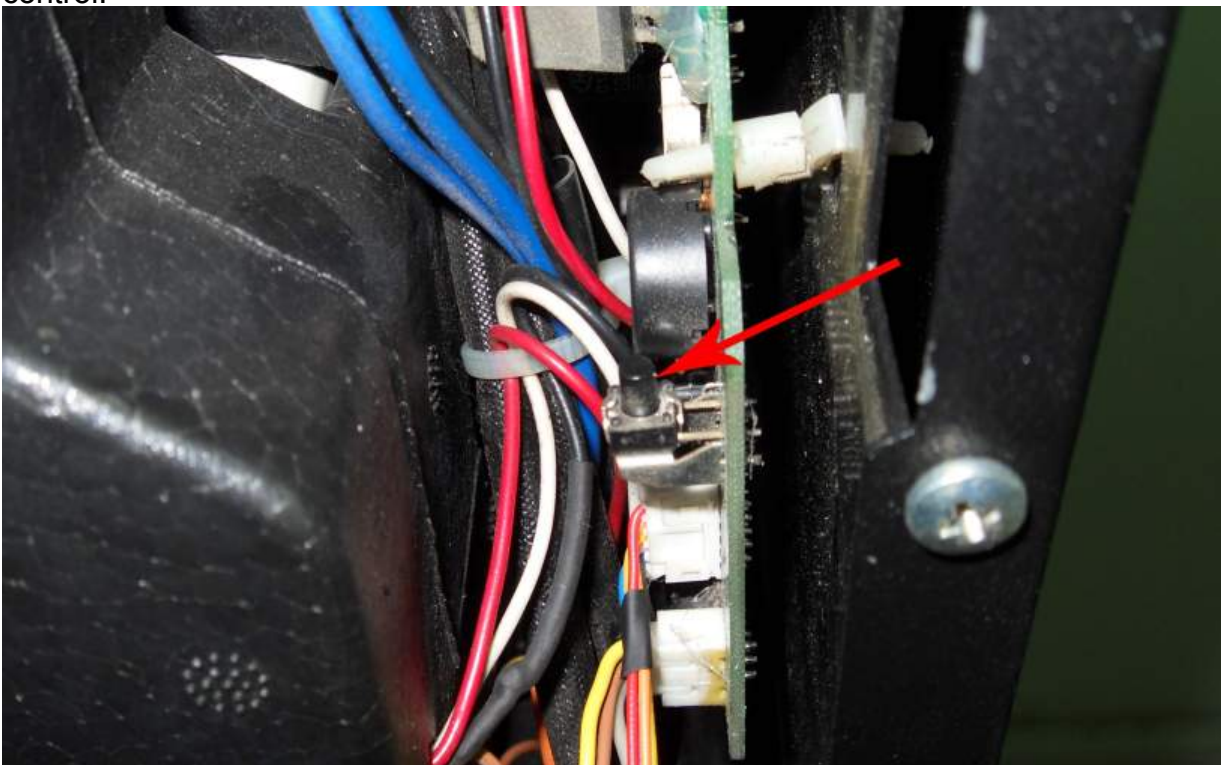
2.3.3 Clock setting: Press the clock key on the control, and then press the temperature rising and reducing key to adjust the time. The temperature rising key is for one hour, press it and it will increase in one hour steps. The temperature reducing key is for minutes, press it and it will increase in 1 minute steps.

## 2.4 EMERGENCY OPERATION (NOT AVAILABLE FOR USER)

2.4.1 There is one emergency button on the unit. When the remote control is lost or damaged, use this button to go into auto operation. If the unit stands by, pressing this button can turn on the machine in auto mode with indoor unit operating in auto fan speed.

2.4.2 Pressing this button can turn off the machine when the machine is operating.

2.4.3 During emergency operation, when an effective signal from the remote control is received, the unit will exit the emergency function and process the setting of the remote control.



## 2.5 LOUVER CONTROL

2.5.1 When unit is first turns on, louver will swing with 30 degree automatically.

2.5.2 Use the handset to control the louver to swing or stop at the desired location along the 30 degree range.

Note: To prevent causing damage to the stepper motor, it is not recommended to move the louver by hand.

## 2.6 PROTECTION FUNCTIONS

2.6.1 Compressor 3 minutes delay protection

a. The first time the unit is connected to electric power, the compressor will run at once.

b. After compressor stops every time, it must delay 3 minutes before starting again (Except heating mode and defrost function).

2.6.2 Anti-freeze protection in cooling and dehumidification modes

a. When the sensor determines  $IPT \leq -1^{\circ}\text{C}$ , compressor and outdoor fan motor will stop, indoor unit will maintain its original state.

b. When  $IPT \geq 8^{\circ}\text{C}$ , and is in the protection state for 3 minutes, compressor and outdoor fan motor start again and exit the anti-freeze protection state.

2.6.3 Over heat protection in heating mode

In heating mode:

a. When  $IPT \geq 55^{\circ}\text{C}$ , outdoor fan motor will stop.

b. When  $IPT \leq 48^{\circ}\text{C}$ , outdoor fan motor start again.

c. When  $IPT \geq 64^{\circ}\text{C}$ , compressor and outdoor fan motor will stop.

d. When  $IPT \leq 48^{\circ}\text{C}$ , 3 minutes later compressor and outdoor fan motor will start again.

In this case, four-way valve is always open and indoor fan motor always runs according to the setting.

2.6.4 Sensor damage protection

2.6.4.1 When RT sensor is damaged

a. When unit is in cooling, heating or dehumidification mode, and the RT temperature is lower than  $-40^{\circ}\text{C}$  or higher than  $120^{\circ}\text{C}$ , the sensor is judged to be damaged and the unit will go into protection mode - compressor will operate for 20 minutes and stop for 5 minutes repeatedly.

b. When unit is in auto mode, and the RT temperature is lower than  $-40^{\circ}\text{C}$  or higher than  $120^{\circ}\text{C}$ , the sensor is judged to be damaged and the unit will go into fan mode.

Note: After the RT sensor is damaged, the green light will flash with 1Hz frequency, or the unit will display E1 on the panel.

## 2.6.4.2 When IPT sensor is damaged

When IPT is lower than  $-30^{\circ}\text{C}$  or higher than  $90^{\circ}\text{C}$ , it is judged to be damaged :

Note : After IPT sensor is damaged, the green light will flash with 0.5Hz frequency, or the unit will display E2 on the panel.

## 2.6.4.3 When OPT sensor is damaged

When unit is In heating mode, compressor runs for 50 minutes, and then defrosts 3 minutes.

## 2.6.4.4 When RT and IPT sensors are damaged at the same time

Protection function will be according to 2.6.4.1a.

## 2.6.5 Indoor PG motor failure protection

If there is no fan speed feedback pulse from the PG motor after the motor has been powered on for 5 seconds, indoor fan motor, compressor, outdoor fan motor, valve and electric heater will stop. After 10 seconds, PG motor will be powered on again. If the fan speed feedback signal from the motor is still absent, it will be judged as PG motor failure. Green Light will flash 1.5S/Stop 0.5S, and the unit will display E3 on the panel.

## 2.6.6 Refrigerant insufficient protection

In cooling mode or cooling in auto mode, compressor operators for 20 minutes, if indoor coil temperature  $\geq$  room temperature -  $5^{\circ}\text{C}$ , and time lasts to 40 minutes, unit will stop working and display E4 on the panel.

In heating mode or heating in auto mode, compressor operates for 20 minutes, if indoor coil temperature  $\leq$  room temperature +  $5^{\circ}\text{C}$ , and time lasts to 40 minutes, unit will stop working and display E4 on the panel.

## 2.6.7 Failure Code

Failure means the system cannot self adjust. Turn off the unit and report the error code to your service centre. Error code:

Failure situation	Light flash	Code
RT Sensor Failure	1 time	E1
IPT Sensor Failure	2 times	E2
Indoor PG Motor Failure	on 1.5 sec./Stop 0.5 sec.	E3
Insufficient Refrigerant	on 1.5 sec./Stop 1 sec.	E4

## 2.6.8 OPT failure protection

The OPT sensor 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 defrost function is necessary.

Please refer to 2.1.4.

If OPT sensor fails, the unit will select automatic defrost function.

Automatic defrost function start condition:

Heating mode, and compressor continuously working for 25 minutes, if  $IPT-RT \leq 18^{\circ}\text{C}$ , the unit will go into defrost function.

Automatic defrost function stop condition:

When the compressor has worked for 12 minutes, unit will stop defrost function.

**SENSOR RESISTANCE R-T CONVERSION TABLE**

**R25: 5KΩ±1%**

**B25/50: 3470±1%**

T (°C)	Resistance	T (°C)	Resistance	T (°C)	Resistance	T (°C)	Resistance
-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



# THROUGH THE WALL UNIT

## PROBLEMS AND SOLUTIONS

### Problem possible causes

- The air conditioner does not work
- The air conditioner does not cool or heat the room
- Strange smell in the room. Water drips from the air conditioner.
- The remote control does not work.
- The air conditioner does not work for 3 minutes when switched on.

### Possible solutions

- Wrong setting of the timer / check it
- Problem with the power supply / check it
- The filter could be dirty / clean it
- The room temperature is too high or too low / wait for a few minutes until the temperature adjusts
- The temperature is not properly set / check it
- The grilles could be obstructed / check and remove any obstacles
- Wrong installation of the air conditioner
- Wrong connection of the drainage pipe
- Exhausted batteries
- Wrong insertion of the batteries inside the remote control
- Protection of the air conditioner. Wait for 3 minutes and see if the air conditioner will start to work again.

### REMARKS:

- If the electrical supply cord is damaged, it must be replaced.
- The max operation temperature for the air conditioner:
  - Max cooling: outdoor DB43°C / WB26°C, indoor DB32°C / WB23°C,
  - Min heating: outdoor DB-5°C / WB-6°C, indoor DB20°C without auxiliary electrical heater (only available for PTTW 12).

