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# **FUNCTIONAL SPECIFICATIONS**

**For**

## **AIR CONDITIONING CONTROLLER**

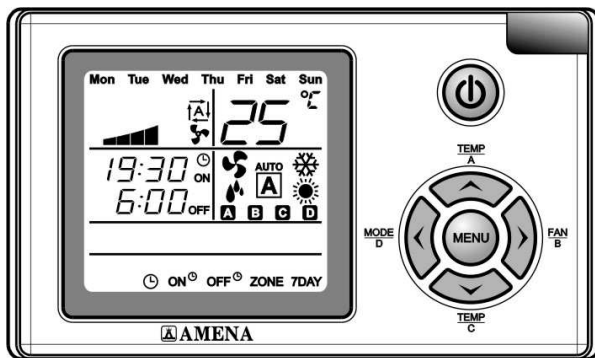
**Applied to**

### **AMENA 4 ZONE CONTROL II**

## 1. INTRODUCTION

Amena 4 Zone control II is a two pieces fan coil thermostat available for Cool only & Heat/Cool versions. Its application is for the duct type system which can control up to 4 zone dampers. The system consists of

- ❑ Main unit
- ❑ Display unit (which up to 2 units can be used).
- ❑ External transformer
- ❑ Cable 2 cores, 10M connected between Main & Display units.
- ❑ Remote unit with mounting bracket (optional)

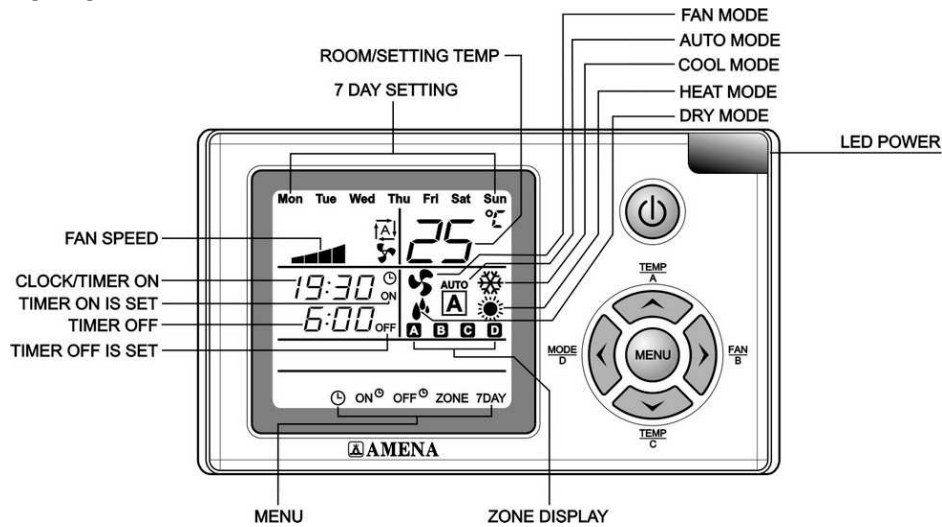


Display unit




Remote unit

## 2. USER'S FEATURES



### 2.1 Power on/off

Press  button to turn on/off the system.

### 2.2 Fan speed

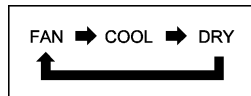
Press FAN button to set fan speed (turbo, high, medium, low or auto). In auto mode the speed will be changed automatically according to the difference between  $T_{room}$  &  $T_{set}$ . ( $\rho T$ )

$\rho T$	Speed
$\geq 3^{\circ}\text{C}$	high
$= 2^{\circ}\text{C}$	medium
$\leq 1^{\circ}\text{C}$	low

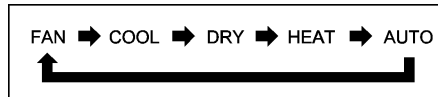
### 2.3 Operating mode

By pressing MODE button, the air conditioner can be put in

- 3 operating modes (fan, cool, dry) if the COOL version is ordered.





- 5 operating modes (fan, cool, dry, heat, auto) if the HEAT/COOL version is ordered.



**Note** : If HEAT/COOL version is used for Cool only application, the Jumper setting shall be done (see Section 4.6).

### 2.4 Temperature setting

Press  or  button to set the temperature in a range of 18-30°C.

### 2.5 Zone control

To turn on/off the zone dampers is to

- Press & hold MENU button for 2 seconds, Display shows ZONE in blinking.
- Press A, B, C or D button(s) to turn on/off any particular zone(s), Display shows the active zone(s).

**Note** : To exit is by pressing MENU button again or no button is pressed within 15 seconds.

## 2.6 Enhanced features

Following is an enhanced features that the user has to enter into Menu window.

### Enter into Menu

- ❑ Press MENU button to display the menu. Using < or > button to move the cursor.

### Clock setting

- ❑ Move cursor to ⌚ position and then press MENU button.
- ❑ Press ^ or v button for Hour setting.
- ❑ Use < or > button to enter into Minute setting and then press ^ or v button for setting.
- ❑ Use > button to enter into Day setting and then press ^ or v button for setting.

**Note :** If Timer on/off is set, there will be no Clock display.

### Timer on

- ❑ Move cursor to ON ⌚ position and then press MENU button.
- ❑ Press ^ or v button for Hour setting.
- ❑ Use < or > button to enter into Minute setting and then press ^ or v button for setting.

**Note :** To cancel is by pressing POWER button while in this setting mode.

### Timer off

- ❑ Move cursor to OFF ⌚ position and then press MENU button.
- ❑ Press ^ or v button for Hour setting.
- ❑ Use < or > button to enter into Minute setting and then press ^ or v button for setting.

**Note :** To cancel is by pressing POWER button while in this setting mode.

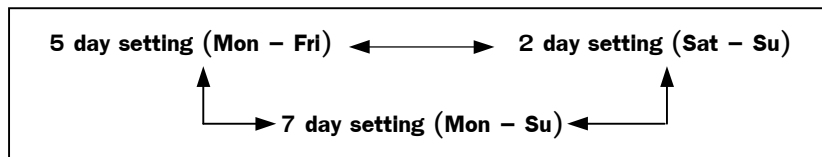
### Zone control

- ❑ Move cursor to ZONE position and then press MENU button.
- ❑ Press A, B, C or D button(s) to turn on/off any particular zone(s), Display shows the active zone(s).

### 7 Day program

The system can be programmed to turn on/off on 5 + 2 or 7 day basis.

- ❑ Move cursor to 7 DAY position and then press MENU button.
- ❑ Use < or > button to select 5, 2 or 7 day setting and then press MENU button.



- ❑ Use < or > button to enter into Timer on/off, Hour/Minute setting and then press ^ or v button for setting.

**Note :** - If 7 Day program's Timer on/off is set, the LCD shows "7 DAY".

- To cancel is by pressing POWER button while in Timer on/off of 7 Day program mode. The LCD does not show "7 DAY".

- To override is by pressing v button at the same time. The LCD shows "7 DAY" in blinking.

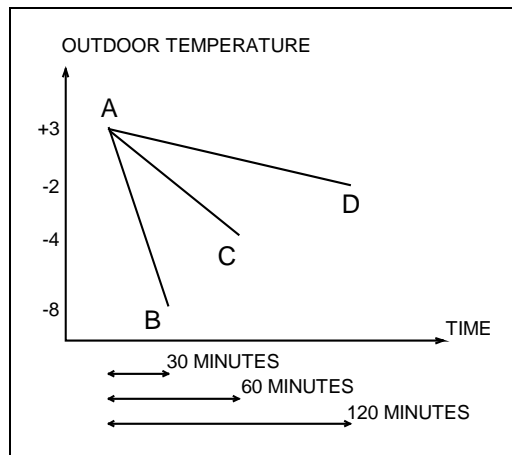
- To deactivate the override is by pressing v button at the same time again.

### 3. SYSTEM FEATURES

- 3.1 Watchdog :** There is a watchdog circuit to reset the MCU if it malfunctions due to voltage fluctuation or other abnormality.
- 3.2 Compressor delay protection :** There is a 3 minute delay time for compressor to restart. However in case of power interruption the compressor can be restarted in a range of 3-4 minutes in random order.
- 3.3 Compressor minimum on time :** If  $T_{room}$  reaches  $T_{set}$  but the compressor operates less than 3 minutes, it will continuously operate up to 3 minutes.
- 3.4 Auto restart :** In case of power interruption and back to normal, the control will automatically resume its operation with same settings. (see Section 4.7 for Non – auto restart).
- 3.5 Freeze protection :** In Cool or Dry mode if  $T_{indoor\ coil} \leq 3^{\circ}\text{C}$  and Compressor runs continuously more than 10 minutes, this function will be activated. It will stop the compressor, runs the fan at low speed.  
The system will resume its normal operation if  $T_{indoor\ coil} \geq 7^{\circ}\text{C}$  or the system is turned off.
- 3.6 Defrost function :** In Heat mode if  $T_{outdoor\ coil}$  is very low, the compressor can not operate efficiently. This function will be activated to protect the compressor.

#### Defrost process

As soon as  $T_{outdoor\ coil} < 3^{\circ}\text{C}$ , Defrost timer starts. If  $T_{outdoor\ coil}$  is above  $2^{\circ}\text{C}$  more than 2 minutes, Defrost timer is reset. The Defrost function is activated if



- a) Compressor has been running continuously in heat mode more than 5 minutes, and
- b) Defrost timer meets one of the below conditions
- $T_{outdoor\ coil}$  falls from +3 to  $-8^{\circ}\text{C}$  (line AB) during 30-60 minutes and remains  $\leq -8^{\circ}\text{C}$  more than 5 minutes.
  - $T_{outdoor\ coil}$  falls from +3 to  $-4^{\circ}\text{C}$  (line AC) during 60-120 minutes and remains  $\leq -4^{\circ}\text{C}$  more than 5 minutes.
  - $T_{outdoor\ coil}$  falls from +3 to  $-2^{\circ}\text{C}$  (line AD) after 120 minutes and remains  $\leq -2^{\circ}\text{C}$  more than 5 minutes.

#### While defrost

The indoor & outdoor fan stop while the compressor operates in Cool mode.

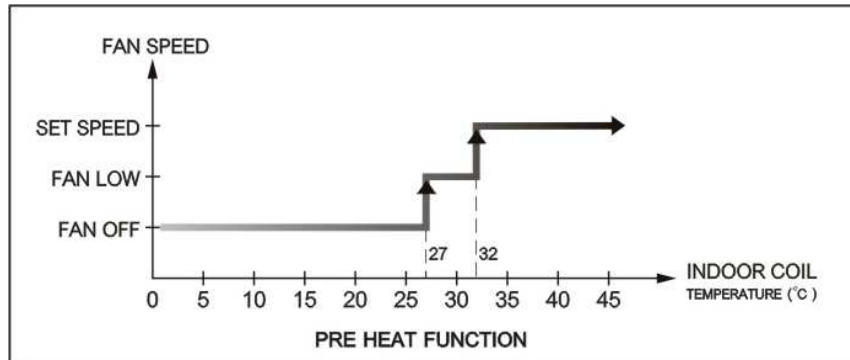
#### Defrost ends

If  $T_{outdoor\ coil}$  is above  $14^{\circ}\text{C}$  or Defrost function operates more than 10 minutes, the system will return to heat mode automatically.

### 3.7 Pre heat & Post heat functions

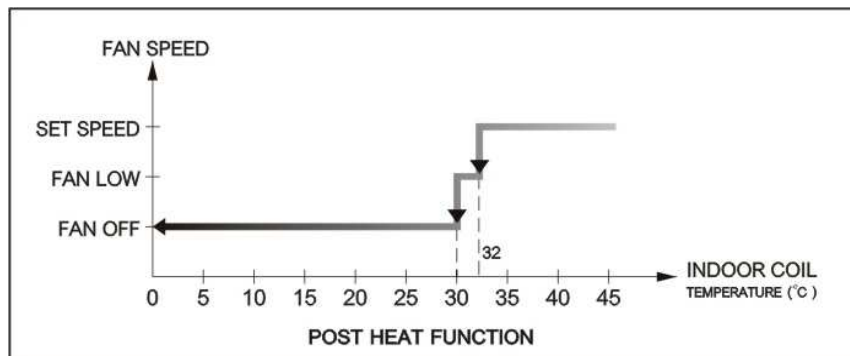
Pre heat function is to prevent fan coil unit blowing cold draught in Heat mode while the compressor is ON.

- ❑ When  $T_{\text{indoor coil}}$  is below 27°C, fan remains off.
- ❑ When  $T_{\text{indoor coil}}$  is between 27-32°C, fan operates at low speed.
- ❑ When  $T_{\text{indoor coil}}$  is above 32°C, fan operates at set speed.



Post heat function is to prevent fan coil unit blowing cold draught in Heat mode while the compressor is OFF.

- ❑ When  $T_{\text{indoor coil}}$  is above 32°C, fan operates at set speed.
- ❑ When  $T_{\text{indoor coil}}$  is between 30-32°C, fan operates at low speed.
- ❑ When  $T_{\text{indoor coil}}$  is below 30°C, fan stops.

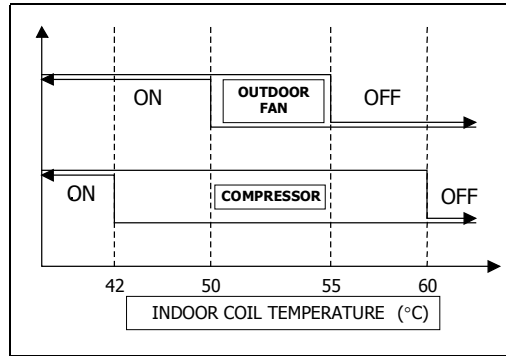


**Note :** - For Post heat function, the temperature for fan – off can be changed by using Jumpers OP1 & OP2 on Main unit (see Section 4.1).

- For Post heat function when  $T_{\text{indoor coil}} \leq 32^\circ\text{C}$ , the fan can be set to stop (see Section 4.4).

### 3.8 Compressor overload protection

If the compressor has been operating continuously in heat mode and  $T_{\text{indoor coil}}$  is abnormally high, the compressor will be stopped as a protection. The alarm will be alert (see Section 3.14).



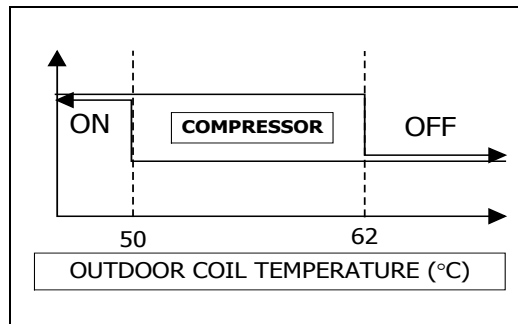
It will resume to normal operation when  $T_{\text{indoor coil}}$  is lower than 42°C.

### 3.9 Reversing valve change protection

The reversing valve can change its state only after the compressor stops at least one minute.


### 3.10 Anti overheat (outdoor coil) protection

In cool or dry mode if  $T_{\text{outdoor coil}}$  is abnormally high, the compressor will be stopped as a protection. The alarm is alert on Display unit (see Section 3.14)



It will resume to normal operation when  $T_{\text{outdoor coil}}$  is lower than 50°C or the operating mode is changed.

### 3.11 Protection of all dampers are off

While system is turned on but all zone dampers are turned off, the system will delay for 2 minutes and then turn off the operation. The alarm will be alert (see Section 3.14). During this delayed period if  button is pressed to turn on again. The system will turn on all zone dampers.

However this feature can be deactivated (see Section 4.2).

### 3.12 Reading temperature sensors

Both Main & Display units are equipped with room temperature sensors.

- In Cool mode, the reading temperature is from Main unit's sensor or display unit's sensor can be selected by Jumper at connector P21 (see Section 4.8).
- In Heat mode, the reading temperature is from Display unit's sensor.
- If two Display units are installed the reading temperature will be either
  - a) the average value of two readings, or
  - b) from the last Display unit which the button is pressed.

This option can be selected by Jumper OP4 on Main unit (see Section 4.3).

### 3.13 Offset temperature

In heat mode, the offset for room temperature can be set for 0 or 1°C (see Section 4.5).

### 3.14 Error display

When there is any error, the LED on Display unit will blink and the LCD shows error status.

Error code	Description	LED Power blinking
Er : 03	Compressor overload protection	yes
Er : 04	Anti overheat protection	yes
Er : 05	Room sensor error	yes
Er : 06	Deice sensor error	yes
Er : 07	Freeze sensor error	yes
Er : 08	Protection & Alarm Damper	yes

#### 4. OPTIONS

4.1 Jumpers OP1 & OP2 are used to select the temperature for Fan off in Post heat function.

OP1	OP2	POST HEAT TEMP
Not inserted	Not inserted	23°C
Inserted	Not inserted	27°C
Not inserted	Inserted	30°C
Inserted	Inserted	Disable post heat (Override OP5)

4.2 Jumper OP3 is used to activate / deactivate the protection when all dampers are off.

OP3	Operation
Inserted	deactivate
Not inserted	Activate

4.3 Jumper OP4 is used to select the reading temperature(s) from any sensor(s) in Heat mode.

OP4	Reading temperature is from
Inserted	average value of two readings
Not inserted	sensor inside the last Display unit which button is pressed

4.4 Jumper OP5 is used to select the fan operation during Post heat function.

OP5	Fan
Inserted	Stops when $T_{\text{indoor coil}} \leq 32^{\circ}\text{C}$
Not inserted	Operates at low speed when $T_{\text{indoor coil}} \leq 32^{\circ}\text{C}$

4.5 Jumper OP6 is used to select the offset temperature in Heat mode.

OP6	Off set temp.
Inserted	1°C
Not inserted	0°C

4.6 Jumper OP7 is used to select for Cool only or Heat/Cool operating mode.

OP7	Operating mode
Inserted	Heat / Cool
Not inserted	Cool only

4.7 Jumper OP8 is used to select for Auto restart or Non - auto restart.

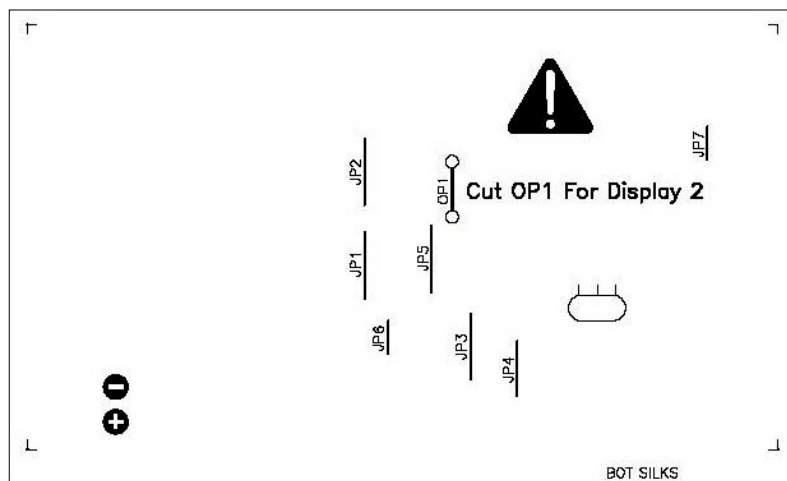
OP8	Operation
Inserted	Non - auto restart
Not inserted	Auto restart

4.8 Jumper at connector P21 is used to select the reading temperature from any sensor in Cool mode.

P21	Reading temperature is from
Inserted	Display unit's sensor
Not inserted	Main unit's sensor

## 5. Display addressing

As up to 2 Display units can be installed in the system, then Display addressing is needed. Open the Display unit, you can see Jumper at OP1. With this jumper, it is addressed to be Unit # 1 (factory setting is Unit # 1). To change the address to be Unit # 2 is to cut the said jumper:



6. WIRING DIAGRAM

