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# Special Debugging Tools for Inverter Units - P Models

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Technical Support Department

A background graphic of a globe with a grid of latitude and longitude lines. Overlaid on the globe are several glowing blue rectangular shapes, resembling circuit board components or data points, arranged in a pattern that suggests a global network or data flow.

# ***Contents***

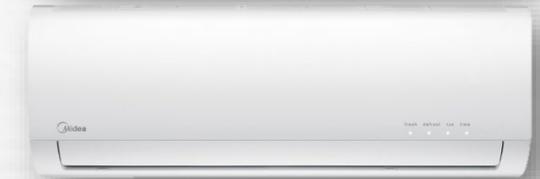
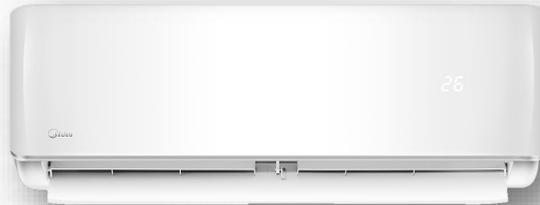
>> Normal Remote Controller	-----·	01
>> Engineering Remote Controller	-----·	02
>> Debugging Board	-----·	03

## Running Parameter Checking



Now you can check the running parameters of air conditioner with normal remote controller. And these parameters will be displayed on the digital 88 of indoor unit. You can analysis running state of the A/C from these information.

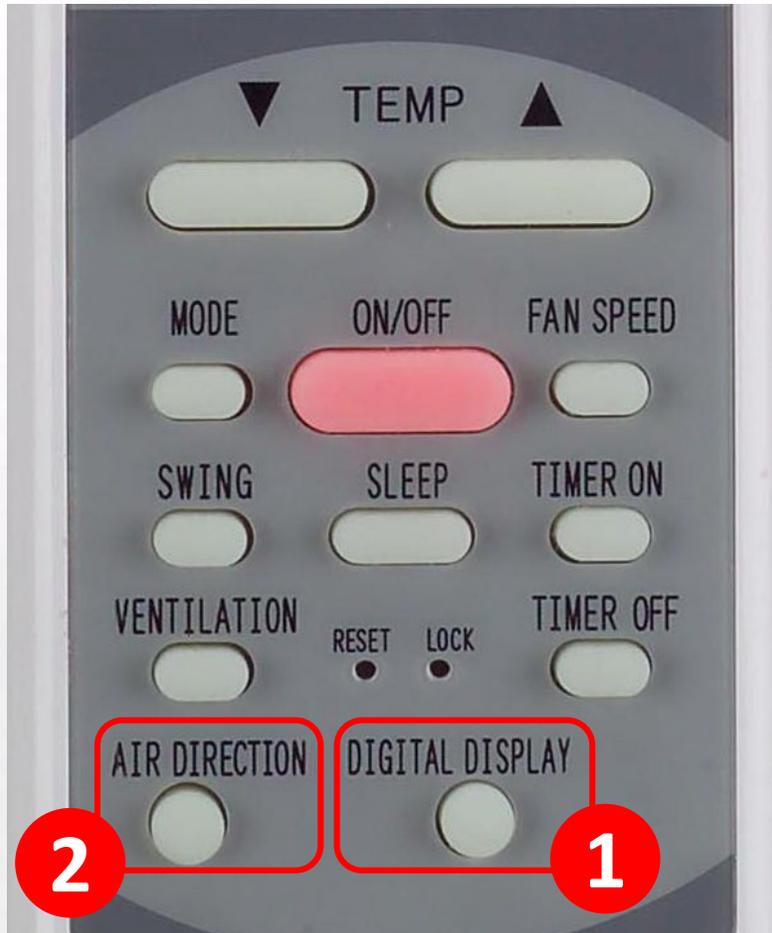
# Running Parameter Checking



LCAC Series



## Into Parameter Checking mode



**1** Press “LED” (or “DO NOT DISTURB”) 3 times

**2** Press “AIR DIRECTION” (or “SWING”) 3 times

Finish **1** and **2** within 10 seconds, the beep will keep beeping for 2 seconds, which means the unit goes into parameter checking mode. **This operation can be carried out when unit is running, standing by or even faulty.**

## Parameter Checking operation



When in Parameter Checking mode,

Press “LED” (or “DO NOT DISTURB” ) for NEXT information

Press “AIR DIRECTION” (or “SWING” ) for PREVIOUS information

## Parameter Checking operation



In “Parameter Checking” mode, the screen will display the code name for 2 seconds, and then the information for 25 seconds. The meaning of codes are as right table shows. **If there is no any operation in this 27s or other button is pressed, the unit will quit this mode.**

Displaying code	Meaning
T1	Room temperature
T2	Indoor coil temperature
T3	Outdoor coil temperature
T4	Ambient temperature
Tb	Outlet temperature of indoor coil
TP	Discharge temperature
TH	Function temperature
FT	Targeted Frequency
Fr	Actual Frequency
IF	Indoor fan speed
OF	Outdoor fan speed
LA	EXV opening steps
CT	Compressor continuous running time
ST	Causes of compressor stop.
A0, A1, 0, 1, 2, 3, 4, 5, 6, LA, UT	Reserved

## Parameter Checking operation

Enquiry information	Display value	Meaning	Remark
T1, T2, T3, T4, T2B, TP, TH, Targeted Frequency, Actual Frequency	-1F, -1E, -1d, -1c, -1b, -1A	-25, -24, -23, -22, -21, -20	<ol style="list-style-type: none"> <li>All the displaying temperature is actual value.</li> <li>All the temperature is °C no matter what kind of remote controller is used.</li> <li>T1, T2, T3, T4, T2B display range:-25~70; TP display range:-20~130.</li> <li>Frequency display range: 0~159HZ.</li> <li>If the actual value exceeds the range, it will display the maximum value or minimum value.</li> </ol>
	-19—99	-19—99	
	A0, A1, ...A9	100, 101, ...109	
	b0, b1, ...b9	110, 111, ...119	
	c0, c1, ...c9	120, 121, ...129	
	d0, d1, ...d9	130, 131, ...139	
	E0, E1, ...E9	140, 141, ...149	
	F0, F1, ...F9	150, 151, ...159	
Indoor fan speed /Outdoor fan speed	0	OFF	<p>For some big capacity motors.</p> <p>For some small capacity motors, display value is from 14-FF(hexadecimal), the corresponding fan speed range is from 200-2550RPM.</p>
	1, 2, 3, 4	Low speed, Medium speed, High speed, Turbo	
	14-FF	Actual fan speed=Display value turns to decimal value and then multiply by 10. The unit is RPM.	
EXV opening steps	0-FF	Actual EXV opening value=Display value turns to decimal value and then multiply by 2.	
Compressor continuous running time	0-FF	0-255 minutes	If the actual value exceeds the range, it will display the maximum value or minimum value.
Causes of compressor stop.	0-99	For the detailed meaning, please consult with engineer	Decimal display
Reserve	0-FF		

## Cause of compressor stops

Code	Reasons of compressor stop	Code	Reasons of compressor stop
1	Frequency limit caused by current	24	IMP overcurrent protection
2	Frequency limit caused by T2 in cooling	25	Compressor lack of phase
3	Frequency limit caused by T2 in heating	26	Compressor malfunction
4	Preset temperature reached	27	Low voltage protection of 311
5	Frequency limit caused by T4	28	Fan current protection
6	Defrosting	29	Fan lack of phase
7	Mode switching	30	Fan zero speed protection
9	High discharge temperature protection	31	PFC module protection
10	High evaporator coil temperature T2 protection	32	High voltage protection of 311
11	Evaporator low temperature T2 protection	33	Zero speed malfunction
12	Condenser high temperature T3 protection	34	PWM malfunction
13	Low indoor room temperature protection in drying mode	35	MCE malfunction
14	Low ambient temperature protection	36	Compressor overcurrent protection
15	Refrigerant leakage detection	37	Compressor EE malfunction
16	Communication malfunction between indoor and outdoor units	38	Compressor start-up malfunction
17	Communication error between outdoor main chip and compressor driven chip IR341	39	311 fan speed has been malfunction
18	AC power input voltage protection	40	Low pressure protection
19	Top temperature protection of compressor	41	High pressure protection
20	Outdoor EE Malfunction	42	PFC module malfunction
21	Fan speed malfunction	49	Shutdown stop
22	Temperature sensor open or short circuit	50	Electrical disconnect
23	Overcurrent protection	51	DR stop

## Pre-setting when installation



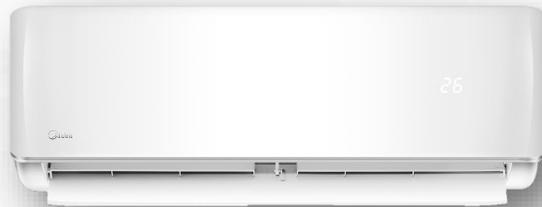
With this remote controller, you can change some pre-settings when installing an air conditioner to make it run more properly for real applications.



RG52I/BGE 17317000000235



# Pre-setting when installation



LCAC Series



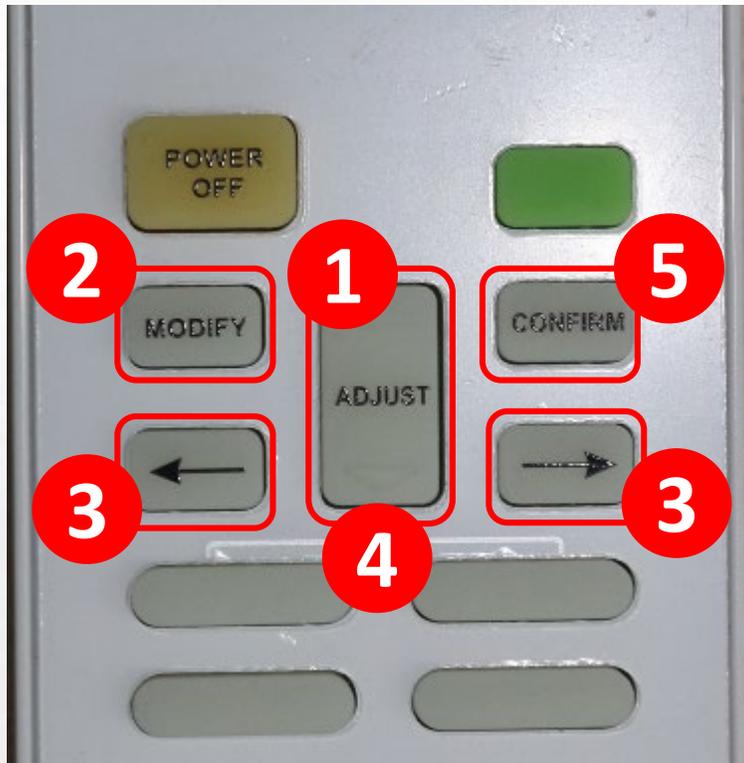
## Into pre-setting mode

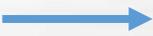
This engineering remote controller is valid only within 10 minutes after unit is electrified and the unit should be off. The air conditioner will not response after 10 minutes or it is turned on within that 10 minutes. If you still want to use the remote controller, you have to cut off the power and electrify the unit again.

*NOTE: this remote controller is also available for LCAC units. Once you change the pre-settings with the controller, all pre-settings of micro-switches will be transferred to the controller and these switches will be invalid. You can never use them to make pre-settings again but this remote controller.*



## How to change the pre-setting

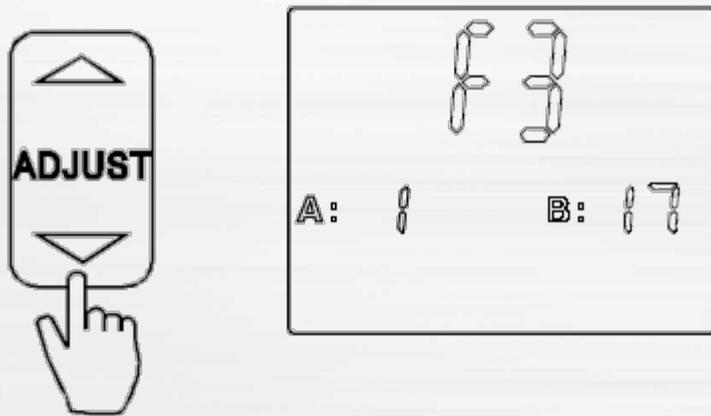


- 1 Press  or  of “ADJUST” to find the item you want to change;
- 2 Press “MODIFY” to start edit mode;
- 3 Press  or  to select A, or B parameter;
- 4 Press  or  of “ADJUST” to find the optional value you want;
- 5 Press “CONFIRM” to store the setting and quite edit mode.

## For example

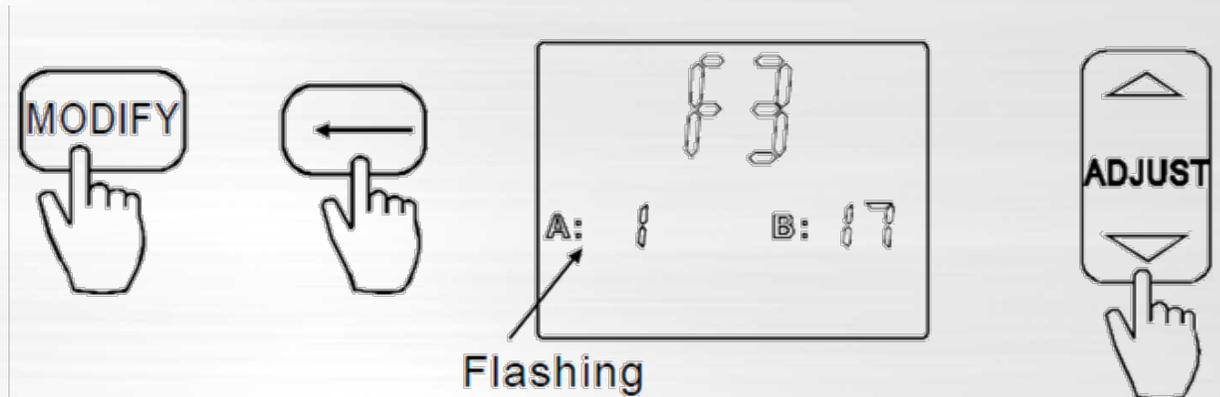
Set “anti-cold wind” function as “intelligent anti-cold wind” and fan stop temperature is 17 °C.

- 1** Press  or  of “ADJUST” to find the item F3;



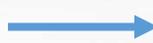
- 2** Press “MODIFY” to start edit mode; Press  to set item “A”. And press  or  to set value as “1”.

(1—intelligent anti-cold wind; 2—normal anti-cold wind)

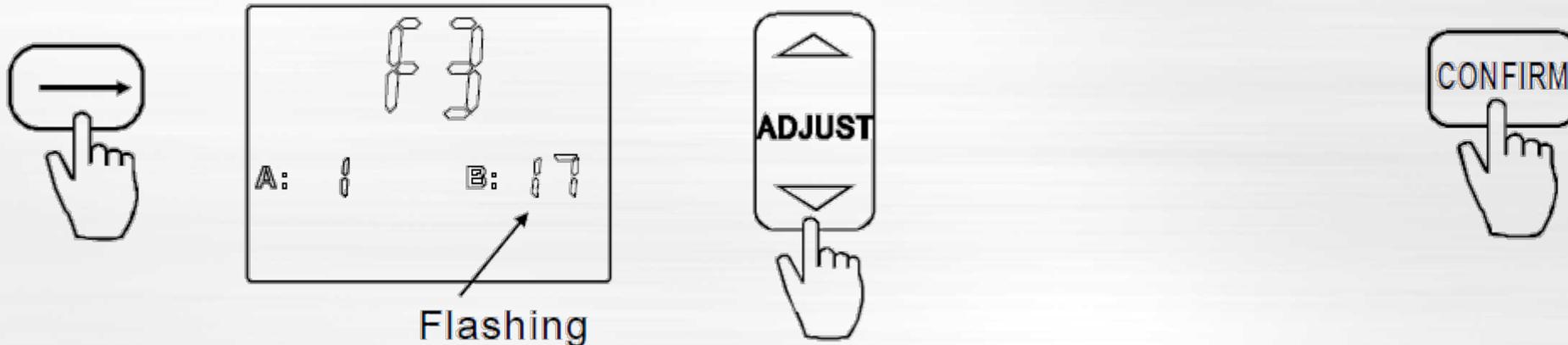


## For example

Set “anti-cold wind” function as “intelligent anti-cold wind” and fan stop temperature is 17 °C.

- 3** Press  to set item “B”. And press  or  to set value as “17”.  
(B: fan stop temperature, option value: 17-21)

- 4** Press “CONFIRM” to store the setting and quite edit mode.



## Engineering Mode of Normal RG57



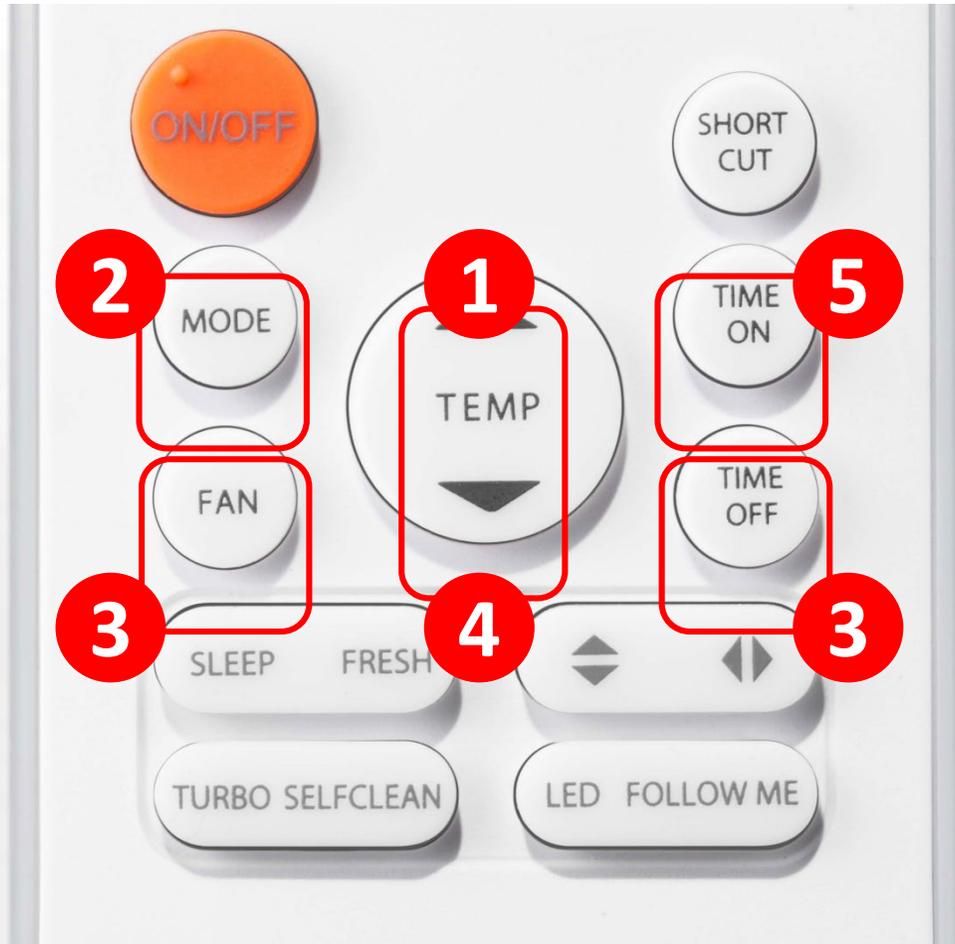
Normal RG57 remote controller can also be set into **Engineering Mode** to be an engineering remote controller.

To set RG57 into Engineering Mode, Press and hold **MODE**, **FAN** and **TIME ON** buttons at the same time until **F1** shows on display (about 5 seconds) during the first 30 seconds when the controller is electrified (batteries installed).

Take out the batteries and re-install them again to quit **Engineering Mode**.

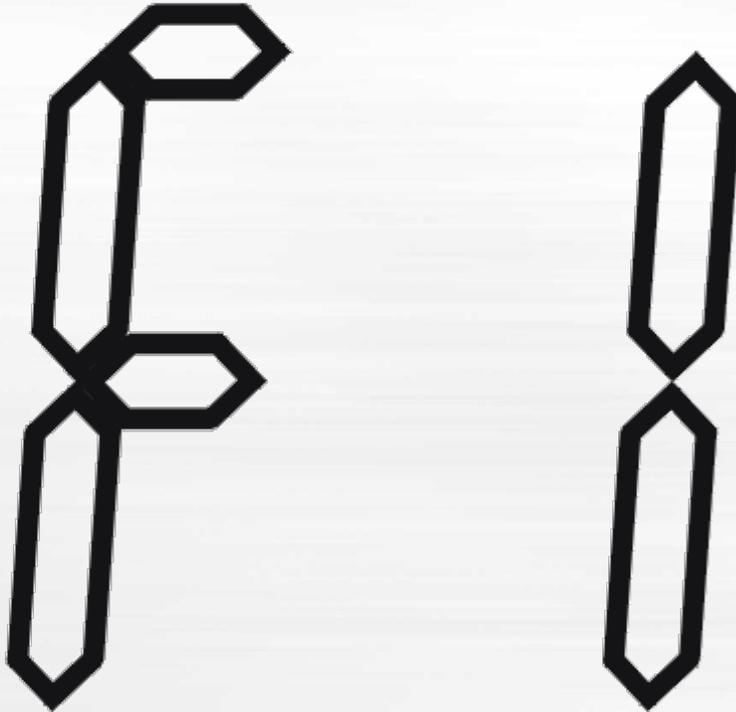


## How to change the pre-setting



- 1 Press  or  of “TEMP” to find the item you want to change;
- 2 Press “MODE” to start edit mode;
- 3 Press FAN or TIMER OFF to select A, or B parameter;
- 4 Press  or  of “TEMP” to find the optional value you want;
- 5 Press “TIMER ON” to store the setting and quite edit mode.

## Settable Items



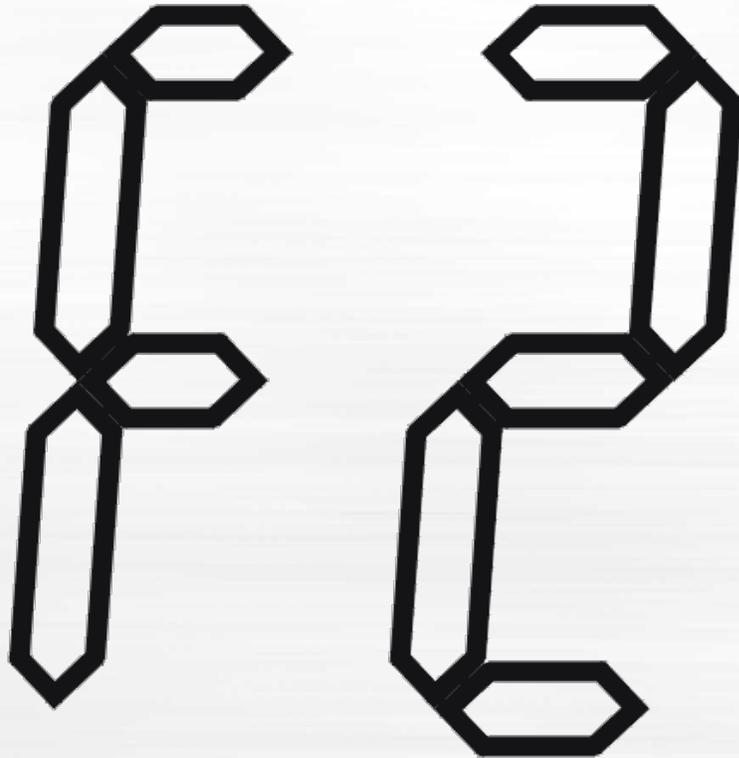
## Auto-restart

Optional Parameters:

On

Off

## Settable Items

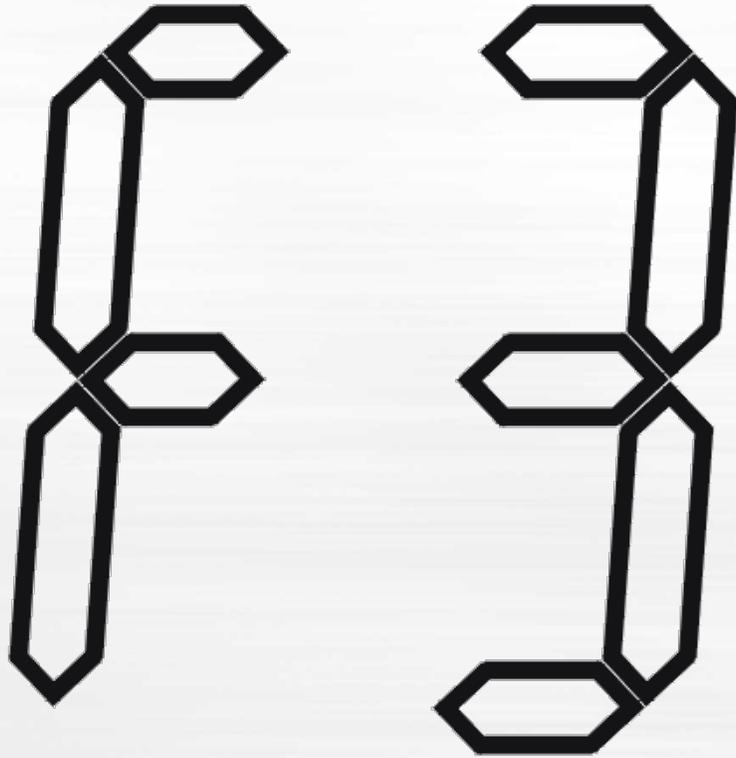


## Heating temperature compensation

Optional Parameters:

- 6     6
- 5     5
- 4     4
- 3     3
- 2     2
- 1     1
- 0

## Settable Items



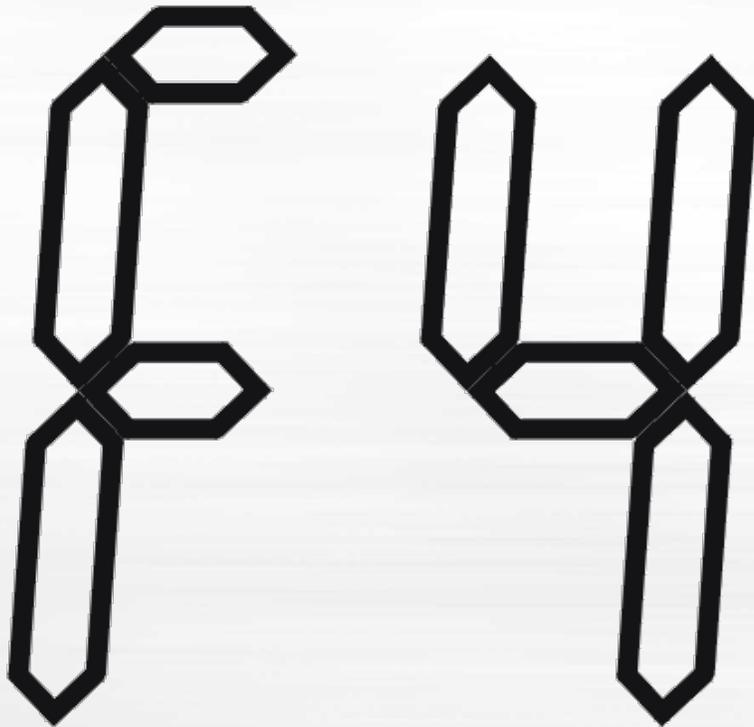
## Anti-cold air

Optional Parameters:

1(intelligent): 17-21

2(normal): 8-24-28

## Settable Items

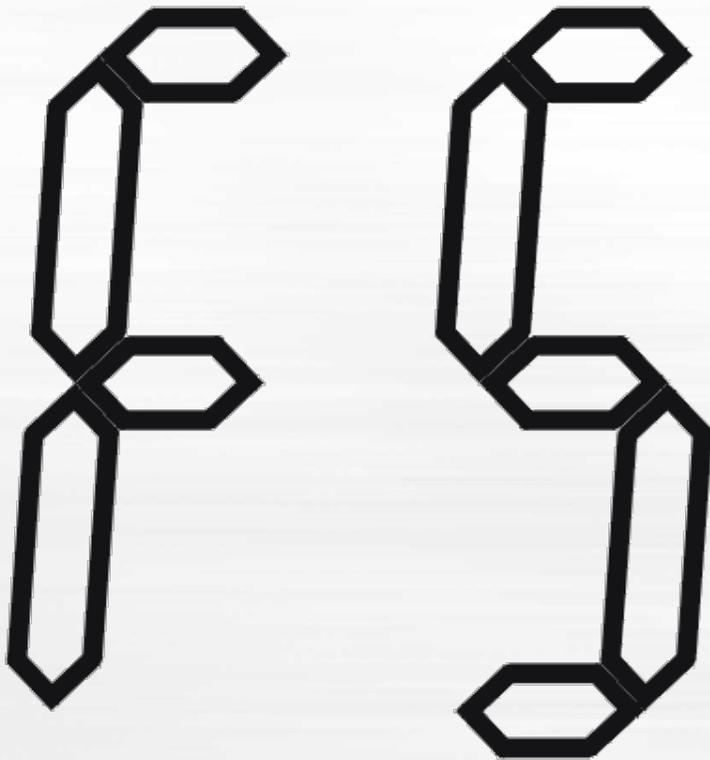


## Speed control after $T_s$ reached

Optional Parameters:

- 1: Fan stop
- 2: **Lowest RPM**
- 3: Setting RPM
- 4: Thermal function

## Settable Items



## Louver position memory

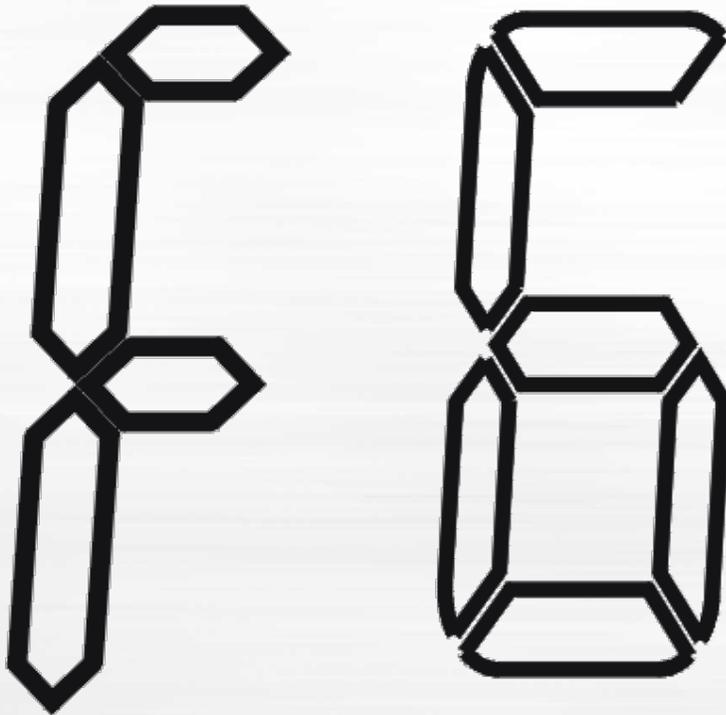
Optional Parameters:

1: No memory

2: Switch off ✓; Power failure ✓

3: Switch off ✓; Power failure ✗

## Settable Items



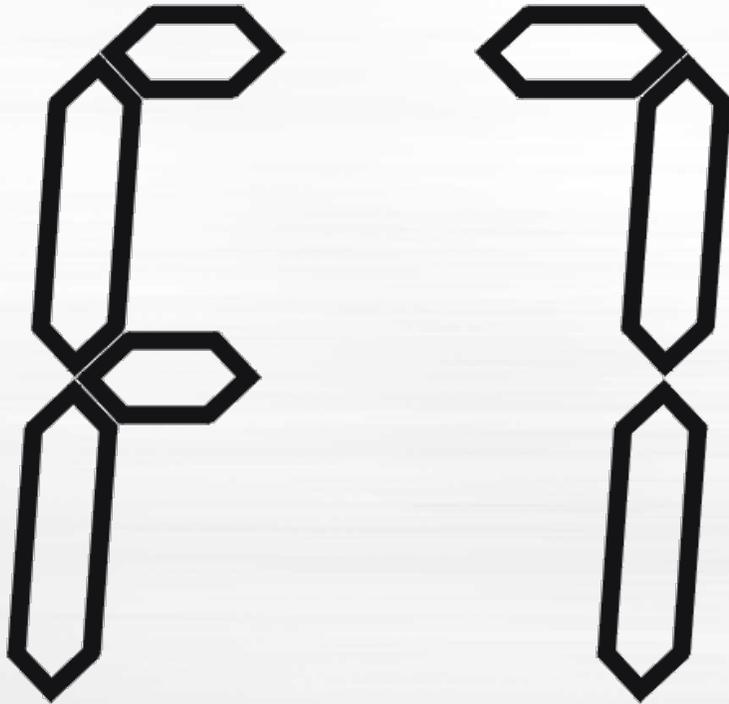
Heating only or  
cooling & heating

Optional Parameters:

HH

CH

## Settable Items



# Cooling temperature compensation

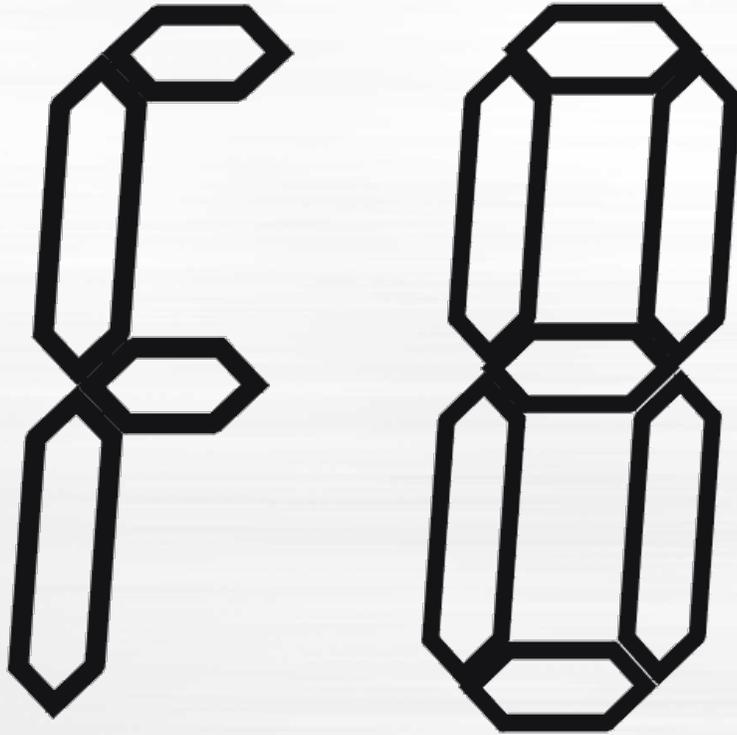
Optional Parameters:

-2    2

-1    1

0

## Settable Items



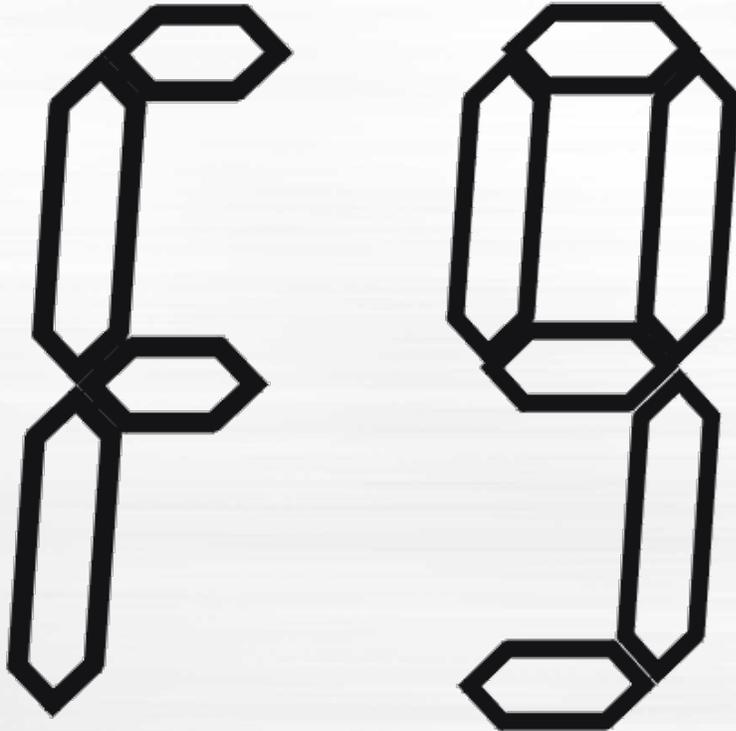
## EC protection

Optional Parameters:

On

Off

## Settable Items



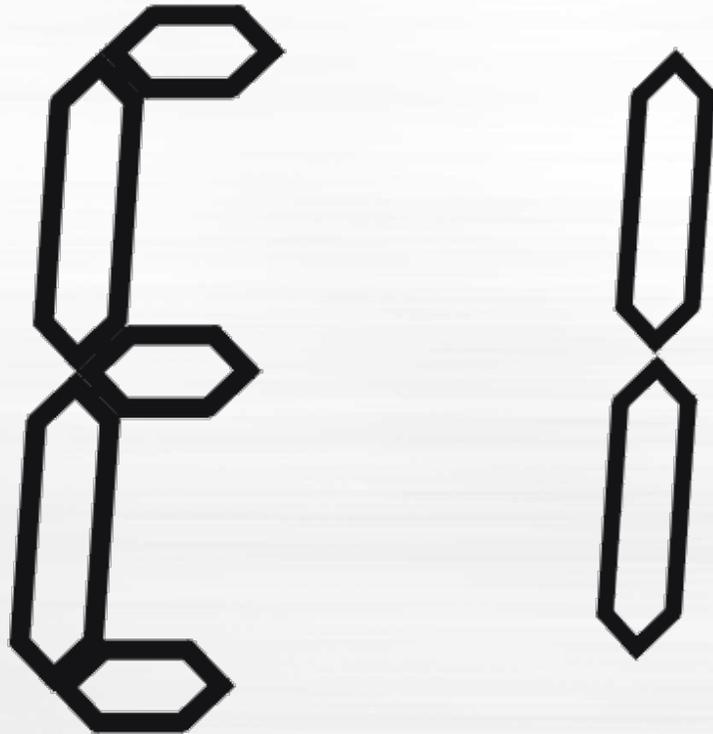
## Filter cleaning reminding

Optional Parameters:

On

Off

## Settable Items



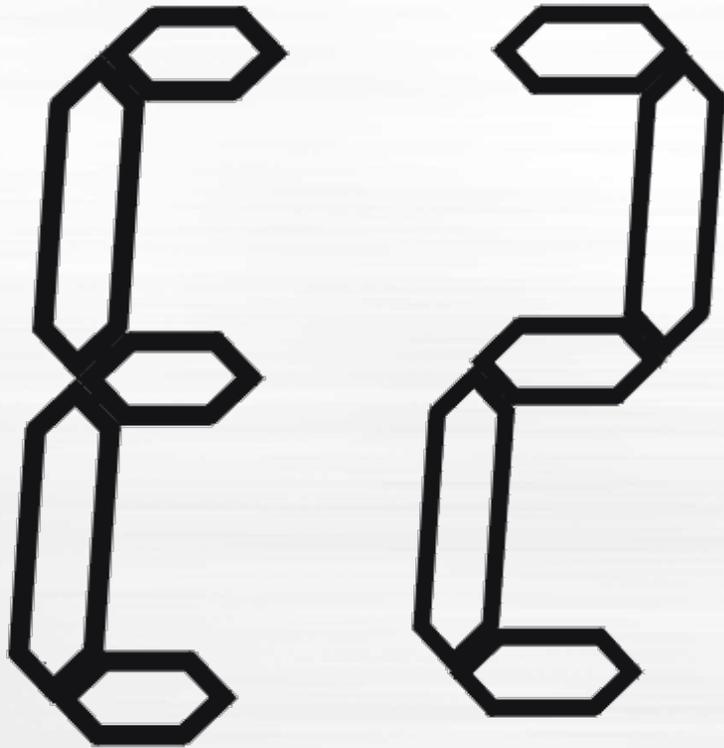
## Filter change reminding

Optional Parameters:

On

Off

## Settable Items

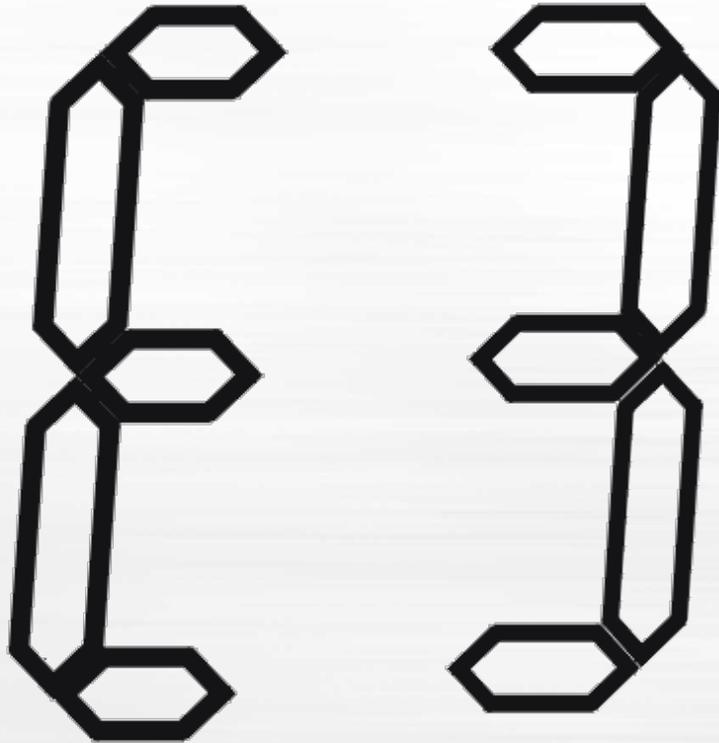


Lowest setting  
temperature in cooling

Optional Parameters:

17-24

## Settable Items

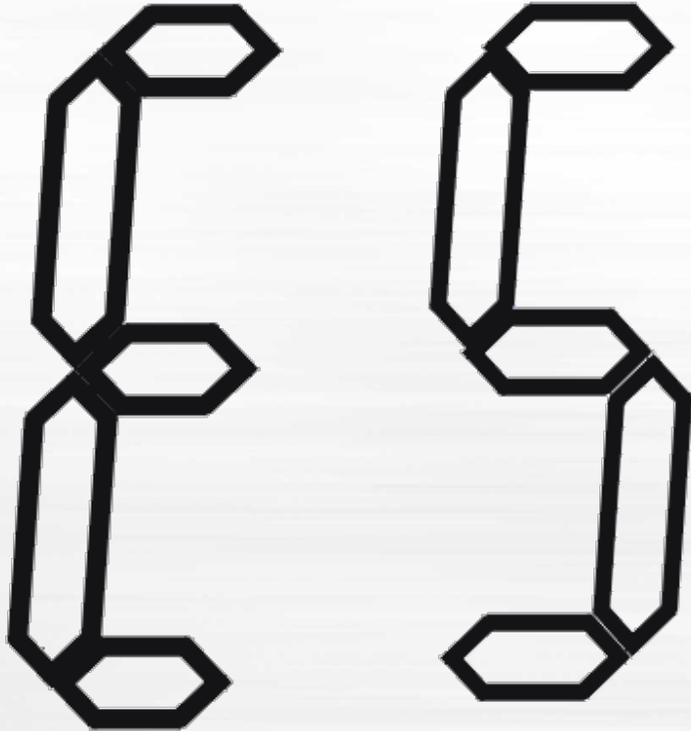


Highest setting  
temperature in heating

Optional Parameters:

25-30

## Settable Items



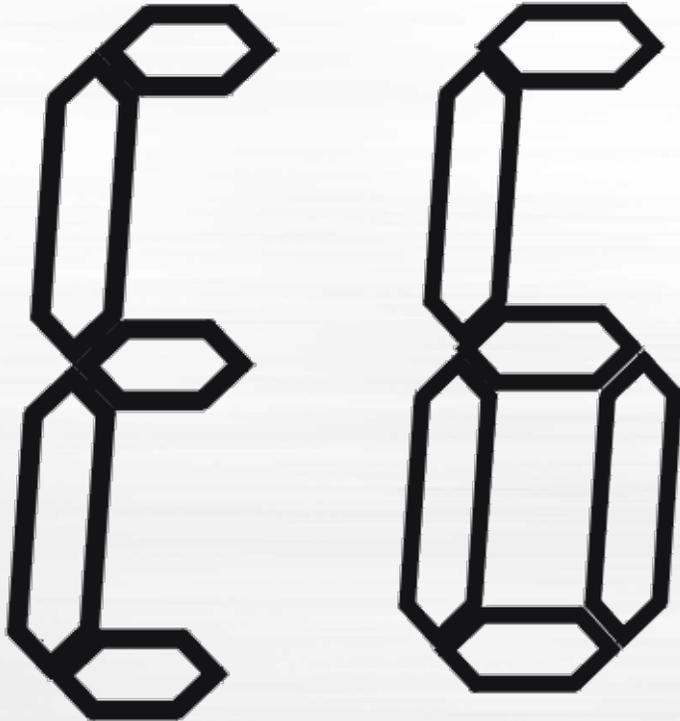
## Priority mode setting of multi units

Optional Parameters:

H

C

## Settable Items



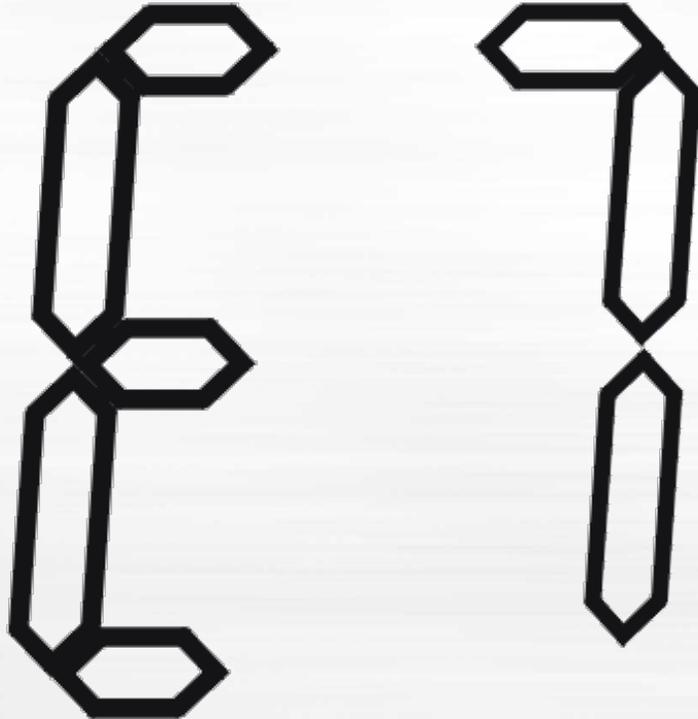
## Network address setting

Optional Parameters:

0-63

--: determined by dial switch

## Settable Items



## Capacity code setting

Optional Parameters:

0~3 (reserved)

4: 18K

8: 48K

5: 24K

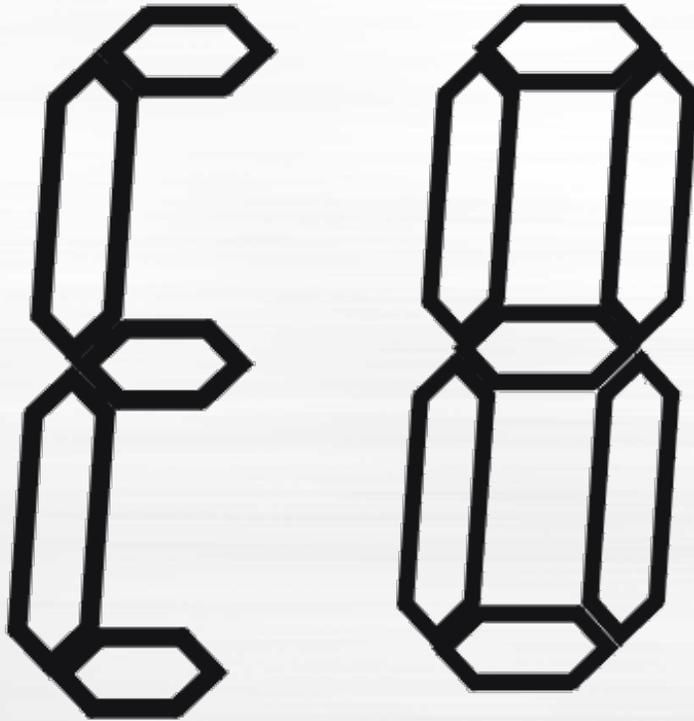
9: 54K

6: 30K

10: 60K

7: 35K

## Settable Items



## Twins setting

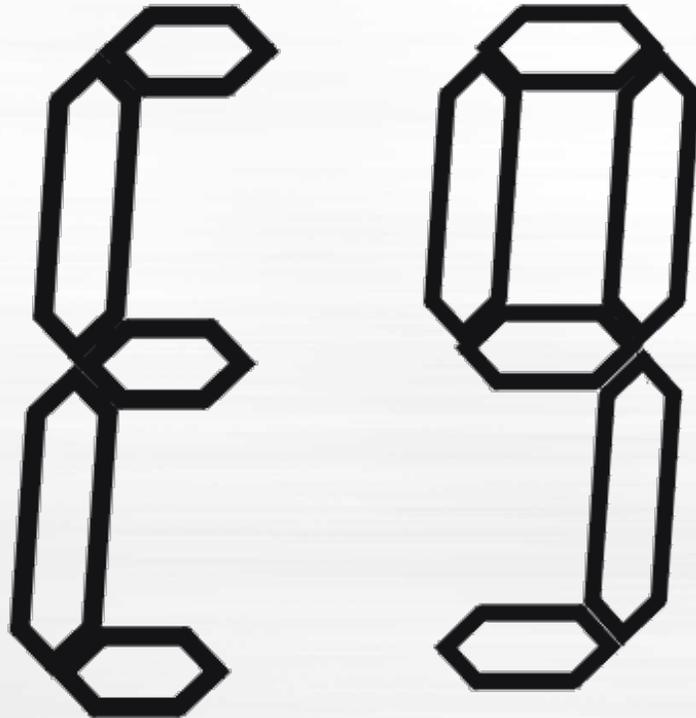
Optional Parameters:

0: No twins

1: Master unit

2: Slave unit

## Settable Items



## Static pressure setting

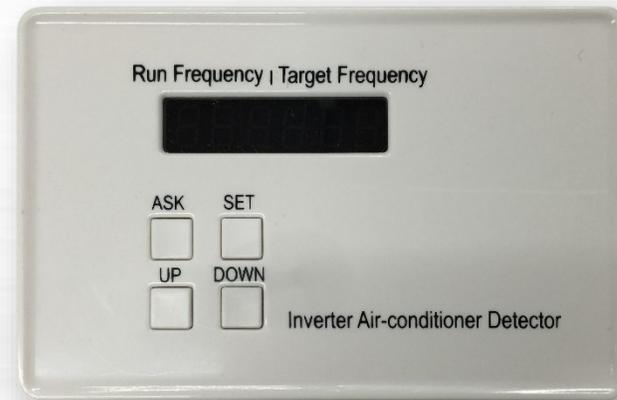
Optional Parameters:

0 (determined by dial switch)

- 1
- 2
- 3
- 4

## General information

### JC-01



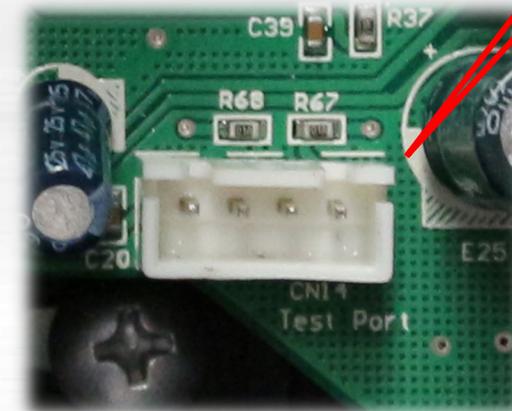
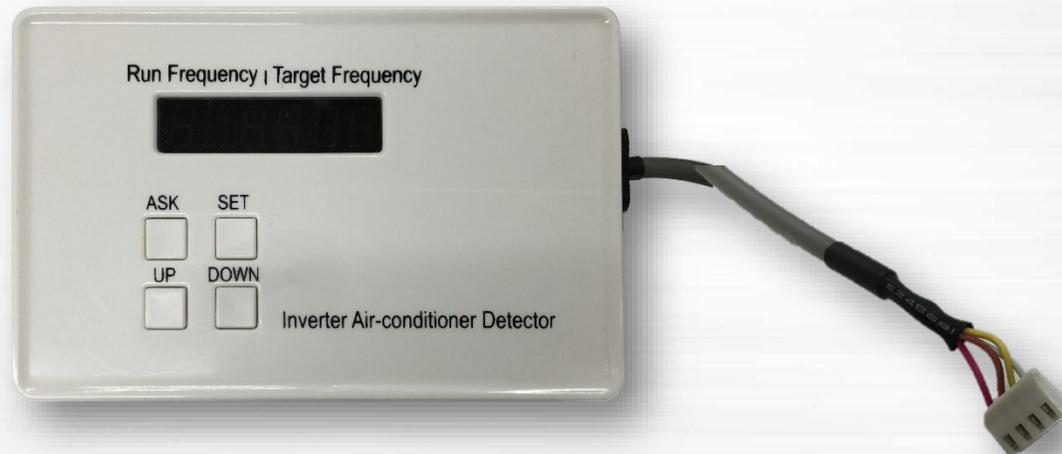
**BOM Code: 17222000A00556**

#### Functions:

Display running frequency and target frequency of compressor;  
Check information such as temperatures, current and so on;  
Display detailed error codes.

*NOTE: These two debugging board are exactly same in functions and different in connection methods.*

## Connection



This board should be connected to the “Test Port” which is a 4-pin socket on the control PCB of outdoor unit.

## Display

### Normal display

If there is no error of indoor and outdoor unit, it shows both current frequency (left side 3 pcs digital tube) and target frequency (right side 3 pcs digital tube).

Run Frequency | Target Frequency

48 56

### Error Code display

If there is an error in indoor or outdoor unit, error code is to be listed accordingly and switch to previous display periodically. Previous display is 2.5s, Error display is 0.5s.

Run Frequency | Target Frequency

E1 P0

### Information display

Press or hold "ASK" button to goes into information inquiry mode. The first 2 digits shows "information code", and the last 4 digits shows "information value".

Run Frequency | Target Frequency

r3. 52

## Buttons



**ASK:** Switch “frequency display” and “information inquiry”

**UP** or  : page up

**DOWN** or  : page down

**SET:** to set the running frequency of compressor

## Error code and explanation

Error Code	Explanation
<b>E0</b>	Indoor EEPROM error
<b>E1</b>	Communication error of indoor and outdoor unit
<b>E2</b>	Error of zero cross detection of indoor unit
<b>E3</b>	Indoor fan out of control
<b>E5</b>	EERROM or temperature sensor error of outdoor unit
<b>E50</b>	Temperature sensor error of outdoor unit
<b>E51</b>	Outdoor EEPROM error
<b>E6</b>	Temperature sensor error of indoor unit
<b>E60</b>	Error of room temperature sensor of indoor unit
<b>E61</b>	Error of evaporator temperature sensor of indoor unit
<b>E7</b>	DC fan of outdoor unit out of control
<b>Eb</b>	Error of communication between indoor PCB and display PCB
<b>P0</b>	IPM Module protection of outdoor unit
<b>P1</b>	Voltage protection
<b>P10</b>	Low voltage low protection
<b>P11</b>	Over voltage protection
<b>P12</b>	Error of 341MCE
<b>P2</b>	Top temperature protection of compressor
<b>P4</b>	Feedback protection of compressor in outdoor unit
<b>P40</b>	Communication error between main control trip and drive chip
<b>P41</b>	Error of current sampling circuit of compressor
<b>P42</b>	Error of compressor start up

## Error code and explanation

Error Code	Explanation
P43	Phase lose protection
P44	Zero speed protection
P45	Synchronization error between 341 chip and PWM
P46	Compressor speed out of control
P49	Error of over current of compressor
P6	High discharge temperature protection of compressor
P8	Current protection
P80	Current protection of indoor unit
P81	Current protection of outdoor unit
P82	Error of sampling of input AC
P9	High and low temperature protection of evaporator
P90	High temperature protection of evaporator
P91	Low temperature protection of evaporator
PA	High temperature protection of condenser
L0	Frequency limit caused by High or low evaporator temperature
L1	Frequency limit caused by high condenser temperature
L2	Frequency limit caused by high discharge temperature of compressor
L3	Frequency limit caused by current
L5	Frequency limit caused by voltage

## Information code and explanation

Query code	Query Info.	Way of display	Range of display
Fr.	Running frequency	decimal	0~999Hz
FT.	Target frequency	decimal	0~999Hz
T1. or T.1.	Room temperature value or AD value	decimal Or hex	-99~99°C or 0000~00FFH
T2. or T.2.	Indoor evaporator temperature value or AD value	decimal Or hex	-99~99°C or 0000~00FFH
T3. or T.3.	Outdoor Capillary temperature value or AD value	decimal Or hex	-99~99°C or 0000~00FFH
T4. or T.4.	Room ambient temperature value or AD value	decimal Or hex	-99~99°C or 0000~00FFH
TP. or T.P.	Discharge temperature value or AD value	decimal Or hex	-99~99°C or 0000~00FFH
TH. or T.H.	Suction temperature value or AD value	decimal Or hex	-99~99°C or 0000~00FFH
dL. or d.L.	Current value or AD value	decimal Or hex	0~99.99 or 0000~00FFH
Uo. or U.o.	Voltage value or AD value	decimal Or hex	0~9999 or 0000~00FFH
TT.	Setting temperature of indoor unit	decimal	0~99°C
dT. nF. oF. Pr. Lr. od. Sn. SF. CF. FL. oT.	Reserved		

## Tips for fast identify the problem

### P0 IPM over current protection

Running State	Causes	Solution
Occurs when connect to the power.	IPM board failure	Replace IPM board.
Occurs when compressor operates	<ol style="list-style-type: none"> <li>1) Compressor cable connection problem.</li> <li>2) Refrigerant system overload.</li> <li>3) Power failure.</li> <li>4) IPM board failure.</li> <li>5) Compressor failure.</li> </ol>	<ol style="list-style-type: none"> <li>1) Check compressor cable connection.</li> <li>2) Check the refrigerant system and indoor/outdoor heat exchanger.</li> <li>3) Check power supply and the power of each point on IPM board.</li> <li>4) Replace IPM board.</li> <li>5) Replace compressor.</li> </ol>



## Tips for fast identify the problem

### P1 DC voltage is too high or too low

P10	DC voltage too low
P11	DC voltage too high
P12	341 (Driver MCU) MCE (Motion Control Engine) malfunction

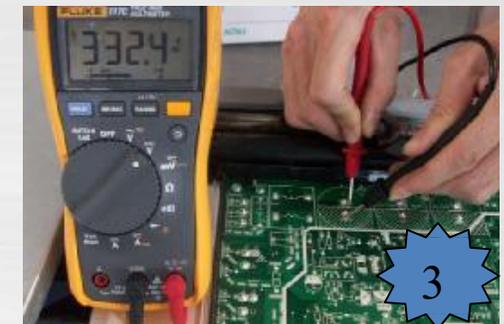
The relation of the input voltage and DC bus voltage when standby (DC bus voltage means the high voltage electrolytic capacitor voltage between two pins):

$$VDC = VAC_{in} * 1.414$$

Because of the load and power input,  $VDC = 200 \sim 380$  V.

Test as shown in Figure 2 and figure 3, you can get 2 possibilities:

Figure 2 and 3 should be consistent.	Check power, connector and Bridge rectifier
Figure 2 and 3 don't be consistent.	PCB board malfunction.



## Tips for fast identify the problem

### P4 Compressor drive error

P42	Compressor startup failure
P43	Compress phase loss failure
P44	Compress zero speed failure
P46	Compressor speed out of control
P49	Compressor over current

P40	Communication malfunction between control MCU and compressor driver MCU
P41	Compressor current sampling circuit fault
P45	341 PWM synchronous error

The above faults need to be solved by replacing the outdoor PCB board.

Causes	Solution
<ol style="list-style-type: none"> <li>1) Compressor cable connection problem.</li> <li>2) Control board error</li> <li>3) Heat exchange of refrigerant system poor.</li> <li>4) Compressor failure</li> </ol>	<ol style="list-style-type: none"> <li>1) Check compressor cable connection including both ends.</li> <li>2) Replace control board.</li> <li>3) Check refrigerant system pressure.</li> <li>4) Replace compressor</li> </ol>



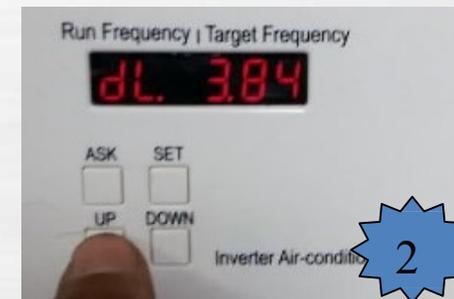
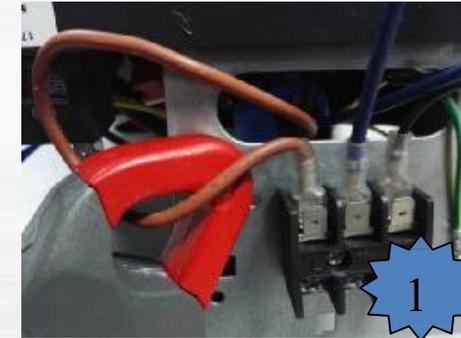
## Tips for fast identify the problem

### P8 Cover-current protection

P80	Indoor unit over current (Indoor detect)
P81	Outdoor unit over current (outdoor detect)
P82	Input AC current sampling circuit fault

Outdoor unit AC current detected from compressor controller and send the data to indoor.

Figure 1 show how to measure AC current with ammeter,  
Figure 2 show query sampling current.



P82 code or another code when standy.		PCB board malfunction, Replace compressor control board.
P80 and P81 code when running	Figure 1 and 2 Basically consistent.	1Too much system load, check the system pressure. 2PFC malfunction,Replace the main PCB
	Figure 1 and 2 don't consistent.	Faulty PCB, Replace it.

## Tips for fast identify the problem

### E1 Communication error between indoor and outdoor unit

This error code means that the communication between the indoor unit and the outdoor unit was interrupted or not exist at all.



Under the usual conditions, the failure rate of indoor PCB is low, so replace outdoor PCB first, and then the indoor PCB.

Running state	Causes	Solution
Compressor can run	Interference	<ol style="list-style-type: none"> <li>1) Adjust the indoor and outdoor Connecting wire, for example: close, far from noise, use a single cable for S wire.</li> <li>2) Replace indoor or outdoor PCB board.</li> </ol>
Compress can't run	<ol style="list-style-type: none"> <li>1) the wire sequence on L, N &amp; S mistake.</li> <li>2) Communication circuit of outdoor and indoor malfunction.</li> <li>3) Outdoor board power supply problem.</li> </ol>	<ol style="list-style-type: none"> <li>1) Check the wire sequence of L, N and S.</li> <li>2) The detector can detect T1 and T2 values means indoor sending and outdoor receiving are normal. Disconnect T3 or T4, it means outdoor sending and indoor receiving are normal if the indoor unit shows the error code. You will find out where the problem comes from by above tests.</li> <li>3) LEDs on outdoor PCB are all off, which means there is power supply problem of outdoor PCB. Check the wiring or replace outdoor PCB.</li> </ol>

THANK YOU

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