



EMIDUCTLESS.COM

3DC Freematch Multi Units

Technical Support Department

July 23

Contents


>> Basic Information	-----	01
>> Technical features	-----	02
>> Control system	-----	03
>> Protection	-----	04

Part I Basic Information



Product line Basic Information

● Indoor units

Series	Panel	6K	9K	12K	18K	24K	30K	36K
Wall mounted								
Cassette								

Note: 9K-24K wall mounted units and light commercial units are universal for multi and mono connection.



Product line Basic Information

● *Outdoor units*

2 Zone 18K	3 Zone 27K	4 Zone 36K	5 Zone 48K	5 Zone 55K
M2OA-18HFN1-M	M3OJ-27HFN1-M	M4OG-36HFN1-M	M5OG-48HFN1-M	M5OA-55HFN1-M
M2OI-18HFN1-M	M3OI-28HFN1-M	M4OI-36HFN1-M	M5OG-48HFN1-M-[X]	M5OA-55HFN1-M-[X]
				
845x363x702mm 33.27x14.29x27.64 in	946x410x810mm 37.24x16.14x31.89 in	952x415x1333mm 37.48x16.34x52.48 in		



Product line Basic Information

- *Outdoor units - Regular*

	Indoor unit	Cooling Capacity (Btu/h)	SEER	EER	Heating Capacity (Btu/h)	HSPF4	HSPF5
	Type	95° F			47° F		
2 zones Condenser	Non-Ducted	18000	22.5	13.3	19000	10.6	8.5
3 zones Condenser	Non-Ducted	28000	23.8	12.5	28000	10.5	8.8
4 zones Condenser	Non-Ducted	36000	23.0	11.5	37000	11.3	9.2
5 Zones Condenser	Non-Ducted	48000	22.4	12.5	48000	11.0	8.8
5 Zones Condenser	Non-Ducted	55000	19	10.5	55000	10.8	8.8



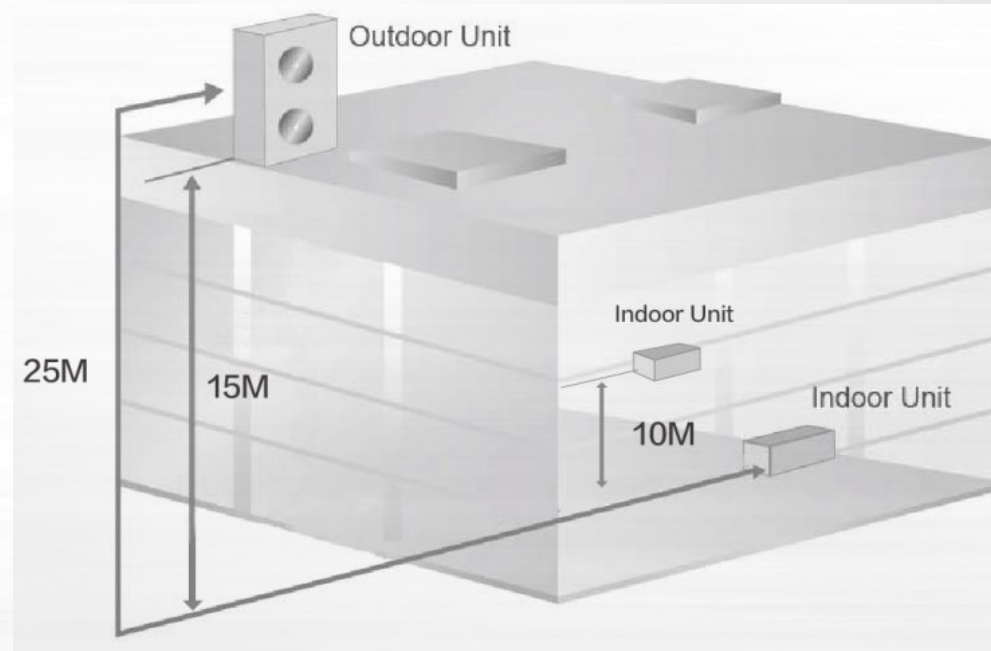
Product line Basic Information

- *Outdoor units – Hyper Heat*

	Indoor unit	Cooling Capacity (Btu/h)	SEER	EER	Heating Capacity (Btu/h)	HSPF4	HSPF5
	Type	95° F			47° F		
2 zones Condenser	Non-Ducted	19000	22	12.5	20000	10.2	8.7
3 zones Condenser	Non-Ducted	28000	22.5	12.5	28000	11.3	9.0
4 zones Condenser	Non-Ducted	36000	21.8	13.6	36400	11.0	9.0
5 Zones Condenser	Non-Ducted	48000	21.5	11.6	49000	11.0	9.0
5 Zones Condenser	Non-Ducted	55000	21.5	10.5	55000	10.6	8.8



● *Installation requirement*



Outdoor units	Max. Length		Max. Elevation	
	Total length	One indoor	Between indoor and outdoor	Between indoor and indoor
1 drive 2	40 m – 131 ft	25 m – 82 ft	15 m – 49 ft	10 m – 33 ft
1 drive 3	60 m – 197 ft	30 m – 98 ft	15 m – 49 ft	10 m – 33 ft
1 drive 4	80 m – 262 ft	35 m – 115 ft	15 m – 49 ft	10 m – 33 ft
1 drive 5	80 m – 262 ft	35 m – 115 ft	15 m – 49 ft	10 m – 33 ft


 Product line **Basic Information**

 ● *Installation requirement*

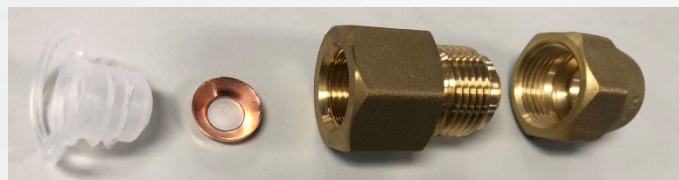
	Model	Liquid (mm/in)	Gas (mm/in)	Max. length (m/ft)	Max. elevation (m/ft)
Indoor unit	6K, 9K	Φ6.35 1/4"	Φ9.52 3/8"	25m / 82ft	Between IDUs: 10m/ 33ft
	12K, 8K	Φ6.35 1/4"	Φ12.7 1/2"	12K 25m/ 82ft 18K 30m/ 98ft	Between IDUs: 10m/ 33ft
	24K, 30K, 36K	Φ9.52 3/8"	Φ15.9 5/8"	35m/ 115ft	Between IDUs: 10m/ 33ft
Outdoor unit	18K (Dual)	Φ6.35 x 2 1/4" x 2	Φ9.52 x 2 3/8" x 2	Single: 25m/ 82ft Total: 40m/131ft	IDU AND ODU: 15m/ 49ft
	27K (Triple)	Φ6.35 x 3 1/4" x 3	Φ9.52 x 3 3/8" x 3 or 2 1/2 x 1	Single: 30m/98ft Total: 60m/ 197ft	IDU AND ODU: 15m/ 49ft
	36K (quadruple)	Φ6.35 x 4 1/4" x 4	Φ9.52 x 3 + Φ12.7 x 1 3/8" x 3 + 1/2" x 1	Single: 35m/ 115ft Total: 80m/ 262ft	IDU AND ODU: 15m/ 49ft
	48K, 55K (quintuple)	Φ6.35 x 5 1/4" x 5	Φ9.52 x 3 + Φ12.7 x 2 3/8" x 3 + 1/2" x 2	Single: 35m/ 115ft Total: 80m/ 262ft	IDU AND ODU: 15m/ 49ft

The refrigerant pre-charged inside the outdoor unit is applied to 7.5m(**25ft**) standard pipes **each**.
If the actual pipes are longer than 7.5m(**25ft**), extra refrigerant charging for every liquid pipe is necessary.



- *Installation requirement*

Pipe adaptor needs to be fixed on the valve of outdoor unit when connecting 12K,18K, 24K, 30K and 36K indoor unit.



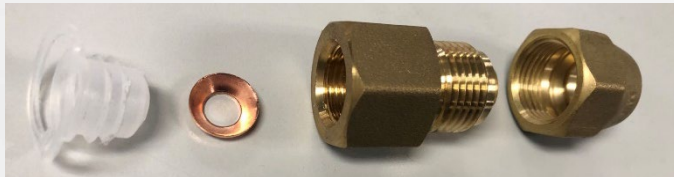
Regular	Model	Adaptor	Part number	Adaptor Qty.
2 Zone 18K	M2OA-18HFN1-M	3/8"-->1/2"	15500303002545	2
3 Zone 27K	M3OJ-27HFN1-M	3/8"-->1/2"	15500303002545	3
4 Zone 36K	M4OG-36HFN1-M	3/8"-->1/2"	15500303002545	3
		1/2"-->3/8"	15500303002544	1
		1/4"-->3/8"	15500303002547	1
		1/2"-->5/8"	15500303002546	1
5 Zone 48K	M5OG-48HFN1-M	1/2"-->3/8"	15500303002544	2
		1/4"-->3/8"	15500303002547	2
		1/2"-->5/8"	15500303002546	2
		3/8"-->1/2"	15500303002545	3
5 Zone 55K	M5OA-55HFN1-M	1/2"-->3/8"	15500303002544	2
		1/4"-->3/8"	15500303002547	2
		1/2"-->5/8"	15500303002546	2
		3/8"-->1/2"	15500303002545	3



Product line **Basic Information**

● *Installation requirement*

Pipe adaptor needs to be fixed on the valve of outdoor unit when connecting 12K,18K, 24K, 30K and 36K indoor unit.



Hyper heat	Model	Adaptor	Part number	Adaptor Qty.
2 Zone 18K	M2OI-18HFN1-M	3/8" --> 1/2"	15500303002545	2
3 Zone 27K	M3OI-28HFN1-M	3/8" --> 1/2"	15500303002545	2
		1/2" --> 3/8"	15500303002544	1
		1/4" --> 3/8"	15500303002547	1
		1/2" --> 5/8"	15500303002546	1
4 Zone 36K	M4OI-36HFN1-M	3/8" --> 1/2"	15500303002545	2
		1/2" --> 3/8"	15500303002544	2
		1/4" --> 3/8"	15500303002547	2
		1/2" --> 5/8"	15500303002546	2
5 Zone 48K	M5OG-48HFN1-M-[X]	1/2" --> 3/8"	15500303002544	2
		1/4" --> 3/8"	15500303002547	2
		1/2" --> 5/8"	15500303002546	2
		3/8" --> 1/2"	15500303002545	3
5 Zone 55K	M5OA-55HFN1-M-[X]	1/2" --> 3/8"	15500303002544	2
		1/4" --> 3/8"	15500303002547	2
		1/2" --> 5/8"	15500303002546	2
		3/8" --> 1/2"	15500303002545	3

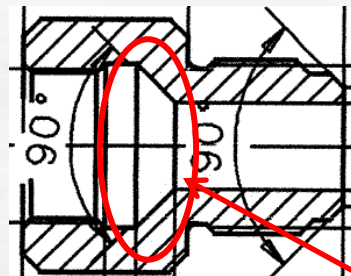
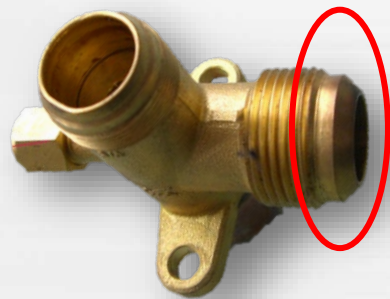


● *Installation requirement*

For 18K-27K, all connectors are 6.35/9.52(1/4" / 3/8"),

When connecting 12K & 18K IDU, pipe adaptor ($\Phi 9.52 \rightarrow \Phi 12.7$ (3/8" \rightarrow 1/2")) needs to be fixed on the gas valve of outdoor unit.

Capacity	Joint	Pipe	Dimension		Adaptor I (for 12K 18K IDU), Standard
			1/4"	3/8"	
18K	A	Liquid	6.35	9.52	3/8" \rightarrow 1/2"
		Gas	6.35	9.52	
	B	Liquid	6.35	9.52	3/8" \rightarrow 1/2"
		Gas	6.35	9.52	
27K	A	Liquid	6.35	9.52	3/8" \rightarrow 1/2"
		Gas	6.35	9.52	
	B	Liquid	6.35	9.52	3/8" \rightarrow 1/2"
		Gas	6.35	9.52	
	C	Liquid	6.35	9.52	3/8" \rightarrow 1/2"
		Gas	6.35	9.52	





Product line Basic Information

- Installation requirement

For **36K-48K**, one connector is 6.35/12.7,

When connect to 9K, pipe adaptor ($\Phi 12.7 \rightarrow \Phi 9.52$) needs to be fixed on the gas valve of outdoor unit.

The other connectors are 6.35/9.52, when connecting 12K & 18K IDU, pipe adaptor ($\Phi 9.52 \rightarrow \Phi 12.7$) needs to be fixed on the gas valve of outdoor unit.

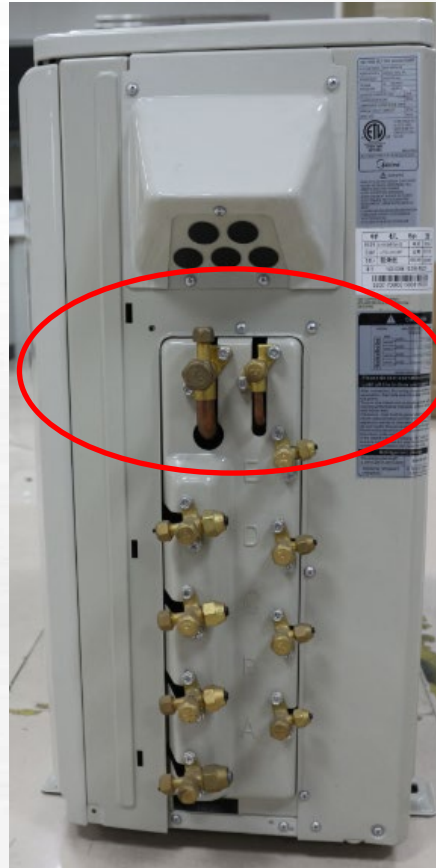
For **48K**, the connector 6.35/12.7 cannot connect with 24K/30K/36K indoor unit.

When connecting to 24K/30K/36K, two pipe adaptors (Liquid: $\Phi 6.35 \rightarrow \Phi 9.52$, Gas: $\Phi 12.7 \rightarrow \Phi 15.9$,) need to be fixed on the gas valve of outdoor unit.

Capacity	Joint	Pipe	Dimension		Adaptor I (for 9K IDU), Standard	Adaptor I (for 12K/18K IDU), Standard	Adaptor II (for 24K/30K/36K IDU), Standard
36K	A	Liquid	1/4	6.35			
		Gas	3/8	9.52		3/8" → 1/2"	
	B	Liquid	1/4	6.35			
		Gas	3/8	9.52		3/8" → 1/2"	
	C	Liquid	1/4	6.35			
		Gas	3/8	9.52		3/8" → 1/2"	
E	Liquid	1/4	6.35				
	Gas	1/2	12.7	1/2" → 3/8"			
48K 55k	A	Liquid	1/4	6.35			1/4" → 3/8"
		Gas	3/8	9.52		3/8" → 1/2"	
	B	Liquid	1/4	6.35			1/4" → 3/8"
		Gas	3/8	9.52		3/8" → 1/2"	
	C	Liquid	1/4	6.35			
		Gas	3/8	9.52		3/8" → 1/2"	
	D	Liquid	1/4	6.35			
		Gas	1/2	12.7	1/2" → 3/8		1/2" → 5/8
E	Liquid	1/4	6.35				
	Gas	1/2	12.7	1/2" → 3/8		1/2" → 5/8	

- *Installation requirement*

- Quick vacuum



Note: The main valve must be opened before turning on the unit.



- *Installation combination*
- Combinations for 2 zones condenser.

Multi Outdoor Unit	Avaliable Indoor	Two units	
		Unit 1	Unit 2
1 drive 2	Wall mounted: 6K/9K/12K; Cassette/Duct/Console: 9K/12K;	6	6
		6	9
		6	12
		9	9
		9	12
		12	12

Rules: ODU Capacity*0.66<= IDU total capacity <= OUD Capacity 1.33



Product line Basic Information

● *Installation combination*

➤ Combinations for 3 zones condenser.

Multi Outdoor Unit	Avaliable Indoor	Two units		Three units		
		Unit 1	Unit 2	Unit 1	Unit 2	Unit 3
1 drive 3	Wall mounted: 6K/9K/12K/18K; Cassette/Duct/Console&Floor Ceiling: 9K/12K/18K; AHU: 18K	6	12	6	6	6
		6	18	6	6	9
		9	9	6	6	12
		9	12	6	6	18
		9	18	6	9	9
		12	12	6	9	12
		12	18	6	9	18
		18	18	6	12	12
				6	12	18
				9	9	9
				9	9	12
				9	9	18
				9	12	12
				12	12	12

Rules: ODU Capacity*0.66<= IDU total capacity <= OUD Capacity 1.33



Product line Basic Information

● Installation combination



Combinations for 4 zone condenser.

Multi Outdoor Unit	Available Indoor	Two units		Three units			Four units				
		Unit 1	Unit 2	Unit 1	Unit 2	Unit 3	Unit 1	Unit 2	Unit 3	Unit 4	
1 drive 4	Wall mounted: 6K/9K/12K/18K/24K; Cassette/Duct/Console&Floor Ceiling: 9K/12K/18K/24K; AHU: 18K/24K	6	18	6	6	12	6	6	6	6	
		6	24	6	6	18	6	6	6	9	
		9	18	6	6	24	6	6	6	12	
		9	24	6	9	12	6	6	6	18	
		12	12	6	9	18	6	6	6	24	
		12	18	6	9	24	6	6	9	9	
		12	24	6	12	12	6	6	9	12	
		18	18	6	12	18	6	6	9	18	
		18	24	6	12	24	6	6	9	24	
		24	24	6	18	18	6	6	12	12	
					6	18	24	6	6	12	18
					9	9	9	6	6	12	24
					9	9	12	6	9	9	9
					9	9	18	6	9	9	12
					9	9	24	6	9	9	18
					9	12	12	6	9	9	24
					9	12	18	6	9	12	12
					9	12	24	6	9	12	18
					9	18	18	6	12	12	12
					12	12	12	6	12	12	18
					12	12	18	9	9	9	9
					12	12	24	9	9	9	12
					12	18	18	9	9	9	18
								9	9	12	12
								9	9	12	18
								9	12	12	12
								12	12	12	12

Rules: ODU Capacity*0.66<= IDU total capacity <= OUD Capacity 1.33



Product line Basic Information

➤ ● *Installation combination*
Combinations for 5 zone condenser.

Multi Outdoor Unit	Available Indoor	Two units		Three units			Four units				Five units					
		Unit 1	Unit 2	Unit 1	Unit 2	Unit 3	Unit 1	Unit 2	Unit 3	Unit 4	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	
1 drive 5	Wall mounted, 6K/9K/12K/18K/24K/30K/36K, Cassette/Duct/Console&Floor Ceiling, 9K/12K/18K/24K, AHU, 18K/24K/30K/36K	9	24	6	6	24	6	6	6	18	6	6	6	6	9	
		9	30	6	6	30	6	6	6	24	6	6	6	6	12	
		9	36	6	6	36	6	6	6	30	6	6	6	6	18	
		12	24	6	9	24	6	6	6	36	6	6	6	6	24	
		12	30	6	9	30	6	6	9	18	6	6	6	6	30	
		12	36	6	9	36	6	6	9	24	6	6	6	6	36	
		18	18	6	12	18	6	6	9	30	6	6	6	9	9	
		18	24	6	12	24	6	6	9	36	6	6	6	9	12	
		18	30	6	12	30	6	6	12	12	6	6	6	9	18	
		18	36	6	12	36	6	6	12	18	6	6	6	9	24	
		24	30	6	18	18	6	6	12	24	6	6	6	9	30	
		24	36	6	18	24	6	6	12	30	6	6	6	9	36	
		30	30	6	18	30	6	6	12	36	6	6	6	12	12	
					6	18	36	6	6	18	18	6	6	6	12	18
					6	24	24	6	6	18	24	6	6	6	12	24
					6	24	30	6	6	18	30	6	6	6	12	30
					9	9	18	6	6	24	24	6	6	6	18	18
					9	9	24	6	9	9	12	6	6	6	18	24
					9	9	30	6	9	9	18	6	6	9	9	9
					9	9	36	6	9	9	24	6	6	9	9	12
					9	12	12	6	9	9	30	6	6	9	9	18
					9	12	18	6	9	9	36	6	6	9	9	24
					9	12	24	6	9	12	12	6	6	9	9	30
					9	12	30	6	9	12	18	6	6	9	12	12
					9	12	36	6	9	12	24	6	6	9	12	18
					9	18	18	6	9	12	30	6	6	9	12	24
					9	18	24	6	9	12	36	6	6	9	12	30
					9	18	30	6	9	18	18	6	6	9	18	18
					9	18	36	6	9	18	24	6	6	9	18	24
					9	24	24	6	9	18	30	6	6	12	12	12
					9	24	30	6	12	12	12	6	6	12	12	18
					12	12	12	6	12	12	18	6	6	12	12	24
					12	12	18	6	12	12	24	6	6	12	18	18
					12	12	24	6	12	12	30	6	9	9	9	9
					12	12	30	6	12	18	18	6	9	9	9	12
					12	12	36	6	12	18	24	6	9	9	9	18
					12	18	18	9	9	9	9	6	9	9	9	24
					12	18	24	9	9	9	12	6	9	9	9	30
					12	18	30	9	9	9	18	6	9	9	12	12
					12	24	24	9	9	9	24	6	9	9	12	18
					18	18	18	9	9	9	30	6	9	9	12	24
					18	18	24	9	9	9	36	6	9	9	18	18
								9	9	12	12	6	9	12	12	12
								9	9	12	18	6	9	12	12	18
								9	9	12	24	6	9	12	12	24
								9	9	12	30	6	12	12	12	12
								9	9	18	18	6	12	12	12	18
								9	9	18	24	9	9	9	9	9
								9	12	12	12	9	9	9	9	12
								9	12	12	18	9	9	9	9	18
						9	12	12	24	9	9	9	9	24		
						9	12	12	30	9	9	9	12	12		
						9	12	18	18	9	9	9	12	18		
						9	12	18	24	9	9	9	12	24		
						12	12	12	12	9	9	12	12	12		
						12	12	12	18	9	9	12	12	18		
						12	12	12	24	9	12	12	12	12		
						12	12	18	18	12	12	12	12	12		

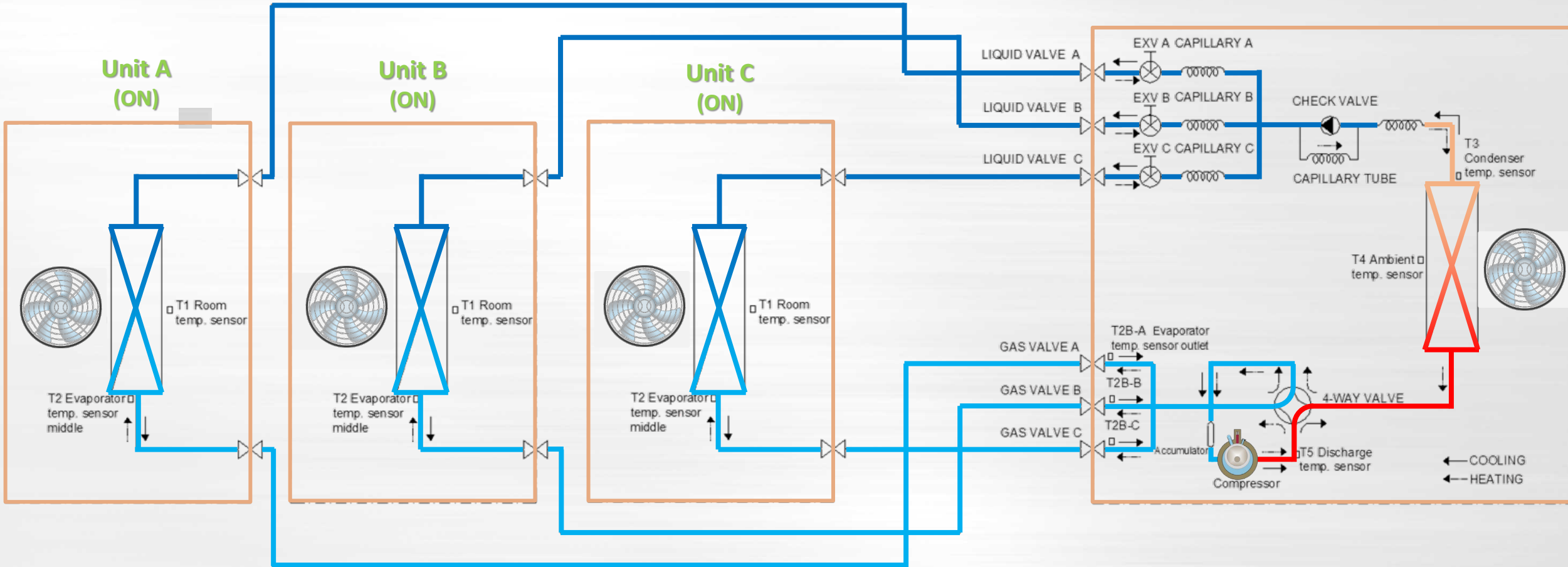
When matching 30K/36K models, additional 500g refrigerant is needed.

Rules: ODU Capacity*0.66<= IDU total capacity <= OUD Capacity 1.33



Product line Basic Information

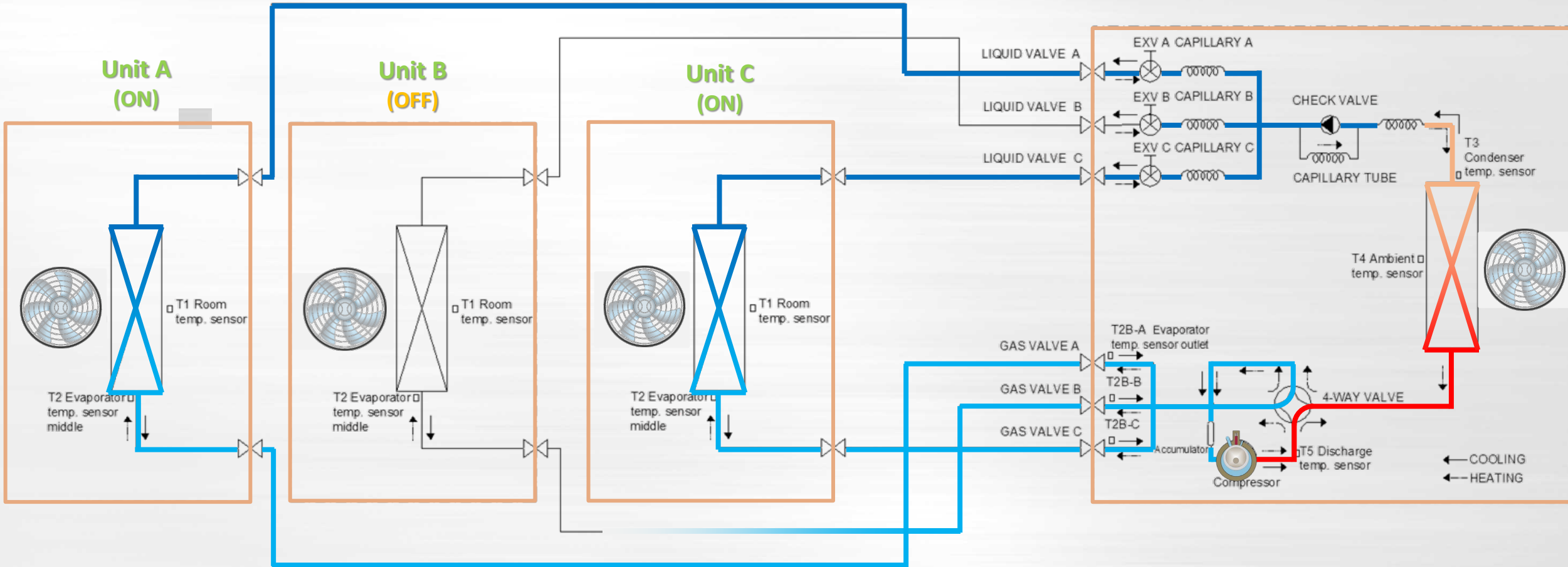
- Refrigerant circuit chart (Cooling mode, Full load)





Product line Basic Information

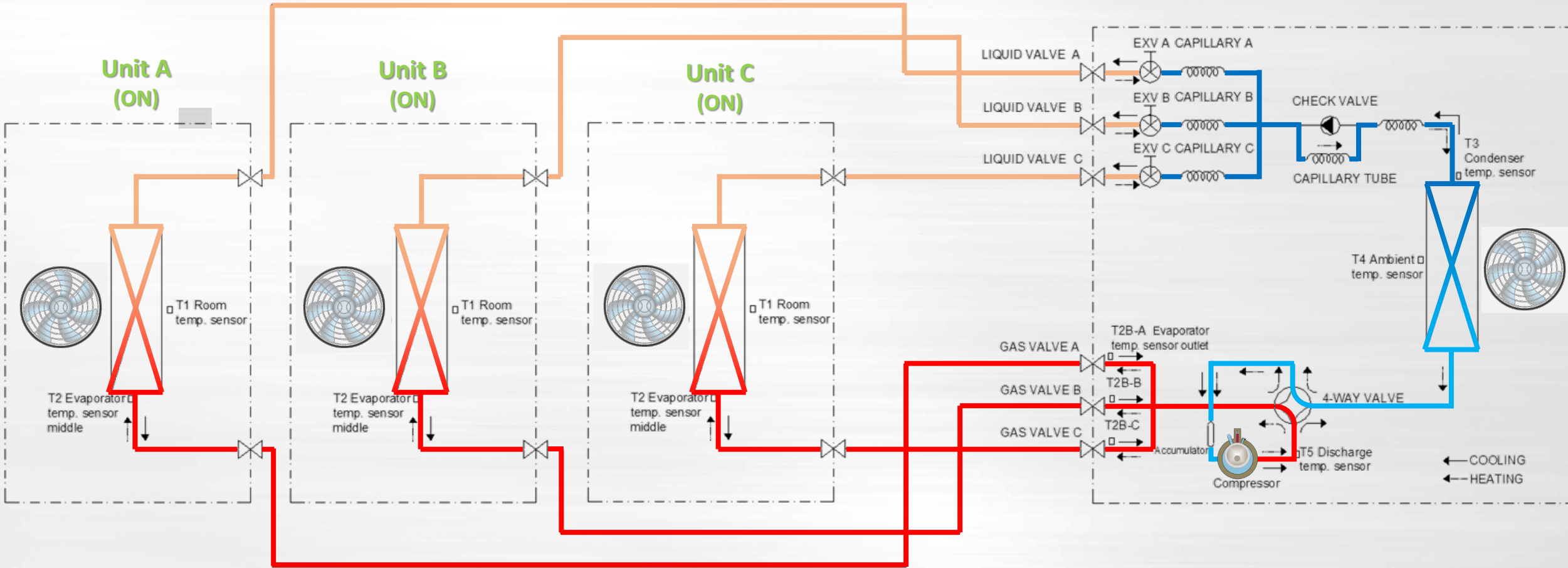
● Refrigerant circuit chart (Cooling mode, Partial load)





Product line Basic Information

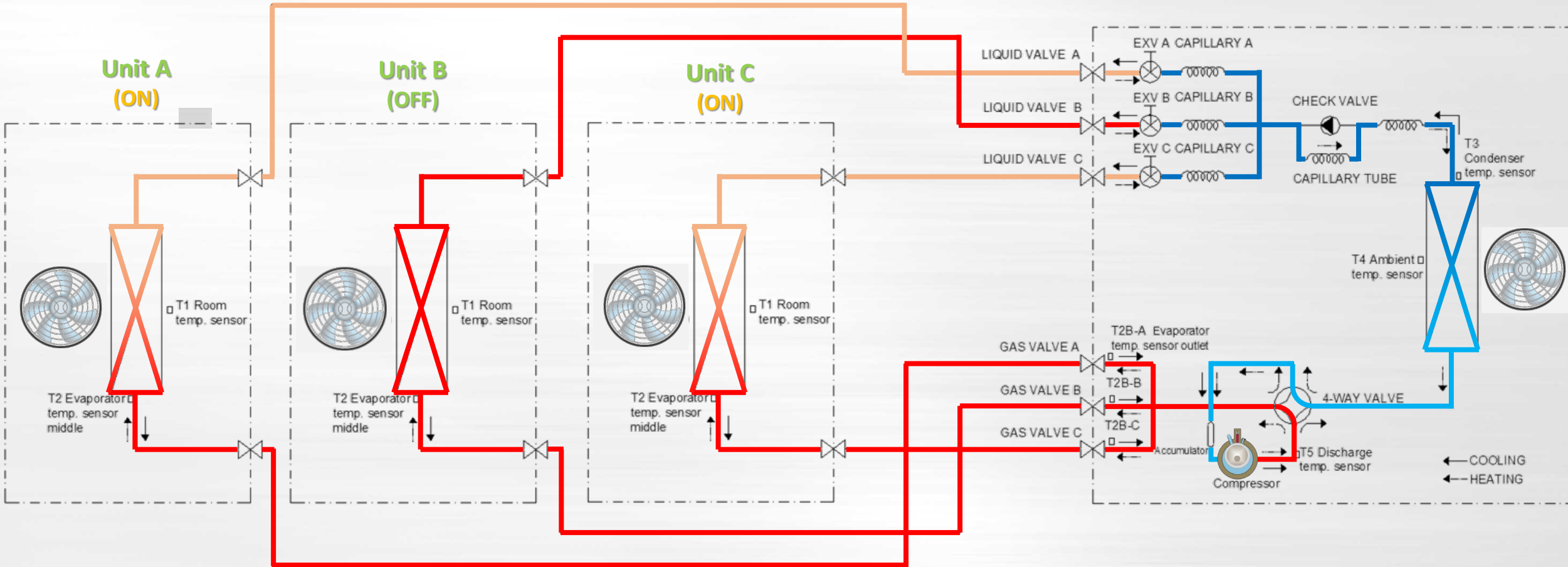
● Refrigerant circuit chart (Heating mode, Full load)





Product line Basic Information

● Refrigerant circuit chart (Heating mode, Partial load)





- Working temperature range

Series	Mode	Cooling	Heating	Drying
	Room temp.	$\geq 17^{\circ}\text{C}$	$\leq 30^{\circ}\text{C}$	$> 10^{\circ}\text{C}$
		$\geq 62^{\circ}\text{F}$	$\leq 86^{\circ}\text{F}$	$> 50^{\circ}\text{F}$
Regular	Outdoor ambient temp.	$-25^{\circ}\text{C} \sim 50^{\circ}\text{C}$	$-25^{\circ}\text{C} \sim 30^{\circ}\text{C}$	$10^{\circ}\text{C} \sim 50^{\circ}\text{C}$
		$-13^{\circ}\text{F} \sim 122^{\circ}\text{F}$	$-13^{\circ}\text{F} \sim 86^{\circ}\text{F}$	$50^{\circ}\text{F} \sim 122^{\circ}\text{F}$
Hyper heat	Outdoor ambient temp.	$-30^{\circ}\text{C} \sim 50^{\circ}\text{C}$	$-30^{\circ}\text{C} \sim 30^{\circ}\text{C}$	$10^{\circ}\text{C} \sim 50^{\circ}\text{C}$
		$-22^{\circ}\text{F} \sim 122^{\circ}\text{F}$	$-22^{\circ}\text{F} \sim 86^{\circ}\text{F}$	$50^{\circ}\text{F} \sim 122^{\circ}\text{F}$



- *Basic information for key components*

Compressor:	DC Inverter Rotary type
Indoor fan motor:	DC 310V
Outdoor fan motor:	DC 310V
Swing motor:	DC 12V
Four-way valve:	220-240V, 50/60Hz, energized in heating mode
Electronic expansive valve:	DC 12V
Communication Circuit:	DC 5 V

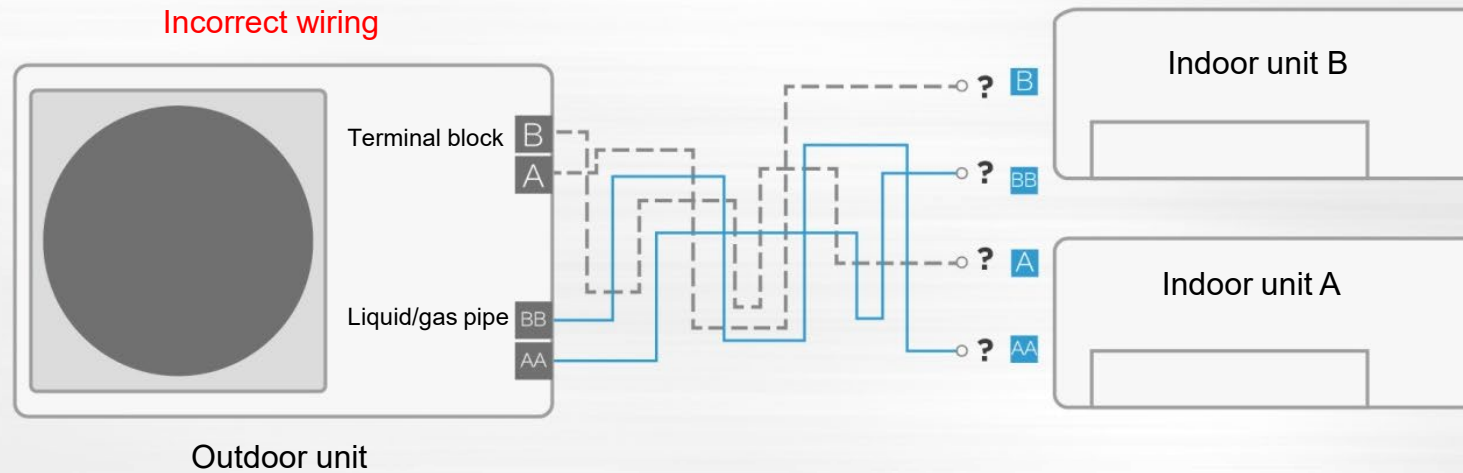
Part II Features



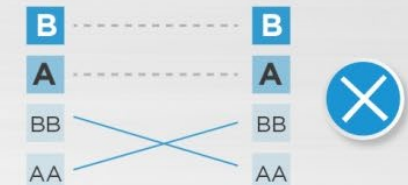
- *Automatic wiring/piping correction function (new feature)*

New product is capable of automatic correction of wiring/piping error.

Press the "check switch" on the outdoor unit PCB board 5 seconds until LED display "CE", which mean this function is working, Approximately 5-10 minutes after the switch is pressed, the "CE" will disappear and the wiring/piping error will be corrected, and wiring/piping is properly connected.



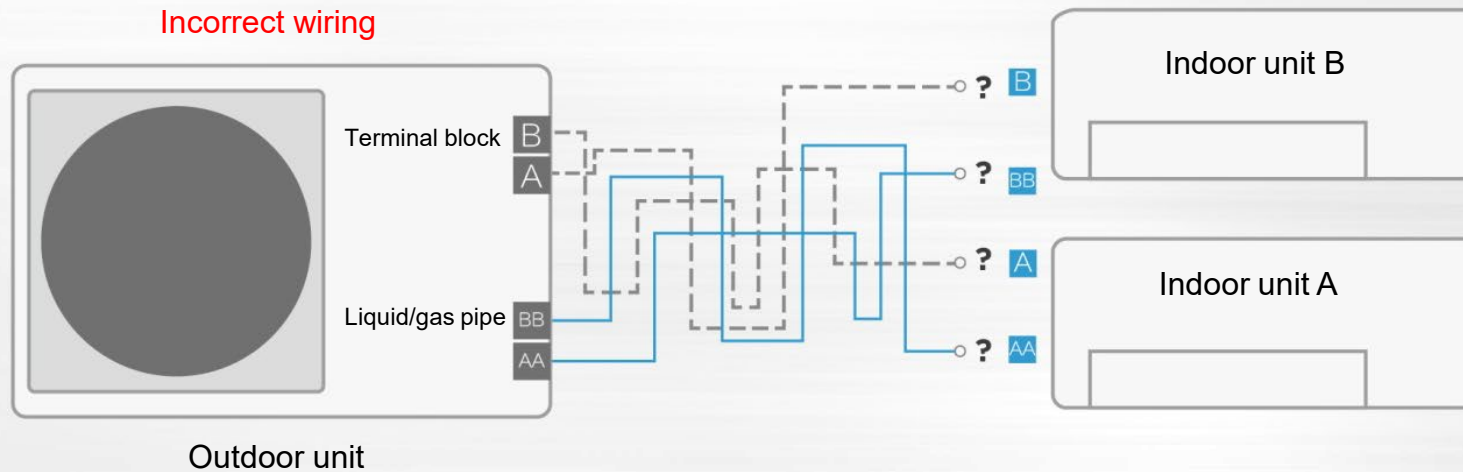
Before



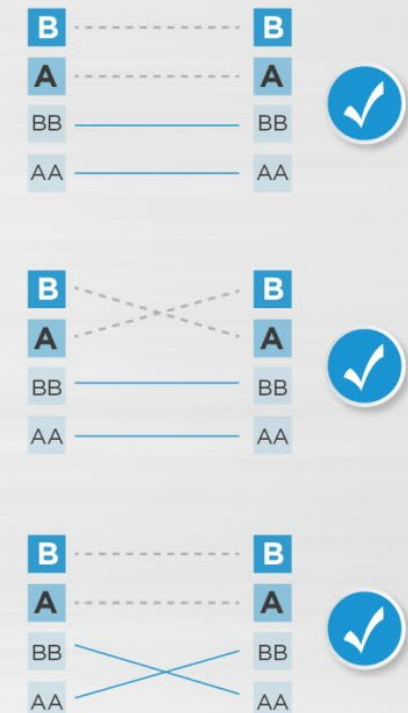
- *Automatic wiring/piping correction function (new feature)*

Conditions:

1. Check at outside temperature is above 5°C/41°F.
(This function does not work when outside temperature is not above 5°C /41°F)
2. Check that the stop valves of the liquid pipe and gas pipe are open.
3. Turn on the breaker and wait at least 2 minute.
4. Press the check switch on the outdoor PCB board unit LED display "CE".

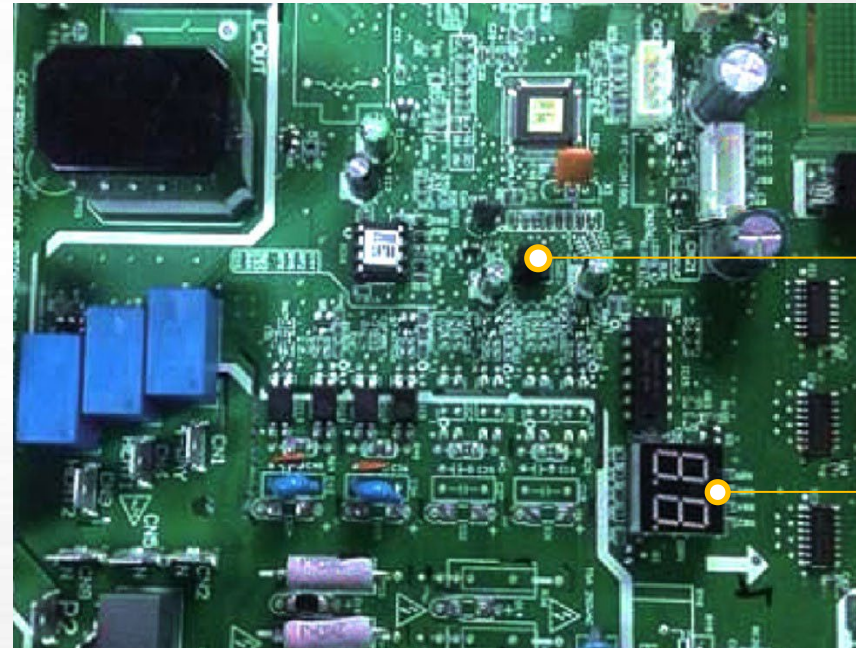


Now



- *Automatic wiring/piping correction function (new feature)*

New product is capable of automatic correction of wiring/piping error.
Press the "check switch" on the outdoor unit PCB board 5 seconds until LED display "CE", which means this function is working, Approximately 5-10 minutes after the switch is pressed, the "CE" will disappear and the wiring/piping error will be corrected, and wiring/piping is properly connected.



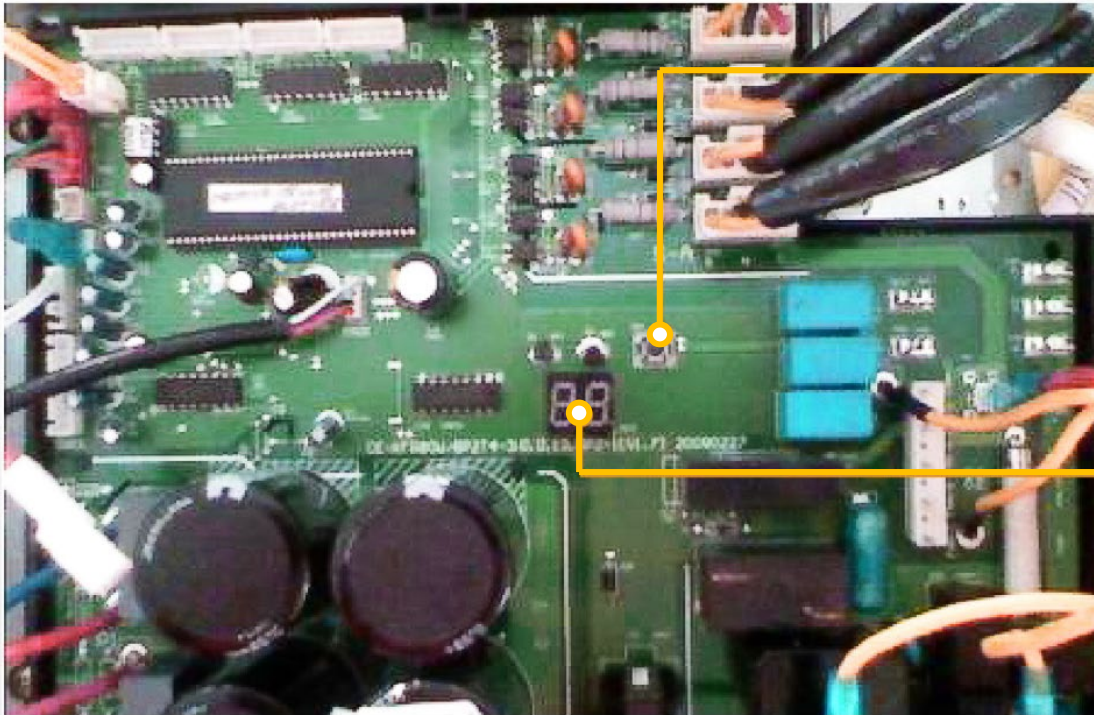
Check switch



LED display



- *Check button and information display*



- **Check point button**

Press this button to check operation parameters when the unit is running.

- **Status and Error Display**

Display operation status and error codes.

Basic Information

Features

Electric control

Protection

Auto-correction

Easy Diagnostic

Compatible

Reliable

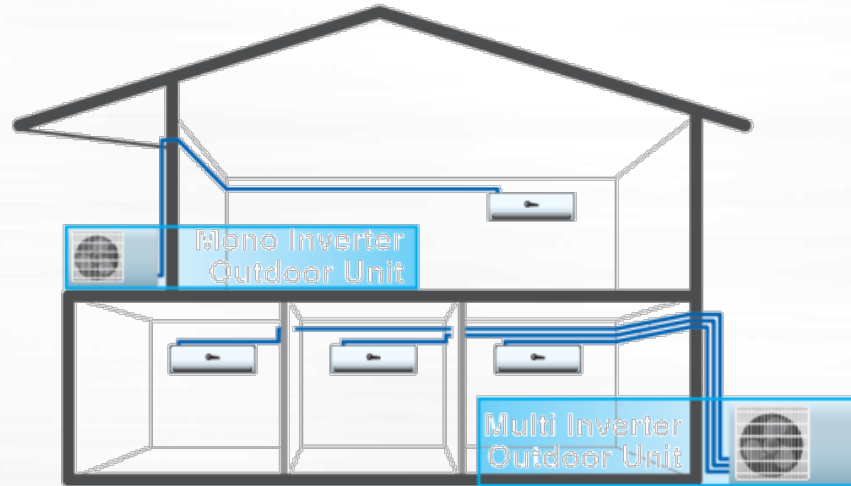
- *Check button and information display*

Push the button, you can check parameters on display while the unit is running.

This will guide you in the diagnostic procedure and make sure that the units are operating properly.



● *Mono & Multi Compatible (standard)*



Compatible indoor unit for both mono and multi-inverter system.

Models	6K	9K	12K	18K	24K	30K	36K
Wall mounted	Y	Y	Y	Y	Y	Y	Y
Cassette		Y	Y	Y	Y		

- *Outdoor heating belts*

A. Crankcase heating belt (20W, helps to start compressor in low ambient temperatures)

- Starts working when compressor is in standby for 1 hour or first powered, and T4 1°C/34°F
- Stops working when compressor starts or T4 5°C/41°F



B. Chassis heating tube (120W, helps to de-ice and anti-freezing)

- Starts to work and lasts only for 5 min when unit in heating mode for 25 min and T4 3°C/ 37°F
- Keeps working in defrost mode when T4 1°C/34°F
- Stops working in 5 mins after defrost mode ends.
- If defrosting happens once, it will start to work 10 mins ahead of last compressor cumulative working time. It will stop in 15 mins if defrost doesn't occur.



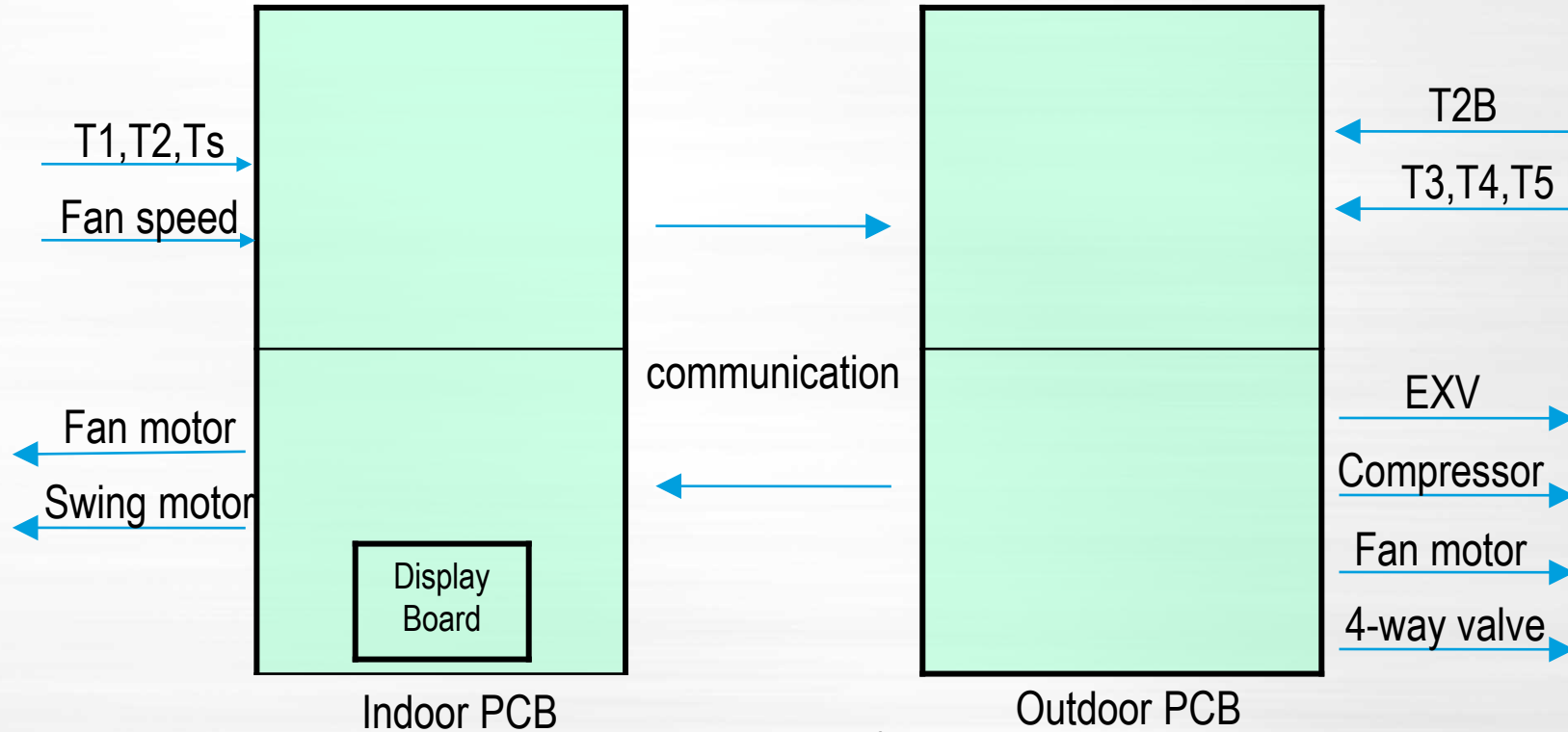
Part III Electrical Control



Electric control system

How compressor works

Electric control function



Indoor Remote controller

Remark:

T1--room temp.

T2---evaporator temp.

T2B--evaporator out temp.

Ts--setting temp.

T3--condenser temp.

T4--outdoor temp.

T5-- compressor discharge temp.



- *How is the compressor adjusted?*

The compressor frequency is adjusted according to the **capacity request** of all the indoor units. The higher the capacity request, the higher the compressor frequency.

Capacity Request	Frequency grade	Capacity Request	Frequency grade
0	F0	13	F13
1	F1	14	F14
2	F2	15	F15
3	F3	16	F16
4	F4	17	F17
5	F5	18	F18
6	F6	19	F19
7	F7	20	F20
8	F8	21	F21
9	F9	22	F22
10	F10	23	F23
11	F11	24	F24
12	F12	25	F25



- *How to calculate the capacity request?*

What is Capacity Request?

- Capacity Request(CR) means cooling or heating load (capacity) request of indoor side.
- When the unit starts, the main program chip will scan indoor capacity request(CR) every 20S and controls the compressor to run at a certain frequency so that controls the cooling or heating output based on the capacity request(CR).
- The capacity request(CR) value is calculated in accordance with setting temperature (T_s), room temperature (T_1), evaporator temperature (T_2 , heating mode) and ambient temperature (T_4).



- *How to calculate the capacity request?*

Calculation formula:

Capacity demand = Modify rate × Σ Norm. code × HP + correction

1: Norm code: determined by Temperature difference between

T1(room temp.) and TS (set temp.);

2: HP: determined by indoor unit capacity;

3: Correction: determined by average evaporator outlet temperature

T2B(cooling mode), or average evaporator temp T2(heating mode)

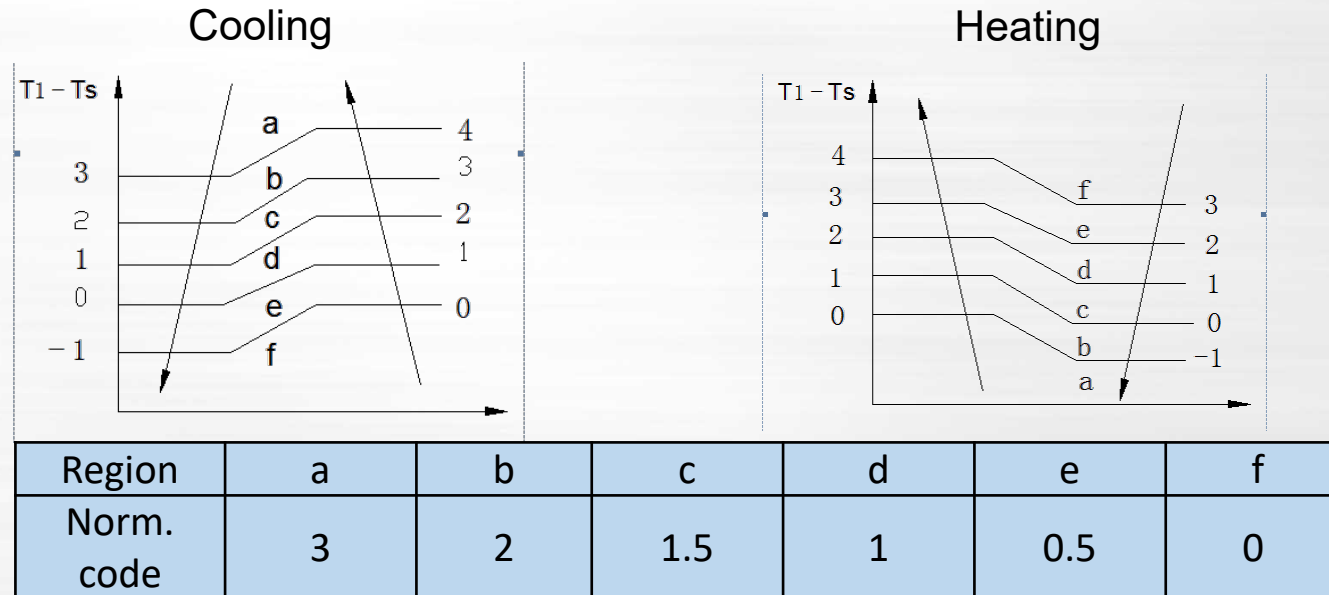


Electric control system **How compressor works** Electric control function

● *How to calculate the capacity request?*

a. Norm code and HP

Norm. code is a value determined by the difference between room temp. and setting temp($T1-Ts$). $(T1-Ts)$ is divided into 6 regions, each region has a Norm. code.



HP is indoor unit's capacity size, expressed in hp (horsepower).

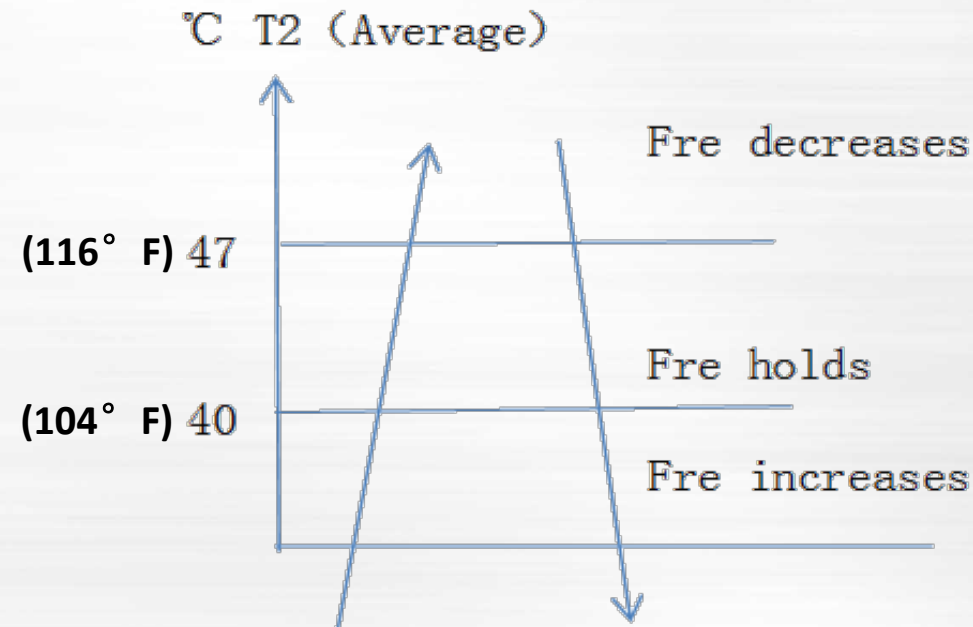
Capacity size	6K	9K	12K	18K	24K	30K	36K
HP	0.5	1.0	1.2	1.5	2.0	2.5	3.0



- *How to calculate the capacity request?*

- b. **Correction by T2(in heating mode)**

Correction is a value based on average evaporator temperature T2(heating mode).



T2 has a correction in heating mode



- *How to calculate the capacity request?*

Capacity request calculation example



Room 1: 9K (1HP)

Room1 temp $T_1=25^{\circ}\text{C}$ (77°F); Set temp $T_S=19^{\circ}\text{C}$ (66°F)
 $T_1-T_S=6^{\circ}\text{C}$ (42°F), Cooling mode, **Norm code** is 3;

Room 2: 12K (1.2HP)

Room2 temp $T_1=22^{\circ}\text{C}$ (71°F); Set temp $T_S=20^{\circ}\text{C}$ (68°F)
 $T_1-T_S=2^{\circ}\text{C}$ (35°F), cooling mode, **Norm code** is 2;

Capacity request=Norm. code \times HP

Capacity request= $3*1+2*1.5=6$



- How is the compressor adjusted?

Fre(Hz)	F0	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	F20	F21	F22	F23	F24	F25
Final cooling capacity request	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

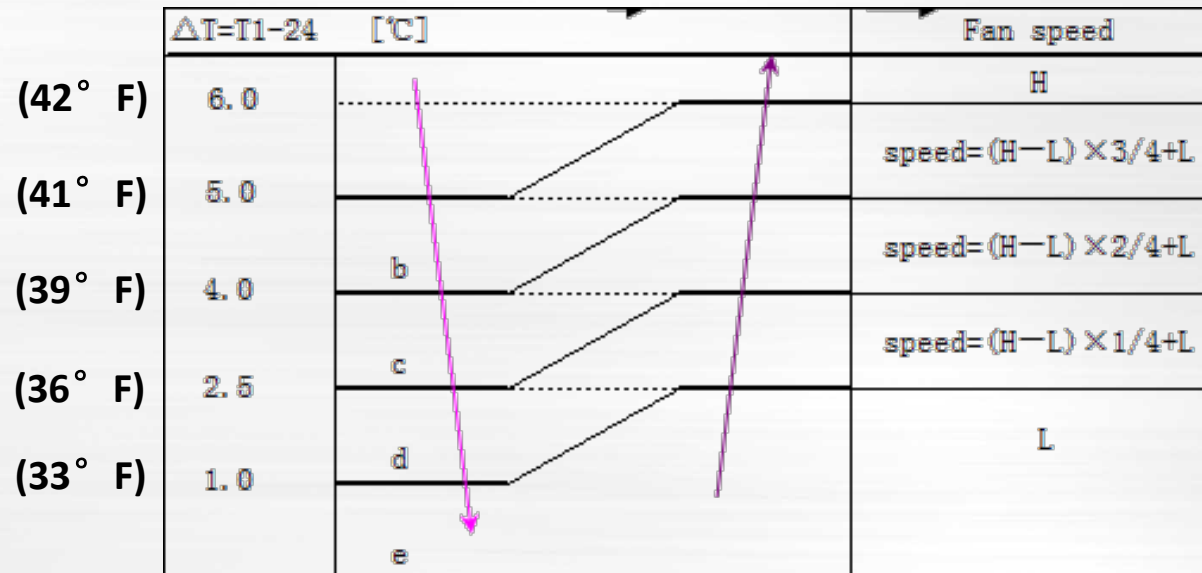
Example

Fre(Hz)	F0	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	F20	F21	F22	F23	F24	F25
2 zone	0	31	33	35	39	41	43	45	48	51	53	55	57	61	63	67	69	72	74	78	82	85	87	90	95	98
3 zone	0	20	24	28	31	34	38	41	44	48	52	56	59	62	66	70	73	76	79	82	85	92	95	98	102	105



- *Fan only mode*

1. Temperature setting function is disabled, and no setting temperature displays.
2. Fan speed can be set to high / mid / low / auto speed by remote controller.
3. The action of auto fan in fan-only mode is the same as auto fan in cooling mode with 24°C (75° F) setting temperature.





● *Cooling mode*

1. Fan speed can be set to high / mid / low / auto speed by remote controller.

12 grades (SH/H+/H/H-/M+/M/M-/L+/L/L-/S/SS)

	Setting Fan speed	T1-Ts	Actual fan speed
(40° F) (37° F) (35° F)	H	4.5	H+(H+=H+G)
		3.0	H (=H)
		1.5	H- (H=H-G)
(40° F) (37° F) (35° F)	M	4.5	M+(M+=M+Z)
		3.0	M(M=M)
		1.5	M-(M-=M-Z)
(40° F) (37° F) (35° F)	L	4.5	L+(L+=L+D)
		3.0	L(L=L)
		1.5	L-(L-=L-D)

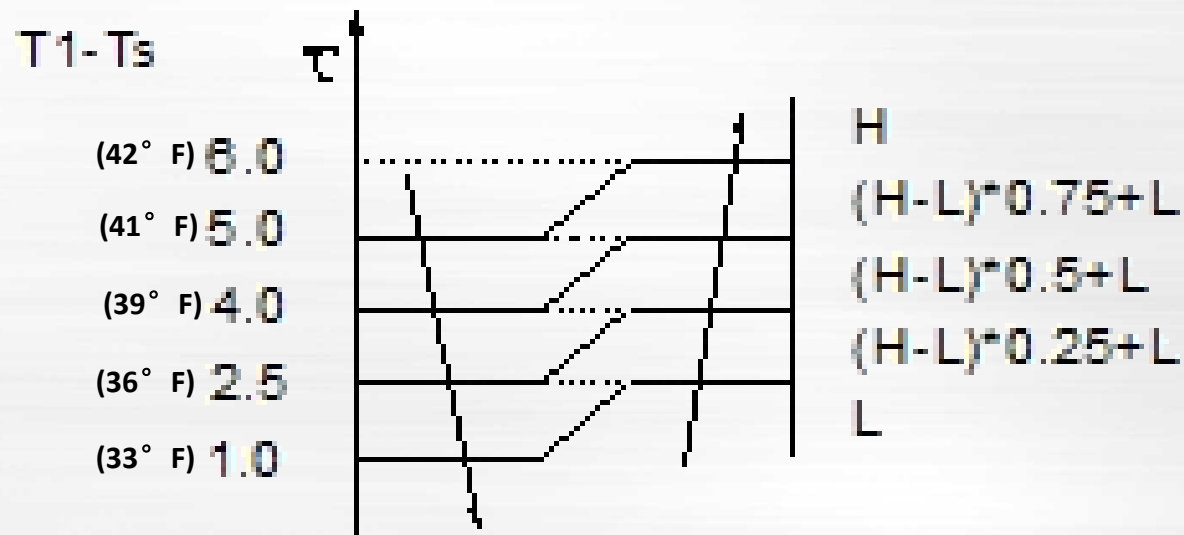
H+/H/H-/M+/M/M-/L+/L/L- in cooling mode



- *Cooling mode*

2. Auto Fan in cooling mode

Auto fan in cooling mode



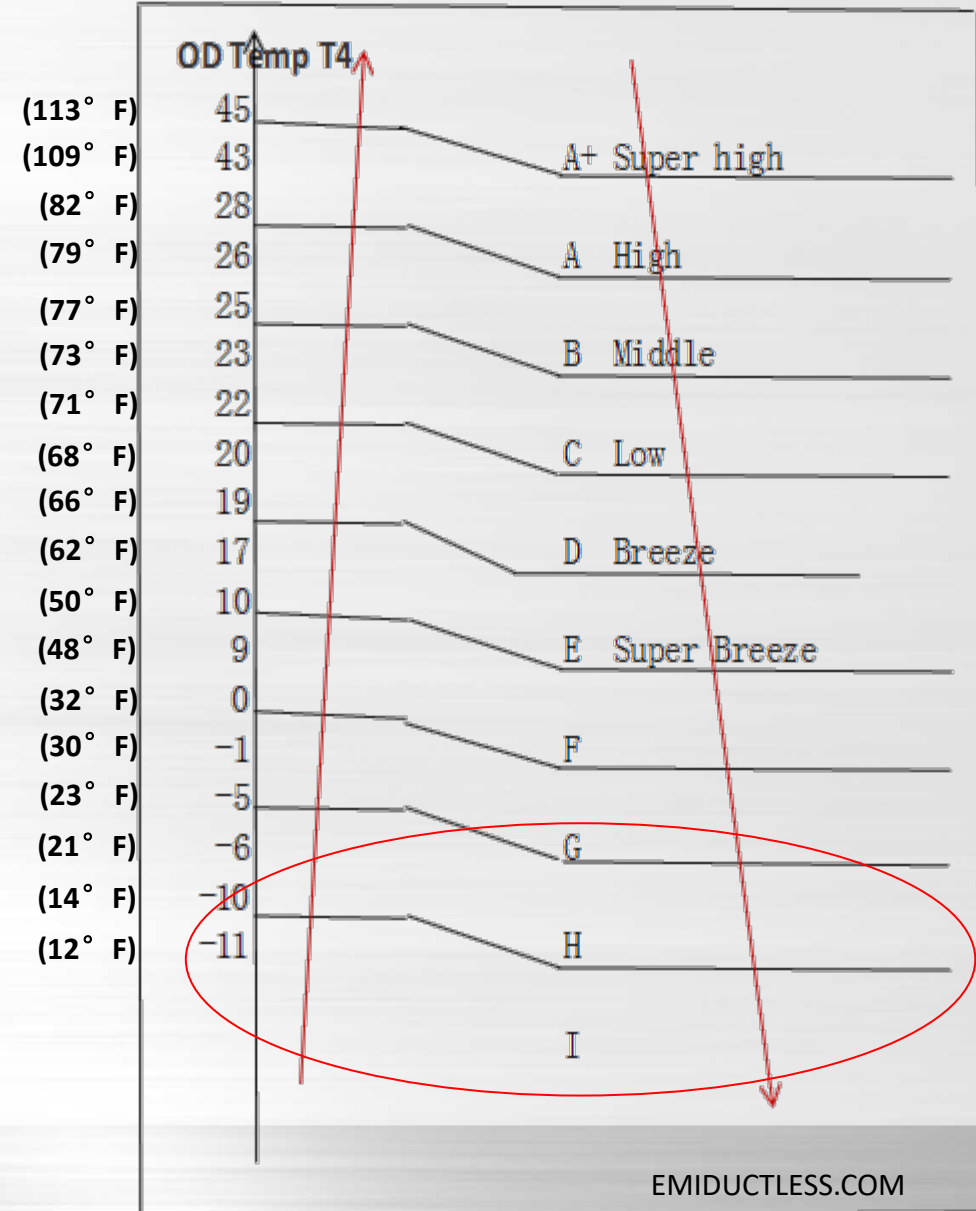
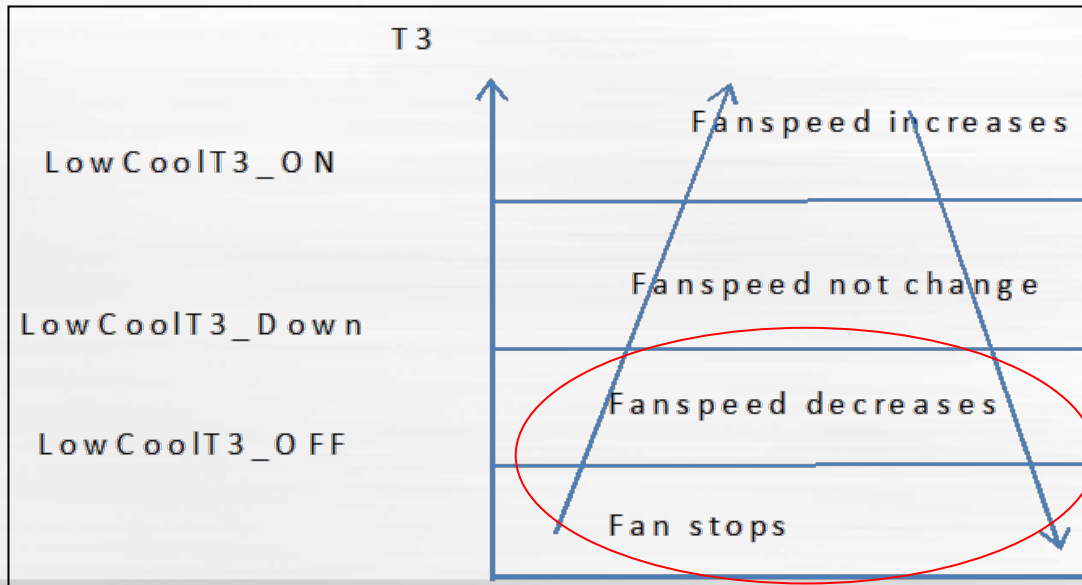


● *Cooling mode*

3. Outdoor fan operation(10 speed)

When compressor starts, outdoor initial fan speed is determined according to ambient temperature T4.

Then it is adjusted according to condenser temperature T3 every 30s.





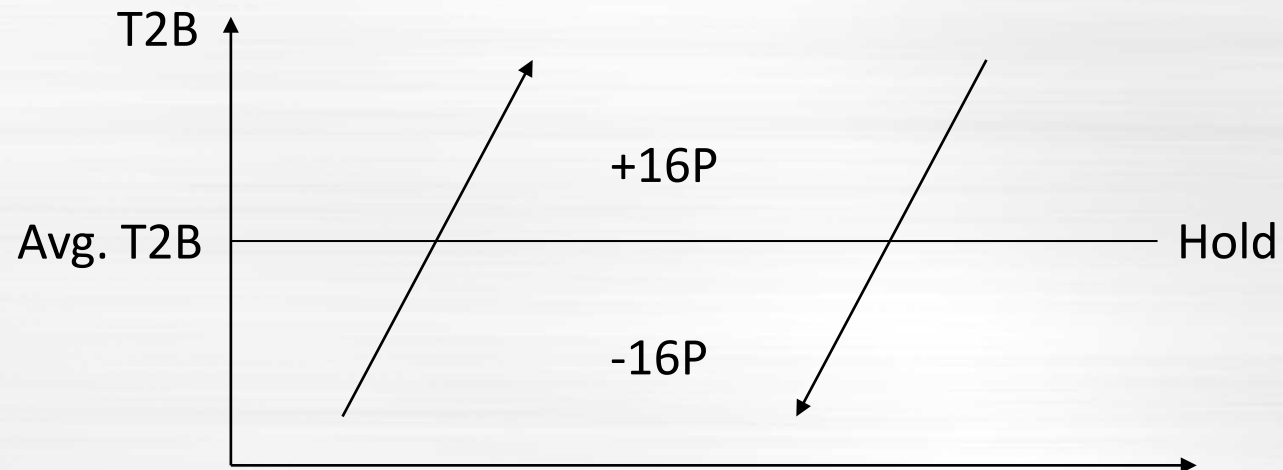
- *Cooling mode*

- 4. EEV control

Initial EEV open steps

Capacity size	9K	12K	18K	24K
EEV open steps	200P	250P	300P	350P

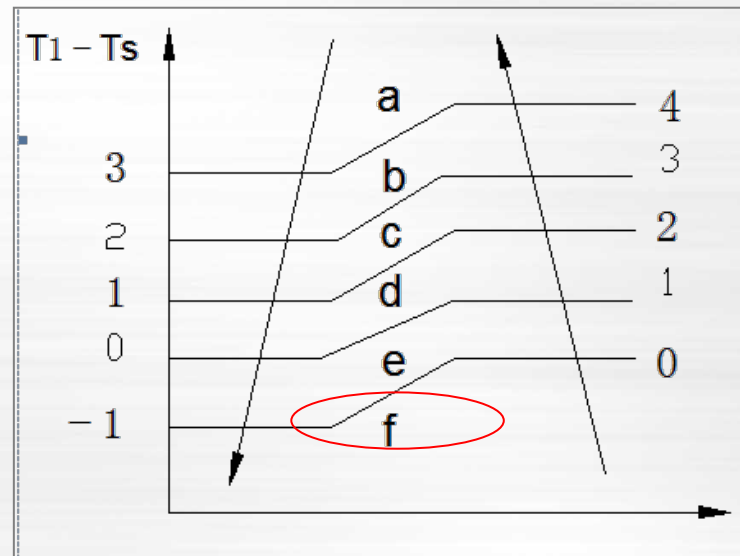
It will be adjusted according to T2B every 2 minutes





- *Drying mode*

1. Indoor fan is fixed at low speed in dehumidifying mode
2. Capacity region is fixed at d. Not related to T1 and Ts.



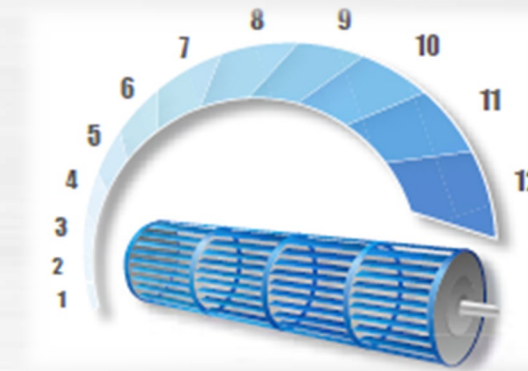
Region	a	b	c	d	e	f
Norm. code	3	2	1.5	1	0.5	0

- *Heating mode*

1. Fan speed can be set to high / mid / low / auto speed by remote controller.

12 grades (SH/H+/H/H-/M+/M/M-/L+/L/L-/S/SS) for.

Setting Fanspeed	T1-Ts [°C]		Actual fanspeed
(26° F) (23° F) (21° F)	H	-3.0	H- (H=H-G)
		-4.5	H (=H)
		-6.0	H+(H+=H+G)
(26° F) (23° F) (21° F)	M	-3.0	M-(M=M-Z)
		-4.5	M(M=M)
		-6.0	M+(M+=M+Z)
(26° F) (23° F) (21° F)	L	-3.0	L-(L=L-D)
		-4.5	L(L=L)
		-6.0	L+(L+=L+D)



Indoor fan speed can change only after staying in a same zone for 1 minutes. (no this limit when fan speed, mode, setting temp. is changed by remote controller)

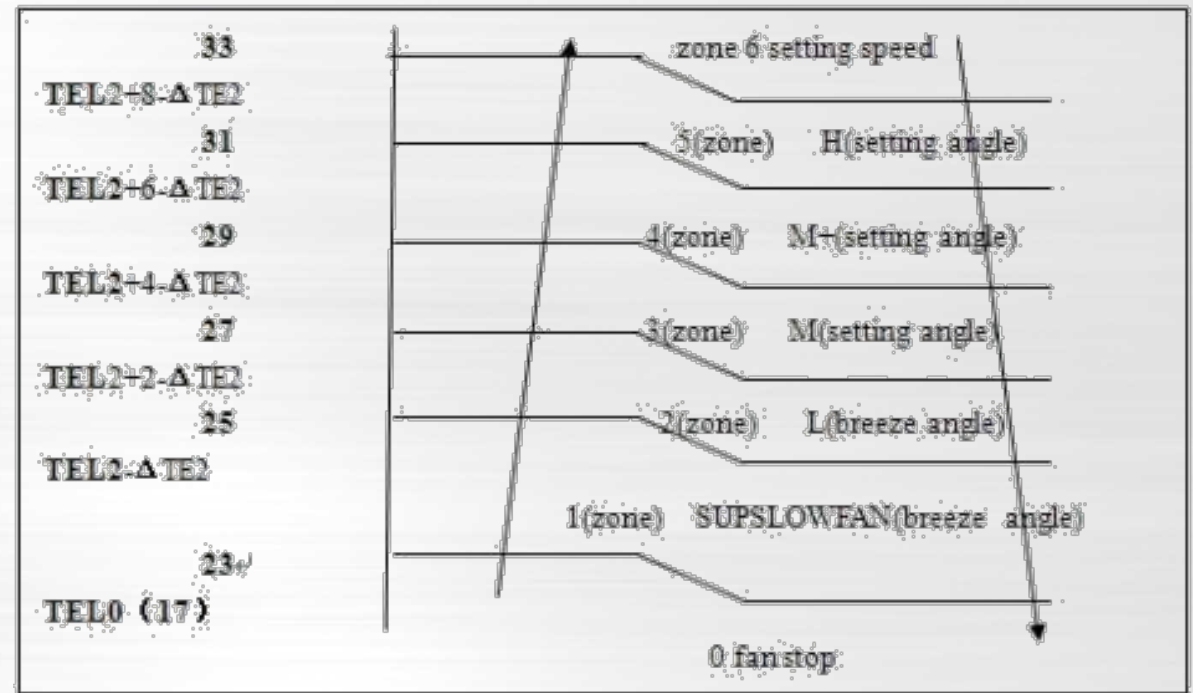
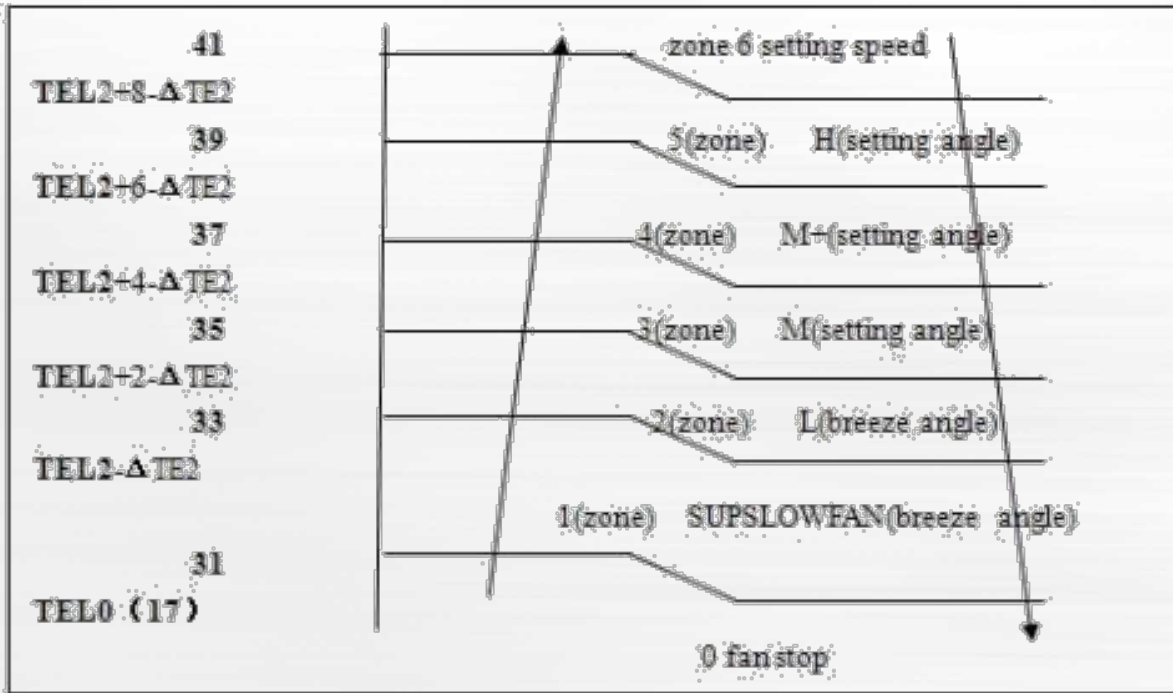


● Heating mode

2. Anti-cold-air function Example

If T1=20, rising, then ΔTE1=0, the diagram is:

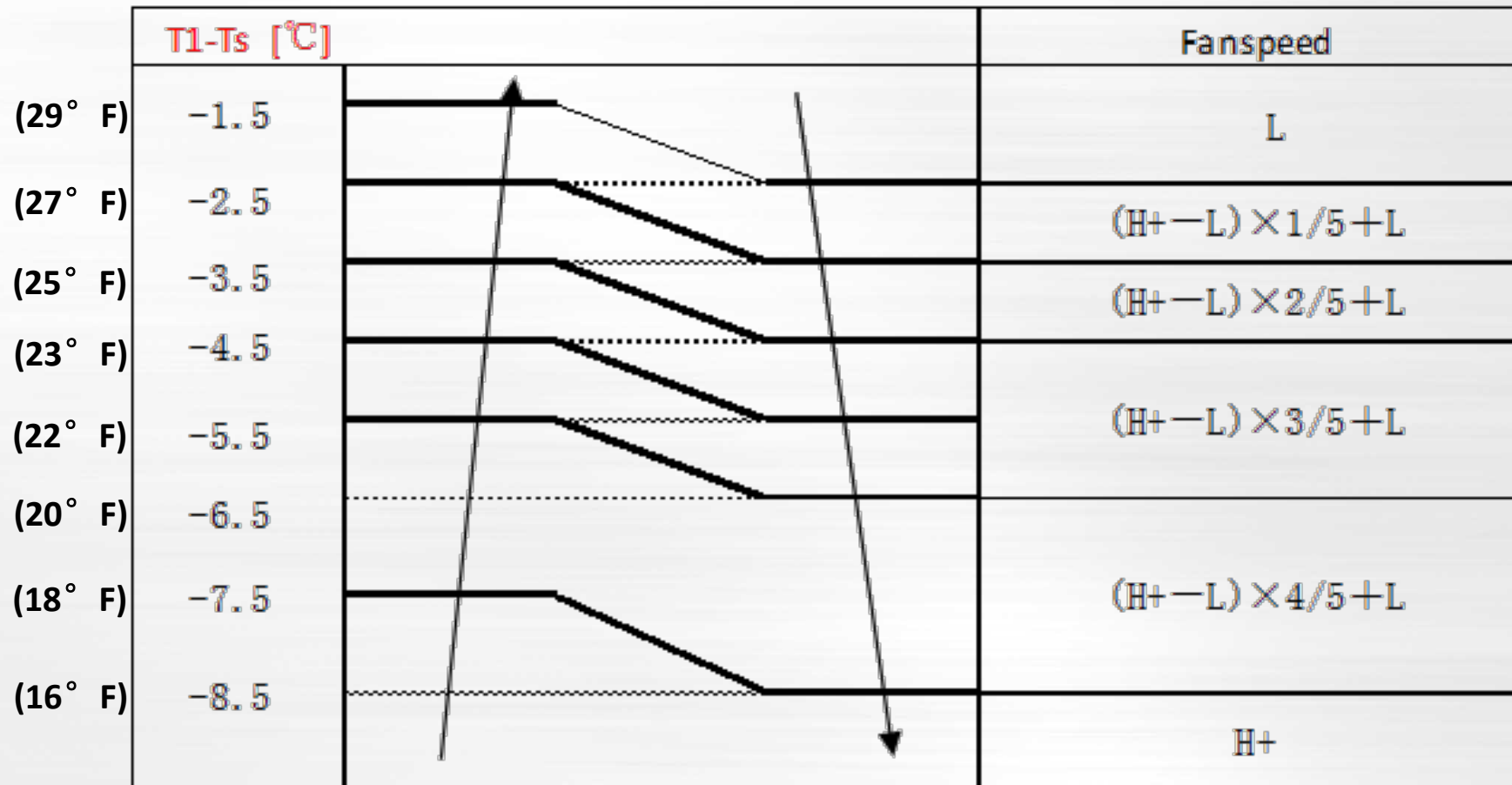
If T1=14, rising, then ΔTE1=8, the diagram is:





- *Heating mode*

3. Auto fan in heating mode

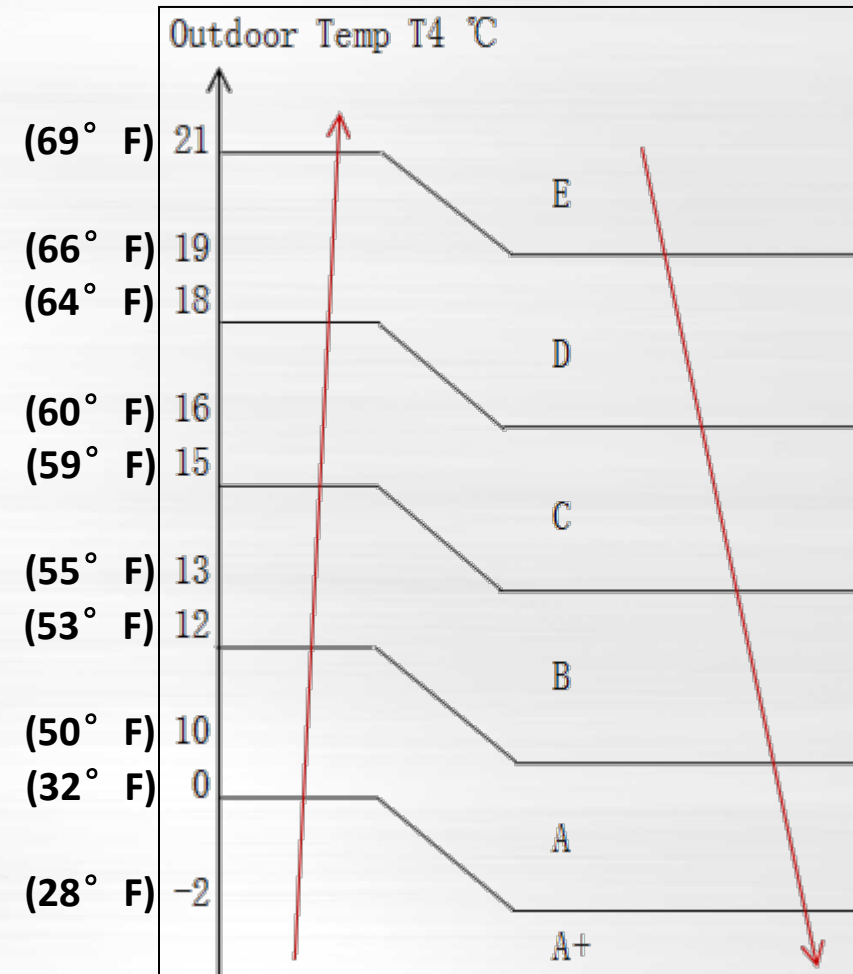




- *Heating mode*

4. Multi speeds outdoor fan function

Outdoor fan speed is determined according to outdoor temperature T4.





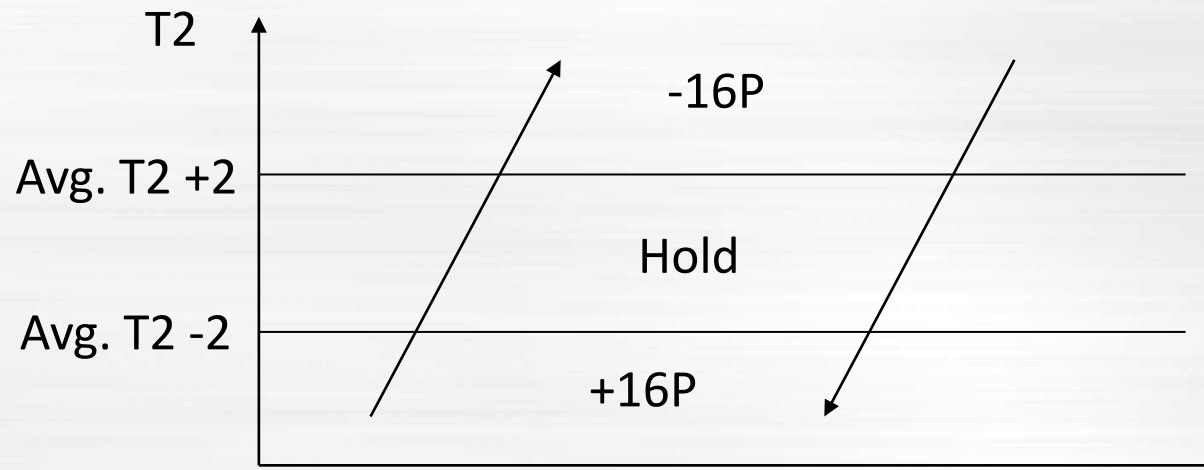
- *Heating mode*

- 5. EEV control

Initial EEV open steps

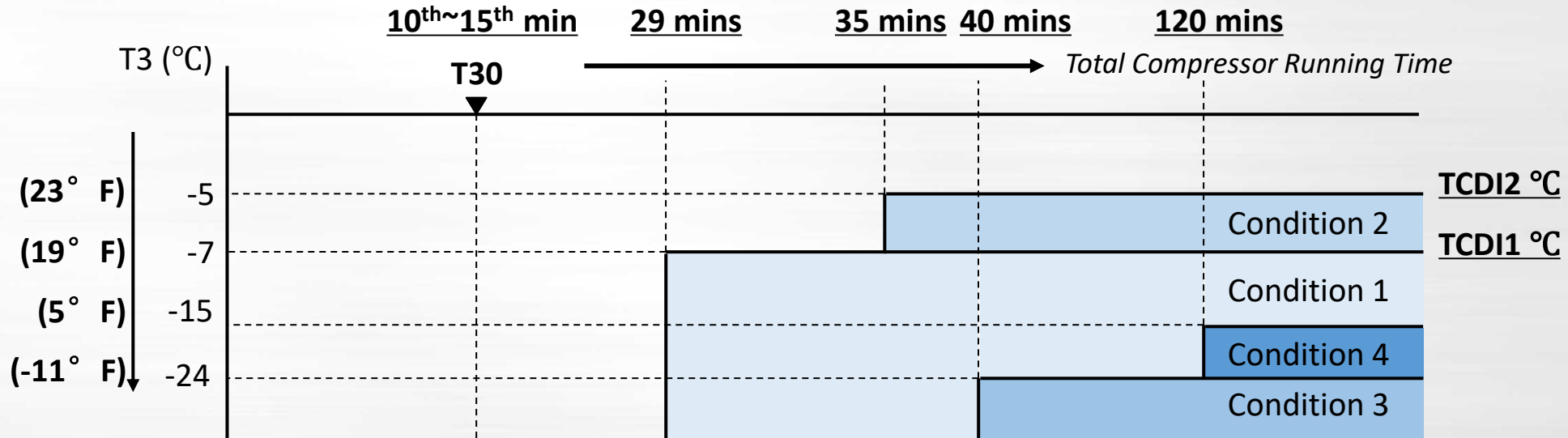
Capacity size	9K	12K	18K	24K	30K	36K
EEV open steps	200P	250P	300P	350P		

It will be adjusted according to T2 every 2 minutes





● *Defrosting mode*



Condition 1	Total compressor running time is 29 mins	$T3 \leq -7^{\circ}\text{C}$ (19° F) & $T3 \leq T30 - 3^{\circ}\text{C}$ (37° F)
Condition 2	Total compressor running time is 35 mins	$T3 \leq -5$ & $T3 \leq T30 - 1.5^{\circ}\text{C}$ (34° F)
Condition 3	Total compressor running time is 40 mins	$T3 \leq -24^{\circ}\text{C}$ (-11° F) and last for 3 mins
Condition 4	Total compressor running time is 120 mins	$T3 \leq -15^{\circ}\text{C}$ (5° F)



- *Defrosting mode*
- **Exit defrosting**

If any one of following items is satisfied, defrosting will finish and the unit will turn to normal heating mode.

- a. T3 rises to be higher than TCDE1 °C (**33° F**).
- b. T3 rises to be higher than TCDE2°C (**35° F**) and remains for 80 seconds.
- c. The unit has been running for 10 minutes in defrost.

Temp.	14	18	21	28	36
TCDI1_ADD			2		
TCDI2_ADD			-7		
TCDI3_ADD			-24		
TCDE1_ADD			15		
TCDE2_ADD			5		
T30SUBT3ONE_ADD			3		
T30SUBT3TWO_ADD			1.5		



Electric control system

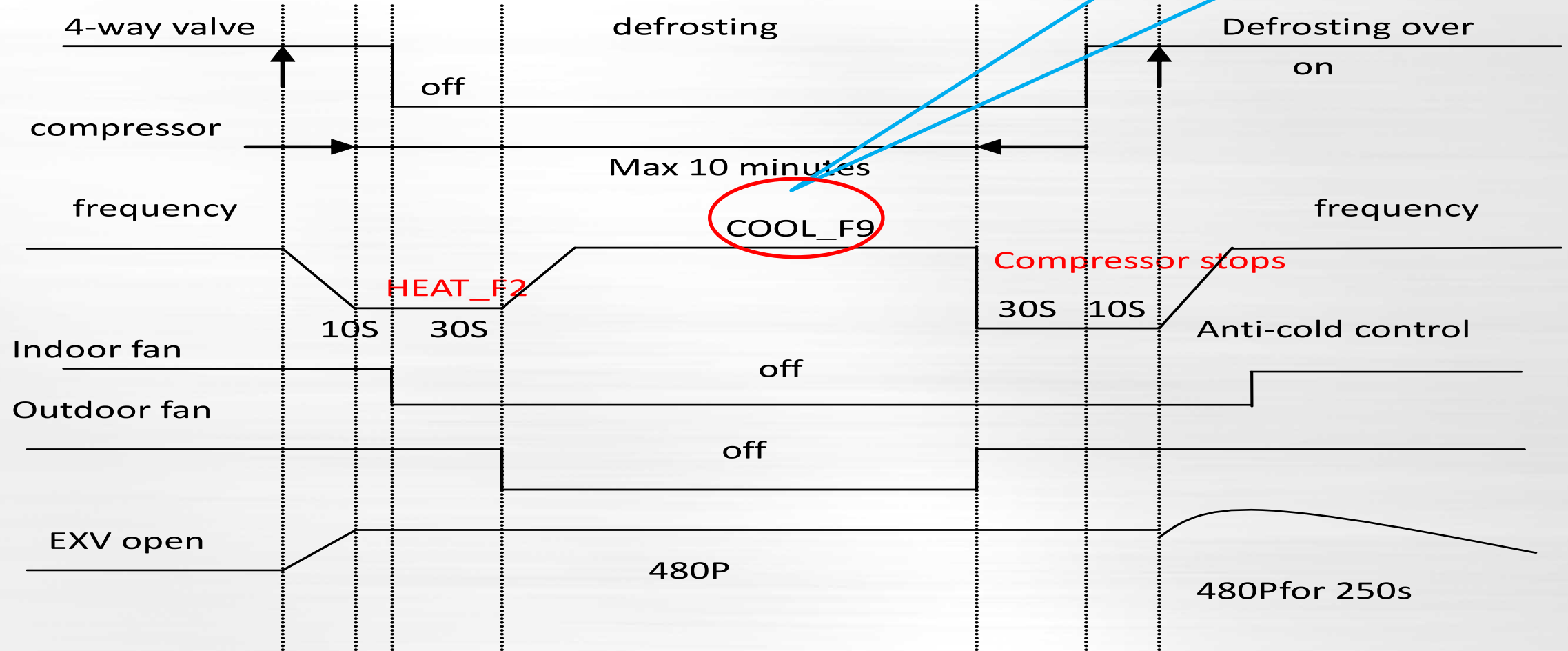
How compressor works

Electric control function

● Defrosting mode

● Defrosting action

Runs at COOL_F7 if T3 ≥ 5 °C (41 ° F)





- *Auto mode*

1. In Auto mode, the unit will select running mode (cooling/heating/fan) automatically according to ΔT ($\Delta T = T1 - T_s$).

$\Delta T = T1 - T_s$	Running mode
$\Delta T > 2^\circ\text{C}$ (35°F)	Cooling
$-2 < \Delta T \leq 2^\circ\text{C}$ (35°F)	Fan
$\Delta T \leq -2^\circ\text{C}$ (28°F)	Heating

2. Temperature setting range is 17 (62° F)~30 °C (86° F).
3. Indoor fan will run auto fan speed under corresponding mode.
4. If the system switches modes between heating and cooling, compressor will stop for 15 minutes and then decide mode according to ΔT .



- *Forced operation mode*

Press the AUTO/COOL button, the AC will run as below sequence:

Forced auto → Forced cooling → Off



Forced cooling mode:

The compressor and outdoor fan keep running (fixed at F2), and the indoor fan runs at breeze speed. After running for 30 minutes, AC will turn to auto mode with 24°C (**75° F**) setting temperature.

When any one indoor unit (master unit) enter forced cooling mode, the other indoor units (slave units) will enter forced cooling mode.

The slave units can not be controlled by RC or AUTO/COOL button.

The slave units will quit forced cooling mode and run cooling at low fan speed with 24°C (**75° F**) setting temp. only after master unit quits forced cooling mode first.

The slave units can not quit forced cooling mode first.



- *Forced operation mode*

Forced auto mode:

The action of forced auto mode is the same as normal auto mode with 24°C (75° F) setting temperature.

When AC receives signals, such as switch on, switch off, timer on, timer off, mode setting, fan speed setting, sleep mode setting, follow me setting, it will quit the forced operation.



- *Auto restart function*

In case of a sudden power failure, the unit will resume the previous operation setting (including mode, temperature, fan speed, swing, on/off, & heating, forced operation) automatically after 3 minutes when power returns.



Electric control system How compressor works **Electric control function**

● *Oil return operation*

Oil return operation is to avoid compressor operating with low frequency for long time.

Condition of entering oil return:

- 1- Compressor actual frequency is low than RET_OIL_FREQ1_ADD. **AND**
- 2- Continuous operating time > RET_OIL_TIME1_ADD

Oil return operation

Compressor is forced to run higher frequency RET_OIL_FREQ2_ADD for RET_OIL_TIME2_ADD.
EEV open angle will adjust to 300P. Indoor unit will keep current running.

Exiting oil return

- 1- The oil return operating time reaches RET_OIL_TIME2_ADD. **OR**
- 2- When defrosting or frequency limits (caused by evaporator temp., condenser temp. discharge temp., current or voltage) happens. **OR**
- 3- Target frequency lower than RET_OIL_FREQ1_ADD **and** T4 higher than TempT4HeatLimit_ADD °C.

Temp.	18 (64° F)	27 (80° F)	30 (86° F)	36 (96° F)
RET_OIL_FREQ1_ADD (Hz)	50	50	35	50
RET_OIL_TIME1_ADD (minutes)	120	120	90	120
RET_OIL_FREQ2_ADD (Hz)	62	62	57	64
RET_OIL_TIME2_ADD (S)	180	180	100	180
TempT4HeatLimit_ADD (°C)	15 (59° F)	15 (59° F)	20 (68° F)	20 (68° F)



- *Mode conflict*

When there are different mode settings among active indoor units, system will define as following:

- Heating mode will have a priority.
- Cooling mode and Fan mode will conflict to heating mode.

Setting mode	Cooling	Heating	Fan	Off
Cooling	No	Yes	No	No
Heating	Yes	No	Yes	No
Fan	No	Yes	No	No
Off	No	No	No	No

★ Note: "Yes" means mode conflict, "No" means no mode conflict.

- *Outdoor check function*

With the check button and digital display, useful information will be shown.

Every time the button is pressed, the item code will be shown for 1.5 seconds, then the information will be shown.

In standby, the LED displays “- -”.

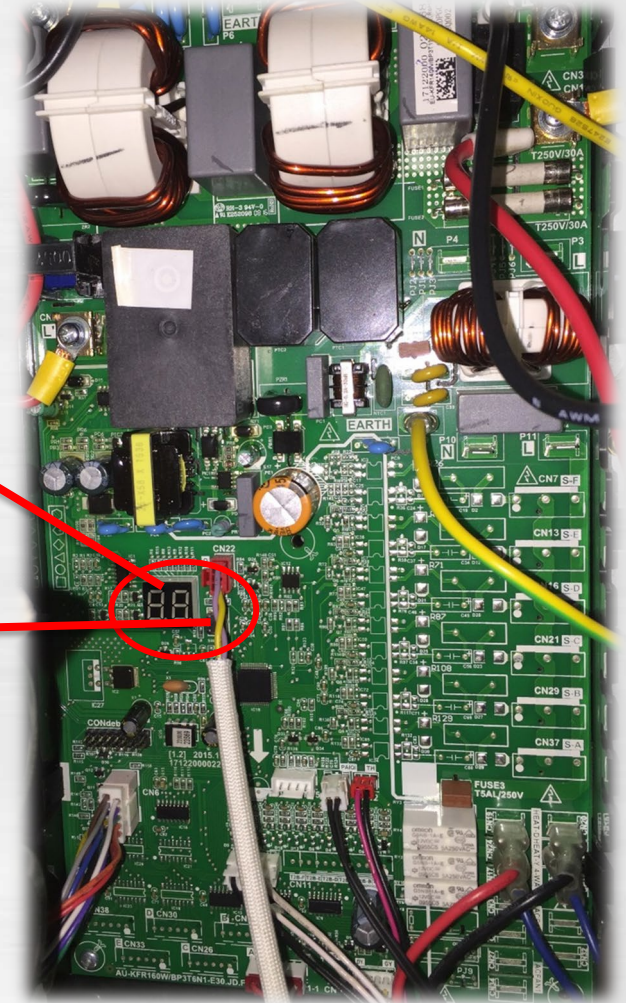
In compressor operation, the LED displays the running frequency.

In defrosting mode, The LED displays “dF” or alternative displays between running frequency and “dF”(each displays 2s).

In protection or malfunction, the LED displays error code or protection code.

Digital Display

Check Button





● *Outdoor check function*

- Push the button, you can check some parameters on display when the unit is running.

No.	Display	Remark
00	Normal display	Display running frequency, running state or malfunction code
01	Number of indoor units in good connection	Actual data
02	Outdoor unit running mode	0-Standby, 1-Fan only, 2-Cooling, 3-Heating, 4-Forced cooling
03	A indoor unit capacity HP	7K: HP=0.8, 9K: HP=1.0, 12K: HP=1.2, 18K: HP=1.5 If the indoor unit is not connected, the digital display tube will show: "___"
04	B indoor unit capacity HP	
05	C indoor unit capacity HP	
06	D indoor unit capacity HP	
07	E indoor unit capacity HP	
08	A Indoor unit capacity demand code	Norm value*HP
09	B Indoor unit capacity demand code	
10	C Indoor unit capacity demand code	
11	D Indoor unit capacity demand code	
12	E Indoor unit capacity demand code	
13	Total indoor units amendatory capacity demand code	7 for Forced cooling mode
14	Target frequency corresponding to the total indoor units amendatory capacity demand	



● Outdoor check function

No.	Display	Remark
15	Target frequency after the frequency limit	
16	Target frequency sending to compressor control chip	
17	A indoor unit evaporator outlet temp.(T _{2B} A)	If the temp. is lower than -9 degree, the digital display tube will show "-9".If the temp. is higher than 70 degree, the digital display tube will show "70". If the indoor unit is not connected, the digital display will show: "——"
18	B indoor unit evaporator outlet temp.(T _{2B} B)	
19	C indoor unit evaporator outlet temp.(T _{2B} C)	
20	D indoor unit evaporator outlet temp.(T _{2B} D)	
21	E indoor unit evaporator outlet temp.(T _{2B} E)	
22	A indoor unit room temp.(T ₁ A)	If the temp. is lower than 0 degree, the digital display will show "0".If the temp. is higher than 50 degree, the digital display will show "50". If the indoor unit is not connected, the digital display will show: "——"
23	B indoor unit room temp.(T ₁ B)	
24	C indoor unit room temp.(T ₁ C)	
25	D indoor unit room temp.(T ₁ D)	
26	E indoor unit room temp.(T ₁ E)	
27	A indoor unit evaporator temp.(T ₂ A)	If the temp. is lower than -9 degree, the digital display will show "-9".If the temp. is higher than 70 degree, the digital display will show "70". If the indoor unit is not connected, the digital display will show: "——"
28	B indoor unit evaporator temp.(T ₂ B)	
29	C indoor unit evaporator temp.(T ₂ C)	
30	D indoor unit evaporator temp.(T ₂ D)	
31	E indoor unit evaporator temp.(T ₂ E)	



- *Outdoor check function*

No.	Display	Remark
32	Condenser pipe temp.(T3)	If the temp. is lower than -9 degree, the digital display will show "-9".If the temp. is higher than 70 degree, the digital display will show "70".
33	Outdoor ambient temp.(T4)	
34	Compressor discharge temp.(Tp)	The display value is between 30~129 degree. If the temp. is lower than 30 degree, the digital display will show "30".If the temp. is higher than 99 degree, the digital display will show single digit and tens digit. For example, the digital display shows "0.5",it means the compressor discharge temp. is 105 degrees.)
35	AD value of current	The display value is hex number. For example ,the digital display tube show "Cd", it means AD value is 205.
36	AD value of voltage	
37	EEV open angle for A indoor unit	Actual data/4. If the value is higher than 99, the digital display will show single digit and tens digit. For example ,the digital display tube show "2.0",it means the EEV open angle is $120 \times 4 = 480$ p.)
38	EEV open angle for B indoor unit	
39	EEV open angle for C indoor unit	
40	EEV open angle for D indoor unit	
41	EEV open angle for E indoor unit	



● Outdoor check function

No.	Display	Remark		
42	Frequency limit symbol	Bit7	Frequency limit caused by IGBT radiator	The display value is hex number. For example, the digital display shows 2A, then Bit5=1, Bit3=1, Bit1=1. It means frequency limit caused by T4, T3 and current.
		Bit6	Frequency limit caused by PFC	
		Bit5	Frequency limit caused by T4.	
		Bit4	Frequency limit caused by T2.	
		Bit3	Frequency limit caused by T3.	
		Bit2	Frequency limit caused by Tp.	
		Bit1	Frequency limit caused by current	
		Bit0	Frequency limit caused by voltage	
43	Average value of T2	(Sum T2 value of all indoor units)/(indoor units number)		
44	Outdoor fan speed	0- Off, 1- High speed, 2- Med speed, 3- Low speed, 4- breeze speed, 5- Super breeze speed		
45	The last error or protection code	00 means no error or protection		



Electric control system How compressor works Electric control function

● *Outdoor check function*

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



● Protection

1. Three Minutes Start-Delay for compressor.

The compressor delays starting 3 minutes. after being turned on every time except after defrosting and power on at first time (delays 1 minute.)

2. Temperature protection of compressor exhaust.

$T_d < 90^{\circ}\text{C}$ (**194°F**), free from the frequency limit and run at target frequency.

91°C (**195°F**) $< T_d < 101^{\circ}\text{C}$ (**213°F**) The compressor will keep the current frequency.

102°C (**215°F**) $< T_d < 115^{\circ}\text{C}$ (**239°F**) Decrease frequency one grade every 2 mins , running at F1 all the time if frequency decreased to F1.

$T_d > 115^{\circ}\text{C}$ (**239°F**) for 10s, compressor stops. When $T_d < 90^{\circ}\text{C}$ (**194°F**), compressor restarts.

3. Sensor protection at open circuit and short circuit.

4. Inverter module protection.

5. Fan Speed out-of-control error.

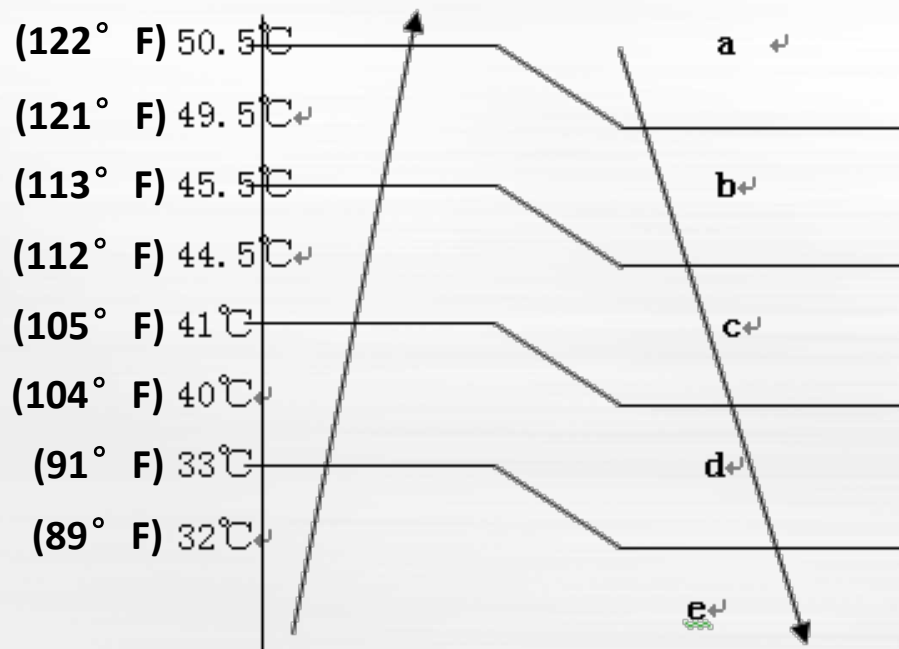


● General protection

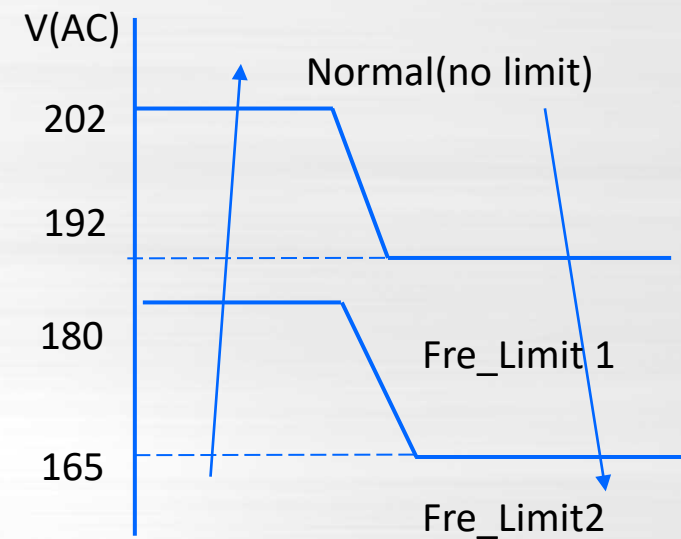
6. Voltage lacking protection:

Cooling

Temperature segmentation



Frequency limitation



Note: For each temperature segment, the Fre_Limit1 and Fre_Limit2 are different.

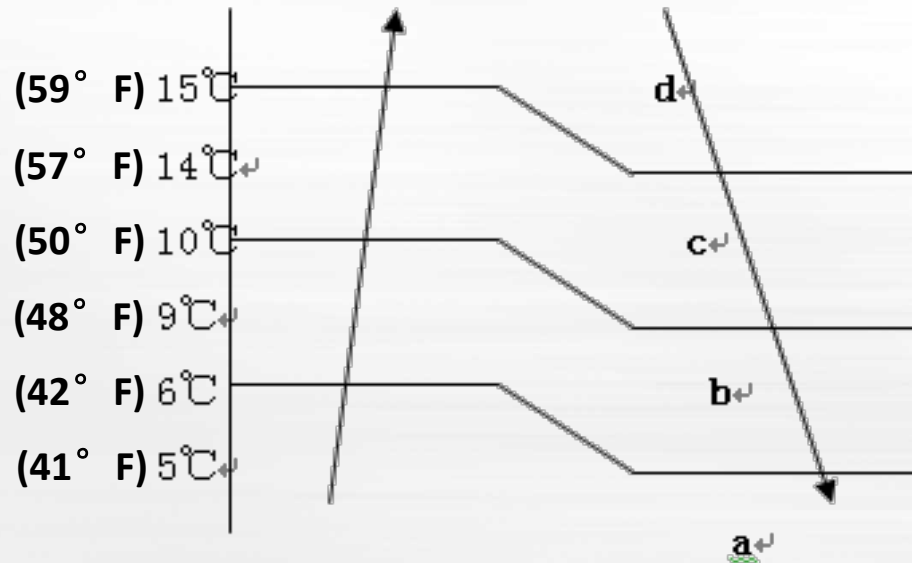


- *General protection*

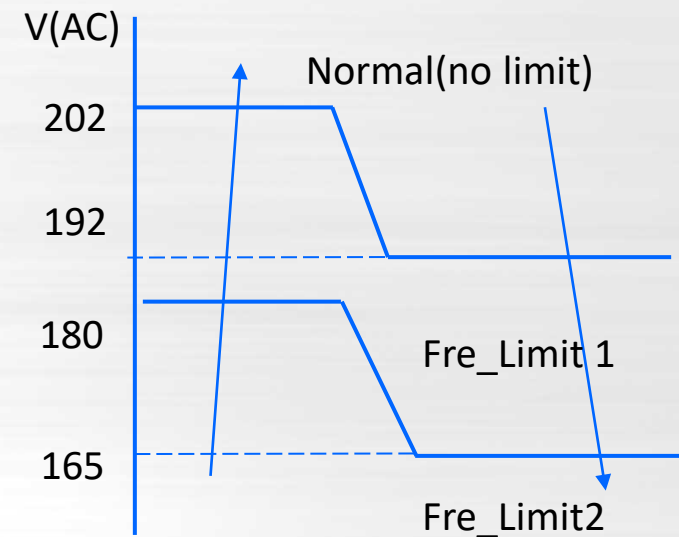
6. Voltage lacking protection:

Heating

Temperature segmentation



Frequency limitation

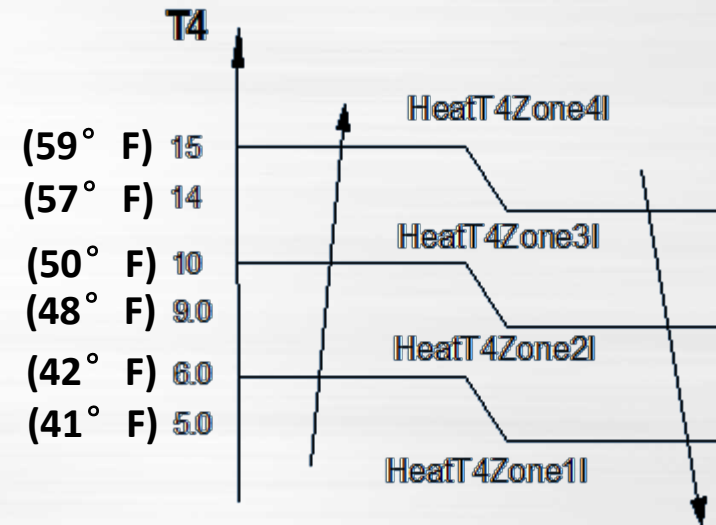
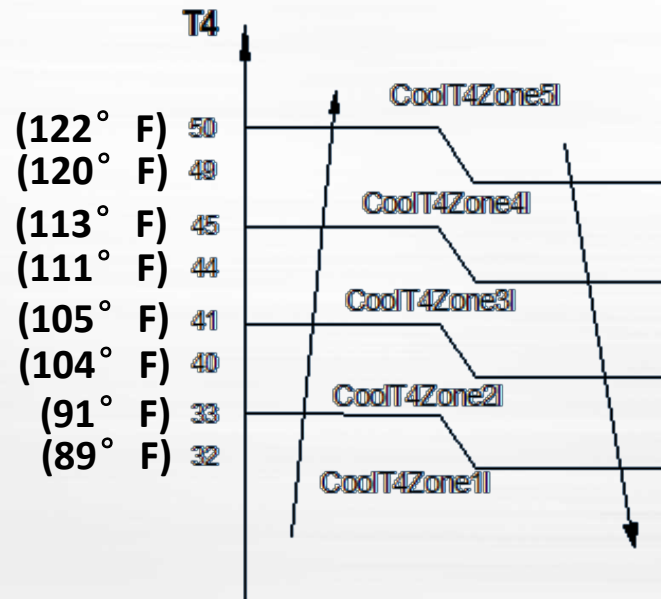


Note: For each temperature segment, the Fre_Limit1 and Fre_Limit2 are different.



- *Protection*

7.The compressor running frequency is limited by the current.



T4 has a relationship with current restriction for ERP products, which is better for the system.



- *Protection*

8. Indoor heat exchanger anti-freezing function.

---When $T2 < 0^{\circ}\text{C}$ (**32°F**) for 250 seconds, the indoor unit capacity demand will be zero and resume to normal when $T2 > 8^{\circ}\text{C}$ (**46°F**).

9. Condenser high temperature protection function (in cooling and drying mode)

--- 55°C (**131°F**) $< T3 < 60^{\circ}\text{C}$ (**140°F**), the compressor frequency will decrease to the lower level until to F1 and then runs at F1. If $T3 < 54^{\circ}\text{C}$ (**129°F**), the compressor will keep running at the current frequency.

--- $T3 < 52^{\circ}\text{C}$ (**125°F**), the compressor will not limit the frequency and resume to the former frequency.

--- $T3 > 60^{\circ}\text{C}$ (**140°F**) for 5 seconds, the compressor will stop until $T3 < 52^{\circ}\text{C}$ (**125°F**).



- *Protection*

10. High temperature protection for indoor evaporator in heating mode

If $T_2 > 63^{\circ}\text{C}$ (**145°F**) in heating mode, the corresponding indoor capacity demand will be 0 and won't resume until $T_2 < 48^{\circ}\text{C}$ (**118°F**).

11. Indoor room low temperature protection in drying mode:

If $T_1 < 10^{\circ}\text{C}$ (**50°F**) in this mode, the corresponding indoor fan will be turned off and won't resume until $T_1 > 12^{\circ}\text{C}$ (**53°F**).



- *Protection*

12. Pressure protection

- When the discharge pressure is higher than 638 Psi, the outdoor unit will stop, and when the pressure is lower than 464 Psi, the outdoor unit will restart.
- When the suction pressure is lower than 20 Psi, the outdoor unit will stop. When the pressure is higher than 43 Psi, the outdoor unit will restart.



- *Protection*

13. High noise protection

On cooling or Dry mode if only one IDU is in operation, each time the compressor starts the Off or Standby unit's EEV will open 200 steps (around 50%) for 3 minutes.

This situation could cause high humidity on the Off unit and cause water dripping from the indoor unit.

Part IV Troubleshooting



● Indoor Error display

IMPORTANT

What ever the error code inside you always must check what is the error code on the ODU display.

Operation lamp	Timer lamp	Display	Malfunction	ODU Error
★ 1 time	X	E0	Indoor unit EEPROM parameter error	---
★ 2 times	X	E1	Communication malfunction between indoor and outdoor units	E2
★ 4 times	X	E3	Indoor fan speed malfunction	---
★ 5 times	X	E4	Indoor room temperature sensor (T1) malfunction	---
★ 6 times	X	E5	Evaporator coil temperature sensor (T2) malfunction	---
★ 8 times	X	EE	Water-level alarm malfunction	
★ 1 times	●	F0	Current overload protection	P3
★ 2 times	●	F1	Outdoor ambient temperature sensor (T4) malfunction	E4
★ 3 times	●	F2	Condenser coil temperature sensor (T3) malfunction	E4
★ 4 times	●	F3	Compressor discharge temperature sensor (T5) malfunction	E4
★ 5 times	●	F4	Outdoor unit EEPROM parameter error	E0
★ 6 times	●	F5	Outdoor fan speed malfunction	E8
★ 7 times	●	F6	Indoor coil outlet pipe sensor (Located on outdoor unit low pressure valve)	---
★ 1 times	★	P0	Inverter module (IPM) malfunction	P6
★ 2 times	★	P1	Over-voltage or under-voltage protection	E5
★ 3 times	★	P2	High temperature protection of compressor top(OLP)/ High temperature protection of IPM board	---
★ 5 times	★	P4	Compressor drive malfunction	P6
★ 6 times	★	P5 (---	Indoor units mode conflict	---
★ 7 times	★	P6	Low pressure protection	P2

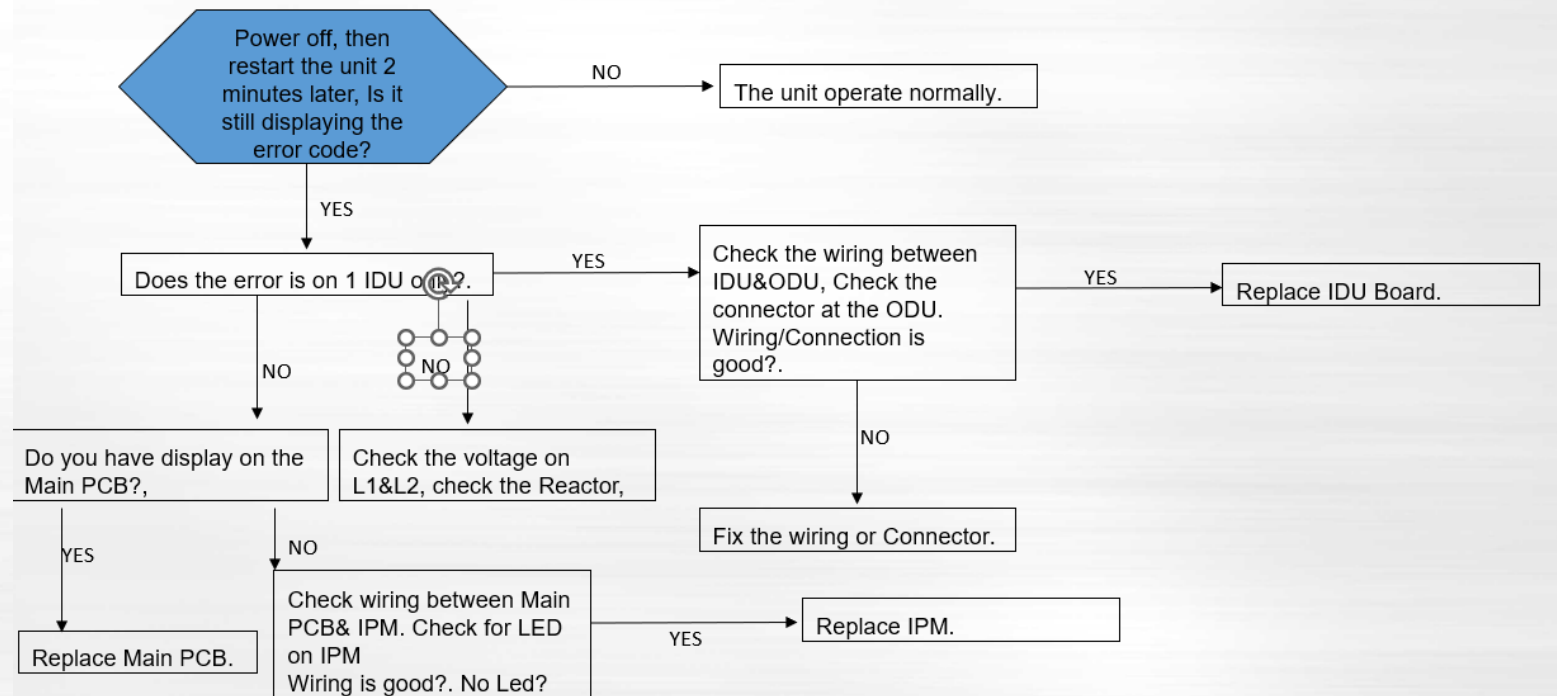


● *Communication Error between Indoor and Outdoor Unit*

Error Code	E1/E2
Malfunction decision conditions	Indoor unit does not receive the feedback from outdoor unit during 110 seconds and this condition happens 4 times continuously.
Possible causes	<ul style="list-style-type: none"> ● Wiring mistake ● Indoor or outdoor PCB faulty

When you have E1 on 1 zone on a Multi you can try to swap 2 zones and see if the code will follow the unit or the zone.
 (You just have to swap the wires DO NOT TOUCH THE LINE SET)

If the error code follow the unit check for IDU issue.
 If the error code follow the zone check for ODU issue.

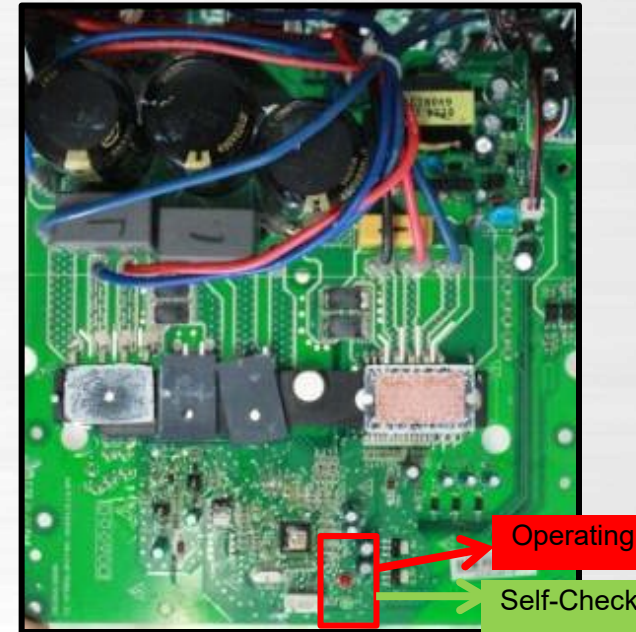




● *Communication Error between Indoor and Outdoor Unit*



Power,
Self-Check
Operating

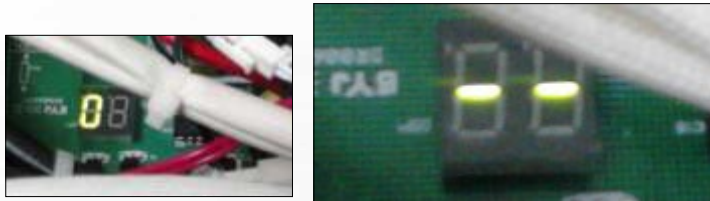


Operating
Self-Check

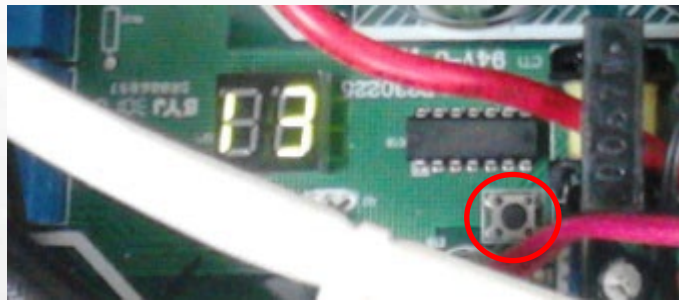
Pic 2: IPM or outdoor main PCB



● *Communication Error between Indoor and Outdoor Unit*



Pic 3: Main board LED when power on and unit standby.

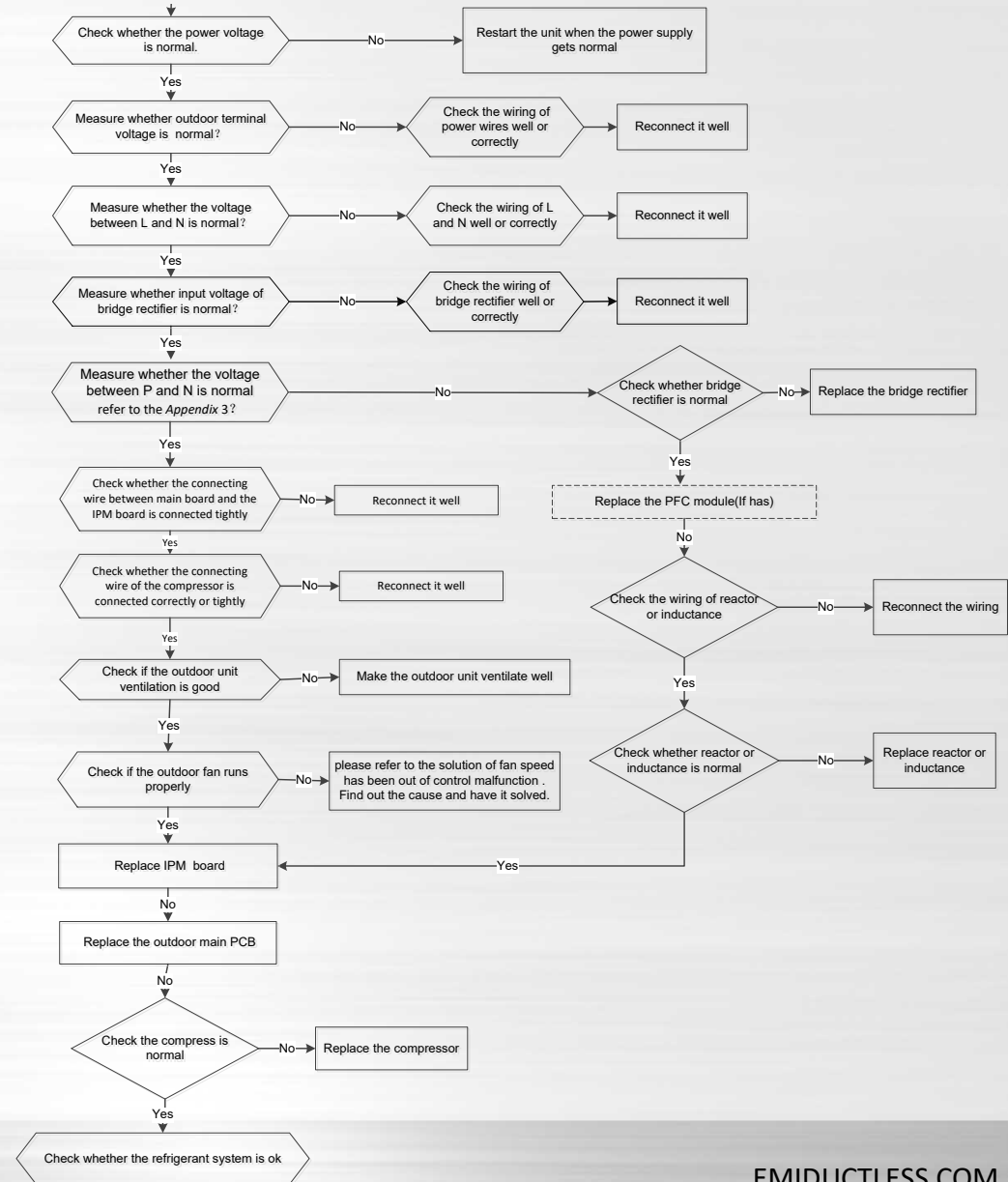


Pic 4: check point button,
Press once for check how many indoor units are connected



● *IPM protection*

Error Code	P0/P6
Malfunction decision conditions	Outdoor PCB detects IPM signal is low voltage
Possible causes	<ul style="list-style-type: none"> ● Wiring mistake ● Power supply problem ● Faulty high-voltage components ● Bad ventilation of outdoor coil ● Faulty PFC circuit or broken reactor ● Faulty IPM board ● Faulty outdoor fan ● Faulty outdoor PCB ● Faulty compressor





- *IPM protection*

DC voltage test between P and N

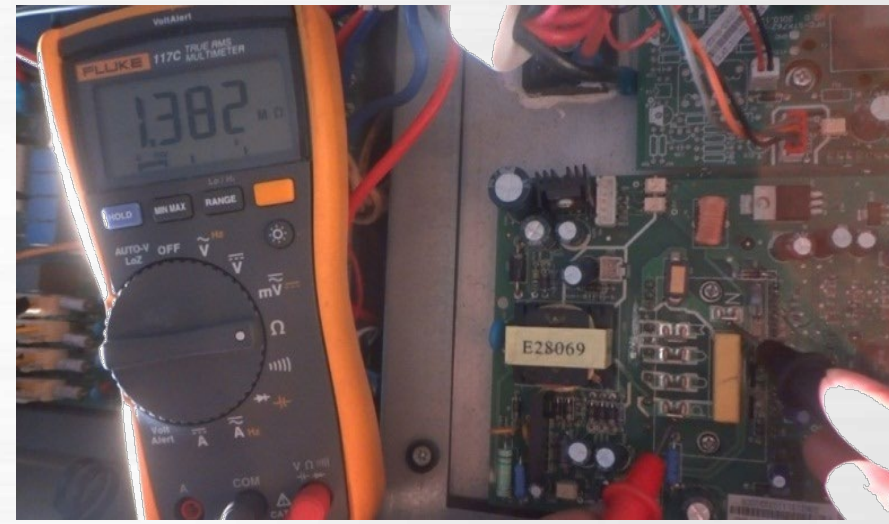
Normal voltage of P and N			
208-240V (1-phase, 3-phase)		380-420V(3-phase)	
In standby			
around 310VDC		around 530VDC	
In operation			
With passive PFC module	With partial active PFC module	With fully active PFC module	/
>200VDC	>310VDC	>370VDC	>450VDC



● *IPM protection*

IPM check

Turn off the power, let the large capacity electrolytic capacitors discharge completely, and dismantle the IPM.



Needle-type tester		Normal resistance value
(-)	(+)	
P	N	∞ (several M Ω)
	U	
	V	
	W	

Needle-type tester		Normal resistance value
(-)	(+)	
U	N	∞ (several M Ω)
V		
W		

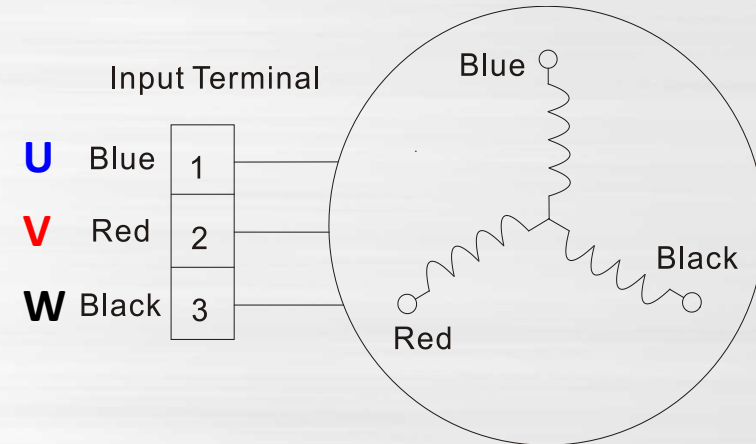
Values in () are for digital tester.

Values in () are for digital tester.

- *IPM protection*

Compressor check

Disconnect the compressor and check the resistance between **U-V**, **V-W** and **U-W**, and all 3 values should be equal. If not, the compressor is faulty and should be replaced.

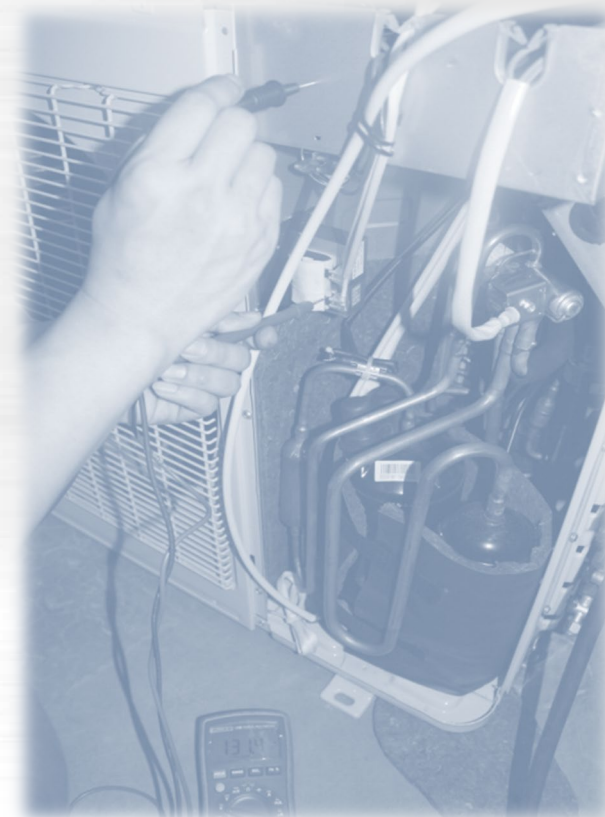
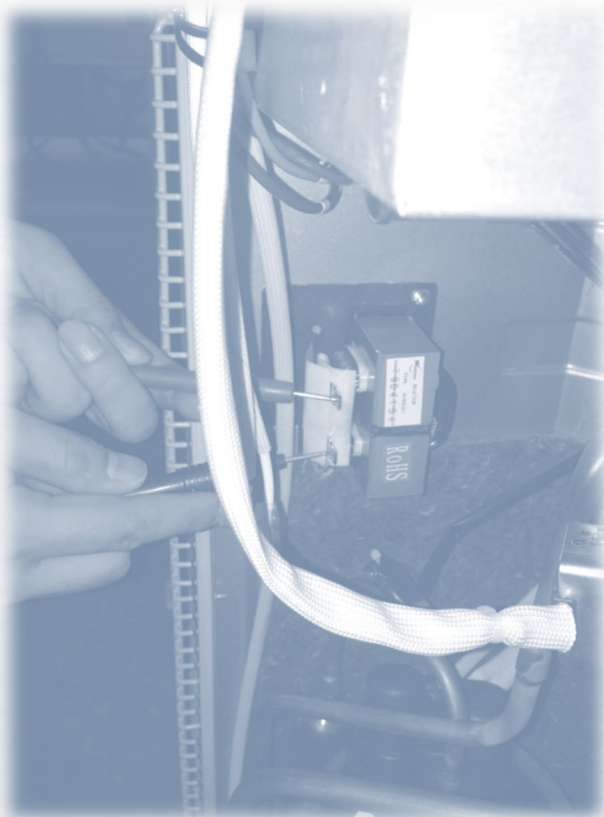


- *IPM protection*

Reactor check

Measure the resistance and voltage (to ground) of the reactor.

The normal resistance should be **around 0-1Ω**.





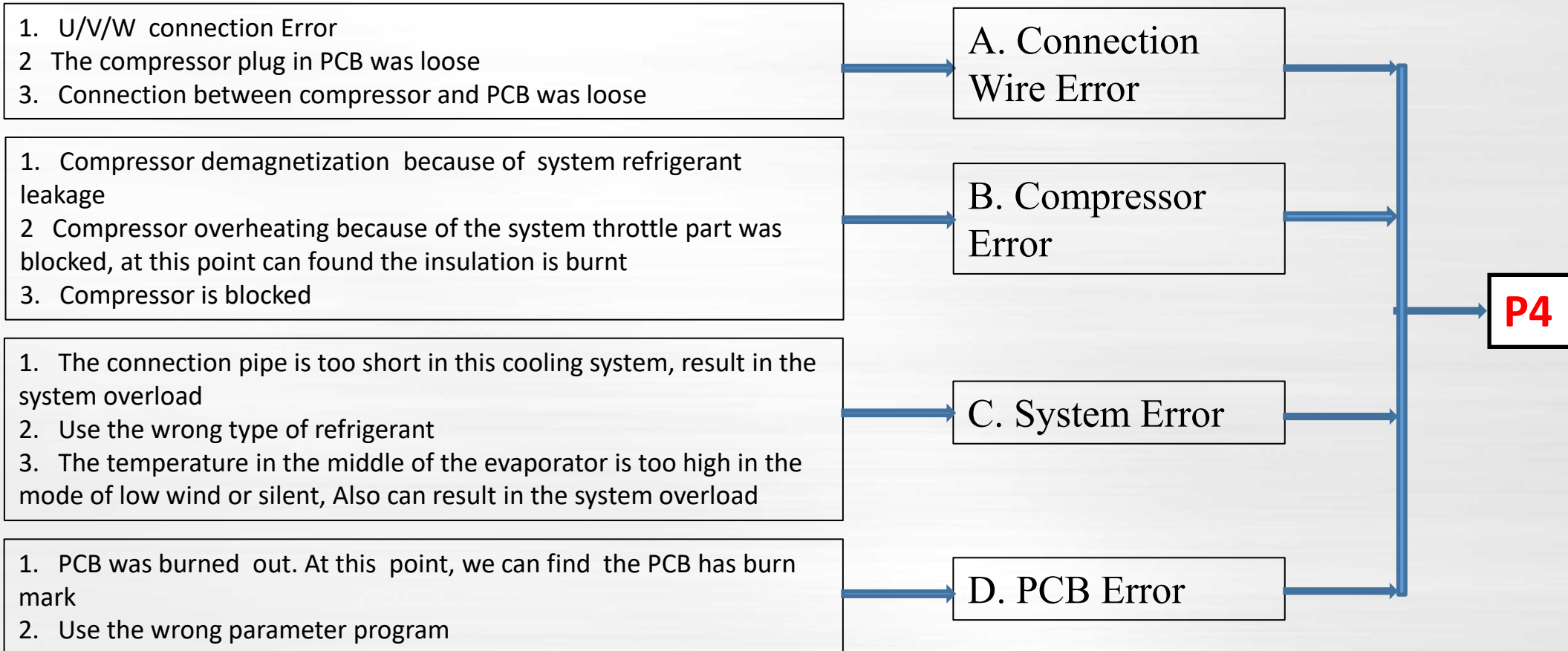
● *Compressor rotor position protection*

Error Code	P4 / P6
Malfunction decision conditions	The driven chip cannot detect the right rotor position of compressor
Possible causes	<ul style="list-style-type: none"> ● Wiring mistake ● Power supply problem ● Faulty high-voltage components ● Bad ventilation of outdoor coil ● Faulty PFC circuit or broken reactor ● Faulty IPM board ● Faulty outdoor PCB ● Faulty compressor



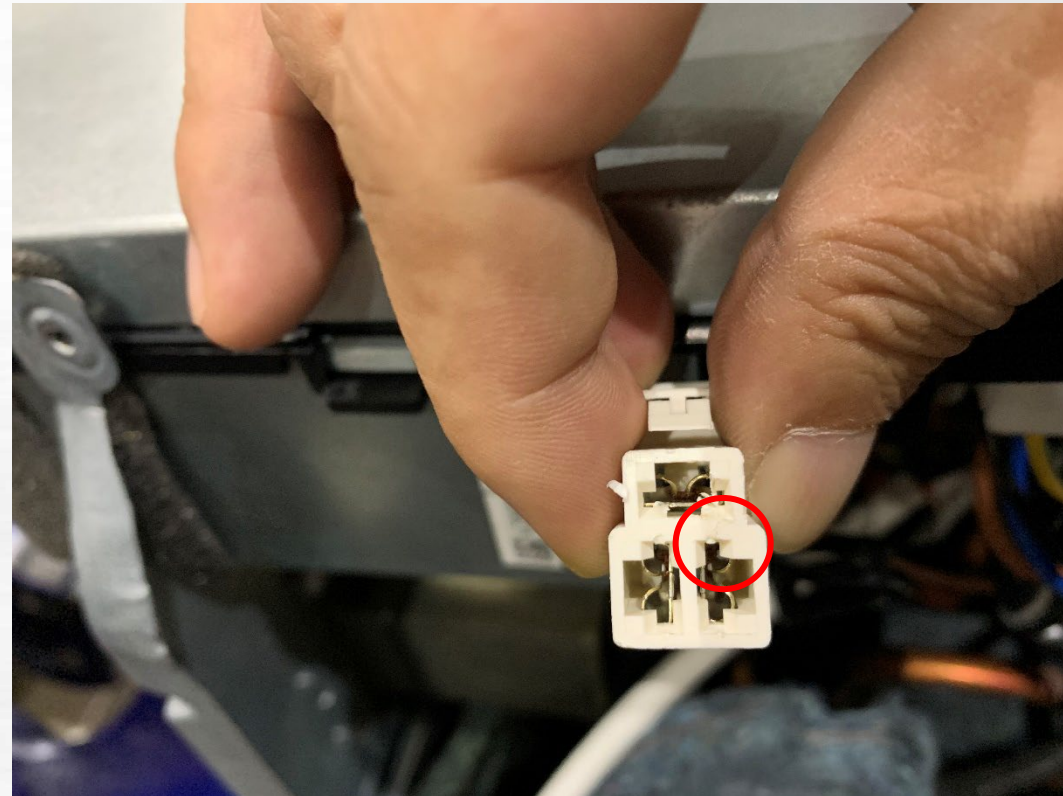


- *Inverter compressor drive error*
- *P4 (P6)*



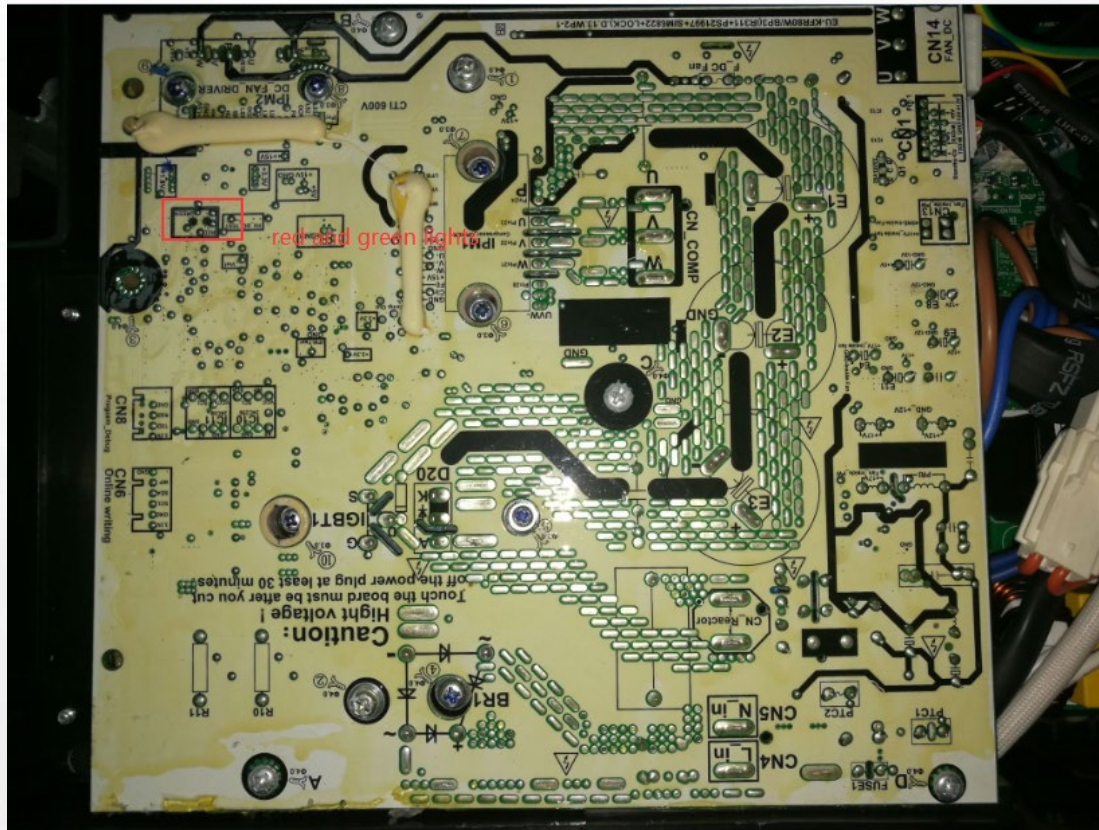
- *Inverter compressor drive error*
- *P4 (P6)*

Step 1. Confirm whether the wiring of outdoor unit power, main PCB and IPM board are correct or not, and whether the connection is loose.



- *Inverter compressor drive error*
- *P4 (P6)*

Step 2. Please record the status of the red light and green light of the module board when confirming the fault.

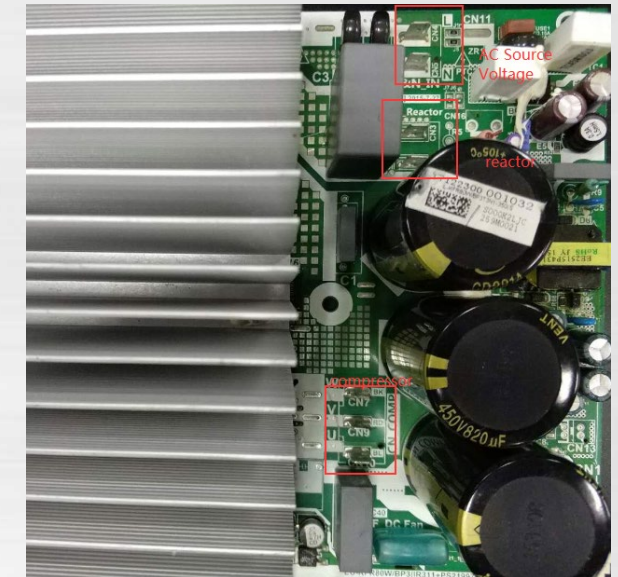
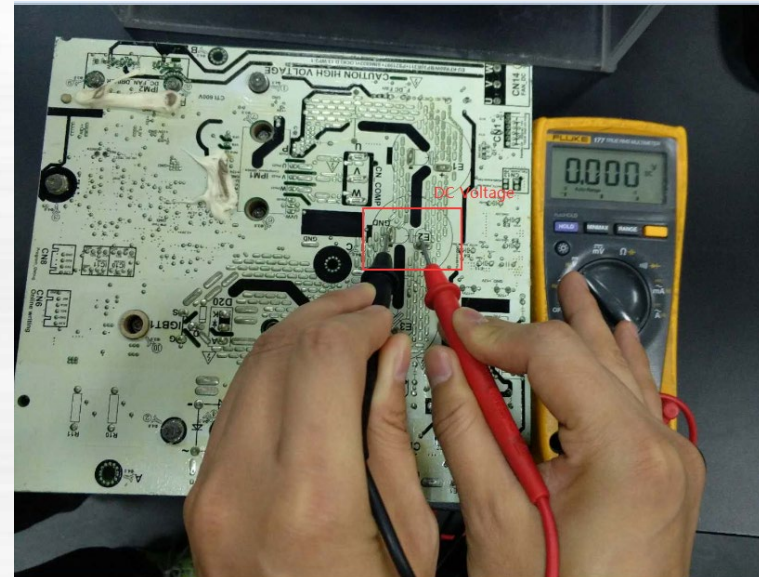


- *Inverter compressor drive error*
- *P4 (P6)*

Step 3. Measure the bus voltage at startup and failure. After starting up the compressor, the bus voltage will change to about 310~330V. If the bus voltage is significantly different from this value, to confirm whether the wiring of the module board is firm.

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):

$$V_{DC} = V_{ACin} * 1.414$$



- *Inverter compressor drive error*
- *P4 (P6)*

Step 6. check and make sure the liquid and gas valve are fully opened, and measure system pressure and make sure the refrigerant is correct.



- *Inverter compressor drive error*
- *P4 (P6)*

Step 7. To check whether the compressor sleeve is brown. If yes, it is preliminarily judged as high temperature demagnetization of the compressor





- *Inverter compressor drive error*
- *P4 (P6)*

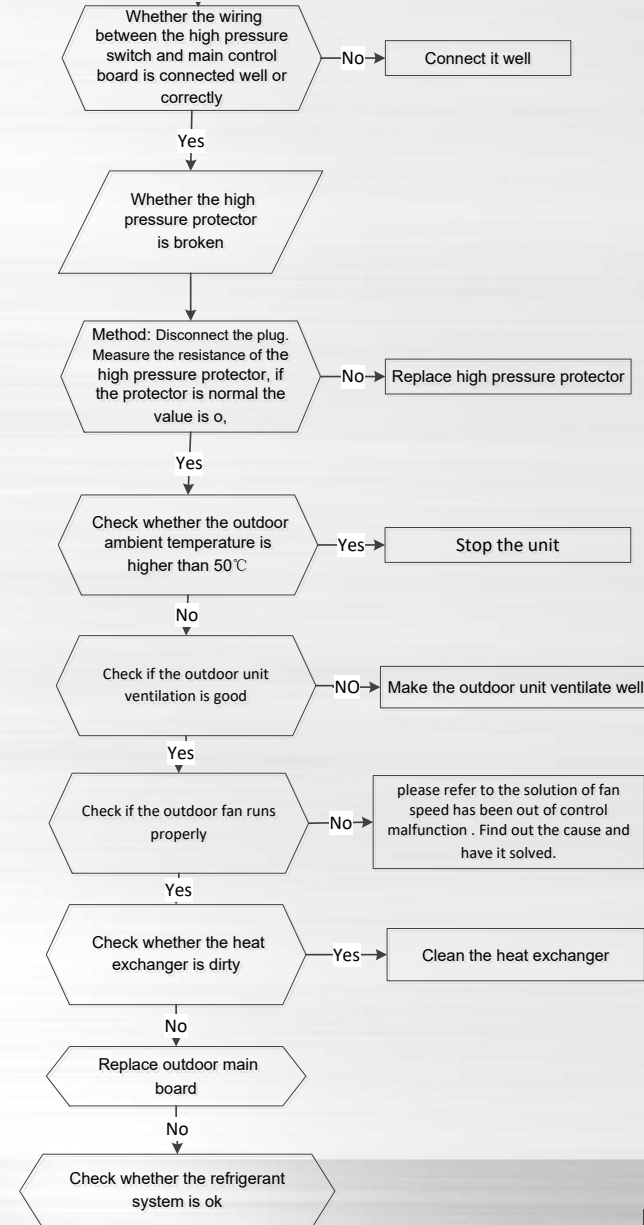
Step 8. To check the running frequency of compressor through the 88 LED on the board or the debugging tool. If the running frequency is Flashing, it is preliminarily judged as high temperature demagnetization of the compressor





● *High pressure protection*

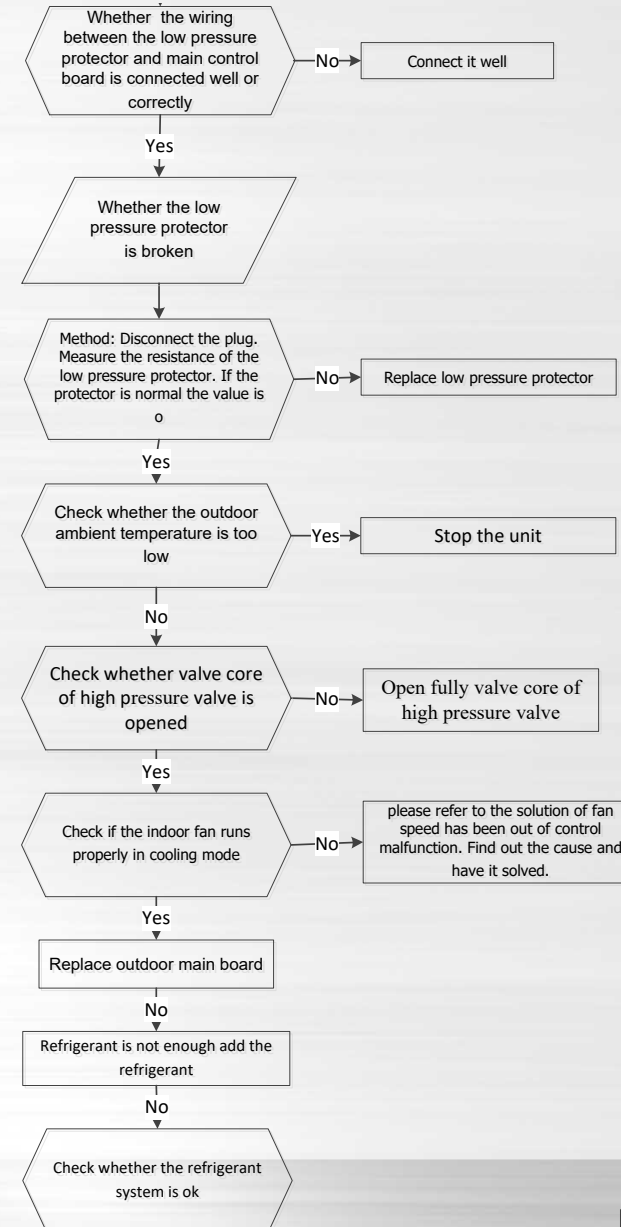
Error Code	P6 / P1
Malfunction decision conditions	Outdoor pressure switch cut off the system because high pressure is higher than 4.4 Mpa (638 psi)
Possible causes	<ul style="list-style-type: none"> ● Wiring problem of pressure switch ● Blocked refrigeration piping system ● Bad ventilation of outdoor coil ● Faulty pressure switch ● Faulty outdoor fan ● Faulty outdoor PCB





● *Low pressure protection*

Error Code	P6 / P2
Malfunction decision conditions	Outdoor pressure switch cut off the system because low pressure is lower than 0.13 Mpa (18psi)
Possible causes	<ul style="list-style-type: none"> ● Wiring problem of pressure switch ● Faulty pressure switch ● Ambient temperature is too low in heating ● Liquid valve or EXV is closed in cooling ● Lack of refrigerant ● Blocked refrigeration piping system ● Faulty outdoor PCB





EMIDUCTLESS.COM

THANK YOU

FOR YOUR ATTENTION

Strategic Partners:

