



Service Manual

VERSATI V Monobloc Type Air-to-water Heat Pump



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1 Product Data

1.1 Lineup

Series	Model	Product Code	Cooling Capacity (kW)	Heating Capacity (kW)	Power Supply	Refrigerant	Image
VERSATI IV	GRS-CQ8.0Pd/ NpG4-E	ER01002880	8.3	8.4	230VAC, 1Ph, 50Hz	R290 R290	
	GRS-CQ10Pd/ NpG4-E	ER01002850	10	10			
	GRS-CQ12Pd/ NpG4-E	ER01003170	12	12			
	GRS-CQ14Pd/ NpG4-E	ER01003250	14	14			

1.2 Nomenclature

G	RS	-	C	Q	14	Pd	/	Np	G4	-	M
1	2		3	4	5	6		7	8		9

NO.	Description	Options
1	GREE	G-GREE Air to water heat pump
2	Heat Pump Water Heater	RS
3	Heating Mode	S= Static; C=Circulating
4	Function	Q=Multi-function; Omitted=Single-function
5	Nominal Heating Capacity	4.0=4.0kW; 6.0=6.0kW; 8.0=8.0kW;10=10kW; 12=12kW; 14=14kW; 16=16kW
6	Compressor Type	Pd=DC Inverter; Default=On/Off
7	Refrigerant	Np=R290
8	Design Serial Number	G3,G4, G4 series is the same with G3 series but without the electric heater.
9	Power Supply	E/M: 230/400V,~,50Hz; E1/M1: 230/400V,3N~,50Hz (dual fan)

1.3 Product Features

1.3.1 General

It's a kind of integrated DC inverter unit that can provide cooling, heating and water heating functions, and can reach an energy efficiency of COP up to 5.2. It adopts R290 refrigerant and single-stage compressor. For heating, ambient temperature range is -25~35°C while the leaving water temperature range is 20~80°C.

The Versati V unit is designed specially for the European market where there is a demand for high-temperature water. The whole series of products strictly comply with EN14511, EUROVENT energy efficiency Class A and SCOP class A+++ (35°C), SCOP class A++ (55°C) with EN14825. The units can realize space heating and sanitary hot water supply through terminal units, like the fan coil unit, floor coil and radiator. Environment-friendly refrigerant

R290 is adopted for the unit, with ODP of 0 and quite low GWP (=3). Besides, the adopted heat pump technologies will reduce consumption of coal and other energy source and lower greatly CO₂ emission. Ranged from 4.0kW~18kW, it is widely applicable to small and medium-sized apartment, large-sized villa etc.

1.3.2 Features

- ◆ Wide Operation Range

Heating: -25~35°C; Cooling: -15~48°C; Water Heating: -25~45°C

- ◆ Unique Low Ambient Single-stage Compressor

(1) It is a compressor special for refrigerant R290 and under the protection of IP55.

- ◆ High-efficiency Component(Inverter pump, Inverter fan, Plate heat exchanger)

(1) The A-class high-efficiency inverter water pump which complies with the European ErP directive, can control the running frequency based on the actual load. Therefore, it can enhance the operation efficiency and control the water temperature more accurately.

(2) The DC inverter fan can control the air volume accurately and make the system run more stably and save more energy.

(3) It uses the plate-type heat exchanger special for refrigerant R290, which is bearable for 22Mpa pressure and will greatly improve the performance of the unit.



(4) It uses the water pump with explosion-proof design for electrical devices and real-time flow feedback, which will greatly improve the performance of the unit.



(5) It uses the micro-bubble processor special for refrigerant R290, which can quickly detect leakage so as to ensure the safety of the unit.

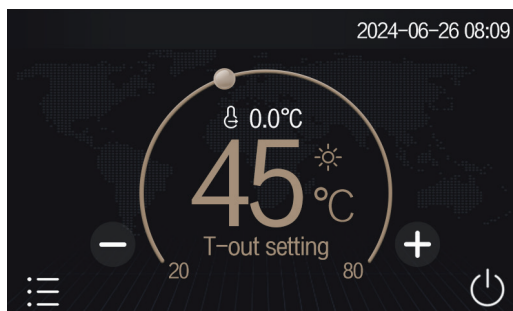
- ◆ All-in-one Design

(1) The unit can integrate with terminal units, like the radiator, floor heating device, FCU, water heating device, solar kit, gas furnace etc. Versatile functions can meet various kinds of demands from different users and enhance applicability of this product.

(2) The all-in-one structure design can save more installation cost, reduce risks of refrigerant leak, and improve safety and reliability of the system.

◆ Brand-new Controller

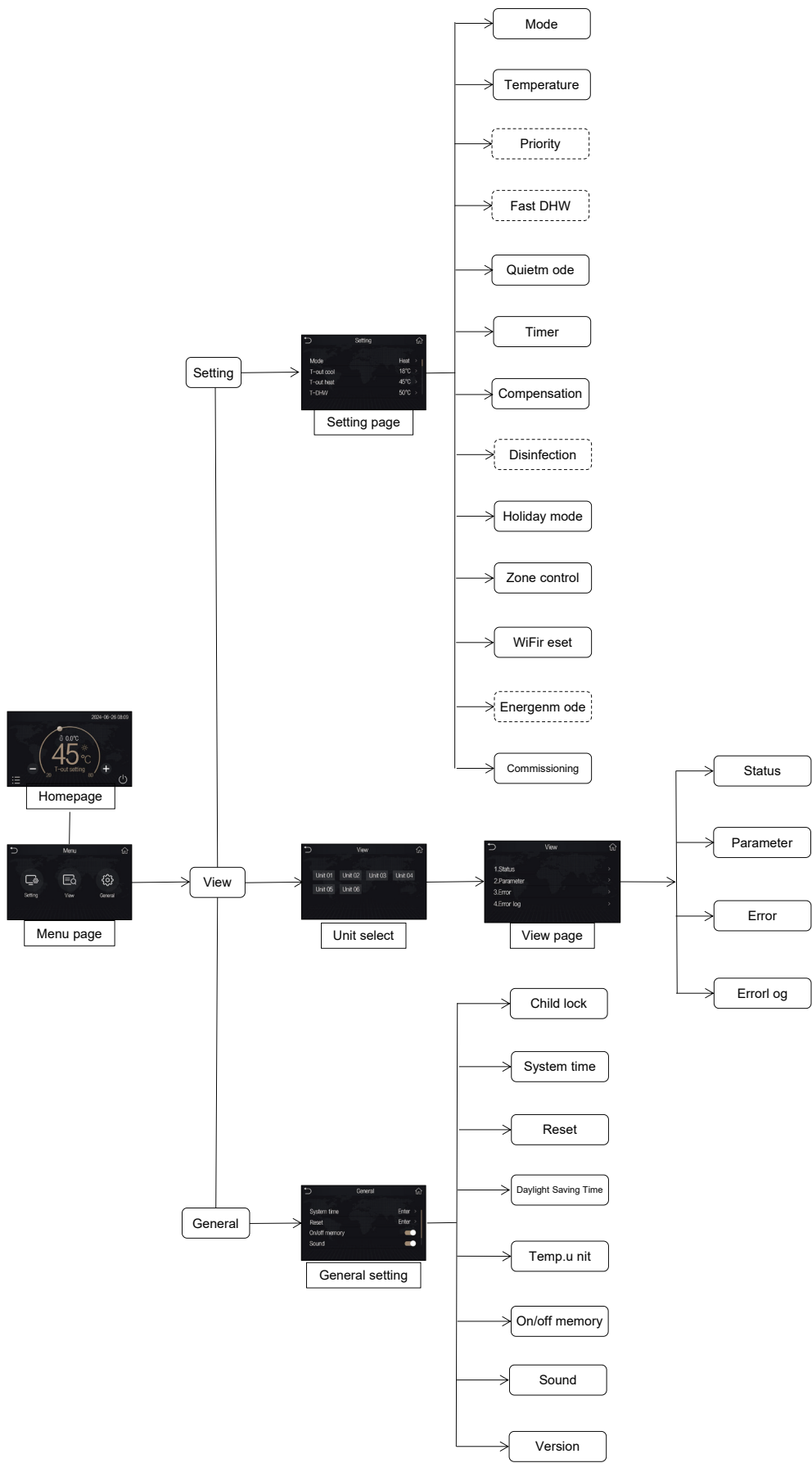
- (1) Exquisite design, and the wall-mounted design that facilitates installation.
- (2) Liquid crystal display and touch-screen operation.
- (3) The 12V JACK interface can supply power to the control separately and lengthen the communication distance.
- (4) The remote monitoring interface can monitor the unit through the Modbus interface and be integrated into the BMS system.



◆ Smart Control, Powerful Function

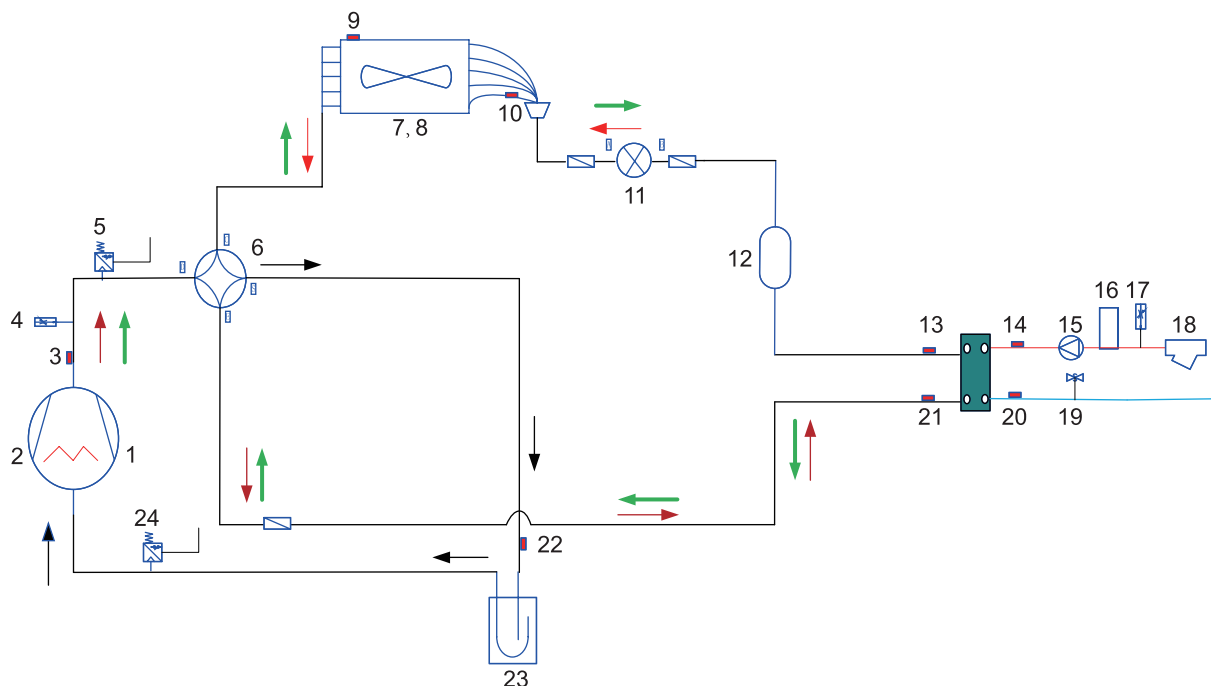
- (1) The operating mode can be switched freely. Furthermore, based on different demands, the holiday mode, weather-dependent mode, quiet timer, temperature timer and floor commissioning can be activated.
- (2) Multiple protections can make this product much safer. The added electric heater will prevent the plate heat exchanger from being frosted owing to too low water temperature and resultantly extend the service life of the product and enhance its safety and reliability.
- (3) The newly developed smart defrosting control program, can intelligently defrost when it is actually needed and thus ensure a sustainable heat supply for users.

See the flowchart to how to set parameters. At the menu page, by touching "Commission" for 5 seconds, a window will pop up requiring to set the password, otherwise you are not allowed to enter the commissioning parameter page. The password then can be modified, but please remember it as several incorrect input will incur password protection for at most half an hour.



1.4 Operating Principle

1.4.1 Schematic Diagram



Item	Description	Item	Description
1	Compressor	13	Liquid line temperature bulb
2	Electric heater for the compressor	14	Water inlet temperature bulb
3	Discharge temperature sensor	15	Water pump
4	High pressure switch	16	Expansion tank
5	High pressure sensor	17	Flow switch
6	4-way valve	18	Filter
7	Finned heat exchanger	19	Micro air bubble processor
8	Electric heater for the base	20	Water outlet temperature bulb
9	Ambient temperature sensor	21	Gas line temperature bulb
10	Defrosting sensor	22	Suction temperature bulb
11	Electronic expansion valve	23	Gas-liquid separator
12	Refrigerant receiver	24	Low pressure sensor

Notes:

- (a) it is the system schematic diagram. The manufacturer is committed to continuously improving this product to ensure the highest quality and reliability standards and to meet local regulations and market requirements. All features and specifications are subject to change without prior notice.
- (b) Water mixing accessories are optional parts. When they are required, please contact the manufacturer. The diagram above is just for reference and actual installation depends on the project's field. Buffer tank specifications should be calculated based on 8-10L/KW.

1.5 Technical Data

1.5.1 Parameter List

Model			GRS-CQ8.0Pd/ NpG4-E	GRS-CQ10Pd/ NpG4-E	GRS-CQ12Pd/ NpG4-E	GRS-CQ14Pd/ NpG4-E
Product Code			ER01002880	ER01002850	ER01003170	ER01003250
Power Supply			230VAC, 50HZ	230VAC, 50HZ	230VAC,50Hz	230VAC,50Hz
Capacity*1	Cooling (floor cooling)	kW	8.3	10	12	14
	Heating (floor heating)	kW	8.4	10	12	14
Power Input*1	Cooling (floor cooling)	kW	1.60	2.08	2.61	3.26
	Heating (floor heating)	kW	1.68	2.11	2.42	2.98
EER*1(floor cooling)		w/w	5.2	4.8	4.6	4.3
COP*1(floor heating)		w/w	5	4.75	4.95	4.7
Capacity*2	Cooling (for fan coil)	kW	7.5	8.9	11.6	12.8
	Heating (fan coil or radiator)	kW	8.2	10	12	14
Power Input*2	Cooling (for fan coil)	kW	2.34	2.92	3.68	4.34
	Heating (fan coil or radiator)	kW	2.10	2.70	3.16	3.78
EER*1 (for fan coil)		w/w	3.2	3.05	3.15	2.95
COP*1 (fan coil or radiator)		w/w	3.9	3.7	3.8	3.7
Sound Pressure Level	Cooling	dB(A)	52	53.5	55	56
	Heating	dB(A)	52	53.5	55	56
Outdoor Dimensions (W×D×H)	Outline	mm	1210×450×880	1210×450×880	1210×450×880	1210×450×880
	Packaged	mm	1323×528×900	1323×528×900	1323×528×900	1323×528×900
Net weight/ Gross weight	Outdoor	Kg	124/141	124/141	138/155	138/155
Refrigerant Charge Volume		kg	1	1	1.2	1.2
Operating Temperature Range	Cooling	°C	-15~48			
	Heating	°C	-25~35			
	Water Heating	°C	-25~45			

1.5.2 Nominal Working Conditions

Item	Water Side		Heat Source/User Side	
	Entering Water Temp (°C)	Leaving Water Temp(°C)	Dry Bulb Temp (°C)	Wet Bulb Temp (°C)
FCU Cooling	12	7	35	—
FCU Heating	40	45	7	6
Floor Cooling	23	18	35	—
Floor Heating	30	35	7	6
Water Heating	53	-	7	6

1.5.3 Operation Range

Maximum and minimum water operating temperatures

Item	Minimum water operating temperatures	Maximum water operating temperatures
Cooling	5°C	25°C
Heating	20°C	80°C*
Water heating	40°C	80°C**

Maximum and minimum water operating pressures

Item	Minimum water operating pressures	Maximum water operating pressures
Cooling	0.05MPa	0.25MPa
Heating		
Water heating		

Maximum and minimum entering water pressures

Item	Minimum entering water pressures	Maximum entering water pressures
Cooling	0.05MPa	0.25MPa
Heating		
Water heating		

*: The leaving water temperature varies at different environment. 80°C is the highest leaving water temperature at -7~5°C ambient temperature.

** : When the electric heater for the water tank prepared by the user themselves has been activated, the leaving water temperature can go up to 80°C.

1.5.4 Temperature sensor parameter

Displayed Name	Inspection range(°C)	Nominal working datas			Remark
		Cooling	Heating	Hot water	
T-outdoor	-30~150	8~50	-27~37	-27~45	temperature sensor resistance 15K
T-suction	-30~150	5~30	-25~20	-25~30	temperature sensor resistance 20K
T-discharge	-30~150	30~102	35~102	35~102	temperature sensor resistance 50K
T-defrost	-30~150	20~57	-25~30	-25~40	temperature sensor resistance 20K
T-water in PE	-30~150	10~30	20~55	20~55	temperature sensor resistance 20K
T-water out PE	-30~150	5~25	25~60	25~60	temperature sensor resistance 20K
T-optional water Sen.	-30~150	5~25	25~60	25~60	temperature sensor resistance 50K
T-tank ctrl.	-30~150	/	/	10~80	temperature sensor resistance 50K
T-floor debug	-30~150	/	25~45	/	/
Debug time	-30~150	/	12~72	/	/
T-liquid pipe	-30~150	5~25	20~57	20~57	temperature sensor resistance 20K
T-gas pipe	-30~150	30~102	35~102	35~102	temperature sensor resistance 20K
T-remote room	-30~150	18~30	18~30	18~30	/
Dis. Pressure	-40~70	25~60	25~62	25~62	/
T-weather depend	-30~150	7~25	25~60	/	based on calculation

1.5.5 Electric Data

Power cable specifications and Leakage switch types in the following list are recommended.

Model	Power Supply	Power Supply Air Break Switch	Air Break Switch (Electric heater)	Minimum Section Area of Earth Wire	Minimum Section Area of Earth Wire (Electric heater)	Minimum Section Area of Power Wire	Minimum Section Area of Power Wire (Electric heater)
	V,Ph, Hz	A	A	mm ²	mm ²	mm ²	mm ²
GRS-CQ8.0Pd/NpG4-E	230VAC, 1Ph,50Hz	25	/	4	/	4	/
GRS-CQ10Pd/NpG4-E	230VAC, 1Ph,50Hz	25	/	4	/	4	/
GRS-CQ12Pd/NpG4-E	230VAC, 1Ph,50Hz	40	/	6	/	6	/
GRS-CQ14Pd/NpG4-E	230VAC, 1Ph,50Hz	40	/	6	/	6	/

Notes

- Leakage Switch is necessary for additional installation. If circuit breakers with leakage protection are in use, action response time must be less than 0.1 second, leakage circuit must be 30mA.
- The above selected power cable diameters are determined based on assumption of distance from the distribution cabinet to the unit less than 75m. If cables are laid out in a distance of 75m to 150m, diameter of power cable must be increased to a further grade.
- The power supply must be of rated voltage of the unit and special electrical line for air-conditioning.
- All electrical installation shall be carried out by professional technicians in accordance with the local laws and regulations.
- Ensure safe grounding and the grounding wire shall be connected with the special grounding equipment of the building and must be installed by professional technicians.
- The specifications of the breaker and power cable listed in the table above are determined based on the maximum power (maximum amps) of the unit.

- (g) The specifications of the power cable listed in the table above are applied to the conduit-guarded multi-wire copper cable (like, YJV XLPE insulated power cable) used at 40°C and resistible to 90°C (see IEC 60364-5-52). If the working condition changes, they should be modified according to the related national standard.
- (h) The specifications of the breaker listed in the table above are applied to the breaker with the working temperature at 40°C. If the working condition changes, they should be modified according to the related national standard.
- (i) A circuit breaker must be added to the fixed line. The circuit breaker is all-pole disconnected and the breaking distance of the contact is at least 3mm.
- (j) Selected power cables should comply with relevant CE standards.
- (k) Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc. Ensure that apparatus is mounted securely. Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

1.5.6 Capacity Correction

Actual cooling capacity = nominal cooling capacity x cooling capacity correction coefficient.

Actual heating capacity = nominal heating capacity x heating capacity correction coefficient.

[illegible]

Heating Capacity Correction_10																
Outflow water(°C)	Ambient Temp.(°C)															
	-25				-20				-15				-10			
	Capacity	Power	COP	Capacity	Capacity	Power	COP	Capacity	Capacity	Power	COP	Capacity	Capacity	Power	COP	Capacity
25	max	4.59	2.49	1.84	4.91	2.06	2.38	5.88	2.17	2.71	7.57	2.41	3.14	8.21	2.37	3.47
	norm	4.38	2.33	1.88	4.69	1.93	2.43	5.61	2.03	2.76	7.23	2.25	3.21	7.84	2.22	3.54
	min	1.90	0.82	2.30	2.03	0.68	2.98	2.43	0.72	3.39	3.13	0.80	3.93	3.39	0.78	4.33
30	max	4.64	2.74	1.69	4.96	2.27	2.19	5.94	2.39	2.49	7.65	2.65	2.88	8.30	2.61	3.18
	norm	4.43	2.57	1.73	4.74	2.12	2.23	5.66	2.23	2.54	7.30	2.48	2.94	7.92	2.44	3.25
	min	1.92	0.91	2.11	2.05	0.75	2.74	2.45	0.79	3.11	3.16	0.88	3.61	3.43	0.86	3.98
35	max	4.69	3.10	1.51	5.01	2.57	1.95	6.00	2.70	2.22	7.73	3.00	2.63	8.38	2.95	2.84
	norm	4.47	2.90	1.54	4.78	2.40	1.99	5.72	2.53	2.27	7.37	2.81	2.58	8.00	2.86	2.80
	min	1.94	1.03	1.89	2.07	0.85	2.44	2.48	0.89	2.78	3.19	0.99	3.22	3.46	0.97	3.55
40	max	4.69	3.53	1.33	5.01	2.92	1.72	6.00	3.07	1.95	7.73	3.41	2.27	8.38	3.35	2.50
	norm	4.47	3.30	1.36	4.78	2.73	1.75	5.72	2.87	1.99	7.37	3.19	2.31	8.00	3.13	2.55
	min	1.94	1.17	1.66	2.07	0.96	2.15	2.48	1.01	2.44	3.19	1.13	2.83	3.46	1.11	3.13
45	max	4.69	3.88	1.21	5.01	3.21	1.56	6.00	3.38	1.78	7.73	3.75	2.06	8.38	3.69	2.27
	norm	4.47	3.63	1.23	4.78	3.00	1.59	5.72	3.16	1.81	7.37	3.51	2.10	8.00	3.48	2.30
	min	1.94	1.28	1.51	2.07	1.06	1.95	2.48	1.11	2.22	3.19	1.24	2.58	3.46	1.22	2.84
50	max	4.59	4.00	1.15	4.91	3.31	1.48	5.88	3.48	1.69	7.57	3.87	1.96	8.21	3.80	2.12
	norm	4.38	3.74	1.17	4.69	3.09	1.51	5.61	3.26	1.72	7.23	3.62	2.00	7.84	3.56	2.20
	min	1.90	1.32	1.43	2.03	1.09	1.86	2.43	1.15	2.11	3.13	1.28	2.45	3.39	1.26	2.70
55	max	/	/	/	/	4.36	3.10	1.41	5.22	3.26	1.60	6.72	1.85	7.29	3.56	2.05
	norm	/	/	/	/	4.16	2.90	1.44	4.98	3.05	1.63	6.42	1.89	7.00	3.33	2.10
	min	/	/	/	/	1.80	1.02	1.76	2.15	1.08	2.00	2.78	2.32	3.01	1.18	2.56
60	max	/	/	/	/	/	/	/	4.92	3.88	1.27	6.34	1.44	7.21	4.53	1.59
	norm	/	/	/	/	/	/	/	4.68	3.64	1.27	6.08	1.47	6.88	4.24	1.62
	min	/	/	/	/	/	/	/	2.10	1.52	1.39	2.71	1.68	2.94	1.66	1.78
65	max	/	/	/	/	/	/	/	2.13	1.37	1.55	2.74	1.80	2.98	1.50	1.99
	norm	/	/	/	/	/	/	/	2.10	1.34	1.52	2.71	1.77	2.94	1.47	1.96
	min	/	/	/	/	/	/	/	1.11	0.57	1.11	1.67	1.31	1.60	0.49	1.45
70	max	/	/	/	/	/	/	/	4.86	4.29	1.13	6.27	1.31	6.80	4.69	1.45
	norm	/	/	/	/	/	/	/	4.62	4.05	1.13	6.03	1.31	6.56	4.43	1.45
	min	/	/	/	/	/	/	/	2.10	1.52	1.39	2.71	1.68	2.94	1.66	1.78
75	max	/	/	/	/	/	/	/	2.10	1.52	1.39	2.71	1.68	2.94	1.66	1.78
	norm	/	/	/	/	/	/	/	2.10	1.52	1.39	2.71	1.68	2.94	1.66	1.78
	min	/	/	/	/	/	/	/	2.10	1.52	1.39	2.71	1.68	2.94	1.66	1.78
80	max	/	/	/	/	/	/	/	2.10	1.52	1.39	2.71	1.68	2.94	1.66	1.78
	norm	/	/	/	/	/	/	/	2.10	1.52	1.39	2.71	1.68	2.94	1.66	1.78
	min	/	/	/	/	/	/	/	2.10	1.52	1.39	2.71	1.68	2.94	1.66	1.78

Heating Capacity Correction_12																																											
Ambient Temp. (°C)																																											
			-25			-20			-15			-10			-7			-2			7			10			15			20			25			30			35				
Capacity level			Capacity	Power	COP	Capacity	Power	COP	Capacity	Power	COP	Capacity	Power	COP	Capacity	Power	COP	Capacity	Power	COP	Capacity	Power	COP	Capacity	Power	COP	Capacity	Power	COP	Capacity	Power	COP	Capacity	Power	COP								
25	max	6.19	3.25	1.90	6.63	3.03	2.18	7.92	3.14	2.52	9.65	3.25	2.97	11.08	3.35	3.30	11.13	2.86	3.89	11.27	2.61	4.31	12.94	2.23	5.81	13.19	2.22	5.95	13.41	2.12	6.34	13.76	2.09	6.58	12.15	1.67	7.27	12.35	1.63	7.58	12.54	1.59	7.90
	norm	5.48	2.78	1.97	5.86	2.59	2.26	7.01	2.69	2.61	8.54	2.78	3.07	9.80	2.87	3.42	10.19	2.57	3.97	10.32	2.34	4.40	11.76	1.95	6.04	12.00	1.94	6.19	12.85	2.01	6.40	13.18	1.98	6.64	11.91	1.63	7.32	12.10	1.58	7.64	12.29	1.54	7.96
	min	2.74	1.20	2.28	2.93	1.12	2.62	3.50	1.16	3.02	4.27	1.20	3.56	4.90	1.24	3.96	5.10	1.11	4.60	5.16	1.01	5.10	6.37	0.95	6.71	6.50	0.94	6.88	7.33	1.03	7.11	7.52	1.02	7.38	7.90	1.02	7.72	8.03	1.00	8.05	8.15	0.97	8.39
	max	6.26	3.58	1.75	6.69	3.34	2.00	8.00	3.46	2.31	9.75	3.58	2.72	11.19	3.69	3.03	11.25	3.15	3.57	11.39	2.88	3.96	13.07	2.45	5.46	13.33	2.44	5.46	13.55	2.33	5.82	13.90	2.30	6.04	12.28	1.84	6.67	12.47	1.79	6.96	12.67	1.75	7.25
	norm	5.53	3.06	1.81	5.92	2.85	2.07	7.08	2.96	2.39	8.62	3.06	2.82	9.90	3.15	3.14	10.20	2.83	3.64	10.42	2.58	4.04	11.88	2.14	5.54	12.12	2.13	5.68	12.98	2.21	5.88	13.32	2.18	6.10	12.03	1.79	6.72	12.22	1.74	7.02	12.42	1.70	7.31
30	min	2.77	1.32	2.09	2.96	1.23	2.40	3.54	1.28	2.77	4.84	1.32	3.26	4.95	1.36	3.63	5.15	1.22	4.22	5.21	1.11	4.68	6.44	1.04	6.16	6.56	1.04	6.31	7.40	1.13	6.53	7.59	1.12	6.78	7.98	1.13	7.08	8.11	1.10	7.39	8.24	1.07	7.70
	max	6.32	4.05	1.56	6.76	3.78	1.79	8.09	3.91	2.07	9.85	4.05	2.43	11.30	4.17	2.71	11.36	3.57	3.79	11.50	3.25	3.53	13.20	2.77	4.76	13.46	2.76	4.88	13.69	2.63	5.19	14.04	2.61	5.39	12.40	2.08	5.96	12.60	2.03	6.22	12.80	1.98	6.48
	norm	5.59	3.46	1.62	5.98	3.23	1.85	7.15	3.35	2.14	8.71	3.46	2.52	10.00	3.57	2.80	10.40	3.20	3.25	10.53	2.92	3.62	12.00	2.42	4.95	12.24	2.41	5.07	13.11	2.50	5.25	13.45	2.47	5.45	12.15	2.02	6.00	12.35	1.97	6.26	12.54	1.92	6.53
	min	2.80	1.49	1.87	2.99	1.39	2.15	3.58	1.44	2.48	4.36	1.49	2.92	5.00	1.54	3.25	5.20	1.38	3.77	5.27	1.26	4.18	6.50	1.18	5.50	6.63	1.18	5.64	7.48	1.28	5.83	7.67	1.27	6.05	8.06	1.27	6.33	8.19	1.24	6.60	8.32	1.21	6.88
	max	6.32	4.60	1.37	6.76	4.29	1.58	8.09	4.45	1.82	9.85	4.60	2.14	11.30																													

Heating Capacity Correction_14												
Outflow water(°C)	Ambient Temp.(°C)											
	-25			-20			-15			-10		
	Capacity	Power	COP	Capacity	Power	COP	Capacity	Power	COP	Capacity	Power	COP
25	max	6.95	3.81	1.83	7.44	3.46	2.15	8.89	3.60	2.47	11.14	3.84
	norm	6.30	3.38	1.87	6.74	3.07	2.20	8.06	3.19	2.53	10.09	3.41
	min	2.74	1.20	2.28	2.93	1.09	2.68	3.50	1.14	3.09	4.39	1.21
30	max	7.02	4.19	1.68	7.51	3.81	1.97	8.98	3.96	2.27	11.25	4.23
	norm	6.36	3.71	1.71	6.81	3.38	2.02	8.14	3.51	2.32	10.20	3.75
	min	2.77	1.32	2.09	2.96	1.20	2.46	3.54	1.25	2.83	4.43	1.33
35	max	7.10	4.74	1.50	7.59	4.31	1.76	9.08	4.48	2.02	11.37	4.78
	norm	6.43	4.20	1.53	6.88	3.82	1.80	8.22	3.97	2.07	10.30	4.24
	min	2.80	1.49	1.87	2.99	1.36	2.20	3.58	1.41	2.53	4.48	1.51
40	max	7.10	5.39	1.32	7.59	4.90	1.55	9.08	5.10	1.78	11.37	5.44
	norm	6.43	4.77	1.35	6.88	4.34	1.58	8.22	4.51	1.82	10.30	4.82
	min	2.80	1.70	1.65	2.99	1.54	1.94	3.58	1.61	2.23	4.48	1.71
45	max	7.10	6.02	1.18	7.59	5.47	1.39	9.08	5.69	1.59	11.37	6.07
	norm	6.43	5.33	1.21	6.88	4.85	1.42	8.22	5.04	1.63	10.30	5.38
	min	2.80	1.90	1.47	2.99	1.72	1.73	3.58	1.79	1.99	4.48	1.91
50	max	7.10	6.24	1.14	7.59	5.67	1.34	9.08	5.90	1.54	11.37	6.30
	norm	6.43	5.53	1.16	6.88	5.03	1.37	8.22	5.23	1.57	10.30	5.58
	min	2.80	1.97	1.42	2.99	1.79	1.67	3.58	1.86	1.92	4.48	1.98
55	max	/	/	/	/	/	/	/	/	/	/	/
	norm	/	/	/	/	/	/	/	/	/	/	/
	min	/	/	/	/	/	/	/	/	/	/	/
60	max	/	/	/	/	/	/	/	/	/	/	/
	norm	/	/	/	/	/	/	/	/	/	/	/
	min	/	/	/	/	/	/	/	/	/	/	/
65	max	/	/	/	/	/	/	/	/	/	/	/
	norm	/	/	/	/	/	/	/	/	/	/	/
	min	/	/	/	/	/	/	/	/	/	/	/
70	max	/	/	/	/	/	/	/	/	/	/	/
	norm	/	/	/	/	/	/	/	/	/	/	/
	min	/	/	/	/	/	/	/	/	/	/	/
75	max	/	/	/	/	/	/	/	/	/	/	/
	norm	/	/	/	/	/	/	/	/	/	/	/
	min	/	/	/	/	/	/	/	/	/	/	/
80	max	/	/	/	/	/	/	/	/	/	/	/
	norm	/	/	/	/	/	/	/	/	/	/	/
	min	/	/	/	/	/	/	/	/	/	/	/

Cooling Capacity Correction_8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
Capacity level		Ambient Temp.(°C)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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		Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity	Power	EER	Capacity

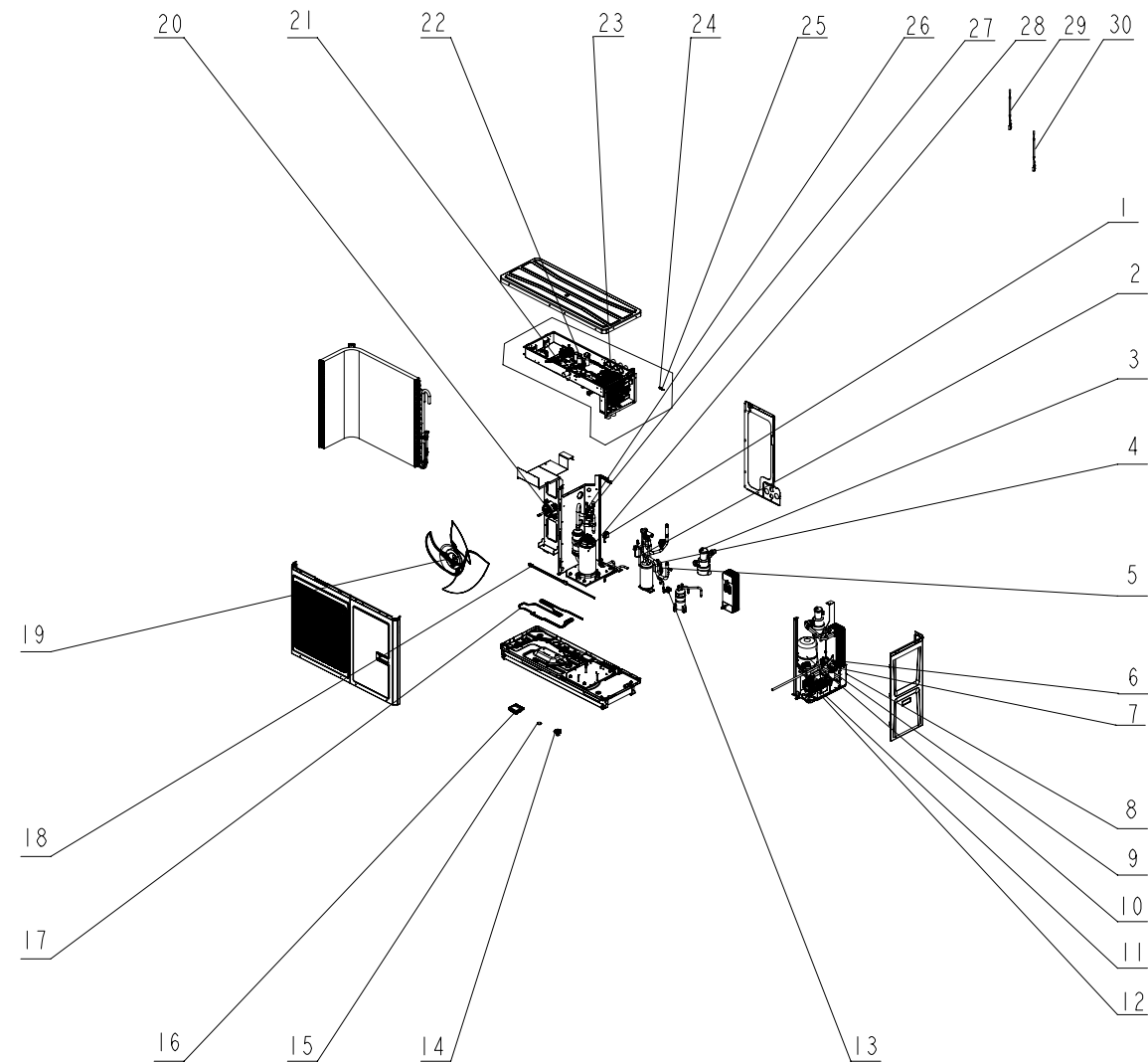
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Cooling Capacity Correction_12										Ambient Temp. (°C)																																						
		-15			-10			-5			0			5			10			15			20			25			30			35			40			45			48							
Outflow water(°C)	Capacity level	EER	Power	Capacity	EER	Power	Capacity	EER	Power	Capacity	EER	Power	Capacity	EER	Power	Capacity	EER	Power	Capacity	EER	Power	Capacity	EER	Power	Capacity	EER	Power	Capacity	EER	Power	Capacity	EER	Power	Capacity														
		max	5.33	0.84	6.32	5.25	0.75	7.04	5.17	0.67	7.76	4.84	0.61	7.94	5.13	0.79	6.48	11.88	1.90	6.24	11.31	2.01	5.63	10.83	2.15	5.05	11.23	2.61	4.30	10.71	2.84	3.77	11.60	3.68	3.15	8.56	2.98	2.87	6.89	2.99	2.30	6.31	3.37	1.87				
7	norm	5.07	0.79	6.39	4.99	0.70	7.12	4.91	0.63	7.85	4.60	0.57	8.03	4.90	0.75	6.57	11.38	1.80	6.31	10.83	1.90	5.69	10.37	2.03	5.11	11.02	2.53	4.35	10.11	2.75	3.82	11.60	3.68	3.15	8.56	2.98	2.87	6.89	2.99	2.30	6.31	3.37	1.87					
	min	3.90	0.57	6.90	3.84	0.50	7.68	3.78	0.45	8.47	3.54	0.41	8.67	3.42	0.47	7.29	7.50	1.04	7.21	7.14	1.10	6.50	6.84	1.17	5.11	6.83	4.26	5.16	6.18	1.36	4.53	6.00	1.52	3.94	5.52	1.69	3.27	5.04	2.00	2.52	4.62	2.25	2.05					
	max	5.38	0.80	6.76	5.30	0.70	7.53	5.22	0.63	8.30	4.89	0.58	8.50	5.18	0.75	6.93	11.99	1.80	6.68	11.42	1.90	6.02	10.94	2.03	5.40	11.34	2.47	4.60	10.82	2.68	4.04	11.72	3.48	3.37	8.64	2.81	3.07	6.96	2.82	2.47	6.38	3.18	2.00					
8	norm	5.12	0.75	6.83	5.04	0.66	7.62	4.96	0.59	8.40	4.65	0.54	8.59	4.95	0.70	7.03	11.49	1.70	6.76	10.94	1.80	6.09	10.48	1.92	5.46	11.13	2.39	4.65	10.61	2.60	4.09	11.72	3.48	3.37	8.64	2.81	3.07	6.82	2.65	2.50	6.07	2.99	2.03					
	min	3.94	0.53	7.38	3.88	0.47	8.22	3.82	0.42	9.06	3.58	0.39	9.27	3.45	0.44	7.80	7.58	0.98	7.71	7.21	1.04	6.96	6.91	1.11	6.24	6.54	1.19	5.52	6.24	1.29	4.85	6.06	1.44	4.22	5.58	1.59	3.50	5.09	1.89	2.70	4.67	2.13	2.19					
	max	5.41	0.75	7.20	5.33	0.66	8.03	5.24	0.59	8.85	4.91	0.54	9.05	5.21	0.71	7.38	12.05	1.69	7.11	11.47	1.79	6.41	10.99	1.91	5.75	11.40	2.33	4.90	10.87	2.53	4.30	11.77	3.28	3.59	8.68	2.65	3.27	6.99	2.66	2.63	6.41	3.00	2.13					
9	norm	5.15	0.71	7.28	5.07	0.62	8.11	4.99	0.56	8.95	4.67	0.51	9.15	4.98	0.66	7.49	11.55	1.60	7.20	10.99	1.69	6.49	10.53	1.81	5.82	11.18	2.26	4.96	10.66	2.45	4.35	11.77	3.28	3.59	8.68	2.65	3.27	6.85	2.50	2.66	6.10	2.82	2.16					
	min	3.96	0.50	7.86	3.90	0.45	8.76	3.84	0.40	9.66	3.59	0.36	9.88	3.47	0.42	8.31	7.61	0.93	8.22	7.25	0.98	7.41	6.94	1.04	6.55	6.58	1.22	5.11	6.11	1.14	4.62	2.20	5.20	10.93	2.39	4.56	11.83	3.10	3.81	8.73	2.51	3.47	7.03	2.52	2.79	6.44	2.84	2.27
	max	5.44	0.71	7.64	5.35	0.63	8.52	5.27	0.56	9.39	4.93	0.51	9.61	5.23	0.67	7.83	12.11	1.60	7.55	11.53	1.69	6.81	11.05	1.81	6.11	11.46	2.20	5.20	10.93	2.39	4.56	11.83	3.10	3.81	8.73	2.51	3.47	7.03	2.52	2.79	6.44	2.84	2.27					
10	norm	5.17	0.67	7.73	5.09	0.59	8.61	5.01	0.53	9.50	4.69	0.48	9.72	5.00	0.63	7.95	11.60	1.52	7.64	11.05	1.60	6.89	10.58	1.71	6.18	11.24	2.14	5.26	10.72	2.32	4.62	11.83	3.10	3.81	8.73	2.51	3.47	6.88	2.36	2.83	6.13	2.67	2.30					
	min	3.98	0.48	8.34	3.92	0.42	9.30	3.86	0.38	10.25	3.61	0.34	10.49	3.49	0.40	8.82	7.65	0.88	8.72	7.28	0.93	7.87	6.98	0.99	7.06	6.61	1.06	6.25	6.30	1.15	5.48	6.12	1.28	4.77	5.63	1.42	3.96	5.14	1.68	3.05	4.71	1.90	2.48					
	max	5.46	0.70	7.77	5.38	0.62	8.66	5.30	0.55	9.55	4.96	0.51	9.77	5.26	0.66	7.96	12.17	1.59	7.68	11.59	1.67	6.92	11.10	1.79	6.21	11.51	2.18	5.29	10.98	2.37	4.64	11.89	3.07	3.87	8.77	2.48	3.53	7.06	2.49	2.83	6.47	2.81	2.30					
11	norm	5.20	0.66	7.86	5.12	0.58	8.75	5.04	0.52	9.65	4.72	0.48	9.88	5.02	0.62	8.08	11.66	1.50	7.77	11.10	1.59	7.00	10.63	1.69	6.28	11.29	2.11	5.35	10.77	2.29	4.70	11.89	3.07	3.87	8.77	2.48	3.53	6.72	2.34	2.87	6.16	2.64	2.33					
	min	4.00	0.47	8.48	3.94	0.42	9.45	3.87	0.37	10.42	3.63	0.34	10.66	3.51	0.39	8.97	7.69	0.87	8.87	7.32	0.90	7.00	7.01	0.98	7.17	6.64	1.05	6.35	6.33	1.14	5.57	6.15	1.27	4.85	5.66	1.41	4.02	5.17	1.67	3.10	4.74	1.88	2.52					
	max	5.47	0.69	7.90	5.39	0.61	8.80	5.31	0.55	9.70	4.97	0.50	9.93	5.27	0.65	8.09	12.20	1.56	7.80	11.61	1.65	7.03	11.12	1.76	6.31	11.54	2.15	5.37	11.00	2.33	4.72	11.91	3.03	3.94	8.79	2.45	3.59	7.07	2.46	2.88	6.48	2.77	2.34					
12	norm	5.21	0.65	7.98	5.13	0.58	8.90	5.05	0.51	9.81	4.73	0.47	10.04	5.03	0.61	8.21	11.68	1.48	7.89	11.12	1.56	7.12	10.65	1.67	6.38	11.31	2.08	5.44	10.79	2.26	4.77	11.91	3.03	3.94	8.79	2.45	3.59	6.73	2.30	2.92	6.17	2.60	2.37					
	min	4.01	0.46	8.62	3.94	0.41	9.60	3.88	0.37	10.59	3.64	0.34	10.84	3.51	0.39	9.11	7.70	0.85	9.01	7.33	0.90	8.13	7.02	0.96	7.29	6.65	1.03	6.45	6.35	1.12	5.66	6.16	1.25	4.93	5.67	1.39	4.09	5.18	1.64	3.15	4.74	1.85	2.56					
	max	5.48	0.67	8.21	5.40	0.59	9.15	5.32	0.53	10.09	4.98	0.48	10.32	5.28	0.63	8.42	12.22	1.51	8.11	11.63	1.59	7.31	11.14	1.70	6.56	11.56	2.07	5.59	11.02	2.25	4.90	11.94	2.91	4.10	8.80	2.36	3.73	7.09	2.37	3.00	6.50	2.67	2.43					
13	norm	5.22	0.63	8.30	5.14	0.56	9.25	5.06	0.50	10.20	4.74	0.45	10.44	5.04	0.59	8.54	11.70	1.43	8.21	11.14	1.51	7.40	10.67	1.61	6.64	11.34	2.00	5.65	10.81	2.18	4.96	11.94	2.91	4.10	8.80	2.36	3.73	7.14	2.22	3.04	6.18	2.50	2.47					
	min	4.01	0.45	8.96	3.95	0.40	9.99	3.89	0.35	11.01	3.64	0.32	11.27	3.52	0.37	9.48	7.72	0.82	9.37	7.35	0.87	8.45	7.04	0.93	7.58	6.67	0.99	6.71	6.36	1.08	5.89	6.17	1.21	5.12	5.68	1.34	4.25	5.19	1.58	3.28	4.75	1.78	2.66					
	max	5.50	0.64	8.53	5.41	0.57	9.50	5.33	0.51	10.48	4.99	0.47	10.72	5.29	0.61	8.74	12.24	1.45	8.42	11.66	1.53	7.60	11.17	1.64	6.81	11.58	2.00	5.80	11.04	2.17	5.09	11.96	2.81	4.25	8.82	2.28	3.88	7.10	2.28	3.11	6.51	2.58	2.53					
14	norm	5.23	0.61	8.62	5.15	0.54	9.61	5.07	0.48	10.59	4.74	0.44	10.84	5.05	0.57	8.87	11.73	1.38	8.52	11.16	1.45	7.68	10.70	1.55	6.89	11.36	1.93	5.87	10.83	2.10	5.15	11.96	2.81	4.25	8.82	2.28	3.88	6.76	2.14	3.15	6.19	2.42	2.56					
	min	4.02	0.43	9.31	3.96	0.38	10.37	3.90	0.34	11.44	3.65	0.31	11.70	3.53	0.36	9.84	7.73	0.79	9.73	7.36	0.84	8.78	7.05	0.90	7.87	6.68	0.96	6.97	6.37	1.04	6.12	6.19	1.16	5.32	5.69	1.29	4.41	5.20	1.53	3.40	4.76	1.72	2.77					
	max	5.51	0.62	8.91	5.42	0.55	9.93	5.34	0.49	10.94	5.00	0.45	11.20	5.30	0.58	9.13	12.27	1.39	8.80	11.68	1.47	7.93	11.19	1.57	7.12	11.62	1.92	6.06	11.07	2.08	5.32	11.98	2.70	4.44	8.84	2.18	4.05	6.77	2.19	3.25	6.52	2.42	2.68					
15	norm	5.24	0.58	9.01	5.16	0.51	10.04	5.08	0.46	11.06	4.75	0.42	11.32	5.06	0.55	9.26	11.75	1.32	8.90	11.19	1.39	8.03	10.72	1.49	7.20	11.38	1.86	6.13	10.85	2.02	5.38	11.98	2.70	4.44	8.84	2.18	4.05	6.77	2.05	3.29	6.20	2.32	2.68					
	min	4.03	0.41	9.72	3.97	0.37	10.83	3.90	0.33	11.94	3.66	0.30	12.22	3.53	0.34	10.28	7.75	0.76	10.17	7.38	0.80	9.17	7.07	0.86	8.22	6.69	0.92	7.28	6.38	1.00	6.39	6.20	1.12	5.56	5.74	1.24	4.61	5.21	1.46	3.56	4.77	1.65	2.89					
	max	5.51	0.60	9.22	5.43	0.53	10.28	5.34.																																								

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1.6 Exploded Views and Part Lists

(1) GRS-CQ8.0Pd/NpG4-E, GRS-CQ10Pd/NpG4-E

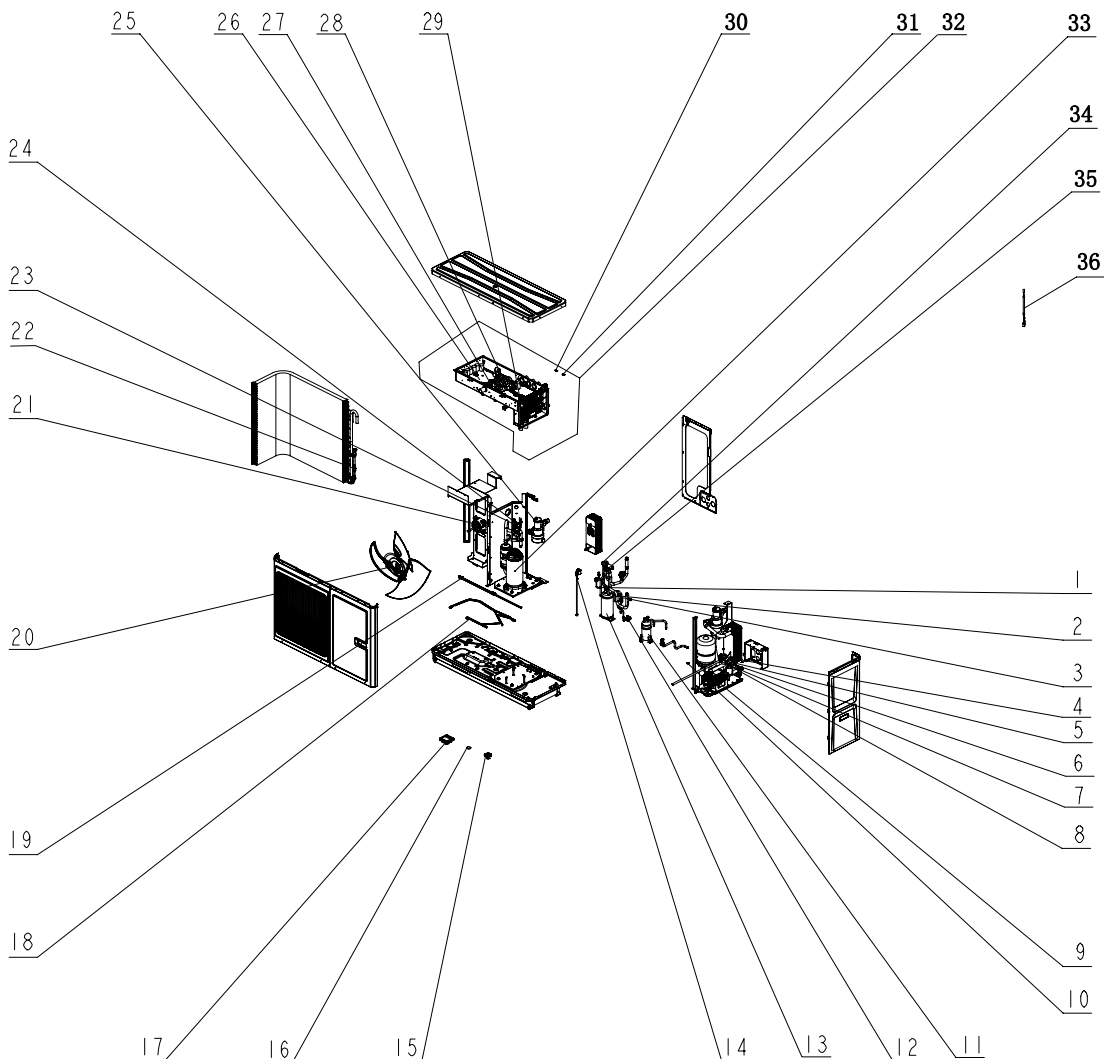


Parts List of GRS-CQ8.0Pd/NpG4-E, GRS-CQ10Pd/NpG4-E

No.	Name	Quantity
1	Electric Expand Valve Fitting	1
2	High Pressure Switch	1
3	Micro-bubble air Vent	1
4	Electronic Expansion Valve	1
5	Strainer	1
6	Relief Valve	1
7	Drainage Pipe Sub-assy	1
8	Water Pipe Connector	2
9	Steam current Switch sub- Assy	1
10	Expansion Drum	1
11	Gasket	1
12	Water Pump	1
13	Cut-off valve 1/4(N)	1
14	Drainage Joint	1

No.	Name	Quantity
15	Drainage hole Cap	1
16	Display Board	1
17	Electrical Heater	1
18	Electrical Heater(Compressor)	1
19	Axial Flow Fan	1
20	Brushless DC Motor	1
21	Drive Board	1
22	Main Board	1
23	Main Board	1
24	Jumper	1
25	Jumper	1
26	Pressure Sensor	1
27	Pressure Sensor	1
28	Compressor and Fittings	1
29	Temperature Sensor	1
30	Temperature Sensor	1

(2) GRS-CQ12Pd/NpG4-E, GRS-CQ14Pd/NpG4-E



Parts List of GRS-CQ8.0Pd/NpG4-E, GRS-CQ10Pd/NpG4-E

No.	Name	Quantity
1	High Pressure Switch	46025201
2	Electronic Expansion Valve	072009060040
3	Strainer	0721212101
4	Expansion Drum	035124000005
5	Relief Valve	07382814
6	Water Pipe Connector	06652839
7	Drainage Pipe Sub-assy	0436289501
8	Steam current Switch sub-Assy	45028062
9	Water Pump	812007060064
10	Gasket	760048000008
11	Bidirection Accumulator	07228741
12	Cut-off valve 1/4(N)	07130208
13	Gas-liquid Separator	035027060029
14	Electric Expand Valve Fitting	4304413236
15	Drainage Joint	200038000012
16	Drainage hole Cap	06813401
17	Display Board	300001061606
18	Electrical Heater	765100049
19	Electrical Heater(Compressor)	7651521242
20	Axial Flow Fan	1043410000802
21	Brushless DC Motor	15010406001306
22	Strainer	0721520101
23	Pressure Sensor	322101002
24	Pressure Sensor	43004406000303
25	Micro-bubble Air Vent	071013000009
26	Drive Board	300078060467
27	Filter Board	300020060091
28	Main Board	300027064200
29	Main Board	300002064345
30	Jumper	4202021908
31	Jumper	4202021901
32	Electric Box Assy	100002083659
33	Compressor and Fittings	009001061207
34	4-Way Valve	43000338
35	4 Way Valve Coil	4300040095
36	Temperature Sensor	3900028316G

1.7 Supply Scope

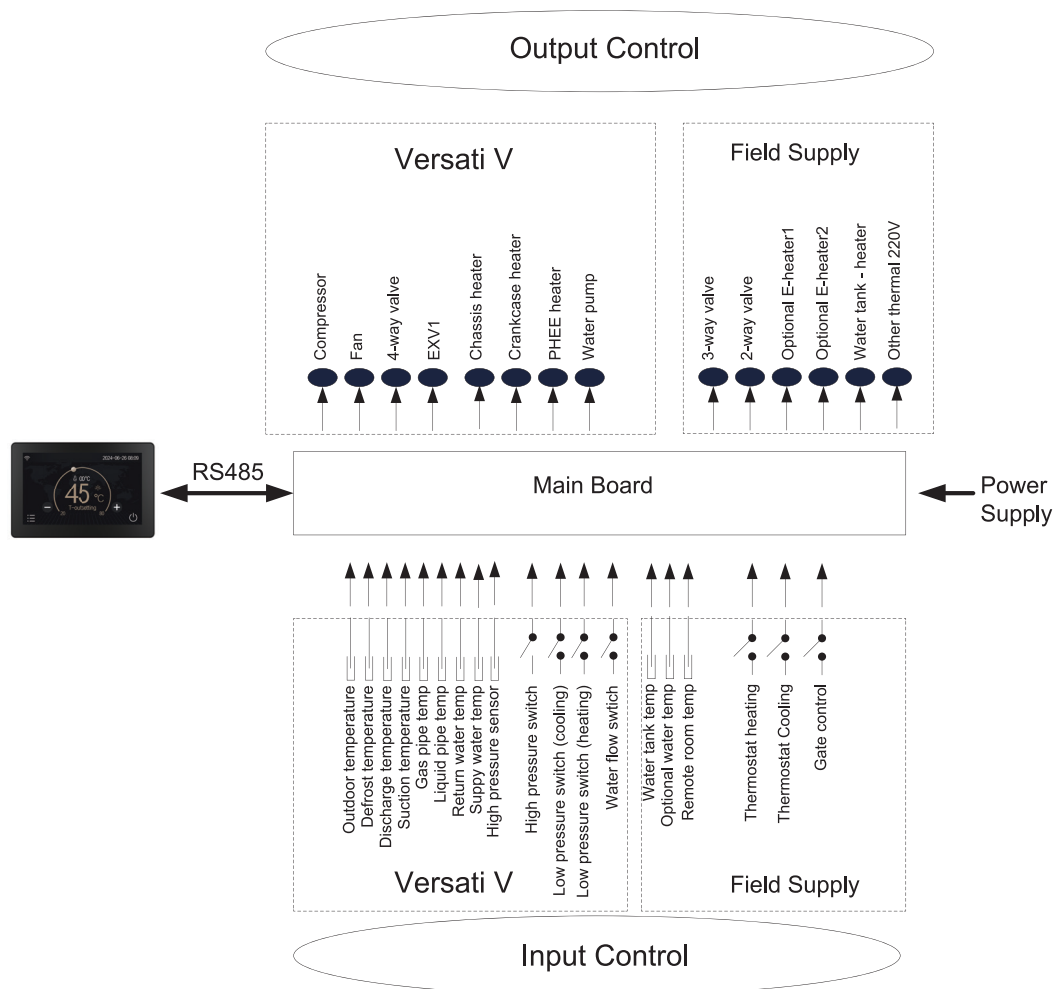
S= Standard O= Optional F= Field Supplied

Name	Standard	Optional	Field Supplied	Standard Part Code
Owner's Manual for the Main Unit	√	/	/	600005063520
Owner's Manual for the Control	√	/	/	600005064437 600005065860
Owner's Manual for the Water Tank	√	/	/	600005067454
2-way Valve	/	/	√	/
3-way Valve	/	/	√	/
Remote Temperature Sensor	√	/	/	30261014
Wired Controller	√	/	/	/
Communication Cable	√	/	/	400300412
Water Tank Temperature Sensor	√	/	/	3900028316G
Expansion Bolt	√	/	/	70110066
Other thermal	/	/	√	/
Optional Electric Heater	/	/	√	/

2 Control

2.1 Control Principle Diagram

◆ Control diagram



◆ Instructions for Protective Elements

- (1) The outdoor temperature is detected by the sensor installed at fins of the finned heat exchanger, which is mainly used to control the initialization steps of the fan and the electronic expansion valve and also limit the maximum running frequency of the compressor. When this sensor fails, the main board will detect it and deliver this error message to the controller and then the unit will fail to start up or shut down.
- (2) The defrost temperature is detected by the sensor installed at the defrosting pipes of the finned heat exchanger, which is mainly used to control defrosting. When this sensor fails at the heating or water heating mode, the compressor will stop and this error will be displayed at the controller. When it fails at the cooling mode, the compressor continues to run but this error will be displayed at the controller.
- (3) The discharge temperature is detected by the sensor installed at the discharge pipe of the compressor, which is mainly used for high discharge temperature protection. When this sensor fails, this error will be displayed at the controller, all loads except the water pump of the solar system and the electric heater of the water tank will stop. Then, the main unit will resume normal running when this error is eliminated.
- (4) The suction temperature is detected by the sensor installed at the suction pipe of the compressor, which is mainly used to control superheating degree. When this sensor fails, this error will be displayed at the controller, all loads except the water pump of the solar system and the electric heater of the water tank will stop. Then, the main unit will resume normal running when this error is eliminated.

- (5) The high pressure is detected by the sensor installed at the discharge pipe of the compressor, the low pressure is detected by the sensor installed at the suction pipe of the compressor, and the enhanced vapor injection pressure is detected by the sensor installed at the enhanced vapor injection pipe. The first one is mainly used for high pressure protection, the second one is mainly used to control defrosting, freeze protection and superheating degree, and all of three are used to together to control the intermediate pressure ratio of the compressor. When any of these sensors fails, it will be displayed at the controller, all loads except the water pump of the solar system and the electric heater of the water tank will stop. Among them, the water pump will stop 120 seconds later than the compressor. Then, the main unit will resume normal running when this error is eliminated.

Component	rip-off value/Reset value
High pressure sensor	85°C/82°C
Low pressure switch (cooling)	-25°C/-20°C
Low pressure switch (heating)	-38°C/-33°C

- (6) The return water temperature of the plate heat exchanger is detected by the sensor installed at the inlet pipe of the plate heat exchanger, which is mainly used for freeze protection. When this sensor fails, this error will be displayed at the controller but the unit will resume normal operation.
- (7) The supply water temperature of the plate heat exchanger is detected by the sensor installed at the outlet pipe of the plate heat exchanger, which is mainly used for freeze protection at the water side. When this sensor fails, this error will be displayed at the controller and the unit will continues to operate.
- (8) The optional water temperature is detected by the sensor installed at the outlet pipe of the optional E-heater, which is mainly used to control the supply water temperature. When this sensor fails, this error will be displayed at the controller, all loads except the electric heater of the water tank will stop (the 2-way electric and 3-way electric valves will be closed).
- (9) The tempeaure sensor for the vapor line is used to detect the temperature of the vapor refrigerant line. Under the Cooling mode, it and that for the liquid line together are used to control the opening of the electronic expansion valve 1.
- (10) The tempeaure sensor for the liquid line is used to detect the temperature of the liquid refrigerant line. Under the Cooling mode, it and that for the vapor line together are used to control the opening angle of the electronic expansion valve 1.
- (11) The hi-pressure switch is used to judge the system pressure. When the pressure is too high, this switch will disconnect and the unit will shut down.
- (12) The flow switch of the main unit is mainly used to judge the water flow. When the flow rate is too low, this switch will be disconnected; all loads except the water tank heater and the water pump of the solar system will stop. This error will be displayed at the controller and will be unrecoverable. The unit can restart only when it is repowered on and this error does not be displayed again.

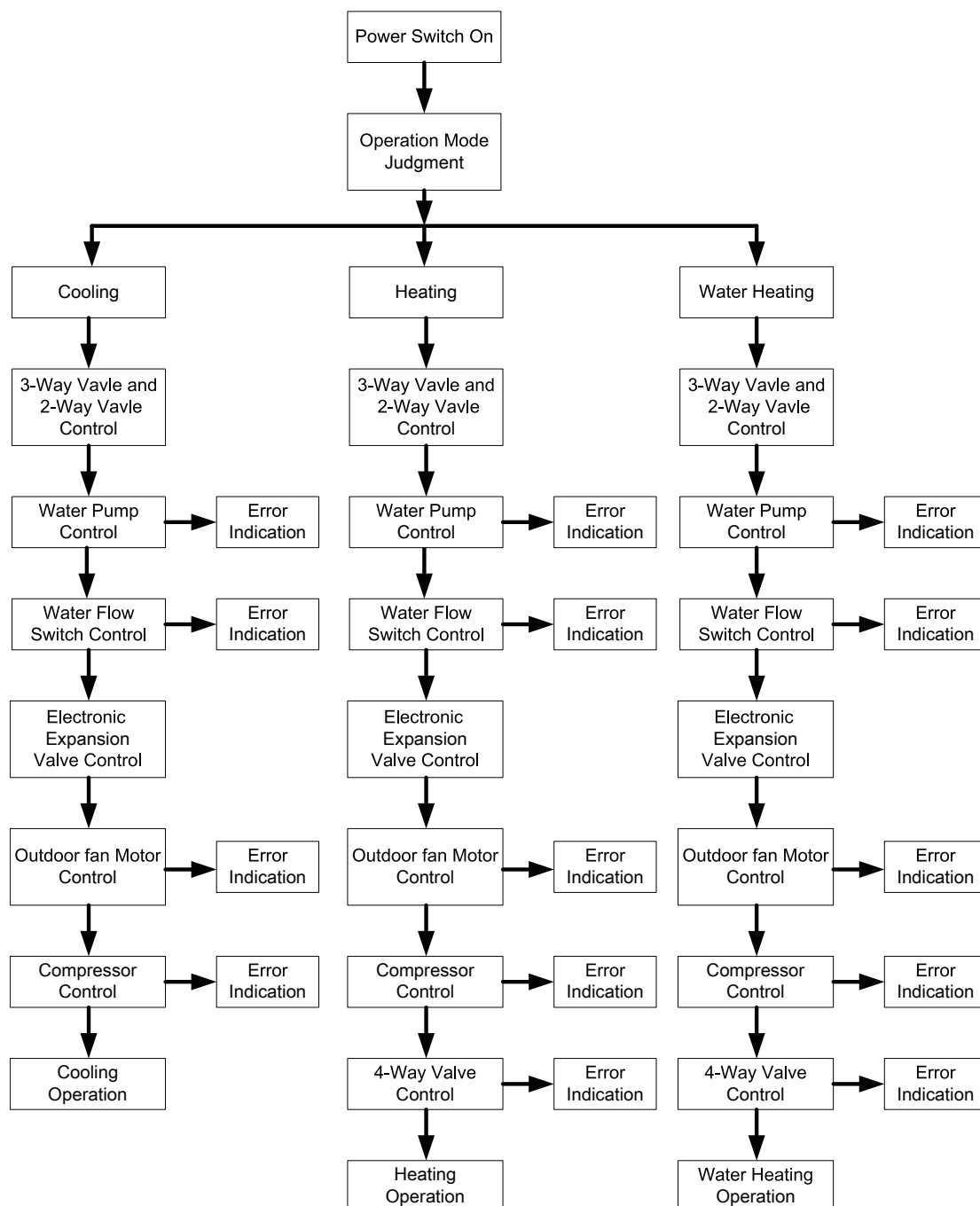
Items from 1~14 listed above are control parameters input by the main unit.

- (13) The water tank temperature is detected by sensors immersed inside the water tank. These sensors can be divided into two groups. Group 1 is used to control the water tank temperature and group 2 is used to display the water tank temperature. When group 1 fails at the heating mode, this error will be displayed at the controller, and all loads except the water pump of the main unit will stop. When group 2 fails, this error also will be displayed at the controller but the unit continues normal operation.
- (14) The leaving and entering water temperature of the solar panel and also the solar panel temperature are detected by sensors installed at the inlet pipe, outlet pipe and solar panel of the solar system respectively. Theses sensors are mainly used to control the water pump of the hot water of the solar system. When the entering water temperature sensor fails, this error will be displayed at the controller and the unit continues normal operation. When other two sensors fail, this error also will be displayed at the controller and the water pump of the solar system will stop.

- (15) The remote room temperature is detected by the sensor installed at the room, which is mainly used to control the input capacity of the compressor through room temperature setting. When the main unit is controlled through the room temperature and this sensor fails, all loads except the water pump of the solar system and the electric heater of the water tank will stop. However, when the main unit is controlled through the leaving water temperature, if this sensor fails, this error will be displayed but the main unit will resume normal operation.
- (16) Only when the control function of the thermostat has been activated through the wired controller, then the thermostat can switch run modes among cooling, heating and shutdown, otherwise, the unit will run as per the run mode set by the wired controller.
- (17) The gate control function can be set to be "On" or "Off" at the function setting page of the wired controller. When this function has been activated and it is detected that the gate control card has been drawn out, the unit will shut down and will tell any key operation of the controller is invalid. Then, if it is detected that the gate control card has been inserted in, the unit will resume normal operation.
- (18) The flow switch of the solar system is mainly used to judge the water flow. When the flow rate is too low, the flow switch will disconnect and immediately the water pump of the solar system will stop. This error will be displayed at the controller and is unrecoverable. When this error is cleared, upon power on again, the unit will restart.

Items 13~ 18 are control parameters input by the field installed equipment.

2.2 Control Flowchart



2.3 Control to Cooling

2.3.1 Control to the Compressor

When the unit is controlled by the leaving water temperature, the compressor operating frequency will be adjusted according to the temperature difference in direct proportion. (Temperature difference= actual leaving water temperature-leaving water temperature set point).

2.3.2 Freeze Protection

When it is detected that the leaving water temperature of the plate heat exchanger is lower than the freeze protection temperature, the compressor will drop its operating frequency until it reaches the minimum operating frequency. Then if it is still detected that the leaving water temperature is lower than the freeze protection temperature, the main unit will stop as per the shutdown frequency but the water pump keeps normal operation.

When it is detected that the leaving water temperature of the plate heat exchanger is equal to or larger than the freeze protection withdrawing temperature, freeze protection will stop. At this point, once the compressor has stopped for three minutes and conditions for startup have been satisfied, the compressor will run for cooling.

2.4 Control to Heating

2.4.1 Control to the Compressor

When the unit is controlled by the leaving water temperature, the operating frequency of the compressor will be adjusted by the temperature difference in the way that it increases as the temperature difference goes up and it decreases as the temperature difference goes down. When the compressor reaches the minimum frequency but the temperature frequency is still quite large, the unit will shut down (temperature difference= actual leaving water temperature-leaving water temperature set point).

2.4.2 Over-temperature Protection

When the compressor is running and it is detected that the leaving water temperature of the auxiliary electric heater is higher than the over-temperature protection temperature, the compressor will lower its frequency to the minimal. Then if it is still detected that the leaving water temperature of the auxiliary electric heater is higher than the over-temperature protection temperature, all loads except the water pump of the main unit and the 4-way valve will stop. Over-temperature protection will stop until the leaving water temperature of the auxiliary electric heater is lower than the over-temperature withdrawing temperature. After that, the unit will resume normal operation.

2.5 Control to Water Heating

Water heating can be achieved by either the solar system or the main unit (heat pump).

2.5.1 Water Heating by the Main Unit

- (1) When the outdoor temperature is out of the operation range, the compressor will not start, and water heating will be done by the water tank heater.
- (2) When the outdoor temperature is within the operation range, water heating will be done by the main unit. The output frequency of the compressor will be adjusted by the difference between the water tank temperature set point and the actual water tank temperature.
- (3) Control to the Water Tank Electric Heater
 - when the water tank temperature set point is lower than the maximum value of the water heating range of the main unit, the auxiliary electric heater of the main unit will run depending on the temperature difference, and the water tank keeps shut-down.
 - when the water tank temperature set point is higher than the maximum value of the water heating range of the main unit but the actual water tank temperature is lower than the maximum value of the water heating range of the main unit, the auxiliary electric heater of the main unit will run depending on the temperature difference. If the actual water tank temperature is higher than the maximum value of the water heating range of the main unit, the water tank heater will start. At any time, only one between the auxiliary electric heater and the water tank heater is allowed to run.
- (4) Over-temperature Protection for Water Heating

When the compressor is running, if it is detected that the leaving water temperature of the auxiliary electric heater of the main unit is higher than the over-temperature protection temperature, the compressor will lower its operating frequency until it reaches the minimal operating frequency. At this point, if it is still detected that leaving water temperature is still higher than the over-temperature protection, all loads except the water pump of the main unit and the 4-way valve will stop. Over-temperature protection will exit when the leaving water temperature is lower than the over-temperature protection temperature. Then, the main unit will resume normal operation.

2.5.2 Water Heating by the Solar System

When the solar water heating system is equipped but temperature difference value (it is the difference of solar panel temperature and the actual water tank temperature) for startup is not reached, the water pump of the solar system will not start. When the temperature difference value is reached, the water pump will start. However, when it is detected that the water tank temperature reaches the set point, or the entering/leaving water temperature difference of the solar panel is too small, then this water pump will stop running.

2.6 Control to Shutdown

There are three kinds of shutdown conditions: normal shutdown, shutdown with some error, shutdown for protection

Shutdown sequence: for normal shutdown, the compressor lowers its frequency firstly to the minimum value, while for shutdown with some error or for protection, the compressor will stop directly. Then, the electronic expansion valve turns to the maximum opening angle; the fan stops after the compressor has stopped; the water pump of the main unit stops after the compressor has stopped; the electronic expansion valve turns the maximum opening angle to the fixed opening angle.

During shutdown under the heating and water heating modes, the 4-way valve will be powered off after the compressor has stopped.

For shutdown owing to some error (except the communication error) or protection, the 4-way valve will keep the power-on status.

For shutdown owing to communication between the unit and the wired controller, the 4-way valve will be powered off some time later.

For shutdown with some error or for protection, the electronic expansion valve will keep the maximum opening angle.

2.7 Control to the Compressor

When the unit is controlled by the leaving water temperature, the output frequency of the compressor is adjusted by the difference between the actual water temperature and the leaving water temperature set point. When the unit is controlled by the room temperature, the output frequency of the compressor is adjusted by the difference between the actual room temperature and the room temperature set point.

2.8 Control to the Fan

Under the cooling mode, the operating frequency of the fan is adjusted according to pressure at the high pressure side. Under the heating or water heating mode, the operating frequency of the fan is adjusted according to the pressure at the low pressure side. During defrosting, the fan stops and resumes operation when defrosting ends up.

2.9 Control to the 4-way Valve

The 4-way valve always keeps on under the cooling mode and will off after the compressor starts up under the heating or water heating mode. When the unit comes into defrosting, the 4-way valve will be on and resume the off status when defrosting ends up. For shutdown under the heating mode, the 4-way valve will be closed after the compressor stops.

2.10 Control to the Water Pump

The water pump firstly will run at the initialized speed and then adjust the speed according to the entering/leaving water temperature difference. When the temperature difference is large, the fan runs at the high speed. When the temperature difference is small, the fan runs at the low speed.

2.11 Control the Electronic Expansion Valve

There are two electronic expansion valves for two-stage throttling control. The opening angle of the first-stage electronic expansion valve is adjusted based on the ratio of readings of the high-pressure sensor, low-pressure sensor. The opening angle of the second-stage is adjusted based on the suction superheating degree.

3 Electric Wiring

Please see the wiring diagrams stuck to the unit for actual wiring guides.

4 Test Operation

4.1 Check for Wiring

NOTE

- Do not check for the power supply unless proper checkout equipment has prepared and preventive measures have been taken, otherwise it would lead to severe injury.

- (1) Are sizes of connection lines and the air switch properly selected?
- (2) Does wiring comply with relative standards and electric codes?
- (3) Is there any incorrect wiring?
- (4) Does each contact work properly?
- (5) Is the power supply and insulation proper?
- (6) Are initial set points of control and protective elements satisfied?

4.2 Check for the Water System

- (1) Are water inlet and outlet directions correct?
- (2) Is the water piping cleaned? Are there foreign matters at the pipe joints? Is the water quality satisfied?
- (3) Is insulation of water pipes in good condition?
- (4) Does exhaust valve of the water system work properly?

4.3 Check for the Communication System

When the unit is powered on, check for the communication system, including: communication between AP1 and AP2, between the wired controller and the main board. When there is unusual communication, this error will be displayed at the wired controller. Then, check out the cause according to the displayed error. See the figure below for wiring of the communication system.

4.4 Trial Run

Start the unit when there is no any problem for wiring and piping. After startup, check for the electrostatic expansion valve, water pump, fan, and compressor to see if they work normally. When there is any error, solve it according to the troubleshooting flowchart covered in this manual. However, if the troubleshooting flowchart is still unhelpful, please contact GREE sales distributor.

5 Commissioning

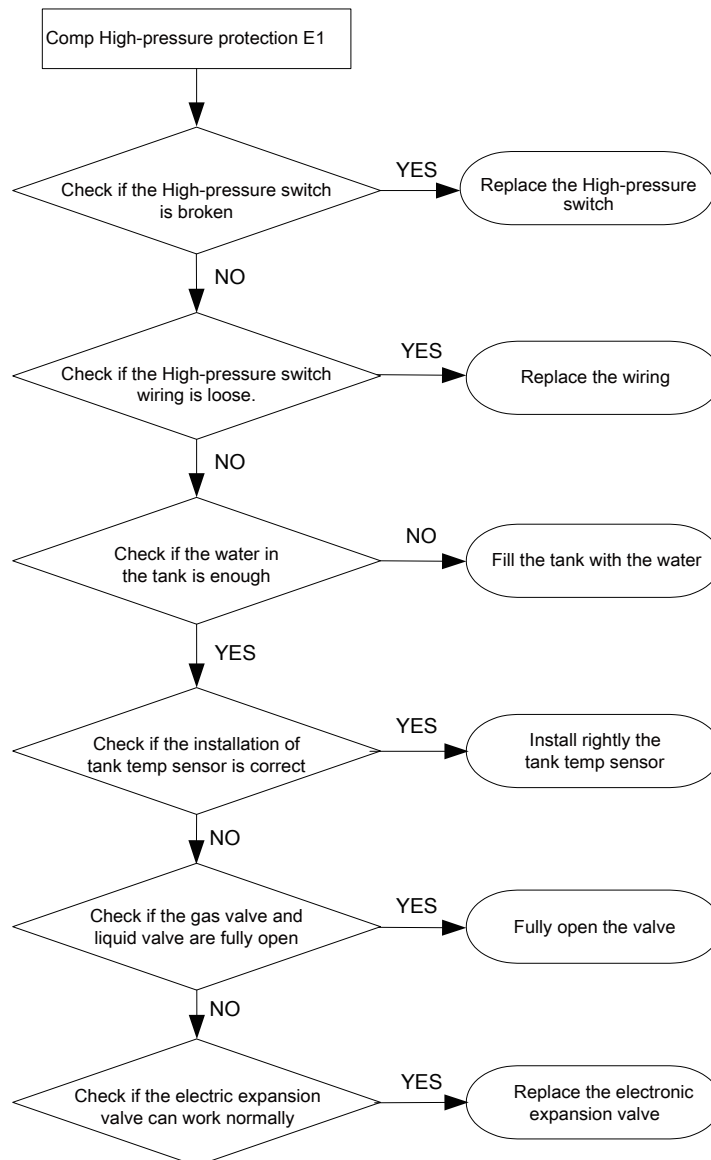
5.1 Error Code List

No.	Full Name	Displayed Name	Error Code
1	Ambient temperature sensor error	Ambient sensor	F4
2	Defrosting temperature sensor error	Defrost sensor	d6
3	Discharge temperature sensor error	Discharge sensor	F7
4	Suction temperature sensor error	Suction sensor	F5
5	Economizer inlet temperature sensor	Econ. in sens.	F2
6	Economizer outlet temperature sensor	Econ. out sens.	F6
7	Fan error	Outdoor fan	EF
8	High pressure protection	High pressure	E1
9	Low pressure protection	Low pressure	E3
10	High discharge protection	Hi-discharge	E4
11	Capacity DIP switch error	Capacity DIP	c5
12	Communication error between the outdoor and indoor main boards	ODU-IDU Com.	E6
13	Communication error between the outdoor main board and the drive board	Drive-main com.	P6
14	Communication error between the display panel and indoor main board	IDU Com.	E6
15	High pressure sensor error	HI-pre. sens.	Fc
16	Leaving water temperature sensor error for the plate type heat exchanger of the heat pump	Temp-HELW	F9
17	Leaving water temperature sensor error for the auxiliary electric heat of the heat pump	Temp-AHLW	dH
18	Entering water temperature sensor error of the plate type heat exchanger of the heat pump	Temp-HEEW	No error code but displayed on control pannel
19	Water tank temperature sensor error ("NA" for mini chillers)	Tank sens.	FE
20	Remote room temperature sensor error	T-Remote Air	F3
21	Protection for the flow switch of the heat pump	HP-Water Switch	Ec
22	Welding protection to the auxiliary electric heater 1 of the heat pump	Auxi. heater 1	EH
23	Welding protection to the auxiliary electric heater 2 of the heat pump	Auxi. heater 2	EH
24	Welding protection to the water tank electric heater	Auxi. -WTH	EH
25	DC bus under-voltage or voltage drop error	DC under-vol.	PL
26	DC bus over-voltage	DC over-vol.	PH
27	AC current protection (input side)	AC curr. pro.	PA
28	IPM defective	IPM defective	H5
29	PFC defective	PFC defective	Hc
30	Start failure	Start failure	Lc
31	Phase loss	Phase loss	Ld
32	Jumper cap error	Jumper cap error	c5
33	Driver resetting	Driver reset	P0
34	Compressor overcurrent	Com. over-cur.	P5
35	Current sensing circuit error or current sensor error	Current sen.	Pc
36	Desynchronization	Desynchronize	H7

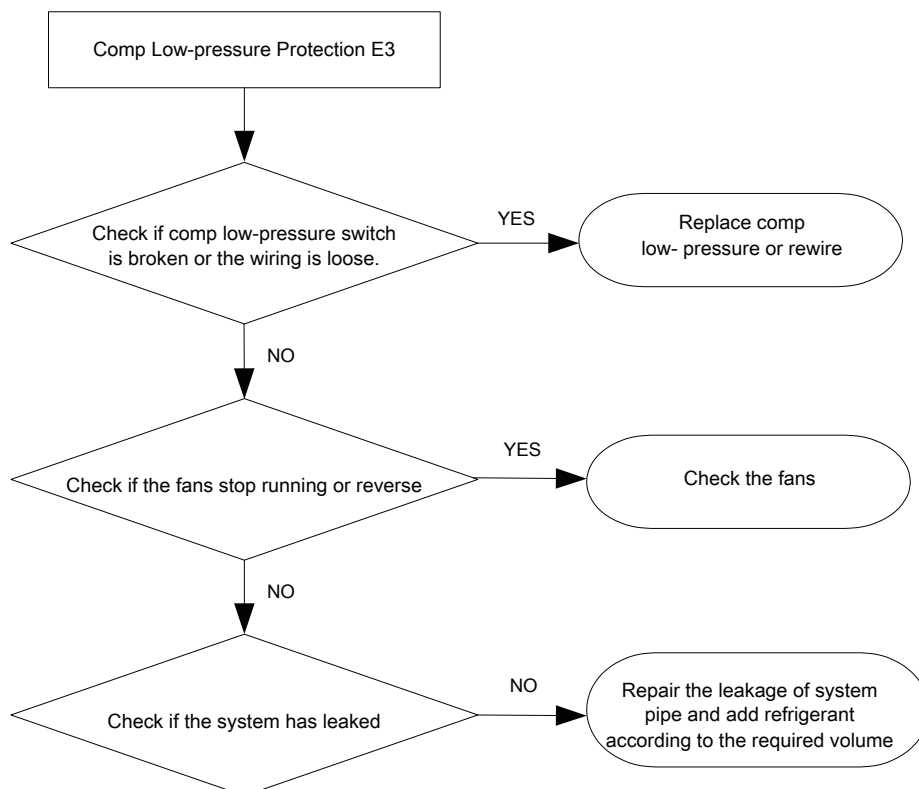
No.	Full Name	Displayed Name	Error Code
37	Radiator or IPM or PFC over-temperature	Overtemp.-mod.	P8
38	Radiator or IPM or PFC temperature sensor error	T-mod. sensor	P7
39	Charging circuit error	Charge circuit	Pu
40	AC input voltage error	AC voltage	PP
41	Sensor connection protection (the current sensor fails to be connected with the corresponding phase U and or phase V)	Sensor con.	Pd
42	Communication error between the display panel and the outdoor unit	ODU Com.	E6
43	Refrigerant vapor line temperature sensor error	Temp RGL	F0
44	Refrigerant liquid line temperature sensor error	Temp RLL	F1
45	4-way valve error	4-way valve	U7
46	Solar leaving water temperature sensor error	Solar sensor	FF
47	Low pressure sensor error	Low-pre. sens.	dL

5.2 Flow Chart of Troubleshooting

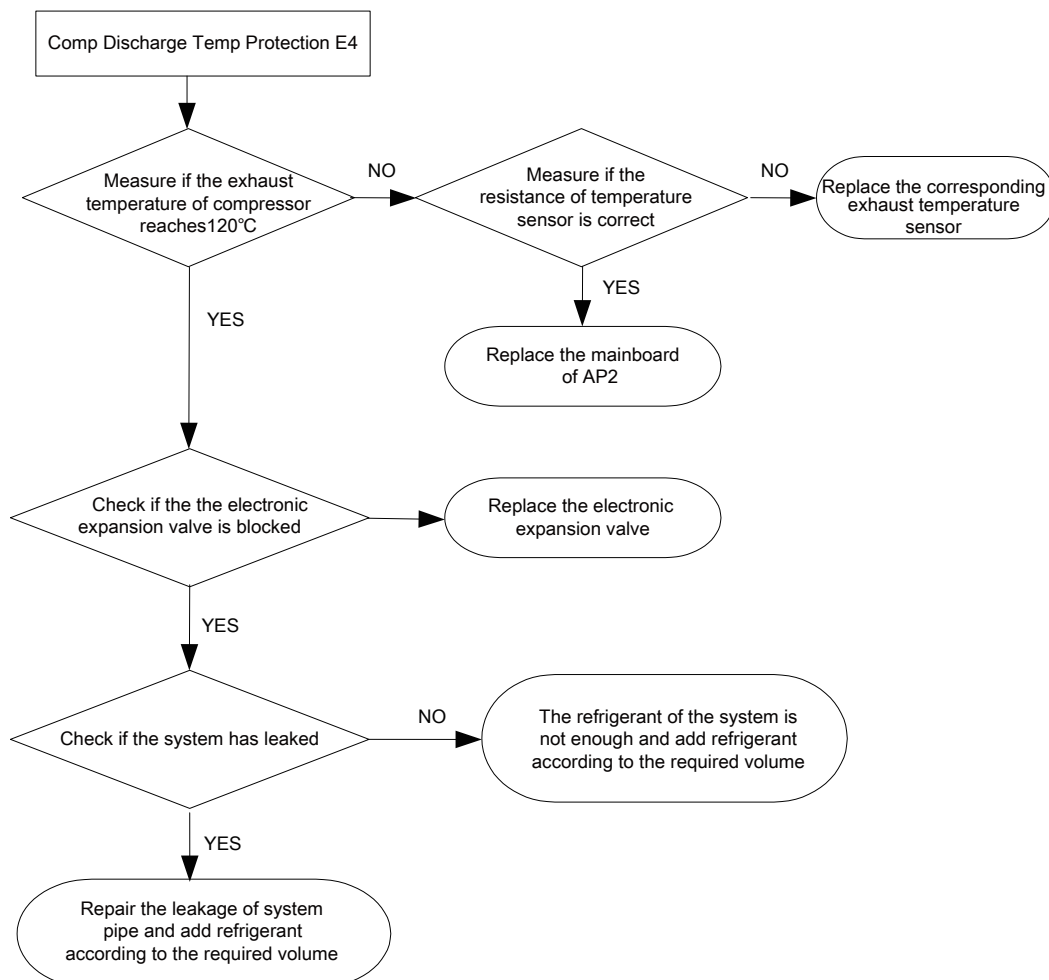
(1) Compressor High-pressure Protection E1



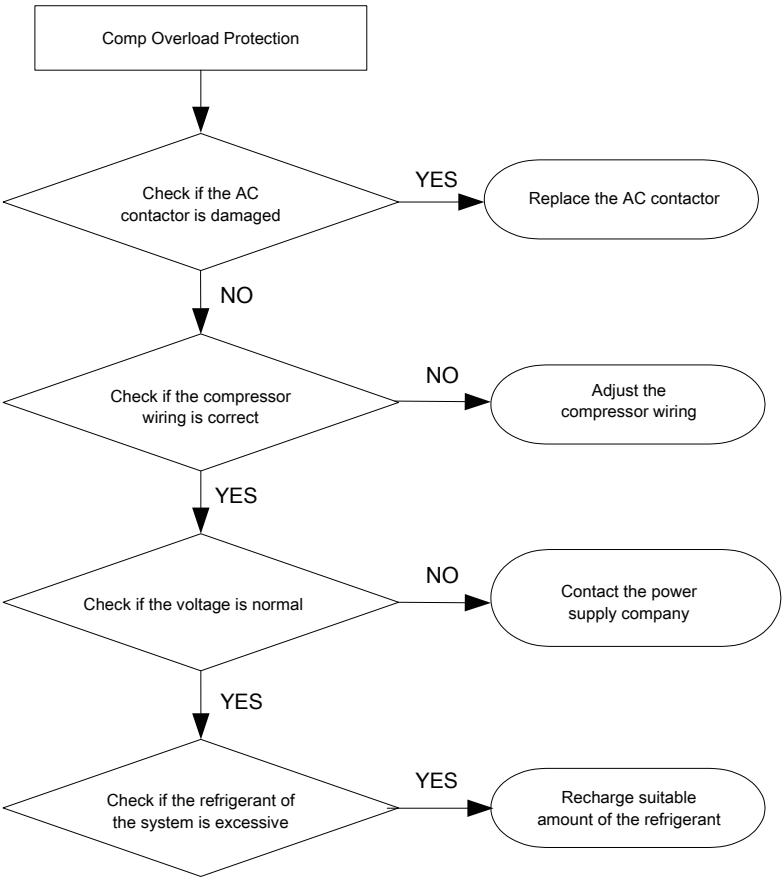
(2) Compressor Low- pressure Protection E3



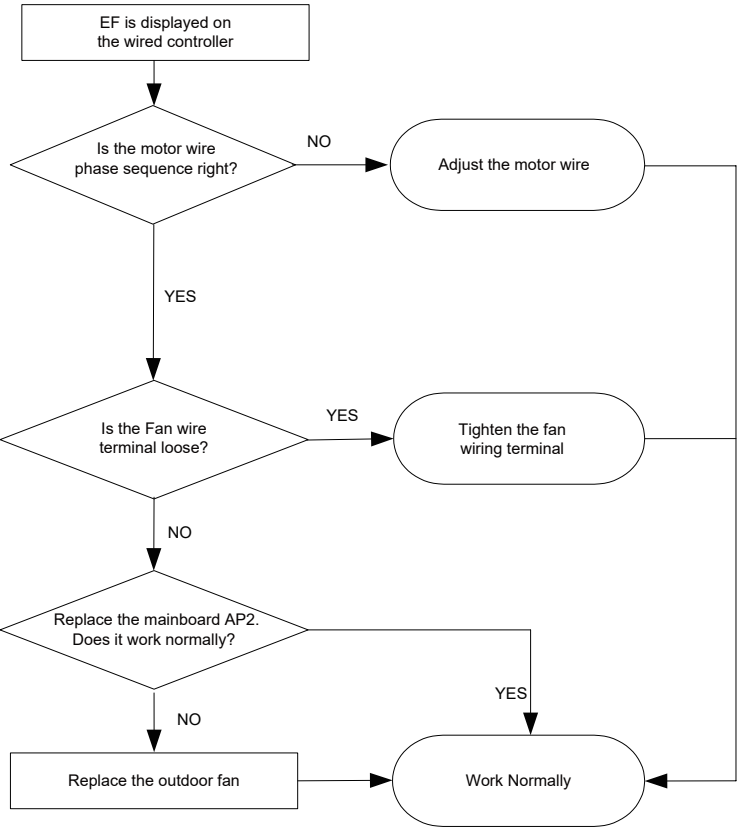
(3) Compressor Discharge Temp Protection E4



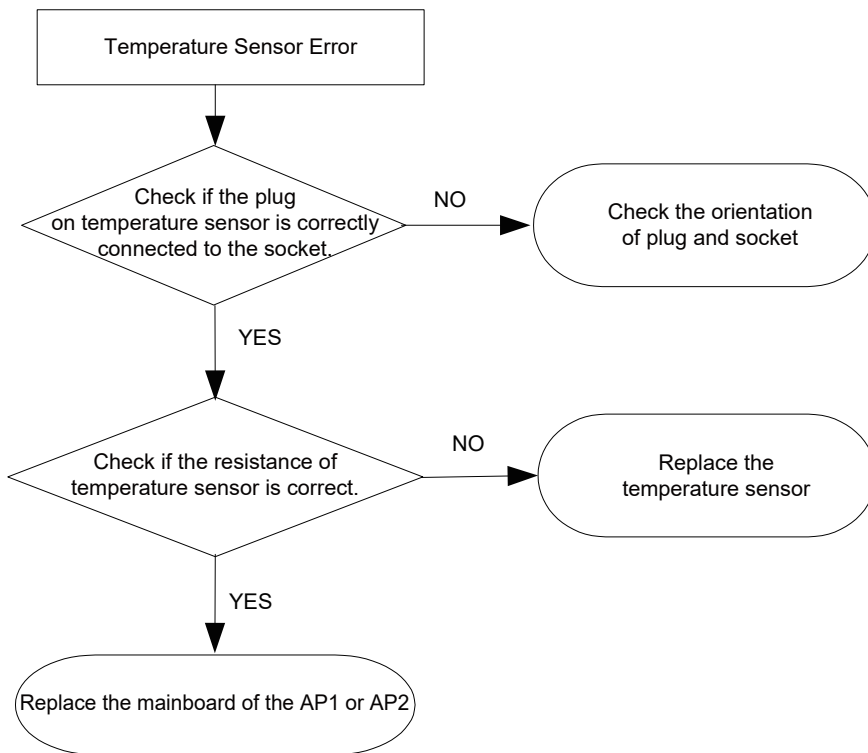
(4) Overload Protection of Compressor or Driver Error



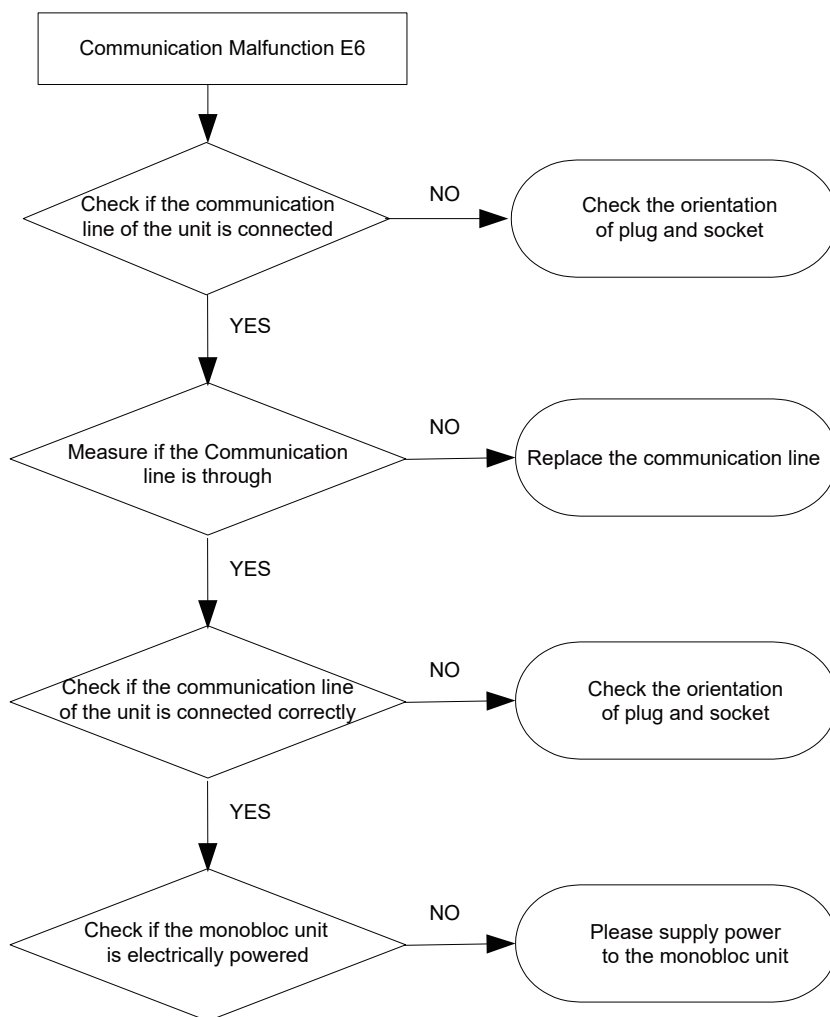
(5) DC Fan Error EF



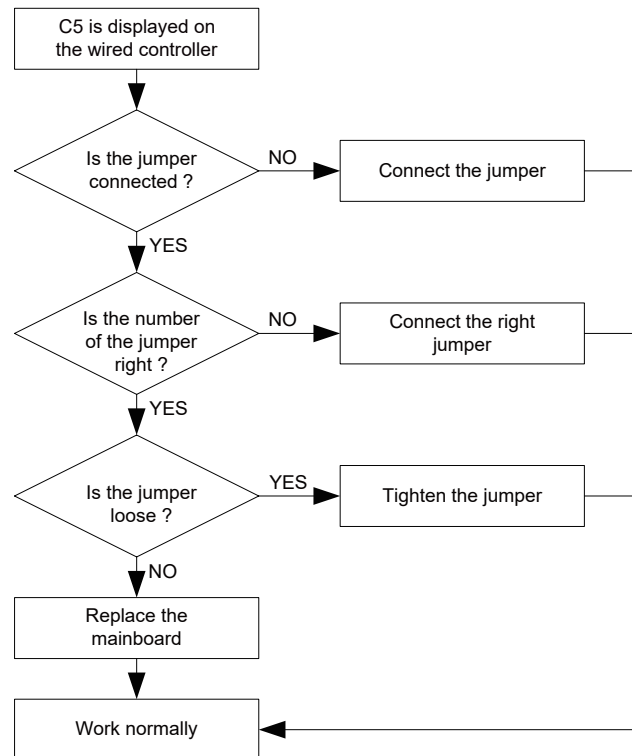
(6) Temperature Sensor Error



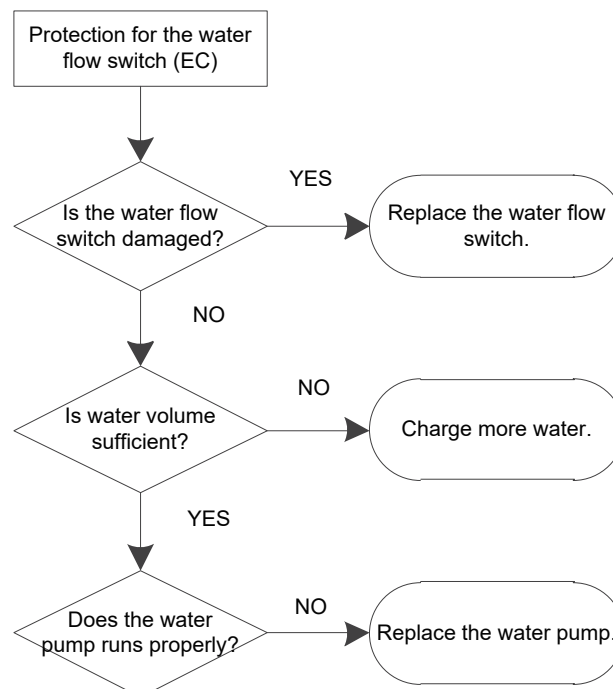
(7) Communication Malfunction E6



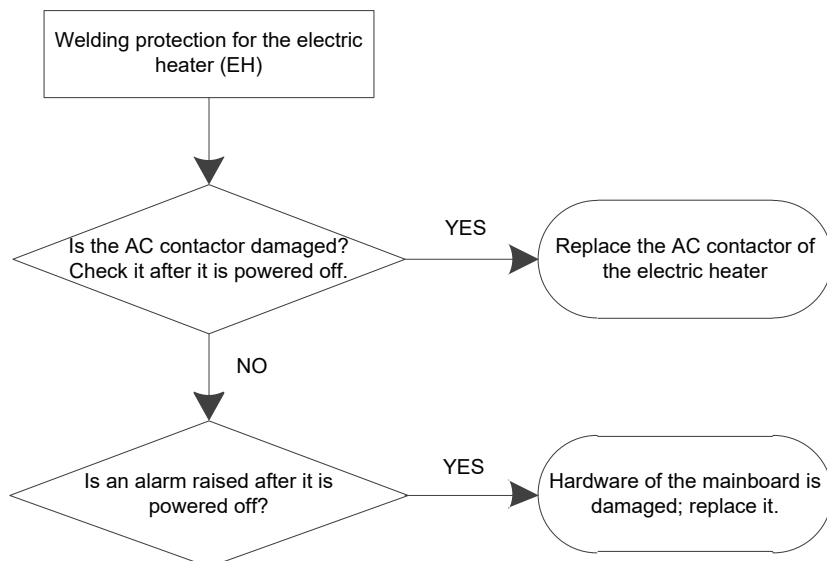
(8) Capacity Switch Error (Code:"C5")



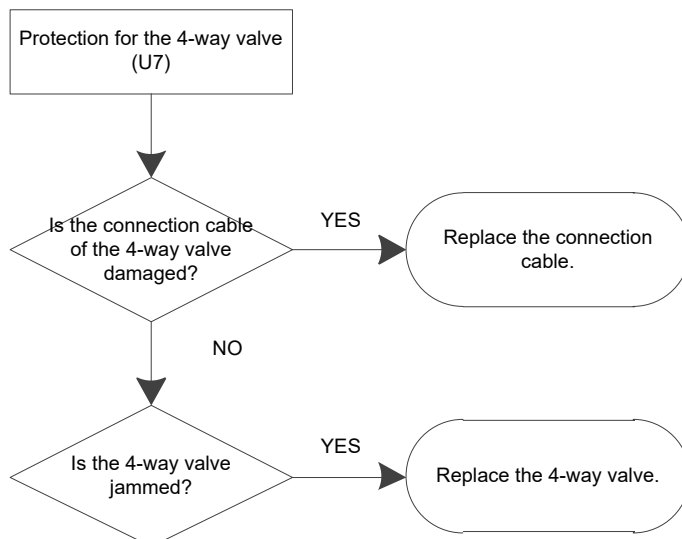
(9) Protection for the water flow switch (Code:"EC")



(10) Welding protection for the electric heater (Code:"EH")

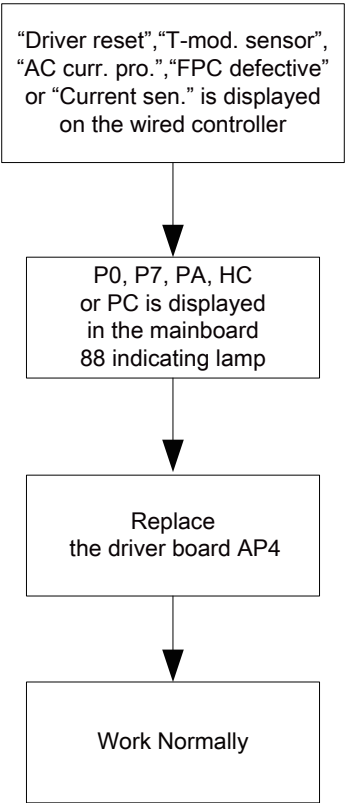


(11) Protection for the 4-way valve (Code:"U7")

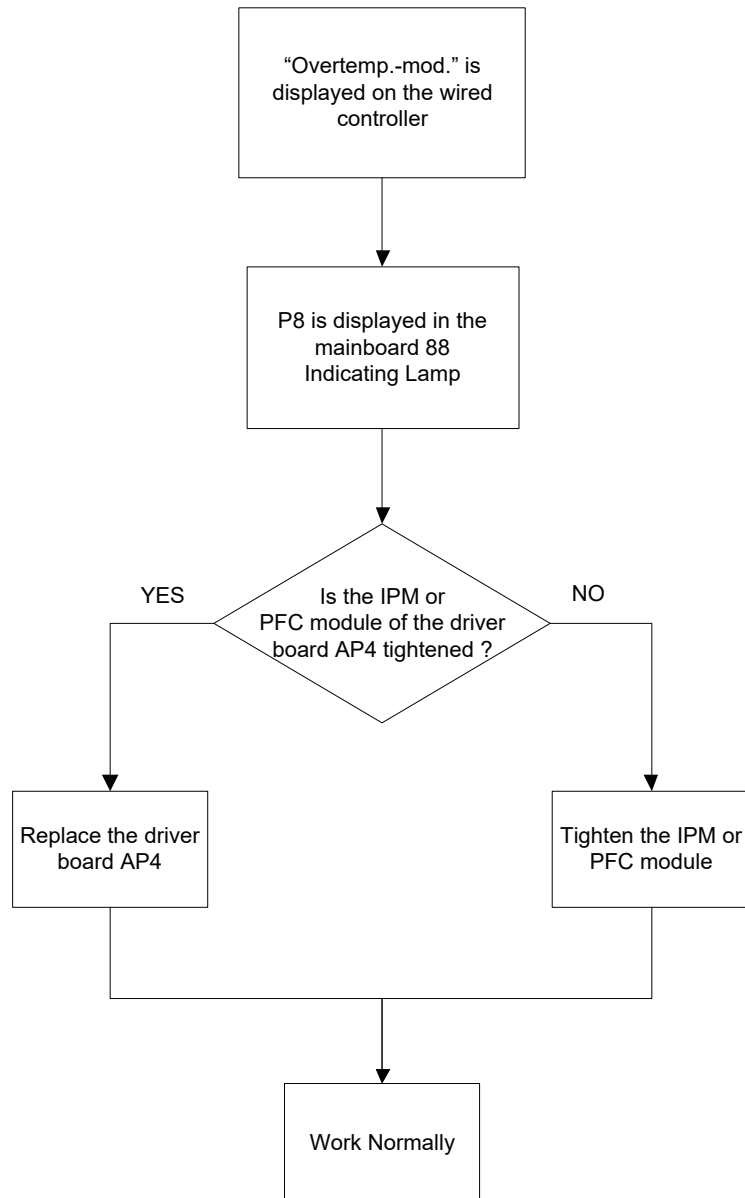


5.3 Diagnosis of Drive

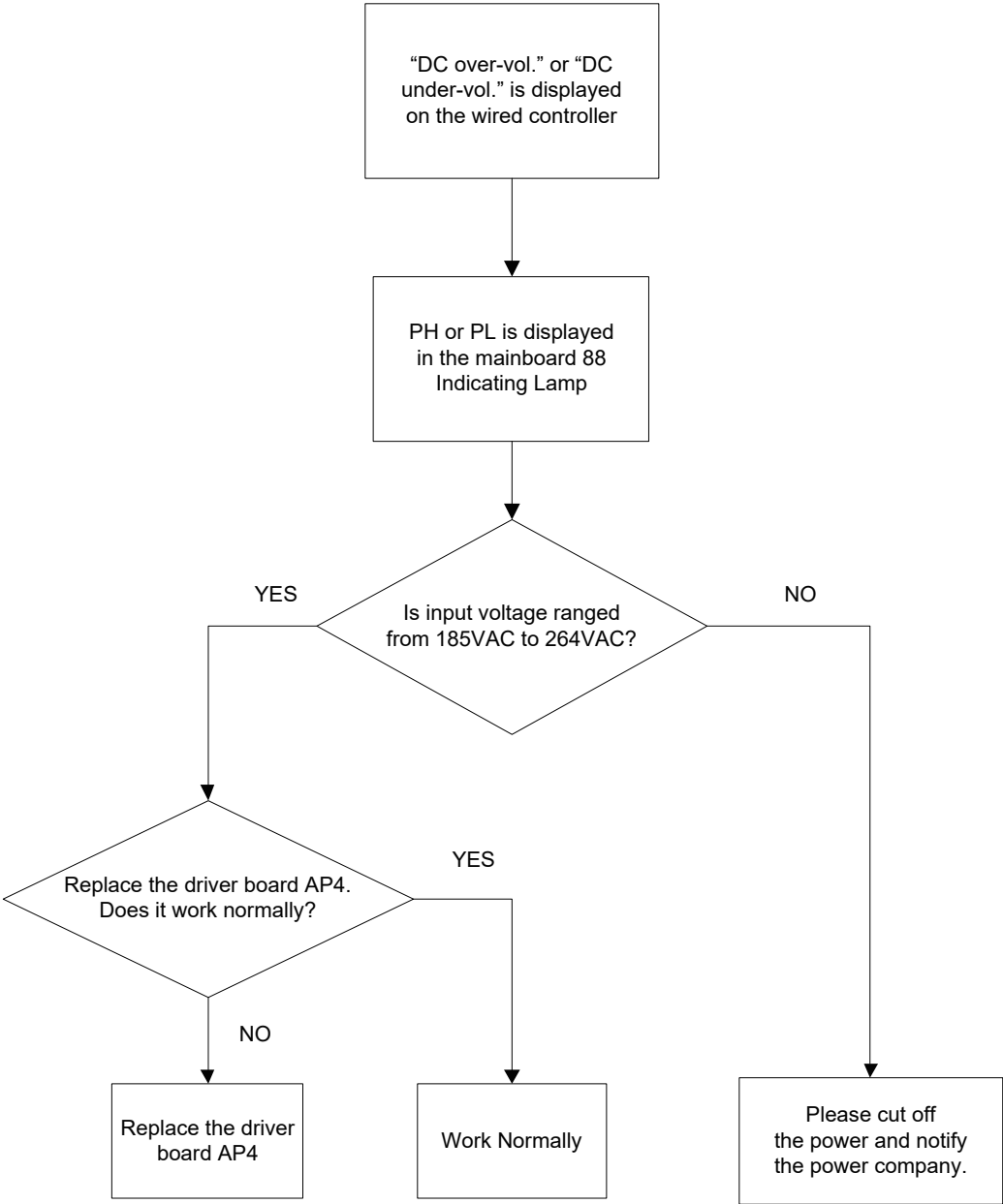
- (1) Drive Module Reset(Code:"P0") ; IPM or PFC Temperature Sensor Error(Code:"P7") ; AC Current Protection (Input Side)(Code:"PA"); Current Sense Circuit Error(code:"PC"); PFC Protection(Code:"HC")



(2) IPM or PFC Over-temperature Protection(Code:"P8")

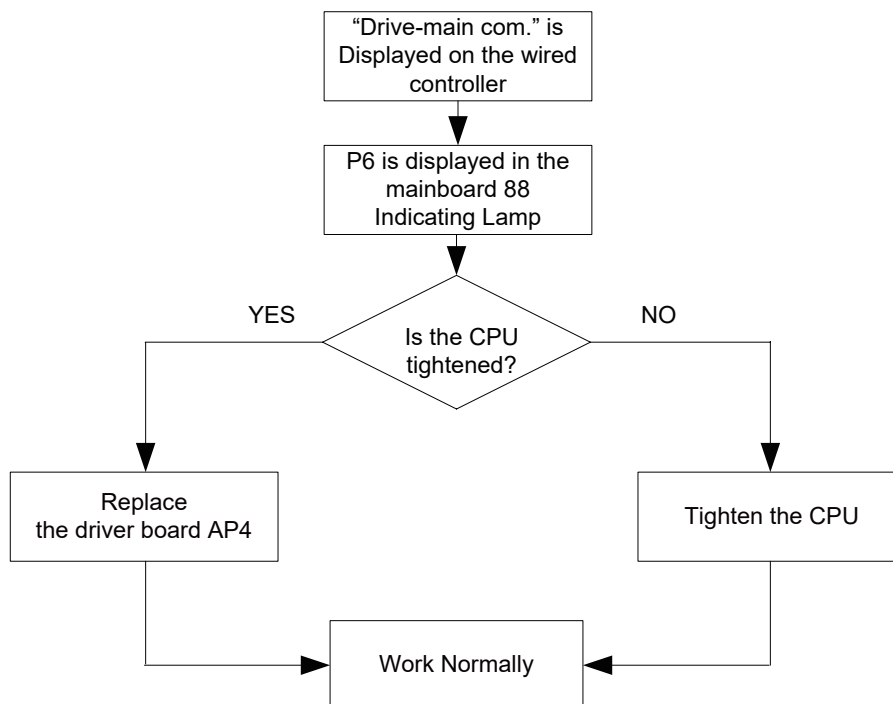


(3) DC Busbar Over-voltage Protection(Code:"PH") ; DC Busbar Under-voltage Protection (Code:"PL")

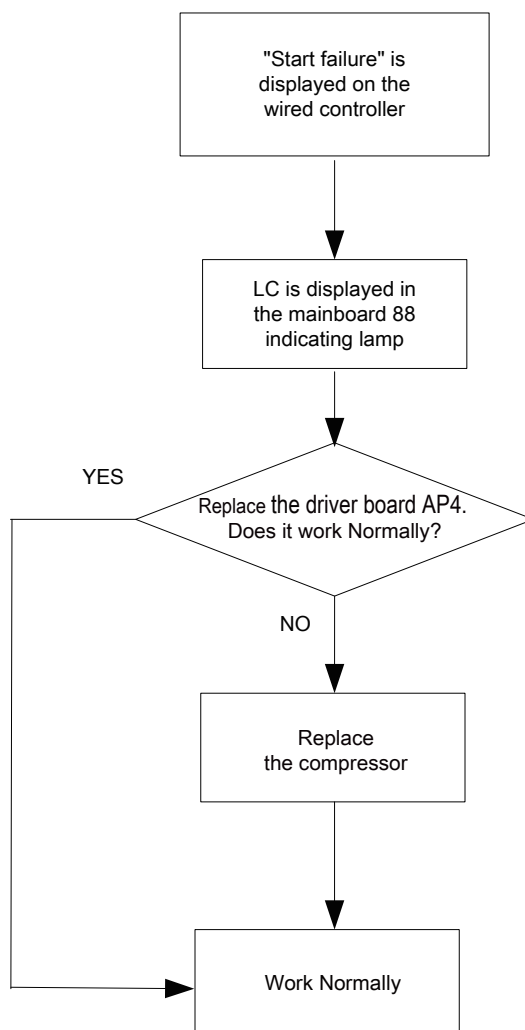


Note: three-phase input voltage is in the range from 320VAC to 475VAC.

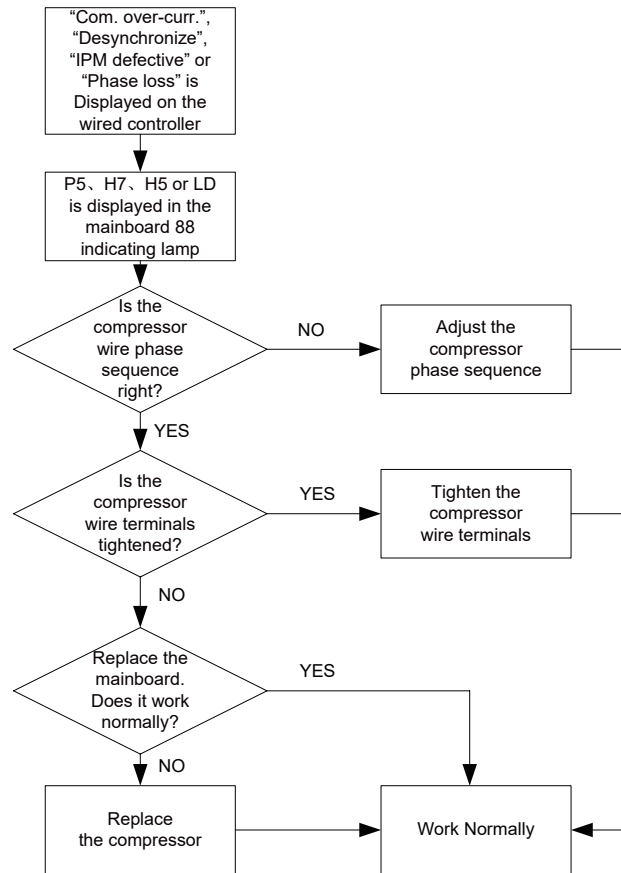
(4) Drive-to-main-control Communication Error(Code:"P6")



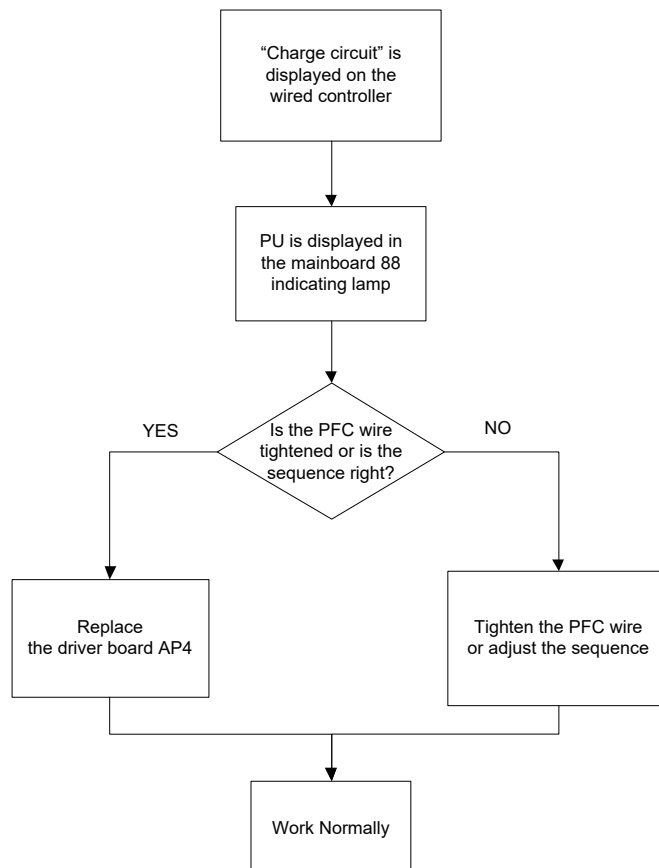
(5) Compressor Startup Failure(code:"LC")



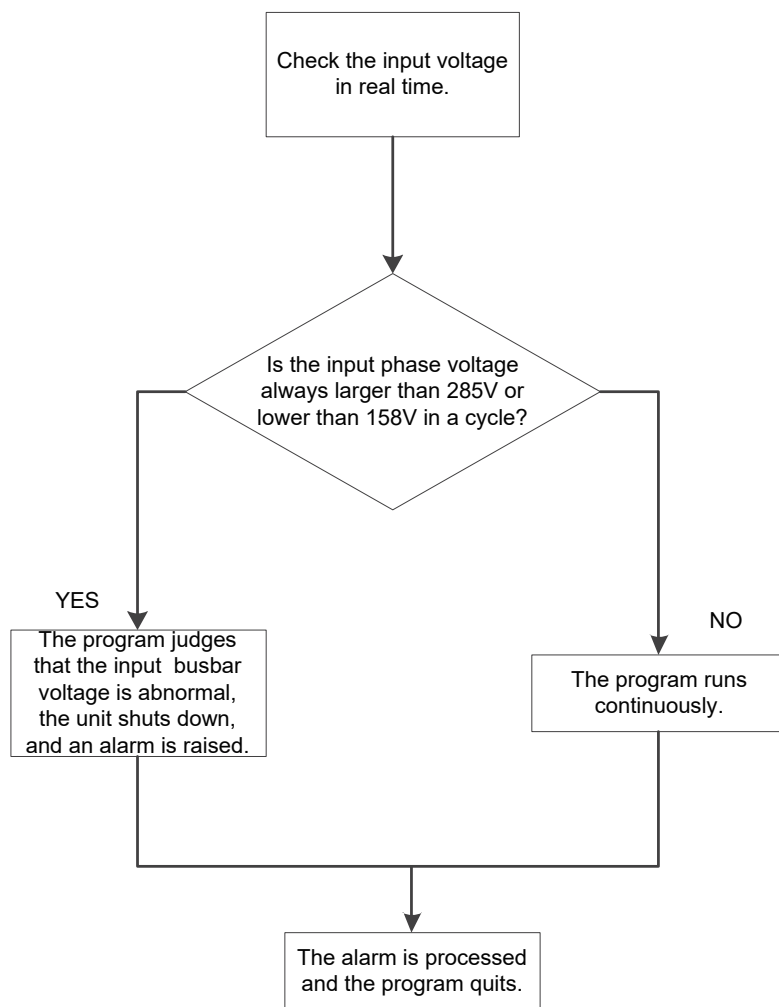
(6) Compressor Current Protection (Code:"P5"); Compressor Motor Desynchronizing (Code:"H7"); IPM Protection (Code:"H5"); Phase Loss (Code:"LD")



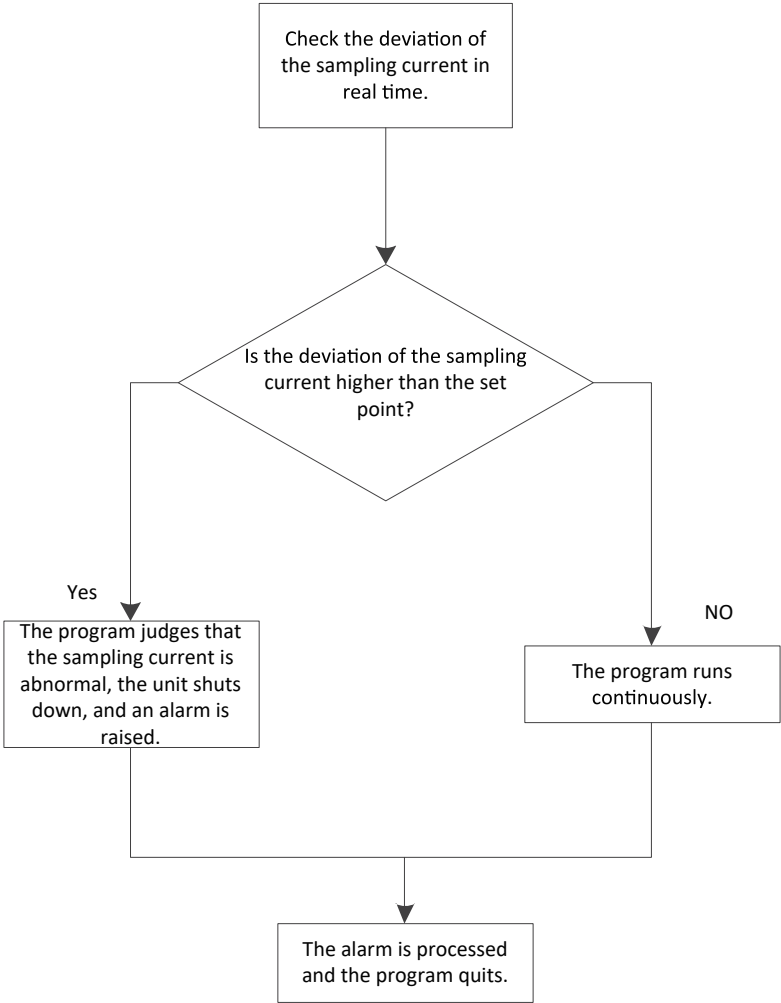
(7) Charging Circuit Error(Code:"PU")



(8) PP1



(9) PD2



6 Daily Maintenance and Repair

6.1 Daily Maintenance Precautions

In order to avoid damage of unit, all protecting devices in the unit have been set before packaging and delivering, so the user should never adjust or remove them.

For the first startup of the unit or next startup of unit after long-period stop (above 1 day) by cutting off the power, please electrify the unit in advance to preheat the unit for more than 8hr

Never put sundries on the unit and accessories. Keep dry, clean and ventilated around the unit.

Remove the dust accumulated on the condenser fin timely to ensure performance of unit and to avoid stop of unit for protection.

In order to avoid damage of unit caused by blockage of water system, clean the filter in water system periodically and frequently check water replenishing device.

In order to ensure anti-freezing protection, never cut off the power if ambient temperature is below zero in winter.

In order to avoid frost crack of the unit, water in the unit and pipeline systemd should be drained reguarly. In addition, open the end cap of water tank for drainage.

Never frequently make the unit on/off and close manual valve of water system during operation of unit by users.

Ensure frequently check the working condition of each part to see if there is oil stain at pipeline joint and charge valve to avoid leakage of refrigerant.

If users are not able to handle the malfunction of the unit,, please timely contact with authorized service center of company.

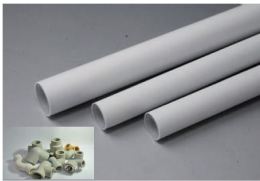
NOTE

The water pressure gage is installed in returning water line in the indoor unit, Please adjust the hydraulics system pressure according to next item:

- (1) If the pressure is less than 0.5 bar, please recharge the water immediately;
- (2) When recharging, the hydraulics system pressure should be not more than 2.5 Bar.

6.2 Field Supplied Pipes and Valves

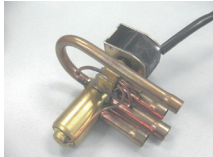
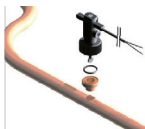
Name	Picture	Usage
Water Filter		It is used to remove foreign matters in the waterway.
2-way Valve		It is used to switch waterways between underfloor system and the FCU.
3-way Valve		It is used to switch waterways of hot water inside the water tank and circulation water inside the main unit.

Name	Picture	Usage
Bypass Valve		It is used to balance the water pressure.
Water manifold		It is used to distribute water.
Pipe and Pipe Joint		It is used to connect the water pipes.
Cut-off Valve		It is used to cut off or get through the waterway.

6.3 Service Tools

Name	Picture
Spanner	
Screw Driver	
Pliers	
Tube Tongs	

6.4 Key Components

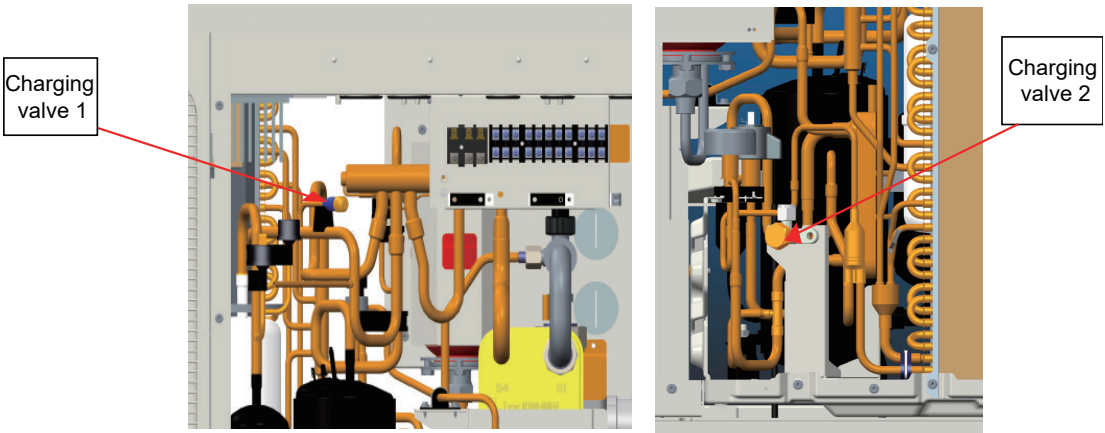
Picture	Name	Function
	Compressor	It is the heart of the cooling system, mainly used to turn the low-temperature, low-pressure refrigerant vapor to high-temperature high-pressure vapor and then discharge it to the evaporator. It is a compressor special for refrigerant R290 and under the protection of IP55.
	Electroic Expansion Valve	It is one of four main components and used to turn the hi-pressure liquid refrigerant to low-temperature, low-pressure vapor-liquid mixture and adjust the refrigerant flow rate entering the evaporator.
	Gas-liquid Separator	It is installed at the side of the suction line, and used to prevent liquid refrigerant entering the compressor, otherwise, the wet compression or the liquid slugging may occur.
	4-way Valve	It is used to switch flow direction of refrigerant and then realize switchover between cooling and heating. It also can be used for defrosting through the counterflow.
	Plate Heat Exchanger	It is the water-refrigerant plate type heat exchanger, used to liquefy the high-temperature high-pressure vapor refrigerant or evaporate the low-temperature low pressure liquid refrigerant. Heat of condensation is taken away by circulation water and heat for evaporation is supplied also by circulation water.
	Water Pump	It is the power equipment for water circulation.
	Expansion vessel	It is used to keep stable pressure of the water system. The tank is charged with a certain volume of nitrogen which is separated from the water side with a gasbag. When pressure of the water side exceeds the nitrogen pressure, the gasbag will expand and water enters into the tank so as to lower the pressure of the water system. In contract, when pressure of the water system goes down, nitrogen in the tank will expel water out to the water system.
	Flow Switch	It is used to prevent the heat exchanger from being frozen owing to reduced water flow rate. When the flow rate goes down to the point at which the flow switch will act, the switch will trip off and the unit will raise an alarm and shut down.
	Safety Valve	It is used to prevent the pressure of circulation water from increasing unusually. When the pressure is larger than the set point (0.3MPa), this valve will open to relieve water pressure.

Picture	Name	Function
	Exhaust Valve	It is used to expel air trapped inside the water system to make sure normal operation of the system. It is usually installed at the highest point of the system.

6.5 Charging and Discharging of Refrigerant

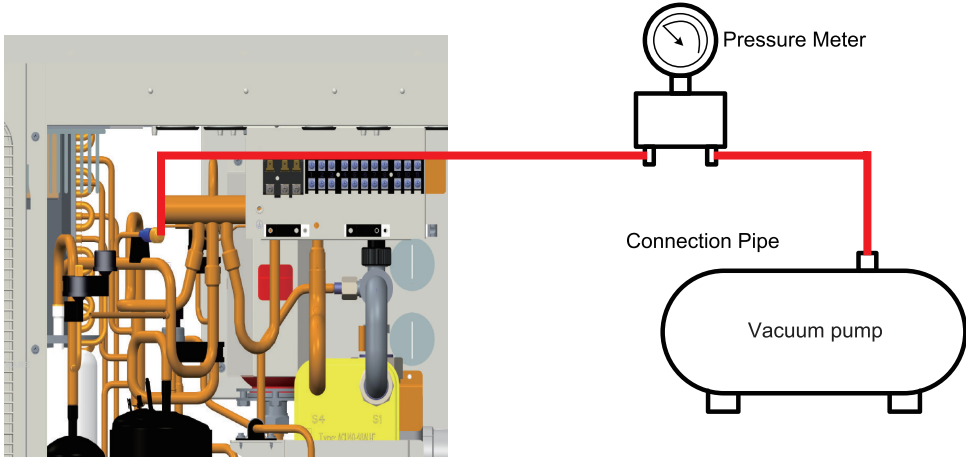
The unit has been charged with refrigerant before delivery. Overcharging or undercharging will cause the compressor to run improperly or be damaged. When refrigerant is required to be charged or discharged for installation, maintenance and other reasons, please follow steps below and nominal charged volume on the nameplate.

Discharging: remove metal sheets of the outer casing, connect a hose to the charging valve and then discharge refrigerant:



 **NOTE**

- Discharge is allowed unless the unit has been stopped. (Cut off the power and repower it 1 minutes later)
- Protective measures should be taken during discharging to avoid frost bites.
- When discharging is finished, if vacuuming cannot be done immediately, remove the hose to avoid air or foreign matters entering the unit.
- Vacuuming: when discharging is finished, use hoses to connect the charging valve, manometer and vacuum pump to vacuum the unit.
- When vacuuming is finished, pressure inside the unit should be kept lower than 80Pa for at least 30 minutes to make sure there is no leak. Either charging valve 1 or charging valve 2 can be used for vacuuming.
- When vacuuming is finished and it is certain that there is no leak, charging can be done.



◆ Leak Detection Methods

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants.

Electronic leak detector shall be used to detect flammable refrigerant, but the sensitivity may not be adequate, or may need re-calibration (Detection equipment shall be calibrated in a refrigerant-free area).

Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant.

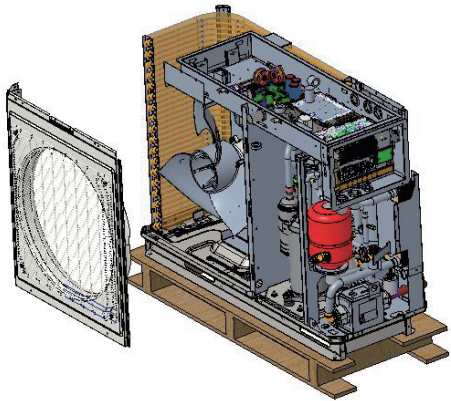
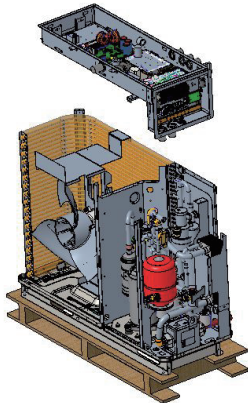
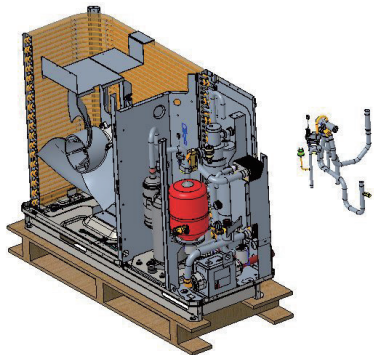
Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25% maximum) is confirmed.

Leak detection fluids are suitable for use with most refrigerant but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

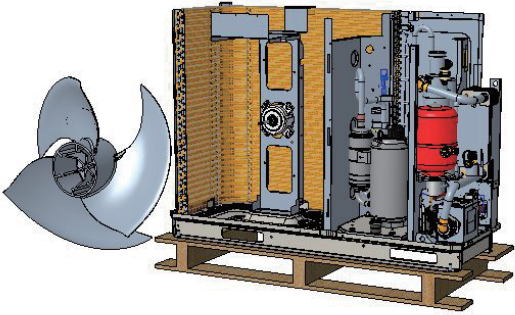
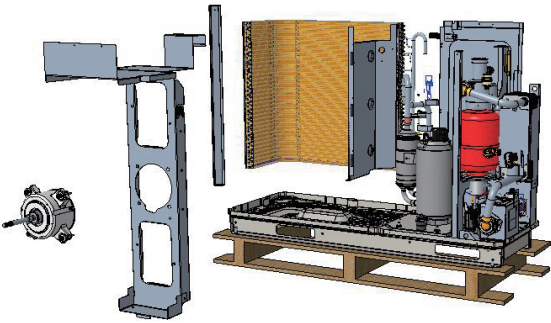
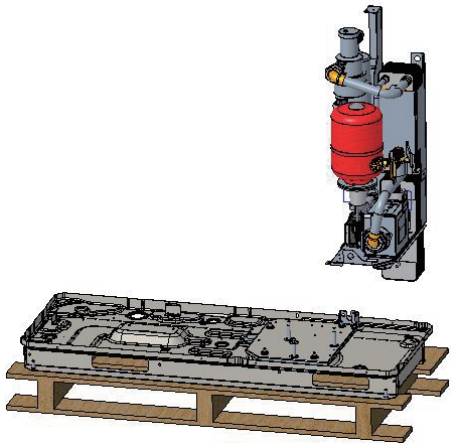
If a leak is suspected, all naked flames shall be removed / extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

Note: before and during operation, use an appropriate refrigerant leak detector to monitor the operation area and make sure the technicians can be well aware of any potential or actual leakage of inflammable gas. Make sure the leak detecting device is applicable to inflammable refrigerant. For example, it should be free of sparks, completely sealed and safe in nature.

6.6 Disassembly of the Main Unit

Note: firstly please cut off the power supply and discharge refrigerant out of the unit.	
Operation Procedure	Illustration
GRS-CQ8.0Pd/NpG4-E, GRS-CQ10Pd/NpG4-E, GRS-CQ12Pd/NpG4-E, GRS-CQ14Pd/NpG4-E	
Remove the fixing bolts and outer guard.	
Remove the fixing bolts and electric box.	
Desolder connection points of the 4-way valve, and remove the pipelines of the 4-way valve. Note:when desoldering the connection joint, pay attention to covering the solder joints with a wet cloth to avoid high temperature damage.	

Note: firstly please cut off the power supply and discharge refrigerant out of the unit.

Operation Procedure	Illustration
GRS-CQ8.0Pd/NpG4-E, GRS-CQ10Pd/NpG4-E, GRS-CQ12Pd/NpG4-E, GRS-CQ14Pd/NpG4-E	
Remove fixing bolts and then the fan.	
Remove fixing bolts of the motor and the motor support and then move them. Remove fixing bolts, and then separate the condenser from the base.	
Remove fixing bolts, desolder connection points between gas/liquid lines of the plate-type heat exchanger and the main unit, and then remove the water system. Note: when desoldering the connection joint, pay attention to covering the solder joints with a wet cloth to avoid high temperature damage.	



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