Service Manual

CLIVET

WSAT-YES CO/FC 18.2-35.2

R-32

1 GENERAL TECHNICAL DATA

WSAT-YES

Performance

SIZE			18.2	20.2	25.2	30.2	35.2
Radiant panels							
Cooling							
Cooling capacity (EN 14511:2018)	kW	1/4	61,7	72,1	88,1	94,5	108
EER (EN 14511:2018)		2	4,30	3,96	4,44	4,28	4,02
Water flow-rate	l/s	1	2,95	3,44	4,21	4,51	5,14
User side exchanger pressure drops	kPa	1	33,4	44,7	65,2	74,4	95,1
Terminal unit							
Cooling							
Cooling capacity (EN 14511:2018)	kW	3	53,1	59,2	72,2	77,5	85,1
EER (EN 14511:2018)		2	3,10	3,00	3,21	3,20	3,10
SEER (EN 14511:2018)		5	4,85	4,84	4,89	4,81	4,74
Water flow-rate	l/s	5	2,54	2,83	3,45	3,70	4,07
User side exchanger pressure drops	kPa	3	25,2	30,9	31,3	35,8	42,8
Dati AHRI							
Cooling capacity (AHRI 550/590)	kW	6	61,3	69,1	80,7	88,1	95,5
Total power input (AHRI 550/590)	kW	6	12,9	14,3	16,2	18,3	20,4
COP_R		6	4,75	4,83	4,98	4,81	4,68
IPLV		6	5,24	5,23	5,20	5,12	5,04

The Product is compliant with the ErP (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 811/2013 (rated heat output ≤ 70 kW at specified reference conditions) and the Commission delegated Regulation (EU) No 813/2013 (rated heat output ≤ 400 kW at specified reference conditions).
Contains fluorinated greenhouse gases'(GWP 675).

1. Entering/leaving water temperature user side 23/18 °C, Entering external exchanger air temperature 35 °C.
2. EER (EN 14511:2018) cooling performance coefficient. Ratio between delivered coolimg capacitu and power input in compliance with EN 14511:2018.
3. User side entering/leaving water temperature 12/7 °C, external exchanger entering air 35 °C.
4. Data referred to unit operation with inverter frequency optimized for this application..
5. Data calculated according to the EN 14825:2016 Regulation.
6. Data compliant to Standard AHRI 550/590 referred to the following conditions: internal exchanger water temperature = 6,7 °C. Water flow-rate 0,043 l/s per kW. Entering external exchanger air temperature 35°C. Evaporator fouling factor = 0.18 x 10^(-4) m² K/W.

Indicative data subject to being updated.
Refer to the current Technical Bulletin.

1 GENERAL TECHNICAL DATA

CLIVET

WSAT-YES

Construction

SIZE			18.2	20.2	25.2	30.2	35.2
Compressor							
Compressor type			ROTARY INVERTER			SCROLL INVERTER	
Refrigerant					R32		
N° compressor		Nr	2	2	2	2	2
Oil charge		l	5	5	6	6	6
Refrigerant charge		Kg	6,3	6,3	9,0	9,0	9,0
N° circuits		Nr	1	1	1	1	1
User side exchanger							
Type of internal exchanger	1				BPHE		
Water content		l	5,7	5,7	7,8	7,8	7,8
External Section Fans							
Fans type					BRUSHLESS DC MOTOR		
N° fans		Nr	2	2	3	3	3
Standard air-flow		l/s	6889	6889	10333	10333	10333
Installed unit power		kW	0,9	0,9	0,9	0,9	0,9
Water circuit							
Maximum water side pressure		MPa	1	1	1	1	1
Minimum circuit water volume in cooling	2	l	150	150	200	200	200
Total internal water volume		l	5,9	5,9	8,0	8,0	8,0
Power supply							
Standard power supply			400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N

1. BPHE = plate exchanger
2. Entering/leaving water temperature user side 15/10 °C, external exchanger entering air 25°C (U.R. = 85%) - Minimum water volume that does not consider the volume of water inside the unit.

Overload and control device calibrations

		Open	Close	Value
Refrigerant side				
High pressure safety switch	kPa	4200	3200	-
Low pressure safety switch	kPa	50	130	-
Low pressure safety valve	kPa	-	-	3000
Compressor discharge high temperature safety thermostat	°C	115	75	-
Water side				
Antifreeze protection	°C	4	20	-
High pressure safety valve	kPa	-	-	600*

* The value entered refers to units supplied with a hydronic group installed on board

Indicative data subject to being updated.
Refer to the current Technical Bulletin.

WSAT-YES FC

Performance

SIZE			18.2	20.2	25.2	30.2	35.2
Radiant panels							
Cooling							
Cooling capacity (EN 14511:2018)	kW	1/4	58,6	68,5	83,7	89,8	103
EER (EN 14511:2018)		2	4,00	3,69	4,14	3,99	3,74
Water flow-rate	l/s	1	2,8	3,3	4,0	4,3	4,9
User side exchanger pressure drops	kPa	1	30,4	40,6	41,4	47,4	61,2
Terminal unit							
Cooling							
Cooling capacity (EN 14511:2018)	kW	3	50,4	56,2	68,6	73,6	80,8
EER (EN 14511:2018)		2	2,83	2,66	2,85	2,84	2,75
SEER (EN 14511:2018)		5	4,48	4,51	4,56	4,48	4,41
SEPR		7	5,84	5,61	5,52	5,45	5,38
Water flow-rate	l/s	5	2,4	2,7	3,3	3,5	3,9
User side exchanger pressure drops	kPa	3	22,9	28,1	28,3	32,4	38,8
Dati AHRI							
Cooling capacity (AHRI 550/590)	kW	6	58,2	65,6	76,7	83,7	90,7
Total power input (AHRI 550/590)	kW	6	12,9	14,6	16,5	18,7	20,8
COP_R		6	4,51	4,50	4,64	4,48	4,36
IPLV		6	4,85	4,88	4,85	4,77	4,70

The Product is compliant with the ErP (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 811/2013 (rated heat output ≤ 70 kW at specified reference conditions) and the Commission delegated Regulation (EU) No 813/2013 (rated heat output ≤ 400 kW at specified reference conditions)
Contains fluorinated greenhouse gases'(GWP 675)

1. Entering/leaving water temperature user side 23/18 °C, Entering external exchanger air temperature 35 °C
2. EER (EN 14511:2018) cooling performance coefficient. Ratio between delivered coolimg capacitu and power input in compliance with EN 14511:2018.
3. User side entering/leaving water temperature 12/7 °C, external exchanger entering air 35 °C
4. Data referred to unit operation with inverter frequency optimized for this application.
5. Data calculated according to the EN 14825:2016 Regulation
6. Data compliant to Standard AHRI 550/590 referred to the following conditions: internal exchanger water temperature = 6,7 °C. Water flow-rate 0,043 l/s per kW. Entering external exchanger air temperature 35°C. Evaporator fouling factor = 0.18 x 10^(-4) m2 K/W
7. Data compliant to EU regulation 2016/2281

Indicative data subject to being updated.
Refer to the current Technical Bulletin.

WSAT-YES FC

Construction

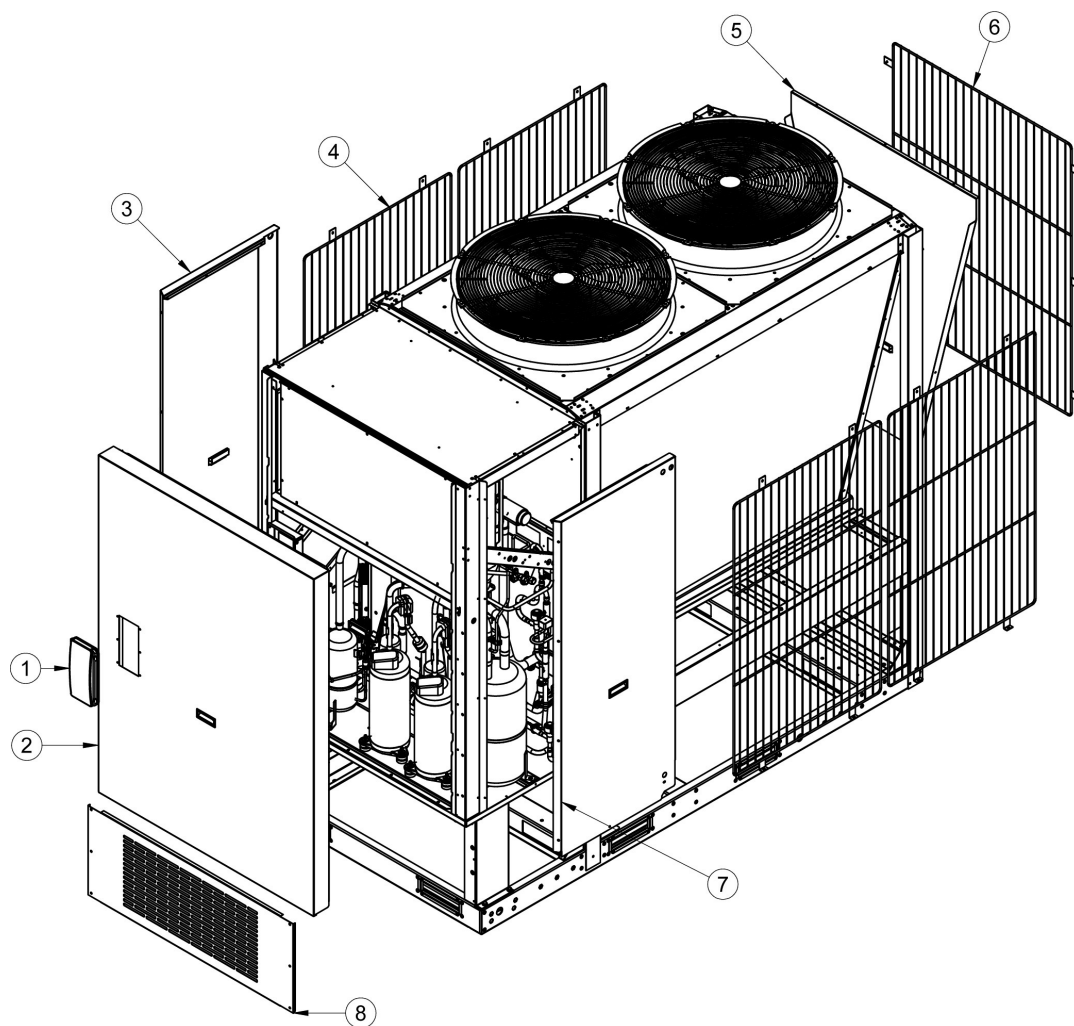| SIZE			18.2	20.2	25.2	30.2	35.2
Compressor							
Compressor type			ROTARY INVERTER			SCROLL INVERTER	
Refrigerant					R32		
N° compressor		Nr	2	2	2	2	2
Oil charge		I	5	5	6	6	6
Refrigerant charge		Kg	6,3	6,3	9,0	9,0	9,0
N° circuits		Nr	1	1	1	1	1
User side exchanger							
Type of internal exchanger	1				BPHE		
Water content		I	5,7	5,7	7,8	7,8	7,8
External Section Fans							
Fans type					BRUSHLESS DC MOTOR		
N° fans		Nr	2	2	3	3	3
Standard air-flow		I/s	6889	6889	10333	10333	10333
Installed unit power		kW	0,9	0,9	0,9	0,9	0,9
Water circuit							
Maximum water side pressure		MPa	1	1	1	1	1
Minimum circuit water volume in cooling	2	I	150	150	200	200	200
Total internal water volume		I	5,9	5,9	8,0	8,0	8,0
Power supply							
Standard power supply			400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N

1. BPHE = plate exchanger
2. Entering/leaving water temperature user side 15/10 °C, external exchanger entering air 25°C (U.R. = 85%) - Minimum water volume that does not consider the volume of water inside the unit.

Overload and control device calibrations

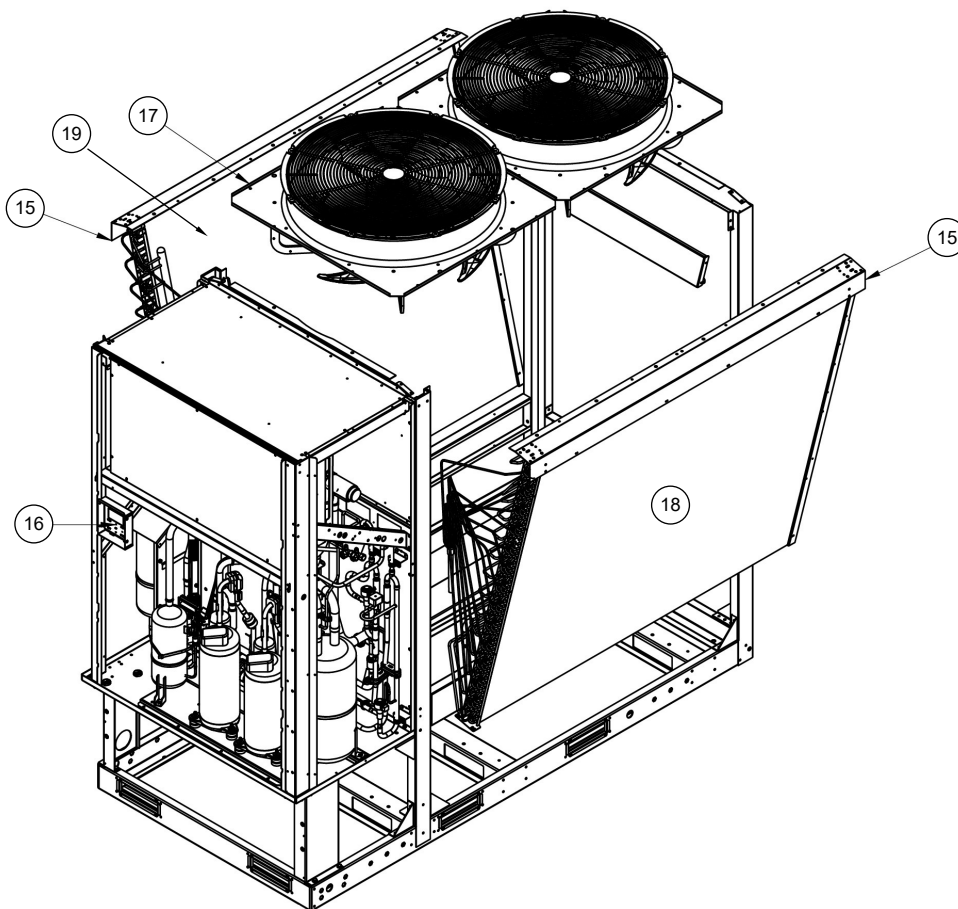|		Open	Close	Value
Refrigerant side				
High pressure safety switch	kPa	4200	3200	-
Low pressure safety switch	kPa	50	130	-
Low pressure safety valve	kPa	-	-	3000
Compressor discharge high temperature safety thermostat	°C	115	75	-
Water side				
Antifreeze protection	°C	4	20	-
High pressure safety valve	kPa	-	-	600*

* The value entered refers to units supplied with a hydronic group installed on board

Indicative data subject to being updated.
Refer to the current Technical Bulletin.

CLIVET

N.	CODE	DESCRIPTION
1	C8700962	DISPLAY COVER
2	RNST00002	FRONTAL PANEL
3	SRST00004	LEFT PANEL
4	C22410143	LATERAL GRILLE
5	SLST00003	BACK COVER
6	C22410144	BACK GRILLE
7	SRST00005	RIGHT PANEL
8	SLSM00045	FRONTAL COVER

The codes are subject to being updated.
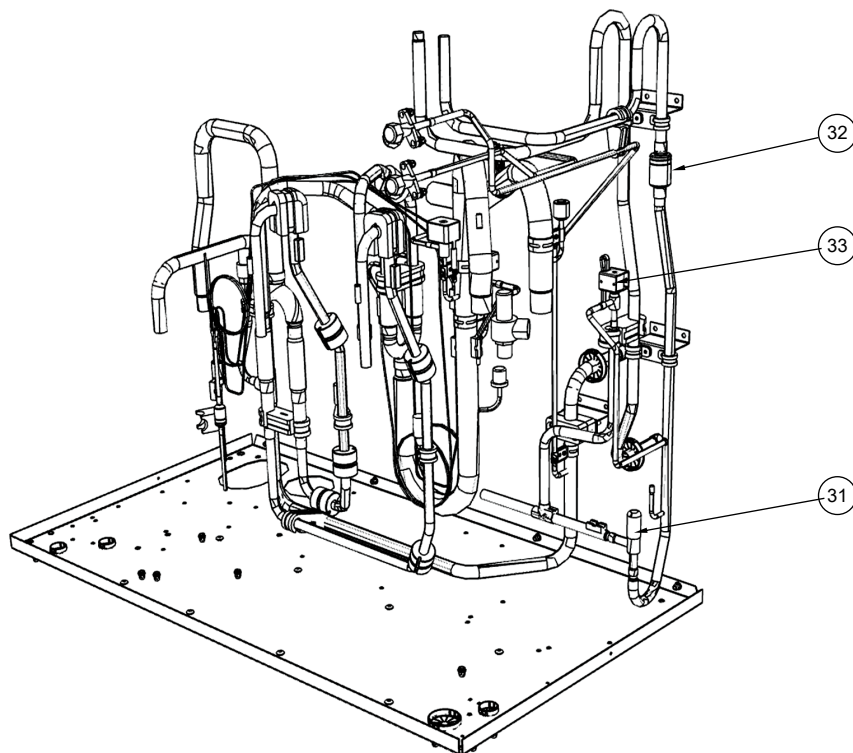
Check with Clivet before placing any orders.

No.	CODE	DESCRIPTION
16	CBMC00010	RIGHT /LEFT MICROCHANNEL COIL
15	17317100002875	HMI USER INTERFACE
17	SVSM00001	FAN ASSEMBLY
18	BWSF00001	FC RIGHT COIL
19	BWSF00002	FC LEFT COIL

The codes are subject to being updated.

Check with Clivet before placing any orders.

CLIVET
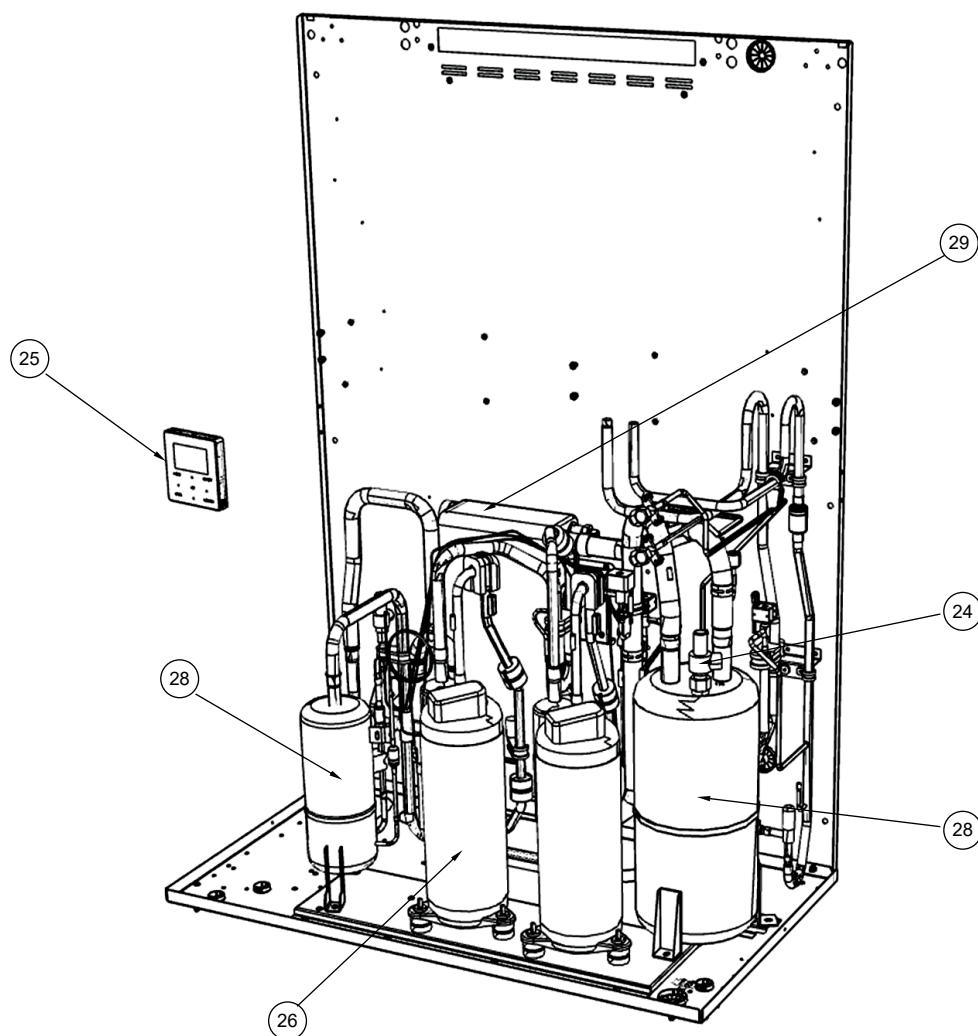
No.	CODE	DESCRIPTION
24	C7460147	SAFETY VALVE
25	17317100002875	HMI USER INTERFACE
26	C10810017	ROTARY COMPRESSOR
27	15500501001470	LIQUID SEPARATOR
28	15500501001473	OIL SEPARATOR
29	C31110284	PLATE HEAT EXCHANGER

The codes are subject to being updated.
Check with Clivet before placing any orders.

No.	CODE	DESCRIPTION
31	C50010053	EXVB ELECTRONIC EXPANSION VALVE
32	15500504000096	MESH FILTER
33	15500205000880	SOLENOID VALVE

The codes are subject to being updated.
Check with Clivet before placing any orders.
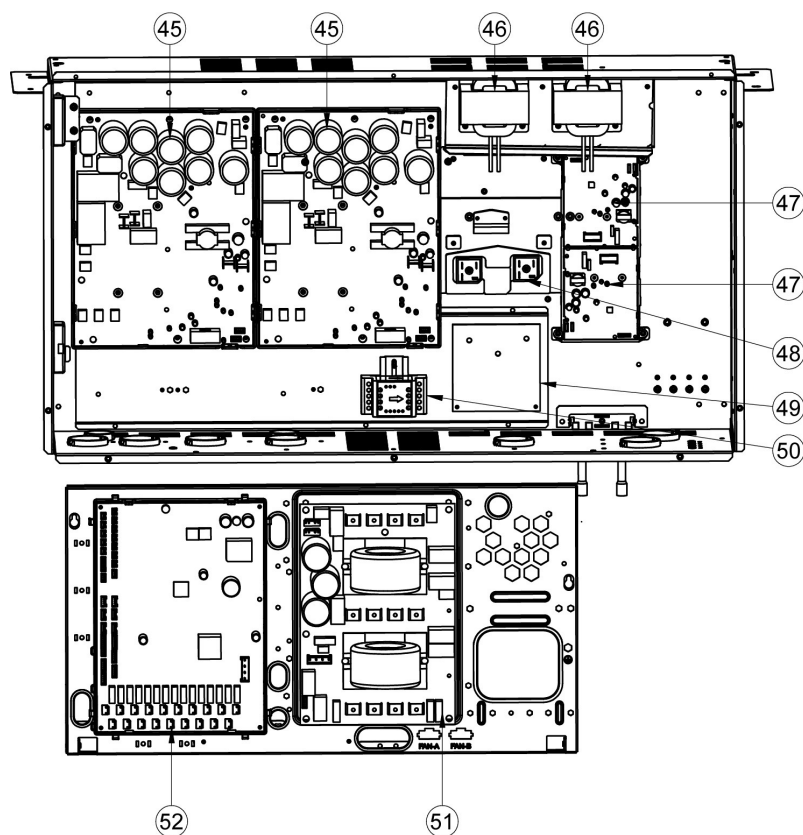
No.	CODE	DESCRIPTION
45	17127100001003	INVERTER COMPRESSOR BOARD
46	17400306000303	REACTOR R2503C
47	17127100001026	INVERTER FAN BOARD
48	11201418000049	BRIDGE RECTIFIER SBR-BR-35/100-B-01
49	17127000007540	FILTER BOARD
50	17227100001124	PHASE MONITOR
51	17127000009856	INTERFERENCE SUPPRESSION BOARD
52	17127100001725	MAIN CONTROL BOARD

The codes are subject to being updated.
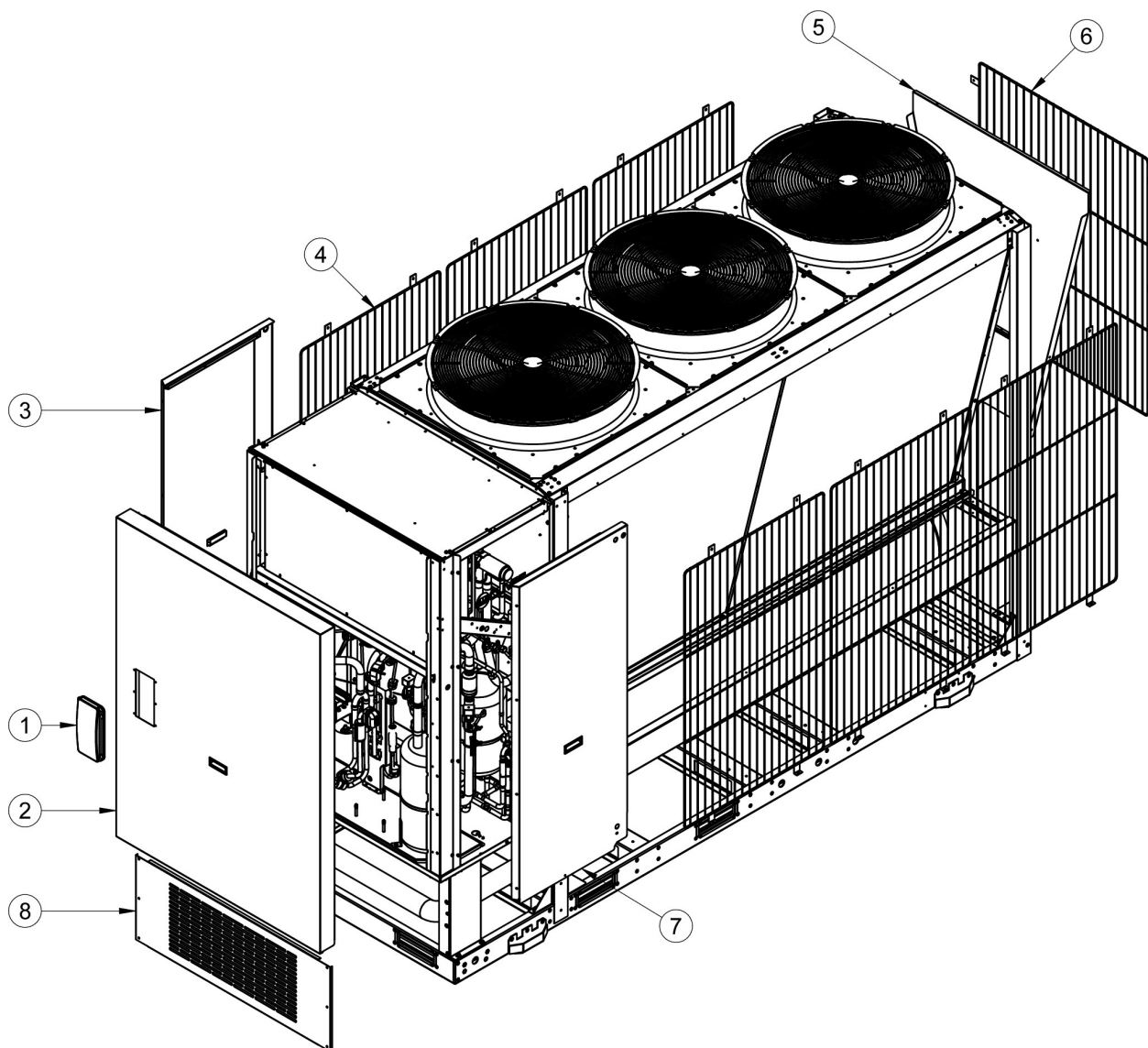Check with Clivet before placing any orders.

VERSION: FREE COOLING
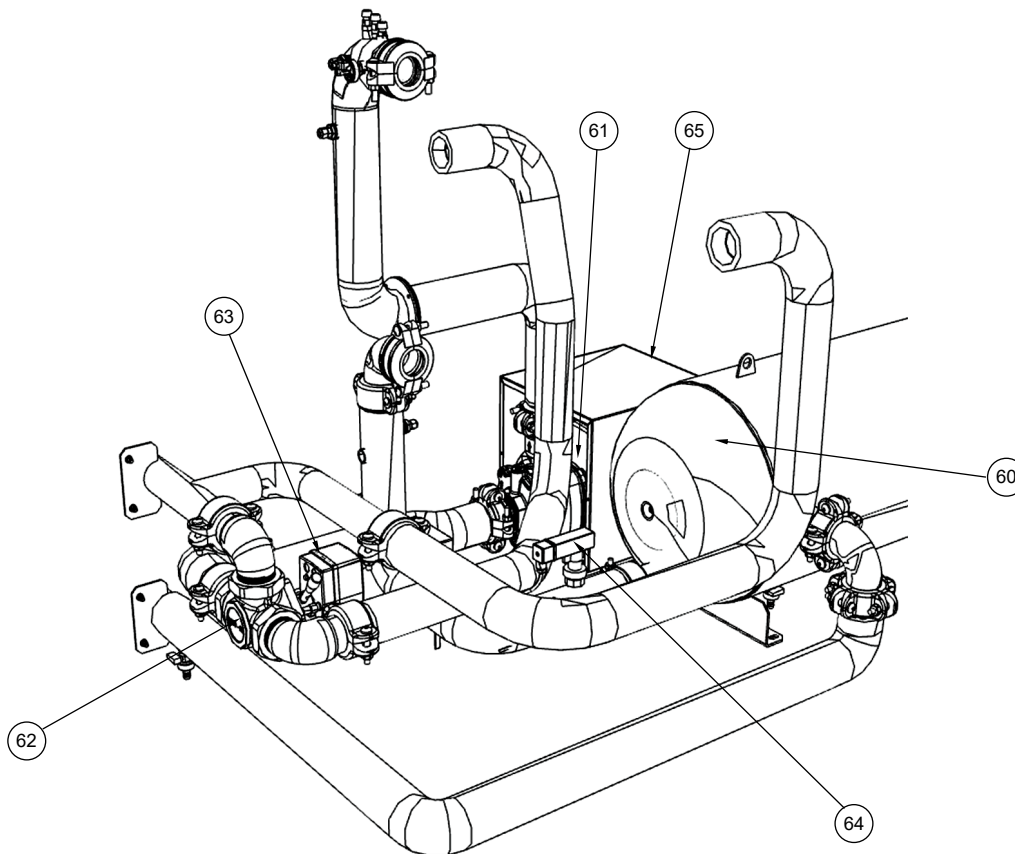
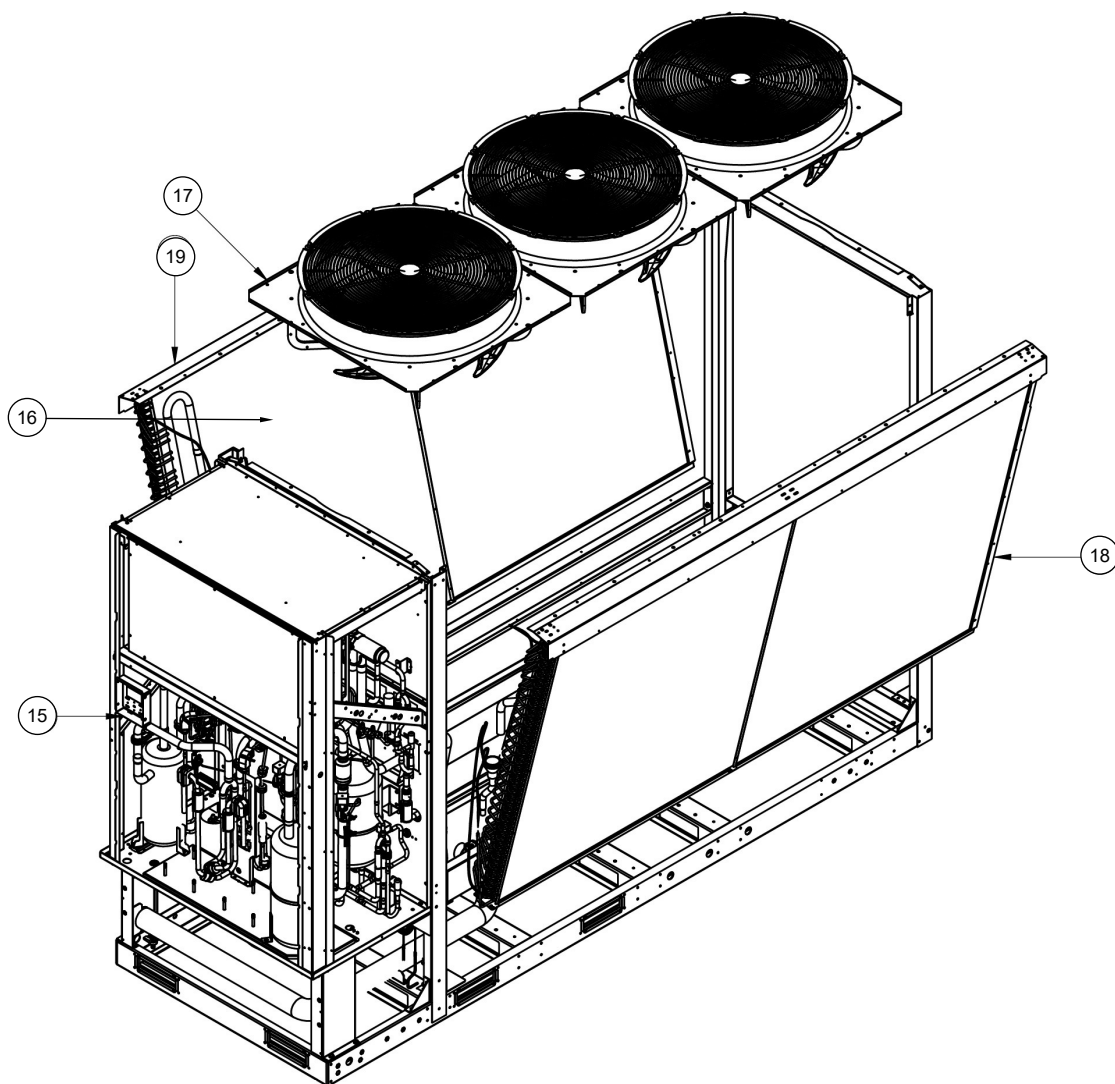| No.	CODE	DESCRIPTION
60	C31710051	WATER TANK
61	C40710144	INVERTER WATER PUMP
62	C50210003	3 WAY VALVE
63	C50310011	3 WAY VALVE ACTUATOR
64	C51500002	FLOW SWITCH
65	CSSM00049	PUMP COVER

Cooling only version:
Water components are the same unless pipes for water coils

The codes are subject to being updated.

Check with Clivet before placing any orders.

N.	CODE	DESCRIPTION
1	C8700962	DISPLAY COVER
2	RNST00002	FRONTAL PANEL
3	SRST00004	LEFT PANEL
4	C22410143	LATERAL GRILLE
5	SLST00003	BACK COVER
6	C22410144	BACK GRILLE
7	SRST00005	RIGHT PANEL
8	SLSM00045	FRONTAL COVER

The codes are subject to being updated.

Check with Clivet before placing any orders.

No.	CODE	DESCRIPTION
16	CBMC00011	RIGHT /LEFT MICROCHANNEL COIL
15	17317100002875	HMI USER INTERFACE
17	SVSM00001	FAN ASSEMBLY
18	BWSF00005	FC RIGHT COIL
19	BWSF00006	FC LEFT COIL

The codes are subject to being updated.

Check with Clivet before placing any orders.
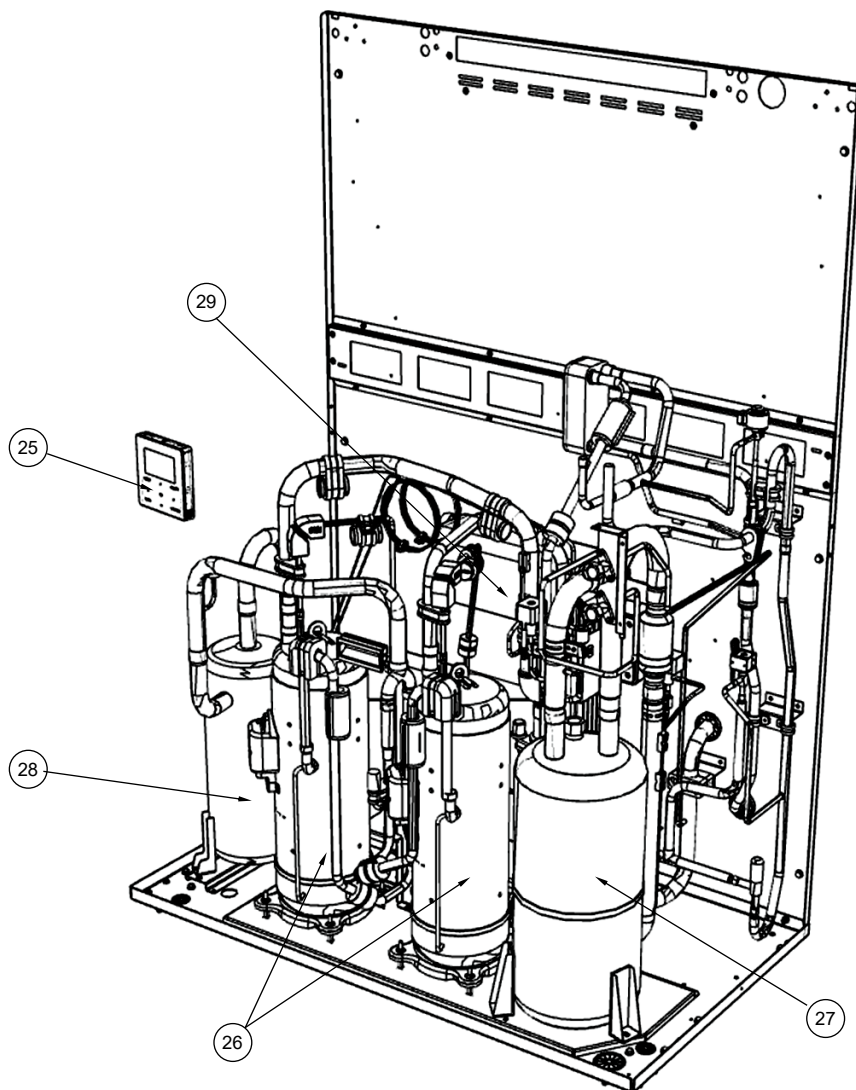
No.	CODE	DESCRIPTION
25	17317100002875	HMI USER INTERFACE
26	C10710099	SCROLL COMPRESSOR
27	15500501001470	LIQUID SEPARATOR
28	15500501001474	OIL SEPARATOR
29	C31110285	PLATE HEAT EXCHANGER

The codes are subject to being updated.
Check with Clivet before placing any orders.
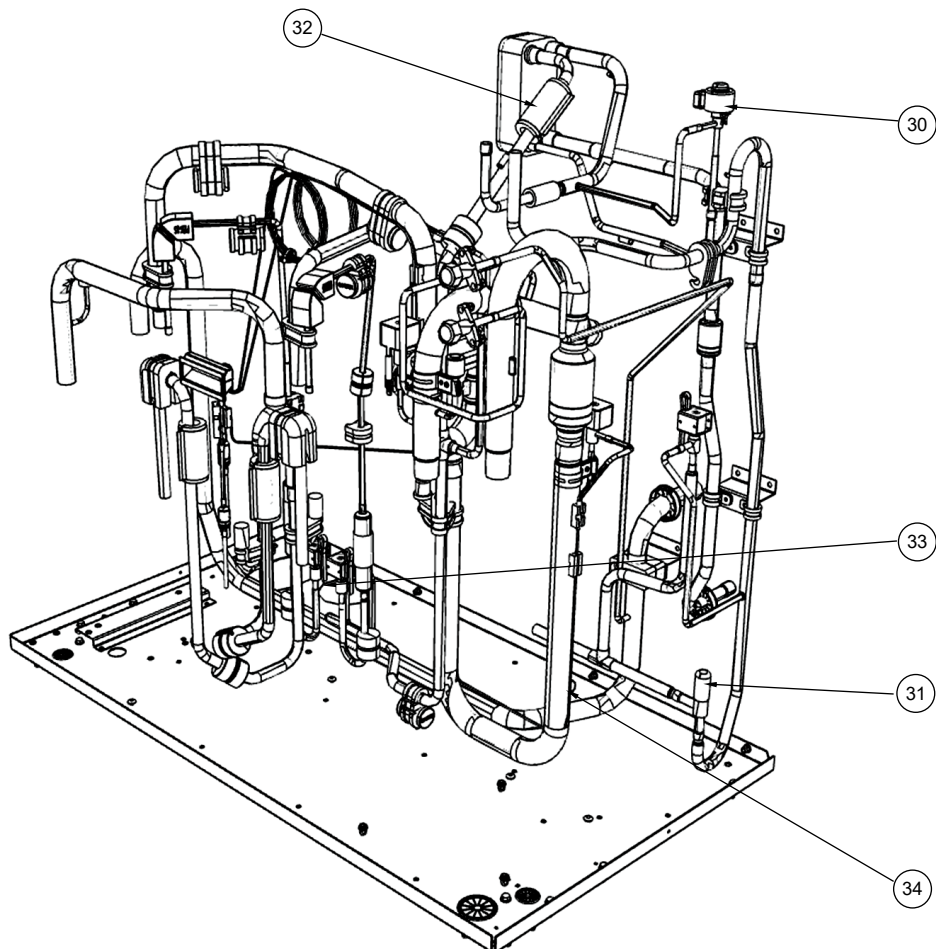
No.	CODE	DESCRIPTION
30	15500213001487	EXVC ELECTRONIC EXPANSION VALVE
31	C50010053	EXVB ELECTRONIC EXPANSION VALVE
32	C31110296	ECONOMIZER
33	15500205000880	SOLENOID VALVE
34	C7460184	SAFETY VALVE

The codes are subject to being updated.

Check with Clivet before placing any orders.
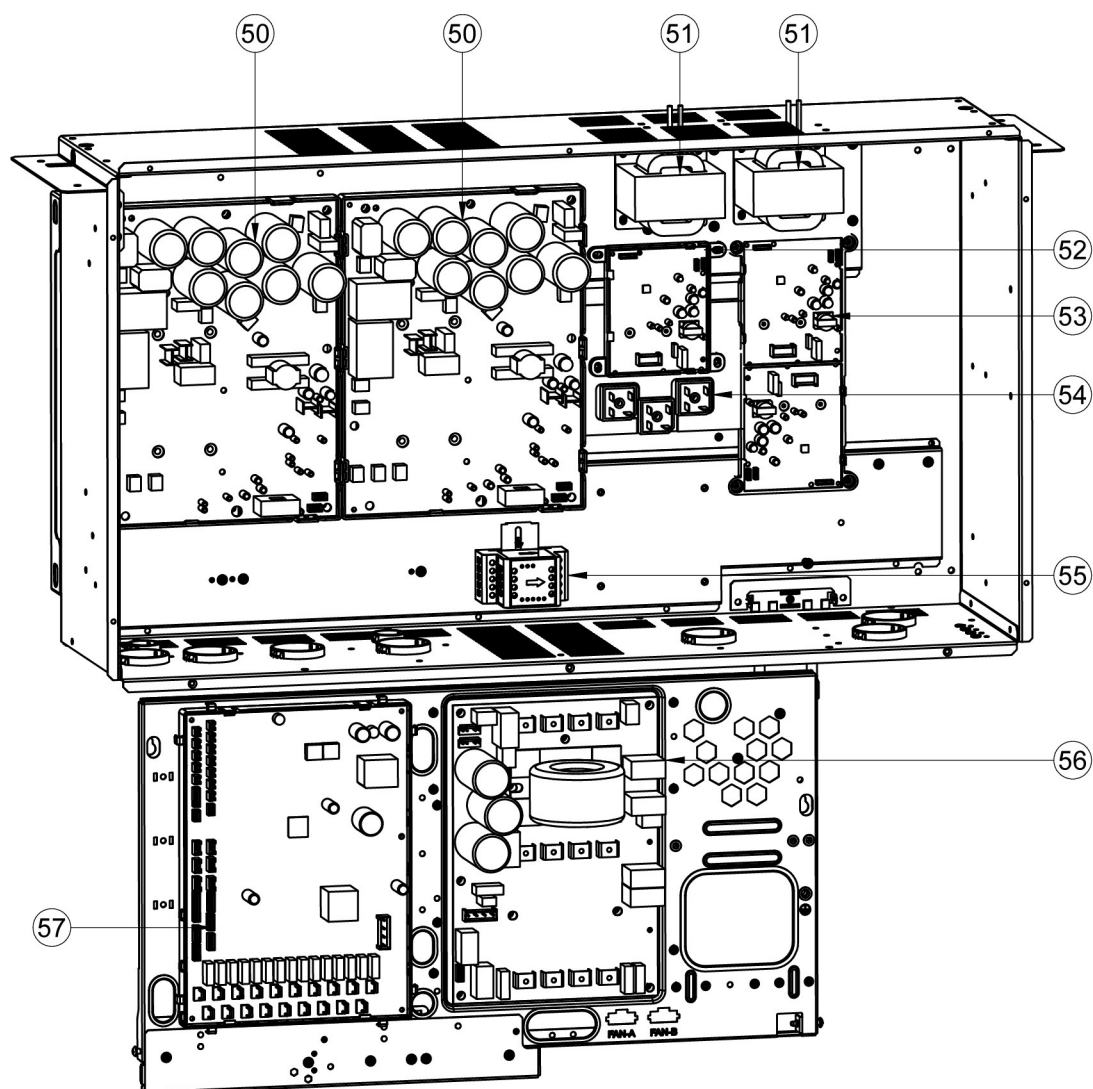
No.	CODE	DESCRIPTION
50	17127000009840	INVERTER COMPRESSOR BOARD
51	17400306000703	REACTOR R4015G(1.5mH/40A)
52	17127000009148	INVERTER FAN BOARD
53	17127000009144	INVERTER FAN BOARD ASSEMBLED
54	11201418000049	BRIDGE RECTIFIER SBR-BR-35/100-B-01
55	17227100001124	PHASE MONITOR
56	17127000009856	INTERFERENCE SUPPRESSION BOARD
57	17127100001723	MAIN CONTROL BOARD

The codes are subject to being updated.
Check with Clivet before placing any orders.

VERSION: FREE COOLING
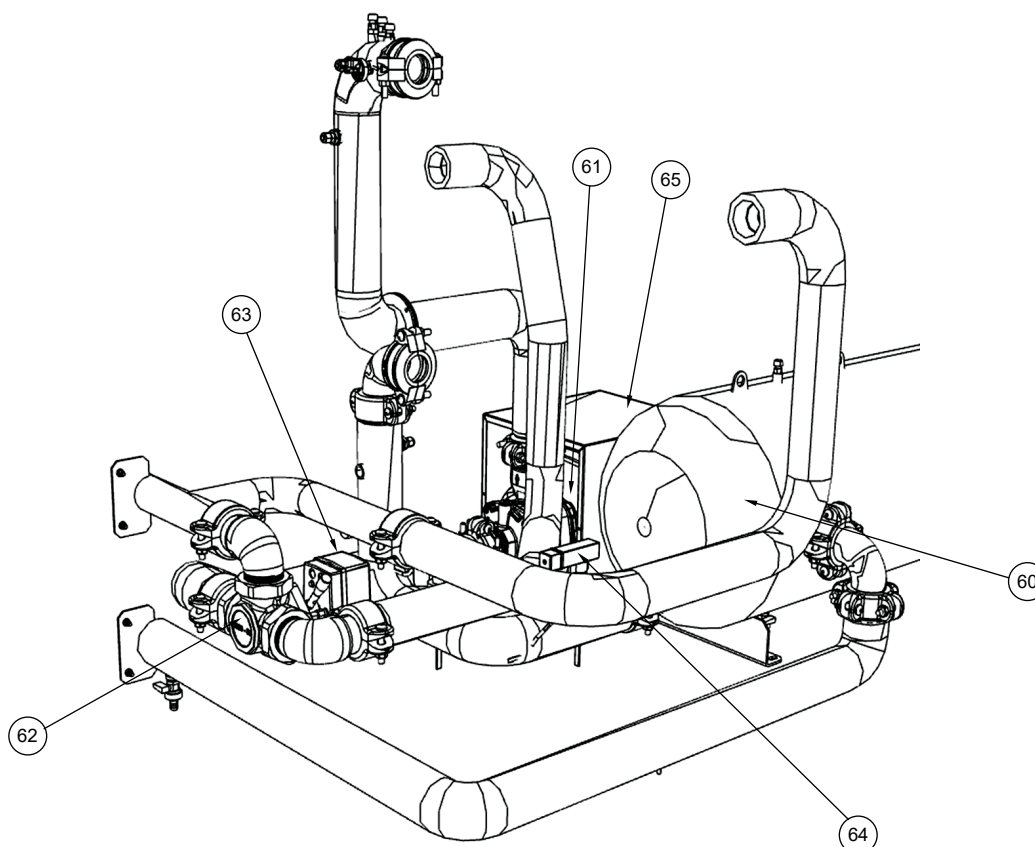
No.	CODE	DESCRIPTION
60	C31710053	WATER TANK
61	C40710164	INVERTER WATER PUMP
62	C50210003	3 WAY VALVE
63	C50310011	3 WAY VALVE ACTUATOR
64	C51500002	FLOW SWITCH
65	CSSM00049	PUMP COVER

Cooling only version:
Water components are the same unless pipes for water coils

The codes are subject to being updated.

Check with Clivet before placing any orders.

CLIVET

VERSION: COOLING

TpB	DISCHARGE TEMPERATURE CONTROL SWITCH B
H-SW	HIGH PRESSURE SWITCH
L-PRO	LOW PRESSURE SWITCH
Pro-W	WATER FLOW SWITCH
Tp1-Tp2	DISCHARGE INVERTER COMPRESSOR 1-2 DISCHARGE TEMPERATURE
Tfa2	WATER SIDE ANTIFREEZE TEMP.
EH	ELECTRIC HEATER
SV2	SOLENOID VALVE
IV	ISOLATING VALVE
AC	CHARGE ACCESS
CC	CRIMPED CAPPILLARY
VSU	HIGH PRESSURE SAFETY VALVE WATER SIDE
VSB	LOW PRESSURE SAFETY VALVE
VSA	HIGH PRESSURE SAFETY VALVE
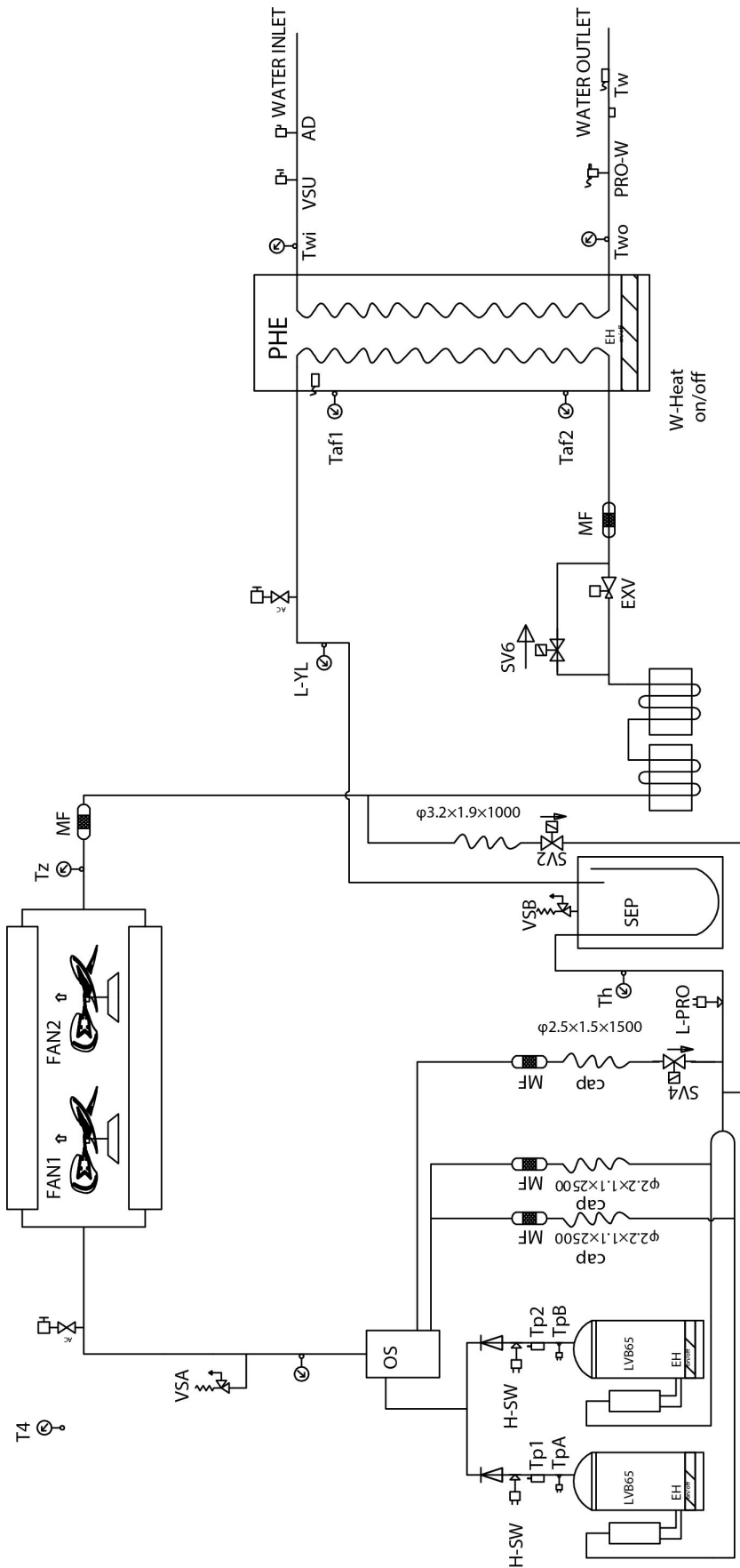
Functional components	
SYMBOLS	DESCRIPTION
T4	OUTDOOR AMBIENT TEMPERATURE PROBE
Tz	TOTAL COLD OUTLET PROBE
Twi	UNIT WATER INLET TEMPERATURE PROBE
Two	UNIT WATER OUTLET TEMPERATURE PROBE
SV4	FAST OIL RETURN SOLENOID VALVE
CAP1	CAPILLARY
PHE	PLATE EXCHANGER (EVAPORATOR)
L-YL	PRESSURE SENSOR LOW SIDE
TpA	DISCHARGE TEMPERATURE CONTROL SWITCH A
FAN1, FAN2	FAN
OS	OIL SEPARATOR
SEP	LIQUID SEPARATOR
EXV	ELECTRONIC EXPANSION VALVE
CLR	PCB COOLER
Th	SYSTEM RETURN REF. TEMPERATURE PROBE
PU	PUMP
MF	MESH FILTER

LINEE TUBAZIONE:
- Linea attraversata da fluido
- Linea coibentata
- Linea NON attraversata da fluido
- Linea ausiliaria o di servizio
- Linea acqua

VERSION: FREE-COOLING

SYMBOLS	Functional components DESCRIPTION
T4	OUTDOOR AMBIENT TEMPERATURE PROBE
Tz	TOTAL COLD OUTLET PROBE
Twi	UNIT WATER INLET TEMPERATURE PROBE
Two	UNIT WATER OUTLET TEMPERATURE PROBE
SV4	FAST OIL RETURN SOLENOID VALVE
CAP1	CAPILLARY
PHE	PLATE EXCHANGER (EVAPORATOR)
L-YL	PRESSURE SENSOR LOW SIDE
H-YL	PRESSURE SENSOR HIGH SIDE
FAN1, FAN2	FAN
OS	OIL SEPARATOR
SEP	LIQUID SEPARATOR
EXV	ELECTRONIC EXPANSION VALVE
CLR	PCB COOLER
Th	SYSTEM RETURN REF. TEMPERATURE PROBE
PU	PUMP
MF	MESH FILTER
TpA	DISCHARGE TEMPERATURE CONTROL SWITCH A

TpB	DISCHARGE TEMPERATURE CONTROL SWITCH B
H-SW	HIGH PRESSURE SWITCH
L-PRO	LOW PRESSURE SWITCH
Pro-W	WATER FLOW SWITCH
Tp1-Tp2	DISCHARGE INVERTER COMPRESSOR 1-2 DISCHARGE TEMPERATURE
Tfa2	WATER SIDE ANTIFREEZE TEMP.
EH	ELECTRIC HEATER
SV2	SOLENOID VALVE
IV	ISOLATING VALVE
AC	CHARGE ACCESS
CC	CRIMPED CAPPILLARY
VSU	HIGH PRESSURE SAFETY VALVE WATER SIDE
VSB	LOW PRESSURE SAFETY VALVE
VSA	HIGH PRESSURE SAFETY VALVE

LINEE TUBAZIONE:

Linea attraversata da fluido
Linea coibentata
Linea NON attraversata da fluido
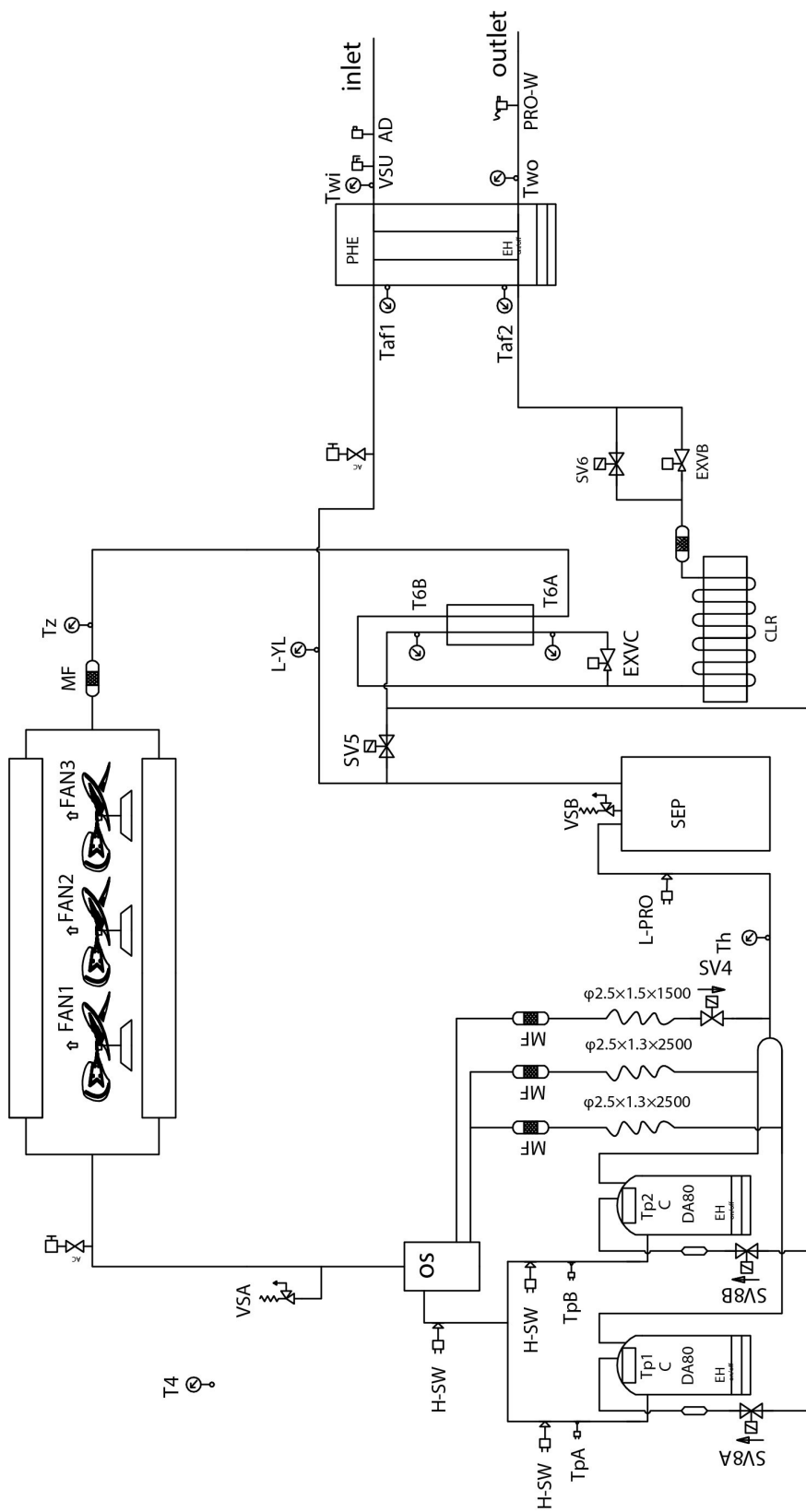Linea ausiliaria o di servizio
Linea acqua

VERSION: COOLING

Functional components	
SYMBOLS	DESCRIPTION
T4	OUTDOOR AMBIENT TEMPERATURE PROBE
Tz	TOTAL COLD OUTLET PROBE
Twi	UNIT WATER INLET TEMPERATURE PROBE
Two	UNIT WATER OUTLET TEMPERATURE PROBE
SV4	FAST OIL RETURN SOLENOID VALVE
PHE	PLATE EXCHANGER (EVAPORATOR)
L-YL	PRESSURE SENSOR LOW SIDE
MF	MESH FILTER
FAN1, FAN2	FAN
VNR	CHECK VALVE
OS	OIL SEPARATOR
SEP	LIQUID SEPARATOR
EXVC	ELECTRONIC EXPANSION VALVE
EXVB	ELECTRONIC EXPANSION VALVE
CLR	PCB COOLER
Th	SYSTEM RETURN REF. TEMPERATURE PROBE

TpA	DISCHARGE TEMPERATURE CONTROL SWITCH A
TpB	DISCHARGE TEMPERATURE CONTROL SWITCH B
H-SW	HIGH PRESSURE SWITCH
L-PRO	LOW PRESSURE SWITCH
Pro-W	WATER FLOW SWITCH
Tp1-Tp2	DISCHARGE INVERTER COMPRESSOR 1-2 DISCHARGE TEMPERATURE
Taf2	WATER SIDE ANTIFREEZE TEMP.
Taf1	WATER SIDE ANTIFREEZE TEMP.
EH	ELECTRIC HEATER
SV6	SOLENOID VALVE
IV	ISOLATING VALVE
VSA	HIGH PRESSURE SAFETY VALVE
VSB	LOW PRESSURE SAFETY VALVE
AC	CHARGE ACCESS
CC	CRIMPED CAPPILLARY
SV8A/B	SOLENOID VALVE (INJECTION VALVE)

VERSION: FREE-COOLING

Functional components	
SYMBOLS	DESCRIPTION
T4	OUTDOOR AMBIENT TEMPERATURE PROBE
Tz	TOTAL COLD OUTLET PROBE
Twi	UNIT WATER INLET TEMPERATURE PROBE
Two	UNIT WATER OUTLET TEMPERATURE PROBE
SV4	FAST OIL RETURN SOLENOID VALVE
PHE	PLATE EXCHANGER (EVAPORATOR)
L-YL	PRESSURE SENSOR LOW SIDE
H-YL	PRESSURE SENSOR HIGH SIDE
FAN1, FAN2	FAN
VNR	CHECK VALVE
OS	OIL SEPARATOR
SEP	LIQUID SEPARATOR
EXVC	ELECTRONIC EXPANSION VALVE
EXVB	ELECTRONIC EXPANSION VALVE
CLR	PCB COOLER
Th	SYSTEM RETURN REF. TEMPERATURE PROBE
MF	MESH FILTER

TpA	DISCHARGE TEMPERATURE CONTROL SWITCH A
TpB	DISCHARGE TEMPERATURE CONTROL SWITCH B
H-SW	HIGH PRESSURE SWITCH
L-PRO	LOW PRESSURE SWITCH
Pro-W	WATER FLOW SWITCH
Tp1-Tp2	DISCHARGE INVERTER COMPRESSOR 1-2 DISCHARGE TEMPERATURE
Taf2	WATER SIDE ANTIFREEZE TEMP.
Taf1	WATER SIDE ANTIFREEZE TEMP.
EH	ELECTRIC HEATER
SV6	SOLENOID VALVE
IV	ISOLATING VALVE
VSA	HIGH PRESSURE SAFETY VALVE
VSB	LOW PRESSURE SAFETY VALVE
AC	CHARGE ACCESS
CC	CRIMPED CAPPILLARY
SV8A/B	SOLENOID VALVE (INJECTION VALVE)

4 CONTROL

OPERATING CONDITIONS
Power Supply

Phase	Voltage	Frequency
3N	380~415V	50Hz

OPERATION RANGE
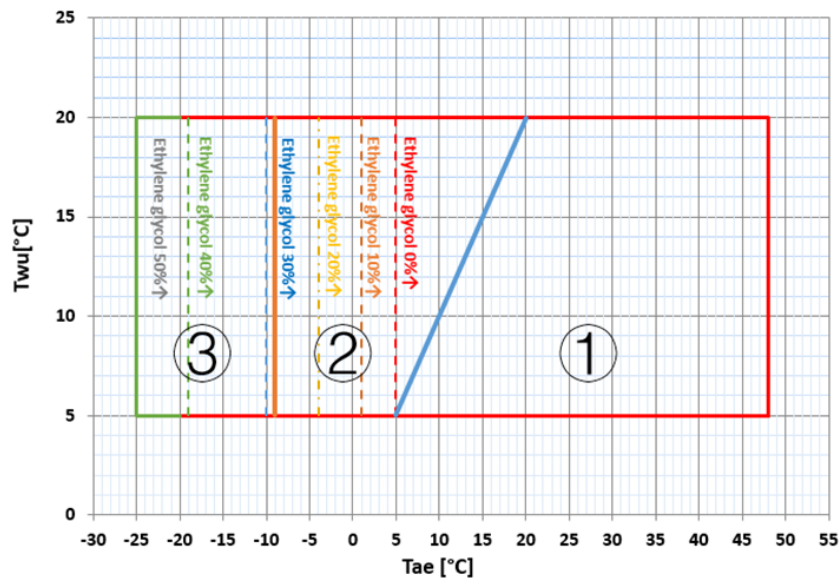Operating Ambient Temperature Range of the Unit

	60kW	90kW
Cooling	-20~48℃	-20~48℃

* Considering solar radiation, the actual shutdown condition is 65°C

Cooling only
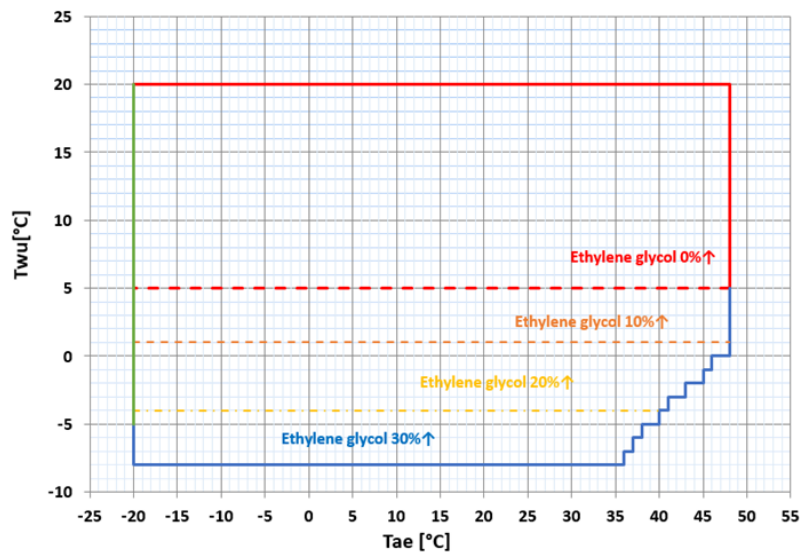
Free cooling

Water Temperature Control Range

The unit is controlled according to the outlet water temperature, here is the water temperature control range:

Normal cooling（Tsafe=5°C）	（T4≥10°C）	Default 5~20°C
	（-20≤T4<10°C）	Default 5~20°C
Low cooling（Tsafe<5°C）	T4>48°C	5~20°C
	10°C<T4≤48°C	Max[0.21×（T4-48）,Tsafe] ~20°C
	T4≤10	Max(-8,Tsafe)~20°C

0.21×（T4-48）explain：

T4	[11,12]	[13,16]	[17,21]	[22,26]	[27,31]	[32,36]	[37,40]	[41,48]
Value	-7	-6	-5	-4	-3	-2	-1	0

Note：The selection of control range of cooling water temperature is realized by judging Tsafe, and the temperature range is written into the program.

Ethylene Percent	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Propylene percent	0~5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	/
freezing temperature	0	-2	-3.9	-6.5	-8.9	-11.8	-15.6	-19	-23.4	-30.4	-33
safety temperature	5	3	1	-1	-4	-6	-10	-14	-15	-15	-15
anti-freeze temperature	4	2	0	-2	-5	-7	-11	-15	-20	-26	-29
lowest Tws	5	3	1	-1	-4	-6	-8	-8	-8	-8	-8
temp difference	5	5	4.9	5.5	4.9	5.8	5.6	5	8.4	15.4	18

4 CONTROL

List of components

No	Part	Specifications	Cooling only		Free cooling	
			60	90	60	90
1	DC inverter compressor	60kW： LVB65FAEMC	2	2	2	2
		90kW：DA80PHDG-D1Y6				
2	Compressor heating belt	60kW：DJRD-450A-1500-25W-VHR	2	2	2	2
		90kW：DJRD-516A-2400-30W-VHR				
3	Exhaust temperature Tp1/2	CGQ-WD/PQ3950-L1000-SMP3-G800	2	2	2	2
4	Exhaust temperature switch	PQWKQ-115/75-1700-AMP	2	2	2	2
5	Exhaust check valve	DXF-41A	2	0	2	0
6	High voltage switch	YK-4.2/3.2-C-1200-KET(UL)	1	2	1	2
7	Oil separator	60kW：YFLQ-06VA（A）	1	1	1	1
		90kW：YFLQ-08X（A）				
9	DC fan	ZKSN-920-8-9 （Storm）	2	3	2	3
9.1	DC fan	ZKSN-750-8-10 （Sheen 60kW）	2	3	/	/
		ZKSN-920-8-9 （Sheen 90kW）				
10	Coils	Sanhua/Dunan Microchannel	CL08	CL09	CL08	CL09
12	Tz total outlet temperature of outdoor heat exchanger	CGQ-WD/GW4100-L1300-SMP3B	1	1	1	1
13	Filters before and after the electronic EXV	60kW：GLQ-41B 80目	2	2	2	2
		90kW：GLQ-41B 80目				
16	EXVB	PAM-BA2YGMISZ-1 4.8mm	1	1	1	1
17	SV6	FDF6A-048-RK	1	1	1	1
21	Refrigerant radiator	9.52mm, 4U	1	1	1	1
22	Plate replacement heating belt	DJRD-390X90D-2000-35W-VHR	1	1	1	1
23	Antifreeze temperature on water side Taf1/2	CGQ-WD/GW3970-L1600-AMP2	2	2	2	2
24	Pressure Sensor	CGQ-YL-NSK-BH020D-U643	1	1	1	1
25	Refrigerant safety valve	D10/CS Cat: 4 DCV: 1/2" NPT OR: 10 mm Ps: 30 bar D7/CS Cat: 4 DCV: 1/4" NPT OR: 7 mm Ps: 42 bar	2	2	2	2
26	Liquid separator	QYFLQ-44V(A):vol. 14.7L，diam. 32，hole oil return 2.5	1	1	1	1
27	Total return air filter	80	0	1	0	1
28	Th return air temperature	CGQ-WD/GW4100-L1300-SMP3B	1	1	1	1
29	Low voltage switch	YK-0.3/0.14-O-800	1	1	1	1
30	Quick return oil filter	GLQ-46A	1	1	1	1

30	Quick return oil filter	GLQ-46A	1	1	1	1
31	Quick oil return capillary	2.5*1.5*1500	1	1	1	1
32	Solenoid valve SV4	FDF2A-217-PK (L1250,VHR)	1	1	1	1
33	Oil filter	GLQ-03V	1	1	1	1
34	Oil capillary	2.2*1.1*2500	1	1	1	1
35	T4 outdoor ambient temperature	CGQ-WD/SW4100-L2600-SMP2	1	1	1	1
36	Twi inlet water temperature	CGQ-WD/GW3970-L1600-AMP2	1	1	1	1
37	Water safety valve	AQF-06-G1/2	1	1	1	1
38	Vent	PQF-03	1	1	1	1
39	Two outlet temperature	CGQ-WD/GW3970-L1600-AMP2	1	1	1	1
40	Flow switch	SLKG-117-42-2200	1	1	1	1
41	Manual drain valve	RSJ-15/190RDN3-C.ZL.1.50-1	1	1	1	1
42	Tw total outlet water temperature	CGQ-WD/GW3970-L10000-AMP2	1	1	1	1
43	BPHE	60kW：ACK73-112AH-F 90kW：ACK73-152AH-F	1	1	1	1
44	Spray capillary	3.2*1.9*600	1	0	1	0
45	Solenoid valve SV2	FDF6A-048-RK	1	0	1	0
46	Target current heating belt	DJRD-390X90D-2000-35W	1	1	1	1
47	Refrigerant stop valve	GYF-A26N1	2	2	2	2
48	Module temperature Tf1/Tf2	CGQ-WD/SW3965-L800-XAP2-P765+CGQ-WD/PQ3965-L2000-XAP2-P1960	2	2	2	2
50	Water pressure switch	SFS 101 M1	1	1	1	1
51	HMI	KJRM-120H/BMWK02-E	1	1	1	1
52	Economizer	C12L-EZ-30	0	1	0	1
53	EXVC	BD24FKS(L)	0	1	0	1
54	Temperature sensor T6a	CGQ-WD/GW4100-L1700-SMP3B	0	1	0	1
55	Temperature sensor T6b	CGQ-WD/GW4100-L1700-SMP3B	0	1	0	1
56	Injection solenoid valve SV8A/B	FDF6A-048-RK	0	2	0	2
57	Solenoid valve SV5	FDF6A-048-RK	0	1	0	1
58	Sound reducer	ZYG-26	0	2	0	2
59	Refrigerant/kg	R32	6.3	9	6.3	9
60	Oil added/L	60kW: Idemitsu Kosan FW68S 90kW: Idemitsu Kosan FW68H	0	2	0	2
61	High pressure sensor H-YL	CGQ-YL-NSK-BD046D-U477-00	/	/	1	1
62	3-way valve (SV1)	MUT VDM3	/	/	1	1
63	Water coils	Type	/	/	corrugated sheet	corrugated sheet
		Pass			1.8	1.8
		Pipe diameter			9.52	9.52
		Pipe distance			25	25
		Rows			2	2
		Row spacing			21.65	21.65
		N. tubes per row			56	56

Settable parameter by Wired controller

|	Setting Content	Symbol	Setting Range	Default Value	Adjustment Range
Double setpoint	Double setpoint	Double setpoint	Enable/disable	Enable	/
Dual temperature setting function	The first setpoint	Setpoint_Cool_1	max(-8,Tsafe)~20°C	7°C	1
	The second setpoint	Setpoint_Cool_2	max(-8,Tsafe)~20°C	7°C	1
TEMPERATURE COMPENSATION	Temperature Compensation Point 1 in Cooling Mode	T4_cool_1	25~30°C	25°C	1°C
	Temperature Compensation Point 2 in Cooling Mode	T4_cool_2	30~40°C	35°C	1°C
	Cooling Temperature Compensation Value	Offset_C	0~15°C	10°C	1°C
	Set	Temp_Compensation	Enable/Disable	Disable	/
Cooling Hysteresis Temperature		Tw_cool_Diff	1~5°C	2°C	1°C
Safety temp		Tsafe	Only view	-5°C	/
Safety pressure		Paf	Only view	0.7Mpa	/
Free cooling	Offset of Tws	DtTws	1~3°C	1°C	1°C
	Hysteresis of mixed mode	Dtmix	1~3°C	2°C	1°C
	Offset of FC	Fcoffset	1~15°C	3°C	1°C
	Hysteresis of FC	Fchyster	1~3°C	1°C	1°C
Multi-module capability regulation cycle		Tim_Cap_Adj	60s~360s	80s	20s
Total outlet hysteresis temperature		Tw_diff	1~5°C	2°C	1°C
First start ratio		Ratio_cool_first	0~100%	50%	5%
The inlet and outlet water protects the temperature difference		T_Diff_Pro	8~15°C	12°C	1°C
HEATER1	/	Enable/disable	Enable/disable	Enable	/
	/	Temp_AuxHeatON	0~10°C	5°C	1°C
	/	TW_HEAT1_ON	max(-13,Tsafe-5) ~TW_HEAT1_OFF - 1	max(-9,Tsafe-1)	1°C
	/	TW_HEAT1_OFF	max(max(-12,Tsafe-4), TW_HEAT1_ON + 1)~15°C	max(-9,Tsafe-1) +6	1°C
MODBUS	/	MODBUS	YES/NO	NO	/
	/	MODBUS ADDRESS	1~64	1	1
EWATER PUMP	/	Enable/disable	Enable/disable	Disable	/
	/	RATIO_PUMP	0~100%	100%	5%
Glycol system	Type	Glycol type	ETHYLENE/PROPYLENE	ETHYLENE	/
	Percent	Set the percent	0~50%	0	5%
	Safety temp	Tsafe	Only view	-5°C	/
	Safety pressure	Paf	+0.2MPa	0.7Mpa	0.05MPa

4 CONTROL

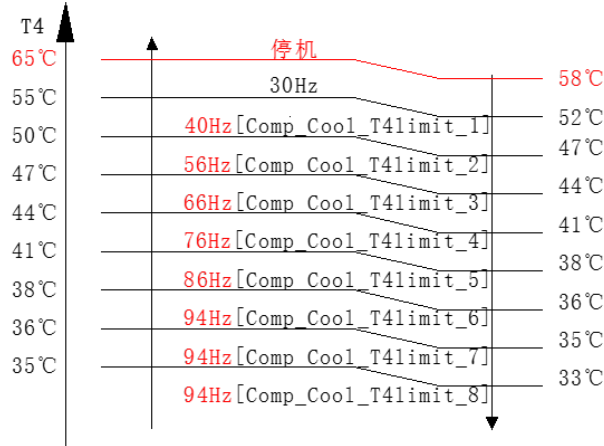**Start-up Control Sequence Diagram**

Size 18.2 – 20.2
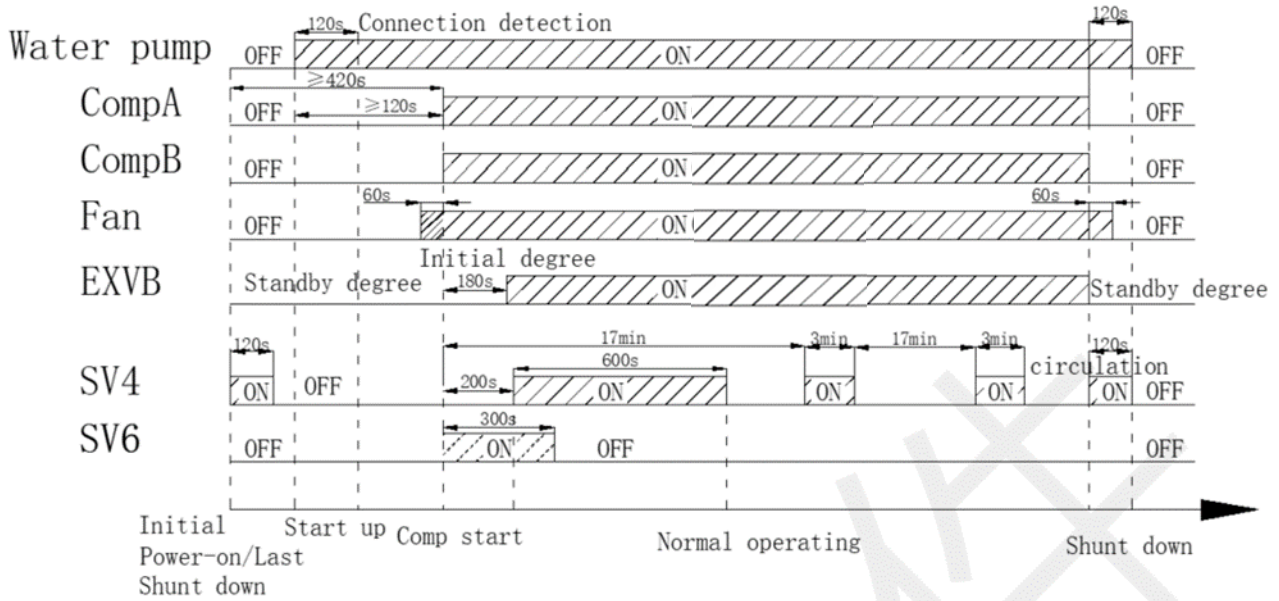
Size 25.2 – 35.2
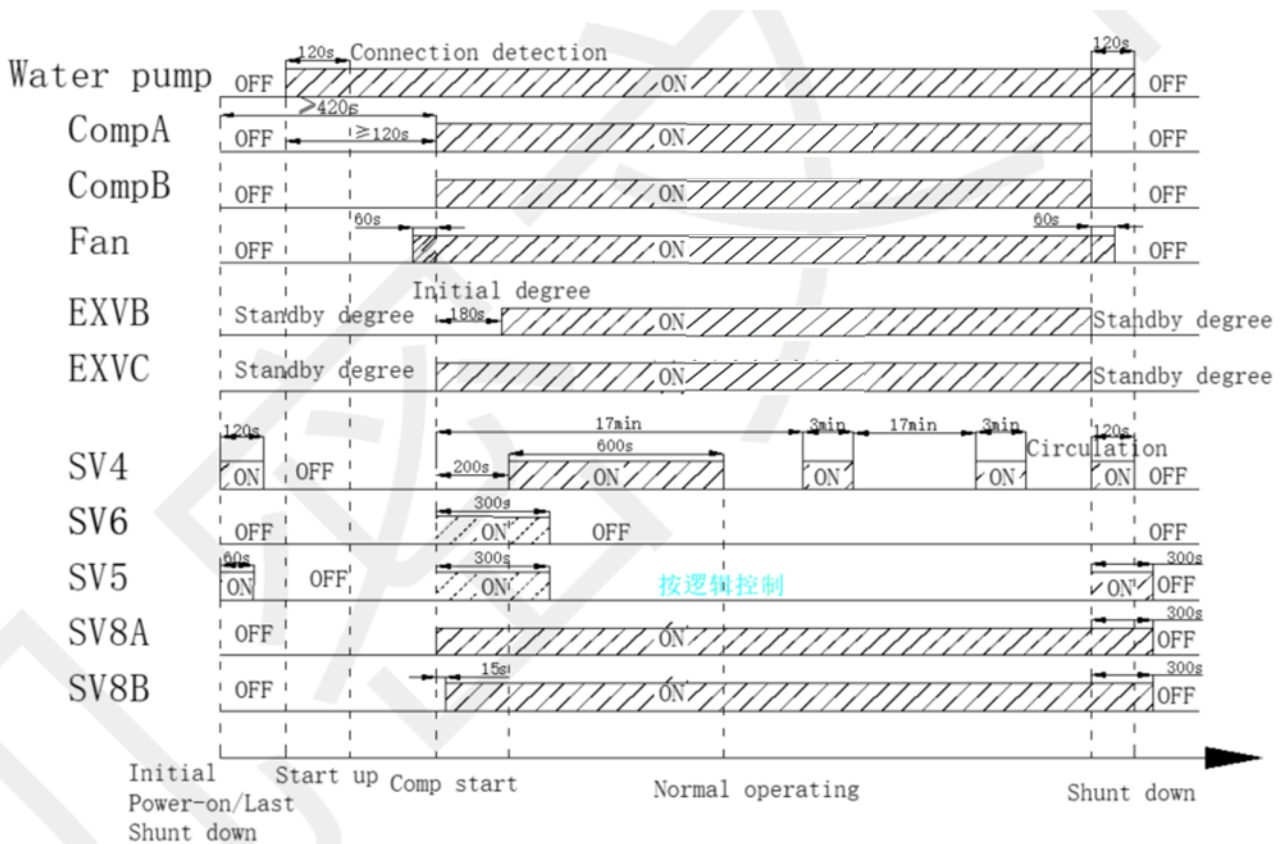
4 CONTROL

Frequency Limiting Control in Cooling Mode
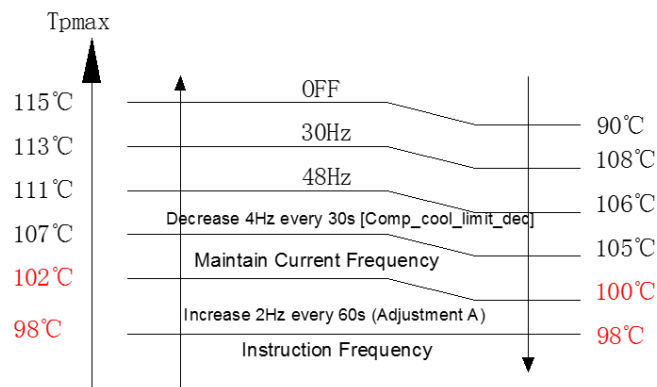
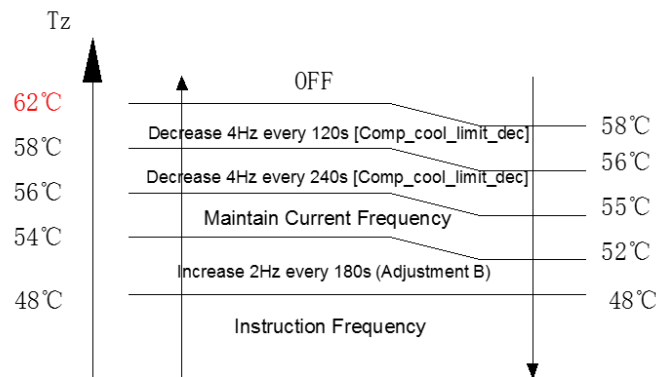a）Ambient Temperature Frequency Limitation

Size 18.2 – 20.2


```
T4
65℃ ──────── 停机 ────────  58℃
55℃ ──────── 30Hz ────────
50℃ ──── 40Hz[Comp_Cool_T4limit_1] ──── 52℃
                                          47℃
47℃ ──── 56Hz[Comp_Cool_T4limit_2] ────
                                          44℃
44℃ ──── 66Hz[Comp_Cool_T4limit_3] ────
                                          41℃
41℃ ──── 76Hz[Comp_Cool_T4limit_4] ────
                                          38℃
38℃ ──── 86Hz[Comp_Cool_T4limit_5] ────
                                          36℃
36℃ ──── 94Hz[Comp_Cool_T4limit_6] ────
                                          35℃
35℃ ──── 94Hz[Comp_Cool_T4limit_7] ────
                                          33℃
      ──── 94Hz[Comp_Cool_T4limit_8] ────
```

Size 25.2 – 35.2


```
T4
65℃ ──────── 停机 ────────  58℃
55℃ ──────── 30Hz ────────
50℃ ──── 40Hz[Comp_Cool_T4limit_1] ──── 52℃
                                          47℃
47℃ ──── 56Hz[Comp_Cool_T4limit_2] ────
                                          44℃
44℃ ──── 66Hz[Comp_Cool_T4limit_3] ────
                                          41℃
41℃ ──── 78Hz[Comp_Cool_T4limit_4] ────
                                          38℃
38℃ ──── 86Hz[Comp_Cool_T4limit_5] ────
                                          36℃
36℃ ──── 98Hz[Comp_Cool_T4limit_6] ────
                                          35℃
32℃ ──── 110Hz[Comp_Cool_T4limit_7] ────
                                          30℃
      ──── 110Hz[Comp_Cool_T4limit_8] ────
```

b）Discharge temperature frequency limitation


```
Tpmax
115℃ ──────── OFF ────────  90℃
113℃ ──────── 30Hz ──────── 108℃
111℃ ──────── 48Hz ──────── 106℃
107℃ ── Decrease 4Hz every 30s [Comp_cool_limit_dec] ── 105℃
102℃ ──── Maintain Current Frequency ──── 100℃
98℃ ──── Increase 2Hz every 60s (Adjustment A) ──── 98℃
         Instruction Frequency
```

c) Tz Total Outlet of Condenser Frequency Limitation

Electronic Expansion Valve Control

Definitions:

Suction superheat degree in cooling Tssh = Th- Saturated vapour temperature corresponding to suction air pressure (the plate heat exchanger outlet pressure)

The unit is equipped with 2 electronic expansion valves: EXVB and EXVC (No EXVC for 60KW)

The electronic expansion valves EXVB is electronic expansion valves with a 4.8 mm caliber and a maximum opening degree of 2880P, which are used for throttling during cooling.

The maximum opening degree for EXVC is 480P, and minimum is 40P.

After the unit restarts or all the compressors stop, the electronic expansion valve is initialized automatically and then enters standby status. The initialization control is as follows:

After the unit starts, EXVB closes first (-3200P counter is cleared) and then opens to 2000P; the system is in standby status, the compressor starts and operates to target opening degree; EXVC closes (-700P counter is cleared) and then opens to 0P, the system adjusts according to logic.

When a power-off instruction is received during operation, the compressor stops in the current status. After all the unit compressors stop, EXVB closes first (namely, the -200P counter is cleared) and then opens to 2000P; the system is in standby status, the compressor starts and operates to target opening degree; EXVC closes (namely, -160P counter is cleared) and then opens to 0P, the system is in standby status, the compressor starts and operates to target opening degree.

Fan Control

1）In cooling mode, the fan starts before compressor and operates 60s according to Table 4.4.4-1;

When the compressor stops, the outdoor fan operates in W22 gear and stops at a delay of 60s.

Table 3.4.4-1 Initial Fan Gear

Ambient temp T4°C	T4＜0	0≤T4＜5	5≤T4＜10	10≤T4＜15	15≤T4＜20	20≤T4＜25	25≤T4＜30	T4≥30
Fan initial status	W1	W5	W15	W20	W22	W30	W32	W32

2）During the compressor operates for 0s-60s, the outdoor fan operates in maximum rotating speed according to the Table 4.6.4-2 (During 0-60s, if the area of Table 4.6.4-2 changes, the rotating speed of fan changes accordingly)

3）After the compressor starts for 60s, the outdoor fan is controlled according to the compressor operating frequency, Tz and T4, and it determined in every 10s.

Fan Control of Snow and Wind Defence

The fan control of snow and wind defence is selected by the wired controller: when the wired controller selects its effective, it is controlled as shown below:

The fan control of snow and wind defence is controlled in power-off, cooling standby, heating standby, or water heating standby mode. Controls of snow and wind defence are as following:

1) If T4<3°C, the fan starts and operates at 7gear for 2min immediately, and then starts the timer;

2) T4<3°c and lasts for 30min, the fan operates at 7gear for 2min (period operation);

3) T4≥5°C, the timer clears.

Note: except fan module protection or voltage protection, the snow and wind defence fan is controlled normally.

FREE COOLING SPECIFICATIONS

Free cooling units have three running mode: COMP MODE, MIXED MODE, FC MODE。

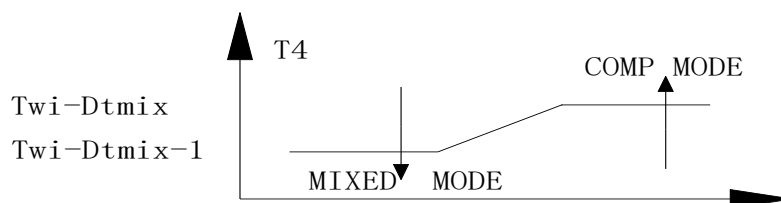Units will change and switch running mode depend on different T4.
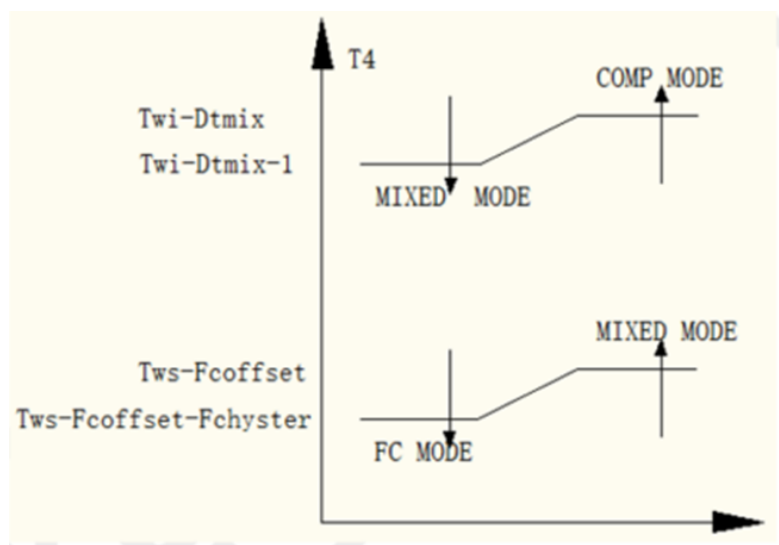
2.1 COMP MODE

COMP MODE is compressor mode, the same with cooling only logic.

2.2 MIXED MODE

Condition of switch on/off

When T4<Twi-Dtmix-1, unit switch in MIXED MODE

When T4≥Twi-Dtmix, unit switch out of MIXED MODE, running COMP MODE

Note: Dtmix default is 2°C, change by HMI during [1,3]

2.2.2 Mode select when starting

2min before unit start, select running mode depend on T4:

If not satisfy MIXED MODE condition, starting as COMP MODE or FC MODE.

If satisfy MIXED MDOE condition, open water coil, switch in MIXED MODE after compressor have ran 30 minutes.

2.2.3 Mode switch during running

1) Under MIXED MODE, when Two reach to Tws+DtTws-1,compressor stop, then fan adjust automatically, let Two equal to Tws.

A. If could maintain at Tws, maintain the current situation.

B. If couldn't maintain at Tws, water temp would increase, so when Two＞Tws+ DtTws+ Tw_cool_Diff, compressor start.

2) During running, when switch from MIXED MODE to COMP MODE, Firstly, fan speed change to original speed, then close water coils, then fan adjust automatically depend on energy requirement.

2.2.4 Components action

When units switch from COMP MODE to MIXED MODE

Open water coils

Tws automatically increased by DtTws which default is 1°C and can be adjusted by HMI (range:[1,3])

Fan speed gears stay at 32.

Activate solenoid valve beside coils (When condensing pressure lower than PFC, close the valve, when condensing pressure higher than PFC+DtP, open it)

When units switch from MIXED MODE to COMP MODE,
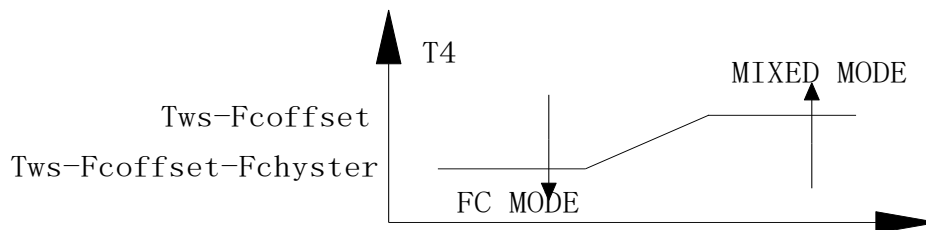
Fan speed switch to control logic under COMP MODE

Open solenoid valve beside coils

Close water coil

Tws back to original setting

2.3 FC MODE

2.3.1 Condition of switch on/off

When T4<Tws-Fcoffset-Fchy，unit switch in FC MODE

When T4≥Tws-Fcffset, unit switch out of FC MODE, running MIXED MODE

Note:

Fcoffset default is 3°C, change by HMI during [1,15]

Fchyster default is 1°C, change by HMI during [1,3]

2.3.2 Mode select when starting

2min before unit start，select running mode depend on T4：

If not satisfy FC MODE condition，starting as COMP MODE or MIXED MODE.

If satisfy FC MDOE condition，open water coil, then start fan, adjust automatically

2.3.3 Mode switch during running

1) Under FC MODE，when Tws close to Tws，fan adjust automatically, let Two equal to Tws.

A. If could maintain at Tws, maintain the current situation.

B. If couldn't maintain at Tws, water temp would increase，so when Two＞Tws+ DtTws+ Tw_cool_Diff，compressor start.

2) During running, when T4＜-20°C and Two≤Tws-1, close water coil

Components action

When units switch from MIXED MODE to FC MODE

Stop compressor

Fan adjusted automatically depend on Two

Activate solenoid valve beside coils (When condensing pressure lower than PFC, close the valve，when condensing pressure higher than PFC+DtP, open it)

When units switch from FC MODE to MIXED MODE,

Fan speed switch to original gears

Start compressor

Fan speed gears stay at 32

5 MODBUS

Communication specifications：RS-485：

ModbusRTU：9600,8,N,1

Baud rate：9600bps

Data bit：8 Data bits

None Parity

1 stop bit

Supported function codes and exception codes

03	Read Holding Registers	Number of registers to be read continuously at a time≤20
06	Write Single Register	
16	Write Multiple Registers	The number of registers written continuously in a single time≤20

Exception code description:

01	Illegal function code	Unsupported function code
02	Illegal data address	The address sent during query or setting is not defined in the online controller
03	Illegal data value	The set parameter is an illegal value, exceeds a reasonable setting range or a parameter cannot be set in the current state of the wire controller.

Address 138 before the Modbus control switch of the line controller is set to 1, except for address 138, cannot be written.

Use Protocol Addresses(Base 0).

Table 1 (Write/Read)

Register Address	Data Content	Remark
0	Modeset	(1 Cool, 2 Heat, 4 DHW ,8 Off DHW The mode is only available with hot water model and is valid for single pump system External remote control = invalid when ON Single cooling/FC model can only be set: 1 Cooling, 8 Off
1	Set Two Temperature A	COOL MODE Only Cool & Free Cooling : (Max(-8, TSafe)°C ~20°C) Heat Pump : (0°C ~20°C) HEAT MODE (25°C ~55°C)
2	Set Two Temperature B	COOL MODE Only Cool & Free Cooling : (Max(-8, TSafe)°C ~20°C) Heat Pump : (0°C ~20°C) HEAT MODE (25°C ~55°C)
3	Offset Temperature OFFSET-C/OFFSET-H	COOL(0~15°C) HEAT (0~30°C)
4	Water Set Temperature	T5sMin°C~ T5sMax°C Available for single pump) Invalid without hot water model
5	Water Offset Temperature	Reserved Set 0
6	Clear Lock Errs	(0 invalid, 1 clear fault, other values are invalid) Clear all lock errors Clear all lock errors
7	Snow blowing switch	Enable/Disable : 1/0

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Table 2 (Write/Read)

Register Address	Data Content	Remark
100	Silent Mode	1: Standard mode
		2: Silent mode
		3: Night silent mode 1
		4：Night silent mode 2
		5：Night silent mode 3
		6：Night silent mode 4
		7：Super silent mode
101	DOUBLE SETPOINT Dual target temperature setting	Enable/Disable 1/0
102	SETPOINT COOL_1 First target temperature in cooling	Only Cool & Free Cooling : (Max(-8, TSafe)℃ ~20℃) Heat Pump(0℃ ~20℃)
103	SETPOINT COOL_2 Second target temperature in cooling	Only Cool & Free Cooling (Max(-8, TSafe)℃ ~20℃) Heat Pump : (0℃ ~20℃)
104	SETPOINT HEAT_1 First target temperature in heating	(25~55℃)
105	SETPOINT HEAT_2 Second target temperature in heating	(25~55℃)
106	COOL MODE ENABLE Temperature compensation function setting in cooling	Enable/Disable
107	T4_COOL_1 Temperature compensation point 1 in cooling mode	15~30℃
108	T4_COOL_2 Temperature compensation point 2 in cooling mode	35~45℃
109	OFFSET-C Temperature compensation value in cooling	0~15℃
110	HEAT MODE ENABLE Temperature compensation function setting in heating	Enable/Disable
111	T4_HEAT_1 Temperature compensation point 1 in heating mode	-10~10℃
112	T4_HEAT_2 Temperature compensation point 2 in heating mode	15~30℃
113	OFFSET-H Temperature compensation value in heating	0~30℃
114	FORCED HEAT2 OPEN Forced auxiliary electric heater 2 of single pump	Enable/Disable 1/0 (Available for single pump)

115	DHW SWITCH Water heating switch	Enable/Disable 1/0 (Available for single pump)
116	TWO_COOL_DIFF Differential temperature of unit outlet water in cooling	1℃ ~ 5℃
117	TWO_HEAT_DIFF Differential temperature of unit outlet water in heating	1℃ ~ 5℃
118	DT5_ON Differential temperature of unit outlet water in water heating	2℃ ~ 10℃
119	DT1S5 Temperature difference of heat exchange in water heating	5℃ ~ 20℃
120	TIM_CAP_ADJ Capacity adjustment period	60S – 360S 20s
121	TW_COOL_DIFF/ TW_HEAT_DIFF Differential temperature of total outlet water	COOL MODE: 1℃ ~ 5℃ HEAT MODE: 1℃ ~ 5℃
122	RATIO_COOL_FIRST Initial startup ratio in cooling	5~100% 5%
123	RATIO_HEAT_FIRST Initial startup ratio in heating	5~100% 5%
124	T_DIFF_PRO Protection of temperature difference between inlet and outlet water	8℃ ~ 15℃
125	T_FROST Defrost period	20min ~120min 5min
126	DEFROST_IN Entry temperature of defrosting	-5℃ ~ 5℃
127	T_FROST_OUT Exit temperature of defrosting	-10℃ ~ 10℃
128	HEAT1 ENABLE Auxiliary electric heater	Enable/Disable 1/0
129	TEMP_AUXHEAT1_ON Available ambient temperature of auxiliary electric heater	0℃~10℃ Single cooling/FC model is invalid
130	TW_HEAT1_ON Opening water temperature of auxiliary electric heater	Heat Pump: 0℃~49℃ Only Cool & Free Cooling: Tsafe-4~TW_HEAT1_OFF-1℃ "Turn on water temperature" must be lower than "off water temperature"
131	TW_HEAT1_OFF Closing water temperature of auxiliary electric heater	Heat Pump: 1℃~50℃ Only Cool & Free Cooling: Max(Tsafe-3,TW_HEAT1_ON+1)~15℃ "Turn off water temperature" must be higher than "turn on water temperature"

5 MODBUS

132	Water tank electric auxiliary heating valid/invalid HEAT2 ENABLE Auxiliary electric heater of water tank is enabled/disabled	Enable/Disable 1/0 (Single pump is effective) Invalid without hot water model
133	T_HEAT2_DELAY Delay opening time of auxiliary electric heater of water tank	60min~240min Adjustment range 5min (effective for single pump) Invalid without hot water model
134	DT5_HEAT2_0FF Hysteresis when auxiliary electric heater of water tank stops	2℃~10℃ (Single pump is effective) Invalid without hot water model
135	T4_HEAT2_ON Available ambient temperature of auxiliary electric heater of water tank	-5℃~20℃ (Single pump is effective) Invalid without hot water model
136	SWITCH ON THE PUMP Startup of inverter water pump	Enable/Disable 1/0（Single pump effective) Invalid without hot water model
137	RATIO-PUMP Startup percentage of inverter water pump	30-100% Adjustment range 5% (effective for single pump) Before the variable frequency water pump turns on Enable, it is not allowed to set the turn-on percentage
138	MODBUS ENABLE Modbus write enable switch	Enable/Disable Write operation is valid/write operation is invalid 1/0
139	Glycol type	0: ETHYLENE ethylene glycol 1: PROPYLENE propylene glycol (Available for Only Cool & Free Cooling)
140	Percent of glycol	0 ~ 50% Adjustment range 5% (Available for Only Cool & Free Cooling)
141	ΔPaf	0 ~ 20: 0.0 ~ 0.2Mpa Actual value*100, adjustment range 5: 0.05Mpa (Available for Only Cool & Free Cooling)
142	Water Coil Control	0 : AUTOMATIC 1 : MANUAL 1 2 : MANUAL 2 (Available for Free Cooling)
143	Tws rises DtTws after entering mix	1℃~3℃ (Available for Free Cooling)
144	Enter the mix back difference Dtmix	1℃~3℃ (Available for Free Cooling)
145	Enter FC offset FCoffset	1℃~15℃ (Available for Free Cooling)
146	Enter FC Hysteresis FChy	1℃~3℃ (Available for Free Cooling)
147	TWI-O ABNORMAL	1℃~5℃

148	LOW OUTLETWATER CONTROL	0~20℃
149	Energy saving switch	40%~100% Adjustment range 10% 100% means power saving mode is off
150	Set E9 time	2~20s
151	E9 Detection Method	1: The rake flow is not detected before the pump is turned on 2: Detect the rake flow before the pump is turned on
152	Invert pump min ratio	40~Min(100%, Invert pump max ratio) Adjustment range 5% Multi-pump hot water model is effective
153	Invert pump max ratio	Max(70%, Invert pump min ratio)~100% Adjustment range 5% Multi-pump hot water model is effective
154	Pump On Time	5~60min Adjustment range 5min
155	Pump Off Time	0~60min Adjustment range 5min
156	TW_COOL_DIFF Cool mode differential temperature of total outlet water	1℃ ~ 5℃ Conventional heat pump models, only valid for the host when the setting mode is heating
157	TW_HEAT_DIFF Heat mode differential temperature of total outlet water	1℃ ~ 5℃ Single cooling and FC models are invalid Conventional heat pump models, only valid for the host when the setting mode is heating
158-199	Reserved	

Table 3 (Write/Read)

Unit Address（0-15）indicates the selected unit address

201+(Unit Address)*100+200—239+(Unit Address)*100 ,which can be read and written.

Register Address	Data Content	Remark
200+(Unit Address)*100	Reserved	
201+(Unit Address)*100	Unit Address number address unit auxiliary electric heating HEAT2 valid HEAT2 EANBLE Auxiliary electric heater HEAT2 of the selected unit is enabled.	Enable/Disable 1/0（Multi-pump hot water model is effective）
202+(Unit Address)*100	Unit Address number address unit auxiliary electric heating HEAT2 forced on FORCED HEAT2 ON Auxiliary electric heater HEAT2 forced ON of the selected unit	ON/OFF 1/0 (valid for multi-pump hot water model) Before HEAT2 is valid, it is not allowed to set the HEAT2 switch state. After the line control sends a command to the external machine, it will be cleared automatically
203+(Unit Address)*100	Unit Address number address unit auxiliary electric heating HEAT2 delay opening time T-HEAT2-DELAYDelay opening time of auxiliary electric heater HEAT2 of the selected unit	60min~240min Adjustment range 5min (effective for multi-pump hot water model)

204+(Unit Address)*100	Unit Address Address Unit Auxiliary Electric Heating HEAT2 Shutdown Difference DT5-HEAT2-OFF Hysteresis when auxiliary electric heater HEAT2 of the selected unit stops	2℃~10℃（Multi-pump hot water model is effective)
205+(Unit Address)*100	Unit Address number address unit auxiliary electric heating HEAT2 available ambient temperature T4-HEAT2-ON. Available ambient temperature of auxiliary electric heater HEAT2 of the selected unit	-5℃~20℃（Multi-pump hot water model is effective）
206+(Unit Address)*100	Unit AddressNo. address unit hot water function is effective DHW SWITCH Water heating function of the selected unit is enabled	Enable/Disable 1/0（Multi-pump hot water model is effective） After the hot water system is turned on, write 0 and the hot water mode will be automatically set to off
207+(Unit Address)*100	Unit Address number address unit hot water function switch DHW MODE ON/OFF Water heating function switch of the selected unit	ON/OFF 1/0 (valid for multi-pump hot water model) This register cannot be written to before the hot water function is valid.
208+(Unit Address)*100	Unit Address number address unit hot water priority. DHW FIRST Water heating priority of the selected unit	Enable/Disable 1/0（Multi-pump hot water model is effective）
209+(Unit Address)*100	Unit Address number address unit hot water cooling longest time. COOL MAX TIME Maximum cooling time in the water heating mode of the selected unit	30~1440min 30min adjustment range (valid for multi-pump hot water model)
210+(Unit Address)*100	Unit Address number address unit hot water cooling minimum time COOL MIN TIME Minimum cooling time in the water heating mode of the selected unit	30~1440min 30min adjustment range (valid for multi-pump hot water model)
211+(Unit Address)*100	Unit Address number address unit hot water heating maximum time. HEAT MAX TIME Maximum heating time in the water heating mode of the selected unit	30~1440min 30min adjustment range (valid for multi-pump hot water model)
212+(Unit Address)*100	Unit Address number address unit hot water heating minimum time. HEAT MIN TIME Minimum heating time in the water heating mode of the selected unit	30~1440min 30min adjustment range (valid for multi-pump hot water model)

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213+(Unit Address)*100	The longest time for the unit to produce hot water for the unit address DHW MAX TIME Maximum water heating time in the water heating mode of the selected unit	30~1440min 30min adjustment range (valid for multi-pump hot water model)
214+(Unit Address)*100	Unit Address number address unit hot water system hot water minimum time DHW MIN TIME Minimum water heating time in the water heating mode of the selected unit	30~1440min 30min adjustment range (valid for multi-pump hot water model)
215+(Unit Address)*100	Unit Address number address unit variable frequency water pump is turned on. SWITCH ON THE PUMP Startup of inverter water pump of the selected unit	Enable/Disable 1/0（Multiple pumps are effective）
216+(Unit Address)*100	Unit Address Address Unit Variable Frequency Water Pump Open Percentage RATIO-PUMP. Startup percentage of inverter water pump of the selected unit	30 ~ 100% Adjustment range 5% (multi-pump effective)
217+(Unit Address)*100	Unit Address number address unit hot water set temperature T5S Water Set Temperature of the selected unit	30℃~ 60℃ (Effective for multi-pump hot water model)
(218~239)+(Unit Address)*100	Reserved	

5 MODBUS

Table 4 (Read)

Unit Address（0-15）indicates the selected unit address

240+(Unit Address)*100—299+(Unit Address)*100 ,which are read-only.

Register Address	Data Content	Remark
240+(Unit Address)*100	Running Mode	1 Shut down 2 refrigeration 3 heating 4 hot water
241+(Unit Address)*100	Current silent mode	Standard mode Silent mode Super silent mode Night silent mode 1 Night silent mode 2 Night silent mode 3 Night silent mode 4
242+(Unit Address)*100	DHW SetTemperature T5s	Hot water set temperature Unit: 1℃ Single pump system: all outdoor machines have the same value Multi-pump system: independent setting value of each external machine
243+(Unit Address)*100	DHW SetTemperature B	Reserved Set 0
244+(Unit Address)*100	Twi Unit inlet water temperature	unit：1℃ 255：Invalid data
245+(Unit Address)*100	Two Unit outlet water temperature	Unit: 1℃ 255: Invalid data
246+(Unit Address)*100	Tw Total outlet water temperature	Unit: 1℃ Only the data of No. 0 host is valid 255: Invalid data
247+(Unit Address)*100	T4 Outdoor ambient temperature	Unit: 1℃ 255: Invalid data
248+(Unit Address)*100	Compressor Speed	Unit: 1Hz
249+(Unit Address)*100	Current of Compressor 1	Unit: 1A
250+(Unit Address)*100	Fan1Speed	Actual speed
251+(Unit Address)*100	Fan2Speed	Actual speed
252+(Unit Address)*100	Fan3Speed	Actual speed
253+(Unit Address)*100	EXVA	Actual speed
254+(Unit Address)*100	EXVB	Actual speed
255+(Unit Address)*100	EXVC	Actual speed
256+(Unit Address)*100	SV4	0 off, 1 on

257+(Unit Address)*100	SV5	0 off, 1 on
258+(Unit Address)*100	SV8A	0 off, 1 on
259+(Unit Address)*100	SV8B	0 off, 1 on
260+(Unit Address)*100	FOUR-WAY VALVE	0 off, 1 on
261+(Unit Address)*100	WATER PUMP STATE	0 off, 1 on
262+(Unit Address)*100	SV1 STATE	0 off, 1 on
263+(Unit Address)*100	SV2 STATE	0 off, 1 on
264+(Unit Address)*100	HEAT1 STATE	0 off, 1 on only the data of No. 0 host is valid
265+(Unit Address)*100	HEAT2 STATE	0 off, 1 on This item is not configured for non-hot water models, and the data is invalid Only the data of No. 0 host is valid for single pump system
266+(Unit Address)*100	Tp1 Discharge temperature 1	Unit: 1℃ 255: Invalid data
267+(Unit Address)*100	Th Suction temperature	Unit: 1℃ 255: Invalid data
268+(Unit Address)*100	T3 TEMP	The minimum value of T3A and T3B, unit: 1℃ 255: Invalid data
269+(Unit Address)*100	Tz TEMP	Unit: 1℃ 255: Invalid data
270+(Unit Address)*100	T5 TEMP	Unit: 1℃ This item is not configured for non-hot water models, and the data is invalid The single pump system only has this data for the No. 0 host 255: Invalid data
271+(Unit Address)*100	Heat Pump : P PRESSURE Only Cool & Free Cooling : EVA PRESSURE	Unit: 10 kPa 0: Invalid data
272+(Unit Address)*100	MainBoard Err or protect	See the fault code table of the external machine
273+(Unit Address)*100	MainBoard Last Err or protect	See the fault code table of the external machine
274+(Unit Address)*100	HMI Software Version	Current HMI version number
275+(Unit Address)*100	Tp2 Discharge temperature 2	Unit: 1℃ 255: Invalid data
276+(Unit Address)*100	T5sMin	Unit: 1℃ This item is not configured for non-hot water models, and the data is invalid 255: Invalid data
277+(Unit Address)*100	T6A TEMP	Unit: 1℃ 255: Invalid data
278+(Unit Address)*100	Wire Control Err	See the wire control fault code table
279+(Unit Address)*100	SV6 STATE	0 off, 1 on
280+(Unit Address)*100	Current of Compressor 2	Unit: 1A

281+(Unit Address)*100	Unit Capacity	Unit: 1kw
282+(Unit Address)*100	Defrost	0 no, 1 yes
283+(Unit Address)*100	Anti-freezing electric heater	0 off, 1 on
284+(Unit Address)*100	Remote control	0 off, 1 on Reading of address of external machine 0 is valid
285+(Unit Address)*100	FCT working state	0 off, 1 on Reading of address of external machine 0 is valid Only valid when the host enters FCT2/FCT3
286+(Unit Address)*100	Pump group status	1: Multiple pumps 0: Single pump
287+(Unit Address)*100	ODU Type	0 : Normal Heat Pump 1 : Only Cool 2 : Free Cooling
288+(Unit Address)*100	T5sMax	Unit: 1℃ This item is not configured for non-hot water models, and the data is invalid
289+(Unit Address)*100	Safe temperature Tsafe	Unit: 1℃ (valid for single cooling/FC model)
290+(Unit Address)*100	Protection pressure PAF	Unit: 10 kPa (valid for single cooling/FC model)
291+(Unit Address)*100	Taf1 IN-LET BPHE TEMP	Unit: 10 kPa (valid for single cooling/FC model)
292+(Unit Address)*100	MainBoard Software Version	The current main control board program version number Note: The old heat pump model does not have this value; when the value is 0, it means that the outside machine does not have this data.
293+(Unit Address)*100	MainBoard EEPROM Version	Version number of current main control board EEPROM program Note: The old heat pump model does not have this value; when the value is 0, it means that the outside machine does not have this data.
294+(Unit Address)*100	COND PRESSURE	Unit: 10 kPa (valid for FC model) 0: Invalid data Note: Old heat pump models do not have this value;
295+(Unit Address)*100	T6B TEMP	Unit: 1℃ 255: Invalid data
296+(Unit Address)*100	TAF2 TEMP	Unit: 1℃ 255: Invalid data
297+(Unit Address)*100	TFIN1 TEMP	Unit: 1℃ 255: Invalid data
298+(Unit Address)*100	TFIN2 TEMP	Unit: 1℃ 255: Invalid data
299+(Unit Address)*100	TFIN3 TEMP(Reserved)	Unit: 1℃ 255: Invalid data
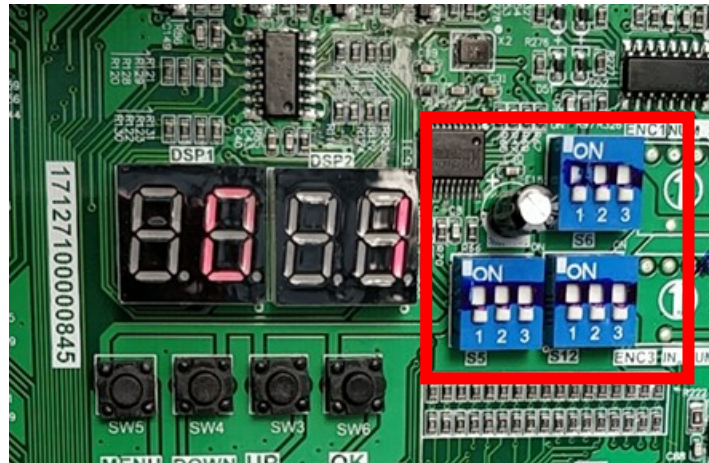
ENC2		DIP switch of outdoor unit capacity: 1 (factory default)
ENC4		DIP switch 0-F of outdoor unit network address is enabled, which represent address 0-15.
S5-2	ON OFF 3	For Storm unit, vaild for S5-2 OFF (factory default)
	ON OFF 3	For Sheen unit, vaild for S5-2 ON
S5-3	ON OFF 3	No Remote control, Valid for S5-3 OFF(factory default)
	ON OFF 3	Remote control, Valid for S5-3 ON
S6-1	ON OFF 1	Cooling machine model, Valid for S6-1 OFF
	ON OFF 1	Free Cooling machine model, Valid for S6-1 ON
S12-1	ON OFF 1	Valid for S12-1 OFF(factory default)
S12-2	ON OFF 2	Single water pump control Valid for S12-2 OFF
	ON OFF 2	Multiple water pumps control Valid for S12-2 ON(factory default)

Function SW3, SW4, SW5, SW6

Button	Function
SW3	Up
SW4	Down
SW5	Menu
SW5	Ok

ERROR CODE TABLE

	Code	Description	Remarks
1	E0	Main Control EEPROM Error	Recovered upon error recovery
2	E1	Phase Sequence Error of Main Control Board Check	Recovered upon error recovery
3	E2	Transmission Error between Main Control and Wired Control, the Master Unit Alarms E2 Transmission Error between Master Unit and Slave Unit, the Slave Unit Alarms E2	Recovered upon error recovery
4	E3	Total Outlet Water Temperature Sensor Error (valid for the master unit)	Recovered upon error recovery
5	E4	Unit Water Outlet Temperature Sensor Error	Recovered upon error recovery
6	E5	1E5 Condenser Tube Temperature Sensor T3A Error	Recovered upon error recovery
		2E5 Condenser Tube Temperature Sensor T3B Error	Recovered upon error recovery
7	E6	Water Tank Temperature Sensor T5 Error	Recovered upon error recovery
8	E7	Ambient Temperature Sensor Error	Recovered upon error recovery
9	E8	Power Supply Phase Sequence Protector Output Error	Recovered upon error recovery
10	E9	Water Flow Detection Error	If protection occurs 3 times in 60 minutes, it can be recovered by turning off the power supply only
11	EA	Reserved	
12	Eb	1Eb --> Taf1 Water Tank Tube Defrost Protection Sensor Error	Recovered upon error recovery
		2Eb --> Taf2 Cooling Evaporator Defrost Protection Sensor Error	Recovered upon error recovery
13	EC	Slave Unit Module Reduction	
14	Ed	1Ed --> A System Discharge Temperature Sensor Error	Recovered upon error recovery
		2Ed --> B System Discharge Temperature Sensor Error	Recovered upon error recovery
15	EE	1EE EVI Plate Heat Exchanger Refrigerant Temperature T6A Sensor Error	Recovered upon error recovery
		2EE EVI Plate Heat Exchanger Refrigerant Temperature T6B Sensor Error	
16	EF	Unit Return Water Temperature Sensor Error	Recovered upon error recovery
17	EH	System Self-check Failure Alarm	Recovered upon error recovery
18	EL	Reserved	Recovered upon error recovery
19	EP	Discharge Sensor Failure Alarm	Recovered upon error recovery
20	EU	Tz Sensor Error	Recovered upon error recovery
21	P0	System High-pressure Protection or Discharge Temperature Protection	If protection occurs 3 times in 60 minutes, it can be recovered by turning off the power supply only

22	P1	System Low-pressure Protection	If protection occurs 3 times in 60 minutes, it can be recovered by turning off the power supply only
23	P2	Tz Total Condenser Outlet Temperature is Too High	
24	P3	Reserved	
25	P4	System A Current Protection	If protection occurs 3 times in 60 minutes, it can be recovered by turning off the power supply only
26	P5	System B Current Protection	If protection occurs 3 times in 60 minutes, it can be recovered by turning off the power supply only
27	P6	Module Error	
28	P7	System Condenser High-temperature Protection	If protection occurs 3 times in 60 minutes, it can be recovered by turning off the power supply only
29	P8	Reserved (the wired controller displays P8, indicating other error protection)	
30	P9	Temperature Difference Protection between Inlet and Outlet Water	Recovered upon error recovery
31	PA	Fault Protection of Temperature Difference between Inlet and Outlet Water	Recovered upon error recovery
32	Pb	Winter Defrost Protection	
33	PC	Evaporator Pressure is too Low in Cooling	If protection occurs 3 times in 60 minutes, it can be recovered by turning off the power supply only
34	Pd	Reserved	
35	PE	Cooling Evaporator Low-temperature Defrost Protection	If protection occurs 3 times in 60 minutes, it can be recovered by turning off the power supply only
36	PF	Reserved	
37	PH	T4 Over-temperature Protection in Heating	Heating is valid
38	PL	Tfin Module Over-temperature Protection	If protection occurs 3 times in 100 minutes, it can be recovered by turning off the power supply only
39	PP	1PP --> IPM Module Error, System A Protection (reserved)	
		2PP --> IPM Module Error, System B Protection (reserved)	
40	PU	1PU --> DC Fan A Module Protection	
		2PU --> DC Fan B Module Protection	
41	H0	Reserved	
42	H1	Reserved	
43	H2	Reserved	

44	H3	Reserved	
45	H4	Reserved	
46	H5	Voltage Too High or Low	
47	H6	Reserved	
48	H7	Reserved	
49	H8	Reserved	
50	xH9	Driver Model Mismatch	X presents the compressor, 1 is A compressor, 2 is B compressor
51	HA	Reserved	
52	Hb	Reserved	
53	HC	Reserved	
54	Hd	Reserved	
55	HE	Error for No Plug A Valve 1HE	Recovered upon error recovery
		Error for No Plug B Valve 2HE	Recovered upon error recovery
		Error for No Plug C Valve 3HE	Recovered upon error recovery
56	HF	Reserved	
57	HH	Reserved	
58	HL	Reserved	
59	HP	Reserved	
60	HU	Reserved	
61	F0	1F0: IPM Module Transmission Error	Recovered upon error recovery
		2F0: IPM Module Transmission Error	Recovered upon error recovery
62	F1	Reserved	Recovered upon error recovery
63	F2	Superheat Insufficient	If protection occurs 3 times in 240 minutes, it can be recovered by turning off the power supply only
64	F3 (Reserved)	1 Fan Transmission Error 1F3	Recovered upon error recovery
		2 Fan Transmission Error 2F3	Recovered upon error recovery
		3 Fan Transmission Error 3F3	Recovered upon error recovery
65	F4	1F4 L0/L1 Protection Occurs for 3 Times in 60min (recovered by turning off the power supply)	
		2F4 L0/L1 Protection Occurs for 3 Times in 60min (recovered by turning off the power supply)	
66	F5	Reserved	
67	F6	1F6 A System Buss Voltage Error (PTC)	~~Recovered upon error recovery~~
		2F6 B System Buss Voltage Error (PTC)	~~Recovered upon error recovery~~
68	F7	Electronic Expansion Valve Omission Error	After the EXV is connected, F7 blinks, it can be Recovered by turning off the power supply only.

68	F7	Electronic Expansion Valve Omission Error	After the EXV is connected, F7 blinks, it can be Recovered by turning off the power supply only.
69	F8	Reserved	
70	F9	Tfin1 Radiator Temperature Sensor Error 1 F9	Recovered upon error recovery
		Tfin2 Radiator Temperature Sensor Error 2 F9	
72	Fb	Pressure Sensor Error	Recovered upon error recovery
73	FC	Reserved	
74	Fd	Suction Temperature Sensor Error	Recovered upon error recovery
75	FE	Reserved	
76	FF	1FF DC Fan A Error	Recovered by turning off the power supply only
		2FF DC Fan B Error	Recovered by turning off the power supply only
		3FF DC Fan B Error	Recovered by turning off the power supply only
77	FH	Reserved	
78	FL	Reserved	
79	FP	Dial-up Inconsistency of Multiple Water Pumps	Recovered by turning off the power supply
80	FU	Reserved	
81	C0	Reserved	
82	C1	Reserved	
83	C2	Reserved	
84	C3	Reserved	
85	C4	Reserved	
86	C5	Reserved	
87	C6	Reserved	
88	C7	PL Alarms C7 for 3 Times	Recovered by turning off the power supply
89	C8	Reserved	
90	C9	Reserved	
91	CA	Reserved	
92	Cb	Reserved	
93	CC	Reserved	
94	Cd	Reserved	
95	CE	Reserved	
96	CF	Reserved	

97	CH	Reserved	
98	CL	Reserved	
99	CP	Reserved	
100	CU	Reserved	
101	L0	L0 Module Protection	
102	L1	L1 Low-voltage Protection	
103	L2	L2 High-voltage Protection	
104	L3	Reserved	
105	L4	L4MCE Error	
106	L5	L5 Zero-speed Protection	
107	L6	Reserved	
108	L7	L7 Phase Loss	
109	L8	L8 Frequency Changes Over 15Hz	
110	L9	L9 Frequency Difference is 15Hz	
111	LA	Reserved	
112	Lb	Reserved	
113	LC	Reserved	
114	Ld	Reserved	
115	LE	Reserved	
116	LF	Reserved	
117	LH	Reserved	
118	LL	Reserved	
119	LP	Reserved	
120	LU	Reserved	
131	d0	Reserved	Reserved
132	d1	Reserved	
133	d2	Reserved	
134	d3	Reserved	
135	d4	Reserved	
136	d5	Reserved	
137	d6	Reserved	
138	d7	Reserved	
139	d8	Reserved	
140	d9	Reserved	
141	dA	Reserved	
142	db	Reserved	

143	dC	Reserved	
144	dd	Reserved	
145	dE	Reserved	
146	dF	Defrosting Prompt	
147	dH	Reserved	
148	dL	Reserved	
149	dP	Reserved	
150	dU	Reserved	