

1. Operation instruction

1.1 Start-up and Shut-off

The unit can be started/stopped by 3 methods:

- 1) **ON/OFF key** (or **Start** and **Stop** keys) on the display;
- 2) Remote switch

[Remote switch type PL03-09] = Toggle switch: The unit is started up when the remote switch is closed and stopped when the remote switch is disconnected;

[Remote switch type PL03-09] = Pulse switch: Effective when the remote switch is closed -> disconnected (pulse width > 300 ms);

The unit is started up when the switch is stopped and stopped when the switch is in operation.

- 3) Timed start-up/shutdown: Start up or shut down based on the set time. See [Timing setting] in *User Operation Manual*.

The 3 methods have the same priority.

1.2 Failure reset description

4 ways to reset failure:

- 1) Power-on reset
 - Failure that only can be reset by powering on again after failure clearance.
 - Failure requiring power-on resetting: EEPROM data error.
- 2) Restricted automatic reset:
 - After the failure is cleared, the alarm is delayed **[Failure resetting time PL08-03]**, the same failure will not occur during this period, automatic reset;
 - Within the set time **[Allowed automatic reset time PL08-04]**, 2 automatic resets are allowed, manual reset is required when alarm number > 2; after manual reset, alarm number can be re-calculated.
 - Restricted failures: See the failure table
- 3) Automatic reset:
 - After the failure is cleared, the alarm is delayed **[Failure resetting time PL08-03]**, the same failure will not occur during this period, automatic reset;
 - There is no restriction on number of automatic resets;
 - Automatically reset failure: See the failure table.
- 4) Manual reset:
 - After the failure is cleared, the alarm can only be manually reset on the controller;
 - Failures of Category 1), 2) and 3) can also be manually reset.

1.3 Description of air supply fan model

1.3.1 Input and output correspond to each other

Control of air supply fan model is similar to that of water supply fan model, you can connect wires by referencing to electrical connection schematic of the water supply fan model, and replace the corresponding points according to the following table:

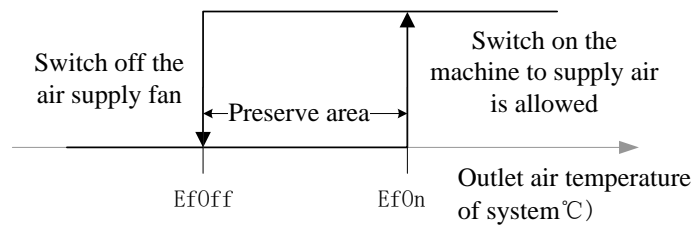
Air-cooled water supply	Air-cooled air supply
Output-A/C water pump	Output-Air supply fan
Input-A/C pump overload	Input-Overloading of pressure fan
Input-Insufficient water flow of A/C	Input-Air supply pressure difference
Probe- Return water temperature of system	Probe- Return air temperature of system
Probe- Outlet water temperature of system	Probe- Outlet air temperature of system

1.3.2 Anti-cold air function

Parameters used

- EfOff: [Temperature when turning off the air supply fan PL05-06] 18°C by default
- EfOn: [Temperature when turning on the air supply fan PL05-07] 30°C by default

In the heating mode, to prevent blowing cold air, output of the air supply fan is controlled by outlet air temperature of the system.



- During defrosting, the air supply fan does not operate according to the above anti-cold air requirement (since the auxiliary electric heater is switched on forcibly, the air supply fan must be kept turned on)

1.3.3 Air supply fan paused

Parameters used:

- [Air supply fan pause delay PL05-08] 0 min by default
During the air supply fan operation, when all compressors and refrigeration fans have been turned off, the air supply fan will be turned off after a delay; it will be restarted when there is any compressor to be turned on.
- For units equipped with electric heater, you also must wait until all electric heaters have been turned off for more than 60s;
- **Setting [Air supply fan pause delay]** to 0 indicates this function is not used, and the air supply fan operates all the time with the unit switched on.

2. Password management

Currently this controller has two kinds of passwords, which are independent from each other:

1) Password for service life: Used to enter into the service life setting;

Factory defaults: 66666666 (eight "6").

2) Password for parameter setting: Used to enter into each parameter setting;

The password for parameter setting is divided into four levels, which are:

Maintenance-level password, factory defaults: 20040101

Engineering-level password, factory defaults: 8888

User-level password, factory defaults: 123456 (**user-level password is not required when DM602 is used**)

See [Parameter Setting Table](#) of the machine for parameters that can be operated by password of each level. The factory-level password has the highest priority and the user-level password has the lowest one, the priority is listed in order. Passwords of high priority can enter into operation interface of low priority and modify passwords of low priority.

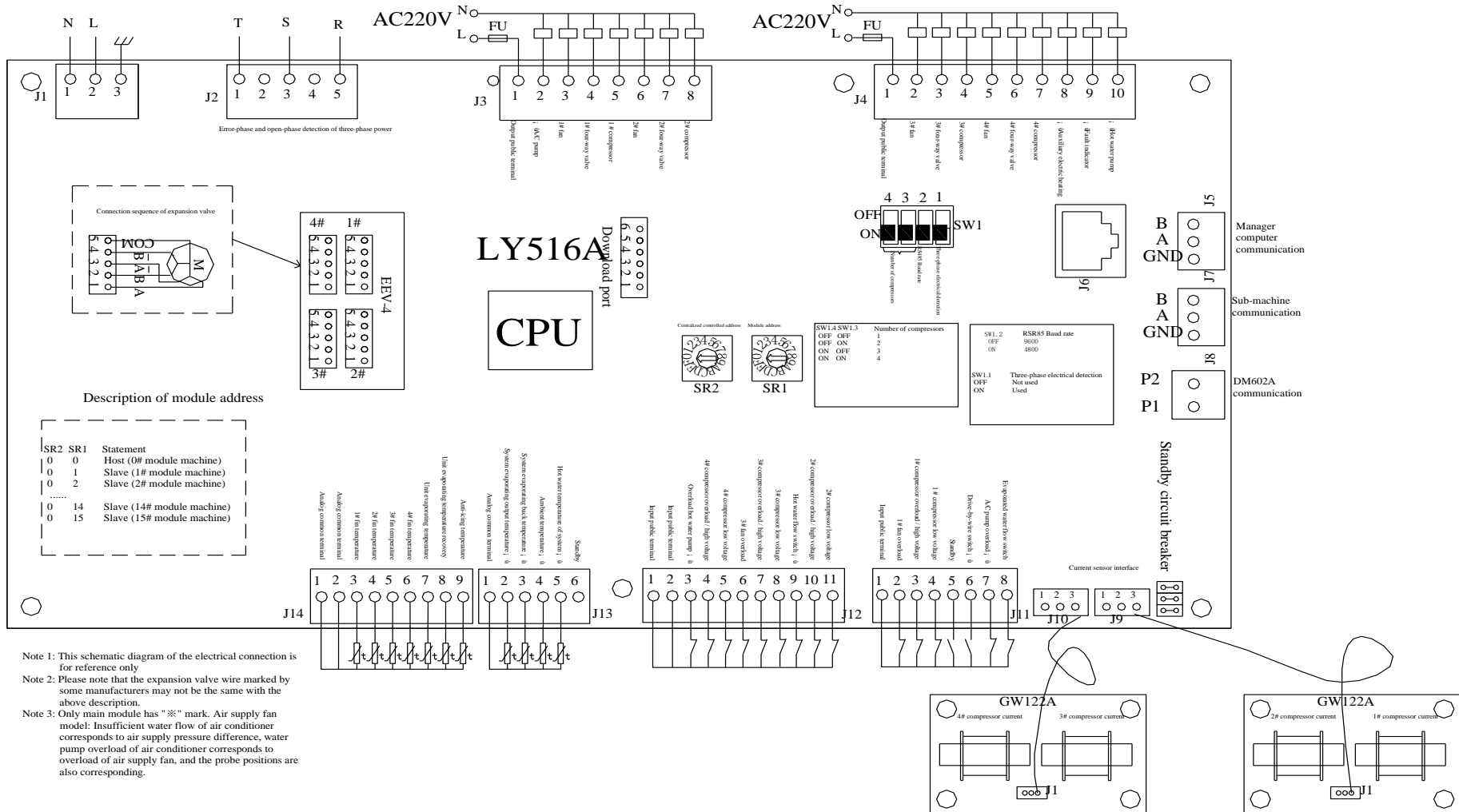
- Note:**
- (1) **The original password will not be modified or initialized by program redownloading or parameter initialization.**
 - (2) **The passwords can be reset but cannot be initialized.**
 - (3) **When setting a password, in the "Type in old password" step, password of current level or higher level can be entered.**

7. Parameter management

- 1) When parameter initialization is performed for the main module, the slave module will be initialized synchronously.
- 2) Parameters can be set separately for the slave module, but they are only effective when there is no power failure. When powered on again, parameters on the slave modules will be updated to be same as those on the main module.

Annex1. Electric connection Diagram

X1.LY516A.TY.B03M. Electrical Connection Diagram. Module - four compressors



- Note 1: This schematic diagram of the electrical connection is for reference only.
- Note 2: Please note that the expansion valve wire marked by some manufacturers may not be the same with the above description.
- Note 3: Only main module has "※" mark. Air supply fan model; Insufficient water flow of air conditioner corresponds to air supply pressure difference, water pump overload of air conditioner corresponds to overload of air supply fan, and the probe positions are also corresponding.

Annex2. List of state numbers

Information on each module can be queried on DM602A state query interface of the line controller, including temperature and current.

Txxx indicates state number, which corresponds to information on individual module, see the following table for specific meaning:

System status (Toxx)		Compressor state (Tnxx) n=1,2,3,4		Module status (T9xx)	
T000	Ambient temperature	Tn00	Opening of the electronic expansion valve	T900	Unit evaporating outlet temperature
T001	System evaporating output temperature	Tn01	Current of the compressor	T912	Anti-icing temperature
T002	System evaporating return temperature	Tn05	Fin temperature	T913	Unit evaporating return temperature
T003	Hot water temperature of system				

Annex3. Parameters setting

All the parameters of the unit have been set before delivery and modification is not necessary except that specially needed, avoiding the improper operation of the unit. Please confirm that the parameters are suitable for your machine before first start!

Annex3.1 Machine parameter setting table

- B-type parameters, consisting of 16 digits from 00 to 15, they are shown as PLXX-XX.YY (YY=00...15) in related description, each digit of the parameter can be independently set to 0/1;

Non-B-type parameters, shown as PLXX-XX in related description, and parameter is determined by [Setting range];

- N-type parameters cannot be modified when the unit is in operation;
- 1, 2, 3 and 4 indicate parameter operation authorization (4 levels of user, engineering, maintenance and factory), the number increases with level. Operator with high levels can operate low-level parameters.

Setting items	Setting scope	Default values	Unit	Type	Remarks
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PL01 User parameter 1						
01	Unit operation mode	1...3	2		1/N	1= Heating mode 2= Cooling mode 3 = Automatic mode Single heat model only supports heating, and single cold model only supports refrigeration
02	Set value of refrigeration temperature	min...max	12	°C	1	min=[Minimum refrigeration PL04-07] max=[Maximum refrigeration PL04-06]
03	Set value of heating temperature	min...max	40	°C	1	min=[Minimum heating PL04-09] max=[Maximum heating PL04-08]

PL02 User parameter 2						
01	Use setting of module				2/B	0 = Disabled 1 = Enabled [PL02-01.00] ... [PL02-01.15] Use setting of corresponding modules 0#...15#
	01.00 Setting of module 0	0...1	1			
	...	0...1	1			

	01.15	Setting of module 15	0...1	1			
02	Number of modules		1...16	1		2/N	Quantity of modules that can be controlled by the unit, corresponding addresses (SR1) are set to 0...F respectively, 0# indicates main module

PL03 System set parameter							
01	Machine type		0...1	0		N	0 = Air-cooled water supply 1 = Air-cooled air supply
02	Factory mode		0...2	2		N	0 = Single heat 1 = Single cool 2 = Heat pump
03	Standby						
04	Control object		0...1	1		2/N	0 = Outlet water 1 = Return water Control point for temperature adjustment
05	Standby						
06	Fan mode		0...2	0		N	0 = Mode 1 1 = Mode 2 2 = Mode 3
07	Standby						
08	Preheating time		0...24	0	Hour	3	When the unit is powered on, it cannot be started up until warm up completes; Setting to 0 indicates warm-up function is not used.
09	Type of remote switch		0...1	0		2	0 = Toggle switch 1 = Pulse switch
10	The setting used will be memorized in case of power failure		0...1	0		2	0 = Disabled 1 = Enabled If the unit is started when power fails, it is started automatically when powered on again.
11	The setting used will be automatically enabled when powered on.		0...1	0		2	0 = Disabled 1 = Enabled When powered on, the unit is started up automatically.

12	Use setting for water flow switch of the module	0...1	1		3/N	0 = Disabled 1 = Enabled When it is set to be Enabled, insufficient water flow failure of the module will be detected only when there is any compressor started in the module.
13	Unit start & stop control	0...4	0		2/N	See Start & Stop Control of the Unit
14	Condenser type I	0...3	1		N	0 = Independent 1 = Shared by 2
15	Condenser type II	0...3	2		N	2 = Shared by 3 3 = Shared by 4.
16	Condenser type III	0...3	1		N	See Condenser Type
17	Number of heat recovery modules	0...16	0		3	"0" indicates inapplicable to heat recovery

PL04 Energy control parameter							
01	Temperature control period	10...255	60	s	3	See description of [Energy adjustment]	
02	Air-conditioner loading deviation	0...10	2	°C	3		
03	Air-conditioner unloading deviation	0...10	2	°C	3		
04	Ambient temperature of automatic heating	10...20	15	°C	3	Ambient temperature ≤ 15 °C, the unit operates in heating mode	Valid when [Unit operation mode PL01-01]=[Automatic mode], see description of [Automatic mode]
05	Ambient temperature of automatic refrigeration	18...35	25	°C	3	Ambient temperature ≥ 25 °C, the unit operates in refrigeration mode	
06	Refrigeration upper limit	10...60	25	°C	3	Upper limit of setting range for [refrigeration temperature set value PL01-02]	
07	Refrigeration lower limit	-30...10	9	°C	3	Lower limit of setting range for [refrigeration temperature set value PL01-02]	
08	Heating upper limit	10...10 0	55	°C	3	Upper limit of setting range for [heating temperature set value PL01-03]	
09	Heating lower limit	10...60	30	°C	3	Lower limit of setting range for [heating temperature set value PL01-03]	

10	Low-temperature environment value 1	-20...6 0	5	°C	3	Used during heating, please see Heating Control Temperature Limit .
11	Low-temperature environment value 2	-20...6 0	0	°C	3	
12	Low-temperature environment value 3	-20...6 0	-5	°C	3	
13	Maximum control temperature of low-temperature environment 1	20...60	41	°C	3	
14	Maximum control temperature of low-temperature environment 2	20...60	37	°C	3	
15	Maximum control temperature of low-temperature environment 3	20...60	35	°C	3	

PL05 Evaporator/valve parameter setting						
01	Four-way valve type	0...1	0			0 = Closed during heating 1 = Closed during refrigeration
02	Four-way valve opening delay	-100...100	-3	s	3	E.g. Value = 10 (n > 0, positive): Open the four-way valve first, and then switch on the compressor after a delay of 10 s. Value = -10 (n < 0, negative): Switch on the compressor first, and then open the four-way valve after a delay of 10s.
03	Four-way valve closing delay	-100...100	-10	s	3	E.g. Value = 10 (n > 0, positive): close the four-way valve first, and then switch off the compressor after a delay of 10s. Value = -10 (n < 0, negative): Switch off the compressor first, and then close the four-way valve after a delay of 10s.

04	Water pump opening delay	0...240	30	s	3	E.g. Value = 30: Switch on water pump of the air conditioner, and then enter into temperature adjustment after a delay of 30s. "Air supply fan opening delay" for air supply fan model
05	Water pump closing delay	0...240	30	s	3	E.g. Value = 30, all compressors have been switched off during shut down, and then switch off water pump of the air conditioner after a delay of 30s "Air supply fan closing delay" for air supply fan model
06	Temperature when switching off the air supply fan	10...60	18	°C	3	See description of [Anti-cold air function]
07	Temperature when switching on the air supply fan	10...60	30	°C	3	
08	Air supply fan pause delay	0...30	0	min	3	See description of [Air supply fan pause]; Setting to 0 indicates this function is not used.

PL06 Fan parameter setting

01	Refrigeration fan opening delay	-100...100	10	s	3	E.g. Value = 10 (n > 0, positive): Refrigeration, switch on fan first, and then switch on the compressor after a delay of 10s; Value = -10 (n < 0, negative): Refrigeration, switch on the compressor first, and then switch on the fan after a delay of 10s;
02	Refrigeration fan closing delay:	-100...100	-10	s	3	E.g. Value = 10 (n > 0, positive): Refrigeration, switch off fan first, and then switch off the compressor after a delay of 10s; Value = -10 (n < 0, negative): Refrigeration, switch off the compressor first, and then switch off the fan after a delay of 10s;
03	Heating fan opening delay	-100...100	10	s	3	E.g. Value = 10 (n > 0, positive): Heating, switch on the fan first, and then switch on the compressor after a delay of 10s; Value = -10 (n < 0, negative): Heating, switch on the compressor first, and then switch on the fan after a delay of 10s;

04	Heating fan closing delay	-100...100	-10	s	3	E.g. Value = 10 (n > 0, positive): Heating, switch off fan first, and then switch off the compressor after a delay of 10s; Value = -10 (n < 0, negative): Heating, switch off the compressor first, and then switch off the fan after a delay of 10s;
05	Ambient temperature of refrigeration with high air	10...40	20	°C	3	See Fan Control
06	Ambient temperature of heating with high air	0...30	15	°C	3	

PL07 Compressor parameter setting

01	Frequent compressor start prevention	0...800	180	s		
02	Minimum compressor operation time	0...800	180	s	3	
03	Standby					
04	Full open temperature difference of compressor during first startup	2...10	6	°C	3	See description of [Energy adjustment]
05	Downtime during continuous operation	0...120	0	min		E.g. Value = 30, when the compressor has operated continuously for 30 min, force the compressor to shut down, and start it again after [PL07-01 Frequent compressor start prevention]; Setting to 0 indicates this function is not used.

PL08 Protection parameter setting

01	General failure delay	0...30	3	s	3	
02	Insufficient water flow detection delay	0...30	15	s	3	
03	Failure reset time	0...30	3	min	3	E.g. Value = 5, automatically reset 5 min after the failure signal cleared

04	Allowed automatic reset time	0...360	120	min	3	
05	Low pressure failure detection delay	10...240	60	s	3	E.g. Value = 120: Low compressor pressure is allowed to be detected when the compressor has operated for 120 s
06	Low pressure detection recovery after exiting defrost process	0...255	60	s	3	E.g. Value = 60, low compressor pressure detection is recovered 60 s after the compressor exiting the defrost process
07	Refrigeration low pressure jitter elimination delay	1...10	5	s	3	
08	Heating low pressure jitter elimination delay	3...90	30	s	3	
09	Temperature difference when exiting temperature protection	1...30	5	°C	3	
10	Too low output temperature at refrigeration air conditioner side	-20...30	4	°C	3	
11	Too high outlet temperature at heating air conditioner side	0...100	55	°C	3	
12	Fin overheating protection	0...100	65	°C	3	
13	Temperature difference when exiting fin temperature protection	1...30	10	°C	3	
14	Rated current of compressor	0...25	22	A	3	Safe current for compressor operation, taken as (maximum overcurrent 1/2)

15	Compressor current is too low	0...15	3	A	3	Too low current protection value for compressor operation
16	Current detection delay	0...180	10	s	3	E.g. Value=30: Current alarm detection is allowed only after the compressor has operated for 30s
17	Current use setting	0...2	1		3	0: Only current value displayed, current alarm protection not determined 1: Current value displayed, and current alarm protection determined 2: Current value not displayed, current alarm protection unavailable
18	Anti-ice protection temperature	-20...30	-5	°C	3	

PL09 Defrost parameter setting		See description of [Defrost logic]"				
01	Percentage of compressors under defrosting	1...100	50	%	3	<p>Multiply total number of compressors that can be operated in all modules by percentage of compressors under defrosting to obtain maximum number of compressors under defrosting</p> <p>If the calculated number of compressors under defrosting is not an integer, add it up to give an integer.</p> <p>E.g. Total number of compressors that can be operated in all modules is 32, the percentage of compressors under defrosting is set to be 60%, and calculation shows that 19.2 compressors can enter into the defrost process simultaneously, so 20 compressors should be allowed to enter into the defrost process simultaneously, see Manual Defrosting for details.</p>
02	Minimum operation of compressor for first defrosting	0...255	7	min	3	
03	Ambient temperature for defrosting 1	-10...15	5	°C	3	
04	Ambient temperature for defrosting 2	-10...10	-5	°C	3	
05	Defrosting interval 1	0...255	40	min	3	
06	Defrosting interval 2	0...255	35	min	3	
07	Defrosting interval 3	0...255	30	min	3	
08	Defrosting time	90...1200	480	s	3	
09	Allowed ambient temperature for defrosting	0...30	15	°C	3	
10	Allowed fin temperature for defrosting	-10...10	-2	°C	3	

11	Allowed difference between ambient temperature and fin temperature for defrosting 1	0...20	5	°C	3	Used when ambient temperature ≥ 0
12	Allowed difference between ambient temperature and fin temperature for defrosting 2	0...20	5	°C	3	Used when ambient temperature < 0
13	Fin temperature when exiting the defrost process	0...30	12	°C	3	
14	Outlet water temperature when exiting the defrost process	0...60	4	°C	3	
15	Low-pressure defrost detecting delay	3...30	5	min	3	E.g. Value =5, when the low-voltage switch is effective and the compressor has been operated for more than 5 min, defrost can be determined
16	Low-pressure defrost interval	5...60	15	min	3	
17	Fin temperature during low-pressure defrost	-20...0	-8	°C	3	
18	Fan delay during low-pressure defrost	0...255	10	s	3	
19	Use setting for low-pressure defrost	0...1	0		3	0 = Disabled 1 = Enabled
20	Selection of compressor frost-deposit timing	0...1	1		3	0 = Frost-deposit time of compressor 1 = Compressor operation time

21	Switch-on time of compressor during defrosting	0...60	5	min	3	
22	Deviation of exiting defrost process	0...10	3	°C	3	

PL10 Anti-freezing parameter setting						
01	Anti-freezing interval 1	0...100	30	min	3	
02	Anti-freezing interval 2	0...100	30	min	3	
03	Anti-freezing temperature of water pump	-10...20	6	°C	3	
04	Anti-freezing temperature of electric heater	-10...20	4	°C	3	
05	Anti-freezing temperature of compressor	-10...20	3	°C	3	
06	Temperature of electric heater when exiting freezing protection	5...20	8	°C	3	
07	Compressor temperature when exiting anti-freezing	5...40	15	°C	3	
08	Ambient temperature of Anti-freezing interval	-10...20	0	°C	3	Select different Anti-freezing intervals based on this temperature, see Anti-freezing logic for details
09	Ambient temperature when entering into anti-freezing process	-10...20	2	°C	3	Restriction on ambient temperature when entering into and exiting the anti-freezing process, see Anti-freezing logic for details
10	Ambient temperature difference when exiting anti-freezing process	0...10	1	°C	3	
11	Anti-freezing function setting	0...1	1		3	0 = Disabled 1 = Enabled

PL11: Parameter setting of electric heater						
01	Ambient temperature when the electric heater is switched on	0...20	15	°C	3	

PL12: Electronic expansion valve control						
01	Electronic expansion valve use setting	0...1	1		N	0 = Disabled 1 = Enabled
02	Excitation mode	0...1	0		N	0 = Four-phase and eight-step 1 = Four-phase and four-step
03	Excitation frequency	0...6	0			0=31PPS 1=62PPS 2=83PPS 3=100PPS 4=125PPS 5=166PPS 6=250PPS Maximum steps during operation per second
04	Total steps of expansion valve	20...9000	480	Step	N	Maximum steps of EEV, please set based on the valve actually used
05	Zero opening of expansion valve when powered on	100...200	120	%	3/N	E.g. Value = 120: Zero steps after powered on = [PL12-04 Total steps of motor]*120%
06	Minimum opening of expansion valve	0...100	10	%	3	E.g. Value = 10: Minimum opening of motor ← [PL12-04 Total steps of motor]*10%
07	Standby opening	0...100	60	%	3	E.g. Value = 60: Steps of motor during standby = [PL12-04 Total steps of motor]*60%
08	Refrigeration opening 1	0...100	58	%		See Electronic Expansion Valve Control .
09	Refrigeration opening 2	0...100	42	%		
10	Refrigeration opening 3	0...100	42	%		
11	Heating opening 1	0...100	52	%		
12	Heating opening 2	0...100	31	%		
13	Defrosting opening	0...100	31	%		

14	Transition temperature 1 of refrigeration opening	0...20	39	°C		
15	Transition temperature 2 of refrigeration opening	0...20	25	°C		
16	Transition temperature 1 of heating opening	0...20	15	°C		
17	Transition temperature 2 of heating opening	0...20	5	°C		
18	Heating opening 3	0...100	26	%		

Normally-open & normally-closed setting of PL13 switch

01	Setting of unit 1				3/B	0 = Normally open 1 = Normally closed [PL14-01.00] ... [PL14-01.15] Setting of the corresponding 16 switches
	01.00	Insufficient A/C water flow	0...1	1		
	01.01	A/C water pump overload ※	0...1	1		
	01.02	Standby		0		
	01.03	Standby	0...1	0		
	01.04	1 # compressor low voltage		1		
	01.05	1# compressor overload / high voltage	0...1	1		
	01.06	1# fan overload	0...1	1		
	01.07	2# compressor low voltage	0...1	1		
	01.08	2# compressor overload / high voltage	0...1	1		
	01.09	Hot water flow switch	0...1	1		
	01.10	3# compressor low voltage	0...1	1		
	01.11	3# compressor overload / high voltage	0...1	1		
	01.12	3# fan overload	0...1	1		
	01.13	4# compressor low voltage	0...1	1		
	01.14	4# compressor overload / high voltage	0...1	1		
01.15	Overload hot water pump	0...1	1			

PL14 Temperature corrected value

01	Water output temperature of the system	-10.0...10.0	0.0	°C	2	
02	Return water temperature of system	-10.0...10.0	0.0	°C	2	
03	Ambient temperature	-10.0...10.0	0.0	°C	2	

PL15 Temperature probe use setting

01	Outlet water temperature probe 1	0...1	1		2/N	0 = Disabled 1 = Enabled
02	Standby	0...1	1		2/N	
03	Standby	0...1	1		2/N	
04	Standby	0...1	1		2/N	
05	1# fin temperature probe	0...1	1		2/N	
06	2# fin temperature probe	0...1	1		2/N	
07	3# fin temperature probe	0...1	1		2/N	
08	4# fin temperature probe	0...1	1		2/N	
09	Anti-icing temperature	0...1	0		2/N	
10	Return water temperature of unit	0...1	0		2/N	