

# Liebert. PEX+ Series Precision Air Conditioner

## User Manual

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# Contents

Chapter 1 Overview .....	1
1.1 Model Description .....	1
1.2 Appearance .....	2
1.3 Main Components and Optional Features .....	2
1.3.1 Components of Indoor Unit.....	2
1.3.2 Condenser .....	3
1.3.3 Remote Monitoring Software .....	3
1.3.4 Optional Features.....	3
1.4 Storage Environment .....	3
Chapter 2 Instructions for Installation Preparations .....	4
2.1 Equipment Room Requirement.....	4
2.2 Installation Space .....	4
2.2.1 Installation Space Requirements.....	4
2.2.2 Maintenance Space requirement .....	4
2.3 Operating Environment .....	5
2.4 Unpacking And Inspection.....	5
2.4.1 Transportation And Movement.....	5
2.4.2 Unpacking.....	6
2.4.3 Inspection .....	7
Chapter 3 Mechanical Installation.....	8
3.1 Installation Notes .....	8
3.2 System Installation Arrangement .....	8
3.2.1 Overall System Arrangement.....	8
3.2.2 System Installation Illustration.....	9
3.3 Mechanical Parameters.....	9
3.3.1 Dimensions and weight of indoor unit.....	9
3.3.2 Dimensions and weight of condenser .....	10
3.3.3 Plenum dimensions (for upflow unit) .....	10
3.3.4 Positions and dimensions of air outlet .....	11
3.4 Installing Indoor Unit .....	13
3.4.1 Making base .....	13
3.4.2 Installing base.....	13
3.4.3 Vibration absorbing .....	13
3.4.4 Install Indoor Unit Cabinet .....	14
3.5 Installing Condenser .....	14
3.6 Piping For Air-Cooled Unit.....	14
3.6.1 Pipe Extension Kit (Optional) .....	14
3.6.2 Connecting condensate drain pipe of indoor unit .....	14
3.6.3 Connecting water inlet pipe of humidifier .....	15
3.6.4 Connecting copper pipes (discharge pipe and liquid pipe) between indoor unit and condenser .....	16
3.6.5 Installing pipe extension kit (optional, for site installation).....	17

3.7 Lowering Fan (For Down Flow Unit).....	17
3.8 Removing Fastener And Vibration Absorber .....	19
3.9 Installation Inspection.....	20
Chapter 4 Electrical Installation .....	21
4.1 Installation Notes .....	21
4.2 Wiring Of Indoor Unit.....	21
4.2.1 Locating Electrical Ports Of Indoor Unit.....	21
4.2.2 Connecting Power Cable Of Indoor Unit.....	21
4.2.3 Connecting Control Cables.....	22
4.2.4 Connecting Solenoid Valve Of Pipe Extension Kit (Options, For Site Installation).....	23
4.3 Wiring Of Condenser.....	24
4.3.1 Connecting Control Signal Terminals .....	24
4.3.2 Connecting Control Signal Cables .....	24
4.4 Installation Inspection.....	24
Chapter 5 iCOM Controller.....	25
5.1 Appearance .....	25
5.2 Button And Indicator Panel.....	25
5.3 Structure Chart Of Control Menu .....	27
5.4 Startup Interface .....	27
5.5 Main Interface.....	27
5.6 USER MENUS.....	28
5.6.2 PASSWORD.....	28
5.6.3 SET POINTS .....	28
5.6.4 EVENT LOG .....	29
5.6.5 GRAPHICS.....	29
5.6.6 SET ALARMS .....	30
5.6.7 SENSOR DATA .....	31
5.6.8 DISPLAY SETUP .....	32
5.6.9 TOTAL RUN HRS .....	32
5.6.10 SLEEP MODE.....	33
5.6.11 SERVICE INFO.....	33
5.6.12 ACTIVE ALARMS .....	33
5.7 SERVICE MENUS .....	34
5.7.1 PASSWORD LEVEL .....	34
5.7.2 SET POINTS .....	34
5.7.3 STANDBY.....	36
5.7.4 WELLNESS .....	36
5.7.5 DIAGNOSTICS .....	39
5.7.6 SET ALARMS .....	41
5.7.7 CALIBRATION.....	43
5.7.8 NETWORK SETUP.....	44
5.7.9 OPTIONS SETUP.....	45
5.7.10 SERVICE INFO.....	45
5.8 ADVANCED MENUS .....	46
5.8.1 PASSWORD LEVEL .....	46

5.8.2 FACTORY SETUP .....	46
5.9 MBV Settings.....	50
5.10 EVENT NAME AND DEFINITION.....	51
Chapter 6 Application Of INTELLISLOT.....	55
6.1 Introduction Of Host Communication Cards .....	55
6.2 Installation Of Host Communication Cards.....	55
6.3 Commission Of Host Communication Component .....	56
6.3.1 Setting HyperTerminal.....	56
6.3.2 Setting 485 Communication Card .....	57
6.3.3 Setting TCP/IP Communication Card .....	59
6.3.4 Setting SNMP Parameters Of TCP/IP Communication Card .....	60
6.4 Host Communication Networking Diagram .....	63
Chapter 7 System Operation And Maintenance .....	65
7.1 Monthly Routine Inspection Items .....	65
7.2 Routine Inspection Items (Half A Year) .....	65
7.3 Self-diagnosis Function .....	66
7.4 Electrical Connection Inspection .....	66
7.5 Control Component Appearance Inspection.....	66
7.6 Air Cooled Condenser.....	67
7.7 Filter .....	67
7.8 Infrared Humidifier .....	68
7.9 Electric Heater .....	68
Chapter 8 Troubleshooting.....	69
8.1 Fan Troubleshooting .....	69
8.2 Compressor And Cooling System Troubleshooting.....	70
8.3 Infrared Humidifier Troubleshooting .....	72
8.4 Heating System Troubleshooting .....	72
Appendix 1 Circuit Diagram.....	75
Appendix 2 Menu Structure Of iCOM Controller (USERS MENUS).....	77
Appendix 3 Menu Structure Of iCOM Controller (SERVICE MENUS) .....	79
Appendix 4 Alarm Control Menu Table .....	81
Appendix 5 Hazardous Substances or Elements Announcement .....	82
Appendix 6 Monthly Routine Inspection Items.....	83
Appendix 7 Routine Inspection Items (Half A Year).....	84



## **Foreword**

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*Liebert.PEX+ series product is the precision air conditioner used in data center, which is developed based on the Global R&D Platform of Emerson Network Power Co., Ltd. (“Emerson” for short hereafter)*

*This manual focuses on the using instructions, including instructions for installation preparations, mechanical installation, electrical installation, controller operation, system operation and maintenance, and troubleshooting, etc. The system operation and maintenance, trouble-shooting and handling are only limited to user’s independent maintenance. For the maintenance and troubleshooting works not mentioned in this manual, please contact Emerson professional engineer. The commissioning and startup will be conducted by Emerson engineer, so this part is not described in this manual.*

*Please read this manual carefully before installing, maintaining and troubleshooting, especially the warning information in the manual.*

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# Chapter 1 Overview

The Liebert.PEX+ series precision air conditioner (“Liebert.PEX+” for short hereafter) is professional equipment, which should not be accessible to the general public. The Liebert.PEX+ is a medium-large size precision environment control system, suitable for the environment control of the equipment room or computer room, featuring high reliability, high sensible heat ratio and large air flow. This chapter introduces the model description, appearance, main components and optional parts.

## 1.1 Model Description

The model description of Liebert.PEX+ is shown in Figure 1-1.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
P	1	0	5	0	D	A	1	3	S	H	S	1	2	E	1	D	0	0	0	P	A	0	0	0
<b>Digit1 Product model</b>														N Dual Cool Coil,BPHE-2way,CW-3 way,TXV										
P PEX+														P Dual Cool Coil,BPHE-3way,CW-2 way,TXV										
<b>Digit2 Product model</b>														<b>Digit16 Enclosure options</b>										
1-2 Number of Modules/Bays														1 Standard Color black orange peel grain coating										
<b>Digit3 Cooling Capacity kW</b>														2 White orange peel grain coating										
0-9 Nominal Net Cooling Capacity - kW														6 Color Charcoal grey w/Double skin										
<b>Digit4 Cooling Capacity kW</b>														<b>Digit17 Mains Switch High Voltage Option</b>										
0-9 Nominal Net Cooling Capacity - kW														0 None										
<b>Digit5 Cooling Capacity kW</b>														D Main non-Locking Disconnect										
0-9 Nominal Net Cooling Capacity - kW														P Dual Power Supply Parallel										
<b>Digit6 Air Discharge</b>														A Dual Power Supply Auto Alternate(Interlocking contactor)										
U Upflow														T Dual Power Supply Auto Alternate(ATS)										
D Downflow														<b>Digit18 Lock Out Low Voltage Option</b>										
<b>Digit7 System type</b>														0 None										
A Air cooled														H Reheat & Humidity Lockout										
W Water cooled														<b>Digit19 Monitoring</b>										
D Dual Cool-Chilled water+Air cooled														0 No Card										
H Dual Cool-Chilled water+Water cooled														7 IS-UNITY Card										
<b>Digit8 Fan</b>														C ICOM DO Card										
1 EC plug fan														U IS-UNITY Card & ICOM DO Card										
<b>Digit9 Power Supply</b>														<b>Digit20 Sensors</b>										
3 380-415V / 3ph / 50Hz+N														0 None										
T 380-415V / 3ph / 60Hz+N														S Smoke Sensor										
<b>Digit10 Cooling System</b>														H High Temperature										
C Compliant Scroll Single Circuit, R407C														N Supply Air Temperature Sensor										
S Compliant Scroll Dual Circuit, R407C														F Smoke & High Temp										
E Digital Scroll Single Circuit, R407C														A Supply air pressure sensor										
D Digital Scroll Dual Circuit, R407C														L Water Flow Sensor										
4 Compliant Scroll Single Circuit, R410A														X Other Sensor										
6 Compliant Scroll Dual Circuit,R410A														<b>Digit21 Packaging</b>										
7 Digital Scroll Single Circuit,R410A														P Packaging - Standard Cardboard and Wooden Pallet										
T Digital Scroll Dual Circuit,R410A														C Packaging - Wooden crate Export										
<b>Digit11 Humidification</b>														<b>Digit22 Special Requirements</b>										
0 None														A SFA - none										
H Infrared Humidifier														Z For Internal Use Only(For Australia and New Zealand)										
S Electrode humidifier														E For Export										
<b>Digit12 Display</b>														<b>Digit23 Order Identifier</b>										
S Standard Display														0 Standard Static										
L Large Display														1 High ESP 100 Pa										
<b>Digit13 Re-Heating</b>														2 High ESP 200 Pa										
0 None														3 Other High ESP										
1 Electric heating Std 1 Stage														X SFA Included										
2 Electric heating Opt. 2 Stage														<b>Digit24 Order Identifier</b>										
<b>Digit14 Air Filter</b>														0 None										
2 G4														L Air cooled-long piping>30m										
3 F5														C Low temp Kits										
<b>Digit15 Coil and Valves</b>														B Low temp Kits+Long piping										
S Standard DX Air cooled coil , TXV														X SFA Included										
E Standard DX Air cooled coil , EEV														<b>Digit25 Order Identifier</b>										
4 Dual Cool Coil,BPHE-2way,CW 2 way,TXV														0 None										
K Dual Cool Coil,BPHE-3way,CW-3 way,TXV														X SFA Included										

Figure 1-1 Model description

## 1.2 Appearance

Liebert.PEX+ appearance is shown in Figure 1-2 with P2080UA as an example.



Figure 1-2 Appearance

## 1.3 Main Components and Optional Features

The components include indoor unit, condenser and remote monitoring software.

### 1.3.1 Components of Indoor Unit

The indoor unit includes compressor, evaporator, electronic expansion valve, infrared humidifier, DC speed-regulated centrifugal fan ("EC fan" for short hereafter), electric heater, sight glass, filter drier and iCOM controller (Precision Air-Conditioner controller). The descriptions of the components are given in Table 1-1.

Table 1-1 Descriptions of main components of indoor unit

Components	Descriptions
Compressor	<ul style="list-style-type: none"> <li>Highly effective Copeland scroll compressor is used, featuring low vibration, low noise and high reliability.</li> <li>The Rotalock (screw thread) connection mode makes the maintenance easier.</li> </ul>
Evaporator	<ul style="list-style-type: none"> <li>Adopt a fin-tube heat exchanger with high efficiency.</li> <li>The distributor is designed and verified according to individual model to ensure that the refrigerant is distributed evenly in each loop, improving the heat exchanger efficiency to a great extent.</li> </ul>
Electronic expansion valve	<ul style="list-style-type: none"> <li>The electronic expansion valve is very precise and accurate device which can react instantaneously to any kind variation or abnormality occurs during air-conditioners working.</li> </ul>
Infrared humidifier	<ul style="list-style-type: none"> <li>The infrared humidifier has a simple structure, which is easy for teardown, cleaning and maintenance.</li> <li>Application of the infrared humidifier can reduce the dependence on water quality. It also features fast startup, short humidifying time, large humidifying capacity and high humidifying efficiency.</li> </ul>
Fan	<ul style="list-style-type: none"> <li>PEX+ series use EC fan, which features high efficiency, energy-saving, space-saving and low noise.</li> <li>EC fan unit uses elaborate structure design, and the downflow unit uses the 'in-floor' design, which positions the fan unit below the floor to further improve the efficiency of air supply.</li> </ul>
Electric heater	<ul style="list-style-type: none"> <li>The electric metal heater is used. It features fast heating speed and even heat and high reliability.</li> </ul>
Sight glass	<ul style="list-style-type: none"> <li>The sight glass is the window of the system cycle, for observing the refrigerant state, mainly the moisture content of the system. When the moisture content exceeds the standard, the color will be changed.</li> </ul>
iCOM Controller	<ul style="list-style-type: none"> <li>LCD screen with blue backlight and 128 × 64 pixels, or selects the large screen with 320 × 240 pixels</li> <li>The multi-level password protection can effectively prevent unauthorized operation.</li> <li>Self-recovery upon power failure</li> <li>The operation time of main components is available through the menus.</li> <li>The expert-level fault diagnosis system can display the current fault information automatically, facilitating the maintenance.</li> <li>It can store up to 400 historical event records.</li> <li>There are two kinds of panels for option: one with common screen and the other with large screen</li> </ul>
Filter drier	<ul style="list-style-type: none"> <li>The filter drier eliminates the moisture effectively in the system, and also filtrates the impurities generated during the long-term system operation so as to ensure normal system operation.</li> </ul>

### 1.3.2 Condenser

Refer to condenser user manual.

### 1.3.3 Remote Monitoring Software

Through the configured RS485 or TCP/IP port, Liebert.PEX+ can communicate with the host computer and receive the control of the host software.

### 1.3.4 Optional Features

The optional parts include: Extension kit, low temperature kit, two-level electric heater, no heater, no humidifier, plenum for upflow unit, electrode humidifier, water cooled unit and thermal expansion valve.

#### **Extension kit**

If there is a requirement for long piping / high vertical drop between the indoor unit and condenser according to actual application condition, an extension kit shall be configured and the specific selection is described in 3.6.1 Pipe Extension Kit (Optional) .

#### **Low temperature kit**

In winter (outdoor temperature below  $-15^{\circ}\text{C}$ ), the air conditioner shall use a low temperature kit for cooling. This kit is inside the unit. User should consider the low temperature environment to make reasonable selection.

#### **Two-stage electric heater**

According to user requirement, a two-stage electric heater shall be used and the heating capacity shall be identical with the one-stage heater

#### **No heater**

Liebert.PEX+ AC shall have the option without heating according to user requirements.

#### **No humidifier**

Liebert.PEX+ AC shall have the option without humidifying according to user requirements.

#### **Plenum**

The upflow unit shall be configured with a plenum with its configuration listed in 3.3.3 *Plenum* dimensions (for upflow unit). For special plenum, please contact Emerson.

#### **Electrode humidifier**

Liebert.PEX+ AC shall have the option of electrode humidifier according to user requirements. The electrode humidifier has a different requirement for water inlet / outlet pipes with the standard infrared humidifier. Refer to 3.6.3 Connecting water inlet pipe of humidifier for the configurations of water inlet/outlet pipes of electrode humidifier.

#### **Thermal expansion valve**

The standard configuration is electronic expansion valve, and optional thermal expansion valve can be provided according to user requirements.

## 1.4 Storage Environment

See Table 1-2 for storage environment requirement.

Table 1-2 Storage environment requirement

Item	Requirement
General requirements	Indoor, clean, no dust
Ambient humidity	5%RH to 85%RH (non-condensing)
Ambient temperature	$-20^{\circ}\text{C}$ to $+54^{\circ}\text{C}$
Storage time	Total transportation and storage time should not exceed six months. Otherwise, the performance needs to be re-calibrated

## Chapter 2 Instructions for Installation Preparations

Liebert.PEX+ is professional equipment, and there are lots of complex installation works, so the preparation is very important. This chapter details the installation preparation, including how to prepare the installation environment and space and reserve the maintenance space, and how to unpack and inspect. Please read this chapter carefully before installation.

### 2.1 Equipment Room Requirement

The requirements are as follows:

1. The equipment room should have good heat insulation.
2. The equipment room should have sealed damp proof layer. The damp proof layer of the ceiling and walls must use polyethylene film or be applied with moisture proof paint. The coating of the concrete wall and the floor must be damp proof.
3. All the doors and windows should be closed and the seams (if any) should be as narrow as possible to prevent the outdoor air from entering the equipment room, which may increase the load of heating, cooling, humidifying and dehumidification of the system. It is recommended that the inhalation of outdoor air be kept below 5% of the total indoor airflow.

### 2.2 Installation Space

#### 2.2.1 Installation Space Requirements

Adequate installation space for the indoor unit must be provided. The indoor unit of air cooled product must be installed on the floor of equipment room or computer room, and the condenser can be installed on the ground of outdoor or other room. The entire water cooled precision AC shall be installed on floor of equipment room or computer room.

#### warning

- Do not use the indoor unit in the open and severe outdoor environment.
- Avoid locating the indoor unit in concave or narrow areas, which can baffle the airflow, shorten the cooling cycle and result in air return short circuit and air noise.
- Avoid locating multiple indoor units close to each other. That can result in crossing air patterns, unbalanced load and competitive operation.
- Do not install the unit in the vicinity of any precision equipment, and prevent the leaked condensation water due to improper use of the air conditioner from affecting the operation of precision equipment.
- Do not install other devices (such as smoke detector) over the cabinet.

#### 2.2.2 Maintenance Space requirement

Be sure to reserve maintenance space when installing the equipment. Leave a maintenance space of 850mm in front of the air conditioner unit normally, and the minimal maintenance space is not less than 600mm. The requirement for maintenance space is given in Figure 2-1.

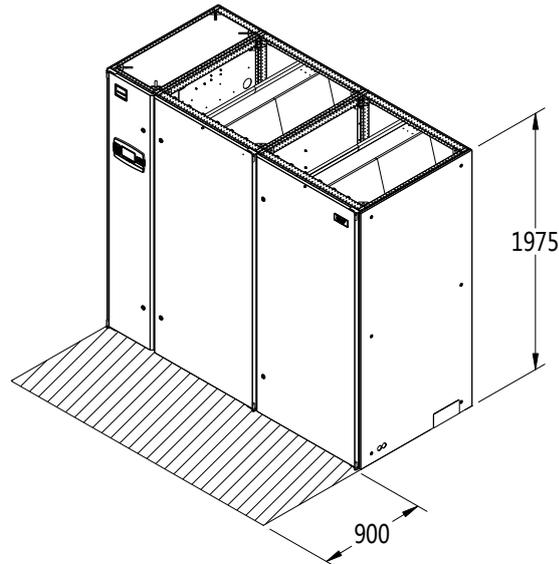


Figure 2-1 Maintenance space of unit

## 2.3 Operating Environment

The operation environment of Liebert.PEX+ meets the requirements of GB4798.3-2007. See Table 2-1 for details.

Table 2-1 Operating environment requirement

Item	Requirement	
Ambient temperature	Indoor	0°C ~ 40°C, the unit should not run in 32~40°C environment for a long time.
	Outdoor	Air-cooled: -35°C ~ +45°C (Low-temp kit is required when the temperature is below -15°C)
Protection level (indoor unit)	IP20	
Altitude	<1000m. Above that, derating is required	
Operation voltage range	380V (-10% ~ +15%), 3N~ 50Hz	

### Note

When the unit is used in the following condition, please contact Emerson:

- If the unit voltage exceeds the operating voltage range.
- Derating for altitude above 1000m.
- Other applications outside of applicable scopes.

## 2.4 Unpacking And Inspection

### 2.4.1 Transportation And Movement

Railroad transportation and shipping are the recommended means of transportation. If truck transportation is unavoidable, choose roads that are less bumpy in order to protect the equipment.

The Liebert.PEX+ series air conditioner is heavy (see Table 3-1 for the weight). It is recommended to use mechanical equipment such as an electric forklift to unload and move the equipment to the place close to the installation site. If an electric forklift is used, insert the tines of the forklift below the pallet, as shown in Figure 2-2. Align the tines with the center of gravity to prevent the equipment from falling over.



Figure 2-2 Inserting and movement

When moving the indoor unit, keep the obliquity within the range from  $75^{\circ}$  to  $105^{\circ}$ , as shown in Figure 2-3.

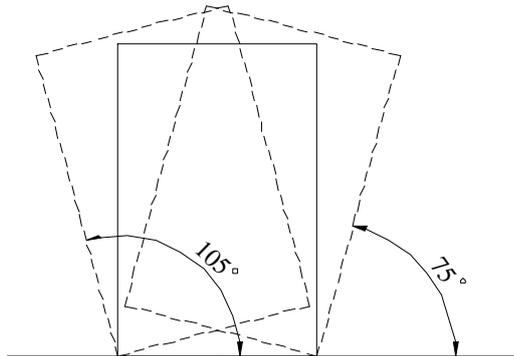


Figure 2-3 Moving obliquity of indoor unit

#### 2.4.2 Unpacking

Move the equipment to the place closest to the final installation site and then unpack it.

Follow the procedures below for unpacking:

1. Remove the side panels and top cover

Liebert.PEX+ series air conditioner uses the international packaging. You can use a hammer or straight screwdriver to straighten the connection hook that connects the side panels to the top cover, as shown in Figure 2-4.



Figure 2-4 Straightening the hook

At first, straighten all the hooks that fix side panel I, and remove side panel I. Then straighten all the hooks that fix side panel II, and remove side panel II. At last remove top cover III, as shown in Figure 2-5 .

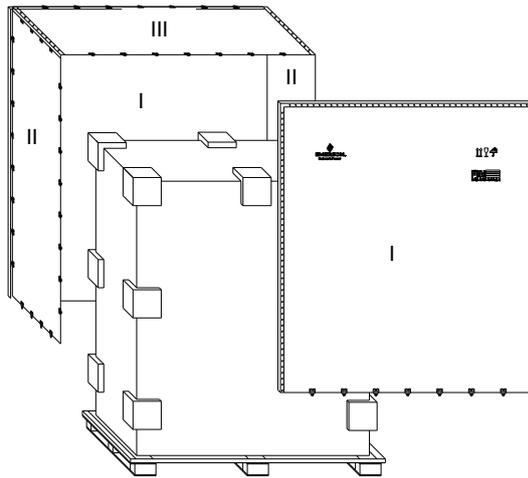


Figure 2-5 Removing side panels and top cover

## 2. Remove the base pallet

The unit is fixed onto the base pallet with M8x65 bolts or 8x90 screw, as shown in Figure 2-6. You can use a 17mm open-end spanner, ratchet spanner or sleeve to remove the fixing bolts.

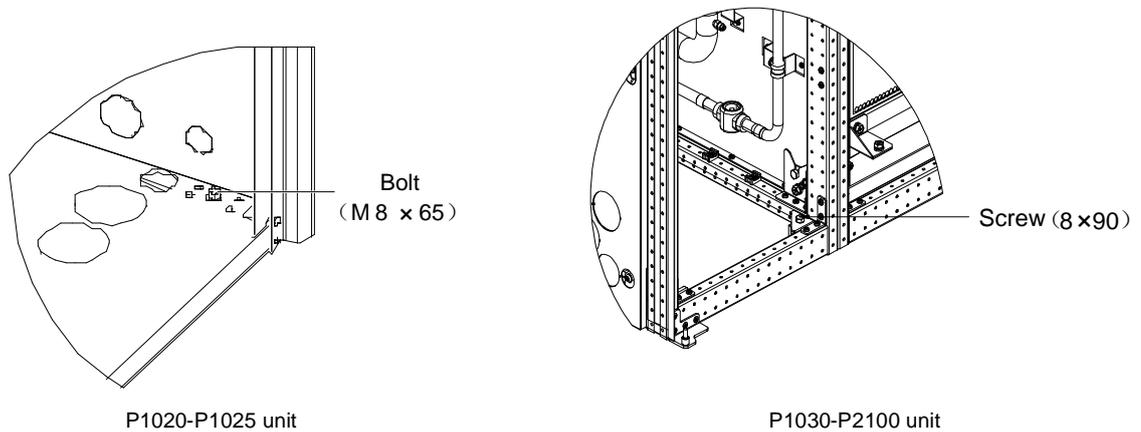


Figure 2-6 Fixing screw on the base pallet

### 2.4.3 Inspection

Check against the *Packing List* that the fittings are complete and the components are intact. If any parts are found missing, or damaged, please report to the carrier immediately. If any hidden damages are found, please report to the local offices of the carrier and Emerson.

## Chapter 3 Mechanical Installation

To achieve the designed performance and maximize the product life, correct installation is vital. This chapter introduces the installation notes, installation layout, installation procedures, piping and fan lowering operations.

### 3.1 Installation Notes

1. Prior to installation, be sure to read the whole contents of *Chapter 2 Instructions* for Installation Preparations, and confirm that the installation positions have been confirmed according to the requirements of 2.2 .
2. Liebert.PEX+ air-cooled series air conditioner is designed for split floor installation. The indoor unit must be installed on the floor of the equipment room or computer room, and the condenser can be installed outdoors or on the floor of other rooms. The Liebert.PEX+ water-cooled air conditioner is designed for integrated floor installation. It should be installed on the floor of the equipment room or computer room.
3. The selection, layout and fixing of the pipes shall comply with industrial standard.
4. Pressure drop, compressor oil return, noise reduction and vibration shall be considered in design and installation.
5. The unit shall be fixed by screws and mounting rails to avoid shaking during startup or operating processes.

### 3.2 System Installation Arrangement

#### 3.2.1 Overall System Arrangement

The overall arrangement of Liebert.PEX+ series air conditioner is shown in Figure 3-1.

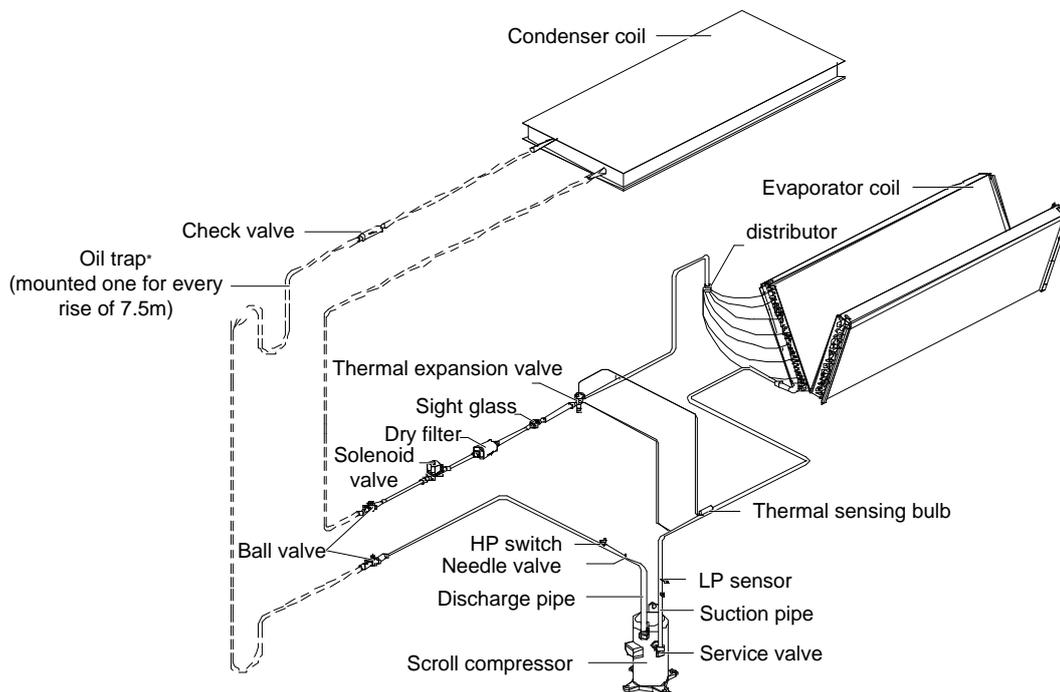


Figure 3-1 Overall system arrangement



Note

- The single system is used as an example to describe the double system.
- —————: Emerson piping.
- =====: Field piping (by technicians).
- \*: Components are not supplied by Emerson but are recommended for proper circuit operation and maintenance.
- +: Components are required when the equivalent length exceeds 30m.

### 3.2.2 System Installation Illustration

The installation modes of the unit are shown in Figure 3-2 and Figure 3-3.

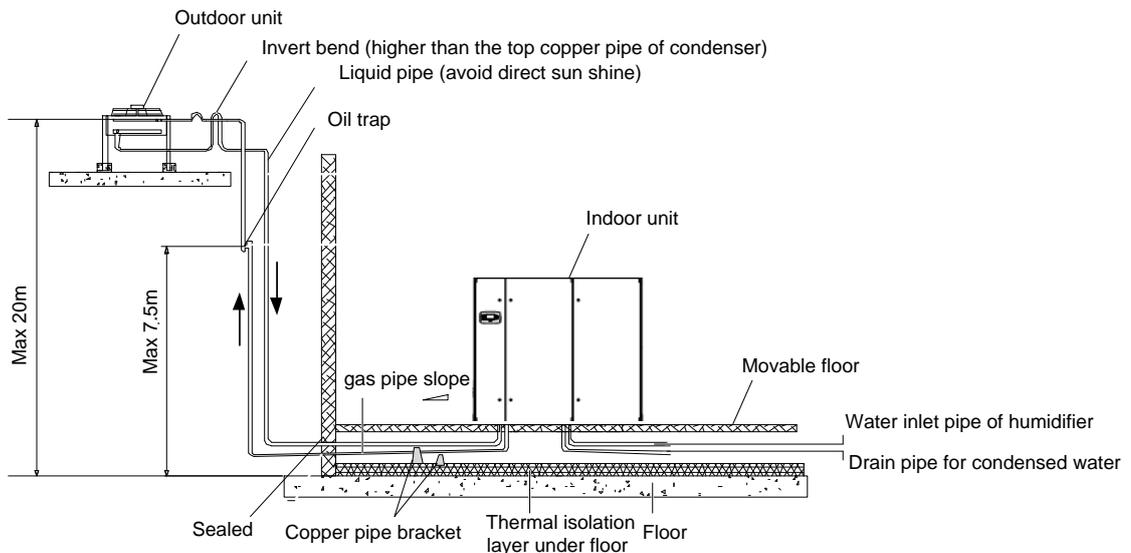


Figure 3-2 Condenser installed higher than compressor

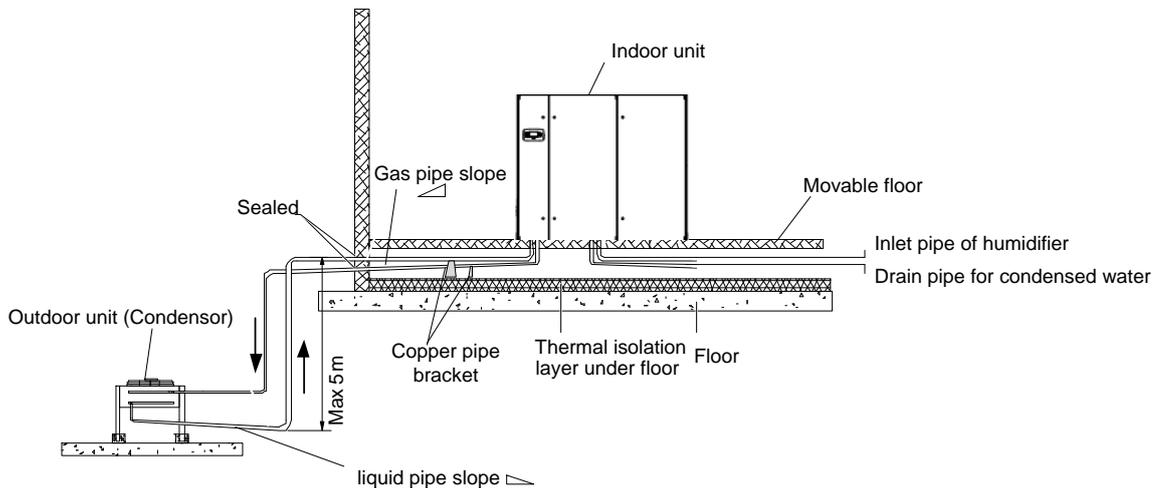


Figure 3-3 Condenser installed lower than compressor

#### Note

- If the condenser is installed higher than the compressor (see Figure 3-2), a back bend should be fitted to the discharge line and liquid line of the condenser, so as to prevent the liquid refrigerant from flowing back when the condenser stops.
- The top end of the back bend must be installed higher than the highest copper pipe of the condenser.

## 3.3 Mechanical Parameters

### 3.3.1 Dimensions and weight of indoor unit

The dimensions and weight of the indoor unit are shown in Figure 3-4, Figure 3-5 and Table 3-1.

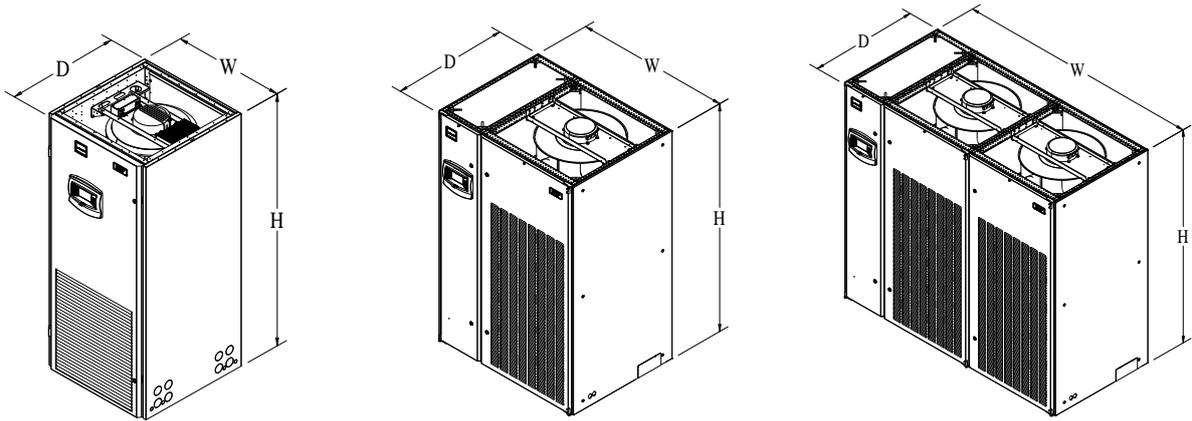


Figure 3-4 Outline drawings of the upflow indoor unit (unit: mm)

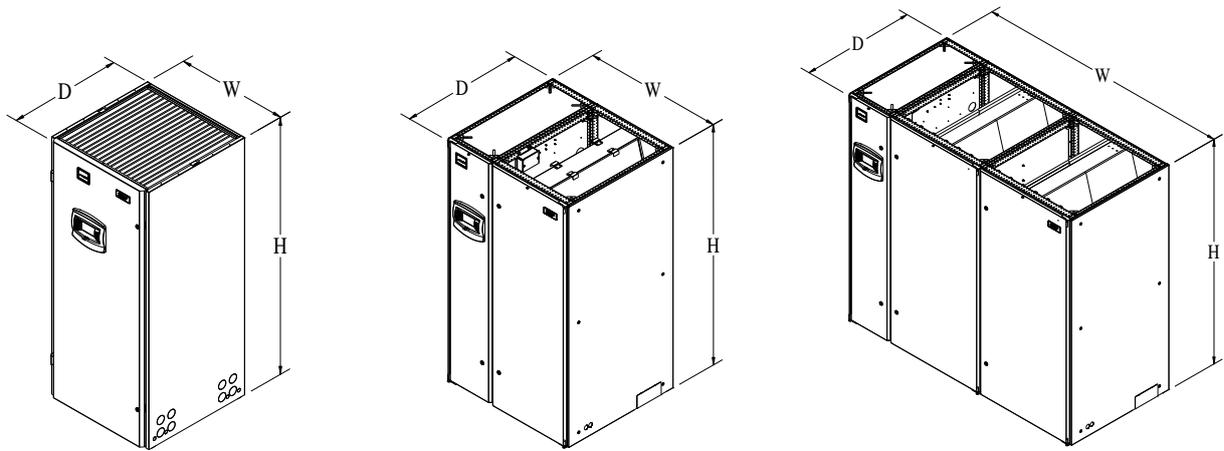


Figure 3-5 Outline drawings of the downflow indoor unit

Table 3-1 Dimensions and weight of indoor unit

Model	Dimensions (WxDxH)(mm)	Net weight (kg)
P1020U(D)A13C	853×874×1970	320
P1025U(D)A13C	853×874×1970	340
P1030U(D)A13C	1130×995×1975	400
P1035U(D)A13C	1130×995×1975	420
P1040U(D)A13C	1330×995×1975	460
P1040U(D)A13S	1330×995×1975	480
P1050U(D)A13C	1330×995×1975	530
P1050U(D)A13S	1330×995×1975	570
P2060U(D)A13S	1830×995×1975	690
P2070U(D)A13S	1830×995×1975	730
P2080U(D)A13S	2230×995×1975	770
P2090U(D)A13S	2230×995×1975	805
P2100U(D)A13S	2230×995×1975	810

### 3.3.2 Dimensions and weight of condenser

Refer to condenser user manual for the condenser dimensions and weight.

### 3.3.3 Plenum dimensions (for upflow unit)

The dimensions of plenum are shown in Table 3-2.



**Position and dimensions of air outlet on top cover**

The position and dimensions of air outlet on top cover of upflow unit are shown in Figure 3-7 and Table 3-3.

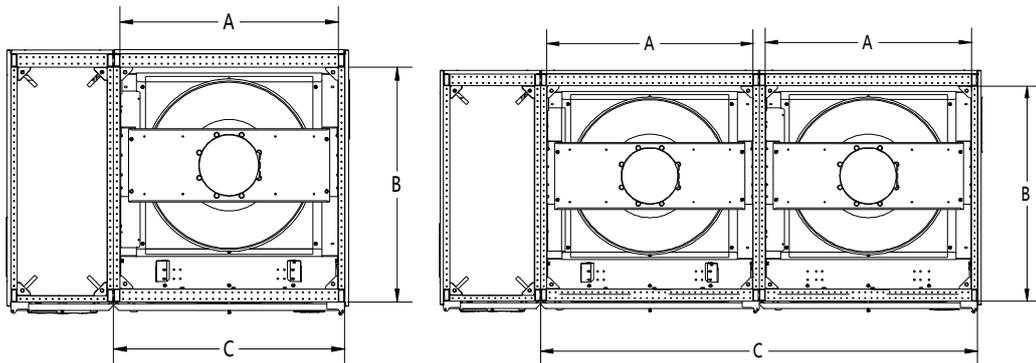


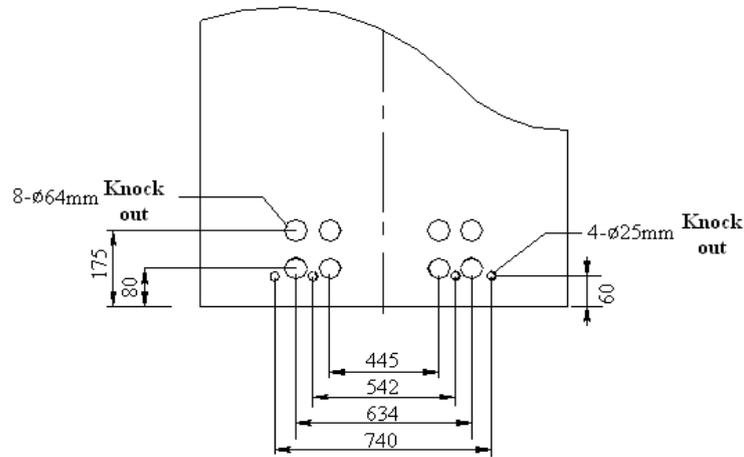
Figure 3-7 Position of air outlet on top cover of upflow unit

Table 3-3 Dimensions of air outlet on top cover of upflow unit (unit:mm)

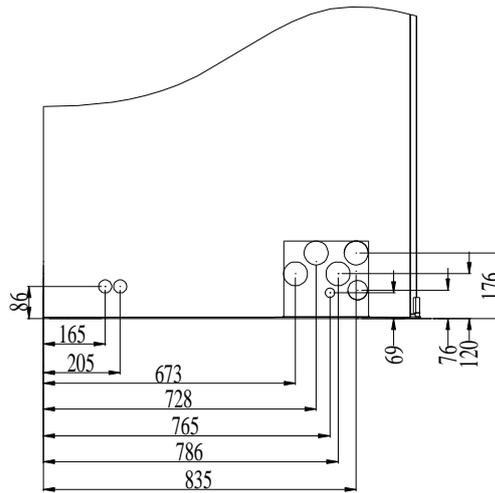
Model	A	B	C
P1020~P1025	720	795	800
P1030~P1035	650	900	700
P1040~P1050	850	900	900
P2060~P2070	650	900	1400
P2080~P2100	850	900	1800

**Side panel knock-out locations**

If piping and wiring from the base are difficult, connection from side panel can be selected. The locations and dimensions of knock-out holes are shown in Figure 3-8. You should select the inlet and outlet holes according to the actual needs. Ensure only one service is used per opening.



P1020 and P1025 series knock-out



P1030-2100 series knock-out

Figure 3-8 Knock-out holes of side panel (unit: mm)

 Note

- The equipment has knock-outs, be sure to mount sleeve to the cable holes to avoid cutting the cables.

### 3.4 Installing Indoor Unit

#### 3.4.1 Making base

The base shall be made by the installation team according to the dimensions, weight and height of the unit to ensure the rigidity of the structure meets the requirement. User can make the base by himself or ask Emerson to make it.

 Note

- For the downflow unit, the base height must be higher than 450mm.
- The external side boards of the unit cannot bear weight.
- The distance between the object that may block the air flow at the top of the base and the outer edge of the EC fan shall be bigger than 160mm.

#### 3.4.2 Installing base

Determine the installation position according to the requirements of 2.2 manual, and fix the base onto the selected mounting position. The base shall be fixed to the ground through expansion bolts or spot welding, and the base shall be calibrated by horizontal ruler before it is fixed, so as to ensure the leveling top surface of the base. For downflow unit that requires the EC fan to be lowered, we must consider the spatial distance and the strength of the base in the design and installation of the base.

#### 3.4.3 Vibration absorbing

Lay a layer of rubber cushion on the top, lateral of the base and on the bottom of the steel plate respectively so as to avoid transmission of vibration during operation of the unit, see Table 3-4 for details.

Table 3-4 Dimensions of rubber cushion for vibration absorbing (unit: mm)

Item		Specification
Rubber cushion	Top	Thickness:3mm to 5mm
	Lateral	Thickness:2mm to 3mm
	Bottom	Thickness:10mm to 12mm

### 3.4.4 Install Indoor Unit Cabinet

The indoor unit cabinet should be installed on the base horizontal plane, and keep the unit after installation in the same horizontal plane, between the indoor unit and the base does not require welding or other rigid connections fixed

## 3.5 Installing Condenser

Refer to condenser user manual for condenser installation.

## 3.6 Piping For Air-Cooled Unit

Four kinds of pipes need to be installed: Condensate drain pipe of indoor unit, water inlet pipe of humidifier, copper pipes between indoor unit and condenser (air cooled series) and extension kit (optional). When installing pipes, user shall decide whether to use extension kit according to the conditions for selecting the kit.



Note

- All joints of the cooling pipes must be silver-brazed.

### 3.6.1 Pipe Extension Kit (Optional)

#### Conditions for selecting extension kit

If the one-way equivalent length exceeds 30m, or if the vertical distance between indoor unit and condenser exceeds the values in Table 3-6, consult Emerson before installation to confirm whether a pipe extension kit is needed. The pipe sizes recommended are 'equivalent lengths', with the resistance caused by bends taken into account. See Table 3-5 for equivalent lengths of partial components, and the installer should confirm that the sizes are appropriate for the site conditions.

Table 3-5 Equivalent lengths of partial components

Outer Diameter (OD) of liquid pipe (inch)	Equivalent length (m)		
	90° bend	45° bend	T type three-way
3/8	0.21	0.10	0.76
1/2	0.24	0.12	0.76
5/8	0.27	0.15	0.76
3/4	0.3	0.18	0.76
7/8	0.44	0.24	1.1
1-1/8	0.56	0.3	1.4

Table 3-6 Vertical distance between indoor unit and condenser

Relative position	Altitude difference
Condenser higher than indoor unit	20m
Condenser lower than indoor unit	5m



Note

- A trap should be installed for every 7.5m of vertical distance. Please consult Emerson for details.

### 3.6.2 Connecting condensate drain pipe of indoor unit

The condensate of infrared humidifier and evaporator is converged by a cross connector and drained through the drain pipe, as shown in Figure 3-9. The pipe OD is 25mm. If the drain pipe is used by three or more units, the minimal pipe OD should be 40mm. For the unit that uses electrode humidifier, the inner diameter of drain pipe is 40mm.



Note

- When connecting the drain pipe, you must make sure that the U bend is installed vertically and the 'U' shape is not distorted, so as to ensure that the condensate can be drained immediately and effectively.

**⚠ warning**

- Because the infrared humidifier contains flowing hot water, the water pipe must be resistant to heat higher than 90°C. For the unit that uses electrode humidifier, the drain pipe of the condensate water must be able to withstand 120°C.

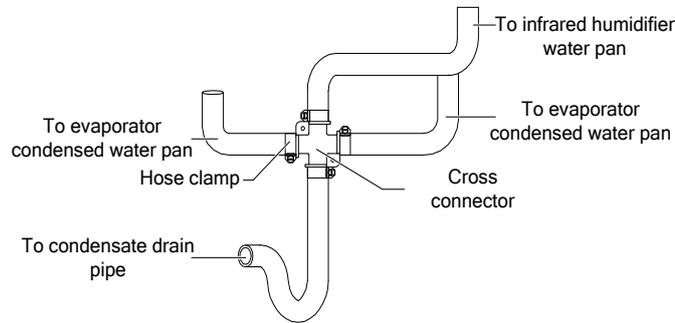


Figure 3-9 Connection of drain pipe of condensate water

### 3.6.3 Connecting water inlet pipe of humidifier

#### Connecting water inlet pipe of infrared humidifier

Requirements for connecting the water inlet pipe of infrared humidifier:

- 1.To facilitate maintenance, an isolation valve should be fitted to the water inlet pipe.
- 2.Make sure that the connection of the water inlet pipe is well sealed to prevent leakage. The infrared humidifier reserves a copper pipe (OD: 6.35mm), as shown in Figure 3-10. There is a 1/4" copper nut at the end of the copper pipe, and the 1/4" × 1/2" conversion copper thread connector has been connected to the copper nut to avoid losing them. You can also select other connection methods.

**📖 Note**

- Where the main pipe pressure may rise above 700kPa (The main pipe pressure should be between 100kPa ~ 700kPa), a pressure reducer should be fitted.
- Where the main pipe pressure falls below 100kPa, a water tank and pump system should be used.
- Some product may include components required by local codes.

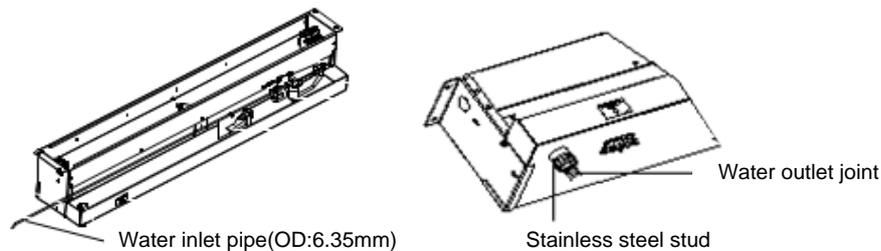


Figure 3-10 Water inlet pipe of infrared humidifier (P1020&P1025)

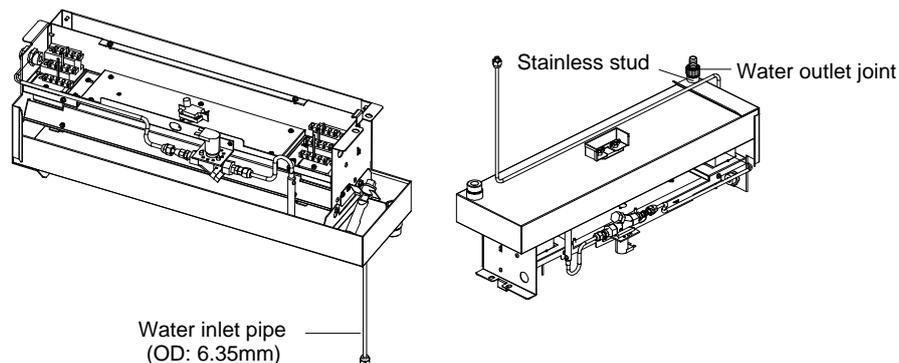


Figure 3-11 Water inlet pipe of infrared humidifier (P1030-P2100)

**Connecting the pipes of electrode humidifier (for the unit that uses electrode humidifier)**

Requirements for connecting water inlet pipe of electrode humidifier:

1. Water inlet pipe uses 3/4”G screw-threaded connection pipe.
2. Water filter and water quality detection are recommended to prevent the water quality from affecting the normal operation of humidifier.

**3.6.4 Connecting copper pipes (discharge pipe and liquid pipe) between indoor unit and condenser**

1. Select the size of connection pipes of the indoor unit. Considering the effect of the pipe diameter on the system pressure drop, the pipe diameter of the indoor unit and outdoor unit should be determined according to the specifications listed in Table 3-7, or consult the technicians in local Emerson office.
2. Connect the copper pipes in welding mode. The connection ball valves of the discharge pipe and liquid pipe of indoor unit are shown in Figure 3-12. Many notes and instruction labels are pasted onto the base and side panel close to the ball valve. Note that the ball valve must be wrapped with a wet cloth before welding to protect the label from burned during the welding operation.
3. Connect the discharge pipe and liquid pipe of indoor unit according to the instructions on the label.
4. Horizontal sections of the discharge pipe should be sloped downward from the compressor, with a slope of at least 1:200 (5mm down for each 1m run). The discharge pipes should be insulated where they are routed in the conditioned space (including under a raised floor).

**⚠ warning**

- The exposure time of system pipes do not exceed 15min. Longer exposure will lead to the compressor refrigeration oil being affected with moisture, which can affect the life of the key components and the system operation stability.

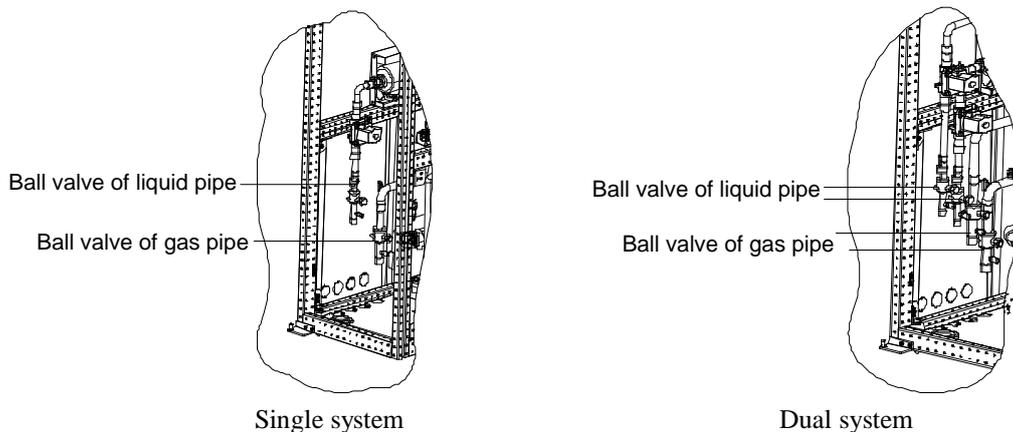


Figure 3-12 Locations of discharge pipe and ball valve in liquid pipe

Table 3-7 Recommended pipe sizes

Recommended pipe sizes (unit: mm)												
Model	P1020 single system		P1025 single system		P1030 single system		P1035 single system		P1040 single system		P1040 dual system	
	D	L	D	L	D	L	D	L	D	L	D	L
Pipe length												
10m	22	13	22	13	22	16	22	16	22	16	22	13
20m	22	13	22	13	22	16	22	16	22	16	22	13
30m	22	13	22	13	25	16	25	16	25	19	22	13
40m*	22	16	22	16	25	19	25	19	25	19	22	16
50m*	22	16	22	16	25	19	28	19	28	19	22	16
60m*	22	16	22	16	25	19	28	19	28	19	22	16

Recommended pipe sizes (unit: mm)												
Model	P1050 dual system		P2060 dual system		P2070 dual system		P2080 dual system		P2090 dual system		P1050 single system & P2100 dual system	
	D	L	D	L	D	L	D	L	D	L	D	L
10m	22	13	22	16	22	16	22	16	22	16	22	16
20m	22	13	22	16	22	16	22	16	22	16	25	16
30m	22	16	25	16	25	16	25	19	25	19	28	19
40m*	22	16	25	19	25	19	25	19	28	19	28	19
50m*	22	16	25	19	28	19	28	19	28	19	28	19
60m*	22	16	25	19	28	19	28	19	32	19	32	19

Note:

1. Extension kit should be added to the “Eq.Lgth” marked with \*.
2. D: discharge line, L: liquid line.
3. Consult Emerson if the line length exceeds 60m.
4. If the outdoor temperature of the unit is below -15°C, the low temperature kit shall be used, and please consult Emerson for details.

### 3.6.5 Installing pipe extension kit (optional, for site installation)

When the equivalent length of the one-way pipe exceeds 30m, the pipe extension kit should be installed. During the installation of the pipe extension kit, to avoid the pipe opening, it is recommended to install the solenoid valve of the pipe extension kit onto the outside project pipe of the ball valve on the liquid pipe. The outer side or the bottom of the unit is allowable. So, during installing the solenoid valve, you do not need to cut the indoor unit pipes. After the whole system is installed, you can open the ball valve to keep pressure and carry out the vacuum operation, avoiding the moisture absorption of the compressor refrigeration oil and ensuring the operation safety and life of the compressor. For the installation position of the check valve, refer to Figure 3-1. For the electrical connections of the pipe extension kit, refer to 4.2.4 (suitable for field installation).

## 3.7 Lowering Fan (For Down Flow Unit)

**⚠ warning**

- Be careful when lowering the fan, avoid trapping your fingers and fan cables.
- Avoid foreign matter falling into the inlet ring of the fan.

You must lower all EC fans of the downflow unit before commissioning. The downflow unit has been equipped with a lowering tool when it is shipped. The lowering tool that uses winch is shown in Figure 3-13. It mainly includes a hand winch, a winch bracket, a hook, a sling, and a handle, and also an L shaped lifting component in Figure 3-14.

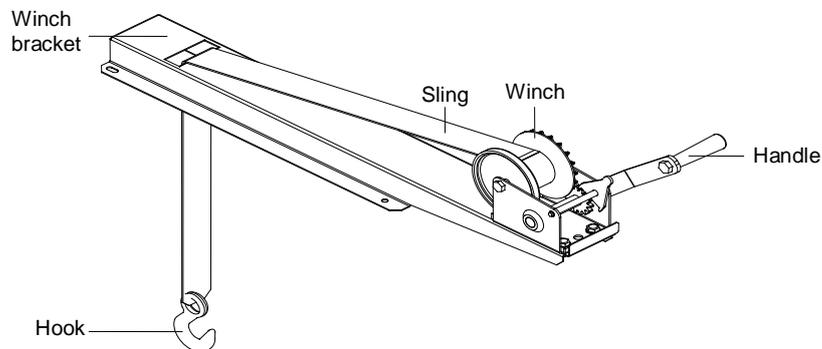


Figure 3-13 Fan elevator assembly (winch mode)

Lowering procedures:

1. Install lift and lowering kit for fan: Open the unit maintenance cover, check the fixing bolts (see Figure 3-14, totally 2 PCS) of the L shaped lifting component to make sure that it is fixed properly, and then install the fixing bolts (totally 4 PCS) of the winch bracket, as shown in Figure 3-14;

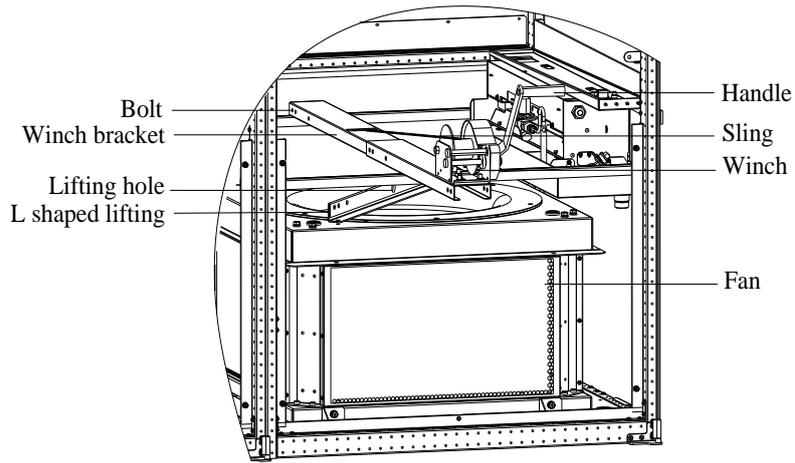


Figure 3-14 Installing winch bracket

2. Turn the handle and use the hook of the winch to hook the middle round hole (see Figure 3-14) of the L shaped lifting component. Adjust the handle until the sling is completely tight.
3. Cut off the cable tie binding the fan cables to make the cables length satisfy fan lowering requirements, and then remove the fixing bolts (see Figure 3-15, totally 4 pcs) for fan transportation.

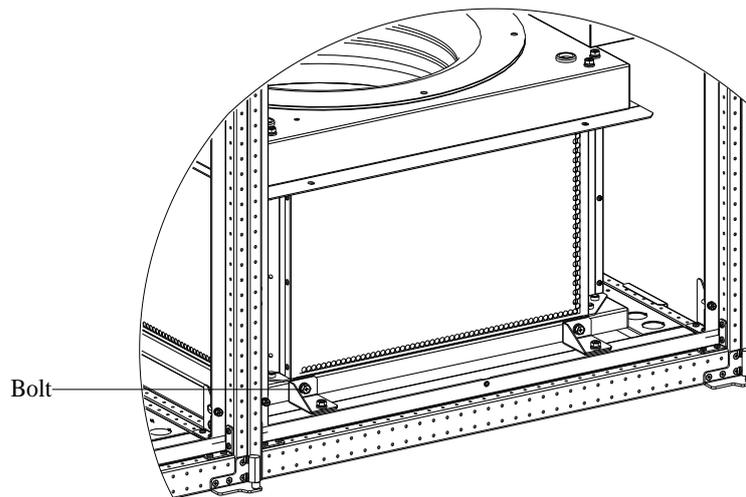


Figure 3-15 Position of fixing bolt

4. Hold the handle of the winch firmly, and then turn the handle counter-clockwise to lower the fan. After the fan is sunk, the status is shown in Figure 3-16;

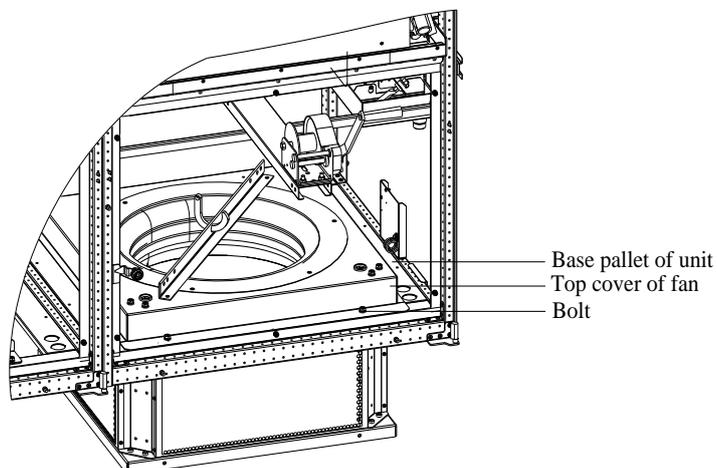


Figure 3-16 Lowered fan

5. Install the fixing bolts (see Figure 3-16, totally 4 PCS) of the fan.
6. Remove the hook from the L shaped lifting component, turn the handle clockwise, tidy the sling and remove the fixing bolts (see Figure 3-14, totally 4 PCS) of the winch bracket, and take out the winch and the bracket assembly.
7. Remove the fixing bolts (see Figure 3-14, totally 2 PCS) of the L shaped lifting component, and take out the L shaped lifting component.

At this point, the operation of lowering the fan of one-bay unit is completed.

For the unit with two fans, you should also lower the other fan using the fan elevator assembly. The requirements are as follows:

1. Repeat the step 1 to step 7 of the one-bay unit to lower the other fan.
2. After lowering all fans, tidy the fan cables and fix them using a cable tie.
3. Confirm if the EC fan has been lowered and installed, and ensure the blade will not touch the fan housing when the fan is rotating.

### 3.8 Removing Fastener And Vibration Absorber

To protect partial components from damaging and distorting due to bumping, impact and resonance in transportation, fasteners and vibration absorbers are mounted at certain locations before delivery. Remove the fasteners and vibration absorbers before installation and commissioning.

#### Removing transportation fixing plate of compressor

To reduce the compressor operation vibration and noise, the vibration absorbing cushions are added to the compressor base. However, such method cannot best restrain the vibration during transportation, and may result in loosened connections and wearing of certain parts. To prevent this, three L shaped fixing plates are added to the three compressor bases during transportation, as shown in Figure 3-17. After the installation and before the commissioning, remove the three L shaped fixing plates before commissioning, and then restore the bolts and washers in the sequence that is reverse to the disassembly process. The fastening torque of the bolts is  $(12\pm 1)\text{N}\cdot\text{m}$ .

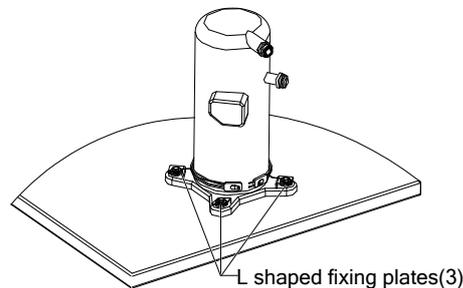


Figure 3-17 Positions of L shaped fixing plates

#### Removing fastener of infrared humidifier

The floating pole of the humidifier high water-level switch are tightly bound together with a rubber string before delivery, as shown in Figure 3-18. Remove the rubber string before unit operation. Otherwise, the unit cannot detect the high water-level alarm.

#### warning

- Do not touch the lamps with bare fingers.

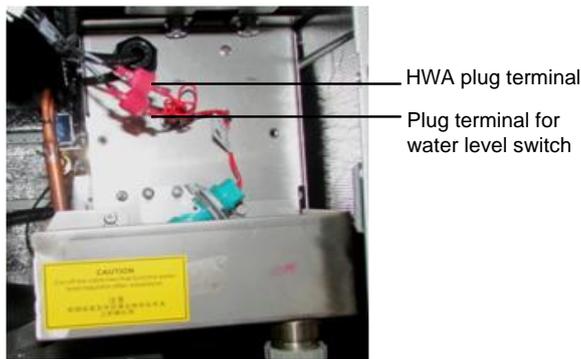


Figure 3-18 Floating pole of high water-level switch

**Removing pipe fasteners**

To prevent the long copper pipes from scratching the metal plate and being damaged, the pipes are cushioned with foam or bound up before delivery. Remove those materials before power-on commissioning.

**3.9 Installation Inspection**

After the mechanical installation is completed, you should check and confirm it according to Table 3-8.

Table 3-8 Installation Inspection

Items	Results
Sufficient space is left around the unit for maintenance	
The equipment is installed vertically and the installation fasteners have been fixed	
The pipes between the indoor unit and outdoor unit have been connected, and the ball valves of the indoor unit and outdoor unit have been opened completely	
The condensate pump (if needed) has been installed	
The drain pipe has been connected	
The water supply pipe for the infrared humidifier has been connected	
All pipe joints have been made fixed	
The transportation fasteners have been removed	
Irrelevant things (such as transportation material, structure material and tools) inside or around the equipment have been cleared after the equipment is installed	
The air distribution system is installed as per room design (for example, raised floor/grilles, ductwork, etc)	
The upflow unit must have plenum or have air supply pipe connection, and the fan and heater shall not be accessible after installation.	

After confirming the preceding points, you can start the electrical installation.

## Chapter 4 Electrical Installation

Start electrical installation after mechanical installation is done. This chapter introduces the electrical installation of the Liebert.PEX+ AC, including installation notes, and the wiring of indoor unit, and condenser power cables.

### 4.1 Installation Notes

1. The connection of all power cables, control cables and ground cables should comply with the local and national electrician regulations.
2. The electrical installation and maintenance must be performed by authorized professional installation personnel.
3. See the unit nameplate for the full load current. The cable sizes should meet the local wiring rules.
4. Mains supply requirement: 380Vac (-10% to +15%), 50Hz, 3N~
5. If the soft power cable uses Y-connection, and if the cable is damaged, it must be replaced by professional service personnel.
6. Before the wiring, use a voltmeter to measure the power supply voltage and make sure that the power supply has been switched off.
7. The applicable grid for this air conditioner: TN, TT star connection power system; consult Emerson for other connections.
8. A breaking device shall be provided to be disconnected from power supply.

### 4.2 Wiring Of Indoor Unit

#### 4.2.1 Locating Electrical Ports Of Indoor Unit

The locations of the low voltage devices are visible after the front door of the electrical control box of the indoor unit is opened, as shown in Figure 4-1. The distribution information of the detailed low voltage components shall be differentiated according to the labels.

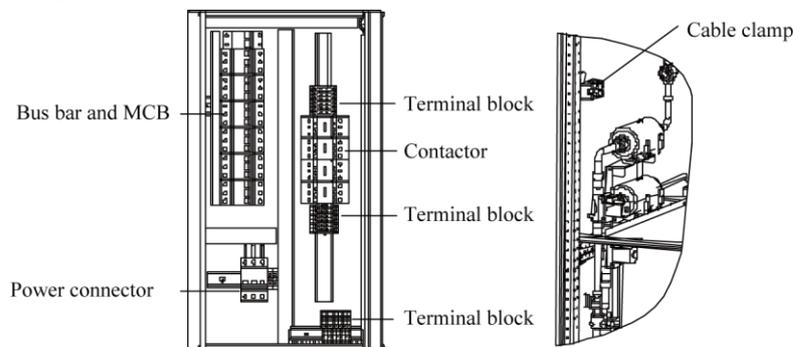


Figure 4-1 Electrical control box

#### 4.2.2 Connecting Power Cable Of Indoor Unit

The power connectors are located as shown in Figure 4-1. The enlarged view of power connector is as shown in Figure 4-2, connect terminals L1 ~ L3, N, and PE respectively to their counterparts of external power supply. Reserve some redundancy of the incoming cable and fix the cable to the cable clamp located on the inner side panel of the unit, see Figure 4-1. For the cable specification, see the rated full load ampere (FLA) listed in Table 4-1.

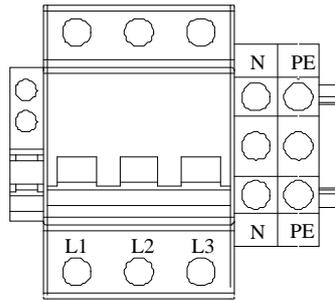


Figure 4-2 Enlarged view of power connector

 Note

- The cable sizes should meet the local wiring regulations.

Table 4-1 Rated full load ampere (FLA) (unit: A)

Model	Standard model	With heating			No heating	
		Standard model with 2-level electric heating	1-level electric heating/ No humidifying	2-level electric heating/ No humidifying	Humidifying	No humidifying
P1020U(D)A13C	25.7	34.8	25.7	34.8	22.7	16.6
P1025U(D)A13C	30.9	40.0	30.9	40.0	27.9	21.8
P1030U(D)A13C	32.8	41.9	32.8	41.9	29.8	23.7
P1035U(D)A13C	35.7	44.8	35.7	44.8	32.7	26.6
P1040U(D)A13C	43.2	56.8	43.2	56.8	35.6	29.5
P1040U(D)A13S	42,4	56,0	42,4	56,0	34,8	28,7
P1050U(D)A13C	48.0	61.6	48.0	61.8	40.4	34.3
P1050U(D)A13S	51.0	64.6	51.0	64.6	43.4	37.3
P2060U(D)A13S	61.0	74.7	61.0	74.7	58.8	47.4
P2070U(D)A13S	64.0	77.7	64.0	77.7	61.8	50.4
P2080U(D)A13S	77.2	95.4	77.2	95.4	70.4	59.0
P2090U(D)A13S	82.2	100.4	82.2	100.4	75.4	64.0
P2100U(D)A13S	87.2	105.4	87.2	105.4	80.4	69.0

Note:

1. The standard model is configured with humidifier and 1-level electric heating.
2. Air-cooled unit FLA excludes the condenser current .

### 4.2.3 Connecting Control Cables

The position of field connection terminals is shown in Figure 4-1, and the amplified figure is shown in Figure 4-3. The upper part of the terminal block is connected to the unit, while the lower part serves as user control signal interfaces.

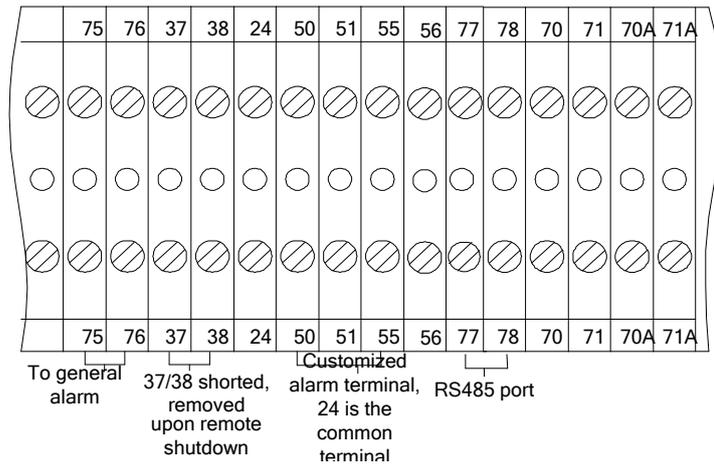


Figure 4-3 Enlarged view of terminal block

**! warning**

- The connection personnel must take anti-static measures before connecting the control cables.

**Connecting water-under-floor sensor**

Each unit is equipped with a water-under-floor sensor. You should connect one end of the sensor to terminal 51#, and the other end to the common terminal 24#.

The number of the sensors in parallel connection is not limited, but each unit has only one water-under-floor alarm.

**Remote shutdown**

As shown in Figure 4-3, 37# and 38# terminals can connect to remote shutdown switch, and they have been shorted in factory and the shorting cable should be removed if the terminals are to be connected to the remote shutdown switch.

**📖 Note**

- When 37# and 38# are opened, the unit will be shut down.

**Customized alarm terminal**

Terminals 50#, 51# and 55# can be connected to three kinds of sensors, and terminal 24# is their common terminal, and can be defined as smoke sensor and water-under-floor sensor. After the customer terminals are connected with external alarm signals, you should set the corresponding customized alarm through the iCOM controller.

When the contact is open and no external alarm is generated, the input state of the customer terminal is open. But when the contact is closed and the external alarm is generated, the input state of the customer terminal will be shorted. At this point, the air conditioner system will generate an audible alarm, and the iCOM controller LCD will display the alarm information.

Terminals 50# and 24#: Smoke detector alarm switch.

Terminals 37# and 38#: Remote alarm

Terminals 51# and 24#: Water-under-floor sensor by factory setting

**External general alarm**

Terminals 75# and 76# can be connected to the external general alarms. They output signals to external alarm devices, such as alarm indicator. When critical alarm occurs, the contact will be closed to trigger remote alarms, send signals to the building management system or dial the paging system automatically. The power supply of the external general alarm system is user-prepared.

For the detailed definition of other terminals, refer to *Appendix 1*

**4.2.4 Connecting Solenoid Valve Of Pipe Extension Kit (Options, For Site Installation)**

The solenoid valve of the pipe extension kit has two control cables used to connect with the corresponding terminals of the control board. The solenoid valve cables of 1# system and 2# system in dual system unit should be remarked separately to avoid wrong connection. For specific wiring terminals in interface board, refer to the circuit diagram printed on the unit label.



Note

- The controller uses the 24VAC solenoid valve port, if other types of solenoid valves are used, please consult Emerson.

### 4.3 Wiring Of Condenser

#### 4.3.1 Connecting Control Signal Terminals

70#/71# and 70A#/71A# are control signal input terminals for two circuits of condensers and their switching status are identical with those of the compressor.

#### 4.3.2 Connecting Control Signal Cables

Open the sealed panel of the electric control box of condenser to reveal the fan speed controller board, according to the cable connection instructions in *Liebert.PEX Condenser User Manual*. The signal cable connection of condenser is as follows:

**Wiring of a condenser with single system used to match an indoor unit with single system**

The digital signal of dry contact J6 on the board (see 3.1 *Cable terminals* in *Liebert PEX Condenser User Manual* for the locations) is connected with the control terminals 70#/71# (see Figure 4-3) of the indoor unit.

**Wiring of two condensers with single system used to match an indoor unit with dual system**

The digital signals of dry contacts J6 on the condenser board corresponding to compressor 1# are connected with the control terminals 70#/71# of the indoor unit, and the digital signals of dry contacts J6 on the condenser board corresponding to compressor 2# are connected with the control terminals 70A#/71A# of the indoor unit.

**Wiring of a condenser with dual system used to match an indoor unit with dual system**

You should short the terminals 70# & 70A# and 71# & 71A#. The digital signal of dry contact J6 on the board can be connected with the control terminals 70#/71# or 70A#/71A#. For the detailed connection, refer to *Appendix 1 Circuit Diagram*.

**Connecting Power Cables Of Condenser**

The power cables of the outdoor unit are connected with the MCBs reserved in the condenser (see Figure 4-1).

### 4.4 Installation Inspection

After the electrical installation is completed, you should confirm it according to Table 4-2.

Table 4-2 Installation Inspection

Items	Results
The power supply voltage meets the rated voltage on the unit nameplate	
The system electric loop has no open circuit or short circuit	
Power cables and ground cables to the MCBs, indoor unit and condenser are well connected	
The ratings of the MCBs and fuses are correct	
The control cables are well connected	
All the cables connections are fastened, with no loose screws	

After confirming the above points, you can start the commissioning. The commissioning is a professional operation and please contact Emerson engineer to do this job.



Warning

- Do not power on the unit until Emerson authorized technical has checked and confirmed the unit.

## Chapter 5 iCOM Controller

The iCOM controller adopts menu operation. It can monitor, display and operate the precision cooling air conditioner and control the environment within a set range. This chapter expounds the LCD, button and indicator panel, structure chart of control menu, startup interface, main interface, USER MENUS, SERVICE MENUS, ADVANCED MENUS and EVENT NAME AND DIFINITION of the iCOM controller.

### 5.1 Appearance

The appearance of the iCOM controller is shown in Figure 5-1.



Figure 5-1 Appearance of Icom controller

### 5.2 Button And Indicator Panel

Nine buttons and two indicators are located on the button and indicator panel, including:

- Indicators: alarm indicator and operation indicator.
- Buttons: ON/OFF button, ENTER button, ESC button, up button, DOWN button, left button, right button, alarm silence button and help button.

The button and indicator panel is shown in Figure 5-2. If no button is pressed within a certain period of time (settable; default: 5min), the backlight will be off, until the next time any button is pressed.

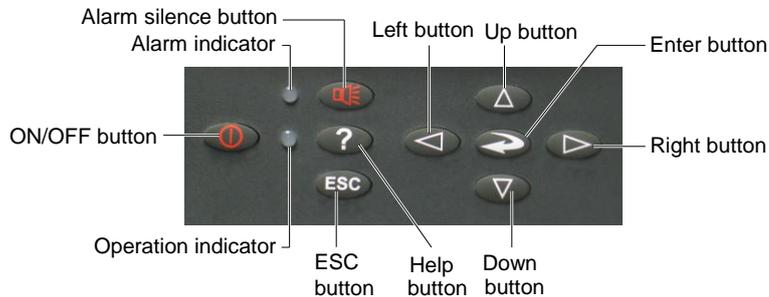


Figure 5-2 Button and indicator panel

The indicators are described in Table 5-1.

Table 5-1 Indicator description

Indicator	Description
Alarm indicator	The alarm indicator turns on in red upon alarms. It is off after the alarm is cleared
Operation indicator	The operation indicator is on in green when the unit is operating. When the unit is shut down, it will be on in yellow

The functions of the buttons are described in Table 5-2.

Table 5-2 Function description of buttons

Button	Function description
ON/OFF button	<ol style="list-style-type: none"> <li>1. Switch on/off the system. Press the ON/OFF button to shut down an operating system, or to start an idle system.</li> <li>2. Test the display state of the backlight of the LCD and the operation indicator. After powering-on, when the system is in the standby state (defined as test state in this manual), pressing the ON/OFF button will switch between the operation indicator (green then) and the LCD backlight. This function is used to test whether the LCD backlight and the operation indicator are normal</li> </ol>
Enter button	<ol style="list-style-type: none"> <li>1. Enter the selected menu, or save the setting after parameters are changed. When you are entering a menu or changing a parameter, the menu and the parameter will be high lighted.</li> <li>2. Test the display of characters. When the system is in the test state, pressing the ENTER button will display the ASCII code. This function is used to test whether the characters are displayed normally on the LCD</li> </ol>
ESC button	<ol style="list-style-type: none"> <li>1. Quit the current menu.</li> <li>2. Abolish the current change of parameter.</li> <li>3. Test the LCD high light. Pressing the ESC button to switch the LCD between light and high light when the system is in the test state. This function can test whether the LCD high light is normal</li> </ol>
Up button	<ol style="list-style-type: none"> <li>1. Increase the value of the displayed parameter during parameter setting.</li> <li>2. Scroll a row or a screen up in the query state.</li> <li>3. Test the buzzer. Pressing the up button when the system is in the test state will increase the buzzing frequency (initial value: 0%). Meanwhile the buzzer will sound at the set frequency. This function is used to test whether the buzzer is normal</li> </ol>
Down button	<ol style="list-style-type: none"> <li>1. Decrease the value of the displayed parameter during parameter setting.</li> <li>2. Scroll a row or a screen down in the query state.</li> <li>3. Test the buzzer. If the buzzer frequency is not 0%, pressing the DOWN button when the system is in the test state will decrease the buzzing frequency. Meanwhile the buzzer will sound at the set frequency. This function is used to test whether the buzzer is normal</li> </ol>
Left button	<ol style="list-style-type: none"> <li>1. Select the left bit during the parameter setting operation.</li> <li>2. Test the LCD contrast. Pressing the left button when the system is in the test state will decrease the LCD contrast (by default: 100%). This function is used to test whether the LCD contrast is normal</li> </ol>
Right button	<ol style="list-style-type: none"> <li>1. Select the right bit during the parameter setting operation.</li> <li>2. Test the LCD contrast. If the LCD contrast is not 100%, pressing the right button when the system is in the test state will increase the LCD contrast. This function is used to test whether the LCD contrast is normal</li> </ol>
Alarm silence button	<ol style="list-style-type: none"> <li>1. The system will issue an alarm sound upon alarms. If you press the alarm silence button, the alarm sound will be eliminated.</li> <li>2. Clear the current alarm after the alarm sound is silenced.</li> <li>3. Test the alarm indicator, and reset the LCD contrast and buzzer frequency. Pressing the alarm silence button when the system is in the test state will switch the alarm indicator between on and off. It can test whether the alarm indicator is normal. Meanwhile, reset the LCD contrast to 100% and buzzer frequency to 0%</li> </ol>
Help button	<ol style="list-style-type: none"> <li>1. Display the online help.</li> <li>2. Test the yellow display of the LCD operation indicator. When the system is in the test state, pressing the help button will switch on and off the LCD operation indicator. This function is used to test whether the yellow display of the LCD operation indicator is normal</li> </ol>



Note

- After the system is powered on, the system will assume the operation state before power-off. For example, if the system is in the work state when it is powered off, it will enter the work state automatically after power-on. You do not need to start it manually.
- When the system is in the test state, the set points will not be written into the iCOM controller.

### 5.3 Structure Chart Of Control Menu

Please refer to *Appendix3 Menu Structure Of iCOM Controller*.

### 5.4 Startup Interface

After the system is powered on, it is in the waiting state. The LCD will display the interface shown in Figure 5-3.

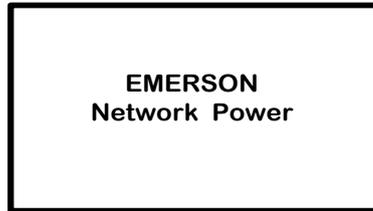


Figure 5-3 Startup interface

### 5.5 Main Interface

After power-on, the LCD will enter the main interface after 20s. The main interface provides the general information of the relative equipment status, including current temperature and humidity, temperature and humidity set points, equipment output status (fan, compressor, cooling, heating, dehumidifying, humidifying), alarm and maintenance status.

The main interface has two display modes: graphical and simple. The difference between the two display modes is that the graphic interface (see Figure 5-4) displays the percentage output chart of the function components while the simple interface (see Figure 5-5) displays the icons of current operation mode only. The switching of two modes can be realized by operating the menu. For details, refer to 5.6.8 *DISPLAY SETUP*. The upper left corner of the main interface displays the current unit number; the upper right corner displays the current system status. If there is no button operation for 255s on other menu display screen, the LCD screen will return to the main interface.

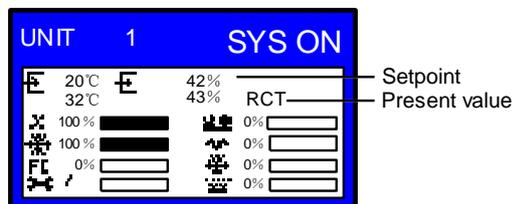


Figure 5-4 Graphical mode of main interface

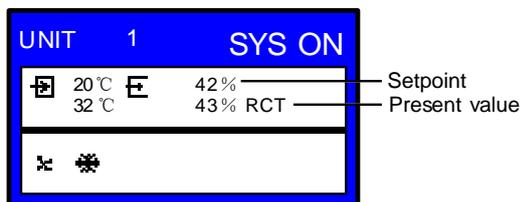


Figure 5-5 Simple mode of main interface

The icons of the graphical mode and the simple mode on the main interface are defined in Table 5-3.

Table 5-3 Definition of icons

Icon	Definition	Icon	Definition
	Fan running	<b>FC</b>	Free cooling
	Cooling		Maintenance
	Hot water heating		Dehumidifying
	Electric heating		Humidifying

## 5.6 USER MENUS

Press the ENTER or DOWN button on the main interface to enter the USER MENU, as shown in Figure 5-6. The USER MENUS are displayed in six pages, each displaying one or two submenus. Press the ENTER button to highlight the submenu, the up or down button to browse the submenus, and the ENTER button to enter the selected one.

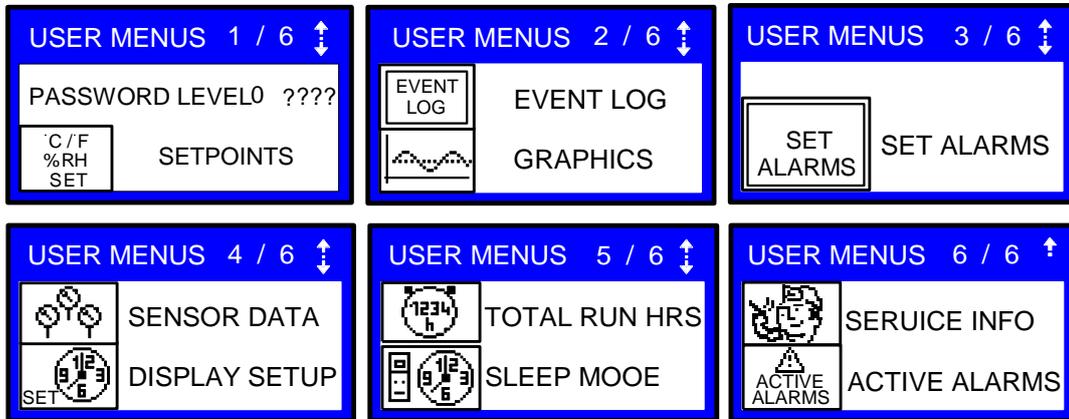


Figure 5-6 USER MENUS

### 5.6.2 PASSWORD

The password is necessary for some set points. After inputting the password (user password: 149), use the up button and DOWN button to browse all the options, and then press the ENTER button to enter the selected one.

### 5.6.3 SET POINTS

The set points will not be lost when the power fails. You can enter to browse and set the parameters in the SET POINTS submenu through the USER MENUS. The left row displays the parameter codes; the middle row, the parameter name; the right row, the set points, as shown in Table 5-4.

Table 5-4 Descriptions of SET POINTS parameters

Parameters		Default	Setting range	Description
U102	TEMP SET	23.0 °C	5.0-40.0 °C	Air Temperature Set Point
U102	TEMP ACT	-	5.0-40.0 °C	Actual Air Temperature Set Point
U103	TEMPSENS	Return Sensor	0 = SUP 1 = REM 2 = RET	Temperature Control Sensor
U104	HUM SET	50 %	20-80 %	Humidity Set Point
		12.0 °C	5.0 - 30.0 °C	Dew Point Set Point
U105	SUP SENS	No	No, Lim, Ctrl, Cool	Supply air type
U106	HUM CTRL	Predictive	0 = Rel 1 = Comp 2 = Pred 3 = DewP	Humidity Proportional Control Type
U107	FAN SET	23.0 °C	5.0-40.0 °C	Fan Speed Temperature Set Point
U108	FAN SENS	Return Sensor	0 = SUP 1 = REM 2 = RET 3 = MAN	Fan Control Sensor
U110	SMART AI	-	0 = No 1 = Yes	Smart Aisle Enabled
U113	2ND SETP	23.0 °C	5.0-40.0 °C	2nd Temperature Set point
U114	SUP TEMP	5.0 °C	5.0-27.0 °C	Supply Temp Limit Set point
U116	BACK TSP	23.0 °C	5.0-40.0 °C	BMS Backup Temp Set point
U117	BACK FAN	23.0 °C	5.0-40.0 °C	BMS Backup Fan Set point
U119	RCOMP SP	23.0 °C	5.0-40.0 °C	Return Compensation Set point

If you want to modify the preceding set points, you should input the password before entering the SET POINTS menu. Then press the ENTER button to highlight it and use the UP and DOWN button to scroll the options. Press the ENTER button to select one parameter, use the up or DOWN button to set the value, and press the ENTER button to save the change.

### 5.6.4 EVENT LOG

You can enter the EVENT LOG menu without a password, as shown in Figure 5-7.

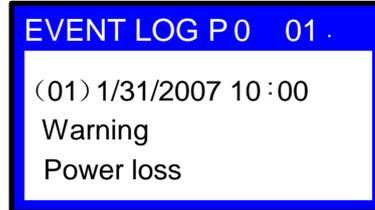


Figure 5-7 EVENT LOG menu

The EVENT LOG menu saves the last 400 system records. The event types include message, warning and alarm.

- When the event type is message, the LCD will display the event name only.
- When the event type is warning, the LCD will display the event name and the alarm indicator will turn on in red.
- When the event type is alarm, the LCD will display the event name, the alarm indicator will turn on in red, and an audible alarm will be raised.

### 5.6.5 GRAPHICS

The GRAPHICS menu provides two kinds of graphs: RETURN TEMP and RETURN HUMIDITY. These graphs reflect the temperature and humidity changes over a period of time in the past.

In the graphs, the current temperature or humidity is the origin, the time is the horizontal axis, and the temperature or humidity is the vertical axis, as shown in Figure 5-8.

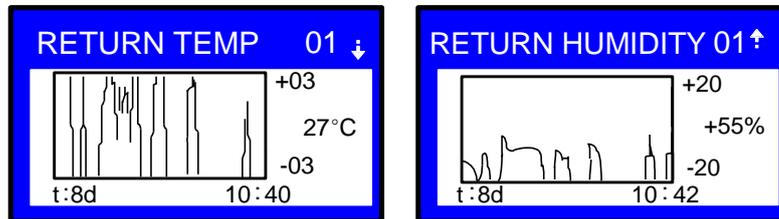


Figure 5-8 The graph of return temperature and return humidity

As the horizontal axis, the time range can be set into eight kinds. Each pixel indicates different time in different time ranges. See Table 5-5 for the detailed time range.

Table 5-5 Time range

Time range	Time indicated by each pixel	Time range	Time indicated by each pixel
8min	6s	2d	36min
32min	24s	4d	72min
1hr	45s	8d	144min
12hr	9min	16d	288min
24hr	18min		

The scaling of the vertical axis can also be set. For the RETURN TEMP, the scaling range is  $\pm 3 \sim \pm 20$ ; for the RETURN HUMIDITY, the scaling range is  $\pm 10 \sim \pm 30$ . The bigger the scaling range is, the bigger the value each pixel indicates will be, and the more centered the curves will be.

You can set the parameters without inputting the password. Press the ENTER button to highlight the parameters, use the up or DOWN button to select one parameter. Then press the ENTER button again to enter the parameter, and use the up or DOWN button to set the value. Press the ENTER button to save the change at last.

### 5.6.6 SET ALARMS

The SET ALARMS menu is used to set the upper and lower limits of temperature and humidity alarms. The settings will not be lost when the power fails. You can select the 'SET ALARMS' submenu to browse and set the parameters through the USER MENU. The parameters are described in Table 5-6.



**Note**

- It is recommended not to change the system defaults. If you consider it necessary to change the defaults, consult professionals first and set the alarm settings under the guidance of them.

Table 5-6 Descriptions of SET ALARMS parameters

Parameters		Default	Setting range	Description
U202	RTN SNSR	Yes	Yes, No	Return air alarm enable
U203	HI TEMP	37.8 °C	1.0 - 99.0 °C	High return air temperature alarm set point
U204	LO TEMP	18.3 °C	1.0 - 99.0 °C	Low return air temperature alarm set point
U205	HI HUM	60%	1% ~ 99%	High return air humidity alarm set point
U206	LO HUM	40%	1% ~ 99%	Low return air humidity alarm set point
U207	SENSOR A	No	Yes, No	Sensor A alarm enable
U208	HI TEMP A	32.3 °C	1.0 - 99.0 °C	High temperature alarm set point of sensor A
U209	LO TEMP A	12.8 °C	1.0 - 99.0 °C	Low temperature alarm set point of sensor A
U210	HI HUM A	70%	1% ~ 99%	High humidity alarm set point of sensor A
U211	LO HUM A	30%	1% ~ 99%	Low humidity alarm set point of sensor A
U213	SUP SNSR	Yes	Yes, No	Supply air alarm enable
U214	HI SUP T	23.9 °C	1.0 - 99.0 °C	High supply air temperature alarm setting value
U215	LO SUP T	10.0 °C	1.0 - 99.0 °C	Low supply air temperature alarm setting value
U219	REM SNSR	Disabled	0 = No 1 = Com 2 = Sep	Remote Sensor Alarms
U220	HI REM	32.3 °C	1.0 - 99.0 °C	High Remote Temperature
U220	LO REM	12.8 °C	1.0 - 99.0 °C	Low Remote Temperature
U224	HIREM 01	32.3 °C	1.0 - 99.0 °C	High Remote Temperature 01
U224	LOREM 01	12.8 °C	1.0 - 99.0 °C	Low Remote Temperature 01
U225	HIREM 02	32.3 °C	1.0 - 99.0 °C	High Remote Temperature 02
U225	LOREM 02	12.8 °C	1.0 - 99.0 °C	Low Remote Temperature 02
U226	HIREM 03	32.3 °C	1.0 - 99.0 °C	High Remote Temperature 03
U226	LOREM 03	12.8 °C	1.0 - 99.0 °C	Low Remote Temperature 03
U227	HIREM 04	32.3 °C	1.0 - 99.0 °C	High Remote Temperature 04
U227	LOREM 04	12.8 °C	1.0 - 99.0 °C	Low Remote Temperature 04
U228	HIREM 05	32.3 °C	1.0 - 99.0 °C	High Remote Temperature 05
U228	LOREM 05	12.8 °C	1.0 - 99.0 °C	Low Remote Temperature 05
U229	HIREM 06	32.3 °C	1.0 - 99.0 °C	High Remote Temperature 06
U229	LOREM 06	12.8 °C	1.0 - 99.0 °C	Low Remote Temperature 06
U230	HIREM 07	32.3 °C	1.0 - 99.0 °C	High Remote Temperature 07
U230	LOREM 07	12.8 °C	1.0 - 99.0 °C	Low Remote Temperature 07
U231	HIREM 08	32.3 °C	1.0 - 99.0 °C	High Remote Temperature 08
U231	LOREM 08	12.8 °C	1.0 - 99.0 °C	Low Remote Temperature 08
U232	HIREM 09	32.3 °C	1.0 - 99.0 °C	High Remote Temperature 09
U232	LOREM 09	12.8 °C	1.0 - 99.0 °C	Low Remote Temperature 09
U233	HIREM 10	32.3 °C	1.0 - 99.0 °C	High Remote Temperature 10
U233	LOREM 10	12.8 °C	1.0 - 99.0 °C	Low Remote Temperature 10

To browse through the menu, press the ENTER button to highlight the option, and use the up or DOWN button to scroll.

Password is required for changing the set points. Then, enter the SET ALARMS menu, press the ENTER button to highlight the option, use the up or DOWN button to browse the submenu. Press the ENTER button to enter the selected parameter. Use the up or DOWN button to change the set points, and press the ENTER button to save the change, or press the ESC button to quit the change.

5.6.7 SENSOR DATA

You can monitor the data acquired by the sensors through the SENSOR DATA menu. The values are read only, no setting or change is allowed. The parameters are described in Table 5-7.

Table 5-7 Descriptions of SENSOR DATA parameters

Parameters		Unit	Description	Parameters		Unit	Description
U301	TEMP A1T	°C	Ext Air Sensor A Temperature	U317	Hi DewP	°C	Daily High Dew Point
U302	HUM A2H	%	Ext Air Sensor A Humidity	U317	Hi DP H	hr	Daily High Dew Point
U303	TEMP B1T	°C	Ext Air Sensor B Temperature	U317	Hi DP M	m	Daily High Dew Point
U303	TEMP B2T	°C	Ext Air Sensor B Temperature	U318	Lo DP H	hr	Daily Low Dew point
U304	HUM B2H	%	Relative humidity of sensor B	U318	Lo DP M	m	Daily Low Dew point
U305	TEMP C1T	°C	Ext Air Sensor C Temperature	U318	Lo DP S	S	Daily Low Dew point
U305	TEMP C2T	°C	Ext Air Sensor C Temperature	U320	THB T	°C	Return Temperature
U305	AMB TEMP	°C	Ext Air Sensor C Temperature	U320	THB H	%	Return Humidity
U306	HUM C2H	%	Ext Air Sensor C Humidity	U320	THB DP	°C	Return Dew Point
U306	AMB HUM	%	Ext Air Sensor C Humidity	U321	S_A T	°C	Ext Air Sensor A Temperature
U307	FC TEMP	°C	Free cooling temperature	U321	S_A H	%	Ext Air Sensor A Humidity
U308	AMB TEMP	°C	Outdoor temperature	U321	S_A DP	°C	Ext Air Sensor A Dew Point Temp
U309	FC STATE	-	Free cooling status	U325	REM S 1	°C	Remote Sensor Temperature
U310	DS1 TEMP	°C	Temperature of digital scroll 1	U325	REM S 2	°C	Remote Sensor Temperature
U310	DS2 TEMP	°C	Temperature of digital scroll 2	U326	REM S 3	°C	Remote Sensor Temperature
U313	Hi Te H	hr	Daily high temperature (hour)	U326	REM S 4	°C	Remote Sensor Temperature
U313	Hi Te M	m	Daily high temperature (minute)	U327	REM S 5	°C	Remote Sensor Temperature
U313	Hi Te S	s	Daily high temperature (second)	U327	REM S 6	°C	Remote Sensor Temperature
U313	Hi Temp	°C	Daily high temperature	U328	REM S 7	°C	Remote Sensor Temperature
U314	Lo Te H	hr	Daily low temperature (hour)	U328	REM S 8	°C	Remote Sensor Temperature
U314	Lo Te M	m	Daily low temperature (minute)	U329	REM S 9	°C	Remote Sensor Temperature
U314	Lo Te S	s	Daily low temperature (second)	U329	REM S 10	°C	Remote Sensor Temperature
U314	Lo Temp	°C	Daily low temperature	U331	REM CTRL	-	Rem Sensor Control is set to:
U315	Hi Hu H	hr	Daily high humidity (hour)	U332	NUM REM	-	# of Remote Control Sensors:
U315	Hi Hu M	m	Daily high humidity (minute)	U333	REM AVG	°C	Remote Sensor Unit Average:
U315	Hi Hu S	s	Daily high humidity (second)	U334	REM MAX	°C	Remote Sensor Unit Maximum:
U315	Hi Humi	%	Daily high humidity	U335	SYS AVG	°C	Remote Sensor System Average:
U316	Lo Hu H	hr	Daily low humidity (hour)	U336	SYS MAX	°C	Remote Sensor System Maximum:
U316	Lo Hu M	m	Daily low humidity (minute)	U337	AN IN 1:	-	-
U316	Lo Hu S	s	Daily low humidity (second)	U338	AN IN 2:	-	-

Parameters			Unit	Description	Parameters			Unit	Description
U316	Lo Humi	%		Daily low humidity	U339	AN IN 3:	-	-	
U317	Hi DewP	s		Daily High Dew Point	U340	AN IN 4:	-	-	
U317	Hi DP H	hr		Daily High Dew Point					
U317	Hi DP M	m		Daily High Dew Point					
U317	Hi DP S	s		Daily High Dew Point					
U318	Lo DewP	°C		Daily Low Dew point					

### 5.6.8 DISPLAY SETUP

The DISPLAY SETUP menu is used to set the LCD display attributes. Password is not required for changing the set points. The parameters are described in Table 5-8.

Table 5-8 Descriptions of DISPLAY SETUP parameters

Parameters		Default	Setting range	Description
U401	LANGUAG	EN	RUS, CZE, CHI, ESP, FRE, ITA, DEU, EN, POR	Language options
U402	YEAR	2005	-	Current year
U402	MONTH	04	01 ~ 12	Current month
U402	DAY	19	01 ~ 31	Current day
U403	HOUR	19h	-	Current hour
U403	MINUTE	8min	-	Current minute
U403	SECOND	17s	-	Current second
U404	TEMP F/C	°C	°F, °C	Temperature indication
U405	CONTRAST	50%	0% ~ 100%	Display contract
U406	BUZ FREQ	50%	0% ~ 100%	Buzzer frequency. 0% means buzzer silenced
U406	BUZ TEST	Off	On, Off	Buzzer frequency test switch. It determines whether or not there will be sound accompanying the adjustment of BUZ FREQ through the setting
U407	BACKLITE	5min	5min, 10min, 30min, 1hr, 12hr	Backlight time, or the backlight time when there is no button operation
U408	SCREEN	Graph	Graph, Simple, SimCo, GraCo	Main interface display mode
U409	SHOWS	A + S	SET, ACT, A + S	Main interface display mode of set points and actual values. Range: SET: only set points of the temperature and humidity are displayed. ACT: only actual temperature and humidity are displayed. A + S: both set points and actual values of the temperature and humidity are displayed
U410	DISPLAY	Norm	Norm (normal), Inv	Display color
U411	DATE	m/d/y	m/d/y, d.m.y, y-m-d	Date display format

### 5.6.9 TOTAL RUN HRS

The TOTAL RUN HRS menu records the total run time (unit: hr) of the system components. You can also set the run time limits of the system components through this menu. If the actual component run time exceeds the set limit, alarms will be raised.

This menu requires password. You can reset the total run time to zero in order to restart timing.



Note

- Resetting the timers is not needed unless the components are replaced.

The parameters on this menu are described in Table 5-9. Each component has a LIMIT option to set the run time limit of the corresponding component.

Table 5-9 Descriptions of TOTAL RUN HRS parameters

Parameters			Default	Related component	Parameters			Default	Related component
U502	MOTOR(S)	1000hr	32000hr	Fan motor	U507	HG / HW	23hr	-	Hot gas/hot water
U502	LIMIT				U508	EL HEAT1			
U503	COMP1	500hr	32000hr	Compressor 1	U508	LIMIT	0hr	-	Electric heater 1
U503	LIMIT				U509	EL HEAT2			
U504	COMP2	500hr	32000hr	Compressor 2	U509	LIMIT	0hr	-	Electric heater 2
U504	LIMIT				U510	EL HEAT3			
U505	CW	-	-	Chilled Water	U510	LIMIT	0hr	-	Electric heater 3
U505	-				U511	HUM			
U506	LIMIT	3200hr	23hr	Free Cooling	U511	LIMIT	0hr	-	Humidifier
U506	FC				U512	DEHUM			
U507	LIMIT	3200hr		Hot gas/hot water	U512	LIMIT	0hr		Dehumidification

### 5.6.10 SLEEP MODE

In the sleep mode, the air conditioner unit can realize auto-on/off. Through the SLEEP MODE menu, you can set two time zones of the sleep mode, and select the sleep timing mode. The parameters on this menu are described in Table 5-10.

Table 5-10 Descriptions of SLEEP MODE parameters

Parameters		Default	Setting range	Description
U602	SLEEP EN	No	Yes, No	Sleep mode day, including Monday ~ Sunday. Set the value of any day to 'Yes', and the system will enter sleep mode on that day every week. This parameter works together with the following hour and minute settings to designate an exact time
U604	MON	No		
U604	TUE	No		
U604	WED	No		
U604	THU	No		
U604	FRI	No		
U604	SAT	No		
U604	SUN	No		
U606	START 1	0hr	-	Sleep mode start time 1. The first parameter is used to set the hour of time, and the second one is used to set the minute of time
U606	START 1	0m		
U606	STOP 1	0hr		
U606	STOP 1	0m		
U608	START 2	0hr		
U608	START 2	0m		
U608	STOP 2	0hr		
U608	STOP 2	0m		
U609	TIME MOD	Yes	Auto, Yes, No	Timing mode setting. Range: Auto: during the system sleep time, if high/low temperature occurs, the system will resume operation and mask the alarm for 15min. The system will re-enter the sleep mode after the alarm is cleared Yes: start sleep mode No: no sleep mode
U610	TIME TYP	S.OFF	S.OFF, DEADB	Timing mode selection
U611	DEADBAND	2.3 K	2K ~ 15K	Used to set the deadband temperature setting range

### 5.6.11 SERVICE INFO

The SERVICE INFO menu provides the contact information of customer service personnel. The information is read only.

### 5.6.12 ACTIVE ALARMS

The ACTIVE ALARMS menu displays the active alarms of the system. No password is required to query this menu.

## 5.7 SERVICE MENUS

Press the right button at the first page of the USER MENUS, and you can enter the SERVICE MENUS, as shown in Figure 5-9.

The SERVICE MENUS are displayed in five pages. Each page displays one or two submenus. Press the ENTER button to highlight the submenu, and use the up or DOWN button to scroll up or down. Press the ENTER button to enter the selected submenu.

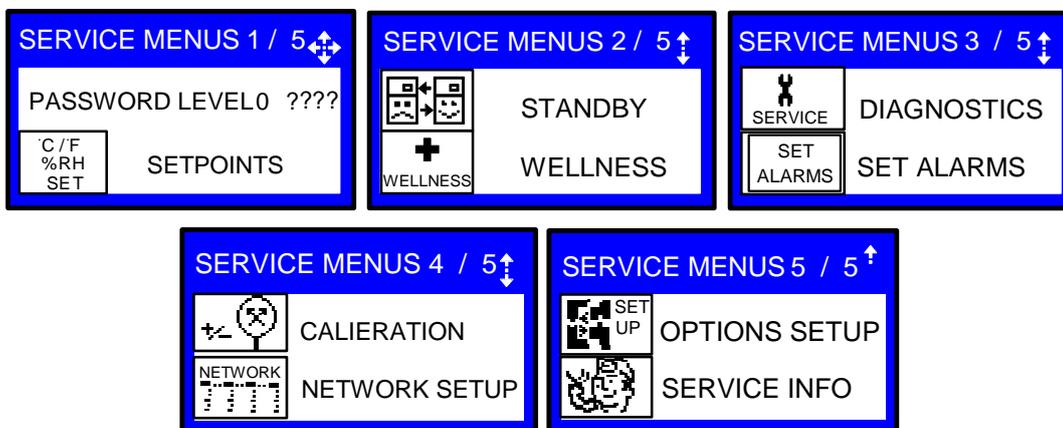


Figure 5-9 SERVICE MENUS

### 5.7.1 PASSWORD LEVEL

It is operated by Emerson service personnel.

### 5.7.2 SET POINTS

Different from the SET POINTS in the USER MENUS, the SET POINTS in SERVICE MENUS has many more parameters. See Table 5-11 for the parameter descriptions.

Table 5-11 Descriptions of SET POINTS parameters

Parameters	Default	Setting range	Description
S102 TEMPSSENS	Return Sensor	SUP,REM,RET	Temperature Control Sensor
S103 TEMP SET	23.0 °C	5.0-40.0 °C	Temperature set point
S103 TEMP ACT	-	5.0-40.0 °C	
S104 CTRL TYPE	PI	PROP,PI,n.u.,INTEL	Temperature Control Type
S106 TEMP PB	7K	2.2 -111.0 K	Temperature proportional band set point, or the P in PID control
S106 TEMP INT	5.0min	0.0 - 15.0 min	Temperature integration time set point, or the I in PID control
S107 TEMP DER	0 sec	0-900 sec	Temp Derivative Time
S108 AUTOSET	Yes	Yes, No	Autoset enable
S109 TEMP DB	1.1 K	0-20.0 K	Temperature Deadband
S110 SUPSENS	No	No,Yes	Supply Sensor
S110 SUPPLY LIMIT SET	5.0 °C	5.0-27.0 °C	Supply Set point
S111 HEAT DB	0K	0-20.0 K	Heaters deadband setting range
S113 COMP EN	No	No,Ret,Sup,R+S	Enable Temp Compensation
S114 RCOMP SP	23.0 °C	5.0-40.0 °C	Return Compensation Set point
S115 RCOMP PB	0.0K	0.0-10.0 K	Return Compensation Band
S115 RET CO	0.0K	0.0-10.0 K	Return Compensation Value
S116 SUP CO	0.0K	0.0-10.0 K	Supply Compensation Value
S118 CO F0	0.60%/s	0.01 - 100.00 %/s	DX Capacity Change at 0 %
S118 CO F100	4.00%/s	0.01 - 100.00 %/s	DX Capacity Change at 100 %
S119 TRANS CH	4.00%/s	0.1 - 100.0 %/s	Capacity Transition Filter
S120 CW F0	0.10 %/s	0.01-100.00%/s	CW Capacity Change at 0 %
S120 CW F100	0.60 %/s	0.01-100.00%/s	CW Capacity Change at 100 %
S121 BACK TSP	23.0 °C	5.0-40.0 °C	Backup Temperature Set point

Parameters		Default	Setting range	Description
S122	2ND SETP	23.0 °C	5.0-40.0 °C	Temperature Set point
S124	HUM SENS	Return Sensor	REM,RET	Humidity Control Sensor
S125	HUM SET	50 %	20% ~ 80%	Humidity Set Point
S125	HUM SET	8.9 °C	5.0 - 30.0 °C	Dew Point Set Point
S126	HUM CTRL	Pred	Comp, Rel, Pred,DewP	Humidity control type
S126	HUM MODE	SUP	SUP,RET	Humidity Control Mode
S127	SUP PB	20%	1-20 %	Humidity Proportional Band
S127	SUP PB	4.4 K	1.1K - 10.0 K	Dew Point Proportional Band
S128	HUM INT	0min	0 - 25min	Humidity integration time
S129	HUM DB	10 %	0-50 %	Humidity Dead Band
S129	HUM DB	2.2 K	0-10.0 K	Dew Point Dead Band
S130	DEHUM TEMP SET	12.2 °C	5.0-40.0 °C	Dehum Temp Set point
S130	DEH ACT	-	5.0-40.0 °C	Actual Dehum Set point
S131	DEH ADJ	5K	0-10K	Dehum Set point Adjustment
S131	DEH FIL	0.02 K/s	0.01 - 0.10 K/s	Dehum Set point Filter
S132	LL SENS	Return Sensor	SUP,REM,RET	Dehum Reheat/LL Sensor
S132	LL SET	21.7 °C	5.0-40.0 °C	Dehum Reheat/LL Set
S133	Lo Lim 1	-	-16.7K / -1.1K	Low Limit 1 Temperature Hysteresis
S133	LOW LIMIT2	-	-16.7K / -1.1K	Low Limit 2 Temperature Hysteresis
S13A	DEHSUPB	7.8 K	2.0 -30.0 K	Dehum Reheat Prop Band
S13B	ESTD AIS	23.9 °C	5.0-40.0 °C	ESTIMATED AISLE TEMP
S135	AMB TYPE	No	CONT, EFC, VAL, No	DT between Room/Outdoor Type
S136	AMB DT	1.0 K	0.0-20.0 K	DT between Room Air/Outdoor
S137	FC TYPE	No	No, CONT, VAL	DT between Room/FC Type
S138	FC DT	6.7K	0.0-20.0 K	DT between Room Air/FC Fluid
S139	MIN CW	No	Yes, No	Minimum Chilled Water Temp Enable
S140	MIN CW	7 °C	0.0-20.0 °C	Minimum CW temperature value
S141	LOCK FC	0 °C	0.0-9.0 °C	Lockout FC at FC Fluid below
S146	FAN SENS	Return Sensor	SUP,REM,RET,MAN	Fan Control Sensor
S147	FAN SET	22.8 °C	5.0-40.0 °C	Fan Speed Temperature Set Point
S148	FCTL TYP	PI	PROP,PI,NU	Fan Temperature Control Type
S149	FTEMP PB	20.0 K	2.2 -111.0 K	Fan Temperature Control P- Band
S149	FTEMPINT	1.0 min	0.0 - 15.0 min	Fan Temperature Control Integration Time
S150	FAN DB	0.6 K	0-20.0 K	Fan Deadband
S151	AIR CAL	10.0V	3.0 - 10.0V	Airflow Calibration
S152	VSD SET	100%	0-100 %	Fanspeed VSD Set point Standard
S152	VSD MIN	CW:60% DX: 70%	0-100 %	Fanspeed VSD Set point Minimum
S153	VSD DEH	CW:60% DX: 70%	0-100 %	Fanspeed VSD Set point Dehum
S153	VSD NOP	HPM CW:60% HPM DX: 85% non HPM:100%	0-100 %	Fanspeed VSD Set point No Power
S154	FAN + CO	HPM: No non HPM: yes	No,Yes	Allow Fan Modulation on Compressors
S155	RETLIMEN	Local	No,LOC,TEAM	High Return Limit Enable
S15A	HIRETLIM	29.4 °C	5.0-40.0 °C	High Return Temperature Limit
S15B	RETLIMPB	11.1 K	0.2-20.0 K	Return Limit P-Band
S158	FF0 %	0.20 %/s	0.01 - 100.0 %/s	Fanspeed Change 0
S158	FF100 %	1.00 %/s	0.01 - 100.0 %/s	Fanspeed Change 100
S159	TRANS CH	1.0%/s	0.1 - 100.0 %/s	Fan Transition Change
S160	FRM	Decel	Decel, Both	Fanspeed Reposition Mode
S160	FRD	0 sec	0-300 sec	Fanspeed Reposition Delay
S161	FF DEC	0.10 %/s	0.01 - 100.0 %/s	Max Deceleration Rate
S162	BACK FAN	23.0 °C	5.0-40.0 °C	BMS Backup Fan Set point
S163	BACK DRV	No	No,STD,COUPL,B SET	BMS Backup Fan Operation
S164	FAN BMS	Yes	No, Yes	Allow BMS to change Fanspeed
S166	FAN MOD	Full	Full,Light	EC-Fan Mode

Parameters		Default	Setting range	Description
S168	BACKDRFT	No	No, Yes	Fan Back Draft Control
S169	VSD BDR	1.5V	0.1 - 5.1V	VSD Set point BACK DRAFT
S171	NO BDR 1	3.5V	0.0 - 5.0V	Not Selectable Zone 1
S172	NO BDR 2	0.0V	0.0 - 5.0V	Not Selectable Zone 2
S173	BDR SOFF	No	No, Yes	Stop BDR when System is Off
S174	REM BDR	Off	Off, BDR	Remote Off at BDR
S175	DISP BDR	Off	Off, BDR	Display Off at BDR
S176	BMS BDR	Off	Off, BDR	BMS Off at BDR
S177	LOC BDR	Off	Off, BDR	LOC Off at BDR
S179	CtrlType	no	Tight, Std, no	SCR Control Type
S180	Co1 on	0%	-100/+100%	Start 1st Compressor at
S181	Co1 off	-200%	-200/+50%	Stop 1st Compressor at
S182	Co1 TD	20 min	0 - 30 min	1st Compressor stop delay
S183	Co2 on	100%	-100 / +100 %	-
S184	Co2 off	0%	-200 / +50 %	-
S185	Co2 TD	0 min	0-30min	-
S186	CycleT	20 sec	1.0 - 200.0 sec	-
S187	SCRFact	1.0	1.0-10.0	-
S188	Act SCR	-	0-100%	-

### 5.7.3 STANDBY

The parameters of the STANDBY menu are described in Table 5-12.

Table 5-12 Descriptions of STANDBY parameters

Parameters		Default	Setting range	Description
S502	#STANDBY	1	0 ~ 31	Number of standby units
S503	ROTATION	Daily	No, Daily, MON ~ SUN, M - MON ~ M - SUN	Rotation frequency setting of the running and standby units. Range: Daily: rotate once a day. MON ~ SUN: rotate once a week. The rotation occurs on Monday ~ Sunday of the week. For example, MON means rotation occurs on Monday of every week. M - MON ~ M - SUN: rotate once a month. The rotation occurs on Monday ~ Sunday of the first week of the month. For example, M - MON means rotation occurs on Monday of the first week of every month
S504	ROT HOUR	hr	-	Used to set the hour of the detailed time while rotation
S504	ROT MIN	min	-	Used to set the minute of the detailed time while rotation
S505	ROT BY	1	1 ~ 8	The unit number for a rotation
S506	STBY FT	1 min	1 - 5 min	Stdby Fan Timer at Reheat/Hum
S507	DO ROT	No	Yes, No	Perform one rotation
S508	CASCADE	No	CO/HE, Cool, Yes, No	Cascade function selection. 'Yes' corresponds to temperature and humidity control and 'no' corresponds to closing the cascade
S509	CAS DEL	5 min	0 - 30 min	Cascaded Units Delay
S510	CAS QUI	2 min	0 - 30 min	Cascaded Units Quick Start
S511	CAS MIN	30 min	2 - 360 min	Cascaded Units Min Run
S512	CAS CTRL	5 min	0 - 30 min	Cascaded Units Control Delay
S513	STBY HT	No	0 = No 1 = Yes	Start all Standby Units by HT

### 5.7.4 WELLNESS

The iCOM controller calculates the bonus and penalty over the equipment maintenance based on the parameters in the WELLNESS menu and the equipment operation historical data, so as to find out the next system maintenance time.

Informing the maintenance personnel of the maintenance time makes the air conditioner run in the optimal mode, which reduces the chances of faults and raises the system reliability.

The WELLNESS menu includes nine groups of parameters, including WELLNESS BASICs, and WELLNESS MOTOR, WELLNESS COMPs, WELLNESS HEATs and WELLNESS HUM. See Table 5-13 ~ Table 5-22 for detailed parameter descriptions.

### WELLNESS BASIC1

Table 5-13 Descriptions of WELLNESS BASIC1 parameters

Parameters		Default	Setting range	Description
S002	FREQ/YR	1pY	0pY ~ 12pY	Maintenance frequency every year
S003	BONUS	MM	0MM ~ 12MM	Bonus setting
S004	PENALTY	MM	0MM ~ 12MM	Penalty setting
S005	LAST PM	YY	-	Last maintenance. Year (YY), month (MM) and day (DD). This parameter is read only
S005	LAST PM	MM		
S005	LAST PM	DD		

### WELLNESS BASIC2

Table 5-14 Descriptions of WELLNESS BASIC2 parameters

Parameters		Default	Setting range	Description
S006	SERVICE	-	Name	Service personnel setting
S007	CONFIRM	No	Yes, No	Maintenance confirmation selection
S008	NEXT PM	-	-	Calculated next maintenance. This parameter is read only

### WELLNESS MOTOR

Table 5-15 Descriptions of WELLNESS MOTOR parameters

Parameters		Default	Description
S013	STARTS	-	Number of fan starts since the last maintenance
S014	RUN HRS	hr	Fan run hours since the last maintenance
S015	AVG RUN	min	Average fan run time calculated through number of fan starts and run hours
S016	BEST	1	Starts per day best
S017	WORST	24	Starts per day worst
S018	ALARMS	0	Number of alarms since the last maintenance
S019	BONUS	0MM	Bonus amount. Actual bonus calculated through the number of starts and average run time. This value determines the time for the next maintenance

### WELLNESS COMP1

Table 5-16 Descriptions of WELLNESS COMP1 parameters

Parameters		Default	Description
S024	STARTS	-	Number of compressor 1 starts since the last maintenance
S025	RUN HRS	hr	Compressor 1 run hours since the last maintenance
S026	AVG RUN	min	Average compressor 1 run time calculated through the number of starts and run hours
S027	BEST	12	Starts per day best
S028	WORST	240	Starts per day worst
S029	HP AL	0	Number of high pressure alarms occurred to compressor 1 since the last maintenance
S030	LP AL	0	Number of low pressure alarms occurred to compressor 1 since the last maintenance
S031	OL AL	0	Number of overload alarms occurred to compressor 1 since the last maintenance
S032	DS HT AL	0	Number of digital scroll high temperature alarms occurred to compressor 1 since the last maintenance
S033	BONUS	0MM	Bonus amount. Actual bonus calculated through the number of starts and average run time. This value determines the time for the next maintenance

### WELLNESS COMP2

Table 5-17 Descriptions of WELLNESS COMP2 parameters

Parameters		Default	Description
S035	STARTS	-	Number of compressor 2 starts since the last maintenance
S036	RUN HRS	hr	Compressor 2 run hours since the last maintenance
S037	AVG RUN	min	Average compressor 2 run time calculated through the number of starts and run hours

Parameters		Default	Description
S038	BEST	12	Starts per day best
S039	WORST	240	Starts per day worst
S040	HP AL	0	Number of high pressure alarms occurred to compressor 2 since the last maintenance
S041	LP AL	0	Number of low pressure alarms occurred to compressor 2 since the last maintenance
S042	OL AL	0	Number of overload alarms occurred to compressor 2 since the last maintenance
S043	DS HT AL	0	Number of digital scroll high temperature alarms occurred to compressor 2 since the last maintenance
S044	BONUS	0MM	Bonus amount. Actual bonus calculated through the number of starts and average run time. This value determines the time for the next maintenance

**WELLNESS HEAT1**

*Table 5-18 Descriptions of WELLNESS HEAT1 parameters*

Parameters		Default	Description
S046	STARTS	-	Number of electric heater 1 starts since the last maintenance
S047	RUN HRS	hr	Electric heater 1 run hours since the last maintenance
S048	AVG RUN	min	Average electric heater 1 run time calculated through the number of starts and run hours
S049	BEST	24	Starts per day best
S050	WORST	240	Starts per day worst
S051	ALARMS	0	Number of high pressure alarms since the last maintenance
S052	BONUS	0MM	Bonus amount. Actual bonus calculated through the number of starts and average run time. This value determines the time for the next maintenance

**WELLNESS HEAT2**

*Table 5-19 Descriptions of WELLNESS HEAT2 parameters*

Parameters		Default	Description
S057	STARTS	-	Number of electric heater 2 starts since the last maintenance
S058	RUN HRS	hr	Electric heater 2 run hours since the last maintenance
S059	AVG RUN	min	Average electric heater 2 run time calculated through the number of starts and run hours
S060	BEST	24	Starts per day best
S061	WORST	240	Starts per day worst
S062	ALARMS	0	Number of high pressure alarms since the last maintenance
S063	BONUS	0MM	Bonus amount. Actual bonus calculated through the number of starts and average run time. This value determines the time for the next maintenance

**WELLNESS HEAT3**

*Table 5-20 Descriptions of WELLNESS HEAT3 parameters*

Parameters		Default	Description
S068	STARTS	-	Number of electric heater 3 starts since the last maintenance
S069	RUN HRS	hr	Electric heater 3 run hours since the last maintenance
S070	AVG RUN	min	Average electric heater 3 run time calculated through the number of starts and run hours
S071	BEST	24	Starts per day best
S072	WORST	240	Starts per day worst
S073	ALARMS	0	Number of high pressure alarms since the last maintenance
S074	BONUS	0MM	Bonus amount. Actual bonus calculated through the number of starts and average run time. This value determines the time for the next maintenance

**WELLNESS HUM**

*Table 5-21 Descriptions of WELLNESS HUM parameters*

Parameters		Default	Description
S079	STARTS	-	Number of humidifier starts since the last maintenance
S080	RUN HRS	hr	Humidifier run hours since the last maintenance
S081	AVG RUN	min	Average humidifier run time calculated through the number of starts and run hours
S082	BEST	24	Starts per day best
S083	WORST	240	Starts per day worst
S084	ALARMS	0	Number of high pressure alarms since the last maintenance

Parameters		Default	Description
S085	BONUS	0MM	Bonus amount. Actual bonus calculated through the number of starts and average run time. This value determines the time for the next maintenance

## WELLNESS ECO

Table 5-22 Descriptions of WELLNESS ECO parameters

Parameters		Default	Description
S090	REPOS	-	Number of Repositions
S091	RUN HRS	hr	Economizer Run Hours
S092	REP/HR	-	Economizer Repositions per Hour

## 5.7.5 DIAGNOSTICS

The DIAGNOSTICS menu is classified into two groups. After entering the menu, pressing the up button and DOWN button can switch between two groups and pressing the ENTER button can enter the parameters of the corresponding group. The parameters of group 1 are settable and used to help the maintenance personnel start and cut off devices by hand in site, so as to realize the diagnosis for devices. The parameters of group 2 are read only and reflect the fault condition of the devices. See Table 5-23 for detailed descriptions.

Table 5-23 Descriptions of DIAGNOSTICS parameters

Parameters		Default	Setting range	Description	
Group 1	S302	HP1 CODE	0	-	HP 1 alarm counting. The counter can be reset to 0 through the parameter
	S303	HP2 CODE	0	-	HP 2 alarm counting. The counter can be reset to 0 through the parameter
	S304	HT1 CNT	0	-	HT 1 alarm counting. The counter can be reset to 0 through the parameter
	S305	HT2 CNT	0	-	HT 2 alarm counting. The counter can be reset to 0 through the parameter
	S306	LP1 CODE	0	-	LP 1 alarm counting. The counter can be reset to 0 through the parameter
	S307	LP2 CODE	0	-	LP 2 alarm counting. The counter can be reset to 0 through the parameter
	S308	LP1 ACT	br	-	Actual LP 1
	S309	LP2 ACT	br	-	Actual LP 2
	S310	HP1 ACT	br	-	Actual HP1 Pressure
	S311	HP2 ACT	br	-	Actual HP2 Pressure
	S313	MANUAL	No	Yes, No	Selecting 'Yes' can turn on or off the components; selecting 'No' can prohibit manual setting
	S314	MOTOR(S)	On	On, Off	Diagnosis switch of fan motor. The settings 'On' and 'Off' are used to manually start and shut down the fan respectively
	S315	COMP1	-	Off, On	Semi Manual Compressor 1 Request
	S315	C1 MODE	Run	Run, Evac, Charg	Compressor 1 operation mode selection
	S317	C1 CAP	Off	On, Off	Refrigeration capacity output of digital scroll compressor 1
	S318	C1 CYCLE	0%	-	-
	S319	LLSV 1	Off	On, Off	Diagnostic of liquid line solenoid valve of compressor 1
	S320	C2 MODE	Run	Run, Evac, Charg	Compressor 2 operation mode selection
	S322	C2 CAP	Off	-	Refrigeration capacity output of digital scroll compressor 2
	S32A	C2 CYCLE	0%	-	-
S32B	LLSV2	Off	On, Off	Diagnosis switch of liquid line solenoid valve of compressor 2	
S324	EL HEAT1	Off	On, Off.	Diagnosis switch of electric heater 1. The 'On' setting of this parameter can start electric heater 1 only when the air loss is normal	
S325	EL HEAT2	Off	On, Off.	Diagnosis switch of electric heater 2. The 'On' setting of this parameter can start electric heater 2 only when the air loss is normal	

Parameters		Default	Setting range	Description	
Group 1	S326	EL HEAT3	Off	On, Off.	Diagnosis switch of electric heater 3. The 'On' setting of this parameter can start electric heater 3 only when the air loss is normal
	S327	SCR HEAT	-	0 ~ 100 %	SCR Heat
	S328	DEHUMI	Off	On, Off	Diagnostic switch of Dehumidification solenoid valve
	S329	HUM FILL	Off	On, Off	Diagnosis switch of solenoid valve of water supply to the humidifier
	S330	HUM	Off	On, Off	Diagnosis switch of humidifier. The 'On' setting of this parameter can start the humidifier only when the air loss is normal
Group 1	S331	H DRAIN	-	On, Off	Humidifier drain
	S332	HUM.C.	0.00A	-	Electric current of humidifier
	S335	ALM REL	Off	On, Off	Diagnostic switch of alarm relay.
	S336	FC REL	-	On, Off	Diagnostic switch of free cooling relay.
	S337	3P1 OPEN	Off	On, Off	Diagnostic switch of 3-phase electric regulator.
	S337	3P2 OPEN	Off	On, Off	
	S338	3P1 CLOSE	Off	On, Off	
	S338	3P2 CLOSE	Off	On, Off	
	S339	BV CTRL	-	Man, Auto	Ball valve control type
	S340	MBV1 POS	-	0 ~ 100%	MBV1 position, MBV2 position
	S340	MBV2 POS	-	0 ~ 100%	
	S341	ANALOG1	0%	0 ~ 100%	Diagnostic output of analog variable 1 ~ 4. They can be set to be percentage of desired output
	S342	ANALOG2	0%	0 ~ 100%	
	S343	ANALOG3	0%	0 ~ 100%	
S344	ANALOG4	0%	0 ~ 100%		
Group 2	S345	RSD	On	On, Off	Remote shut down. Range: On, Off
	S346	AIR LOSS	OK	OK, ACT	Air loss alarm. OK means the system is normal. ACT means the air loss is active, and abnormality occurred
	S347	MOTOR OL	ACT	OK, ACT	Fan motor overload alarm. OK means the fan is normal. ACT means the fan is overloaded, and abnormality occurred
	S348	FILTER	OK	OK, ACT	Filter clogging situation. OK means normal; ACT means the filter is clogged
	S349	CUSTOM1	OK	OK, ACT	States of customized alarms 1 ~ 4. 'OK' means normality; 'ACT' means that the alarm is active and that abnormality occurs
	S350	CUSTOM2	OK	OK, ACT	
	S351	CUSTOM3	Ok	OK, ACT	
	S352	CUSTOM4	OK	OK, ACT	
	S353	HEAT SAF	OK	OK, ACT	Status heaters safety
	S354	FLOW AT	%	-	-
	S355	FLOW ACT	%	-	-
	S356	HP1	OK	OK, ACT	State of high pressure switch 1. OK means normal. ACT means abnormal
	S357	LP1	OK	OK, ACT	State of low pressure switch 1. OK means normal. ACT means abnormal
	S358	C1 OL	OK	OK, ACT	Overload state of compressor 1. OK means normal. ACT means abnormal
	S359	HP2	OK	OK, ACT	State of high pressure switch 2. OK means normal. ACT means abnormal
	S360	LP2	OK	OK, ACT	State of low pressure switch 2. OK means normal. ACT means abnormal
	S361	C2 OL	OK	OK, ACT	Overload state of compressor 2. OK means normal. ACT means abnormal
	S367	HUM PROB	OK	OK, ACT	Humidifier fault state. OK means normal. ACT means abnormal
	S368	DT1	-	OK, ACT	Status DT1 (Outdoor/Glycol)
	S369	DT2	-	OK, ACT	Status DT2 (Glycol/Room)
	S370	DT3	On	On, Off	Status DT3 (Room/Set point)
	S371	DT4	-	NOK,OK	Status DT4 (Eco Zone)
	S372	MIN CW	-	OK, ACT	Status Min CW
S373	LWD Val	-	0-100	-	

Parameters		Default	Setting range	Description
Group 2	S374	LSI	-	Off, On
	S375	COND 2	-	Off, On
	S376	COND 1	-	-
	S379	V_CTRL	Time	Time, Feedb
	S380	V_CAL	No	Yes. No
	S381	CAL_STAT	Idle	-
	S382	CLSD 1	-	0.0-10.0V
	S383	OPEN 1	-	0.0-10.0V
	S384	V1FDB	-	0.0-10.0V
	S385	CLSD 2	-	0.0-10.0V
	S386	OPEN 2	-	0.0-10.0V
	S387	V2FDB	-	0.0-10.0V

5.7.6 SET ALARMS

The SET ALARMS menu is displayed in nine pages. The first page provides the settings of alarm upper/lower limits and customized alarms. The other eight pages provide the settings of alarm delay.

**Alarm upper/lower limits setting**

The alarm upper/lower limits in the SERVICE MENUS are set the same as those in the USER MENUS. For details, see Table 5-6.

**Customized alarms setting**

See Table 5-24 for the descriptions of customized alarms setting.

Table 5-24 Descriptions of customized alarms setting

Parameters		Default	Parameters		Default
S202	RTN SNSR	Yes	S216	LO DP	3.9 °C
S202	RET DEL	90 sec	S217	DP A AL	Disabled
S203	HI TEMP	°C	S217	DP A DEL	90 sec
S204	LO TEMP	°C	S218	HI DP A	16.7 °C
S205	HI HUM	60%	S218	HI DP A	2.2 °C
S206	LOW HUM	40%	S219	REM SNSR	Disabled
S207	SENSOR A	No	S219	DP A DEL	180 sec
S207	SE A DEL	90 sec	S220	HI REM	32.3 °C
S208	HI TEMP A	°C	S220	LO REM	12.8 °C
S209	LO TEMP A	°C	S222	EEV ALBD	NC
S210	HI HUM A	%	S224	CUST IN1	WATER
S211	LO HUM A	%	S225	C1 ACT	CLOSE
S21A	FLOCT	0 sec	S226	CUST IN2	WATER
S21B	LOF THRH	10%	S227	C2 ACT	CLOSE
S213	SUP SNSR	No	S228	CUST IN3	WATER
S213	SUP DEL	90 sec	S229	C3 ACT	CLOSE
S214	HI SUP T	23.9 °C	S230	CUST IN4	HEAT A
S214	LO SUP T	10.0 °C	S231	C4 ACT	OPEN
S215	DP AL	Disabled	S232	WA AC AL	No
S215	DP DEL	90 sec	S233	WAT OFF	No
S216	HI DP	15.0 °C			

CUST IN1, CUST IN2, CUST IN3 and CUST IN4 can be set to 21 types of input. See Table 5-25 for details.

Table 5-25 Descriptions of types

Types	Description	Types	Description	Types	Description
SMOKE	Smoke alarm	RH+HU	Rht + Hum lockout	RJTVS	HTRJ TVSS
WATER	Water leakage alarm	COMP	Compressor lockout	Fire	Fire Alarm
C PMP	Cooling pump alarm	Call	Call for service	2.Set	2nd Set point
FLOW	Insufficient water alarm	Temp	High temperature alarm	NoP	No Power
G PMP	Standby pump alarm	Air	Air loss alarm	LSI	LSI
STBY	Standby unit alarm	FC L.	FC lockout	Cnd 1	Condensor 1 Fail
C-In1	Customized alarm 1	HeatA	Heater alarm	Cnd 2	Condensor 2 Fail

Types	Description	Types	Description	Types	Description
C-In2	Customized alarm 2	FLOSD	Flow AL SD	ScRed	D-Scroll Red
C-In3	Customized alarm 3	FLOLC	Flow AL LC	Swap V	Swap Valve
C-In4	Customized alarm 4	ComPD	Comp Lock PD	ECFan	EC Fan Fail
RHT	Reheater lockout	En FC	Enable FC,		
HUM	Humidifier lockout	RJVFD	HTRJ VFD		

C1 ACT, C2 ACT, C3 ACT and C4 ACT correspond to the customer alarms. 'OPEN' means normally open, 'CLOSE' means normally closed.

**Alarm delays setting**

The alarm delays are the time after faults occur and before the alarms are triggered. See Figure 5-10 for the menu format.

SET ALARMS		2/10	01	
		DEL	EN	T
S236	FOL	5	Yes	ALM
S237	LOA	3	Yes	ALM
S238	CF	2	Yes	WRN
S239	HRT	30	Yes	WRN
S240	LRT	30	Yes	WRN
S241	HRH	30	Yes	WRN

Figure 5-10 Alarm delay

The alarm name, delay time, delay enabling and alarm type are displayed from left to right in the list.

The alarm delay can be set to 0 ~ 9999. Unit: second.

The delay enabling determines whether the alarm will be displayed and the alarm menu is entered, Options include 'Yes' and 'No'.

The alarm type can be set to 'ALM' (alarm), 'WRN' (warning) and 'MSG' (message). They determine the alarm degree of the corresponding event.

The alarm names are listed in Table 5-26.

Table 5-26 Alarm name description

SN	Alarm/event name	Description	SN	Alarm/event name	Description
S236	FOL	Fan overload	S266	LOF	Loss of flow
S237	LOA	Loss of airflow	S267	SGP	Standby glycol pump on
S238	CF	Filter clogged	S268	STB	Standby unit on
S239	HRT	High room temp.	S269	HUP	Humidifier problem
S240	LRT	Low room temp.	S270	NOC	No connection w/Unit1
S241	HRH	High room hum.	S271	-	No connection w/UnitX
S242	LRH	Low room hum.	S272	LOP	LOSS OF POWER
S243	HTA	High temperature of sensor A	S275	CI1	CUSTOMER INPUT 1
S244	LTA	Low temperature of sensor A	S276	CI2	CUSTOMER INPUT 2
S245	HHA	High humidity of sensor A	S277	CI3	Customized input 3
S246	LHA	Low humidity of sensor A	S278	CI4	Customized input 4
S249	OL1	Compressor 1 overload	S279	CS	Call for service
S250	OL2	Compressor 2 overload	S280	HTD	High temperature
S251	HP1	Compressor 1 high pressure	S281	LB1	Loss of air blower 2
S252	HP2	Compressor 2 high pressure	S282	RL	Reheat lockout
S253	LP1	Compressor 1 low pressure	S283	HL	Humidifier lockout
S254	LP2	Compressor 2 low pressure	S284	FCL	FC lockout
S255	PD1	Compressor 1 pumpdown fails	S285	CL	Compressor(s) lockout
S256	PD2	Compressor 2 pumpdown fails	S288	SC1	Short cycle 1
S257	HT1	Digital scroll 1 high temperature	S289	SC2	Short cycle 2
S258	HT2	Digital scroll 2 high temperature	S290	NOP	NO power
S259	EHO	EL HEAT HIGH TEMP	S291	CN1	Condensor 1 Fail
S262	WHE	Working hours exceeded	S292	CN2	Condensor 2 Fail
S263	SMO	Smoke detected	S293	EFF	EC Fan fail
S264	WUF	Water under floor	S294	HST	High supply air temperature
S265	CPH	Condenser pump high water	S295	LST	Low supply air temperature

### 5.7.7 CALIBRATION

The CALIBRATION menu can calibrate sensors by setting offsets. The parameters are listed in Table 5-27. The parameters are in pairs: the former is the calibrated value and the latter is the calculated value, or the sum of the measured value and the calibrated value. This value is engaged in the calculation of control need.

Table 5-27 Descriptions of CALIBRATION parameters

Parameters		Default	Description
S602	RTN TEMP	0	Calibrated return air temperature. It can be set as a positive or negative value. Use the UP and DOWN buttons to change the setting value, 0.1K at each step
S603	CAL TEMP	-	Sum of the calibrated value and measured return air temperature. This value is compared with the setting value as the system actual temperature and is engaged in the calculation
S604	RTN HUM	+0.0%	Calibrated return air humidity. It can be set as a positive or negative value. Use the UP and DOWN buttons to change the setting value, 1% at each step
S605	CAL HUM	-	Sum of the calibrated value and measured return air humidity. This value is compared with the setting value as the system actual humidity and is engaged in the calculation
S606	DS1 NTC	+0.0K	Calibrated digital scroll 1NTC. It can be set as a positive or negative or positive value. Use the UP and DOWN buttons to change the setting value, 0.1K at each step
S607	CAL DS1	-	Sum of the calibrated value and return air humidity measured by digital scroll 1NTC sensor. This value is engaged in the calculation
S608	DS2 NTC	+0.0K	Calibrated digital scroll 2NTC. It can be set as a positive or negative value. Use the UP and DOWN buttons to change the setting value, 0.1K at each step
S609	CAL DS2	-	Sum of the calibrated value and return air humidity measured by digital scroll 2NTC sensor. This value is engaged in the calculation
S610	OUT SNS	0	Outdoor Sensor
S611	CAL OUT	-	Calibrated Outdoor Sensor
S613	TEMP A1T	+0.0K	Calibrated value of temperature sensor A1T
S614	CAL A1T	-	Calculated value corresponding to temperature sensor A1T
S615	HUM A1H	+0.0%	Calibrated value of humidity sensor A1H
S616	CAL A1H	-	Calculated value corresponding to humidity sensor A1H
S617	TEMP B	TH	Calibrated value of temperature sensor B
S618	TEMP B1T	+0.0K	Type of temperature sensor B1T
S619	CAL B1T	-	Calculated value corresponding to temperature sensor B1T
S620	HUM B2H	+0.0%	Calibrated value of humidity sensor B2H
S621	CAL B2H	-	Calculated value corresponding to humidity sensor B2H
S622	TEMP B2T	+0.0K	Optional Sensor B2T
S62A	CAL B2T	-	Calibrated Optional Sensor B2T
S62B	TYPE C	-	Optional Sensor C Type
S624	FC SNSR	NTC	Free cooling temperature sensor. PTC or NTC sensor can be configured according to the actual configuration
S625	FC SNSR	+0.0K	Calibrated value of free cooling temperature sensor
S626	CAL FC	-	Calculated value of free cooling temperature sensor
S627	SUP SNSR	NTC	Air supply temperature sensor. PTC or NTC sensor can be configured
S628	SUP TEMP	+0.0K	Calibrated value of air supply temperature sensor
S629	CAL SUP	-	Calculated value of air supply temperature sensor
S630	TEMP C1T	-	Calibrated value of temperature sensor C1T
S630	AMB TEMP	-	Offset Outdoor Temperature
S631	CAL C1T	-	Calculated value of temperature sensor C1T
S631	CAL AMBT	-	Calibrated Outdoor Temperature
S632	HUM C2H	+0.0%	Calibrated value of humidity sensor C2H
S632	AMB HUM	+0.0%	Offset Outdoor Humidity
S633	CAL C2H	-	Calculated value of humidity sensor C
S633	CAL AMBH	-	Calibrated Outdoor Humidity
S63A	TEMP C2T	0	Temperature Sensor C2T Calibration
S63B	CAL C2T	-	Calibrated Optional Sensor C2T

## 5.7.8 NETWORK SETUP

The NETWORK SETUP menu is used to set the parameters when the system is in a network subject to the monitoring of a host. See Table 5-28 for parameter descriptions.

Table 5-28 Descriptions of NETWORK SETUP parameters

Parameters		Default	Setting range	Description
S802	#UNITS	1	1 ~ 32	Range: 1 ~ 32
S803	TEAMWORK	No	No, 1, 2	Range: No, 1, 2
S824	MON ADD	3	1 ~ 99	Monitoring address No. of the unit
S825	MON T.O.	No	No, 1, 2	Monitoring Timeout
S825	MON H.S.	3	1 ~ 99	Monitoring Handshake
S830	UPGRSTAT	-	None,S CS, S NS,S SR, S GDR, SBLV,SRAM, Ready,Fail	Lock for Upgrade Status
S830	UPGRADE	-	No,Yes, ULock	Lock for Upgrade
S831	CS CTRL	No	Save, Load, No	Save the parameter set through MON ADD to the iCOM controller. 'No' means not saved
S831	CS STAT	Change	Change, Valid	Indication of the saving state of the parameter set through MON ADD. 'Change' means that the parameter is changed but not saved. 'Valid' means that the setting is valid and saved
S832	NW CTRL	No	Save, Load, No	Save the parameter set through U2U GRP to the iCOM controller. 'No' means not saved
S832	NW STAT	Valid	Change, Valid	Indication of the saving state of the parameter set through U2U GRP. 'Change' means that the parameter is changed but not saved. 'Valid' means that the setting is valid and saved
S835	MON PROT	Vlct4	No,Vlct3,HN, IGM,n.a.,Vlct4	Host monitoring protocol setting. Range: Vlcty (Velocity uses intelligent card), HN (Hironet), IGM (ECA2), No
S836	IP #1	192	-	Set IP address
S836	IP #2	168		
S836	IP #3	254		
S836	IP #4	1		
S837	NM #1	255	-	Set subnet mask
S837	NM #2	255		
S837	NM #3	255		
S837	NM #4	0		
S838	GW #1	0	-	Set gateway address
S838	GW #2	0		
S838	GW #3	0		
S838	GW #4	0		
S840	U2U PROT	GBP	-	-
S841	U2U ADD	3	-	Group address No. of this unit
S842	U2U GRP	1	-	-
S843	BL CTRL	No	S + R, No	Boot program variant load. Saving the change of S835 ~ S841 needs the S + R command of this parameter. The system will reset after the saving, and configure according to the new parameters
S843	BL STAT	Valid	Change, Valid	Indication of whether or not the parameters set through S835 ~ S841 are saved. 'Change' means that the parameter is changed but not saved. 'Valid' means that the setting is valid and saved
S844	SR CTRL	No	C + R, No	Static RAM data reset control. If the change of S835 ~ S841 are not saved, using the C + R command in this parameter can restore S835 ~ S841 to their original settings, and the system will reset afterwards
S844	SR STAT	Valid	-	STD
SW#		-	-	Version No. of the control software
MAC		-	-	MAC address of the network card of the iCOM controller
NAME		UNIT	UNIT	Name of the unit. By default: UNIT. You can change the name as you need

## 5.7.9 OPTIONS SETUP

The OPTIONS SETUP menu is used to set the parameters according to the equipment-specific demands. See Table 5-29 for detailed descriptions.

Table 5-29 Descriptions of OPTIONS SETUP parameters

Parameters		Default	Setting range	Description
S402	COMP SEQ	Auto	Auto, 1 (compressor 1 being the primary one), 2 (compressor 2 being the primary one)	Compressor sequence. Range: Auto, 1 (compressor 1 being the primary one), 2 (compressor 2 being the primary one)
S403	LP DELAY	1min	-	Low pressure alarm delay
S404	EL HEAT	1	0 ~ 3	Electric heating stages
S405	HW HEAT	No	Yes, No	Hot water heating enabled
S406	ALL HEAT	-	0,1,2,3	No. Of all Heat Stages
S407	LWDconn	No	Yes, No	LWD connected. Range: Yes (water low sensor connected), No (water low sensor not connected)
S408	V_CTRL	Time	Time, Feedback	Feedback Signal Enable
S409	3P RUN	165s	-	3P actuator runtime
S410	3P DIR	DIR	DIR, REV	3P actuator direction
S411	VPULS	5%	0 - 10 %	Minimum Valve Pulse
S413	HUM ENAB	Yes	Yes, No	Humidification enabled
S414	IR FLUSH	150%	-	Infrared flush rate
S415	HUMSTEAM	%	-	-
S416	HUM CONT	On, Off	On, Off, Prop	Humidifier control mode
S417	HumFlush	5 s	5-30 sec	Humidifier Bottle Flush Time
S418	ManFlush	Off	Yes, No	Humidifier Bottle Manual Flush
S419	DEHUM EN	Yes	Yes, No	Dehumidification enabled.
S419	DEH FAN	Yes	Yes, No	Dehumidification Fan Control Enabled
S420	REST EN	Yes	Yes, No	Auto restart enabled
S421	RESTART	s	-	Unit auto restart time
S422	ONOFF EN	Yes	Yes, No	On-off key enabled. If "no" is selected, the ON/OFF key cannot be used to perform on/off operation on the machine.
S424	CW FLUSH	0hr	0-99 hours	Cooling water auto flush time, unit: hr (hour)
S425	FC FLUSH	0hr	0-99 hours	Free cooling auto flush time, unit: hr (hour)
S426	HW FLUSH	0hr	0-99 hours	Hot Water Flush
S427	BALL OFF	+0.0br	-	-
S428	HEAT AS	-	-	-
S429	CW_CTRL	-	-	-
S430	MAIN V	-	-	-
S431	VALV ROT	-	-	-
S432	VALV TIM	-	-	-
S433	DEHUM OP	-	-	-

## 5.7.10 SERVICE INFO

The SERVICE INFO menu provides the contact information of maintenance personnel. The maintenance personnel can input and save their contact information through this submenu.

## 5.8 ADVANCED MENUS

The ADVANCED MENUS include PASSWORD LEVEL, FACTORY SETUP and PASSWORDS, as shown in Figure 5-11.

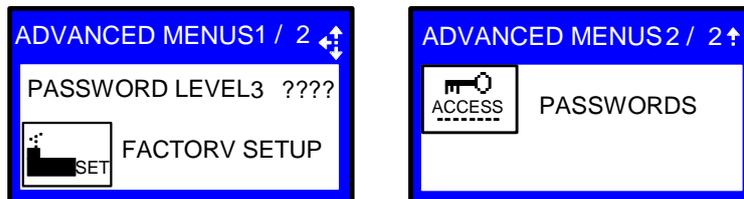


Figure 5-11 ADVANCED MENUS

### 5.8.1 PASSWORD LEVEL

It is operated by Emerson service personnel.

### 5.8.2 FACTORY SETUP

The FACTORY SETUP menu is displayed in nine pages. The parameters are described in Table 5-30 ~ Table 5-39.

#### Unit code related settings

Table 5-30 Descriptions of unit code related settings

Parameters (1/9)		Default	Setting range	Description
A003	UC 01	0	-	Unit code setting. The code has 18 bits. Each bit can be set as 0 ~ 20
...	...	...		
A003	UC 06	0		
A005	UC 07	0		
...	...	...		
A005	UC 12	0		
A007	UC 13	0		
...	...	...		
A007	UC 18	0		
A008	UC CTRL	No	Save, Load, Compare, No	Options include: Save: after UC01 ~ UC18 are changed, the changed can be saved through the save command. Load: load parameters to the unit code directly. Compare: compare the present parameters and the parameters to be loaded. No: All changes are cancelled. Keep the old parameters
A009	UC STAT	OK	Not available, Invalid, OK, Changed, Updating	Unit code status. Range: Not available: parameters set through UC01 ~ UC18 are unavailable. Invalid: parameters set through UC01 ~ UC18 are invalid. OK: parameters set through UC01 ~ UC18 are effective. Changed: parameters UC01 ~ UC18 are changed, but not saved. Updating: parameters are updating
A010	EL CTRL	Load	-	External data can be loaded through the load command
A011	EL STAT	OK	Not available, Invalid, OK, Changed, Updating	Exception list status. Range: Not available: parameters set through UC01 ~ UC18 are unavailable. Invalid: parameters set through UC01 ~ UC18 are invalid. OK: parameters set through UC01 ~ UC18 are effective. Changed: parameters UC01 ~ UC18 are changed, but not saved. Updating: parameters are updating

**System related settings**

Table 5-31 Descriptions of system related settings

Parameters (2/9)		Default	Setting range	Description
A102	REFRIG	R22	R407C, R22, R410A	Refrigerant type selection
A103	MOTOR OL	SHUTD	SHUTD, DISAB	Main fan overload. The action to take after the fan overload. Range: SHUTD (fan shuts down), DISAB (shut down humidifier, dehumidifier and heater, only keep the cooling unit running)
A104	AIR LOSS	SHUTD	SHUTD, DISAB	The action to take after the loss of airflow. Range: SHUTD (fan shuts down), DISAB (shut down humidifier, dehumidifier and heater, only keep the cooling unit running)
A105	# COMP	0	0 ~ 2	Number of compressors
A106	COMP DLY	0sec	0-120sec	Compressor delay time
A107	COMP ON	min	0 ~ 5min	Compressor minimum on time
A108	COMP OFF	3min	0 ~ 5min	Compressor minimum off time
A109	PUMPDOWN	Yes	Yes, No	Pump down enable
A110	CAP TYPE	No	4step, HGBP, DS, DS + TH, No	Capacity control type. 4step: four steps. HGBP: hot gas bypass. DS: digital scroll. DS + TH: digital scroll and temperature switch. No: with no need for capacity control type

**Other settings**

Table 5-32 Descriptions of other settings

Parameters (3/9)		Default	Setting range	Description
A113	DS CYCLE	s	-	Digital scroll cycle
A114	DS HT	°F	-	Digital scroll high temperature
A115	DS SWB	°F	-	Digital scroll switchback
A116	LP TYPE	Analog	Analog, Digital	Low pressure device type
A117	LP PH1	ps	-	Low pressure threshold phase 1
A118	LP PH2	ps	-	Low pressure threshold phase 2
A119	LC PRE	0.0s	-	Liquid control pre-time
A120	LC POST	0.0s	-	Liquid control post-time
A121	CHARGE P	br	-	Loss of Charge Protection
A122	SUP CYC	1 sec	1 - 300 sec	Supply Cycle Average
A122	REM CYC	1 sec	1 - 300 sec	Remote Cycle Average

**LP sensor related settings**

Table 5-33 Descriptions of LP sensor related settings

Parameters (4/9)		Default	Setting range	Description
A124	LP1 LOW	10%	0 ~ 100%	LP1 sensor lower threshold (percentage)
A124	LP1 LOW	0br	10 ~ 50br	LP1 sensor lower threshold
A125	LP1 HIGH	90%	0 ~ 100%	HP1 sensor lower threshold (percentage)
A125	LP1 HIGH	10.3br	10 ~ 50br	HP1 sensor lower threshold
A126	LP1 ACT	-	-	Actual LP1 signal. Read only
A127	LP2 LOW	10%	0 ~ 100%	LP2 sensor lower threshold (percentage)
A127	LP2 LOW	0br	10 ~ 50br	LP2 sensor lower threshold
A128	LP2 HIGH	90%	0 ~ 100%	HP2 sensor lower threshold (percentage)
A128	LP2 HIGH	10.3br	10 ~ 50br	HP2 sensor lower threshold
A129	LP2 ACT	-	-	Actual LP2 signal. Read only
A130	PD CUT	br	-	Pumpdown cutout
A131	PD RECYC	br	-	Pumpdown recycle
A132	HEAT REJ	W/G	FSC, L-T, W/G	Heat rejection control. Range: FSC: fan speed control; L-T: Lee-Temp; W/G: water/glycol cooling
A133	GlobCond	No	No, Yes	Global Condenser enabled
A13A	EEV EN	No EEV	-	EEV Enable
A13B	EEV LP	Yes	-	LP with EEV

**Free-cooling, HG and HW related settings**

Table 5-34 Descriptions of free-cooling, HG and HW related settings

Parameters (5/9)		Default	Setting range	Description
A135	K11 ACT	DEH	WNG、DEH、NOP、FC	-
A136	C/W F DUR	3min	1min ~ 3min	Cooling water flush duration
A137	COOL TYP	SINGL	Singl, FC, DC	Three cooling type
A138	STOP FC+	°F	-	Stop FC at set point + or value
A139	FC F DUR	0min	1min ~ 3min	Freecooling flush duration
A140	FC F K11	Yes	Yes, No	Freecooling flush starts R5
A141	COMP + FC	No	Yes, No	Compressor plus FC simultaneously
A142	HW F DUR	3min	0 ~ 3min	Hot water flush duration
A143	HG HEAT	No	Comp.1, Comp.2, No	Hot gas heating enabled
A144	HEAT OP	No	Stage, Delay, No	Electric heater operation mode
A144	HEAT DEH	Dehum	Normal, Dehum	Electric Reheat Operation during Dehum

**Humidification and dehumidification related settings**

Table 5-35 Descriptions of humidification and dehumidification related settings

Factory 6/9		Default	Setting range	Description
A146	HUM TYPE	IFS	External, IFS, IFL, PEX6, PEX9, PEX12, 21LLA, 53LLC, 53HLB, 93LLE, 93HLD, d3H, HT2, HT5, HT9, SGH, No	Humidifier model
A147	HUM VOLT	V	-	-
A148	HUM LAST	15hr	-	Detect whether the last operation time exceeds this cycle setting during the startup of the humidifier. Unit: hr
A149	PREFILL	30s or 57s	-	Prefill time. Unit: second
A150	FILL	57s	-	Fill time. Unit: second
A151	HUM ON	584s	-	Humidifier on time. Unit: second
A152	DEH COMP	1	1, 2, both	Dehumidification with compressor. When 1 or 2 is selected, compressor 1 or 2 is used for dehumidification. When Both is selected, the two compressors are both used for dehumidification
A153	MAX LL1	26.7°C	5.0-40.0 °C	Max Low Limit 1 Set point
A153	MAX LL2	23.9°C	5.0-40.0 °C	Max Low Limit 2 Set point

**Analog output related settings**

Table 5-36 Descriptions of analog output related settings

Factory 7/9		Default	Setting range	Description
A157	ANOUT1LO	0%	0-100%	-
A157	ANOUT1HI	100%	0-100%	
A158	ANOUT2LO	0%	0-100%	
A158	ANOUT2HI	100%	0-100%	
A159	ANOUT3LO	0%	0-100%	
A159	ANOUT3HI	100%	0-100%	
A160	ANOUT4LO	0%	0-100%	
A160	ANOUT4HI	100%	0-100%	
A161	MIN DEH	100%	0-100%	Min Dehum Fanspeed
A161	MIN HEAT	100%	0-100%	Min Heat Fanspeed
A161	MIN HUM	100%	0-100%	Min Humidifying Fanspeed
A162	FAN MOD	Full	Full,Light	EC-Fan Mode
A163	ANOUT1	No	-	Analog output selection. See Table 5-36
A164	ANOUT2	No	-	
A165	ANOUT3	No	-	
A166	ANOUT4	No	-	

Table 5-37 Descriptions of analog output options

Options	Description	Options	Description
CW010	CW/FC 0 ~ 10V	ALBD2	AlarmBoard 2
HW	Hot water	ALBD3	AlarmBoard 3
HW175	Hot water 1.75	IVAR	I-Variex 1
VSD	Variable fan speed drive	HUM%	HT HUM
COOL	Cooling	SUP	Supply Temperature
CV175	CW/FC 1.75	RET	Return Temperature
COOL1	Cooling 1	HUMI	Humidifier
COOL2	Cooling 2	SUPSA	Supersaver
HEAT	Heater	INVCO	Inverted Cool
No	No use	HEAT3	Heating 33%
MBV1	Motorized ball vavle1	CW210	CW/FC 2 ~ 10V
MBV2	Motorized ball vavle 2	C2010	CW2 0 ~ 10V
SCR	Silicon controlled rectifier	C2175	CW2 1.75
CONF	Configurable	C2210	CW2 2 ~ 10V
ALBD1	AlarmBoard 1		

### Analog action related settings

Table 5-38 Descriptions of analog action related settings

Parameters (8/9)	Default	Setting range	Description
A168 AO1 STA	0%	0% ~ 100%	Analog output 1 start percentage
A168 AO1 STA	0V	0V ~ 10V	Analog output 1 start voltage
A169 AO1 END	100%	0% ~ 100%	Analog output 1 end percentage
A169 AO1 END	10V	0V ~ 10V	Analog output 1 end voltage
A170 AO2 STA	0%	0% ~ 100%	Analog output 2 start percentage
A170 AO2 STA	0V	0V ~ 10V	Analog output 2 start voltage
A171 AO2 END	100%	0% ~ 100%	Analog output 2 end percentage
A171 AO2 END	10V	0V ~ 10V	Analog output 2 end voltage
A172 AO3 STA	0%	0% ~ 100%	Analog output 3 start percentage
A172 AO3 STA	0V	0V ~ 10V	Analog output 3 start voltage
A173 AO3 END	100%	0% ~ 100%	Analog output 3 end percentage
A173 AO3 END	10V	0V ~ 10V	Analog output 3 end voltage
A174 AO4 STA	0%	0% ~ 100%	Analog output 4 start percentage
A174 AO4 STA	0V	0V ~ 10V	Analog output 4 start voltage
A175 AO4 END	100%	0% ~ 100%	Analog output 4 end percentage
A175 AO4 END	10V	0V ~ 10V	Analog output 4 end voltage

### LL related settings

Table 5-39 Descriptions of LL related settings

Parameters (9/9)	Default	Setting range	Description
A179 LL1 LOW	%	0 ~ 100%	HPT1 low limit percentage setting
A179 LL1 LOW	br	10.0 ~ 50.0br	HPT1 low limit set point
A180 LL1 HIGH	%	0 ~ 100%	HPT1 high limit percentage setting
A180 LL1 HIGH	br	10.0 ~ 50.0br	HPT1 high limit set point
A181 LL1 ACT	%	-	HPT1 actual percentage, read only
A182 LL1 ACT	br	-	HPT1 actual value, read only
A183 LL2 LOW	%	0 ~ 100%	HPT2 low limit percentage setting
A183 LL2 LOW	br	10.0 ~ 50.0br	HPT2 low limit set point
A184 LL2 HIGH	%	0 ~ 100%	HPT2 high limit percentage setting
A184 LL2 HIGH	br	10.0 ~ 50.0br	HPT2 high limit set point
A185 LL2 ACT	%	-	HPT2 actual percentage, read only
A186 LL2 ACT	br	-	HPT2 actual value, read only
A187 REM SHUT	Closed	CLSON,OPNON	Remote Shutdown
A188 MM OVR	No	-	Manual Mode Override

## 5.9 MBV Settings

Through the ADVANCED MENUS screen (see Figure 5-12), you can view the current status of the cooled valve. MBV menu is displayed in six pages, and the description of the menus is listed in Table 5-40.

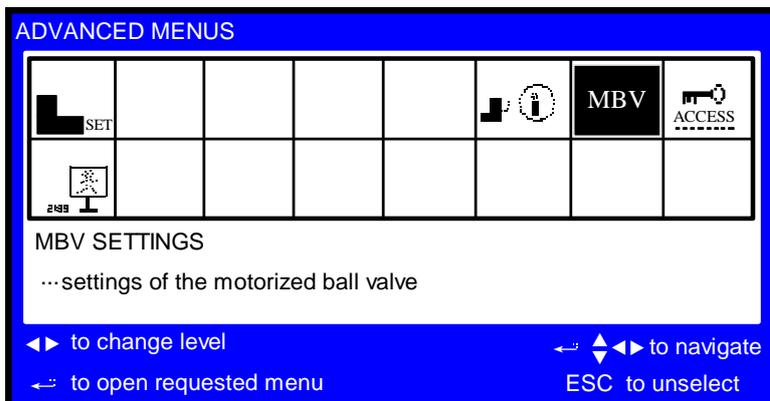


Figure 5-12 ADVANCED MENUS screen

Table 5-40 MBV settings

Parameters	Default	Range	Description
A403	UNIT HI PRESS	-	Unit high pressure
A404	MBV OP PRESS	-	MBV control available pressure
A405	MBV POSITION	-	MBV position
A406	ACTIVE OFFSET	-	Active offset
A408	MBV PHASE	-	-
A409	COMPR LP PHASE	-	-
A410	MBV PRESS READ	-	-
A411	MBV POSITION SET	-	-
A414	START OFFSET	-	-
A415	MAX OFFSET STEP	-	-
A416	SERVICE OFFSET	-	-
A417	START DELAY	-	-
A418	STOP DELAY	-	-
A419	4ST OPEN PRESET	-	-
A420	4ST CLOSE PRESET	-	-
A424	MBV REINT	-	-
A425	READ INTERVAL	-	-
A426	DIG SCROLL FILTER	-	-
A427	4ST-30SEC LOADING	-	-
A428	PUMPDOWN PRESS	-	-
A431	REPOSITION COUNTER	-	MBV reposition counter
A432	REPOSITION COUNTER RESET	-	Reposition counter reset
A436	U4	-	U4 proportional band
A437	U3A	-	U3A proportional band
A438	U2A	-	U2A proportional band
A439	U1	-	U1 proportional band
A440	L1	-	L1 proportional band
A441	L2A	-	L2A proportional band
A442	L3	-	L3 default proportional band
A443	ACTIVE OFFSET	-	ACTIVE OFFSET
A444	4ST PHASHE	-	4ST PHASHE
A447	MAX	-	Max proportional band
A448	U4	-	U4 default proportional band
A449	U3A	-	U3A default proportional band
A450	U3B	-	U3B default proportional band
A451	U2A	-	U2A default proportional band
A452	U2B	-	U2B default proportional band
A453	U1	-	U1 default proportional band

Parameters		Default	Range	Description
A458	L1	-	-	L1 default proportional band
A459	L2A	-	-	L2A default proportional band
A460	L2B	-	-	L2B default proportional band
A461	L3	-	-	L3 default proportional band
A462	MIN	-	-	Min proportional band

## 5.10 EVENT NAME AND DEFINITION

See Table 5-41 for event name and definition.

Table 5-41 List of event name and definition

Event	Definition
General Alarm	General Alarm
COMP 1 HIGH PRESSURE	Compressor 1 high pressure
COMP 1 LOW PRESSURE	Compressor 1 low pressure
HIGH CW TEMP	Chilled water high temperature
LOSS OF CW FLOW	Loss of chilled water
EL HEAT HIGH TEMP	Electric heater high temperature
MAIN FAN OVERLOAD	Main fan overload
LOSS OF AIRFLOW	Loss of air flow
CLOGGED FILTERS	Clogged filters
CUSTOMER INPUT n (n = 1 ~ 4)	Customer input n (n = 1 ~ 4)
FC LOCKOUT	Free cooling lockout
LP Transducer 1 Fail	Low pressure transducer 1 fails
CALL SERVICE	Call for service
HIGH TEMPERATURE	High temperature alarm
LOSS OF AIR BLOWER 1	Loss of air blower 1
HIGH ROOM TEMP	High room temperature
LOW ROOM TEMP	Low room temperature
HIGH ROOM HUM	High room humidity
LOW ROOM HUM	Low room humidity
HIGH TEMP SENSOR A	High temperature of sensor A
LOW TEMP SENSOR A	Low temperature of sensor A
HIGH HUM SENSOR A	High humidity of sensor A
LOW HUM SENSOR A	Low humidity of sensor A
UNIT HRS EXCEEDED	Unit has exceeded operating time
COMP 1 HRS EXCEEDED	Compressor 1 has exceeded operating time limit
HUM HRS EXCEEDED	Humidifier has exceeded operating time limit
SUPPLY SENSOR FAILURE	Supply sensor failure
DSCROLL 2 SENSOR FAIL	Digital scroll 2 sensor fails
ROOM SENSOR FAILURE	Room sensor failure
SENSOR A FAILURE	Sensor A failure
LP Transducer 2 Fail	Low pressure transducer 2 fails
NETWORK FAILURE	Network failure
Low Start Pressure 1	Alarm of low start pressure 1
UNIT ON	Unit on
UNIT OFF	Unit off
SLEEP MODE	Sleep mode
STANDBY MODE	Standby mode
POWER ON	Power on
POWER OFF	Power off
Unit n disconnected (n = 1 ~ 32)	Unit n disconnected (n = 1 ~ 32)
COMP 2 HIGH PRESSURE	Compressor 2 high pressure
COMP 2 LOW PRESSURE	Compressor 2 low pressure
COMP 2 HRS EXCEEDED	Compressor 2 has exceeded operating time limit
DSCROLL 1 SENSOR FAIL	digital scroll 1 sensor fails
FREECOOL TEMP SENSOR	Free cooling source sensor failure
Low Start Pressure 2	Alarm of low Start Pressure 2

Event	Definition
ON-OFF KEY DISABLED	ON-OFFkey disabled
LWD SENSOR FAIL	Low water level sensor fails
WATER LEAKAGE	Water leakage alarm
Dummy 67	Dummy alarm 067
RAM / Battery Failure	RAM/battery failure
Low Memory 1	Low memory 1
NO CONNECTION w/Unit1	No connection with unit 1
COMP 1 OVERLOAD	Compressor 1 overload
COMP 2 OVERLOAD	Compressor 2 overload
WRONG DAMPER POSITION	Wrong damper position
Dummy 074	Dummy alarm 074
HP 1 SENSOR FAIL	High pressuresensor 1 fails
HP 2 SENSOR FAIL	High pressure sensor 2 fails
COMP POWER REDUCTION ACTIVE	Compressor power reduction active
NO POWER	No power
UNIT DISABLED	Humidification/heating disabled due to unit failure
UNIT SHUT DOWN	Unit shutdown due to failure
Low Coil Pressure 1	Low coil pressure 1
Low Coil Pressure 2	Low coil pressure 2
Low OP Pressure 1	Low op pressure 1
Low OP Pressure 2	Low op pressure 2
UNIT SYNCHRONISATION	Unit recovers online
HUMIDIFIER PROBLEM	Humidifier failure
REMOTE SHUTDOWN	Remote shutdown
DEHUM HRS EXCEEDED	Dehumidifier has exceeded operating time limit
FC HRS EXCEEDED	Free cooling source has exceeded operating time limit
C1 FREEZE PROTECTION	Compressor 1 freeze protection
COMP 1 PUMPDOWN FAIL	Compressor 1 pumpdown fails
MEMORY 1 FAIL	Memory 1 fail
MEMORY 2 FAIL	Memory 2 fail
HCB not connected	Humidifier contorl board not connected
BMS Disconnected	Battery management system disconnected
COMP 2 PUMPDOWN FAIL	Compressor 2 pumpdown fails
DIG SCROLL1 HIGH TEMP	Digital scroll 1 high temperature
DIG SCROLL2 HIGH TEMP	Digital scroll 2 high temperature
Dummy 099	Dummy alarm 099
RESERVED 100	Reserved 100
RESERVED 101	Reserved 101
RESERVED 102	Reserved 102
Dummy 103	Dummy alarm 103
SMOKE DETECTED	Smoke detected
WATER UNDER FLOOR	Water leakage under floor
COND PUMP-HIGH WATER	Condensing pump high water level
LOSS OF FLOW	Loss of water flow
STBY GLYCOL PUMP ON	Standby glycol pump on
STANDBY UNIT ON	Standby unit on
HW/HG HRS EXCEEDED	Hot water/hot gas has exceeded operating time limit
EL HEAT1 HRS EXCEEDED	Electric heater 1 has exceeded operating time limit
EL HEAT2 HRS EXCEEDED	Electric heater 2 has exceeded operating time limit
EL HEAT3 HRS EXCEEDED	Electric heater 3 has exceeded operating time limit
UNIT CODE MISSING	Unit code missing
UNIT CODE n MISMATCH (n = 01 ~ 18)	Unit code n mismatch (n = 01 ~ 18)
FRONT DOOR OPEN	Front door not closed
REAR DOOR POEN	Rear door not closed
LOSS COMPRESSOR POWER	Loss of compressor power
CABINET SENSOR FAIL	Cabinet sensor fail
CABINET H-SENSOR FAIL	Cabinet H-sensor fail
EMERGENCY DAMPER FAIL	Emergency damper fails

Event	Definition
HIGH CABINET TEMP	High cabinet temperature
LOW CABINET TEMP	Low cabinet temperature
HIGH EXT DEWPOINT	High external dewpoint
LOSS OF POWER	Loss of power
REHEAT LOCKOUT	Reheater lockout
HEAT REJ VFD	HEAT REJ VFD
HUMIDIFIER LOCKOUT	Humidifier lockout
HEAT REJ TVSS	HEAT REJ TVSS
COMPRESSOR (S) LOCKOUT	Compressor lockout
AMBIENT SENSOR FAIL	Ambient sensor fail
HUMIDIFIER LOW AMPS	Humidifier low current
COMP 1 SHORT CYCLE	Compressor 1 short cycle
COMP 2 SHORT CYCLE	Compressor 2 short cycle
HUMIDIFIER HIGH AMPS	Humidifier high current
HUMIDIFIER LOW WATER	Humidifier low water level
SYSTEM OFF REQUESTED	System off requested
SYSTEM OFF CONFIRMED	System off confirmed
C2 FREEZE PROTECTION	Compressor 2 freeze protection
FIRE ALARM	Fire alarm
HEATERS OVERHEATED	Heaters overreheated
CONDENSER 1 FAILURE	Condenser 1 failure
CONDENSER 2 FAILURE	Condenser 2 failure
HUM CYLINDER WORN	Humidifier cylinder worn
FC STOPPED FOR 1 HOUR	Free cooling stopped for 1 hour
MAINTENANCE DONE	Maintenance done
MAINTENANCE NEEDED	Maintenance needed
REDUCED ECO AIRFLOW	Reduced eco airflow
LOSS OF FLOW PUMP 1	Loss of flow pump 1
LOSS OF FLOW PUMP 2	Loss of flow pump 2
COMP 3 HIGH PRESSURE	Compressor 3 high pressure
COMP 4 HIGH PRESSURE	Compressor 4 high pressure
CONDENSATION DETECTED	Condensation detected
COMP 1 LOW PRESSURE	Compressor 1 low pressure
HIGH REF TEMPERATURE	High refrigerant temperature
LOW REF TEMPERATURE	Low refrigerant temperature
REFRIGERANT SENSOR FAIL	Refrigerant sensor fail
HIGH TEMP SENSOR B	High temperature sensor B
LOW TEMP SENSOR B	Low temperature sensor B
COMP 2 LOW PRESSURE	Compressor 2 low pressure
SENSOR B FAILURE	Sensor B failure
COMP 3 SHORT CYCLE	Compressor 3 short cycle
COMP 4 SHORT CYCLE	Compressor 4 short cycle
HIGH DEWPOINT	High dewpoint
PUMP SHORT CYCLE	Pump short cycle
Top Fan Failure	Top fan failure
CONTROL VALVE FAILURE	Control valve failure
PUMP 1 HRS EXCEEDED	Pump 1 has exceeded operating time limit
PUMP 2 HRS EXCEEDED	Pump 2 has exceeded operating time limit
COMP 3 HRS EXCEEDED	Compressor 3 has exceeded operating time limit
COMP 4 HRS EXCEEDED	Compressor 4 has exceeded operating time limit
TANDEM 1 PUMPDOWN FAIL	Tandem 1 pumpdown fail
TANDEM 2 PUMPDOWN FAIL	Tandem 2 pumpdown fail
TANDEM 1 LOW PRESSURE	Tandem 1 low pressure
TANDEM 2 LOW PRESSURE	Tandem 2 low pressure
HIGH FLUID TEMPERATURE	High fluid temperature
LOW FLUID TEMPERATURE	Low fluid temperature
FLUID SENSOR FAILURE	Fluid sensor failure
FAN FAILURE	Fan failure

Event	Definition
FEEDBACK SIGNAL 1 FAILURE	Feedback signal 1 failure
SUPPLY CW SENSOR FAILURE	Supply chilled water sensor failure
RETURN CW SENSOR FAILURE	Return chilled water sensor failure
SUPPLY REF SENSOR FAILURE	Supply refrigerant sensor failure
RETURN REF SENSOR FAILURE	Return refrigerant sensor failure
VALVE HRS EXCEEDED	Valve has exceeded operating time limit
COMP 1A HIGH PRESSURE	Compressor 1A high pressure
COMP 1B HIGH PRESSURE	Compressor 1B high pressure
COMP 2A HIGH PRESSURE	Compressor 2A high pressure
COMP 2B HIGH PRESSURE	Compressor 2B high pressure
COMP 1A HRS EXCEEDED	Compressor 1A has exceeded operating time limit
COMP 1B HRS EXCEEDED	Compressor 1B has exceeded operating time limit
COMP 2A HRS EXCEEDED	Compressor 2A has exceeded operating time limit
COMP 2B HRS EXCEEDED	Compressor 2B has exceeded operating time limit
COMP 1A SHORT CYCLE	Compressor 1A short cycle
COMP 1B SHORT CYCLE	Compressor 1B short cycle
COMP 2A SHORT CYCLE	Compressor 2A short cycle
COMP 2B SHORT CYCLE	Compressor 2B short cycle
HIGH SUPPLY TEMPERATURE	High supply temperature
LOW SUPPLY TEMPERATURE	Low supply temperature
HIGH RETURN HUMIDITY	High return humidity
LOW RETURN HUMIDITY	Low return humidity
NOISE RED MODE STARTED	Noise reduced mode started
NOISE RED MODE STOPPED	Noise reduced mode stopped
RACK SENSOR 1~10 FAILURE	Rack sensor 1 ~ 10 failure
HIGH RETURN TEMPERATURE	High return temperature
ROOM HUMIDITY PROBLEM	Room humidity problem
iCOM-DO #0 ~ #2 DISCONNECTED	iCOM-do #0 ~ #2 disconnected
FEEDBACK SIGNAL 2 FAILURE	Feedback signal 2 failure
BOTTOM FAN FAILURE	Bottom fan failure
EC FAN FAULT	EC fan fault

## Chapter 6 Application Of INTELLISLOT

This chapter introduces the application of the host communication component INTELLISLOT, including introduction and installation of the host communication cards, commissioning of the host communication component and host communication networking diagram.

### 6.1 Introduction Of Host Communication Cards

The host communication configuration of the Liebert.PEX+ series air conditioner supports the following two communication cards:

#### 1. TCP/IP communication card

The TCP/IP communication card is shown in Figure 6-1. This card can provide a network port and MIB library, and you can browse the data through IE.



Figure 6-1 TCP/IP communication card

#### 2. 485 communication card

The 485 communication card is shown in Figure 6-2. This card can provide the Modbus protocol of the RS485 port to the host.



Figure 6-2 485 communication card

### 6.2 Installation Of Host Communication Cards

#### Installing host communication card

The installation boxes 1 and 2 have been installed on the Liebert.PEX+ series air conditioner unit. If the host communication configuration is needed, insert the host communication card into the installation box 1 and tighten the screws, as shown in Figure 6-3.

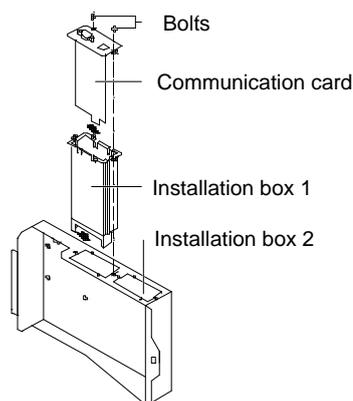


Figure 6-3 Installing communication card

**Connecting cables**

The electrical schematic diagram of the host communication configuration is shown in Figure 6-4. Cables P61, P65 and P67 have been connected in factory. So you should only connect the host communication card to the monitoring center.

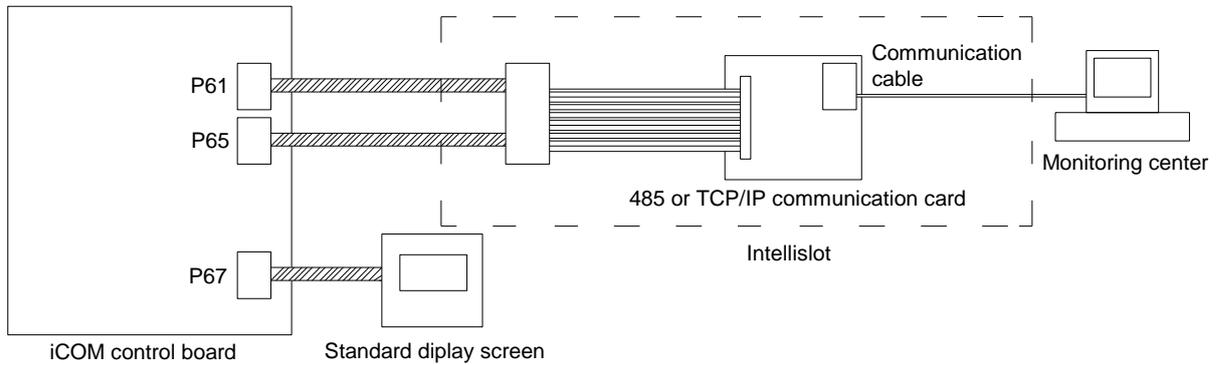


Figure 6-4 Electrical schematic diagram of host communication configuration

### 6.3 Commission Of Host Communication Component

After the communication cable is connected, you can start to set the HyperTerminal and communication card parameters.

 **Note**

- Before commissioning, you must enter 'SERVICE MEMUS' of the iCOM controller to set S824 MON ADD to '3', S835 MON PORT to 'Vlcty' and S843 BL CTRL to 'S+R'.

#### 6.3.1 Setting HyperTerminal

After the 485 communication card and TCP/IP communication card are set, they can communicate with the host monitoring system. Use the communication cable provided with the communication card to connect the serial port of the computer and the console port of the communication card, and then set the parameters using the HyperTerminal of Windows. The detailed setting procedures are as follows:

1. Click **Start-> Programs -> Accessories -> Communications -> HyperTerminal** to start the HyperTerminal, as shown in Figure 6-5.

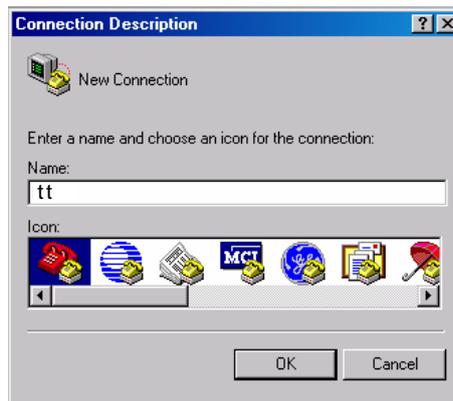


Figure 6-5 Typing the name

2. Type the name 'tt' in the **Name** field, and click **OK**, as shown in Figure 6-6.



Figure 6-6 Choosing serial port

3. In the **Connect to** interface, choose the serial port being used (such as 'COM1'), and click **OK**, as shown in Figure 6-7.

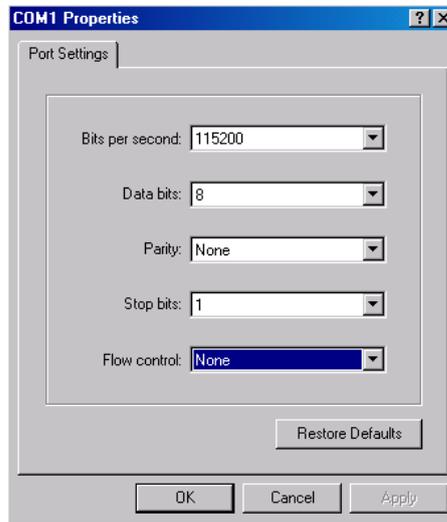


Figure 6-7 Setting port property

4. Set the communication parameters as shown in Figure 6-7 and click OK.

### 6.3.2 Setting 485 Communication Card

Set the parameters of the 485 communication card according to the following procedures:

1. After the HyperTerminal is set, you can click OK to display the following HyperTerminal interface.

```

Emerson Network Power OpenComms 485
Discovering Device...

Main Menu
-----
1: 485 Network Settings
2: Factory Settings
3: Firmware Updates
4: Device Connection State

q: Quit and abort changes
x: Exit and save

Please select a key ?>

```

2. Type '1' and the following figure will appear.

```

Emerson Network Power OpenComms 485
Discovering Device...

485 Network Settings Menu
-----
1: Enabled Application      Modbus Server
2: Control                  enabled
3: Server ID                1
4: Communications Rate     9600

<ESC>: Cancel menu level
Please select a key ?> _
    
```

3. Type '1' and the following figure will appear.

```

Valid Selections:
-----
1. Modbus Server
2. IGMNet Server

Select Auxiliary Com Port Application: ( <Esc> - Cancel) ?>
    
```

4. Type '1' and select the Modbus protocol, and the following figure will appear.

```

Emerson Network Power OpenComms 485
Discovering Device...

485 Network Settings Menu
-----
1: Enabled Application      Modbus Server
2: Control                  enabled
3: Server ID                2
4: Communications Rate     9600

<ESC>: Cancel menu level
Please select a key ?> 3
    
```

5. Type '3' and select the ID used to communicate between the communication card and the host, and the following figure will appear.

```

Enter the server ID (1 - 255) ?>
    
```

6. Type the server ID following the command prompt, and the following figure will appear.

```

Emerson Network Power OpenComms 485
ICOM Environmental Control

485 Network Settings Menu
-----
1: Enabled Application      Modbus Server
2: Control                  enabled
3: Server ID                2
4: Communications Rate     9600

<ESC>: Cancel menu level
Please select a key ?> 4
    
```

7. Type '4' and the following figure will appear.

```

Valid Selections:
-----
1. 9600
2. 19200
3. 38400
Select BaudRate: ( <Esc> - Cancel) ?>
    
```

8. Type '1', '2' or '3' to select the baud rate used to communicate with the host, and the following figure will appear.

```

Emerson Network Power OpenComms 485
ICOM Environmental Control

Main Menu
-----
1: 485 Network Settings
2: Factory Settings
3: Firmware Updates
4: Device Connection State

q: Quit and abort changes
x: Exit and save

Please select a key ?>

```

9. Press the ESC button to return to the main interface.

If you type 'x', the setting can be saved. After the setting is saved, the 485 communication card will be restarted.

10. On the main interface, typing '4' can view whether the communication status between the communication card and the Liebert.PEX+ series air conditioner is normal, as shown in the following figure.

Device Connection State		
Stage	Status	Details
00:01:04 (SysUpTime)		
Discovering Communication Protocol	Complete	VELOCITY
Discovering Device	Complete	ICOM Environmental Control
Reading Device Information	Complete	100 %
Launching Services	Complete	100 %
Running Application	00:00:57 (SysUpTime)	
Connection Count	1	

### 6.3.3 Setting TCP/IP Communication Card

Set the parameters of the TCP/IP communication card according to the following procedures:

1. After the HyperTerminal is set, you can click OK to display the following HyperTerminal interface.

```

Emerson Network Power OpenComms WEB
Discovering Device...

Main Menu
-----
1: System Information
2: IP Network Settings
3: Factory Settings
4: Firmware Updates
5: Device Connection State

q: Quit and abort changes
x: Exit and save

Please select a key ?>

```

2. Type '2' and the following figure will appear.

```

Emerson Network Power OpenComms WEB
ICOM Environmental Control

IP Network Settings Menu
-----
1: Boot/IP Settings
2: SNMP Communications
3: Web Server
4: Telnet Server
5: Change Username/Password

<ESC>: Cancel menu level

Please select a key ?> _

```

3. Type '1' and the following figure will appear.

```

Emerson Network Power OpenComms WEB
ICOM Environmental Control

Boot/IP Settings Menu
-----
1: Speed/Duplex      Auto
2: Boot mode        Static
3: IP Address       142.100.8.35
4: Netmask          255.255.254.0
5: Default Gateway  142.100.8.1

<ESC>: Cancel menu level
Please select a key ?>
    
```

Normally, **Boot mode** should be set to **Static**. If the user network can automatically distribute the address, select DHCP, and the IP Address, Netmask and Default Gateway do not need to be set. If the boot mode is static, Type '3', '4' and '5', and then respectively type the corresponding IP address, Netmask and Default Gateway according to the prompt. These three parameters should be given by the user.

4. Press the ESC button to return to the main interface, as shown in the following figure. If you type 'x', the setting can be saved. After the setting is saved, the TCP/IP communication card will be restarted.

```

Emerson Network Power OpenComms WEB
Discovering Device...

Main Menu
-----
1: System Information
2: IP Network Settings
3: Factory Settings
4: Firmware Updates
5: Device Connection State

q: Quit and abort changes
x: Exit and save

Please select a key ?>
    
```

5. On the main interface, typing '5' can view whether the communication status between the communication card and the Liebert.PEX+ series air conditioner is normal, as shown in the following figure.

Device Connection State		
Stage	Status	Details
00:11:14 (SysUpTime)		
Discovering Communication Protocol	Complete	VELOCITY
Discovering Device	Complete	ICOM Environmental Control
Reading Device Information	Complete	100 %
Launching Services	Complete	100 %
Running Application	00:01:09 (SysUpTime)	
Connection Count	1	

### 6.3.4 Setting SNMP Parameters Of TCP/IP Communication Card

After the HyperTerminal of the TCP/IP communication card is set, you can set the parameters of this communication card. The detailed setting procedures are as follows:

1. Type the IP address of the TCP/IP communication card in the address bar of the IE browser. If the interface shown in Figure 6-8 appears, it indicates that the communication between the communication card and the iCOM controller is abnormal. If the **State** shows **Completing** or **In Process**, it indicates that the communication card is communicating with the iCOM controller.



The web card is attempting to establish a communication link to the Liebert device.

Phase	State	Detail
Discovering Communication Protocol	Pending	VELOCITY
Discovering Device	Pending	
Reading Device Information	Pending	0% Complete
Launching Services	Pending	0% Complete

Connection Count: 0

If this message appears for more than 3 minutes it may indicate a communication problem, and may require service assistance. Please verify wiring and consult the troubleshooting section of your user's manual.

If further assistance is necessary, visit [Liebert.com](http://Liebert.com).

Last updated: Monday - July 28, 2008 10:19:35am

Figure 6-8 Initial interface (1)

After the communication becomes normal, the interface shown in Figure 6-9 will appear.

The screenshot shows the Liebert web interface with the following components:

- Navigation Tabs:** monitor, control, **configure**, support
- Summary:** Updated: July 28, 2008 10:29:52AM
- Device Identification:** Uninitialized, Uninitialized, Uninitialized, 192.168.254.1
- Device Status:** Unit Off, **Check Device Status**
- Device Information:** Summary, Active Alarms, Local Display, Temperature, Humidity, Statistics, System Status, System Alarms, System Settings
- Temperature Control:** Actual 5 °C, Setpoint 23, Prop. Band 3, Deadband 0. Capacity: Cooling 0%, Heating 0%.
- Humidity Control:** Actual 37%, Setpoint 80, Prop. Band 10, Deadband 0.
- Active Alarms:**
  - Humidifier Problem
  - Compressor 1 Overload
  - Compressor 2 Overload
  - Room Th Sensor Failure Alarm
  - Supply Sensor Failure Warning

Figure 6-9 Initial interface (2)

2. Click the **configure** tab to enter the configuration interface, as shown in Figure 6-10.

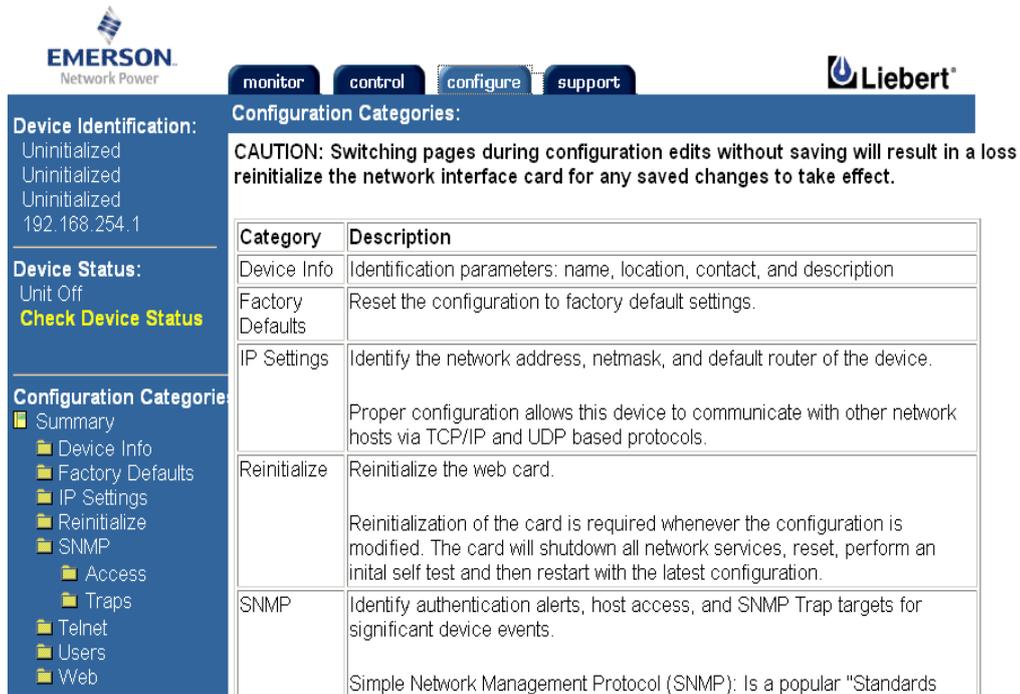


Figure 6-10 Configuration interface

3. Click **Access** under **SNMP** at the left side of the interface, as shown in Figure 6-11. Type the user name 'Liebert' and the password 'Liebert', and click **OK** to enter the configuration interface.



Note

- The user name and password are case-sensitive.



Figure 6-11 Typing user name and password

4. Configure the Network Management System (NMS) of the host monitoring center in Figure 6-12. Click **Edit** and type the IP address of the NMS in **IP Address**. Select **read** or **write**, type 'Public' in **Community** and then click **Save**.



Note

- Before setting the NMS, the Edit button is displayed on the interface. After the configuration is edited, the Edit button will become the Save button.
- After the NMS is configured, you must click Save to save the configuration.

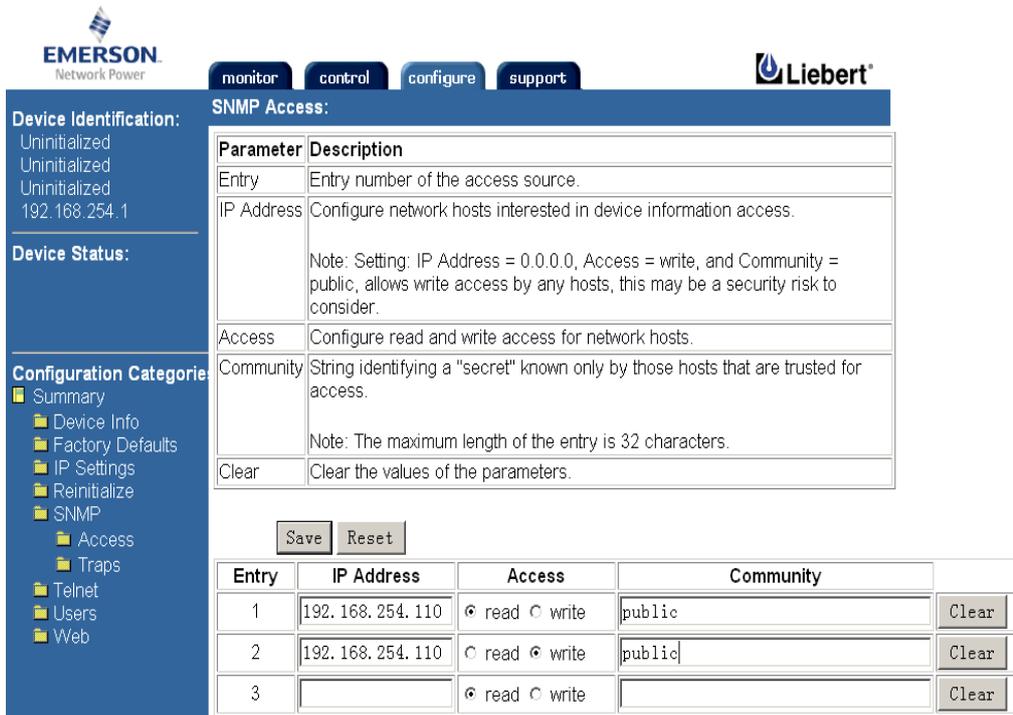


Figure 6-12 NMS configuration interface of SNMP host monitoring center (1)

5. Expand the **SNMP** node at the left side of the interface shown in Figure 6-13 and click **Traps** to set **IP Address**, **Port** and **Community** of the NMS used for receiving Traps. After modifying, you must click **Save** to save the setting.

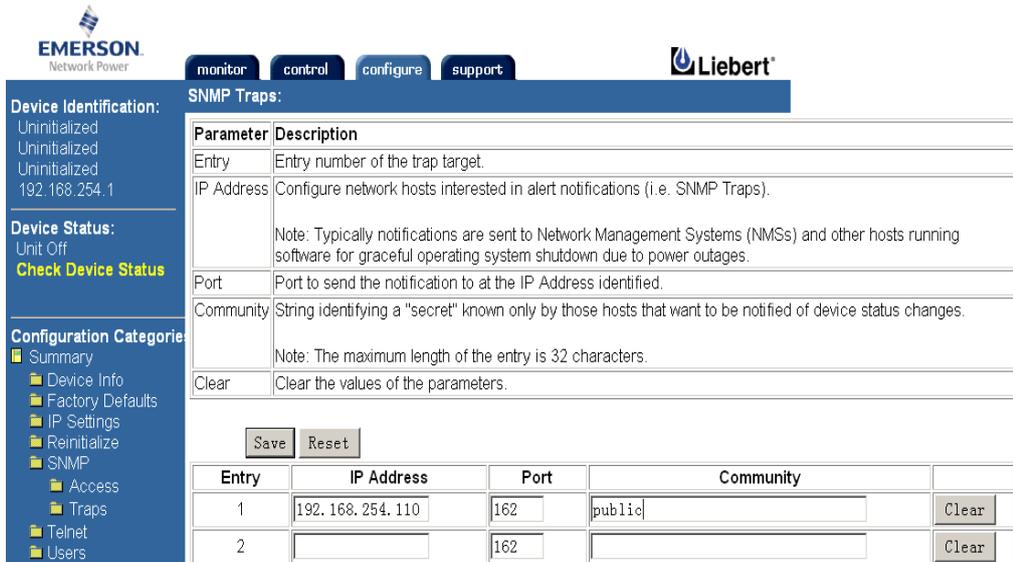


Figure 6-13 NMS configuration interface of SNMP host monitoring center (2)

## 6.4 Host Communication Networking Diagram

The networking diagram of the TCP/IP communication card (SNMP protocol) is shown in Figure 6-14. The connection number of air conditioner is not limited.

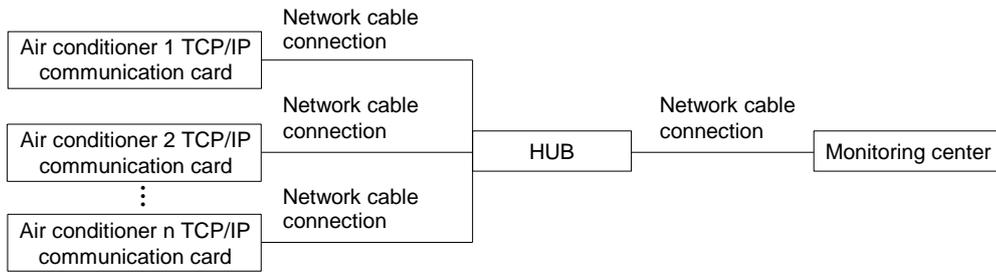


Figure 6-14 Networking diagram of TCP/IP communication card

 **Note**

- The single air conditioner unit does not need HUB.

The networking diagram of the 485 communication card ( Modbus protocol) is shown in Figure 6-15. Up to 32 air conditioner units can be connected.

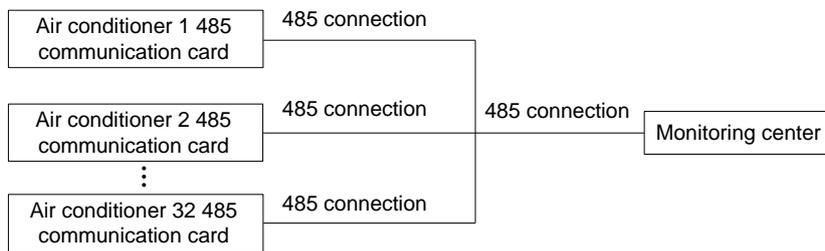


Figure 6-15 Networking diagram of 485 communication card

## Chapter 7 System Operation And Maintenance

This chapter introduces the operation and maintenance of the Liebert.PEX+ AC, including routine maintenance and inspection items, electrical connection inspection, control component appearance checking, and air cooled condenser, filter , infrared humidifier and electric heating maintenance guidance.

### warning

- During the operation of the Liebert.PEX+ , lethal voltage may be present in theequipment.It is a must to obey all the notes and warnings marked on the equipment or contained in this manual, otherwise injury or fatality may occur.
- Only qualified maintenance personnel can operate and handle the equipment.

### 7.1 Monthly Routine Inspection Items

Check the system components monthly, focusing on system function and component wearing symptoms, and the inspection items are shown in Table 7-1.

Table 7-1 Monthly routine inspection items

Components	Inspection items	
Filter	Check if filter is clogged and damaged.	
	Clean the filter	
Fan	Check if fan blades are distorted.	
Compressor	No leakage	
	Check for noise and observe vibration condition	
Air cooled condenser	Cleanliness of condenser fins	
	Fan base is rigid.	
	Check if vibration absorbing cushion is aging or damaged	
	Check if SPD board(if any) is working, and check once a week in thunderstorm seasons.	
Cooling system	Refrigerant pipes have suitable support	
	Check refrigerant pipes	
	Check the moisture condition in system through sight glass	
	Check HGBP valve (if HGBO system is equipped)	
	Check thermal expansion valve	
	Check water inlet/outlet temperature for unit with dual cooling sources or free cooling unit	
Heating system	Check if the condensed water pan is clogged	
	Check the operation of reheat system components	
Infrared humidifier	Check eroding condition of components	
	Check if water pan drainage is clogged	
	Check the lamp of humidifier	
	Check water pan for mineral deposits	

### 7.2 Routine Inspection Items (Half A Year)

See Table 7-2 for the routine maintenance items every half a year.

Table 7-2 Routine maintenance items every half a year

Components	Inspection items	
Filter	Check if filter is clogged and damaged	
	Clean the filter	
Fan	Check if fan blades are distorted.	
	Bearings in good condition	
	Check and fix connectors	

Components	Inspection items	
Compressor	No leakage	
	Check for noise and observe vibration condition	
	Check and fix connectors	
Air cooled condenser	Cleanliness of condenser fins	
	Fan base is rigid.	
	Check if vibration absorbing cushion is aging or damaged	
	Check if SPD board(if any) is working, and check once a week in thunderstorm seasons.	
	Refrigerant pipes have suitable support	
	Check and fix connectors	
Water cooled condenser	Clean pipe system	
	Check the function of ball valve	
	Check if the water system leaks	
Cooling system	Check the refrigerant pipes that must have support bracket and should not be closed to wall, floor or fixed frames with vibrations.	
	Check the moisture condition in system through sight glass	
	Check HGBP valve	
	Check thermal expansion valve	
	Check if the system needs to be added with refrigerants through sight glass	
Heating syste	Check the operation of reheat system components	
	Check and fix connectors	
Infrared humidifier	Check if water pan drainage is clogged	
	Check the lamp of humidifier	
	Check water pan for mineral deposits	
	Check and fix connectors	
Electric control part	Check and fix connectors	

### 7.3 Self-diagnosis Function

The Icom controller features a diagnostic function that enables you to turn on/off the components in site manually so as to check their functionality.

### 7.4 Electrical Connection Inspection

The inspection items include:

1. Conduct overall electrical insulation test: find out the unqualified contacts and handle them. Note to disconnect the fuses or MCBs of the control part during the test lest the high voltage should damage the control components.
2. Check the contactors before power-on and make sure the contactors can act freely without obstruction.
3. Clean the electric and control elements of dust with brush or dry compressed air.
4. Check the closing of contactors for arcs or signs of burning. Replace the contactor if necessary.
5. Fasten all the electric connection terminals.
6. Check that the sockets and plugs are in good condition. Replace those loosened ones.
7. If the power cables are damaged, to avoid damage, the cables must be replaced by professional personnel.

### 7.5 Control Component Appearance Inspection

Carry out visual inspection and simple function test by referring to the following items:

1. Visually inspect the power transformers and isolation transformers, and test the output voltage (of the indoor unit and outdoor condenser).
2. Check that there is no signs of aging on the control interface board, control board, temperature and humidity sensor board and fuse board.
3. Clean the electric control elements and control board of dust and dirt with brush and electronic dust removing agent.
4. Check and fasten the I/O ports at the control interface board, including the connection between control board and control interface board, as well as between the temperature/humidity sensor board and the interface board.

5. Check the connection between the user terminals (70#, 71#, 70A#, 71A#, 37#, 38#) and the control interface board.
6. Check the output connection between the control interface board and various contactors and solenoid valves for liquid pipes, and the input connection between control interface board and fan overload protector, high pressure switch, heating over-temperature protection switch, humidifier protection switches, discharge air temperature sensor, and low pressure sensor. In particular, check the connection parts such as high pressure switches and solenoid valves, and replace the component if in poor connection or faulty.
7. Check and replace electrical components that are faulty, such as control fuses (or MCBs) and control boards.
8. Check the specification and aging condition of the control cable and power cable between the indoor unit and the condenser, and replace the cables when necessary.
9. Use temperature and humidity measuring meters with higher precision to measure and calibrate the temperature and humidity sensors.

 Note

- Set the humidity control mode to 'relative humidity control' during calibration process.

10. Adjust the setpoints. Check the action of the functional parts and the auto-flush control logic of water pan of the infrared humidifier according to control logic.
11. Simulate and check the operation of the protection devices including high and low pressure alarm, high and low temperature alarm, high water level alarm and over-temperature protection.
12. Check the water detection sensor.

Bridge the water detection sensor probes and confirm the alarm through the controller.

The sensor should be placed away from any water pool or drainage trench on the floor, 2m ~ 2.5m away from the unit. Do not place it directly under the unit. The recommended installation location of the water detection sensor is shown in Figure 7-1.

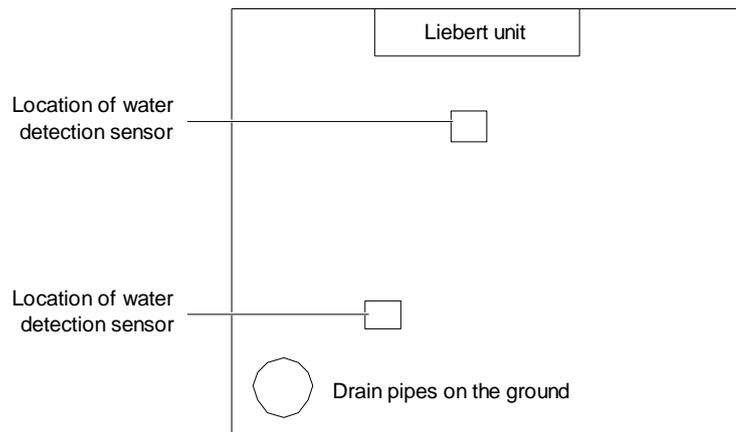


Figure 7-1 Recommended location for the water detection sensor

 warning

- Before fastening the connection of any mechanical parts or cables, make sure that the power supply of the control unit has been disconnected.
- Do not use the water detection sensor adjacent to flammable liquid or use it to detect flammable liquid.

## 7.6 Air Cooled Condenser

Refer to associated condenser user manual for details.

## 7.7 Filter

The efficiency of the filter in the unit is 30%, which complies with US ASHRAE52-76 and Eurovent 4/5 standards, and the dust resistance value is 90%(EU4 standard). To ensure the normal operation of the filter, the filter service alarm logic is provided by the controller. The default fan running time is 2000 hours, when the time is exceeded, the filter

service alarm is triggered. User needs to replace the filter based on the clogging condition of the filter. The filter must be checked once a month, and be replaced as required during operation.



Note

- Cut the power before replacing the filter.
- Clear the fan running time to 0 after replacing the filter.

## 7.8 Infrared Humidifier

During the normal operation of the infrared humidifier, sediment such as mineral particles will accumulate on its water pan. To ensure efficient operation of the infrared humidifier, you need to clean the sediment regularly. However, the cleansing cycle varies because the water is different in different regions. It is recommended to check, and cleanse (when necessary) the water pan, once a month. The autoflush function of the infrared humidifier can prolong the cleansing cycle. However, regular checks and maintenance are necessary.

Cleaning steps:

1. Remove the water level standpipe to drain the water pan;
2. Disconnect the drainage pipe;
3. Remove the safety switch of the water pan;
4. Remove the fixing screws at the two ends of the pan, and pull out the water pan. Cleanse the water pan with water and hard brush;
5. Restore the water pan by reversing the preceding procedures.



Warning

- Before exercising the corresponding operation, make sure that the power has been cut off; and also ensure that the water in the water pan is close to the room temperature before draining the water from the infrared humidifier water pan so as to avoid the personal injury.

## 7.9 Electric Heater

The electric heater is as shown in Figure 7-2. Three temperature switches are series connected to the control loop inside the electric heater, including two automatic reset switches and one manual reset switch.

1. Check the rustiness condition of the electric heater; use the iron brush to get rid of the rust, or replace it according to actual conditions.
2. When there is heating requirement, but no heating effect, you should use a multimeter to check whether the cable connected to temperature switch is in action, so as to ensure the three temperature switches are normal.
3. If the cable is not in action, you should remove the electric heater to check whether the manual reset switch is disconnected, the automatic reset switch or the electric heater pipe is damaged.

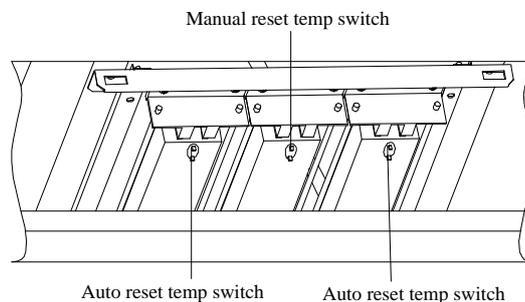


Figure 7-2 PTC electric reheat

## Chapter 8 Troubleshooting

This chapter introduces the troubleshooting.

### warning

- Certain circuits carry lethal voltages. Only professional technicians are allowed to maintain the unit. Extra care should be taken when troubleshooting online.

### Note

- If jumpers are used for troubleshooting, remember to remove the jumpers after the troubleshooting, or the connected jumpers may bypass certain control function and damage the equipment.

## 8.1 Fan Troubleshooting

The troubleshooting of fan is listed in Table 8-1.

Table 8-1 Fan fault removal

Symptom	Potential causes	Items to be examined or handled
FC fan cannot be started	No main power supply	Examine the rated voltage of L1, L2 and L3 of the fan
	Circuit breaker disconnection	Examine the circuit breaker of main fan
	Overload, circuit breaker disconnection	Manual reset. Examine the current value
	Contactors not pulling on	Examine whether there is 24Vac voltage between P36-3 and E1. If there is, but the contactor cannot pull on, then the contactor has failures. Please replace the contactor
	Control board failure	Examine whether there is 24Vac voltage between P36-3 and E1. If there is not, then the control panel has failures. Please check whether the green LED beside silicon control Q5 on the control panel is on or not
	Fuse panel failure	Examine whether there is 24Vac voltage between P36-3 and E1. If there is not, and the green LED beside Q5 is not on, please check further whether LED DS4 beside F4 on the fuse panel is on, or take down F4 to test whether it is burnt out
	Air flow loss switch alarm (action)	1) Check that the belt is firm and the fan motor is normal; 2) Check whether the external static pressure (ESP) is too high, if so, fix it by optimizing the air channel and adjusting the belt setting value properly
	The fan is ineffective	Replace the fan
EC fan cannot be started	Circuit breaker disconnection	Examine the circuit breaker of main fan
	Contactors cannot close	Examine whether there is 24Vac voltage between P36-3 and E1. If there is, but the contactor cannot close, then the contactor has failures. Please replace the contactor
	Control board failure	Examine whether there is 24Vac voltage between P36-3 and E1. If there is not, then the control panel has failures. Please check whether the green LED beside silicon control Q5 on the control panel is on or not
	Fuse panel failure	Examine whether there is 24Vac voltage between P36-3 and E1. If there is not, and the green LED beside Q5 is not on, please check further whether LED DS4 beside F4 on the fuse panel is on, or take down F4 to test whether it is burnt out
	Contactors closed, air flow loss switch alarm	1) Check whether there is 0 ~ 10Vdc analog signals output from P51, if not, check the control board carefully; 2) Check whether the values of S147 and S149 are set too low, if so, fix it by increasing the setting value properly; 3) Check whether the external static pressure (ESP) is too high, if so, fix it by optimizing the air channel and increasing the setting value properly

Symptom	Potential causes	Items to be examined or handled
EC fan cannot be started	EC fan failure	1) Check whether the fans L1, L2 and L3 are power-off, phase failure or undervoltage; 2) Check whether the analog signals output from P51 meet 0 ~ 10Vac requirements; 3) Check whether the motor is clogged (overcurrent); 4) Check whether the motor is over temperature; 5) Hall failure; If the problem is related to the first three points, the motor will run automatically after fixing the problem; If the motor is over temperature, switch off the fan till the motor cools down, and recover it by switching on; If the problem is Hall failure, contact the manufacturer for maintenance

## 8.2 Compressor And Cooling System Troubleshooting

The troubleshooting of refrigerant is listed in Table8-2.

Table 8-2 Troubleshooting of compressor and cooling system

Symptom	Potential causes	Items to be examined or handled
Compressor cannot start	Power is not on (shutdown)	Check the main power switch, fuse or circuit breaker and the connection cable
	Power overloaded and MCB tripped	Manual reset and check the average current
	Circuit connection loosened	Fasten the connections
	Compressor coils shorted	Check the motor winding and replace it if defects are found
Contactor cannot close, compressor cannot start	No demand for cooling output	Check the iCOM controller state
	High voltage switch action	Check the high voltage switch
Contactor closed, but compressor cannot start	Contactor failure	Check the contactor, and check whether the 24Vac voltage is between E1 and P32-10 (compressor 1) and P32-12 (compressor 2) terminals
	Circuit breaker disconnected	Check the circuit breaker and the contactor, and measure the circuit voltage
Compressor stops after running for 5min (1min ~ 5min settable). Or contactor opens	Compressor internal circuit breaker open	Check the compressor coils. If the coils are open, they will reset automatically after they cool down
	Refrigerant leaked, the LP switch cannot close, or the pressure reading from the LP sensor of the dual cooling unit is lower; the reading is incorrect from the LP sensor of the dual cooling unit	1) Check the suction pressure; 2) Check the cable containing LP switch; 3) Check whether the LP sensor reading and actual pressure meet $\pm 0.3\text{bar}$ requirement (the HP sensor value can be read from the SERVICE MENUS/DIAGNOSTICS, which displays the absolute pressure)
Dual cooling/free cool unit. When the room/setting temperature checked to display refrigeration requirement, but without refrigeration output within 10min, the compressor will stop running	In compressor operation, the antifreezing protection will be generated for shutdown	Check the system and air channel to find out the reason why LP is too low
HP protection	Condenser clogged Temperature of input water is too high or the water flow if too small (water-cooled)	Clean the condenser or BPHE; Check the water system
	Condenser system does not start	For air-cooled series, check the condensing fan; for water-cooled series, check water system. Check the operation procedures

Symptom	Potential causes	Items to be examined or handled
HP protection	Too much refrigerant charging	Check whether the subcooling degree is too high
	Electric valve improperly set (water-cooled)	Check whether the LP sensor reading and actual pressure meet $\pm 0.6$ bar requirement (the HP sensor value can be read from the SERVICE MENU/DIAGNOSTICS, which displays the absolute pressure) Check whether the BPHE electric ball valve is normal
Low discharge pressure	Water flow too big or temperature of input water too low (water-cooled)	Check the water system
	Refrigerant leaked	Locate the leakage point, repair it and add refrigerant
	Fan speed controller of outdoor unit is faulty, while the output voltage remains 100%, regardless of the change of condensing pressure (air-cooled)	If the fan speed controller is found faulty, replace it
The suction and discharge pressures do not change after startup	Compressor reversed or compressor internal air tightness failed	If compressor is reversed, exchange any two L lines of the compressor. If the compressor internal air tightness is failed to recover, replace the compressor
Low suction pressure or liquid returned	Insufficient refrigerant in the system	Check for leakage. Seal the leaking point and add refrigerant
	Filter too dirty	Replace the filter
	Filter drier clogged	Replace the filter drier
	Improper superheating degree	Regulate by strictly following the adjusting procedures of the thermal expansion valve
	Defective element of the thermal expansion valve faulty	Replace the thermal expansion valve
	Improper air flow distribution	Check the air supply and return system
	Low condensing pressure	Check the condenser
	Belt slipped	Check the belt and make necessary adjustment or replacement
	The single source cooling unit configured with FC fan, its dehumidification electromagnetic valve is closed	Check the status of the dehumidification electromagnetic valve when the system has no dehumidification requirement. Examine whether there is 24Vac voltage between P34-8 and E1, if there is not, it indicates that the dehumidification electromagnetic valve is closed, you should check the relevant cables of the electromagnetic valve; Check whether the air flow lose switch connection is normal. Examine whether there is 24Vac voltage between P36-7 and E1 after power-on, if there is not, you should check whether the air flow lose switch is damaged
ESP is too large, air flow reduction	Check the ventilation duct or air channel, evaluate the unit ESP again	
Compressor too noisy	Liquid returned	Refer to the handling methods of <i>Low suction pressure or liquid returned</i>
	Lubricant loss	Add lubricant
	Fixture of compressor is not removed	Remove the transportation fixture
Compressor over-temperature	Too high compression ratio	Check the settings of the HP switch and LP switch, and make sure whether the condenser is clogged; Check that the fans of the evaporator and condenser are normal
	Too high suction temperature	Regulate the expansion valve or add proper amount of refrigerant

Symptom	Potential causes	Items to be examined or handled
Dual cooling /free cool unit, FC (free cooling) fan cannot start when there is chilled water provided	The difference between room air return temperature and setting temperature is too high (more than A138 setting value),and the alarm record can display the FC fan off time for one hour	Set the preset temperature after the first startup, the unit will power off, restart the system can run the FC system; when the unit is in normal state, but the FC fan stops for one hour, it means that the present refrigeration requirement is higher, at this point, you should start the compressor refrigeration
	Under the chilled water inlet normal temperature, FC will not start, and FC stop for one hour is impossible, it means the difference between unit air return temperature and water inlet temperature is lower	1) Examine the chilled water inlet temperature, and compare it with the free cool temperature (the free cool temperature can be gained from the temperature sensor installed on the chilled water inlet pipe, ans be read from User Menu/SENSOR DATA). If the difference is larger, check whether the sensor installation as well as the sensor is damaged; 2) To start FC, you should ensure the difference between the unit air return temperature and water inlet temperature exceed S138. Maybe the reason is that the water inlet temperature is too high or the unit preset temperature is too low, you can properly reduce S138 preset value to start FC. Note that too low S138 preset value may result in the larger temperature change in equipment room
<p>Note: The refrigerant requirement is the precondition for judging the potential causes listed in this Table</p>		

### 8.3 Infrared Humidifier Troubleshooting

The troubleshooting of infrared humidifier is listed in Table8-3.

Table 8-3 Troubleshooting of infrared humidifier

Symptom	Potential causes	Items to be examined or handled
Humidiifcation ineffective	No water in water pan	Check the water supply
		Check that the water supply solenoid valve is working
		Check the state of the high water-level switch and water level regulator
		Check that the water supply pipe is not clogged
	The humidification contactor does not close	Check the contactor, and check the circuit voltage of the contactor
		Check the opened safety devices of the infrared humidifier: water pan over-temperature protection switch and lamp over-temperature protection switch. Use a jumper to shot terminals P35-6 and P35-5. If the contactor closes, replace the series-connected safety device, and remove the jumper
	Air flow lose switch failure	Check that the air flow lose switch connection is normal. Examine whether there is 24Vac voltage between P36-7 and E1 after startup, if there is not, you should check whether the air flow lose switch is damaged
Humidifier main power failure	Check that the humidifier MCB is closed; In humidifier contactor closed state, check that L1, L2 and L3 voltages are normal	
Infrared humidifier lamp burned	Replace the lamp	

### 8.4 Heating System Troubleshooting

The troubleshooting of heat system is listed in Table8-4.

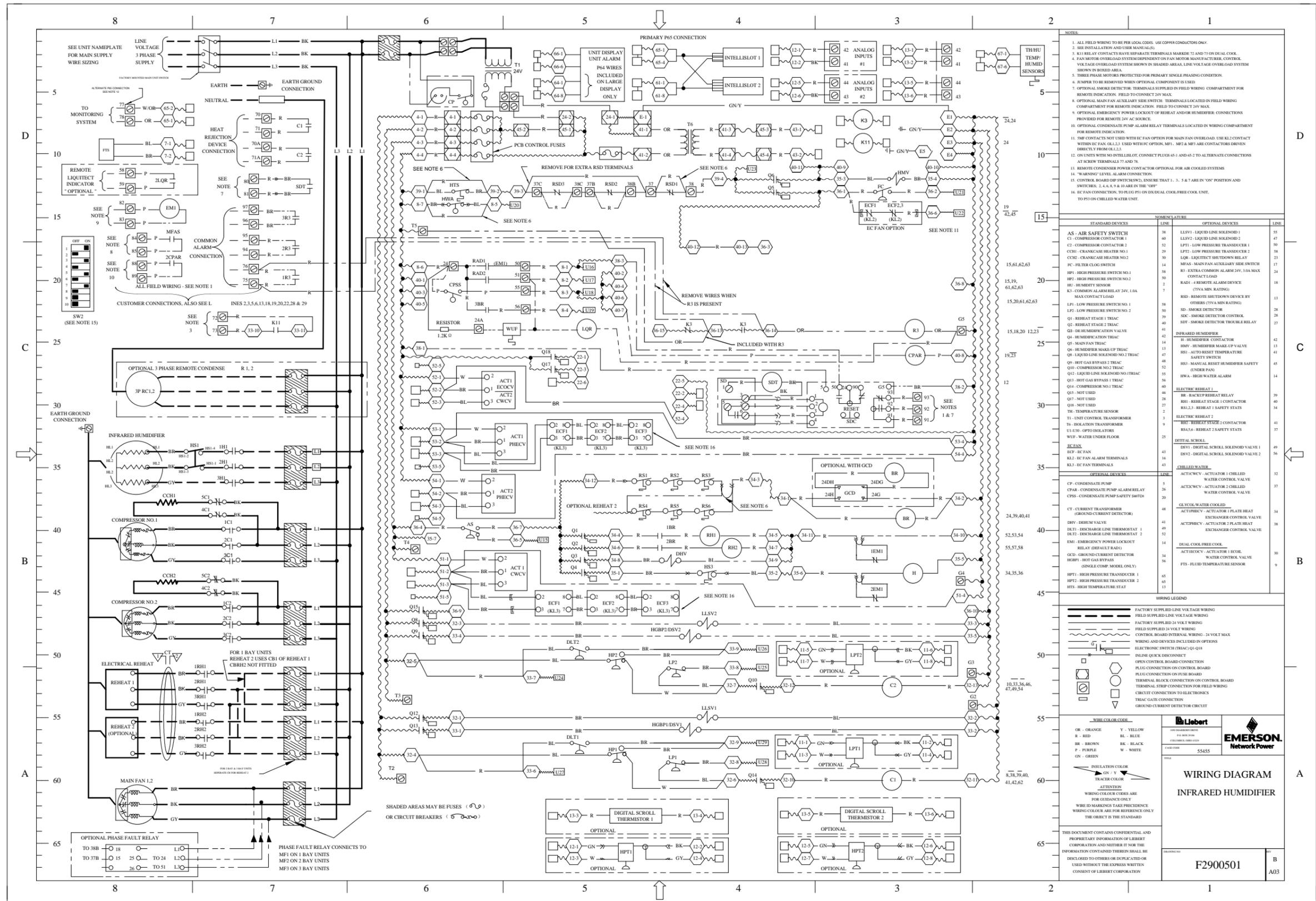
Table 8-4 Troubleshooting of heating system

Symptom	Potential causes	Items to be examined or handled
Heating system cannot start, the contactor cannot close	No heating demand	Check the state of the iCOM controller, and verify whether there is a humidifying demand

Heating system cannot start, the contactor cannot close	Heating auxiliary relay failure	Check the heating auxiliary relay and its cable
	Safety device of the heating system is open	In the case of two-stage heating, check terminals P34-1 and P34-2. If the heating system then starts to work, it means that the safety device is open. Remove the jumper and the electric heater, and check that the manual reset switch is open, meanwhile, check that the automatic reset switch is damaged. To judge whether the electric heater is damaged, you can use an Ohm meter to check the resistance status of the electric heater
	Air flow lose switch failure	Check that the air flow lose switch connection is correct. Examine whether there is 24V ac voltage between P36-7 and E1 after startup, if there is not, you should check whether the air flow lose switch is damaged
Contactor closes, but heating is ineffective	Electric heater main power failure	Check that the electric heater MCB is closed; In humidifier contactor closed state, check that L1, L2 and L3 voltages are normal
	Electric heater burned	Cut off the power supply and measure the resistance of the heater with an Ohm meter

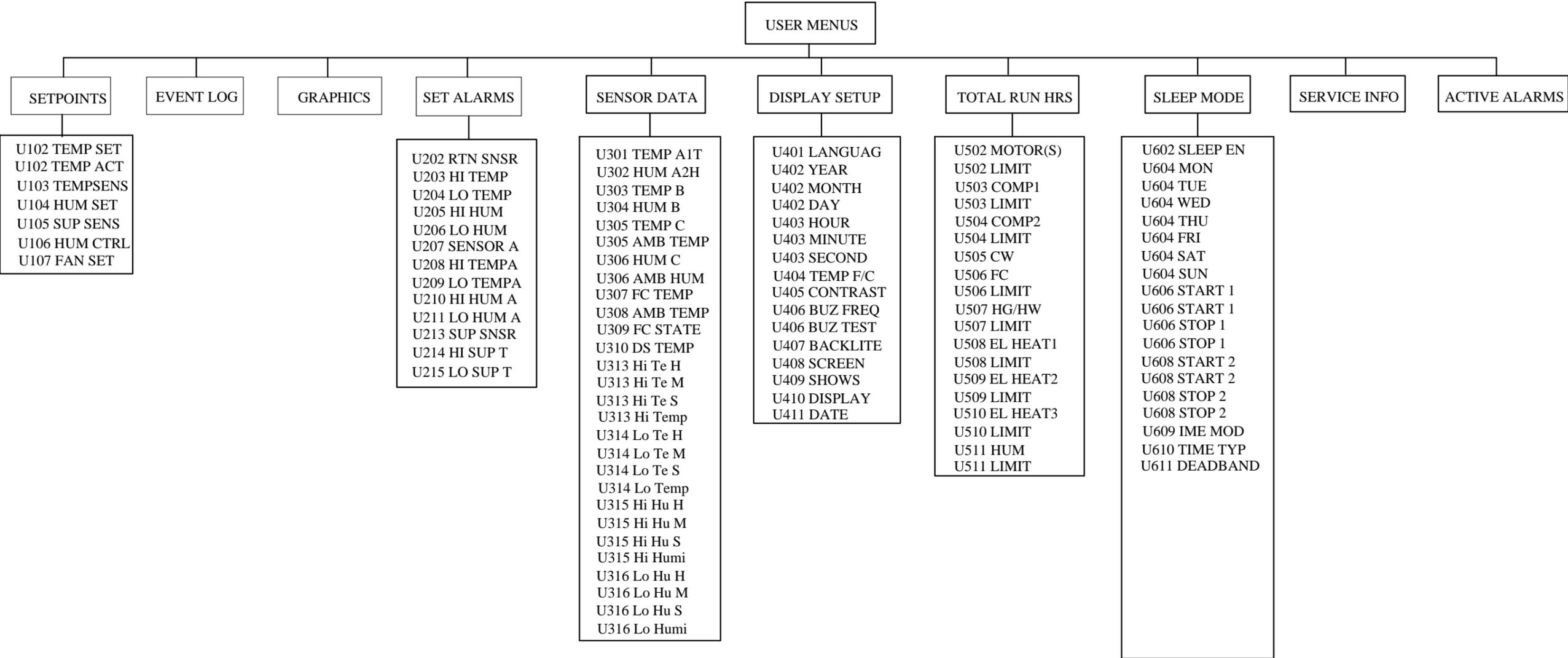


# Appendix 1 Circuit Diagram



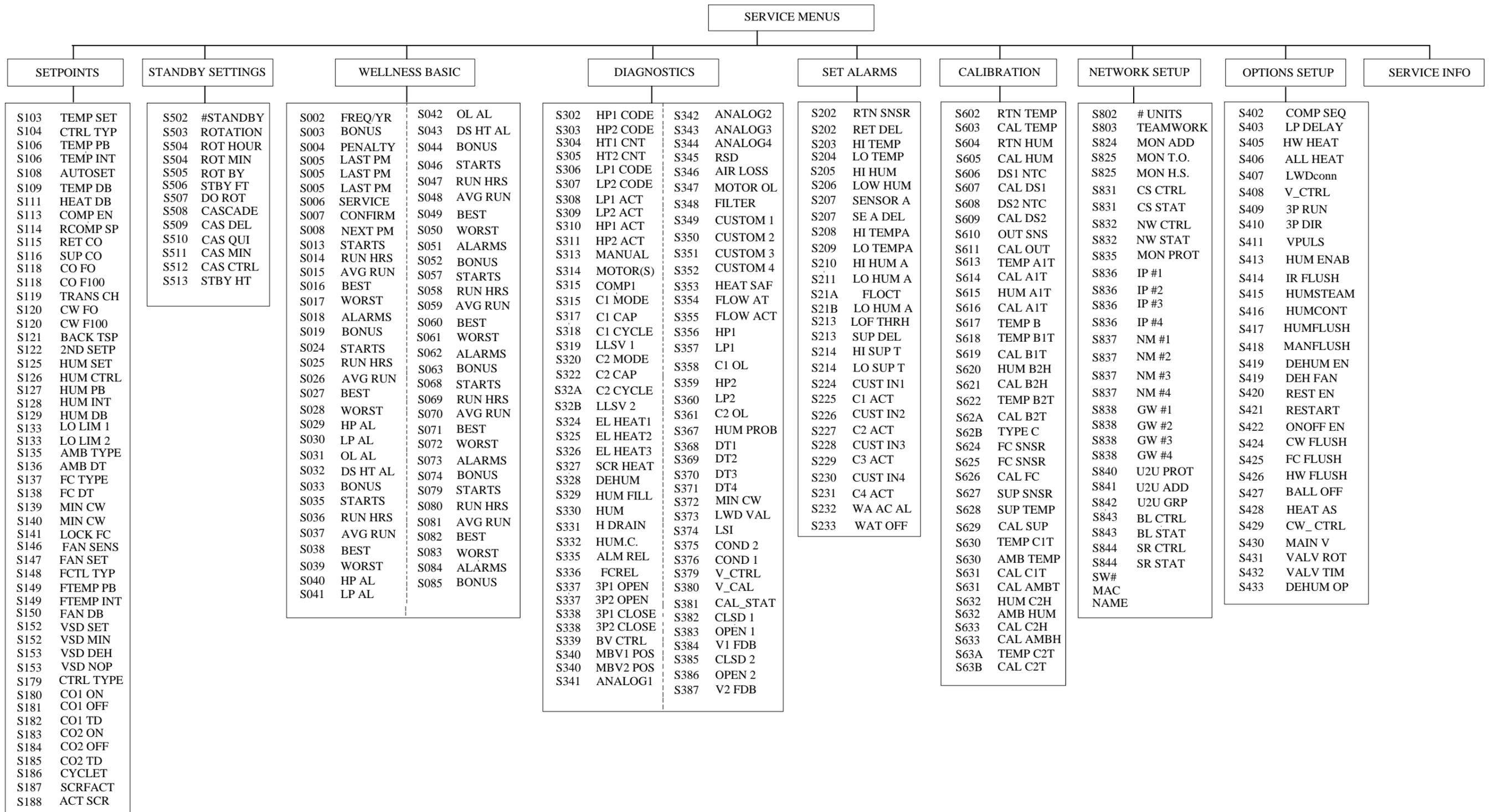


### Appendix 2 Menu Structure Of iCOM Controller (USERS MENUS)





### Appendix 3 Menu Structure Of iCOM Controller (SERVICE MENUS)





## Appendix 4 Alarm Control Menu Table

Alarm control				
High TEMP	Low TEMP	High HUM	Low HUM	
C1 HP	C2 HP	C1 LP	C2 LP	
LP Sensor 1 Alarm	LP Sensor 2 Alarm	HP1 lock	HP2 lock	
LP1 lock	LP2 lock	High temperature alarm of air discharge 1	High temperature alarm of air discharge 2	
Low temperature alarm of air discharge 1	Low temperature alarm of air discharge 2	Discharge High TEMP1 lock	Discharge High TEMP2 lock	
Discharge Low TEMP1 lock	Discharge Low TEMP2 lock	Loss of power	Over Volt	
Low Volt	Freq error	Phase loss	Phase reverse	
Remote shutdown	High TEMP of Air Supply	Fan overload	Air loss	
Water Loss A	Water Loss B	Coil1 frost lock	Coil2 frost lock	
Clogged filter	IR HUM error	HUM high water	Air Pressure Sensor Error	TEMP/HUM Detector Error
Smoke detected	Heater Fault	Customer 1 Alarm	Customer 2 Alarm	Water Detected
NTC1 Fault	NTC2 Fault	NTC3 Fault		
Repetitive Address	Slave Loss	Master Loss		
Fan hours exceeded	C1 hours exceeded	C2 hours exceeded		
Heater 1 Service Interval	Heater 2 Service Interval	HUM Service Interval		

## Appendix 5 Hazardous Substances or Elements Announcement

Parts	Hazardous Substances					
	Plumbum	Hydrargyrum	Cadmium	Chrome6+	PBB	PBDE
	Pb	Hg	Cd	Cr6+	PBB	PBDE
Cabinet	x	o	o	o	o	o
Cooling part	x	o	o	o	o	o
Fan unit	x	o	x	o	o	o
Heater unit	x	o	o	o	o	o
Electric control unit	x	o	x	o	o	o
LCD	x	x	o	o	o	o
PCBA	x	o	o	o	o	o
Heat exchanger	x	o	o	o	o	o
Copper pipe	x	o	o	o	o	o
Cables	x	o	o	o	o	o
<p>o: Means the content of the hazardous substances in all the average quality materials of the part is within the limits specified in SJ/T-11363-2006;</p> <p>x: Means the content of the hazardous substances in at least one of the average quality materials of the part is outside the limits specified in SJ/T 11363-2006</p>						
<p>Emerson Network Power Co., Ltd. has been committed to the design and manufacturing of environment-friendly products. It will reduce and eventually eliminate the hazardous substances in the products through unremitting efforts in research. However, limited by the current technical level, the following parts still contain hazardous substances due to the lack of reliable substitute or mature solution:</p> <ol style="list-style-type: none"> <li>1. The reason that the above parts contain plumbum: copper alloy, high temperature solders in the products and diode, glass part of resistor (exempted) and electronic ceramic (exempted) contain plumbum;</li> <li>2. Backlight bulb contains Hydrargyrum</li> <li>3. The contacts of MCB in distribution unit contain Cadmium.</li> </ol>						
<p>About Environment Protection Period: The Environment Protection Period of the product is marked on the product. Under normal working conditions and normal use of the products observing relevant safety precautions, the hazardous substances in the product will not seriously affect the environment, personnel safety or property in the Environment Protection Period starting from the manufacturing date.</p>						
<p>Applicable product: Liebert.PEX+ Series Precision Air Conditioner</p>						

## Appendix 6 Monthly Routine Inspection Items

Date: \_\_\_\_\_

Recorded by: \_\_\_\_\_

Model: \_\_\_\_\_

SN: \_\_\_\_\_

<i>Components</i>	<i>Inspection items</i>	<i>Remark</i>
Filter	Check if filter is clogged and damaged.	
	Clean the filter	
Fan	Check if fan blades are distorted.	
	Bearings in good condition	
Compressor	No leakage	
	Check for noise and observe vibration condition	
Air cooled condenser	Cleanliness of condenser fins	
	Fan base is rigid.	
	Check if vibration absorbing cushion is aging or damaged	
	Check if SPD board(if any) is working, and check once a week in thunderstorm seasons	
	Refrigerant pipes have suitable support	
Cooling system	Check refrigerant pipes	
	Check the moisture condition in system through sight glass	
	Check HGBP valve (if HGBO system is equipped)	
	Check thermal expansion valve	
	Check water inlet/outlet temperature for unit with dual cooling sources or free cooling unit	
Heating system	Check the operation of reheat system components	
	Check eroding condition of components	
Infrared humidifier	Check if water pan drainage is clogged	
	Check the lamp of humidifier	
	Check water pan for mineral deposits	

Signature \_\_\_\_\_

Note: Please duplicate this table for archiving.

## Appendix 7 Routine Inspection Items (Half A Year)

Date: \_\_\_\_\_

Recorded by: \_\_\_\_\_

Model: \_\_\_\_\_

SN: \_\_\_\_\_

<i>Components</i>	<i>Inspection items</i>	<i>Remark</i>
Filter	Check if filter is clogged and damaged	
	Clean the filter	
Fan	Check if fan blades are distorted.	
	Bearings in good condition	
	Check and fix connectors	
Compressor	No leakage	
	Check for noise and observe vibration condition	
	Check and fix connectors	
Air cooled condenser	Cleanliness of condenser fins	
	Fan base is rigid.	
	Check if vibration absorbing cushion is aging or damaged	
	Check if SPD board(if any) is working, and check once a week in thunderstorm seasons	
	Refrigerant pipes have suitable support	
	Check and fix connectors	
Water cooled condenser	Clean pipe system	
	Check the function of ball valve	
	Check if the water system leaks	
Cooling system	Check the refrigerant pipes that must have support bracket and should not be closed to wall, floor or fixed frames with	
	Check the moisture condition in system through sight glass	
	Check HGBP valve	
	Check thermal expansion valve	
	Check if the system needs to be added with refrigerants through sight glass	
Heating syste	Check the operation of reheat system components	
	Check and fix connectors	
Infrared humidifier	Check if water pan drainage is clogged	
	Check the lamp of humidifier	
	Check water pan for mineral deposits	
	Check and fix connectors	
Electric control part	Check and fix connectors	

Signature \_\_\_\_\_

Note: Please duplicate this table for archiving.