Next Generation Critical Cooling
for Room and Row

Liebert PEX

Efficiency And Reliability For High Availability Cooling

Condenser User Manual

EMERSON
Network Power

Liebert.PEX Condenser

User Manual

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Chapter 1 Overview

This chapter introduces the classification and models, model description, main components and technical parameters of the Liebert.PEX condenser (condenser for short).

1.1 Classification And Models

The condenser is classified into two types: single circuit and dual circuit. The single circuit has a set of discharge/liquid pipe to match the single refrigeration system of indoor unit. The dual circuit has two sets of discharge/liquid pipes to match the two separate refrigeration systems of indoor unit.

The condenser is available in 17 models. The classification and models are listed in Table 1-1.

Table 1-1 Condenser models

Classification	Model
Single circuit	LS12, LS18, LSF24, LSF32, LSF38, LSF42, LSF52, LSF62, LSF72, LSF76, LSF85
Dual circuit	LDF42, LDF52, LDF62, LDF72, LDF76, LDF85

1.2 Model Description

Taking LSF62 for example, the model description of the condenser is shown in Figure 1-1.

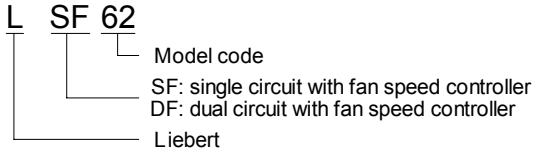


Figure 1-1 Model description

1.3 Main Components

The main components of the condenser include the heat exchanger, fan, fan speed controller and pressure sensor. The heat exchanger is inside the condenser, and the appearance and position of other components are shown in Figure 1-2 and Figure 1-3.

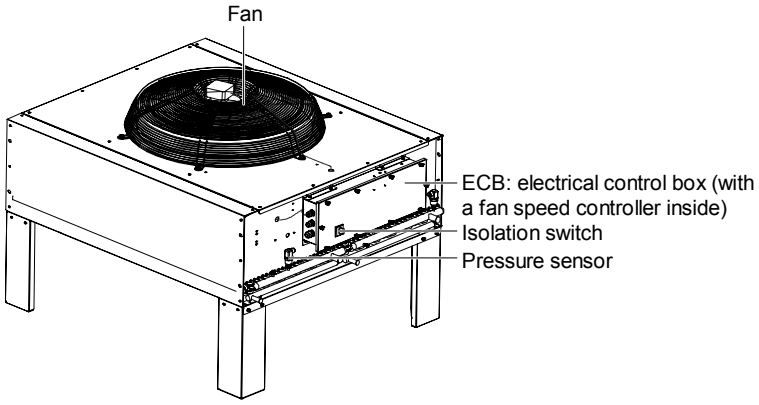


Figure 1-2 PEX condenser (single fan, single circuit)

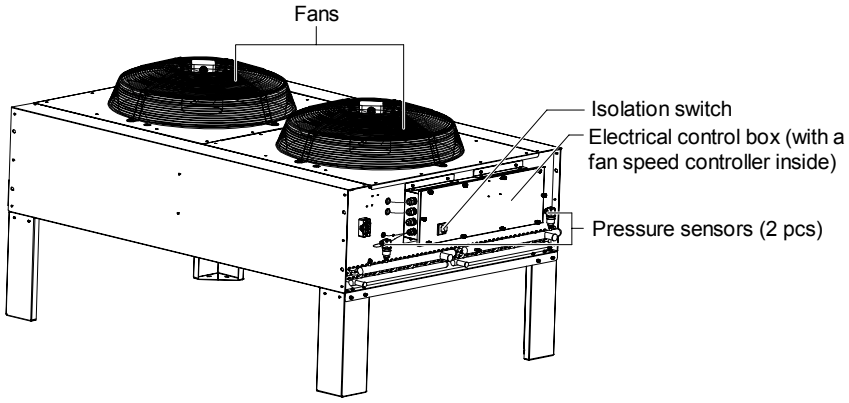


Figure 1-3 PEX condenser (double fans, dual circuit)

1.4 Technical Parameters

1.4.1 Mechanical Parameters

The condenser structure is shown in Figure 1-4. The mechanical parameters of each model are listed in Table 1-2.

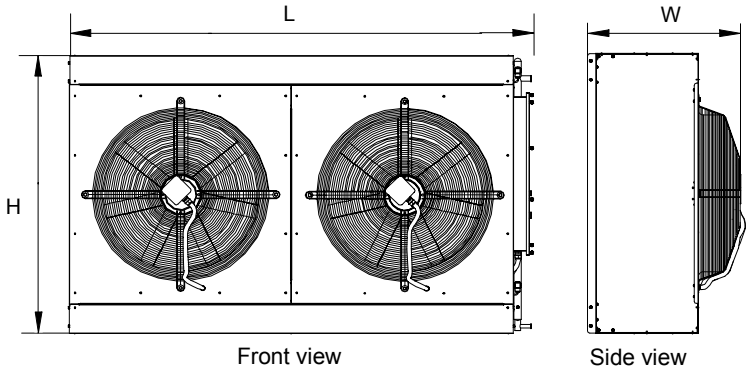


Figure 1-4 Structure (double fans) (unit: mm)

Table 1-2 Mechanical parameters

Model	Weight (kg)	Fan diameter (mm)	Fan number	Dimension (mm)		
				L	H	W
LSF12	80	500	1	924	990	599
LSF18	80	500	1	924	990	599
LSF24	105	710	1	1374	990	689
LSF32	110	710	1	1374	990	689
LSF38	120	800	1	1374	990	695
LSF42	130	800	1	1574	1273	695
LSF52	140	800	1	1574	1273	695
LSF62	150	710	2	1874	1273	689
LSF72	150	710	2	1874	1273	689
LSF76	220	800	2	2374	1273	695
LSF85	230	800	2	2374	1273	695
LDF42	130	800	1	1574	1273	695
LDF52	140	800	1	1574	1273	695
LDF62	160	710	2	2074	1273	689
LDF72	160	710	2	2074	1273	689
LDF76	220	800	2	2374	1273	695
LDF85	230	800	2	2374	1273	695

1.4.2 Mounting Base Dimensions

Mounting base dimensions for horizontal installation

The mounting base figure for horizontal installation is shown in Figure 1-5, and the specific mounting base dimensions of each model are listed in Table 1-3.

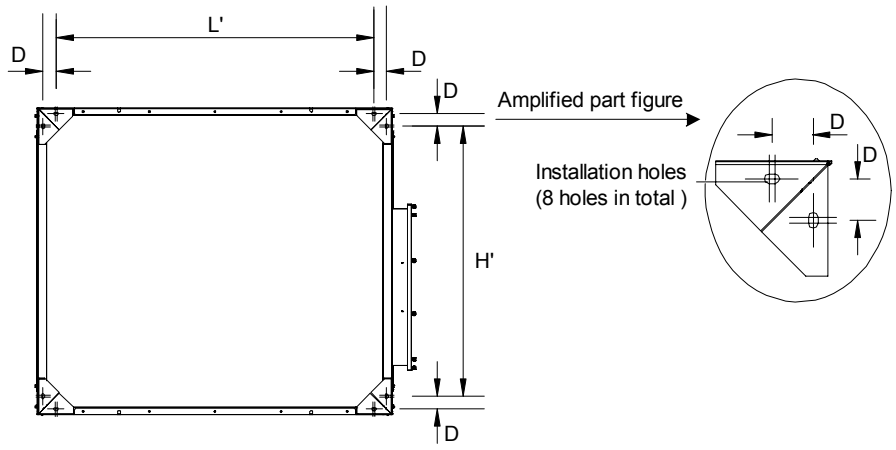


Figure 1-5 Mounting base figure for horizontal installation (unit: mm)

Table 1-3 Mounting base dimensions for horizontal installation (unit: mm)

Model	Dimension (L' × H' × D)		Model	Dimension (L' × H' × D)
LSF12	676 × 837 × 53		LSF76	2126 × 1120 × 53
LSF18	676 × 837 × 53		LSF85	2126 × 1120 × 53
LSF24	1126 × 837 × 53		LDF42	1326 × 1120 × 53
LSF32	1126 × 837 × 53		LDF52	1326 × 1120 × 53
LSF38	1126 × 837 × 53		LDF62	1826 × 1120 × 53
LSF42	1326 × 1120 × 53		LDF72	1826 × 1120 × 53
LSF52	1326 × 1120 × 53		LDF76	2126 × 1120 × 53
LSF62	1626 × 1120 × 53		LDF85	2126 × 1120 × 53
LSF72	1626 × 1120 × 53			

Note

The installation holes are long and flat holes. It is recommended to use M10 × 20 bolts to fix the mounting base.

Mounting base dimensions for vertical installation

The mounting base figure for vertical installation is shown in Figure 1-6, and the specific mounting base dimensions of each model are listed in Table 1-4.

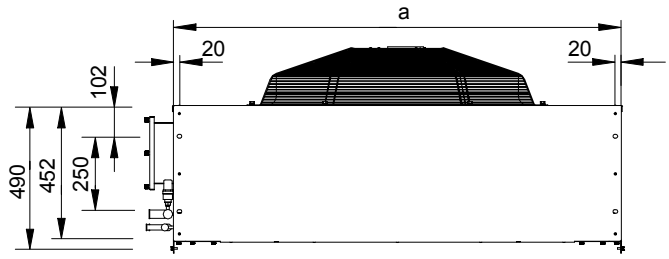


Figure 1-6 Mounting base figure for vertical installation (top view) (unit: mm)

Table 1-4 Mounting base dimensions for vertical installation (unit: mm)

Model	Dimension 'a'
LSF12, LSF18	830
LSF24, LDF32, LSF38	1280
LSF42, LDF42, LSF52, LDF52	1480
LSF62, LSF72	1780
LDF62, LDF72	1980

Model	Dimension ‘a’
LSF76, LDF76, LSF85, LDF85	2280

Note

1. The installation holes are long and flat holes. It is recommended to use M10 × 20 bolts to fix the mounting base.
2. The upper condenser must be installed on a rack during vertical installation, and the cushion pads should be installed between the condenser and the rack for reducing vibration. It is prohibited to stack two condensers through bolt connection.

1.4.3 Parameters Of Operating Environment

Refer to Table 1-5 for parameters of operating environment.

Table 1-5 Parameters of operating environment

Item	Requirement
Installation position	The standard equivalent distance between the indoor unit and the condenser is 30m. Vertical difference* ΔH: -5m ≤ ΔH ≤ 20m. Installation mode: horizontal or vertical mode
Ambient temperature	Outdoor temperature: -20°C ~ +45°C. Low temperature accessories are required if the temperature is between -35°C and -20°C
Ambient relative humidity	Outdoor humidity: 5%RH ~ 95%RH
Operation power	400V ± 10%, 50Hz
Altitude	≤ 1000m. Derating is required if the altitude exceeds 1000m
Protection level	Electrical control box: IP55; unit: IP20; fan motor: IP54
Note*: Condenser fins have a corrosion resistant coating designed to provide maximum life expectancy for the heat exchanger and protect the aluminium fins from harsh environments. The high performance coating has been tested for 2000 hours exposure to a 5% neutral salt spray test in accordance with ASTMB117 without impact to the coating	

Note

When the equivalent distance between the indoor unit and the condenser exceeds 30m, refer to *5.1 Refrigerant Tubing System* in *Liebert.PEX Series Air Conditioner Technical Manual* for the requirement of the line equivalent length.

1.4.4 Parameters Of Storage Environment

Refer to Table 1-6 for parameters of storage environment.

Table 1-6 Parameters of storage environment

Item	Requirement
Storage environment	Clean indoor environment with good ventilation and no dust
Ambient temperature	-40°C ~ +70°C
Ambient relative humidity	5%RH ~ 85%RH
Storage time	The total storage time should not exceed 6 months. Otherwise, the performance needs to be re-calibrated

Chapter 2 Installation

This chapter introduces the moving, unpacking, inspection, installation notes, space requirements and installation procedures.

2.1 Moving, Unpacking And Inspection

Moving

It is recommended to use the mechanical transport equipment such as a forklift or a crane when unloading and transferring the condenser closest to the installation site.

When a forklift is used, insert the tines of the forklift shown in Figure 2-1 (taking the single fan condenser for example).

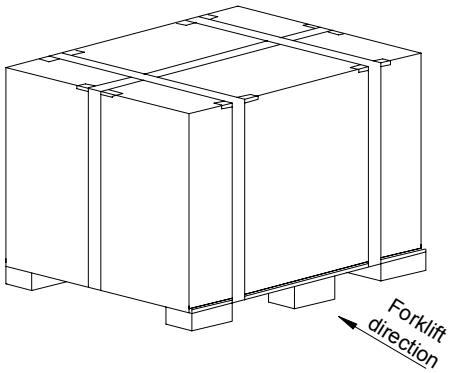


Figure 2-1 Forklift direction

When a crane is used, refer to Figure 2-2 to lift the package (taking the double fans condenser for example).

Note

When lifting the package, fix the cable by leading it through the slots located at the bottom of the pallet. Otherwise, the cable may slide during the lifting process, and the package may fall to the ground, damaging the pipes inside and resulting in system leakage.

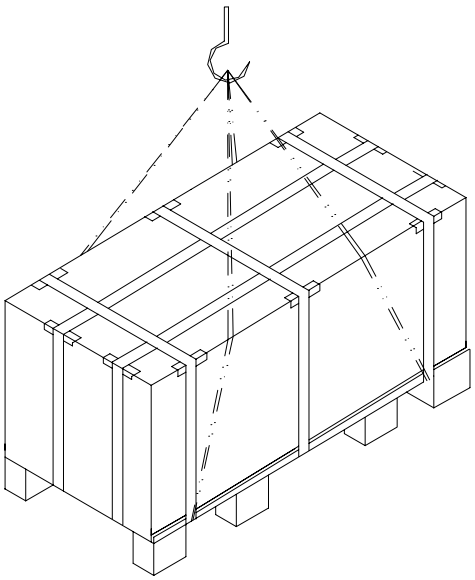


Figure 2-2 Crane lifting

Unpacking

Remove the timber frame package and foam of the condenser but reserve the protection cardboard of fins. The protection cardboard of fins and the cushion pad of U tube located at the end of the condenser should be removed after the condenser is in its installation position.

Note

1. If the condenser is to be placed horizontally, you should complete the installation of legs while the condenser is located vertically.
2. When moving the condenser by hand, to avoid distortion and system leakage, do not touch the copper pipes.

Inspection

After the product arrival, you should check the accessories against the packing list. If any parts are found missing or damaged, please report to the carrier immediately. If any covert damage is found, please report to the carrier and the distributor immediately.

2.2 Installation Notes

The installation notes of the condenser are as follows:

1. To ensure the heat dissipation capacity, install the condenser in the place with smooth airflow. Do not install it where the coil of the condenser may be obstructed by dust or snow. Ensure that there is no steam or waste heat around.
2. If possible, the horizontal installation is recommended to reduce the noise.
3. The condenser should be installed away from the residential areas (≥ 15m).
4. Be careful not to damage the waterproof layer and observe the local regulations when the condenser is installed on the roof of the building.
5. Position the condenser higher than the indoor unit to ensure normal oil return.
6. Follow the installation arrows on the condenser for correct installation direction.

2.3 Space Requirements

Note

1. A 4000mm clearance is required around the condenser air outlet.
2. 600mm service spaces are required on the four sides of the condenser.

The condenser needs sufficient installation and service space around the installation place. The specific space requirements are shown in Figure 2-3 and Figure 2-4.

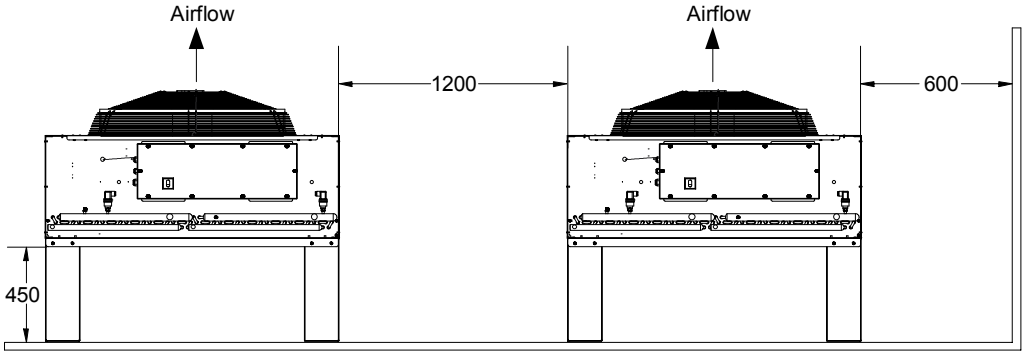


Figure 2-3 Horizontal installation space requirement (unit: mm)

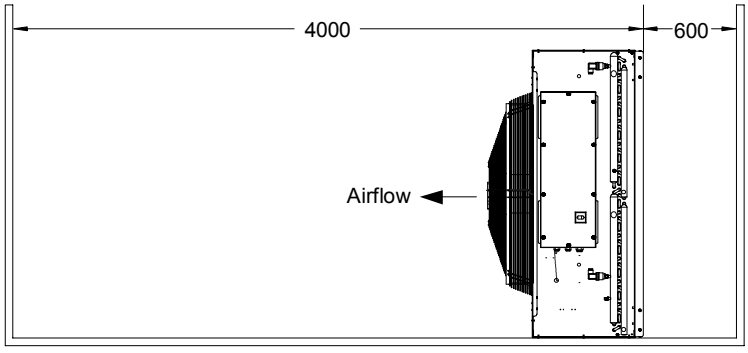


Figure 2-4 Vertical installation space requirement (unit: mm)

2.4 Installation Procedures

Note

Before commencing installation hot works, release all nitrogen holding charges from the indoor and outdoor units.

Installing pipelines

Note

1. Protect copper pipes from heat sources. Isolate copper pipes from structures or other obstacles using rigid supports. Avoid dust, water vapor and irrelevant objects from entering copper pipes.
2. Use a good quality, silver-based solder for all brazed connections. Use refrigeration grade copper pipes and fittings throughout the installation. Purge all pipes with nitrogen during brazing to prevent oxidation.

1. Identify the pipe sizes

Refer to *2.6 Installing Unit Pipes* in *Liebert.PEX Series Air Conditioner User Manual* for pipe sizes.

2. Identify the condenser installation height

Refer to *2.6 Installing Unit Pipes* in *Liebert.PEX Series Air Conditioner User Manual* for installation height.

3. Install the pipes

Install the pipes according to local and national codes and standards.

Connecting external power (external power supply of the condenser)

1. Identify the cable specifications

Select the power supply cables and start/stop signal cables of the condenser according to site conditions, such as the distance between the indoor unit and the condenser.

Table 2-1 Operation current of fan under 400V voltage

Condenser Model	FLA (A)
LSF12	0.79
LSF18	1.45
LSF24	1.65
LSF32	1.05
LSF38, LSF42, LSF52, LDF42, LDF52	2.4
LSF62, LSF72, LDF62, LDF72	3.3
LSF76, LSF85, LDF76, LDF85	4.8

Note

1. It is recommended to use the 20AWG (0.52mm^2) cable as the condenser start/stop signal cable.
2. The outdoor air cooled condenser requires a three-phase, neutral and earth power supply. The indoor PEX unit is the recommended point of connection for this electrical service and includes a three-pole circuit breaker rated at 16 amps.
3. The cables should not contact hot objects, such as the copper pipe and water pipe without insulation, to avoid damaging the insulation layers.
4. The cables should be connected in accordance with the local regulations.

2. Connect the cables

See Figure 2-5, Figure 2-6 and *Appendix 1 Circuit Diagram* for the connections of external power cables.

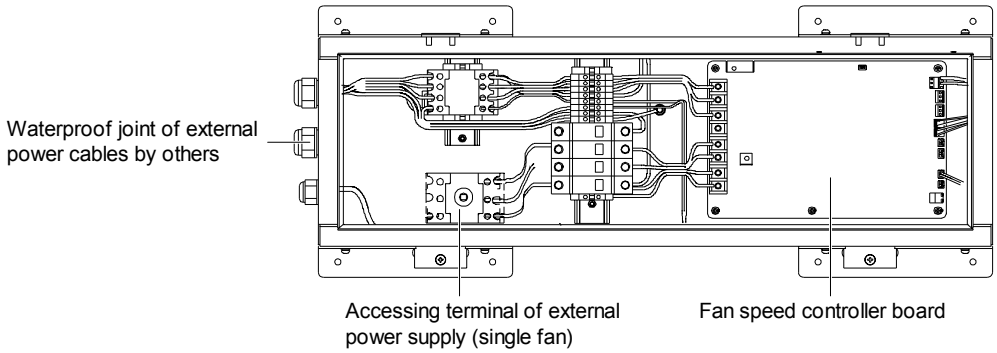


Figure 2-5 Connection figure of single fan external power cables (taking LDF42 for example)

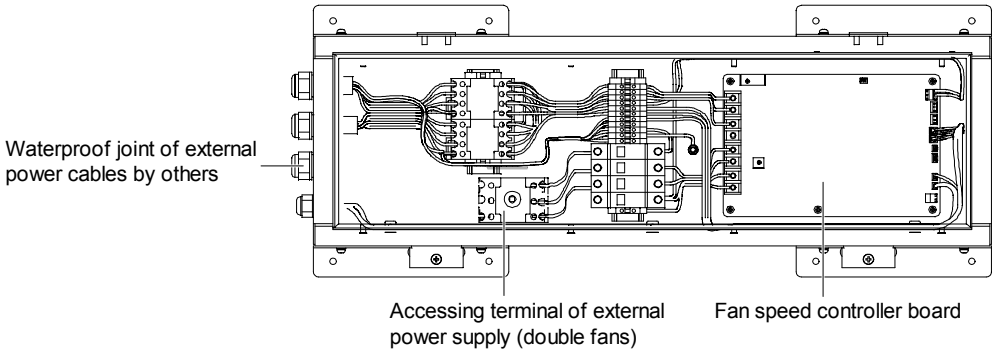


Figure 2-6 Connection figure of double fans external power cables (taking LDF62 for example)

Note

1. The external power cables and compressor signal cables enter the electrical control box through the waterproof joint of external power cable whose inner diameter is Φ10mm.
2. After connecting the external power cables, apply waterproof sealant treatment to ensure the good waterproof performance of electrical control box.
3. The phase sequence of three-phase AC input (L1, L2, L3) must be correct. Otherwise, the fan speed controller will generate the phase loss alarm, and there will be no AC output.
4. For dual circuit condenser (such as LDF42, LDF52, LDF62, LDF72, LDF76 and LDF85), the four condenser start/stop signal cables should be paralleled at the terminal block of indoor unit before connection; for single circuit condenser, the two condenser start/stop signal cables can be connected directly.

Charging refrigerant and adding cooling oil

Refer to *2.6 Installing Unit Pipes* in *Liebert.PEX Series Air Conditioner User Manual* for charging refrigerant and adding cooling oil.

Chapter 3 Application Of Fan Speed Controller

This chapter introduces the use of the fan speed controller, which includes the definitions of wiring terminals, introduction of human-machine interface (HMI) and operation of HMI. This chapter is mainly provided for the factory maintenance personnel. It is recommended that users should not operate the fan speed controller unless necessary.

Note

The configured fan number must be the same as the number of the actual fans, or else a false alarm will be generated. Refer to *Configuration data main menu interface* in *3.3.2 Main Menu Interface* for detailed settings.

3.1 Wiring Terminals

The wiring terminals are located on the fan speed controller board (see Figure 2-5 and Figure 2-6). Their distribution is shown in Figure 3-1 and the definitions are listed in Table 3-1. Refer to *Appendix 1 Circuit Diagram* for detailed connections.

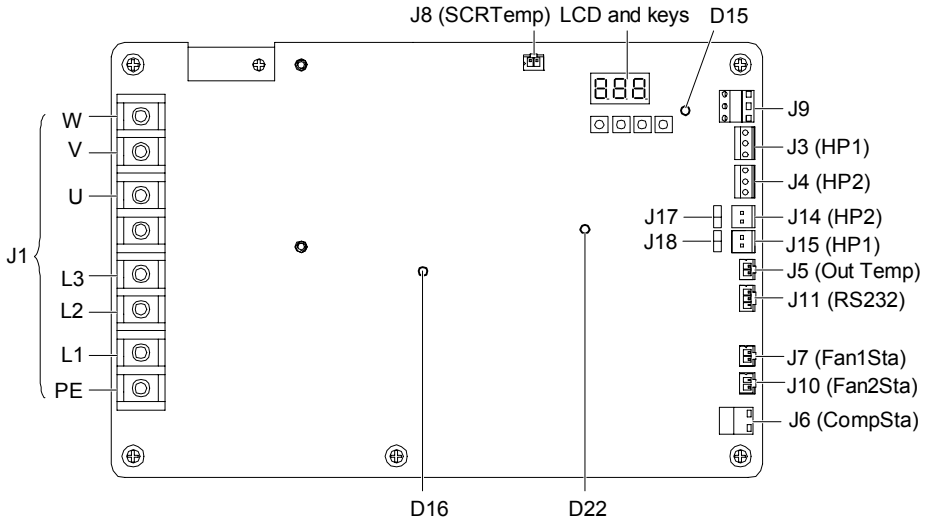


Figure 3-1 Layout of wiring terminals

Table 3-1 Definitions of wiring terminals

Silk print	Definition	Definition of pins
J1	AC I/O terminal	PE: protection earth L1, L2, L3: three-phase AC input U, V, W: three-phase AC output, which connects with the power supply terminals The middle terminal pin without logo is reserved
J9	Passive dry contactor relay output (for the power switch of fan power supply contactor)	Pin 1: normally closed terminal of relay, which is reserved Pin 2: common terminal of relay, which is used for AC input Pin 3: normally open terminal of relay, which is used for AC output
J3 (HP1)	Input terminal of voltage pressure sensor 1 (spare)	Pin 1: positive terminal of 5V power Pin 2: input terminal of 0.5V ~ 4.5V pressure voltage signal Pin 3: negative terminal of 5V power
J4 (HP2)	Input terminal of voltage pressure sensor 2 (spare)	
J15 (HP1)	Input terminal of current pressure sensor 1	Pin 1: positive terminal of 12V power Pin 2: input terminal of 4mA ~ 20mA pressure current signal
J14 (HP2)	Input terminal of current pressure sensor 2	
J17, J18	Jumpers of current pressure sensor	Current pressure sensor: the short circuit ring must be installed on the jumpers Voltage pressure sensor: the open status of jumpers must be kept

Silk print	Definition	Definition of pins
J5 (Out Temp)	Input terminal of ambient temperature sensor (spare)	Pin 1: input terminal of temperature signal Pin 2: signal ground
J11 (RS232)	Serial communication interface (used for maintenance)	Pin 1: communication ground Pin 2: reception terminal of communication Pin 3: transmission terminal of communication
J7 (Fan1Sta)	Detecting terminal of fan 1 over temperature state	Pin 1: output terminal of 19Vac signal Pin 2: return terminal of 19Vac signal
J10 (Fan2Sta)	Detecting terminal of fan 2 over temperature state	
J6 (CompSta)	Detecting terminal of compressor state	
Note: J8 (SCRTemp) in Figure 3-1 is the interface of fan speed controller board, and not to be used by users		

3.2 HMI

The fan speed controller operation and setup is provided through indicators, RS232 serial communication port, keys and LCD.

Indicators

There are three indicators (see Figure 3-1) on the fan speed controller board. See Table 3-2 for the functions of indicators.

Table 3-2 Functions of indicators

Silk print	Definition	Color	State	Function
D16	Power indicator	Green	On	The CPU circuit of fan speed controller board is supplied with 5V power
			Off	The fan speed controller board is faulty
D22	Run indicator	Green	On or off	The fan speed controller board is faulty
			Blinking at 1Hz (slowly)	The system is running normally without alarm
			Blinking at 5Hz (quickly)	There is an alarm or the compressor is shut down
D15	Power switch controlling indicator of AC contactor	Red	On	The control switch which supplies the AC contactor with the driving power is open
			Off	The control switch which supplies the AC contactor with the driving power is closed

RS232 serial communication port

The RS232 serial communication port is a port to connect the computer using factory-defined protocol. It is used for factory commissioning and maintenance.

Keys and LCD

The keys and LCD, which can realize the functions in Table 3-3, provide the HMIs for maintenance personnel. Refer to *3.3 Operation Description Of HMI* for operation of keys and LCD HMI.

Table 3-3 Function descriptions of keys and LCD

NO.	Function	Description
1	Query the acquisition data in real time	The acquisition data include condensing pressure, ambient temperature, silicon controlled rectifier (SCR) temperature and output percentage
2	Query the current alarm data in real time	The current alarm data include phase loss alarm, SCR over temperature, fan 1 over temperature, fan 2 over temperature, pressure sensor failure, EEPROM read fault alarm, SCR temperature sensor failure and abnormal frequency
3	Query the historical alarm data in real time	The latest saved 100 historical alarms can be queried
4	Modify the configured parameters in real time	The configured parameters include running pressure, pressure controlling range, minimum voltage, maximum voltage, fan number and pressure sensor type; or resume the default values

The keys and LCD are on the upper right corner of the fan speed controller board, as shown in Figure 3-1. Their appearance is shown in Figure 3-2.

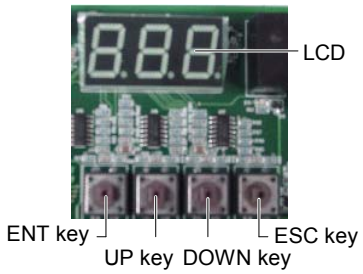


Figure 3-2 Keys and LCD

3.3 Operation Description Of HMI

3.3.1 Initial Interface

The LCD will alternately display ‘F01’ (the maximum pressure logo) and the larger of condensing pressure 1 and condensing pressure 2 when the fan speed controller is powered on initially. However, the pressure value will be displayed as ‘88.8’ on the LCD if:

1. The pressure sensor is not installed.
2. The jumper cap of current pressure sensor is not installed.
3. The pressure sensor is disabled.

The display order is shown in Figure 3-3 (the ‘16.1’ is only an example, and the actual value is determined by the sampling result).

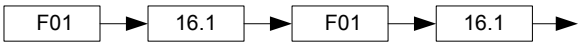


Figure 3-3 Display order of the initial interface

3.3.2 Main Menu Interface

Press the ESC key on the initial interface, and the main menu interface will appear on the LCD. The main menu interfaces include the analog main menu interface, current alarm main menu interface, historical alarm main menu interface and configuration main menu interface. Press the UP key and DOWN key to select a different main menu interface, and press the ENT key to enter the submenu of the current main menu on the main interface. The switching operation processes and orders of the main menus are shown in Figure 3-4.

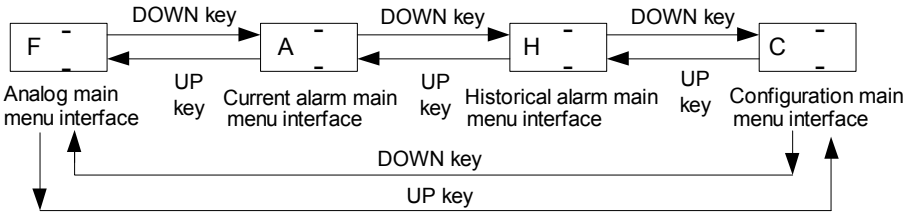


Figure 3-4 Switching operation processes and orders of the main menus

Analog main menu interface

Press the ENT key to enter the analog submenu interface when the current main menu interface shows ‘F--’ (the symbol of analog main menu). The switching operation processes and orders of the analog submenu are shown in Figure 3-5.

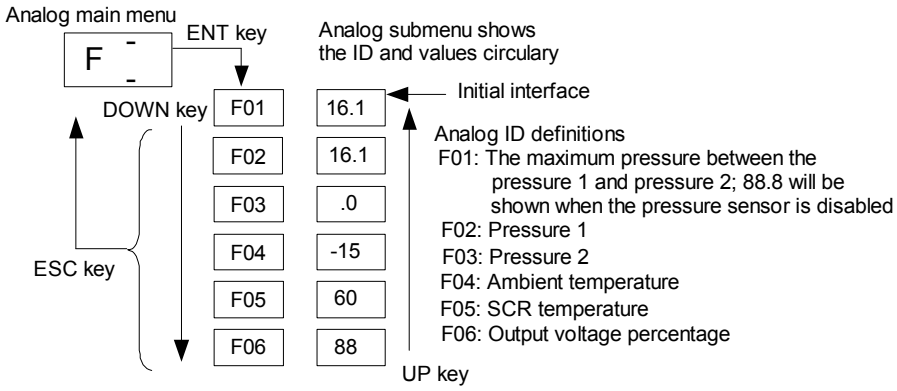


Figure 3-5 Switching operation processes and orders of the analog submenu

Current alarm main menu interface

Press the ENT key to enter the current alarm submenu interface when the current main menu interface shows ‘A--’ (the symbol of current alarm main menu). The switching operation processes and orders of the current alarm submenu are shown in Figure 3-6.

See Table 4-1 for generating conditions and troubleshooting.

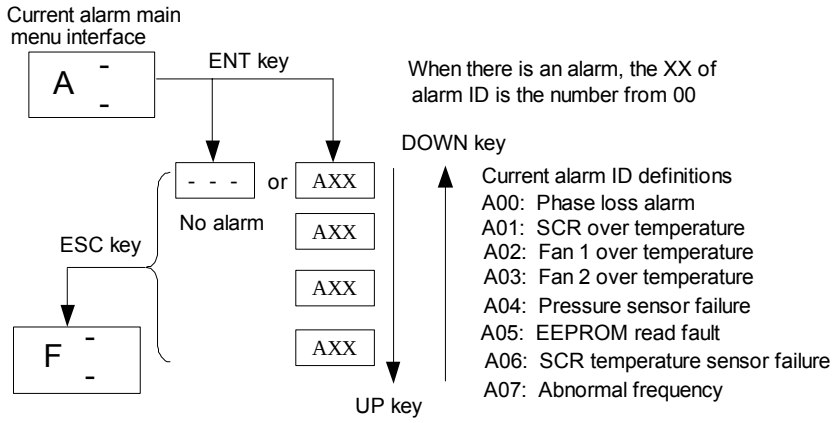


Figure 3-6 Switching operation processes and orders of the current alarm submenu

Historical alarm main menu interface

Press the ENT key to enter the historical alarm submenu interface when the current main menu interface shows ‘H--’ (the symbol of historical main menu). The switching operation processes and orders of the historical main menu are shown in Figure 3-7.

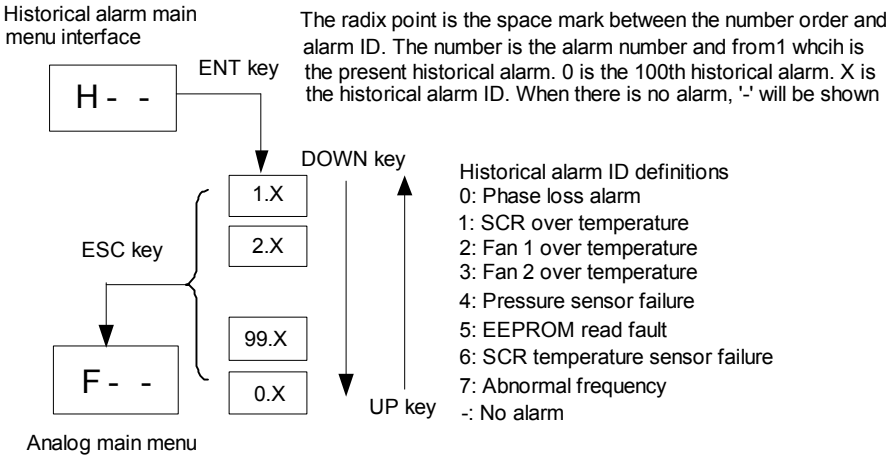


Figure 3-7 Switching operation processes and orders of the historical main menu

Configuration data main menu interface

Note

The configuration data main menu interface is designed only for maintenance personnel to set parameters, others are prohibited to operate it.

Press the ENT key to enter the configuration data submenu interface when the current main menu interface shows ‘C--’ (the symbol of configuration data main menu). The switching operation processes and orders of the configuration data main menu are shown in Figure 3-8.

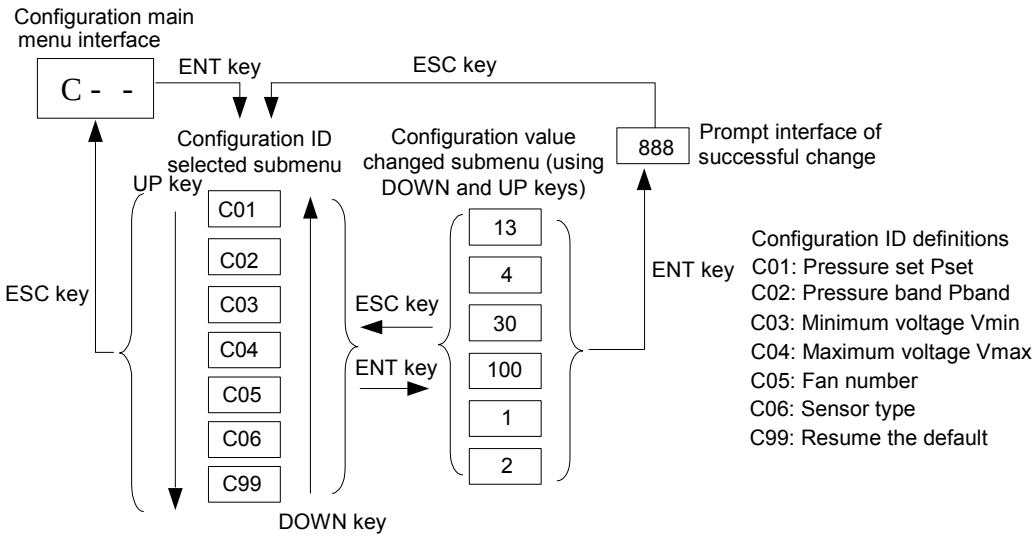


Figure 3-8 Switching operation processes and orders of the configuration data main menu

Chapter 4 Maintenance And Troubleshooting

This chapter introduces the maintenance and troubleshooting of the condenser. Users should check the condenser regularly and solve the problems in time.

Note

1. The maintenance of the condenser must be done by technicians.
2. Except for the commissioning items that must be carried out with power-on, during maintenance, the power of the indoor unit and the air switch of the condenser must be cut off.

4.1 Maintenance

Refrigeration system

1. Check that the refrigeration pipes are firmly fixed. The refrigeration pipes shall not shake with the vibration of wall, earth or equipment frame. Otherwise, reinforce the refrigeration pipes with fastening objects.
2. Check that there is no oil on the accessories of all refrigeration pipes, and make sure that the pipes do not leak.

Heat exchanger

1. Clean the fin of the heat exchanger regularly.
2. Clean the fin of the heat exchanger with compressed air or fin detergent (weakly alkaline) if the condenser airflow is blocked. Inverse airflow is good when the compressed air is used.
3. Check for damaged fins and maintain them in time.
4. Avoid snow accumulation around the condenser in winter.

Fan

Check that the fan runs normally. Check it for problems such as abnormal noise, vibration and bearing failure.

Fan speed controller

Check that the fan speed controller board operates normally. If not, replace it as illustrated in the following paragraph.

Note

Note that the positions of the bolt installation holes on the fan speed controller could be different on the actual product.

The fan speed controller is inside the electrical control box (see Figure 1-2 and Figure 1-3). Rotate the isolation switch to ‘OFF’, and then remove the cover plate of the electrical control box, as shown in Figure 4-1. Remove the cover plate of the electrical control box before removing the fan speed controller board. Except for the seven bolts in Figure 4-2, other bolts are prohibited to remove. The bolt 1 and bolt 2, which are used to fix the heat sink on the fan speed controller board, must be fastened firstly. The heat sink must cling to the floor of the electrical control box. After installing the heat sink, use other five bolts to fix the fan speed controller board.

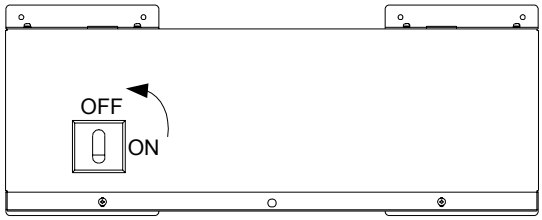


Figure 4-1 Fan speed controller board

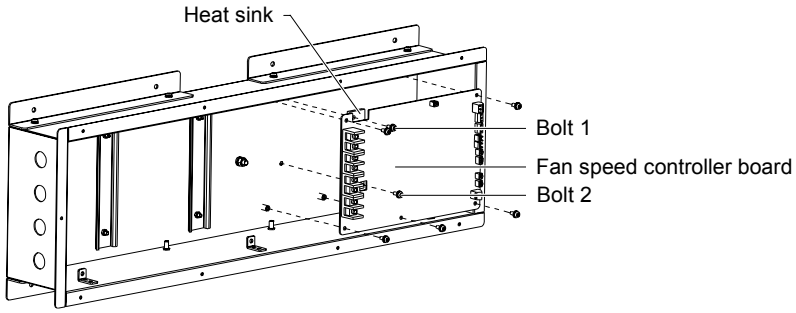


Figure 4-2 Removing the fan speed controller board

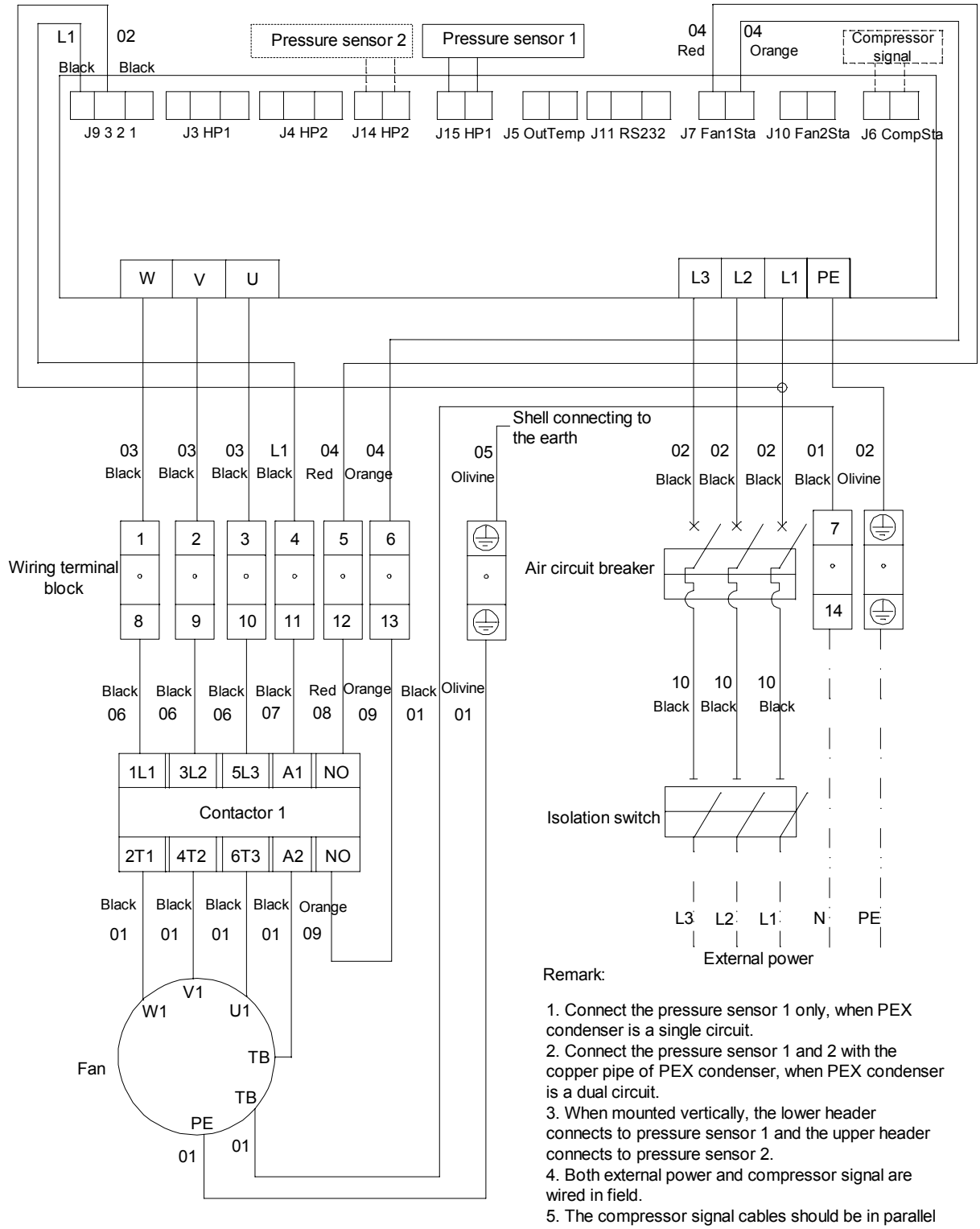
4.2 Troubleshooting

See Table 4-1 for alarm troubleshooting.

Table 4-1 Table of alarm troubleshooting

Alarm number ID	Alarm name	Cause	Troubleshooting
A00	Phase loss alarm	One phase or two phases of three-phase voltage are lost	Check that the three-phase voltage is correct
		The input connection is reversed	Check the input order of wire
		The fan speed controller board has a hardware fault	Replace the fan speed controller board and compare the result of two boards
A01	SCR over temperature	The fan cannot run normally	Check that the fan runs normally
		The fan speed controller board has a hardware fault	Replace the fan speed controller board and compare the result of two boards
A02, A03	Fan 1 over temperature, Fan 2 over temperature	The fan cannot run normally	Check that the fan runs normally
		The AC contactor supplying power for fan has fault or its wire cuts off	Check the wiring of AC contactor; detect the auxiliary contact state of AC contactor
		The fan speed controller board has a hardware fault (the detecting circuit or SCR power supplying circuit has fault)	Replace the fan speed controller board and compare the result of two boards
A04	Pressure sensor failure	The pressure sensor is not installed or its terminal connection is poor	Check the wiring of pressure sensor
		Jumper caps are not used to short terminals J17 and J18 of current pressure sensor	Install the jumper cap when the current pressure sensor is configured
		Pressure sensor failed	Replace the pressure sensor and compare the result of two boards
		The fan speed controller board has a hardware fault	Replace the fan speed controller board and compare the result of two boards
A05	EEPROM read fault	The fan speed controller board has a hardware fault	Replace the fan speed controller board and compare the result of two boards
A06	SCR temperature sensor failure	The SCR temperature sensor is not installed or its terminal connection is poor	Check the wiring of SCR temperature sensors (J8 SCRTemp, see Figure 3-1 for its position)
		SCR temperature sensor failed	Replace the SCR temperature sensor and compare the result of two sensors
		The fan speed controller has a hardware fault	Replace the fan speed controller board and compare the result of two boards
A07	Abnormal frequency	The frequency of power supply voltage is wrong The fan speed controller has a hardware fault	Replace the fan speed controller board and compare the result of two boards

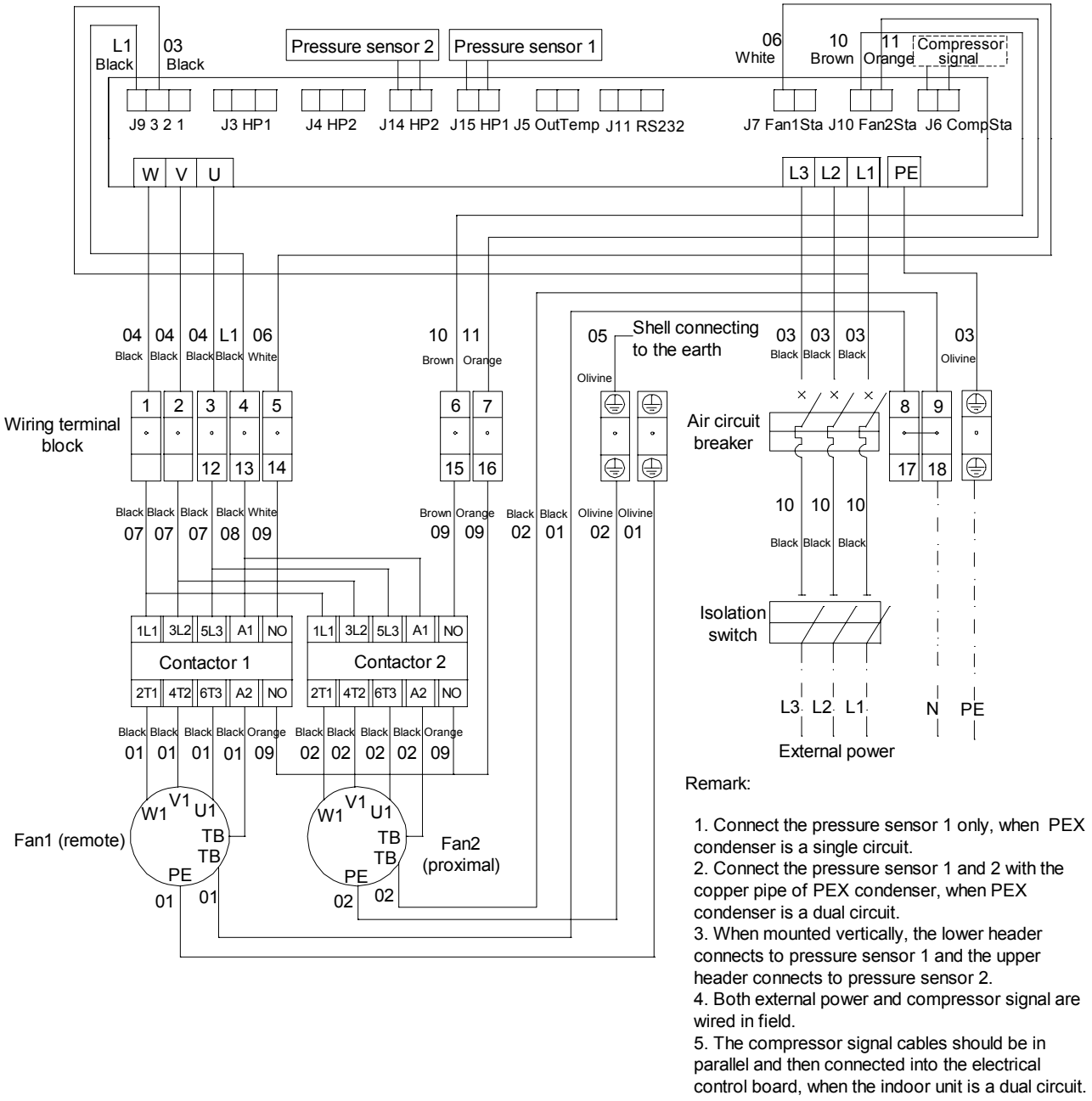
Appendix 1 Circuit Diagram



Remark:

1. Connect the pressure sensor 1 only, when PEX condenser is a single circuit.
2. Connect the pressure sensor 1 and 2 with the copper pipe of PEX condenser, when PEX condenser is a dual circuit.
3. When mounted vertically, the lower header connects to pressure sensor 1 and the upper header connects to pressure sensor 2.
4. Both external power and compressor signal are wired in field.
5. The compressor signal cables should be in parallel and then connected into the electrical control board, when the indoor unit is a dual circuit.

Figure 1 Circuit diagram of the condenser with single fan



Remark:

1. Connect the pressure sensor 1 only, when PEX condenser is a single circuit.
2. Connect the pressure sensor 1 and 2 with the copper pipe of PEX condenser, when PEX condenser is a dual circuit.
3. When mounted vertically, the lower header connects to pressure sensor 1 and the upper header connects to pressure sensor 2.
4. Both external power and compressor signal are wired in field.
5. The compressor signal cables should be in parallel and then connected into the electrical control board, when the indoor unit is a dual circuit.

Figure 2 Circuit diagram of the condenser with double fans

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