Permanent Magnet Variable Frequency Screw Air Compressor

Operating Manual

（D-Series）

Foreword

This operation manual describes in detail the safety precautions of the screw air compressor, the structure and function of each system and component, and the operation and maintenance methods.

The operator should read this operation manual carefully, and only after fully understanding the structure, function and safety precautions of each system and component of the unit, can the unit be operated and maintained. Except as stated in this book, if the user does not operate and maintain according to the operation and maintenance procedures of this book, or disassemble and modify the machine by himself, or use oil and parts not specified by manufacturer, you will lose the right to claim.

This operating manual provide you with a simple illustrated catalog of parts. If you need to order parts from manufacturer, please contact manufacturer. What needs to be reminded is that manufacturer continues to develop and improve its products. After a certain period of time, the content of the parts manual may differ from the actual situation of the product. Before you order parts, please check with manufacturer 's service department.

This operation manual gives a general introduction to the motor and electrical system and maintenance, but before you use and maintain this unit, if you have any questions, please contact manufacturer.

Special reminder for three filter and oil maintenance cycle

Item	Project	Time	Maintenance content	Remark
1	First Maintenance/Routine Maintenance	The new machine runs for 2000 hours or one year (whichever comes first)	Change the lubricating oil Replace the oil filter Replace the air filter Replace the oil/air separator	

★Note: The maintenance period should be shortened appropriately under severe working conditions.

Table of content

Chapter 1 Safety Rules

Safety warning signs

In this manual, the operations and matters involving safety are defined and classified according to the severity of damage to the machine and the degree of personal injury that the operation may cause, and the following signs are used to express and explain in bold.

	"Warning It must be grounded" means that you must confirm that it is properly grounded before starting the machine.
	"Caution" indicates Aunsafe factors that may cause general damage to the machine or personal injury.
	"Warning" indicates unsafe factors that may cause property damage or personal injury.
	"Warning" means electrical equipment, and only qualified personnel can operate in accordance with the specifications.
	"Warning" means that the unit will restart automatically, which may cause serious injury to the human body and equipment.
	"Warning" means do not touch the surface of hot objects. To prevent burns, please do not approach this surface.
	"Warning" means that moving parts can cause serious injury to the body. Do not operate the equipment without a protective cover or when the protective cover is damaged.
	"Danger" refers to unsafe factors that can cause major accidents or personal injury.
	"Danger High-Voltage" means an unsafe factor that can cause serious personal injury or death with a voltage exceeding the safety level. All electrical work must be done by a qualified electrician.
	"Dangerous" means that it is used for breathing and food handling. The compressed air must comply with the standards OSHA 29CFR1910.134 and FDA 21CFR178.3570, otherwise it will cause human injury and even death.
	"Dangerous" means that the pressurized air will cause serious damage to the human body, equipment and property, or even death.
	"Caution Hot" means unsafe factors that may cause property damage or personal injury to hot surfaces.Please refer to maintenance guide.air pressure must be 0 Mpa before changing service spares
	"Attention" indicates important installation, operation and maintenance information.
	“Dange Rotating part”means this is rotating part ,that may cause general damage to the machine or personal injury.
	Air compressors can be potentially dangerous when operated incorrectly. When checking equipment or running maintenance, ensure that the power to the air compressor is switched off and the machine is properly isolated, that all relevant personnel are informed of the work being carried out, and that warning signs are placed in relevant locations to prevent the power to the air compressor being switched on.
	Earplugs are recommended when working near this air compressor.
	Before using this compressor, the operator should read and understand the instruction manual and strictly observe the relevant work procedures, safety precautions and maintenance norms.

Safety warning

Please be sure to read carefully before operating and using the compressor

⚠ Warning

Compressed air and compressed air systems are dangerous!

Failure to comply with the operating procedures and safety precautions of this operating manual may cause accidents and cause the possibility of injury or death to yourself or other personnel!

Before operating and maintaining the compressor, you must carefully read and understand this operation manual!

Before the machine leaves the factory, obvious warning decals have been affixed to dangerous places and places that require attention.

Before performing any operation and maintenance on the unit, you must read and understand this operation manual.

1. The unit must not be operated at an exhaust pressure higher than the rated exhaust pressure of the unit, otherwise the motor will be damaged due to overload.

2. When the unit leaves the factory, various protection controls are set up intact, and the control components of the unit must not be changed or dismantled at will, otherwise it will cause serious equipment and personal injury accidents

3. When the unit is running, never disassemble or loosen any pipeline components, joints, plugs and couplings, and do not pull the safety valve. The unit is full of hot working fluids under pressure, which can cause serious personal injury accidents.

4. Before performing any maintenance work on the unit, you must confirm:
   The unit has stopped;
   The internal pressure of the unit has been completely vented;
   The power is turned off.

5. Only safe solution can be used to clean the compressor and auxiliary equipment of the unit.

6. Once any part fails, it must be replaced immediately, otherwise it may cause immeasurable losses.

7. This machine is for indoor use and cannot be used in the open air. Must be grounded ★★★

The safety measures and safety precautions listed below are only part of the matters that must be observed when using the compressor and compressed air system, but not all of them.

⚠ Warning

Failure to observe the following safety measures will result in personal injury or death, property damage or compressor damage.

Only trained and authorized persons can operate the compressor. Before any work, you should read this operation manual carefully and fully understand its contents. Failure to follow the operation and maintenance procedures and safety rules in the operation manual may cause accidents and personal injury.

Never start the unit under unsafe conditions; if there is a problem with the unit, do not try to start it. The power supply should be cut off and an obvious sign should be made to prevent unknowing people from misoperation.

Compressed air is dangerous, and the unit can be repaired and maintained only when the compressed air in the entire compressor system has been emptied.

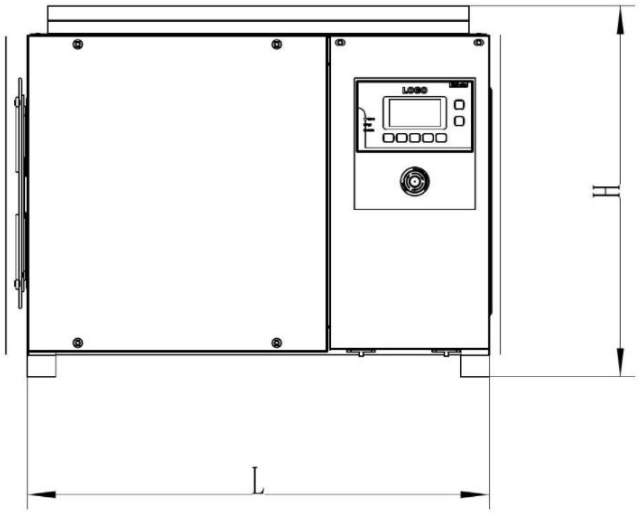
Do not change the internal structure and control method of the unit unless it is approved in writing by Screw Compressor Manufacturer.

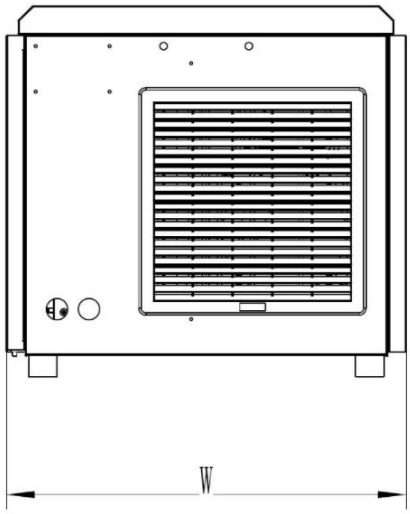
If it is a unit with movable wheels, please make sure that the wheels have been secured by effective measures before starting the machine.

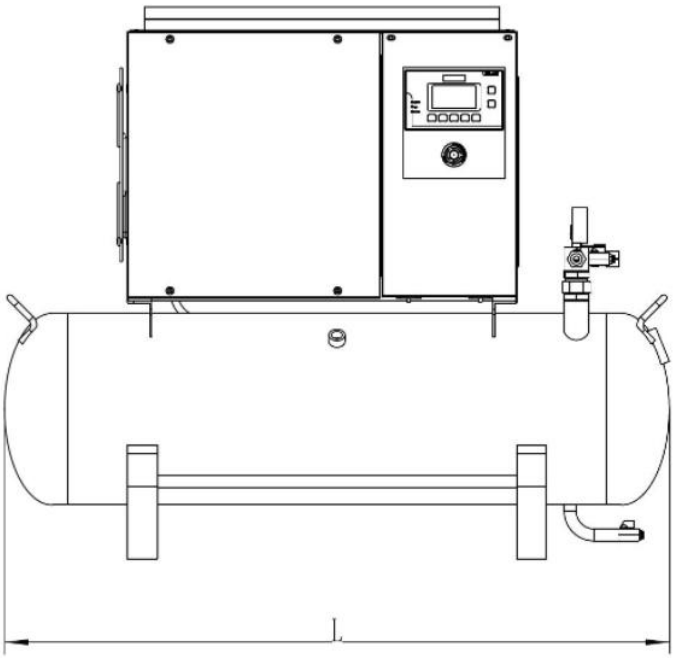
Do daily maintenance and maintenance. The unit should be carefully checked every day to see if there is any leakage, loose parts, damage, adjustment failure or missing parts, etc., and deal with problems in time.

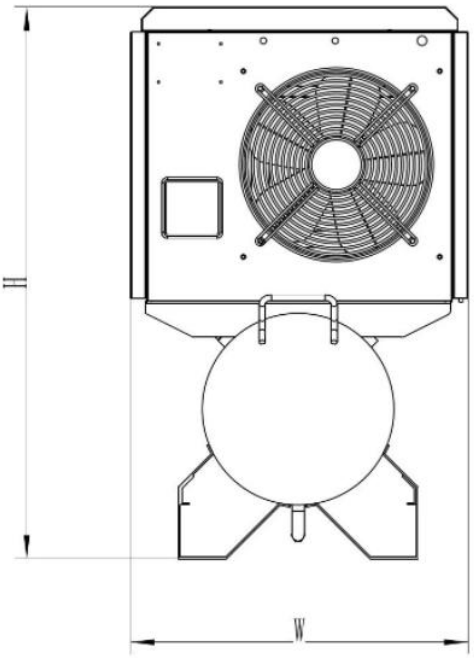
Chapter 2 Specifications

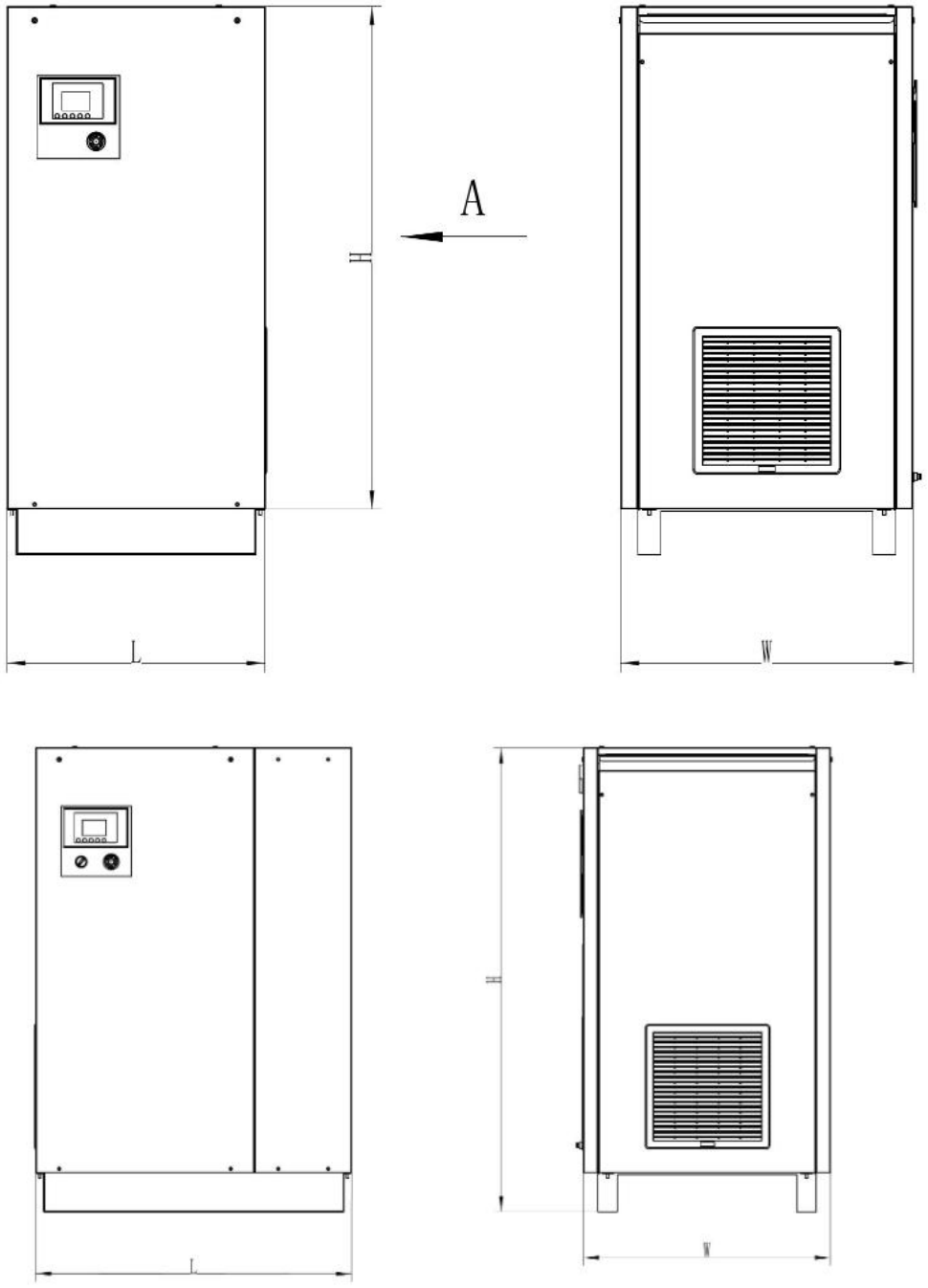
2.1Model Classification











Chapter 3 System Function Introduction

3.1 Introduction

The permanent magnet inverter compressor is a positive displacement, oil-injected twin-screw compressor. The motor and the male rotor of the compressor head are integrated to drive the compressor to rotate. The unit has good power, economy and reliability.

This series has reasonable layout, complete functions, simple operation and maintenance, and beautiful appearance. All instruments, indicators and control devices are concentrated on the control panel, which is easy to operate and can run stably and reliably for a long time, see Figure 3-1. In order to keep the screw compressor unit you have purchased or used in the best operating condition, please read Chapter 6 Maintenance in this operation manual carefully.

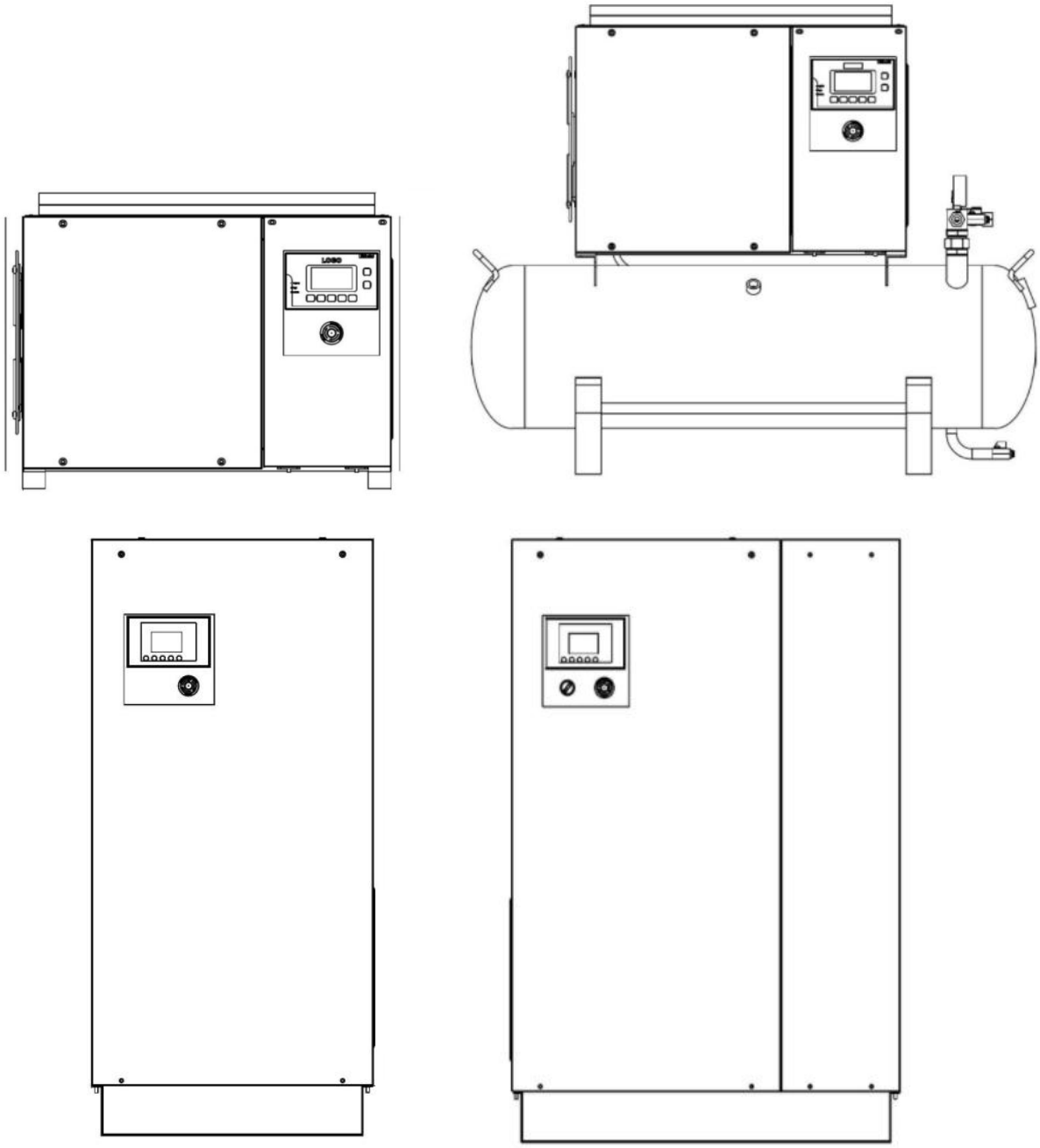
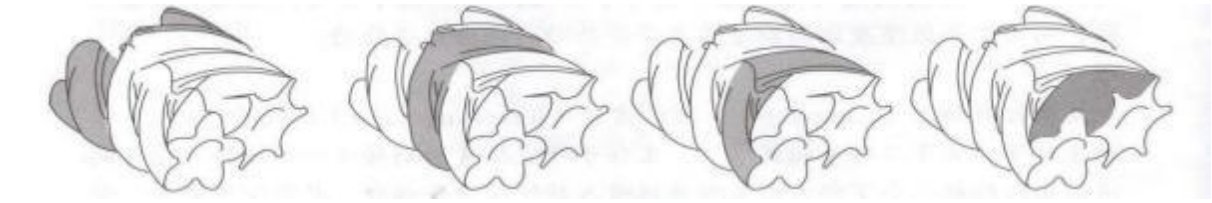


Figure 3-1

3.2 Compressor head and compression cycle

Compressor head (host). Refer to Figure 3-2. When working, air enters the casing through the air inlet at the power input end. When the rotor turns over the edge of the suction orifice on the casing, a part of the sucked air is enclosed in the female and male rotors and in the enclosed volume of the screw groove formed by the casing, the enclosed volume of the screw groove changes continuously with the meshing movement of the female and male rotors, so as to realize a continuous working cycle of suction, sealing, compression and exhaust. The compressed air passes through the exhaust port. Exhaust into the air oil separator tank.



1. Inhalation process 2. Closed and conveyed 3.Compression and fuel injection stroke 4.Exhaust process

Figure 3-2 Compression cycle

3.2.1 Air intake system

Refer to Figure 3-3. The function of the air intake system of the compressor unit is to provide clean air to the compressor. It includes an air filter and an air intake valve.

Figure 3-3 Air intake system

3.2.2 Compressor exhaust system

The exhaust system of the compressor unit is mainly composed of air oil separator tanks, air tanks, combination valves, oil separators, safety valves, etc.

The air oil separator tank part can realize the phase separation of the mixture of oil and air . An oil fine separator is installed above the air oil separator tank. The compressed air after the oil and air separation contains only a few PPM (usually below 3PPM) of lubricating oil. The air tank is located under the machine to store air.

The gas storage tank is located under the machine to store gas.

The combined valve integrates the oil fine separator seat, the oil filter seat, the pressure maintaining valve, and the safety valve interface. The function of the pressure maintenance valve is to ensure that the compressor establishes a minimum tank pressure in the system during normal operation to ensure the normal operation of the lubricating oil circuit. When the unit is shut down, the pressure maintaining valve is a check valve to prevent the compressed air from returning. The opening pressure of the pressure maintenance valve is 4.0±0.34bar (60±5psi), which has been preset before leaving the factory.

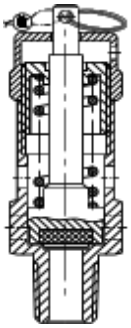


Figure 3-4 Safety valve

There is a safety valve for the air oil separator tank and the air tank on the barrel. When the air pressure in the tank exceeds the set pressure of the safety valve, the safety valve will open automatically. The opening pressure of the safety valve has been set before leaving the factory, please do not change it without authorization.

warning

- When the compressor is running or under pressure, do not disassemble nuts, oil plugs and other parts. Shutdown and release all internal pressure before maintenance operations.
- It is not allowed to replace and use other types of safety valves.

3.2.3 Compressor cooling and lubrication system

The compressor cooling and lubrication system consists of an air oil separator tank, an oil cooler, a combination valve, an oil filter and an oil pipeline, etc.

The oil filter consists of a filter seat and a replaceable spin-on filter element with a built-in bypass valve. When the filter element is dirty or the oil viscosity is too high, it can ensure the smooth flow of the oil path and the normal operation of the compressor.

Oil cooler: The cooler is of aluminum plate-fin structure, the cooling fan forces the air to flow through the cooler fins to cool the lubricating oil in the cooler pipes. In routine maintenance, the cooler surface should be cleaned regularly, removed if necessary, and can be rinsed with high temperature pressure water of not more than 3.5Bar.

3.2.4 Compressor air volume adjustment and control system

This series is equipped with a standard automatic control system.

After the machine is switched on, it will run no-load first, and then enter loading state after 10 seconds, and the motor frequency will be adjusted according to the pressure of the pipe network at the back end. When the system reaches the unloading and stopping pressure, the solenoid valve closes the inlet valve, the compressed air in the oil-air separator is emptied, and the screw machine runs unloaded for 30 seconds (set value), which can be adjusted according to the actual situation, if there is no use of the air, the air compressor will enter into the dormant state, and the screw machine will be restarted when the pressure is lower than the set value, and the cycle of operation will be repeated, so that the user's air pressure will not be lower than the set value.The air volume adjustment and control system of the compressor unit is mainly composed of the following components:

Intake Control Valve, pressure regulating valve, discharge valve, orifice, pipe fittings and joints connecting various components.

The operation of the machine mainly has three states: A. Start load operation condition; B. Stop condition; C. Standby state.

Under normal circumstances, the air volume adjustment and control system of the compressor unit has been set at the factory, and the user does not need to make adjustments. If you really need to adjust, you should refer to the controller instruction manual.

There are four working conditions in the unit: A. Start-up condition; B. Load operation condition; C. Frequency regulation operation condition; D. Standby condition. The following is an example of the rated pressure 8bar (116psi) model to introduce the principle of operation, and other rated pressure units work in order of analogy.

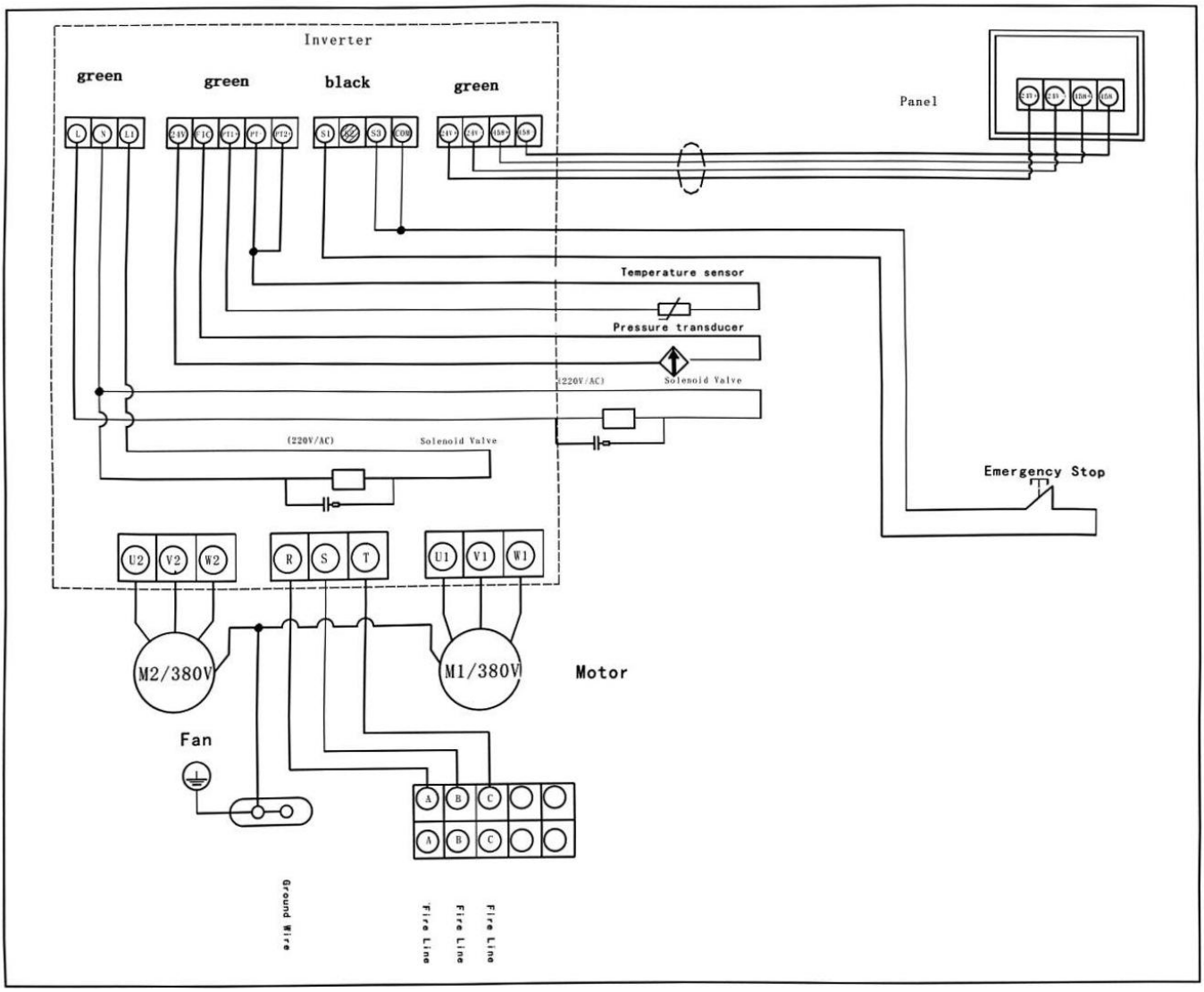
⚠ warning

Do not think that the compressor is not running, and it is safe to perform maintenance operations on it. The compressor may be in a "waiting" state and may start at anytime. Please strictly follow all relevant regulations in the "Repair and Maintenance Regulations".

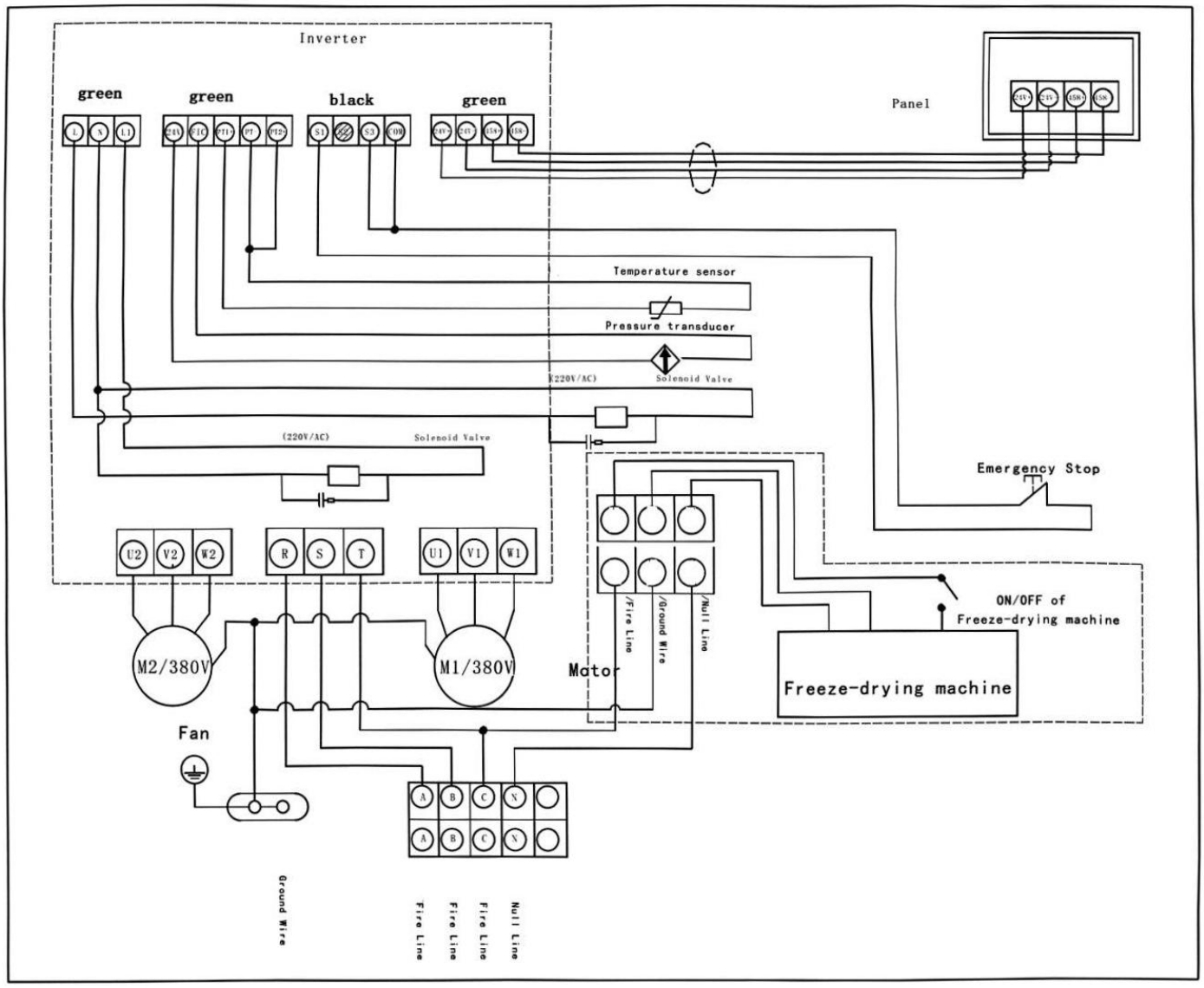
3.3 Electrical control

3.3.1 Electrical schematic diagram

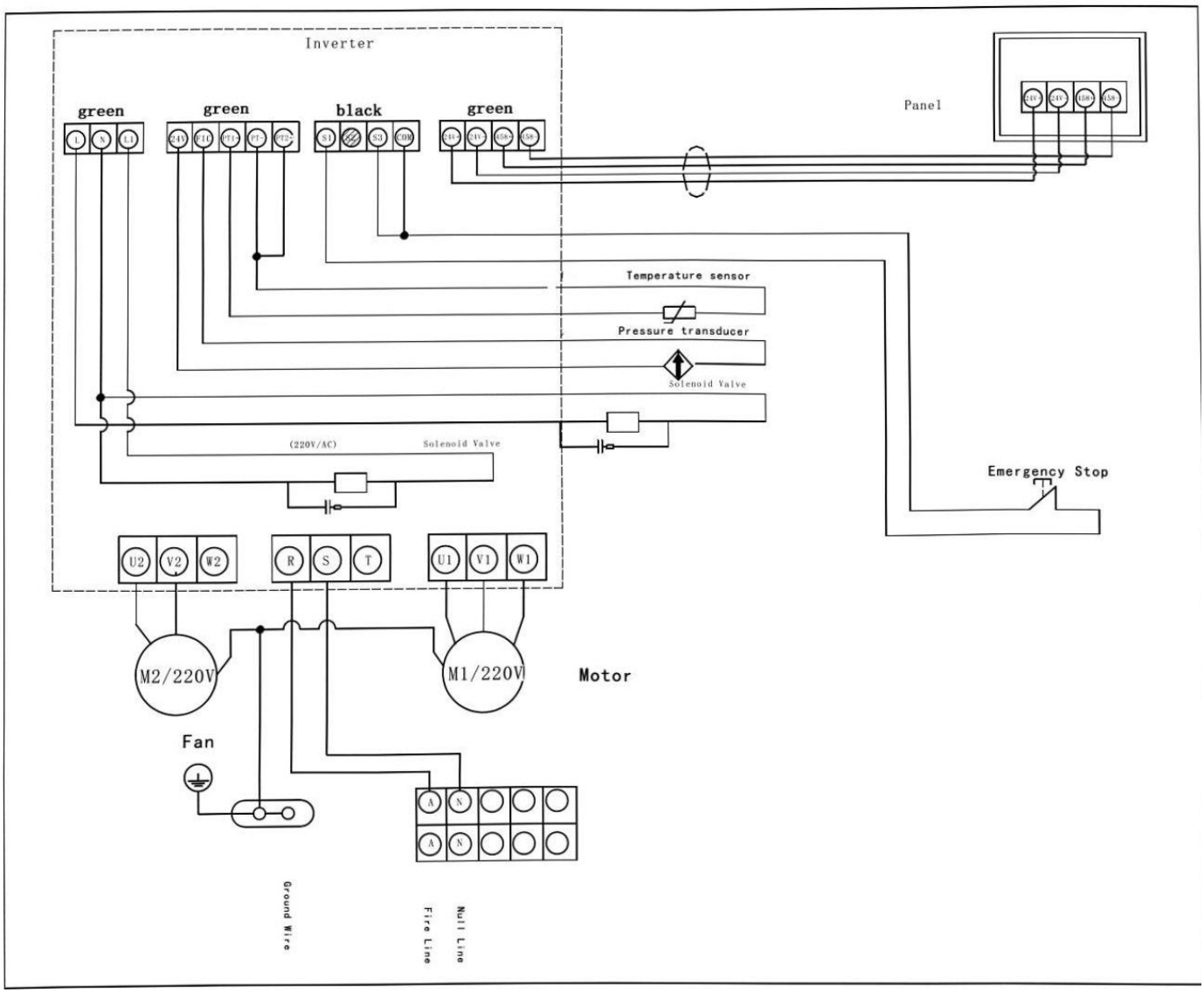
380V


Inverter
green
green
black
green
Panel
Temperature sensor
Pressure transducer
(220V/AC)
Solenoid Valve
(220V/AC)
Solenoid Valve
Emergency Stop
U2
V2
W2
R
S
T
U1
V1
W1
M2/380V
M1/380V
Motor
Fan
A
B
C
A
B
C
Ground Wire
Fire Line
Fire Line
Fire Line

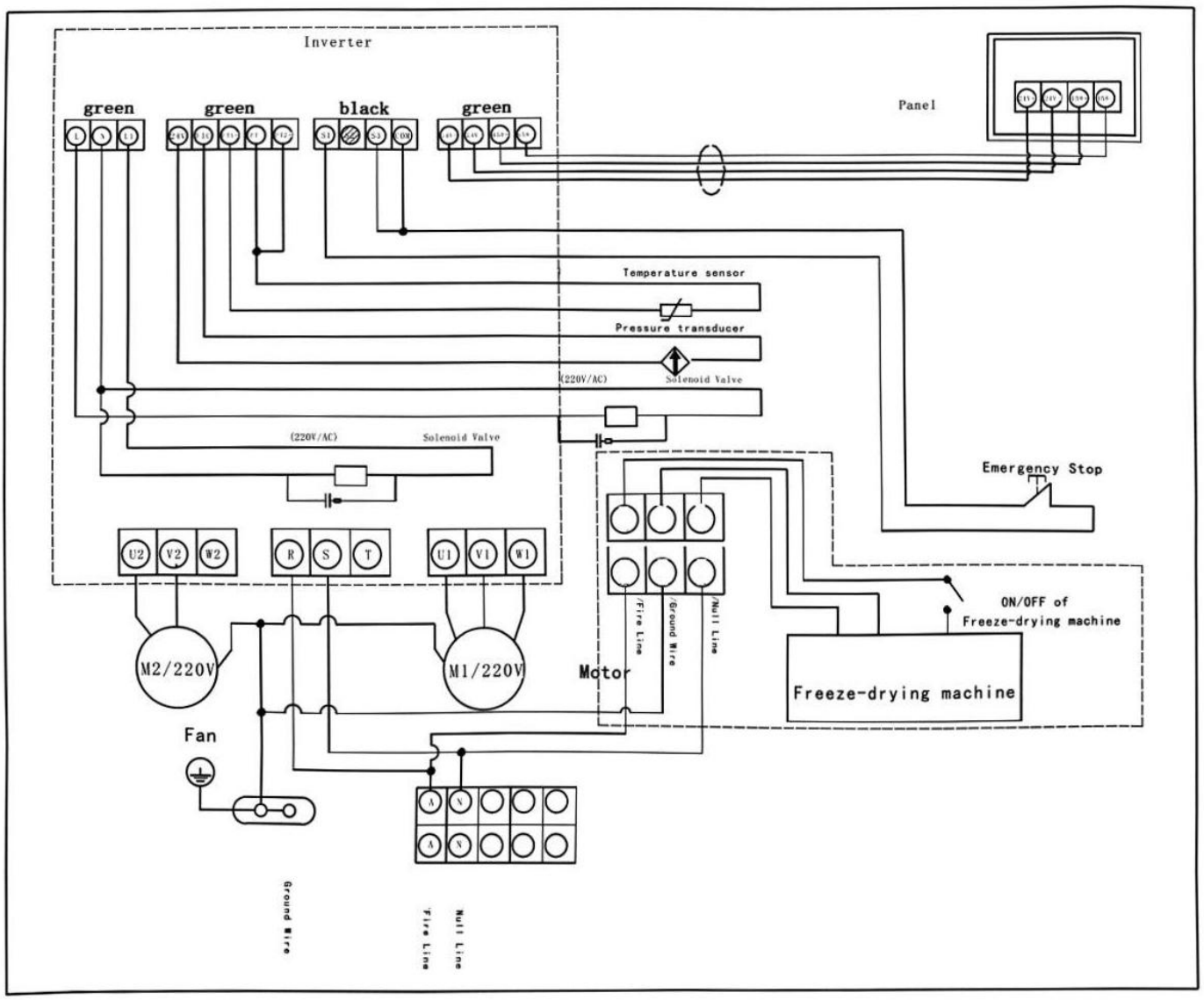
380V+ Freeze-drying machine



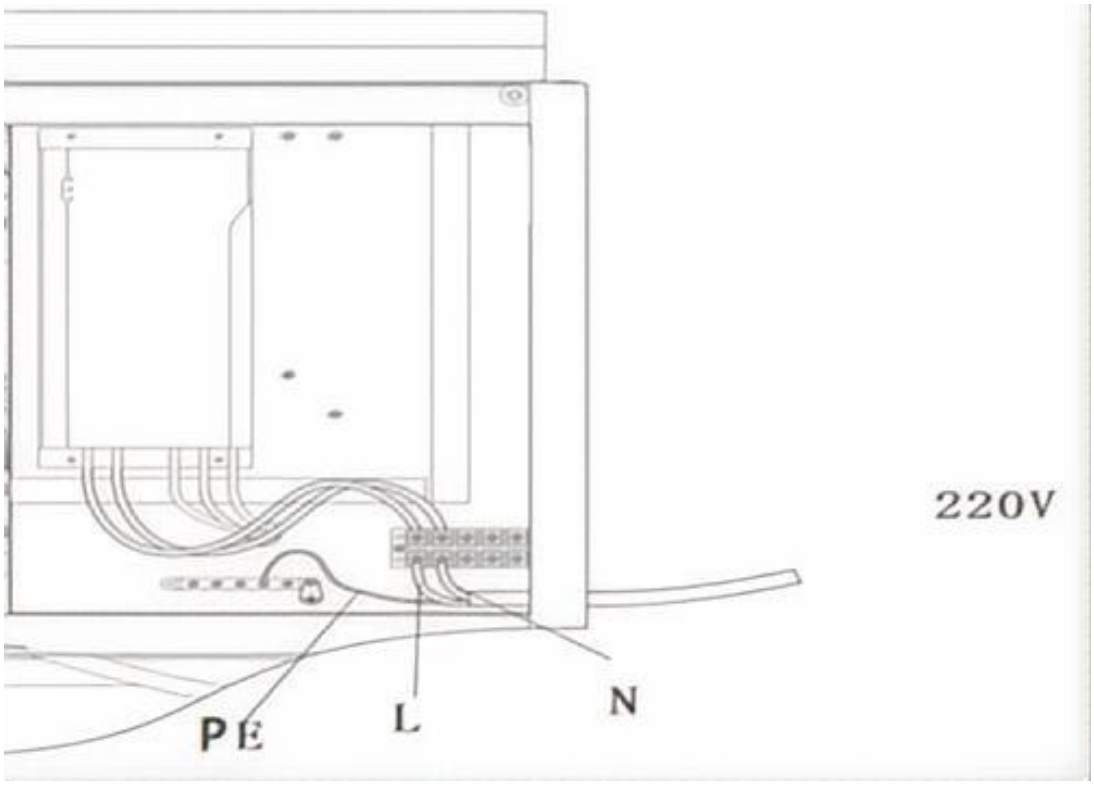
220V


Inverter
green
green
black
green
Panel
Temperature sensor
Pressure transducer
Solenoid Valve
(220V/AC)
Solenoid Valve
Emergency Stop
U2
V2
W2
R
S
T
U1
V1
W1
M2/220V
M1/220V
Motor
Fan
Ground Wire
Fire Line
Null Line

220V+ Freeze-drying machine



3.3.2 Wiring intention of inverter users



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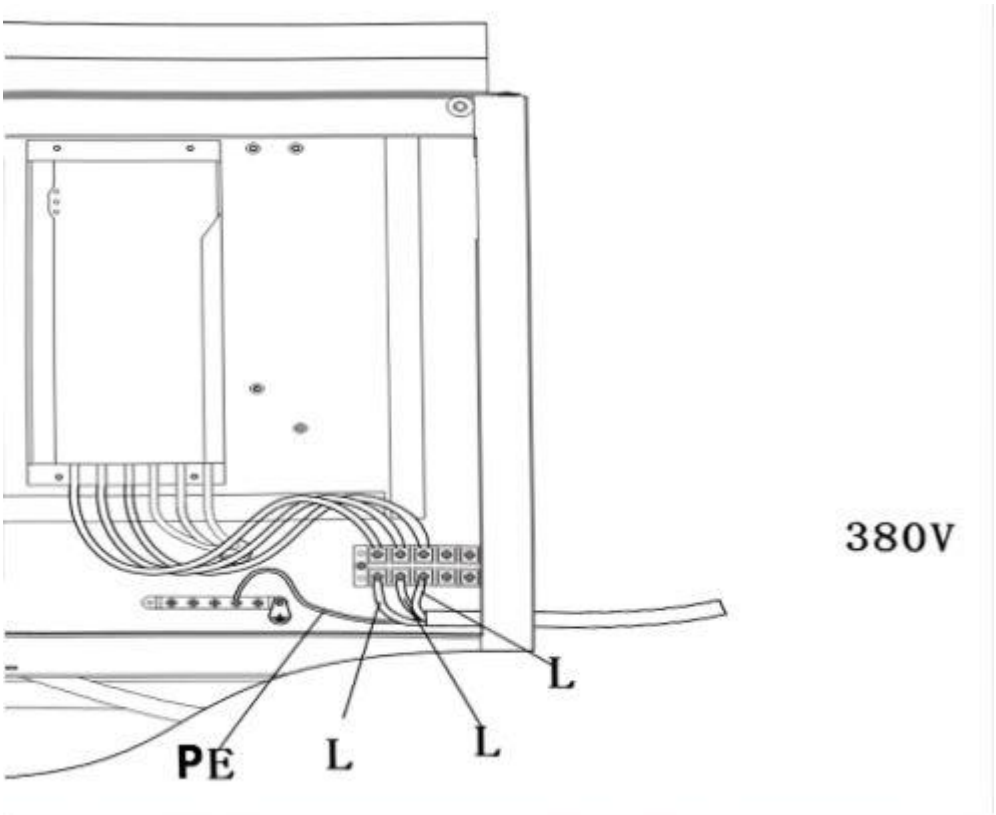
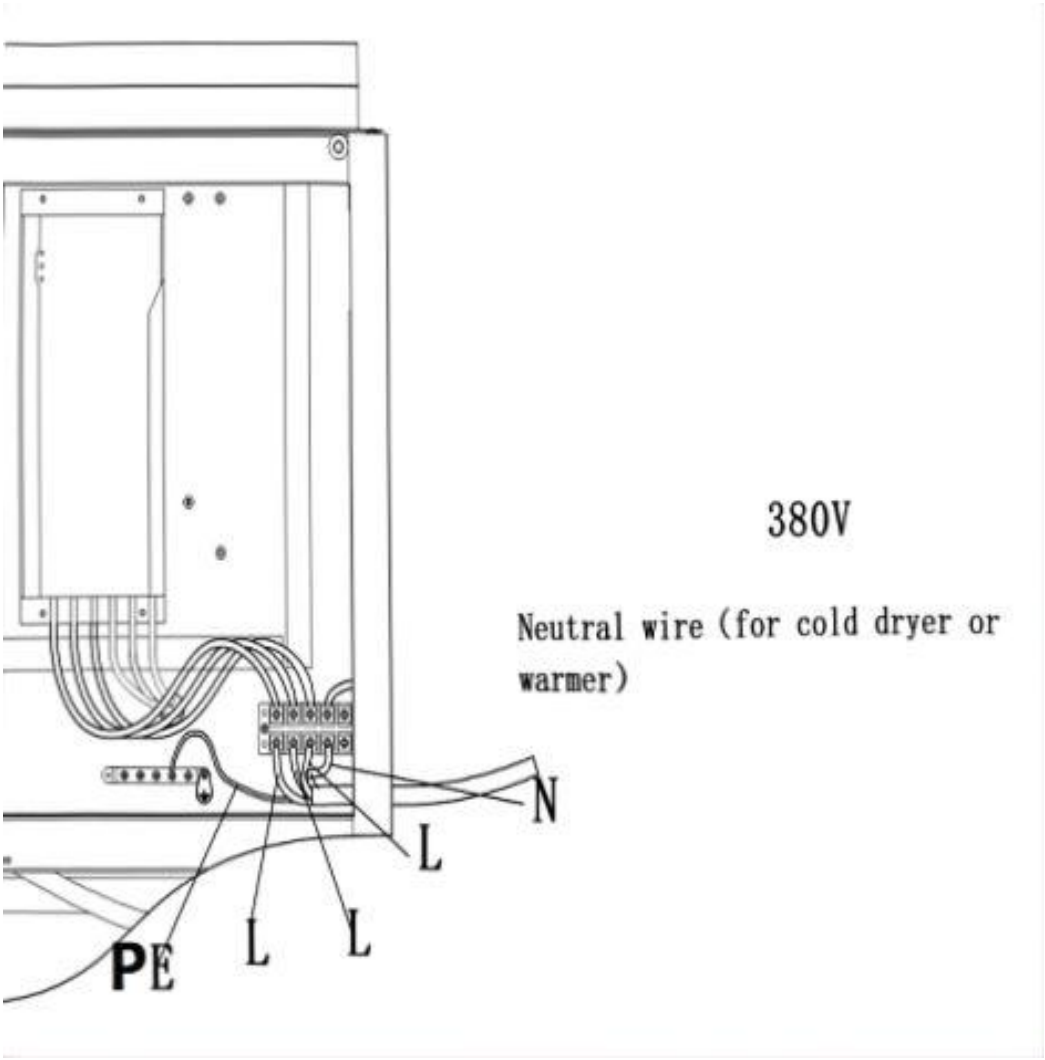
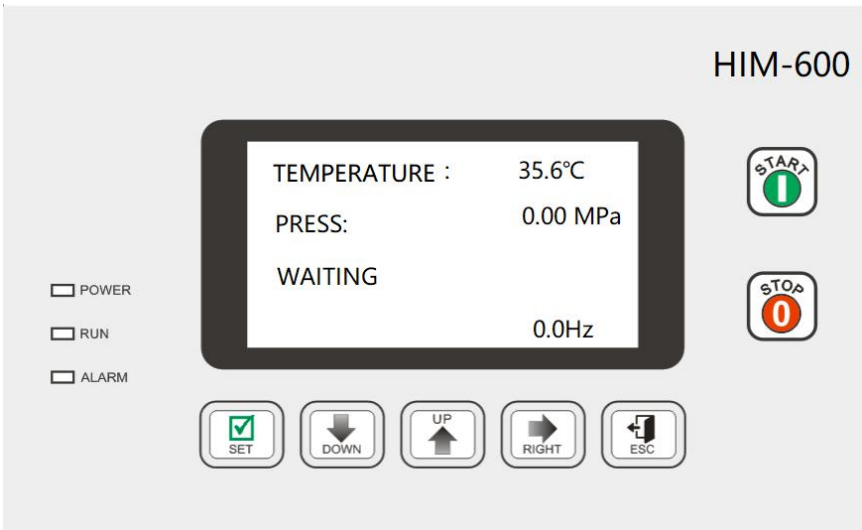



380V
Neutral wire (for cold dryer or warmer)
N
L
L
L
PE

3.4 Controller and function parameter table

3.4.1 Key Screen HIM-600

3.4.1.1 Controller key description



——activation key：

1. When the air compressor is in standby mode, press this button to start the air compressor running;

——Stop button/reset button:

1.When the air compressor is in running state, press this key to stop the air compressor running;

2.When the fault stops, press this key to reset the fault.

——Add and unload keys/confirmation keys:

1.This key is used as a key for loading and unloading when the air compressor is running.

2.In setting mode, press this key to confirm and save the input data;

——Downward key/decrement key:

1.When viewing parameters, press this key to move down the scroll bar.

2. When modifying data, press this key to decrement the current blinking position data.

——Shift up/increment key；

1.When viewing parameters, press this key to move up the scroll bar;

2.When modifying data, press this key to increment the current position data.

——Shift key/entry key:

1.When modifying data, the key acts as a shift key to move the cursor to the next data position;

2.Press this key during menu selection to enter the next level of the current menu.

——Return key:

1.When in setup mode, press this key to exit setup mode.

2.When in parameter view mode, press this key to return to the previous menu;

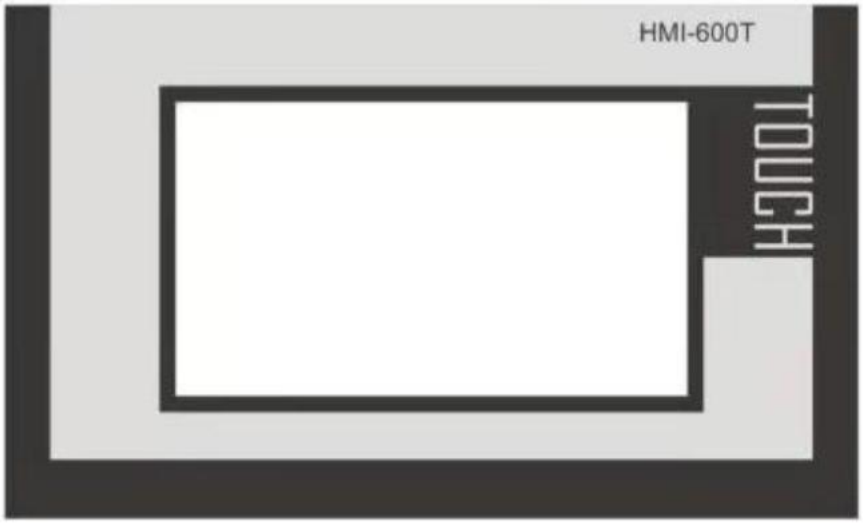
3.4.1.2 Indicator light description

Power: The indicator light is on when the controller gets power.
Running: when the air compressor motor is running, the running indicator light is on.
Failure: When there is a failure, the failure lamp is always on;

3.4.1.3 User parameter tables and functions

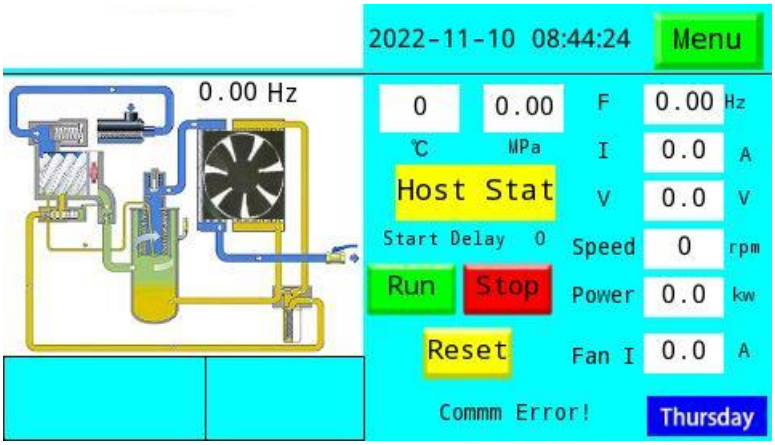
Level 1 menu	Secondary menu	Set initial value	Functional role
Pressure, temperature preset	Preset Pressure	7bar (102 psi)	Target Pressure set during frequency control.
	Loading pressure	6bar (87psi)	1, automatic loading mode, the pressure is lower than the value of the controller automatically loaded 2,Standby mode, the pressure is lower than this value, the operating conditions are available, the controller will start automatically.
	unloading pressure	8 bar (116psi)	1, the pressure is higher than this value, the controller automatically unloading 2,This value should be less than or equal to the "unloading high limit".
	Fan start temperature	0090℃	The fan operates when the exhaust air temperature is higher than the value set here.
	Fan stop temperature	0080℃	When the exhaust temperature falls below the value set here, the fan stops.
Start-stop delay preset	Start-up delay	0010 s	Motor running delay time
	Loading delay	0005 s	Delayed loading time after operation (applicable to industrial frequency control)
	Unloading delay	0030 s	The longest continuous no-load running time allowed for air compressor, exceeding
	Shutdown delay	0010 s	After this time, it will stop automatically.
	Restart delay	000 5s	When the air compressor receives the order to stop, it will turn to no-load operation, and after the no-load operation exceeds the time set here, it will stop automatically.
Maintenance parameter reset	Oil filter used	0000 hours	The oil filter accumulates the time already used, and after replacing the oil filter with a new one, the Zero manually
	Oil separator used	0000 hours	Zero the oil filter manually.
	Air filter used	0000 hours	The oil separator accumulates the used time and is replaced with a new oil separator.
	Lubricating oil used	0000 hours	The oil separator has been used for a total of time and is manually cleared after a new oil separator is replaced.
	Grease used	0000 hours	The air filter has accumulated the time used, and after replacing it with a new one, it is manually zeroed.
Maximum usage time preset	Oil filter preset	2000 hours	The air filter is manually zeroed.
	Oil separator preset	2000 hours	The lubricant accumulates the time used and is manually zeroed after replacing the lubricant with a new one.
	Air filter preset	2000 hours	Zero manually.
	Lubricant preset	2000 hours	1,The controller will warn you when the accumulated use time of lubricant exceeds the value set here; 2,When "0000" is set, the lubricant warning function is disabled.
	Grease preset	2000 hours	The oil filter is manually zeroed after replacing the grease.
User Password	9999	****	Modifiable user password; can be reset with old user password or factory reset with the old user password or factory password

3.4.2 Touch Screen HMI-600T



3.4.2.1 The system starts

Supply power to the touch screen, the power supply is DC24V, wait for a few seconds to complete the system data loading, and enter the main interface,As shown in the following figure:



Main interface of the system

3.4.2.2 System settings

（1）The system main interface

① System startup is completed, enter the main interface, main show air compressor running commands (start, stop, and reset), running parameters (temperature, pressure, output frequency,output current, output voltage, output speed and output power, electricity, fan current ,operating time , motor temp and motor temperature.).

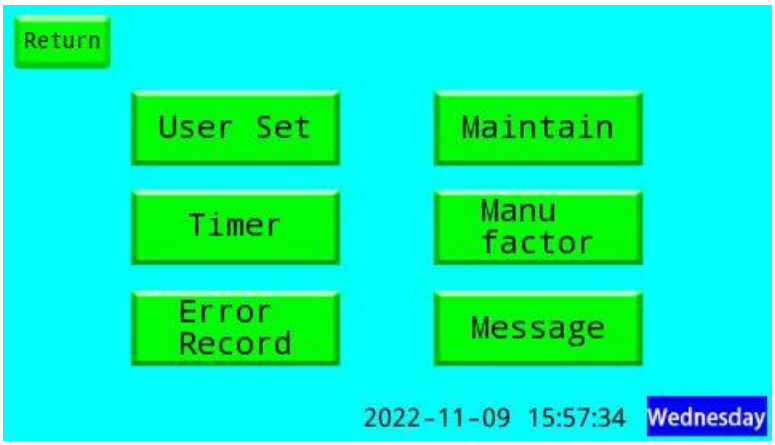
② The lower left corner has multiple fault display functions. When the communication between the touch screen and the frequency converter is interrupted, the communication fault is displayed at the lower end of the reset button.

③ Current time display, the lower right corner display includes the current year, month, day and week display, long press "year" display for 3 seconds, can enter the time adjustment mode.

（2）System to the main menu

Click "menu" option, a pop-up in the main menu including user parameters, timing control, fault records, maintenance parameter， ptions such as manufacturer parameters and manufacturer information.

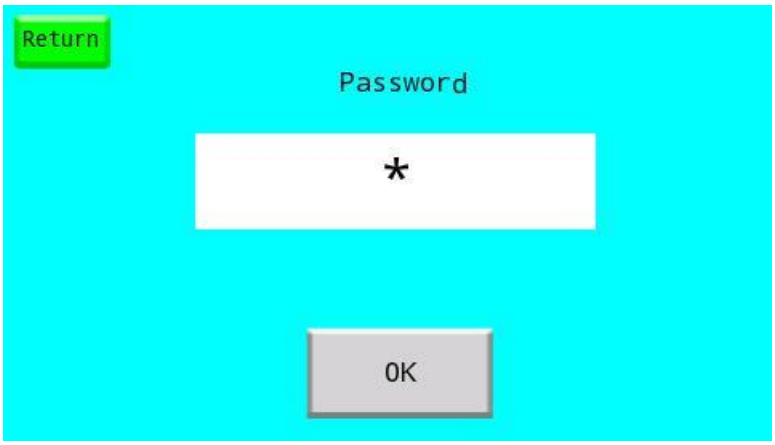
Into the part of the menu to enter the password in the interface, including the "users" parameters "timing control" "maintenance parameters" parameters "manufacturer" as shown in the following figure:



The main menu

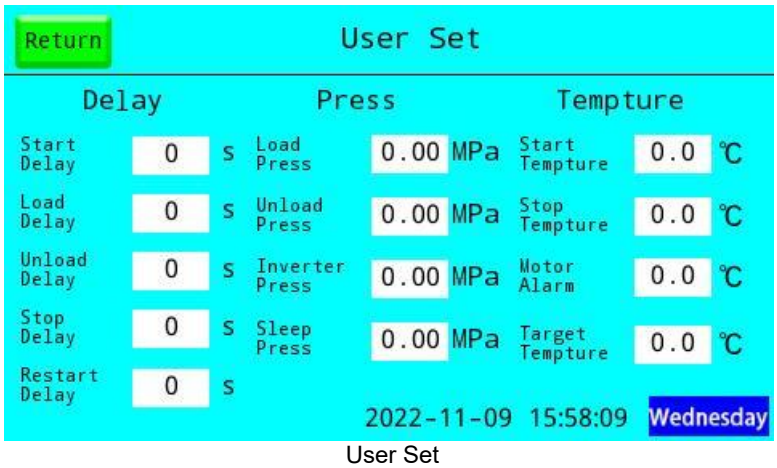
（3）User Set

Click on the "user set" option, "password" interface, enter the password to enter parameter interface, as shown in the following figure：



The password input

Enter a password to enter the "user parameters" interface, users can set in the "user preferences" delay, pressure and fan control parameters, as shown in the following figure：



User Set

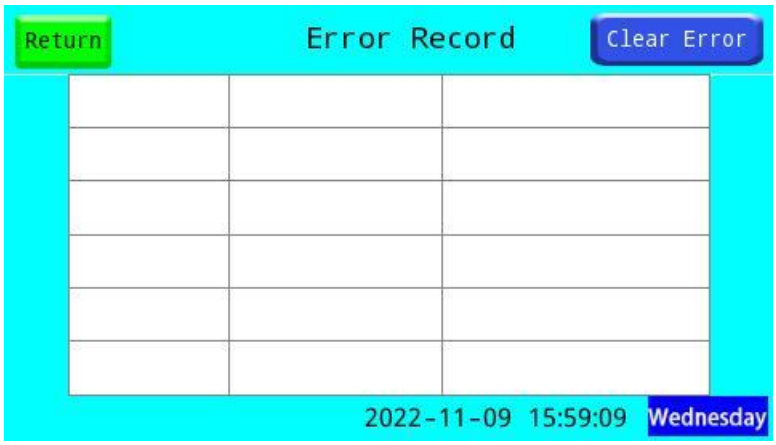
（4）Timing control

"Timing control" function can be set up the system in week timing boot and shutdown time, realize the automatic operation of the system. In the corresponding input box input time Settings, click the corresponding "tick" set to complete; Do not use this function, all the "tick" no choice; As shown in the following figure：

Timing control

（5）Fault record query

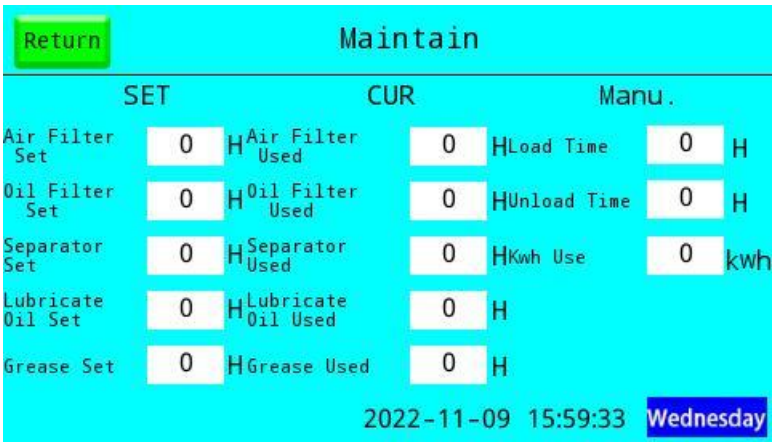
Click on the "failure record" "fault record" interface, real record system fault type and fault time, As shown in the following figure：



Fault record query

（6）Maintain parameter

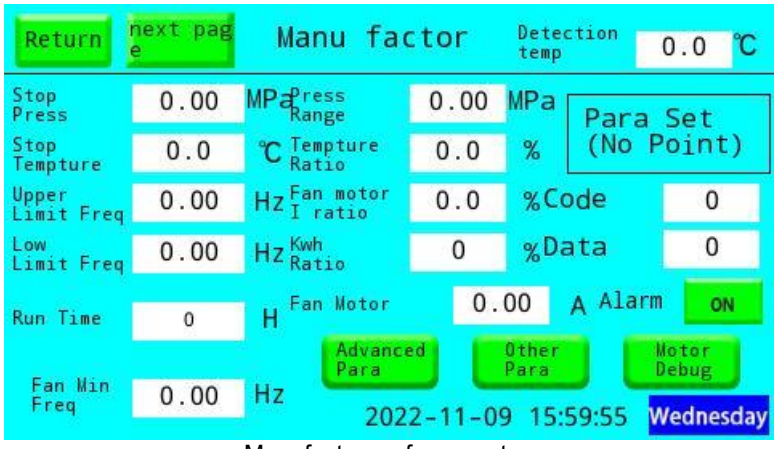
Click on the "maintenance parameter" option, "password" interface, enter the password to enter parameter interface, as shown in the following figure :



Maintain parameter

（7）Manufacturer of parameters

Click on the "manufacturer" parameters, the pop-up interface "password", enter the password to enter parameter interface, as shown in the following figure:

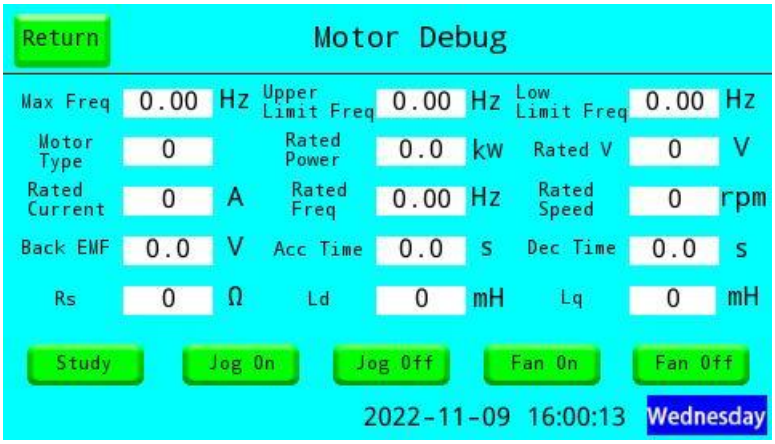


Manufacturer of parameters

Main features include: motor debugging, the function parameter Settings, analog keyboard and information.

① Motor Debugging

Click "motor debugging", "Motor debugging" into the interface as shown in the following figure:

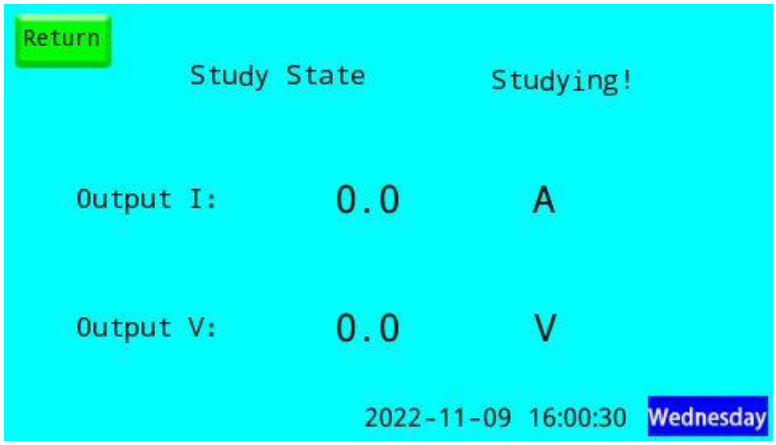


The motor parameters

Main features include: set motor related parameters, self-learning, inching commissioning and fan start-stop control.

② Motor since the study

Click "study", and under the conditions of machine downtime, system of motor, automatically self learning, learning is completed, the system prompt "studying", if learning fails, then the system prompt "study error", the interface is shown in the following figure :



Motor since the study

After successful learning, click the Back button to enter the motor debugging interface. Tap test is used to test the steering of the motor, the default is to run at 10Hz, pay attention to whether the motor steering is correct or not, if the steering is incorrect, click the “Tap Stop” button in time, replace the motor cable, and then re-test the motor in the above steps.

Fan debugging, click “fan running”, observe whether the fan steering is correct, if the work is normal, then stop running, return to the main interface can be, such as reverse operation, then switch any two fan wires can be.

Note: The fan debugging function only works normally with DP500 model.

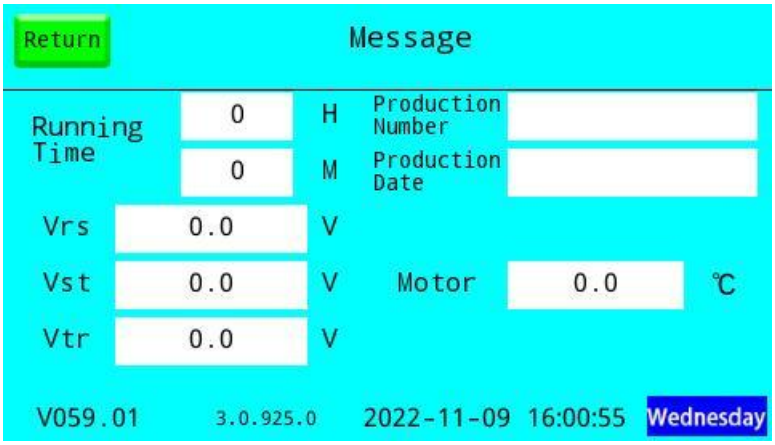
③Other parameters

Click on "information" button, enter the interface system parameters, the password used for manufacturer and user password change, as shown in the following figure:

Information

（8）Information

Click on the "Information", "Information" into the interface, as shown in the following figure :



Information

Note: the above function if you have deviation with the actual use, is the function of the software version upgrades, please refer to use.

Chapter 4 Installation and Acceptance

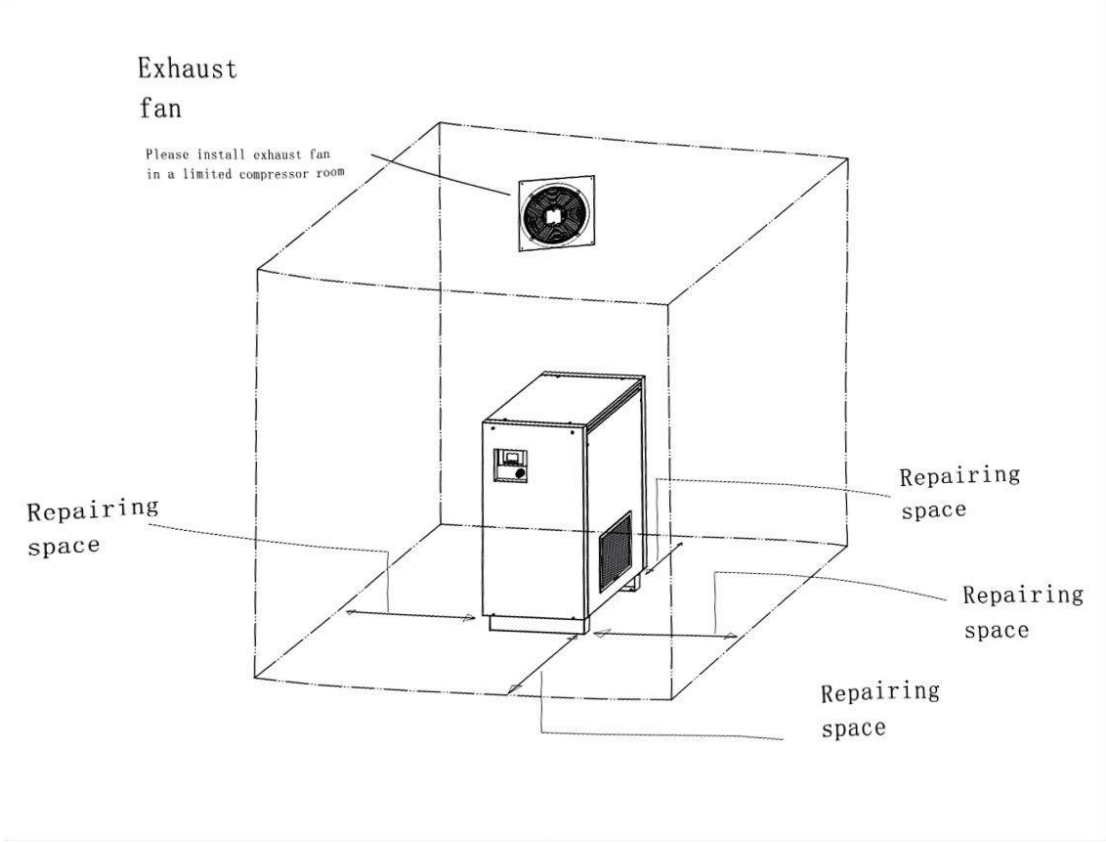
4.1 Installation, acceptance and storage:

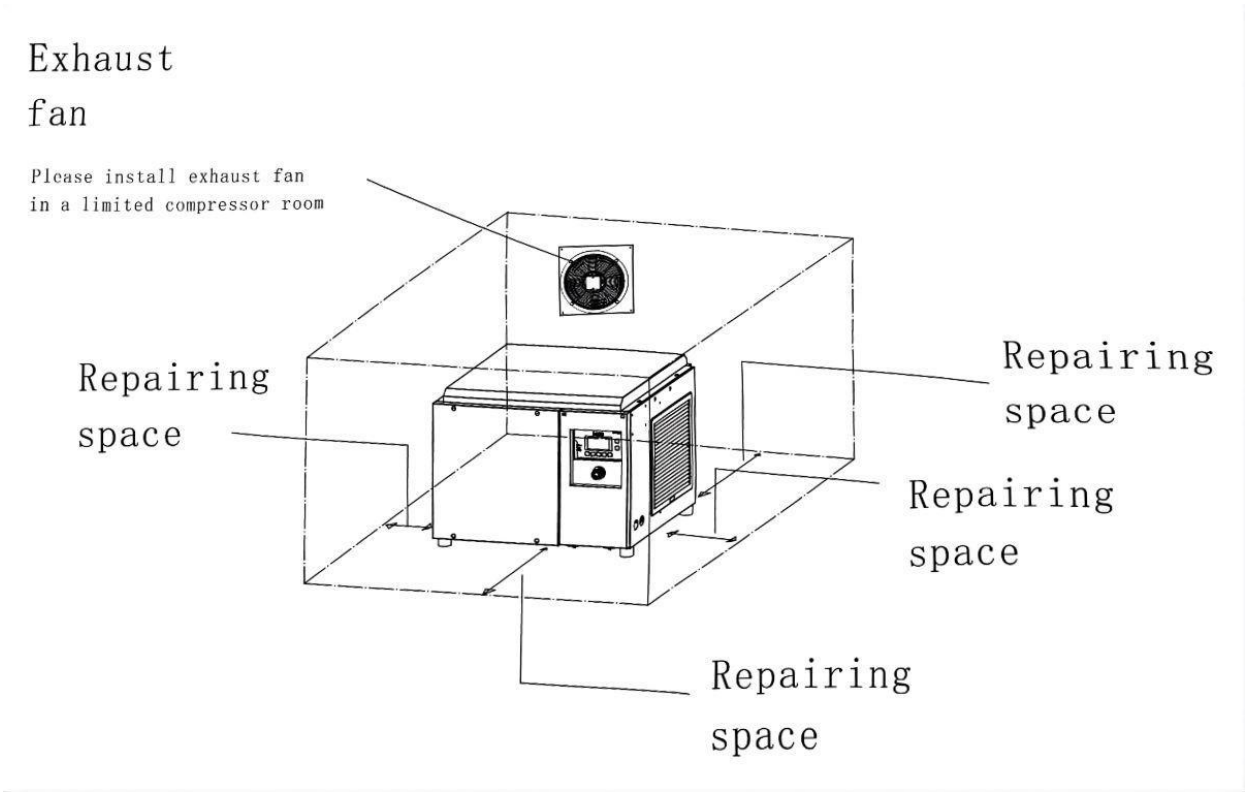
The machine is transported from the factory to the site to be installed in place. The shutdown maintenance and correct maintenance are related to the integrity and normal use of the equipment. Therefore, after receiving the machine, you should immediately check whether there is any damage caused by transportation. If damage is found, the carrier can be asked to sign the shipping documents and make a damage report. If you did not find it in time at that time, but found concealed damage afterwards, please inform the carrier within 15 days after receiving the goods and ask the carrier to make a damage report. A detailed report is very important for the handling of losses (claims).

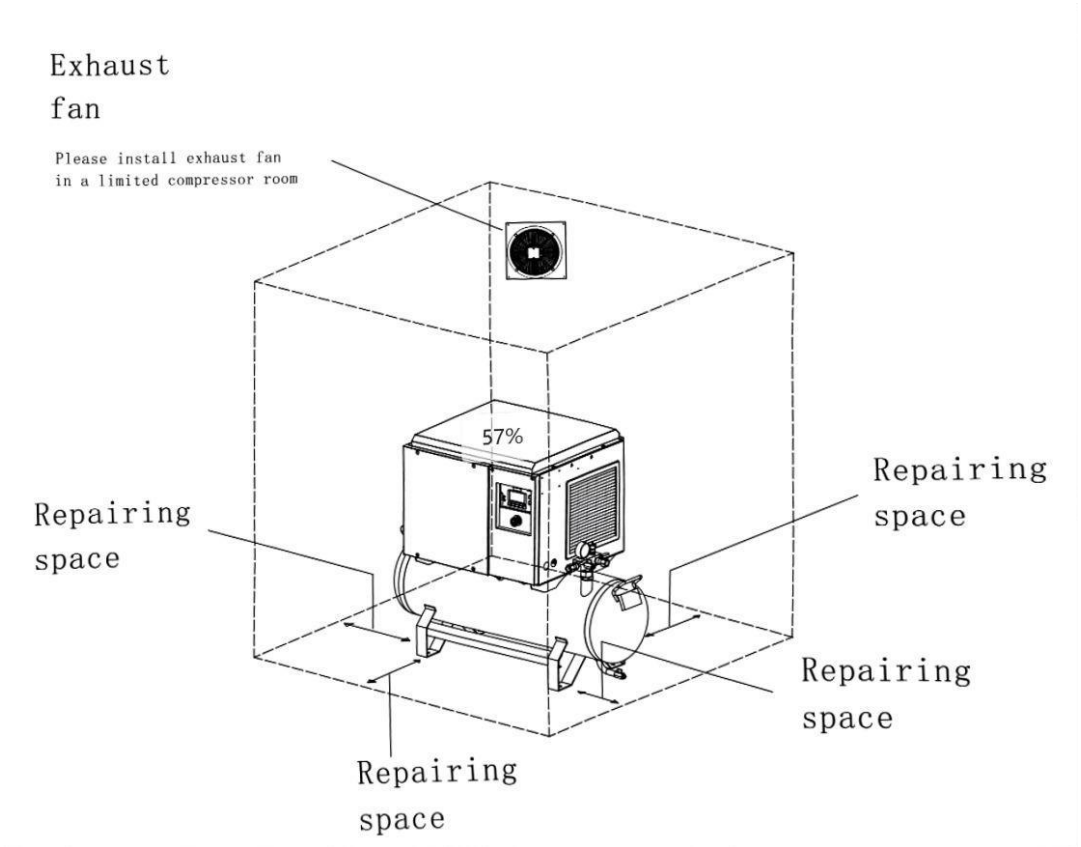
Check the compressor nameplate to determine if the unit is the model and size you purchased, and whether the options are included. At the same time, check the air oil separator tank and safety valve to confirm whether the design or set pressure is correct. For the unit that is temporarily not installed or will not operate for a long time, a protection and maintenance plan must be set to ensure the normal operation of the unit, especially the main engine head.

4.2 Installation and positioning

This series of compressors is suitable for indoor environments. Place the compressor in a clean, well-ventilated environment with a solid foundation and sufficient space around the machine for safety and ease of maintenance and daily inspections.(in the vicinity of the compressor and Reserve at least 1.2 meters of space at the top, see Figure 4-1).




Exhaust
fan
Please install exhaust fan
in a limited compressor room
Repairing
space
Repairing
space
Repairing
space
Repairing
space


Exhaust
fan
Please install exhaust fan
in a limited compressor room
57%
Repairing
space
Repairing
space
Repairing
space
Repairing
space

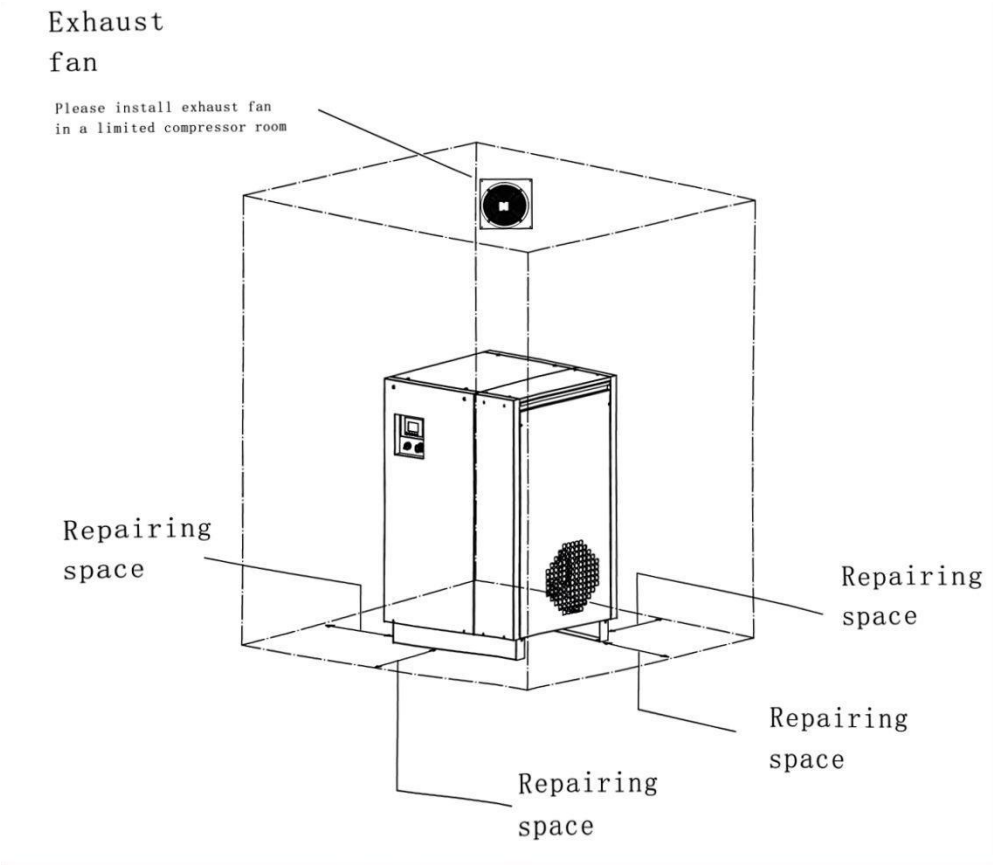


Figure 3-2 Installation space

The ambient temperature of the compressor should not exceed 40°C (104°F). Prevent the hot air discharged by the cooling fan from circulating in the machine room and causing the ambient temperature to rise. In principle, all the fixed screw compressors of ABLE are for indoor installation. After modification, they can also be installed outdoors in some places. Rain, snow, and freezing should be avoided.

: "warning"

The compressor cannot work in an environment below 0°C (32°F) or above the upper limit of the maximum operating temperature.

: "Notice"

The compressor needs enough clean air for normal operation

: "Notice"

Removal or modification of the soundproof cover will generate high noise and endanger human health.

: "warning"

Do not install or expose the compressor to toxic, volatile, or corrosive air , and do not store substances of similar nature near it, otherwise it will cause serious casualties and property losses.

For the design, installation, and use of the compressor room, please refer to GBJ29-90 "Code for Design of Compressed Air Station".

4.3 Storage and maintenance of the whole machine

When the unit is placed for a long time or stop running for a long time, firstly, we must make sure that the environment is clean and dry, empty the oil and gas barrels, air storage tanks, coolers (especially the water cooler), pipelines, water filters and other parts of the water at the bottom of the accumulation of water, and regularly check the unit's major parts and fittings, clean and ensure that there is no leakage and rust phenomenon, and at least run the unit at least every month for no less than 60 minutes in order to ensure that the main engine head of the safe lubrication. Lubrication; secondly, check carefully before starting the machine, replace the lubricating oil of the unit if necessary, and conduct a 2-hour full-load running test of the unit, record the data, and ask qualified professional service engineers for guidance.

4.4 Installation, piping and electrical wiring

In In any case, the pipe size should not be smaller than the connection size of the compressor discharge pipe.

For the compressor, an air filter is essential and should ensure that the ambient air is as clean as possible.

4.5 Precautions for piping, foundation and cooling system

4.5.1 Precautions for air pipe piping

1) When piping the pipeline, the pipeline must have an inclination of 1-2 degrees to facilitate the drainage of condensed water in the pipeline.

2) The pressure drop of the piping should not exceed 5% of the set pressure of the air compressor, and it is better to choose a larger pipe diameter than the design value.

3) The branch pipeline must be connected from the top of the main pipeline to prevent the condensed water in the pipeline from flowing into the working machine or returning to the air compressor.

4) Do not reduce the main pipeline arbitrarily. If necessary, reduce or enlarge the pipeline, use a reducer.

When the air flows in the pipe, frictional resistance is generated in the straight pipe section: local resistance is generated at the valve, tee, elbow, reducer, etc., which leads to air pressure loss. The pressure drop within a length of pipeline can be checked from Table 4-1:

Table 4-1: Flow rate-piping pressure drop Kg/cm²-(100m)

Flow	Diameter (mm)					
m³/min	DN15	DN20	DN25	DN32	DN40	DN50
0.8	5.87	1.23	0.339	0.0858	0.038	
1.0	9.18	1.92	0.53	0.134	0.059	0.0157
1.6	23.5	4.9	1.36	0.343	0.152	0.0428
2.0		7.66	2.12	0.536	0.237	0.0668

Instruction:

1. The actual pressure drop of straight pipe section = table value x pipe length/(100 xcompression ratio). (Compression ratio=gauge pressure+1)

2. Part of the pressure drop in the pipeline should also be added to the partial pressure loss produced by elbows, reducers, tee joints, valves, etc. These values can be checked from the relevant manuals.

3. For the selection of air compressor post-processing equipment (cold dryer, suction dryer, filter). Precision filter, C series centrifugal oil-water separator, T series mainline filter, A series micro-oil mist filter. H series of active adsorption filters are mainly used in food, medicine, and pharmaceutical factories.

4. For compressed air with system pressure below 1.5MPa, the flow velocity in the delivery pipe must be below 15m/sec to avoid excessive pressure drop.

5. Minimize the use of elbows and various valves in the pipeline to reduce pressure loss.

4.5.2 Precautions for air compressor room ventilation

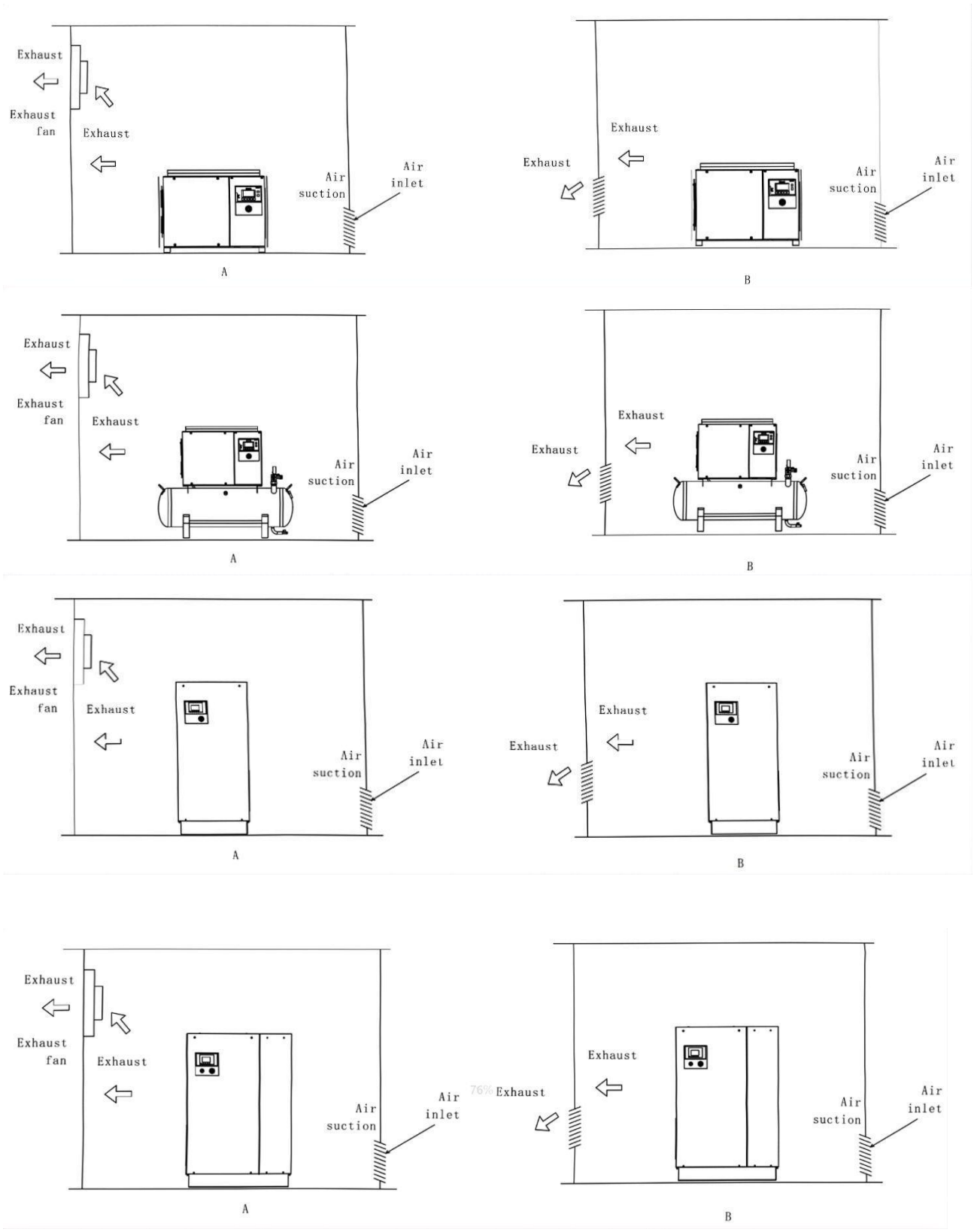


Figure 4-2 Indoor ventilation

When the compressor room is narrow, please install an exhaust fan higher than the side wall of the compressor exhaust port and set the air intake port at a low place on the intake side wall (see Figure 4-2 A). When the compressor is installed in a spacious workshop, please choose a well-ventilated location for installation (see Figure 4-2 B).

4.6 Installation of safety facilities

4.6.1 Safety valve (pressure relief valve)

The safety valve is a pressure relief device used to protect the system. It has been set at the factory. You cannot change its pressure setting or block this valve at will. Only safety valve manufacturers or qualified agents can carryout this work. The air discharged from the safety valve should be led to a safe place away from the crowd.

: "warning"

It is not allowed to change, weld, repair or reprocess GB (or SAA) pressure vessels, and it is not allowed to use them under conditions exceeding the rating of the nameplate, otherwise it will affect the insurance clauses and cause serious personal injuries and property losses.

4.6.2 Protective cover

All mechanical movements have different degrees of danger, so a protective cover should be provided. This series of units is fully equipped with necessary protective facilities in accordance with national and industry standards. Users should check and maintain them regularly and cannot be changed or dismantled at will.

4.6.3 Manual vent valve and shut-off valve

It is recommended to install a manual vent valve in the customer's air system. The purpose of installing the manual vent valve is to discharge the air in the compressor and its exhaust pipe to the atmosphere. When the system air tank is only used with a single compressor, the vent valve can be installed on the air tank. If a shut-off valve is installed in the system, the manual vent valve should be installed upstream of the shut-off valve. This configuration ensures maintenance and personnel, and equipment are in a safe state during maintenance.

If it is only to isolate the compressor from the system for maintenance, please be careful not to replace the stop valve with a check valve.

: "warning"

The manual vent valve must be opened before servicing the machine to vent the pressure in the compressor and the system. Negligence in reducing the pressure of the system may cause serious personal injury, death, and property damage.

4.7 Electrical installation

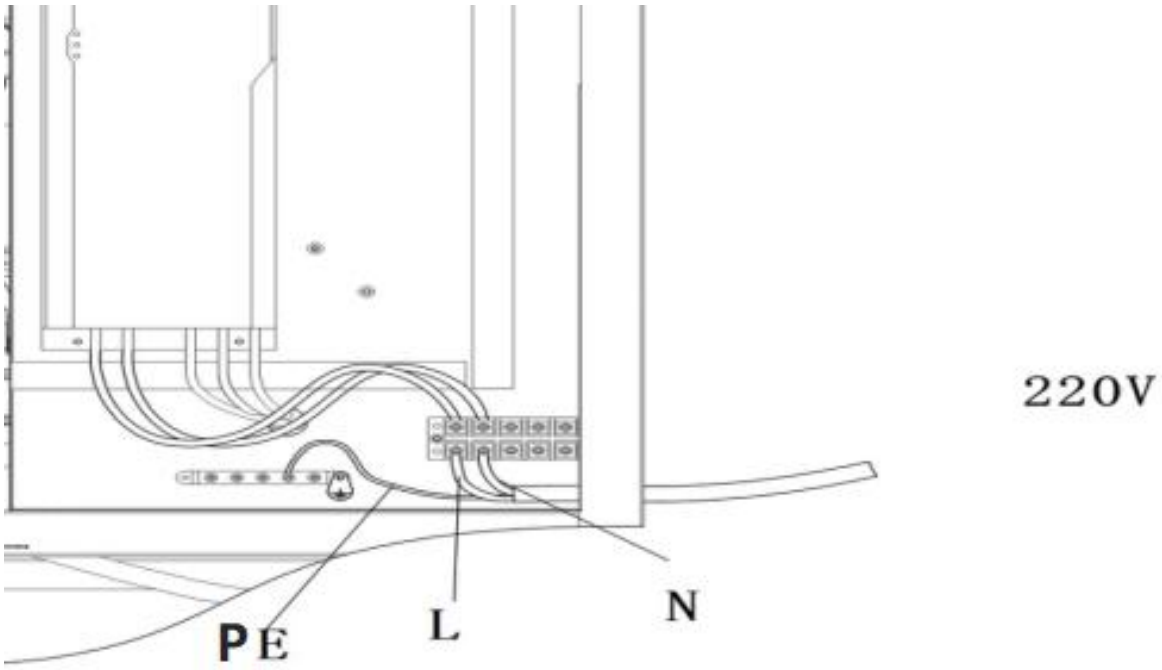
Before installation, check whether the power supply, power cord, and transformer capacity are consistent. Appropriate fuses or circuit breakers should be equipped during installation. The unbalance between voltage phases must be limited to less than 5% to prevent overcurrent caused by low voltage. User power cord and air switch selection, see Table 4-2 for details, user air switch current specifications are selected at 1.5-2 times the total current. The compressor must be well grounded, see electrical wiring diagram.

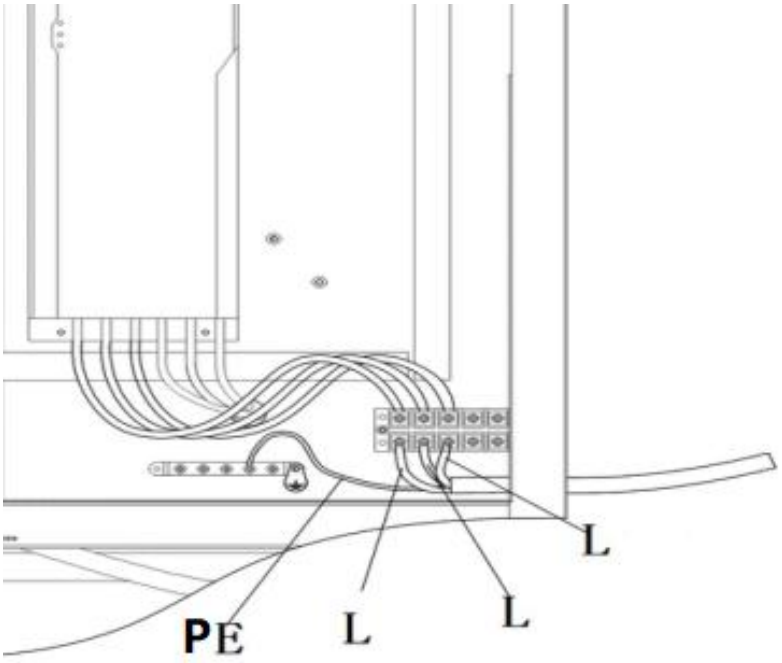
Table 4-2: User power cord and air switch selection

Voltage (V)	Rated power(kW)	Line current(A)	Calculation of current-carrying capacity of customer power cord diameter at 40℃	User air switch specifications are not less than the following current (A)
220	2.7	20	3*4mm²	32
380	2.7	6	4*2.5mm²	16
220	3.7	26	3*4mm²	40
380	3.7	8	4*2.5mm²	20
220	4.5	27	3*4mm²	40
380	4.5	8	4*2.5mm²	20
220	5.5	35	3*6mm²	50
380	5.5	11	4*2.5mm²	25
220	7.5	55	3*10mm²	100
380	7.5	14	4*4mm²	32
380	11	21	4*6mm²	32
380	15	35	4*6mm²	50

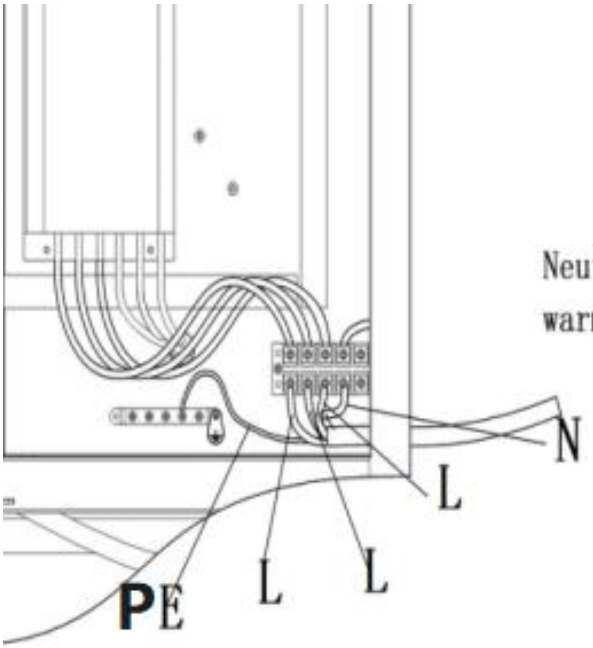
2. If the power distribution cabinet is far away from the air compressor, the wire diameter needs to be increased accordingly to prevent excessive voltage drop from affecting the operation of the machine.

4.8 Wiring diagram (open the inverter cover):





380V



380V

Neutral wire (for cold dryer or warmer)

Chapter 5 Operating Rules

5.1 Overview

This series of screw compressor units are equipped with a series of control elements and display/indicating elements. To ensure the normal operation of the unit, the operator needs to be able to operate the machine correctly, and it is also required that the operator can make correct judgments on the operating status or fault conditions of the unit based on the displayed/indicated values or conditions. Before starting the unit, the operator should be familiar with the position, function and usage of the control/control elements and display/indication elements. Refer to the controller manual for details.

5.2 Ready to start

1) Remove the debris and tools around the compressor.

2) Remove the bolts or devices for transportation and fixation.

3) Check the oil level to make sure it is in the normal position (see Lubricants section).

4) Check the fan to make sure it is installed firmly.

5) Check whether all pressure pipe joints are firm and not loose.

6) Open the air supply valve.

7) Check and make sure that the safety valve is installed in place.

8) Check whether all cover plates and protective devices are safe and firm.

9) Check whether the current setting of the fuse, circuit breaker or controller is suitable and whether the setting is correct.

10) Check whether the air filter is installed reliably.

11) Turn on the power switch, the screen light is on. Jog the start button to ensure that the compressor steering is consistent with the prescribed steering.

12) For integrated air compressors with cooler, please turn on the cooler switch first.

5.3 Routine start-up steps

1) Open the shut-off valve leading to the air supply system.

2) Press the start button after presetting the control parameters.

3) Observe whether the compressor has abnormal vibration, noise, or air /oil leakage after starting. If any problem is found, please stop it immediately and make corrections.

4) Close all the soundproof cover doors to control the noise of the unit and ensure the normal flow of cooling air.

5) Slowly close the air supply shut-off valve and check whether the unit is unloaded according to the setting.

6) Check whether the indicated value of each status parameter is normal.

7) Observe the compressor carefully during the first hour of operation, and periodically thereafter. If there is any abnormality, stop the compressor for maintenance.

8) After the initial operation, shut down according to the shutdown procedure, and check whether the oil tank needs to be filled with lubricating oil; check whether the connections are loose.  "Notice"：

①Condensate should be drained from the bottom of the oil and gas drum periodically. Drain condensate before starting the unit.

②Condensate should be drained from the bottom of the control line filter on a regular (weekly) basis. Drain condensate before starting the unit.

5.4 Shutdown procedure

5.4.1 Press the stop button.

5.4.2 Close the shut-off valve leading to the air supply system.

5.4.3 Turnoff the power switch.

"Caution": Closing the shut-off valve during shutdown can prevent the compressed air of the air supply system from flowing back to the compressor due to the damage of the check valve, causing leakage and damage to the mechanical parts.

Emergency stop: In abnormal conditions, press the emergency stop/reset switch to stop, and cut off the power switch.

Chapter 6 Maintenance

6.1 Preparation before maintenance

To ensure the normal operation and long service life of the unit, good maintenance is the key. Therefore, the maintenance procedures for screw compressor units must be carefully implemented. Before proceeding with maintenance, please carefully read the safety rules in Chapter 1 of this manual, and make at least the following preparations:

1) Cut off the power of the host and hang a sign on the power switch.

2) Close the shut-off valve leading to the air supply system to prevent the compressed air from flowing back to the repaired part.

3) Open the manual vent valve to vent the pressure in the system and keep the vent valve in an open state.

4) Ensure that the compressor unit is cooled to prevent scalds and burns.

5) Wipe offoil and water marks on the ground to prevent slippage.

"warning"

- Don't think that the machine is shut down, just think that it can be overhauled and maintenance work, the automatic control system of the machine will start the compressor at anytime.
- Poor maintenance not only affects the normal operation of the unit, but may also affect the safety of operators.
- When the compressor is running or under pressure, do not disassemble nuts, filler plugs and other parts.
- Do not use flammable solvents such as air oline or kerosene to clean the air filter or other parts. Safe solvents should be used according to the instructions.

6.2 Maintenance of screw compressor

"Attention": Only trained and qualified maintenance personnel are qualified to perform maintenance on the machine.

6.2.1 Replacement of air filter element:

1. Unscrew the clips on both sides of the air filter housing

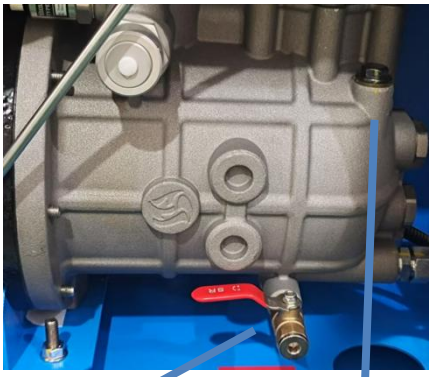
2. Replacement of filter cartridges

6.2.2 Cooling oil replacement:

1. Prepare the container, remove the oil drain plug and release the old cooling oil

Oil
Sight glass

2. Open the refueling plug and add special cooling oil, Recover the plug after reaching the 2/3 to 3/4 position of the oil sight glass



Drain valve

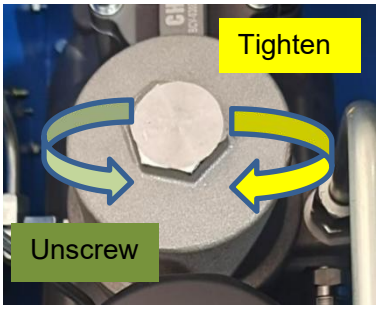
Fuel plug

6.2.3 Replacement of oil filter and oil-air separator:

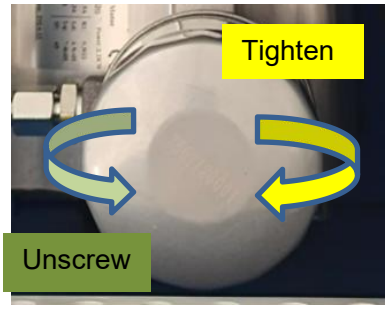
1.Use a belt wrench or special wrench to remove the old product

2.Clean the installation surface, apply a thin layer of cooling oil of the same product name to the new product seal ring, pre-tighten it by hand,and then tighten it with a wrench.

Oil and gas separator



Oil filter



6.3 Maintenance tips and update setting method after maintenance:

Modify the "used time" on the control panel, it can be cleared after this maintenance, and the system will automatically restart timing.

6.4 Maintenance plan

Period(number of hours)	Recommended actions	Spare parts set
500 hours or 1 month (whichever comes first)	Check the oil level Clean the air filter Check the control switch cable screw Check the seal (each joint, air pipe) Clean the radiator (exterior) Air tank blow down Cleaning and dust removal inside the screw machine	Consult the manufacturer for spare parts
2000 hours or one year (whichever comes first)	Replace the special lubricating oil for screw machine Replace the oil filter Replace the oil fine separator Replace the air filter element Check the control switch cable screw Check the seal (each joint, air pipe) Clean the radiator (exterior) Air tank blow down Cleaning and dust removal inside the screw machine	Consult the manufacturer for spare parts
8000	（In addition to maintenance items every 2000 hours） Clean oil and air separator oil Clean the oil return check valve（Replace if necessary） Clean the intake valve（Replace if necessary） Control（Finally changed）motor bearing Clean the radiator（Inside and outside）	Consult the manufacturer for spare parts
20000	（In addition to maintenance items every 8000 hours） Replace the main engine bearing	Consult the manufacturer for spare parts

This maintenance program is based on all installation and operating parameters recommended by the manufacturer.

The manufacturer recommends setting up a compressor maintenance work log for later maintenance and repair.

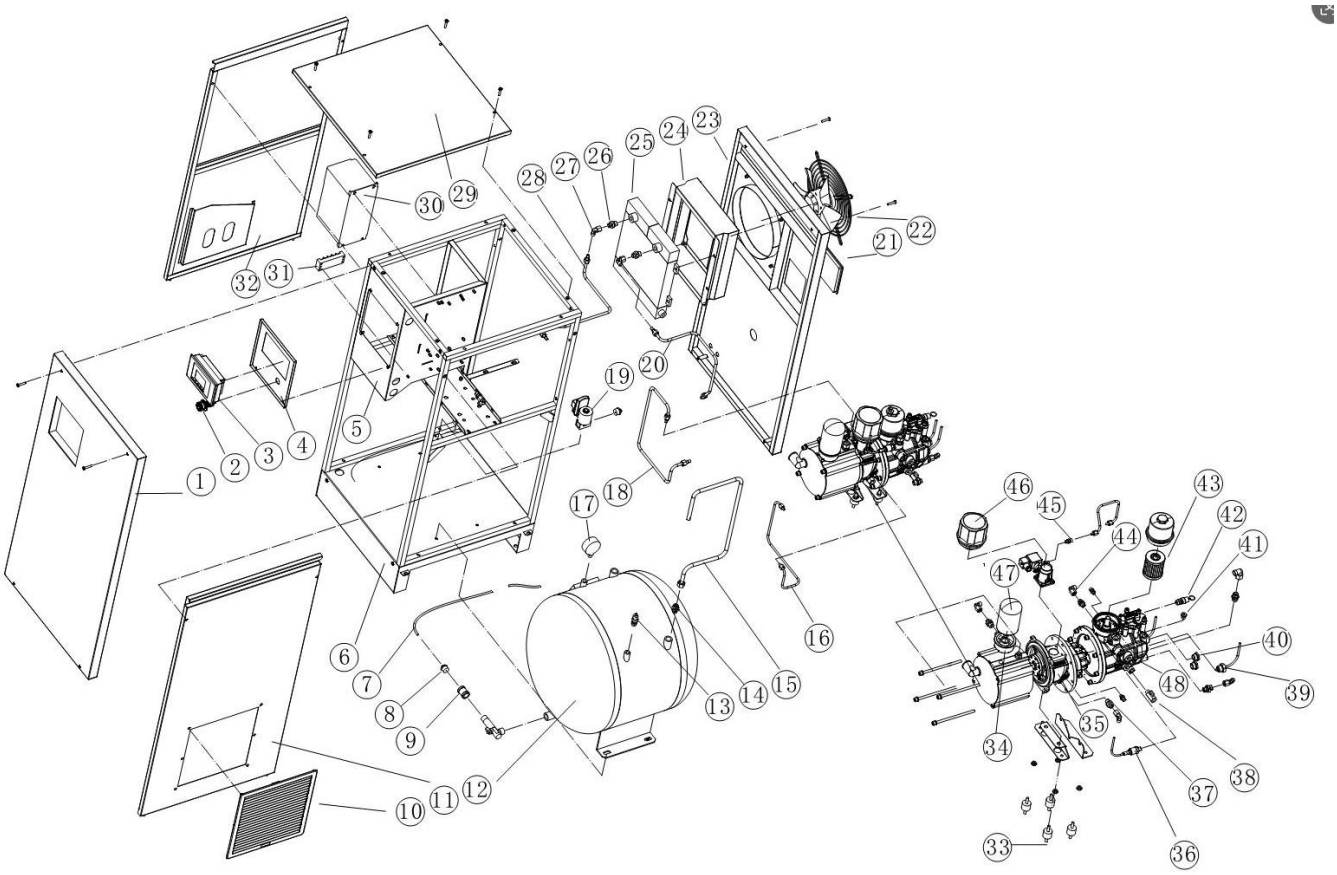
The operating hours shown in the table refer to the optimum use of the machine and may change depending on the workplace and the number of cycles.

6.5 Common troubleshooting table（Power and air must be cut off during manual inspection）

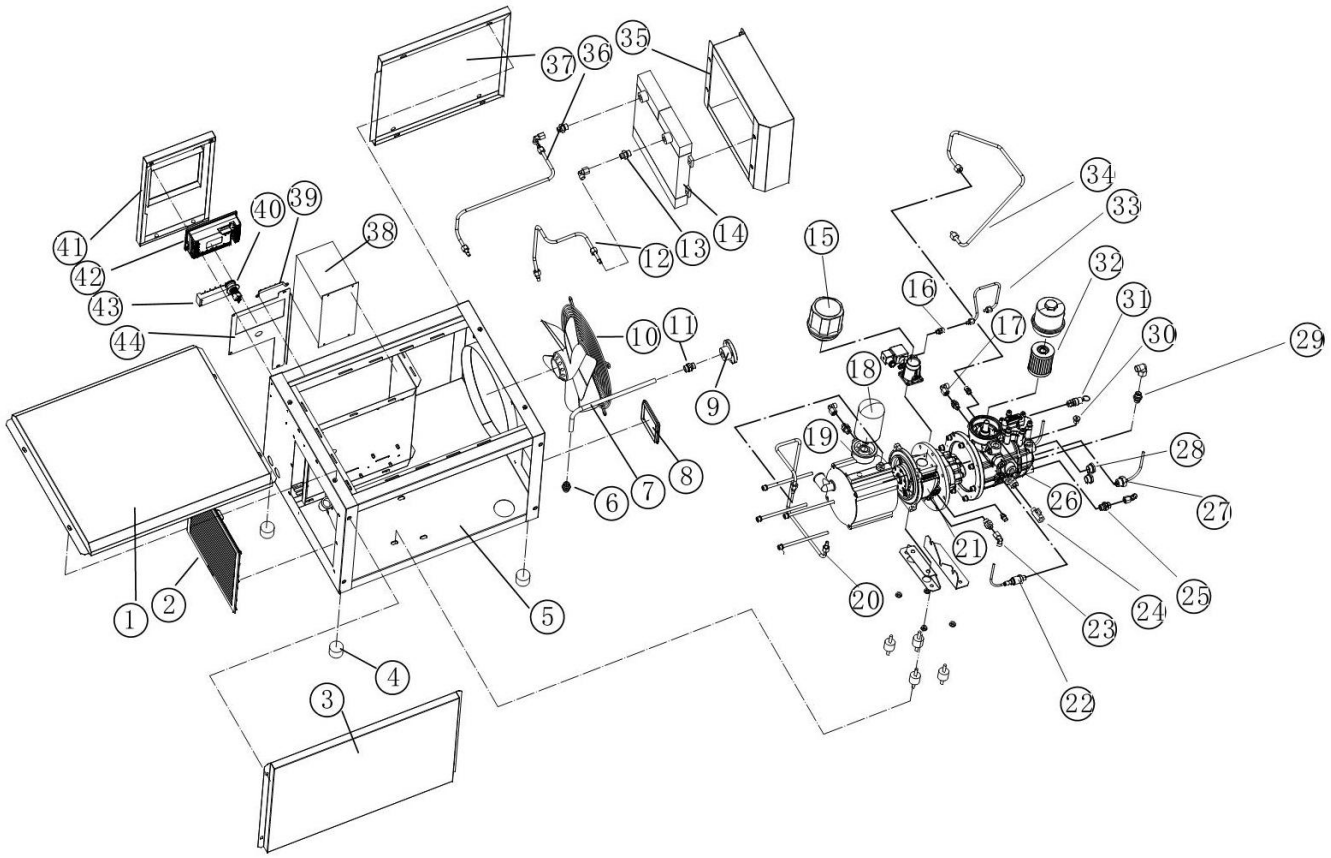
problem	reason	solution
Too high oil temperature causes shutdown	The exhaust temperature of the body is too high (maximum 105℃)	- Check the oil level; - Check the cleanliness of the cooler - Check if the fan is working properly - Check whether the temperature sensor is working properly The reset button must be pressed before restarting the machine. If high temperature occurs repeatedly, please contact the service center
Motor overheated causing shutdown	- The voltage is too low. - Motor temperature is too high - Power consumption is too high	- If the machine is turned on when a fault occurs, check whether the phase sequence is stable; - If the machine is running when the malfunction occurs, confirm the internal pressure and replace the oil/air separator after stopping the machine. - If the current of the motor is higher than the rated current, please contact the technical staff of the service center. - Don't force start, so as not to cause more damage to the compressor control board. - Check whether the voltage and frequency match
Safety valve open	-Pressure sensor failure -The set pressure exceeds the set value of the safety valve -Oil fine separator blocked	- Check whether the pressure sensor and barometer parameters are normal - Check whether the setting value of the control panel matches the safety valve parameter - Replace the safety valve - Remove and replace the oil fine separator
The compressor is running, But the pressure is too low	- The intake valve is not open. - Pressure cannot be increased due to leakage - Transmission element blocking	- When the air compressor is stopped and the internal pressure is safe, remove the air filter and check whether the valve can move - Check the pipeline for leaks - Check carefully whether the motor is running but the body is not running. - Contact the service center

Air filter injection	- High oil level - Dirty return check valve - Faulty oil-air separator - Intake valve draining fast.	- Drain excess oil at stop and check oil level. - Remove the oil return check valve to clean and replace if necessary. - Replace oil-air separator and clean core tube. - Readjust drain rate
Main motor overload	- Low voltage - Power supply out of phase - High oil and gas tank pressure	- Checking the input power supply - Check that the three-phase input of the power supply is similar and reliable. - Check for loose terminals - Check that the cables are not damaged. - Check that the main motor is well ventilated. - If the motor has only two-phase input, have it checked by a qualified technician.（If the motor has only two-phase inputs, have it checked by a qualified technician.) - If the pressure difference between the oil and gas tanks is greater than 1 bar, this will result in high energy consumption in the system. Have the system checked by a qualified technician. - High ambient temperature: ventilation - Restart the machine and press the reset switch on the control panel.
Excessive fuel consumption	- Oil-air separator failure -Coolant not suitable for compressor. - Air/oil separator Filter element worn out or defective. Worn or defective filter element. - Oil level too high.	-Replace the oil-air separator. - Replace the coolant by filling the machine with coolant specified by the manufacturer. - Clean or replace the oil return check valve. -Replace with new parts. -Drain excess coolant until the correct position is reached as specified in the manual.

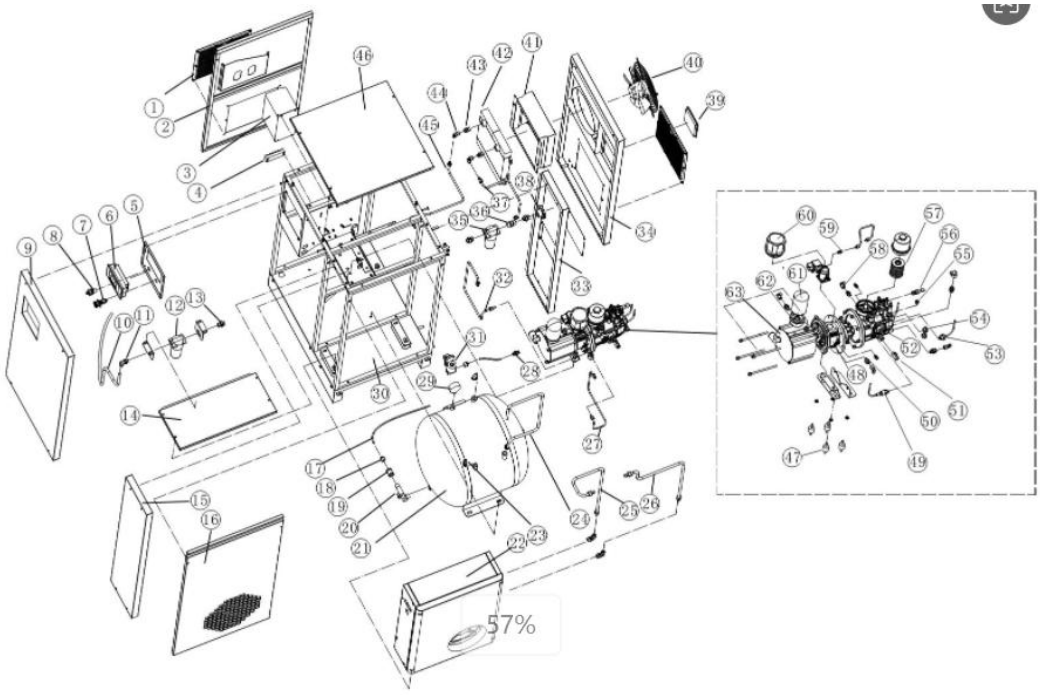
6.6 Schematic diagram of screw fitting explosion



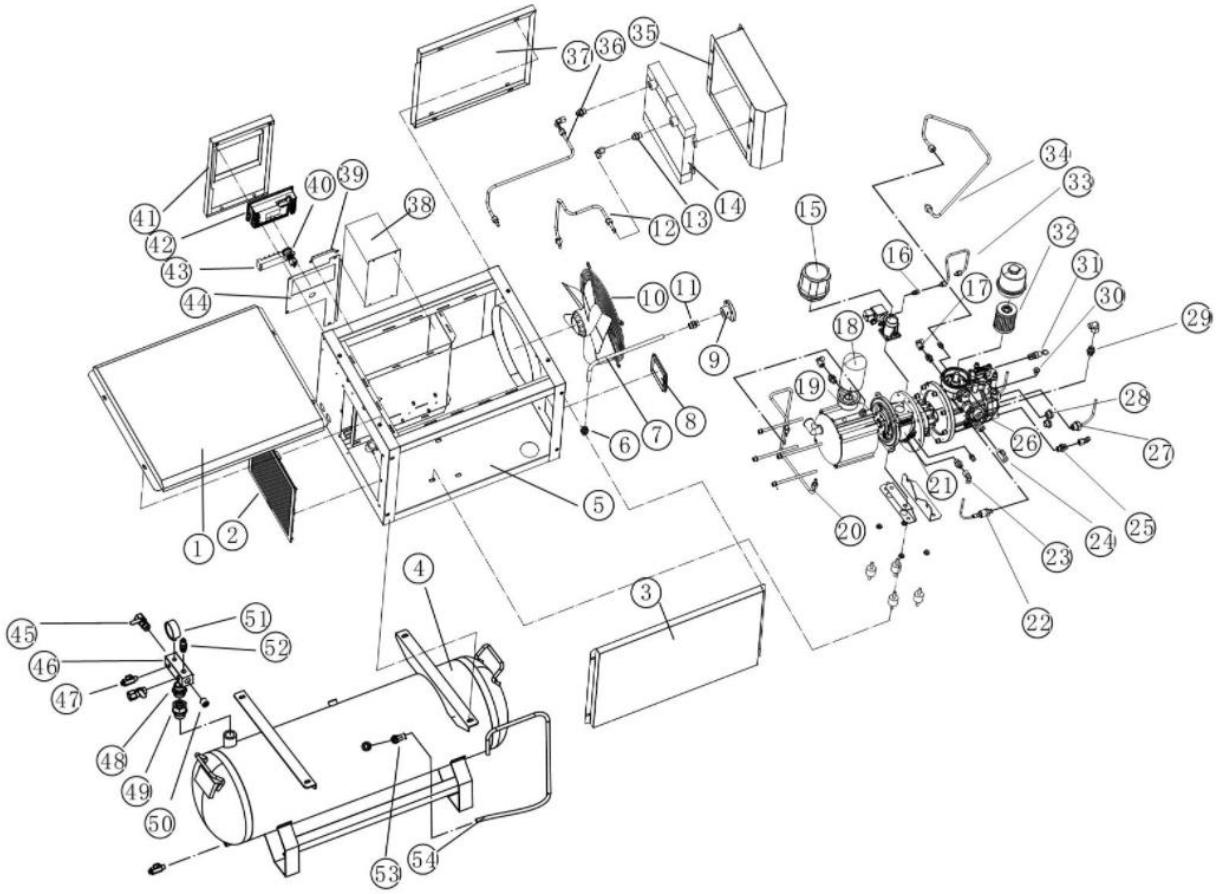
NO	Part Name	Quantity	NO	Part Name	Quantity	NO	Part Name	Quantity
1	Front Door Panel	1	21	Viewing Window	1	41	G1/4 Fueling Plug	1
2	Emergency stop switch	1	22	Cooling Fan	1	42	Oil drum safety valve	1
3	Operation Panel	1	23	Rear door panel	1	43	Built-in oil separator	1
4	Screen Mounting Plate	1	24	Air Guide Hood	1	44	Elbow M12X1.5 nut	1
5	Electrical Box	1	25	Cooler	1	45	Fitting G1/4-M12X1.5	4
6	Chassis	1	26	Connector G3/8-M14X1.5	6	46	Air filter assembly	1
7	Drainage pipe	1	27	Elbow M14X1.5 nut	5	47	Oil filter	1
8	Quick plug G1/2-tube 6	3	28	Cooler outlet pipe	1	48	Oil drum	1
9	Double Female Fittings	1	29	Top cover	1	49		
10	Filter	1	30	Inverter	1	50		
11	Right door panel	1	31	Wiring harness	1	51		
12	Gas storage tank 100L	1	32	Left door panel	1	52		
13	Safety valve for gas	1	33	Shock absorber cushion	4	53		
14	Fitting G3/8-M18X1.5	2	34	Oil separator	1	54		
15	Tank inlet pipe	1	35	Main unit	1	55		
16	Unloading pipe	1	36	Pressure Sensor	1	56		
17	Pressure gauge	1	37	Fitting G1/4-M14X1.5	1	57		
18	Oil cooled motor outlet	1	38	Drain valve	1	58		
19	Electronic drain	1	39	Temperature sensor G1/2	1	59		
20	Cooler inlet pipe	1	40	Sight glass	1	60		



NO	Part Name	quantity	NO	Part Name	quantity	NO	Part name	quantity
1	Top Cover	1	17	Elbow 2C9-18	4	33	unloading pipe	1
2	Filter	1	18	Oil Filter	1	34	secondary oil return pipe	1
3	Rear Door Panel	1	19	Oil Filter Holder	1	35	air deflector	1
4	Cabinet Feet	1	20	Oil Cooling Motor Outlet	1	36	cooler oil outlet pipe	1
5	Cabinet	1	21	Main Unit	1	37	front left door panel	1
6	Fitting G3/8-M18X1.5	1	22	Pressure Sensor	1	38	inverter	1
7	Air Outlet Hose	1	23	Elbow 2C9-14	1	39	grounding strip	1
8	Transparent Window	1	24	Drain Valve	1	40	emergency stop	1
9	Exhaust Flange	1	25	Fitting G3/8-M14X1.5	5	41	front right door panel	1
10	Fan	1	26	Oil Drum	1	42	control panel	1
11	Fitting G1/2-M18X1.5	1	27	Temperature Sensor G1/2	1	43	wiring terminals	1
12	Cooler Oil Inlet Pipe	1	28	Oil Mirror	2	44	control panel mounting plate	1
13	Fitting G3/8-M14X1.5	1	29	Fitting G3/8-M18X1.5	1	45		
14	Cooler	1	30	Fuel Plug	1	46		
15	Air Filter Assembly	1	31	Safety Valve	1	47		
16	Fitting G1/8-M12X1.5	4	32	Oil Split Wick	1	48		



NO	Part Name	Quatity	NO	Part Name	Quatity	NO	Part Name	Quatity
1	Filter	2	26	Cold dryer inlet pipe	1	51	Oil drum drain valve	1
2	Left door panel	1	27	Secondary oil return pipe	1	52	Oil Drum	1
3	Inverter	1	28	Bulkhead quick plug	1	53	Temperature Sensor	1
4	Wiring Terminal	1	29	Pressure gauge	1	54	Oil mirror	2
5	Panel mounting plate	1	30	Base	1	55	G1/4 Fuel Plug	1
6	Control Panel	1	31	Electronic drain valve	1	56	Oil drum safety valve	1
7	Emergency stop	1	32	Oil cooler motor outlet	1	57	Oil separator	1
8	Rotary Switch	1	33	Rear right door panel	1	58	Elbow M12X1.5 nut	1
9	Front Left Door Panel	1	34	Rear left door panel	1	59	Direct G1/8-M12X1.5	4
10	Air tank outlet pipe	1	35	Precision filter T	1	60	Air filter assembly	1
11	Elbow G1/2-M18X1.5	4	36	Direct G1/2-M18X1.5(nut)	1	61	Oil filter	1
12	Precision filter C	1	37	Oil cooler inlet pipe	1	62	Oil filter holder	1
13	Direct G1/2-M18X1.5	3	38	Exhaust flange	1	63	Oil cooler motor	1
14	Right top cover	1	39	Transparent sight glass	1	64		
15	Front right door panel	1	40	Cooling fan	1	65		
16	Right door panel	1	41	Air guide cover	1	66		
17	Drain hose	1	42	Cooler	1	67		
18	Quick coupling G1/2-8	1	43	Direct G3/8-M14X1.5	5	68		
19	Double female connector	1	44	Elbow M14X1.5 nut	4	69		
20	Drain valve	1	45	Cooler outlet pipe	1	70		
21	Gas storage tank	1	46	Left top cover	1	71		
22	Cold dryer	1	47	Vibration damping pad	4	72		
23	Gas storage tank safety	1	48	Main unit	1	73		
24	Tank inlet pipe	1	49	Pressure sensor	1	74		
25	Cold Dryer Outlet Pipe	1	50	Direct G1/4-M14X1.5	1	75		



NO.	Part Name	Quatity	NO.	Part Name	Quatity	NO.	Part Name	Quatity
1	Top cover	1	21	Main unit	1	41	Front right door panel	1
2	Filter	1	22	Pressure Sensor	1	42	Control Panel	1
3	Rear Door Panel	1	23	Elbow 2C9-14	1	43	Wiring Terminal	1
4	Gas Tank	1	24	Drain valve	1	44	Control panel mounting	1
5	Cabinet	1	25	Fitting G3/8-M14X1.5	5	45	Ball valve G1/2	2
6	Connector G3/8-M18X1.5	1	26	Oil drum	1	46	Seven barrels	1
7	Outlet pipe	1	27	Temperature sensor G1/2	1	47	Ball valve G1/4	2
8	Transparent window	1	28	Oil mirror	2	48	Connector G1-M36X2	1
9	Exhaust flange	1	29	Fitting G3/8-M18X1.5	1	49	Fitting G1-M36X2(screw	1
10	Fan	1	30	Oil filling plug	1	50	Plug G1/2	2
11	Connector G1/2-M18X1.5	1	31	Safety valve	1	51	Pressure gauge G1/4	1
12	Cooler oil inlet pipe	1	32	Oil separator	1	52	Safety valve G3/8(gas	1
13	Fitting G3/8-M14X1.5	1	33	Unloading pipe	1	53	Elbow G1/2-M18X1.5	1
14	Cooler	1	34	Secondary oil return pipe	1	54	Gas storage tank inlet	1
15	Air filter assembly	1	35	Air Guide Hood	1	55		
16	Fitting G1/8-M12X1.5	4	36	Cooler oil outlet pipe	1	56		
17	Elbow 2C9-18	4	37	Front left door panel	1	57		
18	Oil filter	1	38	Inverter	1	58		
19	Oil filter holder	1	39	Grounding Plate	1	59		
20	Oil cooler motor outlet	1	40	Emergency stop		60		