
KPB-120

Rotary Screw

Air Compressor

Instruction

Manual

Battery Drive

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Kaishan

Oil-injected rotary screw diesel portable compressor

KPB-120

Instruction book

Original instructions

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Safety Information

Thank you for choosing KAISHAN Compressor. Please read this instruction manual carefully before using the compressor. This manual must be kept in the safe place for future reference.

KAISHAN Compressor's authorized distributors provide maintenance service for KPB series rotary screw compressors. A certified technician is required to ensure compressors maintenance is safely handled. By following the instructions in this manual, the user will minimize possibility of an accident throughout the useful life of this equipment.

1.1 OVERVIEW

Kaishan designs and manufactures its products with Safety as the primary feature.

However, the responsibility for safe operation rests with those who use and maintain these products once the product is installed. The following safety precautions are offered as a guide, which if conscientiously followed, will minimize the possibility of accidents throughout the useful life of this machine.

The compressor should be operated only by those who have been trained, authorized to do so and have read and understood this manual. Failure to follow the instructions, procedures and safety precautions can result in accidents and even injuries or death.

It is the responsibility of the owner or hirer of such products to ensure that operators are provided with the manual and are suitably instructed regarding the purpose of the Manual and its Safety Instructions. In addition, operators should be suitably and adequately trained in the use of the product.

1.2 SAFETY ALERT SYMBOLS

Key hazards are used throughout this manual. The level of hazards seriousness is symbolized as follows:



This symbol identifies immediate hazards which will result in severe personal injury, death or substantial property damage.



This symbol identifies immediate electrical hazards which **will** result in severe personal injury, death or substantial property damage.



This symbol identifies immediate hot surface hazards which **will** result in severe personal injury.



This symbol identifies hazards or unsafe practices which could result in personal injury, death or substantial property damage.



This symbol identifies hazards or unsafe practices which **could** result in personal injury or substantial property damage.



NOTICE

Identifies important installation, operation or maintenance information which is not hazard related.

1.3 PERSONNEL PROTECTION

Prior to the installation and operation of the machine, all personnel should be familiar with and comply with the provisions of the operating procedures and local regulations on labor protection equipment, such as: eye and face protection equipment, breathing apparatus, limb protection equipment, protective clothing, protective panels and anti-electric shock equipment, anti-noise equipment, etc.

1.4 RESPONSIBILITY OF THE OPERATOR

The operator's duty of care includes, among other responsibilities, planning and implementing safety measures.

All personnel performing activities with or on the compressor must receive training on the unit, provided by the operator or Kaishan. They must read and fully understand the operating instructions; by signing a confirmation document, they acknowledge compliance with this requirement.

The operator shall maintain these signatures in a dedicated register. Additionally, the operator must keep an up-to-date list of authorized operators.

1.5 OPERATOR TRAINING

To operate the compressor safely, operators must have knowledge of general safety regulations. These regulations include the requirement that operators wear and properly use personal protective equipment (PPE) at all times during operation.

The compressor may only be operated if all general safety instructions and the guidelines outlined in this manual are strictly followed.

The operator is responsible for conducting regular training for authorized personnel to ensure safe operation of the compressor. This training obligation covers:

- ◆ Safe operation and handling of the compressor
- ◆ Mechanical and electrical installations
- ◆ Maintenance procedures



Training must be conducted periodically to reinforce knowledge and address any updates to safety protocols or equipment operation.

NOTICE

1.6 PERSONAL PROTECTIVE EQUIPMENT

To protect against hazards such as mechanical injury, burns, electric shock, and noise during operation, maintenance, or inspection of the oil-injected screw compressor, personal protective equipment (PPE) is mandatory.

Wear specified PPE before starting any work, as outlined in relevant sections of this manual.

All PPE must comply with Regulation (EU) 2016/425 and applicable EN standards

Follow additional PPE instructions posted in the work area.

	Protective gloves Protective gloves are designed to protect the hands from rubbing, scratches, splinters or more serious injuries because of touching hot or cold surfaces.
	Ear protection Is designated to protect against hearing damage.
	Safety helmet Used to protect against head injuries.
	Protective glasses Are designed to protect the eyes from flying small parts and liquids.
	Light respiratory protection The light respiratory protection is designed to protect against toxic dust.

	Protective shoes Protective shoes are designed to protect against falling parts and materials as well as from sharp objects.
	Protective work clothes Protective clothing is well-fitting workwear with low tear strength, with sleeves and without protruding parts. It is mainly used to protect against movement by moving machine parts. Do not wear rings, chains, jewelry and uncovered long hair

1.7 CONTROL OF HAZARDOUS SUBSTANCES

Your attention is drawn to the following list of substances used in a motor Driven Air Compressor which may expose personnel to risk if swallowed or if skin or facial contact is allowed:

- ◆ Compressor lubricating oils and greases
- ◆ Corrosion Inhibitors and Conditioners
- ◆ Battery Acid

1.8 FIRE AND EXPLOSION PROTECTION

Clean up spills of fluid or inflammable substances immediately.

Avoid spark, flame or inflammable substances. Never smoke near the machine when observing or filling fluid. Service shall be carried out when the machine is stopped and compressor completely cools down.

An explosive atmosphere is a mixture with air, under atmospheric conditions, of flammable gases, vapors, hazes or dusts in which, after ignition has occurred, combustion propagates to the entire unburned mixture and may cause a hazard.

A potentially explosive atmosphere is an atmosphere which could be explosive due to local site conditions.

Do not permit fluid to splash on acoustic material or accumulate on the compressor lower surfaces and inside of cabinet. Wipe down using an aqueous industrial cleaner or steam – clean as required. If necessary, replace acoustic material and clean all surfaces. Any acoustic material with a protective covering that has been damaged should be replaced immediately to prevent accumulation of fluid within the material. Do not use inflammable detergents.

In case welding is necessary when repairs, clear acoustic materials and other inflammables or heat sensitive articles out of site; Sufficient fire extinguishers shall be provided when servicing or operating the compressor;

Clear away inflammable materials such as oil cloth or paper near the compressor;

If the cooling system or lubrication system is not working correctly (poor circulation of cooling air or fluid), do not start the machine;

Do not operate the compressor in a dangerous condition.

1.9 PRESSURE

Use only Certified pressure vessels of adequate working pressure, others could explode.

Distribution pipework and hoses must be the correct size and suitable for the working pressure involved. If working pressures are above 7bar it is recommended that hoses incorporating safety wires are used.

Do not use frayed, damaged or deteriorated hoses. Always store hoses properly and away from heat sources. A hose failure will cause injury.

Use only the correct size hoses and hose end fittings. Use clamps made specifically for compressed air application. If using compressed air to clean down equipment take care not to blow debris onto yourself or other persons and wear eye protection. When blowing through a hose or airline ensure the open end is held securely. A free end will cause whip and can cause injury. Open the air valve slowly and ensure any ejected particles are restrained.

1.10 MOVING PARTS

Keep hands, arms and cloths away from the coupling and fans of the compressor. Do not remove any guards or cabinet panels or attempt to service any compressor part while the compressor is operating.

1.11 HOT SURFACES

Do not touch any hot surface and parts during the compressor's operation. Keep all body parts away from air/oil receiver tank, steel tubing, air end and after-cooler. Wear personal protective equipment including gloves while servicing the compressor.

1.12 PROPER COMPRESSED AIR APPLICATIONS

Air from this compressor will cause severe injury or death if used for breathing or food processing. Air used for those processes must meet OSHA and applicable industry regulations. This compressor is designed for use in the compression of normal atmospheric air only. No other gases, vapors or fumes should be exposed to the compressor intake, nor processed through the compressor. Keep personnel away from the compressed air discharge. Use compressed air for cleaning purpose, only with effective chip guarding and personal protective equipment which meet OSHA standard and/or any federal, state, local codes, standard and regulation.



Never apply compressed air directly onto skin, do not use compressed air to blow dust from clothing or overalls.

Do not operate a compressed air system above the pressure rating which it has been designed to operate. Shut off appropriate air valves at the compressor before disconnecting a hose or airline.

1.13 LIFTING AND TRANSPORTATION

The designated lifting point or points provided on a mobile compressor are designed primarily for the vertical loading associated with the transfer of the compressor between the ground and a transportation vehicle.

Transport by suspending from the lifting point or points over rough terrain is not recommended, but if absolutely necessary, care must be taken to avoid lateral or shock loading of the lifting points by suitably restraining any swinging motion of the compressor with respect to the suspension device. Hoisting equipment shall be capable and comply with local safety standards.

Check the tow bar, braking system and coupling. Check the wheels are secure and the tyres are in good condition and inflated correctly.

Connect the lighting cable to the towing vehicle and ensure all lights and indicators are working correctly.



Do not lift machine when the wind is strong.

1.14 BEFORE TOWING THE UNIT (IF APPLICABLE)

Ascertain that the pressure vessel(s) is (are) depressurized.

Check the tow bar, the brake system and the towing eye. Also check the coupling of the towing vehicle.

Check the towing and brake capability of the towing vehicle.

Check that the tow bar, jockey wheel or stand leg is safely locked in the raised position.

Ascertain that the towing eye can swivel freely on the hook.

Check that the wheels are secure and that the tyres are in good condition and inflated correctly,

connect the signalization cable, check all lights and connect the pneumatic brake

Attach the safety break-away cable or safety chain to the towing vehicle,

Remove wheel chocks, if applied, and disengage the parking brake.

To tow a unit use a towing vehicle of ample capacity. Refer to the documentation of the towing vehicle. If the unit is to be backed up by the towing vehicle, disengage the overrun brake mechanism (if it is not an automatic mechanism). Never exceed the maximum towing speed of the unit (mind the local regulations).

Place the unit on level ground and apply the parking brake before disconnecting the unit from the towing vehicle. Unclip the safety break-away cable or safety chain. If the unit has no parking brake or jockey wheel, immobilize the unit by placing chocks in front of and/or behind the wheels. When the tow bar can be positioned vertically, the locking device must be applied and kept in good order.

1.15 MAINTENANCE AND SERVICE

Ensure a "Work in Progress" or other similar sign is prominently displayed on the unit whilst service or repairs are being carried out. Remove the ignition key. If the compressor is to be left under repair and unattended remove the key and disconnect the battery. Check all pressure is released internally before removing any plugs or hoses. Apply the brakes and chock the wheels to prevent the unit moving whilst work is being undertaken.

Always support the unit on axel stands if working underneath, do not rely on jacks alone to support the weight of the unit. Ensure that the doors are supported correctly when open. Doors can easily slam shut. Always use correct tooling especially lifting gear, hoists and jacks. Do not weld or perform any operation involving heat near fuel or oil systems. Do not weld or make temporary repairs to any pressure vessel. Check all safety switches are working by simulating fault conditions if possible. NEVER bypass a safety switch.



NOTICE

NEVER use alternative spare parts or mix lubricants of different brands or grades.

Ensure all waste products and lubricants are disposed of in accordance to local sight rules and conditions. This specifically applies to oils, greases, anti-freeze, inhibitors and conditioners.



NEVER allow these products to enter the industrial or domestic wasted water systems.

1.16 NOISE SAFETY PRECAUTIONS

Prolonged exposure to the screw air compressor's operational noise may cause hearing damage; to comply with Machinery Directive 2006/42/EC and DIN EN 1012-1, refer to the data sheet for noise emission values.

Note that abnormal noise indicates mechanical faults. Conduct routine inspections of noise-control components, and tighten loose parts or replace worn components promptly to maintain noise suppression. Ensure operators complete noise safety training, do not modify factory-installed noise-control features, and verify that noise emissions do not exceed local occupational limits) or relevant standards. Contact Kaishan technical support if abnormal noise persists.



NOTICE

The sound level is listed in the machine data sheet of the respective com-pressor.

Exposure to high noise levels poses a risk of injury, particularly hearing damage. To mitigate this risk:



- Always wear appropriate hearing protection when operating or working near the compressor.
- Ensure workstations are positioned at a safe distance from the compressor, as specified by the noise emission levels.
- Regularly check and maintain the compressor to prevent abnormal noise that may indicate mechanical issues.

1.17 BATTERY PRECAUTIONS

If the battery malfunctions, contact the manufacturer immediately, do not open the battery casing for self-repair.

Reverse charging of the battery is strictly prohibited.

Before charging/discharging, ensure the Battery Management System (BMS) is properly connected and functioning stably to maintain system communication.

Do not operate the equipment in areas with strong static electricity or magnetic fields, as this may damage safety protection devices and cause battery ignition.

Keep the battery system/battery box away from heat sources and open flames; avoid prolonged exposure to direct sunlight. Do not bake or heat lithium batteries with hot water (this may cause explosions); high-temperature operation is forbidden.

Do not place the battery pack in water or high-humidity environments to prevent leakage or insulation failure.

Unauthorized modification or disassembly of the battery system/battery box is strictly prohibited. Non-professionals are not allowed to disassemble the battery to prevent foreign objects from entering the pack (which may cause combustion or explosion).

Use only the battery charger specifically designed for this equipment, do not use other chargers to avoid battery damage.

Do not connect this battery in series or parallel with batteries of other models/brands.

Prevent water ingress and corrosion of diagnostic ports, connectors, etc.

Do not mix this battery box with batteries of other models/brands.

Do not directly contact the battery box or battery system's positive/negative poles with metals or other conductors (to avoid short-circuit ignition). Also, do not place the battery pack in contact with items that may cause short circuits.

Avoid mechanical damage to the battery box (e.g., squeezing, puncturing, impact).

If dust, metal particles, or other debris accumulate on the battery pack's top cover or poles, clean with compressed air or a dry cloth, do not use water or wet materials.



If the temperature of the battery system rises sharply and the smell is abnormal, stop it immediately and turn off the power. If smoke or fire occurs, stop and turn off the power supply.



Use Water-based fire extinguishers to extinguish fire under the condition of ensuring personnel safety.



It is strictly forbidden to touch the positive and negative poles of the battery box with both hands at any time.

1.18 EMERGENCY STOP

To stop the compressor in the event of an emergency, press emergency stop button

The unit shuts down safely via immediate interruption of the control voltage (safety function: **STOP**). Rotate the button clockwise to unlock and reset it.



Emergency stop button



Do not use emergency stop button for normal stopping!

1.19 PERMIT TO WORK

All work must only be carried out when approved by the local Permit to Work System.



Remote Controlled Unit Can Start Without Warning.



Read the Manual before Working on This Compressor.

1.20 RESIDUAL RISKS

Even with built-in safety features and protective measures, certain residual risks cannot be fully eliminated. These include:

- **Hazards from unauthorized/untrained operation:** Improper handling by unqualified personnel may lead to equipment damage or personal injury.
- **Hazards from inadequate maintenance:** Failure to perform scheduled maintenance can compromise safety devices and increase risk of malfunction.
- **Inherent risks from equipment design:** Persistent risks exist from rotating components, pressurized parts, hot surfaces, and electrical systems, even with protective guards in place.

Controls to Mitigate Risks

Restrict access to the compressor and its control panel exclusively to authorized, trained personnel who have read and understood this manual.

Adhere strictly to the maintenance schedule to ensure safety components remain functional.

Follow the safety instructions for rotating parts, pressurized systems, hot surfaces, and electrical hazards are detailed at relevant sections throughout this manual.

General Information

2.1 INTRODUCTION

The compressor is a battery driven, single-stage, variable speed, positive displacement, fluid-flooded rotary screw compressor.

Ambient temperature should not exceed 45°C. High ambient temperatures may result in high air temperature shutdown.



Figure 1 General view



NOTICE!

Do not startup the compressor if the ambient temperature is below - 8°C. Low ambient temperature optional kit must be installed for lower ambient temperature operation.

2.2 PACKAGE INFORMATION

All components are assembled on a structural steel base. The control panel is located in the front of the enclosure door panel. Acoustical enclosure is one of the standard features for all compressors. A complete package consists of following:

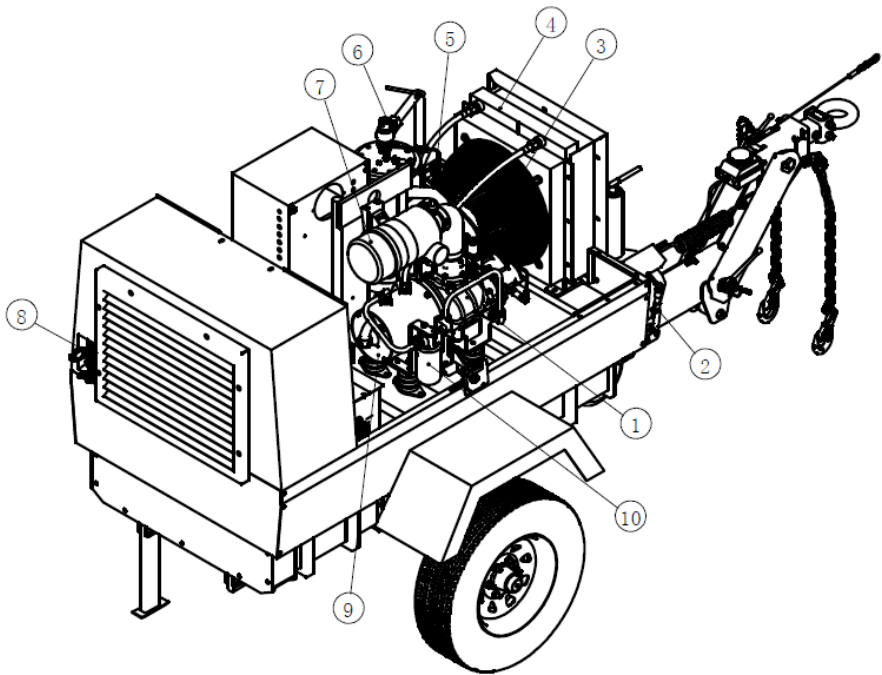


Figure 2 Main parts

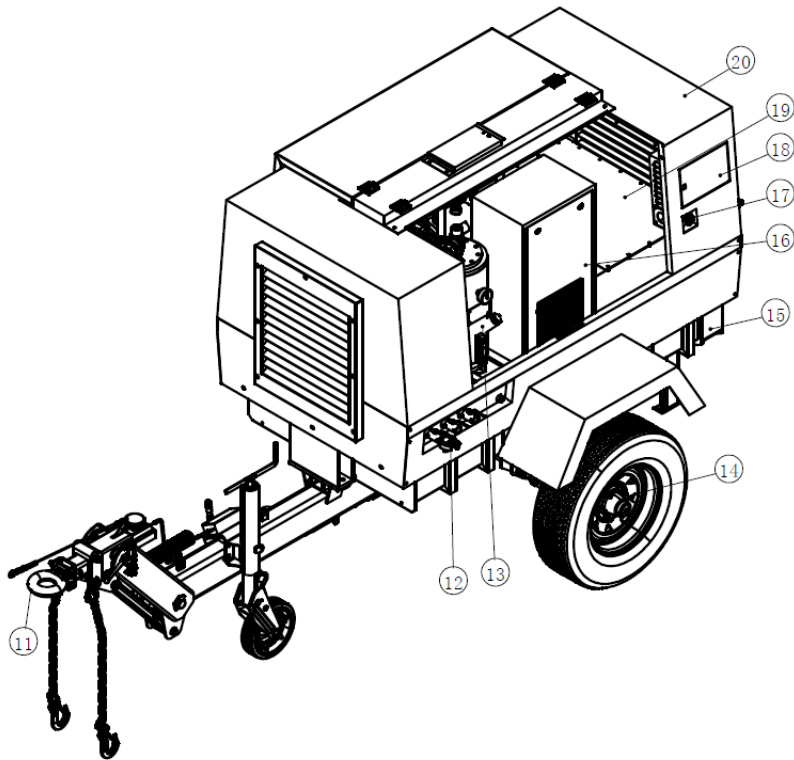


Figure 1.3 Main parts

No.	Item	No.	Item
1	Airend	11	Tow hook
2	Parking brake	12	Discharge port
3	Cooling fan	13	A/O Separator tank
4	After cooler and Fluid cooler	14	Running gear
5	Safety valve	15	Base frame
6	Minimum pressure valve	16	Electrical cabinet
7	Air filter	17	Electric cabinet
8	Charging port	18	Controller
9	Oil-cooled motor	19	Battery
10	Oil filter	20	Canopy

2.3 NAMEPLATE

The nameplates of the compressor and dryer are riveted on the equipment's canopy.

This will help to have all the important information to hand in the case of any discussions with Kaishan Service department. Refer to the Compressor nameplate for;

- Unit Model Number
- Unit Power
- Air Capacity
- Discharge Pressure
- Rated Speed
- Weight
- Serial Number
- Manufacturing Date

Always quote Model and Serial Number when ordering spare parts.

2.4 TECHNICAL DATA

Designation		Screw compressor
Number of compression stages		1
Location		Outdoor
Ambient temperature during storage	°C	+2 to +50
Maximum allowed ambient operating temperature	°C	45
Minimum starting temperature (without low temp. optional kit)	°C	0
Maximum airend discharge temperature	°C	Max. 110
Maximum compressor discharge temperature	°C	Max. 65
Inlet pressure		Atmospheric pressure
Outlet pressure		See nameplate
Charger connector		IEC 62196 Type 2
Charge time to 20-80%		2 hours 10 mins
Charge time from 0 to 100%		3.5 hours
Dimensions	mm	3765x1630x1670
Maximum tow speed	kM/h	80
Designation		Battery
Battery Type		LFP battery
Nominal energy capacity	kWh	93.38
Nominal capacity	Ah	304
Nominal voltage	V	307.2
Discharge cut-off voltage	V	240
Life cycle of batter		≥2000

2.5 FLOW CHART

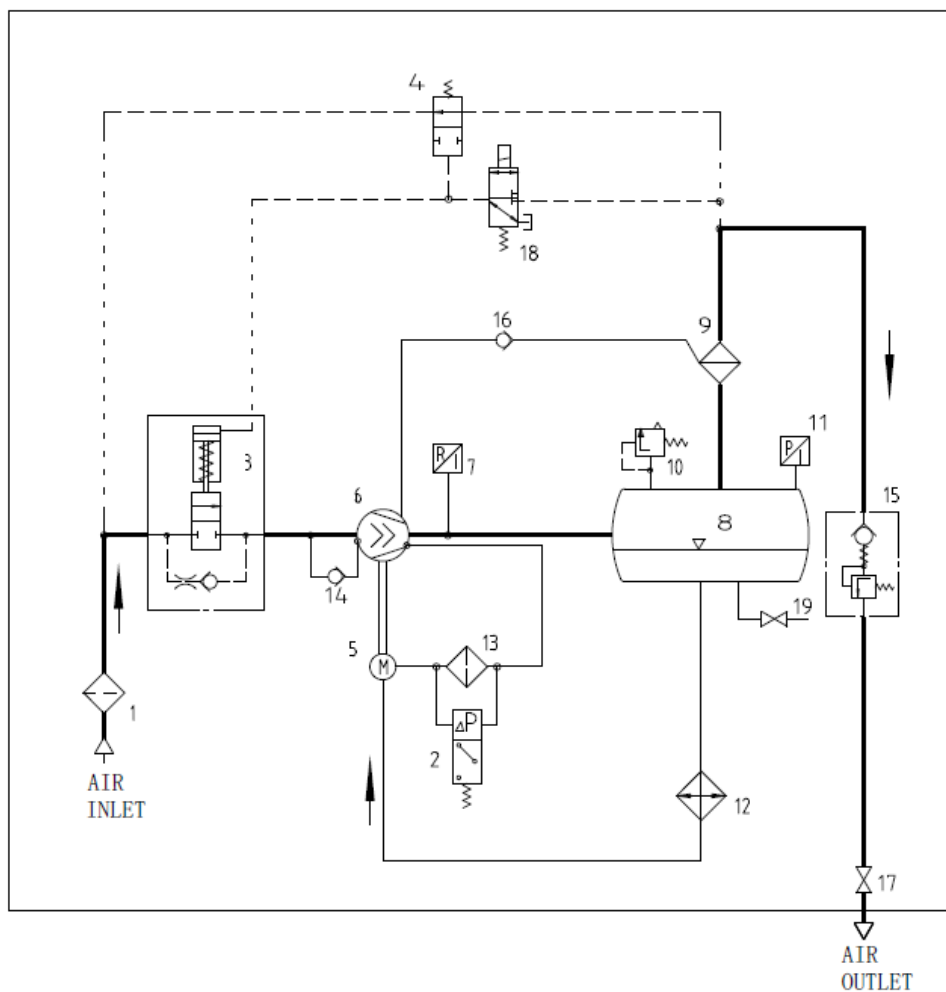
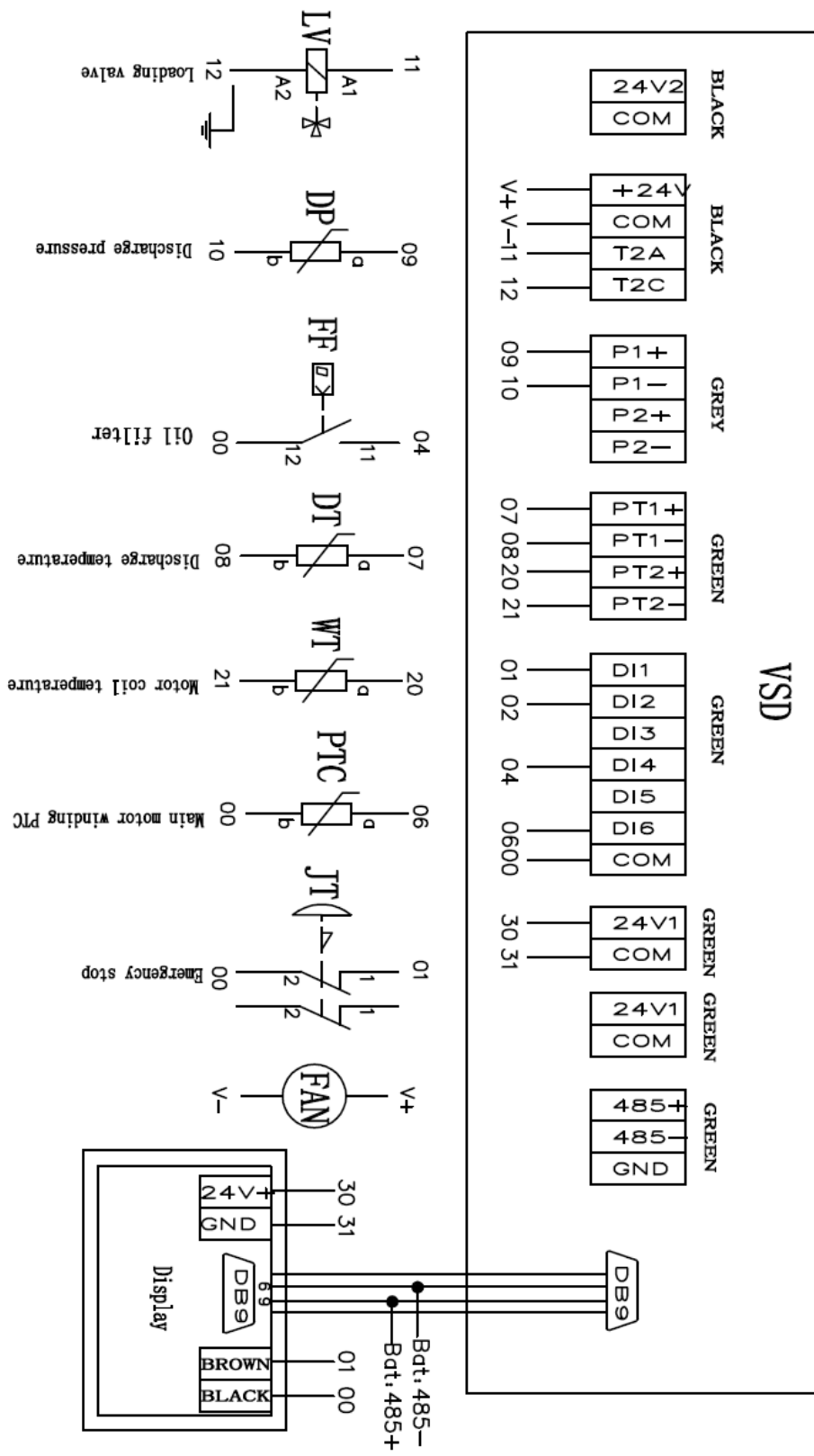


Figure 4 P&I diagram

Item	Description	Item	Description
1	Air filter	11	Pressure sensor
2	Differential pressure switch	12	Oil cooler
3	Inlet valve	13	Oil filter
4	Blow-off valve	14	Check valve
5	Motor	15	MPV
6	Screw compressor airend	16	Check valve
7	Temperature sensor	17	Air discharge ball valve
8	A/O separator tank	18	2/3 Solenoid valve
9	A/O separator element	19	Blow-down ball valve
10	Safety valve		

2.6 ELECTRICAL CONNECTION



2.7 COMPRESSED AIR CIRCUIT

The compressed air system consists of air filter, inlet valve, rotary screw air end, air/oil separator (including separator element), minimum pressure check valve, etc.

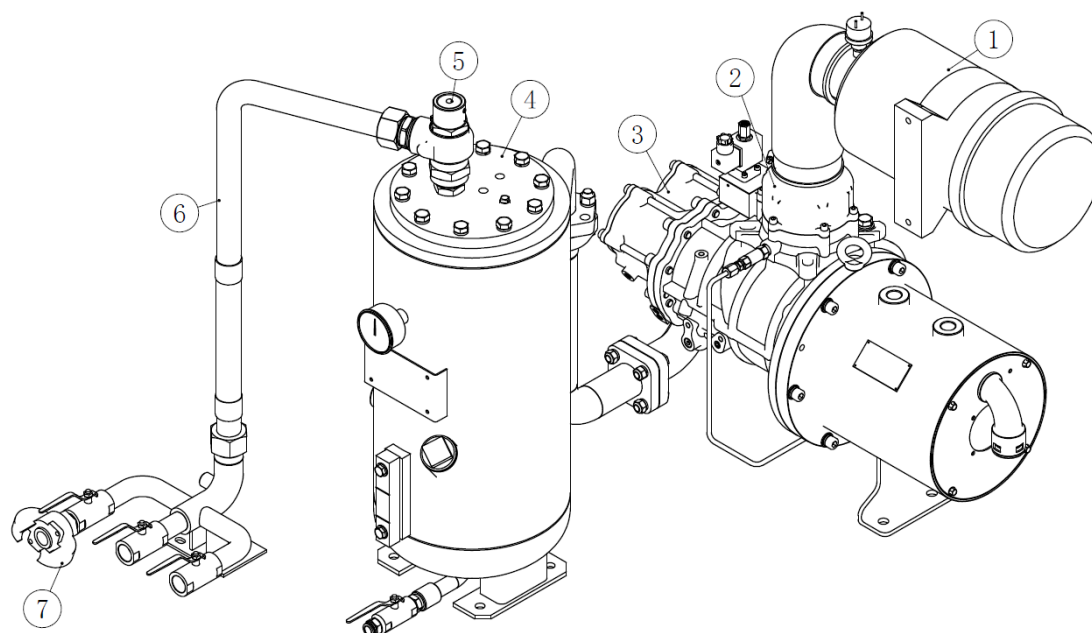


Figure 5 Compressed air circuit

No.	Item	No.	Item
1	Air filter	5	Minimum pressure check valve
2	Inlet valve	6	Discharge pipe
3	Screw airend	7	Discharge manifold
4	Air/oil separator		

When the compressor is operating, a partial vacuum is produced at the compressor inlet. Dust and impurities are filtered by air filter; air enter the air end through an inlet valve. Fluid is injected into the compressor unit and mixed with the air. The air/fluid mixture is discharged from compressor to the reservoir; fluid is separated from the air in the separator tank. Compressed air then flows through the minimum pressure check valve while the lubricant is being cooled by the fluid-cooler for re-injection.

2.7.1 Compressed Air Intake

The Compressed Air inlet system is constructed of an air filter housing, filter element, inlet elbow, flexible suction hose and air inlet valve. When the machine is running on load, air is drawn into the air filter and is drawn into the air end compression chamber through the suction inlet valve.

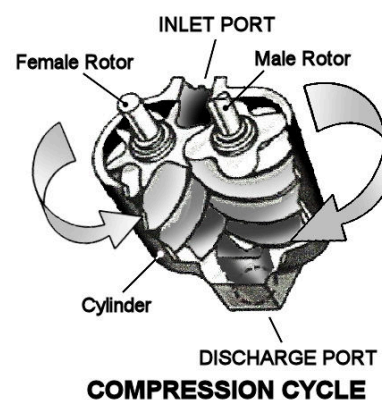
2.7.2 Air filter

The air filter element is used to filter air for the compressor. Impurities in ambient air if not filtered may cause wear on the air end component parts and will certainly degrade the compressor lubricant life.

It is vital to change the air filter at its correct service interval or before jammed in dusty environments. Periodically check the suction hose pipe to ensure it is tightly fastened and there are no splits in the hose assembly.

2.7.3 Air end

The air end housing contains of two rotors: Male and Female rotors. The male rotor has five lobes and female rotor has six flutes. They are constantly and precisely meshed and housed in the cylinder with two parallel adjoining bores. All parts are machined to exacting tolerances. The rotors provide positive-displacement internal compression smoothly and without surging. As the rotors rotate, air is drawn into the cylinder through the inlet port. A volume of air is filled and trapped as the rotor lobes pass the inlet port in the cylinders. Compression occurs as the male rotor rolls into the female flute, progressively reducing the space thereby raising the pressure. Compression continues until the lobe and flute pass the discharge port. The compressed air is then discharged into the air/oil separator tank. There are five complete compression cycles for each complete rotation of the male rotor.



When the compressor is operating, a partial vacuum is produced at the compressor inlet. Fluid is injected into the compressor unit and mixed with the air. The fluid has three basic functions:

- As a coolant, it controls the rise in air temperature normally associated with the heat of compression.
- It seals the leakage paths between the rotors and stator and between the rotors themselves.
- It acts as a lubricating film between the rotors allowing one rotor to directly drive the other, which is an idler.

After air/fluid mixture is discharged from compressor to the separator tank.

2.7.4 Separator tank

The separator tank has two basic functions:

- It acts as a primary fluid separator.
- It serves as the compressor fluid sump.

The compressed air/fluid mixture enters the reservoir and is directed against the internal baffle. Turbulent flow occurs and velocity is significantly reduced, thus causing large droplets of fluid to form and fall to the bottom of reservoir. Fluid collected in the reservoir will then be returned to the compressor due to the pressure differential.

The sight glass enables the operator to visually monitor the reservoir fluid level. Fluid is added to the reservoir by removing the fluid filling cap after all system pressure is relieved. The fluid level should remain at the top red lines on the sight glass. Fluid refill is required once its level drops below the lower red line.

2.7.5 Minimum pressure valve (PMV)

The now clean air can make its way toward entry into the customer's air distribution system.

The MPV located on the top of the separator tank allows the air to pass when the compressor is running and in a load condition, on shutdown the spring return and internal piston will close preventing line pressure to back feed the separator tank.

The MPV has a dual function which prevents the compressor from delivering compressed air lower than setting pressure. This pressure is necessary for air/fluid separation and fluid circulation. The internal spring and piston will start to close and restrict the air flow at that pressure, this setting cannot be modified.

2.8 REGULATION

The compressor regulating system consists of an inlet valve, pressure sensor, variable speed drive, pressure relief valve and solenoid valves.

The inlet valve is fully open during loading. Pressure sensor measures discharge pressure, pressure can reflect the compressed air demand. When the discharge pressure is lower than the target point, the variable speed drive increases the motor speed.

When the motor runs at minimum speed and the discharge pressure exceeds the unload setting pressure, the solenoid valve is activated to close the inlet valve. Simultaneously, internal compressed air is released through the blow-off valve, shifting the compressor into an unloading operating state. If the unloading status persists for the preset duration, the machine will automatically stop. During unloading, if the discharge pressure drops to the set load point, the machine will resume loading.

2.8.1 Vent valve

The valve is controlled by the solenoid valve. At unloading situation, the blowdown valve reduces the internal pressure to approximate 2bar.

2.8.2 Pressure relief valve

The PRV is fitted to the separator vessel to prevent generated pressure exceeding safe working limits of the compressor components. This valve must not be altered and is subject to local Insurance Certification.

2.8.3 Pressure sensor

The Pressure Transducer is installed into the Air Separator Tank and is preset to ensure the compressor cannot run Overpressure. A Warning followed by Shutdown will occur if the pressure exceeds the Preset Values.

2.9 OIL CIRCUIT SYSTEM

The lubrication and cooling system consist of a separator tank, separator element, cooling fan, aluminum finned fluid-cooler and fluid filter.

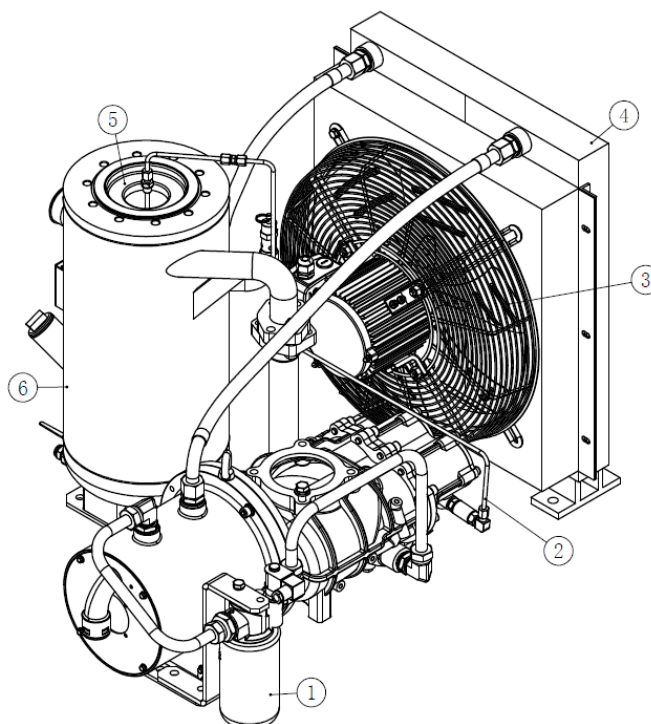


Figure 6 Oil circuit

No.	Item	No.	Item
1	Oil filter	4	Fluid cooler
2	Oil Scavenge line	6	Separator element
3	Cooling fan	7	Separator tank

High pressure forces the lubricant through a series of direction changes in the reservoir where it is separated from the air. The fluid is then delivered to the fluid-cooler. Cooled fluid will be filtered before being re-injected back into the compressor.



This lubricant must not be mixed with any other; this will defiantly result in premature failure of bearings, separators, oil filters and coolers due to internal varnishing.

Ambient air is being forced through the cooler fins by the fan, which cools the fluid in the cooler tubes. Cooler fins must be kept clean at all times.

2.9.1 Fluid cooler

The fluid cooler cools the lubricant. The fins of the fluid cooler are easy to be covered by dust and affect the cooling effect, which may cause the high discharge temperature issue. Therefore, the fins should be cleaned at regular intervals to ensure the cooling ability.

2.9.2 Oil filter

All lubricant oil must pass through the oil filter before injection into the airend. Oil filter's function is to remove impurities in the oil, such as: metal particles, oil degradation, etc., to protect the normal operation of bearings and rotors. Its filter rating ranges is from 10 to 15 μ m. If the oil filter is blocked and not replaced in time, the oil injection capacity may be insufficient, the exhaust temperature of the air end will rise, and the machine will be shut down. At the same time, insufficient lubricant will also affect the service life of the airend bearings.

2.9.3 Oil/air separator tank

Separator tank also works as a lubricant storage sump. There is oil storage space at the bottom of the reservoir. Also, There is a ball valve under the tank to remove the condensate water (because water is heavier than oil, it is deposited on the bottom). The tank has a refueling hole for refueling.

Inspect the fluid level when the compressor is in shut down mode. Fluid level is indicated on the reservoir sight glass. The maximum fluid level is at the top red-mark. Add fluid until the top red-mark is reached.

2.9.4 Oil/air separator element

The element is made of multi-layer fine glass fiber, and the mist oil contained in the compressed air can be almost completely filtered after passing through the element. The oil particle size can be controlled below 0.1um, and the oil carry over can be less than 5PPm.

High separator differentials pressure increases the absorbed power of the compressor and may cause the drive motor overload if ignored.

2.9.5 Oil Scavenge line

Any oil scavenged back from the separator element will be re-introduced back into oil circuit through a scavenge line. The scavenge line must be kept clear and is a serviceable item. Failure to do this will result in oil carryover as the separator element will be unable to drain.

2.10 BATTERY SYSTEM

The air compressor is equipped with an integrated electric energy storage system that eliminates the need for an external power cable, enabling independent operation of the entire screw air compressor unit. This system primarily consists of one or more battery modules, a battery management system (BMS), a thermal management system, high and low-voltage wiring harnesses, connectors, and structural components.

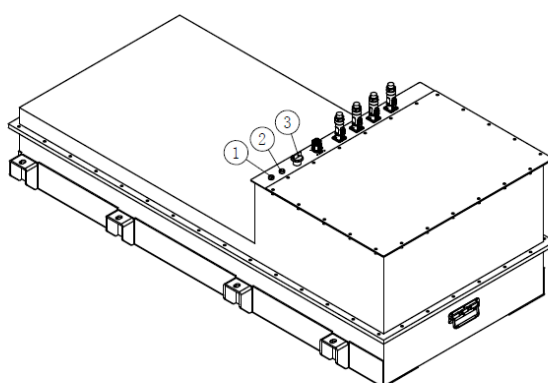


Figure 7 battery system

No.	Item
1	Power indicator
2	Power switch
3	Battery power emergency stop switch

A slight reduction in battery capacity may occur in low-temperature conditions, which is a normal physical characteristic of the battery. The battery's performance will automatically recover to the standard level as the ambient temperature rises to the recommended operating range.

Always charge the battery in a well-ventilated, dry, and dust-free area to ensure charging safety and extend battery service life.

Temperature & Humidity Parameters:

- Charging operating temperature: 0°C–55°C
- Discharging operating temperature: -20°C–55°C
- Short-term storage temperature: -20°C–40°C
- Long-term storage temperature: 0°C–40°C
- Operating humidity: 5%–80%
- Storage humidity: $\leq 70\%$

2.11 MOTOR

PEB compressor uses a liquid cooled permanent magnet synchronous motor. The motor features excellent resistance to corrosion and dust accumulation, it is reliable in harsh environments. A dedicated pump force cooling liquid into flowing through motor for heat removal. Cooling liquid will be cooled down in cooling liquid cooler and recycle.

The main motor transmit power to airend through a flexible, vibration-reducing coupling. There should be no intermittent or unusual noises or vibrations when the motor runs during unload or load condition.

The voltage and frequency power source for the motor are indicated on the nameplate, the motor can operate continuously at the rated power $\times$ power factor.

Compressor operation

3.1 OPERATING MODES

The machine operates in the following modes:

➤ **LOAD**

The inlet valve and check valve are open. The airend delivers compressed air into the air network.

➤ **UNLOAD**

When the line pressure reaches or exceeds the unloading pressure setting, the inlet valve and check valve will close. The compressor motor runs under minimum speed. The venting valve is open.

➤ **STANDBY**

If there is no air demand, the compressor will enter automatic standby mode. To prevent frequent shutdowns and starts, the compressor controller stipulates that no more than six starts per hour are allowed.

If the network pressure drops to a lower set point (LSP), the compressor will start and return to the loading state.

If the compressor runs without load for an extended period, this operation will lead to unnecessary energy waste. The inlet valve and check valve are closed, while the blow-down valve is open. The compressor motor is stopped.

The compressor will reload when the line pressure falls below the set pressure.

3.2 BEFORE STARTING COMPRESSOR

Make sure that the compressor is located on a level and secure ground, secure the brakes.

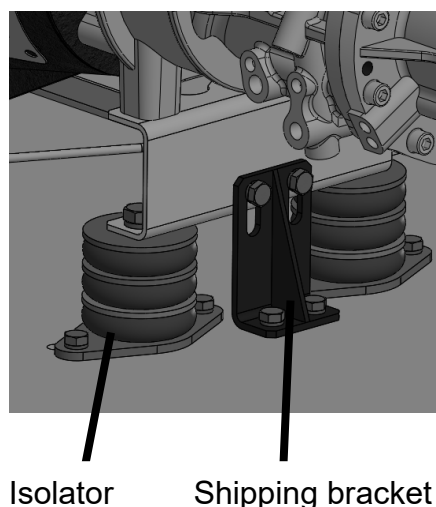


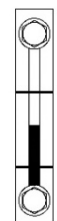
Figure 8 Shipping bracket



Brand new compressor has “Orange Color” shipping bracket installed under airend assembly. Please remove the bracket after the unit is installed.

NOTICE!

Check the compressor oil level. The oil level of compressor in operation condition should be kept between “H” and “L”. The maximum fluid level is at the top red-mark. It is not recommended to operation the air compressor when the oil level is higher than the “H” top red-mark.



When the air compressor stops running, the oil level higher than “H” is normal because the lubricant will flow back to the separator tank.

Check and remove water in the oil and air separator: Open the drain valve at the bottom of the air/oil separator, drain the condensed water during the shutdown, and close the drain valve as soon as there is oil flowing out.

Check and clean the air filter: Clean the evacuator valve and dust dumper of air filter. Remove the main filter element at least once a week to remove dust on surface. This is done by using low pressure air to blow the dust from the inside out.

Check whether the discharge ball valve and the exhaust pipe are unblocked to avoid the pressure rising rapidly after starting.

Verify that the electrical connections match the electrical schematic diagram and are secure.

First commissioning or after the long-term shutdown, fill approximate 0.5-liter screw lubricant into airend through inlet valve to prevent the airend damaged.

Switch on the power supply, check the status of the controller, press the RUN button and stop it immediately.

Check if the rotation direction of the main motor is correct while the motor and fan motor are coasting to a stop. The arrows on the main motor adapter and fan motor frame indicate the correct rotation direction.

3.1 COMMISSIONING

Press and hold the battery-powered power button to energize the system.

Press the RUN button.

Check for any oil or air leaks, abnormal noises, etc.

Run the compressor at full load for 0.5 hours, then check on the control panel whether the compressor reaches the set pressure.

Record the amperes and voltages.

Record the discharge temperature of the compressor and check for any abnormal temperature deviations.

Close the discharge isolation valve and adjust the unit to the unloading status. Verify that the unloading pressure setting is proper, then measure and record the amperes for all three phases.

Set the pressure parameters (load pressure, VSD target pressure, unload pressure) according to customer requirements and complete the commissioning form.

3.2 DURING OPERATION.

Keep enclosure doors closed.

Check all temperatures and pressures are correct.

Stop immediately if warning or alarms are displayed or if gauges register outside of normal working limits. Do not allow unauthorized personnel to make any adjustments.

Do not refill with oil whilst the compressor is running.

Do not carry out adjustments unless authorized and trained to do so. Do not remove any guards when the plant is running; make sure all guards are always in place.

Do not run the compressor in an area deemed as Fire Hazard, do not operate in the presence of toxic fumes.

Be aware of the noise level and warn other people in the location also.

The compressor must be monitored at all times during the test run. After that, check each instrument every 2 hours during operation and record each parameter for future maintenance and maintenance reference.

3.3 CHARGING INSTRUCTIONS:

Initiate charging either after the compressor has stopped, or when the battery system's state of charge (SOC) drops below 20%. Use only the dedicated charging equipment authorized by the manufacturer for charging operations.

If a fault alarm is triggered during charging, the power battery system and charger will automatically stop the charging process, and the charger will display the corresponding fault code. When the lithium battery is fully charged, the charging device will automatically stop charging.

The charging area must be dry and well-ventilated with no flammable or explosive materials present, and it is recommended that the battery be fully charged at least once a week for optimal maintenance.

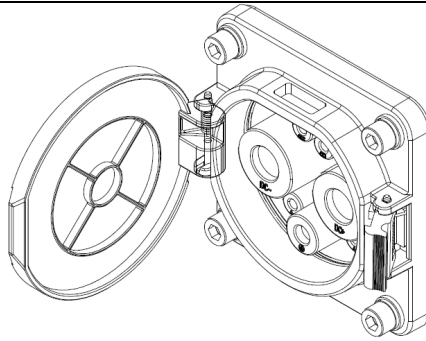


Figure 9 Lithium battery charging port



NOTICE!

A slot is provided above the socket; once the charging gun is inserted into the charging device, the slot can be used to achieve locking and fixing.

3.4 SHUTDOWN

Press the STOP button on the controller to initiate the shutdown procedure.

To test the emergency stop, press the emergency stop button on the panel door to immediately stop the compressor.

Close the isolation valve and turn off the power supply. Drain the oil and condensate circuits.

3.5 LONG-TERM STORAGE

When the machine is shut down for a long-term storage, the following methods should be strictly followed, especially in the season or area with low temperature and high humidity.

3.5.1 Over 3 weeks

Short-term storage temperature range: -20°C-40°C

Release water in coolers, separator tank and pipeline to avoid freezing cracking .

Unit fault should be removed before storage

Store machine in less dust and dry place.

Run the compressor at least once a week until warm. Load and unload the compressor a few times.

3.5.2 Over 2 months

In addition to the above procedures, the following shall be carried out:

Long-term storage temperature range: 0-40°C.

Storage environment should be kept as dry and ventilated as possible, away from heat sources.

Prior to storage, confirm that the compressor battery's state of charge (SOC) is maintained between 50% and 70%. To achieve this charge level, fully charge the battery first and then discharge it to the range of 50%–70% before placing the compressor in storage.

Charge 1 to 2h for every 2 months.

Seal all openings to prevent entry of moisture and dust.

Wrap the safety valve, control display panel, etc. up in oiled paper or anti-rust paper to prevent corrosion.

Replace the lubricant and operate it for 30 minutes. Drain out of condensate from the separator tank and coolers after two or three days.

If the compressor is going to be stored without running from time to time, Consult Kaishan about protective measures must be taken.

3.6 DISPOSAL

The machine is essentially made of reusable materials. The machine does not pose a risk to the operator or the environment if handled properly. However, the machine is operated with materials which can be harmful to the environment and must therefore be properly disposed of according to the regulations.

Provide individual components of the machine to a qualified disposal and recycling company. Use a qualified specialist company for the disposal and recycling of the entire machine.

Control

4.1 HUMAN MACHINE INTERFACE

Power on, and the HMI display automatically switches to the following page.

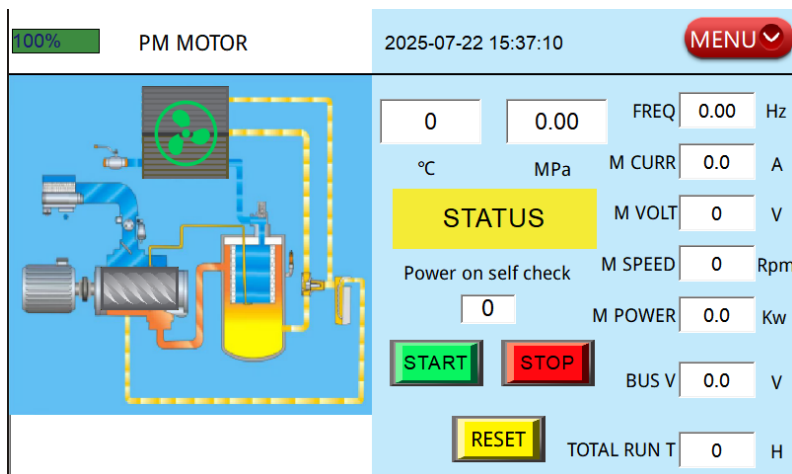


Figure 10 HMI interface

Designation	Description
MENU	Press the button to access main menu
RESET	Use this button to reset
START	Press to startup the compressor. There is a 0.2-second activation delay after pressing the start or stop icon.
STOP	Press to stop the compressor
Mpa	Compressor discharge pressure
°C	Compressor discharge temperature
FREQ	Inverter output frequency
M CURR	motor amps
M VOLT	Motor voltage
M SPEED	Motor speed
M POWER	Motor power
BUS V	Battery output voltage

4.2 MAIN MENU SCREEN

Press the menu button to go to main menu screen. The screen shows 6 menu items, press one to go to a next menu.

Other than USER PARA menu, only authorized and trained personnel have access to the other menus.

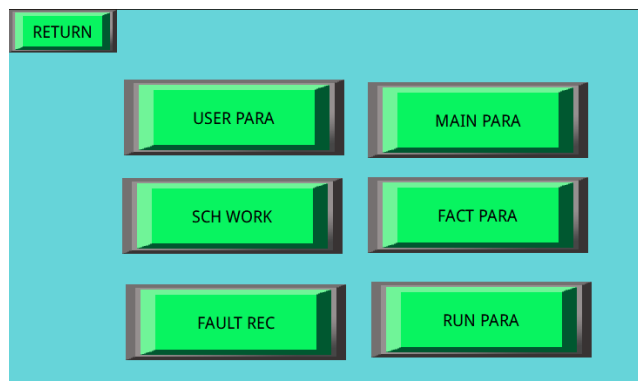


Figure 11 main menu

By default, the password of MAINTENANCE and USER menu is set as shown in the following table.

FUNCTION	PASSWORD
USER SET	9999
TIMER	N/A

4.3 USER SET MENU

Starting from the main screen, press USER SET button and enter password to go to USER SET menu.

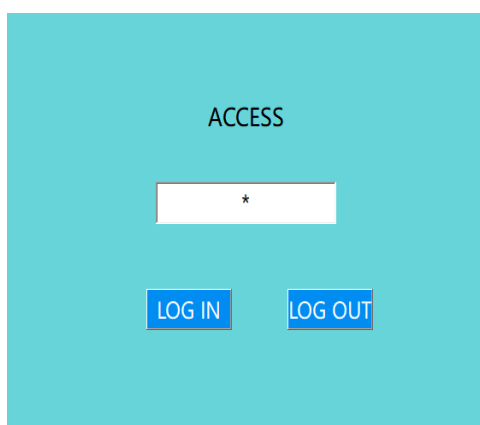


Figure 12 user menu passcode

Touch the password input box to activate the numeric keypad and enter the password, as illustrated in picture below.

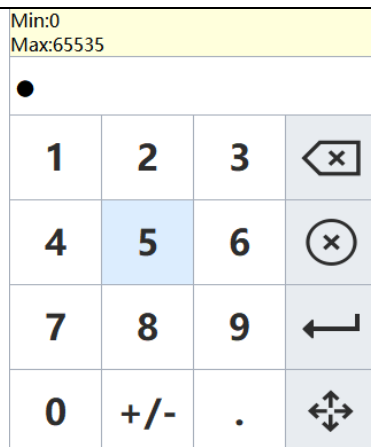


Figure 13 keypad

NOTE:

After entering a correct password, press " ← " to "USER PARA" page. If an incorrect password is input, touch "⌫" or "⊗", then enter the password again.

In the "USER SET" section, you can set parameters for delay, pressure, and fan control, as indicated on the screen.

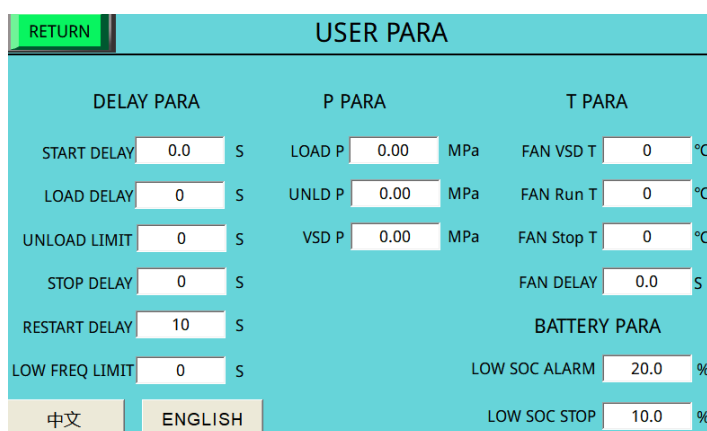


Figure 14 user menu

Designation	Description
Start delay	When the startup button is pressed, the unit will start after the delay setting.
Load delay	The unit will load with the delay setting after completing the startup procedure.
Unload delay	The unloading state will continue for the delay setting e unit stops.

Designation	Description
Stop delay	The unit will shut down with the delay setting after press the stop button.
Restart delay	The compressor can only start after the set time in any case.
Load P	The compressor will load when the pressure is below this setting.
Unload P	Compressor will unload automatically if air pressure is above this setting data.
VSD P	The target constant discharge pressure of the unit
FAN VSD T	Temperature setpoint for fan variable speed drive control
FAN RUN T	Temperature value to trigger fan operation
FAN STOP T	Temperature value to trigger fan shutdown
LOW SOC ALARM	Alarm triggered when battery SOC falls below this value
LOW SOC STOP	Compressor shutdown when battery SOC falls below this value

4.3.1 SCH WORK MENU

The "SCH WORK" function allows setting the system's scheduled power-on and power-off times on a weekly basis, enabling fully automated system operation. After entering the time settings in input fields will enable the power on and power off correspondingly.

SCH WORK				
	START TIME	STOP TIME	POWER ON	POWER OFF
SUN 1	0 : 0	0 : 0	DISABLE	DISABLE
SUN 2	0 : 0	0 : 0	DISABLE	DISABLE
MON 1	0 : 0	0 : 0	DISABLE	DISABLE
MON 2	0 : 0	0 : 0	DISABLE	DISABLE
TUE 1	0 : 0	0 : 0	DISABLE	DISABLE
TUE 2	0 : 0	0 : 0	DISABLE	DISABLE
WED 1	0 : 0	0 : 0	DISABLE	DISABLE

Figure 15 SCH WORK

4.4 FAULT REC MENU

Click " FAULT REC " to pop up the " FAULT REC " interface, which can display the alarm information and alarm time.

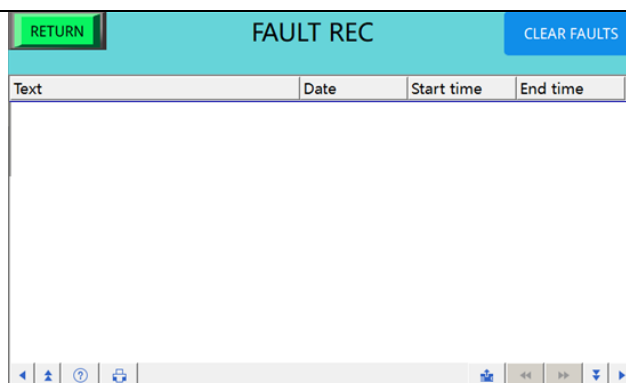


Figure 15 Fault recode

4.5 RUN PARA MENU

Starting from the main menu screen, press RUN PARA button to go to RUN PARA menu.

Following screen appears:



Figure 16 RUN PARA menu

Designation	Description
OIL TIME END	Record total running time of oil filter.
O-A TIME END	Record total running time of O/A separator.
AIR TIME END	Record total running time of air filter.
LUBE TIME END	Record total running time of lubricant
GREASE TIME END	Record total running time of grease
SERIAL NO.	Display serial NO.
FAN CURR	Display fan current
FAN VOLT	Display fan voltage
FAN FREQ	Fan running frequency
FAN POWER	Fan input power
THIS RUN:	Display the current running time of the air compressor.
THIS LOAD:	Display the current load time of the air compressor.

Servicing

KPB compressors require a minimum amount of inspection and maintenance. The controller and indicator alert the operator to perform required maintenance or repair unit problems. Reset the maintenance interval counter in controller after maintenance items are performed.



NOTICE

Use only authorized parts. Any damage or malfunction caused using unauthorized parts is not covered by Warranty or Product Liability.



NOTICE

Wear protective gloves and goggles during operation to avoid skin contact with oil-containing condensate.



NOTICE

Wear protective gloves and goggles during operation to avoid skin contact with oil-containing condensate. More frequently when operating in a dusty environment.



WARNING

Be aware of hot oil and potential spillages as hazards, cordon of working areas prior to commencing work.



CAUTION

This symbol identifies hazards or unsafe practices which could result in personal injury or substantial property damage.



WARNING

When cleaning the compressor, avoid contact with high-voltage components, exposure to water could cause hazardous malfunctions or safety risks.

5.1 DAILY MAINTENANCE

Open the separator tank drain valve and release any condensate present. Close when the flow is oil only.

Check the fuel tank levels.

Check compressor oil level, top up if required.

Check operation condition of compressor after the machine has warmed up, high temperatures, oil leakages or abnormal sound.

General check for oil, water or fuel leakages.

5.2 INITIAL 50 HOURS

Clean fuel tank and oil line.

Check tire pressure and wheel bolts and nuts.

Replace the compressor oil filter.

Check the shutdown protection function.

Check the function of the control system.

fuel pre-filter (if necessary).

Check fan belt tension.

5.3 FLUID CHANGE

Compressor is filled & tested with KTL-8000 lubricant. This oil has a long life and ensures optimum lubrication.

Fluid change needs to be carried out every 1000 hours, or once a year, whichever comes first.

This exchange interval is valid for the standard operating condition of 20°C ambient temperature. The compressor being exposed to external contaminants, operating in high humidity combined with low duty cycles, or running at elevated temperatures may necessitate a shorter oil change interval. If in doubt, please contact Kaishan.

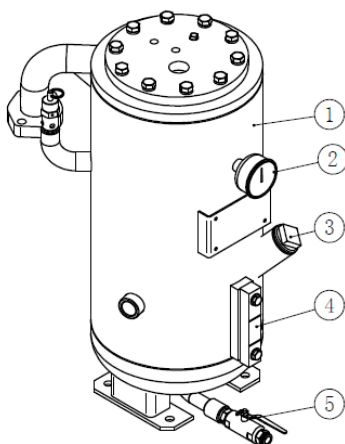


Figure 17 Fluid Fill Location

No.	Item
1	Air/Oil separator tank
2	Pressure gage
3	Fluid fill port
4	Sight glass
5	Fluid drain ball valve

Kaishan portable compressors utilize a pressurized fluid drain. Use the following procedure to drain and replace the compressor fluid.

- i. Run the compressor for a while to warm the lubricant.
- ii. Insert the drain hose into the fitting on the ball valve.
- iii. Stop the compressor, power off.
- iv. Open drain valve on separator tank and fluid cooler
- v. Drain oil in a container or waste dedicated pipeline
- vi. Close drain valve
- vii. Unscrew the plug in airend discharge pipe and drain oil in a container or waste dedicated pipeline. Refit the plug.
- viii. Remove oil filter and pre-filter, drain oil, replace with a new part.
- ix. Remove the plug from the fluid fill port and refill the reservoir with the appropriate amount of fluid. Refit and tighten the plug.
- x. Power on and start up compressor for a few minutes, shut down.
- xi. Unscrew the plug from the fluid fill port and refill the reservoir to the adequate level



NOTICE

All lubricant in the system must be discharged completely, including lubricant in the pipes, cooler and oil/air separator tank.

5.4 AIR FILTER

The standard air filter is a dry type element. Air filter maintenance should be performed when the maintenance gauge shows red with the compressor running full load, or every 500 hours, or once a year, whichever comes first.

Daily cleaning of the filter element is common in dirty conditions. If dirty conditions exist, it is advisable to relocate the intake air to an outside source. Each time the filter is serviced, inspect the filtered air side of the air cleaner canister and the suction manifold for dirt. If dirt is found, determine the cause and correct. Always make sure all gaskets, threaded connections, flange connections, and hose connections between the air filter and air compressor-are airtight. Dirty filters result in reduced airflow and can distort the element and allow dirt to bypass the filter element.



NOTICE

Intake filtration equipment supplied from the factory may not be adequate for extremely dirty applications or some forms of dust or vapors. It is the customer's responsibility to provide adequate filtration for those conditions. Warranty will be voided if inadequate filtration causes a failure.

5.5 COMPRESSOR FLUID FILTER

The fluid filter is a spin on, full flow unit. Replacement of the filter requires spinning off the cartridge and replacing it with a new one. During normal service, the filter cartridge should be replaced under the following conditions, whichever occurs first:

- ◆ As indicated by the fluid filter maintenance indicator when the fluid is at normal operating temperature (if applicable).
- ◆ Every 500 hours
- ◆ Every fluid change



NOTICE

The fluid filter maintenance indicator may read high upon start up on cool mornings due to sluggish fluid creating higher than normal differential pressures. Monitor indicator after the fluid warms up.

5.6 AIR/OIL SEPARATOR ELEMENT

Replacement requires unbolting and lifting the separator tank lid and replacing it with a new one. The air/oil separator element should be replaced as indicated in the maintenance schedule or as follows:

- ◆ If excessive fluid carryover is observed.
- ◆ 1000 hours MAX
- ◆ As indicated by the gauge (if equipped).

Replacement requires unbolting and lifting the separator cover and replacing it with a new one, procedure as follow:

- i. The compressor must be shut off and system pressure must be relieved
- ii. Remove the lid bolts.
- iii. Lift the separator tank lid.
- iv. Take out the old separator element
- v. Clean all sealing surfaces, insert the new separator element
- vi. Check grounding strip
- vii. Put lid back to position, install the lid bolts
- viii. Clean surface and oil mark.

5.7 RELIEF VALVE

Plugged relief valve will result in failure to open, or close automatically after opening. In the first case, the relief valve will not provide protection on the pressure system, no safety

guarantee for the machine. In the latter case, fluid blowing out of the sump tank may lead to property loss. Stop the machine weekly and check the relief valve condition.

5.8 MAINTENANCE SCHEDULE

This Schedule is intended to be used as a guideline only. Depending on the specific operating conditions of your compressor, maintenance requirements may vary.

The instructions in this section will give more details about determining when specific service should be performed.

Every 200 hours or every 2 months	Replace fuel filter element Clean compressor fluid cooler Check battery electrolyte level Drain out of water from fuel tank Check the tire pressure and tighten the tire nut.
Every 500 hours or every 6 months	Replace compressor oil filter Replace air filter element Check the safety valve discharge function Check for oil, air and fuel leakages
Every 1000 hours or every 12 months	Replace air/oil separator element Change compressor fluid Replace safety air filter element (if applicable) Replace fan belt Replace coolant

Trouble shooting guide

Information below is a troubleshooting guideline; it describes symptoms and possible cause. Do not assume that these are the only faulty condition that may occur.

Table 6-1: TROUBLE SHOOTING GUIDE		
Symptom	Possible Cause	Solution
Fail to Start	Battery power failure	Check battery power supply to the unit
	Emergency button	Reset emergency button
	Loose wire connections	Check all wiring terminals for contact and tightness
	Air-end failure	Contact a local authorized distributor.
Compressor shuts down during loaded condition	High ambient temperature	Improve the ventilation condition.
	Low incoming voltage	Check voltage and power source or contact local power company.
	High operating pressure	Reset, check line pressure and ensure it does not exceed the compressor's maximum operating pressure.
	Low fluid level	Check and correct
	PLC controller indicate alarm	Check and correct
	Low battery SOC	Charge the battery
Discharge pressure exceeds the unload pressure set-point	Control system air leakage causing loss of pressure	Check and correct
	Air Intake valve stuck open	Remove the intake hose and check the inlet valve for proper operation
	blow-down valve failure	Check the receiver tank to ensure that it is exhausting air to the atmosphere when the solenoid opens - repair or replace if necessary.
Compressor cannot reload	Solenoid valve failure	Repair or replace as necessary
	Loose wiring connection	Check and tighten wiring terminals
	Inlet valve malfunctioning	Check and repair air inlet valve
	Air pressure sensor failure	Repair or replace as necessary
High air discharge temperature	Low Fluid Level	Check oil level
	Incorrect fluid brand	Check oil code number, replace as necessary
	High ambient temperature	Check air exhaust, reduce room temperature.
	Oil filter clogged	Change oil filter
	Cooling fan malfunctioning	Repair or replace as necessary
	Temperature sensor failure	Check and replace as necessary

Table 6-1: TROUBLE SHOOTING GUIDE

Symptom	Possible Cause	Solution
Excessive Fluid Consumption	Different oil is being used.	Use genuine fluid.
	Separator element failure	Check and replace as necessary.
	Oil level too high	Drain off oil until the correct level.
	Low discharge pressure	Adjust
	Oil scavenging line or orifice clogged	Clean and replace as necessary.
Unloading failure at working pressure, causing safety valve to release pressure	Unloading setting	Adjust as necessary
	Solenoid valve failure	Check and replace as necessary
	Air/oil separator element clogged	Check and replace as necessary
	Air Intake valve stuck open	Remove the intake hose and check the inlet valve for proper operation
	Safety valve failure	Repair or replace as necessary
	PLC controller malfunctioning	Check and replace as necessary
Low air capacity delivery	Air filter clogged	Clean or replace with new element
	Inlet valve malfunctioning	Check and correct
	Separator element clogged	Replace separator element
	Motor drive malfunctioning	Check or replace as necessary
	Air leakage	Check and correct

Contact Information

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