KPE Series Rotary Screw Air Compressor

Instruction Manual

Direct Drive

PN: 96002024000003-A
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KAISHAN

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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 KPE 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 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 hazards or unsafe practices which **could** result in personal injury, death or substantial property damage.

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

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

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

NOTICE

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

1.2 SAFETY PRECAUTIONS

This manual describes the safety precautions, structure and functions of all systems and components, as well as the operation and maintenance methods for the KPE series rotary screw air compressors. The owner and operator shall read the manual carefully. Only after thorough understanding should the machine be operated for the first time. This manual gives you a general description of the mechanical and electrical systems and maintenance. However, if you have any questions about operating and maintenance of the compressor; please contact your authorized distributor or our service department personnel.

Do not modify the compressor and/or controls in any way except with written factory approval. While not specifically applicable to all types of compressors with all types of

main movers, most of the precautionary statements contained herein are applicable to most compressors and the concepts behind these statements are generally applicable to all compressors.

Failure to follow any of these precautions may results in severe personal injury, death, property damage and/or compressor damage

1.3 PRESSURE

A properly sized pressure relief valve must be installed in the discharge piping ahead (upstream) of any shutoff valve (block valve), heat exchanger, orifice or any potential blockage point. Failure to install a pressure relief valve could result in the rupturing or explosion of some system component. Relieve all pressure internally to the compressor prior to servicing.

Do not depend on check valves to hold system pressure. Do not change the pressure setting of the pressure relief valve, restrict the function of the pressure relief valve, or replace the pressure relief valve with a plug. Ovsder pressurization of system or compressor components can occur, resulting in death, severe personal injury or property damage. Do not operate the compressor at pressures in excess of its rating. Failure to ensure system compatibility with compressor piping is dangerous.

Never use plastic pipe or soldered joints in any part of the compressed air system. When the hose is to be used, secure all hose connections by wire, chain or other suitable retaining device to prevent tools or hose end from being accidentally disconnected and expelled.

Ensure all internal pressure has been released, before performing maintenance and service.

1.4 FIRE AND EXPLOSION

Shut down the compressor and disconnect power supply before servicing, repairing, or cleaning compressor components.

Clean up any spills of lubricant or combustible liquid immediately. Keep sparks and flame away from the compressor. Do not permit smoking during servicing, such as checking or adding fluid. Wipe down spills immediately using industrial cleaner as required. Do not use flammable material for cleaning purposes. Wear personal protective equipment including safety goggles and clothing during servicing the compressor. Never use a flammable or toxic solvent for cleaning the air filter or any parts.

Keep trash, paper, leaves or other combustibles out of and away from compressor hot components. Do not operate the compressor without proper flow of cooling air or with inadequate flow of cooling liquid or lubricant.

Do not operate the compressor in a hazardous environment or potentially explosive atmosphere unless the compressor has been specially designed for that duty.

1.5 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. Make sure all personnel keep away from the moving parts before attempting to start it.

1.6 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, fluid coolers and after-cooler. Wear personal protective equipment including gloves while servicing the compressor.

1.7 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.

1.8 LIFTING AND TRANSPORTATION

When loading or transporting machines, ensure that the specified lifting points are used. Before lift a machine, close all doors, shutdown the machine and disconnect all cables. To lift the compressor and no higher than necessary, use a lift truck or crane with sufficient capacity (The compressor weight is indicated on nameplate).

Lifting acceleration and retardation shall be kept within safe limits. Lifting equipment shall be capable and comply with local safety regulations. Never lift a machine over people or residential areas.

Do not lift machine in high winds.

1.9 ELECTRICAL SHOCK

Never start the compressor unless it is safe to do so. Do not attempt to operate the compressor with a known unsafe condition. Tag the compressor and render it inoperative by disconnecting and locking out all power at the source or otherwise disabling its prime mover so others who may not know of the unsafe condition cannot attempt to operate it until the condition is corrected. Install, use and operate the compressor only in full compliance with all pertinent OSHA regulations and/or any applicable Federal, State, and Local codes, standards and regulations. Never assume it is safe to work on the compressor because it is not operating. Many installations have automatic start/stop controls and the compressor may start at any time.

NOTICE

- Follow all maintenance procedures and check all safety devices on schedule.
- Use the correct compressor fluid at all time.
- Do not rely on the discharge check valve to isolate the compressed air service line
- Keep panels closed at all times and stay away from hot surfaces to prevent hazards

NOTICE

These instructions, precautions and descriptions cover KPE series air compressors. As a service to our customers, we often modify or construct packages to the customer's specifications. This manual may not be appropriate in those cases.

Every effort has been taken to ensure complete and correct instructions have been included in this manual. However, possible product updates and changes may have occurred since printing this manual. Compressor reserves the right to change specifications without incurring any obligation for equipment previously or subsequently sold.

General Information

2.1 INTRODUCTION

The KPE series offer models with power ranging from 75HP to 350HP. These compressors have standard full load pressure rating from 75 psig to 190 psig. The compressor is a direct driven, single-stage, positive displacement, fluid-flooded rotary screw, driven by an electric motor.

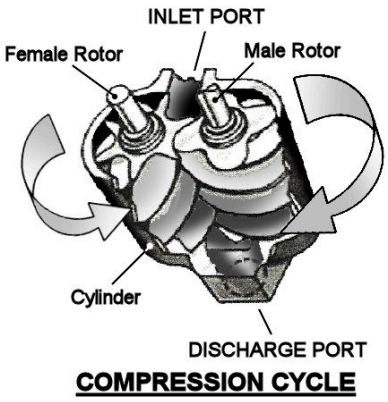
All components are assembled on a structural steel base. The control panel is located in the front of the enclosure door panel. Acoustical enclosure is one of the standard features for all compressors. A complete package mainly consists of following:

- Compressor (Air End)
- Electric motor
- Starter
- Air Inlet valve
- Air filter
- Oil filter
- Air cooler
- Oil cooler
- Cooling liquid cooler
- Drive motor
- Cooling fan
- Electrical enclosure
- Air/ Fluid separator tank
- Controller
- Cold weather aids
- Mist separator and filter

Dismantling the compressor's enclosure may void its warranty.

NOTICE!

2.2 THE COMPRESSION CYCLE



COMPRESSION CYCLE

The compressor 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 reservoir, fluid is separated from the air in the separator tank. Compressed air then flows through the after-cooler for moisture removal while the lubricant is being cooled by the fluid-cooler for re-injection.

2.3 MOTOR

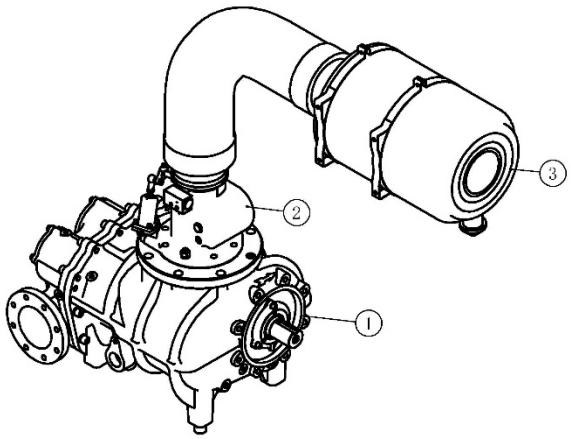
KPE compressor uses a liquid cooled permanent magnet synchronous motor. The motor features excellent resistance to corrosion and dust accumulation, it is reliable in harsh environments. A dedicated pump force cooling liquid into flowing through motor for heat removal. Cooling liquid will be cooled down in cooling liquid cooler and recycle. A temperature sensor monitors the cooling liquid temperature to prevent high cooling liquid temperature causing motor and drive failure.

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 × power factor. If the frequency of the power source deviates from the rating value indicated on the nameplate by 5% of this value, or under voltage/overvoltage exceeds 10%, there can be no guarantee that the motor will deliver rated output power.

2.4 AIREND, INLETVALVE AND FILTRATION SYSTEM

The compressor inlet system consists of an air filter, inlet valve and airend. The inlet valve controls the air intake volume. It also acts as the check valve to prevent the reverse pressure and rotation when compressor is shutting down.



①	Airend
②	Inlet valve
③	Air filter

Figure 2-1 airend, inlet valve and filter

2.5 COMPRESSOR LUBRICATION AND COOLING SYSTEM

The lubrication and cooling system consists of a reservoir, axial fan, aluminum finned fluid-cooler and after-cooler, fluid filter and thermal valve. 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 thermal valve and fluid-cooler. Cooled fluid will be filtered before being re-injected back into the compressor.

Cooling air is being forced through the cooler fins by the axial fan, which cools the fluid and compressed air in the cooler tubes. Cooler fins must be kept clean at all times. A moisture separator downstream of after-cooler helps separate the water content in the discharge air, and through the automatic condensate drain, the water will be drained. A coalescing filter is located downstream of moisture separator in addition for oil, water and solid particle removal. This avoids water, oil and particle contamination problems downstream (in service lines).

Fluid from reservoir circulates to the thermal valve. The thermal valve is a directional valve with a temperature sensitive device. The thermal valve fully closes the access to the

fluid cooler when the fluid temperature is below 74°C (165°F). Fluid (below 158°F) will bypass the fluid cooler, flow through fluid filter and re-inject into the airend. As the fluid temperature rises continually up to 76°C (170°F), due to heat of compression, the thermal valve begins to work, operate, and fluid will flow through the fluid cooler.

2.6 COMPRESSOR DISCHARGE SYSTEM

Air/fluid mixture has been forced into reservoir after compression. The reservoir 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.

The minimum pressure check valve assures the reservoir maintains a minimum pressure between 22psig and 44psig (1.5Bar and 3Bar) during unloading conditions. This pressure is necessary for air/fluid separation and fluid circulation.

The mist separator and coalescing filter located downstream the after-cooler. The cold air flow through the mist separator and coalescing filter can get rid of residual oil, particles and large amount of condensate. The condensate and oil are automatically drained through the drain valves.

2.7 REGULATING SYSTEM

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

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 liquid cooled variable speed drive increases the motor speed.

When the motor operates at minimum speed and discharge pressure is higher than the unload setting pressure, the solenoid valve is energized to close the inlet valve, the compressor turns to the unloading running state. Upon reaching the set duration in unloading status, the machine stops automatically. The machine will load again if discharge reaches the set point during unloading.

2.8 COOLING LIQUID SYSTEM

The system is consisting of a pump, a cooler/ radiator and a series of tubes connecting these components. They function based on the principles of thermodynamics and fluid mechanics. The primary coolant in these systems is often a water-based mixture due to water's excellent thermal conductivity and heat capacity.

The pump circulates the cooling liquid from the cooler through the drive and motor to remove the heat generated by drive and motor. A temperature sensor monitors the liquid temperature to protect the motor and drive from overheating. The radiator acts as a heat exchanger, dissipating the heat absorbed by the cooling liquid to the ambient air.

2.9 COLD WEATHER AIDS

The compressor is designed to operate effectively in cold weather down to -12°C (10°F).

The system includes electrical heat tracings and a heater. Control lines accumulate moisture from condensate during normal operation. In cold temperatures, the electrical heat tracings prevent the control lines and drain valves of the mist separator and coalescing filter from freezing up.

Heater inside the electrical enclosure warm the air to keep electrical components at the ideal operating temperature. Heater with thermostat which is adjustable, can decide when the heater turns on and off.

The heater inside the electrical enclosure warms the air to keep electrical components at the ideal operating temperature. A thermostat which is adjustable, can decide when the heater turns on and off.

Fluid Information

3.1 FLUID GUIDE

KPE compressors are filled & tested with Kerry lubricant. Refer the *Figure 3-1* for filler port, sight glass, quarter-turn valve location on the reservoir. The compressor is filled with the manufacturer's recommended quantity of Kerry fluid. Inspection of the reservoir fluid level during installation or operation is recommended.

①	Air/Oil Separator Tank
②	Fluid Fill Port
③	Sight Glass
④	Fluid Drain Valve
⑤	Safety Valve

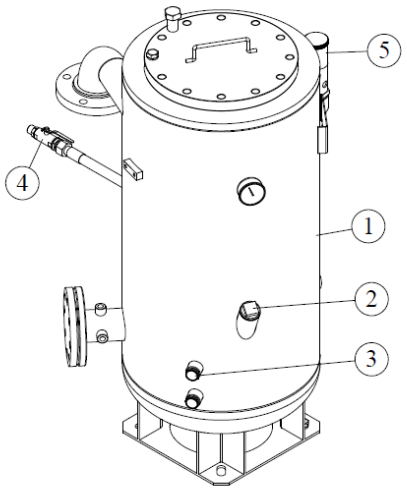


Figure 3-1: Fluid Fill Location

Do not use different fluid. Using different fluid will void compressor's warranty.

3.2 FLUID CHANGE RECOMMENDATIONS

LUBRICANT TYPE	FLUID CHANGE
KTL8000	Every 1,500 hours or one year which occur first
KTL-8000PG-S	Every 1,500 hours or one year which occur first

Installation

4.1 COMPRESSOR MOUNTING, SUPPORT AND LOCATION

Compressor should be located on a flat and solid surface and in a well-ventilated area. Do not operate in areas in which specific requirements with regard to explosion protection are in force. The location must have sufficient access for maintenance equipment and lifting vehicle.

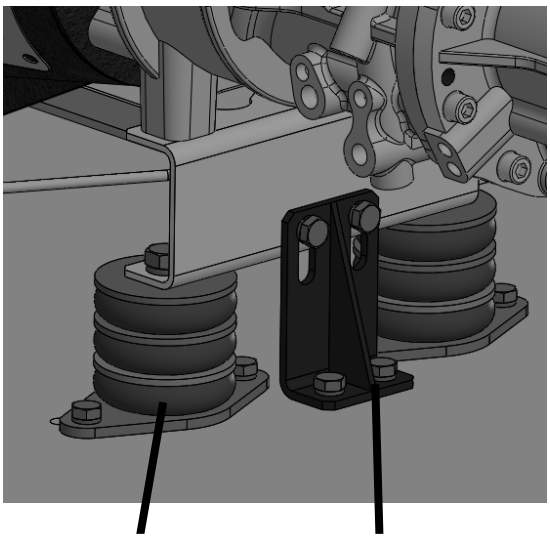


Figure 4-1 Shipping bracket

NOTICE!

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

WARNING

Removal or paint over of safety labels will be a safety hazard. This could result in personal injury or property damage. Warning signs and labels should be conspicuous and on a bright legible surface. Do not remove any warning, caution or instructional material attached with unit.

4.2 VENTILATION AND COOLING

Ambient temperature should not exceed 50°C (122°F). High ambient temperatures may result in high air temperature shutdown.

Power on compressor and make cold weather protection system working for a while if the ambient temperature is below 0°C (32°F).

NOTICE!

The compressor air inlet must be located in the opposite direction to other compressors or heat generating equipment. The object is to avoid hot air being drawn into the system. Do not block the exhaust air from cooler or fan. Hot exhaust air must be vented outside to prevent high discharge temperature and cooling liquid temperature from damage the compressor.

CAUTION

Maintain clean & fresh air and chemical vapor free !

WARNING

Under no circumstances should a compressor be installed in an area exposed to toxic, volatile or corrosive atmosphere, nor should toxic, volatile or corrosive agents be stored near the compressor.

4.3 PIPING CONNECTION

Never use PVC pipe or non-genuine rubber hose in the air system. Use flexible connections to prevent pipe load from being transmitted to the compressor.

WARNING

Release system pressure by opening manual pressure relief valve prior to servicing. Failure to relieve system pressure could result in death or serious injury and property damage.

The moisture separator and coalescing filter comes with automatic drain valves. The drain line should not be plugged during compressor operation.

Service line piping is recommended to be sized to match the compressor's discharge connector. All piping & fittings should be rated to withstand greater pressure than the discharge pressure.

Pressure relief valves are sized to protect the system. Never change the pressure setting or tamper with the valve. Only the valve manufacturer and their authorized representatives are allowed to make such changes.

4.4 FLUID LEVEL INSPECTION

The compressor is shipped fully charged with the proper amount of fluid. However, it is necessary to check the fluid level during the compressor is in shut down mode and operation. Fluid level is indicated on the reservoir sight glass. When the compressor is running, the level should not exceed the upper sight glass. Regularly check the oil level during operation.

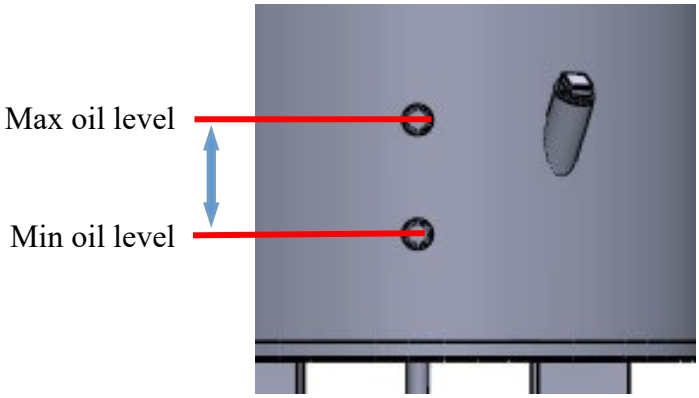


Figure 4-2 Sight glass

4.5 ELECTRICAL

Before installation, the electrical supply should be checked for adequate wire size and capacity. User must comply with national & local electrical codes. The codes specify the surrounding clearance requirement for the electrical panel. Wiring work should be undertaken only by a qualified electrician in compliance with OSHA, national or local electrical code. KPE compressor provides wiring diagrams for user reference. Refer to the electrical control schematic in the parts manual for wiring diagrams. Genuine fused disconnect switch or circuit breaker should be purchased from the manufacturer. Any unreasonable voltage imbalance (5%) between phases must be eliminated and low voltage problems must be corrected to prevent excessive current draw. Air compressors must be grounded in accordance with applicable codes, regulations and requirement.

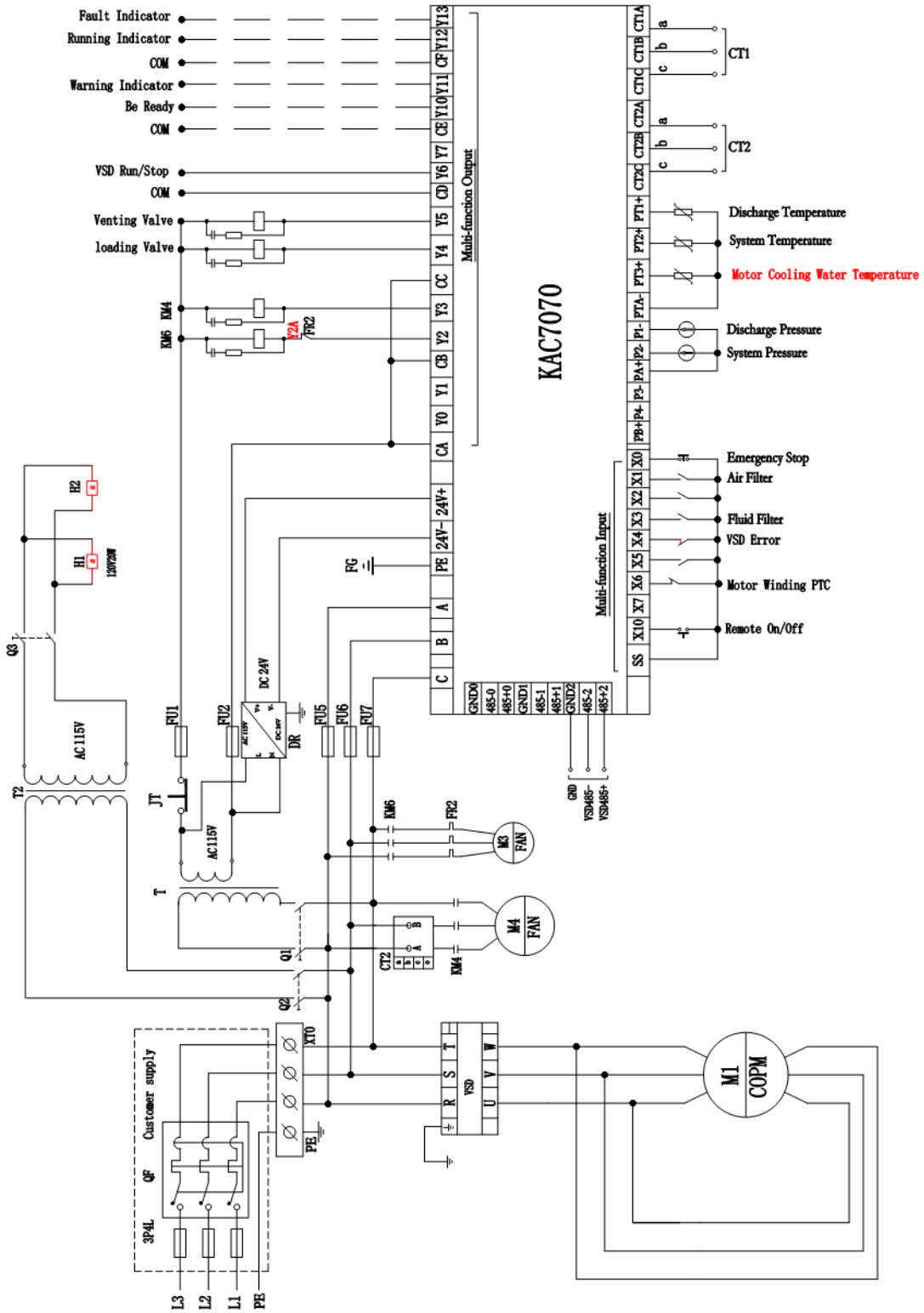
Kaishan Compressor would like to emphasize the importance of providing adequate grounding for air compressors. The common practice of grounding units to a building's structural steel may not provide adequate grounding protection, as paint and corrosion build-up may exist.

All electrical supply cables must be adequately sized to prevent overheating due to current draw.

Enclosure panels and drive grille must be fastened in place before starting the compressor and never removed before lock out / tag out of the main power supply.

Electrical camlocks are provided for an incoming power connection. Inspect incoming voltage to match the compressor's specification. Check all electrical connections L1-L2-L3 for tightness and cleanliness. There is a circuit breaker installed inside the electrical enclosure for additional protection.

4.6 ELECTRICAL CONNECTION


Fault Indicator
Running Indicator
COM
Warning Indicator
Be Ready
COM
VSD Run/Stop
COM
Venting Valve
loading Valve
KM4
KM6
Y2A
FR2
Multi-function Output
KAC7070
Multi-function Input
CT1
CT2
Discharge Temperature
System Temperature
Motor Cooling Water Temperature
Discharge Pressure
System Pressure
Emergency Stop
Air Filter
Fluid Filter
VSD Error
Motor Winding PTC
Remote On/Off
H2
H1
120V20W
Q3
AC115V
T2
FU1
FU2
DC 24V
DR
FU5
FU6
FU7
FG
JT
AC115V
T
KM6
FR2
M3
FAN
M4
FAN
CT2
KM4
Q1
Q2
XT0
PE
Customer supply
QF
3P4L
L3
L2
L1
PE
VSD
M1
COPM

4.7 MOTOR ROTATION INSPECTION

Motor rotation must be checked after the wiring has been installed. Operating the compressor in incorrect rotation will result in severe damage to the compressor and warranty coverage will be voided. Motor rotation can be viewed through the opening in the drive grille. The drive motor end of the compressor is marked with an arrow noting the proper rotation.

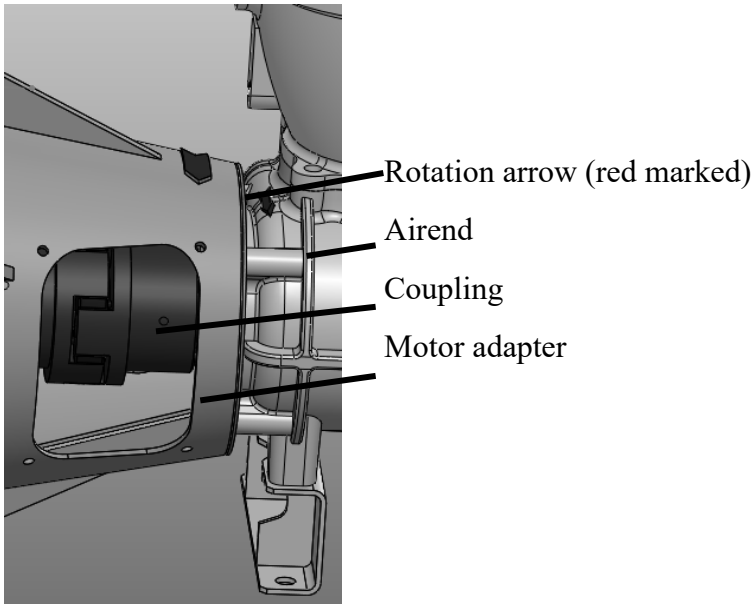


Figure 4-3 Motor rotation arrow

To inspect rotors rotation, pull out the "EMERGENCY STOP" button and press once, quickly press the "START" and "STOP" button in sequence, allowing the motor to turn 2 or 3 revolutions. Observe the drive shaft for correct direction. If reverse rotation is observed, disconnect the power supply, reverse power input leads at the motor starter. Recheck for proper rotation.

4.8 FAN ROTATION INSPECTION

Fan motor rotation should be inspected. KPE compressors uses an axial fan for cooling. Fan rotation is inspected through an arrow shaped observation hole above the fan motor. The fan must rotate in the direction indicated by the arrow.

NOTICE!

Always inspect fan rotation through the observation hole. Never assume the fan rotation is correct based on the induced air flow across the coolers. A centrifugal fan can pull the airflow across the coolers when rotating in either direction; however, incorrect rotation will cause high discharge temperature.

Compressor Control

5.1 INTRODUCTION

The KAC7070 controller is fitted in the electrical enclosure door, it has following functions:

- ✧ Controlling the compressor
- ✧ Monitoring components subject to service
- ✧ Protecting the compressor
- ✧ HMI

Operation of the compressor is determined by the settings and control philosophy programmed into the controller.

5.2 CONTROLLER PANEL

The main screen will show automatically when the power is switched on.

Display of Kaishan KAC7070 controller

Items	Designation	Description
1	UNLOAD	Unloading pressure setpoint
2	VSD	VSD unit applicable, variable speed control pressure
3	LOAD	loading pressure setpoint
4	DISCT	Airend discharge temperature
5	VOLTAGE	Voltage
6	M CURR	Drive motor input current
7	MOTOR FREQ	VSD unit applicable, motor running frequency

Items	Designation	Description
8	START button	Button to startup the compressor
9	STOP button	Button to stop the compressor
10	REST button	Use this button to reset
11	Alarm button	Press the button to access alarm menu
12	Menu button	Press the button to access main menu
13	Discharge P	Compressor discharge pressure
14	Icons	Status icons
15	service display	Percentage of reaching service plan interval

Controller LED indication

Power LED, light up when controller is powered on.

Operation LED, light up when automatic operation.

Alarm LED, Flashes in case of a shut-down and warning condition.

If an alarm occurs, the compressor is shut down immediately and the alarm LED on control lights up. The control will display the actual fault causing the alarm. Alternative, press the Alarm button to go to alarm menu for more information

Physical button

Button	Description
	Push to Start Compressor. When in Sequence Mode and Master Compressor, push to activate the Sequence Mode.
	Push to Stop Compressor. When in Sequence Mode and Master Compressor, push to de-activate the Sequence Mode.

5.3 MAIN MENU SCREEN

Press the menu button to go to main menu screen. The screen shows 14 menu items, press one to go to a next menu.

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

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

FUNCTION	PASSWORD
USER PARA	9999
MAIN PARA	6842

5.4 STATUS ICONS

If function be activated, the following icons will display on the main screen.

Icon	Description
	Timer, to program time-based start/stop commands
	Automatic time-based changeover of discharge pressure
	Automatic restart after voltage failure is active
	Network control
	Remote start / stop
	Sequence Control

5.5 RUN PARA MENU

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

Press menu

Press RUN PARA

Following screen appears：

Item	Description
AIR P	Compressor discharge pressure
DIS T	Airend discharge temperature
SYSTEM T	System temperature
OIL T	Oil temperature
OIL P	Oil pressure
OIL TIME END	Running hours of Oil Filter Element
O-A TIME END	Running hours of Air/Oil Separator Element
AIR TIME END	Running hours of Air Filter Element
LUBE TIME END	Running hours of Lubricant
GREASE TIME END	Running hours of Main Motor Grease
PROD DATE	Manufacture date
SERIAL NO	Compressor serial number

Press DOWN button to move to next page, following screen appears：

Press up to go to previous screen. Press RETURN button to go to previous menu.

Item	Description
MOTOR A, MOTOR B, MOTOR C	Motor current of each phase
FAN A, FAN B, FAN C	Fan current of each phase
THIS RUN	Total running hours
THIS LOAD	Total loading hours
HMI VER	HMI Revision number
PLC VER	PLC Revision number
Digital inputs	Terminal status
Digital outputs	Terminal status

Item	Description
PF MOTOR U*I	Motor real-time power kW
PF M THIS ELEC	Motor real-time power consumption
PF M TOTAL ELEC	Motor total power consumption
PF FAN U*I	Fan real-time KW
PF FAN THIS ELEC	Fan real-time power consumption
PF FAN TOTAL ELEC	Fan total power consumption

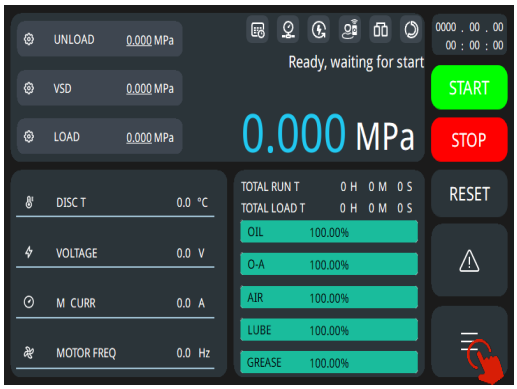
Item	Description
MOTOR SPEED	Calculated motor RPM
MOTOR FREQ	Inverter output Frequency
MOTOR CURR	Inverter Output Current
MOTOR VOLT	Inverter Output Voltage
MOTOR POWER	Inverter Output Power
AIR P	Air pressure
HOST WRITE FREQ	Motor Frequency based on PID calculations
HOST STATUS	Motor Running Status from Inverter data reading
HOST FAULT	Motor Error Status from Inverter data reading

Item	Description
FAN SPEED	Real Time Cooling Fan Speed based on frequency reading
FAN FREQ	Output Frequency of Cooling Fan Inverter
FAN CURR	Output Current of Cooling Fan Inverter
FAN VOLT	Output Voltage of Cooling Fan Inverter
FAN POWER	Real Time Cooling Fan Power from Inverter
DISC T	Discharge temperature
FAN FREQ-W	Fan Frequency on PID calculations
RAN STATUS VALUE	Fan Running Status from Inverter data reading

RAN ERROR VALUE	Fan Error Status from Inverter data reading

5.6 USER PARA MENU

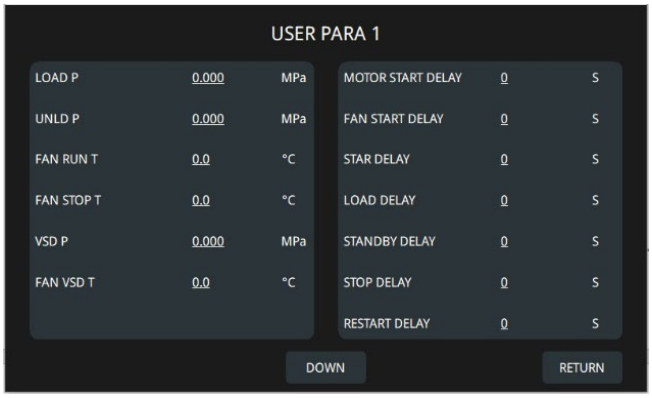
Starting from the main screen, press USER PARA button and enter password to go to USER PARA menu.



Press MENU

Press USER PARA

Enter the User password, press Enter and SINGIN, following screen appears:



Activate the parameter setting by pressure the parameter item. A screen similar to the one below appears:

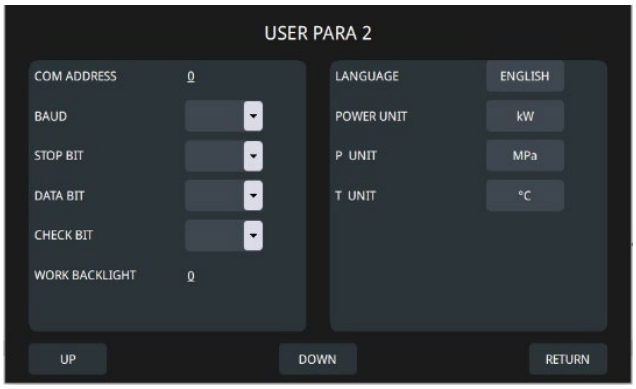
Modify the setting as required by selecting new values on numeric keypad and then press the enter key to confirm and accept.

If necessary, change the other settings as required in the same way as described above.

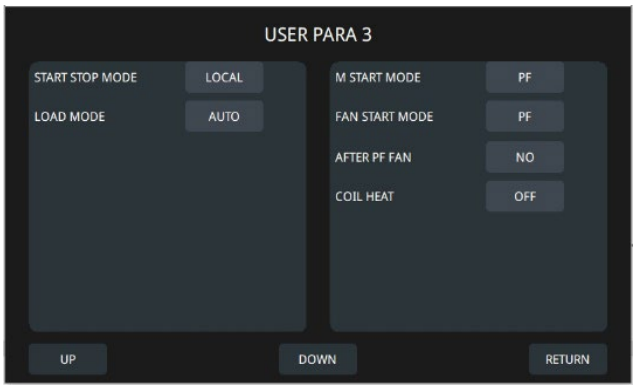
Function description

Item	Description
LOAD P	Loading pressure setpoint
UNLD P	Unloading pressure setpoint
FAN RUN T	Cooling fan start while the discharge temperature exceeds this setpoint.
FAN STOP T	Cooling fan stop while the discharge temperature lower than this setpoint.
VSD P	VSD unit applicable, variable speed control pressure setpoint
FAN VSD T	Frequency conversion temperature
MOTOR START DELAY	Set to bypass Motor Overload protection on start-up, the value here must be longer than the STAR DELAY TIME plus LOAD DELAY TIME
FAN START DELAY	Set to bypass Fan Motor Overload protection on start up

Item	Description
STAR DELAY	Star Delta changeover time
LOAD DELAY	Delay to load after start running in Delta
STANDBY DELAY	Compressor will stop after running continuously unloaded over this time
STOP DELAY	Run on time after Stop Button pressed
RESTART DELAY	Will stop compressor from starting for the duration of this setting



Item	Description
COM ADDRESS	Set the Communication address in Computer or Sequence Mode
BAUD	Set the Communication baud in Computer Mode
STOP BIT	Set the Communication stop bit in Computer Mode
DATA BIT	Set the Communication data bit in Computer Mode
CHECK BIT	Set the Communication check bit in Computer Mode
WORK BACKLIGHT	Set Controller backlight Level
LANGUAGE	Change the controller display language
POWER UNIT	KW or HP
P UNIT	MPa ~ PSI ~ Bar
T UNIT	℃ or ℉

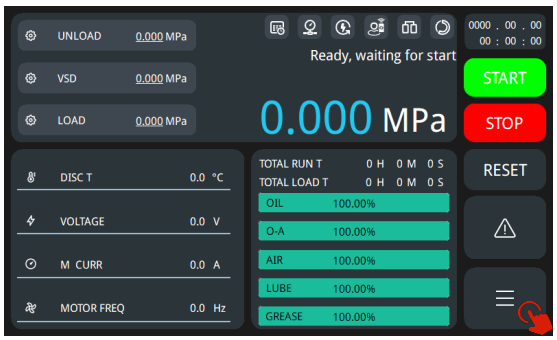


Item	Description
START STOP MODE	Select local control or remote control
LOAD MODE	Manual Mode: Use Load/Unload Button. If pressure is above unload pressure compressor will unload automatically. Automatic Mode: Will load and Unload via Pressure Transducer.
M START MODE	DOL, Motor VSD, Soft Start
FAN START MODE	DOL, Fan VSD, Soft Start
AFTER PF FAN	Enable or not

Item	Description
DRAIN CLOSE TIME	Time set for Condensate Drain to open and purge
DRAIN OPEN TIME	Time set for Condensate Drain to stay closed

5.7 MAIN PARA MENU

Starting from the main screen, press MAIN PARA button and enter password to go to MAIN PARA menu.



Function description

Item	Description
OIL TIME END	Real time hours of oil filter, reset after service.
O-A TIME END	Real time hours of oil/air separator element, reset after service.S
AIR TIME END	Real time hours of air filter, reset after service.
LUBE TIME END	Real time hours of lubricant, reset after service.
GREASE TIME END	Real time hours of motor grease, reset after service.
OIL MAX TIME	Oil filter service interval
O-A MAX TIME	Oil/air separator element service interval
AIR MAX TIME	Air filter service interval
LUBE MAX TIME	Lubricant service interval
GREASE MAX TIME	Motor grease service interval
PROD DATE	Manufacture Date
Serial Number	Compressor serial number

The following alerts will appear on the screen if a service plan interval is reached:

ALARM	MENU	Text
Air filter alarm	Digital X1	AIR BLOCK ALARM
	Maintenance	AIR TIME END ALARM
Oil filter alarm	Digital X2	OIL BLOCK ALARM
	Maintenance	OIL TIME END ALARM
Separator alarm	Digital X3	O-A BLOCK ALARM
	Maintenance	O/A TIME END ALARM
Lubricant alarm	Maintenance	LUBE TIME END ALARM
Grease alarm	Maintenance	GREASE TIME END ALARM

5.8 SCHEDULED PRESSURE

SCH PRES menu will run the compressor within the Pressure Band within the boundaries of the P START and P STOP times programmed.

Outside the time boundary the compressor will go into Standby Mode and will not start even if the pressure drops below minimum setting.

Press MENU, press SCH PRES, enter the password, press Enter and Confirm.

MENU	FUNCTION
Load P (Mpa)	Will Start and Load if Between Start and Stop Schedule Time Set if air pressure is below this setting.
Unload P (Mpa/PSI)	Will Unload if Between Start and Stop Schedule Time Set if air pressure is above this setting.
Scheduled VSD P (Mpa/PSI)	VSD Optimum Pressure Between Start and Stop Schedule Time Set (This data is only available in MOTOR VSD or MOTOR/FAN VSD mode).
P Start Time	Set Time to Activate Schedule. 00.00 Means not Activated.
P Stop Time	Set Time to Deactivate Schedule. 00.00 Means not Activated.

5.9 SCHEDULE ON-OFF

Press MENU, press SCH WORK, enter the password, press Enter and Confirm.

SCH WORK is Time specific and can be programmed for up to 4 scheduled on/off periods per day. When set to 0000, the function is disabled.

5.10 HISTORY RECORD

The FAULT REC shows a list of fault s and alarms. The date at the top is the most recent alert.

Servicing

Kaishan electric portable compressor models offer superior performance and reliability while requiring the minimum amount of inspection and maintenance. The controller and indicator alerts the operator to perform required maintenance or repair unit problems.

6.1 FLUID CHANGE

Fluid change need to be carried out every 1,500 hours, or once a year, whichever comes first.

KPE series compressors utilize a pressurized fluid drain. Use the following procedure to drain and replace the compressor fluid.

i. Run compressor for a while to raise oil temperature.
ii. Press the emergency stop button and remove the right-side cabinet panel (if applicable).
iii. Check the pressure gauge reading on reservoir and wait until reservoir pressure drops to approximately 0.5Bar (8psig).
iv. Slowly open the ball valve on the drain line of oil/air separator tank and fluid coolers. The pressure remaining in the tank will force the fluid out. The ball valve must be opened gradually.
v. When air begins to escape from the tank, close the valve.
vi. Remove the plug from the fluid fill port and refill the reservoir with the appropriate amount of KTL-8000 fluid.
vii. Before starting the compressor opens the 1/4 turn valve on the blow-down valve to ensure the blow-down valve functions correctly.

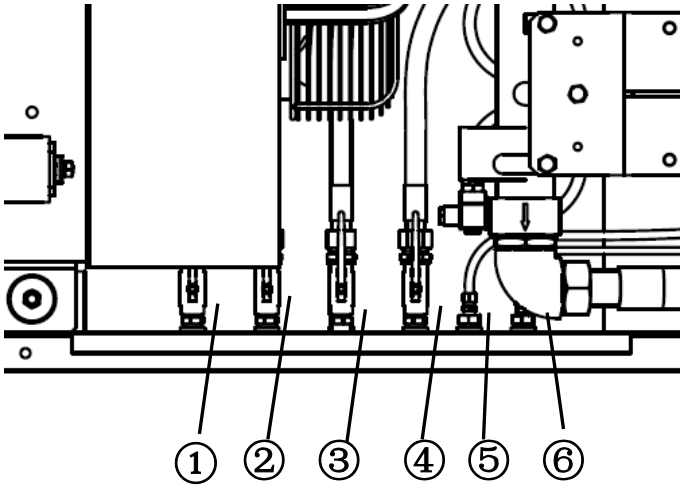


Figure 6-2 drain ports

Item	Description
1	Liquid cooler drain
2	Liquid cooler drain
3	A/O separator tank drain
4	Cooling liquid cooler drain
5	After-cooler drain
6	Moisture trap/filter drain

NOTICE

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

6.2 AIR FILTER

The standard Kerry 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 750 hours, or once half 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.

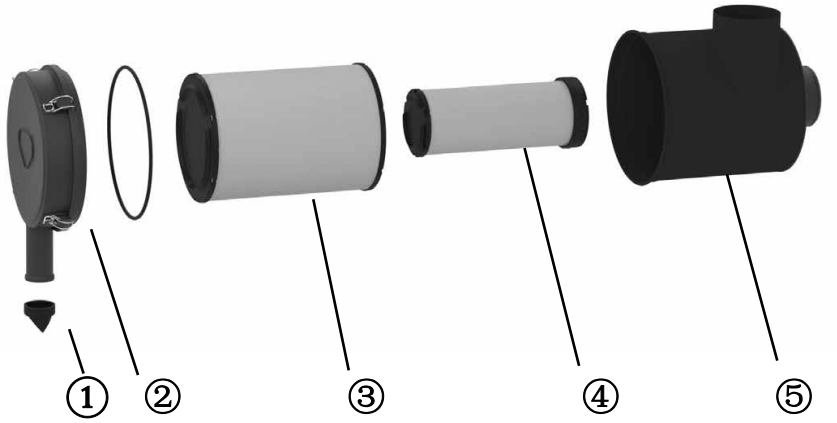


Figure 6-3 separator element replacement

Item	Description
1	Evacuator
2	Rear cover
3	Primary element assembly
4	Safety element
5	Housing

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.

6.3 AIR/OIL SEPARATOR ELEMENT

The air/oil separator is using coalescent filter element. The air/oil separator should be replaced as indicated in the maintenance schedule or as follows:

- If excessive fluid carryover is observed.
- 1,500 hours MAX or as indicated by differential pressure indicator.
- As indicated by the gauge (if equipped).

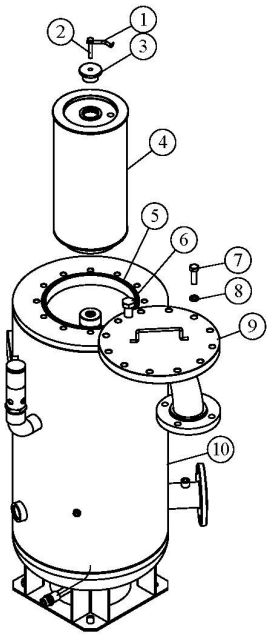


Figure 6-4 separator element replacement

Item	Description	Item	Description
1	Grounding strip	6	Jack-up bolt
2	Mounting bolt	7	Lid bolt
3	Lock block	8	lock-washer
4	Separator element	9	Tank lid
5	Seal O-ring	10	Separator tank

Refer to figure 6-4 when air/oil separator element replacement is necessary.

i. The compressor must be shut off and system pressure must be relieved
ii. Remove the lid bolts and lock-washers.
iii. Twist the jack-up bolt to lift the separator tank lid.
iv. Remove grounding strip, mounting bolt and lock block.
v. Take out the old separator element
vi. Clean all sealing surfaces, insert the new separator element
vii. Install grounding strip and lock block in
viii. Rotate lid back to position, install the lid bolts and lock washers
ix. Clean surface and oil mark.

Replacement requires unbolting and lifting the separator cover and replacing it with a new one.

6.4 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
- Every 750 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.

6.5 COOLING LIQUID

Cooling liquid is deeply important for compressor cooling, and makes sure the motor and drive are at the right operating temperature. KREP compressor is filled with an ethylene glycol type coolant to enable lower temperature operation and prevent freezing. Kaishan recommend renewing it every 2 years. However, if you're changing a part that's connected to the cooling system, such as the water pump, you'll need to replenish some or all of the cooling liquid well before these intervals.

It is also recommended that checking its strength each autumn, and certainly before cold weather arrives, to make sure it's still at sufficient strength to protect your compressor from a deep freeze.

Use the following procedure to drain and replace the compressor cooling liquid:

i. The compressor must be shut off and system pressure must be relieved
ii. Disconnect the power, remove the radiator cap
iii. Allow the cooling liquid to cool off, place your radiator drain pan under the radiator drain valve
iv. Open the drain valve, let the liquid drain completely
v. Close the drain valve, refill cooling liquid
vi. Secure the radiator cap
vii. Clean surface

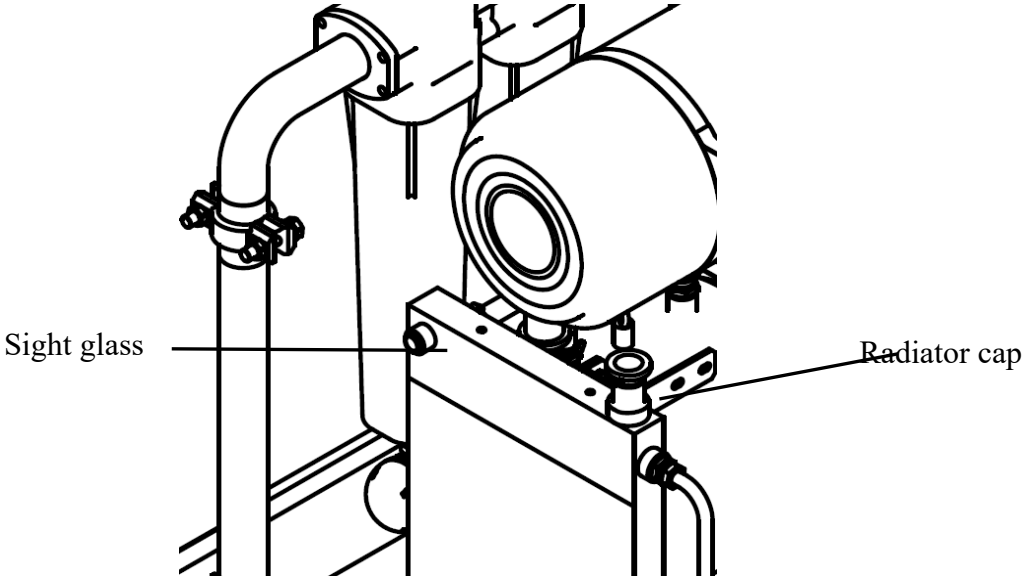


Figure 6-5 Radiator

6.6 FLUID SAMPLING PROCEDURE

The following is a sampling procedure for oil sump, without fixed sampling hardware installed. Check the pressure gauge reading on reservoir and wait until there is no pressure in reservoir. The oil sample is collected by gravity drain into the sample bottle.

i. Take sample at normal operating conditions or immediately after shutting unit down. That will ensure a homogeneous sample of oil.
ii. Wipe excess contamination from sample area.
iii. Remove drain plug. Let sufficient oil drain out before taking sample. If system has drain pipe, flush about 5 times the volume of the dead leg before taking sample.
iv. Avoid overfilling the sample bottle. Fill sample bottle up to above 80% but below the threads of the bottle. Seal the bottle tightly, wipe clean.
v. Pre-label or label sample bottle immediately after filling to avoid mix-ups. Make sure bottles are labelled with full sample details.

6.7 MAINTENANCE SCHEDULE

This Schedule is intended to be used as a guideline only. Depending on the specific operating conditions of your KREP compressor, maintenance requirements may vary. The instructions in this section will give more details about determining when specific service should be performed.

Initial 50 hours	Change fluid filter
Every 6 months /Every 750 hours	Check fluid level. Check safety valve Replace fluid filter

	Replace air filter Fill up the cooling liquid
Every 12 months /Every 1500 hours	Check safety valve Replace fluid filter Replace air filter Replace air/oil separator Fill up cooling liquid

Troubleshooting 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 7-1: TROUBLE SHOOTING GUIDE		
Symptom	**Possible Cause**	**Solution**
Fail to Start	Power failure	Check power supply to the unit
	Low incoming voltage	Check voltage and power source or contact local power company.
	Fuse blown	Replace Fuse

	Emergency button	Reset emergency button
	Motor starter overload tripped	Check motor starter wiring before removing motor. Remove motor and have tested at motor manufacturer repair center.
	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	Re-position the compressor for proper air ventilation
	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
	High cooling liquid temperature	Replenish cooling liquid and clean cooler
Line pressure rises above unload pressure set-point	Pressure sensor failure	Check, replace if necessary
	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.

Table 7-1: TROUBLE SHOOTING GUIDE (Continued)

Symptom	**Possible Cause**	**Solution**
Compressor cannot reload when service line pressure drops to reset	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
	Dusty after-cooler fins	Clean
	Fan motor setting	Adjust
	Temperature sensor failure	Check and replace as necessary
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 return 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 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
	Drive malfunctioning	Check seting or replace as necessary
	Air leakage	Check and correct

Contact Information

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