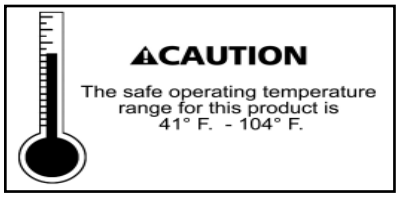
⚠WARNING



PLEASE READ THE ENTIRE CONTENTS OF THIS MANUAL PRIOR TO INSTALLATION AND OPERATION. BY PROCEEDING YOU AGREE THAT YOU FULLY UNDERSTAND AND COMPREHEND THE FULL CONTENTS OF THIS MANUAL. FORWARD THIS MANUAL TO ALL OPERATORS. FAILURE TO OPERATE THIS EQUIPMENT AS DIRECTED MAY CAUSE INJURY OR DEATH.

REV A 10-30-09

p/n 5900156

INSTALLATION AND OPERATION MANUAL

SCREW COMPRESSOR
MODEL: LS15RS

Keep this operation manual near the machine at all times. Make sure that ALL USERS read this manual .

SHIPPING DAMAGE CLAIMS

When this equipment is shipped, title passes to the purchaser upon receipt from the carrier. Consequently, claims for the material damaged in shipment must be made by the purchaser against the transportation company at the time shipment is received.

BE SAFE

Your new BendPak Compressor was designed and built with safety in mind. However, your overall safety can be increased by proper training and thoughtful operation on the part of the operator.

DO NOT operate or repair this equipment without reading this manual and the important safety instructions shown inside.

BendPak®
PROVIDING AUTOMOTIVE SERVICE SOLUTIONS

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TABLE OF CONTENTS

Section 1: Introduction 3

Section 2: General Safety 4

Section 3: General Overview 5

Section 4: Installation and Inspection Before Operation 6

Section 5: Requirements for Air Piping 7

Section 6: Floor Mounting 8

Section 7: Electrical Connections 9

Section 8: Pre-Operation Inspection 11

Section 9: Daily Operation 13

Section 10: Control Panel 15

Section 11: Maintenance 22

Section 12: Common Problem Solving 30

Maintenance/Inspection Records 32

Parts List 33

Warranty 35

NOTE:

Every effort has been taken to ensure complete and accurate instructions have been included in this manual, however, possible product updates, revisions and or changes may have occurred since this printing. BendPak Ranger reserves the right to change specifications without incurring any obligation for equipment previously or subsequently sold. Not responsible for typographical errors.

SECTION 1

DESCRIPTION

Screw compressor units are intended to provide compressed air to power pneumatic tools, operate spray equipment and supply air for pneumatic valves and actuators. A small amount of oil carryover is present in the compressed air stream. The compressed air has a final oil level of < 3ppm, Applications requiring higher levels of air free of oil vapor should have the appropriate filter installed. The Screw compressor units are to be mounted per the instructions provided on a solid floor. Any other use of these units will void the warranty and the manufacturer will not be responsible for problems or damages resulting from such misuse.

SAFETY GUIDELINES

This manual contains information that is very important to know and understand. This information is provided for SAFETY and to PREVENT EQUIPMENT PROBLEMS. To help recognize this information, observe the following symbols.

⚠DANGER

DANGER

Watch for this symbol: It Means: Immediate hazards which will result in severe personal injury or death.

⚠WARNING

WARNING

Watch for this symbol: It Means: Hazards or unsafe practices which could result in severe personal injury or death.

⚠CAUTION

CAUTION

Watch for this symbol: It Means: Hazards or unsafe practices which may result in minor personal injury or product or property damage.

INTRODUCTION

⚠CAUTION

1. Carefully remove the crating and packing materials. **CAUTION!** Be careful when cutting steel banding material as items may become loose and fall causing personal harm or injury.

2. Check the voltage, phase and proper amperage requirements for the motor shown on the motor plate. Wiring should be performed by a certified electrician only.

3. Confirm voltage before connecting power to your machine or serious damage to the motor/electronics will result.

BREATHABLE AIR WARNING

This compressor/pump is NOT equipped and should NOT be used “as is” to supply breathing quality air. For any application of air for human consumption, you must fit the air compressor/pump with suitable in-line safety and alarm equipment. This additional equipment is necessary to properly filter and purify the air to meet minimal specifications for Grade D breathing as described in Compressed Gas Association Commodity Specification G 7.1 - 1966, OSHA 29 CFR 1910. 134, and/orCanadian Standards Associations (CSA).

DISCLAIMER OF WARRANTIES

In the event the compressor is used for the purpose of breathing air application and proper in-line safety and alarm equipment is not simultaneously used, existing warranties are void, and the company disclaims any liability whatsoever for any loss, personal injury or damage!

UNPACKING

After unpacking the unit, inspect carefully for any damage that may have occurred during transit. Make sure to tighten fittings, bolts, etc., before putting unit into service.

⚠DANGER

Do not operate unit if damaged during shipping, handling or use. Damage may result in bursting and cause injury or property damage.

⚠WARNING

Failure to follow danger, warning, and caution instructions may lead to serious personal injury or death to operator or bystander or damage to property. Do not operate this machine until you read and understand all the dangers, warnings and cautions in this manual.

For additional copies
or further information, contact:
BendPak Inc. / Ranger Products
1645 Lemonwood Dr.,
Santa Paula, CA. 93060
1-805-933-9970
www.bendpak.com

SECTION 2

GENERAL SAFETY PRECAUTIONS

Since the air compressor and other components (material pump, spray guns, filters, lubricators, hoses, etc.) may be under high pressure and be subject to explosions, the following safety precautions must be observed at all times:

1. **READ AND UNDERSTAND** all safety warning procedures before installation and operation.

2. **KEEP HANDS AND FEET CLEAR**. Remove hands and feet from any moving parts.

3. **KEEP WORK AREA CLEAN**. Cluttered work areas invite injuries.

4. Consider work area environment. Do not expose equipment to rain . **DO NOT** use in damp or wet locations. Keep area well lighted.

5. **ONLY TRAINED OPERATORS** should operate this equipment. All non-trained personnel should be kept away from work area. Never let non-trained personnel come in contact with, or operate machine.

6. **USE MACHINE CORRECTLY**. Use machine in the proper manner. Never use adapters other than what is approved by the manufacturer.

7. **DO NOT** override or disable safety valves and/or devices.

8. **NEVER** operate compressor without a belt guard or Side covers in place This unit can start automatically without warning. Personal injury or property damage could occur from contact with moving parts.

9. **DRESS PROPERLY**. Non-skid steel-toe footwear is recommended when operating machine.

10. **GUARD AGAINST ELECTRIC SHOCK**. This equipment must be grounded while in use to protect the operator from electric shock. Never connect the green power cord wire to a live terminal. This is for ground only. Follow all local electrical and safety codes as well as the United States National Electrical Codes (NEC) and Occupational Safety and Health Act (OSHA).

⚠DANGER

11. **DANGER!** The motor on this machine contains high voltage. Disconnect power at the receptacle before performing any electrical repairs. Secure plug so that it cannot be accidentally plugged in during service.

12. **WARNING! RISK OF EXPLOSION**. This equipment has internal arcing or sparking parts which should not be exposed to flammable vapors. This machine should not be located in a recessed area or below floor level.

13. Tanks rust from moisture build-up, which weakens the tank. Make sure to drain tank regularly and inspect periodically for unsafe conditions such as rust formation and corrosion.

14. **STAY ALERT**. Watch what you are doing. Use common sense. Be aware.

15. **CHECK FOR DAMAGED PARTS**. Check for condition of all moving parts, breakage of parts or any condition that may affect the machines operation. Do not use if any component is broken or damaged.

16. An ASME code safety relief valve with a setting no higher than the Maximum Allowable Working Pressure (MAWP) of the tank MUST remain installed on this compressor to protect the pressurized components from bursting. Maximum operating pressure is 150 psi. Do not operate with pressure switch or pilot valves set higher than 150 psi. Never attempt to adjust ASME safety valve. Keep safety valve free from paint and other accumulations.

17. **NEVER** remove safety related components or device from the machine. Do not use if safety related components are damaged or missing.

18. Before each use, inspect compressed air system and electrical components for signs of damage, deterioration, weakness or leakage. Repair or replace defective items before using.

19. Check all fasteners at frequent intervals for proper tightness.

20. Compressor parts may be hot even if the unit is stopped. Keep fingers away from a running compressor; fast moving and hot parts will cause injury and/or burns.

21. If the equipment should start to vibrate abnormally, STOP the engine/motor and check immediately for the cause. Vibration is generally an indication of trouble.

22. To reduce fire hazard, keep engine/motor exterior free of oil, solvent, or excessive grease.

22. Never attempt to repair or modify a tank! Welding, drilling or any other modification will weaken the tank resulting in damage from rupture or explosion. Always replace worn, cracked or damaged tanks. Drain liquid from tank daily.

SPRAYING PRECAUTIONS

1. Fast moving air will stir up dust and debris which may be harmful. Release air slowly when draining moisture or depressurizing the compressor system.

2. Do not spray flammable materials in vicinity of open flame or near ignition sources including the compressor unit. Do not smoke when spraying paint, insecticides, or other flammable substances.

3. Use a face mask/respirator when spraying and spray in a well ventilated area to prevent health and fire hazards.

4. Do not direct paint or other sprayed material at the compressor. Locate compressor as far away from the spraying area as possible to minimize over spray accumulation on the compressor.

5. When spraying or cleaning with solvents or toxic chemicals, follow the instructions provided by the chemical manufacturer.

SECTION 3

GENERAL OVERVIEW

The BendPak Hush-Quiet™ Rotary Screw Air Compressor produces well over twice the CFM of conventional, reciprocating piston compressors.

The LS15RS is engineered for high performance, efficiency, reliability and blessed silence to meet the excessive demands of high-volume automotive shops and dealerships like yours.

WORKING PRINCIPLES

COMPRESSION: Air is drawn through the Air Intake Filter and Intake Control Valve then, the twin rotary screws compress the air smoothly and efficiently. At the same time, oil is injected into the compressing cavity to cool and lubricate the screw assembly.

OIL SEPARATION: The compressed air and oil mixture is then run through the air and oil separation cartridge. The majority of the oil is separated out from the compressed air by gravity and centrifugal force. The remaining oil mist is removed from the air oil mixture by passing the air though the Separation Cartridge core. The compressed air has a final oil level of < 3ppm.

The oil is then filtered and returned to the reciprocating screw assembly for reuse via an oil return tube fitted with a valve assembly to limit the loss of pressure in the compressed air line.

COOLING: After the oil is separated from the compressed air it is routed to the after cooler. The compressed air temperature is lowered by 7 -10°C/ 4-7°F above the ambient temperature. A minimum pressure valve is used to guarantee that at startup there is always the minimum pressure needed to maintain oil pressure for operation. A check valve prevents the compressed, cooled, air from flowing backwards through the separation element.

SYSTEM CONTROLS

The goal of the control system is the regulation of the air intake during all phases of operation and startup. The Control System is comprised of intake valve, work piston, magnetic valve and pressure gauge.

STARTUP: The spring loaded intake valve requires minimum pressure to open and generate enough pressure to get the lubricating oil flowing to the reciprocating screws at startup.

LOAD: At load the vacuum within the compressor keeps the intake valve open, and the system pressure increases.

FULL LOAD: When the oil separation pressure chamber reaches 0.4MPa the pressure valve opens to allow the compressed air to flow out.

NO LOAD: When the pressure of the outflow line reaches the desired rated pressure, the pressure switch opens the magnetic valve and the system pressure drops to the minimum required to maintain a proper flow of the lubricating oil.

OPERATING TEMPERATURE: The operating temperature range for the Screw compressor is 41°- 104°F, (5° – 40°C) measured at the air intake.

CONDENSATION: At lower operating temperatures the amount of water that can condense into the oil is higher. The Compressor is equipped with a thermostatic valve set to 70° C (158*F), oil will not pass through the oil cooler until it reaches the set temperature of 70° C /158°F.

The Compressor is best operated in a clean, temperature controlled environment. If the compressor is going to be operated with an air intake temperature below 5°C / 41°F an anti-condensation apparatus is required and the oil separation element should be heated.

OVERHEATING: If the ambient temperature is above 40°C,/ 104°F or the compressor is operating in an area near a heat source, the compressors cooling capacity may not be adequate enough to prevent damage to the compressor. In that case, the intake air may need to be cooled or plumbed to and draw air from a filtered outside air source.

If the work load is consistently below 100% of the compressor's rated full load, a higher ambient operating pressure temperature may be satisfactory. The maximum internal working temperature is 105°C / 221 °F, operating above this temperature will cause the compressor to stop working and may cause permanent damage.

DISCHARGE TEMPERATURE: Discharge temperature is measured at the vent frame end of the compressor. The Discharge temperature will vary according to operating and environmental conditions, temperature, load percentage, the cleanliness of the oil, cleanliness of the intake filter and the cleanliness of the oil filter.

The normal discharge temperature is between 70°C and 90°C / 158°- 194°F When the compressor starts up from a cold condition, the discharge temperature will quickly rise to 85°C / 185°F, then the thermostatic valve will open and close to regulate the discharge temperature.

LUBRICATION

PowerCool is a powerful synthetic lubricant that's designed to help rotary screw air compressors reach maximum performance. The PowerCool unique formulation has a 2-year / 8,000-hour useful lifespan to save you money otherwise spent on disposal fees. Other lubricants can require changing up to 8 times as often as PowerCool. The carryover is up to 75% lower than mineral oils and PAOs, which means less fluid for makeup and reduced contamination. All this results in superior compressor performance, which in turn leads to lower costs from excellent cooling and superior efficiency.

SECTION 4

INSTALLATION AND INSPECTION BEFORE OPERATION

LOCATION REQUIREMENTS:

⚠DANGER

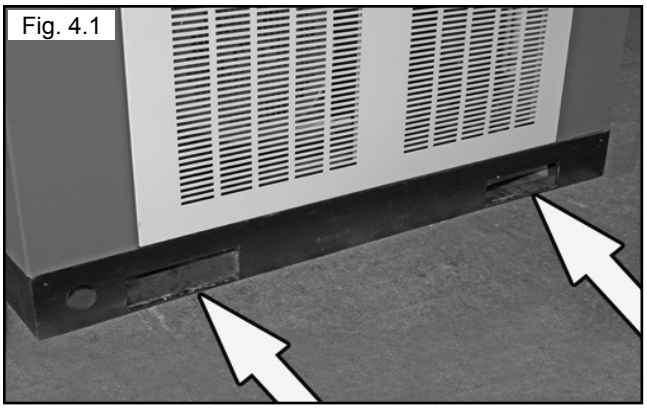
Disconnect, tag and lock out power source then release all pressure from the system before attempting to install, service, relocate or perform any maintenance.

⚠WARNING

Do not lift unit by attaching any lifting device onto the outside case.

DO NOT lift or move unit without appropriately rated forklift, pallet jack or other lifting device. There are slots in the base frame of the compressor for the forklift or pallet jack forks. (See Fig. 4.1)

Fig. 4.1



Never use the wood shipping pallet for mounting the compressor.

Install and operate unit at least 39" / 1m from any obstructions in a clean, well ventilated area. This will ensure an unobstructed flow of air to cool compressor and allow adequate space for maintenance.

⚠CAUTION

The surrounding air temperature should not exceed 100° F / 38° C. Do not locate the compressor air inlet near steam, paint spray, sandblast areas or any other source of contamination.

NOTE:

If compressor operates in a hot, moist environment, supply compressor pump with clean, dry outside air. Supply air should be piped in from external sources.

The compressor should be located in a clean, dust free, well ventilated location.

⚠DANGER

THE AIR NEEDS TO BE FREE OF TOXIC FUMES OR GASES, INFLAMMABLE GAS OR EXPLOSIVE GAS. DO NOT STORE TOXIC, VOLATILE, CORROSIVE OR FLAMMABLE AGENTS NEAR THE COMPRESSOR.

⚠WARNING

The Compressor should **NOT** be located outdoors.

The air intake of any building or enclosed structure must be filtered to help eliminate the dust in the air.

Ambient operating temperature should be greater than 41° F / 5° C to allow for the minimum required oil lubrication.

⚠DANGER

Compressor should be located on a solid level surface.

The Compressor location should be well ventilated and precautions should be taken to exhaust the warm exhaust air outside of the compressor building and or prevent the warm exhaust air from being drawn into the air intake or increasing the ambient temperature of the compressor building or room.

SECTION 5

REQUIREMENTS FOR AIR PIPING

⚠DANGER

DANGER!
NEVER USE PLASTIC (PVC) PIPE FOR COMPRESSED AIR. SERIOUS INJURY OR DEATH COULD RESULT.

Any tube, pipe or hose connected to the unit must be able to withstand the temperature generated and retain the pressure. All pressurized components of the air system, tube, pipe or hose must have a pressure rating higher than or equal to 200 psi or bursting could result and injury occur.

Connect the piping system to any accumulation tank using the same size fitting as the discharge port.

Pipe thread lubricant must be used on all male pipe threads, and all joints are to be made up tight, since small leaks in the piping system are the largest single cause of high operating costs. All piping should be sloped to an accessible drain point and all outlets should be taken off from the top of the main distribution air line so that moisture cannot enter the outlet.

INSTALLING A SHUT-OFF VALVE

A shut-off valve should be installed on the discharge port of the Compressor to control the air flow and isolate the components for maintenance. The valve should be located between the tank and the piping system.

When creating a permanently installed system to distribute compressed air, find the total length of the system and select pipe size from the chart.

MINIMUM PIPE SIZE FOR COMPRESSED AIR LINE

	Length Of Piping System			
CFM	25′	50′	100′	250′
10	1/2″	1/2″	3/4″	3/4″
20	3/4	3/4	3/4	1
40	3/4	1	1	1
60	3/4	1	1	1
100	1	1	1	1 1/4

Bury underground lines below the frost line and avoid pockets where condensation can gather and freeze.

Apply air pressure to the piping installation and make sure all joints are free from leaks BEFORE underground lines are covered. Before putting the compressor into service, find and repair all leaks in the piping, fittings and connections.

The diameter of the discharge pipe should be a least the same as that of the compressor's output pipe.

All pipe and connectors should be able to bear the rated pressure and be rated for compressed air delivery and comply with all local building and safety codes.

The configuration should meet the requirements for the velocity of compressed air.

The pressure drop of the pipeline must exceed the set pressure by 5% or more.

Use the minimum amount of bends to ensure the smoothest airflow as possible. If the pipeline run is long, the diameter of the pipe should be increased.

Prevent any condensation from flowing into any equipment by installing the pipeline run with a minimum slope of 1-2˚ with drain valves located at the low spots. Slope piping so that it drains towards a drop leg or moisture trap away from the compressor.

Consideration of future emergencies, temporary compressor and maintenance needs of equipment should be incorporated into the pipeline design and may include bypass lines, shut off valves, air take off locations, strain on the piping due to dead weight of the pipe, expansion and contraction of the pipe, strains for internal pressure.

An air oil separator should be installed at the head of the pipeline.

A one way valve is mounted on the exit line of the compressor.

The compressor has integrated anti vibration devices and does not have any support for the air pipeline. All external piping requires approved support systems. All piping should be connected to the compressor out line in such a manner as to keep any condensation from running back towards the compressor.

When an air drier is installed in the pipeline, an air tank/ reservoir is recommended as the compressed air temperature will be lowered prior to entering the drying system and therefore increase the efficiency and lower the energy use of the drying system.

SECTION 6

FLOOR MOUNTING

The compressor should be bolted onto a flat, even, concrete floor or on a separate concrete foundation.

If installing the optional Air Tank, Anti-vibration pads should be used between the tank legs and the floor. When using anti-vibration pads, do not draw bolts tight. Allow the pads to absorb vibrations. (See Fig. 6.1)

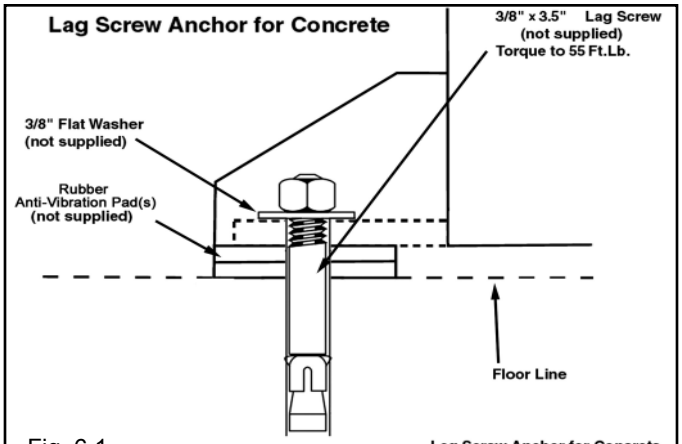


Fig. 6.1

⚠DANGER

A flexible hose or coupling should be installed between the compressor and the tank and the tank and the service piping.

⚠DANGER

Failure to properly install the tank can lead to cracks at the welded joints and possible bursting.

SECTION 7

ELECTRICAL CONNECTIONS

⚠DANGER

DANGER!

DO NOT PERFORM ANY MAINTENANCE OR INSTALLATION OF ANY COMPONENTS WITH OUT FIRST ENSURING THAT ELECTRICAL POWER HAS BEEN DISCONNECTED AT THE SOURCE OR PANEL AND CANNOT BE RE-ENERGIZED UNTIL ALL MAINTENANCE AND/OR INSTALLATION PROCEDURES ARE COMPLETED.

⚠DANGER

DANGER!

ALL WIRING AND ELECTRICAL CONNECTIONS MUST BE PERFORMED BY A QUALIFIED ELECTRICIAN. INSTALLATION MUST BE IN ACCORDANCE WITH LOCAL AND NATIONAL CODES.

Overheating, short circuiting and fire damage will result from inadequate wiring. Wiring must be installed in accordance with National Electrical Code and local codes and standards that have been set up covering electrical apparatus and wiring.

POWER: Standard Requirements; 230V, 3Phase, 60HZ, Grounded.

Be certain that adequate wire sizes are used, and that:

1. Service is of adequate ampere rating.

2. The supply line has the same electrical characteristics (voltage, cycles and phase) as the motor.

3. The line wire is the proper size and that no other equipment is operated from the same line. The chart below gives minimum recommended wire sizes for compressor installations.

MINIMUM WIRE SIZE
USE 75°C COPPER WIRE

HP	Amps	Single Phase 230V	Three Phase 208/230V	Three Phase 460/575V
SPL	up to 22.0	10 AWG		
5.0		8 AWG	12 AWG	14 AWG
7.5		8 AWG	10 AWG	12 AWG
10.0		N/A	8 AWG	12 AWG
15.0		N/A	6 AWG	10 AWG
25.0		N/A	3 AWG	8 AWG

Recommended wire sizes may be larger than the minimum set up by local ordinances. If so, the larger size wire should be used to prevent excessive line voltage drop. The additional wire cost is very small compared with the cost of repairing or replacing a motor electrically "starved" by the use of supply wires which are too small.

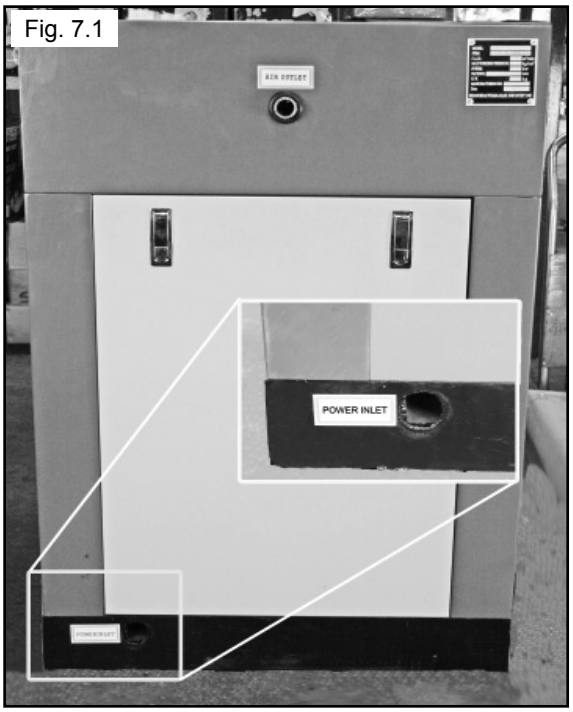
Improperly grounded electrical components are shock hazards. Make sure all the components are properly grounded to prevent death or serious injury.

⚠DANGER

This product must be grounded. Grounding reduces the risk of electrical shock by providing an escape wire for the electric current if short circuit occurs. This product must be installed and operated with a power cord or cable that has a grounding wire.

The base of the unit has holes in it for routing of the power cord. (See Fig. 7.1)

Fig. 7.1



1. Remove the Access panel on the Power Control Box Side of the Compressor. (See Fig. 7.2)

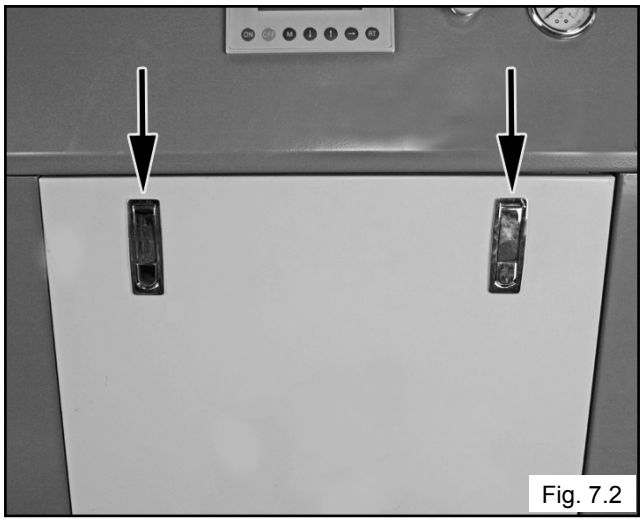


Fig. 7.2

2. Route the power cable up through the bottom of the Power Control Box and to the Terminal Block as shown. (See Fig. 7.3)

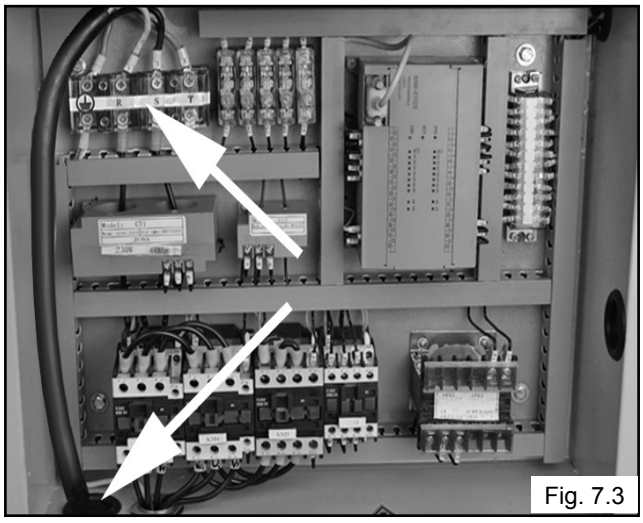


Fig. 7.3

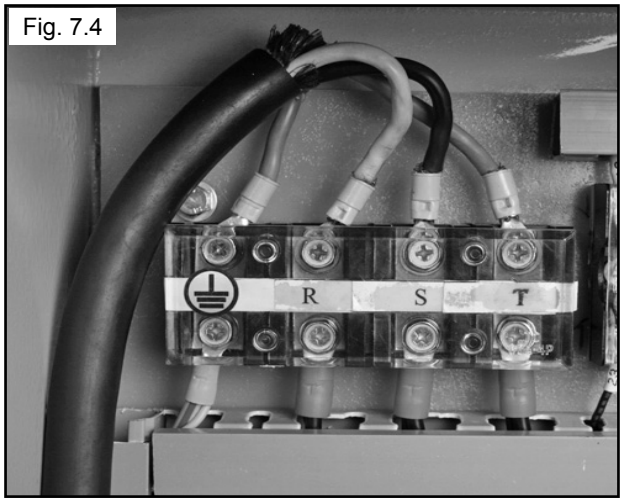
⚠DANGER

DANGER!

ALL WIRING AND ELECTRICAL CONNECTIONS MUST BE PERFORMED BY A QUALIFIED ELECTRICIAN. INSTALLATION MUST BE IN ACCORDANCE WITH LOCAL AND NATIONAL CODES.

3. Connect the Power Source Wires to the incoming Power Terminal Block. (See Fig. 7.4)

Fig. 7.4



DIRECTION OF MOTOR ROTATION

⚠WARNING

MOTOR ROTATION: The 3 Phase power must be connected properly to the compressor to ensure the motor is rotating in the right direction. The compressor controller is fitted with phase detection to prevent damage to the compressor In the event of miss-connection of the three phase power.

1. If the motor does not start upon first startup, then likely the sequence of the three phase wiring is incorrect. Check the Failure history as outlined in the Trouble Shooting to confirm phase problem.

2. Reverse the two phases of power input. **DO NOT** alter the wiring of the motor or starter.

GUARDING

⚠WARNING

WARNING!

ALL MAINTENANCE PANELS MUST BE INSTALLED DURING NORMAL OPERATION. ALL MOVING PARTS MUST BE GUARDED. ALL ELECTRICAL COVERS MUST BE INSTALLED BEFORE TURNING ON THE POWER.

SECTION 8

PRE-OPERATION INSPECTION

⚠DANGER

DANGER!

DO NOT PERFORM ANY MAINTENANCE OR INSTALLATION OF ANY COMPONENTS WITH OUT FIRST ENSURING THAT ELECTRICAL POWER HAS BEEN DISCONNECTED AT THE SOURCE OR PANEL AND CANNOT BE RE-ENERGIZED UNTIL ALL MAINTENANCE AND/OR INSTALLATION PROCEDURES ARE COMPLETED.

⚠DANGER

Servicing while pressurized can cause severe injury

LOCK OUT source and RELIEVE PRESSURE before servicing

DANGER!

DO NOT PERFORM ANY MAINTENANCE OR INSTALLATION OF ANY COMPONENTS WITH OUT FIRST ENSURING THAT ALL INTERNAL PRESSURE HAS BEEN RELIEVED FROM THE SYSTEM. ISOLATE THE COMPRESSOR FROM THE AIR SUPPLY LINE /AIR TANK WITH THE USE OF SHUT OFF VALVES

INSPECTION OF THE SCREW AIR END

1. Rotate the Pulley on the Screw Air End by hand a couple of complete rotations counterclockwise to ensure the Air End is not locked and is pre-lubricated.
(See Fig. 8.1)

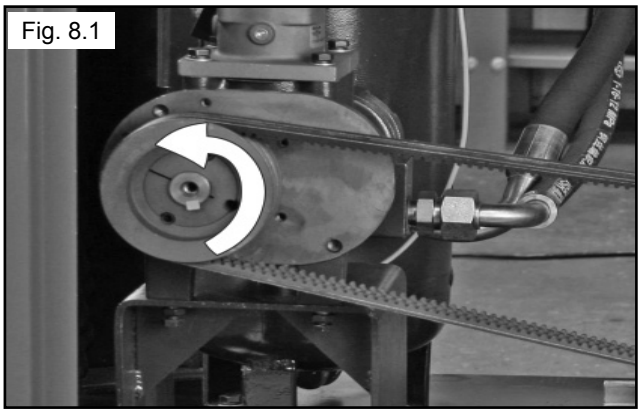


Fig. 8.1

⚠CAUTION

IF COMPRESSOR HAS NOT BEEN IN USE FOR MORE THAN TWO MONTHS OR STORED FOR A LONG PERIOD OF TIME, PERFORM THE FOLLOWING STEPS.

Refer to Maintenance Section 11 for details on Intake Valve Assembly.

1. Remove the Air Intake Filter Housing and Filter.

2. Open the Intake Valve by pressing down gently on top of the Intake Valve to open and hold open.
(See Fig. 8.2)

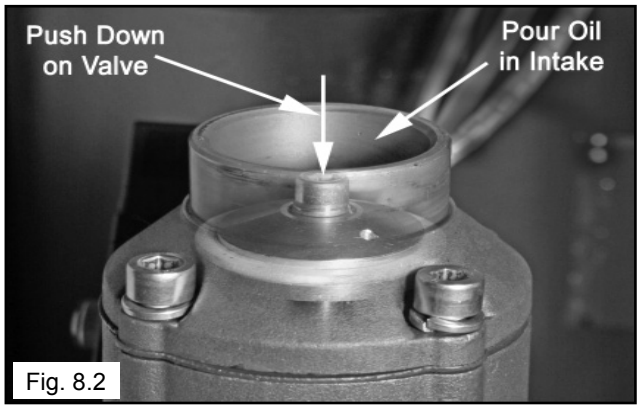


Fig. 8.2

3. Then pour .5 quart (.5 litre) of lubricating oil into Air End through the Intake Valve.

4. Rotate the Pulley on the Screw Air End by hand a couple of complete rotations counterclockwise to ensure the Air End is not locked and lubricated properly.
(See Fig. 8.1)

5. Make sure all oil enters Air End.

6. Make sure Intake Valve closes when released.

OIL LEVEL INSPECTION

1. Remove the Access panel on the left side /Oil Separator Side of the Compressor. (See Fig. 8.3)

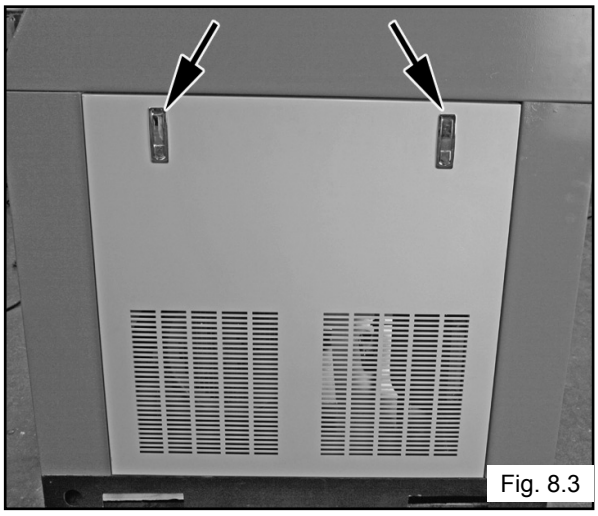


Fig. 8.3

2. The oil level must be above the upper red line after the compressor is off has been stopped for thirty minutes The oil level when the compressor is running must be between the upper and lower red line indicated on the Oil Level Site glass. (See Fig. 8.4 & 8.5)

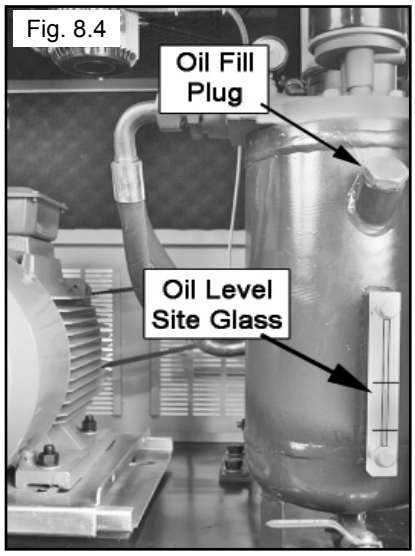


Fig. 8.4

Fig. 8.5

3. Fill with PowerCool Synthetic Air Compressor Lubricant if necessary and inspect the O-Ring on the Oil Fill Plug before tightening.

⚠WARNING

WARNING:
DO NOT OVER FILL. OVER FILLING CAN CAUSE A HIGH LEVEL OF OIL IN THE COMPRESSED AIR. DO NOT UNDER FILL. UNDER FILLING CAN CAUSE OVER HEATING AND DAMAGE.

TRANSMISSION INSPECTION:

Belt Inspection.

1. Remove the Access panel on the right side Drive Belt Side of the Compressor.

2. Check that all drive belts are in the pulley grooves. Adjust the tension of belts through the adjusting Bolt on motor. (See Fig. 8.6)

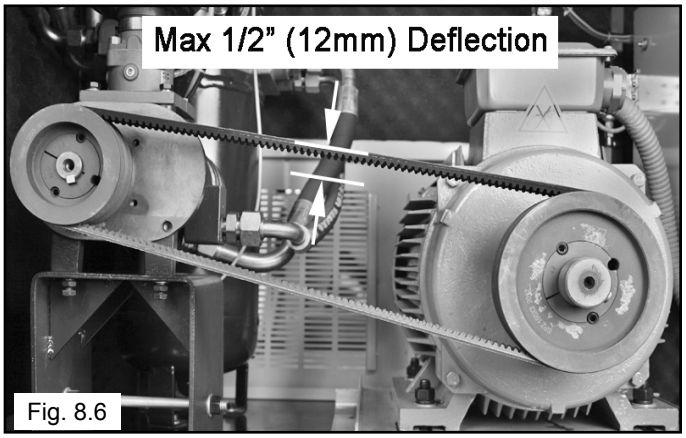


Fig. 8.6

(See Belt maintenance on page 28 for Belt adjustment details.)

STOP VALVE INSPECTION

Check if the stop valve is open.

SECTION 9

DAILY OPERATION

⚠WARNING

WARNING!
IN THE EVENT OF ANY TROUBLE OR OPERATION PROBLEM NOT DETECTED AND TERMINATED BY THE CONTROL SOFTWARE. THE COMPRESSOR CAN BE SHUT DOWN BY PRESSING THE EMERGENCY STOP BUTTON.

EMERGENCY STOP

1. To immediately stop the Compressor press the Emergency Stop Button to cut off the power supply of the controller and contactor power. (See Fig. 9.1)

Fig. 9.1

2. To Reset Emergency Stop; Twist Emergency Stop Button clockwise, The Emergency Stop Button will pop back out.

The Compressor cannot be restarted until the failure has been cleared and the Restart Delay time (90 seconds) has expired.

DAILY STARTUP PROCEDURE:

Before start up:

ATTENTION:
Don't open oil drain ball valve until five minutes after stopping the compressor.

1. Open the oil drain valve slightly and drain off any water from the bottom of the oil Tank. Drain fluid until water stops flowing and only oil flows. (See Fig. 9.2)

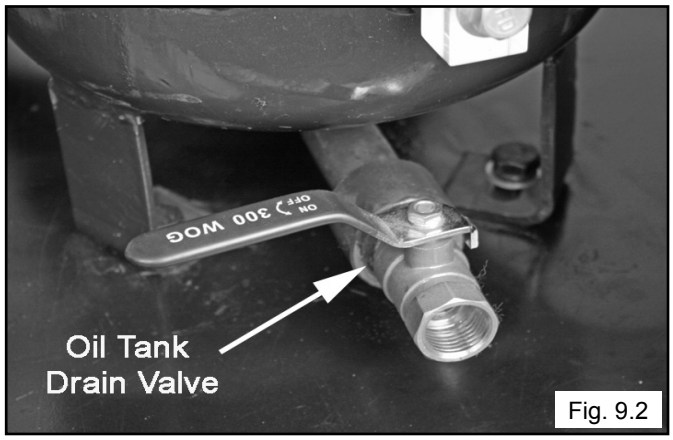


Fig. 9.2

2. The oil level must be above the upper red line after the compressor is shut off and has been stopped for thirty minutes. The oil level when the compressor is running must be between the upper and lower red line indicated on the Oil Level Site Glass. (See Fig. 9.3)

Fig. 9.3

3. Fill with PowerCool Synthetic Air Compressor Lubricant if necessary and inspect the O-Ring on the Oil Fill Plug before tightening.

START UP PROCEDURE*:*

1. Check if stop valve on outlet is open.
(If the stop valve open, this pressure is the pressure of the compressor system.)

2. Turn on the Power; The LCD Display will show the start up screen and then the Display will indicate Compressor's **STATE: NORMAL STOP.**

3. Press the **ON** Button; The compressor will begin the Delayed Start countdown, once the delayed time is reached the Compressor will start up automatically.
(If necessary pressing the **STOP** Button during the delayed Start Countdown will Stop the delayed start Countdown and place the Compressor in the **STATE: NORMAL STOP.**

(The compressor will not be able to be restarted for at least ninety seconds (default) after it has been stopped for any reason.)

4. After starting up: Watch the pressure on the control panel. Check operating temperature and the general conditions inside compressor.

The Compressor will run in the **STATE: AUTO LOADING** until the preset system pressure is reached. The Compressor will continue to run in the **STATE: AUTO UNLOADING** until the system pressure falls below the preset minimum pressure.

The Compressor maintains the preset system pressure by moving from the **STATE: AUTO LOADING,** pressuring the system, to the **STATE: AUTO UNLOADING**; not building any pressure.

Use the monitoring features to monitor pressure, power and other compressor running values to ensure the Compressor is operating normally. See The Parameter Section of this Manual for details on setting pressures and monitoring running parameters.

The Compressor should run smoothly with no excess vibrations.

ATTENTION:

Do not restart compressor up within 90 Seconds after compressor has been stopped. Release all pressure within AIR OIL separation element before restarting. Avoid compressor start up when there is back pressure in the system.

SHUT DOWN PROCEDURE:

1. Press the **OFF** button, and the compressor will move to **STATE: READY STOP**. The Controller will countdown the Remaining delay until the Compressor will stop and then shut down the Compressor when the set time is reached. If the compressor has begun the stop sequence, Press the Emergency Stop Button if you need to stop the compressor immediately.

⚠WARNING

WARNING!
DO NOT ASSUME THAT THE COMPRESSOR CAN NOT STARTUP IF THE MOTOR IS NOT RUNNING. CONFIRM THE STATE OF THE COMPRESSOR BEFORE PERFORMING ANY OPERATION, INSPECTION OR WORK NEAR THE MOTOR AND ENSURE LOCK OUT AND TAG OUT PROCEDURES HAVE BEEN PERFORMED.

⚠WARNING

WARNING!
IN THE EVENT OF ANY TROUBLE OR OPERATION PROBLEM NOT TERMINATED BY THE CONTROL SOFTWARE. THE COMPRESSOR CAN BE SHUT DOWN BY PRESSING THE EMERGENCY STOP BUTTON.

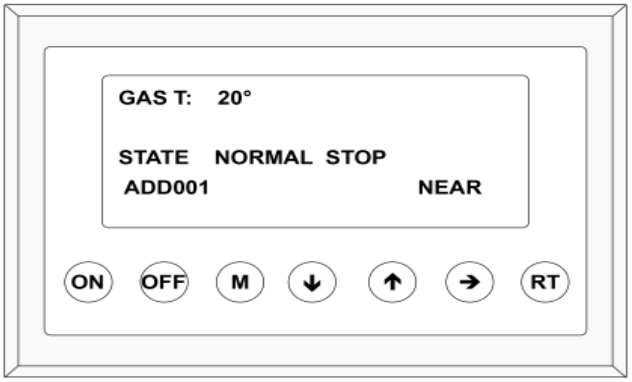
SECTION 10

CONTROL PANEL

Features:

- LCD English display.
- Full protection for the motor in short circuit, locked rotor, phase lost, overload or unbalanced condition.
- Start/Stop and operating control of the motor
- Anti reversing protection of Air Compressor
- Measuring and protection controlling to multiple temperature points.
- High Integrity, Stable reliability excellent value ability.
- Optional Remote Machine Control
- RS-485 Communication interface function.

BASIC OPERATION



BUTTON DESCRIPTION

ON Start Button; Press this button to start the Compressor.

OFF Stop Button: Press this button to stop the Compressor.

M Set Button: Press this button to confirm the input data to be saved after modification of the data.

🡻 Down Button: Press this button to move downward during data modification. Press this button to select a menu option during menu selection.

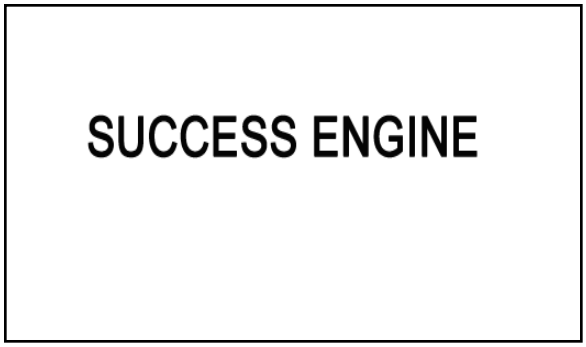
🡹 Up Button: Press this button to move upward during data manipulation. Press this button to select a menu option during menu selection.

➔ Cursor/ Confirm Button: This button can be used as cursor during the data modification and as confirm button during menu selection.

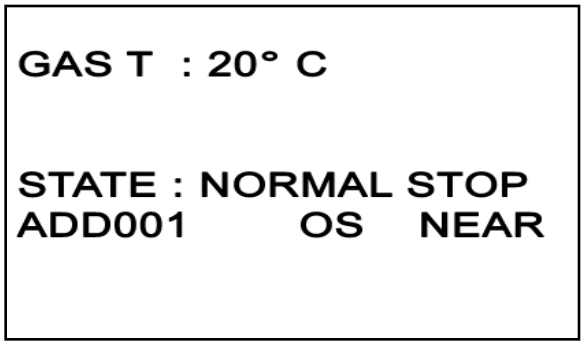
RT Return/Reset Button: Press this button to return to upper menu during the menu operation. Press this button to reset the machine when the unit is stopped due to a failure.

STATUS DISPLAY AND OPERATION:

1. When the unit is powered up, the Display interface will display the welcome screen as follows:



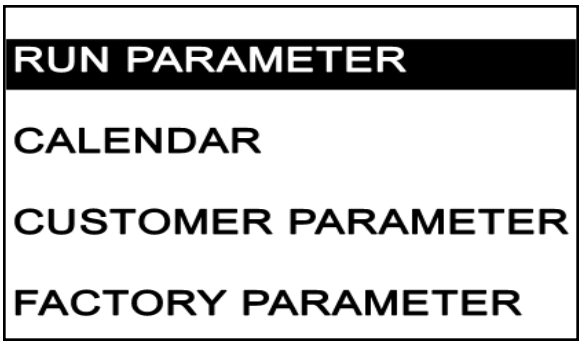
AFTER FIVE SECONDS THE DISPLAY WILL CHANGE:



2. Press 🡻 Enter the following Menu Selection Interface:

3. Run the Parameter Review

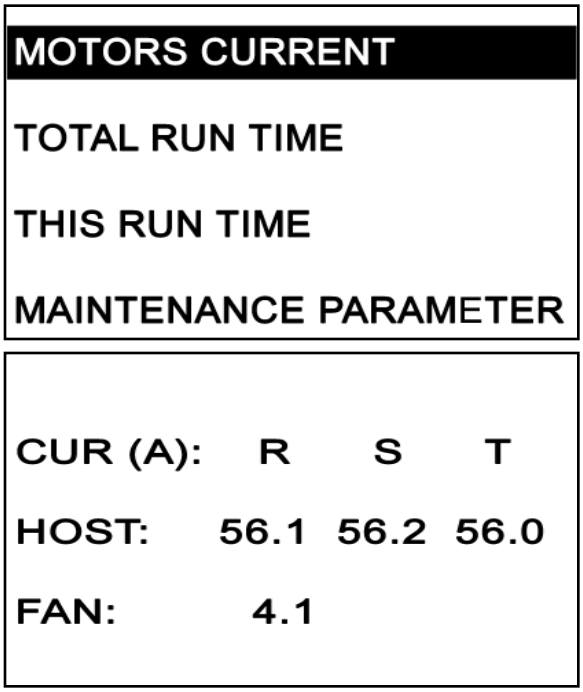
4. Press 🡻 or 🡹 to move the black cursor over the menu "**RUN PARAMETER**" and then press ➔ to select the submenu.



5. Press ➔ to select another menu:

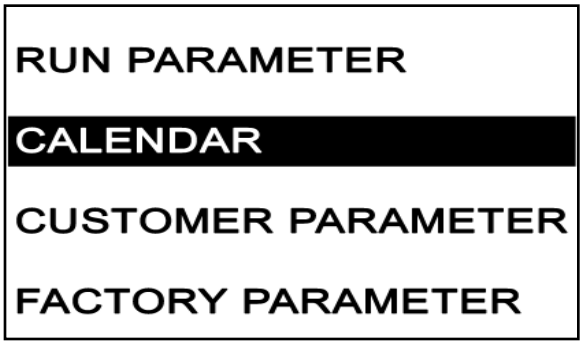
6. If the menu selected is the last menu level, the black cursor will disappear, press the **RETURN** button **"RT"** and return to the upper menu or the main interface. If the operation is stopped in a certain interface, it will automatically return to the main interface after several seconds.

7. Use the up/down buttons ↓ ↑, **CONFIRM** → button; and the return button RT to view the **RUN PARAMETERS** such as the **CURRENT, RUN TIME, MAINTENANCE PARAMETER, HISTORY FAILURE, PRODUCING DATE** and **CURRENT FAILURES**. Return to the upper level menus using the same method. **MOTORS CURRENT** parameters shown below.

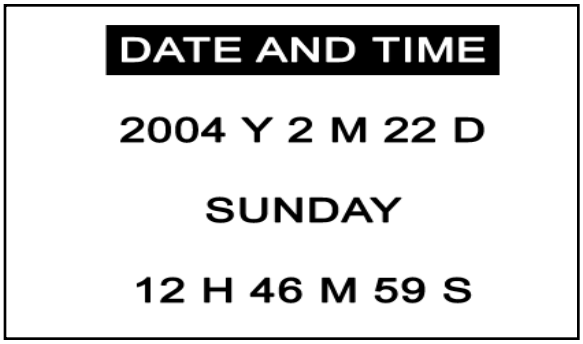


CALENDAR AND TIME

1. Press ↓ or ↑ to move the black cursor to the menu **CALENDA**R and then press →



2. The following menu will be displayed.



3. With the compressor stopped, the date and time can be adjusted by performing the following steps:

4. Press or to move the black cursor to the parameters you want to modify and then press ↓, the number will blink indicating it is modifiable. Use the ↓ or ↑ button to changed the values of the selected parameter. Press "**M**" button to confirm and save the data after finishing the modification.

CUSTOMER PARAMETERS

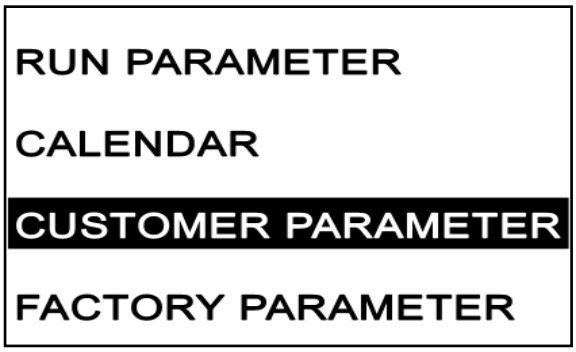
The factory default Password is 5188. This should be changed during setup.

Parameter Modifications

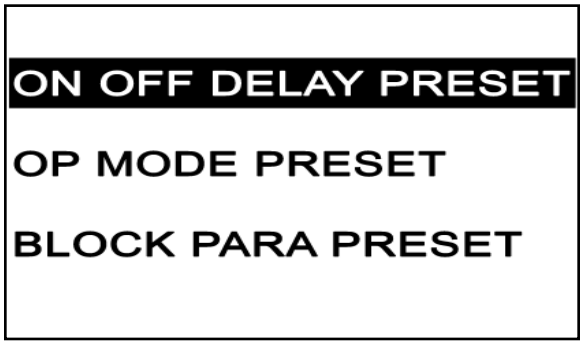
The Customer Parameters and factory Preset Parameters cannot be modified during the Running State and Stop Delay Period.

The Customer Parameters can be read and modified using the same method of running the Parameter Review as mentioned above. For example, to modify the parameter **BLOCK UNLOAD PRESSURE**, the steps will be as the follows;

1. Press ↓ or ↑ to move the black cursor to "**CUSTOMER PARAMETER**" and then press the **CONFIRM** → button.



2. The following menu will be displayed.



3. Select the desired parameter to modify and use the procedures outlined above to change and save.

THE CUSTOMER PARAMETERS and it functions:

First Submenu	Second Submenu	Preset Value	Functions
	HOST START TIME	**0008S**	When using the controller to protect the motor, the time set here can not match the impulse starting current of the motor, the value here must be longer than that of the STAR DELAY TIME plus LOAD DELAY TIME
ON/OFF DELAY TIME PRESET	**FAN START TIME**	**0006S**	When using the controller to protect the motor the time set here can not match the impulse starting current of the motor.
	STAR DELAY TIME	**0006S**	Star contactor release starting delay time.
	LOAD DELAY TIME	**0002S**	The leading delay time after star contactor releases.
	EMPTY DELAY TIME	**0020M**	The amount of time the compressor will run in the unloaded state before shutting off
	STOP DELAY TIME	**0010S**	The machine will not stop until this amount off time passed the load free state .
	START DELAY TIME	**0100S**	Machine can not be started before this set time has passed, after being manually stopped or after “Empty Delay Time” shut off.
Maintenance Parameter Reset	**OIL FILTER RESET**	**0006S**	Reset time for oil filter replacement.
	O/A RESET	**0006S**	Reset time for O/G Separator replacement.
	AIR FILTER RESET	**0006S**	Reset time for gas filter replacement.
	LUBE OIL RESET	**0006S**	Reset time for Lubrication Oil replacement.
	LUB GREASE RESET	**0006S**	Reset time for Lubrication Grease replacement.
MAX LIFE TIME PRESET	**OIL FILTER**	**9999S**	Set this value to “0” to disable the oil filter alarm.
	O/G SEPARATOR	**9999S**	Set this value “0” to disable the O/G separator alarm function.
	GAS FILTER	**9999S**	Set this value to disable the gas filter alarm.
	LUB FILTER	**9999S**	Set this value to “0” to disable the lube oil alarm.
	LUB GREASE	**9999S**	Set this value to “0” to disable the lube grease alarm.

MEASUREMENT RANGE of THE DISPLAY

A) Oil Temperature of Oil: -20 ~ 150°C ;
Accuracy : ± 1°C
B) Air Temperature: 20 ~ 150°C ; Accuracy : ± 1°C
C) Running time: 0 ~9999999 Hours
D) Current Display Measuring Range: 0 ~999.9A
E) Pressure: 0 ~1.6 Mpa, Accuracy: 0.01 Mpa

Phase Sequence Protection: If the protector detects an improper phase sequence, shut down activates in ≤2s.

Motor Protection: This control unit has the following 5 basic protection functions for the motor and fan.

A) Rotor Lock Protection. After motor start, if the working current reaches 4 or 8 times of the set value, the protection activates. The activation time is less than 0.2*s.*

B) Short Circuit Protection: if detected current reaches 8 times or more above the set value, the protection activates, the activation time is less than 0.2s.

C) Lack Phase Protection: If any of the phase lack; the protection activates and the activation time is less than 0.2s.

D) Unbalance Protection: If the current difference between any of the two phases reaches a percentage of 60~ 70 % the activation time is less than 5s.

E) Overload anti-time limitation protection (time unit: s): See the following table. The multiple = I actual value / I Set value.

When the running current of the motor is 1.2 ~ 3.0 times of the set value, the overload multiple and action delay time will be accordance with the following table.

I act /I set / Time para	≥1.2	≥1.3	≥1.5	≥1.6	≥2.0	≥3.0
Action time	60	48	24	8	5	1

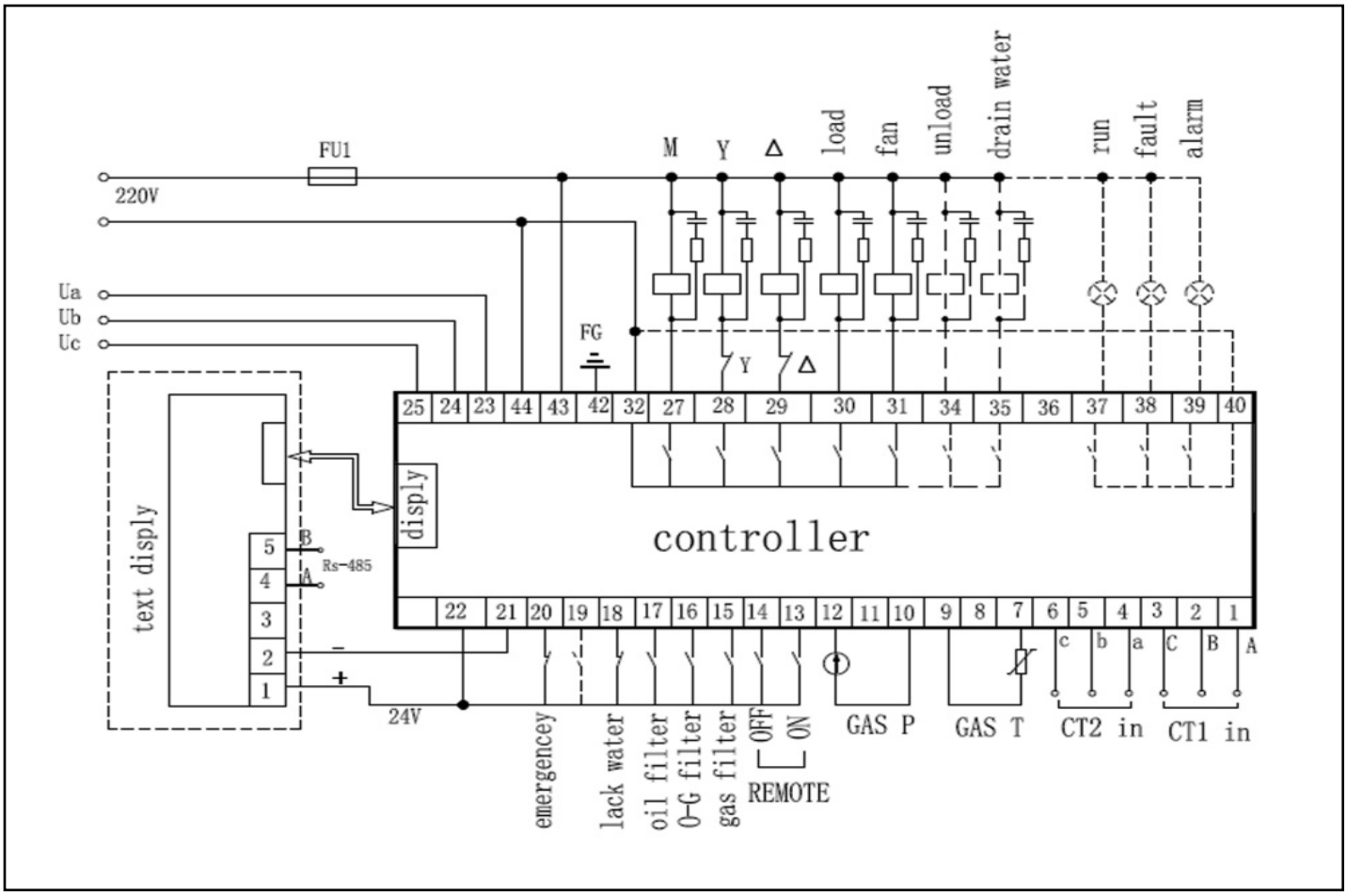
Temperature Protection: When the actual detected temperature is higher than the set temperature, the protection activates and the activation time is ≤2s.

The output relay contactor capacity: 250V5A.
The lifetime of the contactors: 500,000 cycles.

The current display tolerance ≤1.0%
RS-485 communication.

Psi	Mpa
1	**0.007**
25	**0.172**
50	**0.345**
75	**0.517**
100	**0.689**
110	**0.758**
110	**0.758**
120	**0.827**
130	**0.896**
140	**0.965**
145	**1.000**
150	**1.034**
160	**1.103**

To Convert Psi to Mpa
Multiply: Psi x .006894757 = Mpa



TEXT DISPLAY CONNECTOR TERMINALS

There is a five connector D type display cable connector which is used for the display connection, RS-485 communication interface and 24 V Power Input.

Controller Connect Terminals:

The display panel is connected with the controller using communication cables.

23, 24 and 25 are the phase sequence Input terminals:
7 and 9 are the Air Exhaust Temperature Input terminals;
CT1 is the host mutual inductor;
CT2 is the fan mutual Inductor.
32 is the common port COM1 of the relay output;
27 controls the main contactor;
28 controls the star contactor;
29 controls the angel contactor;
30 is the loading magnetic valve;
31 controls the Fan;
34 controls the Load release valve;
37 is the running indicator;
38 is the Failure indicator;
39 is the Alarm indicator;
40 is the COM2;
42 is the simulated ground (Earth);
43 and 44 are the 220V power source.

ATTENTION:
The magnetic coil must be connected to the surging absorber when wiring.

CONTROL PRINCIPLES

*(*Refer to the attached for the Electric schematic circuit.)

Press “ON” to start: (Y— Δ Starting)

When the controller is powered on, it will perform a 3 Second self-check procedure.

Pressing the “ON” button will not start the machine until the self-check is completed. The starting process of the host will be as follows: KM3 is powered on. KM2 is Powered on → Y type Starting Status → Time Delay finish (Y - Δ converting time), KM3 loss power (KM4 and KM3 interlocked), KM4 is powered on → Motor runs in Δ type and the Starting is completed.

The Load Magnetic Valves are un-powered during the whole start up process to ensure load free start up.

AUTOMATIC RUNNING CONTROL

When the motor is in Running State, after the set period of delay, the load magnetic valve will power on and the air compressor begins to build air pressure to increase the pressure in the system (Loaded). When the air pressure reaches the value over the set unload pressure (Unload Pressure Valve) the loading magnetic Valve will be powered off and the release magnetic valve is powered on to run the air compressor load free. If the specified time (load free running period) the air pressure turns to be lower than the set load pressure (LOAD PRESSURE VALUE), the load magnetic valve is powered on and the release magnetic valve looses power, the air compressor will apply normal pressure to increase the pressure in the air tank. If the pressure in the air tank does not drop below the load pressure limit within the Empty Free Running Time the controller will automatically stop the motor and begin the automatic stop cycle. Only when the pressure drops to the Load Pressure Limit, the motor will restart using the normal starting process.

MANUAL LOAD/UNLOAD AT THE AUTOMATIC STATUS

In the automatic status, the unit will remain in the unload state, press the 🡻 🡹 button to load, if the pressure is higher than the unload pressure the load magnetic valve will inch once and then return to the unload status; if the pressure is lower that the unload pressure, the load magnetic valve will be powered on and will not stop running and return to the unload state until the air supply pressure becomes higher that the unload pressure. When the unit is at the load state, press the 🡻 🡹 button to unload. If the pressure is higher than the load pressure, the load magnetic valve will be powered off and return to the load state till the air supply pressure becomes lower than the load pressure. If the pressure is lower than the load pressure the unload function is disabled.

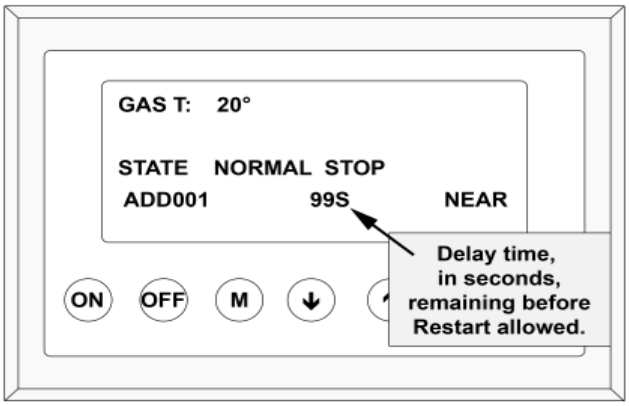
NORMAL STOPPING

Press the **“OFF”** button, the load magnetic valve will be powered off and the unload magnetic valve will be applied powered on, after a delay (stop delay), the motor contactor will be powered off, the host and fan will stop running. Pressing the “ON” button will restart the motor.

RESTART PREVENT CONTROL

The motor cannot be restarted after pressing the **“OFF**” Button or the Emergency Stop Button; or the compressor was stopped due to a failure code, until after the set delay period has expired.

The controller will display the remaining delay time required before restart can occur.



REMOTE AUTOMATIC CONTROL (ON/OFF MODE: REMOTE; LOAD MODE: AUTOMATIC)

The remote automatic control mode is the same as the local automatic control, the only difference is that the start and stopping of the unit is controlled by remote control.

LOCAL MANUAL CONTROL (ON/OFF MODE: BESIDE MACHINE; LOAD MODE; MANUAL)

The Starting and stopping control is the same as the automatic control, the only difference is that when the starting procedure finished, the machine will be at the load free state and can be loaded by pressing the 🡻 🡹 button. When the air supply pressure is higher than the unload pressure, the unit will load automatically, if the button is not pressed to load, the unit will be running at the load free state till the load free stop. During the unload process, press the 🡻 🡹 button to load and during the process of loading, press the 🡻 🡹 button to unload.

REMOTE MANUAL CONTROL (ON/OFF MODE REMOTE; LOAD MODE; MANUAL)

The Remote Automatic Control Mode is the same as the Local Manual Control mode except that the starting and stop of the unit is performed by remote control.

NETWORK CONTROL

When the Network Control is set to **"COMPUTER"**, to have computer network control of the units. Set the controller to **"BLOCKING"** to have the network control between the controllers but the host must be 1# controller.

FAN TEMPERATURE CONTROL

When the Exhaust Air Temperature is higher than the fan starting temperature, the Fan motor will run; when the Exhaust Air Temperature is lower than the fan stop temperature, the fan motor will stop running. If there is no fan or the fan does not need protection, set the starting temperature of the fan to "120° C/ 248°F" and the stop temperature to be 70°C/ 158°F.

FAILURE STOP

If there is any electronic failure or high air temperature failure during the running process, the controller will stop the motor immediately. The motor can only be restarted after the failures or faults have been cleared.

EMERGENCY STOP

1. To immediately stop the Compressor press the Emergency Stop Button to cut off the power supply of the controller and contactor power. (See Fig. 10.1)

Fig. 10.1

2. To reset Emergency Stop; Twist Emergency Stop Button clockwise, the Emergency Stop Button will pop back out.

3. The Compressor cannot be restarted until the failure has been cleared and the Restart Delay time (90 seconds default) has expired.

Main Controller Tips		
Item	**Meaning and Function**	**Lights Status**
POWER	Controller Power On	PWR Lights
RUN	Controller run	RUN Lights
Failure	Detect failure and Stop the unit	ERR Blinking
Input Switching Value	Terminal 20 ~ 12 Input Switching value activate	[N00 08 lights, but here is no function at the input point, no light lighting
Output Switching Value	Terminals 27, 28, 29, 30, 31, 35, 36, 37, 38 and 39 output switching value activate	OUT00 ~ 09 lights
Data Save	Set Data and save time	PWR blinking once

SECTION 11

MAINTENANCE

MAINTENANCE ITEMS AND MAINTENANCE PERIODS

Bendpak Screw Compressors require regular maintenance. Regular maintenance will provide long Compressor component life and long term trouble free operation.

⚠DANGER

DANGER!

DO NOT PERFORM ANY MAINTENANCE OR INSTALLATION OF ANY COMPONENTS WITH OUT FIRST ENSURING THAT ELECTRICAL POWER HAS BEEN DISCONNECTED AT THE SOURCE OR PANEL AND CANNOT BE RE-ENERGIZED UNTIL ALL MAINTENANCE AND/OR INSTALLATION PROCEDURES ARE COMPLETED.

⚠DANGER

Servicing while pressurized can cause severe injury

LOCK OUT source and RELIEVE PRESSURE before servicing

DANGER!

DO NOT PERFORM ANY MAINTENANCE OR INSTALLATION OF ANY COMPONENTS WITH OUT FIRST ENSURING THAT ALL INTERNAL PRESSURE HAS BEEN RELIEVED FROM THE SYSTEM. ISOLATE THE COMPRESSOR FROM THE AIR SUPPLY LINE /AIR TANK WITH USE OF SHUT OFF VALVES.

1. Bleed off any internal pressure by pulling open pressure relief valve located below the Oil Separation Filter. (See Fig. 11.1)

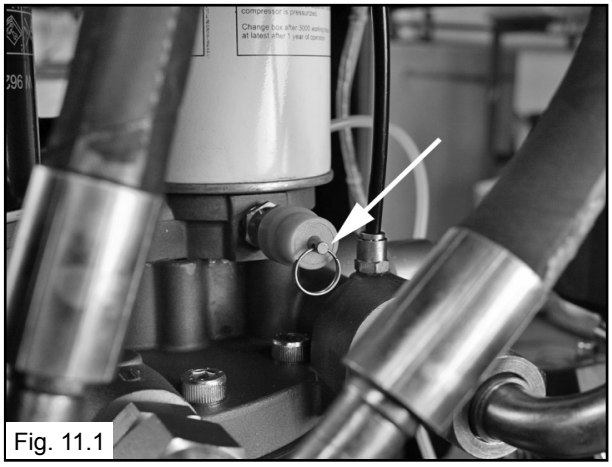


Fig. 11.1

2. Confirm the pressure has been bled off by reading Pressure on oil Separation Tank. (See Fig.11.2)

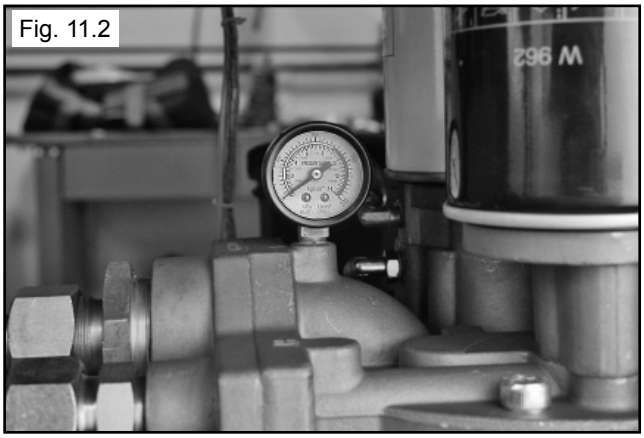


Fig. 11.2

MAINTENANCE SCHEDULES

Check the running temperature and working pressure. (Daily)
Record the current, voltage, temperature and pressure. (Daily)
Clean compressor only after stopping (Weekly)
Blow the air filter with compressed air. (Weekly
Check oil level (Monthly)
Check the bolts on the belt pulley(Shaft coupling) Only after compressor is stopped and the power is locked out.)
Blow the cooler with compressed air. .

ATTENTION:

Reduce the Maintenance intervals in severe operating environments or severe demand applications

First 500 operating hours (first Maintenance)

Check the quality of oil. The oil may be reused after being filtered cleanly. Otherwise, replace it.
Replace the oil filter.
Replace the intake filter.
Replace the oil separation filter.
Check the wear of belt pulley and the alignment of the motor and Air End pulleys.

Every 2000 Hours

Replace the oil filter.
Replace the intake filter.
Replace the oil separation filter.
Check the wear of belt pulley and the alignment of the motor and Air End pulleys.
Check intake-control valve.

Every 4000 hours.

Perform the 2000 Hours procedures and:
Replace the lubricating oil.
Check the minimum-pressure control valve.
Check all electrical connections.
Check main bolts, main nuts and connectors are tight.
Check all maintenance panel clasps for proper operation.
Check intake-control valve.
Check electrical motor for bearing end play

ATTENTION:

Ensure all parts are properly secured or tightened after performing maintenance tasks. Ensure all tools, rags or equipment is removed from internal areas of compressor before closing panels and starting up.

DAILY OPERATION AND MAINTENANCE:

Before start up:

ATTENTION:

Don't open oil drain ball valve until five minutes after stopping compressor.

1. Open the oil drain valve slightly and drain off any water from the bottom of the oil Tank. Drain fluid until water stops flowing and only oil flows. (See Fig 11.3)

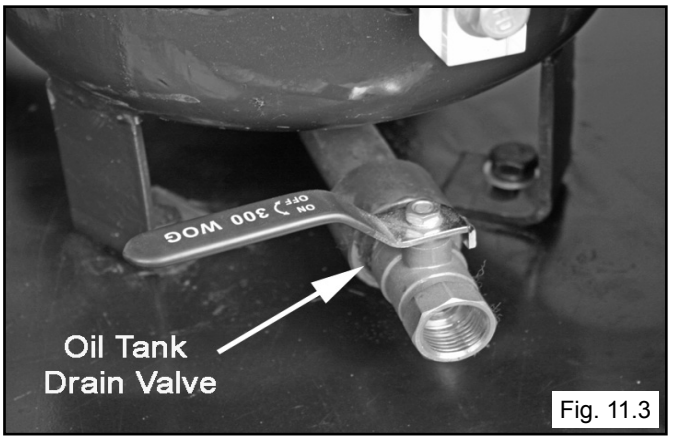


Fig. 11.3

2. The oil level must be above the upper red line after the compressor is off has been stopped for thirty minutes The oil level when the compressor is running must be between the upper and lower red line indicated on the Oil Level Site glass. (See Fig. 11.4)

Fig. 11.4

3. Fill with PowerCool Synthetic Air Compressor Lubricant if necessary and inspect the O-Ring on the Oil Fill Plug before tightening.

4. After starting up: Watch the pressure on the control panel. Check operating temperature and the general conditions inside compressor.

INTAKE FILTER INSPECTION/ REPLACEMENT PROCEDURE

1. Open Drive Belt Side (right) panel. (See Fig.11.5)

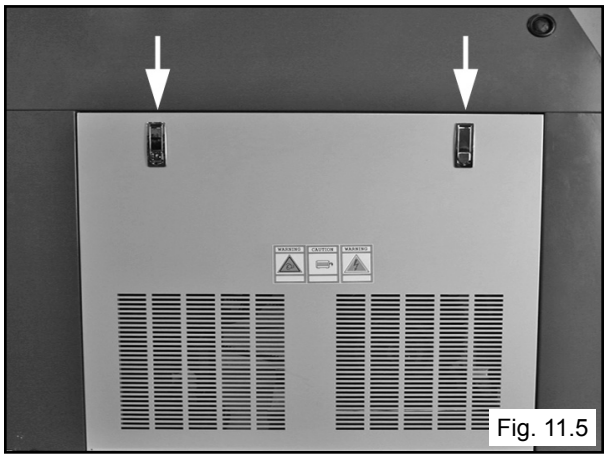


Fig. 11.5

⚠CAUTION

CAUTION:
ENSURE THAT NO FOREIGN OBJECTS OR DEBRIS FALLS INTO THE INTAKE AREA DURING MAINTENANCE PROCEDURES.

2. Twist the Intake Air Filter Cover counter clockwise to remove. (See Fig. 11.6)

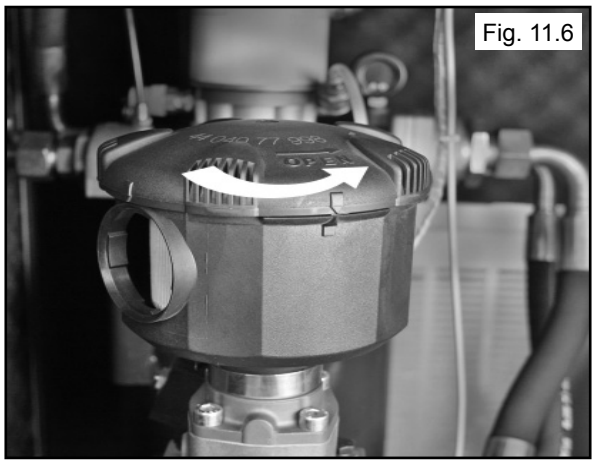


Fig. 11.6

3. Check the condition of intake filter, either blow it clean with compressed air or replace if necessary.
(See Fig. 11.7)

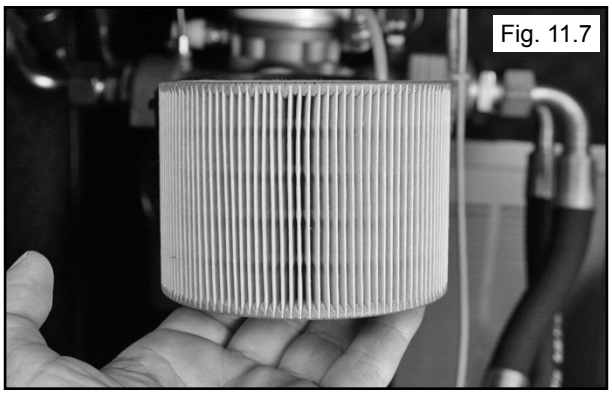


Fig. 11.7

4. Inspect the inside of the plastic Intake Air Filter housing and remove hose clamp and clean if necessary.

5. Reinstall the Intake Air Filter Housing and new Filter and Twist the Intake Air Filter Cover clockwise to tighten.

OIL FILTER REPLACEMENT PROCEDURE

⚠CAUTION

CAUTION:
PERFORM THE LOCKOUT TAG OUT AND DEPRESSURIZATION PROCEDURES AS OUTLINED IN SECTION 11.1.

The Oil Separation Filter is a spin-on style of filter like that of a typical automotive oil filter making for easy replacement.

1. Remove the Access panel on the left side / Oil Separator Side of the Compressor.
(See Section 8; Fig. 8.3)

2. Using an Oil Filter wrench if necessary, unscrew the Oil Filter counter clock wise. (See Fig. 11.8)

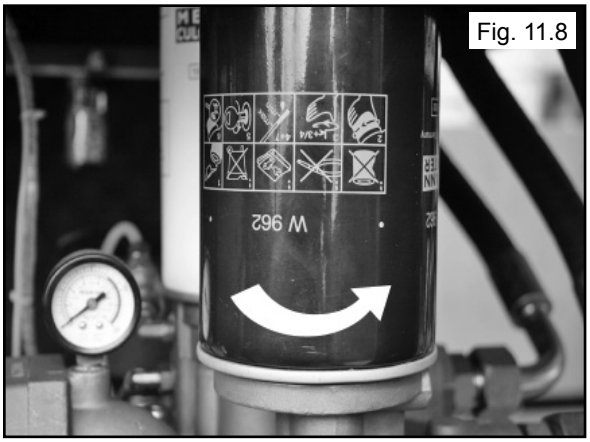


Fig. 11.8

3. Clean the threads and seat and then apply a light layer of clean oil to the face of the Oil Filter seat.
(See Fig. 11.9)

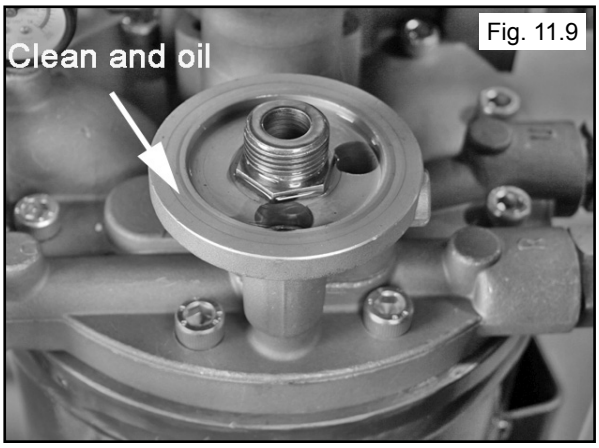


Fig. 11.9

4. Screw the new Oil Filter on clockwise and hand tighten only !!!

AIR OIL SEPARATION FILTER REPLACEMENT PROCEDURE

1. Remove the Access panel on the Rear Side of the Compressor. (See Section 8; Fig. 8.3)

⚠CAUTION

CAUTION:
PERFORM THE LOCKOUT TAG OUT AND DEPRESSURIZATION PROCEDURES AS OUTLINED IN SECTION 11.1.

NOTE:
The Oil Separation Tank needs to be unbolted and tilted to provide adequate clearance for removal of the Air Oil Separator Filter.

2. Unbolt the Oil Separation Tank mounting bolts. (See Fig. 11.10)


Fig. 11.10

3. Using an Oil Filter wrench if necessary, unscrew the Air Oil Separator Filter counter clock wise. (See Fig.11.11)


Fig. 11.11

4. With The Oil Separation Tank unbolted; lean the Tank towards the inside of the compressor while lifting the Air Oil Filter up and off the center pipe.

5. Clean the threads and seat and then apply a light layer of clean oil to the face of the Air Oil Separator Filter seat. (See Fig. 11.12)

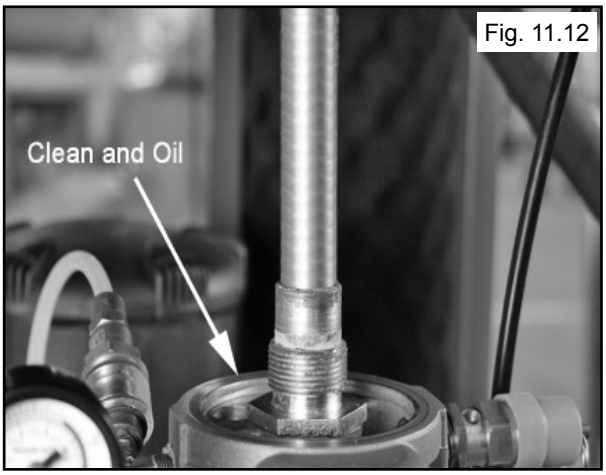


Fig. 11.12

6. Screw the new Air Oil Filter on clockwise and hand tighten only!!!

FEATURES OF THE INTAKE CONTROL VALVE

The Intake Control Valve consists of a valve body, valve gate, piston, cylinder, spring, gasket. There is a Control Plate and an Electromagnetic Control Valve mounted on the side. The Intake Control Valve controls load shedding, noise reduction, depressurization, on/off adjustment.

The Valve also adjusts to maintain a minimum amount of pressure (0.2 -0.3Mpa) to keep the minimum amount of Lubricating Oil in the Air end.

The Air Intake Valve should be inspected at 4000hrs. Pay close attention to the white seal rings. if worn, cracked or damaged replace it. See next Section for inspection and replacement instructions.

INTAKE VALVE INSPECTION / REPLACEMENT PROCEDURE

⚠CAUTION

CAUTION:
PERFORM THE LOCKOUT TAG OUT AND DEPRESSURIZATION PROCEDURES AS OUTLINED IN SECTION SECTION 11.1.

⚠CAUTION

CAUTION:
ENSURE THAT NO FOREIGN OBJECTS OR DEBRIS FALLS INTO THE INTAKE AREA DURING MAINTENANCE PROCEDURES.

1. Remove the Air Filter Housing assembly.

2. Unbolt the four Socket Head cap screws and remove the Valve Body Top. Use caution as the Valve is under light spring pressure. (See Fig. 11.13)

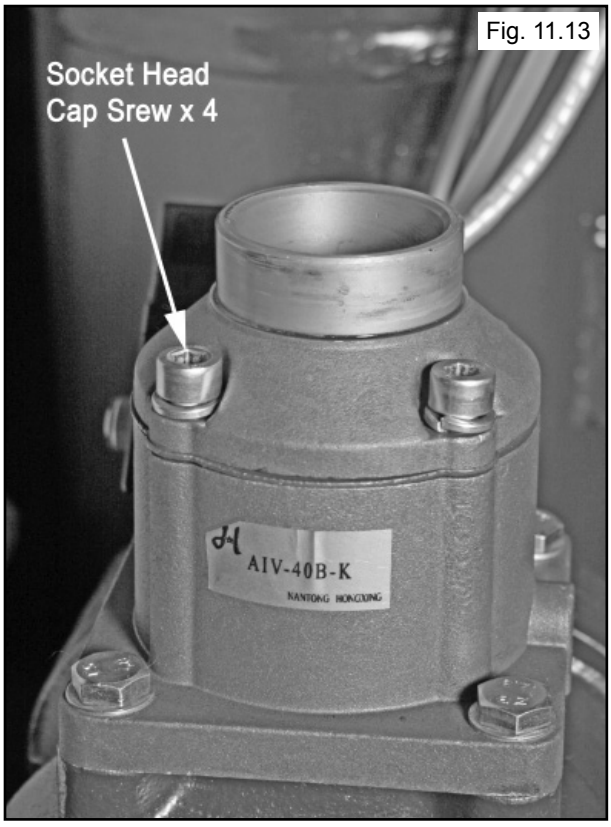


Fig. 11.13

3. Remove and replace the Valve Body Top Gasket. Remove the Valve. (See Fig. 11.14)

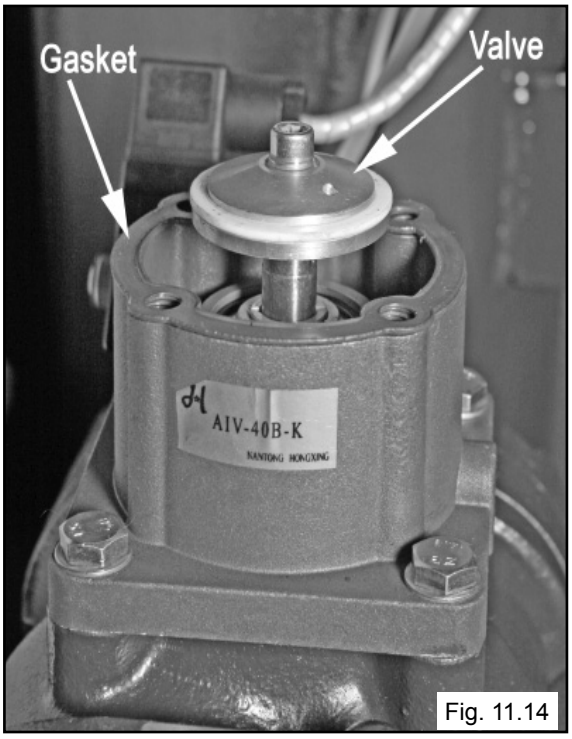


Fig. 11.14

4. Inspect the white seal on the Valve for damage or cracks. Replace if damaged. (See Fig. 11.15)

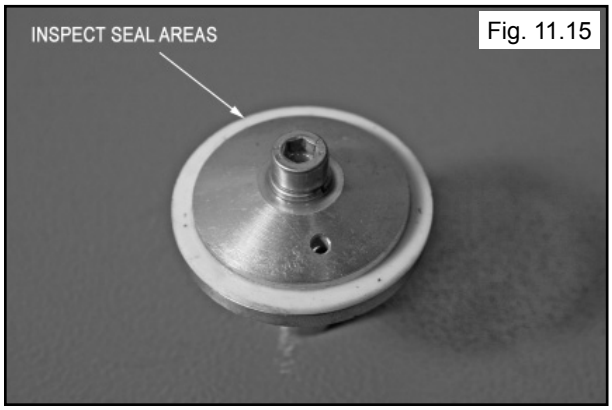


Fig. 11.15

5. Lubricate Valve and Valve Spring with high temperature grease. (See Fig. 11.16)

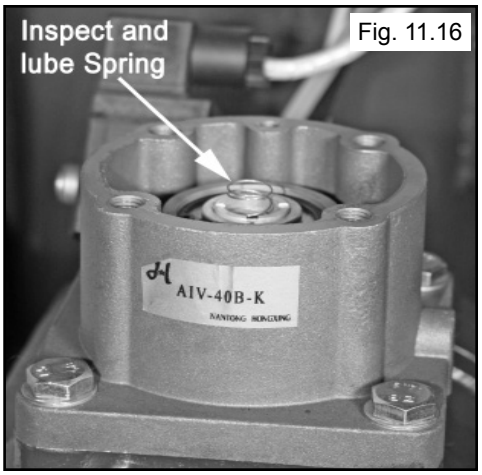


Fig. 11.16

6. Install new Gasket. Installation is reverse of the above procedures.

OIL CHANGE PROCEDURE

⚠CAUTION

CAUTION:
PERFORM THE LOCKOUT TAG OUT AND DEPRESSURIZATION PROCEDURES AS OUTLINED IN SECTION 11.1.

⚠CAUTION

CAUTION:
DISPOSAL OR RECYCLING OF USED OIL MUST BE DONE IN COMPLIANCE WITH FEDERAL, STATE AND LOCAL ENVIRONMENTAL LAWS AND REGULATIONS.

ATTENTION:
Replace the Oil more frequently when the dust level, the operating temperature is high, in severe operating environments or severe demand applications

1. Connect a drain hose up to the Drain Ball Valve.

2. Open the Oil Fill Plug.

3. Open the Drain Ball Valve and drain used oil into an approved container and dispose of in accordance with local regulations. (See Fig. 11.8)

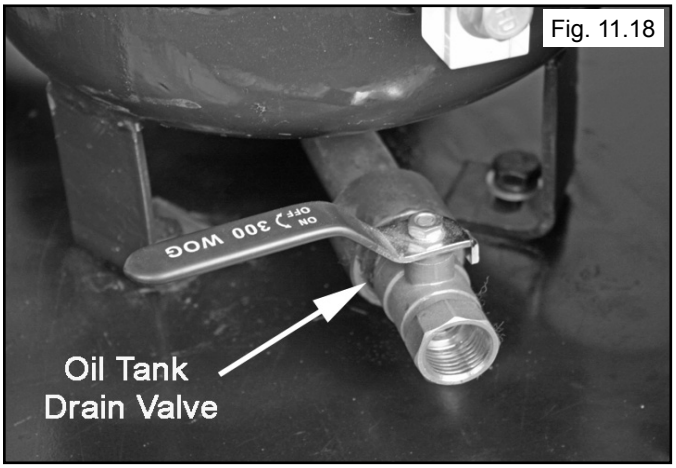


Fig. 11.18

4. Close Drain Ball Valve.

5. Use a clean funnel, fill the Oil Separation tank with PowerCool Synthetic Air Compressor Lubricant.

6. Install and tighten the Oil Fill Plug.

7. The oil level must be above the upper red line after the compressor is off has been stopped for thirty minutes. The oil level when the compressor is running must be between the upper and lower red line indicated on the Oil Level Site glass. (See Fig. 11.19 -11.20)

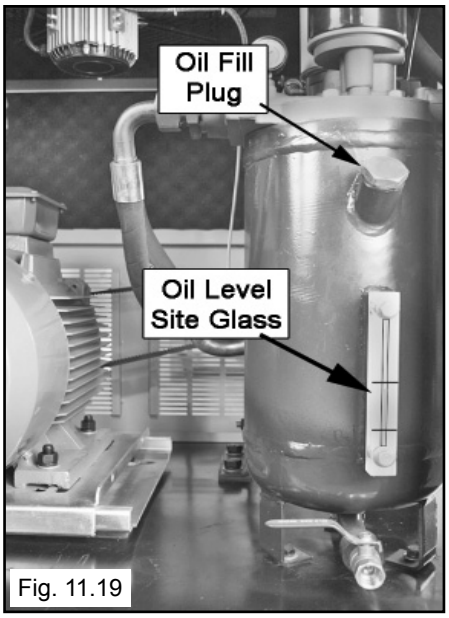


Fig. 11.19

Fig. 11.20

8. Start the compressor. Check the oil level while running and add oil as required. Check again after compressor has be running for about 30 minutes and stopped for 30 minutes. If oil level is low, add Oil as needed.

ALIGNMENT OF DRIVE BELT AIR END PULLEY AND MOTOR PULLEY

If the air end or motor is moved or replaced, the alignment of the drive belt pulleys of the motor and air end need to be adjusted. Misaligned pulleys can cause premature belt wear and or bearing damage.

1. Bolt down the Air End in proper position.

2. Loosen the Motor mounting bolts. (See Fig. 11.21)

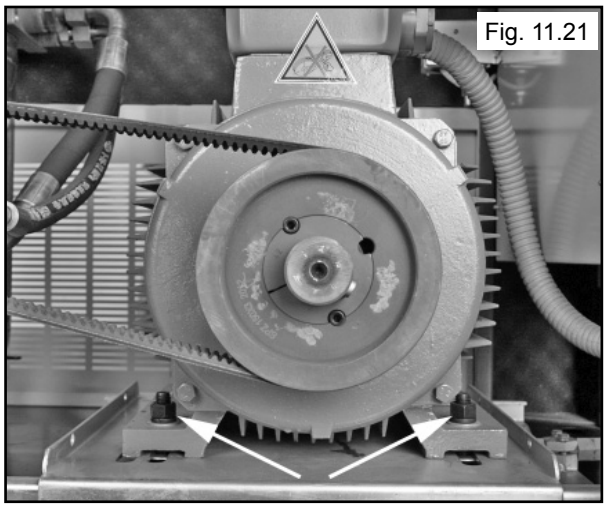


Fig. 11.21

3. Using a straight edge or square and or level, adjust the motor until the Motor pulley and Air End Pulley are in the same vertical and horizontal plane. Shims may be required. (See Fig. 11.22)

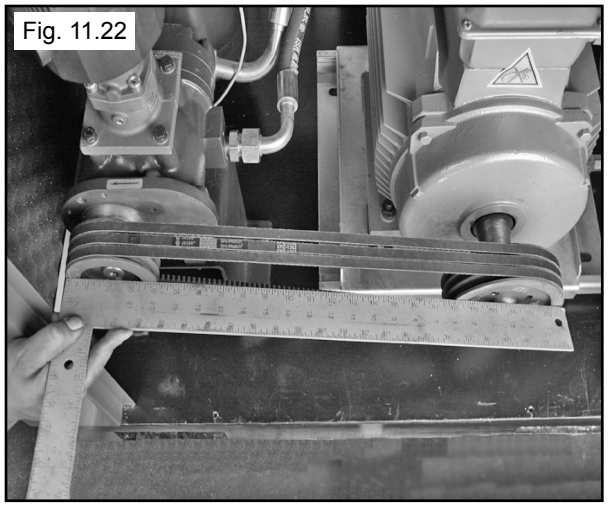


Fig. 11.22

4. Tighten the Mount Bolts and adjust Pulley Tension as described in procedure below.

DRIVE BELT ADJUSTMENT AND REPLACEMENT

Drive Belt Adjustment

⚠CAUTION

CAUTION:
PERFORM THE LOCKOUT TAG OUT AND DEPRESSURIZATION PROCEDURES AS OUTLINED IN SECTION 11.1.

1. Locate the Drive Belt Tension Adjusting assembly. (See Fig. 11.23)

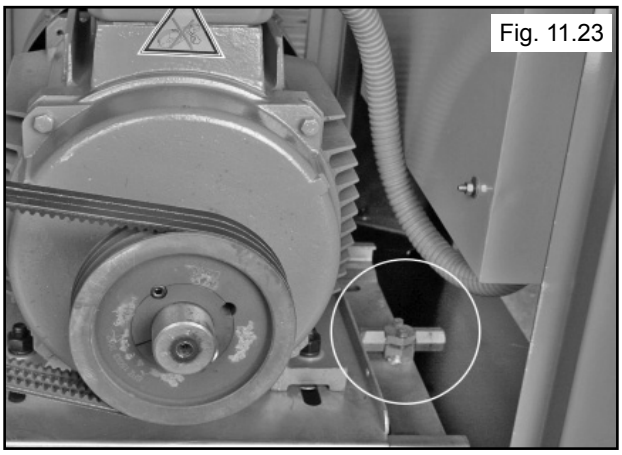


Fig. 11.23

2. Loosen the two Locking Bolts. (See Fig. 11.24)

3. Rotate the Adjusting Nut, then adjust the tension of the Belts. (See Fig. 11.24)

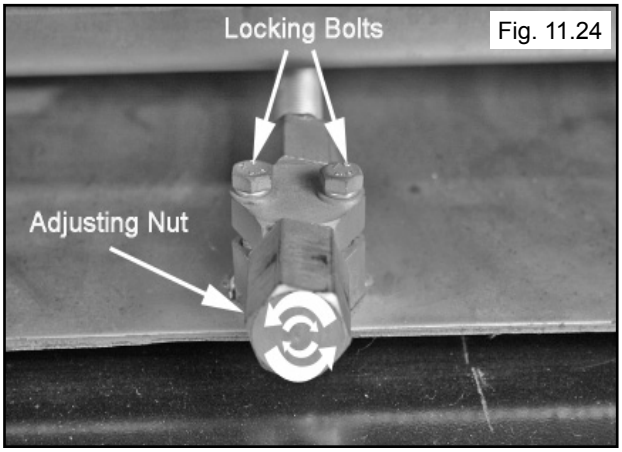


Fig. 11.24

4. Belt should have no more than 1/2”/12mm deflection measured near the middle of the belts. (See Fig. 11.25)

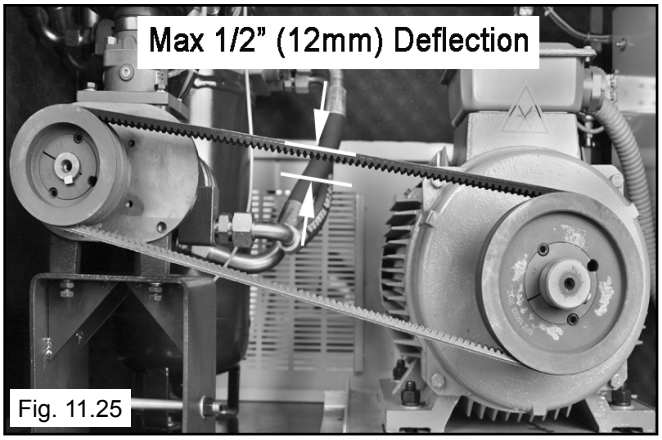


Fig. 11.25

5. Tighten the Locking Bolts.

ATTENTION:

AFTER BELT ADJUSTMENT OR REPLACEMENT, RUN THE COMPRESSOR FOR FIVE MINUTES. THEN STOP THE COMPRESSOR AND READJUST IF NECESSARY. RUN THE COMPRESSOR FOR TEN MINUTES AND THEN STOP COMPRESSOR AND RECHECK AND ADJUST IF NECESSARY.

Drive Belt Replacement

NOTE:

When replacing worn or damage drive belt, ALWAYS replace the entire group of belts at the same time.

1. Follow the procedure described above and loosen Drive Belt tension enough to remove and replace.

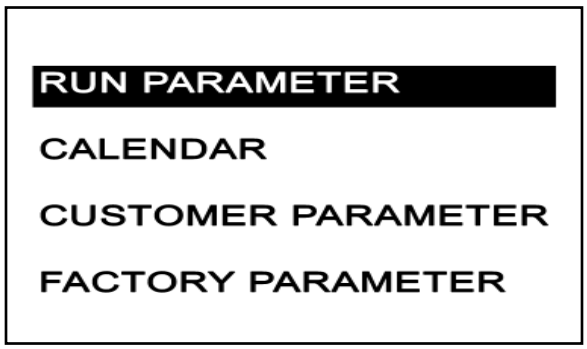
2. Align and Adjust as described above.

SECTION 12

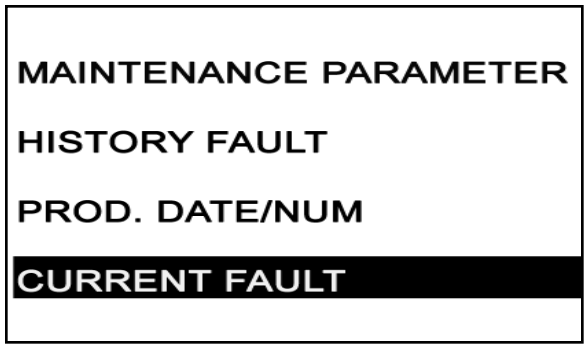
COMMON PROBLEM SOLVING

Failure caused by the peripheral equipment of the controller can be investigated by viewing the Local Failure record or the History Failure Record to find out the failure cause. The detailed method is as follows:

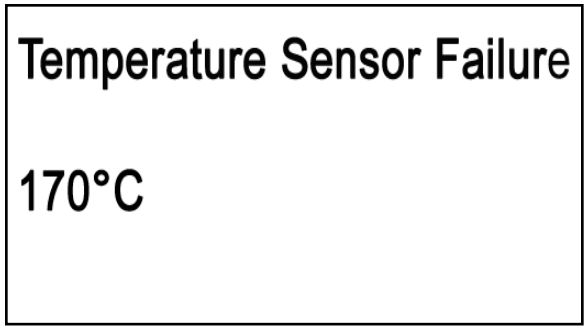
1. Press the ↓ ↑ button or to move the black cursor over the menu “RUN PARAMETER” and then press the confirm button ➔ to select the submenu as shown below;



2. Press the confirm button ➔ again to select the desired menu:



3. Press confirm button ➔ to reach the failure cause:



4. Check the Temperature sensor to confirm if there are any wires broken or damage to this equipment. Repeat for other Faults if needed.

PROBLEM	CAUSES	MEASUREMENT TO MAKE
Air Exhaust Temperature too high	Bad vent condition, lack of oil etc.	Check the vent condition and lubrication level etc.
Temperature Sensor Failure	Cable off or PT100 Damaged	Checking the wiring and PT100
Over Pressure.	The pressure is too high or the pressure sensor failure.	Check the pressure and the pressure sensor.
Pressure Sensor failure	Cable off, sensor damage or the cable connected reversed.	Check the wiring and sensor transformer.
Phase lacking.	Power phase lacking or the Contactor terminal damaged.	Check the power and Contactors.
Overloaded.	Voltage too low, tubes blocked, Bearing Wear off or other mechanical failure or wrong set data etc.	Check the set data, Voltage, bearings tubes and other mechanical system.
Unbalance.	Power unbalance, Contactor damage or the internal open of the motor.	Check the power, Contactors and the motor.
Rotor Lock	Voltage too low, tubes blocked, Bearing Wear off or other mechanical failure or wrong set data etc.	Check the set data, Voltage, bearings tubes and other mechanical system.
Short Circuit.	Wrong Wiring, Incorrect Data setting etc.	Checking the wiring and set the data correctly.
Wrong Phase Sequence.	Reversed Phase sequence or phase off	Check the wiring.
Fan stopped.	Fan damaged, Contactor damaged, no control output.	Check the wiring and control output.
Overload or Rotor locking during starting process.	Host start time set to a valueless than the star angel time delay.	Reset the host starting time to be longer that star angel delay + load delay time.
Main Contactor activate time to time.	The Emergency Button is loose.	Check the wiring.

Motor Protection

MAMKY02S air compressor controller provides Short-circuit Protection, Rotor Lock Protection, Overload Protection, Phase Lacking Protection, and Unbalance Protections to the motor.

ELECTRONIC FAILURE	FAILURE DISPLAY	POSSIBLE CAUSES
Short -Circuit	Local Failure display: “Host or Fan short-circuited”	Short-circuited or the rated current is wrongly set.
Rotor Lock	Local failure display: “Host or Fan Rotor Overloaded”	Overloaded, Bearing wear off or other mechanical Failures.
OVERLOAD	Local failure display: “Host or Fan Over-loaded”	Overloaded, Bearing wear off or other mechanical Failures.
Phase Lock	Local Failure display “Host or Fan Phase Lacking	Phase lacking occurred to the Power or the connectors.
Unbalance	Local failure display : “Host or Fan Current unbalance”	Contactors are not contacted correctly of the motor inner parts open.

AIR EXHAUST OVERHEAT PROTECTION

When the air exhaust temperature is higher that the set limited unload temperature, the controller will sound an alarm and stop the machine. Local Failure will display “Air Exhaust High Temperature”.

REVERSE RUNNING PROTECTION OF THE AIR COMPRESSOR:

If the Phases of the incoming power are reversed, the Local Failure will display “wrong phase sequence”. The controller will not allow the motor to startup under this condition. Check and reverse the incoming power legs.

OVER PRESSURE PROTECTION:

When the pressure of the air exhaust is higher than the set stop pressure of the controller, the controller will sound an alarm and stop the machine; the Local Failure displays “Pressure too High”.

SENSOR FAILURE PROTECTION:

If the Pressure Sensor or the Temperature Sensor Cable is broken, the controller will sound an alarm and stop the machine: the local failure displays “xxx sensor failure”.

INTERLOCK PROTECTIONS:

The Host is running and the air exhaust temperature reaches the fan starting temperature but the Fan does not run, the controller alarm will sound, and the Local Failure displays ”Fan is stopped”

ALARMS AND NOTICES

Text Display Tips

1. Air Filter Alarm tips
   a. Check the alarm using the switch signal.
      i. The Controller will display a message on the text display to remind the operator that “air filter is blocked” by checking the pressure difference switch operation state.
   b. Set the running time alarm of the air filter.
      i. The Text displays “Air filter life terminated” when the usable life of the filter terminates.

2. Oil Filter alarm tips.
   a. Check the alarm using the switch signal.
      i. The controller will display a message on the text display to remind the operator that “the oil filter is blocked” by checking the pressure difference switch operating state.

3. Oil Separator alarm tips
   a. Check the alarm using the switch signal
      i. The controller will display a message on the text display to remind the operator that “the oil separator is blocked” by checking the pressure difference switch operating gate.

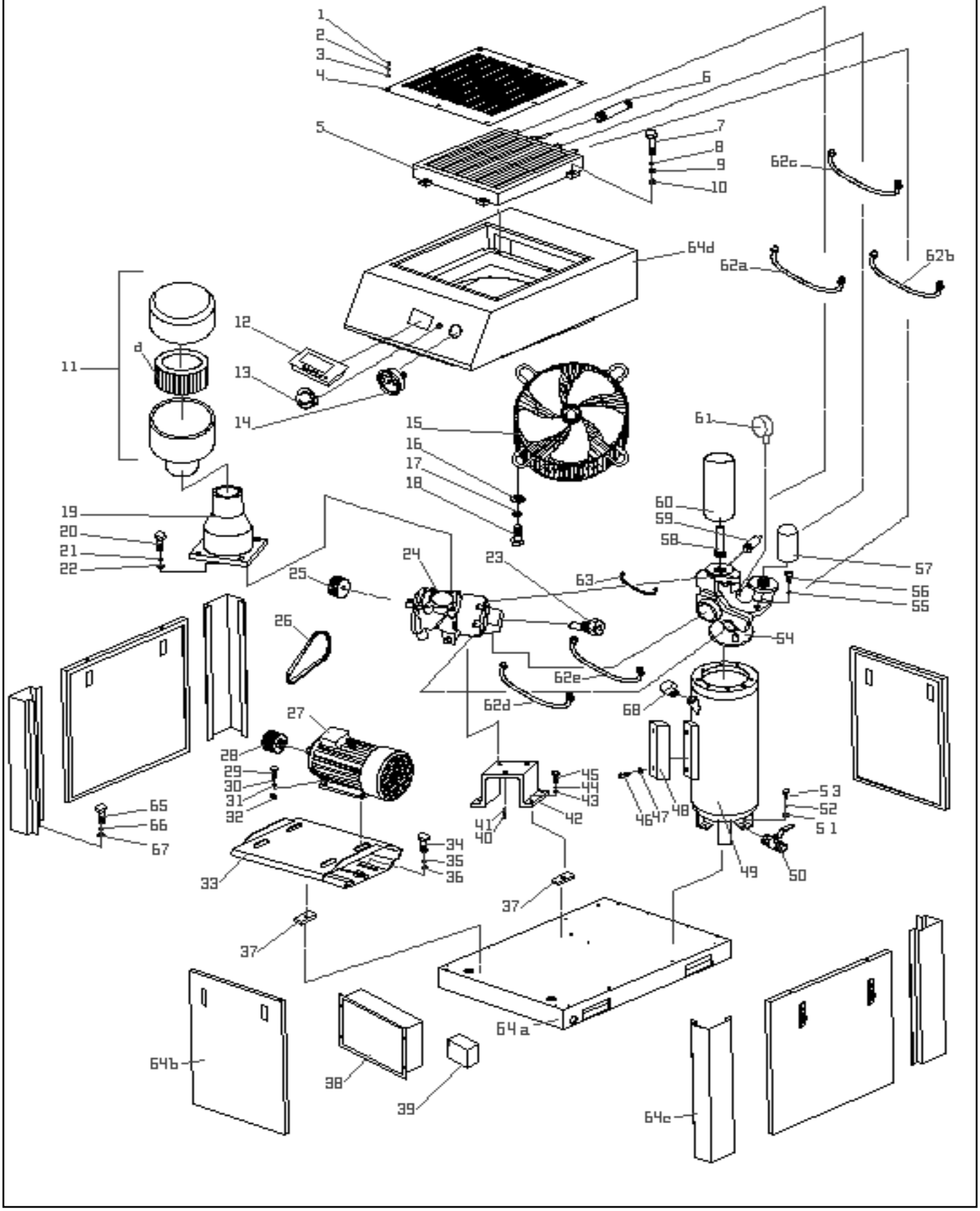
   b. Set the running time alarm of the oil separator
      i. The Text displays “Oil separator life terminated” when the usable life of the oil separator terminates.

4. Lubricate Oil Alarm tips
   a. The Test displays “Lubricate Oil life terminated” when the usable life of the lubricating oil terminates.

5. Lubricate Grease alarm tips
   a. The Text displays “Lubrication Grease life terminated” when the usable life of the lubricating grease terminates.

MAINTENANCE / INSPECTION RECORDS

SCREW COMPRESSOR MODEL: LS15RS PARTS LIST



SCREW COMPRESSOR
MODEL: LS15RS PARTS LIST

No.	Description	Qty.	Specs
1	Bolt	6	m4 x 6
2	Lock Washer	6	4m
3	Washer	6	4m
4	Heat Emission Board	4	
5	Radiator	1	
6	Air Outlet	1	zg1
7	Bolt	4	m8x40
8	Lock Washer	4	8m
9	Washer	4	8m
10	Hex Nut	4	m8
11	Air Filter Assy.	1	
11a	Air Filter Element	1	C1140
12	Control	1	
13	Emergency Switch	1	
14	Pressure Gauge	1	
15	Cooling Fan	1	
16	Washer	4	
17	Lock Washer	4	
18	Bolt	4	m8x30
19	Air-intake Valve	1	
20	Bolt	4	
21	Lock Washer	4	
22	Washer	4	
23	Temperature Sensor	1	
24	Air Pump	1	
25	Air Pump Pulley	1	
26	Gear V belt	3	
27	Motor	1	
28	Motor Pulley	1	
29	Bolt	4	
30	Lock Washer	4	
31	Washer	4	
32	Nut	4	
33	Motor Seat	1	
34	Bolt	4	
35	Lock Washer	4	
36	Washer	4	
37	Shock Absorber	8	

No.	Description	Qty.	Specs
38	Electrical Box	1	
39	Pressure Switch	1	
40	Bolt	4	
41	Lock Washer	4	
42	Pump Seat	1	
43	Washer,	4	
44	Lock Washer	4	
45	Bolt	4	
46	Bolt	2	
47	Seal washer	2	
48	Glass	1	
49	Oil Tank	1	
50	Switch	1	
51	Washer	3	
52	Lock Washer	3	
53	Bolt	3	
54	Valve	1	
55	Lock Washer	4	
56	Bolt	4	
57	Oil Filter	1	W962
58	Oil Air Separator Duct	1	
59	Safety Valve	1	
60	Oil Air Separator	1	LB962/2
61	Pressure Gauge	1	
62a	Rubber Hose	5	
62b	Rubber Hose	1	
62c	Rubber Hose	1	
62d	Rubber Hose	1	
62e	Rubber Hose	1	
63	Tubing	1	
64a	Base	1	
64b	Door	4	
64c	Pillar	4	
64d	Top	1	
65	Bolt	16	
66	Lock Washer	16	
67	Washer	16	
68	Bolt	1	

Rotary Screw Air Compressor Warranty

1. DURATION: From the date of purchase by the original purchaser. Any BendPak 15 HP rotary screw air compressor: >Five-year tank warranty will apply to filtration reservoirs and ASME air receivers only if they are installed on rubber anti-vibration pads or approved equivalent. >Two Year warranty on all major air-end components, filtration and heat exchange components; against defects in material or workmanship under normal use and service, from the date of installation, or 24-months from the date of shipment by BendPak or a BendPak distributor whichever comes first.

2. WHO GIVES THIS WARRANTY (WARRANTOR): BendPak Inc., 1645 Lemonwood Dr. Santa Paula, CA. 93060

3. WHO RECEIVES THIS WARRANTY (PURCHASER): The original purchaser (other than for purpose of resale).

4. WHAT PRODUCTS ARE COVERED BY THIS WARRANTY: Any BendPak 15 HP rotary screw air compressor.

5. WHAT IS COVERED UNDER THIS WARRANTY: Manufacturer defects due to material and workmanship with the exceptions noted below.

6. WHAT IS NOT COVERED UNDER THIS WARRANTY:

A. ANY INCIDENTAL, INDIRECT, OR CONSEQUENTIAL LOSS, DAMAGE, OR EXPENSE THAT MAY RESULT FROM ANY DEFECT, FAILURE, OR MALFUNCTION OF BENDPAK INC PRODUCT.
B. Any failure that results from an accident, purchaser's abuse, neglect or failure to operate products in accordance with instructions provided in the owner's manual(s) supplied with compressor.
C. Pre-delivery service, i.e. assembly, oil or lubricants, and adjustment.
D. Items that are generally wear items such as drive-belts, or service items normally required to maintain the product, i.e. lubricants, filters and gaskets, etc.
E. Additional items not covered under this warranty:
   a. Any component damaged in shipment or any failure caused by installing or operating unit under conditions not in accordance with installation and operation guidelines or damaged by contact with tools or surroundings.
   b. Pump or valve failure caused by rain, excessive humidity, corrosive environments or other contaminants.
   c. Cosmetic defects that do not interfere with compressor functionality.
   d. Rusted tanks, including but not limited to rust due to improper drainage or corrosive environments. A five-year tank warranty will apply to ASME air receivers only if they are installed on rubber anti-vibration pads or approved equivalent.
   e. Electric motors and other assembly components such as check valves and pressure switches after the first year of ownership. (BendPak makes no warranty on components and/or accessories furnished to BendPak by third parties. These are warranted only to the extent of the original manufacturers warranty to BendPak.)
   f. Drain cocks, drain valves. (BendPak makes no warranty on components and/or accessories furnished to BendPak by third parties, such as electric motors, switches and/or controls. These are warranted only to the extent of the original manufacturers warranty to BendPak.)
   g. Damage due to incorrect voltage or improper wiring.

Other items not listed but considered general wear parts.
   a. Pump wear or valve damage caused by using oil not specified.
   b. Pump wear or valve damage caused by any oil contamination or by failure to follow proper oil maintenance guidelines.
   c. Belts.
   d. Ring wear or valve damage from inadequate filter maintenance.

7. RESPONSIBILITIES OF WARRANTOR UNDER THIS WARRANTY: Repair or replace, at Warrantor's option, compressor or component which is defective, has malfunctioned and/or failed to conform within duration of the warranty period. BendPak Inc. will pay reasonable labor costs for the first 12 months only on parts returned as previously described.

8. RESPONSIBILITIES OF PURCHASER UNDER THIS WARRANTY:
A. Provide dated proof of purchase and maintenance records.
B. Portable compressors or components must be delivered or shipped to the nearest BendPak Authorized Service Center. Freight costs, if any, must be borne by the purchaser.
C. Use reasonable care in the operation and maintenance of the products as described in the owner's manual(s).

9. WHEN WARRANTOR WILL PERFORM REPAIR OR REPLACEMENT UNDER THIS WARRANTY: Repair or replacement will be scheduled and serviced according to the normal work flow at the servicing location, and depending on the availability of replacement parts.

THESE WARRANTIES DO NOT EXTEND TO ANY COSMETIC DEFECT NOT INTERFERING WITH EQUIPMENT FUNCTIONALITY OR ANY INCIDENTAL, INDIRECT, OR CONSEQUENTIAL LOSS, DAMAGE, OR EXPENSE THAT MAY RESULT FROM ANY DEFECT, FAILURE, OR MALFUNCTION OF A BENDPAK INC PRODUCT OR THE BREACH OR DELAY IN PERFORMANCE OF THE WARRANTY.

This warranty is exclusive and in lieu of all other warranties expressed or implied. BendPak makes no warranty on components and/or accessories furnished to BendPak by third parties. These are warranted only to the extent of the original manufacturers warranty to BendPak. Other items not listed but may be considered general wear parts. BendPak reserves the right to make design changes or add improvements to its product line without incurring any obligation to make such changes on product sold previously. Warranty adjustments within the above stated policies are based on the model and serial number of the equipment. This data must be furnished with all warranty claims.

For Parts or Service
Contact:

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Santa Paula, CA. 93060

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Toll Free: 1-800-253-2363
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