ROTARY SCREW
STATIONARY AIR COMPRESSOR
MODELS
CL15SS-CL20SS-CL25SS-CL30SS
CL15CUB-CL20CUB-CL25CUB-CL30CUB

OPERATION AND MAINTENANCE MANUAL

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CL15SS-CL20SS-CL25SS-CL30SS
CL15CUB-CL20CUB-CL25CUB-CL30CUB
4391x,4393x,4394,x4395x,4396x

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SAFETY NOTICE

CompAir LeROI strives through constant research and development to provide this equipment with every necessary safety device. This manual contains numerous “Warnings,” “Cautions” and “Notes” intended to protect the equipment from damage and the operator from injury. However, none of these is a substitute for safe operating procedures. Extreme care must be exercised when operating or servicing this equipment.

The operator/serviceman should:

1. Learn all that can be learned about this equipment.
2. Develop safe working habits.
3. Never operate a unit without guards and shields in place.
4. Never operate a unit that is not properly grounded.
5. Never service a unit without disconnecting and locking out the electrical power supply unless following specific operation manual instructions.
6. Never service a unit with air pressure in the air receiver-oil reservoir unless following specific operation manual instructions.
7. Take all necessary precautions, when adjusting controls, etc., to prevent electrical shock.

WARNINGS

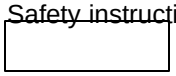
- AIR DELIVERED BY THESE COMPRESSORS **MUST NOT** BE USED AS BREATHING AIR!
- DON’T PLAY WITH COMPRESSED AIR!
- DON’T POINT AIR HOSES AT ANYONE!
- DON’T USE COMPRESSED AIR TO BLOW DIRT FROM CLOTHING!

At close range, compressed air, at the pressures these units develop, can put out eyes, burst ear drums, cause serious skin blisters and other injuries.

Check Pressure Relief Valves daily to make certain they are working properly. An over pressurized air receiver has the potential destructive force of a small bomb which can kill or seriously injure persons nearby.

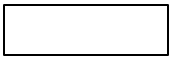
A CAREFUL OPERATOR IS THE BEST INSURANCE AGAINST AN ACCIDENT

Safety instructions in this manual will appear as follows:



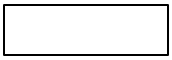
DANGER

Danger is used to indicate the presence of a hazard which *will cause severe* personal injury, death or substantial property damage if the warning is ignored.



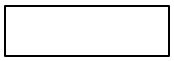
WARNING

Warning is used to indicate the presence of a hazard which *can cause severe* personal injury, death, or substantial property damage if the warning is ignored.



CAUTION

Caution is used to indicate the presence of a hazard which *will or can cause minor* personal injury or property damage if the warning is ignored.



NOTICE

Notice is used to notify people of installation, operation, or maintenance of information which is important but not hazard related.

FORWARD

This manual contains vital information for the safe use and efficient operation of this unit. It must be read carefully and understood before installing, operating or servicing the unit. Failure to adhere to the instructions and warnings will expose operator or service personnel to the risk of serious injury or death.

WARNINGS RELATING TO THE COMPRESSOR

1. This machine was designed to perform within specific operating parameters, and was thoroughly tested at the factory prior to shipment. Do not deviate from the recommended operating parameters. Such improper operation will subject the machine to conditions beyond its design capabilities, and will expose the operator and bystanders to the risk of injury or death, and the machine to damage or failure.

2. When performing maintenance on the compressor, the compressor must be shut down and isolated both electrically and mechanically by means of a discharge isolation valve to prevent pressurizing from an external source. Do not reply upon check valves to provide complete protection from the air system when more than one compressor is installed in the air system.

3. Disconnect this equipment from all power sources before opening the electrical enclosure for any purpose. The enclosure contains exposed parts at high voltage which can cause severe electric shock and burns if contacted, exposing service personnel to the risk of injury to death.

4. Do not bypass or tamper with the discharge temperature switch. If the compressor shuts down due to high discharge temperature, contact a qualified service agency immediately. Overriding the discharge temperature switch can cause a machine malfunction, fire or other damage, and expose the operator and bystanders to the risk of injury or death.

WARNINGS RELATING TO AIR SYSTEMS

1. All service piping to and from the compressor must take into account pressure, temperature, vibration, corrosion and chemical resistance. Special attention should be given to the compatibility of the lubricant used and the system piping and accessories.

2. Do not use plastic bowls on line filters without metal guards. Synthetic lubricants and the additives used in mineral oils collected in the bowl can weaken the bowl materials causing them to rupture. For greater reliability and safety, metal bowls should be used on any pressurized system. Review of your plant air line system is recommended.

Do not use discharge air as breathing air. Severe injury or death will result. Consult a filtration specialist for additional filtration and treatment equipment needed to meet health and safety standards for breathing air.

SPARE PARTS

CompAir LeROI supplies replacement parts for these compressors, and a complete parts list is included in this manual. Order parts from your authorized CompAir LeROI distributor.

NOTE: For prompt and accurate service please have model and serial number available when ordering parts.

CAUTION

Use only genuine CompAir LeROI replacement parts. The use of other than genuine parts may cause machine malfunctions, exposing the operator to injury and the machine to damage. The use of other than genuine parts will also void the CompAir LeROI warranty.

NOTICE

The use of non CompAir LeROI lubricants in this compressor may void the warranty.

This manual is complete at the time of printing. However, machines assembled after the printing may include functionally equivalent components substituted for original components described in the manual. CompAir LeROI reserves the right to make such component substitutions without modifying this manual.

SECTION I
GENERAL INFORMATION

This manual includes installation, operating instructions and maintenance and service procedures for the Model 15, 20, 25, and 30 SS and CUB air compressor units.

An explanation of the model code follows:

Example: CL20 CUB
CL-CompAir LeROI

20 - Horsepower required to drive the air end

CUB - Modulation control

This series of air compressor units are electric motor driven, oil flooded, single stage, rotary screw type.

These compressors are air cooled with the oil cooler and aftercooler mounted as an assembly.

AIR END (Figure 1)

The air end (male rotor) is belt driven. The female rotor is driven by the male rotor because the rotors are meshed. Figure 2 shows the direction of rotor rotation and the air/oil flow through the air end. Note that the air flow through the air end is between the rotors and the inside diameter of the cylinder bore.

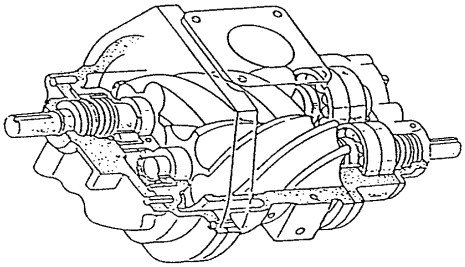


FIGURE 1 - AIR END

Each rotor is mounted with two angular contact ball bearings at the rear or discharge end. The front or inlet end of each rotor is supported by a single row roller bearing. This allows the rotors or cylinder to freely expand or contract due to changes in temperature without affecting critical running clearances.

AIR AND OIL FLOW

Air circulates through the system beginning at the air cleaner, passing through the intake valve and into the air end where it is compressed. During compression oil is injected into the air end (and air) to provide cooling, sealing and lubrication. From the air end compressed air (and oil) is discharged at rated pressure into the unit air receiver/oil reservoir.

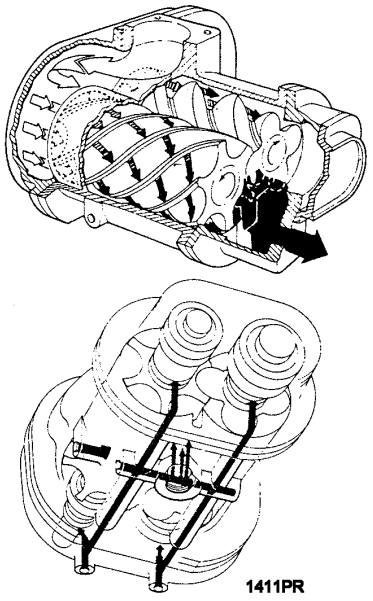


FIGURE 2 - AIR/OIL FLOW - TYPICAL

Separation of oil from the air, which was injected into the air end during compression, begins in the unit air receiver/oil reservoir. From 90 to 95% of the oil is separated from the air with a decrease in air velocity, changes in flow direction, adequate baffling and proper location of the air receiver/oil reservoir inlet port.

Final air/oil separation is obtained using a composition material "can" type separator element to provide nearly oil free air at the separator out or service connection. Oil collected by the separator element is returned to the system by a filter equipped separator drain line.

To prevent over pressuring the air received/oil reservoir, an air pressure relief valve is installed in the received/reservoir. This pressure relief valve is located on the upstream or wet side of the separator element.

Oil flows, forced by air pressure, from the air receiver/oil reservoir through the cooler and filter and its injected into the air end to provide cooling, sealing and lubrication.

Oil injection temperatures for these units should be 130°F or above depending on ambient air temperature.

Air flow to/through the air end is controlled by the intake valve. When there is a demand for air, up to the rated capacity of the air end, the intake valve will be open (air end fully loaded.) When there is no demand for air the intake valve will be closed (air end fully unloaded.)

CONTROL FUNCTION
MODULATING CONTROL
(Cub, Upper Range Modulation)

To obtain modulating control, a control pressure regulator valve is used. The control pressure regulator valve partially or fully unloads the air end in direct proportion to air demand.

As air demand is reduced (unit air received pressure rises), the control pressure regulator valve will gradually close the intake valve. When the demand for air is less than the rated capacity of the air end, the control pressure regulator valve will hold the intake valve partially closed causing the air end to deliver air in direct proportion to demand.
When/if there is no demand for air, both the unit and storage receiver pressures will rise to the maximum operating pressure.

The control pressure regulator valve will, at the maximum operating pressure, hold the intake valve completely closed, fully unloaded.

A plant system or additional storage receiver may not be required for modulating control units provided the unit is tanked mounted.

If air demand varies widely (short periods of high demand with short periods of low or no demand) a system storage receiver is desirable and recommended to prevent too frequent cycling of the controls. (Bed plate mounted units only).

HIGH TEMPERATURE SHUT DOWN SWITCH (Figure 9)

The high air temperature shut down switch is located in the discharge cavity of the rear bearing retainer on the air end.

This is a normally closed temperature sensitive switch. The purpose of this switch is to shut the unit down in the event the air temperature at the air end discharge rises above 230° ± 5°F.

CAUTION
THE CAUSE OF A SHUT DOWN DUE TO HIGH AIR/OIL TEMPERATURE MUST BE CORRECTED BEFORE RESTARTING THE UNIT.

To restart a unit, allow the unit to cool to automatically reset the high temperature shut down switch.

SAFETY SHUTDOWN

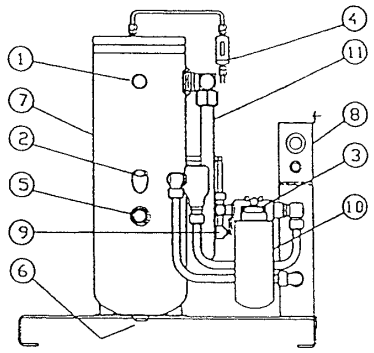
CHECK HIGH AIR TEMPERATURE

There is a high discharge air temperature shutdown function built into the control on each compressor. It is factory pre-set at 230°. This function should be checked at regular intervals for proper operation, once a month is recommended.
PROCEDURE:

1. Block off the cooling air discharge.
2. The compressor discharge temperature will rise at a rapid rate. Shutdown should

occur when the discharge temperature reaches the pre-set maximum discharge air temperature setting.

FIGURE 5



1. Restriction indicator (separator)
2. Oil Filler
3. Restriction Indicator (Oil Filter)
4. Separator Drain Line
5. Oil Level Sight Gage
6. Drain Valve
7. Air Receiver/Oil Reservoir
8. Oil Cooler/Aftercooler
9. Oil Sample Valve
10. Oil Filter
11. Discharge Tube

COMPONENT FUNCTION

Piping and wiring diagrams have been provided to assist in locating components on the unit and determining component function. The following explanation of component function will assist in determining if the compressor is operating properly.

INTAKE VALVE

The intake valve is located on top of the air end. The primary purpose of the intake valve is to control air flow to the air end. The secondary purpose of the intake valve is to check reverse air/oil flow when the unit is shut down.

AIR RECEIVER/OIL RESERVOIR

The air receiver/oil reservoir provides an oil sump, primary oil separation and a mounting location for the separator element. The separator element is mounted at the top of the air receiver/oil reservoir and held in place by the receiver/reservoir cover.

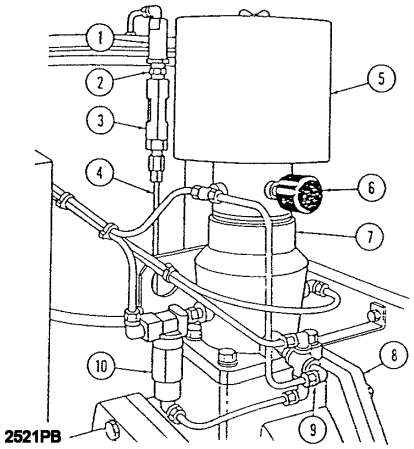


FIGURE 6

1. Drain Line Filter
2. Check Valve
3. Sight Gage
4. Separator Drain Line
5. Air Cleaner
6. Restriction Indicator
7. Intake Valve
8. Air End
9. Control Bleed Orifice
10. Return Air Bleed Back Valve

Other components which are mounted on the receiver/reservoir are the minimum pressure check valve, with piping, pressure relief valve, and blow down valve.

MINIMUM PRESSURE/CHECK VALVE

The minimum pressure/check valve is located on the air receiver/oil reservoir cover at the separator out port.
The purpose of this valve is to maintain minimum air pressure in the air receiver/oil reservoir.

The valve consists of a spring loaded piston which opens when air pressure reaches approximately 65 psi and maintains a

minimum pressure of 60 to 70 psi in the air receiver/oil reservoir regardless of service or distribution piping pressure.

In addition, this valve checks the return flow of air from the system receiver (storage tank and/or distribution system) when the compressor is stopped or running unloaded.

NOTE

COMPRESSOR SHOULD NOT BE OPERATED AT A MINIMUM PRESSURE FOR EXTENDED PERIODS. EXCESSIVE OIL LOSS WILL RESULT.

SEPARATOR DRAIN LINE

The separator drain line is mounted on the air receiver/oil reservoir cover. This tube extends down into and touches the bottom of the separator element.

The other end of the drain line is connected to a low pressure port on the air end.

The drain line is equipped with a filter, a check valve and a flow sight gage.

The filter prevents foreign matter from entering the air end. The check valve allows free flow of air/oil from the separator to the air end but prevents reverse air/oil flow at shut down. The sight gage may be used to assist with service diagnosis.

BLOW DOWN (DUMP) VALVE

The air receiver/oil reservoir blow down or dump valve is located on the air inlet valve.

This is a normally closed valve which is opened by air pressure.

This valve is opened by air pressure from the intake valve when he unit is shut down.

Blow down (dump) air flows to atmosphere through the air cleaner.

RETURN AIR BLEED BACK VALVE

The return air bleed back valve is mounted on the intake valve.

This normally closed valve is opened by control pressure when the unit is running unloaded.

When the unit is running unloaded (intake valve closed) a small amount of air is allowed to "bleed back" from the air receiver/oil reservoir through the air end.

CONTROL PRESSURE REGULATOR VALVE (Cub, Upper Range Modulation Only)

The control pressure regulator valve is located on the unit air intake valve.

The purpose of this valve is to furnish control pressure to operate the intake valve for modulating control.

This valve senses unit air receiver-oil reservoir air pressures between 100 and 110 psi (approximately) and opens or closes the intake valve to control air delivery based on demand.

The higher the unit receiver/reservoir air pressure, the higher the control pressure and the more the intake valve is closed (low demand).

The lower the unit receiver/reservoir air pressure, the lower the control pressure and the more the intake valve is opened (high demand).

When the unit air receiver/reservoir pressure falls below 100 psi (approximately) the control pressure regulator can no longer maintain control pressure. This allows the intake valve to fully open (fully load).

NOTE

THE CONTROL PRESSURE REGULATOR VALVE, ON SOME UNITS, MAY BE ADJUSTED TO OBTAIN A MAXIMUM OF 150 PSI FULL LOAD PRESSURE. THE CONTROL OPERATION AS DESCRIBED ABOVE WOULD THEN WORK BETWEEN 150-160 PSI (APPROXIMATELY).

CHECK THE SPECIFICATIONS FOR EACH UNIT TO OBTAIN THE MAXIMUM

OPERATING PRESSURE BEFORE MAKING ADJUSTMENTS.

SECTION II
COMPAIR TROLLER

The Micro Controller used on the CL compressors is designed to accept three (3) analog inputs and eight (8) digital inputs. From these inputs and the logic stored in the processor, the following functions are supported:

From Analog Inputs:

- Line Pressure
- Sump Pressure
- Discharge Temperature

The following is provided:

- Constantly monitors and displays system pressure
- Monitors sump pressure and displays if selected.
- Monitors discharge temperature and displays if selected.
- Monitors separator differential pressure and displays if selected.
- Loads and unloads basic system pressure (provides indication as to load/unload).
- Provides over pressure warning and indication.
- Provides over pressure shutdown and indication.
- Monitors separator element differential pressure and gives indication and warning that service limit is exceeded (at 15 psi) and shuts unit down (at 25 psi).
- From temperature digital input, display will indicate impending high temperature fault and shut down unit when fault point is exceeded.

From Digital Inputs:

- High oil filter differential
- High inlet filter differential
- Motor overload protection
- Remote start (field installed)
- Remote stop (field installed)
- Emergency stop
- Spare (capable of interfacing with sequence panel driven by digital load/unload signal)
- Metal in oil circuit fault (optional)

The following is provided.

- Indication that air filter needs service
- Indication that oil filter needs service
- Motor overload shutdown and indication
- Ability to wire to a remote start/stop location
- Provide an emergency stop circuit
- Metal in oil fault indication (optional)

Digital outputs are provided as follows:

1. Energize starter contactors (Star + Delta contactors when Star Delta starters are used).
2. Load/Unload solenoid valve.
3. Drain solenoid (field connected)
4. Remote alarm (field connected)

The following additional information is provided by the software.

- Metric or English units (factory set)
- Running hours
- Loaded hours
- Shutdown stop delay timer
- High temperature alarm

The following information <u>is set by service personnel</u> at time of oil and filter service:

- Service hours oil
- Service hours filters (service personnel will set service hours and processor will count down to preset interval)

User Variable Parameters:

- Load/Unload Pressure
- Auto restart delay (if set at “0” will not allow unit to automatically restart after power failure; however, a value provided will actuate restart after power failure in the time in seconds provided).
- Off delay timer
- Drain cycle timer
  - Dwell time
  - Spit time

OPERATION

At power-up, if all operating parameters are normal, the display will read “READY”.

The "Select" Button will scroll through several parameters. This may be done any time if compressor is running or not running. The parameters are displayed as follows:

DISPLAY READY	LED'S	(FUNCTION)
XX	Line Pres	(PSI)
XX	Compressor Temp	(°F)
XX	Sump Pres	(PSI)
XX	Line & Sump	(Oil Sep. D/P, PSI)
XX	Run/Load Hrs	(Total/Hrs Alt)
XX	Run/Load Hrs	(Load/Hrs Alt)
XXXX	Service Hrs	(Fltrs/Hrs Alt)
XXXX	Service Hrs	(Oil/Hrs Alt)

When compressor is stopped, the user menu may be selected by holding in both "UP" and "DOWN" arrow keys for 10 seconds. When all LED's flash, push "UP" arrow key to display "01". Then hold down "STOP" key until display stops flashing. Push "SELECT" to scroll thru menu.

DISPLAY	LED'S	FUNCTION
XXX	Line Pres	Unloaded Set Point
XXX	Line Pres	Load Set Point
XX	Run/Load Hrs	Moist Sol. Valve "Spit" Time
XX	Service Hrs	Moist Sol. Valve "Dwell" time
* X	Auto Restart En.	Auto Restart in XX Seconds
** XX	Auto Restart En.	Auto Stop Time Min.

* This function is auto restart after power failure. Set to time in seconds to activate this function. Setting to "0" de-activates function.

** Auto time out, in minutes, after unloaded for set period of time. Compressor stops and displays "STDBY" (STANDBY) and will restart on falling pressure below "LOAD" set point.

Time can be set between 5 and 240 minutes.

Settings may be changed by pressing UP or DOWN button until desired valve shows on display. Press "STOP" to set new value. Display will stop flashing.

After desired parameters are set, push reset to return to normal display.

NORMAL START

When "READY" is indicated on display and "START" button is pushed, unit will immediately start and load after 3 seconds. If system pressure is above cut-in pressure, display will show "STDBY". Unit will start when pressure falls below cut-in pressure.

NORMAL STOP

When "STOP" button is pushed, stop sequence will commence. Unit will continue to run for 10 seconds while unload and blow down commence. The unit will stop after 10 seconds, display will show "blodn" until unit sump pressure drops below 40 psi. Display will indicate "READY".

EMERGENCY STOP

Unit will stop immediately.

FAULT CONDITIONS

ALARM

The following indications will be observed; however, the compressor will continue to operate:

DISPLAY	LED	CONDITION
	(FLASHES SLOWLY)	
Act. Press.	Sump Press.	High Sump Press. Alarm
Act. Temp.	Comp. Temp.	High Disch. Temp. Alarm
Act. Diff.	Line Press/ Press. Alarm	High Sep. Diff. Press Alarm
"dpAir"		High Inlet

		Filter Diff. Pressure
"dpOil"		High Oil Filter Diff. Pressure
*Oil	Service Hrs	Oil Life Expired
*Fltrs.	Service Hrs	Filter Life Expired
FEFLT		Metal in Oil (Optional)

*** LED and Display flash alternately.**

The following faults will be indicated and cause unit to shut down or not start:

DISPLAY	**LED**	**CONDITION**
	(FLASHES RAPIDLY)	
Act. Press.	Sump Press.	High Sump Pressure
Act. Temp.	Comp. Temp.	High Disch. Temp.
Act. Diff.	Line Press./ Sump Press.	High Sep. Diff. Press.
"TRIP"	Motor Overload	Motor Over-load
---	Sump/Comp. Pressure	Transducer Fault
---	Comp. Temp.	Temp. Probe Fault

Each of the above alarms/fault conditions indicate that the compressor is being operated at or near its designed parameters. Each of the above alarms will require service or maintenance personel to locate the source causing the alarm, repair and reset the compressor returning it to normal operating condition.

Pressing the "Reset" button on the face of the controller will allow the unit to be restarted in most cases, should the unit shut down because of a fault.

To reset the service hours for oil or filters see the "Service Menu" portion of this manual.

NOTE

A MOTOR OVERLOAD "TRIP" ALARM WILL REQUIRE MANUALLY RESETTING THE OVERLOAD LOCATED IN THE STARTER ENCLOSURE.

SERVICE MENU

To set the service timers in the CompAirTroller (CAT) the service menu must be accessed. To access the menu and set times, proceed as follows.

When the compressor is stopped, the service menu is accessed by holding in both "UP"↑ and "Down"↓ arrow keys simultaneously for ten (10) seconds. When all LED's flash, push "UP" ↑ arrow key until "18" shows in display, then push "STOP" key until display stops flashing. Display will alternate between timer and hours remaining, until service is required.

DISPLAY	**LED**	**FUNCTION**
FLTRS/XXXX	Service Hours	Filter Service Hours
OIL/XXXX	Service Hours	Oil Service Hours

To set hours push "UP" ↑ or "DOWN"↓ key until desired hours are shown on display, then push "STOP" button to set. After desired values are displayed, push "RESET" to exit menu. Menu will be canceled after 60 seconds if no key activity is performed.

FACTORY MENU

In the event that a CompAirTroller (CAT) has to be replaced additional programming to that done by user and service personnel is required.

After the unit is powered up the "Factory Menu" is accessed by holding in both "UP"↑ and "DOWN"↓ arrow keys simultaneously for ten (10) seconds. When all LED's flash, push "UP" ↑ arrow key until "48" shows in display, then push "STOP" key until display stops flashing.

The Factory Menu can now be observed by pushing the Select Button.

DISPLAY	**LED**	**FUNCTION**
PSI/bar	Line Pressure	Pressure Units
FAHr/cELS	Compressor Temperature	Temperature Units
XXXX	Compressor Temperature	Alarm Temperature
*AlAr/Coutr		Aux. Contact Configuration
tP-XX		Compressor Configuration Model (Ref. Table B)
Stopt/XXX		Stop Delay after Stop pushed (Normal Stop)
Total/XXXX	Running/Loaded Hours	Hour Meter
Load/XXXX	Running/Loaded Hours	Hour Meter

Scroll through the menu by pushing select and set the following function. Setting the functions is done by pushing the "UP" ↑ and "DOWN"↓ arrow keys.

- Pressure Units
- Temperature Units
- Compressor Configuration Model Number (see table on next page)
- Total Hours
- Loaded Hours

The stop delay may be altered if other than the normal ten seconds is desired.

* The auxiliary contact configuration is used when a sequencer is used or remote annunciation is required.

Coutr	For sequencer use
AlAR	For alarm circuit

Push reset after above parameters are entered to exit menu.
Set service timers by entering service menu.

Display will indicate "READY". Unit is ready to start.

COMPRESSOR CONFIGURATION MODELS
(FACTORY PRESET PARAMETERS)

TABLE B

Model	Y/D Time	Blow Down Time	Unload Time Before Stop	P Load	P Unload	P Max	Design Press. Limit	Run on Time	Accel. Time	Starts per Hour	Max. Temp
1	2.0	10	10	90	100	125	110	15	3	4	230
2	4.0	10	10	90	100	125	110	5	2	8	230
3	1.0	10	10	90	100	125	110	5	2	8	230
4	2.0	10	10	100	110	135	120	15	3	4	230
5	4.0	10	10	100	110	135	120	5	2	8	230
6	1.0	10	10	100	110	135	120	5	2	8	230
7	2.0	10	10	115	125	150	135	15	3	4	230
8	4.0	10	10	115	125	150	135	5	2	8	230
9	1.0	10	10	115	125	150	135	5	2	8	230
10	2.0	10	10	140	150	175	160	15	3	4	230
11	4.0	10	10	140	150	175	160	5	2	8	230
12	1.0	10	10	140	150	175	160	5	2	8	230

SECTION III
SPECIFICATIONS - GENERAL

MODEL	CL15SS,CUB	CL20SS,CUB	CL25SS,CUB	CL30SS,CUB
Type	Rotary Screw	Rotary Screw	Rotary Screw	Rotary Screw
Stages	One	One	One	One
Type of Drive	Belt	Belt	Belt	Belt
Motor Shaft Speed, RPM	1750	1750	1750	1750
Male Rotor Speed, RPM (100 psi)	2140	2790	3454	4158
Female Rotor/Fan Speed RPM (100 psi)	1427	1853	2300	2769
Male Rotor Speed, RPM (125 psi)	1890	2434	3013	3742
Female Rotor/Fan Speed RPM (125 psi)	1260	1621	2006	2492
Male Rotor Speed, RPM (150 psi)		2112	2672	3341
Female Rotor/Fan Speed RPM (150 psi)		1406	1779	2225
Rated Delivery, CFM at 100 psi	65	85	105	125
Rated Delivery, CFM at 125 psi	57	68	90	110
Rated Delivery, CFM at 150 psi		50	75	95
Minimum Working Pressure, (psi Gage)	80 (5.44)	80 (5.44 Bar)	80 (5.44 Bar)	80 (5.44 Bar)
Minimum Pressure Valve Set, (psi Gage)	70 (4.76 Bar)	70 (4.76 Bar)	70 (4.76 Bar)	70 (4.76 Bar)
Oil Reservoir Capacity, U.S. Gallon	3.5	3.5	3.5	3.5
Air Receiver - Oil Reservoir Maximum Working Pressure (psi Gage)	200	200	200	200
Pressure Relief Valve Setting	170	170	170	170
Oil Filter Change Interval, Hours	1000	1000	1000	1000

Air Cleaner Type..... Dry Type
Air Cleaner Change Interval, Hours..... As Required

NOTICE

OBSERVE THE AIR CLEANER RESTRICTION INDICATOR. CHANGE ELEMENT WHEN INDICATOR SHOWS RED. UNDER DIRTY OPERATING CONDITIONS, THE AIR CLEANER ELEMENT WILL REQUIRE CHANGING MORE OFTEN.

CAUTION

CONDITIONS IN WHICH THE UNIT IS RUNNING MAY REQUIRE CHANGING THE OIL FILTER MORE OFTEN. ALWAYS RENEW THE OIL FILTER AT EACH OIL CHANGE.

An oil filter restriction indicator is provided so that the pressure drop across the filter, (filter condition) may be checked. When/if the indicator shows red, (rated pressure, normal operating temperature) change the filter.

Oil Separator Element Change Interval……as required.

An oil separator restriction indicator is provided so that the pressure drop across the separator element may be checked.

CAUTION

ALWAYS CHECK THE SEPARATOR DRAIN LINE, DRAIN LINE CHECK VALVE (INSTALLED POSITION AND CONDITION) AND DRAIN LINE FILTER FOR DAMAGE OR PLUGGING BEFORE CONDEMNING A SEPARATOR ELEMENT.

OBSERVE THE SEPARATOR ELEMENT RESTRICTION INDICATOR.

IF THE INDICATOR SHOWS RED, RENEW THE SEPARATOR ELEMENT. (RATED PRESSURE, NORMAL OPERATING TEMPERATURE.)

LUBRICATION - COMPRESSOR

The useful life of compressor oil depends on the quality of the oil and the conditions in which the unit is operating.

For these reasons oil and oil filter change intervals are to be determined by oil sampling and analysis.

Oil sampling and analysis is recommended every 200 hours or compressor operation at least until an oil/oil filter change pattern or schedule is established.

The quality of the oil is left to the oil manufacturer.

The responsibility for testing and evaluating useful oil life is left to the oil manufacturer and/or the compressor end user.

It is recommended that LeROI SSL-50 or (partial synthetic) SSL-46 synthetic lubricant be used.

Either of these lubricants may be obtained, conveniently packaged, from your nearest LeROI distributor.

If SSL-50 or SSL-46 is not available, contact your local lubricant supplier for a lubricant which meets the specifications in Table I.

LUBRICATION - ELECTRIC MOTOR

Refer to the motor manufacturer's recommendation for motor bearing lubrication.

TABLE 1
TYPICAL LUBRICANT SPECIFICATIONS

Non-Detergent Turbine or Hydraulic Oil or Synthetic PAO (polyalphaolefin) Lubricant
Viscosity at 100°F.....160-200 SSU
Viscosity at 0°F .....11,000 SSU or Less
Minimum Viscosity Index 90
Pour Point, °F..20° lower than lowest expected starting temperature Minimum Flash Point, °F..400
Rust Inhibitor....SSTM, D665 (latest) No rust after 24 hours sea water Oxidation Inhibitor....ASTM, D943 (latest) Neutral No. 2.0 or less after 1000 hours
Anti-Foam Additive.....ASTM, D892 (latest) 3 cycles stability nil

SECTION IV
INSTALLATION
CL15-30 SS, CUB

MOUNTING AND SPACE REQUIREMENTS

A suitable smooth floor should be provided for placing the compressor.

A special foundation is not required unless the floor or other mounting surface is extremely rough or unable to support the weight of the unit. The unit should sit level. It is advisable to use shims, as required, to make certain the tank feet (or Bed plate) are resting firmly on the mounting surface.

If there is danger of the unit being moved out of position for any reason, it may be loosely bolted to the mounting surface.

Adequate space must be provided to service the unit once it is installed. All units must be positioned at least 24" away from a wall or other obstruction on all sides to allow adequate cooling air circulation and service access.

Table II shows the approximate overall dimensions and weights which may be used for selecting a suitable location for the compressor.

TABLE II
DIMENSIONS AND WEIGHTS
TANK MOUNT (120 GAL.)

MODEL	LENGTH, IN.	WIDTH, IN.	HEIGHT, IN.	WEIGHT, LBS.
CL15SS,CUB	69.0	33.43	62.43	1075
CL20SS,CUB	69.0	33.43	62.43	1125
CL25SS,CUB	69.0	33.43	62.43	1175
CL30SS,CUB	69.0	33.43	62.43	1200
		BED PLATE MOUNT		
CL15SS,CUB	50.0	33.42	34.0	700
CL20SS,CUB	50.0	33.42	34.0	750
CL25SS,CUB	50.0	33.42	34.0	800
CL30SS,CUB	50.0	33.42	34.0	825
		ENCLOSED		
CL15SS,CUB	54.5	49.0	40.0	860
CL20SS,CUB	54.5	40.0	40.0	1002
CL25SS,CUB	54.5	49.0	40.0	1144
CL30SS,CUB	54.5	49.0	40.0	1286

ELECTRICAL SUPPLY

An adequate electrical power supply of the correct voltage must be provided. All control enclosure wiring has been completed at the factory. This includes magnetic starter wiring for units furnished with starter. Units furnished without a starter require wiring the starter on the job site.

The electrical supply should be equipped with a fused line disconnect switch or circuit breaker so that electrical power may be disconnected while the unit is being serviced.

The fuse line disconnect should be located and mounted in accordance with all state, local and national regulations.

The unit must be properly grounded to provide adequate ground fault protection. As a guide, it is suggested that the ground wire be equal in size to one of the conductors which feeds the compressor motor circuit. Make certain

the ground wire connections are clean and tight.

The wire used to feed the compressor circuit should be selected and sized based on the following conditions:

1. Motor full load amperage plus service factor.
2. Ambient temperature in the area where the wire is located.
3. Length of wire
4. Insulation type

This information may be found in the latest edition of the National Electrical Code.

When installing a unit in a "Hazardous Location"; that is in a location where fire or explosion is a definite hazard, refer to the appropriate section of the National Electrical Code for further information.

CAUTION

IN ALL CASES, THE LOCAL, STATE, AND NATIONAL ELECTRICAL CODES MUST BE STRICTLY FOLLOWED.

AIR SUPPLY TO COMPRESSOR (COOLING AND COMPRESSION)

Air supplied to the compressor should be free of contaminants such as paint spray mist and vapors, and other chemical vapors as well as normally air borne dust and dirt particles.

Inlet air to the unit may vary slightly in temperature without adversely affecting the performance of the compressor. However, ambient air temperature should be maintained between 32° and 100°F to obtain desirable performance.

The air filter supplied with the compressor has an adequate flow capacity for most applications. In particularly dirty locations clean air may be ducted in from a clean air source or special air cleaners may be installed. Generally, most adverse conditions may be overcome by regular servicing of the filter furnished with the unit.

When bringing outside air into the compressor building for cooling and/or compression the air inlet to the compressor building should be located away from contaminants such as engine exhaust, gases, steam and other harmful vapors.

Also, the opening to the building must be protected from rain, snow and other air borne debris by hoods as well as being located above the ground/roof to prevent other foreign matter pick up. For a typical ducting arrangement refer to Figure 10.

Both inlet and outlet ducts must be sized so that they are restriction free. Where ambient temperatures are below 32°F (inlet air) the temperature may be tempered by controlled recirculation. This may be accomplished by using adjustable louvers (or duct dampers) to admit warm air from the outlet duct back into the inlet duct at a controlled rate.

If duct filters are used, the filters must be restriction free. Typical furnace filter material may be used.

Table III shows the air flow in cubic feet per minute (CFM) required for cooling:

TABLE III

MINIMUM COOLING AIR FLOW

MODEL	**FLOW, CFM**
CL15SS,CUB	1900
CL20SS,CUB	2650
CL25SS,CUB	3300
CL30SS,CUB	3850

DISCHARGE PIPING

It is recommended that all bed plate units be equipped with a system receiver or storage tank. The nominal size of the storage tank should be 200 gallons.

WARNING

THE SYSTEM STORAGE RECEIVER MUST BE EQUIPPED WITH A PRESSURE RELIEF VALVE WITH THE CORRECT PRESSURE RELIEF SETTING AND FLOW CAPACITY. THE RELIEF SETTING MUST NEVER EXCEED THE MAXIMUM ALLOWABLE WORKING PRESSURE AS STATED ON THE VESSEL NAMEPLATE.

THIS IS A REQUIREMENT OF THE ASME CODE AND STATE REGULATIONS TO PREVENT AN OVER PRESSURE CONDITION WHICH COULD CAUSE PERSONAL INJURY OR DEATH.

A tank mounted compressor should be located as near the air usage point as possible. Piping should be as short and as direct as possible with a minimum number of elbows and fittings. Never reduce aftercooler or discharge line size. Never install dryers or filters (except a moisture separator on aftercooled units) in the aftercooler or discharge line.

Manual shut off valves should also be included in the service piping so that the compressor and/or system receiver may be isolated from the rest of the system to permit servicing the compressor.

It is also necessary to install a drop leg and valve in the service piping. Refer to Figure 10 for a typical piping arrangement.

All piping must be adequately supported to prevent excessive strain on the compressor, receiver, or plant storage receiver.

CHECKS TO BE MADE AT INITIAL START UP

1. Make certain that all electrical and air connections have been properly made.
2. Check the compressor reservoir oil level and correct as required. (Use correct type of oil)
3. Close the line disconnect switch.
4. Jog the compressor motor by actuating the START switch and immediately pushing the STOP switch. Observe the air end for correct rotation.

NOTICE

ROTATION OF THE AIR END IS CORRECT WHEN THE <u>INPUT DRIVE</u> SHAFT TURNS COUNTER CLOCKWISE WHEN VIEWING THE AIR END FROM THE DRIVESHAFT END. (FAN - CLOCKWISE).

If rotation is incorrect, open the line disconnect switch and rewire the power feed line at the compressor to obtain correct direction of rotation. After rewiring return to Steps 3 and 4 to double check rotation and correct as required.

5. Close the system isolation valve.
6. Open the drop leg valve.

WARNING

AIR ESCAPING TO ATMOSPHERE IS NOISY. ALWAYS WEAR EAR PROTECTION TO PROTECT HEARING AGAINST HIGH INTENSITY NOISE.

7. Start the unit.
8. Slowly close the system drop leg valve and observe that when the system receiver pressure reaches the full unload pressure (110, 120, 135, or 160 psi) the unit is fully unloaded (no additional increase in receiver pressure; intake valve closed) the blow down (dump) valve has opened lowering unit receiver pressure.
9. Slowly open and close the drop leg valve to cycle the controls. If the controls operate as described, the unit is ready for use.

BE ALERT!

A CAREFUL OPERATOR

IS THE BEST INSURANCE

AGAINST AN ACCIDENT!!

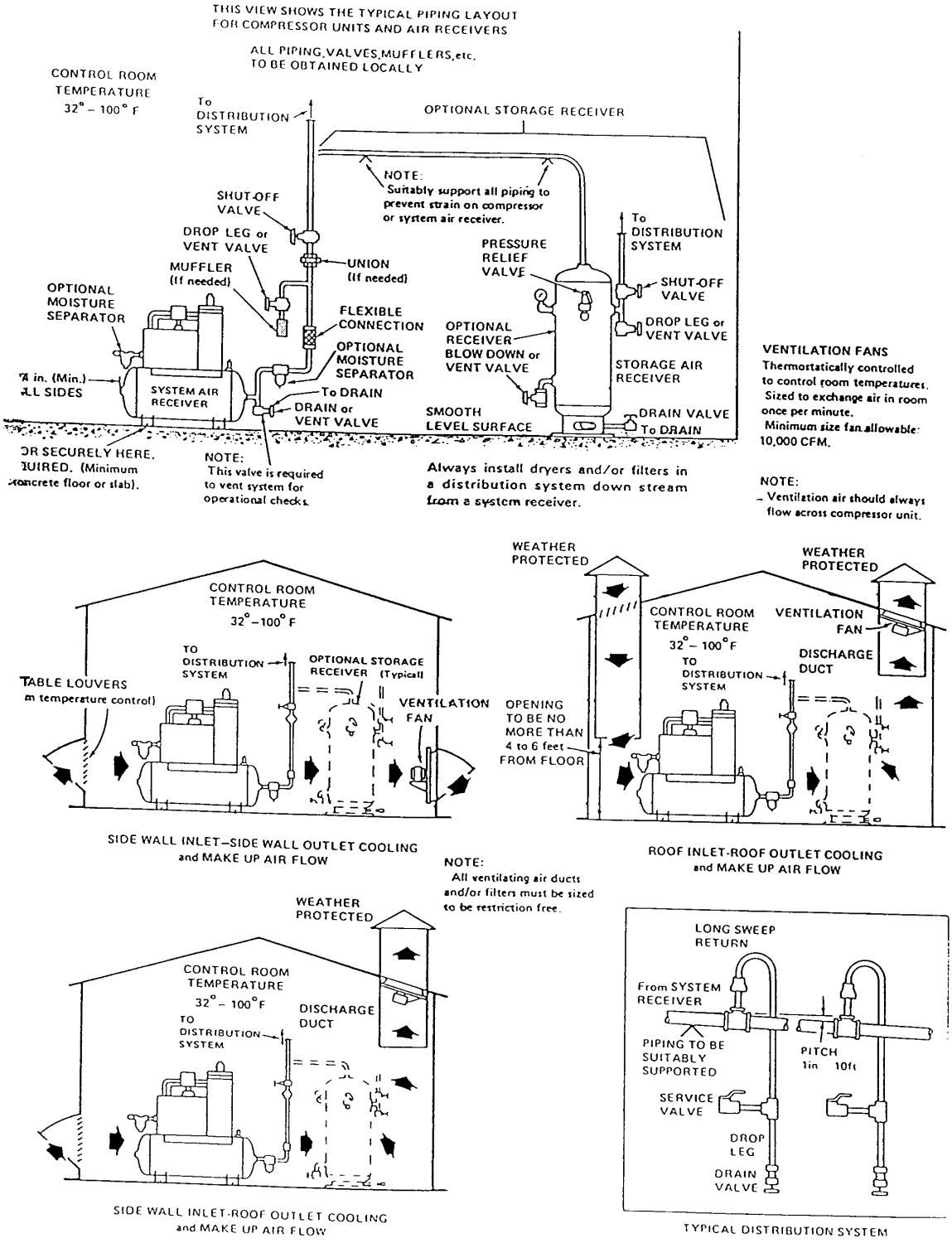


FIGURE 10 - INSTALLATION DIAGRAM

SECTION V
OPERATION AND PREVENTIVE MAINTENANCE

Satisfactory performance of a stationary screw air compressor requires a good preventive maintenance program.

The following information is provided as a guide for such a program.

START UP

Daily start up may be accomplished as follows:

1. Drain the condensate (water) from the oil reservoir. Close the drain valve securely when oil appears.
2. Check the compressor oil reservoir oil level.

NOTICE

THE RESERVOIR IS FULL WHEN THE OIL LEVEL REACHES THE BOTTOM OF THE FILLER HOLE. IF OIL COVERS THE SIGHT GAGE IT IS SAFE TO OPERATE THE UNIT.

3. Operate the air receiver-oil reservoir pressure relief valve manually to make certain it will open.
4. Make certain adequate ventilation is provided.
5. Open the service valve which connects the unit to the system receiver (distribution piping) and actuate the START switch to start the unit.
6. Observe all indicators and gages for proper reading. If the indicators read normally, the unit may be continued in service.

SHUT DOWN

1. Allow the unit to fully unload.
2. Push the stop switch to shut the unit down.

PREVENTIVE MAINTENANCE

Regular testing of oil as specified in the following maintenance guide is intended to assist in establishing oil and oil filter change intervals.

It is possible, however, to obtain information about the wear characteristics of the machine with continued oil testing. The oil test performed should include analyzing the particulate matter in the oil sample, as well as testing for oxidation inhibitors and anti-rust additives.

As an example, an increase in cast iron particles in an oil sample may give advance warning of excessive wear. This information could possibly prevent damaging the entire unit beyond repair, without periodic disassembly and visual inspections.

Normally the oil analysis sheet will list the results of the oil test, in addition to recommendations of the analyzing laboratory showing what maintenance is required.

The following information is furnished as a guide to the critical limits of items which are listed in an oil analysis sheet.

Viscosity increase.....10% over new oil
Neutral No. Increase.....0.5% over new oil
Total solids by weight 0.21%
Oxidation, by weight, oxidized material..11%
Sediment, by volume 0.21%
Water, by volume 0.5%

DAILY

1. Check the air cleaner and service as required.

NOTICE

ALWAYS DRAIN CONDENSATE AFTER THE UNIT HAS BEEN SHUT DOWN FOR A REASONABLE LENGTH OF TIME (USUALLY OVER NIGHT) ALLOWING THE WATER TO SETTLE.

2. Check the compressor oil reservoir oil level. Add correct type of oil as required**. DO NOT OVER FILL.**

NOTICE

FILL UNTIL OIL REACHES THE BOTTOM OF THE FILLER HOLE. OIL MUST BE ADDED IF IT DOES NOT COVER THE SIGHT GAGE.

3. Operate air receiver - oil reservoir and system receiver pressure relief valves manually to make certain they operate properly before starting the unit.
4. Visually inspect all air and oil lines and fittings for leaks. This includes the air cleaner and any inlet piping of the air induction system. Correct leaks as required.
5. Start and run the unit at rated full load pressure long enough to reach normal operating temperature.
6. Observe the air cleaner restriction indicator. If the restriction indicator shows a red “flag”, the air cleaner element must be cleaned or renewed.
7. With the unit running, observe the oil filter restriction indicator. If indicator shows red, replace filter.
8. With the unit running, observe the separator element restriction indicator. If the indicator shows red it indicates the separator element is restricted. If the restriction is caused by dirt or other foreign matter, renew the separator element.

NOTICE

OIL SATURATION CAN CAUSE EXCESSIVE RESTRICTION ACROSS A SEPARATOR ELEMENT. ALWAYS CHECK THE SEPARATOR DRAIN TUBE AND LINE. THE CHECK VALVE (INSTALLATION AND CONDITION) AND CLEAN THE DRAIN LINE FILTER BEFORE CONDEMNING A SEPARATOR ELEMENT.

EVERY 200 HOURS

1. Repeat daily service as applicable.
2. Remove surface dirt and dust from the exterior surfaces of the oil cooler and aftercooler, if required. (Air cooled units)
3. Obtain an oil sample from the compressor oil system and have the sample analyzed for condition. Change oil and oil filter, if required, based onresults of the oil analysis.

NOTICE

OIL SAMPLES MAY BE OBTAINED FROM THE OIL RESERVOIR (AT FILLER, NOT DRAIN) OR FROM THE OIL SYSTEM SAMPLE VALVE LOCATED NEAR THE OIL FILTER.

EVERY 1000 HOURS

1. Repeat Daily and 200 hour service as applicable.
2. Change compressor oil filter element.

SECTION VI
CONTROLS AND ADJUSTMENT PROCEDURES

CONTROLS

Adjustment to all controls are made very carefully at the factory. However, it may be necessary to make certain adjustments at the time the unit is installed, to fit specific applications, or after repair or replacement of components.

The control pressure regulator valve (CPR) is the only control device which may require adjustment.

CAUTION

DO NOT EXCEED THE RATED MAXIMUM FULLY LOAD OPERATING PRESSURE OF ANY UNIT. REFER TO "SPECIFICATIONS", SECTION II.

MODULATING CONTROL - CONTROL PRESSURE REGULATOR (CPR) VALVE ADJUSTMENT (Figure 11)

To change the pressure at which the CPR (control pressure regulator) valve will fully unload the compressor, loosen the adjusting screw locknut and turn the adjusting screw in (clockwise) to increase of out (counterclockwise) to decrease pressure. Tighten the locknut securely when finished.

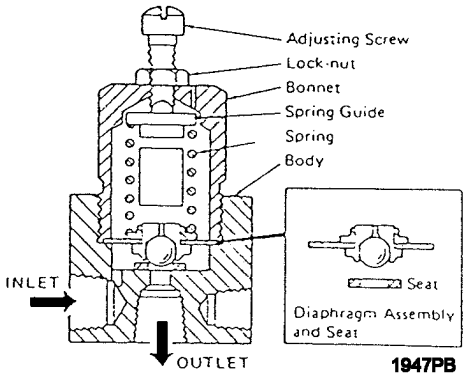


FIGURE 11 - CONTROL PRESSURE REGULATOR VALVE

Follow this procedure:

1. Install/connect pressure test gages (minimum pressure range 200 psi), if required, in place of the existing air pressure gages.
2. Connect a pressure test gage with a minimum range of 100 psi in the control pressure line near the air intake valve.

WARNING

AIR ESCAPING TO ATMOSPHERE IS NOISY. WEAR EAR PROTECTION TO PROTECT HEARING AGAINST HIGH INTENSITY NOISE.

3. Open the drop leg or receiver vent valve. Start the unit. Slowly close the drop leg or vent valve to raise both the unit and system receiver air pressure to 80 psi, approximately. Allow the unit to run long enough to reach normal operating temperature.
4. Adjust the service (drop leg or vent) valve to maintain a constant rated full load pressure. (i.e. 100, 125 or 150 psi).

CAUTION

CHECK SECTION II OF THIS MANUAL TO OBTAIN INFORMATION ABOUT MAXIMUM OPERATING PRESSURE AND AIR END SPEED.

5. Observe the pressure test gage connected in the control pressure line. Loosen the adjusting screw locknut and adjust the control pressure regulator (CPR) valve by turning the adjusting screw out (counterclockwise) until a pressure of 3 to 5 psi is observed on the control line test gage.
6. Then turn the CPR valve adjusting screw in (clockwise) far enough to obtain a control pressure of zero. (No control air bleed). Securely tighten adjusting screw locknut.
7. Cycle the controls by adjusting the service (drop leg or vent) valve to raise the lower both unit and system receiver air pressure.

Observe that the CPR valve control pressure (modulated) rises and unloads the compressor at the rated full unload pressure.

8. Shut the unit down and remove all test equipment. Restart, check for and correct any leaks.

SECTION VII
SERVICE PROCEDURES - COMPONENTS

CONTROL PRESSURE REGULATOR VALVE SERVICE (Figure 11)

The control pressure regulator valve is furnished tighter as a complete unit, or may be serviced with a diaphragm assembly and valve seat.

Installation of the diaphragm and seat may be accomplished as follows:

1. Remove the control pressure regulator from the unit. Mark all tubing disconnected to aid in correct reassembly.
2. Loosen the adjusting screw locknut and turn the screw counterclockwise to release spring pressure on the diaphragm.
3. Support the hexagon body in a bench vise or other suitable fixture. With a wrench unthread the bonnet from the body and remove the bonnet.
4. Remove the spring guide and spring from the body.
5. Remove the diaphragm assembly from the body and discard.
6. Remove the valve seat from the valve body. Discard the valve seat.
7. Clean the remaining parts thoroughly.
8. Lubricate the new valve seat with silicone grease. (Suggest Dow Corning 55M). Install the new valve set in the valve body, centered over the hole, with the small chamfer on the outside diameter down.
9. Install the new diaphragm in the body. Reinstall the spring and spring guide in the body.
10. Install the bonnet in the body and tighten securely.

The control pressure regulator valve may now be mounted on the unit and adjusted according to instructions in Section VI of this manual.

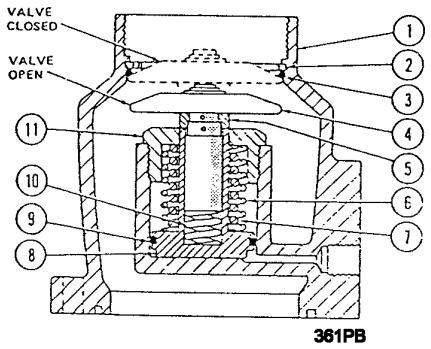
INTAKE VALVE SERVICE

The intake valve may be obtained as a complete assembly, if required. Service parts are available, however, to repair the intake valve is desired.

Do not attempt to disassemble or reassemble an intake valve while it is mounted on the air end. Loose or broken parts could accidentally drop into the air end causing further difficulty.

1. Disconnect the bypass line from the base of the air cleaner assembly and thread the air cleaner assembly out of the intake valve.

FIGURE 12 - INTAKE VALVE



1. Valve Body
2. Retainer Ring
3. Seal
4. Valve Plate
5. Spacer
6. Spring
7. Spring
8. Piston
9 Seal
10. Spring
11. Cap

2. Disconnect all control air lines (tubes) from the intake valve. **CAREFULLY MARK THESE LINES TO AID IN CORRECT REASSEMBLY**.
3. Remove the intake valve to air end attaching capscrews and remove the intake valve and gasket from the air end. Discard the gasket.

NOTICE

COVER THE AIR END INLET PORT TO PREVENT FOREIGN MATTER FROM ENTERING THE CYLINDER.

4. Using a flat bladed tool remove the valve plate seal ring (o-ring) retaining ring. Remove the seal ring. Discard seal ring.
5. Lift and remove the valve plate assembly and spring from the valve body.
6. Using the correct size socket wrench unthread and remove the piston retaining cap from the valve body.
7. Lift and remove both piston springs (one large, one small) from the valve body.
8. Lift and remove the operating piston assembly from the valve body. Remove the piston seal ring (o-ring) from the piston.
9. Thoroughly clean all parts. Make certain the air passage in the valve body and the air holes in the piston assembly are clean.
10. Inspect all parts for wear or damage. (Chipped, score marks, etc.) Replace worn or damaged parts as required.

If the valve plate assembly must be disassembled to replace parts, etc., continue with Step 11. If the valve plate assembly is suitable for reuse, proceed to Step 12.

11. To disassemble the valve plate assembly proceed as follows:
    a. Clamp the piston section of the plate assembly in a soft (wood, brass) jaw vise.
    b. With he correct size hexagon socket head capscrew (allen) wrench unthread the valve plate retaining capscrew from the piston.
    c. Remove the valve plate and spacer from the piston.
    d. Reassemble in reverse order. Make certain that the spacer is in place and that the socket head capscrew is securely tightened.
12. Install a new o-ring seal on the operating piston.
13. Lubricate the piston o-ring seal and piston bore with a silicone lubricant. (Suggest Dow corning 55M or equivalent).
14. Install the operating piston into the valve body bore. Take care not to cut or deform the o-ring seal.
15. Install the two operating piston springs into the valve body.
16. Coat the threads of the piston (spring) retaining cap with Locktite 271 or equivalent. Thread the retaining cap into the valve body and tighten securely.
17. Coat the valve plate assembly piston and valve body bore with silicone lubricant (suggest Dow Corning 55M) and install the spring and valve plate assembly into the valve body.
18. Install the valve plate seal in the valve body. Make certain that the seal ring is firmly seated in the groove. Reinstall the seal retaining ring.
19. Using a new gasket, install the intake valve on the air end. Tighten the attaching capscrews securely.
20. Reinstall the air cleaner assembly on the intake valve.
21. Reconnect all control air lines to the intake valve. Tighten all fittings securely.

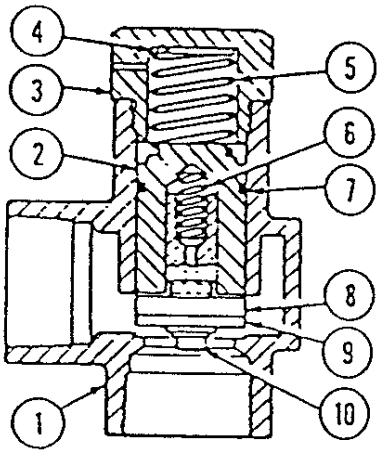


FIGURE 13
MINIMUM PRESSURE/CHECK VALVE

1. Valve Body
2. Piston
3. Cap
4. Shim
5. Large Spring
6. Small Spring
7. Seal

8,9,10. Valve Assembly

MINIMUM PRESSURE/CHECK

VALVE SERVICE

The minimum pressure valve may be purchased as an assembly if required. Service parts are available, however, to repair/overhaul this valve. This valve may be serviced as follows:

1. Remove the service control piping from the minimum pressure valve.
2. Remove the valve from the air receiver/oil reservoir cover.
3. Clamp the valve securely in a vertical position (cap end up) in a suitable fixture (bench vise).
4. With a suitable wrench remove the valve cap from the valve body.

WARNING

THE SPRING BENEATH THE CAP IS UNDER PRESSURE. EXERCISE EXTREME CARE WHEN REMOVING CAP TO PREVENT IT FROM FLYING OFF.

5. Remove the spring from the body.

NOTICE

SAVE SPRING SHIM(S), WASHERS, IF ANY, FOR REUSE.

6. Insert a suitable tool (wood stick) into the inlet port of the valve and push the piston and valve assembly upward and out of the body.
7. Remove the check valve piston from inside the larger piston. Take care not to lose the small spring.
8. Remove the o-ring seal from the large piston and discard the seal.
9. Thoroughly clean all remaining parts. Visually inspect all parts for damage or wear. Replace as required.

NOTICE

THE CHECK VALVE ASSEMBLY (ITEMS 8, 9 AND 10, FIGURE 13) IS FURNISHED ONLY AS A COMPLETE ASSEMBLY. CHECK THE PLASTIC (TEFLON) SEAT ON THE VALVE ASSEMBLY CAREFULLY FOR DAMAGE. REPLACE VALVE ASSEMBLY AS REQUIRED.

10. Install a new o-ring on the larger piston.
11. Reassemble the small check valve piston, with the spring, in the large piston.
12. Lubricate the o-ring seal on the piston with a silicone base lubricant. (Example, Dow Corning 55M).
13. Reinstall the check valve and piston assembly in the valve body. Take care not to damage the o-ring seal during installation.
14. Install the large spring in the valve body on top of the piston. Reinstall spring shim(s).
15. Lightly coat the cap thread with "Locktite" 271 (or equivalent) and install the cap (compress the spring) by threading the cap into the valve body. Torque the cap to 60-70 ft. Lbs.
16. Reinstall the minimum pressure valve on the air receiver - oil reservoir cover. Use a good grade of pipe thread sealer on all pipe threads. Tighten securely. Do not over tighten.
17. Reconnect the service and control piping to the valve using pipe thread sealer on the pipe threads. Tighten service piping securely. Do not over tighten.

BLOW DOWN (DUMP) VALVE

The blow down (dump) valve is furnished as a complete assembly. No service is required.

OIL SEPARATOR SERVICE

An oil separator element may be removed as follows:

1. Remove the separator out (service) piping separator drain piping and control piping from the air receiver/oil reservoir cover.

NOTICE

MARK OR TAG THE PIPING/FITTINGS TO MAKE CERTAIN THEY WILL BE RECONNECTED CORRECTLY.

2. Remove the receiver/reservoir cover to flange nuts and washers. Remove the cover.
3. Lift and remove the element from the air receiver/oil reservoir.

To install a new separator element, reverse the above removal sequence. Make certain the flange and cover surfaces are clean.

Make certain the element flange gaskets have a grounding staple. Torque the separator to flange capscrews evenly and securely to 44 ft. Lbs. Make certain, also, that the separator drain tube touches the bottom of the element. (Make a new tube, if necessary).

For information concerning the conditions which indicate a separator element is defective refer to the service diagnosis chart, Section VII.

DANGER

RECEIVER/RESERVOIR COVER RETAINING STUDS AND NUTS ARE SPECIAL. DO NOT SUBSTITUTE COMMON BOLTS OR NUTS IN PLACE OF THESE SPECIAL STUDS AND NUTS.

AIR END

The air end for these units is serviced only as a complete assembly using a new or factory rebuilt air end.

Parts available for field service include the input shaft rotary oil seal and the fan drive shaft rotary seal.

Rebuild kits are available for air ends exceeding the warranty period.

AIR END INPUT SHAFT OIL SEAL REPLACEMENT (Figure 14)

To replace a rotary seal, proceed as follows:

1. Loosen rocker base spring retainer and rotate motor toward the compressor to relieve drive belt tension.
2. Remove the compressor input shaft drive pulley. Remove belt guard and disconnect oil lines.
3. Remove the seal retainer (front cover) to front retainer attaching capscrews and remove the cover with outer seal. Discard outer seal.
4. Remove the oil seal assembly, including the spring and spring guide, from the input shaft.
5. Remove the oil seal face insert, with o-ring seal, from the seal retainer. Discard the face insert, with o-ring seal.
6. Thoroughly clean all remaining parts. Make certain all gasket material is removed from the seal cover and front retainer mating surfaces.
7. Lubricate the new seal face insert with clean compressor oil and install the insert in the seal retainer.
8. Lubricate the rotary seal assembly with clean compressor oil, including the carbon ring, and install the seal spring guide, spring, and seal assembly on the input shaft.

CAUTION

BE CAREFUL NOT TO SCRATCH THE SEAL FACE INSERT OR SCRATCH OR BREAK THE CARBON RING OR THE SEAL ASSEMBLY. WIPE THE LAPPED (MATING) SURFACES OF THE SEAL INSERT AND CARBON RING WITH A CLEAN LINT FREE CLOTH BEFORE INSTALLING THE SEAL RETAINER.

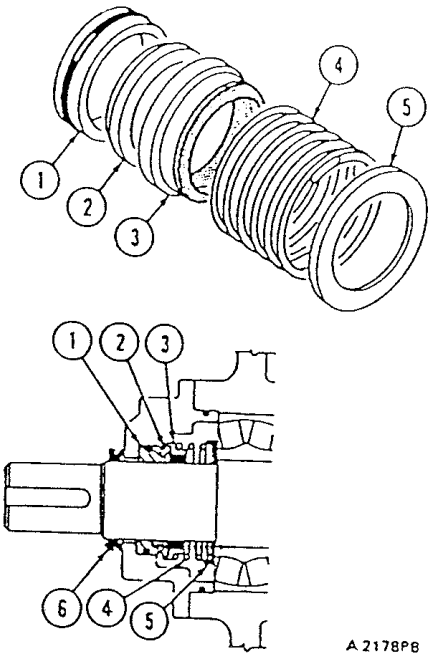


FIGURE 14
AIR END INPUT & FAN SHAFT OIL SEAL

1. Seal Face Insert
2. Carbon Ring

3. Shaft Seal Assembly
4. Spring
5. Spring Guide
6. Outer Seal

9. Using a new gasket, carefully reinstall the seal retainer, retainer capscrews and tighten securely. Install a new outer seal on the shaft. Lubricate the outer seal as necessary to make certain it slides freely on the shaft and bottoms on the seal retainer.
10. Reinstall the compressor pulley and align with motor pulley. (See Section VI, "Pulley Alignment").
11. Reinstall and tighten drive belts by repositioning the motor. (See Section VI, "Belt Tensioning").
12. Recheck pulley alignment and drive belt tension and correct as required.
13. Run the unit and check for air or oil leaks and correct as required.

FAN DRIVE SHAFT OIL SEAL REPLACEMENT (Figure 14)

The fan drive shaft rotary oil seal may be replaced as follows:

1. Remove the fan guard to shroud attaching capscrews. Remove fan guard halves.
2. Remove the shroud to frame attaching and cover bolts. Remove shroud cover and fan shroud if necessary.
3. Loosen the fan hub to fan drive shaft set screws (there are two) and pull or tap the fan off the shaft.
4. Remove the oil seal retainer to rear bearing retainer attaching capscrews and remove the seal retainer with outer seal. Discard outer seal.
5. Remove the oil seal assembly, including spring and spring guide, from the fan drive shaft. Discard the seal assembly.
6. Remove the oil seal face insert, with o-ring seal, from the seal retainer. Discard the face insert, with o-ring seal.
7. Thoroughly clean all remaining parts. (Retainer, seal cavity, shaft, etc.) Remove all traces of gasket material from the seal retainer and rear retainer mating surfaces. Check the condition of the shaft and remove all nicks and burrs.
8. Lubricate the new seal face insert with clean compressor oil and install the seal retainer.
9. Lubricate the rotary seal assembly with clean compressor oil, including the carbon ring, and install the seal spring guide, spring, and seal assembly on the fan drive shaft.

NOTICE

BE CAREFUL NOT TO SCRATCH THE SEAL FACE INSERT OR SCRATCH OR BREAK THE CARBON RING OF THE SEAL ASSEMBLY. WIPE THE LAPPED (MATING) SURFACES OF THE SEAL INSERT AND CARBON RING WITH A CLEAN LINT FREE CLOTH BEFORE INSTALLING THE SEAL RETAINER.

10. Using a new gasket, carefully reinstall the seal retainer, retainer attaching capscrews and tighten securely. Install a new outer seal on the shaft. Lubricate outer seal as necessary to make certain it slides freely on the shaft and bottoms on the seal retainer.
11. Reinstall the fan on the fan drive shaft. Tighten the fan hub set screws securely.
12. Install the shroud to frame attaching bolts and tighten securely. Reinstall fan shroud cover.
13. Reinstall the fan guard on the shroud. Tighten attaching capscrews securely.
14. Following the start up procedure, start and run the unit long enough to reach normal operating temperature. Check for and correct all leaks.

Servicing or replacement of control valves or switches, shut down switches and the oil cooler do not require specific instructions for disassembly and assembly.

WARNING

WHENEVER A UNIT IS BEING SERVICED, MAKE CERTAIN THAT AIR PRESSURE HAS BEEN BLED DOWN AND THE ELECTRICAL POWER ISOLATED FROM THE COMPRESSOR.

COMPRESSOR DRIVE SYSTEM

The V-belt drive systems installed in the CL compressor were designed for optimum

performance for specific combinations of motor horsepower and system pressure requirements. Initial belt tensioning will rapidly drop off during the first fifty to one hundred hours of compressor operation. Therefore, belt tension should be monitored daily during this period to minimize belt wear.

A belt that is too loose will slip, causing excessive heat and accelerated wear. Belts that are too tight will cause an overload condition on motor and/or compressor bearings.

BELT INSTALLATION AND ADJUSTMENT

When installing new belts, do not pry the belts over the pulley grooves. The proper installation method follows:

1. Disconnect and lock out all electrical power to the compressor.
2. Remove the front panel to allow access to the belt drive and remove the front belt guard.
3. Loosen and remove the nut from the threaded rod on the spring tensioning belt adjustment device, located next to airend on the airend mounting plate.
4. Push motor over toward the airend, allowing the complete assembly to pivot on the base. Remove the old belts.
5. Install new belts. Tilt motor assembly back away from airend as far as possible. Reinstall nut and washer on threaded rod and tighten until the bottom of the spring cover is within 1/8" - 1/4" from the pivoting airend mounting base. Check belt tension to make sure tension is correct. Loosen or tighten nut to compress spring as required.
6. Restore electrical power and restart the compressor to check correct tracking of the belts.
7. Replace the front belt guard and front panel.

PULLEY ALIGNMENT

Realignment of pulleys is not required during normal belt service, however, if pulleys, motor or airend positions are changed realignment of pulleys should be done by following method.

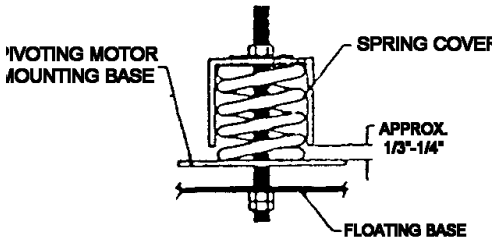


FIGURE 15

Check the pulley alignment by placing a straight edge against the side of the drive pulleys and measure to the edge of the belts at points A and B. If these two measurements are the same, the pulleys are correctly aligned.

If these two measurements are not the same, reposition the pulleys to obtain correct alignment.

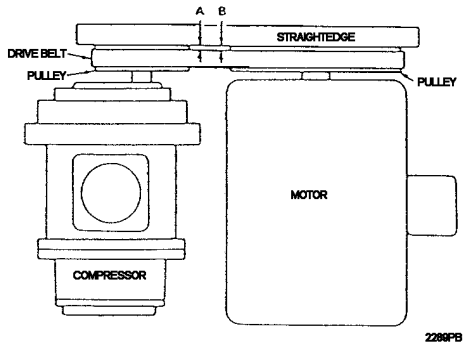


FIGURE 16

SECTION VIII
SERVICE DIAGNOSIS

MALFUNCTION	POSSIBLE CAUSE	REMEDY
Motor will not run	1. Blown branch circuit fuse.	1. Renew fuse(s).
	2. Blown line disconnect fuse or tripped circuit breaker.	2. Renew fuse(s) or reset circuit breaker.
	3. Blown control circuit fuse(s).	3. Renew control circuit fuse(s).
	4. Magnetic starter overload relay tripped.	4. Reset overload relay(s).
	5. Loose or broken wires. (Motor or control)	5. Check and repair or replace broken wire(s) and connection(s).
	6. Defective or damaged control circuit components. (Relays, temperature switches, etc.)	6. Check components. Renew as required.
	7. Damaged motor.	7. Repair or replace motor.
Air end will not rotate.	1. Defective or damaged air end.	1. Replace air end.
Motor will not rotate.	1. Defective or damaged motor.	1. Replace or repair motor.
Air end/motor will not come up to full speed before starter overload trips.	1. Low line voltage or inadequate power supply.	1. Have qualified electrician check and correct power supply.
	2. Starting against pressure. Unit receiver not blown down.	2. Check and correct cause of unit receiver not blowing down. (Blow down valve: controls).
Compressor fails to provide sufficient air for demands.	1. Clogged or restricted air filter element.	1. Clean or renew air filter element.
	2. Excessive distribution system leakage.	2. Correct air leaks as required.
	3. Air demand exceeds compressor capacity.	3. Reduce air demand. Install additional compressors.

MALFUNCTION	POSSIBLE CAUSE	REMEDY
Compressor fails continued.	4. Motor not running up to speed. 5. Drive belts loose and slipping. 6. Damaged or excessively worn intake valve. 7. Air supply to compressor room or enclosure inadequate.	4. Check power supply to motor and correct as required. 5. Replace and/or retention drive belts. 6. Repair or replace intake valve. 7. Properly ventilate compressor room or enclosure.
Compressor fails to pump (load) or is slow to load after running unloaded.	1. Control bleed orifice plugged. 2. Sticky intake valve operating parts.	1. Clean control bleed orifice. 2. Disassemble, clean or replace faulty intake valve parts as required.
Compressor stops but air receiver/oil reservoir does not blow down.	1. Faulty blow down valve.	1. Renew blow down valve.
Excessive compressor oil consumption.	1. Clogged or restricted separator drain line or filter. 2. External oil leaks. 3. Incorrect oil installed in compressor. 4. Oil reservoir over filled. 5. Low pressure operation. 6. Defective separator element.	1. Clean or replace line and/or filter. 2. Inspect for and correct all external oil leaks. 3. Refer to oil specifications. Drain unit and install correct oil. 4. Drain to correct oil level. 5. Operate at correct pressure (80 psi minimum) 6. Renew separator element.
Oil blows out blow down valve when blow down valve actuates.	1. Clogged or restricted separator drain line or filter. 2. Defective blow down valve. 3. defective separator element.	1. Clean or replace line and/or filter. 2. Replace blow down valve. 3. Replace separator element.
Air receiver-oil reservoir pressure relief valve actuates.	1. Incorrect or insufficient control pressure due to: a. Clogged or restricted	1. a. Clean replace supply

MALFUNCTION	POSSIBLE CAUSE	REMEDY
Air receiver-oil continued	control pressure regulator valve supply and control air lines.	or control lines
	b. Incorrectly adjusted control pressure regulator valve.	b. Adjust controls.
	c. Dirty, clogged, or damaged control pressure regulator valve.	c. Clean, repair or replace regulator valve.
	2. Worn or damaged intake valve.	2. Disassemble, inspect, clean and repair intake valve.
	3. Incorrect pressure relief valve installed.	3. Install correct pressure relief valve.
	4. Damaged or worn pressure relief valve.	4. Renew pressure relief valve.
	5. Restricted separator element.	5. Renew separator element.
Unit shut down caused by air end discharge or or separator out high temperature.	1. Air end discharge temperature too high due to:	1.
	a. Insufficient oil in oil reservoir.	a. Fill reservoir too correct level with recommended oil.
	b. Compressor operating above maximum recommended pressure.	b. Adjust to correct pressure.
	c. Dirty or clogged oil cooler inside or out.	c. Clean or replace oil cooler.
	2. Faulty high temperature shut down switch.	2. Renew high temperature shut down switch.
	3. Low compressor oil flow.	3.
		a. Check for restricted oil filter. Change element as required.
		b. Check for and correct cause of restriction in oil system including hoses, fitting tubes, etc.