GARDNER DENVER®

13-8-612 2nd Edition March, 1997

ELECTRA-SCREW® STATIONARY BASE-MOUNTED, BASE-MOUNTED with INTEGRATED DRYER and TANK- MOUNTED COMPRESSORS

MODELS

EBB_BB - 7.5 HP (ES-7.5)

 $EBB_CB - 10 HP (ES-10.0)$

EBB_DB - 15 HP (ESS-15.0)

PARTS LIST &
OPERATING AND
SERVICE MANUAL



TOTAL PRODUCT SUPPORT – GARDNER DENVER'S CONTINUING COMMITMENT TO YOUR AIR COMPRESSOR PERFORMANCE

Commitment to total product support continues long after the purchase of your quality Gardner Denver® rotary screw compressor.

Gardner Denver original parts incorporate years of experience and improvements in design, materials and quality assurance. Maintaining your compressor investment with Gardner Denver[®] parts will insure protection for the air compressor unit and long, dependable service life.

Your authorized Gardner Denver[®] compressor distributor maintains a complete stock of all common maintenance parts, factory approved AEON[™] lubricants, and Gardner Denver[®] factory warranted exchange air ends. In addition, authorized distributor technicians are factory trained, and can provide complete diagnostic, compressor maintenance and repair services.

This manual is designed to assist you in maintaining high performance and receiving many years of dependable service you expect from your Gardner Denver compressor.

REMANUFACTURED AIR ENDS

Whenever an air end requires replacement or repair, Gardner Denver[®] offers an industry unique, factory remanufactured air end exchange program. From its modern Remanufacturing Center in Indianapolis, IN, Gardner Denver is committed to supplying you with the highest quality, factory remanufactured air ends that are quaranteed to save you time, aggravation and money.

Immediately Available

Repair downtime costs you money, which is why there are over 200 remanufactured units in inventory at all times, ready for immediate delivery.

Skilled Craftsmen

Our Remanufacturing assembly technicians average over 20 years experience with air compression products.

Precision Remanufacturing

All potentially usable parts are thoroughly cleaned, inspected and analyzed. Only those parts that can be brought back to original factory specifications are remanufactured. Every remanufactured air end receives a new overhaul kit: bearings, gears, seals, sleeves and gaskets.

Extensive Testing

Gardner Denver[®] performs testing that repair houses just don't do. Magnaflux and ultrasonic inspection spot cracked or stressed castings, monochromatic light analysis exposes oil leaks, and coordinate measurement machine inspects to +/- .0001", insuring that all remanufactured air ends meet factory performance specifications.

Warranty

Gardner Denver backs up every remanufactured air end with a new warranty . . . 18 months from purchase, 12 months from service.

Gardner Denver remanufactured air ends deliver quality without question . . . year in and year out.

Call Gardner Denver for information on the air end exchange program and the name of your authorized distributor.

Phone Number: 800-245-4946 or

FAX: 901–542–6159

FOREWORD

Gardner Denver[®] Electra—Screw[®] compressors are the result of advanced engineering and skilled manufacturing. To be assured of receiving maximum service from this machine the owner must exercise care in its operation and maintenance. This book is written to give the operator and maintenance department essential information for day—to—day operation, maintenance and adjustment. Careful adherence to these instructions will result in economical operation and minimum downtime.

À 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.

MARNING

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.

A 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 information which is important but not hazard-related.

This book covers the following models:

HP	PSI	Air Cooled
7.5	100, 125, 150, 175	EBBQBB EBBRBB EBBSBB
10	100, 125, 150, 175	EBBQCB EBBRCB EBBSCB
15	100, 125, 150, 175	EBBQDB EBBRDB EBBSDB

TABLE OF CONTENTS

PAGE

Total Product Support – Gardner Denver's Continuing Commitment To Your Air Compressor Performance i
Remanufactured Air Endsi
Foreword ii
Maintain Compressor Reliability And Performance With Genuine Gardner Denver® Compressor Parts and Support Services
Instructions for Ordering Repair Partsiv
Indexv thru vii
List of Illustrations viii
Model EBB - 7.5, 10 & 15 HP Electra-Screw® Compressors Matrix/Menuix
Section 1, General Information
Section 2, Installation
Section 3, Starting & Operating Procedures
Section 4, Controls & Instrumentation
Section 5, Lubrication, Oil Cooler, Oil Filter & Separator
Section 6, Air Filter
Section 7, Belt Drive
Section 8, Maintenance Schedule
Section 9, Trouble Shooting
Section 10, Parts List
Section 11, Optional Integrated Dryer, Service Instructions and Parts List
Warranty Last Page

MAINTAIN COMPRESSOR RELIABILITY AND PERFORMANCE WITH GENUINE GARDNER DENVER® COMPRESSOR PARTS AND SUPPORT SERVICES

Gardner Denver[®] Compressor genuine parts, engineered to original tolerances, are designed for optimum dependability — specifically for Gardner Denver[®] compressor systems. Design and material innovations are the result of years of experience with hundreds of different compressor applications. Reliability in materials and quality assurance are incorporated in our genuine replacement parts.

Your authorized Gardner Denver® Compressor distributor offers all the backup you'll need. A worldwide network of authorized distributors provides the finest product support in the air compressor industry. Your local authorized distributor maintains a large inventory of genuine parts and is backed up for emergency parts by direct access to the Gardner Denver Machinery Inc. Master Distribution Center (MDC) in Memphis, Tennessee.

Your authorized distributor can support your Gardner Denver air compressor with these services:

- 1. Trained parts specialists to assist you in selecting the correct replacement parts.
- Factory warranted new and remanufactured rotary screw air ends. Most popular model remanufactured air ends are maintained in stock at MDC for purchase on an exchange basis with liberal core credit available for the replacement unit.
- A full line of factory tested AEON™ compressor lubricants specifically formulated for use in Gardner Denver compressors.
- Repair and maintenance kits designed with the necessary parts to simplify servicing your compressor.

Authorized distributor service technicians are factory—trained and skilled in compressor maintenance and repair. They are ready to respond and assist you by providing fast, expert maintenance and repair services.

For the location of your local authorized Gardner Denver Air Compressor distributor refer to the yellow pages of your phone directory or contact:

Distribution Center:
Gardner Denver Machinery Inc.
Master Distribution Center
5585 East Shelby Drive
Memphis, TN 38141
Phone: (901) 542–6100

(800) 245–4946

Fax: (901) 542–6159

Factory:
Gardner Denver Machinery Inc.
1800 Gardner Expressway
Quincy, IL 62301
Phone: (217) 222–5400
Fax: (217) 224–7814

INSTRUCTIONS FOR ORDERING REPAIR PARTS

When ordering parts, specify Compressor MODEL, Method of Cooling, HORSEPOWER and SERIAL NUMBER (see nameplate on unit). The Serial Number is also stamped on top of the cylinder flange to the right of the inlet housing.

All orders for Parts should be placed with the nearest authorized distributor.

Where NOT specified, quantity of parts required per compressor or unit is one (1); where more than one is

required per unit, quantity is indicated in parenthesis. SPECIFY EXACTLY THE NUMBER OF PARTS REQUIRED.

DO NOT ORDER BY SETS OR GROUPS.

To determine the Right Hand and Left Hand side of a compressor, stand at the motor end and look toward the compressor. Right Hand and Left Hand are indicated in parenthesis following the part name, i.e. (RH) & (LH), when appropriate.

INDEX

Adding/Checking Oil Level and Changing Oil 24	AUTO LEAD Button with LED 1	18
Air Control Components	Change Air Filter LED1	18
Inlet Valve	Change Separator LED	18
Intake Controller	CONSTANT RUN Button with LED	18
Minimum Pressure/Check Valve 16	High Air Temperature LED	18
Air Cooled Unit	Motor Overload LED1	18
AIR FILTER, SECTION 6	Pressure and Temperature Digital Readouts . 1	19
Air Filter	STOP/RESET Button with LED	17
Standard Duty	Control Tubing5	50
Air Filter Element	Controller	
Air Filter Element Life	Auto-Sentry S with Keypad1	17
Air Flow in Compressor System 1	Intake 1	17
Air Receiver, Auxiliary	Intake Valve	11
Air Receiver With Condensate Drain 48	Controller Assembly5	55
Air Receiver Without Condensate Drain 47	CONTROLS & INSTRUMENTS, SECTION 4 1	15
AUTO LAG Button with LED	Controls & Instruments, General	15
AUTO LEAD Button with LED	Cooling, Sealing and Lubrication	1
Auto-Sentry S Controller with Keypad 17	Daily Check1	14
Auxiliary Air Receiver	Decals6,	7
Bare Compressor	Definitions of Error Messages	19
BELT DRIVE, SECTION 7	Discharge Service Line	
Belt Tension, Checking	Drain, Oil Reservoir	9
Change Air Filter LED	Draining and Cleaning Oil System	26
Change Separator LED	Drive Group4	19
Changing Oil24	Electric Motor Grease Recommendations 1	12
Check, Daily	Electric Motor Regreasing Interval 1	12
Checking Belt Tension	Electrical Group 51 thru 5	54
Cleaning and Draining Oil System	Electrical Wiring 1	11
Cold Ambient Operation	Element, Air Filter 3	30
Cold Weather Operation10	Element Life, Air Filter3	30
Cold Weather Operation, Installation for 10	Emergency Stop Pushbutton	17
Compression Principle 1	Enclosure	9
Compressor 1	Error Messages, Definitions	19
Compressor Oil Filter	Fan Motors 5	56
Compressor Oil Separator	Filter, Air4	10
Compressor Oil System	Filter, Compressor Oil	27
Compressor Oil System Check	Foundation	9
Compressor System, Air Flow	GENERAL INFORMATION, SECTION 1	1
CONSTANT RUN Button with LED 18	Grease Recommendations, Electric Motor 1	12
Control Piping	Grounding	11
Control System Operation	High Air Temperature LED	18
AUTO LAG Button with LED	High Discharge Temperature	15

INDEX

High Discharge Temperature	Mounting Group	. 45
High Temperature Operation	Oil Changing Procedure	. 24
Hourmeter	Oil Carry–Over	. 34
Identification and Instruction Group 58, 59	Oil Change Interval	. 26
Inlet Line	Oil Filter, Compressor	. 27
Inlet Line Lengths	Oil Level, Adding/Checking Procedure	. 24
Inlet Valve	Oil Reservoir	. 27
INSTALLATION, SECTION 2 8	Oil Reservoir Drain	9
Installation, General 8	Oil Scavenge Site Glass, Oil Separator	. 28
Installation for Cold Weather Operation 10	Oil Separator	
Intake Controller	Compressor	. 27
Intake Valve Controller	Inspection	
Integrated Dryer Assembly and Piping 67, 68	Oil Scavenge Site Glass	
Integrated Dryer Installation	Removal for Inspection or Replacement	
Integrated Dryer Mounting Group 69	Oil Specifications	
Integrated Dryer Operating Instructions 60	Oil System	
Lead–Lag Operation of Two Compressors 21	Compressor	. 24
Lifting Unit	Draining and Cleaning	
Line, Discharge Service	Oil System Check	
Line, Inlet	Air and Oil Discharge Temperature	
Load–Unload Pressure Setpoints, Programming . 19	Compressor Oil Inlet Temperature	
Location 8	Oil Cooler Oil Pressure Differential	
Lubricant, Recommended	Oil Cooler Temperature Differential	
Lubricant Upgrade Procedure	Oil Inlet Pressure	
Lubrication, Motor	Operation	. 28
Lubrication, Cooling and Sealing	•	47
LUBRICATION, OIL COOLER, OIL FILTER & SEPARATOR, SECTION 5	Control System	
MAINTENANCE SCHEDULE, SECTION 8 32	High Temperature	
Matrix/Menu, Model EBB ix	Lead–Lag, of Two Compressors	. 21
Minimum Pressure, Readjustment	OPTIONAL INTEGRATED DRYER, SERVICE INSTRUCTIONS AND PARTS LIST,	
Minimum Pressure Valve	SECTION 11	. 60
Minimum Pressure/Check Valve	Overload Relay Heater Conversion	. 57
Moisture in the Oil System	PARTS LIST	
Moisture Separator/Trap, Optional	Air Filter	. 40
Motor Grease Recommendations	Air Receiver With Condensate Drain	. 48
Motor Group	Air Receiver Without Condensate Drain	. 47
Fan Motors	Bare Compressor	. 38
Main Motor	Control Tubing	
Motor Lubrication	Controller Assembly	
Motor Overload LED	Drive Group	
Motor Protection Devices	Electrical Group 51 thru	
Motor Regreasing Interval	Identification and Instruction Group	
<u> </u>		

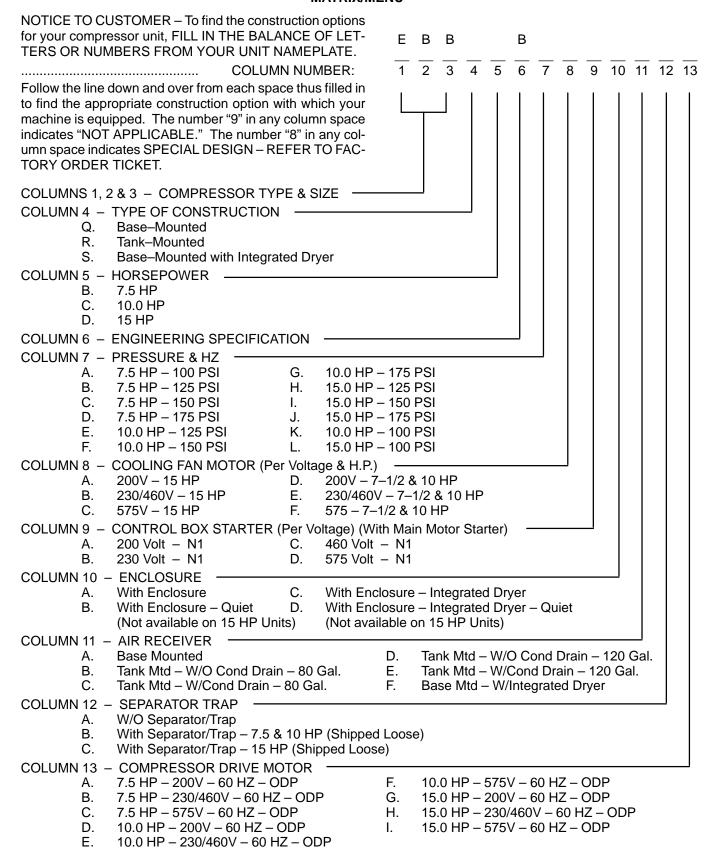
INDEX

	Inlet Valve	Repair Parts	59
	Intake Valve Controller41	Ordering Instructions	įν
	Integrated Dryer Assembly and Piping 67, 68	Reservoir, Oil	27
	Integrated Dryer Mounting Group 69	Safety Precautions4	١, 5
	Minimum Pressure Valve 42	Sealing, Lubrication and Cleaning	. 1
	Motor Group, Main & Fan56	Separator Differential Pressure	15
	Mounting Group 45	Separator/Trap, Moisture, Optional	10
	Overload Relay Heater Conversion 57	Service Check List	32
	Piping and Mounting Group 43, 44	Air Filter	32
	Quiet Enclosure	Every 1000 Hours Operation	32
	Refrigeration Components	Every 125 Hours Operation	32
	Repair Parts59	Every 2000 Hours Operation	32
	Starter/Control Box70	Every 8 Hours Operation	32
	Wiring Diagram	Every Year	32
PAF	RTS LIST, SECTION 10	Motor Lubrication	32
	ng, Control10	Oil Separator	32
	ng and Mounting Group	On All Startups or Every 100 Hours Operation	32
•	ssure and Temperature Digital Readouts 19	Specifications, Oil	24
	ssure Differential Gauging	Starter/Control Box	17
	start–Up Instructions	Auto-Sentry S Controller with Keypad	
	Air Filter	Emergency Stop Pushbutton	17
	Compressor Oil	Hourmeter	17
	Electrical	STARTING & OPERATING PROCEDURES,	40
	Enclosure	SECTION 3	
	Grounding	Starting the Unit	
	Operating Mode	Unit Cold	
	Optional Integrated Dryer 14	Unit Hot	
	Piping	STOP/RESET Button with LED	
	Rotation	Stopping the Unit	
	System Pressure	Temperature, High Discharge	
	gramming Load–Unload Pressure Setpoints 19	Thermal Control (Thermostatic Mixing) Valve	
	tective Devices	TROUBLE SHOOTING, SECTION 9	
	High Discharge Temperature	Upgrade Procedure, Lubricant	20
	Motor Protection Devices		16
	Relief Valve	Control	
	Separator Differential Pressure	Minimum Pressure	
	et Enclosure	Minimum Pressure	
	commended Lubricant		
	rigeration Components	Relief	
	reasing Interval, Electric Motor	Thermal Control (Thermostatic Mixing)	
_	ef Valve16	Warranty Last Pa	-
		_	
rten	nanufactured Air Ends i	Wiring Diagram	12

LIST OF ILLUSTRATIONS

Figure 1–1	Compressor Cycle	1
Figure 1–2	Compressor/Motor Side – Package	2
Figure 1–3	Belt Guard Side – Package	2
Figure 1–4	Controller End – Package	3
Figure 2–1	Typical Compressor Room	8
Figure 2–2	Air Flow Chart	9
Figure 2–3	Cold Weather Installation	9
Figure 4–1	Control Schematic	15
Figure 4–2	Inlet Valve	16
Figure 4–3	Minimum Pressure/Check Valve	16
Figure 4–4	Intake Controller	17
Figure 4–5	Definition of Error Messages	19
Figure 4–6	Maximum Setpoints for Auto-Sentry S Controller, PSIG	21
Figure 4–7	Auto-Sentry S Solid State Control Touch Pad	22
Figure 4–8	Wiring Diagram	23
Figure 5–1	Oil Fill	24
Figure 5–2	Approximate Oil System Capacities	25
Figure 5–3	Oil Change Interval	26
Figure 5–4	Thermostatic Mixing Valve	27
Figure 6–1	Standard Duty Air Filter	30
Figure 7–1	Belt Tension 3VX Belts	31
Figure 11–1	Compressor with Integrated Dryer	60
Figure 11–2	Temperature–Pressure Chart (R–22)	61
Figure 11–3	Adjusting Nut for Suction Pressure	61
Figure 11–4	Refrigerated Dryer	62
Figure 11–5	Suction Pressure Gauge, Dryer Inlet and Outlet	62
Figure 11–6	Condenser, Heat Exchanger, Hot Gas Bypass	63
Figure 11–7	Compressor (Refrigerated Dryer)	63

MODEL EBB - 7.5, 10 & 15 HP ELECTRA-SCREW® COMPRESSORS MATRIX/MENU



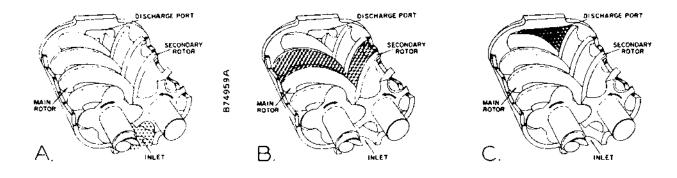


FIGURE 1-1 - COMPRESSOR CYCLE

COMPRESSOR – The Gardner Denver® compressor is a single stage, positive displacement rotary machine using meshing helical rotors to effect compression. Both rotors are supported between high capacity roller bearings located outside the compression chamber. Single width cylindrical roller bearings are used at the inlet end of the rotors to carry part of the radial loads. Tapered roller bearings at the discharge end locate each rotor axially and carry all thrust loads and the remainder of the radial loads.

COMPRESSION PRINCIPLE (FIGURE 1–1) – Compression is accomplished by the main and secondary rotors synchronously meshing in a one–piece cylinder. The main rotor has four (4) helical lobes 90° apart. The secondary rotor has six (6) matching helical grooves 60° apart to allow meshing with main rotor lobes.

The air inlet port is located on top of the compressor cylinder near the drive shaft end. The discharge port is near the bottom at the opposite end of the compressor cylinder. FIGURE 1–1 is an inverted view to show inlet and discharge ports. The compression cycle begins as the rotors unmesh at the inlet port and air is drawn into the cavity between the main rotor lobes and the secondary rotor grooves (A). When the rotors pass the inlet port cutoff, air is trapped in the interlobe cavity and flows axially with the meshing rotors (B). As meshing continues, more of the main rotor lobe enters the secondary rotor grove, normal volume is reduced and pressure increases.

Oil is injected into the cylinder to remove the heat of compression and seal internal clearances. Volume reduction and pressure increase continues until the air/oil mixture trapped in the interlobe cavity by the rotors passes the discharge port and is released to the oil reservoir (C). Each rotor cavity follows the same "fill—compress—discharge" cycle in rapid succession to produce a discharge air flow that is continuous, smooth and shock free.

AIR FLOW IN THE COMPRESSOR SYSTEM (FIGURE 4–1, page 15) – Air enters the air filter and passes through the inlet unloader valve and on into the compression chamber where oil is injected into the air. After compression, the air/oil mixture passes into the oil reservoir where most of the entrained oil is removed by velocity change and impingement and drops back into the reservoir. The air and remaining oil then passes through the air/oil separator. The air then passes through the minimum pressure/check valve, the after-cooler and the moisture separator and into the plant air lines.

LUBRICATION, COOLING AND SEALING — Oil is forced by air pressure from the oil reservoir through the oil cooler, thermostatic mixing valve, and oil filter and discharge into the compressor main oil gallery. A portion of the oil is directed through internal passages to the bearings and shaft oil seal. The balance of the oil is injected directly into the compression chamber to remove heat of compression, seal internal clearances and lubricate the rotors.

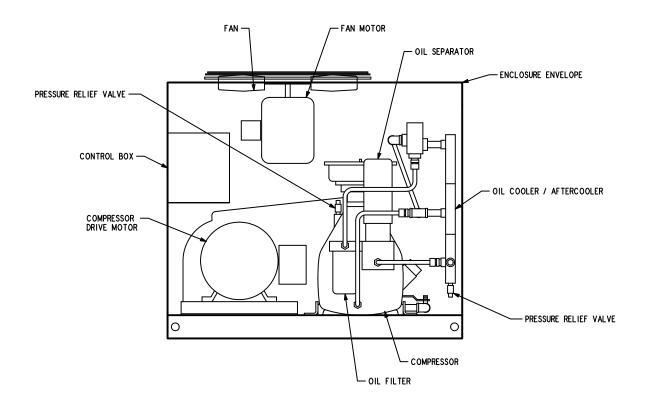


FIGURE 1-2 - PACKAGE - COMPRESSOR / MOTOR SIDE

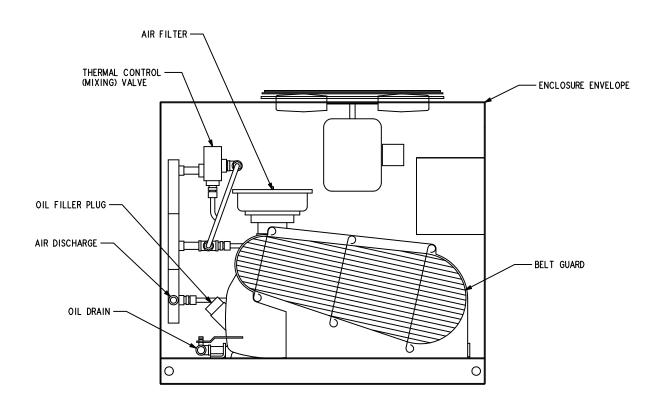


FIGURE 1-3 - PACKAGE - BELT GUARD SIDE

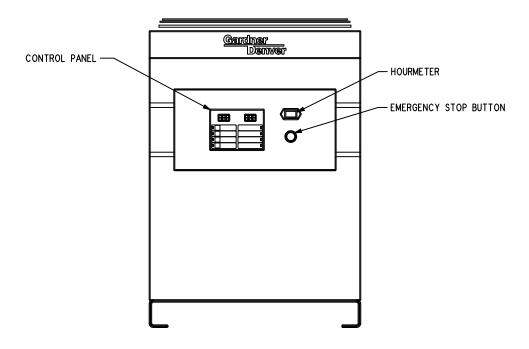


FIGURE 1-4 - PACKAGE - CONTROLLER END

SAFETY PRECAUTIONS

Safety is everybody's business and is based on your use of good common sense. All situations or circumstances cannot always be predicted and covered by established rules. Therefore, use your past experience, watch out for safety hazards and be cautious. Some general safety precautions are given below:

A DANGER

Failure to observe these notices could result in injury to or death of personnel.

- Keep fingers and clothing away from revolving fan, drive coupling, etc.
- <u>Do not use the air discharge</u> from this unit for breathing not suitable for human consumption.
- <u>Do not loosen or remove</u> the oil filler plug, drain plugs, covers, the thermostatic mixing valve or break any connections, etc., in the compressor air or oil system until the unit is shut down and the air pressure has been relieved.
- Electrical shock can and may be fatal.
- Compressor unit must be grounded in accordance with the National Electrical Code. A ground jumper equal to the size of the equipment ground conductor must be used to connect the compressor motor base to the unit base.
- <u>Fan motors must remain grounded</u> to the main base through the starter mounting panel in accordance with the National Electrical Code.
- Open main disconnect switch, tag and lockout before working on the control.
- <u>Disconnect the compressor</u> unit from its power source, tag and lockout before working on the unit this machine is automatically controlled and may start at any time.

MARNING

Failure to observe these notices could result in damage to equipment.

- Stop the unit if any repairs or adjustments on or around the compressor are required.
- Disconnect the compressor unit from its power source, tag and lockout before working on the unit this machine is automatically controlled and may start at any time.
- An Excess Flow Valve should be on all compressed air supply hoses exceeding 1/2 inch inside diameter. (OSHA Regulation, Section 1926.302)
- Do not exceed the rated maximum pressure values shown on the nameplate.
- Do not operate unit if safety devices are not operating properly. Check periodically. Never bypass safety devices.

DECALS



DISCHARGE AIR USED FOR BREATHING WILL CAUSE SEVERE INJURY OR DEATH. CONSULT FILTRATION SPECIALIST FOR ADDITIONAL FILTRATION AND TREATMENT EQUIPMENT TO MEET HEALTH AND SAFETY DEGIL ATIONS SAFETY REGULATIONS.

1 DANGER

AIR AND OIL UNDER PRESSURE WILL CAUSE SEVERE PERSONAL INJURY OR DEATH. SHUTDOWN COMPRESSOR AND RELIEVE SYSTEM OF ALL PRESSURE BEFORE REMOVING VALVES, CAPS, PLUGS, FITTINGS,BOLTS AND FILTERS.

206EAQ077

212EAQ077

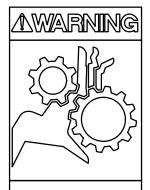
HIGH VOLTAGE, ROTATING MACHINERY, AIR AND OIL UNDER PRESSURE. IMPROPER MODIFICATION OF EQUIPMENT WILL CAUSE SEVERE PERSONAL INJURY OR DEATH.

DO NOT MODIFY UNIT WITHOUT WRITTEN PERMISSION

FROM MANUFACTURER.

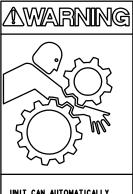
1 DANGER

218EAQ077



ROTATING MACHINERY CAN CAUSE INJURY OR DEATH. KEEP ALL GUARDS AND SAFETY DEVICES IN PLACE.

211EAQ077

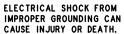


UNIT CAN AUTOMATICALLY
RESTART.
CAN CAUSE PERSONAL INJURY
OR DEATH.
KNOW MODE OF OPERATION
BEFORE WORKING ON OR
NEAR THE MACHINE.

211EAQ077

207EAQ077

DECALS



GROUND UNIT AND RELATED EQUIPMENT ACCORDING TO NATIONAL ELECTRIC CODE AND LOCAL REGULATIONS.

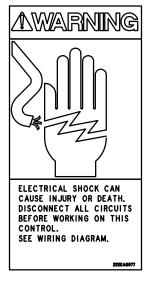


216EAQ077

AIR AND OIL UNDER PRESSURE. CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. INSPECT OIL RESERVOIR FOR CRACKS AT LEAST ANNUALLY.



217EAQ077



222EAQ077



ELECTRICAL ARCING CAN
CAUSE A FIRE WHEN UNIT IS
MOUNTED ON A COMBUSTIBLE
SURFACE RESULTING IN
PERSONAL INJURY OR
PROPERTY DAMAGE.
UNIT MUST BE MOUNTED ON
A FLOOR PLATE EXTENDING
ON ALL SIDES.
SEE INSTALLATION
DRAWING FOR PROPER DRAWING FOR PROPER DIMENSIONS. 221EA0077



208EAQ077

221EAQ077

SECTION 2 INSTALLATION

GENERAL – On receipt of the unit, check for any damage that may have been incurred during transit. Report any damage or missing parts as soon as possible.

A CAUTION

Do not electric weld on the compressor or base; bearings can be damaged by passage of current.

LIFTING UNIT – Proper lifting and/or transporting methods must be used to prevent damage. Lifting slots are provided in the base for towmotor use. Unit may also be moved into location by rolling on bars.

A CAUTION

Lift compressor unit by base only. Do not use other places such as motor, compressor or discharge manifold piping as lifting points.

À DANGER

The eyebolts or lugs provided on the motor are for lifting the motor only and should not be used to lift any additional weight. All eyebolts must be securely tightened. When lifting the motor the lifting angle must not exceed 15 degrees. Failure to observe this warning may result in damage to equipment or personal injury.

LOCATION (FIGURE 2–1) – The compressor should be installed where it is protected from rain, snow and freezing temperatures, in a clean, well–lighted, well–ventilated area with ample space all around for maintenance. Select a location that provides a cool, clean, dry source of air. In some cases it may be necessary to install the air filter at some distance from the compressor to obtain proper air supply.

AIR-COOLED UNIT – A combination oil/aftercooler is supplied as standard equipment on all air-cooled units. The air-cooled unit with the standard enclosure requires sufficient flow for the compressor oil/aftercooling system and electric motor cooling (FIGURE 2–2, page 9). Air is drawn into the unit above the motor and discharged through the cooler. Do not block the air flow to and from the unit. Allow three and one half (3–1/2) feet to the nearest obstruction on the starter end and control box end of the unit. Allow two (2) feet to the nearest obstruction above and on other sides of unit. For continuous efficiency, oil cooler cores must be periodically cleaned with either vacuum or compressed air. If wet cleaning is required, shield motor and spray on a mild soap solution and flush with clean water.

A CAUTION

Do not operate machine while the enclosure panels are not in place. High temperature shutdowns will occur.

M WARNING

For aluminum oil coolers, do not use any cleaning solution that is not compatible with aluminum. Use of improper solution may result in damage to the cooler.

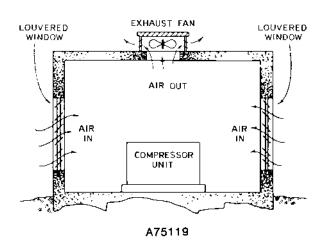


FIGURE 2-1 - TYPICAL COMPRESSOR ROOM

	ow* For Compressor Cubic Feet/Minute)
	Air Cooled
All Models	3000 cfm

* 80° F Inlet Air

FIGURE 2-2

FOUNDATION – The Electra–Screw® compressor requires no special foundation, but should be mounted on a smooth, solid surface. Whenever possible install the unit near level. Temporary installation may be made at a maximum 10° angle lengthwise or 10° sidewise. Mounting bolts are not normally required. However, installation conditions such as piping rigidity, angle of tilt, or danger of shifting from outside vibration or moving vehicles may require the use of mounting bolts and shims to provide uniform support for the base. Belt alignment and tension should be checked after installation. (For information on belt alignment and tension, see page 31.)

OIL RESERVOIR DRAIN – The oil drain is piped from the bottom of the reservoir to the side of the frame. This drain is approximately 2 inches above the floor level. If this is not sufficient to conveniently drain the oil some other methods of providing drain are:

1. Elevate the compressor unit on a suitable structure to obtain the desired drain height.

A CAUTION

If the compressor unit base is raised above floor level, the space between the floor and the base bottom must be closed with solid material all around to prevent recirculation of hot air from the oil cooler end and over temperature operation.

- 2. Construct an oil sump or trough below the floor level and pump or bail the drained oil.
- 3. Pump oil from the reservoir filler opening or drain to a container.

ENCLOSURE – The compressor, electric motor, oil cooler and aftercooler are mounted inside the enclosure

Service panels are provided for maintenance access. Be sure to allow enough space around the unit for the doors to be removed.

Any of the enclosure panels may be removed by opening the latch and lifting it up slightly.

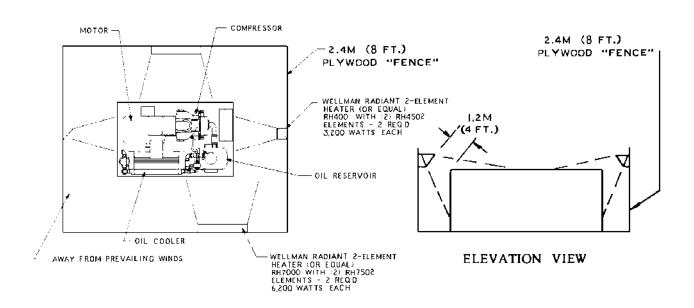


FIGURE 2-3 - COLD WEATHER INSTALLATION

À DANGER

Do not operate the compressor with the fan and belt guard removed. Exposed fan and belts may cause injury to personnel.

INSTALLATION FOR COLD WEATHER OPERATION (FIGURE 2–3, page 9) – It is recommended that the unit be installed inside a shelter that will be heated to temperatures above freezing (32°F, 0°C). This will eliminate many of the problems associated with operating units in cold climates, such as freezing in control lines and downstream of the cooler.

Refer to Engineering Data Sheet 13–9–411 for the advantages of using the heat recovered from rotary compressors. This heat recovery could easily pay for an adequate shelter for the unit.

When an outside installation must be made, the precautions required will depend on the severity of the environment. The following are general guidelines for outside installations:

Cold Weather (Down To +10°F)

- Be sure all drains, traps, and control lines, including pressure transducer lines are heated to avoid freezing of condensate. Heat tape with thermostat control is generally satisfactory for this purpose and can be obtained at various local plumbing or hardware outlets at nominal cost.
- If an air-cooled aftercooler is to be used, provisions to bypass the aftercooler must be made.
 Since cold air contains very little moisture, successful operation can be achieved without the aftercooler.
- Provide at least some simple shelter such as a plywood windbreak to protect against drifting snow.
- Use only Gardner Denver® AEON™ 9000 SP lubricant.
- 5. Monitor unit carefully during start—up and operation to be sure it is functioning normally.

Remember unsheltered (outside) installations should be avoided where possible. Installation next to a heated building where enough heat can be used to keep the compressor room above freezing will save many complications in the operation and installation of the unit.

Refer to Engineering Data Sheet 13–9–411, available from an authorized Gardner Denver distributor, for the advantages of using the heat recovered from rotary compressors. This heat recovery could easily pay for an adequate shelter for the unit.

AUXILIARY AIR RECEIVER – An auxiliary air receiver is not required if the piping system is large and provides sufficient storage capacity to prevent rapid cycling. When used, an air receiver should be of adequate size, provided with a relief valve of proper setting, a pressure gauge and a means of draining condensate.

OPTIONAL MOISTURE SEPARATOR/TRAP – The unit is equipped with a built—in aftercooler, a combination moisture separator and trap is furnished as an option to the unit. This should be piped into the system down stream of the aftercooler.

CONTROL PIPING – Control piping is not necessary since the Electra–Screw® unit is factory wired and piped for the control system specified.

INLET LINE – Where an inlet line is used between the air filter and the compressor, it must be thoroughly cleaned on the inside to prevent dirt or scale from entering the compressor. If welded construction is used, the line must be shot blasted and cleaned to remove welding scale. In either case, the inlet line must be coated internally by galvanizing or painting with a moisture and oil–proof sealing lacquer. Up to ten (10) feet in length, the inlet line should be the full size of the inlet opening on the compressor. If an extralong line is necessary, the pipe size should be increased according to Inlet Line Length Chart below.

Accessibility for inlet air filter servicing must be considered when relocating the filters from the unit to a remote location.

DISCHARGE SERVICE LINE – The discharge service line connection is made at the lower right hand corner of the cooler, viewed from the oil cooler side. A hand operated valve, (air service valve) must be installed be-

INLET LINE LENGTHS

tween the unit and the customer's air system. If a fast operating valve, such as a ball valve, is used, it must be closed slowly to give the intake valve time to shut and keep the discharge pressure from spiking. When manifolding two or more Electra—Screw® units on the same line, each unit is isolated by the check valve in the unit discharge line. If an Electra—Screw® unit is manifolded to another compressor, be sure the other compressor has a check valve in the line between the machine and the manifold. If an Electra—Screw® and a reciprocating compressor are manifolded together, an air receiver must be located between the two units.

🛕 DANGER

Discharge air used for breathing will cause severe injury or death.

Consult filtration specialists for additional filtration and treatment equipment to meet health and safety standards.

ELECTRICAL WIRING – Standard Units – The Electra–Screw® compressor is factory wired for all starter to motor and control connections for the voltage specified on the order. It is necessary only to connect the unit starter to the correct power supply. The standard unit is supplied with an open drip–proof motor, a NEMA 1 starter and control enclosure. See "Location", page 8, for the distance to the nearest obstruction on the starter and control box sides of the unit.

Terminals for incoming power are located on the contactor behind the fan motor fuse block. To remove the fuse block, locate the locking tab on the back side and press forward, then slide the fuse block up and off of the contactor. Connect incoming power leads to L1, L2 and L3 on the contactor. Replace the fuse block by sliding back down on the mounting track until the locking tab snaps and hold it in place.

MARNING

Do not connect incoming power to the fan motor fuse box.

The overload heaters are to be selected according to starter manufacturer's tables, which are attached to the inside of the control box, based on motor nameplate full load amperage.

MARNING

Electrical shock can cause injury or death. Open main disconnect switch, tag and lockout before working on starter/control box.

GROUNDING – Equipment must be grounded in accordance with Section 250 of the National Electrical Code.

MARNING

Failure to properly ground the compressor package could result in controller malfunction.

MOTOR LUBRICATION – Long time satisfactory operation of an electric motor depends in large measure on proper lubrication of the bearings. The following charts show recommended grease qualities and regreasing intervals for ball bearing motors. For additional information refer to the motor manufacturer's instructions. The following procedure should be used in regreasing:

- 1. Stop the unit.
- 2. Disconnect, tag and lockout the unit from the power supply.
- 3. Remove the relief plug and free hole of hardened grease.
- 4. Wipe lubrication fitting clean and add grease with a hand–operated grease gun.
- 5. Leave the relief plug temporarily off. Reconnect unit and run for about 20 minutes to expel the excess grease.
- 6. Stop the unit. Replace the relief plug.
- 7. Restart the unit.

MARNING

Rotating machinery can cause injury or death. Open main disconnect, tag and lockout power supply to the starter before working on the electric motor.

ELECTRIC MOTOR GREASE RECOMMENDATIONS

	Standard Service	High Temperature
Worked Penetration	265–296	220–240
Grease Viscosity, SSU At 100°F	400–550	475–525
Soap Type	Lithium	Lithium
N–H Bomb, Minimum Hours For 20 PSI Drop at 210°F	750	1000
Bleeding, Maximum Weight % In 500 Hours 212°F	10	3
Rust Inhibiting	Yes	Yes

ELECTRIC MOTOR REGREASING INTERVAL

Type of Service	Typical Examples	Rating	Relubrication Interval
Standard	One- or Two-Shift Operation	150 HP & Below	18 Months
Severe	Continuous Operation	150 HP & Below	9 Months
Very Severe	Dirty Locations, High Ambient Temperature	150 HP & Below	4 Months

SECTION 3 STARTING & OPERATING PROCEDURES

PRESTART-UP INSTRUCTIONS – A new unit as received from the factory has been prepared for shipping only. Do not attempt to operate the unit until checked and serviced as follows:

Compressor Oil – The oil must be checked before starting the unit and every 100 hours of operation. For instructions on checking the oil and the proper oil level, refer to Section 5, page 24.

Do not mix different type oils. Unit is shipped filled with Gardner Denver® AEON™ 2000 Lubricating Coolant which is suitable for the first 2000 hours under normal operating conditions. AEON™ 4000 and AEON™ 9000 SP are also available. Check the decal on the reservoir to be sure which lubricant is in the machine.

REPLACE OIL FILTER EVERY 1000 HOURS.

NOTICE

Regular maintenance and replacement at required intervals of the oil filter, air filter and air-oil separator is necessary to achieve maximum service and extended drain intervals of AEON™ 2000 lubricant. Use only genuine Gardner Denver filters designed and specified for this compressor.

À DANGER

Always stop the unit and release air pressure before removing oil filler plug. Failure to release pressure may result in personal injury or death.

During unloaded operation and after shutdown, the system will partially drain back into the oil reservoir and the oil level may read higher than when operating on load. DO NOT DRAIN OIL TO CORRECT; on the next loaded cycle or start, oil will again fill the system.

 Air Filter – Inspect the air filter to be sure it is clean and tightly assembled. Refer to Section 6, "Air Fil-

- ter," page 30, for complete servicing instructions. Be sure the inlet line, if used, is tight and clean.
- 3. **Piping** Refer to Section 2, "Installation," and make sure piping meets all recommendations.
- Electrical Check the wiring diagrams furnished with the unit to be sure it is properly wired. See FIGURE 4–8, page 23, for general wiring diagrams and Section 2, page 8 for installation instructions. If the unit has optional integrated dryer, see Section 11, page 60.
- Grounding Unit must be properly grounded according to Section 250 of the National Electrical Code.

MARNING

Failure to properly ground the compressor package could result in controller malfunction.

 Rotation – Check for correct motor rotation using "JOG MODE." Compressor drive shaft rotation must be counterclockwise standing facing the compressor sheave. See Section 4, page 20, Step 8.

MARNING

Operation with incorrect motor rotation can damage equipment and cause oil eruption from the compressor inlet. When checking motor rotation, induce minimum rotation (less than one revolution if possible). Never allow motor to reach full speed.

7. System Pressure – The discharge pressure of the unit is set at the factory. To change the discharge pressure, set the controls to the desired load pressure. DO NOT EXCEED THE MAXIMUM OPERATING PRESSURE ON THE COMPRESSOR NAMEPLATE. See Section 4, pages 19 through 21, "Programming the Load-Unload Pressure Setpoints," for procedure.

MARNING

Operation at excessive discharge air pressure can cause personal injury or damage to equipment. Do not adjust the full discharge air pressure above the maximum stamped on the unit nameplate.

- 8. **Operating Mode** Refer to Section 4 for detailed information on the control system.
- Enclosure Check for damaged panels or doors.
 Check all screws and latches for tightness. Be sure doors are closed and latched.
- 10 **Optional Integrated Dryer** see Section 11, pages 60 thru 66, for Operating Instructions and pages 67 thru 71, for Parts Listing.

STARTING THE UNIT – Observe the following starting procedures.

Unit Cold:

- 1. If the unit has the optional integrated dryer, start the dryer.
- Close the air service valve (customer furnished) between the main air system and the check valve on the package.
- 3. Start the unit by pushing either the "CONSTANT RUN" or one of the "AUTO" buttons.
- Run for approximately five minutes or until the temperature stabilizes and then open the air service valve.

The unit is equipped with a minimum (65 psig) pressure/check valve, no special procedure to maintain the unit reservoir pressure is required.

Unit Hot (No warm–up period is required):

- 1. If the unit has the optional integrated dryer, start the dryer.
- Close the air service valve (customer furnished) between the main air system and the check valve on the package.
- 3. Start the unit by pushing either the "CONSTANT RUN" or one of the "AUTO" buttons.
- 4. Run for approximately one minute and then open the air service valve. The unit is equipped with a minimum (65 psig) pressure/check valve, no special procedure to maintain the unit reservoir pressure is required.

DAILY CHECK – Refer to Section 8, "Maintenance Schedule," page 32.

STOPPING THE UNIT:

- Close the air service valve (customer furnished) between the main air system and the check valve on the package.
- 2. Allow the unit to build up to full unloaded pressure and run unloaded for 1 to 2 minutes.
- 3. Wait a short period for the reservoir to blow down.
- 4. Press "STOP-RESET" button.

Stopping the unit at a pressure below full unloaded may cause oil carry—over and can damage the air/oil separator element. The oil reservoir will automatically blow down as the motor stops. Open the air service valve.

If the unit has the optional integrated dryer and will be off more than 8 hours, shut down the dryer.

SECTION 4 CONTROLS & INSTRUMENTATION

GENERAL – The Gardner Denver[®] Electra–Screw[®] compressor is supplied with a factory mounted starter and complete controls as standard equipment. The standard control system consists of constant run load/unload operation, or auto start/timed stop operation. Lead/Lag operation of two Electra–Screw compressors is also possible without additional equipment.

PROTECTIVE DEVICES – All compressors incorporate the following protective devices:

Motor Protection Devices – Overload relays are furnished for each motor in the voltage range specified. There are six (6) heaters, sized as indicated in the chart in the starter box. An trip of either relay is indicated by the "MOTOR OVERLOAD" LED located on the control keypad.

Separator Differential Pressure – The separator differential pressure is continually monitored by the microprocessor controller. At a differential of approxi-

mately 8 PSI, the "CHANGE SEPARATOR" LED located on the control keypad flashes indicating required maintenance. If the warning is ignored, and the separator differential continues to increase, the microprocessor controller will stop the unit and the LED will remain on steady. See "Control System Operation," page 17, for further information on operation of the microprocessor controller.

High Discharge Temperature – The compressor is protected from high discharge temperature by two independent thermistor probes. One probe is located in the compressor discharge housing to sense compressor discharge air—oil mixture temperature. The second probe is located at the separator discharge and senses the temperature of the air at the oil separator.

The microprocessor controller will shut the compressor down if the temperature sensed at either location exceeds 225° F. See "HIGH AIR TEMPERATURE" LED, page 18.

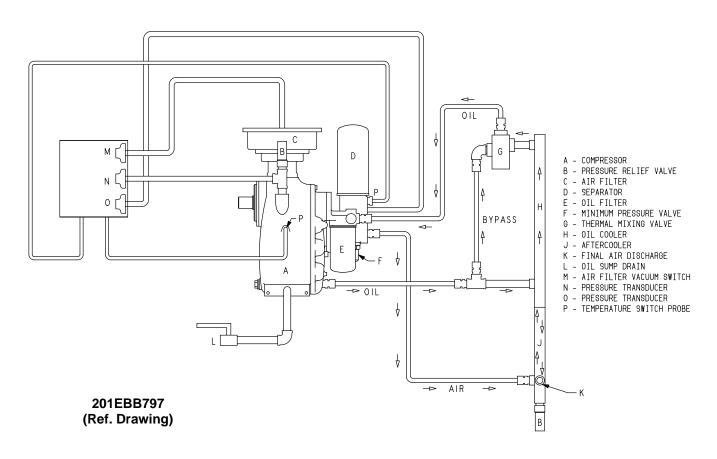
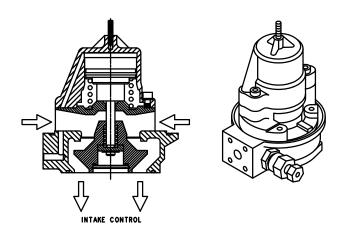


FIGURE 4-1 - CONTROL SCHEMATIC



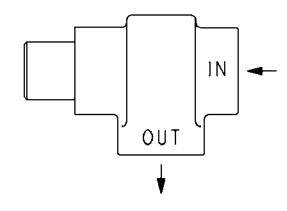


FIGURE 4-2 - INLET VALVE

FIGURE 4-3 - MINIMUM PRESSURE/CHECK VALVE

A CAUTION

Damage will occur to the machine if it is repeatedly restarted after high temperature stops operation. Find and correct the malfunction before resuming operation.

Relief Valve – A pressure relief valve(s) is (are) installed in the final discharge line and set at the factory to approximately 120% of the unit's full load operating pressure for protection against overpressure. Periodic checks should be made to insure its proper operation.

MARNING

When the relief valve opens, a stream of high velocity air is released, resulting in a high noise level and possible discharge of accumulated dirt or other debris. Always wear eye and ear protection and stand clear of the discharge port when testing the relief valve to prevent injury.

A CAUTION

Never paint, lubricate or alter a relief valve. Do not plug vent or restrict discharge.

MARNING

Operation of the unit with improper relief valve setting can result in severe personal injury or machine damage.

Insure properly set valves are installed and maintained.

AIR CONTROL COMPONENTS – All units incorporate the following air control components. See FIGURE 4–1, page 15, for schematic tubing diagram.

Inlet Valve (FIGURE 4–2) – The inlet valve is a pilotactuated valve that closes to unload the compressor. At shutdown the inlet valve closes to function as a check valve and prevent backflow of air. Air pressure is supplied to the cylinder by the Intake Controller to fully open the inlet valve.

Minimum Pressure/Check Valve (FIGURE 4–3) – An internal spring–loaded minimum pressure valve is used in the final discharge line to provide a positive pressure on the oil system even when the air service valve is fully open. The valve senses upstream pressure. If demand for air exceeds the compressor capacity, the valve throttles the flow to maintain a minimum pressure on the upstream (oil reservoir) side of the valve. When pressure rises above the minimum pressure (standard setting 62 to 67 PSIG) the valve reaches the full open position.

A check valve incorporated in the minimum pressure valve prevents backflow of air from the shop air line when the unit stops, unloads or is shut down.

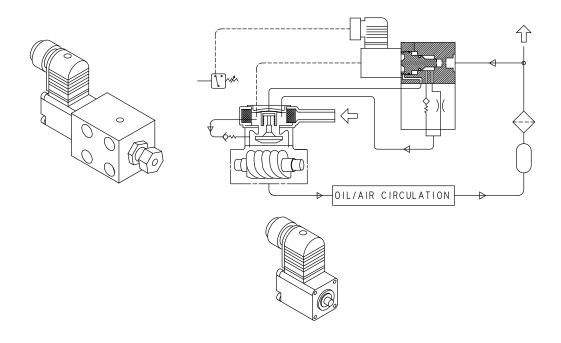


FIGURE 4-4 - INTAKE CONTROLLER

To readjust the minimum pressure:

- 1. Remove the locknut, located below the air/oil separator.
- Turn the adjusting screw clockwise to increase the pressure, counterclockwise to decrease the pressure.
- 3. Retighten the locknut.

A DANGER

Air/oil under pressure will cause severe personal injury or death. Shut down compressor, relieve system of all pressure, disconnect, tag and lockout power supply to the starter before removing valves, caps, plugs, fittings, bolts, and filters.

Intake Controller (FIGURE 4–4) – The intake controller is a solenoid operated control for the inlet valve. The electrical control unit is activated automatically by the electronic controller. When the unload pressure is reached the solenoid valve shuts off, the inlet valve is actuated pneumatically, the intake controller is closed and the compressor is blown down. When the discharge drops below load pressure, the solenoid valve is switched on. This closes the blowdown and feeds

the inlet valve cylinder, so inlet valve opening pressure required to overcome the spring force can be built up in the cylinder above the piston. This pressure is fully relieved via a pressure relief delay valve when the system is switched off. Only restart the system when it is blown down. If a restart is attempted with pressure in the reservoir, the temperature digital display will show reservoir pressure, and the control will prevent starting until the pressure drops below 5 psig.

STARTER/CONTROL BOX (FIGURE 1–2, Section 1, page 2) – The following control components are located on the combination starter/control box.

Hourmeter – A continuous reading (nonreset) type hourmeter displays the accumulated operating time of the unit and provides a convenient means for scheduling changes of oil and servicing of filters, separators and other devices.

Auto–Sentry S Controller With Keypad – Monitors and controls compressor operation.

Emergency Stop Pushbutton – Removes power from the microprocessor controller outputs to provide a positive means of stopping unit in an emergency situation.

CONTROL SYSTEM OPERATION – See FIGURE 4–7, page 22. The following are operations of the Auto–Sentry S Controller.

"STOP/RESET" Button With LED – This button is used to stop the compressor under ordinary conditions. It is also used to extinguish any fault LED's that are illuminated. In addition, it is used in the procedure to adjust

operating pressure. See "Programming the Load-Unload Pressure Setpoints," page 19. The LED is illuminated whenever the unit is stopped for any reason EXCEPT a normal stop in one of the "AUTO" modes. A flashing LED indicates that a reset is required.

A CAUTION

Damage will occur to the machine if it is repeatedly restarted after any one of the shutdown modes stops operation of the unit. Find and correct the malfunction before resuming operation.

"CONSTANT RUN" Button With LED – This button is used to operate the unit in the constant run mode. In this mode, the compressor runs continuously, loading and unloading in response to air demand. It will continue to run until stopped, either manually or by a protective shutdown. The LED is illuminated at all times while running in this mode.

"AUTO LEAD" Button With LED – This button is used to operate the unit in "Auto–Start–Timed–Stop" mode, either by itself, or as the lead compressor in a Lead/Lag arrangement. Loading and unloading occurs as in the "CONSTANT RUN" mode, however, if the compressor runs unloaded for a period of 10 minutes, the unit is stopped. At this point, the compressor remains in the "AUTO LEAD" mode and will restart when the system pressure reaches the 'load' setpoint programmed into the controller. The LED will remain illuminated throughout the cycle.

MARNING

Automatic restarting or electrical shock can cause injury or death. Open, tag and lockout main disconnect and any other circuits before servicing the unit.

"AUTO LAG" Button With LED – This button is used to select the 'lag' unit in a lead–lag arrangement. Operation is identical to "AUTO LEAD" except that the start–load and unload setpoints are automatically 5 PSI lower than programmed.

NOTICE

Any mode may be selected at any time without stopping the compressor.

"HIGH AIR TEMPERATURE" LED – This LED is used to indicate an over temperature condition at either the compressor or oil separator discharge. At the time of a high temperature shutdown, the LED is illuminated and the temperature digital readout is locked on to the offending temperature. Illumination of the decimal point in the lower right hand corner of the digital readout indicates that the temperature displayed is at the oil separator. A non–illuminated decimal point indicates compressor discharge. Pressing "STOP/RESET" will extinguish the LED (if the temperature has lowered below 225° F) and revert the digital readout to displaying actual discharge temperature.

"MOTOR OVERLOAD" LED – This LED indicates that one of the motor overload relays has tripped. The overload relay itself must be reset before pressing "STOP/RESET" will extinguish the LED.

"CHANGE SEPARATOR" LED – This LED flashes when the differential pressure across the oil separator reaches approximately 8 PSI. At this point, schedule the separator element for service at the earliest opportunity. (See Section 5, pages 27 and 28, for separator maintenance.)

Should the condition be ignored and allowed to further deteriorate, the compressor will be shutdown and the LED illuminated steadily when the differential pressure reaches 15 PSI.

A CAUTION

Machine damage will occur if compressor is repeatedly restarted after any one of the shutdown modes stops operation of the unit. Find and correct the malfunction before resuming operation.

"CHANGE AIR FILTER" LED – This LED is used to signal when the air filter requires servicing or changing. It is a reminder only and will not stop or impede the operation of the unit. Operating the compressor with the LED illuminated risks collapse of the filter and ingestion into the compressor.

A CAUTION

Machine damage can occur with extended operation after "Change Air Filter" LED illuminates. Service air filter as soon as possible.

Pressure And Temperature Digital Readouts – These readouts normally indicate pressure after the minimum pressure check valve and temperature at the air end discharge. See "High Air Temperature LED", page 18, for a description of readout action during a high temperature condition.

Alternately, these readouts can be selected to display oil reservoir pressure and separator air temperature. To obtain such display while the compressor is running, simply press the operating mode button that corresponds to the current operating mode of the unit. (For Example: If the unit is operating in "AUTO LEAD" mode, press the "AUTO LEAD" button.) This will cause the readout to display the alternate parameters. This alternate display mode is indicated by illuminated decimal points in the lower right hand corner of each display. After releasing the button, the display will revert to its normal mode in 5 seconds.

The digital readouts are also used to display error messages. These error messages correspond to various indications concerning condition of pressure and temperature sensors and EMERGENCY STOP condition.

DEFINITIONS OF ERROR MESSAGES – Refer to the chart in FIGURE 4–5 below for definitions. An error message will stop the compressor, if running, and prevent it from restarting. The failed sensor must be replaced to clear the error.

Any condition requiring the control panel to be reset will be indicated by a flashing "STOP/RESET" LED. If all readouts and LED's are flashing, a power interruption has occurred, requiring the control panel to be reset.

Programming The Load–Unload Pressure Set- points – Programming of the Load and Unload Pressure setpoints can only be accomplished with the unit not running.

Step 1: Stop the compressor and remove all power from the unit by opening main disconnect.

⚠ WARNING

Electrical shock can cause injury or death. Open main disconnect and any other circuits, tag and lockout before working inside the control box.

Step 2: Turn the "Setup" switch located on the controller circuit board (inner side of control box panel) to the "+" position. Close control box panel and restore power.

NOTICE

This switch is provided to prevent unauthorized programming of the setpoints. If this level of security is not required, the "Setup" switch can be left in the "+" position, eliminating Steps 1 and 2.

Step 3: With the unit already in the STOP/RESET condition, press the "STOP/RESET" button a second time. This puts the controller in program mode. The displays will read as follows:

Pressure: the current unload setpoint (adj. 58–175 psig)

	Pressure Readout		Temperature Readout
Error	# Meaning	Error #	Meaning
E01	Failure of Final Discharge Pressure Sensor	E01	Failure of Compressor Temperature Sensor
E02	Failure of Oil Sump Pressure Sensor	E02	Failure of Separator Temperature Sensor
E03	Failure of Both Pressure Sensors	E03	Failure of Both Temperature Sensors
E04	EMERGENCY STOP		

Temperature: indicates that the pressure value is the "un—load" value.

Step 4: Press the "AUTO LEAD" button to raise the unload setpoint. Press "AUTO LAG" to lower the unload setpoint. See FIGURE 4–6, page 21.

MARNING

Operation at excessive discharge air pressure can cause personal injury or damage to equipment. Do not set unload pressure above the maximum stamped on the unit nameplate.

Step 5: When the desired unload setpoint is displayed in the pressure readout, press the "STOP/RESET" button. This will enter the desired unload setpoint and advance the programming function to the load setpoint. The displays will now read:

Pressure: the current load setpoint (adj. 50–167 psig)

Temperature: indicates that the pressure value is the "load" value.

Step 6: Raise or lower the load setpoint in the same manner as the unload setpoint in Step 4.

NOTICE

The load setpoint cannot be set within 8 PSI of the unload setpoint. See FIGURE 4–6, page 21.

- Step 7: When the desired load setpoint is displayed in the pressure readout, press the "STOP/RESET" button, entering the new load setpoint and completing the programming.
- Step 8: The display now indicates:



At this time, compressor rotation may be checked by pressing any of the three operat-

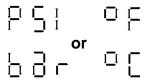
ing mode buttons. The correct rotation is counterclockwise. The starter will be momentarily energized giving a slight rotation that is short enough in duration to prevent reverse oil flow in the event that rotation is reversed. Press "Stop/Reset" to exit jog mode. See Note C, below.

Step 9: The displays will now read:



If this compressor is equipped with the expansion board for the remote control option this must be set to "yes". The standard setting is "no". This value is toggled by pressing either "Auto" button. Press the "Stop/Reset" button to continue to the next step.

Step 10: The display now indicates either



Pressing any mode key will toggle the display from one set of units to the other. PSI/°F causes the controller to display pressures in pounds per square inch and temperatures in degrees Fahrenheit. bar/°C causes the controller to display parameters in bars and degrees Centigrade. Press "Stop/Reset" when the desired units are visible in the display to continue.

- Step 11: When display shows dashes (————): (The Following steps may be skipped by waiting until the display resumes its normal numbers.)
 - a) Press "Stop-Reset" the pressure display now shows the current "zero" pressure for the final discharge transducer in the left window, and "P1" in the right window.
 - b) Press "Stop-Reset" again this will zero the circuit board on the final discharge pressure transducer and move the display to the next step. The left window will read the current "zero" pressure for the oil reservoir transducer and the right window will now read "P2."
 - c) Press "Stop-Reset" again this will zero the circuit board on the oil reservoir pressure transducer and move display program back to the normal setup mode. The display

should read "0" pressure in the left window, and —— current sump temperature in the right window.

Step 12: Move the circuit board slide switch back to the "set" position (right). You may now proceed with normal start up procedure.

NOTICE

- A. To readjust, the slide switch must be in the "+" position.
- B. If procedure is repeated, the transducer zero operation may be bypassed by not pressing "Stop-Reset" while the dashes (———) are displayed.
- C. Transducer must be zeroed only while at zero "0" pressure, or invalid shutdowns may occur.

LEAD-LAG OPERATION OF TWO COMPRES-SORS – The Auto-Sentry S controller provides the capability of true lead-lag operation without the need to

purchase any additional equipment and without complicated interconnecting wiring.

Follow these steps to operate two compressors in a lead–lag arrangement:

- Step 1: Program load and unload pressure setpoint on both units to the same value. For example: Compressor "A" load at 92 PSI; unload at 100 PSI. Compressor "B" load at 92 PSI; unload at 100 PSI. See page 19, this section, for complete information on programming the setpoints.
- Step 2: Operate one compressor in the "Auto Lead" mode. This compressor will now be the "Lead" or "Base Load" compressor.
- Step 3: Operate the second compressor in the "Auto Lag" mode. This compressor will now be the "lag" or "trim" compressor. It will automatically be brought on line, if required, by a large air demand. After the demand is satisfied, the lag unit will unload, time out and stop, ready to start again when needed.
- Step 4: Periodically reverse the roles of the units by changing each unit's mode of operation from "Auto Lead" to "Auto Lag" and vice versa. By using the hourmeters on the control panel to schedule the mode changes, the operating hours can be kept as close as possible, equalizing machine wear and minimizing maintenance costs.

NAMEPLATE FULL LOAD	CONTROL S PRESSUR		
OPERATING PRESSURE	LOAD	UNLOAD	
100	92	100	
125	117	125	
150	142	150	
175	167	175	

NOTICE

Load setpoint cannot be set within 8 psi of the unload setpoint. Minimum operating pressure is 60 – 65 PSIG.

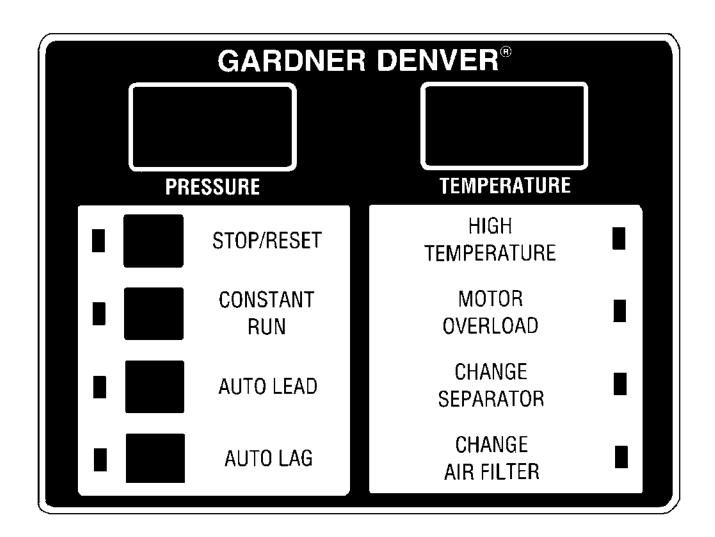


FIGURE 4-7 - AUTO SENTRY "S" SOLID STATE CONTROL TOUCH PAD

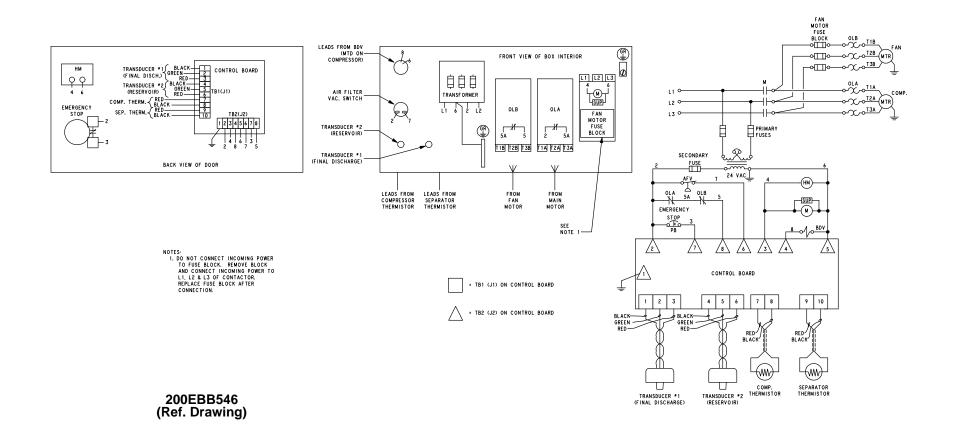


FIGURE 4-8 - WIRING DIAGRAM

SECTION 5 LUBRICATION OIL COOLER, OIL FILTER & SEPARATOR

COMPRESSOR OIL SYSTEM (FIGURE 4–1, page 15) The compressor oil system cools the compressor, lubricates moving parts and seals internal clearances in the compression chamber.

Air pressure in the oil reservoir forces oil through the oil cooler, thermostatic mixing valve, oil filter and into the compressor main oil gallery.

The oil passes through internal passages for lubrication, cooling and sealing. The air—oil mixture is then discharged to the oil reservoir where a large part of the entrained oil drops out of the air stream; the air then passes through the final oil separator where most of the remaining oil is removed. The separated oil is returned to the compressor and the air passes to the final discharge line.

RECOMMENDED LUBRICANT – Gardner Denver[®] compressors are factory filled with AEON [™] lubricants. These lubricants are formulated to the highest quality standards and are factory authorized, tested and approved for use in rotary screw compressors. AEON [™] lubricants are available through your authorized Gardner Denver compressor distributor.

OIL SPECIFICATIONS – The recommended compressor lubricant is Gardner Denver® AEON™ 2000 Lubricating Coolant which can be used for year–round operation except as noted in the "High Temperature Operation" paragraph, page 25, or low temperature, see "Installation for Cold Weather," Section 2, page 10. AEON™ 2000 Lubricating Coolant is a superior petroleum base lubricant formulated and containing additives for use in Gardner Denver® compressors.

A CAUTION

Use of improper lubricants will cause damage to equipment. Do not mix different types of lubricants or use inferior lubricants. Check the decal on the oil reservoir for lubricating coolant specification.

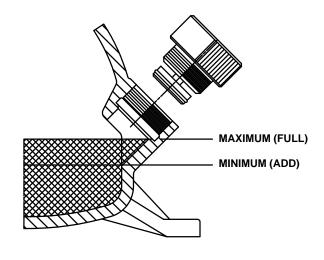


FIGURE 5-1 - OIL FILL

PROCEDURE FOR ADDING/CHECKING OIL LEV-EL AND CHANGING THE OIL — Check the oil level before starting the unit and after every 100 hours of operation.

- 1. Be sure the unit is completely off and that no air pressure is in the oil reservoir.
- 2. Disconnect, tag and lockout the power supply to the starter.
- 3. Wipe away all dirt around the oil filler plug.
- 4. Remove the oil filler plug and add oil as required to return the oil level to the chamfer at the top of the filler neck (see FIGURE 5–1, above). The oil filler plug is provided with a lateral safety hole, from which oil or air will appear if the oil reservoir has not been completely blown down.
- Install the oil filler plug, run the unit and check for leaks.

DO NOT OVERFILL. The quantity required to raise the oil level from "MINIMUM" to "MAXIMUM" is shown in FIGURE 5–1. Repeated addition of oil between oil changes may indicate excessive oil carry–over and should be investigated.

Use only clean containers and funnels so no dirt enters the reservoir. Provide for clean storage of oils. Changing the oil will be of little benefit if done in a careless manner.

A DANGER

Air/oil under pressure will cause severe personal injury or death. Shut down compressor, relieve system of all pressure, disconnect, tag and lockout power supply to the starter before removing valves, caps, plugs, fittings, bolts, and filters.

A CAUTION

Excessive oil carry-over can damage equipment. Never fill oil reservoir above the "FULL" level.

COLD AMBIENT OPERATION – See "Installation for Cold Weather Operation," and FIGURE 2–3, Section 2, pages 9 and 10.

HIGH TEMPERATURE OPERATION — If the discharge temperature is sustained between 200–210° F for a period of more than four (4) hours due to continuing high ambient air temperature, use Gardner Denver® AEON™ 9000 SP Lubricating Coolant which is a superior synthetic lubricant. Short periods of up to four (4) hours of sustained discharge temperatures up to 210° F do not require a change from the recommended year—round lubricant AEON™ 2000.

LUBRICANT UPGRADE PROCEDURE – Upgrading to a longer life lubricant is essentially a very worthwhile practice. Following are the primary steps to be completed when upgrading or changing the type of lubricant.

- 1. Thoroughly drain system:
 - Drain oil from air end and cooler while hot.
 - Break low point connections and drain oil from pipe runs.
 - Dump Oil from filter and reinstall used filter.

- Fill system with a 50 percent charge of the new lubricant:
 - Start the machine and stay there to observe.
 - Allow the machine to run about five minutes at temperature, or until temperature stabilizes, then shut down.
- 3. Thoroughly drain machine.
- 4. Change to a new filter and separator.
- 5. Fill system with a full charge of the new lubricant.
- 6. Machine should then be run normally; however, total run time after the initial changeout should be 50 percent of normal anticipated service life of the new lubricant.
 - Drain all lubricant from system, change filter and separator, and replace with full charge of the new lubricant.
- Subsequent lubricant changeouts should be at normal intervals. (See "Oil Change Interval" and chart, page 26.)

A CAUTION

Improper equipment maintenance with use of synthetic lubricants will damage equipment. Oil filter and oil separator change intervals remain the same as for AEON™ 2000 — See Maintenance Schedule, page 32.

À DANGER

Air/oil under pressure will cause severe personal injury or death. Shut down compressor, relieve system of all pressure, disconnect, tag and lockout power supply to the starter before removing valves, caps, plugs, fittings, bolts, and filters.

MARNING

High temperature operation can cause damage to equipment or personal injury. Do not repeatedly restart the unit after high temperature stops operation. Find and correct the malfunction before resuming operation.

MARNING

All materials used in Gardner Denver® compressor units are compatible with AEON™ 9000 SP Lubricating Coolant. Use caution when selecting downstream components such as air line lubricating bowls, gaskets and valve trim.

AEON™ 9000 SP Synthetic Lubricant is not compatible with low nitrile Buna N or acrylic paints. AEON™ 9000 SP is compatible with most air system downstream components.

Material Safety Data Sheets (MSDS) are available for all AEON[™] lubricants from your authorized Gardner Denver[®] distributor or by calling (901) 363–6100.

MOISTURE IN THE OIL SYSTEM – In normal humidity and with normal operating temperatures and pressures, the thermal mixing valve controls the oil temperature and prevents moisture contamination of the oil. Unusual cooling of the oil reservoir, short loaded cycle in high humidity or malfunctions of the thermal valve

may result in moisture in the oil system which is detrimental to compressor lubrication and could cause oil carryover. If moisture is observed in the oil reservoir, drain the moisture and correct the condition causing the accumulation. See "Compressor Oil System Check," page 28 and "Thermal Control (Thermostatic Mixing) Valve," page 27.

OIL CHANGE INTERVAL – Recommended oil change intervals are based on oil temperature. FIGURE 5–3 shows how the change interval is affected by temperature. When operating conditions are severe (very dusty, high humidity, etc.), it will be necessary to change the oil more frequently. Operating conditions and the appearance of the drained oil must be surveyed and the oil change intervals planned accordingly by the user. Gardner Denver[®] offers a free oil analysis program with the AEON™ lubricants and we recommend a sample be sent in at 100 hours on a new unit.

DRAINING AND CLEANING OIL SYSTEM – Always drain the complete system. Draining when the oil is hot will help to prevent varnish deposits and carry away impurities.

To drain the system, use one of the following methods:

- If the unit is not elevated high enough to use the oil reservoir drain line to drain oil, a small hand, electric or air operated pump should be used to drain reservoir through the oil filler opening or from the drain valve.
- 2. If the unit is elevated so that the oil reservoir drain can be used, empty the oil reservoir through the drain valve to a suitable container or sump.
- If the drained oil and/or the oil filter element are contaminated with dirt, flush the entire system: reservoir, oil cooler, mixing valve and lines. Inspect the oil separator elements for dirt accumulation; replace if necessary. If a varnish deposit exists, contact the factory for recommendations for removal of the deposit and prevention of varnish.

Use only CLEAN containers and funnels so no dirt enters the reservoir. Provide for clean storage of oils.

Discharge Temperature	AEON 2000 Change Interval	AEON 4000 Change Interval	AEON 9000 SP Change Interval
Up to 180° F	2000 Hrs.	6000 Hrs.	8000 Hrs.
180° to 190° F	1500 Hrs.	4500 Hrs.	6000 Hrs.
190° to 200° F	1000 Hrs.	3000 Hrs.	4000 Hrs.
200° F+	500 Hrs.	1500 Hrs.	2000 Hrs.

FIGURE 5-3 - OIL CHANGE INTERVAL

Changing the oil will be of little benefit if done in a careless manner.

COMPRESSOR OIL FILTER (FIGURE 1–2, Section 1, page 2) – This replaceable element filter is a vital part in maintaining a trouble—free compressor, since it removes dirt and abrasives from the circulated oil. The filter is equipped with a relief valve that opens in the event the element becomes dirty enough to block the flow of oil. Use only the replacement element shown on the filter tag or refer to the parts list for the part number.

Use the following procedure to replace the filter element. Do not disturb the piping.

A CAUTION

Improper oil filter maintenance will cause damage to equipment. Replace filter element every 1000 hours of operation. More frequent replacement could be required depending on operating conditions. A filter element left in service too long may damage equipment.

- Stop unit and be sure no air pressure is in the oil reservoir.
- 2. Remove the spin-on element.
- 3. Clean the gasket face of the filter body.
- 4. Coat the new element gasket with clean lubricant used in the unit.
- 5. Screw new element on filter body and tighten by hand. DO NOT OVERTIGHTEN ELEMENT.
- 6. Run the unit and check for leaks.

THERMAL CONTROL (THERMOSTATIC MIXING) VALVE (FIGURE 5–4) is installed in system as shown in FIGURE 4–1, Section 4, page 15. This valve is used to control temperature of the oil both air–cooled radiator and water–cooled heat exchanger type oil cooler systems. On start–up with unit cold, element is open to bypass, allowing oil to pass directly from the reservoir to compressor during warm–up. As oil warms, element gradually closes to the bypass allowing more of the oil from the cooler to mix with oil from the bypass.

After the unit is warmed up, the mixing valve maintains oil injection temperature into the compressor at a minimum of 170° F. This system provides proper com-

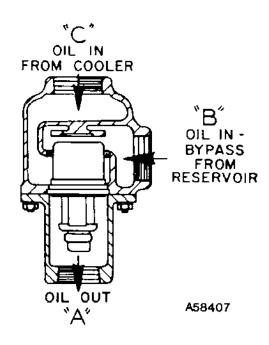


FIGURE 5-4 - THERMOSTATIC MIXING VALVE

pressor warm-up and prevents moisture contamination of the oil.

To check the element, heat in oil – it should be fully extended at 170° F. If the unit shuts down due to high air discharge temperature, the cause may be that the element is stuck open to the bypass, in which case bypass lines (FIGURE 4–1, Section 4, page 15) will be hot to touch and lines out of mixing valve much cooler. When flushing the oil system, remove the mixing valve and clean all parts thoroughly.

OIL RESERVOIR – The oil reservoir–separator, located in the compressor housing, combines multiple functions into one vessel. The lower half is the oil reservoir, providing oil storage capacity for the system and the top portion, a primary oil separation means. The reservoir also provides limited air storage for control and gauge actuation.

COMPRESSOR OIL SEPARATOR – The compressor oil separator located on top of the filter housing, screwed onto a fitting, features a renewable spin–on type separator element and provides the final removal of oil from the air flow.

Oil carry—over through the service lines may be caused by a faulty oil separator, overfilling of the oil reservoir, oil that foams, oil return line malfunction, or water condensate in the oil. If oil carryover occurs, inspect the separator only after it is determined that the oil level is not too high, the oil is not foaming excessively, the oil return tube from the bottom of the separator to the compressor cylinder is not clogged or pinched off, the check valve in the oil return is functioning properly, and there is not water or an oil/water emulsion in the oil.

Oil carry—over malfunctions of the oil separator are usually due to using elements too long, heavy dirt or varnish deposits caused by inadequate air filter service, use of improper oil, or using oil too long for existing conditions. Excessive tilt angle of the unit will also hamper separation and cause oil carry—over.

Oil separator element life cannot be predicted; it will vary greatly depending on the conditions of operation, the quality of the oil used and the maintenance of the oil and air filters. The condition of the separator can be determined by pressure differential or by inspection.

Pressure Differential Gauging – The "CHANGE SEPARATOR" message will flash when the pressure differential across the oil separator reaches approximately 8 PSI. Replace the oil separator element at this time. If ignored, the unit will shut down and the display will indicate shutdown and the change separator LED will be on when the pressure differential reaches 15 PSI.

To measure the pressure differential, see "Pressure and Temperature Digital Readouts" in Section 4, page 19. Simply subtract the downstream reading from the upstream reading.

A CAUTION

Using an oil separator element at excessive pressure differential can cause damage to equipment. Replace the separator when the "Change Separator" advisory appears.

NOTICE

A sudden drop of zero pressure differential or sudden heavy oil carryover may indicate a ruptured element.

Inspection — After removal of separator element, shine a light inside the element to reveal areas of heavy dirt or varnish deposits or breaks (ruptures) in element media.

Removal Of Oil Separator For Inspection Or Replacement:

A DANGER

Air/oil under pressure will cause severe personal injury or death. Shut down compressor, relieve system of all pressure, disconnect, tag and lockout power supply to the starter before removing valves, caps, plugs, fittings, bolts, and filters.

- Be certain unit is off and all system pressure is relieved.
- Disconnect, tag and lockout the power supply to the starter.
- 3. Remove spin-on element.
- 4. Clean the gasket seating surface of the head.
- Inspect and/or replace the separator as necessary. Before reassembly, coat the separator element gasket with the same lubricant used in the unit.
- Screw on until gasket makes contact. Hand tighten 1/3 to 1/2 turn extra.
- Run the unit and check for leaks.

Oil Scavenge Site Glass – During operation the performance of the oil separator can be monitored through the oil site glass in the scavenge line. The site glass shows the oil being returned to the air end. When the unit is started, "Full Oil" is shown, due to oil accumulation in the separator. After a few minutes, only a small amount of oil will be seen. This signifies that the air/oil separator is working properly.

COMPRESSOR OIL SYSTEM CHECK – The following readings are based on ambient temperature of 80° F with the system in good condition. The compressor should be at operating temperature at the time of the checks. One–half hour of loaded operation is usually sufficient to reach level–out operating temperatures.

Air and Oil Discharge Temperature -170° to 200° F – Read at the gauge on the instrument panel or check with a thermometer at the discharge housing.

Compressor Oil Inlet Temperature – 165° to 175° F – Install a tee at oil filter outlet and check with a thermometer.

Oil Inlet Pressure – Check at the fitting in the line near the compressor oil inlet. With air receiver pressure at 100 psi, oil inlet pressure should be 65–75 psig.

Oil Cooler Oil Pressure Differential (Air–Cooled Radiator) – Check differential across the oil system by measuring oil inlet pressure as described above.

Oil Cooler Temperature Differential (Air-Cooled

Radiator) – The oil temperature differential depends on the temperature of the air at the oil cooler fan and cleanliness of the core faces. As ambient temperatures and core restrictions increase, the oil cooler outlet temperature will increase. The oil inlet temperature is approximately the same as the air discharge temperature – see the gauge on the instrument panel. The outlet oil temperature may be checked by installing a tee at the oil filter outlet.

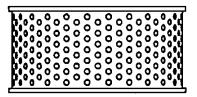


FIGURE 6-1 - STANDARD DUTY AIR FILTER

STANDARD DUTY AIR FILTER (FIGURE 6–1) – Service and replacement instructions are given in the following sections: Filter Element and Filter Element Life.

Filter Element – The element should be serviced when inspection indicates an accumulation of dirt on the outside of the element. Clean every 100 to 500 operating hours depending on dust conditions. Inspect every few days until experience determines the proper time interval for servicing.

To Service:

- 1. Remove element from filter housing.
- 2. Blow off excess dirt with air nozzle. Direct air blast parallel to element pleats at a slight upward angle. Do not point air blast directly at element.
- Inspect for rupture by placing a bright light inside the element. The slightest rupture requires replacement of the element.

Filter Element Life – The element should be replaced after eight cleanings or if visual inspection indicates a rupture, crack or pin hole in the pleated media. Inspection should be done by placing a bright light inside the element.



Do not oil this element. Never operate unit without element. Never use elements that are damaged or ruptured. Never use elements that won't seal. Keep spare elements on hand to reduce downtime. Store elements in a protected area free from damage, dirt and moisture. Handle filter parts with care.

SECTION 7 BELT DRIVE

Proper drive belt tension and alignment are provided at the factory, however, good practice dictates checking the drive alignment and tension after shipment and before initial start—up.

Sheaves should align straight across the front with a straight edge. The best tension is just enough tension to keep belts from "squealing" on start—up.

A CAUTION

Excessive belt tension can damage the equipment. Tension the belts as shown in FIGURE 7–1.

Belts can be changed when necessary by the following instructions. First, disconnect, tag and lockout power to the starter. Then remove the wire guard. Then loosen, but do not remove, the four motor foot nuts.

Next, use the adjusting screws in the motor base to loosen belt tension. Remove the belts, and replace with new belts. Check for correct belt tension and re–attach the wire guard.

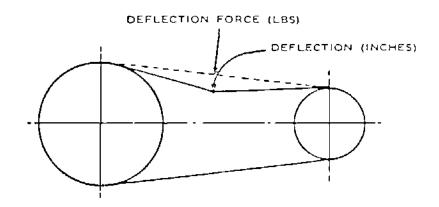
A CAUTION

Interference between the fan and the orifice can damage equipment. Be certain the orifice has even clearance around the fan before starting the unit.

CHECKING BELT TENSION – Using a spring scale, apply a perpendicular force to each belt at the midpoint of the span and measure the deflection. Correct deflection force and deflection are shown in FIGURE 7–1. To tighten belts, merely increase the center distance.

NOTICE

When a new set of belts is installed on a drive, the initial deflection force should be 1/3 greater than shown in FIGURE 7–1. Recheck tension frequently during the first 24 hours of operation.



Motor H.P.	No. Of Belts	Deflection Force Pounds (per belt)	Deflection In Inches
7.5 10	3	6 – 8.5 6 – 7	5/16 5/16
15	3	6 - 7	5/16

FIGURE 7-1 - BELT TENSION 3VX BELTS

SECTION 8 MAINTENANCE SCHEDULE

SERVICE CHECK LIST -

Air Filter – Operating conditions determine frequency of service. The "CHANGE AIR FILTER" display will flash to signal that the air filter requires servicing or changing. See "Air Filter," Section 6, page 30.

Oil Separator – Operating conditions determine frequency of service. The "CHANGE SEPARATOR" display will flash to signal that oil separator element requires changing. See "Compressor Oil Separator" in Section 5, page 27.

Refer to "Compressor Oil Separator", Section 5, page 27, for further details.

Motor Lubrication – Refer to Section 2, page 11, and Maintenance Schedule Chart below.

Every 8 Hours Operation

- 1. Observe if the unit loads and unloads properly.
- 2. Check discharge pressure and temperature.
- Check Panel LED's for advisories.

On All Startups or Every 100 Hours Operation

 Check the reservoir oil level – add oil if required. See Section 5. If oil consumption is high, refer to "Excessive Oil Consumption", Section 9, page 34.

Every 125 Hours Operation

 Check for dirt accumulation on oil/aftercooler core faces and the cooling fan. If cleaning is required, clean the exterior fin surfaces of the cores by blowing compressed air carrying a nonflammable safety solvent in a direction opposite that of the cooling fan air flow. This cleaning operation will keep the exterior cooling surfaces clean and ensure effective heat dissipation.

Every 1000 Hours Operation

1. Change oil filter element.

Every 2000 Hours Operation

 Change the compressor lubricant. UNDER AD-VERSE CONDITIONS, CHANGE MORE FRE-QUENTLY (refer to "Oil Change Interval", Section 5, page 26). Flush system if required.

Every Year

1. Check the relief valve for proper operation. See Section 4, page 16.

MAINTENANCE SCHEDULE (See detail notes above)

Maintenance Action	If Panel LED is Lit	Every 8 Hours	Every 100 Hours**	Every 125 Hours	Every 1000 Hours	Every 2000* Hours	Every Year
Change Air Filter	•						
Change Oil Separator	•						
Check Reservoir Oil Level			•				
Check For Proper Load/Unload		•					
Check Discharge Pressure/Temp		•					
Check Dirt Accumulation on Cooler				•			
Change Oil Filter Element					•		
Change Compressor Lubricant						•	
(AEON™ 2000)							
Check Relief Valve							•

- * See Oil Change Interval Chart, FIGURE 5-3, Section 5, Page 26, for specific lubricant life.
- ** Check oil before all start-ups and every 100 hours of uninterrupted operation.

SECTION 9 TROUBLE SHOOTING

SYMPTOM		POSSIBLE CAUSE		REMEDY
-				
Compressor fails to start.	1.	Wrong lead connections.	1.	Change leads.
	2.	Blown fuses in control box.	2.	Replace fuse.
	3.	Motor starter overload heaters tripped.	3.	Reset and investigate cause of overload.
	4.	Pressure in reservoir.	4.	Inspect blowdown valve.
	5.	Read error message on control panel. See Section 4.	5.	Replace switch.
Compressor starts but stops after a short time.	1.	High discharge temperature.	1.	See "High Discharge Air Temperature," this section.
	2.	High discharge temperature switch malfunction.	2.	Replace switch.
	3.	Blown fuse in starter/control box.	3.	Replace fuse (investigate if fuses continue to blow).
	4.	Motor starter overload heaters trip.	4.	Reset and investigate cause of overload.
Compressor does not unload (or load).	1.	Improperly adjusted control.	1.	Refer to Section 4, page 19, and adjust control.
	2.	Air leak in control lines.	2.	Determine source of leak and correct.
	3.	Restricted control line.	3.	Clean control lines.
Compressor cycles from load to unload excessively.	1.	Insufficient receiver capacity.	1.	Increase receiver size.
load to difficult oxecosivery.	2.	Restriction in service piping.	2.	Inspect and clean service piping.
	3.	Restriction in control tubing.	3.	Inspect and clean control tubing.
	4.	Plugged aftercooler.	4.	Inspect and clean aftercooler.
Compressor is low on delivery and pressure.	1.	Restricted air filter.	1.	Clean or replace filter.
2.2.2., 2.1.2 p.000410.	2.	Sticking inlet valve.	2.	Inspect and clean inlet valve.

Compressor is low on delivery and pressure (continued).	3.	Intake controller is incorrectly set.	3.	Adjust controller. See Section 4, page 17.
	4.	Minimum pressure valve stuck closed.	4.	Replace valve.
High discharge air temperature.	1.	Thermostatic mixing valve stuck open.	1.	Repair or replace valve.
	2.	Dirty or clogged cooler face.	2.	Clean cooler.
	3.	Insufficient cooling air flow.	3.	Provide unrestricted supply of cooling air.
	4.	Clogged oil filter or cooler (interior).	4.	Replace filter or clean cooler.
	5.	Low compressor oil.	5.	Add oil to proper level.
	6.	Fan motor fuses blown.	6.	Check wiring, replace fuses.
Excessive Oil Consumption	1.	Oil carryover through lines.	1.	See "Oil Carryover", in this section.
	2.	Oil leaks at all fittings and gaskets.	2.	Tighten or replace fittings or gasket.
Oil Carry-Over	1.	Overfilling the reservoir.	1.	Drain excess oil from

POSSIBLE CAUSE

REMEDY

system.

SYMPTOM

À DANGER

Air/oil under pressure will cause severe personal injury or death. Shut down compressor, relieve system of all pressure, disconnect, tag and lockout power supply to the starter before removing valves, caps, plugs, fittings, bolts, and filters.

2.	Clogged, broken or loose oil return lines	2.	Tighten or replace faulty lines.
3.	Ruptured oil separator element.	3.	Replace element.
4.	Loose assembly.	4.	Tighten all fittings and gaskets.
5.	Foam caused by use of incorrect oil.	5.	Use Gardner Denver [®] AEON™ 2000, 4000 or 9000 SP Lubricating Coolant.
6.	Inoperative minimum pressure valve.	6.	Replace valve.

SYMPTOM		POSSIBLE CAUSE		REMEDY
Oil Carry-Over (Continued)	7.	Operation at elevated discharge temperatures.	7.	Reduce temperature. See High Discharge Air Temperature, page 34, this section.
	8.	Scavenge line check valve failure.	8.	Replace check valve.
	9.	Water condensate in oil.	9.	Check oil reservoir temperature and if low, change thermal mixing valve element to higher temperature.
"CHANGE SEPARATOR" light (Flashing or on steadily) ON STARTUP	1.	Separator differential is greater than 8 psid (.5 Bars).	1.	Change Separator.
<u>Sitt Siritation</u>	2.	Bad Transducer.	2.	Verify readings with mechan—ical gauges. If defective, replace with 88H242.
	3.	Misadjusted minimum pressure valve.	3.	Set minimum pressure valve at 65 psig (4.5 Bars).
	4.	Sticky minimum pressure valve.	4.	Disassemble and clean.
	5.	Defective minimum pressure valve. [Won't set at 65 psig (4.5 Bars)]	5.	Rebuild or replace.
"CHANGE SEPARATOR" light (Flashing or on steadily) WHILE RUNNING	1.	Separator differential is greater than 8 psid (.5 Bars).	1.	Change Separator.
THE ROLL MADE	2.	Electrical noise creating false readings.	2.	Make sure transducer wires are kept to a minimum length and are twisted.
	3.	Oil reservoir is overfilling.	3.	Fill to proper level (see FIGURE 5–1, Section 5, page 24).
	4.	Defective transducer.	4.	Verify readings with mechan—ical gauges. If defective, replace with 88H242.
	5.	Plugged aftercooler, due to freezing or varnishing.	5.	Clean or replace aftercooler.
"MOTOR OVERLOAD" shutdown.	1.	Running compressor at a pressure over nameplate pressure.	1.	Lower pressure to nameplate.
	2.	Incoming voltage low or high.	2.	Consult your power company.
	3.	Imbalanced voltage (check phase to phase).	3.	If imbalance exceeds 5%, check incoming power.

SYMPTOM		POSSIBLE CAUSE		REMEDY
"MOTOR OVERLOAD" (Continued)	4.	Imbalanced amps.	4.	Rotate 3 phase power leads. If the high reading stays on the same leg, the problem is with the motor.
				If the high reading moves with the lead, the problem is with the incoming power.
	5.	Incorrect motor overload setting.	5.	Set overload to motor name– plate amps.
"CHANGE AIR FILTER" light on.	1.	Dirty air filter.	1.	Clean or replace.
"CHANGE AIR FILTER" light on, and WILL NOT RESET.	1.	Loose connections.	1.	Clean and tighten connections.
	2.	Faulty vacuum switch.	2.	Measure the AC voltage between wire number 7 and wire number #6 at board. If the reading is zero, replace the vacuum switch.
	2.	Control board fault.	2.	Measure the AC voltage between wire number 7 and wire number #6 at board. If the reading is 24 volts, replace the control board.
"MOTOR OVERLOAD" shutdown. (RELAY NOT TRIPPED)	1.	Loose connections.	1.	Measure the AC voltage between wire number 5 and wire number #6 at board. If the reading is zero, tighten the connections.
	2.	Control board fault.	2.	Measure the AC voltage between wire number 5 and wire number #6 at board. If the reading is 24 volts, replace the control board.
"EO4", Emergency Stop will not clear.	1.	Loose connections or faulty switch.	1.	Tighten connection or repair or replace switch.
	2.	Contact block not properly installed.	2.	Ensure contact block is fully snapped into left or right (not center) slot of switch operator.
	3.	Control board fault.	3.	Measure the AC voltage between wire number 3 and wire number #6 at board. If the reading is 24 volts, replace the control board.

Erroneous Pressure Readings [135 – 150 psig constantly]. (9.3 – 10.3 Bars)	1.	Electrical noise creating false readings.	1.	Make sure transducer wires are kept to a minimum length and are twisted.
	2.	Loose connector.	2.	Measure the DC voltage between the green and black wires of the corresponding transducer at the control board with zero pressure on the transducer. If .460 to .540 volts, replace the pluggable connector that connects transducers to the board.
	3.	Bad transducer.	3.	Measure the DC voltage between the green and black wires of the corresponding transducer at the control board with zero pressure on the transducer. If below .450 or over .550 volts, replace the transducer.
Oil leak at the bottom of	1.	Gasket leaking.	1.	Replace the gasket.
the seal housing.	2.	Plug leak.	2.	Repair.
	3.	Capscrew leaking.	3.	Repair.
	_	Shaft seal leaking.	4.	
Fuse on board blows.	1.	Board damaged by high voltage.	1.	Remove all power from the unit by opening the main disconnect, replace fuse, energize main power. If fuse blows – replace board.
Fuse on transformer blows.	1.	Shorted coils on hour meter, starter coil, or blowdown valve.	1.	If fuse does not blow, check for shorted coils.

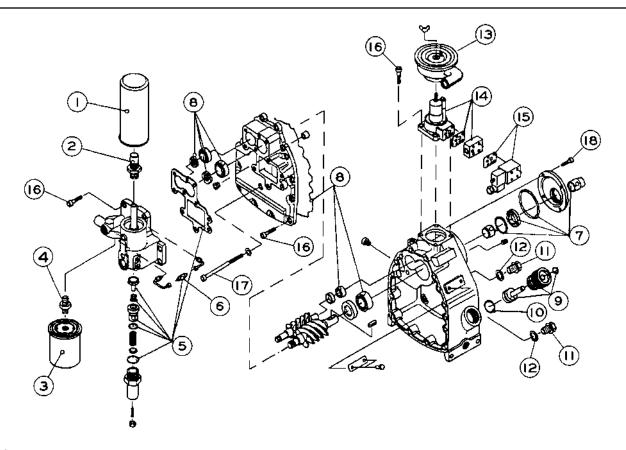
POSSIBLE CAUSE

REMEDY

SYMPTOM

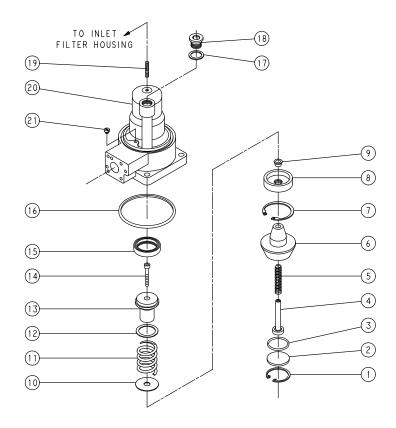
NOTICE

Gardner Denver factory remanufactured replacement compressor air end units are available from your authorized distributor, on an exchange basis, for all rotary screw compressor units.



Ref. No.	Name of Part	Qty.	Part No.
1	SEPARATOR – AIR/OIL	1	Refer to page 42
2	UNION (Separator To Housing)	1	Refer to page 42
3	FILTER-OIL	1	Refer to page 42
4	UNION (Filter To Housing)	1	Refer to page 42
5	KIT-MAINTENANCE (Minimum Pressure Valve)	1	Refer to page 42
6	GAUGE (Oil Scavenge)	1	2116940
7	KIT-SEAL	1	200EBB6029
8	KIT – BEARING (Includes 200EBB6029)	1	200EBB6023
9	CAP (Oil Filler)	1	2116964
10	O–RING	1	2117004
11	PLUG (Hex Screw)	2	2116942
12	WASHÈR	2	2116941
13	FILTER – AIR (Element Only)	1	Refer to page 40
14	VALVE – INLET	1	2116970
*	INLET VALVE MAINTENANCE KIT (Includes Spring,		
	Piston and Shaft Seal Rings	1	Refer to page 39
15	CONTROLLER – INTAKE	1	2116967 – Refer to page 41
16	SCREW-SoHd	28	2117008
17	SCREW-SoHd	2	2116990
18	BOLT	6	2117013
*	SOLENOID VALVE COIL (12V)	1	2116935
*	AIR END	1	200EBB1095
*	REMAN AIR END	1	200EBB1095X
	* Not shown.		

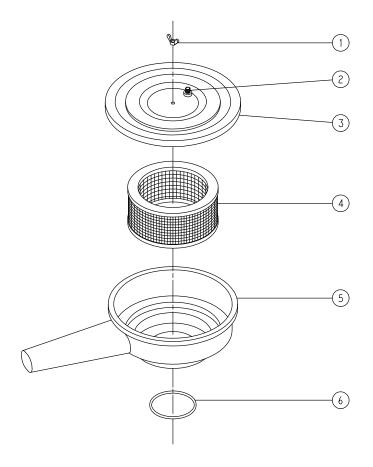
INLET VALVE



208EBB810 (Ref. Drawing)

		•	
Ref. No.	Name of Part	Qty.	Part No.
1	SNAP RING	1	2117021
2	DISK (CHECK VALVE)	1	2116982
3	O–RING	1	*
4	SCREW (SPL)	1	2116992
5	SPRING	1	*
6	VALVE-INLET	1	2116993
7	SNAP RING	1	2116980
8	RETAINER	1	2116978
9	BUSHING	1	*
10	RING-WEAR	1	2117033
11	SPRING	1	2117029
12	RING-WEAR	1	2117032
13	PISTON	1	2116991
14	SCREW-SO HD	1	2116995
15	RING PACKING	1	*
16	O–RING	1	*
17	RING GASKET	1	2117009
18	PLUG	1	2116979
19	STUD	1	2116981
20	HOUSING-INLET VALVE	1	2117003
21	PLUG-ORIFICE	1	2116989
*	KIT-VALVE (INTAKE MAINT.) - Includes Ref. Nos. 3, 5, 9, 15, 16		
	and (1) 2116984 Gasket, not shown)	1	2116966

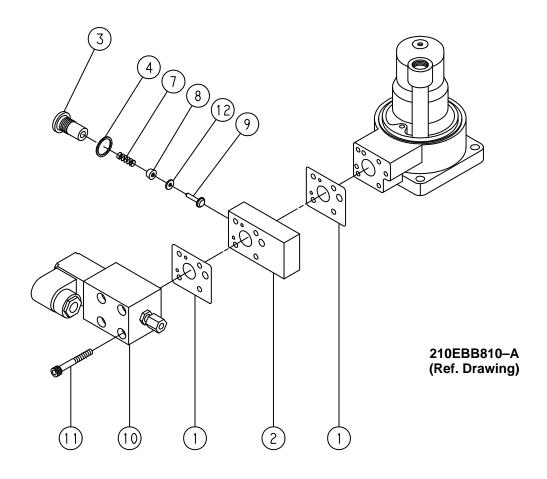
AIR FILTER



209EBB810 (Ref. Drawing)

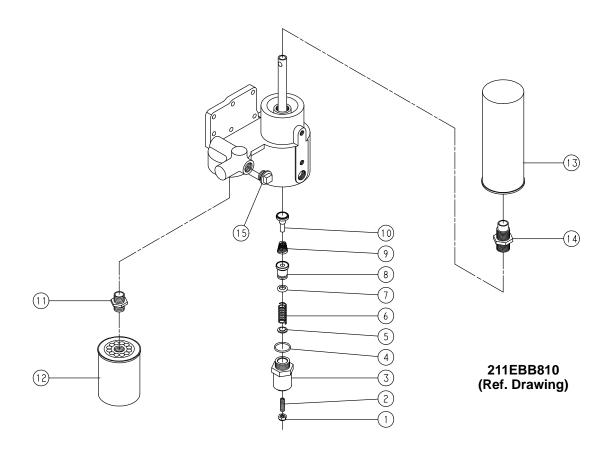
Ref. No.	Name of Part	Qty.	Part No.
4	WING NUT	4	0447004
1	WING NUT	1	2117034
2	CLOSE NIPPLE	1	2116987
3	COVER	1	2117028
4	AIR FILTER ELEMENT	1	200EBB059
5	HOUSING	1	2117027
6	O–RING	1	2116955

INTAKE VALVE CONTROLLER



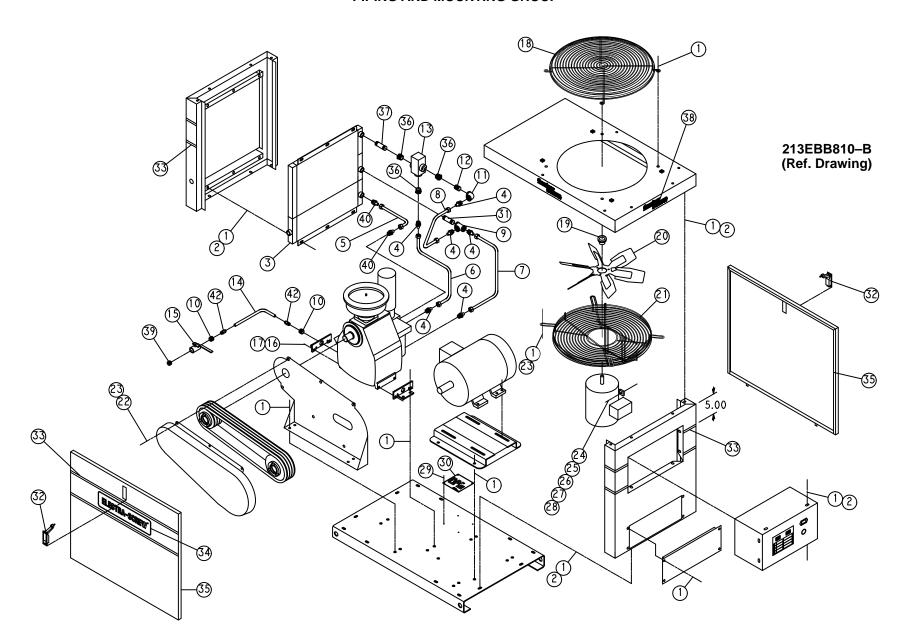
Ref. No.	Name of Part	Qty.	Part No.
1	GASKET	2	*
2	HOUSING	1	*
3	GUIDE (PLUG)	1	*
4	GASKET (RING)	1	*
7	SPRING	1	*
8	BUSHING	1	*
9	PISTON	1	*
10	CONTROLLER (INTAKE)	1	2116967
11	SCREW-So Hd CAP	4	2116976
12	SEAL	1	*
*	KIT-VALVE (INTAKE) Includes Two (2) of Ref. No. 1, and		
	One (1) Each of Ref. Nos. 2, 3, 4, 7, 8, 9 and 12		200EBB6017

MINIMUM PRESSURE/CHECK VALVE



Ref. No.	Name of Part	Qty.	Part No.
1	NUT (Lock)	1	2117006
2	SCREW-SET	1	2117019
3	HOUSING-VALVE	1	2116957
4	O–RING	1	*
5	GUIDE (SPRING)	1	2116946
6	SPRING	1	2116947
7	O–RING	1	*
8	PISTON-CONTROL	1	*
9	SPRING-VALVE	1	*
10	PLATE-VALVE	1	*
11	UNION (STRAIGHT)	1	2116945
12	FILTER-OIL	1	200EBB369
13	SEPARATOR – AIR/OIL	1	200EBB035
14	UNION (STRAIGHT)	1	2116952
15	HOUSING (SEPARATOR)	1	2116965
*	KIT-MAINT. (Min. Press. Valve) Includes Ref. Nos. 4, 7, 8, 9, 10, (1) 2116988 Gasket & (1) 2116940 Oil Scavenge Gauge (Not shown)	1	2116968

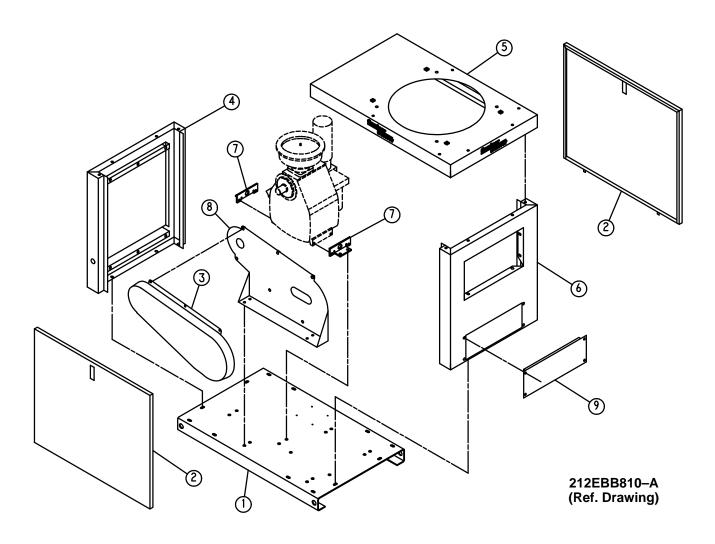
PIPING AND MOUNTING GROUP



PIPING AND MOUNTING GROUP

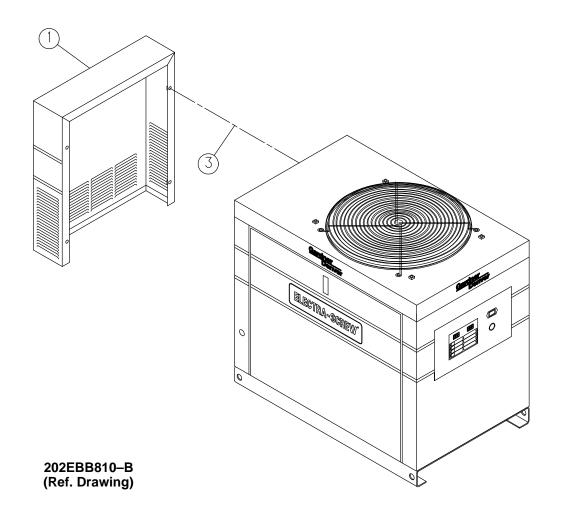
Ref. No.	Name of Part	Qty.	Part No.	Ref. No.	Name of Part	Qty.	Part No.
1	SCREW-FLANGED	54	75LM51	22	SCREW-FLANGED	6	75K48
2	NUT-FLANGED	30	50AW5	23	WASHER-PLAIN	10	95A5
3	COOLER-OIL/AIR RAD	1	200EBB201	24	SCREW-HEX CAP	4	75A35
4	CONNECTOR-TUBE	6	86H139	25	RETAINER	4	2014731
5	TUBE-WITH FITTING	1	301EBB863	26	WASHER-PLAIN	4	95A2
6	TUBE-WITH FITTING	1	202EBB863	27	WASHER-LOCK	4	95B2
7	TUBE-WITH FITTING	1	201EBB863	28	NUT-HEX	4	50B2
8	TUBE-WITH FITTING	1	203EBB863	29	RIVET	4	70E13
9	TEE-PIPE	1	64G6G	30	PLATE-NAME	1	208EAQ496
10	BUSHING-PIPE	2	64R12	31	NIPPLE-PIPE	1	63F22G
11	ELBOW-PIPE	1	64C4G				
12	NIPPLE-PIPE	1	63F21G	32	LATCH	2	31D58
13	VALVE-THERMAL	1	90AR934	33	DECAL	3	203ESO077
14	TUBE	1	85K5	34	DECAL	2	214ECM077
15	VALVE-BALL	1	90AR360	35	SEAL	14	32E12
16	SCREW	4	655MD030	36	BUSHING PIPE	3	64E5G
17	LOCKWASHER	4	95B4	37	NIPPLE-PIPE	1	63F22G
18	GUARD-FAN	1	200ECM393	38	DECAL	4	200EBB077
19	BUSHING-SHEAVE	1	22G27	39	PLUG-PIPE	1	64B2
20	FAN	1	200EBB701	40	CONNECTOR-TUBE	2	88H144
21	GUARD-FAN	1	200EBB393	42	CONNECTOR (TUBE)	2	86E9

MOUNTING GROUP



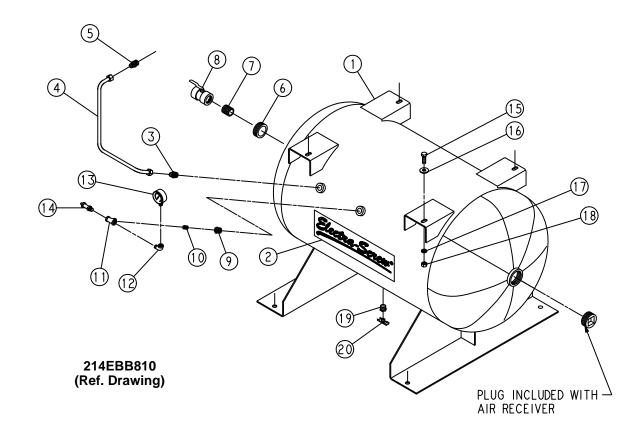
Ref. No.	Name of Part	Qty.	Part No.
1	BASE	1	200EBB285
2	PANEL	2	201EBB216
3	GUARD-DRIVE	1	201EBB120
4	FRAME	1	202EBB314
5	HOOD	1	200EBB053
6	FRAME	1	203EBB314
7	BRACKET (FORMED)	2	200EBB142
8	BRACE	1	200EBB326
9	PLATE-INSPECTION	1	300EBB052
10	PANEL	2	300EBB216
11	FRAME	1	301EBB314
12	BAFFLE	1	300EBB840
13	FRAME	1	300EBB314
14	HOOD	1	300EBB053

QUIET ENCLOSURE



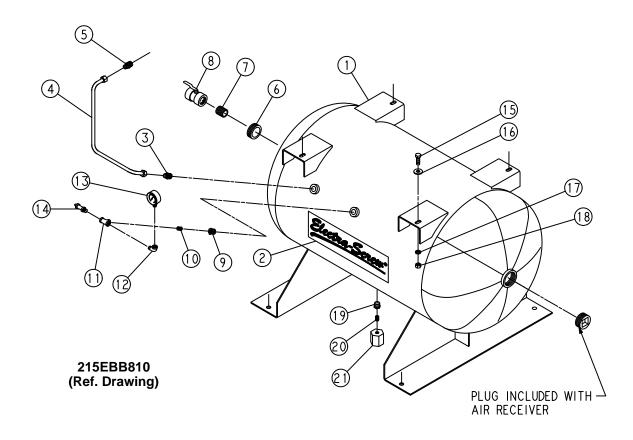
Ref. No.	Name of Part	Qty.	Part No. 203EBB4017
1	BAFFLE	1	202EBB840
3	SCREW-FLANGED	4	75LM51

AIR RECEIVER WITHOUT CONDENSATE DRAIN



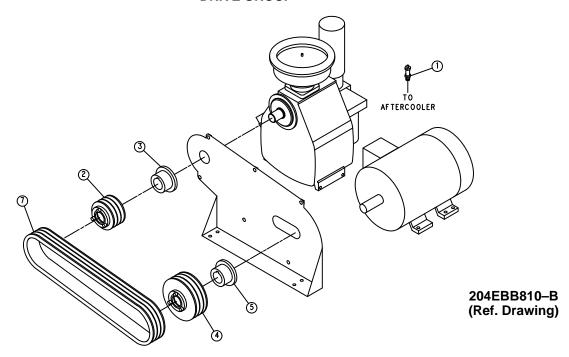
Ref. No.	Name of Part	Qty.	80 Gallon	120 Gallon
1	RECEIVER-AIR	1	200EBB645	201EBB645
2	DECAL	2	212EBE077	212EBE077
3	CONNECTOR-TUBE	1	86H139	86H139
4	TUBE-W/FIT	1	204EBB863	204EBB863
5	CONNECTOR-TUBE	1	86H139	86H139
6	BUSHING-PIPE	1	64E11	64E11
7	NIPPLE	1	63H1G	63H1G
8	VALVE-BALL	1	90AR362	90AR362
9	BUSHING-PIPE	1	64E2G	64E2G
10	NIPPLE	1	63D1G	63D1G
11	TEE-PIPE	1	64G3G	64G3G
12	ELBOW	1	64D2G	64D2G
13	GAUGE-AIR PRESSURE	1	27A114	27A114
14	VALVE-PRESSURE RELIEF	1	90AR657	90AR657
15	SCREW	4	655ED060	655ED060
16	WASHER	8	95A3	95A3
17	LOCKWASHER	4	95B3	95B3
18	NUT	4	50B3	50B3
19	BUSHING-PIPE	1	64E2G	64E2G
20	COCK	1	90C12	90C12

AIR RECEIVER WITH CONDENSATE DRAIN



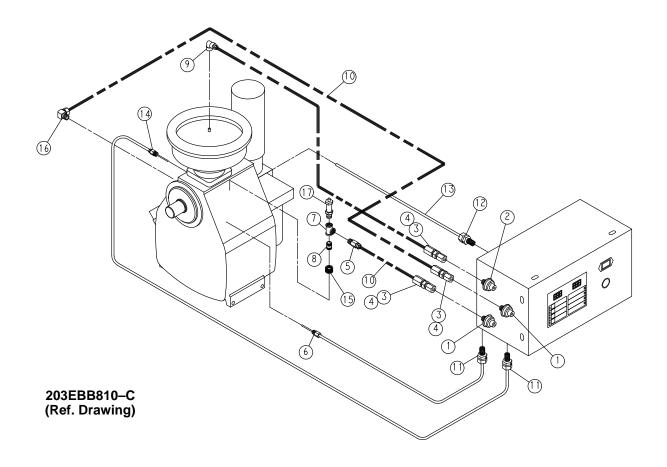
Ref. No.	Name of Part	Qty.	80 Gallon	120 Gallon
1	RECEIVER-AIR	1	200EBB645	201EBB645
2	DECAL	2	212EBE077	212EBE077
3	CONNECTOR-TUBE	1	86H139	86H139
4	TUBE-WITH FITTING	1	204EBB863	204EBB863
5	CONNECTOR-TUBE	1	86H139	86H139
6	BUSHING-PIPE	1	64E11	64E11
7	NIPPLE	1	63H1G	63H1G
8	VALVE-BALL	1	90AR362	90AR362
9	BUSHING-PIPE	1	64E2G	64E2G
10	NIPPLE	1	63D1G	63D1G
11	TEE-PIPE	1	64G3G	64G3G
12	ELBOW	1	64D2G	64D2G
13	GAUGE-AIR PRESSURE	1	27A114	27A114
14	VALVE-PRESSURE RELIEF	1	90AR657	90AR657
15	SCREW	4	655ED060	655ED060
16	WASHER	8	95A3	95A3
17	LOCKWASHER	4	95B3	95B3
18	NUT	4	50B3	50B3
19	BUSHING-PIPE	1	64E2G	64E2G
20	NIPPLE	1	63F21G	63F21G
21	VALVE-DUMP	1	90AR319	90AR319

DRIVE GROUP

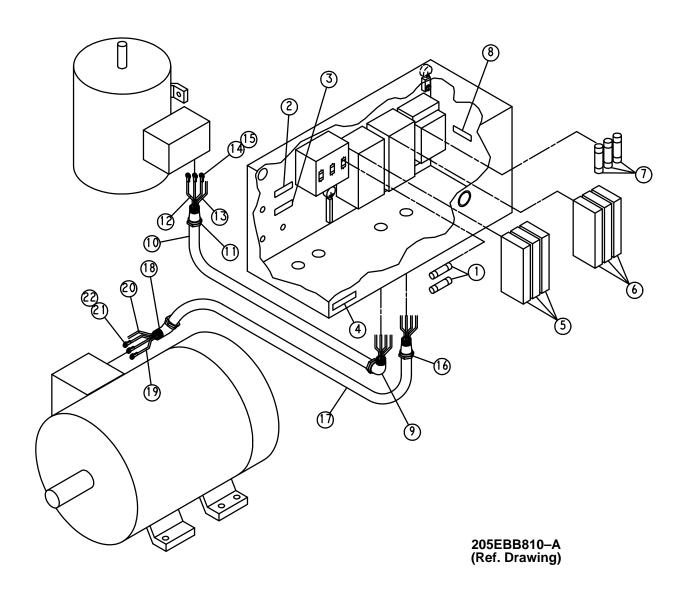


REF. NO.	NAME OF PART	QTY.	100 PSI	125 PSI	150 PSI	175 PSI
1 2 3 4 5 7	7.5 HP DRIVE GROUP VALVE-PRESSURE RELIEF SHEAVE BUSHING-HUB SHEAVE BUSHING-HUB BUSHING-HUB BELT	1 1 1 1 1	209EBB4004 90AR661 73M23V33 22J4 75M23V69 22F22SDS 13AG5002	200EBB4004 90AR662 73M23V36 22J4 73M23V69 22F22SDS 13AG5002	201EBB4004 90AR663 73M23V41 22J4 73M23V69 22F22SDS 13AG5302	202EBB4004 90AR657 73M23V41 22J4 73M23V60 22F22SH 13AG5002
REF. NO.	NAME OF PART	QTY.	100 PSI	125 PSI	150 PSI	175 PSI
1 2 3 4 5 7	10 HP DRIVE GROUP VALVE-PRESSURE RELIEF SHEAVE BUSHING-HUB SHEAVE BUSHING-HUB BUSHING-HUB BELT	1 1 1 1 1	210EBB4004 90AR661 73M23V47 22J4 73M23V69 22F22SDS 13AG5302	203EBB4004 90AR662 73M23V50 22J6 73M23V65 22F22SDS 13AG5002	204EBB4004 90AR663 73M23V41 22J4 73M23V50 22F22SH 13AG4752	205EBB4004 90AR657 73M23V41 22J4 73M23V45 22F22SH 13AG4752
REF. NO.	NAME OF PART	QTY.	100 PSI	125 PSI	150 PSI	175 PSI
1 2 3 4 5 7	15 HP DRIVE GROUP VALVE-PRESSURE RELIEF SHEAVE BUSHING-HUB SHEAVE BUSHING-HUB BUSHING-HUB	1 1 1 1 1	211EBB4004 90AR661 73M33V33 22J4 73M33V69 22F22SDS 13AG5003	206EBB4004 90AR662 73M33V36 22J4 73M33V69 22F22SDS 13AG5003	207EBB4004 90AR663 73M33V41 22J4 73M33V69 22F22SDS 13AG5303	208EBB4004 90AR657 73M33V41 22J4 73M33V60 22F22SDS 13AG5003

CONTROL TUBING



Ref. No.	Name of Part	Qty.	Part No.
1	TRANSDUCER-PRESSURE	2	88H242
2	SWITCH-VACUUM	1	88H195
3	CONNECTOR-TUBE	3	86N287
4	O–RING	3	24A383
5	CONNECTOR-TUBE	1	86E4
6	THERMISTOR PROBE (1/8 NPT)	1	21D293
7	TEE-PIPE	1	64G3G
8	NIPPLE	1	63D1G
9	ELBOW-TUBE	1	86E78
10	TUBE	10	85K3
11	FITTING-CABLE	2	24CA2865
12	FITTING-ELECTRICAL	1	24CA615
13	WIRE	5	97J68
14	THERMISTOR PROBE (1/8 NPT)	1	21D293
15	BUSHING-PIPE	1	64R12
16	ELBOW-TUBE	1	86E60
17	VALVE-PRESSURE RELIEF	1	90AR735



For Parts List, Refer to Pages 52 thru 54.

ELECTRICAL GROUP - 7.5 HP (Refer to Illustration, Page 51, This Section)

Ref. No.	Name of Part	Qty.	200 Volt Part No.	230 Volt Part No.	460 Volt Part No.	575 Volt Part No.
	ELECTRICAL GROUP		200EBB4007	201EBB4007	202EBB4007	203EBB4007
1	FUSE, Primary	2	24CA3722	24CA2779	24CA2897	24CA3718
2	DECAL, Primary Fuse	1	294AUX077	258AUX077	272AUX077	290AUX077
3	DECAL, Secondary Fuse	1	298AUX077	297AUX077	297AUX077	297AUX077
4	MARKER-VOLTAGE	1	69F50	69F51	69F52	69F60
5	HEATER-OVERLOAD, Fan	3	See Page 57	See Page 57	See Page 57	See Page 57
6	HEATER-OVERLOAD, Main	3	See Page 57	See Page 57	See Page 57	See Page 57
7	FUSE, Fan Motor	3	24CA4091	24CA4090	24CA4088	24CA4088
8	DECAL, Fan Motor Fuse	1	309AUX077	308AUX077	306AUX077	306AUX077
9	FITTING-CONDUIT, Fan	1	24A380	24A380	24A380	24A380
10	CONDUIT, Fan	2	24A402	24A402	24A402	24A402
11	FITTING-CONDUIT, Fan	1	24A378	24A378	24A378	24A378
12	WIRE-LINE, Fan	7	97H2A	97H2A	97H2A	97H2A
13	WIRE-GROUND, Fan	3	97H2G	97H2G	97H2G	97H2G
14	LUG-TERMINAL	6	24A488	24A488	24A488	24A488
15	MISC. ELECTRICAL PARTS	1		AUX68367	AUX68367	AUX68367
16	FITTING-CONDUIT, Main	1	24A384	24A384	24A378	24A378
17	CONDUIT, Main	3	24A443	24A443	24A402	24A402
18	FITTING-CONDUIT, Main	1	24A385	24A385	24A379	24A379
19	WIRE-LINE, Main	10	2009801	2009801	2009319	97H2A
20	WIRE-GROUND, Main	4	2009989	2009989	2009988	97H2G
21	LUG-TERMINAL	6	2009530	2009530	24CA1864	24CA1864
22	MISC. ELECTRICAL PARTS	1	AUX68369	AUX68369	AUX68369	AUX68369
*	CONTROL BOX	1	203EBB466	202EBB466	202EBB466	202EBB466

^{*} Not shown.

ELECTRICAL GROUP - 10 HP (Refer to Illustration, Page 51, This Section)

Ref. No.	Name of Part	Qty.	200 Volt Part No.	230 Volt Part No.	460 Volt Part No.	575 Volt Part No.
	ELECTRICAL GROUP		204EBB4007	205EBB4007	206EBB4007	207EBB4007
1	FUSE, Primary	2	24CA3722	24CA2781	24CA2897	24CA3718
2	DECAL, Primary Fuse	1	294AUX077	260AUX077	272AUX077	290AUX077
3	DECAL, Secondary Fuse	1	298AUX077	298AUX077	297AUX077	297AUX077
4	MARKER-VOLTAGE	1	69F50	69F51	69F52	69F60
5	HEATER-OVERLOAD, Fan	3	See Page 57	See Page 57	See Page 57	See Page 57
6	HEATER-OVERLOAD, Main	3	See Page 57	See Page 57	See Page 57	See Page 57
7	FUSE, Fan Motor	3	24CA4091	24CA4090	24CA4088	24CA4088
8	DECAL, Fan Motor Fuse	1	309AUX077	308AUX077	306AUX077	306AUX077
9	FITTING-CONDUIT, Fan	1	24A380	24A380	24A380	24A380
10	CONDUIT, Fan	2	24A402	24A402	24A402	24A402
11	FITTING-CONDUIT, Fan	1	24A378	24A378	24A378	24A378
12	WIRE-LINE, Fan	7	97H2A	97H2A	97H2A	97H2A
13	WIRE-GROUND, Fan	3	97H2G	97H2G	97H2G	97H2G
14	LUG-TERMINAL	6	24A488	24A488	24A488	24A488
15	MISC. ELECTRICAL PARTS	1	AUX68367	AUX68367	AUX68367	AUX68367
16	FITTING-CONDUIT, Main	1	24A384	24A384	24A380	24A378
17	CONDUIT, Main	3	24A443	24A443	24CA402	24CA402
18	FITTING-CONDUIT, Main	1	24A385	24A385	24A379	24A379
19	WIRE-LINE, Main	10	2009801	2009801	2009800	2009319
20	WIRE- GROUND, Main	4	97J39	97J39	2009989	2009988
21	LUG-TERMINAL	6	2009530	2009530	24CA1864	24CA1864
22	MISC. ELECTRICAL PARTS	1	AUX68370	AUX68370	AUX68369	AUX68369
*	CONTROL BOX	1	203EBB466	203EBB466	202EBB466	202EBB466

^{*} Not shown.

ELECTRICAL GROUP - 15 HP (Refer to Illustration, Page 51, This Section)

Ref. No.	Name of Part	Qty.	200 Volt Part No.	230 Volt Part No.	460 Volt Part No.	575 Volt Part No.
	ELECTRICAL GROUP		208EBB4007	209EBB4007	210EBB4007	211EBB4007
1	FUSE, Primary	2	24CA3722	24CA2781	24CA2897	24CA3718
2	DECAL, Primary Fuse	1	294AUX077	260AUX077	272AUX077	290AUX077
3	DECAL, Secondary Fuse	1	298AUX077	298AUX077	297AUX077	297AUX077
4	MARKER-VOLTAGE	1	69F50	69F51	69F52	69F60
5	HEATER-OVERLOAD, Fan	3	See Page 57	See Page 57	See Page 57	See Page 57
6	HEATER-OVERLOAD, Main	3	See Page 57	See Page 57	See Page 57	See Page 57
7	FUSE, Fan Motor	3	24CA4091	24CA4090	24CA4088	24CA4088
8	DECAL, Fan Motor Fuse	1	309AUX077	308AUX077	306AUX077	306AUX077
9	FITTING-CONDUIT, Fan	1	24A380	24A380	24A380	24A380
10	CONDUIT, Fan	2	24A402	24A402	24A402	24A402
11	FITTING-CONDUIT, Fan	1	24A378	24A378	24A378	24A378
12	WIRE-LINE, Fan	7	97H2A	97H2A	97H2A	97H2A
13	WIRE-GROUND, Fan	3	97H2G	97H2G	97H2G	97H2G
14	LUG-TERMINAL	6	24A488	24A488	24A488	24A488
15	MISC. ELECTRICAL PARTS	1	AUX68367	AUX68367	AUX68367	AUX68367
16	FITTING-CONDUIT, Main	1	2009323	2009323	24A384	24A378
17	CONDUIT, Main	3	2009314	2009314	24A443	24A402
18	FITTING-CONDUIT, Main	1	2009324	2009324	24A385	24A379
19	WIRE-LINE, Main	10	2009408	2009406	2009801	2009800
20	WIRE- GROUND, Main	4	97J39	97J39	2009989	2009989
21	LUG-TERMINAL	6	24CA1444	24A306	2009530	24CA1864
22	MISC. ELECTRICAL PARTS	1	AUX68370	AUX68370	AUX68369	AUX68369
*	CONTROL BOX	1	203EBB466	203EBB466	202EBB466	202EBB466

^{*} Not shown.

CONTROLLER ASSEMBLY

Name of Part	Qty	Part No.	Part No.
ASSEMBLED PANEL – NEMA 1	1	202EBB466	203EBB466
BOX-CONTROL	1	201EBB179	201EBB179
CONTROLLER	1	200EBE1173	200EBE1173
KEYPAD ASM	1	200EBE375	200EBE375
PLUG-CONNECTOR	1	24CA3306	24CA3306
PLUG-CONNECTOR	1	24CA3400	24CA3400
FUSE	1	24CA3725	24CA3726
TRANSFORMER	1	2116694	2116695
HOURMETER	1	24CA2895	24CA2895
OPERATOR	1	24CA2907	24CA2907
CONTACT BLOCK	1	24CA2908	24CA2908
CONTACTOR	1	24CA2906	24CA3863
STARTER COIL	1	2116394	2116395
RELAY	1	24CA4086	24CA4086
ADAPTOR	1	24CA2502	24CA2502
RELAY	1	24CA4086	24CA4087
ADAPTOR	1	24CA2502	24CA2612
FUSE	1	24CA4098	24CA4098

MOTOR GROUP (MAIN DRIVE MOTORS) (F1 CONDUIT BOX MOUNTING) (60 HZ – ODP)

DESCRIPTION	7.5 HP PART # (1800 RPM)	10 HP PART # (3600 RPM)	15 HP PART NO. (3600 RPM)
MOTOR, 200V	24AW6		
MOTOR, 230/460V	24AW22		
MOTOR, 575V	24AW41		
MOTOR, 200V		24CA674	
MOTOR, 230/460V		24CA678	
MOTOR, 575V		24CA681	
MOTOR, 200V			24CA675
MOTOR, 230/460V			24CA679
MOTOR, 575V			24CA682
BASE	24AZ34	24AZ34	24AZ35
	MOTOR GROUP FAN MOTORS (60 HZ – TEFC)		
DESCRIPTION	7.5 HP PART # (1200 RPM)	10 HP PART # (1200 RPM)	15 HP PART NO. (1800 RPM)
MOTOR, 200V			24CA2180
MOTOR, 230/460V			24CA2182
MOTOR, 575V			24CA2184
MOTOR, 200V	24CA4177	24CA4177	
MOTOR, 230/460V	24CA2464	24CA2464	
MOTOR, 575V	24CA4178	24CA4178	

OVERLOAD RELAY HEATER CONVERSION LISTING

Refer to Motor Nameplate "Amperage" and Decal in Control Panel for Selection of Overload Relay Heater Packs.

CUTLER-HAMMER **GARDNER DENVER PART NUMBER PART NUMBER** H2018 H2019 H2020 24CA2926 H2021

IDENTIFICATION AND INSTRUCTION GROUP

NAME OF PART			PART NO.
*	DECAL, WARNING – SEE WIRING DIAGRAM	1	222EAQ077
*	DECAL, WARNING – ELECTRICAL SHOCK	1	216EAQ077
	DECAL, PARTS LIST / SERVICE MANUAL NUMBER	1	204EDE077
	DECAL, L1	1	236AUX077
	DECAL, L2	1	237AUX077
	DECAL, L3	1	238AUX077
	TAG-INSTRUCTION, WARNING - INCORRECT MOTOR ROTATION	1	201EAQ304
	DECAL, WARNING – HOT OIL UNDER PRESSURE	1	204EBE077
	DECAL, WARNING – AUTO RESTART, ELECTRIC SHOCK, etc	1	227EAQ077
*	DECAL, WARNING – HOT OIL UNDER PRESSURE	1	212EAQ077
	DECAL, LUBRICANT AEON 2000	1	253EAQ077
*	DECAL, DANGER – DO NOT MODIFY	1	218EAQ077
*	DECAL, WARNING – ROTATING MACHINERY	1	211EAQ077
*	DECAL, WARNING – AUTO RESTART	1	207EAQ077
*	DECAL, DANGER – DO NOT BREATHE	1	206EAQ077
	DECAL, IDENTIFICATION & INSTRUCTION	1	201EJB077
	DECAL, NOTICE – USE GARDNER DENVER PARTS	1	201E3B077 214EAQ077
		-	
	DECAL, AUTO SENTRY S	1	206EJB077
	DECAL, NAMEPLATE	1	69F64
	DECAL, QUALITY WITHOUT QUESTION	1	251EAQ077
	DECAL, CAUTION – USE FLOORPLATE	1	221EAQ077
	DECAL, OIL SEPARATOR	1	201EBB077
	DECAL, INSTALLATION – OIL FILTER ELEMENT	1	202EBB077

^{*} Refer to pages 6 and 7 for Decal information regarding Safety related items.

REPAIR PARTS

Your Gardner Denver rotary screw compressor is designed and manufactured for many years of reliable operation. All components are engineered to exacting specifications, which will function together as a system to provide maximum efficiency. To insure the continuing integrity of compressor operation, use only original quality genuine Gardner Denver replacement parts and accessories.

Name of Part		Part No.
ROUTINE MAINTENANCE KIT, Standard Air Filter	2	200EBB6013 200EBB059
ELEMENT, Oil Filter	3	200EBB369
OIL SEPARATOR ELEMENT	1	200EBB035
MAINTENANCE KIT (Minimum Pressure/Check Valve)	1	2116968
KIT-VALVE (Intake Maintenance)	1	2116966
KIT, BEARING (Includes Oil Seal Kit)	1	200EBB6023
KIT, OIL SEAL	1	200EBB6029
KIT-VALVE (Intake Regulator)	1	200EBB6017
ELECTRICAL CONTROL KIT THERMISTOR PROBE (1/8 NPT) THERMISTOR PROBE (1/4 NPT) SWITCH-VACUUM TRANSDUCER	2 2 1 2	201EBB6013 21D293 21D264 88H195 88H242
LUBRICANT (AEON 2000) 5-GALLON PAIL 55-GALLON DRUM	1 1	28G36 28G37
THERMAL MIXING VALVE ELEMENTS 150° F		2116924 2116925 2116926
NEW AIR END		200EBB1095
REMANUFACTURED AIR END		200EBB1095X
OPTIONAL ACCESSORIES (Available from your Authorized GD Distributor) ELIMINATOR® WATER/OIL SEPARATOR MOISTURE SEPARATOR/TRAP (7.5/10 HP) MOISTURE SEPARATOR/TRAP (15 HP)		200EAQ035 7000352 7000354

SECTION 11 OPTIONAL INTEGRATED DRYER SERVICE INSTRUCTIONS AND PARTS LIST

INSTALLATION – There should be at least 12 inches (305 mm) clearance on all sides of the dryer. The condensor fins and surfaces should be regularly cleaned with compressed air. The grill can be easily removed to access the condensor coil. Ambient temperatures should never be above 110° F (43° C) or below 40° F (4° C).

Before start—up, the refrigerant suction pressure needs to be read. This indicates the refrigerant pressure and during shutdown corresponds with ambient temperature. See FIGURE 11–2.

At start—up, you will want to start the dryer prior to starting the air compressor. DO NOT START WITH A LOAD ON THE DRYER. After pushing the start button, the "MOTOR RUN" indicating light will illuminate. The dryer is designed to run continuously and must not by cycled with the air compressor. The fan on the air cooled unit will cycle in accordance with head pressure.

The refrigerant suction pressure gauge reading after start—up and while operating under rated load will be (R–22) 57–65 psig.

OPERATING INSTRUCTIONS – The EBB integrated dryer is electrically isolated from the EBB air compressor and will not cause a shutdown of an operating air compressor if a fault condition should occur in the dryer

The dryer unit requires a separate power source rated at 120 VAC/60 Hz. Refer to the manufacturer's name-plate, on the dryer, for the minimum supply circuit conductor ampacity and maximum rating of the branch-circuit short—circuit and ground—fault protective device. The dryer control circuit is internally fused for 2 ampere protection. Additionally, the dryer compressor motor is provided with internal thermal overload protection.

Externally mounted controls for the EBB integrated dryer consist of a "START" pushbutton, "STOP" push-

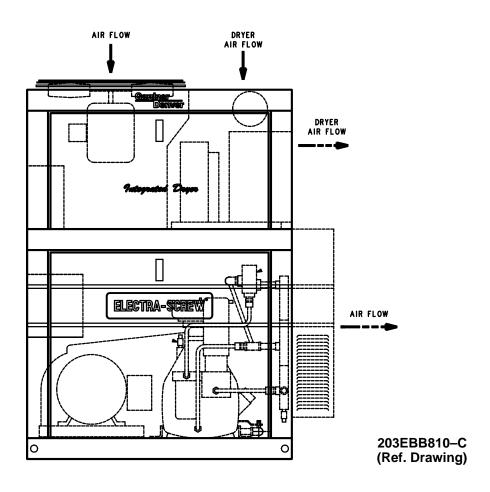


FIGURE 11-1 - COMPRESSOR WITH INTEGRATED DRYER

TEMPERATURE-PRESSURE CHART (R-22)							
Temperature F	Pressure psig		Temperature F	Pressure psig			
28	52.4		65	111.2			
30	54.9		70	121.4			
32	57.5		75	132.2			
34	60.1		80	143.6			
36	62.8		85	155.7			
38	65.6		90	168.4			
40	68.5		95	181.8			
45	76.0		100	195.9			
50	84.0		105	210.8			
55	92.6		110	226.4			
60	101.6						

FIGURE 11-2 - TEMPERATURE-PRESSURE CHART (R-22)

button, "MOTOR RUN" indicator and an "ALARM" indicator light.

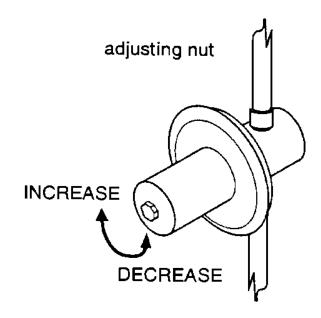
The compressor fan motor is directly controlled by pressure switch S2 when the dryer is in the "MOTOR RUN" mode. Pressure switch S2 will close to activate the fan motor when the dryer compressor discharge pressure reaches 195 PSI. The fan motor will continue to operate until the dryer compressor discharge pressure decreases to 150 PSI causing pressure switch S2 to open.

The "ALARM" circuit in the EBB integrated dryer is controlled by pressure switch S1 which will open if the dryer compressor discharge pressure reaches 375 PSI. This condition will cause the dryer unit to shutdown and the "ALARM" indicator to be lit. The unit cannot be restarted until the dryer compressor discharge pressure decreases below 300 PSI causing pressure switch S1 to close and the "ALARM" indicator to be extinguished. Refer to the troubleshooting guide in the event of an "ALARM" condition.

The EBB integrated dryer must be manually restarted in the event of a power failure.

The noncycling operation of the refrigerated dryer is controlled by two modulating valves. The hot gas bypass valve is used in conjunction with the capillary tube. This valve automatically opens and closes depending on the amount of cooling required, thus maintaining the design pressure dew point. The hot gas by—pass is preset at the factory. The suction pressure gauge

should indicate 65 psig for R–22. If adjustment is necessary, refer to FIGURE 11–3.



Increasing the suction pressure will raise the evaporator temperature.

Decreasing the suction pressure will lower the evaporator temperature.

FIGURE 11-3 - ADJUSTING NUT FOR SUCTION PRESSURE

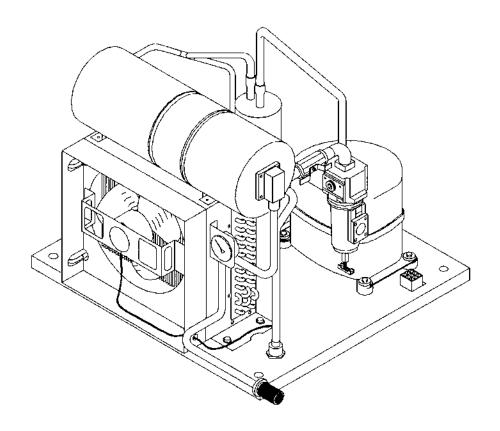


FIGURE 11-4 - REFRIGERATED DRYER

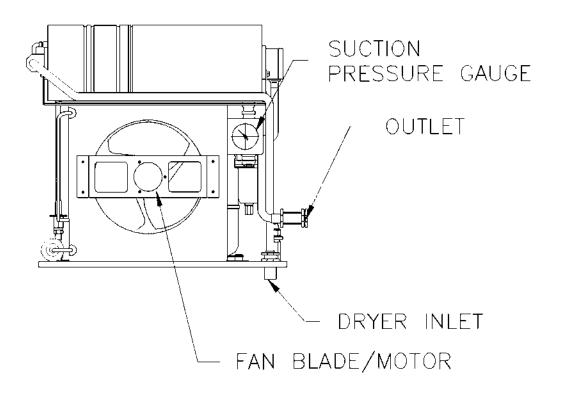


FIGURE 11-5 - SUCTION PRESSURE GAUGE, DRYER INLET AND OUTLET

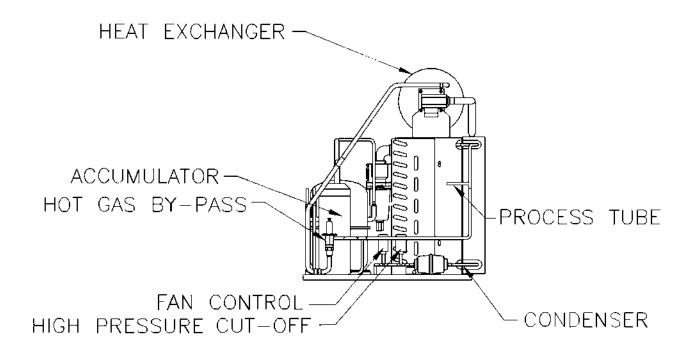


FIGURE 11-6 - CONDENSER, HEAT EXCHANGER, HOT GAS BYPASS

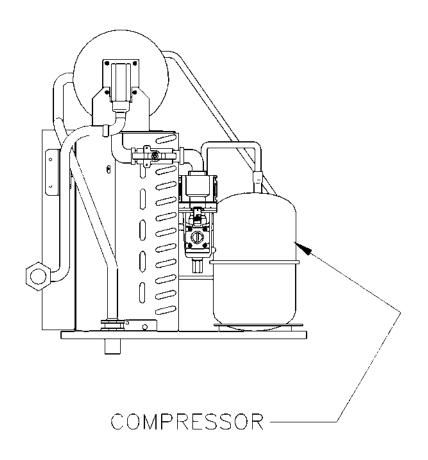


FIGURE 11-7 - COMPRESSOR (REFRIGERATED DRYER)

TROUBLE SHOOTING GUIDE FOR OPTIONAL INTEGRATED DRYER

SYMPTOM		POSSIBLE CAUSE		REMEDY
Dryer not running Motor Run light is on	1.	Low voltage to the dryer.	1.	Verify proper line voltage to unit
Motor Run light is on	2.	Contactor not pulling in.	2.	Check all safeties, verify con- trol voltage, check coil continuity.
	3.	Compressor overload open	3.	Verify that compressor is not grounded or shorted phase to phase, verify proper refrigerant charge in unit, verify proper ambient temperature conditions (40 to 110 F.).
	4.	Defective compressor start components.	4.	Verify that capacitors and voltage relays are functioning properly.
	5.	Compressor windings open.	5.	Verify that overload is functioning properly by checking continuity, read windings for continuity.
Dryer not running	1.	Switch not turned on.	1.	Check switch.
Motor Run light is off.	2.	No power.	2.	Verify proper line voltage to unit.
	3.	Circuit breaker or fuse.	3.	Check circuit breakers and fuses. Ascertain cause of fuse failure before trying to restart.
	4.	Improperly wired.	4.	Check wiring against wiring diagram.
	5.	Defective Start or Stop switch.	5.	Check switches for continuity.
High discharge pressure (above335 psig)	1.	Fan not operating.	1.	Check fan motor. Check fan cycling control for proper operation.
	2.	Dirty or blocked condensor.	2.	Maintain clearances around the unit as specified in the manual. Inspect condensor for dirt and debris.
	3.	High ambient conditions.	3.	Verify ambient conditions as specified in the manual.
	4.	Excessive air load exceeding the capacity of the dryer.	4.	Verify proper flow and load at dryer inlet.

High suction pressure (62 to 72 psig normal)	1.	Excessive air load exceeding the capacity of the dryer.	1.	Verify proper flow and load at dryer inlet.
	2.	Hot gas by–pass valve setting too high.	2.	Follow instructions in manual checking and setting hot gas bypass valve.
	3.	High ambient condition.	3.	Verify ambient conditions as specified in the manual.
Low suction pressure (62 to 72 psig normal)	1.	Low or no air load.	1.	Verify proper flow and load at dryer inlet.
	2.	Fan not cycling at low load.	2.	Check fan operation. Verify proper operation of fan cycling control.
	3.	Hot gas by–pass valve setting too low.	3.	Follow instructions in manual for checking and setting hot gas by–pass valve.
	4.	Refrigerant leak.	4.	Check unit for leaks using soap bubbles or electronic leak detector. Repair leak.
	5.	Low ambient temperature and fan not cycling.	5.	Check fan operation. Verify proper operation of fan cycling control.
Moisture in air system downstream.	1.	Dryer overloaded (air flow).	1.	Verify proper flow and load at dryer inlet.
	2.	Separator drains not functioning.	2.	Inspect automatic drain and verify proper operation. Follow instructions in maintenance manual.
	3.	By-pass valve open.	3.	Close by-pass.
	4.	Refrigeration system not operating.	4.	See "Dryer not running, Motor light is on" and "Dryer not running, Motor light is off," page 64.
High pressure drop in dryer air circuit.	1.	Dryer overloaded (air flow).	1.	Verify proper flow and load at dryer inlet.
	2.	Heat exchanger clogged.	2.	Clean exchanger to remove debris and restart unit.
	3.	Frozen evaporator coil.	3.	Verify proper load and hot gas by– pass valve settings. Follow instruc– tions in manual to check and set hot gas by–pass valve.

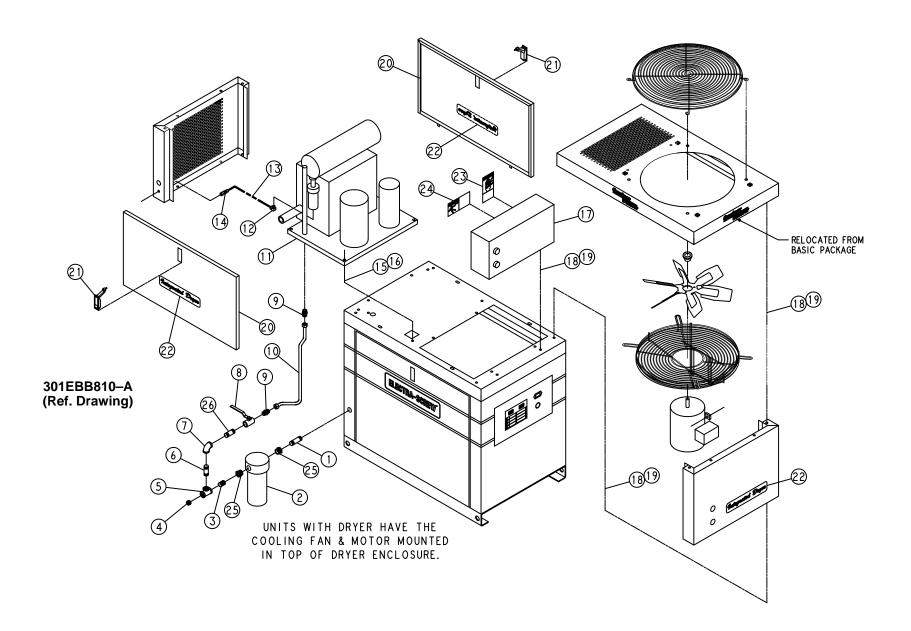
POSSIBLE CAUSE

REMEDY

SYMPTOM

SYMPTOM	PC	OSSIBLE CAUSE		REMEDY
Alarm light on (Refrigerant compressor OFF)	1. Ai	ir inlet temperature too high.	1.	Verify proper load and temperature at dryer inlet.
oomprosser or ry	2. Re	efrigerant shortage. 2	2.	Check for leaks using soap bubbles or electronic leak detector. If leaks are detected repair immediately using industry approved standards.
	3. Bl	locked condensor.	3.	Clean condensor or remove obstruction and restart unit.

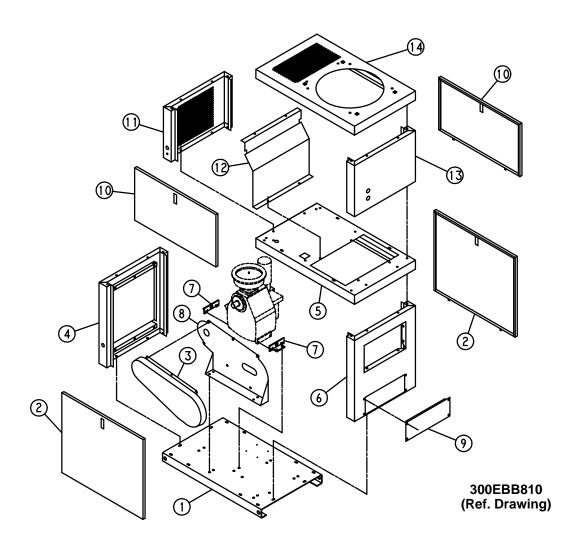
INTEGRATED DRYER ASSEMBLY AND PIPING



INTEGRATED DRYER ASSEMBLY AND PIPING

Ref. No.	Name of Part	Qty.	Part No.
1	NIPPLE-PIPE	1	63G3G
2	SEPARATOR-MOISTURE	1	7000354
3	NIPPLE-PIPE	1	63F21G
4	PLUG	1	64B2
5	TEE-PIPE	1	64G6G
6	NIPPLE-PIPE	1	63F2G
7	ELBOW-PIPE	1	64C4G
8	VALVE-BALL	1	90AR360
9	CONNECTOR-TUBE	2	86H144
10	TUBE-W/FIT	1	302EBB863
11	DRYER-AIR	1	300EBB463
12	ELBOW-TUBE	1	86E78
13	TUBE	2	85K3
14	CONNECTOR-TUBE	1	86N287
15	SCREW-FLANGED	4	75LM98
16	NUT-FLANGED	4	50AW5
17	STARTER-CONTROL BOX	1	300EBB466
18	SCREW-FLANGED	22	75LM51
19	NUT-FLANGED	22	50AW5
20	SEAL	11	32E12
21	LATCH	2	31D58
22	DECAL	3	300EBB077
23	DECAL	1	213EAQ077
24	DECAL	1	216EAQ077
25	BUSHING-PIPE	2	64E5G
26	NIPPLE	1	63F22G

INTEGRATED DRYER MOUNTING GROUP

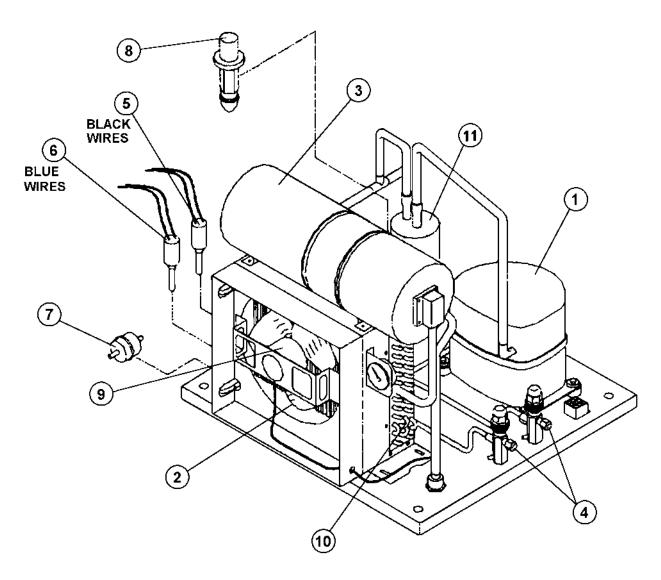


Ref. No.	Name of Part	Qty.	Part No.
1	BASE	1	200EBB285
2	PANEL	2	201EBB216
3	GUARD-DRIVE	1	201EBB120
4	FRAME	1	202EBB314
5	HOOD	1	301EBB053
6	FRAME	1	203EBB314
7	BRACKET (FORMED)	2	200EBB142
8	BRACE	1	200EBB326
9	PLATE-INSPECTION	1	300EBB052
10	PANEL	2	300EBB216
11	FRAME	1	301EBB314
12	BAFFLE	1	300EBB840
13	FRAME	1	300EBB314
14	HOOD	1	300EBB053

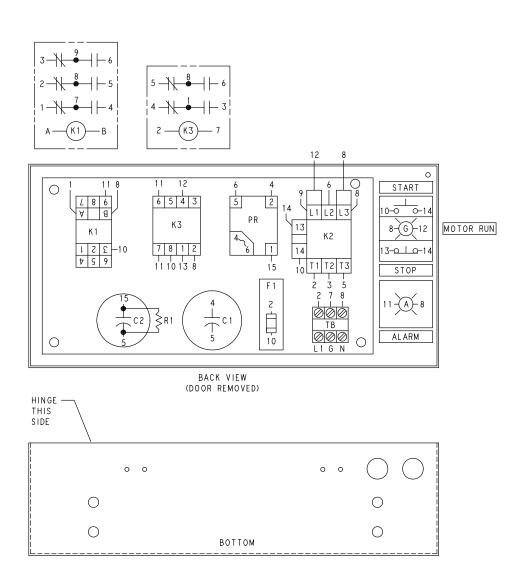
STARTER CONTROL BOX FULL VOLTAGE – NEMA 1 – 120 VOLT

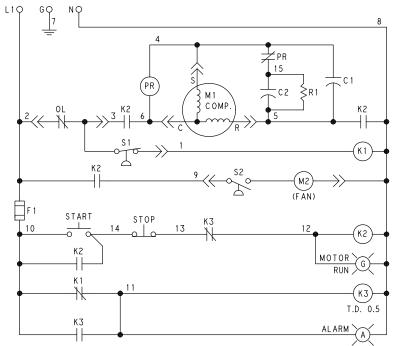
Ref. No.	Name of Part	Qty.	Part No.
1	CONTROL BOX	1	300EBB179
2	BLOCK	1	24CA4460
3	PUSHBUTTON SWITCH	1	24CA4459
4	SWITCH	1	24CA2886
5	CONTACTOR	1	24CA4453
6	CONTACT	1	24CA4461
7	RELAY	1	24CA2167
8	SOCKET	1	24CA2168
9	RELAY	1	24CA2169
10	RELAY	1	24CA4455
11	SOCKET	1	24CA4456
12	SPRING	1	24CA4457
13	RELAY	1	24CA4454
14	CAPACITOR	1	24CA4463
15	CAPACITOR	1	24CA4463
16	HOLDER	1	24CA4458

REFRIGERATION COMPONENTS



Ref. No.	Name of Part	Qty.	Part No.
1	COMPRESSOR	1	7000510
2	FAN BLADE	1	7000542
3	HEAT EXCHANGER	1	7003099
4	REFRIGERANT SERVICE VALVE	1	7000591
5	FAN CYCLE CONTROL	1	7000654
6	HIGH PRESSURE CONTROL	1	7000653
7	FILTER / DRYER	1	7000599
8	HOT GAS VALVE	1	7000553
9	FAN MOTOR	1	7000532
10	CONDENSER	1	7000529
11	ACCUMULATOR	1	7000608





300EBB541-B (Ref. Drawing)



WARRANTY ROTARY SCREW COMPRESSORS OIL INJECTED • OIL FREE

GENERAL PROVISIONS AND LIMITATIONS

Gardner Denver Machinery Inc. (the "Company") warrants to each original retail purchaser ("Purchaser") of its new products from the Company or its authorized distributor that such products are, at the time of delivery to the Purchaser, made with good material and workmanship. No warranty is made with respect to:

- 1. Any product which has been repaired or altered in such a way, in the Company's judgment, as to affect the product adversely.
- Any product which has, in the Company's judgment been subject to negligence, accident, improper storage, or improper installation or application.
- 3. Any product which has not been operated or maintained in accordance with the recommendations of the Company.
- 4. Components or accessories manufactured, warranted and serviced by others.
- 5. Any reconditioned or prior owned product.

Claims for items described in (4) above should be submitted directly to the manufacturer.

WARRANTY PERIOD

The Company's obligation under this warranty is limited to repairing or, at its option, replacing, during normal business hours at an authorized service facility of the Company, any part which in its judgment proved not to be as warranted within the applicable Warranty Period as follows.

COMPRESSOR AIR ENDS

Compressor air ends, consisting of all parts within and including the compressor cylinder and gear housing, are warranted for 24 months from date of initial use or 27 months from date of shipment to the first purchaser, whichever occurs first.

Any disassembly or partial disassembly of the air end, or failure to return the "unopened" air end per Company instructions, will be cause for denial of warranty.

OTHER COMPONENTS

All other components are warranted for 12 months from date of initial use or 15 months from date of shipment to first purchaser, whichever occurs first.

LABOR TRANSPORTATION AND INSPECTION

The Company will provide labor, by Company representative or authorized service personnel, for repair or

replacement of any product or part thereof which in the Company's judgment is proved not to be as warranted. Labor shall be limited to the amount specified in the Company's labor rate schedule.

Labor costs in excess of the Company rate schedule amounts or labor provided by unauthorized service personnel is not provided for by this warranty.

All costs of transportation of product, labor or parts claimed not to be as warranted and, of repaired or replacement parts to or from such service facilities shall be borne by the Purchaser. The Company may require the return of any part claimed not to be as warranted to one of its facilities as designated by Company, transportation prepaid by Purchaser, to establish a claim under this warranty.

Replacement parts provided under the terms of the warranty are warranted for the remainder of the Warranty Period of the product upon which installed to the same extent as if such parts were original components.

DISCLAIMER

THE FOREGOING WARRANTY IS EXCLUSIVE AND IT IS EXPRESSLY AGREED THAT, EXCEPT AS TO TITLE, THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESSED, IMPLIED OR STATUTORY, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY.

THE REMEDY PROVIDED UNDER THIS WARRAN-TY SHALL BE THE SOLE, EXCLUSIVE AND ONLY REMEDY AVAILABLE TO PURCHASER AND IN NO CASE SHALL THE COMPANY BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES. UNDER NO CIRCUMSTANCES SHALL THE COMPANY BE LI-ABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, EXPENSES, LOSSES OR DELAYS HOWSOEVER CAUSED.

No statement, representation, agreement, or understanding, oral or written, made by any agent, distributor, representative, or employee of the Company which is not contained in this Warranty will be binding upon the Company unless made in writing and executed by an officer of the Company.

This warranty shall not be effective as to any claim which is not presented within 30 days after the date upon which the product is claimed not to have been as warranted. Any action for breach of this warranty must be commenced within one year after the date upon which the cause of action occurred.

Any adjustment made pursuant to this warranty shall not be construed as an admission by the Company that any product was not as warranted.



For additional information contact your local representative or Gardner Denver Machinery Inc., Customer Service Department, 1800 Gardner Expressway, Quincy, Iflinois 62301 Telephone: (800) 682-9868 FAX: (217) 224-7814

Sales and Service in all major cities.

For parts information, contact Gardner Denver, Master Distribution Center, Memphis, TN Telephone: (800) 245-4946 FAX: (901) 542-6159

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