U SERIES
SSR EP/HP 15/20/25
U 10/15/20/25 H/HH SP
OPERATIONS MANUAL
OPTIONS
MAINTENANCE
PARTS LIST
RECOMMENDED SPARE PARTS

INGERSOLL-RAND
AIR COMPRESSORS

APDD 273-87
March 1987

OPERATORS MANUAL

ROTARY SCREW AIR COMPRESSOR

This unit was purchased from

_____

_____

_____

Ingersoll-Rand Company reserves the right to make changes or add improvements without notice and without incurring any obligation to make such changes or add such improvements to products sold previously.

Model: _____

No. of units on order:_____

Customer order No.:_____

Ingersoll-Rand Co. Order No.: _____

For ready reference:
Record the serial number and model number of your unit here.

Serial Number: _____

Model number: _____

FOREWARD

The data plate lists the rated operating pressure, the maximum discharge pressure, and the electric motor characteristics and power.

Information has been prepared in this manual to assist an operator to understand, maintain and operate this compressor within the power limits shown on the data plate.

Before installation or starting the compressor for the first time, this manual should be studied carefully to obtain a clear knowledge of the unit and of the duties to be performed.

To facilitate maintainence, refer to the "Recommended list of spare parts" included in this manual.

Normal maintenance requires the replacement of parts — and these parts should be kept on hand in convenient quantities.

Take pride in your compressor. Keep it clean and in good mechanical condition.

AIR SYSTEM SURVEY

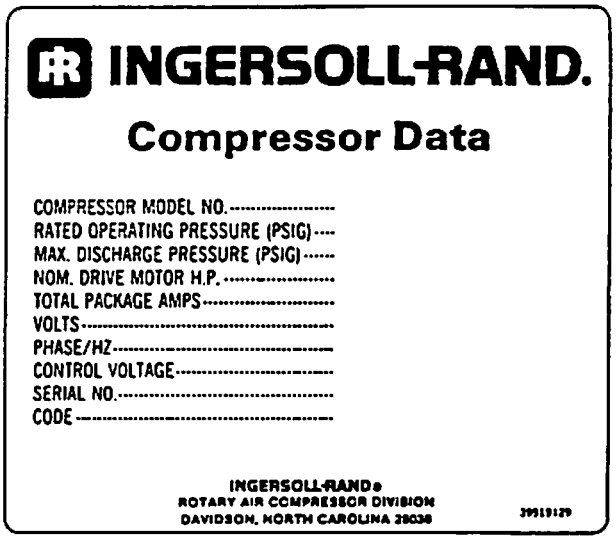
The factory recommends that before installing the U-Series compressor both adequate air storage and/or large piping runs should be available.

In situations where these two pre-conditions are not met then consideration must be given to installing an air receiver adequate to prevent rapid cycling of the compressor.

Rapid cycling would be defined as more than one cycle per minute in the demand mode of operation.

CAUTION

Failure to properly survey the customers air system with the resulting rapid air cycle may result in premature air separator element failure.



SAFETY PRECAUTIONS

READ CAREFULLY BEFORE INSTALLING THE COMPRESSOR.

FAILURE TO HEED THIS WARNING MAY RESULT IN AN ACCIDENT CAUSING PROPERTY DAMAGE / PERSONAL INJURY OR DEATH

WARNING

COMPRESSED AIR AND ELECTRICITY ARE DANGEROUS.

BEFORE DOING ANY WORK ON THIS UNIT, BE SURE THE ELECTRICAL SUPPLY HAS BEEN CUT OFF AND THE ENTIRE COMPRESSOR SYSTEM HAS BEEN VENTED OF ALL PRESSURE.

SAFETY PRECAUTIONS

1. Do not remove the covers, loosen or remove any fittings, connections or devices when this unit is in operation. Hot liquid and air under pressure that are contained within this unit can cause severe injury.

2. The compressor has high and dangerous voltage in the motor, the starter and control box. All installations must be in accordance with recognized electrical codes. Before working on the electrical system, be sure to remove voltage from the system by use of a manual-disconnect-switch. A circuit breaker or fused safety switch must be provided in the electrical supply line leading to the compressor.

Those responsible for installation of this equipment must provide suitable grounds, maintainence clearance and lighting arrestors for all electrical components as stipulated in O.S.H.A. 1910.308 through 1910.329.

3. Do not operate the compressor at higher discharge pressures than those specified on the Compressor Nameplate or motor overload will occur. This conditon will result in motor and compressor shutdown.

4. Use only safety solvent for cleaning the compressor and auxiliary equipment.

5. Install a manual shut off valve (isolation type) in the discharge line as close to the compressor as possible.

6. A pressure relief valve is located on the compression module. Whenever pressure is released through this valve, it is due to excessive pressure in the system. The cause for the excessive pressure should be investigated immediately.

7. Before doing any mechanical work on the compressor:

a.) Shut the unit down.

b.) Electrically isolate the compressor by use of the manual disconnect switch in the power line to the unit. Lock and tag the switch so that it cannot be operated.

c.) Make sure that the unit has blown down and close the unit isolation valve to prevent possible backflow into the unit from the air system.

8. There can be bad effects if compressor lubricants are allowed to enter plant air systems.

Air line separators, properly selected and installed, can reduce any liquid carryover close to zero.

The use of plastic bowls on line filters without metal guards can be hazardous. Their safety can be affected by either synthetic lubricants or the additives used in mineral oils. From a safety standpoint, metal bowls should be used on any pressurized system. Review of your plant air line system is recommended.

9. When a receiver is installed, it is recommended that occupational safety and health standards as covered in the Federal Register, volume 36, number 105, part II, paragraph 1910.169 be adhered to in the installation and maintainance of this receiver

10. Before starting the compressor, its maintenance instructions should be thoroughly read and understood.

TABLE OF CONTENTS

⚠ WARNING ⚠

Failure to adhere to these recommendations can result in mechanical failure, property damage and serious injury or death.

"All air and water inlet, and air and water discharge pipework to and from the inlet and discharge port connections must take into account vibration, pulsations, temperature, maximum pressure applied, corrosion and chemical resistance. In addition, it should also be noted that lubricated compressors will discharge some oil into the air stream; therefore, compatability between discharge piping, system accessories, and software must be assured.

"For the foregoing reasons, the use of plastic piping, soldered copper fittings, and rubber hose as discharge piping is not recommended. In addition, flexible joints and/or flex lines can only be considered for such purposes if their specifications fit the operating parameters of the system.

It is the responsibility of the installer and owner to provide the appropriate service pipework to and from the machine."

⚠ WARNING ⚠

STATEMENT CONCERNING THE USE OF THIS EQUIPMENT FOR BREATHING AIR AND/OR AQUA LUNG SERVICE

If the model number on this air compressor contains the letters "BAP", the compressor is suitable for use in breathing air services. In the absence of such a designation, the compressor is NOT considered as capable of producing air of breathing quality. For a compressor to be capable of use in breathing air services, it must be fitted with additional specialized equipment to properly filter and/or purify the air to meet all applicable federal, state and local laws, rules, regulations and codes, such as, but not limited to, OSHA 29 CFR 1910.134, Compressed Gas Association Commodity Specification G-7, 1-1966, Grade D Breathing Air, and/or Canadian Standards Association. Should the Purchaser and/or User fail to add such specialized equipment and proceeds to use the compressor for breathing air service, the Purhcaser/User assumes all liability resulting therefrom without any responsibility or liability being assumed by Ingersoll-Rand Company.

The Purchaser is urged to include the above provision in any agreement for any resale of this compressor.

CAUTION

THE USE OF REPAIR PARTS OTHER THAN THOSE INCLUDED WITHIN THE INGERSOLL-RAND COMPANY APPROVED PARTS LIST MAY CREATE HAZARDOUS CONDITIONS OVER WHICH THE INGERSOLL-RAND COMPANY HAS NO CONTROL. SUCH HAZARDOUS CONDITIONS CAN LEAD TO ACCIDENTS THAT MAY BE LIFE-THREATENING, CAUSE SUBSTANTIAL BODILY INJURY, OR RESULT IN DAMAGE TO THE EQUIPMENT. THEREFORE, INGERSOLL-RAND COMPANY CAN BEAR NO RESPONSIBILITY FOR EQUIPMENT IN WHICH NON-APPROVED REPAIR PARTS ARE INSTALLED.

GENERAL INFORMATION

The compressor is an electric motor driven, single stage, screw compressor — complete with accessories piped, wired and base-plate mounted. It is a totally self-contained air compressor package.

A standard compressor is composed of the following:

Inlet air filtration
Compressor and motor assembly
Pressurized coolant system with cooler
Separation system
Load control system
Instrumentation
Safety provisions

Compression in the screw-type air compressor is created by the meshing of two helical rotors (male and female) on parallel shafts, enclosed in a heavy-duty cast iron housing, with air inlet and outlet ports located on opposite ends. The male rotor has four lobes 90 degrees apart, and the female rotor has six grooves 60 degrees apart. The grooves of the female rotor mesh with, and are driven by, the male rotor. Tapered roller bearings at the discharge end prevent axial movement of the rotors.

The coolant system consists of a sump, a cooler, temperature control valve and a filter. When the unit is operating the coolant is pressurized and forced to the compressor bearings.

Safety of operation is provided for excessive discharge temperature by causing the compressor to shut down.

Effective coolant filtration is provided by use of a heavy-duty hydraulic type filter. The compressor is designed for operation in an ambient range of 35°F to 100°F (2° to 38°C).

Typical U Series

Compression Module - Cutaway side-view

1. Rotors
2. Separator Element
3. Sump
4. Inlet Valve
5. Minimum Pressure/Check Valve
6. Air Inlet Filter

COOLANT/AIR CIRCULATION SYSTEM

COOLANT

Rotary screw compressor fluids have a triple function to perform in that they lubricate the bearings and contacting surfaces of the rotors, they seal internal clearances within the rotor chamber, and they provide for the cooling of the compression process. The bulk of the fluid is actually used for cooling, with only small amounts used for lubrication and sealing.

The coolant used in the compressor has been specially blended and formulated to perform the above three functions exceptionally well. Its lubricating qualities exceed those of standard petroleum oils as well as those of previously available synthetic lubricants. Its Viscosity characteristics are such as to provide excellent sealing of internal clearances over broad ranges of operating temperatures. In fact, the viscosity change with temperature is small enough to permit the coolant-lubricant to be used over the entire range of ambients from 35°F. to 100°F. (1.7°C. to 38°C.) without significant loss of its qualities, or the cause of problems of any kind.

Most important is the performance of the fluid as a coolant. In this function the coolant demonstrates its outstanding abilities. It has exceptional oxidation-stability at system-operating-temperatures so as to provide long life. Advanced-rust-inhibitors assure clean piping, clean cooler tubes, and clean separator tanks.

Due to the large volume of coolant circulated and its direct contact with the air being compressed foaming at blowdown or other pressure change conditions is often a problem with rotary compressors. The SSR-ULTRA Coolant has quick air release characteristics and minimum air-entrainment, such that foaming has been largely eliminated as an operating concern.

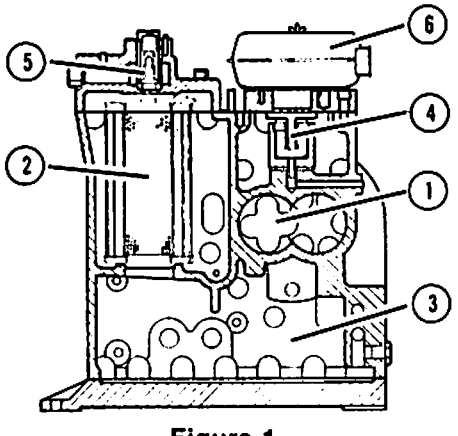


Figure 1

In addition, the coolant has little affinity for water as well as quick, effective water release at shutdown. These characteristics provide a maximum bearing lubrication integrity, as even small amounts of water in the coolant can be highly detrimental.

Readily available but normally ordered and shipped with the unit is a service kit which includes air and coolant filter elements. Make up coolant is ordered separately. See recommended spares list.

If a situation arises where, for some reason this fluid cannot be used, consult Ingersoll-Rand for specifications and recommendations on possible substitutes.

LUBRICATION-FILTRATION

Each compressor has a hydraulic-type-full-flow-filter with a single replacement spin-on element.

The filter is mounted at the back of the compression module. It is rated at 10 microns.

There is a differential-pressure-bypass-valve set to open in the event that the pressure drop across the filter element rises to as high as 15 psi (1 BAR), which indicates an excessively fouled element, as well as poor maintenance practice.

The filter element should be changed after the first 150 hours of operation and again after each 1200 hours of operation. The element should be replaced when the 8,000 hour or two year coolant change is made.

The procedure for changing the filter element is outlined in the maintenance section of this manual. Spare elements should be kept in stock at the installation to facilitate regular replacement.

The procedure for change out of the coolant is outlined in the maintenance section. Make-up for use between changes should also be kept in plant stock.

COOLANT/AIR SEPARATION SYSTEM

The coolant/air separation system is composed of a receiver with specially designed internals, a two-stage, coalescing-type separator-element, and provision for return of the separated coolant back to the compressor.

OPERATION

The air-coolant mixture discharges from the compressor into the separation system. This system, self-contained in the compressor housing, removes all but a few PPM of the coolant from the discharge air. The coolant is returned to the system and the air passes to the optional aftercooler.

COOLANT CIRCULATION SYSTEM

Coolant is forced by pressure from the sump to the inlet port of the temperature control valve. (Fig. 2) The temperature control valve controls the quantity of coolant necessary to provide a suitable compressor injection temperature.

When the compressor starts cold, part of the coolant will by-pass the cooler. As the system temperature rises above the valve setting, the coolant will be directed to the cooler. During periods of operation in higher ambient temperatures, all the coolant flow will be directed through the cooler.

The compressor-injection minimum temperature is controlled to preclude the possibility of water vapor condensing in the receiver. By injecting coolant at a sufficiently high temperature, the discharge air and coolant mixture temperature will be kept above the dew point.

The controlled-temperature coolant passes through the filter to the air end section of the compression module under constant pressure.

INSTALLATION DETAILS

GENERAL

When you receive the compressor please inspect it closely. Any indication of careless handling by the carrier should be noted on the delivery receipt especially if the compressor will not be immediately uncrated. Obtaining the delivery man's signed agreement to any noted damages will facilitate any future insurance claims.

UNPACKING AND HANDLING

The compressor package has been mounted on a heavy duty structural steel base which provides for fork-lifting between the two side channels to facilitate handling during shipment. Care in positioning the forklifts is important because the location of the center of gravity is strongly affected by the compression module and drive motor.

Slings can be used to lift the crates but spreader bars must be used to prevent the slings from exerting a force against the sides of the crates.

FOUNDATION REQUIREMENTS

Refer to the foundation plan for the particular model compressor to be installed. Foundation plans for all models are furnished as part of the service-literature-package sent with each compressor, in additon to other normal drawing-handling-procedures.

The compressor can be installed on any level floor that is capable of supporting it. Compressor weights are listed on the foundation plans.

When sound transmission is of particular importance, it is often helpful to install a sheet of rubber-fabric-matting, or cork under the compressor to reduce the possibility of resonant sounds being transmitted or amplified through the floor.

Note: "Suggested" Power Inlet conduit: Metallic, flexible conduit. Greenfield or Equal Maximum trade size 1.5 inches.

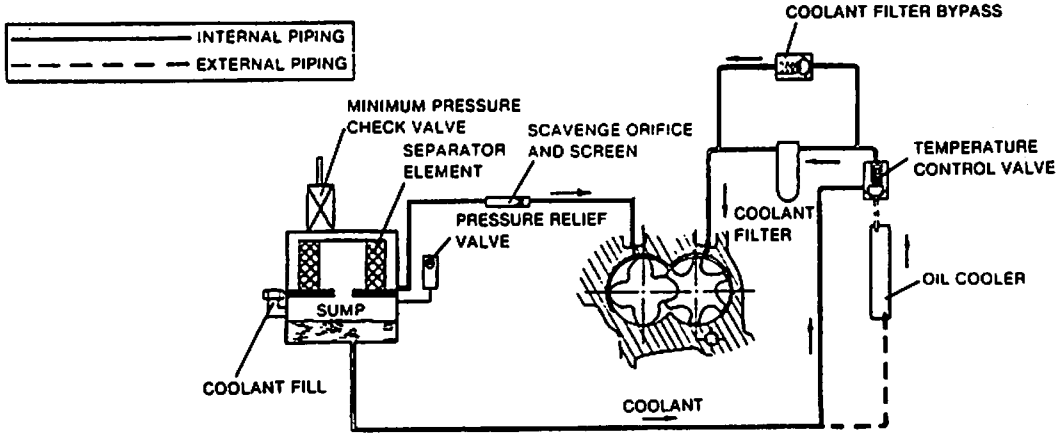


Figure 2
Lubricant Circulation System

LOCATION IN PLANT

The compressor should be installed in a dry, well-ventilated area where the air is as clean as possible.

Air cooled units in particular, require a free flow of cooling air. Recommended clearance is 3 ft.

Consideration must be given to the need for clearances around the compressor for ease of maintainance.

CAUTION

Screw type compressors should not be installed in air systems with reciprocating compressors without a means of isolation, such as a common receiver tank. We recommend both types of compressor units be piped to a common receiver utilizing individual air lines.

DISCHARGE PIPING

Discharge piping should be at least as large as the discharge connection at the compressor. All piping and fittings should be suitably rated for the discharge pressure.

It is essential in installing a new compressor to review the total plant air system. This is to insure a safe and effective total system. One item which must be considered is liquid carryover into the plant air line. Installation of aftercoolers, air dryers, and line separators is always a good practice.

Water condensation can affect the operation of pneumatic devices. Aftercoolers and the addition of air dryers can eliminate this hazard.

Similarly, there can be bad effects if compressor coolant is allowed to enter plant air systems. Air line separators, properly selected and installed, can reduce any liquid carryover close to zero.

CAUTION

The use of plastic bowls on line filters without metal guards can be hazardous. Their safety can be affected by either synthetic lubricants or the additives used in mineral oils. From a safety standpoint, metal bowls should be used on any pressurized system. Review of your plant air line system is recommended.

A. Compressors With Aftercooler

The built-in aftercooler reduces the discharge air temperature well below the dew point (for most ambient conditions), therefore, considerable water vapor is condensed. To remove this condensation, each compressor with built-in aftercooler is furnished with a combination condensate separator/trap.

The separator/trap must be installed as shown in Figure 3. A dripleg assembly, condensate separator/trap, and isolation valve should be mounted near the compressor discharge.

Important: The drain line must slope downward from the trap to work properly.

For ease of inspection of the automatic drain trap operation, the drain piping should include an open funnel.

It is possible that additional condensation can occur if the downstream piping cools the air even further, and low points in the piping system should be provided with driplegs and traps.

B. Compressors Without Aftercooler

When the compressor is furnished without a built-in aftercooler, a dripleg assembly and isolation valve must be mounted near the compressor discharge (refer to Figure 4).

The dripleg must be installed. It is essential that the condensate not be allowed to collect in the discharge piping at the compressor. Additional condensation will occur in the piping downstream from the discharge isolation valve and it is recommended that other driplegs be installed at the low points of the system.

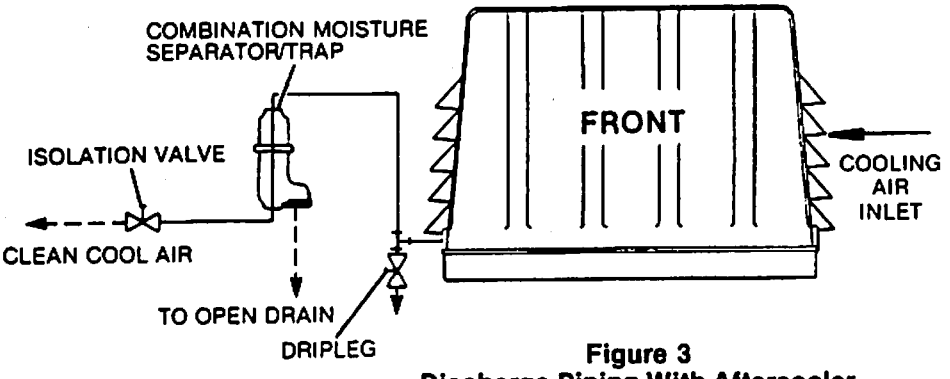


Figure 3
Discharge Piping With Aftercooler

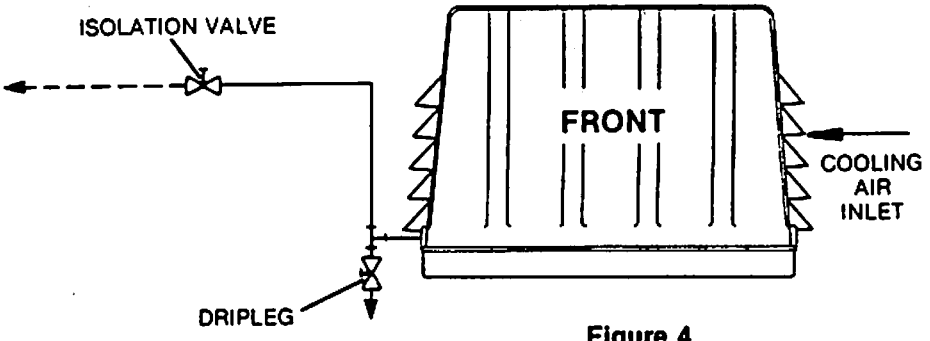
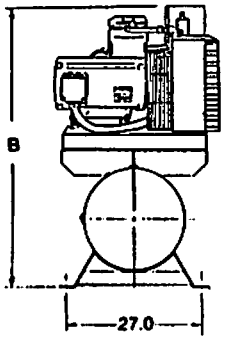
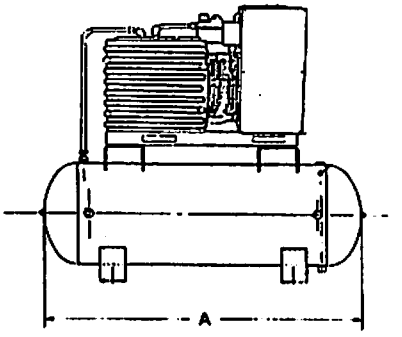


Figure 4
Discharge Piping Without Aftercooler

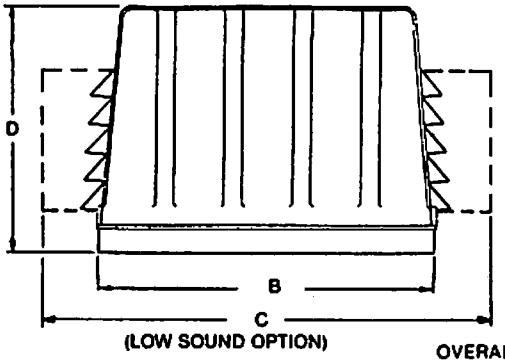




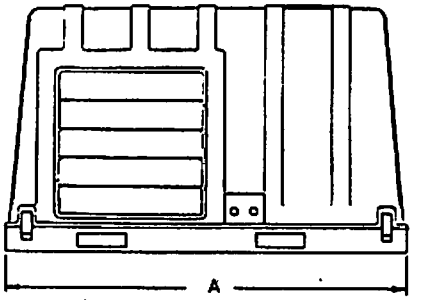
OVERALL UNIT DIMENSIONS
TANK MOUNT UNITS

	Approximate Weight in Pounds
	120 GAL
10 HP	996
15 HP	1026
20 HP	1391
25 HP	1406

	Dimension In Inches
	120 GAL
A	69.00
B	58.63



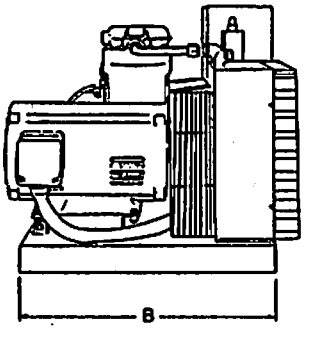
(LOW SOUND OPTION)

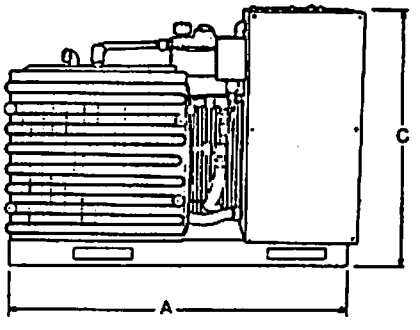


OVERALL UNIT DIMENSIONS
STANDARD ENCLOSURE

Dimension In Inches			
A	B	C	D
45.88	38.31	58.31	28.25

Approximate weight in pounds		
15 HP	20 HP	25 HP
735	735	815





OVERALL UNIT DIMENSIONS
UNENCLOSED UNIT

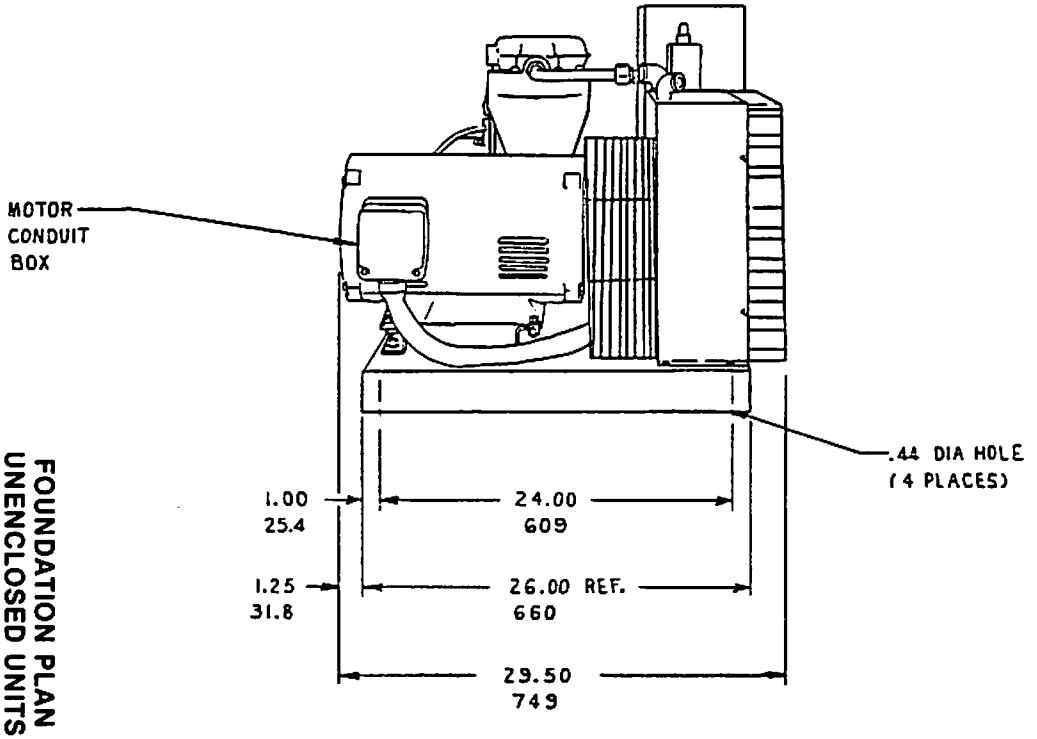
Dimension In Inches		
A	B	C
38.00	31.00	27.75

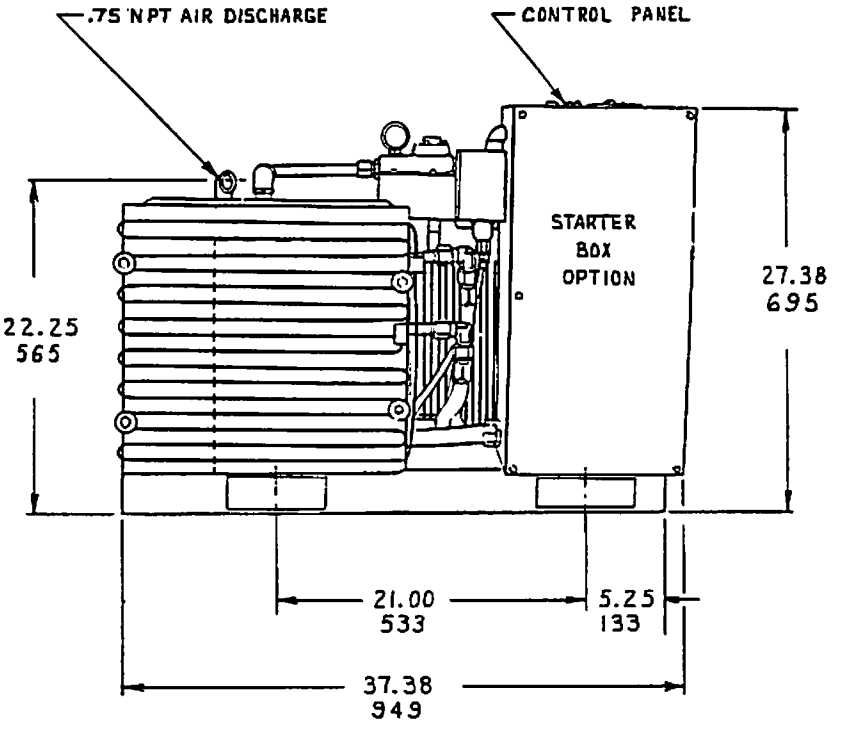
Approximate weight in pounds		
15 HP	20 HP	25 HP
636	644	708

Domestic Units (60 Hz)

(See Foundation Plan for specific details on connections, etc.)

FOUNDATION PLAN
UNENCLOSED UNITS





NOTES:

1. 610 MM (24") MIN. LENGTH OF WIRE REQUIRED FROM POWER INLET TO STARTER CONTACTOR.
2. COOLANT-LUBRICANT FILL QUANTITY DRY 6.5 LITERS (1.7 GALLONS)
3. TOLERANCE ON ALL DIMENSIONS .06" 1.5 MM
MOISTURE SEPARATOR AND TRAP FURNISHED SHIP LOOSE WITH AFTERCOOLED UNITS.
5. ALL DIMENSIONS IN MILLIMETER'S EXCEPT HOLE DIMENSIONS.
6. RECOMMENDED CLEARANCE ON ALL SIDES 914 MM (36").
7. EXTERNAL PIPING CONNECTIONS SHALL NOT EXERT ANY UNRESOLVED MOMENTS OR FORCES ON UNIT (MOISTURE SEPARATOR AND TRAP MUST BE SUPPORTED)
8. DO NOT PIPE AIR DISCHARGE WITH PVC PIPE.

ELECTRICAL NOTES:

FLEXIBLE CONDUIT IS RECOMMENDED FOR POWER INLET

WITH OPTIONAL STARTER

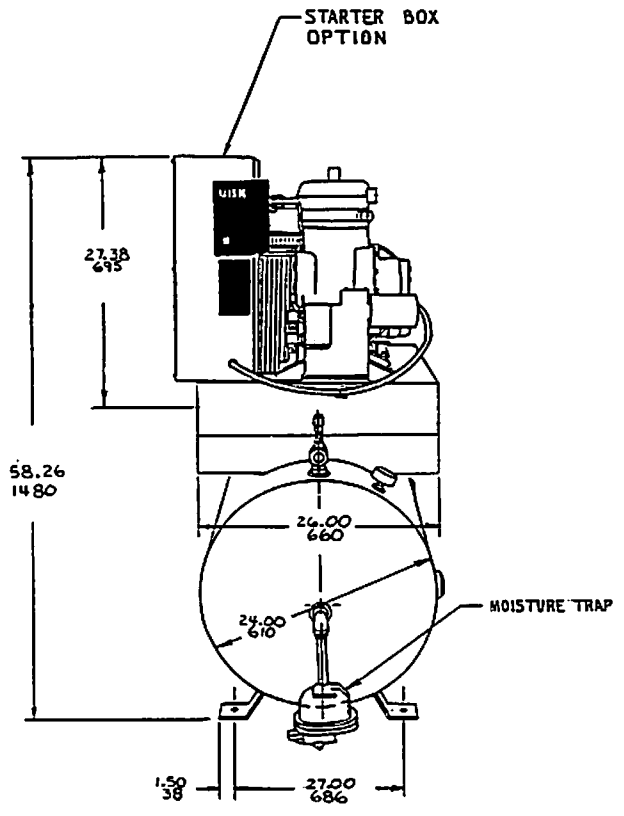
1. MAIN THREE WIRE POWER INLET CONNECTION IS TO SIDE OF STARTER BOX FACING COOLER ASSEMBLY.
2. CONTROL WIRING IS COMPLETE ON UNIT AS SHIPPED (CONTROL TRANSFORMER LOCATED IN STARTER BOX).

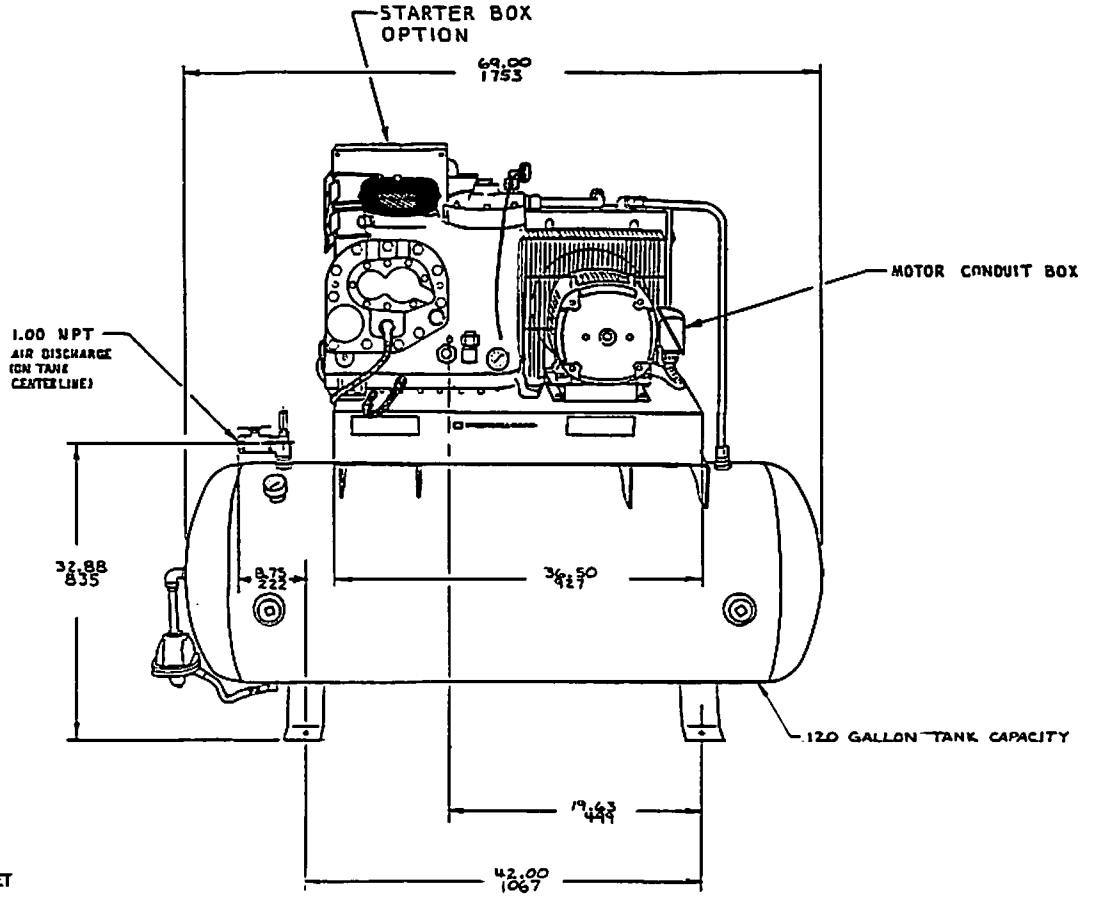
WITHOUT OPTIONAL STARTER

1. MAIN THREE WIRE POWER INLET CONNECTION IS TO DRIVE MOTOR CONDUIT BOX (SHOWN ON DRAWING).
2. 110 VOLT POWER MUST BE BROUGHT TO CONTROL BOX WHICH IS LOCATED IN SAME POSITION AS OPTIONAL STARTER BOX.

		15 HP	20 HP	25 HP
COOLING AIR FLOW	CFM	1250	1250	2000
	M^3/M	35	35	57
WEIGHT	LBS	563	628	643
	KG	255	285	292

FOUNDATION PLAN WITH TANK MOUNT





NOTES:

1. 610 MM (24") MIN. LENGTH OF WIRE REQUIRED FROM POWER INLET TO STARTER CONTACTOR.
2. COOLANT-LUBRICANT FILL QUANTITY DRY 6.5 LITERS (1.7 GALLONS).
3. TOLERANCE ON ALL DIMENSIONS 1.5 MM: (.06").
4. ALL DIMENSIONS IN MILLIMETER'S EXCEPT HOLE DIMENSIONS.
5. RECOMMENDED CLEARANCE ON ALL SIDES 914 MM (36").
6. EXTERNAL PIPING CONNECTIONS SHALL NOT EXERT ANY UNRESOLVED MOMENTS OR FORCES ON UNIT.

ELECTRICAL NOTES

FLEXIBLE CONDUIT IS RECOMMENDED FOR POWER INLET.

WITH OPTIONAL STARTER

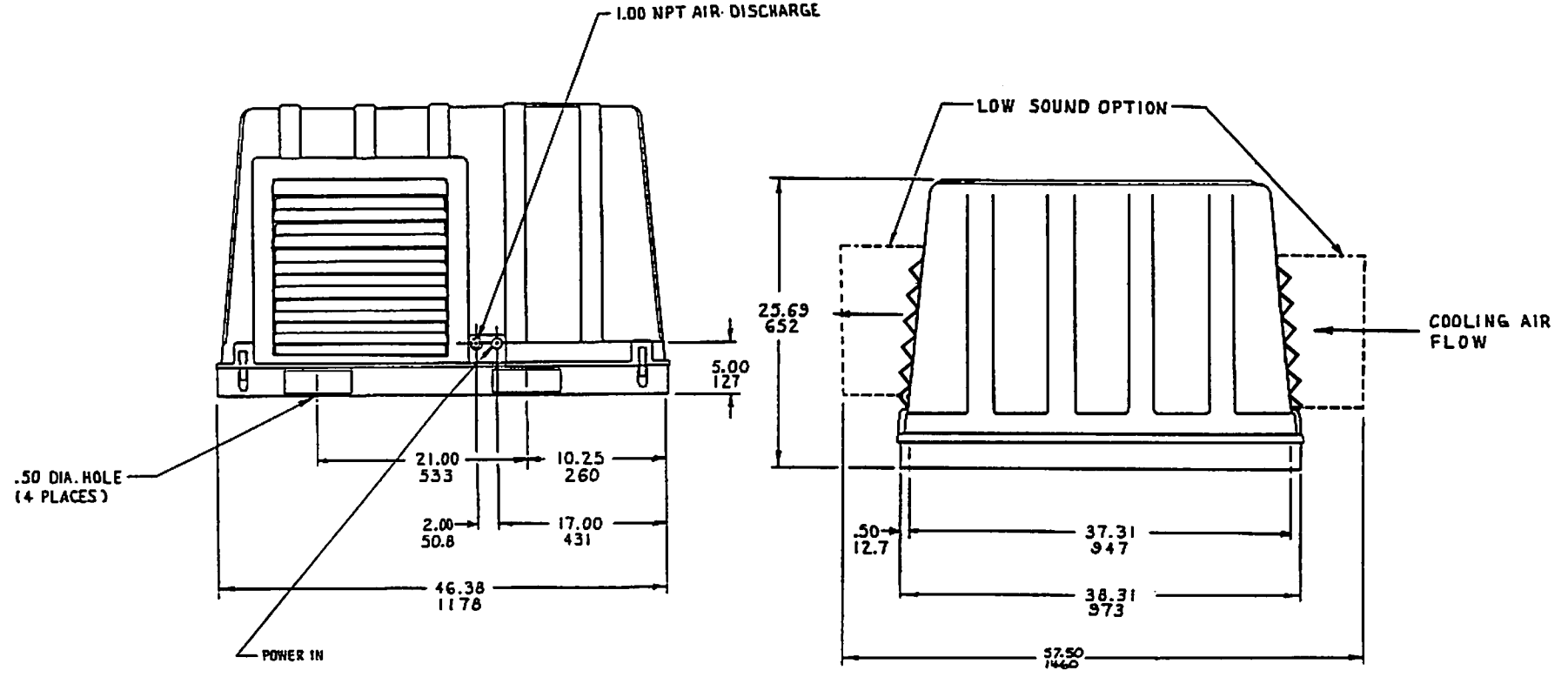
1. MAIN THREE WIRE POWER INLET CONNECTION IS TO SIDE OF STARTER BOX FACING COOLER ASSEMBLY.
2. CONTROL WIRING IS COMPLETE ON UNIT AS SHIPPED (CONTROL TRANSFORMER LOCATED IN STARTER BOX).

WITHOUT OPTIONAL STARTER

1. MAIN THREE WIRE POWER INLET CONNECTION IS TO DRIVE MOTOR CONDUIT BOX (SHOWN ON DWG.) .
2. 110 VOLT POWER MUST BE BROUGHT TO CONTROL BOX WHICH IS LOCATED IN SAME POSITION AS OPTIONAL STARTER BOX.

UNIT SIZE	COOLING AIR FLOW	WEIGHT
U 10	1250 CFM 35 M³/M	1253 LBS 568 KG
U 15	1250 CFM 35 M³/M	1253 LBS 568 KG
U 20	1250 CFM 35 M³/M	1318 LBS 598 KG
U 25	2000 CFM 57 M³/M	1341 LBS 608 KG

FOUNDATION PLAN
ENCLOSED UNITS



NOTES:

1. 610 MM (24") MIN. LENGTH OF WIRE REQUIRED FROM POWER INLET TO STARTER CONTACTOR.
2. COOLANT-LUBRICANT FILL QUANTITY DRY 6.5 LITERS (1.7 GALLONS).
3. TOLERANCE ON ALL DIMENSIONS .06" 1.5 MM.
MOISTURE SEPARATOR AND TRAP FURNISHED SHIP LOOSE WITH AFTERCOOLED UNITS.
5. ALL DIMENSIONS IN MILLIMETER'S EXCEPT HOLE DIMENSIONS.
6. RECOMMENDED CLEARANCE ON ALL SIDES 914 MM (35").
7. EXTERNAL PIPING CONNECTIONS SHALL NOT EXERT ANY UNRESOLVED MOMENTS OR FORCES ON UNIT (MOISTURE SEPARATOR AND TRAP MUST BE SUPPORTED)
8. DO NOT PIPE AIR DISCHARGE WITH PVC PIPE.

ELECTRICAL NOTES:

FLEXIBLE CONDUIT IS RECOMMENDED FOR POWER INLET

WITH STARTER

1. MAIN THREE WIRE POWER INLET CONNECTION IS TO SIDE OF STARTER BOX FACING COOLER ASSEMBLY.
2. CONTROL WIRING IS COMPLETE ON UNIT AS SHIPPED (CONTROL TRANSFORMER LOCATED IN STARTER BOX).

WITHOUT STARTER

1. MAIN THREE WIRE POWER INLET CONNECTION IS TO DRIVE MOTOR CONDUIT BOX
2. 110 VOLT POWER MUST BE BROUGHT TO CONTROL BOX WHICH IS LOCATED IN SAME POSITION AS OPTIONAL STARTER BOX.

		15 HP	20 HP	25 HP
COOLING AIR FLOW	CFM	1000	1000	1500
	M^3/M	28	28	42
WEIGHT	LBS	662	662	742
	KG	301	301	337

ELECTRICAL SYSTEM

GENERAL

The electrical system of each compressor is built with dependable components. Standard electrical components are enclosed in a readily accessible metal control box. The top panel contains the start-stop switches.

Refer to electrical schematic wiring drawing, Figure 7. The terminal block is located inside the unit control box. All necessary electrical connections are prewired.

FULL VOLTAGE TYPE STARTER (ACROSS THE LINE, MAGNETIC)

Refer to the electrical schematic wiring diagram in Figure 9.
The starter coil is controlled by the start switch and an interlocking switch. Provided the protective temperature switch and motor overload relays are closed, when the start button (2PB) is closed the starter coil is energized. An interlock switch on the starter holds the starter energized. The compressor motor will start and the Normal-Unload Selector should then be moved to the Normal position and the compressor will load.

CONTROL TRANSFORMER

The control transformer, mounted in the electrical control box, is a universal type. It is suitable for use with various primary voltages and frequencies and is connected according to the rated voltage of the compressor: up to 575 volts.

The transformer primary-secondary connections should be confirmed prior to initial start-up on the compressor. The primary-secondary connections for various primary voltages are shown in Figure 5.

The electrical terminals at the transformer are as shown in Figure 6.

LINE VOLTS	HZ	LINE	JUMPERS	SEC VOLTS	SEC
220	50	H6-H7	NONE	95	X2-X3
230	60	H5-H7	NONE	120	X1-X3
380	50	H4-H7	NONE	95	X2-X3
415	50	H3-H7	NONE	95	X2-X3
460	60	H2-H7	NONE	120	X1-X3
575	60	H1-H7	NONE	120	X1-X3
380	60	H4-H7	NONE	120	X1-X3
415	60	H3-H7	NONE	120	X1-X3

Figure 5
Control Transformer Connections

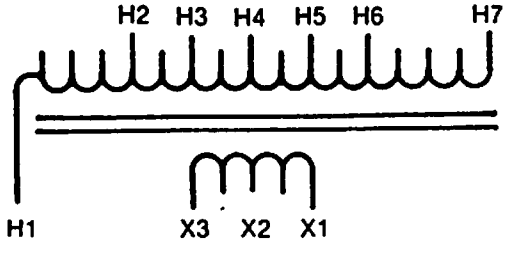


Figure 6
Transformer Terminals

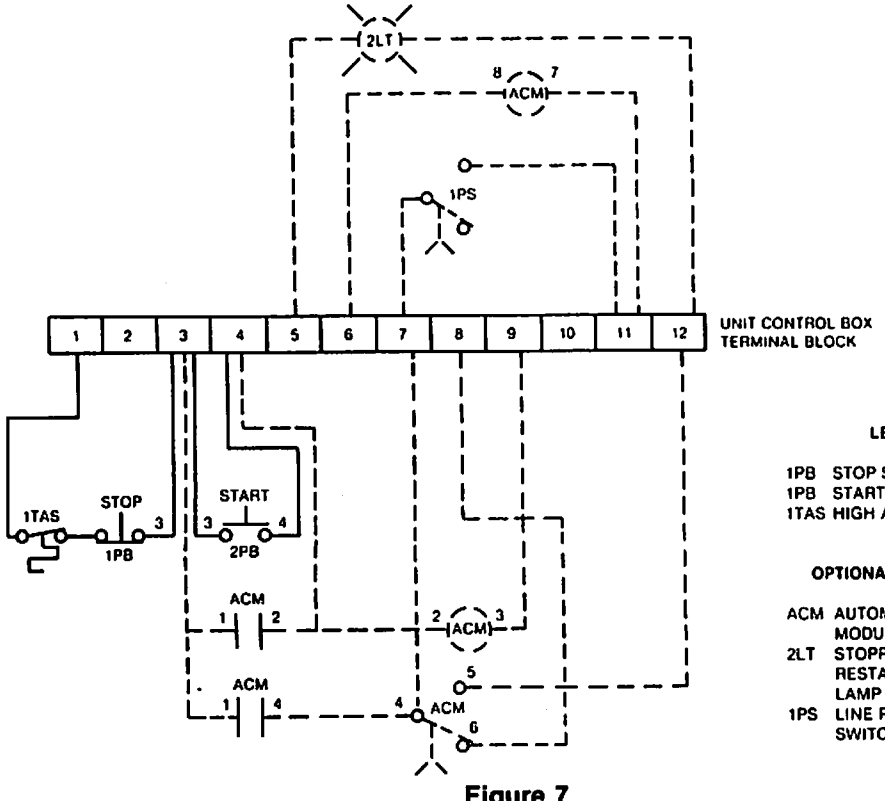
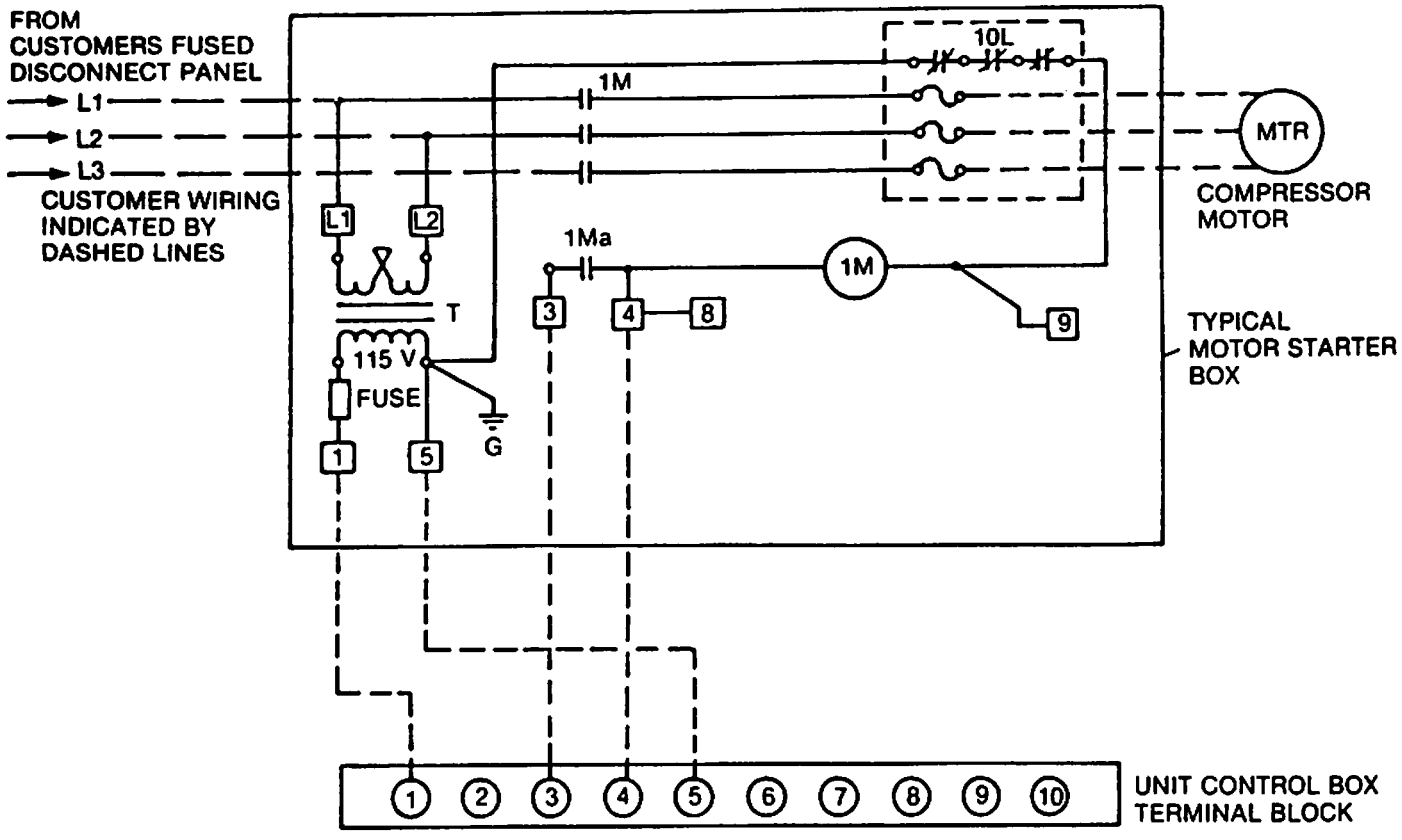


Figure 7
Unit Wiring Schematic with Control Box

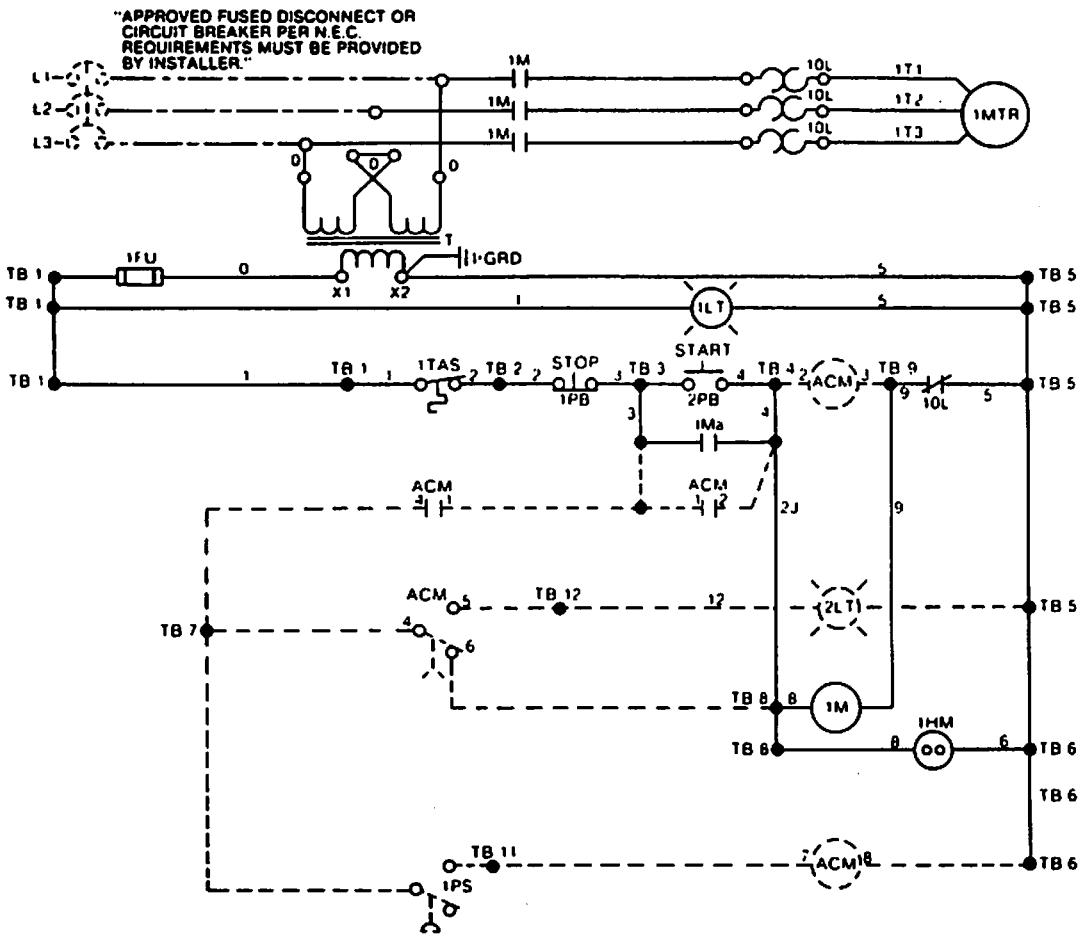


LEGEND

MTR	COMPRESSOR MOTOR
1M	MTR START-RUN CONTACTOR
10L	MTR OVERCURRENT RELAY
1Ma	AUXILIARY INTERLOCK SWITCH
T	CONTROL POWER TRANSFORMER

Figure 8
Typical Full Voltage Remote Starter
Wiring Schematic

	CONNECT STARTER TERMINAL	TO COMPRESSOR TERMINAL
STANDARD UNIT	TB-1 TB-3 TB-4 TB-5	TB-1 TB-3 TB-4 TB-5
UNIT WITH OPTIONAL AUTO START/STOP	TB-1 TB-5 TB-8 TB-9	TB-1 TB-5 TB-8 TB-9



LEGEND

1PB	STOP SWITCH
2PB	START SWITCH
1TAS	HIGH AIR TEMPERATURE SWITCH
1HM	HOURMETER
1MTR	COMPRESSOR DRIVE MOTOR
1LT	POWER ON LIGHT

STARTER PARTS

1M	MTR STARTER
10L	MTR OVERCURRENT RELAY
T	CONTROL POWER TRANSFORMER
1FU	CONTROL POWER FUSE
1Ma	1M NORMALLY OPEN INTERLOCK SWITCH

OPTIONAL EQUIPMENT

ACM	AUTOMATIC CONTROL MODULE
2LT	STOPPED—AUTO RESTART INDICATOR LAMP
1PS	LINE PRESSURE SWITCH

NOTES:

1. ——— INDICATES CUSTOMER WIRING
2. - - - - - - - - INDICATES OPTIONAL EQUIPMENT
3. REMOVE 2J WHEN INSTALLING AUTOMATIC CONTROL MODULE OPTION

Figure 9
Full Voltage Wiring Schematic

INSTRUMENTATION

CONTROL PANEL

Discharge Temperature Gauge - indicates temperature of air leaving the compressor. The temperature sensing bulb is located in the receiver tank.

Air Pressure Gauge - reads receiver (sump) pressure or line pressure, depending on the position of the selector valve. The differential pressure should be recorded when the unit is first started or after a replacement separator element is installed. This base reading can then be used to determine the proper element change period. (See maintenance section.)

Line/Sump Selector - directs the desired pressure to the air pressure gauge. By reading the pressure on either side of the air-coolant separator, the differential shows the conditions of the separator element. Differential pressure readings should be taken when the compressor is operating at rated capacity and pressure.

Power On Light - indicates that control voltage is available to the control circuit and that the line voltage is available at the motor-starter main-contacts.

WARNING

The power on light must never be used as a positive indication that power has been shut off. A burned out bulb can give a false indication. Failure to heed this warning may result in bodily injury or death.

Start-Stop Switches - energize or de-energize the starter coil to start or stop the compressor.

Hourmeter - reads the total time of operation of the compressor. It runs only when the motor starter coils are energized. It should be used to schedule maintenance functions such as coolant, and coolant-filter changes.

Normal-Unload Selector - controls the ability of the compressor to "load up." The "Unload" position should be used for manually starting the machine; the "Normal" position for air delivery to the plant system.

On-Off Line/Modulate Selector - chooses the type of compressor capacity control. Refer to the Capacity Control section for an explanation of the different modes of capacity control.

CAPACITY CONTROL

ON LINE-OFF LINE CONTROL

For those plants which have a widely varying air demand, the On line-Off line control will deliver air at full capacity, (the compressor maximum efficiency condition) or will operate at zero capacity with low receiver pressure (the compressor minimum power conditon).

When the normal/unload selector is in the normal position, pressurized air is removed from the inlet valve allowing it to fully open. The Blowdown Valve closes the atmospheric vent.

The compressor will then operate to deliver full capacity air to the plant system. If the plant air system pressure rises to that of the pilot unload valve upper set point, pressurized air will be sent to the inlet valve causing it to close, and to the blowdown valve, causing it to open.

The compressor will continue to run unloaded, but since pressure levels have been reduced, it will do so with a minimum power draw.

The pilot unload valve has a fixed differential which is set at 12 psi (0.83 Bar) range between its upper and lower set point measures. The upper setpoint pressure is factory set at slightly above the compressor rated discharge pressure.

MODEL	RATED DISCHARGE PRESSURE
EP/H	125 PSIG
HP/HH	150 PSIG

MODULATE CONTROL

For those plants which have relatively high and constant air demand, relative to the compressor capacity, the recommended control mode is Modulation.

The modulation control system retains the features of the On line-Off line control, but provides for throttling of the inlet air flow as the line pressure rises to the upper set point of the pilot unload valve.

By applying line pressure to an adjustable Modulator Valve, the throttling position of the inlet valve is controlled, thus allowing the modulator to "trim" the inlet valve position as dictated by the line pressure.

The modulating pressure range is about 4 psig (0.3 BAR) and the modulator is factory set to straddle the compressor rated pressure. Modulation begins when the line pressure reaches about 99 percent of the compressor rated pressure and continues as/if the line pressure rises. Modulation becomes stable when the compressor output equals the plant air demand. When the modulation is at the factory setting as shown on Figure 10 will indicate the typical reduction will be down to approximately 60 percent of the compressor rated capacity.

If the air demand has decreased to a level below the 60 percent modulated output, the line pressure will increase slightly to actuate the pilot unload valve. The compressor will then shift to the Off-line control position, and operate unloaded with the receiver vented.

It is sometimes desirable to begin modulation at a higher pressure than the standard factory setting, thereby increasing the modulated capacity at the time the pilot unload valve is actuated. Reference to Figure 10 the maximum capacity modulated capacities available when this is done.

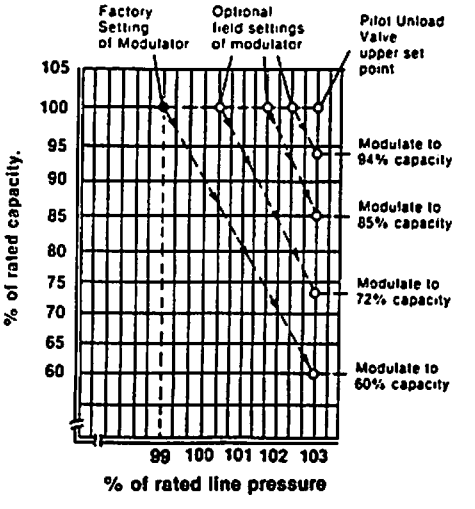


Figure 10
Modulation Capacity

OPERATION

INITIAL PREPARATIONS AND START-UP

1. Inspect and confirm that all piping and electrical work is tight and that the main disconnect switch is in the OFF position.
2. Confirm that the line voltage and compressor Nameplate voltage are the same.
3. Remove the starter box front panel. Confirm that all electrical connections are made and tightened. Confirm that the control transformer is connected correctly.
4. Inspect the motor and control wiring for tightness and safety.
5. Replace the starter box front panel.
6. Place the main disconnect switch in the ON position.
7. Place the normal-unload selector in the unload position.

NOTE: This selector should always be placed in the unload position when starting the unit manually.

8. Rotation check.

CAUTION

For the compressor motor rotation check, the motor jogging must be for as short a time as possible. After depressing the start switch immediately depress the stop switch.

Observe a blade of the compressor cooling fan. The rotation should be in accordance with the directional-arrow-decal affixed to the motor and fan shroud.

NOTE: The correct fan rotation is clockwise when viewed from the motor end.

WARNING

After putting the main disconnect in the off position, if the rotation is not correct, interchange any two line connections (L1, L2, or L3) at the starter. Failure to heed this warning may result in bodily injury or death.

9. Check to determine that the coolant level is at the mid-point of the sight glass.
10. Close the isolation valve leading to the customers plant air system.
11. Start the compressor and allow it to run unloaded for at least two minutes to circulate the coolant. Check for any leaks and correct as required.
12. Set the mode selector to the "NORMAL" position and allow the pressure to rise to the maximum discharge pressure as indicated on the unit data plate.
13. Check for tightness of all fittings, particularly in the coolant system. After a few minutes of operation, place the mode selector in the "UNLOAD" position and shut the unit down.
14. Check the coolant level in the receiver area of the compression module.

    Because some coolant will remain in the piping, it may be necessary to add coolant to bring the level back to the mid-point of the sight glass.

    Tighten the fill cap securely.

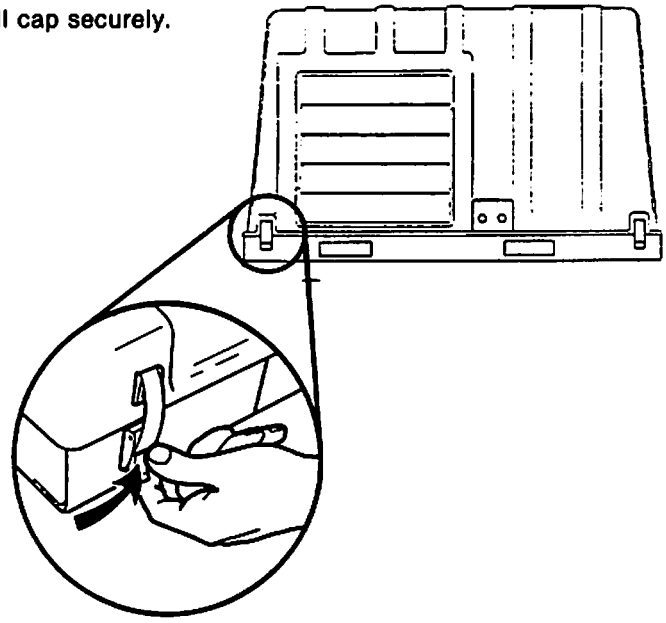
WARNING

Confirm all pressure is relieved from the compressor system and that the main electric disconnect switch is open and tagged to remain open. Failure to heed this warning may result in bodily injury or death.

15. Re-start the compressor and place the mode selector in the "NORMAL" position. Open the isolation valve and allow the compressed air to enter the customers system.
16. The discharge temperature should rise to near 190°F. (88°C.) and may rise as high as 215°F. (99°C.) at full load if the ambient cooling air is as high as 100°F. (38°C.).

CAUTION

Always place normal/unload selector in the unload position and allow the unit to stabilize at the reduced (unloaded) pressure before shutting unit down.



NOTE:

The enclosure draw latch has a quick release tab located at the joint of the latch. A slight pressure applied to this tab allows for easy release of the latch mechanism. See illustration.

REGULATION ADJUSTMENT INSTRUCTIONS

ON LINE-OFF LINE CONTROL

1. Open isolation valve, allowing control system to sense "line" pressure.

2. Place the Normal-Unload selector in the "Unload" position, and the On-Off Line/Modulate selector in the "On-Off Line" position.

3. Start the compressor. Place the Normal-Unload selector in the "Normal" position. The compressor should load if line pressure is lower than the reset point of pilot unload valve. It may be necessary to vent air from customer system to load unit. Slowly close the isolation valve, to allow the discharge air pressure to rise at a rate slow enough to read the line pressure gauge reliably.

4. Refer to table below for pilot unload valve set-point. See machine data plate to confirm your model.

MODEL	MAXIMUM DISCHARGE PRESSURE
EP15-25, 10-25H	128 psig
HP15-25, 10-25HH	150 psig

WARNING

A SMALL AMOUNT OF AIR WILL DISCHARGE FROM THE UPPER SET-POINT SCREW WHEN COMPRESSOR UNLOADS. DO NOT LOOK DIRECTLY OVER VALVE WHEN ADJUSTING. SUITABLE EYE PROTECTION SHOULD BE IN USE. FAILURE TO HEED THIS WARNING MAY RESULT IN BODILY INJURY OR DEATH.

5. Adjust upper set-point as follows: (See Figure 11). Loosen the upper set-point locknut. Turn upper set-point screw, as indicated in Figure 11, to increase or decrease upper set-point. (1/8 turn causes approximately 6 psi change in set-point). Retighten the upper set-point locknut after adjustment.

NOTE: THE PILOT UNLOAD VALVE HAS A FIXED DIFFERENTIAL, NO ADJUSTMENT IS POSSIBLE. DO NOT ATTEMPT TO ADJUST THE DIFFERENTIAL SET-POINT.

THE DIFFERENTIAL PRESSURE WILL VARY SLIGHTLY WITH UPPER SET-POINT PRESSURE CHANGE.

6. Cycle unit by venting air from customer system to confirm proper valve operation.

7. Open isolation valve and put unit back in service.

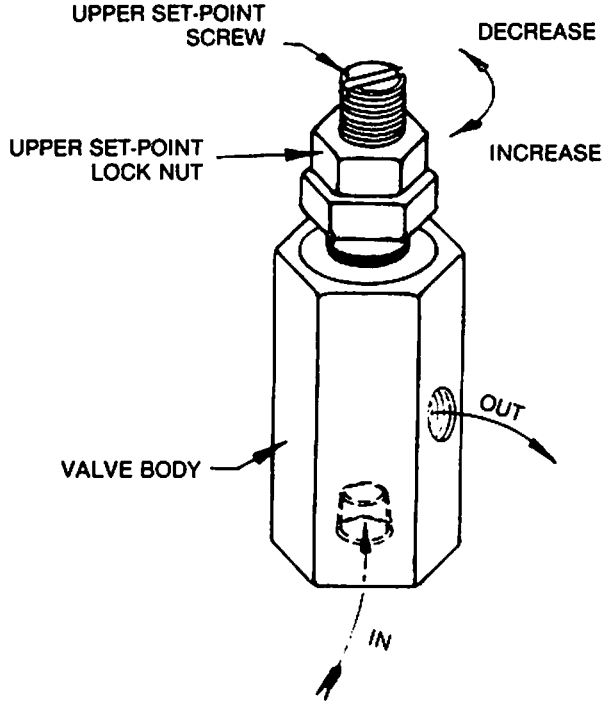


Figure 11

MODULATE CONTROL

WARNING

Stop the compressor and verify that all pressure has been vented from sump area. Failure to heed this warning may result in bodily injury or death.

1. Open the isolation valve that controls the air flow from the compressor to the plant air system.
2. Switch the modulate/on-off line selector to modulate. Switch the normal/unload selector to unload.
3. Remove the 1/8" NPT plug from the tee in the top of the modulator valve. Connect a pressure gauge to the port.
4. Loosen the adjustment screw locknut and back out adjusting screw 3 turns. See Figure 12.
5. Start the compressor.
6. Switch the normal/unload selector to normal.
7. Allow the line pressure to rise to the compressor maximum discharge pressure. This may be done by slowly closing the isolation valve.
8. While maintaining maximum discharge presure, turn the adjustment screw so that the test pressure gauge reads 12 psig. Tighten the adjustment screw locknut.
9. Switch the normal/unload selector to unload.
10. Stop the compressor. Wait for the sump pressure to go to 0 psig. Remove the test pressure gauge and replace the 1/8" NPT plug.

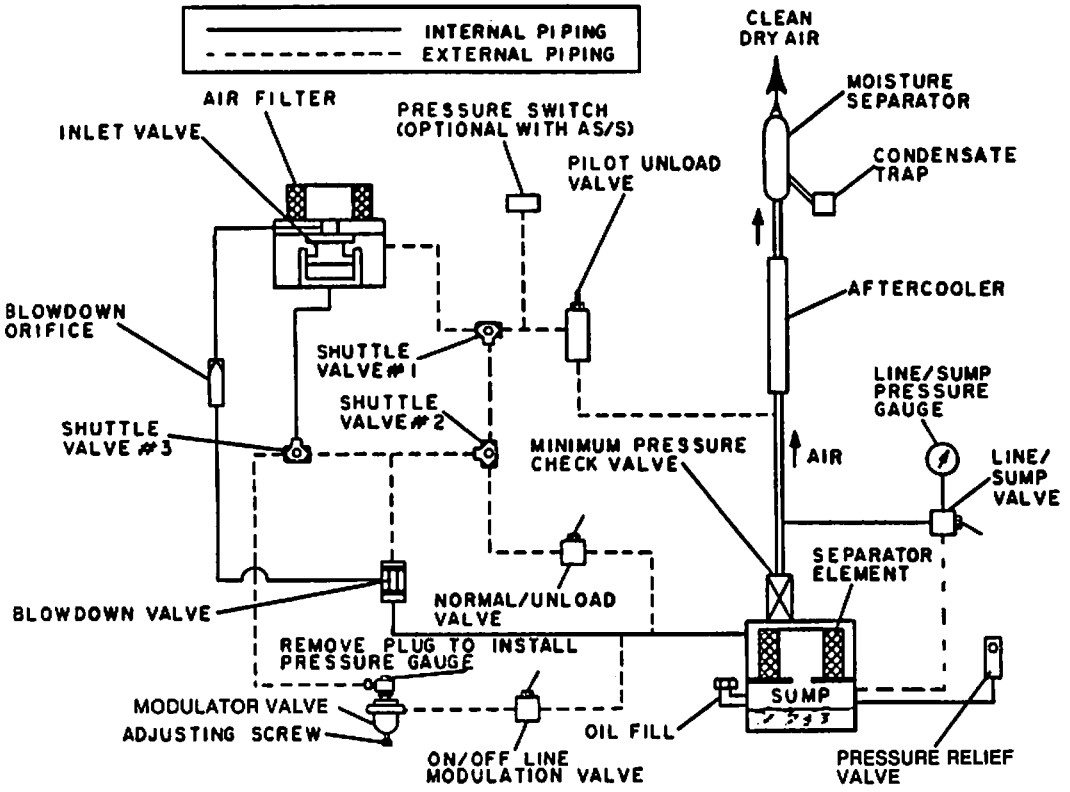


Figure 12
Pneumatic System

SAFETY SHUTDOWN CHECKS

HIGH AIR TEMPERATURE

There is a High Air Discharge Temperature shutdown switch furnished on each compressor. It is located at the discharge housing of the compressor. This switch should be checked at regular intervals; about once a month is recommended. Check by:

1. Block the cooler air discharge.
2. The discharge temperature will rise at a fairly rapid rate. Shutdown should occur at about 230°F. (110°C.), if not, switch should be replaced.

The temperature at which the shutdown occurs should be recorded for comparison with similar future test results.

TROUBLE INVESTIGATION

COMPRESSOR FAILS TO START

WARNING

A qualified electrician should check to see that the customer supplied wiring is connected as shown in Figure 9. Failure to heed this warning may result in bodily injury or death.

COMPRESSOR SUFFERS FROM CAPACITY LOSS

A. Fouled air filter
B. Loose-slipping belts
C. System leaks

COMPRESSOR WILL NOT BUILD UP RATED PRESSURE

The air demand may be too high. Check for plant air leaks or open service valves.

The pilot unload valve may be set too low. Check the pressure setting when the unit is operating in "NORMAL," and the On line-off line control mode. If the pressure setting is increased, it must not be set higher than the maximum discharge pressure listed on the compressor Data Plate.

COMPRESSOR OVERTEMPERATURE SHUTDOWN

Insufficient coolant being circulated.

Check coolant level in receiver sump.

Insufficient cooling of coolant.

Insufficient cooling can be caused by fouled coolers, usually external fouling on air cooled units.

Operating air cooled unit in excessively high ambient air. Insufficient ventilation could be a cause.

Overtemperature can result if the temperature control valve becomes defective. This would show up if the injection temperatures are higher than normal.

Operating above rated discharge pressure can cause overtemperature. It also shortens motor insulation life because of the overload the motor must carry.

EXCESSIVE COOLANT CONSUMPTION:

A ruptured or fouled separator element or a blocked scavenge orifice assembly will increase coolant consumption. The orifice assembly should be checked regularly.

An increase in pressure differential across the separator is the indication of a fouled separator.

A decrease of pressure differential from the previous reading would indicate a ruptured separator.

Differential pressure should be noted and recorded. It should be taken when the compressor is operating at rated capacity and pressure.

EXCESSIVE LINE CURRENT

Overload relays can trip if line voltage is excessively low. This condition causes the motor to draw higher current. Unbalanced electrical phase can contribute to this problem

Operating at pressures above the rated pressure will cause higher motor currents.

All starter contacts must be in good condition.

WATER CARRYOVER TO DISCHARGE LINES

A fouled or defective condensate trap that does not drain condensate will allow the condensate to be carried to the plant system. The trap operation must be checked regularly.

Condensate should flow whenever the aftercooler lowers the discharge air temperature below the dew point.
Under atmospheric conditions of very low humidity, it is possible that no water vapor is condensed and therefore there will be no flow from the condensate trap.

The use of an open funnel in the drain line has been recommended to make a visual inspection easier.

OPTIONS

AUTOMATIC START-STOP CONTROL

For those plants which have a widely varying plant air demand, large air storage capacity and/or want automatically available stand-by air capacity, Automatic Start-Stop Control, is available.

During periods of low demand, if the line pressure rises to the upper set point of pilot unload valve, a time delay relay automatic control module is energized and begins to time out. The module, mounted in the starter box, is set at 10 minutes and will continue to operate as long as the plant line-pressure remains above the lower set-point of the pressure switch.

If the module continues to operate for as long as its time setting a relay contact in the control module opens to de-energize the compressor motor coil. At the same time, an amber light (2LT) on the instrument panel is lit to indicate the compressor has shut down automatically and will restart automatically.

The automatic restart will take place when the line pressure drops to the lower set point of pilot unload valve.

MAINTENANCE

GENERAL

The Compressor requires a minimum of maintenance. The major concerns are the air cleanliness, the quality of the coolant and the lubrication of the electric motors. Over relatively long periods of time, other system accessories will require replacement; items such as the air separator element.

The procedures to follow when servicing the compressor or replacing major accessories are described in the following paragraphs.

Before starting any maintenance, be certain the following is heeded.

WARNING

Confirm all pressure is relieved from the compressor system and that the main electric disconnect switch is open and tagged to remain open. Failure to heed this warning may result in bodily injury or death.

AIR FILTER

The filter should be changed when the filter indicator shows red. The filter should be changed at least once a year, even with no indication.

COOLANT FILTER ELEMENT

Time of change — after the first 150 hours and every 1200 hours thereafter, or when the coolant is being changed.

COOLANT SEPARATOR ELEMENT

The separator element must be replaced when the differential pressure across the element reaches 3 times the initial pressure drop or a maximum of 15 psi (1.0 BAR). The unit must be fully loaded and at its rated pressure when the differential is checked.

Note: A drop to zero differential also indicates a failing or bypassing element that must be replaced.

COOLANT CHANGE TIME

AFTER EVERY 8000 HOURS OR EVERY TWO YEARS, WHICHEVER COMES FIRST (SSR ULTRA).

PROCEDURES AND COMMENTS

1. There is a coolant drainage hose on each compressor. It is located on the bottom of the compressor module.

WARNING

No drainage points should be opened until the compressor has been isolated electrically and all air pressure has been removed from the system. Failure to heed this warning may result in bodily injury or death.

2. The coolant should be drained soon after the compressor has been shut down. When the coolant is hot, the drainage will be more complete and any particles in suspension in the coolant will be carried out with the coolant.

WARNING

Extreme care should be exercised when draining the hot coolant so that no possibility of injury to personnel exists. Failure to heed this warning may result in bodily injury or death.

3. After the unit is drained and a new filter element is installed, refill the system with fresh coolant.

APPROXIMATE RECOMMENDED COOLANT CAPACITY		
	GAL.	LITER
10U-15U-20U-25U	1.7	6.4

Bring the sump level of coolant up to the midpoint of the gauge glass. Replace the fill cap.

4. Start the compressor and run it for a short while. Shut it down and check the coolant level in the sump. Add enough coolant to bring the level back to the gauge midpoint. Replace the fill cap.

TO CHANGE INLET AIR FILTER

Loosen wing nut on top of inlet filter. Remove filter.

Install new filter and inspect to insure that it has seated properly.

Tighten wing nut. Place unit in service.

TO CHANGE COOLANT FILTER ELEMENT

Use a filter wrench to loosen the old element. Use drain pan to catch any leakage during removal. Discard old element.

Wipe the sealing surface of the filter with a clean, lint-free rag to prevent the entry of dirt into the system.

Remove the replacement element from its protective package. Apply a small amount of clean coolant on the rubber seal and install element.

Screw element on until the seal makes contact with the seat on the compressor housing. Tighten approximately one half to three quarter turn additional.

Start unit and check for leaks.

TO REPLACE THE SEPARATOR ELEMENT

Disconnect the main air line from the separator cover.

Disconnect the control air lines after noting their original connection points. Tag the lines to insure they can be reassembled correctly. Remove the bolts that hold the separator cover in position. Remove cover by lifting up and away. Remove bolts retaining separator clamp.

Carefully lift the separator element up and out of the receiver portion of compression module. Discard the old element. Check to assure element "O" ring is removed.

Clean the gasket surface on both the compressor module and its cover. Exercise care to prevent pieces of the old gasket from falling down into the receiver area.

Check the receiver area to be absolutely certain no foreign objects such as rags or tools have fallen into the receiver area.

Place "O" ring onto replacement element. Install and center the element in the receiver area.

CAUTION

While tightening the separator clamp bolts, adjust element to ensure proper alignment and seating of "O" Ring. Failure to do so may result in improper coolant separation. Torque separator clamp bolts to 6 ft. lbs.

Care should be exercised to prevent excessive clamp bending.

Since an improperly tightened cover may result in a leak, following the recommended procedure for re-installing the separator cover is important. Utilizing the cross pattern tightening procedure as illustrated in Figure 12A, begin by using the number one bolt and tighten all bolts hand tight. Start again with the number one bolt and torque to 58 foot pounds again using the cross pattern sequence.

Once all six bolts have been torqued to 58 ft-lbs, check each bolt, in sequence, to insure all bolts are at 58 ft-lbs.

Install the main air line that connects to the separator cover.

Install the regulation lines in their original position.

Start unit, check for leaks, place in service.

TO CHANGE TEMPERATURE CONTROL VALVE ELEMENTS

Use a suitable pan to catch any leakage.

Unscrew the temperature control valve element from its housing.

Install replacement element.

Start unit and check for leaks.

Load unit and check for proper discharge temperature control.

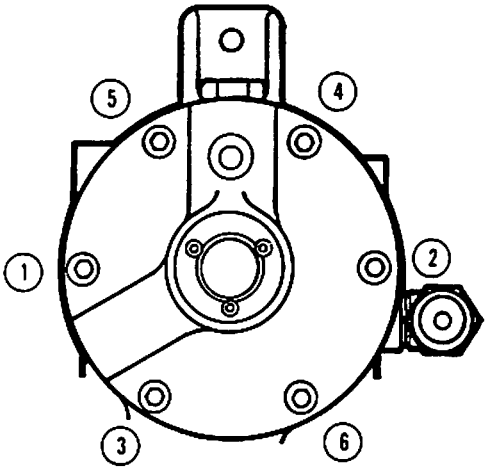


Figure 12A
Separator Cover
Bolt Torque Pattern

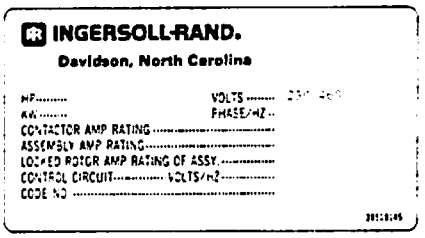
VOLTAGE CONVERSION INSTRUCTIONS, 10-25 HP

WARNING

COMPRESSED AIR AND ELECTRICITY ARE DANGEROUS. BEFORE DOING ANY WORK ON THIS UNIT, BE SURE THE ELECTRICAL SUPPLY HAS BEEN CUT OFF AND THE ENTIRE COMPRESSOR SYSTEM HAS BEEN VENTED OF ALL PRESSURE. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN BODILY INJURY OR DEATH.

This instruction is for voltage conversion of 230/460 volt compressors only. It does not apply to either 200V or 575V units.

Before attempting to convert the voltage of any compressor, it must be determined whether the compressor is designed for dual voltage application. This can be verified by 230/460V in the unit voltage description of the starter nameplate which is located inside the starter box (see example below). If the nameplate indicates 460V only or 230V only, it is not designed for voltage conversion without modification. Consult Ingersoll-Rand Customer Service if modification is required.



When converting the voltage of a compressor, the following three basic steps must be taken:

A. Rewire the main drive motor and change overload relay heaters.

B. Rewire the control transformer to the appropriate primary and secondary voltage.

These steps are described in more detail as follows:

A. Compressor main drive motor:

1. Refer to the main drive motor connection diagram to determine proper motor lead connections. If the motor nameplate does not specify both 230V and 460V do not proceed.

2. Connect the main motor leads as specified on the motor nameplate. Double-check tightness of these leads to ensure good connection.

3. Refer to the motor nameplate to determine the full load amps (FLA) of the motor at the required voltage.

4. Remove factory installed heaters and install replacement heaters.

Note: Contact your nearest Ingersoll-Rand Distributor for heater size.

Replacement heaters can be purchased from an authorized Ingersoll-Rand parts distributor.

B. Control Transformer:

1. Refer to the transformer label to determine the correct primary and secondary wire connections. Wire the transformer accordingly. It is imperative that the transformer wiring is correct. Incorrect wiring will cause major damage to the control and starter system components.

2. When the voltage conversion is complete, prepare a new unit voltage label or tag stating the revised voltage. This label should be placed inside the starter box in a location that is readily visible for future electrical service.

DRIVE MOTOR LUBRICATION

The induction-type squirrel cage motor has anti-friction ball or roller bearings front and rear. At extended intervals they require relubrication.

The periods between re-greasings of the motor bearings can vary, primarily with the severity of the service conditions under which the motor operates. As a general rule the following would apply:

SERVICE CONDITION	
OUTDOORS DIRTY ABRASIVE CORROSIVE	INDOORS CLEAN DRY INDUSTRIAL
2000 HOURS (OR) 3-4 MONTHS	4000 HOURS (OR) 6 MONTHS

IMPORTANT

A major cause of motor bearing failure is overgreasing. The quantity of grease added should be carefully controlled.

WARNING
Grease should only be added when the motor is stopped and power disconnected. Failure to heed this warning may result in bodily injury or death.

Pipe threads for grease gun fittings are arranged at each end on the motor housing.

Use a hand lever type grease gun. Determine in advance the quantity of grease delivered with each stroke of the lever. Add grease in the following quantities:

RECOMMENDED UNIT OF MEASURE:

UNIT SIZE	CUBIC IN.	OUNCES
10U	.5	.3
15U	.5	.3
20U	.8	.4
25U	.8	.4

Recommended Motor Greases
(or equals)
Chevron SRI.....Standard Oil of California
Premium RB.....Texaco
Unirex N2.....Exxon
Dolium R.....Shell
Rykon Premium.....American Oil

PROCEDURE FOR RELUBRICATION

When regreasing, stop motor, remove inlet and outlet plugs, and add amount of grease per reference table with hand lever gun only. **Do not expect grease to appear at the outlet, but if it does, discontinue greasing at once.** Run for about ten minutes before replacing outlet plug.

V-BELT DRIVE

The belt drive system must be accurately aligned and properly tensioned to achieve satisfactory belt life. Belts should be changed immidiately if cracks, wear, or any damage is found.

BELT INSTALLATION

1. Remove air discharge tube between separator cover and aftercooler. Remove fan/belt guards. Loosen idler screws. Retract idler and remove old belt.
2. Install new belts. Always replace all belts and use a matched set of belts.

   Do not pry or roll the belts into the sheave grooves.

SHEAVE ALIGNMENT

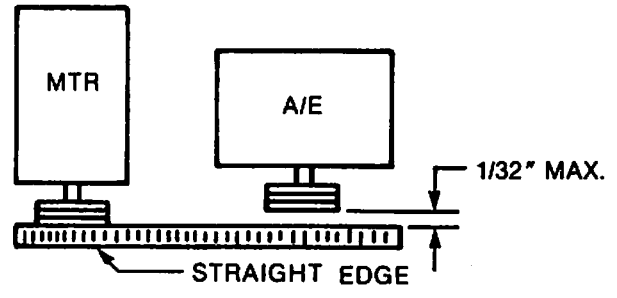
Any degree of sheave misalignment will result in a reduction of belt life.

Misalignment of V-belt drives should not exceed .03 inches.

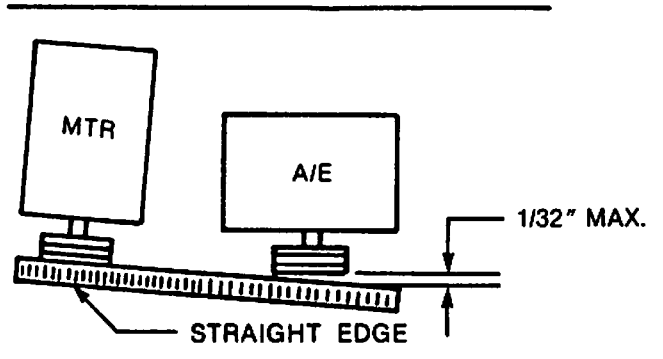
Parallel misalignment occurs when the driver and driven shafts are parallel, but the two sheaves lie in different planes (See Figure 13).

Angular misalignment occurs when the two shafts are not parallel (See Figure 13).

1. Align sheaves. An easy and effective method of checking alignment in both directions between the driver and driven sheaves utilizes an accurate straight edge and a machinist 6" ruler.
2. Lay the straight edge across the face of the driver (motor) sheave and check alignment of the driven (compression module) sheave. Then lay the straight edge across the driven sheave and check that the driver sheave is aligned.
3. Alignment should be within .03 inch **maximum** when measuring the gap between the straight edge and the rim of the opposite sheave (See Figure 13) in each direction.



PARALLEL MISALIGNMENT



ANGULAR MISALIGNMENT

Figure 13

BELT TENSION ADJUSTMENT

Belt tension should be set only after proper sheave alignment has been completed. A belt that is too loose will slip causing overheating, a reduction in belt life, and a loss of compressor efficiency. Conversely, a belt that is too tight will cause a reduction in belt life and may overload bearings. The proper tensioning method is described as follows:

1. Turn idler adjusting screw until idler sheave contacts belt.
2. Determine compressor size, deflection measurement and deflection force from the table.
3. At the center of the sheave span, apply a force (perpendicular to the span) by use of a tension tester or other calibrated spring (See Figure 14).

   The adjacent belt can be used as a reference for measuring deflection. At the appropriate deflection measurement, the applied force should fall within the minimum and maximum for the given unit. New belts should be set at the "initial" deflection force.
4. If the deflection force is less than required, the idler sheave should be moved downward. If the deflection force is greater than required, the idler sheave should be moved upward.
5. Tighten idler retaining screw and adjusting screw lockout.
6. Replace fan and belt guards.
7. Re-connect air discharge tube. Check to see that all bolts and tube fittings are tight before starting unit.
8. Run the unit for 15-30 minutes to seat the belts, then check the tension again and adjust to the maximum deflection force.
9. During the first 24 hours of operation, check tension frequently to see that it is within the minimum to maximum range, then every 1000 hours thereafter.

CAUTION

There will normally be a rapid drop in belt tension during the "run-in" period. Tension new drives with the initial deflection force indicated in the charts below. Check tension frequently during the first 24 hours of unit operation, then every 1000 hours thereafter.

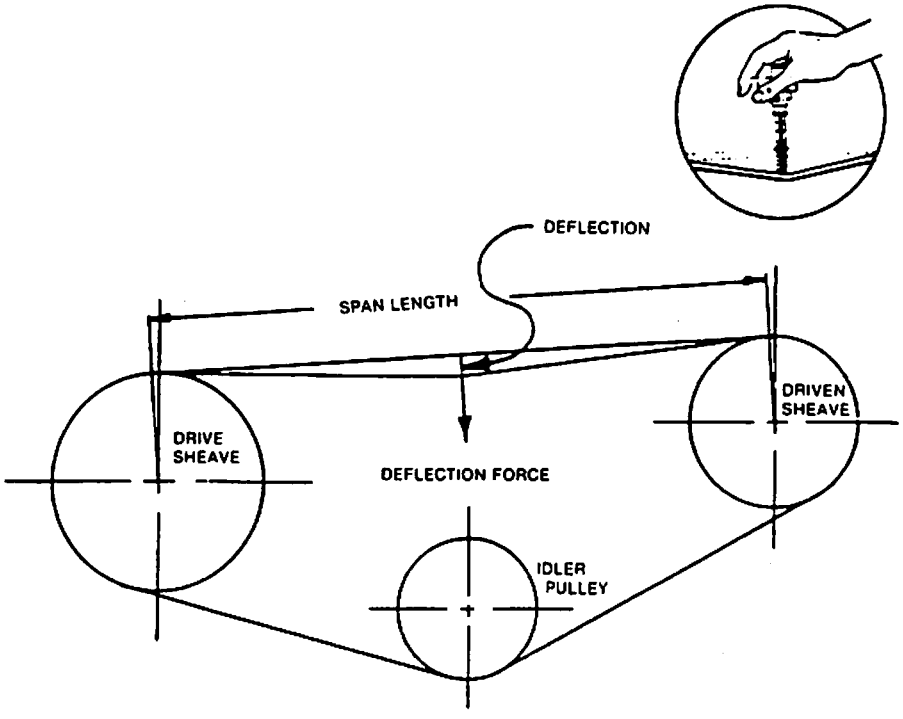


Figure 14

Individual Belts

Unit Size	Deflection (Inches)	Deflection Force (Lbs.) PER BELT		
		Initial	Min.	Max.
10 Horsepower	5/16"	6	3	5
15 Horsepower	5/16"	6	3	5
20 Horsepower	5/16"	6	3	5
25 Horsepower	5/16"	6	3	5

MAINTENANCE SCHEDULE

⚠ WARNING ⚠

TROUBLE INVESTIGATION WITH POWER ON SHOULD ONLY BE DONE WITH EXTREME CARE AND ONLY BY A QUALIFIED ELECTRICIAN. FAILURE TO HEED THIS WARNING MAY RESULT IN PERSONAL INJURY OR DEATH.

THE MAINTENANCE SCHEDULE SPECIFIES ALL RECOMMENDED MAINTENANCE REQUIRED TO KEEP THE COMPRESSOR IN GOOD OPERATING CONDITION. SERVICE AT THE INTERVAL LISTED OR AFTER THAT NUMBER OF HOURS, WHICH EVER OCCURS FIRST.

ACTION	PART OR ITEM	RUNNING HOURS	TIME INTERVAL (WHICHEVER COMES FIRST) DAILY	1 WK.	1 MO.	3 MO.	6 MO.	YEARLY	2 YR.	REFERENCE PAGE
INSPECT	COOLANT LEVEL	8								19
INSPECT	TEMPERATURE (AIR)	8	X							15
INSPECT	SEPARATOR ELEMENT DIFFERENTIAL	8	X							19
INSPECT	AIR FILTER DELTA P	8	X							19
REPLACE	COOLANT FILTER	150	X (INITIAL CHANGE ONLY)							19-20
INSPECT	V-BELT, V-BELT TENSION	1000			X					22-23
CHECK	HAT SWITCH	1000			X					18
REPLACE	COOLANT FILTER	1200	X (SUBSEQUENT CHANGES)							19-20
INSPECT	HOSES	2000				X				—
CLEAN	COOLER CORES	4000					X			—
REPLACE	AIR FILTER	8000						X		17-20
REPLACE	SEPARATOR ELEMENT	8000						X		19-20
REPLACE	V-BELTS	8000						X		22-23
REPLACE	COOLANT	8000							X	19

PARTS LIST

INTRODUCTION

GENERAL

This manual, which contains an illustrated parts breakdown, has been prepared as an aid in identifying and ordering parts in the U Series compressor. All of the compressor parts, listed in the parts breakdown, are manufactured with the same precision as the original equipment.

Ingersoll-Rand Company service facilities and parts are available worldwide. There are Ingersoll-Rand Company Branch Offices and authorized distributors located in the principle cities of the United States. In Canada, our customers are serviced by the Canadian Ingersoll-Rand Company, Limited. There are also Ingersoll-Rand Company subsidiaries and authorized distributors located in the principle cities throughout the world.

DESCRIPTION

The illustrated parts breakdown illustrates the various assemblies, sub-assemblies and detailed parts which make up this particular U Series compressor. A series of illustrations show each part clearly and in its correct location relative to the other parts in the illustration. Each part on an illustration is referenced with a number. The number, description and quantity needed per assembly is listed in numerical order on the following pages.

OPTIONAL EQUIPMENT

Several optional accessory items are available for convenience or special application. These accessories have been selected as being particularly suitable for use on the U Series compressor.

For complete details on Optional Equipment, contact your Sales Representative.

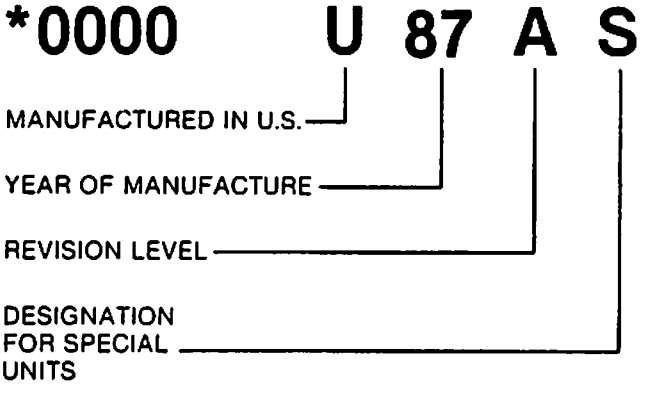
HOW TO USE THIS PARTS MANUAL

1. Turn to the Parts Section to locate the desired illustrations.
2. Locate the part on the illustration by visual identification and the reference number.
3. Find the referenced number on the Tabulated page, along with the Part Number and Description.

HOW TO ORDER PARTS

In order that all avoidable errors be eliminated when ordering parts, please specify the following:

1. The model number of the unit as shown on the Compressor Data Plate.
2. The serial number of the unit as shown on the Compressor Data Plate.
3. The form number of this manual.
4. The reference number, part number, description and quantity needed exactly as listed.
5. The motor data code shown on the motor data plate.



CAUTION

THE USE OF REPAIR PARTS OTHER THAN THOSE INCLUDED WITHIN THE INGERSOLL-RAND COMPANY APPROVED PARTS LIST MAY CREATE HAZARDOUS CONDITIONS OVER WHICH THE INGERSOLL-RAND COMPANY HAS NO CONTROL. SUCH HAZARDOUS CONDITIONS CAN LEAD TO ACCIDENTS THAT MAY BE LIFE-THREATENING, CAUSE SUBSTANTIAL BODILY INJURY, OR RESULT IN DAMAGE TO THE EQUIPMENT. THEREFORE, INGERSOLL-RAND COMPANY CAN BEAR NO RESPONSIBILITY FOR EQUIPMENT IN WHICH NON-APPROVED REPAIR PARTS ARE INSTALLED.

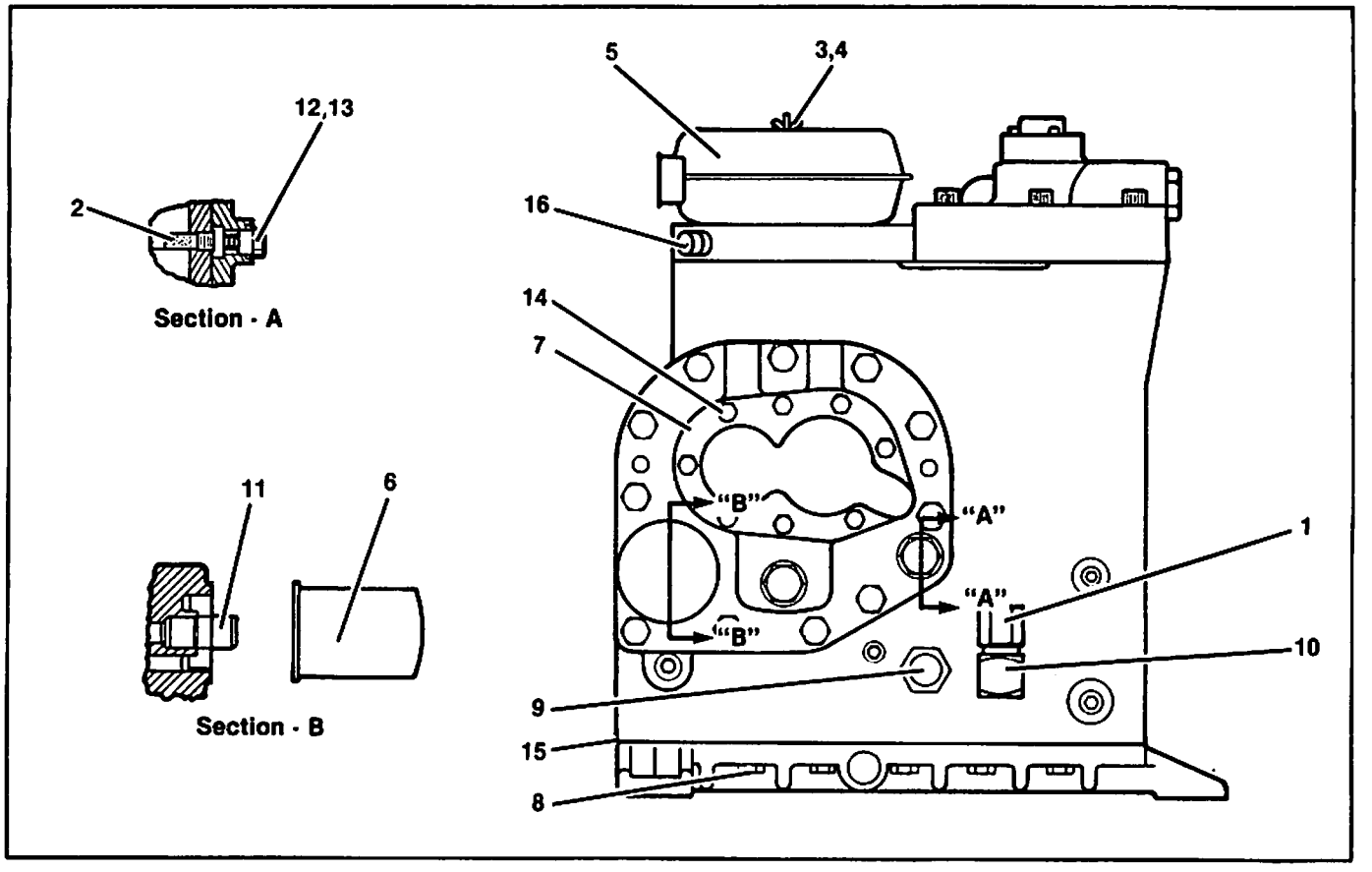


Figure 1
Compression Module
Assembly

Ref. No.	Part Number	Qty.	Description
1.	39144522	1	Cap, Coolant Fill
2.	39148887	1	Screen, Orifice
3.	39152350	1	Nut, Wing
4.	39139316	1	Washer
5.	39763156	1	Filter, Air
6.	39446489	1	Filter, Coolant
7.	39771571	1	Gasket, Rear Bearing Cover
8.	35271139	16	Bolt, Hex Head
9.	39147046	1	Glass, Sight
10.	95219853	1	Elbow
11.	39442306	1	Stem, Coolant Filter
12.	95653317	1	Plug, Hex Head
13.	39404165	1	O-Ring
14.	39155221	8	Bolt, Hex Head
15.	39771563	1	Gasket, Bottom Cover
16.	39124722	1	Indicator, Air Filter

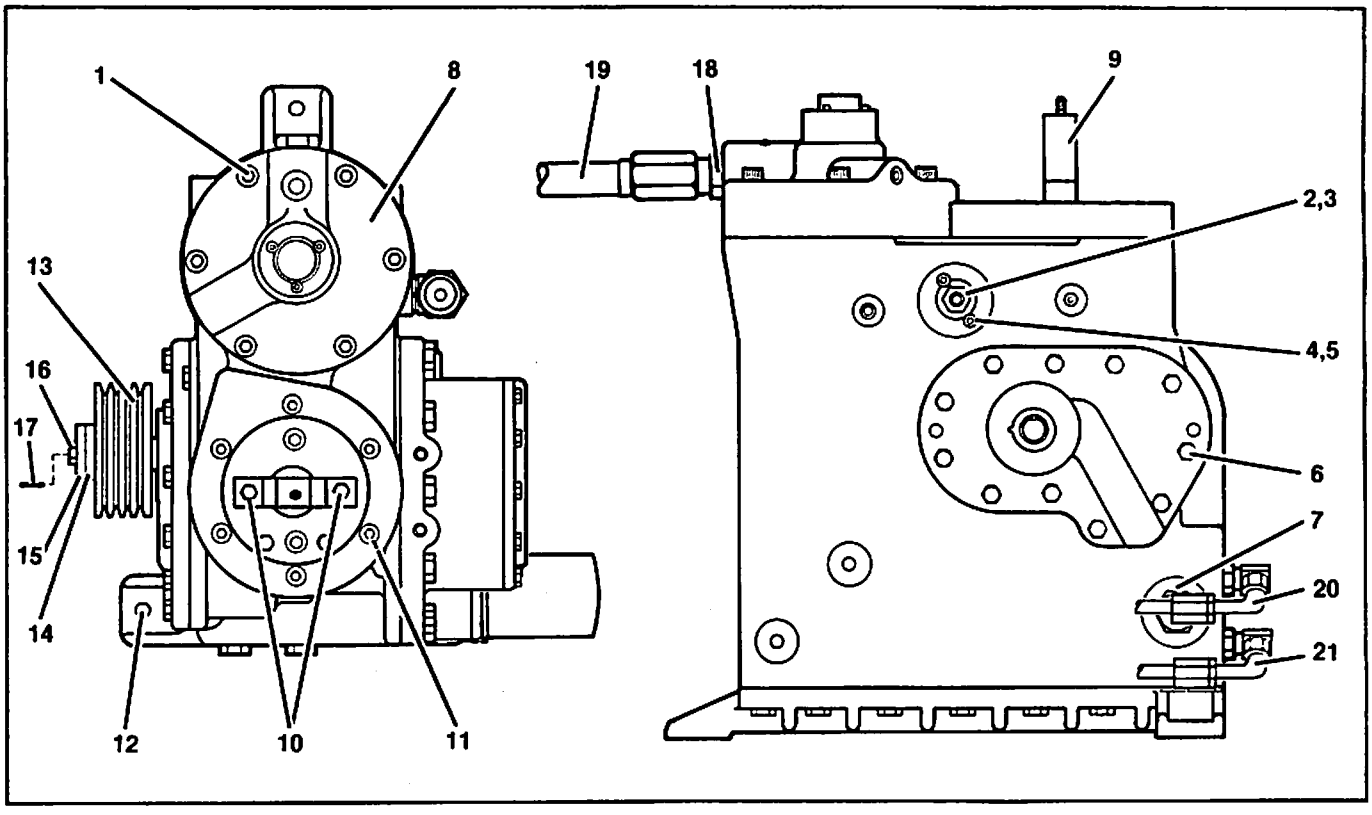


Figure 2
Compression Module
Assembly

Ref. No.	Part Number	Qty.	Description
1.	39151782	6	Screw, Socket Head
2.	39449095	1	Valve, Blowdown
3.	39151659	1	O-Ring, Blowdown Valve
4.	39144993	2	Screw, Socket Head
5.	39145008	2	Washer
6.	35271154	11	Bolt, Hex Head
7.	39442439	1	Element, Temperature Control Valve
8.	39770961	1	Cover, Separator
9.	39446935	1	Brkt., Air Filter
10.	35287648	2	Bolt, Hex Head
11.	35148675	6	Bolt, Socket Head
12.	39128517	3	Bolt
13.	39777230	1	Sheave, 10H
	39777255	1	Sheave, 10HH
	39775002	1	Sheave, 15H, EP15
	39775028	1	Sheave, 15HH, HP15
	39775044	1	Sheave, 20H, EP20
	39775051	1	Sheave, 20HH, HP20
	39775069	1	Sheave, 25H, EP25
	39775077	1	Sheave, 25HH, HP25
14.	39444526	1	Spacer, 10-15 HP
	39444534	1	Spacer, 20-25 HP
15.	39444542	1	Retainer
16.	35291020	1	Screw, Hex Head
17.	29444492	1	Key, 10-15 HP
	39444484	1	Key, 20-25 HP
18.	39142302	1	Fitting, Tube
19.	39456579	1	Tube, Discharge w/ Aftercooler
	39458120	1	Tube, Discharge w/o Aftercooler - SSR Only
20.	39158670	1	Hose, 10-15 HP
	39157508	1	Hose, 20-25 HP
21.	39158662	1	Hose, 10-15 HP
	39157490	1	Hose, 20-25 HP

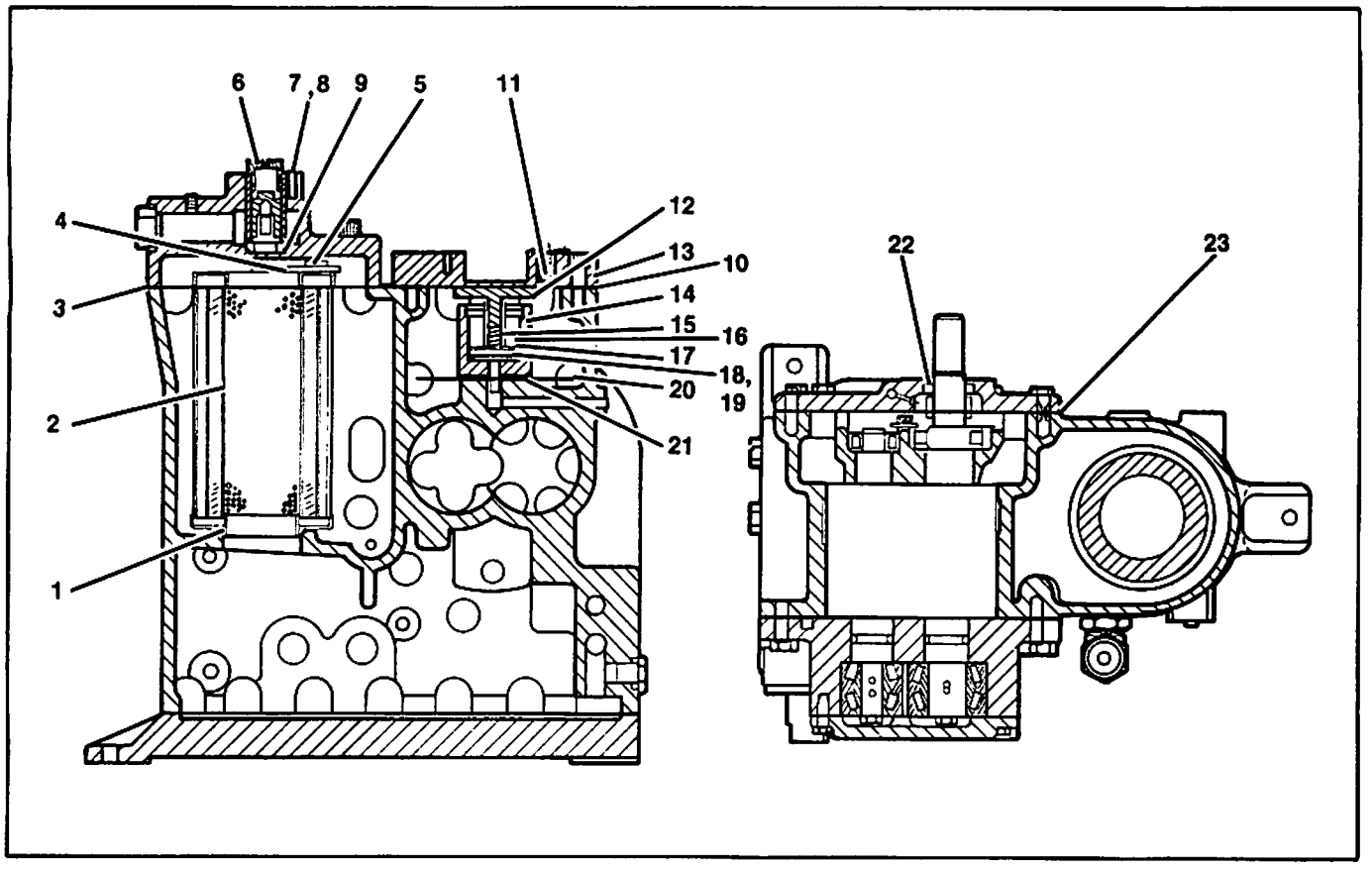


Figure 3
Compression Module
Assembly

Ref. No.	Part Number	Qty.	Description
1.	39151105	1	O-Ring, Sep. Element
2.	39760962	1	Element, Separator
3.	39771605	1	Gasket, Separator Cover
4.	39151576	1	Clamp, Sep. Element
5.	35287655	2	Screw, Socket Head
6.	39442249	1	Valve, Minimum Pressure Check
7.	39144993	3	Screw, Socket Head
8.	39145008	3	Washer
9.	39151667	1	O-Ring, Minimum Pressure Check Valve
10.	39771613	1	Gasket, Intake Valve Seat
11.	39155486	1	Ball, Viton
12.	39446945	1	Plate, Intake Valve
13.	39770847	1	Seat, Intake Valve
14.	39442298	1	Body, Intake Valve
15.	39150263	1	Spring, Valve Plate
16.	39149448	1	Spring, Inner Piston
17.	39442223	1	Piston, Intake Valve
18.	39144498	1	O-Ring
19.	39144506	1	Ring, Glyd
20.	39458435	1	Baffle, Inlet
21.	39144589	2	Gasket, Valve Body
22.	39775226	1	Seal, Shaft
23.	39771597	1	Gasket, Seal Retainer

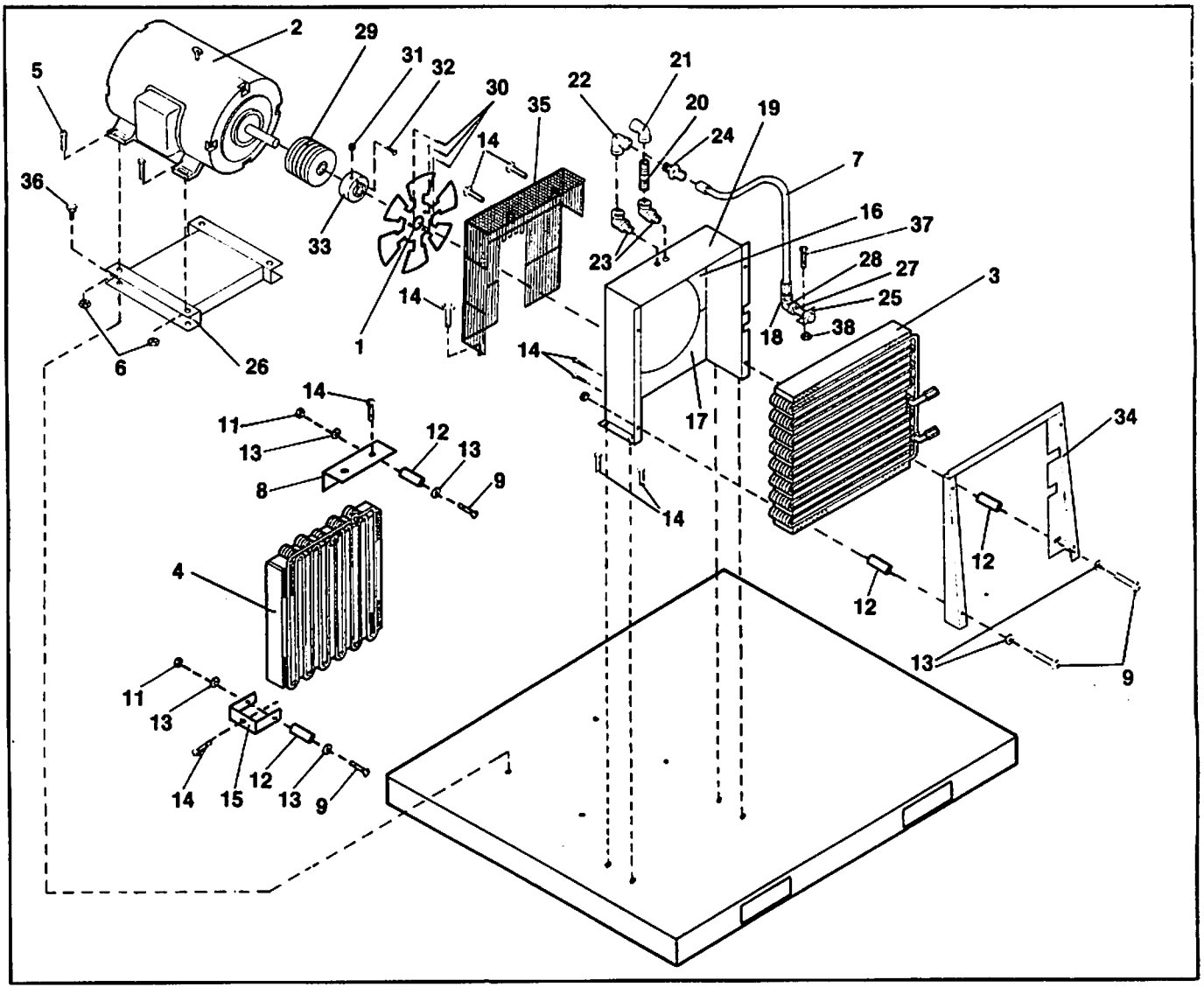


Figure 4 Motor-Cooler Assembly

Ref. No.	Part Number	Qty.	Description
1.	39149273	1	Fan (25 Horsepower)
	39151246	1	Fan (10-20 Horse-power)
2.	*	1	Motor
3.	35841625	1	Oil Cooler (20-25 HP)
	39758768	1	Oil Cooler (10-15 HP)
4.	39758768	1	Aftercooler
5.	39128483	4	Screw (10-15 HP)
	39116330	4	Screw (20-25 HP)
6.	39128566	4	Nut (10-15 HP)
	39116348	4	Nut (20-25 HP)
7.	39452669	1	Tube, AFTCLR Discl (SSR Only)
8.	39444161	1	Bracket, Top
9.	95103982	8	Screw
10.	39145347	6	Washer
11.	39128541	8	Nut
12.	35327501	8	Spacer
13.	39151923	16	Washer, Rubber
14.	39133145	21	Screw
15.	39444153	2	Bracket, Bottom
16.	39445093	1	Plate, Orifice
17.	39446042	1	Plate, Orifice
18.	95219747	1	Adapter
19.	39770334	1	Box, Cooler (10-15 HP)
	39759618	1	Box, Cooler (20-25 HP)
20.	39153366	1	Nipple
21.	39157524	1	Elbow
22.	39153853	1	Elbow, Air Out

Ref. No.	Part Number	Qty.	Description
23.	39153358	2	Elbow, Reducing
24.	95219747	1	Adapter
25.	39452867	1	Bracket (SSR Only)
26.	39775168	1	Motor Support
27.	39154232	1	Nipple (SSR Only)
28.	39154240	1	Elbow, Reducing (SSR Only)
29.	39777222	1	Sheave, 10H
	39777248	1	Sheave, 10HH
	39769989	1	Sheave, 15H, EP15
	39772660	1	Sheave, 15HH, HP15
	39775093	1	Sheave, 20H, EP20
	39775101	1	Sheave, 20HH, HP20
	39775119	1	Sheave, 25H, EP25
	39775127	1	Sheave, 25HH, HP25
30.	95105227	3	Screw
31.	95079257	2	Set Screw
32.	95068037	3	Screw, Hex Head
33.	39777271	1	Spacer (10 HP)
	39762810	1	Spacer (15 HP)
	39760699	1	Spacer (20-25 HP)
34.	39760517	1	Shroud, Enclosure (15 HP)
	39760426	1	Shroud, Enclosure, (20-25 HP)
35.	39775473	1	Guard, Fan
36.	39116330	1	Screw
37.	39128434	2	Screw
38.	39128541	2	Nut

*Furnish Motor Data Code When Ordering Replacement

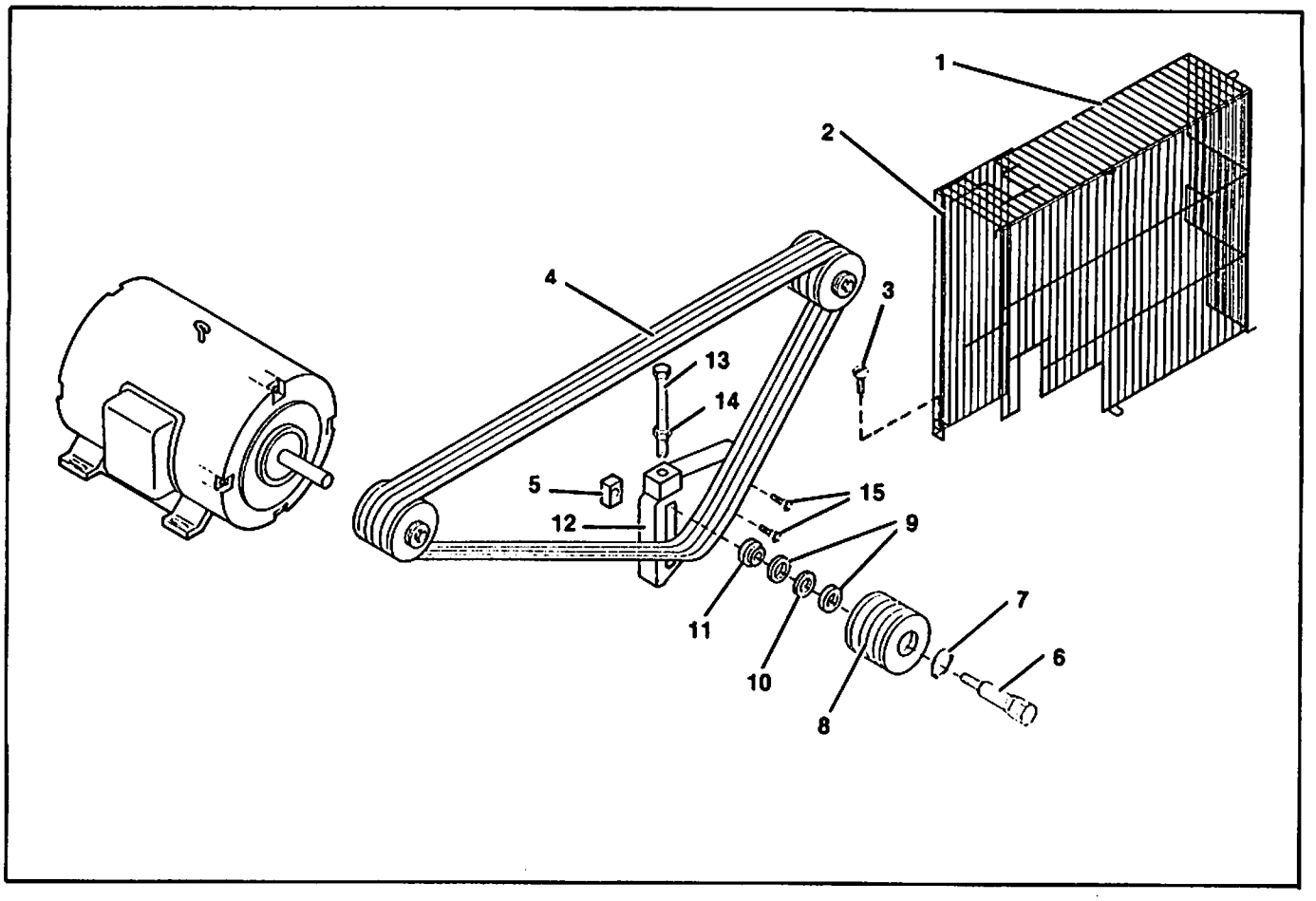


Figure 5
Belt-Tensioner
Assembly

Ref. No.	Part Number	Qty.	Description
1.	39775481	1	Guard, Belt
2.	39776604	1	Guard, Rear Belt
3.	39133145	3	Screw
4.	39160023	3	V-Belt, (10 HP Units), 56"
	39158324	3	V-Belt, (15 HP Units), 60"
	39158324	4	V-Belt, (20-25 HP Units), 60"
5.	39449905	1	Block, Idler
6.	39454293	1	Shaft, Idler
7.	39153127	1	Ring, Retainer
8.	39775135	1	Sheave, Idler
9.	39455969	2	Bearing
10.	39455902	1	Spacer, Bearing
11.	39454301	1	Spacer, Idler
12.	39766134	1	Bracket, Idler
13.	39153291	1	Screw, Adjusting
14.	95287108	1	Nut
15.	35278985	2	Screw
16.	39633268		Belt Tensioner SHV/BRG Repair Kit, (Includes Items 6-11)
17.	39633235		Complete Belt Tensioner Repair Kit, (Includes Items 5-15)

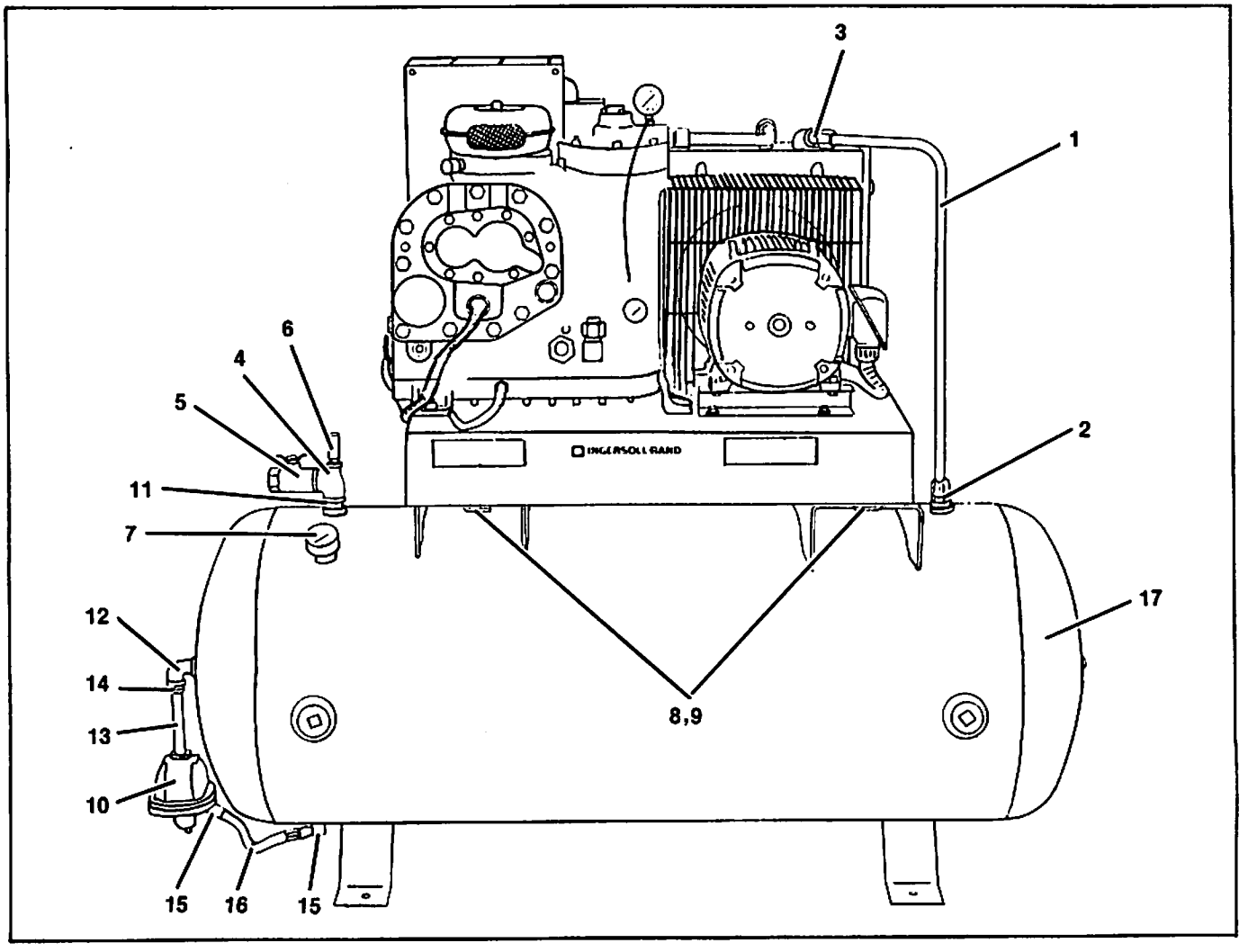


Figure 6
Tank Mounted Units

Ref. No.	Part No.	Qty.	Description
1.	39455423	1	Tube, W/Aft. Clr.
	39456587	1	Tube, W/O Aft. Clr. (Not Shown)
2.	95279329	1	Adapter
3.	95219747	1	Adapter
4.	95006995	1	Tee
5.	39105754	1	Valve, Ball
6.	39121256	1	Valve, Pressure Relief
7.	95295986	1	Gauge, Pressure
8.	39128483	4	Screw
9.	39128566	4	Nut
10.	39137898	1	Trap, Drain
11.	95243101	1	Nipple
12.	95030771	1	Elbow
13.	95272357	1	Nipple
14.	95037438	1	Bushing
15.	95279535	2	Elbow
16.	39135744	1	Hose
17.	39778196	1	Tank, 120 Gal.

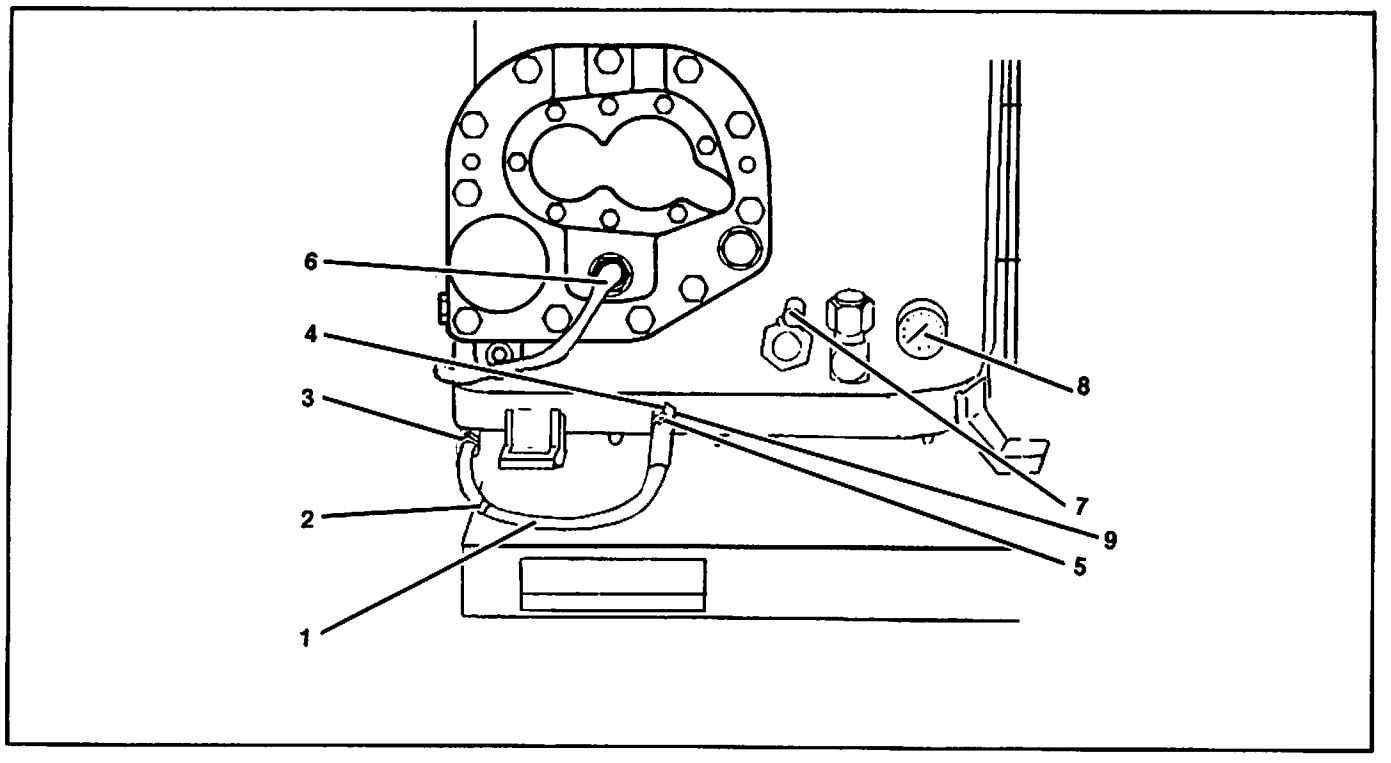


Figure 7
Compression Module

Ref. No.	Part Number	Qty.	Description
1.	39109699	1	Hose, Drain
2.	39156732	1	Clip, Spring
3.	95382206	1	Plug
4.	39106265	1	Adapter
5.	39105739	1	Valve, Ball
6.	39416128	1	Switch, High Air Temperature
7.	39124698	1	Pressure Relief Valve, All Models EP & H
	39124888	1	Pressure Relief Valve, All Models HP & HH
8.	39446497	1	Gauge, Temperature (SP Only)
9.	39404165	1	O-Ring

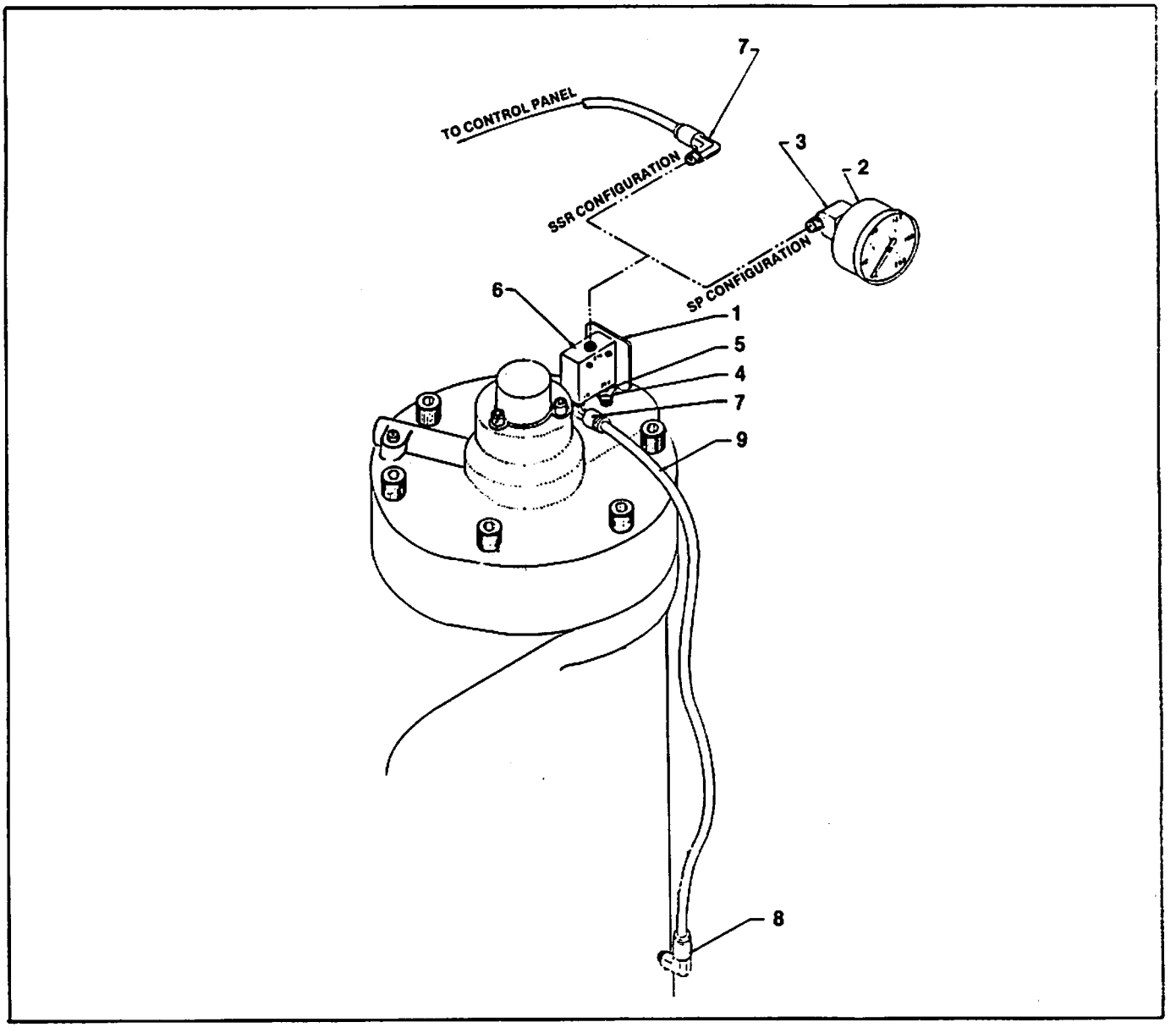


Figure 8
Line/Sump Delta p Indicator

Ref. No.	Part Number	Qty.	Description
1.	39459128	1	Plate, Line/Sump.
2.	39447222	1	Gauge, Pressure (SP Units)
3.	95868386	1	Elbow (SP Units)
4.	39153861	1	Bushing, Reducing
5.	95871828	1	Nipple
6.	39137021	1	Valve, Control
7.	39155577	1	Elbow, (SP)
		2	Elbow, (SSR)
8.	39155478	1	Elbow
9.	39124813	24·	Tubing

·Quantity In Inches

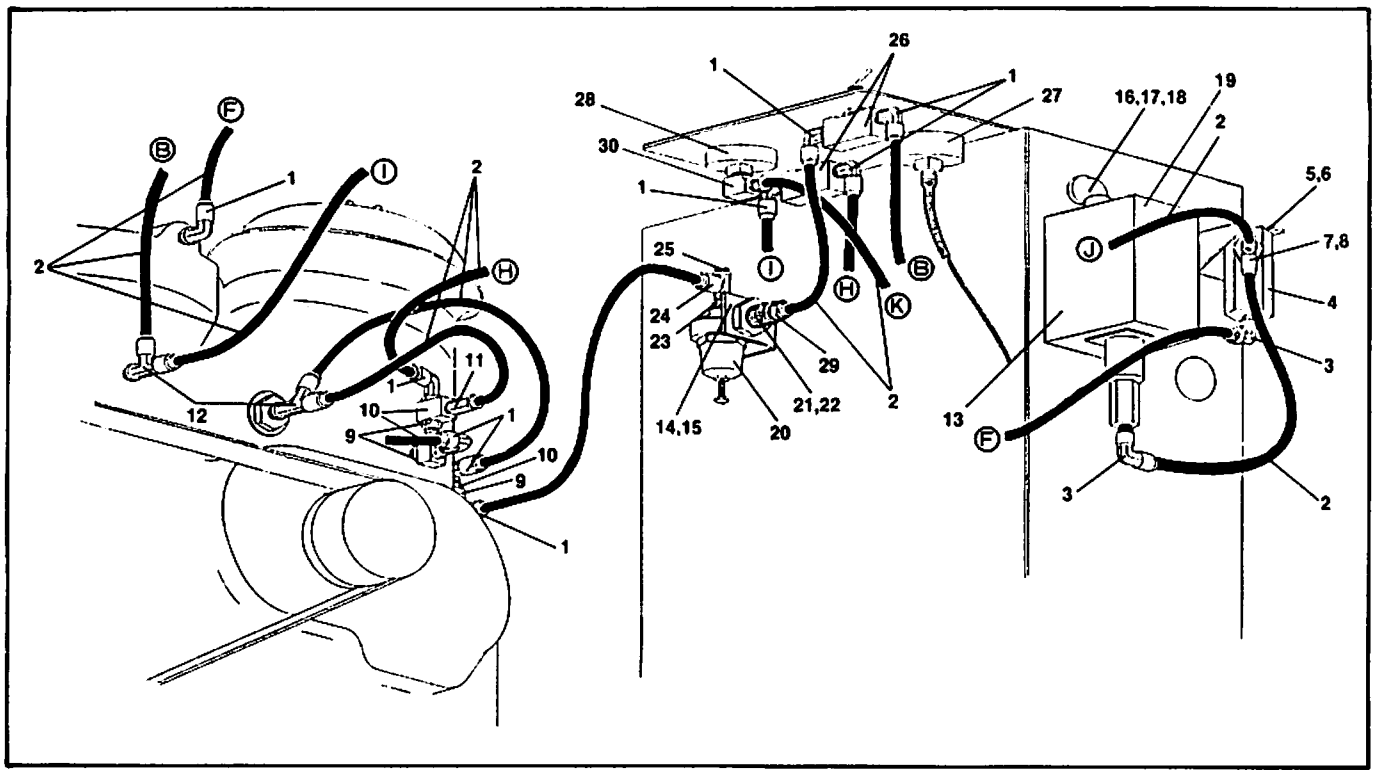


Figure 9
Control Assembly Enclosed Units

Ref. No.	Part Number	Qty.	Description
1.	39155577	9	Elbow
2.	39124813	*	Tubing
3.	33155478	2	Elbow
4.	39457122	1	Valve, Pilot Unload
5.	39458733	1	Bracket
6.	39133145	2	Screw
7.	39156351	1	Tee
8.	39155353	1	Plug (Units w/o AS/S)
9.	95871828	2	Nipple
10.	39127261	3	Valve, Shuttle
11.	39156393	1	Connector
12.	39255347	1	Tee
13.	39100029	1	Switch, Pressure (AS/S Only)
14.	39441795	1	Bracket
15.	39133145	2	Screw
16.	39128079	1	Elbow, Conduit
17.	29114079	1	Locknut
18.	35264068	1	Nipple, Conduit
19.	39141809	2	Screw
20.	39152442	1	Valve, Pressure Regulator
21.	95871828	1	Nipple
22.	39128012	1	Connector, Bulkhead
23.	39153861	1	Bushing, Reducing
24.	39156468	1	Tee
25.	95049359	1	Plug
26.	39137021	2	Valve, Control
27.	39159074	1	Gauge, Temperature
28.	39156245	1	Gauge, Pressure
29.	39156435	1	Connector, Male
30.	39156336	1	Elbow

*Order Per Number of Inches Required

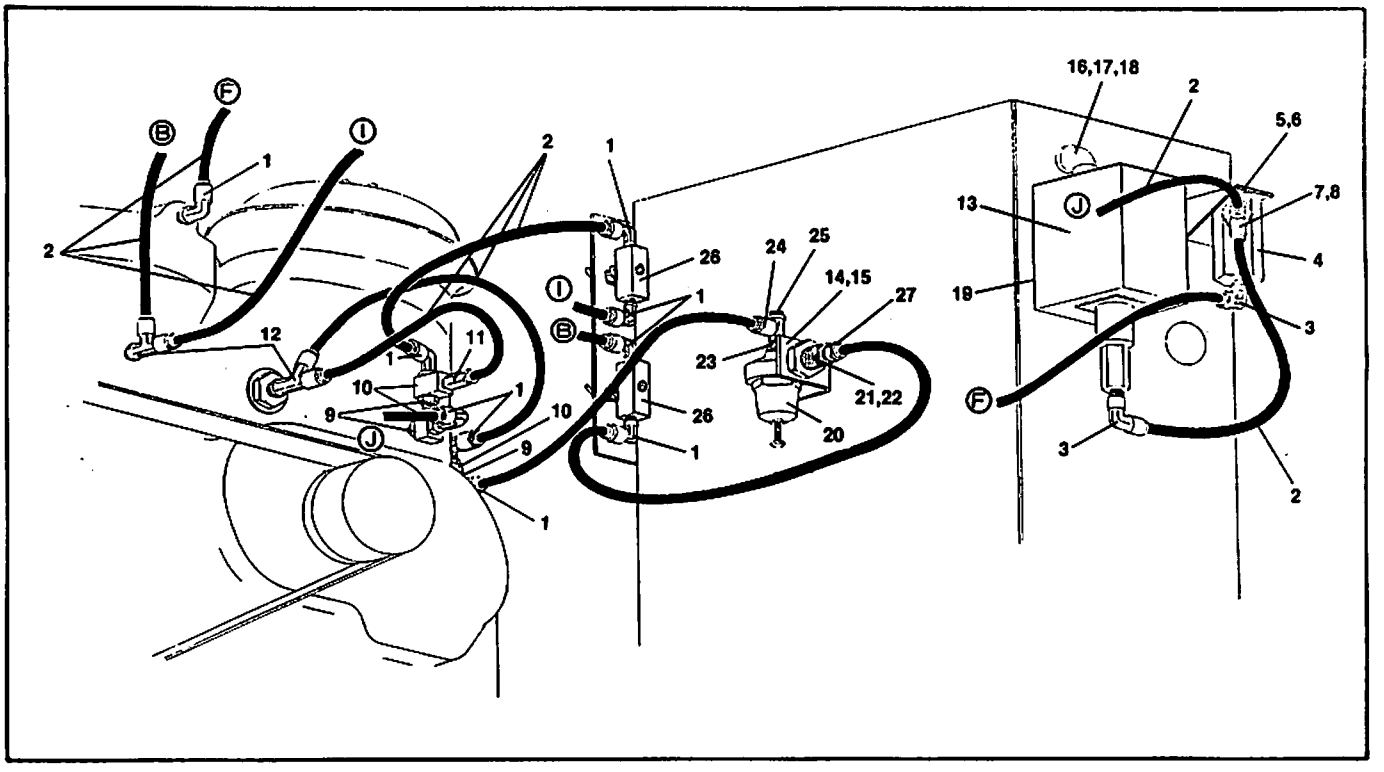


Figure 10
Control Assembly Unenclosed Units

Ref. No.	Part Number	Qty.	Description
1.	39155577	9	Elbow
2.	39124813	*	Tubing
3.	33155478	2	Elbow
4.	39457122	1	Valve, Pilot Unload
5.	39458733	1	Bracket
6.	39133145	2	Screw
7.	39156351	1	Tee
8.	39155353	1	Plug (Units w/o AS/S)
9.	95871828	2	Nipple
10.	39127261	3	Valve, Shuttle
11.	39156393	1	Connector
12.	39255347	1	Tee
13.	39100029	1	Switch, Pressure (AS/S Only)
14.	39441795	1	Bracket
15.	39133145	2	Screw
16.	39128079	1	Elbow, Conduit
17.	29114079	1	Locknut
18.	35264068	1	Nipple, Conduit
19.	39141809	2	Screw
20.	39152442	1	Valve, Pressure Regulator
21.	95871828	1	Nipple
22.	39128012	1	Connector, Bulkhead
23.	39153861	1	Bushing, Reducing
24.	39156468	1	Tee
25.	95049359	1	Plug
26.	39137021	2	Valve, Control
27.	39156435	1	Connector, Male

*Order Per Number of Inches Required

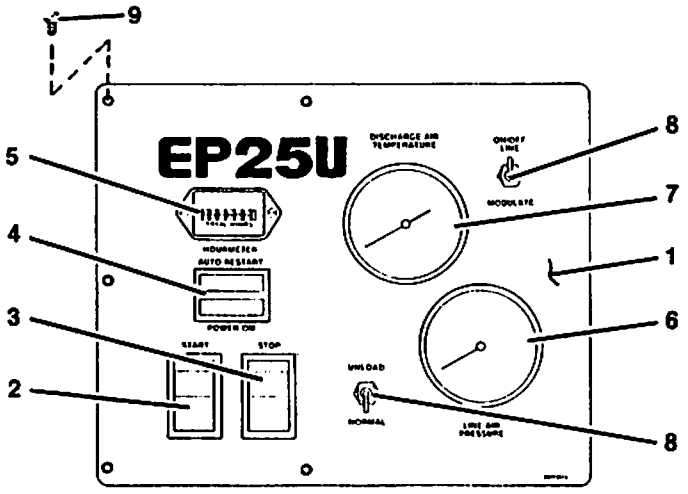


Figure 11
Instrument Panel
Enclosed Units

Ref. No.	Part No.	Qty.	Description
1.	39773973	1	Panel, Instrument
2.	39139985	1	Switch, Start
3.	39139993	1	Switch, Stop
4.	39136981	1	Light, 2 Function
5.	39448360	1	Hourmeter
6.	39156245	1	Gauge, Pressure
7.	39159074	1	Gauge, Temperature
8.	39137021	2	Valve, Control
9.	39121132	5	Screw

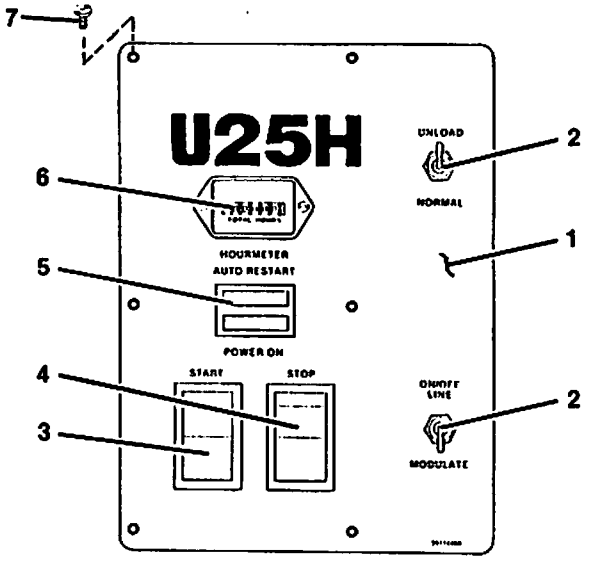


Figure 12
Instrument Panel
Unenclosed Units

Ref. No.	Part No.	Qty.	Description
1.	39774468	1	Panel, Instrument
2.	39137021	2	Valve, Control
3.	39139985	1	Switch, Start
4.	39139993	1	Switch, Stop
5.	39136981	1	Light, 2 Function
6.	39448360	1	Hourmeter
7.	39121132	6	Screw

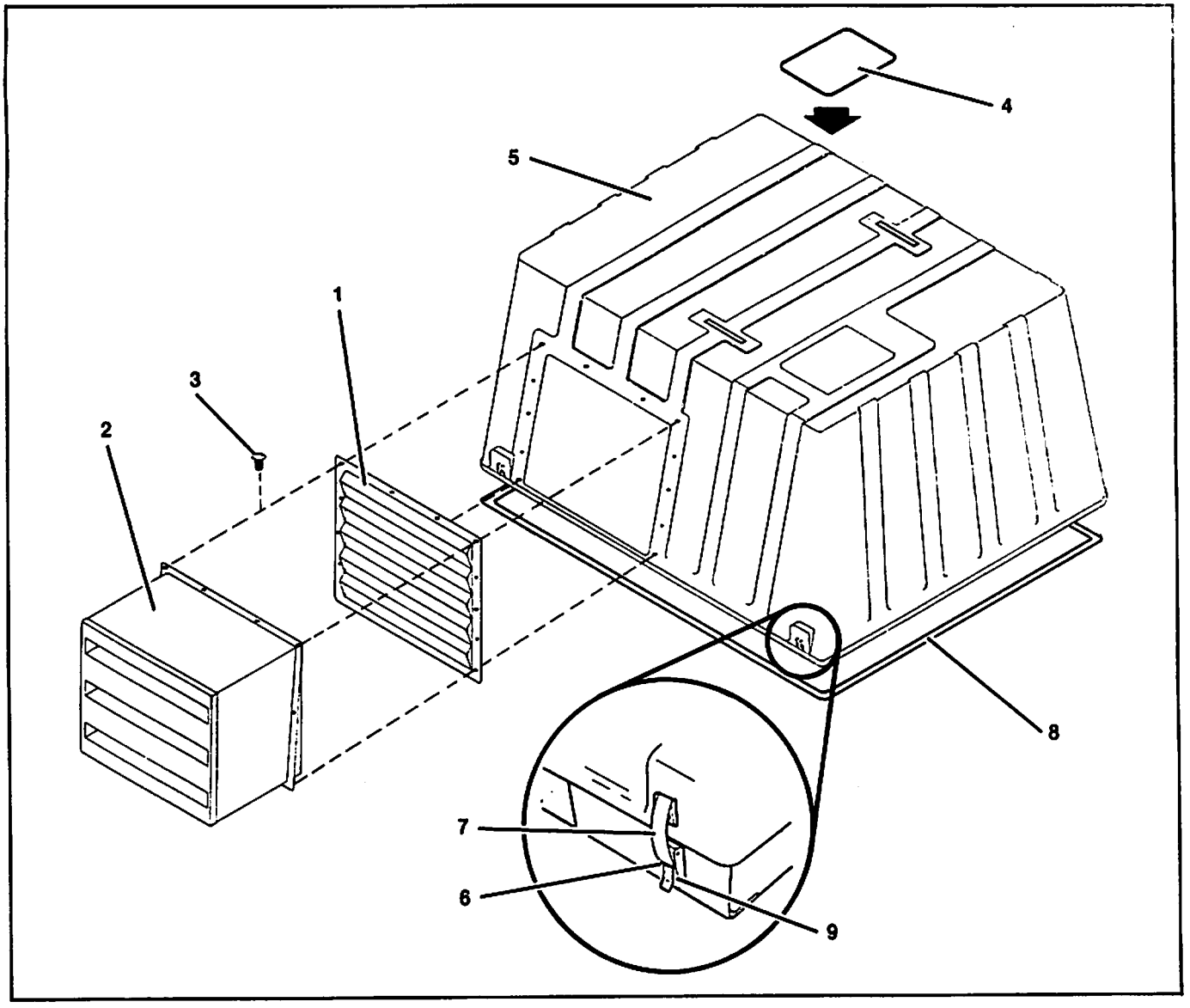


Figure 13
Enclosure

Ref. No.	Part Number	Qty.	Description
1.	39770151	2	Louver, (Standard)
2.	39776380	2	Box, Sound (Low Sound)
3.	39153994	16	Rivet, Enclosure
4.	39149471	3*	Seal, Inst. Panel
5.	39774674	1	Enclosure
6.	39152103	4	Tab, Snap-Lock
7.	39147814	4	Latch, Oven-Center Draw
8.	39151626	20*	Seal, Enclosure
9.	39129994	8	Screw

*Quantity in Feet

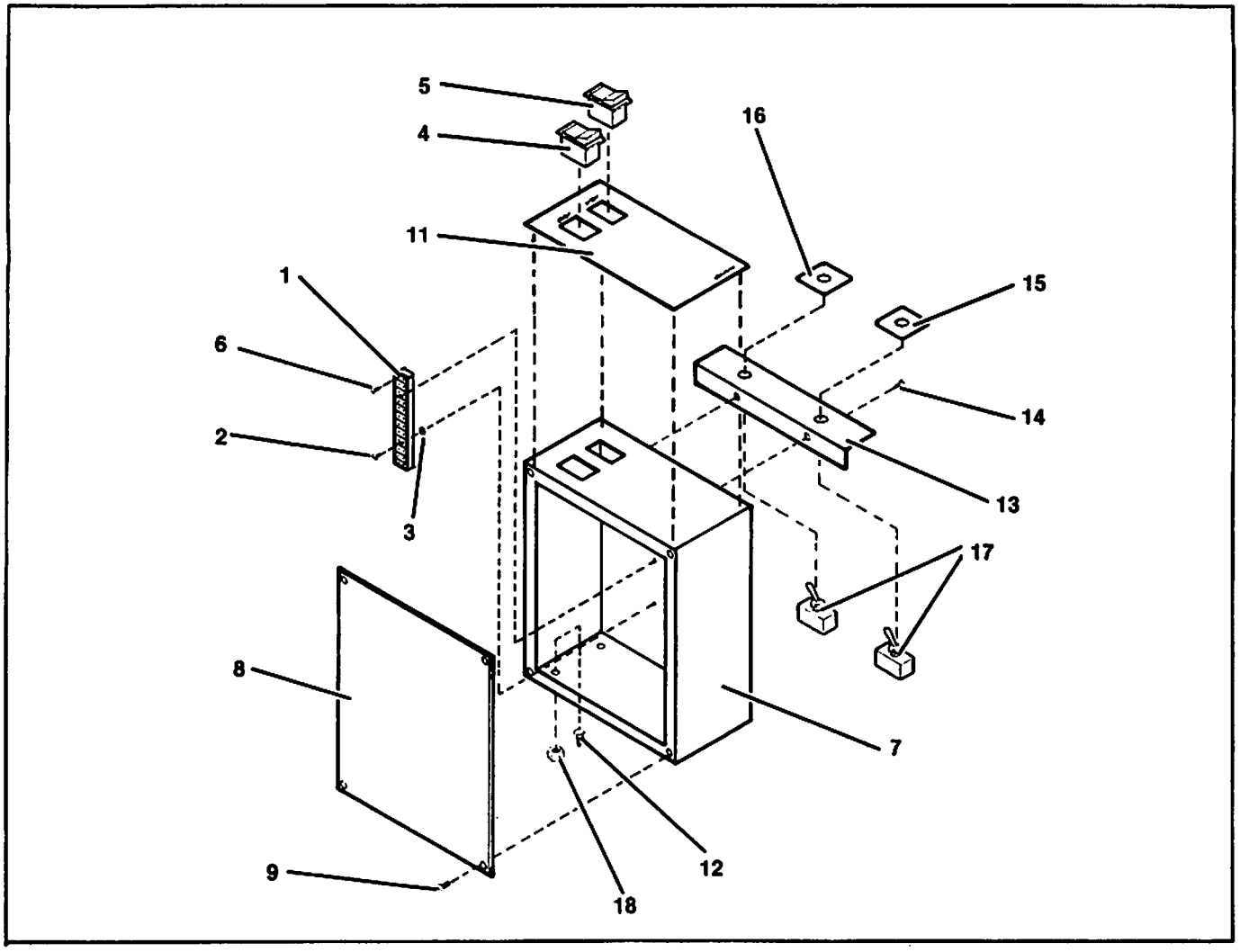


Figure 14
No Starter Control Box

Ref. No.	Part Number	Qty.	Description
1.	39127204	1	Strip, Terminal
2.	39127295	2	Screw
3.	95076709	2	Nut
4.	39139985	1	Switch, Start
5.	39139993	1	Switch, Stop
6.	39136668	4	Terminal Lug
7.	39748033	1	Box, Control
8.	39435623	1	Cover, Control Box
9.	39121132	4	Screw
10.	39129085	*	Wire, Red
11.	39451612	1	Decal, Inst. Panel
12.	39128434	4	Screw
13.	39459466	1	Bracket, Control Valve
14.	39133145	2	Screw
15.	39452891	1	Plate, Modulation
16.	39456256	1	Plate, Normal/Unload
17.	39137021	2	Valve, Control
18.	39128541	4	Nut

* Order per number of feet required.

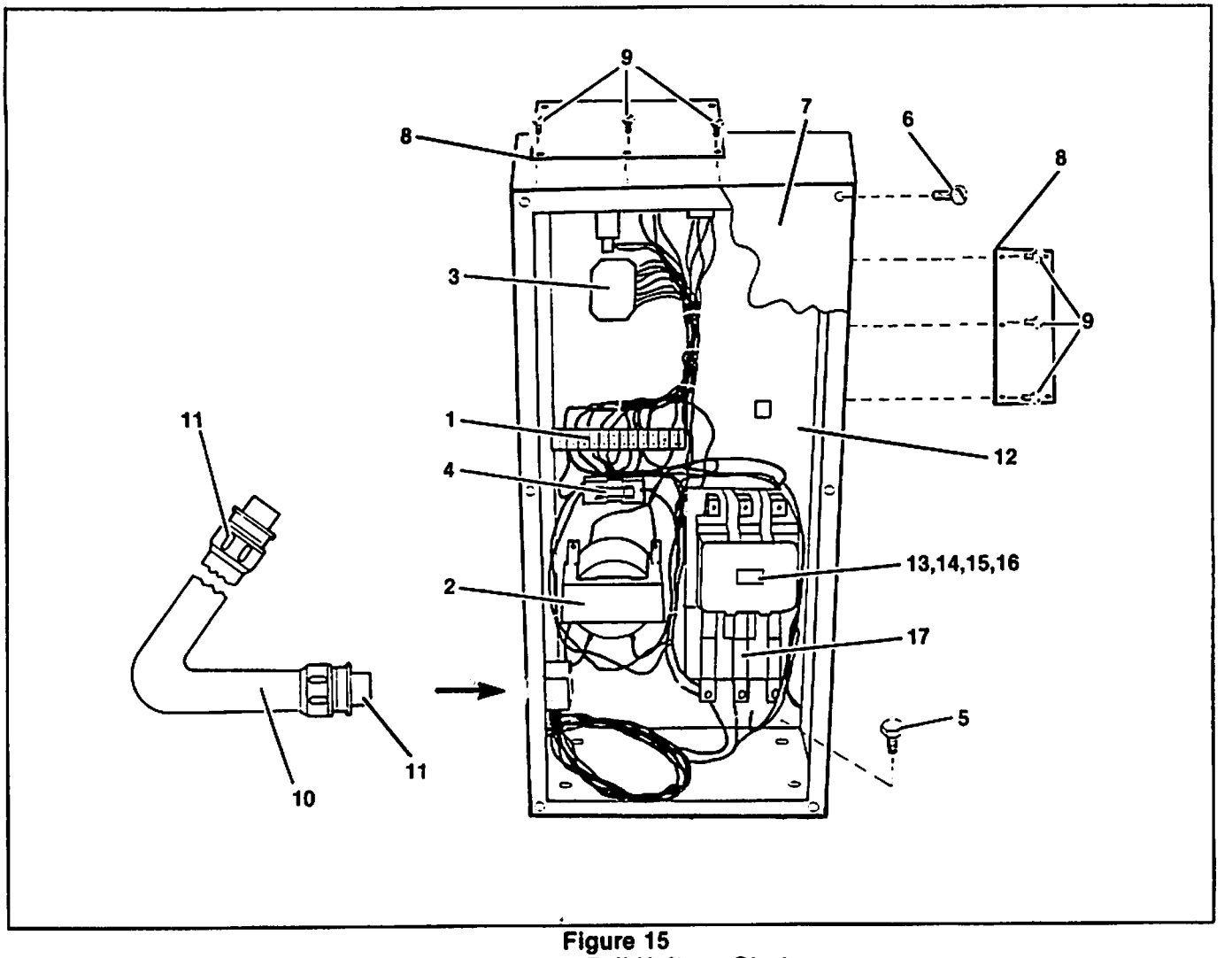


Figure 15
Sizes 2, 3 & 4 Full Voltage Starter
(Items 1-12 are common for all full voltage starters)

Ref. No.	Part Number	Qty.	Description
1.	39127204	1	Strip, Terminal
2.	39153911	1	Control Transformer (230,460,575V)
	39155510	1	Control Transformer (200V)
3.	39729272	1	Auto Control Module
4.	39113535	1	Transformer Fuse
5.	39128434	4	Screw
6.	39133145	6	Screw
7.	39444336	1	Cover, Starter Box
8.	39444906	1	Blank, Panel (Top SP, Side SSR)
9.	39121132	6	Screw
10.	39144100	*	Conduit
11.	39144092	2	Fitting, Conduit
12.	39759634	1	Panel, Rear
SIZE 2 FULL VOLTAGE			
13.	39121157	1	Starter-Size 2 (1M)
14.	39114525	1	Coil
15.	39114541	1	Contacts - 3 Pole
16.	39115126	1	Interlock Switch (N.O. - N.O.)
17.	39118203	1	Overload Relay

Ref. No.	Part Number	Qty.	Description
SIZE 2 FULL VOLTAGE W/S/3 O.L.			
13.	39114418	1	Contactor (1M)
14.	39114525	1	Coil
15.	39114541	1	Contacts - 3 Pole
16.	39115126	1	Interlock Switch (N.O. - N.O.)
17.	39114517	1	Overload Relay (10L)
SIZE 3 FULL VOLTAGE			
13.	39114434	1	Starter - Size 3 (1M)
14.	39114533	1	Coil
15.	39114558	1	Contacts - 3 Pole
16.	39115126	1	Interlock Switch (N.O. - N.O.)
17.	39114517	1	Overload Relay (10L)
SIZE 4 FULL VOLATAGE			
13.	39114442	1	Starter - Size 4 (1M)
14.	39114533	1	Coil
15.	39114566	1	Contact - 3 Pole
16.	39115126	1	Interlock Switch (N.O. - N.O.)
17.	39121264	1	Overload Relay (10L)

* Order Per Number of Inches Required

RECOMMENDED SPARE PARTS LIST

HOW TO SELECT RECOMMENDED SPARES

These sheets list spare parts by class:

CLASS I — Recommended where downtime is acceptable.

CLASS II — Recommended where limited downtime is acceptable.

CLASS III — Recommended where any downtime highly undesirable.

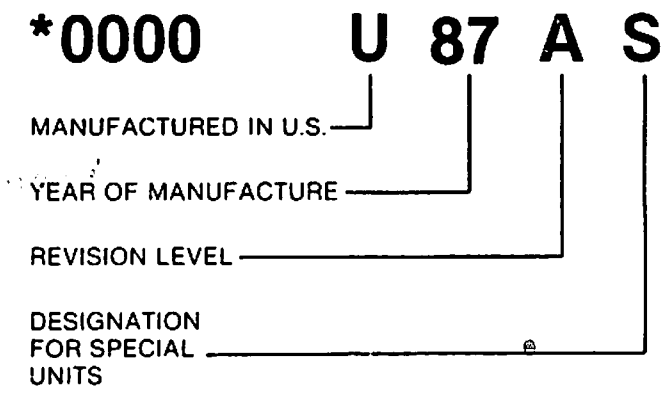
CAUTION

The use of repair parts other than those included within the Ingersoll-Rand Company approved parts list may create hazardous conditions over which the Ingersoll-Rand Company has no control. Such hazardous conditions can lead to accidents that may be life-threatening, cause substansial bodily injury, or result in damage to the equipment. Therefore, Ingersoll-Rand Company can bear no responsibility for equipment in which non-approved repair parts are installed.

HOW TO ORDER PARTS

In order that all avoidable errors be eliminated when ordering parts, please specify the following:

1. The model number of the unit as shown on the Compressor Data Plate.
2. The serial number of the unit as shown on the Compressor Data Plate.
3. The form number of this manual.
4. The reference number, part number, description and quantity needed exactly as listed.
5. The motor data code shown on the motor data plate.



SPECIAL NOTE

THE INGERSOLL-RAND AIREND MODULE IS ENGINEERED AND MANUFACTURED TO THE HIGHEST QUALITY STANDARDS. WITH REGULAR MAINTENANCE YOUR AIR COMPRESSOR SYSTEM WILL PROVIDE MANY YEARS OF TROUBLE FREE CONTINUOUS SERVICE.

THE INGERSOLL-RAND AIREND IS BACKED BY A FACTORY WARRANTED AIREND REBUILD-EXCHANGE PROGRAM.

CONTACT YOUR NEAREST INGERSOLL-RAND REPRESENTATIVE FOR DETAILED INFORMATION.

10/15/20/25 HORSEPOWER
SPARE PARTS

COMPRESSOR PART	PART NO.	QTY. PER UNIT	LOCATION OR USE	RECOMMENDED QUANTITY KEPT ON HAND AT INSTALLATION CLASS 1	CLASS 2	CLASS 3
U1 Compression Module	39617170	1				
Maintenance Kit Air/Coolant Filters	39605357	1	Maintenance Kit	1	1	1
Air Filter Element	39763156	1	At Air Inlet	2	3	4
Coolant Filter Element	39446489	1	On Compression Module	4	4	4
Separator Element Kit	39633227	1	In Compression Module	0	1	1
Pressure Relief Valve	39124698	1	On Compression Module (EP-15, 20, 25) (10H, 15H, 20H, 25H)	0	1	1
Pressure Relief Valve	39124888	1	On Compression Module (HP-15, 20, 25) (10HH, 15HH, 20HH, 25HH)	0	1	1
High Air Temp. Switch	39416128	1	On Compression Module	1	1	2
Air Filter Indicator	39124722	1	On Compression Module	0	1	1
Minimum Pressure Valve	39442249	1	In Compression Module	0	0	1
Blowdown Valve	39449095	1	In Compression Module	0	1	1
Thermal Elem. 185°F (85°C)	39442439	1	In Compression Module	0	1	1
Screen, Orifice	39148887	1	In Compression Module	0	1	1
Shaft Seal Kit	39633201	1	In Compression Module	0	1	2
Dowel Pin	39144654	2	In Compression Module	0	0	1
Spring Pin	39154588	2	In Compression Module	0	0	1
Temperature Gauge(Local Mt.)	39446497	1	On Compression Module (SP Only)	0	1	2
Pressure Gauge (Local Mt.)	39447222	1	On Line/Sump Valve	0	1	1
Pilot Unload Valve	39457122	1	On Starter Box	0	1	1
Start Switch	39139985	1	Instrument Panel	0	1	2
Stop Switch	39139993	1	Instrument Panel	0	1	2
Terminal Strip	39127204	1	In Control Box	0	0	1
Pressure Switch	39100029	1	On Control Box	0	1	1
Auto Control Module	39729272	1	In Control Box	0	0	1
2 Function Light	39136981	1	On Instrument Panel	0	1	1
Control Valve	39137021	3	On Instrument Panel & Line/Sump Valve	3	5	7
Hourmeter	39448360	1	On Instrument Panel	0	1	1
Transformer Fuse	39113535	1	In Starter Box	0	1	2
Control Transformer	39153911	1	In Starter Box (230,460, 575V)	0	1	2
Control Transformer	39155510	1	In Starter Box (200V)			
Coil	39114525	1	In Size #2 Contactor	0	1	1
Contact Kit (3 Poles)	39114541	1	In Size #2 Contactor	0	1	1
Interlock Switch	39115126	1	In Size #2, 3 & 4 Contactor	0	1	2
Coil	39114533	1	In Size #3 & 4 Contactor	0	1	1
Contact Kit (3 Poles)	39114558	1	In Size #3 Contactor	0	1	1
Contact Kit (3 Poles)	39114566	1	In Size #4 Contactor	0	1	2
Aftercooler	39758768	1	(10, 15, 20, 25 Horsepower)	0	0	1
Oil Cooler	35841725	1	(15, 20, 25 Horsepower)	0	0	1
Oil Cooler	39758768	1	(10, 15 Horsepower Only)	0	0	1
Fan, 12"	39149273	1	(25 Horsepower)	0	0	1
Fan, 12"	39151246	1	(10, 15, 20 Horsepower)	0	0	1
Hose	39158662	1	Comp. Module to Oil Cooler (10, 15 HP)	0	1	2
Hose	39158670	1	Comp. Module to Oil Cooler (10, 15 HP Only)	0	1	2
Hose	39157490	1	Comp. Module to Oil Cooler (20-25 HP)	0	1	2
Hose	39157508	1	Comp. Module to Oil Cooler (20-25 HP)	0	1	2

10/15/20/25 HORSEPOWER
SPARE PARTS (CONT.)

COMPRESSOR PART	PART NO.	QTY. PER UNIT	LOCATION OR USE	RECOMMENDED QUANTITY KEPT ON HAND AT INSTALLATION CLASS 1	CLASS 2	CLASS 3
Belt, 56"	39160023	3	(10 Horsepower)	0	3	6
Belt, 60"	39158324	3	(15 Horsepower)	0	3	6
Belt, 60"	39158324	4	(20, 25 Horsepower)	0	4	8
Pressure Gauge (Panel Mt.)	39156245	1	Instrument Panel, SSR Units	0	1	2
Coolant, 5 Gal. (SSR Coolant)	39118294	1		0	1	1
Coolant, 5 Gal. (Ultra Coolant)	39433735	1		0	1	1
Coolant, 55 Gal. (Ultra Coolant)	39433743			0	1	1
Complete Tensioner Repair Kit	39633235	1	(10, 15, 20, 25 Horsepower)	0	0	1
O-Ring Kit	39633219	1	In Compression Module	0	1	1
Tensioner Sheave/Bearing Repair Kit	39633268	1	(10, 15, 20, 25 Horsepower)	0	0	1
Temperature Gauge (Panel Mt.)	39159074	1	Instrument Panel, SSR Units	0	1	2
Kit, Decal	39768387	1	All Units