



**INDUSTRIAL AIR  
COMPRESSOR**

**LS20**

**100HP/ 75KW**

**STANDARD AND 24KT**

**including**

**Variable Speed Drive**

**OPERATOR'S  
MANUAL AND  
PARTS LIST**

**KEEP FOR  
FUTURE  
REFERENCE**

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Sullair Air Care Seminars are 3-day courses that provide hands-on instruction in the proper operation, maintenance and service of Sullair equipment. Individual seminars on Industrial compressors and compressor electrical systems are presented at regular intervals throughout the year at a dedicated training facility at Sullair's corporate headquarters in Michigan City, Indiana.

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**OPERATOR IS REQUIRED TO READ  
ENTIRE INSTRUCTION MANUAL**

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## 1.1 GENERAL

Sullair Corporation and its subsidiaries design and manufacture all of their products so they can be operated safely. However, the responsibility for safe operation rests with those who use and maintain these products. The following safety precautions are offered as a guide which, if conscientiously followed, will minimize the possibility of accidents throughout the useful life of this equipment.

The compressor should be operated only by those who have been trained and delegated to do so, and who have read and understood this Operator's Manual. Failure to follow the instructions, procedures and safety precautions in this manual may result in accidents and injuries.

**NEVER** start the compressor unless it is safe to do so. **DO NOT** attempt to operate the compressor with a known unsafe condition. Tag the compressor and render it inoperative by disconnecting and locking out all power at source or otherwise disabling its prime mover so others who may not know of the unsafe condition cannot attempt to operate it until the condition is corrected.

Install, use and operate the compressor only in full compliance with all pertinent OSHA regulations and/or any applicable Federal, State, and Local codes, standards and regulations.

**DO NOT** modify the compressor and/or controls in any way except with written factory approval.

While not specifically applicable to all types of compressors with all types of prime movers, most of the precautionary statements contained herein are applicable to most compressors and the concepts behind these statements are generally applicable to all compressors.

## 1.2 PERSONAL PROTECTIVE EQUIPMENT

Prior to installing or operating the compressor, owners, employers and users should become familiar with, and comply with, all applicable OSHA regulations and/or any applicable Federal, State and Local codes, standards, and regulations relative to personal protective equipment, such as eye and face protective equipment, respiratory protective equipment, equipment intended to protect the extremities, protective clothing, protective shields and barriers and electrical protective equipment, as well as noise exposure administrative and/or engineering controls and/or personal hearing protective equipment.

## 1.3 PRESSURE RELEASE

**A.** Install an appropriate flow-limiting valve between

the service air outlet and the shut-off (throttle) valve, either at the compressor or at any other point along the air line, when an air hose exceeding 13mm inside diameter is to be connected to the shut-off (throttle) valve, to reduce pressure in case of hose failure, per OSHA Standard 29 CFR 1926.302(b)(7) and/or any applicable Federal, State and Local codes, standards and regulations.

**B.** When the hose is to be used to supply a manifold, install an additional appropriate flow-limiting valve between the manifold and each air hose exceeding 13mm inside diameter that is to be connected to the manifold to reduce pressure in case of hose failure.

**C.** Provide an appropriate flow-limiting valve at the beginning of each additional 23m of hose in runs of air hose exceeding 13mm inside diameter to reduce pressure in case of hose failure.

**D.** Flow-limiting valves are listed by pipe size and flow-rated. Select appropriate valves accordingly, in accordance with their manufacturer's recommendations.

**E. DO NOT** use air tools that are rated below the maximum rating of the compressor. Select air tools, air hoses, pipes, valves, filters and other fittings accordingly. **DO NOT** exceed manufacturer's rated safe operating pressures for these items.

**F.** Secure all hose connections by wire, chain or other suitable retaining device to prevent tools or hose ends from being accidentally disconnected and expelled.

**G.** Open fluid filler cap only when compressor is not running and is not pressurized. Shut down the compressor and bleed the sump (receiver) to zero internal pressure before removing the cap.

**H.** Vent all internal pressure prior to opening any line, fitting, hose, valve, drain plug, connection or other component, such as filters and line oilers, and before attempting to refill optional air line anti-icer systems with antifreeze compound.

**I.** Keep personnel out of line with and away from the discharge opening of hoses or tools or other points of compressed air discharge.

**J.** Use air at pressures less than 2.1 bar for cleaning purposes, and then only with effective chip guarding and personal protective equipment per OSHA Standard 29 CFR 1910.242 (b) and/or any applicable Federal, State, and Local codes, standards and regulations.

**K. DO NOT** engage in horseplay with air hoses as

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death or serious injury may result.

### 1.4 FIRE AND EXPLOSION

**A.** Clean up spills of lubricant or other combustible substances immediately, if such spills occur.

**B.** Shut off the compressor and allow it to cool. Then keep sparks, flames and other sources of ignition away and **DO NOT** permit smoking in the vicinity when checking or adding lubricant or when refilling air line anti-icer systems with antifreeze compound.

**C. DO NOT** permit fluids, including air line anti-icer system antifreeze compound or fluid film, to accumulate on, under or around acoustical material, or on any external surfaces of the air compressor. Wipe down using an aqueous industrial cleaner or steam clean as required. If necessary, remove acoustical material, clean all surfaces and then replace acoustical material. Any acoustical material with a protective covering that has been torn or punctured should be replaced immediately to prevent accumulation of liquids or fluid film within the material. **DO NOT** use flammable solvents for cleaning purposes.

**D.** Disconnect and lock out all power at source prior to attempting any repairs or cleaning of the compressor or of the inside of the enclosure, if any.

**E.** Keep electrical wiring, including all terminals and pressure connectors in good condition. Replace any wiring that has cracked, cut, abraded or otherwise degraded insulation, or terminals that are worn, discolored or corroded. Keep all terminals and pressure connectors clean and tight.

**F.** Keep grounded and/or conductive objects such as tools away from exposed live electrical parts such as terminals to avoid arcing which might serve as a source of ignition.

**G.** Remove any acoustical material or other material that may be damaged by heat or that may support combustion and is in close proximity, prior to attempting weld repairs.

**H.** Keep suitable fully charged Class BC or ABC fire extinguisher or extinguishers nearby when servicing and operating the compressor.

**I.** Keep oily rags, trash, leaves, litter or other combustibles out of and away from the compressor.

**J. DO NOT** operate the compressor without proper flow of cooling air or water or with inadequate flow of lubricant or with degraded lubricant.

**K. DO NOT** attempt to operate the compressor in any classification of hazardous

environment unless the compressor has been specially designed and manufactured for that duty.

### 1.5 MOVING PARTS

**A.** Keep hands, arms and other parts of the body and also clothing away from couplings, fans and other moving parts.

**B. DO NOT** attempt to operate the compressor with the fan, coupling or other guards removed.

**C.** Wear snug-fitting clothing and confine long hair when working around this compressor, especially when exposed to hot or moving parts.

**D.** Keep access doors, if any, closed except when making repairs or adjustments.

**E.** Make sure all personnel are out of and/or clear of the compressor prior to attempting to start or operate it.

**F.** Disconnect and lock out all power at source and verify at the compressor that all circuits are de-energized to minimize the possibility of accidental start-up, or operation, prior to attempting repairs or adjustments. This is especially important when compressors are remotely controlled.

**G.** Keep hands, feet, floors, controls and walking surfaces clean and free of fluid, water or other liquids to minimize the possibility of slips and falls.

### 1.6 HOT SURFACES, SHARP EDGES AND SHARP CORNERS

**A.** Avoid bodily contact with hot fluid, hot coolant, hot surfaces and sharp edges and corners.

**B.** Keep all parts of the body away from all points of air discharge.

**C.** Wear personal protective equipment including gloves and head covering when working in, on or around the compressor.

**D.** Keep a first aid kit handy. Seek medical assistance promptly in case of injury. **DO NOT** ignore small cuts and burns as they may lead to infection.

### 1.7 TOXIC AND IRRITATING SUBSTANCES

**A. DO NOT** use air from this compressor for respiration (breathing) except in full compliance with OSHA Standards 29 CFR 1910 and/or any applicable Federal, State or Local codes or regulations.



Death or serious injury can result from inhaling compressed air without using proper safety equipment. See OSHA standards and/or any applicable Federal, State, and Local codes, standards and regulations on safety equipment.

**B. DO NOT** use air line anti-icer systems in air lines

supplying respirators or other breathing air utilization equipment and **DO NOT** discharge air from these systems into unventilated or other confined areas.

**C.** Operate the compressor only in open or adequately ventilated areas.

**D.** Locate the compressor or provide a remote inlet so that it is not likely to ingest exhaust fumes or other toxic, noxious or corrosive fumes or substances.

**E.** Coolants and lubricants used in this compressor are typical of the industry. Care should be taken to avoid accidental ingestion and/or skin contact. In the event of ingestion, seek medical treatment promptly. Wash with soap and water in the event of skin contact. Consult Material Safety Data Sheet for information pertaining to fluid of fill.

**F.** Wear goggles or a full face shield when adding antifreeze compound to air line anti-icer systems.

**G.** If air line anti-icer system antifreeze compound enters the eyes or if fumes irritate the eyes, they should be washed with large quantities of clean water for fifteen minutes. A physician, preferably an eye specialist, should be contacted immediately.

**H. DO NOT** store air line anti-icer system antifreeze compound in confined areas.

**I.** The antifreeze compound used in air line antifreeze systems contains methanol and is toxic, harmful or fatal if swallowed. Avoid contact with the skin or eyes and avoid breathing the fumes. If swallowed, induce vomiting by administering a tablespoon of salt, in each glass of clean, warm water until vomit is clear, then administer two teaspoons of baking soda in a glass of clean water. Have patient lay down and cover eyes to exclude light. Call a physician immediately.

## 1.8 ELECTRICAL SHOCK

**A.** This compressor should be installed and maintained in full compliance with all applicable Federal, State and Local codes, standards and regulations, including those of the National Electrical Code, and also including those relative to equipment grounding conductors, and only by personnel that are trained, qualified and delegated to do so.

**B.** Keep all parts of the body and any hand-held tools or other conductive objects away from exposed live parts of electrical system. Maintain dry footing, stand on insulating surfaces and **DO NOT** contact any other portion of the compressor when making adjustments or repairs to exposed live parts of the electrical system. Make all such adjustments

or repairs with one hand only, so as to minimize the possibility of creating a current path through the heart.

**C.** Attempt repairs in clean, dry and well lighted and ventilated areas only.

**D. DO NOT** leave the compressor unattended with open electrical enclosures. If necessary to do so, then disconnect, lock out and tag all power at source so others will not inadvertently restore power.

**E.** Disconnect, lock out, and tag all power at source prior to attempting repairs or adjustments to rotating machinery and prior to handling any ungrounded conductors.

## 1.9 LIFTING

**A.** If the compressor is provided with a lifting bail, then lift by the bail provided. If no bail is provided, then lift by sling. Compressors to be air-lifted by helicopter must not be supported by the lifting bail but by slings instead. In any event, lift and/or handle only in full compliance with OSHA standards 29 CFR 1910 subpart N and/or any applicable Federal, State, and Local codes, standards and regulations.

**B.** Inspect points of attachment for cracked welds and for cracked, bent, corroded or otherwise degraded members and for loose bolts or nuts prior to lifting.

**C.** Make sure entire lifting, rigging and supporting structure has been inspected, is in good condition and has a rated capacity of at least the weight of the compressor. If you are unsure of the weight, then weigh compressor before lifting.

**D.** Make sure lifting hook has a functional safety latch or equivalent, and is fully engaged and latched on the bail or slings.

**E.** Use guide ropes or equivalent to prevent twisting or swinging of the compressor once it has been lifted clear of the ground.

**F. DO NOT** attempt to lift in high winds.

**G.** Keep all personnel out from under and away from the compressor whenever it is suspended.

**H.** Lift compressor no higher than necessary.

**I.** Keep lift operator in constant attendance whenever compressor is suspended.

**J.** Set compressor down only on a level surface capable of safely supporting at least its weight and its loading unit.

**K.** When moving the compressor by forklift truck, utilize fork pockets if provided. Otherwise, utilize

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pallet if provided. If neither fork pockets or pallet are provided, then make sure compressor is secure and well balanced on forks before attempting to raise or transport it any significant distance.

**L.** Make sure forklift truck forks are fully engaged and tipped back prior to lifting or transporting the compressor.

**M.** Forklift no higher than necessary to clear obstacles at floor level and transport and corner at minimum practical speeds.

**N.** Make sure pallet-mounted compressors are firmly bolted or otherwise secured to the pallet prior to attempting to forklift or transport them. **NEVER** attempt to forklift a compressor that is not secured to its pallet, as uneven floors or sudden stops may

cause the compressor to tumble off, possibly causing serious injury or property damage in the process.

### 1.10 ENTRAPMENT

**A.** If the compressor enclosure, if any, is large enough to hold a man and if it is necessary to enter it to perform service adjustments, inform other personnel before doing so, or else secure and tag the access door in the open position to avoid the possibility of others closing and possibly latching the door with personnel inside.

**B.** Make sure all personnel are out of compressor before closing and latching enclosure doors.

# Section 2 DESCRIPTION

## 2.1 INTRODUCTION

Your new Sullair flood-lubricated rotary screw air compressor will provide you with a unique experience in improved reliability and greatly reduced maintenance.

Compared to other types of compressors, the Sullair rotary screw is unique in mechanical reliability, with “no wear” and “no inspection” required of the working parts within the compressor unit.

Read Section 7 (Maintenance) to see how surprisingly easy it is to keep your air compressor in top operating condition.

## 2.2 DESCRIPTION OF COMPONENTS

Refer to Figures 2-1A, 2-1B and 2-2. The components and assemblies of the air compressor are clearly shown. The complete package includes compressor, electric motor, starter, compressor inlet system, compressor discharge system, compressor lubrication and cooling system, capacity control system, instrument panel, aftercooler, a combination separator and trap, all mounted on a

heavy gauge steel frame.

On air-cooled models, a fan draws air over the motor and forces it out through the combined aftercooler and fluid cooler thereby removing the compression heat from the compressed air and the cooling fluid.

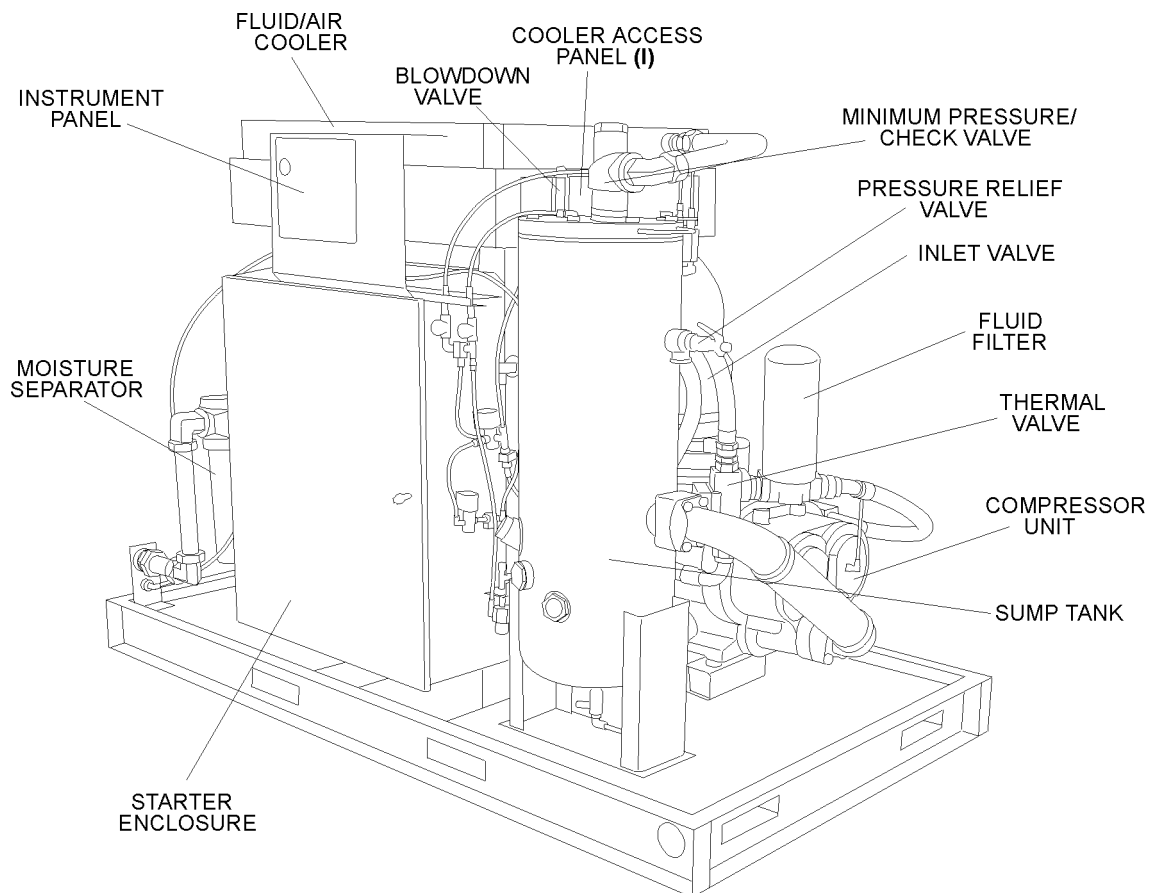
On water-cooled models, a shell and tube heat exchanger is mounted on the compressor frame. Fluid is piped into the heat exchanger where compression heat is removed from the fluid. Another similar heat exchanger cools the compressed air.

Both air-cooled and water-cooled versions have easily accessible items such as the fluid filters and control valves. The inlet air filter is also easily accessible for servicing.

## 2.3 SULLAIR COMPRESSOR UNIT, FUNCTIONAL DESCRIPTION

Sullair air compressors feature the Sullair compressor unit, a single-stage, positive displacement, flood lubricated-type compressor. This unit provides continuous compression to meet your needs.

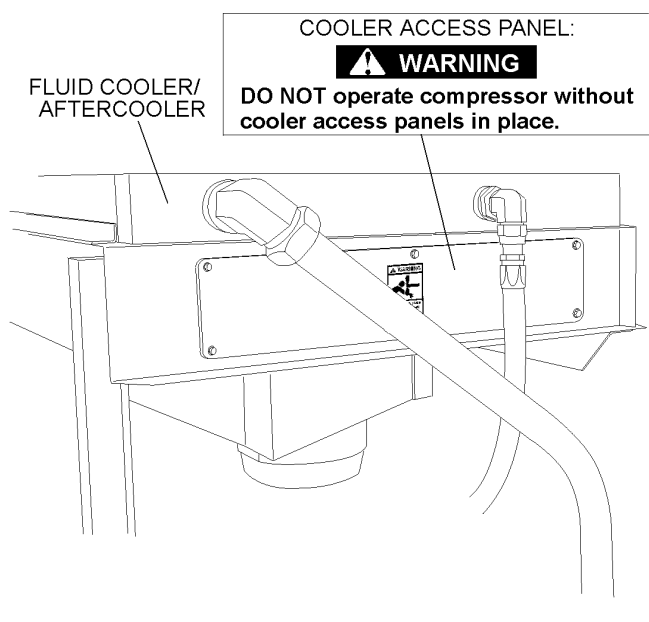
Figure 2-1A Sullair Rotary Screw Air Compressor- Air-cooled (typical component layout)



(I) **DO NOT** Operate compressor without cooler access panels in place (see Figure 2-1B).

## Section 2 DESCRIPTION

Figure 2-1B Caution: Access Panel



### NOTE

With a Sullair compressor, there is no maintenance or inspection of the internal parts of the

compressor unit permitted in accordance with the terms of the warranty.

Sullair 24KT compressors are filled with a long life lubricant. In the event a change of fluid is required, use only Sullair 24KT fluid.

### WARNING

Mixing of other lubricants within the compressor unit will void all warranties!

Sullair recommends that a 24KT sample be taken at the first filter change and sent to the factory for analysis. This is a free service. The sample kit with instructions and self-addressed container is to be supplied by your Sullair dealer at start-up. The user will receive an analysis report with recommendations.

Fluid is injected into the compressor unit in large quantities and mixes directly with the air as the rotors turn, compressing the air. The fluid flow has three basic functions:

1. As coolant, it controls the rise of air temperature normally associated with the heat of compression.
2. Seals the leakage paths between the rotors and

Figure 2-2 Sullair Rotary Screw Air Compressor- Water-cooled (typical component layout)

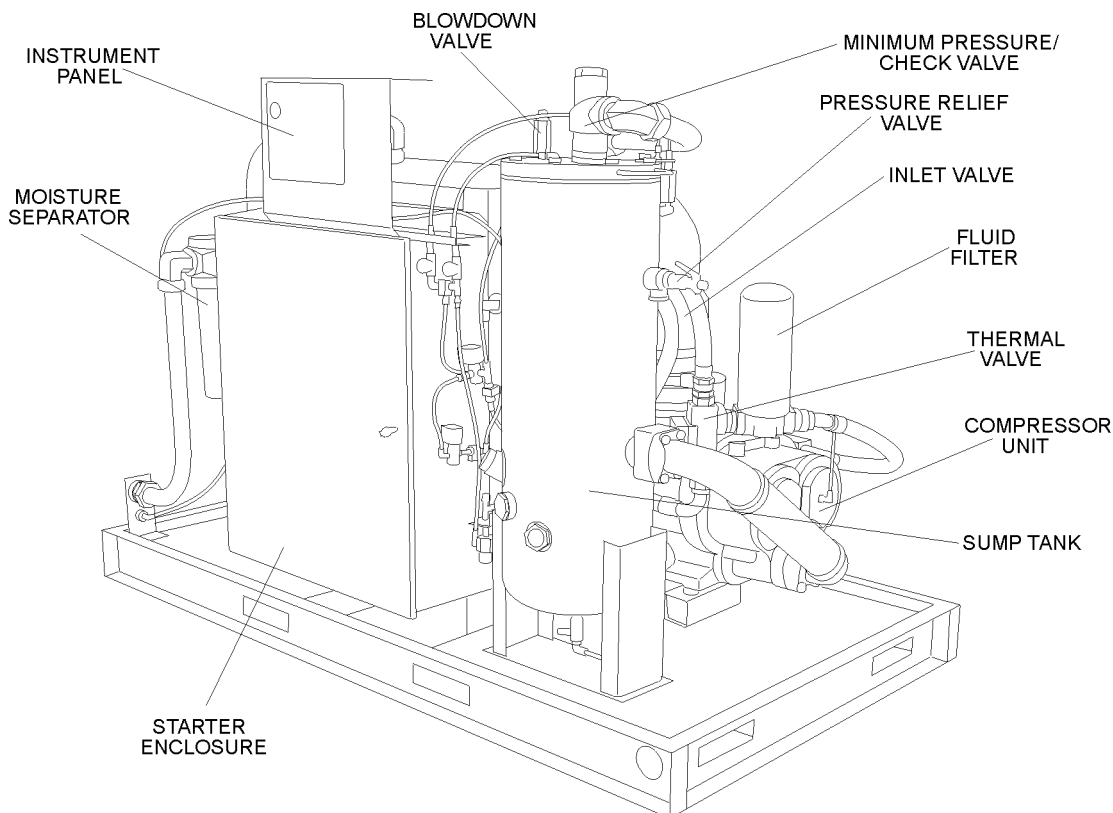
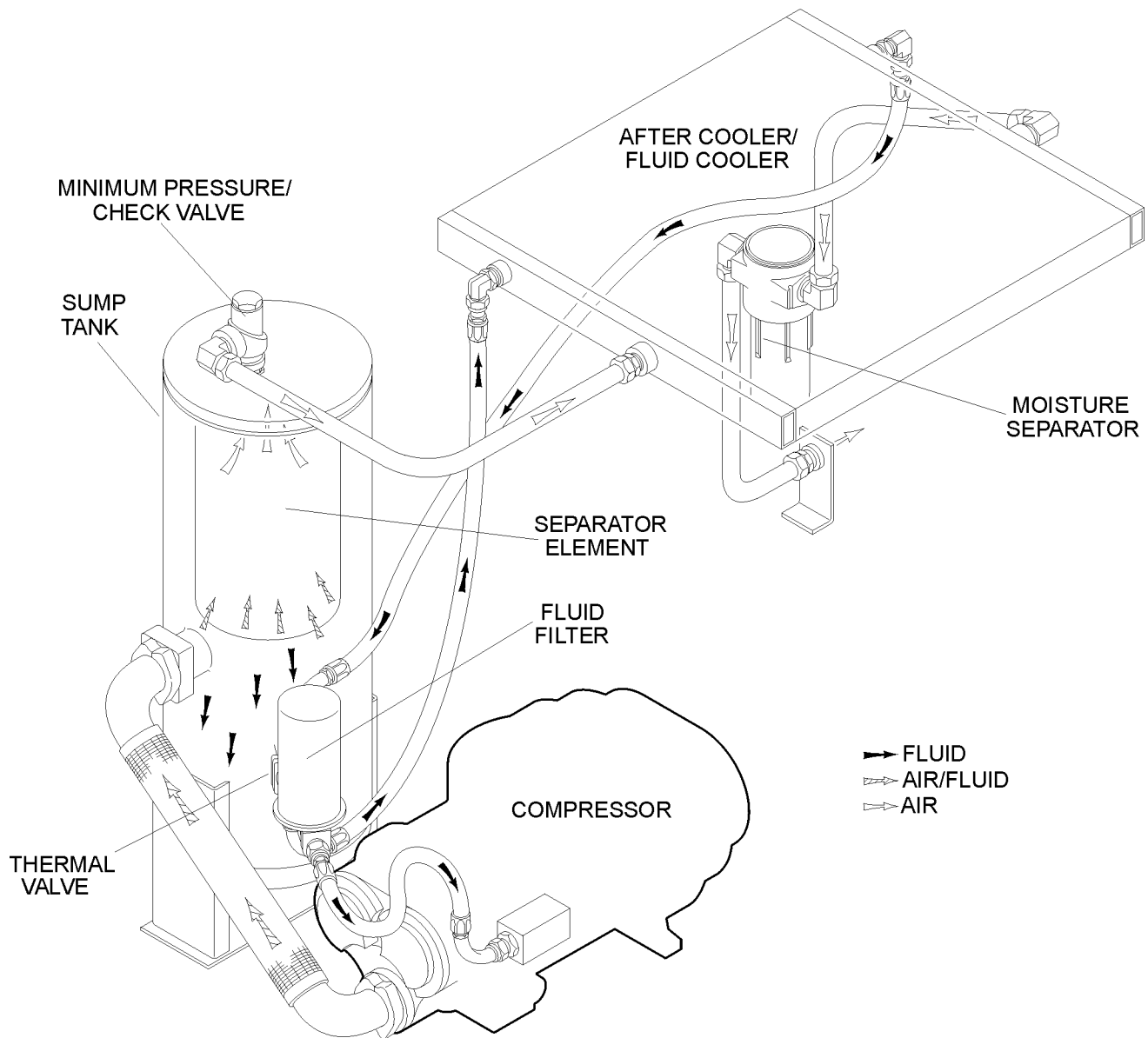


Figure 2-3 Compressor Fluid Cooling/Lubrication and Discharge System- Air-cooled



the stator and also between the rotors themselves.

3. Acts as a lubricating film between the rotors allowing one rotor to directly drive the other, which is an idler.

After the air/fluid mixture is discharged from the compressor unit, the fluid is separated from the air. At this time, the air flows through an aftercooler and separator then to your service line while the fluid is being cooled in preparation for reinjection.

## 2.4 COMPRESSOR COOLING AND LUBRICATION SYSTEM, FUNCTIONAL DESCRIPTION

Refer to Figures 2-3 and 2-4. The **Cooling and**

**Lubrication System** (air-cooled version) consists of a **fan, fan motor, radiator-type aftercooler/fluid cooler, full flow fluid filter, thermal valve, and interconnecting piping and tubing.**

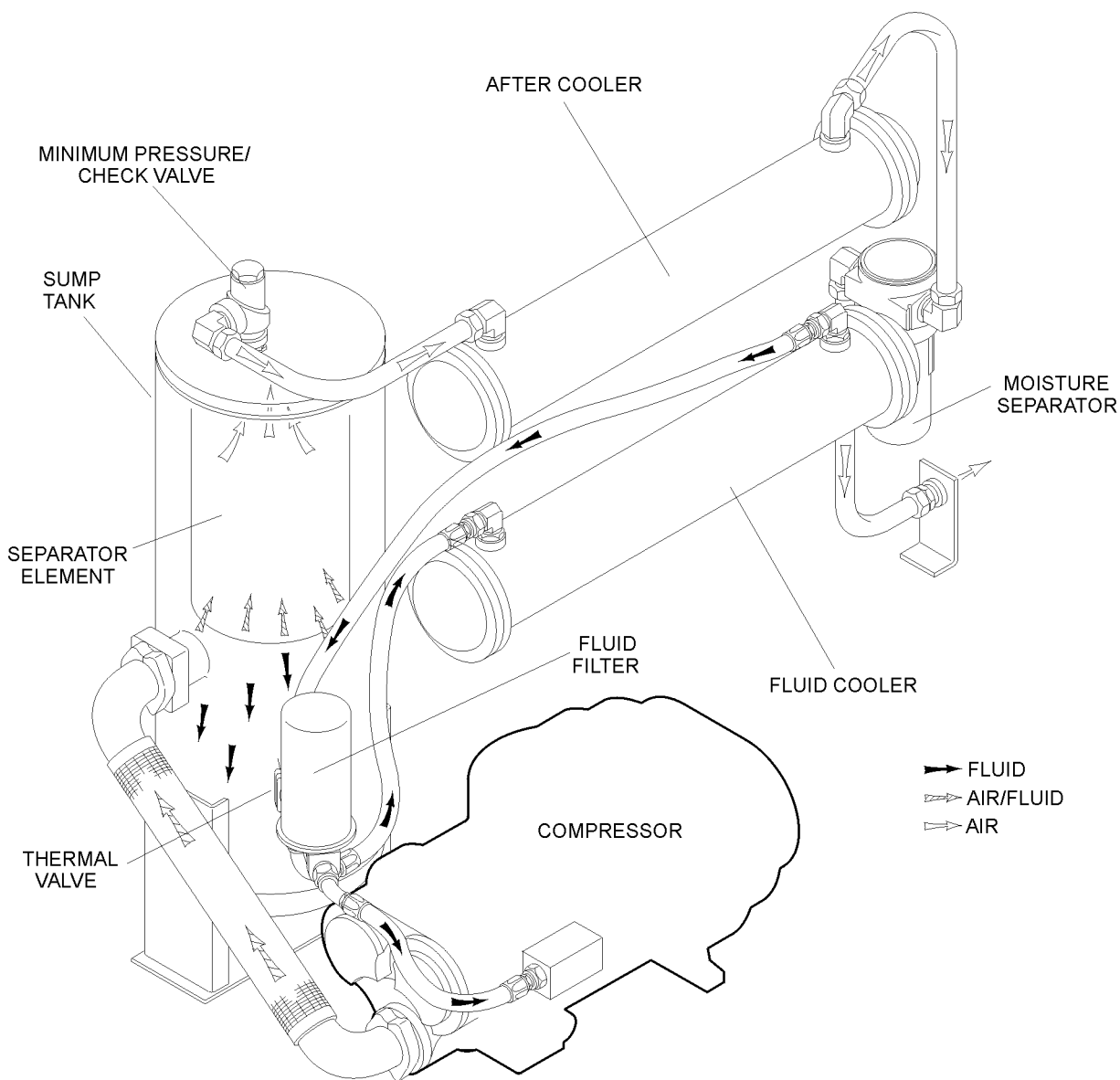
### NOTE

Standard thermal valve temperature is 175°F (79°C). Thermal valve temperature is 190°F (88°C) for HH, XH and 24KT machines.

For water-cooled models, two **shell and tube heat exchangers** are substituted for the radiator-type cooler listed above.

## Section 2 DESCRIPTION

Figure 2-4 Compressor Fluid Cooling/Lubrication and Discharge System- Water-cooled



The pressure in the receiver/sump causes fluid flow by forcing the fluid from the high pressure area of the sump to an area of lower pressure in the compressor unit.

Fluid flows from the bottom of the receiver/sump to the thermal valve. The thermal valve is fully open when the fluid temperature is below 175°F (79°C).

The fluid passes through the thermal valve, the main filter and directly to the compressor unit where it lubricates, cools and seals the rotors and the compression chamber.

As the discharge temperature rises above 175°F (79°C), due to the heat of compression, the thermal

valve begins to close and a portion of the fluid then flows through the cooler. From the cooler the fluid flows to the main filter and then on to the compressor unit.

A portion of the fluid flowing to the compressor is routed to the anti-friction bearings which support the rotors inside the compressor unit. Prior to entering the compressor unit, this fluid is taken through the fluid filter, thus assuring properly filtered lubricant for bearing supply.

The fluid filter has a replacement element and an integral pressure bypass valve. An indicator on the instrument panel shows when the filter needs serv-

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icing. This indicator has a pressure setting lower than that of the bypass valve. The indicator should be checked with compressor running at full system pressure.

Water-cooled models have a water pressure switch to prevent operation with inadequate water pressure.

### 2.5 COMPRESSOR DISCHARGE SYSTEM, FUNCTIONAL DESCRIPTION

Refer to Figures 2-3 and 2-4. The compressor unit discharges the compressed air/fluid mixture into the combination receiver/sump.

The receiver has three basic functions:

1. It acts as a primary fluid separator.
2. Serves as the compressor fluid sump.
3. Houses the final fluid separator.

The compressed air/fluid mixture enters the receiver and is directed against the internal baffle. The direction of movement is changed and its velocity significantly reduced, thus causing large droplets of fluid to form and fall to the bottom of the receiver/sump. The fractional percentage of fluid remaining in the compressed air collects on the surface of the separator element as the compressed air flows through the separator. A return line (or scavenge tube) leads from the bottom of the separator element to the inlet region of the compressor unit. Fluid collecting on the bottom of the separator is returned to the compressor by a pressure differential between the receiver and the compressor inlet. A visual sight glass is located on the return line to observe this fluid flow. There is also an orifice in this return line (protected by a strainer) to assure proper flow. A secondary separator element with a separate return line, strainer, sight glass and orifice further reduce the fluid carry-over to less than 2 ppm (parts per million). An indicator, located on the instrument panel, shows if abnormal pressure drop through the separator develops. At this time, separator element replacement is necessary. This indicator must be checked with the compressor running fully loaded.

A minimum pressure/check valve, located downstream from the separator, assures a minimum receiver pressure of 50 psig (3.5 bar) during loaded conditions. This pressure is necessary for proper air/fluid separation and proper fluid circulation.

A terminal check valve is incorporated into the minimum pressure/check valve to prevent compressed air in the service line from bleeding back into the receiver on shutdown and during operation of the

compressor in an unloaded condition.

A pressure relief valve (located on the wet side of the separator) is set to open if the sump pressure exceeds the sump tank rating. A temperature switch will shut down the compressor if the discharge temperature reaches 235°F (113°C).

### WARNING

**DO NOT** remove caps, plugs, and/or other components when compressor is running or pressurized.

**Stop compressor and relieve all internal pressure before doing so.**

Fluid is added to the sump via a capped fluid filler opening, placed low on the tank to prevent overfilling of the sump. A sight glass enables the operator to visually monitor the sump fluid level.

### 2.6 CONTROL SYSTEM, FUNCTIONAL DESCRIPTION- SUPERVISOR CONTROLLER™

Refer to Figure 2-5A. The purpose of the compressor Control System is to regulate the amount of air being compressed to match the amount of compressed air being used. The **Capacity Control System** consists of a **solenoid valve, regulator valve** and an **inlet valve**. The functional description of the Control System is described below in four distinct phases of operation. The following description text applies to all LS20 series compressors with optional Supervisor Controller. For explanatory purposes, this description will apply to a compressor with an operating range of 100 to 110 psig (6.9 to 7.6 bar). A compressor with any other pressure range would operate in the same manner except stated pressures.

### NOTE

**Always refer to the machine nameplate for designed operating pressure.**

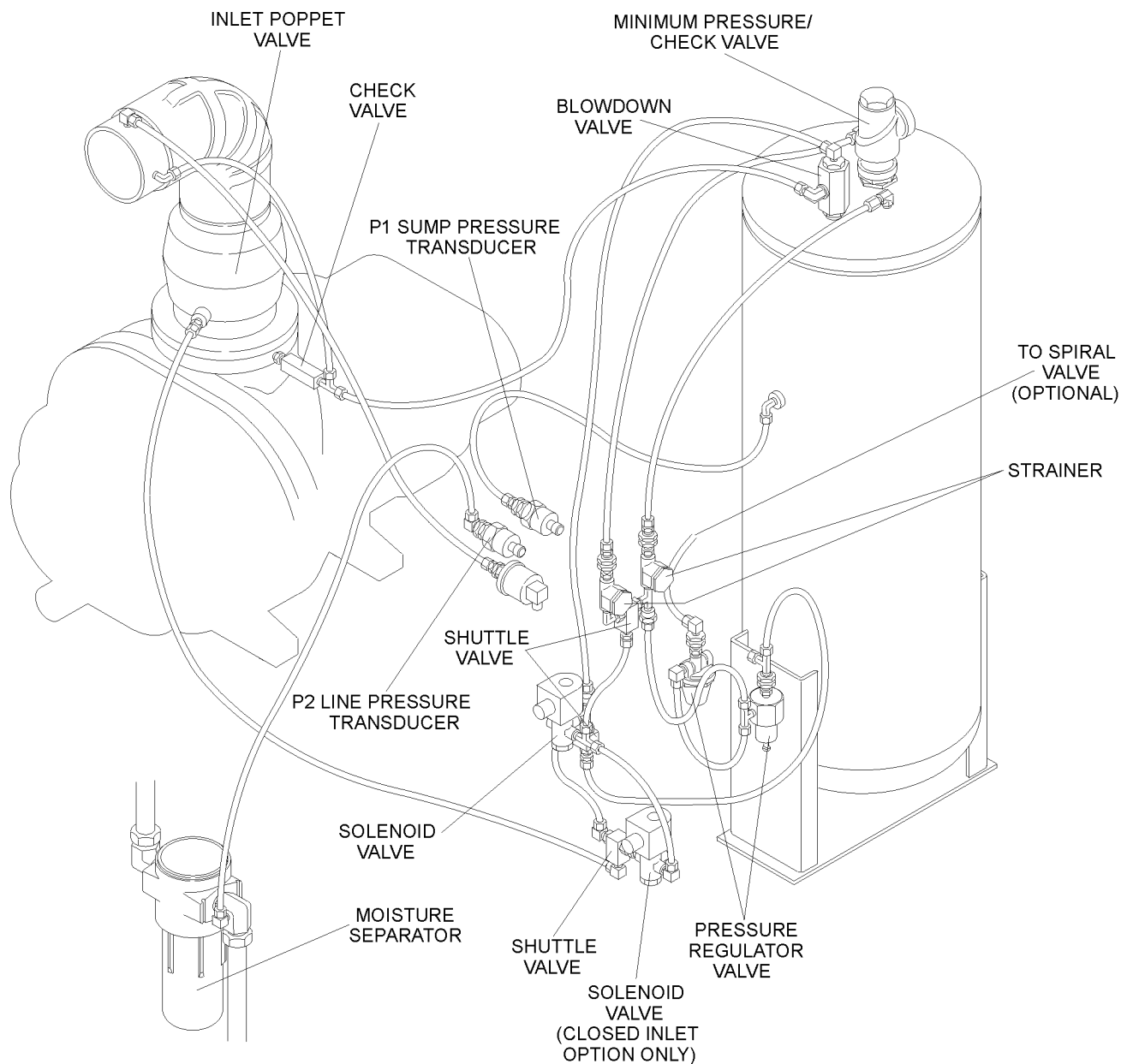
#### **START MODE - 0 TO 50 PSIG (0 TO 3.5 BAR)**

When the compressor "I" (START) pad is depressed, the sump pressure will quickly rise from 0 to 50 psig (0 - 3.4 bar). During this period, both the pressure regulator and the solenoid valve are closed, the inlet valve is fully open and the compressor pumps at full rated capacity. The rising compressor air pressure is isolated from the service line in this phase by the minimum pressure valve set at approximately 50 psig (3.4 bar).

**Closed Inlet Start-** (Wye-delta or Solid-State starting) applies dry-sump or service air pressure through a solenoid valve to hold the inlet valve closed allowing the compressor to start unloaded. After a preset time (4-6 seconds) the controller will

## Section 2 DESCRIPTION

Figure 2-5A Control System with Supervisor Controller



discontinue applying pressure to the inlet valve, and allow the compressor to continued with the start mode.

### FULL LOAD MODE - 50 TO 100 PSIG (3.4 TO 6.9 BAR)

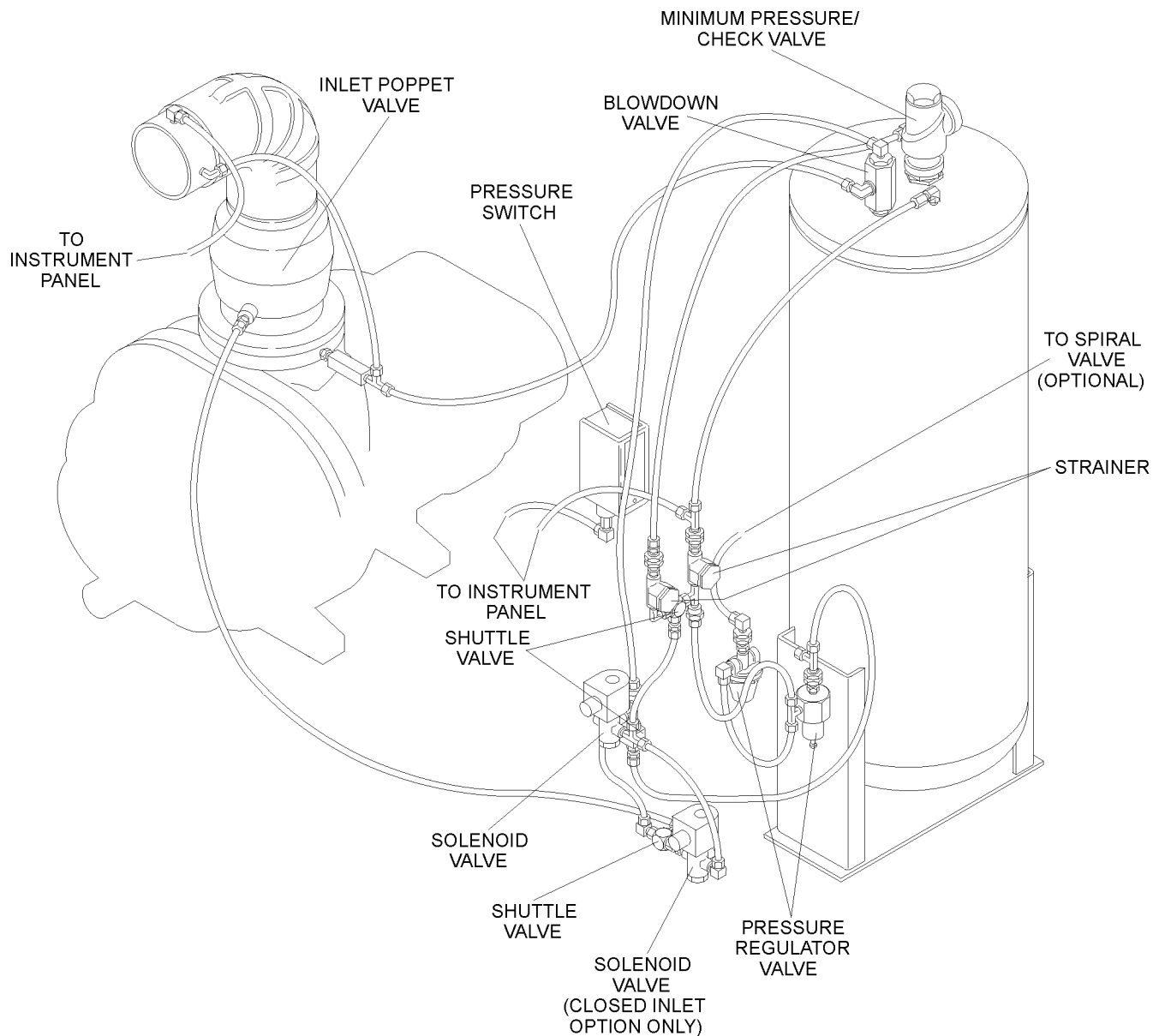
When the compressed air pressure rises above 50 psig (3.4 bar), the minimum pressure valve opens allowing compressed air to flow into the service line. From this point on, the line air pressure is continually monitored by the Supervisor. The pressure

regulator and the solenoid valve remain closed during this phase. The inlet valve is in the fully open position as long as the compressor is running at 100 psig ( 6.9 bar) or below.

### MODULATING MODE (STANDARD CONTROL) - 100 TO 110 PSIG (6.9 TO 7.6 BAR)

If less than the rated capacity of compressed air is being used, the line pressure will rise above 100 psig (6.9 bar), and a pressure regulator starts feeding an air signal to close the inlet poppet valve, throttling the mass of air entering the compressor

Figure 2-5B Control System with Electro-Mechanical Controller



and thereby reducing the latter's air delivery. The air throttling of the inlet poppet valve system increases proportionately with a rise of line pressure from 101 to 110 psig (7 to 7.6 bar).

**MODULATING MODE WITH OPTIONAL SPIRAL VALVE - 100 to 110 PSIG (6.9 TO 7.6 BAR)**

As air demand drops below the rated capacity of the compressor, the line pressure will rise above 100 psig (6.9 bar). As a result, the differential pressure regulator for the spiral valve gradually opens, applying air pressure to the spiral valve actuator. Air pressure at the actuator expands the diaphragm. The

rack, in turn, engages with the pinion mounted on the spiral valve shaft assembly. This results in a rotary motion. As the spiral valve rotates, it starts opening the bypass ports gradually. Excess air is then being returned back internally to the suction end of the compressor unit. Now the compressor is fully compressing only that amount of air, which is being used. As air demand keeps dropping further, the spiral valve keeps opening more and more until all the bypass ports are fully open. At this point, the spiral valve has moved into the unload (minimum) position.

## Section 2

# DESCRIPTION

The spiral valve provides a modulation range from 100 to 50%. During this period, the pressure rises approximately from 100 to 105 psig (6.9 to 7.2 bar). As the air pressure exceeds 105 psig (7.2 bar), the differential pressure regulator controlling the inlet poppet valve starts opening and forcing the poppet closed, thus throttling inlet air flow to the compressor. The inlet poppet valve provides a modulation range from 50 to 40%. During this period, the pressure rises approximately from 106 to 110 psig (7.3 to 7.6 bar). During this range, the spiral valve remains in the unload position.

### **UNLOAD MODE - IN EXCESS OF 110 PSIG (7.6 BAR)**

When a relatively small amount or no air is being used, the service line pressure continues to rise. When it exceeds 110 psig (7.6 bar), the Supervisor Control System de-energizes the solenoid valve allowing sump air pressure to be supplied directly to close the inlet valve. Simultaneously, the solenoid valve sends a pneumatic signal to the blowdown valve. The blowdown valve opens to the atmosphere, reducing the sump pressure to approximately 15 to 20 psig (1.0 to 1.4 bar). The minimum pressure check valve prevents line pressure from returning to the sump.

When the line pressure drops to the low setting (cut-in pressure; usually 100 psig [6.9 bar] on low pressure ["L"] compressors; 125 psig [8.6 bar] on high pressure ["H"] compressors; 150 psig [10.3 bar] on ["HH"] compressors; and 175 psig [12.0 bar] ["XH"] . Supervisor energizes the solenoid valve and allows the blowdown valve to close. The re-energized solenoid valve again prevents line pressure from reaching the inlet control valve. Should the pressure begin to rise, the pressure regulator will resume its normal function as previously described.

### **AUTOMATIC OPERATION**

For applications with varied periods of time when there are no air requirements, Supervisor's AUTOMATIC mode allows the compressor to shutdown (time delayed) when no compressed air requirement is present and restart as compressed air is needed.

### **2.7 CONTROL SYSTEM, FUNCTIONAL DESCRIPTION- ELECTRO-MECHANICAL VALVE**

Refer to Figure 2-5B. The purpose of the compressor Control System is to regulate the compressor air intake to match the amount of compressed air being used. At approximately 10 psig (0.7 bar) air line over-pressure, the control system will automat-

ically blow down the compressor and greatly reduce the unload power consumption. The **Control System** consists of an **inlet valve**, (located on the compressor air inlet), **blowdown valve**, **solenoid valve**, **pressure switch**, and a **pressure regulator**. The functional descriptions of the Control System are given below in four distinct phases of compressor operation. The following guidelines apply to all LS20 Series compressors. For explanatory purposes this description will apply to a compressor with an operating pressure range of 100 to 110 psig (6.9 to 7.6 bar). A compressor with any other pressure range would operate in the same manner excepting stated pressures.

### **START - 0 TO 50 PSIG (0 TO 3.5 BAR)**

When the compressor START button is depressed, the sump pressure will quickly rise from 0 to 50 psig (0 to 3.5 bar). During this period both the pressure regulator and the solenoid valve are closed, the inlet valve is fully open due to inlet air flow, and the compressor pumps at full rated capacity. The rising compressor air pressure is isolated from the service line in this phase by the minimum pressure valve, set at approximately 50 psig (3.5 bar).

**Closed Inlet Start-** (Wye-delta or Solid-State starting) applies dry-sump or service air pressure through a solenoid valve to hold the inlet valve closed allowing the compressor to start unloaded. After a preset time (4-6 seconds) the controller will discontinue applying pressure to the inlet valve, and allow the compressor to continued with the start mode.

### **NORMAL OPERATING MODE - 50 TO 100 PSIG (3.5 TO 6.9 BAR )**

When the pressure air rises above 50 psig (3.5 bar), the minimum pressure/check valve opens and delivers compressed air to the service line. From this point on, the line air pressure is continually monitored by a line pressure gauge and a pressure switch usually set at 100 psig (6.9 bar). The pressure regulator and the solenoid valve remain closed during this phase. The inlet valve remains fully open for maximum capacity.

### **MODULATING MODE (STANDARD CONTROL) - 100 TO 110 PSIG (6.9 TO 7.6 BAR)**

If less than the rated capacity of compressed air is being used, the line pressure will rise above 100 psig (6.9 bar), and a pressure regulator starts feeding an air signal to close the inlet poppet valve, throttling the mass of air entering the compressor and thereby reducing the latter's air delivery. The air throttling of the inlet poppet valve system increases

proportionately with a rise of line pressure from 101 to 110 psig (7 to 7.6 bar).

### MODULATING MODE WITH OPTIONAL SPIRAL VALVE - 100 to 110 PSIG (6.9 TO 7.6 bar)

As air demand drops below the rated capacity of the compressor, the line pressure will rise above 100 psig (6.9 bar). As a result, the differential pressure regulator for the spiral valve gradually opens, applying air pressure to the spiral valve actuator. Air pressure at the actuator expands the diaphragm. The rack, in turn, engages with the pinion mounted on the spiral valve shaft assembly. This results in a rotary motion. As the spiral valve rotates, it starts opening the bypass ports gradually. Excess air is then being returned back internally to the suction end of the compressor unit. Now the compressor is fully compressing only that amount of air, which is being used. As air demand keeps dropping further, the spiral valve keeps opening more and more until all the bypass ports are fully open. At this point, the spiral valve has moved into the unload (minimum) position.

The spiral valve provides a modulation range from 100 to 50%. During this period, the pressure rises approximately from 100 to 105 psig (6.9 to 7.2 bar). As the air pressure exceeds 105 psig (7.2 bar), the differential pressure regulator controlling the inlet poppet valve starts opening and forcing the poppet closed, thus throttling inlet air flow to the compressor. The inlet poppet valve provides a modulation range from 50 to 40%. During this period, the pressure rises approximately from 106 to 110 psig (7.3 to 7.6 bar). During this range, the spiral valve remains in the unload position.

### UNLOAD - IN EXCESS OF 110 PSIG (7.6 BAR) LINE PRESSURE

When no air is being used, the service line pressure rises to the setting (cut-out pressure) of the pressure switch. The pressure switch opens, interrupting the electrical power to the solenoid valve. At this time, the solenoid valve allows dry sump tank air pressure or service air pressure through a shuttle valve to be applied directly to the inlet valve piston and keep it closed. Simultaneously, the solenoid valve sends a pneumatic signal to the blowdown valve. The blowdown valve opens the sump to the compressor intake reducing the sump pressure to approximately 15 to 20 psig (1.0 to 1.4 bar). The check valve in the air service line pressure prevents line pressure from returning to the sump.

When the line pressure drops to the low setting (cut-in pressure) of the pressure switch (usually 100

psig [6.9 bar]), the pressure switch closes, re-energizing the 3-way solenoid valve and allowing the blowdown valve to close. The re-energized solenoid valve again prevents pressure from reaching the inlet valve. The inlet valve is fully open and the compressor delivers full rated capacity. Should the pressure begin to rise, the pressure regulator will resume its normal function as previously described.

To accommodate varied periods of time when there are not any air requirements, "Dual-Control" is utilized. This feature allows you to set the compressor in an automatic position whereby the compressor will shut down when no compressed air requirement is present and restart as compressed air is needed.

## 2.8 AIR INLET SYSTEM, FUNCTIONAL DESCRIPTION

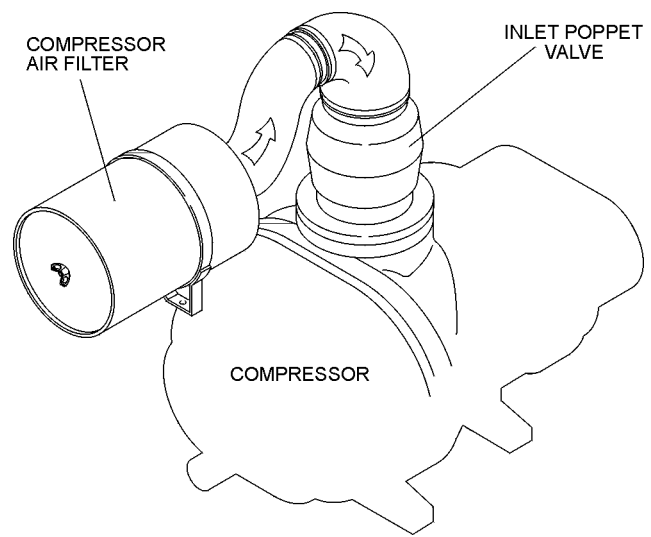
Refer to Figure 2-6. The **Compressor Inlet System** consists of a **dry-type air filter** and an **air inlet valve**.

The poppet-type modulating air inlet valve directly controls the amount of air intake to the compressor in response to the operation of the pressure regulator (see Modulating Mode, Section 2.6 [Supervisor Controller] or Section 2.7 [Electro-Mechanical]). The inlet valve also acts as a check valve, thus preventing reverse rotation when the compressor is shut down.

### WARNING

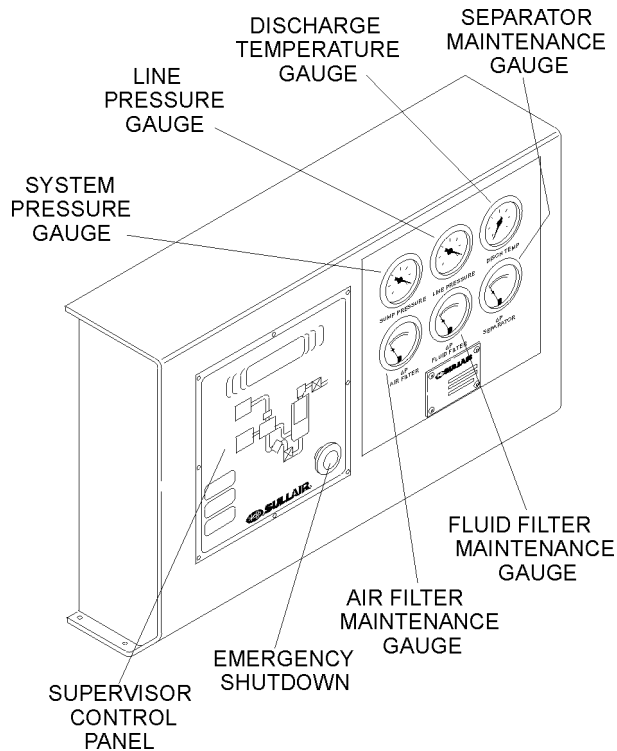
"The Plastic Pipe Institute recommends against the use of thermoplastic pipe to transport compressed air or other compressed gases in exposed above ground locations, e.g. in exposed

Figure 2-6 Air Inlet System



## Section 2 DESCRIPTION

Figure 2-7 Instrument Panel Group



plant piping.” (I)

Sullube should not be used with PVC piping systems. It may affect the bond at cemented joints. Certain other plastic materials may also be affected.

(I) Plastic Pipe Institute, Recommendation B, Adopted January 19, 1972.



### 2.9 INSTRUMENT PANEL GROUP, FUNCTIONAL DESCRIPTION- ELECTRO-MECHANICAL CONTROLLER

Refer to Figure 2-7 for specific location of parts described. For information on Supervisor Controller panel group, see Section 5, Supervisor Controller.

The Electro-mechanical Controller Instrument Panel Group consists of a panel containing the line pressure, sump pressure and discharge temperature gauges, the air filter, the separator element and the fluid filter, restriction gauges, along with START

and STOP push buttons and an hourmeter.

Refer to Figure 2-7 for locations of the following indicators and controls:

- The **line (terminal) pressure gauge** is connected to the dry side of the receiver downstream from the check valve and continually monitors the air pressure.
- The **sump pressure gauge** continually monitors the sump pressure at the various load and/or unload conditions.
- The **discharge temperature gauge** monitors the temperature of the air leaving the compressor unit. For both air-cooled and water-cooled compressors the normal reading is approximately 180°F to 205°F (82°C to 96°C).
- The **air filter restriction gauge** monitors the condition of the air intake filter and shows in the red zone (20 to 30" water [51 to 76 cm]) when filter service is required. The compressor must be running fully loaded for an accurate indication.
- The **START (I)** pad turns the compressor on.
- The **STOP (O)** pad turns the compressor off.
- The **hourmeter** records accumulative hours of operation for the compressor and is useful for planning and logging service operations.
- The **POWER ON** (  ) LED on the instrument panel indicates when power to the compressor is supplied.
- The **ON** LED indicates when the compressor is running.
- The **AUTO** (  ) pad is used to enable automatic control.
- The **separator maintenance gauge** monitors condition of the separator element and shows in the red zone when the element restriction is excessive.
- The **fluid filter maintenance gauge** monitors the condition of the bearing lube filter element and shows in the red zone when the element should be changed.

# Section 3 SPECIFICATIONS

## 3.1 TABLE OF SPECIFICATIONS- LS20-100HP/ 75KW

60 Hz:						
Model (I)	HP CFM	CAPACITY IN	LENGTH IN	WIDTH	HEIGHT (II) IN OPEN/ENCL	WEIGHT (III) LB AC/WC
100-L	100	490	88	48	60/61.5	3590/3660
100-H	100	450	88	48	60/61.5	3590/3660
100-HH	100	380	88	48	60/61.5	3590/3660
100-XH	100	344	88	48	60/61.5	3590/3660

50 Hz:						
Model (I)	KW	CAPACITY M <sup>3</sup> /MIN	LENGTH MM	WIDTH MM	HEIGHT (II) MM OPEN/ENCL	WEIGHT (III) KG AC/WC
100-L	75	14.1	2235	1219	1524/1562	1628/1660
100-H	75	13.0	2235	1219	1524/1562	1628/1660
100-HH	75	11.0	2235	1219	1524/1562	1628/1660
100-XH	75	9.4	2235	1219	1524/1562	1628/1660

(I) Includes standard and 24KT. Rated pressure designations appearing after model number are as follows:

"L" - 100 psig / 6.9 bar; "H" - 125 psig / 7.9 bar; "HH" - 150 psig / 9.7 bar; "XH" - 175 psig / 12 bar

(II) Add an additional height for servicing the separator as follows:

- a) Open: 9 in. / 229 mm
- b) Enclosed: 31.5 in. / 610 mm

(III) Add 500 lbs. / 228 kg for enclosure.

### NOTE

For latest sound test data, consult Sullair factory.

#### **COMPRESSOR:**

**Type:** Positive displacement, fluid-lubricated, twin rotary screws  
**Configuration:** Single-stage geared integral drive  
**Bearing Type:** Anti-friction  
**Lubricant:** Pressurized Sullube  
**Coolant:** See sections 3.2 and 3.3 on Lubricant  
**Sump Capacity:** 10 gallons (38 liters)  
**Control Type:** Electro-pneumatic  
**Options:** Spiral valve (direct-drive)

#### **MOTOR:**

**Size:** 100 HP / 75 KW  
**Type:** C-flanged, Open-dripproof enclosure, Premium Efficiency, 3-phase, 230/460V 60 Hz, 380-415V 50Hz, 104 deg. F / 40 deg. C Maximum Ambient Temperature  
**Options:** Various voltages, TEFC enclosure: CE approved.  
**Speed:** 4-pole (60 Hz - 1770 RPM, 50 Hz - 1475 RPM)  
**Starter:** Full-voltage, Wye-delta, or Solid State; various voltages.

# Section 3 SPECIFICATIONS

## 3.2 LUBRICATION GUIDE

See Figure 3-1. For best value and longest uninterrupted service, the LS20 Series compressors are factory filled and tested with a long life lubricant.

### **WARNING**

Mixing of other lubricants within the compressor unit will void all warranties!

If fluid change is required, follow Lubrication Guide 3.4 below.

### **WARNING**

“The Plastic Pipe Institute recommends against the use of thermoplastic pipe to transport compressed air or other compressed gases in exposed above ground locations, e.g. in exposed plant piping.” (I)

Sullube should not be used with PVC piping systems. It may affect the bond at cemented joints. Certain other plastic materials may also be affected.

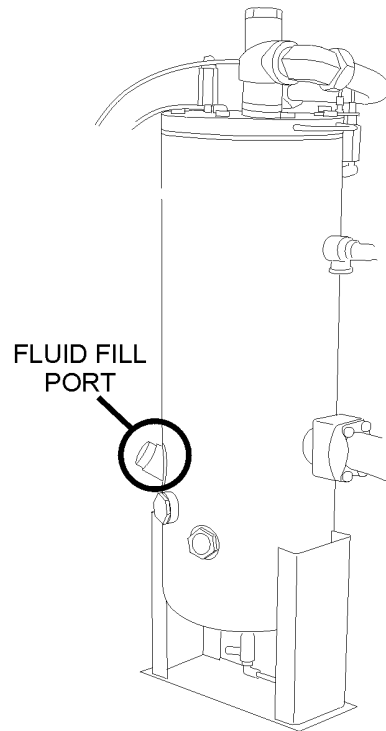
(I) Plastic Pipe Institute, Recommendation B, Adopted January 19, 1972.

Maintenance of all other components is still recommended as indicated in the Operator’s Manual.

For light-duty high-humidity service where condensed moisture and emulsification (mayonnaise) may occur, the fluid change interval must be reduced to 300 hours maximum. A non-detergent fluid with rust, oxidation and foam inhibitors and good water separation characteristics should be used.

**DO NOT MIX DIFFERENT TYPES OF FLUIDS.** Contamination of non-detergent mineral fluids with traces of detergent motor fluids may lead to operational problems such as foaming, filter plugging, orifice or line plugging.

Figure 3-1 Fluid Fill Port Location



### **NOTE**

Flush system when switching lubricant brands.

When ambient conditions exceed those noted or if conditions warrant use of “extended” life lubricants contact Sullair for recommendation.

## 3.3 APPLICATION GUIDE

Sullair encourages the user to participate in a fluid analysis program with the fluid suppliers. This could result in a fluid change interval differing from that stated in the manual. Contact your Sullair dealer for details.

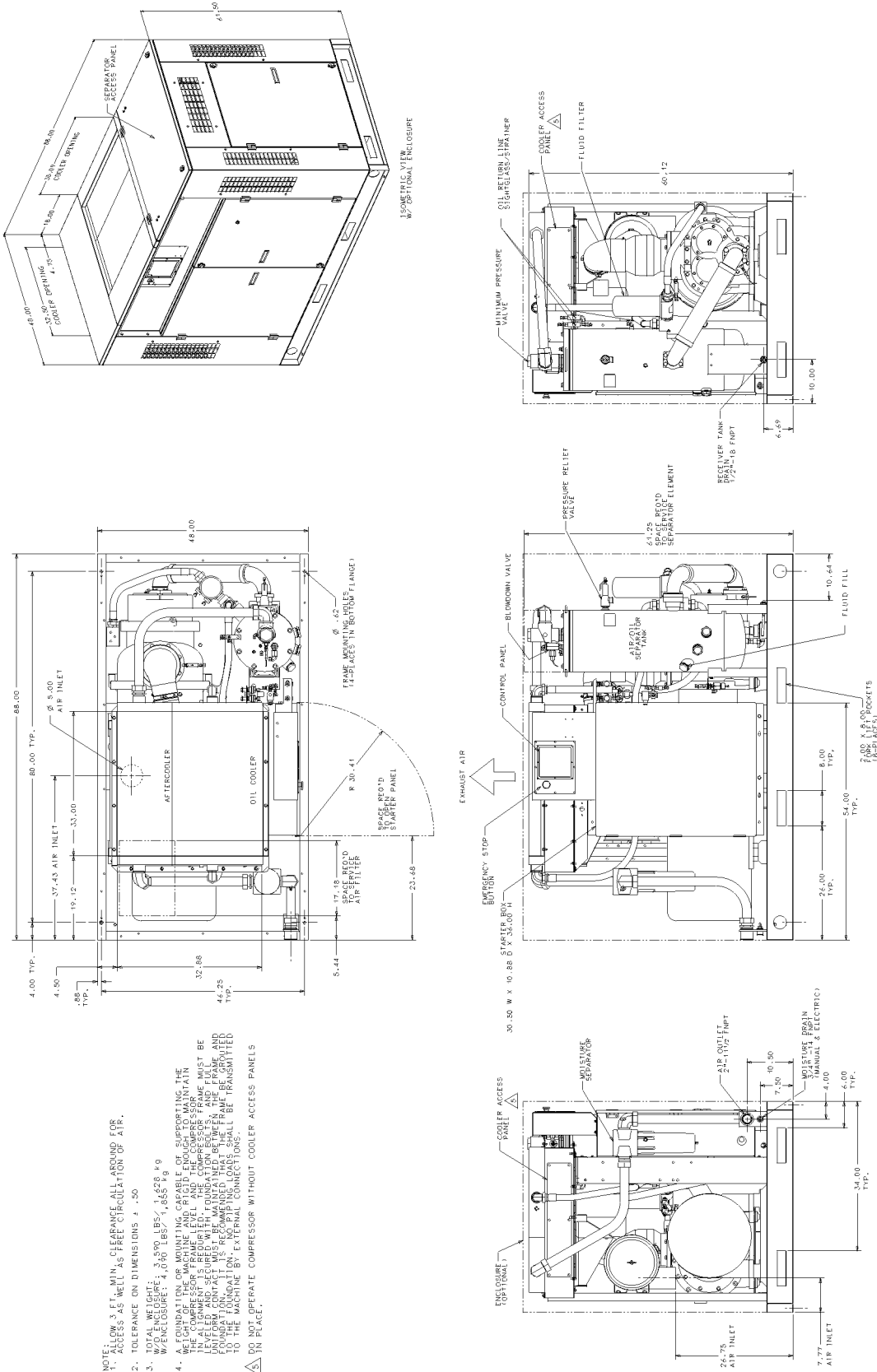
## 3.4 LUBRICATION CHANGE RECOMMENDATIONS AND MAINTENANCE

LUBRICANT	FLUID CHANGE	FLUID FILTER CHANGE	SEPARATOR CHANGE
Sullube	A , E	G , C	A , D
SRF 1/4000	B , E	G , C	B , D
24KT	F , E	G , C	A , D
CP-4600-32-F	B , E	G , C	B , D

- A - 8,000 Hours or once a year.
- B - 4,000 Hours or more frequently if conditions so require.
- C - When measured pressure loss exceeds 20 psig (1.3 bar).
- D - When measured pressure loss exceeds 10 psig (0.7 bar).
- E - When required by fluid analysis or known contamination.
- F - Does not require replacement during normal service conditions.
- G - Every 1000 hours.

# Section 3 SPECIFICATIONS

Figure 3-2 Identification- LS20-100 ACAC Supervisor with Enclosure



- NOTE: ALLOW 3 FT. MIN. CLEARANCE ALL AROUND FOR ACCESS AS WELL AS FREE CIRCULATION OF AIR.
- TOLERANCE ON DIMENSIONS ± .50
  - TOTAL WEIGHT: 3,590 LBS / 1,625 kg
  - WEIGHT ENCLOSURE: 4,050 LBS / 1,835 kg
  - A FOUNDATION OR MOUNTING CAPABLE OF SUPPORTING THE WEIGHT OF THE SUPERVISOR FRAME AND THE COMPRESSOR UNIT MUST BE PROVIDED. THE SUPERVISOR FRAME AND THE COMPRESSOR FRAME MUST BE UNIFORM CONTACT MUST BE MAINTAINED BETWEEN THE FRAME AND THE FOUNDATION. THE PIPING LOADS SHALL BE TRANSMITTED TO THE MACHINE BY EXTERNAL CONNECTIONS.
- △ IN INDICATE COMPRESSOR WITHOUT COOLER ACCESS PANELS

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## 4.1 MOUNTING OF COMPRESSOR

A foundation or mounting capable of supporting the weight of the compressor, and rigid enough to maintain the compressor frame level and the compressor alignment is required. The compressor frame must be leveled and secured with foundation bolts, and full uniform contact must be maintained between the frame and foundation. No piping loads shall be transmitted to the compressor at the external connections.

## 4.2 VENTILATION AND COOLING

For air-cooled compressors, select a location to permit sufficient unobstructed air flowing in and out to the compressor to keep the operating temperature stable. The minimum distance that the compressor should be from surrounding walls is three (3) feet (1m). To prevent excessive ambient temperature rise, it is imperative to provide adequate ventilation.

For water-cooled compressors, it is necessary to check the cooling water supply. The water system must be capable of supplying the flows shown in *Table 1- Water Supply Requirements* (Water-cooled), and must be maintained at all times. These figures apply to a compressor running at full load with an aftercooler. For cooler water or a partially loaded compressor, slightly less water is required. However, for hotter water the flow requirements are significantly greater.

**TABLE 1-WATER SUPPLY REQUIREMENTS**

WATER TEMP. °F (°C)	WATER FLOW GPM (LPM) 100HP
70 (21)	14.9 (56.4)
80 (27)	19.9 (75.3)

(I) Water pressure should be between 25 and 75 psig (1.7 and 5.2 bar).

### NOTE

Water flow requirements are based on 80°F to 85°F (27°C to 29°C) water inlet temperature.

Recommended water pressure range is 25 to 75 psig (1.7 to 5.2 bar).

*Table 2- Ventilation Requirements* indicates the ventilation requirements necessary to keep the compressor running at a normal operating temperature. The fan air requirement is the volume of air which must flow through the compressor for proper ventilation. The specified heat rejection requirement is the amount of heat that is radiated by the compressor. This heat must be removed to assure a normal operating temperature. With air-cooled compressors it is possible to use this heat for space heating, providing no additional pressure drop is created across the fan. Consult a Sullair office for assistance in utilizing this heat.

**DO NOT** install a water-cooled or an air-cooled/aftercooled compressor where it will be exposed to temperatures less than 32°F(0°C).

### NOTE

Consult factory for machine operation in ambient temperature less than 32°F (0°C).

## 4.3 SERVICE AIR PIPING

Service air piping should be installed as shown in Figure 4-1. A shut-off valve should be installed to isolate the compressor from the service line if required. Also notice that the service line should be equipped with water legs and condensate drains throughout the system.

### WARNING

“The Plastic Pipe Institute recommends against the use of thermoplastic pipe to transport compressed air or other compressed gases in exposed above ground locations, e.g. in exposed plant piping.” (I)

Sullube should not be used with PVC piping systems. It may affect the bond at cemented joints. Certain other plastic materials may also be affected.

(I) Plastic Pipe Institute, Recommendation B, Adopted January 19, 1972.

## 4.4 COUPLING ALIGNMENT CHECK

No coupling alignment is required.

## 4.5 FLUID LEVEL CHECK

The air compressor is supplied with the proper amount of fluid. However, it is necessary to check

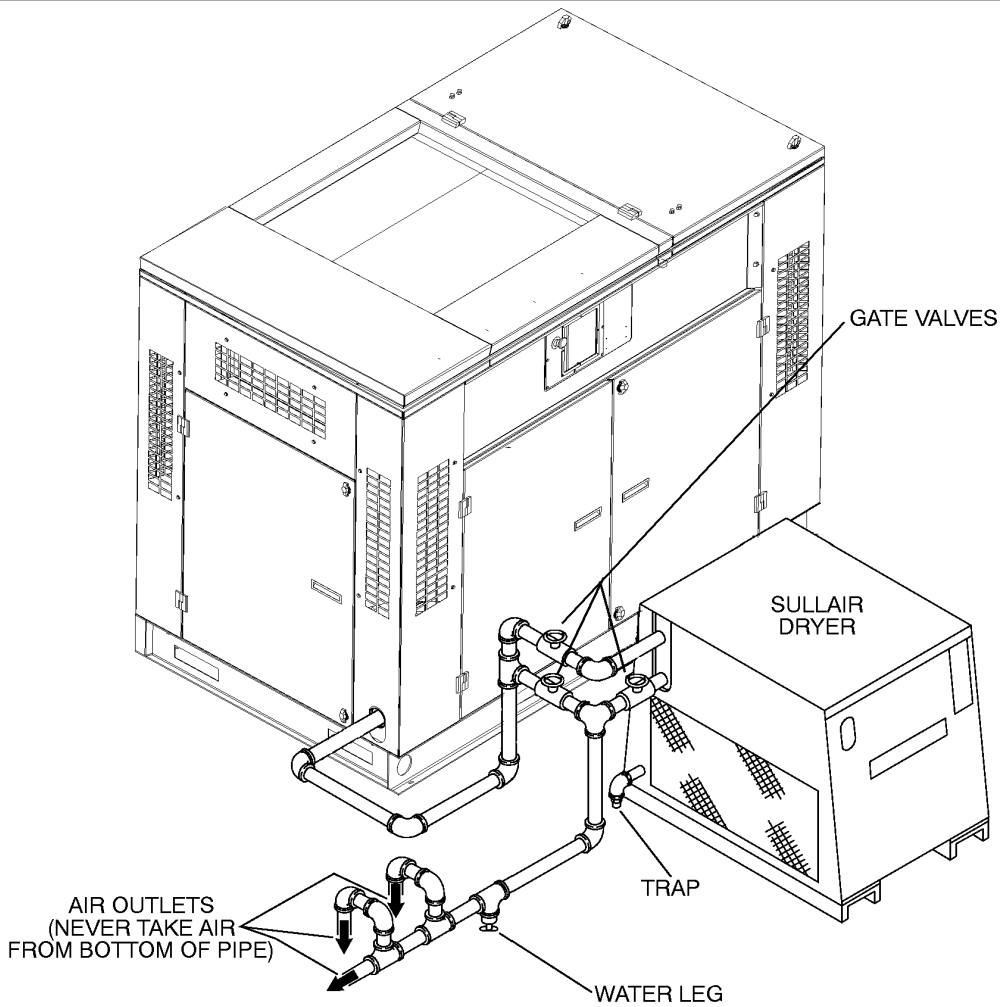
**TABLE 2- VENTILATION REQUIREMENTS**

Cooling Type	Air-Cooled w/Aftercooler	Water-Cooled
Motor HP/ KW	100/75	100/75
Fan Air CFM/ M3/min (I)	8,000/227	2,977/84
Heat Rejection BTU/hr/ Kcal/hr	298,080/75,116	18,000/4536

(I) Applies to compressors with canopy only (vent fan).

# Section 4 INSTALLATION

Figure 4-1 Service Air Piping- Typical Installation



the fluid level at installation and subsequently during the operation of the compressor. The maximum oil level is at the top of the highest sight-glass on the sump when the compressor has been stopped for at least 15 minutes. The minimum oil level is one-half of the lower sight-glass, while the machine is running fully loaded. When a complete oil change is performed, fill the sump to the maximum allowable fluid level (up to the bottom of the fluid fill port.).

## NOTE

DO NOT overfill.

### 4.6 ELECTRICAL PREPARATION- ELECTRO-MECHANICAL

Interior electrical wiring is performed at the factory. Required customer wiring is minimal, but should be done by a qualified electrician in compliance with OSHA, National Electrical Code, and/or any other applicable State, Federal and local electrical codes

concerning isolation switches, fused disconnects, etc. Sullair provides a wiring diagram for use by the installer.

## NOTE

Customer must provide electrical supply power disconnect within sight of machine.

A few electrical checks should be made to help assure that the first start-up will be trouble-free.

## ⚠ DANGER

Lethal shock hazard inside. Disconnect all power at source before opening or servicing.

1. Check incoming voltage. Be sure that compressor is wired for the correct incoming voltage.
2. Check starter for correct size, proper overload relay, and heaters.
3. Check all electrical connections for tightness.

4. “DRY RUN” the electrical controls by disconnecting the three (3) motor leads from the starter. Energize the control circuits by pressing the “I” **START** push button and check all protective devices to be sure that they will de-energize the starter coil when tripped.
5. Reconnect the motor leads and jog the motor for a direction of rotation check as explained in Section 4.8.

## NOTE

Wiring diagram for standard compressors is supplied on the inside cover of the Control Center. Optional compressor wiring diagrams will vary.

### 4.7 ELECTRICAL PREPARATION- SUPERVISOR

Interior electrical wiring is performed at the factory. Required customer wiring is minimal, but should be done by a qualified electrician in compliance with OSHA, National Electric Code and/or any applicable local electrical code concerning isolation switches, fused disconnects, etc. Sullair provides a wiring diagram for use by the installer.

An electrical check should be made to help assure that the first start-up will be trouble-free.



## DANGER

Lethal shock hazard inside. Disconnect all power at source, before opening or servicing.

1. Check incoming voltage. Be sure that the incoming voltage is the same voltage that the compressor was wired for.
2. Check starter and overload heater sizes.
3. Check all electrical connections for tightness.
4. “DRY RUN” the electrical controls by disconnecting the three (3) motor leads from the starter. Energize the control circuits by pushing the “I” (**START**) pad and check all protective devices to be sure that they will de-energize the starter coil when tripped.
5. Reconnect the three (3) motor leads and jog the motor for a direction of rotation check, as explained in Section 4.9.

### 4.8 MOTOR ROTATION DIRECTION CHECK- STANDARD ELECTRO-MECHANICAL

## NOTE

Motor rotation check must be made at compressor start-up. Remove compressor panel as needed to view motor rotation.

After the electrical wiring has been done, it is necessary to check the direction of the motor rotation.

This can be accomplished by toggling between the “I” (**START**) and “O” (**STOP**) push buttons on the control panel. Verify proper rotation by observing the motor shaft during start-up. The shaft should rotate in the same direction as indicated by the rotation decal located on the motor adapter. If the motor shaft is not turning in the proper direction, disconnect power to the compressor and exchange any two of the three power-input leads, then recheck rotation.

An alternative to this procedure is to monitor the sump pressure gauge when pressing the “I” (**START**) push button. If immediate pressure is shown on the sump pressure gauge when the compressor is started, then the proper motor rotation has been achieved. If no pressure is indicated, press the “O” (**STOP**) push button immediately. This indicates improper motor rotation. Disconnect the power to the starter and exchange any two of the three power input leads. Recheck rotation as outlined above.

### 4.9 MOTOR ROTATION DIRECTION CHECK- SUPERVISOR

## NOTE

Motor rotation check must be made at compressor start-up. Remove compressor panel as needed to view motor rotation.

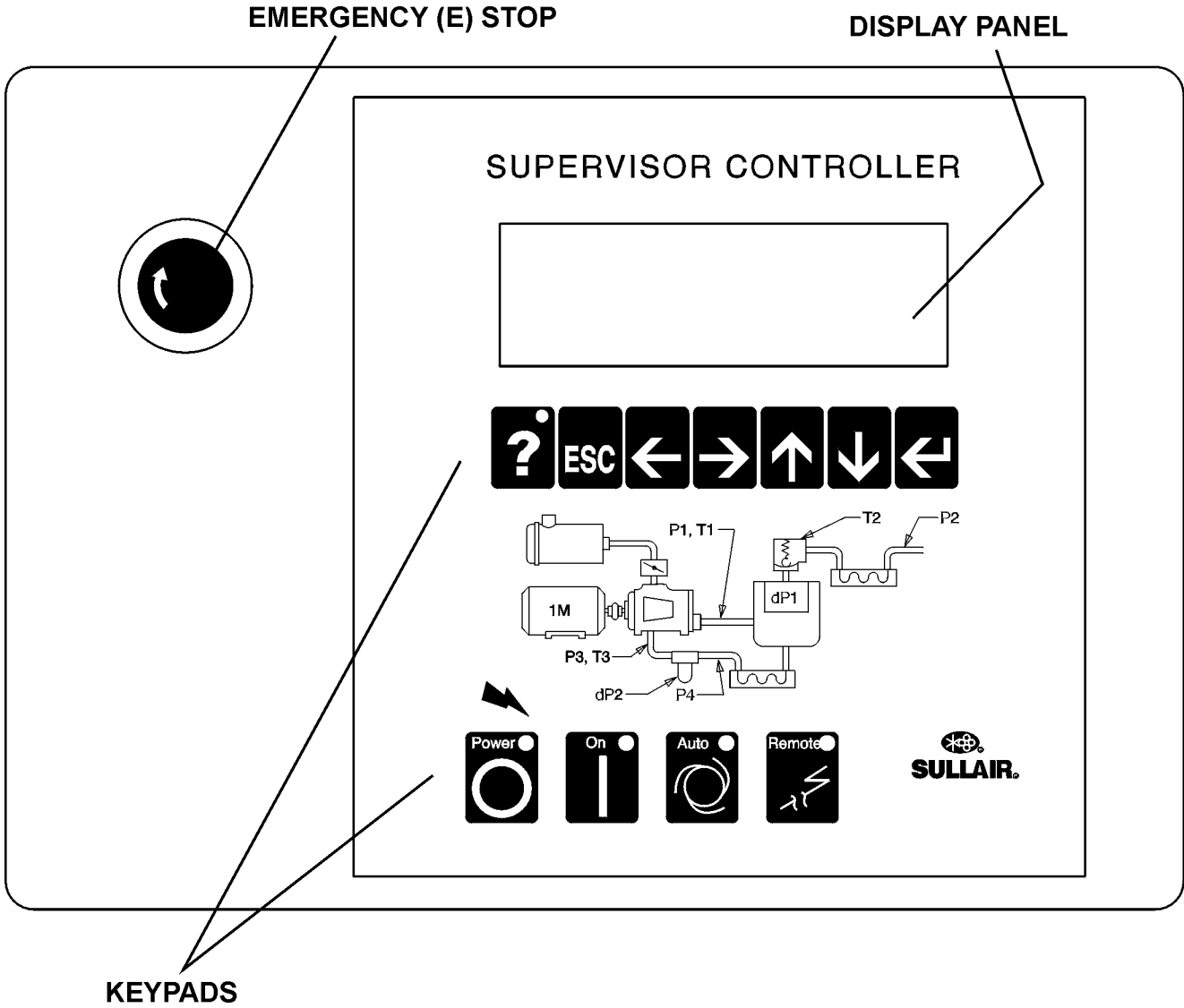
After the electrical wiring has been done, it is necessary to check the direction of the motor rotation.

Pull out the **EMERGENCY STOP** button and press once, quickly and in succession, the “I” (**START**) and “O” (**STOP**) pads. This action will bump start the motor for a very short time. Verify proper rotation by observing the motor shaft during start-up. The shaft should rotate in the same direction as indicated by the rotation decal located on the motor adapter. If the motor shaft is not turning in the proper direction, disconnect power to the compressor and exchange any two of the three power-input leads, then recheck rotation.

An alternative to this procedure is to set the Supervisor to display P1. Pull out the **EMERGENCY STOP** button and press once, quickly and in succession, the “I” (**START**) and “O” (**STOP**) pads. This action will bump start the motor for a very short time. If motor rotation is correct there will be immediate pressure shown. If no pressure is present, reverse rotation is occurring. Disconnect the power to the starter and exchange any two of the three power input leads. Recheck rotation as outlined above.

# Section 5 SUPERVISOR CONTROLLER

Figure 5-1 Supervisor Control Panel




# Section 5


## SUPERVISOR CONTROLLER


### 5.1 SUPERVISOR KEYBOARD LAYOUT


Refer to Figure 5-1. The Display module has eleven keys grouped in two rows.


The top row has the following seven keys :


 - Help key, used to display possible causes of and correction for an alarm or fault.


 - Returns to main display.

 - Used to edit text or numbers (move cursor left).


 - Used to edit text or numbers (move cursor right).


 - Used to change numbers or text, or scroll.


 - Used to change numbers or text, or scroll.


 - Used to select an item from a menu, or start and end an edit on a parameter.

The bottom row has four keys :

 - Stop, stops machine. Clears faults and warnings if machine is stopped.

 - Run, starts machine. Clears warnings if machine is running.

 - Toggles auto mode.

 - Toggles Local/Remote mode. This can be used to disable sequencing.

### 5.2 MAIN DISPLAY

**Line1** - Machine state :

**E-Stop** - E- Stop button pressed, or auxiliary e-stop present.

**Stopped** - Machine not running.

**Unloaded** - Machine running unloaded.

**Loaded** - Machine running, loaded and modulating.

**Full Load** - Machine forced to full load. (Used only in sequencing modes).

**Remote Stop** - Compressor is off but armed to start. The machine will start when the remote start contact is closed. **NOTE** : the machine may start at any time.

**Seq Stop** - Compressor is off but armed to start. The machine will start when the sequencing conditions meet the criteria to start. **NOTE**: the machine may start at any time.

**Line 2** - Fault or Warning, blank means no fault or warning is present.

If there are multiple alarms, they will be shown for 2 seconds each. If an alarm is active, pressing the '?' key will give troubleshooting information on that alarm.

**Line 3** - P2 - Line pressure

**Line 4** - T1 - Discharge Temperature

### 5.3 FUNCTION MENU

While in the main display, if any of the arrow keys are pressed, the function menu is displayed. This menu is used to view status or edit parameters.

The function menu has the following entries :

**Status** - Current pressures, temperatures, inputs and outputs.

**Control Parameters** - Pressure and temperature and timer settings.

**Maintenance** - Preventive maintenance information and timers.

**Fault Log** - Log of previous faults.

**Sensor Log** - Log of sensor readings leading up to a fault.

**Sequencing** - Sequencing parameters.


**System Display** - Display of modes of machines in a sequencing system.

**Calibration** - Correction factors for pressures.

**Factory Setup** - Model settings.

**Test** - Used by Sullair personnel for troubleshooting serial communications.

To select a function, use the up and down arrow keys to scroll to the desired function as indicated on

last line of display, then press the enter  key.

After entering a function, the information can be viewed by using the up and down arrow keys. If the function shows status then values cannot be changed. If the function displays parameters, then the values can be changed.

To change a value, scroll to the line to be changed using the up arrow and down arrow keys, and push the enter button. The value can be changed by using the up arrow or down arrow keys. When editing is finished, pushing the enter key will fix the

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# SUPERVISOR CONTROLLER

value. If during a change the ESC key is pushed, editing is terminated and the original value is reset.

The left and right arrow keys can be used to move to other digits or letters in a value. For example to change a value from 100 to 500, the left arrow key can be used to position the cursor to the 1 digit in the 100, and the up arrow key used to increment the digit to 5.

Text fields can also be edited in the same manner. Push the enter key to start the edit, use the left and right arrow keys to move to the letter to be changed, then use the up and down arrow to change the letter. Push the enter key to complete the edit.

The following are detailed descriptions of the various displays.

### 5.4 STATUS - CURRENT PRESSURES, TEMPERATURES, INPUTS AND OUTPUTS

All inputs and outputs are displayed showing both the designator and the description (eg. T1-Discharge) along with the selected temperature (C or F) or pressure (psi, bar, kPa) units. Digital inputs and outputs are shown either as a '0' (zero) or '1' (one). Zero is off and one is on. This is a view only display.

The order of display is :

**Temperatures** - T1 through T5 depending on model.

**Pressures** - P1 through P4 depending on model.

**Delta pressures** - dp1 through dp3 depending on model.

**Load Hours** - Hours machine has run loaded.

**Run Hours** - Hours machine has run loaded or unloaded.

**Load Cycles** - Number of load/unload cycles.

**Starts** - Number of times machine has started.

**E-Stop String** - E-Stop push button.

**Aux E-Stop** - Auxiliary E-Stop, wired by customer.

**Digital Inputs** - D1 through D10, depending on model.

**Relay Outputs** - K1 through K8, depending on model.

### 5.5 CONTROL PARAMETERS - PRESSURE, TEMPERATURE AND TIMER SETTINGS

Parameters that control the operation of the machine are viewed and set using this display. These parameters may vary by machine model.

The Control Parameters are :

**Unload pressure** - The pressure where the machine is unloaded. For example if this parameter is set to 110 psi (7.6 bar) the machine will unload when the line pressure is above 110 psi (7.6 bar).

**Load delta** - The pressure differential below the unload pressure where the machine is loaded. For example if the unload pressure is set to 110 psi (7.6 bar) and the load differential is set to 10 psid (0.7 bar), the machine will load when the line pressure goes below 100 psi (6.9 bar).

**Unload Time** - If the machine is running in AUTO mode, this parameter specifies the amount of time that the machine will run unloaded before shutting off. If the time is set less than 15 minutes (for example 5), there may be times when the machine will run unloaded for more than 5 minutes. This is because there is another timer that keeps the machine from being started more than four times an hour. This secondary timer is disabled when a machine is configured for VSD motor control.

**Drain Interval** - If the machine has an electric solenoid drain, this parameter and the following parameter (Drain Time) are used to turn on the drain. The interval is the time between activations of the drain and the Drain Time is the length of the time energized. This does not apply to the Sullair SCD zero loss drain, which is not controlled or monitored by the Supervisor.

**Drain Time** - Length of time that drain is energized.

**Restart time** -



Enabling this function also enables automatic restart after power recovery. Be sure to depress the Emergency Stop button to defeat this function when automatic start is to be prevented.

Time to wait after power up before starting machine. This parameter is used to keep several machines from starting at the same time after power up, or to delay start until other equipment is started. If disabled parameter is zero, the machine will not automatically start after power up. If this parameter is a number larger than zero, the machine restarts after a delay defined by this time. For example, if the Restart Time is set to 10 seconds, then the machine will be enabled to start after 10 seconds.

**Wye to delta transition timer** - Also used to control the closed inlet start valve. Disable by setting to zero (0), standard for full voltage start. Requires approximately 4-6 seconds for wye-delta or solid state starting.

**Modulate** - Default state is Yes for normal machine

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# SUPERVISOR CONTROLLER

control. Select No for Load/No Load operation.

### NOTE

Unload pressure **MUST** be lowered to rated pressure when using Load/No Load mode.

**Language select** - English, German, Spanish, Italian and French may be selected for display language.

**Temp Units** - Temperature units may be set to degrees F or degrees C.

**Press Units** - Pressure units may be set to psi, bar, or kPa.

### 5.6 MAINTENANCE - PREVENTIVE MAINTENANCE INFORMATION AND TIMERS

The following lines are on the Maintenance display.

**Information** - The top two lines may be changed to advise what to do when there is a maintenance warning. For example a distributor can put in his name and telephone number.

**Ser. No** - Serial number of machine.

**Warn at** - When the following drop below this number, a warning is issued.

**Oil Filter hours** - Hours before oil filter change.

**PN** - Oil Filter part number.

**Separator hours** - Hours before separator change.

**Prim.** - Primary separator part number.

**Sec.** - Secondary separator part number.

**Air Filter hours** - Hours before air filter change.

**Prim.** - Primary air filter part number.

**Sec.** - Secondary air filter part number.

**Oil hours** - Hours before oil change.

**PN** - Oil part number.

**Oil Anal.** - Hours before oil analysis.

These hours and part numbers can be changed using the enter and arrow keys.

**Fault Log** - Log of previous faults.

The fault log shows the last 16 faults that occurred. The top line of the display shows the run hours where the fault occurred, and the second line shows the fault. The faults can be scrolled through using the up and down arrow keys. They are ordered by most recent first. (ie. when the function is entered the most recent fault is displayed. Pressing the down arrow displays the previous fault etc).

**Sensor Log** - Log of sensor readings leading up to a fault.

The sensor log shows the sensor readings leading up to a fault. The top line shows the last fault. The following lines show T1, T2, P1 & P2. Each line represents readings that are 5 seconds apart for one minute, then one minute apart for 10 minutes. There is a second set of readings for T3, T4, P3 & P4.

### 5.7 SEQUENCING - SEQUENCING & COMMUNICATION PARAMETERS

The following parameters can be viewed and edited. For more details on sequencing see the Supervisor Sequencing and Protocol Manual.

**Sequence By** - Sequencing mode can be set to:

**Disabled** - Control does not do any sequencing.

**Remote** - Enables Remote Start/Stop, Remote Load/Unload and Local/Master inputs

**Hours** - Uses the Seq Hrs parameter to determine order of sequencing

**Number** - Uses the Com Number to determine order of sequencing

**Seq Hrs** - This is an hour counter used when the 'Sequence By' parameter is set to 'Hours'. Each hour that the machine is running increments this counter. When then 'Sequence By' parameter is set to 'Hours', the machine with the least amount of Seq Hrs is started first, and the machine with the most Seq Hrs is shut off first.

**Com Number** - Communications number. When two or more machines are connected together using the network (RS-485 channel), each machine must have a unique number or address. These must be assigned in numerical order. For example in a three machine system the machine communications numbers should be 1, 2 & 3.

**Machines** - This is the total number of machines connected to the network (RS-485 channel). For example in a three machine system, this parameter should be set to 3. Up to sixteen machines may be networked if all have Supervisor Controllers and limited to eight if some have Supervisor II's.

**Low Press** - This is the lowest pressure allowed before immediately starting a machine.

**Recovery Time** - This parameter keeps multiple machines from loading, unloading and starting at the same time. For example if a low pressure condition causes a machine to start, the next machine will not start unless the Recovery Time has elapsed, and the pressure has not recovered (i.e., has risen

# Section 5

## SUPERVISOR CONTROLLER

over 'Low Press').

**Rotate** - This parameter is used only in very special cases.

### NOTE

Leave this parameter disabled unless instructed by Sullair Service Personnel.

The only time this parameter should be used is in a situation where, once a machine is started, it never stops (ie. the unload timer never expires). This can happen when the load matches the output of the machine, all the time. In this case the machine will never unload and shut off. The rotate forces the machine to stop after it's Seq Hrs. are greater than the other machines. For example in a two machine system, with Rotate set at 100 hrs. The machine that is running will shut off when the Seq Hrs. are 100 more than the machine that is stopped.

**Minute, Hour, Day, Month, Year-** If the Communications Module is present in the system, the time and date can be set using these parameters.

### 5.8 SYSTEM DISPLAY - DISPLAY OF MODES OF MACHINES IN A SEQUENCING SYSTEM

Note that this display is only applicable when there are two or more machines connected to the communications network (RS-485) and the Sequence By parameters on each machine are set to 'Hours' or 'Number'.

The columns are described below

#### Communication Number

##### Status -

- E - Emergency Stop
- M - Manual stop
- R - Remote stop
- B - Standby
- S - Starting
- U - Unloaded
- L - Loaded
- T - Trim machine
- F - Full load

##### Sequencing Hours

**Capacity** - Not used at this time.

**Local System Pressure** - Pressure read by machines pressure transducer.

The top line is a legend that describes each column. The right hand number on the top line is the system pressure. The system pressure is the highest pressure reading of all the machines. Note that the local pressure readings can be used to determine what machines may need to be calibrated. The system

pressure transducers on all machines should read within 1(one) psi of one another. The calibration function can be used to set the readings to be the same.

### 5.9 CALIBRATION - CORRECTION FACTORS FOR PRESSURES

The first line of this display is the password. If the password is 0 then the following parameters are not protected and can be changed. If the password is non-zero, then enter the displayed number plus 4 to enable changing the parameters. For example if the number displayed is 10 then changing the password to 14 will enable editing.

The four pressures P1, P2, P3 & P4 as well as the differential pressure dP1 can be calibrated. The number on the right hand side of the line is added to the transducer reading to give the calibrated reading. The calibrated reading is shown in the middle of the line.

There are also three other parameters in the calibration function :

**Protect** - When set to yes, protects the control parameters from change.

**Fault on Warn** - Force fault on warning.

**Force Unload** - When set to yes, forces the machine to unload.

### 5.10 FACTORY SETUP- Model settings.

The factory setup display is used by Sullair personnel to initially set up the machine. The following values reflect the machine configuration.

**Model** - Model number of machine.

**Cooling** - Air or Water.

**Press Trans** - Pressure transducer range 0-250.

**P1 Max** - Maximum discharge pressure.

**Water Switch** - Water pressure switch, Yes or No.

**Oil Switch** - Oil pressure differential switch, Yes or No.

**Min Load Psi** - Minimum acceptable load P1 pressure setting. Separator Maintenance warning is disabled for loaded P1 pressures below this value (i.e., during start-up).

**K8 Option** - K8 output relay function selector - Disabled, Oil pump prelube and postlube control, Master Control for special external sequence control.

**Stop Timer** - Time to run machine before stopping.

**Protect** - Protect control parameters.

**Load Hours** - Hours machine was running and

## Section 5 SUPERVISOR CONTROLLER

loaded.

**Run Hours** - Hours machine was running loaded and unloaded.

**Load Cycles** - Number of load/unload cycles.

**Starts** - Number of machine starts.

**Capacity** - Maximum capacity of machine.

**VFD** - N/Y Indicates if program is configured for

VFD motor control.

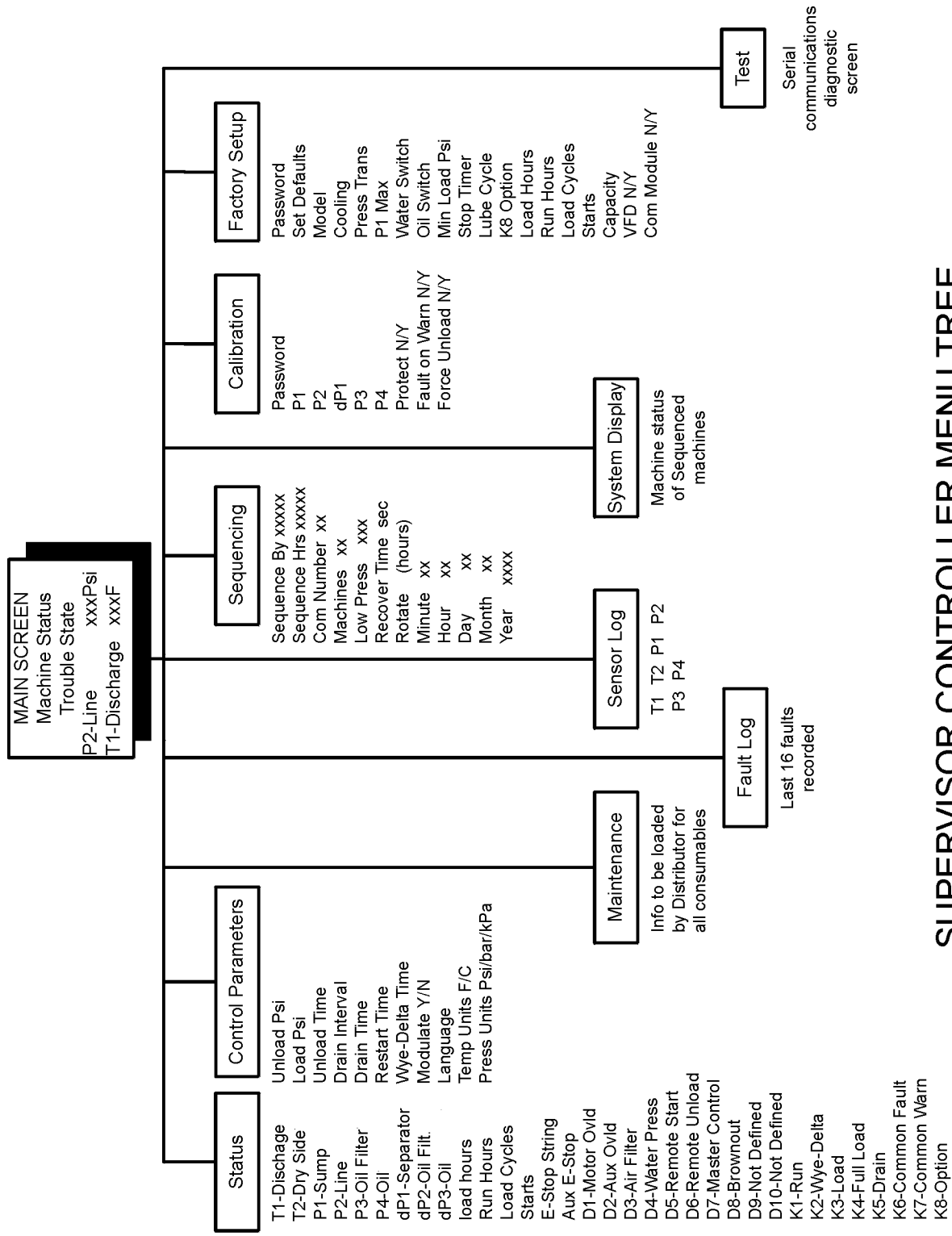
**Com Module** - Yes/No Enables or disables the communication module if installed.

**Mtr Module** - Yes/No Enables or disables the motor actuator module if installed.

**5.11 TEST-** Used by Sullair personnel for troubleshooting of serial communications.

# Section 5 SUPERVISOR CONTROLLER



Table 5-1 Supervisor Controller Menu Tree



## SUPERVISOR CONTROLLER MENU TREE



## 6.1 MOTOR ROTATION DIRECTION CHECK

After the electrical wiring has been done, it is necessary to check the direction of the motor rotation. With the control system in MANUAL mode, press

the  and  pads in succession to bump start the compressor. When looking at the motor from the end opposite the compressor unit, the shaft should be turning clockwise on all gear driven models, and counterclockwise on direct drive models. If the motor shaft is not turning in the proper direction, disconnect the power to the starter and exchange any two of the three power input leads, then re-check rotation. A "Direction of Rotation" decal is located on the coupling guard between the motor and compressor to show proper motor/compressor rotation.

## 6.2 INITIAL START-UP PROCEDURE



The following procedure should be used to make the initial start-up of the compressor.

1. Be sure that all preparations and checks described in the Installation Section have been made.
2. Read the preceding pages of this manual thoroughly.
3. Jog motor to check for correct rotation of fan (refer to Sections 4.8 or 4.9).
4. Start the compressor in the desired operating mode  or .


5. Slowly open the shut-off valve to the service line.
6. Check for possible leaks in piping.
7. Slowly close the shut-off valve to assure proper nameplate pressure unload setting is correct. The compressor will unload at nameplate pressure. If adjustments are necessary, see Control System Adjustment section in the compressor operator's manual.
8. Observe the operating temperature. Refer to compressor operator's manual for acceptable operating range. If temperature exceeds this range, the cooling system and installation environment should be checked.
9. Open shut-off valve to the service line.
10. Reinspect the compressor for temperature and leaks the following day.

## 6.3 SUBSEQUENT START-UP PROCEDURE

On subsequent start-ups, check that the proper level is visible in the fluid sight glass and simply

press the START  or AUTO MODE  button. When the compressor is running, observe the instrument panel and maintenance indicators.

## 6.4 SHUTDOWN PROCEDURE

To shut the compressor down, simply press the STOP  button.

# NOTES

# Section 7

## TROUBLESHOOTING-SUPERVISOR

### 7.1 TROUBLESHOOTING INTRODUCTION

#### NOTE

Whereas Sections 7.1 and 7.2 portray common systematic setbacks that can occur during controller operation, for a more thoroughly in-depth coverage of machine operation setbacks, consult the Troubleshooting Section in the machine's operator's manual.

The information contained in the Troubleshooting chart has been compiled from factory experience. It contains symptoms and usual causes for the described problems. However, **DO NOT** assume that these are the only problems that may occur. All available data concerning the trouble should be systematically analyzed before undertaking any

repairs or component replacement procedures.

A detailed visual inspection is worth performing for almost all problems and may avoid unnecessary additional damage to the compressor. Always remember to:

- a. Check for loose wiring.
- b. Check for damaged piping.
- c. Check for parts damaged by heat or an electrical short circuit, usually apparent by discoloration or a burnt odor.

Should your problem persist after making the recommended check, consult your nearest Sullair Distributor or the Sullair Corporation factory Service Department.

### 7.2 TROUBLESHOOTING GUIDE- SUPERVISOR CONTROLLER

MESSAGE	MODEL	ENABLE	PROBABLE CAUSE	REMEDY
Air Filter Maint	ALL	ALWAYS	Differential Pressure Across Inlet Filter High	Replace filter.
	ALL	ALWAYS		Check inlet filter pressure switch.
Aux Motor Overload	ALL	ALWAYS	Auxiliary Motor Tripped on Cooling Fan, Oil Pump or Other Motor	Reset auxiliary overload after heater element cools. Verify correct motor amps.
	ALL	ALWAYS		Check for loose connections.
	ALL	ALWAYS		Check motor starter contact for proper operation.
	ALL	ALWAYS		Check line voltage, if low consult power company.
E-Stop	ALL	ALWAYS	E-Stop Button Active	Release button.
E-Stop Push Button	ALL	ALWAYS		Check wiring.
E-Stop	ALL	ALWAYS	Auxiliary E-Stop String Open	Check auxiliary E-Stop devices.
E-Stop String	ALL	ALWAYS		Check wiring.
Low Water Pressure	ALL	Watercooled	Cooling Water Pressure Below 10 psi (0.7bar)	Check for closed valves or broken pipes.
Oil Change Due, Oil Filter Change, Separator Change Due, Air Filter Change, Oil Analysis Due	ALL	ALWAYS	Maintenance Due	Select Maintenance from menu to see service due and part numbers.
Main Motor Overload	ALL	ALWAYS	Main Motor Overload	Reset overload after heater element cools down.
	ALL	ALWAYS		Make sure compressor is properly configured.
	ALL	ALWAYS		Make sure load pressure is set below limit of compressor.

# Section 7

## TROUBLESHOOTING-SUPERVISOR

### 7.2 TROUBLESHOOTING GUIDE- SUPERVISOR CONTROLLER (CONTINUED)

MESSAGE	MODEL	ENABLE	PROBABLE CAUSE	REMEDY
<b>Main Motor Overload (CONTINUED)</b>	ALL	ALWAYS	Main Motor Overload (cont.)	Check motor starter contacts for proper operation.
	ALL	ALWAYS		Check line voltage, if low consult power company.
<b>I/O Mod Com Error, Com Mod Com Error, Motor Mod Com Error</b>	ALL	ALWAYS	Module Network Error; The Network that Connects the Display Module, I/O Module and Other Optional Modules is Not Working Correctly	Check wiring.
	ALL	ALWAYS		Replace module referred to in error message, if problem persists replace display module.
<b>Oil Filter Maint., dP2 Oil Filter High</b>	ALL	ALWAYS	Pressure Across Oil Filter Above 20 psi (1.4 bar) While Running	Oil filter clogged, replace oil filter.
	FLOODED	ALWAYS		Low ambient temperature, sump heater may be required in ambients below 40°F (4°C).
	ALL	ALWAYS		Sensor failure, check sensor, wiring and tubing.
<b>P3 Oil Pressure Low, dP3 Oil Pressure Low</b>	ALL	ALWAYS	Oil Pressure Low	Oil filter clogged; replace oil filter.
	FLOODED	ALWAYS		Sump oil level low, replenish oil to proper level.
	FLOODED	ALWAYS		Low ambient temperature, sump heater may be required in ambients below 40°F (4°C).
	FLOODED	ALWAYS		Oil pump may be required for remote coolers.
<b>P1 Sensor Fail, P2 Sensor Fail, P3 Sensor Fail, P4 Sensor Fail, T1 Sensor Fail, T2 Sensor Fail</b>	ALL	ALWAYS	Sensor or Wiring Failure	Check sensor wiring. Check sensor.
	FLOODED	ALWAYS	Pressure Across Separator High	Plugged separator elements, replace. Pressure sensor failure, check sensor wiring.
<b>Factory Setup Error</b>	ALL	ALWAYS	The Factory Setup Information Needs to be Reviewed for Correct Values	If problem persists replace Supervisor.
<b>P1 Sump Pressure High</b>	FLOODED	ALWAYS	Sump Pressure High (Poppet, Spiral, Blowdown or Pneumatic Valve Failed)	Check valves.
	FLOODED	ALWAYS		Solenoid valves, check operation and wiring.
	ALL	ALWAYS		Pressure regulator, check adjustment and operation.

# Section 7

## TROUBLESHOOTING-SUPERVISOR

### 7.2 TROUBLESHOOTING GUIDE- SUPERVISOR CONTROLLER (CONTINUED)

MESSAGE	MODEL	ENABLE	PROBABLE CAUSE	REMEDY
<b>P1 Sump Pressure High (CONTINUED)</b>	FLOODED	ALWAYS	Sump Pressure High (Poppet, Spiral, Blowdown or Pneumatic Valve Failed) (cont.)	Check minimum pressure check valve (not applicable to Oil Free compressors).
<b>P1 Sump Pressure Low</b>	FLOODED	ALWAYS	Sump Pressure Low	Check pressure sensor, wiring and tubing.
	FLOODED	ALWAYS		Machine may have failed to start.
<b>T1 Discharge High, T2 Discharge High</b>	ALL	ALWAYS	High Temp. Fault	Ambient above 105°F (41°C), improve local ventilation.
	FLOODED	ALWAYS		Fluid level low, replenish to proper level.
	FLOODED	ALWAYS		Thermal valve, check operation.
	ALL	Aircooled		Cooler fins dirty, clean fins and fan.
	ALL	Watercooled		Low water flow, check for valve closed, pump off or broken pipe. High water temperature, increase flow or lower water temperature.
	ALL	Watercooled		
	ALL	Watercooled		Cooler plugged, clean tubes and shell, if plugging persists, use cleaner water.
	ALL	ALWAYS		Sensor failure, check sensor and wiring.

# Section 7

## TROUBLESHOOTING-SUPERVISOR

Table 7-1 Alarms (LS20 Compressors)

Sensor	Type	Limit	Start Delay	Run Delay	Check (*)	Comment
System Check	On Fault	0	0	0	Constantly	Factory Setup Check Sum Fail
I/O Module Check	On Fault	0	0	0	Constantly	Communication failure I/O Module
Com Module Check	On Fault	0	0	0	Constantly	Communication failure Com Module
Motor Module Check	On Fault	0	0	0	Constantly	Communication failure Motor Mod
D_1	On Fault	0	1	1	Constantly	Motor overload
D_2	On Fault	0	1	1	Constantly	Aux motor overload
D_3	On Warn	0	5	5	When Running	Air filter maintenance
D_4	On Fault	0	5	5	When Running	Low water pressure
E_1	On Fault	0	0	0	Constantly	E-Stop Push Button
E_2	On Fault	0	0	0	Constantly	Auxiliary E-Stop
AIR FILTER MAINT.	Maint Warn	0	0	0	If Enabled	Air Filter change due
OIL ANALYSIS Check	Maint Warn	0	0	0	If Enabled	Oil Analysis due
OIL CHANGE Check	Maint Warn	0	0	0	If Enabled	Oil change due
OIL FILTER MAINT.	Maint Warn	0	0	0	If Enabled	Oil filter change due
SEPARATOR CHANGE	Maint Warn	0	0	0	If Enabled	Separator change due
dP_1	High Warn	10	5	55	Over Min Psi	Separator maint P1-P2
dP_2	High Warn	20	5	2	When Running	Oil filter maint P4-P3
dP_3	Low Fault	1	5	55	Running Loaded	Low Oil psi P3-(P1/2.5)
dP_3	Low Fault	1	5	55	Running Unloaded	Low Oil psi P3-(P1/3.5)
dP1Max	High Fault	0	5	0	When Running	dP1Max = P1Max - P1
dP1Max	High Warn	3	5	0	When Running	dP1Max = P1Max - P1
P_1	High Inhibit	5	0	0	At Start	High sump psi at start
P_1	Low Fault	5	5	0	When Running	Immediate Fault
P_1	High Fault	500	0	0	Constantly	Sensor failure fault
P_2	High Fault	500	0	0	Constantly	Sensor failure fault
P_3	High Fault	500	0	0	Constantly	Sensor failure fault
P_4	High Fault	500	0	0	Constantly	Sensor failure fault
T_1	Low Fault	-40	0	0	Constantly	Sensor failure fault
T_1	High Warn	225	5	30	Constantly	Delayed for temp spikes
T_1	High Fault	235	5	30	Constantly	Delayed for temp spikes
T_1	High Warn	245	0	0	Constantly	Immediate Warning
T_1	High Fault	255	0	0	Constantly	Immediate Fault
T_1	High Fault	500	0	0	Constantly	Sensor failure fault
T_2	Low Fault	-40	0	0	Constantly	Sensor failure fault
T_2	High Warn	225	5	30	Constantly	Delayed for temp spikes
T_2	High Fault	235	5	30	Constantly	Delayed for temp spikes

(\*) In the 'Check' column above, alarms are checked:

**Constantly** - if machine running or stopped

**When Running** - if machine is running

**If Enabled** - if parameter is non-zero

**At Start** - will not allow start if alarm present

**Over Min Psi** - machine is loaded and above min load pressure

# Section 7 TROUBLESHOOTING-SUPERVISOR

Table 7-2 Parameters

Type	Enable	Default	Min	Max	Display Text	Comment
Setup	Always	1	0	2	Press Trans	250
Setup	X250	135	70	225	P1 Max	250psi transducer
Setup	Always	0	0	1	Water Switch	Water pressure switch enable for water cooled machines
Setup	Flooded	0	0	1	Oil Switch	Oil switch enable for flooded screw machines
Setup	Always	65	20	200	Min Load Psi	Minimum acceptable Loaded P1 value
Setup	Always	0	0	30	Stop Timer	If not 0, run unloaded for this time before stopping
Setup	Always	0	0	30	Lube Cycle	Prelube/Postlube timer
Setup	Always	0	0	2	K8 Option	Disable, Lube Pump, Master Control
Setup	Always	0	0	100000	Load Hours	Hours machine has been loaded
Setup	Always	0	0	100000	Run Hours	Hours machine has been running
Setup	Always	0	0	100000	Load Cycles	Number of load cycles
Setup	Always	0	0	100000	Starts	Number of starts
Setup	Always	0	0	10000	Capacity	Used by monitor to determine system load
Cal	Always	0	-7	7	P1	
Cal	Always	0	-7	7	P2	
Cal	Always	0	-20	10	dP1	
Cal	Always	0	-7	7	P3	
Cal	Always	0	-7	7	P4	
Cal	Always	0	0	1	Fault on Warn	Force shutdown on warning
User	X250	110	50	220	Unload	250psi transducer unload pressure
User	Always	10	3	70	Load Delta	Differential pressure from unload pressure
User	Always	15	0	59	Unload Time	Auto mode shut down after unloaded for this time
User	Always	0	0	30	Drain Interval	Time between drains (Minutes)
User	Always	0	0	10	Drain Time	Duration of drain (Seconds)
User	Always	0	0	59	Restart Time	Auto restart on power up if not 0 (Seconds)
User	Always	0	0	10	Wye Delta	Wye to delta starter transition time (Seconds)
User	Always	0	0	0	Language	French, German, Italian, Spanish, English
User	Always	0	0	1	Temp Units	Fahrenheit, Celsius
User	Always	0	0	2	Press Units	Pressure units, Psi, Bar, kPa
Seq	Com Mod	0	0	3	Sequence by	Disabled,Com, Hours, Remote, Slave, Time Of Day etc.
Seq	Always	0	0	100000	Seq Hrs	Used for Hours sequencing mode
Seq	Always	1	1	16	Com Number	Communications ID number
Seq	Always	1	1	16	Machines	Number of machines in a system
Seq	Always	70	60	185	Low Press	Panic start next machine in sequence
Seq	Always	10	2	59	Recover Time	Keeps multiple machines from starting at same time (seconds)
Seq	Always	0	0	250	Rotate	Used to force a machine to stop
Seq	Always	0	0	60	Minute	Real Time Clock Settings

# Section 7

## TROUBLESHOOTING-SUPERVISOR

### 7.3 MACHINE BEHAVIOR AFTER A POWER OUT-AGE

*Condition: Machine was in a running or ready condition when power was lost.* Table 7-3 below describes how a machine behaves after a power up under various conditions if the Restart timer is greater than 0. If the Restart timer is 0 the machine powers up in the Manual Stop state.

The Seq. Mode column pertains to the Sequencing mode parameter. It can be Disabled, set to Remote Start/Stop or to other sequencing modes (Seq). The Local/Remote column refers to the Local/Remote Button on the display panel. The Remote Start/Stop column pertains to the Remote Start/Stop input. The Run Mode column the machine run mode (Auto button on the display panel). Note that this table only applies if the Restart Timer has a value other than zero. If the Restart Timer is zero then the machine always powers up in Manual Stop.

### 7.4 REMOTE STOP/START INPUT

Table 7-4 below describes how a machine reacts to

the Remote Start/Stop input. See previous table for column descriptions.

### NOTE

the Sequencing Mode parameter must be set to Remote to enable Remote Start/Stop input.

### 7.5 BROWN OUT INPUT

Normally not wired by factory, this feature is used to enable the compressor to properly recover from very short-cycle power loss or voltage dips for those installations that are susceptible to this kind of power interruption. The controller alone is not as sensitive to these interruptions as is the switchgear, and must be told that the loss has occurred.

A normally closed starter contact wired to the Brownout input (D8) forces the controller into a standby state if the starter drops out. The controller will then re-engage the starter after normal start permissives are satisfied.

Table 7-3 Machine Power Outage Behavior

Seq. Mode	Local/Remote	Remote Start/Stop	Run Mode	Action (State)
Disabled	xxxx	xxxx	Cont	Manual Stop
Disabled	xxxx	xxxx	Auto	Start after Restart delay & P2 < Load psi, & P1 < 5 psig
Remote	Local	xxxx	Cont	Manual Stop
Remote	Local	xxxx	Auto	Start after Restart delay & P2 < Load psi, & P1 < 5 psig
Remote	Remote	Off	Cont	Remote Stop
Remote	Remote	Off	Auto	Remote Stop
Remote	Remote	On	Cont	Start after Restart delay
Remote	Remote	On	Auto	Start after Restart delay & P2 < Load psi, & P1 < 5 psig

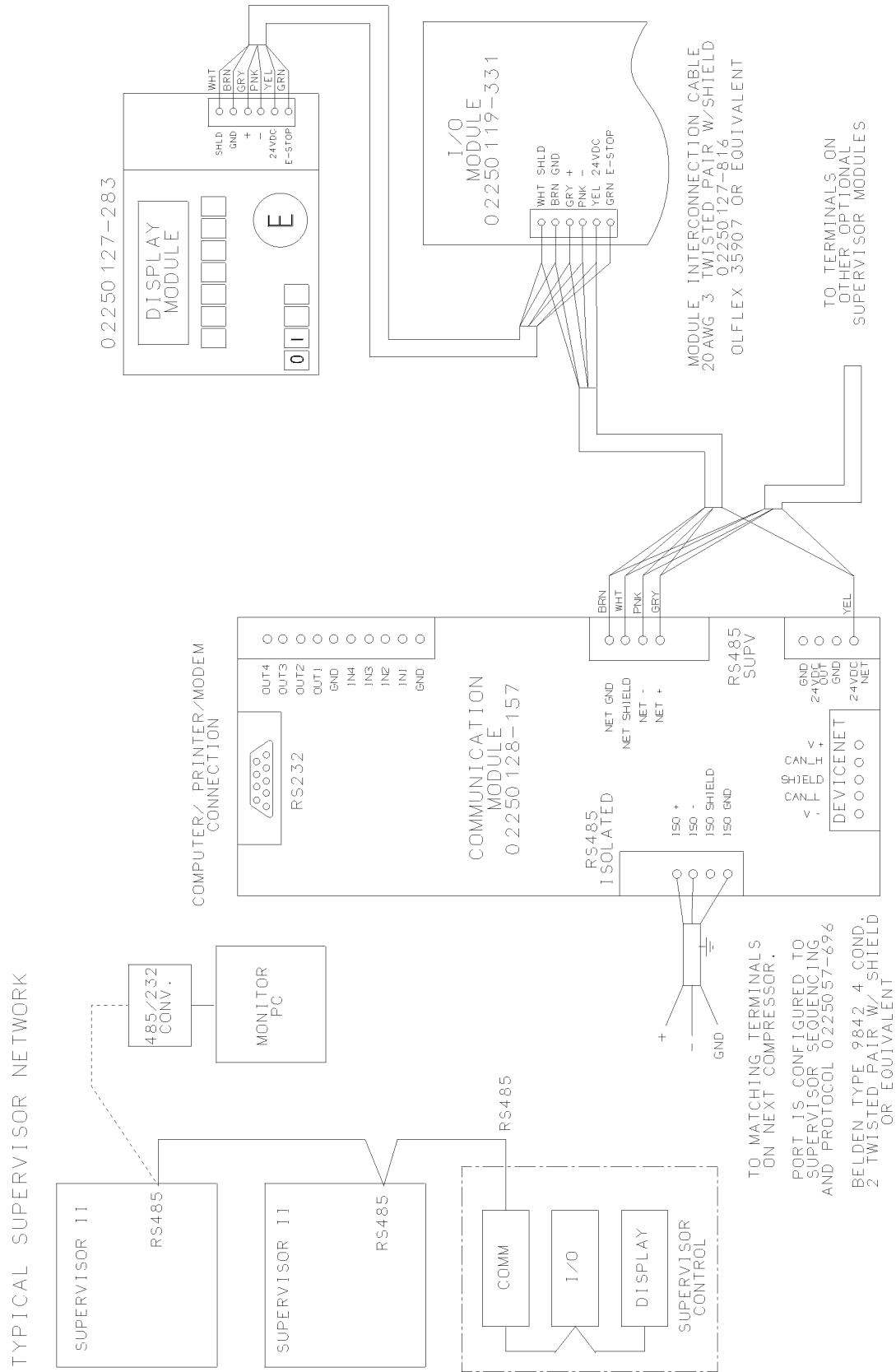
Note: 'xxxx' means 'has no effect'.

Table 7-4 Remote Start/Stop Input

Local/Remote	Remote Start/Stop	Run Mode	Action (State)
Local	xxxx	Cont	Normal Cont Operation
Local	xxxx	Auto	Normal Auto Operation
Remote	Off	Cont	Remote Stop
Remote	Off	Auto	Remote Stop
Remote	On	Cont	Start if stopped
Remote	On	Auto	Normal Auto Operation

# Section 7 TROUBLESHOOTING-SUPERVISOR

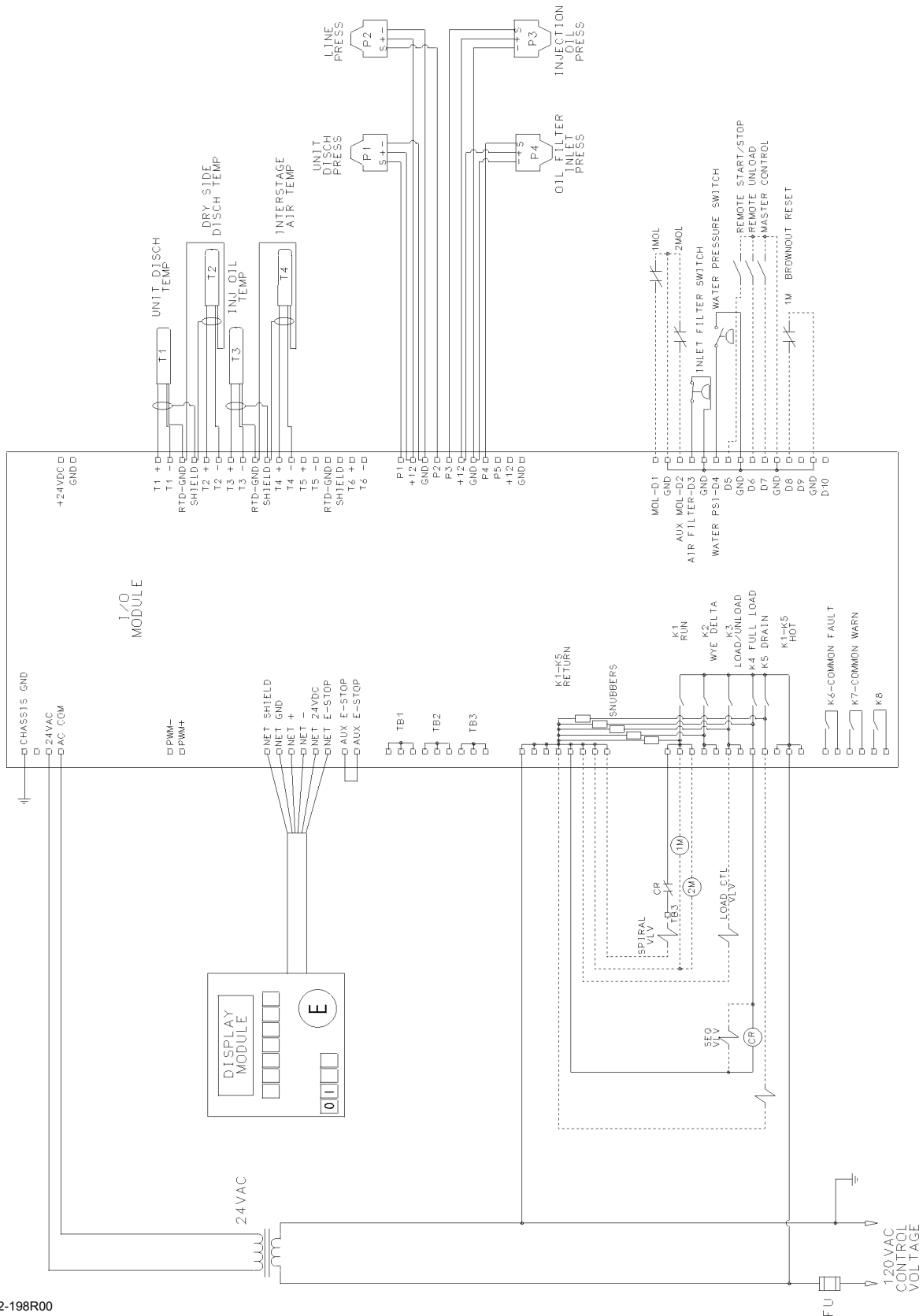
Figure 7-1 Wiring Diagram- Supervisor Communication Module



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# Section 7 TROUBLESHOOTING-SUPERVISOR

Figure 7-2 Wiring Diagram- Supervisor Control

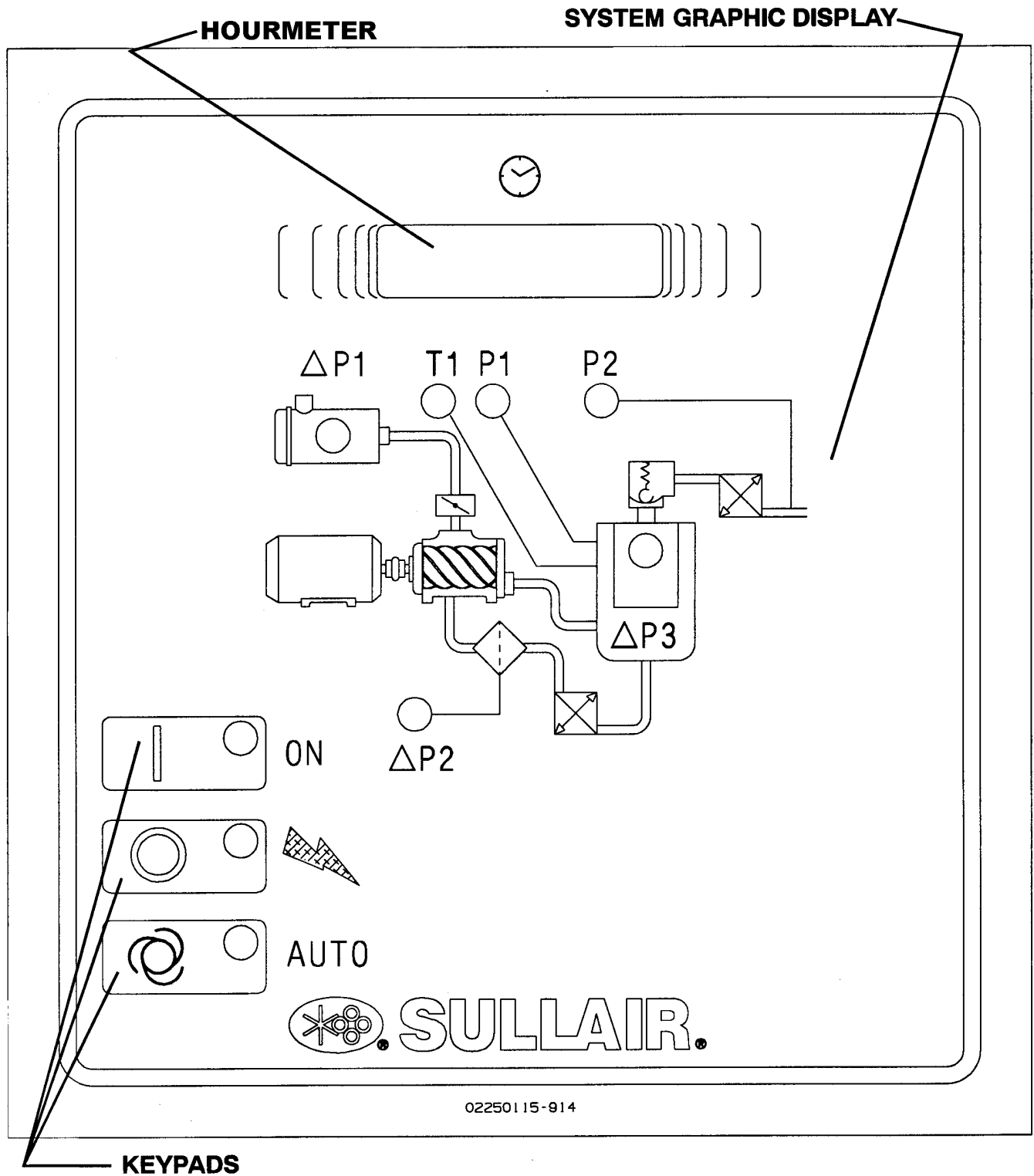


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# NOTES

# Section 8 OPERATION- ELECTRO-MECHANICAL

Figure 8-1 Instrument Panel- Electro-mechanical Controller



# Section 8



## OPERATION- ELECTRO-MECHANICAL

### 8.1 GENERAL INTRODUCTION- ELECTRO-MECHANICAL

While Sullair has built into this compressor a comprehensive array of controls and indicators to assure you that it is operating properly, you will want to recognize and interpret the reading which

will call for service or indicate the beginning of a malfunction. Before starting your Sullair compressor, read this section thoroughly and familiarize yourself with the controls and indicators - their purpose, location and use.

### 8.2 PURPOSE OF CONTROLS- ELECTRO-MECHANICAL

CONTROL OR INDICATOR	PURPOSE
EMERGENCY STOP SWITCH	Pushing in this switch, found adjacent to the controller, cuts all AC outputs from the latter and de-energizes the starter.
START "I" PAD	Depress to turn the compressor ON.
STOP "O" PAD	Depress to turn the compressor OFF and reset the common fault circuit.
AUTO "  " PAD	To select between continuous (HAND) operation and automatic stop/start (AUTO) operation. Shuts off compressor automatically after the compressor runs unloaded for a specified time (ranging from 3-60 minutes [T1]). Restarts compressor when the pressure switch closes to the load setting. Dual control is enabled by pressing the "AUTO" pad.
HOURMETER	Records cumulative hours of compressor operation; useful for planning and logging service schedules.
LINE PRESSURE GAUGE	Continually monitors service line air pressure. It is located on dry side of receiver downstream from check valve.
SUMP PRESSURE GAUGE	Continually monitors receiver/sump pressure at various load and/or unloaded conditions.
DISCHARGE TEMPERATURE GAUGE	Monitors temperature of the air leaving the compressor unit. For both air and water-cooled compressors, the normal reading should be approximately 180°F to 205°F (82°C to 96°C).
AIR FILTER RESTRICTION GAUGE	Indicates when the air filter element change is required. The gauge shows the red zone when drop through the filter is excessive. The compressor must be running full load for an accurate indication.
FLUID FILTER MAINTENANCE GAUGE	Indicates when a fluid filter element change is required. It shows red when the pressure drop through the filter is excessive.
SEPARATOR MAINTENANCE GAUGE	Indicates when separator element change is required. Shows red when the pressure drop through the filter is excessive. The compressor must be running full load for an accurate indication.
POWER ON (  ) LED	Indicates when the starter is receiving power.

## Section 8

# OPERATION- ELECTRO-MECHANICAL

### 8.2 PURPOSE OF CONTROLS- ELECTRO-MECHANICAL (CONTINUED)

CONTROL OR INDICATOR	PURPOSE
ON LED	Indicates when compressor is in operation:
-SOLID (CONTINUOUS) LIGHT	Indicates that machine is running.
-BLINKING LIGHT	Indicates that machine is in `standby' mode, and may start at any moment without any more user intervention.
AUTO LED	Indicates when compressor is in auto mode.
SEPARATOR RETURN LINE SIGHT GLASS	Used to indicate fluid flow in the return line. When the compressor is running at full load, fluid flow should be visible in this sight glass. There may be little or no flow when the compressor is running unloaded, but a sluggish flow at full load indicates a need to clean the return line strainer.
THERMAL VALVE	Regulates flow of fluid to and around the cooler. It is designed to maintain a minimum operating temperature of 180°F (82°C); use for fast warm-up on start-up.
MINIMUM PRESSURE/CHECK VALVE	Maintains minimum of 55 psig (3.8 bar) in the compressor sump. Valve piston restricts receiver air discharge from receiver/sump when pressure falls to 55 psig (3.8 bar). Also prevents backflow into the sump during unload conditions and after shutdown.
COMPRESSOR DISCHARGE TEMPERATURE SWITCH	Designed to shut the compressor down when the discharge temperature reaches 235°F (113°C).
WATER PRESSURE SWITCH (water-cooled compressors only)	It prevents operation when water pressure of compressor is inadequate.
PRESSURE RELIEF VALVE	Opens sump pressure to the atmosphere should pressure inside the sump become too high. Operation of this valve indicates that the high pressure switch is either faulty or out of adjustment.
MODULATING INLET VALVE	Regulates the amount of air allowed to enter the air compressor. This regulation is determined by the amount of air being used at the service line. Also acts as a check valve to prevent reverse compressor rotation at shut down.
SPIRAL VALVE (OPTIONAL)	Internally bypasses and controls the air flow capacity of the compressor, in order to match air supply to the demand. This device is optional.
PRESSURE REGULATOR	Allows a pressure signal to reach the air inlet valve or spiral valve to control air delivery according to demand.
SOLENOID VALVE	Bypasses the pressure regulator valve causing the inlet valve to close when the compressor reaches maximum operating

# Section 8

## OPERATION- ELECTRO-MECHANICAL

### 8.2 PURPOSE OF CONTROLS- ELECTRO-MECHANICAL (CONTINUED)

CONTROL OR INDICATOR	PURPOSE
	pressure. Also activates blow-down valve.
PRESSURE SWITCH	Senses service line pressure. When line pressure reaches maximum setting the pressure switch signals the pilot valves to unload the compressor.
BLOWDOWN VALVE	Vents sump pressure to the atmosphere during unload conditions and shutdown.

### 8.3 INITIAL START-UP PROCEDURE

The following procedure should be used to make the initial start-up of the compressor:

1. Read the preceding pages of this manual thoroughly.
2. Be sure that all preparations and checks described in the Installation Section have been made.
3. Crack open the shut off valve to the service line.
4. Start the compressor by pushing the START button.

#### NOTE

**Motor rotation check must have been checked.**

5. Check for possible leaks in piping.
6. Slowly close the shut-off valve and check that the setting on the pressure switch is set correctly. If set correctly, the compressor will unload at the desired unload pressure. If adjustments are necessary, see [Control System Adjustment](#) in

the Maintenance Section 10.8 of this manual.

7. Observe the operating temperature. If the operating temperature exceeds 205°F (96°C), the cooling system or installation environment should be checked.
8. Observe return line sight glass and maintenance indicators.
9. Open shut-off valve to service line.
10. Reinspect the compressor for temperature and leaks the following day.

### 8.4 SUBSEQUENT START-UP PROCEDURE

On subsequent start-ups, check that fluid level is visible in the fluid sight glass (refer to Section 4.5) and simply press the START button. When the compressor is running, observe the instrument panel and maintenance indicators.

### 8.5 SHUTDOWN PROCEDURE

To shut the compressor down, simply press the STOP pad.

# NOTES

## TROUBLESHOOTING- ELECTRO-MECHANICAL

**9.1 TROUBLESHOOTING- ELECTRO-MECHANICAL**

The information contained in the Troubleshooting chart has been compiled from field report data and factory experience. It contains symptoms and usual causes for the described problems. However, **DO NOT** assume that these are the only problems that may occur. All available data concerning a problem should be systematically analyzed before undertaking any repairs or component replacement procedures.

A detailed visual inspection is worth performing for almost all problems and may avoid unnecessary

additional damage to the compressor. Always remember to:

1. Check for loose wiring.
2. Check for damaged piping.
3. Check for parts damaged by heat or an electrical short circuit, usually apparent by discoloration or a burnt odor.

Should your problem persist after making the recommended check, consult your nearest Sullair representative or the Sullair Corporation factory.

**9.2 TROUBLESHOOTING GUIDE- ELECTRO-MECHANICAL**

<b>SYMPTOM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>
COMPRESSOR WILL NOT START	Main Disconnect Switch Open	Close switch.
	Line Fuse Blown	Replace fuse.
	Control Transformer Fuse Blown	Replace fuse.
	Motor Starter Overloads Tripped	Reset. Should trouble persist, check whether motor starter contacts are functioning properly.
	Low Incoming Line Voltage	Check voltage. Should voltage check low, consult power company.
COMPRESSOR SHUTS DOWN WITH AIR DEMAND PRESENT	Loss of Control Voltage	Reset. If trouble persists, check that line pressure does not exceed maximum operating pressure of the compressor (specified on nameplate).
	Low Incoming Voltage	Consult power company.
	Excessive Operating Pressure	Defect in line pressure switch; check pressure at which contact points open.  Separator requires maintenance; check maintenance indicator under full load conditions.  High pressure shutdown switch is defective; replace.  Defective valve; regulator valve should cause inlet valve to close when operating pressure is met. Repair if defective.  Defective blowdown valve; blowdown valve should exhaust sump pressure to 15 to 20 psig (1.0 to 1.4 bar) when maximum operating pressure is reached. Repair if defective.

# Section 9

## TROUBLESHOOTING- ELECTRO-MECHANICAL

### 9.2 TROUBLESHOOTING GUIDE- ELECTRO-MECHANICAL (CONTINUED)

SYMPTOM	PROBABLE CAUSE	REMEDY
COMPRESSOR SHUTS DOWN WITH AIR DEMAND PRESENT (CONT.)	Discharge Temperature Switch Open	Cooling water temperature too high; increase water flow (water-cooled only).
		Cooling water flow insufficient; check water lines and valves (water-cooled only).
		Cooler plugged; clean tubes. If plugging persists, install water conditioner (water-cooled only).
		Cooling air flow restricted; clean cooler and check for proper ventilation.
		Ambient temperature is too high; provide sufficient ventilation.
		Low fluid level; add fluid.
		Clogged filter; change the fluid filter element and change the bearing filter element if maintenance indicator shows red.
COMPRESSOR WILL NOT BUILD FULL DISCHARGE PRESSURE	Air Demand is Too Great	Check service lines for leaks or open valves up.
	Dirty Air Filter	Check the filter indicator and inspect and/or change element if required.
	Pressure Regulator Out of Adjustment	Adjust regulator according to control adjustment instructions in the Maintenance section.
	Defective Pressure Regulator	Check diaphragm and replace if necessary (kit available).
LINE PRESSURE RISES ABOVE CUT-OUT PRESSURE SETTING ON PRESSURE SWITCH	Leak in Control System Causing Loss of Pressure Signals	Check for leaks.
	Defective Pressure Switch	Check that diaphragm and contacts are not damaged. Replace if necessary. Check that air bleeds from control orifice when the pressure switch contacts open.
	Defective Regulator Valve	Readjust; Repair or replace it if necessary (kit available).

# Section 9

## TROUBLESHOOTING- ELECTRO-MECHANICAL

### 9.2 TROUBLESHOOTING GUIDE- ELECTRO-MECHANICAL (CONTINUED)

SYMPTOM	PROBABLE CAUSE	REMEDY
LINE PRESSURE RISES ABOVE CUT-OUT PRESSURE SETTING ON PRESSURE SWITCH (CONT.)	Plugged Control Line Strainer	Clean strainer (screen and o-ring replacement kit available).
	Defective Blowdown Valve	Check that sump pressure is exhausted to the atmosphere when the pressure switch contacts open. Repair or replace if necessary (kit available).
EXCESSIVE COMPRESSOR FLUID CONSUMPTION	Clogged Return Line or Orifice	Clean strainer (screen and o-ring replacement kit available). Clean orifice.
	Separator Element Damaged or Not Functioning Properly	Change separator <b>(I)</b> .
	Leak in the Lubrication System Excess Fluid Foaming	Check all pipes, connections and components <b>(I)</b> .
	Excess Fluid Foaming	Drain and change <b>(I)</b> .
PRESSURE RELIEF VALVE OPEN REPEATEDLY	Fluid Level Too High	Drain and change <b>(I)</b> .
	Defective Pressure Relief Valve	Replace.
LIQUID WATER IN COMPRESSED AIR LINES	Plugged Separator	Check separator differential.
	Water Vapor Condensation from Cooling and Compression Occurs Naturally	Remove the water vapor from compressed air prior to distribution through the air system. Check operation of aftercooler and moisture separator. Install a compressed air dryer sized for the flow and dryness a level required. (Note: Filters may also be required to remove particulates, liquid oil aerosols or for oil vapor removal. Change cartridges as recommended by the filter manufacturer). Check all drain traps routinely to insure their proper operation. Maintain them regularly.



### WARNING

**(I) Mixing of other lubricants within the compressor unit will void all warranties!**

# NOTES

## 10.1 GENERAL

As you proceed in reading this section, it will be easy to see that the Maintenance Program for the air compressor is quite minimal. The use of the service indicators provided for the fluid filter, air filter and fluid separator, will alert you when service maintenance is required. See instructions for each item in Section 10.8, Parts Replacement and Adjustment procedures.

## 10.2 DAILY OPERATION

Prior to starting the compressor, it is necessary to check the fluid level in the sump. Should the level be low, simply add the necessary amount. If the addition of fluid becomes too frequent, a simple problem has developed which is causing this excessive loss. See the Troubleshooting Section under Excessive Fluid Consumption for a probable cause and remedy.

After a routine start has been made, observe the instrument panel gauges to be sure they monitor the correct readings for their particular phase of operation. After the compressor has warmed up, it is recommended that a general check on the overall compressor and instrument panel be made to assure that the compressor is running properly.

### **WARNING**

**DO NOT** remove caps, plugs, and/or other components when compressor is running or pressurized.

Stop compressor and relieve all internal pressure before doing so.

## 10.3 MAINTENANCE AFTER INITIAL 50 HOURS OF OPERATION

After the initial 50 hours of operation, a few maintenance requirements are needed to clean the system of any foreign materials. Perform the following maintenance operations to prevent unnecessary problems.

1. Clean the return line strainer.
2. Clean the return line orifice.

## 10.4 MAINTENANCE AFTER FIRST 1000 HOURS

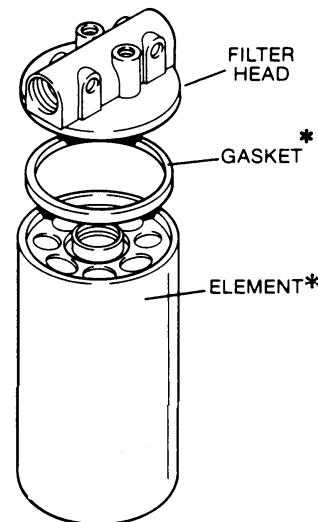
After 1000 hours of operation, it will be necessary to perform the following:

1. Clean the return line strainer.
2. Replace the fluid filter element and gasket.

## 10.5 FLUID MAINTENANCE

Drain the sump and change the compressor fluid per recommendations in Sections 3.2, 3.3, and 3.4.

Figure 10-1 Fluid Filter (P/N 02250054-605)



\*Repair Kit P/N 250025-526

## 10.6 FILTER MAINTENANCE

Replace your fluid filter element and the gasket under any of the following conditions, whichever occurs first:

1. As indicated by the maintenance indicator.
2. Every third change.

## 10.7 SEPARATOR MAINTENANCE

Replace the separator elements when indicated by the maintenance display/gauge or after one (1) year, whichever comes first. The separator elements must be replaced. **DO NOT** clean the separator elements.

## 10.8 PARTS REPLACEMENT AND ADJUSTMENT PROCEDURES

Refer to Figure 10-1.

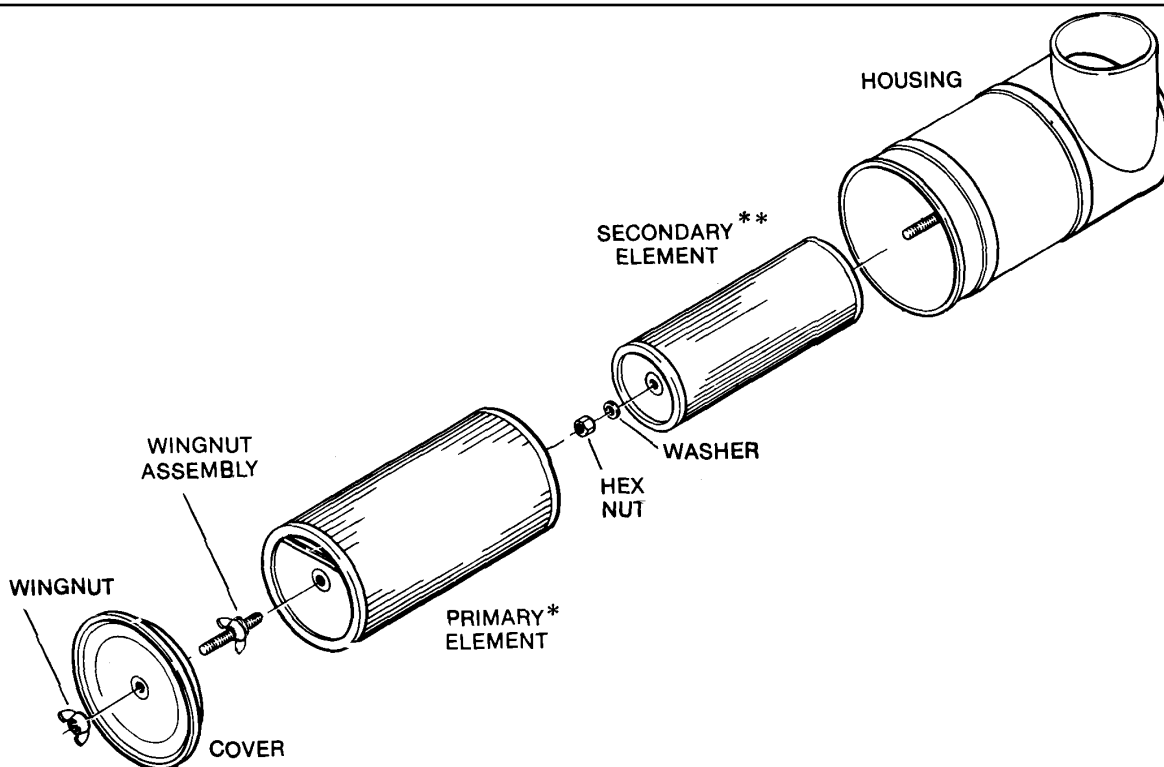
1. Using a strap wrench, remove the old element and gasket.
2. Clean gasket seating surface.
3. Apply a light film of fluid to the new gasket.
4. Hand tighten new element until new gasket is seated in the gasket groove. Avoid any nicks, cuts or pinches to the gasket.
5. Continue tightening element by hand an additional 1/2 to 3/4 turn.
6. Restart compressor and check for leaks.

### **CAUTION**

To minimize the possibility of filter element rupture, it is important that **ONLY** replacement elements identified with the Sullair name, logo and appropriate part number be used and that substi-

# Section 10 MAINTENANCE

Figure 10-2 Air Filter Replacement LS20 (100HP/ 75KW) (P/N 02250059-096)



\*Primary Replacement Element P/N 02250046-012

\*\*Secondary Replacement Element P/N 02250046-013

tuted elements not be used, due to the fact that such filters may have inadequate or questionable working pressure ratings.

## AIR FILTER MAINTENANCE

Refer to Figure 10-2. Air filter maintenance should be performed when indicated by the maintenance display/gauge when running full load, or once a year, whichever comes first. If the filter needs to be replaced, order replacement elements. Following you will find procedures on how to replace the air filter elements.

## AIR FILTER ELEMENT REPLACEMENT

1. Clean exterior of air filter housing.
2. Unscrew the wing nut securing the cover.
3. Carefully remove the element from the housing.
4. Unscrew the wingnut assembly securing the primary element in place.
5. Remove primary element.
6. Loosen the hex nut, and remove the hex nut and washer securing the secondary element in place.
7. Carefully replace the secondary filter, making sure it rests correctly in position.

8. Replace the hex nut and washer; tighten.
9. Replace the primary element, making sure that it rests correctly in position.
10. Replace the wingnut assembly and tighten to secure primary element in place.
11. Replace the cover.
12. Secure the cover by tightening the wingnut.

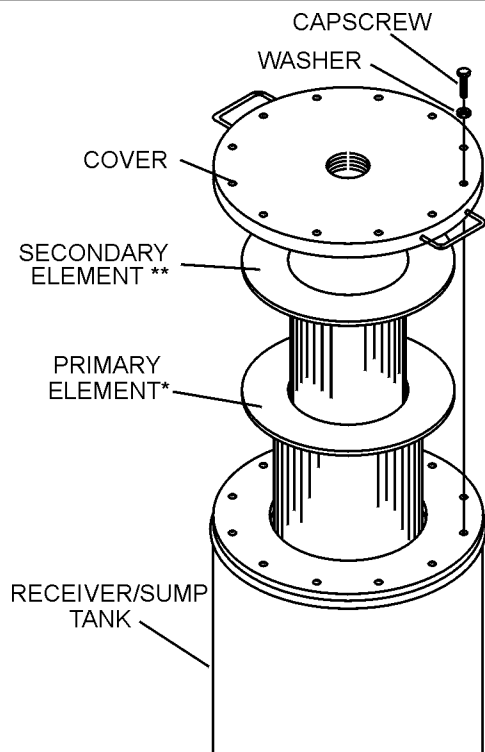
## ELEMENT INSPECTION

1. Place a bright light inside the element to inspect for damage or leak holes. Concentrated light will shine through the element and disclose any holes.
2. Inspect all gaskets and gasket contact surfaces of the housing. Should faulty gaskets be evident, correct the condition immediately.
3. If the clean element is to be stored for later use, it must be stored in a clean container.
4. After the element has been installed, inspect and tighten all air inlet connections prior to resuming operation.

## SEPARATOR ELEMENT REPLACEMENT

Refer to Figure 10-3. Follow the procedure explained below for separator element replace-

Figure 10-3 Separator Element Replacement



\*Replacement Kit for Primary Element P/N 02250100-755

\*\*Replacement Kit for Secondary Element P/N 02250100-756

ment.

## NOTE

Relieve all pressure from the sump tank and all compressor lines.

1. Disconnect all piping connected to the sump cover to allow removal (return lines, service lines, etc.).
2. Loosen and remove the eight (8) hex head cap screws (5/8 x 2") from the cover plate.
3. Lift the cover plate from the sump.
4. Remove the separator elements.
5. Inspect the receiver/sump tank for rust, dirt, etc.
6. Scrape the old gasket material from the cover and flange on the sump. Be careful not to let the scraps fall in the sump.
7. Reinsert the separator elements into the sump taking care not to dent them against the tank opening.
8. Clean the underside of the receiver/sump tank cover and remove any rust.
9. Replace the cover plate, washers and cap-

screws. Torque to 55 ft-lbs. (75 Nm).

10. Reconnect all piping making sure return line tubes extend to the bottom or 1/4" (6mm) above the bottom of the separator element. This will insure proper fluid return flow to the compressor.
12. Clean the return line strainers before restarting the compressor.

### CONTROL SYSTEM ADJUSTMENT

Refer to Figure 10-4. Prior to adjusting the Control System, it is necessary to determine the desired operating pressure range and also the maximum pressure at which your compressor is to operate. The pressure must not exceed the maximum operating pressure which is stamped on the compressor serial number nameplate. The following explanation applies to a typical installation with a desired operating range of 100 to 110 psig (6.9 to 7.6 bar). This information will apply to a compressor with any other operating range excepting the stated pressures.

Remove the cover of the pressure switch. With the shut-off valve closed (or slightly cracked open) start the compressor. Observe the line pressure gauge and pressure switch contacts. When the line pressure reaches 110 psig (7.6 bar), the pressure switch contacts should open. If the pressure switch contacts do not open or they open prior to the desired pressure, the pressure switch setting will require adjustment (refer to Figure 10-4).

### FOR PRESSURE RANGE ADJUSTMENT:

1. Remove cover to pressure switch.
2. Turn the range adjusting screw to the high pressure screw counterclockwise lowers both the high and low pressure equally.

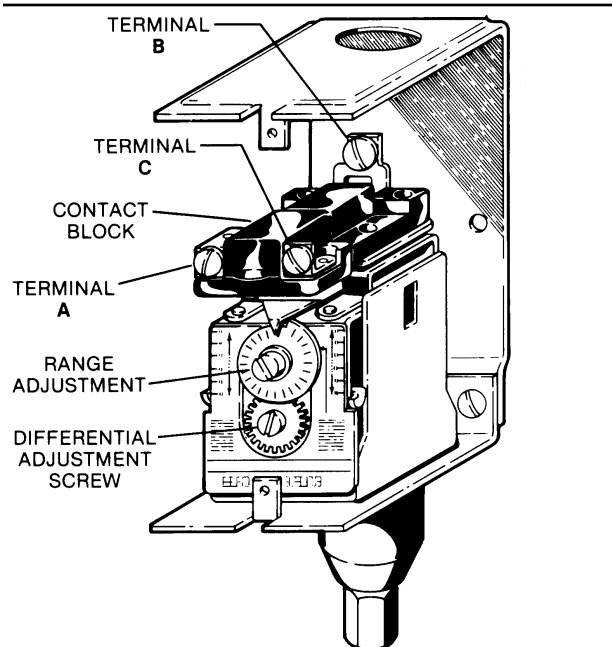
### FOR DIFFERENTIAL ADJUSTMENT:

Differential is the difference between the high and low pressure settings. 10 psig (0.7 bar) is typical.

1. Turn the differential adjusting screw to the lower (reset) setting. Turning the screw counterclockwise widens the differential by lowering the reset (lower) setting only.
2. When the pressure switch adjustment is complete, the pressure regulator should be adjusted for the pressure at which modulation of air delivery should begin. In this case that pressure will be 102 psig (7.0 bar). The regulator is adjusted by loosening the jam nut on the end of the cone shaped cover of the pressure regulator. When the jam nut is loose, turn the adjusting screw clockwise to increase or counterclockwise to

## Section 10 MAINTENANCE

Figure 10-4 Pressure Switch (P/N 040694)



decrease the setting.

3. To set the regulator, continue closing the service valve until the line pressure is 102 psig (7.0 bar). At this point regulator should pass a signal to the inlet valve to start closing it. If the line pressure keeps on rising or if the modulation does not begin, adjust the regulator as described above. After adjustment, line pressure should be approximately 102 psig (7.0 bar) and 1.00 in. Hg (2.54 cm Hg.) vacuum below the inlet.
4. Next, close the service valve; line pressure will start rising. When line pressure reaches 110 psig (7.6 bar), the inlet valve will be closed to its maximum position. The inlet vacuum at this point will be around 25 in. Hg (63.5 cm Hg.). The machine should unload at this point.
5. Open the service valve so the line pressure is 100 psig (6.9 bar). Machine is now set for operation. Recheck the unload pressure by closing of the service valve. Machine should unload via the pressure switch at 110 psig (7.6 bar).

After the control pressures have been adjusted, the “unloaded” sump pressure should be checked. It will be necessary to shut the compressor down, remove the pressure switch cover, and disconnect one of the two lead wires that are connected to the micro-switch (contact block). In order to have a correct reading, the air system to which the compressor is connected must be pressurized to at least 80 psig (5.5 bar). After disconnecting the lead, tape the

exposed wire with electrician’s tape to make sure that it does not come in contact with any metallic surface.

### **⚠ DANGER**

**DO NOT touch the electrical contacts, terminal or leads with any metallic object. Severe electrical shock may occur.**

With the lead taped, you may start the compressor again. Allow the sump pressure to stabilize.

The sump pressure should read 15 to 20 psig (1.0 to 1.4 bar).

Once this is checked, shut the compressor down once again and reconnect the taped lead and replace the pressure switch cover. At this time, start the compressor and cycle the Control System several times and re-check all pressure settings and adjustments.

### **⚠ DANGER**

**DO NOT touch the pressure switch, electrical con with any part of the body or any un-insulated metallic object. Severe electrical shock may occur.**

#### **PRESSURE REGULATOR ADJUSTMENT**

Start the compressor and adjust the service valve to maintain service air pressure approximately at five (5) psi over rated pressure. Turn the inlet valve regulator adjusting screw until air just begins to escape from the control air orifice (located at the bottom of the regulator.). Lock the adjusting screw in place with the locknut. The regulator is now properly set.

#### **COMPRESSORS WITH OPTIONAL SPIRAL VALVE**

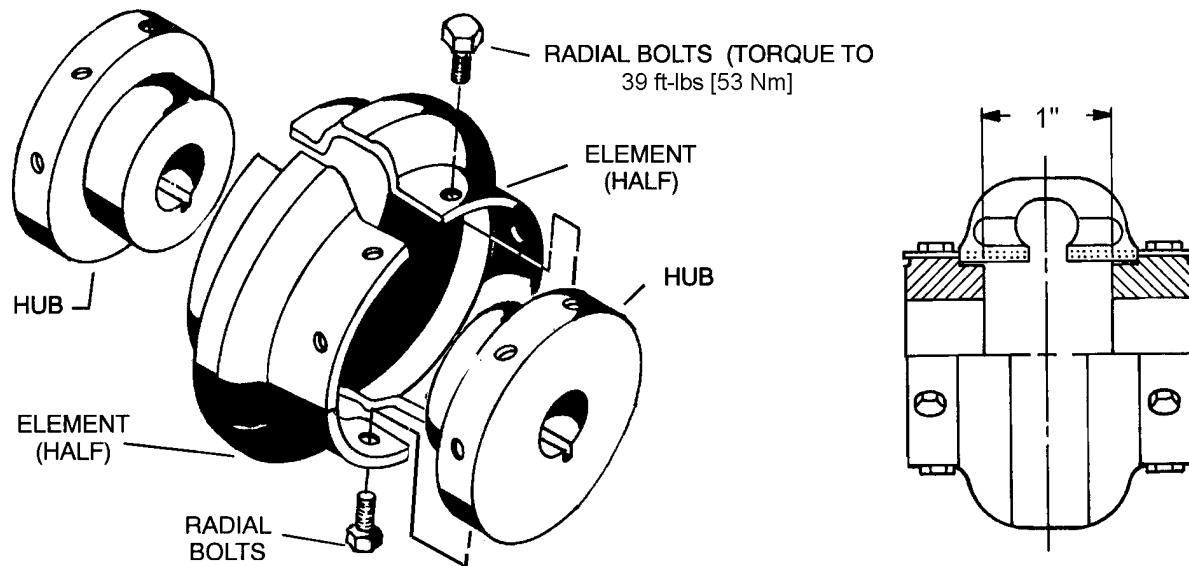
Start the compressor and adjust the service valve to maintain service air pressure approximately at five (5) psi over rated pressure. Turn the inlet valve regulator adjusting screw until air just begins to escape from the control air orifice (located at the bottom of the regulator.). Lock the adjusting screw in place with the locknut.

Readjust the service valve to maintain service air pressure approximately one (1) psi over rated pressure. Turn the spiral valve regulator adjusting screw until air just begins to escape from the control air orifice (located at the bottom of the regulator.). Lock the adjusting screw in place with the locknut. The regulators are now properly set.

#### **SHAFT COUPLING MAINTENANCE**

Refer to Figure 10-5. The compressor unit and motor are rigidly connected via a rigid adapter piece, thus the shafts are maintained in proper

Figure 10-5 Drive Coupling



alignment at assembly. The only component requiring regular inspection or servicing is the coupling flexible element, which may be accessed as follows:

## **⚠ DANGER**

Disconnect all power at source before attempting maintenance or adjustments. Follow lockout procedures (See Safety Section).

### INSPECTION/REMOVAL OF FLEXIBLE ELEMENT

1. Loosen fasteners securing wireform guard to the distance piece and remove to allow access to the coupling assembly.
2. Loosen and remove all capscrews securing each flexible element half to the shaft hubs.
3. Inspect each element body for signs of tears or

separation away from the metal flanges - if any faults are found, elements must be replaced and Sullair contacted for further assistance.

4. Reassemble in reverse order. Capscrews must be re-torqued to 39 ft.-lbs. (53 Nm) (dry). Please note that capscrews have self-locking patches good for two re-uses, but the application of a thread-locking adhesive increases this number.

## **NOTE**

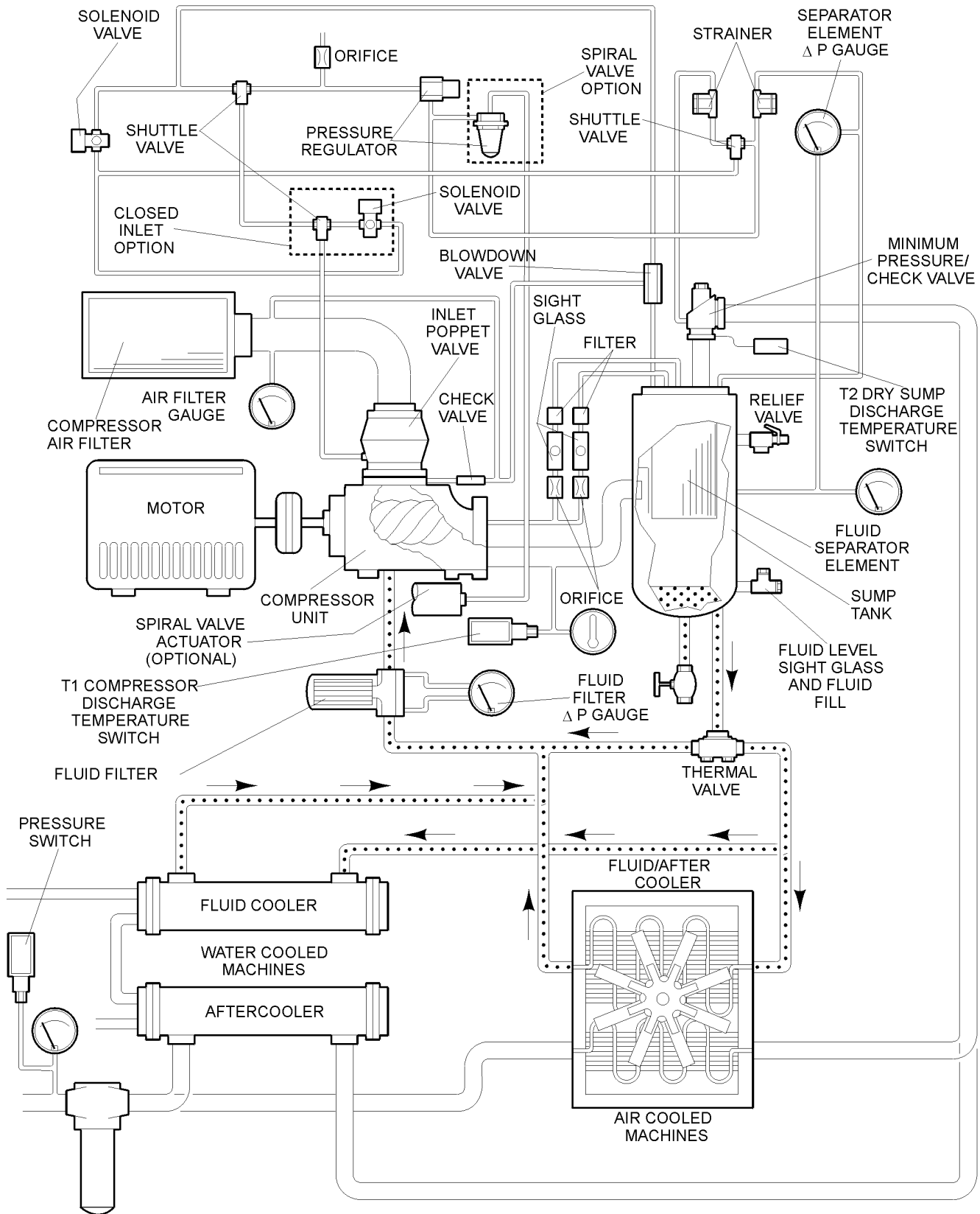
**DO NOT** lubricate capscrew threads.

Please note that replacement of either shaft hub requires the removal of the motor, an operation best handled by Sullair personnel.



# Section 10 MAINTENANCE

Figure 10-7 Piping and Instrumentation Diagram- Electro-Mechanical



# NOTES

# Section 11

## VARIABLE SPEED DRIVE APPLICATIONS

### 11.1 DESCRIPTION OF COMPONENTS

Refer to Figures 11-1A, 11-1B and 11-2. The components and assemblies of the air compressor are clearly shown. The complete package includes **compressor, electric motor, control center, variable speed drive controller, compressor inlet system, compressor discharge system, compressor lubrication and cooling system, capacity control system, instrument panel, aftercooler, and combination separator and trap**, all mounted on a heavy gauge steel frame.

On air-cooled models, a fan draws air over the motor and forces it out through the combined aftercooler and fluid cooler thereby removing the compression heat from the compressed air and the cooling fluid.

On water-cooled models, a shell and tube heat exchanger is mounted on the compressor frame. Fluid is piped into the heat exchanger where com-

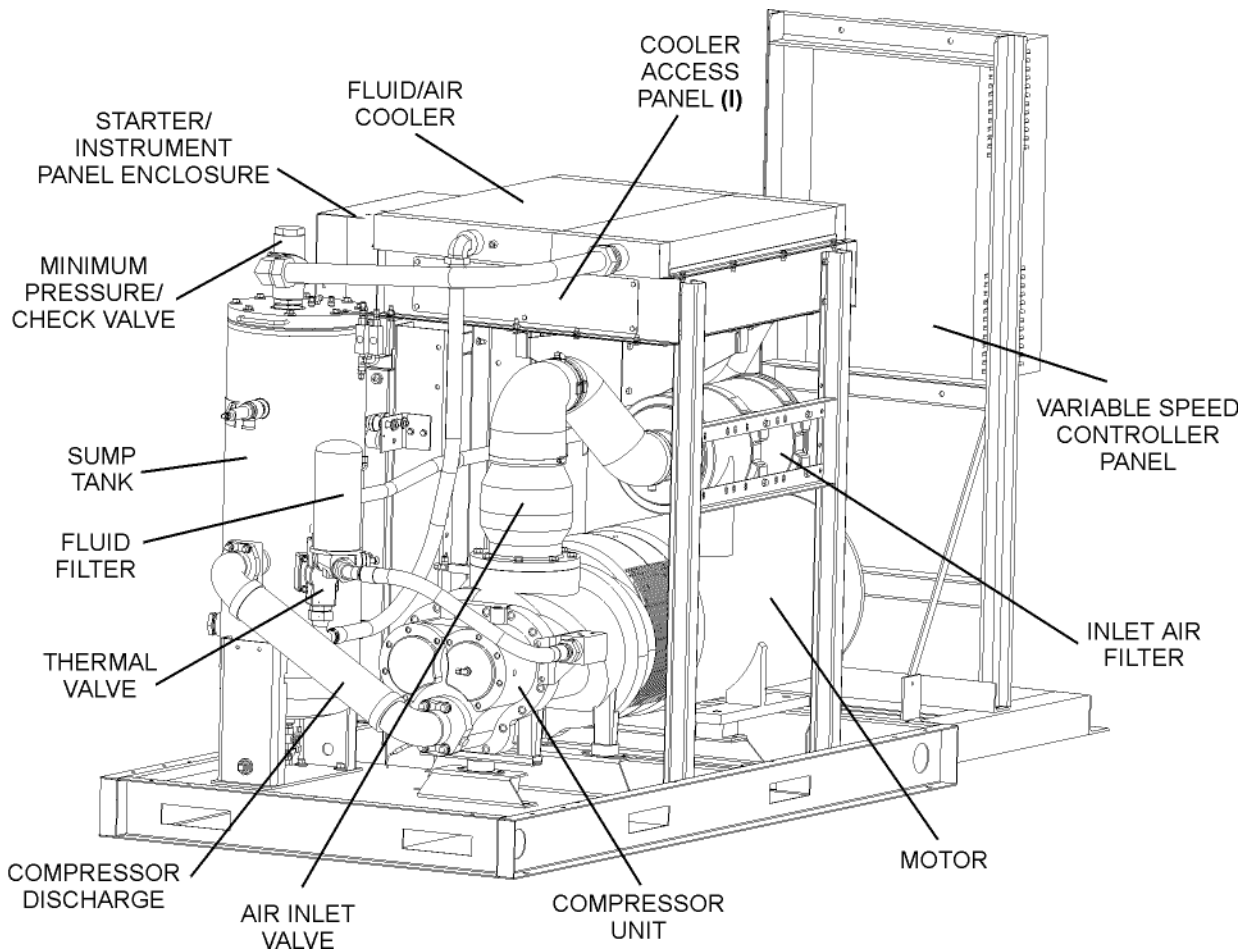
pression heat is removed from the fluid. Another similar heat exchanger cools the compressed air.

Both air-cooled and water-cooled versions have easily accessible items such as the fluid filters and control valves. The inlet air filter is also easily accessible for servicing.

### 11.2 CONTROL SYSTEM, FUNCTIONAL DESCRIPTION SUPERVISOR CONTROLLER

Refer to Figure 11-2. The purpose of the compressor control system is to regulate the amount of the air being compressed to match the amount of compressed air being used. The capacity control system consist of variable speed drive, solenoid valve, regulating valve, and the inlet valve. The functional description of the control system is described below in five distinct phases of operation. The following description text applies to LS20 series variable speed drive compressors with Supervisor Controller. For explanatory purposes, this descrip-

Figure 11-1A Sullair Rotary Screw Air Compressor- 100HP Air-cooled with Variable Speed  
(typical component layout)

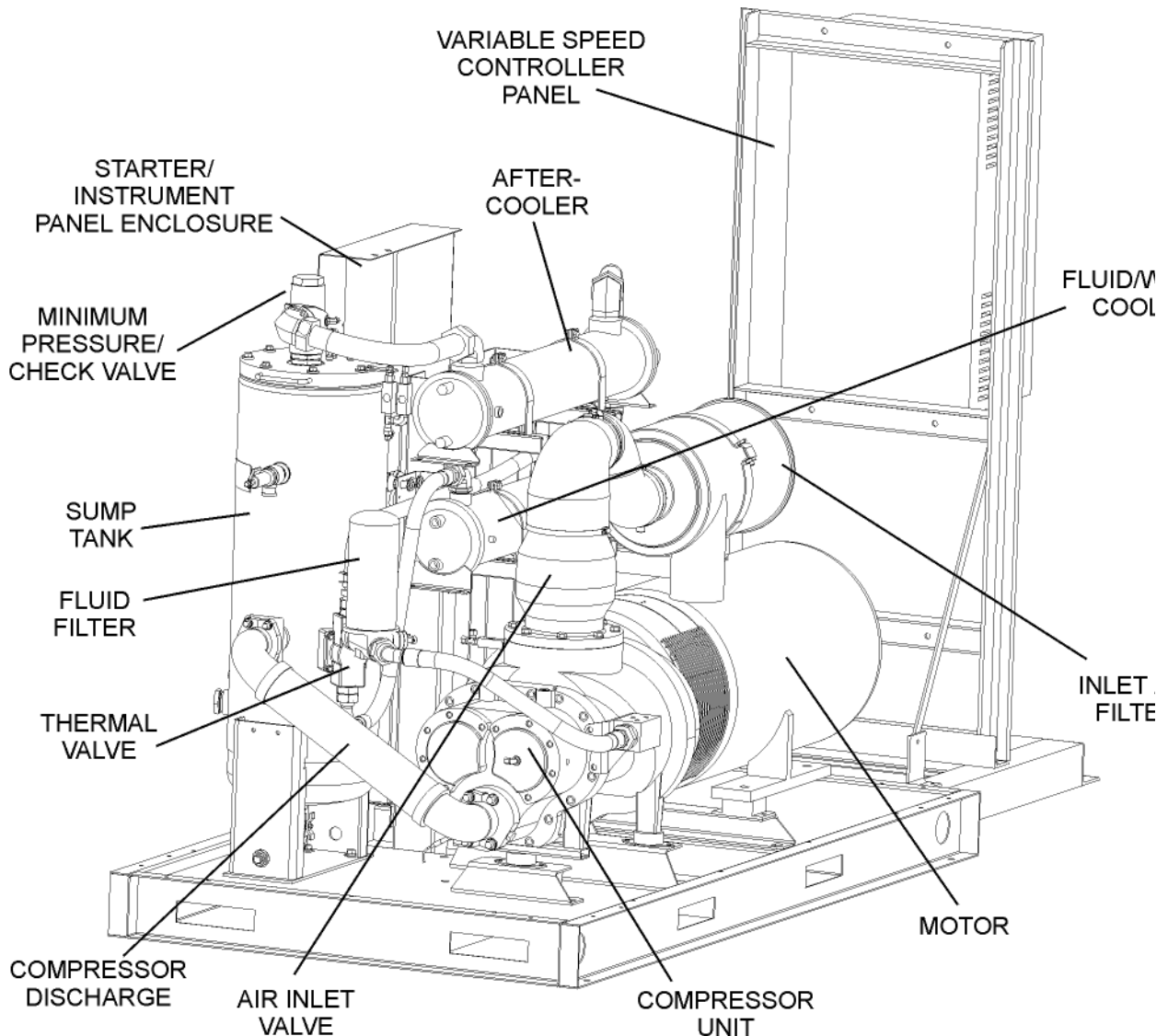


(I) **DO NOT** Operate compressor without cooler access panels in place (see Figure 2-1B in Section 2, Description).

# Section 11

## VARIABLE SPEED DRIVE APPLICATIONS

Figure 11-1B Sullair Rotary Screw Air Compressor- 100HP Water-cooled with Variable Speed  
(typical component layout)



tion will apply to a compressor with an operating range of 100 psig (6.9 bar). A compressor with any other pressure range would operate in the same manner except stated pressures. Supervisor controller and VSD settings for 100 psig model can be found in [Table 11-1 Package Selection Chart](#).

### START MODE- 0 – 50 PSIG (0 TO 3.5 BAR)

When the compressor “I” (START) pad is depressed, the VSD ramps the motor to full speed and the sump pressure will quickly rise from 0 to 50 psig ( 0-3.4 bar). During this period, both the regulator and solenoid valves are closed, the inlet valve is fully open and the compressor delivers full rated capacity. The rising compressor air pressure is isolated from the service line in this phase by the min-

imum pressure valve set at approximately 50 psig (3.4 bar).

### FULL LOAD MODE- 50 TO 100 PSIG (3.4 TO 6.9 BAR)

When the compressed air pressure rises over 50 psig (3.4 bar) the minimum pressure valve opens allowing compressed air to flow into the service line. From this point on the line pressure is continually monitored by the supervisor controller and the variable speed drive. The pressure regulator and solenoid valve remain closed with the inlet valve fully open running at 100 psig (6.9 bar) or below.

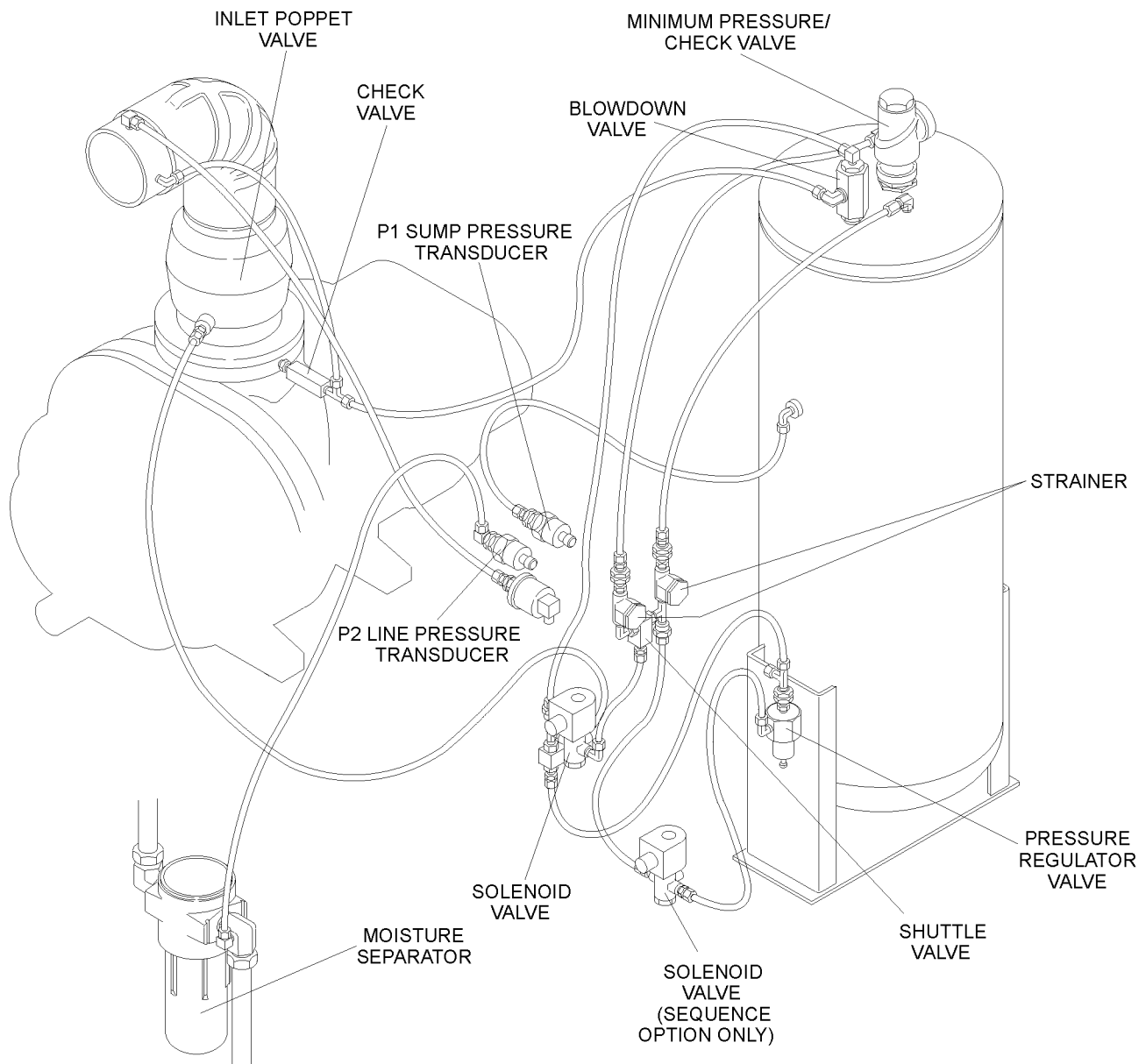
### VARIABLE SPEED DRIVE PART LOAD CONTROL

If less than rated capacity of compressed air is

# Section 11

## VARIABLE SPEED DRIVE APPLICATIONS

Figure 11-2 Variable Speed Drive Control System with Supervisor Controller



being used, the service line pressure will rise above 100 psig (6.9 bar). Once 101.5 psig (7.0 bar) is reached, the Variable Speed Drive will begin to decelerate the motor, thereby reducing the output capacity to match demand. The drive will continuously adjust the motor speed (accelerate or decelerate) to maintain a line pressure of 101.5 psig (7.0 bar). In this mode the VSD will operate within the frequency range specified.

### **MODULATING MODE- 101.5 (7.0 BAR) PSIG TO 106 PSIG (7.3 BAR)**

During low demand periods and with the Variable

Speed Drive at minimum speed, the line pressure can rise above 101.5 psig (7.0 bar). In this case the pressure regulator valve gradually opens, directing air pressure to the inlet control valve piston, this causes the inlet valve to partially close further reducing the air entering the compressor until it matches the amount of air being used. The control system functions continually in this manner between the limits of > 101.5 psig (7.0 bar) to 106 psig (7.3 bar) in response to varying flow demands.

The pressure regulator has an orifice which vents a small amount of air to the atmosphere when the

# Section 11

## VARIABLE SPEED DRIVE APPLICATIONS

Table 11-1 Package Selection Chart- Factory Settings

Series	Model	Pressure	Factory Settings							Maximum Motor Speed
			Supervisor	Settings	Frequency	VSD Settings				
			Full Load PSIG (I)	Unload PSIG	Command PSIG	Maximum Hz (II)	Frequency Value (III)	Minimum Hz (II)	Frequency Value (III)	
HP	PSIG									
LS20V	100	100	100	106	101.5	83.0	691	25	209	2450
		125	125	131	126.5	77.1	637	25	209	2288
		150	150	156	151.5	67.3	561	25	209	1997
W/SPVL		100	100	106	101.5	63.3	527	25	209	1878
W/SPVL		125	125	131	126.5	62.3	519	25	209	1847

(I) Set regulator valve 1.5 psig above full load pressure (applies to non-spiral valve compressors only).

(II) Max/Min Hz used for lap top entry.

(III) MAX/MIN Frequency value is used for key pad entry.

pressure regulator controls the inlet control valve. The orifice also bleeds any accumulated moisture from the pressure regulator.

### MODULATING MODE WITH OPTIONAL SPIRAL VALVE- IN EXCESS 101.5 PSIG (7.0 BAR) TO 106 PSIG (7.3 BAR)

During low periods and with the Variable Speed Drive at minimum speed, the line pressure can rise above 101.5 psig (7.0 bar). In this case the I/P controller releases air pressure to the spiral valve actuator. Air pressure at the actuator expands the diaphragm. The rack, in turn, engages with the pinion mounted on the spiral valve shaft assembly. This results in a rotary motion. As the spiral valve rotates, it starts opening the bypass ports gradually. Excess air is then being returned back internally to the suction end of the compressor unit. Now the compressor is fully compressing only that amount of air which is being used. As air demand keeps dropping further, the spiral valve keeps opening more and more until all bypass ports are fully open. At this point, if the discharge pressure continues to rise, the compressor will unload at 106 psig (7.3 bar).

### UNLOAD MODE- IN EXCESS OF 106 PSIG (7.3 BAR)

When a relatively small amount or no air is being

used, the service line pressure continues to rise. When it exceeds 106 psig (7.3 bar), the Supervisor control system de-energizes the solenoid valve allowing sump air pressure to be supplied directly to close the inlet valve. Simultaneously, the solenoid valve sends a pneumatic signal to the blow down valve. The blowdown valve opens to the atmosphere, reducing the sump pressure to approximately 18 psig (1.2 bar). The check valve in the air service line prevents line pressure from returning to the sump. The compressor will shut down after the unload time setting expires if programmed.

When the line pressure drops to the low setting pressure of 100 psig (6.9 bar) The Supervisor Controller starts the motor and ramps it up to the minimum speed set by the VSD and energizes the solenoid valve which closes the blow down valve. The re-energized solenoid valve prevents line pressure from reaching the inlet control valve, thereby allowing the valve to fully open.

### AUTOMATIC OPERATION

For VSD applications, the Supervisor Controller should be set in the "Automatic" mode. This mode allows the compressor to shutdown when no compressed air requirement is present and restarts when compressed air is needed.

# Section 11

## VARIABLE SPEED DRIVE APPLICATIONS

### 11.3 SPECIFICATIONS- VARIABLE SPEED DRIVE APPLICATION

**LS-20V SERIES 60HZ**

MODEL	HP	CAPACITY ACFM	LENGTH IN	WIDTH IN	HEIGHT OPEN IN	HEIGHT ENCLOSED IN	WEIGHT OPEN LB	WEIGHT ENCLOSED LB
( L )100 PSIG (6.9 BAR)	100	480	88	48	72	72	(AC) 4000 (WC) 4600	(AC) 4525 (WC) 4075
( H )125 PSIG (8.6 BAR)	100	430	88	48	72	72	(AC) 4000 (WC) 4075	(AC) 4525 (WC) 4600
(HH)150 PSIG (10.3 BAR)	100	430	88	48	72	72	(AC) 4000 (WC) 4075	(AC) 4525 (WC) 4075

**COMPRESSOR**

**TYPE:**

**Standard Operating Pressure:**

**Bearing Type:**

**Ambient Temperature:**

**Cooling:**

**Compressor Fluid:**

**Sump Capacity:**

**Control:**

**STANDARD MODELS**

Rotary Screw

100 psig (6.9bar) (L)

125 psig (8.6bar) (H)

Anti-Friction

105° F (41°C)

Pressurized Fluid

Sullair Sullube

10 U.S. Gallons (38 liters)

Supervisor Controller

**MOTOR**

**Size:**

**Type:**

**STANDARD MODELS**

100HP/ 75KW

C-Flanged, Open Dripproof, Premium Efficiency

Three Phase, 230/460 60Hz, 40°C Maximum

Ambient Temperature

Options Available: 575V

TEFC Premium Motor

**Starter:**

Variable Speed Drive Controller 460V

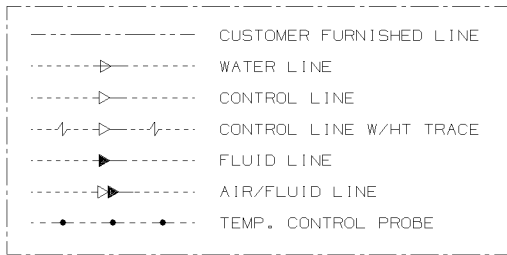
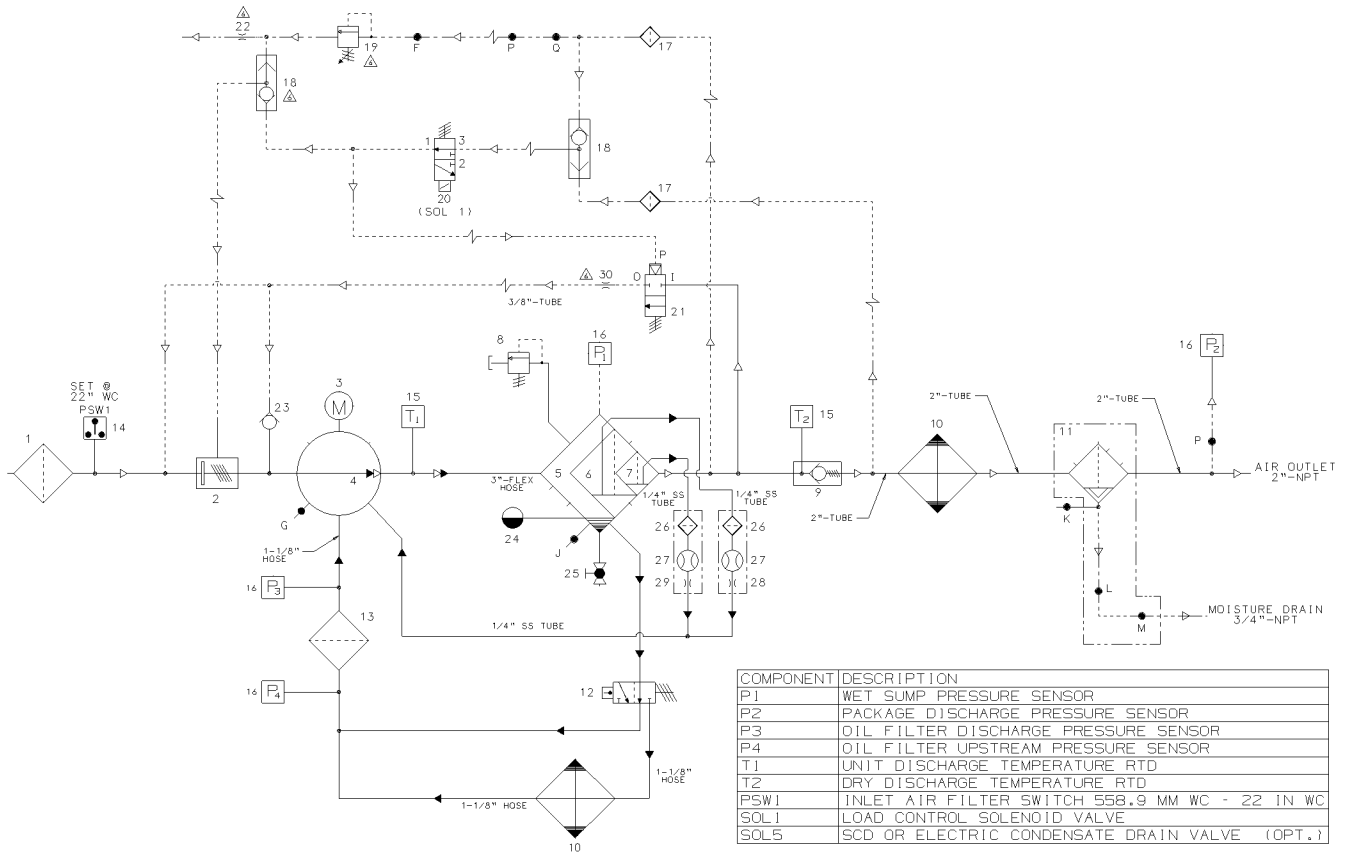
Options Available: 575V

**Speed:**

Various ( Refer to [Table 11-1](#) )

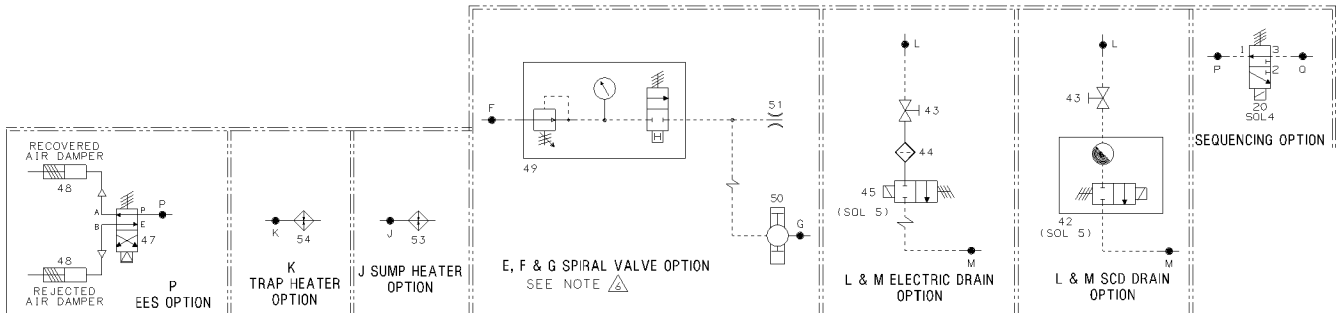
# Section 11 VARIABLE SPEED DRIVE APPLICATIONS

Figure 11-3 LS20V-100 Piping and Instrumentation (Air-cooled)



NOTE:  
 1. PART NUMBERS ARE FOR REFERENCE ONLY, REFER TO BELL OF MATERIAL AND OR FACE OF ORDER FOR ACTUAL PARTS.  
 2. SECTION BETWEEN LETTERED POINTS ARE TO BE REPLACED WITH CORRESPONDING OPTION PICTURED BELOW AS REQUIRED BY FACE OF ORDER.  
 3. SOLENOID VALVES SHOWN DE-ENERGIZED.  
 4. HEAT TRACE SHOWN AS OPTIONAL. CHECK FACE OF ORDER FOR HEAT TRACE REQUIREMENTS.

5 PART VARIES BY MODEL.  
 6 OMIT ITEM 18, 19, 22 AND 30 WITH SPIRAL VALVE OPTION.



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# Section 11

## VARIABLE SPEED DRIVE APPLICATIONS

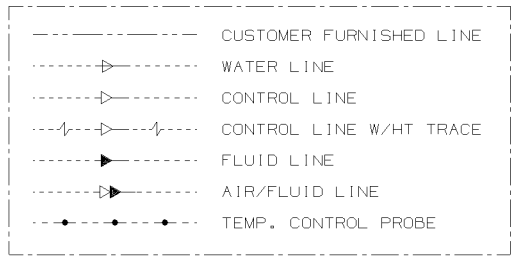
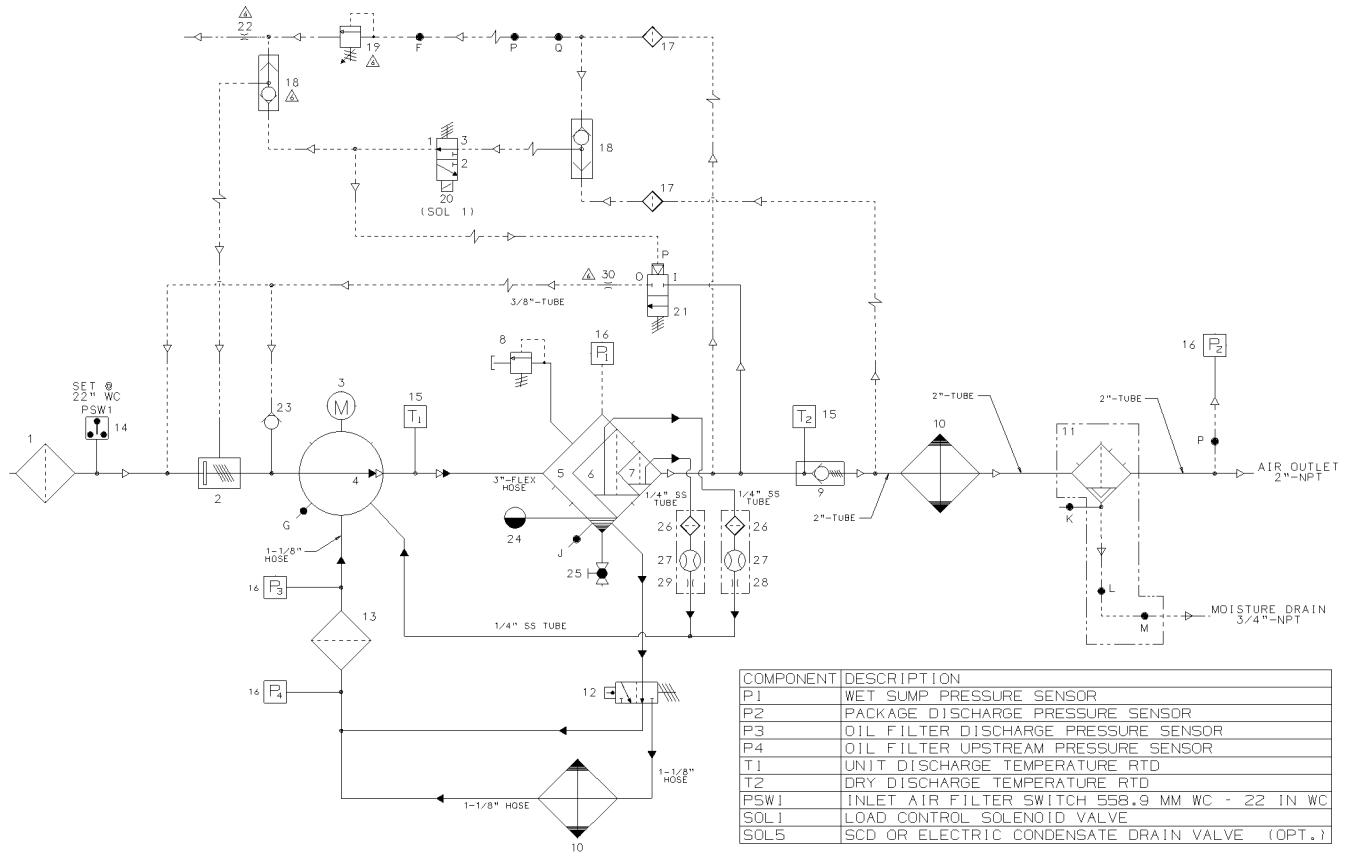
Figure 11-3 LS20V-100 Piping and Instrumentation (Air-cooled)

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>	
SC DRAIN OPTION ITEMS:				
1	filter, air h.d. inlet 12"	02250059-096	1	
2	vlv, air inlet 6t, 20-100	02250060-988	1	
3	motor	-	1	
4	compressor unit	-	1	
5	tank, sep LS20 leak-free	02250125-995	1	
6	element, separator air/oil primary	02250100-753	1	
7	element, separator a1r/oil secondary	02250100-754	1	
8	vlv, relief 3/4" 200# 550 scfm	02250097-349	1	
9	vlv, min pressure 2-1/2" sae	02250129-374	1	
10	cooler, comb oil/air 100hp	02250131-980	1	
11	sep, mo i sture 2 "-npt 0	2250100-365	1	
△	12	element, thermal valve 190°F	250028-762	1
		•element, thermal valve 175°F	49542	1
	13	filter, fluid 1-5/8"-sae	02250054-605	1
	14	sw, vacuum 22" wc n4 -6 ft cable	02250078-249	1
	15	probe, rtd 100 ohm platinum 12 ft	250039-909	2
	16	xdcr, press 0-250 psi 1-5vdc n4	02250078-933	4
	17	strainer, v-type 300 psi 1/4"	241771	2
	18	valve, shuttle 1/4" (double check)	408893	2
	19	valve, pressure regulator	250017-280	1
	20	valve, sol 3wno 1/4" 235# n4	02250125-657	2
	21	vlv, pneu 2-way 1/2"-npt	02250100-042	1
	22	orifice, .031"	02250132-934	1
	23	vlv, check 1/4"-nptf brass v i ton	02250115-272	1
	24	plug, sight glass 1-7/8"-sae	02250097-611	2
	25	vlv, ball 3/4"-male sae x 1/2"-fnpt	02250098-303	1
	26	filter, assy genesis fltr	02250117-782	2
	27	glass, sight/orf blk sae	02250126-129	2
	28	orf, plug brass 1/8"-npt x 1/16"	02250125-775	1
	29	orf, plug, brass 1/8"-npt x 1/32"	02250125-774	1
△	30	orf, 1/2m x 1/2f x .156	234125-156	1

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# Section 11 VARIABLE SPEED DRIVE APPLICATIONS

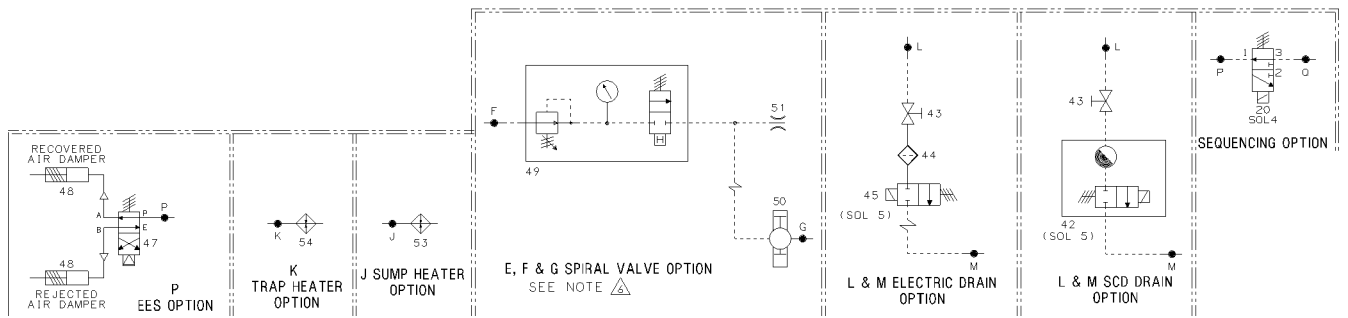
Figure 11-3 LS20V-100 Piping and Instrumentation (Air-cooled)



NOTE:

- PART NUMBERS ARE FOR REFERENCE ONLY. REFER TO BEILL OF MATERIAL AND OR FACE OF ORDER FOR ACTUAL PARTS.
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- SOLENOID VALVES SHOWN DE-ENERGIZED.
- HEAT TRACE SHOWN AS OPTIONAL. CHECK FACE OF ORDER FOR HEAT TRACE REQUIREMENTS.

5 PART VARIES BY MODEL.  
6 OMIT ITEM 18, 19, 22 AND 30 WITH SPIRAL VALVE OPTION.



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# Section 11

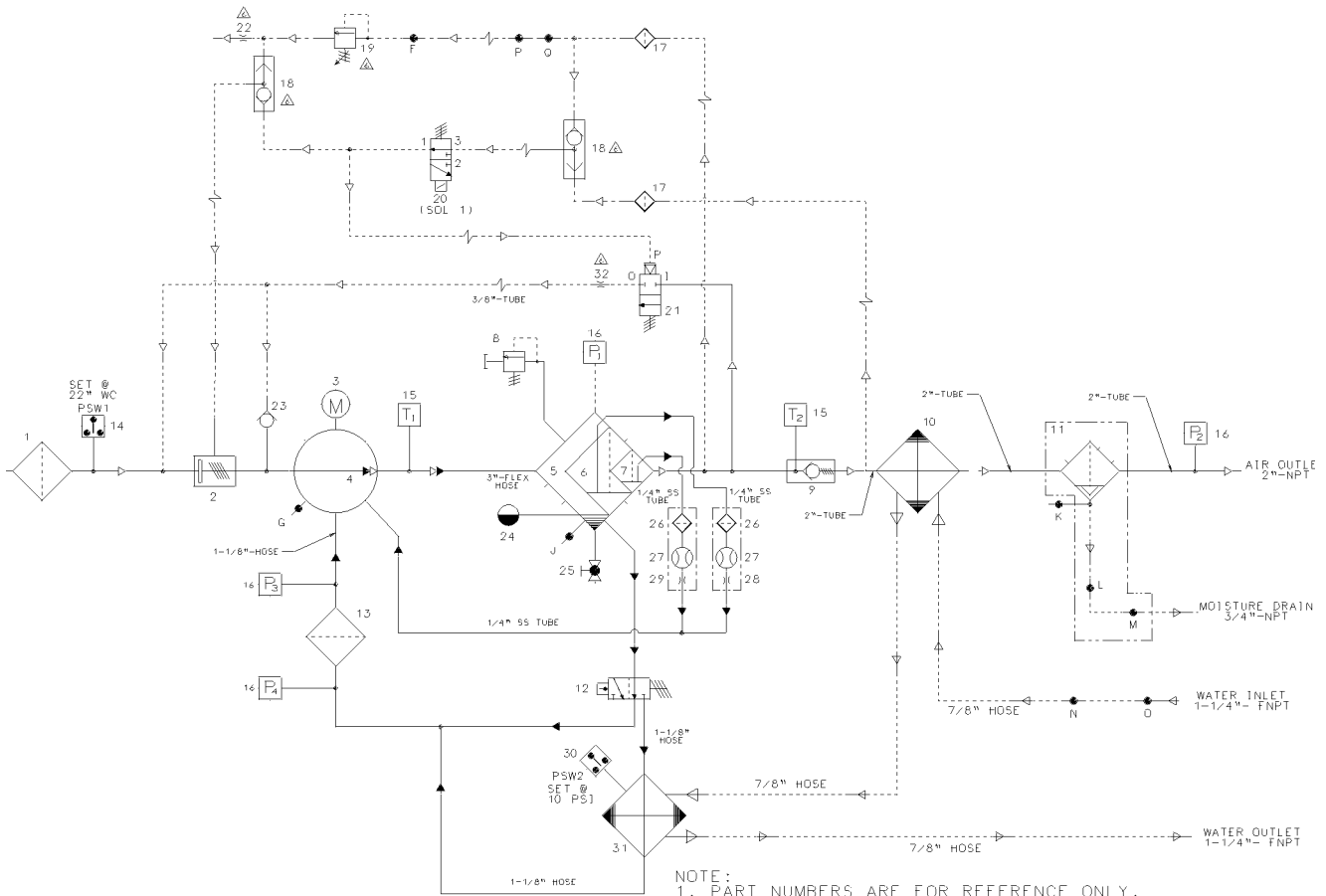
## VARIABLE SPEED DRIVE APPLICATIONS

Figure 11-3 LS20V-100 Piping and Instrumentation (Air-cooled) (Continued)

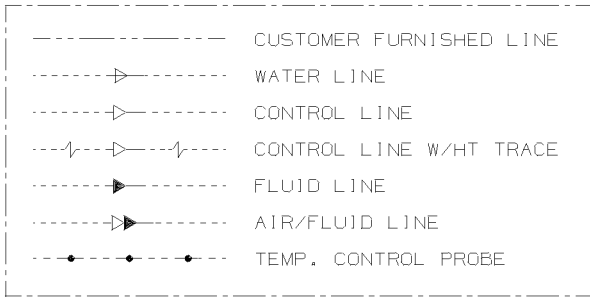
<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
42	drn, scd400	02250111-688	1
43	vlv, ball 1/4"-npt	47115	1
ELECTRIC DRAIN OPTION:			
43	vlv, ball 1/4"-npt	47115	1
44	strainer, v-type 300 psi 1/4"	241771	1
45	vlv, sol 2wnc mo 1/4 200# n4	02250125-674	1
EES OPTION:			
47	vlv, sol 4-way 1/4" 150# n4	02250125-673	1
48	cylinder, pneu 7/8 "-bore x 4 "-stroke	241906	2
SPIRAL VALVE OPTION:			
49	I/P transmitter	02250116-353	1
50	spiral valve	-	1
51	orifice, pip e plug" 1 / 4" .0 3 1	0 2250 132-934	1
SUMP HEATER OPTION:			
53	heater, sump ls20 1250w 120v	02250069-938	1
MOISTURE SEPARATOR HEATER OPTION:			
54	heater, Scd400 /500 wrap 50 w	02250114-171	1

# Section 11 VARIABLE SPEED DRIVE APPLICATIONS

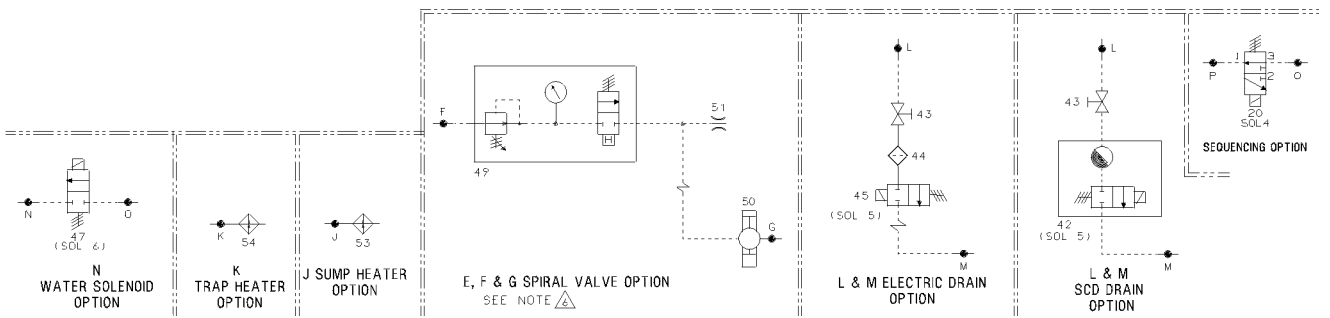
Figure 11-4 LS20V-100 Piping and Instrumentation (Water-cooled)



- NOTE:
- PART NUMBERS ARE FOR REFERENCE ONLY, REFER TO BILL OF MATERIAL AND OR FACE OF ORDER FOR ACTUAL PARTS.
  - SECTION BETWEEN LETTERED POINTS ARE TO BE REPLACED WITH CORRESPONDING OPTION PICTURED BELOW AS REQUIRED BY FACE OF ORDER.
  - SOLENOID VALVES SHOWN DE-ENERGIZED.
  - HEAT TRACE SHOWN AS OPTIONAL. CHECK FACE OF ORDER FOR HEAT TRACE REQUIREMENTS.
- PART VARIES BY MODEL.
  - OMIT ITEMS 18, 19, 22 AND 32 WITH SPIRAL VALVE OPTION



COMPONENT	DESCRIPTION
P1	WET SUMP PRESSURE SENSOR
P2	PACKAGE DISCHARGE PRESSURE SENSOR
P3	OIL FILTER DISCHARGE PRESSURE SENSOR
P4	OIL FILTER UPSTREAM PRESSURE SENSOR
T1	UNIT DISCHARGE TEMPERATURE RTD
T2	DRY DISCHARGE TEMPERATURE RTD
PSW1	INLET AIR FILTER SWITCH 558.9 MM WC - 22 IN WC
PSW2	WATER PRESSURE SWITCH 10 PSI (OPT.)
SOL1	LOAD CONTROL SOLENOID VALVE
SOL5	SCD OR ELECTRIC CONDENSATE DRAIN VALVE (OPT.)
SOL6	WATER SOLENOID VALVE (OPT.)



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# Section 11

## VARIABLE SPEED DRIVE APPLICATIONS

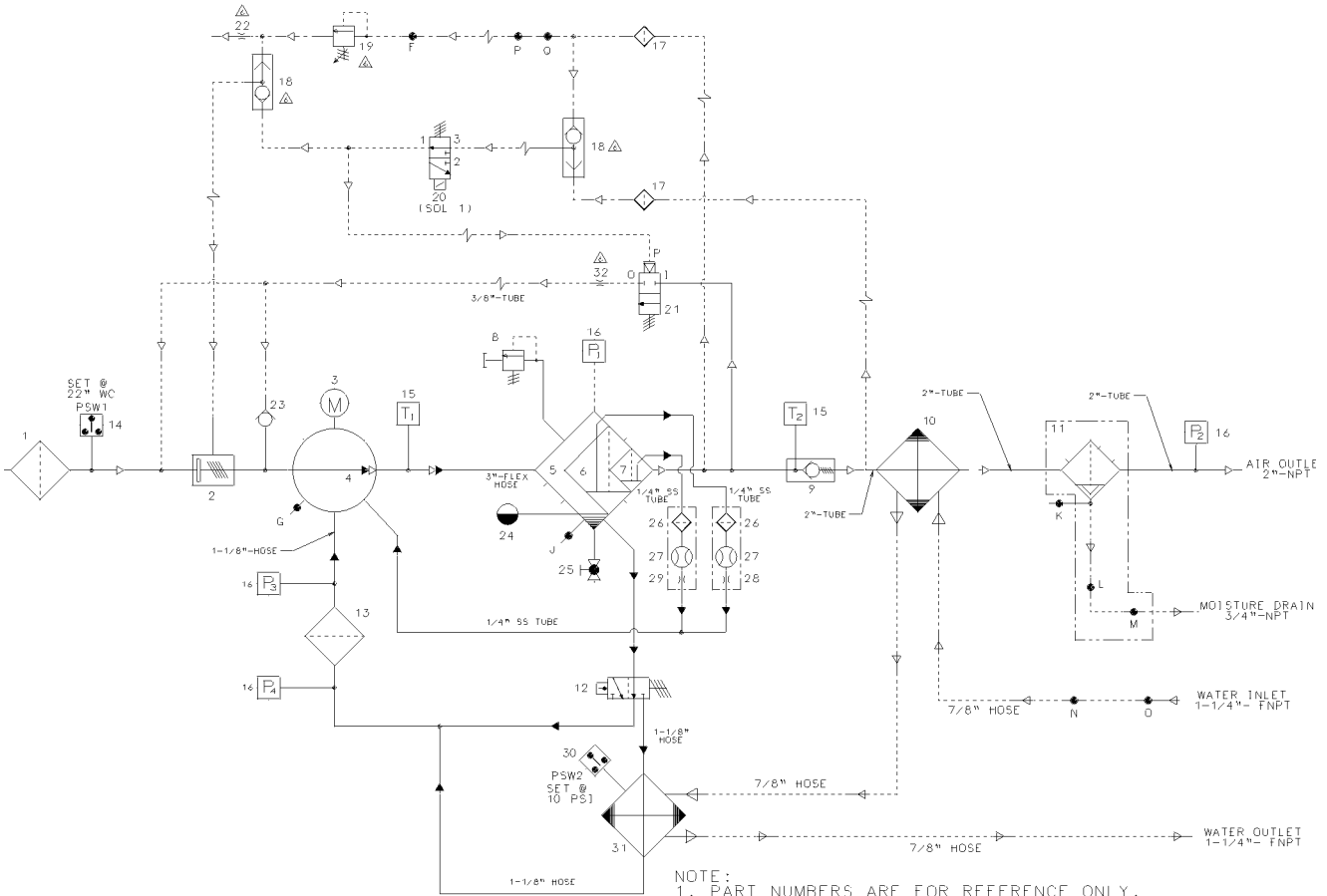
Figure 11-4 LS20V-100 Piping and Instrumentation (Water-cooled)

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	filter, air h.d. inlet 12"	02250059-096	1
2	vlv, air inlet 6" 20-100	02250060-988	1
3	motor	-	1
4	compressor unit ~	-	1
5	tank, sep ls20 leak-free	02250125-995	1
6	element, separator air/oil primary	02250100-753	1
7	element, separator air/oil secondary	02250100-754	1
8	vlv, relief 3/4" 200# 550 scfm	02250097-349	1
9	vlv, min pressure 2-1/2" sae	02250129-374	1
10	aftercooler, wc 6" x 36"	43008	1
11	sep, moisture 2"-npt	02250100-365	1
5	12 element. thermal valve 190°F	250028-762	1
	•element. thermal valve 175°F	49542	1
13	filter, fluid 1-5/8"-sae	02250054-605	1
14	sw, vacuum 22" wc n4 -6 ft cable	02250078-249	1
15	probe, rtd 100 ohm platinum 12 ft	250039-909	2
16	xdcr, press 0-250 psi 1-5vdc n4	02250078-933	4
17	strainer, v-type 300 psi 1/4"	241771	2
18	valve, shuttle 1/4" (double check)	408893	2
19	valve, pressure regulator	250017-280	1
20	valve, sol 3wno 1/4" 235# n4	02250125-657	2
21	vlv, pneu 2-way 1/2"-npt	02250100-042	1
22	orifice, .031"	02250132-934	1
23	vlv, check 1/4"-nptf brass viton	02250115-272	1
24	plug, sight glass 1-7/8"-sae	02250097-611	2
25	vlv, ball 3/4"-male sae x 1/2"-fnpt	02250098-303	1
26	filter, assy genesis fltr	2250117-782	2
27	glass, sight/orf blk sae	02250126-129	2
28	orf, plug brass 1/8"-npt x 1/16"	02250125-775	1
29	orf, plug brass 1/8"-npt x 1/32"	02250125-774	1
30	switch, press no 10 psi	250017-992	1
31	cooler, oil/water 6" x 36"	02250120-863	1
6	32 orf, 1/2m x 1/2f x .156	234125-156	1

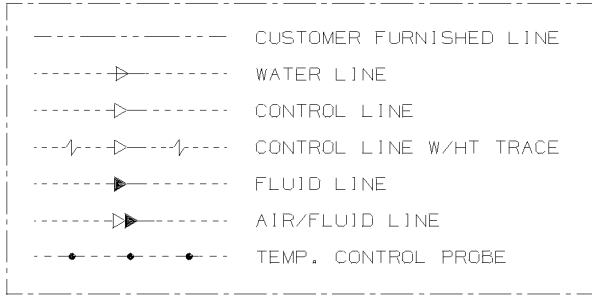
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# Section 11 VARIABLE SPEED DRIVE APPLICATIONS

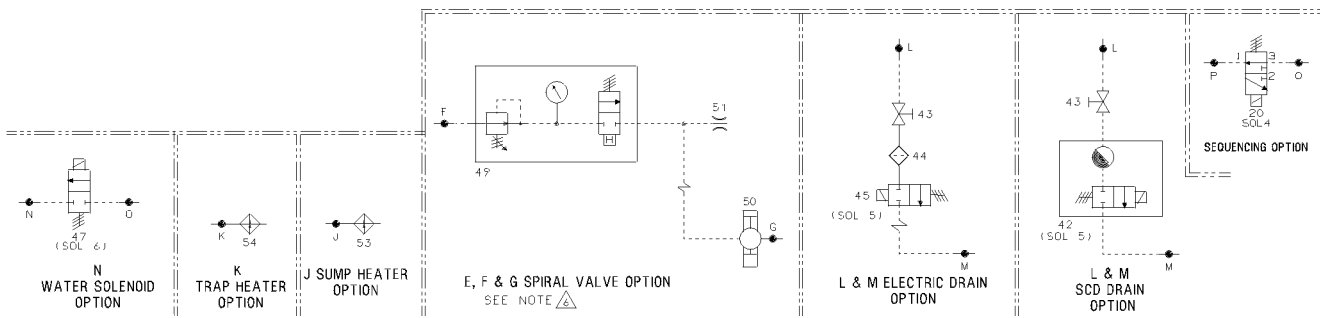
Figure 11-4 LS20V-100 Piping and Instrumentation (Water-cooled)



- NOTE:
- PART NUMBERS ARE FOR REFERENCE ONLY, REFER TO BEILL OF MATERIAL AND OR FACE OF ORDER FOR ACTUAL PARTS.
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  - SOLENOID VALVES SHOWN DE-ENERGIZED.
  - HEAT TRACE SHOWN AS OPTIONAL. CHECK FACE OF ORDER FOR HEAT TRACE REQUIREMENTS.
- PART VARIES BY MODEL.
  - OMIT ITEMS 18, 19, 22 AND 32 WITH SPIRAL VALVE OPTIC



COMPONENT	DESCRIPTION
P1	WET SUMP PRESSURE SENSOR
P2	PACKAGE DISCHARGE PRESSURE SENSOR
P3	OIL FILTER DISCHARGE PRESSURE SENSOR
P4	OIL FILTER UPSTREAM PRESSURE SENSOR
T1	UNIT DISCHARGE TEMPERATURE RTD
T2	DRY DISCHARGE TEMPERATURE RTD
PSW1	INLET AIR FILTER SWITCH 558.9 MM WC - 22 IN WC
PSW2	WATER PRESSURE SWITCH 10 PSI (OPT.)
SOL1	LOAD CONTROL SOLENOID VALVE
SOL5	SCD OR ELECTRIC CONDENSATE DRAIN VALVE (OPT.)
SOL6	WATER SOLENOID VALVE (OPT.)



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# Section 11

## VARIABLE SPEED DRIVE APPLICATIONS

Figure 11-4 LS20V-100 Piping and Instrumentation (Water-cooled) (Continued)

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
SCD DRAIN OPTION:			
42	drn, scd400	02250111-688	1
43	vlv, ball 1/4"-npt	47115	1
ELECTRIC DRAIN OPTION:			
43	vlv, ball 1/4"-npt	47115	1
44	strainer, v-type 300 psi 1/4"	241771	1
45	vlv, sol 1/4" w/timer 120v	250038-163	1
WATER SOLENOID VALVE OPTION:			
47	vlv, sol 2-way 1-1/2" nc	250035-291	1
SPIRAL VALVE OPTION:			
49	i/p transmitter	02250116-353	1
50	spiral valve	-	1
51	orifice, pipe plug 1/4" .031"	02250132-934	1
SUMP HEATER OPTION:			
53	heater, sump ls20,1250w 120v	02250069-938	1
MOISTURE SEPARATOR HEATER OPTION:			
54	heater, scd400/500 wrap 50w	02250114-171	1







# Section 11

## VARIABLE SPEED DRIVE APPLICATIONS

### NOTE

This section may not be required, since the equipment is factory preset.

#### 11.4 SUPERVISOR CONTROLLER/VARIABLE SPEED DRIVE SET UP PROCEDURE

##### SUPERVISOR CONTROLLER SETTINGS:


Depending on the package series the Supervisor Controller shall be programmed according to the settings per [Table 11-1: Package Selection Chart](#), Factory Settings. (Refer to the serial number nameplate for compressor factory setting)

[Refer to [Section 5.1](#) and [Figure 5-1](#) for key descriptions and control panel layout.]

[Refer to [Table 5-1](#) for Supervisor Controller Menu Tree]

Press **E-STOP**.

To select the “control parameters” function (See [Section 5.1](#)), use the up and down arrow keys to scroll to the desired function as indicated on last


line of display, then press .

After entering a function, the information can be viewed by using the up and down arrow keys. If the function shows status then values cannot be changed. If the function displays parameters, then the values can be changed.

To change a value, scroll to the line to be changed using the up arrow and down arrow keys, and push

 button.

The value can be changed by using the up arrow or down arrow keys. When editing is finished, pushing

the  key will fix the value. If during a change the ESC key is pushed, editing is terminated and the original value is reset

The left and right arrow keys can be used to move the other digits or letters in a value. For example to change a value from 100 to 500, the left arrow key can be used to position the cursor to the 1 digit in the 100, and the up arrow key used to increment the digit to 5.

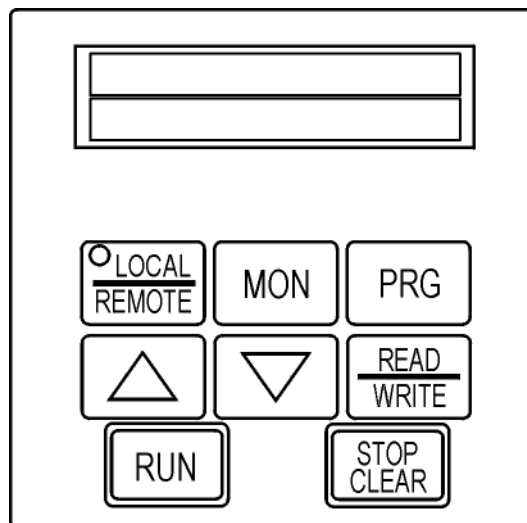
##### VARIABLE SPEED DRIVE SETTINGS


[Refer to [Figures 11-8 & 11-9](#) for VSD control faceplate and key descriptions.]

Go to VSD cabinet. (CAUTION: Power is present)

The controller’s first line should display inverter off. Second line should display **(ST-CC IS OPEN)**.

Figure 11-8 Variable Speed Drive Control Faceplate




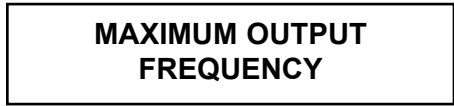
Press the PRG key . The screen will display GROUP: PARAMETER CHANGED FROM DEFAULT SETTINGS.



Press the DOWN ARROW . The screen will display GROUP: FUNDAMENTAL PARAMETERS #1.



Press the READ/WRITE key . The screen should display maximum output frequency.






Press the DOWN ARROW  (5 times) until the screen displays upper limit frequency.

# Section 11

## VARIABLE SPEED DRIVE APPLICATIONS

### UPPER LIMIT FREQUENCY



Press the READ/WRITE key, then Press the UP  or DOWN ARROW  keys to set the required maximum limit frequency value according to [Table 11-1: Package Selection Chart, Field Settings](#), "max. frequency value" column. The number will flash. Press the READ/WRITE  to accept changes. The display will flash WRT.

UPPER LIMIT FREQUENCY  
XXX HZ

UPPER LIMIT FREQUENCY  
WRT

Allow time (approx. 10 sec.) for the controller to return to screen display. INVERTER OFF (ST-CC IS OPEN).

INVERTER OFF  
(ST-CC IS OPEN)

Press the DOWN  or UP ARROW . Screen should display frequency command on first line and a number on the second line. Use the UP or DOWN ARROW to set the required value according to [Table 11-1: Package Selection Chart, Factory Settings](#), "frequency command" column. The number will flash. Press the read/write key to accept changes. Display will flash WRT.

FREQUENCY COMMAND  
XXX

FREQUENCY COMMAND  
WRT

Allow time (approx. 10 sec.) for the controller to

return to screen display. INVERTER OFF (ST-CC IS OPEN).

INVERTER OFF  
(ST-CC IS OPEN)

### NOTE

Consult factory for Variable Speed Drive default settings. The equipment is already programmed with these settings at the factory.









### START UP

For start up procedure refer to [Section 6](#).

### 11.5 VARIABLE SPEED DRIVE DEFAULT SETTINGS


#### Default settings:

To restore Sullair factory default settings, perform the following:

- 1) Press "PRG"  button.
- 2) Using the UP  or DOWN  ARROWS, scroll to the "utility parameters" menu.
- 3) Press  button.
- 4) Using the UP  or DOWN  ARROWS, scroll to "standard setting mode selection".
- 5) Press  button.
- 6) Change value to "6" and then press the  button.

### NOTE

The value of the number in the left digit designates the previous default settings. Entering "6" in the left digit will reset parameters to the Sullair factory settings.

- 7) Press "PRG"  button to exit this mode.

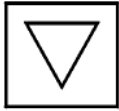
# Section 11

## VARIABLE SPEED DRIVE APPLICATIONS

Figure 11-9 Variable Speed Control Key Description



Up scroll key used for incrementing numerical values. Also, when a parameter or group name is displayed, the name of the previous parameter/group can be displayed by pressing this key.



Down scroll key used for decrementing numerical values. Also, when a parameter or group name is displayed, the name of the next parameter/group can be displayed by pressing this key.



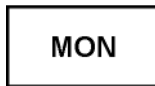
Used to start a run from the keypad (local control).



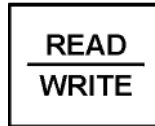
Key changes between the local control mode and the terminal block input control mode operation. When the local control LED in the keypad is "on", operation of the inverter is from the keypad.



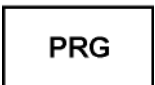
This key functions as the STOP key when running from keypad (local control). IN all other modes, emergency off is engaged when this key is pressed twice. During an inverter trip, the tripped state can be reset by pressing this key twice.



This key is used to enter the monitor mode.



This key is used to select or enter a parameter name, a parameter value, a frequency command, or a group name.



This key is used to enter the programming mode.

# NOTES

# Section 12

## ILLUSTRATIONS AND PARTS LIST

### 12.1 PROCEDURE FOR ORDERING PARTS

Parts should be ordered from the nearest Sullair Representative or the Representative from whom the compressor was purchased. If for any reason parts cannot be obtained in this manner, contact the factory directly at the addresses, fax or phone numbers below.

When ordering parts always indicate the Serial Number of the compressor. This can be obtained from the Bill of Lading for the compressor or from the Serial Number Plate located on the compressor.

**SULLAIR ASIA, LTD.**  
 Sullair Road, No. 1  
 Chiwan, Shekou  
 Shenzhen, Guangdong PRV.  
 PRC POST CODE 518068  
 Telephone: 755-6851686  
 Fax: 755-6853473  
[www.sullair-asia.com](http://www.sullair-asia.com)

**SULLAIR CORPORATION**  
 3700 East Michigan Boulevard  
 Michigan City, Indiana 46360 U.S.A.  
[www.sullair.com](http://www.sullair.com)  
 Telephone: 1-800-SULLAIR (U.S.A. Only)  
 or 1-219-879-5451  
 Fax: (219) 874-1273

**PARTS DEPARTMENT**  
 Fax: (219) 874-1835  
[www.sullair.com/parts.shtm](http://www.sullair.com/parts.shtm)

**SERVICE DEPARTMENT**  
 Fax: (219) 874-1205  
[www.sullaircompressors.com](http://www.sullaircompressors.com)

**SULLAIR EUROPE, S.A.**  
 Zone Des Granges BP 82  
 42602 Montbrison Cedex, France  
 Telephone: 33-477968470  
 Fax: 33-477968499  
[www.sullaireurope.com](http://www.sullaireurope.com)

### 12.2 RECOMMENDED SPARE PARTS LIST

DESCRIPTION	KIT NUMBER	QTY
element, compressor fluid filter 02250054-605	250025-526	1
element, primary heavy duty air filter 02250059-096	02250046-012	1
element, secondary heavy duty air filter 02250059-096	02250046-013	1
element, primary replacement for separator 02250100-753	02250100-755	1
element, secondary replacement for separator 02250100-754	02250100-756	1
kit repair for minimum pressure valve 02250129-374	250018-456	1
•kit, cap for minimum pressure check valve 02250109-817	02250044-355	1
•kit, o-ring for minimum pressure check valve 02250109-817	02250048-365	1
•kit, piston for minimum pressure check valve 02250109-817	02250051-336	1
kit, repair for thermal valve 049542 (175°F/ 79°C)(I)	02250105-553	1
kit, repair for thermal valve 250028-762 (190°F/ 88°C) (II)	02250112-709	1

(Continued on page 78)

**NOTE**

Optional air filter kits are now available. For more information, contact Sullair Factory.

(I) Used on standard compressors, and compressors < 150 psi/ 10.3 bar.

(II) Used on all 24KT and high pressure compressors = or > 150 psi/ 10.3 bar.

---

**PLEASE NOTE: WHEN ORDERING PARTS, ALWAYS INDICATE SERIAL NUMBER OF COMPRESSOR**

# Section 12

## ILLUSTRATIONS AND PARTS LIST

### 12.2 RECOMMENDED SPARE PARTS LIST (CONTINUED)

DESCRIPTION	KIT NUMBER	QTY
kits, repair for compressor shaft seal:		
<b>STANDARD UNIT SEAL KITS-</b>		
kit, seal repl d20c dbl tfe lip	02250057-037	1
kit, tool-d20c gd lip seal repl	02250078-694	1
<b>SPIRAL VALVE UNIT SEAL KITS-</b>		
kit, repl-seal dxr20a dd tfe lp	02250086-865	1
kit, tool-d20c dd lip sl repl	02250087-302	1
kit, repair for air inlet valve 02250060-988	02250053-273	1
kit, repair for pressure regulator 250017-280	250019-453	1
kit, repair for blowdown valve 02250100-042	02250100-042	1
kit, repair for solenoid valve 02250125-657	02250125-829	1
•kit, replacement for solenoid valve coil 02250125-657	02250125-861	1
kit, repair for moisture separator 02250100-365	02250129-173	1
•kit, autodrain for separator 02250100-365	02250129-175	1
kit, repair for moisture separator 02250126-818	02250129-174	1
•kit, autodrain for separator 02250126-818	02250129-175	1
replacement element for drive coupling	02250129-707	1
kit, spiral valve actuator	608311-001	1
kit, spiral valve tool	02250052-625	1
manual, Sequencing & Protocol (III)	02250139-197	1
fluid, SRF 1/4000 (5 gal/ 19l)	250019-662	(IV)
lubricant, Sullube (Std.) (5 gal/ 19l)	250022-669	(IV)
lubricant, 24 KT (5 gal/ 19l)	02250051-053	(IV)
kit, repair for pressure regulator 408275 (spiral valve)	250028-693	1

(III) This document is required to program your personal computer to communicate with the Supervisor panel.

(IV) For proper amount of fluid fill, please consult Lubrication Guide in Section 3, Specifications.



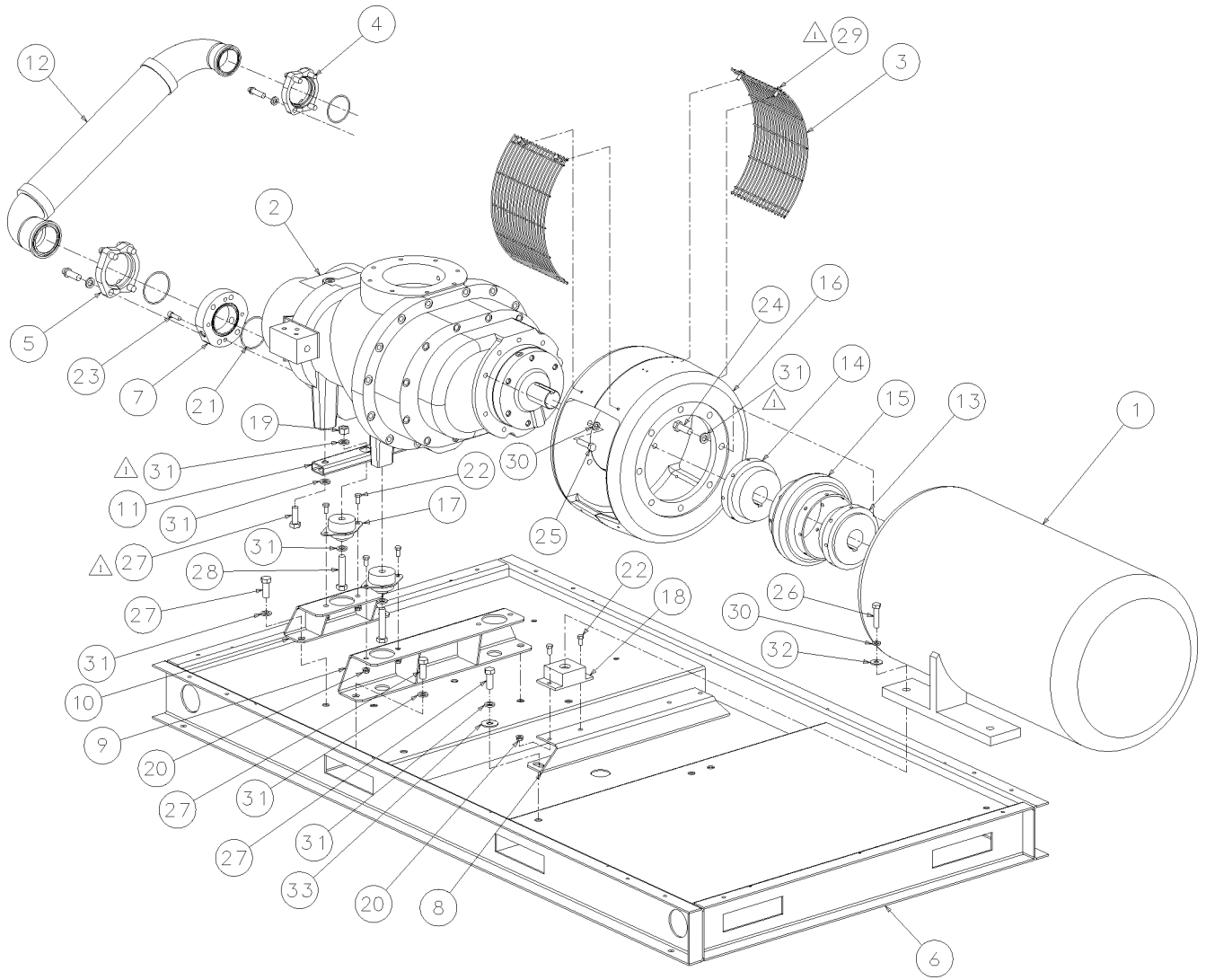
Mixing of other lubricants within the compressor unit will void all warranties!

**PLEASE NOTE: WHEN ORDERING PARTS, ALWAYS INDICATE SERIAL NUMBER OF COMPRESSOR**

# NOTES

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.3 MOTOR, COMPRESSOR, FRAME AND PARTS



02250128-269R01

## Section 12

# ILLUSTRATIONS AND PARTS LIST

### 12.3 MOTOR, COMPRESSOR, FRAME AND PARTS

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	motor, 100 horse power univ/50/60 (I)	-	1
2	compressor, unit dxx204170 (II)	-	1
3	guard, cplg	02250050-131	2
4	flange, kit sae splt 2.5" - viton	02250099-416	1
5	flange, kit sae splt 3" - viton	02250100-926	1
6	frame, base ls20-100	02250127-524	1
7	adapter, discharge 3"	02250127-557	1
8	support, motor	02250127-740	1
9	support, compr front	02250127-741	1
10	support, compr rear	02250127-742	1
11	support, compr rear foot	02250127-748	1
12	joint, expansion ls20-100 std	02250127-905	1
13	hub, coupling rex viva 2-1/8"	02250129-705	1
14	hub, coupling rex viva 2"	02250129-706	1
15	element, coupling viva 245 (III)	02250129-707	1
16	adapter, motor	250042-486	1
17	isolator, vibration compr. - dxr20	250042-541	3
18	isolator, vibration 670-7	250042-756	2
19	nut, hex pltd 5/8-11	825210-559	1
20	nut, hex f pltd 3/8-16	825306-347	10
21	o-ring, viton 3 1/4 x 1/8"	826502-236	1
22	capscre, hex gr8 3/8-16 x 3/4	827906-075	10
23	capscrew, socket hd 3/8-16 x 1 1/4	828306-125	4
24	capscre, hex gr5 5/8-11 x 1 3/4	828610-175	8

(Continued on page 83)

(I) Motor may vary. Consult factory with machine serial number.

(II) There is an exchange program whereby a remanufactured compressor unit can be obtained from Sullair distributors or the factory at less cost than the owner could repair the unit. For information regarding the unit exchange program, contact your nearest Sullair representative or the Sullair Corporation.

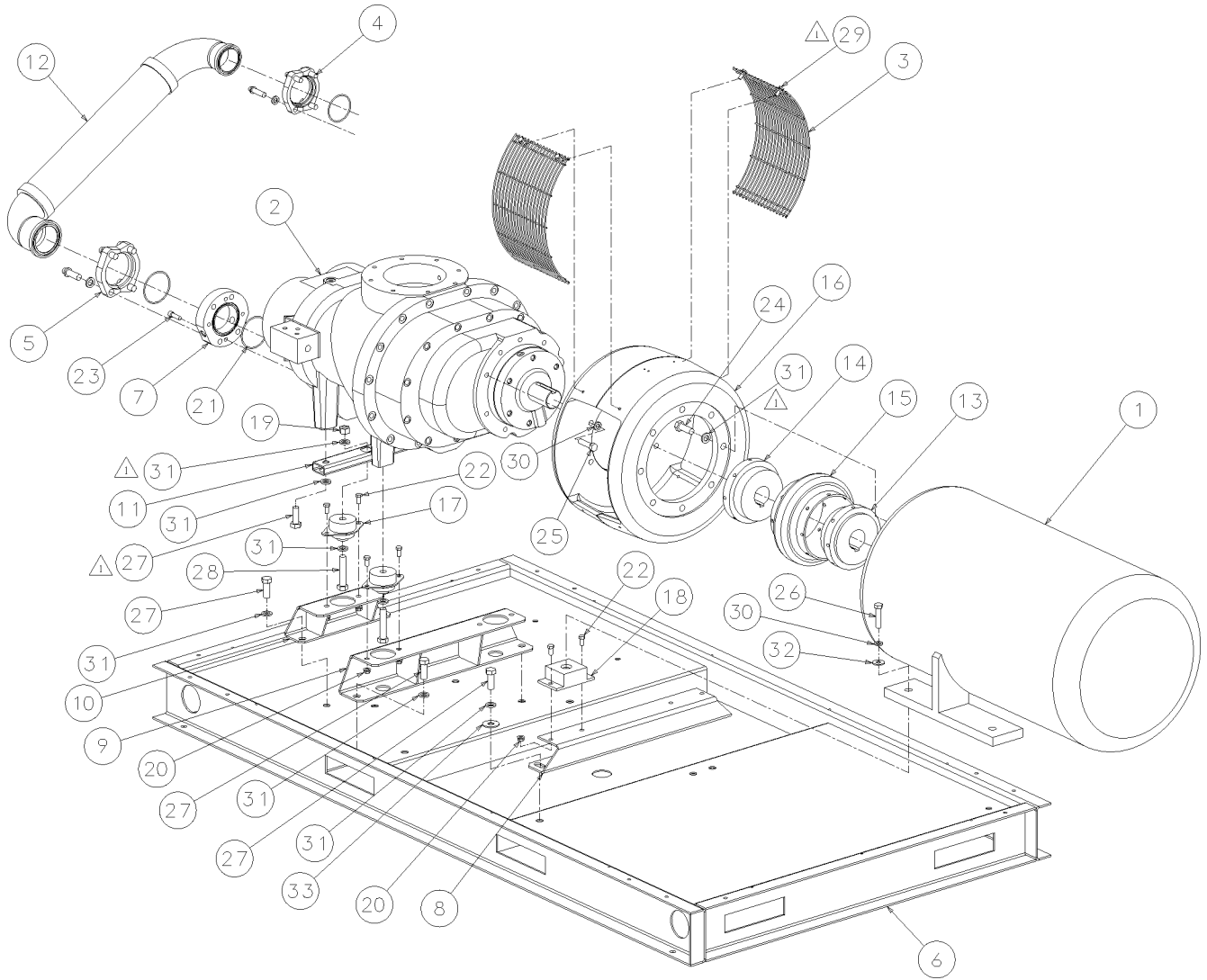
The shaft seal is not considered part of the compressor unit in regard to the two year warranty. The normal Sullair parts warranty applies. For shaft seal repairs, refer to *Section 12.2, Recommended Spare Parts List*.

(III) For maintenance on drive coupling element, order replacement element no. 022500129-707.

**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.3 MOTOR, COMPRESSOR, FRAME AND PARTS



102250128-269R01

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.3 MOTOR, COMPRESSOR, FRAME AND PARTS

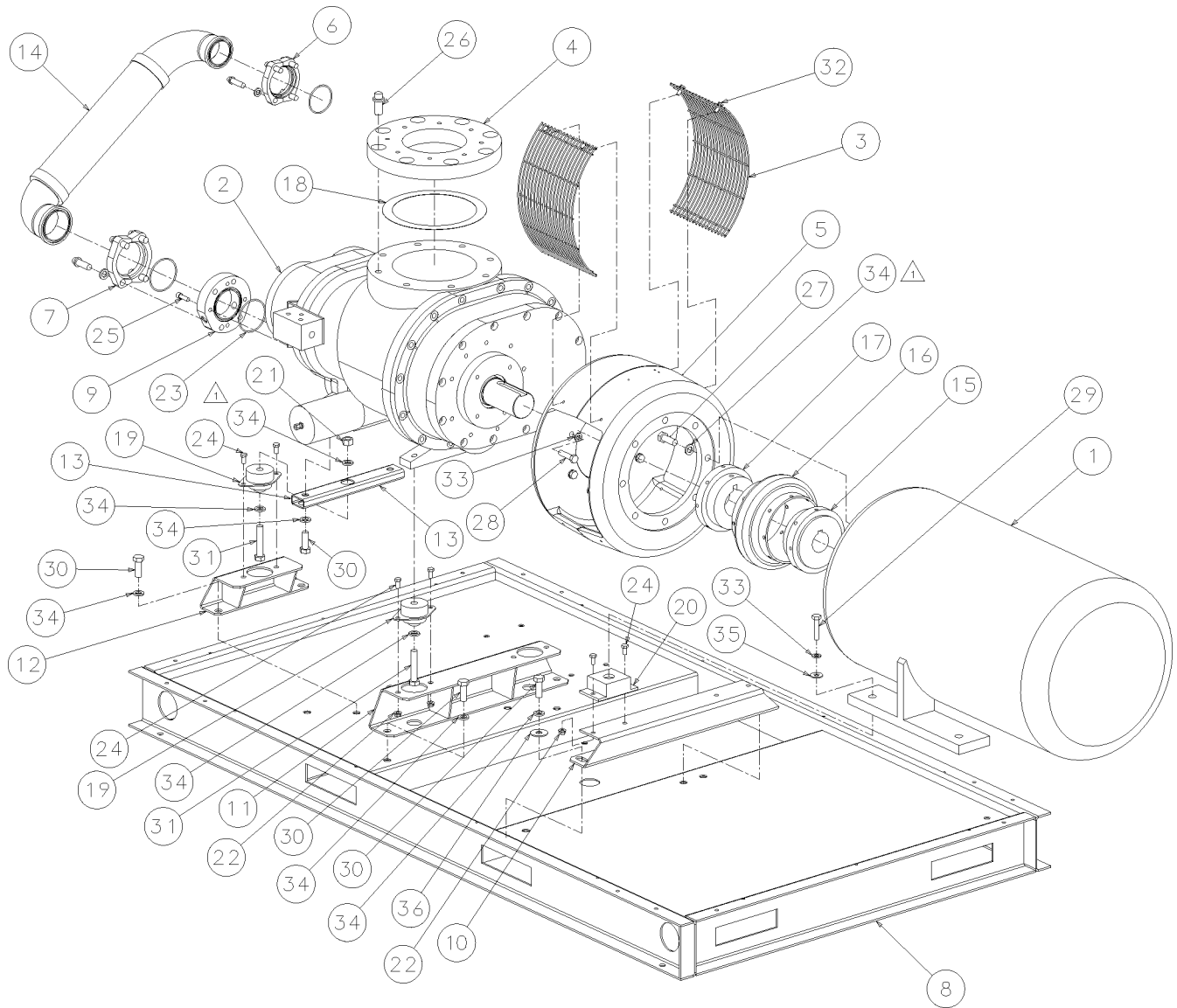
<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
25	capscr, hex gr5 1/2-13 x 2	829108-200	9
26	capscr, hex gr5 1/2-13 x 2 1/4	829108-225	2
27	capscr, hex gr5 5/8-11 x 1 3/4	829110-175	8
28	capscr, hex gr5 5/8-11 x 3 1/4	829110-325	3
29	screw, hex ser washer 5/16-18 x 3/4	829705-075	8
30	washer, spr lock reg pltd 1/2	837808-125	11
31	washer, spr lock reg pltd 5/8	837810-156	20
32	washer, pl-b reg pltd 1/2	838208-112	2
33	washer, pl-b reg pltd 5/8	838210-112	2

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.4 MOTOR, COMPRESSOR, FRAME AND PARTS WITH SPIRAL VALVE



02250128-270R01

## Section 12

# ILLUSTRATIONS AND PARTS LIST

### 12.4 MOTOR, COMPRESSOR, FRAME AND PARTS WITH SPIRAL VALVE

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	motor, 100hp univ/50/60 (I)	-	1
2	compressor, unit dxr204220 (II)	-	1
3	guard, cplg	02250050-131	2
4	adapter, air inl ls20 dir drv	02250065-044	1
5	adapter, motor	02250069-127	1
6	flange, kit sae splt 2.5" - viton	02250099-416	1
7	flange, kit sae splt 3" - viton	02250100-926	1
8	frame, base ls20-100	02250127-524	1
9	adapter, discharge 3"	02250127-557	1
10	support, motor	02250127-740	1
11	support, compr front	02250127-741	1
12	support, compr rear	02250127-742	1
13	support, compr rear foot	02250127-748	1
14	joint, expansion ls20-100 spvlv	02250127-907	1
15	hub, coupling rex viva 2-1/8"	02250129-705	1
16	element, coupling viva 245 (III)	02250129-707	1
17	hub, coupling rex viva 70mm	02250129-759	1
18	gasket, 8-1/2" x 10-1/2" x 1/32"	040422	1
19	isolator, vibration compr. - dxr20	250042-541	3
20	isolator, vibration 670-7	250042-756	2
21	nut, hex pltd 5/8-11	825210-559	1
22	nut, hex f pltd 3/8-16	825306-347	10
23	o-ring, viton 3 1/4 x 1/8"	826502-236	1
24	capscr, hex gr8 3/8-16 x 3/4	827906-075	10

(Continued on page 87)

(I) Motor may vary. Consult factory with machine serial number.

(II) There is an exchange program whereby a remanufactured compressor unit can be obtained from Sullair distributors or the factory at less cost than the owner could repair the unit. For information regarding the unit exchange program, contact your nearest Sullair representative or the Sullair Corporation. For shaft seal repairs, refer to *Section 12.2, Recommended Spare Parts List*.

The shaft seal is not considered part of the compressor unit in regard to the two year warranty. The normal Sullair parts warranty applies. For shaft seal repairs order repair kit no. 02250045-161.

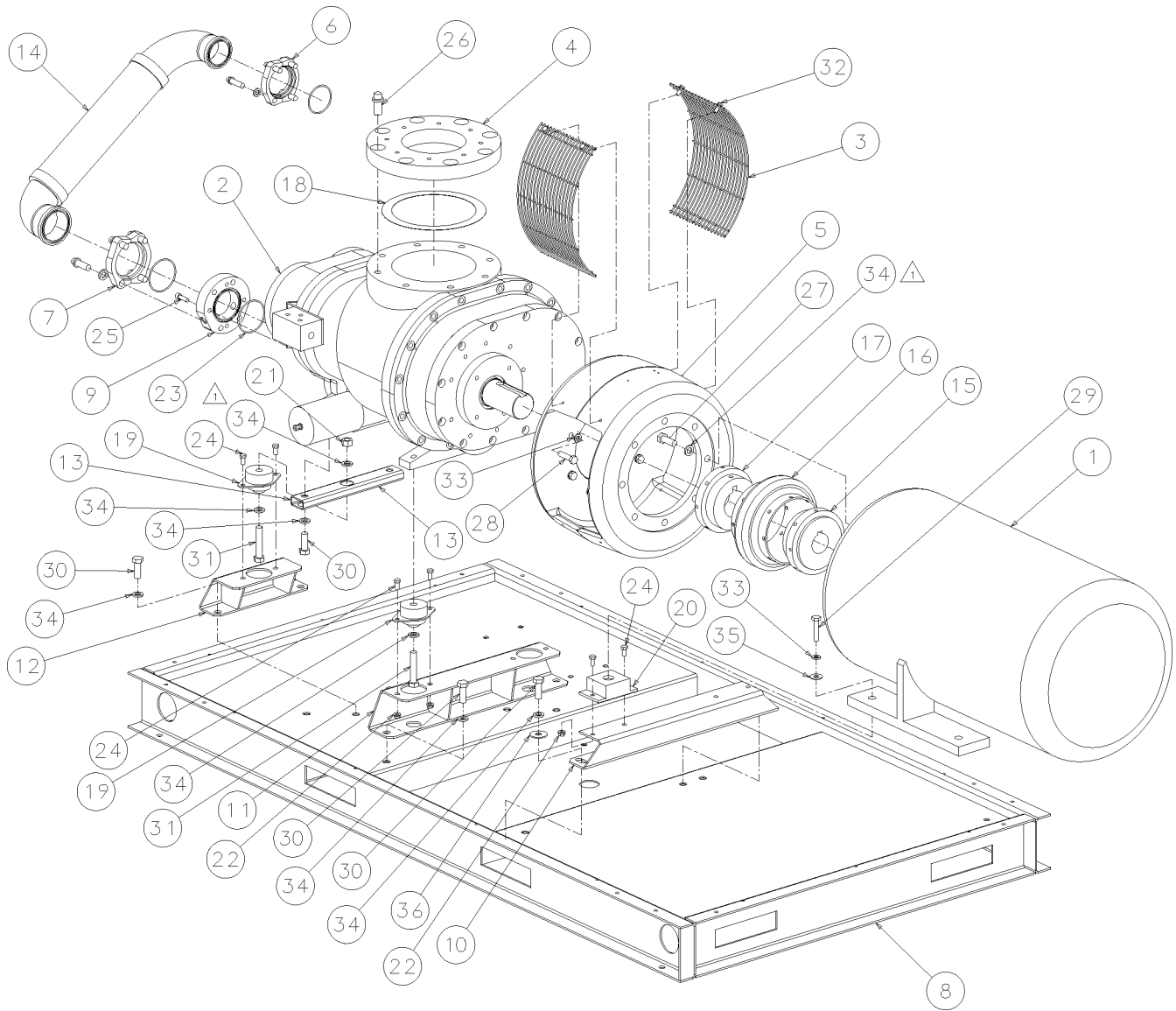
(III) For maintenance on drive coupling element, order replacement element no. 022500129-707.

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.4 MOTOR, COMPRESSOR, FRAME AND PARTS WITH SPIRAL VALVE



02250128-270R01

## Section 12

# ILLUSTRATIONS AND PARTS LIST

### 12.4 MOTOR, COMPRESSOR, FRAME AND PARTS WITH SPIRAL VALVE (CONTINUED)

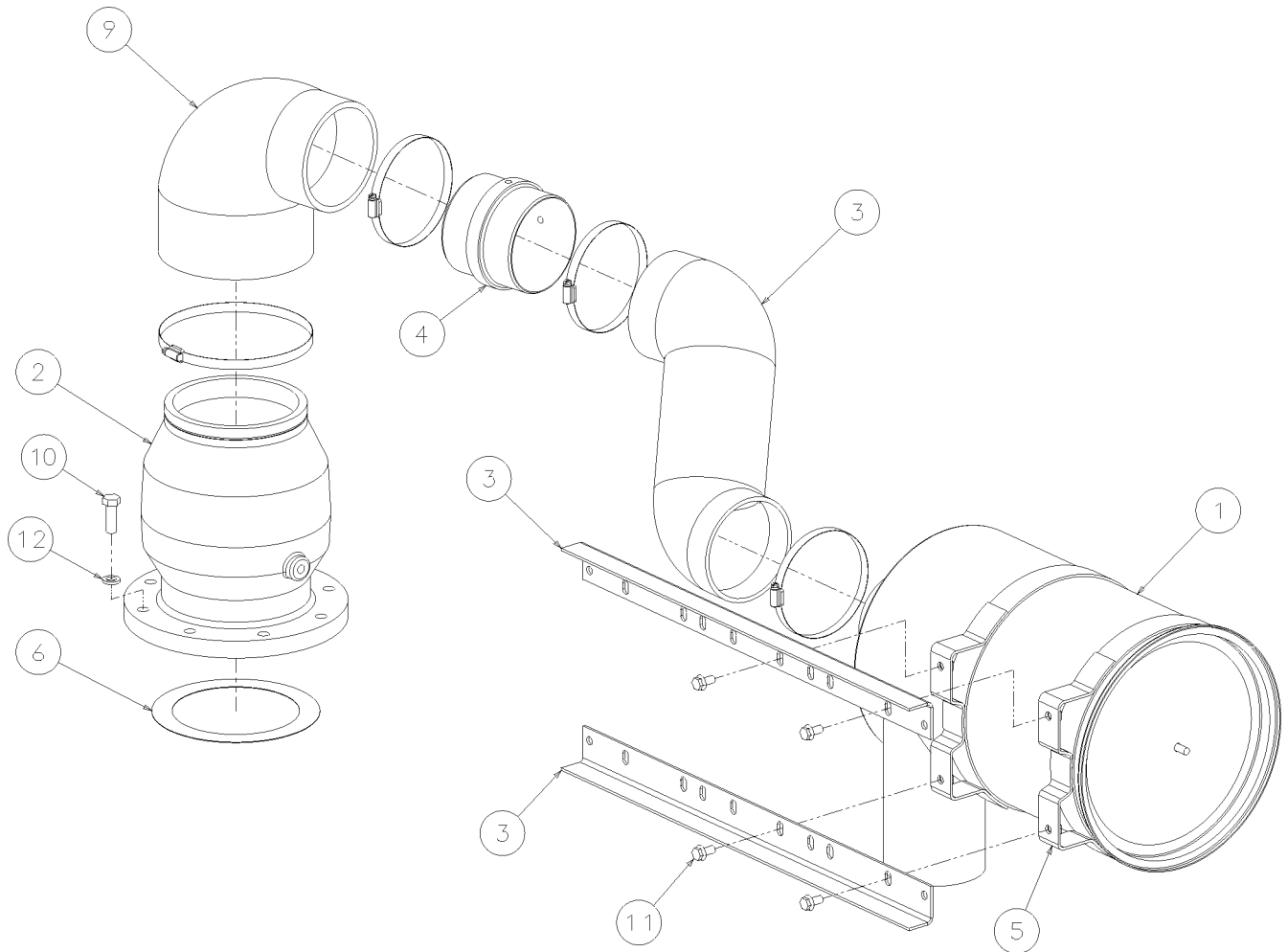
<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
25	capscrew, socket hd 3/8-16 x 1 1/4	828306-125	4
26	capscrew, ferry head hd 3/4-10 x 1 1/2	828412-150	8
27	capscr, hex gr5 5/8-11 x 1 3/4	828610-175	8
28	capscr, hex gr5 1/2-13 x 2	829108-200	9
29	capscr, hex gr5 1/2-13 x 2 1/4	829108-225	2
30	capscr, hex gr5 5/8-11 x 1 3/4	829110-175	8
31	capscr, hex gr5 5/8-11 x 3 1/4	829110-325	3
32	screw, hex ser washer 5/16-18 x 3/4	829705-075	8
33	washer, spr lock reg pltd 1/2	837808-125	11
34	washer, spr lock reg pltd 5/8	837810-156	20
35	washer, pl-b reg pltd 1/2	838208-112	2
36	washer, pl-b reg pltd 5/8	838210-112	2

---

**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.5 AIR INLET SYSTEM- AIR-COOLED



02250128-272R00

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.5 AIR INLET SYSTEM- AIR-COOLED

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	filter, air inlet <b>(I)</b>	02250059-096	1
2	valve, inlet air <b>(II)</b>	02250060-988	1
3	support, hd filter	02250098-457	2
4	tube, air inlet adapt 5"	02250126-730	1
5	band, receiver 12.0" dia.	040081	2
6	gasket, 1/32 x 6 1/4id x 8 1/4od	040696	1
7	clamp, hose 7"	041992	1
8	clamp, hose 5"	047263	3
9	elbow, 90 deg rubber	250002-802	1
10	capscr, hex gr5 1/2-13 x 1 1/2	828608-150	8
11	screw, hex ser washer 3/8-16 x 3/4	829706-075	4
12	washer, spr lock 1/2	837508-125	8

**(I)** For maintenance on air inlet filter no. 02250059-096, order primary replacement element no. 02250046-012, and secondary replacement element no. 02250046-013.

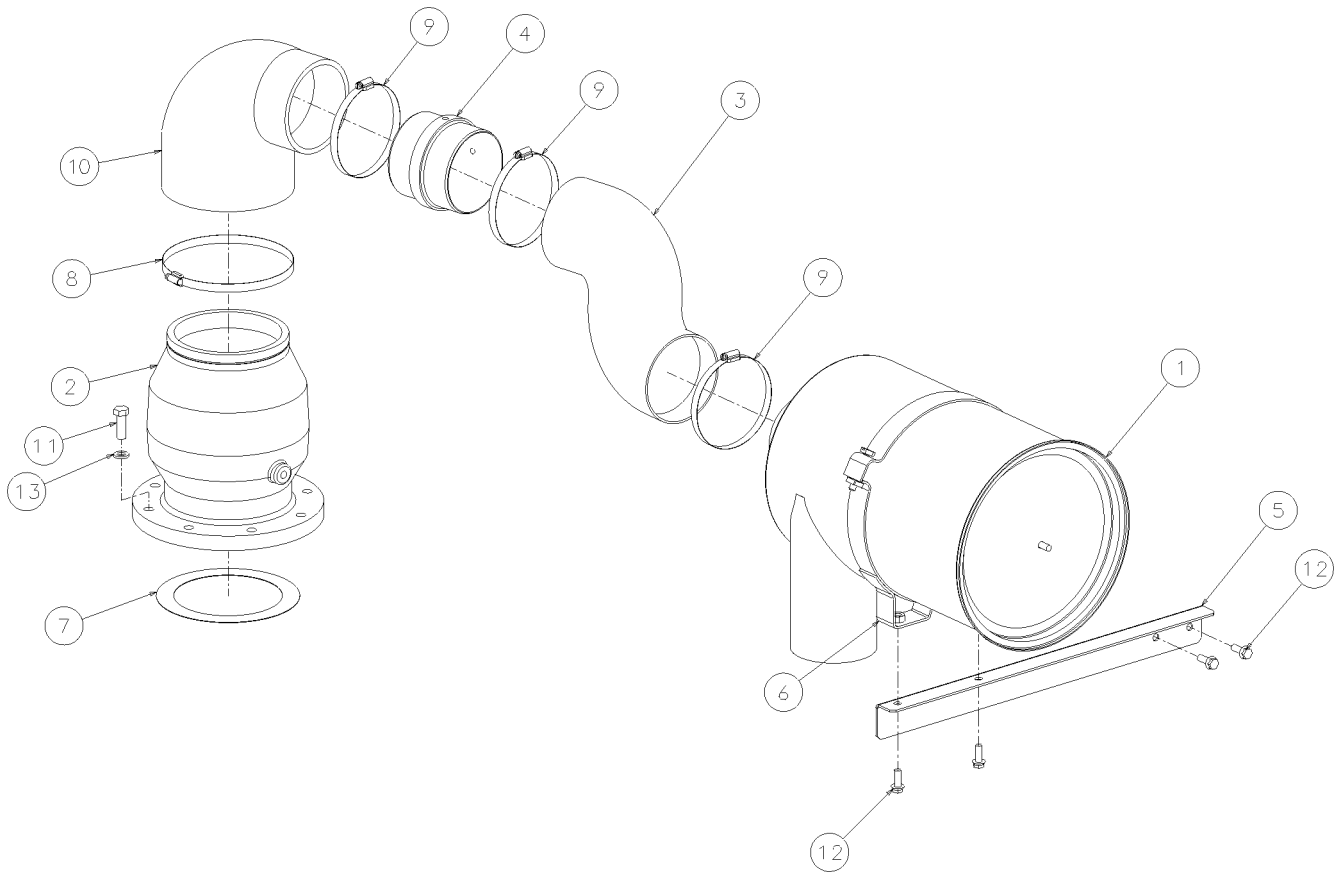
**(II)** For maintenance on inlet air valve no. 02250060-988, order repair kit no. 02250053-273.

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.6 AIR INLET SYSTEM- WATER-COOLED



02250128-273R00

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.6 AIR INLET SYSTEM- WATER-COOLED

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	filter, air inlet <b>(I)</b>	02250059-096	1
2	valve, inlet air <b>(II)</b>	02250060-988	1
3	hose, flexible 5" id vacuum	02250093-920	1
4	tube, air inlet adapt 5"	02250126-730	1
5	support, air filter	02250136-184	1
6	band, receiver 12.0" dia.	040081	1
7	gasket, 1/32 x 6 1/4id x 8 1/4od	040696	1
8	clamp, hose 7"	041992	1
9	clamp, hose 5"	047263	3
10	elbow, 90 deg rubber	250002-802	1
11	capscr, hex gr5 1/2-13 x 1 1/2	829108-150	8
12	screw, hex ser washer 3/8-16 x 1	829706-100	4
13	washer, spr lock reg pltd 1/2	837808-125	8

**(I)** For maintenance on air inlet filter no. 02250059-096, order primary replacement element no. 02250046-012, and secondary replacement element no. 02250046-013.

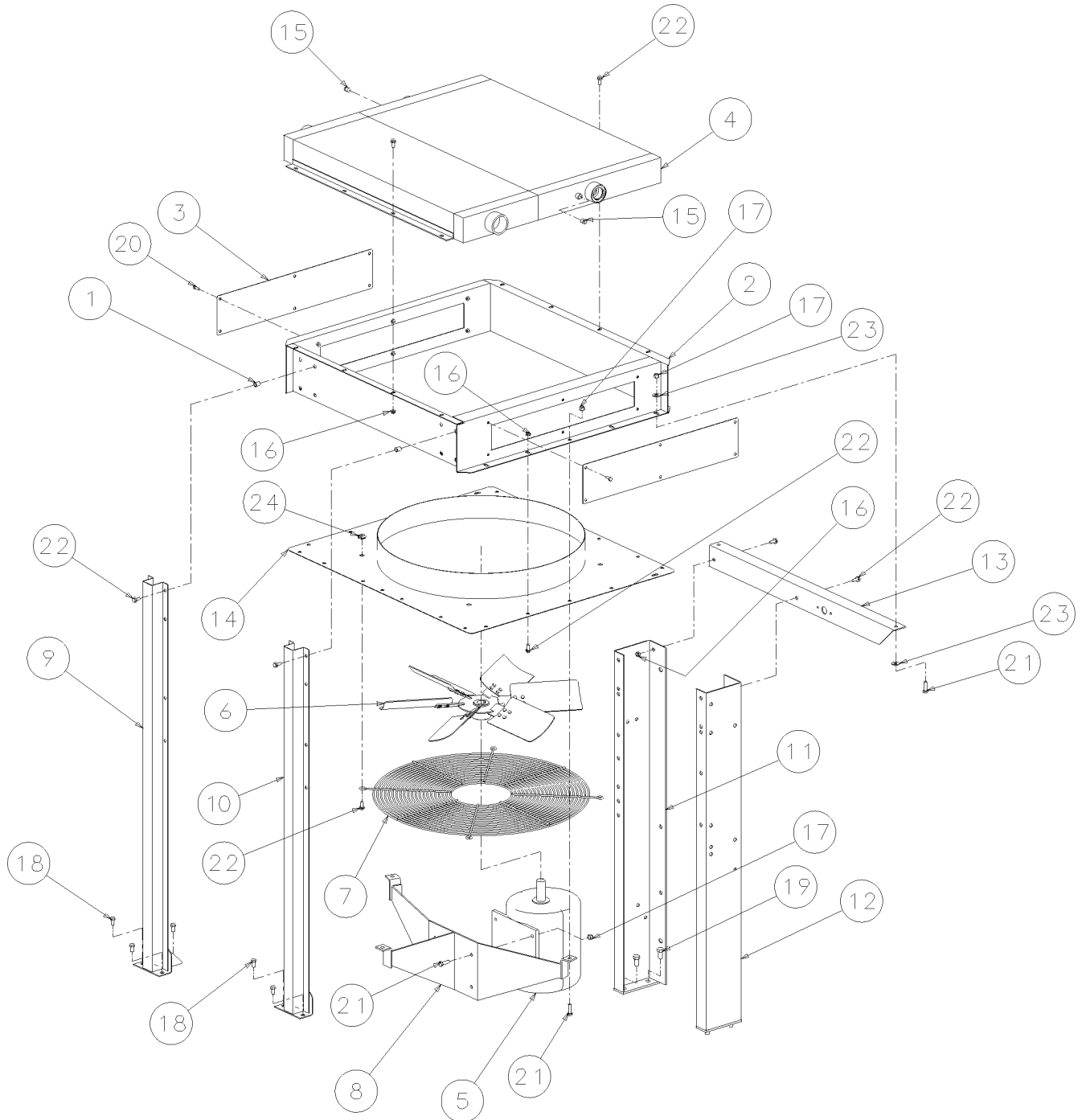
**(II)** For maintenance on inlet air valve no. 02250060-988, order repair kit no. 02250053-273.

---

**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.7 FLUID COOLING SYSTEM- AIR-COOLED



02250128-280R00

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.7 FLUID COOLING SYSTEM- AIR-COOLED

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	insert, 5/16"-18 thrd blind	02250043-765	8
2	venturi, cooler w/access hole	02250127-771	1
3	cover, access venturi (I)	02250127-774	2
4	cooler, air/oil 100hp	02250131-980	1
5	motor, 3hp 230/460/60 4p teep	041035	1
6	fan, 26" dia	241908	1
7	guard, fan	250006-220	1
8	support, fan motor	250017-502	1
9	support, a.c. ls12/16 54-1/4"	250017-630	1
10	support, a.c. ls12/16 51-1/4"	250017-631	1
11	support, starter rh	250017-977	1
12	support, starter lh	250017-978	1
13	angle, cooler support ls16-75	250017-996	1
14	panel, venturi fan	250018-183	1
15	plug, pipe 1/4" 3000# stl	807800-010	2
16	nut, hex f pltd 5/16-18	825305-283	28
17	nut, hex locking 3/8-16	825506-198	9
18	capscr, hex gr8 3/8-16 x 3/4	827906-075	5
19	capscr, hex gr8 1/2-13 x 1	827908-100	4
20	capscr, hex gr5 1/4-20 x 3/4	829104-075	12
21	capscr, hex gr5 3/8-16 x 1 1/4	829106-125	9
22	screw, hex ser washer 5/16-18 x 3/4	829705-075	40
23	washer, pl-b reg unfin 3/8	837206-071	4
24	nut, retainer 5/16-18 .092	861405-092	4



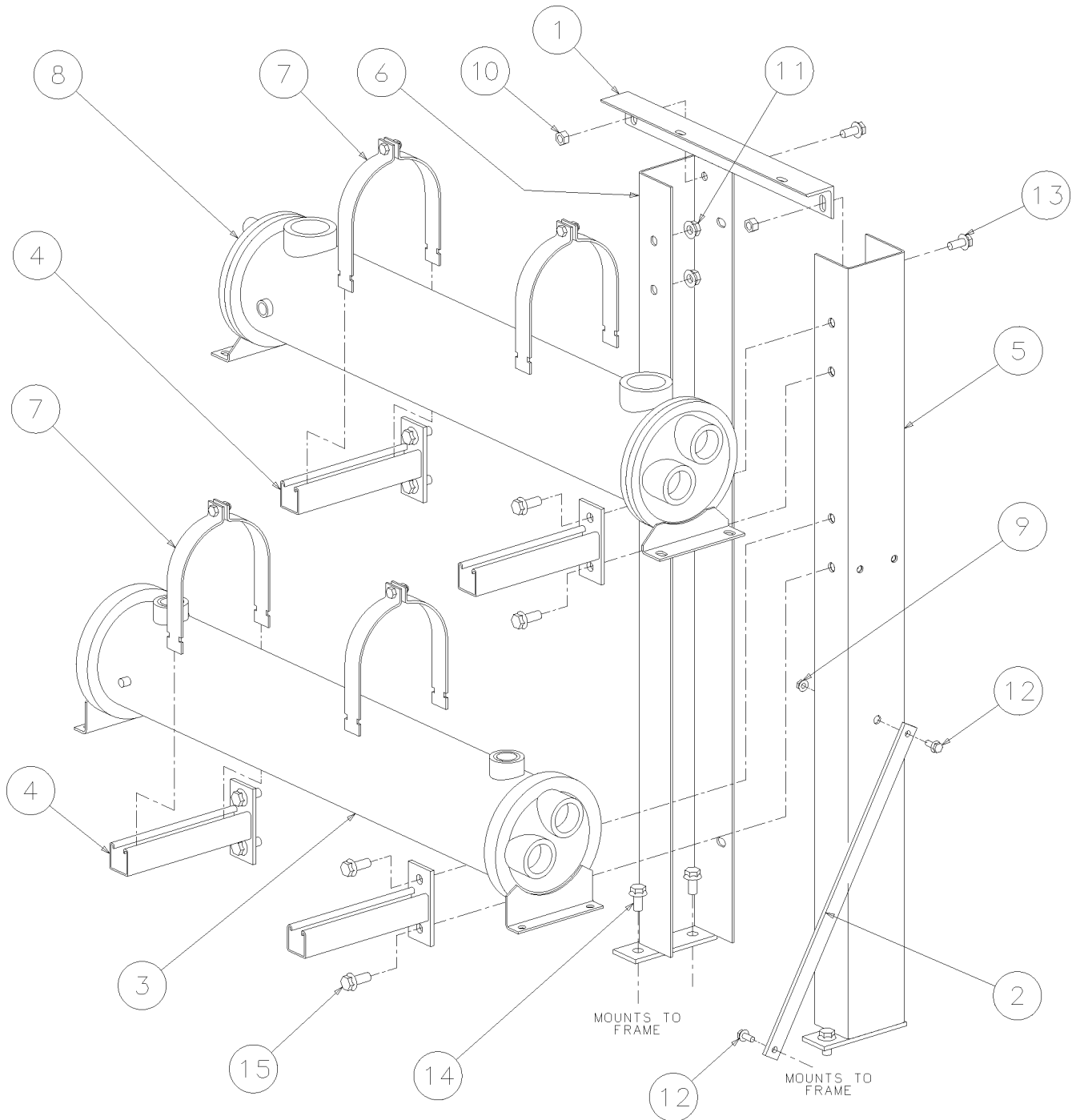
(I) DO NOT operate compressor without cooler access panles in place.

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.8 FLUID COOLING SYSTEM- WATER-COOLED



02250128-281R00

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.8 FLUID COOLING SYSTEM- WATER-COOLED

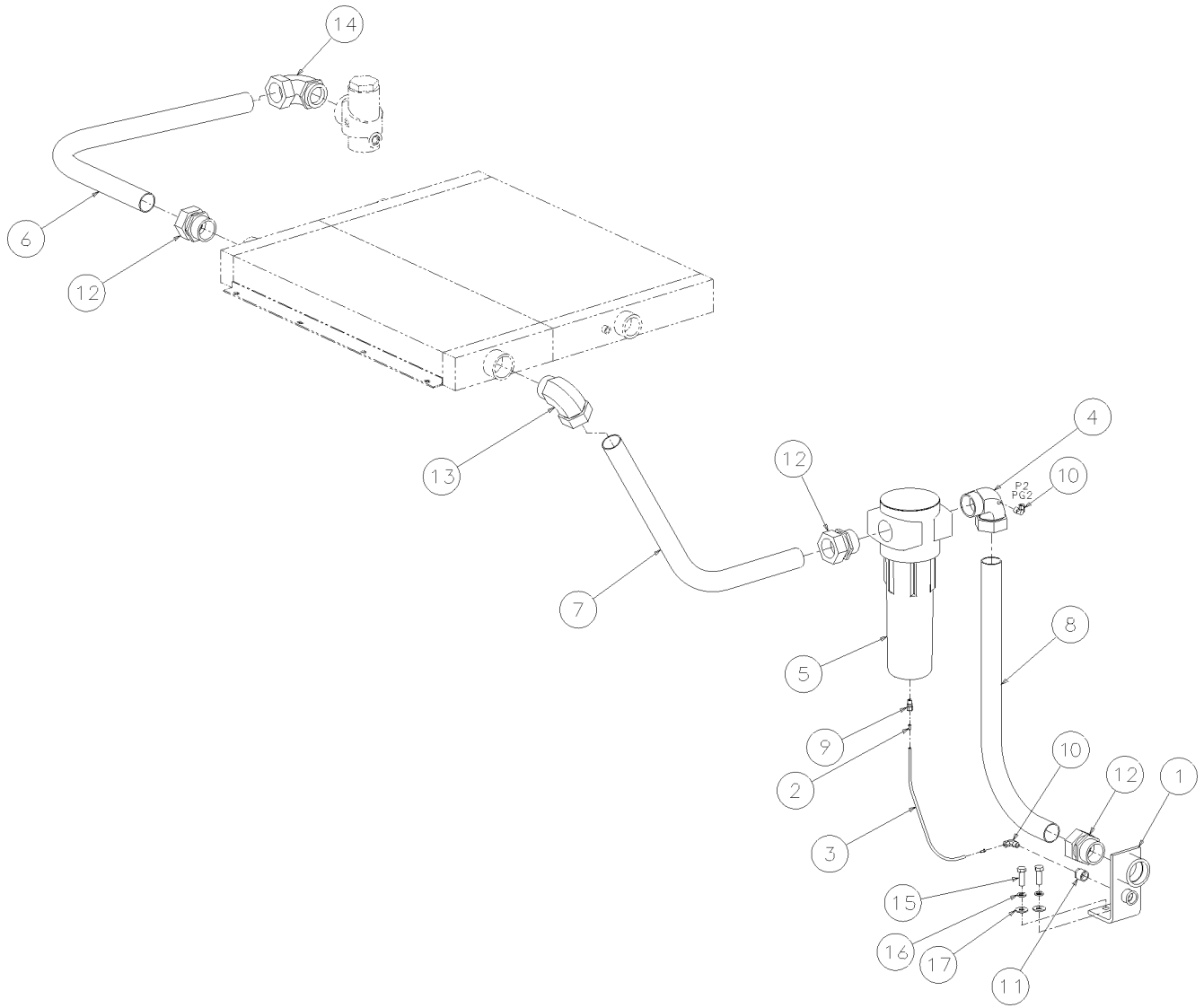
<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	angle, supt instr panel	02250044-407	1
2	support, start-frame plate 12/16wc	02250108-490	1
3	cooler, oil/water 6"x 36" 1-5/8"sae	02250120-863	1
4	support, bracket de18 b-line b409-9	02250121-484	4
5	support, starter lh ls20 wc	02250128-680	1
6	support, starter rh ls20 w/c	02250128-681	1
7	clamp, pipe 6"	02250128-716	4
8	cooler, aftclr 2" npt air/1-1/2" npt wtr	043008	1
9	nut, hex f pltd 5/16-18	825305-283	1
10	nut, hex f pltd 7/16-14	825307-394	2
11	nut, hex f pltd 1/2-13	825308-458	8
12	screw, hex ser washer 5/16-18 x 3/4	829705-075	2
13	screw, hex ser washer 7/16-14 x 1	829707-100	2
14	screw, hex ser washer 1/2-13 x 1	829708-100	4
15	screw, hex ser washer 1/2-13 x 1 1/4	829708-125	8

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.9 AIR PIPING SYSTEM- AIR-COOLED



02250128-274R00

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.9 AIR PIPING SYSTEM- AIR-COOLED

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	support, air conn and cond drn	02250045-613	1
2	insert, nylon tubing 1/4"od	02250052-841	2
3	tube, nylon 1/4"od x .040"w	02250054-861	1
4	elbow, tube m-2 x 2 w/1/4"tap	02250110-165	1
5	separator, water 2" (I)	02250126-818	1
6	tube, mpv to aftclr 2"	02250129-726	1
7	tube, aftercooler to moistsep 2"	02250129-727	1
8	tube, separator disch top 2"	02250129-728	1
9	connector, 1/4t x 1/8 npt str	250018-427	1
10	elbow, 90 1/4t pls x 1/4 npt m	250018-430	2
11	bushing, red stl 3/4 x 1/4	807603-010	1
12	connector, tube-m 2 x 2	810232-200	3
13	elbow, tube 90 deg m 2 x 2	810532-200	1
14	elbow, tube str thrd 2 x 2 1/2	811632-250	1
15	capscr, hex gr5 1/2-13 x 1 1/2	829108-150	2
16	washer, spr lock reg pltd 1/2	837808-125	2
17	washer, pl-b reg pltd 1/2	838208-112	2

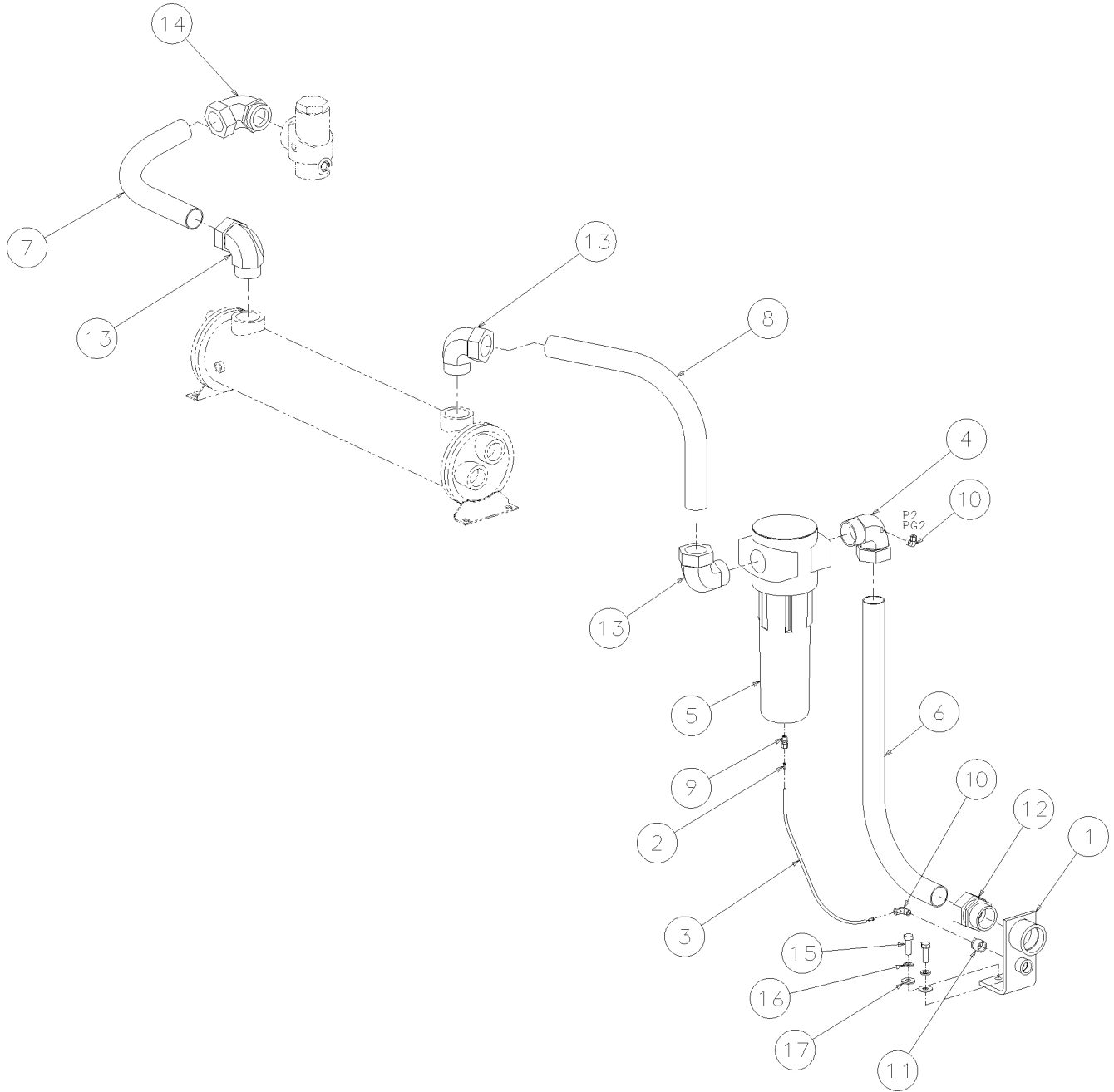
(I) For maintenance on water separator no. 02250126-818, order replacement kit no. 02250129-174, and/or automatic drain kit no. 02250129-175.

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.10 AIR PIPING SYSTEM- WATER-COOLED



02250128-275R00

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.10 AIR PIPING SYSTEM- WATER-COOLED

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	support, air conn and cond drn	02250045-613	1
2	insert, nylon tubing 1/4"od	02250052-841	2
3	tube, nyl .25 od x .040"w	02250054-861	1
4	elbow, tube m-2 x 2 w/1/4"tap	02250110-165	1
5	separator, water 2" (I)	02250126-818	1
6	tube, separator disch top 2"	02250129-728	1
7	tube, mpv to wcaftclr 2"	02250129-733	1
8	tube, wcaftclr to moistsep 2"	02250129-734	1
9	connector, 1/4t x 1/8 npt str	250018-427	1
10	elbow, 90 1/4t pls x 1/4 npt m	250018-430	2
11	bushing, red stl 3/4 x 1/4	807603-010	1
12	connector, tube-m 2 x 2	810232-200	1
13	elbow, tube 90 deg m 2 x 2	810532-200	3
14	elbow, tube str thrd 2 x 2 1/2	811632-250	1
15	capscr, hex gr5 1/2-13 x 1 1/2	829108-150	2
16	washer, spr lock reg pltd 1/2	837808-125	2
17	washer, pl-b reg pltd 1/2	838208-112	2

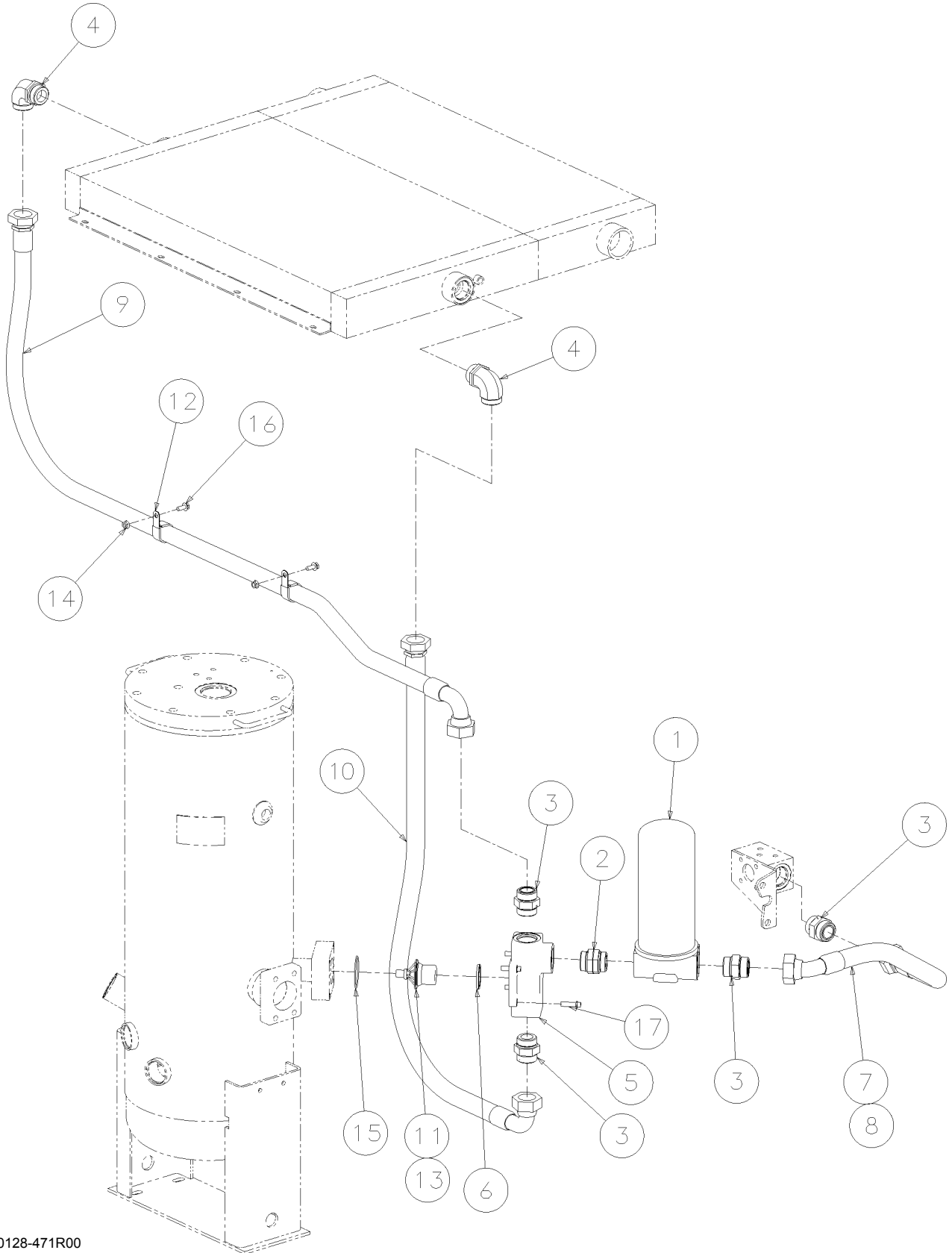
(I) For maintenance on water separator no. 02250126-818, order replacement kit no. 02250129-174, and/or automatic drain kit no. 02250129-175.

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.11 FLUID PIPING SYSTEM- AIR-COOLED



02250128-471R00

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.11 FLUID PIPING SYSTEM- AIR-COOLED

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	filter, fluid 1 5/8" sae str thrd con <b>(I)</b>	02250054-605	1
2	adapter, sae 1 5/8-12 x 1 5/8-12	02250055-015	1
3	connector, sae x orfs 1.25"	02250087-068	4
4	elbow, 90 sae x orfs 1.25"	02250087-071	2
5	housing, therm vlv 1 5/8" conn w/ extra	02250092-929	1
6	seal, u-cup therm vlv	02250101-372	1
7	hose, lp f-orfs 1.125 x 30"	02250136-958	1
8	hose, lp f-orfs 1.125 x 27"	02250136-959	1
9	hose, lp f-orfs 1.125 x 79"	02250136-961	1
10	hose, lp f-orfs 1.125 x 58"	02250136-962	1
11	element, thermal vlv 175 deg <b>(II)</b>	049542	1
12	clamp, tube rubr ctd 1-3/8" dia	250025-638	2
13	element, thermal valve 190 deg <b>(III)</b>	250028-762	1
14	nut, hex f pltd 5/16-18	825305-283	2
15	o-ring, viton 2 1/2 x 3/32"	826502-144	1
16	screw, hex ser washer 5/16-18 x 3/4	829705-075	2
17	capscrew, ferry head hd pltd 3/8-16 x 1 1/4	867306-125	4

**(I)** For maintenance on fluid filter no. 02250054-605, order replacement element no. 250025-526.

**(II)** For maintenance on thermal valve no. 049542, order repair kit no. 02250105-553.

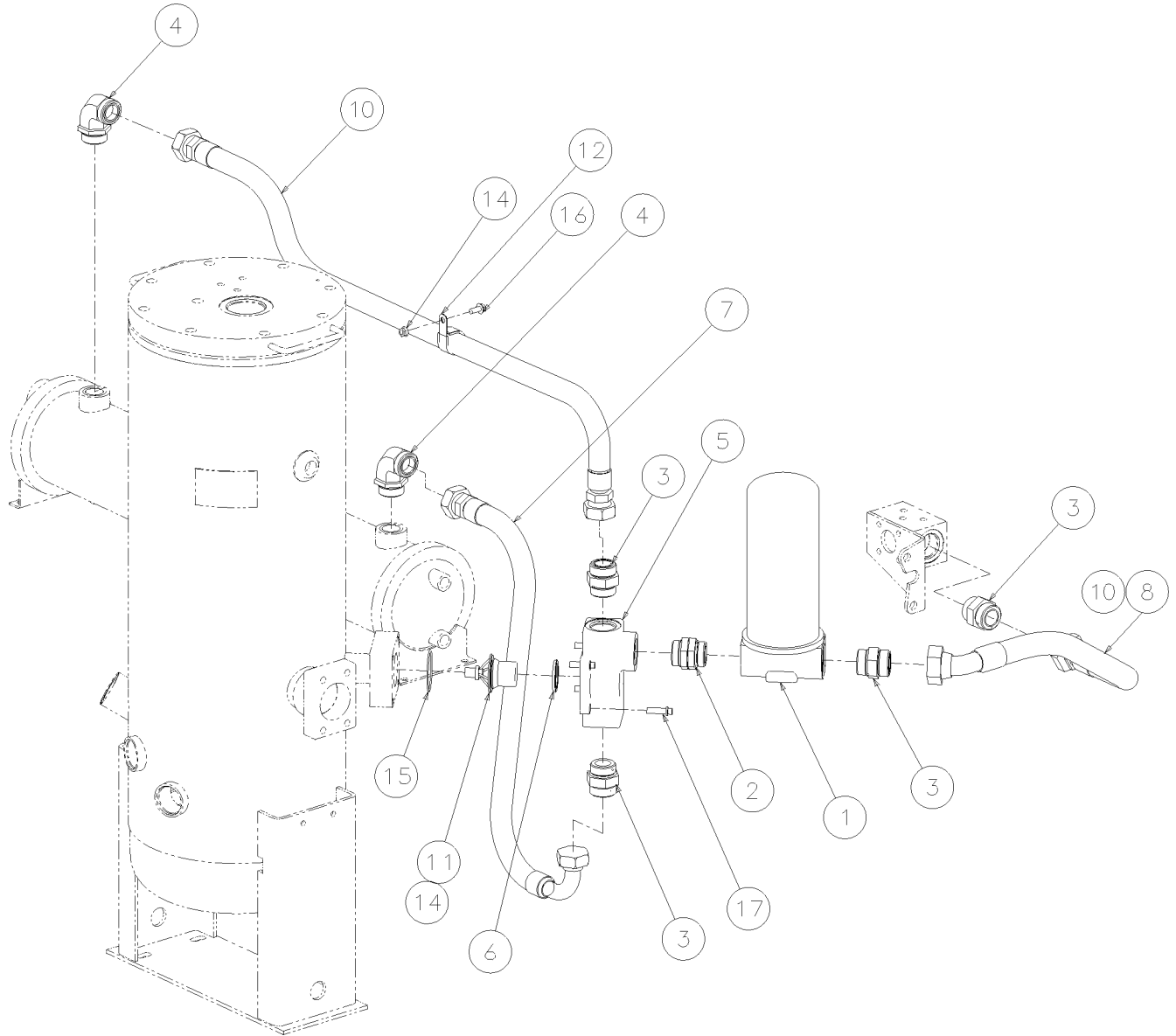
**(III)** For maintenance on thermal valve no. 250028-762, order repair kit no. 02250112-709.

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.12 FLUID PIPING SYSTEM- WATER-COOLED



02250128-472R00

## Section 12

# ILLUSTRATIONS AND PARTS LIST

### 12.12 FLUID PIPING SYSTEM- WATER-COOLED

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	filter, fluid 1 5/8" sae str thrd con (I)	02250054-605	1
2	adapter, sae 1 5/8-12 x 1 5/8-12	02250055-015	1
3	connector, sae x orfs 1.25"	02250087-068	4
4	elbow, 90 sae x orfs 1.25"	02250087-071	2
5	housing, therm vlv 1 5/8" conn w/ extra	02250092-929	1
6	seal, u-cup therm vlv	02250101-372	1
7	hose, lp f-orfs 1.125 x 37"	02250136-957	1
8	hose, lp f-orfs 1.125 x 30"	02250136-958	1
9	hose, lp f-orfs 1.125 x 27"	02250136-959	1
10	hose, lp f-orfs 1.125 x 53"	02250136-960	1
11	element, thermal vlv 175 deg (II)	049542	1
12	clamp, tube rubr ctd 1-3/8" dia	250025-638	1
13	element, thermal valve 190 deg (III)	250028-762	1
14	nut, hex f pltd 5/16-18	825305-283	1
15	o-ring, viton 2 1/2 x 3/32"	826502-144	1
16	screw, hex ser washer 5/16-18 x 3/4	829705-075	1
17	capscrew, ferry head hd pltd 3/8-16 x 1 1/4	867306-125	4

(I) For maintenance on fluid filter no. 02250054-605, order replacement element no. 250025-526.

(II) For maintenance on thermal valve no. 049542, order repair kit no. 02250105-553.

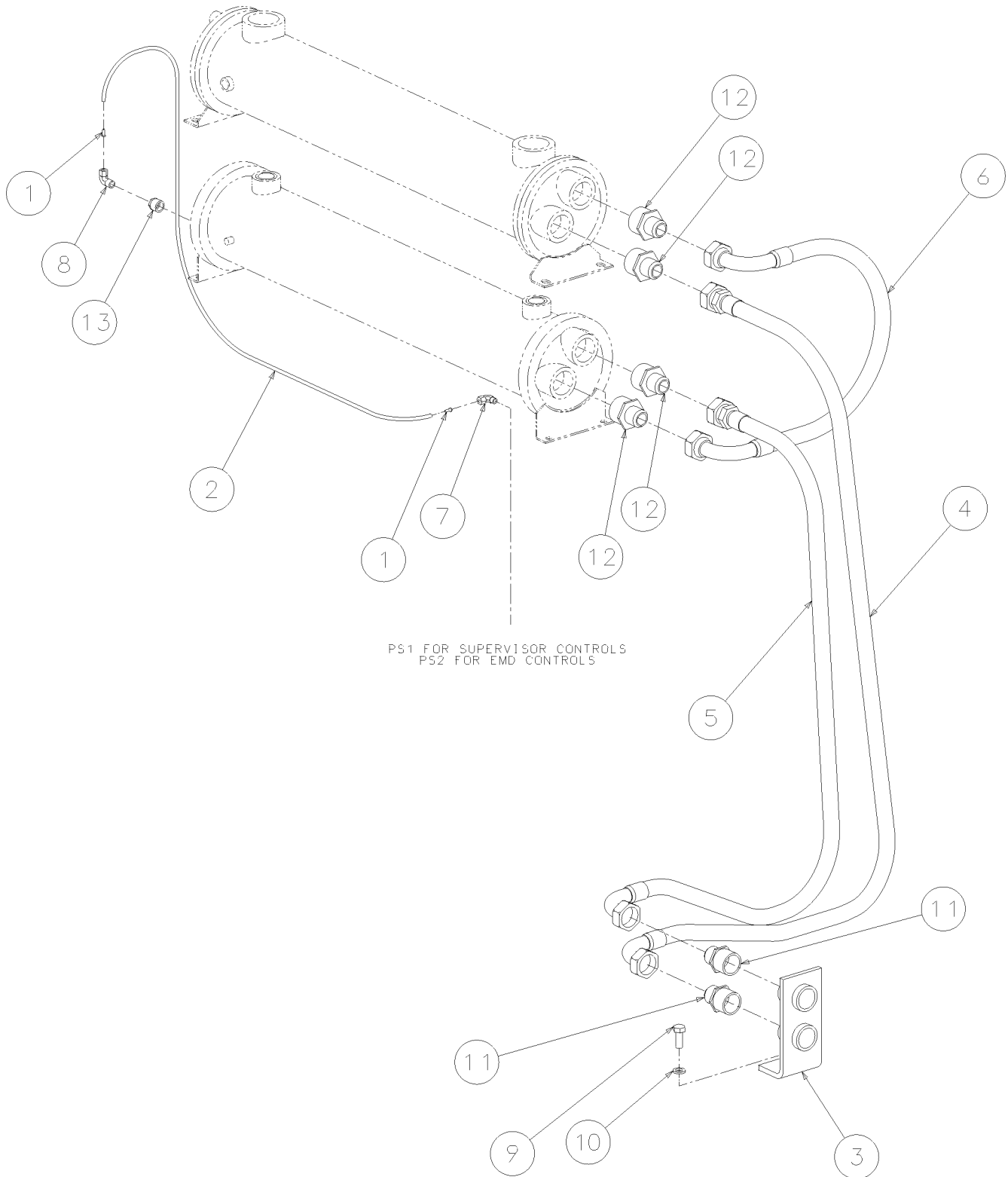
(III) For maintenance on thermal valve no. 250028-762, order repair kit no. 02250112-709.

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.13 WATER PIPING



02250128-588R00

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.13 WATER PIPING

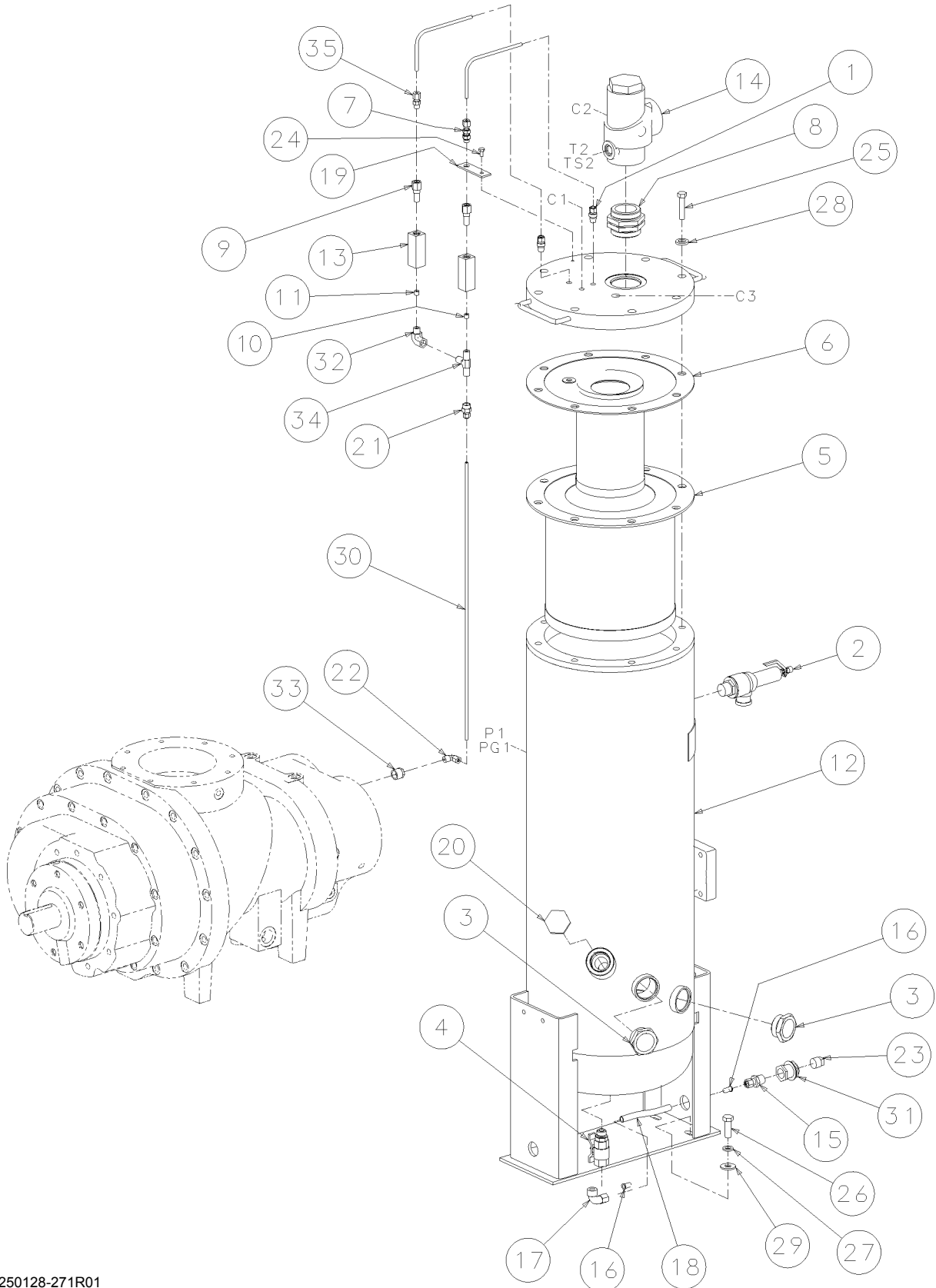
<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	insert, nylon tubing 1/4"od	02250052-841	2
2	tube, nyl .25 od x .040"	02250054-861	1
3	support, water conn 1-1/4"	02250131-777	1
4	hose, hydraulic parkrimp 1" x 73"	02250135-624	1
5	hose, hydraulic parkrimp 1" x 60"	02250135-625	1
6	hose, hydraulic parkrimp 1" x 28"	02250135-626	1
7	elbow, 90 1/4t pls x 1/8 npt m	250018-429	1
8	elbow, 90 1/4t pls x 1/4 npt m	250018-430	1
9	capscr, hex gr5 1/2-13 x 1 1/4	829108-125	1
10	washer, spr lock reg pltd 1/2	837808-125	1
11	connector, 37 fl/mpt pltd 1 x 1 1/4	860116-125	2
12	connector, 37 fl/mpt pltd 1 x 1 1/2	860116-150	4
13	bushing, red hex pltd 1/2 x 1/4	868902-010	1

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.14 SUMP AND PARTS



02250128-271R01

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.14 SUMP AND PARTS

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	connector, flex 1/4t x 1/4p	020169	2
2	valve, relief 200#	02250097-349	1
3	plug, sight glass 1-7/8" sae	02250097-611	2
4	valve, ball 3/4" sae-m x 1/2" npt-f	02250098-303	1
5	separator, air/oil primary ls-12/16 (I)	02250100-753	1
6	separator, air/oil secondary ls-12/16 (II)	02250100-754	1
7	connector, tube male bhd 1/4 x sae	02250101-490	1
8	adapter, sae 2-1/2-12 x 2-1/2-12	02250110-661	1
9	filter, assembly genesis filter	02250117-782	2
10	orifice, plug brass 1/8" npt x 1/32"	02250125-774	1
11	orifice, plug brass 1/8" npt x 1/16"	02250125-775	1
12	tank, air/oil separator	02250125-995	1
13	sightglass, orf block sae	02250126-129	2
14	valve, min pressure 2-1/2"-sae (II)	02250129-374	1
15	connector, tube 1/2tube x 1/2npt	02250134-500	1
16	insert, nyl tbg 1/2 od x .062 w	02250134-503	2
17	elbow, tube-m 1/2" compr	02250134-504	1
18	tube, nylon 1/2" o.d.	02250134-505	1
19	support, sight glass	02250134-697	1
20	plug, o-ring boss sae 1 1/4	040029	1
21	connector, tube-f 1/4" swgk ss	250139-044	1
22	elbow, tube-m 1/4" swgk ss	250211-005	1
23	plug, pipe 1/2" 3000# stl	807800-020	1
24	capscr, hex gr5 1/4-20 x 1/2	829104-050	1
25	capscr, hex gr5 7/16-14 x 2	829107-200	8
26	capscr, hex gr5 1/2-13 x 1 1/2	829108-150	4
27	washer, spr lock reg pltd 1/2	837808-125	4
28	washer, spr lock reg pltd 5/8	837810-156	8
29	washer, pl-b reg pltd 1/2	838208-112	4
30	tubing, stnls stl 1/4" 20 ga	841215-004	6

(Continued on page 109)

(I) For maintenance on separator, order primary replacement element no. 02250100-755, and secondary replacement element no. 02250100-756.

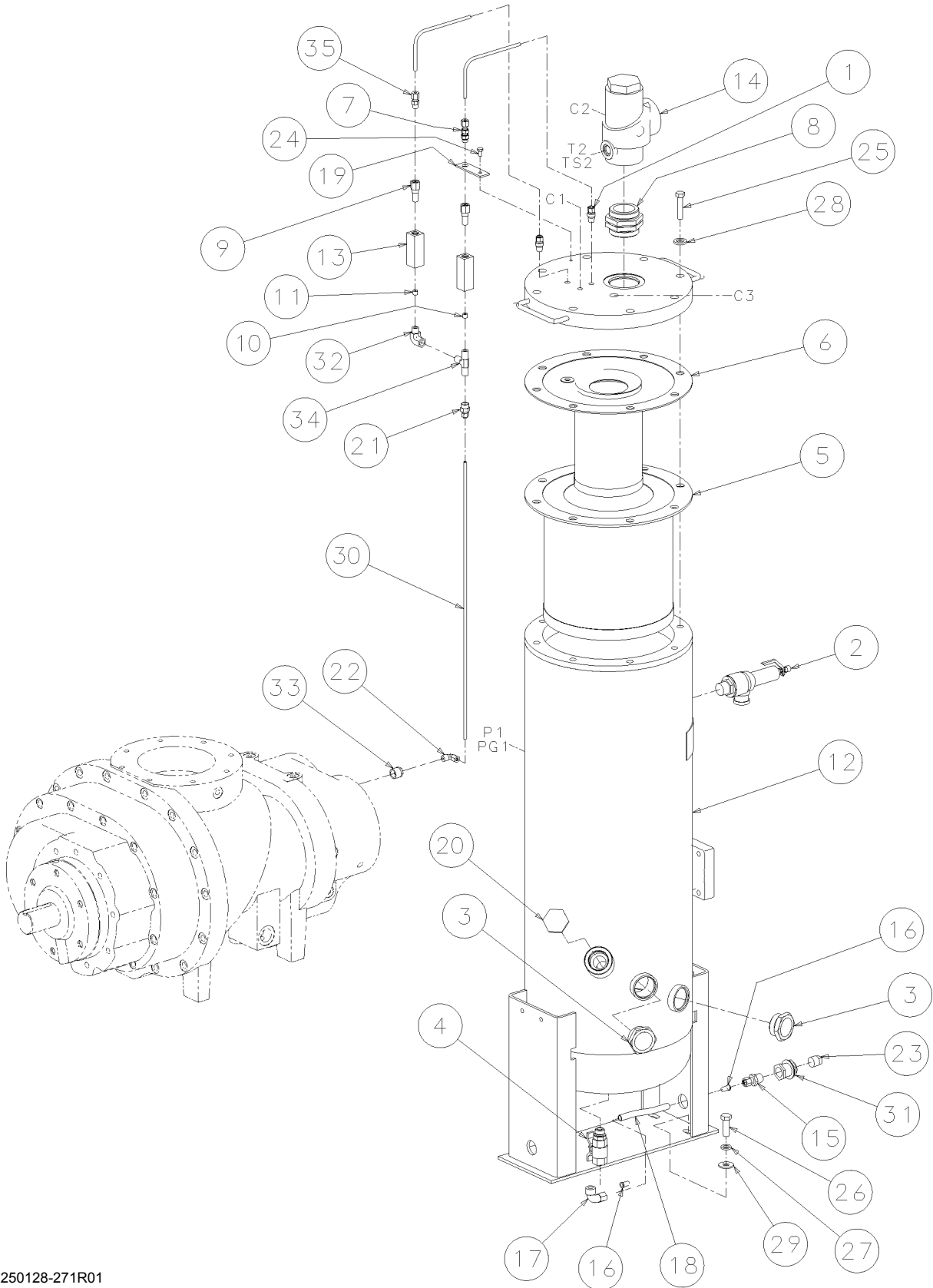
(II) For maintenance on minimum pressure valve no. 02250129-374, order repair kit no. 250018-456.

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.14 SUMP AND PARTS



02250128-271R01

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.14 SUMP AND PARTS (CONTINUED)

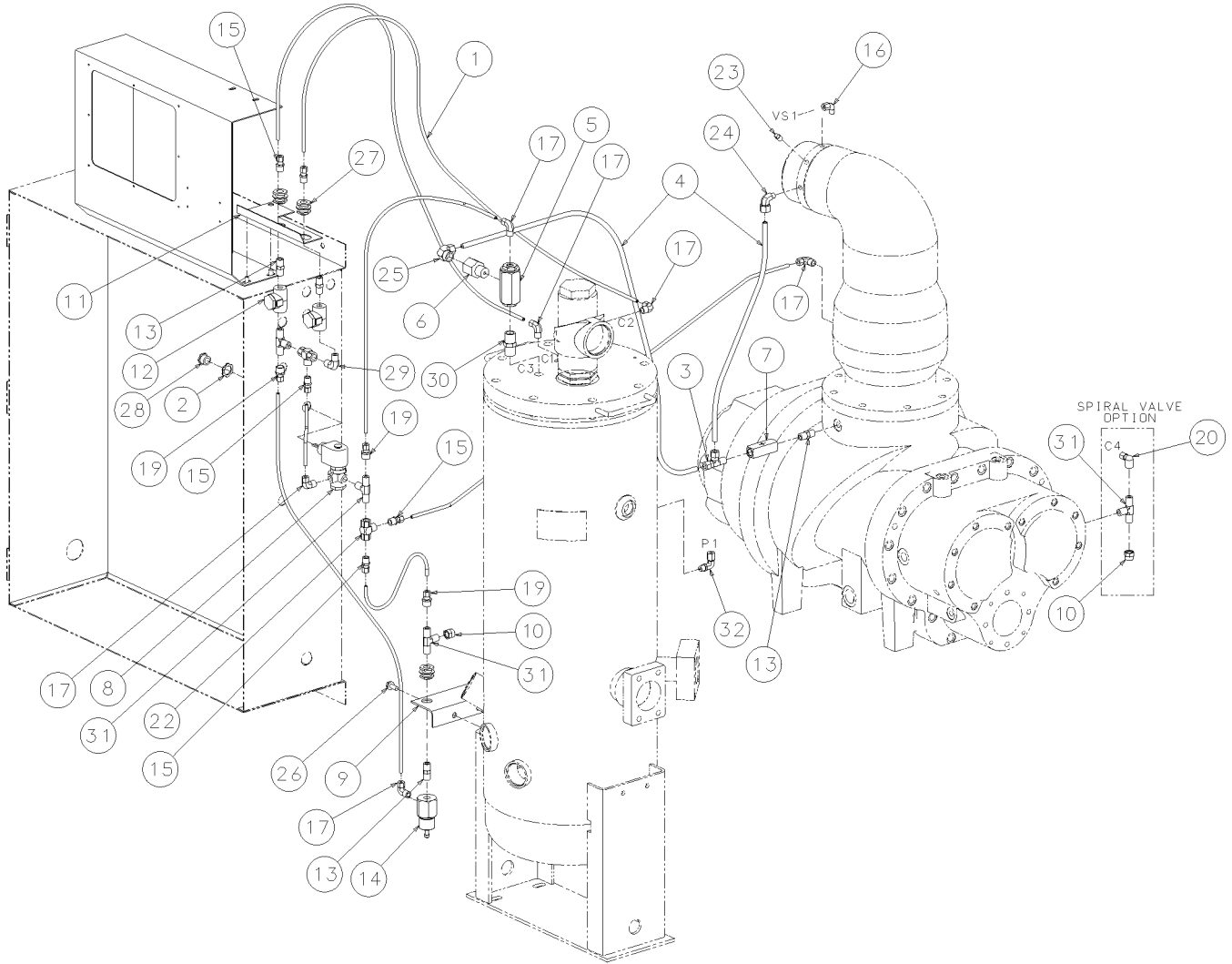
<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
31	bulkhead, pipe 1/2" npt	841500-008	1
32	elbow, pipe 90m/f 1/4 x 1/4	860704-025	1
33	bushing, red hex pltd 1/2 x 1/4	868902-010	1
34	tee,male pipe brass 1/4	869825-025	1
35	connector, tb-m str thd ss 1/4 x 7/16	870904-044	1

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

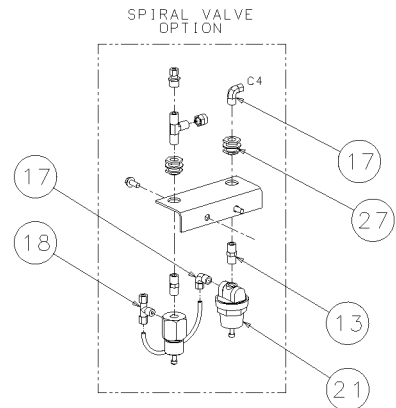
## 12.15 PNEUMATIC CONTROLS- SUPERVISOR CONTROLLER



**NOTES:**

1 ALL NYLON TUBING ENDS REQUIRE BRASS INSERTS AS FOLLOWS:

- 1/4"-TUBING INSERT P/N 02250052-841
- 3/8"-TUBING INSERT P/N 02250099-052



02250128-585R02

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.15 PNEUMATIC CONTROLS- SUPERVISOR CONTROLLER

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	tube, nylon 1/4"od x .040"	02250054-861	21
2	locknut, n4 conduit sealing	02250071-362	1
3	tee, male run 3/8t x 1/4npt	02250099-615	1
4	tube, nylon 3/8"od x .063"	02250099-630	3
5	valve, 1/2 bldwn 1.8:1 250 psig <b>(I)</b>	02250100-042	1
6	orifice, 1/2m x 1/2f x .203	02250109-351	1
7	valve, check 1/4" poppet style	02250115-272	1
8	valve, solenoid 3wy no 1/4" n4 <b>(II)</b>	02250125-657	1
9	support, bracket pneu ctls	02250129-999	1
10	orifice, cap .031" x 1/4" npt	02250132-934	2
11	support, bracket strainer	02250134-380	1
12	strainer, v-type 300psix1/4 <b>(III)</b>	241771	2
13	nipple, brass hex 1/4"-npt	249537	5
14	valve, pressure regulator <b>(IV)</b>	250017-280	1
15	connector, 1/4t x 1/4 npt str	250018-428	5
16	elbow, 90 1/4"tube x 1/8"npt	250018-429	1
17	elbow, 90 1/4t pls x 1/4 npt m	250018-430	8
18	tee, male 1/4 tube x 1/4 npt	250028-582	1
19	connector, fem 1/4t x 1/4 npt	250041-084	3
20	elbow, 90d 1/4" tube x 1/4"fnpt	250041-287	1
21	valve, pressure reg 100psi <b>(V)</b>	408275	1
22	valve, shuttle 1/4" npt (dbl chk)	408893	2
23	plug, pipe 1/8" 3000# stl	807800-005	1
24	elbow, tube 90 deg m 3/8 x 1/8	812406-012	1
25	elbow, tube 90 deg m 3/8 x 1/2	812406-050	1
26	screw, hex ser washer 5/16-18 x 3/4	829705-075	2

(Continued on page 113)

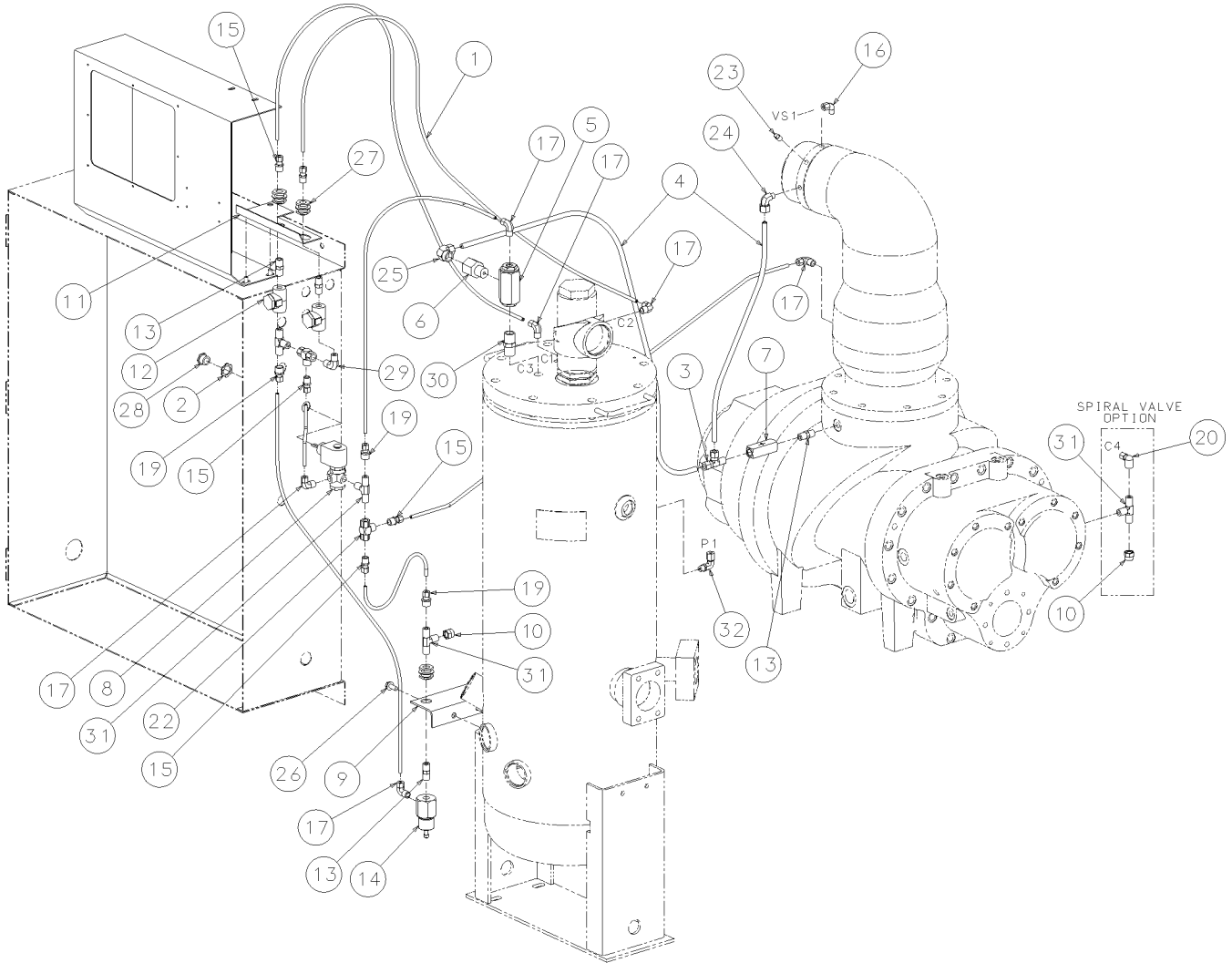
- (I)** For maintenance on blowdown valve no. 02250100-042, order repair kit no. 02250100-042.
- (II)** For maintenance on solenoid valve no. 02250125-657, order repair kit no. 02250125-829, and replacement coil no. 02250125-861.
- (III)** For maintenance on strainer no. 241771, order repair kit no. 241772.
- (IV)** For maintenance on pressure regulator valve no. 250017-280, order repair kit no. 250019-453.
- (V)** For maintenance on pressure regulator valve no. 408275 (spiral valve), order repair kit no. 250028-693.

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.15 PNEUMATIC CONTROLS- SUPERVISOR CONTROLLER

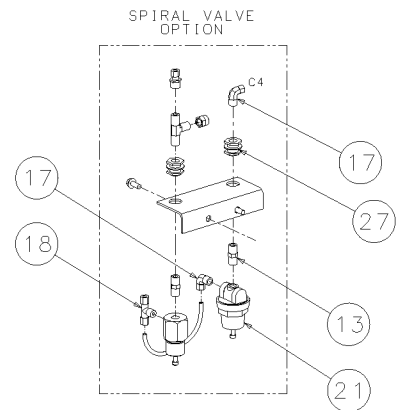


NOTES:



ALL NYLON TUBING ENDS REQUIRE BRASS INSERTS AS FOLLOWS:

- 1/4"-TUBING INSERT P/N 02250052-841
- 3/8"-TUBING INSERT P/N 02250099-052



## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.15 PNEUMATIC CONTROLS- SUPERVISOR CONTROLLER (CONTINUED)

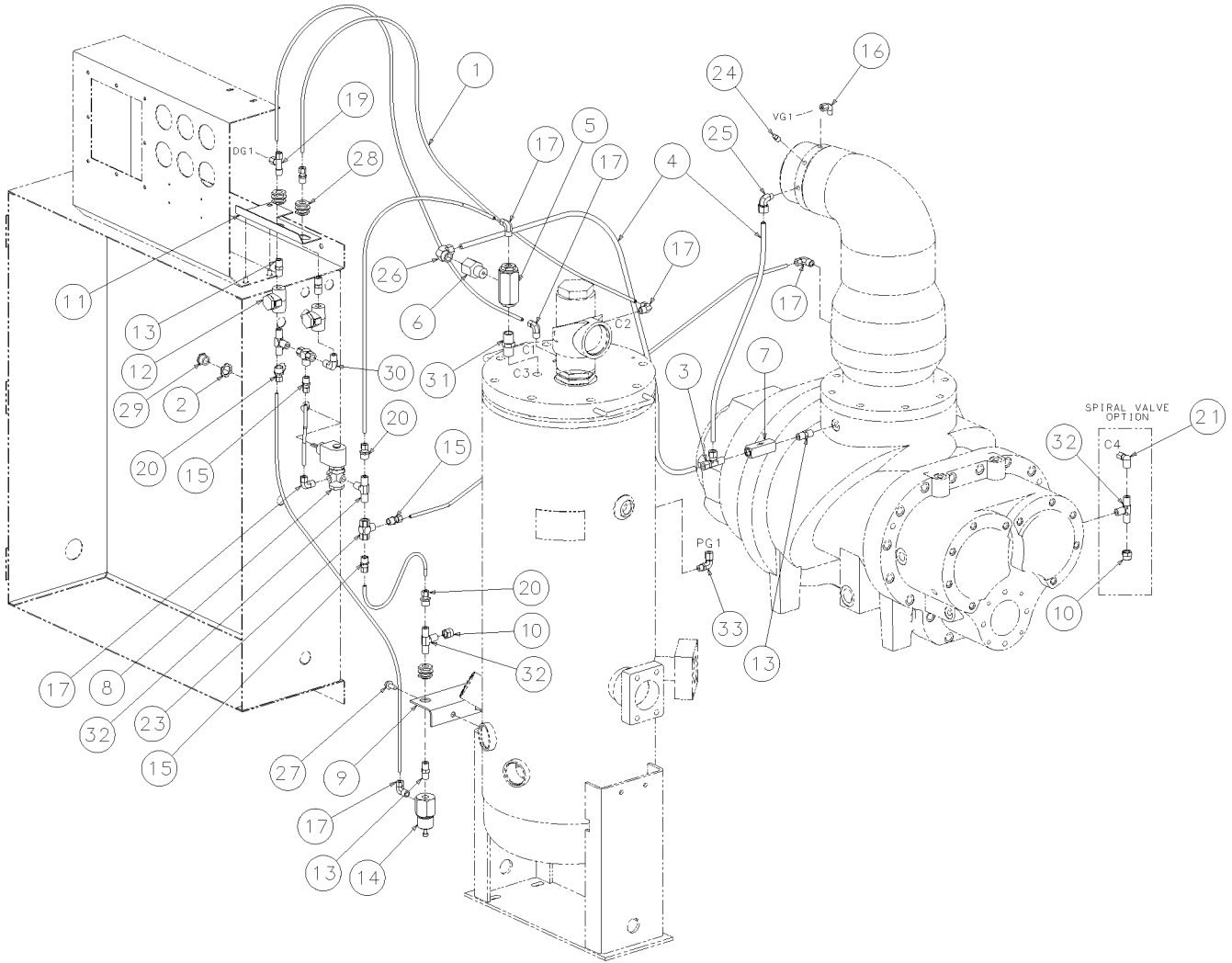
<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
27	bulkhead, pipe 1/4" npt	841500-004	4
28	nipple, chase cond 1/2	847815-050	1
29	elbow, pipe-90m 1/4 x 1/4	860504-025	1
30	nipple, pipe-hx pltd 1/2 x 1/2	868508-050	1
31	tee, male pipe brass 1/4	869825-025	4
32	elbow, tb-m str thd ss 1/4 x 7/16	870804-044	1

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.16 PNEUMATIC CONTROLS- ELECTRO-MECHANICAL



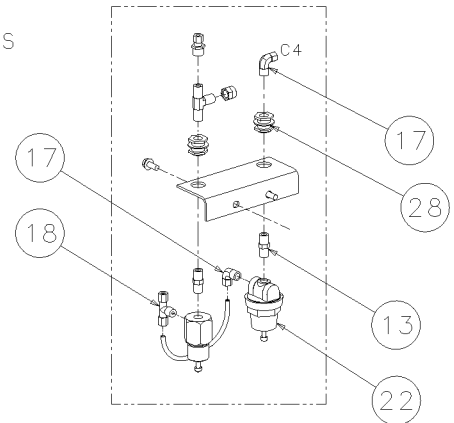
NOTES:



1 ALL NYLON TUBING ENDS REQUIRE BRASS INSERTS AS FOLLOWS:

- 1/4"-TUBING INSERT P/N 02250052-841
- 3/8"-TUBING INSERT P/N 02250099-052

SPIRAL VALVE  
OPTION



## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.16 PNEUMATIC CONTROLS- ELECTRO-MECHANICAL

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	tube, nylon 1/4"od x .040"	02250054-861	21
2	locknut, n4 conduit sealing	02250071-362	1
3	tee, male run 3/8t x 1/4npt	02250099-615	1
4	tube, nylon 3/8"od x .063"	02250099-630	3
5	valve, 1/2 bldwn 1.8:1 250 psig <b>(I)</b>	02250100-042	1
6	orifice, 1/2m x 1/2f x .203	02250109-351	1
7	valve, check 1/4" poppet style	02250115-272	1
8	valve, solenoid 3wy no 1/4" n4 <b>(II)</b>	02250125-657	1
9	support, bracket pneu ctls	02250129-999	1
10	orifice, cap .031" x 1/4" npt	02250132-934	2
11	support, bracket strainer	02250134-380	1
12	strainer, v-type 300psix1/4 <b>(III)</b>	241771	2
13	nipple, brass hex 1/4"-npt	249537	5
14	valve, pressure regulator <b>(IV)</b>	250017-280	1
15	connector, 1/4t x 1/4 npt str	250018-428	4
16	elbow, 90 1/4"tube x 1/8"npt	250018-429	1
17	elbow, 90 1/4t pls x 1/4 npt m	250018-430	8
18	tee, male 1/4 tube x 1/4 npt	250028-582	1
19	tee, male run 1/4 tube x 1/4 npt	250038-059	1
20	connector, fem 1/4t x 1/4 npt	250041-084	3
21	elbow, 90d 1/4" tube x 1/4"fnpt	250041-287	1
22	valve, pressure reg 100psi <b>(V)</b>	408275	1
23	valve, shuttle 1/4" npt (dbl chk)	408893	2
24	plug, pipe 1/8" 3000# stl	807800-005	1
25	elbow, tube 90 deg m 3/8 x 1/8	812406-012	1
26	elbow, tube 90 deg m 3/8 x 1/2	812406-050	1

(Continued on page 117)

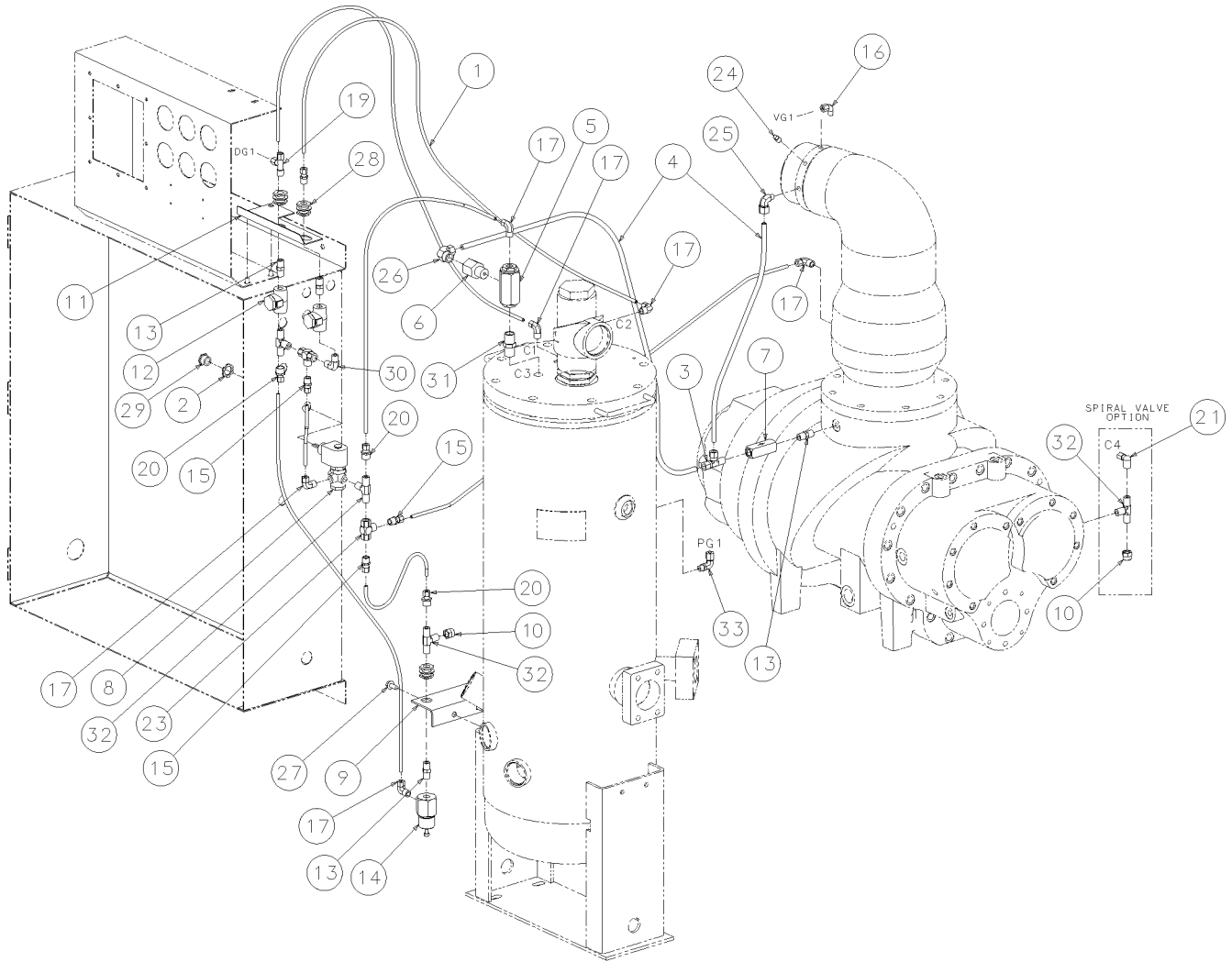
- (I)** For maintenance on blowdown valve no. 02250100-042, order repair kit no. 02250100-042.
- (II)** For maintenance on solenoid valve no. 02250125-657, order repair kit no. 02250125-829, and replacement coil no. 02250125-861.
- (III)** For maintenance on strainer no. 241771, order repair kit no. 241772.
- (IV)** For maintenance on pressure regulator valve no. 250017-280, order repair kit no. 250019-453.
- (V)** For maintenance on pressure regulator valve no. 408275 (spiral valve), order repair kit no. 250028-693.

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.16 PNEUMATIC CONTROLS- ELECTRO-MECHANICAL

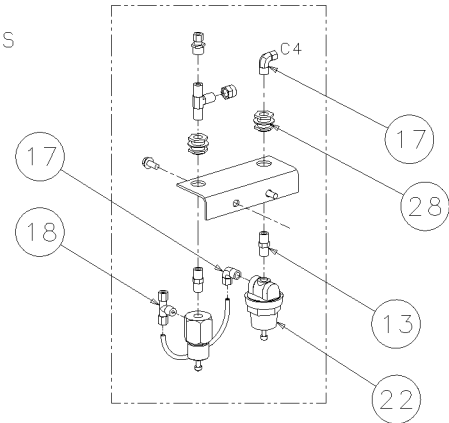


NOTES:

ALL NYLON TUBING ENDS REQUIRE BRASS INSERTS AS FOLLOWS:

- 1/4"-TUBING INSERT P/N 02250052-841
- 3/8"-TUBING INSERT P/N 02250099-052

SPIRAL VALVE  
OPTION



## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.16 PNEUMATIC CONTROLS- ELECTRO-MECHANICAL (CONTINUED)

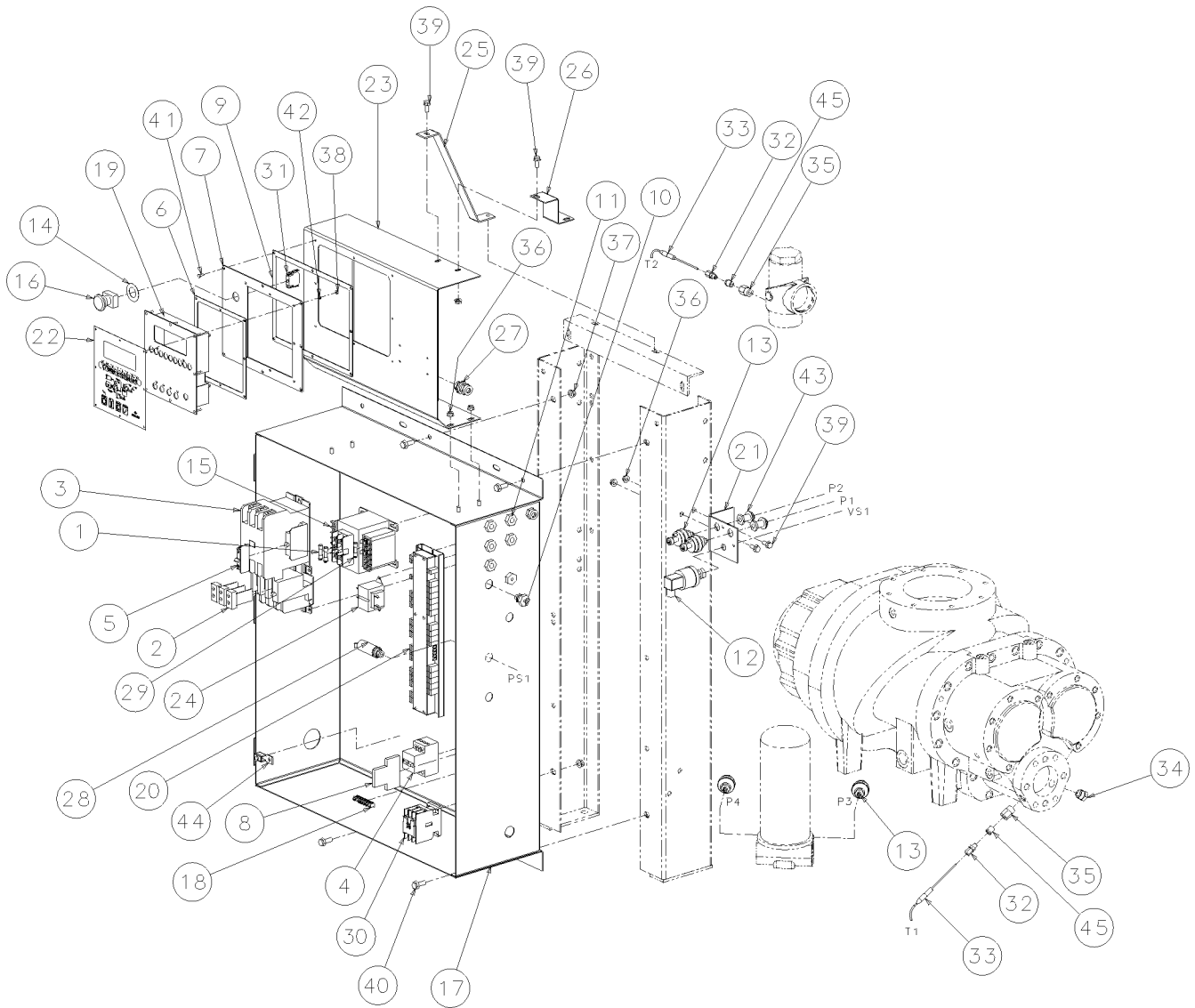
<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
27	screw, hex ser washer 5/16-18 x 3/4	829705-075	2
28	bulkhead, pipe 1/4" npt	841500-004	4
29	nipple, chase cond 1/2	847815-050	1
30	elbow, pipe-90m 1/4 x 1/4	860504-025	1
31	nipple, pipe-hx pltd 1/2 x 1/2	868508-050	1
32	tee, male pipe brass 1/4	869825-025	4
33	elbow, tb-m str thd ss 1/4 x 7/16	870804-044	1

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.17 CONTROL BOX- SUPERVISOR CONTROLLER



02250128-581R00

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.17 CONTROL BOX- SUPERVISOR CONTROLLER

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	fuse, kldr	-	2
2	heater, o.l. pack	-	1
3	starter, 3ph 120v chf open	-	1
4	starter, man mtr prot	-	1
5	block, contact chf lrg aux 1 no	02250048-396	1
6	gasket, panel supervisor II	02250048-822	1
7	panel, cover supervisor II	02250054-854	1
8	block, aux contac 1no-1nc mot/prot	02250057-765	1
9	gasket, ctl pnl superI	02250071-093	1
10	grip, cord n4 .125-.187 x 1/2"	02250071-379	2
11	grip, cord n4 .250-.375 x 1/2"	02250071-381	5
12	switch, vacuum 22"wc n4 6ft cable 5a	02250078-249	1
13	transducer, pressure 0-250 psi 1-5vdc n4	02250078-933	4
14	nameplate, e-stop 45mm yellow	02250081-473	1
15	transformer, control 250va univ w/pri fh	02250083-188	1
16	switch, push-button operator e22 40m	02250085-504	1
17	specification, encl ls-12/16 30w x 10d x 36lg	02250099-482	1
18	bar, ground 5 post cutler hammer	02250101-721	1
19	control, supervisor display mod	02250119-330	1
20	control, supervisor io mod	02250119-331	1
21	support, bracket xdcr/press sw	02250129-880	1
22	decal, supervisor front	02250130-344	1
23	panel, instrument supervisor	02250134-463	1
24	transformer, control 50va 120-24 50/60	02250135-283	1
25	support, control panel	02250136-227	1
26	bracket, control panel	02250136-474	1
27	connector, cord .312 cable x 1/2" hu	241585	2
28	switch, pressure n.o. 10 psi	250017-992	1
29	fuse, limitron ktk-r 2.00	250019-756	1
30	contactor, ac 3p 18v 120v chf	250025-703	1
31	block, contact 1nc	250027-125	1
32	fitting, compress adj	250028-635	2
33	probe, rtd 100 ohm plat 3.5"x 12ft	250039-909	2

(Continued on page 121)

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**



## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.17 CONTROL BOX- SUPERVISOR CONTROLLER (CONTINUED)

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
34	plug, straight thread 3/4-16 viton	250042-623	1
35	adapter, female pipe 1/2 x 1/4	811504-025	2
36	nut, hex f pltd 5/16-18	825305-283	8
37	nut, hex f pltd 3/8-16	825306-347	4
38	nut, hex metric m4 x .7	825904-070	8
39	screw, hex ser washer 5/16-18 x 3/4	829705-075	4
40	screw, hex ser washer 3/8-16 x 1	829706-100	4
41	screw, tc-f pan #8-32 x 1/2	835601-050	8
42	washer, spr lock-metric pltd m4	838804-090	8
43	bulkhead, pipe 1/8" npt	841500-002	2
44	lug, scrulug kpa-25 4-1/0	849215-025	1
45	bushing, red pltd 1/4 x 1/8	867100-005	2

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**



## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.18 CONTROL BOX- ELECTRO-MECHANICAL

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	fuse, kldr	-	2
2	heater, o.l. pack	-	1
3	starter, 3ph 120v chf open	-	1
4	starter, man mtr prot	-	1
5	block, contact chf lrg aux 1 no	02250048-396	1
6	block, aux contac 1no-1nc mot/prot	02250057-765	1
7	locknut, n4 conduit sealing	02250071-362	8
8	locknut, cond seal n4 1"	02250071-365	2
9	transformer, control 250va univ w/pri fh	02250083-188	1
10	switch, high temperature 240 deg f - 3/4" sae	02250100-095	2
11	bar, ground 5 post cutler hammer	02250101-721	1
12	support, bracket xdcr/press sw	02250129-880	1
13	support, control panel	02250136-227	1
14	bracket, control panel	02250136-474	1
15	sub assembly, ctlnl emd ls20	02250136-851	1
16	switch, pres 0-150# spdt n-1	040694	1
17	coupling, conduit rigid	250007-179	2
18	switch, pressure n.o. 10 psi	250017-992	1
19	elbow, 1/4" tube x 1/4" npt	250018-430	1
20	fuse, limitron ktk-r 2.00	250019-756	1
21	contactor, ac 3p 18v 120v chf	250025-703	1
22	block, terminal kt3	250041-102	16
23	block, term adapter kad	250041-103	1
24	plug, hole n4 1/2" cond	409918-002	5
25	nut, hex pltd #10-24	825202-130	2
26	nut, hex f pltd 5/16-18	825305-283	4
27	nut, hex f pltd 3/8-16	825306-347	4
28	screw, hex ser washer 5/16-18 x 3/4	829705-075	4
29	screw, hex ser washer 3/8-16 x 1	829706-100	4
30	screw, mach-rd hd #10-24 x 1/2	831602-050	2
31	washer, spr lock reg pltd #10	837802-047	2
32	conduit, csa flex 1/2"	846315-050	6
33	connector, straight lq-tite 1/2	846400-050	1

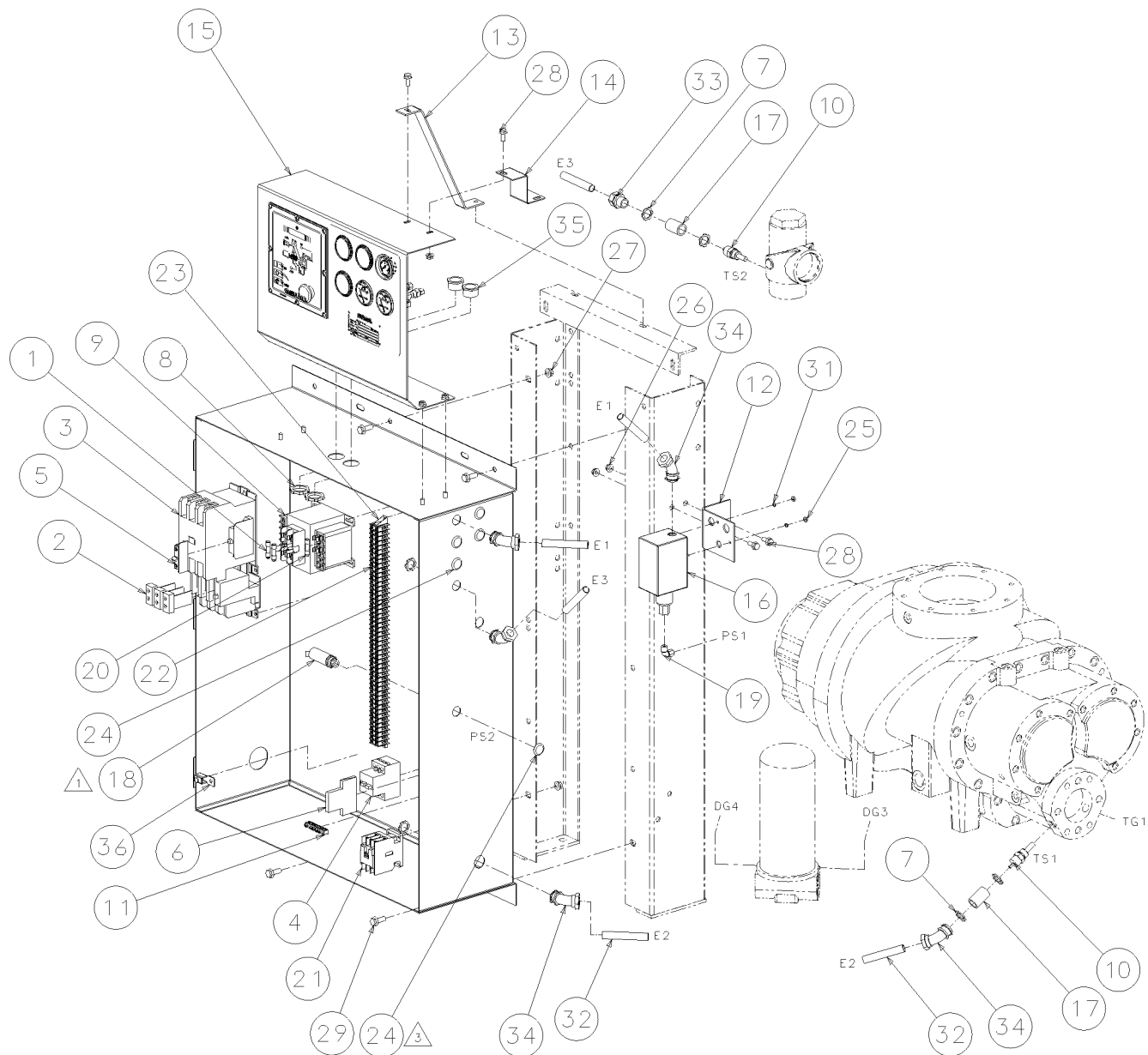
(Continued on page 125)

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.18 CONTROL BOX- ELECTRO-MECHANICAL



02250128-582R00

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.18 CONTROL BOX- ELECTRO-MECHANICAL (CONTINUED)

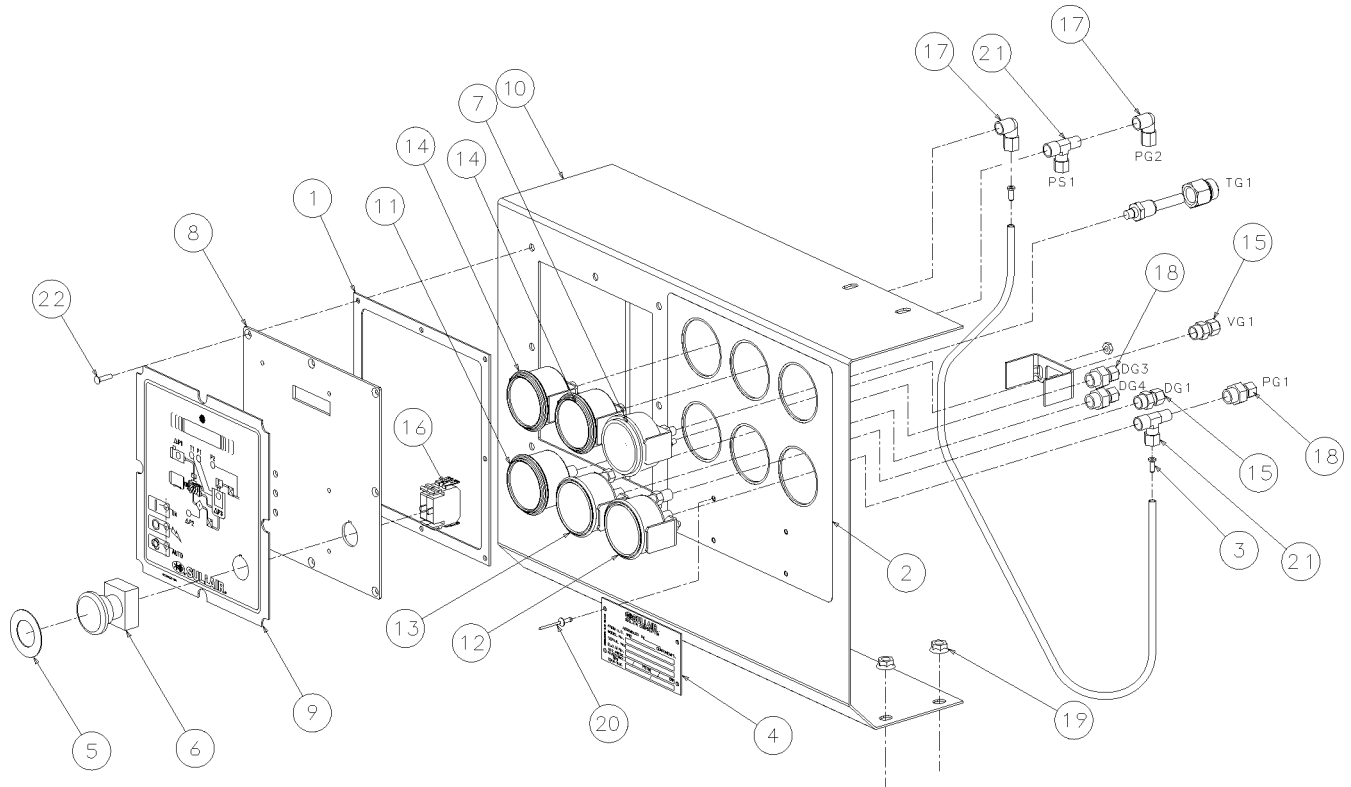
<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
34	elbow, 45deg lq-tite 1/2	846500-050	5
35	nipple, chase cond 1	847815-100	2
36	lug, scrulug kpa-25 4-1/0	849215-025	1

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.19 CONTROL PANEL- EMD



02250136-851R00

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.19 CONTROL PANEL- EMD

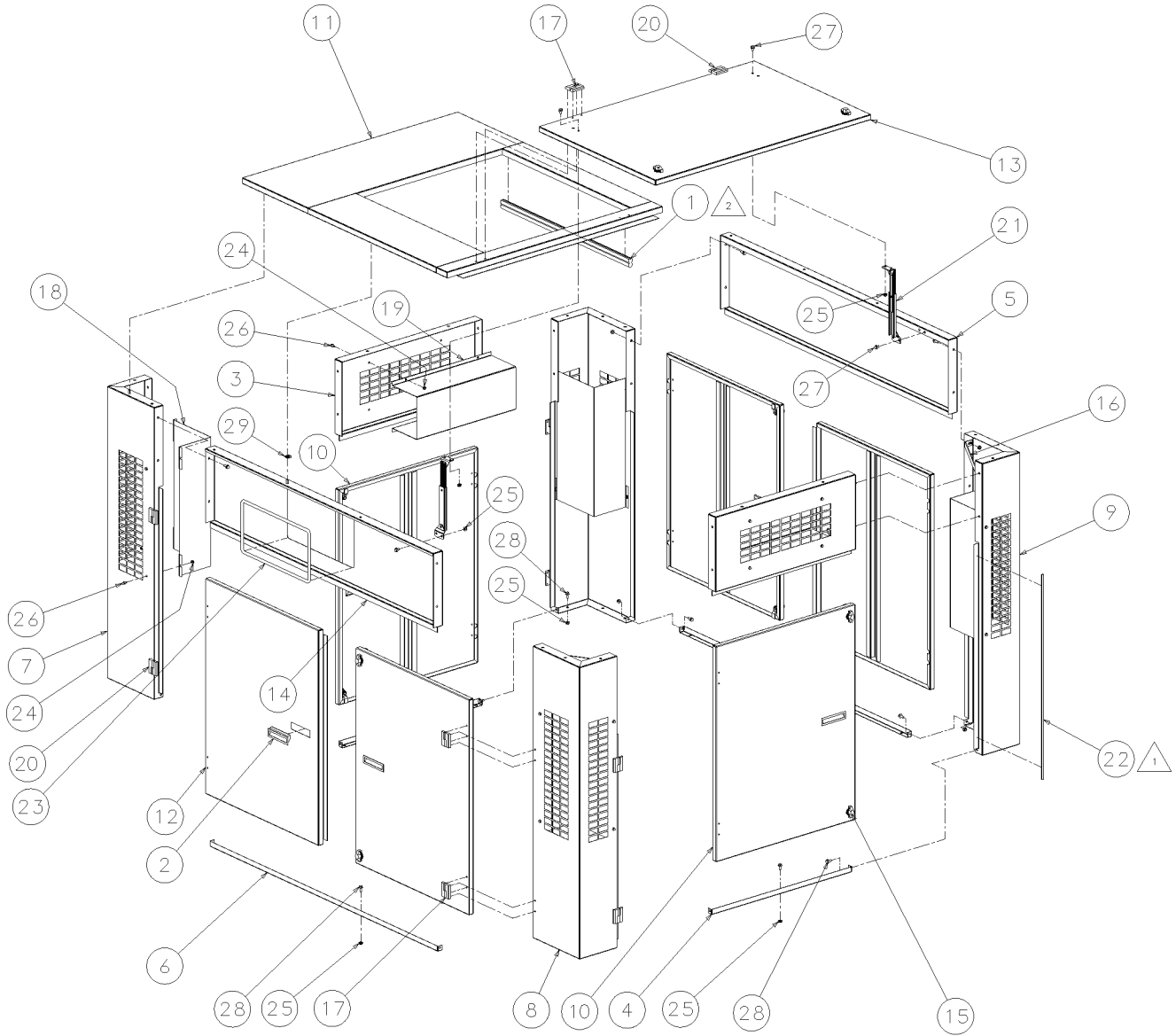
<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	gskt, panel Supervisor II	02250048-822	1
2	decal, instr panel	02250051-301	1
3	insert, nylon tubing 1/4"od	02250052-841	2
4	npl, Sullair serial number	02250059-318	1
5	npl, E-stop 45mm yellow	02250081-473	1
6	switch, push-button operator e22 40mm	02250085-504	1
7	gauge, temp 100-250 deg 3/4" sae	02250100-096	1
8	cont, LS 12/16 emctl	02250119-824	1
9	decal, emctl front I/E-stop	02250120-361	1
10	pnl, inst e/m ls 12/16 n12/4	02250125-351	1
11	gauge, vacuum 2"	250003-797	1
12	gauge, diff press 0-15 psi	250003-798	1
13	gauge, diff press 0-30 psi	250003-799	1
14	gauge, pressure 2"	250005-185	2
15	conn, str 1/4t pls 1/8 npt f	250021-379	2
16	block, contact 1 nc	250027-125	2
17	elbow, 90° 1/4" tube x 1/8" fnpt	250041-286	2
18	conn, tube f-1/4"t x 1/8"p 316ss	250139-050	3
19	nut, hex f pltd 5/16-18	825305-283	4
20	rivet, pop 1/8 x 1/2	843102-050	4
21	tee, adapter 1/4 x 1/8 x 1/8	869704-012	2
22	scrw, sch hex csk m4 x 14	874404-014	8

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.20 CANOPY- AIR-COOLED



APPLY WEATHERSTRIP TO ALL DOOR FLANGES AND TO BOTTOM OF TOP HINGE PANEL (ITEM 12) AND TO TOP OF PANELS UNDER TOP CANOPY PANEL (ITEM 10).



APPLY SEAL TO ALL FOUR SIDES OF COOLER OPENING.

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.20 CANOPY- AIR-COOLED

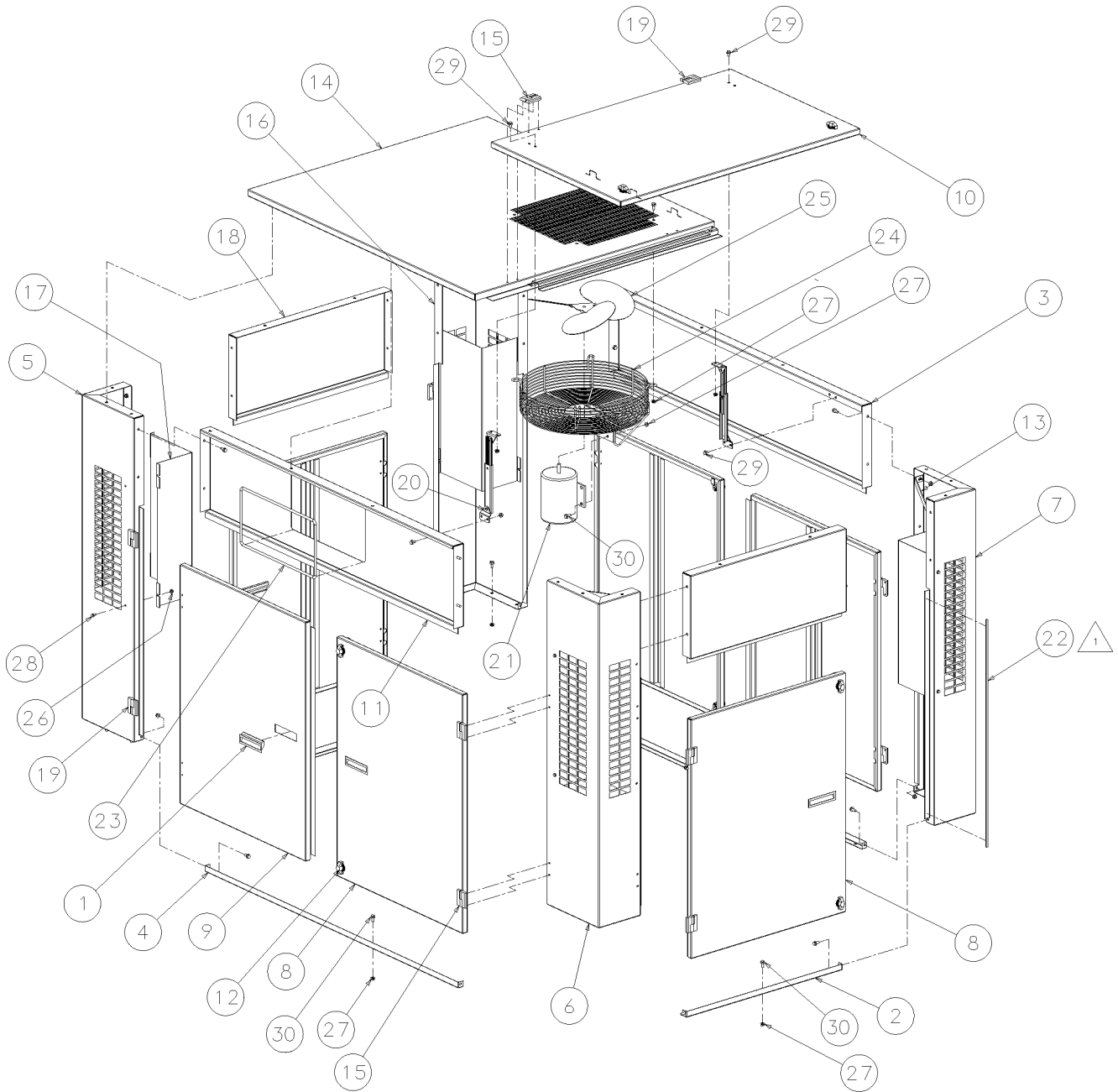
<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	seal, dust	02250105-900	11
2	handle, pocket	02250126-149	6
3	panel, canopy end	02250127-777	2
4	panel, canopy door bottom	02250127-778	2
5	panel, canopy rear	02250127-779	1
6	panel, canopy door bottom	02250127-780	2
7	panel, canopy corner	02250127-785	1
8	panel, canopy corner	02250127-786	2
9	panel, canopy corner	02250127-788	1
10	panel, canopy door	02250127-790	4
11	panel, canopy top ac	02250127-791	1
12	panel, canopy door flg'd	02250127-792	2
13	panel, canopy top hinged	02250127-793	1
14	panel, canopy front	02250128-912	1
15	catch, door compr type	02250129-399	10
16	support, canopy corn pnl	02250129-487	2
17	hinge, 180deg. screw-on lift-off rh	02250129-863	5
18	baffle, canopy crnr	02250133-089	4
19	baffle, canopy end panel	02250133-090	2
20	hinge, 180deg. screw-on lift-off lh	02250134-279	9
21	support, door latching	02250136-333	2
22	weatherstrip, 3/16" x 3/8"	250022-436	96 ft.
23	trim, canopy edge	250034-157	5
24	nut, hex f pltd 1/4-20	825304-236	24
25	nut, hex f pltd 5/16-18	825305-283	58
26	screw, hex ser washer 1/4-20 x 1/2	829704-050	24
27	screw, hex ser washer 5/16-18 x 1/2	829705-050	8
28	screw, hex ser washer 5/16-18 x 3/4	829705-075	64
29	nut, retainer u 5/16-18 .140	861505-140	14

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.21 CANOPY- WATER-COOLED



APPLY WEATHERSTRIP TO ALL DOOR FLANGES AND TO BOTTOM OF TOP HINGE PANEL (ITEM 12) AND TO TOP OF PANELS UNDER TOP CANOPY PANEL (ITEM 10).

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.21 CANOPY- WATER-COOLED

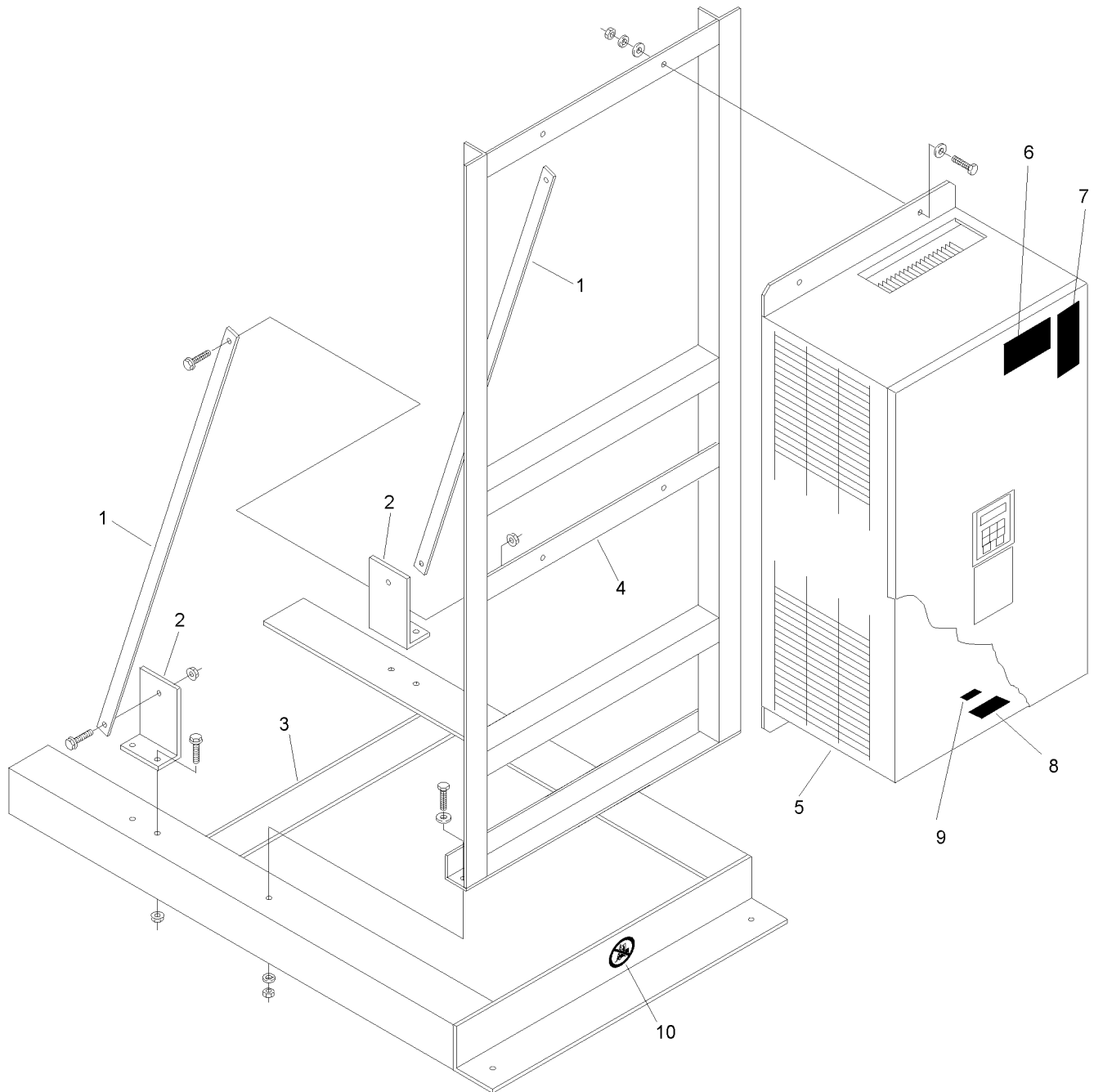
<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	handle, pocket	02250126-149	6
2	panel, canopy door bottom	02250127-778	2
3	panel, canopy rear	02250127-779	1
4	panel, canopy door bottom	02250127-780	2
5	panel, canopy corner	02250127-785	1
6	panel, canopy corner	02250127-786	1
7	panel, canopy corner	02250127-788	1
8	panel, canopy door	02250127-790	4
9	panel, canopy door flg'd	02250127-792	2
10	panel, canopy top hinged	02250127-793	1
11	panel, canopy front	02250128-912	1
12	catch, door compr type	02250129-399	10
13	support, canopy corn pnl	02250129-487	2
14	panel, canopy top w/c	02250129-513	1
15	hinge, 180deg. screw-on lift-off rh	02250129-863	5
16	panel, canopy corner w/c	02250130-363	1
17	baffle, canopy crnr	02250133-089	4
18	panel, canopy end ees	02250133-093	2
19	hinge, 180deg. screw-on lift-off lh	02250134-279	9
20	support, door latching	02250136-333	2
21	motor, .25hp 208-230/460	250000-031	1
22	weatherstrip, 3/16" x 3/8"	250022-436	1 ft.
23	trim, canopy edge	250034-157	1
24	guard, exhaust fan 20"	410179	1
25	fan, 18" vent 1/2"-bore	410358	1
26	nut, hex f pltd 1/4-20	825304-236	14
27	nut, hex f pltd 5/16-18	825305-283	66
28	screw, hex ser washer 1/4-20 x 1/2	829704-050	16
29	screw, hex ser washer 5/16-18 x 1/2	829705-050	8
30	screw, hex ser washer 5/16-18 x 3/4	829705-075	72

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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.22 LS20V VARIABLE SPEED CONTROLLER (INCLUDING DECAL LOCATIONS)



## Section 12

# ILLUSTRATIONS AND PARTS LIST

### 12.22 LS20V VARIABLE SPEED CONTROLLER (INCLUDING DECAL LOCATIONS)

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	plate, support	02250126-137	2
2	support, angle	02250130-552	2
3	support, starter frame assy	02250133-567	1
4	support, starter remote mount	02250130-530	1
5	starter, assy variable speed <b>(I)</b>	-	1
6	decal, electrocution hazard international	02250077-472	1
7	sign, danger electrocution	049850	1
8	decal, voltage <b>(II)</b>	-	1
9	decal, danger high voltage	042218	1
10	decal, do not forklift international	02250108-615	1

**(I)** To determine correct starter assembly part number, consult factory with serial number of machine.


**(II)** Voltage may vary in accordance with your machine requirements. To confirm proper decal, consult factory with serial number of compressor.

---

**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST


## 12.23 DECAL GROUP



**WARNING**

Disconnect all power at source, before attempting maintenance or adjustments.

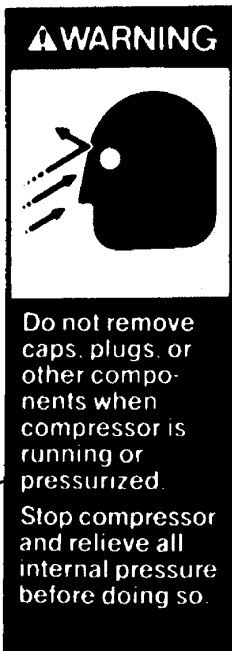
49055



**WARNING**

Rotating fan blade  
Can cause severe injury  
Do not operate without fan guard in place


049965



**WARNING**


Do not remove caps, plugs, or other components when compressor is running or pressurized.  
Stop compressor and relieve all internal pressure before doing so.

41183




**WATER IN**

250019-107



**WATER OUT**


250019-108



**WATER**

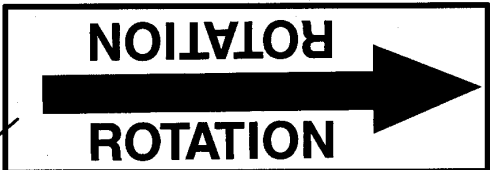
IN OUT

41872




**WATER DRAIN**

740029-818



**NO ROTATION**


ROTATION



**DANGER**

Death or serious injury can occur from inhaling compressed air without using proper safety equipment.  
See OSHA standards on safety equipment.

250027-935



**WARNING**

Hot surfaces.  
To avoid burns, keep hands and all parts of the body away.


407408



**460V**


3 ~ 60 Hz

44C-INDICATED




**NO ROTATION**


ROTATION




02250075-049



02250075-049




02250075-049



**DANGER**

Lethal shock hazard inside.  
Disconnect all power at source, before opening or servicing.

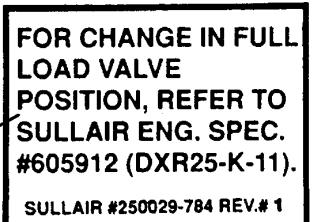
49056



**WARNING**

Mixing of other fluids will void warranty.  
Fill cap has an o-ring seal. Do not use pipe dope.

02250110-891



**FOR CHANGE IN FULL LOAD VALVE POSITION, REFER TO SULLAIR ENG. SPEC. #605912 (DXR25-K-11).**

SULLAIR #250029-784 REV.# 1



## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.23 DECAL GROUP

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	sign, warning sever - fan	049855	2
2	sign, warning sever-fan port	049965	2
3	sign, warning "compressor fluid fill cap"	049685	1
4	decal, water in	250019-107	1
5	decal, water out	250019-108	1
6	decal, water inlet-outlet	049873	1
7	decal, water drain	250022-810	1
8	decal, rotation	250021-286	1
9	decal, danger breath air	250027-935	1
10	sign, warning hot surfaces	407408	3
11	decal, voltage 460/3/60 international (not shown) <b>(I)</b>	02250069-399	1
	•decal, voltage 230/3/60 international (not shown) <b>(I)</b>	02250069-397	1
	•decal, voltage 380-415/3/50 international (not shown) <b>(I)</b>	02250069-403	1
	•decal, voltage 200/3/50 international (not shown) <b>(I)</b>	02250069-406	1
12	decal, rotation	250021-564	1
13	decal, auto start	041065	1
14A	decal, protective earth ground	02250075-045	2
14B	decal, earth ground international	02250075-046	1
15	decal, warning mixing fluids	02250110-891	1
16	sign, danger electrocution	049850	1
17	decal, actuator valve positioning	250029-784	1
18	decal, Sullair logo	02250059-060	2

(Continued on page 137)

**(I)** Voltage may vary in accordance with your machine requirements. To confirm proper decal, consult factory with serial number of compressor.


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**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.23 DECAL GROUP

**WARNING**




This Unit Is Equipped With An Auto Start Sequence That Will Start The Unit In The Event Of A Power Failure Automatically After The Sump Pressure Drops To 10 PSIG And The Power Is Restored.

When Performing Maintenance Follow Your Company's Prescribed Safety Practices for Electrical Equipment.

250017-903

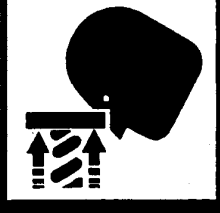
**WARNING**



Use equipment grounding connector in accordance with the National Electrical Code, and all Federal State, and Local Codes, to help avoid possible shock hazard.

19 20 21


**WARNING**



Cannister under spring pressure. When removing any screws on the canister, mechanical restraints must be used. Tool Kit #606174-001 is available from SULLAIR unit parts Division, Michigan City, IN




250029-836 REV. 01

**WARNING**



Do not permit air from this equipment to contact food stuff except in full compliance with FDA Standard 21CFR178.3570, and all other applicable federal, state and local, codes, standards and regulations.

250003-144

This product was manufactured to the highest quality standards in an ISO 9001 certified system.

Ce produit a été fabriqué selon les normes les plus strictes de qualité dans un système ISO 9001 certifié.

Dieses Produkt wurde in einem mit ISO 9001 Zertifikat versehenen System hergestellt und entspricht den höchsten Qualitätsnormen.

Dette produkt er fremstillet i overensstemmelse med de strengeste kvalitetsnormer i et ISO 9001 - certificeret anlæg.

# ISO 9001

Το προϊόν αυτό έχει κατασκευαστεί σύμφωνα με τις πλέον αυστηρές προδιαγραφές ποιότητας σε εγκατάσταση πιστοποιημένη με ISO 9001.

Dit produkt werd volgens de hoogste kwaliteitsnormen geproduceerd in een ISO-9001 gecertificeerd kwaliteitssysteem.

Este producto ha sido fabricado según los más altos estándares de calidad en un sistema con la certificación ISO 9001.

Questo prodotto è stato fabbricato secondo i più alti standard qualitativi, in un sistema omologato ISO 9001.

本產品是由取得最高品質水準 ISO 9001 資格之製造廠所生產

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1 CR	1 TR	LINE PRESS	INLET
2 CR	2 TR	DISCH PRESS	T1
3 CR	3 TR	WATER PRESS	T2
4 CR	4 TR	SEPARATOR	T3
5 CR	1 M	SPIRAL VALVE	T4
6 CR	2 M	INLET VALVE	T5
1 FU	3 M	CIS VALVE	T6
2 FU	4 M	OIL PRESS	T3
3 FU	HCR	OIL FILTER	T4

## DANGER

### HIGH VOLTAGE

# LS-20

# 24KT



**← LIFT HERE →**

241814

MACH. S/N \_\_\_\_\_ MODEL # \_\_\_\_\_

CUST. NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY / STATE \_\_\_\_\_ ZIP \_\_\_\_\_

CUST. PRODUCT \_\_\_\_\_

BRAND OF FLUID \_\_\_\_\_ FLUID \_\_\_\_\_

HOURS ON MACH. \_\_\_\_\_

DATE SAMPLE TAKEN: \_\_\_\_\_

DISCHARGE TEMP. \_\_\_\_\_ °F

AMBIENT TEMP. \_\_\_\_\_ °F

FLUID USAGE RATE - GAL / MO. \_\_\_\_\_

SAMPLE TAKEN FROM: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.23 DECAL GROUP (CONTINUED)

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
19	decal, warning auto start	250017-903	1
20	sign, warning ground fault	049852	1
21	decal, warning actuator	250029-836	1
22	sign, warning "food grade" lube	250003-144	1
23	decal, fluid Sullube (II)	02250069-389	1
24	decal, fluid CP-4600-32-F (II)	02250118-342	1
25	decal, fluid 24KT (II)	02250069-395	1
26	decal, ISO 9001	02250057-624	1
27	decal, electrical component ID	250038-457	1
28	decal, LS-20	02250061-087	1
29	decal, danger high voltage	042218	1
30	decal, 24KT (blk) 1.75" & 4" ht	02250061-022	1
31	decal, fluid sample	250025-675	1
32	decal, fork lifting	241814	4
33	decal, do not forklift- international	02250108-615	1

(Continued on page 139)

(II) Fluid fill may vary in accordance with machine requirements. To confirm proper fill for your compressor, consult Sullair Factory.

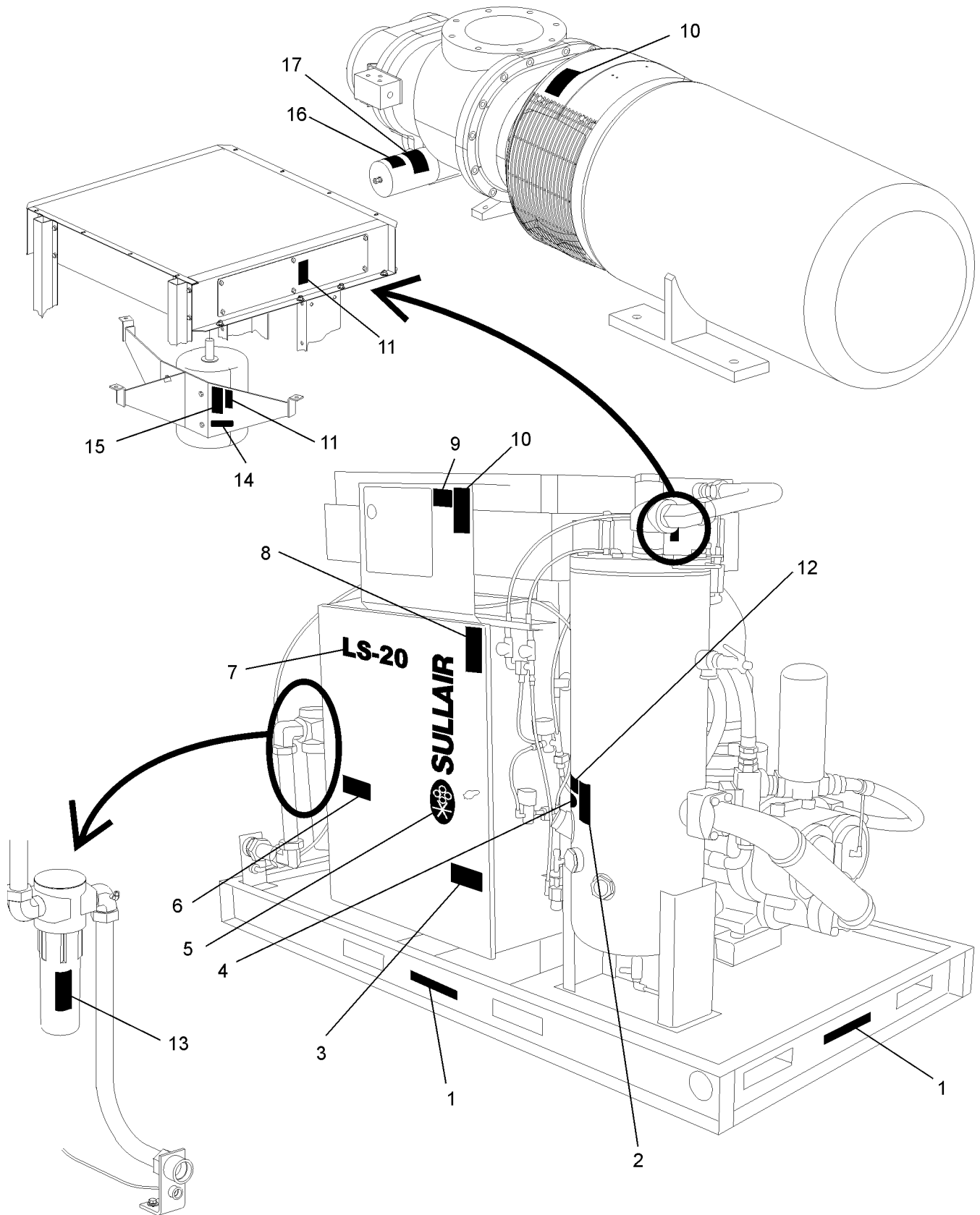


**DO NOT MIX FLUIDS! Mixing of other lubricants within the compressor unit will void all warranties!**

**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.24 DECAL LOCATION- OPEN AIR-COOLED



## Section 12

# ILLUSTRATIONS AND PARTS LIST

### 12.24 DECAL LOCATION- OPEN AIR-COOLED

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	decal, fork lifting	241814	4
2	sign, warning "compressor fluid fill cap"	049685	1
3	decal, electrocution hazard international	02250077-742	1
4	decal, fluid Sullube <b>(I)</b>	02250069-389	1
5	decal, Sullair logo	02250059-060	2
6	decal, ISO 9001	02250057-624	1
7	decal, LS-20	02250061-087	1
8	sign, danger electrocution	049850	1
9	decal, auto start	041065	1
10	decal, warning auto start	250017-903	1
11	sign, warning sever-fan port	049965	2
12	decal, warning mixing fluids	02250110-891	1
13	decal, water drain	250022-810	1
14	decal, rotation	250021-564	1
15	sign, warning sever - fan	049855	1
16	decal, actuator valve positioning	250029-784	1
17	decal, warning actuator	250029-836	1

**(I)** Fluid fill may vary in accordance with machine requirements. To confirm proper fill for your compressor, consult Sullair factory.

---

**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE SERIAL NUMBER OF COMPRESSOR**



## Section 12

# ILLUSTRATIONS AND PARTS LIST

### 12.25 DECAL LOCATION- OPEN WATER-COOLED

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	decal, fork lifting	241814	4
2	sign, warning "compressor fluid fill cap"	049685	1
3	decal, fluid Sullube <b>(I)</b>	02250069-389	1
4	decal, electrocution hazard international	02250077-742	1
5	decal, Sullair logo	02250059-060	2
6	decal, ISO 9001	02250057-624	1
7	decal, LS-20	02250061-087	1
8	sign, danger electrocution	049850	1
9	decal, auto start	041065	1
10	decal, warning auto start	250017-903	1
11	decal, warning mixing fluids	02250110-891	1
12	decal, water in	250019-107	1
13	decal, water out	250019-108	1
14	decal, actuator valve positioning	250029-784	1
15	decal, warning actuator	250029-836	1
16	decal, water drain	250022-810	1

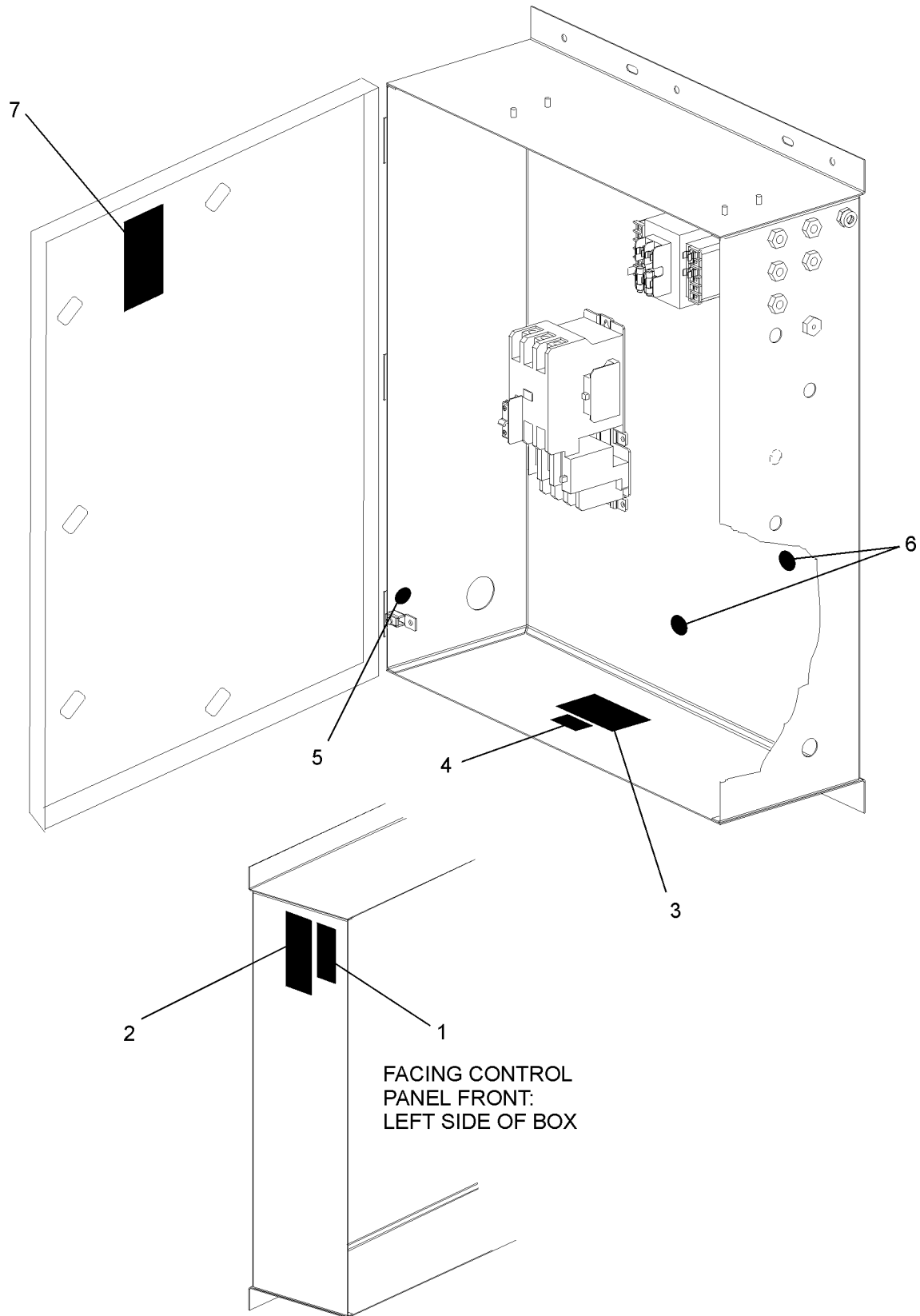
**(I)** Fluid fill may vary in accordance with machine requirements. To confirm proper fill for your compressor, consult Sullair Factory.

---

**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.26 DECAL LOCATION- CONTROL BOX



## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.26 DECAL LOCATION- CONTROL BOX

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	decal, danger breath air	250027-935	1
2	sign, warning "food grade" lube	250003-144	1
3	decal, danger high voltage	042218	1
4	decal, voltage 460/3/60 international (not shown) <b>(I)</b>	02250069-399	1
	•decal, voltage 230/3/60 international (not shown) <b>(I)</b>	02250069-397	1
	•decal, voltage 380-415/3/50 international (not shown) <b>(I)</b>	02250069-403	1
5	decal, earth ground international	02250075-046	1
6	decal, protective earth ground	02250075-045	2
7	sign, warning ground fault	049852	1

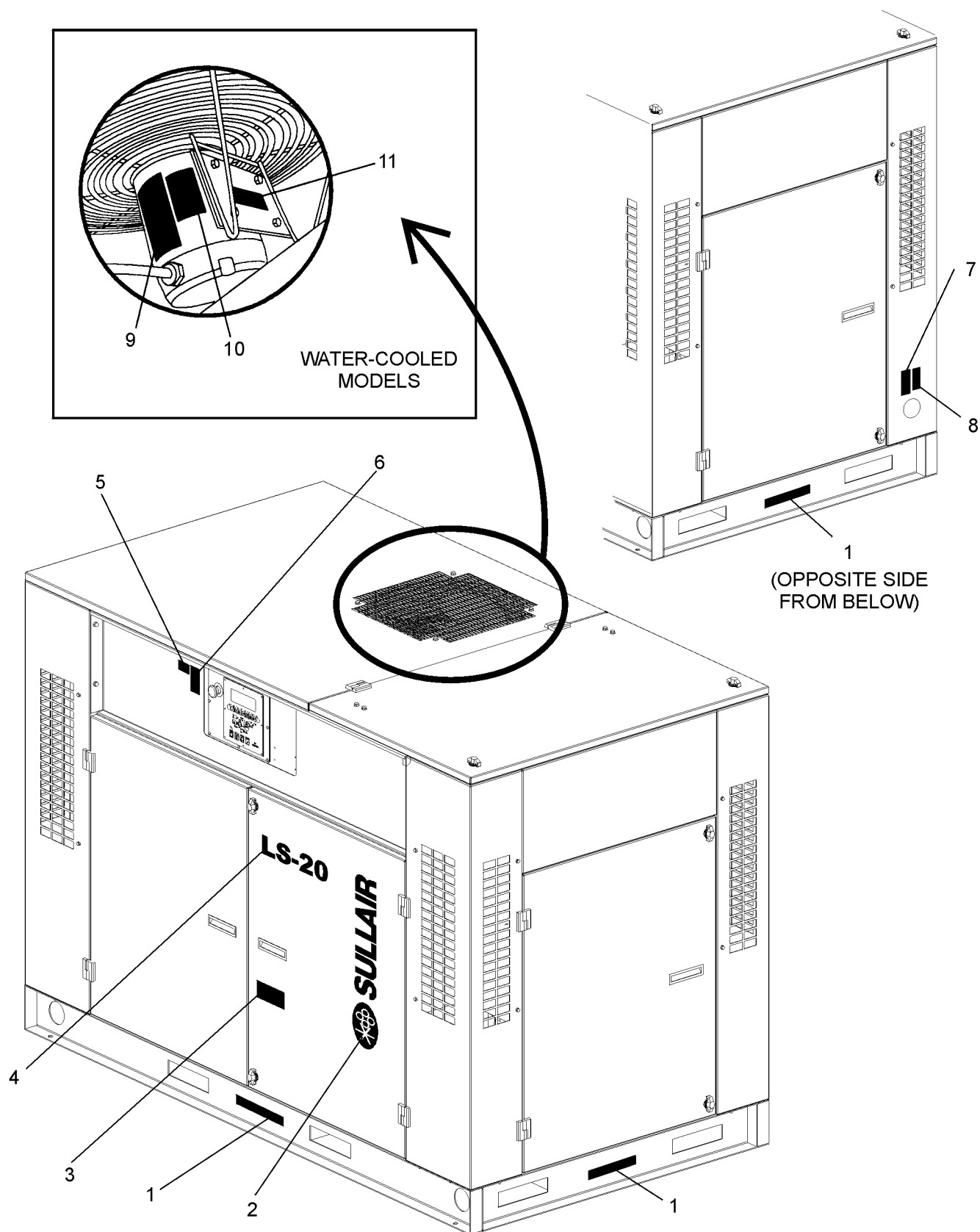
**(I)** Voltage may vary in accordance with your machine requirements. To confirm proper decal, consult factory with serial number of compressor.

---

**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**

# Section 12 ILLUSTRATIONS AND PARTS LIST

## 12.27 DECAL LOCATION- ENCLOSURE



## Section 12 ILLUSTRATIONS AND PARTS LIST

### 12.27 DECAL LOCATION- ENCLOSURE

<i>key number</i>	<i>description</i>	<i>part number</i>	<i>quantity</i>
1	decal, fork lifting	241814	4
2	decal, Sullair logo	02250059-060	1
3	decal, ISO 9001	02250057-624	1
4	decal, LS-20	02250061-087	1
5	decal, auto start	041065	1
6	decal, warning auto start	250017-903	1
7	sign, warning "food grade" lube	250003-144	1
8	decal, danger breath air	250027-935	1
9	sign, warning sever - fan	049855	1
10	sign, warning sever-fan port	049965	1
11	decal, rotation	250021-564	1

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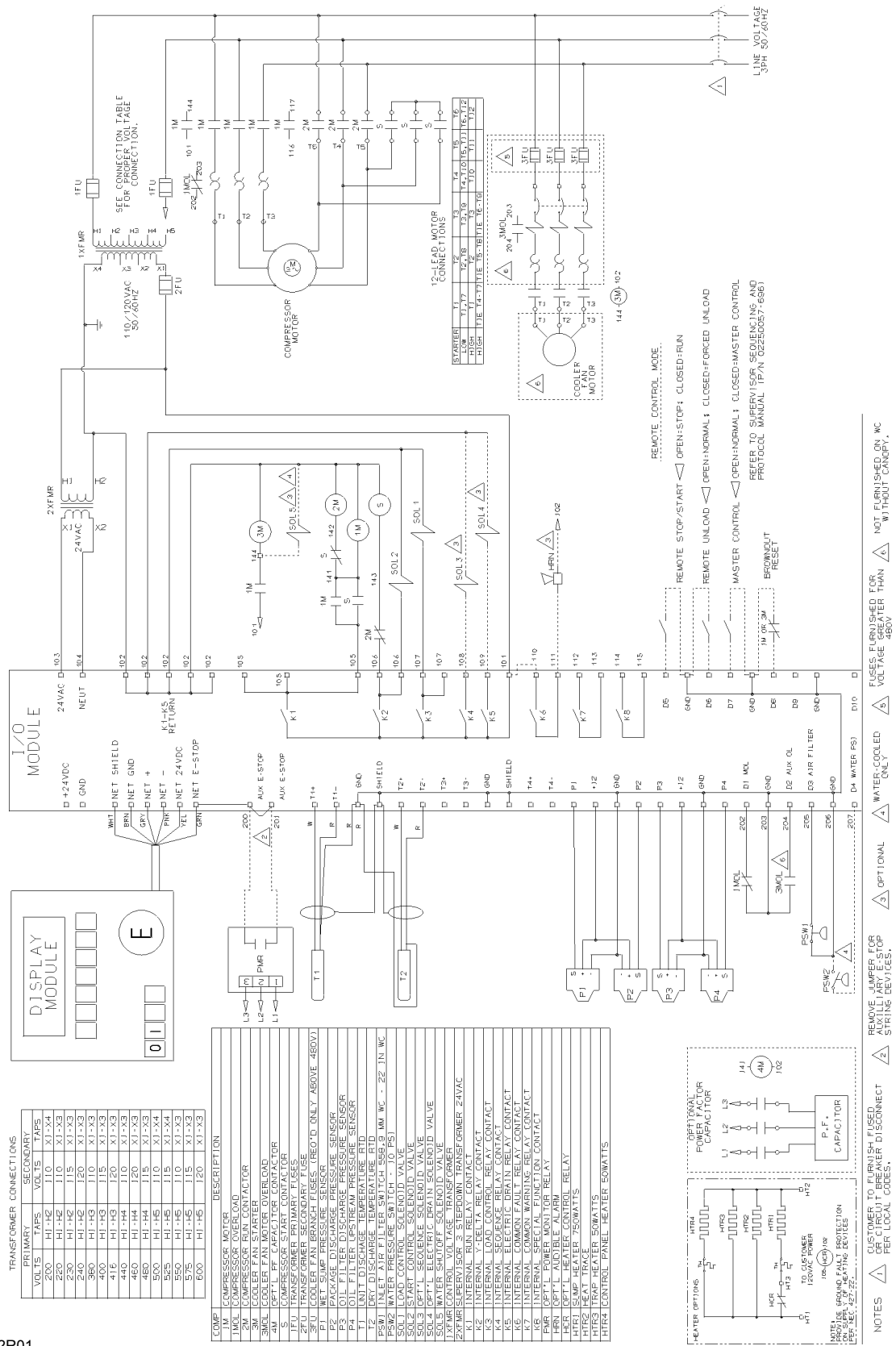
**PLEASE NOTE: WHEN ORDERING PARTS, INDICATE THE SERIAL NUMBER OF COMPRESSOR**





# Section 12 ILLUSTRATIONS AND PARTS LIST

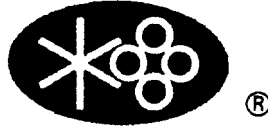
## 12.30 WIRING DIAGRAM- LS20-100HP WYE-DELTA SUPERVISOR CONTROLLER



02250134-172R01



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