SULLAIR

OIL-FREE AIR COMPRESSOR DS-13 Series

100-200 hp
75-150 kw

OPERATOR'S MANUAL AND PARTS LIST

KEEP FOR FUTURE REFERENCE

Part Number 02250107-534

AIR CARE
SEMINAR TRAINING

Sullair Air Care Seminars are courses that provide hands-on instruction in the proper operation, maintenance and service of Sullair equipment. Individual seminars on 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.

Instruction includes discussion of the function and installation of Sullair service parts, troubleshooting of the most common problems, and actual equipment operation. The seminars are recommended for maintenance and service personnel.

For detailed course outlines, schedule and cost information contact:

Sullair Corporate Training Department
1-800-SULLAIR or 219-879-5451 (ext. 5363)

www.sullair.com

- Or Write -

Sullair Corporation
3700 E. Michigan Blvd.
Michigan City, IN 46360
Attn: Service Training Department

OPERATOR IS REQUIRED TO READ ENTIRE INSTRUCTION MANUAL

TABLE OF CONTENTS

TABLE OF CONTENTS
(CONTINUED)

Section 4
COMPRESSOR SYSTEMS (CONT.)

Section 5
SUPERVISOR II

Section 6
COMPRESSOR OPERATION

Section 7
MAINTENANCE

TABLE OF CONTENTS
(CONTINUED)

Section 7
MAINTENANCE

Section 8
TROUBLESHOOTING

Section 9
PARTS LIST

1.1 GENERAL

Sullair Corporation and its subsidiaries designs and manufactures all of its 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 1/2" (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 1/2" (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 75 feet (23m) of hose in runs of air hose exceeding 1/2" (13mm) inside diameter to reduce pressure in case of hose failure.

D. Flow–limiting valves are listed by pipe size and flow rating. Select appropriate valves 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 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 30 psig (2.1 barg) 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 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 accu-

mulate on, under, or around acoustical material, or on any external surfaces of the air compressor or on internal surfaces of the enclosure. 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.

⚠ DANGER

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 in 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 15 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.

⚠ DANGER

All field equipment must be tested for electrostatic fields prior to servincing or making contact with the machine using the following or equivalent test equipment:

• 90-600 VAC : Volt detector such as Fluke Model 1AC-A

• 600-7000 VAC : Voltage detector such as Fluke Networks Model C9970

It is the responsibility of each organization to provide/arrange training for all their associates epected to test for electrostatic fields.

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 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 person 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.

2.1 MOUNTING OF COMPRESSOR

The compressor package should be placed on a surface or foundation that is capable of supporting its weight, while remaining level and free of deflections which may affect the driveline mounts or the inboard pipework.

It is recommended that the package frame be leveled and secured to the foundation with adequate anchorage, and that a good grade grouting be used to insure full contact between the load bearing surfaces. Use 3/4" (19mm) foundation bolts.

The DS compressor/motor driveline is self-aligned by the use of a rigid distance piece and supported by flexible vibration isolation mounts. Poor leveling or excessive deflections may adversely affect the operation and longevity of these devices.

No piping loads or moments should be transmitted to the air and water connections provided with the package.

2.2.1 VENTILATION AND COOLING (AIR-COOLED)

Select a location that allows an unrestricted flow of free ventilation air through the package, (approximately 16,500 CFM [467m^3/min]). The maximum allowable ambient temperature is 115°F (46°C). Heat rejection to the surrounding environment will be up to 120% of the motor horsepower (this is because of the latent heat of condensation of the moisture removed from the intake air and the heat from the motor inefficiency). The 200HP model will discharge up to 615,000 BTU/hr to the surrounding environment (smaller models correspondingly less).

Maintain a 3ft. (0.9m) minimum separation between the package and any surrounding walls. Note that the electrical enclosure has a 32.5 in (826mm) access door hinged on its right side.

⚠ WARNING

Note that the cooling air intake to the package and the hot air discharge are both on top of the package. There should be no restriction to the free flow of cooling air and discharge air, and care should be taken to ensure that cooling air and discharge air remain separate.

If ductwork is installed, the total restriction on intake must not exceed 0.1 inches H_2O (25 Pascals). The total restriction on the outlet must not exceed 0.1 inches H_2O (25 Pascals).

2.2.2 VENTILATION AND COOLING (WATER-COOLED)

Select a location that allows the unrestricted flow of 3000 CFM (85 m^3/min.) of free ventilation air through the package. Maintain a 3 ft. (0.9m) minimum separation between the package, sides and the surrounding walls. Heat rejection to room will be approximately ten percent (10%) of motor horsepower.

The cooling water must be clean and free of scale forming agents. Such compounds, exemplified by calcium oxide and commonly associated with "hard" water, should be limited to concentrations of 100 ppm (mg/l) or less. The water supply must be able to sustain the following flows on the basis of 25-80 psi (1.7-5.5 barg) pressure, 50-90°F (10-32°C) inlet temperature, and a maximum discharge temperature of 120°F (49°C).

Model (60hz)	Line Pressure psig/barg	Water Flow gpm/Lpm
DW13-100H	100/6.9	21/ 79
DW13-100H	125/8.6	21/ 79
DW13-125H	100/6.9	26/ 98
DW13-125H	125/8.6	26/ 98
DW13-125HH	150/10.3	26/ 98
DW13-150H	100/6.9	31/ 117
DW13-150H	125/8.6	31/ 117
DW13-150HH	150/10.3	31/ 117
DW13-200H	100/6.9	37/ 140
DW13-200H	125/8.6	37/ 140
DW13-200HH	150/10.3	37/ 140

Model (50hz)	Line Pressure psig/barg	Water Flow gpm/Lpm
DW13-75H	100/6.9	20/ 75
DW13-75H	125/8.6	20/ 75
DW13-75HH	150/10.3	20/ 75
DW13-90H	100/6.9	25/ 95
DW13-90H	125/8.6	25/ 95
DW13-90HH	150/10.3	25/ 95
DW13-110H	100/6.9	31/ 117
DW13-110H	125/8.6	31/ 117
DW13-110HH	150/10.3	31/ 117
DW13-132H	100/6.9	34/ 129
DW13-132H	125/8.6	34/ 129
DW13-132HH	150/10.3	34/ 129

NOTE

Waterflows are basis a 30°F (17°C) temperature rise.

If the compressor is connected to a closed loop cooling system, a 5-20 psi (0.3- 1.4 bar) differential pressure is required depending upon water flow rate. The required flow for water/glycol systems will, depending upon water flow, vary from the values listed.

2.3 SERVICE AIR CONDENSATE AND WATER PIPING (FOR WATER-COOLED)

It is recommended that service air piping be installed as shown in Fig 2-1. A shut-off valve should be included to isolate the package from the supply line as required. The use of water legs and drain traps is also recommended throughout.

Make sure that the cooling water hook-ups can deliver the required flow at ample pressure - see Section 2.2.2.

No piping loads or moments should be transmitted to the air connections provided with the package.

Condensate drains shall be connected to a non-pressurized gravity feed drain. If the compressor drains are manifolded together, care should be taken to insure that this drain is not pressurized when the machine condensate drains (both automatic or manual) are in operation.

All condensate should be disposed of in accordance with local governing laws.

DO NOT install the DS package in locations exposed to ambient temperatures below 32°F (0°C) unless adequate anti-freeze protection has been provided - consult Sullair for details. If the package will be exposed to freezing temperatures while inactive, open all drain ports available (compressor jacket plates, heat exchangers, condensate manual ports) and evacuate any trapped condensate. The microprocessor controller also requires a space heater in electrical enclosure for temperatures below 32°F (0°C).

2.4 SHAFT COUPLING ALIGNMENT CHECK

The compressor unit and motor are rigidly connected via a cast adaptor piece which maintains the shaft coupling in proper alignment. It is recommended that prior to initial startup all coupling fasteners be checked for proper torque. Refer to the Coupling Service Procedures included in the Maintenance section of this manual.

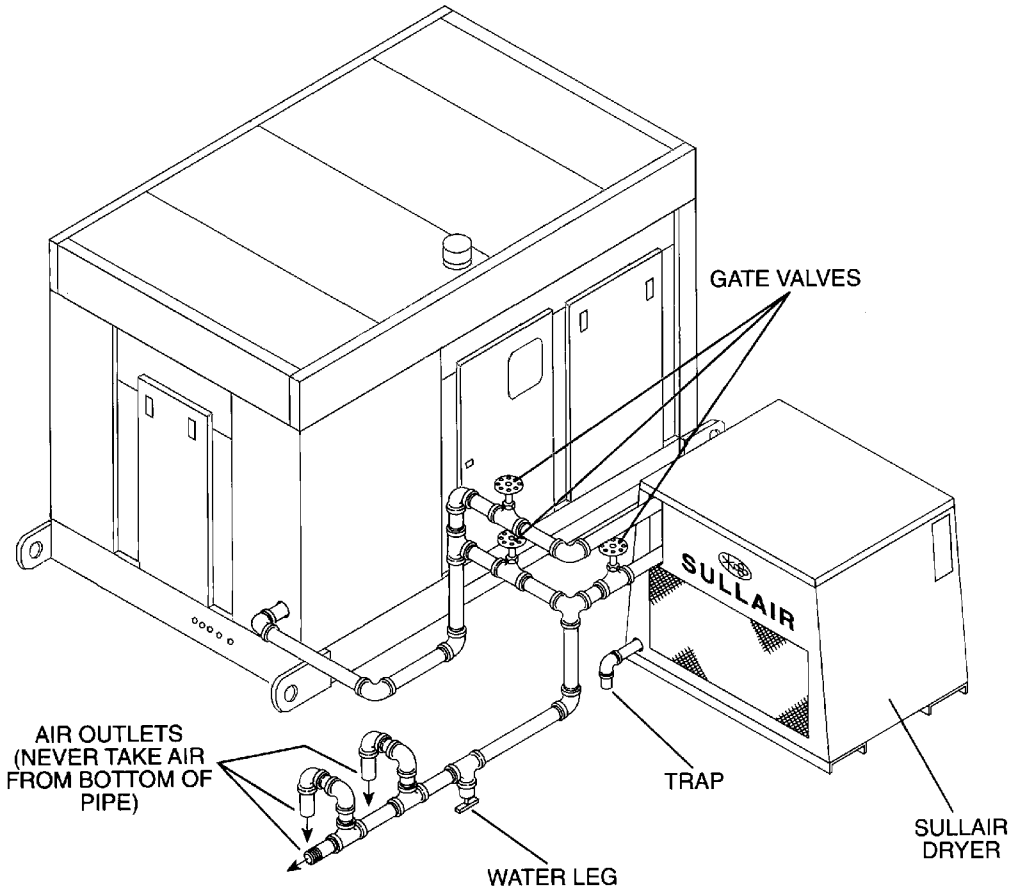
2.5 FLUID LEVEL CHECK

The package oil sump is supplied with the proper charge of lube oil - a level reaching 75% of the sight glass should be visible when the compressor unit is shut down. Check this level after initial installation and periodically thereafter.

2.6 ELECTRICAL PREPARATION

Interior electrical wiring is assembled at the factory. Required customer wiring is minimal (i.e., isolation switches, fusible disconnects, etc.), but

Figure 2-1 Service Air Piping (Typical)



should be done by a qualified electrician, in compliance with OSHA, NEC, and any other applicable codes. All electrical equipment should be sized for main motor, fan motor and service factors. A wiring diagram is provided with the package documentation.

⚠ DANGER

Lethal shock hazard inside.

Disconnect all power at source before opening or servicing.

1. Make sure incoming field voltage matches required package voltage.
2. Check starter overload and heater sizes - see Electrical section in Parts Manual.
3. Check all electrical connections for tightness.
4. Check motor rotation, as explained in Section 2.7.

2.7 MOTOR ROTATION CHECK

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

Pull out the EMERGENCY STOP button and press once, quickly and in succession, the **"I"** and **"O"** pads. This action will "Bump Start" the motor for a very short time. When looking at the motor from the rear end (opposite shaft end), the driveline should be rotating counterclockwise. If the reversed rotation is noted, disconnect the power to the starter and exchange any two of the three power input leads, then re-check rotation. A "Direction of Rotation" nameplate is located on the top of the compressor/motor adaptor piece.

NOTES

3.1 DS-13 SERIES COMPRESSOR PACKAGES

DS-13- SERIES 60 Hz TYPE	MOTOR HP	DIMENSIONS LENGTH IN/CM	WIDTH IN/CM	HEIGHT IN/CM	WEIGHT LB/KG	MAXIMUM OPERATING PRESSURE PSIG
DS13 100H	100	136/346	65/165	80/203	6840/3110	125
DS13 125H	125	136/346	65/165	80/203	6980/3170	125
DS13 125HH	125	136/346	65/165	80/203	6980/3170	150
DS13 150H	150	136/346	65/165	80/203	7040/3200	125
DS13 150HH	150	136/346	65/165	80/203	7040/3200	150
DS13 200H	200	136/346	65/165	80/203	7280/3310	125
DS13 200HH	200	136/346	65/165	80/203	7280/3310	150

DS-13- SERIES 50 Hz TYPE	MOTOR HP	LENGTH IN/CM	WIDTH IN/CM	HEIGHT IN/CM	WEIGHT LB/KG	MAXIMUM OPERATING PRESSURE BARG
DS13 75H	100	136/346	65/165	80/203	6840/3110	8.5
DS13 75HH	100	136/346	65/165	80/203	6840/3110	10.3
DS13 90H	125	136/346	65/165	80/203	6980/3170	8.5
DS13 90HH	125	136/346	65/165	80/203	6980/3170	10.3
DS13 110H	150	136/346	65/165	80/203	7040/3200	8.5
DS13 110HH	150	136/346	65/165	80/203	7040/3200	10.3
DS13 132H	200	136/346	65/165	80/203	7280/3310	8.5
DS13 132HH	200	136/346	65/165	80/203	7280/3310	10.3

COMPRESSOR:

Type:	Positive Displacement, Oil-Free, Twin Rotary Screws
Configuration:	Two-stages, Driven by Single Increaser Gear Box
Bearing Type:	Anti-Friction
Lubrication:	Pressurize System for Bearings, Gears and Cooling Jackets (air-cooled only)
Sump Capacity:	10 gallons (38 liters)
Ambient Temperature:	115°F (46°C) Max.
Control:	Electro-hydro-pneumatic
Discharge Pressure:	Maximum (see Table 3.1); Minimum 70 psig (4.8 barg)

MOTOR:

Type:	ODP Enclosure, NEMA Frames standard, Premium Efficient
Size:	100 through 200 HP, 2-pole speed
Voltage:	230V, 380V, 460V, 575V, @ 60 Hz; 380V, 400V, 415V, @ 50 Hz
Service:	50°C Ambient
Options:	TEFC Enclosure, CE Compliance
Starter:	Full Voltage Standard, Solid State Reduced Voltage (Optional)

3.2 LUBRICATION GUIDE

DS-13 Series compressors are factory filled with Sullair AWF fluid.

⚠ WARNING

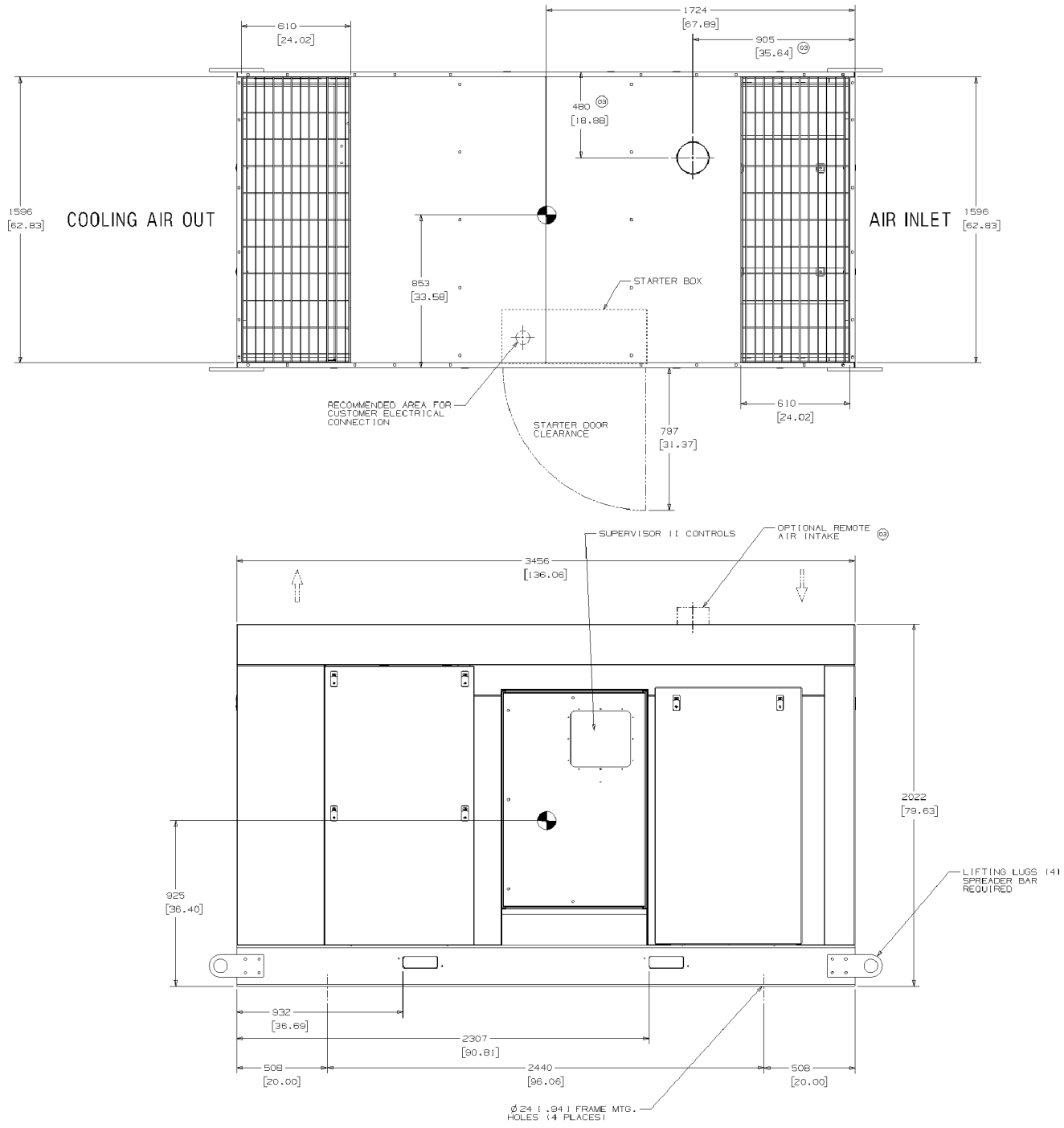
Mixing of other lubricants within the compressor unit will void all warranties!

Lubricant should be checked/changed every 8,000 hours or once a year, whichever comes first. The fluid should be changed more frequently under severe operating conditions, such as high ambient temperatures coupled with high humidity or when high particulate level, corrosive gases or strong oxidizing gases are present in the air.

Please refer to the electric motor manual, for driver requirements.

Maintenance of all other components is still recommended as indicated in the Maintenance section of this manual.

Figure 3-1A Identification- Air-cooled Standard Model: Part 1 of 2 (see Figure 3-1B)

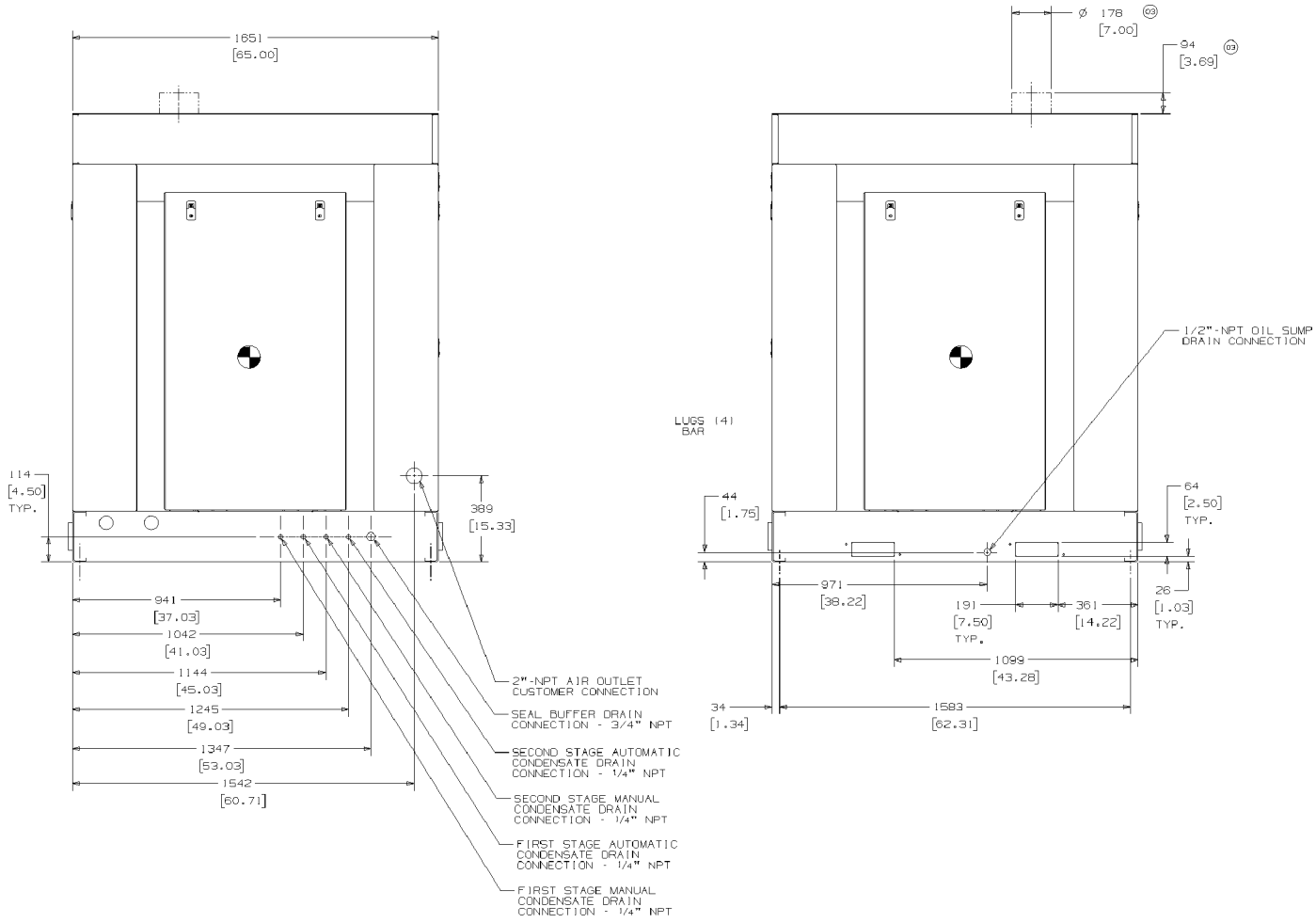


NOTES:

1. ALL DIMENSIONS ARE DUAL DIMENSIONS. MILLIMETERS AND [INCHES] UNLESS OTHERWISE NOTED.
2. APPROXIMATE PACKAGE CENTER OF GRAVITY SHOWN AT LOCATION MARKED
3. ALLOW 915mm [36in] MINIMUM CLEARANCE ALL AROUND MACHINE FOR ACCESS AS WELL AS FREE AIR CIRCULATION.
4. A FOUNDATION OR MOUNTING CAPABLE OF SUPPORTING THE WEIGHT OF THE MACHINE, AND RIGID ENOUGH TO MAINTAIN THE COMPRESSOR FRAME LEVEL 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 AT THE EXTERNAL CONNECTIONS.

PACKAGE DRY WEIGHTS			
DS13 60Hz MODEL	DS13 50Hz MODEL	APPROX WT LBS	APPROX WT KG
200H/200HH	132H/132HH	7280	3310
150H/150HH	110H/110HH	7040	3200
125H/125HH	90H/90HH	6980	3170
100H	75H/75HH	6840	3110

Figure 3-1B Identification- Air-cooled Standard Model: Part 2 of 2 (See Figure 3-1A)

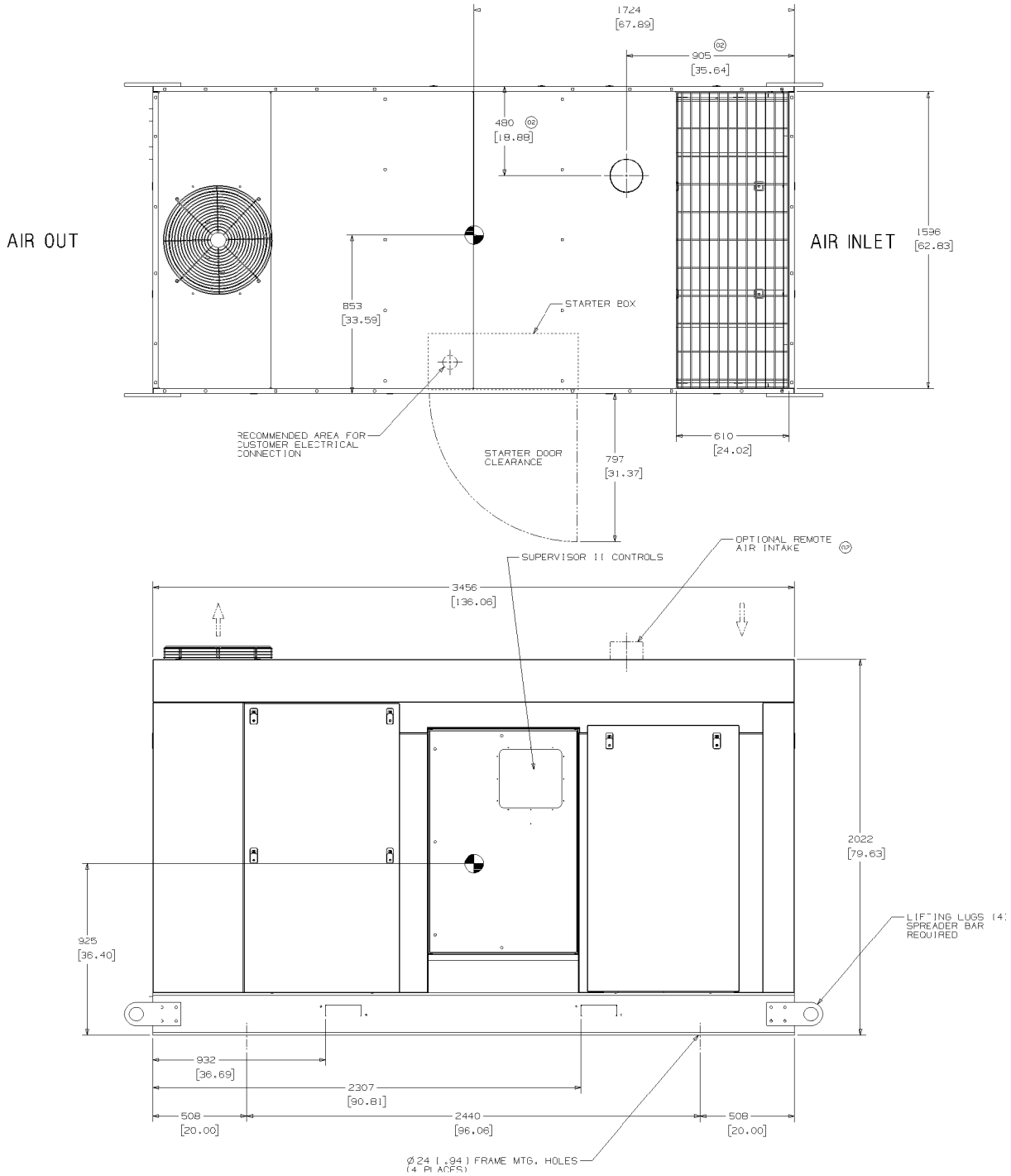


NOTES:

1. ALL DIMENSIONS ARE DUAL DIMENSIONS. MILLIMETERS AND [INCHES] UNLESS OTHERWISE NOTED.
2. APPROXIMATE PACKAGE CENTER OF GRAVITY SHOWN AT LOCATION MARKED
3. ALLOW 915mm [36in] MINIMUM CLEARANCE ALL AROUND MACHINE FOR ACCESS AS WELL AS FREE AIR CIRCULATION.
4. A FOUNDATION OR MOUNTING CAPABLE OF SUPPORTING THE WEIGHT OF THE MACHINE, AND RIGID ENOUGH TO MAINTAIN THE COMPRESSOR FRAME LEVEL 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 AT THE EXTERNAL CONNECTIONS.

PACKAGE DRY WEIGHTS			
DS13 60Hz MODEL	DS13 50Hz MODEL	APPROX WT LBS	APPROX WT KG
200H/200HH	132H/132HH	7280	3310
150H/150HH	110H/110HH	7040	3200
125H/125HH	90H/90HH	6980	3170
100H	75H/75HH	6840	3110

Figure 3-2A Identification- Water-cooled Standard Model: Part 1 of 2 (See Figure 3-2B)



NOTES:

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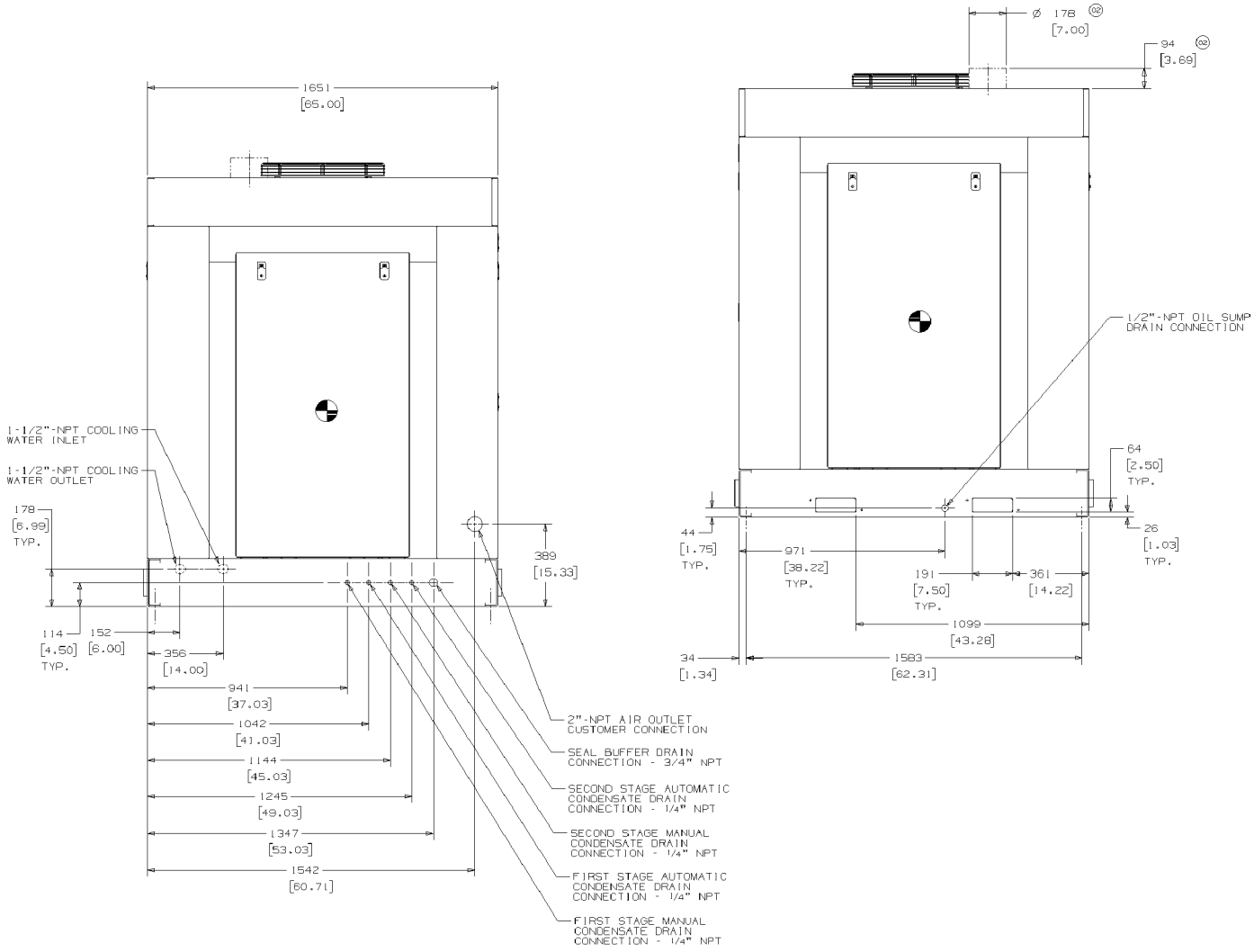
2. APPROXIMATE PACKAGE CENTER OF GRAVITY SHOWN AT LOCATION MARKED
3. ALLOW 915mm [36in] MINIMUM CLEARANCE ALL AROUND MACHINE FOR ACCESS AS WELL AS FREE AIR CIRCULATION.
4. A FOUNDATION OR MOUNTING CAPABLE OF SUPPORTING THE WEIGHT OF THE MACHINE, AND RIGID ENOUGH TO MAINTAIN THE COMPRESSOR FRAME LEVEL 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 AT THE EXTERNAL CONNECTIONS.

PACKAGE DRY WEIGHTS			
DS13 60Hz MODEL	DS13 50Hz MODEL	APPROX WT LBS	APPRCX WT KG
200H/200HH	132H/132HH	7280	3310
150H/150HH	110H/110HH	7040	3200
125H/125HH	90H/90HH	6980	3170
100H	75H/75HH	6840	3110

Figure 3-2B Identification - Water-cooled Standard Model: Part 2 of 2 (See Figure 3-2A)



NOTES:

1. ALL DIMENSIONS ARE DUAL DIMENSIONS. MILLIMETERS AND (INCHES) UNLESS OTHERWISE NOTED.
2. APPROXIMATE PACKAGE CENTER OF GRAVITY SHOWN AT LOCATION MARKED
3. ALLOW 915mm [36in] MINIMUM CLEARANCE ALL AROUND MACHINE FOR ACCESS AS WELL AS FREE AIR CIRCULATION.
4. A FOUNDATION OR MOUNTING CAPABLE OF SUPPORTING THE WEIGHT OF THE MACHINE, AND RIGID ENOUGH TO MAINTAIN THE COMPRESSOR FRAME LEVEL 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 AT THE EXTERNAL CONNECTIONS.

PACKAGE DRY WEIGHTS			
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150H/150HH	110H/110HH	7040	3200
125H/125HH	90H/90HH	6980	3170
100H	75H/75HH	6840	3110

NOTES

4.1 INTRODUCTION

Your DS–13 Series, rotary screw air compressor will provide you with improved reliability and reduced maintenance.

Read Section 7 (Maintenance) to keep your compressor in top operating condition. Should any questions arise which cannot be answered in the following text, call the Sullair Corporation Service Department.

IMPORTANT – Your DS–13 Series compressor package utilizes a simple to operate yet sophisticated computerized controller identified throughout this document as the Supervisor II. All pertinent use of this device is covered herein. Carefully familiarize yourself with it before attempting to operate the machinery.

4.2 DESCRIPTION OF COMPONENTS

Refer to Figure 4–1. The standard package includes a two–stage compressor and gear box assembly, an electric motor and driveline system, a Supervisor II control assembly, an inlet air system, low pressure (LP) and high pressure (HP) silencing/discharge air systems, air or water cooling system, a load/unload control system, an oil lubrication and cooling system, and a sound attenuating enclosure, all mounted on a fabricated steel frame.

Air–cooled or water–cooled heat exchangers are used on all models. A motor driven fan is used to ventilate the interior of the sound attenuating enclosure. The Supervisor II assembly is easily accessible for servicing behind a hinged and locked separate enclosure panel door.

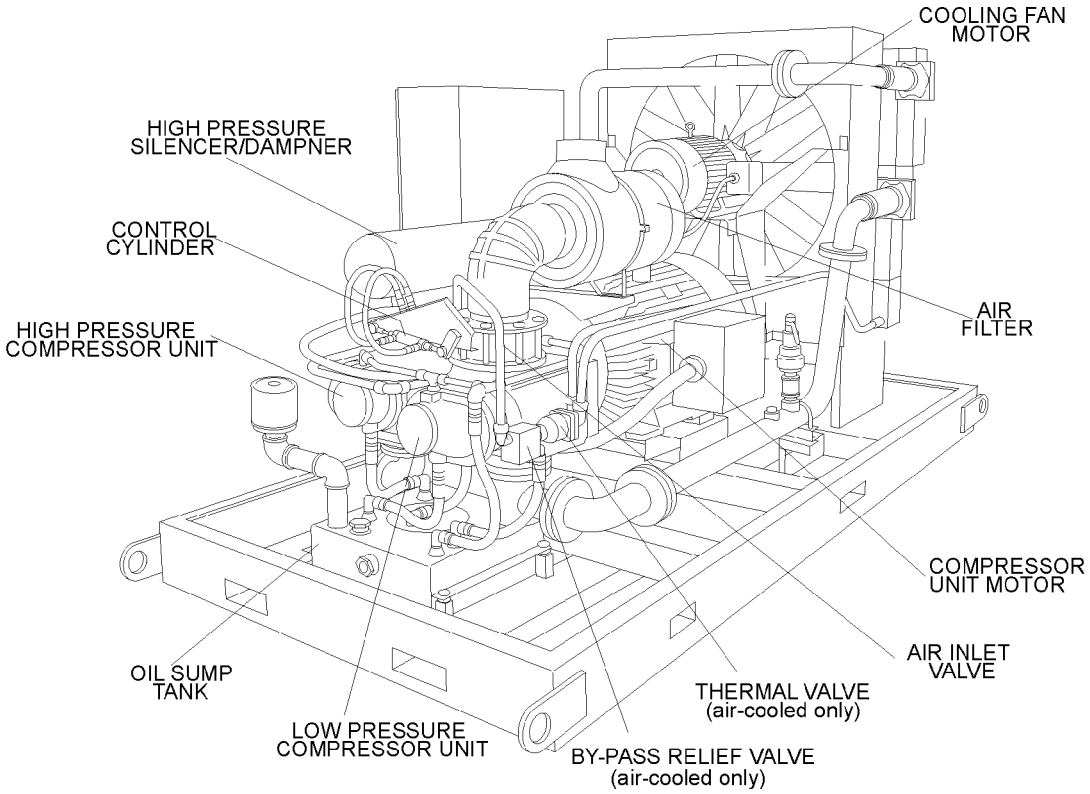
4.3 COMPRESSOR UNIT, FUNCTIONAL DESCRIPTION

DS–13 Series compressors feature a two–stage, oil free, rotary screw design. The rotor profiles and stators, some of which are protected with anti–corrosion coating, deliver near pulse–free compressed air to meet your demands. The rotor shafts are mounted on anti–friction bearings and are sealed by floating carbon ring/stainless steel cage assemblies. Both stages are driven by a common bull gear and speed optimized individual pinions, and are precisely mounted to the rigid gear box. Timing gears synchronize each male/female rotor pair for contact–free operation. Variations of compressor speed, and ultimately flow capacity, are determined by the ratio of pinions– to–bull gear set chosen.

A gear–type pump, coupled to the main drive shaft, supplies the required lubricating oil to the gears, anti–friction bearings and cooling to compressor jacket (air–cooled). For the water–cooled version, water is used to cool the compressor jackets. A baseframe mounted, all–metal tank serves as the sump for the lubrication system.

The compressor/gear box assembly is driven by an electric motor via a torsionally soft, flexible shaft

Figure 4–1 Description of Components (Typical Air–cooled version shown)



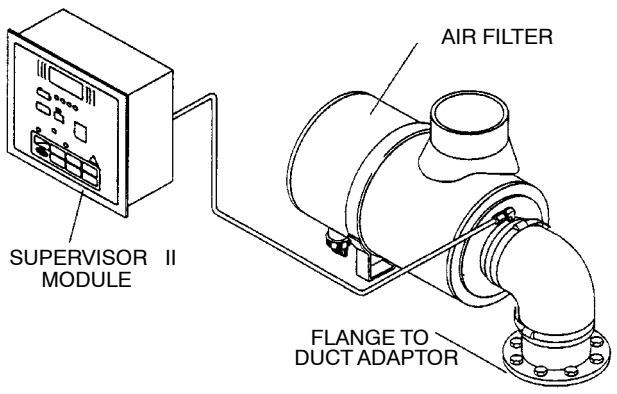
coupling. The NEMA C-flange electric motor is mounted to the gear box through a rigid, cast adaptor which maintains the gear box and motor shafts in optimum alignment and allows the driveline assembly to be supported by soft, vibration isolating rubberized mounts.

4.4 AIR INLET SYSTEM, FUNCTIONAL DESCRIPTION

Refer to Figure 4-2. The compressor inlet system consists of a heavy duty three-stage, dry type air filter with inertial dust separation and dust collection bowl, mounted inside the canopy and connected to the compressor inlet via a flange-to-duct adaptor.

A decrease in compressor inlet pressure, caused by the collected airborne dirt, is sensed by the Supervisor II and a filter maintenance announcement is displayed.

Figure 4-2 Compressor Inlet System



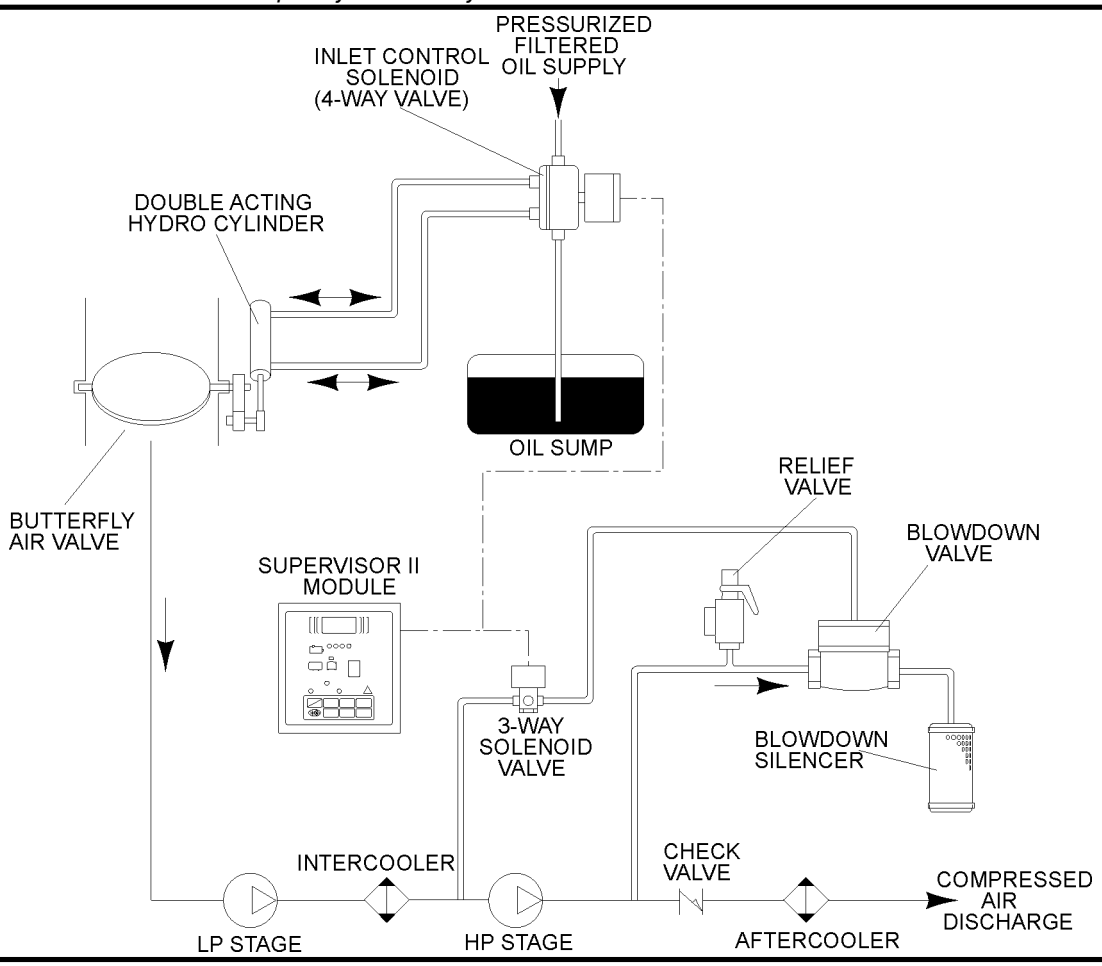
4.5 LOAD/UNLOAD CAPACITY CONTROL SYSTEM, FUNCTIONAL DESCRIPTION

Refer to Figure 4-3. The purpose of the capacity control system is to regulate the compressed air supply to the demand. It consists of the inlet throttling valve and blowdown subsystems integrated with the Supervisor II controller. Primary modes of operation are described below (for illustration purposes, 100 psig service operation will be used):

DEFAULT STATES

Default states for the inlet valve and blowdown sub-

Figure 4-3 Load/Unload Capacity Control System



systems are “mostly closed” and fully open respectively. In these states, the inlet control and blowdown control solenoids are both de–energized.

For the inlet valve subsystem, a “closed” or de–energized inlet control solenoid, results in no pressurized oil being applied to the hydraulic actuator, and therefore the inlet butterfly valve is “mostly closed”, allowing a minimum amount of inlet air to enter the compressor. During the remainder of this description, the term “closed” will be understood to mean, “mostly closed” in describing the inlet butterfly valve condition. **NOTE:** Some minimum volume of air must be allowed to enter the compressor when running in order to avoid excessive inlet depression.

For the blowdown subsystem, a “closed” or de–energized blowdown solenoid valve, means no pilot air pressure is being routed to the pneumatic blowdown valve, and therefore the blowdown valve is open. The pneumatic blowdown valve uses a mechanical spring to keep the valve open if LP pilot air is not routed to the valve’s diaphragm chamber. Once the Supervisor II signals the blowdown solenoid to open, LP pilot air is routed to the blowdown valve. Pilot air pressure of ≥ 10 psig exceeds the mechanical spring force, closing off the flow of HP discharge process air to the blowdown silencer and atmosphere.

This combined inlet/blowdown configuration ensures the air compressor defaults to a safe unloaded condition in the unlikely event of: control signal loss, a component failure, or loss of external power. A closed inlet and open blowdown state are also the conditions for these subsystems during the **UNLOAD MODE**.

START MODE: 0 TO @ 8 PSIG (0 TO 0.55 BARG)
When the “**I**” or “ ” pads on the Supervisor II control panel are depressed, the unit starts and ramps up to 100% motor speed. During this mode, the Supervisor II maintains its default “closed” (de–energized) signal to the inlet control solenoid valve, keeping the inlet butterfly valve “closed”. The same Supervisor signal maintains its default “closed” (de–energized) signal to the blowdown subsystem solenoid valve, resulting in the pneumatic blowdown valve staying open.

Typically, the motor/compressor should reach 100% full speed within 4–8 seconds. After a Supervisor II pre–programmed delay period (typically @ 10 seconds), the compressor should be up to 100% speed with the inlet and blowdown subsystems in the state described above. Once this delay period expires, the Supervisor II will automatically switch to **FULL LOAD MODE**, described below.

FULL LOAD MODE: @ 70 TO 100 PSIG (4.8–6.9 BARG)
After the delay period (typically @ 10 seconds) expires, the Supervisor II switches into **FULL LOAD MODE**. The Supervisor II sends a control signal to the inlet control solenoid, opening (energizing) the solenoid valve. The valve directs pressurized oil to the actuator, which extends its control rod opening the butterfly valve to ingest air. The same Supervisor II signal is sent to the blowdown solenoid valve, opening (energizing) the solenoid and allowing LP pilot air to be routed to the pneumatic blowdown valve diaphragm. The pneumatic force overcomes the spring force and closes the blowdown. With the inlet open, blowdown closed and the motor at 100% speed, the compressor will quickly ramp up to its set–point pressure of 100 psig.

NOTE: The programmable set–point pressure is also known as the unload pressure. Therefore, when P2 exceeds 100 psig, the machine will automatically go into **UNLOAD MODE.** The minimum **FULL LOAD MODE** pressure, is set to a default value of 50 psig by programming the “unload pressure differential” parameter. This sets the minimum pressure = set point pressure – “unload pressure differential”. In our example, this would be:

50 psig (minimum full load pressure) = 100 psig (set-point pressure) – 50 psig (unload pressure differential)

This 50 psig pressure is also the absolute minimum pressure the compressor can be run at for extended periods. The Supervisor II has hard programming that will shut down the compressor if it is run below 50 psig for ≥ 10 minutes. For further programming assistance, please consult the Supervisor II Section of this manual.

If the service pressure (P2) exceeds the set point pressure (100 psig) or falls below the minimum full load pressure (50 psig), the compressor will switch into **UNLOAD MODE**.

NOTE: Typical installations set the minimum full load pressure well above the 50 psig hard limit. For a 100 psig unload pressure, differentials of 10–20 psid are more typical resulting in minimum full load pressures of 80–90 psig.

UNLOAD MODE: ≥ 100 PSIG (≥ 6.9 BARG)
If the demand for compressed air falls below supply, system line pressure (P2) should increase as the discharge check valve closes. When P2 exceeds set point pressure (100 psig) the Supervisor II will signal the inlet control solenoid to close (de–energizing), routing oil pressure to the actuator retract position and closing the inlet butterfly valve. The same signal will close (de–energize) the blowdown solenoid, removing LP pilot air pressure from the pneumatic blowdown valve, opening the valve so that process air will be evacuated to the silencer.

If the Supervisor II is operating in **continuous mode**, the compressor runs in the unloaded state until the line pressure falls below the minimum full load pressure. When this occurs, the Supervisor II will automatically switch back into **FULL LOAD MODE.**

If the Supervisor II is operating in **automatic mode**,

the compressor runs unloaded for a pre-programmed period of time. If during this period, the line pressure **does not** fall below the minimum full load pressure (50 psig), the compressor will automatically shutdown. After shutdown, the Supervisor II continues to monitor line pressure (P2). If the line pressure then falls below the minimum full load pressure (50 psig), the Supervisor II immediately initiates **START MODE**, followed by **FULL LOAD MODE** as described earlier.

4.6 COOLING AND SILENCING SYSTEM, FUNCTIONAL DESCRIPTION

Refer to Figure 4-4 and 4-5. As air is discharged by each compressor stage, it is sequentially routed to:

- a silencer/dampener to reduce noise and pressure pulsations caused by the compressor.
- heat exchangers to cool the compression process.
- combination separator/drains to remove liquids condensed in the heat exchangers.

The LP stage silencer is a reactive pipework sized to dampen lower frequency air pulses, while the HP stage silencer is a reactive vessel sized to dampen higher frequency pulses.

4.7 LUBRICATION SYSTEM, FUNCTIONAL DESCRIPTION

Refer to Figures 4-5, 4-6 and 4-7. The DS-13 Series Compressor delivers oil-free compressed air, but it requires lubricant to maintain its high speed bearings and gears in running order.

For the air-cooled version, a gear-type pump draws lube oil from the baseframe mounted sump and delivers it at a rate of 18gpm (68Lpm), and a pressure equal to approximately 78 psig (5.4 barg). An external bypass valve maintains the set flow, while protecting the pump against undesirable overpressures. A thermal mixing valve, set to open at 85°F (29°C) ensures fast oil warm-up by bypassing oil around the heat exchanger. The lube oil is sequentially pumped through a heat exchanger, the first and second stage compressor cooling jackets, a high efficiency, replaceable element filter, and a multi-port manifold, where the105°F (41°C) filtered outflow is distributed to bearing and gear lubrication points on the compressor and the gear box. Filtered oil is also used to actuate the hydro actuator linked to the inlet control valve.

For the water-cooled version, a gear-type pump,

4-4 LP and HP Silencing/Discharge Air and Cooling Systems (Air-cooled version shown)

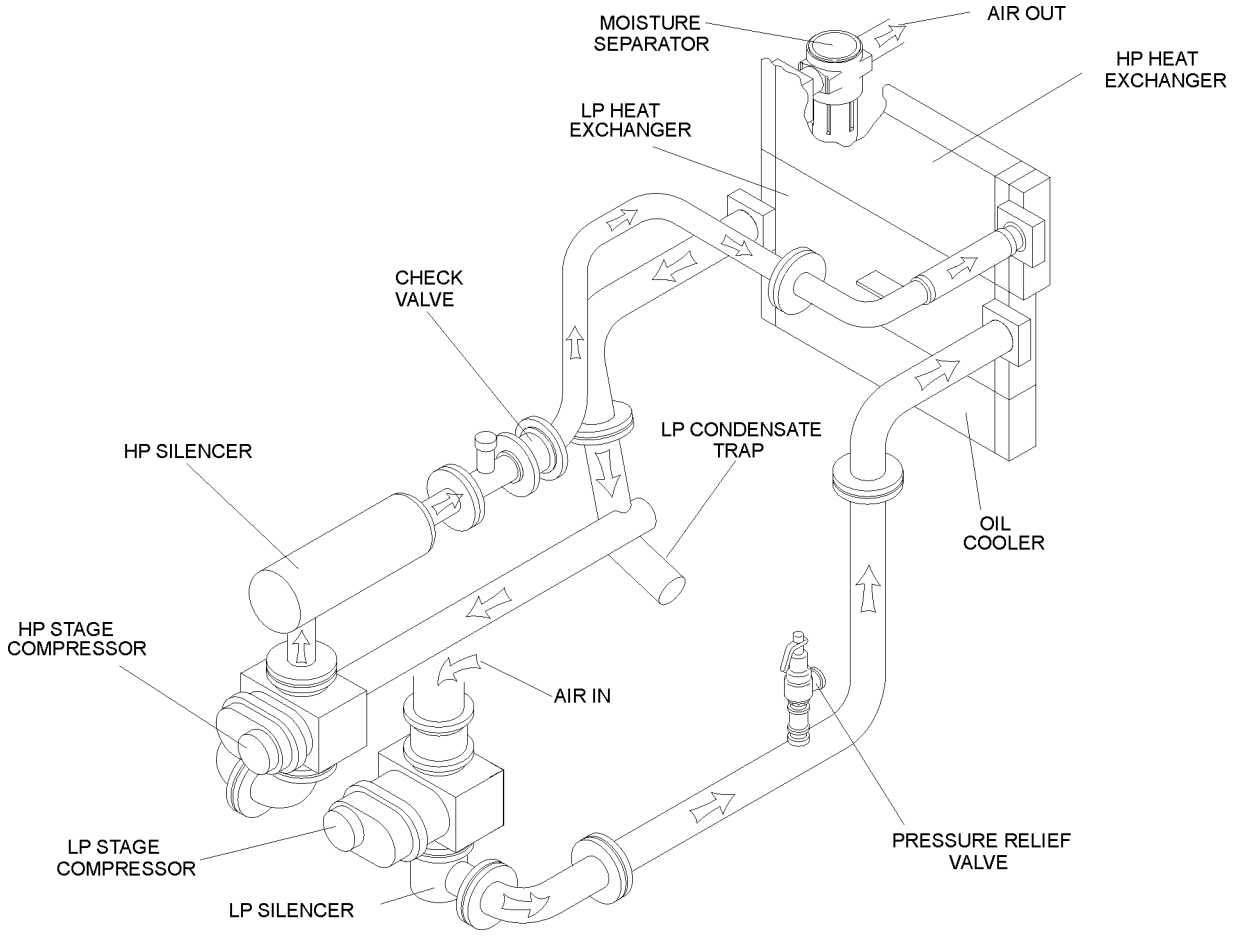


Figure 4–5 Piping and Instrumentation Diagram (Air–cooled)

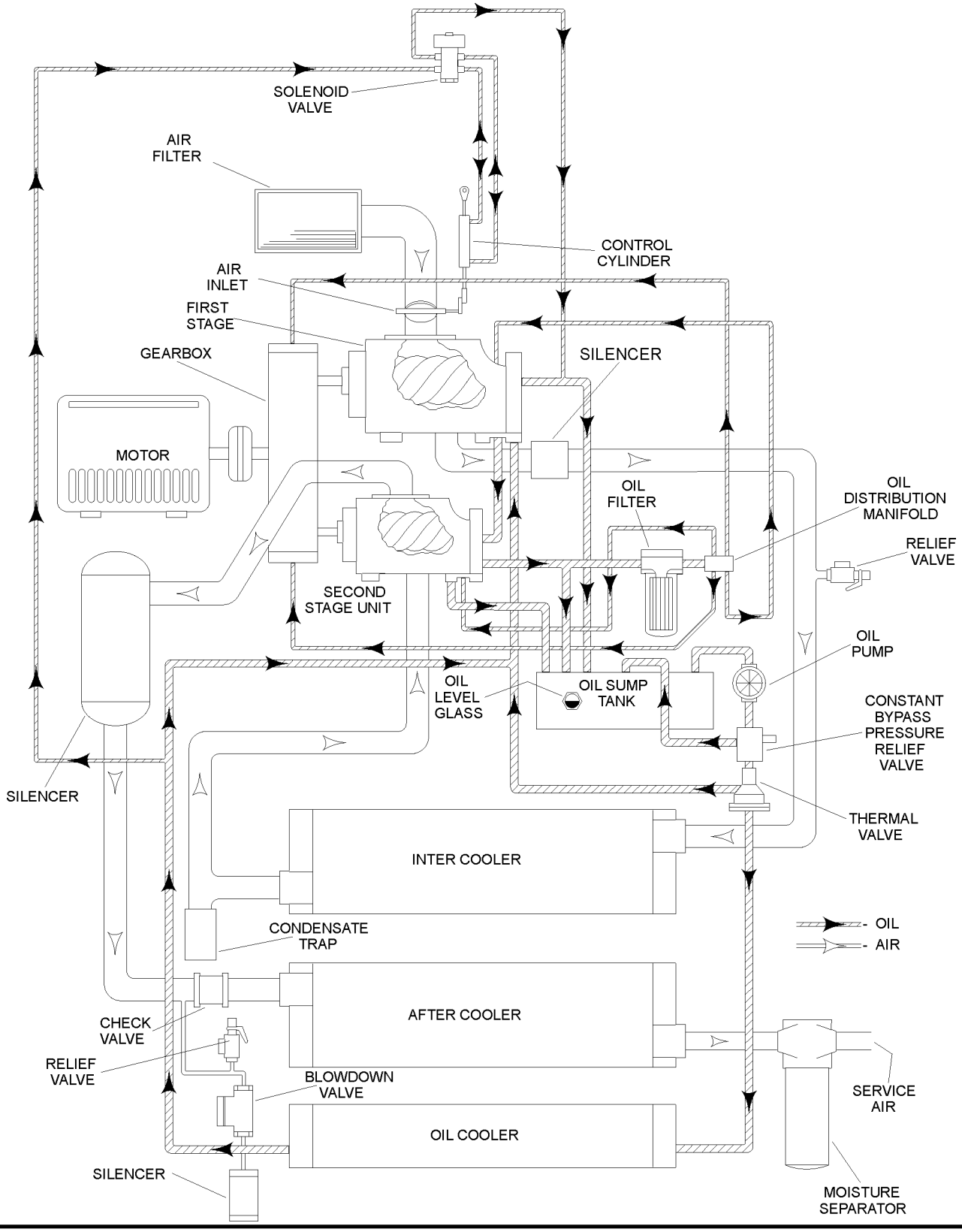
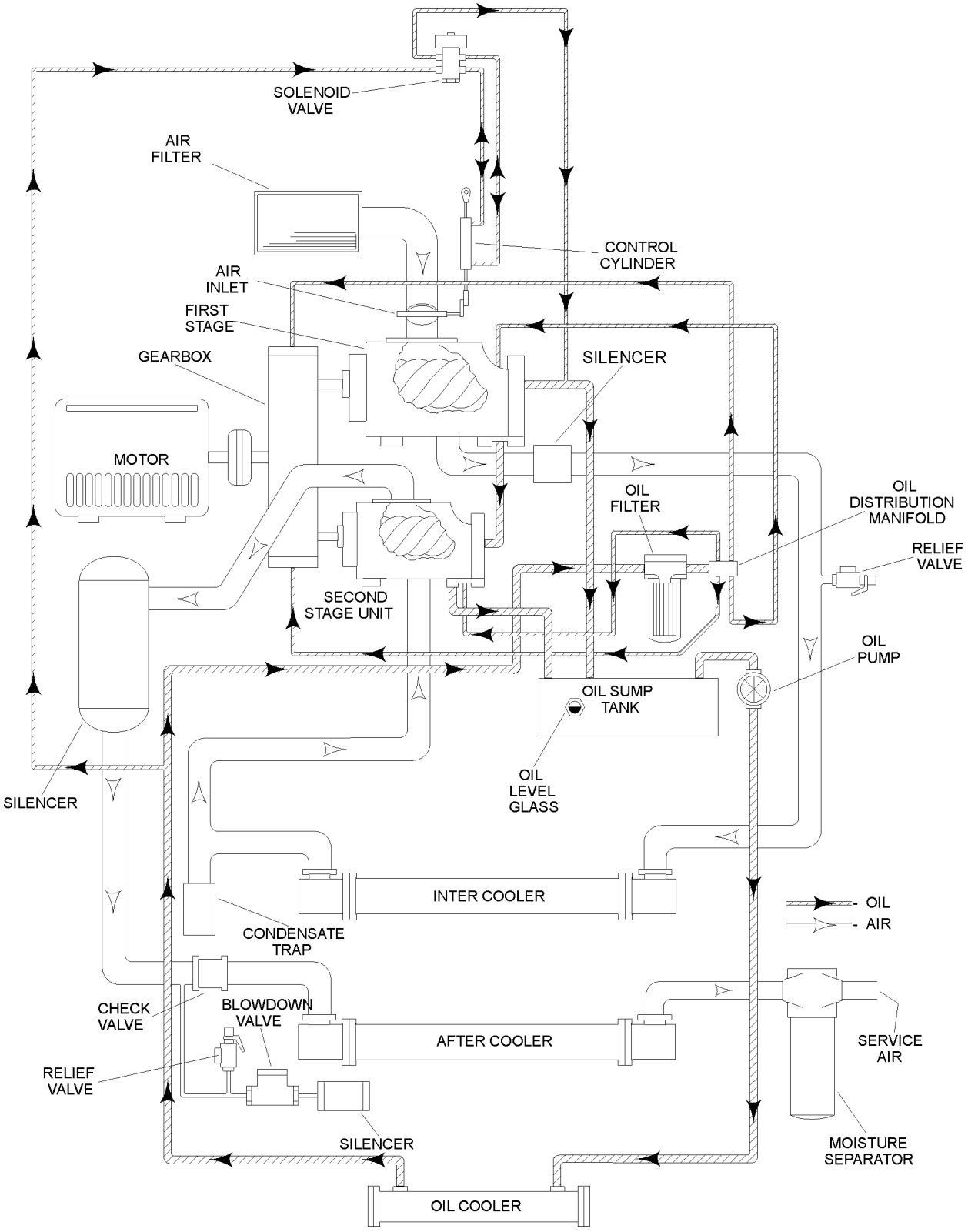


Figure 4-6 Piping and Instrumentation Diagram (Water-cooled)



directly coupled to the gear box input shaft, draws lube oil from the baseframe mounted sump and delivers it at a rate of 4gpm (15Lpm) and a pressure of 100 psig (6.9 barg). An integral bypass valve maintains the set flow, while protecting the pump against undesirable overpressures. The lube oil is sequentially pumped through a 4–pass, water cooled heat exchanger, a high efficiency, replaceable element filter, and a multi–port manifold, where the 105°F (41°C), filtered outflow is distributed to bearing and gear lubrication points on the compressor and the gear box. Filtered oil is also used to actuate the hydro actuator linked to the inlet control valve.

The Supervisor II senses and displays the filter outlet pressure and temperature. As a safety measure, unless oil pressure builds up to 25 psig (1.7 barg) within 10 seconds after startup, the Supervisor II shuts down the unit. In addition, if the pressure drop across the filter ports exceeds 10 psig (0.7 barg), the Supervisor II displays a maintenance requirement message.

All lubed points return the oil to the sump by gravity. Vents on the compressor timing gear covers and the gear box are also piped into the sump, to avoid releasing oil vapor. The sump is vented to atmosphere via a breather which includes an oil vapor trap.

4.8 BUFFER AIR SYSTEM, FUNCTIONAL DESCRIPTION

A small supply of cooled, compressed air is taken at the aftercooler moisture separator, and used to feed the buffer air system. This compressed air goes through a control air filter, and then through a pressure regulator, where the pressure is reduced from the compressor operating pressure to 10 psig (0.7 barg) unloaded (read from locally–mounted pressure gauge). This clean, compressed air supply is fed to both first and second compression stages. This air provides a positive pressure buffer to the seals between the compression air and oil sides of the stages, assuring oil–free air. The buffer air is then drained from the stages, manifolded together, and piped to the exterior of the package.

Figure 4-7 Lubrication System (Air-cooled model shown)

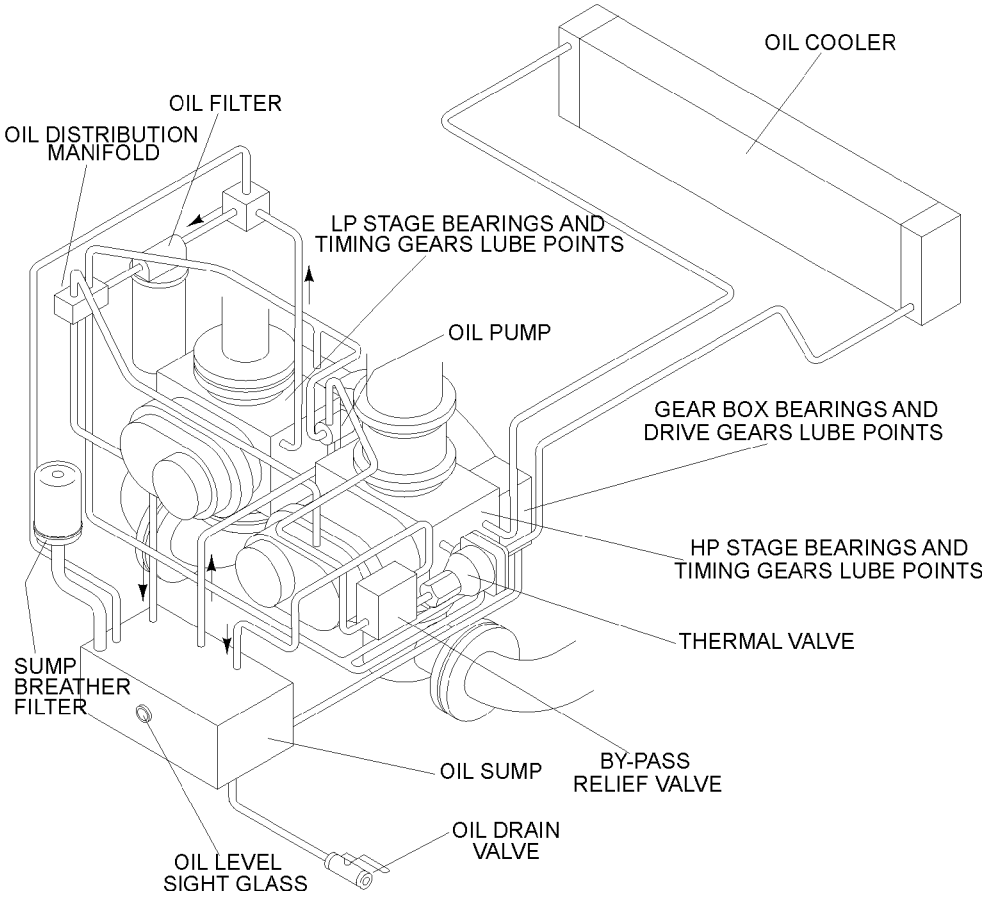
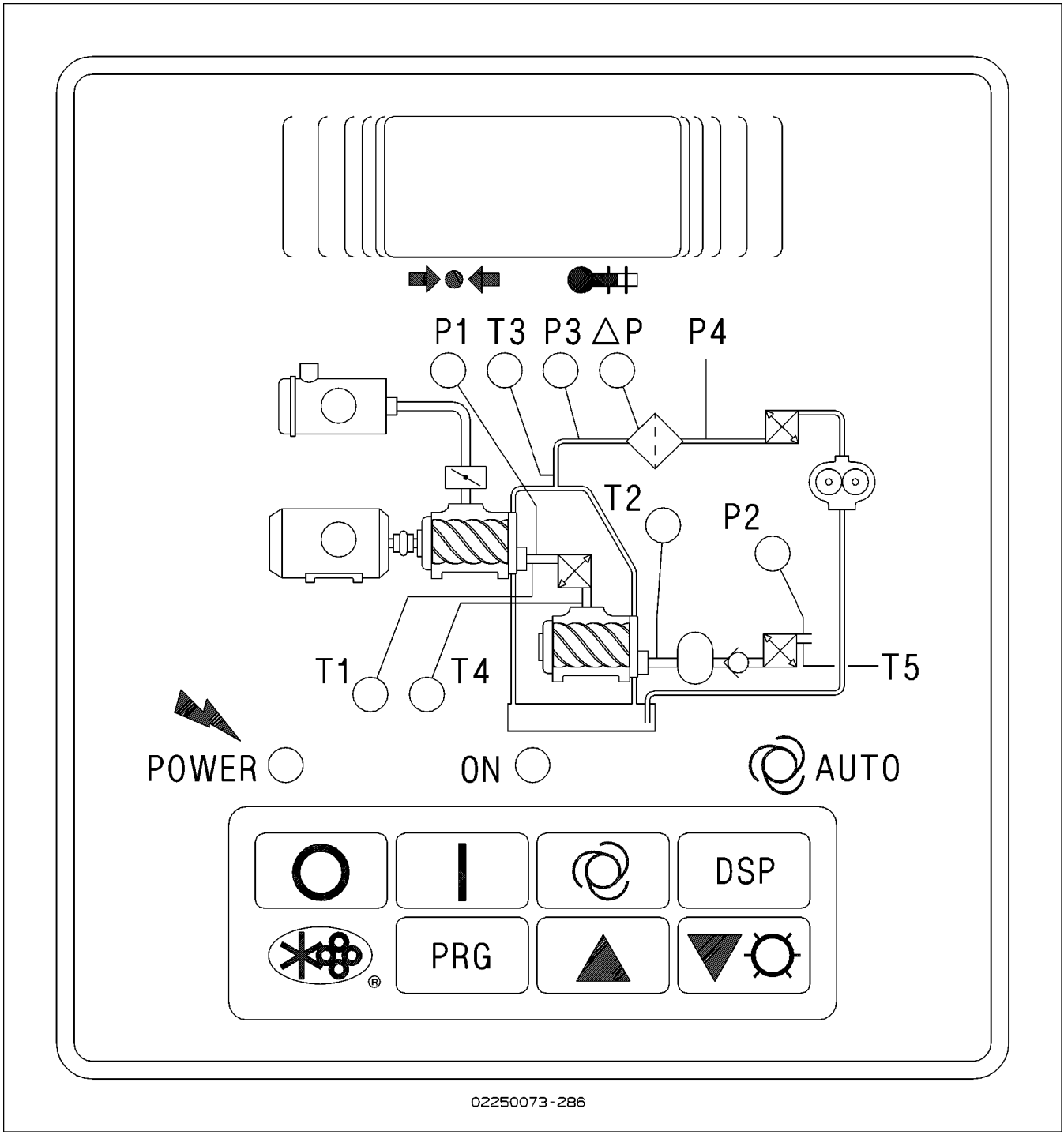


Figure 5-1 Supervisor II Panel



5.1 INTRODUCTION

Refer to Figure 5-1. The Supervisor II has a two line display to show temperature, pressure and status. It has a keypad for operating the compressor, programming the control points and selecting displays. There is a graphic illustration with lamps that light to show the item being displayed. The lamps flash if that component is in an alarm condition.

5.2 KEYPAD

The keypad is used to control the machine as well as display status and change setpoints. Refer to figure 5-1 for following key descriptions.

- **Stop** – Used to put the machine into manual stop. It is also used to clear alarm conditions.

- **Continuous** – Starts machine if no alarm conditions are present. Also used to clear alarm conditions while machine is running.

- **Auto** – Starts machine and selects auto mode if no alarm conditions are present. Also used to clear alarm conditions while machine is running.

- **Display** – Used to display pressures, temperatures and other status information (See section on STATUS DISPLAYS).

- **Logo** – Used for various functions described in later sections

- **Program** – Used to enter the parameter change mode where control parameters may be displayed and changed (See PARAMETER SETUP).

- **Up arrow** – Used in status displays to change displays and in parameter setup mode to increment a value.

- **Down arrow, lamp test** – Used in status displays to change displays and in parameter setup mode to increment a value. When in the default display the key will light all the lamps for three seconds.

5.3 STATUS DISPLAYS

By default the line pressure (P2) and discharge temperature (T2) are shown on the bottom line of the display, and machine status on the top line.
The following are the various machine status messages that indicate the state of the compressor:

(Display graphics shown below.)

- **STOP** – Compressor is off.
- **STANDBY** – Compressor is off but armed to start. This state may be entered because of a power up, or the unload timer had expired and stopped the machine. NOTE : The machine may start at any time.
- **STARTING** – Machine is trying to start.
- **OFF LOAD** – Machine is running and off loaded.
- **ON LOAD** – Machine is running and loaded.
- **RMT 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.

This default display appears as follows:

STOP
110 350

If there are alarms active they will alternately be shown with the default display. The machine status will be displayed for 2 seconds then the alarms for 2 seconds each. For example:

T1 HI
110 350

To view other status press the DSP key. All temperatures and pressures may be displayed as well as other status information. To scroll through the displays press the up arrow or down arrow keys. Up arrow moves to the next display, down arrow the previous display. To return to the default display press the display key.

- Interstage discharge pressure and line pressure.

```
P1  30
P2  110
```

- Oil filter differential pressure and the maximum limit. If the limit is exceeded oil maintenance warning will be displayed.

```
dP2  4
MAX 20
```

- Pressure before (P4) and after (P3) oil filter.

```
P3  40
P4  44
```

- Interstage discharge temperature. Shuts off the compressor it T1 exceeds T1 MAX and system status will display T1 HI.

```
T1  350
MAX 445
```

- Final discharge temperature and the maximum limit. If the temperature exceeds the limit a T2 HI shutdown will occur.

```
T2  350
MAX 445
```

- Oil temperature and the maximum limit. If the temperature exceeds the limit a T3 HI shutdown will occur.

```
T3  100
MAX 160
```

- Interstage temperature after the intercooler and the maximum limit. If the temperature exceeds the limit a T4 HI shutdown will occur.

```
T4  100
MAX 160
```

- Package discharge temperature and the maximum limit. If the temperature exceeds the limit a T5 HI shutdown will occur.

```
T5  100
MAX 160
```

- Total hours that the compressor has been running.

```
HRS RUN
001234.0
```

- Total hours that the compressor has been loaded.

```
HRS LOAD
000987.0
```

- Last fault log. This shows the fault on the first line and the run hours when the fault occurred.

```
T1 HI
@1  234
```

- Next to last fault log. This shows the fault on the first line and the run hours when the fault occurred.

```
T1 HI
@2 204
```

5.4 LAMP INDICATORS

Embedded into the front panel schematic of the compressor are several lamps. Pressing the lamp test key will light all the lamps for 3 seconds. Each LED lamp has the following purpose.

P1 – (Interstage pressure) If lit steady, signifies that P1 is being displayed, if flashing denotes the presence of an alarm.

P2 – (Line pressure) If lit steady, signifies that P2 is being displayed, if flashing denotes the presence of an alarm.

P3 – Pressure after oil filter is being displayed.

P4 – Pressure before oil filter is being displayed.

T1 – (First stage discharge temperature) If lit steady, signifies that T1 is being displayed, if flashing denotes the presence of an alarm.

T2 – (Second stage discharge temperature) If lit steady, signifies that T2 is being displayed, if flashing denotes the presence of an alarm.

T3 – (Oil temperature) If lit steady, signifies that T3 is being displayed, if flashing denotes the presence of an alarm.

T4 – (Interstage temperature) If lit steady, signifies that T4 is being displayed, if flashing denotes the presence of an alarm.

T5 – (Package discharge temperature). If lit steady,

signifies that T5 is being displayed; if flashing denotes the presence of an alarm.

MOTOR – If flashing, indicates the motor overload contact has opened.

INLET FILTER – If flashing, indicates that inlet filter maintenance is needed.

OIL FILTER – If flashing, indicates that oil filter maintenance is needed (oil filter differential pressure dP2 maximum has been reached).

POWER ON – Lit if 120VAC power is applied to the Supervisor II.

ON – If lit steady, the compressor is running. If flashing, indicates that the compressor is armed but stopped because of restart timer not expired, remote stop or sequence stop. **The compressor may start at any time.**

AUTO – If lit steady, the compressor is running and in auto mode. If flashing, indicates that the compressor is armed but stopped because of restart timer not expired, remote stop or sequence stop. **The compressor may start at any time.**

5.5 OPERATING PARAMETER SETUP

Pressing the program key enters parameter display and edit mode. To move to the next parameter press the program key. To increment a parameter press the up arrow key or logo key. The logo key will increment by 10. To decrement the value press the down arrow key.

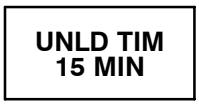
The parameters are displayed in the following order:

- **Unload pressure** – The pressure where the machine is unloaded. For example if this parameter is set to100 psig (6.9 barg) the machine will unload when the line pressure reaches 100 psig (6.9 barg).

- **Load differential** – The pressure differential below the unload pressure where the machine is loaded. For example if the unload pressure is set to100 psig (6.9 barg) and the load differential is set to 10 psid (0.7 bar), the machine will load when the line pressure goes below 90 psi (6.2 bars).

- **Restart time** – 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 the machine will not automatically start after power up.

- **Unload Stop Timer** – 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.

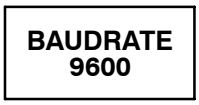


- **Language select** – English, German, Spanish, Italian and French may be selected for display language.

- **Units** – English or metric units may be selected.

- **Communications ID #** – This is the network address of a machine. If there is more that one machine connected to the network, each machine must have a unique number

- **Communications baud rate** – This should always be selected to 9600 baud for all sequencing modes. It may be lower for slave or monitoring modes.



- **Sequence method** – This parameter sets the method used for sequencing. The choices are DISABLED, REMOTE, SLAVE, HOURS, COM ID#. See the Sequencing & Protocol Manual (P/N 02250057–696) for details about these modes.

- **Drain interval** – The time between actua-

tion of the drain valve.

DRN INTV 3 MIN

- **Drain time** – The amount of time that the drain valve is actuated.

DRN TIM 1 SEC

- **Last Communication Number** – Used only for sequencing, see Sequencing & Protocol Manual for details.

LAST COM 3

- **Lowest Allowable Pressure** – Used only for sequencing, see Sequencing & Protocol Manual for details.

LOWEST 90 PSI

- **Recovery Time** – Used only for sequencing, see Sequencing & Protocol Manual for details.

RECOVER 10 SEC

- **Rotate Time** – Used only for sequencing, see Sequencing & Protocol Manual for details.

ROTATE 50

- **Sequence Hours** – Used only for sequencing, see Sequencing & Protocol Manual for details.

SEQ HRS 1000

5.6 OPERATING THE COMPRESSOR

Before operating the compressor the operating parameters must be setup. See Section 6.3, Supervisor II Operating Parameters– Setup, on operating parameter setup.

MANUAL OPERATION MODE

In this mode the compressor will run indefinitely, as long as temperatures and pressure remain within the valid operating ranges, and the motor overload or emergency stop contacts are not tripped. Pressing the "**I**" will turn on the compressor and put it in manual mode. If the compressor is already running, but in automatic mode, pressing "**I**" will switch operation to manual. Pressing "**I**" while already running in manual mode will cause the Supervisor to turn off the common fault relay, if engaged, and clear any maintenance indicators.

To stop the compressor, press "**O**". If the compressor is already off when "**O**" is pressed, the common fault relay will be turned off, if engaged, and it will try to clear the alarm and maintenance indicators. Regardless of what the compressor is doing, pressing "**O**" puts the Supervisor in manual stop mode.

AUTOMATIC OPERATION MODE

In this mode the compressor will start if line pressure (P2) is less than the **LOAD** parameter. It will stop if the compressor runs unloaded for the number of minutes indicated by the **UNLD TIM** parameter . To put the compressor in automatic mode press "⟲ ". If P2 is already less than **LOAD** the compressor will start immediately, otherwise the system status will indicate **STANDBY** and the LED marked **AUTO** will flash.

If the compressor is already running, but in continuous mode, pressing "⟲ " will switch operation to automatic. Pressing "⟲" while already running in automatic mode will cause the Supervisor to turn off the common fault relay, if engaged, and clear any maintenance indicators.

In automatic mode the compressor can be stopped manually by pressing "**O**". Stopping the compressor using "**O**" will put the Supervisor in manual stop mode.

Regardless of whether in AUTOMATIC or MANUAL operation modes, control of the inlet and blowdown subsystems will be based on the parameters **UNLD** and **LOAD**. Further inlet and blowdown subsystem detail is found in Section 4.5. Machine configuration is summarized in Table 5-1.

Table 5-1 Machine Configuration

Line Pressure	Inlet System		Blowdown System	
(Typical)	Solenoid	Butterfly	Solenoid	Valve
P2 > UNLD(>100 psig)	Closed	Closed	Closed	Open
P2 < UNLD-LOAD (<90 psig)	Open	Open	Open	Closed
***P2 < 50 psig for ≥ 10 min (SHUTDOWN CONDITION)**	Closed	Closed	Closed	Open

POWER FAILURE RESTART
If the restart timer (RST TIME parameter) is disabled the compressor will not try to start after a power up. If this time is set to a value the machine will go into standby after power up. When the line pressure drops below the load setpoint, the restart timer will start timing. When the timer expires the machine will start.

SEQUENCING MODES
The following is a brief description of sequencing modes, for details see the Supervisor II Sequencing & Protocol Manual (P/N 02250057–696).

- **DISABLED** – Responds to status and parameter change messages via the RS485 network but will not respond to start, stop, load or unload messages.
- **REMOTE** – Responds to status and parameter change messages but will not respond to start, stop, load or unload messages. The remote inputs and outputs are enabled (start/stop, load/unload, master/local).
- **SLAVE** – Will respond to all messages, but will not start or load unless commanded to do so by a message. This mode is used to control the machine from a master computer.
- **HOURS** – Sends status message about once a second, starts, loads and unloads machines based on sequencing hours.
- **COM ID #** – Sends status message about once a second, starts, loads and unloads machines based on machine Com ID#.

5.7 SUPERVISOR II OUTPUT RELAYS

RELAY	OPERATION
RUN RELAY (K1)	Contact closure energizes the compressor starter.
UNLOAD/LOAD (K3)	Controls ON LOAD/OFF LOAD operation of the load control solenoid valve.
COMMON FAULT (K4)	May be used to provide remote indication of any pre–alarm, maintenance or fault shutdown condition.
ELECTRIC DRAIN VALVE (K5)	Controls a solenoid valve to provide automatic condensate removal.
FULL LOAD/MODULATE (K6)	Used with sequencing feature.

NOTE: All output relays will handle 8 amperes at 120/240 VAC.

Table 5-2

Parameter	Value Range	Notes
Load P2	70–140 psig (4.8– 9.7 barg)	Load pressure setting
Unload P2	70–150 psig (4.8–10.3 barg)	Unload pressure setting
Max P2	160 psig (11 barg)	System shutdown pressure setting
Unload Time	10–60 min	Time lapse to system shutdown on **AUTO** mode
Electrical Drain Interval	0–10 Min.	
Duration	0–10 Sec.	

5.8 SUPERVISOR II CONTROL PARAMETERS- DS-13 SERIES

SENSOR	FUNCTION	UNITS	PREALARM	SHUTDOWN	FAILURE MODE
P1	Interstage Air Pressure	psig/barg	49/ 3.4	52/ 3.6	Hi
P2	Discharge Air Pressure	psig/barg	N/A	50/ 3.4	Lo
P3	Oil Filter Outlet Pressure	psig/barg	N/A	25/ 1.7	Lo
P4	Oil Filter Inlet Pressure	psig/barg	N/A	N/A	N/A
Dp1	Inet Filter Vacuum	inches H_2O/mm	22/1.5	N/A	Hi
Dp2	Oil Filter Differential (P4-P3)	psig/barg	20/ 1.4	N/A	Hi
T1	1st Stage Discharge Air Temp.	˚F/˚C	435/ 224	445/ 229	Hi
T2	2nd Stage Discharge Air Temp.	˚F/˚C	435/ 224	445/ 229	Hi
T3	Oil Filter Outlet Temp.	˚F/˚C	155/ 68	160/ 71	Hi
T4	2nd Stage Inlet Air Temp.	˚F/˚C	155/ 68	160/ 71	Hi
T5	Aftercooler Discharge Temp.	˚F/˚C	155/ 68	160/ 71	Hi
-	Water Flow Switch (WC)	psig/barg	N/A	10/0.7	Lo

COMPRESSOR OPERATION

6.1 GENERAL

While Sullair has built into the DS-13 Series compressor package a comprehensive array of controls and indicators to help assure proper operation, the user should recognize and interpret readings which call for service or indicate the onset of a malfunction. Before starting the unit, the user should become familiar with the controls and indicators - their purpose, location, and use.

⚠ WARNING

The minimum continuous operating pressure is 70 psig (4.8 barg). the compressor should not be operated below this pressure except for short periods. The Supervisor II will shut the machine down if it is operated continuously below 70 psig (4.8 barg) for ten minutes.

6.2 PURPOSE OF CONTROLS

CONTROL OR INDICATOR	PURPOSE
EMERGENCY STOP SWITCH	Pushing in this switch, found adjacent to the Supervisor II, cuts all AC outputs from the latter and de-energizes the starter. A fault message (E STOP) is displayed by the Supervisor II until the button is pulled out and the **"O"** pad is pressed.
MOTOR O/L RESET	Momentarily pushing this button, found on the thermal overload element housing in the starter box, re-closes the latter's contacts after a current overload takes place. Please be aware that the elements must be allowed to cool sufficiently before resetting.
DISCHARGE CHECK VALVE	Isolates compressor from field pipework when shut down. Located between the HP silencer/dampener and the aftercooler.
PRESS RELIEF VALVES	Found on the discharge pipework of both LP and HP stages, they vent the compressed air to atmosphere in case of an over pressure condition - 65 and 165 psig (4.5 and 11.4 barg), respectively.
INLET VALVE CYLINDER AND CONTROL VALVE ASSEMBLY	The hydraulically operated butterfly valve throttles the air flow entering the unit inlet flange - LP stage. A 4-way electric solenoid valve loads and unloads the hydraulic actuator, in response to Supervisor II commands.
BLOWDOWN SOLENOID AND PNEUMATIC BLOWDOWN VALVE ASSEMBLY	The 3-way solenoid valve and pneumatic blowdown valve vents compressed air (HP discharge) to atmosphere through a muffler.
DRAIN VALVES	Furnished as manual backups to automatic drain valves used in the condensate separator drain lines. Also used as lubricant sump drain valve.
OIL PRESSURE BYPASS VALVE	To maintain desired oil flow and to protect oil pump from over pressure situations.
THERMAL VALVE (AIR-COOLED)	This thermal valve automatically opens/closes to bypass cold oil around the heat exchanger to ensure fast oil warmup and optimize operating temperature.
SUMP SIGHT GLASS	Indicates level of lubricant in the sump. Located on the sump side, it should show 75% full (compressor stopped) for proper oil level.
WATER PRESS SWITCH (WATER-COOLED)	De-energizes the starter, via the Supervisor II, if the water pressure falls below 10 psi (0.7 barg). This switch is not adjustable.
COOLANT GLOBE VALVES (WATER-COOLED)	Provided to regulate the flow of cooling water through the Inter, After, and Oil coolers.

COMPRESSOR OPERATION

6.3 SUPERVISOR II OPERATING PARAMETERS - SET UP

Refer to Figure 5-1 in Section 5, Supervisor II.

• To change operating parameters you must go into **"PROGRAM"** mode. PROGRAM mode can only be accessed from the default display mode. To enter PROGRAM mode press **"PRG".**

• When in PROGRAM mode you will be prompted with the name of the parameter, its current value and its units. To increase the value press "▲".

• If you desire a lower value, you must increase until you reach the maximum allowable value; at this point the next increase will set the value to the minimum.

• To confirm the new value, or to go to the next item on the list, press **"PRG"**.

• While modifying a setpoint, you may want to restore the original value. To do so, press the Sullair logo.

• To return to the default display, cancelling any changes to the current parameter, press **"DSP".**

6.4 INITIAL START-UP PROCEDURE

The following procedure should be followed for the initial start-up of the package:

1. Read the preceding pages of this material thoroughly.
2. Be sure that all preparations and checks described in Section 2, Installation, have been made.
3. Close manual condensate drain valves and replace any cooler drain plugs which may have been removed for shipment to prevent freezing.
4. Open service valve to the air net system.
5. Check that the Emergency Stop switch is armed (pulled out), reset faults (if any) by pressing the **"O"** pad. Energize the starter by pressing the **"I"** pad. Compressor will start unloaded, then load.
6. Check for possible leaks in the pipework.
7. Slowly close and open the shut-off valve to check that the Full Load and Unload set pressures programmed in the Supervisor II are adequate for the application.

8.1 (Air-cooled) Observe the operating temperatures T4 (interstage) and T5 (final package air outlet). These should be no higher than 135°F (57°C) or 20°F (11°C) above the ambient temperature. Observe the operating temperature T3 and pressure P3 (lube oil filter discharge). When T3 reaches approximately 100°F (38°C), P3 should be approximately 40 psig (2.8 barg). This is controlled by the constant bypass pressure relief valve setting.

8.2 (Water-cooled) Observe the operating temperatures T4 (interstage) and T5 (final package air outlet). These should be at or below 105°F (41°C) or 15°F (8°C) above the available cooling water temperature. It may be necessary to adjust the water regulating valves to achieve these temperatures.

9. Close service valve to air net system.
10. Check the buffer supply pressure. The buffer supply regulator should be set at minimum 10 psi (0.7 bar), maximum 14 psi (10 bar) in the unload condition.
11. Check the setting of the inlet control valve flapper for unloaded operation – a vacuum level of 23 in. (58 cm) Hg should be measurable at the inlet flange of the LP stage.

If necessary adjustment of the valve flapper may be done as follows:

• Connect a 30 in. (80 cm) Hg manometer to the NPT connection provided at the inlet flange of the LP stage.

• Unload the package by a suitable method. For example, reprogram the Supervisor II to unload at system line pressure, if such is available. If no system air pressure is yet available, locate and disengage the pressure transducer connection (P2), plug the open hole, and feed a separate air pressure signal which exceeds the unload level set in the Supervisor II.

• Loosen the set screw locking the actuator arm to the air control valve flapper shaft and while firmly grasping the shaft with a suitable tool, rotate slowly back-and-forth until 23 in. (58 cm) shows on the manometer (when operating the unit at sea level - approximately. 14.5 psia [1 bara]). For higher elevations, derate the desired vacuum in direct proportion to the local barometric pressure.

• Refasten the flapper shaft to the actuator arm with the set screw.

• Cycle load and unload the package a few times to insure that the flapper setting has been properly achieved – this may be done by feeding and re-

moving the unloading pressure signal from the P2 sensor connection.

• Replace the P2 sensor connection back in the condensate separator vessel.

12. Check adjustment of limit switch actuation– see limit switch maintenance in Section 7, Maintenance.
13. Open service valve to air net system. Compressor will run loaded or unloaded as the system demands.
14. Check operating conditions and reinspect for leaks the following day.

6.5 SYSTEM STATUS MESSAGES

The top row of the display is for the System Status Messages. These messages tell what mode the compressor is in, if maintenance is required, or if the compressor is "shutdown" due to an operating parameter violation. True first–out indication of a fault shutdown is assured by displaying only the first condition of shutdown on the message display. Subsequent fault conditions may appear as LED indications on the graphic map.

The following messages indicate that everything is normal:

MANUAL – Compressor is off, in manual mode.

STANDBY – Compressor is off, in automatic mode.

OFF LOAD – Compressor is on, the load solenoid valves are de–energized.

ON LOAD – Compressor is on, the load solenoid valves are energized.

The following messages indicate that the compressor may need maintenance: The messages are cleared by pressing **"O"**.

AIR MNTN– Air filter maintenance indication; inspect and/or change air filter elements.

OIL MNTN– Oil filter maintenance indication; inspect and/or change oil filter element.

The following messages indicate that the compressor has exceeded an operational limit. Pressing **"O"** will clear these messages, but only if the condition causing these messages is no longer present. The compressor will not run if any of these messages are still present.

P1 HI – P1 was greater than 52 psig (3.6 barg). P1 prealarm occurs at 49 psig (3.4 barg).

T1 HI – T1 was greater than 445°F (229°C). T1 prealarm occurs at 435°F (224°C).

T2 HI – T2 was greater than 445°F (229°C). T2 prealarm occurs at 435°F (224°C).

E–STOP – The emergency stop pushbutton was pushed in.

MOTOR OL – The motor overload contact has opened.

COOL FLT – Cooling fan motor overload contact was opened, or water pressure switch has tripped on low water pressure (<10psig/ 0.7 barg).

P1–LOW – P1 < 25 psig (1.7 barg) while running. This will also occur if the motor fails to run when the RUN relay is energized. An alternate cause for this condition may be a defective P1 transducer.

P2–LOW – The machine ran continuously for five minutes at a final pressure below 50 psig (3.4 barg).

T1 or T2 FAIL – T1 $\leq$ 6°F (-14C) while the compressor was running. Since this is an impossibly low value, the Supervisor assumes that the temperature probe has failed.

P1 FAIL – P1 $\geq$ 198 psig (13.7 barg) while the compressor is stopped. Since this is an impossibly high value, the Supervisor assumes that the pressure transducer has failed.

P2 FAIL – P2 $\geq$ 198 psig (13.7 barg) while the compressor is stopped. Since this is an impossibly high value, the Supervisor assumes that the pressure transducer has failed.

P3 FAIL – P3 $\leq$ 25 psig (1.7 barg) while the compressor is running.

6.6 SUBSEQUENT START–UP PROCEDURE

On subsequent start–ups, check that the steady–state indications supplied by the Supervisor II and local gauges are satisfactory. Also check for proper lubricant level in the sump.

6.7 SHUTDOWN PROCEDURE

To shut the package down, simply press the "**O**" pad.

NOTES

7.1 GENERAL

As you proceed to study this section, it will be easy to see that maintenance for the air compressor is quite minimal. The Supervisor II monitors the status of the air and oil filters. When maintenance to either device is required, the Supervisor II will display the appropriate maintenance message and flash the location LED on the graphics map as a visual remainder.

⚠ 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.

7.2 DAILY OPERATION

Following a routine start, observe the various Supervisor II displays and local gauges to check that normal readings are been made – previous records are very helpful in determining the normalcy of the measurements. These observations should be made during all expected modes of operation (i.e. full load, no–load, different line pressures, cooling water temperatures, etc.).

7.3 INITIAL MAINTENANCE AFTER 50 HOURS OF OPERATION

Upon completion of the first 50 hours of operation, a few maintenance requirements are needed to rid the system of any foreign materials which may have accumulated during assembly:

1. Change the lubricant filter element.
2. Clean the control line filter element.
3. Check/replace the sump breather element.

7.4 MAINTENANCE EVERY 8000 HOURS OR ONE YEAR OF OPERATION

The following items should be checked every 8000 hours of operation or one year, whichever comes first, although service conditions such as relative cleanliness of process air or quality of cooling medium may require shorter inspection intervals.

1. Replace oil charge and filter element.
2. Replace control line filter element.
3. Replace sump breather filter element.
4. Replace air filter element.
5. Check/clean condensate drain valves screen.
6. Check condition of shaft coupling element and tightness of fasteners.
7. Measure and record vibration signatures on compressor, gear box and motor – optional.

NOTE

Please refer to the motor manufacturer's documentation for recommended maintenance. Keep in mind that the specified type and quantity of lubricating grease for motor anti–friction bearings is crucial.

7.5 MAINTENANCE EVERY 16000 HOURS OR TWO YEARS OF OPERATION

In addition to those items covered by the 8000 hour or one year maintenance interval, the following items must also be checked every 16000 hours of operation or two years, depending upon conditions of service:

1. Operate/test all safety devices.
2. Check/clean heat exchangers.
3. Check/clean blowdown valve.
4. Check/clean check valves.
5. Check condition of isolation mounts under compressor unit and motor.
6. Check/clean strainer included in oil pump suction line, inside oil sump.

7.6 DIAGNOSTIC SERVICE (OPTIONAL)

Sullair and its representatives offer a diagnostic service to check the condition of your compressor unit. The service, which is recommended at 8000 hour intervals, performs the following:

1. Tri–axial vibration measurements at the gearbox and the compressor stages.
2. Package performance data collection and analysis.
3. Examination of shaft coupling assembly.
4. Operational check of protective equipment.
5. Final discussion with maintenance engineer.

This service, when supplemented by properly recorded package operational performance and vibrations trends, is most helpful in identifying the presence (or absence) of equipment damage which can be repaired or replaced before a catastrophic breakdown occurs.

7.7 PARTS REPLACEMENT AND ADJUSTMENT PROCEDURES

Please, familiarize yourself with the safety guidelines offered in Section 1 of this manual before attempting any maintenance on the package.

7.7.1 AIR FILTER INSPECTION/MAINTENANCE

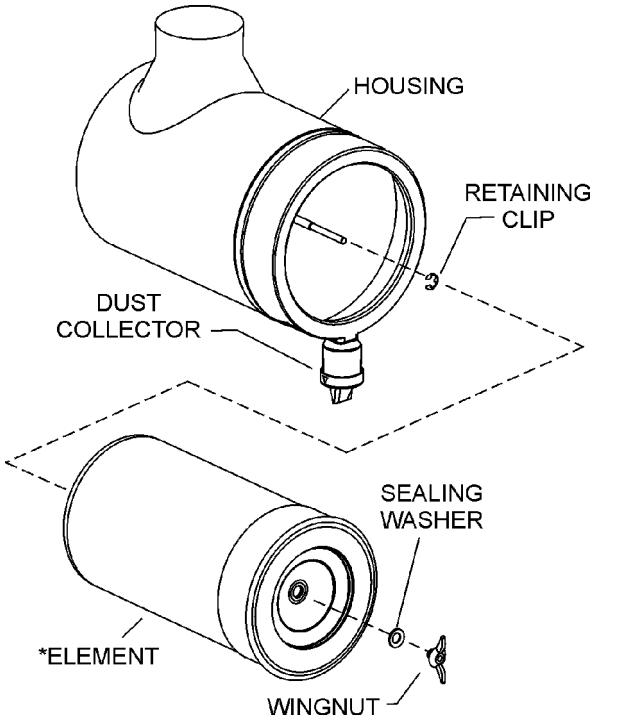
ELEMENT INSPECTION

1. Place a bright light inside the elements to inspect for damage or leak holes.
2. Inspect gaskets and matching sealing surfaces on the housing. It should be smooth or replace in case of damage.
3. The secondary element must be replaced if dirt obstruction is evident.
4. **DO NOT** strike elements against a hard surface to dislodge dirt – this may damage the sealing surfaces and/or rupture the element.

AIR FILTER MAINTENANCE

Refer to Figure 7–1. Air filter maintenance on air filter no. 02250140–798 should be performed at 8000 hours, once per year or when the corresponding maintenance message is displayed by the Supervi-

Figure 7-1 Air Filter (P/N 02250140-798)



*Replacement Element P/N 02250135-150

sor II. This corresponds to a pressure loss condition across the filter of 22 in (56cm) of water.

AIR FILTER ELEMENT REMOVAL

1. Clean exterior of air filter housing
2. Release the three retaining clamps and remove the end cap.
3. Remove element and clean interior of housing using a damp cloth.

ELEMENT REPLACEMENT

Element replacement is performed by reversing the removal instructions. Make sure that the element is fully seated into the housing.

7.7.2 OIL FILTER MAINTENANCE

Refer to Figure 7-2. Oil filter maintenance (using repair kit P/N 02250049-820) should be performed at 8,000 hours, one year or when the corresponding maintenance message is displayed by the Supervisor II - this corresponds to a pressure loss condition across the unit of 20 psig (1.4 barg). Your oil filter includes a proprietary replaceable element (P/N 02250049-821) available solely from Sullair and its agents - **DO NOT** substitute.

1. Using a strap wrench, remove the old element and gasket.
2. Clean the gasket seating surfaces.
3. Apply a light film of fresh oil to the new gasket and hand-tighten new element until gasket contacts the seat.
4. Continue tightening element by hand, an additional 1/2 to 3/4 turn.
5. Restart package and check for leaks.

7.7.3 CONTROL LINE FILTER MAINTENANCE

Refer to Figure 7-3. Control line filter (P/N 02250112-032) maintenance normally requires replacement of the filter element, float assembly and seals. Use repair kit no. 02250112-031 (filter element and seal), and repair kit no. 02250115-960 (float assembly and seals).

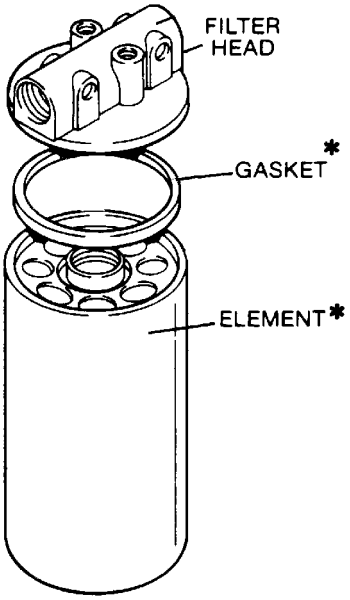
⚠ WARNING

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.

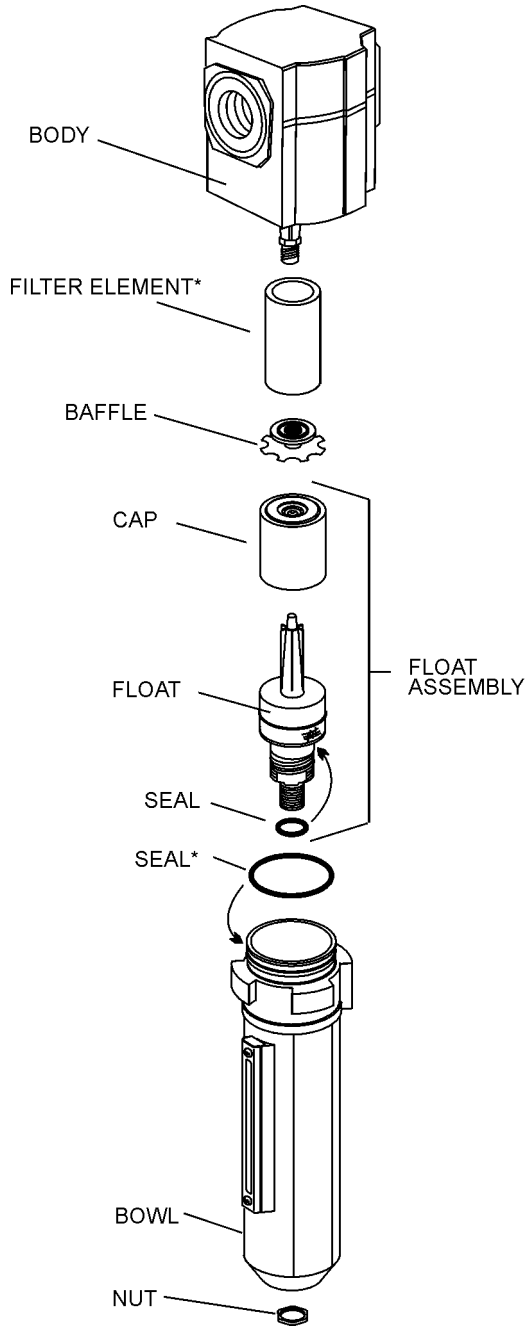
1. Detach the body from the bowl by twisting the body about the bowl as far as it can go (approximately 1/8 turn), and pulling apart.
2. At this time, unscrew the baffle from the body. Remove the element.
3. Discard the element.
4. Replace the element with the new one found in the repair kit, and reinstate into position on the body stem. Replace baffle and tighten.
5. Loosen and remove the nut on the bottom of the bowl.
6. Remove the float assembly and seals.

Figure 7-2 Oil Filter (P/N 02250049-820)



*Replacement Element P/N 02250049-821

Figure 7-3 Control Air Filter (P/N 02250112-032)



*Repair Kit P/N 02250112-031

7. Replace the seals with those found in the repair kit.

NOTE

Coat seals with same fluid as used in compressor fill before installation to promote proper sealing.

8. Replace those items in the float assembly with those found in the repair kit.
9. Replace the float assembly into the bowl. Tighten the nut.
10. Re-connect the body and bowl assemblies.

7.7.4 INLET CONTROL SOLENOID VALVE (P/N 250025-516) MAINTENANCE

Refer to Figure 7-4. Solenoid valve (P/N 250025-516) maintenance is quite minimal but a periodic cleaning is desirable. The time between cleanings will vary depending on operating conditions. In general, if the voltage to the coils is correct, sluggish valve operation or excessive leakage will indicate that cleaning is required. If parts replacement is required, order repair kit no. 02250053-334 (valve) and no. 250031-431 (coil) and follow the procedure explained below.

⚠ WARNING

Turn off all power, relieve package pressure, and disconnect coil lead wires to the valve before making repairs. It is not necessary to remove the valve from pipework for repairs.

DISASSEMBLY AND REASSEMBLY

1. Remove the retaining clip from top of solenoid.

⚠ CAUTION

When metal retaining clip disengages it will spring upward.

2. Remove nameplate, cover and spring washer.
3. Slip yoke containing coil, sleeves, insulating washers (omitted from molded coil) and grounding wire off solenoid base sub-assembly.
4. Coil is now accessible for replacement.
5. Reassemble in reverse order of assembly.

⚠ CAUTION

Solenoid must be fully reassembled because the housing and internal parts complete the magnetic circuit. Place an insulating washer at each end of the non-molded coil.

VALVE DISASSEMBLY MAINTENANCE

⚠ WARNING

Turn off all power, relieve line pressure, and disconnect coil lead wires to the valve before making repairs.

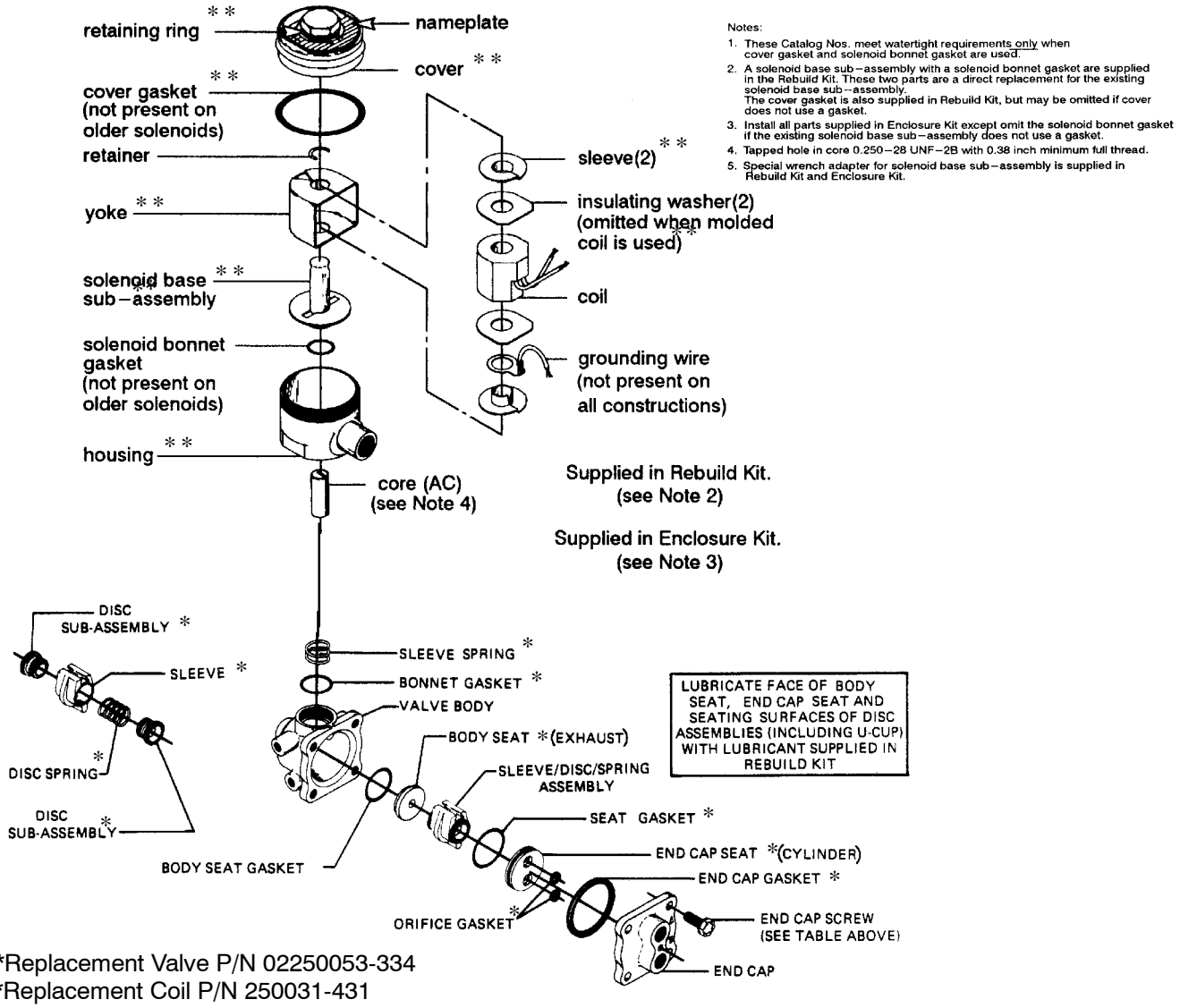
1. Remove retaining clip and pull entire solenoid enclosure off solenoid base sub-assembly.

⚠ CAUTION

When metal retaining clip disengages it will spring upward.

2. Unscrew solenoid base sub-assembly and remove core spring guide and core spring.
3. Unscrew capscrews (4) and remove end cap and end cap gasket from body.

Figure 7-4 Solenoid Valve (P/N 250025-516)



*Replacement Valve P/N 02250053-334
**Replacement Coil P/N 250031-431

4. Pull inner disc sub–assembly, disc spring, sleeve and outer disc sub–assembly from valve body. Remove sleeve spring, core and bonnet gasket.
5. If cleaning is all that is required, do not remove body (exhaust) seat, body seat gasket, end cap (cylinder) seat, end cap gasket or orifice gaskets. Remove these only if replacement seats and gaskets are available.
6. To remove body seat and seat gasket, insert an appropriate tool or a heavy gauge wire with a bent hook on the end through the center hole in the seat. Pull to dislodge seat. if seat will not dislodge easily, remove piping from exhaust port and push seat out with a thin rod through the exhaust port. To remove end cap seat and gaskets, push seat from end cap, using a thin, blunt rod inserted through hole between cylinder port “A” and cylinder port “B”. When the end cap is of the type using metering devices, compressed air applied through either pipe connection or small vent hole in the end cap should force out the seat with the gasket. If this fails, using the appropriate tool or bent wire described above should dislodge the seat with the seat gasket.
7. All parts are now accessible for cleaning or replacement.

VALVE REASSEMBLY

1. Lubricate end cap gasket, end cap (cylinder) seat gasket, body seat gasket, bonnet gasket and orifice gaskets (2) with Dow Corning® III Compound lubricant or an equivalent high–grade silicone grease. Lubricate seating surface of end cap seat,

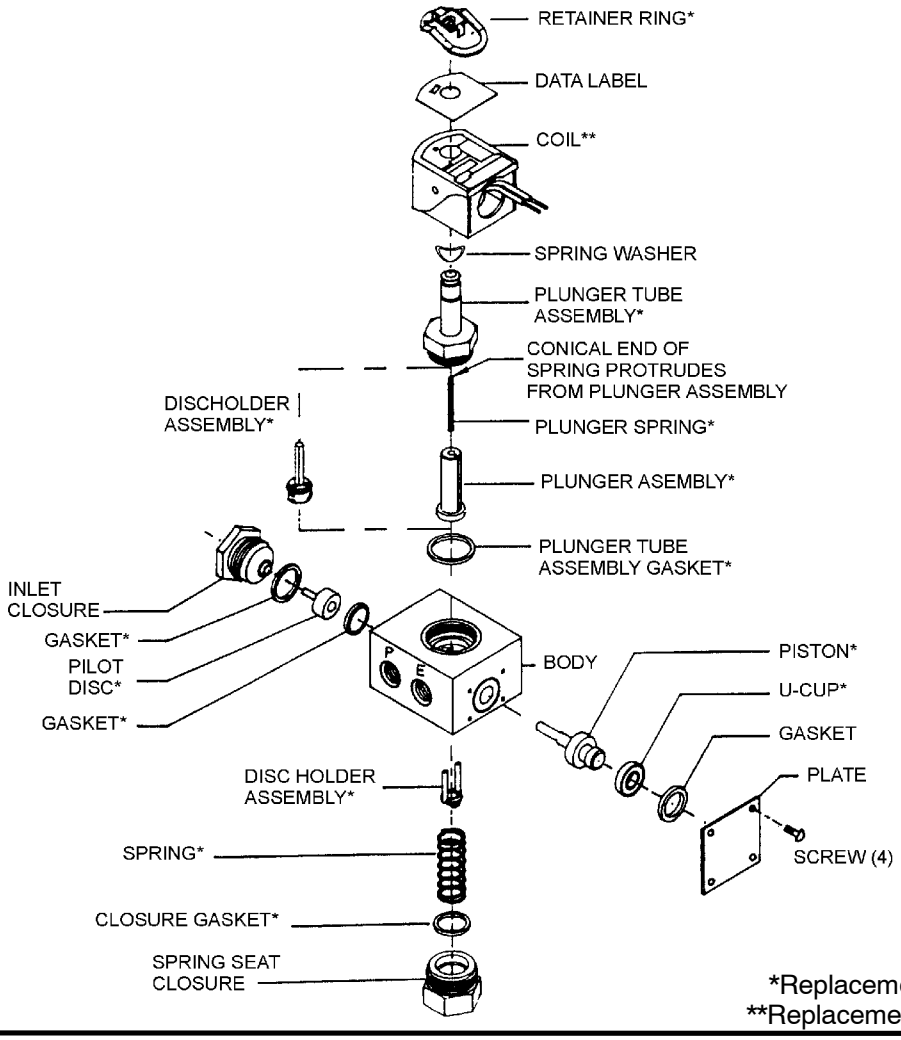
body seat, and disc sub-assemblies (including u-cups) with lubricant supplied in kit.

2. Replace body seat gasket on body seat and install seat with gasket side first into valve body.
3. Preassemble disc sub-assembly on disc spring and install into sleeve. Install remaining disc sub-assembly from the opposite end. The disc sub-assemblies will snap onto the disc spring if pushed evenly and twisted slightly.
4. Install the sleeve (with disc assemblies and disc spring engaged) into the valve body and onto core at the same time.
5. Install the end cap assembly consisting of end cap, end cap gasket, end cap seat, seat gasket and orifice gaskets (2). Install end cap screws (4) and torque in a criss-cross manner to 110 ± 10 in.-lbs. (12.7 ± 1.2 Nm).
6. Move the core up and down to see that it is properly engaged and there is no misalignment or binding of parts.
7. Replace bonnet gasket, sleeve spring, core spring and core spring guide.
8. Replace solenoid base sub-assembly and torque to 175 ± 25 in.-lbs. (20.1 ± 2.9 Nm).
9. Replace solenoid enclosure and retaining clip.
10. After maintenance is completed, operate valve a few times to be sure of proper operation.

7.7.5 SOLENOID VALVE (P/N 02250125-817) MAINTENANCE

Refer to Figure 7-5. Solenoid valve maintenance is quite minimal, but a periodic cleaning is desirable. The time between cleanings will vary depending on operating conditions. In general, if the voltage to the coils is correct, sluggish valve operation will indicate that cleaning is required. Disassemble valve and clean all parts. If parts are worn or damaged, order replacement kit no. 02250125-845, and replacement coil no. 02250125-855.

Figure 7-5 Solenoid Valve (P/N 02250125-817)



*Replacement Kit P/N 02250125-845
**Replacement Coil P/N 02250125-855

⚠ WARNING

Turn off all power, relieve line pressure, and disconnect coil lead wires to the valve before making repairs.

It is not necessary to remove the valve from the pipe line for repairs.

COIL REPLACEMENT

1. Remove solenoid retainer by inserting a 3/16" wide screwdriver under tab on retainer and slide forward.
2. Slide the coil from the plunger tube assembly's stem.
3. Replace old coil with replacement coil no. 02250125-855.
4. Replace tab.
5. Connect coil to system.

KIT REPLACEMENT

1. With coil and spring washer removed, unscrew and remove plunger tube assembly, assembly gasket, plunger and spring from the body.
2. Remove inlet closure.
3. Remove the four (4) screws securing the plate opposite the inlet closure side.
4. Remove spring seat closure (bottom of body).
5. All parts are now accessible for cleaning or replacement.
6. Clean or replace parts with new parts from kit no. 02250125-845. Use all parts for best results. Kit parts include:

From plunger tube assembly [top]:

- plunger tube assembly
- disc-holder assembly
- plunger tube assembly gasket

From inlet closure end:

- gasket
- pilot disc
- interior gasket

From the plate side:

- piston
- U-cup
- gasket

From the spring seat closure end [bottom]:

- closure gasket
- spring
- disc holder

7. Once all parts are cleaned and/or replaced, re-secure the inlet closure (torque closure end to 175 ± 25 in.-lbs [(20.1 ± 2.9 Nm]), and re-establish plate into position using the four (4) screws (torque screws to 30 ± 5 in-lbs. [3.5 ± 0.6 Nm]). Replace the spring seat closure (torque to 90 ± 10 in.-lbs. [10.4 + 1.2 Nm])
8. Replace plunger tube assembly with parts in place. Torque to 175 ± 25 in.-lbs (20.1 ± 2.9 Nm).
9. Replace coil.

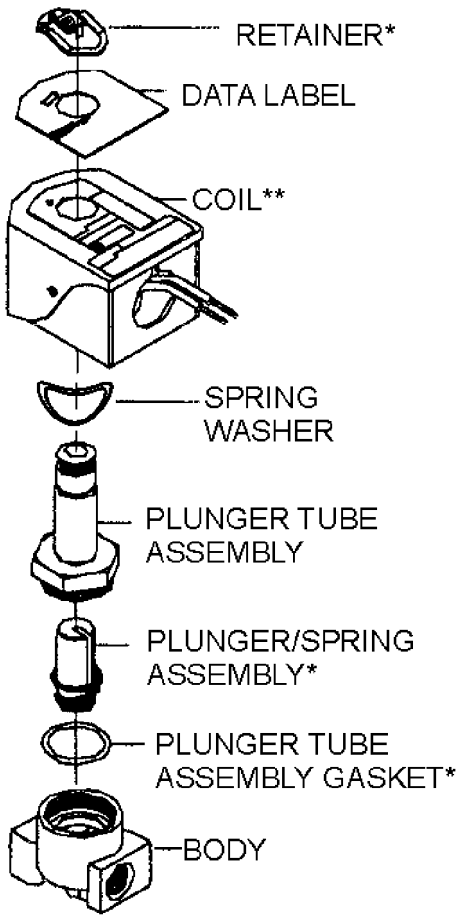
7.7.6 SOLENOID VALVE (P/N 02250125-674) MAINTENANCE

Refer to Figure 7-6. Solenoid valve maintenance is quite minimal, but a periodic cleaning is desireable. The time between cleanings will vary depending on operating conditions. In general, if the voltage to the coils is correct, sluggish valve operation will indicate that cleaing is required. Disassemble valve and clean all parts. If parts are worn or damaged, order replacement kit no. 02250125-823, and replacement coil no. 02250125-861.

⚠ WARNING

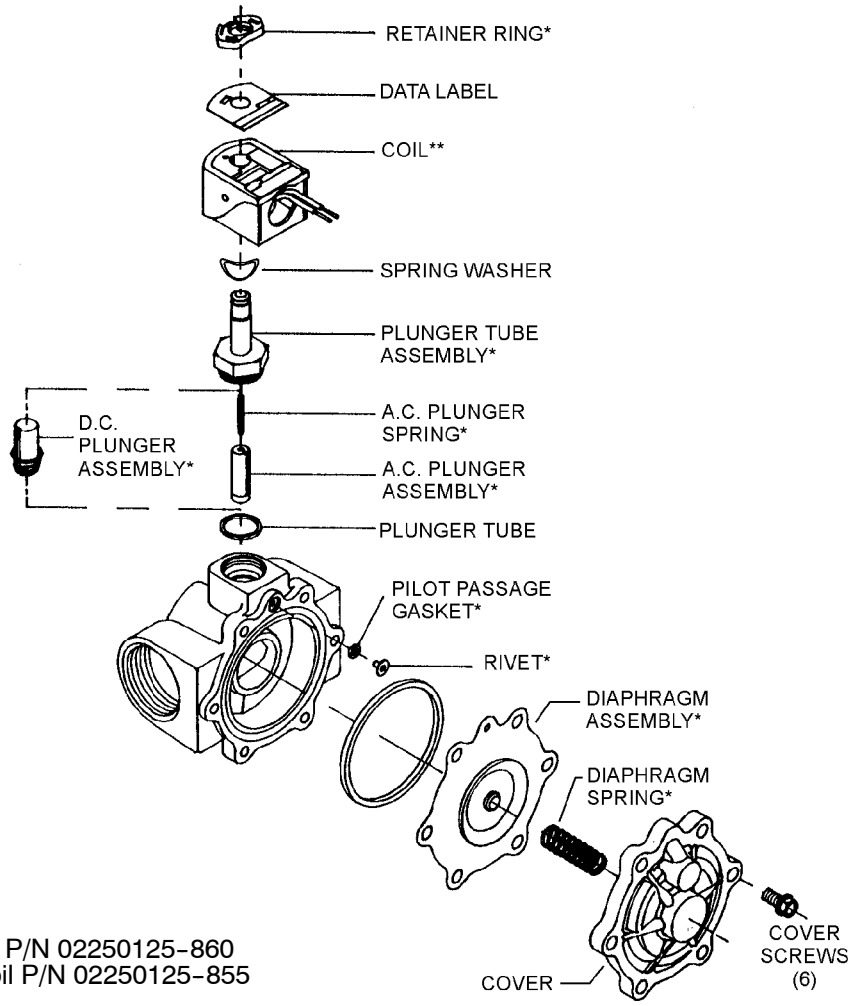
Turn off all power, relieve line pressure, and disconnect coil lead wires to the valve before making repairs.

Figure 7-6 Solenoid Valve (P/N 02250125-674)



*Replacement Kit P/N 02250125-823
**Replacement Coil P/N 02250125-861

Figure 7-7 Solenoid Valve (P/N 02250125-818)



*Replacement Kit P/N 02250125-860
**Replacement Coil P/N 02250125-855

COIL REPLACEMENT

6. Remove solenoid retainer by inserting a 3/16" wide screwdriver under tab on retainer and slide forward.
7. Slide the coil from the plunger tube assembly's stem.
8. Replace old coil with replacement coil no. 02250125–861, making sure that the spring washer remains in place.
9. Replace tab.
10. Connect coil to system.

KIT REPLACEMENT

1. With coil removed, unscrew and remove plunger tube assembly, assembly gasket, plunger and spring from the body. All parts are now accessible for cleaning or replacement.
2. Clean or replace parts with new parts from kit no. 02250125–823.
3. Replace plunger tube assembly with parts in place. Torque to 175 ± 25 in–lbs. (20.1 ± 2.9 Nm).

7.7.7 SOLENOID VALVE (P/N 02250125-818) MAINTENANCE

Refer to Figure 7-7. Solenoid valve maintenance is quite minimal, but a periodic cleaning is desireable. The time between cleanings will vary depending on operating conditions. In general, if the voltage to the coils is correct, sluggish valve operation will indicate that cleaing is required. Disassemble valve and clean all parts. If parts are worn or damaged, order replacement kit no. 02250125-860, and replacement coil no. 02250125-855.

⚠ WARNING

Turn off all power, relieve line pressure, and disconnect coil lead wires to the valve before making repairs.

COIL REPLACEMENT

1. Remove solenoid retainer by inserting a 3/16" wide screwdriver under tab on retainer and slide forward.
2. Slide the coil from the plunger tube assembly's stem.
3. Replace old coil with replacement coil no. 02250129-855.
4. Replace tab.
5. Connect coil to system.

KIT REPLACEMENT

1. With coil and spring washer removed, unscrew and remove plunger tube assembly. , *or*, and plunger from the body.
2. Remove the six (6) cover screws from the body.
3. Remove cover.
4. All parts are now accessible for cleaning or replacement.
5. Clean or replace parts with new parts from kit no. 02250125–860. Use all parts for best results. Kit parts include:

From plunger tube assembly side (top):

- (D.C. only) plunger assembly
- (A.C. only) A.C. plunger spring and A.C. plunger assembly
- plunger tube assembly gasket

From body/cover plate (side):

- Diaphragm spring
- Diaphragm assembly
- Body gasket
- Pilot passage gasket
- Rivet

6. Once all parts are cleaned and/or replaced into their proper position, re-secure cover to the body by hand-tightening the six (6) cover screws into place.
7. Torque the cover screws in a crisscross manner to 144 ± 15 in-lbs. (16.6 ± 1.7 Nm).
8. Replace the plunger tube assembly with parts in place. Torque to 175 ± 25 in-lbs. (20.1 ± 2.9 Nm).
9. Replace spring washer and coil.
10. Connect coil to system.

7.7.8 CONTROL PRESSURE REGULATOR (P/N 02250100-362) MAINTENANCE

Refer to Figure 7-8. Maintenance for this control pressure regulator normally requires the replacement of the internal diaphragm, o-ring, and diaphragm gasket. Use replacement kit no. 02250122-521, and follow the procedure below for proper installation.

⚠ WARNING

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

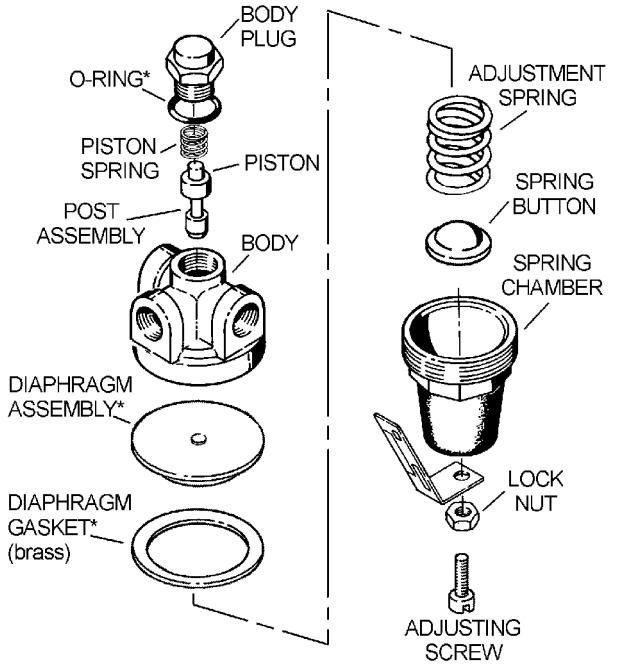
Stop compressor and relieve all internal pressure before doing so.

NOTE

When replacing parts, always visually inspect those parts that are not included with the kit. If these parts show wear, consult Sullair factory.

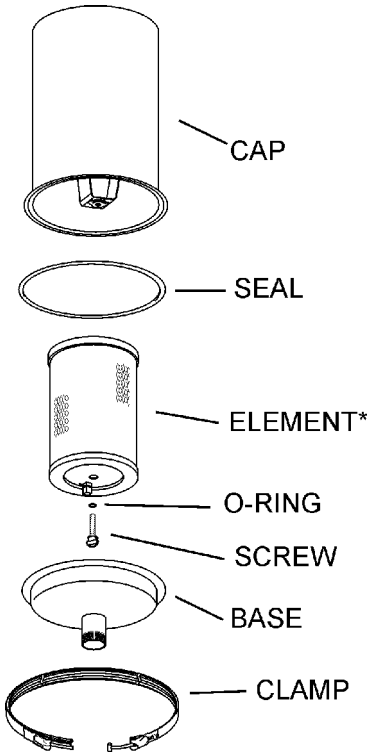
1. Loosen the locknut and turn the adjusting screw counterclockwise until the inner spring tension is relieved. The adjusting screw should turn freely when the spring tension is relieved.
2. Remove the spring chamber from the body to allow access to internal parts.
3. At this time, remove the diaphragm assembly, diaphragm gasket, adjusting spring and spring button from the spring chamber.
4. Discard the brass diaphragm gasket, and replace it with the new gasket from the kit.
5. Discard the diaphragm assembly, and replace it with the new diaphragm assembly from the kit.
6. Remove the body plug from the body to allow access to the post assembly. Remove and discard the o–ring on the plug.
7. Replace the o–ring with the new o–ring from the kit.
8. Re–assemble the piston, post assembly, piston spring, o–ring and body plug into the body portion of the regulator. Use Figure 7-8 as a guide.

Figure 7-8 Pressure Regulator (P/N 02250100-362)



*Replacement Kit P/N 02250122-521

Figure 7-9 Sump Breather Filter (P/N 02250136-658)



*Replacement Element P/N 02250138-201

9. Re-assemble the spring button, adjusting spring, diaphragm gasket and diaphragm assembly into the spring chamber. Use Figure 7-8 as a guide.
10. Replace the body and spring chamber; tighten the adjusting screw until tension is realized.

7.7.9 SUMP BREATHER FILTER MAINTENANCE

Refer to Figure 7-9. This filter (P/N 02250136-658) prevents sump pressure build-up and traps oil aerosol emanating from the compressor stages and gear box. It uses a fine, replaceable element P/N 02250138-201, which may be accessed as follows:

INSPECTION/REPLACEMENT OF ELEMENT

1. Unscrew filter from vent line.
2. Loosen and remove clamp.
3. Remove screw, which secures the element in place.
4. Inspect or replace the element with the new filter.
5. Reassemble in reverse order.

7.7.10 OIL SUMP STRAINER MAINTENANCE

The suction line of the oil pump is fltted with a 100 mesh, stainless steel strainer to protect its internals from foreign matter. To service the cleanable strainer, proceed as follows:

1. With package starter de-energized, remove sump-to-oil pump hose and disconnect oil by-pass hose.
2. Loosen/remove bolts/washers securing circular cover plate to sump tank.
3. Remove cover plate and gasket away from sump tank- some 1/4" control tubing may have to be removed to provide clearance.
4. Inspect, clean, and/or replace strainer.
5. Reassemble in reverse order.

7.7.11 BLOWDOWN VALVE MAINTENANCE

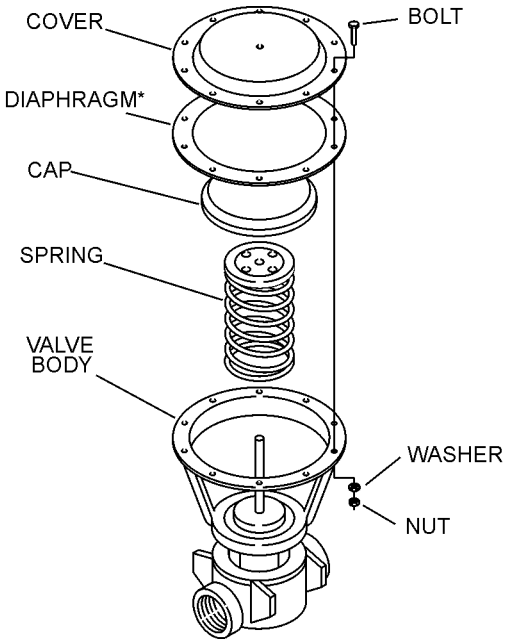
Refer to Figure 7-10. The blowdown valve (P/N 02250119-178) vents air to atmosphere in unload mode. To maintenance the blowdown valve, follow these directions:

1. Loosen/remove bolts/washers and nuts securing cover to valve body.
2. Remove cover.
3. Remove diaphragm.
4. Replace diaphragm with new diaphragm.
5. Re-secure cover by re-positioning bolts, washers and nuts. Tighten.

7.7.12 DRIVE COUPLING MAINTENANCE

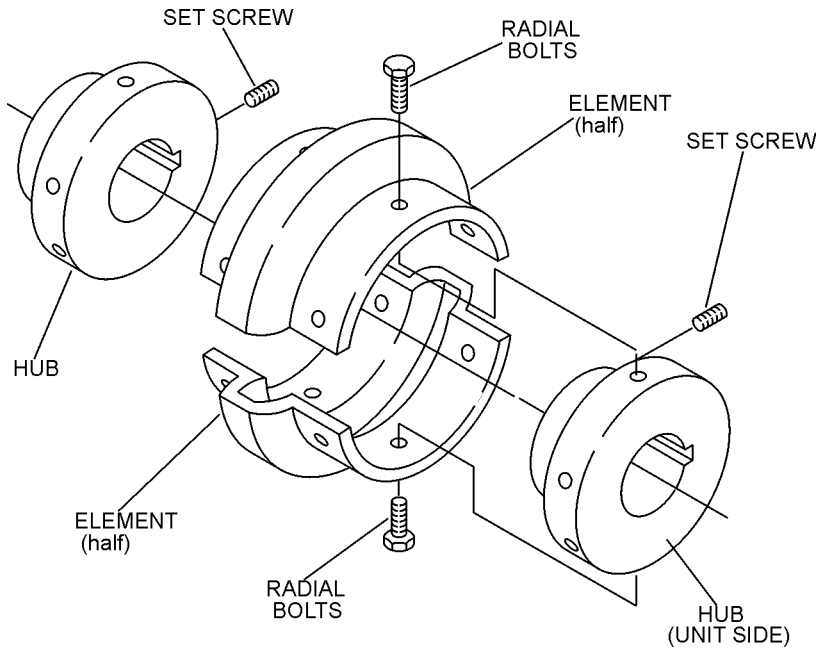
Refer to Figures 7-11 and 7-12. The compressor unit and motor are rigidly connected via a rigid adaptor piece, thus the shafts are maintained in proper alignment at assembly. However, during the initial start-up, after transportation and installation, drive coupling alignment should be checked. For reference only, the allowable angular and parallel shaft misalignments are presented in Table 7A and Figure 7-12.

Figure 7-10 Blowdown Valve (P/N 02250119-178)



* Repair Kit P/N 02250122-079

Figure 7-11 Drive Coupling

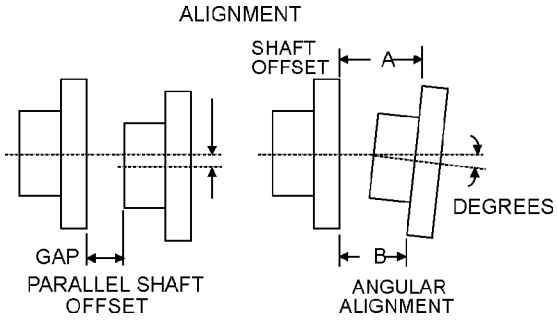


The only component requiring regular inspection or servicing is the coupling's flexible element, which may be accessed as follows:

⚠ DANGER

Disconnect all power at source before attempting maintenance or adjustments.

Figure 7-12 Coupling Alignment

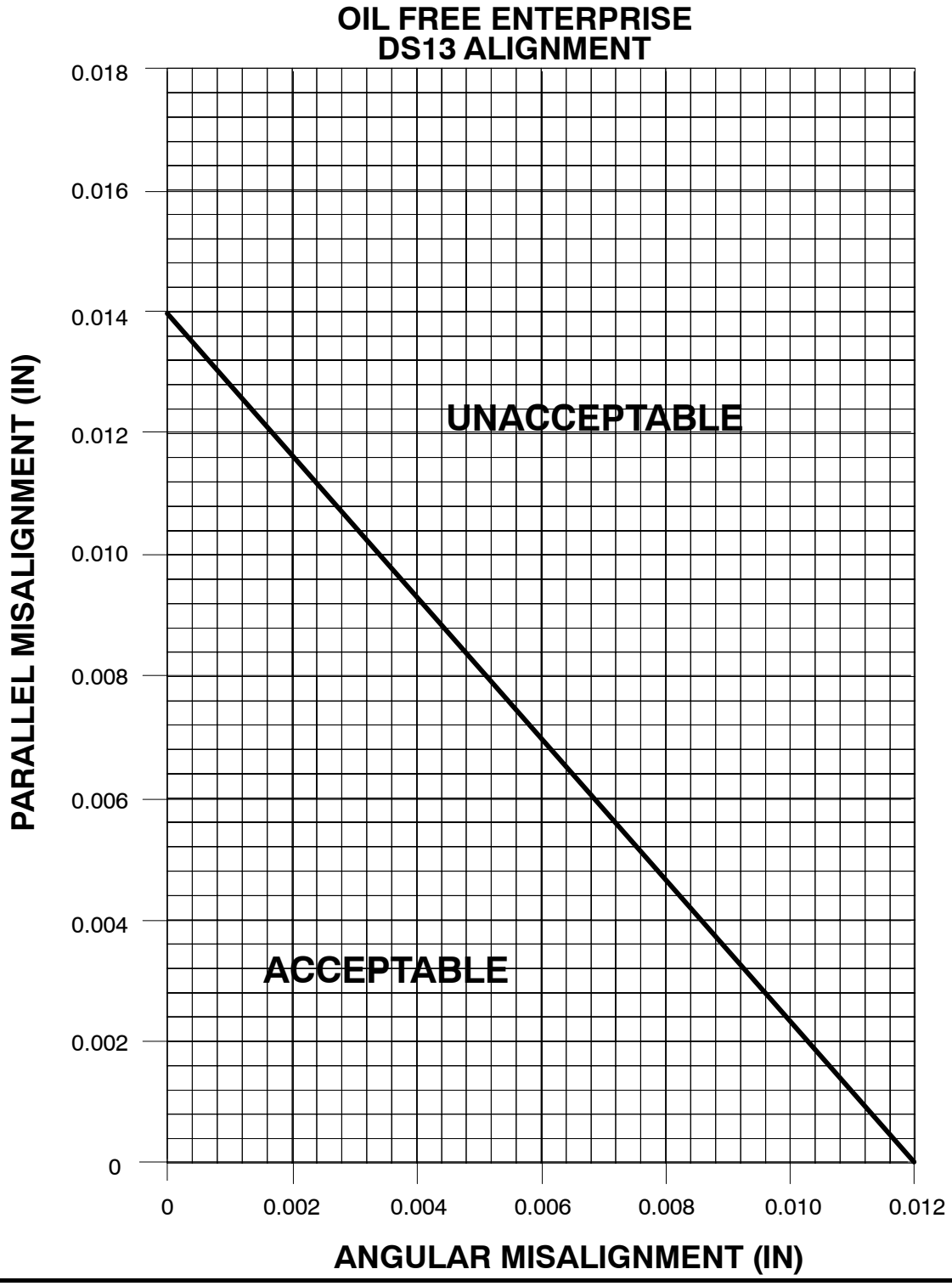


INSPECTION/REMOVAL OF FLEXIBLE ELEMENT

1. Loosen fasteners securing wireform guard to the distance piece and remove to allow access to the coupling assembly.
2. Loosen and remove all bolts 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. Re-assemble in reverse order. Bolts must be re-torqued to 30 ft.-lbs. (41 Nm) (dry). Please note that bolts have self-locking patches good for two re-uses, but the application of a thread-locking adhesive increases this number. **DO NOT LUBRICATE BOLT THREADS!**

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

Table 7A – Installation Data



NOTES

8.1 INTRODUCTION

The following information has been compiled from operational experience with your package. It identifies symptoms and describes probable causes for problems. However **DO NOT** assume that these are the only problems that may occur.

The collection of operational data concerning possible trouble should be analyzed to prevent complete compressor breakdown. An example of this would be the vibrations signature increase of a damaged bearing or the efficiency decrease of a dirty heat exchanger.

A detailed visual inspection should be performed for all problems. 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.

8.2 TROUBLESHOOTING

SYMPTOM/MESSAGE	PROBABLE CAUSE	REMEDY
COMPRESSOR WILL NOT START; POWER LED OFF	Main Disconnect Switch Open	Close switch.
	Line Fuse Blown	Replace fuse.
	Control Transformer Fuse Blown	Replace fuse.
MOTOR OL	Motor Starter Overloads Tripped	Reset after heater elements cool down. Should trouble persist, check whether motor starter contacts are functioning properly.
	Low Incoming Line Voltage	Check voltage. Should voltage check low, consult power company.
T-1, T-2, T-3 T-4, T-5 FAIL	Temperature Transducer Failure	Check connections from transducer. If adequate, replace transducer.
P-1, P-2, P-3 P-4 FAIL	Pressure Transducer Failure	Check connections from transducer. If adequate, replace transducer.
E-STOP	Emergency Switch Open (Depressed)	Close switch (pull).
COOL FLT	Cooling Fan Motor Starter Overloads Tripped	Reset after heater elements cool down. Should trouble persist, check whether motor starter contacts are functioning properly.
COMPRESSOR SHUTS DOWN WITH AIR DEMAND: MOTOR OL	Motor Starter Overloads Tripped	Reset after heater elements cool down. Should trouble persist, check whether motor starter contacts are functioning properly.**(I)**
	Low Incoming Line Voltage	Check voltage. Should voltage check low, consult power company.
P2 LO	The Machine Ran at a Final Discharge Pressure Below 50 psig (3.4 barg) for five minutes	Adjust valve downstream of package to hold minimum 70 psig (4.8 barg) line pressure.
P3 LO	Oil Pressure Falls Below 25 psig (1.7 barg) While Package is Running Because:	
	Oil Pump Malfunctioned	Consult Sullair Service Deptartment.
	Oil Filter Clogged	Replace filter element.

(I) Also check that the compressor-motor driveline rotates freely. In case of rotating resistance or rubbing, contact Sullair Service Department.

8.2 TROUBLESHOOTING (CONTINUED)

SYMPTOM/MESSAGE	PROBABLE CAUSE	REMEDY
P3 LO (continued)	Oil Pressure Falls Below 25 psig (1.7 barg) While Package is Running Because:	
	Oil Temperature Too Low	Check state of globe valve feeding oil cooler. In cold ambient environments below 40°F (4°C) sump heating may be required.
	Sump Oil Level Too Low	Replenish oil level.
	Sump Strainer Clogged	Refer to Section 7.7.10 for oil sump strainer maintenance.
LO P1	P1 Transducer at Fault	Check connection from transducer. If adequate, replace transducer.
T1 HI	LP Inlet Air Temperature Above 115°F (46°C)	Maintain inlet air temperature below 115°F (46°C).
	High Interstage Pressure (Loaded)	Insufficient coolant flow to jackets. Insufficient air flow to intercooler. Defective HP stage.
	High Interstage Pressure (Unloaded)	Clogged blowdown silencer. Clean/replace.
	Cooling Fan Motor Starter Overloads	Reset after heater elements cool tripped down. Should trouble persist, check whether motor starter contacts are functioning properly.
	Temperature Transducer Failure	Check connections from transducer If adequate, replace transducer.
	Blowdown Valve Failed to Open or Operated Sluggishly	See Section 7.7.11 for blowdown valve maintenance.
T2 HI	Intercooler Core Fouled	Clean finning.
	Discharge Check Valve Leaking During Unloaded Operation	Refer to compressor's Operators Manual for check valve maintenance.
	Inlet Throttling Valve Not Fully Open	See inlet valve adjustment.
	During Loaded Operation	Low oil pressure defective control solenoid valve.
	Inlet Air Filter Clogged	See Section 7.7.1 for air filter maintenance.
	Line Pressure is Too High	Reset Supervisor unload pressure.
	Temperature Transducer Failure	Check connection from transducer. If adequate, replace transducer.
	Blowdown Valve Failed to Open or Operated Sluggishly	See Section 7.7.11 for blowdown valve maintenance.
P1 HI	Defective HP Stage	Consult Sullair Service Department.
	Pressure Transducer Failure	Check connection from transducer. If adequate replace transducer.
P2 HI	Blowdown Valve Failed to Open	See Section 7.7.11 for blowdown valve maintenance.
	Limit Switch Controlling Blowdown Valve Failed to Operate	Check actuation and butterfly disc See Section 7.7.11 for blowdown valve maintenance.
	Control Air Filter Clogged	See Section 7.7.3 for control filter maintenance.

8.2 TROUBLESHOOTING (CONTINUED)

SYMPTOM/MESSAGE	PROBABLE CAUSE	REMEDY
COOL FLT	Cooling Fan Motor Starter Overloads Tripped	Reset after heater elements cool down. Should trouble persist, check whether motor starter contacts are functioning properly.
COMPRESSOR DOES NOT BUILD FULL DISCHARGE PRESSURE	Air Demand Exceeds Supply	Check air service lines for open valves or leaks.
	Inlet Air Filter Clogged	Check for maintenance message on Supervisor II display. Change element.
	Inlet Air Valve Not Fully Open	Check actuation and butterfly disc position.
		Low oil pressure defective control solenoid valve.
	Transducer P2 Malfunction	Check connections from transducer. If adequate, replace transducer.
	Blowdown Valve Leaking or Sluggish	See Section 7.7.11 for blowdown valve maintenance.
	Limit Switch Controlling Blowdown Valve Failed to Operate	Check limit switch and cam adjuster on butterfly valve.
	Defective LP Stage	Consult Sullair Service Department.
LINE PRESSURE RISES ABOVE UNLOAD SETTING	Blowdown Valve Failed to Activate	See Section 7.7.11 for blowdown valve maintenance.
	Inlet Throttling Valve Not Fully Open	See inlet valve adjustment.
	Limit Switch Controlling Blowdown Valve Failed to Operate	Check limit switch and cam adjuster on butterfly valve.
	Transducer P2 Malfunction	Check connections from transducer. If adequate, replace transducer.
	Control Air Filter Clogged	See Section 7.7.3 for control filter maintenance. Check operation of limit switch.

NOTE ON TRANSDUCERS: Whenever a sensor is suspected of fault, the recommended cause of action is to measure the signal (pressure, temperature, etc.) with an alternate calibrated instrument and compare readings. If readings conflict, the electrical and/or tubing connections should be inspected, and if no faults are evident, then replace the sensor and re-evaluate against the calibrated instrument.

8.3 CALIBRATION

The Supervisor II has software calibration of the pressure and temperature probes. This calibration affects the offset but not the slope of the pressure and temperature calculations. Because of this, the most accurate method is to heat or pressurize the transducer to its operating value. If this is too difficult, room temperature/open atmosphere calibration is adequate. Calibration may only be done while machine is stopped and unarmed.

NOTE

Calibration mode may be entered from the default display mode when the machine is in "MANUAL" SHUTDOWN.

To enter calibration mode, you must press the following keys in sequence: "", "▲", "**DSP**","", "**PRG**". Once in calibration mode, you will see a screen like the following: In the above example, "0" refers to the amount of adjustment (in psi or ◦F, "97" refers to the current value of P1).

CAL	P1
0	97

To make adjustments, Press the "▲" key to increase the value, press the "" key to decrease the value. The number on the left will increase or decrease always showing the total amount of adjustment. Maximum adjustments is ±7.

Other keys operate the same as in program mode. The "" key restores the original value of the current item. The "**DSP**" key exits, wiping out changes to the current item, while saving changes to any previous items. The "**PRG**" key saves the current item and advances to the next. Items following P1 calibration are (in order): P1, P2, P3, P4, T1, T2, T3, T4 and T5 calibration.

NOTES

ILLUSTRATIONS AND PARTS LIST

9.1 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 address, fax or phone numbers below.

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

SERVICE DEPARTMENT
Telephone : 1–888–775–1604
(U.S.A. & Canada Only)
Fax: (219) 874–1205
www.sullaircompressors.com

SULLAIR CORPORATION
3700 East Michigan Boulevard
Michigan City, Indiana 46360
U.S.A.
www.sullair.com
Telephone : 1–800–SULLAIR
(U.S.A. & Canada Only)
or 1–219–879–5451
Fax: (219) 874–1273

PARTS DEPARTMENT
Telephone : 1–888–SULLAIR
Fax: (219) 874–1835
www.sullair.com

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

SULLAIR EUROPE, S.A.
Zone Des Granges BP 82
42602 Montbrison Cedex, France
Telephone : 33–477968470
Fax: 33–477968499
www.sullaireurope.com

CHAMPION COMPRESSORS, LTD.
Princes Highway
Hallam, Victoria 3803
Australia
Telephone: 1800–810–015
(for Australia–wide
Branch Network Only)
Telephone : 61–3–9796–4000
Fax: 61–3–9703–8053
www.championcompressors.com.au

9.2 RECOMMENDED SPARE PARTS LIST

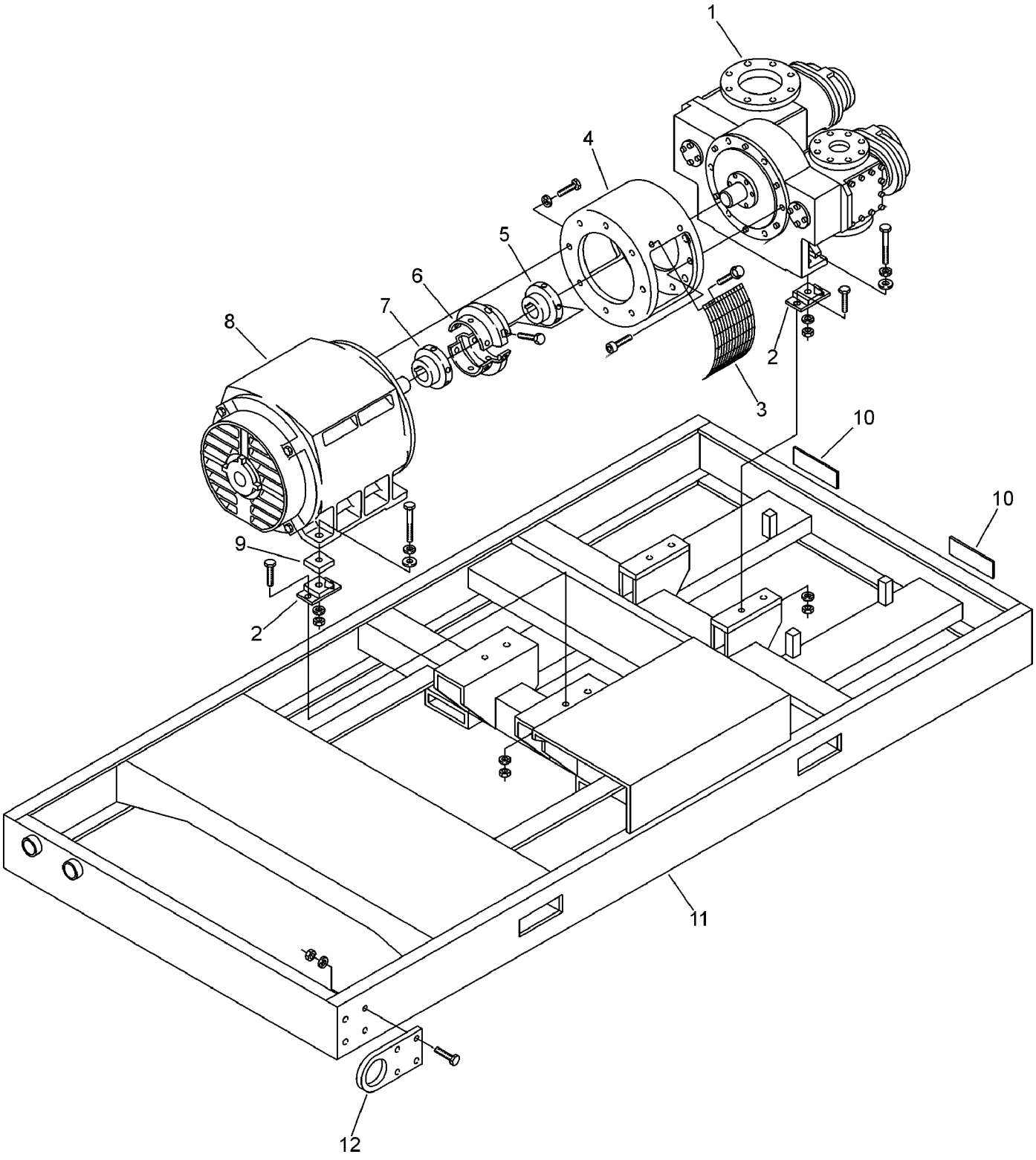
#	DESCRIPTION	KIT NUMBER	QUANTITY
1	element, primary replacement for air filter 048456	**048462**	**1**
2	element, secondary replacement for air filter 048456	**048463**	**1**
3	element, replacement for oil filter 02250049-820	**02250049-821**	**1**
4	kit, element replacement for control line filter 02250112-032	**02250112-031**	**1**
5	kit, float assembly replacement for control line filter 02250112-032	**02250115-960**	**1**
6	element, replacement for sump breather 02250136-658	**02250138-201**	**1**
7	replacement kit for water combo separator 02250106-113	**02250106-113**	**1**
8	lubricant, Sullair AWF	**02250098-047**	**1 gal.**
	•lubricant, Sullair AWF (case)	**02250098-048**	**4 gal.**
9	replacement kit for pressure regulator 02250100-632	**02250122-521**	**1**
10	kit, replacement for solenoid valve 250025-516	**02250053-334**	**1**
11	replacement coil for solenoid valve 250025-516	**250031-431**	**1**
12	kit, replacement for solenoid valve 02250125-674	**02250125-823**	1
13	replacement coil for solenoid valve 02250125-674	**02250125-861**	**1**
14	kit, replacement for solenoid valve 02250125-818	**02250125-860**	**1**
15	replacement coil for solenoid valve 02250125-818	**02250125-855**	**1**
16	kit, replacement for solenoid valve 02250125-817	**02250125-845**	**1**
17	replacement coil for solenoid valve 02250125-817	**02250125-855**	**1**
18	kit, replacement for blowdown valve 02250119-178	**02250122-079**	**1**
19	replacement coupling for drive (various)	**Consult Factory**	**-**
20	replacement for sump strainer 02250105-982	**02250105-982**	**1**
21	manual, Sequencing & Protocol **(I)**	**02250057-696**	**1**

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

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

ILLUSTRATIONS AND PARTS LIST

9.3 COMPRESSOR, MOTOR AND FRAME



9.3 COMPRESSOR, MOTOR AND FRAME

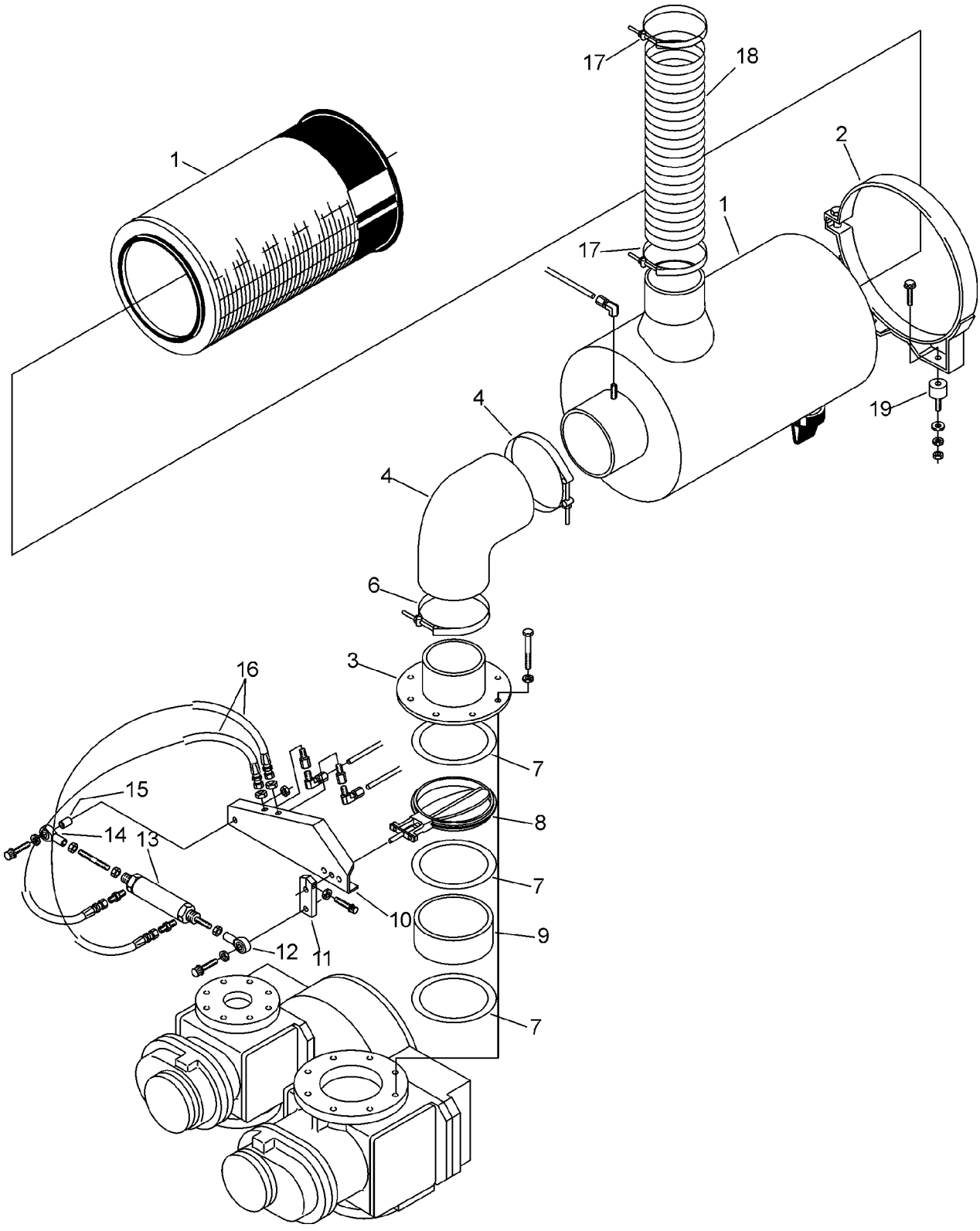
key number	*description*	*part number*	*quantity*
1	unit, compressor **(I)**	-	1
2	isolator, vibration	250042-757	4
3	guard, coupling	02250050-131	2
4	adaptor, motor/compressor 444/445 tsc	02250118-572	1
	•adaptor, motor/compressor 365/405 tsc	02250118-571	1
5	hub, coupling E-50 50mm	250042-754	1
6	element, coupling	406631	1
7	hub, coupling E-50 2.375 dia	407988	1
	•hub, coupling 2.125 dia	407986	1
	•hub, coupling 1.875 dia	250033-538	1
8	motor **(I)**	-	1
9	block, mounting	224511	**(II)**
10	plate, cover fork pocket	02250115-745	6
11	frame	02250103-870	1
12	lug, lifting	250008-361	4

(I) Part number may vary in accordance with each individual machine. Consult factory to determine specific part number.

(II) Quantity may vary in accordance with each individual machine. Consult factory to determine specific quantity.

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

9.4 AIR INLET SYSTEM



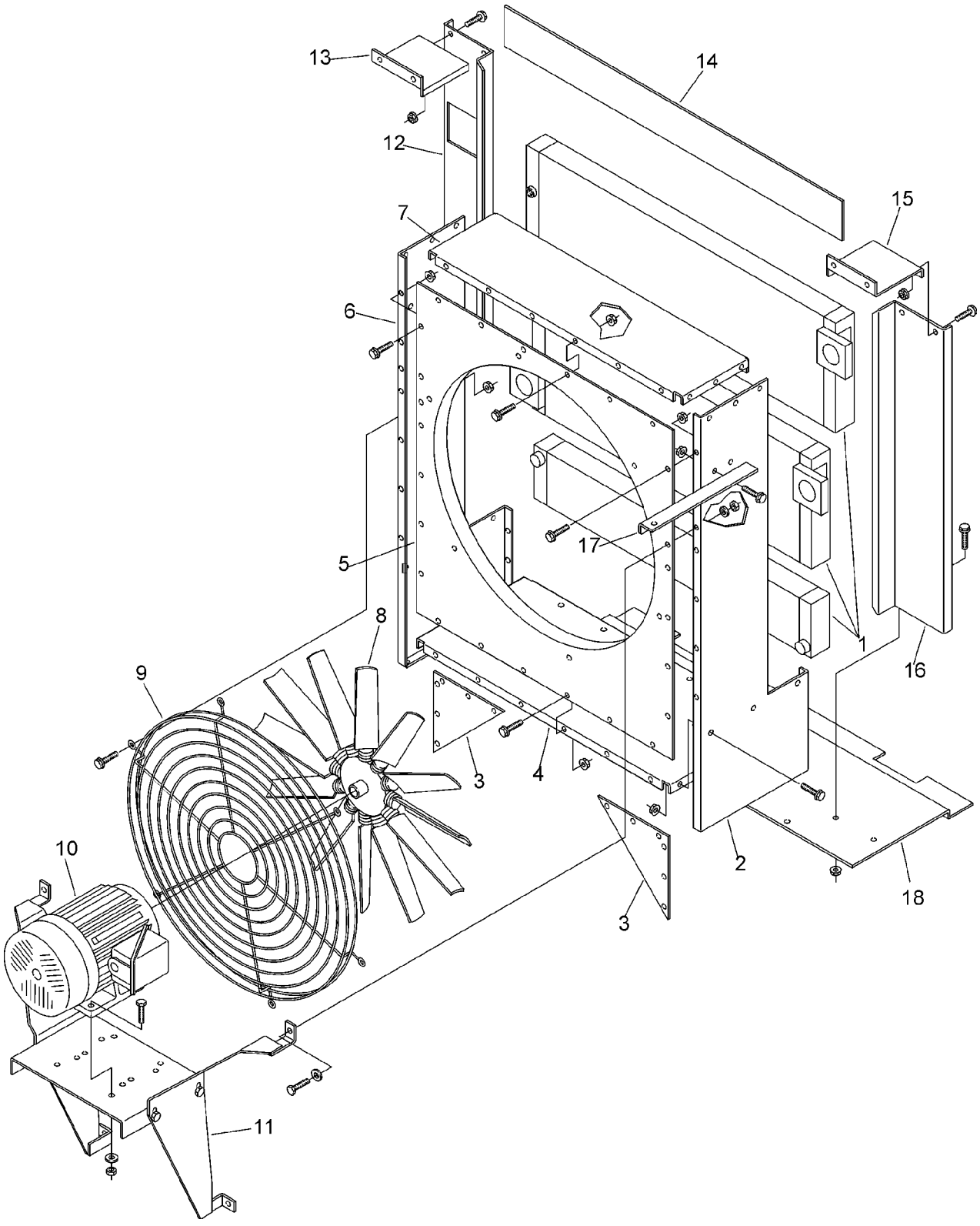
9.4 AIR INLET SYSTEM

key number	*description*	*part number*	*quantity*
1	filter, air 150/200 HP **(I)**	02250140-798	1
1	filter, primary air 150/200 HP **(I)**	02250139-150	1
2	band, mounting	044248	1
3	adapter, inlet 6”	02250105-687	1
4	clamp, hose 7”	041992	1
5	elbow, rubber reducing 7” x 6”	049625	1
6	clamp, hose 6 1/2”	040305	1
7	gasket	040696	3
8	valve, butterfly 6”	040336	1
9	spacer, inlet	250026-509	1
10	support, inlet control valve	02250106-135	1
11	lever, inlet valve	02250106-137	1
12	rod, end spherical RH 5/16”	040136	1
13	cylinder, hydraulic 1 1/2”	02250049-631	1
14	rod, end spherical LH 5/16”	042004	1
15	spacer, tube 1/2”	02250106-136	1
16	hose, hydraulic	02250107-882	2
17	clamp, hose 7”	02250117-375	2
18	hose, flex inlet 7”	02250093-995	1
19	isolator, vibration 3/8”-16	02250106-601	2

(I) For maintenance on air filter no. 02250140-798, order replacement element no. 02250139-150.

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

9.5 COOLER ASSEMBLY- AIR-COOLED

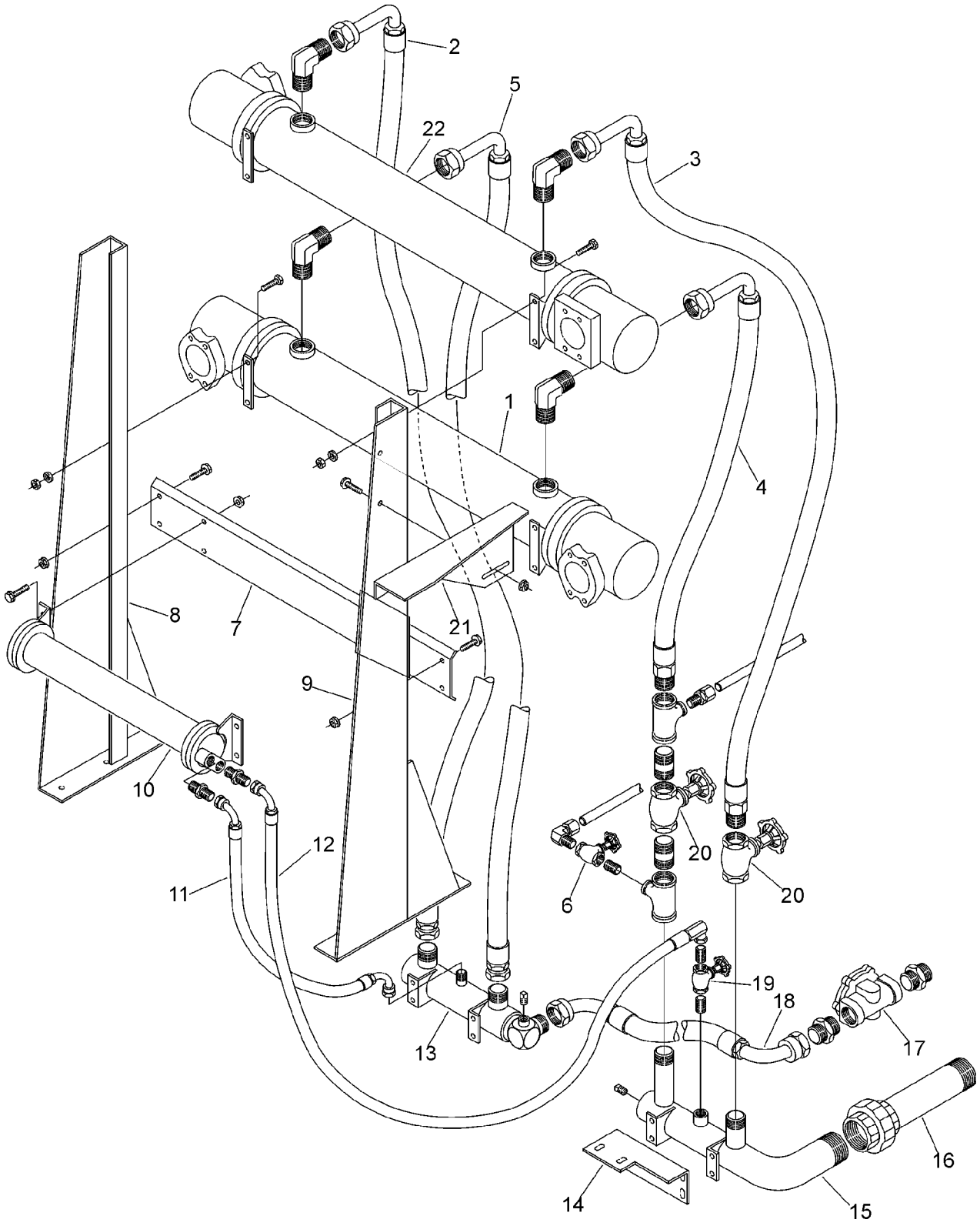


9.5 COOLER ASSEMBLY- AIR-COOLED

key number	*description*	*part number*	*quantity*
1	cooler, assembly	02250104-126	1
2	panel, LH fan box	02250105-470	1
3	plate, stiffener air box	02250107-842	2
4	panel, lower fan box	02250105-471	1
5	plate, venturi 40”	02250105-475	1
6	panel, RH fan box	02250105-472	1
7	panel, upper fan box	02250105-473	1
8	fan, 12 blade 40” 60hz	02250109-349	1
9	guard, fan 42”	02250107-833	1
10	motor, fan 7.5HP 460/60hz	02250108-627	1
11	support, motor	02250105-476	1
12	panel, side cooler LH	02250107-257	1
13	plate, support connecting	02250109-609	1
14	panel, shroud top cooler	02250107-259	1
15	plate, support connecting	02250109-610	1
16	panel, side cooler RH	02250107-256	1
17	support, bracket HP hot ”I”	02250106-633	1
18	panel, shrowd bottom	02250107-258	1

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

9.6 COOLER ASSEMBLY- WATER-COOLED



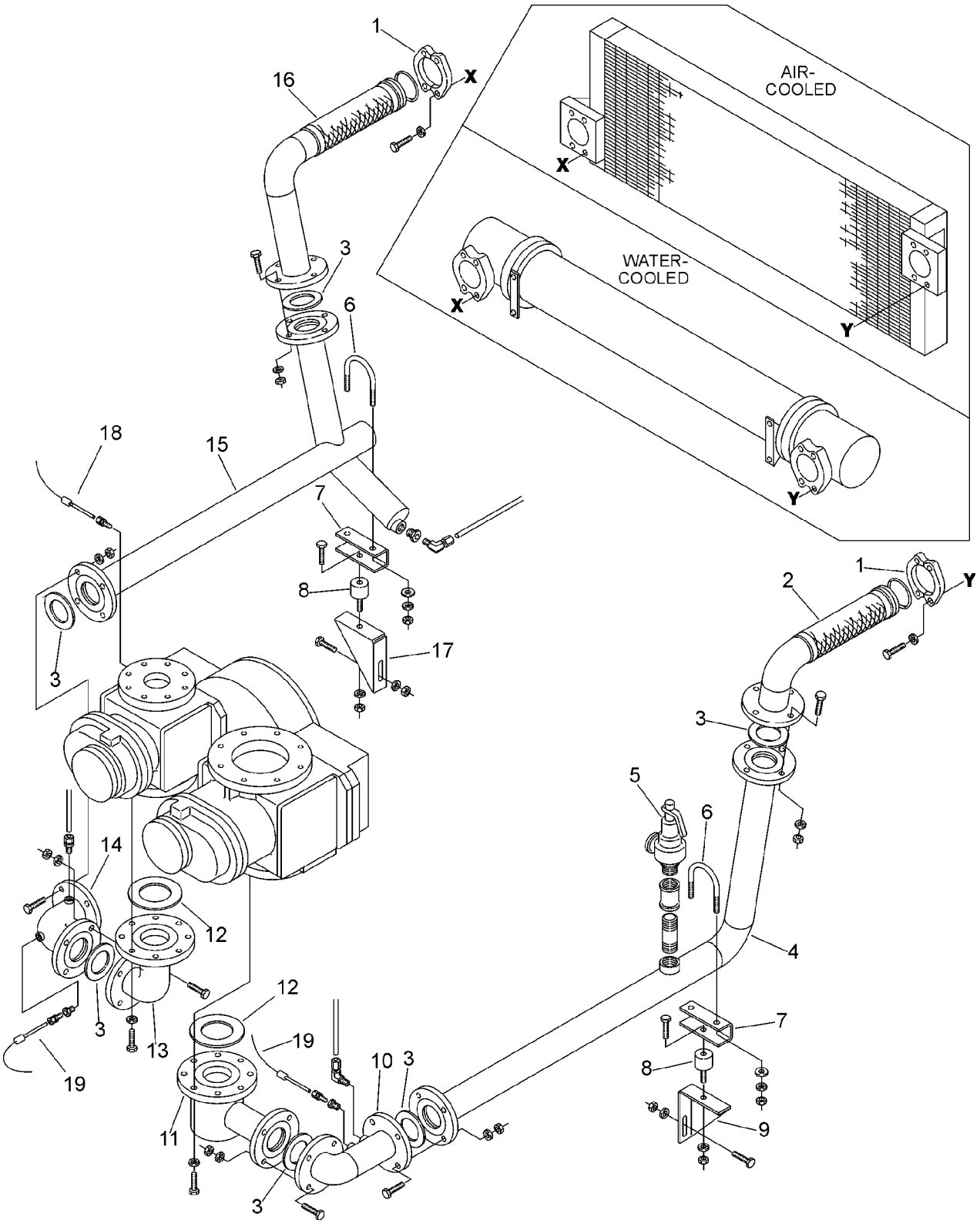
9.6 COOLER ASSEMBLY- WATER-COOLED

key number	*description*	*part number*	*quantity*
1	cooler, intercooler	02250118-695	1
2	hose, assy inlet aftercooler	02250115-124	1
3	hose, assy outlet aftercooler	02250115-127	1
4	hose, assy outlet intercooler	02250115-128	1
5	hose, assy inlet intercooler	02250115-125	1
6	valve, globe 1”	250014-655	1
7	plate, support oil cooler	02250113-680	1
8	support, cooler right	02250113-665	1
9	support, cooler left	02250113-666	1
10	cooler, oil	02250113-473	1
11	hose, assy inlet	02250115-126	1
12	hose, assy outlet	02250115-129	1
13	manifold, pipe inlet 1 1/2”	02250113-489	1
14	support, bracket outlet manifold	02250116-439	1
15	manifold, pipe outlet 1 1/2”	02250113-698	1
16	pipe assy, water out 1 1/2”	02250114-987	1
17	valve, solenoid 2-way NC 1 1/2” **(I)**	02250125-818	1
18	hose, assy inlet	02250115-122	1
19	valve, globe 3/4”	040520	1
20	valve, globe 1 1/4”	042155	2
21	bracket, support HP hot	02250113-781	1
22	cooler, aftercooler	02250118-696	1

(I) For maintenance on solenoid valve no. 02250125-818, order replacement kit no. 02250125-860, and replacement coil no. 02250125-855.

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

9.7 LOW PRESSURE HOT/ LOW PRESSURE COLD

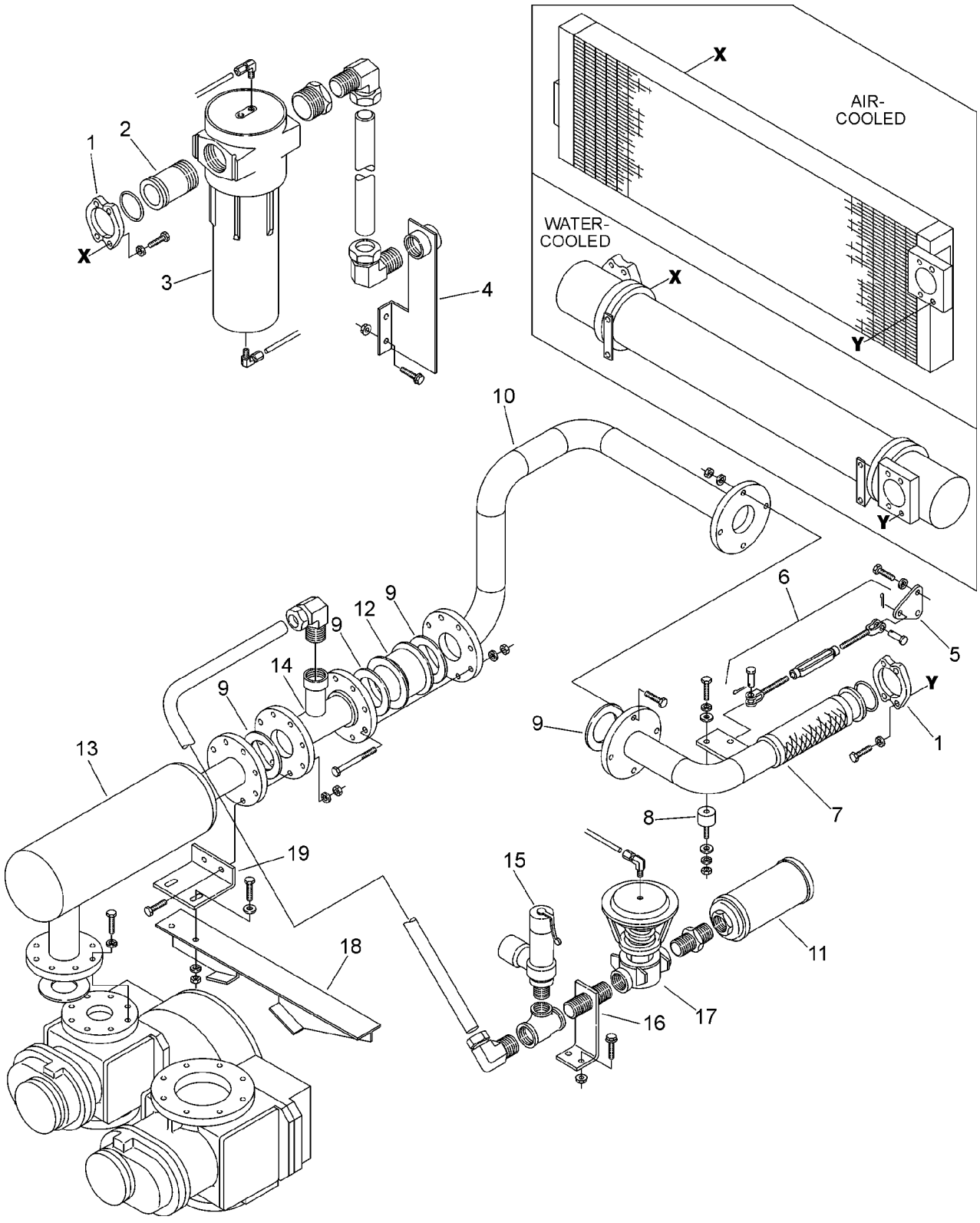


9.7 LOW PRESSURE HOT/ LOW PRESSURE COLD

key number	*description*	*part number*	*quantity*
1	flange, 4” SAE	02250105-533	2
2	pipe, assembly LP hot flex	02250116-965	1
3	gasket, flange	240621-008	6
4	pipe, assembly LP hot	02250116-967	1
5	valve, relief	250042-766	1
6	u-bolt, 3” pipe	02250117-186	2
7	support, bracket ”C”	02250107-479	2
8	isolator, vibration 3/8”-16	02250106-601	2
9	support, bracket LP hot	02250107-478	1
10	pipe, assembly hot	02250116-964	1
11	manifold, assy 3” x 8”	02250116-968	1
12	gasket, flange 4”	240621-010	2
13	pipe, assembly LP cold	02250105-262	1
14	pipe, assembly LP cold intermediate	02250107-547	1
15	pipe, assembly LP cold	02250105-263	1
16	pipe, assembly LP cold flex (air cooled)	02250106-468	1
	•pipe, assembly LP cold flex (water cooled)	02250113-491	1
17	support, bracket LP cold “L”	02250107-019	1
18	probe, RTD	02250058-087	1
19	probe, RTD	250039-039	4

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

9.8 HIGH PRESSURE DISCHARGE



9.8 HIGH PRESSURE DISCHARGE

key number	*description*	*part number*	*quantity*
1	flange, 3” SAE	02250105-534	2
2	pipe, assembly HP cold 2 1/2”	02250107-361	1
3	separator, water combo 2 1/2”	02250106-113	1
4	support, bracket air outlet	02250107-358	1
5	support, bracket turnbuckle	02250109-012	1
6	turnbuckle, 3/8”	02250108-460	1
7	pipe, assembly HP hot flex	02250119-267	1
8	isolator, vibration 3/8”-16	02250106-601	1
9	gasket, 3”	046120	4
10	pipe, assembly HP hot	02250119-269	1
11	silencer, blowdown 1 1/2”	405815-005	1
12	valve, check 3”	02250108-623	1
13	silencer, air	02250117-406	1
14	pipe assy, blowdown	02250118-646	1
15	valve, relief 1”	250042-767	1
16	support, bracket manifold	02250119-440	1
17	valve, blowdown **(II)**	02250119-178	1
18	support, air filter	02250106-215	1
19	support, pipe assembly	02250117-561	1

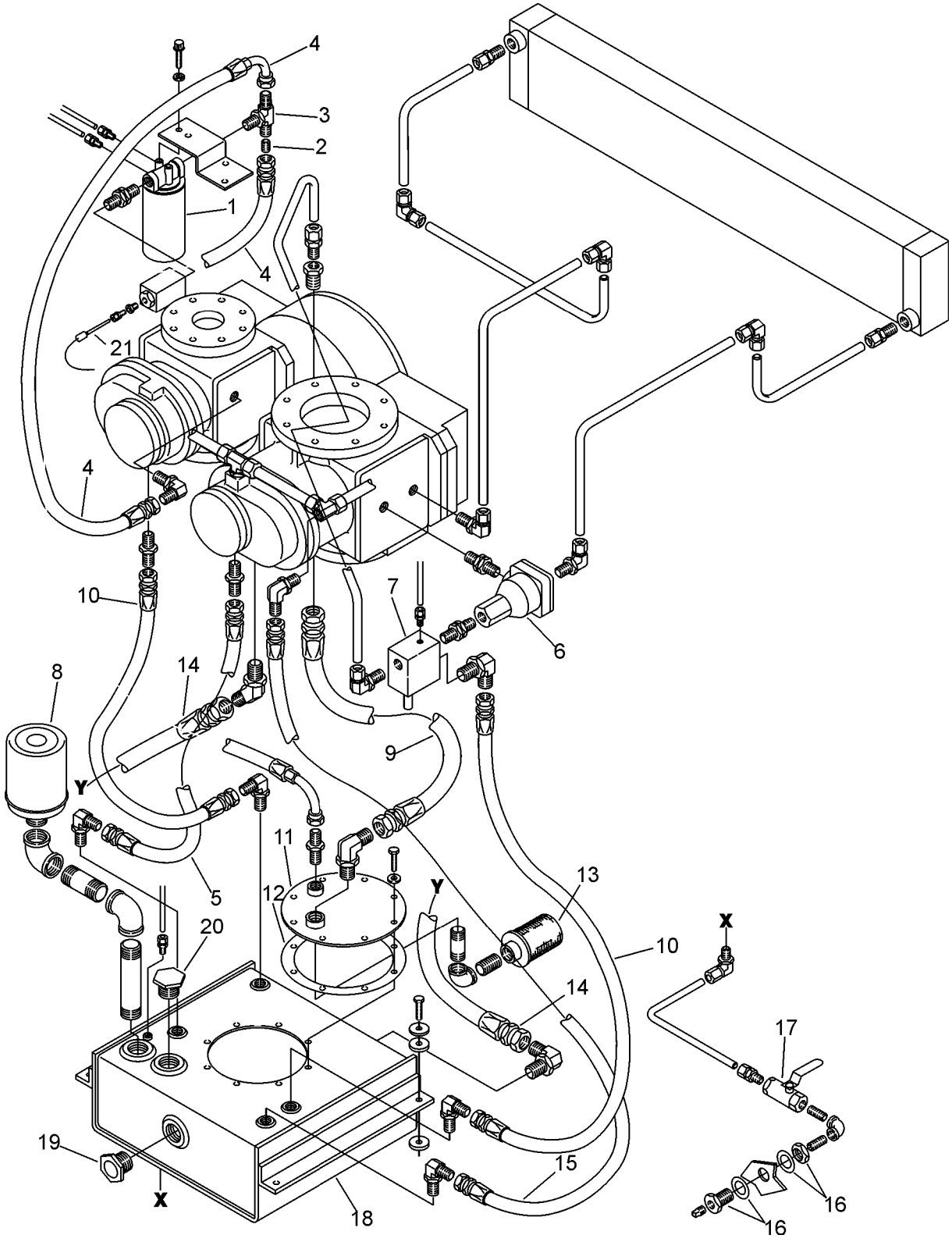
(I) For maintenance on water combo separator no. 02250106-113, order replacement kit no. 02250106-113.

(II) For maintenance on blowdown valve no. 02250119-178. order replacement kit no. 02250122-079.

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

ILLUSTRATIONS AND PARTS LIST

9.9 LUBRICATION SYSTEM- AIR-COOLED



9.9 LUBRICATION SYSTEM- AIR-COOLED

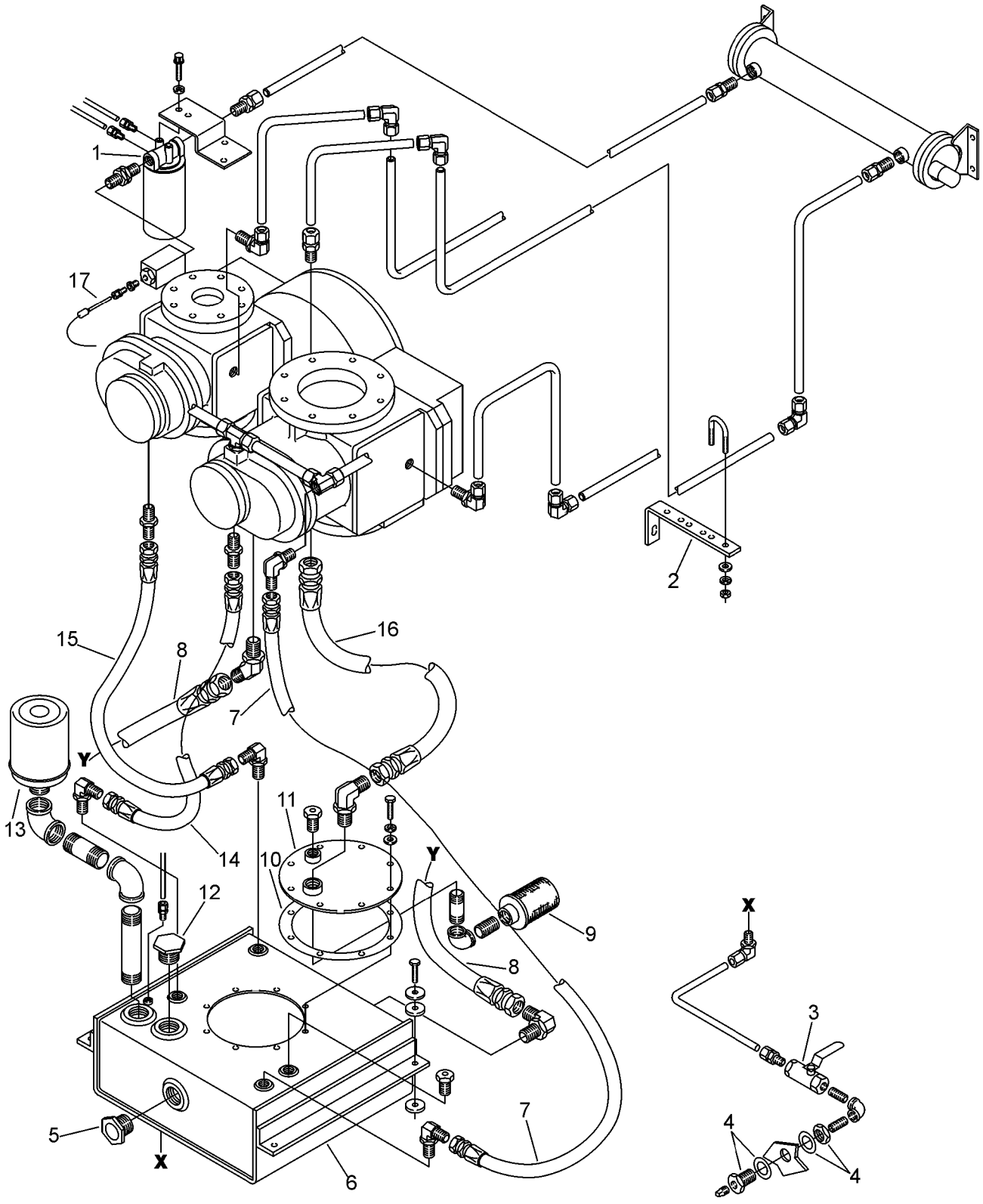
key number	*description*	*part number*	*quantity*
1	filter, oil **(I)**	02250049-820	1
2	orifice, set screw 3/4"-10 x .203	02250115-992	1
3	tee	02250110-549	1
4	hose, assembly flex 3/4"	02250108-308	2
5	hose, assembly flex 3/4"	02250107-874	2
6	valve, thermal 1"	02250107-457	1
7	relief/bypass valve assembly	02250111-586	1
8	filter, sump breather **(II)**	02250136-658	1
9	hose, assembly flex 1"	02250107-873	1
10	hose, assembly flex 3/4"	02250107-875	1
11	plate, cover sump	02250106-159	1
12	gasket, cover plate	02250092-588	1
13	strainer, suction 1"	02250105-982	1
14	hose, assembly flex 1"	02250107-876	1
15	hose, assembly flex 3/4"	02250107-877	1
16	fitting, bulkhead 1/2"	841500-008	1
17	valve, ball 1/2"	047117	1
18	tank, oil sump	02250106-020	1
19	plug, glass oil level 1 7/8"	02250097-611	1
20	plug, fill	250042-628	1
21	probe, RTD	250039-039	4

(I) For maintenance on oil filter no. 02250049-820, order replacement kit no. 02250049-821.

(II) For maintenance on sump breather filter no. 02250136-658, order replacement element no. 02250138-201.

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

9.10 LUBRICATION SYSTEM- WATER-COOLED



9.10 LUBRICATION SYSTEM- WATER-COOLED

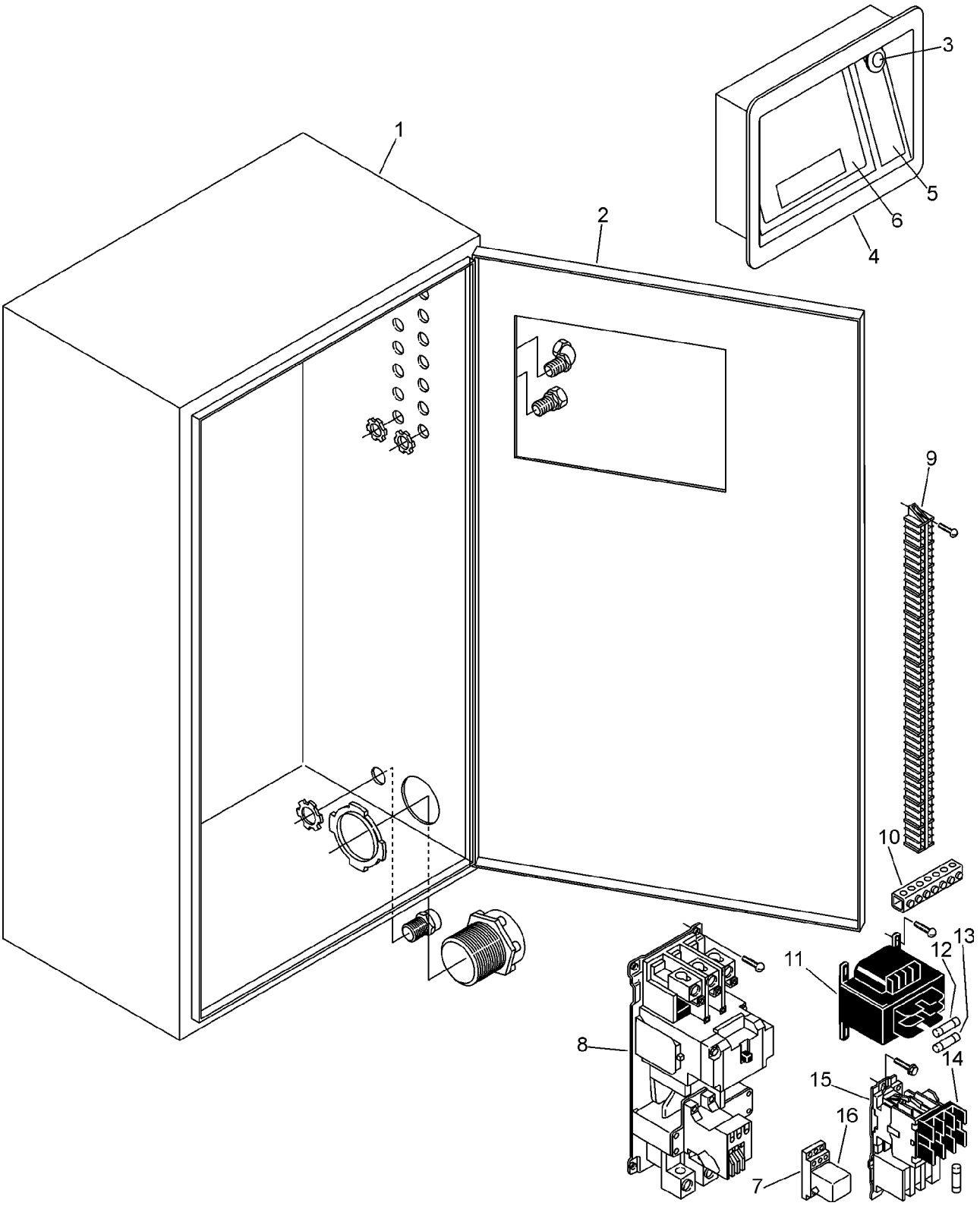
key number	*description*	*part number*	*quantity*
1	filter, oil **(I)**	02250049-820	1
2	bracket, support water lines	02250115-906	1
3	valve, ball 1/2”	047117	1
4	fitting, bulkhead 1/2”	841500-008	1
5	plug, glass oil level 1 7/8”	02250097-611	1
6	tank, oil sump	02250106-020	1
7	hose, assembly flex 3/4”	02250107-877	1
8	hose, assembly flex 1”	02250107-876	1
9	strainer, suction 1”	02250105-982	1
10	gasket, cover plate	02250092-588	1
11	plate, cover sump	02250106-159	1
12	plug, fill	250042-628	1
13	filter, sump breather **(II)**	02250136-658	1
14	hose, assembly flex 3/4”	02250107-874	1
15	hose, assembly flex 3/4”	02250107-875	1
16	hose, assembly flex 1”	02250107-873	1
17	probe, RTD	250039-039	4

(I) For maintenance on oil filter no. 02250049-820, order replacement kit no. 02250049-821.

(II) For maintenance on sump breather filter no. 02250136-658, order replacement element no. 02250138-201.

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

9.11 ELECTRICAL BOX

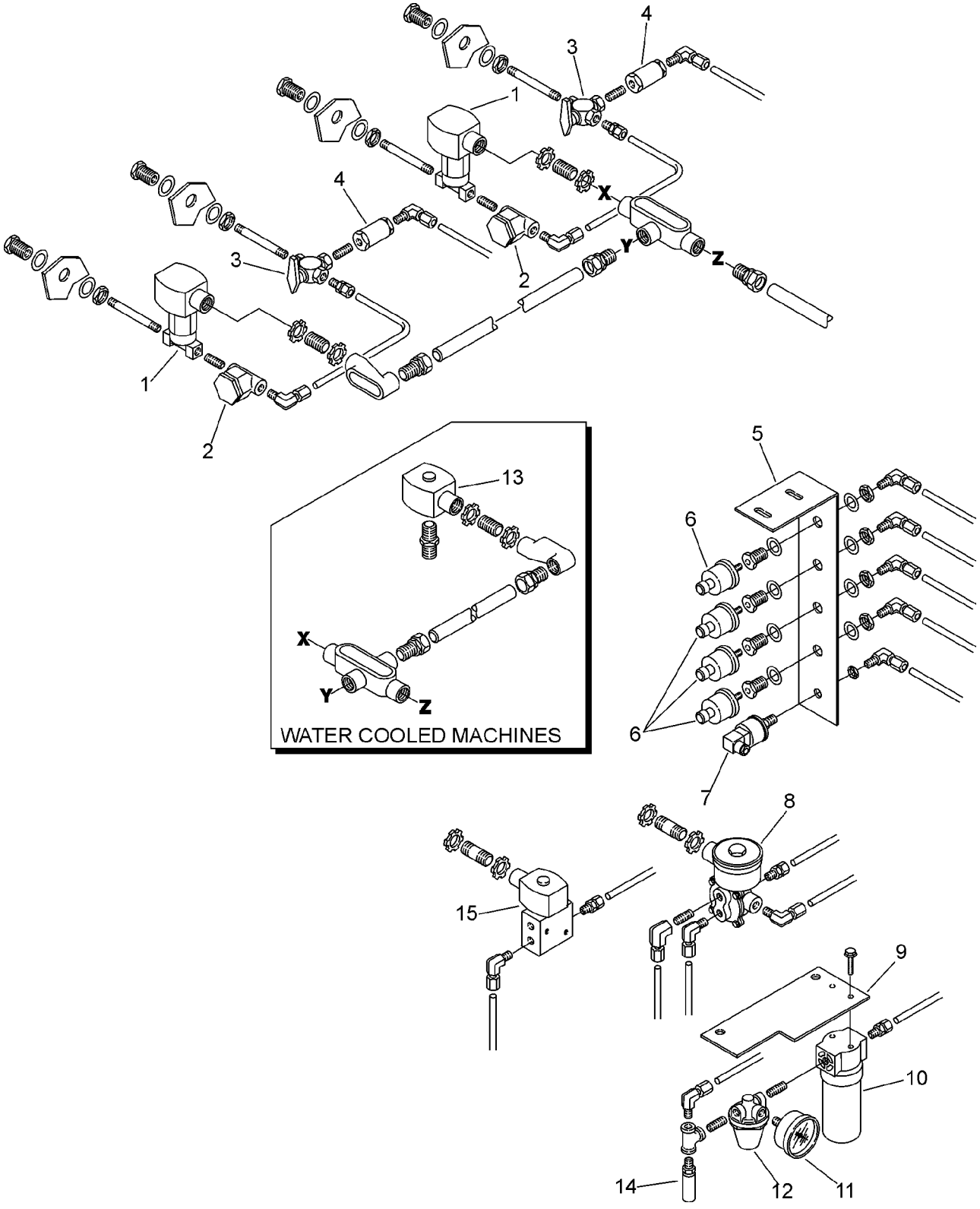


9.11 ELECTRICAL BOX

key number	*description*	*part number*	*quantity*
1	enclosure	02250108-859	1
2	door	02250109-465	1
3	switch, emergency stop	02250085-504	1
	•contact, block	250027-125	2
4	bezel, control box	02250089-302	1
	•gasket, bezel	02250090-872	1
5	gasket, auxiliary plate	02250086-269	1
	•plate, auxiliary	02250086-265	1
	•decal, auxiliary plate	02250086-259	1
6	supervisor II, assembly	02250112-897	1
	•gasket, supervisor II	02250048-822	1
	•decal, Supervisor II	02250073-286	1
7	socket, relay	250034-430	1
8	starter	consult factory	1
9	block, terminal	250041-102	20
	•end, terminal block	250041-103	1
	•jumper, terminal	02250055-172	7
10	bar, ground	02250101-721	1
11	transformer, 350 VA	02250083-190	1
12	fuse, primary 3.5 amp	250026-648	2
13	fuse, secondary 5 amp	250019-751	1
14	block, fuse	250023-290	1
15	starter, size 1	250021-836	1
16	relay, phase monitor	405404	1

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

9.12 CONTROL SYSTEM/ CONDENSATE DRAIN



9.12 CONTROL SYSTEM/ CONDENSATE DRAIN

key number	*description*	*part number*	*quantity*
1	valve, solenoid 2-way NC 1/4" **(I)**	02250125-674	2
2	strainer, V-type **(II)**	241771	2
3	valve, 3-way ball	044205	2
4	valve, check 1/4" **(III)**	049905	2
5	support, bracket transducer	02250110-132	1
6	transducer, pressure	02250078-933	4
7	switch, vacuum	02250078-249	1
8	valve, solenoid 4-way 1/4" **(IV)**	250025-516	1
9	bracket, support pneumatic controls	02250110-131	1
10	filter, control 1/4" **(V)**	02250112-032	1
11	gauge, 0-30 Bkm 1/4"	02250100-643	1
12	regulator, pressure **(VI)**	02250100-362	1
13	valve, solenoid 2-way NC 1 1/2" **(VII)**	02250125-818	1
14	valve, relief 1/4" NPT 25#	02250100-731	1
15	valve, solenoid 1/4" 3-way **(VIII)**	02250125-817	1

(I) For maintenance on solenoid valve no. 02250125-674, order replacement kit no. 02250125-823, and replacement coil no. 02250125-861.

(II) For maintenance on V-type strainer no. 241771, order replacement kit no. 241772.

(III) For maintenance on check valve no. 049905, order replacement spring no. 250003-657.

(IV) For maintenance on solenoid valve no. 250025-516, order replacement kit no. 02250053-334, and replacement coil no. 250031-431.

(V) For maintenance on control filter no. 02250112-032, order float assembly replacement kit no. 02250115-960.

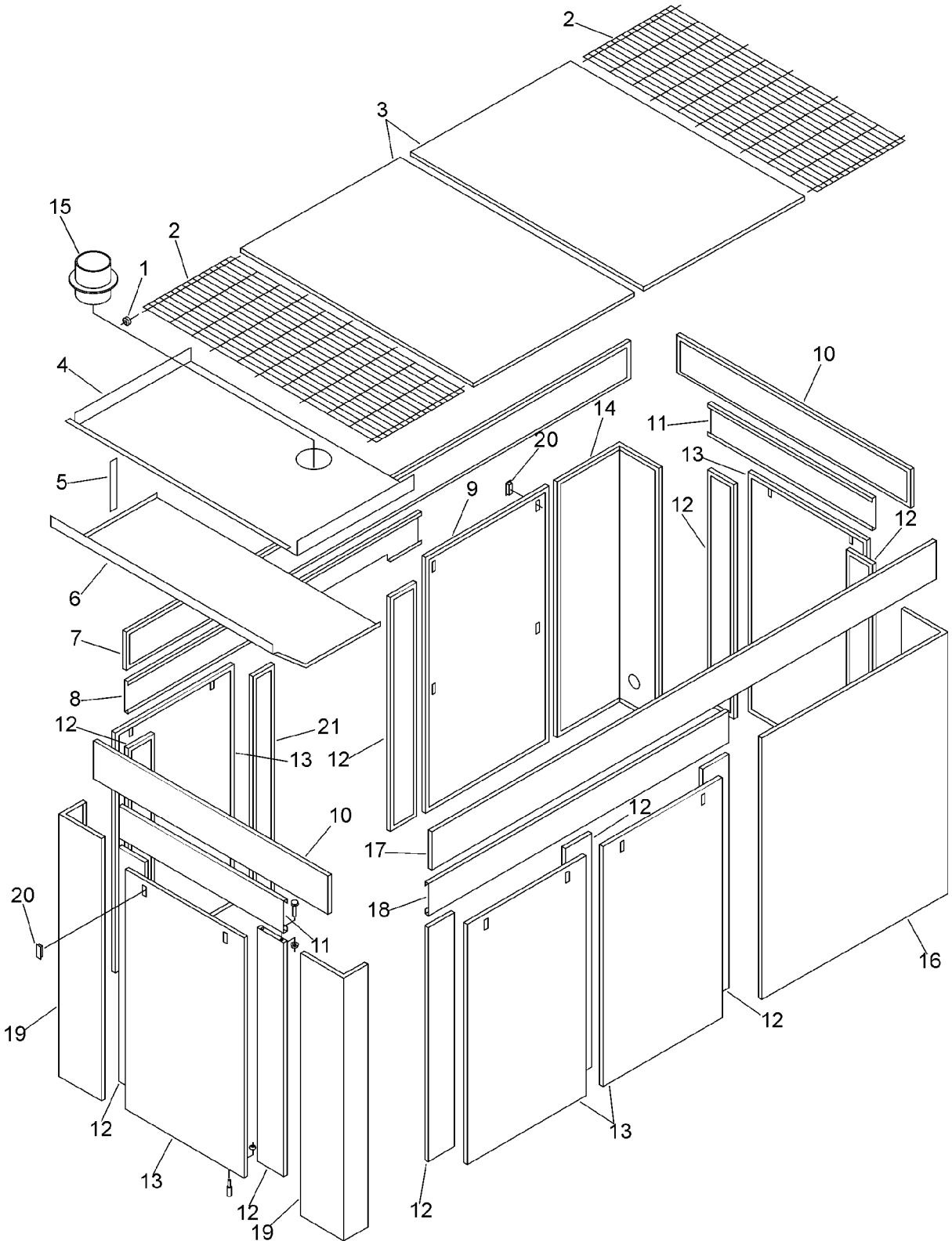
(VI) For maintenance on pressure regulator no. 02250100-362, order replacement kit no. 02250122-521.

(VII) For maintenance on solenoid valve no. 02250125-818, order replacement kit no. 02250125-860, and replacement coil no. 02250125-855.

(VIII) For maintenance on solenoid valve no. 02250125-817, order replacement kit no. 02250125-845, and replacement coil no. 02250125-855.

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

9.13 CANOPY- AIR-COOLED

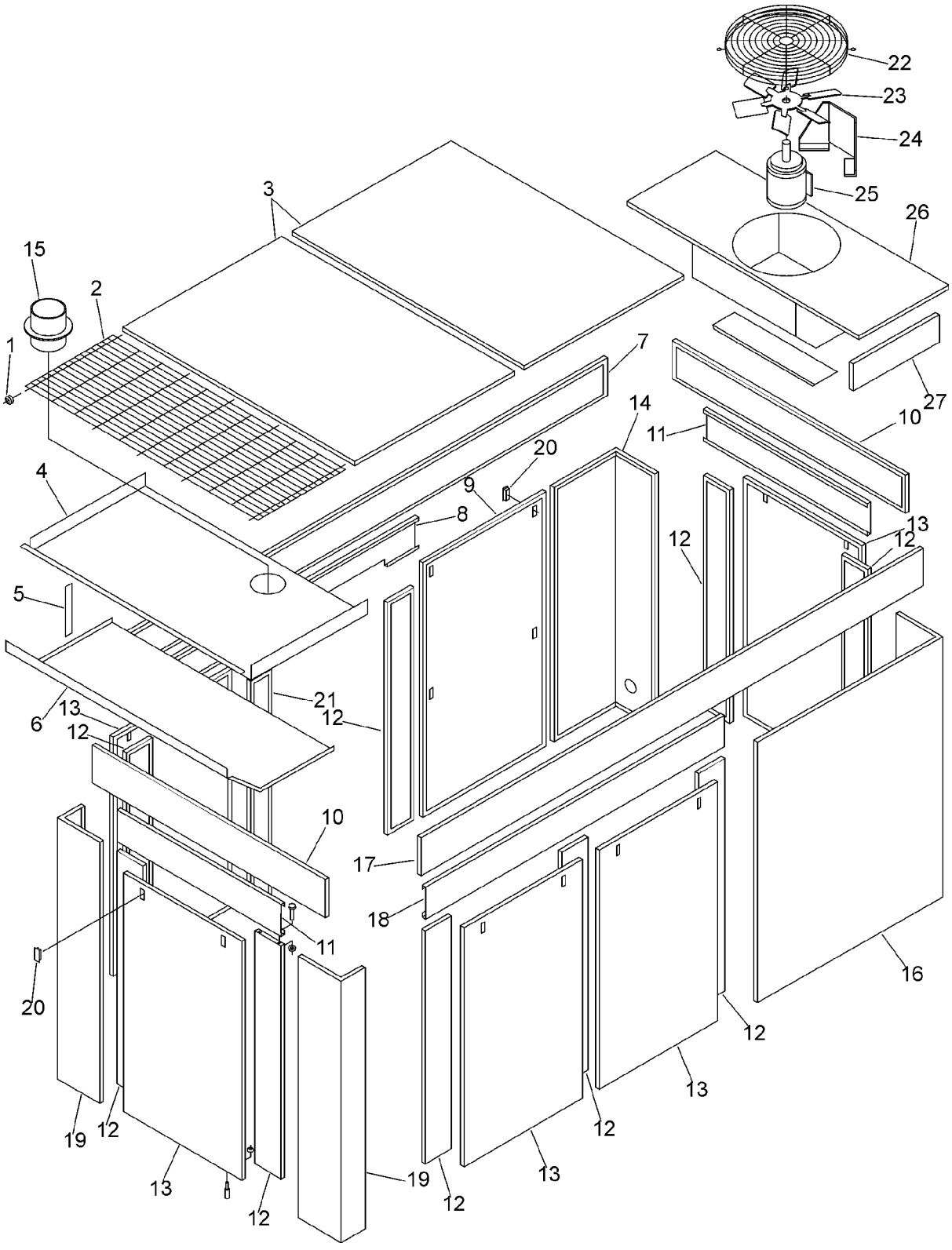


9.13 CANOPY- AIR-COOLED

key number	*description*	*part number*	*quantity*
1	grommet, rubber	040125	20
2	grille, canopy inlet/outlet	02250107-830	2
3	panel, roof	02250107-018	2
4	baffle, air inlet upper	02250109-633	1
5	strap, lower baffle	02250111-900	2
6	baffle, air inlet lower	02250109-634	1
7	panel, canopy left side top	02250116-878	1
8	panel, stiffener shroud LH	02250107-017	1
9	panel, access door	02250113-860	1
10	panel, roof canopy front/rear	02250107-021	2
11	panel, stiffener shroud	02250107-023	2
12	panel, stiffener	02250107-015	9
13	panel, access	02250107-014	5
14	panel, corner rear LH	02250113-861	1
15	tube, assy air inlet	02250117-304	1
16	panel, corner rear RH	02250107-204	1
17	panel, canopy right side top	02250116-879	1
18	panel, stiffener shroud	02250107-024	1
19	panel, corner	02250107-025	2
20	latch, lift & turn locking	02250107-359	7
	•latch, lift & turn non-locking	02250111-031	7
	•pawl, door latch replacement	02250116-371	2
21	panel	02250109-700	1

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

9.14 CANOPY- WATER-COOLED



9.14 CANOPY- WATER-COOLED

key number	*description*	*part number*	*quantity*
1	grommet, rubber	040125	20
2	grille, canopy inlet/outlet	02250107-830	2
3	panel, roof	02250107-018	2
4	baffle, air inlet upper	02250109-633	1
5	strap, lower baffle	02250111-900	2
6	baffle, air inlet lower	02250109-634	1
7	panel, canopy left side top	02250116-878	1
8	panel, stiffener shroud LH	02250107-017	1
9	panel, access door	02250113-860	1
10	panel, roof canopy front/rear	02250107-021	2
11	panel, stiffener shroud	02250107-023	2
12	panel, stiffener	02250107-015	9
13	panel, access	02250107-014	5
14	panel, corner rear LH	02250113-861	1
15	tube, assy air inlet	02250117-304	1
16	panel, corner rear RH	02250107-204	1
17	panel, canopy right side top	02250116-879	1
18	panel, stiffener shroud	02250107-024	1
19	panel, corner	02250107-025	2
20	latch, lift & turn locking	02250107-359	7
	•latch, lift & turn non-locking	02250111-031	7
	•pawl, door latch replacement	02250116-371	2
21	panel	02250109-700	1
22	guard, fan 22.5”	02250058-351	1
23	fan, 20”	consult factory	1
24	support, motor mount fan box	02250113-631	1
25	motor, .75 HP	consult factory	1
26	panel, fan box assy	02250113-630	1
27	baffle, enclosure fan box	02250113-776	2

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

ILLUSTRATIONS AND PARTS LIST

9.15 DECALS

9.15 DECALS

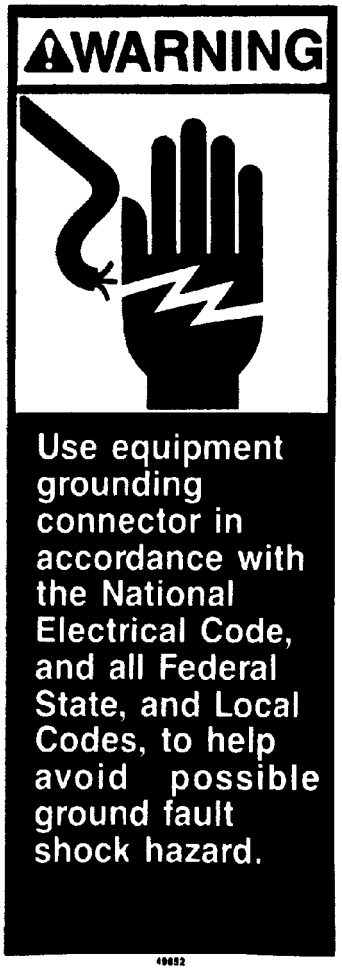
key number	*description*	*part number*	*quantity*
1	sign, warning sever fan	049855	2
2	sign, warning sever fan port	049965	2
3	sign, danger electrocution	049850	1
4	decal, warning auto start	250017-903	1
5	decal, voltage 460/3/60 international **(I)**	02250069-399	1
6	decal, rotation	250021-286	1
7	decal, fluid Sullair AWF	02250069-645	1
8	decal, earth ground	02250075-046	4
9	decal, protective earth ground	02250075-045	1
10	decal, PE designation	02250075-540	1
11	decal, warning auto start	041065	1
12	sign, danger air breathing	250027-935	1
13	sign, “food grade” lube	250003-144	1

(Continued on Page 77)

(I) Voltage decal varies with voltage of machine. To determine correct voltage decal, consult factory with serial number of your machine.

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

9.15 DECALS



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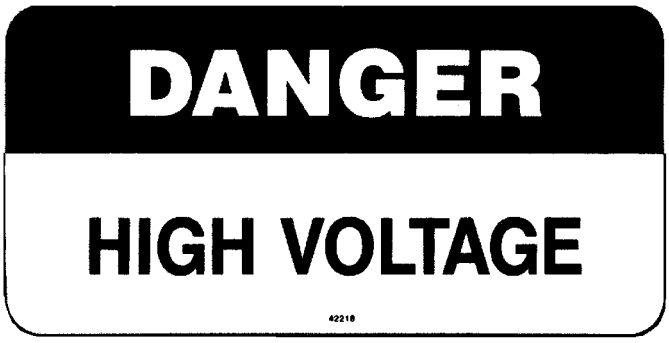

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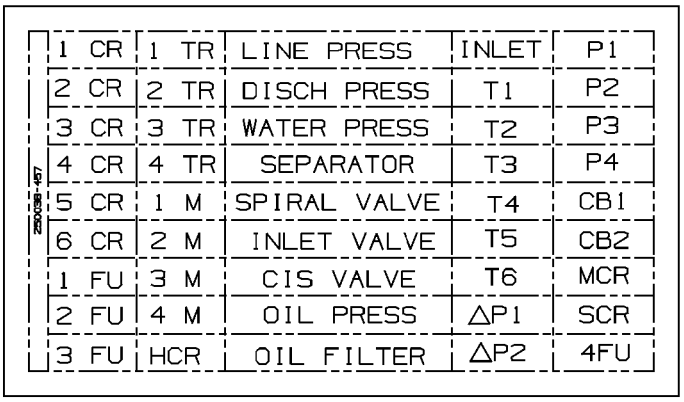

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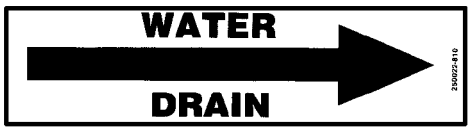

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9.15 DECALS

key number	*description*	*part number*	*quantity*
14	sign, warning ground fault	049852	1
15	decal, danger high voltage	042218	1
16	decal, electrical component ID	250038-457	1
17	decal, ISO 9001	02250057-624	1
18	decal, water drain	250022-810	1
19	decal, water in	250019-107	1
20	decal, water out	250019-108	1
21	decal, fork lifting	241814	4

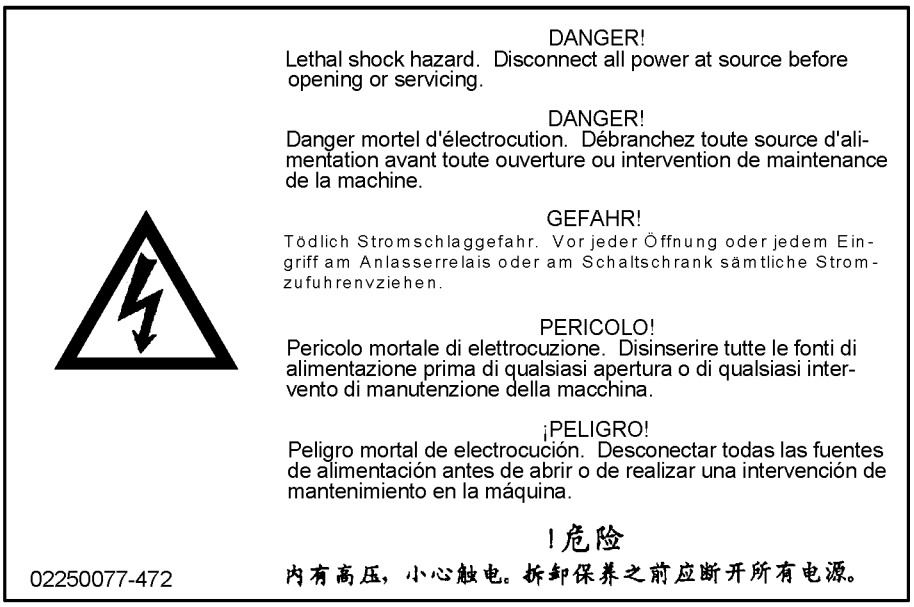
(Continued on page 79)

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

ILLUSTRATIONS AND PARTS LIST

9.15 DECALS

22



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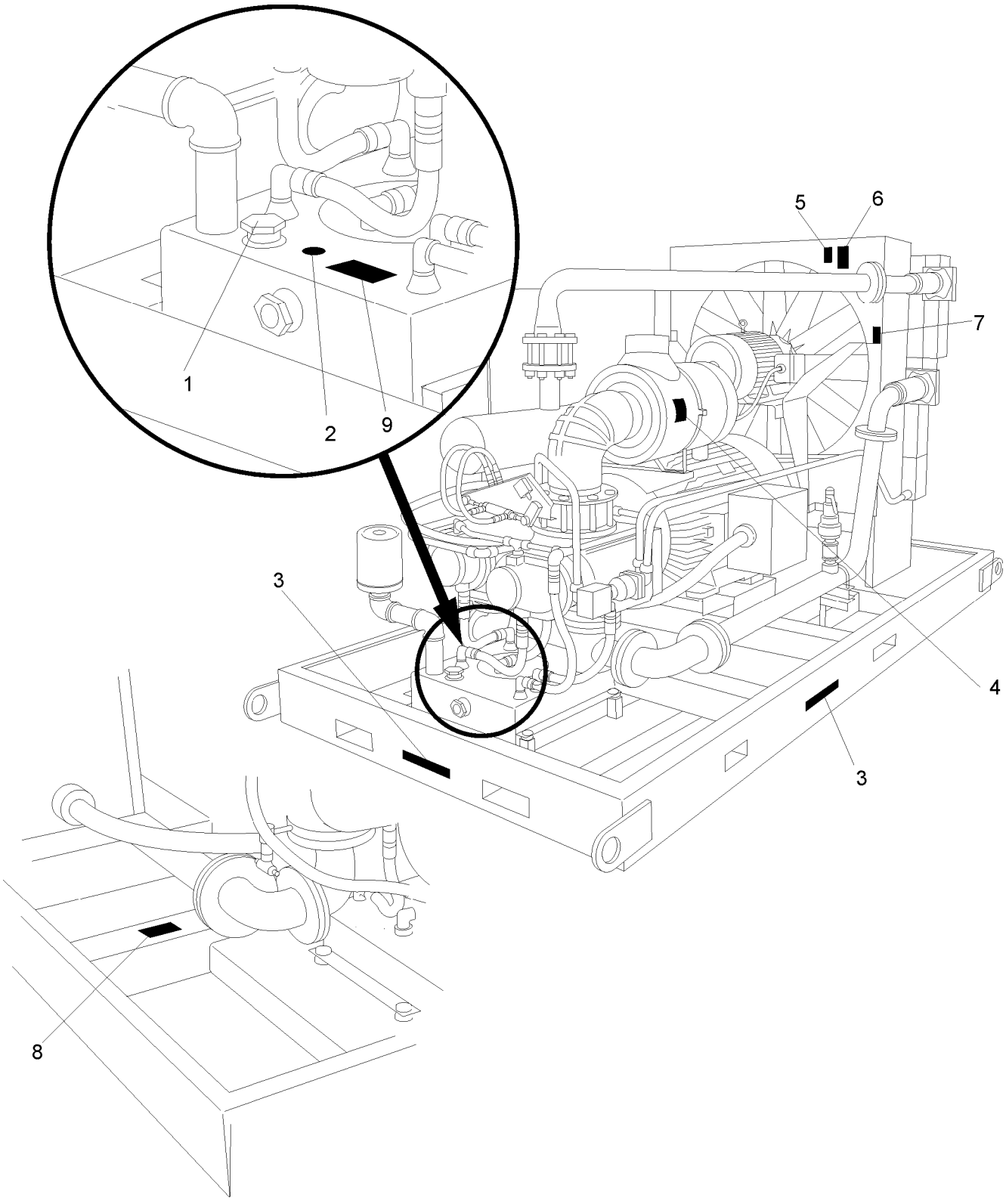
9.15 DECALS

key number	*description*	*part number*	*quantity*
22	sign, warning hot surfaces	407408	1
23	decal, electrocution hazard	02250077-472	1
24	decal, oil fill cap DS-13	02250115-652	1
25	decal, AWF oil free	02250123-639	1
26	decal, Supervisor II **(I)**	02250044-204	1

(I) For detailed view of decal no. 02250073-286, consult Section 5, Supervisor II, Figure 5-1.

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

9.16 DECAL LOCATIONS



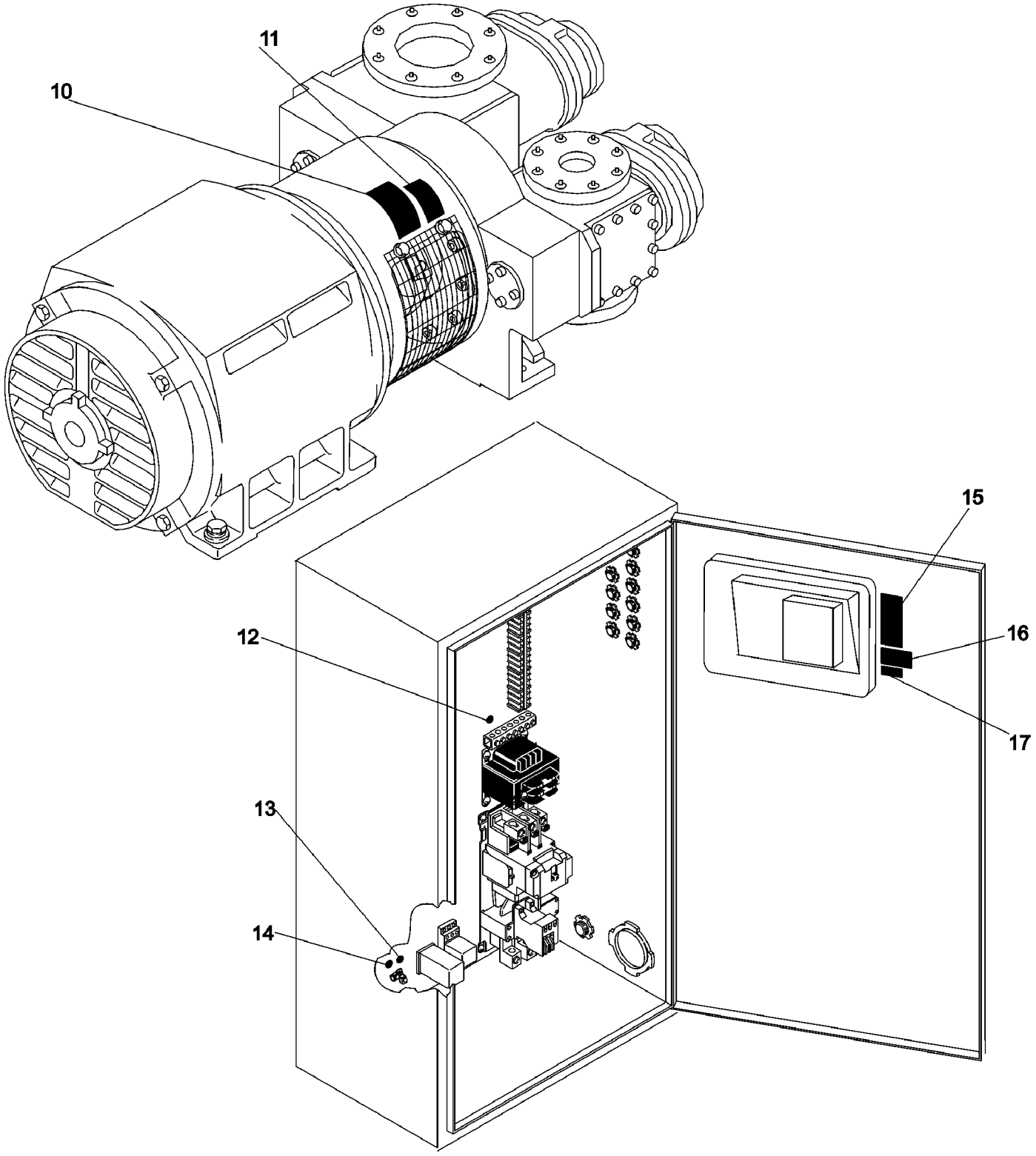
9.16 DECAL LOCATIONS

key number	*description*	*part number*	*quantity*
1	decal, oil fill cap DS-13	02250115-652	1
2	decal, fluid Sullair AWF	02250069-645	1
3	decal, fork lifting	241814	4
5	sign, warning sever fan port	049965	2
6	sign, warning sever fan	049855	2
7	decal, rotation	250021-286	1
8	sign, warning hot surfaces	407408	1
9	decal, AWF oil free	02250123-639	1

(Continued on page 83)

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

9.16 DECAL LOCATIONS



9.16 DECAL LOCATIONS

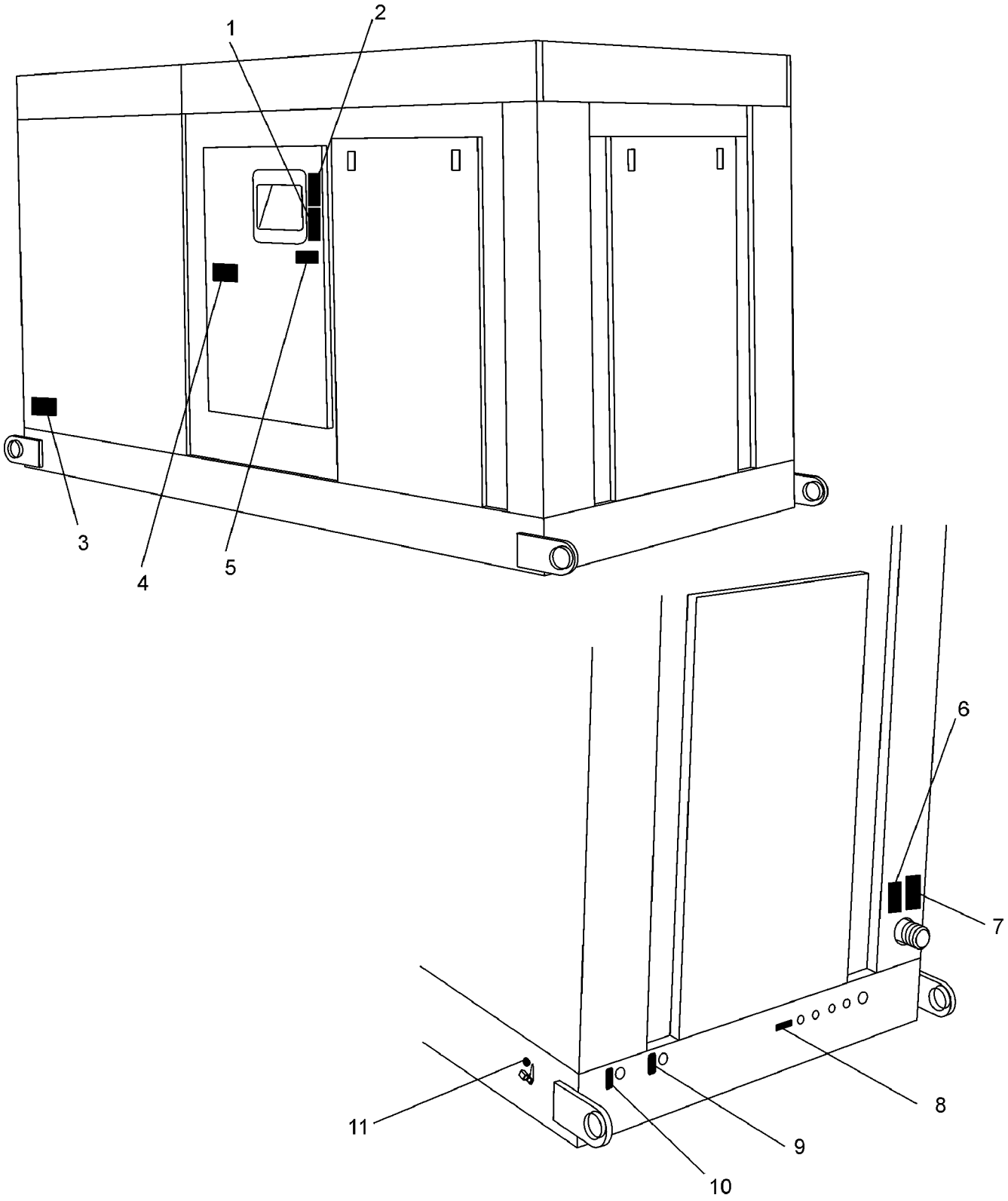
key number	*description*	*part number*	*quantity*
10	sign, warning sever fan	049855	2
11	sign, warning sever fan port	049965	2
12	decal, earth ground	02250075-046	4
13	decal, PE designation	02250075-540	1
14	decal, protective earth ground	02250075-045	1
15	sign, warning ground fault	049852	1
16	decal, danger high voltage	042218	1
17	decal, voltage 460/3/60 international **(I)**	02250069-399	1

(Continued on page 85)

(I) Voltage decal varies with voltage of machine. To determine correct voltage decal, consult factory with serial number of your machine.

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

9.16 DECAL LOCATIONS

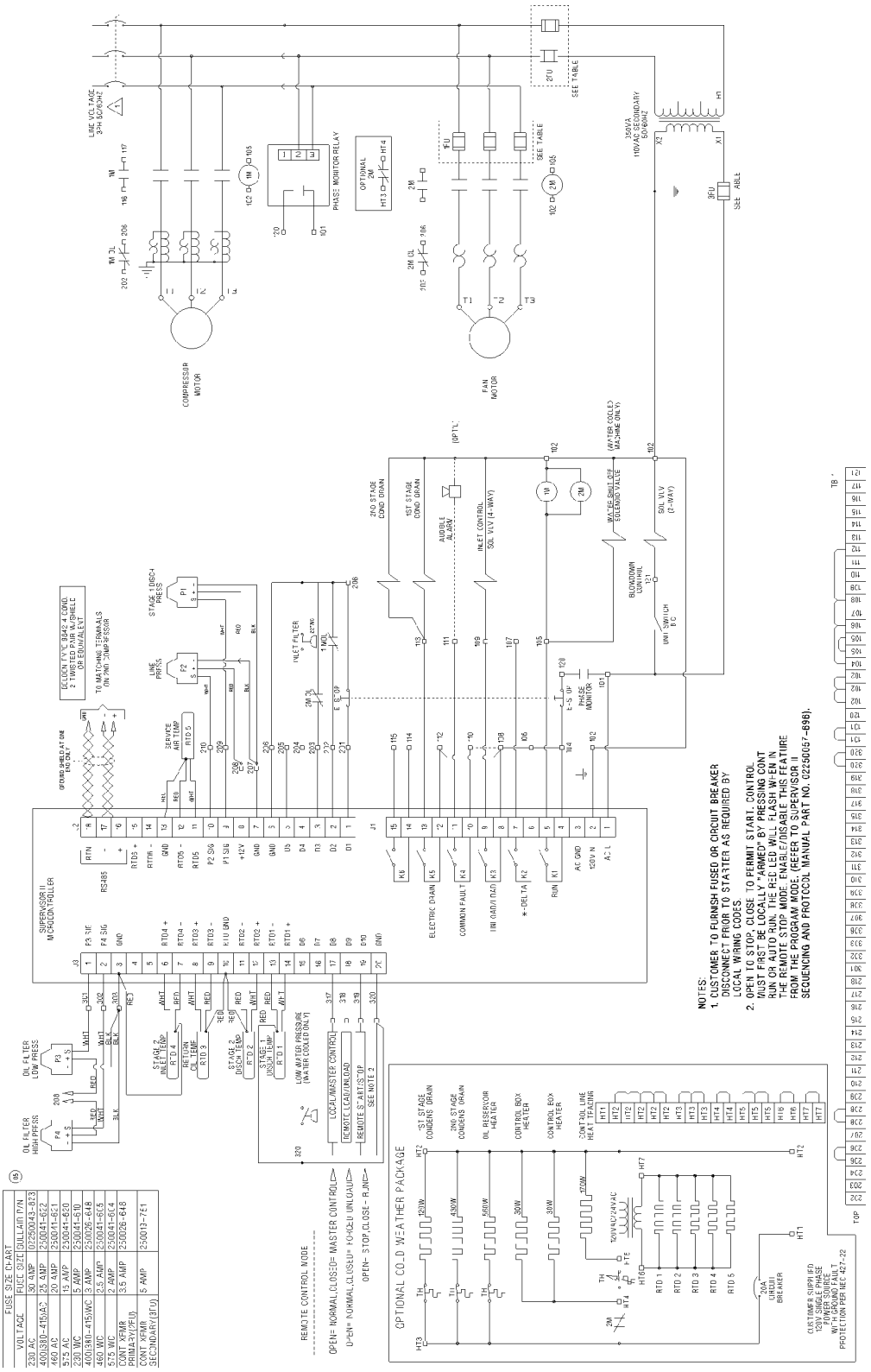


9.16 DECAL LOCATIONS

key number	*description*	*part number*	*quantity*
1	sign, danger electrocution	049850	1
2	decal, warning auto start	250017-903	1
3	decal, ISO 9001	02250057-624	1
4	decal, electrocution hazard	02250077-472	1
5	decal, warning auto start	041065	1
6	sign, “food grade” lube	250003-144	1
7	sign, danger air breathing	250027-935	1
8	decal, water drain	250022-810	1
9	decal, water in	250019-107	1
10	decal, water out	250019-108	1
11	decal, earth ground	02250075-046	4

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

9.17 WIRING DIAGRAM



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