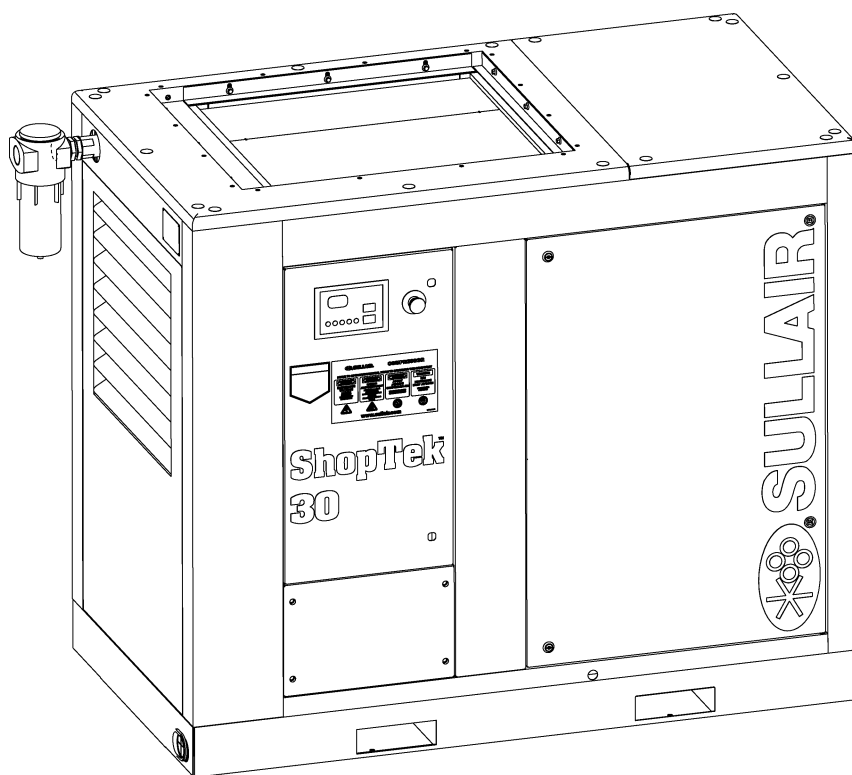




OPERATION & MAINTENANCE MANUAL

ShopTek™ ST30 & ST37

U.S.A. & Mexico



WARRANTY NOTICE

Failure to follow the instructions and procedures in this manual, or misuse of this equipment, will VOID its warranty!

PART NUMBER:
88291013-138 R02

The information in this manual is current as of its publication date.

Publication date: 1/28/2015
Copyright © 2015 Sullair, LLC. All rights reserved.



Air Care Seminar Training

Sullair Air Care Seminars are courses that provide hands-on instruction for the proper operation, maintenance, and servicing of Sullair products. Individual seminars on Stationary compressors and compressor electrical systems are offered at regular intervals throughout the year at Sullair's corporate headquarters training facility located at Michigan City, Indiana.

Instruction includes training on the function and installation of Sullair service parts, troubleshooting common faults and malfunctions, and actual equipment operation. These seminars are recommended for maintenance, contractor maintenance, and service personnel.

For detailed course outlines, schedule, and cost information contact:

Sullair Training Department

1-888-SULLAIR or
219-879-5451 (ext. 5623)
www.sullair.com
training@sullair.com

- Or Write -

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



Table of Contents

Section 1: Safety	1
1.1 General	1
1.2 Personal protective equipment	1
1.3 Pressure release	1
1.4 Fire and explosion	2
1.5 Moving parts	2
1.6 Hot surfaces, sharp edges and sharp corners	3
1.7 Toxic and irritating substances	3
1.8 Electrical shock	4
1.9 Lifting	4
1.10 Entrapment	5
1.11 Implementation of lockout/tagout	5
1.12 Safety warnings	6
Section 2: Description	9
2.1 The air compression cycle	9
2.2 Air inlet system	12
2.2.1 General operation of the air inlet system	12
2.2.2 Air filter	12
2.2.3 Inlet valve	12
2.3 Discharge system	12
2.3.1 General operation of the discharge system	12
2.3.2 Minimum pressure valve	13
2.3.3 Automatic blowdown valve	13
2.3.4 Pressure relief valve	13
2.3.5 Aftercooler	13
2.3.6 Moisture separator	13
2.4 Lubrication system	13
2.4.1 General description of the lubrication system	13
2.4.2 Lubricating fluid	13
2.4.3 Fluid filter	14
2.4.4 Purge oil return line	14
2.5 Cooling system	14
2.5.1 General description of the cooling system	14
2.5.2 Ambient temperature	14

2.6	Fluid/air separation system	14
2.6.1	General description of the fluid/air separation system	14
2.6.2	Fluid/air separator tank	15
2.6.3	Fluid/air separator element	15
2.7	Microprocessor control system	15
Section 3: Specifications		17
3.1	Machine specifications	17
3.2	Lubricant specifications	17
Section 4: Installation & Setup		19
4.1	Compressor pre-installation	19
4.2	Guidelines for lifting and moving the compressor	19
4.2.1	Guidelines for moving the compressor with a forklift	19
4.2.2	Guidelines for moving the compressor with a crane	19
4.3	Compressor installation	19
4.3.1	Physical installation requirements	19
4.3.2	Heat rejection and ventilation requirements	20
4.4	Connection to the air system	20
4.5	Mechanical checks	20
4.5.1	Checking the motor to air end coupling	20
4.5.2	Checking the air end	20
4.5.3	Checking the compressor fluid level	21
4.5.4	Checking the isolation gate valve	21
4.6	Electrical checks	21
4.6.1	Power supply requirements	21
4.6.2	Checking the motor rotation direction	21
Section 5: Operation		23
5.1	Compressor protection features	23
5.1.1	Stop run-on timer	23
5.1.2	Emergency stop	23
5.2	Starting the compressor for the first time	23
5.3	Starting the compressor	24
5.4	Shutting down the compressor	24
5.5	Electronic controller	24
5.6	High temperature shutdown	24
5.7	Motor overload protection	24
5.8	Phase failure/reversal	25
5.9	Run-on timer	25

Section 6: Maintenance	27
6.1 General	27
6.2 Daily maintenance	27
6.2.1 Before starting the compressor	27
6.2.2 After starting the compressor	27
6.3 Recommended maintenance schedule	28
6.3.1 Service at 50 operating hours	28
6.3.2 Service every 1000 operating hours	28
6.3.3 Service every 2000 operating hours	28
6.3.4 Service every 4000 operating hours (or semi-annually)	28
6.3.5 Service every 8000 hours (or yearly)	28
6.3.6 Compressor fluid levels	29
6.4 Compressor maintenance	29
6.4.1 Adding compressor fluid	29
6.4.2 Changing compressor fluid	29
6.4.3 Fluid filter maintenance	30
6.4.4 Air filter maintenance	30
6.4.5 Purge oil return line filter maintenance	31
6.4.6 Fluid/air separator maintenance	31
6.4.7 Minimum pressure valve maintenance	33
6.4.8 Blowdown valve maintenance	33
6.4.9 Solenoid valve maintenance	33
6.4.10 Pressure regulator maintenance	33
6.4.11 Drive coupling maintenance	34
6.5 Main motor operation and maintenance	34
6.5.1 Main motor operation	35
6.5.2 Main motor maintenance and repair	35
6.5.3 Periodic inspection of the main motor	35
6.5.4 Check and clean the windings	36
6.6 Troubleshooting	36
Section 7: Parts List	39
7.1 Procedure for ordering parts	39
7.2 Recommended spare parts list	40
7.3 Motor and air end system (ST3008)	42
7.4 Motor and air end system (ST3708)	44
7.5 Air inlet system (ST3008)	46
7.6 Air inlet system (ST3708)	48
7.7 Fluid piping system	50
7.8 Cooling fan system	52
7.9 Fluid/air separation system	54
7.10 Air discharge system	56
7.11 Control system	58

7.12	Starter assembly—460V	62
7.13	Enclosure	64
7.14	Decal locations.....	66
Appendix A: System Diagrams		69
A.1	ST30 & ST37 identification	69
A.2	ST30 & ST37 piping and instrumentation	70
Appendix B: Metric & Imperial Nominal Sizes.....		72

Section 1

Safety

NOTE



Operator is required to read entire instruction manual.

1.1 General

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

The compressor should be operated only by those who have been trained and delegated to do so, and who have read and understood this Operator's Manual. Failure to follow the instructions, procedures and safety precautions in this manual may result in accidents and injuries. **NEVER** start the compressor unless it is safe to do so. **DO NOT** attempt to operate the compressor with a known unsafe condition. Tag the compressor and render it inoperative by disconnecting and locking out all power at source or otherwise disabling its prime mover so others who may not know of the unsafe condition cannot attempt to operate it until the condition is corrected.

Install, use and operate the compressor only in full compliance with all pertinent OSHA regulations and/or any applicable Federal, State, and Local codes, standards and regulations. **DO NOT** modify the compressor and/or controls in any way except with written factory approval.

While not specifically applicable to all types of compressors with all types of prime movers, most of the precautionary statements contained herein are applicable to

most compressors and the concepts behind these statements are generally applicable to all compressors.

1.2 Personal protective equipment

- A. 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 ½" (13 mm) 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 ½" (13 mm) 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 (23 m) of hose in runs of air hose exceeding ½" (13 mm) inside diameter to reduce pressure in case of hose failure.
- D. Flow-limiting valves are listed by pipe size and flow-rated. Select appropriate valves accordingly, in

accordance with their manufacturer's recommendations.

- E. **DO NOT** use air tools that are rated below the maximum rating of the compressor. Select air tools, air hoses, pipes, valves, filters and other fittings accordingly. **DO NOT** exceed manufacturer's rated safe operating pressures for these items.
- F. Secure all hose connections by wire, chain or other suitable retaining device to prevent tools or hose ends from being accidentally disconnected and expelled.
- G. Open fluid filler cap only when compressor is not running and is not pressurized. Shut down the compressor and bleed the receiver tank 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. **DO NOT** use air at pressures higher than 2.1 bar for cleaning purposes, and then only with effective chip guarding and personal protective equipment per OSHA Standard 29 CFR 1910.242(b) and/or any applicable Federal, State, and Local codes, standards and regulations.
- K. **DO NOT** engage in horseplay with air hoses as death or serious injury may result.

1.4 Fire and explosion

- A. Clean up spills of lubricant or other combustible substances immediately, if such spills occur.
- B. Shut off the compressor and allow it to cool. Then keep sparks, flames and other sources of ignition away and **DO NOT** permit smoking in the vicinity when checking or adding lubricant or when refilling air line anti-icer systems with antifreeze compound.
- C. **DO NOT** permit fluids, including air line anti-icer system antifreeze compound or fluid film, to accumulate on, under or around acoustical material, or on any external surfaces of the air compressor. Wipe down using an aqueous industrial cleaner or steam clean as required. If necessary, remove acoustical material, clean all surfaces and then replace acoustical

material. Any acoustical material with a protective covering that has been torn or punctured should be replaced immediately to prevent accumulation of liquids or fluid film within the material. **DO NOT** use flammable solvents for cleaning purposes.

- D. Disconnect and lock out all power at source prior to attempting any repairs or cleaning of the compressor or of the inside of the enclosure, if any.
- E. Keep electrical wiring, including all terminals and pressure connectors in good condition. Replace any wiring that has cracked, cut, abraded or otherwise degraded insulation, or terminals that are worn, discolored or corroded. Keep all terminals and pressure connectors clean and tight.
- F. Keep grounded and/or conductive objects such as tools away from exposed live electrical parts such as terminals to avoid arcing which might serve as a source of ignition.
- G. Remove any acoustical material or other material that may be damaged by heat or that may support combustion and is in close proximity, prior to attempting weld repairs.
- H. Keep suitable fully charged Class BC or ABC fire extinguisher or extinguishers nearby when servicing and operating the compressor.
- I. Keep oily rags, trash, leaves, litter or other combustibles out of and away from the compressor.
- J. **DO NOT** operate the compressor without proper flow of cooling air or water or with inadequate flow of lubricant or with degraded lubricant.
- K. **DO NOT** attempt to operate the compressor in any classification of hazardous environment unless the compressor has been specially designed and manufactured for that duty.

1.5 Moving parts

- A. Keep hands, arms and other parts of the body and clothing away from couplings, belts, pulleys, 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.

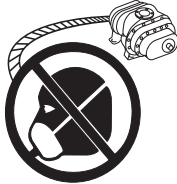
1.6 Hot surfaces, sharp edges and sharp corners

- 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 into unventilated or other confined areas.
- C. Operate the compressor only in open or adequately ventilated areas.
- D. Locate the compressor or provide a remote inlet so that it is not likely to ingest exhaust fumes or other toxic, noxious or corrosive fumes or substances.
- E. Coolants and lubricants used in this compressor are typical of the industry. Care should be taken to avoid accidental ingestion and/or skin contact. In the event of ingestion, seek medical treatment promptly. Wash with soap and water in the event of skin contact. Consult Material Safety Data Sheet for information pertaining to fluid of fill.
- F. Wear goggles or a full face shield when adding anti-freeze compound to air line anti-icer systems.
- G. If air line anti-icer system antifreeze compound enters the eyes or if fumes irritate the eyes, they should be washed with large quantities of clean water for fifteen minutes. A physician, preferably an eye specialist, should be contacted immediately.
- H. **DO NOT** store air line anti-icer system antifreeze compound in confined areas.
- I. The antifreeze compound used in air line antifreeze systems contains methanol and is toxic, harmful or fatal if swallowed. Avoid contact with the skin or eyes and avoid breathing the fumes. If swallowed, induce vomiting by administering a tablespoon of salt, in each glass of clean, warm water until vomit is clear, then administer two teaspoons of baking soda in a glass of clean water. Have patient lay down and

cover eyes to exclude light. Call a physician immediately.

1.8 Electrical shock

- A. This compressor should be installed and maintained in full compliance with all applicable Federal, State and Local codes, standards and regulations, including those of the National Electrical Code, and also including those relative to equipment grounding conductors, and only by personnel that are trained, qualified and delegated to do so.
- B. Keep all parts of the body and any hand-held tools or other conductive objects away from exposed live parts of electrical system. Maintain dry footing, stand on insulating surfaces and **DO NOT** contact any other portion of the compressor when making adjustments or repairs to exposed live parts of the electrical system. Make all such adjustments or repairs with one hand only, so as to minimize the possibility of creating a current path through the heart.
- C. Attempt repairs in clean, dry and well lighted and ventilated areas only.
- D. **DO NOT** leave the compressor unattended with open electrical enclosures. If necessary to do so, then disconnect, lock out and tag all power at source so others will not inadvertently restore power.
- E. Disconnect, lock out, and tag all power at source prior to attempting repairs or adjustments to rotating machinery and prior to handling any ungrounded conductors.



DANGER

All field equipment must be tested for electrostatic fields prior to servicing 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 expected 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. Review the equipment or machine to be locked and tagged out.
 2. Alert operator and supervisor of which machine is to be worked on, and that power and utilities will be turned off.
 3. Check to make certain no one is operating the machine before turning off the power.
 4. Turn off the equipment using normal shut-down procedure.
 5. Disconnect the energy sources:
 - a. Air and hydraulic lines should be bled, drained and cleaned out. There should be no pressure in these lines or in the reservoir tanks. Lockout or tag lines or valves.
 - b. Any mechanism under tension or pressure, such as springs, should be released and locked out or tagged.
 - c. Block any load or machine part prior to working under it.
 - d. Electrical circuits should be checked with calibrated electrical testing equipment and stored energy and electrical capacitors should be safely discharged.
 6. Lockout and/or Tagout each energy source using the proper energy isolating devices and tags. Place lockout hasp and padlock or tag at the point of power disconnect where lockout is required by each person performing work. Each person shall be provided with their own padlock and have possession of the only key. If more than one person is working on a machine each person shall affix personal lock and tag using a multi-lock device.
 7. Tagout devices shall be used only when power sources are not capable of being locked out by use of padlocks and lockout hasp devices. The name of the person affixing tag to power source must be on tag along with date tag was placed on power source.
 8. Release stored energy and bring the equipment to a “zero mechanical state”.
 9. Verify Isolation: Before work is started, test equipment to ensure power is disconnected.

1.10 Entrapment

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

1.11 Implementation of lockout/tagout

The energy control procedure defines actions necessary to lockout a power source of any machine to be repaired, serviced or set-up, where unexpected motion, or an electrical or other energy source, would cause personal injury or equipment damage. The power source on any machine shall be locked out by each employee doing the work except when motion is necessary during setup, adjustment or trouble-shooting.

- A. The established procedures for the application of energy control shall cover the following elements and actions and shall be initiated only by Authorized Persons and done in the following sequence:

B. General Security

1. The lock shall be removed by the “Authorized” person who put the lock on the energy-isolating device. No one other than the person/persons placing padlocks and

lockout hasps on power shall remove padlock and lockout hasps and restore power. However, when the authorized person who applied the lock is unavailable to remove it his/her Supervisor may remove padlock/padlocks and lockout hasps and restore power only if it is first:

- a. verified that no person will be exposed to danger.
 - b. verified that the “Authorized” person who applied the device is not in the facility.
 - c. noted that all reasonable efforts to contact the “Authorized” person have been made to inform him or her that the lockout or tagout device has been removed.
 - d. ensured that the “Authorized” person is notified of lock removal before returning to work.
2. Tagout System—Tags are warning devices affixed at points of power disconnect and are not to be removed by anyone other than the person placing tag on power lockout. Tags shall never be by-passed, ignored, or otherwise defeated.

1.12 Safety warnings

The following special instructions apply to VSD packages provided with electronic adjustable speed motor drives. These cautions that apply to VSD operation.



WARNING

Ground the unit following the instructions in this manual. Ungrounded units may cause electric shock and/or fire. The variable speed drive has a large capacitive leakage current during operation, which can cause enclosure parts to be above ground potential. Proper grounding, as described in this manual, is required. Failure to observe this precaution could result in death or severe injury.



WARNING

Before applying power to the variable speed drive, make sure that the front and cable covers are closed and fastened to prevent exposure to potential electrical fault conditions. Failure to observe this precaution could result in death or severe injury.



WARNING

Refer all drive service to trained technicians. This equipment should be installed, adjusted, and serviced by qualified electrical maintenance personnel familiar with the construction and operation of this type of equipment and the hazards involved and in accordance with published service manuals. Failure to observe this precaution could result in death or severe injury.



WARNING

Line terminals (L1, L2, L3), motor terminals (U, V, W) and the DC link/brake resistor terminals (-/+) are live when the drive is connected to power, even if the motor is not running. Contact with this voltage is extremely dangerous and may cause death or severe injury.

**WARNING**

Before opening the variable speed drive covers:

- Disconnect all power to the variable speed drive.
- Wait a minimum of 5 (five) minutes after all the lights on the keypad are off. This allows time for the DC bus capacitors to discharge.
- A hazard voltage may still remain in the DC bus capacitors even if the power has been turned off. Confirm that the capacitors have fully discharged by measuring their voltage using a multimeter set to measure DC voltage. Failure to follow the above precautions may cause death or severe injury.

**CAUTION**

Do not perform any megger or voltage withstand tests on any part of the variable speed drive or its components. Improper testing may result in damage. Prior to any tests or measurements of the motor or the motor cable, disconnect the motor cable at the variable speed drive output terminals (U, VW) to avoid damaging the variable speed drive during motor or cable testing.

**CAUTION**

Do not touch any components on the circuit boards. Static voltage discharge may damage the components.

**CAUTION**

Install the variable speed drive in a well ventilated room that is not subject to temperature extremes, high humidity, or condensation, and avoid locations that are directly exposed to sunlight, or have high concentrations of dust, corrosive gas, explosive gas, inflammable gas, grinding fluid mist, etc. Improper installation may result in a fire hazard.

**CAUTION**

Make sure that no power correction capacitors are connected to the variable speed drive output or the motor terminals to prevent variable speed drive malfunction and potential damage.

**CAUTION**

Make sure that the variable speed drive output terminals (U, V, W) are not connected to the utility line power as severe damage to the VSD may occur.

NOTE

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

NOTE

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

Notes:

Section 2

Description

2.1 The air compression cycle

The ShopTek™ air compressor uses a lubricated rotary screw air end and supporting components to create compressed air.

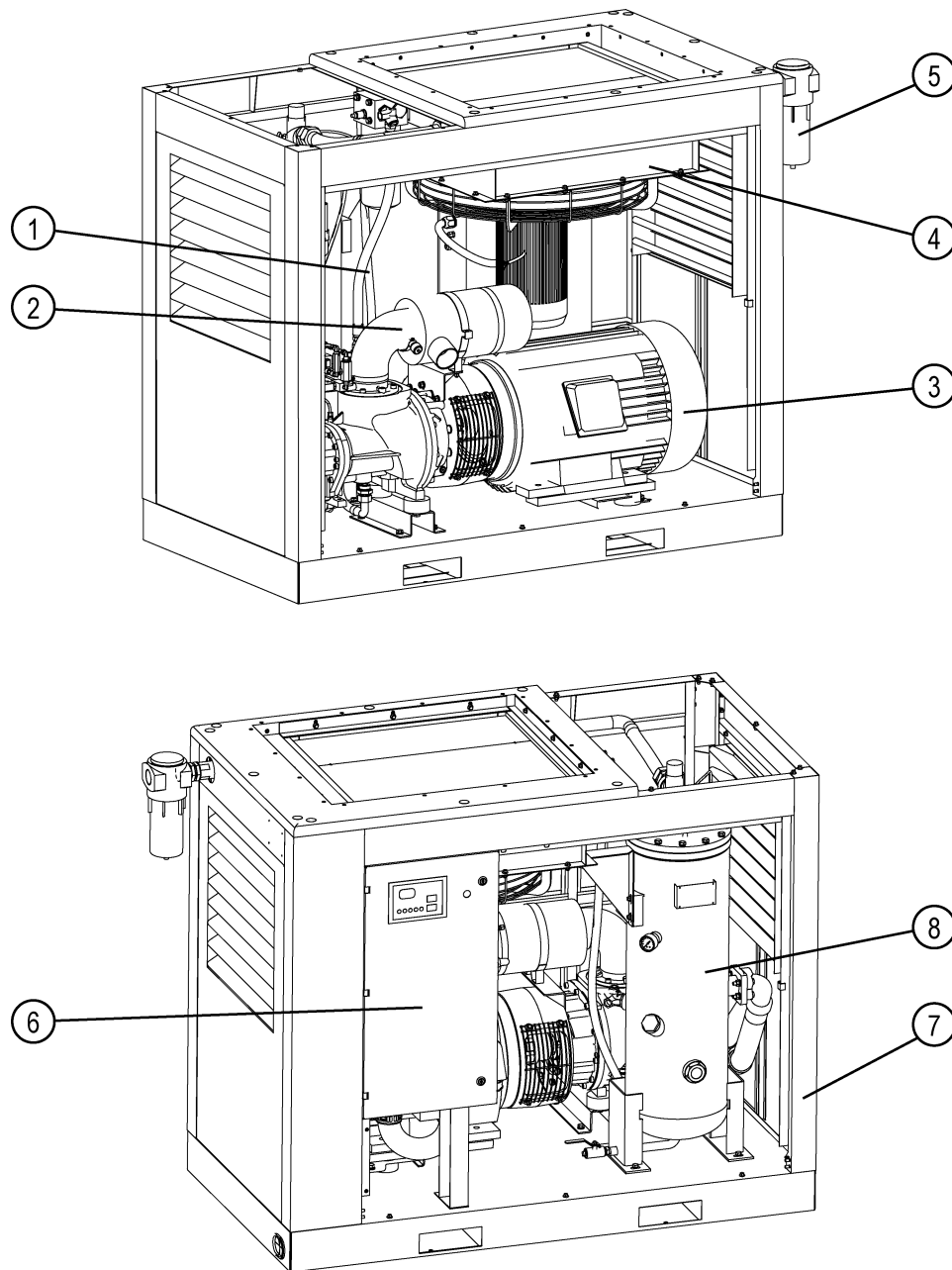
When the rotors inside the air end turn, they draw outside air into the compressor through the air inlet system. As the rotors compress this air from atmospheric pressure to the target pressure, the lubrication system injects fluid into the air end to cool the compressed air, lubricate the rotors and bearings, and create a seal between the rotors and the air end casing.

After leaving the air end, the compressed air/fluid mixture flows into the fluid/air separation system. First, the fluid/air separator tank separates the majority of the fluid from

the compressed air using a combination of centrifugal force, impingement, and gravity. Then the compressed air passes through the fluid/air separator element to remove almost all of the remaining fluid.

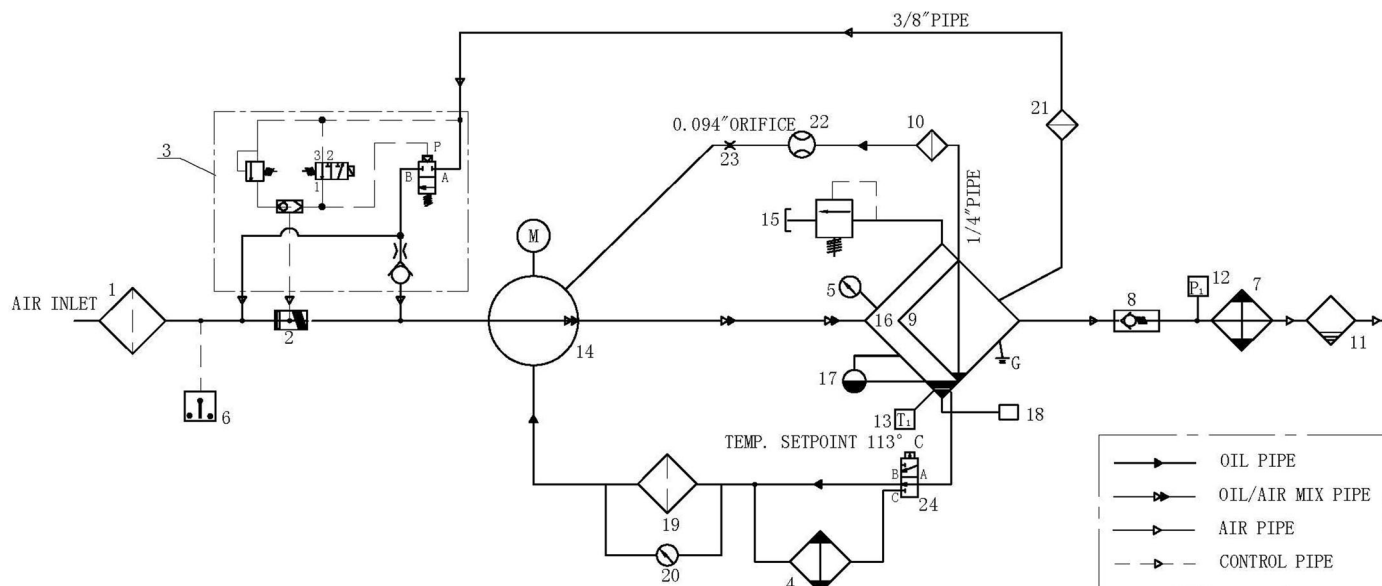
Next, the compressed air flows through the aftercooler. The aftercooler cools the compressed air to 8 – 12°C (14 – 22°F) above the ambient temperature. The compressed air then flows through the moisture separator (if installed). The moisture separator collects the water vapor that condensed when the compressed air was cooled.

After leaving the aftercooler (or the moisture separator, if installed), the compressed air flows through the service connector of the compressor for downstream use.



- | | |
|------------------------|--------------------------------|
| 1. Fluid piping system | 5. Discharge system |
| 2. Air inlet system | 6. Electric control system |
| 3. Motor & air end | 7. Enclosure |
| 4. Cooling fan system | 8. Fluid/air separation system |

Figure 2-1: ST30 & ST37 machine layout



Key	Description
1	Air filter
2	Inlet valve
3	Capacity control integrated system
4	Oil cooler
5	Pressure switch
6	Indicator
7	Aftercooler
8	Minimum pressure valve
9	Single-stage fluid/air separator element
10	Strainer
11	Moisture separator
12	Pressure sensor
13	Temperature sensor
14	Compressor air end
15	Relief valve
16	Fluid/air separator tank
17	Sight glass
18	Oil plug
19	Fluid filter
20	Fluid filter pressure difference indicator
21	Strainer
22	Sight glass
23	Orifice
24	Thermal valve

Figure 2-2: ST30 & ST37 piping and instrumentation

2.2 Air inlet system

The air inlet system provides air for the compressor to pressurize. The primary components of the air inlet system are the air filter, inlet valve, and compressor air end.

2.2.1 General operation of the air inlet system

The air end draws outside air through the air filter and inlet valve into the air end compression chamber. Inside the compression chamber, a male and female rotor pair revolve at high speed, compressing the air and increasing its pressure. When the compressed air/fluid mixture reaches the end of the compression chamber, the mixture flows through the air end discharge port into the fluid/air separator.

2.2.2 Air filter

The air filter removes particulates from the intake air, providing clean air to the compressor. If these particulates were not removed, they could wear down rotor surfaces and contaminate the compressor fluid.

2.2.2.1 Air filter element

Because the air filter element traps the particulates it filters from the air on its surface, the air filter element must be changed periodically to maintain the air filter's effectiveness.

Additional information

- For the recommended air filter maintenance schedule, see *Section 6.3: Recommended maintenance schedule* on page 28.
- For instructions on how to change the air filter element, see *Section 6.4.4: Air filter maintenance* on page 30.

WARRANTY NOTICE

Failure to follow the air filter maintenance schedule or use Sullair genuine air filter elements can cause early contamination of the compressor fluid and the fluid/air separator element and may void your warranty.

2.2.3 Inlet valve

The inlet valve controls intake air volume using a modulation control system.

2.2.3.1 Inlet modulation

To minimize the number of starts and stops the compressor makes, the inlet modulation system automatically

adjusts the size of the inlet valve opening to match air demand. The primary components of the inlet modulation system are the solenoid valve, inlet valve, blowdown valve, and control line.

When air demand is equal to or greater than the compressor's rating, the compressor will run at full load. The solenoid valve is energized, closing the control line. Because the control is not in use, the inlet valve of the air end is fully open.

When air demand is lower than the compressor rating, discharge pressure builds up slowly. Once the discharge pressure reaches the unload setting of the controller, the compressor will switch to unload mode. The solenoid valve is de-energized, opening the control line. Because the control line is in use and the discharge pressure is high, the control line closes the inlet valve. At the same time, the blowdown valve opens to release the pressure in the fluid/air separator tank until the pressure stabilizes at 15 – 25 psi.

Now the compressor will run with no load for a preset time. Once the preset time is reached, the compressor will stop. However, if the discharge pressure drops to the load setting of the controller before the preset time is reached, the compressor re-enters load mode. The solenoid valve is energized, closing the control line. Because the control is not in use, the inlet valve of the air end is fully open.

2.3 Discharge system

The discharge system pushes air from the compressor air end to the service connector. The primary components of the discharge system are the compressor air end, fluid/air separator, minimum pressure valve, pressure relief valve, automatic blowdown valve, aftercooler, moisture separator (optional), and service connector.

2.3.1 General operation of the discharge system

The compressed air/fluid mixture flows through the air end discharge port into the fluid/air separator tank and separator element. The separator tank and element remove fluid from the air.

The compressed air then flows through the minimum pressure valve, followed by the aftercooler, then the moisture separator (if installed). Once the air is cooled and the moisture removed (if the moisture separator is installed), the air flows to the service connector for downstream use.

To lower the frequency of the compressor's load/unload cycles and extend the life of the compressor, Sullair rec-

ommends installing a wet air receiver after the service connector.

Additional information

- For the size of the service connector, see *Section 3.1: Machine specifications* on page 17.

2.3.2 Minimum pressure valve

The minimum pressure valve on the top cover of the fluid/air separator ensures lubricant flow during both normal operation and start-up by keeping pressure in the fluid/air separator above 340 kPa (49.3 psi).

When pressure in the fluid/air separator is above 340 kPa (49.3 psi) and higher than the downstream pipeline pressure, the minimum pressure valve will be opened. Otherwise, the minimum pressure valve will be closed to maintain minimum tank pressure.

The minimum pressure valve also functions as a check (non-return) valve, preventing compressed air downstream of the separator from flowing back into the separator and air end during compressor blowdown.

2.3.3 Automatic blowdown valve

When the compressor is unloading or stopping, the blowdown valve in the control line automatically opens to release pressure. The blowdown valve routes the air to the air inlet pipe (after the air filter) to prevent a compressed air/fluid mixture from venting into the atmosphere.

2.3.4 Pressure relief valve

To prevent damage to the fluid/air separator and other compressor components the pressure relief valve located on the fluid/air separator tank will open when the pressure in the separator tank exceeds the pressure relief valve setpoint.

Under normal operating conditions, the over pressure stop switch will shut down the compressor before the pressure relief valve setpoint is reached (see *Section 3.1: Machine specifications* on page 17). However, the pressure relief valve serves as an additional mechanical safeguard.

2.3.5 Aftercooler

The aftercooler cools the compressed air to 8 – 12°C (14 – 22°F) above the ambient temperature. This cooling causes water vapor to condense, which creates moisture in the compressed air stream.

2.3.6 Moisture separator

The moisture separator removes the moisture from the compressed air stream. Moisture collected by the moisture separator can then be safely disposed of according to local regulations.

NOTE

The moisture separator ships loose for the customer to install if needed for their installation. It is not installed by the factory.

2.4 Lubrication system

The lubrication system cools the compressor; lubricates the rotors, bearings, and gears; and seals the air end against leaks. The primary components of the lubrication system are the compressor air end, fluid/air separator, thermal valve, aftercooler, fluid filter, and interconnecting piping.

2.4.1 General description of the lubrication system

Fluid is injected into the air end compression chamber, where it is compressed along with the intake air. The compressed air/fluid mixture then flows into the fluid/air separation system, which separates the fluid from the air and collects the fluid for re-use. Depending on the fluid temperature, the thermal valve routes none, some, or all of the fluid to the aftercooler for cooling. Fluid that has passed through the aftercooler, or that was not routed to the aftercooler, flows through the fluid filter into the air end to restart the lubrication cycle.

2.4.2 Lubricating fluid

The lubricating fluid provides three benefits.

- **Cooling.** The compressor fluid acts as a coolant, absorbing the large amount of heat generated during compression.
- **Lubricating.** The compressor fluid forms a layer between the rotors, preventing the male and female rotors from making direct contact and minimizing the surface wear of the rotors. The compressor fluid also lubricates the bearings and gears.
- **Sealing.** Compressor fluid with sufficient viscosity can fill the gaps between rotors and between the rotors and the casing. This reduces air lost through leakage and increases the efficiency of the compressor.

Additional information

- For the viscosity required for the compressor fluid to act as a sealant, see *Section 3.2: Lubricant specifications* on page 17.

2.4.3 Fluid filter

The fluid filter collects any impurities in the compressor fluid and ensures that only clean fluid enters the air end compression chamber and internal lubrication feeds. If these impurities in the fluid were not removed, they would cause wear on the rotor and gear surfaces and bearings and shorten the life of compressor.

2.4.3.1 Fluid filter element

Because the fluid filter element collects impurities on its surface, the fluid filter element must be replaced regularly to ensure good fluid circulation for proper lubrication and cooling.

Additional information

- For the recommended fluid filter maintenance schedule, see *Section 6.3: Recommended maintenance schedule* on page 28.
- For instructions on how to change the fluid filter element, see *Section 6.4.3: Fluid filter maintenance* on page 30.

2.4.4 Purge oil return line

The purge oil return line located on the cover of the fluid/air separator passes the compressor fluid collected by the fluid/air separator element through the purge line filter, then returns the clean fluid to the compressor air end.

A small orifice in the purge oil return line limits return air flow, minimizing the loss of compressed air. A sight glass located in the purge line allows an operator to observe the amount of fluid returning from the separator element.

2.5 Cooling system

The cooling system maintains a proper operating temperature for the compressor.

2.5.1 General description of the cooling system

Suction created by an axial flow cooling fan pulls cooling air through louvers on both sides of the compressor. This cooling air draws heat from the aftercooler before flowing out of the machine.

2.5.2 Ambient temperature

Sullair ShopTek™ compressors are designed to operate in ambient temperatures between 4°C and 40°C (40°F and 104°F), measured at the cooling air inlet. If you need to operate the compressor in a temperature outside this range, contact your Sullair representative.

2.5.2.1 High ambient temperature and overheating

If the ambient temperature is above 40°C (104°F), the air drawn into the compressor may be too hot to adequately cool the compressor fluid or the electric motor when the compressor is operating at full load. If the compressor load is less than 100%, operating the compressor in higher ambient temperatures may be possible.

Regardless of the ambient temperature, the maximum recommended operating temperature is 108°C (226°F).

**CAUTION**

Continuously exceeding the maximum operating temperature will damage the compressor.

**CAUTION**

In the event of a high operating temperature shutdown fault, do not attempt to restart the compressor without first finding and correcting the underlying cause. Contact your Sullair representative for assistance.

2.6 Fluid/air separation system

The fluid/air separator system removes the fluid from the compressed air stream. The primary components of the fluid/air separation system are the fluid/air separator tank and fluid/air separator element.

2.6.1 General description of the fluid/air separation system

The compressed air/fluid mixture from the air end flows into the fluid/air separator and strikes the wall of the separator tank, causing large drops of fluid to form because of the lower air speed. Most of these fluid drops attach to the wall of the tank, and gravity causes the drops to collect at the bottom of the tank. The thermal valve then routes this collected fluid back to the air end through the aftercooler (if necessary) and the filter.

After hitting the wall of the separator tank, the compressed air/fluid mixture then flows through the separator element. The separator element removes fine fluid particles. These particles accumulate at the bottom of the element and return to the air end through the purge oil return line.

2.6.2 Fluid/air separator tank

In addition to separating the air from the fluid, the fluid/air separator tank acts as a fluid reservoir, storing most of the compressor fluid.

2.6.2.1 Fluid filler port and sight glass

The fluid/air separator tank is equipped with a fluid filler port and sight glass. Since trace amounts of compressor fluid remain in the discharged compressed air even after separation, over time the fluid level of the compressor will drop. You will need to monitor the fluid level and periodically add additional fluid to the tank.

Additional information

- For an explanation of how determine the fluid level of the compressor, see *Section 6.3.6: Compressor fluid levels* on page 29.
- For instructions on how to add compressor fluid, see *Section 6.4.1: Adding compressor fluid* on page 29.

2.6.2.2 Separator tank condensation—low operating temperature

In conditions of high humidity and low operating temperature, water formed by condensation may collect in the compressor fluid. To ensure trouble-free operation, Sullair ShopTek™ compressors are fitted with an oil bypass

thermal valve set at 83°C (181°F), the temperature required to evaporate water.

In areas where the ambient temperature is less than 4°C (40°F), you may need to take steps to prevent condensation. This may include fitting anti-condensation heaters to the separator vessel. For assistance in operating the compressor in very low ambient temperatures, please contact your Sullair representative.

2.6.3 Fluid/air separator element

The fluid/air separator element removes fine fluid particles from the compressed air stream.

Over time, impurities in the lubrication system will clog the fluid/air separator element, increasing the resistance of the separator to compressed air flow. Because the increased resistance will compromise the compressor's operation, the separator element needs to be replaced periodically.

Additional information

- For the recommended fluid/air separator element maintenance schedule, see *Section 6.3: Recommended maintenance schedule* on page 28.
- For instructions on how to change the fluid/air separator element, see *Section 6.4.6: Fluid/air separator maintenance* on page 31.

2.7 Microprocessor control system

The ShopTek™ compressor is equipped with a microprocessor controller. For detailed information on this controller, see *EC2000 Controller Operation Manual*.

Notes:

Section 3

Specifications

3.1 Machine specifications

Table 3-1: Compressor specifications

Model	ST3008	ST3708
Capacity at full load pressure	4.5 m ³ /min (160 cfm)	6.1 m ³ /min (216 cfm)
Rated pressure	8 bar (115 psi)	8 bar (115 psi)
Maximum working pressure	8.6 bar (125 psi)	8.6 bar (125 psi)
Relief valve setpoint	10 bar (145 psi)	10 bar (145 psi)
Voltage & frequency	460V/60 Hz	
Air end type	Single stage, oil injected rotary screw	
Configuration	Gear driven with integrated inlet modulation	
Motor type	ODP (IP23)	
Motor rating	30 kW (40 hp)	37 kW (50 hp)
Motor nominal speed	1770 rpm	
Starting mode	Y-Δ (Y-delta)	
Service factor	1.15	
Ambient temperature	Between 4° and 40°C (40° and 104°F)	
Lubricant	Sullube®	
Lubricant volume	22 L (5.8 gal)	26 L (6.9 gal)
Service connector	NPT 1½"	
Moisture drain connector	NPT ⅛" (moisture separator shipped loose)	
Machine weight	900 kg (1984 lbs)	998 kg (2200 lbs)
Machine dimensions (L × W × H)	1700 × 935 × 1450 mm (66.9 × 36.8 × 57.1 in)	
Package dimensions (L × W × H)	1820 × 1120 × 1625 mm (71.7 × 44.1 × 64.0 in)	

3.2 Lubricant specifications

The oil used as a lubricant in Sullair's rotary screw compressors must have the following properties:

- Low foaming
- Good resistance to emulsification
- High oxidation resistance
- Viscosity of 10.5 cSt at the compressor's operating temperature

Table 3-2: Lubricant specifications

Synthetic oils	Ambient temperature
Sullube® (factory fill)	Up to 40°C (104°F)

WARRANTY INFORMATION

Mixing of fluids other than Sullube® **will** void the compressor's warranty.

Notes:

Section 4

Installation & Setup



WARNING

Incorrect installation or setup may void warranty.

4.1 Compressor pre-installation

Before installing your ShopTek™ compressor, check it carefully for any transportation damage. If you find any damage, contact your Sullair representative immediately.

4.2 Guidelines for lifting and moving the compressor

Sullair recommends using a forklift to move the compressor. A crane can also be used.

NOTE

A site assessment must be carried out to ensure forklift or crane access for removal and servicing of major components and compressor transport.

4.2.1 Guidelines for moving the compressor with a forklift

When using a forklift to move the compressor, follow all local regulations for operating a forklift. In addition, Sullair has several guidelines that must be followed.

- The forklift's load rating must be sufficient to lift the compressor's weight (see *Section 3.1: Machine specifications* on page 17).
- The forklift must lift the compressor from the front.
- The fork tines must be correctly spaced.
- The fork lift tines must be long enough to cover the full depth of the compressor.
- The fork tines must be fully engaged and tipped back prior to lifting the compressor.

4.2.2 Guidelines for moving the compressor with a crane

If a crane is used to move the compressor, ensure that it's rating is sufficient to lift the compressor's weight (see *Section 3.1: Machine specifications* on page 17).

When moving the compressor with a crane, lift the compressor with slings and use guide ropes to prevent twisting. You should also use spreader bars to prevent panel damage.

When the compressor has been set down, check for cracked welds and loose bolts or nuts.

4.3 Compressor installation

The ShopTek™ compressor is **not weatherproof**. The compressor should be installed inside (or in a sheltered position outside).

NOTE

A site assessment must be carried out to ensure forklift or crane access for removal and servicing of major components and compressor transport.

4.3.1 Physical installation requirements

Because the compressor must remain level at all times (not more than 6 mm or ¼" unevenness allowed), you should install the compressor on a flat surface rated to hold the compressor's weight (see *Section 3.1: Machine specifications* on page 17). If you must install the compressor on an uneven surface, you can use shims to level the compressor. You do not need to bolt the compressor in place.

You must position the compressor so it has sufficient clearance on all sides (for the minimum distances required, see *Section A.1: ST30 & ST37 identification* on page 69). If you have more than one compressor installed at the same location, you must have clear access to each compressor. If you need help correctly positioning your compressor, contact your Sullair representative for assistance.

4.3.2 Heat rejection and ventilation requirements

The compressor rejects a considerable amount of heat, so you must install it in a well-ventilated area.

Hot air from the cooling air discharge must not recirculate into the cooling air inlet. This recirculation can be caused by installing the compressor in a room with a low ceiling or in a location where the cooling air is discharged past the compressor's cooling air inlet. In these situations, you should follow the guidelines in *Section 4.3.2.1: Poorly ventilated areas*.

IMPORTANT

Do not install the compressor in an area where exhaust fumes or other toxic, noxious, or corrosive fumes, chemicals, or substances can be drawn into the air inlet.

4.3.2.1 Poorly ventilated areas

In a poorly ventilated area, the heated cooling air discharged from the compressor can cause the ambient temperature to rise above 40°C (104°F), which will cause the compressor to overheat. Sullair recommends adding ductwork to route the cooling air discharge away from the compressor, possibly to another area or room. Any ductwork added (including the outlet grill) should not cause a pressure drop greater than 30 Pa (.004 psi) (contact Sullair Aftermarket prior to installation) and **must not** apply any weight to the compressor cabinet. Sullair also recommends a section of the ductwork be removable to allow easy access for servicing.

4.3.2.2 Additional considerations for multiple compressor installations

In a multiple compressor installation, the air discharged from one compressor must **never** flow into the intake of another compressor.

4.3.2.3 Ventilation and existing high ambient temperature

If the compressor is in a location where existing environmental conditions will cause the ambient temperature to exceed 40°C (104°F) even if the cooling air is adequately dissipated (for example, in a boiler room), Sullair recommends following the guidelines in *Section 4.3.2.1: Poorly ventilated areas*.

4.4 Connection to the air system

Sullair recommends installing an isolation gate valve immediately after the service connector to make installation, service, and removal of the compressor easier.

You must install a flexible connection between the compressor and the external pipe work. Because the internal components of the compressor are mounted on anti-vibration pads and are not rigidly supported, no load should ever be transferred to the service connector of the compressor.

WARRANTY INFORMATION

Failure to install a flexible connection may result in damage to the compressor and void your warranty.

The plant air line should have an internal diameter at least the size of the service connector (for service connector size, see *Section 3.1: Machine specifications* on page 17). For longer pipe runs, the pipe sizes should be increased by one size to minimize pressure drop. Condensate from the pipe work should never flow towards the compressor. One way of achieving this is to install mains pipe work adjacent to the compressor and below the service connector.

Additional information

- For the exact location of the service connector, see *Section A.1: ST30 & ST37 identification* on page 69.

4.5 Mechanical checks



WARNING

Ensure that the compressor is electrically isolated before performing any mechanical checks.

4.5.1 Checking the motor to air end coupling

Ensure that the flexible drive coupling connecting the motor and air end is correctly fastened.

4.5.2 Checking the air end

Before a new machine is started for the first time, you must check that the air end is not hydraulically locked.

4.5.2.1 Checking the air end of a new machine

Rotate the flexible drive coupling by hand through two complete revolutions in the direction indicated by the arrows located on the air end and motor.

4.5.3 Checking the compressor fluid level

Open the front access panel just enough to view the sight glass located on the separator tank, then follow the instructions in *Section 6.3.6: Compressor fluid levels* on page 29 for how to check the compressor's fluid level.

- If the fluid level is below the minimum fluid level, see *Section 6.4.1: Adding compressor fluid* on page 29.

4.5.4 Checking the isolation gate valve

If an isolation gate valve is installed in your air system, make sure the valve is open.

4.6 Electrical checks

When performing any electrical work, refer to the electrical diagram supplied with your compressor.

All the compressor's internal wiring is factory fitted and tested. The required connection wiring is minimal, but it must be performed by a licensed electrician. A licensed electrician must also review the electrical system to see that it is adequate for starting and running the compressor.

4.6.1 Power supply requirements

- Depending on the electrical frequency and voltage in your region, your power supply will be either:
 - 460 VAC, 3-phase, 60 Hz with ground
- Control voltage: 110 VAC

4.6.2 Checking the motor rotation direction

For the motor to rotate in the correct direction, the power supply must be correctly connected.



WARNING

Never run the motor with the rotation direction reversed!

Motor rotation in the wrong direction can damage the air end and may void your warranty.

You should check the rotation of the motor before starting up the compressor for use. Before checking the motor rotation direction, you **must** familiarize yourself with *Section 5: Operation*.

1. Pull out emergency stop (E-stop) button from the monitor's control panel.
2. Press the Start button.
 - If the phase sequence is wrong, a compressor with a phase sequence protector will not start and the controller will display an error message.
3. **Immediately** press the E-Stop button.
 - This will cause the motor and air end to rotate momentarily, but not long enough to damage the air end if the motor rotation direction is reversed.
4. Check that the motor and air end rotate in the direction indicated by the arrows on the air end to motor drive coupling.
 - If the motor and air end do not rotate in the direction indicated by the arrows, the incoming mains power leads need to be reversed by a licensed electrician.
 - Do not reverse any motor or starter wiring. This wiring must not be modified.

Notes:

Section 5

Operation

5.1 Compressor protection features

Your ShopTek™ compressor controller optimizes the performance of your system by adding additional electronic protection to the motor and air end.

5.1.1 Stop run-on timer

This stop run-on timer provides a soft stop function, reducing the load on the air end before stopping the compressor. When you press the Stop button, the compressor will unload and then run for a period of time pre-set by the factory, reducing the pressure in the separator tank, before coming to a complete stop.

5.1.2 Emergency stop

Pressing the emergency stop (E-stop) button will stop the compressor immediately.

You must pull out the E-stop button to release it before the compressor can be restarted.

NOTE

You should always use the Stop button to stop the compressor under normal circumstances.

You should only use the E-stop button to stop the compressor in an emergency.

5.2 Starting the compressor for the first time

NOTE

Also follow this procedure if the compressor has been out of service for more than 60 days or you have installed the compressor in a new location.

1. Read the preceding pages of this manual thoroughly.
2. If you are installing the compressor, confirm you have followed all the requirements and

guidelines in *Section 4.3: Compressor installation* and *Section 4.4: Connection to the air system*.

3. Perform all mechanical checks described in *Section 4.5*.
4. Open the isolation gate valve if it is installed.
5. If you are installing the compressor, perform the motor rotation direction check described in *Section 4.6.2*.
6. Switch on the mains power (if it is not already on).
7. Press the Start button.
 - The compressor will start and switch from the Y start configuration to the delta running configuration as it reaches full speed.



CAUTION

The compressor should always run smoothly. If the compressor vibrates excessively while running, shut it down and contact your Sullair representative immediately.

8. Monitor the status of the compressor on the controller display.
 - Rising discharge air pressure and rising operating temperature indicate correct operation (see *Section 2.1: The air compression cycle* on page 9).
 - On reaching the preset operating pressure, the controller will unload the compressor and the discharge air pressure will stop rising. The compressor will continue to run, but it will run unloaded.
9. Run the compressor through a number of load/unload cycles (bleed air from the plant air system, if necessary) and check for consistent operation, leaks (air or fluid), and a stable operating temperature (see *Section 2.5: Cooling system* on page 14).

5.3 Starting the compressor

If the compressor has been out of service for more than 60 days or you have installed the compressor in a new location, follow the steps under *Section 5.2: Starting the compressor for the first time* instead of this procedure.

1. Open the isolation gate valve if it is installed.
2. Press the Start button.

5.4 Shutting down the compressor

1. Press the Stop button.
 - The compressor will begin a delayed stop sequence and will stop automatically after the delayed stop sequence is complete.
 - During the delayed stop sequence pressing the Start button will not restart the compressor. You can only restart the compressor after the delayed stop sequence is complete.



WARNING

Never assume that the compressor has completely stopped, even if the compressor does not appear to be running. The compressor may be in standby mode and restart at any time. Do not remove any covers or panels or attempt any service without first isolating the compressor from the mains power supply and tagging it.

5.5 Electronic controller

The *EC2000 Controller Operation Manual* describes the layout and explains the features of the ShopTek™ electronic controller.



WARNING

For safety reasons, the electronic controller pressure settings should never be adjusted to anything other than the required settings for the serial plate nominal operating pressure. If you require different pressure settings, contact your Sullair representative.

Adjusting the nominal operating pressure above the maximum working pressure of your compressor as indicated on the serial number plate may damage your compressor and void your warranty.

5.6 High temperature shutdown

The electronic controller will shut down the compressor if the fluid temperature sensor reports a separator tank temperature above 113°C (235°F). This shutdown temperature is set at the factory and should not be changed.

A high temperature shutdown places the electronic controller into fault mode, which prevents the compressor from restarting. After the compressor cools down, the fault mode may be cleared by pressing the Reset button on the controller.



CAUTION

In the event of a high operating temperature shutdown fault, do not attempt to restart the compressor without first finding and correcting the underlying cause. Contact your Sullair representative for assistance.

5.7 Motor overload protection

Both the compressor main drive motor and the fan motor have overload protection. If either motor draws too much current, its overload protection will shut down the compressor.

A motor overload protection shutdown places the electronic controller into fault mode, which prevents the com-

pressor from restarting. The fault mode may be cleared by pressing the Reset button on the controller.



CAUTION

In the event of a motor overload protection shut-down fault, do not attempt to restart the compressor without first finding and correcting the underlying cause that triggered the motor overload protection.

You can contact your Sullair representative for assistance in finding and correcting the underlying cause of a motor overload protection shut-down condition.

5.8 Phase failure/reversal

The electronic controller includes a phase failure/reversal monitor to protect against reverse motor rotation. The monitor can detect an under voltage condition, the absence of a supply phase, or the incorrect sequencing of the supply power. If the monitor detects any of these conditions, the electronic controller will shut down the compressor. A licensed electrician must examine the compressor to resolve the problem.

5.9 Run-on timer

Keeping with Sullair's philosophy of minimizing energy consumption, the electronic controller has a run-on timer. The run-on timer monitors how long the compressor has run without compressing air. If this length of time is greater than the pre-set run-on time, the compressor will enter standby mode. The compressor will automatically restart if a fall in system pressure is registered.

The factory setting of the run-on time is six minutes, but you can use the electronic controller to adjust the run-on time to anywhere between zero and ten minutes to ensure that the compressor does not exceed six shut downs per hour. Contact your Sullair representative before making any adjustments, since an incorrect setting may result in damage to the compressor.



WARNING

Never assume that the compressor has completely stopped, even if the compressor does not appear to be running. The compressor may be in standby mode and restart at any time. Do not remove any covers or panels or attempt any service without first isolating the compressor from the mains power supply and tagging it.

Notes:

Section 6

Maintenance

6.1 General

Normal operation of your compressor depends upon performing maintenance and service correctly and according to a consistent schedule.

To help you follow this schedule, the ShopTek™ micro-processor controller has a programmable service timer. When the service timer reaches the programmed value, the controller will display a service reminder message in the status column. (After service is performed, you must reset the service timer. For more information, see the *EC2000 Controller Operation Manual*.)



WARNING

Isolate the compressor from the power supply before performing any maintenance or service work.



WARNING

Do not disassemble any component of the compressor when the compressor is running or pressurized. Before disassembling any compressor component, shut down the compressor, isolate the compressor from any sources of external pressure, and bleed the compressor's internal pressure to zero.

WARRANTY NOTICE

Failure to use Sullair genuine parts when servicing a Sullair compressor may void your warranty.

6.2 Daily maintenance

If the compressor is run 24 hours a day, perform the services listed in *Section 6.2.1* and *Section 6.2.2* frequently.

6.2.1 Before starting the compressor

- Check the compressor fluid level and add fluid if necessary.



WARNING

If you need to open the fluid filler plug, wait for the fluid level to settle and the separator tank to depressurize.

- Drain the water from the moisture separator.

6.2.2 After starting the compressor

- Monitor the electronic controller display for any fault messages or abnormal readings (for example, unusually high or low temperatures or pressures).
- Check for fluid or air leaks, excessive vibration, or unusual sounds.

6.3 Recommended maintenance schedule

Table 6-1: Standard maintenance intervals

Fluid	Change intervals ¹ (all hours are operating hours)			
	Fluid	Fluid filter ²	Fluid/air separator element	Air filter ²
Sullube®	1 year or 8000 hours	1000 hours	6 months or 4000 hours	2000 hours
¹ If multiple intervals are listed, change the item at whichever interval is reached first.				
² If the compressor is in a dusty environment, you should service the fluid and air filters more frequently.				

NOTE

Service intervals may be extended if the compressor is installed in a clean, cool environment. Contact your Sullair representative for advice on the correct service intervals for your installation.

6.3.1 Service at 50 operating hours

- Replace the fluid filter element.
- Check the condition of the purge oil return line filter and replace the filter if necessary.
- Tighten all electrical connections.
- Assess the condition of the air filter element. If it is excessively dirty, you may need to replace it more frequently than the normal schedule (every 2000 hours).

6.3.2 Service every 1000 operating hours

- Replace the fluid filter element(s).
- Inspect the air filter element and replace it if necessary.

- Check the condition of the purge oil return line filter and replace the filter if necessary.
- Tighten all electrical connections.

6.3.3 Service every 2000 operating hours

Perform all checks listed for every 1000 hours plus:

- Replace the air filter element.
- Grease the main motor bearings.
 - Use POLYREX EM grease unless the motor nameplate indicates a different grease model.
 - Refer to the motor nameplate for grease filling volume and filling locations.
- Take a sample of the compressor fluid and send it for analysis.
 - Change the compressor fluid (Sullube®) if the analysis indicates it is necessary.

6.3.4 Service every 4000 operating hours (or semi-annually)

Perform all checks listed for every 1000 and 2000 hours plus:

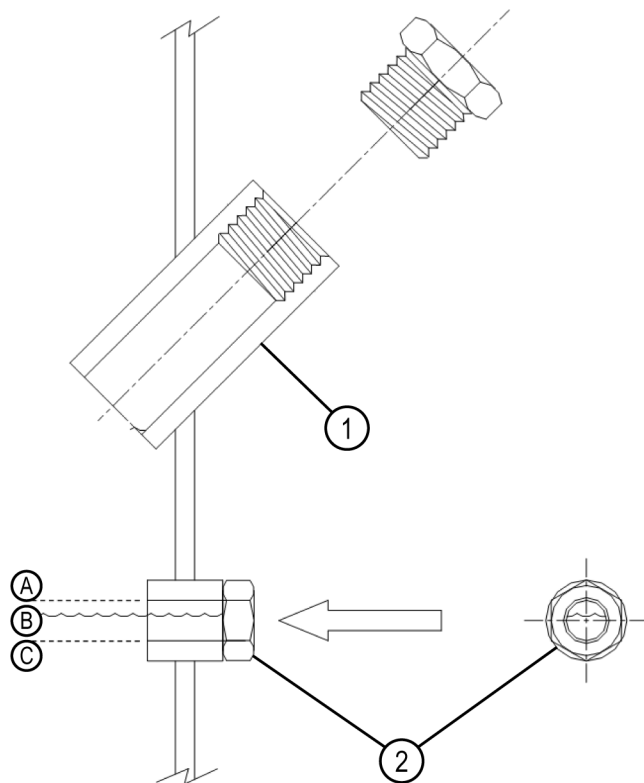
- Replace the fluid/air separator element and purge oil return line filter.
- Inspect the flexible drive coupling and service it if necessary.
- Tighten all nuts, bolts, pipe fittings and electrical connections.
- Check that all safety devices are operating correctly.

6.3.5 Service every 8000 hours (or yearly)

Perform all checks listed for every 1000, 2000, and 4000 hours plus:

- Change the compressor fluid (Sullube®)

6.3.6 Compressor fluid levels



1. Fluid filler
2. Sight glass
- A. Maximum fluid level
- B. Normal fluid level
- C. Minimum fluid level

Figure 6-1: Compressor fluid levels

Check the fluid level when the compressor is running. The fluid level in the sight glass should normally be between halfway and three-quarters of the way up the sight glass.

- While the compressor is running, the fluid level should never exceed the maximum fluid level shown in *Figure 6-1*.
- Fluid should be added before the fluid level drops below the minimum fluid level shown in *Figure 6-1*.

6.4 Compressor maintenance

Refer to *Section 7: Parts List* for the part numbers of all items mentioned in this section.

WARNING

Do not attempt any maintenance when the compressor is running or pressurized. Stop the compressor, relieve all internal pressure, and isolate the power supply before performing maintenance. Only a competent person, experienced in compressor service, should perform any service, including maintenance.

6.4.1 Adding compressor fluid

When adding compressor fluid, only use new Sullube® fluid. Using dirty or used fluid may cause poor performance, foaming, and clogging of the filter element, nozzle, or pipes.

WARRANTY INFORMATION

Mixing of fluids other than Sullube® will void the compressor's warranty.

1. Shut down the compressor, bleed pressure to zero, and allow the compressor to cool.
2. **Slowly** loosen the fluid filler cap by turning it to the left by hand to allow any trapped air to vent, then remove the cap.
3. Pour fluid into the fluid filler.
4. Replace the fluid filler cap by turning the cap to the right by hand until it will not turn any further. Ensure the O-ring is properly seated.
5. Run the compressor for a short period of time and check the fluid level through the sight glass, adding more fluid if necessary (see *Section 6.3.6: Compressor fluid levels*).

6.4.2 Changing compressor fluid

When changing compressor fluid, only use new Sullube® fluid. Using dirty or used fluid may cause poor performance, foaming, and clogging of the filter element, nozzle, or pipes.

Clean the lubrication system before changing fluid. If the ambient temperature is outside of the allowed range for the fluid, please contact your Sullair representative.

WARRANTY INFORMATION

Mixing of fluids other than Sullube® will void the compressor's warranty.

1. Shut down the compressor, bleed pressure to zero, and allow the compressor to cool.
2. Slowly remove the plug from the ball valve at the bottom of the fluid/air separator tank.
3. Securely attach a drain hose to the valve.
 - It may be convenient to run the waste fluid directly into a waste fluid drum.
4. Slowly open the ball valve. Leave the valve open until the fluid stops draining.



CAUTION

Assume the fluid is hot and under pressure.

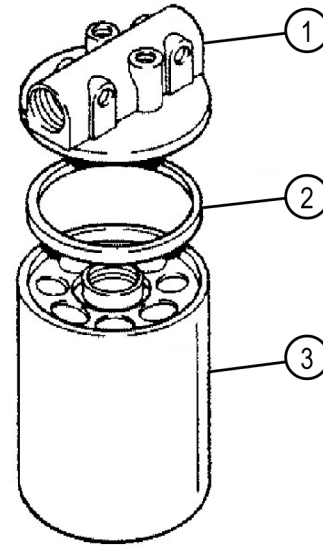
5. Close the valve and remove the drain hose.
6. Replace the plug.
7. Remove the fluid filler cap.
8. Pour fluid into the fluid filler.
9. Replace the fluid filler cap by turning the cap to the right by hand until it will not turn any further. Ensure the O-ring is properly seated.
10. Run the compressor for a short period of time and check the fluid level through the sight glass, adding more fluid if necessary (see Section 6.3.6: Compressor fluid levels).

6.4.3 Fluid filter maintenance

Replace the fluid filter element every 1000 hours of service. The fluid filter service indicator will display a warning when the fluid filter element has exceeded its useful service life.

6.4.3.1 Replacing the fluid filter element

1. Shut down the compressor and bleed pressure to zero.
2. Remove the old element and washer using a filter wrench.
3. Clean the washer seating surface.



1. Top cover
2. Washer
3. Fluid filter element¹

¹ Element part number: 250025-526

Figure 6-2: Fluid filter

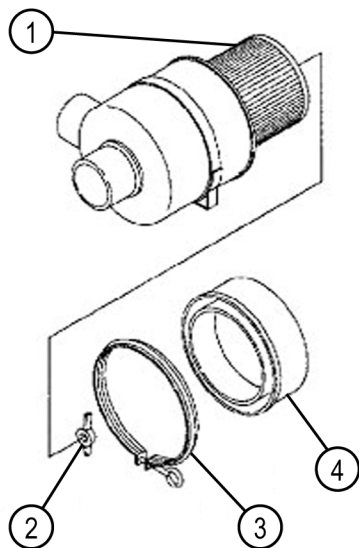
4. Apply a light film of silicone grease to the new washer.
5. Hand tighten the new element until the washer is seated.
6. Continue to tighten the element by hand an additional ½ to ¾ turn.
7. Restart the compressor and check for leaks.

6.4.4 Air filter maintenance

Inspect the air filter element every 1000 hours of service. Replace the air filter element every 2000 hours of service or if the service indicator of the air filter is in the red zone when running the compressor at full load.

6.4.4.1 Replacing the air filter element

1. Shut down the compressor.
2. Clean the shell of filter.
3. Loosen the clamp.
4. Screw off rubber ring inside the dust cover and dust off.



- | | |
|--------------------------------|------------|
| 1. Filter element ¹ | 3. Clamp |
| 2. Wing cap | 4. Housing |

¹ Element part number (ST30): 88291002-854
Element part number (ST37): 88290006-013

Figure 6-3: Air filter

5. Loosen the wing cap and remove the filter element.
6. Clean the inside of the shell. Do not use compressed air.
7. Install the new filter element.
8. Reassemble the filter.
9. Reset the service indicator.

6.4.4.2 Inspecting the air filter element

- Insert a bright light source into the air filter element and look for light shining through holes or cracks.
 - If you find any holes or cracks, the element is damaged and should be discarded.
- Check the condition of all washers.
 - If a washer is damaged, replace the washer.
- If the filter element is excessively dirty, replace it with a new element.

- Do not strike the filter element against a hard surface to remove the dirt. You may damage the element.

- Do not oil the filter element.

6.4.5 Purge oil return line filter maintenance

Clean the purge oil return line filter after the first 50 hours of service. Check the condition of the purge oil return line filter every 1000 hours of service for blockages or other problems. Replace the purge oil return line filter when you replace the separator element.

When replacing the separator element, adjust the purge oil return line tube so the tube is centered within the separator element with a clearance from the separator element base of 1 to 3 mm.

6.4.6 Fluid/air separator maintenance

Replace the fluid/air separator element every 4000 hours or if the pressure drop is greater than 0.7 bar (10 psi). You may need to replace the separator element more frequently in dusty or hot conditions.

NOTE

The fluid/air separator element cannot be cleaned or re-used.

6.4.6.1 Replacing the fluid/air separator element

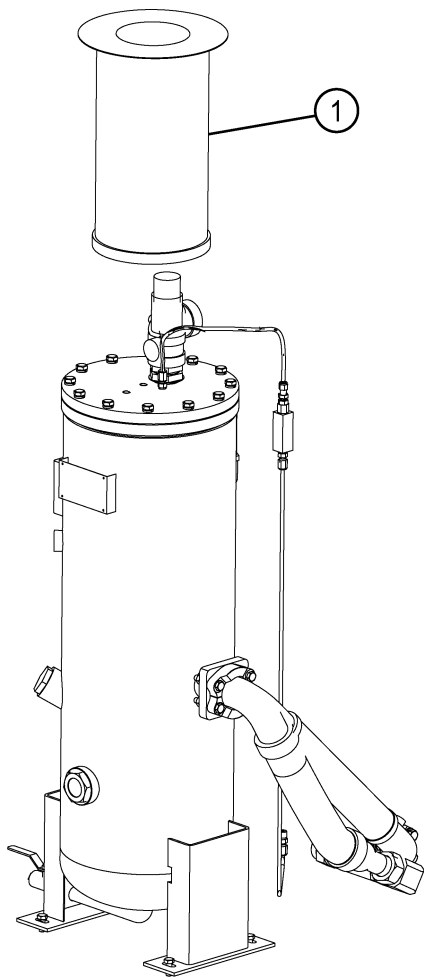
1. Shut down the compressor and bleed pressure to zero.
2. Loosen the swivel nut on the discharge hose connecting the minimum pressure valve to the aftercooler.
3. Disconnect the fittings and pipes from the separator cover and minimum pressure valve. Mark the locations of the fittings and pipes to ensure correct reassembly.
4. Remove the separator cover retaining bolts.
5. Remove the cover, complete with the minimum pressure valve, carefully clearing the purge oil return line tube projecting into the center of the separator element.
6. Remove the separator element.

7. Install the new fluid/air separator element and gasket assembly.

**CAUTION**

Do not remove the staples incorporated into the gaskets. They maintain a ground contact with the separator.

8. Reassemble in reverse order, carefully adjusting the purge oil return line tube so it has the correct clearance from the separator element base (see *Section 6.4.5: Purge oil return line filter maintenance*).
9. Evenly tighten the separator cover bolts.
10. Re-tension the separator cover bolts after the compressor has reached operating temperature.

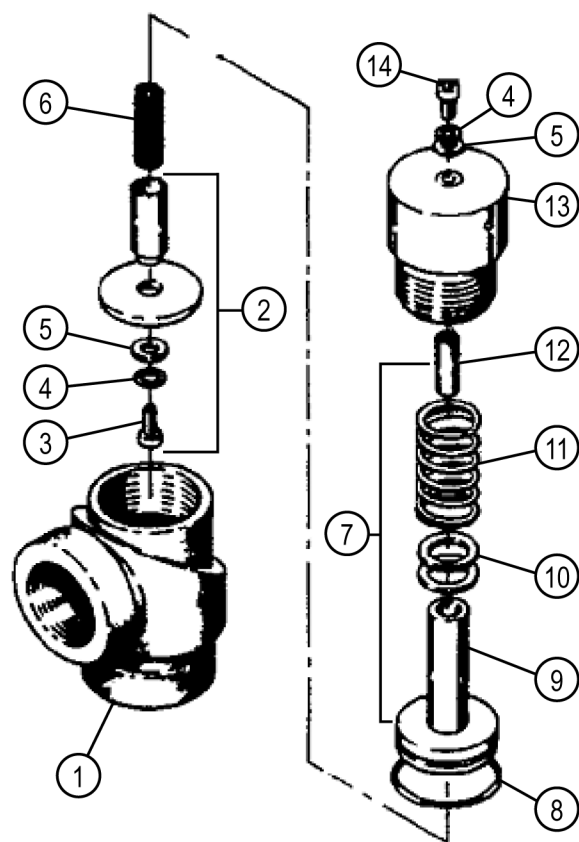


1. Fluid/air separator element¹

¹ Element part number: 250034-116

Figure 6-4: Fluid/air separator tank

6.4.7 Minimum pressure valve maintenance



- | | |
|-------------------------|-----------------------|
| 1. Valve body | 8. O-ring |
| 2. Check valve assembly | 9. Piston assembly |
| 3. Allen fixing screw | 10. Positioning ring |
| 4. Anti-loose washer | 11. Spring |
| 5. Washer | 12. Piston guide pole |
| 6. Check valve spring | 13. Top cap |
| 7. Piston components | 14. Inner hex screw |

Minimum pressure valve repair kit part number: 88291011-689

Figure 6-5: Minimum pressure valve

1. Shut down the compressor and bleed pressure to zero.
2. Disconnect the pipe connected to the minimum pressure valve and remove the valve from the cover of the fluid/air separator.

3. Unscrew the top cap of the valve and remove the piston assembly from the valve.
4. Clean the valve and piston assembly carefully.
5. Replace the O-ring, applying a layer of grease to the O-ring and the piston.
6. Apply Loctite gasket maker to the top cap of the valve and reassemble the valve.
7. Reinstall the valve on the cover of the fluid/air separator tank and reconnect the pipe.

6.4.8 Blowdown valve maintenance

Maintenance of the blowdown valve is primarily about replacing the O-ring (repair kit part number 88291008-365).

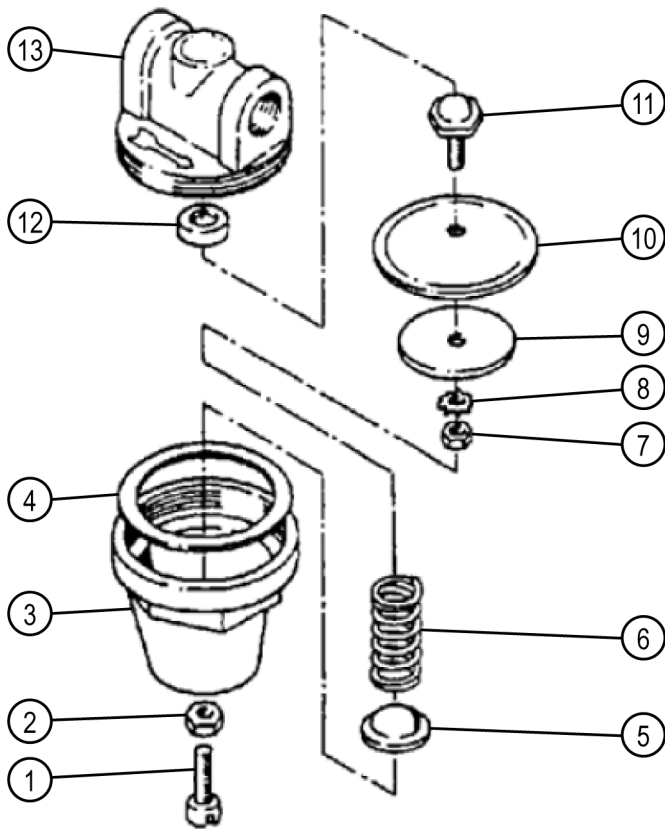
1. Shut down the compressor and bleed pressure to zero.
2. Screw off the bolts and remove the top cap of the blowdown valve.
3. Remove the spring, piston, O-ring, etc.
4. Replace washer and all O-rings.
5. Reassemble the blowdown valve.

6.4.9 Solenoid valve maintenance

The solenoid valve needs little service. However, if the solenoid is reacting slowly or is leaking and the working voltage is correct, you should clean the valve or, if necessary, replace it (repair kit part number 88290021-950).

6.4.10 Pressure regulator maintenance

1. Shut down the compressor and bleed pressure to zero.
2. Unscrew the locking nut and turn the adjusting screw counterclockwise until the spring is relaxed. Now the adjusting screw is not under pressure.
3. Unscrew the spring chamber and take out the spring seat, upper assembly, and gasket.
4. Unscrew the valve plate nut and remove the valve plate, membrane, and retainer ring.
5. Replace the retainer ring with a new retainer ring.
6. Reassemble the retainer ring, membrane, and valve plate and tighten the valve plate nut.
7. Replace the gasket with a new gasket.
8. Check the condition of the spring and if it is damaged, replace it with a new spring.



- | | |
|--------------------|--------------------|
| 1. Adjusting screw | 7. Valve plate nut |
| 2. Locking nut | 8. Locking washer |
| 3. Spring chamber | 9. Valve plate |
| 4. Gasket | 10. Membrane |
| 5. Spring seat | 11. Bolt |
| 6. Spring | 12. Retainer ring |
| | 13. Valve body |

Pressure regulator repair kit part number: 250019-453

Figure 6-6: Pressure regulator

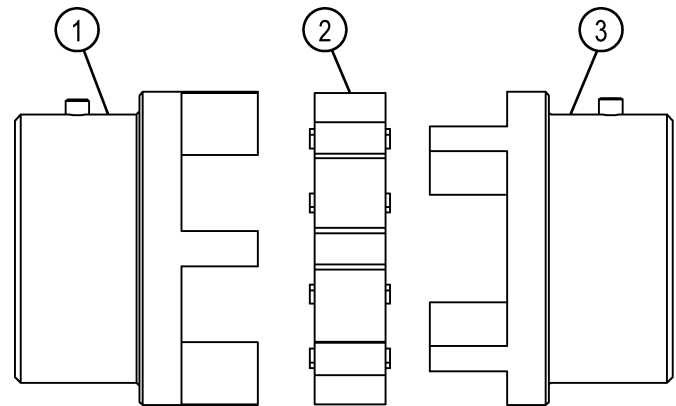
9. Reassemble and reinstall the spring chamber.
10. Turn the adjusting screw clockwise until it is under pressure from the spring.
11. Readjust the pressure regulator using inlet modulation procedures.

6.4.11 Drive coupling maintenance



WARNING

Isolate the compressor from the power supply before making any repairs or adjustments to the drive coupling.



1. Motor end sleeve
2. Elastomer
3. Air end sleeve

Figure 6-7: Flexible drive coupling

1. Shut down the compressor.
2. Mount the motor end sleeve on the motor spindle.
3. Mount the air end sleeve on the air end shaft so that the air end disc end contact the shoulder of air end shaft.
4. Slide the elastomer into the discs.
 - The gap between the end surfaces of the two discs should be 2 to 3 mm.
5. Tighten the set screw on the discs.

6.5 Main motor operation and maintenance

- Ambient temperature $\leq 40^{\circ}\text{C}$ (104°F)
- Altitude ≤ 1000 m (3280 ft)

See the main motor nameplate and the other topics in this section for additional information about operating conditions.

6.5.1 Main motor operation

- The main motor must be grounded correctly. The ground wire of the main motor is already connected in the electric cabinet. You only need to connect this connection point to your ground.
- The lead wires of the main motor are clearly marked.
- The main motor connection diagram is on the motor nameplate.
- If the voltage and frequency of the power source for the main motor match the requirements on the motor's nameplate, the motor can operate continuously at the rated power × utility coefficient. If the power source's frequency deviates from the value on the nameplate by 1%, or under voltage or over voltage exceeds 10%, the motor is not guaranteed to deliver that output power continuously.
- The compressor motor runs best when imbalance among the three phases does not exceed 1%.
- A current detection device in the electrical cabinet of the compressor provides motor overload protection.
- The motor should not make intermittent or unusual noises or vibrations when running (either at no load or load).

6.5.2 Main motor maintenance and repair

- The operating environment should be dry, the motor surface should be clean, and the motor's air inlet should not be blocked by dust or fibers.
- When the motor overload protection device shuts down the compressor, do not restart the compressor until you find and eliminate the cause of the overload.
- Make sure bearings are well lubricated. Grease should be added or replaced every 2000 hours. If grease becomes too hot or deteriorates during operation, replace it. Before adding grease, clean the bearing and cap slot. Different motors use different types of grease. See the motor nameplate for the type of grease needed.
- Replace the bearings at the end of their service life. (At the end of the bearings' service life, the

motor will create significantly more noise and vibration.)

- After any motor faults occurs, contact your Sulair representative.

6.5.3 Periodic inspection of the main motor

You should inspect the main motor yearly to ensure that the motor is operating correctly and in good condition.



WARNING

Isolate the compressor from the power supply before making any repairs or adjustments to the drive coupling.

You should inspect the motor every six months if the compressor is exposed to any of these conditions:

- Corrosive or conductive dust
- Excessive dirt or dust (the accumulated dust may interfere with the compressor's ventilation)
- Chemical smoke, steam, salt mist, or oil mist
- A very wet or very dry atmosphere
- Radiant heat
- Pests or mold

You should also inspect the main motor every six months when the compressor runs under nonstandard conditions, such as:

- The rated voltage and/or frequency often deviates from the limits set under *Section 6.5.1: Main motor operation*.
- The compressor is in a room with either poor ventilation or an ambient temperature over 40°C (104°F).
- The motor starts and stops often because of frequent fluctuations in air demand.

6.5.3.1 Periodic inspection checklist

- Add or change the main motor bearing grease according to the maintenance schedule.
- Inspect the bearing seal and eliminate oil leaks you find.
- Check the end cover and the shroud for condensation, deposited water, iron rust, or corrosion.
- Check for excessive dust or other foreign material.

- Check the main lead-out wiring for overheating or a corona discharge.
- Tighten the non-insulated electric connections and check them for overheating, corrosion, or electrical arcing.
- Tighten all nuts and bolts.

6.5.4 Check and clean the windings

The best way to clean the motor windings depends on both the accessibility of the surface and what you are trying to remove from it. For a thorough cleaning, or if the winding is very dusty, the rotor needs to be removed from of the stator.



WARNING

Isolate the compressor from the power supply before checking or cleaning the windings.

6.5.4.1 Dry cloth

You can clean easy-to-reach surfaces that are dusty with a dry, clean, lint-free cloth.

6.5.4.2 Brush and vacuum

You can clean easy-to-reach surfaces that are dirty or very dusty by scrubbing them with a short, hard, non-metal brush, and then vacuuming up the loosened dirt and dust. (Vacuuming the dirt after loosening it prevents the dirt from getting deposited on other components.)

6.5.4.3 Compressed air

You can blow dry compressed air through gaps to clean hard-to-reach surfaces, but you must follow the guidelines for cleaning with compressed air.

- The pressure of the compressed air must not exceed 0.2 MPa (29 psi). Air at pressures above 2 MPa (29 psi) can damage the insulation.

- The compressed air does not contain any condensed water so that the motor stays dry.
- The compressed air does not blow the dust deeper inside the motor. This could make the dust harder to clean or even block an air duct.

6.5.4.4 Solvent

For a surface covered in bitumen, grease, wax, or oil, wipe the surface with a cloth soaked in a solvent and then with a dry, clean, lint-free cloth.

Sullair recommends using a petroleum-based solvent for cleaning the insulation. In very flammable areas, methyl chloroform can be used. Although this solvent is not combustible under normal conditions, partial ventilation is required when the smell of the solvent becomes strong.

6.6 Troubleshooting

Because a compressor fault can have multiple causes, you should carry out a systematic analysis of the fault to determine the specific cause before performing service or replacing parts.



CAUTION

Never disassemble the machine without a specific purpose.

To avoid damaging the compressor, always perform a visual check of it prior to attempting any repair, remembering to:

- Check for loose or disconnected cable leads
- Check for damaged or disconnected pipelines, tubing, or hoses
- Check for parts damaged by excessive heat or short circuits

Table 6-2: Troubleshooting guide lists some compressor symptoms with their most probable causes and remedies

Table 6-2: Troubleshooting guide

Symptom	Possible causes	Remedy
High discharge air temperature	Low fluid level in fluid/air separator	Check fluid level. Add fluid if necessary.
	Cooler fin dirty	Clean cooler fin
	Fluid filter clogged and bypass valve failed	Replace fluid filter element
	High ambient temperature	Improve ventilation
	High resistance in exhaust duct	<ul style="list-style-type: none"> • Enlarge exhaust duct • Install fan in the duct
	Thermal resistor temperature transducer RTD failure	Check RTD connector. If the connector is good, replace RTD.
	Fan motor damaged	Check and repair fan motor
Air supply pressure lower than pressure rating	Air demand higher than air supply	<ul style="list-style-type: none"> • Reduce air demand • Check piping for air leaks
	Air filter clogged	Replace air filter element
	Inlet valve does not open completely	Check movement of inlet valve. Check settings of the pressure relief valve and pressure regulator.
	Pressure transducer fault	Check transducer's contacts. Replace transducer if contacts are normal.
Pipeline pressure higher than unloading pressure	Pressure transducer fault	Check transducer's contacts. Replace transducer if contacts are normal.
	Unloading components (e.g. blow-down valve, inlet regulator valve) are not working properly	Check if unloading components are working normally
	Solenoid valve unload failure	Check solenoid valve
	Control pipeline is leaking air	Check if control pipeline is leaking air
Fluid consumption too high	Purge oil return line filter or nozzle blocked	Clean purge oil return line filter and nozzle
	Fluid/air separator element damaged or washer displaced	Check fluid/air separator element and washer. Replace if necessary.
	System piping is leaking fluid	Check if system piping is leaking fluid
	Fluid level too high	Discharge some fluid
	Excessive fluid foam	Change fluid
Vibration and noise increased	Isolator damaged	Replace isolator
	Fan fault	Check centrifugal fan

Notes:

Section 7

Parts List

7.1 Procedure for ordering parts

You should order parts from the nearest authorized Sullair representative or the representative from whom the compressor was purchased. If for any reason you cannot obtain parts in this manner, contact the factory directly at the address, phone number, or website listed below.

Sullair, World Headquarters
3700 East Michigan Boulevard
Michigan City, IN 46360 USA
www.sullair.com
1-800-SULLAIR (USA only)
1-219-879-5451 (non-USA)

When ordering parts, always indicate the serial number of the compressor. You can get the serial number from the Bill of Lading for the compressor or from the Serial Number Plate located on the compressor (see *Figure 7-1: Serial number plate and location*).

The genuine Sullair service parts listed meet or exceed the demands of this compressor. Use of replacement parts other than those approved by Sullair will void the Sullair warranties specific to this product and may lead to hazardous conditions over which Sullair has no control. Such conditions include, but are not limited to, bodily injury and compressor failure.

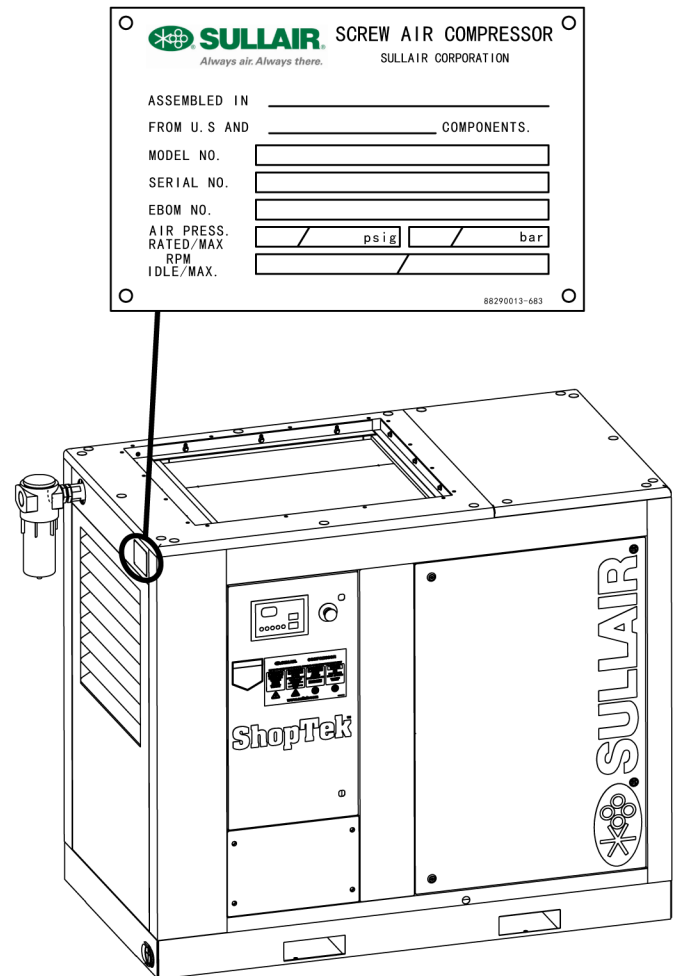
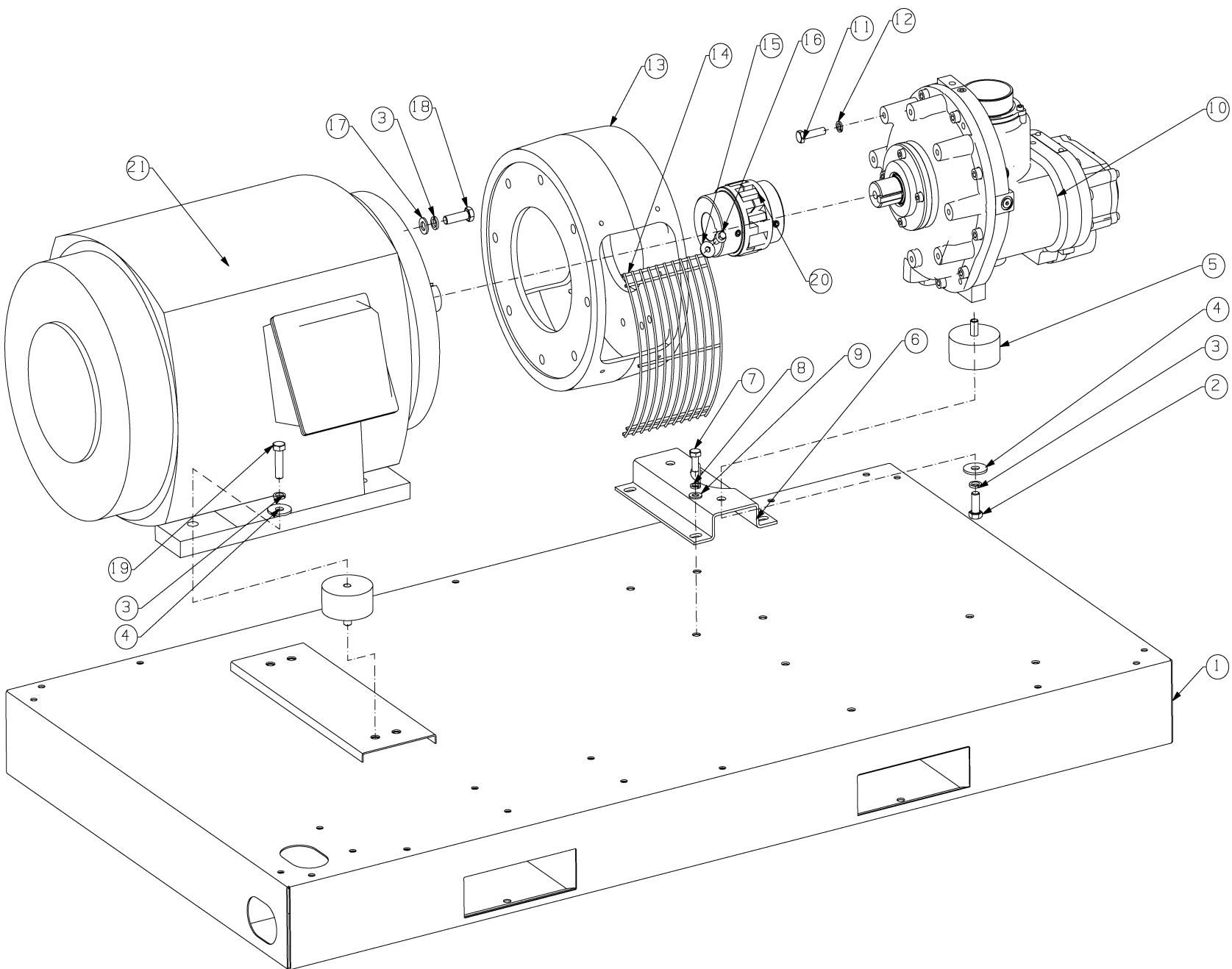


Figure 7-1: Serial number plate and location

7.2 Recommended spare parts list

Service kit part number	Qty	Description
250025-526	1	Element for compressor fluid filter
88291002-854	1	Element for heavy duty air filter 88291002-853 (ST30)
88290006-013	1	Element for heavy duty air filter 88290006-012 (ST37)
250034-116	1	Element for fluid/air separator
02250155-971	1	Repair kit for inlet valve
02250155-970	1	Maintenance kit for inlet valve
88291011-689	1	Repair kit for minimum pressure valve 02250097-598
02250078-204	1	Repair kit for thermal valve
250019-453	1	Repair kit for pressure regulator in capacity control integrated system 88291010-153
88290021-950	1	Repair kit for solenoid valve in capacity control integrated system 88291010-153
88291008-365	1	Repair kit for blowdown valve in capacity control integrated system 88291010-153
02250050-363	1	Repair kit for shaft seal
602542-001	1	Repair kit for shaft seal service tool
88290010-079	1	Element, coupling
250022-669	1	Fluid, Sullube® (5 gallons)
250022-670	1	Fluid, Sullube® (55 gallons)

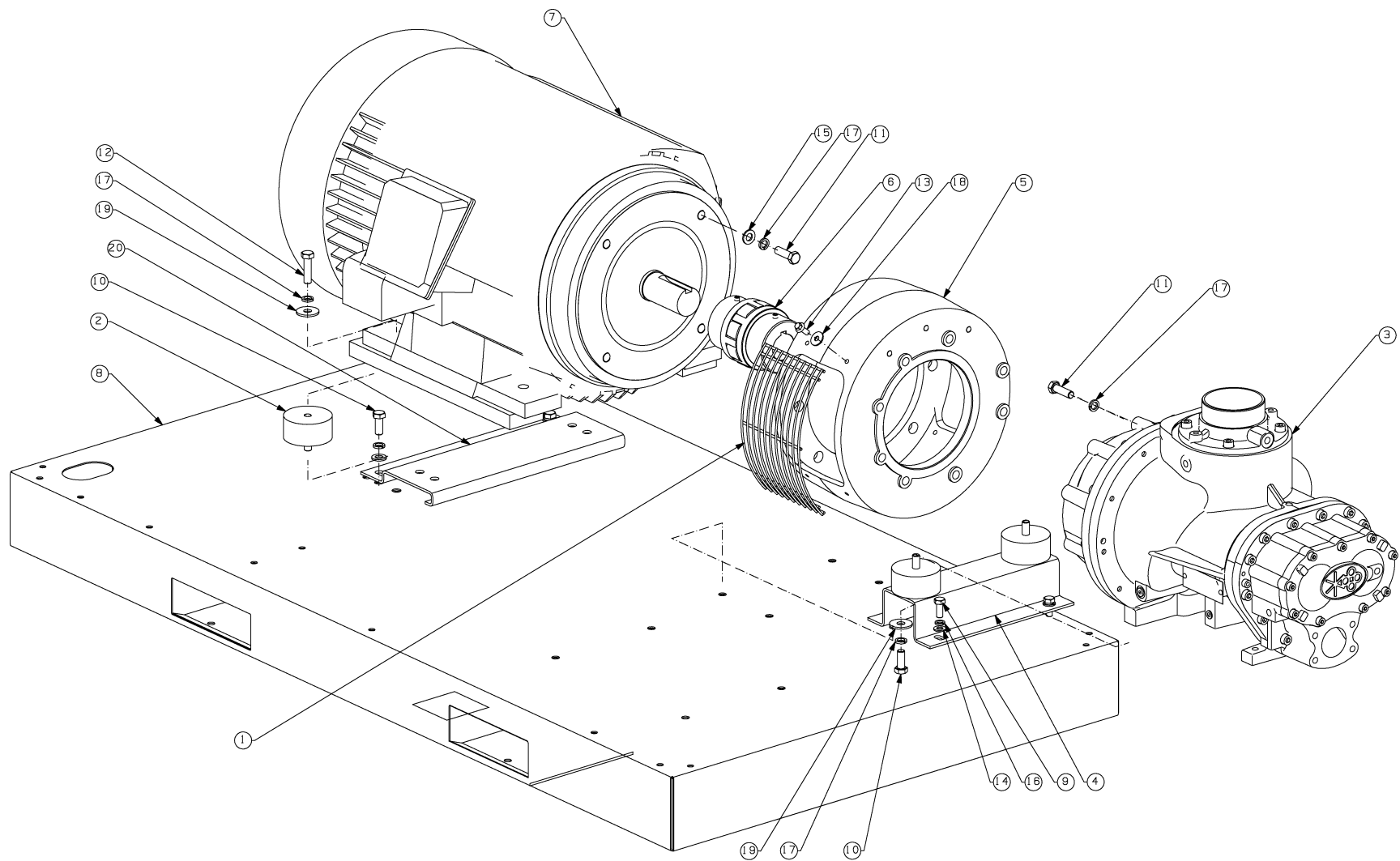
Notes:



7.3 Motor and air end system (ST3008)

7.3 Motor and air end system (ST3008)

Key	Part number	Qty	Description	Notes
1	02250152-346	2	Shield	
2	02250155-285	4	Shock absorber	
3	829106-150	7	Bolt	
4	837806-094	7	Washer	
5	88250160-003	1	Compressor unit	ST3008 60Hz
6	88290012-853	1	Supporting plate	
7	88290019-861	1	Coupling	
8	88291005-388	1	Adapter	
9	88291013-508	1	Motor	30kW 60Hz 230/460V IP23
10	88291011-257	1	Base	
11	88812110-025	4	Bolt	
12	88812112-030	4	Bolt	
13	88812112-040	4	Bolt	
14	88812112-045	2	Bolt	
15	88813108-020	8	Bolt	
16	88831110-020	4	Flat washer	
17	88831112-025	6	Washer	
18	88832110-026	4	Spring washer	
19	88832112-031	10	Spring washer	
20	88833108-022	8	Washer	
21	88833112-033	4	Washer	



88291010-682 R01

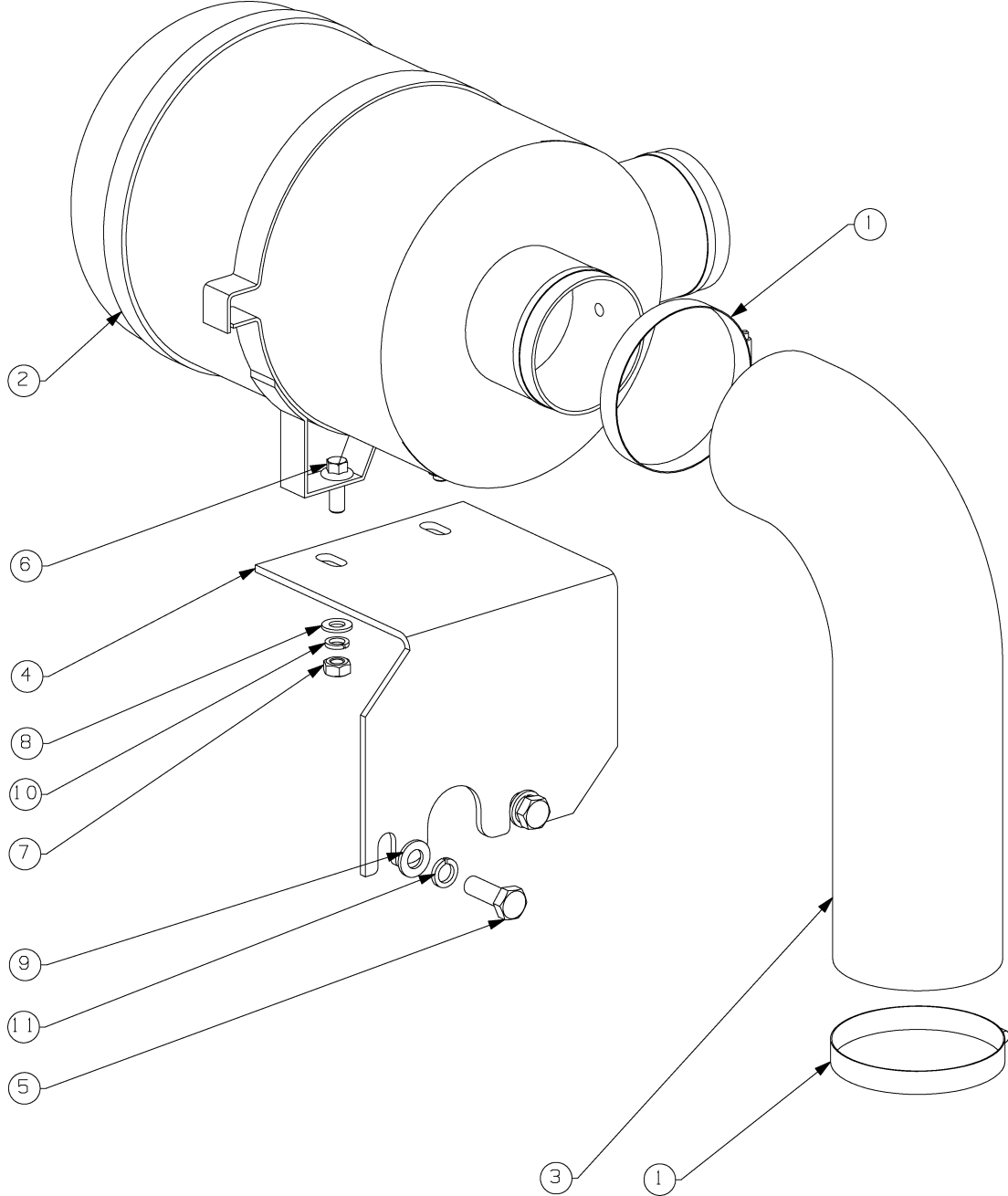
7.4 Motor and air end system (ST3708)

88291013-138 R02
Subject to EAR, ECCN EAR99 and related export control restrictions.

7.4 Motor and air end system (ST3708)

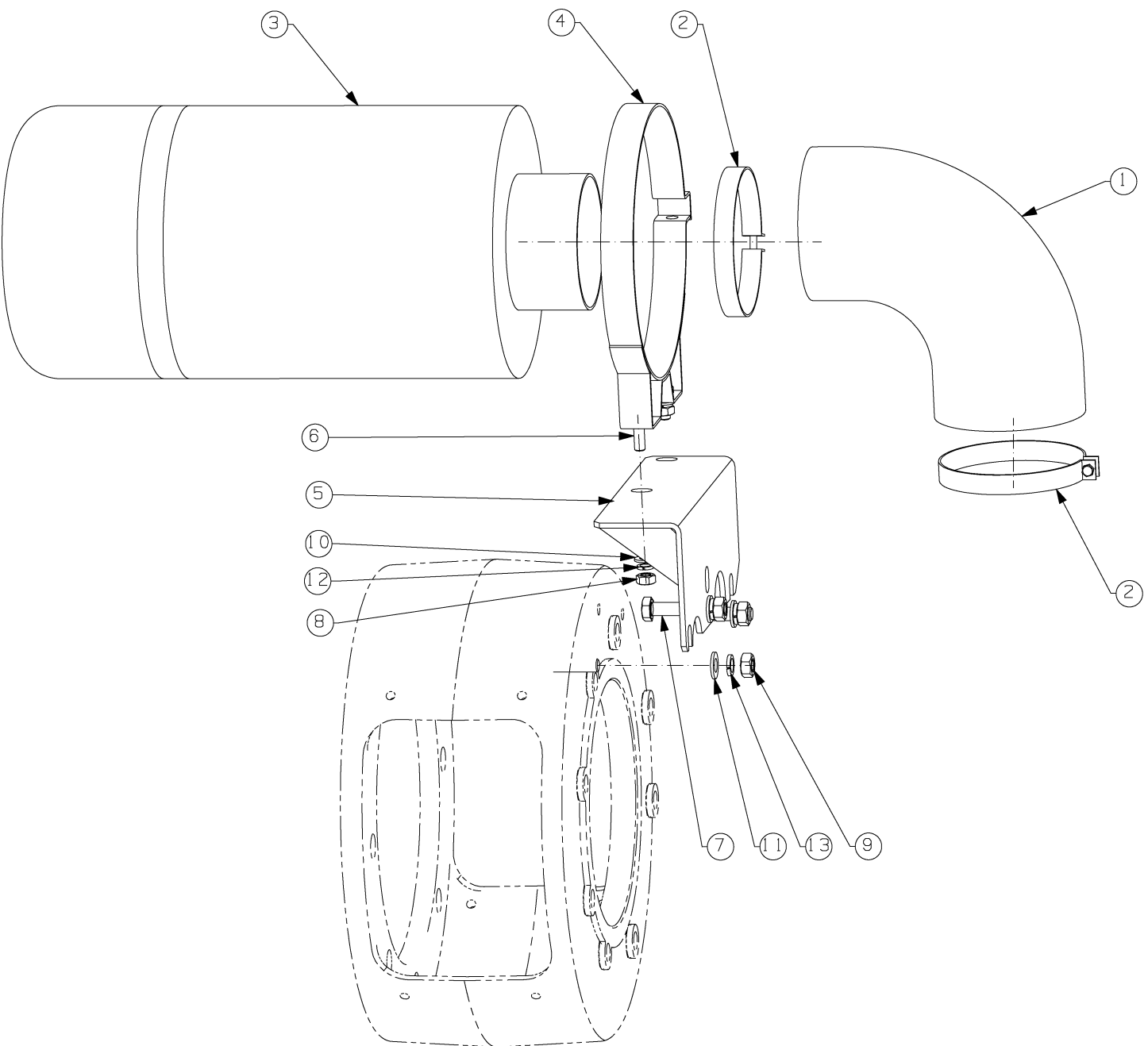
Key	Part number	Qty	Description	Notes
1	02250152-346	2	Shield	
2	02250155-285	4	Shock absorber	
3	88250152-539	1	Compressor unit	ST3708 60Hz
4	88291010-693	1	Supporting plate	
5	88290021-477	1	Adapter	60HZ 230/460V IP23
6	88290021-964	1	Coupling	
7	88290012-637	1	Motor	37kW 60HZ 230/460V IP23
8	88291010-692	1	Base	
9	88812110-025	4	Bolt	
10	88812112-030	4	Bolt	
11	88812112-040	12	Bolt	
12	88812112-045	2	Bolt	
13	88813108-020	8	Flange bolt	
14	88831110-020	4	Flat washer	
15	88831112-025	6	Flat washer	
16	88832110-026	4	Spring washer	
17	88832112-031	18	Spring washer	
18	88833108-022	8	Washer	
19	88833112-033	4	Washer	
20	88291012-975	1	Supporting plate	

7.5 Air inlet system (ST3008)



7.5 Air inlet system (ST3008)

Key	Part number	Qty	Description	Notes
1	250018-550	2	Clamp	
2	88291002-853	1	Air filter	
3	88291005-386	1	Rubber elbow	
4	88291005-389	1	Air filter holder	
5	88812110-030	2	Bolt	
6	88813108-020	2	Flange bolt	
7	88821108-068	2	Nut	
8	88831108-016	2	Flat washer	
9	88831110-020	2	Flat washer	
10	88832108-021	2	Spring washer	
11	88832110-026	2	Spring washer	

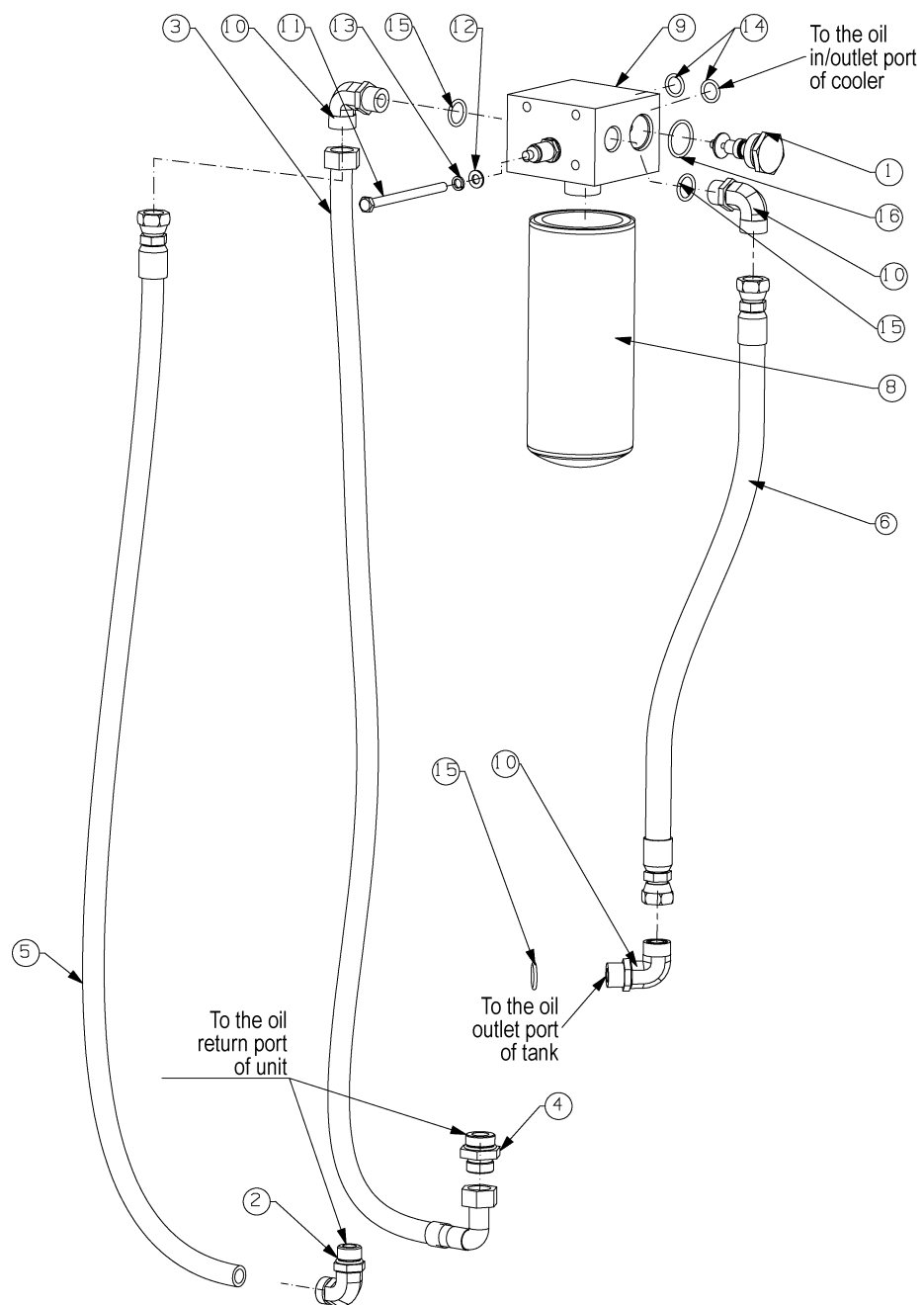


7.6 Air inlet system (ST3708)

7.6 Air inlet system (ST3708)

Key	Part number	Qty	Description	Notes
1	040550	1	Rubber elbow	
2	040642	2	Clamp	
3	88290006-012	1	Air filter	
4	88290006-144	1	Air filter anchor hoop	
5	88290021-476	1	Air filter holder	
6	88812108-020	2	Bolt	
7	88812110-035	3	Bolt	
8	88821108-068	2	Nut	
9	88821110-084	3	Nut	
10	88831108-016	2	Flat washer	
11	88831110-020	3	Flat washer	
12	88832108-021	2	Spring washer	
13	88832110-026	3	Spring washer	

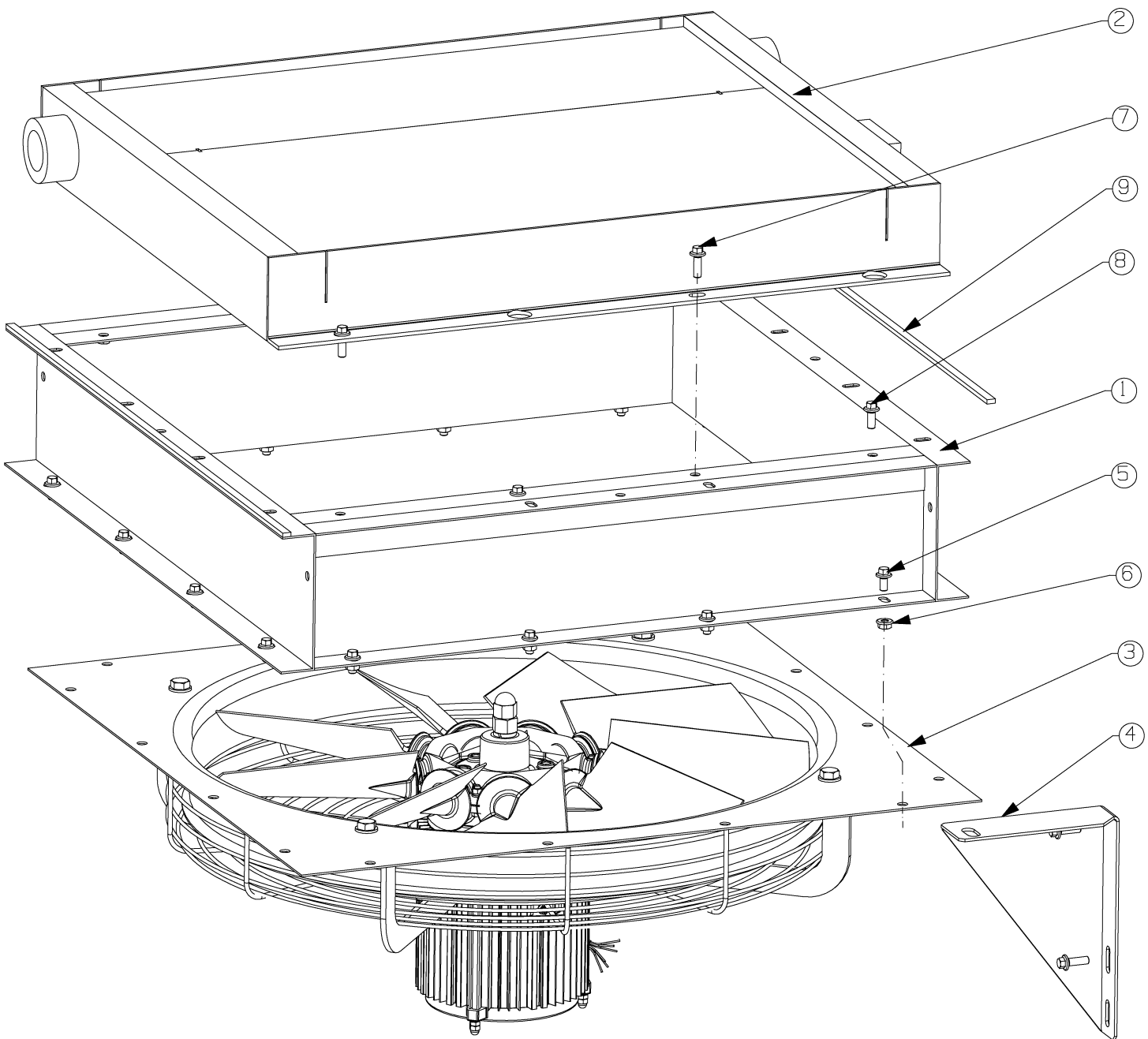
7.7 Fluid piping system



7.7 Fluid piping system

Key	Part number	Qty	Description	Notes
1	02250078-204	1	Thermal valve element	<12bar model
2	02250099-766	1	Connector	For ST30
3	02250141-104	1	Oil tube E	For ST37
4	02250152-223	1	Joint	For ST37
5	02250156-913	1	Oil pipe	For ST30
6	02250164-115	1	Oil pipe	
7				
8	250025-526	1	Oil filter element	
9	88290021-503	1	Oil filter thermal valve assembly	
10	883527-012	3	Straight joint	
11	88811110-135	4	Bolt	
12	88831110-020	4	Flat washer	
13	88832110-026	4	Spring washer	
14	88842035-019	2	O-ring	
15	88842035-023	3	O-ring	
16	88842035-035	1	O-ring	
17	87250009-396	6.9	Sullube® 2G Lubricating oil (GA)	For ST37
		5.8	Sullube® 2G Lubricating oil (GA)	For ST30

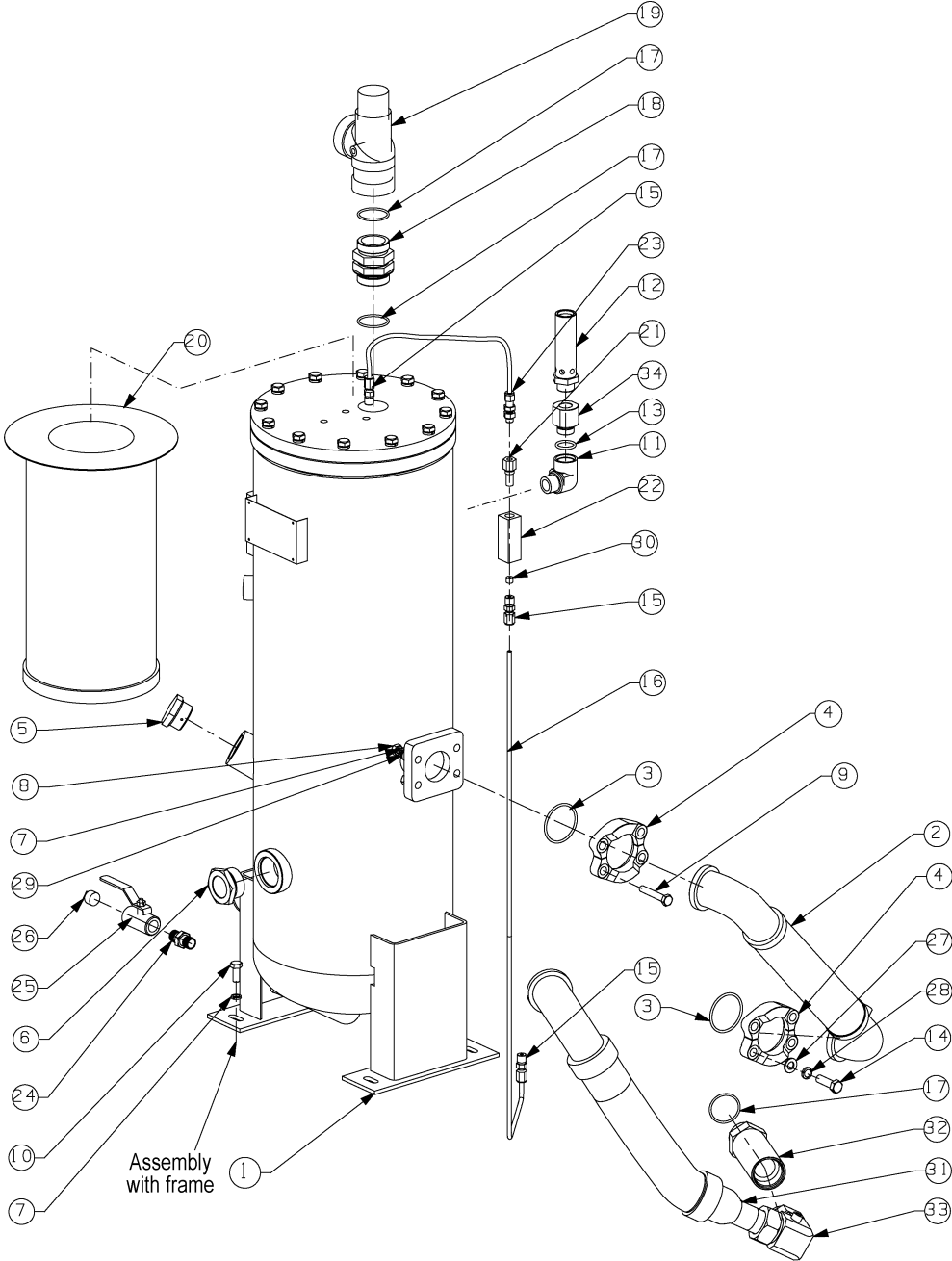
7.8 Cooling fan system



7.8 Cooling fan system

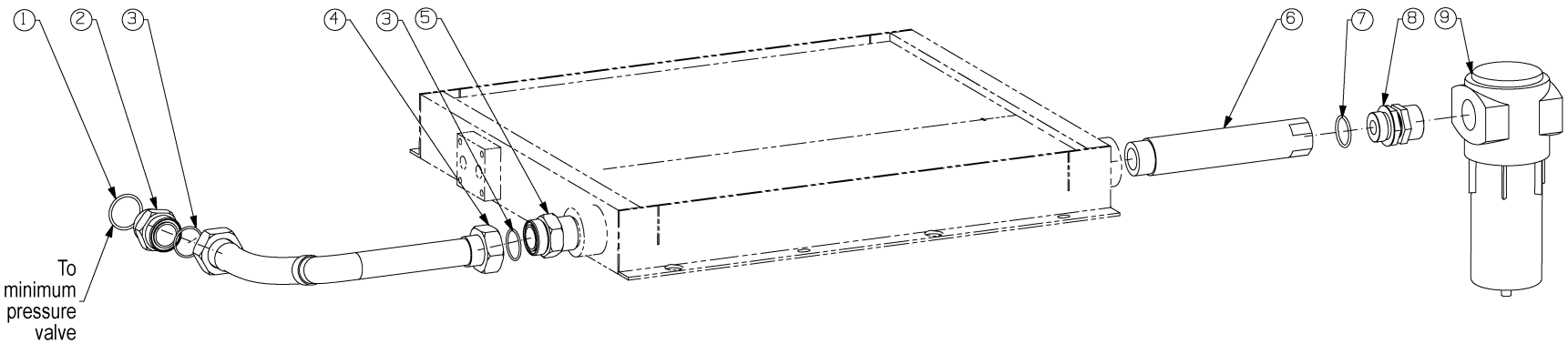
Key	Part number	Qty	Description	Notes
1	250018-330	1	Adapter,venturi	
2	88290021-446	1	Oil cooler	
3	88291013-109		Axial fan assembly	60Hz 230/460V
4	88290021-473	1	Supporting plate	
5	88831108-016	15	Flange bolt	
6	88821108-076	16	Flange nut	
7	88811108-025	6	Flange bolt	
8	88811108-020	5	Flange bolt	
9	250022-436	7ft	Seal	

7.9 Fluid/air separation system



7.9 Fluid/air separation system

Key	Part number	Qty	Description	Notes
1	88291010-368	1	Oil/air separator	
2	88291010-842	1	Discharge pipe DN50	For ST37
3	88842035-058	2	O-ring	
4	88290007-143	2	Half flange	
5	040029	1	Plug	
6	88290006-366	1	Sight glass	
7	88832110-026	8	Spring washer	
8	88821110-084	4	Nut	
9	88812110-060	4	Bolt	
10	88812110-025	4	Bolt	
11	88290005-770	1	Adjustable rectangular joint	
12	250006-938	1	Relief valve	ASME US MODEL
13	88842035-025	1	O-ring	
14	88811112-040	4	Bolt	For ST37
15	810204-025	3	Joint	
16	841215-004	2	Stainless steel pipe	
17	88842030-044	2	O-ring	
18	88290002-281	1	Straight joint	
19	88291011-663	1	Min pressure valve	
20	250034-116	1	Element	
21	02250117-782	1	Filter connector	
22	02250126-129	1	Sight glass	
23	02250101-490	1	Joint	
24	88871008-044	1	Nipple	
25	88290002-435	1	Female thread ball valve	
26	88290002-836	1	Oil drain plug	
27	88831112-025	4	Flat washer	For ST37
28	88832112-031	4	Spring washer	For ST37
29	88831110-020	4	Flat washer	
30	02250125-776	1	Sub-throttle	
31	88291005-387	1	Exhaust pipe	For ST30
32	88290011-183	1	Adaptor	For ST30
33	88291003-043	1	Adjustable rectangular joint	For ST30
34	88291012-944	1	Connector	

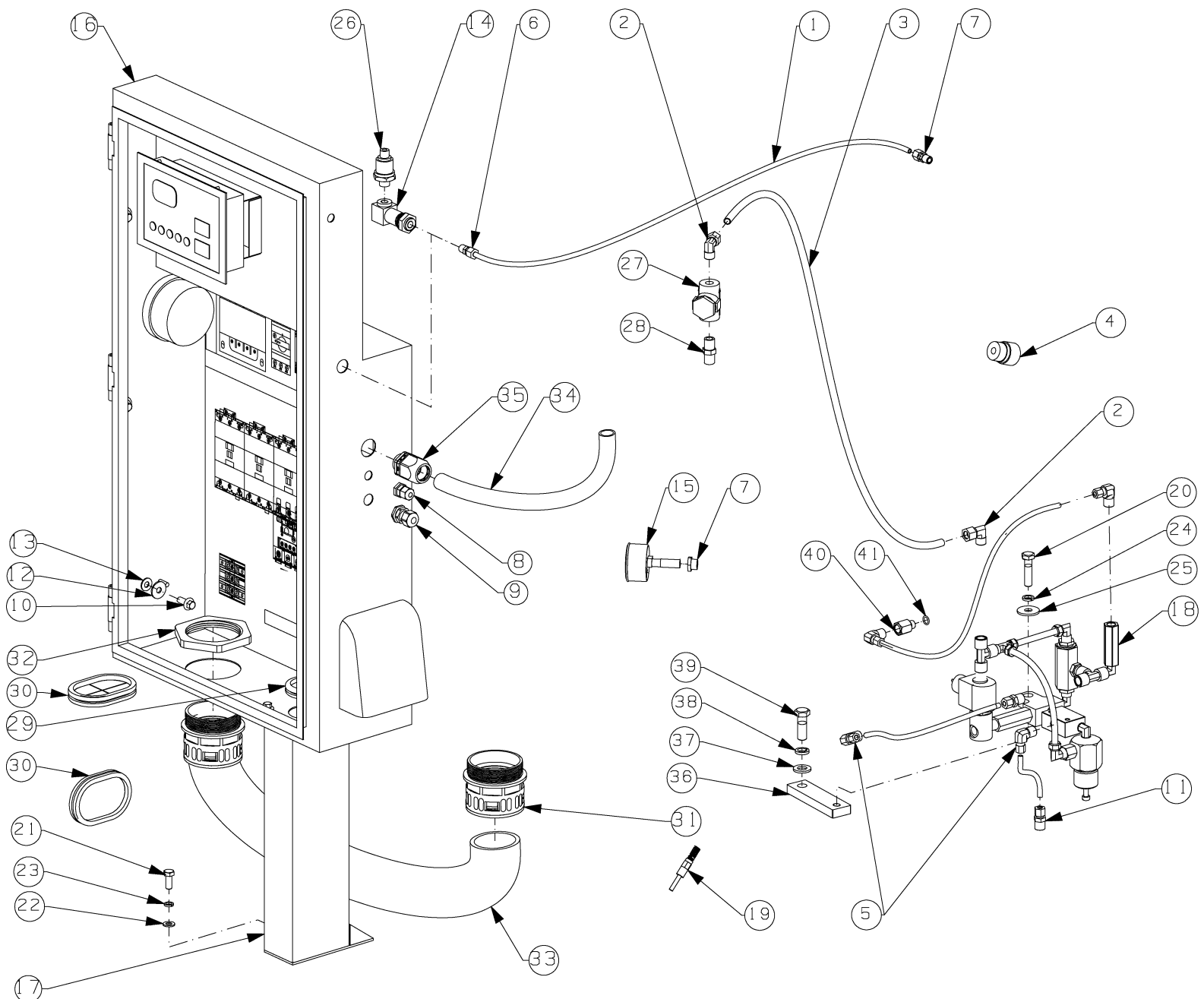


88291010-846 R00

7.10 Air discharge system

Key	Part number	Qty	Description	Notes
1	88842035-045	1	O-ring	
2	88290018-064	1	Straight	
3	88842026-040	2	O-ring	
4	88290021-609	1	Metal hose	
5	88290021-608	1	Straight joint	
6	88290021-484	1	Connector	
7	88842035-038	1	O-ring	
8	88291013-637	1	Connector	
9	88291013-634	1	Water trap	

7.11 Control system



88291012-749 R02

7.11 Control system

Key	Part number	Qty	Description	Notes
1	02250054-861	7ft	Nylon conduit	
2	02250099-626	2	Elbow	
3	02250099-630	5ft	Nylon conduit	
4	250003-869	1	Vacuum indicator	
5	250018-430	4	Elbow	
6	250018-427	2	Straight joint	
7	807600-005	1	Connector	
8	88291011-142	1	Nylon cable joint	
9	88291011-143	1	Nylon cable joint	
10	88813108-020	7	Flange bolt	
11	250018-428	1	Straight joint	
12	88833108-022	3	Large flat washer	
13	88291011-444	7	Rubber washer	
14	88291011-584	1	Straight joint	
15	88290002-119	1	Pressure gauge	
16	88291012-978	1	Electric cabinet assembly	460V YD EC2000 UL
17	88291010-709	1	support	
18	88291010-153	1	Inlet system assembly	
19	88290021-986	1	Temperature sensor	
20	88811110-040	1	Bolt	
21	88812108-020	2	Bolt	
22	88831108-016	2	Flat washer	
23	88832108-021	6	Spring washer	
24	88832110-026	1	Spring washer	
25	88833110-027	1	Flat washer	
26	88290014-514	1	Pressure sensor	
27	241771	1	Strainer	
28	868504-025	1	Connector	
29	88290022-463	1	Cable sheath	
30	88290020-494	2	Cable sheath	
31	88291011-824	2	Nylon Connector	
32	88291011-738	1	Nylon Nut	

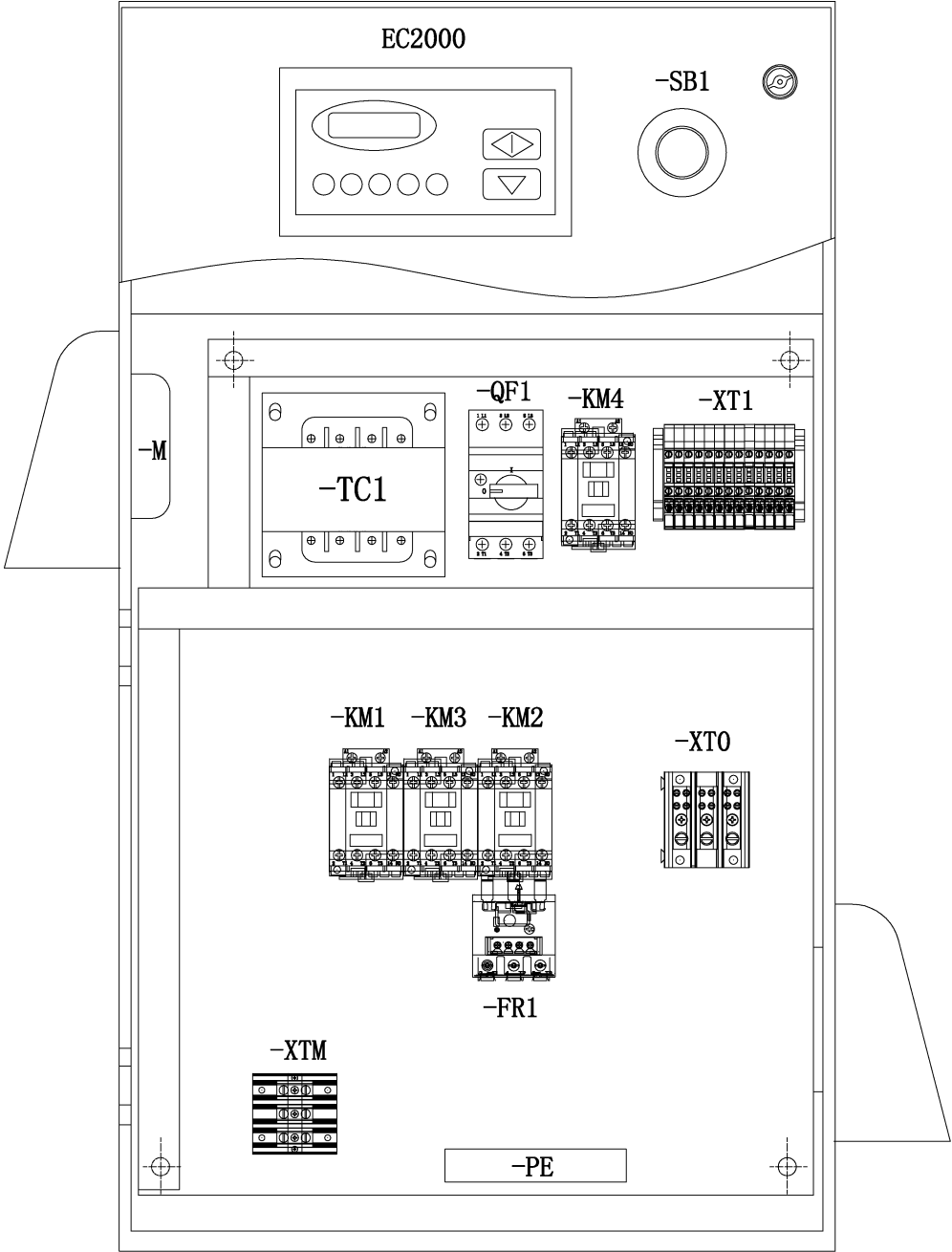
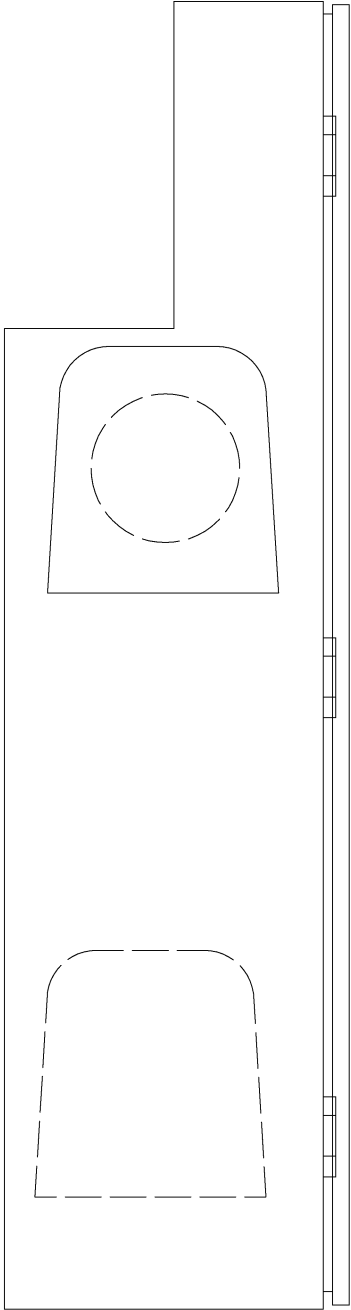
7.11 Control system

Key	Part number	Qty	Description	Notes
33	88291011-908	0.8m	Nylon conduit	
34	88291011-450	1.2m	Nylon conduit	
35	88291013-456	1	Nylon joint	
36	88291003-004	1	support	FOR ST30
37	88831112-025	1	Flat washer	FOR ST30
38	88832112-031	1	Spring washer	FOR ST30
39	88811112-035	1	Bolt	FOR ST30
40	88290010-794	1	joint	FOR ST30
41	88842018-009	1	O-ring	FOR ST30

Notes:



88291013-138 R02
Subject to EAR, ECCN EAR99 and related export control restrictions.

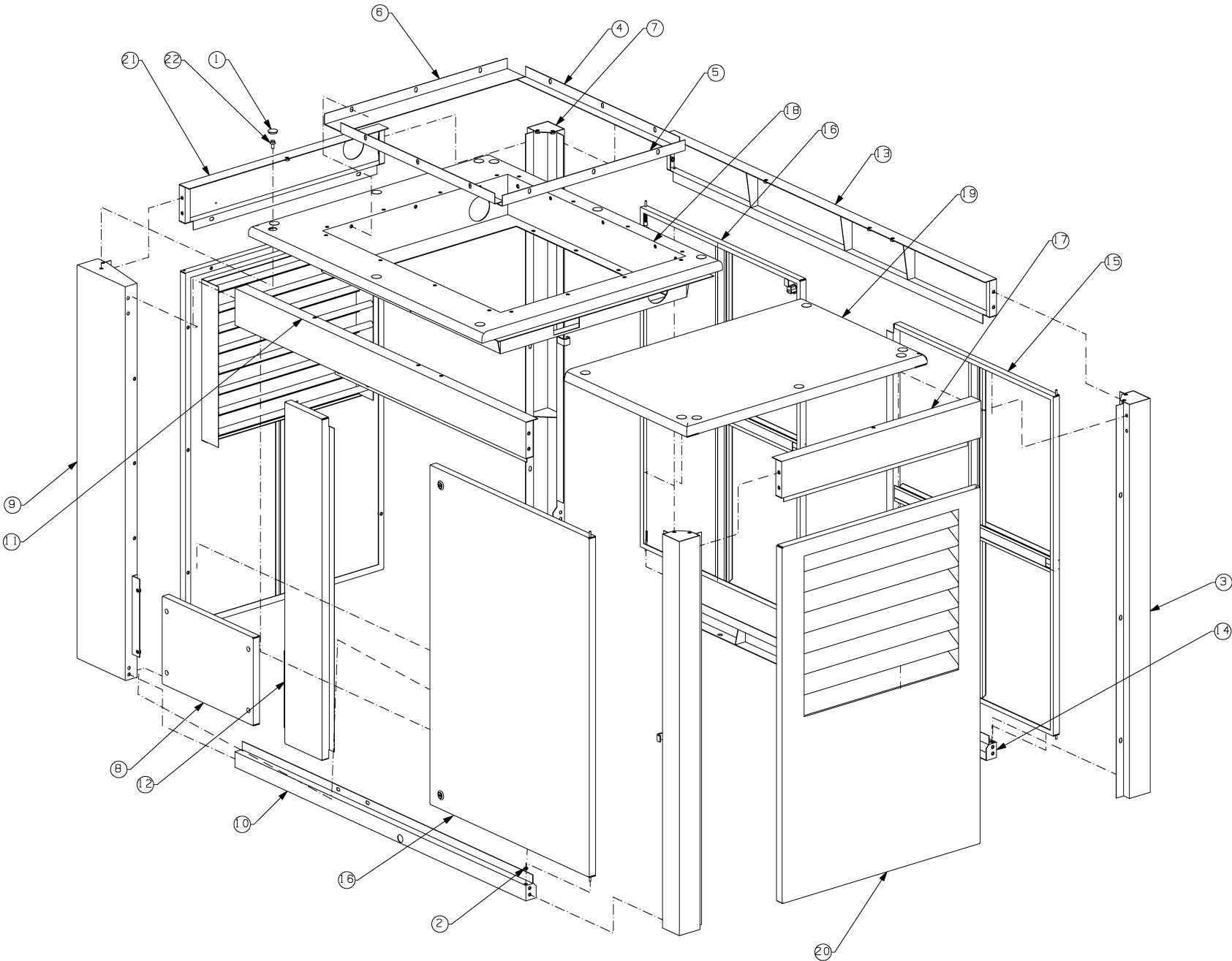


7.12 Starter assembly—460V

7.12 Starter assembly—460V

Key	Part Number	Qty	Description	Notes
-QF1	88291013-763	1	MPCB, Standard Magnetic Trip (Fixed at 13 x Ie), 4-6.3 A	
	88291012-865	1	Auxiliary Contact Block, Front Mounted, 1 N.O. 1 N.C.	
-TC1	88291012-840	1	200VA, 230/460V-110V/25V (50/60Hz) UL	
-KM2,-KM3	88291013-038	2	MCS-C Contactor, IEC, 43A, 120V 50/60Hz	
-KM1	88291013-033	1	MCS-C Contactor, IEC,30A, 120V 50/60Hz	
-KM4	88291012-880	1	MCS-C Contactor, IEC, 9A, 120V 50/60Hz	
-SB	88291012-885	1	Pushbutton Emergency Stop	
	88291012-887	2	22.5mm PB No Latch, Screw Contact Block, 1 N.C.	
	88291012-886	1	800F Legend Plate, 60mm Round, Universal: EMERGENCY STOP, Yellow with Black Legend Text, 22.5mm Opening	
	88291012-896	1	Plastic Latch	
-XT1	88291012-897	4	end anchor	
	88291012-898	2	end barrier	
	88291012-899	11	1492-J IEC Terminal Block, 4 mm 3 Connection points, 2 on one side, Gray	
	88291012-900	2	1492-J IEC Terminal Block, Ground Block, 4 mm 3 Connection points, 2 on one side, Green / Yellow Stripe	
	88291012-901	1	Terminal marker	
-XTM	88291012-904	1	1492 Power Block, 3-Pole, Aluminum, 1 Opening Line Side, 1 Opening Load Side, 115 Amps	
-XT0	88291012-908	1	1492 Power Block, 1 Opening Line Side, 4 Openings Load Side, 175 Amps	
-FR	88291013-035	1	E1 Plus Solid State Overload Relay, 9-45A (3 Phase)	
M	88291012-910	1	FAN 110V WITH accessories	
-FU1-4	88291012-905	4	FUSE 2A CLASS CC	
-PE	88291011-071	1	PE 4X20	
BOX	88291012-718	1	BOX,START ASSY ST30/37 USA	
EC2000	88290021-398	1	CONT,EC2000 AC25V HONGSAI	

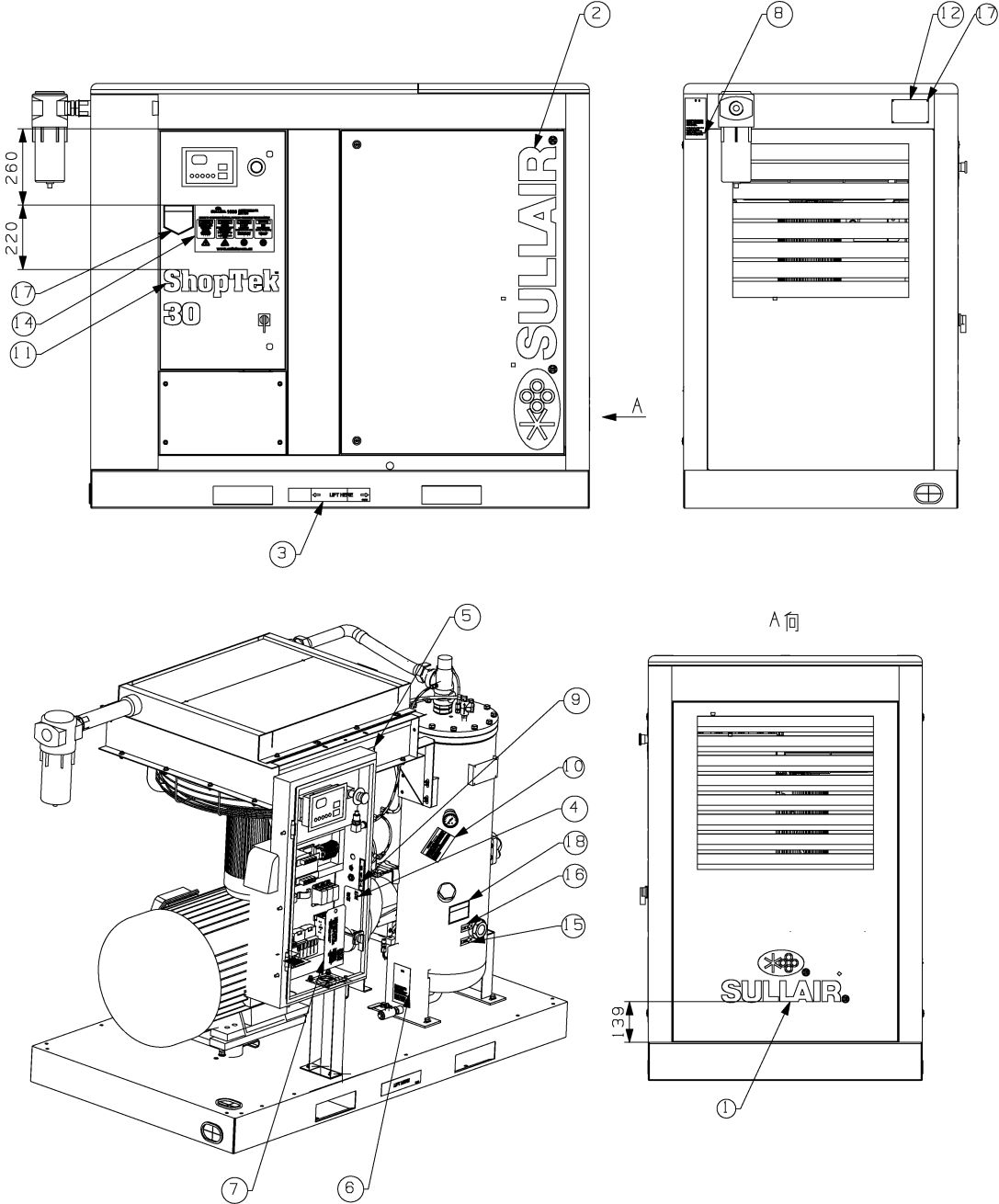
7.13 Enclosure



7.13 Enclosure

Key	Part number	Qty	Description	Notes
1	02250048-520	16	Plastic cap	
2	02250151-635	3	Door gasket	
3	88290021-394	1	Post A	
4	88291010-226	2	Corner panel A	
5	88291010-227	1	Corner panel B	
6	88291010-228	1	Corner panel C	
7	88291010-232	2	Post B	
8	88291010-716	1	Plate A	
9	88291010-722	1	Post C	
10	88291010-724	1	Beam A	
11	88291010-725	1	Beam B	
12	88291010-727	1	Post E	
13	88291010-790	1	Beam B	
14	88291010-791	1	Beam D	
15	88291010-793	1	Door B	
16	88291010-794	2	Door C	
17	88291010-796	1	Beam C	
18	88291010-797	1	Top plate B	
19	88291010-816	1	Top plate A	
20	88291010-817	2	Door A	
21	88291010-818	1	Beam E	
22	88813108-016	82	Flange bolt	

7.14 Decal locations



7.14 Decal locations

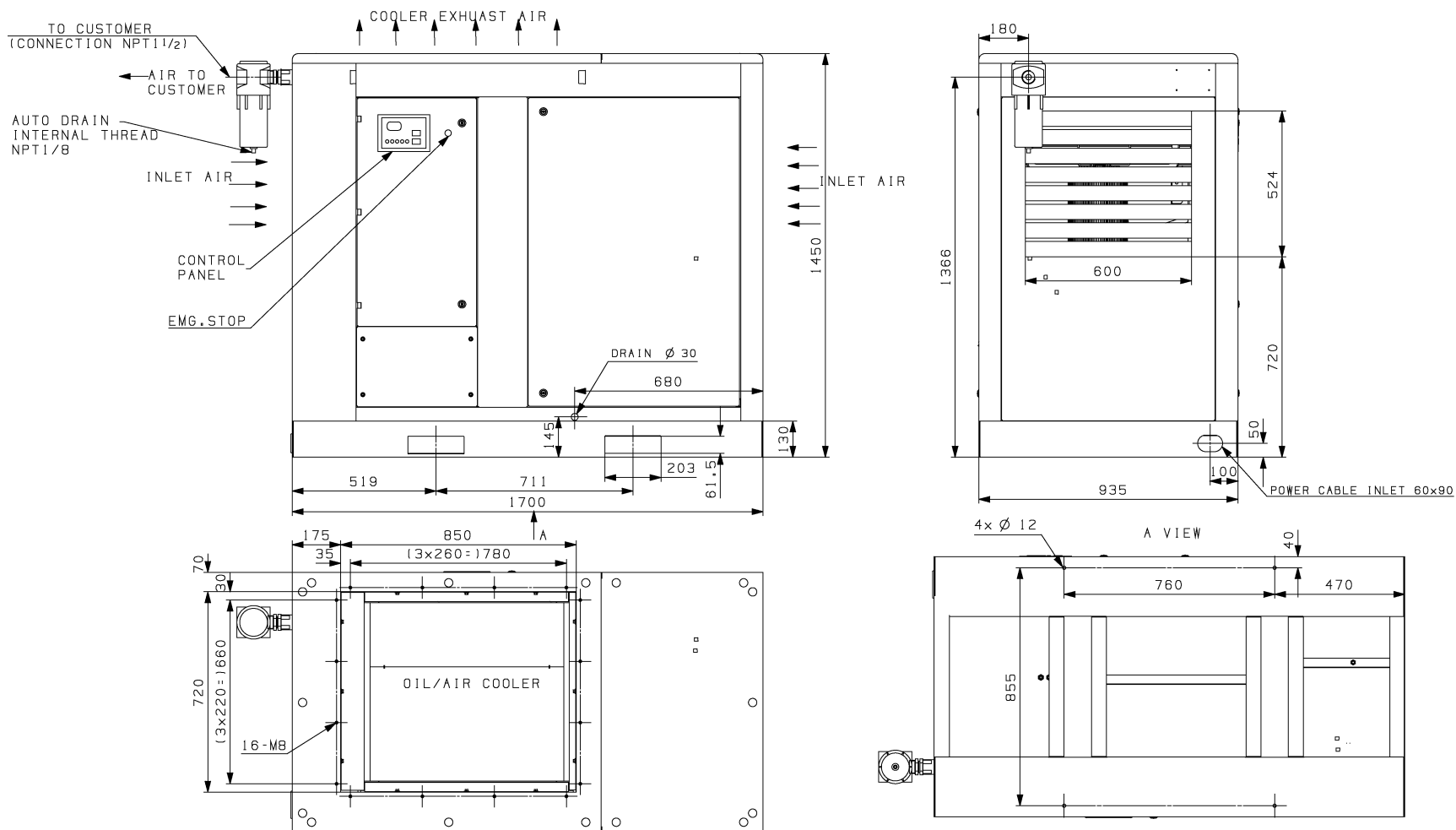
Key	Part number	Qty	Description	Notes
1	88291011-503	1	SULLAIR LOGO decal	
2	88291011-602	1	SULLAIR LOGO decal	
3	241814	2	Decal, fork lifting	
4	042218	1	Decal,danger hi voltage	
5	250021-564	2	Decal,rotation 3.5" lg	
6	049852	2	Sign,warning ground fault	
7	250021-337	1	Tag,first start	
8	250003-144	1	Sign,warn "food grade" lube	
9	88290016-067	1	Decal,voltage wan component	
10	250023-361	1	Sullube® oil reminder decal	
11	88291011-515	1	Decal,shoptek 30	For ST30
	88291011-516	1	Decal,shoptek 37	For ST37
12	88290013-683	1	Npl,for export model	
13	88290013-723	4	Rivet,busterpop dia3.2 l=8	
14	88291012-969	1	Safety decal	
15	811640-15	1	DECAL,MIN	
16	811640-16	1	DECAL,MAX	
17	02250210-811	1	10Year warranty decal	
18	02250210-812	1	10Year warranty decal	

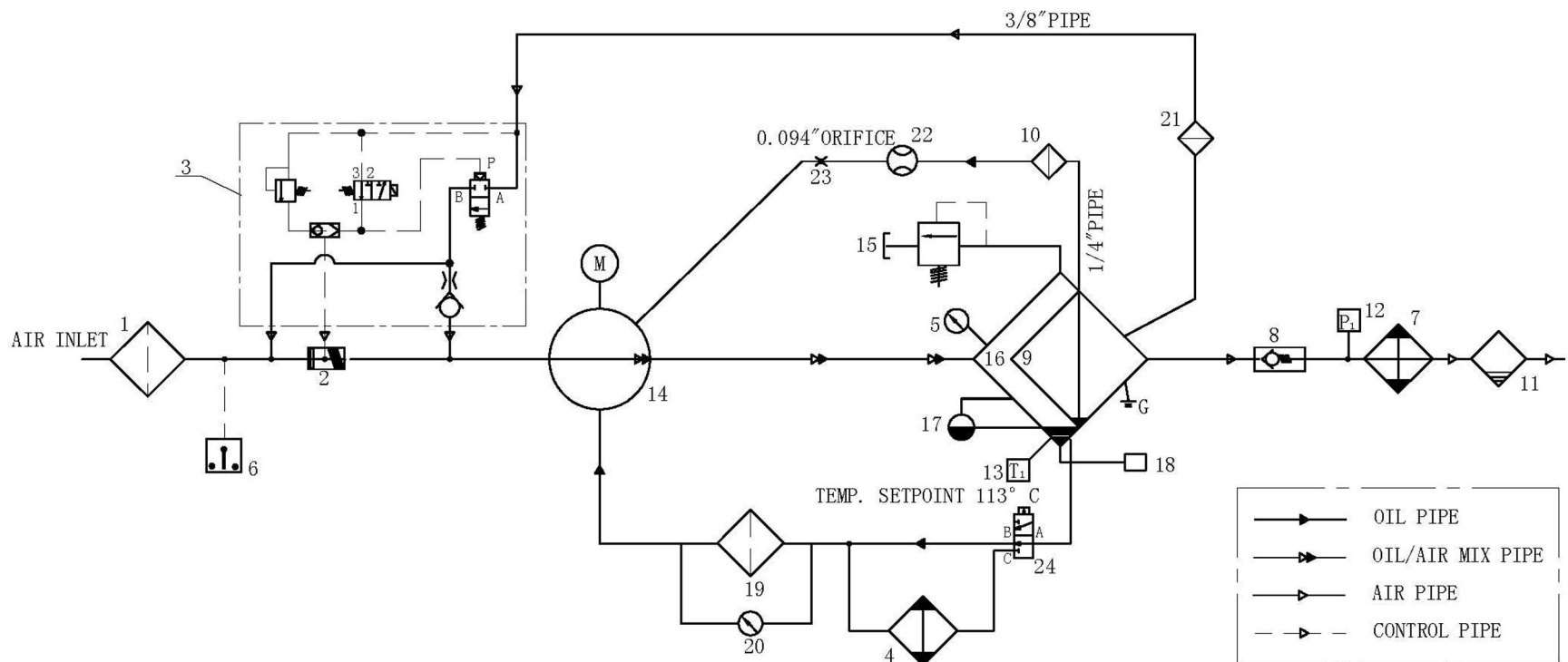


Notes:

Appendix A: System Diagrams

A.1 ST30 & ST37 identification





A.2 ST30 & ST37 piping and instrumentation

A.2 ST30 & ST37 piping and instrumentation

Key	Description
1	Air filter
2	Inlet valve
3	Capacity control integrated system
4	Oil cooler
5	Pressure switch
6	Indicator
7	Aftercooler
8	Minimum pressure valve
9	Single-stage fluid/air separator element
10	Strainer
11	Moisture separator
12	Pressure sensor
13	Temperature sensor
14	Compressor air end
15	Relief valve
16	Fluid/air separator tank
17	Sight glass
18	Oil plug
19	Fluid filter
20	Fluid filter pressure difference indicator
21	Strainer
22	Sight glass
23	Orifice
24	Thermal valve

Appendix B: Metric & Imperial Nominal Sizes

Metric nominal size (DN) is the nominal size for valves, flanges and fittings as defined by ISO 6708-1980. DN designates the size of all components in a piping system other than components designated by outside diameters or by thread size. For example, steel tubes are designated and ordered by outside diameter and thickness.

NOTE

Because DN is a round number that *cannot* be measured and is only *loosely related* to manufacturing dimensions, you should *only* use the DN number for reference and *never* for calculations.

A metric nominal size is indicated by the letters “DN” followed by a number *without* any unit of measure. For metric to imperial nominal size equivalents, refer to *Table B-1: Metric to Imperial nominal sizes*.

Table B-1: Metric to Imperial nominal sizes

Metric DN (Nominal Size)	Imperial NS (Nominal Size)
A dimensionless designation	Designated in inches sometimes as ND, NB or NPS
6	1/8"
8	1/4"
10	3/8"
15	1/2"
20	3/4"
25	1"
32	1 1/4"
40	1 1/2"
50	2"
65	2 1/2"
80	3"



a division of Accudyne Industries

Sullair, LLC

3700 East Michigan Boulevard

Michigan City, IN 46360 USA

www.sullair.com

1-800-SULLAIR (USA only)

1-219-879-5451 (non-USA)

Information and specifications are subject to change without prior notice.
Subject to EAR, ECCN EAR99 and related export control restrictions.