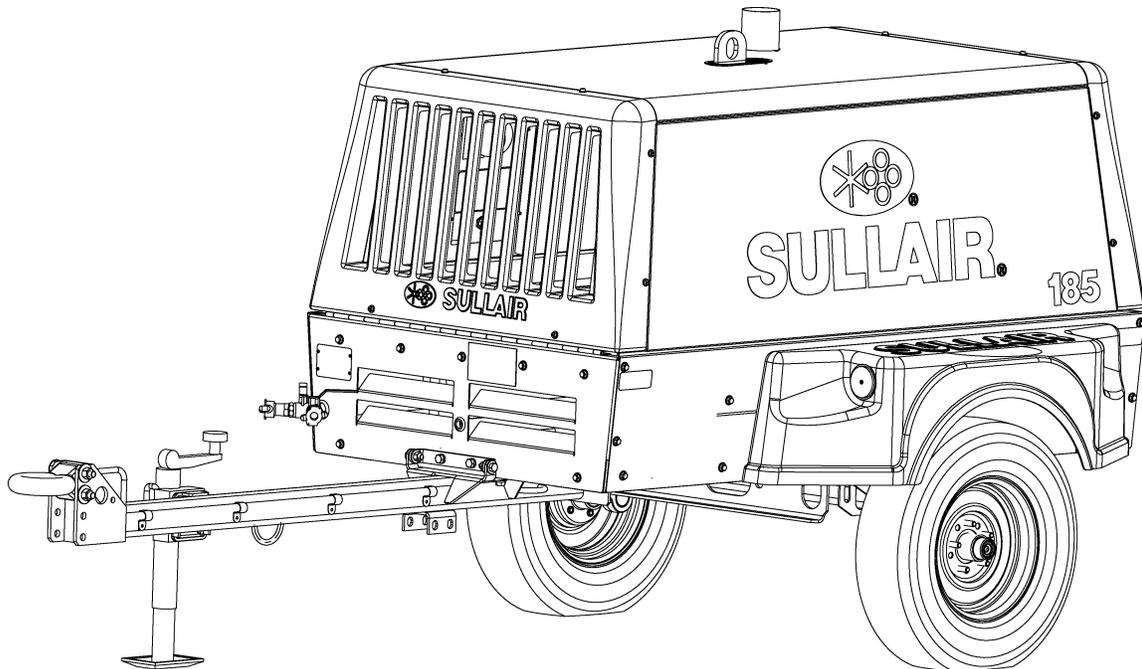




USER MANUAL

Portable Air Compressor 185

Tier 4 Final
Kubota



PART NUMBER:
02250216-781 R01

SAFETY WARNING

Users are required to read the entire User Manual before handling or using the product.

WARRANTY NOTICE

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

The information in this manual is current as of its publication date and applies to compressor models indicated on this cover with **serial number:**

201507170000
and all subsequent serial numbers.

Publication date: 4/13/2016

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

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Section 1

Safety

NOTE



Operator is required to read entire instruction manual.

1.1 General

Sullair designs and manufactures all of its products so they can be operated safely. However, the responsibility for safe operation rests with those who use and maintain these products. The following safety precautions are offered as a guide which, if conscientiously followed, will minimize the possibility of accidents throughout the useful life of this equipment. **Read the AEM Safety Manual prior to compressor operation and towing, if applicable in your area.**

The air 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 can result in accidents and injuries.

NEVER start the air compressor unless it is safe to do so. **DO NOT** attempt to operate the air compressor with a known unsafe condition. Tag the air 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.

Use and operate the air compressor only in full compliance with all pertinent OSHA requirements and/or all pertinent Federal, State and Local codes or requirements.

DO NOT modify the compressor except with written factory approval.

Each day, walk around the air compressor and inspect for leaks, loose or missing parts, damaged parts or parts out of adjustment. Perform all recommended daily maintenance.

Inspect for torn, frayed, blistered or otherwise deteriorated and degraded hoses. Replace as required.

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. Open the pressure relief valve at least weekly to make sure it is not blocked, closed, obstructed or otherwise disabled.
- B. Install an appropriate flow-limiting valve between the compressor service air outlet and the shutoff (throttle) valve, when an air hose exceeding 1/2" (13 mm) inside diameter is to be connected to the shutoff (throttle) valve, to reduce pressure in case of hose failure, per OSHA Standard 29 CFR 1926.302 (b) (7) or any applicable Federal, State and Local codes, standards and regulations.
- C. When the hose is to be used to supply a manifold, install an additional appropriate flow-limiting valve between the manifold and each air hose exceeding 1/2" (13 mm) inside diameter that is to be connected to the manifold to reduce pressure in case of hose failure.

- D. Provide an appropriate flow-limiting valve for each additional 75 feet (23 m) of hose in runs of air hose exceeding 1/2" (13 mm) inside diameter to reduce pressure in case of hose failure.
- E. Flow-limiting valves are listed by pipe size and rated CFM. Select appropriate valve accordingly.
- F. **DO NOT** use tools that are rated below the maximum rating of this compressor. Select tools, air hoses, pipes, valves, filters and other fittings accordingly. **DO NOT** exceed manufacturer's rated safe operating pressures for these items.
- G. Secure all hose connections by wire, chain or other suitable retaining device to prevent tools or hose ends from being accidentally disconnected and expelled.
- H. Open fluid filler cap only when compressor is not running and is not pressurized. Shut down the compressor and bleed the sump (receiver) to zero internal pressure before removing the cap.
- I. 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.
- J. Keep personnel out of line with and away from the discharge opening of hoses, tools or other points of compressed air discharge.
- K. **DO NOT** use air at pressures higher than 30 psig (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) or any applicable Federal, State and Local codes, standards and regulations.
- L. **DO NOT** engage in horseplay with air hoses as death or serious injury may result.
- M. This equipment is supplied with an ASME designed pressure vessel protected by an ASME rated relief valve. Lift the handle once a week to make sure the valve is functional. **DO NOT** lift the handle while machine is under pressure.
- N. If the machine is installed in an enclosed area it is necessary to vent the relief valve to the outside of the structure or to an area of non-exposure.
- O. **DO NOT** remove radiator filler cap until the coolant temperature is below its boiling point. Then loosen cap slowly to its stop to relieve any excess pressure and make sure coolant is not boiling before removing

cap completely. Remove radiator filler cap only when cool enough to touch with a bare hand.

- P. The ethyl ether in the replaceable cylinders used in diesel ether starting aid systems (optional) is under pressure. **DO NOT** puncture or incinerate those cylinders. **DO NOT** attempt to remove the center valve core or side pressure relief valve from these cylinders regardless of whether they are full or empty.
- Q. If a manual blowdown valve is provided on the receiver, open the valve to ensure all internal pressure has been vented prior to servicing any pressurized component of the compressor air/fluid system.

1.4 Fire and explosion



WARNING

Do not attempt to operate the compressor in any classification of hazardous environment or potentially explosive atmosphere unless the compressor has been specially designed and manufactured for that duty.

- A. Refuel at a service station or from a fuel tank designed for its intended purpose. If this is not possible, ground the compressor to the dispenser prior to refueling.
- B. Clean up spills of lubricant or other combustible substances immediately, if such spills occur.
- C. Shut off air 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 adding fuel, checking or adding electrolyte to batteries, checking or adding fluid, checking diesel engine ether starting aid systems, replacing cylinders, or when refilling air line anti-icer systems antifreeze compound.
- D. **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 liq-

- uids or fluid film within the material. **DO NOT** use flammable solvents for cleaning purposes.
- E. 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.
 - F. 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.
 - G. Turn off battery charger before making or breaking connections to the battery.
 - H. 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.
 - I. Replace damaged fuel tanks or lines immediately rather than attempt to weld or otherwise repair them. **DO NOT** store or attempt to operate the compressor with any known leaks in the fuel system. Tag the compressor and render it inoperative until repair can be made.
 - J. 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.
 - K. Keep suitable fully charged Class BC or ABC fire extinguisher or extinguishers nearby when servicing and operating the compressor.
 - L. Keep oily rags, trash, leaves, litter or other combustibles out of and away from the compressor.
 - M. Open all access doors and allow the enclosure to ventilate thoroughly prior to attempting to start the engine.
 - N. **DO NOT** operate compressor under low overhanging leaves or permit such leaves to contact hot exhaust system surfaces when operating the compressor in forested areas.
 - O. Ethyl ether used in diesel engine ether starting aid systems is extremely flammable. Change cylinders, or maintain or troubleshoot these systems only in well-ventilated areas away from heat, open flame or sparks. **DO NOT** install, store or otherwise expose ether cylinders to temperatures above 160°F (71°C). Remove ether cylinder from the compressor when operating in ambient temperatures above 60°F (16°C).
 - P. **DO NOT** attempt to use ether as a starting aid in gasoline engines or diesel engines with glow plugs as serious personnel injury or property damage may result.
 - Q. **DO NOT** spray ether into compressor air filter or into an air filter that serves both the engine and the compressor as serious damage to the compressor or personal injury may result.
 - R. Antifreeze compound used in air line anti-icer systems contains methanol which is flammable. Use systems and refill with compound only in well-ventilated areas away from heat, open flames or sparks. **DO NOT** expose any part of these systems or the antifreeze compound to temperatures above 150°F (66°C). Vapors from the antifreeze compound are heavier than air. **DO NOT** store compound or discharge treated air in confined or unventilated areas. **DO NOT** store containers of antifreeze compound in direct sunlight.
 - S. Store flammable fluids and materials away from your work area. Know where fire extinguishers are and how to use them, and for what type of fire they are intended. Check readiness of fire suppression systems and detectors if so equipped.
 - T. **DO NOT** operate the compressor without proper flow of cooling air or water or with inadequate flow of lubricant or with degraded lubricant.
 - U. **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



WARNING

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.

- A. Keep hands, arms and other parts of the body and also clothing away from couplings, fans and other moving parts.
- B. **DO NOT** attempt to operate the compressor with the fan, coupling or other guards removed.

- C. Wear snug-fitting clothing and confine long hair when working around this compressor, especially when exposed to hot or moving parts.
- D. Make sure all personnel are out of and/or clear of the compressor prior to attempting to start or operate it.
- E. When adjusting the controls, it may require operation of the equipment during adjustment. **DO NOT** come in contact with any moving parts while adjusting the control regulator and setting the engine RPM. Make all other adjustments with the engine shut off. When necessary, make adjustment, other than setting control regulator and engine RPM, with the engine shut off. If necessary, start the engine and check adjustment. If adjustment is incorrect, shut engine off, readjust, then restart the engine to recheck adjustment.
- F. 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 and away from hot exhaust gases.
- 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.

1.6.1 Tier 4 emissions module—if equipped

General Guidelines: Thermal Protection. The main exhaust piping routes exhaust gas from the engine to the exhaust aftertreatment. Normal operating temperatures can reach up to 530°C (986°F). Regeneration of the Diesel Particulate Filter (DPF) can create temperatures above normal engine exhaust temperatures. Gas temperatures during the regeneration period can reach 750°C (1382°F).



T4—WARNING

Increased DPF skin temperature and exhaust gas temperature may occur in the event of an unexpected engine/aftertreatment failure. An unexpected failure of the engine/aftertreatment may increase temperature at the DPF as high as 900°C (1652°F) gas temperature and 750°C (1382°F) skin temperature. This may result in fire, burn, or explosion hazards, which may result in personal injury or death. Do not expose flammable material or explosive atmospheres to exhaust gas or exhaust system components during regeneration. The aftertreatment skin temperature and the gas temperature are difficult to measure and/or simulate and are dependent upon many factors including the following: the nature of the engine/aftertreatment failure, the design and packaging of the aftertreatment, the engine speed/load conditions, the condition of the aftertreatment and ambient conditions. Therefore, the potential temperatures are provided as a guideline even under conditions of unexpected engine and/or aftertreatment failure.

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 1920 and any other 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 so that exhaust fumes are not apt to be carried towards personnel, air intakes servicing personnel areas or towards the air intake of any portable or stationary compressor.
- E. Fuels, fluids 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 the specific fluid.
- F. Wear goggles or a full face shield when adding anti-freeze compound to air line anti-icer systems.
- G. Wear an acid-resistant apron and a face shield or goggles when servicing the battery. If electrolyte is spilled on skin or clothing, immediately flush with large quantities of water.
- H. Ethyl ether used in diesel engine ether starting aid systems is toxic, harmful or fatal if swallowed. Avoid contact with the skin or eyes and avoid breathing the fumes. If swallowed, **DO NOT** induce vomiting and call a physician immediately.
- I. Wear goggles or a full face shield when testing ether starting aid systems or when adding antifreeze compound to air line anti-icer systems. Keep openings of valve or atomizer tube of ether starting aid system pointed away from yourself and other personnel.
- J. 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.
- K. **DO NOT** store ether cylinders or air line anti-icer system antifreeze compound in operator's cabs or in other similar confined areas.
- L. 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.

- M. If your compressor is equipped with Diesel Emissions Fluid (DEF), when handling DEF wear protective clothing. Tools and clothing that come in contact with DEF must be cleaned.



IMPORTANT

It is very important that all electrical connectors are protected from coming in contact with DEF. If not, there is a risk that DEF will cause oxidation in the wiring that is not possible to clean. The resulting oxidation will result in a wiring/connection failure. Water and compressed air fail to remove DEF. If a connector has been in contact with DEF, it must be changed immediately to prevent the chemical from further migrating into the wiring cable harness, which happens at a speed of 0.6 m/h.



WARNING

In case of DEF contact with eyes or skin, the affected area must be thoroughly rinsed with lukewarm water. If you breathe any fumes, make sure and breathe fresh air.

1.8 Electrical shock

- A. Keep the towing vehicle or equipment carrier, compressor hoses, tools and all personnel at least 10 feet (3 m) from power lines and buried cables.
- B. Stay clear of the compressor during electrical storms! It can attract lightning.
- C. 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.
- D. Attempt repairs in clean, dry and well lighted and ventilated areas only.

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 only in full compliance with OSHA Standards 29 CFR 1910 subpart N or any other Local, State, Military and Federal regulations that may apply.
- B. Inspect lifting bail and 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 net weight of the compressor plus an additional 10% allowance for weight of water, snow, ice, mud, stored tools, and equipment. 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.
- 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 supporting at least its net weight plus an additional 10% allowance for the weight of water, snow, ice, mud, stored tools, and/or equipment.
- K. If the compressor is provided with parking brakes, make sure they are set, and in any event, block or chock both sides of all running wheels before disengaging the lifting hook.

1.10 Entrapment

- A. Make sure all personnel are out of compressor before closing and engaging enclosure doors.
- B. If the compressor is large enough to hold a man and if it is necessary to enter it to perform service adjust-

ments, inform other personnel before doing so, or else secure the access door in the open position to avoid the possibility of others closing and possibly latching the door with personnel inside.

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:
 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.

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 Jump starting

- A. Observe all safety precautions mentioned elsewhere in this manual.

- B. Batteries may contain hydrogen gas which is flammable and explosive. Keep flames, sparks and other sources of ignition away.
- C. Batteries contain acid which is corrosive and poisonous. **DO NOT** allow battery acid to contact eyes, skin, fabrics or painted surfaces as serious personal injury or property damage could result. Flush any contacted areas thoroughly with water immediately. Always wear an acid-resistant apron and face shield when attempting to jump start the compressor.
- D. Remove all vent caps (if so equipped) from the battery or batteries in the compressor. **DO NOT** permit dirt or foreign matter to enter the open cells.
- E. Check fluid level. If low, bring fluid to proper level before attempting to jump start (not applicable to maintenance-free batteries).
- F. **DO NOT** attempt to jump start if fluid is frozen or slushy. Bring batteries up to at least 60°F (16°C) before attempting to jump start or it may explode.
- G. Cover open cells of all compressor batteries with clean dampened cloths before attempting to jump start.
- H. Attempt to jump start only with a vehicle having a negative ground electrical system with the same voltage, and is also equipped with a battery or batteries of comparable size or larger than supplied in the compressor. **DO NOT** attempt to jump start using motor generator sets, welders or other sources of DC power as serious damage may result.
- I. Bring the starting vehicle alongside the compressor, but **DO NOT** permit metal to metal contact between the compressor and the starting vehicle.
- J. Set the parking brakes of both the compressor (if provided) and the starting vehicle or otherwise block both sides of all wheels.
- K. Place the starting vehicle in neutral or park, turn off all non-essential accessory electrical loads and start its engine.
- L. Use only jumper cables that are clean, in good condition and are heavy enough to handle the starting current.
- M. Avoid accidental contact between jumper cable terminal clips or clamps and any metallic portion of either the compressor or the starting vehicle to minimize the possibility of uncontrolled arcing which might serve as a source of ignition.
- N. Positive battery terminals are usually identified by a plus (+) sign on the terminal and the letters POS

adjacent to the terminal. Negative battery terminals are usually identified by the letters NEG adjacent to the terminal or a negative (-) sign.

- O. Connect one end of a jumper cable to the positive (POS) (+) battery terminal in the starting vehicle. When jump starting 24V compressors and if the starting vehicle is provided with two (2) 12V batteries connected in series, connect the jumper cable to the positive (POS) (+) terminal of the ungrounded battery.
- P. Connect the other end of the same jumper cable to the positive (POS) (+) terminal of the starter motor battery in the compressor when jump starting 24V compressors, to the positive (POS) (+) terminal of the ungrounded battery in the compressor.
- Q. Connect one end of the other jumper cable to the grounded negative (NEG) (-) terminal of the battery in the starting vehicle. When jump starting 24V compressors and if the starting vehicle is provided with two (2) 12V batteries connected in series, connect the jumper cable to the negative (NEG) (-) terminal of the grounded battery.
- R. Check your connections. **DO NOT** attempt to start a 24V compressor with one 12V battery in the starting vehicle. **DO NOT** apply 24V to one 12V battery in the compressor.
- S. Connect the other end of this same jumper cable to a clean portion of the compressor engine block away from fuel lines, the crank case breather opening and the battery.
- T. Start the compressor in accordance with normal procedure. Avoid prolonged cranking.
- U. Allow the compressor to warm up. When the compressor is warm and operating smoothly at normal idle RPM, disconnect the jumper cable from the engine block in the compressor, then disconnect the other end of this same cable from the grounded negative (NEG) (-) terminal of the battery in the starting vehicle. Then disconnect the other jumper cable from the positive (POS) (+) terminal of the battery in the compressor, or if provided with two (2) 12V batteries connected in series, from the ungrounded battery in the compressor, and finally, disconnect the other end of this same jumper cable from the positive (POS) (+) terminal of the battery in the starting vehicle or from the positive (POS) (+) terminal of the ungrounded battery in the starting vehicle, if it is provided with two (2) 12V batteries connected in series.

- V. Remove and carefully dispose of the dampened cloths, as they may now be contaminated with acid, then replace all vent caps.

1.13 Towing¹

1.13.1 Preparing to tow



WARNING

Do **NOT** tow the compressor should its weight exceed the rated limit of the tow vehicle, as the vehicle may not brake safely with excess weight. See rated limit in tow vehicle Operator's Manual, and review its instructions and other requirements for safe towing.

- A. Prior to hitching the air compressor to the tow vehicle, inspect all attachment parts and equipment, checking for (I) signs of excessive wear or corrosion, (II) parts that are cracked, bent, dented or otherwise deformed or degraded, and (III) loose nuts, bolts or other fasteners. Should any such condition be present, **DO NOT TOW** until the problem is corrected.
- B. Back the tow vehicle to the compressor and position it in preparation for coupling the compressor.
- C. If the compressor is provided with a drawbar latched in the vertical upright position, carefully unlatch drawbar and lower it to engage the coupling device. If not, raise drawbar with the jack to engage coupling device or otherwise couple the compressor to the towing vehicle.



WARNING

This equipment may be tongue heavy. **DO NOT** attempt to raise or lower the drawbar by hand if the weight is more than you can safely handle.

Use the screw jack provided or a chain fall if you cannot lift or lower it without avoiding injury to yourself or others. Keep hands and fingers clear of the coupling device and all other pinch points. Keep feet clear of drawbar to avoid injury in case it should slip from your hands.

¹ While not towed in the usual sense of the word, many of these instructions are directly applicable to skid-mounted portable air compressors as well.

- D. Make sure the coupling device is fully engaged, closed and locked.
- E. If chains are provided, pass each chain through its point of attachment on the towing vehicle; then hook each chain to itself by passing the grab hook over (not through) a link. Cross chains under the front of drawbar before passing them through points of attachment on towing vehicle to support the front of drawbar in case it should accidentally become uncoupled.
- F. Make sure that the coupling device and adjacent structures on the towing vehicle (and also, if utilized, chain adjustment, brake and/or electrical interconnections) **DO NOT** interfere with or restrict motion of any part of the compressor, including its coupling device, with respect to the towing vehicle when maneuvering over any anticipated terrain.
- G. If provided, make sure chain length, brake and electrical interconnections provide sufficient slack to prevent strain when cornering and maneuvering, yet are supported so they cannot drag or rub on road, terrain or towing vehicle surfaces which might cause wear that could render them inoperative.

**WARNING**

This equipment may be tongue heavy. **DO NOT** attempt to raise or lower the drawbar by hand if the weight is more than you can safely handle.

**CAUTION**

Retract the front screw jack only after attaching the compressor to the tow vehicle. Raise the screw jack to its full up position and pull the pin connecting the jack to the drawbar. Rotate the screw jack to its stowed position, parallel to the drawbar, and reinsert the pin. Make sure the jack is secured in place prior to towing.

If a caster wheel is provided on the screw jack it is part of the screw jack and can not be removed. Follow the same procedure for stowing away the wheeled jack as you would for the standard screw jack. Pull the pin connecting the jack to the drawbar and raise the screw jack to its full up position. Rotate the screw jack to its stowed position, parallel to the drawbar, and reinsert the pin. Make sure the jack is secured in place prior to towing.

- H. On two-wheeled models, fully retract front screw jack and any rear stabilizer legs. If a caster wheel is provided on the screw jack it is part of the screw jack, and can not be removed. Follow the same procedure for stowing away the wheeled jack as you would for the standard screw jack. Pull the pin connecting the jack to the drawbar and raise the screw jack to its full upright position. Rotate the screw jack to its stowed position, parallel to the drawbar, and reinsert the pin. Make sure the jack is secured in place prior to towing.
- I. Make sure tires are in good condition and are the size (load range) specified and are inflated to the specified pressures. **DO NOT** change the tire size or type. Also, make sure wheel bolts, lugs or nuts are tightened to the specified torques.
- J. If provided, make sure all dual stop, tail directional and clearance lights are operating properly and that their lenses are clean and functional. Also, make sure all reflectors and reflecting surfaces, including the slow moving vehicle emblem on compressors provided with same, are clean and functional.
- K. Make sure all service air hoses (not air brake hoses) are disconnected or are fully stowed and secured on hose reels, if provided.
- L. Make sure all access doors and tool box covers are closed and latched. If the compressor is large enough to hold a man, make sure all personnel are out before closing and latching access doors.

- M. Make sure parking brakes in towing vehicle are set, or that its wheels are chocked or blocked, or that it is otherwise restrained from moving. Then, release the compressor parking brakes, if provided.
- N. Make sure the compressor wheels are not chocked or blocked, and that all tie-downs, if any, are free.
- O. Test running brake operation, including breakaway switch operation if provided, before attempting to tow the compressor at its rated speed or less when conditions prevail.
- P. **DO NOT** carry loose or inappropriate tools, equipment or supplies on or in the compressor.
- Q. **DO NOT** load this equipment with accessories or tools such that it is unbalanced from side to side or front to back. Such unbalance will reduce the towability of this equipment and may increase the possibility of tipping, rolling over, jackknifing, etc. Loss of control of the towing vehicle may result.

1.13.2 Towing

- A. Observe all Federal, State, and Local laws while towing this equipment (including those specifying minimum speed).
- B. **DO NOT** exceed the towing speeds listed below under ideal conditions. Reduce your speed according to posted speed limits, weather, traffic, road or terrain conditions:
 - C. Two axle four-wheel or three axle six-wheel steerable models: 15 mph (24 km/h).
 - D. All other models: 55 mph (88 km/h).
- E. Remember that the portable air compressor may approach or exceed the weight of the towing vehicle. Maintain increased stopping distances accordingly. **DO NOT** make sudden lane changes, **U-turns** or other maneuvers. Such maneuvers can cause the compressor to tip, roll over, jackknife or slide and cause loss of control of the towing vehicle. Tipping, rolling over, etc. can occur suddenly without warning. **U-turns** especially should be made slowly and carefully.
- F. Avoid grades in excess of 15° (27%).
- G. Avoid potholes, rocks and other obstructions, and soft shoulders or unstable terrain.
- H. Maneuver in a manner that will not exceed the freedom of motion of the compressor's drawbar and/ or coupling device, in or on the towing vehicle's coupling device and/or adjacent structure whether tow-

ing forward or backing up, regardless of the terrain being traversed.

- I. **DO NOT** permit personnel to ride in or on the compressor.
- J. Make sure the area behind, in front of, and under the compressor is clear of all personnel and obstructions prior to towing in any direction.
- K. **DO NOT** permit personnel to stand or ride on the drawbar, or to stand or walk between the compressor and the towing vehicle.

1.13.3 Parking or locating compressor

- A. Park or locate compressor on a level surface, if possible. If not, park or locate compressor across grade so the compressor does not tend to roll downhill. **DO NOT** park or locate compressor on grades exceeding 15° (27%).
- B. Make sure compressor is parked or located on a firm surface that can support its weight.
- C. Park or locate compressor so the wind, if any, tends to carry the exhaust fumes and radiator heat away from the compressor air inlet openings, and also where the compressor will not be exposed to excessive dust from the work site.
- D. On steerable models, park compressor with front wheels in straight-ahead position.
- E. Set parking brakes and disconnect breakaway switch cable and all other interconnecting electrical and/or brake connections, if provided.
- F. Block or chock both sides of all wheels.
- G. If provided, unhook chains and remove them from the points of chain attachment on the towing vehicle, then hook chains to bail on drawbar or wrap chains around the drawbar and hook them to themselves to keep chains off the ground which might accelerate rusting.
- H. Lower front screw jack and/or any front and rear stabilizer legs. Make sure the surface they contact has sufficient load bearing capability to support the weight of the compressor.



WARNING

This equipment may be tongue heavy. **DO NOT** attempt to raise or lower the drawbar by hand if the weight is more than you can safely handle.

**CAUTION**

Retract the front screw jack only after attaching the compressor to the tow vehicle. Raise the screw jack to its full up position and pull the pin connecting the jack to the drawbar. Rotate the screw jack to its stowed position, parallel to the drawbar, and reinsert the pin. Make sure the jack is secured in place prior to towing.

On two-wheeled models, fully retract front screw jack and any rear stabilizer legs. If a caster wheel is provided on the screw jack it is part of the screw jack and can not be removed. Follow the same procedure for stowing away the wheeled jack as you would for the standard screw jack. Pull the pin connecting the jack to the drawbar and raise the screw jack to its full up position. Rotate the screw jack to its stowed position, parallel to the drawbar, and reinsert the pin. Make sure the jack is secured in place prior to towing.

- I. If a caster wheel is provided on the screw jack, it is part of the screw jack and cannot be removed. Follow the same procedure for stowing away the wheeled jack as you would for the standard screw jack. Raise the screw jack to its full upright position and pull the pin connecting the jack to the drawbar. Rotate the screw jack to its stowed position, parallel to the drawbar and reinsert the pin. Make sure the jack is secured in place prior to towing.
- J. Disconnect coupling device, keeping hands and fingers clear of all pinch points. If the compressor is provided with a drawbar, **DO NOT** attempt to lift the drawbar or if hinged, to raise it to the upright position by hand, if the weight is more than you can safely

handle. Use a screwjack or chain fall if you cannot lift or raise the drawbar without avoiding injury to yourself or others.

- K. Move the towing vehicle well clear of the parked compressor and erect hazard indicators, barricades and/or flares (if at night) if compressor is parked on or adjacent to public roads. Park so as not to interfere with traffic.

NOTE

While not towed in the usual sense of the word, many of these instructions are directly applicable to skidmounted portable air compressors as well.

1.14 California proposition 65**WARNING****California Proposition 65 Warning**

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

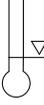
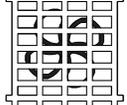
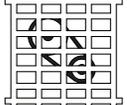
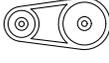
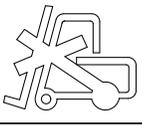
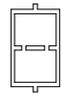
Battery posts, terminals and related accessories contain lead and other compounds known to the State of California to cause cancer and birth defects and other reproductive harm. Wash hands after handling.

1.15 Symbols and references

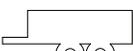
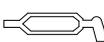
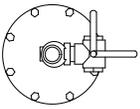
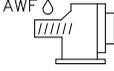
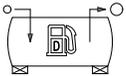
The symbols below may or may not be used. Please refer to the decals set forth on the machine for applicable symbols.

	DIESEL FUEL		HEARING PROTECTION
	ROTARY COMPRESSOR		HARD HAT
	TEST RUN		SAFETY GLASSES
	DRAIN		HOOK HERE
	HIGH PRESSURE		DO NOT REMOVE MANUAL
	SHUT-OFF VALVE W/ SAFETY		DO NOT BREATHE COMPRESSED AIR
	NO		DO NOT STAND ON SERV. VALVE
	ENGINE		DO NOT OPERATE W/ DOORS OPEN
	COMPRESSOR		DO NOT OPEN
	ENGINE OIL		DO NOT STACK
	ENGINE COOLANT		ELECTRICAL SHOCK
	WATER		AIR FLOW
	OIL		HOT SURFACE
	DO NOT		PRESSURIZED VESSEL
	CLOSED MECHANICAL		PRESSURIZED COMPONENT
	FUSE		
	LOW PRESSURE		
	READ MANUAL		
	BRAKES		

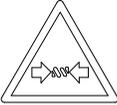
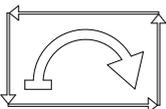
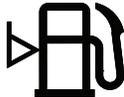
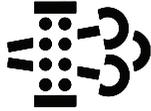
SAFETY SYMBOLS 1

	DANGEROUS OUTLET		ENGINE START
	REMOTELY CONTROLLED		ENGINE ECM
	CORROSIVE		READ/WRITE DATA
	WARNING		INTAKE AIR
	DO NOT MAINTENANCE		EXHAUST GAS
	BELOW TEMPERATURE		FAN GUARD
	DO NOT TOW		BELT GUARD
	BAR/PSI		SERVICE POINT
	BATTERY		LOW TEMPERATURE
	BATTERY DISCONNECT		STD AIR
	OFF		A/C AIR
	ON		24 HOURS
	RESET		BELTS
	NO FORKLIFT		FILTER
	FORK LIFT HERE		STRAINER
	DIRECTION OF ROTATION		

SAFETY SYMBOLS 2

	RADIATOR		HOUR METER
	AIR-CIRCULATING FAN		COMPRESSOR AIR PRESSURE
	AIR-COOLED OIL COOLER		START
	LIQUID-COOLED OIL COOLER		CONTROL
	LUBRICATION		ENGINE PREHEAT LOW TEMP AID
	TRAILER TOWING MODE		ENGINE WARNING
	AXEL		FUEL LEVEL
	LUBRICANT GREASE		ENGINE RPM n/min
	EXAMINE, CHECK		ENGINE OIL PRESSURE
	CRUSH/PINCH POINT		ENGINE COOLANT TEMPERATURE
	FUNCTIONAL ARROW		COMPRESSOR TEMPERATURE
	ENGINE INTAKE AIR FILTER		DO NOT MIX COOLANTS
	PRESSURE CONTROL		AFTERCOOLER BYPASS VALVE
	INLET VALVE SPRING		DRAIN HEATER
	INTERNAL FUEL		BATTERY HEATER
	EXTERNAL FUEL		COMPRESSOR OIL HEAT
	SIDE DOOR T-LATCH		STACKING LIMIT BY NUMBER

SAFETY SYMBOLS 3

	DO NOT OPERATE WHILE STACKED		WATER DRAIN
	PRESSURIZED SPRING		SEVER (FAN)
	DO NOT MIX FLUIDS		DEF FLUID ONLY
	AUTO START/STOP		RUN
	FLUID DRAIN		LOW FUEL
	DPF: DIESEL PARTICULATE FILTER		HEST: HIGH EMISSIONS SYSTEM TEMPERATURE
	DPF REGEN. INHIBIT		EMISSIONS MALFUNCTION INDICATION

SAFETY SYMBOLS 4

Notes:

Section 2

Description

2.1 Introduction

The Sullair 185 CFM Standard Portable Air Compressor offers superior performance, reliability and require a minimal amount of maintenance. Compared to other compressors, Sullair's are unique in terms of reliability and durability. Compressor internal components require no routine maintenance inspections.

2.2 Description of components

Figure 2-1 on page 18 shows the main components and subassemblies of the Sullair 185 Standard Portable Air Compressor. These packages include a heavy duty rotary screw air compressor, a diesel engine, fuel tank, compressor inlet system, compressor cooling and lubrication system, compressor discharge system, capacity control system, instrument panel and electrical system. A low profile canopy offers improved handling and mobility. A clamshell canopy provides easy access to all serviceable components.

The control system can easily be adjusted for pressures from 80 to 125 psig (5.6 to 8.6 bar). The compressor unit is driven by an industrial diesel engine designed to provide enough horsepower to provide an adequate reserve under rated conditions.

Refer to the *Engine Operator's Manual* for a more detailed description of the engine. The engine cooling system is comprised of a radiator, high capacity fan, and thermostat. The high capacity fan pushes air through the radiator to maintain the engine's specified operating temperature. The same fan also cools the fluid in the compressor cooling and lubrication system.

The engine radiator and the compressor fluid cooler are next to each other allowing the fan air to push through both simultaneously. As air passes through the fluid cooler, the heat of compression is removed from the fluid.

2.3 Sullair compressor unit, functional description

Sullair compressors are single-stage, positive displacement, flood lubricated-type compressors that provide

continuous (pulse-free) compression to meet various demand loads. Sullair compressors require no routine maintenance or inspection of their internal parts or systems. The compressor works by injecting fluid into the compressor unit where it mixes directly with the air as the rotors turn. The fluid flow has three main functions:

- It acts as a coolant, to control the rise of air temperature which is generated by compression (heat of compression).
- Seals the leakage paths between the rotors and the stator and also between the rotors themselves.
- Lubricates the rotors allowing one rotor to directly drive the other.

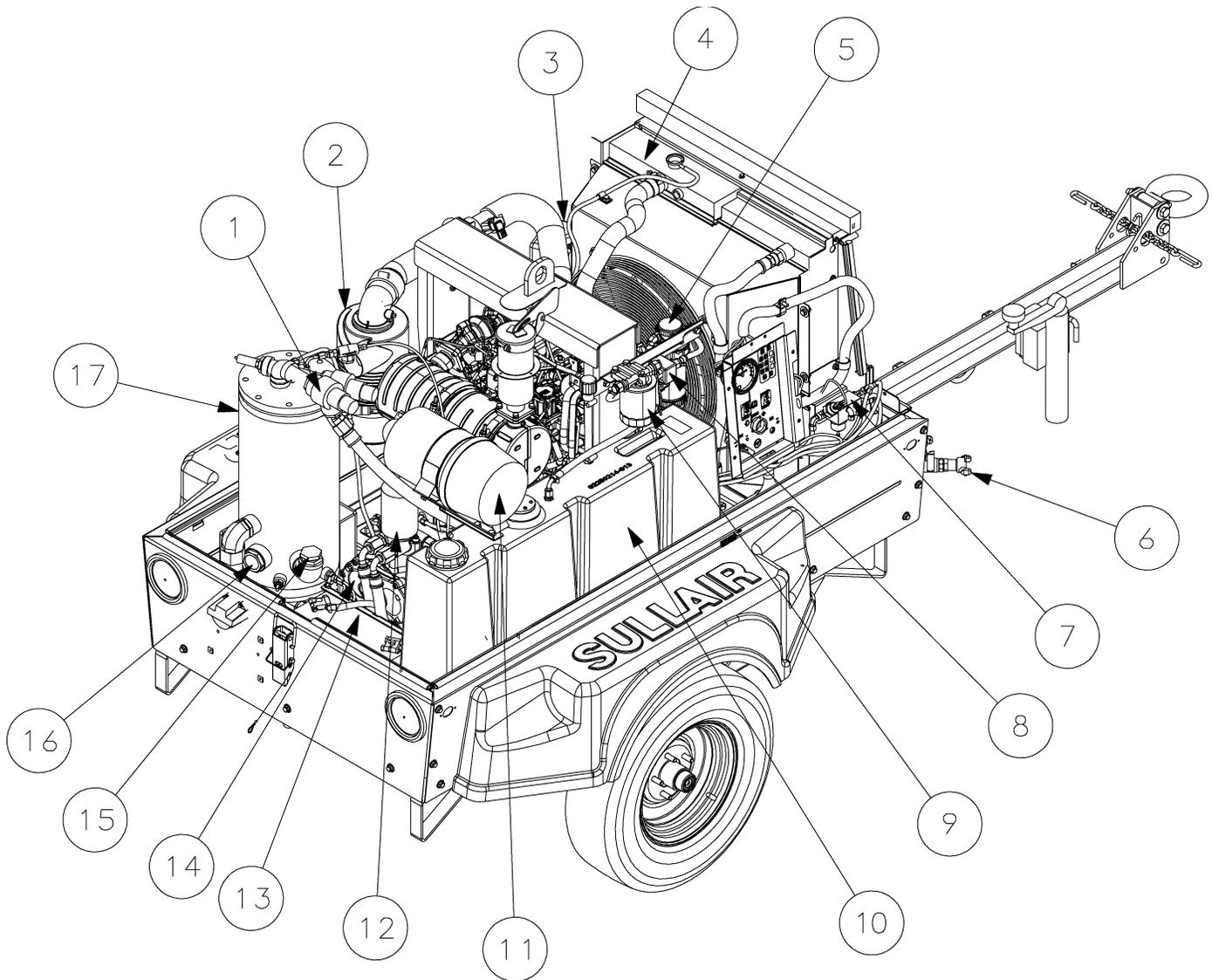
After the air/fluid mixture is discharged from the compressor unit, the fluid is separated from the air. At this time, the air flows to the service line and the fluid is cooled in preparation for re-injection.

2.4 Compressor cooling and lubrication system, functional description

Refer to *Figure 2-2* on page 19 The compressor cooling and lubrication system is designed to provide adequate lubrication as well as maintain the proper operating temperature of the compressor. In addition to the fluid cooler and interconnecting piping, the system consists also of three other components: a fluid filter, thermal valve, and a fan which perform the following functions:

- The fluid filter removes and collects any contaminants in the fluid.
- The thermal valve functions as a temperature regulator directing fluid either to the cooler or to the compressor unit.
- The fan pushes air through the cooler dissipating the heat resulting from compression of the fluid.

The functions of the lubrication system are explained in more detail below. Fluid is used in the system as a coolant and as a lubricant: the receiver tank serves as the



- | | |
|---|---|
| 1. Minimum pressure/check valve | 10. Fuel tank |
| 2. Engine air filter | 11. Compressor air filter |
| 3. Coolant overflow bottle | 12. Thermal valve/compressor fluid filter |
| 4. Radiator/fluid cooler assembly | 13. Battery |
| 5. Fuel/water separator | 14. Compressor air end |
| 6. Service valves | 15. Fluid fill |
| 7. Pressure regulator & blowdown manifold | 16. Fluid level sight glass |
| 8. Fuel pump | 17. Receiver tank |
| 9. Fuel filter | |

Figure 2-1: 185 T4 Kubota rotary screw portable air compressor

fluid reservoir. At start-up, fluid flows from the receiver tank to the fluid thermal valve. Fluid circulation is achieved by forcing the fluid from the high pressure region of the receiver tank to a lower pressure area in the compressor unit. A minimum pressure device (See *Section 2.5: Compressor discharge system, functional description* on page 19) is provided to assure adequate fluid flow under all conditions. When entering the thermal valve upon start-up, the fluid temperature is cool and thus it is not necessary to route it through the cooler. The fluid flows through the fluid filter and on to the compressor unit bypassing the cooler. As the compressor continues to operate, the temperature of the fluid rises and the thermostatic control opens, allowing a portion of the fluid into the cooler.

When the temperature reaches 160°F (71°C), the thermostat is fully open allowing all fluid entering the thermal valve to flow to the cooler.

The cooler is a radiator type that works in concert with the engine fan. The fan pushes air through the cooler

removing the heat from the fluid. From the cooler, the fluid is then routed back through the fluid filter. All fluid flowing to the compressor unit passes through this filter. The fluid leaving the filter flows to the compressor unit where it lubricates, seals and cools the compression chamber; and lubricates the bearings and gears.

2.5 Compressor discharge system, functional description

Refer to *Figure 2-2* on page 19. The Sullair compressor unit discharges a compressed air/fluid mixture into the receiver tank. The receiver tank has three functions:

- It acts as a primary fluid separator.
- Serves as the compressor fluid reservoir.
- Houses the air/fluid separator.

The compressed air/fluid mixture enters the receiver tank and is directed against its side. Because of a change of direction and reduction of velocity, large droplets of fluid

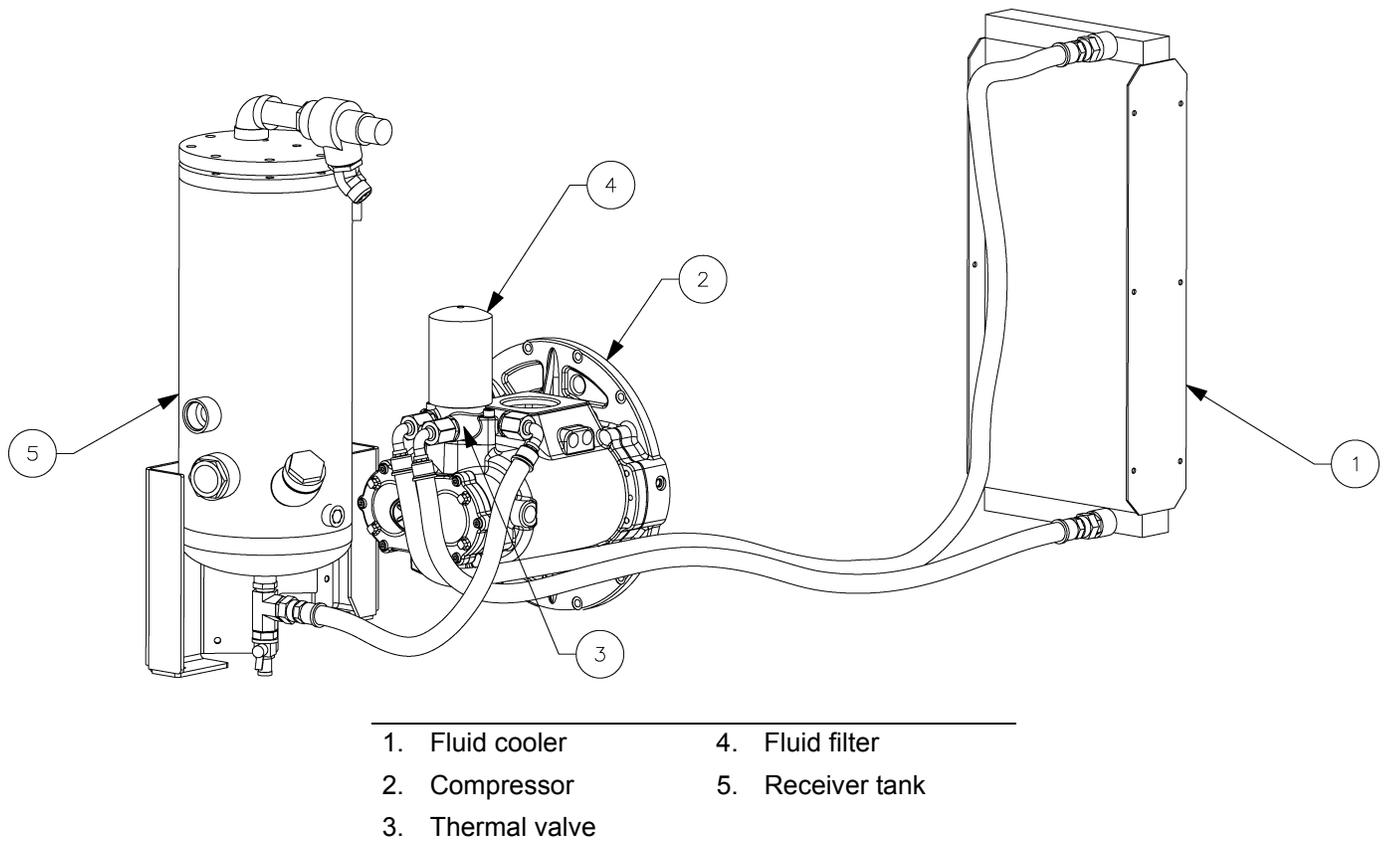
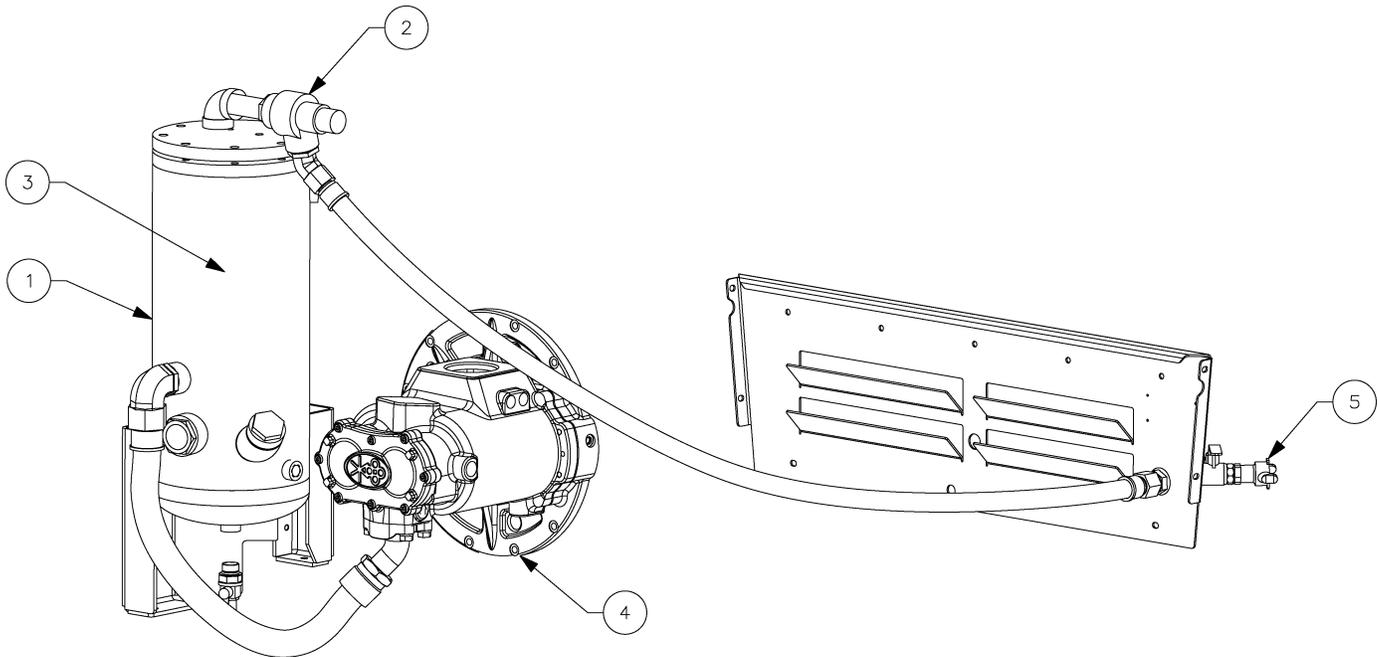


Figure 2-2: Compressor cooling and lubrication system



- | | |
|---------------------------------------|------------------------|
| 1. Receiver tank | 4. Compressor unit |
| 2. Minimum pressure/check valve | 5. Service air outlets |
| 3. Internal air/oil separator element | |

Figure 2-3: Compressor discharge system

separate and fall to the bottom of the receiver tank. The small amount of fluid remaining in the compressed air collects on the surface of the separator element as the compressed air flows through the separator. As more fluid collects on the element surface, it then flows to the bottom of the separator. A return line (or scavenge tube) leads from the bottom of the separator element to the inlet region of the compressor unit. Fluid collecting on the bottom of the separator element is returned to the compressor by the pressure difference between the area surrounding the separator element and the compressor inlet. An orifice (protected by a strainer) is included in this return line to assure proper and unobstructed flow. The receiver tank is code rated at 200 psig (13.8 bar) working pressure. A minimum pressure device located downstream from the separator, ensures a minimum receiver pressure of 80 psig (5.5 bar) during all conditions. Keeping this pressure level stable is necessary for proper air/fluid separation and proper fluid circulation. A pressure relief valve (located on the wet side of the separator) is

set to open if the receiver tank pressure exceeds 200 psig (13.8 bar).



WARNING

Do not remove caps, plugs and/or other components when the compressor is running or pressurized. Stop the compressor and relieve all internal pressure before removing these items.

2.6 Capacity control system, functional description

Refer to *Figure 2-3* on page 20. The purpose of the control system is to regulate the amount of air intake and match it to the demand (required output) on the compressor. The control system consists of a pressure regulating valve(s), air inlet valve, system blowdown valve, engine speed control, and tubing connecting the various compo-

nents of the compressor. The functional descriptions of the control system are described by relating them to four distinct phases of operation. They apply to any control system with the exception of those with specified pressures which are dependent on pressure requirements. The given values apply to a compressor with an operating pressure range of 100 to 125 psig (6.9 to 8.6 bar).

2.6.1 Start—0 to 58 psig (0 to 4.0 bar)

When the compressor is started, the receiver tank pressure quickly rises from 0 to 58 psig (0 to 4.0 bar). During this period the pressure regulator valve is inactive. At this pressure range the idle warm-up control keeps the inlet valve closed for engine idle operation. Within 30 seconds of starting the compressor (the instrument controller **READY** status light is on) turn the handle of the warm-up selector valve (located on the instrument panel) from the **START** to the **RUN** position. The inlet valve is fully open due to inlet pressure, and the compressor operates at full capacity. When the compressor operates at full capacity, the engine runs at full speed.

2.6.2 Normal operation—80 to 100 psig (5.6 to 6.9 bar)

When the warm-up control selector valve handle is moved to the **RUN** position, the receiver tank pressure rises above 80 psig (5.6 bar). At this time, the inlet valve remains fully open for maximum air output. The engine will continue to run at full speed during this phase of operation.

2.6.3 Modulation—100 to 125 psig (6.9 to 8.6 bar)

If the demand on the compressor is less than its rated capacity, the service line pressure will rise above 125 psig (8.6 bar). The pressure regulating valve gradually opens, applying pressure to the inlet valve piston and engine speed control. This causes the inlet valve to partially close and reduces the engine speed. As the pressure increases, the inlet valve piston will further close the inlet valve and the engine speed will decrease until it reaches its preset idle speed. When the demand on the compressor increases, the receiver tank pressure falls below 125 psig (8.6 bar). The pressure regulating valve closes, the air inlet valve opens fully, and the engine speed increases to its preset full load rating.

Between the pressure regulating valve and the inlet valve, there is a small orifice that vents a small amount of air into the atmosphere when the pressure regulating valve is open. This allows changes in air output to conform to air demand. This orifice also discharges any accumulated moisture from the regulator.

2.6.4 Shutdown

The blowdown valve is normally closed. At shutdown the back pressure in the compressor inlet signals the blowdown valve to vent the receiver tank pressure into the atmosphere.

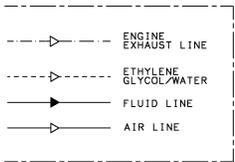
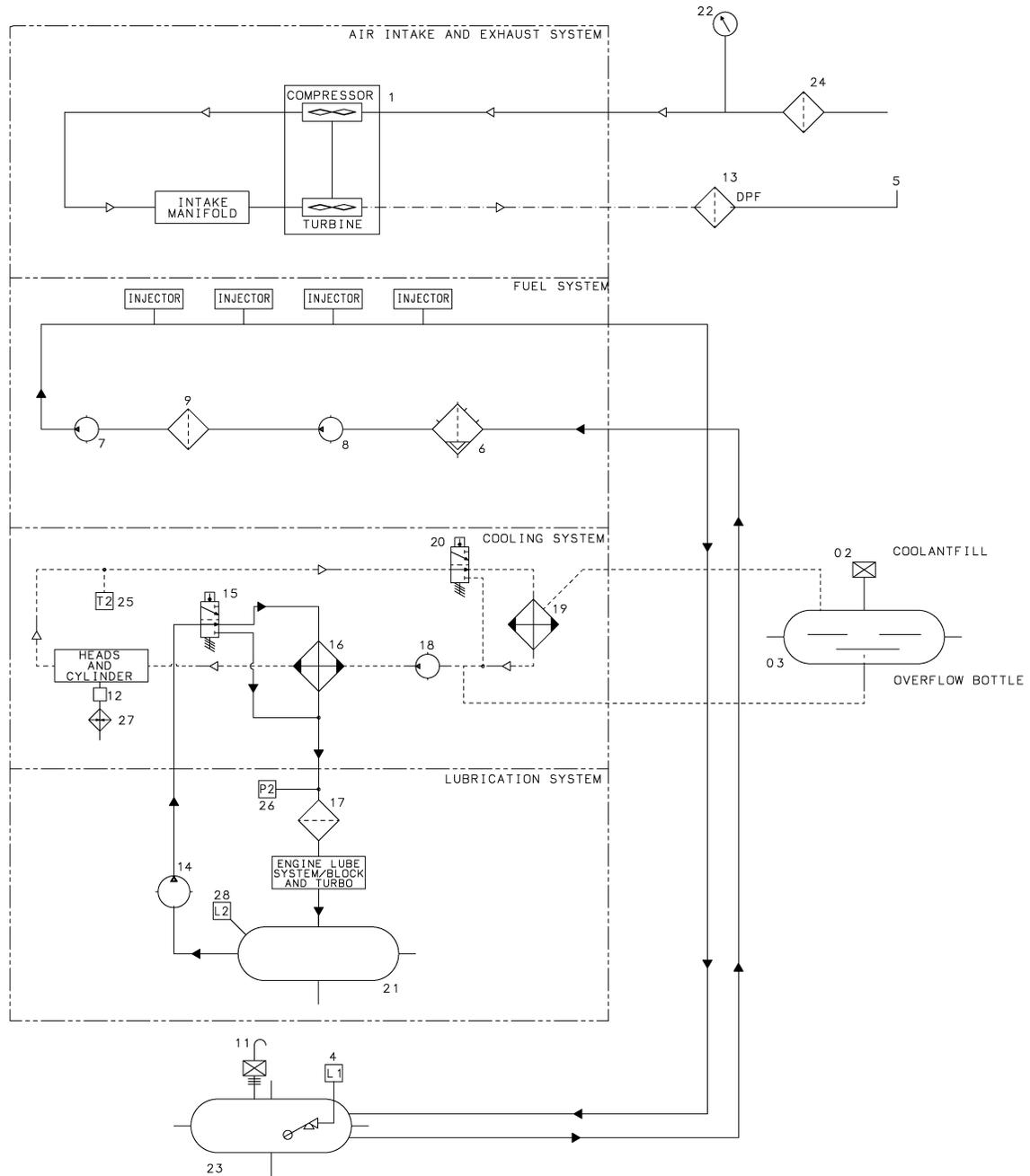
2.7 Piping and instrumentation—compressor system

Key	Description
01	FILTER, AIR
02	GAUGE, FILTER RESTRICTION (OPTIONAL)
03	INLET VALVE
04	COMPRESSOR
05	SWITCH, TEMPERATURE
06	VALVE, RELIEF
07	RECEIVER, AIR/OIL
08	GLASS, SIGHT OIL LEVEL
09	VALVE, MINIMUM PRESSURE/CHECK
10	VALVE, BALL
11	ORIFICE
12	VALVE, BLOWDOWN N.C.
13	STRAINER
14	VALVE, THERMAL BYPASS
15	COOLER, OIL
16	FILTER, OIL
17	GAUGE, PRESSURE
18	VALVE, PRESSURE REGULATOR
19	VALVE, 3-WAY SELECTOR
20	VALVE, CHECK
21	SEPARATOR, AIR/OIL
22	PRESSURE TRANSDUCER
23	OPTIONAL TEMP SENSOR

Components

Component	Description
T1	RECIEVER TANK TEMPERATURE SWITCH
P1	DRY SIDE SERVICE PRESSURE

2.8 Piping and instrumentation—engine system



02250210-170 R02 (sh2)

2.8 Piping and instrumentation—engine system

Key	Description
01	TURBOCHARGER, COMPRESSOR
02	COOLANTFILL
03	OVERFLOW BOTTLE
04	FUEL LEVEL SENDER W/SWITCH (OPTIONAL)
05	RAIN CAP, EXHAUST SYSTEM
06	FUEL FILTER W/ WATER SEPARATOR
07	FUEL INJECTION PUMP
08	ELECTRIC FUEL PRIMING PUMP
09	FILTER, FUEL
11	FUEL TANK CAP W/VENT
12	THERMOSTAT, THERMOCORD(OPTIONAL)
13	FILTER, DEISEL PARTICULATE
14	OIL PUMP (INTEGRAL TO ENGINE)
15	BY-PASS VALVE (INTERNAL TO ENGINE)
16	COOLER, OIL (INTERNAL TO ENGINE)
17	FILTER, OIL
18	WATER PUMP (INTEGRAL TO ENGINE)
19	RADIATOR, ENGINE
20	ENGINE THERMOSTAT (INTEGRAL TO ENGINE)
21	ENGINE OIL PAN
22	GAUGE, FILTER RESTRICTION
23	TANK, FUEL
24	FILTER,AIR
25	SENSOR, COOLANT TEMPERATURE
26	SENSOR, ENGINE OIL PRESSURE
27	JACKET WATER HEATER (OPTIONAL)
28	OIL LEVEL (DIPSTICK)

Components

Component	Description
L1	FUEL LEVEL
L2	OIL LEVEL (DIPSTICK)
P2	OIL PRESSURE
T2	COOLANT TEMPERATURE SENSOR

2.9 Air inlet system, functional description

The air inlet system consists of two air filters, a compressor air inlet valve and interconnecting piping to the engine and the compressor.

The air filters are two-stage dry element type filters that are capable of cleaning extremely dirty air. However, when operating in dirty environments, the filters should be checked more frequently.

See *Section 5.9.3: Air filter maintenance* on page 48 for air filter maintenance procedures.

2.10 Instrument panel group, functional description

Refer to *Figure 2-4* on page 27 for the locations of the following indicators and controls:

1. The **master gauge** continuously monitors the receiver tank pressure and displays engine and compressor status.
2. The **LCD display** displays the status of the engine and the compressor.
3. The **user interface buttons** navigate the LCD display screen.
4. The **active regeneration lamp** helps to indicate regeneration status. See *Section 2.11: Engine exhaust after-treatment* on page 28.
5. The **regeneration needed / request lamp** helps to indicate regeneration status. See *Section 2.11: Engine exhaust after-treatment* on page 28.
6. The **engine shutdown lamp** indicates that the engine should be shut down immediately to prevent engine damage. Always correct the problem that caused the shutdown before restarting the compressor.
7. The **compressor shutdown lamp** indicates the engine and compressor safety shutdown status.
8. If equipped with the fuel level sender option, the **low fuel lamp** indicates that the fuel level is near the shutdown level.
 - If equipped with the fuel level sender option, you can also view the fuel tank level on the LCD display.
9. The **inhibit lamp** indicates that regeneration is inhibited. See *Section 2.11: Engine exhaust after-treatment* on page 28.
10. The **compressor warning lamp** indicates a compressor fault has occurred.
11. The **engine warning lamp** indicates that an abnormal condition exists in the engine system. You do not need to shutdown the compressor and correct the problem immediately, but you should correct the problem as soon as possible.
12. The **START/ON/OFF** switch energizes the system and starts the compressor. The engine switch is pressed to the **ON** position to energize the electrical system, and pressed momentarily to the **START** position to engage the starter and start the compressor.
13. The **FORCE/REGEN/INHIBIT** regeneration switch controls after-treatment of the engine exhaust. See *Section 2.11: Engine exhaust after-treatment* on page 28.
 - If the inhibit lamp is not lit, pressing **INHIBIT** will inhibit regeneration.
 - If the inhibit lamp is lit, pressing **INHIBIT** will allow the compressor to regenerate normally.
14. The **diagnostic service port** is used to connect a service diagnostic tool.
15. The idle **warm-up control** reduces compressor load at start-up. Turned the control from **START** to **RUN** after the compressor warms up for full compressor operation.

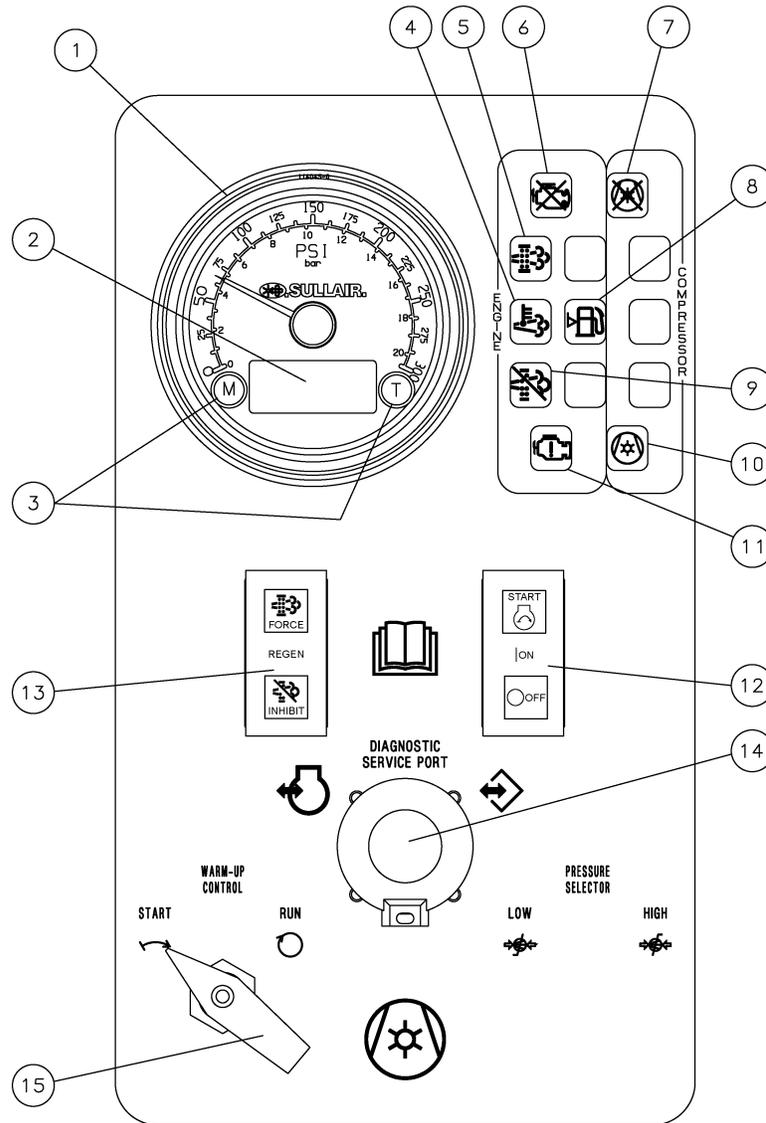


WARNING

Do not use aerosol types of starting aids such as ether.

Such use could result in an explosion and personal injury.

If the engine fails to start during the automatic startup sequence, wait two minutes to allow the starting motor to cool before attempting to start the engine again.



- | | |
|---------------------------------------|---|
| 1. Master gauge | 9. Inhibit lamp |
| 2. LCD display | 10. Compressor warning lamp |
| 3. User interface buttons | 11. Engine warning lamp |
| 4. Active regeneration lamp | 12. START/ON/OFF switch |
| 5. Regeneration needed / request lamp | 13. FORCE/REGEN/INHIBIT regeneration switch |
| 6. Engine shutdown lamp | 14. Engine controller diagnostic service port |
| 7. Compressor shutdown lamp | 15. Compressor warm-up control (START/RUN) |
| 8. Low fuel lamp | |

Figure 2-4: Instrument panel

2.11 Engine exhaust after-treatment

Tier 4 engine emission regulations require the installation of exhaust filters (EF) on most engines. The exhaust filters discussed here consist primarily of a diesel oxidation catalyst (DOC) and a diesel particulate filter (DPF). The exhaust flows from the engine through the DOC and then the DPF. The DOC reduces hydrocarbon (HC) emissions, enables passive regeneration of the DPF, and oxidizes dosed hydrocarbon for active cleaning of the DPF. The DPF traps diesel particulate (primarily carbon soot) from the exhaust. Any engine fitted with an EF must be run on ultra-low sulfur fuel and low ash CJ-4 or equivalent lubricating oil.

During normal operation, the diesel particulate filter (DPF) accumulates soot. When that soot level reaches a certain level, the engine control unit (ECU) determines that the DPF needs to be cleaned or “regenerated”. At that time, the ECU prepares the diesel oxidation catalyst (DOC) through exhaust temperature management. When the DOC reaches the required temperature, hydrocarbon (HC) fuel dosing is activated.

After a period of high temperature cleaning, the DPF is ready to trap more particulate and the engine returns to

normal operation. The frequency of cleaning is highly dependant on the engine operating conditions.

Your Sullair compressor’s engine exhaust regenerates in one of several different ways, depending on the compressor’s operating conditions.

- **Passive regeneration.** Continuous regeneration due to high exhaust temperature.
- **Active regeneration.** Automatic controlled regeneration with the aid of post injection despite low exhaust temperature. Machine operation is not interrupted.
- **Parked regeneration.** Machine is manually placed in Start mode and the **FORCE/REGEN/INHIBIT** switch is in the **FORCE** position. Normal operations are not possible in parked regeneration. Machine should be left to finish a parked regeneration unless it is absolutely necessary to take it out of regeneration or to shut down the machine. If machine is not allowed to regenerate while in parked regeneration, the DPF may become damaged and need to be serviced or replaced.

Table 2-1: Engine exhaust regeneration lamp sequence

Particulate level	Active/Parked regeneration	 Inhibit lamp	 Active regeneration lamp	 Regeneration needed / request lamp	 Engine lamps
Level 0: Passive regeneration only	Regeneration not needed	ON	OFF	OFF	OFF
	Regeneration not needed	OFF	OFF	OFF	OFF
Level 1: Active regeneration	Active regeneration needed	ON	OFF	SOLID LIGHT	OFF
	Active regeneration occurring	OFF	SOLID LIGHT	SOLID LIGHT	OFF
Level 2: Active / parked regeneration	Active regeneration needed	ON	OFF	BLINKING LIGHT	OFF
	Parked regeneration needed	ON	OFF	BLINKING LIGHT	OFF
	Active regeneration occurring	OFF	SOLID LIGHT	SOLID LIGHT	OFF
	Parked regeneration occurring	OFF	SOLID LIGHT	SOLID LIGHT	OFF
Level 3: De-rating power & speed	Parked regeneration needed	ON	OFF	BLINKING LIGHT	 WARNING
	Parked regeneration occurring	OFF	SOLID LIGHT	SOLID LIGHT	 WARNING
Level 4: De-rating power & speed	Parked regeneration needed (Kubota service)	ON	OFF	BLINKING LIGHT	 WARNING
	Parked regeneration occurring (Kubota service)	OFF	SOLID LIGHT	SOLID LIGHT	 WARNING
Level 5: Engine stop	DPF service required	ON	OFF	BLINKING LIGHT	 SHUTDOWN
	DPF service required	OFF	OFF	BLINKING LIGHT	 SHUTDOWN

2.12 Wiring diagram

Drawing notes

A1	TO BATTERY POSITIVE
A2	TO BATTERY SIDE OF DISCONNECT SWITCH

ISO 280 relay socket (bottom view)

30 COM		86 COIL+
85 COIL-	87A NC	87 NO

Cooper/Bussmann 15303-4-0-4S RTMR power distribution module

	AA	A		B	C	D	
KEYSWITCH	502 ²	503 ²	1	326 ¹		250 ³	GLOW PLUG RELAY
ALTERNATOR	500 ³	501 ³	2	135 ³	D	325 ¹	
IGNITION SWITCH	226A ⁴	226 ⁴	3				
GLOW PLUGS	326 ¹	344 ¹	4	331 ¹		361 ⁴	START RELAY
START SWITCH	216 ⁴	216A ⁴	5	313 ⁴	D	330 ¹	
EGR	6 ³	324 ³	6	327 ¹		328 ⁴	EGR RELAY
CONTROL POWER	340 ¹	339 ¹	7	241 ⁴	D	324 ³	
KEYSWITCH/SHUTDOWN	341 ³	336 ³	8				SHUTDOWN RELAY
STARTER RELAY POWER	342 ³	331 ¹	9	336 ³		338 ³	
ECU POWER	343 ¹	327 ¹	10	318 ⁴	218 ³	356 ⁴	

D=DUMMY OR DEAD END CONTACT TO PROVIDE COMPLETE 5 CONTACT RELAY CONNECTION

2.13 Electrical system, functional description

The electrical system consists of the basic electrical elements required to operate the compressor and also has a system feature that automatically shuts down the compressor when a malfunction occurs. The system's components include: an engine starter, battery, alternator/voltage regulator, and a fuel solenoid. It also has a com-

pressor discharge temperature switch that will shut the compressor down if the compressor temperature exceeds 250°F (121°C). The single axle controller will shut the compressor down if the engine speed falls below 1300 rpm and an optional low fuel level switch shuts down the engine when fuel level is low to prevent running the engine dry (out of fuel). The engine is also equipped with an ECU (engine control unit).

Section 3

Specifications

3.1 Specifications—49HP 185 Kubota

Table 3-1: Package specifications

Model series		49HP 185	
		DPQ	DLQ
Package			
Working weight	lbs	2175	1950
	kg	987	885
Dry weight	lbs	1960	1740
	kg	889	789
Length (with standard drawbar)	in	130.8	79.3
	mm	3322	2014
Width	in	59.2	40.7
	mm	1504	1034
Height	in	58	47.8
	mm	1473	1214
Track width	in	50.9	n/a
	mm	1293	n/a
Maximum towing speed	mph	55	n/a
	km/h	89	n/a
Axle rating	lbs	3700	n/a
	kg	1678	n/a
Tire size		ST175/80D13	n/a
Tire pressure	psig	50	n/a
	bar	3.4	n/a
Lug nut torque	lb-ft	60	n/a
	N•m	81	n/a

Table 3-2: Compressor specifications

Model series		49HP 185	
Type		Rotary screw	
Actual delivery	cfm	185	
	m ³ /min	5.2	
Rated pressure	psig	100	
	bar	6.9	
Pressure range, min.	psig	80	
	bar	5.5	
Pressure range, max.	psig	125	
	bar	8.6	
Service valves	number	2	
	size	3/4"	
Compressor fluid capacity	gal	2.1	
	L	7.9	
Receiver tank volume	ft ³	n/a	
	m ³	n/a	
Maximum operating altitude	ft	9000	
	m	2743	
Fuel consumption, 100% load	gph	2.7	
	L/h	10.2	
Compressor discharge shutdown temperature	°F	250	
	°C	121	
Operating tilt (maximum)		15°	

Table 3-3: Engine specifications

Model Series		49HP 185
Type		Diesel
Make		Kubota
Model		KUB1803 (T4F)
Emissions level	U.S. EPA	Tier 4 final
Operating speed	rpm	2720
Minimum idle speed	rpm	1800
Electrical system	voltage	12
Battery rating	CCA	1000
Available power	bhp	49
	kW	36.5
Displacement	in ³	134
	cm ³	2196
Cooling system capacity	gal	2.75
	L	10.4
Engine oil capacity	qts	7.3
	L	6.9
Fuel tank capacity	gal	27
	L	102.2
Cylinders		3

3.2 Lubrication guide—compressor

Fluid type	Change period, hours	Ambient temperature range	
		°F	°C
Sullair AWF [®] 1	1500	-20 to 120	-29 to 49
¹ Sullair AWF part numbers: 250030-757 (5 gallons/18.9 liters) and 250030-758 (55 gallon/208 liter drum)			

3.3 Lubrication guide—engine

Refer to the *Kubota Diesel Engine Operation and Maintenance Manual* for engine oil specifications.

3.4 Application guide

Sullair portable air compressors are filled with Sullair AWF®. Sullair AWF is a heavy-duty, multi-viscosity, all-weather fluid suitable to a wide variety of conditions, including conditions that can cause severe fluid oxidation.

Periodically drain the condensate from the air/fluid separator. In high ambient temperature and high humidity conditions, condensed moisture can emulsify with the fluid (indicated by the fluid turning a “milky” color). Change the fluid if this condition develops.

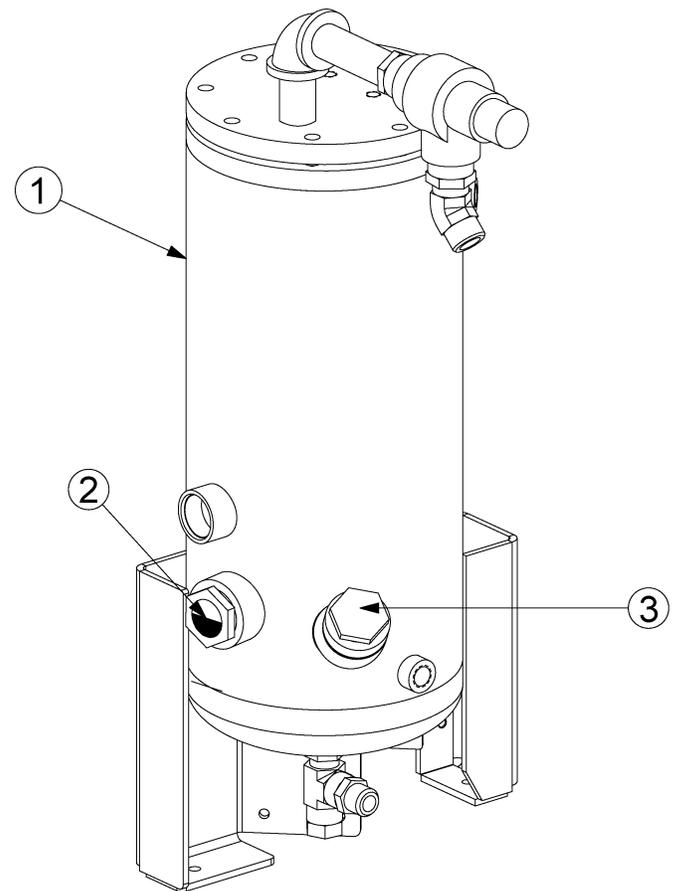
Do not mix different types or brands of fluid. Mixing different types or brands of fluids can lead to operational problems such as foaming, plugged filters, blocked orifices or lines, or even severe problems like a plugged cooler or a locked air end.

Contact your Sullair representative for fluid recommendations if operating conditions require the use of an extended life fluid (for example, the ambient temperature is outside the recommended temperature range for Sullair AWF).

Sullair encourages users to participate in a fluid analysis program. The analysis might indicate a need for change intervals different from those recommended in this manual (for example, to maximize the life of the machine in dirty environments). Contact your Sullair representative for details.

NOTE

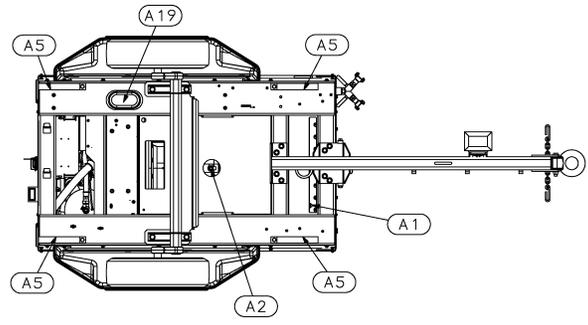
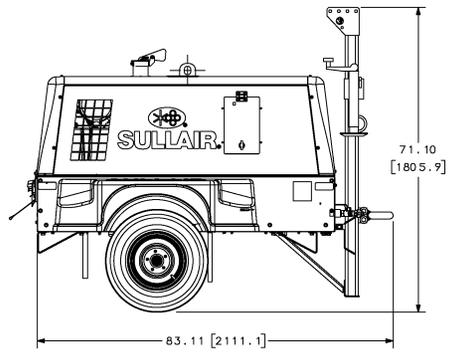
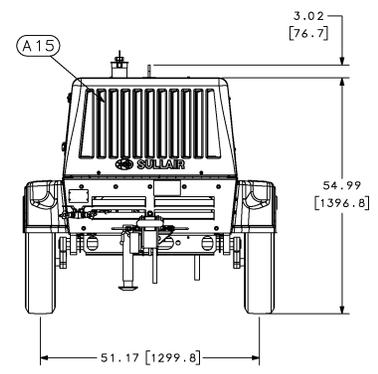
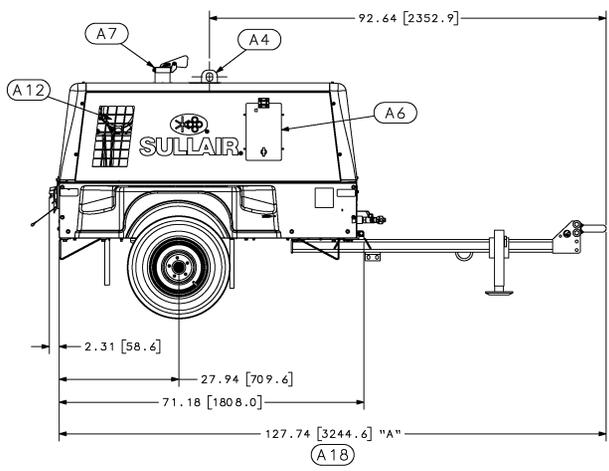
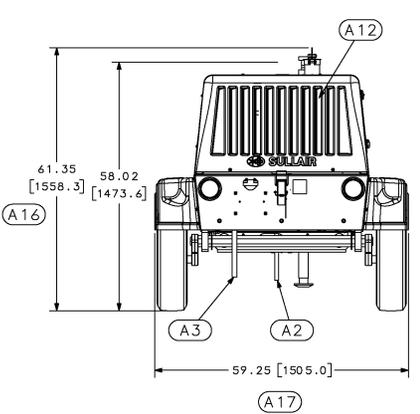
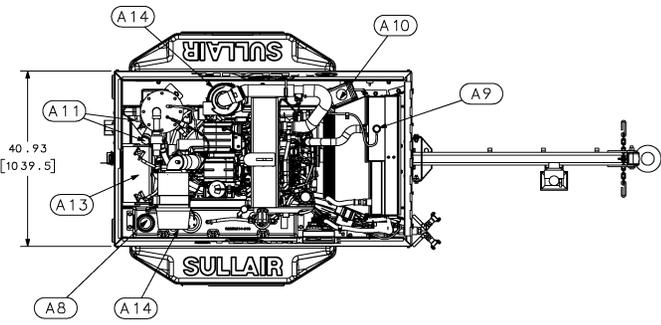
Proper compressor fluid level visible halfway in fluid sight glass when checked on a level surface with the compressor not running.



1. Receiver/tank
2. Sight glass
3. Fluid fill port

Figure 3-1: Receiver tank

3.5 Identification—DPQ



3.5 Identification—DPQ

Drawing notes

1	DIMENSIONS ARE IN INCHES. [] DIMENSIONS ARE IN MILLIMETERS.
2	REFERENCE: A STANDARD CONTAINER SIZE IS 92" WIDE X 94" TALL X 232" LONG.
3	ALL DIMENSIONS ARE +/- .50" [12.7mm]
A1	ENGINE COOLANT DRAIN FLEXIBLE HOSE
A2	ENGINE OIL DRAIN FLEXIBLE HOSE
A3	COMPRESSOR OIL DRAIN
A4	LIFTING BAIL EYE (APPROX. CENTER OF GRAVITY)
A5	TIEDOWN NOT SHOWN(4-PLACES)
A6	INSTRUMENT PANEL DOOR
A7	ENGINE EXHAUST AIR OUT (3" DIA)
A8	ENGINE FUEL FILL
A9	ENGINE COOLANT FILL
A10	ENGINE COOLANT OVERFLOW ACCESS
A11	COMPRESSOR OIL FILL AND SIGHT GLASS
A12	AIR INTAKE
A13	BATTERY ACCESS
A14	AIR FILTER ELEMENT ACCESS
A15	AIR OUTLET
A16	OVERALL HEIGHT (STANDARD MACHINE)
A17	OVERALL WIDTH
A18	OVERALL LENGTH
A19	FUEL TANK DRAIN

Option	Add to dimension "A"	
	in	mm
Standard eye	0	0
Ball hitch	.75	19
Extended drawbar with standard eye	21.25	540

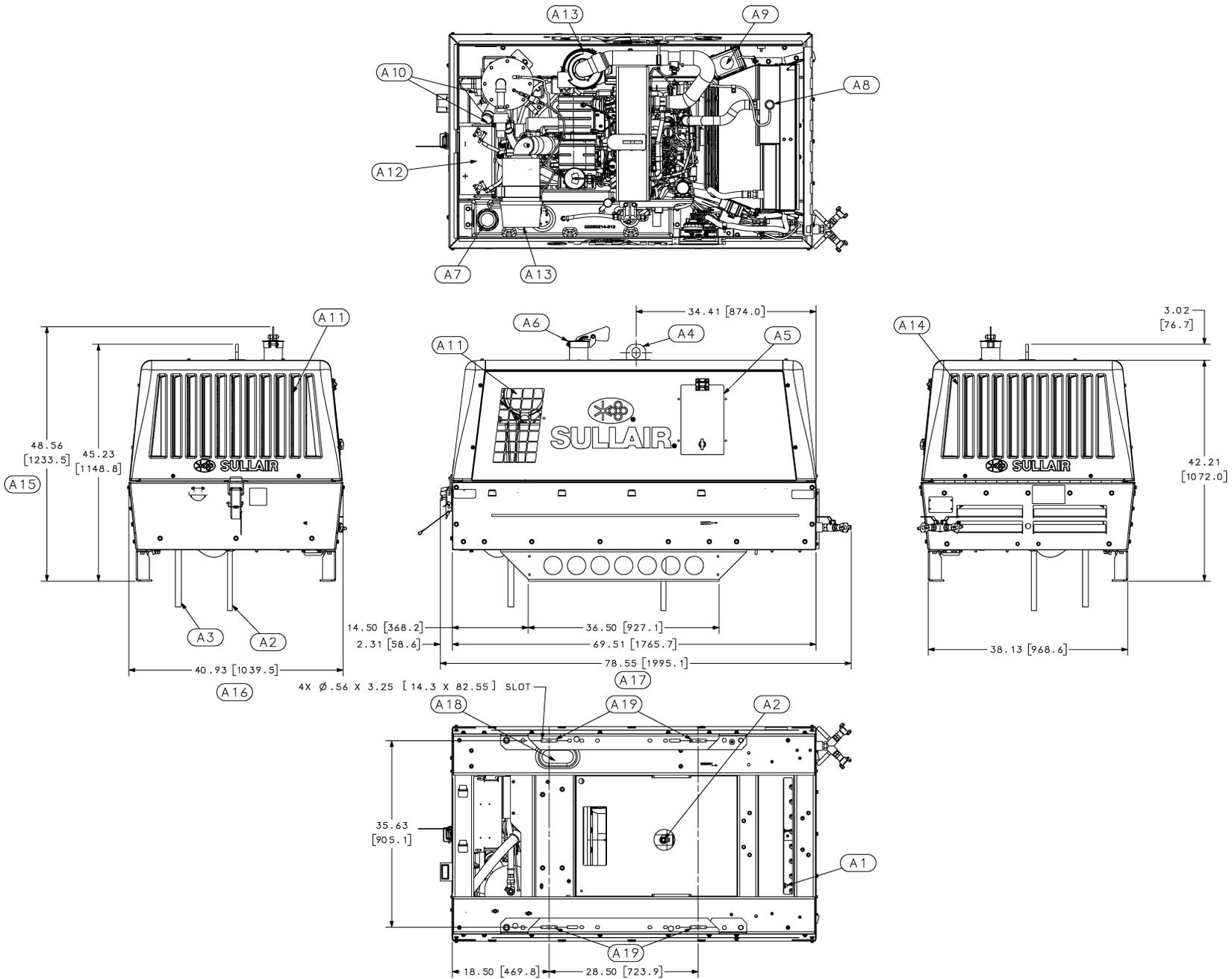
3.6 Identification—DLQ

Subject to EAR, ECCN EAR99 and related export control restrictions.

02250216-781 R01



02250224-015 R00



3.6 Identification—DLQ

Drawing notes

1	DIMENSIONS ARE IN INCHES. [] DIMENSIONS ARE IN MILLIMETERS.
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A4	LIFTING BAIL EYE (APPROX. CENTER OF GRAVITY)
A5	INSTRUMENT PANEL DOOR
A6	ENGINE EXHAUST AIR OUT (3" DIA)
A7	ENGINE FUEL FILL
A8	ENGINE COOLANT FILL
A9	ENGINE COOLANT OVERFLOW ACCESS
A10	COMPRESSOR OIL FILL AND SIGHT GLASS
A11	AIR INTAKE
A12	BATTERY ACCESS
A13	AIR FILTER ELEMENT ACCESS
A14	AIR OUTLET
A15	OVERALL HEIGHT (STANDARD MACHINE)
A16	OVERALL WIDTH
A17	OVERALL LENGTH
A18	FUEL TANK DRAIN
A19	MOUNTING HOLES

Notes:

Section 4

Operation

4.1 General

While Sullair has built into this compressor a complete set of controls and indicators that allow the operator to control and monitor the compressor's operation and performance, operators should learn to recognize indications which identify a service requirement or conditions that could lead to (or show) a (current) malfunction. Before starting the compressor, read this section thoroughly to gain familiarity with the controls and indicators—their function and location.

4.2 Purpose of controls

Engine switch

Press this switch to the **ON** (ignition) position to energize the electrical system of the compressor. Press the switch to the **START** position to momentarily engage the starter and start the compressor. Press the switch to the **OFF** position to shut the compressor down. This switch is located on the instrument panel.

Regeneration switch

When the regeneration switch is in the **REGEN** position, regeneration occurs normally. When the switch is in the **INHIBIT** position, regeneration is prevented. When the switch is in the **FORCE** position, regeneration occurs immediately if the conditions for regeneration are met.

Air pressure gauge

Continuously monitors the pressure inside the receiver tank.

Fluid level sight glass

Indicates the fluid level in the receiver tank. Proper level is marked halfway up the sight glass. Check the level when the compressor is shutdown and on level ground.

Compressor discharge temperature switch

Opens the electrical circuit to shut down the compressor when the discharge temperature reaches the compressor discharge shutdown temperature (see *Section 3.1: Specifications—49HP 185 Kubota* on page 33).

Thermal valve

Functions as a temperature regulator by directing the compressor fluid either to the cooler or to the compressor unit.

Minimum pressure device

Maintains the minimum of 80 psig (5.6 bar) in the compressor receiver tank.

Pressure relief valve

Vents receiver tank pressure to the atmosphere if pressure inside the receiver tank exceeds 200 psig (13.8 bar).

Air inlet valve

Controls the amount of air allowed to enter the air compressor inlet. Regulation is determined by a signal from the pressure regulator(s).

Blowdown valve

Vents receiver tank pressure to the atmosphere at shutdown.

Idle warm-up control

Keeps the compressor inlet valve closed for reduced compressor load at start-up. When the compressor is warmed-up, the handle is turned from the **START** to the **RUN** position for full operation.

4.3 Starting the compressor



WARNING

Do not use aerosol types of starting aids such as ether.¹ Such use could result in an explosion and personal injury.

¹Unless the starting aid is factory-installed or an aftermarket kit designed specifically for use with the Sullair provided ether start electrical connector.

1. Ensure that the compressor is on a level surface.

- If the compressor is on an uneven surface, the fluid sight gauge readings will not be accurate, and it will not be possible to determine if fluid levels are too low.
2. Ensure that a minimum clearance of 3 feet is provided all the way around the machine to allow exhaust gas to ventilate before operating the machine.
 - Failure to ventilate hot exhaust gas can result in improper functioning of machine and the heat build-up can result in melting of rubber and/or plastic components.
 3. Check all oil and fluid levels in the engine and compressor. Add oil and/or fluid if necessary.
 4. Fill the fuel tank and drain any water from the fuel/ water separator.
 5. Check the dust collectors and clean if necessary.
 6. Crack open one service line.
 7. Turn the **WARM-UP CONTROL** control to the **START** position.
 - When the Single Axle Controller is initially powered up, the system will initiate a “Self Test” sequence to verify its operational integrity and safety status. During this process, the following actions will be performed.
 1. Gauge pointers will move to the zero position, then to half and full scale, then back to zero, and finally to the actual value reading.
 2. The LCD display will turn on all its segments for one second, off for one second, and then display the Sullair logo followed by the software product number with revision level.

3. All warning lights will turn on for 2.5 seconds and then turn off, then set to the actual indicator state.
8. Toggle the **START/ON/OFF** switch to the **ON** position.
9. Wait for the status message on the display to switch to **Ready**.
10. Momentarily toggle the **START/ON/OFF** to the **START** position and release the switch to engage the starter.
11. After 30 seconds, turn the **WARM-UP CONTROL** from **START** to **RUN** to put the compressor in full operation.
12. Close all doors to maintain proper noise level.

4.4 Shutting down the compressor

1. Close the service valves and run the compressor for approximately five minutes to allow the compressor to cool down.
2. (“H” and “HH” models only) Turn the **PRESSURE SELECTOR** control to the **LOW** position.
3. Toggle the engine switch to the **OFF** position after five minutes.



WARNING

If an emergency shutdown is required, **immediately** press the emergency stop button.

Do not use the emergency stop button in place of the normal shutdown procedure described above.

4.5 Troubleshooting

The following guide contains symptoms and usual causes for the problems that may occur throughout the compressor system. Each warning or fault message that may appear is listed along with conditions for the problem, a probable cause, and a suggested solution to the problem. **Do not** assume that these are the only troubles that may occur. The following table denotes all warning/shutdown conditions that the Single Axle Controller will sense. Shutdown conditions will display the associated

message on the LCD, light the compressor shutdown panel lamp, shut the system down, and wait for operator to toggle the **MENU TOGGLE** switch to “EXIT” to acknowledge the fault condition before a restart may be attempted. Warning conditions display the associated message on the LCD and light the compressor warning lamp. Under a warning condition the system will continue to operate normally.

Error Message	Warning/Shutdown/ Prevent Startup	Description	Recommended action
No Message	Prevent Startup	No power or initialization of controller.	Turn OFF/ON/START switch to ON position. Make sure E-stop is not engaged (pull out). Turn battery disconnect switch to ON position. Check battery voltage. Check connections between Single Axle Controller and harness and at the starter and harness. Make sure Single Axle Controller internal circuit breakers (4) are closed.
Low Fuel Level	Shutdown/Prevent Startup	Fuel level low shutdown threshold reached.	Add fuel and restart.
Comp High Temp	Shutdown/Prevent Startup	CDT sensor is above shutdown setpoint.	Verify thermistor resistance between 803 Ω @ -50°C and 1573 Ω @ 150°C.
		Coolers dirty.	Clean coolers.
		Fan slipping.	Check/adjust fan belt tension.
RTT High	Shutdown/Prevent Startup	Compressor oil thermostat malfunction.	Replace thermostat.
		RTT (Receiver Tank Temperature) switch normally closed, has opened.	Replace the RTT switch.
Primary Shutdown	Shutdown/Prevent Startup	After filter restriction too high (filters dirty).	Replace filters.
		After filters dp module malfunction.	Check source voltage and ground and correct if necessary. Visually inspect for damage and replace if necessary.
WL Comm Error	Shutdown/Prevent Startup	Loss of LIN communication with warning bank module.	Check Single Axle Controller and ensure that all gauge and warning bank connectors are well seated/engaged.

Error Message	Warning/Shutdown/ Prevent Startup	Description	Recommended action
High Comp Pressure	Shutdown/Prevent Startup	P1 (Dry) pressure is above setpoint.	Pressure above 10 psi (recent shutdown). Wait for pressure to fall below 10 psi.
		Transducers out of calibration.	Transducers need to be calibrated using the gauge calibration subroutine (See "Pressure Calibration" on page 26).
Engine Overcrank	Shutdown	The maximum number of engine crank cycles has been exceeded	Check battery voltage & recharge if necessary.
			Check starter relay for short to ground.
			Check source voltage to starter relay.
Engine Comm Error	Shutdown/Prevent Startup	The Single Axle Controller is not properly receiving J1939 messages from the engine ECM.	Check connections at engine ECM and Single Axle Controller.
			Check the termination resistor in the harness ECM connector and replace if necessary.
E-Stop Pressed	Shutdown/Prevent Startup	The Single Axle Controller will not power up/initialize. (No message at controller.)	Disengage E-stop.
			Once conditions are deemed safe, toggle the OFF/ON/START switch OFF .
Eng Speed Too Low	Shutdown	Engine speed dropped below preset value for a preset amount of time. This is to protect the vulcanized rubber drive coupling between the engine and compressor.	Check fuel level.
			Check the inlet valve for premature opening during the warm-up phase.
P1,P2 Signal Error	Shutdown	Error loss of all transducer inputs during run phase.	Check voltage source and ground for good connection.
Low Fuel Level	Warning	Fuel light is on. Compressor warning light is on. Fuel level is below 20%.	Add fuel soon.

Error Message	Warning/Shutdown/ Prevent Startup	Description	Recommended action	
Fuel Sender Error	Warning	The fuel level sensor signal is out of range.	Check connections at sensor on tank. Verify source voltage and ground.	
			Wires possibly reversed.	
			Fuel sensor is defective. Replace.	
P1 Signal Error	Warning	Transducer has no source voltage.	Single Axle Controller is configured incorrectly (configured for level switch only). Reprogram the Single Axle Controller using the Single Axle Controller communication software, communication adapter, and PC.	
			Verify 5 V dc to transducer.	
			Transducer has lost ground.	Verify path to ground.
			Output voltage to controller is lost.	Verify 0.5 – 4.5 V dc to controller.
P2 Signal Error	Warning/Shutdown/ Prevent Startup	Transducer malfunction.	Replace transducer.	
			Transducer has no source voltage.	Verify 5 V dc to transducer.
			Transducer has lost ground.	Verify path to ground.
			Output voltage to controller is lost.	Verify 0.5 – 4.5 V dc to controller.
			Replace transducer.	

Notes:

Section 5

Maintenance



WARNING

Do not remove caps, plugs and/or other components when the compressor is running or pressurized. Shutdown the compressor before removing any components.

5.1 General

Consistent and correctly performed maintenance will ensure the compressor's performance and extend its operational life. See *Section 5.9: Part replacement and adjustment procedures* on page 48 for a detailed description of specific compressor components. Before performing maintenance actions, read the *CIMA Safety Manual*, if applicable. For engine maintenance requirements and procedures, refer to the *Engine Operator's Manual*.

5.2 Engine coolant requirement for radiators

The coolant provided with Sullair portable air compressors is ethylene glycol based, 50/50 mixture, and should never be mixed with a different coolant type, color or brand. If radiator coolant is to be added, for any reason, be sure that the coolant added is the same as what is in the cooling system, as well as what is recommended. Refer to the *Maintenance* section of the *Engine Operator's Manual* for proper engine coolant specifications and instructions. Ensure that the proper coolant is used when adding engine coolant to the machine. If you are not sure of the coolant that is installed originally or want to change to a different type, the cooling system must be cleaned with a commercial cleaning agent and completely flushed and filled with distilled water several times to remove all traces of old coolant. Then, fill the system with the recommended coolant using only one brand/type. Cross contamination which is caused by adding different types of engine coolants may result in the coolant additives to deplete (dropout); thus leaving radiator surfaces unprotected. Corrosion to radiator surfaces may occur, thus reducing radiator life expectancy. It is extremely impor-

tant to evacuate/purge all air within the cooling system before replacing the radiator cap.

5.3 Daily maintenance

See *Section 4.3: Starting the compressor* on page 37 for general operation.



CAUTION

The radiator and engine cooling system must be drained and flushed periodically. Refer to the *OEM Engine Manual* for more information. Replace the coolant with a solution of 50% ethylene glycol and 50% water or as required for your geographic location. **Do not** use a leak sealing type of antifreeze. Should a 100% water solution be used, a non-chromate rust inhibitor must be added. **Do not** mix coolant types.

NOTE

Dispose of fluids in accordance with applicable federal, state and local regulations.

5.4 Maintenance after initial 50 hours of operation

After the initial 50 hours of operation, the following maintenance actions are required to eliminate contaminants from the system:

- Clean the scavenge return line orifice and change the strainer.
- Change the compressor fluid filter.
- Check the *Engine Operator's Manual* for service requirements.
- Check the fuel filter for water.
- Confirm that the receiver tank cover bolts are tightened to 60 ft-lbs (81 N·m).

5.5 Maintenance every 50 hours

- Inspect air filter elements and replace if necessary.
- Check the engine fuel/water separator for water.

5.6 Maintenance every 100 hours

- Clean the radiator and cooler exterior surfaces.
- Check the Engine Operator's Manual for service requirements.

5.7 Maintenance every 250 hours

- Check fan belt tension.
- Clean the radiator and cooler exterior surfaces. (Where dust and other atmospheric contaminants are present, it might be necessary to clean these parts more frequently.)
- Check the *Engine Operator's Manual* for service requirements.
- Change the engine oil and filter (see the *Engine Operator's Manual*).
- Clean or replace the scavenge return line strainer.
- Change the air filter primary elements.
- Change the compressor fluid filter.
- Clean the return line orifice.
- Change the engine fuel/water separator filter. (If the filter tends to clog more often than what is expected, change the filter more frequently.)
- Change the engine fuel/water separator.
- Check the engine rpm idle speed. The idle speed should be at the specified minimum idle speed listed in *Section 3.1: Specifications—49HP 185 Kubota* on page 33.



WARNING

Operating the compressor below its minimum specified idle speed will damage the compressor. Operating the compressor in this condition will cause coupling and/or compressor failure.

5.8 Maintenance every 1500 hours

- Change the compressor fluid with new Sullair AWF[®] and replace the fluid filter element. (See

Section 5.9.2: Compressor fluid filter replacement.)

- Lubricate axle bearings on wheel-mounted units.
- Service the engine cooling system. (See *Section 5.9.6: Cleaning the engine cooling system.*)

5.9 Part replacement and adjustment procedures

5.9.1 Compressor fluid change procedure

1. Run the compressor five to ten minutes to warm the fluid.
2. Shut the compressor down and relieve all internal pressure.
3. Drain the fluid receiver tank by removing the plug, or opening the valve at the bottom of the receiver tank.
4. Change the compressor fluid and replace the fluid filter element (For element replacement see *Section 5.9.2: Compressor fluid filter replacement.*)
5. Fill the receiver tank with fluid in accordance with the specifications in Section 3.

5.9.2 Compressor fluid filter replacement

See *Figure 5-1*.

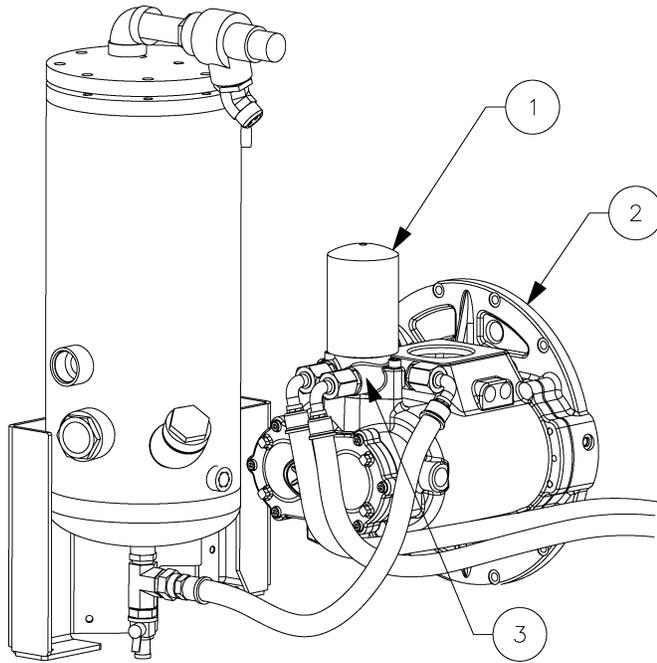
1. Remove the old fluid filter with a strap wrench.
2. Clean the gasket seating surface.
3. Apply a light coating of fluid to the new gasket.
4. Hand tighten the new fluid filter until the new gasket is seated.
5. Continue tightening the fluid filter by hand an additional $\frac{1}{2}$ to $\frac{3}{4}$ turn.
6. Restart the compressor and check for leaks.

5.9.3 Air filter maintenance

Refer to *Figure 5-2*. Air filter maintenance should be performed as often as conditions require. If the filters are equipped with optional maintenance indicators, change the filters every time the indicators show a change is necessary.

5.9.3.1 Air filter replacement

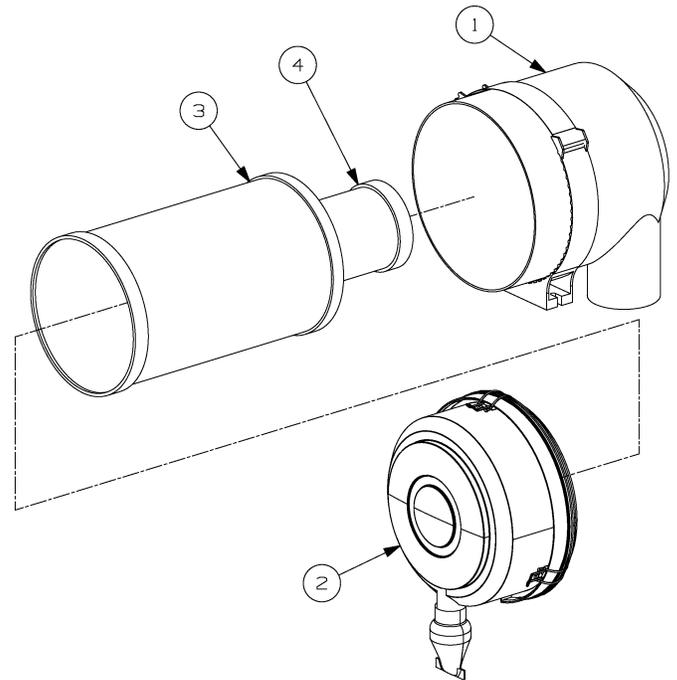
1. Loosen and remove the air filter and cover.



1. Fluid filter¹
2. Compressor unit
3. Thermal valve manifold

¹Fluid filter replacement P/N: 250028-032

Figure 5-1: Compressor fluid filter



1. Filter body
2. Filter cover
3. Primary element¹
4. Safety element (optional)²

¹Air filter primary element replacement P/N: 02250102-158

²Air filter safety element replacement P/N: 02250102-160

Figure 5-2: Air filter

2. Remove the primary and optional safety elements.
3. Clean the body, inside and out, with a damp cloth.
4. Reinstall (if clean) or replace the safety element if installed.
5. Replace the new primary filter element.
6. Reposition the cover and lock it into the position.
7. Reset the filter restriction indicator (if equipped).

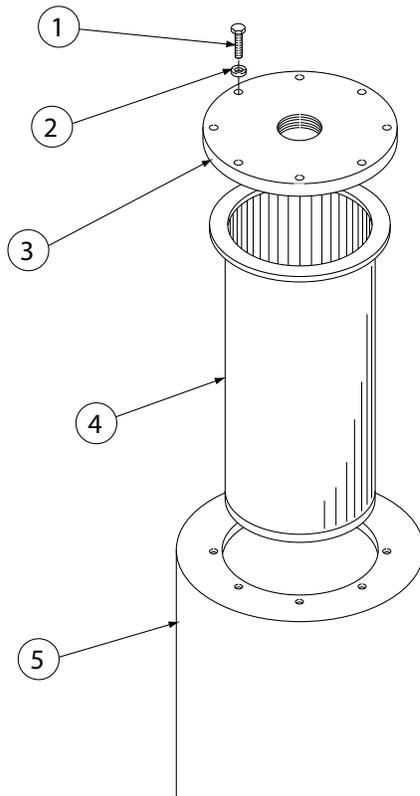
Element inspection

1. Insert a bright light source into the element and look for any light leaks which indicate the presence of damage (holes, cracks, etc.)
2. Inspect all gaskets and gasket contact surfaces of the housing and replace any damaged ones.

3. Store clean elements for later use in a clean container.
4. After installing the element, inspect and tighten all air inlet connections before operating the compressor.

5.9.4 Separator element replacement

Refer to *Figure 5-3*. When compressor fluid carryover is evident, after replacing or inspecting the fluid return line strainer and orifice, and the blowdown valve; and all are in satisfactory condition, the separator element must be replaced with kit number 250034-112 (element for air/fluid separator).



1. Capscrew
2. Washer
3. Cover
4. Separator element (with gaskets)¹
5. Receiver tank

¹Separator element replacement P/N: 250034-112

Figure 5-3: Air/fluid separator

1. Disconnect all receiver tank cover piping connections to permit removal (return line, service line, etc.).
2. Remove the fluid return line from the fitting on the cover.
3. Remove the eight (8) cover bolts and washers and lift the cover off the receiver tank.
4. Remove the separator element.
5. Scrape the old gasket material from the cover and the flange on the receiver tank. Do not allow the scrapings to fall into the tank.
6. Install the new element.
7. Replace the receiver tank cover and bolts. Lightly tighten all the bolts and then gradually tighten them alternating between bolts which are diagonally opposite each other. Torque the bolts to 60 ft-lbs (81 N•m).
8. Reconnect all piping. The fluid return line tube should extend to the bottom of the separator element which will ensure proper return line flow.
9. Clean the fluid return line strainer and clear the orifice before starting the compressor.
10. After 24 hours of operation, tighten the receiver tank cover bolts to the value given in step 7.

5.9.5 Fuel/water separator maintenance

Refer to *Figure 5-4* for all fuel/water separator maintenance procedures.

5.9.5.1 Draining water from the fuel/water separator

1. Shut down the compressor.
2. Open the compressor canopy.
3. Place a container for collecting the fluid under the drain.
4. Open the drain valve by turning it two turns to the left. Any water in the separator bowl will flow out through the drain.
5. When the fluid flowing from the drain changes from water to fuel, close the drain valve by turning the valve to the right until tight.
6. Close the compressor canopy.

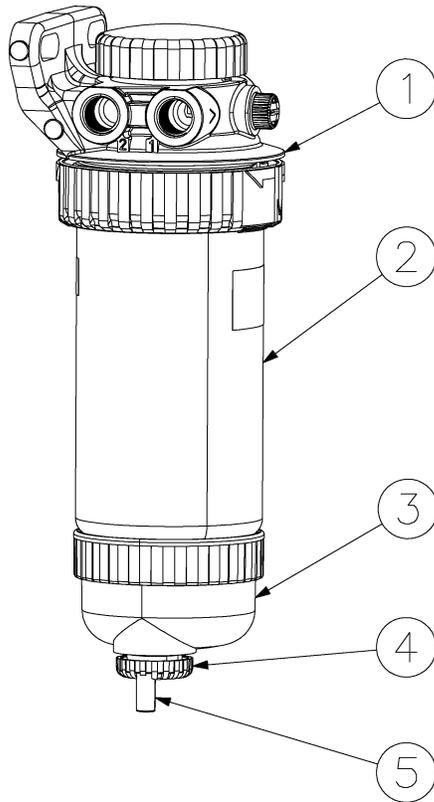


WARNING

Fire hazard.

If the separator element's staples are removed, a static electrical charge can create sparks that ignite the atomized oil in the compressed air stream.

Do not remove the staples from the separator element.



- | | |
|-------------------|----------------|
| 1. Separator head | 4. Drain valve |
| 2. Fuel filter | 5. Drain |
| 3. Separator bowl | |

Figure 5-4: Fuel/water separator

5.9.5.2 Replacing the fuel filter of the fuel/water separator

NOTE

This machine is fitted with an electric fuel pump that primes the fuel system as soon as the power switch is turned on. A buzzing can be heard from the pump when it is on. When changing filters, this pump will prime the system with fuel.

1. Shut down the compressor.

2. Open the compressor canopy.
3. Remove the separator bowl by turning it to the left.
4. Remove the old fuel filter by turning it to the left.
5. Install the new fuel filter by turning it to the right until tight.
6. Install the separator bowl by turning it to the right until tight.
7. Close the compressor canopy.

5.9.6 Cleaning the engine cooling system

1. Shut down the compressor.
2. Allow the compressor to cool to ambient temperature.
3. Open the compressor canopy.
4. Disconnect the battery and tagout the connection.
5. Close the compressor canopy.
6. Remove the eight (8) recessed hex cap screws from the front louver.
7. Detach the front louver from the canopy.
8. Using a pressure washer, spray the cooler and radiator from side-to-side, starting at the top and moving down.
 - Before using the pressure washer, consult the pressure washer's owner's manual.

NOTICE

Stand directly in front of the compressor when spraying. Spraying from the sides can damage the cooler and radiator.

9. Open the compressor canopy.
10. Using a pressure washer, clean the fan blades by blowing down through the fan guards.
11. Allow the compressor to dry completely.
12. Connect the battery and remove the tagout.
13. Close the compressor canopy.
14. Attach the front louver to the canopy.
15. Install the eight (8) recessed hex cap screws on the front louver.

5.9.7 Procedure for setting speed & pressure controls on portable compressors equipped with poppet valves

Refer to *Figure 5-5*. Before adjusting the compressor's control system, the rated full-load pressure and the high/low rpm settings must be determined. This information is provided in *Section 3.1: Specifications—49HP 185 Kubota* on page 33 or can be obtained by contacting a Sullair representative.

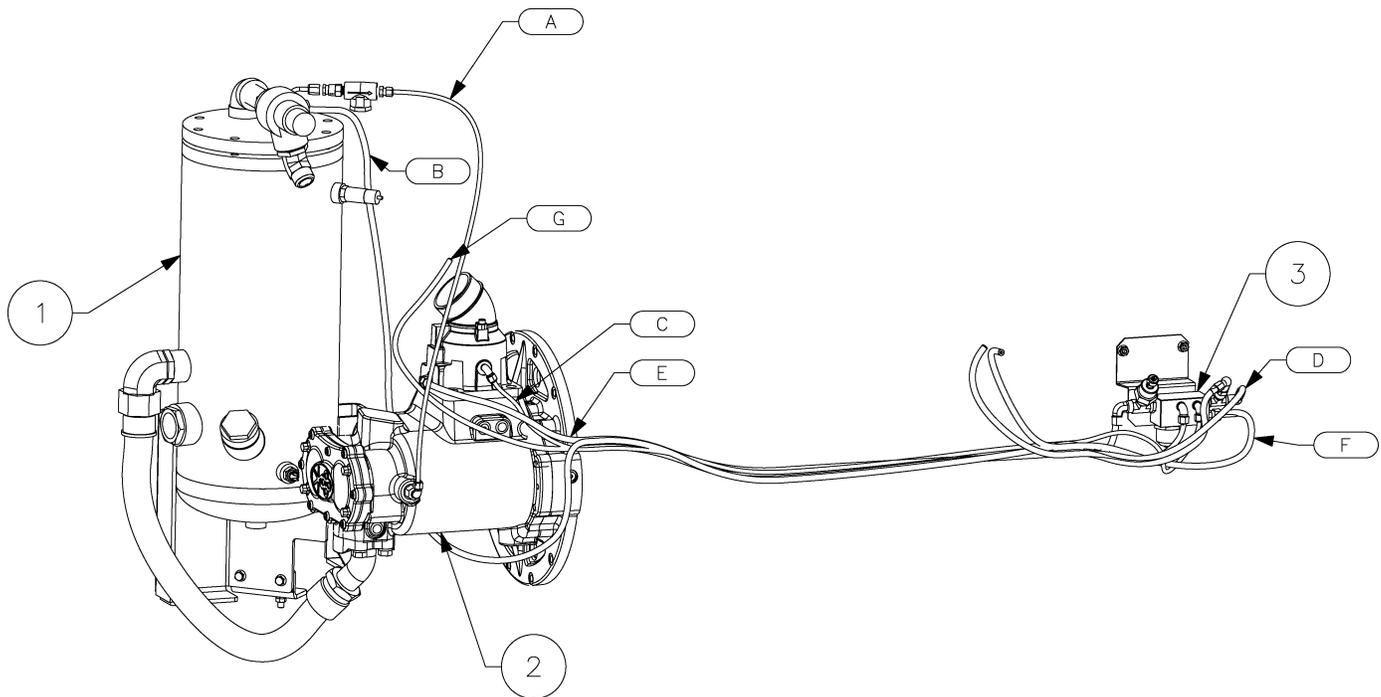
The following procedure applies to a compressor with full-load pressure rating of 100 psig (6.9 bar).

1. Start the compressor and allow the engine to warm-up to its normal operating temperature with the service valve closed.

NOTICE

Operating the compressor below its minimum specified idle speed will damage the compressor. Operating the compressor in this condition will cause coupling and/or compressor failure.

2. Adjust the pressure regulator so that the compressor maintains 115 psig (8 bar).
3. Open the service valve to 100 psig (6.9 bar) (rated full load pressure) and recheck top engine speed and control response. Close the service valve and allow the compressor to cycle and re-check low engine speed (idle).



1. Receiver tank	C. .25 OD black
2. Compressor unit	D. .25 OD orange
3. Pressure regulator / blowdown manifold	E. .38 yellow
A. .25 OD white	F. .38 OD red
B. .38 OD blue	G. .31 OD white (to fitting at unit air filter)

Figure 5-5: Control system adjustment

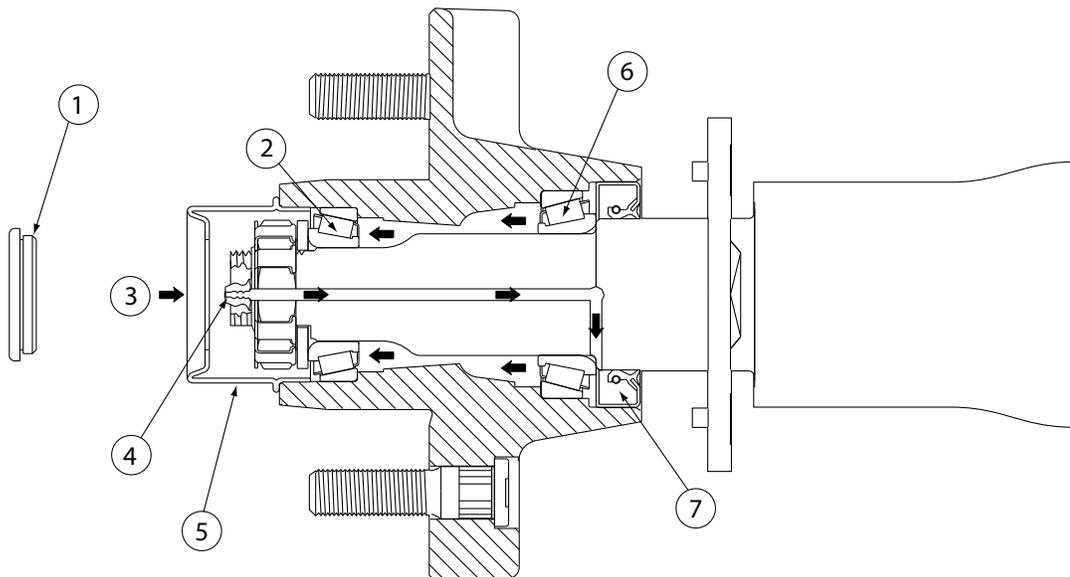
5.9.8 Bearing lubrication

Refer to *Figure 5-6*. Proper lubrication of the portable compressor's bearing axle is critical to its proper function and reduction of wear on this part. Wheel bearings should be lubricated at least every 12 months, or more, to ensure proper performance and minimize wear. Use a wheel bearing grease that conforms to MILSPEC MIL-G-10924 or a high temperature one such as lithium complex NLGI consistency #2.

Axles with the E-Z Lube feature can be periodically lubricated without removing the hubs from the axle. This feature consists of axle spindles that have been fitted with a grease zerk in their ends. When grease is pumped into the zerk, it is channeled to the inner bearing and then

flows back to the outer bearing, and then back out of the grease cap hold (see *Figure 5-6*).

1. Remove the rubber cap from the grease cap's end.
2. Using a full charged grease gun, place the gun onto the grease zerk located on the end of the spindle. Make sure the nozzle is fully engaged on the fitting.
3. Pump grease into the zerk. The old grease will be displaced and flow out of the cap around the grease gun nozzle.
4. When the new grease starts flowing out of the cap, disengage the gun and wipe off any excess off the cap; and replace the rubber plug.



- | | |
|-------------------|----------------------------------|
| 1. Rubber plug | 5. Metal end cap |
| 2. Outer bearing | 6. Inner bearing |
| 3. Grease flow | 7. Spring-loaded double lip seal |
| 4. Grease fitting | |

Figure 5-6: Typical E-Z lube axle

5.10 Troubleshooting

The following troubleshooting chart is based upon data obtained from factory tests and information from the field. It lists symptoms, probable causes and remedies. This chart does not cover all possible malfunctions or cases of abnormal operation. Before undertaking repairs or replacement actions, analyze all of the available data.

Performing a detailed visual inspection in all cases can prevent additional damage or abnormal operation.

Always:

- Check for loose wiring or connections.
- Check for damaged piping.
- Check for heat damage to parts (electrical short circuits can cause heat damage) which can appear as discolorations or the presence of a burnt odor.

If the troubleshooting remedy does not work, or the malfunction is not covered in this troubleshooting chart, contact your nearest Sullair representative or Sullair for technical assistance.

Table 5-1: Troubleshooting guide

Symptom	Probable cause	Remedy
Low voltage or no voltage	Low voltage or battery disconnected	Check battery cables and tighten if loose
		Check ground wire for proper attachment to frame. Tighten if required.
	Recharge or replace battery if required.	
Low voltage or no voltage	Blown fuse in wiring harness	Remove and inspect fuse. Replace if necessary.
	Instrument panel connectors loose or disconnected.	Check instrument panel connectors and reattach if required
		Check instrument panel wires for broken connections or corrosion. Clean and/or replace if damaged.
High compressor temperature	Compressor temperature switch is open	Check wiring connection to the switch and tighten if loose Check switch continuity to ground and replace if necessary
	Low receiver tank fluid level	Add fluid to receiver tank as required
	Loose or broken fan belt	Tighten or replace belt
	Cooling air flow is insufficient, dirty fluid cooler core	Clean core thoroughly and check for proper ventilation
	Clogged compressor fluid filter	Change fluid filter element
	Faulty fluid thermostat	Change fluid thermostat element
	Plugged fluid cooler tube (internal)	Replace cooler

Table 5-1: Troubleshooting guide

Symptom	Probable cause	Remedy	
High engine temperature	Faulty engine temperature sensor	Check wiring connection to the sensor	
	Cooling air flow is insufficient	Clean cooler and check for proper ventilation	
	Loose or broken fan belt	Tighten or replace belt	
	Low engine coolant	Fill with proper water/glycol mixture as required	
	Faulty water pump	Change pump	
	Defective engine thermostat	Change thermostat element	
	Engine problems might be present	Refer to the <i>Engine Operator's Manual</i>	
Engine will not start	Did not start compressor within the 30 seconds from turning the ignition switch to the ON position	After turning the ignition switch to the ON position, press the switch to the START position within 30 seconds	
	Low battery voltage	Check the battery cables and tighten if necessary	
		Recharge or replace battery if necessary	
	No fuel	Refuel	
	Water or dirt in the fuel and/or filter	Drain water from the fuel/water separators on the fuel filters. Siphon water from the fuel tank and clean the tank if necessary	
		Plugged air filter	Clean and replace if necessary
		Plugged fuel filter	Replace the fuel filter
	Engine problems	Turn the compressor off. See the <i>Engine Operator's Manual</i> for shutdown codes.	
Starter solenoid relay does not engage	Check wiring and tighten all connectors		
	Replace relay		
Poor fuel delivery	No fuel	Check fuel level and fill tank if empty	
	Air in fuel system	Check fuel system for air	
		Prime fuel system. See <i>Figure 5-4</i> for location of the primer.	
		Refer to <i>Engine Operator's Manual</i>	
Compressor does not achieve full discharge pressure	Run/start switch not in run position	For compressors with idle warm-up controls, switch toggle to RUN for full operation	
	Air demand is excessive	Check service lines for leaks or open valves	
	Dirty air filter	Check the filter and change the element if required	
	Defective pressure regulator	Check the diaphragm and replace with kit if necessary	
	Defective idle warm-up control	Replace control	

Table 5-1: Troubleshooting guide

Symptom	Probable cause	Remedy
Improper unloading with an excessive pressure build-up causing the pressure relief valve to open	Pressure regulating valve is set too high	Readjust
	Control system leak causing loss of pressure signal	Check control lines
		Defective pressure regulating valve. Repair valve (kit available)
	Inlet valve jammed	Free or replace valve
	Restriction in the control system	Check all control lines and components. Ice and/or other contaminants could be the cause
	Defective pressure relief valve opens when pressure is too low	Replace the pressure relief valve
Insufficient air delivery	Defective pressure regulator	Check the diaphragm and replace with kit if necessary
	Run/start switch not in run position	For compressors with idle warm-up controls, switch toggle to RUN for full operation
	Plugged air filter	Replace
	Defective idle warm-up control	Replace control
	Plugged air/fluid separator	Replace separator element and also change compressor fluid and fluid filter
	Defective pressure regulator	Adjust or repair
Excessive compressor fluid consumption	Engine speed too low	Readjust engine speed
	Clogged return line	Clear orifice and return line strainer
	Lubrication system leak	Check all pipes, connections and components
	Separator element damaged or malfunctioning	Change separator element

Section 6

Noise Control

6.1 Noise emissions warranty

Sullair warrants to the ultimate purchaser and each subsequent purchaser that this air compressor was designed, built and equipped to conform at the time of sale to the first retail purchaser, with all applicable U.S. E.P.A. and/or any Federal, State or Local noise control regulations.

This warranty is not limited to any particular part, component, or system of the air compressor. Defects in the design, assembly, or in any part, component, or system of the compressor which, at the time of sale to the first retail purchaser, caused noise emissions to exceed Federal standards are covered by this warranty for the life of the air compressor.

6.2 Tampering with the noise control system is prohibited

Federal Law prohibits the following acts or the causing thereof:

1. The removal or rendering inoperative by any persons, other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new compressor for the purpose of noise

control prior to its sale or delivery to the ultimate purchaser or while it is in use.

2. The use of the compressor after such device or element of design has been removed or rendered inoperative by any person.

Among those acts included in the prohibition against tampering are the acts listed below:

1. Removal or rendering inoperative any of the following:
 - Engine exhaust system or parts thereof
 - Compressor air intake system or part thereof
 - Enclosure of part thereof
2. Removal of any of the following:
 - Vibration isolators
 - Control silencer
 - Floor panel
 - Fan shroud
 - Acoustical materials including fiberglass foam or foam tape
3. Operation with canopy doors open for any purpose other than starting, stopping, adjustment, repair, replacement of parts or maintenance.

6.3 Noise emissions maintenance and maintenance record log

The following instructions and maintenance record log book, for the proper maintenance, use and repair of this compressor, is intended to prevent noise emission degradation.

Table 6-1: Annual muffler and exhaust system inspection

At least annually inspect muffler(s) and engine exhaust system to make sure all parts are securely mounted, that all joints and connections are tight, and that the muffler is in good condition. **Do not** operate compressor with defective exhaust system. Remove and replace any defective parts by ordering with part numbers indicated in the Parts List.

Maintenance performed:

By:

Location:

Date:

Maintenance performed:

By:

Location:

Date:

Maintenance performed:

By:

Location:

Date:

Table 6-2: Annual air filter(s) and air inlet system inspection

In addition to the instructions in the Maintenance section of the Operator's Manual, the air filter(s) and entire air inlet system should be inspected at least annually, to make sure all parts are securely mounted, that all joints and connections are tight, that there are no other leaks in the system, and that the filter element(s) are intact. **Do not** operate compressor with defective air inlet system. Remove and replace defective parts by ordering with part numbers indicated in the Parts List.

Maintenance performed:

By:

Location:

Date:

Maintenance performed:

By:

Location:

Date:

Maintenance performed:

By:

Location:

Date:

Table 6-3: Annual engine vibration mount inspection

At least annually inspect engine vibration mounts for security of attachment and to make sure the resilient parts are intact. **Do not** operate compressor with defective engine mounting system. Remove and replace defective parts by ordering with part numbers indicated in Parts List.

Maintenance performed:

By:

Location:

Date:

Maintenance performed:

By:

Location:

Date:

Maintenance performed:

By:

Location:

Date:

Table 6-4: Annual frame, canopy and parts inspection

At least annually inspect frame, canopy and parts, for security of attachment. Make sure there are not any missing or deformed members, including all hinged doors, covers and their fastening devices. **Do not** operate compressor with defective frame, canopy and parts. Remove and replace defective parts by ordering with part numbers indicated in Parts List.

Maintenance performed:

By:

Location:

Date:

Maintenance performed:

By:

Location:

Date:

Maintenance performed:

By:

Location:

Date:

Table 6-5: Annual acoustical materials inspection

At least annually inspect all acoustical materials, if any, for security of attachment. Make sure that there is not any material missing or damaged (refer to Parts List). Clean or replace, if necessary. **Do not** operate compressor with defective acoustical material. Remove and replace defective parts by ordering with part numbers indicated in the Parts List.

Maintenance performed:

By:

Location:

Date:

Maintenance performed:

By:

Location:

Date:

Maintenance performed:

By:

Location:

Date:

Table 6-6: Annual inspections for proper operation of all systems

In addition to other instructions in the Operator's Manual, at least annually, operate compressor and inspect to make sure all systems are operating properly and that engine runs at rated speed and pressure. **Do not** operate malfunctioning or improperly adjusted compressor. Repair or adjust, per instructions in Operator's Manual, as required.

Maintenance performed:

By:

Location:

Date:

Maintenance performed:

By:

Location:

Date:

Maintenance performed:

By:

Location:

Date:



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