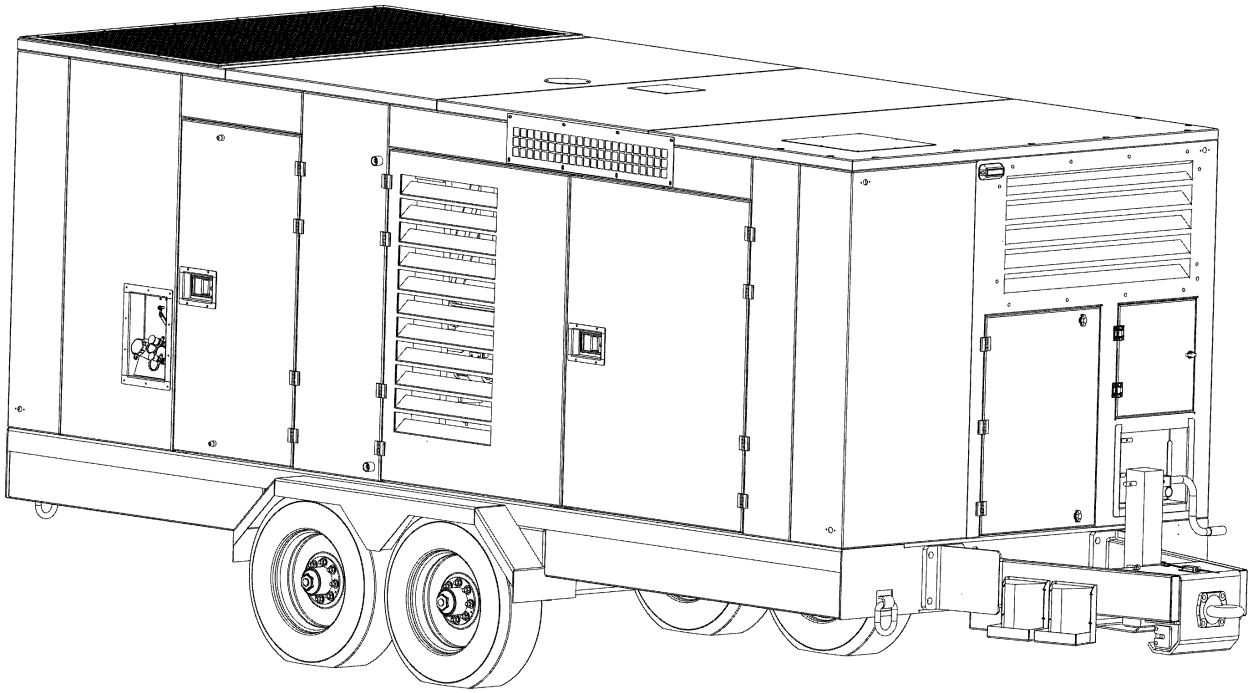
SULLAIR®

USER MANUAL

PORTABLE AIR COMPRESSOR
750XHH/900XH [A] [F]
900XHH/1150XH [A] [F]

XHH=500 PSIG, XH=350 PSIG
[A] AFTERCOOLED MODELS, [F] FILTERED MODELS
CATERPILLAR iT4



PART NUMBER:
02250207-736 r01

KEEP FOR FUTURE REFERENCE

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 **serial number**:

20130520000

and all subsequent serial numbers.

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SULLAIR®

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 CIMA 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 TOWING *

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

* 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.

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.

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.

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:

1. Two axle four-wheel or three axle six-wheel steerable models: 15 MPH (24 km/h).
2. All other models: 55 MPH (88 km/h).

C. 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.

D. Avoid grades in excess of 15° (27%).

E. Avoid potholes, rocks and other obstructions, and soft shoulders or unstable terrain.

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

G. **DO NOT** permit personnel to ride in or on the compressor.

H. 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.

I. **DO NOT** permit personnel to stand or ride on the drawbar, or to stand or walk between the compressor and the towing vehicle.

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.

1.3 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 liquids 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

General Guidelines: Thermal Protection. The main exhaust piping routes exhaust gas from the engine to the Clean Emissions Module (CEM). Normal operating temperatures can reach up to 530 °C (986 °F). During regeneration of the Diesel Particulate Filter (DPF), the Auxiliary Regeneration Device (ARD) will be in operation, this creating temperatures above normal engine exhaust temperatures. Gas temperatures during the regeneration period can reach 750 °C (1382 °F).

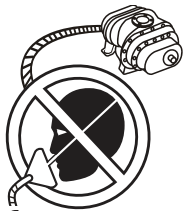
⚠ T4 - WARNING

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. Proper precautions should be taken to ensure that the aftertreatment device is not mounted in close proximity to components that may be damaged by heat.

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



⚠ DANGER

INHALATION HAZARD!

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 antifreeze 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. When handling **DEF** (Diesel Emissions Fluid) 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 your 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 adjustments, 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 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.

1.12 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 troubleshooting.

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 shutdown 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 that the person placing tag on power lockout. Tags shall never be by-passed, ignored, or otherwise defeated

1.13 CALIFORNIA PROPOSITION 65

⚠ WARNING

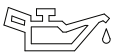
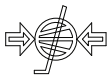
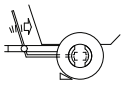
CALIFORNIA PROPOSITION 65 WARNING

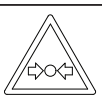
Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

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.

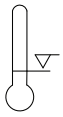
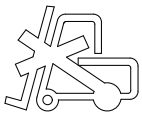
1.14 SYMBOLS AND REFERENCES

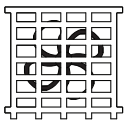
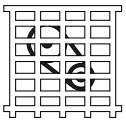
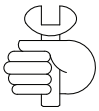
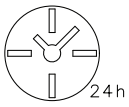
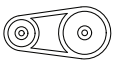
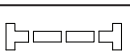
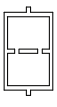
The symbols below may or may not be used. Please refer to the decals set forth on the machine for applicable symbols.

	DIESEL FUEL
	ROTARY COMPRESSOR
	TEST RUN
	DRAIN
	HIGH PRESSURE
	SHUT-OFF VALVE W/ SAFETY
	NO
	ENGINE
	COMPRESSOR
	ENGINE OIL
	ENGINE COOLANT
	WATER
	OIL
	DO NOT
	CLOSED MECHANICAL
	FUSE
	LOW PRESSURE
	READ MANUAL
	BRAKES

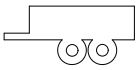
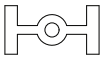
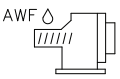
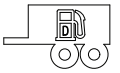
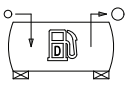
	HEARING PROTECTION
	HARD HAT
	SAFETY GLASSES
	HEARING PROTECTION
	DO NOT REMOVE MANUAL
	DO NOT BREATHE COMPRESSED AIR
	DO NOT STAND ON SERV. VALVE
	DO NOT OPERATE W/ DOORS OPEN
	DO NOT OPEN
	DO NOT STACK
	ELECTRICAL SHOCK
	AIR FLOW
	HOT SURFACE
	PRESSURIZED VESSEL
	PRESSURIZED COMPONENT

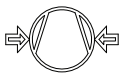
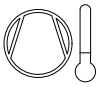
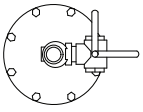
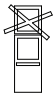
SAFETY SYMBOLS 1

	DANGEROUS OUTLET
	REMOTELY CONTROLLED
	CORROSIVE
	WARNING
	DO NOT MAINTENANCE
	BELOW TEMPERATURE
	DO NOT TOW
	BAR/PSI
	BATTERY
	BATTERY DISCONNECT
	OFF
	ON
	RESET
	NO FORKLIFT
	FORK LIFT HERE
	DIRECTION OF ROTATION

	ENGINE START
	ENGINE ECM
	READ/WRITE DATA
	INTAKE AIR
	EXHAUST GAS
	FAN GUARD
	BELT GUARD
	SERVICE POINT
	LOW TEMPERATURE
	STD AIR
	A/C AIR
	24 HOURS
	BELTS
	FILTER
	STRAINER

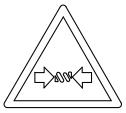
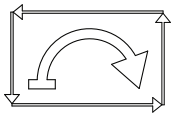
SAFETY SYMBOLS 2

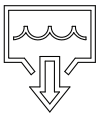
	RADIATOR
	AIR-CIRCULATING FAN
	AIR-COOLED OIL COOLER
	LIQUID-COOLED OIL COOLER
	LUBRICATION
	TRAILER TOWING MODE
	AXEL
	LUBRICANT GREASE
	EXAMINE, CHECK
	CRUSH/PINCH POINT
	FUNCTIONAL ARROW
	ENGINE INTAKE AIR FILTER
	PRESSURE CONTROL
	INLET VALVE SPRING
	INTERNAL FUEL
	EXTERNAL FUEL
	SIDE DOOR T-LATCH

	HOUR METER
	COMPRESSOR AIR PRESSURE
	START
	CONTROL
	ENGINE PREHEAT LOW TEMP AID
	ENGINE WARNING
	FUEL LEVEL
	ENGINE RPM
	ENGINE OIL PRESSURE
	ENGINE COOLANT TEMPERATURE
	COMPRESSOR TEMPERATURE
	DO NOT MIX COOLANTS
	AFTERCOOLER BYPASS VALVE
	DRAIN HEATER
	BATTERY HEATER
	COMPRESSOR OIL HEAT
	STACKING LIMIT BY NUMBER

SAFETY SYMBOLS 3

SULLAIR

	DO NOT OPERATE WHILE STACKED
	PRESSURIZED SPRING
	DO NOT MIX FLUIDS
	AUTO START/STOP
	FLUID DRAIN

	WATER DRAIN
	SEVER (FAN)
	DEF FLUID ONLY
	RUN

SAFETY SYMBOLS 4

Section 2
DESCRIPTION

2.1 INTRODUCTION

Sullair Portable Air Compressor models offer superior performance and reliability while requiring only minimal maintenance.

The compressor is equipped with a Sullair rotary screw compressor unit. Compared to other compressors, the Sullair is unique in mechanical reliability and compressor durability. No inspection is required of the working parts within the compressor unit.

As you continue reading this manual and come to learn how the compressor operates and is cared for, you will see how surprisingly easy it is to keep a Sullair compressor in top operating condition.

Read the *Maintenance section* to keep your compressor in top operating condition. Should any problem or question arise which cannot be answered in this text, contact your nearest Sullair representative or the Sullair Service Department.

2.2 DESCRIPTION OF COMPONENTS

Refer to *Figure 2-1*. The components and assemblies of the Sullair Portable Air Compressor models are clearly shown. The package includes a compressor, diesel engine, engine exhaust aftertreatment, compressor inlet system, compressor cooling and lubrication system, compressor discharge system, capacity control system, instrument panel and electrical system. The machine is also supplied with sound deadening insulation to lower noise emissions to meet EPA and/or any Federal, State, or Local noise requirement. The Sullair compressor unit is driven by an industrial engine designed to provide enough horsepower for more than adequate reserve at rated conditions. Refer to **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, keeping the engine at the proper operating temperature.

The same fan also cools the fluid in the compressor cooling and lubrication system. The fan air also passes through the compressor fluid cooler (which is mounted adjacent to the radiator). As air passes through the cooler, the heat of compression is removed from the fluid.

The same fan also cools the engine intake air supply (which is mounted adjacent to the radiator). As air passes through the air to air aftercooler heat is removed which was introduced by the engine's turbo charger. The engine is coupled to the compressor unit with a non-lubricated, vulcanized rubber disk and a drive flange-type coupling.

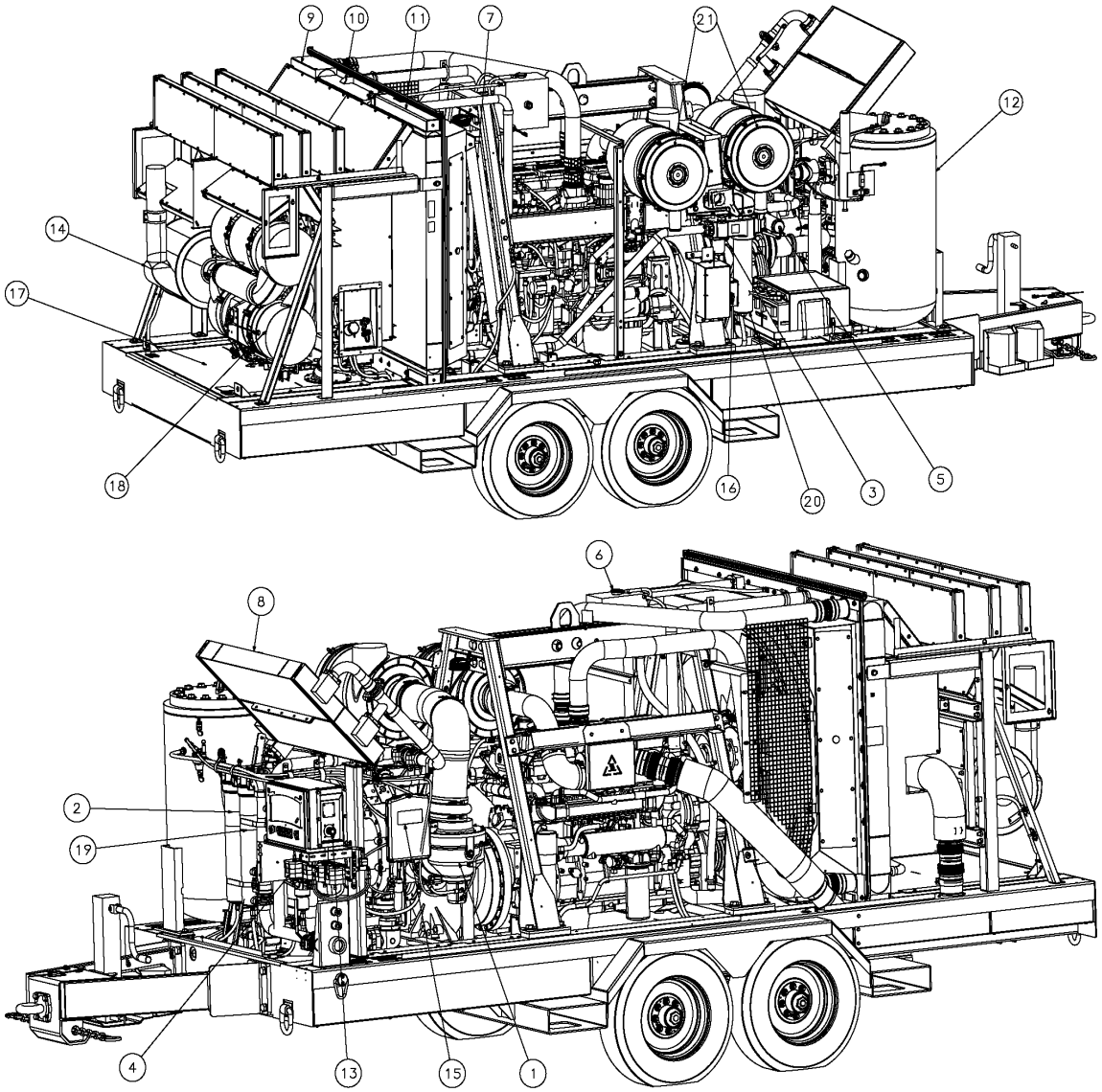


Figure 2-1: 1.Main Component Locations

1. INLET VALVE	7. FUEL COOLER	13. E-STOP	19. DISCHARGE AIR FILTER (IF EQUIPPED)
2. MOISTURE SEPARATOR (IF EQUIPPED)	8. AFTERCOOLER (IF EQUIPPED)	14. ENGINE MUFFLER	20. COMPRESSOR FLUID FILTER
3. THERMAL VALVE	9. ENGINE CHARGE AIR COOLER	15. MANUAL BOX	21. ENGINE & COMPRESSOR AIR INTAKE FILTERS
4. REGULATOR VALVES	10. ENGINE RADIATOR	16. BATTERY DISCONNECT SWITCH	
5. FLUID STOP VALVE	11. COMPRESSOR FLUID COOLER	17. FUEL TANK	
6. ENGINE COOLANT FILL	12. RECEIVER TANK	18. CAT CEM MODULE	

2.3 SULLAIR COMPRESSOR UNIT, FUNCTIONAL DESCRIPTION

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

NOTE

With a Sullair compressor, there is no maintenance or inspection of the internal parts of the compressor unit permitted in accordance with the terms of the warranty.

Sullair compressors are factory-filled with Sullair HPL 1500 lubricant. For more information on fluid fill, refer to *Specifications* on page 55.

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

1. As coolant, it controls the rise of air temperature normally associated with the heat of compression.
2. Seals the clearance paths between the rotors and the stator and also between the rotors themselves.
3. Acts as a lubricating film between the rotors allowing one rotor to directly drive the other, which is an idler.

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

2.4 COMPRESSOR COOLING AND LUBRICATION SYSTEM, FUNCTIONAL DESCRIPTION

Refer to *Figure 2-2*. 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 cooler and fan, the system consists of a main filter and thermal valve.

Fluid is used in the system as a coolant and a lubricant. The fluid is housed in the receiver tank.

Upon start-up, the fluid temperature is cool, and routing to the cooler is not required. The fluid first enters the thermal valve and then flows on to the compressor unit, bypassing the cooler. As the compressor continues to operate, the temperature of the fluid rises and the thermal valve element begins to shift. This forces a portion of the fluid to the fluid cooler. The cooler is a radiator-type that works in conjunction with the engine fan. The fan pushes air through the cooler removing the heat of compression from the fluid. From the cooler, the fluid is routed back to the thermal valve.

Before the temperature of the fluid reaches the valve set point, cooled fluid is mixed with warmer fluid. When the temperature of the fluid reaches 230°F (110°C), the thermal element shifts completely causing all fluid to flow to the cooler. The thermal valve incorporates a pressure relief valve, which allows fluid to bypass the cooler, if the cooler becomes plugged or frozen. This helps assure that fluid will continue to be provided to the compressor for lubrication. After the fluid passes through the thermal valve it is then directed through the main fluid filter. There, the fluid is filtered in preparation for injection into the compression chamber and bearings of the compressor unit. The filter has a replaceable element and a built-in bypass valve which allows the fluid to flow even when the filter element becomes plugged and requires changing or when the viscosity of the fluid is too high for adequate flow. The filter housing includes a pressure differential gage to monitor the cleanliness of the compressor oil filter. Please refer to the Maintenance section 6.11.2 for further details. After the fluid is properly filtered, it then flows on to the compressor unit where it lubricates, seals and cools the compression chamber as well as lubricates the bearings and gears.

The fluid stop valve functions on shutdown when it shuts off the fluid supply to the compressor unit. The fluid stop valve is held open by a pressure signal from the compressor discharge. At shutdown, the pressure signal is lost and the fluid stop valve closes, isolating the compressor unit from the cooling system. This prevents oil from pooling into the compressor unit.

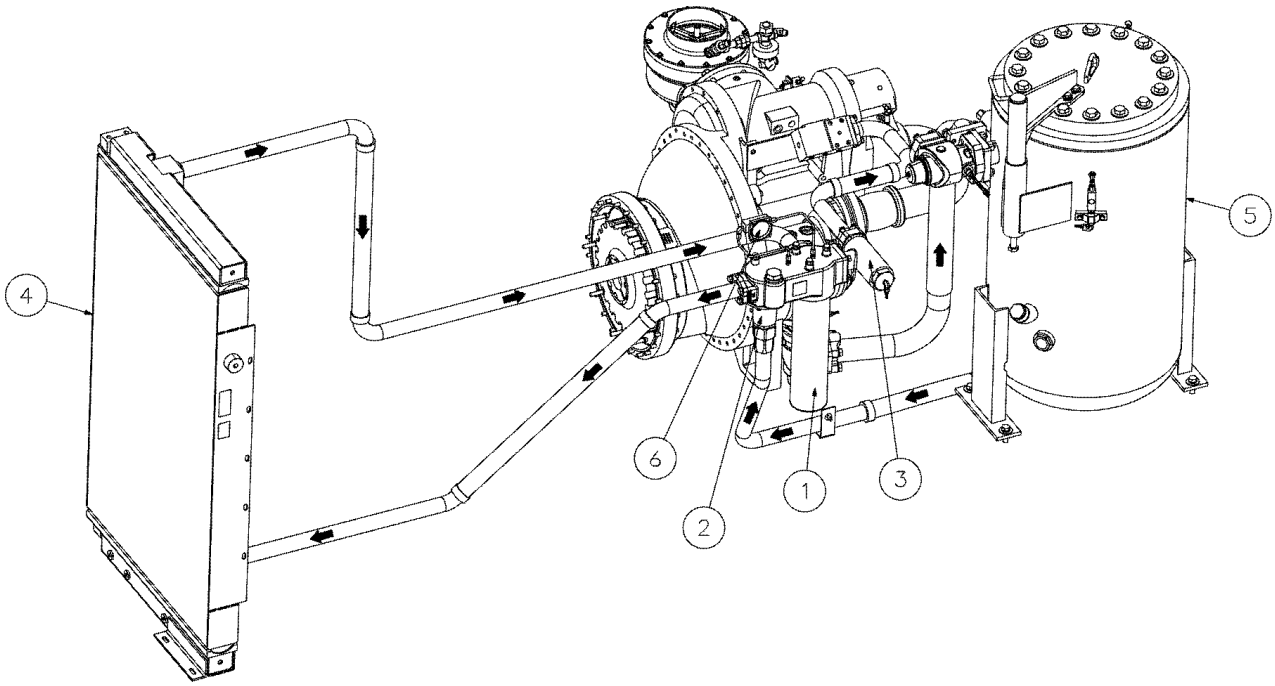


Figure 2-2: Cooling and Lubrication System

1. COMPRESSOR FLUID FILTER	4. COOLER
2. THERMAL VALVE	5. RECEIVER TANK
3. OIL STOP VALVE	6. COMPRESSOR FLUID FILTER RESTRICTION GAUGE

NOTE

Arrows indicate direction of fluid flow within the Cooling and Lubrication System.

2.5 COMPRESSOR DISCHARGE SYSTEM, FUNCTIONAL DESCRIPTION

Refer to *Figure 2-3*. The Sullair compressor unit discharges compressed air/fluid mixture into the receiver tank.

The receiver tank has three functions:

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

The compressed air/fluid mixture enters the receiver tank and is directed against the tank side wall. By change of direction and reduction of velocity, large droplets of fluid separate and fall to the bottom of the receiver tank. The fractional percentage of fluid remaining in the compressed air collects on the surface of the final separator element as the compressed air flows through the separator. As more and more fluid collects on the element's surface, the fluid descends 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 help assure proper flow.

The receiver tank is code rated. A minimum pressure/check valve, located downstream from the receiver, helps assure a minimum receiver pressure of 200 psig (13.8 bar) during all conditions. This pressure is necessary for proper air/fluid separation and proper fluid circulation.

A minimum pressure/check valve is also used to prevent compressed air in the service line from bleeding back into the receiver on shutdown when the compressor is being run in parallel with other compressors tied to a large air system.

A pressure relief valve (located on the wet side of the separator) is set to open if the receiver tank pressure exceeds 600 psig (41.4 bar). A temperature switch will shut down the compressor if the discharge temperature reaches 300°F (149°C) or 280°F (138°C) at the inter-stage.

Fluid is added to the receiver tank via a capped fluid filler. A fluid level gauge glass enables the operator to visually monitor the receiver tank fluid level.

⚠ WARNING

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

Stop compressor and relieve all internal pressure before doing so.

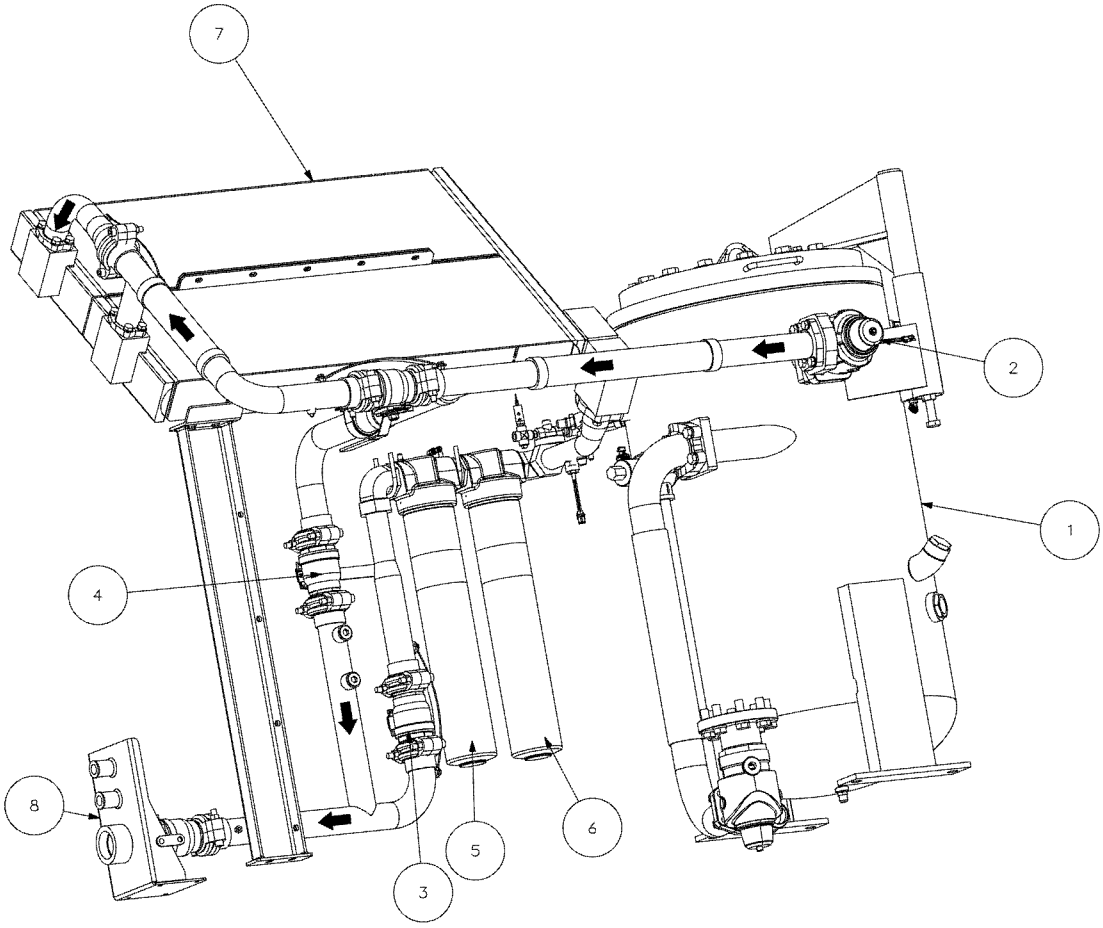


Figure 2-3: Discharge System (with optional aftercooler and discharge filter)

1. RECEIVER TANK	5. DISCHARGE FILTER
2. MINIMUM PRESSURE/CHECK VALVE	6. MOISTURE SEPARATOR
3. AFTERCOOLED AIR VALVE	7. AFTERCOOLER
4. STANDARD AIR VALVE	8. SERVICE AIR OUT

2.6 CONTROL SYSTEM, FUNCTIONAL DESCRIPTION

Refer to *Compressor System Schematic* for *P & I COMPRESSOR SYSTEM* on page 44 and *Figure 6-4: Pneumatic Control System*. The purpose of the control system is to regulate the amount of air intake in accordance with the amount of compressed air demand. The control system consists of an inlet valve, high and low pressure regulators, pressure reducing regulator, a blowdown valve, the C-Pro Controller, a START/RUN selector switch, and the HIGH/LOW selector switch.

START MODE—0 TO 200 PSIG (0 TO 13.8 BAR)

Push OFF/ON/START switch to "ON" position to initialize the Controller. Once the Controller says "READY" on LCD, press OFF/ON/START switch to the "START" position. In the "START" Position, the inlet valve is held closed by the springs in the inlet valve. The valve is cracked open by vacuum in the compressor and is allowed to build up to 150 psig (10.3 bar). The reason for keeping the valve closed during the start is to allow the engine to warm up without being loaded by the compressor. Air pressure is contained in the receiver tank by the minimum pressure valve which has a set point of 200 psig (13.8 bar). At this point the valve opens allowing the air to pass to the service valve. After engine has warmed up the machine automatically transfers to "RUN" mode.

LOW PRESSURE MODE - 200 TO 350 PSIG (13.8 TO 24.1 BAR)

With the HIGH/LOW switch in the "LOW" position, and the controller in "RUN" mode, the service valve can now be opened. Pressure from the 80 psig (5.5 bar) reducing regulator opens up the inlet valve and the C-Pro Controller increases the engine speed to full load (1800 rpm). As the demand for air decreases, the C-Pro Controller commands the engine to reduce speed to idle (1400 rpm) and the inlet valve closes, where it stabilizes until the air demand is required again.

HIGH PRESSURE MODE—200 TO 500 PSIG (13.8 TO 34.5 BAR)

When the HIGH/LOW switch is switched to the "HIGH" position, the low pressure regulator is blocked off allowing the high pressure regulator to take over control of the machine. The 80 psi (5.5 bar) reducing regulator fully opens the inlet valve and the C-Pro Controller commands maximum speed (1800 rpm) from the engine. As the pressure reaches the set point of the system the high pressure regulator cracks open and closes the inlet valve and the C-Pro Controller returns the engine back to idle, until a demand for air is seen.

SHUTDOWN

The blowdown valve is normally closed. When the compressor is shutdown, system pressure backs up to the inlet valve causing the check spring in the inlet valve to close the air inlet valve. This sends a pressure signal to the blowdown valve causing it to open and vent the pressure in the system. After the pressure is vented, the blowdown valve spring returns the blowdown valve to the closed position.

2.7 AIR INLET SYSTEM, FUNCTIONAL DESCRIPTION

The inlet system consists of two air filters, a compressor air inlet valve and interconnecting piping to the engine and compressor. Also, nylon tubing and air filter restriction indicator gauges are provided.

The air filters are a 2-stage unit with a safety element dry element-type filter. This filter is capable of cleaning extremely dirty air. However, in such cases, frequent checks of the air filter will be required. Referring to the instrument panel, the engine air filter restriction gauge or the compressor air filter restriction gauge will indicate when restriction of the air passing through the filter becomes too high.

At this time, change the air filter element. Refer to *Daily Operation* on page 65. These indicators should be checked daily, after start-up under normal conditions.

The compressor air inlet valve controls the amount of air intake of the compressor in response to the air demand.

2.8 INSTRUMENT PANEL GROUP, FUNCTIONAL DESCRIPTION

Refer to **C-Pro Controller Manual**, Sullair Part No. 02250201-742.

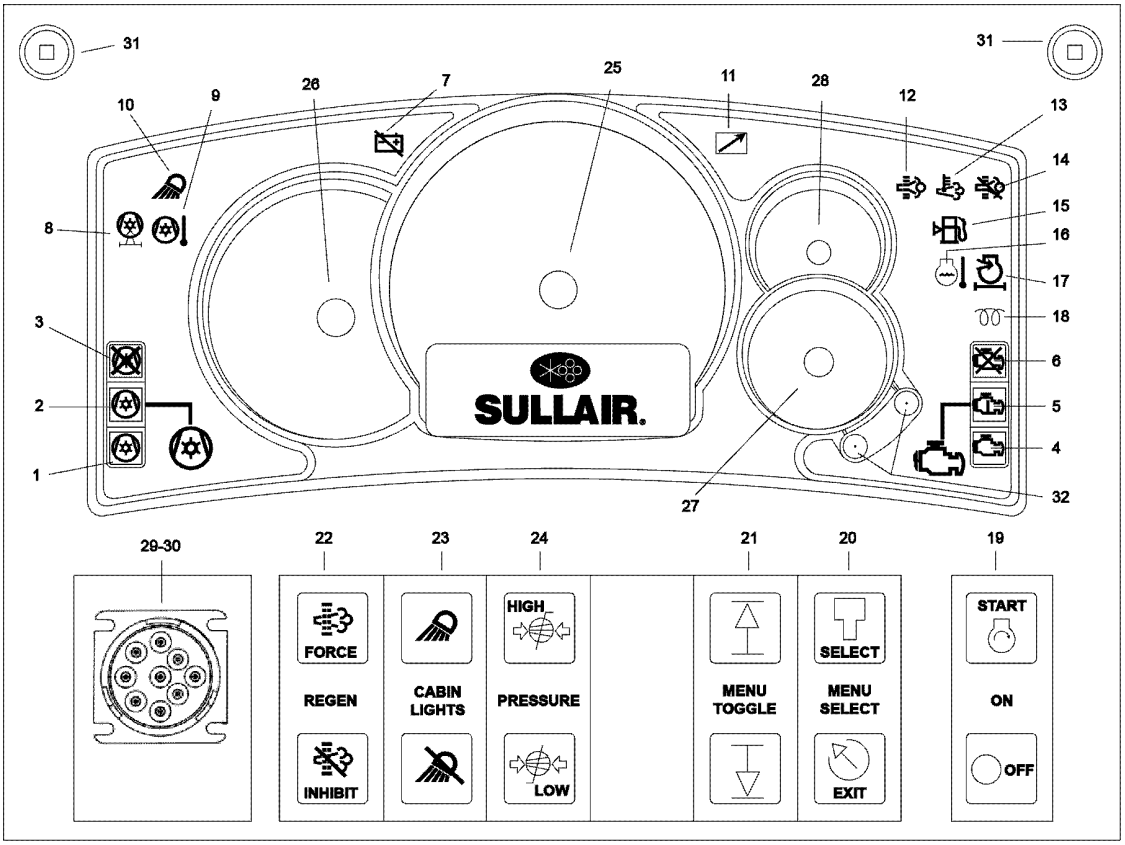


Figure 2-4: Controller Instrument Panel

Lamp Indicators	Switches/Gauges/Features
1. Compressor OK Lamp	19. Power On/Off Switch
2. Compressor Warning Lamp	20. Menu Select/Exit Switch
3. Compressor Shut Down Lamp	21. Menu Toggle Switch
4. Engine OK Lamp	22. Force/Inhibit Regeneration Switch
5. Check Engine Lamp	23. Cabin Light Switch
6. Engine Shutdown Lamp	24. High/Low Pressure Selector Switch (only on dual pressure models)
7. Battery Disconnect Lamp	25. Service Air Pressure Gauge (P1)
8. Compressor Air Filter Warning Lamp	26. Compressor Temperature Gauge
9. High Compressor Temperature Lamp	27. Engine Temperature Gauge
10. Cabin Light Lamp	28. Fuel Level Gauge
11. Remote Start Lamp	29. Engine Controller Diagnostics Service Port
12. Diesel Particulate Filter (PDF) Lamp	30. Engine Controller Port Cover
13. High Exhaust System Temperature (HEST) Lamp	31. Key Port
14. Regeneration Inhibit Lamp	32. Contrast Buttons
15. Low Fuel Lamp	
16. High Coolant Temperature Lamp	
17. Engine Air Filter Warning Lamp	
18. Wait to Start Lamp	

2.9 ENGINE CONTROL MODULE, FUNCTIONAL DESCRIPTION

Diagnostic Fault Codes are provided to indicate an electrical or electronic problem has been detected by the ECM (Engine Control Module). In some cases, the engine performance can be affected when the condition causing the code exists. More frequently, however, the operator cannot detect any difference in the engine performance.

The controller indicates an engine performance problem has occurred whenever the Engine Warning Lamp is flashing. The diagnostic code may indicate the cause of the problem, and should be corrected.

If the controller does not indicate a problem with the engine performance, but a diagnostic code is logged by the ECM, an abnormal condition was detected that did not affect performance.

If this is the case, unless there are several occurrences of the code in a very short period of time, or, the ECM is indicating an Active Code at the present time, there is most likely nothing wrong with the system.

If there is an error the controller should display a brief message containing the Failure Mode Indicator (FMI) and Suspect Parameter Number (SPN) in the LCD of the master gauge. This message helps to pinpoint the source of the problem and aid in troubleshooting the compressor..

NOTE

Only Active diagnostic codes can be read in this manner. Logged diagnostic codes must be retrieved with an Electronic Service Tool.

Refer to *Table 2-1* on page 29 for possible performance of active diagnostic codes.

Table 2-1: Diagnostic Codes

J1939		CATERPILLAR DATA LINK (CDL)	
CODE	**DESCRIPTION**	**CODE**	**DESCRIPTION**
29-2	Accelerator Pedal Position 2: Erratic, Intermittent, or Incorrect		
29-3	Accelerator Pedal Position 2: Voltage Above Normal		
29-4	Accelerator Pedal Position 2: Voltage Below Normal		
29-8	Accelerator Pedal Position 2: Abnormal Frequency, Pulse Width, or Period.		
91-2	Accelerator Pedal Position 1: Erratic, Intermittent, or Incorrect.	91-2	Throttle Position Sensor: Erratic, Intermittent, or Incorrect.
91-3	Accelerator Pedal Position 1: Voltage Above Normal	91-3	Throttle Position Sensor: Voltage Above Normal
91-4	Accelerator Pedal Position 1: Voltage Below Normal	91-4	Throttle Position Sensor: Voltage Below Normal
91-8	Accelerator Pedal Position 1: Abnormal Frequency, Pulse Width, or Period.	91-8	Throttle Position Sensor: Abnormal Frequency, Pulse Width, or Period.
100-3	Engine Oil Pressure: Voltage Above Normal	100-3	Engine Oil Pressure Sensor: Voltage Above Normal
100-4	Engine Oil Pressure: Voltage Below Normal	100-4	Engine Oil Pressure Sensor: Voltage Below Normal
100-13	Engine Oil Pressure: Calibration Required	100-13	Engine Oil Pressure Sensor: Calibration Required
101-3	Engine Crankcase Pressure: Voltage Above Normal	101-3	Crankcase Air Pressure Sensor: Voltage Above Normal
101-4	Engine Crankcase Pressure: Voltage Below Normal	101-4	Crankcase Air Pressure Sensor: Voltage Below Normal

Table 2-1: Diagnostic Codes

J1939		CATERPILLAR DATA LINK (CDL)	
101-13	Engine Crankcase Pressure: Calibration Required	101-13	Crankcase Air Pressure Sensor: Calibration Required
108-3	Barometric Pressure: Voltage Above Normal	274-3	Atmospheric Pressure Sensor: Voltage Above Normal
108-4	Barometric Pressure: Voltage Below Normal	274-4	Atmospheric Pressure Sensor: Voltage Below Normal
108-13	Barometric Pressure: Calibration Required	274-13	Atmospheric Pressure Sensor: Calibration Required
110-3	Engine Coolant Temperature: Voltage Above Normal	110-3	Engine Coolant Temperature Sensor: Voltage Above Normal
110-4	Engine Coolant Temperature: Voltage Below Normal	110-4	Engine Coolant Temperature Sensor: Voltage Below Normal
157-3	Engine Injector Metering Rail #1 Pressure: Voltage Above Normal	1797-3	Fuel Rail Pressure Sensor: Voltage Above Normal
157-4	Engine Injector Metering Rail #1 Pressure: Voltage Below Normal	1797-4	Fuel Rail Pressure Sensor: Voltage Below Normal
157-7	Engine Injector Metering Rail #1 Pressure: Not Responding Properly	1797-7	Fuel Rail Pressure Sensor: Not Responding Properly
158-2	Keyswitch Battery Potential: Erratic, Intermittent, or Incorrect	1834-2	Ignition Key Switch loss of signal
168-2	Battery Potential / Power Input 1: Erratic, Intermittent, or Incorrect	168-2	Electrical System Voltage: Erratic, Intermittent, or Incorrect
168-3	Battery Potential / Power Input 1: Voltage Above Normal	168-3	Electrical System Voltage: Voltage Above Normal
168-4	Battery Potential / Power Input 1: Voltage Below Normal	168-4	Electrical System Voltage: Voltage Below Normal
172-3	Engine Air Inlet Temperature: Voltage Above Normal	2526-3	Air Inlet Temperature Sensor: Voltage Above Normal
172-4	Engine Air Inlet Temperature: Voltage Below Normal	2526-4	Air Inlet Temperature Sensor: Voltage Below Normal
174-3	Engine Fuel Temperature 1: Voltage Above Normal	174-3	Fuel Temperature Sensor: Voltage Above Normal
174-4	Engine Fuel Temperature 1: Voltage Below Normal	174-4	Fuel Temperature Sensor: Voltage Below Normal
190-8	Engine Speed: Abnormal Frequency, Pulse Width, or Period	190-8	Engine Speed Sensor: Abnormal Frequency, Pulse Width, or Period
411-3	Engine Exhaust Gas Recirculation Differential Pressure: Voltage Above Normal	3387-3	EGR Differential Pressure Sensor: Voltage Above Normal
411-4	Engine Exhaust Gas Recirculation Differential Pressure: Voltage Below Normal	3387-4	EGR Differential Pressure Sensor: Voltage Below Normal
411-13	Engine Exhaust Gas Recirculation Differential Pressure: Calibration Required	3387-13	EGR Differential Pressure Sensor: Calibration Required
412-3	Engine Exhaust Gas Recirculation Temperature: Voltage Above Normal	3386-3	EGR Temperature Sensor: Voltage Above Normal
412-4	Engine Exhaust Gas Recirculation Temperature: Voltage Below Normal	3386-4	EGR Temperature Sensor: Voltage Below Normal
626-5	Engine Start Enable Device 1: Current Below Normal	2417-5	Ether Injection Control Solenoid: Current Below Normal

Table 2-1: Diagnostic Codes

J1939		CATERPILLAR DATA LINK (CDL)	
626-6	Engine Start Enable Device 1: Current Above Normal	2417-6	Ether Injection Control Solenoid: Current Above Normal
630-2	Calibration Memory: Erratic, Intermittent, or Incorrect	268-2	Programmed Parameter Fault: Erratic, Intermittent, or Incorrect
631-2	Calibration Module: Erratic, Intermittent, or Incorrect	253-2	Personality Module: Erratic, Intermittent, or Incorrect
637-11	Engine Timing Sensor: Other Failure Mode	261-11	Engine Timing Offset fault
637-13	Engine Timing Sensor: Calibration Required	261-13	Engine Timing Calibration: Calibration
651-2	Engine Injector Cylinder #01: Erratic, Intermittent, or Incorrect	1-2	Cylinder #1 Injector: Erratic, Intermittent, or Incorrect
651-5	Engine Injector Cylinder #01: Current Below Normal	1-5	Cylinder #1 Injector: Current Below Normal
651-6	Engine Injector Cylinder #01: Current Above Normal	1-6	Cylinder #1 Injector: Current Above Normal
651-7	Engine Injector Cylinder #01: Not Responding Properly	1-7	Cylinder #1 Injector: Not Responding Properly
652-2	Engine Injector Cylinder #02: Erratic, Intermittent, or Incorrect	2-2	Cylinder #2 Injector: Erratic, Intermittent, or Incorrect
652-5	Engine Injector Cylinder #02: Current Below Normal	2-5	Cylinder #2 Injector: Current Below Normal
652-6	Engine Injector Cylinder #02: Current Above Normal	2-6	Cylinder #2 Injector: Current Above Normal
652-7	Engine Injector Cylinder #02: Not Responding Properly	2-7	Cylinder #2 Injector: Not Responding Properly
653-2	Engine Injector Cylinder #03: Erratic, Intermittent, or Incorrect	3-2	Cylinder #3 Injector: Erratic, Intermittent, or Incorrect
653-5	Engine Injector Cylinder #03: Current Below Normal	3-5	Cylinder #3 Injector: Current Below Normal
653-6	Engine Injector Cylinder #03: Current Above Normal	3-6	Cylinder #3 Injector: Current Above Normal
653-7	Engine Injector Cylinder #03: Not Responding Properly	3-7	Cylinder #3 Injector: Not Responding Properly
654-2	Engine Injector Cylinder #04: Erratic, Intermittent, or Incorrect	4-2	Cylinder #4 Injector: Erratic, Intermittent, or Incorrect
654-5	Engine Injector Cylinder #04: Current Below Normal	4-5	Cylinder #4 Injector: Current Below Normal
654-6	Engine Injector Cylinder #04: Current Above Normal	4-6	Cylinder #4 Injector: Current Above Normal
654-7	Engine Injector Cylinder #04: Not Responding Properly	4-7	Cylinder #4 Injector: Not Responding Properly
655-2	Engine Injector Cylinder #05: Erratic, Intermittent, or Incorrect	5-2	Cylinder #5 Injector: Erratic, Intermittent, or Incorrect
655-5	Engine Injector Cylinder #05: Current Below Normal	5-5	Cylinder #5 Injector: Current Below Normal
655-6	Engine Injector Cylinder #05: Current Above Normal	5-6	Cylinder #5 Injector: Current Above Normal
655-7	Engine Injector Cylinder #05: Not Responding Properly	5-7	Cylinder #5 Injector: Not Responding Properly

Table 2-1: Diagnostic Codes

J1939		CATERPILLAR DATA LINK (CDL)	
656-2	Engine Injector Cylinder #06: Erratic, Intermittent, or Incorrect	62-2	Cylinder #6 Injector: Erratic, Intermittent, or Incorrect
656-5	Engine Injector Cylinder #06: Current Below Normal	6-5	Cylinder #6 Injector: Current Below Normal
656-6	Engine Injector Cylinder #06: Current Above Normal	6-6	Cylinder #6 Injector: Current Above Normal
656-7	Engine Injector Cylinder #06: Not Responding Properly	6-7	Cylinder #6 Injector: Not Responding Properly
678-3	ECU 8 Volts DC Supply: Voltage Above Normal	41-3	8 Volt DC Supply: Voltage Above Normal
678-4	ECU 8 Volts DC Supply: Voltage Below Normal	41-4	8 Volt DC Supply: Voltage Below Normal
723-8	Engine Speed Sensor #2: Abnormal Frequency, Pulse Width, or Period	342-8	Secondary Engine Speed Sensor: Abnormal Frequency, Pulse Width, or Period
1347-5	Engine Fuel Pump Pressurizing Assembly #1: Current Below Normal	1779-5	Fuel Rail #1 Pressure Valve Solenoid: Current Below Normal
1347-6	Engine Fuel Pump Pressurizing Assembly #1: Current Above Normal	1779-6	Fuel Rail #1 Pressure Valve Solenoid: Current Above Normal
1348-5	Engine Fuel Pump Pressurizing Assembly #2: Current Below Normal	1780-5	Fuel Rail #2 Pressure Valve Solenoid: Current Below Normal
1348-6	Engine Fuel Pump Pressurizing Assembly #2: Current Above Normal	1780-6	Fuel Rail #2 Pressure Valve Solenoid: Current Above Normal
1385-3	Auxiliary Temperature #1: Voltage Above Normal	1836-3	Auxiliary Temperature Sensor: Voltage Above Normal
1385-4	Auxiliary Temperature #1: Voltage Below Normal	1836-4	Auxiliary Temperature Sensor: Voltage Below Normal
1387-3	Auxiliary Pressure #1: Voltage Above Normal	1835-3	Auxiliary Pressure Sensor: Voltage Above Normal
1387-4	Auxiliary Pressure #1: Voltage Below Normal	1835-4	Auxiliary Pressure Sensor: Voltage Below Normal
2630-3	Engine Charge Air Cooler Outlet Temperature: Voltage Above Normal	3372-3	Engine Charge Air Cooler #1 Outlet Temperature Sensor: Voltage Above Normal
2630-4	Engine Charge Air Cooler Outlet Temperature: Voltage Below Normal	3372-4	Engine Charge Air Cooler #1 Outlet Temperature Sensor: Voltage Below Normal
2791-5	Engine Exhaust Gas Recirculation (EGR) Valve Control: Current Below Normal	3405-5	EGR Valve Control: Current Below Normal
2791-6	Engine Exhaust Gas Recirculation (EGR) Valve Control: Current Above Normal	3405-6	EGR Valve Control: Current Above Normal
3241-3	Exhaust Gas Temperature 1: Voltage Above Normal	3485-3	Aftertreatment #1 Exhaust Gas Temperature #1 Sensor: Voltage Above Normal
3241-4	Exhaust Gas Temperature 1: Voltage Below Normal	3485-4	Aftertreatment #1 Exhaust Gas Temperature #1 Sensor: Voltage Below Normal
3242-3	Particulate Trap Intake Gas Temperature: Voltage Above Normal	2452-3	DPF #1 Intake Temperature Sensor: Voltage Above Normal
3242-4	Particulate Trap Intake Gas Temperature: Voltage Below Normal	2452-4	DPF #1 Intake Temperature Sensor: Voltage Below Normal
3358-3	Engine Exhaust Gas Recirculation Inlet Pressure: Voltage Above Normal	3385-3	EGR Intake Pressure Sensor: Voltage Above Normal

Table 2-1: Diagnostic Codes

J1939		CATERPILLAR DATA LINK (CDL)	
3358-4	Engine Exhaust Gas Recirculation Inlet Pressure: Voltage Below Normal	3385-4	EGR Intake Pressure Sensor: Voltage Below Normal
3358-13	Engine Exhaust Gas Recirculation Inlet Pressure: Calibration Required	3385-13	EGR Intake Pressure Sensor: Calibration Required
3479-5	Aftertreatment #1 Fuel Pressure Control: Current Below Normal	2461-5	ARD Fuel Pressure #1 Control: Current Below Normal
3479-6	Aftertreatment #1 Fuel Pressure Control: Current Above Normal	2461-6	ARD Fuel Pressure #1 Control: Current Above Normal
3480-3	Aftertreatment #1 Fuel Pressure #1: Voltage Above Normal	2460-3	ARD Fuel Pressure #1 Sensor: Voltage Above Normal
3480-4	Aftertreatment #1 Fuel Pressure #1: Voltage Below Normal	2460-4	ARD Fuel Pressure #1 Sensor: Voltage Below Normal
3484-5	Aftertreatment #1 Ignition: Current Below Normal	2465-5	Aftertreatment #1 Ignition Transformer Primary: Current Below Normal
3484-6	Aftertreatment #1 Ignition: Current Above Normal	2465-6	Aftertreatment #1 Ignition Transformer Primary: Current Above Normal
3487-5	Aftertreatment #1 Air Pressure Control: Current Below Normal	2489-5	ARD Air Pressure Control Actuator: Current Below Normal
3487-6	Aftertreatment #1 Air Pressure Control: Current Above Normal	2489-6	ARD Air Pressure Control Actuator: Current Above Normal
3487-7	Aftertreatment #1 Air Pressure Control: Not Responding Properly	2489-7	ARD Air Pressure Control Actuator: Not Responding Properly
3487-8	Aftertreatment #1 Air Pressure Control: Abnormal Frequency, Pulse Width, or Period	2489-8	ARD Air Pressure Control Actuator: Abnormal Frequency, Pulse Width, or Period
3488-3	Aftertreatment #1 Air Pressure Actuator Position: Voltage Above Normal	2490-3	ARD Air Pressure Control Actuator Position Sensor: Voltage Above Normal
3488-4	Aftertreatment #1 Air Pressure Actuator Position: Voltage Below Normal	2490-4	ARD Air Pressure Control Actuator Position Sensor: Voltage Below Normal
3509-3	Sensor Supply Voltage 1: Voltage Above Normal	262-3	5 Volt Sensor DC Power Supply: Voltage Above Normal
3509-4	Sensor Supply Voltage 1: Voltage Below Normal	262-4	5 Volt Sensor DC Power Supply: Voltage Below Normal
3510-3	Sensor Supply Voltage 2: Voltage Above Normal	2131-3	5 Volt Sensor DC Power Supply #2: Voltage Above Normal
3510-4	Sensor Supply Voltage 2: Voltage Below Normal	2131-4	5 Volt Sensor DC Power Supply #2: Voltage Below Normal
3511-3	Sensor Supply Voltage 3: Voltage Above Normal	3482-3	Sensor Supply #3: Voltage Above Normal
3511-4	Sensor Supply Voltage 3: Voltage Below Normal	3482-4	Sensor Supply #3: Voltage Below Normal
3563-3	Engine Intake Manifold #1 Absolute Pressure: Voltage Above Normal	1785-3	Intake Manifold Pressure Sensor: Voltage Above Normal
3563-4	Engine Intake Manifold #1 Absolute Pressure: Voltage Below Normal	1785-4	Intake Manifold Pressure Sensor: Voltage Below Normal
3563-13	Engine Intake Manifold #1 Absolute Pressure: Calibration Required	1785-13	Intake Manifold Pressure Sensor: Calibration Required
3609-3	DPF #1 Intake Pressure: Voltage Above Normal	3464-3	DPF #1 Intake Pressure Sensor: Voltage Above Normal

Table 2-1: Diagnostic Codes

J1939		CATERPILLAR DATA LINK (CDL)	
3609-4	DPF #1 Intake Pressure: Voltage Below Normal	3464-4	DPF #1 Intake Pressure Sensor: Voltage Below Normal
3609-13	DPF #1 Intake Pressure: Calibration Required	3464-13	DPF #1 Intake Pressure Sensor: Calibration Required
3837-3	Aftertreatment 1 Secondary Air Pressure: Voltage Above Normal	3493-3	Aftertreatment #1 Secondary Air Pressure Sensor: Voltage Above Normal
3837-4	Aftertreatment 1 Secondary Air Pressure: Voltage Below Normal	3493-4	Aftertreatment #1 Secondary Air Pressure Sensor: Voltage Below Normal
3837-13	Aftertreatment 1 Secondary Air Pressure: Calibration Required	3493-13	Aftertreatment #1 Secondary Air Pressure Sensor: Calibration Required
4077-3	Aftertreatment #1 Fuel Pressure #2: Voltage Above Normal	2497-3	ARD Fuel Pressure #2 Sensor: Voltage Above Normal
4077-4	Aftertreatment #1 Fuel Pressure #2: Voltage Below Normal	2497-4	ARD Fuel Pressure #2 Sensor: Voltage Below Normal
4265-6	Aftertreatment #1 Transformer Secondary Output: Current Above Normal	3180-6	Aftertreatment #1 Ignition Transformer Secondary: Current Above Normal
4301-5	Aftertreatment #1 Fuel Injector #1 Heater Control: Current Below Normal	3182-5	Aftertreatment #1 Fuel Injector #1 Heater: Current Below Normal
4301-6	Aftertreatment #1 Fuel Injector #1 Heater Control: Current Above Normal	3182-6	Aftertreatment #1 Fuel Injector #1 Heater: Current Above Normal
4783-21	DPF #1 Mean Soot Signal: Data Drifted Low	3397-21	DPF #1 Soot Loading Sensor: Data Drifted Low
5276-5	Engine Exhaust Manifold Bank #1 Flow Balance Valve Actuator Control: Current Below Normal	3409-5	Engine Exhaust Manifold Bank #1 Flow Balance Valve Solenoid: Current Above Normal
5276-6	Engine Exhaust Manifold Bank #1 Flow Balance Valve Actuator Control: Current Above Normal	3409-6	Engine Exhaust Manifold Bank #1 Flow Balance Valve Solenoid: Current Above Normal
5423-5	Aftertreatment #1 Fuel Pump Relay Control: Current Below Normal	3427-5	Aftertreatment Fuel Pump Relay: Current Below Normal
5423-6	Aftertreatment #1 Fuel Pump Relay Control: Current Above Normal	3427-6	Aftertreatment Fuel Pump Relay: Current Above Normal
5424-5	Aftertreatment #1 Fuel Flow Diverter Valve Control: Current Below Normal	3413-5	ARD Fuel Flow Diverter Actuator: Current Below Normal
5424-6	Aftertreatment #1 Fuel Flow Diverter Valve Control: Current Above Normal	3413-6	ARD Fuel Flow Diverter Actuator: Current Above Normal
5495-14	Aftertreatment #1 DPF Soot Mean Calibration Offset: Special Instruction	3397-14	DPF #1 Soot Loading Sensor: Special Instruction
5576-2	Aftertreatment #1 Identification: Erratic, Intermittent, or Incorrect	3468-2	Aftertreatment #1 Identification Number Module: Erratic, Intermittent, or Incorrect
5576-8	Aftertreatment #1 Identification: Abnormal Frequency, Pulse Width, or Period	3468-8	Aftertreatment #1 Identification Number Module: Abnormal Frequency, Pulse Width, or Period
5576-14	Aftertreatment #1 Identification: Special Instruction	3468-14	Aftertreatment #1 Identification Number Module: Special Instruction
5578-3	Engine Fuel Delivery Absolute Pressure: Voltage Above Normal	289-3	Fuel Pressure Sensor - Before Fuel Filter: Voltage Above Normal
5578-4	Engine Fuel Delivery Absolute Pressure: Voltage Below Normal	289-4	Fuel Pressure Sensor - Before Fuel Filter: Voltage Below Normal

Table 2-1: Diagnostic Codes

J1939		CATERPILLAR DATA LINK (CDL)	
5578-13	Engine Fuel Delivery Absolute Pressure: Calibration Required	289-13	Fuel Pressure Sensor - Before Fuel Filter: Calibration Required
5580-3	Engine Filtered Fuel Delivery Absolute Pressure: Voltage Above Normal	460-3	Fuel Pressure Sensor - After Fuel Filter: Voltage Above Normal
5580-4	Engine Filtered Fuel Delivery Absolute Pressure: Voltage Below Normal	460-4	Fuel Pressure Sensor - After Fuel Filter: Voltage Below Normal
5580-13	Engine Filtered Fuel Delivery Absolute Pressure: Calibration Required	460-13	Fuel Pressure Sensor - After Fuel Filter: Calibration Required
5591-3	Aftertreatment #1 DPF Air Control Module: Voltage Above Normal	3472-3	ARD Air Pressure Control System: Voltage Above Normal
5591-4	Aftertreatment #1 DPF Air Control Module: Voltage Below Normal	3472-4	ARD Air Pressure Control System: Voltage Below Normal
5591-6	Aftertreatment #1 DPF Air Control Module: Current Above Normal	3471-6	ARD Air Pressure Control Module: Current Above Normal
5591-9	Aftertreatment #1 DPF Air Control Module: Abnormal Update Rate	3472-9	ARD Air Pressure Control System: Abnormal Update Rate
5591-14	Aftertreatment #1 DPF Air Control Module: Special Instruction	3472-14	ARD Air Pressure Control System: Special Instruction
520204-3		3397-3	DPF #1 Soot Loading Sensor: Voltage Above Normal
520204-4		3397-4	DPF #1 Soot Loading Sensor: Voltage Below Normal
520204-9		3397-9	DPF #1 Soot Loading Sensor: Abnormal Update Rate
520204-12		3397-12	DPF #1 Soot Loading Sensor: Failure
520204-13		3397-13	DPF #1 Soot Loading Sensor: Calibration Required
520204-19		3397-19	DPF #1 Soot Loading Sensor: Data Error

Table 2-2: Event Codes

Event Codes	Description	Event Codes	Description
E198 (1)	Low Fuel Pressure	E1008 (2)	High DPF #1 Intake Temperature
E198 (2)	Low Fuel Pressure	E1014 (2)	Low DPF #1 Intake Temperature
E360 (1)	Low Engine Oil Pressure	E1025 (2)	Aftertreatment #1 Failed to Ignite
E360 (2)	Low Engine Oil Pressure	E1026 (2)	Aftertreatment #1 Loss of Combustion
E360 (3)	Low Engine Oil Pressure	E1036 (1)	High Crankcase Pressure
E361 (1)	High Engine Coolant Temperature	E1036 (2)	High Crankcase Pressure
E361 (2)	High Engine Coolant Temperature	E1045 (2)	Low Intake Manifold Pressure
E361 (3)	High Engine Coolant Temperature	E1050 (1)	High Aftertreatment #1 Fuel Pressure #1
E362 (1)	Engine Overspeed	E1050 (2)	High Aftertreatment #1 Fuel Pressure #1
E362 (3)	Engine Overspeed	E1051 (1)	High Aftertreatment #1 Fuel Pressure #2
E363 (1)	High Fuel Supply Temperature	E1051 (2)	High Aftertreatment #1 Fuel Pressure #2
E363 (2)	High Fuel Supply Temperature	E1052 (1)	Low Aftertreatment #1 Fuel Pressure #1
E363 (3)	High Fuel Supply Temperature	E1052 (2)	Low Aftertreatment #1 Fuel Pressure #1

Table 2-2: Event Codes			
E390 (1)	Fuel Filter Restriction	E1053 (1)	Low Aftertreatment #1 Fuel Pressure #2
E390 (2)	Fuel Filter Restriction	E1053 (2)	Low Aftertreatment #1 Fuel Pressure #2
E396 (1)	High Fuel Rail Pressure	E1070 (1)	Aftertreatment Fuel Injector #1 not responding
E398 (1)	Low Fuel Rail Pressure	E1070 (2)	Aftertreatment Fuel Injector #1 not responding
E441 (1)	Idle Elevated to Increase Battery Voltage	E1090 (2)	High EGR Intake Pressure
E443 (1)	High Auxiliary Pressure	E1092 (1)	High EGR Temperature
E443 (2)	High Auxiliary Pressure	E1092 (2)	High EGR Temperature
E443 (3)	High Auxiliary Pressure	E1093 (2)	Low EGR Differential Pressure
E445 (1)	High Auxiliary Temperature	E1094 (2)	High EGR Differential Pressure
E445 (2)	High Auxiliary Temperature	E1095 (2)	Low EGR Mass Flow Rate
E445 (3)	High Auxiliary Temperature	E1096 (1)	High EGR Mass Flow Rate
E499 (3)	Fuel Rail #1 Pressure Leak	E1096 (2)	High EGR Mass Flow Rate
E539 (1)	High Intake Manifold Air Temperature	E1154 (2)	Low DPF #1 Intake Pressure
E539 (2)	High Intake Manifold Air Temperature	E1156 (1)	High DPF #1 Intake Pressure
E539 (3)	High Intake Manifold Air Temperature	E1170 (2)	Low Aftertreatment #1 Secondary Air Pressure
E583 (1)	High Air Inlet #1 Differential Pressure	E1171 (1)	Engine Idle Shutdown Occurred
E583 (2)	High Air Inlet #1 Differential Pressure	E1172 (2)	Engine Idle Shutdown Pending
E593 (2)	Aftertreatment Insufficient Temperature to Complete Regeneration	E1172 (3)	Engine Idle Shutdown Pending
E678 (3)	Ground Level Shutdown	E1187 (2)	Engine Exhaust Manifold Bank #1 Flow Balance Valve Stuck Closed
E991 (3)	DPF Active Regeneration Inhibited Due to Permanent System Lockout	E1188 (1)	Engine Exhaust Manifold Bank #1 Flow Balance Valve Stuck Open
E992 (3)	DPF Active Regeneration Inhibited Due to Permanent System Lockout	E1190 (3)	Low Aftertreatment Cooling Fan Speed
E993 (2)	DPF Active Regeneration Inhibited Due to Inhibit Switch	E1217 (3)	Delayed Engine Shutdown Override
E995 (2)	High DPF #1 Soot Loading	E1218 (2)	High Unfiltered Fuel Pressure
E995 (3)	High DPF #1 Soot Loading	E1220 (2)	Low Cranking Fuel Rail Pressure
E997 (1)	High DPF #1 Ash Loading	E1239 (1)	DPF #1 Conditions Not Met for Active Regeneration
E997 (2)	High DPF #1 Ash Loading	E2143 (1)	Low Engine Coolant Level
E1008 (1)	High DPF #1 Intake Temperature	E2143 (2)	Low Engine Coolant Level
		E2143 (3)	Low Engine Coolant Level

2.10 PARTS OF THE EVENT CODE

The “E” identifies the code as an event code. The “XX(X)” represents a numeric identifier for the event code. The fourth “(X)” assigns one of three levels to the active event code according to the severity of the abnormal system condition. This is followed by a description of the code. Refer to the following example:

- E360(1) Low Oil Pressure
- E360(2) Low Oil Pressure
- E360(3) Low Oil Pressure

The definition for the levels of severity for an event are defined below:

Level 1 - Level 1 alerts the operator that an engine system requires attention. The operator should check the involved system condition or the operator should

perform maintenance on the involved system at the earliest possible time.

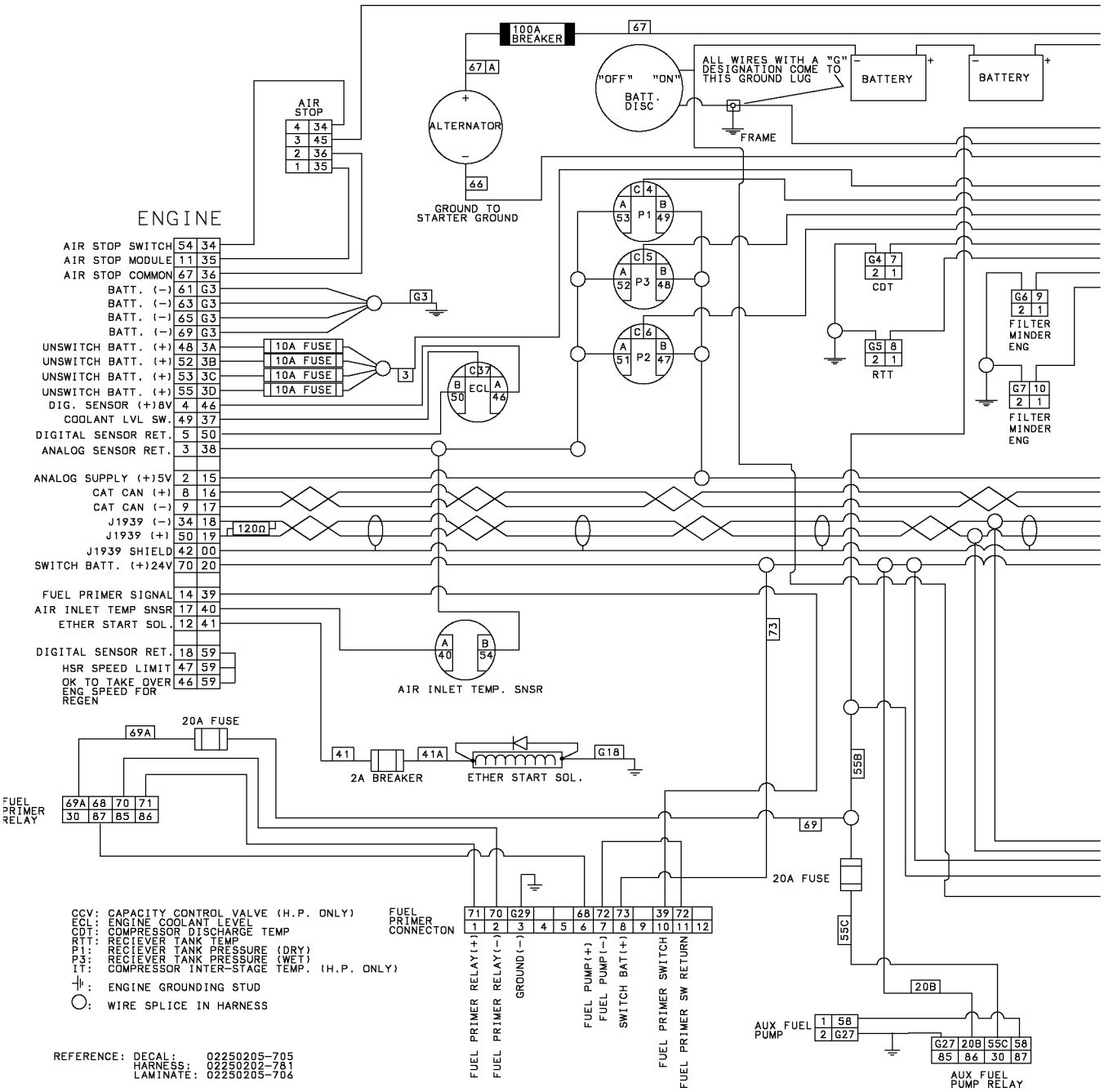
Level 2 - Level 2 requires a change in the operation of the engine or the performance of a maintenance procedure. Failure to correct the problem that caused this warning may result in damage to the engine components.

Level 3 - Level 3 requires an immediate safe shutdown of the engine in order to avoid damage to the engine or injury to personnel around the engine.The problem that caused the event must be corrected before engine operation can resume.

2.11 ELECTRICAL SYSTEM, FUNCTIONAL DESCRIPTION

Refer to *Section 2.12: MAIN WIRING DIAGRAM*. The electrical system is comprised of not only the necessary equipment required to operate the compressor, but also a system to shut it down in the event of a malfunction. The components of the electrical system are an engine starter (with an integral solenoid), battery, an alternator with a built-in voltage regulator, a compressor discharge temperature switch (which will shut down the compressor should the compressor temperature exceed 300°F [149°C]), a low coolant shutdown switch and low fuel shutdown protection. The engine coolant level detector is located in the deaeration tank for the engine cooling system. It will shut the compressor down or prevent it from being started if the engine coolant level drops too low. In addition, there is a starter protection relay which prevents accidental starter engagement after the engine is running or whenever there is pressure in the receiver tank.

2.12 MAIN WIRING DIAGRAM



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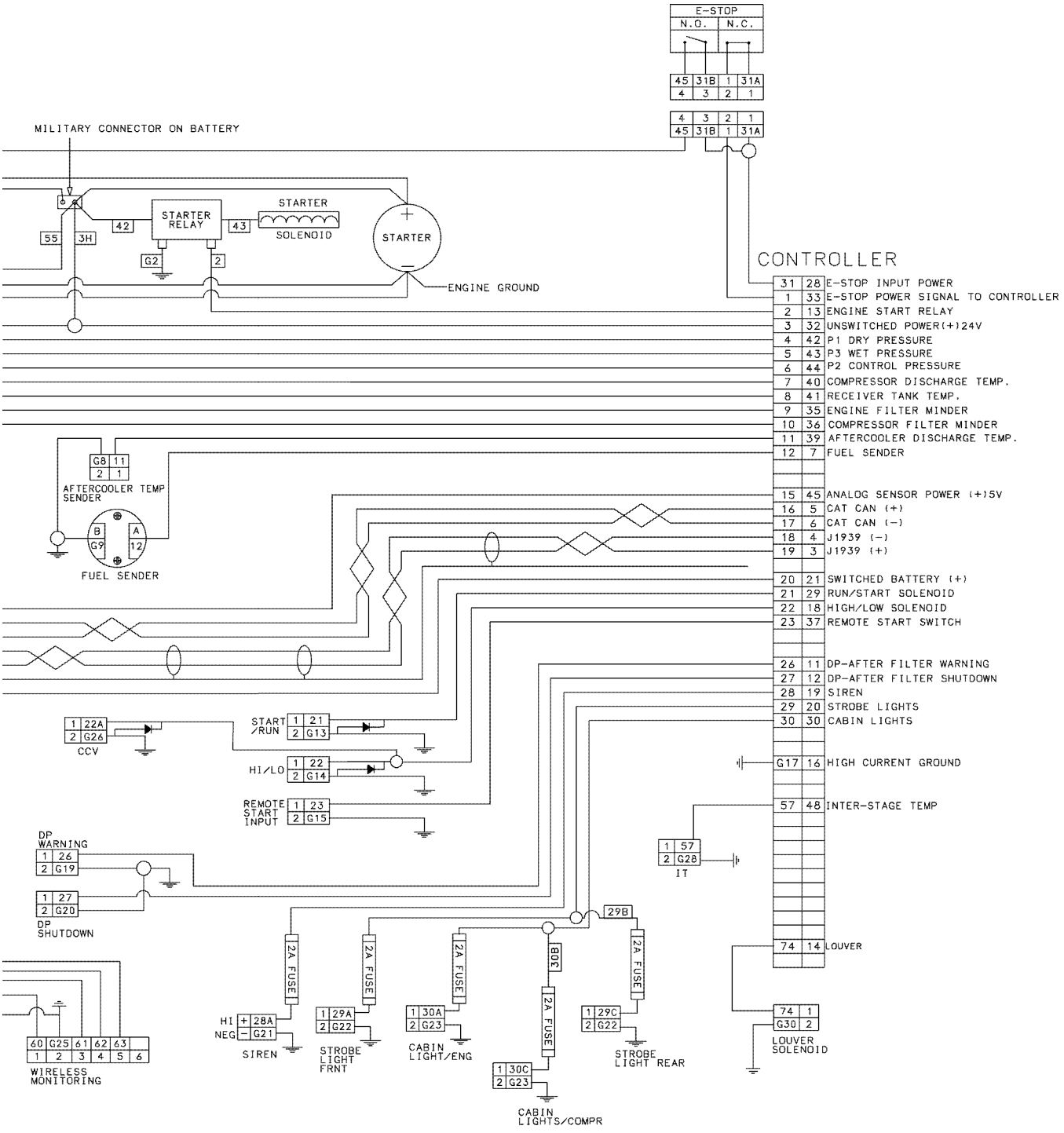
2.13 MAIN WIRING DIAGRAM



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2.13 MAIN WIRING DIAGRAM

SORTED BY PIN NUMBER

Pin	Wire	Function
1		Not Used
2		Not Used
3	19	J1939 (+)
4	18	J1939 (-)
5	16	CAT CAN (+)
6	17	CAT CAN (-)
7	12	Fuel Sender Signal
8		Not Used
9		Not Used
10		Not Used
11	26	DP After-filter Warning Signal
12	27	DP After-filter Shutdown Signal
13	2	Engine Start Relay Coil (+)
14	74	Louver
15		Not Used
16	G17	High Current Ground
17		Not Used
18	22	High / Low Solenoid Coil (+)
19	28	Siren Signal
20	29	Strobe Lights Signal
21	20	Switched Battery (+)
22		Not Used
23		Not Used
24		Not Used
25		Not Used
26		Not Used
27		Not Used
28	31	E-Stop Input Power
29	21	Run / Start Solenoid Coil (+)
30	30	Cabin Lights Signal
31		Not Used
32	3	Unswitched Power (+)24V
33	1	E-Stop Power Signal to Controller
34		Not Used
35	9	Engine Filter Minder Signal
36	10	Compressor Filter Minder Signal
37	23	Remote Start Switch (Dry Contact)
38		Not Used
39	11	After-cooler Discharge Temp Signal
40	7	Compressor Discharge Temp Signal
41	8	Receiver Tank Temp Signal
42	4	P1 Dry Pressure Signal
43	5	P3 Wet Pressure Signal
44	6	P2 Control Pressure Signal
45	15	Analog Sensor Power (+) 5
46		Not Used
47		Not Used
48	57	Inter-stage Temp Switch

SORTED BY WIRE NUMBER

Pin	Wire	Function
33	1	E-Stop Power Signal to Controller
13	2	Engine Start Relay Coil (+)
32	3	Unswitched Power (+)24V
42	4	P1 Dry Pressure Signal
43	5	P3 Wet Pressure Signal
44	6	P2 Control Pressure Signal
40	7	Compressor Discharge Temp Signal
41	8	Receiver Tank Temp Signal
35	9	Engine Filter Minder Signal
36	10	Compressor Filter Minder Signal
39	11	After-cooler Discharge Temp Signal
7	12	Fuel Sender Signal
45	15	Analog Sensor Power (+) 5
5	16	CAT CAN (+)
6	17	CAT CAN (-)
4	18	J1939 (-)
3	19	J1939 (+)
21	20	Switched Battery (+)
29	21	Run / Start Solenoid Coil (+)
18	22	High / Low Solenoid Coil (+)
37	23	Remote Start Switch (Dry Contact)
11	26	DP After-filter Warning Signal
12	27	DP After-filter Shutdown Signal
19	28	Siren Signal
20	29	Strobe Lights Signal
30	30	Cabin Lights Signal
28	31	E-Stop Input Power
48	57	Inter-stage Temp Switch
14	74	Louver
16	G17	High Current Ground
1		Not Used
2		Not Used
8		Not Used
9		Not Used
10		Not Used
15		Not Used
17		Not Used
22		Not Used
23		Not Used
24		Not Used
25		Not Used
26		Not Used
27		Not Used
31		Not Used
34		Not Used
38		Not Used
47		Not Used
46		Not Used

CONTROLLER CONNECTOR

GENERAL WIRE INFORMATION

Pin	Wire	Function
	3H	Unswitched Power Feed To Controller
1	22A	Butterfly Power 24VDC
	28A	Siren Fused
1	29A	Strobe Lt. Front Fused
	29B	Strobe Lt. Rear Feed To Fuse
1	29C	Strobe Lt. Rear Fused
1	30A	Cabin Lt./Eng. Power Fused
	30B	Cabin Lt./Comp. Power Unfused
1	30C	Cabin Lt./Comp. Power Fused
1	31A	E-Stop Input Power
3	31B	E-Stop Input Power
	41A	Ether Start Power Fused
	42	Unswitched Power Feed To Starter Relay
	43	Starter Relay To Starter Solenoid
B	47	P2 Control Pressure (+5)
B	48	P3 Wet Pressure (+5)
B	49	P1 Dry Pressure (+5)
A	51	P2 Control Pressure (Return)
A	52	P3 Wet Pressure (Return)
A	53	P1 Dry Pressure (Return)
B	54	Eng Air Inlet Sensor Return
	55	Unswitched Power To Relays
	55B	Unswitched Power To Aux Fuel Pump Relay Unfused
1	58	Aux Fuel Pump (+)24 Power
	66	Alternator (-)
	67	Alternator (+) Fused
	67A	Alternator Power Unfused
	69	Unswitched Power To Fuel Primer Relay Unfused
	G2	Engine Start Relay Coil (-)
2	G4	Compressor Discharge Temp Ground
2	G5	Receiver Tank Temp Ground
2	G6	Engine Filter Minder Ground
2	G7	Compressor Filter Minder Ground
	G8	After-cooler Discharge Temp Ground
	G9	Fuel Sender Ground
	G11	Not Used
	G12	Not Used
	G13	Run / Start Solenoid Coil (-)
	G14	High / Low Solenoid Coil (-)
	G15	Remote Start Switch Ground
	G18	Ether Start Sol. Ground
2	G19	DP After-filter Warning Ground
2	G20	DP After-filter Shutdown Ground
	G21	Siren Ground
	G22	Strobe Lights Ground
	G23	Cabin Lights Ground
	G24	Not Used
2	G26	Butterfly Valve Solenoid Ground
2	G27	Aux Fuel Pump Ground
	G28	Inter-stage Temp Switch Ground
	G30	Louver Ground

SORTED BY PIN NUMBER

Pin	Wire	Function
1		Not Used
2	15	Analog Sensor Ref. (+)5
3	38	Analog Sensor Return
4	46	Digital Sensor (+)8V
5	50	Digital Sensor Return
6		Not Used
7		Not Used
8	16	CAT CAN (+)
9	17	CAT CAN (-)
10		Not Used
11	35	Air Stop Module
12	41	Ether Start Solenoid
13		Not Used
14	39	Fuel Primer Signal
15		Not Used
16		Not Used
17	40	Air Inlet Temp Sensor
18	59	Digital Sensor Return
19		Not Used
20		Not Used
21		Not Used
22		Not Used
23		Not Used
24		Not Used
25		Not Used
26		Not Used
27		Not Used
28		Not Used
29		Not Used
30		Not Used
31		Not Used
32		Not Used
33		Not Used
34	18	J1939 (-)
35		Not Used
36		Not Used
37		Not Used
38		Not Used
39		Not Used
40		Not Used
41		Not Used
42	00	J1939 Shield
43		Not Used
44		Not Used
45		Not Used
46	59	Okay to take over Eng Speed for Regen
47	59	HSR Speed Limit
48	3A	Unswitched Battery (+)
49	37	Coolant Level Switch
50	19	J1939 (+)
51		Not Used
52	3B	Unswitched Battery (+)
53	3C	Unswitched Battery (+)
54	34	Air Stop Switch
55	3D	Unswitched Battery (+)
56		Not Used
57		Not Used
58		Not Used
59		Not Used
60		Not Used
61	G3	Battery (-)
62		Not Used
63	G3	Battery (-)
64		Not Used
65	G3	Battery (-)
66		Not Used
67	36	Air Stop Common
68		Not Used
69	G3	Battery (-)
70	20	Switch Battery (+)24V

SORTED BY WIRE NUMBER

Pin	Wire	Function
42	00	J1939 Shield
48	3A	Unswitched Battery (+)
52	3B	Unswitched Battery (+)
53	3C	Unswitched Battery (+)
55	3D	Unswitched Battery (+)
2	15	Analog Sensor Ref. (+)5
8	16	CAT CAN (+)
9	17	CAT CAN (-)
34	18	J1939 (-)
50	19	J1939 (+)
70	20	Switch Battery (+)24V
54	34	Air Stop Switch
11	35	Air Stop Module
67	36	Air Stop Common
49	37	Coolant Level Switch
3	38	Analog Sensor Return
14	39	Fuel Primer Signal
17	40	Air Inlet Temp Sensor
12	41	Ether Start Solenoid
4	46	Digital Sensor (+)8V
5	50	Digital Sensor Return
18	59	Digital Sensor Return
46	59	Okay to take over Eng Speed for Regen
47	59	HSR Speed Limit
61	G3	Battery (-)
63	G3	Battery (-)
65	G3	Battery (-)
69	G3	Battery (-)
1		Not Used
6		Not Used
7		Not Used
10		Not Used
13		Not Used
15		Not Used
16		Not Used
19		Not Used
20		Not Used
21		Not Used
22		Not Used
23		Not Used
24		Not Used
25		Not Used
26		Not Used
27		Not Used
28		Not Used
29		Not Used
30		Not Used
31		Not Used
32		Not Used
33		Not Used
35		Not Used
36		Not Used
37		Not Used
38		Not Used
39		Not Used
40		Not Used
41		Not Used
43		Not Used
44		Not Used
45		Not Used
51		Not Used
56		Not Used
57		Not Used
58		Not Used
59		Not Used
60		Not Used
62		Not Used
64		Not Used
66		Not Used
68		Not Used

ENGINE CONNECTOR

Connector	Pin	Wire	Function
Fuel Primer Relay	30	69A	Unswitched Power Fused
	85	70	Fuel Primer Relay Ground
	86	71	Switch Batt. For Fuel Primer
	87	68	Fuel Primer (+)24V

Connector	Pin	Wire	Function
Aux Fuel Pump Relay	30	55C	Unswitched Power for Aux Fuel Pump Relay
	85	G27	Aux Fuel Pump Relay Ground
	86	20B	Switch Battery for Aux Fuel Pump Relay
	87	58	Aux Fuel Pump +24 Power

Connector	Pin	Wire	Function
Wireless Monitoring	1	60	Battery (+)
	3	61	Switched Battery
	4	62	J1939 (+)
	5	63	J1939 (-)
	2	G25	Battery (-)
	6		Not Used

Connector	Pin	Wire	Function
Fuel Primer Connection	1	71	Fuel Primer Relay (+) Switch
	2	70	Fuel Primer Relay (-)
	3	G29	Ground
	6	68	Fuel Primer (+)24V
	7	72	Fuel Pump (-)
	8	73	Switch Batt. (+)
	10	39	Fuel Primer Signal
	11	72	Fuel Primer Switch Return

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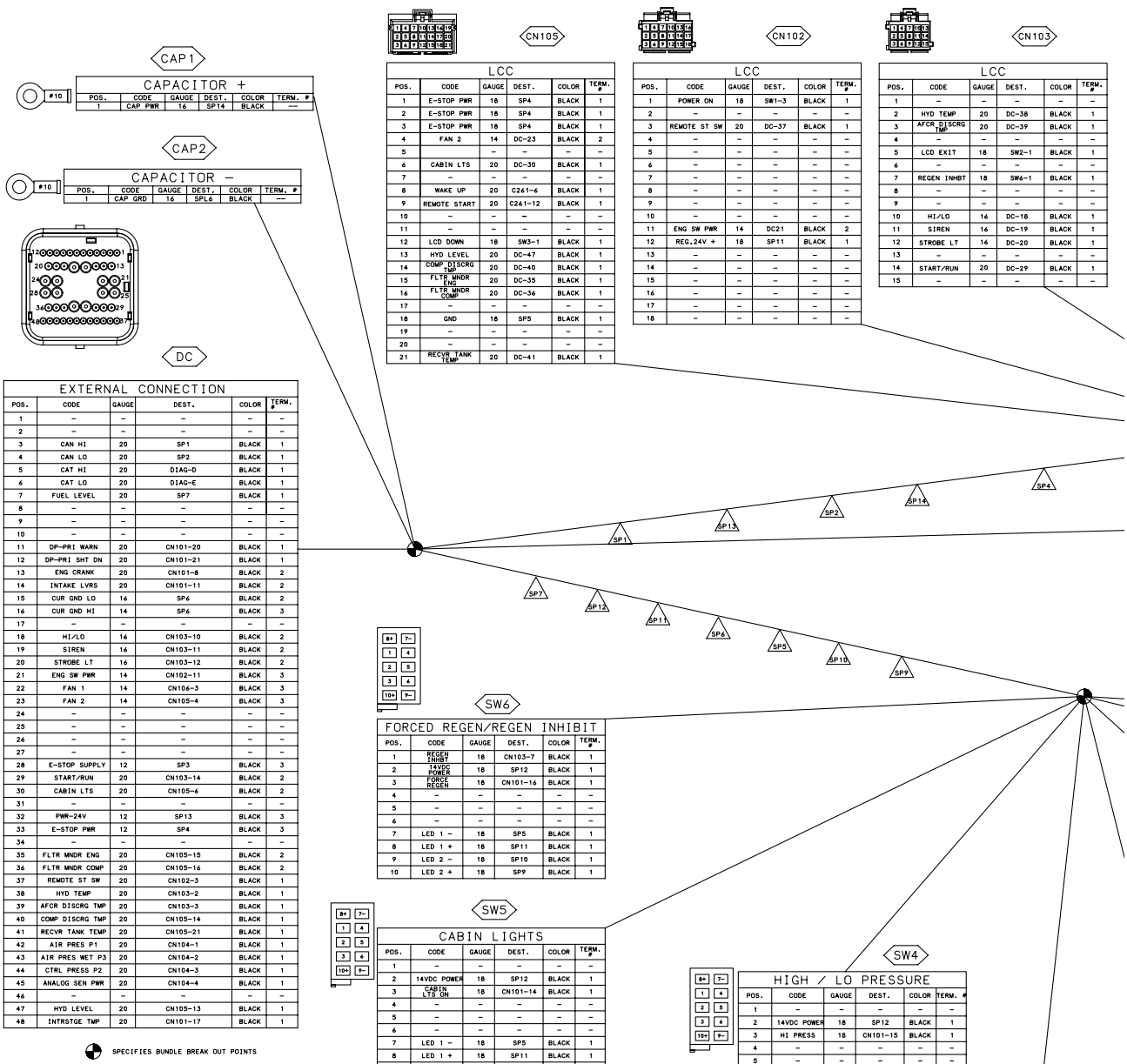
2.14 C-PRO CONTROLLER WIRING DIAGRAM



LCC

POS.	CODE	GAUGE	DEST.	COLOR	TERM. #
1	E-STOP PWR	18	SP4	BLACK	1
2	E-STOP PWR	18	SP4	BLACK	1
3	E-STOP PWR	18	SP4	BLACK	1
4	FAN 2	14	DC-23	BLACK	2
5	–	–	–	–	–
6	CABIN LTS	20	DC-30	BLACK	1
7	–	–	–	–	–
8	WAKE UP	20	C261-6	BLACK	1
9	REMOTE START	20	C261-12	BLACK	1
10	–	–	–	–	–
11	–	–	–	–	–
12	LCD DOWN	18	SW3-1	BLACK	1
13	HYD LEVEL	20	DC-47	BLACK	1
14	COMP DISCRG TMP	20	DC-40	BLACK	1
15	FLTR MNDR ENG	20	DC-35	BLACK	1
16	FLTR MNDR COMP	20	DC-36	BLACK	1
17	–	–	–	–	–
18	GND	18	SP5	BLACK	1
19	–	–	–	–	–
20	–	–	–	–	–
21	RECVR TANK TEMP	20	DC-41	BLACK	1

LCC

POS.	CODE	GAUGE	DEST.	COLOR	TERM. #
1	POWER ON	18	SW1-3	BLACK	1
2	–	–	–	–	–
3	REMOTE ST SW	20	DC-37	BLACK	1
4	–	–	–	–	–
5	–	–	–	–	–
6	–	–	–	–	–
7	–	–	–	–	–
8	–	–	–	–	–
9	–	–	–	–	–
10	–	–	–	–	–
11	ENG SW PWR	14	DC21	BLACK	2
12	REG.24V +	18	SP11	BLACK	1
13	–	–	–	–	–
14	–	–	–	–	–
15	–	–	–	–	–
16	–	–	–	–	–
17	–	–	–	–	–
18	–	–	–	–	–

LCC

POS.	CODE	GAUGE	DEST.	COLOR	TERM. #
1	–	–	–	–	–
2	HYD TEMP	20	DC-38	BLACK	1
3	AFCR DISCRG TMP	20	DC-39	BLACK	1
4	–	–	–	–	–
5	LCD EXIT	18	SW2-1	BLACK	1
6	–	–	–	–	–
7	REGEN INHBT	18	SW6-1	BLACK	1
8	–	–	–	–	–
9	–	–	–	–	–
10	HI/LO	16	DC-18	BLACK	1
11	SIREN	16	DC-19	BLACK	1
12	STROBE LT	16	DC-20	BLACK	1
13	–	–	–	–	–
14	START/RUN	20	DC-29	BLACK	1
15	–	–	–	–	–

EXTERNAL CONNECTION

POS.	CODE	GAUGE	DEST.	COLOR	TERM. #
1	–	–	–	–	–
2	–	–	–	–	–
3	CAN HI	20	SP1	BLACK	1
4	CAN LO	20	SP2	BLACK	1
5	CAT HI	20	DIAG-D	BLACK	1
6	CAT LO	20	DIAG-E	BLACK	1
7	FUEL LEVEL	20	SP7	BLACK	1
8	–	–	–	–	–
9	–	–	–	–	–
10	–	–	–	–	–
11	DP-PRI WARN	20	CN101-20	BLACK	1
12	DP-PRI SHT DN	20	CN101-21	BLACK	1
13	ENG CRANK	20	CN101-8	BLACK	2
14	INTAKE LVRS	20	CN101-11	BLACK	2
15	CUR GND LO	16	SP6	BLACK	2
16	CUR GND HI	14	SP6	BLACK	3
17	–	–	–	–	–
18	HI/LO	16	CN103-10	BLACK	2
19	SIREN	16	CN103-11	BLACK	2
20	STROBE LT	16	CN103-12	BLACK	2
21	ENG SW PWR	14	CN102-11	BLACK	3
22	FAN 1	14	CN106-3	BLACK	3
23	FAN 2	14	CN105-4	BLACK	3
24	–	–	–	–	–
25	–	–	–	–	–
26	–	–	–	–	–
27	–	–	–	–	–
28	E-STOP SUPPLY	12	SP3	BLACK	3
29	START/RUN	20	CN103-14	BLACK	2
30	CABIN LTS	20	CN105-6	BLACK	2
31	–	–	–	–	–
32	PWR-24V	12	SP13	BLACK	3
33	E-STOP PWR	12	SP4	BLACK	3
34	–	–	–	–	–
35	FLTR MNDR ENG	20	CN105-15	BLACK	2
36	FLTR MNDR COMP	20	CN105-16	BLACK	2
37	REMOTE ST SW	20	CN102-3	BLACK	1
38	HYD TEMP	20	CN103-2	BLACK	1
39	AFCR DISCRG TMP	20	CN103-3	BLACK	1
40	COMP DISCRG TMP	20	CN105-14	BLACK	1
41	RECVR TANK TEMP	20	CN105-21	BLACK	1
42	AIR PRES P1	20	CN104-1	BLACK	1
43	AIR PRES WET P3	20	CN104-2	BLACK	1
44	CTRL PRESS P2	20	CN104-3	BLACK	1
45	ANALOG SEN PWR	20	CN104-4	BLACK	1
46	–	–	–	–	–
47	HYD LEVEL	20	CN105-13	BLACK	1
48	INTRSTGE TMP	20	CN101-17	BLACK	1

FORCED REGEN/REGEN INHIBIT

POS.	CODE	GAUGE	DEST.	COLOR	TERM. #
1	REGEN INHBT	18	CN103-7	BLACK	1
2	14VDC POWER	18	SP12	BLACK	1
3	FORCE REGEN	18	CN101-16	BLACK	1
4	–	–	–	–	–
5	–	–	–	–	–
6	–	–	–	–	–
7	LED 1 –	18	SP5	BLACK	1
8	LED 1 +	18	SP11	BLACK	1
9	LED 2 –	18	SP10	BLACK	1
10	LED 2 +	18	SP9	BLACK	1

CABIN LIGHTS

POS.	CODE	GAUGE	DEST.	COLOR	TERM. #
1	–	–	–	–	–
2	14VDC POWER	18	SP12	BLACK	1
3	CABIN LTS ON	18	CN101-14	BLACK	1
4	–	–	–	–	–
5	–	–	–	–	–
6	–	–	–	–	–
7	LED 1 –	18	SP5	BLACK	1
8	LED 1 +	18	SP11	BLACK	1
9	LED 2 –	18	SP10	BLACK	1
10	LED 2 +	18	SP9	BLACK	1

HIGH / LO PRESSURE

POS.	CODE	GAUGE	DEST.	COLOR	TERM. #
1	–	–	–	–	–
2	14VDC POWER	18	SP12	BLACK	1
3	HI PRESS	18	CN101-15	BLACK	1
4	–	–	–	–	–
5	–	–	–	–	–
6	–	–	–	–	–
7	LED 1 –	18	SP5	BLACK	1
8	LED 1 +	18	SP11	BLACK	1
9	LED 2 –	18	SP10	BLACK	1
10	LED 2 +	18	SP9	BLACK	1

LCD TOGGLE

POS.	CODE	GAUGE	DEST.	COLOR	TERM. #
1	LCD DOWN	18	CN105-12	BLACK	1
2	GND	18	SP6	BLACK	1
3	LCD UP	18	CN101-18	BLACK	1
4	–	–	–	–	–
5	–	–	–	–	–
6	–	–	–	–	–
7	LED 1 –	18	SP5	BLACK	1
8	LED 1 +	18	SP11	BLACK	1
9	LED 2 –	18	SP10	BLACK	1
10	LED 2 +	18	SP9	BLACK	1

NOTES:

1. CONNECTOR VIEWS ARE FROM WIRE INSERTION SIDE.
2. LABEL CONNECTORS WITH PERMANENT MARKING. USE LABEL OR PERMANANT MARKER. DO NOT USE PAPER LABELS. USE A COLOR THAT IS CONTRASTING TO THE CONNECTOR COLOR.
3. LABEL HARNESS WITH HARNESS PART NUMBER, REVISION, AND DATE PRODUCED.
4. SPLICED CONNECTIONS TO BE SEALED WITH ADHESIVE LINED HEAT SHRINK UNLESS NOTED OTHERWISE.
5. WIRE CODE SHOULD BE PRINTED 2" FROM EACH END OF THE WIRE AT A MIN. UNLESS OTHERWISE NOTED.
6. ULTRASONIC WELD PER SAE J836 IS PREFERRED METHOD OF SPLICING HOWEVER SOLDERING IS AN ACCEPTABLE ALTERNATIVE IF DONE ACCORDING TO SAE J473Z.
7. ALL TERMINATIONS SHOULD BE MADE PER TERMINAL MANF REQUIREMENTS.
8. ALL CIRCUITS MUST BE 100% TESTED FOR CONTINUITY.
9. TWISTED PAIR WIRES SHALL BE A MINIMUM OF 1 TWIST PER INCH.
10. USE GXL WIRE UNLESS SPECIFIED.
11. WIRE TIES TO BE AT PROPER DISTANCE FROM CONNECTOR, AVOIDING LATERAL TERMINAL STRESS AND ABILITY TO SEAL PROPERLY. USE ADDITIONAL WIRE TIES TO SUPPORT SPLICES & COMPONENTS.
12. ALL 20 GA WIRE IS TO BE TXL.

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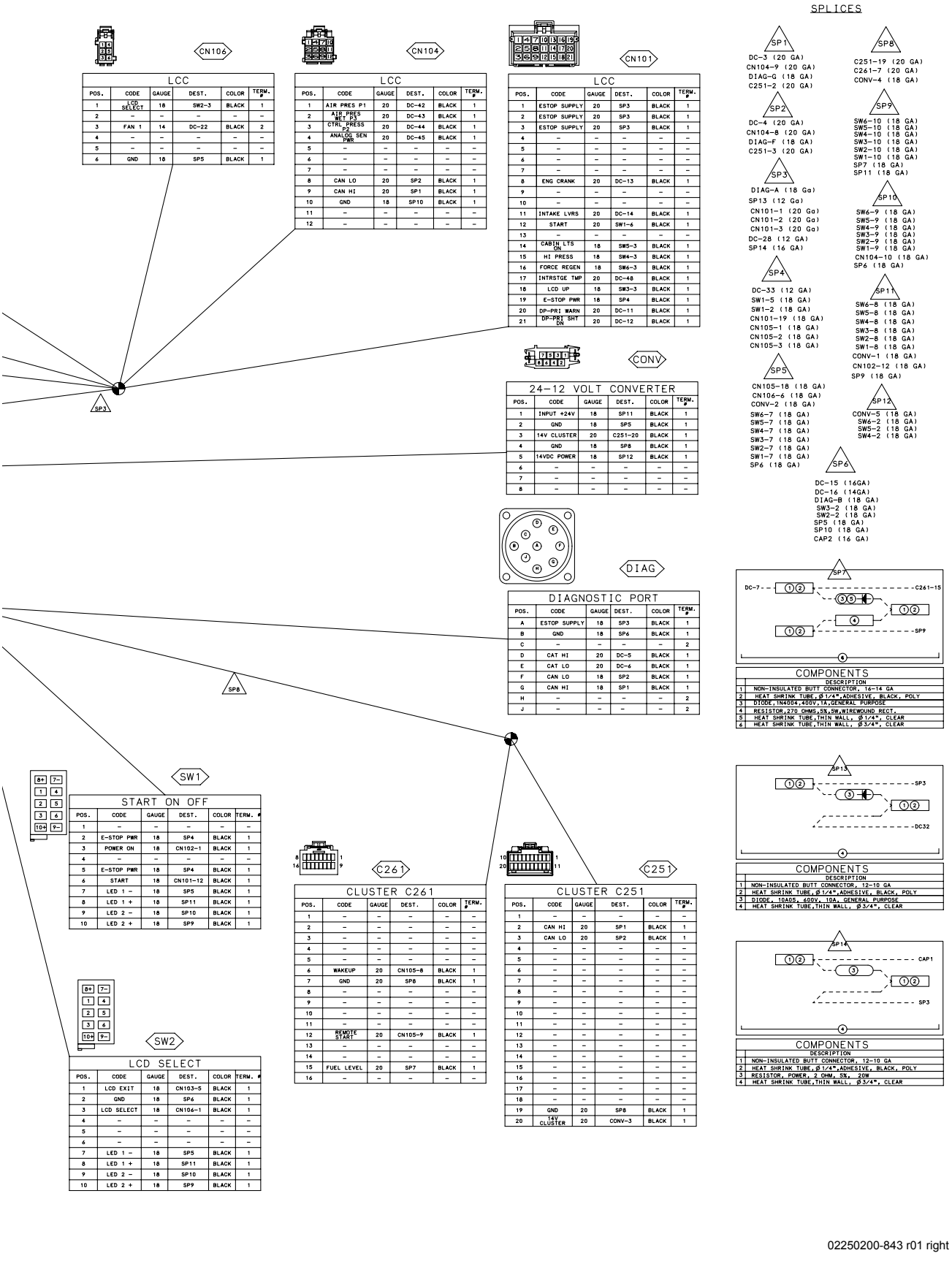
2.14 C-PRO CONTROLLER WIRING DIAGRAM



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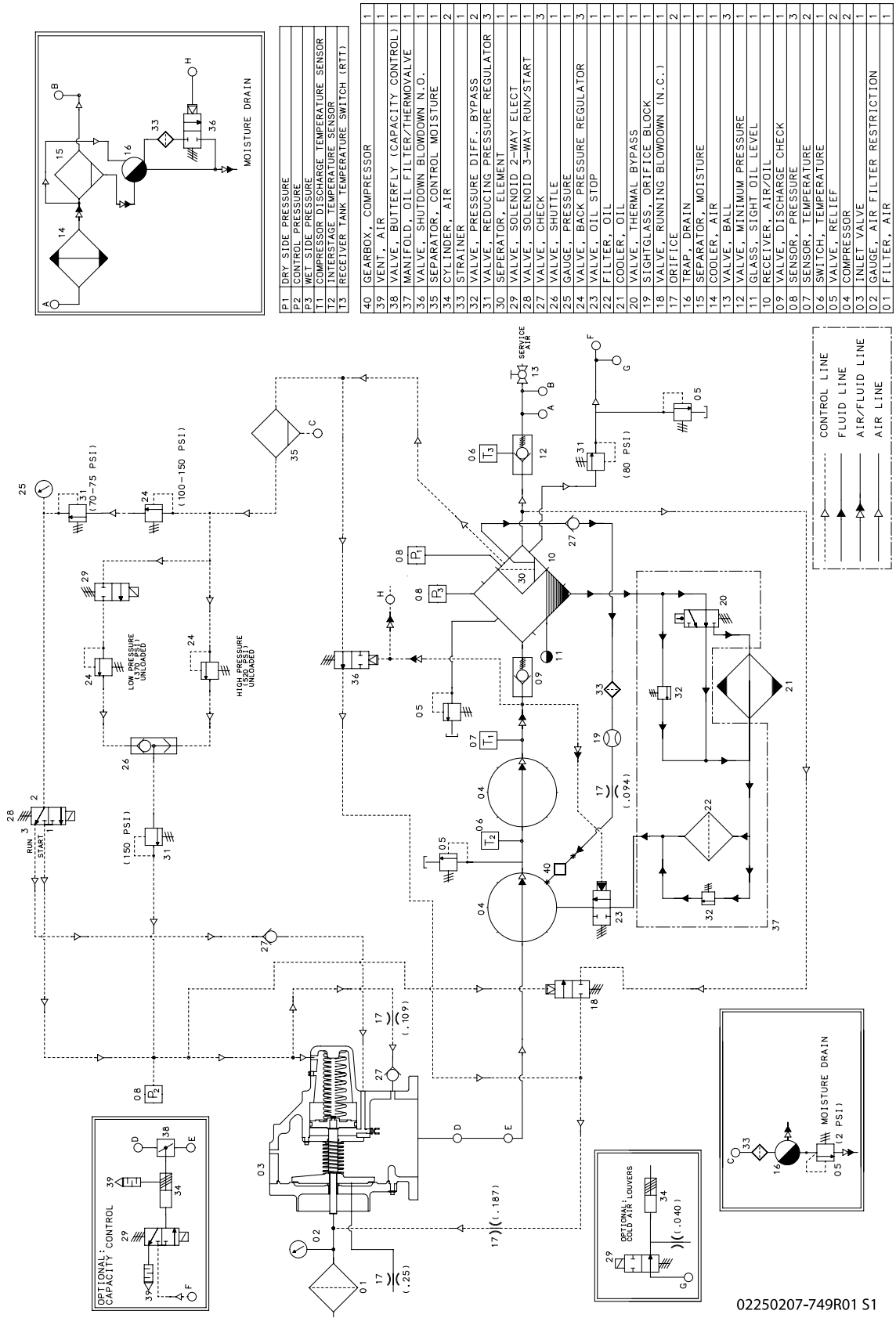
2.15 P & I COMPRESSOR SYSTEM



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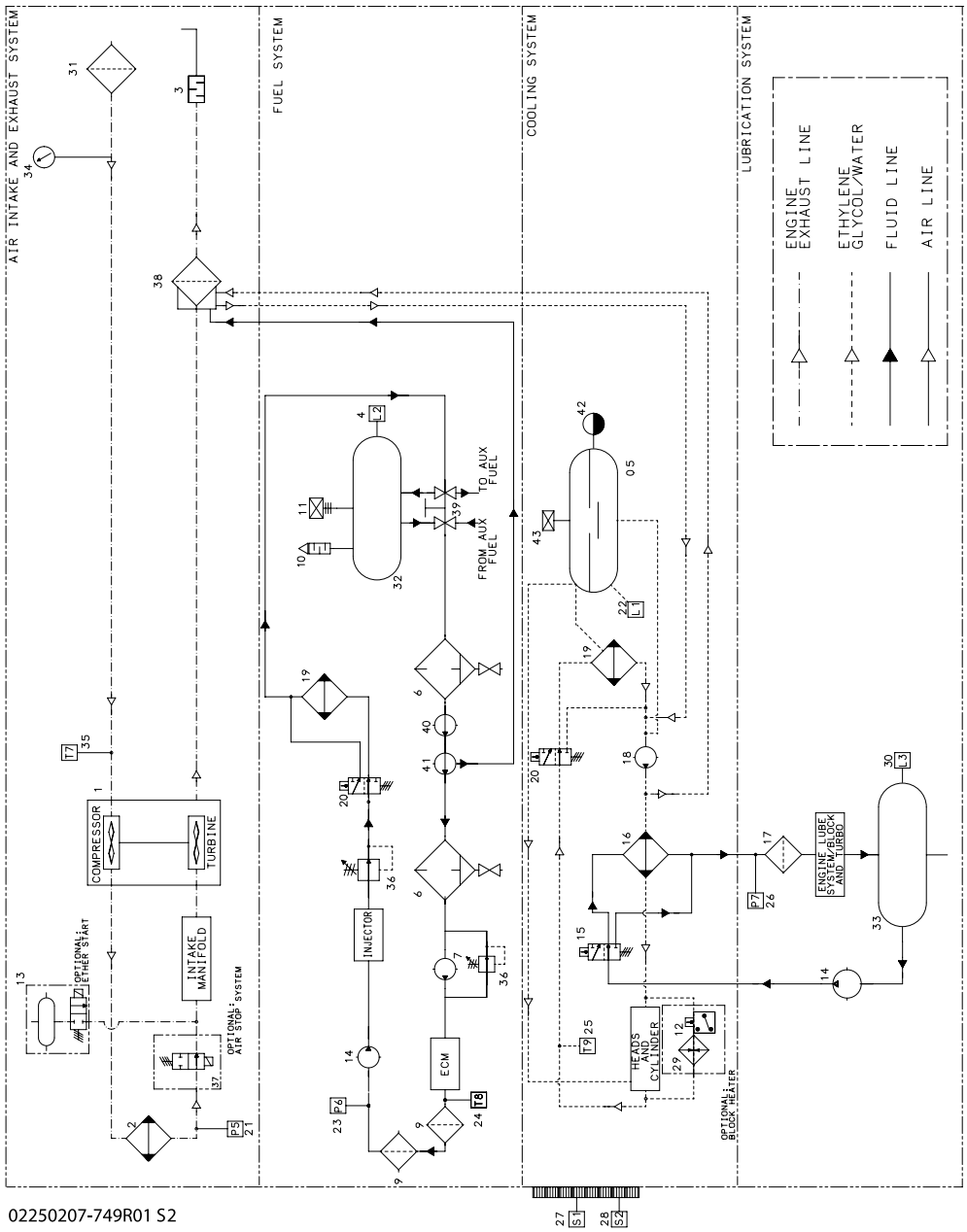
SULLAIR

2.16 P & I—ENGINE SYSTEM

COMPONENT	DESCRIPTION
L1	COOLANT LEVEL
L2	FUEL LEVEL
L3	OIL LEVEL (DIPSTICK)
P5	INLET MANIFOLD AIR PRESSURE
P6	FUEL PRESSURE
P7	OIL PRESSURE
T7	INLET AIR TEMPERATURE
T8	FUEL TEMPERATURE
T9	COOLANT TEMPERATURE
S1	CAM SPEED
S2	CRANK SPEED

43	CAP, COOLANT SYSTEM FILL	1
42	GLASS, SIGHT COOLANT LEVEL	1
41	PUMP, CAT PRIMING/ARD	1
40	PUMP, FUEL ASSIST	1
39	VALVE, 3 WAY	1
38	EXHAUST, DIESEL PARTICULATE FILTER	1
37	VALVE, AIR STOP (OPTIONAL)	1
36	VALVE, RELIEF (INTEGRAL TO ENGINE)	1
35	SENSOR, INLET AIR TEMPERATURE	1
34	GAUGE, FILTER RESTRICTION	1
33	PAN, ENGINE OIL	1
32	TANK, FUEL	1
31	FILTER, AIR	1
30	OIL LEVEL (DIPSTICK)	1
29	HEATER, WATER JACKET (OPTIONAL)	1
28	SENSOR, CRANK SPEED TIMING	1
27	SENSOR, CAM SPEED TIMING	1
26	SENSOR, ENGINE OIL PRESSURE	1
25	SENSOR, COOLANT TEMPERATURE	1
24	SENSOR, FUEL TEMPERATURE	1
23	SENSOR, FUEL PRESSURE	1
22	SWITCH, COOLANT LEVEL	1
21	SENSOR, INLET AIR PRESS(TURBO BOOST)	1
20	ENGINE THERMO (INTEGRAL TO ENGINE)	1
19	RADIATOR, ENGINE	1
18	PUMP, WATER (INTEGRAL TO ENGINE)	1
17	FILTER, OIL	1
16	COOLER, OIL (INTERNAL TO ENGINE)	1
15	BY-PASS VALVE (INTERNAL TO ENGINE)	1
14	PUMP, OIL (INTEGRAL TO ENGINE)	1
13	KIT, ETHER ASSEMBLY	1
12	THERMOSTAT, THERMOCORD(OPTIONAL)	1
11	CAP, FUEL TANK FILL	1
10	VENT, FUEL TANK	1
09	FILTER, FUEL	1
08	PUMP, FUEL HAND OPERATED PRIMING	1
07	PUMP, FUEL (INTERNAL TO ENGINE)	1
06	FILTER, FUEL W/ WATER SEPARATOR	1
05	DEARATION TANK	1
04	SENDER, FUEL LEVEL	1
03	MUFFLER, ENGINE	1
02	COOLER, CHARGE AIR	1
01	TURBOCHARGER, ENGINE	1



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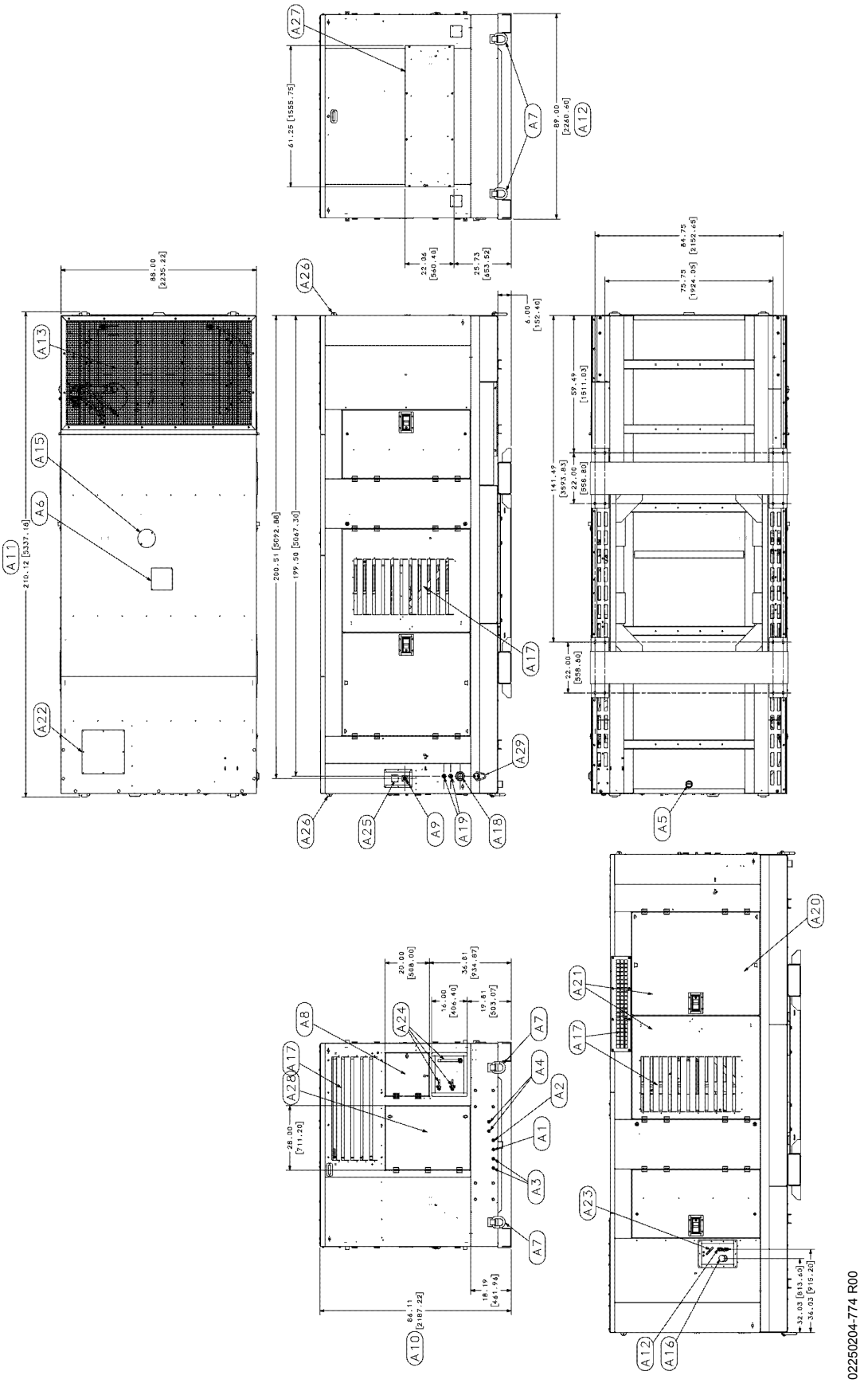
2.17 ID, DLQ AFTERCOOLED



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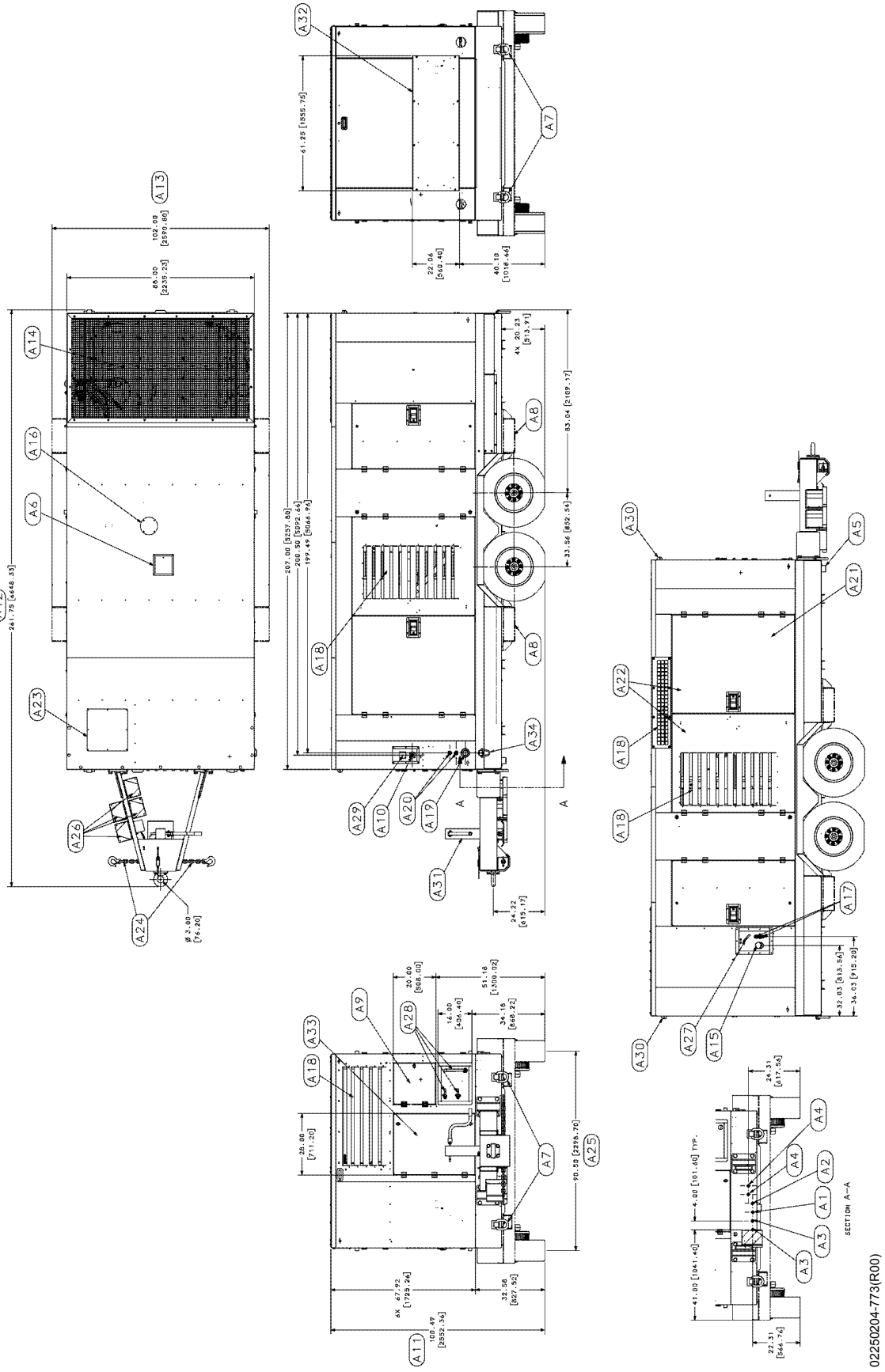
SULLAIR

2.17 ID, DLQ AFTERCOOLED

KEY	DESCRIPTION
	NOTES:
1:	DIMENSIONS ARE IN INCHES
	[ ] DIMENSIONS ARE IN MILLIMETERS.
2:	ALL DOORS REQUIRE 45” [1143 MM] CLEARANCE.
	ALL DOORS ARE PAD/KEY LOCKABLE.
3:	REFERENCE: A STANDARD CONTAINER SIZE IS 92” WIDE X 94” TALL X 232” LONG.
4:	REFERENCE: TWO COMPRESSORS CAN FIT IN A 40’LONG CUBE CONTAINER.
5:	APPROX. WET WEIGHT = 21,000 LBS. [9526 KG.],
	APPROX. DRY WEIGHT = 19,000 LB [8619 KG.]
6:	THIS FRAME CAN CONTAIN 100% OF ALL MACHINE FLUIDS.
A1:	ENGINE COOLANT DRAIN
A2:	ENGINE OIL DRAIN
A3:	COMPRESSOR OIL DRAIN
A4:	WATER CONDENSATE DRAIN (DO NOT PLUG)
	(ONLY REQ’D ON AFTER-COOLED MACHINES)
A5:	CONTAINMENT FRAME DRAIN
A6:	LIFTING BAIL ACCESS COVER
A7:	TOW EYE/TIEDOWN (4-PLACES)
A8:	INSTRUMENT PANEL DOOR
A9:	E-STOP
A10:	OVERALL HEIGHT
A11:	OVERALL LENGTH
A12:	OVERALL WIDTH
A13:	AIR EXHAUST
A14:	ENGINE FUEL FILL
A15:	ENGINE COOLANT FILL
A16:	ENGINE FUEL CONNECTION PORTS
A17:	AIR INTAKE

KEY	DESCRIPTION
A18:	2” NPT AIR DISCHARGE
A19:	3/4” NPT AIR DISCHARGE (LP ONLY)
A20:	BATTERY ACCESS
A21:	AIR FILTER ELEMENT ACCESS
A22:	AIR/OIL SEPARATOR ELEMENT ACCESS
A23:	FUEL SELECTOR VALVE
A24:	DISCHARGE VALVE CONTROL
A25:	BLOCK HEATER INLET (OPTIONAL)
A26:	STROBE LIGHT
A27:	CEM ACCESS
A28:	FILTER/H2O TRAP ACCESS
A29	D-RING FOR DISCHARGE HOSE SAFETY LANYARD

2.18 ID, DTQ AFTERCOOLED



2.18 ID, DTQ AFTERCOOLED

KEY	DESCRIPTION
	NOTES:
1:	DIMENSIONS ARE IN INCHES
	[ ] DIMENSIONS ARE IN MILLIMETERS.
2:	ALL DOORS REQUIRE 45” [1143 MM] CLEARANCE.
	ALL DOORS ARE PAD/KEY LOCKABLE.
3:	REFERENCE: A STANDARD CONTAINER SIZE IS 92” WIDE X 94” TALL X 232” LONG.
4:	REFERENCE: TWO COMPRESSORS CAN FIT IN A 40’LONG CUBE CONTAINER.
5:	APPROX. WET WEIGHT = 21,000 LBS. [9526 KG.],
	APPROX. DRY WEIGHT = 19,000 LB [8619 KG.]
6:	THIS FRAME CAN CONTAIN 100% OF ALL MACHINE FLUIDS.
A1:	ENGINE COOLANT DRAIN
A2:	ENGINE OIL DRAIN
A3:	COMPRESSOR OIL DRAIN
A4:	WATER CONDENSATE DRAIN (DO NOT PLUG)
	(ONLY REQ’D ON AFTER-COOLED MACHINES)
A5:	CONTAINMENT FRAME DRAIN
A6:	LIFTING BAIL ACCESS COVER
A7:	TOW EYE/TIEDOWN (4-PLACES)
A8:	FORK LIFT POCKET (OPTIONAL)
A9:	INSTRUMENT PANEL DOOR
A10:	E-STOP
A11:	OVERALL HEIGHT
A12:	OVERALL LENGTH
A13:	OVERALL WIDTH
A14:	AIR EXHAUST
A15:	ENGINE FUEL FILL
A16:	ENGINE COOLANT FILL
A17:	ENGINE FUEL CONNECTION PORTS

KEY	DESCRIPTION
A18:	AIR INTAKE
A19:	2” NPT AIR DISCHARGE
A20:	3/4” NPT AIR DISCHARGE (LP ONLY)
A21:	BATTERY ACCESS
A22:	AIR FILTER ELEMENT ACCESS
A23:	AIR/OIL SEPARATOR ELEMENT ACCESS
A24:	SAFETY CHAINS
A25:	TRACK WIDTH
A26:	WHEEL CHOCKS
A27:	FUEL SELECTOR VALVE
A28:	DISCHARGE VALVE CONTROL
A29:	BLOCK HEATER INLET (OPTIONAL)
A30:	STROBE LIGHT
A31:	JACK
A32:	CEM ACCESS
A33:	FILTER/H2O TRAP ACCESS
A34:	D-RING FOR DISCHARGE HOSE SAFETY LANYARD

2.19 AFTERCOOLER AIR SYSTEM, FUNCTIONAL DESCRIPTION

Refer to *Figure 2-5*. The purpose of the aftercooler air system is to operate the air compressor in conditions when compressed air temperatures are required to be 10 to 25°F (5 to 13°C) over ambient temperature. This compressor has one main discharge valve. The discharge plumbing within the compressor allows the user to switch between standard air to aftercooled air through a set a valves. These valves are labeled on the machine to help assist the user to select the proper valve orientation with respect to the type of air that is required for the application.

Depending upon the application, the compressed air can be by-passed around the aftercooler for unprocessed air or it can be routed through the aftercooler for cooling. The ambient air, which is drawn through the aftercooler by the engine fan, cools the compressed air as it passes through the aftercooler core. Cooled air enters the moisture separator where condensation is removed and discharged. This condensation does carry some oil and it should be disposed of properly in accordance with local regulations. From the moisture separator the compressed air goes to the compressor service valve.

NOTE

Aftercooler system should not be operated in ambient conditions below 32°F (0°C). If it is necessary to operate in these conditions, Sullair can supply optional equipment to accommodate this requirement.

To operate in the non-aftercooled mode, close the aftercooler service valve completely and open non-aftercooler valve.

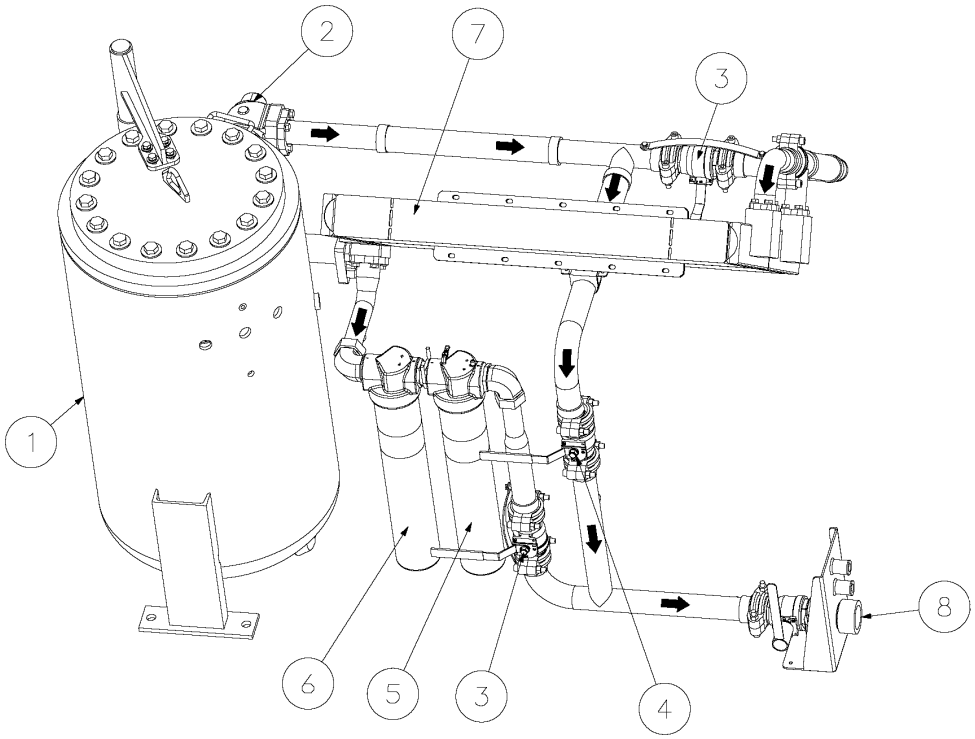


Figure 2-5: Discharge System

1. RECEIVER TANK	5. DISCHARGE FILTER
2. MIN PRESSURE/CHECK VALVE	6. MOISTURE SEPARATOR
3. AFTERCOOLER AIR VALVE	7. AFTERCOOLER
4. STANDARD AIR VALVE	8. SERVICE AIR OUT

2.20 ENGINE EXHAUST AFTERTREATMENT, FUNCTIONAL DESCRIPTION

Refer to *Figure 2-6*. The Clean Emissions Module (CEM) or aftertreatment serves as the means of achieving the Tier IV emissions requirements set forth by the EPA/ EU (69 FR 38957-39273, 29 Jun 2004) to be phased in from 2008-2015. The module itself consists of a Diesel Particulate Filter (DPF), Muffler, Exhaust Outlet, DOC/Inlet Cap, Absolute pressure sensor, CEM Connector to ECM, Combustion Air Valve, Exhaust inlet, Outlet cap, and a Caterpillar RS head. The basic function of the aftertreatment is to remove soot and other solid particulates from the exhaust via the DPF. The level of soot is monitored by the engine and, when needed, the system will automatically regenerate the DPF by raising the temperature in the DPF through active combustion and reducing the soot to ash. This system allows the unit to keep the particulate concentrations of the exhaust at levels that comply with EPA/EU regulations. If the aftertreatment is working correctly, it will not affect the engine performance. The engine will still function normally during aftertreatment regeneration.

Regeneration can be engaged by two methods:

1. Regeneration Switch (manual force/ inhibition)
2. ECU controlled (automatically managed) .

⚠ WARNING

Regenerated exhaust gases can reach temperatures of up to 1800ºF. DO NOT come into direct contact with these gases.

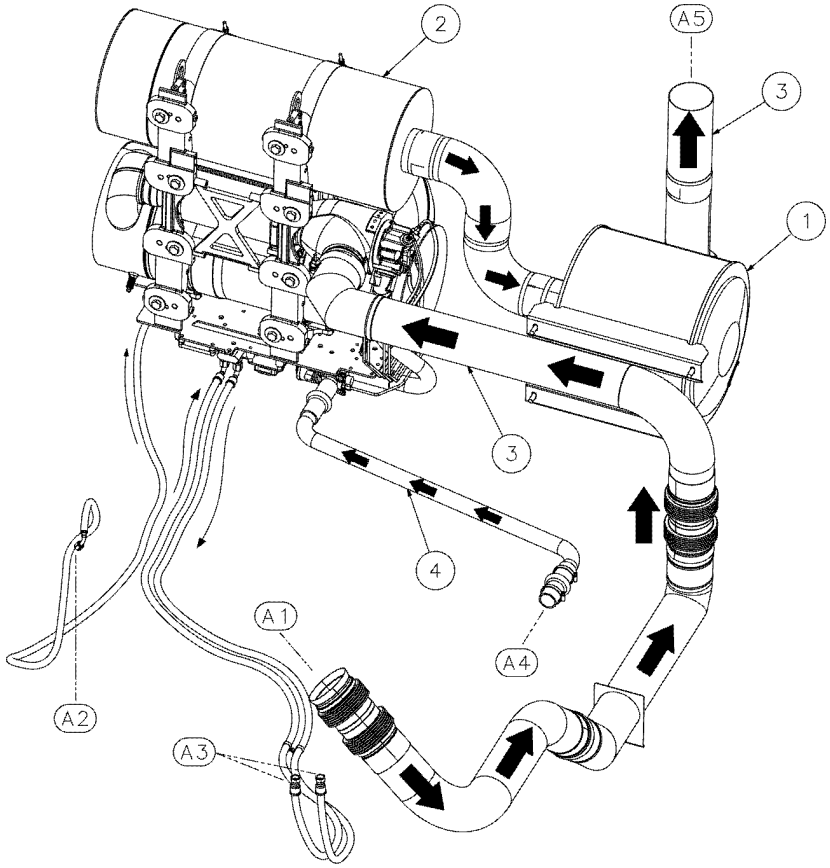


Figure 2-6: Exhaust System

1. MUFFLER	A1. FROM ENGINE TURBO CHARGE
2. DPF (Diesel Particulate Filter)	A2. FROM ENGINE FUEL SYSTEM
3. EXHAUST PIPE	A3. ENGINE COOLANT
4. AUXILIARY REGENERATION DEVICE.	A4. ENGINE COOLANT CHARGE AIR COOLER
	A5. FROM ENGINE EXHAUST OUTLET

Instead of expelling exhaust gases to the atmosphere as typical exhaust systems do, exhaust exits the engine turbocharger and enters the inlet of the CEM, where the level of soot loading in the DPF is measured by the pressure differential across the DPF. This information in conjunction with engine speed is used to determine if conditions are correct to initiate an automatic regeneration cycle. During regeneration the CAT RS module adds diesel fuel and air from the turbocharger to burn the exhaust fumes and reduce the accumulated soot to ash. The information in *Table 5-1* on page 62 describes the reaction of the system at various stages of the soot loading profile. For detailed CEM component information please see the **Engine Operator's Manual** please see the **Engine Operator's Manual**

Section 3

INSTALLATION

3.1 LOCATING THE PACKAGE

Position the compressor on a level surface, if possible. If unable to locate the compressor on a level surface, position the compressor on a grade surface which will not allow the compressor to slide downhill.

DO NOT locate compressor on surface grades exceeding 15 degrees.

The compressor package should be placed on a surface or foundation capable of supporting 10% more than the compressor weight. Take into consideration additional weight allowances for stored tools, rainwater, snow, ice and mud.

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

Locate compressor so the wind, if any, will help carry the exhaust fumes and package heat away from the compressor air inlet openings. The compressor coolers should not be exposed to excessive dust from the worksite. Contaminants on the coolers will directly affect the packages ability to run in high ambient temperatures.

3.2 VENTILATION AND COOLING

Select a location that allows an unrestricted flow of free ventilation air through the package.

Avoid any recirculation or ingestion of heated gases.

Compressor and engine intakes are located above the double set of doors on the engine and compressor side. Canopy discharge (for cooling air) and engine exhaust is located on the roof at the rear of the package. Canopy intake (for cooling air) is located on the front and sides and along the frame.

Maintain a 6 ft. (1.8 m) minimum separation between the package and any surrounding walls.

If ductwork is installed, the total restriction on intake must not exceed 0.1 inches H20 (25 Pascals). The total restriction on the outlet must not exceed 0.1 inches H20 (25 Pascals).

3.3 SERVICE AIR CONDENSATE PIPING

A shut-off valve is included to isolate the package from the supply line as required.

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

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

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

NOTES

Section 4
SPECIFICATIONS

4.1 TABLE OF SPECIFICATIONS

Table 4-1: Overall Specifications		
Model Series	**DTQ (Tandem Axle)**	**DLQ**
Length (in / mm)	262/6655	210/5334
Width (in / mm)	102/2591	88 / 2235
Height (in / mm)	101/2565	86/2187
Wet Weight (lbs / kg)*	22,200/10070	21,200/9616
Track width (in / mm)	91/2311	n/a
Tire Size	245/70R17.5H	n/a
Tire Pressure (psi / bar)	130/9.0	n/a
Wheel Size	17.5	n/a
Lug Nut Torque (ft*lbs / Nm)	300/407	n/a
Max Towing Speed (mph / km/h)	55 / 89	n/a
Axle Rating (lbs / kg)	12000/5443	n/a
(*) Aftercooled add 500 lbs/227 kg Forklift pocket option adds 740 lbs/336 kg		

Table 4-2: Compressor Specifications		
Compressor	**750XHH/900XH**	**900XHH/1150XH**
Type	Rotary Screw	Rotary Screw
Maximum Operating Pressure	500 psig (34.5 bar)	500 psig (34.5 bar)
Rated Pressure	500/350 psig (34.5/24.1 bar)	500/350 psig (34.5/24.1 bar)
Rated Delivery	750/900 Free CFM	900/1150 Free CFM
Cooling	Pressurized Compressor Fluid	Pressurized Compressor Fluid
Lubricating Compressor Fluid	See Lubrication Guide	See Lubrication Guide
Compressor System Oil Capacity	45 US gallons (170 liters)	45 US gallons (170 liters)
Operating Tilt	15°	15°
Engine	24 Volt	24 Volt
Battery (2) - (8D)	1700 CA @ 32°F (0°C)	1700 CA @ 32°F (0°C)
	1400 CCA @ 0°F (-18°C)	1400 CCA @ 0°F (-18°C)
Alternator	95 Amp (24V)	95 Amp (24v)
Fuel Tank Capacity	244 US gallons (924 liters)	244 US gallons (924 liters)
Service Valves	2 1/2" npt	2 1/2" npt
Sound Level (US EPA)[a]	76 dBA	76 dBA
[a] Sound level measured per US 40 CFR CH.1 Part 204		

Table 4-3: Engine Specifications		
Engine	**750XHH/900XH**	**900XHH/1150XH**
Make	Caterpillar	Caterpillar
Type	C15 Tier IV/Stage IIIB	C15 Tier IV/Stage IIIB
Rated Speed	1800 RPM	1800 RPM
Horsepower, SAE	475 HP (354 kw)	540 HP (403 kw)
Cylinders	6	6
Cycles	4	4
Bore x Stroke	5.4 x 6.75 in (138 x 171 mm)	5.4 x 6.75 in (138 x 171 mm)
Displacement	928 cu.in (15.2 liters)	928 cu.in (15.2 liters)
Lubricating System	Full Pressure Fluid	Full Pressure Fluid
Type of Motor Oil	See Engine Operator's Manual	See Engine Operator's Manual
Fuel Tank Capacity	244 U.S. gallons (924 liters)	244 U.S. gallons (924 liters)
Engine Cooling System Capacity	20 U.S. gallons (76 liters)	20 U.S. gallons (76 liters)
Idle Speed	1400 RPM	1400 RPM

4.2 LUBRICATION GUIDE—COMPRESSOR

Factory Fluid Type	Change Period, Hours	Ambient Temperature Range °F (°C)
Sullair HPL 1500 (*)	1500*	-20 to 120 (-29 to 49)
(*) Sullair part numbers for multi-viscosity lubricants are 02250207-067 (5gallons/18.9 liters), 02250207-068 (55 gallons,208 liter drum)		

*1500 hrs is based on 250-260°F(121-126°C) discharge temperature. If discharge temperature consistently exceeds this range, change period may need to be adjusted. It is recommended that the operator monitor lubricant condition by participating in Sullair's Oil Analysis Program.

4.3 ALTERNATIVE LUBRICATION GUIDE

Fluid Type	Change Period, Hours	Ambient Temperature Range °F (°C)
Sullair AWF (I)	300	-20 to 120 (-29 to 49)
(I) Sullair part numbers for multi-viscosity lubricants are 250030-757 (5 gallons/18.9 liters), 250030-758 (55 gallons/208 liter drum)		

4.4 APPLICATION GUIDE

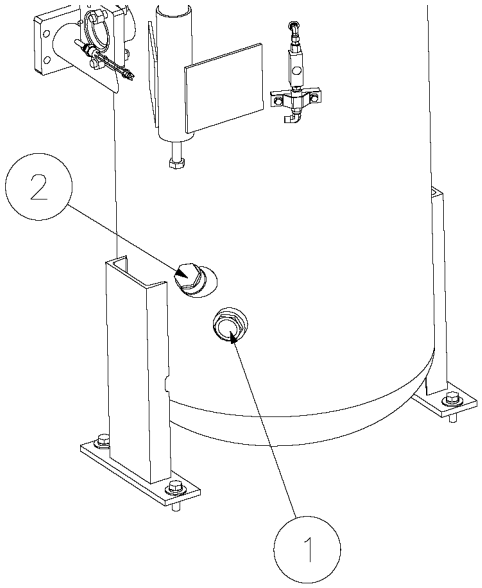


Figure 4-1: Fluid Fill Location

1. Sight Glass	2. Fluid Fill

Refer to *Section 4.2: Lubrication Guide—Compressor*. Sullair Air Compressors are supplied with Sullair HPL 1500 which is heavy duty multi-viscosity, all-weather fluid. This fluid also allows an extended change interval.

The fluids in *Lubrication Guide—Compressor* on page 56 can be used. Any of these oils are suitable under conditions where severe oil oxidations can occur.

Water must be drained from the receiver tank periodically. In high ambient temperature and high humidity conditions, condensed moisture may emulsify with the oil forming a “milky” color. ATF or SAE 10W is especially prone to this condition. The fluid should be changed if this condition develops.

⚠ CAUTION

DO NOT mix types of fluids. Combinations of different fluids may lead to operational problems such as foaming, filter plugging, orifice or line plugging.

When ambient conditions exceed those noted or if conditions warrant use of other extended life lubricants, contact Sullair for recommendations.

Sullair encourages the user to participate in a fluid analysis program. This could result in a fluid change interval differing from that stated in the manual. Sullair offers a fluid analysis program for Sullair HPL 1500. Contact your local Sullair representative for details.

4.5 LUBRICATION GUIDE, ENGINE

Refer to the **Engine Operator’s Manual** for oil specifications.

NOTES

Section 5

OPERATION

5.1 GENERAL

While Sullair has built into this compressor a comprehensive array of controls and indicators to assure you that it is operating properly, you will want to recognize and interpret the readings which will call for service or indicate the beginning of a malfunction.

Before starting your Sullair compressor, read this section thoroughly and familiarize yourself with the controls and indicators—their purpose, location and use.

5.2 PURPOSE OF CONTROLS

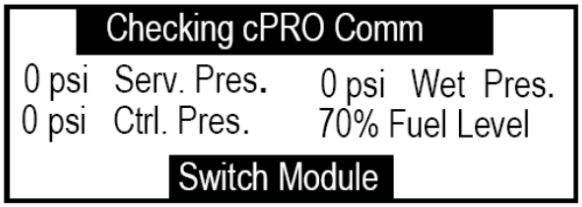
CONTROL OR INDICATOR	PURPOSE
OFF/ON Switch / START Switch (Up) *	The engine switch is used to both energize the compressor's electrical system and engage the engine/starter. It also has a built-in anti-restart device that protects the starter from engaging while the engine is running. The switch must be turned back to the "off" position before the engine can be re-started. **NOTE** When restarting the compressor, the controller will not allow restart until system pressure falls below 10 psig (0.7 bar) or less. More than 10 psig (0.7 bar) can put extra load on the starter.
Voltmeter *	Monitors the condition of the batteries and the charging circuit. The normal reading is 24 to 28 volts.
Service Air Pressure Gauge *	Continually monitors the pressure inside the receiver tank at various load and unload conditions.
Engine Temperature Gauge *	Monitors the temperature of the engine water. The normal operating temperature should read approximately 160ºF to 210ºF (71ºC to 99ºC).
Controller *	Depicts system related diagnostics. Can be used for system performance monitoring.
Compressor Temperature Gauge *	Monitors the temperature of the air/fluid mixture leaving the compressor unit. The normal reading should be approximately 210ºF to 250ºF (99ºC to 121ºC).
System Pressure Sensor	Prevents starter engagement when the air system is pressurized.
Fluid Level Sight Glass	Monitors the fluid level in the receiver tank. Proper level is always visible in the sight glass. Check the level when the compressor is shutdown.
Receiver Tank Temperature Switch	Opens the electrical circuit to shut down the compressor when then receiver tank temperature reaches 300ºF (149ºC).
ON/OFF Start Switch Structure	Allows the engine to run at unload speed (lower pressure until properly cooled down. refer to controller manual 02250201-242

CONTROL OR INDICATOR	PURPOSE
Notes*	
Control Regulating Valve	Provides an air signal to the inlet valve and engine to close the inlet valve and reduce engine speed to control air delivery according to demand.
Minimum Pressure/Check Valve	Maintains a minimum of 200 psig (13.8 bar) in the compressor receiver tank. This valve restricts receiver air discharge from receiver/receiver tank when pressure falls to 200 psig (13.8 bar). Also prevents back flow into the receiver tank during upload conditions and after shutdown.
High/Low Pressure Selector Switch * (only on dual pressure models)	Select high pressure 500 psig (34.5 bar) or low pressure 350 psig (24.1 bar) at instrument panel to correspond to operator's needs.
Pressure Relief Valve	Opens receiver tank pressure to atmosphere should pressure inside the receiver tank exceed the pressure relief valve setting.
Air Inlet Valve	Regulates the amount of air allowed to enter the compressor. This regulation is determined by the amount of air being used at the service line.
Thermal Valve	Regulates flow of fluid to and around the fluid cooler. Designed to maintain a minimum operating temperature; used for fast warm-up at start-up and to eliminate condensation during operation.
Blowdown Valve	Vents surplus receiver tank pressure to the atmosphere during operation and shutdown.
Coolant Level Switch	Shuts the compressor down and/or prevents it from being started if the engine coolant level drops too low.
Regeneration Switch *	To manually control the exhaust aftertreatment is in soot indicator levels of 15 - 105%
DPF Lamp *	Indicates DPF is above 80% soot loading. Warns operator that regeneration is required.
Regeneration Inhibited Lamp *	Indicates regeneration is inhibited by operator, application, or Cat ET.
High Exhaust System Temperature (HEST) Lamp *	Indicates that the exhaust aftertreatment is in active regeneration.
Cabin Light Switch *	Manually turns interior compressor lighting on.
Menu select switch *	Allows the user to make selections in the controller menu, and navigate the menu structure
Menu Toggle switch *	Allows the user to scroll the menu options

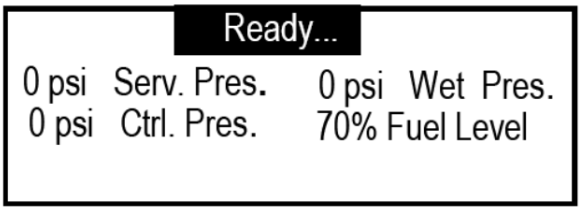
* indicates item is part of the compressor controller.

5.3 COMPRESSOR START-UP PROCEDURE

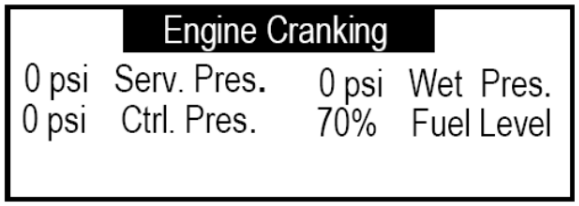
1. Turn on the system power supply by disengaging the battery disconnect switch.
2. Toggle the **<ON>** switch, located on the controller, to the “on” position. The controller will power up and a self-diagnostic program will be initiated. During the initiation process, the gauges will wag (the needles on each gauge will sweep through its full scale) to verify all relevant sensors are operational. Also, a communication link will be established with the engine ECU. During this time, several messages will be displayed on the panel. Some of these messages may not be noticed by the operator because the controller steps through the initialization phase rather quickly. However, the operator should see the following messages during this step:



When the system has successfully initialized, the following message will be displayed on the LCD Graphic Display:



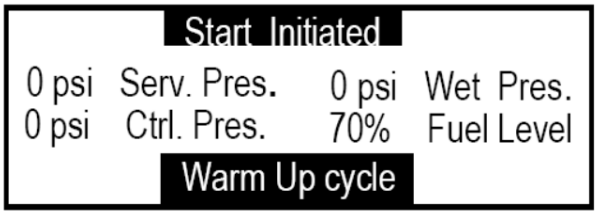
3. Toggle the **<ON>** switch to the “Start” position. You do not have to hold the switch in the “Start” position. The LCD panel will show the following message:



⚠ WARNING

If the machine does not start successfully when starter disengages, the starter will automatically engage up to four more times after brief pauses to try and start the machine.

Once the compressor has started, the unit will enter a warm-up phase. At this point, the unit is not producing usable compressed air and the service valve should still be closed. The following message will be displayed on the LCD panel:



Once the proper operating conditions are met, the machine will automatically switch into run mode and provide pressurized service air.

5.4 EXHAUST REGENERATION PROCEDURE

The aftertreatment constantly monitors the soot levels of the exhaust gas. If soot levels detected by the indicator reach above 80% the engine Electronic Control Module (ECM) lights the DPF lamp , on the controller screen, and should automatically trigger the ARD to ignite diesel fuel passing through the DPF until soot levels return to normal (< 10%).

During regeneration the HEST Lamp  , on the controller screen, should be lit. If for some reason the emissions module is not automatically engaged regeneration can be achieved, manually, by pressing and holding the **<REGEN>** Switch in the "force" position  , on the controller, for 15 seconds. This will manually force the regeneration process at soot levels of 15% - 105%. If regeneration is not desired the automatic regeneration process can be halted by engaging the **<REGEN>** Switch in the "inhibit" position  , on the controller. If regeneration is inhibited the DPF Inhibited Lamp  , on the controller screen, should be lit. Regeneration inhibition should not be a regular practice, as allowing soot load percentages to get above 116% could cause the unit to abnormally shut down and fault the DPF. The Unit will **NOT** be able to function until the faulted DPF is replaced. Force regeneration to re-engage automatic feature. If for some reason the regeneration methods do not work and soot levels are close too, at, or above 100% shut the unit down immediately until this issue is resolved. For troubleshooting and next steps please refer to the *Troubleshooting Guide* on page 80, **Engine Operator's Manual**, or contact your CAT dealer

DANGER

Regenerated exhaust gas can reach temperatures as high as1800F. DO NOT come into direct contact with these gases.

WARNING

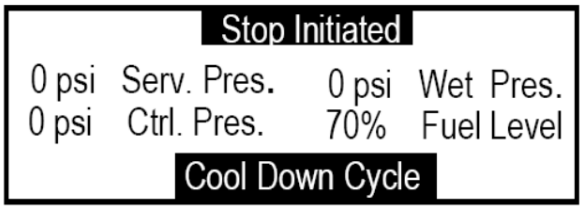
Under no circumstances should the soot level reach above 140% as this will fault the DPF and halt unit operation until it is replaced. If for some reason the regeneration methods mentioned in this document do not work and soot levels are close to, at, or above 116%, shut the unit down immediately until this issue is resolved.

Table 5-1: Active Regeneration Operation Sequence

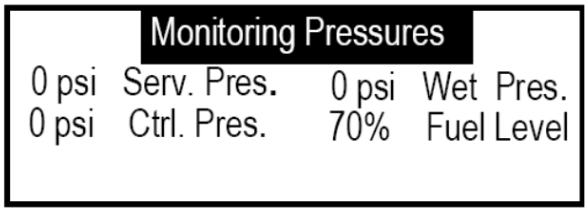
Soot Level	Timer	Operator Indication	Engine De-Rate Strategy	Engine Shutdown Strategy	Engine Protection
<80%	NA				
80%	NA				
100%	NA	Yellow	Engine De-Rate begins at -25%		Low Soot Mode
116%	NA	Yellow			
116%	+5min			** Pre-Emptive Idle Down (Programmable—Enable/Disable)	
116%	+10min			*** Rolling Shutdown Trigger REGEN Disabled Service Level Regen Only	
120%	NA		Engine De-Rate at -60%		
140%	NA	Yellow Red		Engine Shutdown Replace DPF 30 sec Rolling Shutdowns	

5.5 SHUTDOWN PROCEDURE

1. Close the service valve.
2. Place the **<ON>** switch in the “off” position. The following message will be displayed in the LCD graphic display:



3. The unit will continue to run, though it will not produce usable air. At the end of the cool down cycle, the engine will be shut down. The controller will stay powered up, and a new message will be displayed:



The controller will continue to monitor the system pressures and will not power down until all pressures drop below 10 PSI (0.7 bar). This final process may take 3 to 5 minutes. Operator interaction is not necessary during this time as the controller will automatically disconnect power to all systems so that the battery is not inadvertently drained after shutdown.

⚠ WARNING

The E-Stop (emergency stop switch) should be used only in the event of an emergency. Refrain from using the E-Stop to shut the machine down during normal operations. All usage of the E-Stop is logged in permanent memory for use by service technicians when troubleshooting a machine. Non-emergency use of E-Stop is considered equipment abuse and could void the manufacturer’s warranty.

4. Engage battery disconnect switch.

⚠ WARNING

It is a good practice to engage the battery disconnect after use. The engine and the compressor controller systems continually draw power after the controller is powered down. Over time, this will deplete the batteries. If the batteries are left on per application requirements, like remote start applications, a battery maintainer should be used to keep the batteries fully charged.

NOTES

Section 6

MAINTENANCE

6.1 GENERAL

A good maintenance program is the key to long compressor life. Below is a program that when adhered to, should keep the compressor in top operating condition. For engine maintenance requirements, refer to the **Engine Operator's Manual** for a detailed description of service instructions. Refer to Parts Replacement and Adjustment Procedures for a detailed description of specific compressor system components. Prior to performing maintenance, read the **CIMA Safety Manual**, if applicable.

⚠ CAUTION

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

6.2 DAILY OPERATION

Prior to starting the compressor, it is necessary to perform a daily inspection. Perform the following maintenance operations to prevent unnecessary problems.

NOTE

True system oil level can only be determined after the compressor has warmed up to operating temperature and run for a short period of time. This releases trapped oil within the oil cooling system. Short running periods may trap additional oil within the plumbing. Awareness of how the compressor operated and shutdown will help keep the system from being over filled.

1. Check the fluid level in the compressor receiver tank. Should the level be low, simply add the necessary amount.
2. If the addition of fluid becomes too frequent, a simple problem has developed which is causing this excessive loss. Refer to *Section 6.12* under Excessive Compressor Fluid Consumption for a probable cause and remedy.
3. Drain water from the fuel/water separator and control system coalescing filter.
4. Check the fuel level in the fuel tank.
5. Check the engine oil level.
6. Check the engine coolant level
7. Check for proper tire inflation. Refer to tire sidewall for tire manufacturer's recommendations.

After a routine start has been made, it is necessary to perform an inspection to ensure all operations are performing correctly. Perform the following inspections to prevent unnecessary problems.

1. Observe the instrument panel gauges and be sure they monitor the correct readings for their particular phase of operation.
2. After the compressor has warmed up, it is recommended that a general check on the overall compressor and instrument panel be made to assure that the compressor is running properly.
3. Check the engine soot load percentage on the controller display.
4. Check the air filter restriction gauges. Should they indicate restriction, replace the elements immediately. Refer to *Air Filter Maintenance* section 6.11.3.
5. If equipped, check aftercooler condensate drain system functionality.

6.3 ENGINE COOLANT REQUIREMENTS

⚠ WARNING

Please note: not following the recommendations of the coolant requirements may induce cooling system inefficiencies which may result in engine overheating. Non recommended coolant can drastically reduce the life expectancy of the cooling circuit and engine.

This machine is factory filled with Mobil Delvac Extended Life Coolant. It is an ethylene glycol based, OAT inhibited coolant. This coolant is able to protect the cooling system from freezing, extend the boiling point, provide corrosion protection for all metals within the cooling system; especially for systems with aluminum radiators, provide liner cavitation protection for heavy duty diesel engines, and be safe to use with all seals/gasket materials.
This coolant 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.
The Engine Coolant type should follow these recommended specifications:

- Organic acid technology (OAT)
- Premixed coolant pH range of 8.0 to 9.5.
- Contains no silicates, phosphates, borates, nitrates and amines
- Solution states that it is formulated for use in heavy duty diesel applications
- Protects all standard metals within the cooling system (i.e. brass, copper, steel, solder, cast iron, and aluminum.)
- Meets specification requirements of current industry standards which include: ASTM D 3306, Cat EC-1
- Meets or exceeds performance requirements of current industry standards which include: ASTM D 6210, John Deere H24A2 and H24C2.

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 (such as CAT Cooling System Cleaner p/n 4C-4611) and then completely flushed and filled with water (preferably distilled) several times to remove all traces of cleaner and old coolant.

Finally, 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 depletion or dropout of coolant additives; thus leaving cooling system surfaces unprotected against corrosion. Corrosion to radiator surfaces may reduce cooling efficiency and radiator life expectancy. It is extremely important to evacuate/purge all air within the cooling system before replacing the radiator cap. Engine coolant must not only maintain proper freeze protection levels but also maintain proper corrosion inhibitor levels. Please contact the coolant manufacture for specifics on testing methods and suggested coolant maintenance intervals.

Coolant Service Life	
Coolant Type	**Service Life**
Mobil Delvac EXTENDED LIFE Coolant/Antifreeze	*Six Years/12,000 Hours
Caterpillar ELC	*Six Years/12,000 Hours

*(using manufactures extender additive to system at 3 years or 6000 hours

6.4 DAILY MAINTENANCE

See Initial Startup Shutdown/Procedure 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.

6.5 MAINTENANCE AFTER INITIAL 50 HOURS OF OPERATION

After the initial 50 hours of operation, a few simple maintenance routines can rid the system of any possible foreign materials, if any. Perform the following maintenance operations to prevent unnecessary problems.

1. Clean the receiver tank return line (or scavenge tube) orifice and strainer.
2. Change compressor fluid filter
3. Check **Engine Operator's Manual** for required service.
4. Inspect and check fan belt tension. If necessary, adjust the tension to 160 lbs while cold.

6.6 MAINTENANCE EVERY 250 HOURS

1. Change the engine oil, engine filter and fuel system filters. Refer to the Engine Operator's Manual for requirements and other maintenance items.

6.7 MAINTENANCE EVERY 300 HOURS

When using Sullair AWF, change the compressor fluid and replace the fluid filter element. When using other approved oil types listed in *Table 6-2*, change the fluid and filter at the interval described in that section per oil type. Refer to *Main Fluid Filter Servicing* on page 67. Perform the following after every 300 hours of operation:

1. Clean the return line orifice and strainer.
2. Inspect and check fan belt tension. If necessary, adjust the tension to 160 lbs while cold.
3. Clean the radiator, oil cooler and aftercooler exterior. Depending on how contaminated the atmosphere may be, more frequent cooler and radiator cleaning may be necessary in dusty conditions. service.
4. Check the battery level and fill with water if necessary.
5. Check Engine Operator's Manual for required service.

6.8 MAINTENANCE EVERY 1000 HOURS (ANNUALLY)

1. (If equipped) Replace the water condensate element and the discharge air filter element.
2. Concerning compressor models with running gear and brakes:

Depending on the compressor's working environment and the amount of travel it encounters, the braking system may require more frequent adjustment which is left to the discretion of the end-user. *See Sections 6.11.7 through 6.11.11.*

6.9 MAINTENANCE AFTER 4500 HOURS OF OPERATION

1. Replace CEM spark plugs.
2. Check **Engine Operator's Manual** for required service.

6.10 MAINTENANCE AFTER 5000 HOURS OF OPERATION

1. Replace the CEM DPF element.
2. Check **Engine Operator's Manual** for required service.

6.11 PARTS REPLACEMENT AND ADJUSTMENT PROCEDURES

6.11.1 Compressor Fluid Change Procedure

Warm-up the compressor for 5 to 10 minutes to warm the fluid. Shut the compressor off and relieve all internal pressure before proceeding. Drain the fluid by opening the valve that is bulkhead mounted to the frame (see ID drawings under *Section 2.17* and *Section 2.18* for location of drain port). Change the compressor fluid and replace the fluid filter element. For element replacement see procedure for servicing the fluid filter in this section. Fill the receiver tank with fluid according to*Section 6.11.2: Main Fluid Filter Servicing*.

6.11.2 Main Fluid Filter Servicing

Refer to *Figure 6-1*. The main fluid filter is located schematically in the coolant line between the receiver tank and the compressor unit. The main filter element is replaceable. For installation of the filter element, follow the procedure explained below.

1. The compressor MUST be shut off and system pressure MUST be relieved.

2. Drain by removing drain plug at bottom of bowl and catching drainage in a container.
3. Rotate bowl counterclockwise and remove.
4. Remove element and O-ring from housing and discard. This element is NOT cleanable.
5. Make sure mounting surface of filter head is clean.
6. Apply a light film of compressor oil to O-ring and place it in its proper position.
7. Place new, clean element in bowl, over center-perforated tub. 8. Inspect bowl seal and replace if necessary.
8. Replace bowl. Rotate clockwise and hand-tighten.
9. Replace drain plug. Torque to 15 to 20 ft-lbs. (20 to 27 N·m).

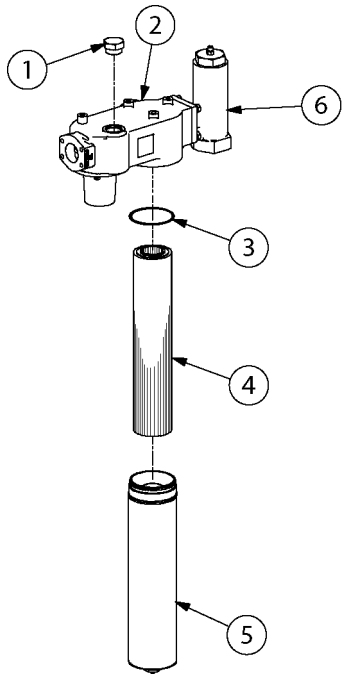


Figure 6-1: Main Fluid Filter Assembly

1. Fluid Filter Bypass	4. Element
2. Filter Head	5. Bowl
3. Bowl Seal (O-ring)	6. Fluid Stop Valve

6.11.3 Air Filter Maintenance

Refer to *Figure 6-2*. Maintenance should be performed when indicated on the instrument panel located by the engine air filter restriction gauges. Both air filters are two- stage with a primary element and secondary element each.

PRIMARY ELEMENT REMOVAL

1. Clean the exterior of the air filter housing.
2. Unlatch and remove the service cover. Make certain the latches are folded back.
3. Remove the primary filter from the housing.
4. Clean the interior of the housing by using a damp cloth. DO NOT blow out dirt with compressed air as this may introduce dust downstream of the filter.

SECONDARY ELEMENT REMOVAL

The secondary element serves as a safety element. The secondary element must be replaced after every third primary element change.

1. Gently pull the element off the outlet tube and out of the housing.
2. Carefully wipe the inside of the outlet tube with a clean cloth.

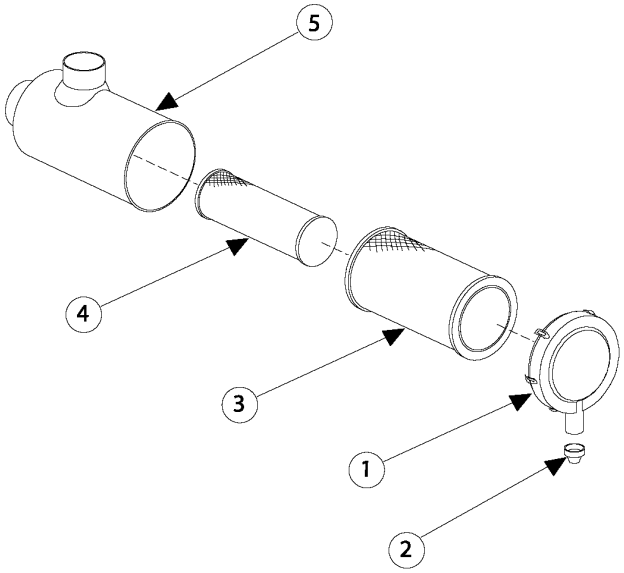


Figure 6-2: Air Filter Assembly

1. Access Cover	4. Secondary Element**
2. Vacuator™ Valve	5. Air Cleaner Housing
3. Primary Filter Element *	

* Primary replacement element, P/N 02250155-691 (qty 2)
** Secondary replacement element, P/N 02250155-692 (qty 2)

6.11.4 CONTROL SYSTEM ADJUSTMENT

Refer to *Figure 6-3* on page 70 and *Figure 6-4* on page 71. Prior to adjusting the control system, it is necessary to determine the desired operating pressure range as well as the maximum pressure at which the machine is to operate. This pressure must not exceed the maximum operating pressure which is stamped on the machine serial number plate. The following explanation applies to a typical machine with a desired operating range of 350 to 500 psig (24.1 to 34.5 bar). This information will apply to a machine with any other operating range except for the stated operating pressure. For high-pressure machines, adjustment pressures are shown in

parenthesis.

1. Start the machine and let it warm-up and enter full “RUN” mode.
2. Open service valve slightly until engine tries to speed up. Slowly close the service valve. With service valve closed, check and adjust the pressure at the reducing regulator to a minimum of 75 psig (5.2 bar) and not to exceed 90 psig (6.2 bar). With service valve still closed, and the "HI/LO" switch in the "LO" position, adjust the low-pressure back-pressure regulator so the service pressure is between 360 to 375 psig (24.8 to 25.9 bar) with the engine at 1400 rpm. Open the service valve to load the compressor to maintain 350 psig (24.1 bar) discharge pressure. Operating speed should be 1800 RPM on the instrument panel. If not, repeat step, but adjust the unload service pressure up or down as needed until 350 psig (24.1 bar) is maintained when engine speed is 1800 rpm.
3. For 500 psig (34.5 bar), turn the “HI/LO” switch to "HI" position. Close the service valve and set the “HI” pressure control regulator to maintain 520 to 535 psig (35.8 to 36.9 bar) discharge pressure. Open the service valve to maintain 500 psig (34.5 bar) and check for 1800 RPM full-load speed. If lower speed is observed, raise the setting of the low pressure control regulator until rated speed is achieved.

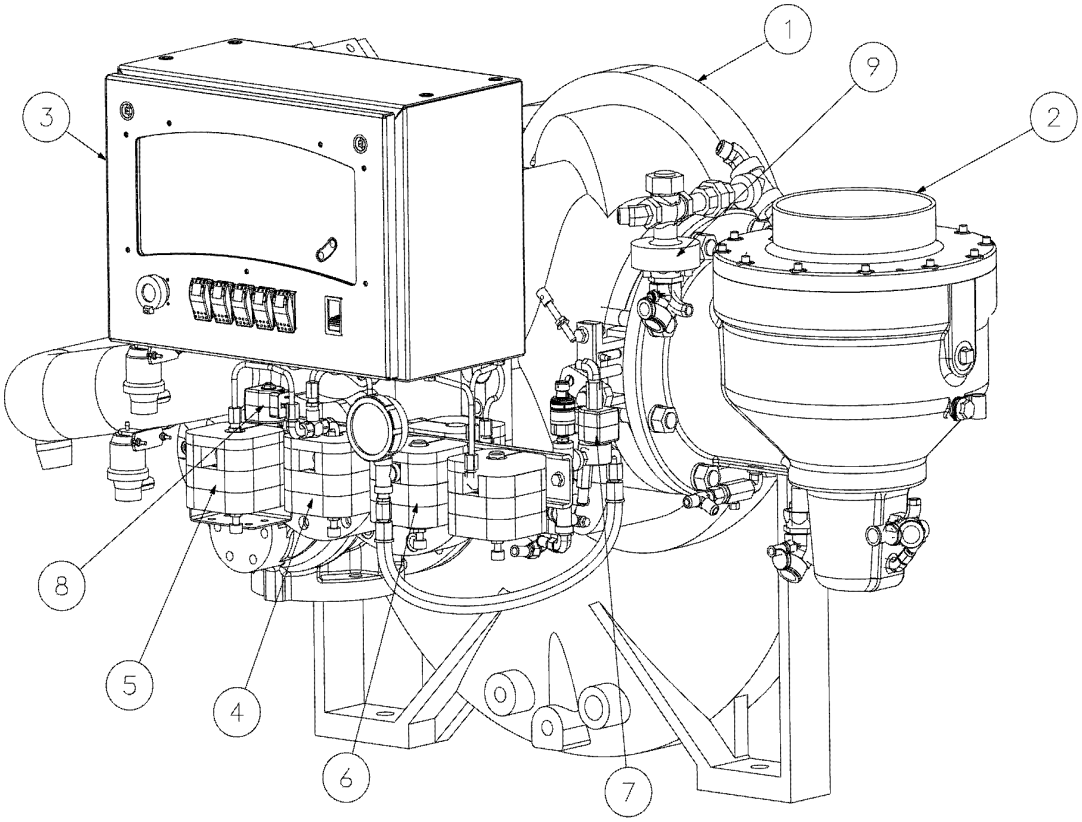


Figure 6-3: Control System Assembly

1. COMPRESSOR UNIT	6. REDUCING PRESSURE REGULATOR
2. AIR INLET VALVE	7. RUN/START SOLENOID
3. CONTROLLER ENCLOSURE	8. HI/LOW SOLENOID
4. HIGH PRESSURE REGULATOR	9. BLOW DOWN VALVE
5. LOW PRESSURE REGULATOR	

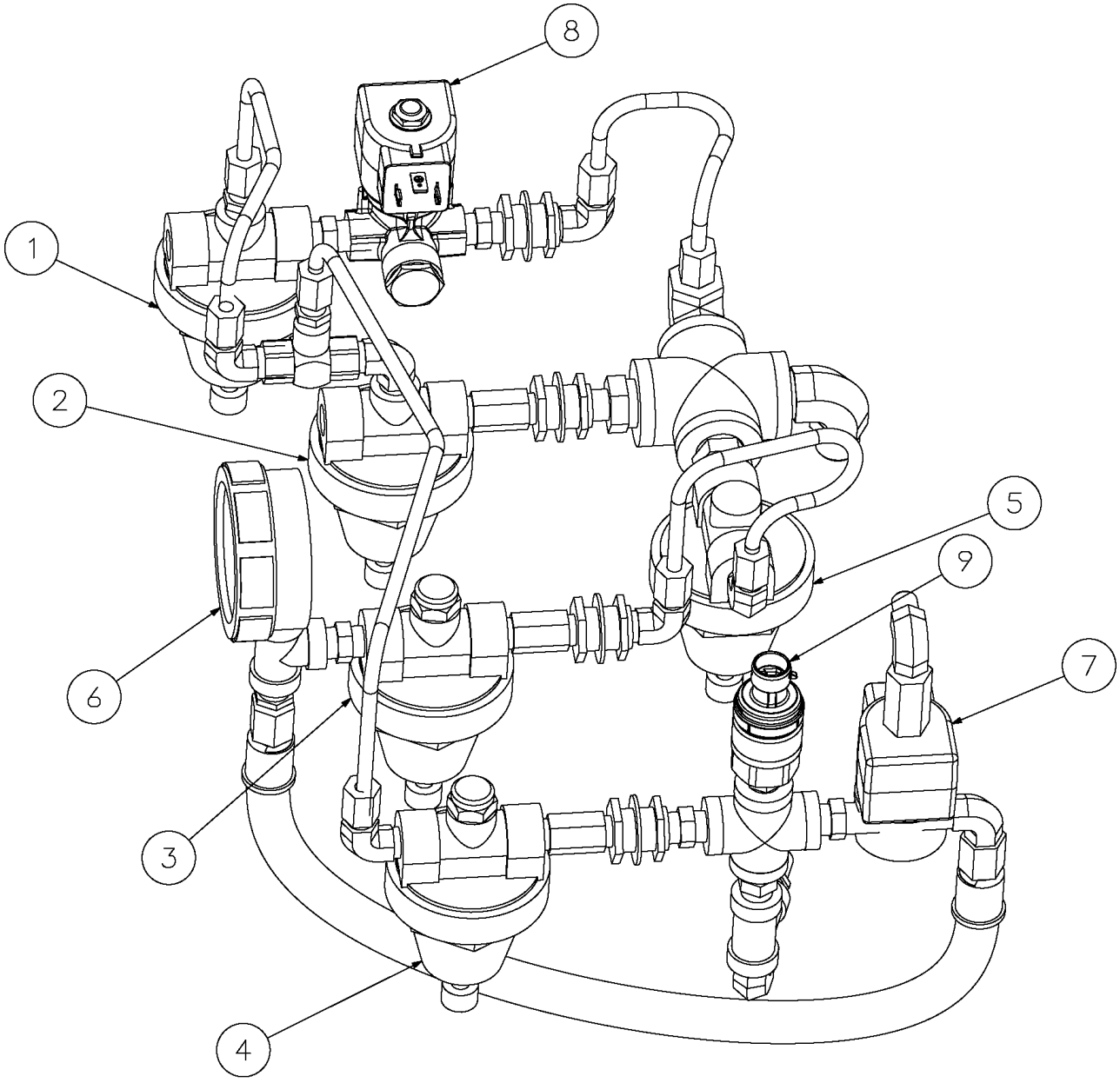


Figure 6-4: Pneumatic Control System

1. Low Pressure Regulator	6. Control Air Pressure Gauge
2. High Pressure Regulator	7. Start/Run Solenoid Valve
3. Reducing Regulator	8.High/Low Solenoid Valve
4. Control Pressure Dampening Regulator	9. P2 Control Pressure Transducer
5. Back Pressure Regulator (startup pressure	

AUXILIARY SIGNAL AIR

The adjustment for the Auxiliary Signal air is as follows:

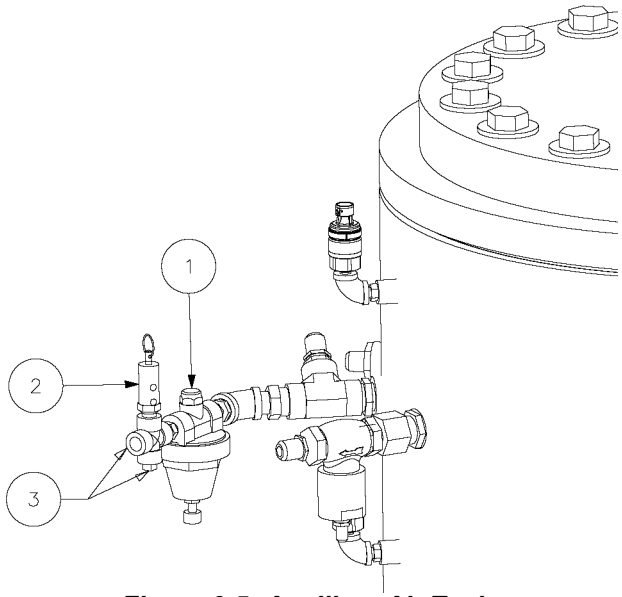


Figure 6-5: Auxiliary Air Tank

1. Auxiliary Air -reducing regulator
2. Relief Valve
3. Air Supply Ports

1. With the compressor off and system air pressure bled down, remove the auxiliary safety relief valve. Refer to *Figure 6-5*.
2. In its place install a tee and necessary fitting to install a 0 to 200 psi (0 to 10 bar) gauge and the auxiliary safety relief valve.
3. Start up the compressor and wait for it to go through the warm up cycle
4. On the auxiliary regulator, loosen the jam nut on the adjustment set screw.
5. Adjust the auxiliary reducing regulator to produce 80 to 90 psi (5.5 to 6.2 bar).
6. Tighten jam nut on set screw.
7. Shut down the compressor and wait for the system pressure to bleed down.
8. Remove the pressure gauge, tee, additional fittings and safety relief valve.
9. Re-install the safety relief valve to its original configuration within the system before the adjustment procedure.

ALTERNATIVELY…

1. Use the auxiliary safety relief valve as an indicator for control air pressure. This method relies on a properly functioning relief valve. It is set to activate at 100 psi (6.9 bar).
2. Start up the compressor (if it not running already) and wait for it to go through the warm up cycle.
3. On the auxiliary regulator, loosen jam nut on set screw and increase regulator pressure slowly until the relief valve activates.
4. Slowly decrease regulator pressure until relief valve closes.
5. Then rotate set screw additional ½ turn and lock jam nut. The system should be set at 80 to 90 psi (5.5 to 6.2 bar).

6.11.5 CAPACITY CONTROL SYSTEM ADJUSTMENT

In general, the capacity control for the air-end should never have to be adjusted. Refer to *Figure 6-6*. If for some reason the system goes out of adjustment, follow the procedure described below. The compressor should be properly shutdown, along with the system de-energized before performing this procedure.

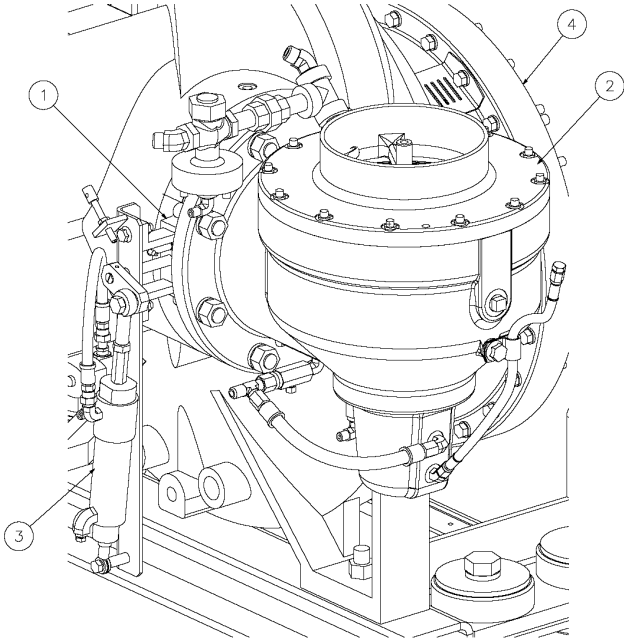


Figure 6-6: Capacity Control System

1. Butterfly Valve
2. Inlet Valve Assembly
3. Capacity Control Actuation Cylinder
4. Unit

Before making an adjustment, make sure all of the components are arranged like depicted within *Figure 6-6* and *Figure 6-7*. Make sure the butterfly valve between the inlet valve and compressor moves freely. Also make sure both spherical bearings, and pivot shaft are not bound and all components are properly fastened together.

The butterfly valve's movement and position is controlled by an actuation cylinder and an adjustable mechanical stop arrangement. Refer to *Figure 6-7*. To make the adjustment, loosen the locknut on the adjustment screw and rotate the screw until the stop length is 0.9-1.0 inches (22.9 to 25.4 mm) from the support as depicted in the figure. The engine load percentage parameter, taken from the controller display, can be used to help assist with adjustment also. The engine load should be within 93 to 97%. After the adjustment is made, lock the adjustment screw back in place with the locknut.

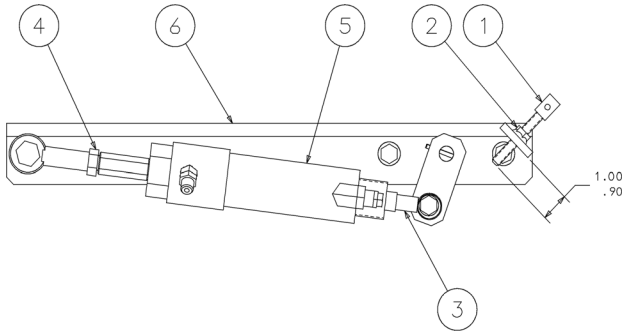


Figure 6-7: Capacity Control-Actuation Cylinder Arrangement

1. ADJUSTMENT SCREW
2. LOCKNUT
3. SPACER
4. JAM NUT
5. AIR CYLINDER
6. MOUNTING BRACKET

6.11.6 Separator Element Replacement

Refer to *Figure 6-8*. When the need for a separator element replacement is indicated by the Compass Controller, use the following procedure for separator replacement.

1. Remove the air receiver tank lid by removing the hex head capscrews and washers.

⚠ CAUTION

To assist with the removal of the tank lid, Sullair has provided a jack bolt at the bottom of the lid pivot shaft. Simply jack the lid up until it will clear the dowel pin located on the top tank flange underneath the lid. Rotate out of the way.

2. Remove the elements from the separator chamber by gently rocking back and forth and pulling upward and discarding.
3. Before installing the new separator elements, make sure to lubricate the sealing O-ring on each element with a lubricating compound (i.e. Silglyde). Then install the new separator elements by firmly pressing downward until the element is fully seated on the baffle plate inside the tank.

4. Next, inspect the tank flange O-ring and replace if necessary. Before installing the lid, re lubricate the O-ring (i.e. Silglyde). Reinstall the tank lid. Install the capscrews and washers finger tight, then gradually tighten in a crisscross pattern in 4 to 5 steps. Always tighten the capscrews alternately at opposite sides of the cover. Torque lubricated capscrews to 322 ft-lbs. (440 N·m).
5. Clean or replace fluid return line strainer.
6. Clean the fluid return line orifice installed in the side of the compressor unit air end.

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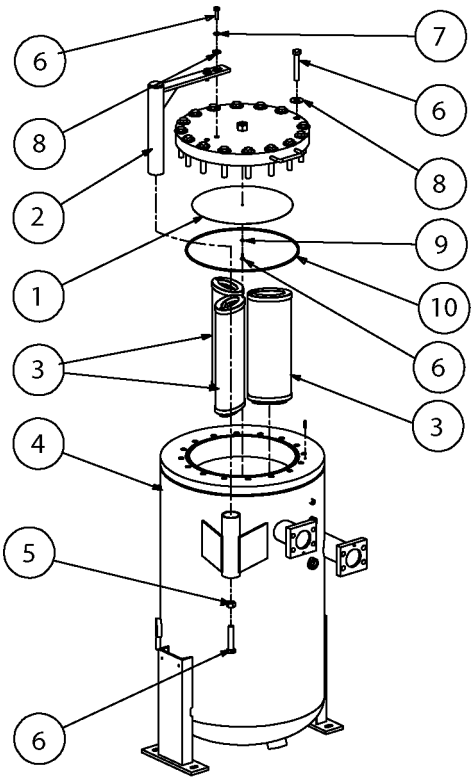

Figure 6-8: Separator Element Assembly

1. Grounding Plate
2. Davit Assembly Support
3. Separator Elements (3)*
4. Receiver Tank
5. Hex Nut
6. Capscrew
7. Spring Lock Washer
8. Washer
9. Lockwasher
10. O-ring

*Replacement kit P/N 02250168-375 (contains three elements)

6.11.7 Running Gear—Brake Shoe Maintenance and Adjustment

⚠ WARNING

Before proceeding...
Park or locate the compressor on flat stable ground. Block or chock both sides of all wheels. Use proper personal protection equipment when performing these tasks described below.

The highway tow-able running gear utilizes a electronically actuated braking system. The brakes in this system require periodic maintenance. The brakes should be adjusted (1) after the first 200 miles of operation when the brake shoes and drums have "seated," (2) at 3,000 mile intervals, (3) or as use and performance requires.

1. Elevate on side of the axle being worked on off the ground and remove the tire and brake drum. (If the shoe linings wore into the brake drum, the brake adjusters may have to be backed-off to remove the drum. The access port is located on the backside of the drum assembly and will be covered with a rubber plug. If a brake adjuster tool is not available, a flat screwdriver may be substituted.
2. Clean the brake assembly and drum.
3. Inspect the shoe linings and drum. If there is noticeable wear, cracks, or grooves that are present, replacement is required. If the shoe linings are oil soaked they must be replaced with new.
4. Make sure the brake adjuster rotates freely and functions properly within the brake assembly. Make sure springs, hold-downs, cables and actuators are functional. If any of these components look damaged or are excessively worn, replacement is required.
5. As a general rule, if any component of the brake system is questionable, replace the item with new.
6. Once the brake assembly passes inspection it can be re-assembled. The drum and linings must be cleaned of all oils, lubricants and dirt. Use brake cleaner or equivalent to clean. Do not touch linings or drum once cleaned.
7. Lightly lubricate anchor plate shoe contact surfaces with suitable brake lube.
8. If assembly utilizes a manual actuated cable, make sure the cable is still attached in its proper location.
9. Replace the drum and tire.
10. Remove the rubber plug to access the adjuster. Rotate the adjuster out until the point the tire cannot be rotated. From this point the shoes have to be centered within the brake assembly. Note the amount of tension required to turn the adjuster. Further lengthen the adjuster out until a noticeable increase in effort is felt. The lining should now be centered within the assembly. The adjuster can be backed off until the tire rotates by hand again. A very slight amount of drum to lining drag is acceptable. Replace the adjuster access port plug.
11. Lower the compressor and re-torque the lug nuts.
12. Complete the rest of the running gear in the same manner.

6.11.8 Brake Cleaning and Inspection

Your brake system must be inspected and serviced immediately if a loss of performance is indicated. With normal use, servicing at one year intervals is usually adequate. With increased usage, maintenance should be performed more frequently as required. Magnets and shoes must be changed when they become excessively worn or scored, a condition which can reduce vehicle braking.

Clean the backing plate, magnet arm, magnet, and brake shoes. Make certain that all the parts removed are replaced in the same brake and drum assembly. Inspect for any loose or worn parts, stretched or deformed springs and replace as necessary.

6.11.9 Brake Lubrication

Before reassembling, apply a light film of grease or anti-seize compound on the brake anchor pin, the actuation arm bushing and pin, and the areas on the backing plate that are in contact with the brake shoes and magnet lever arm. Apply a light film of grease on the actuating block mounted on the actuation arm.

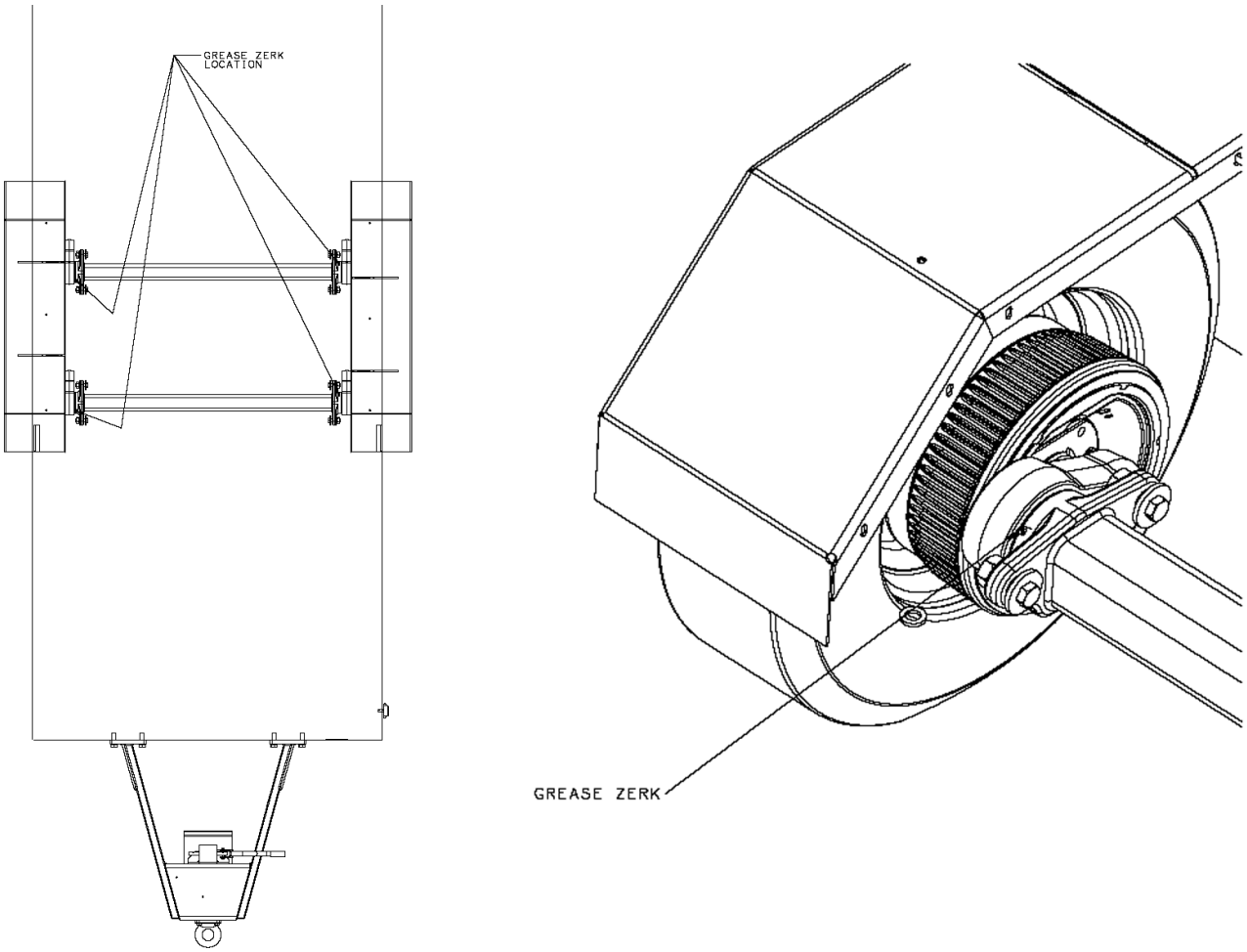

Figure 6-10: Running Gear Lubrication

CAUTION

Do not get grease or oil on the brake linings, drums or magnets.

6.11.10 BEARING LUBRICATION - GREASE

CAUTION

Do not mix Lithium, calcium, sodium or barium complex greases due to possible compatibility problems. When changing from one type of grease to another, it is necessary to ensure all the old grease has been removed.

Determine if your axle bearings are filled with grease or oil. Axle bearings filled with grease will have a black plastic dust cover. Axle bearings filled with oil will have a clear transparent dust cover with a rubber plug at the end.

BEARING LUBRICATION - GREASE - *CONTINUED*

Grease should be replaced every 12,000 miles or 12 months. Prior to repacking bearings, all old grease should be removed from the wheel hub cavity and bearings. Bearings should be packed by a packing machine, if possible. If a packing machine is unavailable, packing by the hand method is acceptable.

The method to pack bearing cones is as follows:

1. Place a quantity of grease onto the palm of your hand.
2. Press a section of the widest end of the bearing into the outer edge of the grease pile closest to the thumb forcing grease into the interior of the bearing between two adjacent rollers.
3. Repeat this while rotating the bearing from roller to roller.
4. Continue this process until you have the entire bearing completely filled with grease.
5. Before reinstalling, apply a light coat of grease onto the bearing cup mating surface.

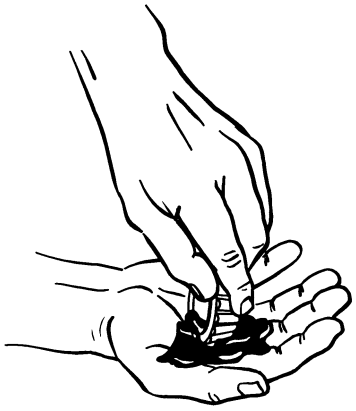

Figure 6-11: Packing a bearing

Table 6-1: Recommended Wheel Bearing Lubrication Specifications - Grease	
Thickener Type	Lithium Complex
Dropping Point	215°C (419°F) Minimum
Consistency	NLGI No.2
Additives	EP, Corrosion & Oxidation Inhibitors
Viscosity	80 Minimum
Approved Grease Sources	
ConocoPhilips/76 Lubricants/Kendall	Multiplex RED #2, L427 Super Blu Grease
Citgo	Lithoplex MP #2, Lithoplex CM #2, Mystik JT-6 Hi-Temp Grease #2
Exxon/Mobile Company	Ronex, MP, Mobilith AW 2, Mobil 1 Synthetic Grease
Oil Center Research of Oklahoma	Liquid-O-Ring No. 167L
Pennzoil-Quaker State Company	Synthetic Red Grease
Shell	Gadus S3 V220C, Gadus S5 V220, Rotella Heavy Duty Lithium Complex #2
Royal Mfg. Company	Royal 98 Lithium Complex EP #2
Chevron Texaco	Chevron Ulti-Plex Grease EP #2, Texaco Starplex Moly MPGM #2
Valvoline	Valvoline Multi-Purpose GM, Valvoline Durablend
Great Plains Lubricants	Lithium Complex EP #2
Chem Arrow	Arrow 2282

*Source Material: Dexter Axle Company. http://l.b5z.net/i/u/6149609/f/Instruction_Sheets/059-831-00A.pdf

6.11.11 Bearing Lubrication- Oil

Determine if your axle bearings are filled with grease or oil. Axle bearings filled with grease will have a black plastic dust cover. Axle bearings filled with oil will have a clear transparent dust cover with a rubber plug at the end.

Refer to *Figure 6-12*. Proper lubrication is essential to the proper functioning and reliability of your portable compressor axle. The wheel bearings are lubricated through the use of a oil-bath. See Table 6-1 for company approved oil sources. Oil level should be checked every month. The oil can be filled through the rubber plugged hole in the clear end cap. Oil should be replaced every year or 12,000 miles, whichever comes first

*Table 6-2: Recommended Oil Lubrication Specifications**

Use:	**Axle hubs with tapered roller bearings**
Service Designation:	API-GL-5
Viscosity:	SAE 80W-90
Pour Point:	-180°C (0°F) Maximum
Additives:	Corrosion and oxidation inhibitors, foam inhibitors, EP additives
Compatibility:	Must be compatible with nitrile and neoprene seals and polycarbonate plastic oil caps
Approved Sources:	
Company	**Product Description**
Ashland Oil	Valvoline Dura Blend
Ashland Oil	Valvoline Power Lube
CITGO Petroleum Company	CITGO Premium Gear Oil MP
CITGO Petroleum Company	Mystik JT-7
CITGO Petroleum Company	Mystik Power Lube
Exxon Company USA	Gear Oil GX 80W-90
Kendall Refining Company	Kendall NS-MP Hypoid Gear Lube
Lubriplate Division / Fiske Brothers Refining	Lubriplate APG 90
Mobile Oil Corporation	Mobilube SHC
Mobile Oil Corporation	Mobil 1 Synthetic Gear Lube
Phillips 66 Petroleum	Superior Multi-Purpose Gear Lube
Phillips 66 Petroleum	Philguard Gear Oil
Phillips 66 Petroleum	Philsyn Gear Oil
Pennzoil Products Company	Gear Plus 80W-90 GL-5
Pennzoil Products Company	Gear Plus Super 75W-90
Pennzoil Products Company	Gear Plus Super EW 80W-90
Pennzoil Products Company	Multi-Purpose 4092 Gear Lube
Oil Center Research	Liquid-O-Ring 750 GX
Sun Refining and Marketing Company	Sonoco Ultra
Sun Refining and Marketing Company	Sonoco Dura Gear
Shell Oil Company	Spirax A
Shell Oil Company	Spirax G
Shell Oil Company	Spirax HD
Shell Oil Company	Spirax S
Texaco Oil Company	Multigear EP
Texaco Oil Company	Multigear SS
Troco Division / Royal Manufacturing	Multigear Select Gear Oil
Union Oil Company	Unocal MP Gear Lube
Union Oil Company	76 Triton Syn Lube EP

*Source Material: http://dexteraxle.com/i/u/6149609/f/9-15K_Catalog_5-12/Oil_Specification_5-12.pdf

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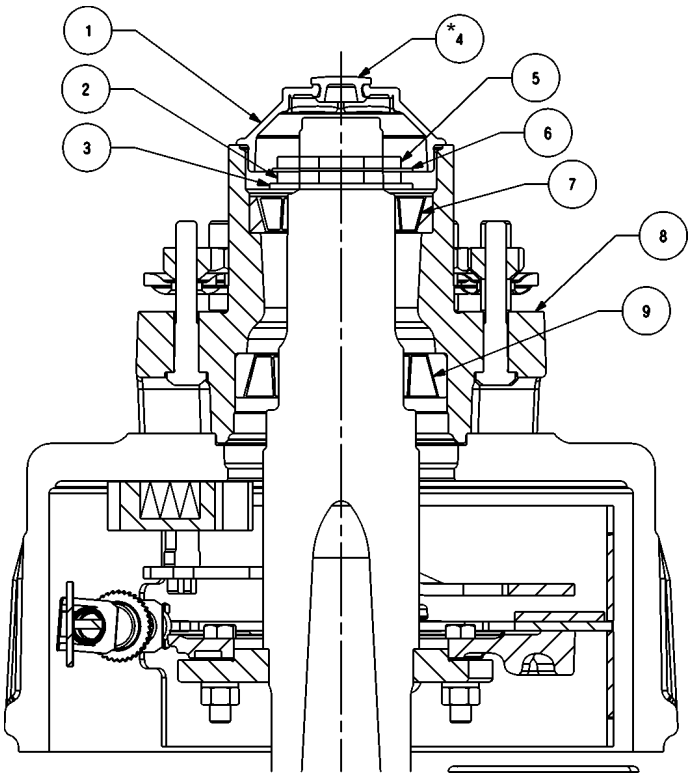

1. Dust Cover
2. Inner Lock Nut
3. Washer
4. *Rubber Plug - Oil Fill Point (oil filled hubs only)
5. Outer Lock Nut
6. Tang Washer
7. Outer Bearing
8. Hub Assembly
9. Inner Bearing

Figure 6-12: Wheel Bearing Assembly

6.11.12 AXLE BEARING ADJUSTMENT

The correct end-play adjustment for the bearings is 0.001” to 0.010”. Refer to figure 6-11.

1. Remove the dust cover on the hub assembly. Disengage the tang washer holding the outer locking nut. Then remove the nut and tang washer.
2. Rotate the hub assembly slowly while tightening the inner locknut to 100 ft-lb. to seat the bearings.
3. Loosen the inner lock nut to remove the preload torque. DO NOT ROTATE THE HUB!
4. Finger tighten the inner lock nut and snug.
5. Back out the inner lock nut 1/4 to 3/8 of a turn.
6. Install the tang washer and outer lock nut. Bend two tangs over the inner lock nut. Torque the outer lock nut to 150 ft-lbs., insuring the inner lock nut does not turn. Bend two tangs over the flats on the outer lock nut to secure.
7. Install the dust cover and refill the hub assembly with new oil.

6.12 TROUBLESHOOTING GUIDE

Table 6-3 is based on both the data obtained from actual tests conducted at our factory and real applied situations. It contains symptoms and usual causes for the described problems. However, DO NOT assume that these are the only problems that may occur. All available data concerning the trouble should be systematically analyzed before undertaking any repairs or component replacement procedures.

- Check for loose wiring.
- Check for damaged piping.
- Check for parts damaged by heat or an electrical short circuit - usually apparent by discoloration or a burnt odor. Should your problem persist after making the recommended check, consult your nearest Sullair representative or the Sullair.

Table 6-3: Troubleshooting Chart

SYMPTOM	PROBABLE CAUSE	REMEDY
Compressor will not start	No fuel	Check fuel level and add fuel if necessary.
	Plugged fuel filter	Replace the fuel filter element.
	Battery	Check electrolyte level and add distilled water and recharge if necessary.
		Loose battery cables; tighten cables.
		Dirty battery cables; clean thoroughly.
	Plugged air filter	Replace the air filter element.
	Engine problems may have developed	Refer to Engine Operator's Manual
	Instrument panel problems may have developed	Refer to Controller Manual. Sullair Part No. 02250201-742.
Compressor shuts down with air demand present	No fuel	Check fuel gauge and add fuel if necessary.
	Compressor discharge temperature switch is open	Cooling air flow is insufficient; clean cooler and check for proper ventilation.
		Low fluid sump level; add fluid.
		Dirty compressor fluid filter; change element.
		Thermostatic element is not functioning properly; change the thermostatic element.
		Defective discharge temperature switch; check for a short or open circuit to the engine fuel solenoid. Should this checkout normal, it could be possible that the temperature switch itself is defective.
	Instrument panel problems may have developed	Refer to Controller Manual. Sullair Part No. 02250201-742.
	Aftertreatment soot load >100%.	Force a regeneration cycle to reduce soot loading. If problem persists, contact your local CAT dealer.
Compressor will not build up full discharge pressure	Air demand is too great	Check service lines for leaks of open valves.
	Dirty air filter	Check the filter gauges on instrument panel and change element if required.
	Pressure regulator out of adjustment	Adjust regulator according to control adjustment instructions in the Maintenance section.
	Defective pressure regulator	Check diaphragm and replace if necessary (kit available).
	Defective air inlet cylinder	Replace cylinder
	Aftertreatment soot load >100%.	Force a regeneration cycle to reduce soot loading. If problem persists, contact your local CAT dealer.

Table 6-3: Troubleshooting Chart

SYMPTOM	PROBABLE CAUSE	REMEDY
Improper unloading with an excessive pressure build-up causing pressure relief valve to open	Fluid charge lost from spring chamber on inlet valve pressure regulating valve is set too high	Add fluid to inlet valve spring chamber by removing plugs in the top of the spring chamber and filing with compressor fluid.
		Some fluid may leak from the control regulator at first but will stop leaking when fluid level in the spring chamber equalizes.
	Running blowdown valve pressure regulating valve set too high	Readjust.
	Leak in control system causing loss of pressure signal	Check control lines.
		Worn seals in inlet valve. Replace seals (kit available).
		Defective pressure regulating valves; repair valves (kits available).
	Inlet valve jammed	Free or replace valve.
	Restriction in the control system	Check all control lines and components.
		Ice and other contaminants could cause restrictions.
	Defective pressure relief valve	Replace pressure relief valve.
Insufficient air delivery	Plugged air filter	Replace.
	Plugged air/fluid separator	Replace separator element and also change compressor fluid and fluid filter at this time.
	Defective pressure regulator	Adjust or repair.
	Engine speed too low	Readjust engine speed.
	Control air cylinder defective	Replace cylinder.
Excessive compressor fluid consumption	Clogged return line	Clear orifice.
	Leak in the lubrication system	Check all pipes, connections and components
	Separator element damaged or not functioning properly	Change separator element.
	Defective minimum pressure/check valve	Repair or replace.
	Fluid receiver tank overfilled	Drain to proper level.
Compressor overheating	Loose or broken fan belt	Tighten or change belt
	Dirty fluid cooler core	Clean core thoroughly.
	Dirty aftercooler	Clean core thoroughly.
	Dirty radiator core	Clean core thoroughly.
	Faulty thermostat element	Change thermostat element.
	Plugged fluid cooler tube (internal)	Clean tube thoroughly.
	Low receiver tank fluid level	Refill.
	Plugged compressor fluid filter	Change element.

Table 6-3: Troubleshooting Chart

SYMPTOM	PROBABLE CAUSE	REMEDY
Engine overheating	Loose or broken fan belt	Tighten or change belt.
	Dirty radiator core	Clean thoroughly.
	Dirty oil cooler	Clean thoroughly.
	Low water level	Refill.
	Dirty aftercooler	Clean thoroughly.
	Low fluid level	Refill.
	Faulty water pump	Change pump.
	Plugged radiator	Clean and flush thoroughly.
	Defective engine thermostat	Replace engine thermostat.
Shutdown panel lights	Faulty switch indicated by light	Replace the switch.
Check engine light	Engine safety switch (low coolant) fault	Replace the switch (Caterpillar part).
Engine warning flashing light	Count number of flashes. This will flash trouble code.	Determine trouble code and call Caterpillar Service Representative to correct problem.
Regeneration will not automatically engage.	Regeneration Switch in the inhibit position.	Force regeneration, or restart the unit.
Unit derated on its own	Soot load >100%	Force regeneration, or restart the unit.
		Inspect spark plugs.
		Inspect CEM ARD ignitor temperature sensor.
Compressor shuts down with air demand present	Compressor discharge temperature switch is open	Insufficient cooling airflow due to low hydraulic fluid level; add fluid and check for leaks
Compressor overheating	Low cooling airflow due to low hydraulic fluid level	Add fluid and check for leaks
	Low cooling airflow due to incorrectly programmed machine.	Verify controller is loaded with correct machine configuration file.

NOTE

Additional troubleshooting tips are available in the Controller Manual. Sullair part no. 02250201-742

6.13 AIR-STOP FUNCTION TEST

This test should be performed bi-annually, every 1000 hours of run time, or per local requirements. The test checks the function of the Air-Stop valve (located on the engine air-intake) when it receives a test signal from the Air-Stop control panel.Locate the Air Stop control panel which is mounted along the fuel tank on the curbside of the machine. Push the test switch to ‘ON’. Start the compressor if it is not running already. Make sure the compressor is set to run on low pressure (350 psi/24.1 bar).Open the service valve slowly to create demand and raise the rpm of the engine to high idle. Just before 1800 rpm the Air Shut Off solenoid will pull the valve closed, and the engine will shut-down. After completing the functionality test, make sure the test switch on the Air-Stop control panel is moved to the ‘OFF’ position.

Section 7

NOISE CONTROL

7.1 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.

7.2 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:
   - **a.** Engine exhaust system or parts thereof
   - **b.** Compressor air intake system or part thereof
   - **c.** Enclosure of part thereof
2. Removal of any of the following:
   - **a.** Vibration isolators
   - **b.** Control silencer
   - **c.** Floor panel
   - **d.** Fan shroud
   - **e.** 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.

7.3 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.

NOISE EMISSION MAINTENANCE AND MAINTENANCE RECORD LOG

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

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

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

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

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

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

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