

**Instruction Manual
for Portable Compressors**

PTS 916 Cd

**Instruction Manual
for Portable Compressors**

PTS 916 Cd

Instruction manual 5

Circuit diagrams 57

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.

COMPRESSOR NOISE EMISSION CONTROL INFORMATION

This compressor conforms to U.S. E.P.A. regulations for noise emissions applicable to portable air compressors.

The following acts or the causing thereof by any person are prohibited by the Noise Control Act of 1972:

1. The removal or rendering inoperative, other than for the purpose of maintenance, repair, or replacement, of any noise control device or element of design (listed in the owner's manual) incorporated into this compressor in compliance with the Noise Control Act.
2. The use of this compressor after such device or element of design has been removed or rendered inoperative.

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 muffler.
 - b. Cooling air exhaust and intake silencers.
 - c. Acoustic baffles.
 - d. Housing components, canopy or bottom panel.
 - e. Engine or components mounts.
 - f. Inlet air throttling system.
2. Removal of any of the following:
 - a. Sound absorptive material, including sealing strips on doors, panels and other canopy parts.
 - b. Fan shroud.
3. Operation of the compressor with any of the enclosure doors open.

Warranty and Liability Limitation

Use only authorized parts.

Any damage or malfunction caused by the use of unauthorized parts is not covered by Warranty or Product Liability.

The manufacturer does not accept any liability for any damage arising for modifications, additions or conversions made without the manufacturer's approval in writing.

Copyright 2007, Atlas Copco Airpower n.v., Antwerp, Belgium.

Any unauthorized use or copying of the contents or any part thereof is prohibited.

This applies in particular to trademarks, model denominations, part numbers and drawings.

Congratulations on the purchase of your AC compressor. It is a solid, safe and reliable machine, built according to the latest technology. Follow the instructions in this booklet and we guarantee you years of troublefree operation. Please read the following instructions carefully before starting to use your machine.

Always keep the manual available near the machine. In all correspondence always mention the compressor type and serial number, shown on the data plate.

The company reserves the right to make changes without prior notice.

Contents

1 Safety precautions for portable compressors7	4 Operating instructions27
1.1. Introduction.....7	4.1. Parking, transporting and lifting instruction27
1.2. General safety precautions.....7	4.1.1. Parking instructions.....27
1.3. Safety during transport and installation.....8	4.1.2. Transporting instructions28
1.4. Safety during use and operation.....8	4.1.3. Lifting instructions.....28
1.5. Safety during maintenance and repair9	4.2. Before starting29
1.6. Tool applications safety10	4.3. Starting instructions.....29
1.7. Battery safety precautions.....10	4.4. Operation via User Interface.....30
2 Leading particulars11	4.4.1. General30
2.1. Description of safety pictograms used in this manual11	4.4.2. Ready for Start status.....30
2.2. Markings and information labels12	4.4.3. Standby status30
2.3. Abbreviations.....13	4.4.4. Permissive start status31
2.4. Definitions.....13	4.4.5. Cranking status31
2.5. General description15	4.4.6. Warmup status32
2.6. Air flow system.....17	4.4.7. Not Loaded status33
2.7. Cooling and lubricating oil system18	4.4.8. Load/Unload status33
2.8. Fuel system19	4.4.9. Cooldown status.....34
2.9. Water system.....20	4.4.10. Stopping status.....34
3 User Interface and Compressor Control Module21	4.4.11. Start failure status35
3.1. Look of User Interface.....21	4.4.12. Shutdown status.....35
3.2. Control.....21	4.4.13. Emergency stop status.....36
3.3. Functionality23	4.4.14. System info status.....36
3.3.1. Manual start/manual stop.....23	4.4.15. Options status.....37
3.3.2. Automatic start/automatic stop.....23	4.4.16. Process Info status37
3.3.3. A closer look at some operating procedure blocks24	4.5. During operation38
	4.6. Stopping instructions.....38

5 Maintenance and service	39	6 Problem solving	50
5.1. Preventive maintenance schedule.....	40	6.1. Problem solving chart.....	50
5.2. Service paks and kits	40	6.2. Battery and alternator precautions.....	50
5.2.1. Service paks.....	40	6.3. Trouble shooting.....	51
5.2.2. Service kits.....	40	7 Technical specifications	55
5.3. Oil engine/compressor	40	7.1. Torque values.....	55
5.3.1. Oil specifications.....	40	7.1.1. For general applications.....	55
5.3.2. Engine oil level.....	41	7.1.2. For important assemblies.....	55
5.3.3. Compressor oil level.....	41	7.2. Settings of shutdowns and safety valves.....	55
5.3.4. Engine oil and oil filter change	42	7.3. Compressor/engine specifications.....	55
5.3.5. Compressor oil and oil filter change	42	7.4. Conversion list of SI units into British units... 56	
5.4. Air filters engine/Compressor	43	7.5. Dataplate.....	56
5.4.1. Main parts.....	43		
5.4.2. Cleaning the dust trap	43		
5.4.3. Replacing the air filter element and the safety cartridge.....	43		
5.4.4. Cleaning the filter element	43		
5.5. Coolant level.....	44		
5.5.1. Coolant level check	44		
5.5.2. Test coolant inhibitor level.....	44		
5.5.3. Coolant change	44		
5.6. Fuel.....	44		
5.6.1. Fuel filters	44		
5.6.2. C18 electrical fuel priming pump instruction 45			
5.6.3. Cleaning fuel tanks.....	45		
5.7. Cleaning coolers.....	45		
5.8. Poly V-belt tension adjustment.....	46		
5.8.1. Poly V-belt cooler fan.....	46		
5.8.2. V-belts engine fan	46		
5.9. MP safety valve	46		
5.10. Intercooler relief valves	47		
5.11. Shutdowns.....	47		
5.12. Battery care.....	48		
5.12.1. Electrolyte.....	48		
5.12.2. Activating a dry-charged battery	48		
5.12.3. Recharging a battery.....	48		
5.12.4. Maintaining the battery voltage.....	48		
5.12.5. Battery maintenance.....	48		
5.13. Fuses	48		
5.14. Caterpillar air shut-off valve.....	49		
5.15. Integrated spark arrestors	49		
5.16. Water separator.....	49		
5.17. Electric blow-off valve	49		
5.18. Storage.....	50		
5.19. Compressor element overhaul	50		
5.20. Liability.....	50		

1 Safety precautions for portable compressors

To be read attentively and acted accordingly before towing, lifting, operating, performing maintenance or repairing the compressor.

1.1 Introduction

The policy of Atlas Copco is to provide the users of their equipment with safe, reliable and efficient products. Factors taken into account are among others:

- the intended and predictable future use of the products, and the environments in which they are expected to operate,
- applicable rules, codes and regulations,
- the expected useful product life, assuming proper service and maintenance,
- providing the manual with up-to-date information.

Before handling any product, take time to read the relevant instruction manual. Besides giving detailed operating instructions, it also gives specific information about safety, preventive maintenance, etc.

Keep the manual always at the unit location, easily accessible to the operating personnel.

See also the safety precautions of the engine and possible other equipment, which are separately sent along or are mentioned on the equipment or parts of the unit.

These safety precautions are general and some statements will therefore not always apply to a particular unit.

Only people that have the right skills should be allowed to operate, adjust, perform maintenance or repair on Atlas Copco equipment. It is the responsibility of management to appoint operators with the appropriate training and skill for each category of job.

Skill level 1: Operator

An operator is trained in all aspects of operating the unit with the push-buttons, and is trained to know the safety aspects.

Skill level 2: Mechanical technician

A mechanical technician is trained to operate the unit the same as the operator. In addition, the mechanical technician is also trained to perform maintenance and repair, as described in the instruction manual, and is allowed to change settings of the control and safety system. A mechanical technician does not work on live electrical components.

Skill level 3: Electrical technician

An electrical technician is trained and has the same qualifications as both the operator and the mechanical technician. In addition, the electrical technician may carry out electrical repairs within the various enclosures of the unit. This includes work on live electrical components.

Skill level 4: Specialist from the manufacturer

This is a skilled specialist sent by the manufacturer or its agent to perform complex repairs or modifications to the equipment.

In general it is recommended that not more than two people operate the unit, more operators could lead to unsafe operating conditions. Take necessary steps to keep unauthorized persons away from the unit and eliminate all possible sources of danger at the unit.

When handling, operating, overhauling and/or performing maintenance or repair on Atlas Copco equipment, the mechanics are expected to use safe engineering practices and to observe all relevant local safety requirements and ordinances. The following list is a reminder of special safety directives and precautions mainly applicable to Atlas Copco equipment.

These safety precautions apply to machinery processing or consuming air. Processing of any other gas requires additional safety precautions typical to the application and are not included herein.

Neglecting the safety precautions may endanger people as well as environment and machinery:

- endanger people due to electrical, mechanical or chemical influences,
- endanger the environment due to leakage of oil, solvents or other substances,
- endanger the machinery due to function failures.

All responsibility for any damage or injury resulting from neglecting these precautions or by non-observance of ordinary caution and due care required in handling, operating, maintenance or repair, also if not expressly mentioned in this instruction manual, is disclaimed by Atlas Copco.

The manufacturer does not accept any liability for any damage arising from the

use of non-original parts and for modifications, additions or conversions made without the manufacturer's approval in writing.

If any statement in this manual does not comply with local legislation, the stricter of the two shall be applied.

Statements in these safety precautions should not be interpreted as suggestions, recommendations or inducements that it should be used in violation of any applicable laws or regulations.

1.2 General safety precautions

- 1 The owner is responsible for maintaining the unit in a safe operating condition. Unit parts and accessories must be replaced if missing or unsuitable for safe operation.
- 2 The supervisor, or the responsible person, shall at all times make sure that all instructions regarding machinery and equipment operation and maintenance are strictly followed and that the machines with all accessories and safety devices, as well as the consuming devices, are in good repair, free of abnormal wear or abuse, and are not tampered with.
- 3 Whenever there is an indication or any suspicion that an internal part of a machine is overheated, the machine shall be stopped but no inspection covers shall be opened before sufficient cooling time has elapsed; this to avoid the risk of spontaneous ignition of oil vapour when air is admitted.
- 4 Normal ratings (pressures, temperatures, speeds, etc.) shall be durably marked.
- 5 Operate the unit only for the intended purpose and within its rated limits (pressure, temperature, speeds, etc.).
- 6 The machinery and equipment shall be kept clean, i.e. as free as possible from oil, dust or other deposits.
- 7 To prevent an increase in working temperature, inspect and clean heat transfer surfaces (cooler fins, intercoolers, coolant jackets, etc.) regularly. See "Preventive maintenance schedule".
- 8 All regulating and safety devices shall be maintained with due care to ensure that they function properly. They may not be put out of action.
- 9 Care shall be taken to avoid damage to safety valves and other pressure-relief devices, especially to avoid plugging by paint, oil coke or dirt accumulation, which could interfere with the functioning of the device.
- 10 Pressure and temperature gauges shall be checked regularly with regard to their accuracy. They shall be replaced whenever outside acceptable tolerances.
- 11 Safety devices shall be tested as described in the maintenance schedule of the instruction manual to determine that they are in good operating condition.
- 12 Mind the markings and information labels on the unit.
- 13 In the event the safety labels are damaged or destroyed, they must be replaced to ensure operator safety.
- 14 Keep the work area neat. Lack of order will increase the risk of accidents.
- 15 When working on the unit, wear safety clothing. Depending on the kind of activities these are: safety glasses, ear protection, safety helmet (including visor), safety gloves, protective clothing, safety shoes. Do not wear the hair long and loose (protect long hair with a hairnet), or wear loose clothing or jewellery.
- 16 Take precautions against fire. Handle fuel, oil and anti-freeze with care because they are inflammable substances. Do not smoke or approach with naked flame when handling such substances. Keep a fire-extinguisher in the vicinity.

1.3 Safety during transport and installation

To lift a unit, all loose or pivoting parts, e.g. doors and towbar, shall first be securely fastened.

Do not attach cables, chains or ropes directly to the lifting eye; apply a crane hook or lifting shackle meeting local safety regulations. Never allow sharp bends in lifting cables, chains or ropes.

Helicopter lifting is not allowed.

It is strictly forbidden to dwell or stay in the risk zone under a lifted load. Never lift the unit over people or residential areas. Lifting acceleration and retardation shall be kept within safe limits.

- 1 Before towing the unit:
 - ascertain that the pressure vessel(s) is (are) depressurized,
 - check the towbar, the brake system and the towing eye. Also check the coupling of the towing vehicle,
 - check the towing and brake capability of the towing vehicle,
 - check that the towbar, jockey wheel or stand leg is safely locked in the raised position,
 - ascertain that the towing eye can swivel freely on the hook,
 - check that the wheels are secure and that the tyres are in good condition and inflated correctly,
 - connect the signalisation cable, check all lights and connect the pneumatic brake couplers,
 - attach the safety break-away cable or safety chain to the towing vehicle,
 - remove wheel chocks, if applied, and disengage the parking brake.
- 2 To tow a unit use a towing vehicle of ample capacity. Refer to the documentation of the towing vehicle.
- 3 If the unit is to be backed up by the towing vehicle, disengage the overrun brake mechanism (if it is not an automatic mechanism).
- 4 Never exceed the maximum towing speed of the unit (mind the local regulations).
- 5 Place the unit on level ground and apply the parking brake before disconnecting the unit from the towing vehicle. Unclip the safety break-away cable or safety chain. If the unit has no parking brake or jockey wheel, immobilize the unit by placing chocks in front of and/or behind the wheels. When the towbar can be positioned vertically, the locking device must be applied and kept in good order.
- 6 To lift heavy parts, a hoist of ample capacity, tested and approved according to local safety regulations, shall be used.
- 7 Lifting hooks, eyes, shackles, etc., shall never be bent and shall only have stress in line with their design load axis. The capacity of a lifting device diminishes when the lifting force is applied at an angle to its load axis.
- 8 For maximum safety and efficiency of the lifting apparatus all lifting members shall be applied as near to perpendicular as possible. If required, a lifting beam shall be applied between hoist and load.
- 9 Never leave a load hanging on a hoist.
- 10 A hoist has to be installed in such a way that the object will be lifted perpendicular. If that is not possible, the necessary precautions must be taken to prevent load-swinging, e.g. by using two hoists, each at approximately the same angle not exceeding 30° from the vertical.
- 11 Locate the unit away from walls. Take all precautions to ensure that hot air exhausted from the engine and driven machine cooling systems cannot be recirculated. If such hot air is taken in by the engine or driven machine cooling fan, this may cause overheating of the unit; if taken in for combustion, the engine power will be reduced.

1.4 Safety during use and operation

- 1 When the unit has to operate in a fire-hazardous environment, each engine exhaust has to be provided with a spark arrestor to trap incendiary sparks.
- 2 The exhaust contains carbon monoxide which is a lethal gas. When the unit is used in a confined space, conduct the engine exhaust to the outside atmosphere by a pipe of sufficient diameter; do this in such a way that no extra back pressure is created for the engine. If necessary, install an extractor. Observe any existing local regulations. Make sure that the unit has sufficient air intake for operation. If necessary, install extra air intake ducts.
- 3 When operating in a dust-laden atmosphere, place the unit so that dust is not carried towards it by the wind. Operation in clean surroundings considerably extends the intervals for cleaning the air intake filters and the cores of the coolers.
- 4 Close the compressor air outlet valve before connecting or disconnecting a hose. Ascertain that a hose is fully depressurized before disconnecting it. Before blowing compressed air through a hose or air line, ensure that the open end is held securely, so that it cannot whip and cause injury.
- 5 The air line end connected to the outlet valve must be safeguarded with a safety cable, attached next to the valve.
- 6 No external force may be exerted on the air outlet valves, e.g. by pulling on hoses or by installing auxiliary equipment directly to a valve, e.g. a water separator, a lubricator, etc. Do not step on the air outlet valves.
- 7 Never move a unit when external lines or hoses are connected to the outlet valves, to avoid damage to valves, manifold and hoses.
- 8 Do not use compressed air from any type of compressor, without taking extra measures, for breathing purposes as this may result in injury or death. For breathing air quality, the compressed air must be adequately purified according to local legislation and standards. Breathing air must always be supplied at stable, suitable pressure.
- 9 Distribution pipework and air hoses must be of correct diameter and suitable for the working pressure. Never use frayed, damaged or deteriorated hoses. Replace hoses and flexibles before the lifetime expires. Use only the correct type and size of hose end fittings and connections.
- 10 If the compressor is to be used for sand-blasting or will be connected to a common compressed-air system, fit an appropriate non-return valve (check valve) between compressor outlet and the connected sand-blasting or compressed-air system. Observe the right mounting position/direction.
- 11 Before removing the oil filler plug, ensure that the pressure is released by opening an air outlet valve.
- 12 Never remove a filler cap of the coolant system of a hot engine. Wait until the engine has sufficiently cooled down.
- 13 Never refill fuel while the unit is running, unless otherwise stated in the Atlas Copco Instruction Book (AIB). Keep fuel away from hot parts such as air outlet pipes or the engine exhaust. Do not smoke when fuelling. When fuelling from an automatic pump, an earthing cable should be connected to the unit to discharge static electricity. Never spill nor leave oil, fuel, coolant or cleansing agent in or around the unit.
- 14 All doors shall be shut during operation so as not to disturb the cooling air flow inside the bodywork and/or render the silencing less effective. A door should be kept open for a short period only e.g. for inspection or adjustment.
- 15 Periodically carry out maintenance works according to the maintenance schedule.
- 16 Stationary housing guards are provided on all rotating or reciprocating parts not otherwise protected and which may be hazardous to personnel. Machinery shall never be put into operation, when such guards have been removed, before the guards are securely reinstalled.
- 17 Noise, even at reasonable levels, can cause irritation and disturbance which, over a long period of time, may cause severe injuries to the nervous system of human beings.
When the sound pressure level, at any point where personnel normally has to attend, is:
 - below 70 dB(A): no action needs to be taken,
 - above 70 dB(A): noise-protective devices should be provided for people continuously being present in the room,
 - below 85 dB(A): no action needs to be taken for occasional visitors staying a limited time only,
 - above 85 dB(A): room to be classified as a noise-hazardous area and an obvious warning shall be placed permanently at each entrance to alert people entering the room, for even relatively short times, about the need to wear ear protectors,
 - above 95 dB(A): the warning(s) at the entrance(s) shall be completed

with the recommendation that also occasional visitors shall wear ear protectors,

- above 105 dB(A): special ear protectors that are adequate for this noise level and the spectral composition of the noise shall be provided and a special warning to that effect shall be placed at each entrance.
- 18 Insulation or safety guards of parts the temperature of which can be in excess of 80°C (175°F) and which may be accidentally touched by personnel shall not be removed before the parts have cooled to room temperature.
- 19 Never operate the unit in surroundings where there is a possibility of taking in flammable or toxic fumes.
- 20 If the working process produces fumes, dust or vibration hazards, etc., take the necessary steps to eliminate the risk of personnel injury.
- 21 When using compressed air or inert gas to clean down equipment, do so with caution and use the appropriate protection, at least safety glasses, for the operator as well as for any bystander. Do not apply compressed air or inert gas to your skin or direct an air or gas stream at people. Never use it to clean dirt from your clothes.
- 22 When washing parts in or with a cleaning solvent, provide the required ventilation and use appropriate protection such as a breathing filter, safety glasses, rubber apron and gloves, etc.
- 23 Safety shoes should be compulsory in any workshop and if there is a risk, however small, of falling objects, wearing of a safety helmet should be included.
- 24 If there is a risk of inhaling hazardous gases, fumes or dust, the respiratory organs must be protected and depending on the nature of the hazard, so must the eyes and skin.
- 25 Remember that where there is visible dust, the finer, invisible particles will almost certainly be present too; but the fact that no dust can be seen is not a reliable indication that dangerous, invisible dust is not present in the air.
- 26 Never operate the unit at pressures or speeds below or in excess of its limits as indicated in the technical specifications.

1.5 Safety during maintenance and repair

Maintenance, overhaul and repair work shall only be carried out by adequately trained personnel; if required, under supervision of someone qualified for the job.

- 1 Use only the correct tools for maintenance and repair work, and only tools which are in good condition.
- 2 Parts shall only be replaced by genuine Atlas Copco replacement parts.
- 3 All maintenance work, other than routine attention, shall only be undertaken when the unit is stopped. Steps shall be taken to prevent inadvertent starting. In addition, a warning sign bearing a legend such as "work in progress; do not start" shall be attached to the starting equipment. On engine-driven units the battery shall be disconnected and removed or the terminals covered by insulating caps. On electrically driven units the main switch shall be locked in open position and the fuses shall be taken out. A warning sign bearing a legend such as "work in progress; do not supply voltage" shall be attached to the fuse box or main switch.
- 4 Before dismantling any pressurized component, the compressor or equipment shall be effectively isolated from all sources of pressure and the entire system shall be relieved of pressure. Do not rely on non-return valves (check valves) to isolate pressure systems. In addition, a warning sign bearing a legend such as "work in progress; do not open" shall be attached to each of the outlet valves.
- 5 Prior to stripping an engine or other machine or undertaking major overhaul on it, prevent all movable parts from rolling over or moving.
- 6 Make sure that no tools, loose parts or rags are left in or on the machine. Never leave rags or loose clothing near the engine air intake.
- 7 Never use flammable solvents for cleaning (fire-risk).
- 8 Take safety precautions against toxic vapours of cleaning liquids.
- 9 Never use machine parts as a climbing aid.
- 10 Observe scrupulous cleanliness during maintenance and repair. Keep away dirt, cover the parts and exposed openings with a clean cloth, paper or tape.
- 11 Never weld on or perform any operation involving heat near the fuel or oil systems. Fuel and oil tanks must be completely purged, e.g. by steam-cleaning, before carrying out such operations. Never weld on, or in any way modify, pressure vessels. Disconnect the alternator cables during arc welding on the unit.
- 12 Support the towbar and the axle(s) securely if working underneath the unit or when removing a wheel. Do not rely on jacks.
- 13 Do not remove any of, or tamper with, the sound-damping material. Keep the material free of dirt and liquids such as fuel, oil and cleansing agents. If any sound-damping material is damaged, replace it to prevent the sound pressure level from increasing.
- 14 Use only lubricating oils and greases recommended or approved by Atlas Copco or the machine manufacturer. Ascertain that the selected lubricants comply with all applicable safety regulations, especially with regard to explosion or fire-risk and the possibility of decomposition or generation of hazardous gases. Never mix synthetic with mineral oil.
- 15 Protect the engine, alternator, air intake filter, electrical and regulating components, etc., to prevent moisture ingress, e.g. when steam-cleaning.
- 16 When performing any operation involving heat, flames or sparks on a machine, the surrounding components shall first be screened with non-flammable material.
- 17 Never use a light source with open flame for inspecting the interior of a machine.
- 18 When repair has been completed, the machine shall be barred over at least one revolution for reciprocating machines, several revolutions for rotary ones to ensure that there is no mechanical interference within the machine or driver. Check the direction of rotation of electric motors when starting up the machine initially and after any alteration to the electrical connection(s) or switch gear, to check that the oil pump and the fan function properly.
- 19 Maintenance and repair work should be recorded in an operator's logbook for all machinery. Frequency and nature of repairs can reveal unsafe conditions.
- 20 When hot parts have to be handled, e.g. shrink fitting, special heat-resistant gloves shall be used and, if required, other body protection shall be applied.

- 21 When using cartridge type breathing filter equipment, ascertain that the correct type of cartridge is used and that its useful service life is not surpassed.
- 22 Make sure that oil, solvents and other substances likely to pollute the environment are properly disposed of.
- 23 Before clearing the unit for use after maintenance or overhaul, check that operating pressures, temperatures and speeds are correct and that the control and shutdown devices function correctly.

**Piping and coolers
(according to directive 97/23)**

Safety valves

All adjustments or repairs are to be done by an authorized representative of the valve supplier (see "Preventive maintenance schedule").

1.6 Tool applications safety

Apply the proper tool for each job. With the knowledge of correct tool use and knowing the limitations of tools, along with some common sense, many accidents can be prevented.

Special service tools are available for specific jobs and should be used when recommended. The use of these tools will save time and prevent damage to parts.

1.7 Battery safety precautions

Batteries

When servicing batteries, always wear protecting clothing and glasses.

- 1 The electrolyte in batteries is a sulphuric acid solution which is fatal if it hits your eyes, and which can cause burns if it contacts your skin. Therefore, be careful when handling batteries, e.g. when checking the charge condition.
- 2 Install a sign prohibiting fire, open flame and smoking at the post where batteries are being charged.
- 3 When batteries are being charged, an explosive gas mixture forms in the cells and might escape through the vent holes in the plugs. Thus an explosive atmosphere may form around the battery if ventilation is poor, and can remain in and around the battery for several hours after it has been charged. Therefore:
 - never smoke near batteries being, or having recently been, charged,
 - never break live circuits at battery terminals, because a spark usually occurs.
- 4 When connecting an auxiliary battery (AB) in parallel to the unit battery (CB) with booster cables: connect the + pole of AB to the + pole of CB, then connect the - pole of CB to the mass of the unit. Disconnect in the reverse order.

2 Leading particulars

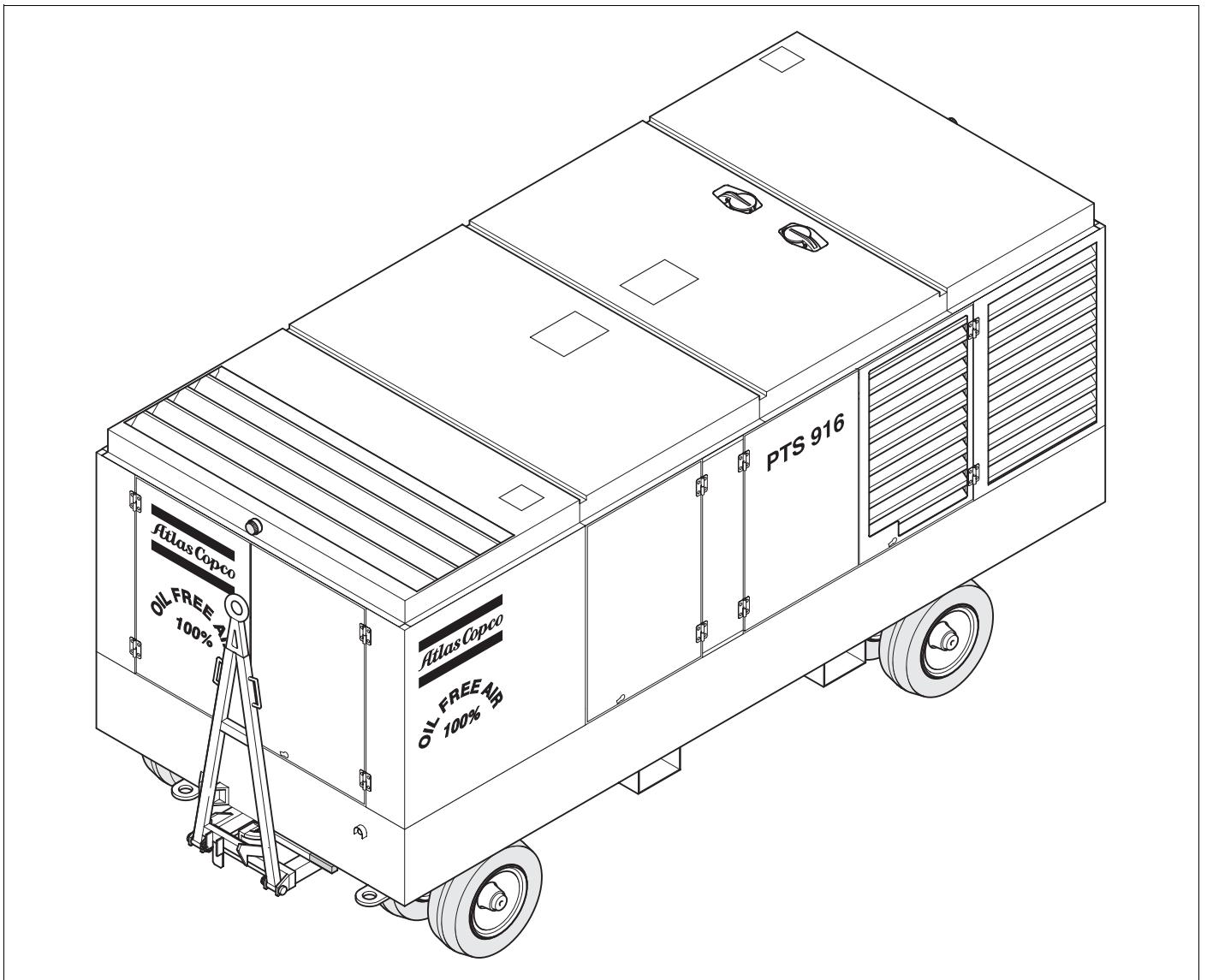
2.1 Description of safety pictograms used in this manual








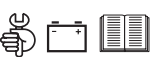






This symbol draws your attention to dangerous situations. The operation concerned may endanger persons and cause injuries.












This symbol is followed by supplementary information.



2.2 Markings and information labels

	Dangerous outlet
	Danger, heat flat
	Electrocution hazard
	Atlas Copco engine oil
	Manual
	Read the instruction manual before working on the battery
	On/Off button
	Prohibition to open air valves without connected hoses
	Airfilter
	Rotation direction
	Inlet
	Outlet

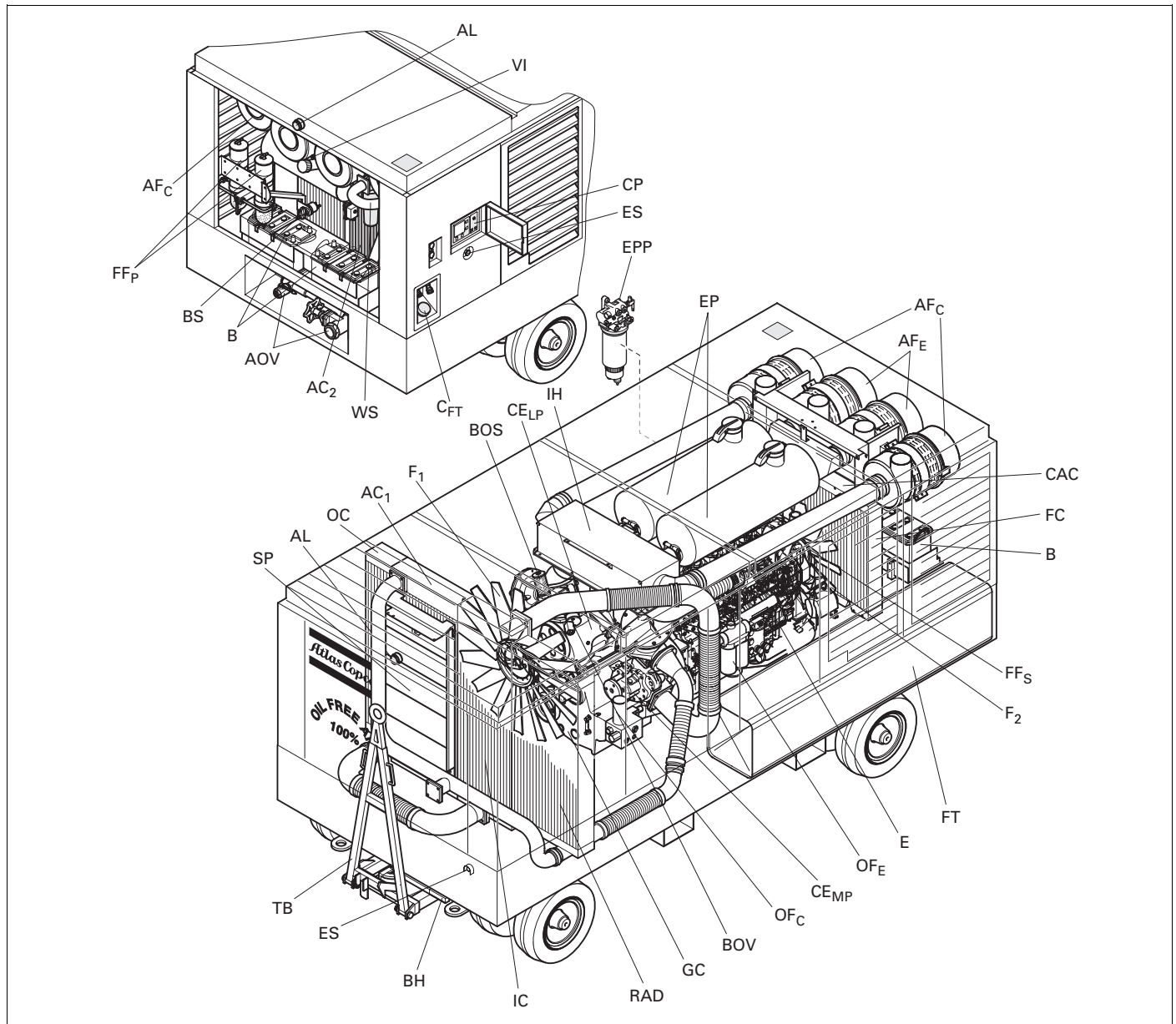
	Compressor oil drain
	Read the instruction manual before starting
	Service every 24 hours
	Warning! Part under pressure
	Do not stand on outlet valves
	Start/Stop indication of switch
	Do not run the motor with open doors
	Use diesel fuel only
	Sound power level in accordance with Directive 84/533/EC (expressed in dB (A))

2.3 Abbreviations

AC	Atlas Copco
AIB	Atlas Copco Instruction Book
ASB	Service Bulletin
ASL	Atlas Copco List
CAC	Charge Air Cooler
CAN	Controller Area Network Interface
CCM	Compressor Control Module
DDR	Diagnostic Data Reader
ECM	Engine Control Module
EOM	Engine Operation Manual
LP	Low-pressure
MAX	Maximum
MIN	Minimum
MP	Medium-pressure
PAR	Portable Air Division
PC	Personal Computer
RPM	Revolves Per Minute
UI	User Interface

2.4 Definitions

Control panel	This is the panel on the unit where the User Interface, power switch, DDR connector, PC connector, remote control connector, heater switch, light switch and pressure setpoint buttons are situated.
Technician	AC personnel allowed to change settings of the control and safety system.
Operator	AC personnel or user allowed to operate the compressor unit with the push-buttons.
Load	Operating condition with inlet compressor open and engine speed regulated between minimum and maximum.
Not loaded	Operating condition with inlet compressor forced to closed position by operator command. The engine speed is held at minimum.
Unload	Operating condition with inlet compressor forced to closed position by working pressure command. The engine speed is held at minimum.
DDR	Diagnostic Data Reader. This is a tool that can be connected to the ECM to read and calibrate engine parameters.
ECM	Engine Control Module. This is the basic engine control module used by DDC for the engine controls (emissions, safeties, fuel injection, ...).
CCM	Compressor Control Module. This module is linked with the ECM and is used for speed regulation and for the compressor controls (unloading system, safeties, ...). It can be operated via PC or User Interface.
User Interface setpoint	Max. working pressure setpoint calibrated in the CCM. At this max. setpoint the engine speed will be regulated between max. and min. speed when running in manual or automatic operation.



AC ₁	Aftercooler 1	ES	Emergency stop
AC ₂	Aftercooler 2	F ₁	Cooling fan 1 (RAD, IC, AC ₁ , OC)
AFC	Air intake filter (compressor)	F ₂	Cooling fan 2 (AC ₂ , CAC/FC)
AFE	Air intake filter (engine)	FC	Fuel cooler
AL	Alarm lamp	FF _P	Primary fuel filter
AOV	Air outlet valve	FF _S	Secondary fuel filter
B	Battery	FT	Fuel tank
BH	Brake handle	GC	Gear casing
BOS	Blow-off silencer	IC	Intercooler
BOV	Blow-off valve	IH	Air inlet housing
BS	Battery switch	OC	Oil cooler
CAC	Charge air cooler	OF _C	Oil filters (compressor)
C _{FT}	Filler cap (fuel tank)	OF _E	Oil filter (engine)
C _{EMP}	MP compressor element	RAD	Radiator
C _{ELP}	LP compressor element	SP	Sliding plates
CP	Control panel	TB	Towbar
E	Engine	VI	Vacuum indicator
EP	Exhaust pipe	WS	Water separator
EPP	Electrical priming pump		

2.5 General description

The PTS 916 Cd is a portable, two-stage screw compressor unit, that delivers oil-free air.

The PTS 916 Cd is built for a nominal effective working pressure of up to:

- 0.5 - 10.3 bar (7 - 150 psi) at 1550 rpm
- 0.5 - 9.3 bar (7 - 135 psi) at 1750 rpm
- 0.5 - 6.9 bar (7 - 100 psi) at 1850 rpm

The driving direction has always been originated with, when the sides of the unit are denoted. E.g. the towbar is at the front and the User Interface is at the rear right-hand side of the unit.

Engine

The compressor is driven by a liquid-cooled diesel engine, manufactured by Caterpillar. This engine has the following characteristics: direct fuel injection, electronic unit injection that is mechanically actuated, turbocharged, and air-to-air aftercooled.

For general description, see Engine Operation Manual (EOM).

Compressor

The compressor has one low-pressure and one high-pressure compressor element, individually bolted to the housing of a common step up gear. The step up gear is bolted directly to the engine flywheel housing. The power from the engine is transmitted to the step up gear shaft through a flexible coupling.

Compressor elements

Each compressor element houses two screw-type rotors, mounted on ball and roller bearings. The male rotor, driven by the step up gear, and the female rotor are synchronized through timing gears, which maintain the slight clearance between the rotors.

The male rotors have four lobes and the female rotors six flutes. Thus, the male rotors revolve at 1 1/2 times the speed of the female rotors. The absence of contact between the rotors and between the rotor crests and the compressor casings eliminates wear and power loss. The elements deliver pulsation-free air.

Air and oil sealing rings are fitted on the rotor shafts. The air seals are located next to the compression space, the oil seals next to the rotor bearings. The leak air from the air seals is evacuated to the atmosphere through vent-holes. Any oil that might gather between the oil and air seals is prevented from entering the compression space, as it is drained through the same vent holes.

Cooling and lubrication

The unit is provided with an air-cooled aftercooler 2, with water separator, and CAC (= charge air cooler)/fuel cooler placed in the back of the unit. The cooling air is generated by an axial fan, which is belt-driven from the engine fan shaft.

Water condensate from the water separator is drained through a nipple in the bottom of the frame in the back of the unit.

The radiator, intercooler, aftercooler and oil cooler are installed side by side in the front of the unit. These coolers are air-cooled by an axial fan, which is belt-driven from the compressor main-shaft.

Oil is used for jacket-cooling of the compressor elements, as well as for lubricating the rotor bearings, timing and drive gears. The system includes an oil pump and an oil filter.

Speed regulation and unloading system

The regulation of the unit is governed by the Engine Control Module (ECM) and the Compressor Control Module (CCM), which will vary engine speed and operate the compressor throttle valve and unloading valve through a 3-way loading valve.

Safety devices

Two relief valves and a MP safety valve protect the LP and MP sides of the compressor respectively.

A check valve prevents blow-back of compressed air when the compressor is unloaded or stopped.

Pressure and thermal shutdown switches protect the compressor against abnormal operating conditions.

Frame and axles

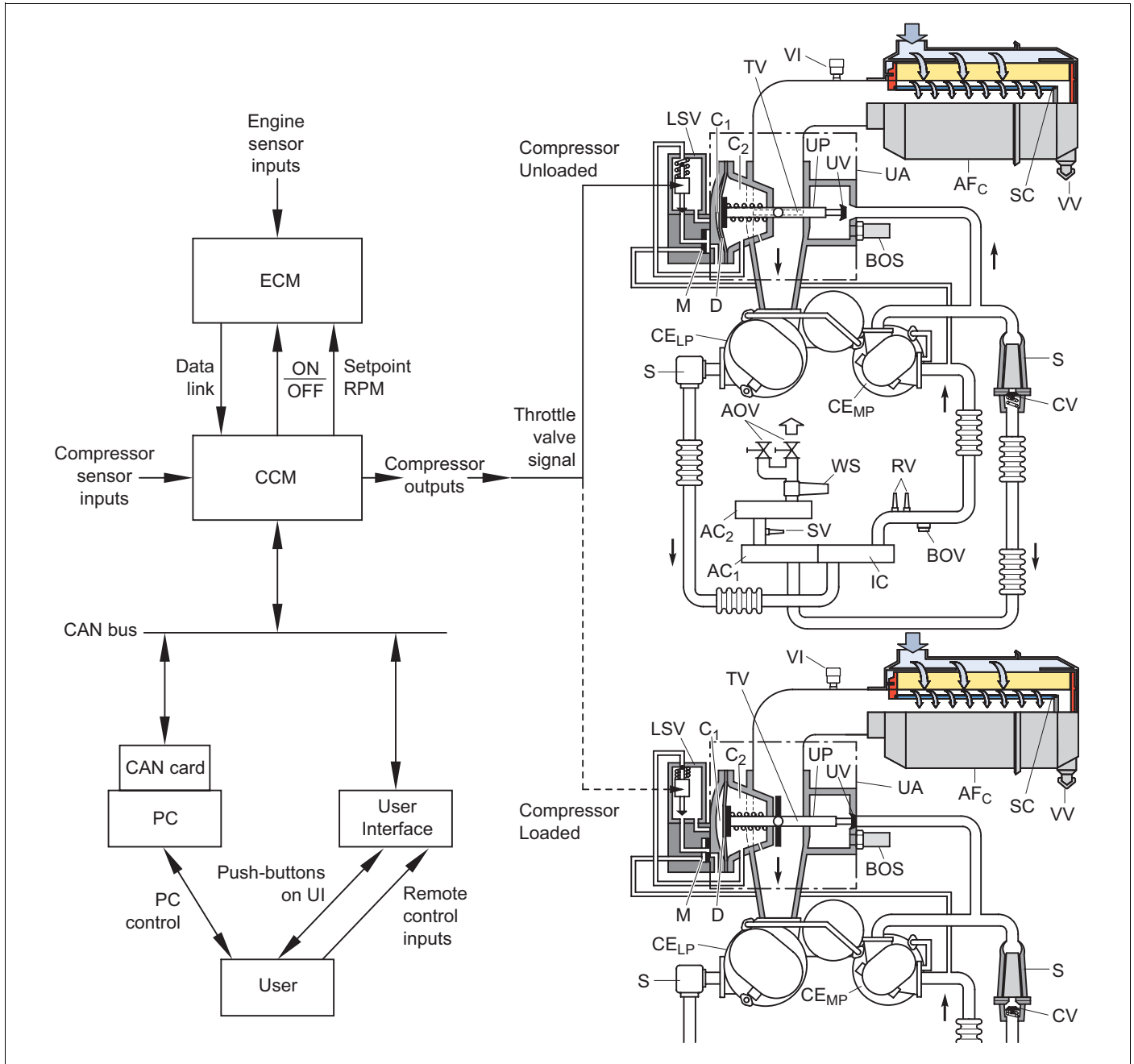
The compressor/engine unit is supported on a frame which also carries the compressor cooling block.

The front axle is provided with a steering gear and a hinged towbar with towing eye. The towbar can be locked in the raised position.

The unit is equipped with a parking brake, operated by a handle close to the towbar.

Bodywork

The bodywork has openings for the intake, cooling and exhaust air and specially hinged doors for maintenance and service operations. The bodywork is internally lined with sound-absorbing material. The air outlet valves are in the frame, at the back.



AC ₁	Aftercooler 1
AC ₂	Aftercooler 2
AF _C	Air intake filter (compressor)
AOV	Air outlet valve
BOS	Blow-off silencer
BOV	Blow-off valve
C ₁	Chamber (unloader assembly)
C ₂	Chamber (unloader assembly)
CE _{MP}	MP compressor element
CE _{LP}	LP compressor element
CV	Check valve
D	Diaphragm (unloader assembly)
IC	Intercooler

LSV	Loading solenoid valve
M	Membrane (unloader assembly)
RV	Intercooler relief valve
S	Air outlet silencer (compressor element)
SC	Safety cartridge
SV	MP safety valve
TV	Throttle valve (unloader assembly)
UA	Unloader assembly
UP	Unloader piston (unloader assembly)
UV	Unloading valve (unloader assembly)
VI	Vacuum indicator
VV	Vacuator valve (dust ejector)
WS	Water separator

Fuel tanks

The unit has two interconnected fuel tanks, but can also be connected to an external fuel tank.

Control panel

The control panel is located behind a small door at the rear right-hand side of the unit.

Data plate

The compressor is furnished with a data plate showing among others type, serial number and nominal working pressure.

2.6 Air flow system

Air drawn through the air intake filters (AF_C), and unloader (UA) into LP compressor element (CE_{LP}) is compressed and discharged to the intercooler (IC) where the heat of first-stage compression is removed by the cooling air flow.

The cooled air then enters MP compressor element (CE_{MP}) where it is further compressed and discharged through check valve (CV), aftercooler 1 (AC₁), aftercooler 2 (AC₂), water separator (WS) and air outlet valves (AOV).

During loaded operation air inlet throttle valve (TV) is open and unloading valve (UV) closed. These valves are simultaneously closed and opened respectively by loading solenoid valve (LSV) through unloader piston (UP) when the working pressure reaches its preset maximum. The pressure of the MP compressor element is then released to the atmosphere through the unloading valve and the blow-off silencers (BOS), resulting in closing of the check valve. The throttle valve leaves an air passage in the closed position. Thus air remains drawn into the compressor to maintain a reasonable pressure ratio over the elements.

An air-operated balancing piston is fitted behind the male rotor rear thrust bearing of MP compressor element. The piston decreases the load on the male rotor front thrust bearing during loaded operation. During loading the MP compressor element balancing piston is actuated by working pressure, while during unloading the pressure on the piston equals the atmospheric pressure.

Two intercooler relief valves (RV), an electric blow-off valve (BOV) and a MP safety valve (SV) are comprised in the system.

2.7 Cooling and lubricating oil system

Oil from the oil sump (OS) of gear casing (GC) is circulated by an oil pump (OP), mounted on the front of the gear casing. The pump is driven from the main drive shaft. The oil is pumped to the cooling jacket of the MP compressor element (CE_{MP}) and to the cooling jacket of the LP compressor element (CE_{LP}) and from there through the air-cooled oil cooler (OC). From the LP element cooling jacket the oil passes through oil filter (OF_C) on gear casing before entering the LP and MP element oil pipes and ducts to lubricate the rotor bearings, driving and timing gears. The oil then flows back to the oil sump.

The gear casing is vented to the atmosphere through a breather pot assembly.

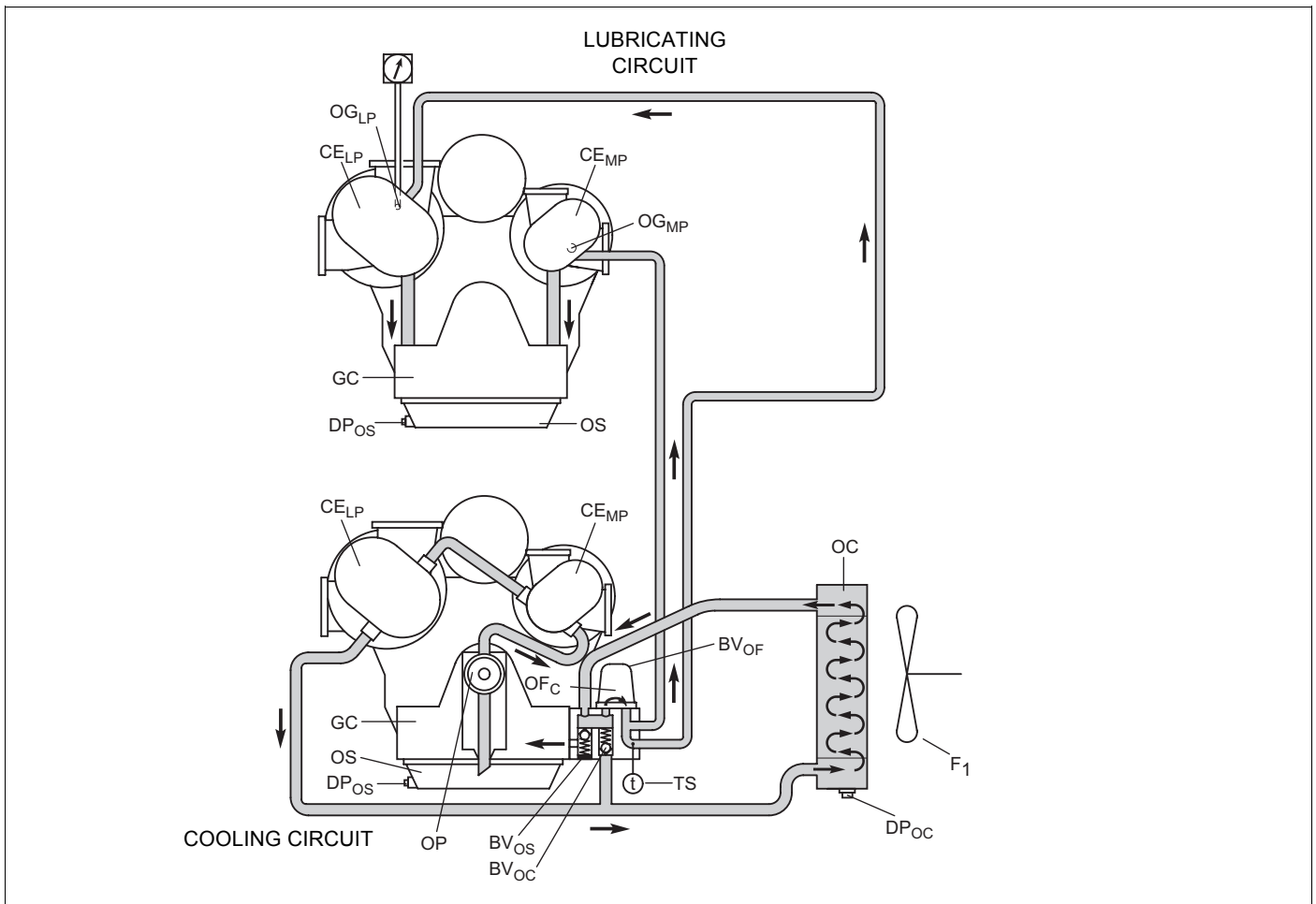
The bypass valve (BV_{OF}) of the oil filter opens when the pressure drop over the filter is above normal due to clogging of the element.

The oil is then circulated without being filtered. For this reason, it is imperative to replace the oil filter at regular intervals.

Bypass valve (BV_{OS}) opens when the pressure drop over the filter and lubricating circuit is above normal. The oil is then returned to the oil sump.

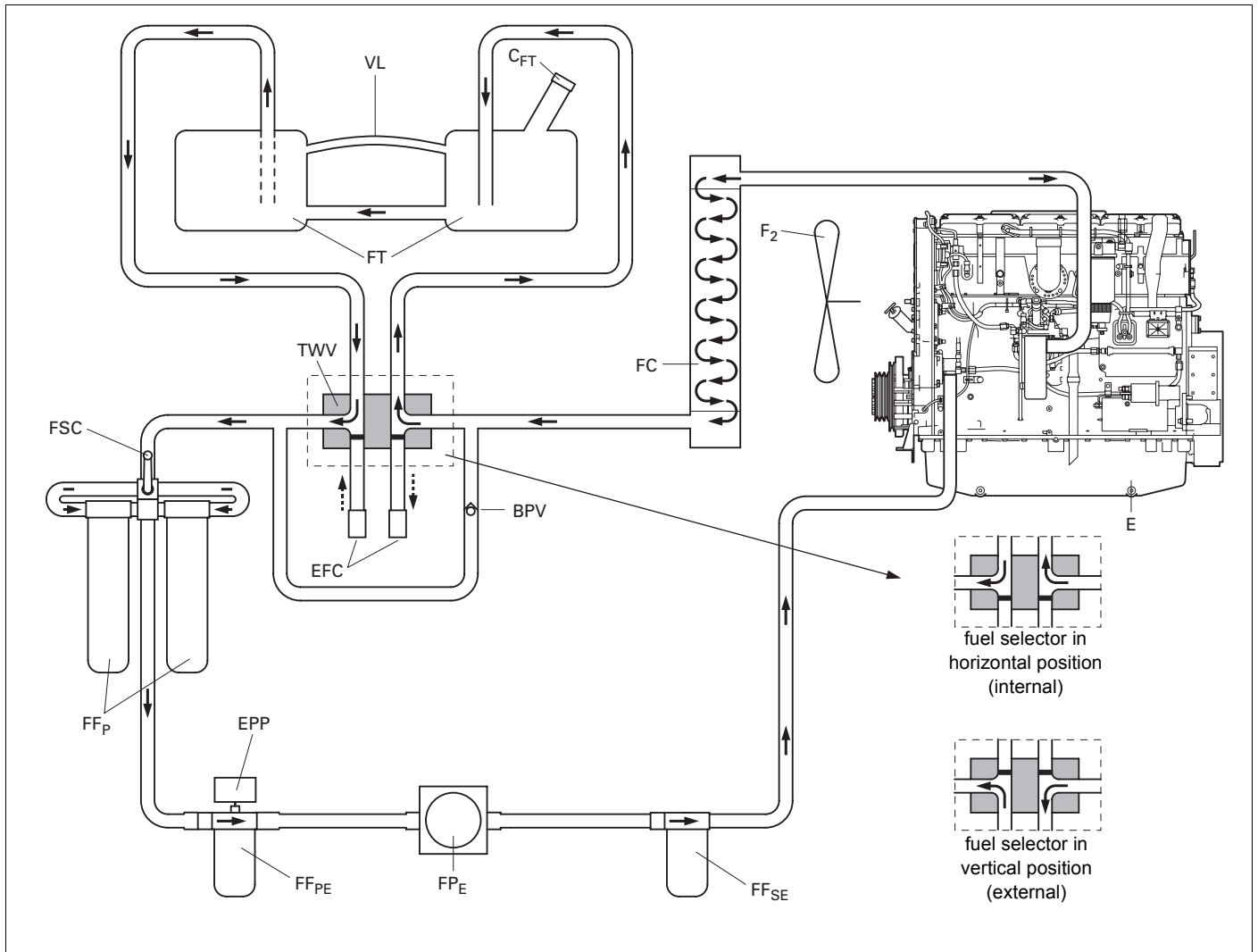
Bypass valve (BV_{OC}) opens when the pressure rise over the oil cooler is above normal. This will happen mainly when starting the compressor from cold in low ambient temperatures. The bypassing of the oil cooler will ensure rapid warming of the oil to the normal working temperature.

A pressure shutdown sensor and a temperature reading sensor (TS) are comprised in the system.



BV _{OC}	Bypass valve (oil cooler)	GC	Gear casing
BV _{OF}	Bypass valve (oil filter)	OC	Oil cooler
BV _{OS}	Bypass valve (oil sump)	OF _C	Compressor oil filter (with bypass valve)
CE _{LP}	LP compressor element	OG _{LP}	Oil gallery (LP compressor element)
CE _{MP}	MP compressor element	OG _{MP}	Oil gallery (MP compressor element)
DP _{OC}	Drain plug (oil cooler)	OP	Oil pump
DP _{OS}	Drain plug (oil sump)	OS	Oil sump
F ₁	Cooling fan 1 (RAD, IC, AC ₁ , OC)	TS	Temperature sensor

2.8 Fuel system



BPV	Bypass valve
C _{FT}	Filler cap (fuel tank)
CV	Check valve
E	Engine
EFC	External fuel supply coupling
EPP	Electrical priming pump
F ₂	Cooling fan 2 (AC ₂ , CAC/FC)
FC	Fuel cooler
FF _P	Primary fuel filter / water separator

FF _S	Fuel filter
FF _{PE}	Primary engine fuel filter / water separator
FF _{SE}	Secondary engine fuel filter
FP _E	Engine fuel pump
FSC	Fuel shut-off cock
FT	Fuel tank
TWV	3-way valve
VL	Venting line

In case of internal fuel supply, fuel from the fuel tanks (FT) is circulated by the engine fuel pump (FP_E). The fuel is pumped through a 3-way valve (TWV) to two primary fuel filters (FF_P). The fuel then passes through the secondary fuel filters (FF_S) and enters the engine (E).

The fuel, which is not used by the engine to combust, returns via the air-cooled fuel cooler (FC) and the 3-way valve to the fuel tanks.

Normally the primary fuel filters are in parallel. By means of the fuel shut-off cock (FSC), seated on the housing of the filters, one of the filters can be shut off when it has to be serviced. This can even be done while the engine is running.

⚠ Do not put the fuel shut-off cock in the lowered position (the handle pointer points up) when the engine is running, because both filters will be shut off and no fuel will flow to the engine.

An electrical priming pump (EPP) is comprised in the system to fill up filters and fuellines after maintenance and servicing. A description of this procedure can be found on page 45.

Instead of internal fuel supply via the fuel tanks, external fuel supply is possible.

⚠ The unit must be stopped before switching from the internal to an external fuel source.

When using external fuel, both the supply and the return hose must be connected to the external fuel supply couplings (EFC).

No restrictions are allowed in those hoses.

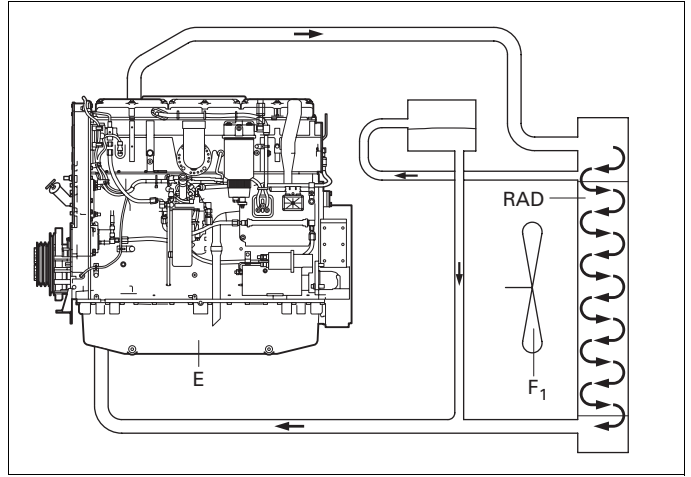
Take the necessary precautions to keep the fuel return hose opened and connected, while the unit is running.

Check that the primary fuel filters are not both shut off.

Restart the unit.

2.9 Water system

Radiator



E	Engine
F ₁	Cooling fan 1 (RAD, IC, AC ₁ , OC)
RAD	Radiator
TT _{RAD}	Top tank (radiator)
WP _E	Engine water pump (radiator)

The water system contains a coolant flow to cool the engine's cylinders.

The coolant is circulated by the engine water pump (WP_E), seated on the back of the engine (E). When the coolant returns from the engine, it passes through the radiator (RAD), which is air-cooled by the cooler fan (F₁).

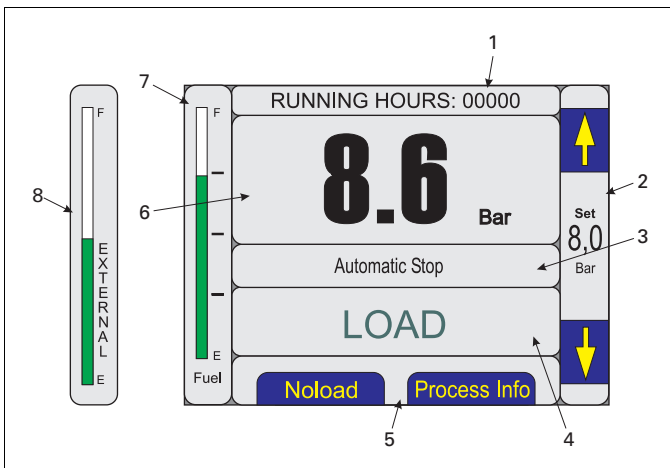
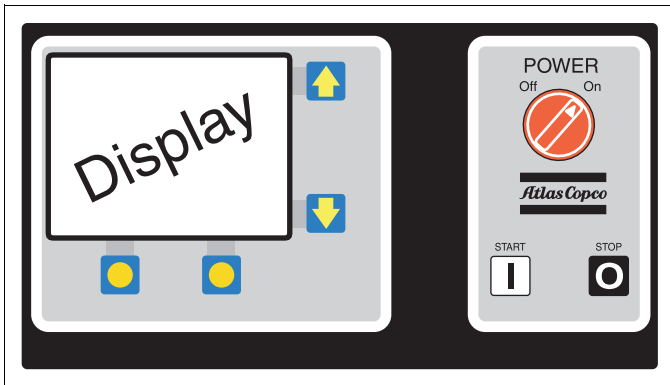
The radiator top tank (TT_{RAD}) supplies the coolant to the system and gives the coolant in the system room to expand.

3 User Interface and Compressor Control Module

3.1 Look of User Interface

The User Interface consists of a color LCD display which gives the user the essential process information feedback.

Any mix-up of buttons and button functions is reduced to an absolute minimum thanks to an ergonomic design, which has as few buttons as possible.



- 1 Running hours and warning bar. When warnings occur, they swap with the running hours on this bar, showing the next message every 3 seconds.
- 2 Setpressure bar
- 3 Additional information bar
- 4 Compressor status bar
- 5 Button function bar
- 6 Air discharge pressure and shutdown information bar
- 7 Fuel bar
- 8 This is what the fuel level bar would look like if you hook up external fuel supply.

The User Interface is built in into the side of the rear right corner panel, with an emergency stop button directly underneath, for maximum safety during the cranking procedure.

3.2 Control

Arrow buttons

The arrow buttons are generally used to increase or decrease the setpressure.

In the Process Info status however, they are used to scroll the text up and down the screen, and in the Options status they are used to change the user parameters.

Control modes

The CCM can be controlled via three different control modes:

Local control mode

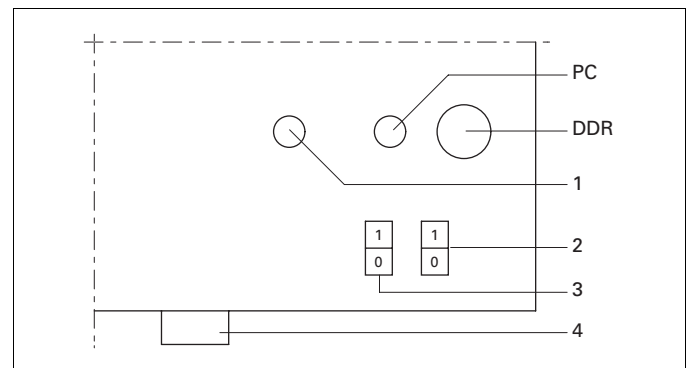
The CCM is controlled by means of the UI. The Control Mode parameter is Local when the Remote parameter is disable or disable lock.

The Local control mode is the default mode.

Remote control mode

The CCM is controlled by means of the remote inputs; the remote control connector is located at the back of the UI.

The Control Mode parameter is Remote when the Remote parameter is enable or enable lock.



- 1 Remote
- 2 Internal lights
- 3 Heaters
- 4 Harness connector

When this control mode is active, monitoring the operation on the UI stays possible. Further, the UI can only be used for looking at the System information and the Process information, and for changing parameters in the Options status.

PC control mode

The CCM is controlled by means of a PC. This control mode can only be selected with the Connect button on the PC. When the button is clicked, the Control Mode parameter becomes remote PC, regardless of the state of the Remote parameter. Changing the Remote parameter will not effect the Control Mode parameter until the Disconnect button is clicked.

When the PC mode is active, monitoring the operation on the UI stays possible. Further, the UI can only be used for looking at the System information and the Process information.

Control commands

Start command

Local: Pressing the Start button on the UI.
 Remote: Activating the Remote Start input.
 PC: Clicking the Start button on the PC.

Stop command

Local: Pressing the Stop button on the UI.
 Remote: Activating the Remote Stop input.
 PC: Clicking the Stop button on the PC.

Load command

Local: Pressing the Load button on the UI.
 Remote: Activating the Remote Load input (when not loaded).
 PC: Clicking the Load button with the mouse.

Noload command

Local: Pressing the Noload button on the UI.
 Remote: Activating the Remote Load input (when loaded).
 PC: Clicking the Noload button with the mouse.

Enable parameters

There are four enable parameters with four possible conditions.

The lock extension gives the Rental companies the possibility to prohibit the operator from changing the parameters via the UI, thus restricting the operator to one condition of the parameter.

Parameter	E/D	Lock	CCM operation
Autostart	enable	x	Automatic start
	disable	x	Manual start
Autostop	enable	x	Automatic stop
	disable	x	Manual stop
Remote	enable	x	Remote Control Mode
	disable	x	Local Control Mode
Air Discharge Temperature Regulation	enable	x	Air Disch. Temp. Control activated
	disable	x	Air Disch. Temp. Control not active
Re/Unload Control	enable	-	Re/Unload press. adjustable with UI
	disable	-	Re/Unload press. not adjustable with UI
Unload RPM Control	enable	-	Unload RPM adjustable with UI
	disable	-	Unload RPM not adjustable with UI

3.3 Functionality

The start and stop function can be set to manual or automatic operation.

It is possible to combine these two into a semi-automatic operation.

3.3.1 Manual start/manual stop

When switching on the power, the compressor goes to the Ready for Start status.

From this status more information about all system configuration settings can be got, or the engine can be started immediately by pressing the Start button.

When the Start button is pressed, the CCM checks all sensor inputs and parameters. The engine cranking procedure begins.

The engine starts, and the warmup procedure begins.

When the compressor is ready to be loaded, it goes into the Not Loaded status.

The operator can now load the compressor at any time by pressing the Load button.

When loaded, the compressor's regulating system becomes active. Actual pressure and setpressure are displayed, as well as the condition of the regulating system (load or unload).

The operator can put the compressor back to the Not Loaded status, by pressing the Noload button.

When the operator presses the Stop button in any status from Warmup to Load, the compressor immediately goes to the Cooldown status.

When the cooldown time has elapsed, the stopping procedure begins. The engine stops and the compressor will automatically return to the Ready for Start status.

3.3.2 Automatic start/automatic stop

When switching on the power, the compressor goes to the Ready for Start status.

From this status more information about all system configuration settings can be got, or the automatic start can be immediately activated, by pressing the OK button.

When the automatic start is activated, the air discharge pressure is constantly displayed.

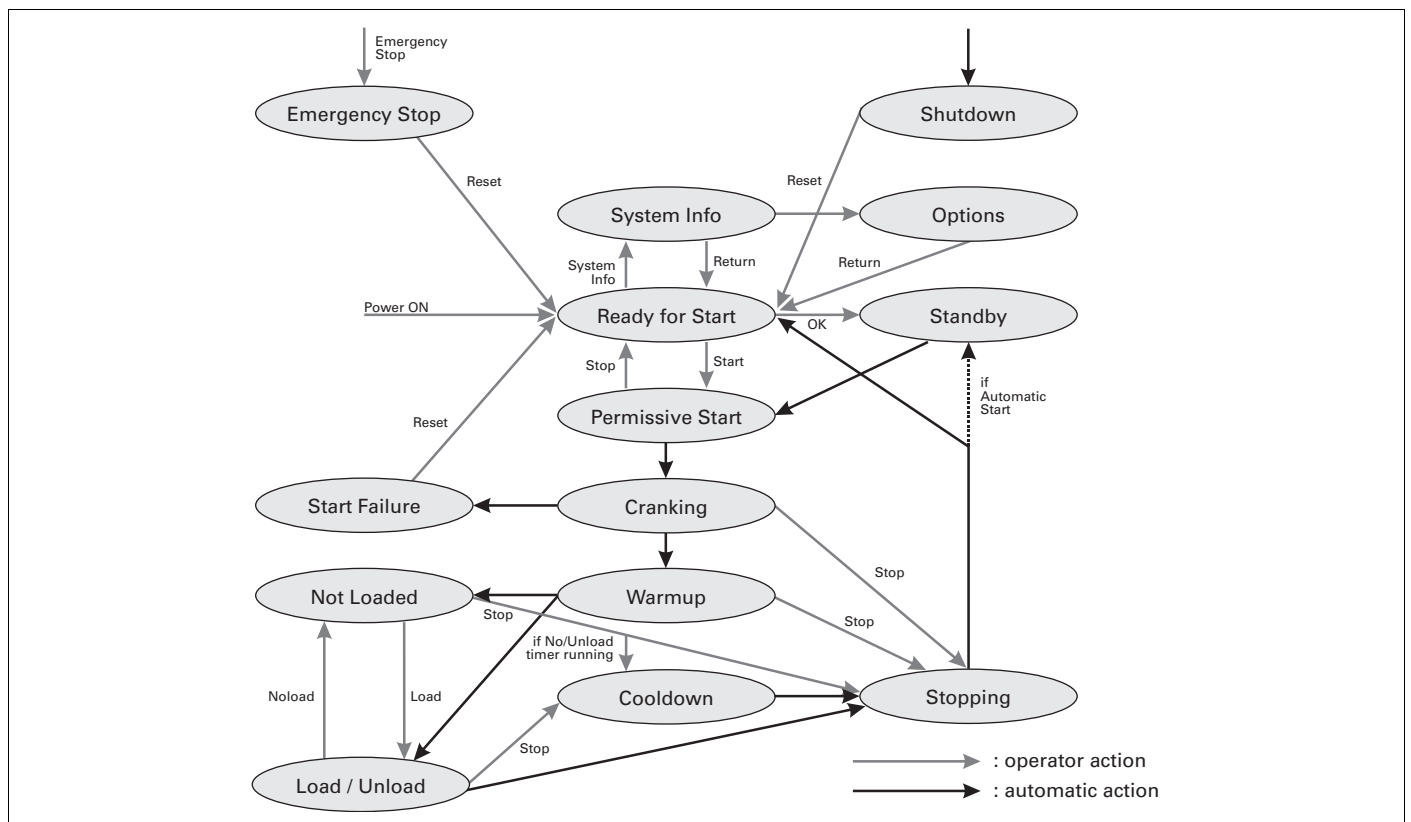
When more air is needed, the pressure drops, and the compressor starts the cranking procedure.

When the engine starts, the compressor still runs through the Warmup status, but the Not Loaded status is skipped, and the regulating system immediately becomes active.

When the compressor runs in the Unload status for a preset time, the stopping procedure begins. The engine stops and the compressor returns to the Standby status, with the automatic start already activated.



The automatic operation can always be interrupted by pressing the Stop button.



3.3.3 A closer look at some operating procedure blocks

Process information

While the compressor is running, the operator can take a brief look at all the incoming compressor and engine data, by pressing the Process Info button.

This can be very useful for troubleshooting over the phone.

System information

When in the Ready for Start status the System Info button is pressed, all the system configuration settings are displayed, such as: unit type, max. and min. set pressure, active control mode, max. set RPM, battery voltage.

From here the operator can enter the Options status, where he can configure all the parameters he has access to.

Options

Here the screen shows all the parameters the operator can edit. With the arrow buttons, one scrolls to an object, and toggles or selects it with the right function button.

Selected values can be changed with the arrow buttons, and the new value is confirmed with the OK button.

At any time the operator can leave the Options status and go to the Ready for Start status by pressing the Return button.

Cranking procedure

When a start request is made, either by the operator or automatically, the horn and flasher light outputs are activated for the duration of the start warning time. All the compressor parameters are checked.

When one of these parameters is out of its limits, the operator is prompted to the Start failure status, and must return to the Ready for Start status or to the System Info status.

When all the parameters are within limits, the engine starts cranking.

The starter motor runs for a preset time, and then the engine rests for some time, before trying to start again.

This cycle is repeated for a number of times.

When the engine does not start, the starting procedure is ended, and the operator is prompted to the Start Failure status after several failed attempts.

When during the cranking procedure the operator presses the Stop button, a stopping procedure will be executed, and the compressor will return to the Ready for Start status.

Warming up

When the engine starts, the compressor enters the Warmup status. This means the engine is going to run idle until the engine coolant temperature has reached a specific value. If this coolant temperature setting is already reached, there is no warmup, and loading can immediately commence.

When after a specified maximum time the coolant temperature setting is not reached, the compressor will proceed anyway.

When starting manually, the operator can press the Auto Load button. This will result in a skipping of the Not Loaded status, and loading directly after the Warmup status.

Pressure regulating system

A PID regulating system is implemented in the CCM and becomes active in the Load/Unload status. This PID regulates the air discharge pressure by adjusting the engine RPM between RPM Min. and RPM Max.

When the air discharge pressure, which is monitored, drops below the Reload pressure, the loading valve is opened and the PID becomes active (load condition).

When less air is needed, the pressure rises and the PID will decrease the engine RPM.

When the engine RPM is at its minimum, and the air flow needed is still smaller than the compressor's output, the pressure will rise until it reaches the Unload pressure. Then the PID will become inactive and the loading valve will close. The engine runs at RPM Min. (unload condition).

When the air discharge pressure drops again, below the Reload pressure, the loading valve is opened and the PID becomes active.

Cooling down

When the Stop button is pressed, the engine runs idle for a specified time. If the engine already ran unloaded for some time, before pressing the Stop button, this time is subtracted from the cooldown time because the engine conditions in these cases are the same. This is also why the engine stops without cooldown in automatic stop operation.

When a unit goes to cooldown due to "Engine coolant temperature too high" (see "Engine warnings"). The unit will shut down and on the screen appears "ready for start". When pressing the start button "start request denied" will be displayed. After resetting, this message is cleared and a start attempt can be made. Cooldown Time: default 3 minutes.

Shutdowns

There are several parameters which are continuously watched. When one of these parameters exceeds the specified limits, the compressor will shutdown immediately.

The parameters appear on the screen.

The operator can leave the Shutdown status at any time, and go to the Ready for Start status or to the Process Info status by pressing the reset button.

Restarting before the parameter is back within its limits is impossible, because of the parameter check in the cranking procedure.

Emergency stop

When an emergency stop button is hit, this message appears on the screen.

Until the emergency stop button is reset, the operator cannot do anything.

When the emergency stop button is reset, the operator can proceed to the Ready for Start status or to the Process Info status.

Warnings

When a warning is generated, the warning will appear on the screen of the UI, and the user is prompted to a malfunction or a potential shutdown.

There are two kinds of warnings: Process warnings and Apparatus warnings.

- Process warnings do not have any effect on the CCM’s operation. They are generated when a measured value has exceeded its limits. These Process warnings are: fuel level warning, engine oil level warning, compressor oil level warning and discharge temperature warning.
- During operation, all sensors, some outputs and the communication lines are continuously checked for failures. When such a failure occurs, the CCM will generate an Apparatus warning. Some errors can cause the CCM to go to the Shutdown status (if running) or to the Start Failure status (if in Permissive Start status).

Process warnings	Effect
Fuel Level	Shutdown
Engine Oil Level Too Low	Shutdown
Engine Oil Overfill	Shutdown
LP Element Temperature	Shutdown
MP Element Temperature	Shutdown
Fuel Level	Warning
Engine Oil Level Low	Warning
Air Discharge Temperature	Warning
Autostart Pressure higher than Setpressure	Warning
Battery Voltage Low	Warning
Battery Not Charging	Warning

Engine warnings	Effect
Engine Coolant Level Sensor Failure	Shutdown
Engine Coolant Temp. Sensor Failure	Shutdown
Engine Oil Temperature Sensor Failure	Warning
Engine Fuel Temperature Sensor Failure	Shutdown
Engine Air Inlet Temp. Sensor Failure	Warning
Engine Turbo Boost Press. Sensor Failure	Warning
Engine Oil Pressure Sensor Failure	Shutdown
Engine Fuel Pressure Sensor Failure	Shutdown
Engine Coolant Level Low	Shutdown
Engine Coolant Temperature Too High	Cooldown*
Engine Air Inlet Temperature High	Warning
Engine Oil Pressure Too Low	Shutdown
Turbo Boost Pressure High	Warning
Engine Fuel Pressure Too Low	Shutdown
Engine Injector X Failure	Shutdown
Fuel Temperature Too High	Shutdown
Engine RPM Sensor Failure	Shutdown

*Note: See “Cooling down” on page 24.

Apparatus warnings	Effect
Fuel Level Sensor	Shutdown
Air Discharge Pressure Sensor	Shutdown
Compressor Oil Pressure Sensor	Shutdown
LP Element Temperature Sensor	Shutdown
MP Element Temperature Sensor	Shutdown
Loading Valve Output	Shutdown
ECM Communication Link	Shutdown
CAN Communication Link	Shutdown
Starter Relay	Shutdown
Compressor Intercooler Pressure 1 Sensor	Warning
Compressor Intercooler Pressure 2 Sensor	Warning
Compressor Oil Temperature Sensor	Warning
Air Discharge Temperature Sensor	Warning
Air Inlet Temperature Sensor	Warning
Oil Level Maintainer Valve Output	Warning
Flasher Lights Output	Warning
Horn Output	Warning
Blow-off Valve Output	Warning
EEPROM	Warning
Default Mode	Warning

Unload RPM Control

It allows compensation of engine power at high altitude applications.

In the Unload condition the engine will run at the Unload RPM.

In the Load condition the engine will not run slower than the Unload RPM. If the Unload RPM parameter is enable, it is possible for the user to change the Unload RPM with the UI.

Loading Valve Control

When the compressor is going to the load condition, and the engine RPM setpoint is above 1420 RPM the loading valve is opened when the engine reaches 1400 RPM.

If the engine RPM setpoint is below 1400 RPM, the loading valve is opened at the engine RPM setpoint - 20 RPM.

Pressure Calibration

To compensate the offset error of the Air Discharge Pressure sensor, a Pressure Calibration parameter is implemented.

The offset error is measured by comparing the sensor value with that of a verified and stamped pressure gauge.

This parameter is programmed with the value that compensates the error.

Ex. Pressure gauge value: 7.8 bar

Sensor value: 8.1 bar

Parameter value: - 0.3 bar

Poweroff

When the power is switched on, a Wrong Poweroff flag is set.

When the power is switched off when the engine is not running, the Wrong Poweroff flag is reset.

When pressing the emergency stop, the programs of the CCM and the UI keep on running, but the power to the outputs is cut off, so the engine will stop immediately.

When the power is switched off then, the Wrong Poweroff flag is reset.

When the power is switched off while the engine is running, the programs of the CCM and the UI will keep on running and the CCM will stop in a controlled manner (cooldown - stopping procedure), before it will Powerdown and reset the Wrong Poweroff flag.

When the power is switched off as well as the emergency stop is pressed, no power supply to the CCM is left and the engine cannot be shut down properly. The Wrong Poweroff flag is not reset.

When the power is then switched on again, the Wrong Poweroff counter will add 1.

Executing a wrong poweroff can result in memory damage.

Powerdown

To save the batteries, the CCM and UI are equipped with a Powerdown function.

When the compressor is not running and the Automatic start is not activated, the CCM and UI will go to Powerdown mode if there has not been any action during the Powerdown time.

In Powerdown mode the CCM and UI will perform as little as possible to reduce the power consumption. The screen of the UI will therefore be shut down.

Local control mode

When a button is pressed on the UI, the CCM will return to its previous status.

Remote control mode

When the compressor is in the Ready for Start status and the Remote start button is pressed, the CCM will come out of Powerdown and go directly to the Permissive Start or Standby status. Pressing any other Remote control button (except Remote ON), will only result in deactivating the Powerdown, also when the CCM is in any other status.

When the Remote ON input is not active, none of the Remote inputs can deactivate the Powerdown.

When a button on the UI is pressed, the CCM will come out of Powerdown.

When there has not been any action during three minutes, the CCM will return to Powerdown.

PC control mode

When an action is performed via the PC, demanding a response from the CCM or UI (Start signal, changing settings, ...), the CCM will come out of Powerdown.

When a button on the UI is pressed, the CCM will come out of Powerdown as well.

When there has not been any action during three minutes, the CCM will return to Powerdown.

Air Discharge Temperature Control (optional)

By changing the temperature of the cooling air going through the aftercooler it is possible to heat the discharge air to a certain setting. This is done with a proportional valve controlled with a PWM signal, and mounted on a cooler.

The Air Discharge Temperature Control becomes active after the Warmup status, and stays active for as long as the engine is running. The operation of the Air Discharge Temperature Control depends on the Air Discharge Temperature Control Parameter.

Air Discharge Temperature Control parameter “Disable”

When the parameter is disable or disable lock, the PID will regulate the Air Discharge Temperature to a fixed value of 4°C to prevent freezing.

The CCM will run through the standard Warmup procedure, with the valve closed.

Air Discharge Temperature Control parameter “Enable”

When the parameter is enable or enable lock, the PID will regulate the Air Discharge Temperature to the Air Discharge Temperature Setting.

After starting the compressor, the CCM will first run through the Temperature Control Warmup procedure in the Warmup status. This procedure will override the standard Warmup procedure and settings.

When the engine started, the CCM executes following Warmup procedure if the Air Discharge Control Parameter is Enable (lock); If the Coolant Water Temperature is at 50°C or above, the Warmup procedure is ended.

When the Warmup procedure has ended, the CCM can go to the Not Loaded status, or to the Load/Unload status.

Barometric Calibration

For applications running in low barometric pressure environments (high altitude), Caterpillar compensates the diesel injection.

4 Operating instructions

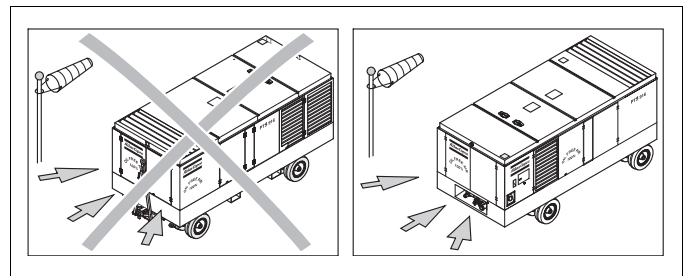
4.1 Parking, transporting and lifting instruction



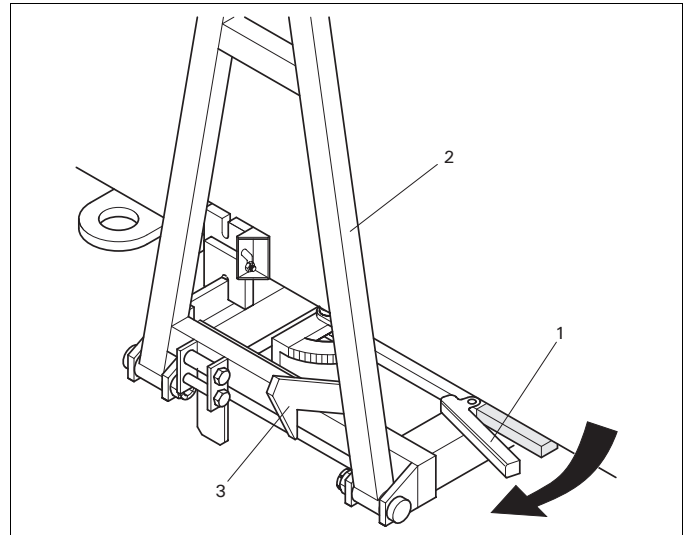
The operator is expected to apply all relevant safety precautions, including those mentioned on the pages 7-10 of this book.

4.1.1 Parking instructions

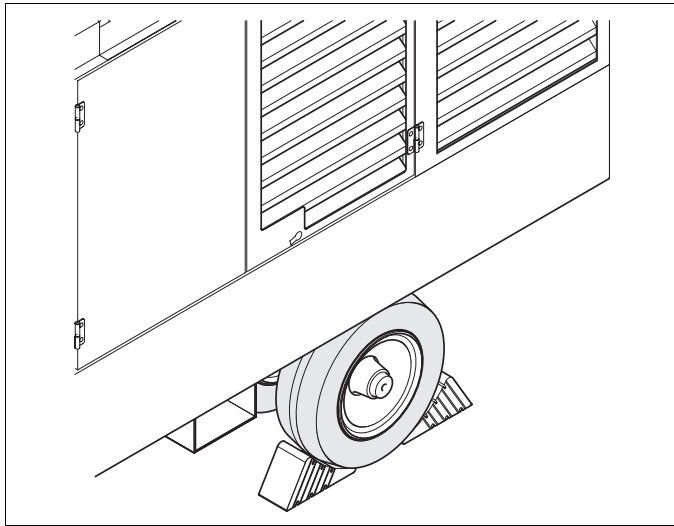
Locate the wind direction and place the rear end of the unit upwind, away from contaminated wind streams and walls. Avoid recirculation of exhaust air from the engine. This causes overheating and engine power decrease.



Park the unit on solid level ground. Engage the parking brake by pulling parking brake handle (1) and place wheel chocks in front of and behind the wheels before the unit is disconnected from the towing or lifting vehicle.




Lock the towbar (2) in the raised position with catcher (3).

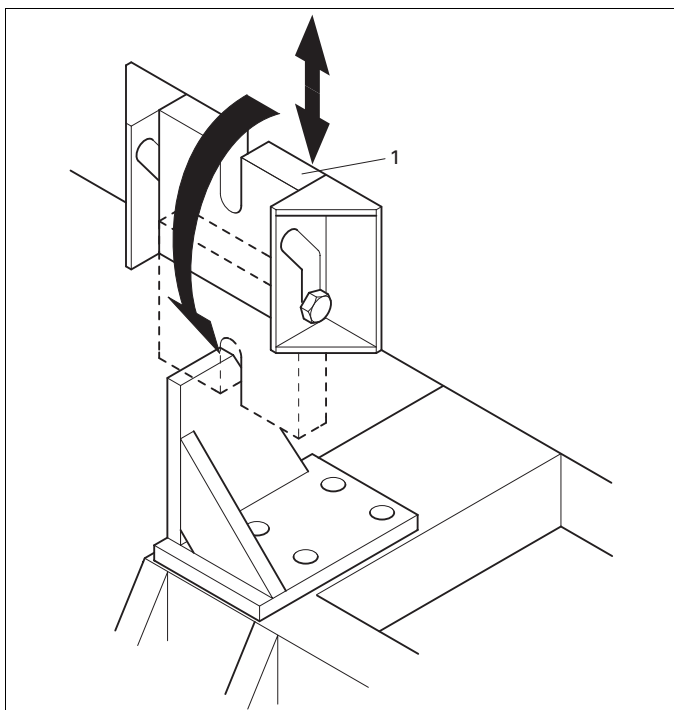


4.1.2 Transporting instructions

Road transport is only allowed on a trailer, with sufficient capacity (wet weight of unit is 8260 kg (18213 lb)).

Before towing the unit on the trailer, block the towbar by locking the blocking device (1) in downward position. The blocking device has to be pulled up first, before it can be turned over.

 **Release brake before towing.**



Leave the towbar in blocked position on the trailer and secure the unit (see section 4.1.1).

Lock blockage device in upward position when unit is manoeuvred to its working location.


Lock all service doors.

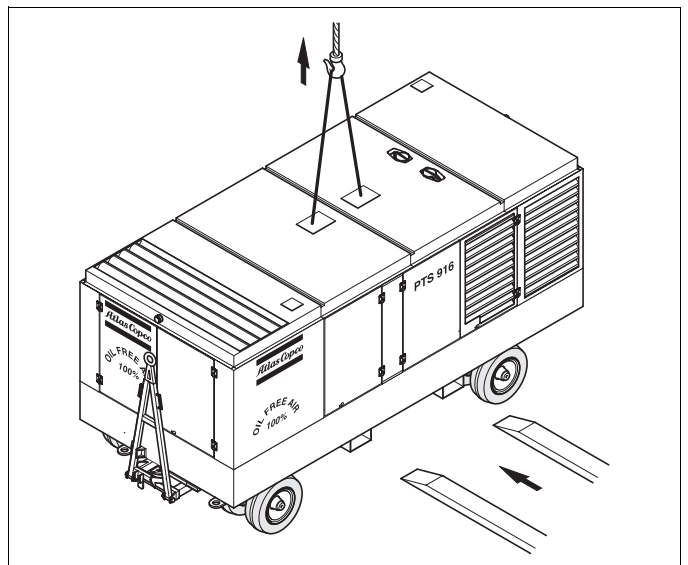
4.1.3 Lifting instructions

To lift the unit, use a lift truck or crane with sufficient capacity (wet weight of unit is 8260 kg (18213 lb)).

Use the lifting positions of the unit as shown in the figure below.

See to it that the unit will be lifted vertically and remains level.

 **Lifting acceleration and retardation must be kept within safe limits (max. 4g). Helicopter lifting is not allowed.**



4.2 Before starting

- With the unit standing level, check the engine and compressor oil levels (see section 5.3.2 and 5.3.3). Add oil if necessary. See section 5.3.1 for the types of oil to be used. Normally, there is no need to add oil between two oil changes; if there is, check the source of oil consumption.
- Attach the air line(s) to the closed air outlet valve(s) (AOV).



The air line end connected to the outlet valve must be safeguarded with a safety cable, attached next to the valve.

No external force may be applied to the air outlet valves, e.g. by pulling hoses or by connecting equipment directly to the valves (e.g. a water separator, a lubricator, pipe extensions, etc.).

- Turn ON the battery switch (BS).
- Move the power switch on the control panel (CP) to the ON position and read the fuel level on the display. Top up the fuel tanks (FT), if necessary. Consult the Engine Operation Manual for the type of fuel. Move the control panel power switch to OFF again after filling.
- Check the level of the coolant in the engine radiator (RAD). See section 5.5.1. Add coolant if necessary. Consult the Engine Operation Manual for the coolant solutions to be used.
- Press the vacuator valves of the air filters (AF_C and AF_E) to remove dust. See section 5.4.2.
- Check the air filter vacuum indicators (VI). If the yellow piston reaches the red marked service range (see section 5.4.3), clean or replace the filter elements (see sections 5.4.3 and 5.4.4). Reset the indicator by pushing the reset button.
- Check the electrolyte level in the batteries (B). Top up if necessary, with distilled water (see section 5.12.1).
- Put the fuel shut-off cock, which is seated on the primary fuel filter housing in the back of the unit, in the raised position (the handle pointer points down/filter selection "ALL ON").
- Drain any water and sediment from the primary fuel filters (FF_p).



Make sure that nobody is in the unit and all doors are closed prior to starting the unit.



In cold ambient conditions (temperature below -5°C (23°F), the engine must be preheated before starting. In auto mode, connect the engine and compressor block heater and the battery charger to the 220 Volt/110 Volt receptacle.

4.3 Starting instructions

Move the control panel power switch to ON. The display of the User Interface will light up. See also chapter 3. Use the arrow keys to set the working pressure.



Make sure that nobody is in the unit and all doors are closed prior to starting the unit.

Push the start button on the panel. The horn will sound.

The compressor can be loaded after the warmup period.

- Manual: push the button below the indication LOAD, in the display.
- Automatic: the compressor will load automatically when the button below the indication AUTO LOAD, in the display, is pushed during the warmup period.

The unit will LOAD/UNLOAD according to the air demand.

Open the air outlet valve(s).



The start/stop instructions are available in different languages on request.

When the unit is in the standby status for a long time, the following action should be performed:

- Without application: turn OFF the battery switch.
- Running: supply power to the battery charger.

4.4 Operation via User Interface

4.4.1 General

In this section an overview is given of all statuses of the CCM.

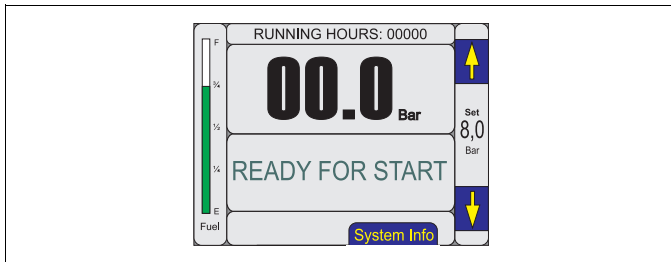
The reactions of the compressor to actions of the operator and to signals from the compressor itself, are also shown.



- A:** action (carried out by operator)
- S:** signal (generated by compressor)
- R:** reaction

4.4.2 Ready for Start status

Manual start



S	Warnings	R	Are shown on the screen
A	Emergency stop button	R	To emergency stop status (see section 4.4.13)
A	↓-button, press once	R	Set pressure - 0.1 bar
A	↑-button, press once	R	Set pressure + 0.1 bar
A	↓-button, press continuously	R	Set pressure - 0.1 bar/second
A	↑-button, press continuously	R	Set pressure + 0.1 bar/second
A	Power OFF switch	R	End of operation
A	System info button	R	To system info status (see section 4.4.14)
A	Start command	R	To permissive start status (see section 4.4.4)

Other actions and signals have no effect in this status.

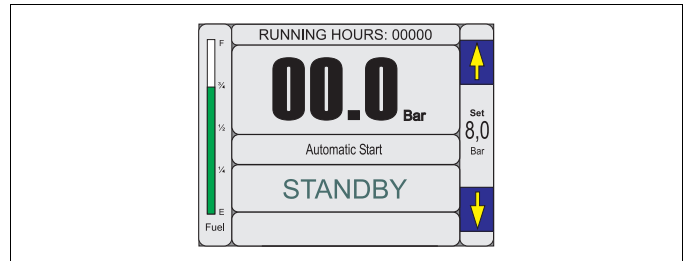
Automatic start



S	Warnings	R	Are shown on the screen
A	Emergency stop button	R	To emergency stop status (see section 4.4.13)
A	↓-button, press once	R	Set pressure - 0.1 bar
A	↑-button, press once	R	Set pressure + 0.1 bar
A	↓-button, press continuously	R	Set pressure - 0.1 bar/second
A	↑-button, press continuously	R	Set pressure + 0.1 bar/second
A	Power OFF switch	R	End of operation
A	System info button	R	To system info status (see section 4.4.14)
A	OK button or Remote start input (if Remote control mode)	R	To standby status (see section 4.4.3)

Other actions and signals have no effect in this status.

4.4.3 Standby status



S	Warnings	R	Are shown on the screen
A	Emergency stop button	R	To emergency stop status (see section 4.4.13)
A	↓-button, press once	R	Set pressure - 0.1 bar
A	↑-button, press once	R	Set pressure + 0.1 bar
A	↓-button, press continuously	R	Set pressure - 0.1 bar/second
A	↑-button, press continuously	R	Set pressure + 0.1 bar/second
A	Stop command	R	Automatic start deactivated. To Ready for Start status, automatic start (see section 4.4.2)
A	Autostart pressure reached	R	To permissive start status (see section 4.4.4)
A	Power OFF switch	R	Automatic start deactivated. End of operation

Other actions and signals have no effect in this status.

4.4.4 Permissive start status

In this status the CCM checks if the parameters are out of range and checks all sensor inputs for sensor faults.

This status does not require any action from the operator, and is therefore not visible on the screen.

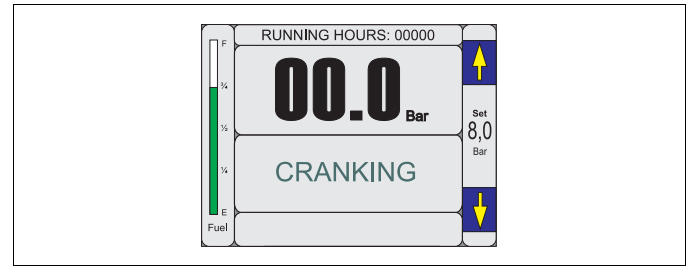
Yet, some buttons and signals do have a function.

S Warnings	R Are shown on the screen
A Shutdowns	R To start failure status (see section 4.4.11)
A Emergency stop button	R To emergency stop status (see section 4.4.13)
A ↓-button, press once	R Set pressure - 0.1 bar
A ↑-button, press once	R Set pressure + 0.1 bar
A ↓-button, press continuously	R Set pressure - 0.1 bar/second
A ↑-button, press continuously	R Set pressure + 0.1 bar/second
A Stop command	R To ready for start status (see section 4.4.2)
A Power OFF switch	R Automatic start deactivated. End of operation

Other actions and signals have no effect in this status.

If all parameters are within the defined limits, cranking will begin, the CCM will go to the Cranking status.

4.4.5 Cranking status



S Warnings	R Are shown on the screen
A Shutdowns	R To start failure status (see section 4.4.11)
A Crank counter = Max. crank attempts	R To start failure status (see section 4.4.11)
A Starter lockout activation RPM reached	R The starter motor output is activated; to Warmup status (see section 4.4.6)
A Emergency stop button	R To emergency stop status
A ↓-button, press once	R Set pressure - 0.1 bar
A ↑-button, press once	R Set pressure + 0.1 bar
A ↓-button, press continuously	R Set pressure - 0.1 bar/second
A ↑-button, press continuously	R Set pressure + 0.1 bar/second
A Power OFF switch	R To stopping status (see section 4.4.10)
A Stop command	R To stopping status (see section 4.4.10)

If cranking:

S Crank time elapsed	S The starter motor output is deactivated for the duration of the crank time (resting). Crank counter +1
----------------------	--

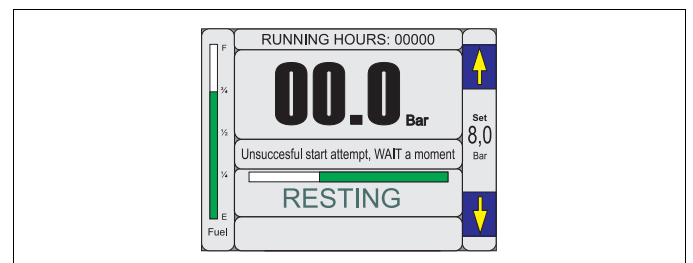
The starter motor output is activated when the CCM enters this status.

The Crank counter is reset to 0.

If resting:

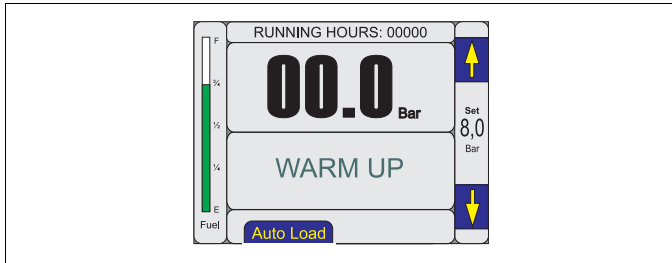
S Crank time elapsed	S The starter motor is reactivated, the screen shows "Crank attempt X", with X being the Crank counter.
----------------------	---

Other actions and signals have no effect in this status.



4.4.6 Warmup status

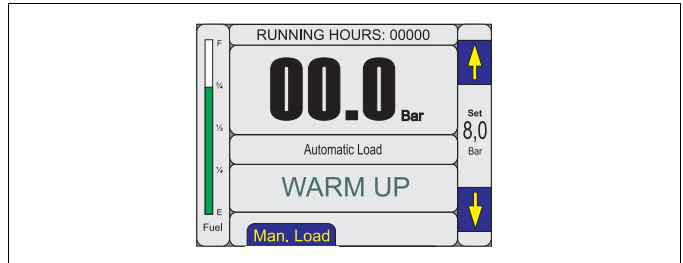
Manual start



S Warnings	R Are shown on the screen
A Shutdowns	R To start failure status (see section 4.4.11)
A Max. warmup time elapsed	R Not Loaded status or Load/Unload status (see section 4.4.7)
A Emergency stop button	R To emergency stop status (see section 4.4.13)
A ↓-button, press once	R Set pressure - 0.1 bar
A ↑-button, press once	R Set pressure + 0.1 bar
A ↓-button, press continuously	R Set pressure - 0.1 bar/second
A ↑-button, press continuously	R Set pressure + 0.1 bar/second
A Stop command	R To stopping status (see section 4.4.10)
A Power OFF switch	R To stopping status (see section 4.4.10)
A Auto load button or Remote Load input if Remote control mode	R After the Warmup status, the CCM will skip the Not Loaded status and go directly to the Load/Unload status (see section 4.4.8) “Automatic load” will appear on the screen
If min. Warmup time is elapsed:	
S Coolant = Warmup temperature	R To Not Loaded status (see section 4.4.7) or Load/Unload status (see section 4.4.8)
If Auto Load button was pressed:	
A Manual load button or Remote Load input if Remote control mode	R Auto Load condition is canceled

Other actions and signals have no effect in this status.

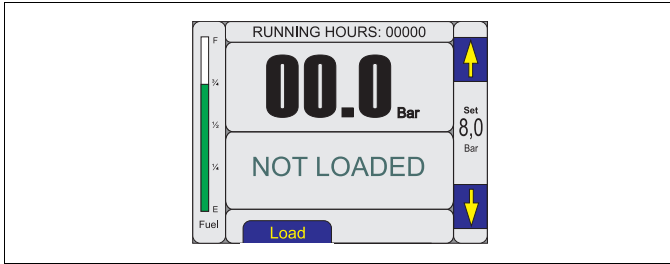
Automatic start



S Warnings	R Are shown on the screen
A Shutdowns	R To shutdown status (see section 4.4.12)
A Max. warmup time elapsed	R To Not Loaded status (see section 4.4.7) or Load/Unload status (see section 4.4.8)
A Emergency stop button	R To emergency stop status (see section 4.4.13)
A ↓-button, press once	R Set pressure - 0.1 bar
A ↑-button, press once	R Set pressure + 0.1 bar
A ↓-button, press continuously	R Set pressure - 0.1 bar/second
A ↑-button, press continuously	R Set pressure + 0.1 bar/second
A Stop command	R To stopping status (see section 4.4.10)
A Power OFF switch	R To stopping status (see section 4.4.10)
A Manual load button or Remote Load input if Remote control mode	R After the Warmup status, the CCM will go to the Not Loaded status (see section 4.4.7) before going to the Load/Unload status (see section 4.4.8) “Automatic load” will disappear from the display
If min. Warmup time is elapsed:	
S Coolant = Warmup temp.	R To Load/Unload status (see section 4.4.8) or Not Loaded status (see section 4.4.7)
If Manual Load button was pressed:	
A Auto load button or Remote Load input if Remote control mode	R Manual Load condition is canceled

Other actions and signals have no effect in this status.

4.4.7 Not Loaded status

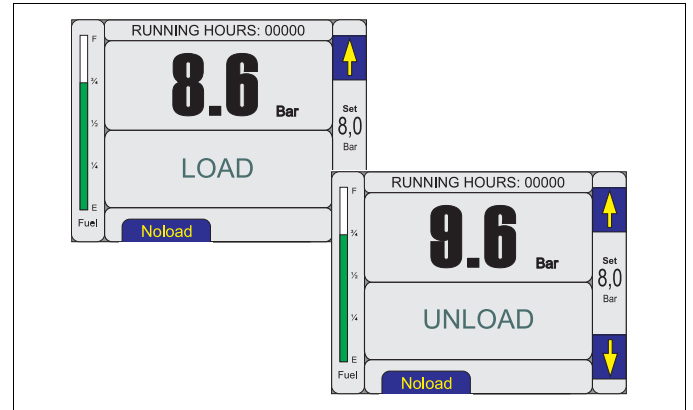


S	Warnings	R	Are shown on the screen
S	Shutdowns	R	To Shutdown status (see section 4.4.12)
A	Emergency stop button	R	To emergency stop status (see section 4.4.13)
A	↓-button, press once	R	Set pressure - 0.1 bar
A	↑-button, press once	R	Set pressure + 0.1 bar
A	↓-button, press continuously	R	Set pressure - 0.1 bar/second
A	↑-button, press continuously	R	Set pressure + 0.1 bar/second
A	Stop command	R	To Stopping status (see section 4.4.10)
A	Power OFF switch	R	To Stopping status (see section 4.4.10)
A	Load command	R	To Load/Unload status (see section 4.4.8)

Other actions and signals have no effect in this status.

4.4.8 Load/Unload status

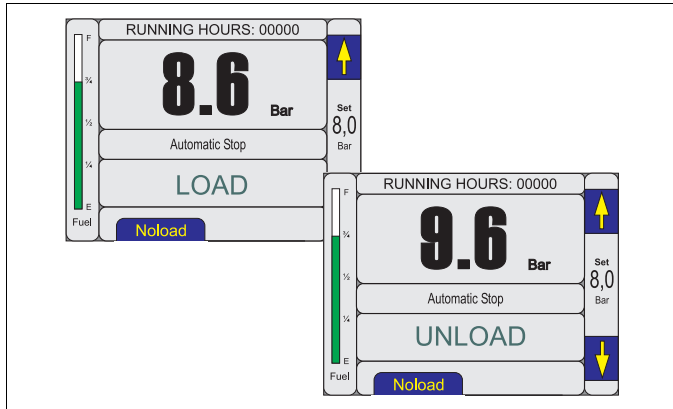
Manual stop



S	Warnings	R	Are shown on the screen
A	Shutdowns	R	To Shutdown status (see section 4.4.12)
A	Emergency stop button	R	To emergency stop status (see section 4.4.13)
A	↓-button, press once	R	Set pressure - 0.1 bar
A	↑-button, press once	R	Set pressure + 0.1 bar
A	↓-button, press continuously	R	Set pressure - 0.1 bar/second
A	↑-button, press continuously	R	Set pressure + 0.1 bar/second
A	Stop command	R	To Cooldown status (see section 4.4.9)
A	Power OFF switch	R	To Cooldown status (see section 4.4.9)
A	Noload command	R	To Not Loaded status (see section 4.4.7)
If Loaded:			
S	Unload pressure reached	R	“Unload” appears on the screen
If Unloaded:			
A	Reload pressure reached	R	“Load” appears on the screen

Other actions and signals have no effect in this status.

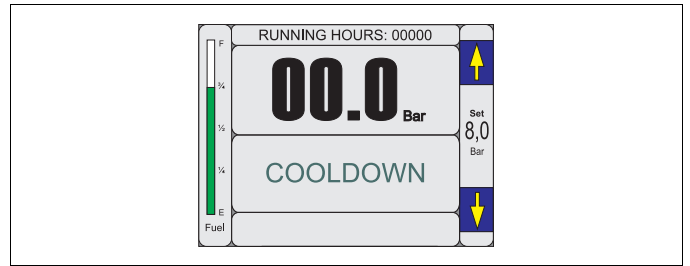
Automatic stop



- | | |
|--------------------------------|--|
| S Warnings | R Are shown on the screen |
| A Shutdowns | R To Shutdown status (see section 4.4.12) |
| A Emergency stop button | R To emergency stop status (see section 4.4.13) |
| A ↓-button, press once | R Set pressure - 0.1 bar |
| A ↑-button, press once | R Set pressure + 0.1 bar |
| A ↓-button, press continuously | R Set pressure - 0.1 bar/second |
| A ↑-button, press continuously | R Set pressure + 0.1 bar/second |
| A Stop command | R To Cooldown status (see section 4.4.9) |
| A Power OFF switch | R To Cooldown status (see section 4.4.9) |
| A Noload command | R To Not Loaded status (see section 4.4.7) |
| If Loaded: | |
| S Unload pressure reached | R “Unload” appears on the screen
Autostop timer activated |
| If Unloaded: | |
| A Reload pressure reached | R “Load” appears on the screen
Autostop timer reset |
| S Autostop time elapsed | R To stopping status (see section 4.4.10) |

Other actions and signals have no effect in this status.

4.4.9 Cooldown status



- | | |
|--------------------------------|---|
| S Warnings | R Are shown on the screen |
| A Shutdowns | R To shutdown status (see section 4.4.12) |
| A Cooldown time elapsed | R Stopping status (see section 4.4.10) |
| A ↓-button, press once | R Set pressure - 0.1 bar |
| A ↑-button, press once | R Set pressure + 0.1 bar |
| A ↓-button, press continuously | R Set pressure - 0.1 bar/second |
| A ↑-button, press continuously | R Set pressure + 0.1 bar/second |
| A Emergency Stop button | R To emergency Stop status (see section 4.4.13) |

Other actions and signals have no effect in this status.

4.4.10 Stopping status

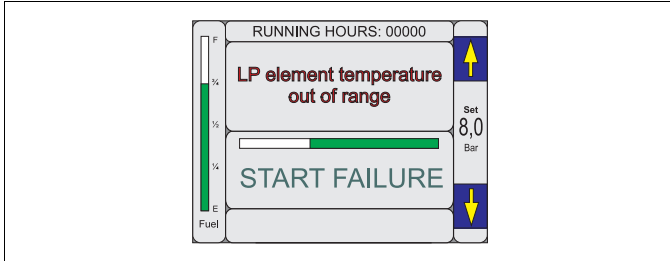


- | | |
|--------------------------------|--|
| S Warnings | R Are shown on the screen |
| A Shutdowns | R To shutdown status (see section 4.4.12) |
| A Stopping procedure has ended | R If manual start:
To Ready for Start status (see section 4.4.2)
If automatic start:
To Standby status (see section 4.4.3)
If Power OFF:
End of operation |
| A Emergency Stop button | R To emergency Stop status (see section 4.4.13) |
| A ↓-button, press once | R Set pressure - 0.1 bar |
| A ↑-button, press once | R Set pressure + 0.1 bar |
| A ↓-button, press continuously | R Set pressure - 0.1 bar/second |
| A ↑-button, press continuously | R Set pressure + 0.1 bar/second |

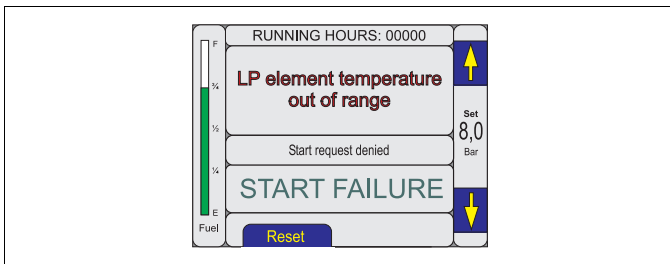
Other actions and signals have no effect in this status.

4.4.11 Start failure status

First a stopping procedure is executed, and the operator has to wait.



Screen A: Start failure, origin in Permissive start status.



Screen B: Start failure, origin in Cranking status.

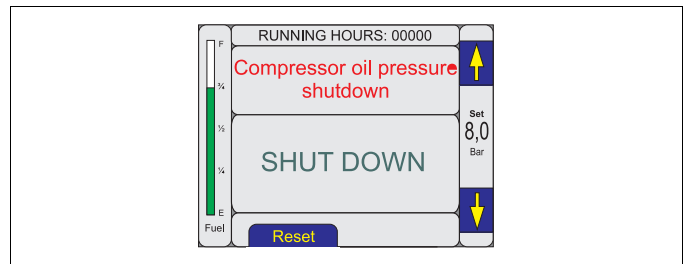
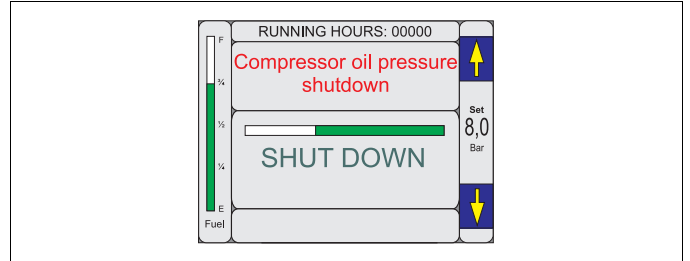


- | | | | |
|---|------------------------------|---|---|
| S | Warnings | R | Are shown on the screen |
| A | Emergency Stop button | R | To emergency Stop status (see section 4.4.13) |
| A | ↓-button, press once | R | Set pressure - 0.1 bar |
| A | ↑-button, press once | R | Set pressure + 0.1 bar |
| A | ↓-button, press continuously | R | Set pressure - 0.1 bar/second |
| A | ↑-button, press continuously | R | Set pressure + 0.1 bar/second |
| A | Power OFF switch | R | End of operation |
| A | Reset button | R | To Ready for Start status (see section 4.4.2) |

Other actions and signals have no effect in this status.

4.4.12 Shutdown status

First a stopping procedure is executed.

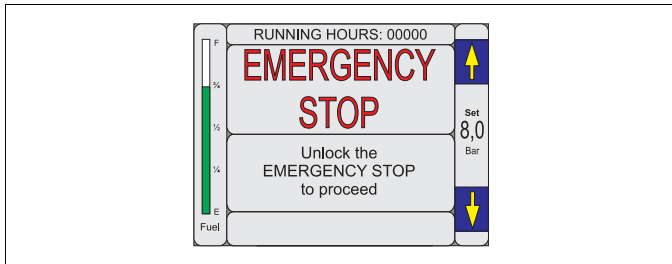


- | | | | |
|---|------------------------------|---|---|
| S | Warnings | R | Are shown on the screen |
| A | Emergency Stop button | R | To emergency Stop status (see section 4.4.13) |
| A | ↓-button, press once | R | Set pressure - 0.1 bar |
| A | ↑-button, press once | R | Set pressure + 0.1 bar |
| A | ↓-button, press continuously | R | Set pressure - 0.1 bar/second |
| A | ↑-button, press continuously | R | Set pressure + 0.1 bar/second |
| A | Power OFF switch | R | End of operation |
| A | Reset button | R | To Ready for Start status (see section 4.4.2) |

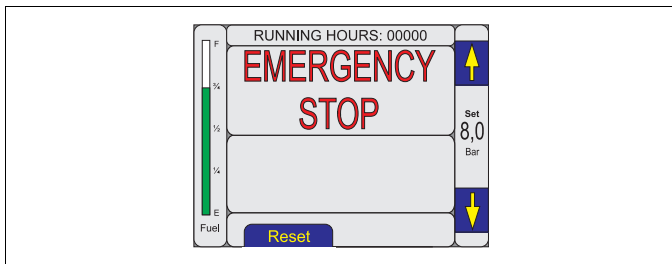
Other actions and signals have no effect in this status.

4.4.13 Emergency stop status

Screen A: Emergency Stop is pressed.



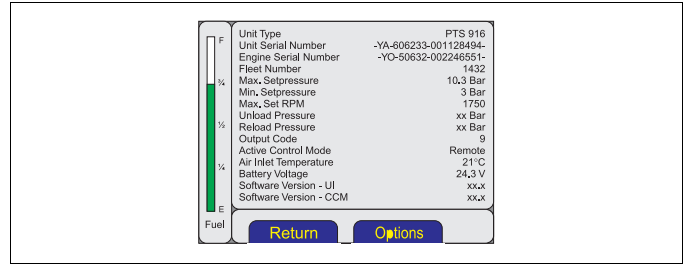
Screen B: Emergency Stop is unlocked.



S	Warnings	R	Are shown on the screen
A	↓-button, press once	R	Set pressure - 0.1 bar
A	↑-button, press once	R	Set pressure + 0.1 bar
A	↓-button, press continuously	R	Set pressure - 0.1 bar/second
A	↑-button, press continuously	R	Set pressure + 0.1 bar/second
A	Power OFF switch	R	End of operation
If Emergency Stop is locked:			
A	Unlock Emergency Stop	R	To screen B
If Emergency Stop is unlocked:			
A	Lock Emergency Stop	R	To screen A
A	Reset button	R	To Ready for Start status (see section 4.4.2)

Other actions and signals have no effect in this status.

4.4.14 System info status



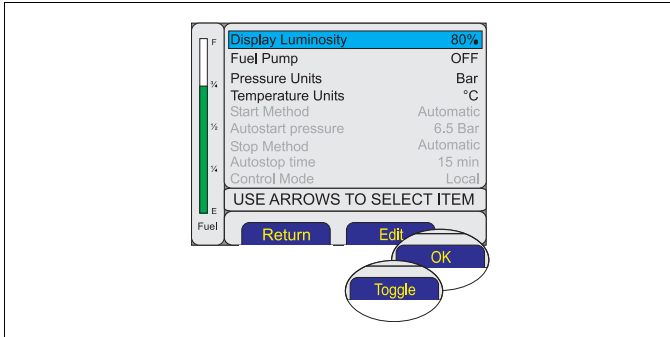
This status gives a summary of the following parameters:

- Unit Type
- Unit Serial Number
- Engine Serial Number
- Fleet Number
- Maximum Setpressure
- Minimum Setpressure
- Maximum Set RPM
- Unload pressure
- Reload pressure
- Output Code: This code is directly proportional to the Maximum set RPM, and gives a rough indication of the maximum Free Air Delivery (FAD) with the current setting.
- Active Control Mode: Local control; Remote control; PC control.
- Air Inlet Temperature
- Battery Voltage
- Software version UI
- Software version CCM

A	↓-button, press once	R	Set pressure - 0.1 bar
A	↑-button, press once	R	Set pressure + 0.1 bar
A	Return button	R	To Ready for Start status (see section 4.4.2)
A	Options button	R	To options status (see section 4.4.15)
A	Emergency stop button	R	To emergency stop status (see section 4.4.13)
A	Power OFF switch	R	End of operation

Other actions and signals have no effect in this status.

4.4.15 Options status



In this status, the operator can change the parameters for which he has clearance.

The Rental companies can deny access to the gray parameters for the operator.

In that case, the parameters are not shown on the screen.

With the arrow buttons, a parameter is selected.

Parameters which toggle between different settings (e.g.: Pressure Units), can be changed by pressing the Toggle button.

Other parameters (e.g.: Display Luminosity) can be changed by pressing the Edit button.

After changing the value with the arrow buttons, the new value needs to be confirmed with the OK button.

- | | | | |
|---|---------------|---|---|
| A | Return button | R | To Ready for Start status (see section 4.4.2) |
|---|---------------|---|---|

The parameters the operator can change are:

- Display Luminosity
- Pressure Units (Metric/Imperial)
- Temperature Units (Metric/Imperial)
- Flow Units (Metric/Imperial)
- Start method (if Autostart = enable or disable)
- Autostart pressure (if Autostart = enable or enable lock)
- Stop method (if Autostop = enable or disable)
- Autostop time (if Autostop = enable or enable lock)
- Control mode (if Remote = enable or disable) (Local/Remote)
- Air discharge temperature control (if Air Discharge Temperature Control Parameter = enable or disable)
- Air discharge temperature setpoint (if Air Discharge Temperature Control Parameter = enable or enable lock)
- Reload/Unload pressure (if enabled)

Other actions and signals have no effect in this status.

4.4.16 Process Info status

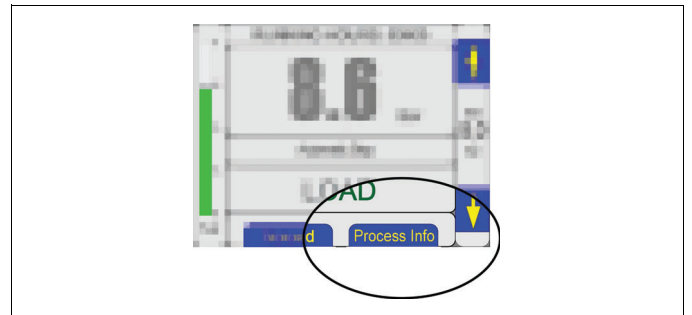
Two key access

Depending on the setting of the Infobutton parameter, the operator has access to the Process Info status by pressing a single named function key, the Process Info button. In that case the Infobutton parameter is enable.

When the Infobutton parameter is disable, the access to the Process Info status is made by a two button function.

While pressing the unnamed function button, which otherwise would be the Process Info button, the other function button has to be pressed.

The Infobutton parameter can be changed with the PC, Rental companies clearance.



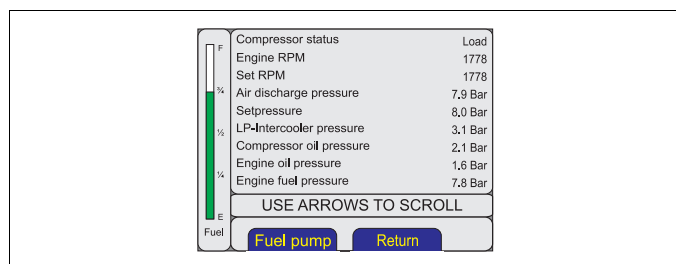
Process Info status function

This status is not an active status, but can be entered from the following statuses:

- Standby status
- Permissive Start status
- Cranking status
- Warmup status
- Noload status
- Load/Unload status
- Cooldown status
- Shutdown status
- Start Failure status
- Emergency Stop status

The Process Info status gives a summary of all parameters measured by the CCM, and those taken from the ECM's dataline.

These parameters are:



- Compressor status
- Engine RPM
- Set RPM
- Air discharge pressure
- Set pressure
- LP intercooler pressure
- MP intercooler pressure
- Compressor oil pressure
- Engine oil pressure
- Engine fuel pressure
- Ambient temperature
- LP element temperature
- MP element temperature
- HP element temperature
- Compressor oil temperature
- Air discharge temperature
- Air discharge temp. Setting
- Air disch. Temp. Valve pos.
- Coolant temperature
- Fuel temperature
- Fuel level
- Engine fuel consumption
- Battery voltage
- Loading valve status
- Engine power contact
- Starter engine status
- Oiler valve status
- Blow-off valve status
- Flap lock solenoid
- Engine load
- Engine boost pressure
- Air inlet temperature

Other actions and signals have no effect in this status.

S	Shutdowns	R	To Shutdown status (see section 4.4.12)
A	Time-out	R	Back to active compressor status
A	Emergency Stop button	R	To Emergency Stop status (see section 4.4.13)
A	↓-button	R	Scroll text down
A	↑-button	R	Scroll text up
A	Return button	R	Back to active compressor status
A	Stop command	R	Same function as in the active compressor status

Other actions and signals have no effect in this status.

4.5 During operation

Regularly carry out following checks:

- Check alarm lamp at the front and alarm lamp and horn at the back of the unit.
When starting up the unit and also when a shutdown occurs, the alarm lamps and the horn will be activated. But when a warning occurs, only the lamps will be activated.
- Check the air filter service indicator.
If the yellow signal shows in the window of the indicator (see section 5.4.3), clean or replace the filter elements.
- Check the air outlet temperature of the MP compressor element.

4.6 Stopping instructions

- Close the air outlet valve(s).
- On the User Interface, push the function button below the indication Noload.
- Push the Stop button.



The pressure is not immediately relieved from the unit, when the Stop button is pushed.

- Once the engine has stopped, switch the control panel power switch to the OFF position.
- Turn OFF the battery switch.

5 Maintenance and service

Maintenance schedule	Daily	every 500 hours	every 1000 hours	every 2000 hours	every 3000 hours	every 4000 hours	every 8000 hours	every 10000 hours
Service pak	-	2912 6046 05	2912 6047 06	2912 6048 07	-	-	-	-
Engine oil level	Check	Check	Check	Check	Check	Check	Check	
Engine oil	Add	Change	Change	Change	Change	Change	Change	
Engine oil filters		Replace	Replace	Replace	Replace	Replace	Replace	
Engine generator drive belt		Check	Check	Check	Check	Check	Check	
Engine fan drive belt		Check	Check	Check	Check	Check	Check	
Engine valve clearance					Inspect / Adjust			
Engine fan drive					Grease			
Engine crankcase breather			Clean					
Electronic unit injector					Inspect / Adjust			
Engine timing sensors					Check / Clean / Calibrate			
Fan drive					Grease			
Compressor oil level	Check	Check	Check	Check	Check	Check		
Compressor oil						Change		
Compressor oil filter				Replace				
Service filter water separator		Clean	Clean	Clean	Clean	Clean	Clean	
Air filter vacuum indicator								
Vacuator valve (dust ejector)	Empty	Empty	Empty	Empty	Empty	Empty	Empty	
Air filter elements (1)		Clean	Replace	Replace	Replace	Replace	Replace	
Air filter safety cartridge			Replace	Replace	Replace	Replace		
Gear casing breather pot			Clean					
Silencers glasswool and insert						Replace every 2 years		
Primary fuel filters (water separators)	Drain	Replace	Replace	Replace	Replace	Replace	Replace	
Secondary fuel filters		Replace	Replace	Replace	Replace	Replace		
Water and sediment in fuel tanks		Drain	Drain	Drain	Drain	Drain		
Coolant levels (radiator)	Check	Check	Check	Check	Check	Check		
Coolant condition			Check					Replace
Cooler system water temperature regulator					Replace			
Spark arrestors			Inspect	Inspect	Inspect	Inspect		
Electrolyte and terminals on batteries		Check	Check	Check	Check	Check		
Safety / relief valves			Test	Test	Test	Test		
Roller diaphragm of unloader cylinder							Replace	
Parts of unloader cylinder							Replace	
Diaphragm of the balancing pistons							Replace	
Check valve in compressed-air system							Replace	
Tension and condition of poly V-belts		Check	Check	Check	Check	Check		
Routing and condition of flexible hoses	Check	Check	Check	Check	Check			
Air, oil, water and fuel system								
Turntable		Grease	Grease	Grease	Grease	Grease		

Notes:

The initial service pak, which has been supplied with the unit, should be performed after the first 50 hours.

(1) More frequently when operating in a dusty environment.



Keep the bolts of the housing, the lifting eye, the towbar and the axle securely tightened. Refer to “Technical specifications” on page 55 and to “Torque values” on page 55.

5.1 Preventive maintenance schedule

The schedule contains a summary of the maintenance instructions. Read the respective section before taking maintenance measures.

When servicing, replace all disengaged packings, e.g. gaskets, O-rings, washers.

For engine maintenance refer to Engine Operation Manual.

The maintenance schedule has to be seen as a guideline for units operating in a dusty environment typical to compressor applications. The maintenance schedule can be adapted depending on application, environment and quality of maintenance.

5.2 Service paks and kits

5.2.1 Service paks

Service paks include all genuine parts needed for normal maintenance of both compressor and engine.

Service paks minimise downtime and keep your maintenance budget low.

Order service paks at your local Atlas Copco dealer.


5.2.2 Service kits

A service kit is a collection of parts to fit a specific repair or rebuilding task.

It guarantees that all necessary parts are replaced at the same time which improves the uptime of the unit.

Atlas Copco service kits offer you all the benefits of genuine Atlas Copco parts, save on administration costs and are offered at a reduced price compared to the loose components.

The order numbers of the service paks and kits are listed in the Atlas Copco Parts List (ASL).

 **Contact Atlas Copco.**

5.3 Oil engine/compressor



It is strongly recommended to use Atlas Copco branded lubrication oils for both compressor and engine.

High-quality, mineral, hydraulic or synthesized hydrocarbon oil with rust and oxidation inhibitors, anti-foam and anti-wear properties is recommended.

The viscosity grade should correspond to the ambient temperature and ISO 3448, as follows.

Ambient temperature range	Type of lubricant engine
between -25°C (-13°F) and -10°C (14°F)	-
between -10°C (14°F) and 30°C (86°F)	PAROIL 15W40
between 30°C (86°F) and 50°C (122°F)	PAROIL 15W40



Never mix synthetic with mineral oil.



If you want to use another brand of oil, consult Atlas Copco for more information concerning the recommended oil and service intervals.

5.3.1 Oil specifications

PAROIL from Atlas Copco is the ONLY oil tested and approved for use in all engines built into Atlas Copco compressors and generators.

Extensive laboratory and field endurance tests on Atlas Copco equipment have proven PAROIL to match all lubrication demands in varied conditions. It meets stringent quality control specifications to ensure your equipment will run smoothly and reliably.

The quality lubricant additives in PAROIL allow for extended oil change intervals without any loss in performance or longevity.

PAROIL provides wear protection under extreme conditions. Powerful oxidation resistance, high chemical stability and rust-inhibiting additives help reduce corrosion, even within engines left idle for extended periods.

PAROIL contains high quality anti-oxidants to control deposits, sludge and contaminants that tend to build up under very high temperatures.

PAROIL's detergent additives keep sludge forming particles in a fine suspension instead of allowing them to clog your filter and accumulate in the valve/rocker cover area.

PAROIL releases excess heat efficiently, whilst maintaining excellent bore-polish protection to limit oil consumption.

PAROIL has an excellent Total Base Number (TBN) retention and more alkalinity to control acid formation.

PAROIL prevents Soot build-up.

PAROIL is optimized for the latest low emission EURO -3 & -2, EPA TIER II & III engines running on low sulphur diesel for lower oil and fuel consumption.

Multigrade PAROIL 15W40

PAROIL 15W40 is a mineral based high performance diesel engine oil with a high viscosity- index. Atlas Copco PAROIL 15W40 is designed to provide a high level of performance and protection in standard ambient conditions as from -15°C (5°F).

	Liter	US gal	Imp gal	cu.ft	Order number
can	5	1.3	1.1	0.175	1615 5953 00
can	20	5.3	4.4	0.7	1615 5954 00
barrel	210	55.2	46	7.35	1615 5955 00

5.3.2 Engine oil level

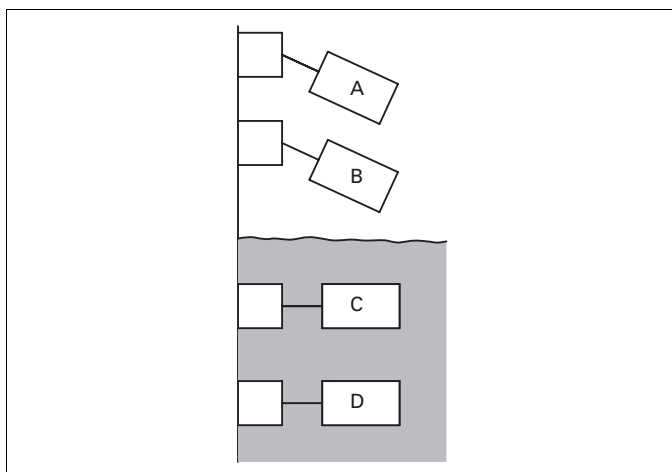
Check the engine oil level via the dipstick on the engine and via the transparent tube on the engine oil tank.

Add correct oil (see section 5.3.1), if necessary.

The unit has been equipped with an automatic oil level control.

The oil level maintainer valve controls the oil level in the oil sump of the engine. This valve is seated underneath the oil tank in the back of the unit.

A small oil tank with three level switches is mounted on the engine and is functioning as a communicating vessel with the oil sump of the engine. These level switches (overfill - full - warning - shutdown) are connected to the CCM and control the oil level maintainer valve.



- A Oil level switch 'overfill'
- B Oil level switch 'full'
- C Oil level switch 'warning'
- D Oil level switch 'shutdown'

When the engine is running, the oil level diminishes. When the oil reaches the warning level, the CCM generates an Engine Oil Level warning. This warning is not immediately displayed on the screen of the User Interface, but is held back for the duration of the Engine Oil Level Warning Time.

When the warning is generated, the oil level maintainer valve is opened. Oil flows from the oil tank into the oil sump of the engine and into the small oil tank. The warning condition will disappear. The oil level rises until the oil reaches the full level. Then the oil level maintainer valve is closed.

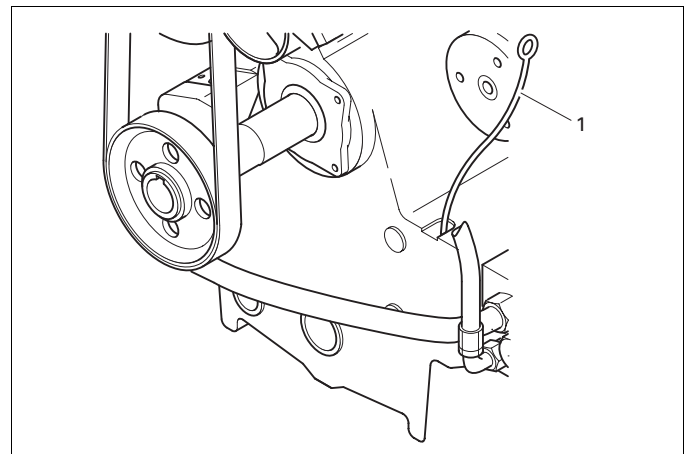
When the warning does not disappear, because the oil tank is empty, the warning will be displayed on the screen of the User Interface.

When the oil reaches the shutdown level, the CCM generates an Engine Oil Level shutdown and the unit will deactivate.

When the oil level maintainer valve would not close after the oil level has reached the full level, the oil will start to overfill the engine.

When the oil reaches the overfill shutdown level, the CCM generates an Engine Oil Level shutdown and the unit will deactivate.

5.3.3 Compressor oil level



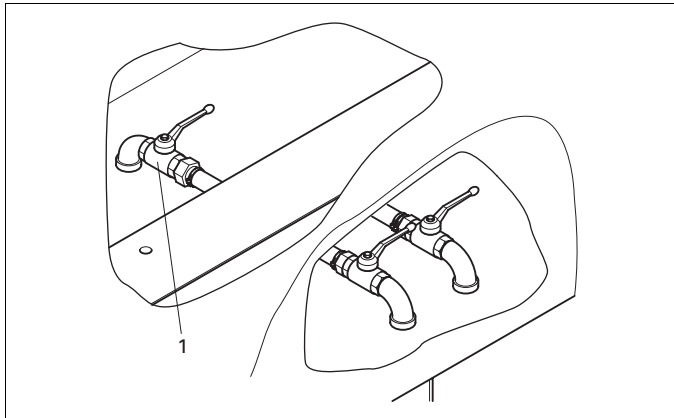
Close the outlet valve(s) and stop the unit. Before checking the compressor oil level, wait approx. 10 minutes to allow oil to return to the oil sump.

Check the oil level with the dipstick.

Add correct oil (see section 5.3.1), if necessary.

5.3.4 Engine oil and oil filter change

DRAIN
engine oil (red)

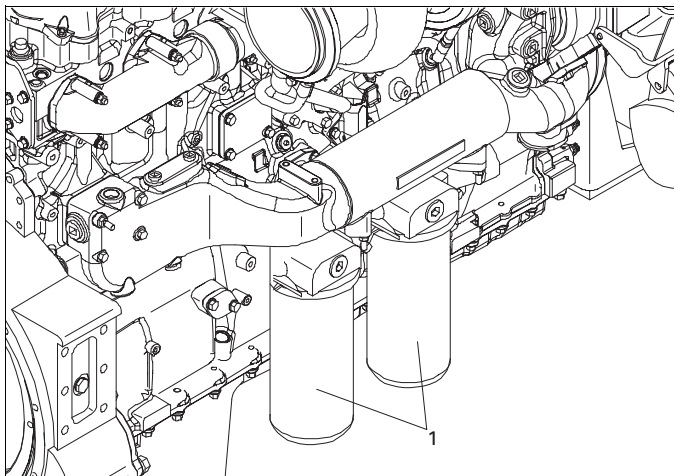


DRAIN compressor oil (red) DRAIN coolant radiator (blue)

Consult, besides the maintenance schedule, the Engine Operation Manual as well for oil and oil filter change intervals.

To drain oil from system, open the oil filler cap, remove the drain plug, located at the right-hand side under the unit and open the drain cock (1).

Use a proper drain pan.



The engine oil filters (1) are located at the unit's left-hand side.

Put a proper drain pan under the engine oil filters and replace the oil filters.

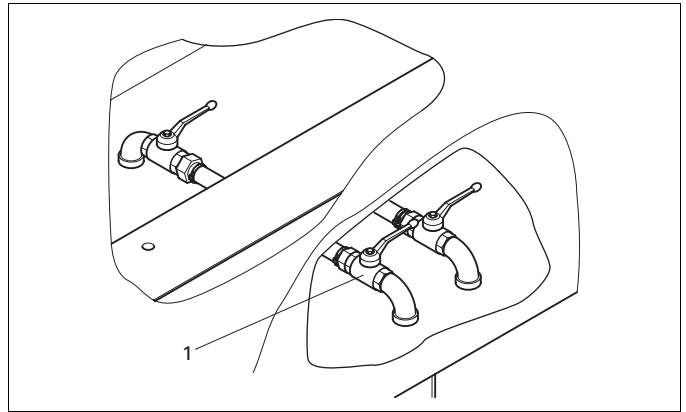
Close the drain cock and tighten all drain plugs before filling the system with fresh oil.

Reinstall the oil filler cap.

Check on leakages.

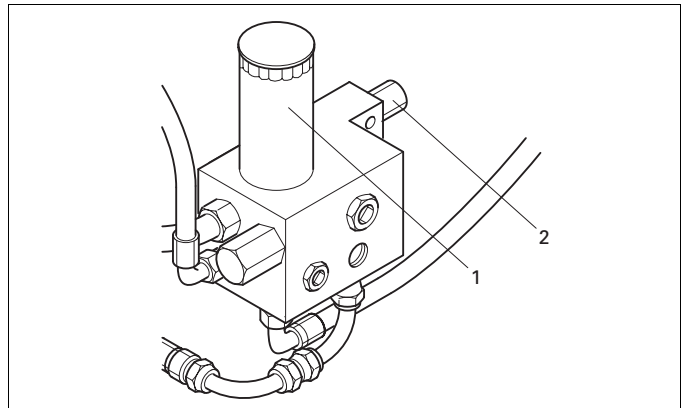
5.3.5 Compressor oil and oil filter change

DRAIN
engine oil (red)



DRAIN compressor oil (red) DRAIN coolant radiator (blue)

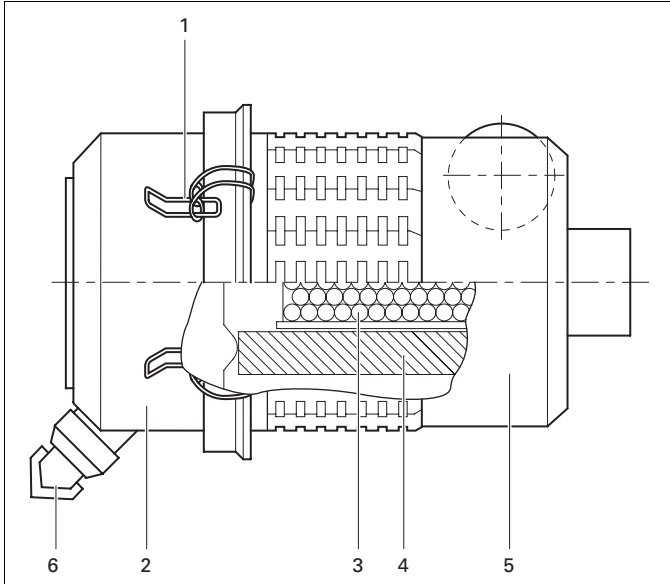
- Run the compressor until warm. Close the outlet valve(s) and stop the compressor.
- Drain the oil by removing the drain plug and opening the drain cock (1). The drain plug is located at the left-hand side under the unit. Catch the oil in a drain pan. Screw out the filler plug to speed up draining. Close the drain cock and tighten the plugs after draining.



- Loosen the bypass plug (2) (bypass to the oil sump) to allow the oil in the oil filter (1) to be drained.
- Remove the oil filter, e.g. by means of the handle of a spanner in the slot at the top.
- Clean the filter seat on the manifold, see to it that no dirt drops into the system. Oil the gasket of the new filter element. Screw the element into place until the gasket contacts its seat, then tighten one half turn only.
- Run the unit at Not Loaded for a few minutes to circulate the oil. Stop and depressurize the unit. Screw out the filler plug, add oil, if necessary, until the oil level registers between markings A and B (see section 5.3.3). Reinstall and tighten the filler plug. Never add more oil. Overfilling results in oil consumption.

5.4 Air filters engine/Compressor

5.4.1 Main parts



- 1 | Snap clips (4x)
- 2 | Dust trap cover
- 3 | Safety cartridge
- 4 | Filter element
- 5 | Filter housing
- 6 | Vacuator valve (dust ejector)



The Atlas Copco air filters are specially designed for the application. The use of non-genuine air filters may lead to severe damage of engine and/or compressor elements.

5.4.2 Cleaning the dust trap

To remove dust from the dust trap pinch the vacuator valve (6) several times.

5.4.3 Replacing the air filter element and the safety cartridge

The instructions that apply to one air filter should be repeated for both air filters engine and air filters compressor.

- Release the snap clips (1) and remove the dust trap cover (2). Clean the inside of the cover.
- Withdraw the filter element (4) and safety cartridge (3) from the housing (5).

Discard the filter element when damaged.

A dirty safety cartridge is an indication of a malfunctioning filter element.

Replace the filter element and the safety cartridge at the same time.

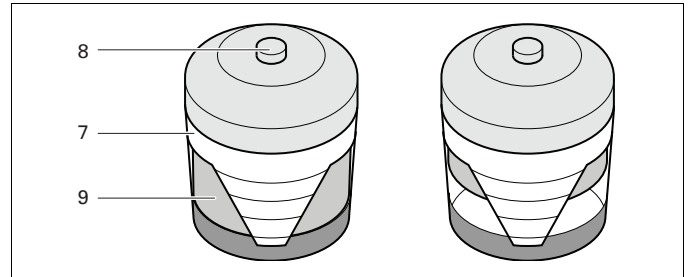


New elements should be inspected for tears and punctures before installation.



The safety cartridge cannot be cleaned.

- Reassemble in reverse order of dismantling.
- Inspect and tighten all air intake connections.
- Reset the air filter vacuum indicator by pushing the reset button (8).



- 7 | Air filter contamination indicator
- 8 | Reset button
- 9 | Yellow indicator

5.4.4 Cleaning the filter element

- Withdraw the filter element (see section 5.4.3). Reinstall the dust trap cover to protect the air intake system while cleaning the element.

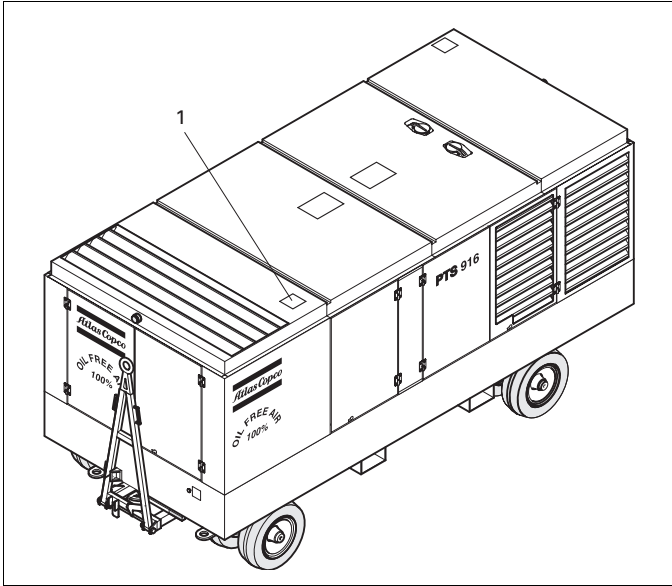


Never run the compressor without air filter element.

- Carefully knock the end faces of the filter element on a flat surface to remove the dry contaminant. Never strike on a hard surface. Then blow dry air up and down the pleats in the reverse direction of normal flow; subsequently blow up and down the pleats on both sides of the element. The air pressure may not exceed 5 bar (73 psi) and a reasonable distance must be maintained between the hose nozzle and the pleats.
- If the contaminant is oily, soak the element for 10 minutes in luke-warm water in which a non-foaming detergent is dissolved. Then, move the element to and fro in the solution for 5 minutes.
- Rinse with soft water until the drain water is clear. Let the element dry. Never use compressed air to hasten drying.
- Inspect the element by placing a light inside it. Spots or ruptures of the paper render the element unfit for further use.
- Reassemble in reverse order of dismantling.
- Reset the air filter service indicator by pushing the reset button (8).

5.5 Coolant level

5.5.1 Coolant level check



Check the levels of the coolant in the radiator cooler. The levels show in transparent tubes fitted at the radiator top tank. The levels should normally be at the bottom of the filler pipes as they go into the tanks.

Add coolant, if necessary. The location of the radiator filler cap (1) is shown in figure above.

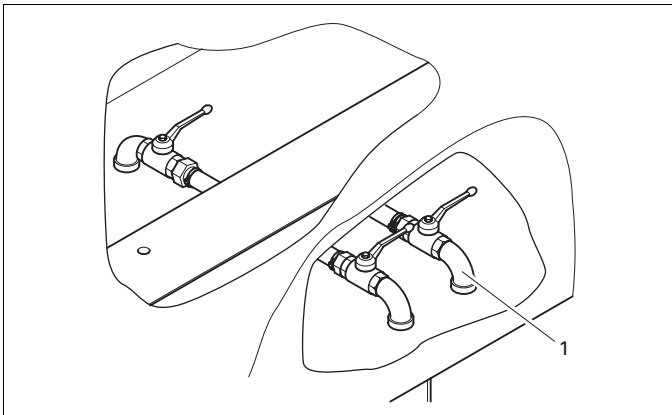
Consult the Engine Operation Manual for the coolant solutions to be used.

5.5.2 Test coolant inhibitor level

Use a refractometer and a pH-meter to test the ethylene glycol (EG) coolant water. Freeze/boilover protection is determined by glycol concentration.

5.5.3 Coolant change

DRAIN
engine oil (red)



DRAIN
compressor oil (red)

DRAIN
coolant radiator (blue)

Consult the Engine Operation Manual and section 5.5.2 for coolant specifications.

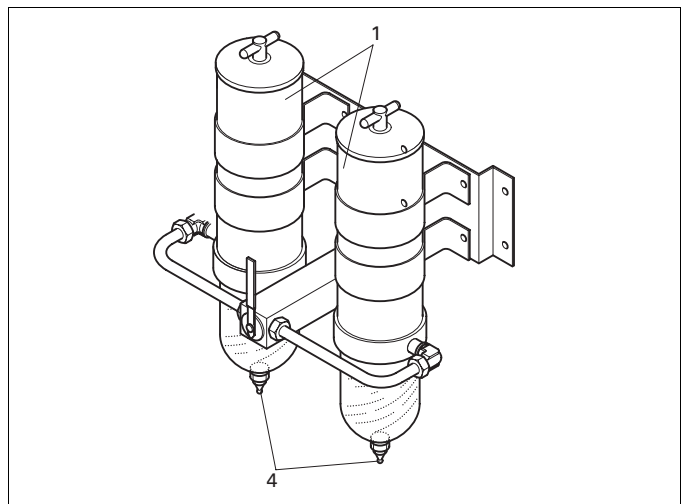
To drain coolant from system, remove drain plugs. Drain plugs are located at the right- and left-hand side under the unit and open the drain cocks (1).

Use a proper drain pan.

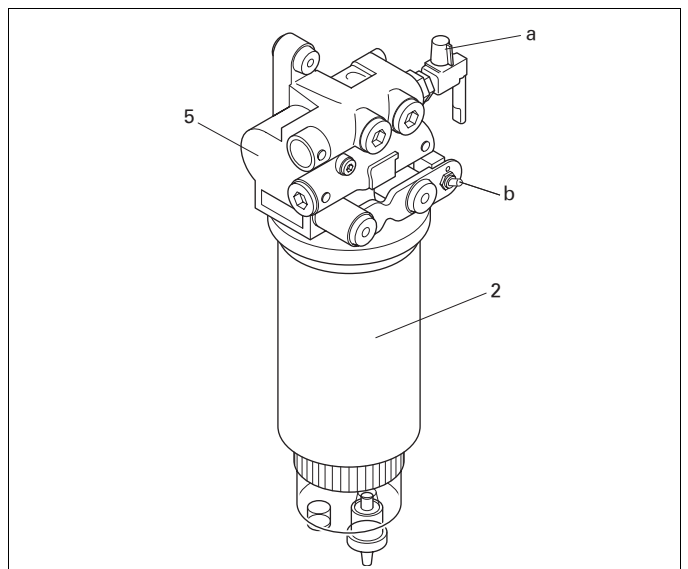
Before filling the system, close the drain cocks and tighten all plugs.

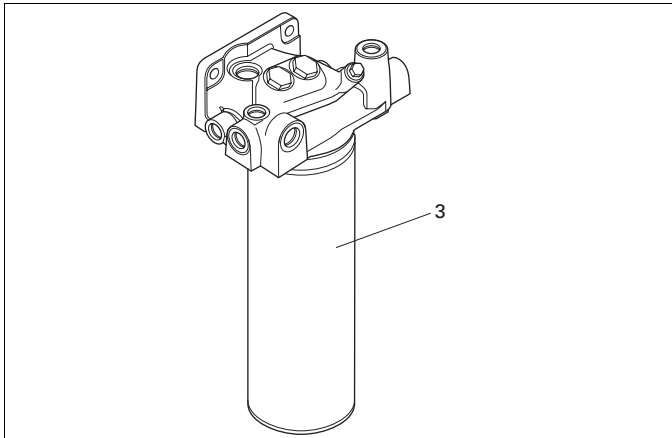
5.6 Fuel

5.6.1 Fuel filters



The fuel system comprises two primary fuel filter / water separators (1), one primary engine fuel filter / water separator (2), one secondary engine fuel filter (3) and one electrical fuel priming pump (5).






Consult the preventive maintenance schedule (section 5.1) for replacing intervals.

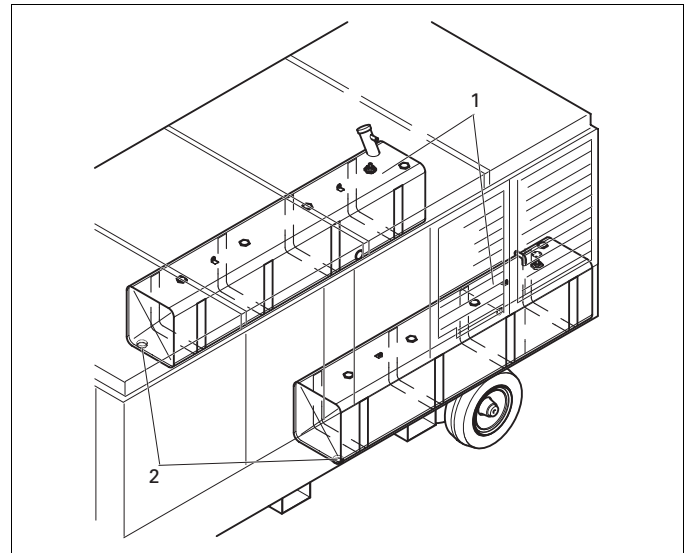
Drain condensate from the primary fuel filters (water separators) regularly by loosening the drain plugs (4). Catch the condensate in a drain pan. Tighten the plugs after draining.

5.6.2 C18 electrical fuel priming pump instruction

- Switch unit ON
- Place the end of the transparent fuel hose in a suitable container to catch fuel when priming
- Turn yellow valve (a) on priming pump to the open position
- Activate the priming pump by switching (b) to the ON position
- Switch off (b) when fuel appears in the transparent hose
- Close valve (a) and drain fluid left in transparent hose
- Start the engine and initiate a test run

 **If pump does not start when switch (b) is activated, check fuse in CCM fuse box**

5.6.3 Cleaning fuel tanks



To drain sediment and water from the fuel tanks (1), remove the drain plug (2) of both fuel tanks and frame.

For a better drainage slightly slope the unit.

Use water to clean the inside of the fuel tanks, use a high-pressure purifier if necessary. Spurt the sediment and water to the drain side of the tank.



After cleaning or heavy rains, drain the spillage-free frame.

5.7 Cleaning coolers

Keep all coolers clean to maintain the cooling efficiency.

The fan side surface of the radiator, intercooler, aftercooler 1 and oil cooler is accessible by opening the service doors.

The CAC/fuel cooler and aftercooler 2 are located at the rear end of the unit, under the air filters.

Remove any dirt from the coolers with a fibre brush. Never use a wire brush or metal objects. Then clean by air jet in reverse direction of normal flow.

If the dirt is oily, wash the coolers with fuel or a cleansing agent.



Protect the electrical and controlling equipment, air filters, etc. against penetration of moisture.

A spray gun should preferably be used to apply the solvent to the cooler block. Rinse the block by means of a water jet after a soaking-in period. Steam-cleaning may also be applied.

Close the service doors.

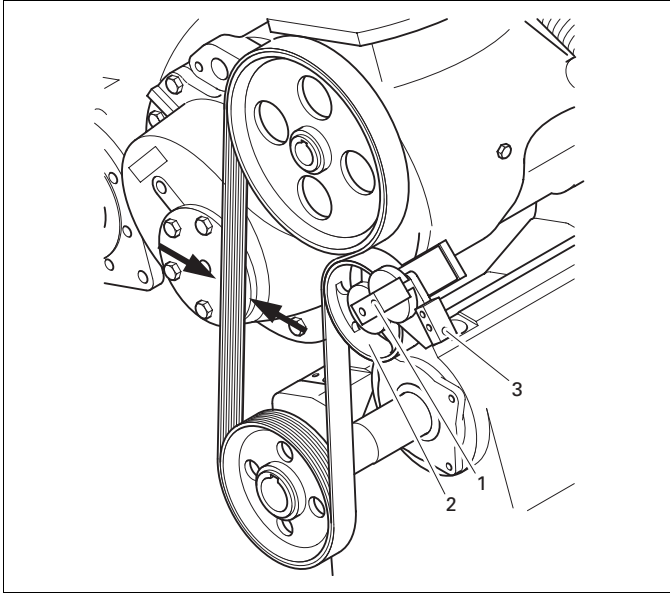
Do not leave liquids behind.

5.8 Poly V-belt tension adjustment

5.8.1 Poly V-belt cooler fan

To check the poly V-belt tension, measure the belt frequency. Use tensioning tool 2913 0022 00. The arrows show where the frequency should be measured.

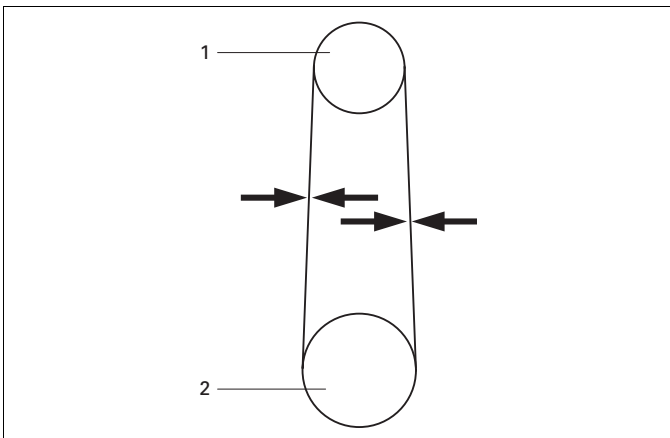
The correct belt frequency is 50 Hz \pm 2.5 Hz.



Correct the V-belt tension by loosening the fixing screw (1) of V-belt tensioner (2). Loosen the lock nut on the adjusting screw (3). Turn the adjusting screw clockwise to increase V-belt tension or counter-clockwise to decrease V-belt tension.

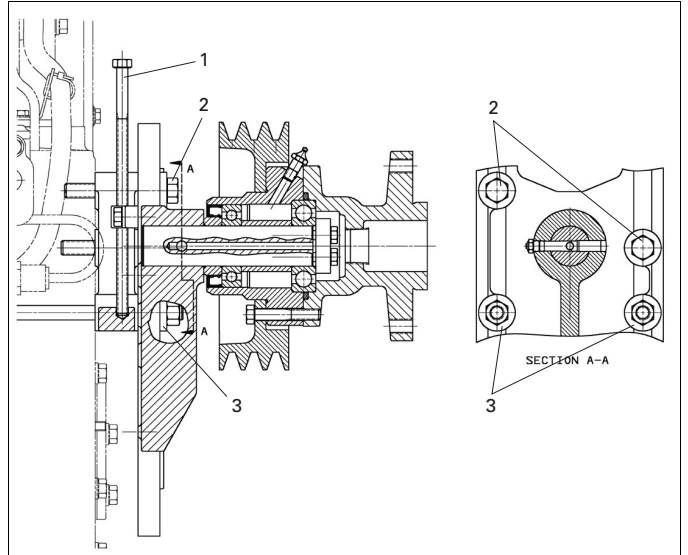
After adjusting the V-belt tension, retighten the adjusting screw lock nut and the fixing screw.

5.8.2 V-belts engine fan



To check the V-belt tension, measure the belt frequency. Use tensioning tool 2913 0022 00.

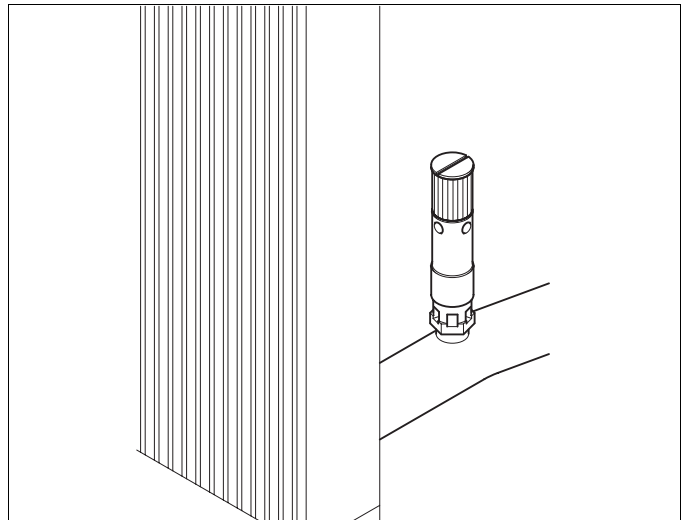
Measure the belt frequency midway between the two pulleys (1) and (2), shown with the arrows.



Correct the V-belt tension by loosening the four fixing bolts (2, 3) on both sides of bearing housing. Turn the adjusting screw (1) clockwise to increase V-belt tension or counter-clockwise to decrease V-belt tension.

When the V-belt tension is within limit, retighten the fixing screws.

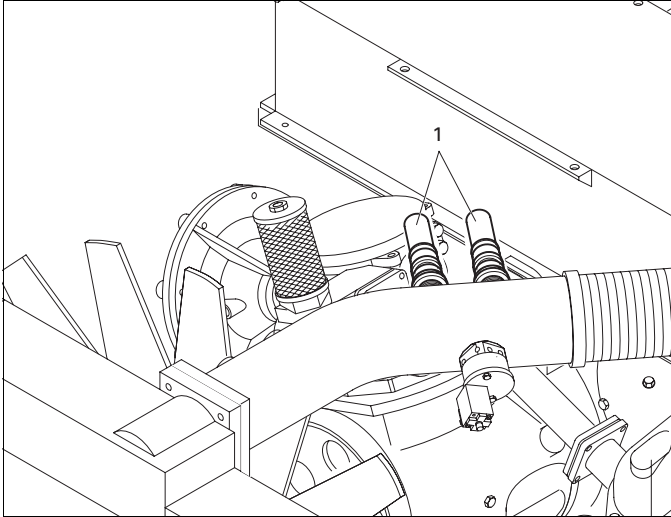
5.9 MP safety valve



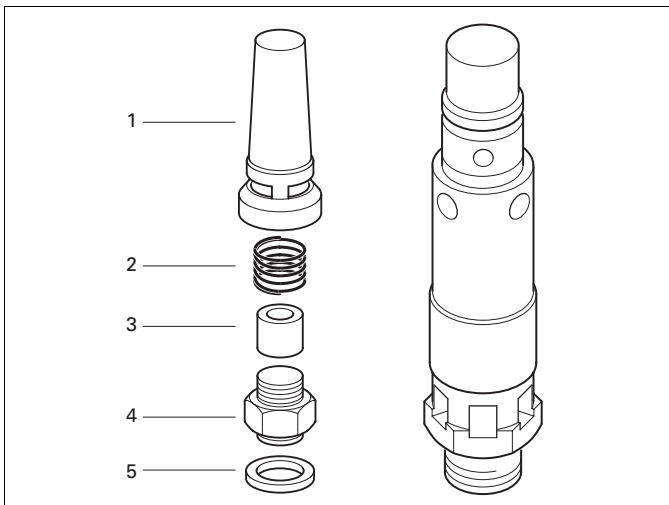
All adjustments and repairs and following checks must be done by an authorized representative of the valve supplier.

- A check of the opening of the lifting gear, once a year.
- A check of the set pressure once a year according to the local regulations. This check cannot be done on the unit and must be carried out on a proper test bench.

5.10 Intercooler relief valves



Test the two intercooler relief valves (1), which are fitted on the MP air inlet pipe, statically on a compressed air line at least once a year.



- | | |
|---|----------------|
| 1 | Valve housing |
| 2 | Spring |
| 3 | Valve |
| 4 | Valve seat |
| 5 | Washer, copper |

The valves should open at a pressure as specified in the chapter Technical specifications.

If the valves open too soon: remove a washer, if installed, between valve seat (4) and housing (1) or add a washer between spring (2) and housing.

If the valves open too late: remove a washer, if installed, between spring and housing or add a washer between valve seat and housing.

5.11 Shutdowns

The unit comprises several shutdown sensors:

- Engine shutdowns (by ECM):
 - Engine Coolant Level Sensor Failure
 - Engine Coolant Temp. Sensor Failure
 - Engine Oil Temperature Sensor Failure
 - Engine Fuel Temperature Sensor Failure
 - Engine Air Inlet Temp. Sensor Failure
 - Engine Turbo Boost Press. Sensor Failure
 - Engine Oil Pressure Sensor Failure
 - Engine Fuel Pressure Sensor Failure
 - Engine Coolant Level Low
 - Engine Coolant Temperature Too High
 - Engine Air Inlet Temperature High
 - Engine Oil Pressure Too Low
 - Turbo Boost Pressure High
 - Engine Fuel Pressure Too Low
 - Engine Injector X Failure
 - Fuel Temperature Too High
 - Engine RPM Sensor Failure
- Fuel level shutdown
- Engine oil level shutdown (switch)
- Engine oil level overfill shutdown (switch)
- LP element temperature shutdown
- MP element temperature shutdown
- Compressor oil pressure shutdown
- Apparatus shutdown:
 - Air discharge pressure sensor
 - LP element temperature sensor
 - MP element temperature sensor
 - Loaded solenoid valve output
 - ECM communication link
 - CAN communication link

5.12 Battery care

 **Before handling batteries, read the relevant safety precautions and act accordingly.**

If the battery is still dry, it must be activated as described in section 5.12.2.

The battery must be in operation within 2 months from being activated; if not, it needs to be recharged first.

5.12.1 Electrolyte

 **Read the safety instructions carefully.**

Electrolyte in batteries is a sulphuric acid solution in distilled water.


The solution must be made up before being introduced into the battery.

5.12.2 Activating a dry-charged battery

- Take out the battery.
- Battery and electrolyte must be at equal temperature above 10°C.
- Remove cover and/or plug from each cell.
- Fill each cell with electrolyte until the level reaches 10 to 15 mm above the plates, or reaches the level marked on the battery.
- Rock the battery a few times so that possible air bubbles can escape; wait 10 minutes and check the level in each cell once more; if required, add electrolyte.
- Refit plugs and/or cover.
- Place the battery in the compressor.

5.12.3 Recharging a battery

Before and after charging a battery, always check the electrolyte level in each cell; if required, top up with distilled water only. When charging batteries, each cell must be open, i.e. plugs and/or cover removed.

 **Use a commercial automatic battery charger according to its manufacturer's instructions.**

Apply with preference the slow charging method and adjust the charge current according to the following rule of thumb: battery capacity in Ah divided by 20 gives safe charging current in Amp.

To keep a battery charged, use the unit's battery charger.

Do not use this battery charger to charge an empty battery.

5.12.4 Maintaining the battery voltage


To maintain the battery voltage, use the unit's automatic battery charger.

- Battery charger EEC/AUS: 240 VAC / 24 VDC - 100 VA
- Battery charger USA: 120 VAC / 24 VDC - 100 VA

When power is supplied to the charger, the battery voltage will be kept within preset limits.

Three LEDs on top of the battery charger show the charging condition:

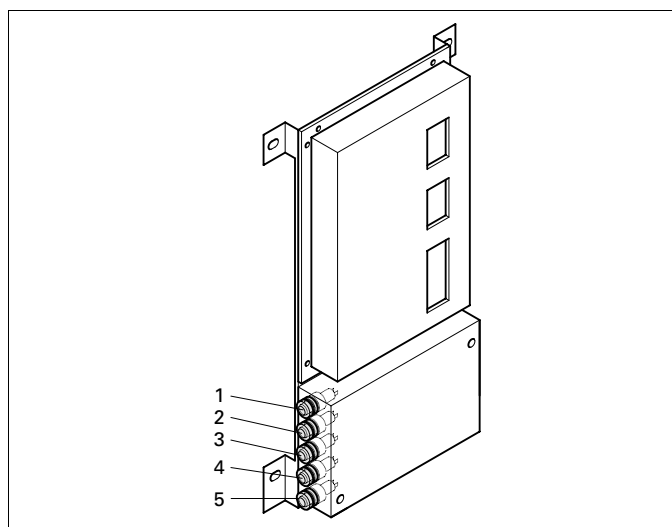
- Green: AC supply voltage present
- Yellow: Battery voltage high
- Red: DC voltage present / unit charging

 **Do not use the unit's automatic battery charger to charge an empty battery. In this case use a commercial automatic battery charger (see section 5.12.3).**

5.12.5 Battery maintenance

- Keep the battery clean and dry.
- Keep the electrolyte level at 10 to 15 mm above the plates or at the indicated level; top up with distilled water only.
- Keep the terminals and clamps tight, clean, and lightly covered with petroleum jelly.

5.13 Fuses



The Compressor Control Module (CCM) is equipped with the following five fuses:

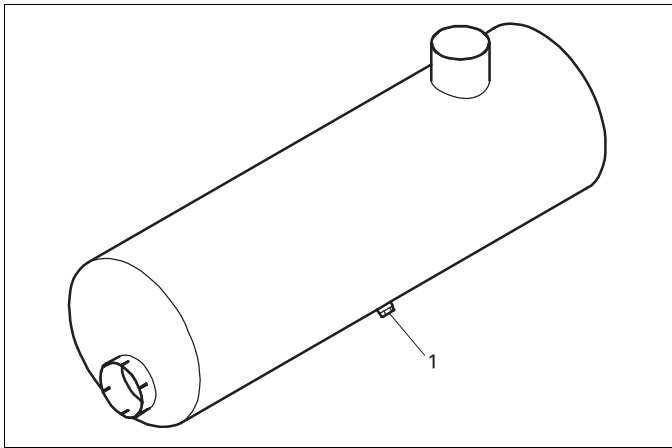
- | | |
|---|-------------------------------------|
| 1 | Fuse electrical priming pump: 10 A |
| 2 | Fuse ECM: 20 A |
| 3 | Fuse CCM: 20 A |
| 4 | Fuse UI: 10 A |
| 5 | Fuse roof + overspeed shutdown: 3 A |

5.14 Caterpillar air shut-off valve

The air shut-off valve, mounted on the engine, is part of the refinery equipment. This valve prevents combustion air to enter the engine. When an overspeed is detected, the engine will shutdown (emergency stop) and the air shut-off valve will close.

To reset the air shut-off valve, pull the handle of the valve up until a click is heard.

5.15 Integrated spark arrestors



Stop the unit and allow the exhaust system to cool. Remove the plug (1) of the spark arrester. Start up the unit to blow out collected particles. Stop the unit and reinstall the plug.

5.16 Water separator

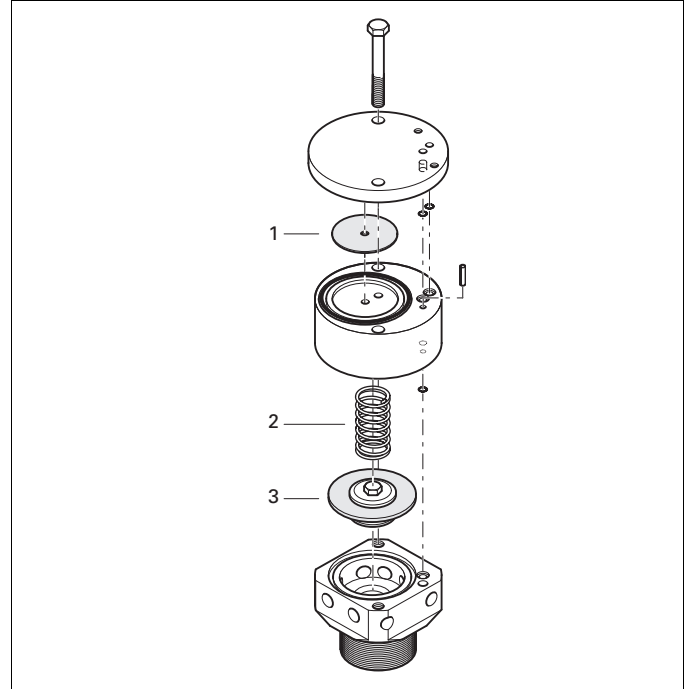
The water separator in the back of the unit filters water condensate out of the compressed air, before the air is discharged through the outlet valves.

Water condensate from the water separator is drained through a nipple in the bottom of the frame. Connect a drain hose to the nipple and make sure that the condensate is properly disposed of.

Service the filter of the water separator every 500 hours.

5.17 Electric blow-off valve

The blow-off valve, fitted on the MP air inlet pipe, is opened to release air when the air inlet throttle valve is closed; it closes when the throttle valve is opened.



Replace the membrane (1), the diaphragm valve assembly (3), the spring (2) and the o-rings every 2000 hours.

5.18 Storage

Run the compressor regularly, e.g. twice a week, until warm.

Load and unload the compressor a few times to operate the unloading and regulating components. Close the air outlet valves after stopping.



If the unit is going to be stored without running from time to time, protective measures must be taken.

5.19 Compressor element overhaul

When a compressor element is due for overhaul, it is recommended to have it done by Atlas Copco. This guarantees the use of genuine parts and correct tools with care and precision.

5.20 Liability

The manufacturer does not accept any liability for any damage arising from the use of non-genuine parts and for modifications, additions or conversions made without the manufacturer's approval in writing.

6 Problem solving

6.1 Problem solving chart

The chart helps to solve mechanical and electrical problems.

It is assumed that the engine is in good condition and that there is adequate fuel flow to the filter and injection equipment.



An electrical fault must be traced by an electrician.

Make sure that the wires are not damaged and that they are clamped tight to their terminals.

6.2 Battery and alternator precautions

- Never reverse the polarity of the battery or the alternator.
- Never break any alternator or battery connections while the engine is running.
- When recharging the battery, disconnect it from the alternator. Before using booster cables to start the engine, be sure of the polarity and connect the batteries correctly.
- Never operate the engine without the main or voltage sensing cables connected in the circuit.

6.3 Trouble shooting

Symptom	Possible cause	Corrective action
<i>Compressor loaded automatically to full capacity after starting</i>	Loading solenoid valve stuck in loaded position.	Remove and check loading solenoid valve. Replace valve if necessary.
	Air intake throttle valve in open position.	Check position throttle valve. Disconnect loading solenoid valve from throttle valve housing and connect independent compressed-air line to throttle valve housing. Repeatedly admit air and listen for opening and closing sound of throttle valve. If sound is not evident, remove unloader valve assembly, dismantle and inspect. Replace parts where necessary.
<i>Compressor does not deliver air or not immediatly after loading solenoid valve has been energized.</i>	Diaphragm of unloader piston cracked.	If air blows from venting device, open unloader piston cover and replace diaphragm.
	Air intake throttle valve stuck in closed position.	Disconnect loading solenoid valve from throttle valve housing and connect independent compressed-air line to throttle valve housing. Repeatedly admit air and listen for opening and closing sound of throttle valve. If sound is not evident, remove unloader valve assembly, dismantle and inspect. Replace parts where necessary.
	Air leaks in regulating system.	Same action as above.
	Loading solenoid valve out of order.	Check loading solenoid valve and electric wiring. Replace valve, if necessary.
<i>Compressor capacity or pressure below normal</i>	Air consumption exceeds capacity of compressor.	Check equipment connected.
	Choked air filter element.	Remove and inspect air filter element. Clean or replace element, if necessary.
	Working pressure setpoint incorrect.	Adjust setting.
	Engine not up to max. load speed.	Check engine and correct if necessary.
	Electric blow-off valve malfunctioning.	Check interstage pressure. Check functioning of loading solenoid valve. Replace diaphragm of blow-off valve if necessary.
	Loading solenoid valve leakage.	With unit running at max. load speed, disconnect pipe from loading solenoid valve. If air leaks, remove and inspect loading solenoid valve. Replace valve, if necessary.
	Compressor element(s) not in order.	Check interstage pressure and have compressor element(s) inspected by Atlas Copco.
	Air intake throttle valve remains partially closed.	Disconnect loading solenoid valve from throttle valve housing and connect independent compressed-air line to throttle valve housing. Repeatedly admit air and listen for opening and closing sound of throttle valve. If sound is not evident, remove unloader valve assembly, dismantle and inspect. Replace parts where necessary.

Symptom	Possible cause	Corrective action
<i>Compressor capacity or pressure below normal</i>	Safety valve or relief valve(s) leaking.	Remove and inspect safety valve or relief valve(s). Replace valve(s) if not airtight after reinstallation.
	Unloading valve leaking.	Remove and inspect unloading valve. Replace valve, if necessary.
	Pipe connections leaking.	Check connections and repair if necessary.
<i>Air pressure rises above maximum and causes safety valve to blow off</i>	Working pressure setpoint incorrect.	Adjust setting.
	Air intake throttle valve does not close for some reason.	Check position throttle valve. Disconnect loading solenoid valve from throttle valve housing and connect independent compressed-air line to throttle valve housing. Repeatedly admit air and listen for opening and closing sound of throttle valve. If sound is not evident, remove unloader valve assembly, dismantle and inspect. Replace parts where necessary.
	Unloading valve malfunctioning.	Remove and inspect unloading valve and blow-off silencers.
<i>Compressor overheating</i>	Insufficient compressor cooling.	Move unit away from walls; when banked with other units, leave space between them.
	Oil cooler clogged externally.	Clean oil cooler.
	Oil cooler clogged internally.	Consult Atlas Copco.
	Compressor oil filter clogged.	Replace oil filter.
	Compressor oil level too low.	Before checking compressor oil level, wait approx. 10 minutes after unit has stopped. Add correct oil, if necessary. Never overfill.
	Fan blade broken or fan drive defective.	Check and correct, if necessary.
	Working pressure too high.	Adjust setting.
	Pressure ratio over compressor element(s) too high.	Consult Atlas Copco.
	Electric blow-off valve malfunctioning.	Check interstage pressure. Check functioning of loading solenoid valve. Replace diaphragm of blow-off valve if necessary.
	By-pass valve of oil cooler remains stuck in open position.	Remove bypass valve, clean and inspect.
<i>Engine running but compressor does not load when 'Load' button is pressed</i>	Loading solenoid valve inoperative.	Check loading solenoid valve and electric wiring. Replace valve, if necessary.
	Diaphragm of unloader piston perforated or throttle valve remains closed for some reason.	Remove unloader piston cover and inspect rolling diaphragm. If in order, check piston for free axial movement by hand. If jammed, remove throttle valve housing, dismantle and replace defective parts.
	Control panel 'Load' button inoperative.	Consult Atlas Copco.

Symptom	Possible cause	Corrective action
<i>Compressor oil pressure too low</i>	Compressor oil level too low.	Before checking compressor oil level, wait approx. 10 minutes after unit has stopped. Add correct oil, if necessary. Never overfill.
	Compressor oil filter clogged.	Replace compressor oil filter.
	By-pass valve in oil pump stuck in open position.	Remove bypass valve, clean and inspect.
	Oil pump failure.	Remove oil pump and inspect parts for wear.
	By-pass valve of oil sump stuck in open position.	Remove bypass valve, clean and inspect.
	Ambient temperature too low.	Use heaters, check oil viscosity.
<i>Engine does not start</i>	Compressor oil pressure sensor disconnected.	Connect wiring.
	Engine oil pressure does not build up.	See Engine Operation Manual.
	Compressor oil pressure does not build up.	See problem “Compressor oil pressure too low”.
	Faulty compressor oil pressure shutdown switch.	Remove and test switch. Replace, if out of order.
	ECM fault.	Consult Atlas Copco.
	Coolant level(s) too low.	Check and adjust coolant level(s), if necessary.
	Crank time too short.	Adjust crank time on User Interface.
	Ambient temperature too low.	Connect engine heaters.
	Speed sensor inoperative.	Check speed sensor and electric wiring.
Insufficient fuel supply.	Check fuel lines or bleed.	
<i>After working for some time, the unit keeps shutting down</i>	Temperature or pressure sensor missing or malfunctioning.	Check via the User Interface display and replace sensor.
	Restriction in fuel supply to engine.	Check fuel lines and fuel filters.
	Air leak in fuel suction line or fuel filters.	Check suction side of electric fuel pump and fuel filters for air leaks.
	Compressor oil pressure too low.	See problem “Compressor oil pressure too low”.
	Engine oil pressure too low.	See Engine Operation Manual.
	Compressor overheating.	See “Compressor overheating”
	Engine overheating.	See Engine Operation Manual.
<i>Excessive oil fumes or air flow coming from breather pot assembly on gear casing.</i>	Compressor element(s) seals defective.	Have compressor element(s) inspected by Atlas Copco.
<i>Intercooler pressure below normal</i>	Choked air filter elements.	Remove and inspect air filter elements. Clean or replace elements, if necessary.
	Intercooler relief valve(s) leaking.	Remove valve(s), clean and inspect.
	Electric blow-off valve malfunctioning.	Check interstage pressure. Check functioning of loading solenoid valve. Replace diaphragm of blow-off valve if necessary.
	Air leak between LP and MP compressor element.	Inspect pipe connections and intercooler. Replace leaking O-rings, gaskets or intercooler, if necessary.
	LP compressor element not in order.	Have LP compressor element inspected by Atlas Copco.
	Intercooler clogged internally.	Consult Atlas Copco.

Symptom	Possible cause	Corrective action
<i>Intercooler pressure above normal</i>	Aftercooler clogged internally.	Consult Atlas Copco.
	MP compressor element not in order.	Have MP compressor element inspected by Atlas Copco.
	MP silencer and/or check valve give restriction.	Check and take corrective action.

7 Technical specifications

7.1 Torque values

7.1.1 For general applications

The following tables list the recommended torques applied for general applications at assembly of the compressor.

For hexagon screws and nuts with strength grade 8.8:

Thread size	M6	M8	M10	M12	M14	M16
Nm	9	23	46	80	125	205

For hexagon screws and nuts with strength grade 12.9:

Thread size	M6	M8	M10	M12	M14	M16
Nm	15	39	78	135	210	345

7.1.2 For important assemblies

Assemblies	Unit	Torque values
Axles to frame:		
Wheel nuts	Nm	80 + 10/- 0
Bolts, towing eye/towbar	Nm	80 ± 10
Bolts, towbar/turntable	Nm	80 ± 10
Bolts, front axle/frame	Nm	80 ± 10
Bolts, rear axle/frame	Nm	205 ± 20
Compressor to frame:		
Bolts, elements/gear casing	Nm	80 ± 10
Bolts, gear casing/support	Nm	205 ± 20
Bolts, support/buffer	Nm	205 ± 20
Bolts, buffer/frame	Nm	80 ± 10
Engine to frame:		
Bolts, engine/support	Nm	205 ± 20
Bolts, support/buffer	Nm	205 ± 20
Bolts, buffer/frame	Nm	80 ± 10
Lifting beam to frame:		
Bolts, lifting beams/yoke (M12)	Nm	80 ± 10
Bolts, lifting beams/yoke (M16)	Nm	205 ± 20
Bolts, yoke/lifting supports	Nm	205 ± 20
Bolts, lifting supports/frame	Nm	205 ± 20

7.2 Settings of shutdowns and safety valves

Designation	Value
Engine shutdowns (see EOM)	
Fuel level	5%
LP element temperature	250°C
MP element temperature	250°C
Compressor oil pressure	1.2 bar(e)
MP safety valve opening pressure	
EEC type	15 bar(e)
USA/AUS type	220 psi
Relief valves opening pressure	3.7 bar(e)

7.3 Compressor/engine specifications

Compressor type Designation	PTS 916 Cd			
	Unit	Value		
Reference conditions				
Absolute inlet pressure	bar(e)	1		
Relative air humidity	%	0		
Air inlet temperature	°C	20		
Normal effective working pressure	bar(e)	6.9	9.3	10.3
The inlet conditions are specified at the air inlet grating outside the canopy				
Limitations				
Minimum effective receiver pressure	bar(e)	3	3	3
Maximum effective receiver pressure, compressor unloaded	bar(e)	8.0	10.3	11.3
Maximum ambient temperature	°C	45	45	45
Minimum starting temperature	°C	-25	-25	-25
Performance data ¹⁾				
Engine shaft speed, normal and maximum	r/min	1850	1750	1550
Engine shaft speed, compressor unloaded	r/min	1200	1200	1200
Free air delivery ²⁾	l/s	762	718	623
Compressed air temperature at outlet valves	°C	30	30	30
Noise level				
Sound pressure level (LP), measured according to EPA with a tolerance of ± 3dB(A) under free field conditions at 7 m distance	dB(A)			
Sound power level (LW) complies with 84/532/533/EEC and 85/406/EEC limits	dB(A)	104		

Compressor type Design data	PTS 916 Cd			
	Value			
Compressor				
Number of compressor stages	2 in serial			
Engine				
Make	Caterpillar			
Type	C18			
Coolant	Liquid			
Number of cylinders	6			
Bore	145 mm			
Stroke	183 mm			
Swept volume	18.1 l			
Output according to SAEJ1995 at normal shaft speed:	429 kW			
Load factor	100%			
Capacity of oil sump:				
Initial fill	65 l			
Refill (max.) ⁴⁾	-			
Capacity of cooling system (engine jackets)	86 l			
Unit				
Capacity of compressor oil system	84 l			
Capacity of fuel tanks	900 l			
Air volume at inlet grating (approx.) ³⁾	15 m ³ /s			

Unit dimensions

Length	5240 mm (with towbar in towing position: 6770 mm)
Width	2210 mm
Height	2350 mm
Weight (ready to operate)	8260 kg
Weight (dry)	7120 kg

- 1) At reference conditions, if applicable, and in normal shaft speed, unless otherwise stated.
- 2)

Data	Measured according to	Tolerance
Free air delivery	ISO 1217 ed. 3 1996 annex D	$\pm 5\% 25 \text{ l/s } < \text{FAD} < 250 \text{ l/s}$ $\pm 4\% 250 \text{ l/s } < \text{FAD}$

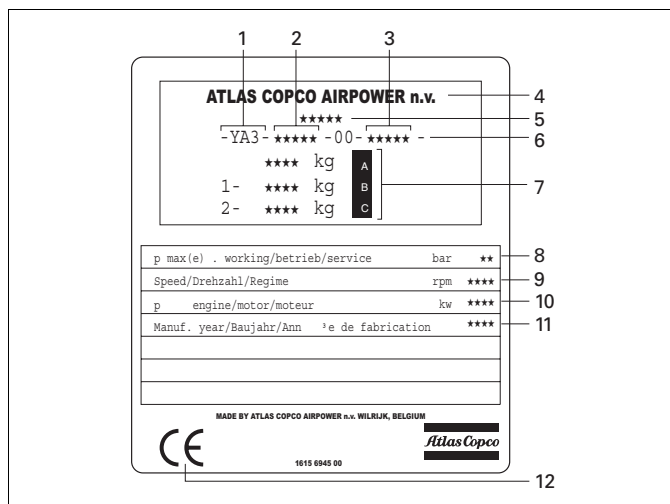
The international standard ISO 1217 corresponds to following national standards:
 British BSI 1571 part 1
 German DIN 1945 part 1
 Swedish SS-ISO 1217
 American ANSI PTC9
 Free air delivery = volume flow rate
- 3) Air required for engine and compressor cooling, combustion and for compression
- 4) With filter change

7.4 Conversion list of SI units into British units

1 bar	=	14.504 psi
1 g	=	0.035 oz
1 kg	=	2.205 lb
1 km/h	=	0.621 mile/h
1 kW	=	1.341 hp (UK and US)
1 l	=	0.264 US gal
1 l	=	0.220 imp gal (UK)
1 l	=	0.035 cu.ft
1 m	=	3.281 ft
1 mm	=	0.039 in
1 m ³ /min	=	35.315 cfm
1 mbar	=	0.401 in wc
1 N	=	0.225 lbf
1 Nm	=	0.738 lbf.ft
t_{F}	=	$32 + (1.8 \times t_{\text{C}})$
t_{C}	=	$(t_{\text{F}} - 32)/1.8$

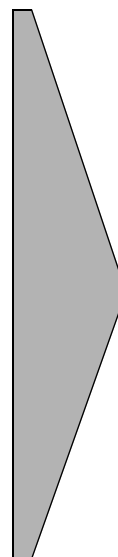
A temperature difference of 1°C = a temperature difference of 1.8°F.

7.5 Dataplate

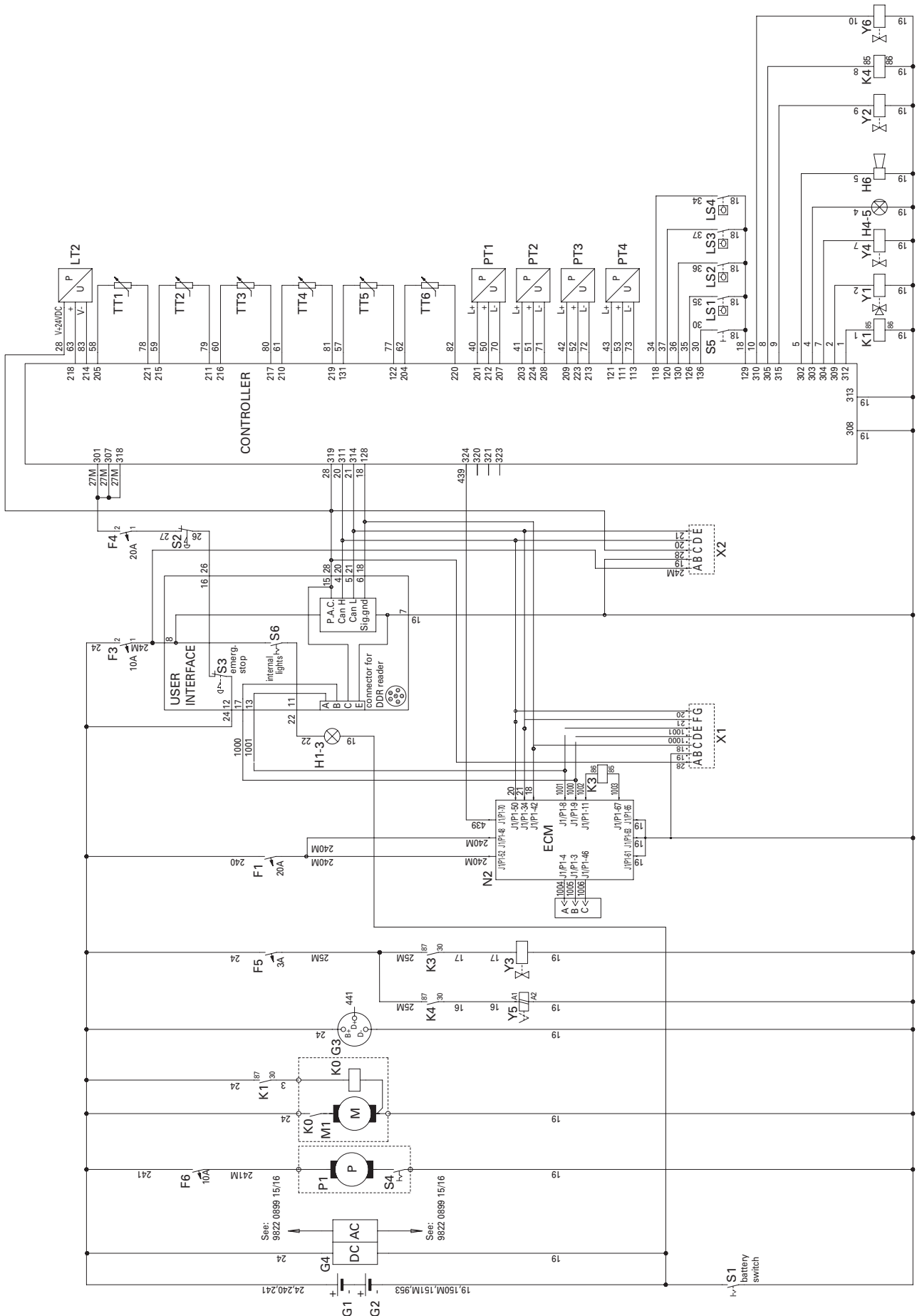


1. Company code
2. Product code
3. Unit serial number
4. Name of manufacturer
5. EEC or national type approved number
6. Vehicle identification number
7. A. Maximum permitted laden weight of the vehicle
B. Maximum permitted road weight of the front axle
C. Maximum permitted road weight of the rear axle
8. Working pressure
9. Speed
10. Engine power
11. Manufacturing year
12. EC mark in accordance with Machine Directive 89/392 EEC

Circuit diagrams



Circuit diagram



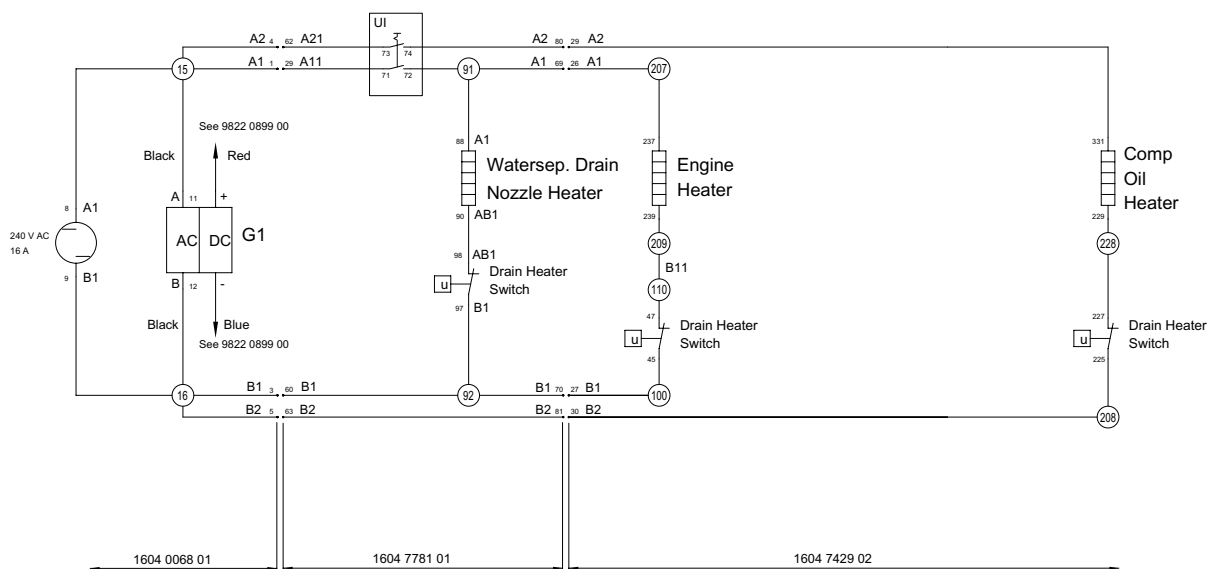
Controller: a7-f7: System Control Unit

ECM: Engine Control Module - CAT C18
F1: Fuse ECM - 20A
F3: Fuse User Interface - 10A
F4: Fuse Controller - 20A
F5: Fuse Flap Lock Solenoid - 3A
F6: Fuse Electrical Priming Pump - 10A
G1: Battery 1
G2: Battery 1
G3: Alternator
G4: Battery Charger
H1-3: Internal Lights
H4-5: Warning Flasher Lights
H6: Horn
K0: Startmotor Relay
K1: Auxiliary Starter Relay
K3: Refinery Equipment Relay
K4: Flap Lock Solenoid Relay
LS1: Level Switch - Engine Oil Level Full
LS2: Level Switch - Engine Oil Level Warning
LS3: Level Switch - Engine Oil Level Shutdown
LS4: Level Switch - Engine Oil Level Overfill Shutdown
LT1: Level Sensor - C18 Coolant Level
LT2: Level Sensor - Fuel Level
M1: Start Motor
P1: Electrical Priming Pump
PT1: Pressure Sensor - Air Discharge Pressure
PT2: Pressure Sensor - Compressor Intercooler Pressure 1
PT3: Pressure Sensor - Compressor Intercooler Pressure 2
PT4: Pressure Sensor - Compressor Oil Pressure
S1: Battery Switch
S2: Emergency Stop 2
S3: Emergency Stop 3
S4: Electrical Priming Pump Switch
S5: External Fuel Supply
S6: Internal Lights On/Off Switch
TT1: Temperature Sensor - Compressor Oil Temperature
TT2: Temperature Sensor - Low Pressure Element Temperature
TT3: Temperature Sensor - Medium Pressure Element Temperature
TT4: Temperature Sensor - High Pressure Element Temperature
TT5: Temperature Sensor - Ambient Temperature
TT6: Temperature Sensor - Air Discharge Temperature

User Interface: User/Controller Communication Device

Y1: Loading Valve
Y2: Oil Level Maintainer Valve
Y3: Refinery Equipment - Air Shut-off Valve
Y4: Blow-off Valve
Y5: Flap Lock Solenoid
Y6: Outlet Temperature Regulation Valve
X1: CAT Diagnostic
X2: COSMOS Connector

Circuit diagram (EC)



R1, R2: Coolant heater (engine)

240 VAC
1000 W

R3: Oil heater (compressor)

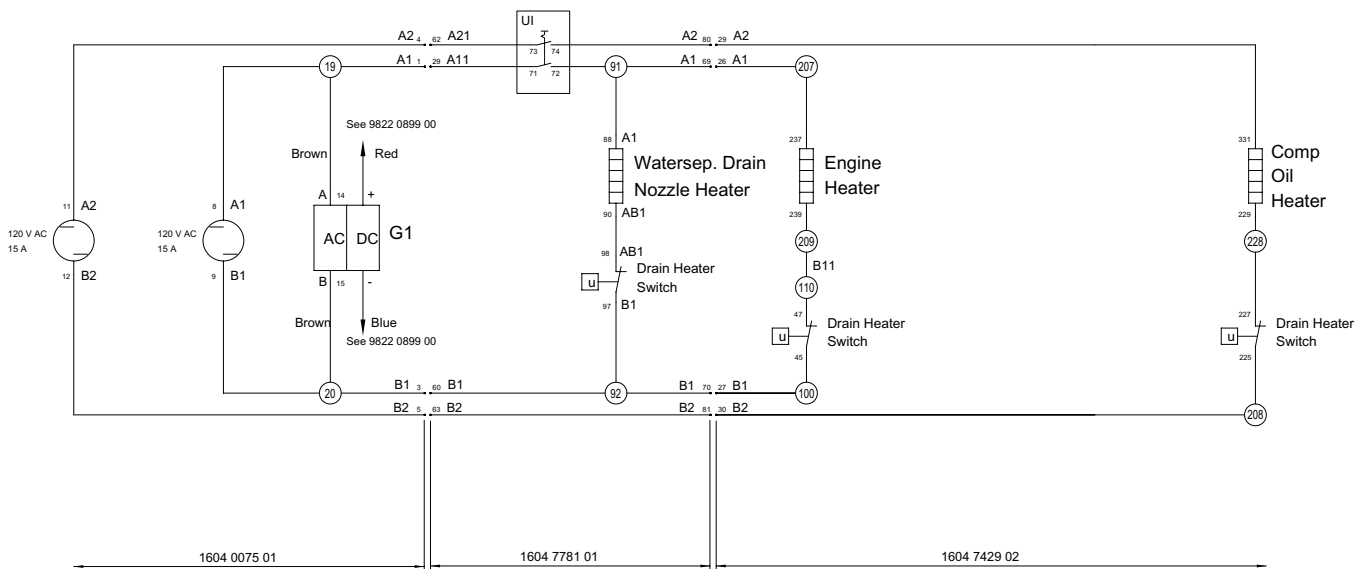
240 VAC
500 W

S1-3: Temperature switch

Fixed setting
Opens at 26.6 °C - 37.7 °C (80 °F - 100 °F)

G1: Battery charger

240 VAC / 24 VDC
100 VA



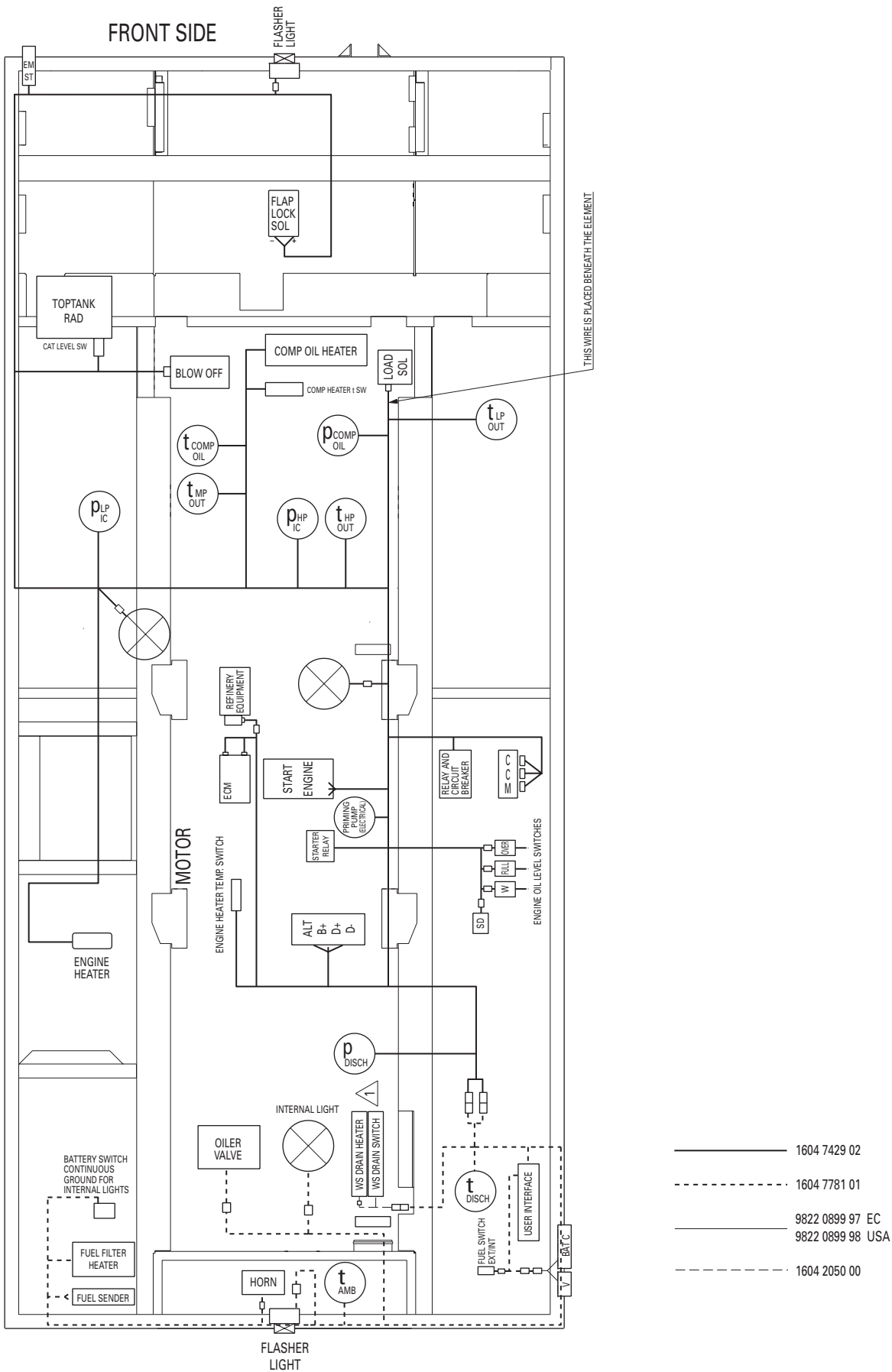
R1, R2: Coolant heater (engine)
120 VAC
1000 W

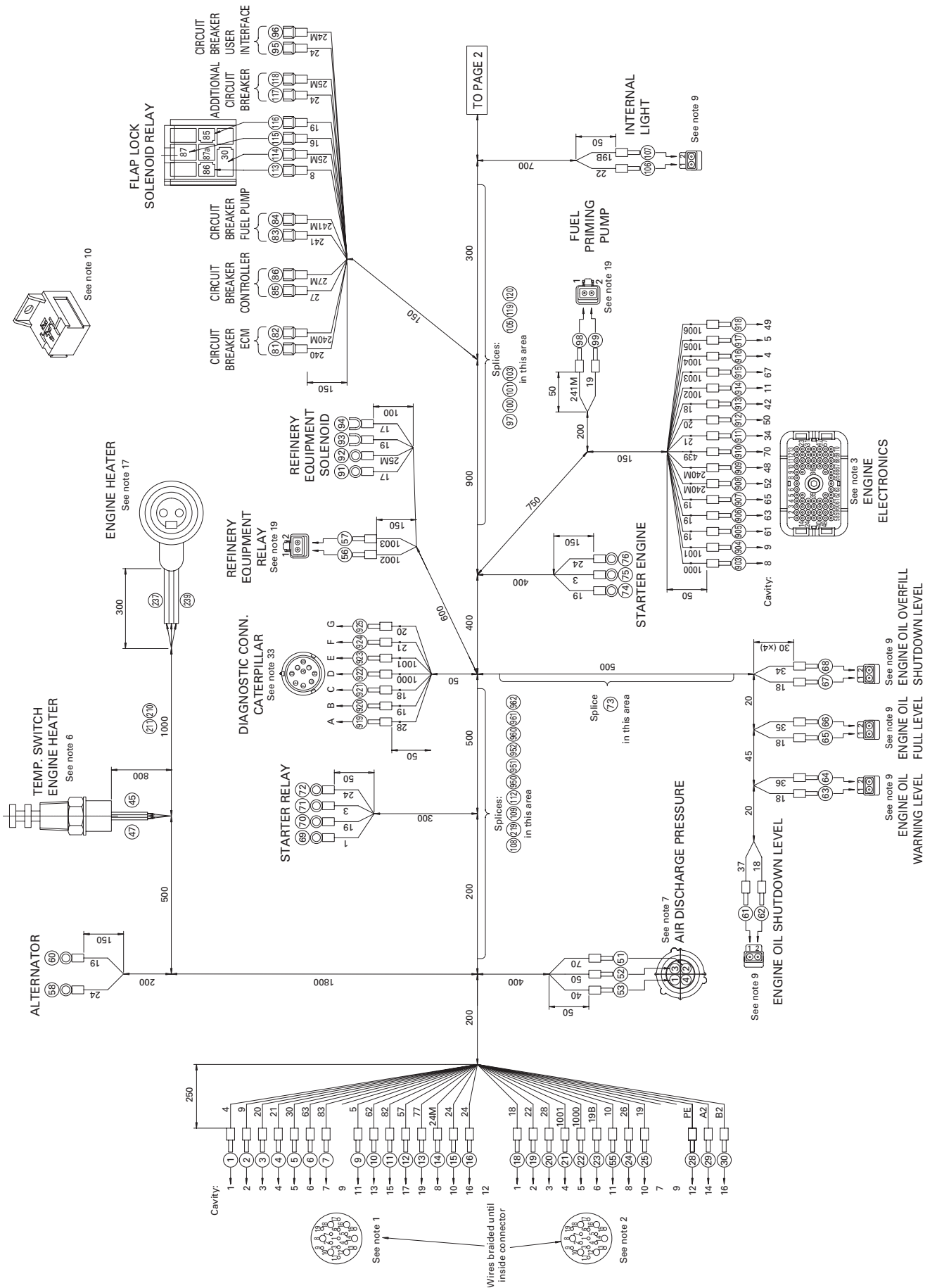
R3: Oil heater (compressor)
120 VAC
500 W

S1-3: Temperature switch
Fixed setting
Opens at 26.6 °C - 37.7 °C (80 °F - 100 °F)

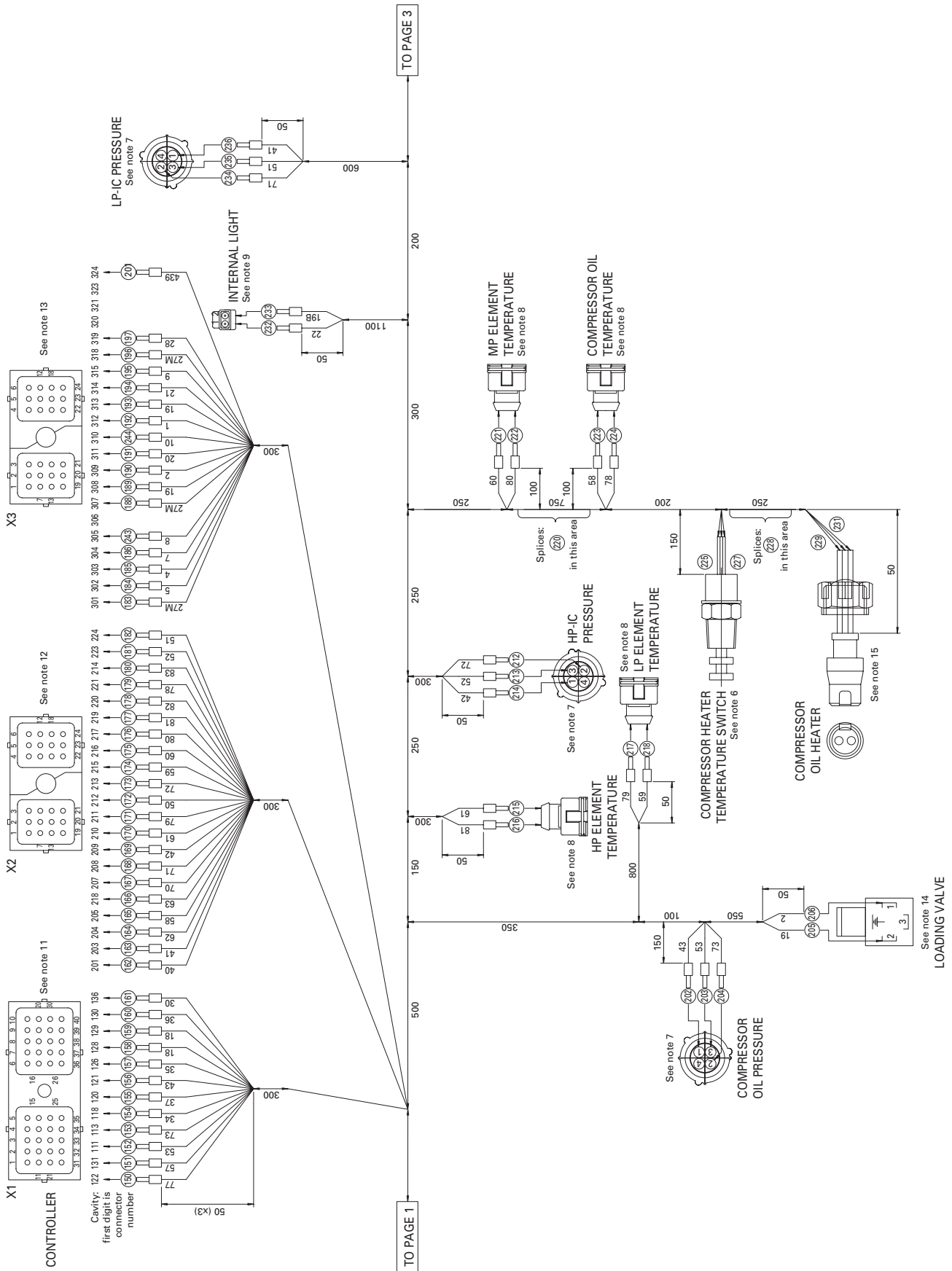
G1: Battery charger
120 VAC / 24 VDC
100 VA

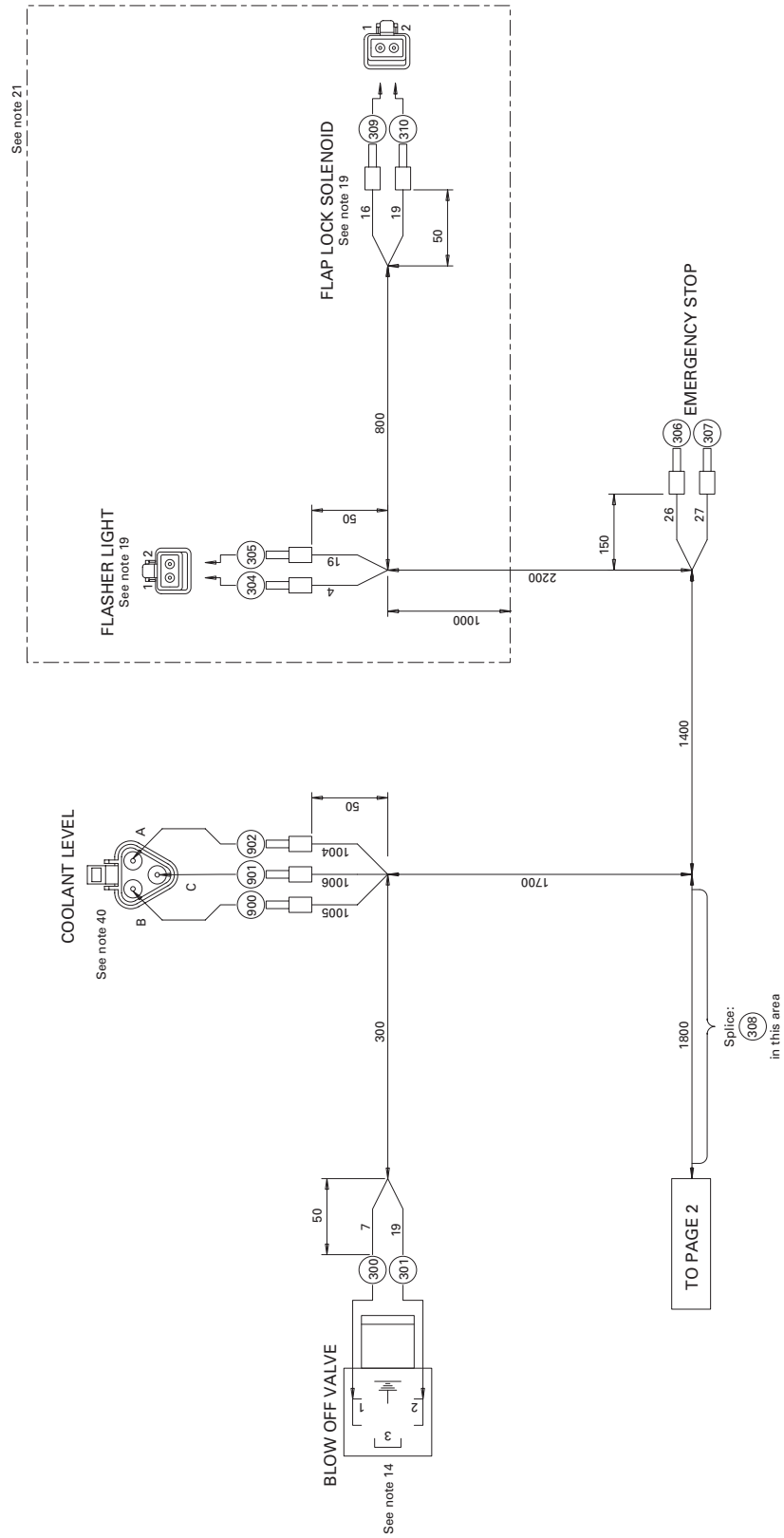
Circuit wiring





Wiring diagram





Wiring diagram

TERMINAL END A		WIRE				TERMINAL END B	
NR	TERMINAL	NR	MM ²	COLOR	L	NR	TERMINAL
1	See note 1	4	1	Orange		97	Splice
185	See note 13	4	1	Orange			
304	See note 19	4	1	Orange			
2	See note 1	9	1	Orange	2600	195	See note 13
5	See note 1	30	1	Green	2600	161	See note 11
6	See note 1	63	1	Green	2600	166	See note 12
7	See note 1	83	1	Purple	2600	180	See note 12
916	See note 3	1004	1	Red		902	See note 40
917	See note 3	1005	1	Blue		900	See note 40
918	See note 3	1006	1	Orange		901	See note 40
9	See note 1	5	1	Orange	2600	184	See note 13
10	See note 1	62	1	Green	2600	164	See note 12
11	See note 1	82	1	Purple	2600	178	See note 12
12	See note 1	57	1	Green	2600	151	See note 11
13	See note 1	77	1	Purple	2600	150	See note 11
14	See note 1	24M	1.5	Red	2250	96	AMP 3-520117-2
15	See note 1	24	4	Red	1550	76	See note 18
16	See note 1	24	4	Red	1550		Sleeve colour: Red
58	AMP 165034-0	24	10	Red	1350		
81	AMP 3-520117-2	240	2.5	Red	1400		
117	AMP 3-520117-2	24	2.5	Red	1400		
95	AMP 3-520117-2	24	1.5	Red	1400		
72	AMP 328998-0	24	2.5	Red	1050		
83	AMP 3-520117-2	241	1.5	Red			
19	See note 2	22	1	Orange		100	Splice
106	See note 9	22	1	Orange			
232	See note 9	22	1	Orange			
910	See note 3	439	1	Orange		201	See note 13
84	AMP 3-520117-2	241M	1.5	Orange		98	See note 19
903	See note 3	1000	1	Orange		960	Splice
22	See note 2	1000	1	Orange			
922	See note 33	1000	1	Orange			
923	See note 33	1001	1	Orange		961	Splice
21	See note 2	1001	1	Orange			
904	See note 3	1001	1	Orange			
23	See note 2	19B	1	Blue		103	Splice
107	See note 9	19B	1	Blue			
233	See note 9	19B	1	Blue			
25	See note 2	19	4	Blue	1550	74	See note 18
60	AMP 165034-0	19	10	Blue	1350		Sleeve colour: Blue
99	See note 19	19	1.5	Blue			
116	See note 10	19	1	Blue	1400		
189	See note 13	19	1.5	Blue	1750		
193	See note 13	19	1.5	Blue	1750		
93	AMP SPADE M5	19	1.5	Blue			
205	See note 14	19	1	Blue	2750		
905	See note 3	19	2.5	Blue			
906	See note 3	19	2.5	Blue			
907	See note 3	19	2.5	Blue			
920	See note 3	19	2.5	Blue			
70	AMP 31890-0	19	1	Blue	1050		
308	Splice	19	2.5	Blue			
		19	1	Blue		301	See note 14
		19	1	Blue		305	See note 19
		19	1.5	Blue		310	See note 19
4	See note 2	21	1	Grey		951	Splice
194	See note 13	21	1	Grey			
911	See note 3	21	1	Grey			
924	See note 33	21	1	Grey			
82		240M	2.5	Red		101	Splice
908	See note 3	240M	2.5	Red			
909	See note 3	240M	2.5	Red			
51	See note 7	70	1	Purple	2600	167	See note 12
52	See note 7	50	1	Green	2600	172	See note 12
53	See note 7	40	1	White	2600	162	See note 12
91	AMP EYE M6	17	1.5	Orange	3200	94	AMP SPADE M5
61	See note 9	37	1	Green	2365	155	See note 11
62	See note 9	18	1	Blue		73	Splice
63	See note 9	18	1	Blue			
65	See note 9	18	1	Blue			
67	See note 9	18	1	Blue			
159	See note 11	18	1	Blue			
64	See note 9	36	1	Green	2345	160	See note 11
66	See note 9	35	1	Green	2300	157	See note 11
68	See note 9	34	1	Green	2280	154	See note 11
69	AMP 31890-0	1	1	Orange	2100	192	See note 13
71	AMP AMP 160296-0	3	2.5	Orange	1050	75	AMP 130090-0
85	AMP 4-520448-2	27	4	Red		120	Splice
307	Terminal End	27	4	Red			
86	AMP 4-520448-2	27M	4	Red		105	Splice
188	See note 13	27M	1.5	Red			
183	See note 13	27M	1	Red			
196	See note 13	27M	1.5	Red			

TERMINAL END A		WIRE				TERMINAL END B	
NR	TERMINAL	NR	MM ²	COLOR	L	NR	TERMINAL
152	See note 11	53	1	Green	1300	203	See note 7
153	See note 11	73	1	Purple	1300	204	See note 7
156	See note 11	43	1	White	1300	202	See note 7
163	See note 12	41	1	White	2500	236	See note 7
165	See note 12	58	1	Green	2400	223	See note 8
168	See note 12	71	1	Purple	2500	234	See note 7
169	See note 12	42	1	White	1450	214	See note 7
170	See note 12	61	1	Green	1200	215	See note 8
171	See note 12	79	1	Purple	1900	217	See note 8
173	See note 12	72	1	Purple	1450	212	See note 7
174	See note 12	59	1	Green	1900	218	See note 8
175	See note 12	60	1	Green	1650	221	See note 8
176	See note 12	80	1	Purple	1650	222	See note 8
177	See note 12	81	1	Purple	1200	216	See note 8
179	See note 12	78	1	Purple	2400	224	See note 8
181	See note 12	52	1	Green	1450	213	See note 7
182	See note 12	51	1	Green	2500	235	See note 7
186	See note 13	7	1	Orange	5700	300	See note 14
190	See note 13	2	1	Orange	1655	206	See note 14
24	See note 2	26	4	Red	7100	306	Terminal End
20	See note 2	28	1	Orange		962	Splice
197	See note 13	28	1	Orange			
919	See note 33	28	1	Orange			
118	AMP 3-520117-2	25M	2.5	Red		119	Splice
114	See note 10	25M	1.5	Red			
92	AMP EYE M6	25M	1.5	Red			
115	See note 10	16	1.5	Orange	7850	309	See note 19
113	See note 10	8	1	Orange	950	243	See note 13
56	See note 19	1002	1.5	Orange		914	See note 3
57	See note 19	1003	1.5	Orange		915	See note 3
55	See note 2	10	1	Orange	2600	244	See note 13
3	See note 2	20	1	Grey		950	Splice
191	See note 13	20	1	Grey			
912	See note 3	20	1	Grey			
925	See note 33	20	1	Grey			
18	See note 2	18	1	Grey		952	Splice
158	See note 11	18	1	Grey			
913	See note 3	18	1	Grey			
921	See note 33	18	1	Grey			
29	See note 2	A2	2.5	Black		219	Splice
231	See note 15	AWG 16		Black			
237	See note 17	AWG 16		Black			
30	See note 2	B2	2.5	Black		109	Splice
47	See note 6	AWG 16		Black			
225	See note 6	B2	AWG 16	Black			
45	See note 6	AWG 16		Black		210	Splice
239	See note 17	AWG 16		Black			
227	See note 6	AWG 16		Black		228	Splice
229	See note 15	AWG 16		Black			
226	See note 6	AWG 16		Green		220	Splice
230	See note 15	AWG 16		Green			
112	Splice	PE	2.5	Yellow/Green			
			2.5	Yellow/Green		28	AMP 328998-0
46	See note 6	AWG 16		Green		211	Splice
238	See note 17	AWG 16		Green			

Note 1: Connector: Deutsch HD N 36 - 24-19 SN - 059
 Terminals: Size 12 (large): Deutsch 0462-203-12141
 Size 16 (small): Deutsch 0462-201-16141
 Unused cavities to be sealed with: Deutsch 114017

Note 2: Connector: Deutsch HD N 34 - 24-19 PN - 059
 Terminals: Size 12 (large): Deutsch 0460-202-12141
 Size 16 (small): Deutsch 0460-202-16141
 Nut: Deutsch 112263-90
 Lockwasher: Deutsch 112264
 Unused cavities shall be sealed with: Deutsch 114017

Note 3: Connector: AMP 776241-1
 Terminals: Deutsch 0462-209-16141
 Unused cavities shall be sealed with: Deutsch 114017

Note 4: Connector: Packard 1212 4634
 Terminals: Packard 1207 7413
 Wire seal: Packard 1201 0293

Note 5: Connector: Deutsch DT 04-2P
 Terminals: Deutsch 1060-14-0122
 Wedge: Deutsch W2P

Note 6: Temperature switch, KIM HOTSTART nr: DIT 810. (1/2" NPT)
 Delivered with 3 feet 16-3 cord attached.
 Middle wire (ground) is separately insulated.
 Residual insulation from wire separation on wire ends shall be removed before splicing.

Note 7: Connector: G&H 17984.000.001 (DIN 72585 - 4 pins)
 Terminals: G&H 26570.201.184
 Wire seal: G&H 14414.627.626
 Unused cavities to be sealed with: G&H 14416.627.646
 Wiring braided until connector, and attached to strain relief with nylon strap.

Note 8: Connector: AMP 0-963040-3
 Terminals: AMP 0-929939-1
 Wire seal: AMP 828904-1
 Seal grommet: Bosch 1280 703 26026

Note 9: Connector: Deutsch DTM 06-2S
 Terminals: Deutsch 1062-20-01221
 Wedge: Deutsch WM 2S

Note 10: Relay socket: Bosch 3334485008
 Terminals: AMP 6-160448-2

Note 11: Connector: Deutsch DRC 16-40S
 Terminals: Deutsch 0462-201-16141
 Unused cavities to be sealed with: Deutsch 11407

Note 12: Connector: Deutsch DRC 16-24S
 Terminals: Deutsch 0462-201-16141
 Unused cavities to be sealed with: Deutsch 11407

Note 13: Connector: Deutsch DRC 16-24SB
 Terminals: Deutsch 0462-201-16141
 Unused cavities to be sealed with: Deutsch 11407

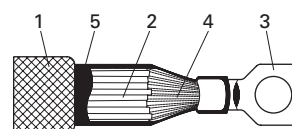
Note 14: Connector: White products nr: WHT 1616 (moulded on wire)

Note 15: Connector with 4 feet 16-3 cord attached.
 Delivered with KIM HOTSTART glowplugs nrs: OW650100-000 or OW650200-000.
 No KIM HOTSTART partnumber available, contact MFI department for delivery agreements.
 Middle wire (ground) is separately insulated.
 Power supply plug shall be removed.
 Residual insulation from wire separation on wire ends shall be removed before splicing.

Note 16: Connector: Packard 1530 0027
 Terminals: Packard 1207 7412
 Wire seals: Packard 1201 5323
 Sec. lock: Packard 1530 0014

Note 17: Connector with 6 feet 16-3 cord attached.
 Delivered with KIM HOTSTART glowplugs nrs: TF101-000-WOC or TF102-000-WOC.
 Middle wire (ground) is separately insulated.
 Power supply plug shall be removed.
 Residual insulation from wire separation on wire ends shall be removed before splicing.

Note 18: AMP 133544-4
 Shrinkable sleeve to be attached as in drawing.
 Wall thickness: min. 1 mm.
 Wires may be divided over two terminals if necessary.



- 1: Braiding
- 2: Insulated wires
- 3: Terminal
- 4: Non-insulated wires
- 5: Sleeve

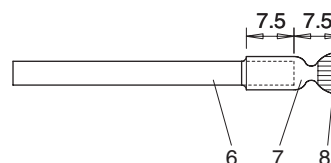
Note 19: Connector: Deutsch DT 06-2S
 Terminals: Deutsch 0460-201-16141
 Wedge: Deutsch W 2S

Note 20: In order to fix wire 17 it will go into the braided part of the harness and once around the wires in the main branch before returning.

Note 21: This part of the harness should be resistant to temperatures up to 105 °C.

Note 22: Wire insulation should be resistant to oil, fuel and coolant.

Note 23: Terminals shall be equipped with a label with printing: "ALWAYS INSULATE WIRE". Label and printing must be water, oil, coolant and diesel resistant. Terminals shall be equipped with a shrinkable sleeve with a layer of glue, as in drawing below, and strapped to the harness with nylon straps.



- 6: Wire
- 7: Sleeve
- 8: Squeezed tight when hot

Note 31: Connector: Deutsch DT 06-3S-EP11
 Terminals: Deutsch 0462-201-16141
 Secondary lock: Deutsch W3P-1939

Note 32: Connector: Deutsch DT 04-3P-P006
 Secondary lock: Deutsch W3S-1939
 Plugged into connector of note 31

Note 33: Connector: Deutsch HD 14-9-96-P
 Terminals: Deutsch 0460-202-16141
 Unused cavities to be sealed with: Deutsch 114017
 Protective cover: HDC 16-9
 Protective cover fixed to harness with a wire
 Both ends of the wire run at least 200 mm into the wire harness

Note 40: Connector: Deutsch DT 06-3S-EP11
 Terminals: Deutsch 0462-201-16141
 Unused cavities to be sealed with: Deutsch 11407
 Secondary lock: Deutsch W3S

Note 50: Wiring from tree to CAT diagnostic
 To be protected by Shrinkhose

Note 51: Protection cap: WHITE n° 02-06-001549
 ORIENTATION AS STATED BELOW
 Harness to be fixed on the protection cap.

TERMINAL END A		WIRE			TERMINAL END B	
NR	TERMINAL	NR	MM ²	COLOR	NR	TERMINAL
1	See Note 11	63	1	Green	35	See Note 11
2	See Note 11	83	1	Purple	36	See Note 11
3	See Note 2	5	1	Orange	38	See Note 4
30	See Note 4	4	1	Orange	83	Splice
82	See Note 1	4	1	Orange		
5	See Note 3	4	1	Orange	49	Splice
4	See Note 2	19	1	Blue		
6	See Note 3	19	1	Blue		
10	See Note 2	19	1	Blue		
21	See Note 1	19	1.5	Blue		
58	See Note 1	19	4	Blue		
95	See Note 3	19	1	Blue		
107	See note 12	19	1	Blue	52	Splice
7	See Note 2	22	1	Orange		
47	See Note 1	22	1	Orange		
22	See Note 1	22	1.5	Orange	31	See Note 4
9	See Note 2	9	1	Orange		
23	See Note 1	24	4	Red	66	Splice
44	See Note 4	24	4	Red		
64	See Note 5	24	1.5	Red		
17	See Note 1	24M	1.5	Red	51	Splice
43	See Note 4	24M	1.5	Red		
85	See Note 7	24M	1	Red		
103	See Note 12	24M	1.5	Red		
18	See Note 1	20	1	Grey	101	Splice
32	See Note 4	20	1	Grey		
104	See Note 12	20	1	Grey		
19	See Note 1	21	1	Grey	102	Splice
33	See Note 4	21	1	Grey		
105	See Note 12	21	1	Grey		
20	See Note 1	18	1	Blue	53	Splice
29	See Note 2	18	1	Blue		
46	See Note 1	18	1	Blue		
98	See Note 6	AB1	1	BROWN	90	SEE NOTE 9
26	See Note 1	26	4	Red	57	See Note 1
28	See Note 2	30	1	Green	34	See Note 4
67	See note 6	57	1	Green	41	See note 4
68	See note 6	77	1	Purple	42	See note 4
8	See Note 2	19B	1	Blue	77	Splice
56	See Note 1	19B	1	Blue		
76	AMP 160136-0	19B	4	Blue		
65	See note 5	19B	1.5	Blue		
86	See note 7	19B	4	Blue		
78	See note 6	62	1	Green	39	See note 4
79	See note 6	82	1	Purple	40	See note 4
84	See note 7	24	4	Red	87	See note 4
94	See note 3	10	1	Orange	96	See note 1
72	SEE NOTE 1	A1	1.5	BROWN	88	SEE NOTE 8
71	SEE NOTE 1	A11	1.5	BROWN	59	SEE NOTE 5
60	SEE NOTE 5	B1	1.5	BROWN	97	SEE NOTE 6
75	SEE NOTE 1	PE	2.5	YELLOW/GREEN	93	SPLICE
61	SEE NOTE 5	PE	2.5	YELLOW/GREEN		
89	SEE NOTE 9	PE	1	YELLOW/GREEN		
80	SEE NOTE 1	A2	2.5	BLACK	74	SEE NOTE 1
73	SEE NOTE 1	A21	2.5	BLACK	62	SEE NOTE 5
81	SEE NOTE 1	B2	2.5	BLACK	63	SEE NOTE 5
24	SEE NOTE 1	1001	1	ORANGE	49	SEE NOTE 1
27	SEE NOTE 1	1000	1	ORANGE	50	SEE NOTE 1
99	SEE NOTE 11	28	1	ORANGE	100	Splice
25	SEE NOTE 1	28	1	ORANGE		
48	SEE NOTE 1	28	1	ORANGE		
106	SEE NOTE 12	28	1	ORANGE		

Note 1: Connector: Deutsch HD N 36 - 24-19 SN - 059
 Terminals: Size 12 (large): Deutsch 0462-203-12141
 Size 16 (small): Deutsch 0462-201-16141
 Unused Cavities to be sealed with: Deutsch 114017

Note 2: Connector: Deutsch DTM 06-2S
 Terminals: Deutsch 1062-20-0122
 Secondary Lock: Deutsch WM 2S

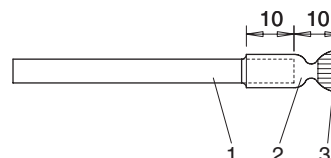
Note 3: Connector: Deutsch DT 06-2S
 Terminals: Deutsch 0460-201-16141
 Secondary Lock: Deutsch W 2S

Note 4: Connector: Deutsch HD N 34 - 24-19 - PN - 059
 Terminals: Size 12 (large): Deutsch 0460-204-12141
 Size 16 (small): Deutsch 0460-202-16141
 Nut: Deutsch 112263-90
 Lockwasher: Deutsch 112264
 Unused Cavities to be sealed with: Deutsch 114017

Note 5: Connector: Deutsch HD N 34 - 18-8 PN - 059
 Terminals: Deutsch 0460-204-12141
 Unused Cavities to be sealed with: Deutsch 114017

Note 6: Connector: AMP 0-963040-3
 Terminals: AMP 0-929939-1
 Wire seal: AMP 828904-1
 Seal Grommet: Bosch 1280 703 26026

Note 7: - Terminals 84, 85 shall be equipped with a label with printing: "ALWAYS INSULATE WIRE".
 - Label and printing must be water, oil and coolant resistant.
 - Terminals 84, 85, 86 shall be equipped with a shrinkable sleeve with a layer of glue, as in drawing below, and strapped to the harness with nylon straps.



1: Wire
 2: Sleeve
 3: Squeezed tight when hot

Note 8: Terminals 1 and 2 shall be equipped with rubber protection cap
 AC nr: 1612 0846 00

Note 9: Connector: Deutsch DTM 06-3S
 Terminals: Deutsch 1062-20-0122
 Secondary Lock: Deutsch WM 3S

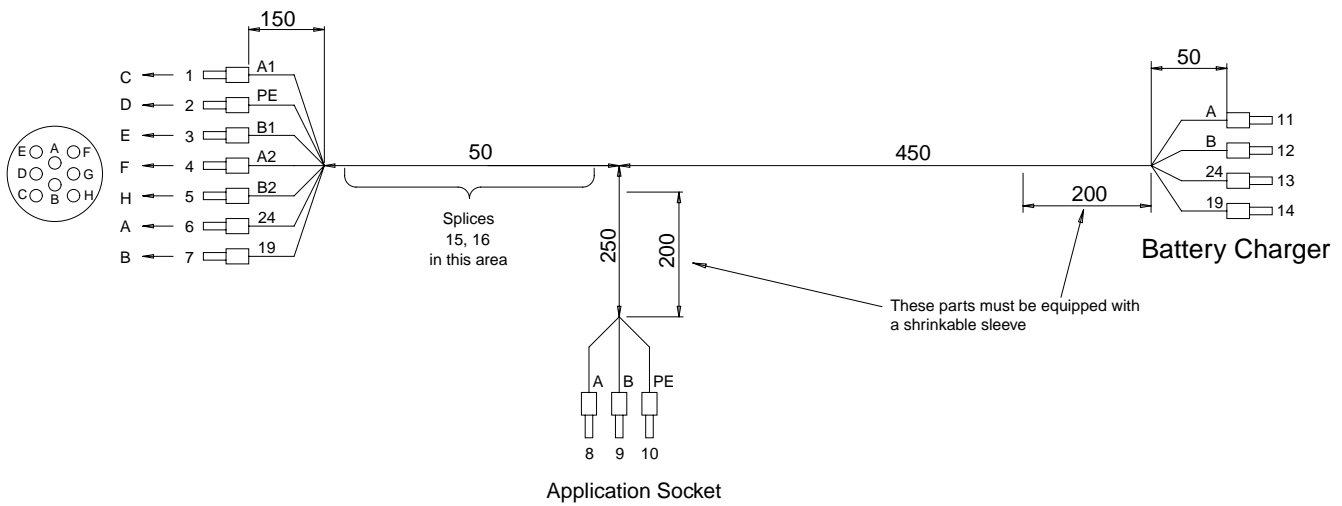
Note 10: Wire insulation should be resistant to oil, diesel fuel and coolant.

Note 11: Connector according to DIN 72585 4 pins.
 Connector: G&H 17984.000.001
 Terminals: G&H 26570.201.184
 Wire seal: G&H 14414.627.626
 Unused cavities to be sealed with: G&H 14416.627.646
 Strain relief of fuel level: G&H 14830.625.699

Wiring braided until connector, and attached to strain relief with nylon strap.

Note 12: Connector: Deutsch HD14-5-16P
 Terminals: Deutsch 0460-202-16141
 Unused Cavities to be sealed with: Deutsch 114017
 Protective cover Deutsch HDC 16-5 fixed to harness with wire.
 Both ends of wire run at least 200mm into harness.

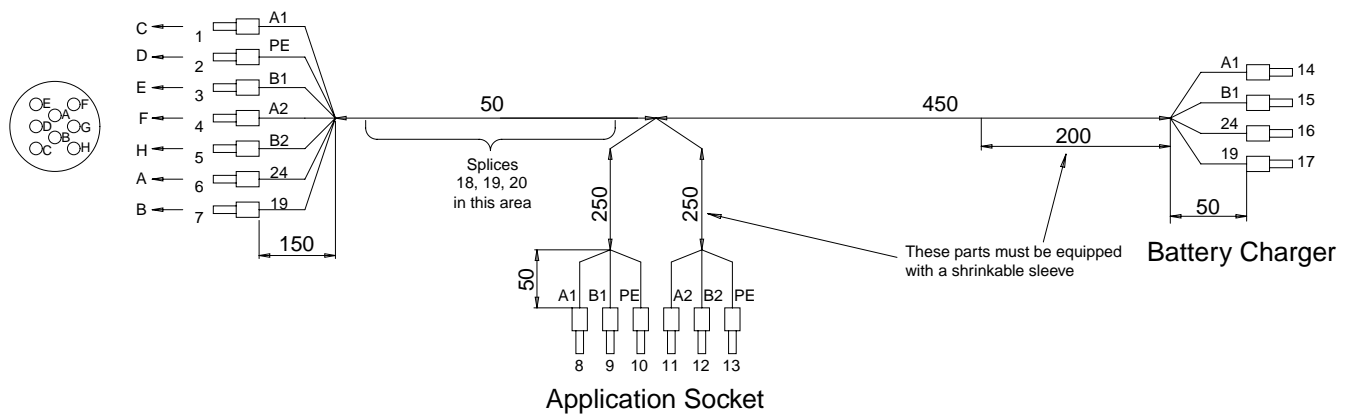
Wiring diagram (EEC/AUS)



TERMINAL END A		WIRE			TERMINAL END B	
NR	TERMINAL	NR	MM ²	COLOUR	NR	TERMINAL
1	SEE DRAWING AREA	A1	1.5	BLACK	15	SPLICE
11	END SOCKET	A	1	BLACK		
4	SEE DRAWING AREA	A2	2.5	BLACK		
8	END SOCKET	A	2.5	BLACK	16	SPLICE
3	SEE DRAWING AREA	B1	1.5	BLACK		
12	END SOCKET	B	1	BLACK		
5	SEE DRAWING AREA	B2	2.5	BLACK	10	END SOCKET
9	END SOCKET	B	2.5	BLACK		
2	SEE DRAWING AREA	PE	2.5	GREEN/YELLOW		
13	END SOCKET	24	1.5	RED	6	SEE DRAWING AREA
14	END SOCKET	19	1.5	BLUE	7	SEE DRAWING AREA

Connector: Deutsch HD N 36-18-8 SN-059

Terminals: Deutsch 0462-203-12141



TERMINAL END A		WIRE			TERMINAL END B	
NR	TERMINAL	NR	MM ²	COLOUR	NR	TERMINAL
1	SEE DRAWING AREA	A1	1.5	BROWN	19	SPLICE
8	END SOCKET	A1	2.5	BROWN		AMP 340701-0
14	END SOCKET	A1	1	BROWN		
3	SEE DRAWING AREA	B1	1.5	BROWN	20	SPLICE
9	END SOCKET	B1	2.5	BROWN		AMP 340701-0
15	END SOCKET	B1	1	BROWN		
4	SEE DRAWING AREA	A2	2.5	BLACK	11	END SOCKET
5	SEE DRAWING AREA	B2	2.5	BLACK	12	END SOCKET
2	SEE DRAWING AREA	PE	2.5	GREEN/YELLOW	18	SPLICE
10	END SOCKET	PE	1.5	GREEN/YELLOW		AMP 340702-0
13	END SOCKET	PE	1.5	GREEN/YELLOW		
6	SEE DRAWING AREA	24	1.5	RED	16	END SOCKET
7	SEE DRAWING AREA	19	1.5	BLUE	17	END SOCKET

Connector: Deutsch HD N 36-18-8 SN-059

Terminals: Deutsch 0462-203-12141



www.atlascopco.com

Printed in Belgium 07/2007 - Preliminary