



**DU-190**  
Instruction Manual  
English



# **Instruction Manual for Portable Compressors**

## **DU-190**

**Original instructions**

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### **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.

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Neglecting maintenance or making changes to the setup of the machine can result in major hazards, including fire risk.

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## Preface

*Please read the following instructions carefully before starting to use your 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 trouble free operation.*

*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.*

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# Safety precautions



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

## INTRODUCTION

The policy of Denyo 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, easy 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 Denyo 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 Denyo 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 Denyo 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 Denyo.

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.

## 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, water jackets, etc.) regularly. See the **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. See the **Preventive maintenance schedule**.
- 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.



## **SAFETY DURING TRANSPORT AND INSTALLATION**

When towing, lifting or transporting the compressor in any way, the battery switch must always be in the "OFF" position!

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.
- 12 Before moving the compressor, switch it off.
- 13 If the warning light on the ABS module or in the vehicle lights up, please contact Denyo.

## **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 cooling water 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 Instruction Book. 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 The unit has parts, which may be accidentally touched by personal, of which the temperature can be in excess of 80 °C (176 °F). The insulation or safety guard, protecting these parts shall not be removed before the parts have cooled down to room temperature. As it is technically not possible to insulate all hot parts or to install safety guards around hot parts (e.g. exhaust manifold, exhaust turbine), the operator / service engineer must always be aware not to touch hot parts when opening a machine door.
  - 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 personal 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.
  - 27 Do not use aerosol types of starting aids such as ether. Such use could result in an explosion and personal injury.

## **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 Denyo 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 Denyo 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 Disconnect –battery-clamp before starting electrical servicing or welding (or turn battery-switch in “off” position).
- 19 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.
- 20 Maintenance and repair work should be recorded in an operator’s logbook for all machinery. Frequency and nature of repairs can reveal unsafe conditions.
- 21 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.
- 22 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.
- 23 Make sure that oil, solvents and other substances likely to pollute the environment are properly disposed of.
- 24 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.

### **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.

## SPECIFIC 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.

### Pressure vessels

Maintenance/installation requirements:

- 1 The vessel can be used as pressure vessel or as separator and is designed to hold compressed air for the following application:
  - pressure vessel for compressor,
  - medium AIR/OIL,
  - and operates as detailed on the data plate of the vessel:
  - the maximum working pressure ps in bar (psi),
  - the maximum working temperature Tmax in °C (°F),
  - the minimum working temperature Tmin in °C (°F),
  - the capacity of the vessel V in l (US gal, Imp gal, cu.ft).
- 2 The pressure vessel is only to be used for the applications as specified above and in accordance with the technical specifications. Safety reasons prohibit any other applications.
- 3 National legislation requirements with respect to re-inspection must be complied with.
- 4 No welding or heat treatment of any kind is permitted to those vessel walls which are exposed to pressure.
- 5 The vessel is provided and may only be used with the required safety equipment such as manometer, overpressure control devices, safety valve, etc.
- 6 Draining of condensate shall be performed daily when vessel is in use.
- 7 Installation, design and connections should not be changed.
- 8 Bolts of cover and flanges may not be used for extra fixation.

### Safety valves

Operating & Maintenance

Only trained and technically competent personnel should consider overhaul, re-set or performance testing of safety valves.

The safety valve is supplied with either a lead security seal or crimped cover to deter unauthorised access to the pressure regulation device.

Under no circumstances should the set pressure of the safety valve be altered to a different pressure than that stamped on the valve without the permission of the installation designer.

If the set pressure must be altered then use only correct parts supplied by Denyo and in accordance with the instructions available for the valve type.

Safety valves must be frequently tested and regularly maintained.

The set pressure should be periodically checked for accuracy.

When fitted, the compressors should be operated at pressures not less than 75% of the set pressure to ensure free and easy movement of internal parts.

The frequency of tests is influenced by factors such as the severity of the operating environment and aggressiveness of the pressurised medium.

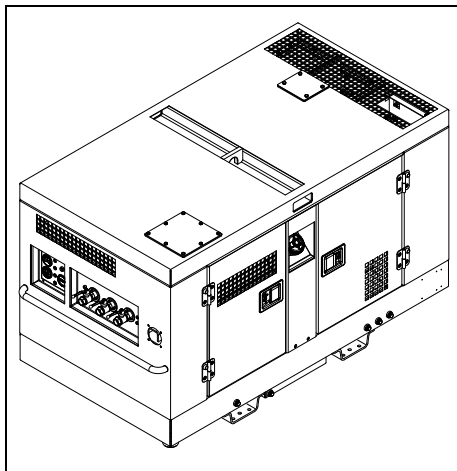
Soft seals and springs should be replaced as part of the maintenance procedure.

Do not paint or coat the installed safety valve (see also **Preventive maintenance schedule**).

# Leading particulars

## GENERAL DESCRIPTION

The DU-190 are silenced, single-stage, oil-injected screw compressors, built for a nominal effective working pressure of 7 bar (101.52 psi).



## Engine

The compressors DU-190 are driven by a 4 cylinder in-line liquid-cooled diesel engine.

The engine's power is transmitted to the compressor element through a heavy-duty coupling.

## Compressor

The compressor casing houses two screw-type rotors, mounted on ball and roller bearings. The male rotor, driven by the engine, drives the female rotor. The compressor delivers pulsation-free air.

Injected oil is used for sealing, cooling and lubricating purposes.

## Compressor oil system

The oil is boosted by air pressure. The system has no oil pump.

The oil is removed from the air, in the air/oil vessel first by centrifugal force, secondly by the oil separator element.

The vessel is provided with an oil level indicator.

## Regulation

The compressor is provided with a continuous pneumatic regulating system and a blow-off valve which is integrated in the unloader assembly. The valve is closed during operation by air receiver pressure and opens by air receiver pressure via the compressor element when the compressor is stopped.

When air consumption increases, the air receiver pressure will decrease and vice versa.

This receiver pressure variation is sensed by the regulating valve which, by means of control air to the unloader and an electronic engine speed regulator, matches the air output to the air consumption. The air receiver pressure is maintained between the pre-selected working pressure and the corresponding unloading pressure.

## Cooling system

The engine is provided with a liquid-cooler and intercooler and the compressor is provided with an oil cooler. For available options see section **Available options**.

The cooling air is generated by a fan, driven by the engine.

## Safety devices

A thermal shut-down sensor protects the compressor against overheating. The air receiver is provided with a safety valve.

The engine is equipped with low oil pressure and high coolant temperature shut-down sensors.

### Frame and axles

The compressor/engine unit is supported by rubber buffers in the frame.

### Bodywork

The bodywork has openings at the shaped front and rear end for the intake and outlet of cooling air and hinged doors for maintenance and service operations. The bodywork is internally lined with sound-absorbing material.

### Lifting eye

A lifting eye is accessible from the roof of the unit .

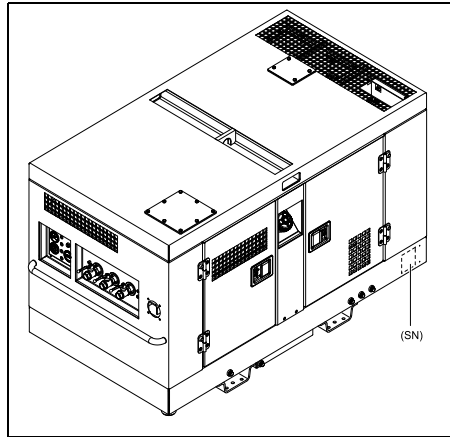
### Control panel

The control panel grouping the air pressure gauge, control switch etc., is placed at the left hand/ rear end corner.

### Data plate

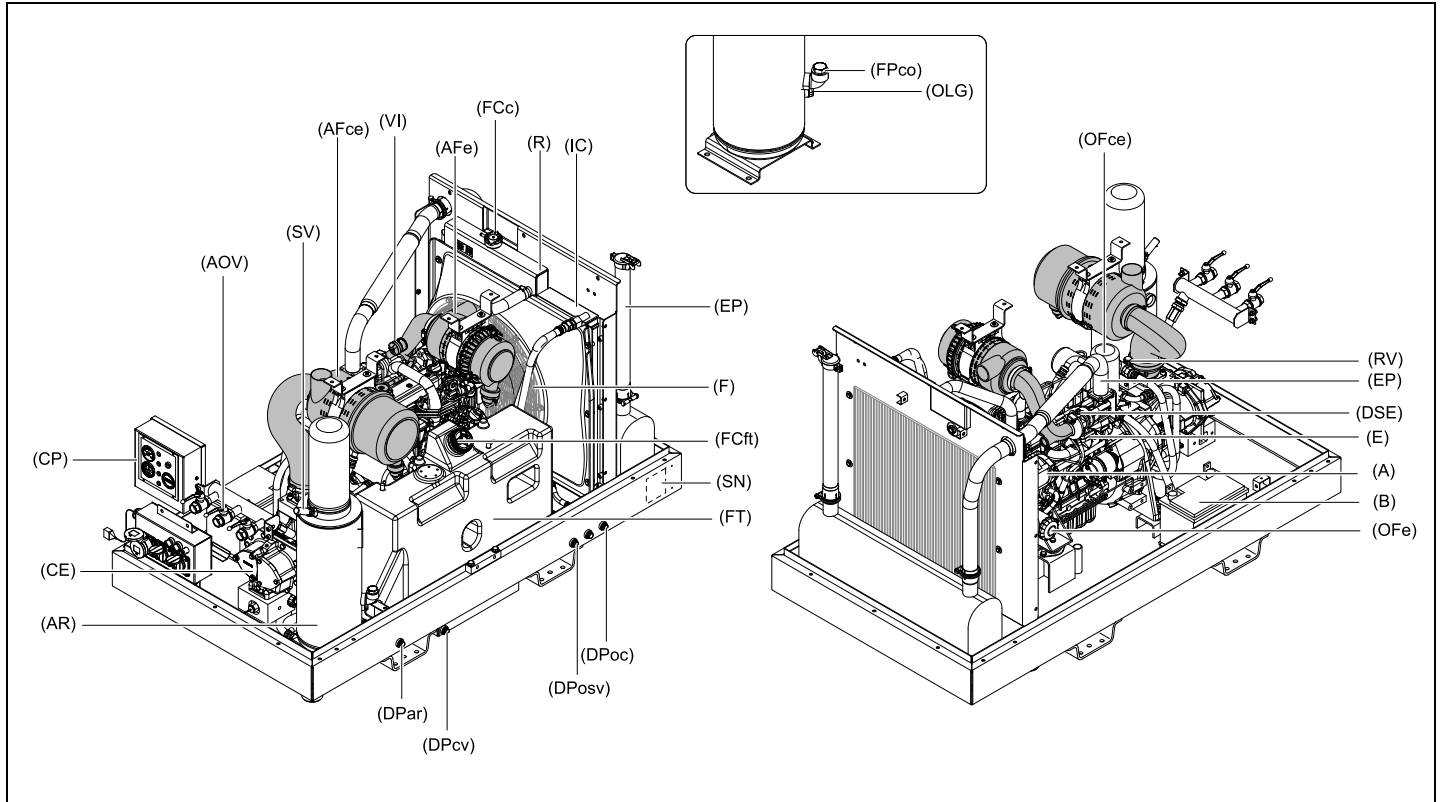
The compressor is furnished with a data plate showing the product code, the unit serial number and the working pressure (see chapter **Data plate**).

### Serial number



The serial number (SN) is located on the right-hand side towards the front on the upper edge of the frame.

# Main Parts

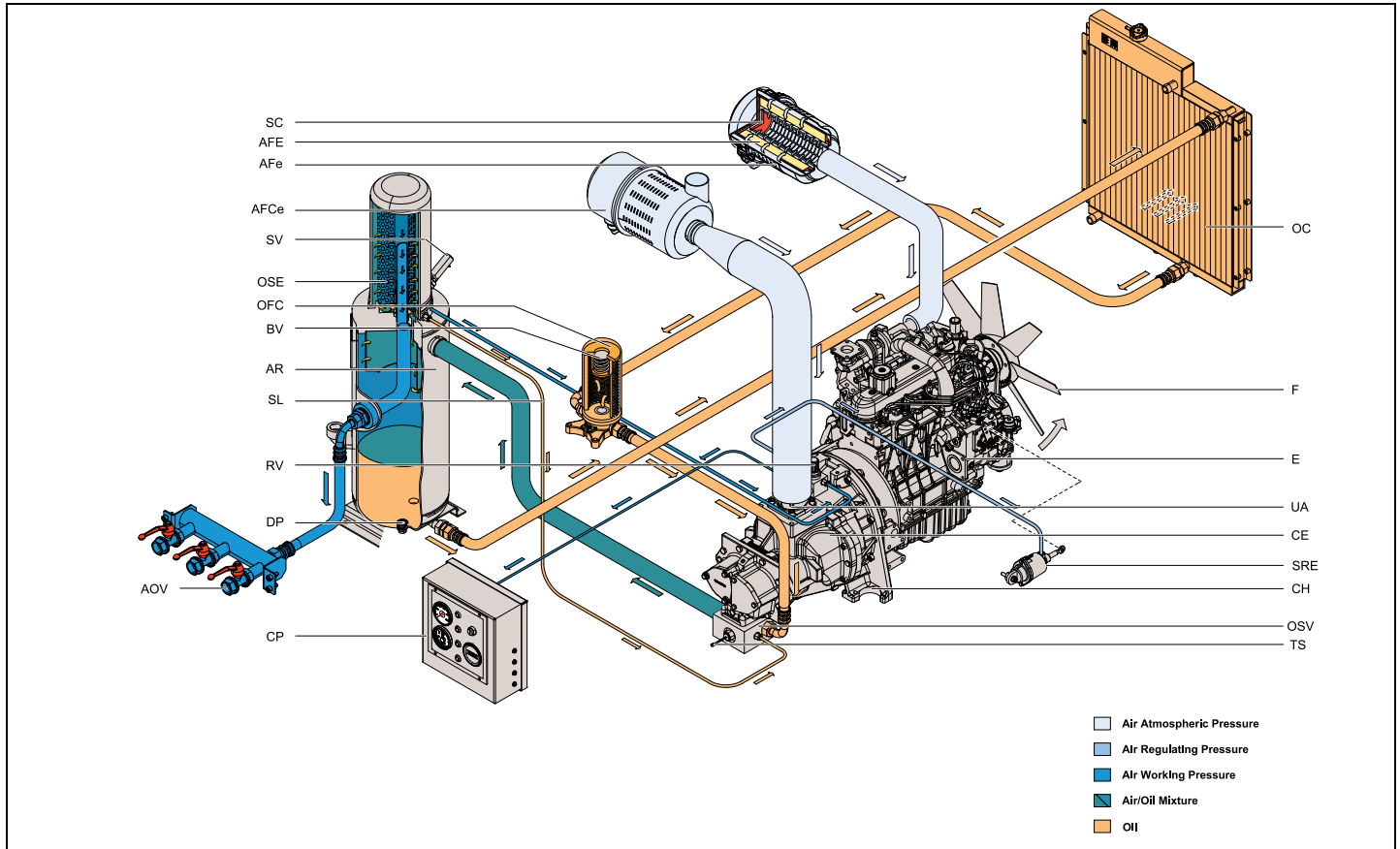




Reference	Name
A	Alternator
AFce	Air filter (compressor element)
AFe	Air filter (engine)
AOV	Air outlet valves
AR	Air receiver
B	Battery
CE	Compressor element
CP	Control panel
DPar	Drain plug air receiver
DPcv	Drain plug compressor element
DPoc	Drain plug compressor oil cooler
DPosv	Drain plug oil shut off valve
DSe	Dip stick engine
E	Engine
EP	Exhaust pipe
F	Fan
FCc	Filler cap (coolant)
FCft	Filler cap fuel tank
FPco	Filler plug (oil compressor element)
FT	Fuel tank
IC	Intercooler
OFce	Oil filter compressor element
OFe	Oil filter (engine)
OLG	Oil level gauge
R	Radiator

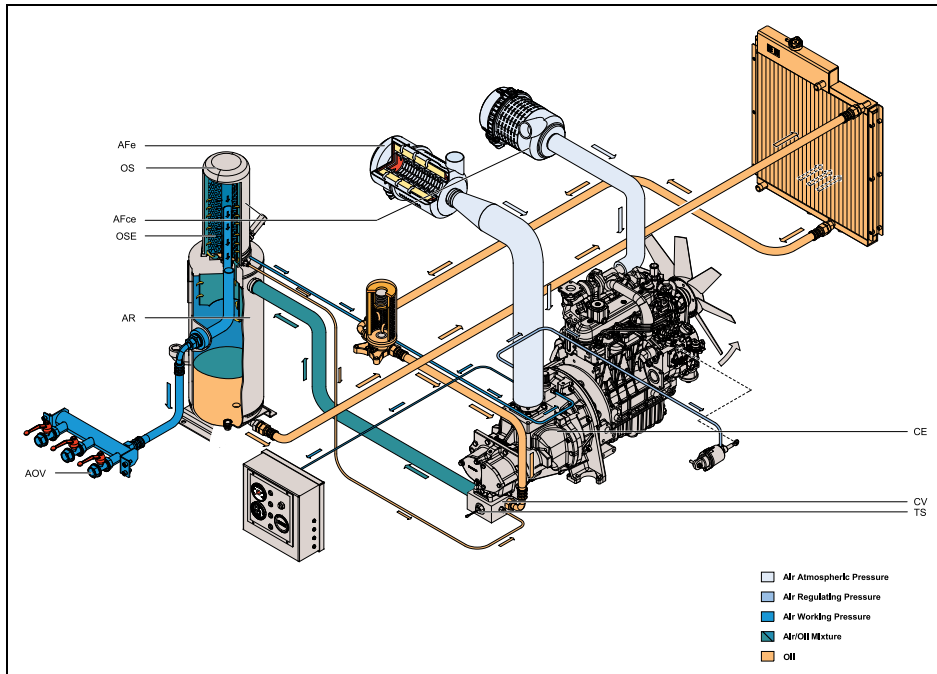
Reference	Name
RV	Regulating valve
SN	Serial number
SV	Safety valve
VI	Vacuum indicator

# COMPRESSOR REGULATING SYSTEM



<b>Reference</b>	<b>Name</b>
AFce	Air filter (compressor element)
AFe	Air filter (engine)
AFE	Air filter Element
AR	Air receiver/Oil separator
AOV	Air outlet valve
BV	Bypass valve
CH	Coupling housing
CE	Compressor element
CP	Control panel
F	Cooling fan
DP	Drain plug
E	Engine
OC	Oil cooler
OSE	Oil separator element
OSV	Oil stop valve
OFC	Oil filter compressor
RV	Regulating valve
SC	Safety cartridge
SL	Scavenge line
SV	Safety valve
SRE	Speed regulator engine
TS	Temperature sensor
UA	Unloader assembly

## AIR FLOW

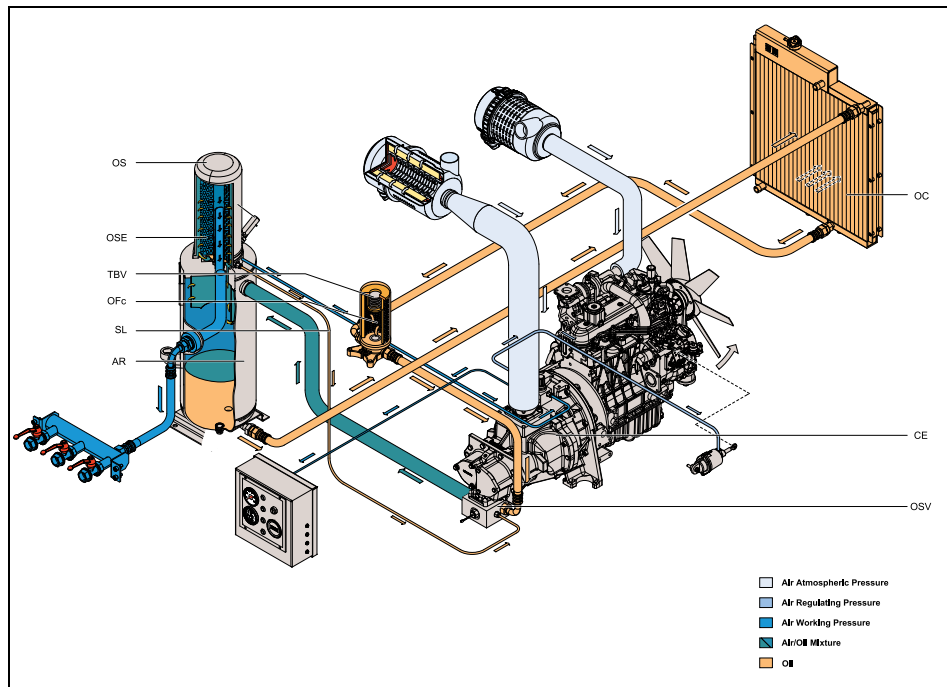


Air drawn through the airfilter (AFce) into the compressor element (CE) is compressed. At the element outlet, compressed air and oil pass into the air receiver/oil separator (AR/OS).

The check valve (CV) prevents blow-back of compressed air when the compressor is stopped. In the air receiver/oil separator (AR/OS), most of the oil is removed from the air/oil mixture.

The oil collects in the receiver and on the bottom of the separator element.

## OIL SYSTEM



The lower part of the air receiver (AR) serves as an oil tank.

Air pressure forces the oil from the air receiver/oil separator (AR/OS) through the oil cooler (OC), the oil filter (OFc) and the oil stop valve (OSV) to the compressor element (CE).

When the compressor is stopped and / or there is no pressure in the system, the oil stop valve (OSV) prevents the oil from flowing back into the compressor element.

The thermostatic by-pass valve (TBV) starts opening when the oil temperature is 70 °C (158 °F).

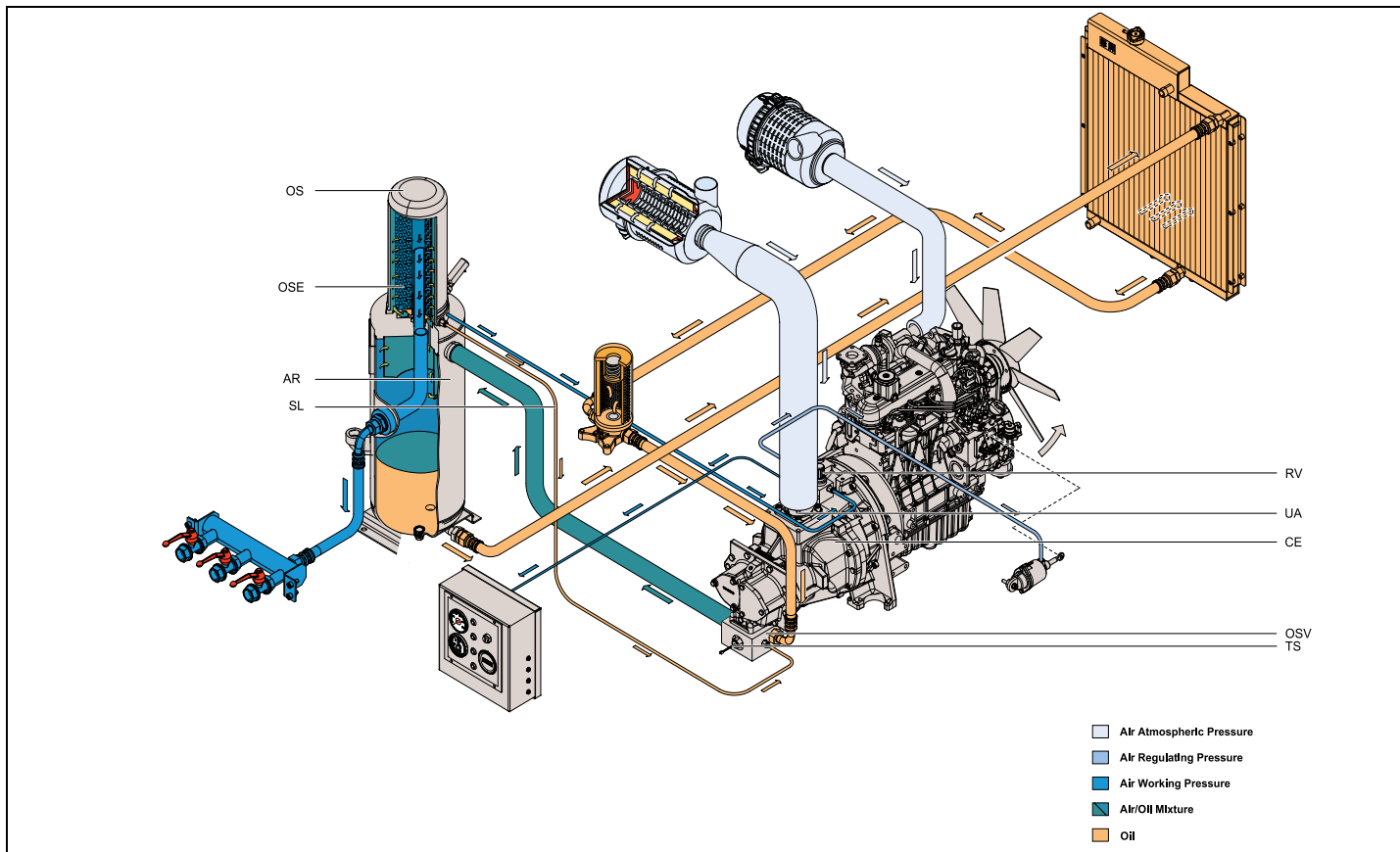
The compressor element has an oil gallery in the bottom of its casing. The oil for rotor lubrication, cooling and sealing is injected through holes in the gallery.

Lubrication of the bearings is ensured by oil injected into the bearing housings.

The injected oil, mixed with the compressed air, leaves the compressor element and re-enters the air receiver, where it is separated from the air as described in section **Air flow**. The oil that collects on the bottom of the oil separator element is returned to the system through a scavenging line (SL), which is provided with a flow restrictor.

The oil filter by-pass valve opens when the pressure drop over the filter is above normal because of a clogged filter. The oil then by-passes the filter without being filtered. For this reason, the oil filter must be replaced at regular intervals (see section **Preventive maintenance schedule**).

# CONTINUOUS PNEUMATIC REGULATING SYSTEM



The compressor is provided with a continuous pneumatic regulating system and a blow-off valve, which is integrated in the unloader assembly (UA). The blow-off valve is kept closed by receiver pressure and opens by compressor element outlet pressure when the compressor is stopped.

When the air consumption increases, the air receiver pressure will decrease and vice versa. This receiver pressure variation is sensed by the regulating valve (RV) which, by means of control air to the unloader assembly (UA), matches the air output to the air consumption. The air receiver (AR) pressure is maintained between the pre-selected working pressure and the corresponding unloading pressure.

When starting the compressor, the throttle valve is kept closed via receiver pressure. The compressor element (CE) takes in air and pressure builds up inside the receiver (AR). The throttle valve is closed. The air output is controlled from maximum output (100%) to no output (0%) by:

1. Speed control of the engine between maximum load speed and unloading speed (the output of a screw compressor is proportional to the rotating speed).
2. Air inlet throttling.

If the air consumption is equal to or exceeds the maximum air output, the engine speed is held at maximum load speed and the throttle valve is fully open.













If the air consumption is less than the maximum air output, air receiver pressure increases and the regulating valve supplies control air to throttle valve to reduce the air output and holds air receiver pressure between the normal working pressure and the corresponding unloading pressure. Unloading pressure = normal working pressure + 1 bar (14.5 psi).












When the air consumption is resumed, the blow off valve closes and the throttle valve gradually opens the air intake and the electronic speed regulator increases the engine speed.









The construction of the regulating valve (RV) is such that any increase (decrease) of the air receiver pressure above the pre-set valve opening pressure results in a proportional increase (decrease) of the control pressure to the throttle valve and the electronic speed regulator.

Part of the control air is vented into the atmosphere, and any condensate discharged, through the vent holes.

## MARKINGS AND INFORMATION LABELS

	Dangerous outlet gases.
	Danger, hot surface.
	Electrocution hazard.
	Manual.
	Read the instruction manual before working on the battery.
 <b>PAROIL</b>	Paroil S
	On / off button.
	Prohibition to open air valves without connected hoses.
	Rotation direction.
	Inlet.
	Outlet.
	Compressor oil drain.

	Read the instruction manual before starting.
	Warning! Part under pressure.
	Do not stand on outlet valves.
	Start-Stop indication of switch.
	Do not run the compressor with open doors.
	Lifting permitted.
	Use diesel fuel only.
	Sound power level in accordance with Directive 2000/14/EC, 84/533/EEC and 85/406/EEC. (expressed in dB (A)).
	Fork lifting permitted.
	Don't lift here.
	Read the instruction manual before lifting.

	Filler cap coolant.
	Read the instruction manual before topping up with coolant.
	Service point.
	Do not run the compressor when the baffles are not in the right position.
	Never use it for lifting the unit.
	Moving parts.
	Engine exhaust.
	Diesel fuel.



# Operating instructions

## LIFTING INSTRUCTIONS

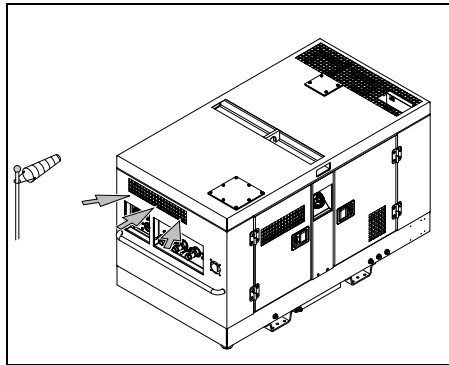
### Safety precautions



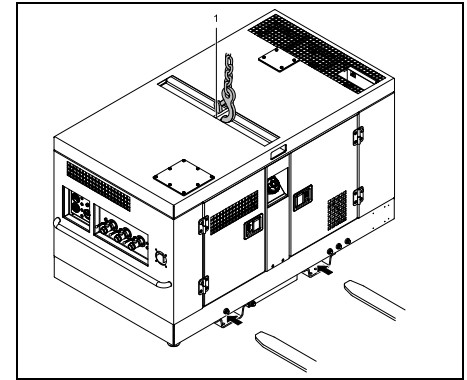
The operator is expected to apply all relevant Safety precautions.



When lifting or transporting the compressor in any way, the battery switch must always be in the “OFF” position.



Locate the rear-end of the compressor upwind, away from contaminated wind-streams and walls. Avoid recirculation of exhaust air from the engine. This can cause overheating and engine power decrease.



When lifting the compressor, the hoist has to be placed in such a way that the compressor, which must be placed level, is lifted vertically. Keep lifting acceleration and retardation within safe limits.

The lifting eye (1) can be accessed from the roof of the unit.



**Lifting acceleration and retardation must be kept within safe limits (max. 2xg).**

**Helicopter lifting is not allowed.  
Lifting is not allowed when the unit is running.**

## STARTING / STOPPING

### BEFORE STARTING

1. Before initial start-up, prepare battery for operation if not already done. See section **Recharging a battery**.
2. With the compressor standing level, check the level of the engine oil. Add oil, if necessary, up to the upper mark on the dipstick. Also check the engine coolant level. Consult the Engine Operation Manual for the type of coolant and type and viscosity grade of the engine oil.
3. Check the level of the compressor oil. The pointer of oil level gauge (OLG) should register in the green range. Add oil if necessary. See section **Engine oil and oil filter change** for the oil to be used.



**Before removing oil filler plug (FP), ensure that pressure is released by opening an air outlet valve.**

4. Check that the fuel tank contains sufficient fuel. Top up, if necessary. Consult the Engine Operation Manual for the type of fuel.
5. Drain any water and sediment from the fuel filters until clean fuel flows from the drain cock. See section **Priming instructions**.
6. Empty the dust trap of each air filter (AF). See section **Cleaning the dust trap**.
7. Check coolant level in engine coolant top tank. Top up, if necessary. Consult the Engine Operation Manual for coolant specifications.

8. Attach the air line(s) to the closed air outlet valve(s). Connect the safety chain.



**No external force may be applied to the air outlet valve(s), e.g. by pulling hoses or by connecting equipment directly to the valve(s).**

### Safety precautions



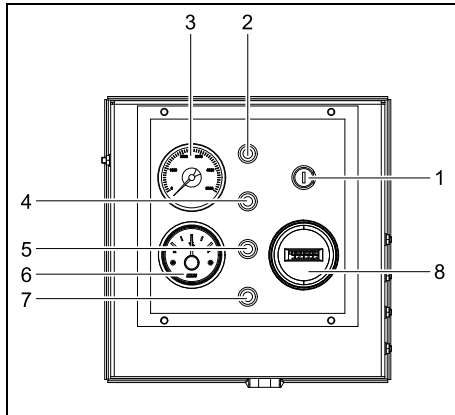
**Do not disconnect power supply to control box in any way when the control box is switched on.**

Make sure the fuel tank is filled up.



**When the compressor is put in operation for the first time and after running out of fuel or changing the fuel filter, follow the specific start procedure as described in section Priming instructions.**

# Controller Panel



Reference	Description
1	Engine ignition key port
2	Fuel level low indicator
3	Pressure gauge
4	Battery malfunction indicator
5	Compressor outlet temperature high indicator
6	Fuel gauge
7	Oil temperature high indicator
8	Meter for running hours

## CONTROL PANEL DESCRIPTION

1. The engine ignition key port (1) is used to start the engine.
2. The fuel level low indicator (2) glows if the fuel level in the fuel tank is low.
3. The pressure gauge (3) is used to monitor the outlet pressure of the unit.
4. The battery malfunction indicator (4) glows if the battery is about to fail. Some situations where this indicator will glow are when the level of electrolyte is low, the battery is short, the battery begins gassing, the battery is overheating etc.
5. The temperature switch at the compressor outlet port continuously monitors the outlet temperature. If the outlet temperature exceeds the limiting conditions (see section Technical specifications, limitation ), the compressor outlet temperature high indicator (5) begins to glow.
6. The Fuel gauge (6) helps monitoring the quantity of fuel filled into the fuel tank. Do not overfill the fuel tank. Fill fuel within the limits represented on the fuel gauge (6).
7. The temperature switch at the outlet of the oil cooler continuously monitors the oil temperature. If it is higher than the permissible limits, the Oil temperature high indicator (7) begins to glow.
8. The machine running hours can be tracked on the running hours meter (8). It can be used to track hours between required service activities.

## STARTING/STOPPING

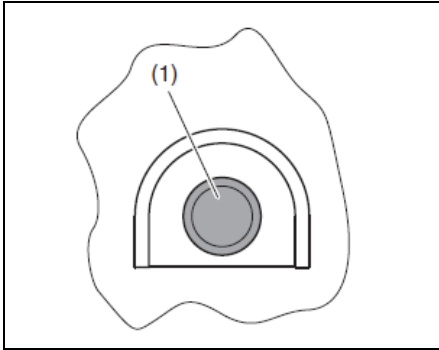
### SAFETY PRECAUTION

1. Before starting the machine, make sure that the fuel tank is full.

### PROCEDURE

1. Insert the ignition key into the ignition key port (1). Twist the ignition key in the clockwise direction to start the engine.
2. Run the engine for a few minutes at no-load to warm up.
3. To shut down the engine, twist the ignition key in the anti-clockwise direction.

## EMERGENCY STOP



**The emergency stop button is only to be used in emergency situations not for stopping procedures.**

When an emergency stop button (1) is pressed, power to all outputs is terminated, by the emergency stop itself (hardware) as well as by the software.

When the emergency stop button (1) is pressed the operator can unlock the emergency stop by turning it counterclockwise

# Maintenance

## LIABILITY

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.

## SERVICE PAKS

A Service Pak is a collection of parts to be used for a specific maintenance task, e.g. after 250, 500, 1000 and after 1500 running hours.

It guarantees that all necessary parts are replaced at the same time keeping down time to a minimum.

The order number of the Service Paks are listed in the Denyo Parts List.

### Use of service paks

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

Service Paks minimize downtime and keep your maintenance budget low.

Order Service Paks at your local Denyo dealer.

## 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.

The order numbers of the Service Kits are listed in the Denyo Parts List.



**Contact Denyo.**

## 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 compressor is going to be stored without running from time to time, protective measures must be taken.**

## PREVENTIVE MAINTENANCE SCHEDULE



Unauthorised modifications can lead to risk for injury or machine damage.



Always keep the machine tidy in order to prevent fire hazard.



Poor maintenance can void any warranty claims.

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 compressors operating in a dusty environment typical for compressor applications. Maintenance schedule can be adapted depending on application, environment and quality of maintenance.

## MAINTENANCE SCHEDULE COMPRESSOR

To determine the maintenance intervals, use of service hours, or calendar time, whichever occurs first.

Maintenance schedule (running hours)	50 hours after initial start-up	Every 250 hours	Every 500 hours	Every 1000 hours	Every 1500 hours	Yearly	Biennially
Service parts	-	3002 6085 20	3002 6085 30	3002 6085 40	3002 6085 50	-	-
<i>For the most important subassemblies, Denyo has developed service kits that combine all wear parts. These service kits offer you the benefits of genuine parts, save administration costs and are offered at a reduced price, compared to individual components. Refer to the parts list for more information on the contents of the service kits.</i>							
Change engine oil <sup>(2)</sup>	x	x				x	
Replace engine oil filter <sup>(2)</sup>	x	x				x	
Check for leaks in engine, compressor, air, oil, or fuel system	x		x			x	
Check torque on critical bolt connections	x		x			x	
Hoses and clamps-Inspect/Replace	x		x			x	
Inspect/Adjust fan belt		x				x	
Check valve in the fuel return (for mechanical injection system)		x				x	
Clean after cooler (option) <sup>(1)</sup>		x				x	
Drain/Clean fuel tank water and sediments <sup>(1)</sup>		x				x	
Replace fuel filter <sup>(3)</sup>		x				x	
Replace fuel prefilter <sup>(3)</sup>		x				x	
<i>(to be continued on page 31)</i>							

Maintenance schedule (running hours) (continuation of page 30)	50 hours after initial start-up	Every 250 hours	Every 500 hours	Every 1000 hours	Every 1500 hours	Yearly	Biennially
Service parts	-	3002 6085 20	3002 6085 30	3002 6085 40	3002 6085 50	-	-
Clean oil cooler(s)/radiator		x				x	
Inspection by Denyo service technician		x				x	
Check engine & compressor anti-vibration pads			x			x	
Check functioning of regulating valve			x			x	
Check electrical system cables for wear			x			x	
Check engine (minimum and maximum) speed			x			x	
Clean flow restrictor in oil scavenge line			x			x	
Grease hinges			x			x	
Check/Test glow plugs-grid heater			x			x	
Replace bleed-off valve unloader			x			x	
Check rubber flexibles <sup>(9)</sup>			x			x	
Analyse coolant <sup>(3)(7)</sup>			x			x	
Replace fan belt			x				
Adjust engine inlet and outlet valves <sup>(2)</sup>			x				
Replace oil separator element					x		x
Check/Replace safety cartridge				x	x	x	
Replace compressor oil filter(s) <sup>(4)</sup>	x				x		x
Change compressor oil <sup>(1)(6)</sup>					x		x
Replace air filter element <sup>(1)</sup>				x	x	x	
Measure alternator insulation resistance (on optional genset)						x	
Check electrolyte level and terminals of battery						x	
Test safety valve <sup>(8)</sup>						x	
Check emergency stop						x	

**Notes:**



1. More frequently when operating in a dusty environment.
2. Refer to the engine operation manual.
3. Yearly is only valid when using COOLANT EG. Change coolant every 5 years.
4. Use Denyo oil filters, with by-pass valve, as specified in the parts list.
5. Gummed or clogged filters mean fuel starvation and reduced engine performance.
6. See section **Oil specifications**.
7. The following part numbers can be ordered from Denyo to check on inhibitors and freezing point:
  - 2913 0028 00 Refractometer
  - 2913 0029 00 pH meter.
8. See section **Safety valve**.
9. Replace all rubber flexibles every 6 years, according to DIN 20066.



**Keep the bolts of the housing, the lifting beam, tow bar and axles securely tightened. For torque values see section Technical specifications.**



## OIL SPECIFICATIONS



**It is strongly recommended to use Denyo branded lubrication oils for both compressor and engine.**



**Only use synthetic compressor oil Paroil S in DU-190.**

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



**Never mix synthetic with mineral oil.**

**Remark:**

**When changing from mineral to synthetic oil (or the other way around), you will need to do an extra rinse:**

**After a complete change over to synthetic oil, run the unit for a few minutes to allow proper and complete circulation of the synthetic oil.**

**Then drain the synthetic oil again and fill again with new synthetic oil. To set correct oil levels, follow the normal instructions.**

Paroil from Denyo is the ONLY oil tested and approved for use in all engines built into Denyo compressors and generators.

Extensive laboratory and field endurance tests on Denyo equipment have proven Compressor oil 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 Compressor oil 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. Compressor oil 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.

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

Paroil prevents soot build-up

Compressor oil 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.

Paroil is a synthetic ultra high performance diesel engine oil with a high viscosity- index. Denyo Compressor oil is designed to provide excellent lubrication from start-up at temperatures as low as -25 °C (-13 °F).

Paroil is a mineral based high performance diesel engine oil with a high viscosity- index. Denyo Compressor oil is designed to provide a high level of performance and protection under 'standard' ambient conditions from -5 °C (23 °F) onward.

## COMPRESSOR OIL

Synthetic Compressor oil Paroil S

	Liter	US gal	Order number
Can	5	1.3	1630 0160 00
Can	20	5.3	1630 0161 00
Barrel	210	55.2	1630 0162 00
Container	1000	265	1630 0163 00

## ENGINE OIL



**Use specified engine oil, It greatly affects the startup operation and life of the engine.**



**Only use oil, CF class or higher, classified by API service.**

## OIL LEVEL CHECK

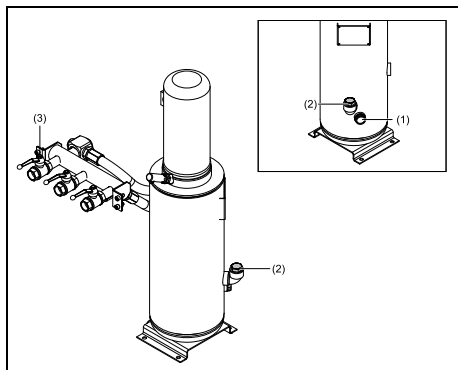
### CHECK ENGINE OIL LEVEL

Also consult the Engine Operation Manual for the oil specifications, viscosity recommendations and oil change intervals.

For intervals, see **Preventive maintenance schedule**.

Check engine oil level in accordance to the instructions in the Engine Operation Manual and if necessary, top up with oil.

### CHECK COMPRESSOR OIL LEVEL



With the unit standing horizontal, check the level of the compressor oil. The oil level should be shown in the sight glass or above the sight glass. Add oil if necessary.

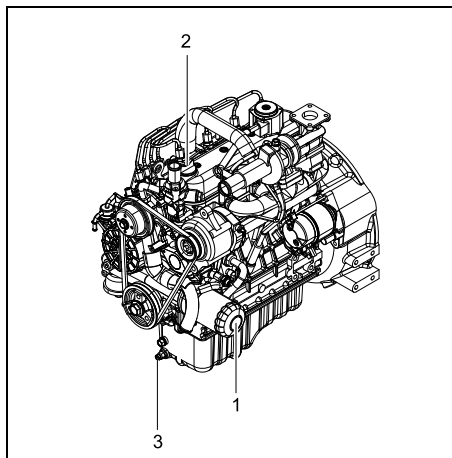


**Before removing the oil filler plug (2), ensure that the pressure is released by opening an air outlet valve (3).**

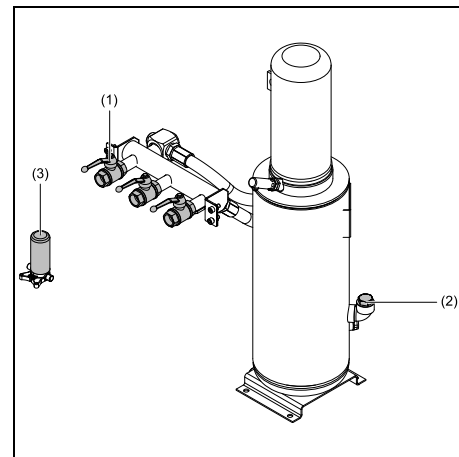
## OIL AND OIL FILTER CHANGE

### ENGINE OIL AND OIL FILTER CHANGE

See section **Preventive maintenance schedule**.



## COMPRESSOR OIL AND OIL FILTER CHANGE



The quality and the temperature of the oil determine the oil change interval.

The prescribed interval is based on normal operating conditions and an oil temperature of up to 100 °C (212 °F) (see section **Preventive maintenance schedule**).

When operating in high ambient temperatures, in very dusty or high humidity conditions, it is recommended to change the oil more frequently.



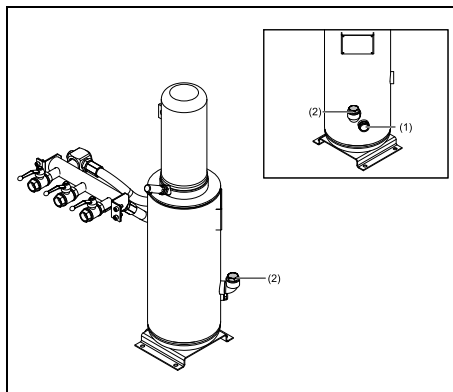
**In this case, contact Denyo.**

1. Run the compressor until warm. Close the outlet valve(s) (1) and stop the compressor. Wait until the pressure is released through the automatic blow-down valve. Unscrew the oil filler plug (2) by a single turn. This uncovers a vent hole, which permits any pressure in the system to escape.
2. Drain the compressor oil by removing all relevant drain plugs. Drain plugs are fitted at the air receiver (DPar), compressor element (DPcv, DPosv) and compressor oil cooler (DPoc). Catch the oil in a drain pan. Unscrew the filler plug (2) to speed up draining. After draining, reposition and tighten the drain plugs.
3. Remove the oil filters (3), e.g. by means of a special tool. Catch the oil in a drain pan.
4. Clean the filter seat on the manifold, taking care that no dirt drops into the system. Oil the gasket of the new filter element. Screw it into place until the gasket contacts its seat, then tighten one half turn only.
5. Fill the air receiver until the pointer of the oil level gauge is in the upper part of the green area. Be sure that no dirt gets into the system. Reinstall and tighten the filler plug (2).
6. Start the compressor and let it run unloaded for a few minutes.
7. Stop the compressor, wait a few minutes and top up with oil until the pointer of the oil level gauge is in the upper part of the green area.



**Never add more oil. Overfilling results in oil consumption.**

## TOPPING UP THE COMPRESSOR OIL



1. Stop the compressor and be sure that all pressure has been released by opening the filler plug (2) one turn.
2. Wait a few minutes until the oil level is constant (oil level gauge (1)).
3. Remove the oil filler plug (2) and top up with oil until the pointer of the oil level gauge (1) is in the upper part of the green area.
4. Reinstall and tighten the filler plug (2).

## COMPRESSOR OIL FLUSHING PROCEDURE



**Not respecting compressor oil changing intervals in accordance with the maintenance schedule, can lead to serious problems, including fire hazard! The manufacturer does not accept any liability for damage arising from not following the maintenance schedule or not using genuine parts.**

To avoid problems when changing over to a new type of oil (see table) a special Compressor Oil Flushing Procedure has to be followed. The table is only valid when the replaced oil has not exceeded its lifetime. For more information consult Denyo Service dept.

Aged oil can be recognized best by using an oil sampling analysis program. Indicators for aged oil are strong smell, or contamination such as sludge and varnish inside the oil vessel and oil stop valve or a brownish colour of the oil.

Whenever aged oil is discovered, e.g. when changing the oil separator, contact Denyo Service dept. to have your compressor cleaned and flushed.

1. First thoroughly drain the system when the oil is warm, leaving as little oil in the system as possible, especially in dead areas, if possible blow out remaining oil by pressurising the oil system. Check the instruction manual for detailed description.
2. Remove the compressor oil filter(s).
3. Open the oil vessel and remove the oil separator element.



**Instructions on replacing the oil separator element are available from Denyo Service dept.**

4. Check the interior of the oil vessel (see pictures). If varnish deposits are discovered, contact Denyo Service dept. and do not continue.
5. Put in a new oil separator, screw on new compressor oil filter(s) and close the oil vessel according to the instructions.
6. Fill the oil vessel with the minimum amount of replacement oil, run the compressor under light load conditions for 30 minutes.
7. Thoroughly drain the system when the oil is warm, leaving as little oil in the system as possible, especially in dead areas, if possible blow out remaining oil by pressurising the oil.
8. Fill the system with the final oil charge.
9. Run the compressor under light load conditions for 15 minutes and check for leakage.
10. Check the oil level and top up if necessary.
11. Collect all waste lubricant used during the flushing process and dispose of it in accordance with the applicable procedures for managing waste lubricant.



*Vessel cover contaminated*

*clean*



*Vessel contaminated*

*clean*

	Paroil S
Compressor oil	draining *

\* When changing over to the same oil within the oil changing interval, draining is sufficient

\*\* Change over not recommended

## COOLANT SPECIFICATIONS



**It is strongly recommended to use Denyo branded coolant.**

The use of the correct coolant is important for proper heat transfer and protection of liquid-cooled engines. Coolants used in these engines must be mixtures of good quality water (distilled or de-ionised), special coolant additives and anti-freeze, if required. Coolant that is not to manufacturer's specification will result in mechanical damage of the engine.

The freezing point of the coolant must be lower than the freezing point that can occur in the area. The difference must be at least 5 °C (9 °F). If the coolant freezes, it may crack the cylinder block, radiator or coolant pump.

Consult the engine's operation manual and follow the manufacturer's directions.



**Never mix different coolants and mix the coolant components outside the cooling system.**

## COOLANT EG

**COOLANT EG is the only coolant that has been tested and approved by all manufacturers of engines currently used in Denyo compressors and generators.**

Denyo's COOLANT EG extended life coolant is the new range of organic coolants purpose-designed to meet the needs of modern engines. COOLANT EG can help prevent leaks caused by corrosion. COOLANT EG is also fully compatible with all sealants and gasket types developed to join different materials used within an engine.

Because COOLANT EG inhibits corrosion, deposit formation is minimized. This effectively eliminates flow restriction problems through the engine coolant ducts and the radiator, minimizing the risk of engine overheating and possible failure.

It reduces water pump seal wear and has excellent stability when subjected to sustained high operating temperatures.

COOLANT EG is free of nitride and amines to protect your health and the environment. Longer service life reduces the amount of coolant produced and disposal requirements, which limits environmental impact.

To ensure protection against corrosion, cavitation and formation of deposits, the concentration of the additives in the coolant must be kept to certain limits, as stated by the manufacturer's guidelines. Topping up the coolant with water only, changes the concentration and is therefore not allowed.

Liquid-cooled engines are factory-filled with this type of coolant mixture.

Mix long-life coolant (LLC) of anti-freeze and anti-rust aluminium radiator into soft water of good quality such as tap water, and use it as cooling water.

Mixing rate of LLC should be selected within the range of 30-50%.

if the mixing rate decreases to 30% or lower, rust prevention properties deteriorate.

Standard mixing rate to of LLC and operating ambient temperature are as shown below.

30%: -10°C

40%: -20°C

50%: -30°C

In general, LLC needs to be replaced after 2 years of use.

## HANDLING COOLANT EG

COOLANT EG should be stored at ambient temperatures, while periods of exposure to temperatures above 35 °C (95 °F) should be minimized. COOLANT EG can be stored for a minimum of 5 years in unopened containers without any effect on the product quality of performance.

COOLANT EG is compatible with most other coolants based on ethylene glycol, but you only get the benefits of 5 years protection when its used on its own. Exclusive use of COOLANT EG is recommended for optimum corrosion protection and sludge control.

For simple density-measuring of Ethylene Glycol and Propylene Glycol in general the standard available 'density' measuring devices are used to measure the concentration of EG. In case a device is used to measure EG, no PG can be measured afterwards as a result of the difference in the density. More specific measurements can be done by the use of a refractometer. This device can measure both EG and PG. A mix of both products will be show unreliable results!

Mixed EG coolants with identical glycol type can be measured by use of a refractometer as well as the 'density' system. The mixed coolants will be considered as one product.

The use of distilled water is recommended. If you have exceptionally soft water it would be acceptable, as well. Basically, the engine metals are going to corrode to some extent no matter what water you use, and hard water will encourage the resulting metal salts to precipitate.

COOLANT EG comes as a pre-mixed coolant to safeguard the quality of the complete product.

It is recommended that topping up of the cooling system is always done with COOLANT EG.

## COOLANT CHECK



**Never remove the cooling system filler cap while coolant is hot.**

**The system may be under pressure. Remove the cap slowly and only when coolant is at ambient temperature. A sudden release of pressure from a heated cooling system can result in personal injury from the splash of hot coolant.**

In order to guarantee the lifetime and quality of the product, thus optimising engine protection, regular coolant-condition-analysis is recommended.

The quality of the product can be determined by three parameters:

### Visual check

- Verify the appearance of the coolant with regard to its colour and make sure that no loose particles are floating around.

### pH measurement

- Check the pH value of the coolant using a pH-measuring device.
- The pH-meter can be ordered from Denyo with part number 2913 0029 00.
- Typical value for EG = 8.6.
- If the pH-level is below 7 or above 9.5, the coolant should be replaced.

## Glycol concentration measurement

- To optimise the unique engine protection features of the COOLANT EG, the concentration of the Glycol in the water should always be above 33 vol. %.
- Mixtures exceeding a 68 vol. % mix ratio in water are not recommended, as this will lead to high engine operating temperatures.
- A refractometer can be ordered from Denyo with part number 2913 0028 00.



**In case of a mix of different coolant products this type of measuring might provide incorrect values.**

## TOPPING UP/REPLACING COOLANT

- Verify whether the engine cooling system is in a good condition (no leaks, clean).
- Check the condition of the coolant.
- If the condition of the coolant is no longer up to standard, the complete coolant should be replaced (see section **Replacing the coolant**).
- Always top-up with COOLANT EG Concentrate / COOLANT EG.
- Topping up the coolant with water only, changes the concentration of additives and is therefore not allowed.

## TOPPING UP WITHOUT DRAINING FROM THE COOLING SYSTEM

The quantity of COOLANT EG Concentrate to be topped up can be estimated with the following formula and/or graph:

### Corrections concentrate in measured system towards 50% volume by using COOLANT EG Concentrate

PN: 1604 8159 00

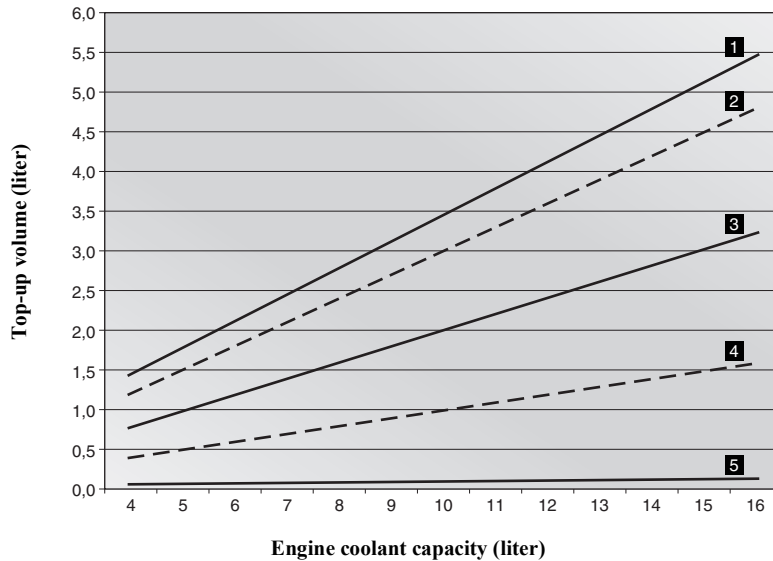
#### Example:

Total volume coolant = 14 Liter

Measured concentration = 33 Vol %

$$50 - \frac{33}{33} = 17 \cdot \frac{14}{50} = 4,8 \text{ Liter COOLANT EG Concentrate}$$

#### Top-up volume COOLANT EG Concentrate without drainage



In case of expansion tank at low level, this quantity is to be filled without draining from the cooling system.

- 1 Refractometer indication -20 °C (-4 °F) (33%)
- 2 Refractometer indication -22 °C (-7.6 °F)
- 3 Refractometer indication -25 °C (-13 °F)
- 4 Refractometer indication -30 °C (-22 °F)
- 5 Refractometer indication -36 °C (-32.8 °F)



## TOPPING UP AFTER LIMITED QUANTITY DRAINING FROM THE COOLING SYSTEM

The quantity of COOLANT EG Concentrate to be topped up after draining a calculated volume from the cooling system, can be estimated with the following formula and/or graph:

### Corrections concentrate in measured system towards 50% volume by using COOLANT Concentrate

PN: 1604 8159 00

#### Example:

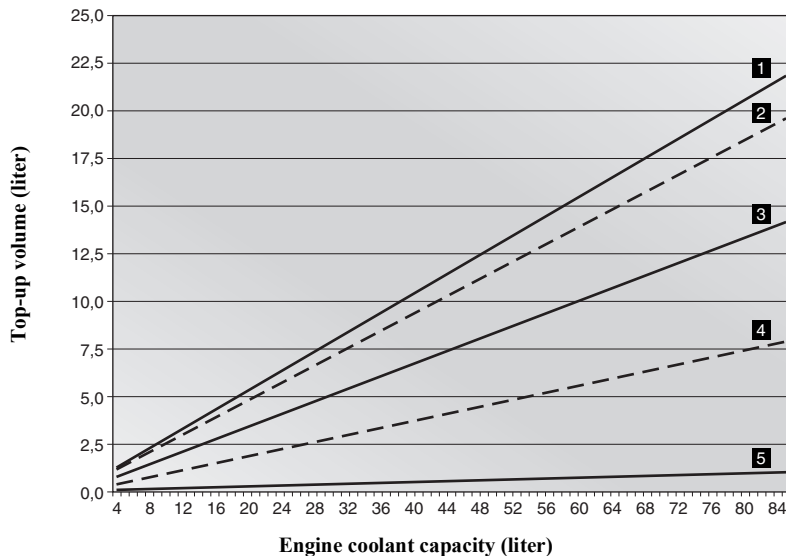
Total volume coolant = 80 Liter

Measured concentration = 33 Vol %

$$50 - \frac{33}{33} = 17 \rightarrow \frac{80}{67} = 20 \text{ Liter COOLANT EG Concentrate}$$

$$100 - \frac{33}{33} = 67$$

Top-up volume COOLANT EG Concentrate with drainage



In case of expansion tank at normal level, this quantity is to be drained from the cooling system.

- 1 Refractometer indication -20 °C (-4 °F) (33%)
- 2 Refractometer indication -22 °C (-7.6 °F)
- 3 Refractometer indication -25 °C (-13 °F)
- 4 Refractometer indication -30 °C (-22 °F)
- 5 Refractometer indication -36 °C (-32.8 °F)

## REPLACING THE COOLANT

### Drain

- Completely drain the entire cooling system.
- Used coolant must be disposed of or recycled in accordance with legislation and local regulations.

### Flush

- Flush twice with clean water. Used coolant must be disposed of or recycled in accordance with laws and local regulations.
- Using the Denyo Instruction book, determine the amount of COOLANT EG required and pour into the radiator top tank.
- It should be clearly understood that proper cleaning reduces contamination risks.
- In case of “other” coolant residues inside the system, the coolant with the lowest properties influences the quality of the ‘mixed’ coolant.

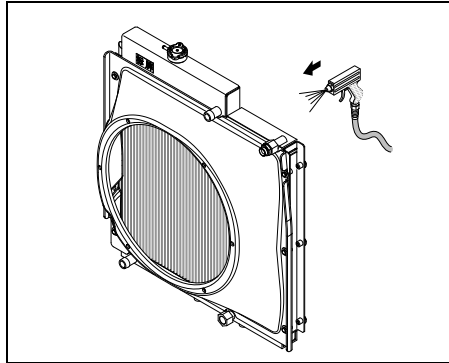
### Fill

- To assure proper operation and the release of trapped air, run the engine until normal engine operation temperature is reached. Turn off the engine and allow to cool.
- From the Denyo Instruction book, determine the amount of COOLANT EG required.
- Mix concentrate and water before filling.
- Fill with a maximum rate of 10 l/min (0.35 cu.ft/min).
- Recheck coolant level and add coolant mixture if necessary.



**Caution: Do not top up when the engine is hot.**

## CLEANING COOLERS



Keep the compressor oil cooler and engine liquid cooler clean to maintain the cooling efficiency.



**Remove any dirt from the coolers with a fibre brush. Never use a wire brush or metal objects.**

Clean by air jet in the direction of the arrow.

Steam cleaning in combination with a cleansing agent may be applied (do not use jet at max. power).



**To avoid damaging the coolers, angle between jet and coolers should be approximately 90°.**

Close the service door(s).



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

**Never leave spilled liquids such as fuel, oil, coolant and cleansing agents in or around the compressor.**

## 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 **Activating a dry-charged battery**.

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

## 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.

## ACTIVATING A DRY-CHARGED BATTERY

- Take out the battery.
- Battery and electrolyte must be at equal temperature above 10 °C (50 °F).
- Remove cover and/or plug from each cell.
- Fill each cell with electrolyte until the level reaches 10 mm (0.4 in) to 15 mm (0.6 in) above the plates, or to 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.

## 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.**

Preferably use 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.

## MAKE-UP DISTILLED WATER

The amount of water evaporating from batteries is largely dependant on the operating conditions, i.e. temperatures, number of starts, running time between start and stop, etc.

If a battery starts to need excessive make-up water, this points to overcharging. Most common causes are high temperatures or a too high voltage regulator setting.

If a battery does not need any make-up water at all over a considerable time of operation, an undercharged battery condition may be caused by poor cable connections or a too low voltage regulator setting.

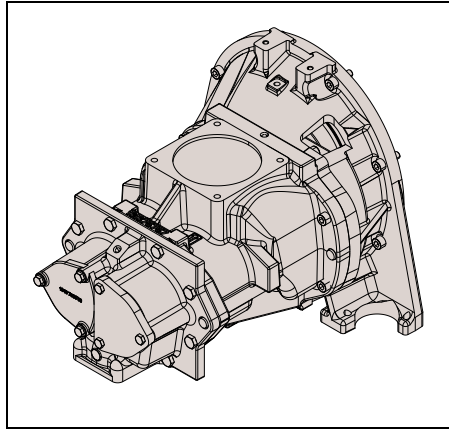
## PERIODIC BATTERY SERVICE

- 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. Never overfill, as this will cause poor performance and excessive corrosion.
- Record the quantity of distilled water added.
- Keep the terminals and clamps tight, clean, and lightly covered with petroleum jelly.
- Carry out periodic condition tests. Test intervals of 1 to 3 months, depending on climate and operating conditions, are recommended.

If doubtful conditions are noticed or malfunctions arise, keep in mind that the cause may be in the electrical system, e.g. loose terminals, voltage regulator maladjusted, poor performance of compressor, etc...

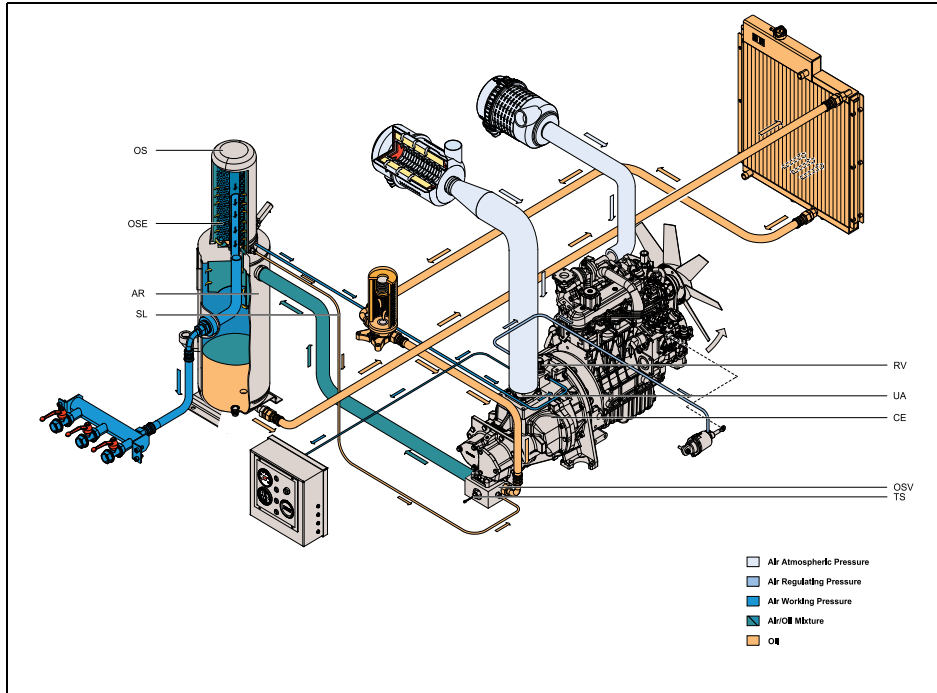
## COMPRESSOR ELEMENT OVERHAUL

When a compressor element is due for overhaul, it needs to be done by Denyo. This guarantees the use of genuine parts and correct tools with care and precision.



# Adjustments and servicing procedures

## ADJUSTMENT OF THE CONTINUOUS PNEUMATIC REGULATING SYSTEM



The working pressure is determined by the tension of the spring in the regulating valve (RV). This tension can be increased to raise the pressure and decreased by turning the adjusting wheel clockwise and anti-clockwise respectively.

To adjust the normal working pressure, proceed as follows:



**Be aware not to touch hot parts when the door is open.**

1. Loosen the lock nut of the regulating valve.
2. Release Regulating Valve (turn out).
3. With the outlet valves (AOV) closed, adjust the regulating valve (RV), until a pressure is reached of nominal pressure + 1.5 bar (+ 22 psi).
4. Lock the regulating valve (RV) by fixing the lock nut.

## AIR FILTER ENGINE/COMPRESSOR



The Denyo air filters are specially designed for the application. The use of non-originals air filters may lead to severe damage of engine and/or compressor element.

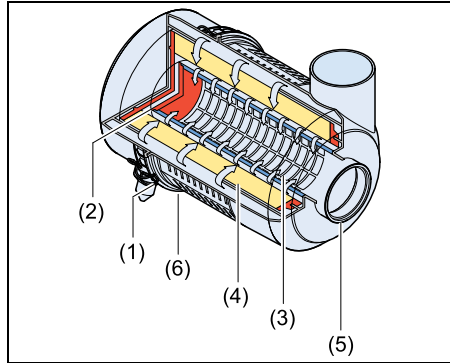
Never run the compressor without air filter element.

## SERVICING

Always select the service point according to the vacuum indicator or display message. A regular inspection or cleaning as it is sometimes practiced in the field is more likely to be damaging than useful as there is a risk that the element will be damaged and dust will gain access to the engine.

**Denyo always recommends exchanging rather than cleaning the filter element in order to avoid damage and ensure maximum engine protection.**

## MAIN PARTS



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

## CLEANING THE DUST TRAP

Remove dust daily.

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

## CLEANING INSTRUCTIONS FILTER ELEMENT

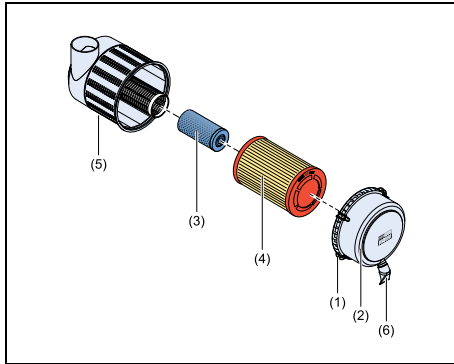
If element cleaning can not be avoided, care should be taken that the filter element (4) is not washed out. Please note that engine damage can cause considerable costs, which makes the cost of a new filter element seem insignificant.

Safety cartridges (3) can not be cleaned but must be exchanged.

Please note that a cleaned element will never match the service life and performance of a new element.

Take the element from the air filter housing (5) (see section **Replacing the air filter element**).

## REPLACING THE AIR FILTER ELEMENT



In order to clean, position a pipe with an end bent by approximately 90° on the end of a compressed-air pistol. The pipe must be long enough to reach the bottom of the filter element. Carefully blow out the filter element with dry compressed air (maximum 5 bar (72.5 psi)) from the inside to the outside until there is no more development of dust. The end of the pipe must not touch the element.

Next carefully examine the element for possible damage. Never beat or knock the element as this will damage it and there will be a danger of damage to the engine.

Carefully clean the inside of the housing and put the element in the housing (see section **Replacing the air filter element**).

New elements must also be inspected for tears or punctures before installation.

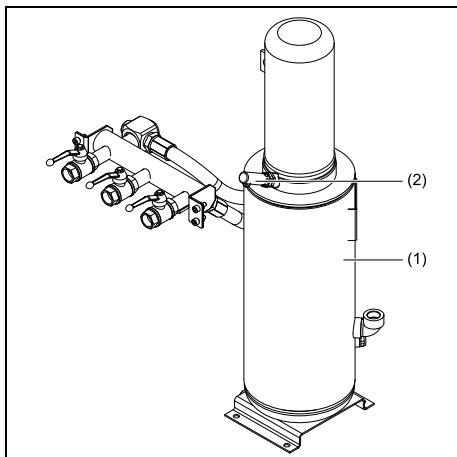
Discard the element (4) when damaged.

A dirty safety cartridge (3) is an indication of a malfunctioning air filter element. In that case replace the element and safety cartridge.

The safety cartridge cannot be cleaned.

1. Release the snap clips (1) and remove the dust trap (2). Clean the trap.
2. Remove the element (4) and the safety cartridge.
3. Reassemble in reverse order of dismantling. Make sure the vacuator valve (5) points down.
4. Inspect and tighten all air intake connections.

## AIR RECEIVER



The air receiver (1) is tested according to official standards. Carry out regular inspections in conformity with local regulations.



**Daily drain condensate.**

## SAFETY VALVE



**All adjustments or repairs are to be done by an authorized representative of the valve supplier, see section Specific safety precautions.**

Following checks must be carried out on the safety valve (2):

- A check of the opening of the lifting gear, twice a year. This can be done by screwing the cap of the valve anti-clockwise.
- an annual check of the set pressure according to local regulations. This check cannot be done on the machine and must be carried out on a proper test bench.

## FUEL SYSTEM

### PRIMING INSTRUCTIONS



**Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn the “ON/OFF” switch in position “OFF” when changing fuel filters or water separator elements. Clean up fuel spills immediately.**

Prime the fuel system in order to fill the fuel filter. Prime the fuel system in order to purge trapped air. The fuel system should be primed under the following conditions:

- Compressor is put in operation for the first time
- Running out of fuel
- Storage
- Replacement of the fuel filter



**Do not loosen the fuel lines at the fuel manifold. The fittings may be damaged and/or a loss of priming pressure may occur when the fuel lines are loosened.**



# Problem solving

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.

For denomination of switches, relays, etc., see **Electric system**.

See also section **Controller Panel**.

## Problem: Compressor capacity or pressure below normal.

Possible faults	Corrective actions
Air consumption exceeds capacity of compressor.	Check equipment connected.
Choked air filter elements (AF).	Remove and inspect elements. Clean or replace, if necessary.
Regulating valve (RV) defective.	Have regulating valve removed and inspected by an Denyo Service representative.
Blow down valve stuck in open position.	Check and correct as necessary.
Loading valve (LV) leaking past O-ring.	With compressor running at max. load speed, disconnect hose leading to unloader. If air leaks from the hose, remove and inspect loading valve. Replace damaged or worn O-rings.
Oil separator element clogged.	Have element removed and inspected by an Denyo Service representative.
Air intake throttle valve remains partially closed.	Remove air filters, air intake manifold and throttle valve spring seat. Withdraw the valve and inspect. Replace parts where necessary. Caution: the spring seat is fixed with 4 short and 2 long setscrews: first remove the short screws, then release the spring tension unscrewing the long ones.
Safety valve (SV) leaking.	Remove and inspect. Replace if not airtight after reinstallation.
Blow-off valve leaking.	Remove and inspect. Replace if necessary.

**Problem: Pressure in air receiver rises above maximum and causes safety valve to blow.**

Possible faults	Corrective actions
Regulating valve (RV) opens too late or its ball valve spring is broken.	Have regulating valve removed and inspected by an Denyo Service representative.
Air leaks in regulating system.	Check hoses and their fittings. Stop leaks; replace leaking hoses.
Air intake throttle valve does not close for some reason.	Remove air filters, air intake manifold and throttle valve spring seat. Withdraw the valve and inspect. Replace parts where necessary. Caution: the spring seat is fixed with 4 short and 2 long setscrews: first remove the short screws, then release the spring tension unscrewing the long ones.
Minimum pressure valve malfunctioning.	Remove and inspect valve.
Blow-off valve malfunctioning.	Remove and inspect valve.

**Problem: After working some time, the unit stops through a shutdown switch.**

Possible faults	Corrective actions
Engine oil pressure too low.	Refer to the engine instruction manual.
Compressor or engine overheating.	See corrective actions “Compressor overheating”.
Fuel tank contains insufficient fuel.	Fill fuel tank.
Low coolant level.	Top up cooling system.

**Problem: Air and oil mist expelles from air filters immediately after stopping.**

Possible faults	Corrective actions
Check valve at element outlet.	Remove and inspect. Replace if necessary. Replace air filter elements and safety cartridges. Check the oil level and add oil if necessary. Run the compressor for a few minutes, stop and recheck oil level.
Plunger of oil stop valve jammed.	Remove and inspect. Replace if necessary. Replace air filter elements and safety cartridges. Check the oil level and add oil if necessary. Run the compressor for a few minutes, stop and recheck oil level.

**Problem: Compressor overheating.**

<b>Possible faults</b>	<b>Corrective actions</b>
Insufficient compressor cooling.	Locate compressor away from walls; when banked with other compressors, leave space between them.
Oil cooler clogged externally.	Clean oil cooler. Refer to section <b>Cleaning coolers</b> .
Oil cooler clogged internally.	Consult Denyo.
Oil filters clogged.	Replace oil filters.
Oil level too low.	Check oil level. Top up with recommended oil if necessary.
Thermostatic by-pass valve remains stuck in opened position.	Remove valve and check for proper opening and closing. Replace if out of order.
Fan blade(s) broken.	Check and correct if necessary.
Oil stop valve malfunctioning.	Remove and inspect valve.
Oil separator element (OS) clogged.	Have element removed and inspected by an Denyo Service representative.

**Alternator precautions**

1. Never reverse the polarity of the battery or the alternator.
2. Never break any alternator or battery connections while the engine is running.
3. 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.
4. Never operate the engine without the main or voltage sensing cables connected in the circuit.

## Available options

1	Cold start (-20 °C)
2	Aftercooler + water separator + bypass
3	Generator 15kVA
4	Inlet shut down + spark arrestor
5	Tool box
6	Non-return valve
7	Additional fuel filter
8	Lubricator
9	Additional fuel tank
10	Undercarriage

# Technical specifications

## TORQUE VALUES

### GENERAL TORQUE VALUES

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

#### For hexagon screws and nuts with strength grade 8.8

Thread size	Torque value, Nm (lbf.ft)
M6	8 (6) +/-25 %
M8	20 (15) +/-25 %
M10	41 (30) +/-25 %
M12	73 (54) +/-25 %
M14	115 (85) +/-25 %
M16	185 (137) +/-25 %

#### For hexagon screws and nuts with strength grade 12.9

Thread size	Torque value, Nm (lbf.ft)
M6	14 (10) +/-21 %
M8	34 (25) +/-23 %
M10	70 (52) +/-24 %
M12	120 (89) +/-25 %
M14	195 (144) +/-23 %
M16	315 (233) +/-23 %

### CRITICAL TORQUE VALUES

Assemblies	Torque value, Nm (lbf.ft)
<b>Compressor to frame:</b>	
Bolts, elements/gear casing	46 (33.95)
Bolts, elements/support	80 (59.04)
Bolts, support/buffer	205 (151.29)
Bolts, buffer/frame	80 (59.04)
<b>Engine to frame:</b>	
Bolts, engine/support	205 (151.29)
Bolts, support/buffer	46 (33.95)
Bolts, buffer/frame	23 (16.97)
<b>Lifting beams to frame:</b>	
Bolts, lifting beams/yoke (M12)	125 (92.25)
Bolts, lifting beams/yoke (M16)	205 (151.29)
Bolts, lifting beams/A-Frames	205 (151.29)
Bolts, A-Frames/frame	205 (151.29)
<b>Hose clamps:</b>	
Pebra hose clamps on all IC/radiator hoses	12 (8.85)



**Secure the drain cock and tank cap of the fuel tank handtight.**

## COMPRESSOR / ENGINE SPECIFICATIONS

### REFERENCE CONDITIONS

Designation	Unit	DU-190
		7 bar
Absolute inlet pressure	bar	1
	psi	14.5
Relative air humidity	%	0
Air inlet temperature	°C	20
	°F	68
Normal effective working pressure	bar	7
	psi	101.52

The inlet conditions are specified at the air inlet grating outside the canopy.

## LIMITATIONS

Designation	Unit	DU-190
		7 bar
Minimum effective receiver pressure	bar	2
	psi	29
Maximum effective receiver pressure, compressor unloaded	bar	8.7
	psi	126.18
Maximum ambient temperature at sea level <sup>5)</sup>	°C	50
	°F	122
Minimum starting temperature	°C	-10
	°F	14
Minimum starting temperature, with coldstart equipment	°C	-20
	°F	-4
Altitude capability	m	3000

## PERFORMANCE DATA

Designation	Unit	DU-190
		7 bar
Engine shaft speed, normal and maximum	rpm	3000
Engine shaft speed, compressor unloaded	rpm	1600
Free air delivery <sup>2) 6)</sup>	l/s	82
	cfm	172
Fuel consumption		
- at 100% FAD	kg/h	8.52
	lb/h	18.78
- at 75% FAD	kg/h	7
	lb/h	15.43
- at 50% FAD	kg/h	5.27
	lb/h	11.61
- at 25% FAD	kg/h	3.59
	lb/h	7.91
- at unload	kg/h	2.69
	lb/h	5.93
Specific fuel consumption at 100% FAD	g/m <sup>3</sup>	28.73
	lb/1000cu ft	1.79
Typical oil content of compressed air	mg/m <sup>3</sup>	5
Engine oil consumption (maximum)	g/h	17
	oz/h	0.6
Compressed air temperature at outlet valves <sup>7)</sup>	°C	90
	°F	194



Designation	Unit	DU-190
		7 bar
Noise level		
- Sound pressure level (Lp), measured according to ISO 2151 under free field conditions at 7 m distance	dB(A)	70
- Sound power level (Lw) complies with 2000/14/EC	dB(A)	98

## DESIGN DATA

### Compressor

Designation	DU-190
Number of compression stages	1

### Engine

Designation	Unit	DU-190
Make		Kubota
Type		V1505T
Coolant		Liquid (glycol 50%)
Number of cylinders		4
Bore	mm	78
	in	3.07
Stroke	mm	78.4
	in	3.08
Swept volume	l	1.498
	cu.in	91.41
Output according to SAE J 1995 at normal shaft speed	kW	32.5
	BHP	43.58
- Load factor	%	NA
Capacity of oil sump		
- Initial fill	l	5.5
	us gallon	1.45
- Refill (maximum) <sup>1)</sup>	l	6.7
	us gallon	1.76

Designation	Unit	DU-190
Capacity of cooling system	l	8.5
	us gallon	2.24

1) With filter change.

### Unit

Designation	Unit	DU-190
Capacity of compressor oil system	l	9
	us gallon	2.37
Net capacity of air receiver	l	18
	us gallon	4.7
Capacity of fuel tanks	l	62.7
	us gallon	16.5
Air volume at inlet grating (approximately) <sup>3)</sup>	m <sup>3</sup> /s	0.93
	cu ft/s	32.84

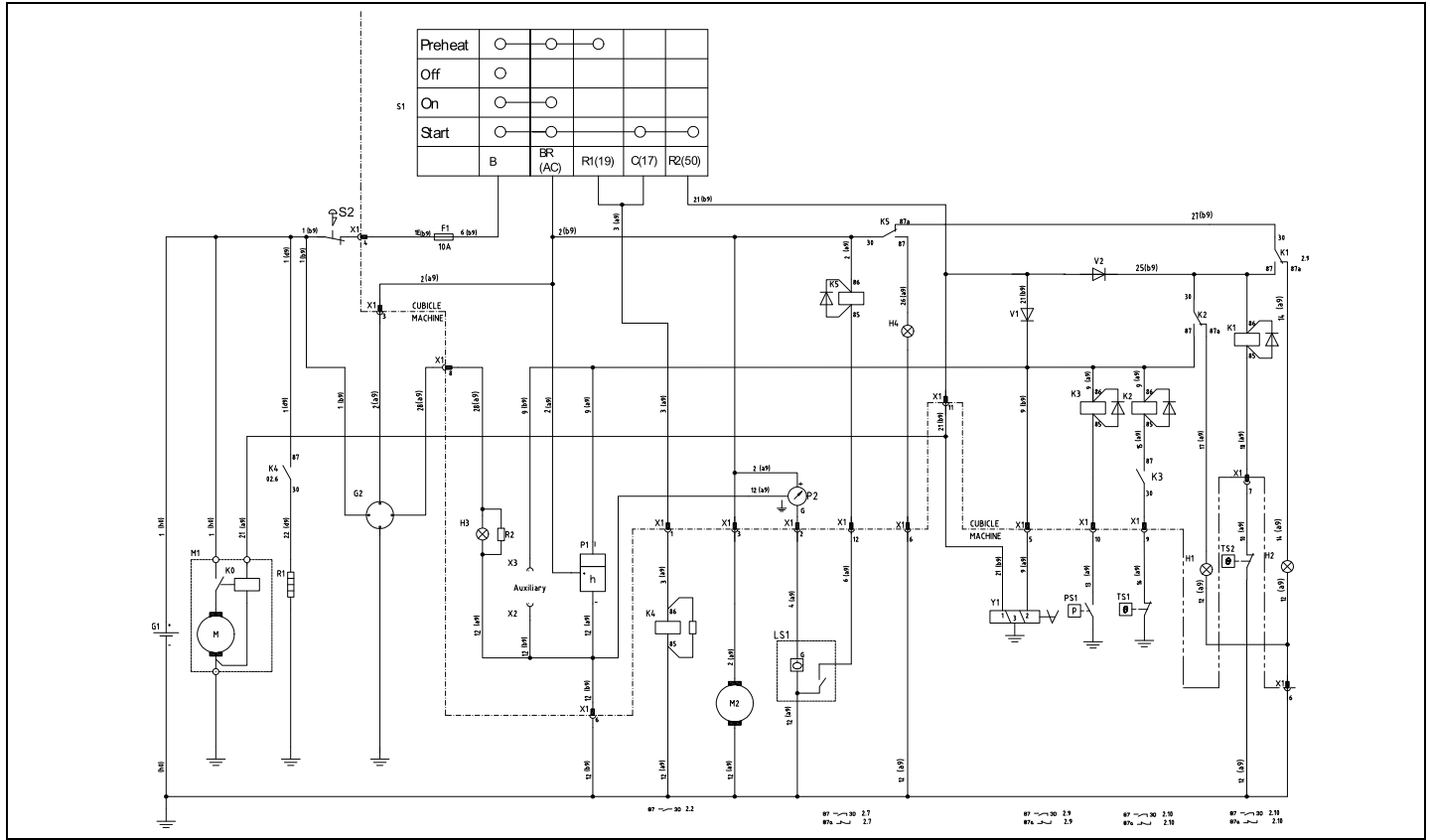
- 1) At reference conditions, if applicable, and at normal shaft speed unless otherwise stated
- 2) Free air delivery is measured according to ISO 1217 ed.3 1996 annex D

Tolerance:	+/- 5% 25l/s<FAD<250l/s +/- 4% 250l/s <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

- 3) Air required for engine and compressor cooling, combustion and for compression.
- 4) With filter change.
- 5) With after cooler: -5 °C
- 6) With after cooler: -1%
- 7) Without after cooler.

# ELECTRIC SYSTEM

## Circuit diagram - 9829 3801 10



## Circuit diagram - 9829 3801 10

SHEET	DESCRIPTION
1	INDEX AND LEGEND
2	CONTROL CIRCUIT

### Color code

1 = brown  
 2 = red  
 3 = orange  
 4 = yellow  
 5 = green  
 6 = blue  
 7 = purple  
 8 = grey  
 9 = white  
 0 = black  
 54 = green/yellow

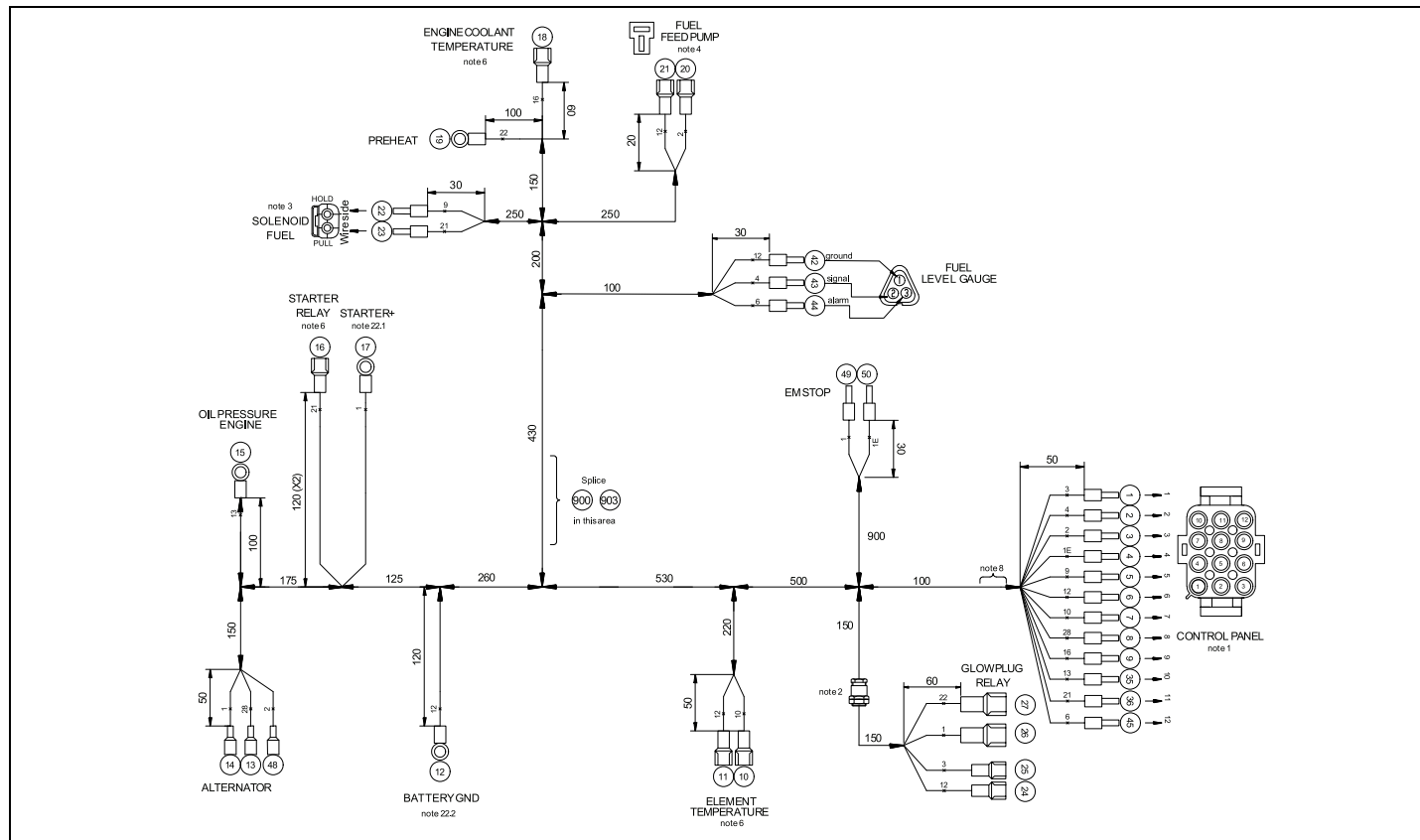
### Wire size

aa = 0.5mm<sup>2</sup>  
 a = 1 mm<sup>2</sup>  
 b = 1,5 mm<sup>2</sup>  
 c = 2,5 mm<sup>2</sup>  
 d = 4 mm<sup>2</sup>  
 e = 6 mm<sup>2</sup>  
 f = 10mm<sup>2</sup>  
 g = 16mm<sup>2</sup>  
 h = 25mm<sup>2</sup>  
 i = 35mm<sup>2</sup>  
 j = 50 mm<sup>2</sup>

TAG	Desc. 1	Desc. 2	Location	Pg.	Col.
F1	FUSE	10A	CUBICLE	2	3
G1	BATTERY	MAIN	MACHINE	2	1
G2	ALTERNATOR	CHARGING	MACHINE	2	1
H1	LAMP(R)	GENERAL ALARM	CUBICLE	2	9
H2	LAMP(R)	COMPRESSOR TEMPERATURE ALARM	CUBICLE	2	10
H3	LAMP(G)	CHARGE INDICATOR	CUBICLE	2	4
H4	LAMP(R)	FUEL LEVEL ALARM	CUBICLE	2	7
R2	RESISTOR	4W 47Ω	CUBICLE	2	4
K0	RELAY	STARTER SOLENOID	MACHINE	2	2
K1	RELAY	GENERAL ALARM	CUBICLE	2	10
K2	RELAY	TEMPERATURE SWITCH	CUBICLE	2	9
K3	RELAY	PRESSURE SWITCH	CUBICLE	2	8
K4	RELAY	PREHEAT	MACHINE	2	6
K5	RELAY	FUEL LEVEL SWITCH	CUBICLE	2	9
M1	MOTOR	STARTER	MACHINE	2	2
M2	PUMP	FUEL FEED	MACHINE	2	8
P1	METER	DIGITAL HOUR METER	CUBICLE	2	5
PS1	PRESSURE SWITCH	ENGINE OIL	ENGINE	2	8
R1	HEAT PLUG	PREHEAT	MACHINE	2	2
S1	SWITCH	SELECTOR SWITCH PREHEAT/OFF/ON/START	CUBICLE	2	5
S2	SWITCH	EM STOP	MACHINE	2	2
TS1	TEMPERATURE SWITCH	ENGINE COOLANT	ENGINE	2	9
LS2	LEVEL SWITCH	COOLANT LEVEL	MACHINE	2	9
V1	DIODE		CUBICLE	2	7
V2	DIODE		CUBICLE	2	8
X1	CONTROLLER	CONTROL PANEL	CUBICLE	2	7
X2	TERMINAL	KDBSM/10	CUBICLE	2	5
X3	TERMINAL	KDBSF/100	CUBICLE	2	5
Y1	SOLENOID VALVE	FUEL	MACHINE	2	7
LS1	LEVEL SENSOR	FUEL	MACHINE	2	
P2	GAUGE	FUEL	CUBICLE	2	

# ELECTRIC SYSTEM

## Wire harness - 1094 3133 02



# Data plate

The diagram shows a data plate with the following fields and callouts:

- 1: Points to the weight fields (0- and 1- kg).
- 2: Points to the Model field.
- 3: Points to the Serial number field.
- 4: Points to the p max(e). working field (Bar).
- 5: Points to the Fad field (cfm).
- 6: Points to the P.engine field (kW).
- 7: Points to the Speed field (RPM).
- 8: Points to the Maurf. year field.

YA3	
0- [ ] kg	
1- [ ] kg	
Model	
Serial number	
p max(e). working	Bar
Fad	cfm
P.engine	kW
Speed	RPM
Maurf. year	

1. Weight
2. Model
3. Serial number
4. Maximum working pressure
5. Free air delivery
6. Engine power
7. Speed
8. Year of manufacturing

# Disposal

## GENERAL

When developing products and services, Denyo tries to understand, address, and minimize the negative environmental effects that the products and services may have, when being manufactured, distributed, used and disposed.

Recycling and disposal policy are part of the development of all Denyo products. Denyo company standards determine strict requirements.

Material selection, substantial recyclability, disassembly possibilities and separability of materials and assemblies are considered, as well as environmental perils and dangers to health during the recycling and disposal of the unavoidable rates of non-recyclable materials.

Your Denyo compressor consists for the most part of metallic materials, that can be remelted in steelworks and smelting works and are therefore almost infinitely recyclable. The plastic used is labelled; sorting and fractioning of the materials for recycling in the future is foreseen.



**This concept can only succeed with your help. Support us by disposing professionally. By assuring correct disposal of the product you help prevent possible negative consequences for environment and health as a result of inappropriate waste handling.**

**Recycling and re-usage of material help preserve natural resources.**

## DISPOSAL OF MATERIALS

Dispose of contaminated substances and material separately, in accordance with locally applicable environmental legislation.

Before dismantling a machine at the end of its operating lifetime drain and dispose of all fluids of according the applicable local disposal regulations.

Remove the batteries. Do not throw batteries into the fire (explosion risk) or residual waste. Separate the machine into metal, electronics, wiring, hoses, insulation and plastic parts.

Dispose of all components in accordance with applicable disposal regulations.

Remove spilled fluid mechanically; pick up the rest with absorbing agent (for example sand, sawdust) and dispose of it in accordance with applicable local disposal regulations. Do not drain into the sewage system or surface water.



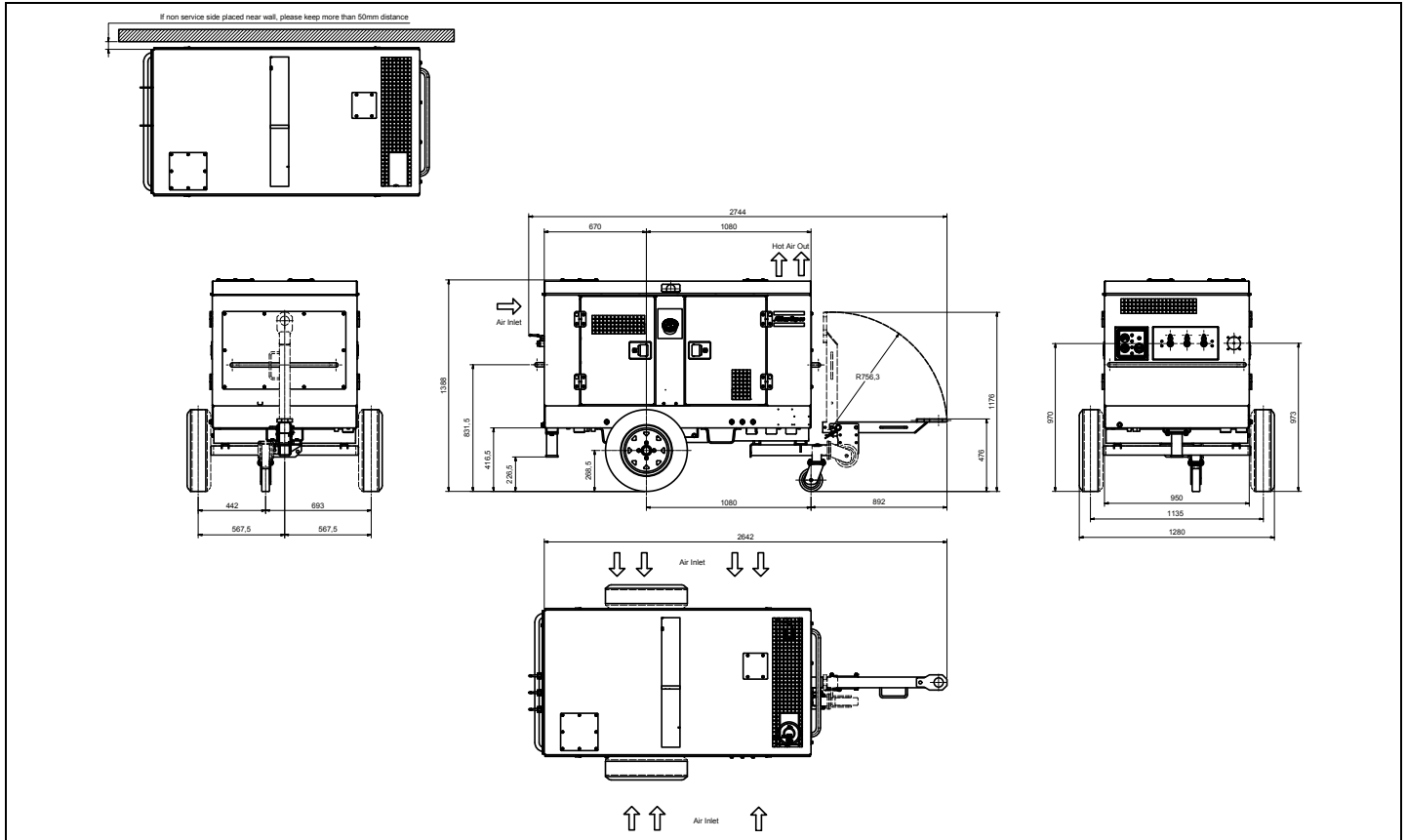
# Maintenance Log

Compressor ..... Customer .....

Serial number.....

Service hours	Maintenance action	Date	By: initials

# Dimension drawing - 9829380226-01





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