USER'S AND MAINTENANCE MANUAL

Air Compressor

D185T4F-DB

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Dear customer,

Thank you for purchasing this ROTAIR Air Compressor, which is designed and manufactured in compliance with high standards in order to ensure high quality performance as well as easy use and installation.

For additional information, you can contact our customer service at the following address:

ELGi Portable Compressors
4610 Entrance Drive Suite A
Charlotte, NC 28273
Direct (704) 523-4123
www.elgi.us/portable-compressors

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FOREWORD

These service instructions have been drafted to facilitate the knowledge of the machinery purchased and its modes of use. In drafting them, we have intentionally omitted the technical in-depth description of some operations linked to the engine, since such information is contained in the user's and maintenance manuals of the respective manufacturers. The service instructions contain recommendations of the utmost importance concerning the safe, appropriate, and cost-effective operation of the machine. Complying with these recommendations helps prevent potentially hazardous situations, additional costs, and loss of time, increasing the service life of the machine. The service instructions and safety measures reported in this manual must be complied with by the user of the machinery. In addition to the service instructions and the accident prevention measures that apply in the countries and places of installation, all of the general safety rules at the workplace must be complied with. It is therefore recommended to carefully read, understand and follow the instructions reported in this manual. This manual cannot be disclosed, duplicated, or copied without the previous authorization by the manufacturer. Any lack of compliance with the above shall be pursued under the law, especially if the illicit action involves advantages for competing companies.

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1 GENERAL

1.1 Definitions

The most significant definitions contained in this manual are reported in the following pages.

1.1-1 QUALIFIED PERSONNEL

"Qualified personnel" are those personnel who are familiar with the rules for installation, assembly, repair, and servicing of the machinery and who are provided with the specified technical qualifications, such as:

- Technical training of proper operation and safety precautions relating to possible hazards of electric currents, hydraulic and air pressure circuits, etc.
- Technical background or specific training relevant to the safe operation and maintenance procedures of the machinery
- Training in basic first-aid activities

1.1-2 HAZARD

A potential source of injury or damage to health

1.1-3 HAZARDOUS AREA

Any area within and/or in proximity of machinery where the presence of a person constitutes a risk for the health and safety of said person

1.1-4 EXPOSED PERSON

Any person being fully or partially in a hazardous area

1.1-5 OPERATOR

The person/people in charge of installing, operating, adjusting, cleaning, repairing, or moving machinery or perform maintenance

1.1-6 RISK

Combination of the likelihood and severity of an injury or damage to health which may arise in a hazardous situation

1.1-7 GUARD

Part of the machinery utilized to ensure protection by means of a material barrier

1.1-8 PROTECTION EQUIPMENT

Device (different from a guard) which reduces the risk, by itself or associated with a guard

1.1-9 EXPECTED USE

The use of the machinery in compliance with the user's information

1.1-10 INCORRECT USE

The use of the machinery in a different way than indicated in the user's instructions

1.1-11 COMPONENT

A part of the electrical, mechanical, or pneumatic equipment, usually specified by its function but used in various applications

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1.1-12 CONTROL DEVICE

A device introduced into a control circuit and used to control the operation of the system (e.g.: position sensors, manual control switches, relays, electro-magnetic control valves, manual control switches, relays, electro-magnetic control valves)

1.1-13 SAFETY INTERLOCK

Mechanical, electrical, or other device whose purpose is to prevent the parts of the machinery from operating in specified conditions (generally, until the guard is closed)

1.1-14 MANUFACTURER

Physical or legal person who designed and/or developed machinery or partly-completed machinery which is subject of this directive and who is liable for the compliance of the machinery or partly-completed machinery with this directive as related to its marketing with his/her name or brand or for personal use. In absence of a manufacturer as defined above, the manufacturer shall be considered the physical or juridical person who markets or puts into service machinery or partly-completed machinery.

1.2 Machinery Identification

The identification nameplate is attached to the air compressor chassis. This nameplate contains the manufacturer's data, the denomination of the machinery, and the code and year of manufacturing.

For any requests for spare parts or actions by our technicians, please refer to the data reported on the nameplate, particularly the code number of the machinery, which must always be mentioned.

Figure 1.2-1 Nameplate of air compressor D185T4F-DB

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1.3 General technical standards

The machinery has been designed and developed in compliance with the recommendations contained in the technical standards reported below.

UNI EN ISO 12100	Safety of machinery - General design principles - Risk assessment and risk reduction.
UNI EN ISO 13857	Safety of machinery - Safety distances to prevent from reaching the hazardous areas with the upper or lower limbs.
UNI EN ISO 13850	Safety of machinery - Emergency stop system, functional aspects
CEI EN 62061	Safety of machinery - Functional safety of the programmable electrical and electronic control systems as related to safety
CEI EN 60204-1	Safety of machinery - Electrical equipment of the machineries. Part I: General rules.
UNI EN 983	Safety of machinery - Safety requirements relevant to systems/related components for hydraulic and pneumatic transmission - Pneumatics
UNI EN 349	Safety of machinery - Minimum openings to prevent the crushing of parts of the human body
D. LGS. January 27th 2010 no.17	Implementation of Directive 2006/42/CE relevant to machinery, which modifies directive 95/16/CE relevant to elevators
UNI EN ISO 14121-1	Safety of machinery - Risk assessment - General principles
UNI EN ISO -TR 14121-2	Safety of machinery - Examples

Machine directive 2006/42/CE.

Article 7. Presumption of conformity and general standards

1. The Member States deem that the machinery provided with the “CE” marking and accompanied by the CE declaration of conformity, whose elements are provided for in Annex II, Part 1, Section A, comply with the provisions of this directive.
2. The machinery manufactured in compliance with an authorized standard, whose reference has been published in the Official Journal of the European Union, is assumed to be compliant with the essential health and safety requirements covered by such harmonized standards.
3. The Commission published the references of the harmonized standards in the Official Journal of the European Union.
4. The Member States shall take the appropriate measures to allow the social partners influencing—at the national level—the development and control processes of the general standards.

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1.4 General description of the machinery

The piece of machinery described in this manual is the air compressor D185T4F-DB. The air compressor has the capacity of generating a given quantity of compressed air in liters per minute (l/m) by using a diesel engine as its power source. The pneumatic energy finds applications in different fields of use, where "pneumatic" operated tools, accessories, and equipment are utilized, for instance demolition hammers, drilling hammers, vibrators, drilling machines, rammers, coating machines, etc.

Each of these tools/accessories has its own consumption of compressed air, expressed in liters per minute (l/m). The optimum coupling between the compressor and the tool is achieved when the compressed air consumption does not exceed 85% of the air generated by the compressor; furthermore, it must be taken into consideration that the quantity of compressed air required by the tool shall increase over time proportionally to the wear of the tool itself.

The correct compressor-tool coupling ratio allows the machinery to operate in optimum conditions as appropriate to ensure long life-span at the highest performance. An oversized tool, besides creating unfavorable conditions for the appropriate operation of the machinery, shall not develop full performance since it cannot be supplied with the required quantity of compressed air.

This machinery has been designed to work at ambient temperatures ranging from -10°C (14°F) and +40°C (105°F).

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2 TECHNICAL SPECIFICATIONS OF THE MACHINERY

The general technical specifications of the machinery are reported below

2.1 General technical specifications

	D185T4F-DB
DESCRIPTION	TECHNICAL VALUES AND DATA
Length (Body)	1835 mm – 72.2 inches
Width	1030 mm – 40.5 inches
Height (with hood closed)	1530 mm – 60.2 inches
Mass	793 kg – 1748 lbs
Compression system	Screw single-stage
Fuel tank capacity	90 lt – 23.75 gal

2.2 Technical specifications of the compressor

	D185T4F
DESCRIPTION	TECHNICAL VALUES AND DATA
Service pressure	8.2 bars, 120 psi
Min. pressure	5 bars, 73 psi
Max. pressure	9.7 bars, 140 psi
Rated payload at service pressure	5200 lt/min, 185 CFM
Cooling system	Hydraulic oil (*)
Hydraulic system capacity	9 lt, 2.4 gal
Separator tank capacity	20 lt, 5.3 gal

(*) We recommend ROTAIR COMPRESSOR 46

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2.3 Technical characteristics of the engine

	D185T4F-DB
DESCRIPTION	TECHNICAL VALUES AND DATA
Engine brand	Kohler / Lombardini
Type	KDI-1903-TCR – Turbo - intercooler
Number of cylinders	3
Fuel	Diesel
Cooling	By liquid
Power available	42 Kw (57Hp) @ 2600 RPM
Maximum revolutions per minute	2600 RPM
Minimum revolutions per minute	1700 RPM
Emissions	Stage IIIB - Tier 4 final
Engine oil tank capacity	9 lt, 2.40 gal

2.4 Technical characteristics of the electric battery

DESCRIPTION	TECHNICAL VALUES AND DATA
Rated voltage	12 VDC
Capacity	100 Ah
Discharge current	750 CCA

2.5 Service temperatures

DESCRIPTION	TECHNICAL VALUES AND DATA
Minimum ambient temperature limit	-10°C, 14°F
Maximum ambient temperature limit	+40°C, 105°F
Humidity limits	≤ 50% @+40°C, 105°F
Altitude	3280 feet above sea level

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NOTES:_____

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3 SYMBOLS AND WARNINGS

The pictograms and main warnings for the operators are reported below and are indicated by the following denominations and symbols:

3.1 Hazards

WARNING
The pictogram calls attention to specific recommendations in order to prevent damage.

WARNING FOR ELECTRICAL HAZARD
The pictogram calls attention to specific recommendations in order to prevent damage.

WARNING FOR CRUSHING OR PERSONAL INJURY HAZARD
The pictogram calls attention to a likely hazardous situation with risk of crushing the upper limbs.

WARNING HAZARD OF PARTS IN MOTION
The pictogram calls attention to the hazard of parts in motion.

WARNING FOR RISK OF SCALDING OR HAZARD DUE TO HIGH-TEMPERATURE PARTS OR AREAS
The pictogram calls attention to the hazard of high-temperature parts or areas and risk of scalding.

WARNING: OVERHANGING LOADS

WARNING OF OVERHANGING LOADS
The pictogram calls attention to hazards due to the presence of overhanging loads

WARNING OF THE PRESENCE OF PRESSURE TANKS
The pictogram calls the attention to the presence of pressure tanks.

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3.2 Safety Precautions and Warnings

DO NOT REMOVE THE PROTECTION EQUIPMENT OR GUARDS
The pictogram instructs that the users SHOULD NOT remove protective equipment such as fixed, movable, and interlocking guards and SHOULD NOT tamper with photocells or photocell barriers.

DO NOT PERFORM CLEANING OR MAINTENANCE WHEN THE MACHINERY IS IN OPERATION
The pictogram warns the user AGAINST performing cleaning or maintenance operations with parts in motion.

DO NOT WALK UNDER OVERHANGING LOADS
The pictogram instructs the user to avoid walking under overhanging loads.

DO NOT OPERATE THE MACHINERY WHEN THE HOOD IS OPEN

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3.3 Recommendations and notices

NOTICES
This symbol recommends consulting the manual before undertaking a given action.

RECOMMENDATION TO USE THE PPE (PERSONAL PROTECTION EQUIPMENT)
The pictogram expresses the necessity of using personal protection equipment.

***NOTICES*:**
This symbol highlights that the description involves significant parts, since they may cause severe mechanical and electrical damage and malfunctions if the relevant standards are not complied with. It is recommended to comply with the information contained in this manual and with the law provisions in force as related to health and safety at the workplace.

HIGHLIGHTING OF THE HOOKING POINT TO LIFT THE MACHINERY

REQUIREMENT TO USE THE SUPPORT FOOT, PARKING BRAKE, AND WHEEL LOCKING WEDGES

3.4 General notices

This manual includes the user's and routine maintenance instructions for the machinery. Whenever it is not otherwise specified, the operation and maintenance actions are to be considered "specialized", meaning they can only be performed by a technician appointed for that purpose.

Before undertaking any operation on the machinery, carefully read this manual.

ROTAIR S.P.A. declines any responsibility for any operation performed in conflict with the contents of this document. Before utilizing the machinery, carefully read this document and comply with the safety laws, regulations, recommendations, and standards in force. This manual and the annexed documents must be considered as an integral part of the machinery they refer to and must always accompany the machinery, even if the latter is transferred to another user. It is therefore appropriate to preserve them for further reference.

This manual and the annexed documents are specific to the machinery they have been drafted for.

Do NOT utilize this manual and the other included documents on similar machinery even of the same brand or type.

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ROTAIR S.P.A. is available to its customers for any further information. Please report the information (type of machinery, model, and code) found on the machinery identification nameplate. All of the specific data not indicated in the text are mentioned in the chapter "Technical Specifications of the Machinery" as well as in the technical annexes of this user's and maintenance manual.

This manual thoroughly describes:
- The information relevant to, lifting, and parking of the machinery
- The general rules and recommendations useful for routine and extraordinary maintenance
- The procedures to identify and order the parts

Remark: the instructions for the appropriate use of the engine are described in the manual drafted by the engine manufacturer.

This manual must be preserved with care in its folder, far from sources of humidity, heat, and sun rays so that it can be consulted at any time by both the personnel appointed to its use and by those who need to perform routine and extraordinary maintenance. This machinery has been exclusively designed and manufactured to deliver compressed air in the conditions stated by the manufacturer. Every other utilization not mentioned in the "expected uses" shall relieve the manufacturer from any liabilities, which will be at full liability of the user.

“Approved purpose" assumes compliance with the recommendations reported and related to the appropriate use and maintenance, as well as to the transport of the unit. All of the accident prevention regulations and standards in force need to be complied with as well, besides complying with the general rules in terms of safety and occupational medicine which are governed by the legislation in force.

The manufacturer declines any responsibility in case of changes made on the machinery without its authorization. Before commissioning, the buyer must ascertain that ANY equipment or machinery, components, and protection installations that are not part of this machinery comply with Machine Directive 2006/42/CE and to the other applicable European Directives (2006/95/CE - 2004/108/CE, etc.).

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4 USE OF THE MACHINERY

4.1 Use allowed

The machinery described in this manual is the air compressor D185T4F-DB and is allocated to work outdoors. The air compressor is a piece of machinery with the capacity of generating a given quantity of compressed air in l/m by using a diesel engine as its power source.

The pneumatic energy finds applications in different fields of use where "pneumatic" operated tools, accessories, and equipment are utilized, for instance: demolition hammers, drilling hammers, vibrators, drilling machines, rammers, coating machines, etc. Each of these tools/accessories has its own consumption of compressed air expressed in liters per minute. The optimum coupling between the compressor and the tool is achieved when the compressed air consumption does not exceed 85% of the air generated by the compressor. Furthermore, it must be taken into consideration that the quantity of compressed air required by the tool shall increase over time proportionally to the wear of the tool itself.

The correct compressor-tool coupling ratio allows the machinery to operate in optimum conditions as appropriate to ensure long life-span at the highest performance. An oversized tool, besides creating unfavorable conditions for the appropriate operation of the machinery shall not develop full performance, since it cannot be supplied with required quantity of compressed air.

This machinery has been designed to work at ambient temperatures ranging from -10°C (14°F) to +40°C (105°F).

WARNING: It must be recognized that the compressed air generated by this unit may contain some very fine traces of oil; therefore, it is not appropriate to be utilized with those systems that call for fully oil-free air (e.g..: food processing and pharmaceutical industry, transports of flours and powders, cement, etc...).

4.2 Use not allowed

Using the machinery for other processes than those which are mentioned in the section above is not allowed. ROTAIR S.P.A. declines any responsibility as related to injuries or accidents due to lack of compliance with the specific provisions for use.

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4.3 Residual risk

Avoid standing in front of the compressed air discharge ports. The direct exposure to the air stream may cause severe injuries due to the strength and speed of the compressed air.

The machine must operate outdoors because of the presence of the engine and the relevant exhaust gases.

DO NOT operate the machine in an indoor environment that has an atmosphere containing vapors or mixtures of corrosive or explosive gases.

When performing demolition, drilling, sandblasting activities, or any other operation that generates dust, the tool needs to be connected to the compressor through a pressure-resistant hose of sufficient length to keep the machinery away from the work area, thus preventing clogging of both the air filters mounted on the unit or the radiator for the cooling of the lubrication and engine cooling systems. Even in this case, an educated user will operate the machinery an appropriate distance away from the work area.

The machinery has been designed and built to work with the hood closed and, consequently, DO NOT keep it open when the engine is on because besides generating harmful sound emissions, the required internal ventilation would be interrupted, and possible damage to the machine may result.

Make sure that the hood is closed and the latches located on the rear side of the air compressor are latched.

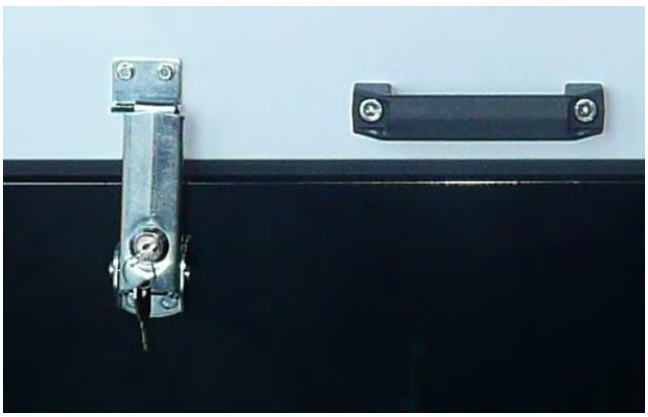

Figure 4.3-1 Engine compartment hood latches

When selecting the hoses to connect the machinery to the tool, make sure that they are sized appropriately, taking into account their length, the volume of air which needs to pass through them, and the service pressures. If the hoses are too small in diameter or too long in length, the air flow would be interrupted, with subsequent loss of load and poor performance of the tool.

The hoses, which transmit compressed air from the machinery to the tool or to any device applied, are to be provided with a valve located at the end which is connected to the tool. The air valve shall be held closed during the connection of the hoses to both the machinery and the tool in order to prevent an accidental opening of the air valve on the machine side and to prevent an uncontrolled whipping of the hoses, which may cause injuries. Before disconnecting any hose, make sure there is no pressure inside.

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5 LEVELS AND QUALIFICATIONS OF THE PERSONNEL

The operation, service, and maintenance of the machinery must be performed by qualified, trained, and informed personnel only. "Qualified personnel" means people who, based on their profession, have acquired experience and instructions as well as knowledge on the relevant standards and recommendations on accident prevention and operational conditions. Such personnel, appointed by the machinery safety managers, must be able to perform the required operations as well as recognize and anticipate the potential hazards.

Entrust the activities to appropriately trained or instructed personnel only; determine unmistakably the competence of personnel as related to the fine-tuning and the maintenance and repair activities. Define the responsibility of the operators appointed to run the equipment through accurate written recommendations and authorize them to reject recommendations by third parties if in conflict with the safety regulations and standards of the machine manufacturer. Ensure that the activities are performed by purposely-appointed personnel only. The actions on the electrical equipment of the machinery can be performed in compliance with the electro-technical regulations and standards by qualified electricians or by people with an appropriate level of competence in the electro-technical field. The mechanical and pneumatic maintenance can be performed by the technicians of the authorized service centers.

6 SAFETY RECOMMENDATIONS

6.1 Safety provisions concerning transport

The air compressors that are not certified for towing need to be loaded onto another means of transport. The air compressor has to be attached appropriately to the loading deck of the transport vehicle in such a way to prevent an unbalancing of the load during transport.

The unit is shipped by ROTAIR and attached to a support appropriate for its handling by means of fork-lift trucks; such wooden platforms facilitate the anchorage to the loading deck of the transport vehicle and prevents the load from sliding.

For safe transport, operate as follows:

1) Make sure the tie-downs pass over the air compressor and tighten them by means of the winches provided with the means of transport.
2) Set blocks or wedges on all sides of the air compressor, attaching them to the loading deck of the vehicle in order to prevent the machinery from moving.
3) Travel at moderate speeds.

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6.2 Safety recommendations concerning lifting

A purposely-allocated opening protected by a rubber cover is located in the upper panel of the hood and allows for easy access to the lifting hook.

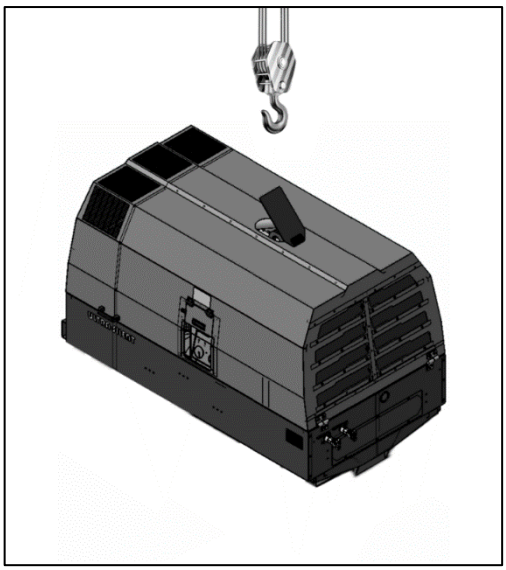

Figure 6.2-1

List of the operations for the safe lifting of the machine:

1) Make sure that the lifting device (crane, hoist, etc.) is of the appropriate payload for the weight of the unit and that it is maintained appropriately.
2) In the case that the lifting device is installed on the truck, use the side anti-tilting stabilizers.
3) Attach the hook of the lifting device to the hooking point of the compressor (Figure 6.2-1).
4) Lift the unit slowly and without sudden movements to prevent the load from swaying excessively.
5) Before transporting, always check that there are no parts that may fall off during transport.
6) Check the status of tie-downs or chains before starting the transport operations.
7) In any case, always make sure that the machine is solidly secured to the loading deck of the transport vehicle and balanced appropriately.
8) Communicate appropriately when the compressor is lifted to or from the transport vehicle.
9) Never leave the lifting area with the compressor hanging.
10) Do not stand or walk under the hanging load.

WARNING OVERHANGING LOADS

The user must periodically check the condition of the lifting equipment and machine-supplied lifting hook and replace it if it is no longer appropriate or safe. No other hooking and lifting systems are allowed except those that are provided with the machine.

This pictogram shows the hooking system to lift the machine.

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6.3 Safety recommendations concerning maintenance

In order to perform the maintenance operations in safe conditions, the following provisions need to be complied with:

1) The control and maintenance operations need to be performed by specialized qualified personnel aware of the recommendations shown in this manual. "Specialized qualified personnel" means people with the appropriate educational background and whose level of skills is appropriate to the kind of intervention and who have acquired experience and instructions on accident prevention and on the procedures required to perform maintenance operations
2) All of the maintenance activities need to be performed after a safe stop of the machine and an interruption of the power supply to the engine
3) If the machinery is stopped during the maintenance and repair operations, it must be protected against accidental restart
4) If replacement parts are needed, they must be ordered at ELGi customer service and must correspond to the technical standards defined by ROTAIR
5) The electrical equipment of the machinery must be periodically inspected. Any component's faults must be immediately pointed out and replaced after careful assessment of their effectiveness and efficiency
6) Keep the greatest possible cleanliness during the maintenance operations, avoiding using flammable solvents
7) Before restarting the machinery after maintenance or overhaul, make sure that all of the guards and safety devices are restored and operational
8) Never use water to extinguish the flames in case of fire (Figure 6.5-1)

Figure 6.5-1

After performing any maintenance operations, it is mandatory to restore all protective devices, particularly in the area of the cooling fan or other moving parts

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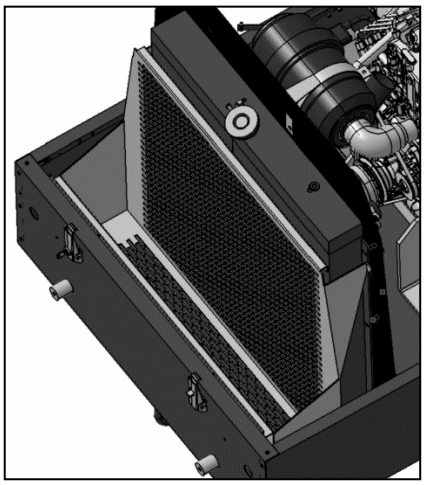
6.4 Safety provisions concerning toolbox

The compressor can be equipped with a toolbox to put tools and/or objects inside the machine, under the cover.

1) Before putting any tool and/or object inside the toolbox, make sure you have allowed the machine to cool down for a few minutes

2) Avoid storing containers with flammable or non-flammable liquid inside the toolbox

3) If you use the toolbox to store tools and other objects during the compressor's transport, make sure that the cover is closed and locked



Picture 6.6-1 D185T4F-DB Toolbox

WARNING: The toolbox must be empty of tools and/or any other objects before starting the engine to allow an unobstructed air flow to the engine radiator.

The max loading capacity of the toolbox is 100 lbs (45Kg).

The toolbox should only be used for storage and during transport. DO NOT use it while the machine is working for operator's safety reasons.

WARNING: The toolbox, while the machine is working, can reach temperatures that could cause skin burns. Make sure the toolbox has properly cooled before storing any objects in it.

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7 MACHINERY COMPONENTS

This unit D185T4F-DB is a single-phase, silenced oil injection screw air compressor. The engine is an internal-combustion, fueled by gas or diesel, and is connected to the compressor by a flexible coupling.

7.1 Body

The body is built entirely out of galvanized sheet iron. Panels can easily be removed to allow convenient access to the main machine parts. The machine is entirely lined with sound absorbent and fire-retardant material. Special holes have been created in the panels forming the body, complete with baffles, which allow the cool air necessary for engine and compressor cooling, to be sucked in from one side and the heated air to be expelled from the other side. These baffles have been carefully designed in terms of size and shape so as to allow the most efficient internal ventilation of the machine. Therefore, it is advisable to ensure that these openings are kept free from debris and remain undamaged. All of the parts of the body have been treated with a special painting process which guarantees excellent finishing quality, together with maximum impact and rust resistance.

7.2 Engine

The unit is equipped with a diesel engine whose features are described in Section 2.
As related to the user's and maintenance instructions, refer to the manual provided by the manufacturer and the enclosed documentation relevant to this machinery.

7.3 Compressor unit

It is completely manufactured in the ROTAIR factory and consists of a central body cylinder inside, which is fitted with two screw rotors with asymmetric section, a male one with 5 lobes and female one with 6 lobes. The cylinder is closed at the ends by two head sections which contain the bearings that bear the radial and axial loads created by the air compression. A series of channels inside the cylinder and heads deliver the oil to the various components. The distribution of the lubricant serves to lubricate the bearings and maintain a coating of oil between the rotors and the bearings themselves as well as the internal cylinder walls, thereby promoting compression resistance. Another important function of the oil injected between the rotors is that of absorbing the heat generated by the compression of the air. The compressed air supplied by this compressor is free of any pulsations, and compression comes about axially.

A "regulator" unit is mounted on the compressor unit to regulate the quantity of air taken in according to the amount of air consumed. A double-stage filter mounted on the top of this unit guarantees maximum purity of the suctioned air.

7.4 Oil mist separator tank

The oil mist separator tank consists of a pressurized container, and, due to its construction features, it is exempt from the annual I.S.P.E.L. inspection and is supplied with a conformity certificate issued by the manufacturer. The identification and inspection details are stamped on a plate which is welded to the machine.

The lid features the following elements: safety valve for overpressure, a thermal switch which intervenes if the temperature inside the tank exceeds 100°C (212°F), and valves which regulate the maximum and minimum pressure of the machine.

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7.5 Hub and splined coupling (KTR Joint)

The engine and the compressor are interconnected by a hub and splined coupling which guarantees concentricity between the engine flywheel and the compressor shaft. A large-size block joint with rubber pieces inter-spaced transmits power in a smooth and silent way without splitting.

The engine and compressor, once assembled, are clamped to the frame with four flexible supports (silent-blocks) which completely absorb the vibrations the machine generates. A fan is splined to the engine shaft on the opposite side of the flywheel, generating large air displacement which cools the machine fluids and parts.

7.6 Control panel

The control panel layout was specifically designed to have all of the controls within reach of a single person. All the necessary instruments to control and monitor the unit are located on the control panel.

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8 ELECTRICAL EQUIPMENT OF THE MACHINERY

WARNING: any action on the electrical system must be performed by qualified personnel.

8.1 Operator's instrument panel and controls

1) Air pressure gauge
2) Hour counter
3) START button
4) ON/OFF switch
5) Fuel level indicator

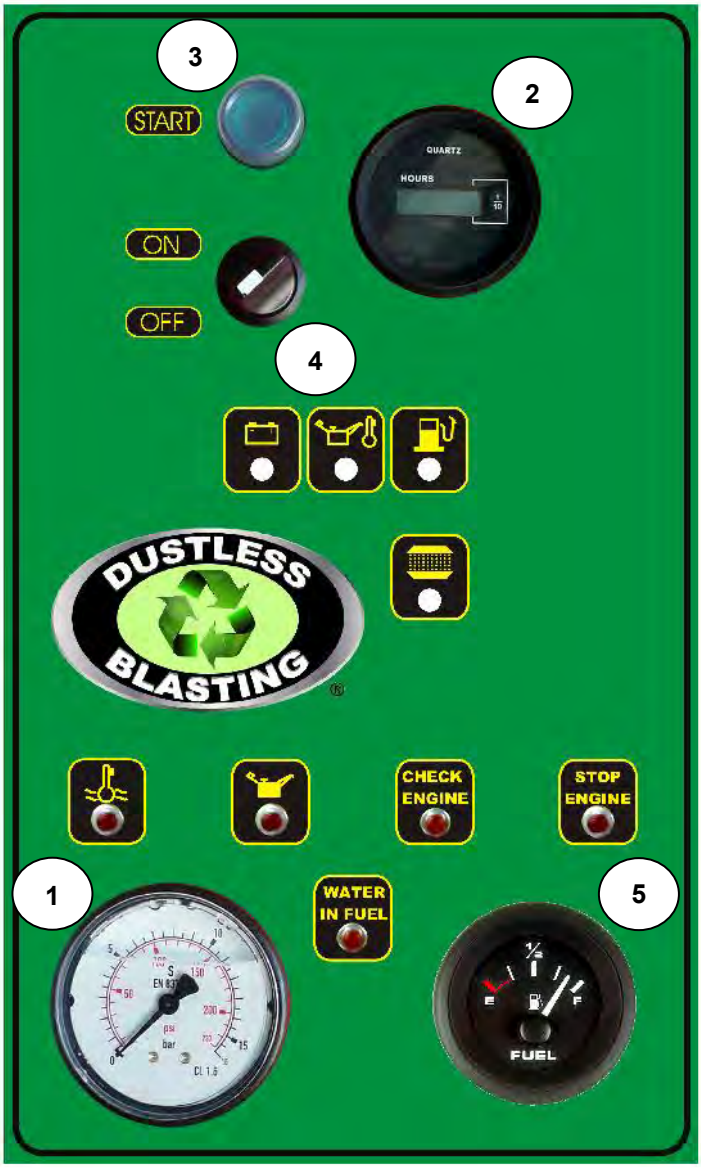

Figure 8.1-1 Instrument panel and controls

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8.2 Operator's panel warning/indicator lights

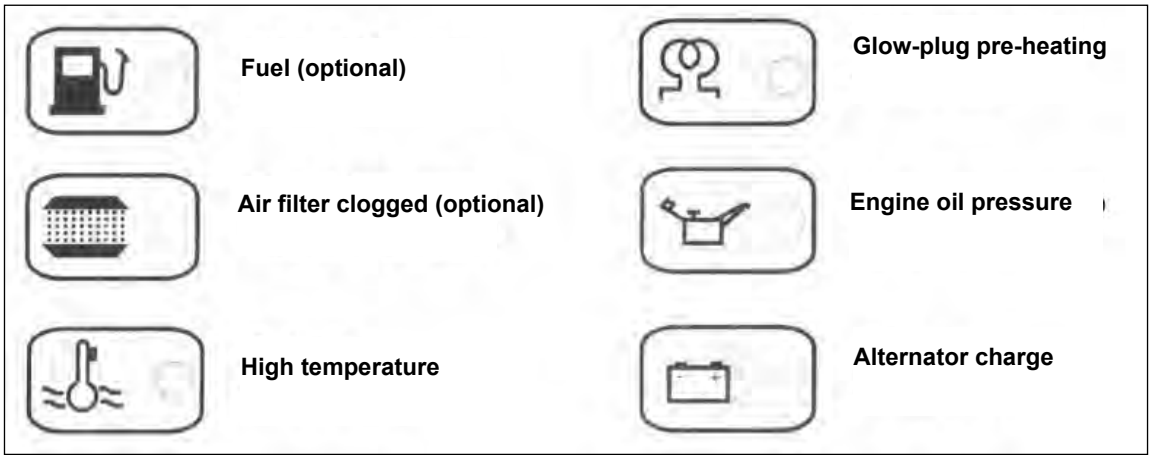

Figure 8.2-1 Warning/indicator lights

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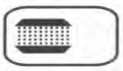
WARNING/ INDICATOR LIGHTS	DEFINITION	FUNCTION	OPERATION TO BE PERFORMED	S/O
	LOW FUEL	The low fuel light illuminates when there is a minimum level of fuel in the fuel tank.	Fill the fuel tank (Diesel only)	❍
	AIR FILTER CLOGGED	This light will illuminates when the air filter is clogged.	Clean the filter or replace it	❍
	HIGH TEMP LIGHT	This light will illuminate when the engine coolant or compressor oil has reached an excessive temperature.	Immediately switch off the machinery and verify the following cases: 1) check the coolant level in the radiator and clean debris from the radiator fins 2) the coolant pump does not operate as appropriate (contact ROTAIR customer service) 3) the engine thermostat does not operate correctly (replace) 4) check for coolant leaks, contact ROTAIR customer service 5) air flow to the radiator is obstructed; remove the obstruction (contact ROTAIR assistance)	●
	GLOW-PLUG PRE-HEATING	This light remains illuminated during the pre-heating of the glow-plugs. Wait for the light to go off before cranking the engine by pushing the START button. The light should be off when the engine is running.	If the light is on for a lengthened period of time, inspect the condition of the glow-plugs and replace them if required.	●
	ENGINE, LOW OIL PRESSURE LIGHT	This light will illuminate if there is insufficient engine oil pressure. The light should be off when the engine is running.	Insufficient engine oil pressure may be caused by: 1) low engine oil level 2) defective engine oil pump 3) oil not reaching the pump, blocked oil pump inlet	●
	ALTERNATOR CHARGE LIGHT	This light illuminates if the alternator is not supplying an adequate charge back to the battery when the engine is running.	If it is illuminated during normal operation of the engine, test the battery and the alternator.	●

● *Warning/Indicator lights operational on the series version* ❍ *Optional Warning/Indicator lights*

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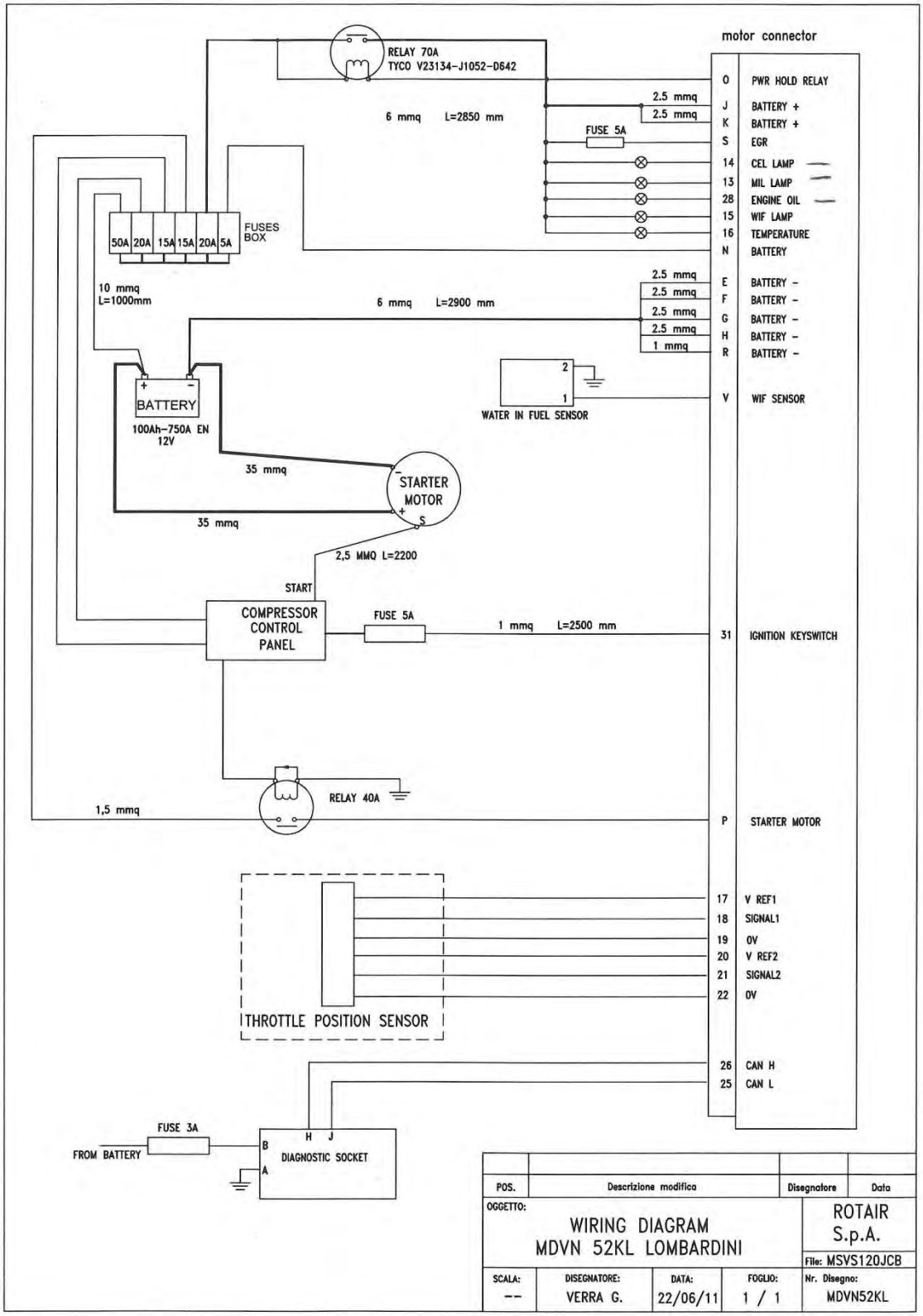

Figure 8.2-2 Diagram of machine's electrical system D185T4F-DB

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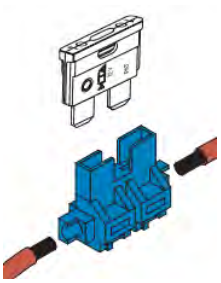
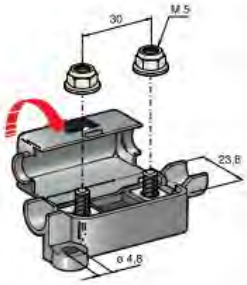
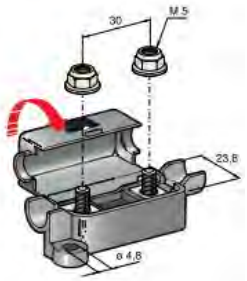
8.3 Fuses

The fuse is an electrical device which can protect a circuit or a device from excessive current. The fuse consists of a cartridge provided by a thin lead wire through which the rated current of the circuit travels; this wire is the actual fuse, with a precise amperage load capability. In case of excessive current, the filament melts and causes the circuit to open.

Fuse holder	Fuse	Description	Ampere
		Secondary fuse: device to protect against excessive current which might damage the fuel solenoid	16 A
		Operator Panel Fuse: protection device against excessive current that may damage the operator's control panel	40 A
		Glow plug fuse: Protection device against excessive current that could damage the engine	40 A

WARNING: When replacing the fuses, we recommend always utilizing the same type and rating as indicated in this table and following the procedures reported in Section 13.4-3 of the manual.

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9 HYDRAULIC AND PNEUMATIC SYSTEMS

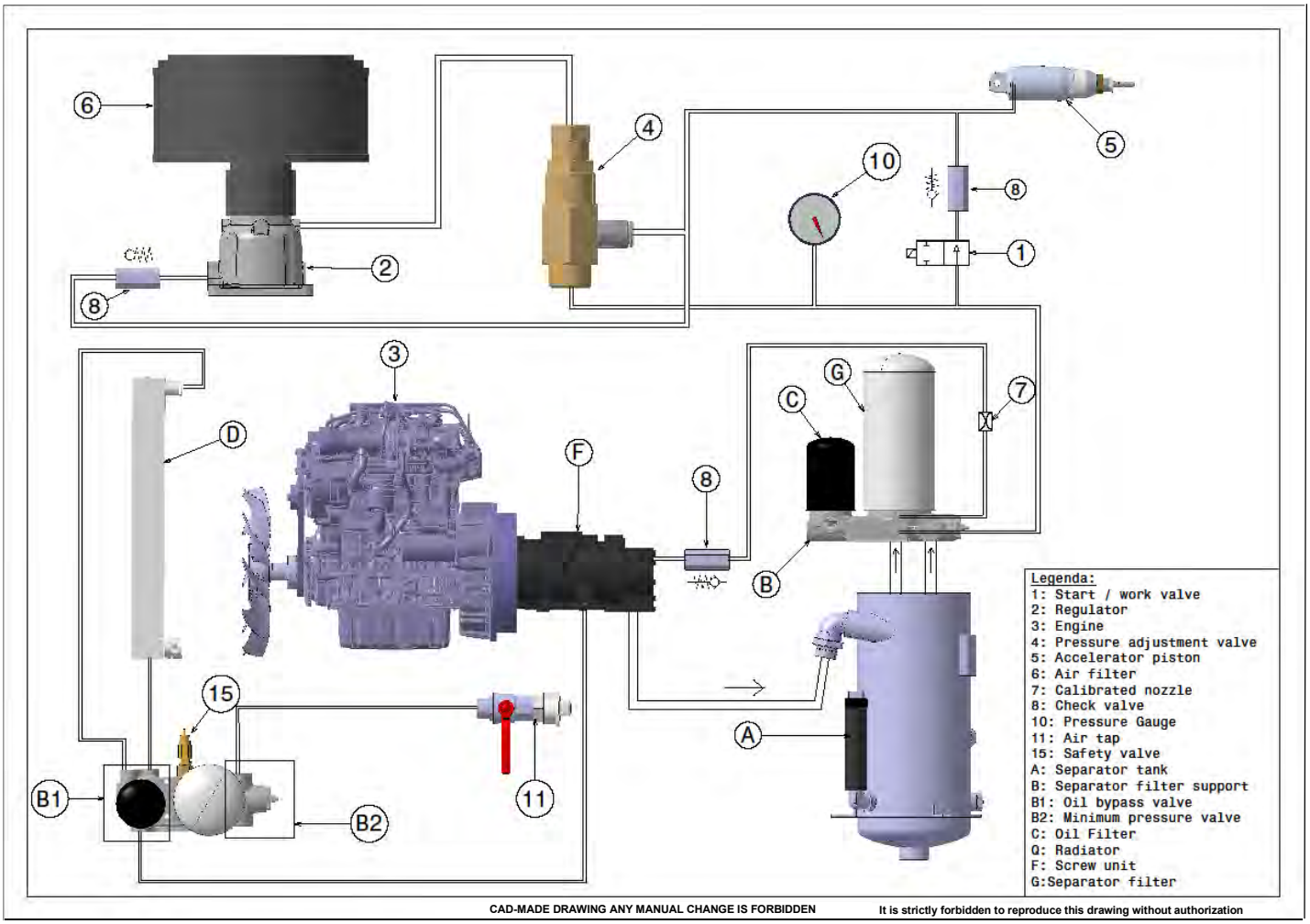

Figure 8.4-1 Hydraulic and pneumatic systems

9.1 Hydraulic lubrication system

The hydraulic lubrication system (Figure 8.4-1) of the compressor consists of:

- Oil mist separator tank (A)
- Oil mist separator filter (G)
- Minimum pressure valve (B2)
- Oil filter (C)
- Oil cooling radiator (D)

As you may notice, the lower portion of the oil mist separator tank (A) is used as an oil tank while the minimum pressure valve located in the upper part (B) operates as a support of the oil mist separator filter (G). When starting the machine, the oil under pressure located in the tank starts flowing through the tubing into the oil filter (C) and from there to the cooling radiator (D).
The cooled filtered oil then reaches the compressor (F) and is distributed to the different parts (rotors, bearings, etc.) which are then lubricated and cooled.

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From the compressor (F), the oil is mixed with the compressed air from the check valve (8) and is sent to the separator tank (A), where, through a forced centrifugal circuit, the first separation of the compressed air from the oil occurs. The resulting compressed air leaves the separator tank through the oil mist separator filter (G), which will provide a second and last separation of the oil from the compressed air.
Even though the separating filter (G) separates the oil from the air, it is worth pointing out that a limited quantity of oil manages to penetrate inside the oil mist separator filter and deposits on the lower portion of the filter itself.
The oil is sucked into the tubing where a calibrated nozzle (7) and a check-valve (8) will route it to the compressor (F). The check valve (8) shall prevent the oil from returning to the oil mist separator filter (G) when the machine is stopped.

Attention: The oil filter (C) is provided with a “by-pass” valve which allows the oil to circulate in case it is clogged. In such case, the oil shall circulate regularly without being filtered.

WARNING: The filter therefore needs to be replaced at regular intervals, as specified in the maintenance program.

9.2 Pneumatic system

The pneumatic system (Figure 8.4-1) includes:

- start/work valve (1)
- suction filter (6)
- suction adjustment valve (2)
- compressor (F)
- separator tank (A)
- oil mist separator filter (G)
- min. pressure and check valves integrated in the valve (B2)
- air valve (11)
- max. pressure valve (4)

The compressor suction air, after passing through the air filter (6), reaches the suction adjuster (2) and then the compressor (F), which, after compressing it, directs it together with the injected oil into the separator tank (A). Here, the oil is separated from the air. This process, as indicated above, is made by centrifugal force and then by the use of the oil mist separator filter (G).
Once the air is separated from the oil, it is routed to the minimum pressure valve (B2) which opens only when the pressure in the tank has reached the established value.
It is in any case a good practice not to use tools that, with their excessive consumption, may cause the lowering of the pressure in the tank under 5-5.2 bar/72.5-75psi. Lengthened working conditions below 5 bar/72.5 psi may create insufficient separation of the oil from the air with subsequent excessive consumption of lubricant. Furthermore, the minimum pressure valve (B2) acts as a check valve, thus preventing the return of compressed air into the unit from piping or tools connected to the machinery.

WARNING: Pressure tank

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9.2-1 AUTOMATIC ADJUSTMENT OF THE ENGINE RPM

The system controls the diesel engine RPM as a function of the compressed air used and includes:
- Max. Pressure valve (4)
- Suction adjustment valve (2)
- Accelerator control piston (5)

1) With the engine running and the air valve (11) fully open, the engine RPM is at the max. value and the suction adjuster is fully open.
2) Partially close the air valve (11) to simulate a reduction in the air consumption with subsequent increase of the pressure in the tank (A).
3) When the air valve (11) is progressively closed, the pressure reaches the established adjustment value and the max. pressure valve (4) controls the compressed air flow out and acts at the same time on the accelerator control piston (5) and under the suction adjuster valve (2).
4) Under the action of such pressure, the piston (5) proportionally decelerates the engine.
5) At the same time, the suction adjustment valve (2) proportionally closes as well, thus reducing the passage of the air being taken in. Consequently, with the air valve (11) closed and without any air demand, the engine shall stabilize at the minimum RPM it was adjusted for, while the suction valve of the adjuster shall move to an almost totally closed position.
6) At this stage of the cycle, the intake air is minimal and is used to compensate for any leakages and internal leakages of the circuit.
7) The pressure gauge on the control panel shall display the value of the max. delivery pressure.
8) When the demand for air is resumed, the max. pressure valve (4) shall start closing again and shall be totally closed once the pressure valve lowers by approx. 1 bar/14.4 psi, versus the value of the max. final pressure.
9) At this stage, the compressor delivers the max. rate at the service pressure, since the internal spring of the accelerator piston (5) accelerates the engine up to the max. RPM, and the suction adjustment valve is in the full open position.
10) If tools of greater consumption than the rated capacity of the compressor are used, the pressure gauge shall display a lower pressure, which must never be lower than 5 bar/72.5 psi.
11) Avoid sudden openings of the air valves; this generates great stress to the separator filter with subsequent severe damage to the filter itself.

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10 RECOMMENDATIONS FOR THE PROPER OPERATION OF THE AIR COMPRESSOR

Consult this user's and maintenance manual before starting the machinery.

10.1 Before starting

Strictly follow the instructions outlined in the manual:

1) Level the machine by adjusting the support foot or the wheel; no incline greater than 15° is allowed.
2) Check that the battery cables are connected to the battery correctly; if the cables need to be connected, use care and verify that the cable coming from the starter motor is connected to the positive pole (+) of the battery and that the ground cable is connected to the negative pole (-) of the battery.
3) Check the fuel level in the tank. USE DIESEL FUEL ONLY.
4) Check the level of the engine oil. As related to the types of lubricant and correct quantities, comply with the recommendations contained in the engine manufacturer's user's and maintenance manual included with the machinery documentation.
5) Check the oil level in the compressor. Stop the machine and allow it to sit for at least 5 minutes, allowing the lubricant to return to the oil mist separator tank. Before unscrewing the dipstick, level the machine, making sure that there is no pressure in the system (the pressure gauge shall indicate 0 bar/psi).
   a) Remove and clean the dipstick.
   b) Thoroughly screw the dipstick back in and then remove it again to verify that the lubricant level is between the two engraved marks (min. and max. level).
   c) Top off the oil if required; the level must never exceed the max. mark.
   d) Exclusively utilize the types of oil recommended in this user's and maintenance manual.

Figure 10.1-1 Checking the oil level in the compressor

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Figure 10.1-2 Fuel tank for Diesel engine

6 If the air compressor is equipped with a liquid-cooling diesel engine, check the level of the coolant contained in the radiator (Figure 10.1-3).

Figure 10.1-3 Checking the radiator coolant

Recommended cooling liquid: ROLOIL ROL-ICE BLU

WARNING: The radiator cap (Figure 10.1-3) must never be removed when the engine is hot; this would cause a sudden outflow of liquid which might result in severe scalding. Topping off, if required, must be done with a mixture of water and anti-freeze in the percentage indicated on the container.

10.2 Starting

Operations to be performed for correct starting of the machinery:

1) By turning the ignition switch (Part. 4 Figure 8.1-1) to the right to the position “ON”, the panel is powered and the following warning lights come on:

Engine oil pressure warning light

This indicates whether the engine has sufficient oil pressure (warning light off) or not (warning light on).

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Alternator warning light
This indicates alternator efficiency.

Glow plug warning light
The first two warning lights are red, and when the engine has been started, they must go off.

The glow plug warning light stays on for as long as it takes to heat the glow plugs, after which it switches itself off automatically. At this point, it is possible to start the engine-compressor by pushing the “Start” button (Part 3 Figure 8.1-1). The starter motor is powered by the push-button, which will start the diesel engine.

WARNING: Release the button at the first sign that the diesel engine is starting. Do not operate the starter for more than 10 seconds continuously. In case of difficult starting cycles, repeat the starting procedure after allowing cool down intervals.

2) Wait for a few minutes, until the engine warms up. The pressure shall raise up to the max. pressure of the machinery. If one or more warnings lights stay on, immediately stop the machinery and identify the cause and correct it.
3) Connect the compressed air lines to the relevant tools.
4) Progressively open the air valves (Figure 10.2-1).

WARNING: DO NOT operate the machinery with the engine hood open.

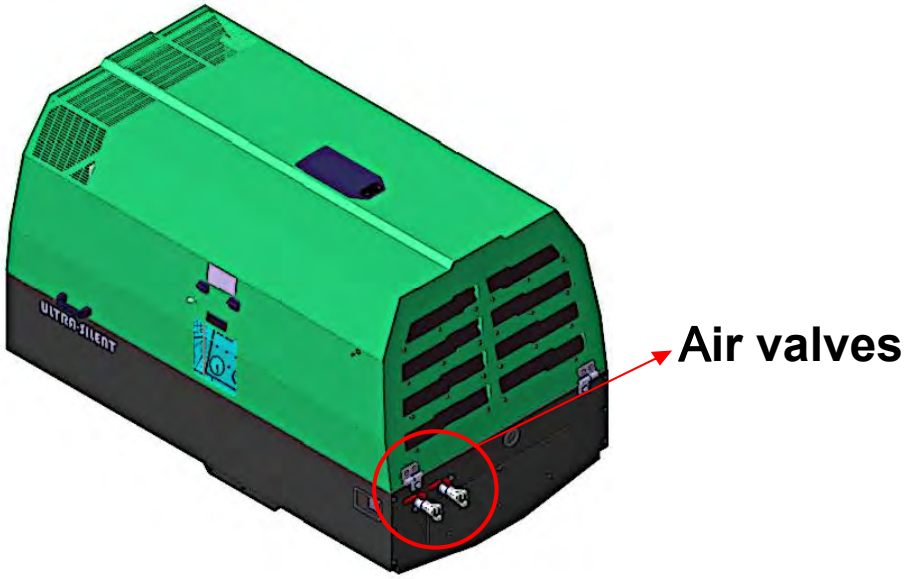

Figure 10.2-1 Location of the air valves

WARNING: Do not breathe the compressed air produced by this unit; it will contain trace amounts of oil.

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10.3 During operation

The machine must always operate with the hood down and closed.

During operation, it is necessary to verify that the cooling air intake openings are free of foreign objects such as pieces of paper, plastic, etc. as these materials can create obstructions to the ventilation system.

Figure 10.3-1 Exhaust pipe

WARNING: Areas near the exhaust pipes are very hot, and exhaust gases are harmful. Avoid coming in close proximity of the exhaust system.

10.4 Stopping the engine

By turning the "*ON/OFF" switch (Part 4 Figure 8.1-1)* to the "OFF" position, the pressure in the tank lowers to 3-3.5bar/43-51psi.
As soon as the pressure reaches 3-3.5bar/43-51psi, the engine automatically stops.

10.5 After stopping the machine

1) If the machine has operated in dusty environments, it will be necessary to replace the air filter and check the status of the cooling radiator; if the fins are obstructed by debris, remove the debris as needed.
2) Check that during the working phase there is no leaking of fuel or lubricating oil inside the machine.
3) When possible, place the machine away from the elements.

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11 MONITORING AND TESTING OF THE MACHINE

11.1 Monitoring and testing of engine speed

ALL TESTING AND CALIBRATION SYSTEM MINIMUMS AND MAXIMUMS MUST BE ADJUSTED BY A KNOWLEDGABLE PROFESSIONAL WHO IS TRAINED AND EQUIPPED WITH A SPECIAL TACHOMETER FOR THIS APPLICATION AND MUST WEAR EAR PROTECTION.

For all calibrations and adjustments, be aware of the following residual risks and their pictograms:

Presence of parts in motion; pay attention to mechanical risks

Presence of hot surfaces at high temperatures

Pay attention to the risk of burns

11.1-1 CONTROL SYSTEM OF MAXIMUM ENGINE SPEED

The calibration of the maximum speed is set by the manufacturer. It should not be changed for any reason. Any tampering or variation of the maximum speed of rotation of the motor will cause an immediate voiding of the warranty.

11.1-2 CONTROL SYSTEM OF MINIMUM ENGINE SPEED

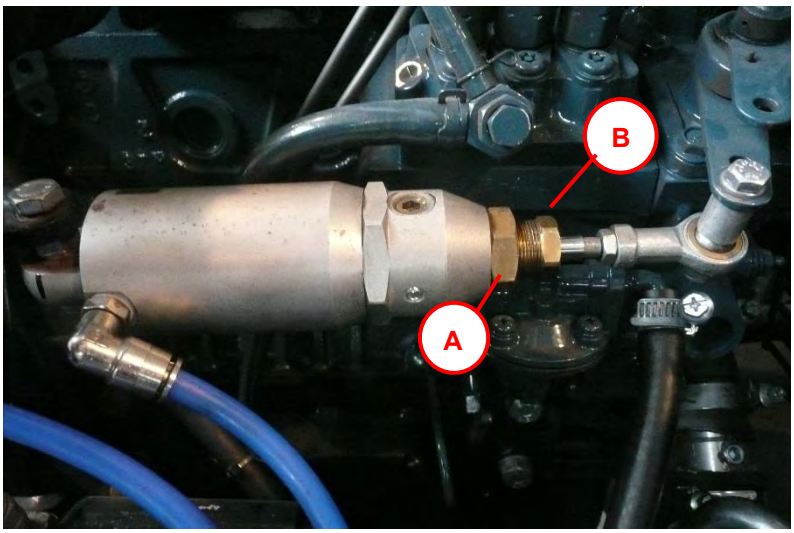

Figure 11.1-1 Adjusting idle speed motor

For calibration of the idle speed of the engine RPM, a qualified maintenance technician must do the following:

1) Start the machine as described in Section 10.2 “Starting”
2) Wait for the compressor to reach the maximum pressure while the engine is at idle speed
3) Close all air valves (Figure 10.2-1)
4) Open the hood with the engine running
5) Loosen the 23mm lock nut (Letter A in Figure 11.1-1)
6) To increase the idle speed of the engine, tighten the 18mm nut (Letter B in Figure 11.1-1)
7) To reduce the idle speed of the engine, loosen the 18-mm nut (Letter B in Figure 11.1-1)

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8) Measure with an optical tachometer (Letter B in Figure 11.1-2) the RPM of the harmonic balancer, focusing the optical beam on the reflective indicator (Letter A in Figure 11.1-2)

9) Compare the measured value with the specification in Section 2.3 (1700RPM)

10) Adjust RPM as described above to the value of idle speed indicated ± 2-3%

11) Tighten the 23 mm lock nut when the appropriate RPM is obtained (Letter A in Figure 11.1-1)

12) Close the hood

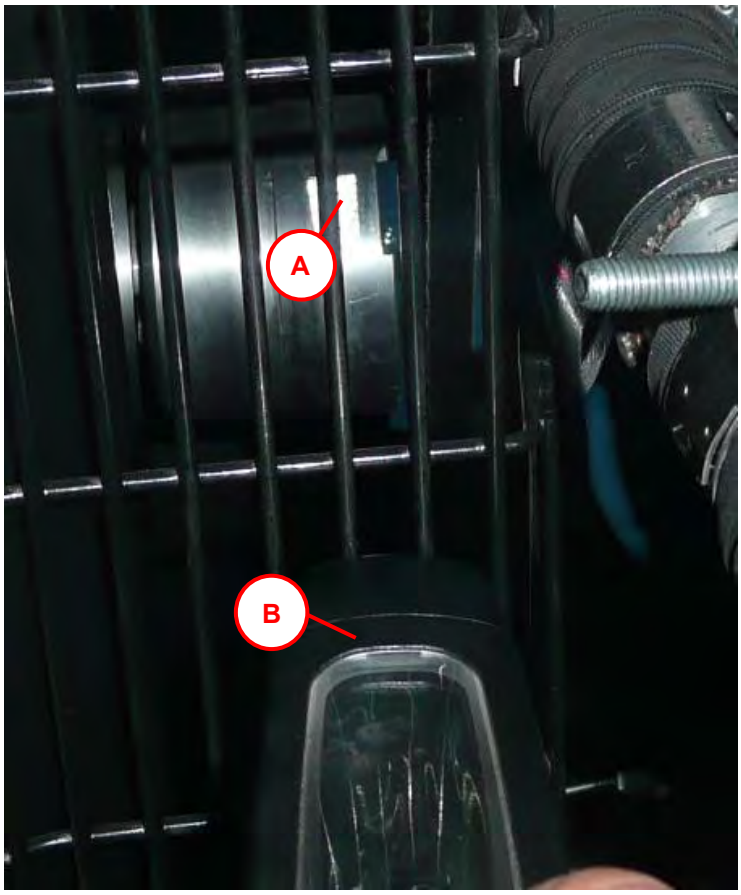

Figure 11.1-2 Reflective mark on the harmonic balancer

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11.2 Monitoring and control of the air pressure of the compressor

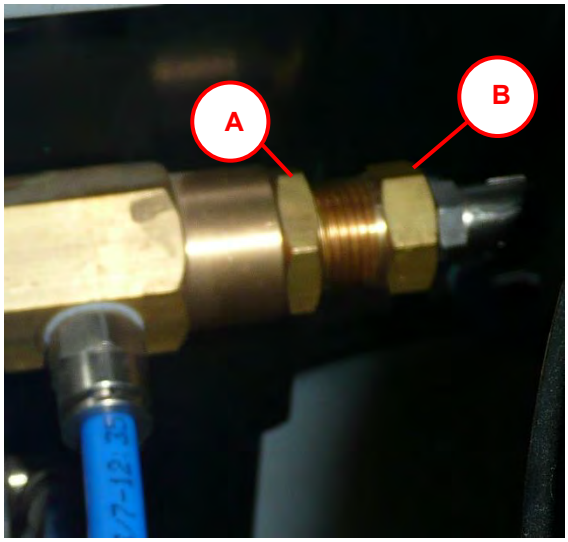

Figure 11.2-1 Adjusting maximum pressure of the air compressor

The maximum pneumatic pressure is calibrated during the testing phase of the machine. If the value of the maximum air pressure indicated by the pressure gauge on the control panel has changed more than ± 5% from the value specified in Specification Section 2 of this manual, proceed as follows:

1) Start the machine as described in Section 10.2 “Starting”
2) Wait for the compressor to reach maximum pressure when the engine is at idle speed
3) Close all air valves (Figure 10.2-1)
4) Open the hood with the engine running and loosen the 22mm lock nut (Letter A in Figure 11.2-1) on the maximum pressure valve
5) To increase the maximum pressure, tighten the 19 mm nut (Letter B in Figure 11.2-1)
6) To reduce the maximum pressure, loosen the 19 mm nut (Letter B in Figure 11.2-1)
7) Tighten the lock nut when the appropriate pressure is obtained (Letter A in Figure 11.2-1)
8) Slightly open the air valve until the engine accelerates, then close the air valve. Repeat this 2-3 times to allow the settling of the pressure valve.
9) Check the reading on the pressure gauge located in the control panel to insure that the maximum pressure has been obtained
10) Compare the measured pressure with the specification in Section 2.2 and repeat Steps 5-10 if needed to obtain the correct maximum pressure max. 8.5bar/123psi.
11) Close the hood

WARNING: Notice that the gauge needle should move smoothly; if it doesn't, replace it. Before making any calibration to the high or low pressure, make sure that the gauge is working correctly and reliably.

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11.3 Monitoring and adjusting the minimum air pressure

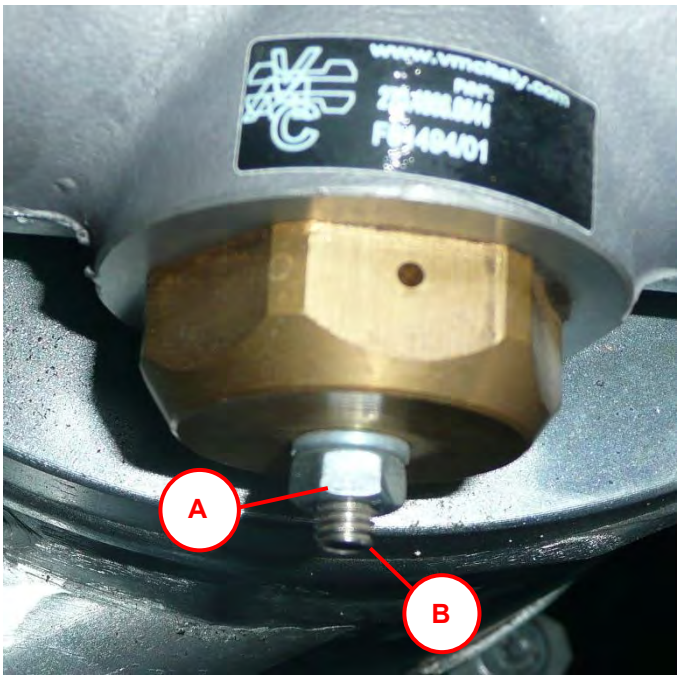

Figure 11.3-1 Adjusting minimum pressure of the air compressor

The minimum air pressure is calibrated during the testing phase of the machine.
If the air pressure indicated by the pressure gauge on the control panel varies over a ± 5% from the value specified in Section 2.2 of this manual, proceed as follows:

1) Start the machine as described in Section 10.2 "Starting"
2) Wait for the compressor to reach maximum pressure when the engine is at idle speed
3) Gradually open the air valve (Figure 10.2-1)
4) Open the hood with the engine running
5) Loosen the 10mm lock nut on the minimum pressure valve (Letter A Figure 11.3-1)
6) To increase the maximum pressure, tighten the 3mm Allen screw (Figure 11.3 Letter B)
7) To reduce the minimum pressure, loosen the 3mm Allen screw (Figure 11.3 Letter B)
8) Tighten the 10mm lock nut (Letter A Figure 11.3-1) and close the air valves (Figure 10.2-1)
9) Slowly open the air valve (Figure 10.2-1) and close it again, repeating the process a few times to allow the settling of the minimum pressure air valve minimum 5 bar/73psi.
10) Close the hood

WARNING: Pressure tank

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12 SAFETY DEVICE

12.1 Verification of the safety valve

The safety valve is located on the oil separator tank and starts working to relieve any accidental excessive pressure. The calibration of this valve is performed and verified in testing at the factory and cannot be adjusted for any reason. Its efficiency should be checked quarterly by doing the following:

1) Start the machine as described in Section 10.2 “Starting”
2) With the air valves closed and the engine at idle speed, using smooth needle-nose pliers, pull out on the pin as shown in Figure 12.2-1 and release it as soon as pressure exits the valve

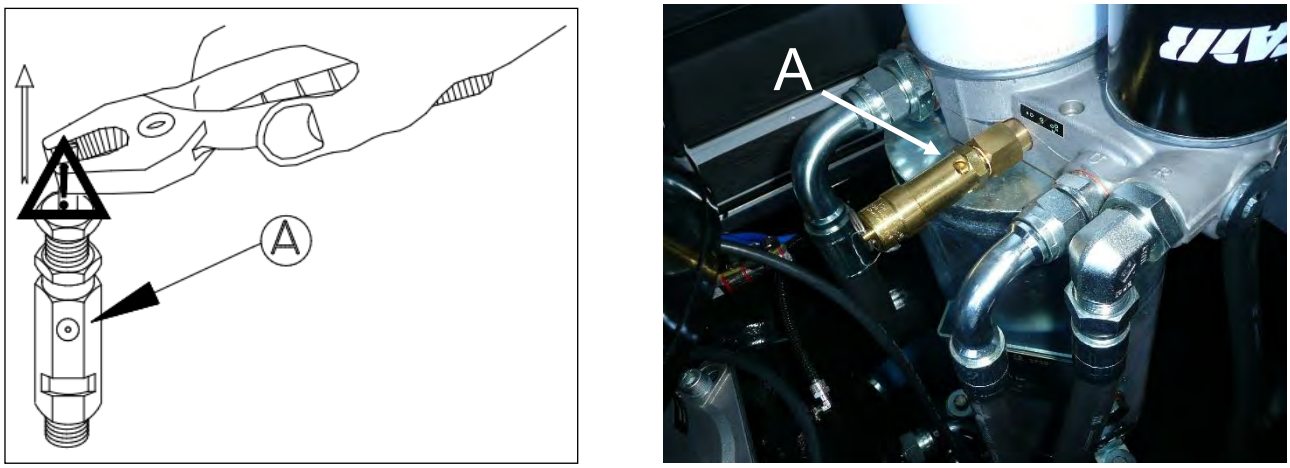

Figure 12.2-1 Testing of the safety valve

WARNING: The air escaping from the valve during this operation contains small particles of oil.

WARNING: Pay attention to the danger of high-pressure liquids.

If, following the testing of the valve, the pin does not return to its normal operating position, thus preventing the valve to vent or seal properly, an immediate replacement of the valve will be necessary. Contact ROTAIR for replacement parts.

If part replacement is necessary, it is recommended to contact ROTAIR, quoting the serial number of the machine.
The use of a non-ROTAIR supplied safety valve will release ROTAIR from any liability.

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13 MAINTENANCE

The machine must be receive regular periodic maintenance in order to provide safe, adequate, and uninterrupted service. Maintenance work must be performed by qualified personnel that have been properly trained to operate and service the machine. Most maintenance and service will be performed with the machine stopped and the power switched off on the electrical panel.

The maintenance and service technicians must check that they have removed their tools at the end of service and before starting the machine again to avoid damage to the moving parts.

13.1 Routine maintenance

The sole objective of routine maintenance is to restore a system (or one of its components) from a state of failure or non-optimal operation to the state that it is performing as it was before the onset of the problem.

In the following chapter are listed in order of frequency all operations concerning the compressor and the engine. It will be necessary to refer to OPERATING AND MAINTENANCE, which is prepared by the manufacturer of the engine and is supplied with the machine.

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13.2 Maintenance program

In this program are listed all the maintenance items and the frequency of which they must be executed on the various components of the machine. Such maintenance is essential for the proper functioning of the machine and its mechanical durability over time.

RECOMMENDED OPERATIONS	*FREQUENCY*
Check the compressor oil level	Daily
Check engine oil level (refer to the manufacturer's manual)	Daily
Check Coolant Level	Daily
Check fuel level and top off (if necessary)	Daily
Check oil or fuel leakage	Daily
Check operation indicator\warning lights	Daily
Check the readability of measuring instruments	Daily
General cleaning operations	Daily
Check for obstructions to the ventilation system	Daily
Check air filter in dusty work conditions	Daily
Check operation trailering lights and license plate lights (only for the approved road version)	Daily
Check the compressor air filter	Weekly
Check the engine air filter	(Ref. Manual of the engine manufacturer)
Check the battery electrolyte level	Monthly
Check tire pressure	Monthly
Check belt tension	Three months
Check speed controls at the minimum and maximum engine RPM	Three months
Check the operation of the safety valve	Three months
Clean the oil cooler	Three months
Check the oil recovery nozzle	Three months
Drain the fuel tank	Three months
Replace diesel fuel pre-filter	Every 500 hours
Check the operation of the braking system	Three months
Check the parking brake if equipped	Three months
Change engine oil	Ref. Manual of the engine manufacturer
Replace compressor oil filter	After the first 50 hours

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RECOMMENDED OPERATIONS	*FREQUENCY*
Replace compressor oil	After the first 50 hours
Check the torque of screws and bolts on compressor and engine silent-blocks	Every 50 hours
Check the torque of all screws and bolts	Every 100 hours
Check tightness of all pipe/tubing connections	Every 100 hours
Replace compressor air filter	After 500 hours
Replace compressor oil filter	After 500 hours or after a long storage period (9-12 months), whichever comes first
Replace compressor oil	After 1500 hours
Replace oil separator filter element	After 2000 hours
Check-up by "authorized ROTAIR" service	Every 3000 hours
Check readability of the nameplate	Annually
Control valves serviced by "authorized ROTAIR" service	Biannually

The ROTAIR S.P.A. disclaims any responsibility for the failure to comply with maintenance requirements in the table above.

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13.3 Torque values for screws and bolts

For the correct tightening of screws and bolts on the machine, please observe the torque values corresponding to the class of coupling illustrated in the table below.
We recommend the use of torque wrenches for tightening the screws and bolts on the machine.

Torques not binding N.m (Newton meters)							Couples test sockets for hexagonal screws							
These pairs are reference values for normal metric threads according to DIN ISO 261 and measures supporting heads according to DIN EN ISO 4762, DIN ISO EM 4032, DIN EN ISO 4014 and DIN 931-2, 6912, 7984 and 7990. With these values obtains an exploitation of 90% of the yield strength of the screws, on the basis of a coefficient of friction equal to 0.14 (screw new, untreated, not lubricated). Important: In extreme cases, e.g. screws lubricated with MOS2 and coupling elements cadmium-plated on both sides, the value of torque should be reduced by about 20%.								No. 2, 2A, 2B No. 1B, 308, 7	No. 4	No. 6, No. 1B, 7, 400	No. 25	No. 26 R No. 626	No. 35 A No. 35 B No. 3112	No. 894 No. 895
M	Tightening values for classes of coupling according to DIN 267						mm							
	4.6	5.6	6.9	8.8	10.9	12.9								
M 2	0,123	0,162	0,314	0,373	0,520	0,628	4			1,90				
M 2,2	0,196	0,265	0,510	0,598	0,843	1,010	4,5*			2,64				
M 2,5	0,284	0,373	0,726	0,863	1,206	1,451	5			3,55				
M 3	0,441	0,588	1,128	1,344	1,883	2,256	5,5			4,64		14,4		2,32
M 3,5	0,677	0,902	1,736	2,060	2,893	3,481	6*	17,6	7,4	5,92		17,6		2,96
M 4	1,000	1,344	2,599	3,040	4,315	5,148	7	25,2	11,4	9,12		25,2		4,56
M 5	1,916	2,648	5,099	6,031	8,483	10,200	8 9*	34,5 45,4	16,6 23	13,3 18,4		34,5 45,4	34,5 45,4	6,65 9,20
M 6	3,432	4,511	8,728	10,300	14,710	17,652	10	58,1	31	24,8	58,1	58,1	58,1	12,4
M 7	5,590	7,453	14,220	17,162	24,517	28,439	11 12	72,7 89,1	40,4 51,5	32,3 41,2	72,7 89,1	72,7 89,1	72,7 89,1	16,1 20,6
M 8	8,238	10,787	21,575	25,497	35,304	42,168	13 14*	107 128	64,5 79,4	51,6 63,5	107 128	107 128	107 128	25,8 31,7
M 10	16,67	21,575	42,168	50,014	70,608	85,317	15 16 17	150 175 201	96,2 115 134	77,0 92,3 107	150 175 201	150 175 201	150 175 201	38,5 46,1 53,5
M 12	28,44	38,246	73,550	87,279	122,60	147,10	18 19* 20*	230 261 294	160 186 215	128 149 172	230 261 294	230 261 294	230 261 294	64,0 74,5 86,0
M 14	45,11	60,801	116,70	138,30	194,20	235,40	21 22* 23*	330 368 408	247 281 319	198 225 255	330 368 408	330 368 408	330 368 408	99,0 112 127
M 16	69,63	93,163	178,5	210,80	299,10	357,90	24 25* 26*	451 496 544	359 402 449	287 322 359	451 496 544	451 496 544	451 496 544	143 161 179

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13.4 Maintenance

13.4-1 CHECKING AIR FILTERS (INTAKE VALVE)

This check should be performed periodically after every 100 hours of work. If the machine operates in severe conditions, especially very dusty environments, it will be necessary to perform these checks on a daily basis.

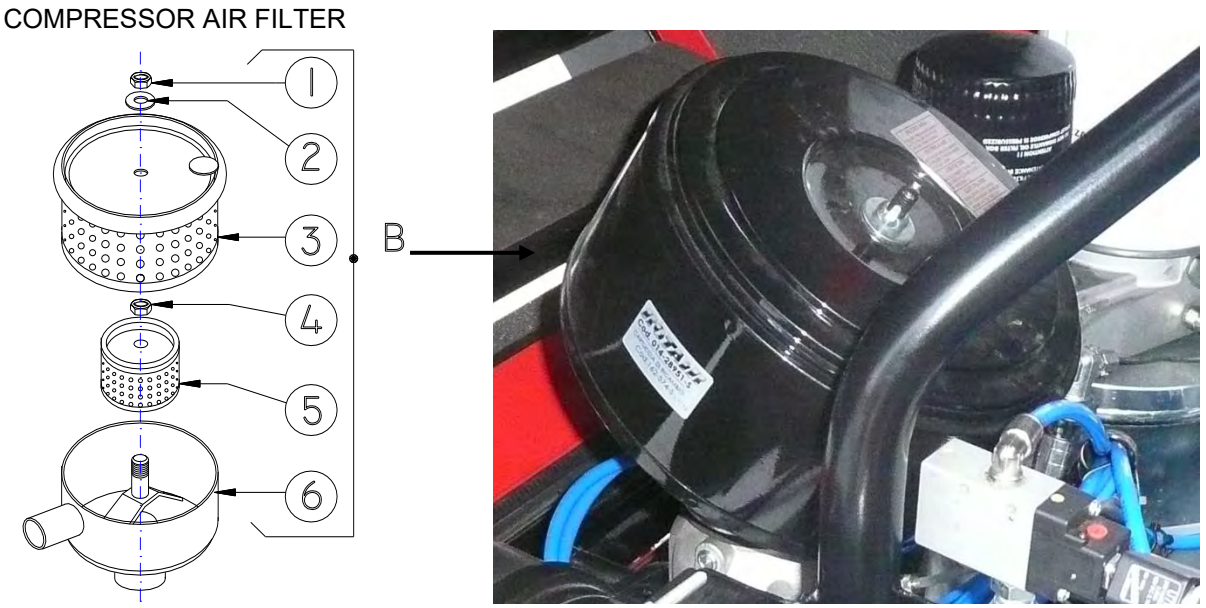

Figure 13.4-1A Compressor air filter

The filter consists of two filtering elements. To check them, loosen the nut (Figure13.4-1A, (1)) and remove the element of the 1st stage (outer) (3). Should any traces of dust be noticed on the element of the 2nd stage (inner) (5), remove this one also by removing the nut (4).

The filter element must never be washed with water or other substances, but it must be replaced after every 500 hours of work.

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13.4-2 CHECKING THE ELECTRICAL BATTERY

Figure 13.4-2 Battery compartment

During extended periods of storage of the machine, check the battery's charge status

- ***To avoid complete discharge of the battery, if the machine will not be used for more than 3 months, disconnect the negative terminal of the electrical system.***
- ***Periodically check the battery charge and recharge it every 3 months.***

Cleaning the terminals

The battery terminals (poles) must be cleaned and greased periodically. The accumulation of dirt can hinder the passage of electric current. For cleaning it is necessary to switch off the machine, disconnect the terminals starting with the negative terminal, and clean the terminals.

Checking the clamps

Generally, the negative and positive poles of the battery are greased (eg. Pulp Vaseline or similar product) to avoid the oxidation of metals. The paste on the clamps must be periodically replaced. In the same way, check that the terminals are firmly connected to the battery poles, and if necessary, tighten them. In fact, it may occur that vibrations loosen the grip of the clamps. A mobile connection can cause malfunctions and even failures to the vehicle's electrical systems.

Checking the electrolyte (in the case of an unsealed battery)

The electrolyte must always cover the element plates. If the battery fluid is low, it may compromise its operation. In these cases, if the level of electrolyte is below the minimum level, it is necessary to have it checked by a qualified electric maintenance technician, and if necessary, provide the addition of distilled water to restore the electrolyte level. If after refilling and charging the battery, the battery continues to discharge frequently, it must be replaced.

CAUTION: Take special care when handling battery electrolyte because it is a potentially corrosive liquid.

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13.4-3 FUSE REPLACEMENT

Fuse replacement should be performed when one or both fuses are damaged.
To replace the fuse, proceed as follows:

1) Stop the machine
2) Open the hood
3) Open the fuse box
4) Pull the fuse to be replaced with tweezers (to fuse 15 A) or remove the nuts for the 40 A fuses
5) Once the fuse has been removed, observe the internal filament. This must be intact to function properly, and if it is intact, reinstall the fuse
6) In the event of a open/broken fuse, replace it by choosing a fuse with identical ratings. The ratings of the fuses are described in Section 8.3 of this manual

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13.4-4 CLEANING THE RADIATOR COOLER

The coolants of the compressor and the engine are cooled by a radiator which, consequently, must be kept clean so that the ventilation air can pass freely and easily through its fins. Radiator fins clogged with dust or any other debris will lead to harmful and dangerous overheating of the mechanical screw compressor, greatly jeopardizing the operation and durability of the machine. We recommend that you check the radiator fins periodically and, if necessary, clean them with compressed air or a jet of water under pressure.

13.4-5 PERCENTAGE/MIXTURE OF COOLANT

To determine the proper amount of antifreeze to be mixed within the the radiator (Figure 13.4-3), follow the mixture amounts in table below:

T (°C / °F)	Total volume of the cooling plant	Water volume	Antifreeze volume	Antifreeze percentage*
(°C / °F)	*(lt , gal)*	*(lt, gal)*	*(lt, gal)*	*%*
- 10 / 14	7, 1.84	5.25, 1.40	1.75, .5	25%
- 15 / 5	7, 1.84	4.5, 1.20	2.50, .7	35%
- 20 / -4	7, 1.84	3.8, 1.00	3.2, .85	45%

**Coolant recommendation: ROLOIL ROL-ICE BLU*

Figure 13.4-3 Checking the coolant radiator

WARNING**: **The radiator cap (Figure 10.1-3) must never be removed on a warm or hot engine. Doing this would cause hot coolant under pressure to exit the radiator and cause severe burns to the person(s) in the area. Refilling/ filling the system must be done with a cold engine and a mixture of water and antifreeze in the correct percentages to allow for proper cooling and protection in cold climates.

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13.4-6 CHECKING AND CLEANING THE OIL RECOVERY NOZZLE

Check and clean the oil recovery system. Should you find a leak of oil mist mixed with compressed air, operate as follows (Figure 13.4-4):

1) Remove the fitting located at the center of the tank (Letter Z)
2) Inside the fitting (Letter Z) is a nozzle (Letter U). Make sure that its calibrated hole is not blocked (blow it out with compressed air)
3) Reinstall the fitting

WARNING: During normal operation of the compressor, the fitting in the pipe is transparent (Z).You will notice a certain amount of oil flow from the fitting (Z) towards the head of the compressor

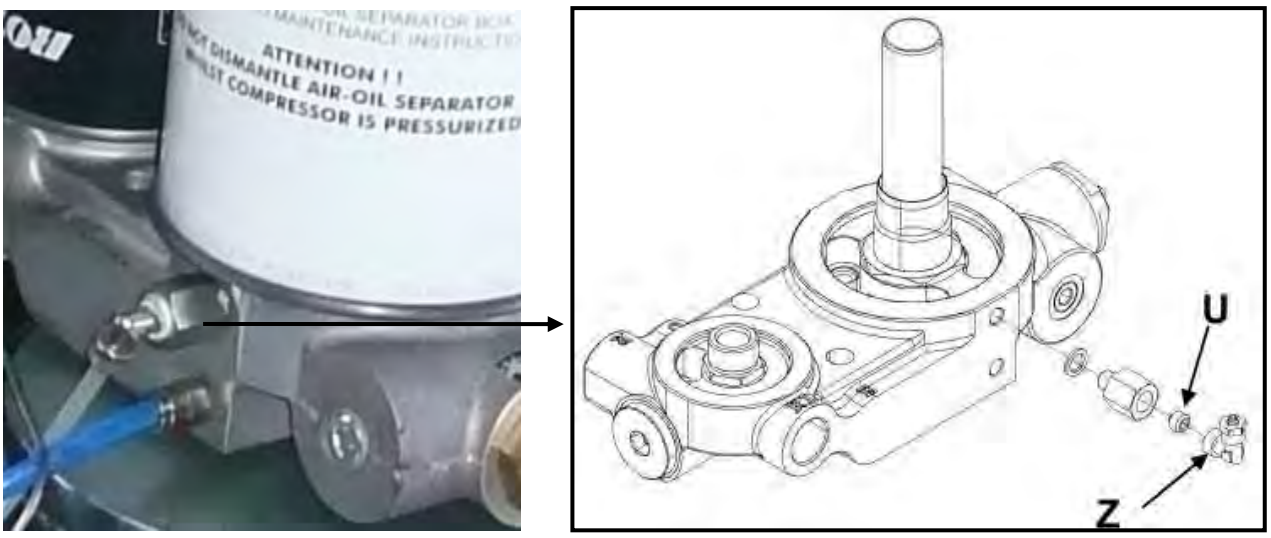

Figure 13.4-4 Nozzle oil recovery

13.4-7 DRAINING THE FUEL TANK

The draining of the fuel tank is recommended at times in an effort to remove water and contaminants that may collect in the tank during normal operation and filling. Avoid refueling with cans because these may contain traces of water which, being heavier than the diesel fuel, are at the bottom of the can and thus can be introduced into the fuel tank of the machine.

Periodically open the fuel tank drain to remove the water from the fuel tank. Failure to periodically drain the tank can allow small amounts of water to be injected into the engine.

It is also advisable to refuel at the end of the work shift to prevent the varying temperature range of the tank walls from allowing condensation to form in the fuel tank overnight.

In conjunction with draining water from the fuel tank, replacing the fuel filter at the same time can help to eliminate water from the entire fuel system.

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The draining of the tank must be performed at least 30 minutes after stopping the machine to allow water to separate from the diesel fuel and settle to the bottom of the tank.

The contaminated fuel from the tank should be disposed of properly and in accordance to the requirements of hazardous waste disposal in your area.

Remember that the contaminated fuel should not be discarded into the environment.

13.4-8 REPLACING THE DIESEL FUEL FILTER AND PRE-FILTER

For instructions regarding replacing the diesel pre-filter, diesel filter, engine oil, and other specific filters, refer to the owner's manual of the engine manufacturer attached to this documentation.

13.4-9 COMPRESSOR OIL FILTER REPLACEMENT

For proper compressor oil filter replacement, follow the directions below:

1) Stop the machine and open the hood of the engine compartment
2) Use an oil filter wrench to remove the filter that needs to be replaced (Figure 13.4-6)
3) Oil the seal of the new filter and hand-tighten it only
4) Start the engine and make sure that there are no oil leaks in the vicinity of the oil filter seal. If there is a leak, stop the engine and correct the leak.

Figure 13.4-6 Compressor oil filter

WARNING: The used oil filter contains hazardous materials and needs to be treated as hazardous waste; therefore, it must be disposed of according to the requirements for hazardous waste disposal in your area.

WARNING: Replace the compressor oil filter after 500 hours or after a long storage period (9-12 months), whichever comes first.

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13.4-10 REPLACEMENT OF COMPRESSOR OIL

The compressor oil replacement must be performed, taking into consideration the working conditions in which the machine operates (standard, severe, dusty, very high temperatures, etc.).

The oil change intervals must never exceed 1,500 hours of work.
In conjunction with the replacement of the oil, the filter must also be changed (Section 13.4-12).

RECOMMENDED OIL	BRAND
ROTAIR COMPRESSOR 46	ROTAIR

List of compatible oils:

DEMOMINATION AND TYPE OF OIL	BRAND
DICREA 46	AGIP
COMPRESSOR OIL 46	API
ENERGOL RC-R 46	BP OIL
SCHUBERT 46	Q8
RARUS 425	MOBIL
SCARLATTI 46	Q8
LR CCW 46	ROLOIL
CORENA D 46	SHELL
DACNIS VS 46	TOTAL

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13.4-11 CHECKING THE OIL MIST SEPARATOR FILTER

The oil mist separator filter is expected to last for around 2000 hours of work but is closely related to a careful observance of all maintenance requirements given in this manual. An excessively low oil level, not following recommended oil change intervals, and using the machine with the cooling radiator clogged may cause serious and irreparable deterioration of the filters.

Therefore, if after checking and cleaning the oil recovery nozzle (operation described in Section 13.4-7) and making sure of the proper oil level in the tank, there are still traces of oil in the compressed air, the oil mist separator filter will need to be replaced.

To determine the degree of restriction of the oil mist separator filter, proceed as follows:

1) Install a pressure gauge upstream of the separator and make sure that the engine is ready to be started
2) Start the engine
3) Partially open the air valve until the pressure gauge on the control panel shows the maximum operating pressure
4) Read the value of the pressure gauge located upstream of the oil mist separator filter and compare the two gauge readings. If there is a difference of more than 1 bar/14.5psi, replace the separator filter. The oil separator filter must never be washed with water.

WARNING: Pressure tank

13.4-12 REPLACEMENT OF THE OIL MIST SEPARATOR FILTER

To replace the oil mist separator filter, proceed as follows:

1) Stop the engine and release all pressure in the oil separator tank.
2) We recommend using a cloth in order to catch any oil spillage that may occur during the replacement of the oil mist separator filter.
3) Remove the oil mist separator filter; the filter is situated above the oil separator tank
4) Replace with the new filter, making sure to lubricate the gasket.
5) The filter must be tightened by hand only.

WARNING: Pressure tank

Figure 13.4-7 Oil mist separator filter

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13.4-13 ENGINE CONTROL AND MAINTENANCE

As for the controls of the engine and replacing air filters, diesel filters, timing belt, engine oil, and other specific controls, refer to the owner's manual of the engine manufacturer attached to this documentation.

14 SPARE PARTS

To order any parts, contact your authorized ELGi service center.

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15 FAULTS AND TROUBLESHOOTING

Abnormal	Cause	Solution
The engine will not start	Battery discharged or defective	Recharge and replace if necessary
	Terminals of the battery cables oxidized or loose	Clean or tighten the connections
	No fuel	Top off the fuel in the diesel tank
	Faulty fuel soleoid	Seek customer service by the manufacturer of the engine
	Air in the fuel pipe	Locate the leak by carefully inspecting all fuel lines and make repairs as necessary
	Injection pump defective	Seek customer service support from the engine manufacturer
	Temperature sensors defective	They are located at: - Cylinder head - Output of air compressor - Oil mist separator tank One at a time, unplug the wire from each sensor to identify the defective sensor and then replace it. The temperature light on the control panel should go off when the faulty sensor is disconnected.
	Starter defective injectors failures	Seek customer service support from the engine manufacturer
When opening the air valves, the engine does not accelerate	Maximum pressure valve defective	Remove the maximum pressure valve spring and conical seat. Inspect the valve and seat. If a defect cannot be found and repaired, the valve must be replaced.
The engine speeds up but no air comes out	Minimum pressure control valve blocked	Disassemble and check that the piston is free to move. Check that the spring is intact. If the defect cannot be repaired, the valve must be replaced. Reassemble and adjust the minimum pressure, following the instructions in Section 11.3.
The machine stops suddenly and can only be restarted after a few minutes of waiting	A temperature sensor detects a high temperature and consequently stops the machine	Disconnect one sensor at a time and locate the sensor that caused the engine to stop. If that sensor is on the engine, check the oil level, the voltage, and the condition of the alternator belt. For water-cooled engines, check the coolant level. If the faulty sensor was the sensor on the compressor control, check the level of oil in the tank and fill as needed.

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Abnormal	Cause	Solution
		Check the cooling fan and clean the radiator; replace the compressor oil filter If the sensor is on the oil separator tank, check the oil separator filter by following the instructions to Section 13.4-14, proceeding to its eventual replacement in Section 13.4-15
The engine does not reach the maximum RPM and the compressor does not keep up with the work load	The spring in the accelerator piston is broken/needs to be adjusted	Check the tension of the spring piston accelerator (Section 11.1-2)
	Engine speed is lower than expected	Have the diesel injection pump of the engine inspected by qualified personnel Drain the fuel tank and replace the fuel filter (Section 13.4-9)
Oil leaking from the air valves	Minimum working pressure too low	Adjust it to the instructions of Section 11.3
	Too much oil in the tank	Adjust to the correct level in Section 10.1
	The machine is not level during operation	Level the machine
	Nozzle clogged oil recovery	See Section 13.4-6
	Defective oil mist separator filter	See Section 13.4-11 and 13.4-12

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16 ELIMINATION OR DISPOSAL OF THE MACHINE

16.1 Instructions for dismantling

To dismantle the machine safely, proceed as follows:

1) Place the machine in a large area and make sure it is turned off.
2) Drain all liquids from all the tanks, including engine oil, fuel, coolant, and hydraulic oil and store them in safety containers. For disposal of these types of waste, follow the next paragraph.
3) Loosen the screws of the body panels and remove all covers.
   Remove all the components of the machine one by one, dividing them according to their material composition. The various components of the machine have to be disposed of based on the type of waste they contain.

The following describes the different types of waste that can be generated during the life of the machine:

1) Waste motor oil
2) Waste hydraulic oil
3) Engine coolant
4) Diesel fuel
5) Electrolyte from the battery
6) Rags or paper impregnated with solvents or other substances used to clean various parts of the machine

17 ELIMINATING THE MACHINE

The operations of destruction and disposal must be carried out in a safe condition by a qualified specialist and after carefully reading and incorporating the recommendations and instructions provided in this section of the manual of use and maintenance and consulting the safety data sheets relating to substances in the machine mentioned in the previous chapter.

Once you reach the end of the mechanical life of the compressor, it has to be taken out of service so that it cannot be used for other purposes.

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18 WASTE MANAGEMENT

The withdrawal of special waste and/or hazardous materials should be entrusted with the written contract to authorized firms, and those who physically transport and handle the waste must be in possession of the required authorizations. The haulers authorized to accept the waste must be authorized by the local waste management authorities.

18.1 Special waste

Parts or fluids are considered a hazardous waste from industrial, agricultural, crafts, commercial, and service, by quality or quantity, are declared similar to municipal waste. These also include machinery, equipment, and metal parts of deteriorated and obsolete engines.

18.2 Toxic and hazardous waste

Items considered to be hazardous or toxic include all waste containing or contaminated by the substances listed in Directives 75/442 / CEE, 76/403 / CEE and 768/319 / CEE or other regulations in the countries of use and installation of the machines.

18.3 Temporary storage

Hazardous or toxic waste is waste containing or contaminated by substances listed in Directives 75/442 / CEE, 76/403 / CEE and 768/319 / CEE or other regulations in the countries of use and installation of the machines.
Temporary storage of toxic and hazardous waste is allowed according to the expected disposal methods of waste by treatment and/or final disposal. In any case, observe the mandatory laws of the country of the user in the field of environmental protection.

18.4 Features of the containers

Stationary and mobile containers designed to contain toxic and hazardous waste must possess adequate strength requirements in relation to the chemical-physical properties and to its hazardous specifications of the waste contained. The containers in which dangerous or harmful products are stored must be labeled to disclose the nature of their content and carry signs and markings as required by local laws.

18.5 Registration requirements

In accordance with the EU Directive 75/439 / CEE on the disposal of waste oil, the records of loading/ unloading must be kept by all companies that produce hazardous waste or hazardous toxins from industrial use (in each case the users should refer to the regulations implementing that Directive in the country of installation and use of the machines).

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