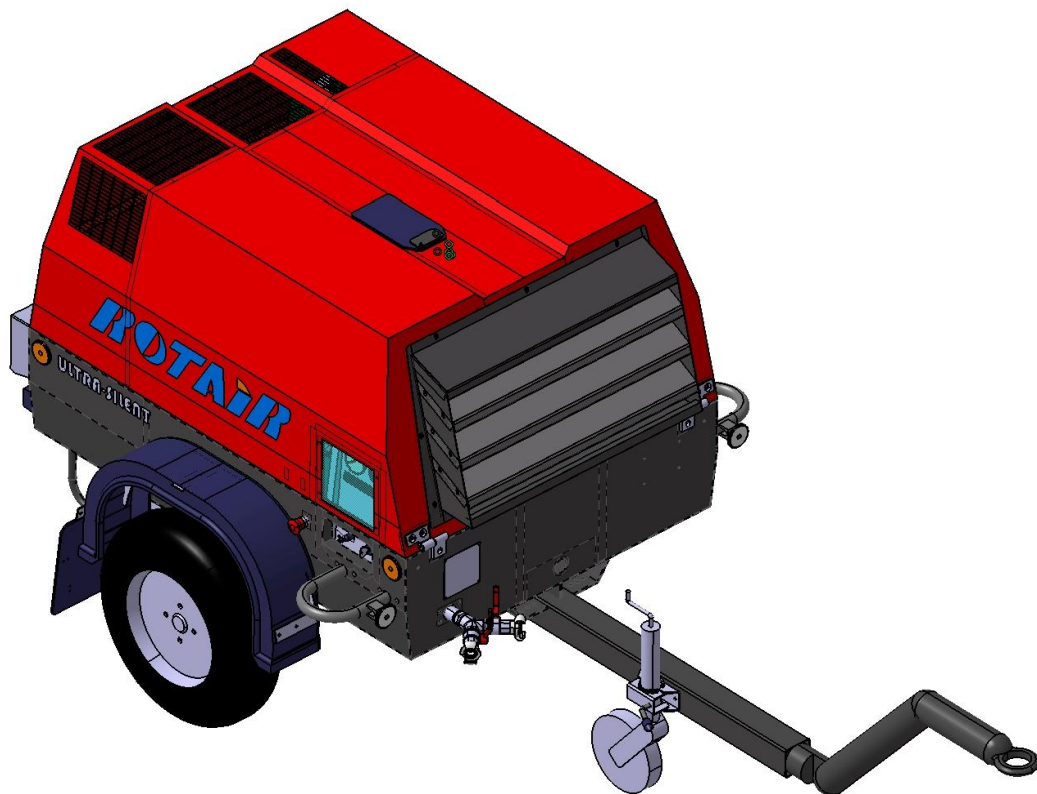




USER'S AND MAINTENANCE MANUAL

Motor compressor

MDVN 22K – MDVN 26K





USER'S AND MAINTENANCE MANUAL

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|----------|-------------------------|
| Date: | 20/02/2017 |
| Code | MAN MDVN 22-26 K ENG |
| Revision | 02 |

Motor compressor MDVN 22 K – MDVN 26 K


Dear customer,

Thanks for having purchased this Rotair motor 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 any information, you can contact our customer service at the following address:

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Via Bernezzo, 67
12023 CARAGLIO (CN) - ITALY
Phone: +39 0171 619676
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E-MAIL: info@rotairspa.com



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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 motor and the axle, since such information is contained in the user's and maintenance of the respective manufacturers.

The service instructions contain indications of utter importance concerning the safe appropriate and cost-effective operation of the machine.

The compliance with said operations helps prevent potentially hazardous situations, additional costs and loss of time, increasing at the same time its life-span.

The service instructions and safety measures reported in this manual must be complied with by the user of the machinery.

Besides the service instructions and the accident prevention prescriptions which apply in the countries and places of installation, all the more general rules of safety at the workplace must be complied with.

It is therefore recommended to carefully read 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, in particular if the illicit action involves advantage for competing companies.

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1 GENERAL

1.1 Definitions

The most significant definitions contained in this manual are reported hereinafter

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 qualification, such as e.g.:

Technical training authorizing to operate in compliance with the safety standards as related to the hazards the presence of electric current, pressure circuits, etc. may involve.

Technical background or - in any case - specific training relevant to the user's and maintenance procedures of the machinery in safety conditions.

Training in the 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 charged to install, operate, adjust, clean, repair or move a Machinery or perform its 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 to a guard.

1.1.9 EXPECTED USE

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


1.1.10 REASONABLY EXPECTABLE INCORRECT USE

The use of the machinery in a different way than the one indicated in the user's instructions, but which may derive from the easily expectable human behaviour.

1.1.11 COMPONENT

A constituent part of the electrical/pneumatic equipment, usually specified by its function, but used in various applications.



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1.1.12 CONTROL DEVICE

A device introduced in a control circuit and used to control the operation of the system (e.g. position sensors, 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 develops 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 CE identification nameplate is attached on the motor compressor chassis.

Such nameplate reports the Manufacturer's data, the CE brand, the denomination of the machinery, the code and year of manufacturing.

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



Figure 1.2-1 CE nameplate of motor compressor MDVN 22K – 26K



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1.3 Harmonized technical standards

The machinery has been designed and developed in compliance with the provisions contained in the technical standards reported herein under:

| | |
|---------------------------------|---|
| 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 and 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 harmonized 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 on the Official Journal of the European Union is assumed to be compliant with the essential health and safety requirements covered by such harmonized standard.
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 national level - the development and control process of the harmonized standards.



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1.4 General description of the machinery

The machinery described in this manual is motor compressor MDVN 22K – MDVN 26K.

The motor 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 primary energy.

The pneumatic energy finds applications in different fields of use, where "pneumatic" operation 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 in time, proportionally to the wear of the tool itself).

The correct compressor-tool coupling ratio allows the machinery operating in optimum conditions, as appropriate to ensure long life-span at the highest performance.

An oversized tool - besides creating unfavourable conditions for the appropriate operation of the machinery - shall not develop full performance, since it cannot resort to the required quantity of compressed air.

This machinery has been designed to work at ambient temperature ranging from -10 and +40°C.



2 TECHNICAL CHARACTERISTICS OF THE MACHINERY

The general technical characteristics of the machinery are reported hereinafter.

2.1 General technical characteristics

| DESCRIPTION | TECHNICAL VALUES AND DATA | |
|---------------------------------|---------------------------|----------|
| | MDVN 22K | MDVN 26K |
| Length | 2970 mm | |
| Width | 1410 mm | |
| Height (with hood closed) | 1200 mm | |
| Mass of the braked version | 547 Kg | 597 Kg |
| Mass of the non- braked version | 490 Kg | 540 Kg |
| Compression system | Screw single-stage | |
| Fuel tank capacity | 30 Lt | |
| Tire data | 145/80 R13 – 155/80R13 | |

2.2 Technical characteristics of the compressor

| DESCRIPTION | TECHNICAL VALUES AND DATA | |
|-----------------------------------|---------------------------|------------|
| Service pressure | 6.5 bar | |
| Minimum pressure | 5 bar | |
| Max. pressure | 8 bar | |
| Rated payload at service pressure | 2000 l/min | 2500 l/min |
| Cooling typology | Hydraulic oil (*) | |
| Hydraulic system capacity | 6 Litres | |

(*) We recommend COMPRESSOR 46 - TOTAL ERG.

Motor compressor MDVN 22 K – MDVN 26 K
2.3 Technical characteristics of the engine

| | MDVN 22K | MDVN 26K |
|--------------------------|----------------------------------|---------------------|
| DESCRIPTION | TECHNICAL VALUES AND DATA | |
| Engine brand | KUBOTA | |
| Type | D902-E3B | D1105-E3B |
| Number of cylinders | 3 | |
| Fuel | Diesel | |
| Cooling | By liquid | |
| Power available | 18.5 kW at 3600 rpm | 18.5 kW at 2900 rpm |
| Max. rotation speed | 3600 r.p.m. | 3000 r.p.m. |
| Min. rotation speed | 1900 r.p.m. | 1900 r.p.m. |
| Emissions | Tier 4 final | |
| Engine oil tank capacity | 4 Litres | 5.1 Litres |

2.4 Technical characteristics of the electric battery

| DESCRIPTION | TECHNICAL VALUES AND DATA | |
|-------------------|---------------------------|--------|
| Rated voltage | 12 Vdc | 12 Vdc |
| Capacity | 55 Ah | 70 Ah |
| Discharge current | 270 A | 400 A |

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% (a +40°C) |
| Altitude | 1.000 m above sea level |



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2.6 Acoustic emissions



This machinery is included in the list of machinery mentioned in Annex 1 of European Directive 2000/14/CE dated May 8th 2000 on the approaching of the Member States legislation as related to the acoustic emissions in the environment of machinery and equipment allocated to work outdoor.

The noise tests run with the machinery in operation have highlighted an allowed level of sound power L_{WA} in dB(A)/1 pW lower than 98 db (limit value mentioned in table Art. 12 Directive 2000/14/CE)

The position and value of the max. acoustic pressure as well as the acoustic pressure values must be indicated.



If - during the running-in stage of the machinery components - excessive noise arises, call ROTAIR S.P.A customer service.

3 SYMBOLS AND WARNINGS

The pictograms and main warning for the operators are reported herein under and indicated by the following denominations and symbols:

3.1 Hazards



WARNING

The pictogram calls the attention of specific provisions in order to prevent damage.



WARNING FOR ELECTRICAL HAZARD

The pictogram calls the attention of specific provisions in order to prevent damage.



WARNING FOR CRUSHING HAZARD

The pictogram calls the attention on a likely hazardous situation with risk of crushing the upper limbs.



WARNING HAZARD OF ORGANS IN MOTION

The pictogram calls the attention to the hazard of organs in motion.



WARNING ON RISK OF SCALDING OR HAZARD DUE TO HIGH-TEMPERATURE ELEMENTS

The pictogram calls the attention on the hazard of high-temperature elements and risk of scalding.



**WARNING:
OVERHANG
ING LOADS**

OVERHANGING LOAD WARNING

The pictogram calls the attention to the hazard due to the presence of overhanging loads



WARNING OF THE PRESENCE OF PRESSURE VESSELS

The pictogram calls the attention to the presence of pressure vessels.

3.2 Forbiddances



FORBIDDANCE TO REMOVE THE PROTECTION EQUIPMENT AND THE GUARDS

The pictogram calls the attention on the forbiddance to remove protection equipment such as fixed, movable, interlock guards or to tamper with photocells or photocell barriers.



FORBIDDANCE TO PERFORM CLEANING OR MAINTENANCE WHEN THE MACHINERY IS IN MOTION

The pictogram calls the attention on the forbiddance to perform cleaning or maintenance operations with organs in motion.



FORBIDDANCE TO TRANSIT UNDER OVERHANGING LOADS

The pictogram calls the attention on the forbiddance to transit under overhanging loads.



FORBIDDANCE TO START THE MACHINERY WHEN THE HOOD IS OPEN

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3.3 Obligations and notices



NOTICES

This symbol recommends to consult the manual before undertaking a given action.



OBLIGATIONS TO USE THE PPE (PERSONAL PROTECTION EQUIPMENT)

The pictogram calls the attention on the obligation to use the 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.



OBLIGATION TO USE THE SUPPORT FOOT, THE PARK BRAKE AND WHEEL LOCKING WEDGES.

3.4 General notices

This manual includes the user's and routine maintenance instructions of the machinery. Whenever it is not specified otherwise, the operational and maintenance actions are to be considered as "specialized", i.e. they can only be performed by a technician appointed to the 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 law, regulations 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 for the machinery they have been drafted for.



Do NOT utilize this manual and the annexed documents to run operations on similar machinery, of the same brand or typology.

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ROTAIR S.P.A. is available to its Customer for any further information. Please report the information (type of machinery, model and code) contained in the machinery identification nameplate. All the specific data not indicated in the text are mentioned in chapter "Technical characteristics 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 towing, lifting and parking of the machinery;
- The general rules and recommendations useful for routine and extraordinary maintenance;
- The modalities to identify and order the spare 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 the 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 charge of the user.

"Approved purpose" assumes compliance with the provisions reported hereinafter and related to the appropriate use and maintenance, as well as to the transport of the unit.

All 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 the supply 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 motor compressor MDVN 22K and MDVN 26K.

The machinery is allocated to work outdoor.

The motor 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 primary energy.

The pneumatic energy finds applications in different fields of use, where "pneumatic" operation 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 litres 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 in time, proportionally to the wear of the tool itself).

The correct compressor-tool coupling ratio allows the machinery operating in optimum conditions, as appropriate to ensure long life-span at the highest performance.

An oversized tool - besides creating unfavourable conditions for the appropriate operation of the machinery - shall not develop full performance, since it cannot resort to the required quantity of compressed air.

This machinery has been designed to work at ambient temperature ranging from -10 and +40°C.



WARNING: *It must be highlighted 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

It is not allowed to use the machinery for other processes than those which are mentioned in the section above. 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 discharges. The direct exposure to the air jet may cause medium severity injuries because of the strength and speed of the compressed air.



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



It is strictly forbidden to operate the machine in indoor environments whose atmosphere is made of vapours 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 the clogging of both the exhaustion filters mounted on the unit and of the radiator for the cooling of the lubrication and cooling liquids. Even in this case, a good operator will locate the machinery leeseide versus the work area.

The machinery has been designed and built to work with the hood closed and - consequently - it is forbidden to keep it open when the engine is on, because - besides generation harmful sound emissions - the required internal ventilation would be interrupted, and this is instead indispensable for the appropriate operation of the compressor.

Make sure that the hood is closed, as well as the hinges located on the rear side of the motor compressor.



Figure 4.3-1 Engine compartment hood closing hinges

Even selecting the hoses to connect the machinery to the tool, make sure that they are sized as appropriate, taking into account their length, the volume of air which needs to pass through them and the service pressures: if the hoses show a too small diameter or excessive length, the air flow would interrupt, with subsequent loss of load and poor performance of the tool.

The hoses which convey compressed air to from the machinery to the tool, or to any device applied, is to be provided with a tap located at the end which is connected to the tool; the tap shall be held closed during the connection of the hoses to both the machinery and the tool in order to prevent an inappropriate opening of the tap on board the machine from generating strong flickering of the piping, 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 actions on the machinery must be performed by qualified, trained and informed personnel only. "Qualified personnel" means people who - based upon their profession - have acquired experience and instructions as well as knowledge on the relevant standards and provisions 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 to recognize and anticipate the potential hazards.



Entrust the activities to appropriately trained or instructed personnel only; determine unmistakably the competences of the personnel as related to the fine tuning and to the maintenance and repair activities.

Define the responsibility of the operators appointed to run the equipment, also through accurate written provisions and authorize them to reject provisions by third parties if in conflict with the safety regulations and standards.

Make sure 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 - only by qualified electricians or by people with an appropriate level of competences in the electro-technical field.

The mechanical and pneumatic maintenance can be performed by the operators of the authorized workshops only.

6 SAFETY PROVISIONS

6.1 Safety provisions concerning transport

The motor-compressors which are not certified for towing need to be loaded onto another means of transport. The motor compressor shall have to be attached as appropriate to the floor of the means of transport in order to prevent and unbalancing of the load during transport.

The unit is shipped by Rotair attached to a support appropriate for its handling by means of fork-lift trucks; such wooden platform facilitates the anchorage to the floor of the transport vehicle and prevents the load from sliding. For safe transport, operate as follows:

- 1) Locate the unit with the towing steer opposed to the cockpit of the transport vehicle.
- 2) Locate the towing bar as in Figure 6.1-1.
- 3) Make the ropes pass around the towing bar and tighten them by means of the winches provided with the means of transport.
- 4) Set two wedges (Part A Figure 6.1-1) on each wheel, attaching them to the vehicle floor, in order to prevent the machinery from moving. Utilize wedges of appropriate sizes, both in height and in width.
- 5) Travel at moderate speed.

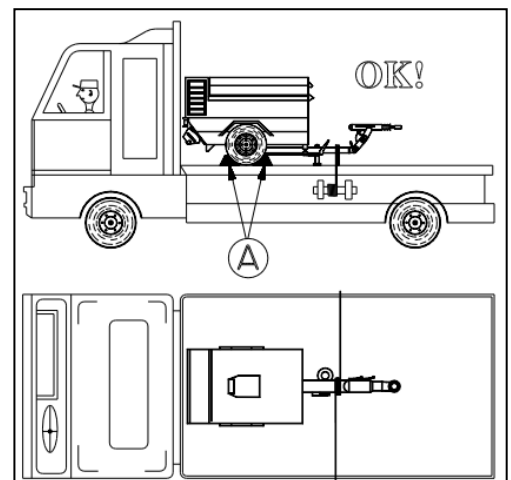


Figure 6.1-1 Instruction for towing in safe conditions

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6.2 Safety provisions concerning lifting

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

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

- 1) Make sure that the lifting organ (crane, hoist, etc.) is of the appropriate payload to the weight of the unit and that it is maintained as appropriate.
- 2) In case of lifting installed on truck, use the side anti-tilting stabilizes of the means.
- 3) Attach the hook of the lifting means to the hooking point of the compressor (Figure 6.2-1).
- 4) Lift the unit slowly and without sudden pulls. In the side displacements, prevent the load from swaying excessively.

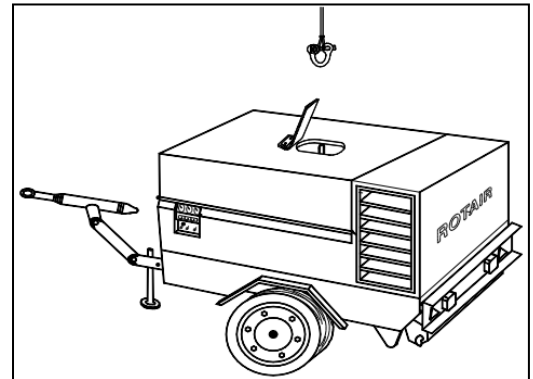


Figure 6.2-1 Lifting system of the machinery



The user must periodically check the efficiency of the lifting equipment and replace it if it results to be no longer appropriate or safe.

No other hooking and lifting systems are allowed except those which are provided with the machine.



This pictogram allows pointing out the hooking system to lift the machine.

- 5) Always check - before handling - that there are no moving parts that may fall. In such case, attach them as appropriate.
- 6) Check the status of ropes and chains before starting the handling operations.
- 7) In any case, always make sure that the machine is solidly fixed to the rope and balanced as appropriate.
- 8) Communicate the start-up of the maneuver as appropriate.
- 9) Never leave the maneuver area with an overhanging load
- 10) Do not stand or transit under the overhanging load.



**WARNING
OVERHANGING
LOADS**



Motor compressor MDVN 22 K – MDVN 26 K

6.3 Safety provisions relevant to towing (for road-certified compressors only)

This paragraph concerns the machinery enabled to road circulation and therefore provided with regular certification.

For the appropriate towing of the motor compressor, comply with the following prescriptions:

- 1) Make sure that the large towing eyebolt or the sphere connection is compatible with the towing device located on the towing vehicle. Make sure that the vehicle is enabled to tow a weight equal to or greater than the one of the motor compressor you intend to tow.
- 2) Check the pressure of the tires.
- 3) Adjust the height of the eyebolt so that it corresponds to the one of the towing vehicle hook; this can be obtained by acting on the articulate joints of the steer, until the towing bar that supports the eyebolt is as horizontal as possible.
- 4) Solidly lock the articulations by means of the appropriate levers, make sure that there is no clearance between the joint teeth.
- 5) Fit the safety plugs.
- 6) Hook the trailer to the vehicle, connecting also the safety cable.
- 7) Release the park brake.
- 8) Lock the foot, or the support wheel, in the highest possible position, making sure that the wheel cannot rotate on itself, and remove the wheel if required.
- 9) Connect the lighting system by introducing the motor compressor plug into the purposely-allocated power outlet located on the vehicle and make sure that all the lights (position, turn, stop, number plate) are operational.
- 10) If the machinery is provided with inertial brake, the latter disengages automatically when maneuvering at reverse speed.
- 11) Periodically check the brakes and - if required - maintain them.

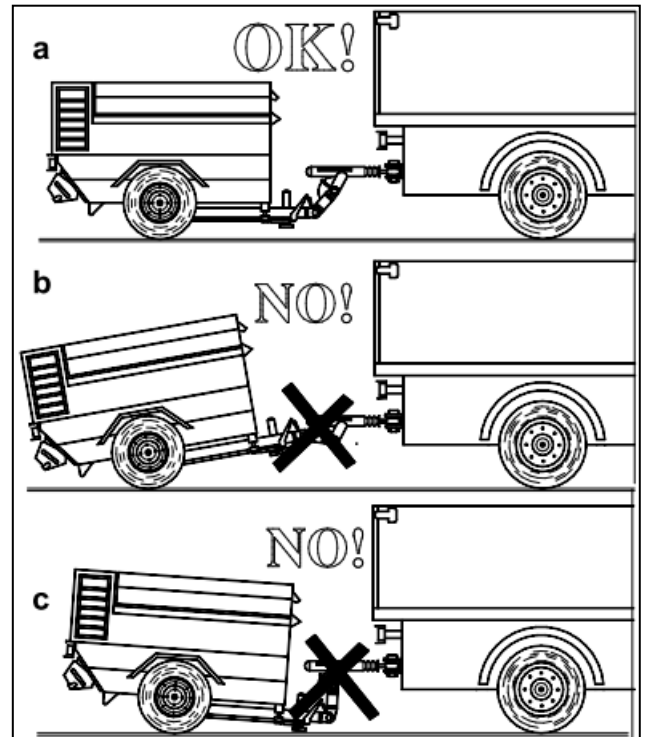


Figure 6.3-1 Instructions for safe towing

For the maintenance of the towing steer, of the axle and for the adjustment of the brakes, refer to the Manufacturer's manual enclosed to this documentation.

WARNING: To know the maximum speed for towing on the road, refer to the standards in force in the country where the towing is performed. On site or in a towing area, do not exceed the towing speed of 10 km/h.



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6.4 Prescriptions for the installation and parking of the motor compressor

Before disconnecting the drawing vehicle, or from the lifting hook, adjust the height of the support foot (Part B Figure 6.4-1) or the pivoting wheel, so that the motor compressor is in horizontal position. In case the machinery is on incline, locate the wedges (Part A Figure 6.4-1) provided with the machine, in front of or behind the wheels to prevent any displacements, which might also occur during the working stage. Engage the park brake, if provided (Part C Figure 6.4-1). It is forbidden to operate with the machine hooked to the towing vehicle.

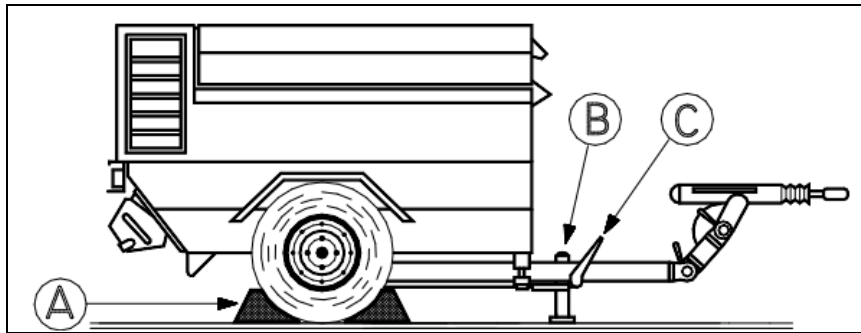


Figure 6.4-1 Instructions for parking and installation of the motor compressor



When parking, it is mandatory to use the support foot, of the hand brake and of the wheel locking wedges.

The lever of the manual parking brake is illustrated hereinafter for the braked version only.



Figure 6.4-2 Lever of the manual park brake with release red push-button

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6.5 Safety provisions concerning maintenance

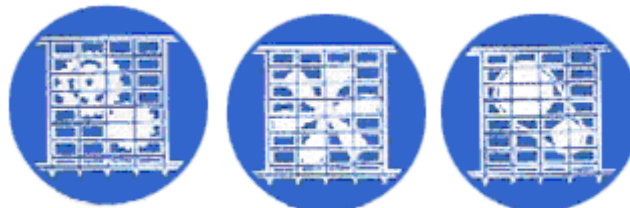
In order to perform the maintenance operations in safety conditions, the following provisions need to be complied with:

- The control and maintenance operations need to be performed by specialized qualified personnel aware of the indications 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;
- all the maintenance activities need to be performed after a safe stop of the machine and interrupting power supply to the engine;
- if the machinery is stopped during the maintenance and repair operations, it must be protected against accidental restart;
- in case of replacement of parts, the spare parts must be ordered at Rotair's customer service and must correspond to the technical standards defined by Rotair;
- 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;
- keep the greatest possible cleanness during the maintenance operations, avoiding using flammable solvents;
- before restarting the machinery after maintenance or overhaul, make sure that all the guards and safety devices are restored and operational.
- never use water to extinguish the flames in case of fire (Figure 6.5-1).



Figure 6.5-1

After performing the maintenance operations, it is mandatory to restore the protections and - in particular - on the area of the cooling fan moving organs



Motor compressor MDVN 22 K – MDVN 26 K

7 MACHINERY COMPONENTS

This unit - like the whole MDVN product range - is a single-phase, silenced oil injection screw mobile motor compressor.

The engine is internal-combustion, fuelled by gas oil, and is connected to the compressor by belt transmission.

7.1 Chassis and axle

The chassis consists of shaped electro-welded sheet metal and is of the bearing frame type. Said chassis is submitted to two paint treatments which ensure resistance against corrosion and rust.

A spring loaded, appropriately axle support the weight of the machine.

It is provided with a towing steer that can be equipped with an eyelet hook, or by a sphere attachment. It consists of articulated elements which allow for the appropriate hooking to the most different towing means.

The motor compressor needs to be certified for towing on road.

The certified version is provided with lighting system with lights for number plate, braking system, and road-type tires sized by the axle manufactured.

The braking system includes the parking brake and the inertial braking system. The both act on the wheel-bearing drums of the axle.

The certified axle is an option supplied upon customer's request.

7.2 Body

The body in galvanized sheet metal is treated by a special painting procedure which ensures optimum finishing quality coupled to the high resistance to impacts and rust.

It is hinged to the chassis and easily tilting thanks to two gas lifters and allows for comfortable access to the main organs of the machinery.

The body is provided with purposely-allocated opening that allow for the inlet of the fresh air required to cool the engine and the compressor and for the exhaustion of the heated air. These openings have been carefully sized and shaped to allow for the most effective internal ventilation of the machinery: it is therefore recommended to take the greatest care to keep these channels free and integer.

7.3 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 enclosed to the documentation relevant to this machinery.

7.4 Compression unit

This unit is fully manufactured in the ROTAIR plants and it consists of a centre body (cylinder) which host inside two asymmetric profile screw rotors: a 5-lobe male one and a 6-lobe female one.

The cylinder is closed at its end by two heads that contain the bearings which withstand the radial and axial loads generated by the compression of the air.

A set of channels machined in both the cylinder and the heads send oil to the different components. The lubricant that is thus distributed - besides lubricating the bearings - allows keeping a shroud of oil between the rotors and between the rotors themselves and the inner walls of the cylinder, thus fostering tightness to compression. Another significant function of the oil injected between the rotors is the absorption of the heat generated by the compression of the air.

The compressed air supplied by this compressor is pulse-free and the compression is generated axially.

An "adjuster" unit is mounted on the compressor to regulate the quantity of air to let in as a function of the air which is being consumed. Upstream this unit, a double-stage filter ensures the greatest purity of the inlet air.



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7.5 Separator tank

This is a pressure vessel and - because of its manufacturing characteristics - it does not need to be annually inspected by the body appointed to the verification of the requirements stated in directive 97/23/CE and is provided by the certificate of conformity released by the manufacturer. A nameplate welded on it reports all the identification and testing data.

Its lid is equipped with: the overpressure safety valve and the valve that adjusts the minimum pressure of the machinery.

7.6 Belts and pulley

The gas oil engine is connected to the compressor by belt transmission. The engine and the compressor are installed on a support that ensures their co-axiality and therefore the perfect alignment of the belts to the pulleys. A simple drawing system allows for the accurate tightening of the belts.

7.7 Control panel

The control panel is located on the RH side of the chassis. Protected by a door in transparent polycarbonate, it allows reading the pressure values of the compressed air, of the hour counter as well as the visual check of the pilot lamps, for each of which it will highlight any failures of the machinery organ it is connected to. The control panel contains all the tools required for the control of the machine.



Motor compressor MDVN 22 K – MDVN 26 K

8 ELECTRICAL EQUIPMENT OF THE MACHINERY



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

8.1 Operator's panel tools

- 1) Pressure gauge;
- 2) Hour counter;
- 3) Ignition key;
- 4) START/WORK start-up key switch.



Figure 8.1-1 Instrument panel and control devices

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8.2 Operator's panel pilot lamps

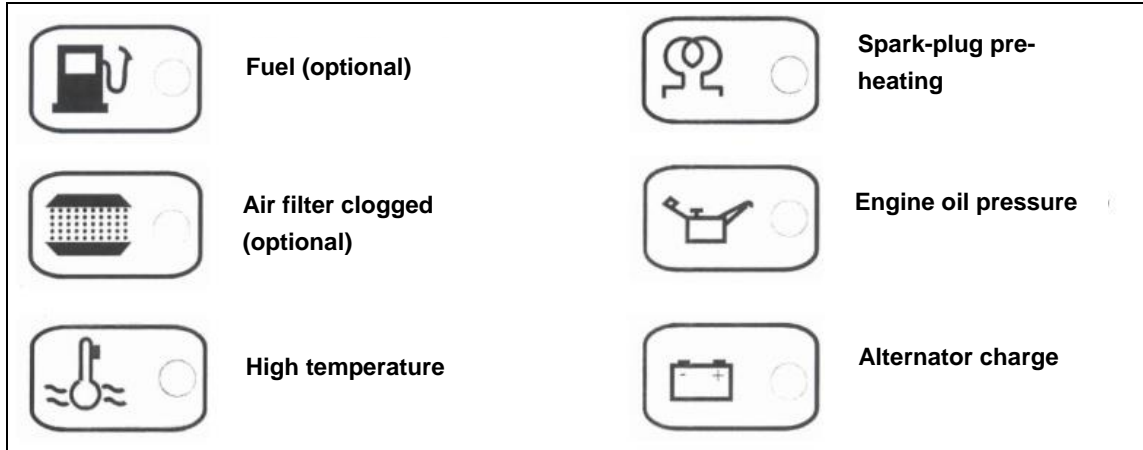








Figure 8.2-1 Pilot lamps

| PILOT LAMP | DEFINITION | FUNCTION | OPERATION TO BE PERFORMED | S/O |
|---|--------------------------|---|---|-----|
|  | FUEL | The fuel lamp highlights the minimum level of fuel in the Diesel tank of the motor compressor | Top up the fuel (Diesel only) | ○ |
|  | AIR FILTER CLOGGED | This pilot lamp highlights that the air filter is clogged. | Clean the filter or replace it | ○ |
|  | HIGH TEMPERATURE LAMP | This pilot lamp highlights that the radiator cooling liquid or the compressor oil have reached an excessive temperature | Immediately switch off the machinery and verify the following cases 1) check the liquid level in the radiator and clean it; 2) the cooling liquid pump does not operate as appropriate (contact Rotair customer service); 3) the liquid valve does not close or open at the right moment (replace); 4) if the cooling liquid is leaking, contact Rotair customer service; 5) the radiator is obstructed (contact Rotair assistance). | ● |
|  | SPARK-PLUG PRE-HEATING | This pilot lamp remains lit during the pre-heating of the spark-plugs. Wait for the pilot lamp to come off before starting the motor compressor by pushing the ignition push-button. The pilot lamp must be off when the engine is running. | If the pilot lamp is on for a lengthened time, ascertain the state of the ignition spark-plugs and replace them if required. | ● |
|  | ENGINE OIL PRESSURE LAMP | This pilot lamp highlights the insufficient pressure of the engine oil. The lamp is off when the engine oil is in pressure Pilot lamp lit: engine oil not in pressure. | The oil pilot lamp highlights the insufficient pressure of the oil. Such insufficient pressure may be caused by: 1) engine oil level check; 2) breakage of the delivery pump; 3) oil not reaching the delivery pump | ● |
|  | ALTERNATOR CHARGE LAMP | This pilot lamp monitors the efficiency of the alternator. The pilot lamp must be off when the engine is running. | Should it light up during the normal operation, check the efficiency of both the battery and the alternator. | ● |

● Pilot lamp operational on the series version ○ Option pilot lamp



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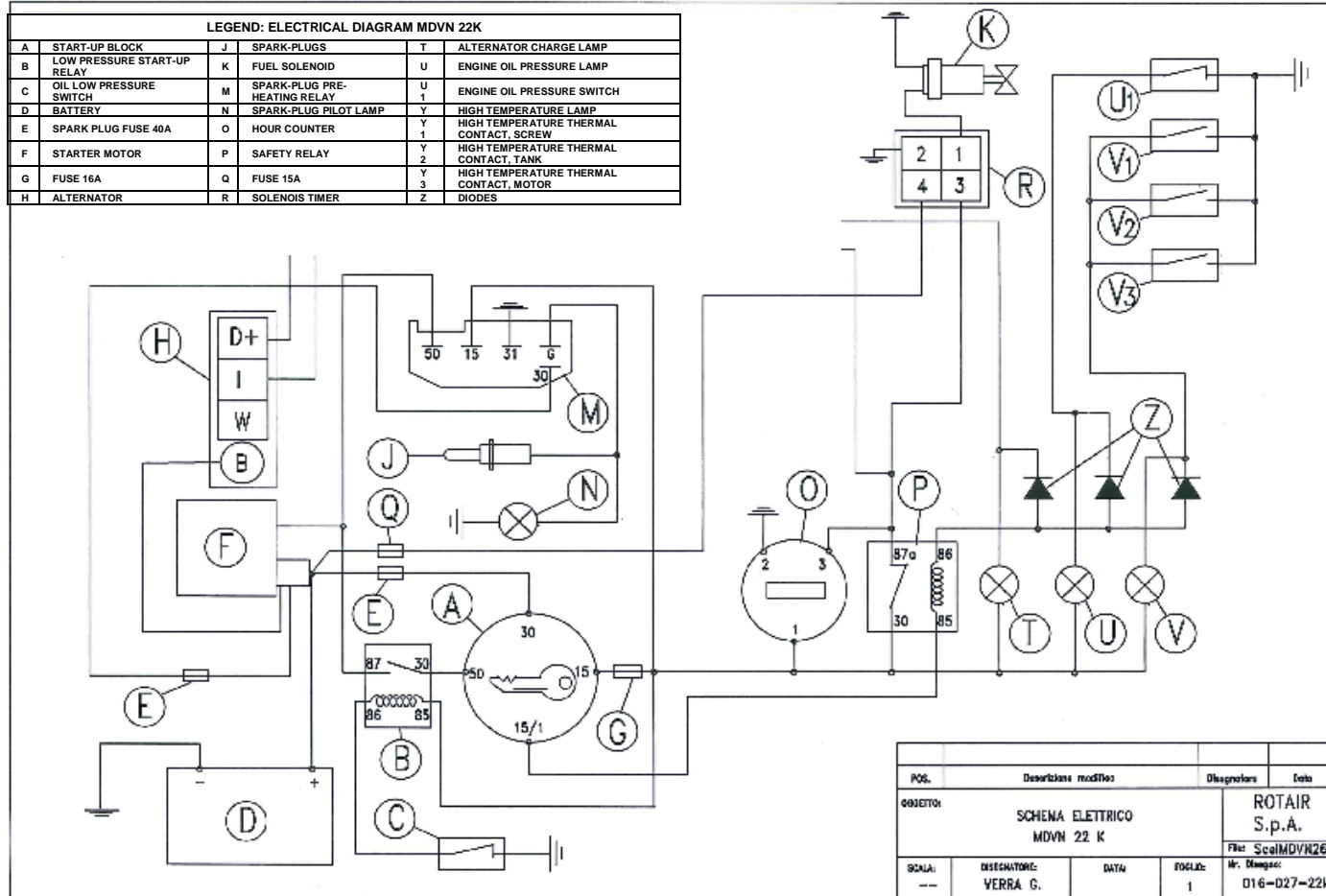


Figure 8.2-2 Diagram 2 machine's electrical system MDVN 22K



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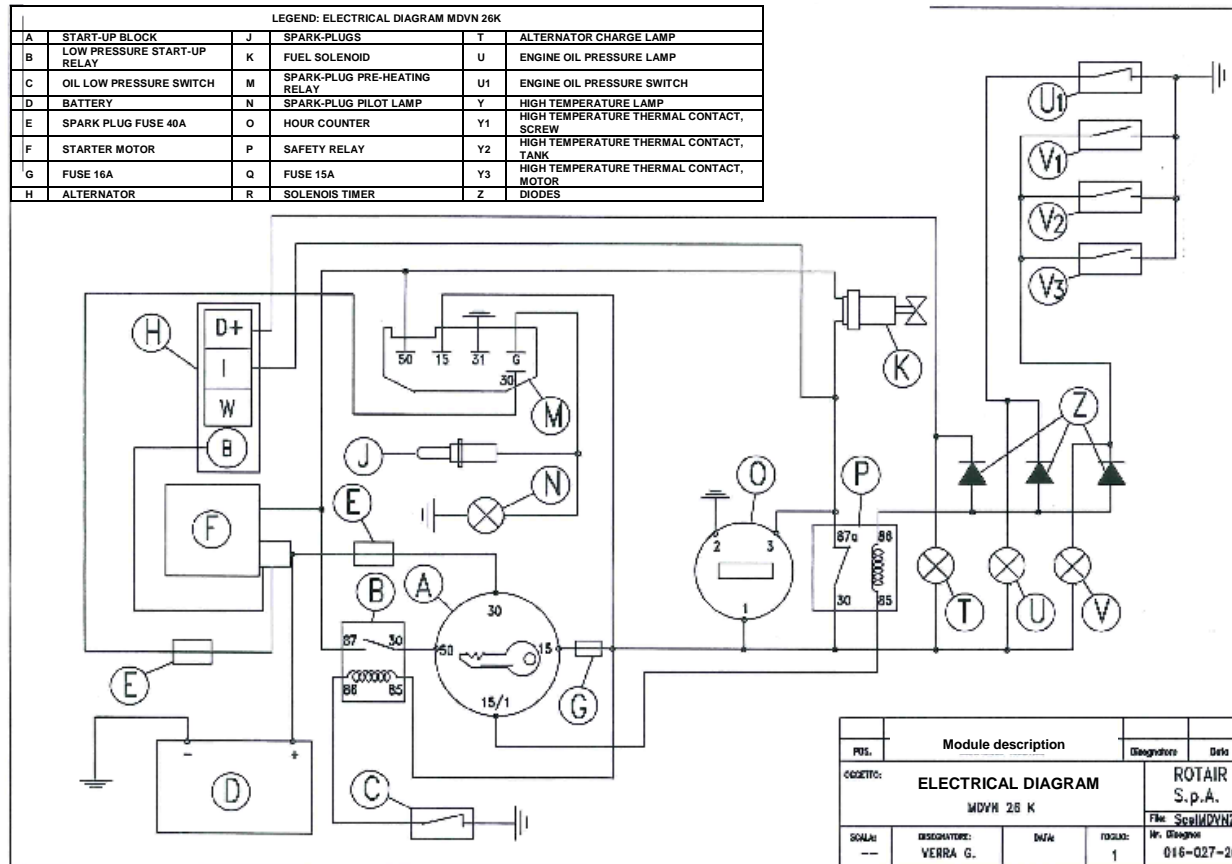


Figure 8.2-3 Diagram of the MDVN 26K machinery electrical system



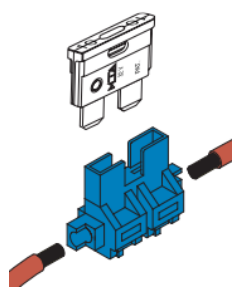

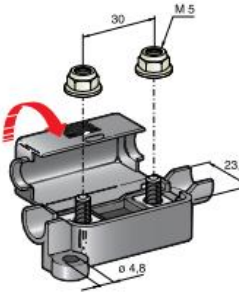

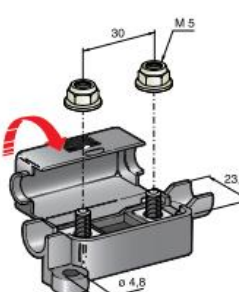

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8.3 Fuses

The fuse is an electrical device which can protect a circuit or a device from over current.

The fuse consists of a cartridge provided by a thin lead wire through which the rated current of the circuit/element transits; this wire is the actual fuse, with a precise Amp load. In case of overcurrent, the filament melts and causes the circuit to open.

| Fuse holder | Fuse drawing | Description | Ampere |
|---|---|---|--------|
|  |  | Secondary fuse: device to protect against overcurrent which might damage the fuel solenoid (MDVN 22K only) | 15 A |
|  |  | Control panel supply fuse: protection device against overcurrent that might damage the control panel. | 40 A |
|  |  | Spark-plug fuse: protection device against overcurrent that might damage the engine spark-plugs during pre-heating. | 40 A |



WARNING: When replacing the fuses, we recommend always utilizing the sale type as indicated in this table and to follow the procedure reported in section 13.4.3 of the manual.

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8.4 Lights (for road-certified version)



In the road-certified machinery, the electrical system is completed by the light wiring (Figure 8.4-3). The table here in under reports the connections of the wires within the 7-pole outlet and their connection to the rear lighting equipment. This system is directly connected to the towing machine through an extension supplied with the motor compressor.

Rear lights:

- 1) Turn light
- 2) Position and stop light (stop detected by light intensity)
- 3) Rear fog lamp

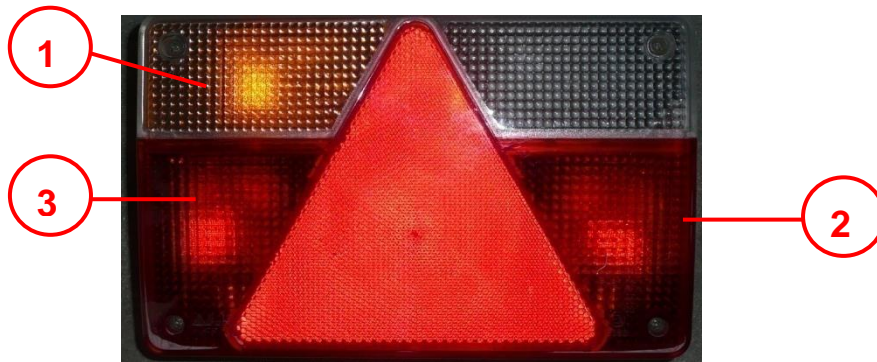
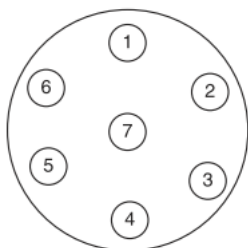


Figure 8.4-1 Rear light LH



Figure 8.4-2 Rear light RH

7-POLE PLUG DIAGRAM



- 1) Turn light LH:
- 2) Fog lamp
- 3) Earthling
- 4) Turn light RH:
- 5) Position light RH
- 6) Stop
- 7) Position light LH



WARNING: To replace the lamps, refer to the Maintenance chapter.

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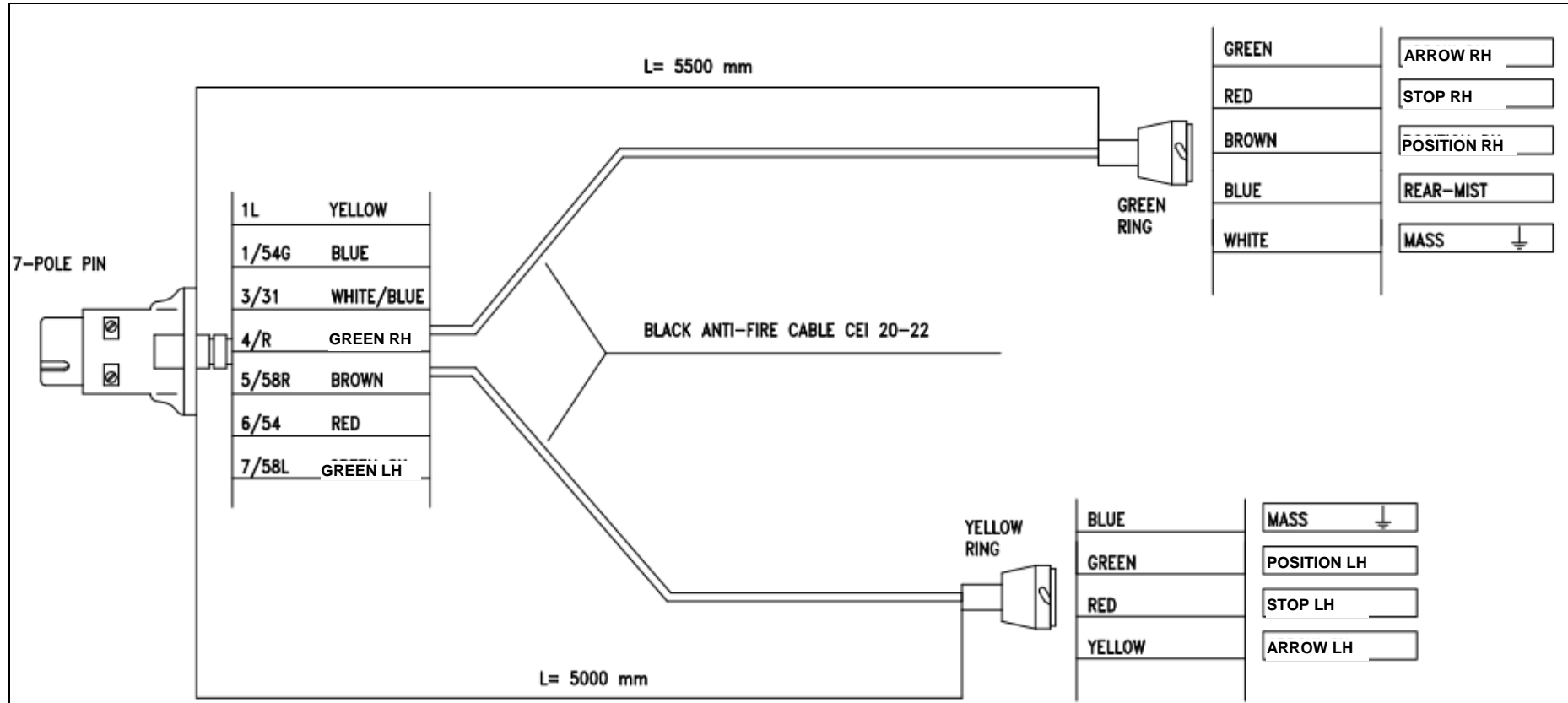



Figure 8.4-3 Light wiring harness



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From the compressor (3), the oil -mixed to the compressed air in input from the exhaust valve (2), is sent to the tank (16), where - through a forced centrifugal circuit - the compressed air is submitted to a first separation from the oil.

The resulting compressed air leaves the separator tank through the separator filter (12), which will provide to a second and last separation of the air from the remaining oil.

Even though the separating filter (12) separates the air from the oil, it is worth pointing out that a limited quantity of the latter manages to penetrate inside the filter and deposits on the lower portion of the filter itself. The oil is sucked into the piping where a calibrated nozzle (7) and a check-valve (8) will route it to the compressor (3).

The check valve (8) shall prevent the oil from retuning into the separator filter (12) when the machinery is stopped.

Attention! The oil filter (13) is provided with a “by-pass” valve which allows the oil to circulate also in case it is clogged. In such case, the oil shall circulate regularly without being filtered.



WARNING: The filter needs therefore 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 (3);
- separator tank (16);
- separator filter (12);
- the min. pressure and check valves integrated in the composed valve (15)
- tap (11);
- Max. pressure record valve (4);

The sucked air, after passing through the air filter (6), reaches the suction adjuster (2) and then the compressor (3), which - after compressing it - conveys it -together with the injected oil - into the separator tank (16). Here the air is separated from the oil. This process - as indicated above - is made first of all by centrifugal force and then by the use of the separator filter (12).


Once the air is purified from the oil, is conveyed to the minimum pressure valve (15), 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. Lengthened working conditions below 5 bar may create insufficient separation of oil from air, with a subsequent anomalous consumption of lubricant.

Furthermore, the min. pressure valve (15) acts as a check valve, thus preventing the return into the unit of compressed air coming from piping or tools connected to the machinery.




WARNING: pressure vessel

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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 retrieved and includes:

- Max. Pressure valve (4);
 - Suction adjustment valve (2);
 - Accelerator control piston (5)
- With the engine running and the tap (3) fully open, the engine rpm are at the max. value and the suction adjuster is fully open.
 - Partially close the tap (3) to simulate a reduction in the air consumption with subsequent increase of the pressure in the tank (A).
 - When the tap (3) is progressively closed, the pressure reaches the established adjustment value and the max. pressure valve (4) ones letting the compressed air flow out and act - at the same time - on the accelerator control piston (5) and under the suction adjuster valve (2).
 - Under the action of such pressure the piston (5) proportionally decelerates the engine.
 - At the same time, the suction adjustment valve (2) proportionally closes as well, thus reducing the passage of the air which is being sucked. Consequently, with the tap (3) closed and - subsequently - without any air retrieval, the engine shall stabilize at the minimum rpm it was adjusted for, while the suction valve (2) of the adjuster shall move to an almost total closing position.
 - At this stage of the cycle, the sucked air is minimum and is used to compensate for any leakages and internal leakages of the circuit.
 - The pressure gauge on the control panel shall display the value of the max. final pressure.
 - When air is resumed to be retrieved, the max. Pressure valve (4) shall start closing again and shall be totally closed once the pressure valve lowers by approx. 1 bar versus the value of the max. final pressure.
 - At this stage, the compressor delivers the max. rate at the service pressure, since the internal spring of the accelerator piston (5) accelerate the engine up to the max. Speed, and the suction adjustment valves is the full opening position.
 - If tools of greater consumption that the rated capacity of the compressor are used, the pressure gauge shall display a lowering of the pressure which - in any case - must never be lower than 5 bar.
 - Avoid sudden openings of the taps: they generate strong stress to the separator filter, with subsequent severe damage to the filter itself.

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10 PROVISIONS FOR THE APPROPRIATE UTILIZATION OF THE MOTOR COMPRESSOR

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

10.1 Before starting-up

Before starting-up the machinery, strictly follow the instructions here in under:

1. Level the planarity of the machine by acting on the support foot or on the wheel: no incline greater than 15° is allowed;
2. make sure that the electric wires are connected to the battery terminals; if the connection is to be performed, use the greater care so that the cable coming from the starter motor is connected to the positive pole (+) of the battery and the earthing one is connected to the negative pole (-) of the battery.
3. Check the fuel level in the tank*.
4. Check the level of the engine oil: as related to the types of lubricant and relevant quantities, comply with the prescriptions contained in the engine manufacturer's users and maintenance manual enclosed to the machinery documentation.
5. Check the oil level in the compressor: this operation must be performed not before than five minutes have passed from the time the machinery was stopped, and this to allow the lubricant in circulation to flow completely into the separator tank.
 - a) Before unscrewing the filler plug where the level gauge is attached, make sure that there is no longer pressure in the system. (The pressure gauge shall indicate 0 bar).
 - b) Take off the plug and clean the level gauge.
 - c) Thoroughly screw back the filler plug and then take it off again to verify that the lubricant level is included between the two marks (min. and max. level) engraved on the gauge.
 - d) Top up if required: the level must never exceed the max. mark.
 - e) 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



* Only use Diesel fuel for topping up.


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Figure 10.1-2 Gas oil tanks for Diesel engine

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



Figure 10.1-3 Checking the radiator cooling liquid

Recommended cooling liquid: ROLOIL ROL-ICE BLU




WARNING: *the radiator plug (Figure 10.1-3) must never be removed when the engine is hot: this would cause a sudden outflow of liquid which might cause severe scalding. Topping up - if required - must be made by means of a blend of water and anti-freeze liquid, in the percentage indicated on the container of the latter.*

10.2 Start-up

Operations to be performed for a correct start-up of the machinery:

- 1) Completely close the air delivery taps.
- 2) Take the Start/Work key switch (Part 3 Figure 8.1-1) onto the Start position.
- 3) Turn the ignition key (Part 4 Figure 8.1-1) to the first trigger to supply the control panel. The spark-plug pre-heating and oil pressure lamps shall light up.
- 4) Wait for the spark-plug pre-heating lamp to switch off, turn the start-up key (Part 4 Figure 8.1-1) until the engine starts.

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WARNING: Release the key at the first signs that the diesel engine is starting.

Do not run any lengthened starts, above 10 seconds.

In case of difficult start-up, repeat the maneuver with short start-ups at intervals.

- 5) When the engine is started and the key switch is still on Start position, the engine shall turn at the minimum rpm; the pressure gauge highlights a pressure included between 2 and 3 bar, while all the pilot lamps on the control panel must be off.
- 6) Wait for a few minutes, until the engine warms up, then move the Start/Work key switch (Par. 3 Figure 8.1-1) on Work. The pressure shall raise up to the max, pressure of the machinery. If one or more lamps were still lit, immediately stop the machinery and identify the cause.
- 7) Then connect the compressed air ducts to the relevant tools.
- 8) Progressively open the taps (Letter A Figure 10.2-1).



WARNING: It is forbidden to open the machinery with the engine hood open.

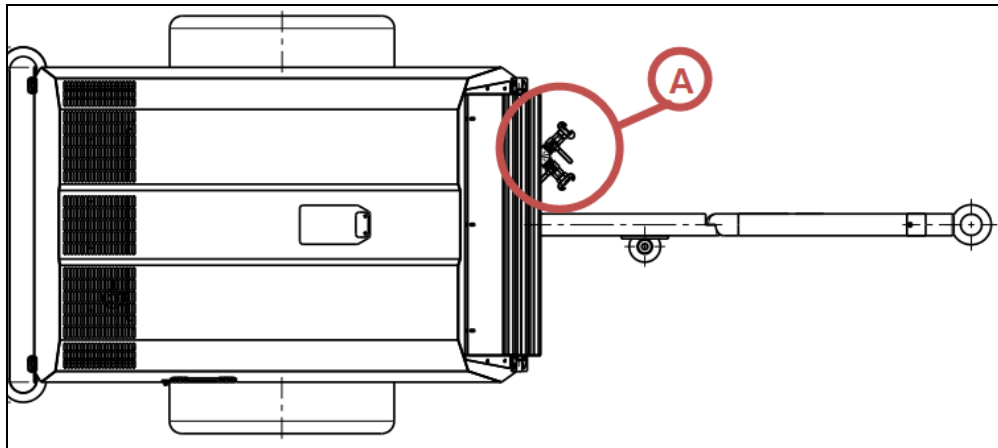


Figure 10.2-1 Location of the taps (top view)




Figure 10.2-2 End of the pneumatic connection of the tap with safety plug



WARNING: Do not breathe the compressed air produced by this unit in output from the taps



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10.3 During the work cycle



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

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



Figure 10.3-1 Exhaust pipe




WARNING: *in the vicinity of the exhaust pipe are very hot exhaust gases and harmful. Avoid the stop in the vicinity of the exhaust pipe*

10.4 Stop

- 1) Completely close the taps flow.
- 2) Turn the selector (Part 3 Figure 8.1-1) on the position "Start". the pneumatic pressure is discharged
- 3) When the pressure drops to 3 bars stop the compressor by turning the key counter clockwise position 0.

10.5 After stopping the machine

- 1) If the machine has operated in dusty environments, it will be necessary to clean or replace the air filter and check the status of cleaning the cooling radiator; where this is clogged, it will proceed as indicated in paragraph maintenance.
- 2) Check that during the working phase there are no losses of fuel or lubricating oil inside the machine
- 3) Where 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 SYSTEMS MINIMUM AND MAXIMUM, MUST BE DONE BY A PROFESSIONAL, INFORMED, FORMAT AND TRAINED, EQUIPPED WITH A SPECIAL EQUIPMENT TACHYMERIC A STRIKER REFLECTIVE AND EQUIPPED WITH HEADPHONES NOISE.



For all calibrations and adjustments we highlight the following residual risks



Presence of organs of motion. Pay attention to mechanical risks.



The presence of hot surfaces at high temperatures. Pay attention to the risk burn.



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

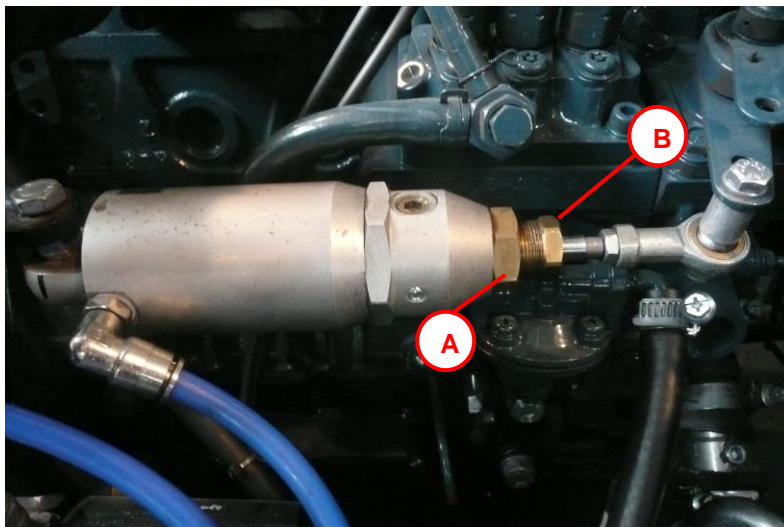



Figure 11.1-1 Adjusting idle speed motor

For calibration of the idle speed of the engine revs qualified maintenance personnel must do the following:

1. Start the machine as described in section 10.2 "Start"
2. Wait for the compressor reaches the maximum pressure and the engine stating the values of idle speed;
3. Close all faucets (Letter A in Figure 10.2 1);
4. Open the bonnet with the compressor in motion;
5. Unscrew with wrench 23 mm, the nut (Letter A in Figure 11.1 1);
6. If you want to increase the idle speed of the engine, you must tighten the lock nut by an 18-mm wrench (Letter B in Figure 11.1 1).



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7. If you want to reduce the idle speed of the engine, you must loosen the lock nut by an 18-mm wrench (Letter B in Figure 11.1 1).
8. Measure with a optical tachometer (Letter B in Figure 11.1 2) the speed of rotation (in revolutions / minute) of the motor hub focusing the optical beam on the speedometer notch Reflective (Letter A in Figure 11.1 2);
9. Compare the measured value with that reported in Paragraph 2 a tolerance of $\pm 2/3\%$ between the two values
10. Adjust the speed of the motor hub, as described above, to the value of idle speed indicated in paragraph 2 of this manual;
11. Once the adjustment screw, with a 23 mm wrench, nut (Letter A in Figure 11.1 1);
12. Close the bonnet.

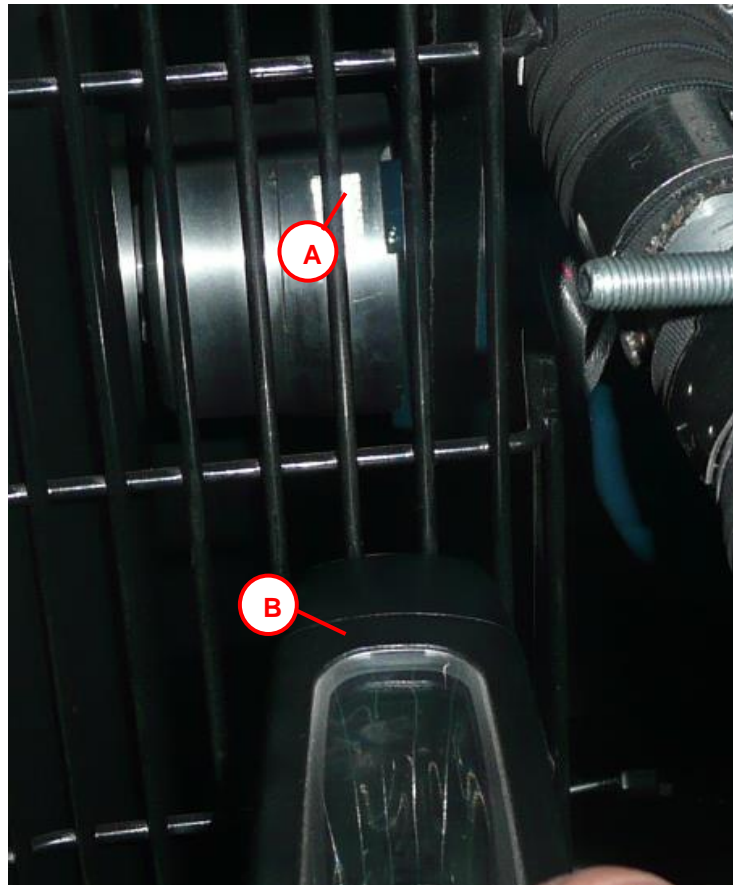



Figure 11.1-2 Measurement speed rotating motor hub

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11.2 Monitoring and control of the air pressure of the compressor

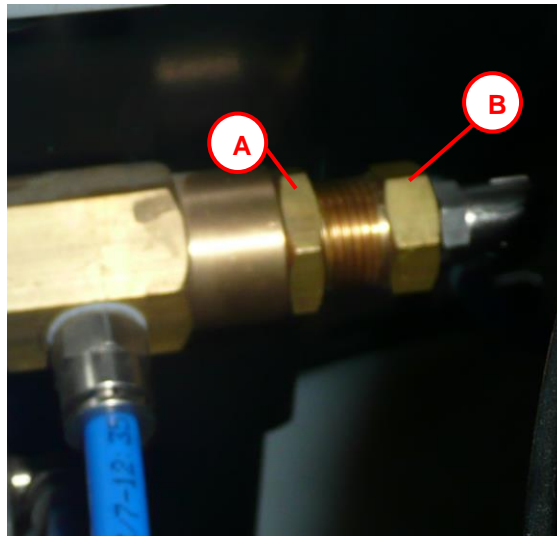


Figure 11.2-1 Adjusting maximum pressure pneumatic circuit


The maximum pneumatic pressure is calibrated during the testing phase of the machine.

If the value of the maximum pressure pneumatic, indicated by the pressure gauge on the control panel, diverged over a $\pm 5\%$ from the value specified in Paragraph 2 of this manual, proceed as follows:

1. Start the machine as described in section 10.2 "Start",
2. Wait for the compressor reaches the maximum pressure and the engine stating the values of idle speed;
3. Close all faucets (Letter A in Figure 10.2 1);
4. Open the bonnet with the compressor in motion;
5. Unscrew with wrench 22 mm in, the nut (Letter A in Figure 11.2 1); Air filter area:
6. If you want to increase the maximum pressure must tighten with 19 mm wrench, nut (Letter B in Figure 11.2 1);
7. If you want to reduce the regime min unscrew, with a 19 mm wrench, nut (Letter B in Figure 11.2 1);
8. Once the adjustment screw, with a 22 mm wrench, nut (Letter A in Figure 11.2 1);
9. Slightly open for 3/4 seconds, the faucet supply air to the engine to accelerate, and then close it. Repeat this 2-3 times to allow the settling of the valve.
10. Reading on the pressure gauge located in the control panel, the value of the maximum pressure reached;
11. Compare the measured value with that reported in Paragraph 2, repeat the steps up to the alignment of the two values;
12. Close the bonnet.



WARNING: Notice: if the gauge had a discontinuous, jerky, you will have to replace it. So, before making any calibration valve high or low pressure, make sure that the gauge is efficient and reliable.

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11.3 Monitoring and control of air pressure minimum compressor

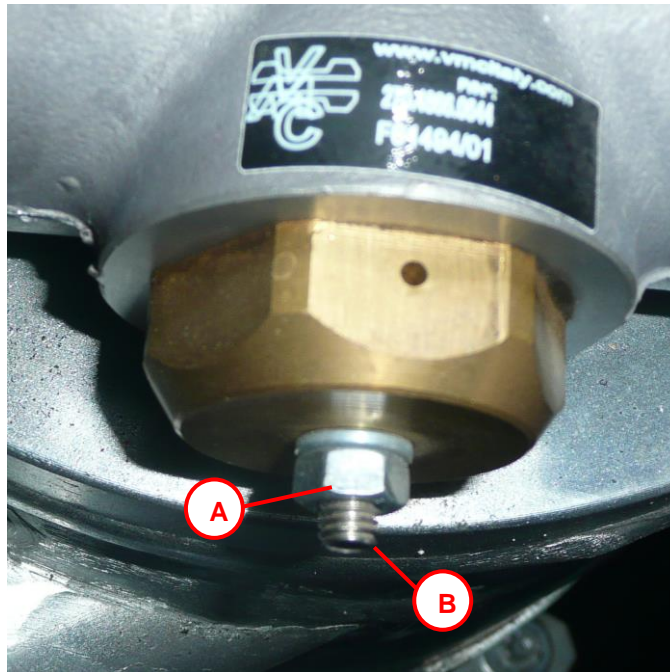


Figure 11.3-1 Adjusting minimum pressure pneumatic circuit


The minimum pneumatic pressure is calibrated during the testing phase of the machine.

If the minimum pressure pneumatic, indicated by the pressure gauge on the control panel, diverged over a $\pm 5\%$ from the value specified in Paragraph 2 of this manual, proceed as follows:


1. Start the machine as described in section 10.2 Start.
2. Wait for the compressor reaches the maximum pressure and the engine stating the values of idle speed;
3. Gradually open the air valve (Letter A in Figure 10.2-1);
4. Open the bonnet with the compressor in motion;
5. Unscrew, with 10 mm wrench, nut (Letter A Figure 11.3 1) located in the vicinity of the exhaust cleaner. Please Translate These points.
6. If you want to increase the maximum pressure must tighten the Allen screw (Figure 11.3 Letter B 1) with Allen key 3 mm;
7. If you want to reduce the regime min loosen the Allen screw (Figure 11.3 Letter B 1) with Allen key 3 mm;
8. Once the adjustment screw, with a 10 mm wrench, nut (Letter A Figure 11.3 1) and turn off the taps;
9. Reopen slowly the air tap (Letter A Figure 10.2 1) and close it again repeating the process a few times to allow the settling of the valve;
10. Close the bonnet.



WARNING: *Pressure vessel*

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12 SAFETY DEVICE

| PRESENT | SAFETY DEVICE | FUNCTION |
|---|--|---|
|  | Top buttons with rearmament rolling (fungus) | Immediate stop of the machine. Intervenes by switching off power to the electrical circuits. |


12.1 Emergency stop buttons

On board the machine is installed an emergency stop button with self-restraint type "fungus" according to EN 418, red or yellow with priority in all operating modes with respect to other functions and activations. In case of need the machine can be locked immediately by pressing the emergency button. After pressing the power supply is cut.

12.1.1 OPERATION OF THE EMERGENCY BUTTON

| | |
|---|--|
|  | Press this button to stop the machine in emergency conditions. WARNING: Use only for emergency and not to turn off the machine normally. |
|  | To restore the normal working conditions, in the event of an emergency stop due to the pressure of the above buttons, the following procedure should be followed: <ul style="list-style-type: none"> • Remove the cause that prompted the shutdown of the machine; • Turn out the emergency stop button pressed; • Operate the power switch turning off and on the machine. |



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12.2 Verification of the safety valve

The safety valve is located on the oil separator tank and starts working to download any accidental overpressure.

The calibration of this valve is performed and verified in the testing of the factory and cannot be varied for any reason or tampered with.

Its efficiency should be checked quarterly by doing the following:

- 1) Start the machine the machine as described in section 10.2 "Start"
- 2) With the valves closed and with the engine at idle speed, using forceps, pick up the pin, as shown in Figure and release it as soon as you have the perception that the valve exhausts air.

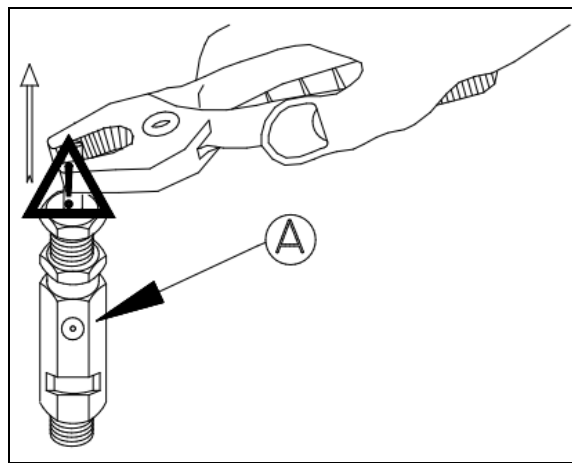


Figure 12.2-1 Control of the safety valve



WARNING: *The air escaping from the valve during this operation control is also composed of small particles of oil.*



WARNING: *Pay attention to the danger of projection of liquids.*




If, following the traction using a clamp, the pin is not raised, thus preventing the valve to vent, will require an immediate replacement of the same.



In case of replacement, it is recommended to contact the service ROTAIR, quoting the serial number of the machine.

The use of a safety valve is not original and does not comply, the ROTAIR exempt from any liability.



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13 MAINTENANCE



The machine must be subjected to regular periodic maintenance in order to keep unchanged the technical characteristics, and safety originate.

Maintenance work must be performed by qualified personnel of patterns and designs, the machine stopped and power switched off to the electrical panel. Therefore, all maintenance must be carried out only after turning off the machine.




The staff of the service maintenance has to check that they have withdrawn their tools at the end of surgery and before starting the machine again, to avoid damage to the moving parts.

13.1 Routine maintenance

Means with **routine maintenance**, all the maintenance actions that its sole objective was to bring back a system (or one of its components) from a state of failure, the state is working properly before the onset of the problem, without changing or improving the functions performed by the system, nor to increase the value, or improve performance.

Maintenance includes all those periodic operations including:


In the following chapter are listed in order of frequency, all transactions concerning the compressor part, while as regards the part of the engine, it will be necessary to refer to OPERATING AND MAINTENANCE, which is prepared by the manufacturer of the engine and that is as supplied with the machine

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13.2 Maintenance program

In this program are listed all the interventions and their frequency to be executed on the various components of the machine. Such interventions are essential for the proper functioning of the machine and its mechanical durability over time.

| <i>RECOMMENDED OPERATIONS</i> | <i>FREQUENCY</i> |
|---|---|
| Checking the oil level compressor | Daily |
| Check engine oil level (refer to the manufacturer's manual) | Daily |
| Checking Coolant Level | Daily |
| Check fuel level and top up (if necessary) | Daily |
| Check oil or fuel leakage | Daily |
| Check operation indicator lights | Daily |
| Check the readability of measuring instruments | Daily |
| General cleaning operations | Daily |
| Control of the absence of obstructions to the ventilation system | Daily |
| Control and clean up the air filter | Every 100 hours |
| Control and thorough cleaning air filter in dusty | Daily |
| Check operation lights and license plate lights (only for the approved version of the road) | Daily |
| Control of the air filter Compressor | weekly |
| Control of the engine air filter | (Ref. Manual of the engine manufacturer). |
| Checking the battery electrolyte level | Monthly |
| Checking tire pressure | Monthly |
| Checking belt tension | After first 100 hrs |
| Checking belt tension | Three months |
| Speed control the minimum and maximum engine | Three months |
| Control of the efficiency of the safety valve | Three months |
| Cleaning the oil cooler | Three months |
| Control nozzle oil recovery | Three months |
| Drainage of the fuel tank | Three months |
| Replacing diesel pre-filter | Every 500 hours |
| Control of the efficiency of the braking system | Three months |

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| <i>RECOMMENDED OPERATIONS</i> | <i>FREQUENCY</i> |
|--|--|
| Control and wheel lock | Three months |
| Change engine oil | (Ref. Manual of the engine manufacturer) |
| Oil Filter Replacement compressor | After the first 50 hours |
| Replacing compressor oil | After the first 50 hours |
| Control of tightening screws and bolts | Every 100 hours |
| Control of tightening engine and airend screws and bolts | Every 100 hours |
| Check tightness of all pipe connections | Every 100 hours |
| Replace Air Filter Compressor | After 500 hours |
| Replace oil filter compressor | After 500 hours |
| Replacing compressor oil | After 1500 hours |
| Replacing oil separator element | After 2000 hours |
| Check-up by the service "authorized Rotair". | Every 3000 hours |
| Control readability nameplate EC Annual | Annual |
| Control valves from service "authorized Rotair". | Biennial |



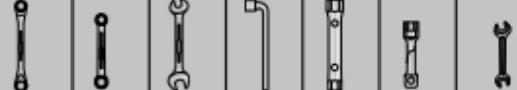
The ROTAIR S.P.A. disclaims any responsibility for the failure to comply with maintenance requirements in the table above.


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13.3 Values of tightening screws and bolts

For the correct tightening of screws and bolts on the machine please observe the tightening 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 | | | | | | | | | |
|---|-------|--------|--------|--------|--------|--------|---|--|--------------------|---------------------|-------------------|-------------------|-------------------|--|------|------|
| <p>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%.</p> | | | | | | | | | | | | | | | | |
| | | | | | | | <p>Tightening values for classes of coupling according to DIN 267</p> | | | | | | | <p>No. 2, 2A, 2B No. 1B, 308, 7</p> <p>No. 4</p> <p>No. 6, 1B, 7, 400</p> <p>No. 25</p> <p>No. 26 R No. 626</p> <p>No. 35 A No. 35 B No. 3112</p> <p>No. 894 No. 895</p> | | |
|  | | | | | | |  |  | | | | | | | | |
| | 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 | 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 AND CLEANING THE FILTER AIR INTAKE

This check should be performed periodically every 100 hours of work;
If the machine operates in a very dusty environment, it will also be necessary on a daily basis.



Figure 13.4-1 Aspiration air filter


The filter consists of a filter cartridge.

For cleaning or replacement cartridge, proceed as follows:

- 1) Remove the lid by rotating it in the direction indicated by the arrow printed on it,
- 2) Remove the filter, place the new one and close the cover;



The filter cartridge can be cleaned several times with compressed air.
The filter cartridge must never be washed with water or other substances;
It must, however, be replaced every 500 hours of work.

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13.4.2 CONTROL THE ELECTRICAL BATTERY



Figure 13.4-2 Battery compartment

Checking the battery fluid.

The electrolyte must always reach the level of overlap of the plates of the elements.

If the battery fluid is low may cause undesired operation.

In these cases, if the level of the coating is below the minimum level is necessary to have it checked by a qualified electrical maintainer and possibly provide for the addition of distilled water to a cold battery to restore the level of the liquid.

If, despite the tuck the battery continues to discharge frequently, you should consider replacing the battery.



WARNING: *Be careful when handling the battery fluid. Potentially corrosive liquid.*

To clean the terminals

Clean the battery terminals. The terminals (poles) of the battery must be periodically cleaned and greased. The accumulation of dirt can obstruct the passage of electric current.

For cleaning you must turn off the machine, disconnect the terminals, from the negative terminal, and make a clean the terminals.

Control terminal


Generally, the negative and positive pole of the battery are greased (eg. Pulp vaseline or similar product) to avoid oxidation of the metals. Over time the paste on the terminals should be periodically replaced. **Tighten the battery terminals**

Control terminal. Similarly be verified that the terminals are tight to the battery terminals and tighten them if necessary. It can happen that the vibration from loosening the grip of the terminals. A mobile connection can cause malfunctions and even failures in vehicle electronic systems.

State of battery charge

Control the state of charge. To avoid unexpected battery discharge is advisable to check each year the state of charge of the battery. The control can be made by a car battery charger.



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13.4.3 FUSO REPLACEMENT

Fuse replacement should be performed when one or both fuses were damaged or not intervene.

To replace the fuse proceed as follows:

- 1) Stop the machine;
- 2) Open the bonnet;
- 3) Open the fuse box;
- 4) Pull the fuse to be replaced with tweezers (to fuse 15 A), and unscrew the screws for the 40 A fuse:
- 5) Once removed the fuse concerned, observe the internal filament, this must be intact to function properly, if this is the case simply up item. If this filament is sectioned into two means this is to be replaced;
- 6) In the event of a damaged fuse replace it by choosing a fuse with identical characteristics. The characteristics of the fuses are described 8.3 in this manual;
- 7) After inserting the new fuse in the housing close the fuse box;
- 8) Close the bonnet;
- 9) Now you can restart the machine.



13.4.4 REPLACEMENT LAMPS LIGHT (FOR VERSION APPROVED)

For the replacement of a bulb must procedures as listed below:

- 1) Stop the machine;
- 2) Open the cover of the headlight using a screwdriver to remove the four screws of the lamp
- 3) Unscrew the light bulb;
- 4) Screw in a new bulb taking into account the value of the corresponding power (see table below);
- 5) Close the cover of the headlight using a screwdriver to screw the four screws of the headlights

| Headlight composition | | |
|---------------------------------|------------|-----------------|
| Type of bulb | Power bulb | Number of bulbs |
| Lamp position, stop * | 5/21 W | 1 |
| Signal light bulb | 21 W | 1 |
| License plate lamp and rear fog | 21 W | 1 |

* The lamp position/stop double stranded vary its own light intensity depending on the use of the brake

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13.4.5 TYRE PRESSURE MONITORING

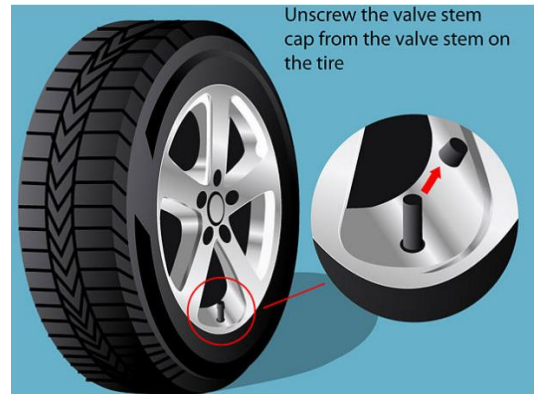


Make sure the tires are "cold" (vehicle hasn't been driven for more than 2km)

Make sure that the tire is "cold", i.e., that has driven more than 2 km, so that the air inside is not already expanded.

The nominal pressure of the tire expressed in BAR is 2.5 atm

Unscrew the valve cap from the tire. The valve is a tube of black metal placed near the hubcap, about 2-3 cm long.



Unscrew the valve stem cap from the valve stem on the tire



Press the air pressure gauge onto the valve stem and record the reading given


Place the gauge on the valve and read the value reported. If you hear a "breath", it means that the gauge was not properly connected and the measurement will not be reliable. You may need to reallocate the valve of the pressure gauge.

If the pressure of the tire conforms to the parameters indicated in Chapter 2 of this manual, there is nothing left to do but check the remaining tires. If the pressure is lower, you must enter the air in the tire checking the value measured by the manometer



Replace the valve cap.

The cap serves to keep clean and to protect the valve mechanism from dust and moisture.

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13.4.6 CLEAN THE RADIATOR COOLER

The coolants of the compressor and the motor are cooled by a radiator which, consequently, must be kept clean so that the ventilation air can pass freely and easily through its fins honeycomb.

A radiator fins clogged with dust or any other bodies, because of the harmful and dangerous overheating to the mechanical screw compressor, greatly jeopardizing the operation and durability. We recommend that you check it periodically and, if necessary, clean it with compressed air or clean it with a jet of water under pressure.

13.4.7 PERCENTAGE DOSAGE OF COOLING LIQUID

To determine the proper amount of antifreeze to be paid within the tank of the radiator (Figure 13.4-3) must follow the following table:

| T (°C) | Total volume of the cooling plant | Water volume | Antifreeze volume | Antifreeze percentage* |
|--------|-----------------------------------|--------------|-------------------|------------------------|
| (°C) | (Litres) | (Litres) | (Litres) | % |
| - 10 | 4 | 3.2 | 0.8 | 20% |
| - 15 | 4 | 2,8 | 1,2 | 30% |
| - 20 | 4 | 2.4 | 1.6 | 40% |


*Cooling liquid suggestions: ROLOIL ROL-ICE BLU



Figure 13.4-3 Checking the coolant radiator



WARNING: The radiator cap (Figure 10.1-3) must never be removed in a warm engine: in this condition would occur a sudden leakage, which could cause serious burns to the person. The possible filling must be done with a mixture of water and antifreeze liquid, in the percentage indicated on the container of the latter.

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13.4.8 CHECKING AND CLEANING NOZZLE OIL RECOVERY

Control and clean the oil recovery is to be performed, should you find a leak of oil mist mixed with air compressed, operating as follows (Figure 13.4-4).

- 1) Unscrew the fitting located at the center of the tank (Letter Z in Figure 13.4-4);
- 2) Inside the ring (Letter Z in Figure 13.4-4) is a nozzle (Letter U in Figure 13.4-4): make sure that its calibrated hole is not blocked (blow with compressed air);
- 3) Replace the fitting.



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

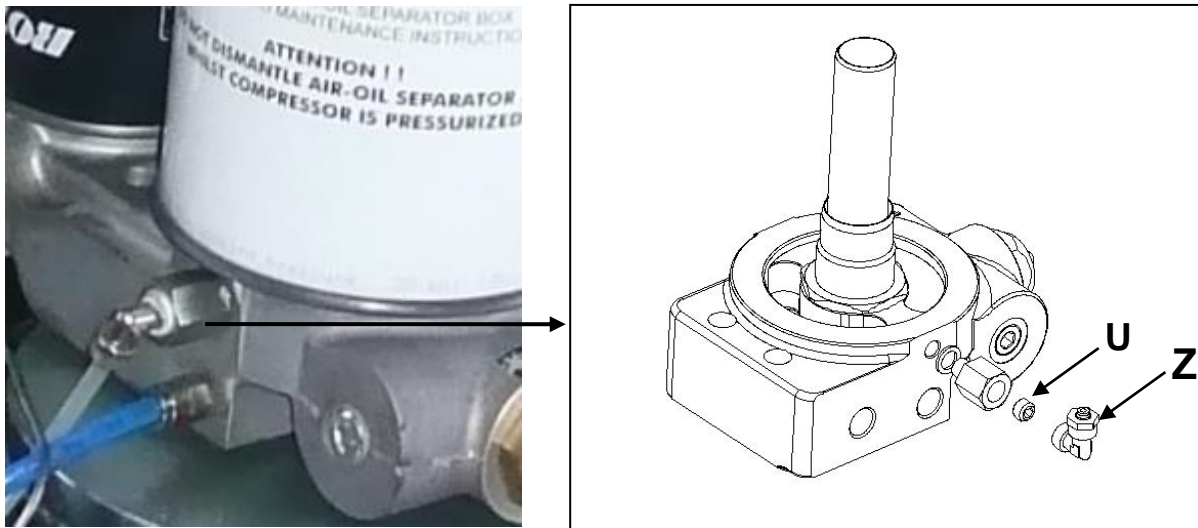


Figure 13.4-4 Nozzle oil recovery

13.4.9 DRAINAGE OF THE FUEL TANK

The draining of the fuel tank has the aim to eliminate the water possibly settled on the bottom of the tank due to the formation of condensation or refilling fuel polluted.

Avoid fuel filling with cans because sometimes, these may contain traces of water which, being heavier than the gas oil, is deposited on the bottom and can build up to reach the level of the dip tube.




Periodically carry out the drains to prevent even small parts of water can be aspirated and injected into the engine.

It is also advisable to carry refuel at the end of the work shift to prevent the temperature range of the tank walls make possible the formation of condensation inside it.

In conjunction with the drainage of the tank, also proceed to the replacement of the fuel filter to eliminate from the fuel every trace of water.



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 to settle to the bottom of the tank.

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The polluted fuel spilled from the purges should be collected and delivered to specialized centres and authorized the collection and disposal of hazardous waste.



Remember that the residual fuel should not be totally discarded in the environment.

13.4.10 REPLACING DIESEL PRE-FILTER

To replace the pre-fuel filter (Figure 13.4-5) proceed as follows:

1. Turn off the machine;
2. Open the bonnet;
3. Bring small pan to contain any spillage of small amounts of oil still in the pipeline;
4. Pull out the pre-fuel filter to be replaced;
5. Insert the new pre-filter;
6. Tighten the new pre-filter;
7. Check the tightness;
8. Close the bonnet;
9. Turn on the machine.



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Figure 13.4-5 Pre-diesel filter




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13.4.11 CHECK BREAK DEVICE



For this and for the replacement of the brake drum see the user's manual of the group-axle brake-repulsion, prepared by the manufacturer, attached to the documentation provided with the machine.



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13.4.12 CONTROL OF LOCKING WHEEL BOLTS

Periodically check the tightness of the wheel bolts using a spanner, avoiding the use of air screwdrivers that may damage the bolt threads.

13.4.13 OIL FILTER REPLACEMENT COMPRESSOR

For proper filter replacement compressor oil must do the following:

- 1) Stop the machine and open the hood of the engine compartment;
- 2) Use a chain wrench to unscrew the filter to be replaced (Figure 13.4-6);
- 3) Oil the seal of the new filter to be tightened and only by hand;
- 4) Start the machine and make sure that there are no oil leaks in the vicinity of the seal, in this case to stop the machine and recheck the status and the correct positioning of the seal in its housing.




Figure 13.4-6 Compressor oil filter



WARNING: The filter is impregnated exhausted mineral oil pollution and harmful to the environment, therefore it must be disposed of at specialized centres of collection and treatment of waste.



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13.4.14 REPLACEMENT OF COMPRESSOR OIL

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

The oil change intervals must never exceed 2.000 hours of work.

In conjunction with the replacement of the oil must be changed the corresponding filter.

ENVIRONMENTAL MEDIUM TEMPERATURE

| Up to 40 C°/ 105 F° | | Up to 55 C°/ 131 F° | |
|---------------------|-----------|---------------------|-------|
| RECOMMENDED OIL | BRAND | RECOMMENDED OIL | BRAND |
| COMPRESSOR 46 | TOTAL ERG | SINCOM 68 | Q8 |
| | | | |
| COMPATIBLE OIL | BRAND | COMPATIBLE OIL | BRAND |
| DICREA 46 | AGIP | SCHUMANN 68 | Q8 |
| COMPRESSOR OIL 46 | API | RARUS SHC 1026 | MOBIL |
| ENERGOL RC-R 46 | BP OIL | CORENA S4 R 68 | SHELL |
| SCHUBERT 46 | Q8 | CORENA D 68 | SHELL |
| RARUS 425 | MOBIL | DACNIS 68 | TOTAL |
| SCARLATTI 46 | Q8 | | |
| LR CCW 46 | ROLOIL | | |
| CORENA D 46 | SHELL | | |
| DACNIS VS 46 | TOTAL | | |



WARNING: It is strictly recommended to use ONLY OIL FOR SCREW COMPRESSORS.
ROTAIR S.P.A. declines any responsibility if other oils will be used.




13.4.15 CHECKING THE OIL MIST SEPARATOR

Filter life oiler is expected around 2000 hours of work, but is closely related to a careful observance of all maintenance requirements given in this manual.

A quantity of oil or excessively low in the tank, the breach of the frequency of oil changes or the use of the machine with cooling radiator clogged may determine an anticipated and irreparable deterioration of the filters. Therefore, if, after the control and clean the recovery (operation described in the paragraph 13.4.8) and making sure the proper oil level in the tank, you are still traces of oil in the compressed air, is will have to replace the exhaust cleaner.



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To ascertain the degree of clogging of the filter separator operate as follows:

- 1) Install a pressure gauge upstream of the separator and make sure that on the machine is efficient.
- 2) Start the machine.
- 3) Partially open the faucet flow until the pressure gauge on the control panel shows the value of the operating pressure.
- 4) Read the value of the pressure gauge located upstream of the oil separator filter and compare two values: if, between the two readings, is a difference of more than 1 bar replace the filter separator

The oil separator filter must never be washed with water.



WARNING: *Pressure vessel*

13.4.16 REPLACEMENT OF THE OIL SEPARATOR FILTER

To replace the oil separator filter proceed as follows:

- 1) The operation must be performed with the machine stopped and in the absence of pressure in the oil separator tank.
- 2) We recommend applying a cloth in order to contain any oil leakage that may occur during the replacement of the oil filter.
- 3) Unscrew the oil separator filter: the filter is situated above the oil separator tank
- 4) Replace the new filter making sure to lubricate the gasket.
- 5) The filter must be tightened by hand only.



Figure 13.4-7 Oil separator filter




WARNING: *Pressure vessel*

13.4.17 ENGINE CONTROL AND MAINTENANCE



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

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13.4.18 CONTROL, TENSION AND REPLACEMENT OF TRANSMISSION BELTS

For the normal and good operation of the compressor, drive belts must always be perfectly tensioned. To determine the exact tension transmission belt you need to follow these instructions (Fig. 13.4.8) Applying a force "F" between 7.5 and 8 kg in the midpoint of the free section "T" of a belt of the arrow "f" must be of c.a. 1 cm. If the value of the arrow "f" should be greater than the value indicated means that the straps are loose while if the value is less means that the straps are too tight. During the control of the belts is good to check the wear of the same and if necessary to provide replacing them (Fig. 13.4-9 and 13.4-10).



WARNING: Caution: The straps too loose can cause them slip with loss of compressor power. The straps too tight deteriorate with the consequent rupture of the same.

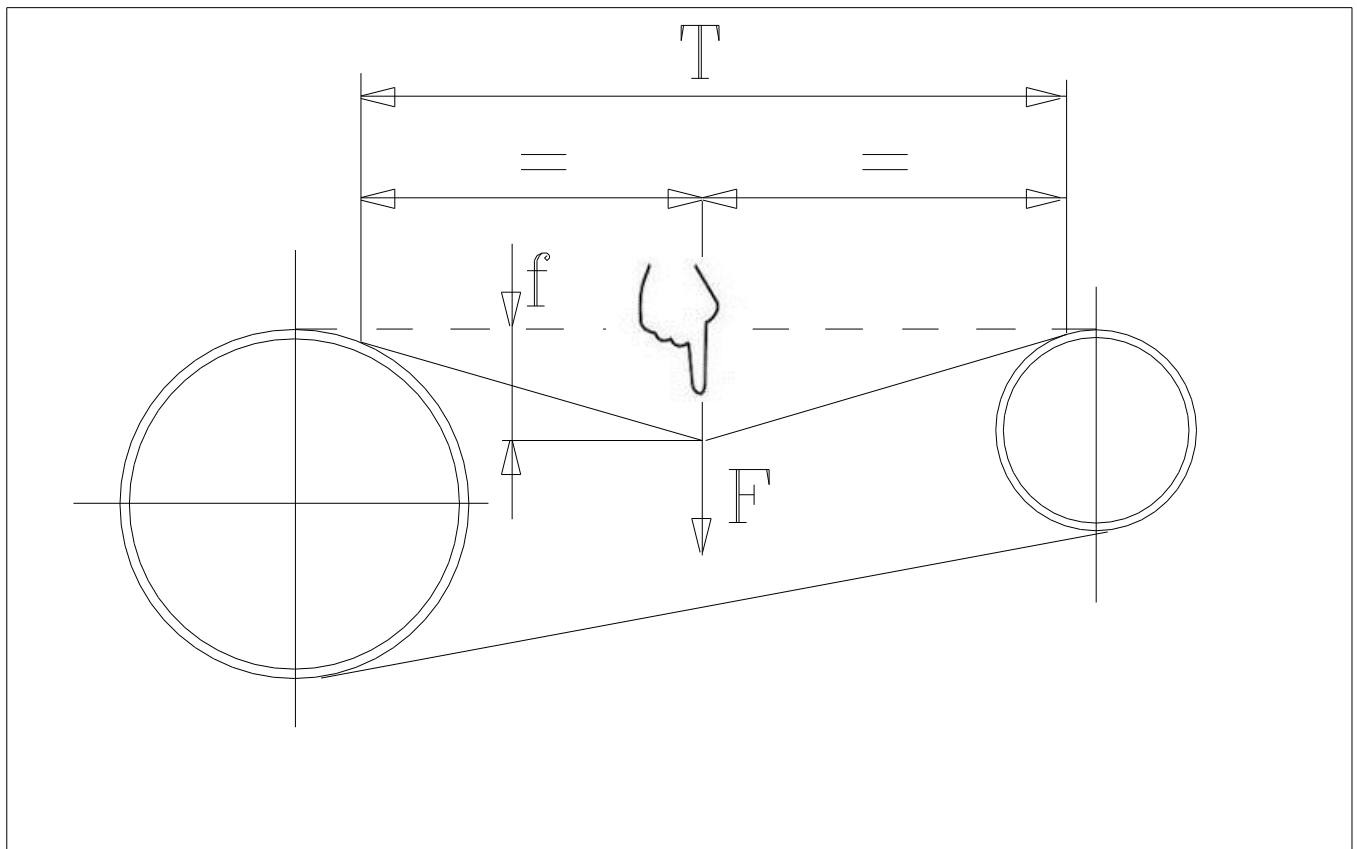


Figure 13.4-8 Tensioning straps

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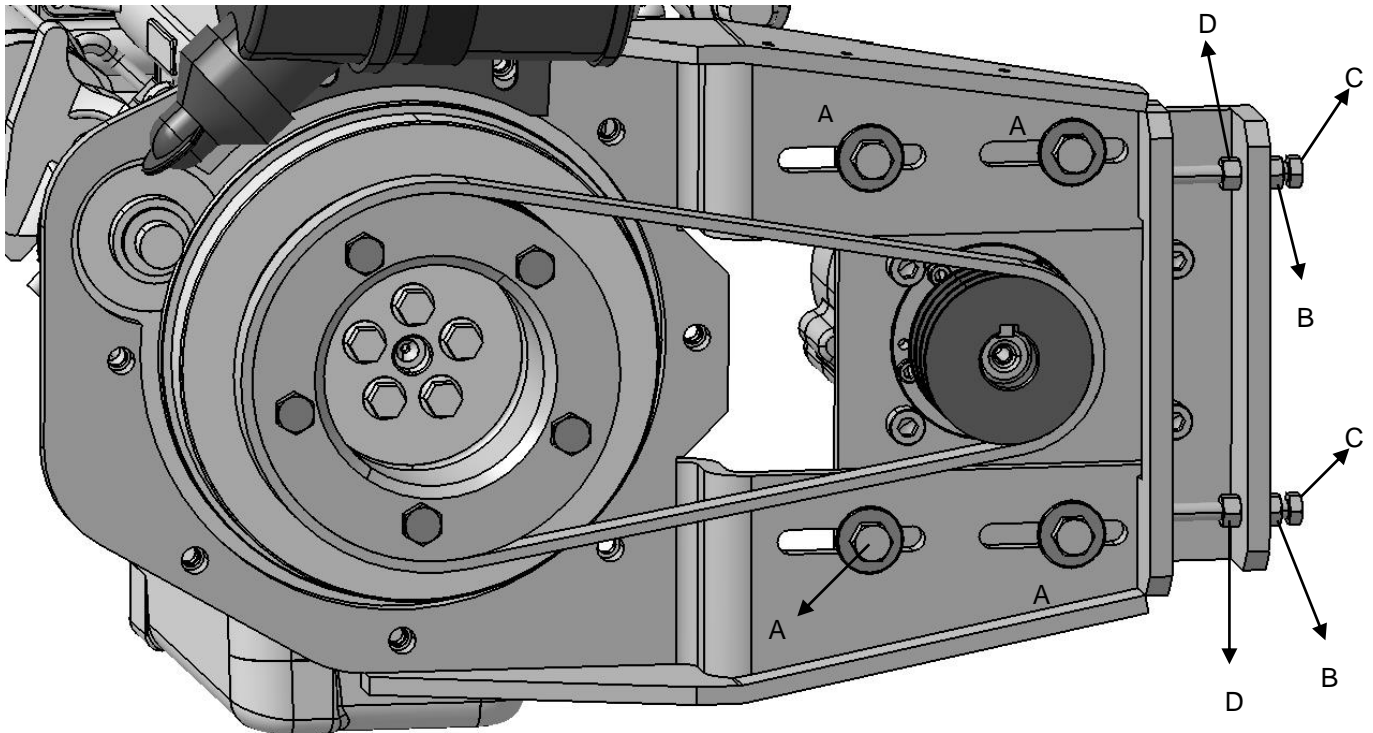


Figure 13.4-9 Disassembly straps MDVN 22K

- Loosen the 4 bolts A
- Loosen the lock nut and locknut B & D
- Acting on the bolt for tensioning C. Tightening of the belt tension is increased and unscrewing it decreases.
- When you have reached the right tension tighten the lock nut B and D
- Close firmly the 4 screws A

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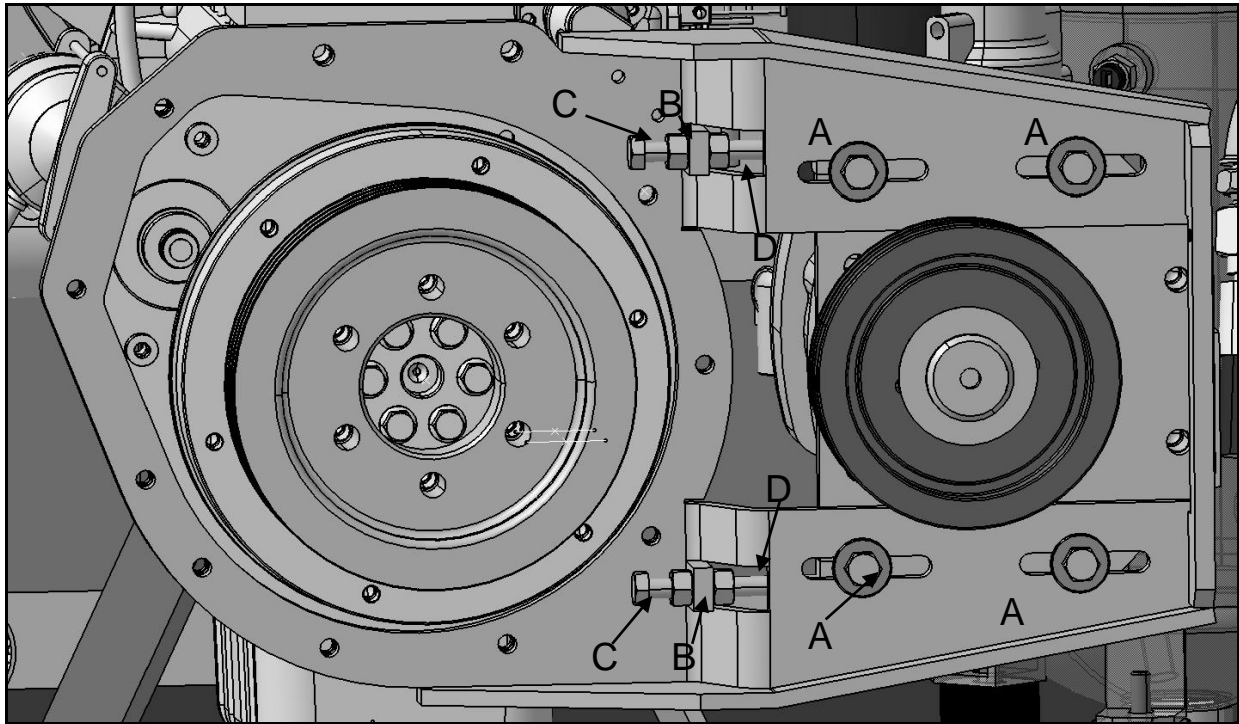



Figure 13.4-10 Disassembly straps MDVN 26K

- Loosen the 4 bolts A
- Loosen the lock nut and locknut B & D
- Acting on the bolt for tensioning C. Tightening of the belt tension is increased and unscrewing it decreases.
- When you have reached the right tension tighten the lock nut B and D
- Close firmly the 4 screws A

14 SPARE PARTS




In case of need to order a single component contact your authorized service center Rotair.


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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. | Cleaning of the same and their tightening. |
| | No fuel. | Top up the fuel in the diesel tank. |
| | Solenoid faulty fuel. | Seek customer service by the manufacturer of the engine. |
| | Air in the fuel pipe. | Locate the infiltration by careful verification of all pipes. |
| | Injection pump defective. | Call in Customer Service by the engine manufacturer. |
| | Temperature sensors defective. | They are located at: - Headed-cylinder engine; - Output air compressor; - Tank separator. One at a time, unplug its power cable from the probes to identify the defective sensor and replace it. The temperature light on the control panel should go off. |
| Opening the taps the motor does not accelerate. | Starter defective Injectors failures | Call in Customer Service by the engine manufacturer. |
| The engine speeds up but no air come out | Control valve of maximum pressure defective. | Remove the control valve max and accurately control the spring and the conical seat. If the defect cannot be repaired, the valve must be replaced. |
| | 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 temperature anomaly and consequently stops the machine. | Take off one at a time, locate the probe that determines the stop. If that proves to be placed on the engine, check the oil level of the motor, the voltage and the conditions of the alternator belt. |
| | | For water-cooled engines, check the coolant level. If it turned out to be the probe placed on the |

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| Abnormal | Cause | Solution |
|--|---|--|
| | | <p>compressor control the level of 'oil in the tank and if necessary top up;</p> <p>Check the cooling fan and clean the radiator; replace the oil filter of the compressor.</p> <p>If that proves to be positioned on the oil separator tank, check the oil separator filter following the instructions to Par. 13.4-15, proceeding to its eventual replacement Par 13.4-16.</p> |
| Abnormal | Cause | Solution |
| The engine does not reach the maximum speed of the speed indicated and the compressor does not do. | The spring piston accelerator is broken or to be put under tension. | Check the tension of the spring piston accelerator (Par. 11.1.2). |
| | Engine speed lower than expected. | <p>Have the injection apparatus of the motor by qualified personnel.</p> <p>Replace the fuel filter. Run the draining of the fuel tank (Par. 13.4.9).</p> |
| Oil leaking from the taps. | Minimum working pressure too low. | Adjust it according to the instructions of Par. 11.3. |
| | Too much oil in the tank. | To the correct level (Par.13.4). |
| | The machine works in non-horizontal position. | Ensure position the machine level |
| | Nozzle clogged oil recovery. | See Par. 13.4.8. |
| | Defective exhaust cleaner. | See Par. 13.4.15. |

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16 DISPOSAL, ELIMINATION, DISPOSAL OF THE MACHINE

16.1 Instructions for dismantling

To dismantle the machine safely, proceed as follows:

- 1) Place the machine in a wide and make sure it is turned off.
- 2) Empty the liquid waste in the tanks of motor oil, fuel, coolant, hydraulic oil and store them in special containers. For disposal of these types of waste follow the next paragraph.
- 3) Loosen the screws of the body and remove covers
- 4) 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 in relation to the type of waste to which they belong.

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

- Waste motor oil
- Waste hydraulic oil
- Residues of coolant
- Residual fuel
- Liquid remaining battery power
- Rags or paper impregnated with a diluents or other substances used for the cleaning of the various organs 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 incorporated 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, this 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 should be entrusted with the written contract to authorized firms; and those who physically transport and handling must be in possession of the required authorizations. The hauliers authorized must be enrolled in the relevant register.

18.1 Special waste

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



18.2 Toxic and hazardous waste



Are considered hazardous toxic waste 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



Are considered hazardous toxic waste all 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 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

The fixed 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 characteristics of the waste contained. The containers in which products are stored or dangerous or harmful materials must, in order to disclose the nature of their content, carry signs and markings prescribed.



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 toxic from industrial and artisanal (in each case the 'Users should refer to the regulations implementing that Directive in the country of installation and use of the machines).

