TRACK DUMPER

ATD5000

SAFETY & OPERATIONS MANUAL

Manual Part #: 078235 | Revision: -
Language: English | Original Instructions

TRACK DUMPER

Safety & Operations Manual

This manual covers the Track Dumper model listed below:

Part No.	Description
077751	Track Dumper, ATD5000

NOTICE

This manual, or a copy of it, must be kept with the machine at all times.
There is a manual storage container located on the machine for your convenience.

Allen Products are covered under one or more of the following patent numbers:
10,100,537; 9,068,301; 9,068,300; 8,360,680; 7,690,864; 7,114,876B1; 6,857,815B2; 6,582,153
With other Patents Pending.
Printed in U.S.A.

Limited Warranty & Limitation of Liability

GENERAL INFORMATION

Allen Engineering Corporation ("Allen") warrants its products to be free of defects in material or workmanship for:

TWO YEARS FROM END USER'S DATE OF PURCHASE

Warranty period begins on the date of purchase by the End User of the product. All warranty is based on the following limited warranty terms and conditions, including the disclaimer of implied warranties and consequential damages.

1. Allen's obligation and liability under this warranty is limited to repairing or replacing parts if, after Allen's inspection, there is determined to be a defect in material or workmanship. Allen reserves the choice to repair or replace.
2. If Allen chooses to replace the part, it will be at no cost to the customer and will be made available to the Allen Distributor, Dealer, or Rental Center from whom the End User purchased the product.
3. Replacement or repair parts, installed in the product, are warranted only for the remainder of warranty period of the product as though they were the original parts.
4. Allen does not warranty engines or batteries. Engine warranty claims should be made directly to an authorized factory service center for the particular engine manufacturer. Batteries are not warranted due to unknown treatment during transport, etc, and any battery claims should be directed to the battery manufacturer.
5. Allen's warranty does not cover the normal maintenance of products or its components (such as engine tuneups and oil & filter changes). The warranty also does not cover normal wear and tear items (such as belts and consumables).
6. Allen's warranty will be void if it is determined that the defect resulted from operator abuse, failure to perform normal maintenance on the product, modification to product, alterations or repairs made to the product without the written approval of Allen. Allen specifically excludes from warranty any damage to any trowels resulting from an impact to the rotors.
7. Impact damage to gear boxes is not covered under the Allen warranty and is deemed customer abuse.
8. Allen will pay shop labor on warranty items at the Allen Shop Labor Rate in existence on the date of the warranty claim. An Allen labor chart will determine the time allowed to complete a repair and will govern the shop labor hours that will be allowed.
9. Allen will pay freight on warranty replacement parts at worldwide standard ground rates. No warranty replacement parts will be shipped air freight at the expense of Allen. Allen only pays outbound freight charges when sending warranty replacement parts to the customer via ground service. Allen does not pay any inbound freight. However, if Allen determines this to be a warranted item, only then will Allen reimburse the customer for inbound freight at standard ground rates.
10. ALLEN ENGINEERING CORPORATION'S WARRANTY POLICY WILL NOT COVER THE FOLLOWING: TAXES; SHOP SUPPLIES; ENVIRONMENTAL SURCHARGES; AIR FREIGHT; TRAVEL TIME; LOSS OF TIME; INCONVENIENCE; LOSS OF RENTAL REVENUE; RENTAL COSTS OF EQUIPMENT USED TO REPLACE THE PRODUCT BEING REPAIRED; LOSS OF USE OF THE PRODUCT; COMMERCIAL LOSS; OR ANY OTHER CHARGES WHATSOEVER OR ANY LIABILITIES FOR DIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGE OR DELAY.
11. ALLEN ENGINEERING CORPORATION MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED. THIS LIMITED WARRANTY IS IN LIEU OF THE WARRANTY OF MERCHANTABILITY AND FITNESS. THERE ARE NO OTHER WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THIS DOCUMENT.
12. No Allen employee or representative is authorized to change this warranty in any way or grant any other warranty unless such change is made in writing and signed by an officer of Allen Engineering Corporation.

GENERAL INFORMATION

Dealer Information & Ordering Parts

Your Dealer has Allen Engineering Corporation trained mechanics and original Allen replacement parts. Always contact the Allen Dealer who sold you this machine for Allen Certified repairs and replacement parts.

Place Allen Dealer information below for future reference.

Dealer Name: _____

Phone #: (___) -____- _____

Address: _____

City:_____ **State:**_____ **Zip:**_____

Salesman:_____ **Mobile Phone:**_____

Additional Comments:_____

_____

_____

_____

ALL INFORMATION, SPECIFICATIONS, AND ILLUSTRATIONS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE AND ARE BASED ON THE LATEST INFORMATION AT THE TIME OF PUBLICATION.

The “PARTS & DECALS MANUAL” contain illustrated parts lists for help in ordering replacement parts for your machine. Follow the instructions below when ordering parts to insure prompt and accurate delivery:

1. All orders for service parts - include the serial number for the machine. Shipment will be delayed if this information is not available.
2. Include correct description and part number from the “PARTS & DECALS MANUAL”
3. Specify exact shipping instructions, including the preferred routing and complete destination address.
4. **DO NOT** return parts to AEC without receiving written authorization from AEC. All authorized returns must be shipped pre-paid.
5. When placing an order, please contact the AEC dealer nearest you.

Model & Serial Number / Unit Identification

Manufacturer's Codes:
When ordering parts or requesting service information, you will always be asked to specify the model and serial numbers of the machine. The legends below specifically defines each significant character or group of characters of the Model Number and Serial Number codes.

Model Number
ATD 5000

- **Model**
- **Series**

Serial Number
The serial number found on the identification plate is a ten digit format. The model number identifies your machine and will ensure that you receive the correct replacement parts.

Serial Number Example
ATD 01 19 001

- **Sequence Number**
- **Year**
- **Month**
- **Series**

Unit Identification Plate Location:
An identification plate listing the model number and the serial number is attached to each unit and is located on the rear lower left side of mainframe or under the seat. Refer below for serial number and model number location. This plate should not be removed at any time.

Please record the information found on this plate below so it will be available should the identification plate become lost or damaged. When ordering parts or requesting service information, you will always be asked to specify the model and serial numbers of the machine.

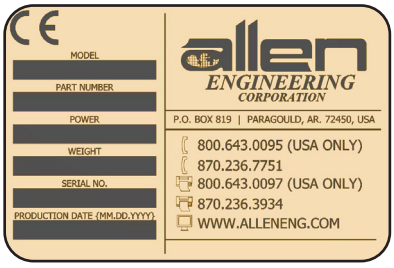
FILL IN FOR FUTURE REFERENCE

Model Number:_____

Serial Number:_____

Date Purchased:_____

Purchased From:_____



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ATTENTION!!!

THIS MANUAL MUST ALWAYS ACCOMPANY THE VEHICLE AND MUST BE READILY AVAILABLE TO THE OPERATOR.
BESIDES PROVIDING INSTRUCTIONS ON THE PROPER USE OF THE VEHICLE, IT PROVIDES WARNINGS ABOUT THE RISKS AND HAZARDS DERIVING FROM INCORRECT USE AND NON-COMPLIANCE WITH THE INTENDED USE.

TO BE KEPT FOR FUTURE REFERENCE.

Released 24.05.2023

1. GENERAL ACCIDENT PREVENTION

For the vehicle to work properly it must be set up perfectly (installation and use) and the oil level of the various mechanisms must be verified. An inaccurate inspection or incorrect installation or use can impair vehicle efficiency and compromise operator safety.

All the information and diagrams in this manual refer to the model in production at the time of publication.

For more information contact an Authorised Service Centre.

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

Everything in this manual belongs to the company, therefore no part or diagram can be used for any other use without authorisation.

Caution is the principal factor in preventing accidents and injuries.

Before starting up the vehicle, carefully read all the instructions in this booklet. Should doubt or uncertainties arise, contact the manufacturing company.

Before starting the engine, make sure that there are no people near the vehicle, especially children.

It is strictly forbidden to transport or lift people.

Do not use the vehicle unless you are physically fit: do not drink alcoholic beverages while at work.

This vehicle is not approved for road circulation.

Do not use the vehicle on steep slopes but only on ground with a gradient that is less than the limits indicated further on.

It is strictly forbidden to abandon the vehicle while the diesel engine is running or with the ignition key inserted. The engine must always be stopped.

It is strictly forbidden for minors to use the vehicle.

Do not use the vehicle in closed or poorly ventilated areas: exhaust fumes are toxic and could be seriously harmful to the body and may even be fatal.

The vehicle must be refuelled with the engine switched off. Always keep away from flames and do not smoke.

Do not spill hydraulic or lubricating oil or any other liquid on the ground during maintenance; pick it up and dispose of it at authorised companies.

Unauthorised personnel must be prohibited from operating the vehicle by removing the ignition key. The person it is handed over to is responsible for any harm and damage caused to third parties.

It is strictly forbidden to remove the safety devices installed.

Avoid stopping the vehicle in a place where there lies the risk of a landslide, especially when fully loaded.

Avoid wearing inadequate clothing when operating the vehicle (oil-stained, torn, etc.).

It is strictly forbidden to stop or park while the Diesel engine is running. The engine must always be stopped.

Certain symbols are found in the manual and where necessary on some parts of the vehicle, followed by safety-related messages. For them to be read more easily and carefully, follow the instructions below:

DANGER!
This symbol indicates a high degree of danger and risk for the safety of the operator or other persons, including death. Use all the precautions recommended in this manual.

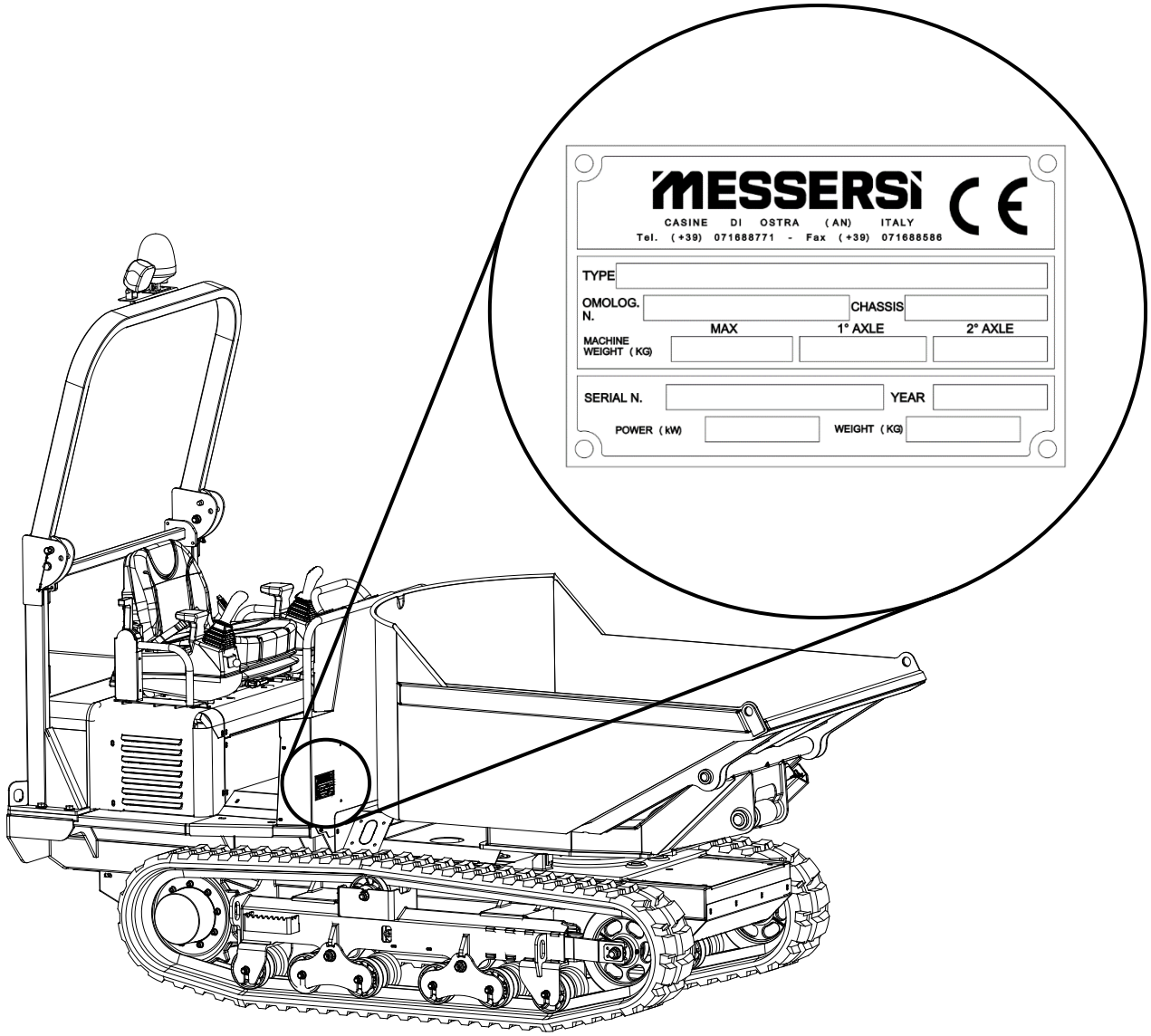
ATTENTION!
This symbol indicates a potential hazard that can be eliminated by applying and complying with the instructions provided in this manual or by using common sense.

2. MAIN FEATURES

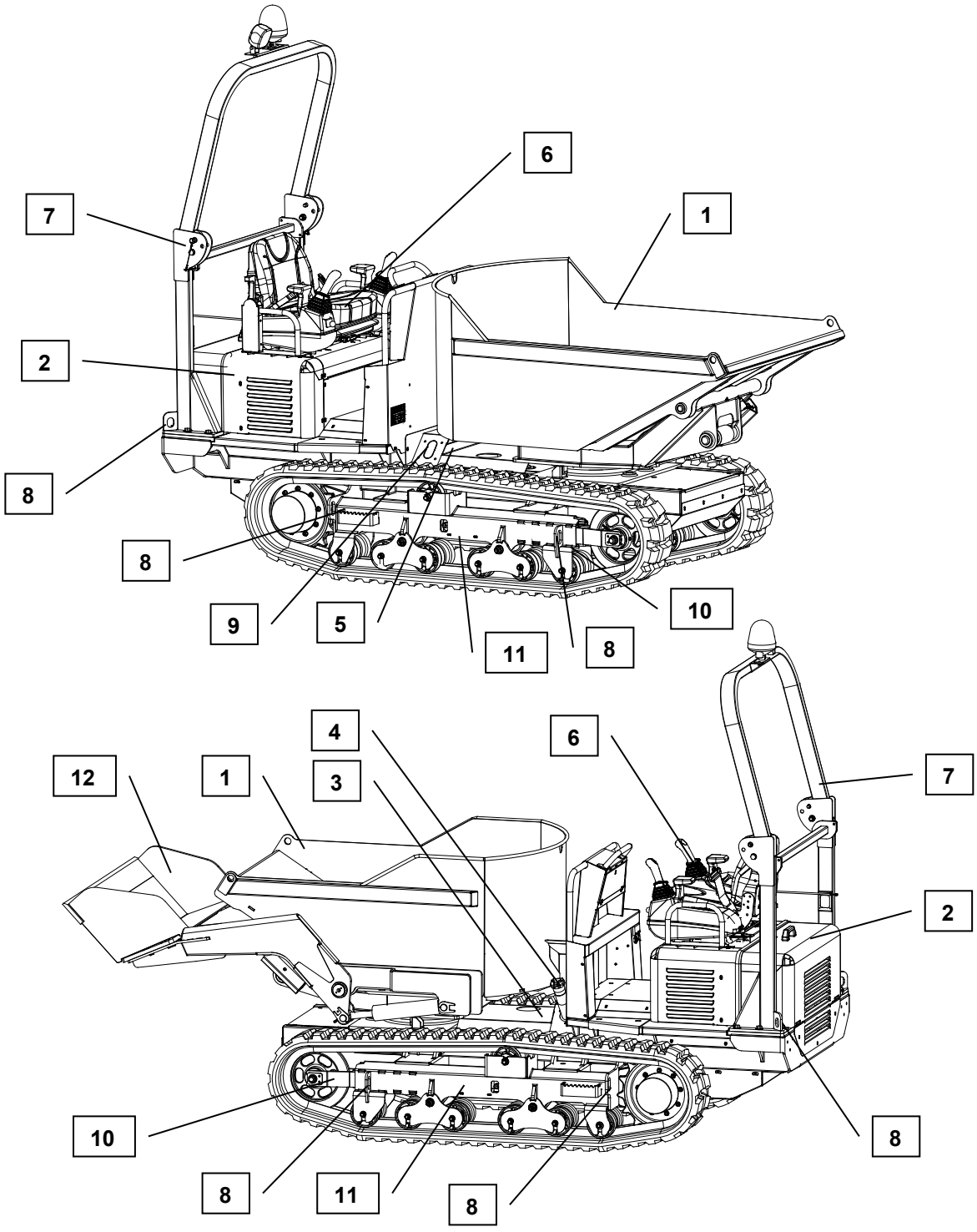
2.1. VEHICLE IDENTIFICATION

The vehicle is equipped with a special label, riveted to the front of the chassis of the driver's side (tipper side), indicating its identification data.
Always quote the type and serial number shown on the label when submitting any request.

For further clarification consult the methods described in the Spare Parts Manual that comes with the vehicle.
Any accessory that can be installed on the vehicle will have its own label, which is generally found on its outer part. For more information consult the documentation concerning the specific part.



2.2. MAIN PARTS OF THE VEHICLE



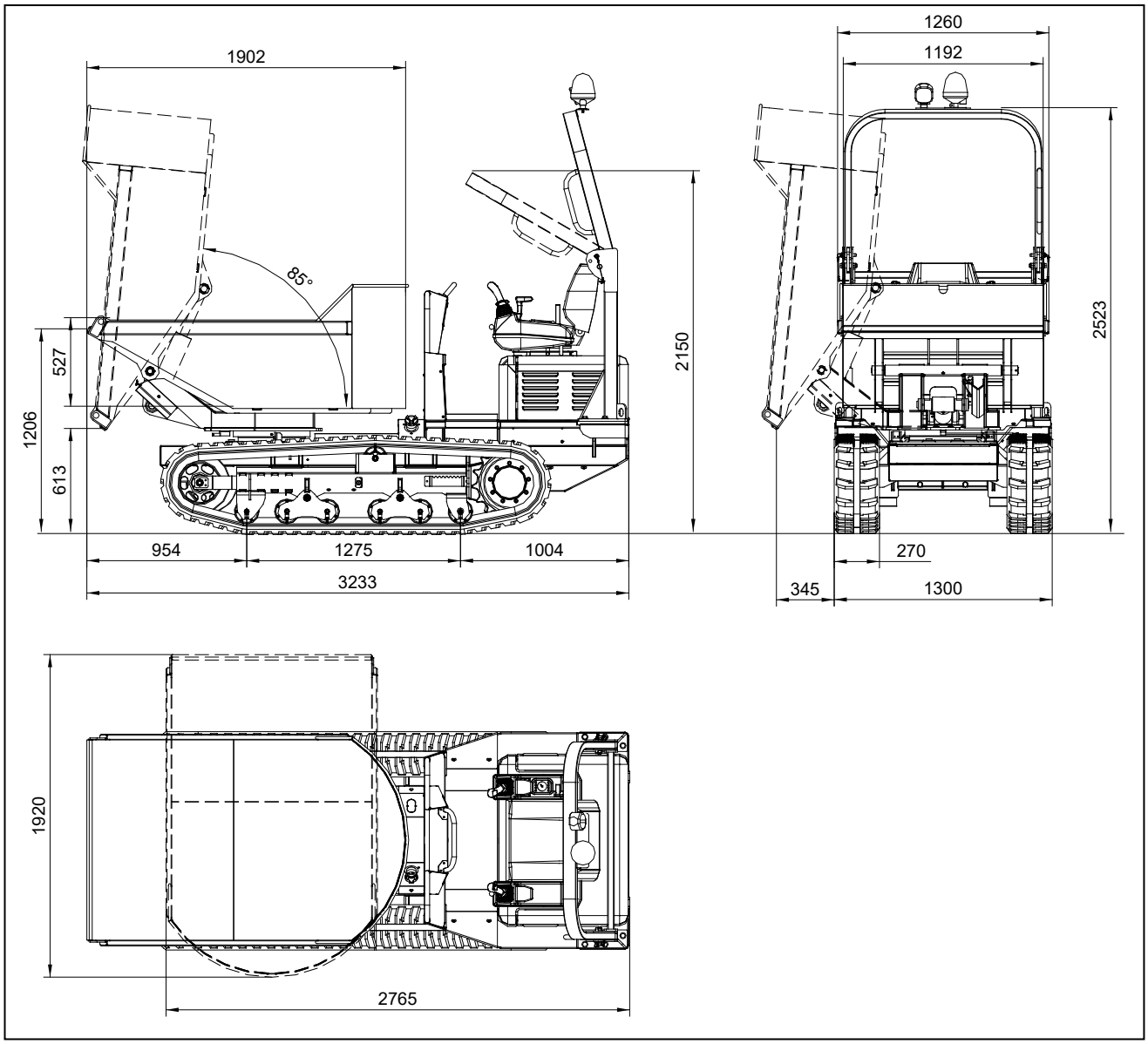
1 – Loading skip with 3-side tipping
2 – Engine bonnet
3 – Fuel tank
4 – Refuelling cap
5 – Hydraulic oil tank
6 – Driver's seat
7 – Tilting operator's canopy
8 – Handling / lifting hooks
9 – Hydraulic power take-off (option)
10 – Idler
11 – Tracked undercarriage
12 – Self loading shovel

2.3. FEATURES – TECHNICAL DATA

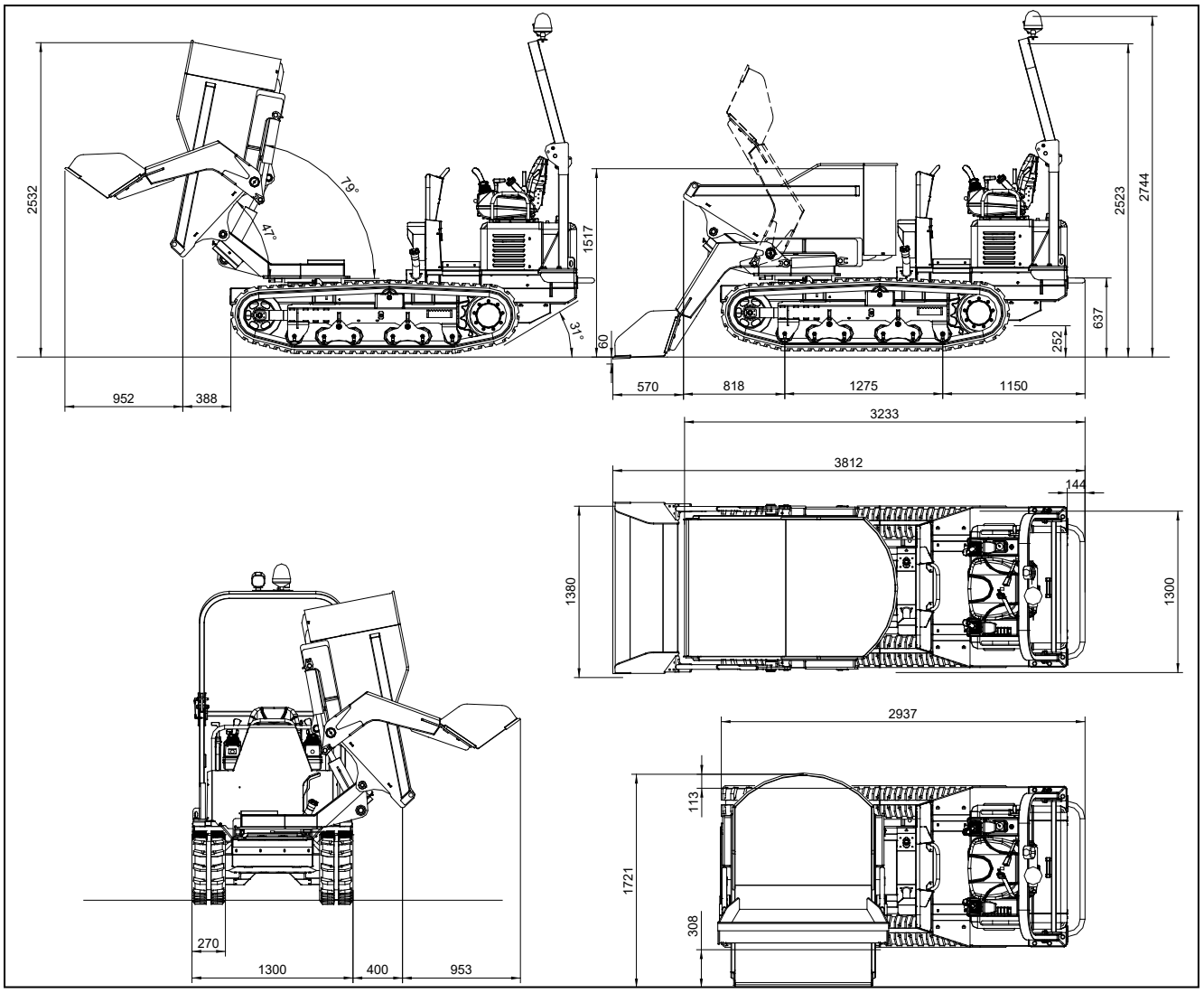
SPECIFICATIONS

The vehicle is designed and built to load, transport and unload soil, sand, excavation debris and other material that is loose or corresponds with the characteristics and performance specifications described in this manual.

TC230d / BT



TC230d / BTP


2532
79°
47°
1517
37°
60
952
388
570
818
1275
1150
2523
2744
637
252
3233
3812
144
1380
1300
2937
113
1721
308
270
1300
400
953

MAIN FEATURES

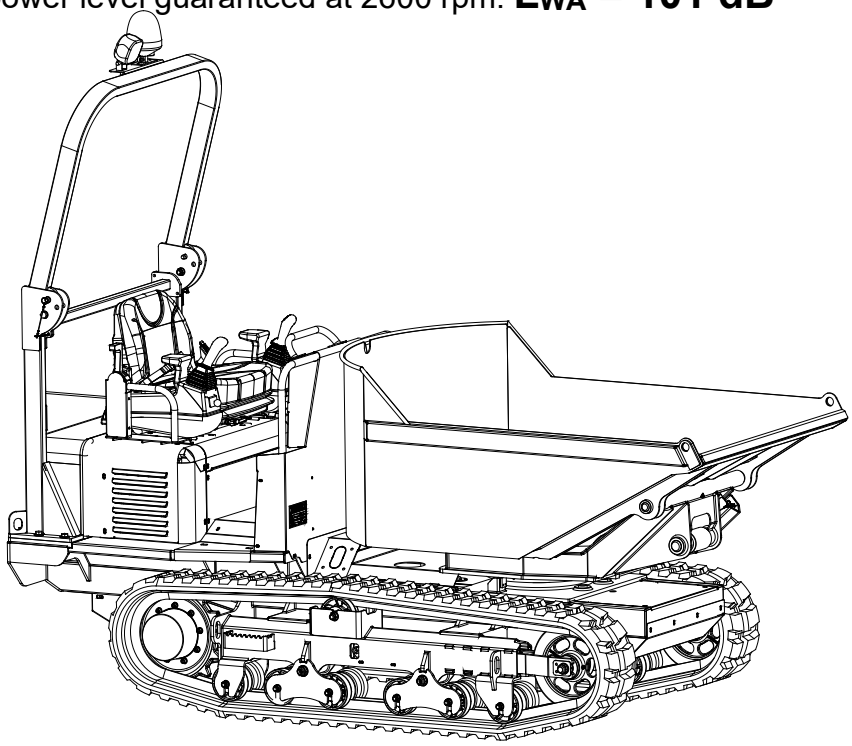
Tracked dumper with closed loop hydrostatic transmission with variable displacement axial piston pump and two speeds axial piston motor for each track.
TIER 4 / Stage V water cooled diesel engine.
Machine with two speeds with electric selection.
Mechanical parking brake with negative control to stop the machine on deep slopes.
Double effect cylinder to tip the skip.
Rubber tracks in monobloc structure with a steel wire core and treated steel inserts.
A couple of pivoting rollers in the centre of the track to adapt better to the roughness of the ground.
The considerable ground clearance allows the easy motion even on dirt patches and on rough terrains.
Track layout to guarantee a wide supporting area, high stability and excellent driving comfort in all conditions of use.
High capacity dumping skip. The rotation system of the 180° dumping skip is made by horizontal opposed pistons.
As optional fitting the machine can be equipped with an hydraulic P.T.O. with delivery of 32 l/min at 170 bar, deliverable even after the purchase of the machine.

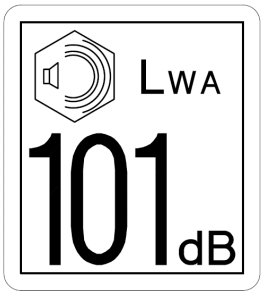
TECHNICAL DATA

		TC230d / BT	TC230d / BTP
Operating weight (without operator)	**kg**	**2285**	**2500**
Operating capacity	**kg**	**2300**	
Load capacity: - heaped (SAE Standard)	**m^3**	**1,17**	**1,07**
- flat: sand/liquid	**m^3**	**0,90 / 0,72**	**0,88 / 0,72**
DIESEL Engine	**type**	**KUBOTA D 1305-E4B**	
Maximum engine rotation speed	**rpm**	**2600**	
Max. power at maximum speed	**hp/kW**	**24 / 18,5**	
Displacement	**cm^3**	**1261**	
Cylinders	**no.**	**3**	
Max torque at 1700 rpm	**daNm**	**8,01**	
Cooling	**type**	**liquid**	
Transmission	**type**	**Hydrostatic**	
Transmission pumps with variable displacement pistons	**no.**	**2**	
Total delivery	**l/min.**	**45 x 2**	
Services gear pump	**no.**	**1**	
Oil flow delivery	**l/min.**	**28**	
Max. operating pressure for driving	**bar**	**350**	
Max. operating pressure for services	**bar**	**180**	
Maximum speed	**km/h**	**3,7 / 7,0**	
Steering system through independent tracks	**type**	**Hydrostatic**	
Rubber tracks tensioning	**type**	**With grease**	
Width of the rubber track	**mm**	**270**	
Specific ground pressure: - empty / loaded	**kg/cm^2**	**0,308 / 0,588**	
Max. gradient capability full loaded	**max %**	**76**	
REFUELLING			
Fuel tank capacity	**lt**	**26**	
Hydraulic oil tank capacity	**lt**	**20,5**	
Capacity of each driving motor	**lt**	**0,6**	
Pumps overload pressure	**bar**	**24 – 25**	
Noise emission level at 2600 rpm	**dBA**	**101**	

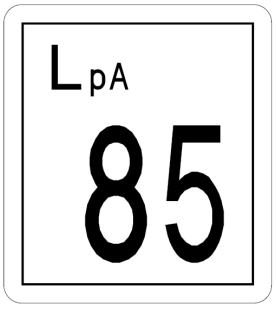
Implementation of **EEC Directive 14/2000** concerning the noise limitation generated by the operating machine.

Sound power level guaranteed at 2600 rpm: **L_{WA} = 101 dB**





Sound pressure level at operator's ear: **L_{PA} = 85 dB**



Implementation of **EEC Directive 44/2002** regarding minimum safety and health prescriptions for on-the-job exposure to the risks derived from mechanical vibrations.

Daily action values

- **Hand-arm system:** **less than 2.5 m/sec^2**
- **Whole body system:** **less than 0.5 m/sec^2**

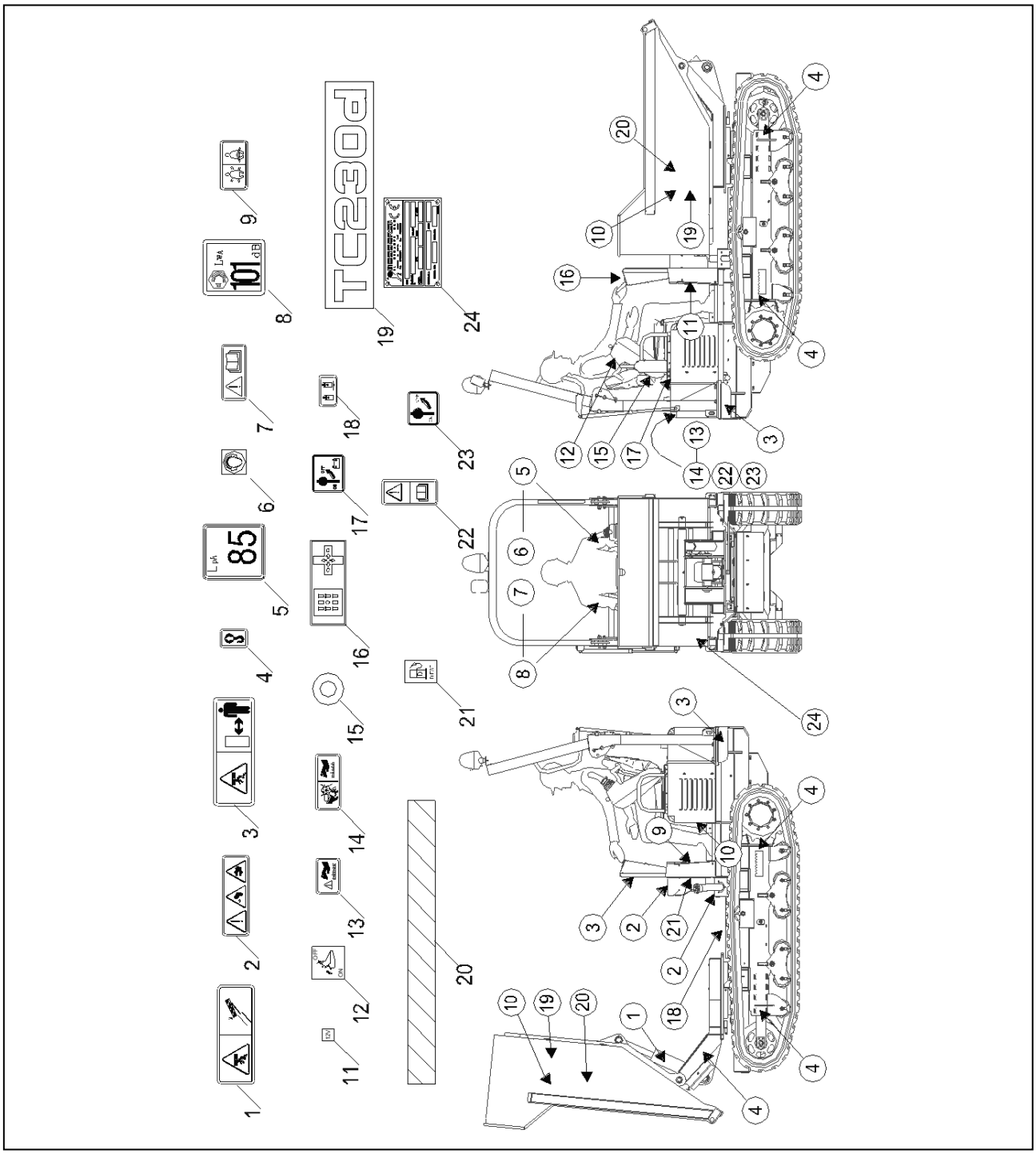
3. SAFETY – OPERATING STANDARDS

3.1. SAFETY LABELS AND DECALS

Besides indicating the various operations to control and use the machine, the labels also highlight the risks related to operating the machine.

Operators who normally wear eyeglasses must wear them to read the labels.

Keep the labels clean and legible paying particular attention to the safety indications. Replace the labels when damaged or missing. The Manufacturer is at your disposal when you make such request.



3.2. GENERAL USE – SAFETY REGULATIONS

The present manual contains the information required to run the machine.

Contact the Manufacturer for any spare parts, accessories or information you might require.

The tracked dumper fitted with swivel skip serves to carry and dump materials. It can be equipped with a self-loading bucket (for details see the supplied and possible optional accessories).

The materials being handled must comply with the characteristics of the equipment currently being used.

Avoid abrupt movements. All movements and manoeuvres must be performed with utmost care and while running at a slow speed.

Check that the work area is free and that there are no unauthorized persons around. Also check that no one enters or passes within the machine operating range.

In case of operating anomalies while moving the various mobile parts of the machine, turn the engine off immediately.

Never perform any checks, controls or maintenance operations with the engine running.

It is strictly forbidden to transport or lift people besides the operator.

When hoisting and transporting the machine, follow the instructions given in the specific chapter.

Before starting up the machine, make sure that the load has been positioned correctly in the dump body.

Always make sure that the weights are balanced while driving forwards or reversing on slopes.

<u>It is forbidden</u> to move on ground where the **gradient** is both **lateral as well as longitudinal**. The ground **must be solid and compact** and always adequate for the specific load of the vehicle.

Before tipping the bucket, verify that the loaded material inside it is free to slide. Lifting the tipper with material blocked inside it can jeopardise the stability and is therefore ***<u>forbidden</u>***. The situation is even riskier when lifting and unloading sideways.

The bucket must be lifted for unloading operations very slowly in order to prevent any fluctuation that may facilitate the machine tipping over.

Before lifting the load, verify that the material in the bucket has been placed in a way so as to prevent the risk of it accidentally falling out while being moved.

If the loading bucket is also equipped with a shovel, it must be positioned as high as possible, to prevent it from interfering with the remaining structure when tipping over.

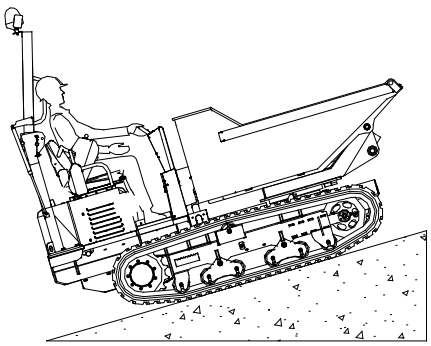
The vehicle can be used to unload on ground with a gradient that is less than 25% (longitudinal) and 10% (transversal). The skip has to be always tipped towards the hill. It is forbidden to unload if the gradient is both longitudinal and lateral.

Before tilting the bucket make sure that there are no obstacles in its path, especially power cables, wires, etc

Pay utmost attention while unloading and if in doubt, lower the bucket again and verify that the material is free to move. If the material is blocked, you can only try to release it with the bucket in the lowest position, otherwise it can cause the vehicle to overturn and risk crushing the operator and causing damage.

3.3. DRIVING STABILITY

FORWARD AND BACKWARD, EMPTY



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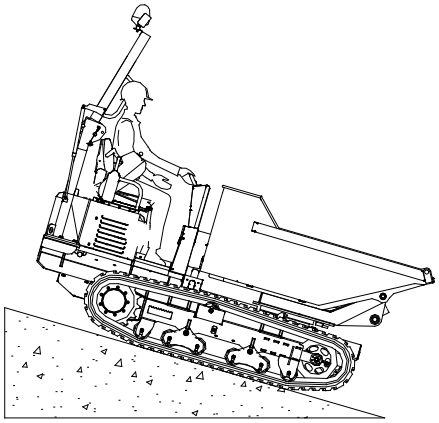
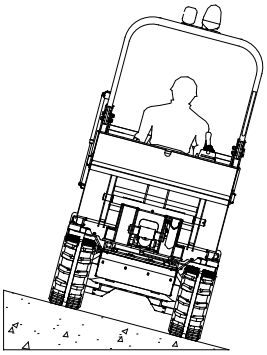


46% MAX



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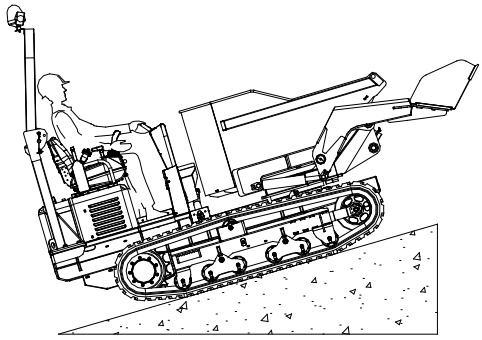

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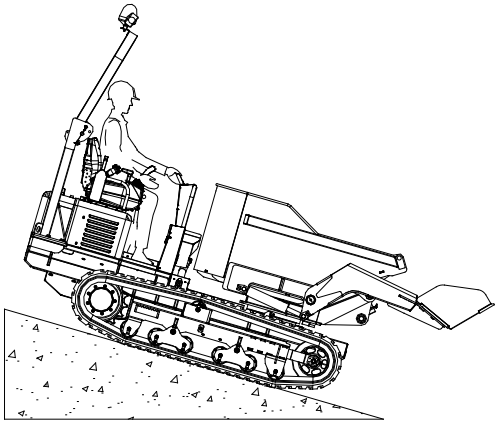
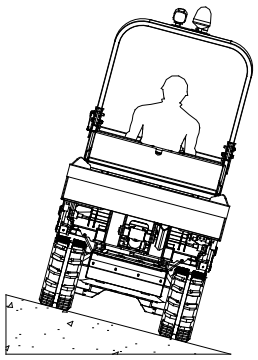
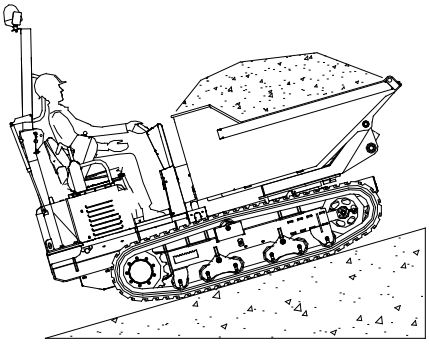


46% MAX



30% MAX

FORWARD AND BACKWARD, FULL LOADED



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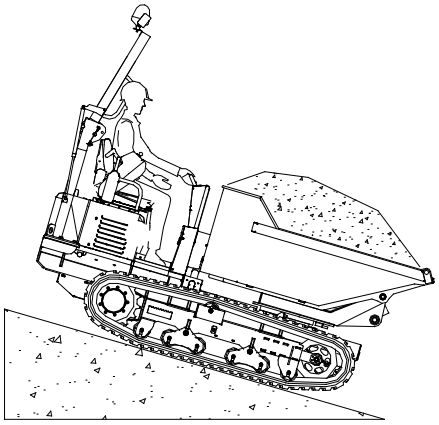

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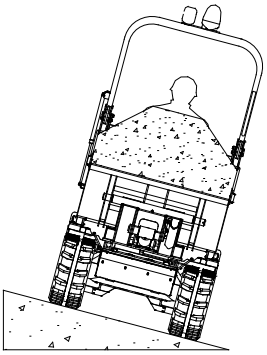

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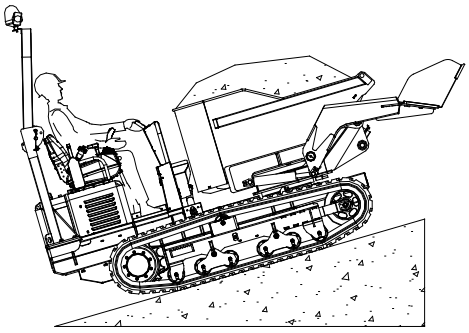

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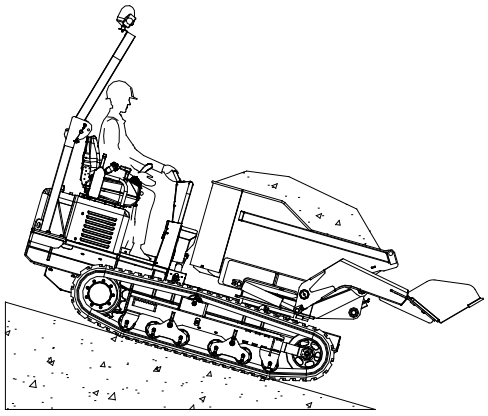

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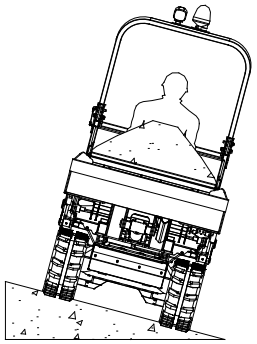
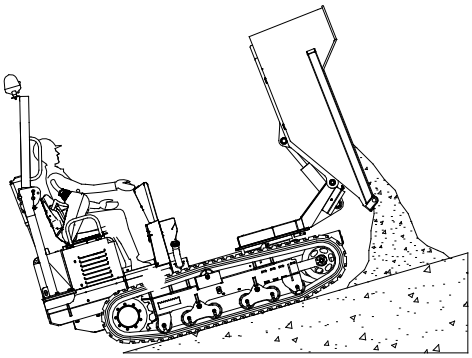
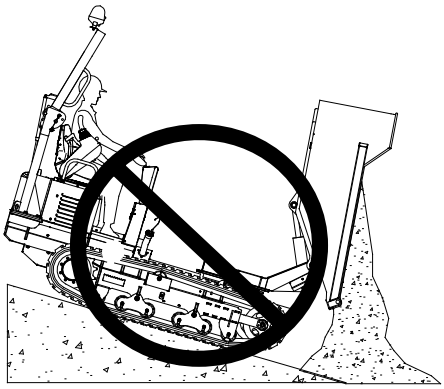


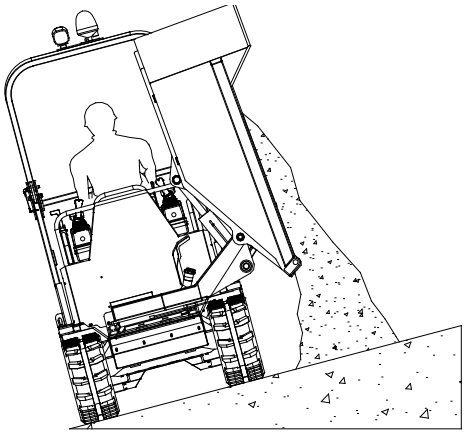
25% MAX

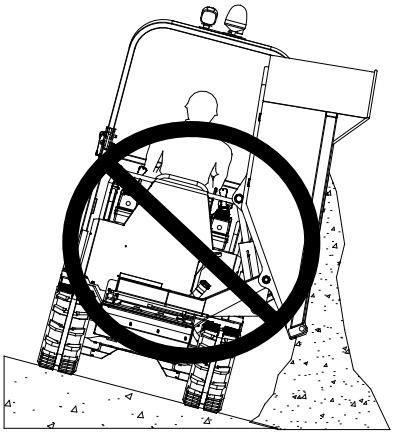
MATERIAL DISCHARGE



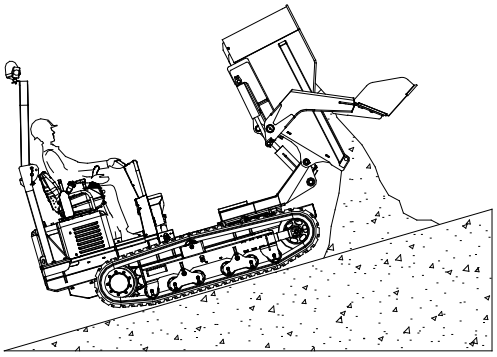


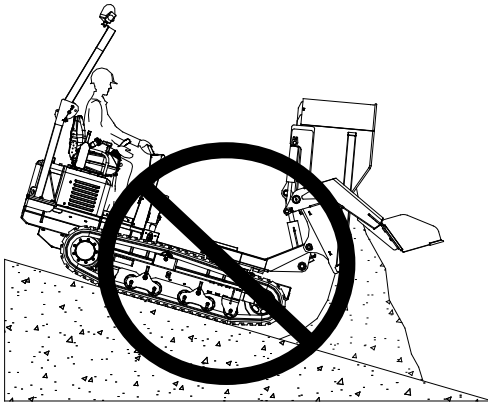
25% MAX



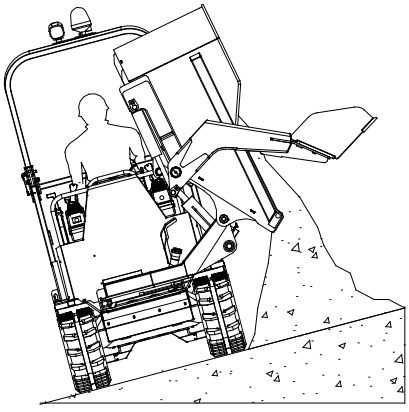


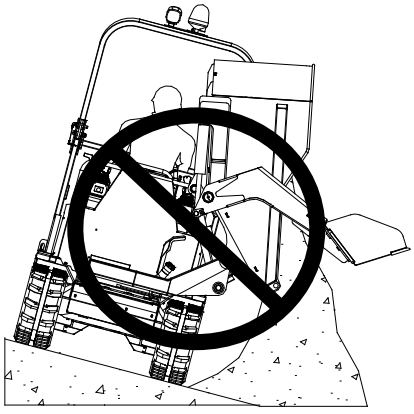
15% MAX





25% MAX





10% MAX

The allowed operational loading weight in the skip is 2300 kg max.

It is **FORBIDDEN** to leave the vehicle while the engine is running.

- **WARNING !**

WHEN STOPPING OR PARKING, ALWAYS TURN OFF THE DIESEL ENGINE

Never use the machine at the rated maximum for excessively long periods of time. Always alternate with periods operating at more moderate rates. In particular, to prevent damage from overheating of the hydraulic parts, never make excessively long transfers.

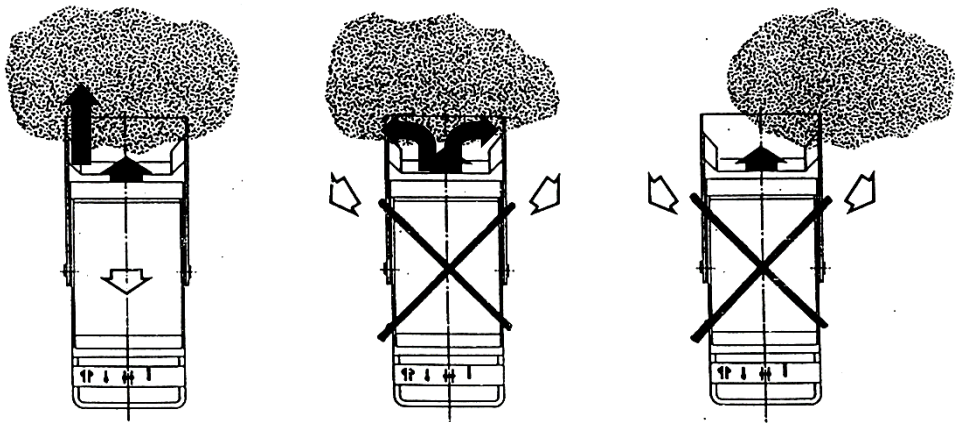
Prevent foreign bodies (gravel, stones, debris, etc.) from wedging between the rubber tracks as this would create interference between the various transmission bodies and could damage or break them.

On machines fit with load bucket, **self-loading** is possible and indicated only for **loose material** and the bucket must be inserted in the centre of the pile.
Never:

- Penetrate the pile by pushing forward with alternating side movements.
- Penetrate the pile from the side (with the side of the bucket).

These movements can damage the lift booms.

NEVER USE THE LOAD BUCKET TO MOVE OR REMOVE OBSTACLES.



3.4. LIFTING AND TRANSPORTING

See section 3 of this manual for the “overall dimensions of the machine”, while for the loading on a lorry by using ramps, follow what explained below.

- Close the loading/unloading areas, forbidding the entrance to foreign people and clearing the zone from obstacles and dangerous stuffs.
- Loading and unloading operations have to be done in a flat and compact surface.
- Check that the transport vehicle is in perfect condition. Apply the hand brake and insert safety wedges at the front and rear of the rear axle tyres. The vehicle engine must be off and the key removed from the ignition. The body must be level.
- Position the machine at the rear of the truck, ensuring that the longitudinal axle coincides with that of the truck.
- Check that the ramps are suitable for the vehicle to be loaded. **Only** use **homologated** and/or **certified ramps**.
- Check that the ramps are perfectly clean and free of grease and that there is no risk whatsoever of the tracks slipping.
- Check that the ramps are long enough to avoid problems during ascent and descent of the machine. Particularly check the length of the ramps, taking note their angle with the lorry loading platform has to be between 15° and 16°.
- Check that the ramps are properly coupled to the transport vehicle and appropriately spaced. The width of the ramp must be such as to allow comfortable passage of the track.
- The ascent and descent operations must always be carried out with the machine running and the hydraulic oil at operating temperature.
- Do not use the ramps as a gangway for crossing from one vehicle to the next.
- During machine loading, transportation and unloading phases, make sure the tipping vessel is blocked in the central position.

- The tracked transporter is already fitted with negative brakes, thus no other safety devices to avoid the machine moving during transport are required.

- Just in particular cases of transport and handlings (such as limited height passages, low bridges etc…) is possible to tilt the operator's canopy. During working phases, the canopy HAS to remain blocked in open position to protect the operator.

- Load and unload the machine in correct driving ways, as explained below.

- Before ascending or descending, check perfect alignment between the tracks and the ramps. Do not steer or adjust direction while on the ramps. If necessary, return to the point of departure, repositioning correctly.

- Caution with pivoting in the connection area between the ramps and the loading platform of the truck; the steep slope must be negotiated by moving very slowly and with extreme caution. Be twice as careful in the descent phase since the unbalance towards the bottom in this case is much higher.

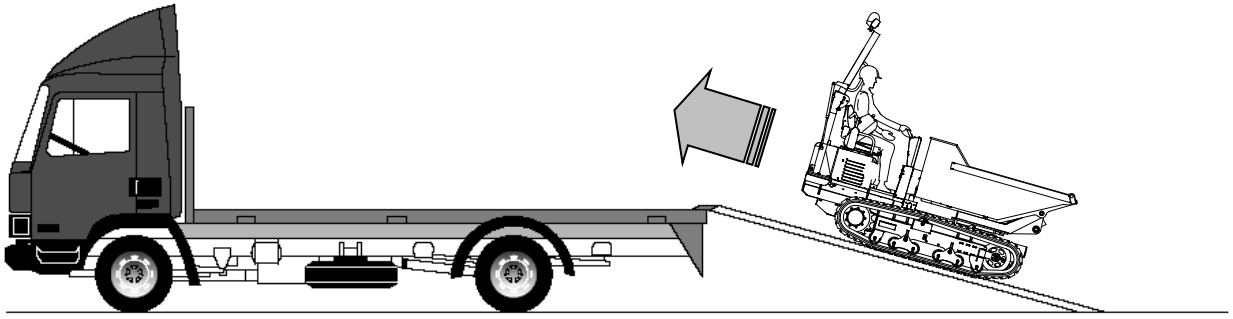
- All the loading and unloading operations of the machine must be carried out and co-ordinated by at least a second person who controls good progress of the operations.

 **ATTENTION!!!**

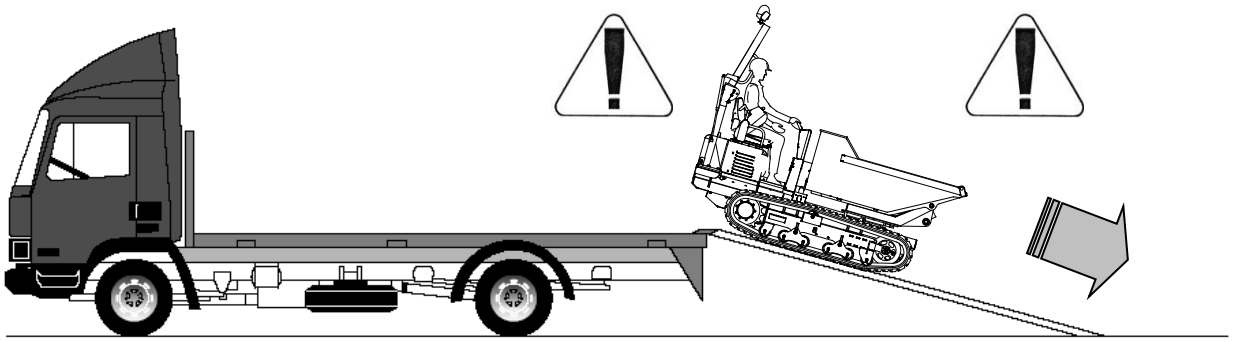
It is recommended to close the fuel valve every time the vehicle is transported or handled in order to prevent causing harm or damage.

To load and unload the transporter from the truck, it is suggested to act as shown below. Particular attention has to be taken during the overcome of the connection between the ramps and the lorry loading platform, which can cause an excessive gradient.

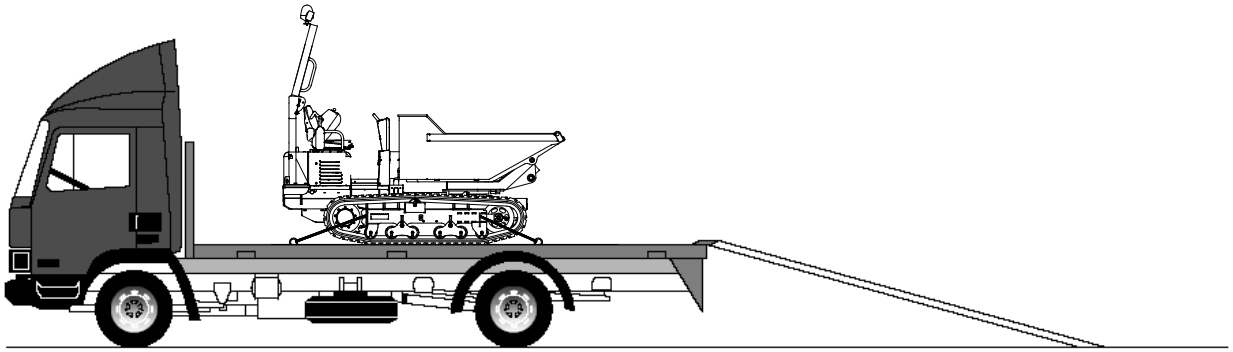
ASCENT



DESCENT



TRANSPORT



3.5. LIFTING AND TRANSPORT

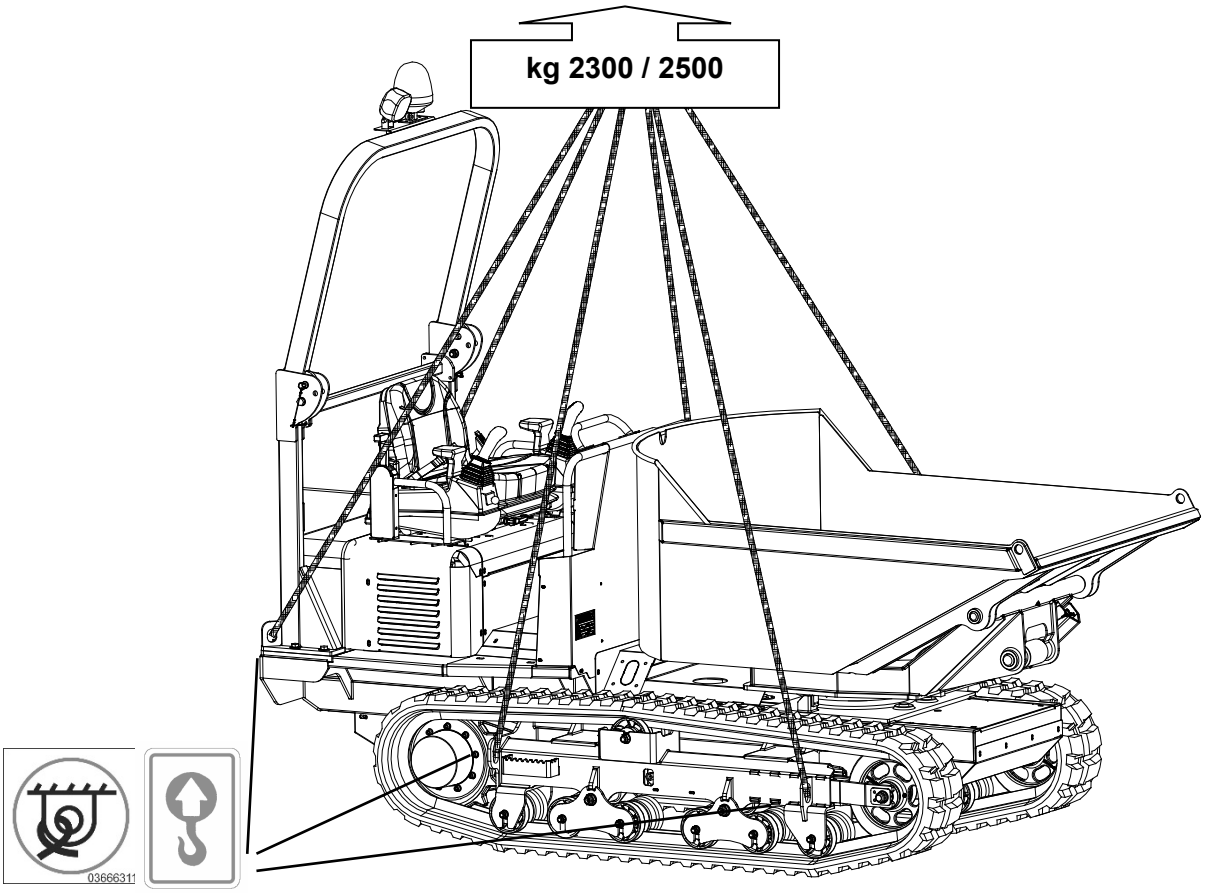
The vehicle must only be lifted when empty and it is of utmost importance to strictly comply with the following:

- Close off the lifting area and prohibit unauthorised people from entering. Do direct the load over people or things and make sure that the area where the un/loading operations are performed is clear from any obstruction (power cables, telephone line, etc.).
- It is strictly forbidden for people to pass or stand under the suspended load.
- Use strips (not cables or chains that could damage the skip) of adequate capacity for the load that is to be lifted: the empty machine, complete with the bucket, weighs about **2300 kg** (**kg 2500** with shovel).
- Hook the vehicle from the provided points and proceed with the lifting operations; avoid sudden movements and use very low lifting speeds.

It is strictly prohibited to walk or stand under the suspended loads.

During transport follow the instructions previously recommended.

ATTENTION! During lifting, protect any machine parts that come into contact with ropes or chains adequately.



- Lift the vehicle and place it on the transport vehicle, then anchor it properly by inserting and blocking wedges at the ends of the tracks on the flatbed.

- If necessary, secure the vehicle to the flatbed with steel cables of adequate capacity.

- Unload the vehicle by following the steps in inverse order and adopting all the necessary safety precautions to safeguard the personnel involved and the vehicle itself.

 **ATTENTION!!!**

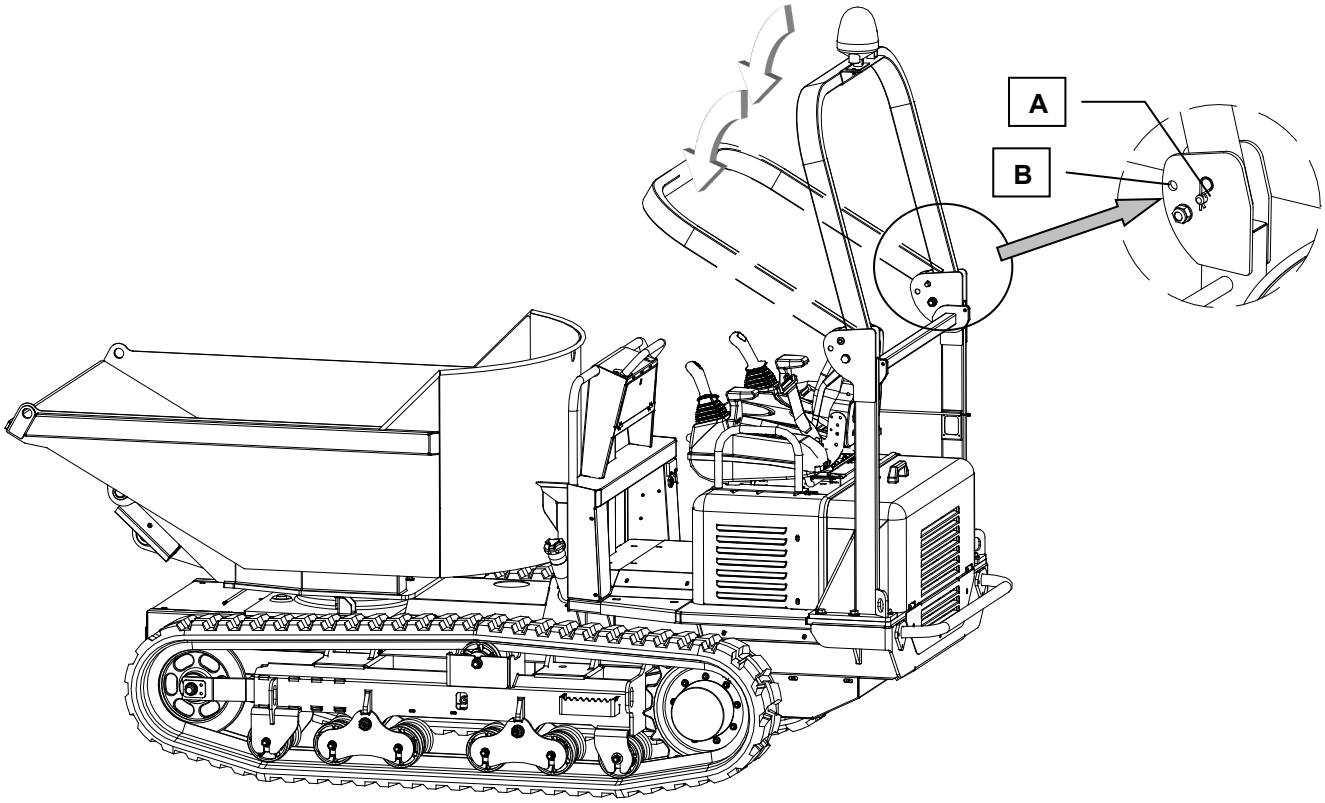
It is recommended to close the fuel valve every time the vehicle is transported or handled in order to prevent causing harm or damage.

3.6. OPERATOR'S CANOPY TILTING

In some special cases, such as low passages, under bridge driving or lorry loading / unloading phases, it could be necessary to tilt the operator's canopy of the machine.

It is necessary to act as indicated below:

Remove the elastic plug and the metallic pin **(Ref. A)** from both the operator's canopy pillar.



Tilt the canopy until it reaches the horizontal position. Re-insert the metallic pin and the elastic plug in the hole to keep the canopy blocked (**Ref. B**).

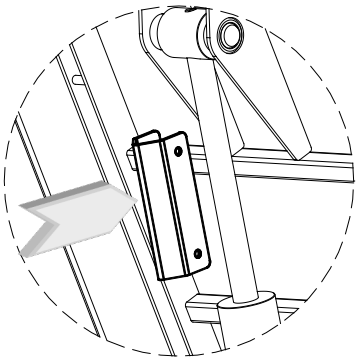
The operator's canopy can be lowered only to make the loading / unloading, the transportation and the passages in low places easier. It is strictly forbidden, to use the machine for the normal job with the tilted canopy since this condition does not respect the minimum standards required by the safety norms.

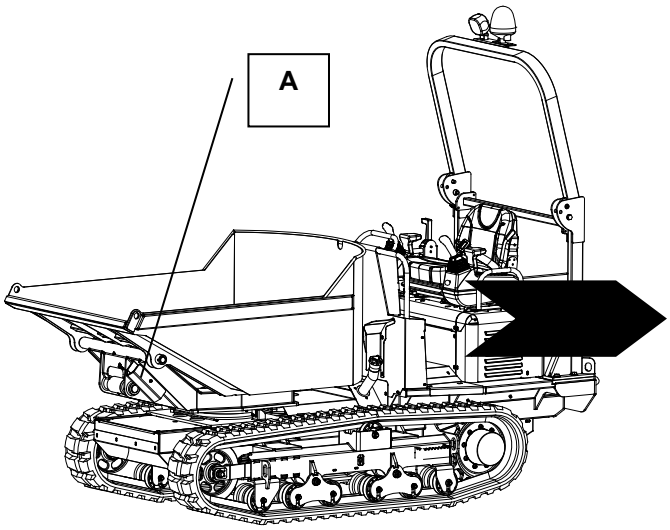
3.7. SAFETY LOCK FOR OPERATIONS ON THE MACHINE WITH RAISED BODY

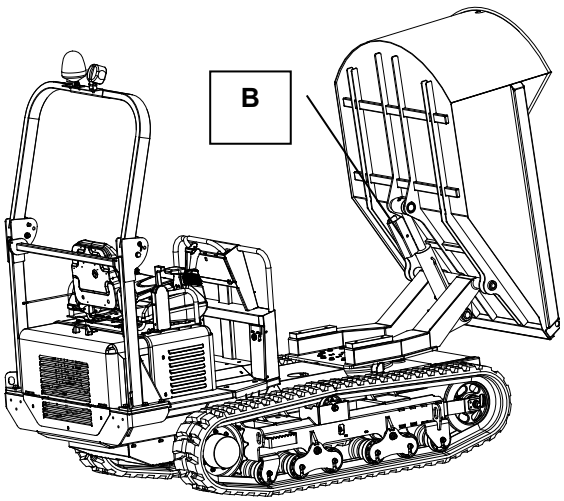
DANGER ZONE!:

Given its functional characteristics, the machine has some pinch points (descent of the body onto the frame, track) and some shearing points (lowering the skip on the operator's canopy). For this reason, particular care must be taken during these movements. Never insert arms or body parts inside these areas.

For the maintenance**, the lifted skip has to be blocked** by inserting **to the relevant cylinder (Ref. B)** its **safety item** which is supplied with the machine **(Ref. A):** remove the safety wedge by tearing the two metallic pins and the two elastic plug off and put on the body lifting ram and then always re-locate the pins and the plugs. Before parking the machine, always low the vessel on the chassis to avoid treading and shearing dangers. Such operation is needed to grant the safety of the operator or the mechanic, during maintenance or service.

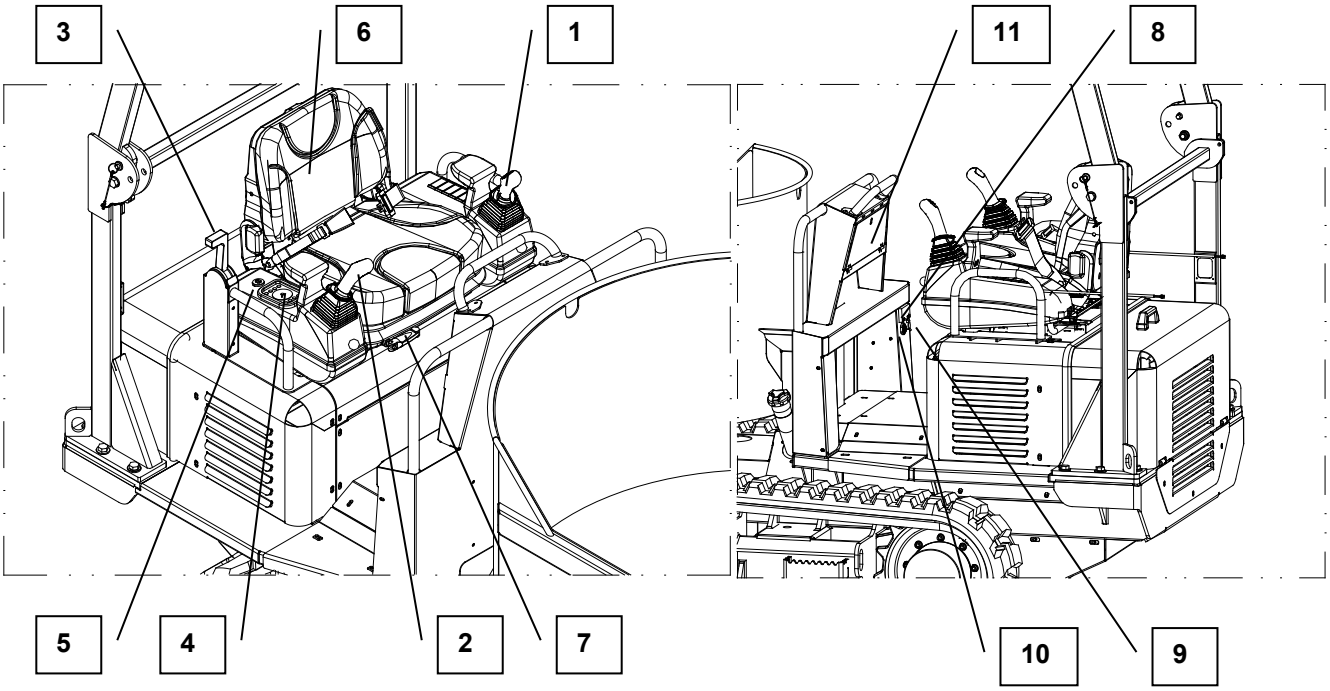






4. DRIVING POSITION – CONTROLS

4.1. VEHICLE CONTROLS



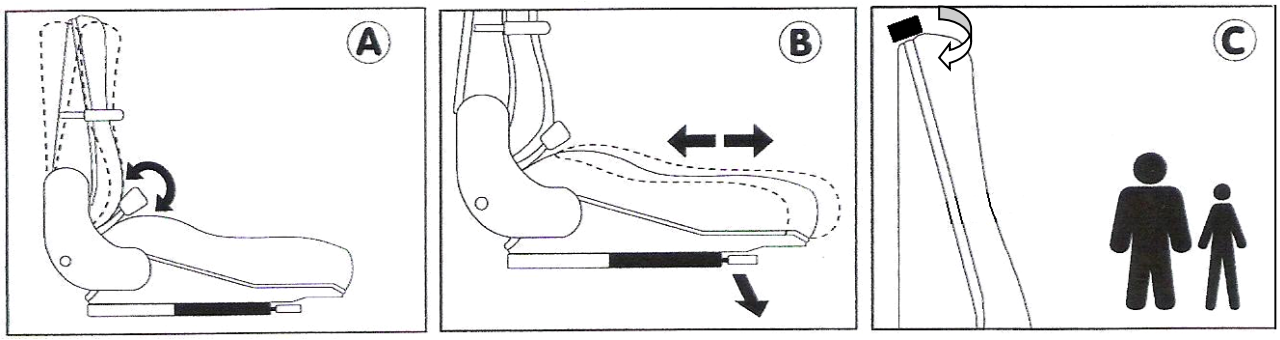
1 –LEFT JOYSTICK ***(TRACKS DRIVING controls)***
2 – RIGHT JOYSTICK ***(SKIP and accessories controls)***
3 – THROTTLE LEVER
4 – DASHBOARD
5 – IGNITION KEY
6 – OPERATOR'S SEAT
7 – LEVA REGOLAZIONE POSIZIONE SEDILE
8 – FUSE BOX
9 – 12 V SINGLE POLE SOCKET
10 – WARNING
11 – GLOVE COMPARTMENT

Comply with the following to operate the various controls.

4.2. OPERATOR'S SEAT

The driver's seat must **not** be adjusted while the vehicle is moving. Danger of accidents!
Always fasten the seatbelts.
The driver's seat is important for good health. Therefore, it must be maintained in a good state with the appropriate maintenance. The driver's seat is shock-absorbing.
3 types of adjustment may be made:

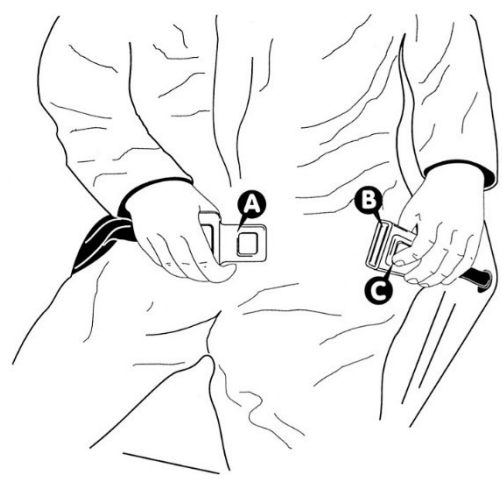
A – Back inclination adjustment.
B – Longitudinal adjustment of seat only.
C – Weight adjustment.



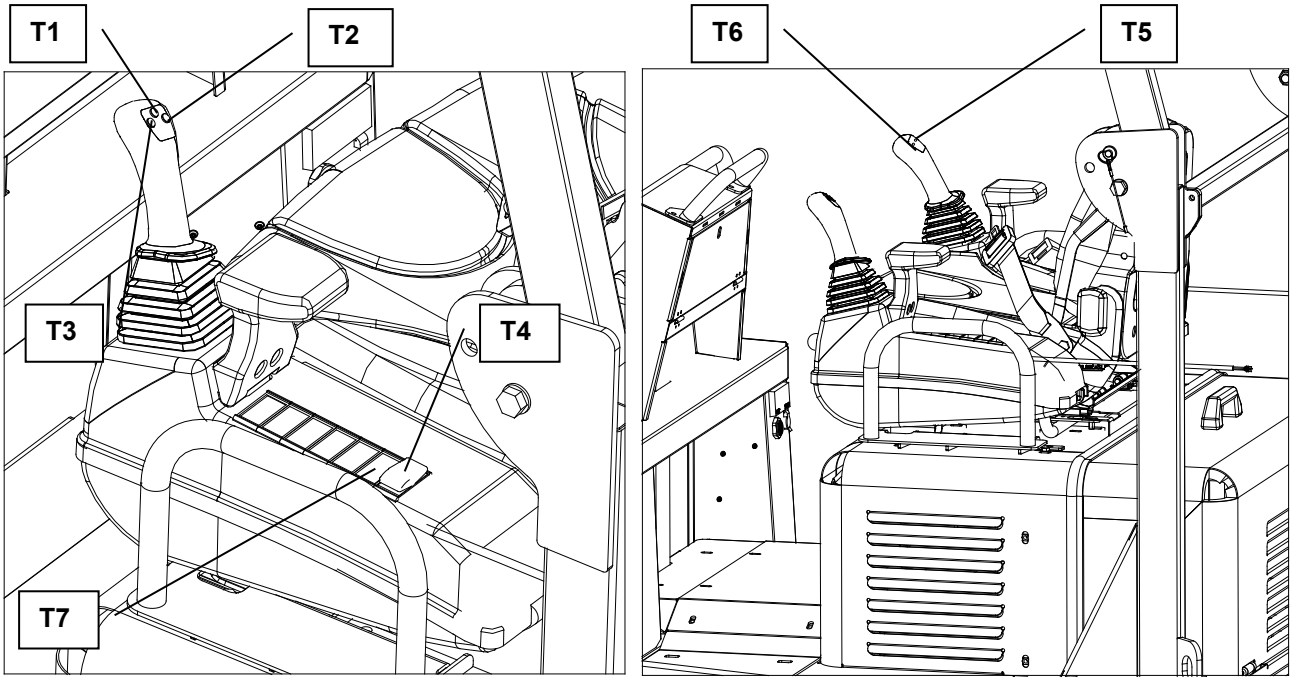
4.3. SAFETY BELTS

FASTENING:
Sit properly in the driver's seat, adjust the belt length, check that it is not twisted, then insert the clip **A** into the housing **B** until locked.

UNFASTENING:
Press the button **C** and remove the belt from the fixed part placing it to the right of the driver.



4.4. CONTROL AND AUXILIARY INSTRUMENTS



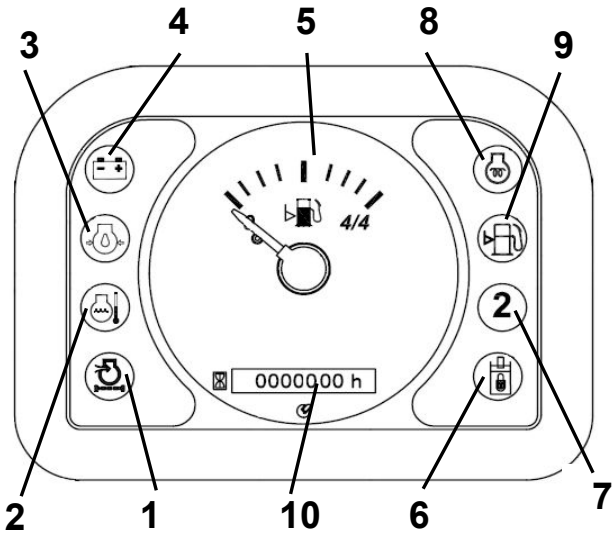
T1 – HORN
T2 – SECOND SPEED (ON / OFF)
T3 – FREE
T4 – RELEASE PARKING BRAKE
T5 – SELECTOR SHOVEL / SKIP TIPPING FUNCTIONS (*)
T6 – FREE
T7 – WARNING LIGHT LOADING SHOVEL ENABLING ACTUATION (*)

(*) *option*

1) AIR FILTER CLOGGED INDICATOR
When the indicator is on, it signals inefficiency of the suction system - filter cartridge clogged.

2) ENGINE COOLING LIQUID TEMPERATURE INDICATOR
The light switches on to indicate any faults with the diesel engine's cooling system. Stop immediately.

3) ENGINE OIL PRESSURE INDICATOR
When this indicator comes on, it signals malfunctioning in the diesel engine lubrication system - insufficient pressure or lack of oil. Immediately stop and identify the cause.



4) GENERATOR LIGHT
OFF: during normal operation (it switches off after engine start-up).
ON: indicates a fault with the battery recharging system.

5) FUEL LEVEL INDICATOR.
This indicates the amount of fuel (gas oil) in the tank. The red zone indicates a low level of fuel, so if the arrow points to this zone you should re-fuel as soon as possible.

6) ARM-REST POSITION SAFETY INDICATOR
This indicates that the left-hand arm-rest has been lifted up and therefore all arm-rest and travel controls are blocked.

7) SECOND SPEED INDICATOR
This indicates that the second travel speed switch has been pressed.

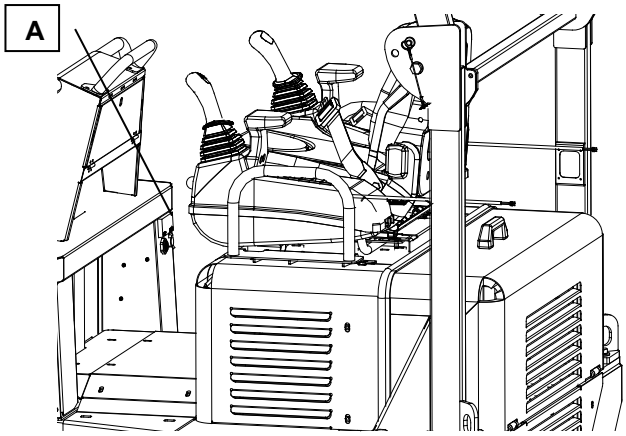
8) GLOW PLUGS PRE-HEATING INDICATOR
The indicator comes on after turning the key in the ignition switch clockwise. When it goes off, start by using the methods described in the relevant chapter.

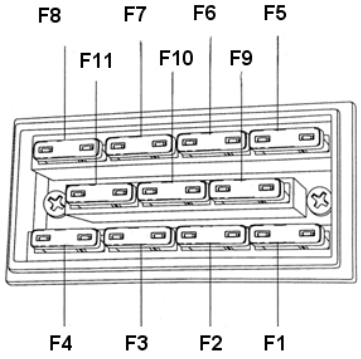
9) (RESERVE) FUEL INDICATOR
This switches on to indicate low level of fuel in the tank. Re-fuel as soon as possible.

10) HOUR COUNTER
Signals the progressive working time. Functions with the engine running.

4.5. FUSE BOX

The fuse box **(Ref.A)** has easy access as it is located in the driving position in front of the operator's seat.





FUSES

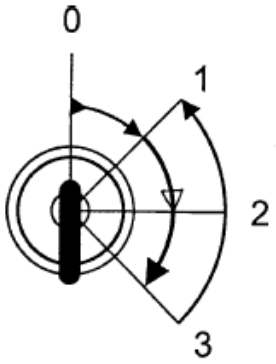
REF.	DEVICE	CAPACITY
F1	12 V single-pole socket	10 A
F2	Light switch	15 A
F3	Arm-rest micro-switch	5 A
F4	Second speed switch	7.5 A
F5	Optional 1	7.5 A
F6	Electro-stop	5 A
F7	Optional 2	7.5 A
F8	Rotating beacon	10 A
F9	Instrument panel illumination	3 A
F10	Generator excitation system	5 A
F11	Horn relay	7.5 A

On the other hand, the fuses for the general feeder, alternator and sparkles glowing are located under the engine bonnet as shown in the picture below.

REF.	DEVICE	CAPACITY
X17	Diesel engine sparkles glow	40 A
X19	General feeder	60 A
X20	Alternator	50 A

4.6. STARTING

Instructions on how to start up the vehicle:



a – Insert the key in the ignition switch **(pos. 5 pag.24)** and turn clockwise to position **"1"** (to switch on the dashboard).
b – Move the throttle lever **(pos. 3 pag. 24)** to the middle of the stroke.
c – Continue turning the key to position **"2"** and hold for approx ***13-15*** seconds until the plug pre-heating indicator on the verification and control instrument switches off **(pos. 8 pag. 24)**.
d – Turn the key to position **"3"** to fully start up the engine.
e – The key automatically returns to position **"1"** when the engine has started up**.**
f – If the engine does not start up, return the key to position **"0"** and repeat the entire procedure.

Follow the above instructions and the ones given below to ensure proper start-up.

After starting the engine, shift the accelerator lever **"A"** to a minimum speed slow enough to avoid sudden acceleration. Keep in this position until the hydraulic system reaches working temperature (*approx 5 to 10 minutes, depending on atmospheric and meteorological conditions*).

Do not allow unauthorised persons to drive the machine. Remember that the responsibility for the machine lies with the person who has received it.

If you are in any way unsure about how to operate the vehicle and have to carry out vehicle operations you are not familiar with, it is recommended to practise in a large, open area.

As far as the machine driving is concerned follow the instructions below taken into account the frontal side of the transporter.

WARNING!
ENGINE REQUIRES DIESEL

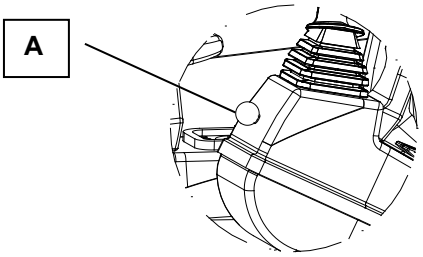
NEVER PROLONG START UP

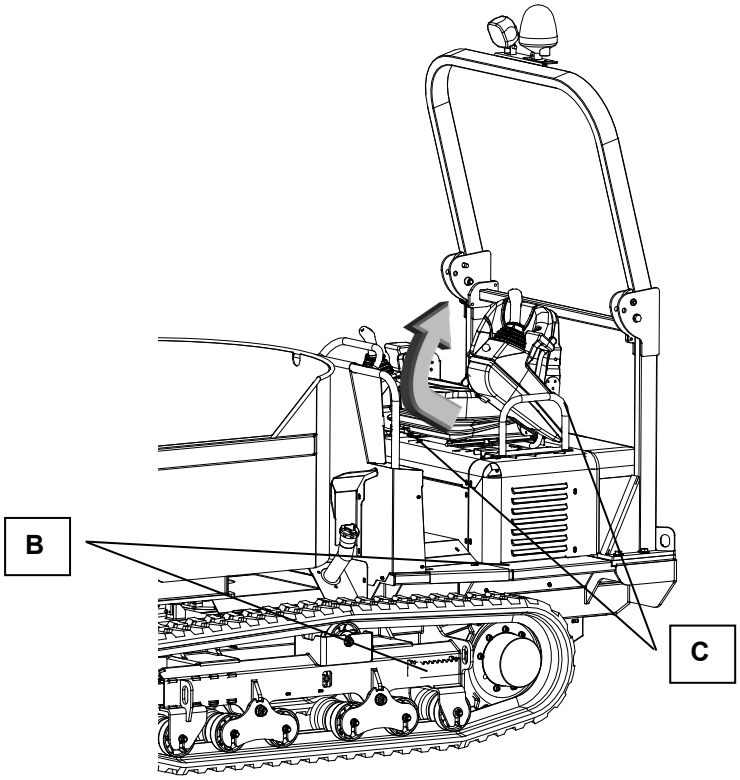
4.7. STOPPING

To stop the engine it suffices to turn the key anticlockwise.It is advisable to idle the engine for a few minutes before stopping the machine. Remove the key whenever leaving the driver's seat. Never leave the machine running and unattended and always close the protective cap in order to avoid water infiltration and humidity that may damage the electrical system of the machine.

4.8. SERVOCONTROL EXCLUSION

To enter the driver's seat, always lift the machine external armrest, in accordance with the seat position, by using the relevant handle **(Ref. A)**. Such manoeuvre further to help the get on and get off from the machine exclude both the joysticks hydraulic system, blocking all the movements of the tracked transporter. This prevents the involuntary actuation of the primary mechanisms of the machine.





Use the relevant climbing steps **(Ref. B)** and the hand bar **(Ref. C)** to easily get on. Do not cling to the joysticks, to avoid any damages.

You must leave the joystick housing upright even if you're only leaving the vehicle for a few seconds. You have to lower the joystick housing to re-start work as it enables all the machine controls..

Every time the machine has started and every time one of the joysticks has lifted, actuating the controls block, it is necessary to reset all the functions by pushing the relevant button on the left armrest **(pag. 26)**.

Always close the hood after removing the key from the ignition switch.
Ensure the hood is properly in place before cleaning the vehicle, especially when using high pressure jets.

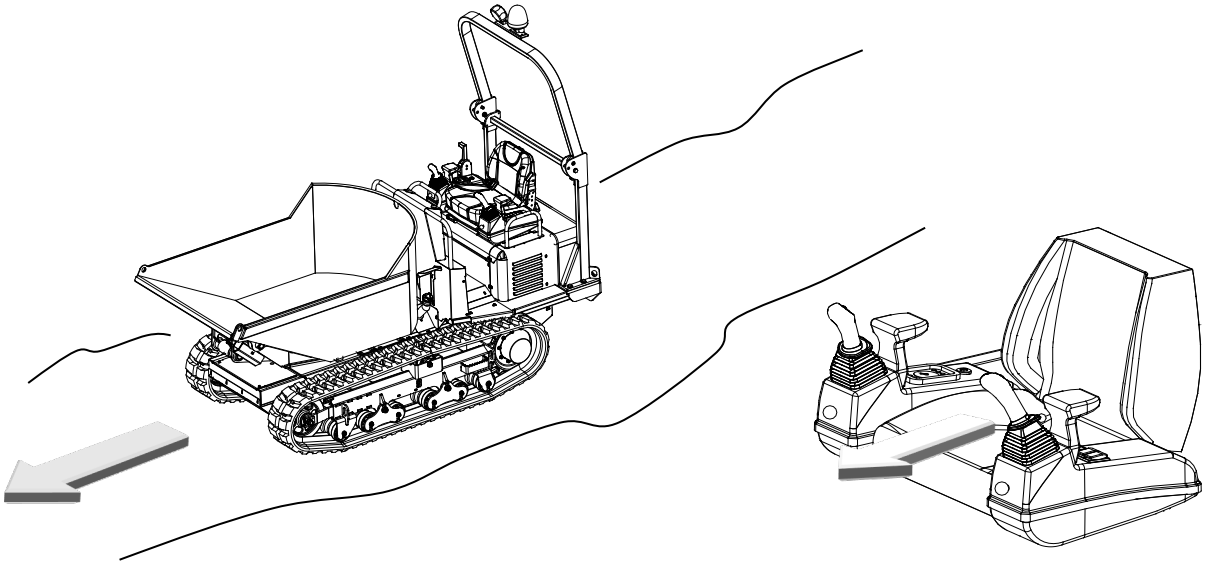
Do not direct jets of water or steam directly at the dashboard.

4.9. DRIVING

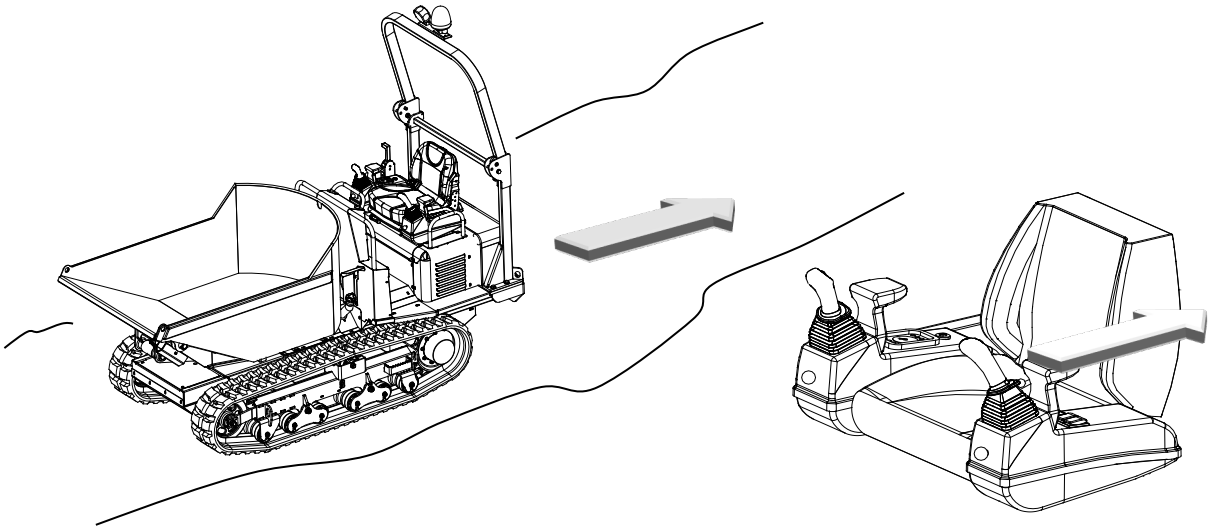
The driving of the tracked transporter is servo-controlled type and got by using the left joystick **(pos. 1 pag. 24)**.

The manoeuvres to drive forward, backward and steering are shown below. Any joystick position means a different movement of the machine.
Before actuating the controls, unable the block of the parking negative brakes, by pressing the relevant button on the left joystick.

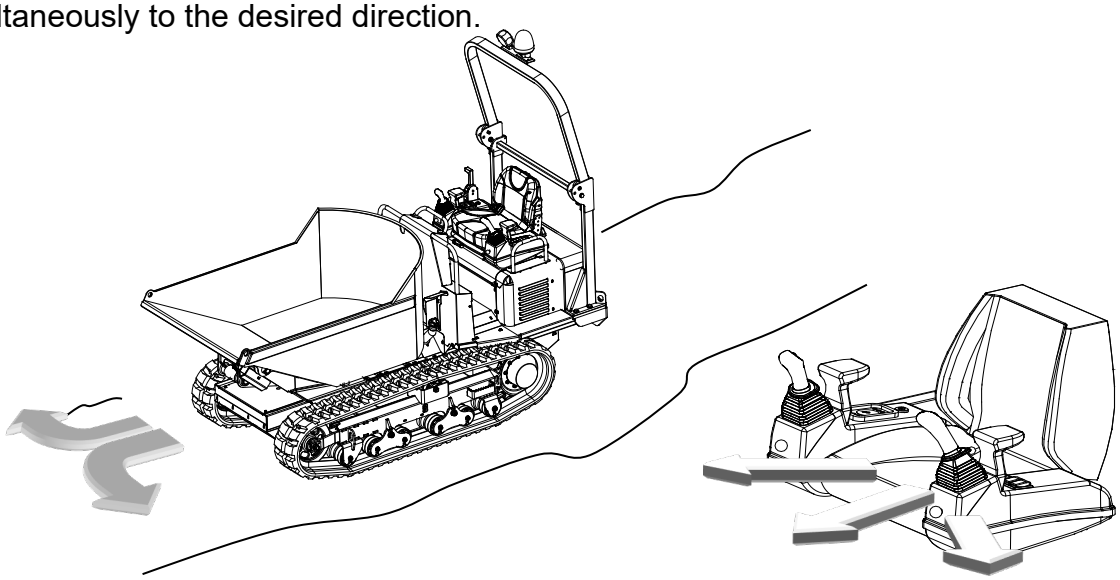
FORWARD DRIVING: move the left joystick forward.



BACKWARD DRIVING: move the left joystick backward.

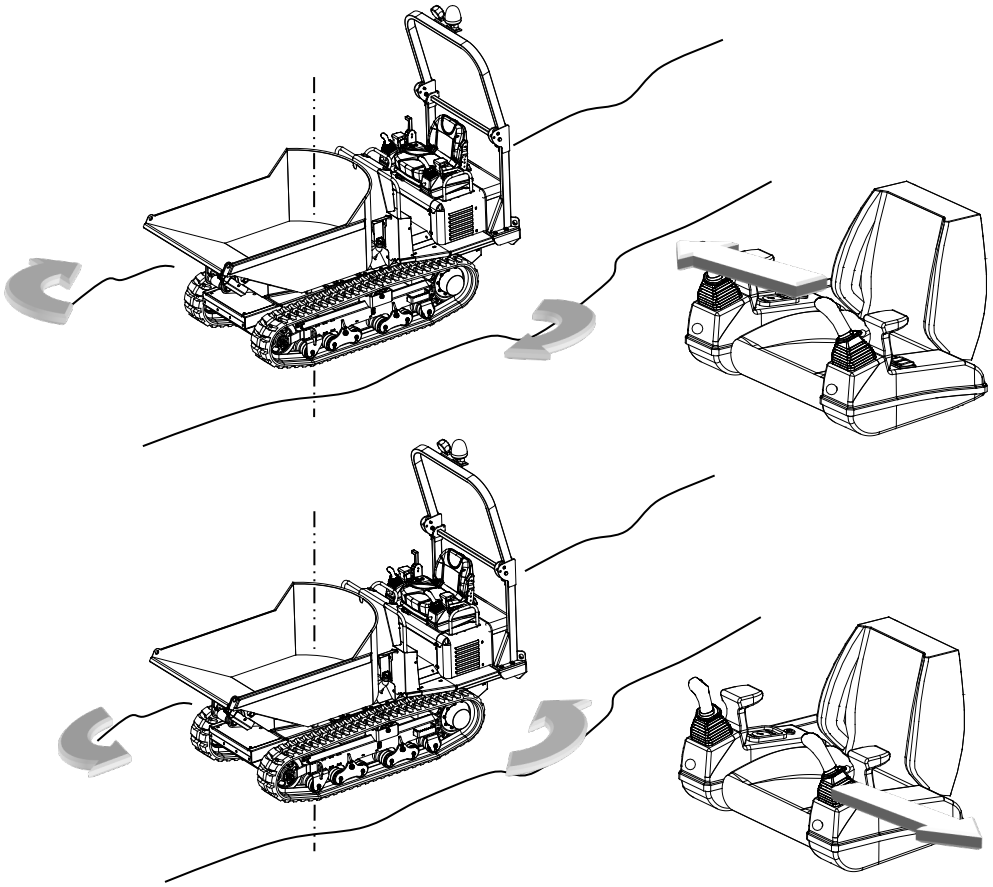


GRADUAL STEERING IN FORWARD DRIVING: move the left joystick forward and simultaneously to the desired direction.



The same instructions are valid for the steering but in backward direction.

COUNTER-STEERING. It means to rotate the machine on its centre by the inverted steering of the two tracks. To contra-rotate, it is sufficient to move the left joystick completely to right or left according to the desired direction of the counter-steering.



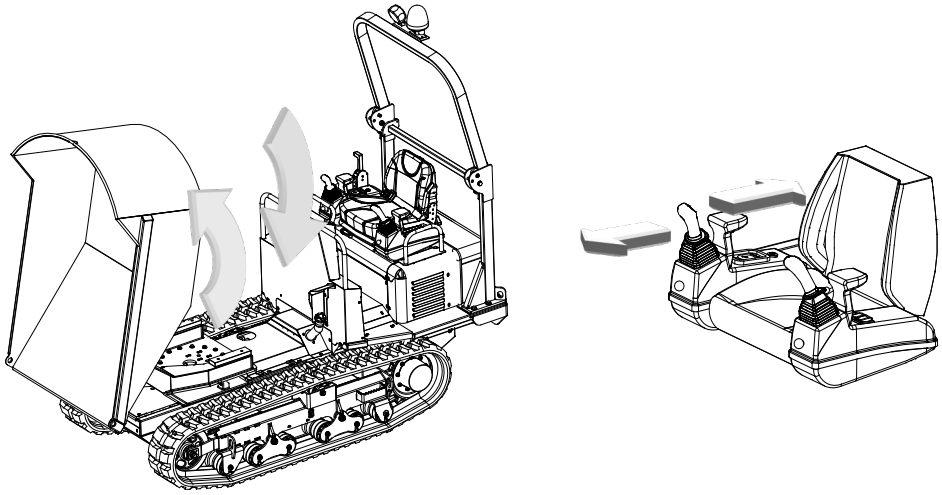
ALL STEERING AND DRIVING DIRECTION CORRECTION MANEUVERS MUST BE PERFORMED SLOWLY AND WITH CAUTION.

4.10. ACCESSORIES AND SERVICES

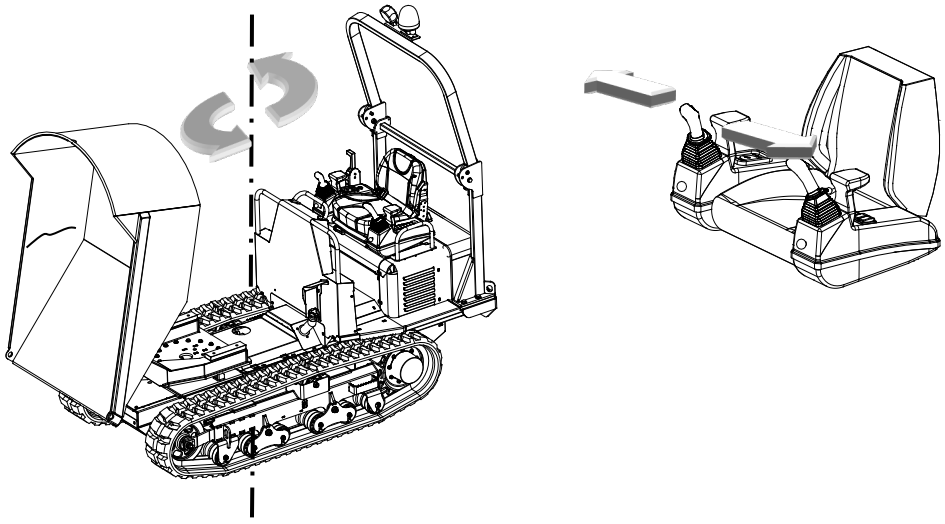
The skip (as well as other, future accessories) movements and the utilities of the tracked transporter are completely servo actuated and controlled by the right joystick **(pos. 2 pag.24)**.

The details of the right joystick and relevant skip manoeuvring are shown below.

VESSEL TIPPING: the hydraulic cylinder to raise/low the skip is actuated by moving “forward/backward” the right joystick”.

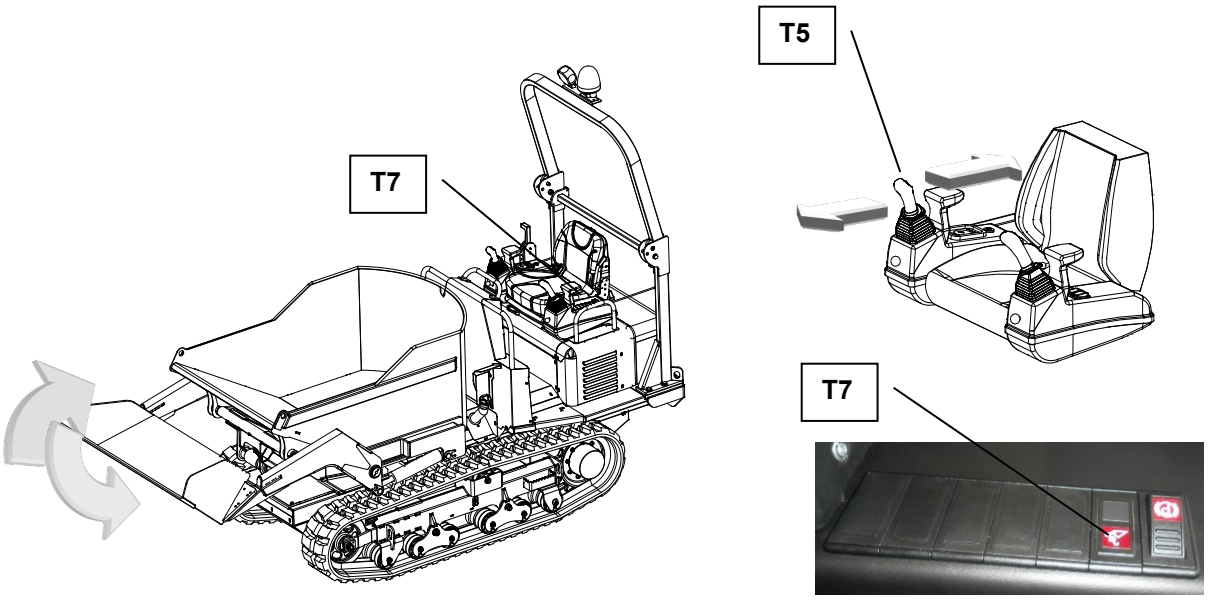


VESSEL SWIVELLING: the loading body of the machine can rotate of 180° around its vertical axe. To swivel the skip, the right joystick has to be moved towards right or left in accordance with the direction required for the handled material discharge.



SELF-LOADING SHOVEL (OPTION)**:** further than being used to tip the skip, the right Joystick can be used also to raise or lower the loading shovel (backward and forward movements directions respectively).

To commutate the control and activate the shovel by the joystick, it is necessary to press the **"T5"** button on the right hand manipulator. A special warning light **"T7"** on the left armrest indicates the activation of the shovel controls. Press the **"T5"** button again to commutate again and re-actuate the skip tipping controls.



To prevent incorrect maneuvering that could provoke danger to the operator's safety or damages, the machine has been equipped with special safety devices.

- The raising and the lowering of the loading shovel is enabled only when the vessel is in the central position.
- Skip swivel and tipping is possible only if the shovel is in the raised up position.
- When the safety devise have blocked the movements of the skip or the shovel, it is sufficient to bring them back to the safe standard positions and restart to work normally and properly.

WARNING!

Use the joysticks carefully to avoid endangering surrounding people and property.

To ensure good machine performance for a long time, never use excessive force on the transmission and never overload the endothermic engine.

4.1. STARTING UP AND STOPPING THE ENGINE

The diesel engine powers the transporter.
For more details, see the user's manual for the engine installed in the machine.

Before starting up the engine, check that the machine is in perfect condition and, in particular, check the following:

- Check that all fluids are up to level (engine oil, hydraulic oil and fuel).
- Check that there is no carryover of liquid from the fuel feed circuit and hydraulic oil circuit or from other elements in an oil bath.
- Check that none of the hydraulic hoses are damaged, worn or burnt.
- Check that there are no foreign bodies in the tracks and other machine parts.
- Check that the degree of wear on the tracks permits use of the machine.
- Check that none of the sheaths on the electrical cables are damaged or worn and that none of the cables are burnt.
- Moving the machine control joysticks, check that there is no gripping or seizing of the various tools.

If one of the above controls gives a negative result, eliminate the problem and repair the element, working independently if the operations involved are covered in this manual. If not, contact an authorized assistance point to perform any other operations.

Before starting up the engine, set the accelerator lever at its midpoint.

Once the engine has been started up, let it idle for approximately 1 minute so that the oil can reach all lubrication points and that the hydraulic oil powers the various users. For the following 5 or 10 minutes, operate accelerating slowly. Only after this time has elapsed is the machine ready for full operation.

N. B. The engines are built to operate even if they are exposed to the weather. Nevertheless, in order to prevent rapid oxidation of ferrous parts (conveyors, flywheels, self-winding spring, etc.), if the machine is to remain unused for long periods of time (a few hours) in the rain or snow, it is advisable to protect the engine with a tarpaulin and remove it before starting to work.

For details on the operations required to start-up and shutdown the engine, see the following pages.

WARNING!
ENGINE REQUIRES DIESEL

5. GENERAL MAINTENANCE

A maintenance operation is such only if carried out by qualified personnel in the way and with the methods indicated. To facilitate inspection the machine is equipped with an hour counter located on the dashboard, which records the hours of operation and thus work.

Only with perfect maintenance can the machine be maintained in perfect condition allowing to work well and in safety.

Always ensure, before working on the machine, that all the appropriate precautions have been taken to guarantee that the person(s) carrying out the maintenance, repair, etc. may work in total safety.

All cleaning operations must be carried out with the engine cold using, where possible, a jet of pressurised water. Do not use solvents or similar substances to prevent damaging the guards, gaskets, etc., and the paintwork.

All inspection and checking operations of the hydraulic system must be carried out with the oil at operating temperature (around 60º C).

Do not dispose of the oil and other liquids leaked during the maintenance operation in the environment. Collect it and send it to an authorised waste disposal. It is advisable to equip an area dedicated to maintenance operations, protecting it from dripping deriving from any drawing of hydraulic tubes, connections, joints.

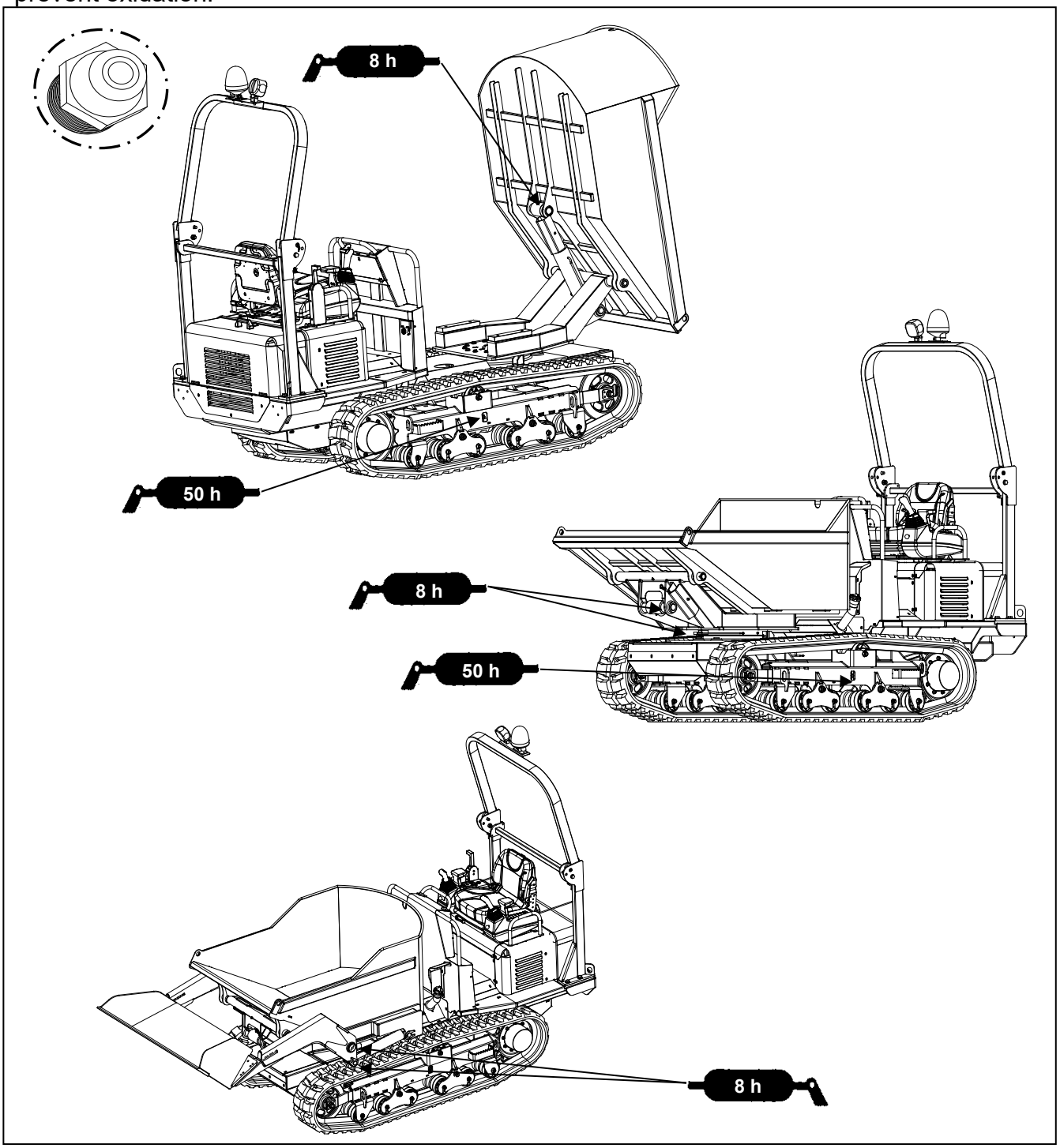
5.1. GREASE POINTS

Periodically grease the shown points. The suggested service period and the relevant lubricants are listed in the table below.

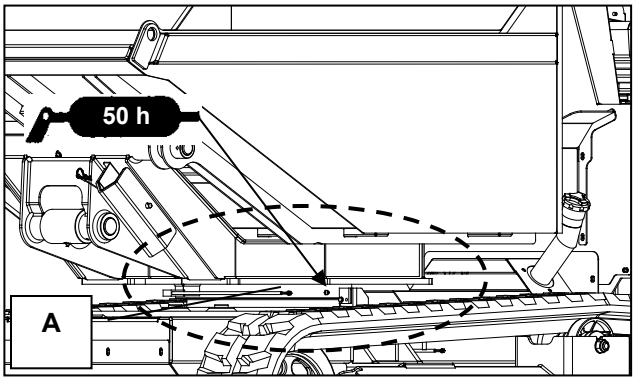
Always keep the lubricators clean and efficient, and replace them when they are worn or damaged.

Careful, constant greasing of the machine ensures perfect efficiency and safety.

Also grease all those parts that are exposed to the weather and that require protection to prevent oxidation.

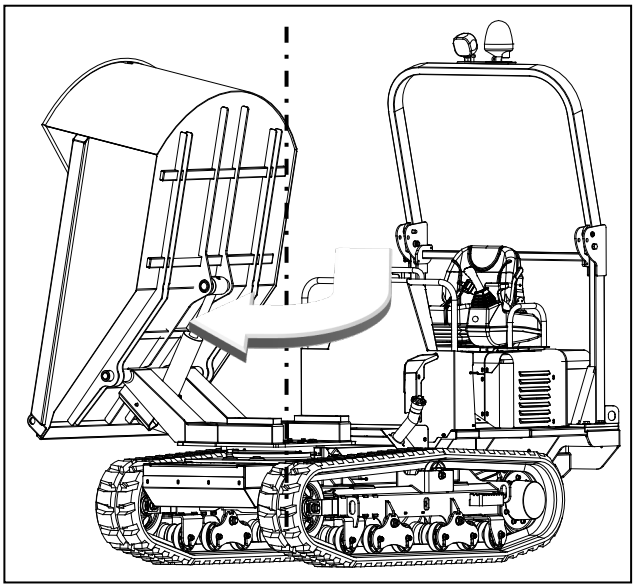


5.2. GREASING THE SLEWING RING

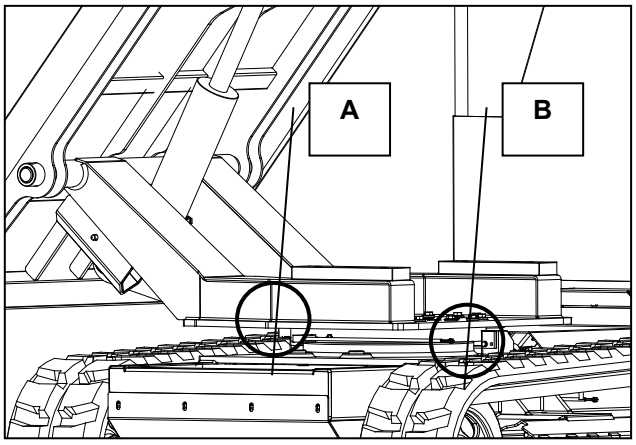


The **TC230d** slewing ring **"A"** that rotates the loading bucket must be regularly greased (*every 50 h*) to maintain optimal conditions of use.

Follow the steps below for the complete greasing procedure.

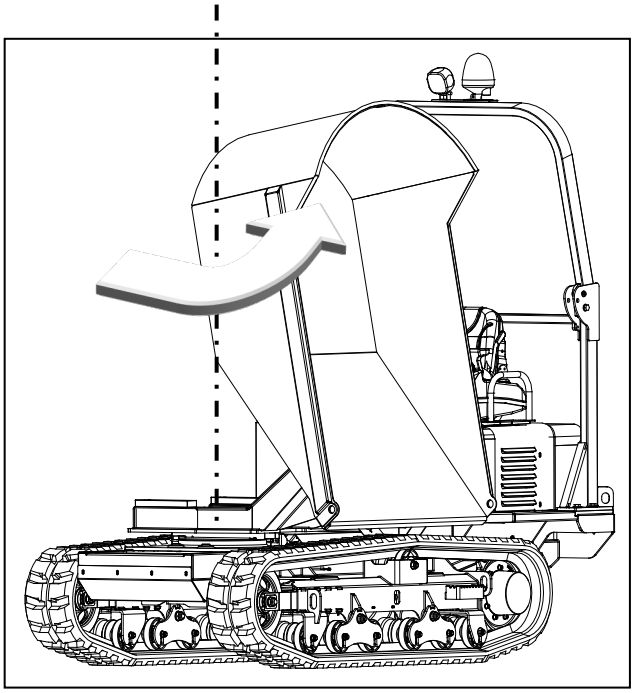


- Tilt the loading bucket, insert the safety hook (refer to *sec. 3.7*) and turn the bucket completely to the right as shown in the figure at the side.

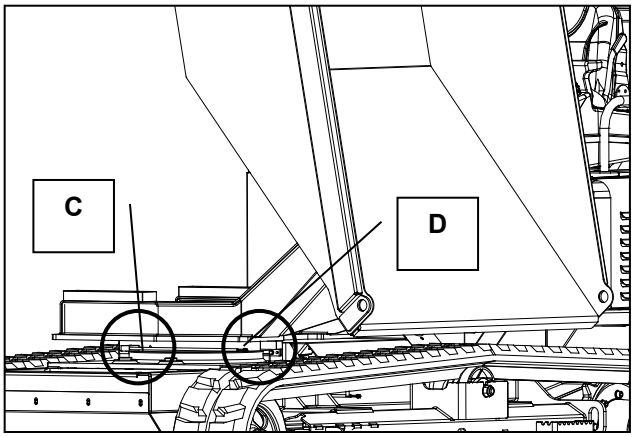


- Grease the rotation slewing ring through the 2 greasing points **"A"** and **"B"**, making sure to apply more grease to the front left point **"B"**.

- Turn the loading bucket completely to the left as shown in the figure at the side.



- Grease the rotation slewing ring through the 2 greasing points **“C”** and **“D”**, making sure to apply more grease to the front right point **“C”**.

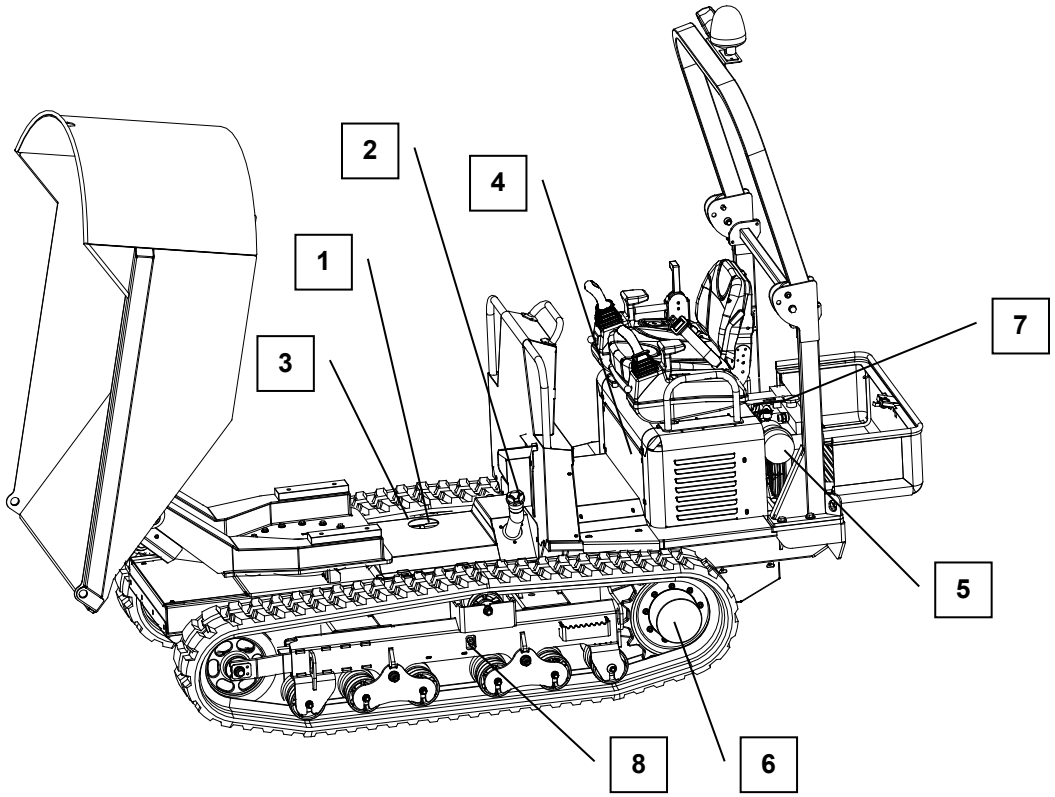


- Repeat the greasing procedure again and lastly turn the bucket completely, several times, on both sides so as to distribute the grease evenly over the entire surface of the slewing ring.

Repeat the greasing procedure on the slewing ring every **50 hours** of vehicle operation.

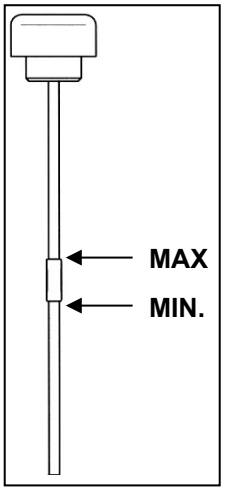
5.3. CHECKS AND CONTROLS

Pay particular attention to the items indicated below:



1 – HYDRAULIC OIL TANK FILLER CAP
2 – FUEL FILLER CAP
3 – HYDRAULIC OIL SUCTION FILTER
4 – HYDRAULIC OIL RETURN FILTER
5 – AIR FILTER
6 – REDUCTION GEAR
7 – COOLER
8 – IDLER

1 – HYDRAULIC OIL FILLER CAP



A complete change consists of **20,5 l;** the type is indicated in the relative table of lubricants.
Change the oil after the first **200 HOURS** of operation and then every **1000 HOURS** or once a year.

When filling or topping-up, check that the oil is between the min. and max. indications on the dipstick that forms part of the cap. It must be checked with the bucket raised (extended cylinder) and the vehicle level.

IT MUST ALWAYS BE KEPT BETWEEN THE MINIMUM AND MAXIMUM LEVELS

Do not overfill the tank as it also acts as a container for the oil expansion while the vehicle is used.

2 – FUEL FILLER CAP

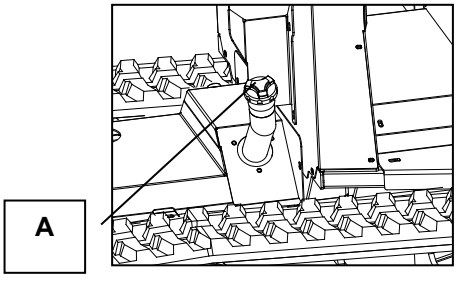
The fuel tank is located in the machine front side.
The refilling cap **"A"** can be easily found on the top of fuel tank, identified by a decal. The level gauge is on the dashboard.

It is advisable not to fully empty the tank as this lets air into the fuel supply system. Should this happen, however, the system must be cleaned; otherwise the Diesel engine may not start up even with a full tank.

Fill up the tank using a funnel with a super-fine mesh metal filter to prevent solid impurities in the fuel from entering the injection system and causing faults.

For the refuelling it is recommended to fill the tank until ¾ to the overflow in order to leave room (about ¼) for fuel expansion inside the tank.

WARNING! : ENGINE REQUIRES DIESEL
Tank capacity: **26 l**.
Duration: **approx 8 hours**

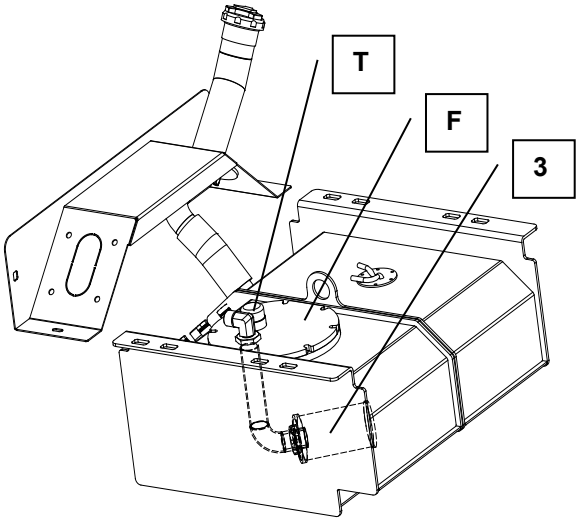


3 – HYDRAULIC OIL SUCTION FILTER

The hydraulic oil suction filter is located inside the oil tank.

Capacity: **45 lt/min**
Filtering level: **60 micron**

The filter has to be replaced whenever the hydraulic oil is changed.
Completely empty the oil tank by the mean of the discharge cap located in the bottom of the tank, using a proportioned container (approx 45 l). Unscrew the flange **(Ref. F),** raise it and replace the filter **(Ref. 3)** with a new one with the same filtering characteristics.
Relocate the flange, checking to correctly put the gasket in its seat. The operation can be made simpler, using some grease.
Remove the cap and refill the tank up to the right level with new oil of the same type, like suggested by the manufacturer; close the cap **(Ref. T)**.



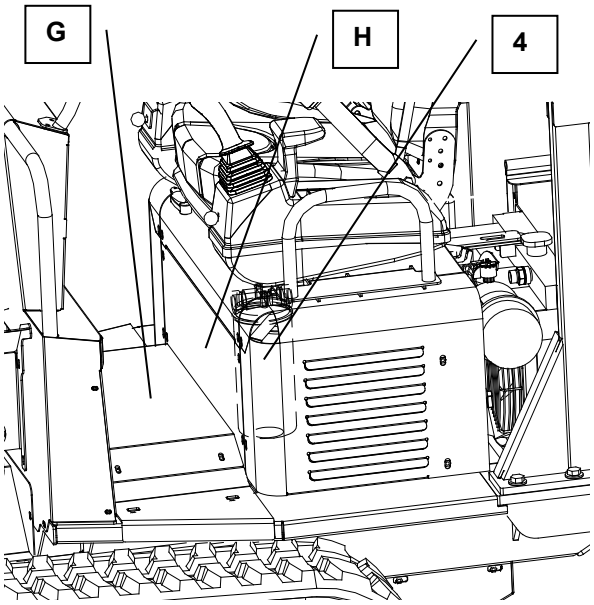
4 – HYDRAULIC OIL RETURN FILTER

The return filter **(Ref. 4)** is located under the operator's seat.

Capacity: **60 l/min**
Filtering level: **10 micron**

For an appropriate maintenance of the machine, the discharge filter has to be replaced every **250 working hours**.

For the substitution, remove the plates **"G"** and the cap **"H",** unscrew the filter from the support and change with a new one with teh same features.



5 – AIR FILTER

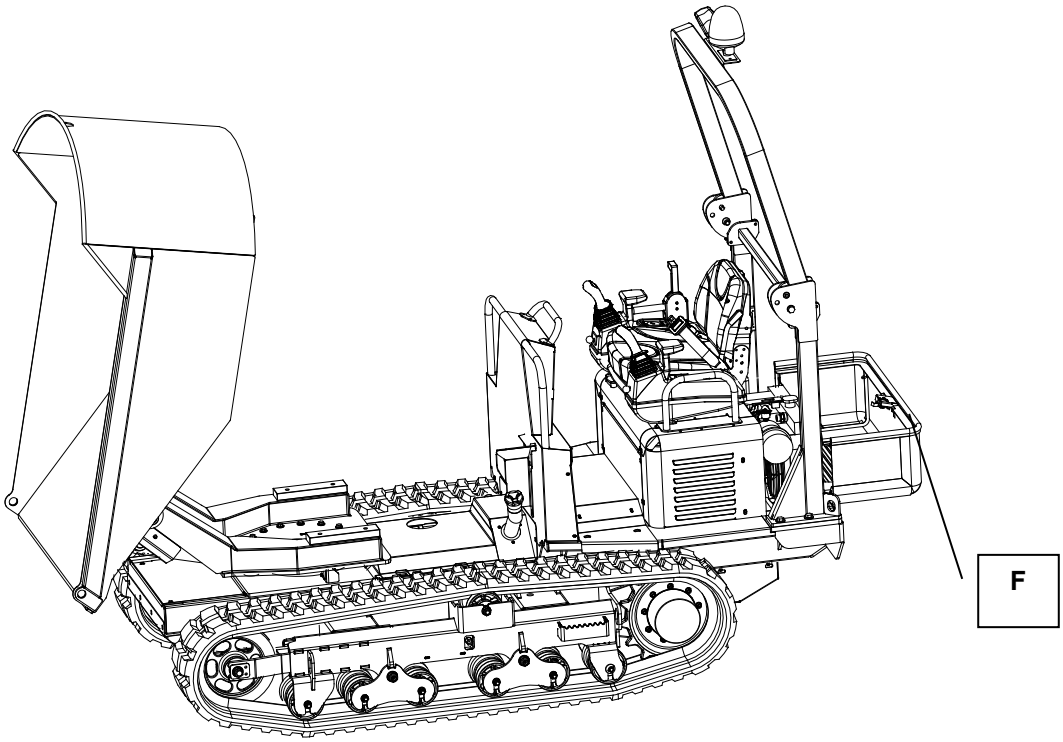
The air filter **"F"** is located under the engine bonnet.

To clean the cartridge, it is sufficient to remove the top cover, remove the cartridge and clean with compressed air. Do not use solvents, brushes or rags to prevent damage to the cartridge.

The air filter should be replaced with another one having the same characteristics.

The filter should be cleaned every **50 hours** of operation and the replacement must be done every **200 hours**.

THE AIR FILTER CLEANING OPERATION MUST BE DONE ONLY WITH AIR PRESSURE, KEEPING PROPER DISTANCE FROM THE CARTRIDGE AS THE AIR JET MAY DAMAGE IT.



6 – WHEEL REDUCTION GEARS

Each track is driven by a reduction gear coupled to a hydrostatic motor. For inspection, filling and oil change in the wheel reduction gears, follow the instructions indicated and specified below:

Periodically check *(see maintenance table)* for leaks, and that with the machine off and the reduction gears positioned as previously illustrated, the oil is at the required level. If necessary, top up.

When a top-up of more than 10% of the total quantity is required, it may be an indication of reduction gear leaks.

The first oil change must be carried out after the first **100 hours** of operation. Subsequent changes after **1000 hours or at least once a year**.

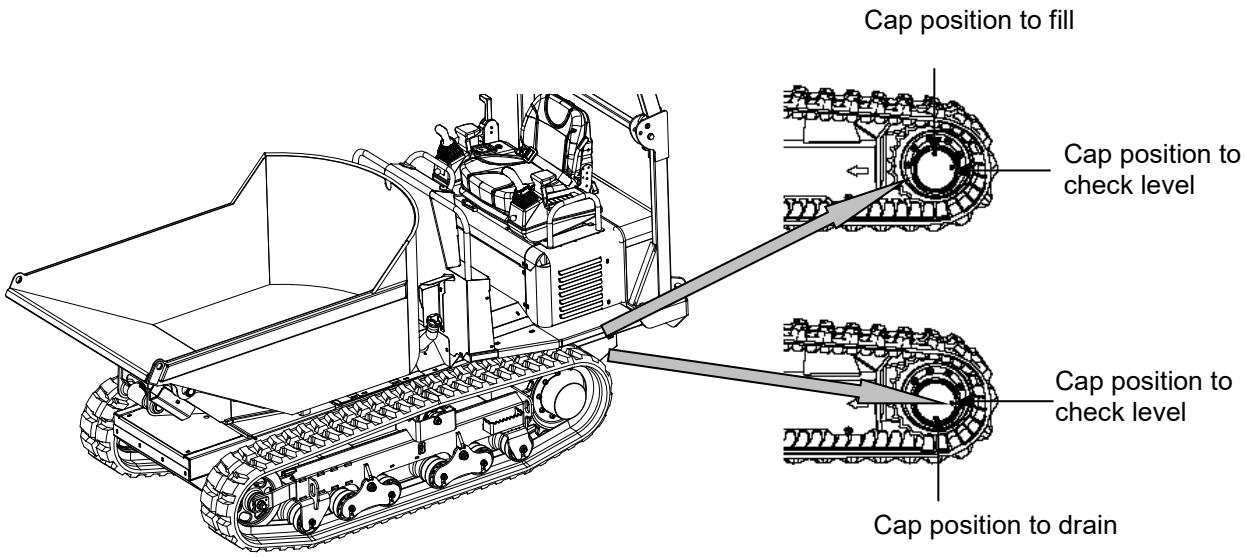
Capacity of each reduction gear: **0,6 l**
For the type of lubricant, refer to the lubrification table.

Emptying of the reduction gear must be carried out immediately after operation with the oil still hot to prevent depositing of impurities. Be extremely careful during emptying, since the hot oil may cause serious burns. Protect the hands. Clean the plug with liquid detergent, taking maximum care over cleanliness during the filling phase. Cleanliness is an essential component for good functioning of the machine, and the hydrostatic system in particular.

If on checking, the oil level in the reduction gear is found to be low, in the absence of external leaks, the gaskets inside the reduction gear must be overhauled. This must be carried out by an authorised service centre.

When checking the level and topping-up, filling, emptying, the machine must stand level and horizontal, and with the engine off. Place a container of adequate capacity under the drain plug to collect the oil.

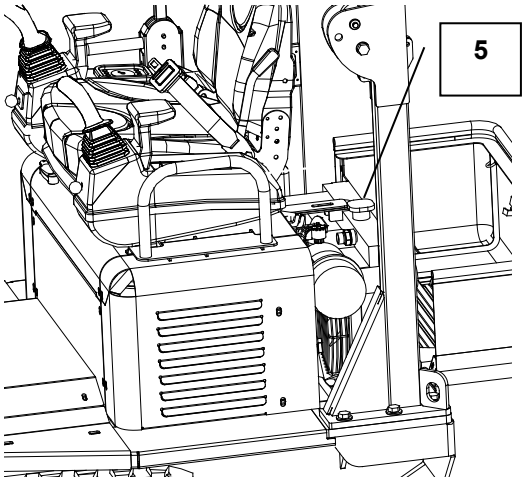
Do not dispose of the oil in the environment. Disposal must always be through authorised companies.



7 – DIESEL ENGINE COLLING SYSTEM

The cooler is located in the rear side of the machine, under the engine cover.

A special indicator on the dashboard signals inefficiency of the diesel engine cooling circuit.



The level is checked and topped up with the engine cold; should the refilling cap **(Ref. 5)** still be hot, use a protection glove or a cloth soaked in cold water.

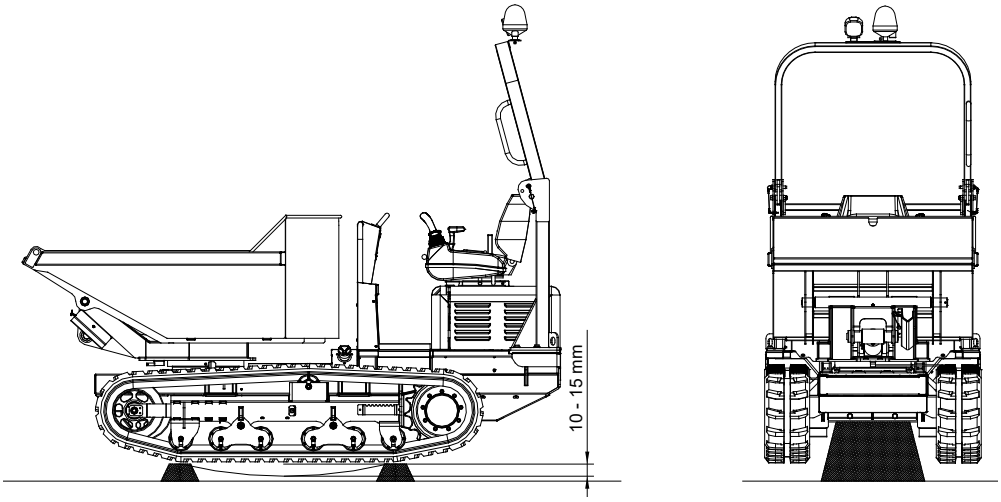
Cooling liquid quantity: **8 l**

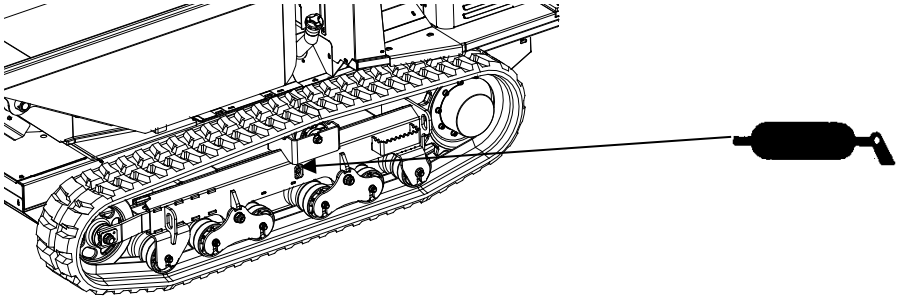
The cooling liquid refilling has to be done only in case of pipe failure (leakage).

8 – TRACK TENSION CHECKS AND ADJUSTMENT

This device is used to restore correct track tightness if they loosen during use. When operating with loose tracks, they tend to slip over the driving wheel teeth causing it to jump its housing or to work in precarious fashion, damaging and causing wear to the housing.
Never allow this situation to occur. To restore correct track tightness, proceed as follows:

Set the machine on a flat surface with compact ground, better on an asphalt or stone pavement. Lift the machine and set it on blocks or supports rated for the weight of the machine so that the tracks are approximately **100 mm** off the ground.
Measure the track midline vs. the horizontal line; the reading must not be more than **10 - 15 mm**.





If the distance is greater, proceed as follows:

- Get the greasing pump supplied along with the machine;
- Enter the end of the pipe of the pump in the relevant greasing point, as shown in the picture;
- Pump the grease in the track idler until the measure of 10 -15 mm has been got, as above mentioned;
- Repeat the operation for the other track.

Before proceeding, it is recommended to inspect the track and the various transmission elements, removing dirt and debris which may have deposited between the track and the driving wheel, idle wheel and support rollers, since they could alter the tension adjustment.

At this point, track tightness has been restored to the original tension found with new tracks Run the track blank for a few minutes so that it can settle in. With the track not running, check that the track tightness is correct. Then raise the machine and set it on the ground. It is now ready to use.

Once a day, clean all moving parts of the machine.

TRACK REPLACEMENT

To replace one or both tracks proceed as follows:

- Lift the machine using the methods previously described for track tension adjustment.
- Unscrew the greasing valve until the grease comes out, being careful to do not waste in the environment.
- Then, pull the track away and repeat the same instructions explained above but in backwards way and, in details, string the track on the front wheel checking the right position of the track on the rollers, grease until the idler is correctly tensioned; drive the tracks (free from the ground) to let them settle;
- Low the tracked transporter on the ground carefully.

USE OF THE MACHINE

In order to safeguard the integrity and functionality of the track, follow the recommendations and specifications below:

- Avoid sharp turns and frequent changes of direction while driving on the road, in particularly on rough, hard terrains full of sharp, uneven points with a high degree of friction**. DO NOT COUNTERSTEER**. To turn to the right and left, whether driving or at a standstill, only operate one track.

- Prevent the tracks from coming into contact with protrusions or sharp, cutting objects while driving.

- Prevent the tracks from coming into contact with oils, solvents, fuel or other corrosive materials. If they do, clean the substance away immediately and wash the tracks.

- Avoid extended use of the machine in marine or salty environments since this can cause the metal core to detach from the rubber.

- The basic characteristics of the rubber used to produce the tracks require that they be used at temperatures ranging from **– 25°C to + 55°C**.

Never leave the tracks exposed to the weather for extended periods of time: abrupt variations in climate can cause premature aging.

- Wear of the transmission wheels can cause abrasions or cause the metal core to come out of the track. Replace promptly when this occurs.

OPERATING ANOMALIES AND PROBLEMS

FAILURE OF THE TRACK STEEL CORDS
- Excessive tightening of the track plus use on gravel and loose material that can accumulate between the track and the carriage.
- Track jumping the guide wheels.
- Strong friction in cases of excessively frequent and rapid changes of direction.

WEAR OR BREAKAGE OF THE METAL CORES
- Excessive tightening of the tracks.
- Improper contact between the notched wheel and the track (notched wheel worn, debris wedged between tooth and track, etc.).
- Use on sandy terrain.

DETACHMENT OF METAL CORE FROM RUBBER
- Excessive abrasion between the internal side portions of the track and the guide rollers (excessively frequent and rapid steering and counter steering).
- Harpooning of the notched wheel, wear during rotation.

WARNING !
The above problems require immediate replacement of the damaged track.

ABRASIONS OR LACERATIONS DUE TO FATIGUE OR OUTSIDE FACTORS
- Generally these problems are caused both by the way the machine is used and the nature of the site where the unit is operating. These lacerations of the track can be reduced, but not eliminated, by attentive, responsible use of the machine and do not require immediate replacement of the track, even if it is reaching the end of its life span and it is time for it to be replaced. **It is best to replace the tracks also when the treads are reduced to approximately 2 - 5 mm.**
- Abrasions, lacerations, cuts on the outer surface of the track (the surface in contact with the terrain) are, in most cases, due to contact with sharp stones or cutting materials (sheet metal, glass, nails, brick chips, etc.) which can cut and partially or completely remove parts of the track. Obviously, because of the properties of the rubber, this is inevitable although it depends on the specific use and operating conditions.

N.B.: the integrity of the rubber track and the speed with which it is worn depends mainly on the use and the way the machine is used.

9 – CHECKING TIGHTNESS OF NUTS AND BOLTS

Periodically check tightness of the main parts of the machine:

- Crawler wheel *(nuts and bolts class 12.9);*
- Guide rollers;
- Engine retaining supports;
- Engine vibration-damping;
- Full dash board unit.

The resistance class of the nuts and bolts not specifically indicated is **8.8**

To facilitate the fastening operations, the table on the side lists the driving torques according to the relevant dimension and class of resistance *(values expressed in daNm = Kgm)*.

METRIC THREAD		DRIVING TORQUE CLASS	
		8,8	**12,9**
M6	DaNm	1 – 1,2	
M8		2,3 – 2,5	
M10		4,8 – 5,2	8,5
M12		8 – 9	
M20 x 1,5		42 -44	

5.4. MACHINE STOPPING DUE TO INACTIVITY

When anticipating a long period of machine inactivity, it is recommended to place it under cover in a dry place.

Below follows some advice and precautions to take before shutting down the machine:

- Thoroughly clean and wash the machine with pressurised water and dry it, especially in the zones not protected by paint or without special protections. Touch up any chips or scratches to prevent harmful oxidation.

- Completely empty out the fuel tank and fill it with about 10 litres of diesel fuel with added oil, and then drain the system. Start the engine and let it run for about 10-15 minutes to ensure uniform distribution of the lubricant. When the operation is over, fill up the fuel tank with Diesel fuel.

- Completely change the oil of the diesel engine, hydraulic system and wheel reduction gears, taking care to replace the various filters.

- Dismantle the battery, checking the level, top up with distilled water if necessary and store it in a dry and protected place. Periodically check the level during inactivity.

- Lubricate all the delicate parts that require special attention.

5.5. RESTARTING AFTER INACTIVITY

To restart the machine after inactivity follow the instructions listed and recommended below:

- Remount the battery, checking the level and charge.

- Check the levels of the engine oil, hydraulic system and wheel reduction gears.

- Start the engine and leave it to idle for about 10-15 minutes. On completion, check perfect functioning of the various mechanical and electrical parts and the hydraulic controls.

5.6. SPECIAL CONDITIONS OF USE

MUDDY, HUMID, SNOWY TERRAIN:

- Check hermetic seal of the caps and valves.

- Clean and check the machine overall, tightness of the nuts and screws,and check for any sagging due to knocks or formation of cracks, etc.

MARINE TERRAIN:

- Check hermetic seal of the caps and valves.

- Generally clean the machine and wash with sweet water to remove deposited salt which causes corrosion and rust.

- Check and inspect functioning of the electrical system to prevent corrosion and various faults.

DUSTY TERRAIN:

- Periodically check and clean the air filter.

- Check and clean the terminal board of the alternator and the starter.

- Clean the water/oil radiator

ROCKY TERRAIN:

- Use the machine with caution, carry out manoeuvres and movements gently to prevent damaging the underbody and the rubber tracks.

- Before starting the operating phases, check the articulations, joints, pins and fastening of the various elements of the machine.

ICY TERRAIN:

- Use a fuel suitable for low temperatures or use specific additives.

- Use lubricants suitable for use at low temperatures, both for the hydraulic system and the engine system.

- Use antifreeze in the water radiator.

- Periodically check the battery level.

- Protect the tracks against possible compacting with earth during extended parking or stopping.

5.7. LUBRICANT TABLE

Agip		
RECOMMENDED PRODUCTS	**PARTS TO BE LUBRICATED**	**QUANTITY (Liters)**
AGIP SIGMA S SAE 30	DIESEL ENGINE	5,7
AGIP ARNICA 46	HYDRAULIC SYSTEM AND HYDRAULIC SYSTEM	26
AGIP GR SM	GREASE POINTS	As needed

It is possible to replace the suggested products with other brands as long as they have the same characteristics.

5.8. DIESEL ENGINE

For operation, refuelling, start-up and shutdown, controls and cleaning, and for maintenance, follow the indications given in the User's Manual that the Manufacturer has supplied with the machine.

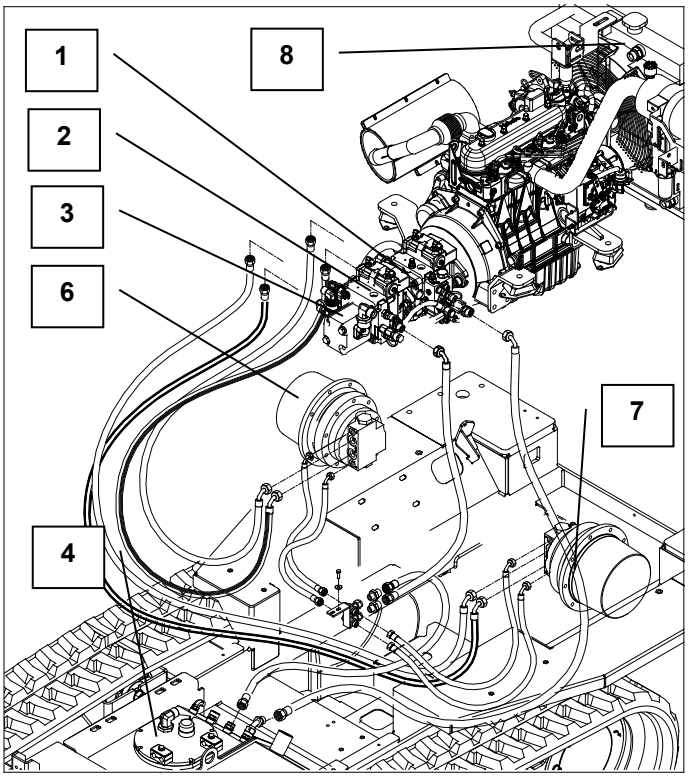
5.9. MAINTENANCE TABLE

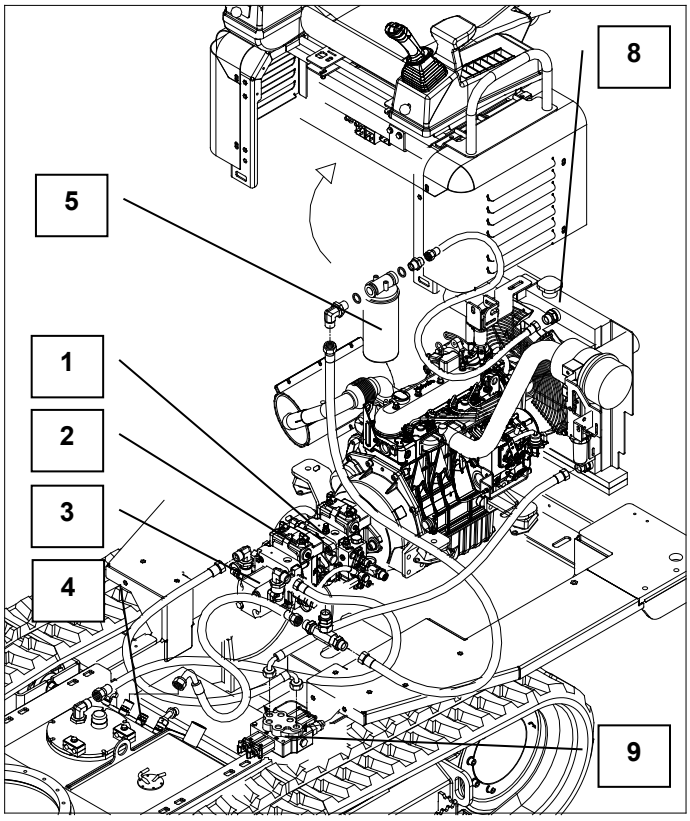
OPERATION TO PERFORM	COMPONENT CONCERNED	FREQUENCY IN HOURS					
		8	50	100	250	500	1000
CLEANING	AIR FILTER - CARTRIDGE		•				
	RADIATORS - FINNING		•				
	BODY	•					
	TRACKS	•					
	DIESEL FUEL TANK					•	
	HYDRAULIC OIL TANK						•
CHECKING AND CORRECTING, IF NECESSARY	ENGINE OIL LEVEL	•					
	COOLANT LEVEL	•					
	BATTERY LEVEL		•				
	HYDRAULIC OIL LEVEL	•					
	AIR FILTER		•				
	WHEEL RED. GEAR OIL LEVEL				•		
	TRACK TENSION		•				
	TIGHTNESS NUTS AND SCREWS				•		
	ALTERNATOR BELT			•			
	BODY BALL-TYPE SUPPORTS	•					
	ELECTR. AND HYDR. CIRCUIT	•					
REPLACEMENT	ENGINE OIL			•			
	ENGINE OIL FILTER				•		
	DIESEL FUEL FILTER				•		
	HYDRAULI OIL						•
	COOLANT					•	
	HYDRAULIC OIL FILTER (CART.)					•	
	ALTERNATOR BELT					•	
	WHEEL REDUCTION GEAR OIL						•
	AIR FILTER CARTDRIDGE					•	
GREASING	PINS, ROLLERS AND CYLINDERS	•					
PARTIAL OVERHAUL		EVERY 2000 HOURS (4 YEARS)					
TOTAL OVERHAUL		EVERY 5000 HOURS (10 YEARS)					

IMPORTANT:
Concerning the use and maintenance of the diesel engine and the components connected to it, **ALWAYS FOLLOW** the instructions indicated in the attached use and maintenance manual of the engine manufacturer.

6. HYDROSTATIC TRANSMISSION SYSTEM

1. Right track hydrostatic pump
2. Left track hydrostatic pump
3. Service pump
4. Hydraulic oil tank
5. Hydraulic oil return filter
6. Right hydraulic motor
7. Left hydraulic motor
8. Oil cooler
9. Hydraulic main valve





WARNING!!!

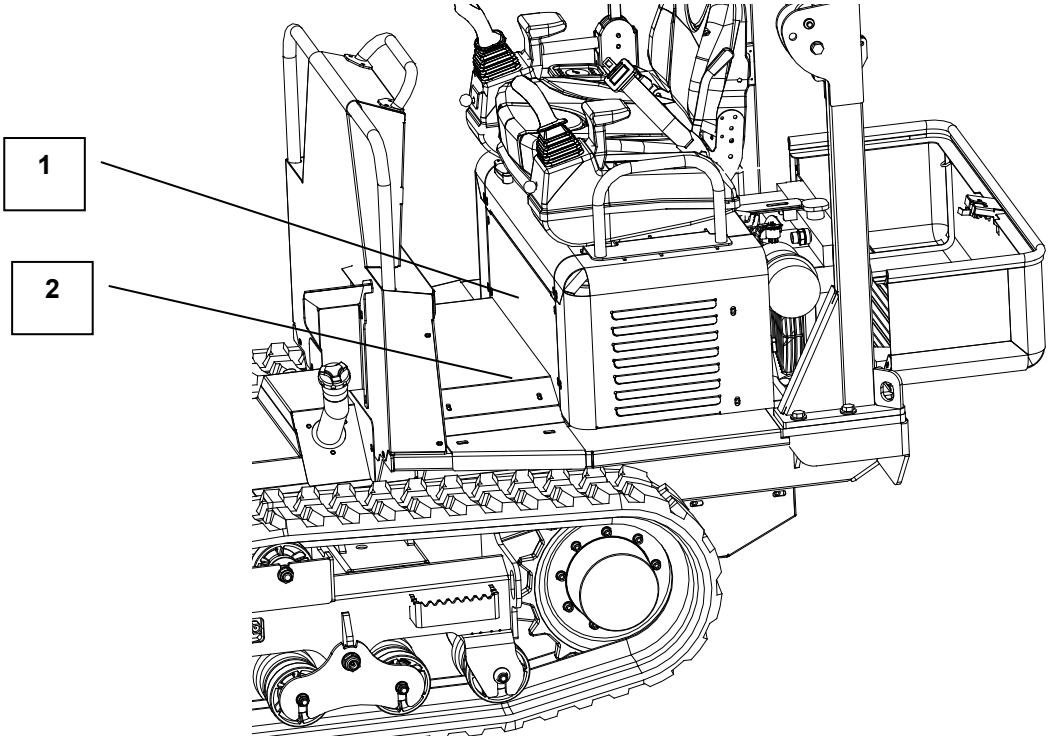
Refer to the paragraph CHECKS AND INSPECTIONS when changing the oil filter

6.1. ADJUSTMENT AND ZERO SETTING OF THE HYDRAULIC PUMPS

Each part of all the machines produced is carefully checked and tested in order to supply to the customer a machine that offers an efficient and perfect mechanical, electrical and hydraulic performance.

The machine has been equipped with quick coupling connections on which pressure calibration values of each user can be checked in order to facilitate the hydraulic system inspections.

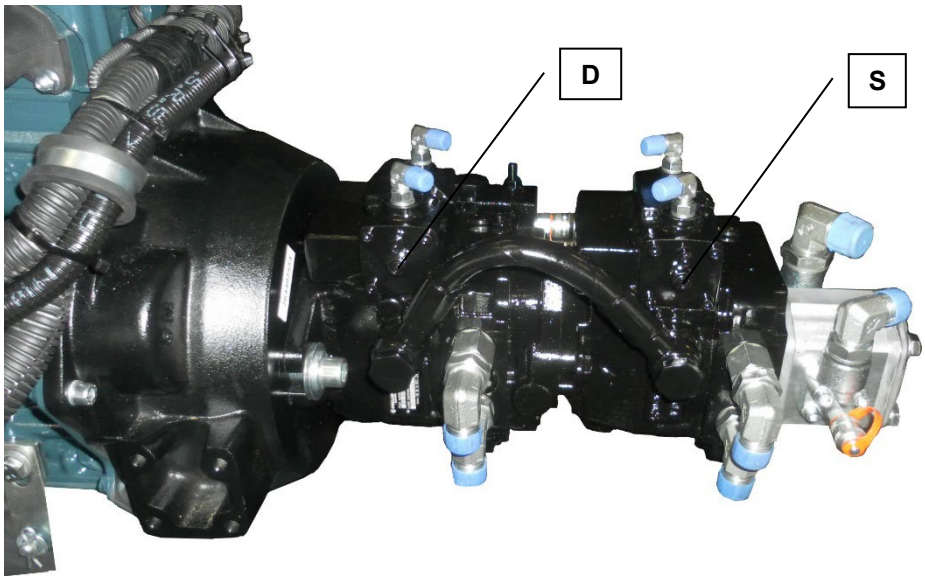
To get an easy access to the hydrostatic pumps, it is necessary to unscrew the bolts and remove the casing **(Ref.1)** and the footboard **(Ref.2).**



Once had the access to the hydrostatic pumps, it is possible to set the pressure of the same, as required.

Both joysticks have an automatic return to zero (neutral position) independent to the engine rpm.

If after some time the machine should move forward, in reverse or if it should rotate even while the left joystick is on the position zero (neutral), you must act on the pump that makes the track move or if required even on both.



In order to adjust the pump (pumps) and carry out zeroing follow the procedure listed below:

- park the tracked transporter on a compact and flat surface;
- Lift the machine using the methods as above described for track tension adjustment;
- get the access to the pumps removing the cases as explained above;
- loosen the hexagonal screws **“S”**, **“D”** or both by a suitable key, then use a “L” key to reset or setting;
- by using this key move the setting screw in **“S”** or **“D”** or both, to make the relevant track stop;
- tighten the screws **“S”**, **“D”** or both, being sure the tracks do not move.

IN CASE OF ANY DIFFICULTIES OR DOUBTS, IT IS ADVISABLE TO CONTACT AN AUTHORISED ASSISTANCE POINT

6.2. HYDRAULIC SYSTEM PRESSURE CHECKS AND CONTROLS

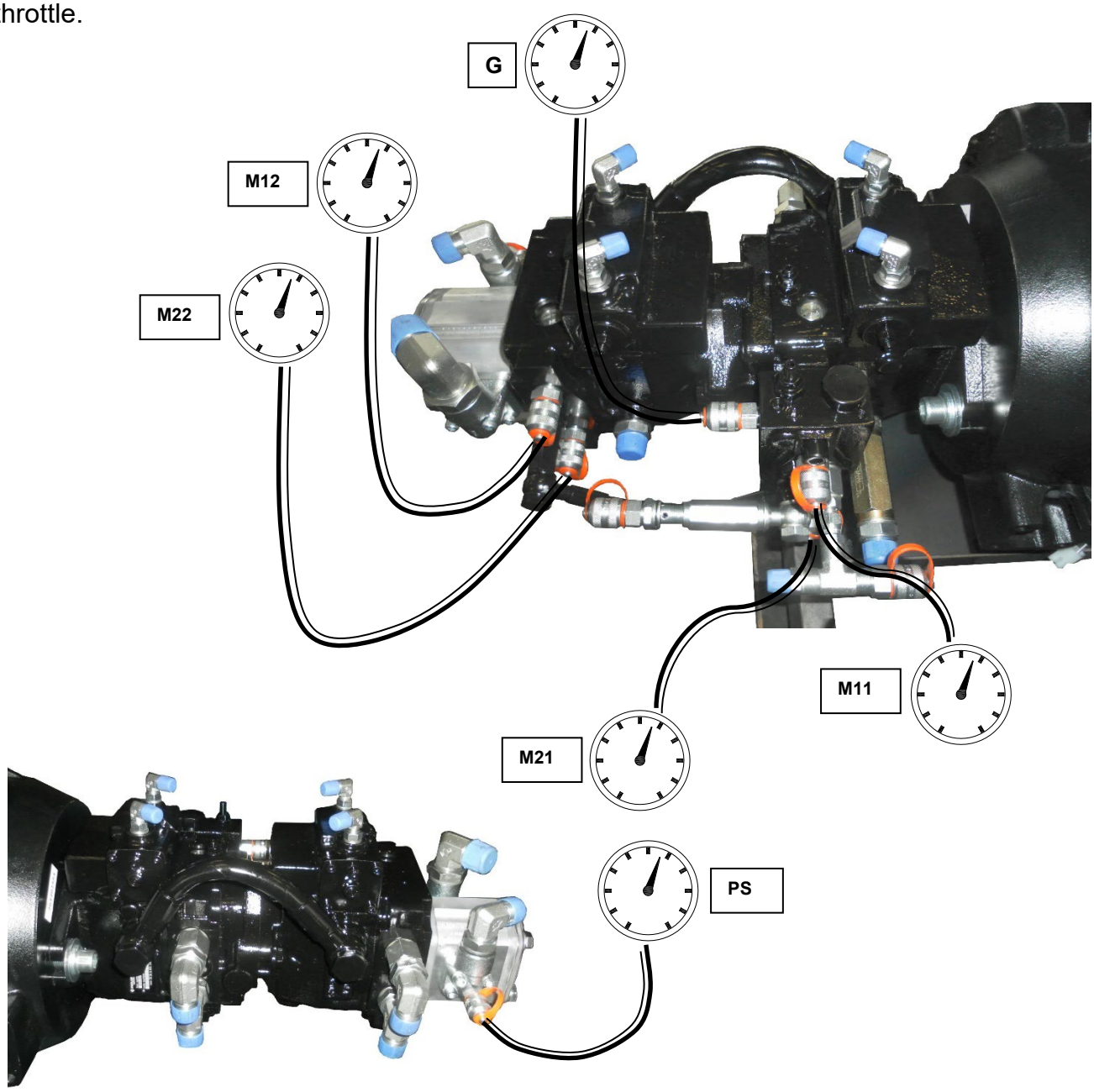
The check consists in getting the maximum pressures in the services valve, in the supercharger and in the driving pumps.

IMPORTANT!!!

For correct machine use we suggest to bring the hydraulic oil up to the operating temperature with no-load running and with the endothermic engine slightly accelerated for approx. 5-10 minutes.

To check the pressure of the hydraulic system, act as explained before to get the access to the pumps.

Install suitable gauges in the appropriate points and drive the engine at the maximum throttle.



MEASUREMENT POINT	PRESSURE TO BE DETECTED	MANOMETER FULL SCALE	TYPE OF CONNECTION	ENGINE RPM
M12 (Left track forward)	350 ± 10 bar	400 bar	1/4” G	Max rpm
M22 (Left track backward)	350 ± 10 bar	400 bar	1/4” G	Max rpm
M11 (Right track forward)	350 ± 10 bar	400 bar	1/4” G	Max rpm
M21 (Right track backward)	350 ± 10 bar	400 bar	1/4” G	Max rpm
G (Overpressure)	24 ÷ 25 bar	60 bar	1/4” G	Max rpm
PS (Service hydr. system)	180 ÷ 185 bar	250 bar	1/8” G	Max rpm

Keep the track blocked to make the driving pumps pressure test.

WHEN TESTING THE 4 SERVICES, THE BOOST PRESSURE READ AT POINT **“G”** MUST REMAIN UNALTERED, RANGING BETWEEN THE LIMITS INDICATED PREVIOUSLY (**24 – 25 bar**).

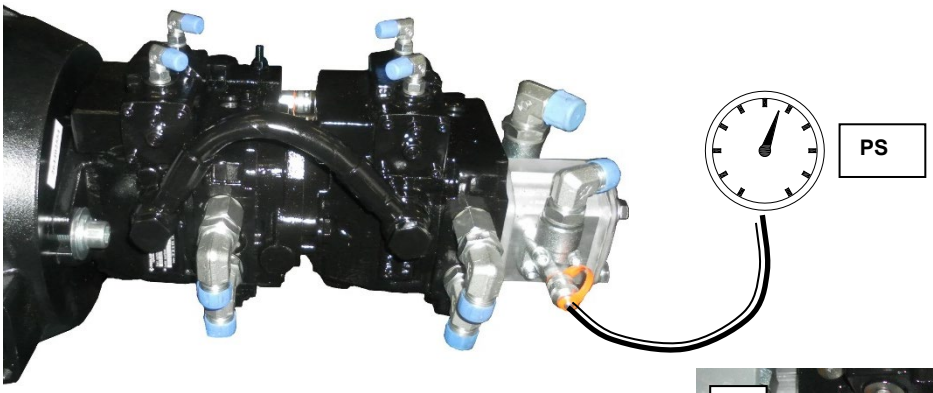
Should the found values be different from what above displayed it is recommended to contact the SERVICE POINT.

ATTENTION!!!

DO NOT INSERT YOUR HANDS, BODY PARTS OR TOOLS NEAR THE RADIATOR FAN AS THIS STARTS-UP AUTOMATICALLY.

NOTE: IF IN DOUBT, UNCERTAIN OR IN DIFFICULTY, IT IS RECOMMENDED TO CONTACT AN AUTHORISED SERVICE CENTRE

6.3. VERIFYING AND CHECKING THE HYDRAULIC SYSTEM SERVICE PRESSURES



The operation consists of detecting the maximum distributor pressure. Verify by following the instructions below:

- with the vehicle stationary and the engine off, connect a **250 bar** full-scale gauge to position **"PS"**;
- start the engine and bring it at max rpm then read the pressure indicated on the gauge;
- if the detected pressure differs from the calibration value (**180 ÷ 185 bar**), restore it by acting on the adjusting screw **"C"** at the end of the distributor pressure relief valve.

Complete all the verifications and inspections, bring the hydraulic service system and the hydrostatic drive system to the the initial operating conditions.

NOTE: for the pressures to be set correctly, it is recommended to take the above mentioned readings with the hydraulic oil at an operating temperature of about 65 °C.

It is also advisable to have the above mentioned checks and inspections carried out by an authorised workshop and always in compliance with the instructions provided by the TECHNICAL SUPPORT DEPARTMENT.

7. HYDRAULIC POWER TAKE-OFF

SPECIFICATIONS:

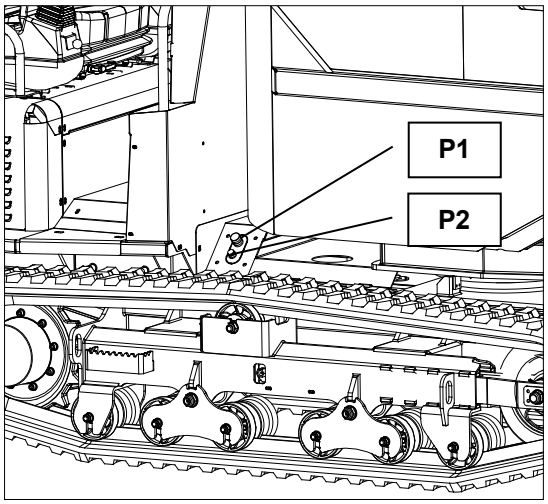
The vehicle can be equipped with a double-acting hydraulic PTO (OPTIONAL) to use auxiliary machinery, accessories or hydraulic equipment.
Its main specifications are:

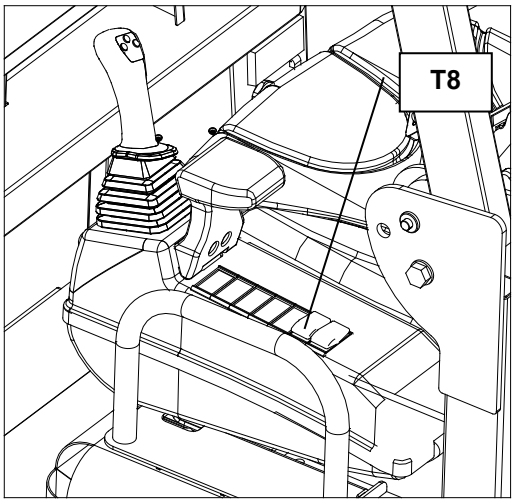
MAX FLOW RATE	**32**	**lt/min**
PRESSURE	**170**	**bar**

The PTO flow rate and pressure output is directly proportional to the number of revolutions of the diesel engine. Therefore, the flow rate can vary from a minimum of **0 l/min** up to a maximum of **32**.

Follow the instructions below when using the PTO:

- bring the accelerator lever to the minimum;
- connect the equipment that is to be used on the couplings **"P1"** and **"P2"** of the PTO (hammer, pump, etc.);
- actuate the hydraulic power take off by pressing the button **"T8"**;
- increase the number of revolutions of the diesel engine by acting on the accelerator lever until the oil flow rate corresponds to the correct operation of the connected equipment.

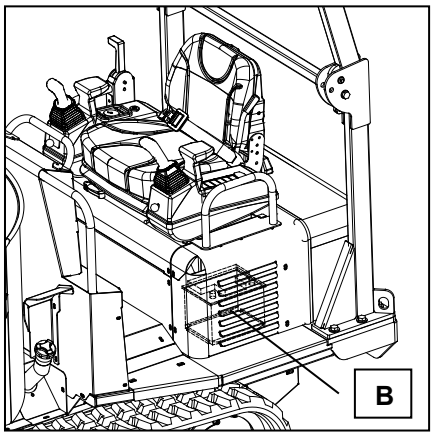




ATTENTION!!!

DO NOT USE THE POWER TAKE-OFF CONTINUOUSLY FOR A LONG TIME. IT IS RECOMMENDED TO ONLY USE THE VEHICLE AT THE MAXIMUM PRESSURE FOR SHORT PERIODS, OCCASIONALLY SLOWING DOWN TO A MODERATE SPEED.

8.ELECTRICAL SYSTEM



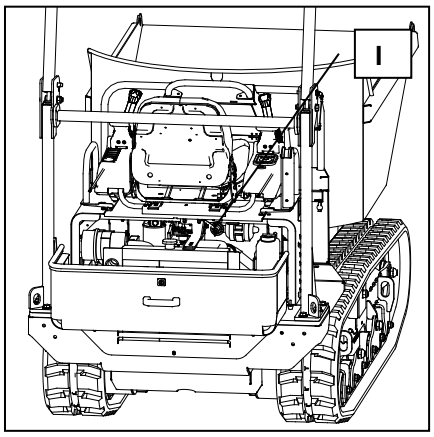
Battery **"B"** is located under the bonnet, on the left side.

BATTERY SPECIFICATIONS:

VOLTAGE: 12 V
CONSUMPTION: 60 Ah
DISCHARGE: 320 A

A - IGNITION KEY

B - BATTERY



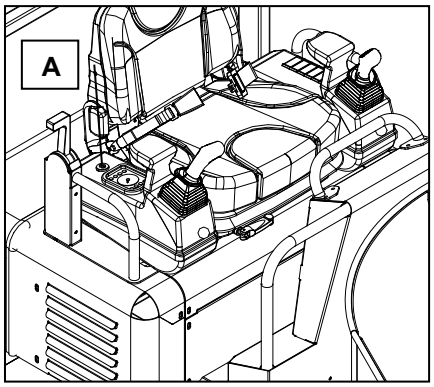
The key in switch **"A"** is only removed when this is disconnected ("OFF" position).

ATTENTION!

Verify the level of the battery liquid every **100 HOURS.**

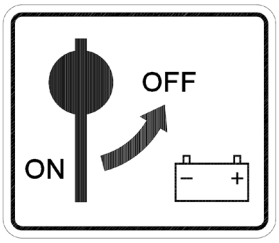
Follow the instructions found on the casing of the battery itself to check the level.

Only distilled water must be used to top-up - do not use acid. The electrolyte may leak due to it reaching boiling point and cause severe burns.



Always make sure the filler caps are closed perfectly.

Do not drain the battery completely.



If it drains quickly, have the voltage regulator checked. If this is not the cause, recharge the battery or possibly replace it.

The used battery must be disposed of by an authorised Company or personnel.

THE LIQUID INSIDE THE BATTERY IS HIGHLY CORROSIVE. PROTECT YOUR EYES AND HANDS WHEN CHECKING AND RESTORING THE LEVEL.

RISK OF BURNS!
RISK OF SCALDING!

Keep the cable terminals fastened well and protected with grease or even better with pure Vaseline.

When disconnecting the battery, the earth wire (-) must be disconnected first.

When connecting the battery, the positive wire (+) must be connected first.

Keep metal tools and objects away from the battery poles as these may short-circuit the terminals and pose a risk of burns.

Always contact **Authorised Workshops** to charge the battery.

The machine is equipped with a switch **(Ref. I)**, that is located under the engine cover between the battery and the tank wich allows disabling the battery in case of EMEGENCY, or for a long period of stop *(for more than 4 hours)*.

9.TROUBLESHOOTING: CAUSES AND SOLUTIONS

9.1. ENGINE

PROBLEM	CAUSE	SOLUTION
Start failure	Battery disconnected	Connect
	Battery flat	Recharge, replace
	Battery terminals oxidised, disconnected or loose	Clean, connect, tighten
	Glow plug fuse tripped	Replace fuse
	Starting motor inefficient	Check and replace if necessary
	Injection pump, injectors faulty	Replace faulty component
	Water, impurities or air in fuel supply system	Release air, clean tank
	Incorrect engine oil	Replace with recommended oil
	Injectors not efficient	Replace
	No fuel	Check and fill up
	Fuel filter clogged	Replace
	Fuel supply piped damaged	Inspect and replace in necessary
Irregular functioning	Engine oil level low	Check and top up
	Air outlets obstructed	Inspect, clean or replace filter
	Fuel filter clogged	Replace
	Injectors faulty	Check, replace
	Accelerator broken, faulty	Inspect, repair
	Poor compression	Call an authorised workshop
	Insufficient fuel supply	Replace fuel filter
Excess black fumes	Air outlet clogged	Inspect, clean or replace filter
	Injectors faulty or dirty	Replace
	Injection pump inefficient	Call an authorised workshop
	Impurities in fuel	Filter or change brand
	Engine cold	Warm up for about 10 minutes with accelerator at half-travel
Engine overheating  **Stop immediately**	Engine oil level too low	Top up
	Thermostat faulty	Inspect, call an authorised workshop
	Cooler broken, faulty, clogged	Inspect, clean or replace if necessary
	Air filter clogged	Clean and replace if necessary
	Fan belt faulty	Adjust or replace if necessary
	Malfunctioning of water temperature indicator on dashboard or bulb faulty	Inspect and if necessary, replace the component concerned
	Radiator coolant level low	Check, top up if necessary
	Cooling fan faulty, broken	Inspect and replace if necessary
	Water pump/alternator belt broken	Inspect and replace if necessary
	Water pump broken	Inspect and replace if necessary

PROBLEM	CAUSE	SOLUTION
Engine oil pressure low  **Stop immediately**	Engine oil level too low	Check and top up
	Pipe and connectors oil leaks	Check, replace or tighten
	Engine oil filter clogged	Replace
	Oil leak	Check, top up if necessary
	Incorrect engine oil	Replace with reccomended oil
	Oil pressure indicator or bulb faulty	Inspect and if necessary, replace the component concerned
Generator light on	Alternator does not recharge	Check belt tension efficiency, replace alternator (call an authorised workshop)
Battery does not recharge	Terminals loose or oxidised	Inspect, clean, tighten
	Alternator belt faulty	Restore tension
	Alternator does not recharge	Call an authorised workshop
Starting motor turns slowly or is blocked	Terminals loose or oxidised	Inspect, clean, tighten
	Battery flat	Check electrolyte level
	Incorrect engine oil	Replace with recommended oil

9.2. TRANSLATION HYDRAULIC SYSTEM

PROBLEM	CAUSE	SOLUTION
High hydraulic oil temperature	Unsuitable hydraulic oil	Use recommended oil only
	Hydraulic pipes clogged	Call an authorised workshop
	Hydraulic filter clogged	Replace
	Hydraulic pumps faulty	Check, call an authorised workshop
	Max. pressure valves faulty	Check and replace if necessary
	Hydraulic oil level low	Check and top up if necessary
	Foamy oil, possibile air infiltration	Remove through pump suction
	Hydraulic oil dirty	Check and top up if necessary
	Manoeuvres not conform with machine use	Use the machine linearly without forcing the controls (in particular with cylinders at end of travel)
Slow movement of hydraulical controlled parts (insufficient performance)	Hydraulic oil overheating	Cool for the appropriate time
	Incorrect hydraulic oil	Check, use recommended oil only
	Hydraulic pumps damaged	Check with authorised workshop
	Irregular functioning of hydrostatic motors	Check with authorised workshop
	Valve decalibration	Inspect and if necessary call an authorised workshop
Foamy hydraulic oil	Air in suction system	Check and release if necessary
	Water in oil	Replace oil and clean tank
	Incorrect hydraulic oil	Replace, use recommended oil
	Oil level too low	Top up
Low or no system pressure	Incorrect hydraulic oil	Replace, use recommended oil
	Oil level too low	Top up
	Max. pressure valves faulty	Check and replace if necessary

9.3. SERVICE HYDRAULIC SYSTEM

PROBLEM	CAUSE	SOLUTION
The maneouvring cylinders do not work properly or work improperly	Faulty gear pump	Inspect and replace if necessary
	Max valve on the distributor is faulty or not calibrated	Check, calibrate and replace if needed
	Worn or damaged seals	Inspect, replace
	Piping, damaged connections, oil leak	Inspect and if necessary, replace the component concerned

For checks of the diesel engine, follow what is mentioned in relevant user's manual supplied with the machine.

10. NOTES ON MAINTENANCE

DATE	WORK COMPLETED	HOURS OF WORK	PARTS INVOLVED

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