USE - MAINTENANCE

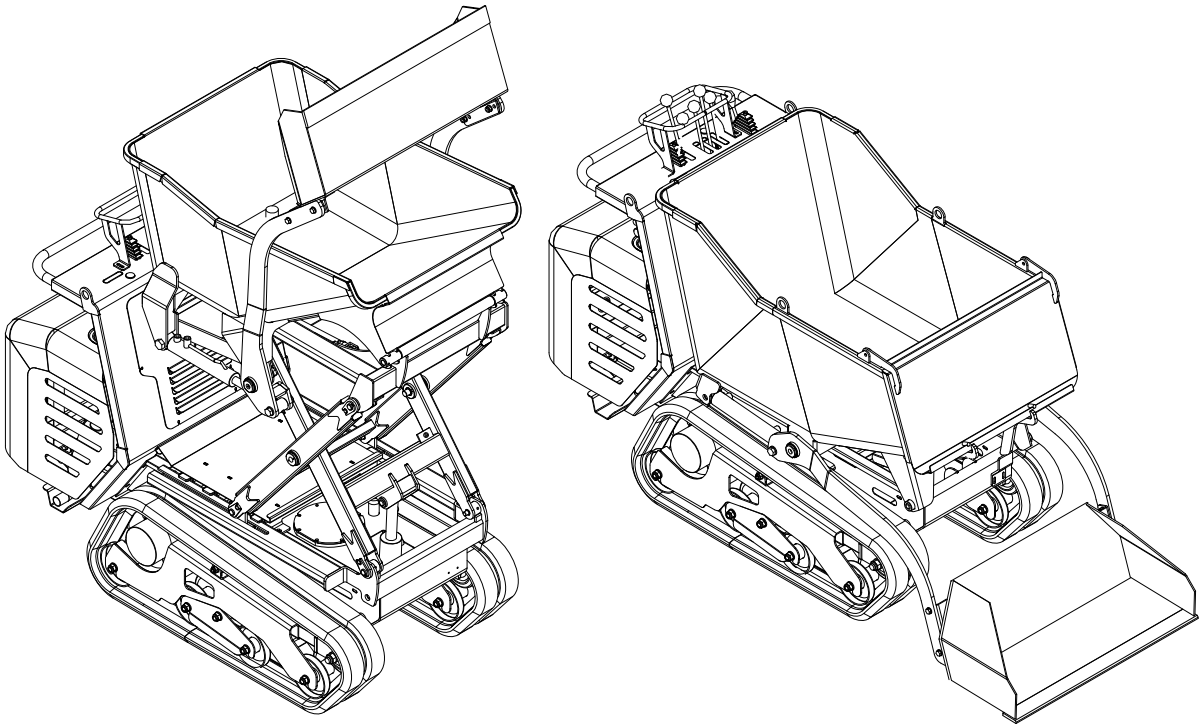
03672892

GB

*MINI*TRANSPORTER

TC100

TC100d



N° _____

MESSERSI
machines born to work
Sede Legale: Via Arceviese, 44 - 60010 CASINE di OSTRA (AN) ITALY

Member of CISQ Federation
RINA
CERTIFIED MANAGEMENT SYSTEM
ISO 9001

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Capitale Sociale € 5.000.000 i.v.
Cod.Fisc.e Part.IVA: IT 02240770426
R.E.A.Ancona n. 171900
Reg.Imprese AN 02240770426
Reg.Pile e Accumulatori IT18120P00005015
Fax Export (+39) 071 688586 Com.It. 071 688683
Web: www.messersi.it E-mail: messersi@messersi.it

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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.

Revision 4 02/03/2021

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 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 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.

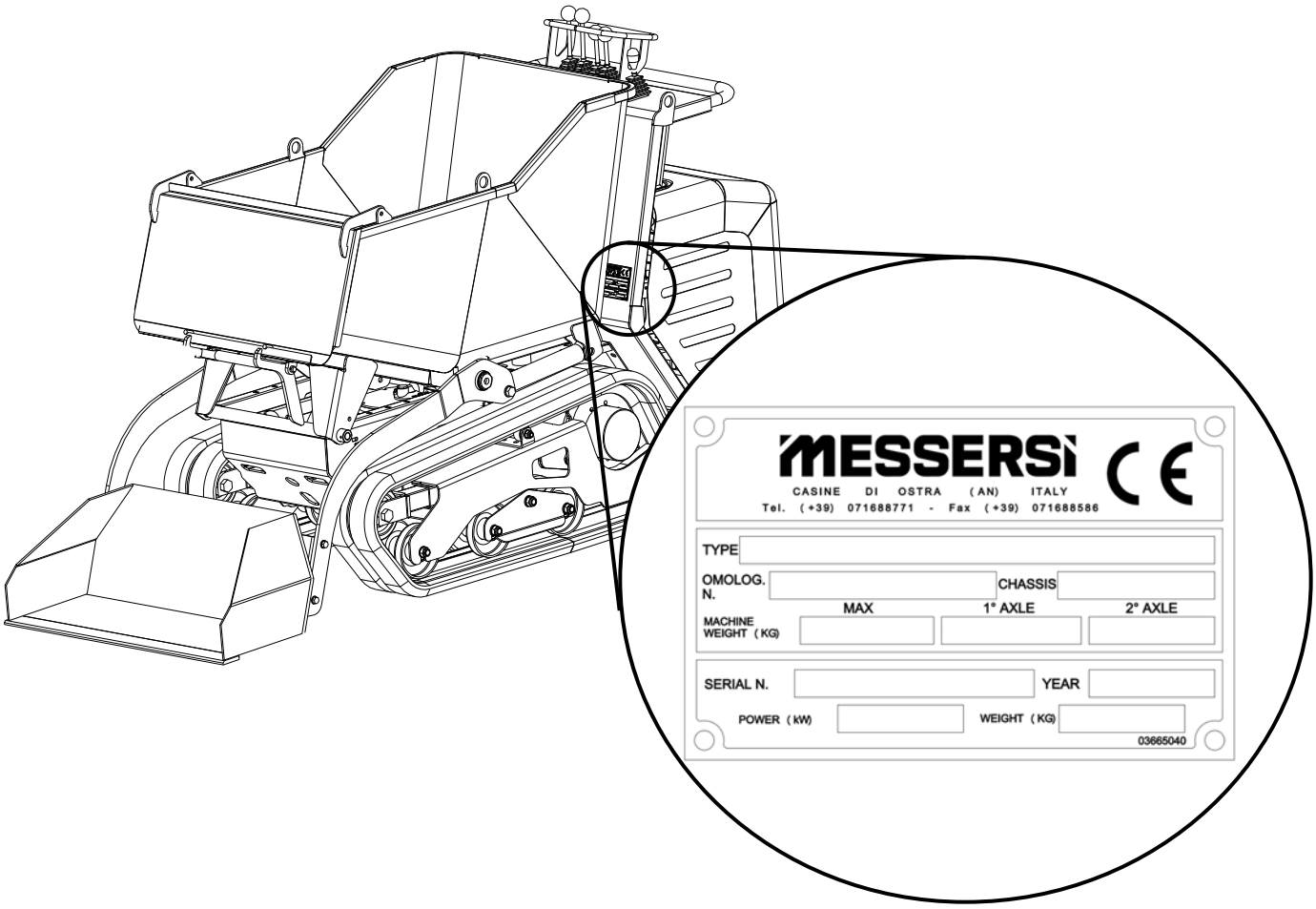
ATTENTION!
This symbol indicates a potential hazard that can be eliminated by applying and complying with the instructions provided in this manual or by using common sense.

2. MAIN CHARACTERISTICS

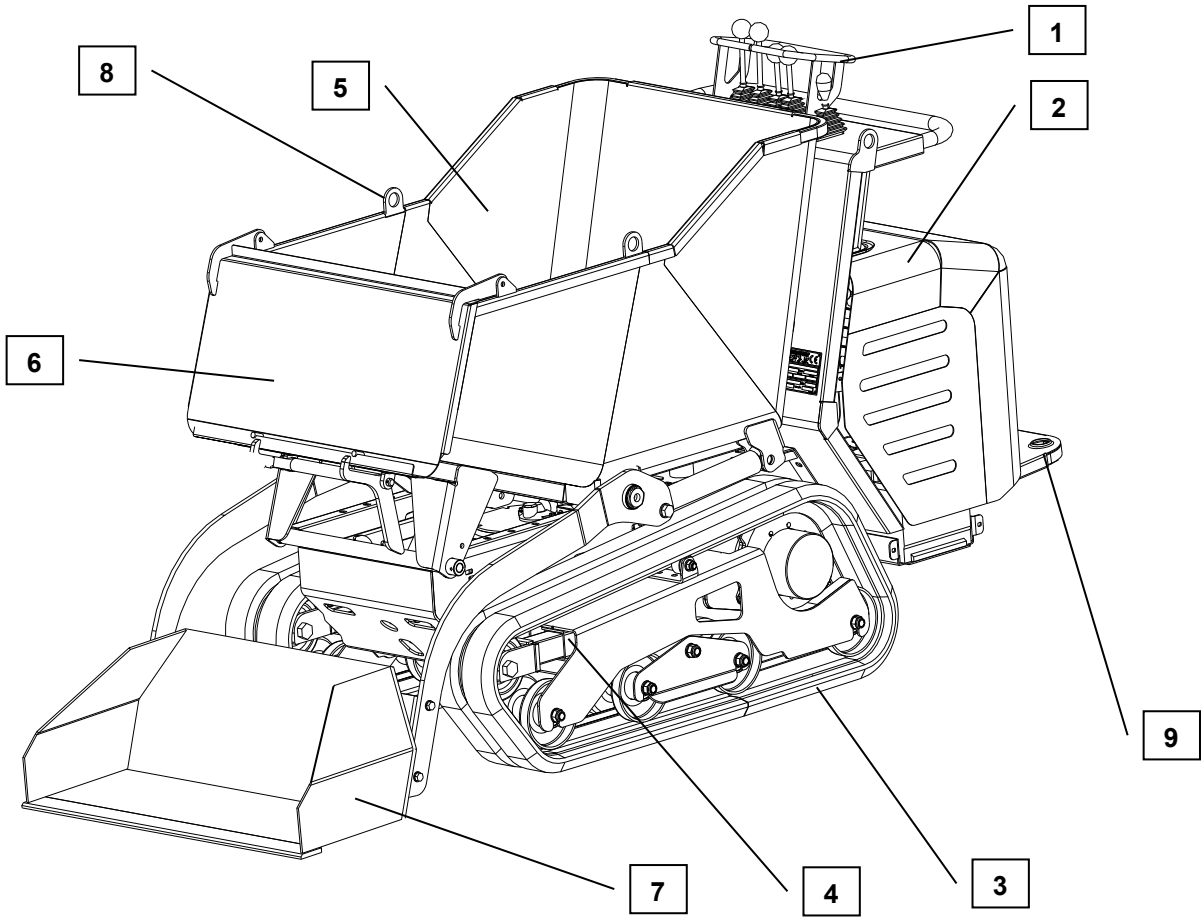
2.1. VEHICLE IDENTIFICATION

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

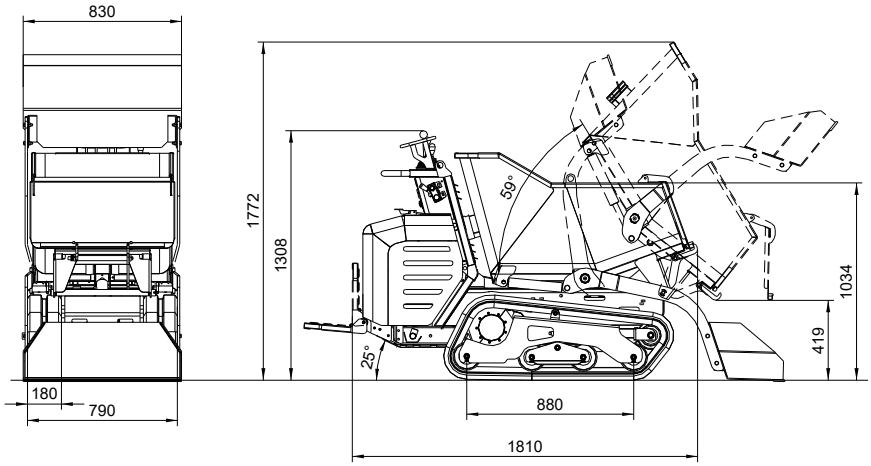


1 - CONTROL PANEL
2 - ENGINE AND BONNET
3 - TRACK
4 - TRACK ADJUSTER WITH ADJUSTING SCREW
5 - TIPPER OR BUCKET
6 - HATCH TO OPEN-CLOSE DUMP BODY OR BUCKET
7 - SELF-LOADING BUCKET (OPTIONAL)
8 - MACHINE LIFT HOOKS
9 - MOBILE FOOTBOARD

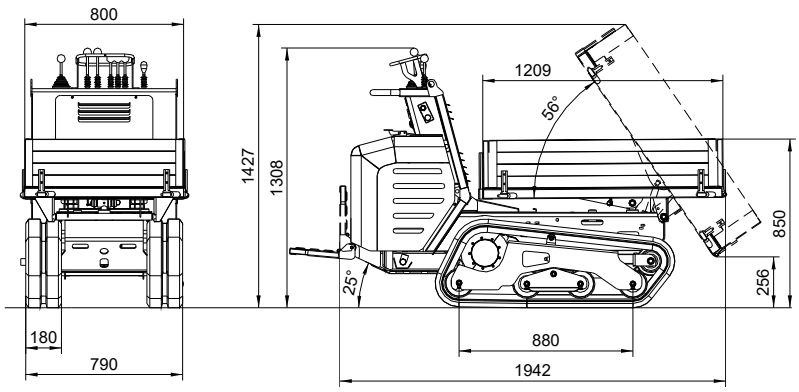
2.3. SPECIFICATIONS - TECHNICAL DATA

SPECIFICATIONS

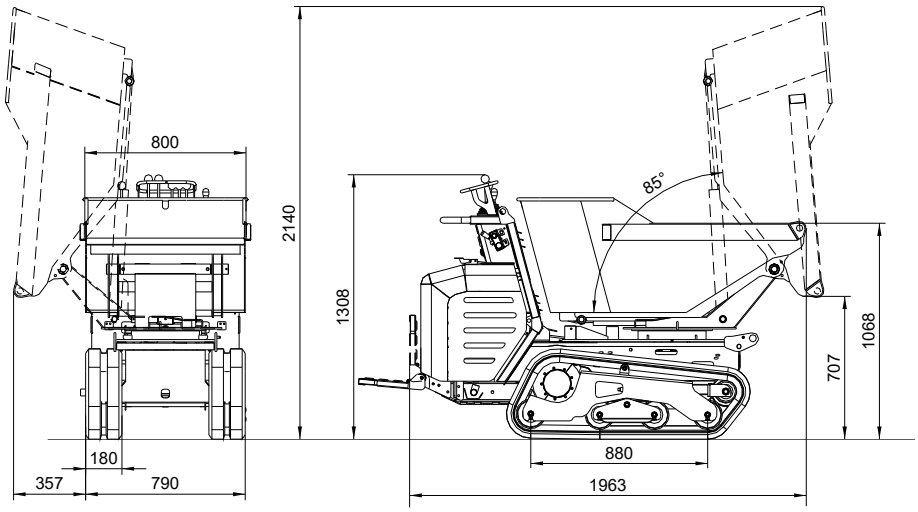
The machine has been designed and built for loading, transport and dumping of soil, sand, excavation debris and other loose materials suitable in terms of the characteristics and performance indicated in this manual. When necessary, the front of the machine can be equipped with a self-loading bucket (OPTIONAL) to facilitate loading operations.



TC100/MTP *(Petrol)*
TC100d/MTP *(Diesel)*



TC100/CA *(Petrol)*
TC100d/CA *(Diesel)*



TC100/BT *(Petrol)*
TC100d/BT *(Diesel)*

TC100/BT *(Petrol)*
TC100d/BT *(Diesel)*

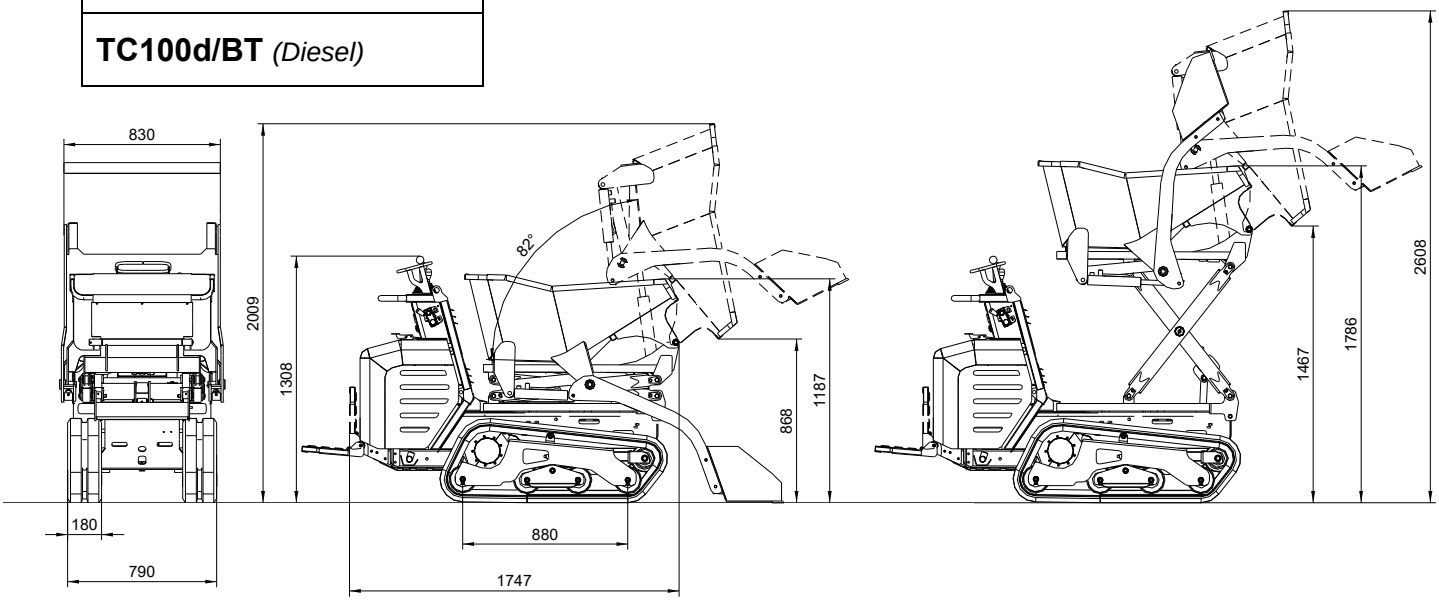


TABLE OF SPECIFICATIONS

Tracked undercarriage with hydrostatic transmission that can take several pieces of equipment.
Double-acting cylinder to lift accessories from the front.
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.
Patented track layout to guarantee a wide supporting area, high stability and excellent driving comfort in all conditions of use
Air cooled petrol engine; standard electric starter.
Water cooled diesel engine; standard electric starter.
Hydrostatic transmission with 2 variable displacement pumps and 2 orbital motors. Track rotation steering.
Loading body with large angle of discharge.
The round shaped design gives to the machine a pleasant look and allows a quick dumping of the loaded materials.
The selfloading shovel of 65 lit. of capacity (option) allows an optimal loading of the body. The limited width of the machine is also due to position of the shovel lifting cylinders.
Double-acting hydraulic power take-off (optional) to use auxiliary machinery with a max capacity of 28 lt/min and pressure P = 155 bar.
Standard bonnet and operator platform.

TECHNICAL DATA TC100

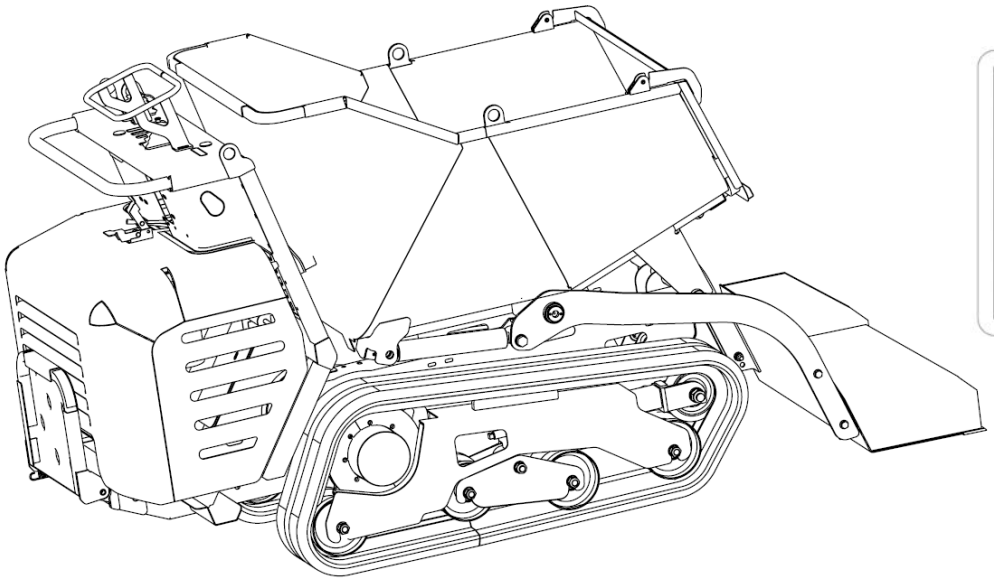
		TC100			
Operating weight with shovel (without operator)	Kg	MTP	CA	BT	AVP
		630	540	670	770
Operating capacity	Kg	800			
Load capacity: - heaped (SAE Standard)	m^3	MTP	CA	BT	AVP
		0,41	0,30	0,45	0,28
- flat: sand liquid	m^3	MTP	CA	BT	AVP
		0,36 0,10	0,21 0,21	0,36 0,25	0,24 0,20
Petrol **Engine**	type	VANGUARD 400 14 HP			
Maximum engine rotation speed	rpm	3600			
Max. power at maximum speed	HP/Kw	14,0/10,3			
Displacement	cm^3	408			
Cylinders	n°	1			
Max. torque at 2800 rpm	daNm	3,3			
Cooling	type	air			
Transmission	type	Hydrostatic			
Transmission pumps with variable displacement pistons	n°	2			
Total capacity	l/min.	29x2			
Services gear pump	n°	1			
Capacity	l/min.	7			
Max. operating pressure for driving	bar	230			
Max. operating pressure for services	bar	160			
Maximum speed:	Km/h	4,0			
Separate track steering system	type	Hydrostatic			
Rubber track tensioning	type	spring + adjusting screw			
Width of the rubber track	mm	180			
Specific ground pressure: - empty/loaded	Kg/cm^2	0,18/0,48			
Max. gradient when fully loaded	max %	62			
REFUELLING					
Fuel tank capacity	lt	9,7			
Hydraulic oil tank capacity	lt	22,1			
Pumps overload pressure	bar	12 – 13			
Noise emission level at 3000 rpm	dBA	101			

TECHNICAL DATA TC100d

		TC100d			
Operating weight with shovel (without operator)	Kg	MTP	CA	BT	AVP
		630	540	670	770
Operating capacity	Kg	800			
Load capacity: - heaped (SAE Standard)	m^3	MTP	CA	BT	AVP
		0,41	0,30	0,45	0,28
- flat: sand	m^3	MTP	CA	BT	AVP
liquid		0,36 0,10	0,21 0,21	0,36 0,25	0,24 0,20
DIESEL **Engine**	type	KUBOTA Z 482			
Maximum engine rotation speed	rpm	3600			
Max. power at maximum speed	HP/Kw	13/9,6			
Displacement	cm^3	479			
Cylinders	n°	2			
Max. torque at 2600 rpm	daNm	3,0			
Cooling	type	liquid			
Transmission	type	Hydrostatic			
Transmission pumps with variable displacement pistons	n°	2			
Total capacity	l/min.	29x2			
Services gear pump	n°	1			
Capacity	l/min.	8			
Max. operating pressure for driving	bar	230			
Max. operating pressure for services	bar	160			
Maximum speed:	Km/h	4,0			
Separate track steering system	type	Hydrostatic			
Rubber track tensioning	type	spring + adjusting screw			
Width of the rubber track	mm	180			
Specific ground pressure: - empty/loaded	Kg/cm^2	0,18/0,48			
Max. gradient when fully loaded	max %	62			
REFUELLING					
Fuel tank capacity	lt	9			
Hydraulic oil tank capacity	lt	22,1			
Pumps overload pressure	bar	12 – 13			
Noise emission level at 3000 rpm	dBA	101			

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

Guaranteed noise level at 3000 rpm: **L_{WA} = 101 dB**



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

Implementation of **Directive 2002/44/EC** concerning the minimum health and safety requirements concerning the exposure of workers to the risks deriving from mechanical vibrations.

Daily action values

- **Hand-arm system:** **lower than 2.5 m/sec^2**
- **Full body system:** **lower than 0.5 m/sec^2**

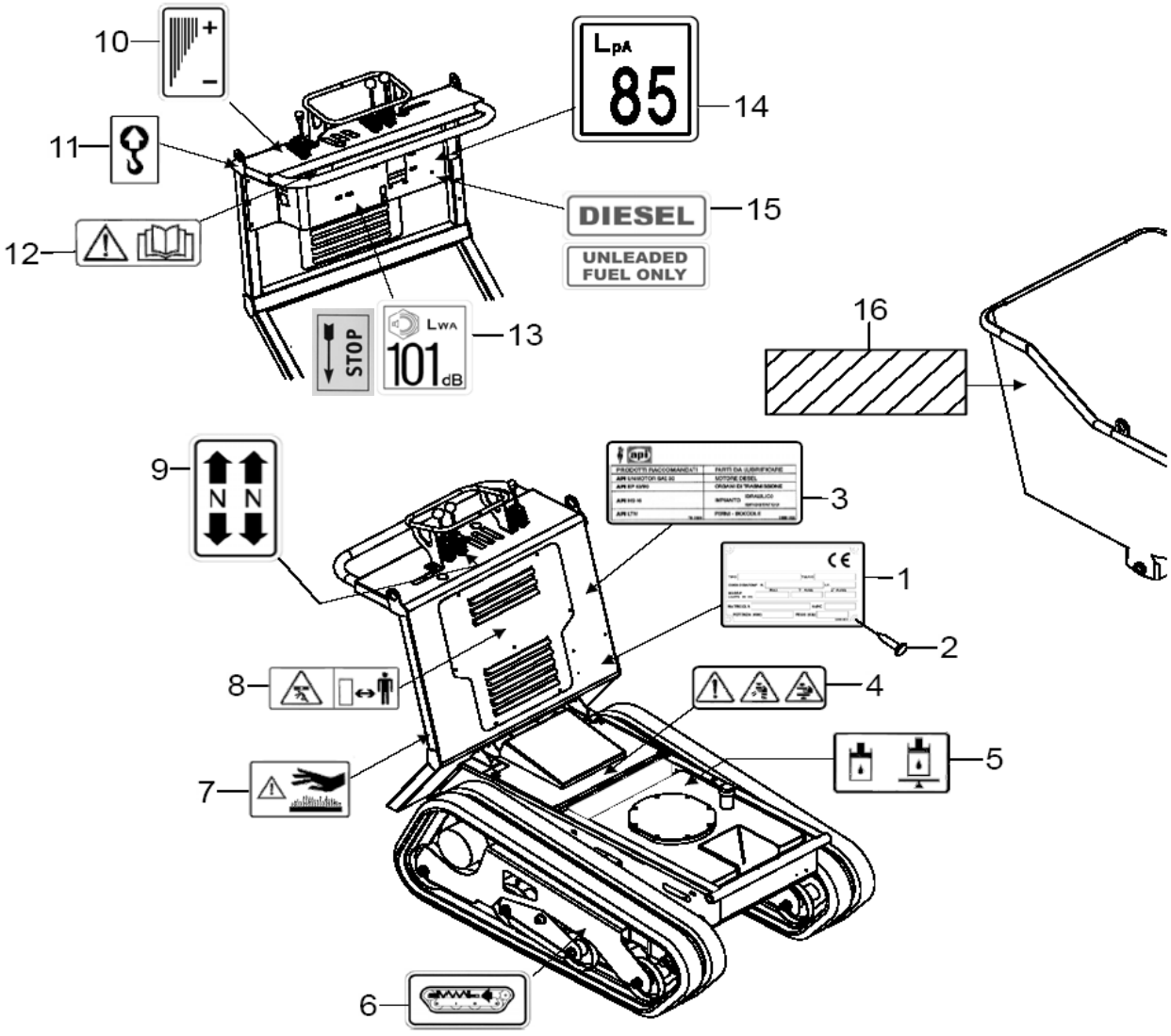
3. SAFETY – OPERATING STANDARDS

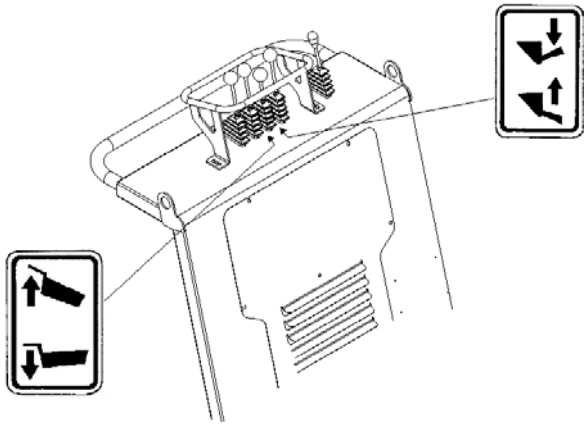
3.1. SAFETY LABELS AND DECALS

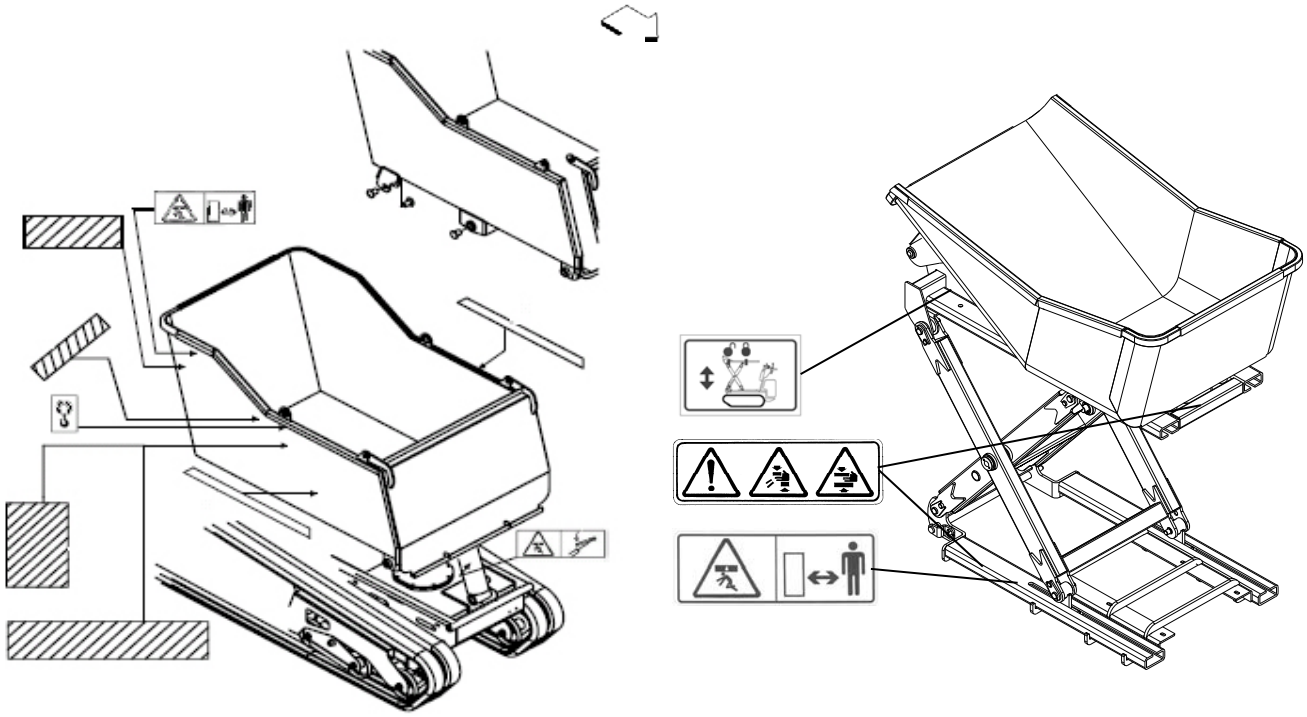
Besides indicating the various manoeuvres to use and control the vehicle, the affixed labels highlight the risks related to its operation.

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

Keep all affixed labels clean and legible, while paying particular attention to the indicated safety warnings; replace any damaged or missing labels. The company is at your disposal.







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 minitransporter fit with bucket or open dump body 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.

Never transport or lift anyone except the operator.

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

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

When moving over a slope, whether moving forward or in reverse, always make certain that the weight is evenly balanced. If the unit has a bucket, set it in a position that improves stability.

Never move over terrain that has both a **lateral** and **longitudinal slope**. The terrain **must be solid and compact**.

Before tipping the hopper or loading bucket, check that the loaded material can slide freely. If the hopper or loading bucket are lifted with the material blocked inside stability may be lost, therefore this operation ***is prohibited***. This situation is riskier if lifting and unloading is carried out laterally.

The machine can be used for unloading on ground with a gradient lower than 25% (both lateral and longitudinal). It is prohibited to unload where there is a longitudinal and lateral slope present at the same time.

Lifting of the loading bucket for unloading, must be carried out very slowly to prevent swinging, which could cause the machine to tip over.

Before lifting the load, check that the material contained in the loading bucket has been positioned in a way to prevent its accidental escape during movement.

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.

If a transporter equipped with AV or AVP systems is used (high unloading system, variable, with or without loading shovel) the following additional recommendations must be respected:

The machine can be used for unloading on land with a gradient lower than 25% (longitudinal) and 18% (lateral). It is prohibited to unload where there is a longitudinal and lateral slope present at the same time.

Move the loading system upwards only when the machine is at a standstill (it is not traversing).

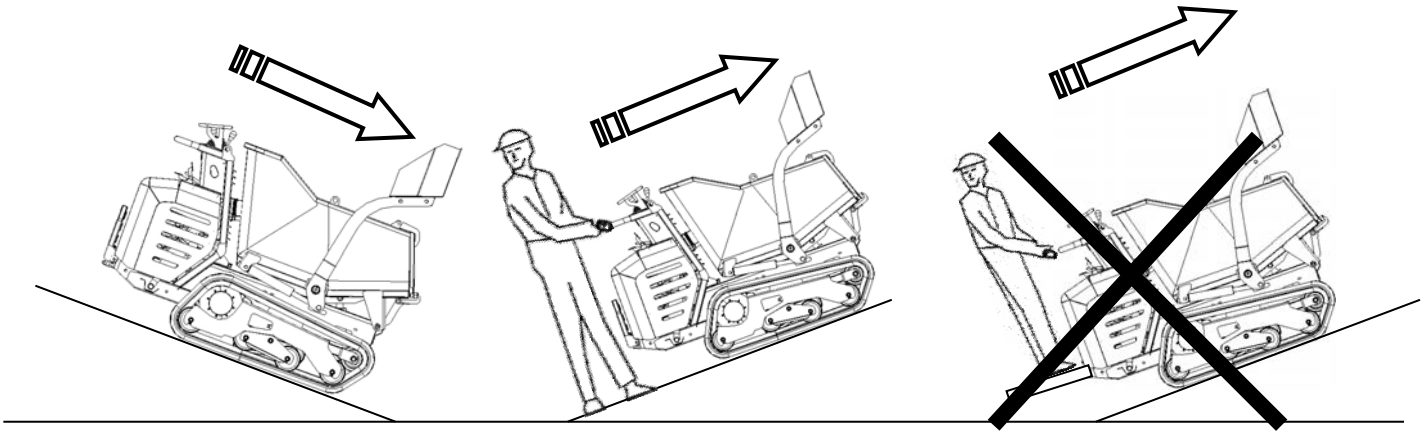
It is prohibited to traverse with the system lifted, even if only by a few centimetres with respect to the chassis.

Before lifting the loading bucket and tipping it, it is necessary to check that this will not interfere with other objects, in particular with electric cables etc…

Only use the high tipping system with friable material. On tipping the loading bucket it is necessary to check that the material really does slide downwards.

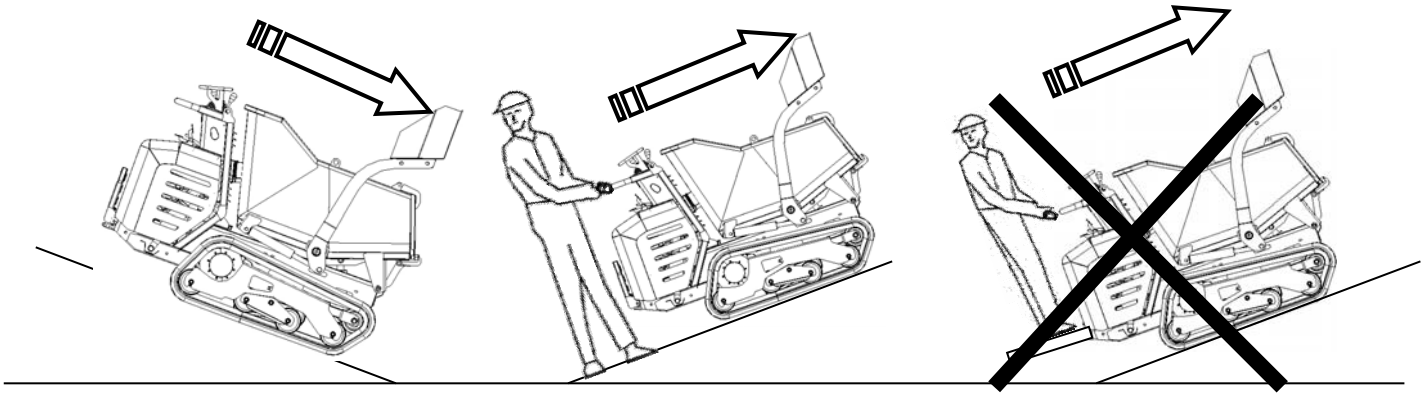
Take great care during the unloading phase. If in doubt lower the loading bucket again and check that the material moves freely. If the material is blocked, try to unblock it with the loading bucket in a low position, otherwise the machine may tip over, crushing the operator and causing damage.

UPHILL OR DOWNHILL, LOADED



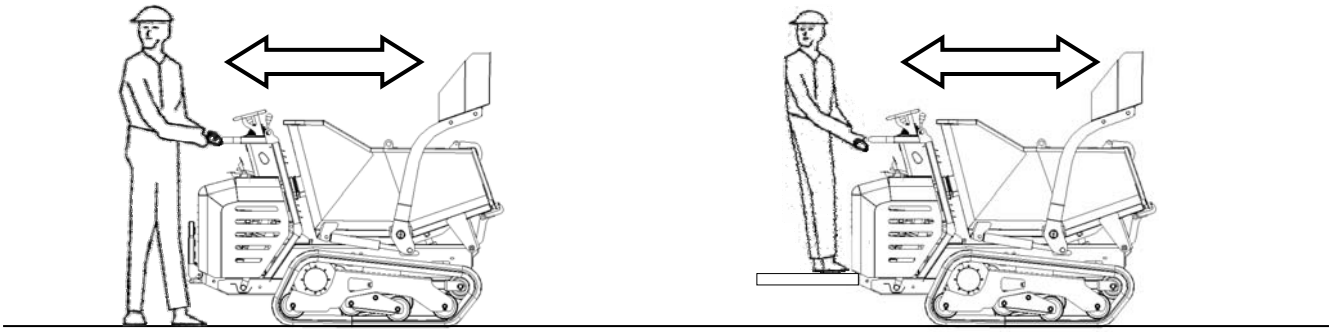
30% MAX **30% MAX**

UPHILL OR DOWNHILL, EMPTY



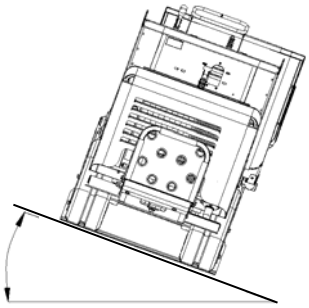
MAX 30 % **25% MAX**

FLAT GROUND, EMPTY



UPHILL OR DOWNHILL, EMPTY AND LOADED

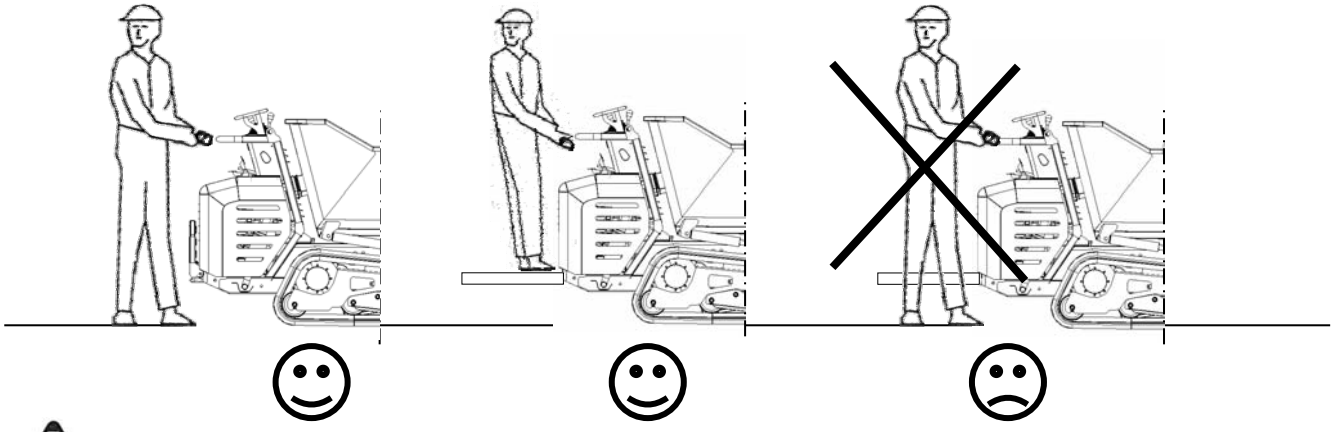
MAX 22 %



USING THE OPERATOR PLATFORM:

- The **PLATFORM** must be **LIFTED** (max. height) with the **OPERATOR** on the **GROUND**.
- The **PLATFORM** must be **LOWERED** with the **OPERATOR ON IT**.

Under no circumstances is the operator to drive while the platform is lowered.



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

- **ATTENTION!**

ALWAYS STOP THE ENGINE
WHEN STOPPING OR PARKING

Do not use the vehicle at the maximum speed allowed for an abnormally long time - occasionally slow down to a moderate speed. Do not drive too far in order to prevent the hydraulic components from overheating, which may cause damage.

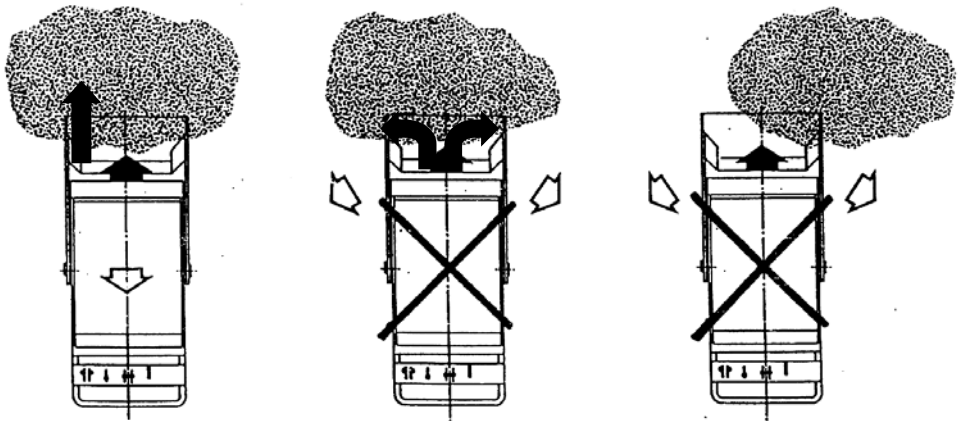
Prevent foreign objects (gravel, stones, debris, etc.) from lodging inside the rubber track, causing interference between the various transmission parts, and posing a hazard to the relative components.

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).

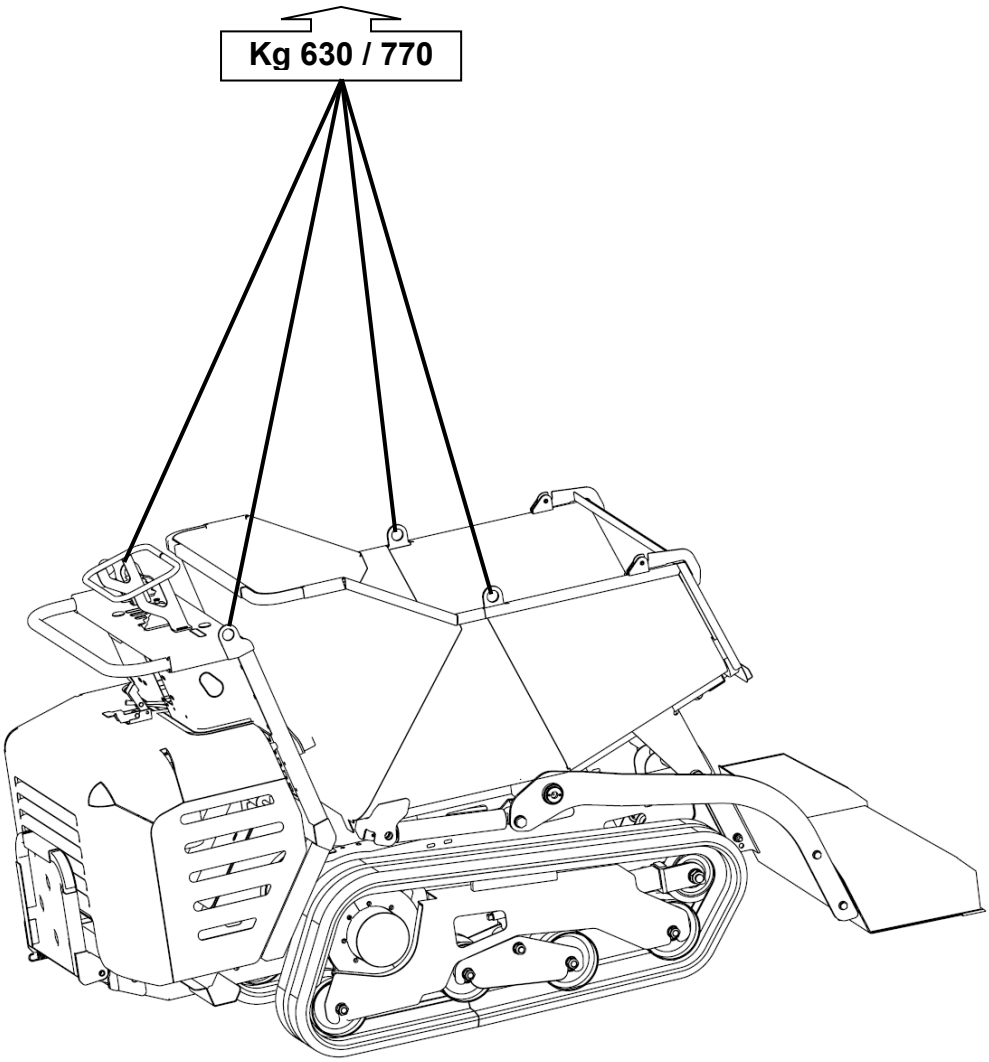
These movements can damage the lift booms.

NEVER USE THE LOAD BUCKET TO MOVE OR REMOVE OBSTACLES.



YES NO NO

3.3. HOISTING AND TRANSPORT



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

- Lower the load bucket slightly to release the two hooks located on the sides of the dump body: the other two are positioned on the sides of the driving position (see figure).

- 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 cables or chains rated for the weight to be lifted: when empty and fit with bucket, the machine weights approximately **630 Kg.** The machine fitted with high tip skip weights approximately **770 Kg.**

- Hook the vehicle from the **4** points provided and proceed with the lifting operations; avoid sudden movements and use very low lifting speeds.

- 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.

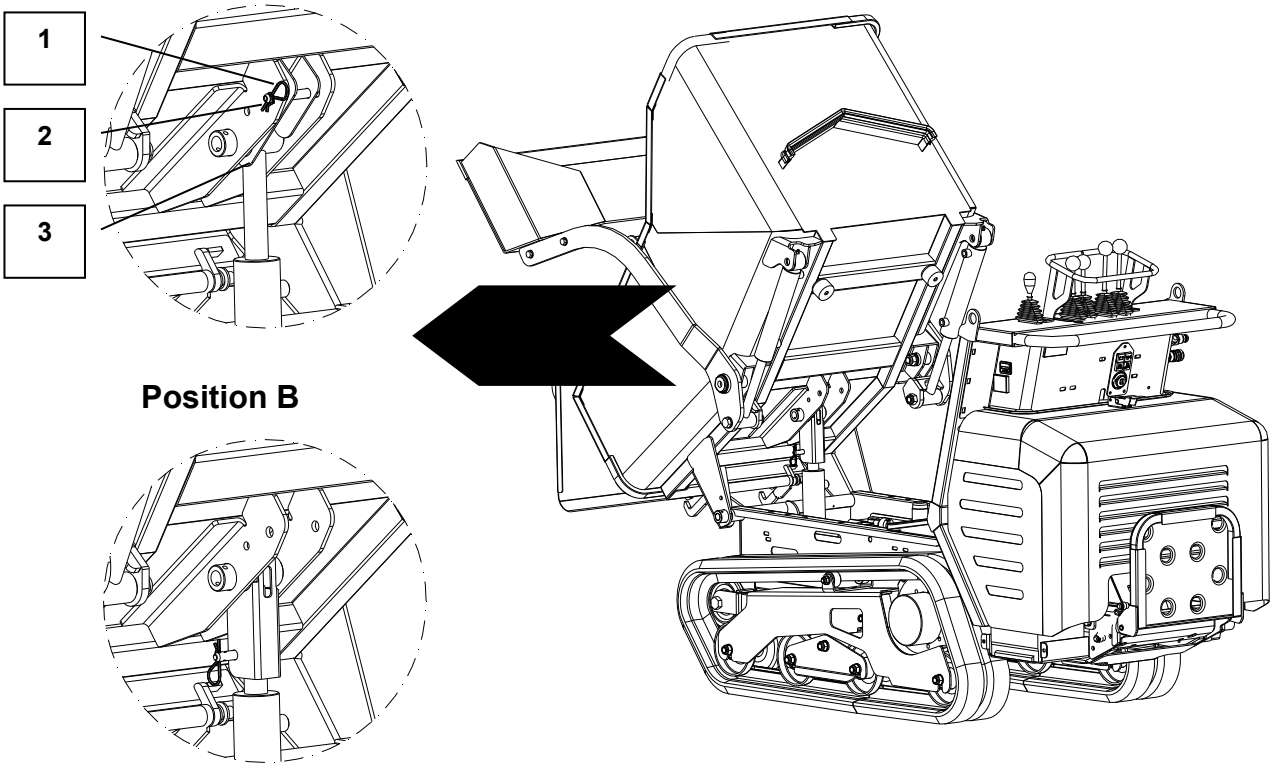
3.4. SAFETY RETAINER TO PERFORM OPERATIONS ON THE MACHINE WITH THE BUCKET RAISED

DANGER ZONES!

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

In case of maintenance, **the raised body must be blocked** with a special **safety item** supplied with the machine, that must be inserted **on the lifting cylinder ram** moving it from **position A** to **position B**, as shown in the picture.
Always block with pivot and safety pin. If a shovel is mounted on the machine, it must be secured to the body with cords, etc. To prevent the danger of pinching or shearing, before turning off the engine to park the machine, set the shovel on the ground and return the body to the frame. This precaution is necessary for the safety of the operator or the technician who performs the maintenance.

Position A

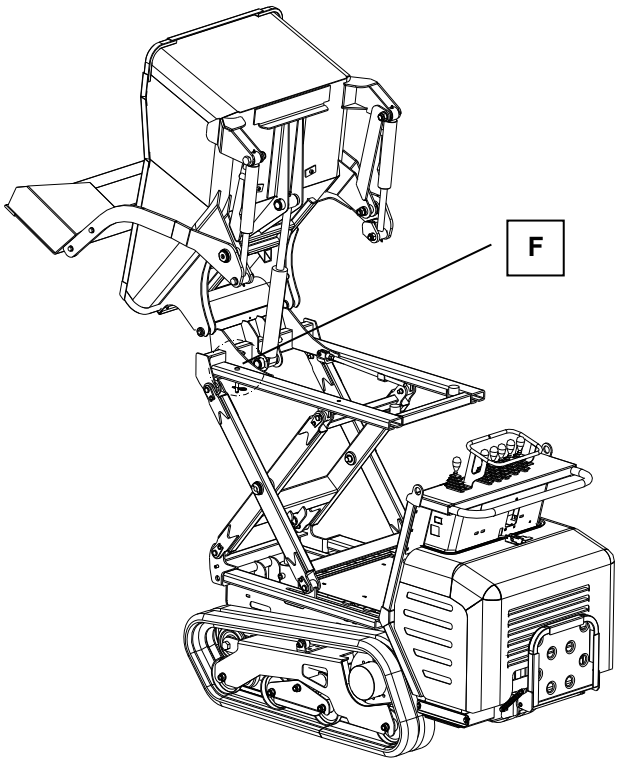


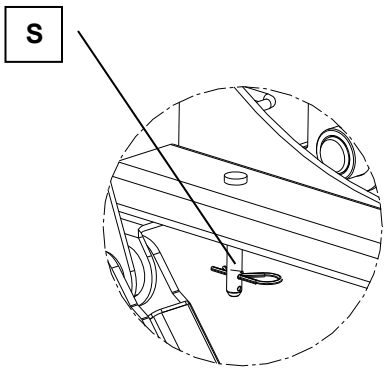
Position B

To insert the safety lock make the following operations:

- disconnect the split pin **"1"**;
- unthread the pivot **"2"**;
- rotate the safety lock **"3"** till enveloping the liner of the lifting cylinder of the body (see **"Position B"**);
- in this position reinsert the blocking elements, pivot and split pin, as shown in the picture **"Position B"**.

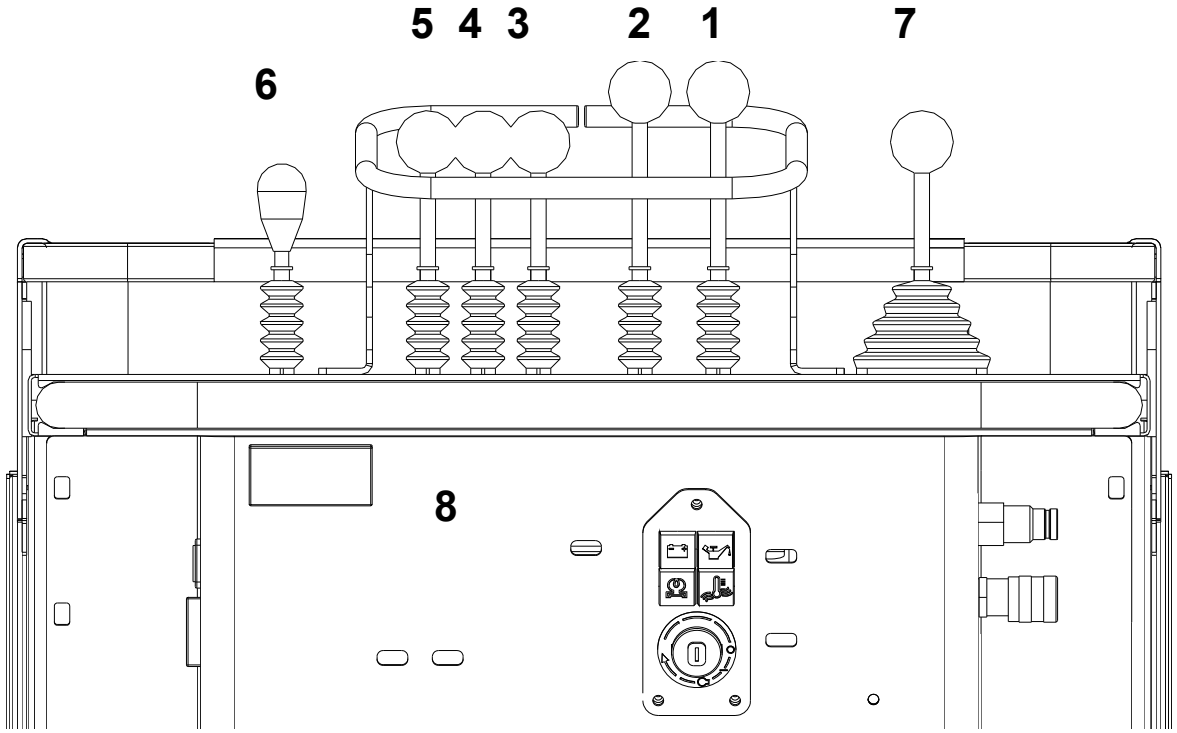
In case of machines fitted with High-Tip skip, to block the lifting scissor in upper position, pull the elastic plug away from the safety pin **"S"** and insert it into the appropriate hole **ref. "F"**. Always insert the elastic plug. This enables to block the body lifting chassis to make the operation/work on the machine in total safety.





4. DRIVING POSITION-CONTROLS

4.1. VEHICLE CONTROLS



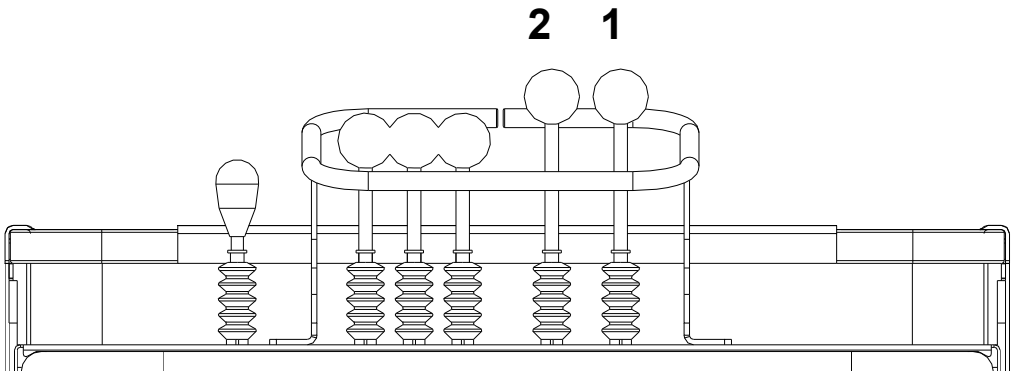
1 – RIGHT TRACK DRIVE CONTROL LEVER
2 – LEFT TRACK DRIVE CONTROL LEVER
3 – LOAD BUCKET UP-DOWN LEVER
4 – SELF-LOADING BUCKET LEVER * / LOADING BUCKET ROTATION LEVER ***
5 – DRIVING LEVER FOR THE LIFTING OF THE UNLOADING SKIP **
6 – ACCELERATOR LEVER
7 – P.T.O. CONTROL LEVER *
8 – DRIVING HANDLEBAR

(*) *optional*
(**) *only on TC100/AV or AVP, TC100d/AV or AVP*
(***) *only on TC100/BT, TC100d/BT*

To operate the various commands, follow the indications reported below:

4.2. DRIVE

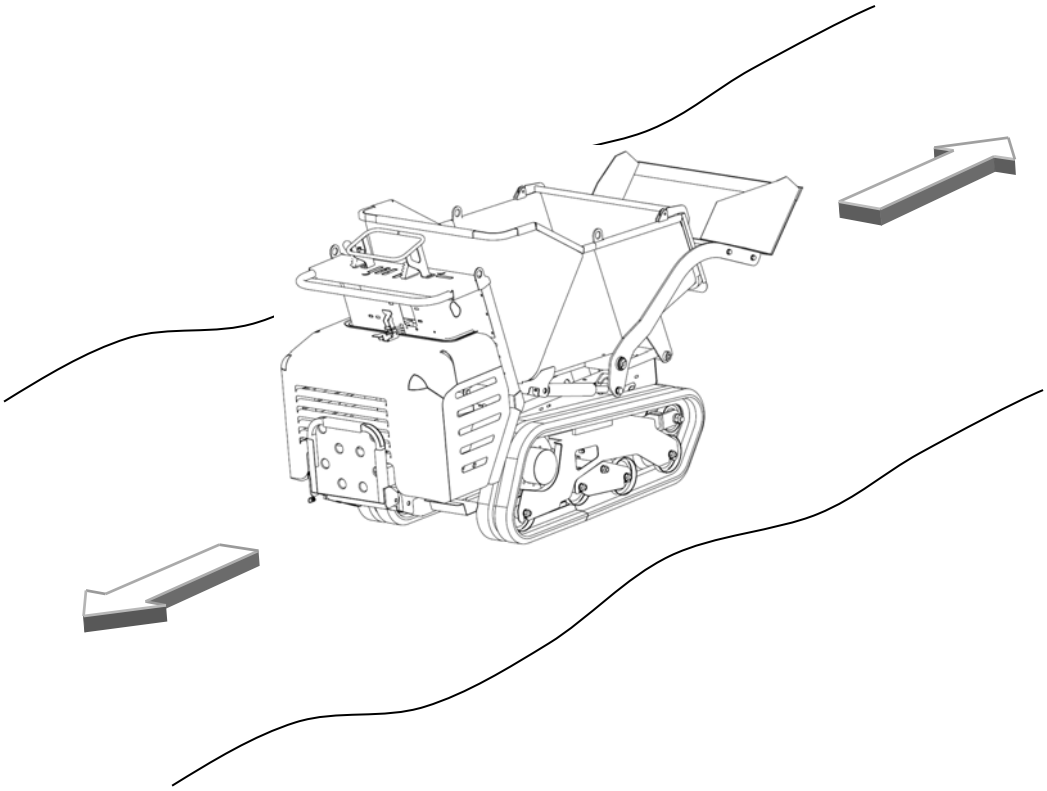
The vehicle drive is activated via levers **“1”** and **“2”**.



Hereunder are the detailed descriptions of the manoeuvres that are to be performed to drive forward, backward and to steer.

FORWARD GEAR: bring levers **“1”** and **“2”** simultaneously forward.

REVERSE GEAR: bring levers **“1”** and **“2”** simultaneously backwards.

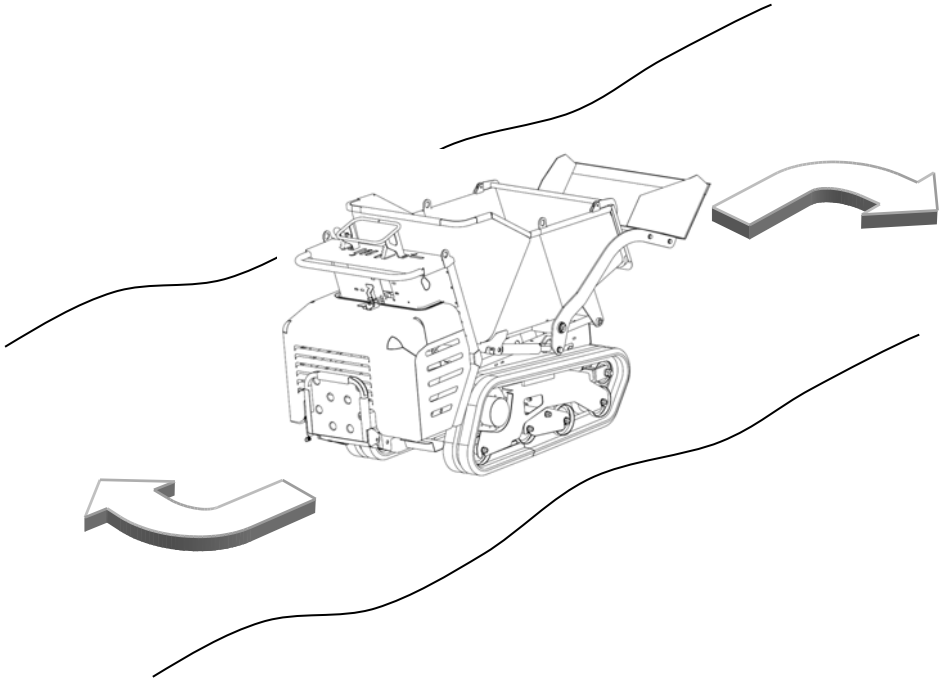


STEERING FORWARD TO THE RIGHT:

WITH THE VEHICLE STOPPED: bring lever **"2"** forward with respect to lever **"1"**
WHILE THE VEHICLE IS MOVING: reverse lever **"1"** with respect to lever **"2"**

STEERING BACKWARDS TO THE RIGHT:

WITH THE VEHICLE STOPPED: bring lever **"2"** backwards with respect to lever **"1"**
WHILE THE VEHICLE IS MOVING: bring lever **"1"** forward with respect to lever **"2"**



STEERING FORWARD TO THE LEFT:

WITH THE VEHICLE STOPPED: bring lever **"1"** forward with respect to lever **"2"**
WHILE THE VEHICLE IS MOVING: bring lever **"2"** backwards with respect to lever **"1"**

STEERING BACKWARDS TO THE LEFT:

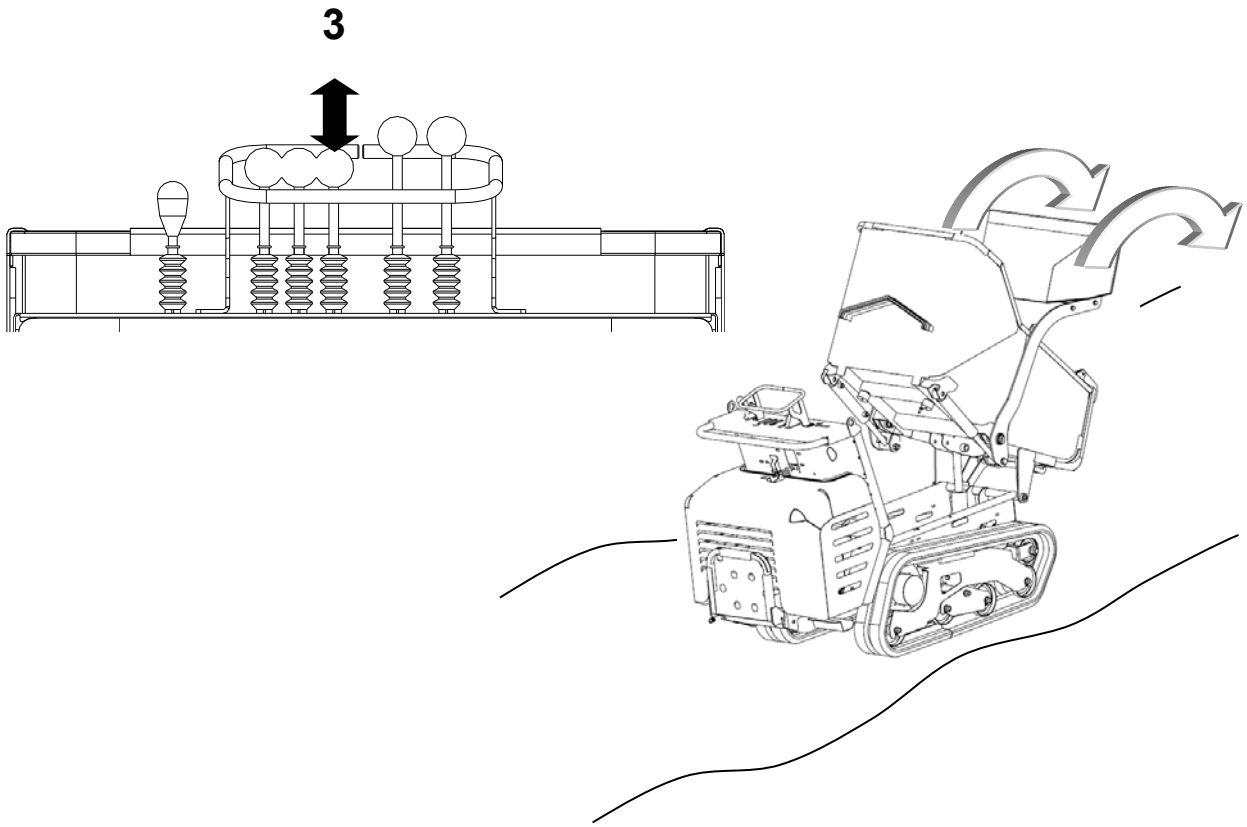
WITH THE VEHICLE STOPPED: bring lever **"1"** backwards with respect to lever **"2"**
WHILE THE VEHICLE IS MOVING: bring lever **"2"** forward with respect to lever **"1"**

ALL STEERING AND DIRECTION OF TRAVEL CORRECTION MANOEUVRES MUST BE MADE SMOOTHLY AND CAUTIOUSLY.

4.3. SERVICES

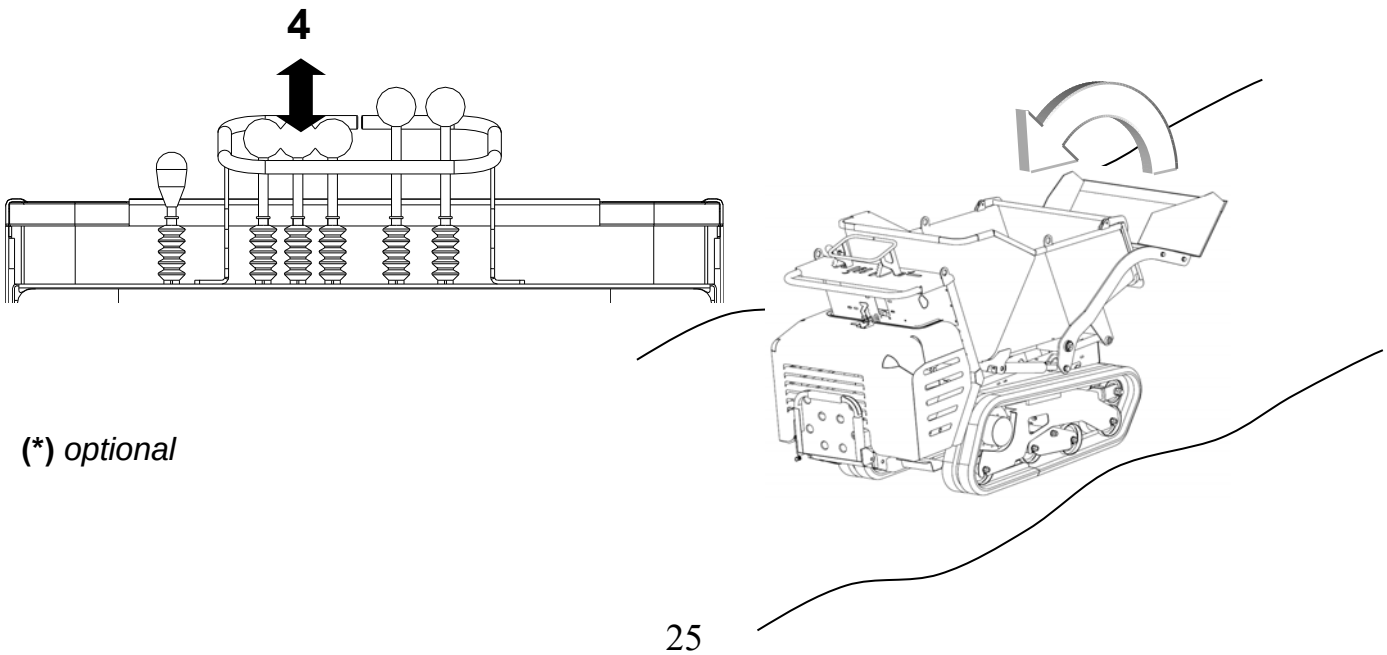
Lever "3": bucket or dump body control

This lever controls tipping of the dump body to lift the dump body, push the lever forward; to lower the body, just pull the lever back.



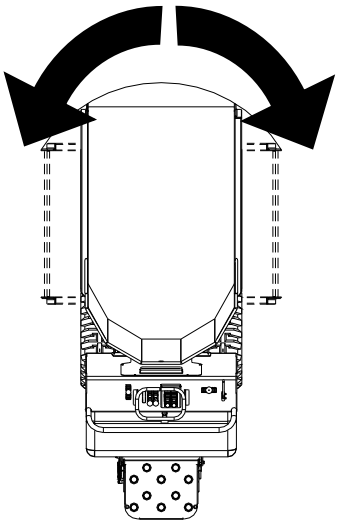
Lever "4": self-loading bucket control *

This lever controls up and down movement of the loading bucket. To lower the bucket, push the lever forward; to raise it and load the body, pull the lever back.



(*) *optional*

Lever "4": loading bucket rotation control lever***

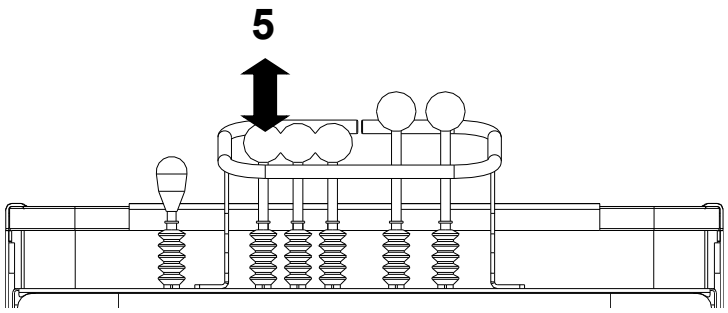


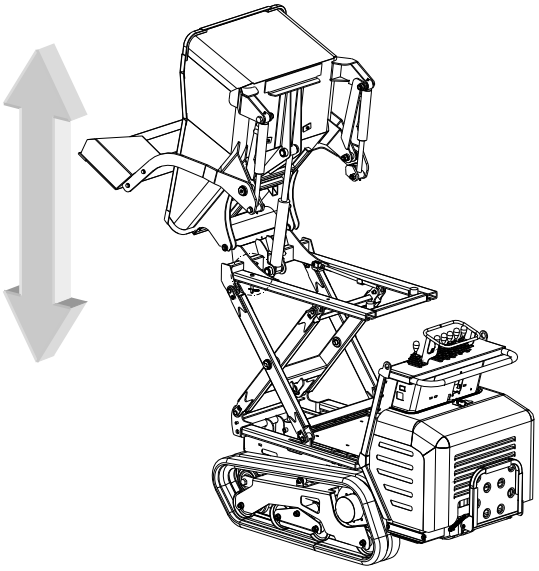
Rotates the loading bucket clockwise or anti-clockwise. Bring the lever forwards for the bucket to rotate clockwise and backwards for it to rotate anti-clockwise.

(***) *only on TC100/BT, TC100d /BT*

Lever "5": driving lever for the lifting of the unloading skip **

Activation of the lever allows to lift the frame-loading bucket unit for high unloading. Pull the lever down to lift the frame. Push up the lever to lower the bucket.

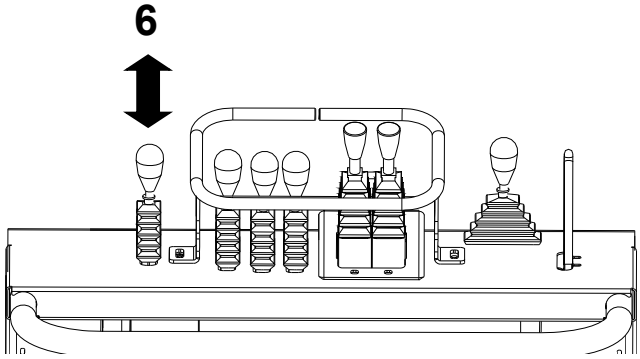




(**) *only on TC100/AV or AVP TC100d/AV or AVP*

Lever "6": accelerator.

When the engine is started up, this lever must be at the midpoint.



WARNING!

Use the levers 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.

4.4. STARTING UP AND STOPPING THE ENGINE

The engine powers the minitransporter. Below an extract from the user's manual provides an outline of its use. 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 levers, 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 (machines without hood). 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.

HOW TO ENSURE EXCELLENT START-UP EVERY TIME (PETROL ENGINE)

OPERATION No. 1 – bring the accelerator control to approximately the middle of its adjustment range.

OPERATION No. 2 – set the "STARTER" air lever **"S"** to the intermediate position if the engine is warm and to "START" position if it is cold.

OPERATION No. 3 – turn the key **"F"** clockwise towards position "1" to start the engine. Once the engine is started, the key automatically returns to the "0" position.
Set the "STARTER" air lever **"S"** to the "RUN" position.

OPERAZION No 3.1 – In case of a "cold" start, pull the "STARTER" lever ("START" position) and put the accelerator at half stroke. Then turn the ignition key and close the "STARTER" ("RUN" position) at the same time by pushing the lever.

DO NOT PROLONG THE START-UPS

OPERATION No. 4 – stop the engine by bringing the accelerator control to the minimum of its adjustment range and push **"P"** button.

WARNING!
ENGINE REQUIRES UNLEADED FUEL ONLY

HOW TO ENSURE EXCELLENT START-UP EVERY TIME (DIESEL ENGINE)

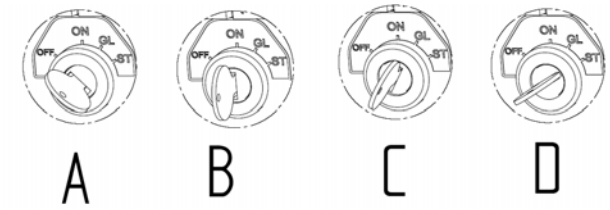
OPERATION No. 1 – bring the accelerator control to approximately the middle of its adjustment range.

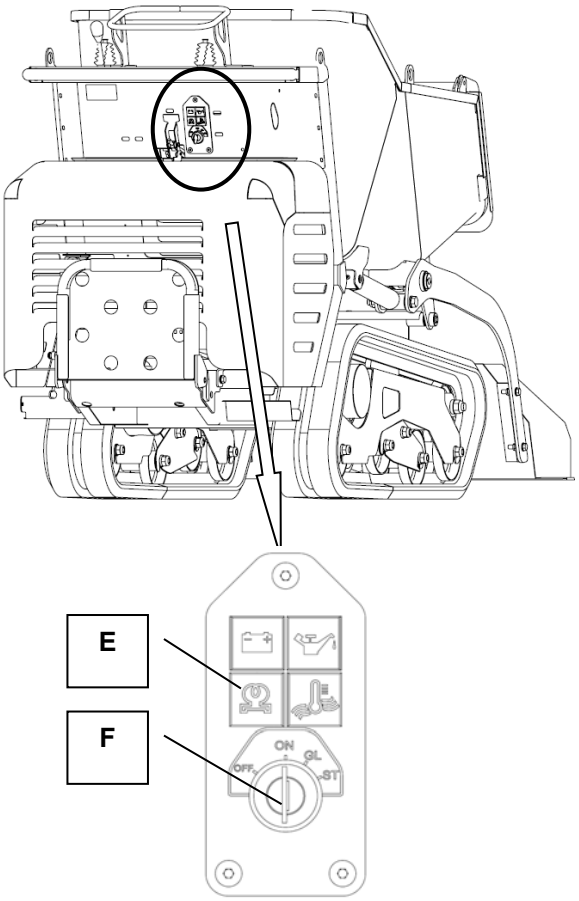
OPERATION No. 2 – turn the key **"F"** (Ref. **A**) clockwise towards position "ON" (Ref. **B**) and then towards position "GL" (Ref. **C**) to preheat the spark plugs. Hold the key in this position until the LED goes off (Ref. **E**) then bring the key to the "START" position (Ref. **D**) to start the engine.
Once the engine is started, the key automatically returns to the "ON" position (Ref. **B**)

DO NOT PROLONG THE START-UPS

OPERATION No. 3 – stop the engine by bringing the accelerator control to the minimum of its adjustment range.

OPERATION No. 4 – turn the key **"D"** counterclockwise,
until it reaches the "OFF" position (Ref. **"A"**).

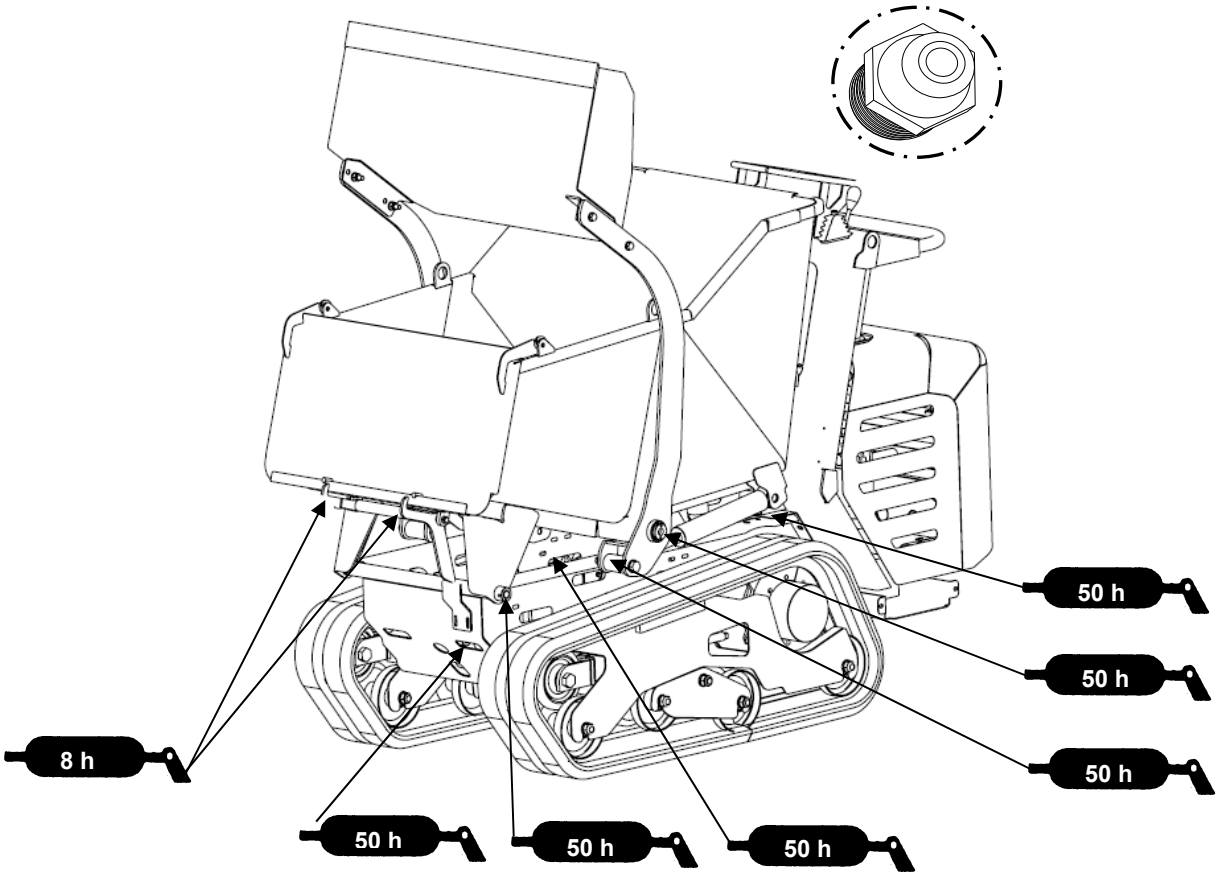




WARNING!
ENGINE REQUIRES DIESEL

5. GENERAL MAINTENANCE

5.1. GREASE POINTS



Periodically grease the indicated points. The lubrication intervals and the lubricant that is to be used are indicated in the table of lubricants below.

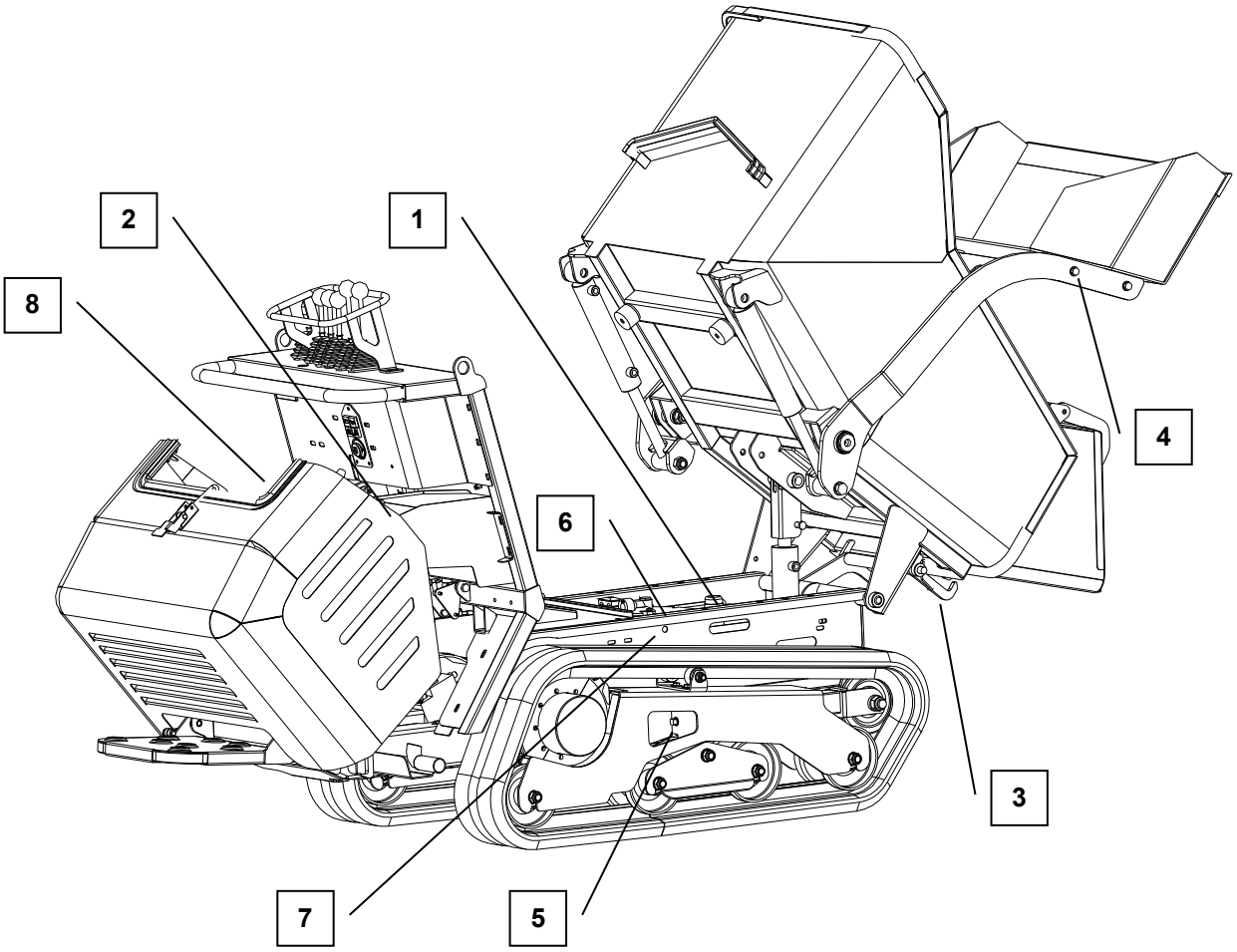
It is recommended to keep all the grease fittings clean and efficient and replace them if inefficient or damaged.

A thorough inspection and constant greasing allow the vehicle to operate perfectly efficient and safely.

Also grease the parts exposed to the elements as they require adequate protection against oxidation.

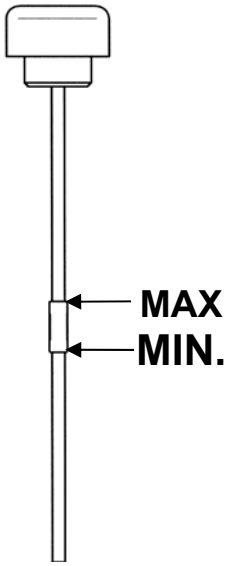
5.2. CHECKS AND CONTROLS

Pay particular attention to that listed and shown below:



1 – HYDRAULIC OIL TANK FILLER CAP
2 – FUEL FILLER CAP
3 – AUTOMATIC DUMPER HATCH OPENING DEVICE
4 – LOADING SHOVEL BLOCKING SCREWS
5 – TRACK TENSIONING DEVICE
6 – HYDRAULIC OIL INTAKE FILTER
7 – DISCHARGE HYDRAULIC OIL FILTER
8 – AIR FILTER

1 – HYDRAULIC OIL TANK FILLER CAP



Complete change **lt. 22,1** For the type of grease, follow the indications in the lubricant table.
Replace the oil after the first **200 HOURS** of operation and every **1000 HOURS** thereafter or once a year.

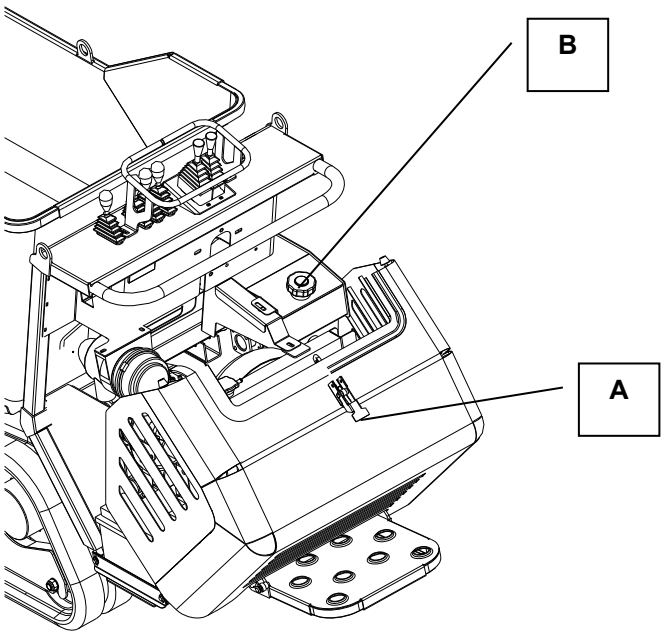
To fill or top up, check that the oil is between the min. and max. levels on the dip stick incorporated in the screw down cap. This control must be performed with the bucket raised (cylinder extended) and the machine on a flat surface.

ALWAYS KEEP THE LEVEL BETWEEN MINIMUM AND MAXIMUM

Never overfill because the tank serves as an oil expansion tank during machine operation.

2 – FUEL FILLER CAP

Open the bonnet by acting on the locking device **"A"** and top-up through cap **"B".**



When refuelling, it is recommended to fill the tank up to ¾ of the maximum overflow level in order to leave space (about ¼) for fuel expansion.

Fuel tank capacity *(unleaded fuel):* **9,7 lt.**

Fuel tank capacity *(diesel):* **9,0 lt.**

3 – AUTOMATIC DUMPER HATCH OPENING DEVICE

The device is made by two spring-hooks that keep the dumper hatch closed.
During the skip's lifting phase, the hooks are automatically unlocked in order to allow the opening of the hatch and the unloading of the goods.
Periodically check both the fixed and mobile parts of the device to ensure that they are always efficient.

4 – LOADING SHOVEL BLOCKING SCREWS

Periodically check that the screws are fully tight. Protect them against oxidation.

5 – TRACK TENSIONING DEVICE

This device is used to restore correct track tightness if they loosen during use.

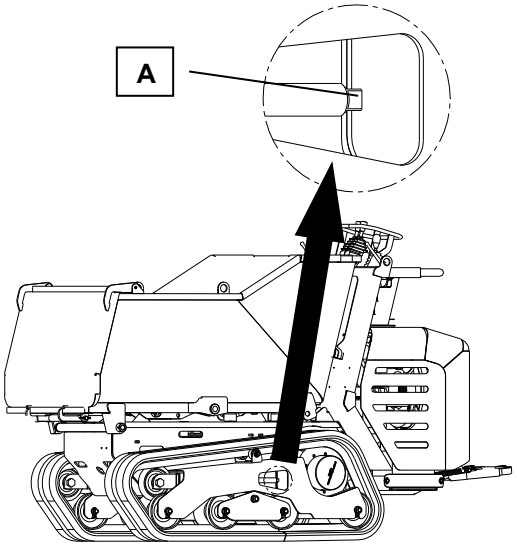
5.3. TIGHTENING THE TRACKS

With use, the tracks tend to loosen.
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 **5 mm**.

If the distance is greater, proceed as follows:

- loosen lock nut **"A"**.
- tighten screw **"B"** until the correct tightness is restored.
- lock screw **"B"** tightening lock-nut **"A"** thoroughly.



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.

VEHICLE USE

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

- Avoid sudden turns and changes in direction while driving on the road, especially on rough and hard ground, bumpy and sharp ground or with high friction**. DO NOT COUNTERSTEER**; turn only one track to go round a bend, both while driving as well as when stationary.
- While driving, prevent the tracks from coming into contact with protrusions and parts with sharp and pointed edges.
- Prevent the tracks from coming in contact with oils, solvents, fuel or other corrosive materials; otherwise, clean and wash immediately.
- Prevent prolonged use of the vehicle in marine areas or in a salty environment, as this enhances the detachment of the metal core from the rubber.

- Due to the basic characteristics of the rubber that the track is made of, it is recommended to use it in temperatures ranging from **– 25°C to + 55°C**.
- Do not leave the tracks exposed to the elements for prolonged periods; sudden climate changes will enhance premature ageing.

- Any wear on the transmission wheels can cause abrasions or the metal core of the tracks to emerge; these must be promptly replaced.

TROUBLESHOOTING

BROKEN STEEL ROPES OF THE TRACK
- Excessive track tension combined with it being used on stones and loose material that accumulate between the track and the undercarriage.
- The track emerging from the guides on the wheels
- High friction in the case of successive and rapid changes in direction.

WORN OR BROKEN METAL CORES
- Excessive track tension
- Incorrect contact between the sprocket and the track (worn sprocket, debris interposed between the sprocket and the track, etc.)
- Used on sandy ground

DETACHED METAL CORES FROM THE RUBBER
- Excessive abrasion of the inner sides of the track with the guide rollers (excessive and sudden steering and countersteering).
- Worn and entangled sprocket while turning.

ATTETION!!!
The anomalies listed above require the damaged track to be replaced immediately.

ABRASIONS OR TEARS DUE TO FATIGUE OR EXTERNAL FACTORS
- Generally, these problems are caused by the way the vehicle is used or the environment in which the work is carried out. These changes in the track can be reduced but not eliminated by using the vehicle with care and responsibly, which allow the track to be used without being replaced, even though it is nearing the end of its life cycle and it must be replaced. **It is recommended to replace it even if the tread is reduced to about 2 to 5 mm.**
- Abrasions, tears and cuts on the outer surface of the track (that in contact with the ground) are more often due to contact with sharp stones or cutting material (metal sheets, glass, nails, brick chips, etc.), which cut and partially or completely remove parts of the track. It is clear that from the aspect related to the rubber characteristics, this is inevitable even though it depends on the specific use and service conditions.

NOTE: The integrity of the rubber track and the fact that it wears sooner or later mainly depend on how the vehicle is used.

5.4. REPLACING THE HYDRAULIC OIL INTAKE FILTER

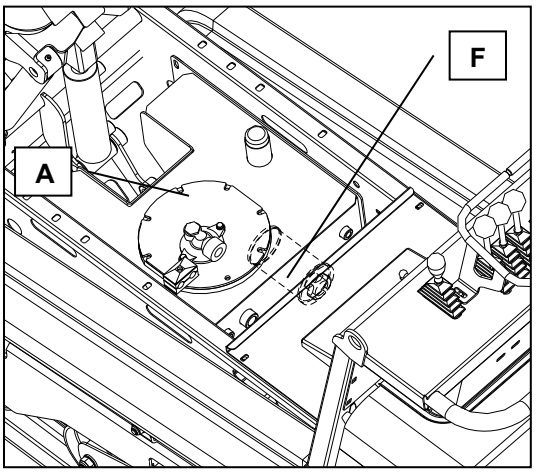
The filter is located inside the hydraulic oil tank (see picture).

Replace the filter after the first **50 HOURS** of operation and every **500 HOURS** thereafter.

Remove the oil tank cover by loosing the screws **"A"**, unscrew the filter **"F"** and replace it with another having the same characteristics:

Degree of filtration: 30 micron.
Nominal flow rate: 25 l/min.

NOTE: <u>each time the filter is replaced, any oil that leaks must not be released in the environment.</u>



IT IS ADVISABLE TO CARRY OUT THIS OPERATION OVER WATERPROOF OR PLASTIC SHEET.

THE OIL MUST ONLY BE DISPOSED OF AT AUTHORISED COMPANIES.

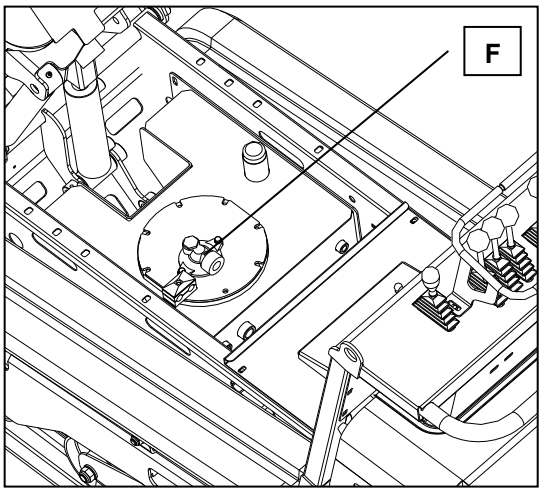
5.5. REPLACING THE DISCHARGE HYDRAULIC OIL FILTER

The filter is located inside the hydraulic oil tank (see picture).

Replace the filter after the first **50 HOURS** of operation and every **500 HOURS** thereafter.

Unscrew the filter **"F"** and replace it with another having the same characteristics:

NOTE: <u>each time the filter is replaced, any oil that leaks must not be released in the environment.</u>



IT IS ADVISABLE TO CARRY OUT THIS OPERATION OVER WATERPROOF OR PLASTIC SHEET.

THE OIL MUST ONLY BE DISPOSED OF AT AUTHORISED COMPANIES.

5.6. REPLACING THE AIR FILTER (PETROL ENGINE)

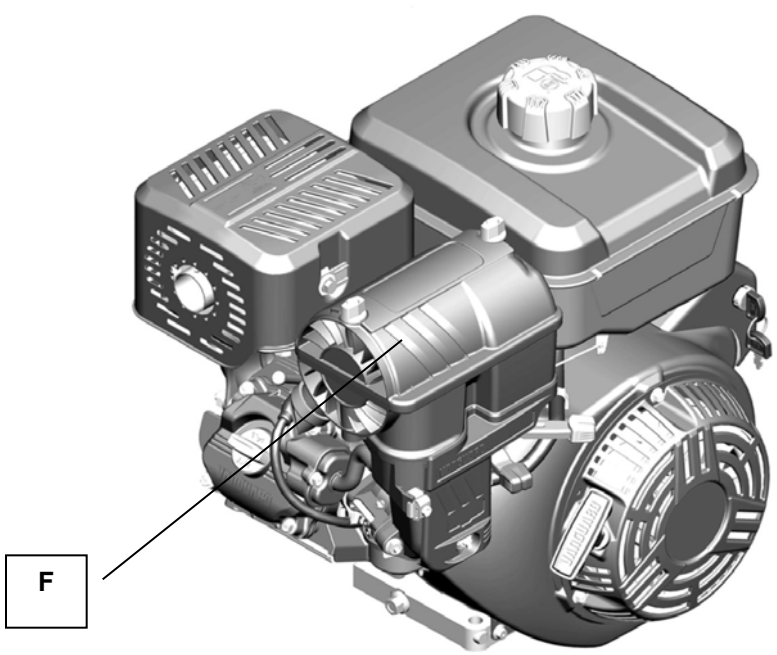
The air filter **“F”** is located under the engine bonnet.

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.



5.7. REPLACING THE AIR FILTER (DIESEL ENGINE)

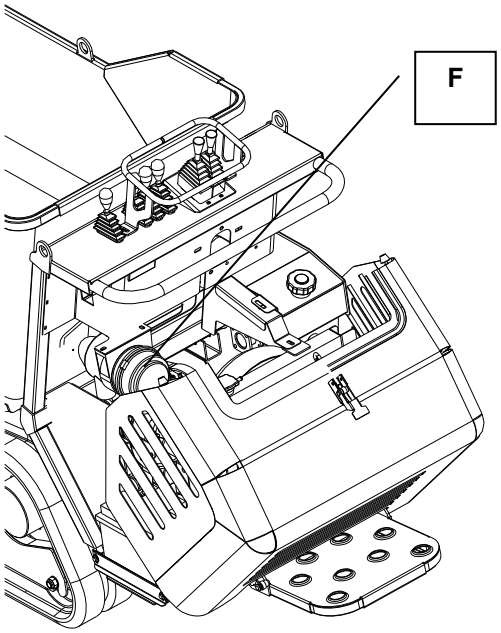
The air filter **"F"** is located under the engine bonnet.

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.



5.8. LUBRICANT TABLE

Agip		
RECOMMENDED PRODUCTS	**PARTS TO BE LUBRICATED**	**QUANTITY (Liters)**
AGIP SIGMA S 30	DIESEL ENGINE	See engine manual
FORD FORMULA F 5W-30	PETROL ENGINE	Vedi libretto motore
AGIP ARNICA 46	HYDRAULIC SYSTEM AND HYDROSTATIC SYSTEM	22,1
AGIP GR SM	GREASE FITTINGS	As needed

The recommended products can be replaced with other brands provided they have the same characteristics.

5.9. ENGINE

With regards to use, topping-up, starting and stopping, inspections, cleaning and maintenance, refer to the information and recommendations in the use and maintenance manual of the manufacturing companies supplied with the vehicle.

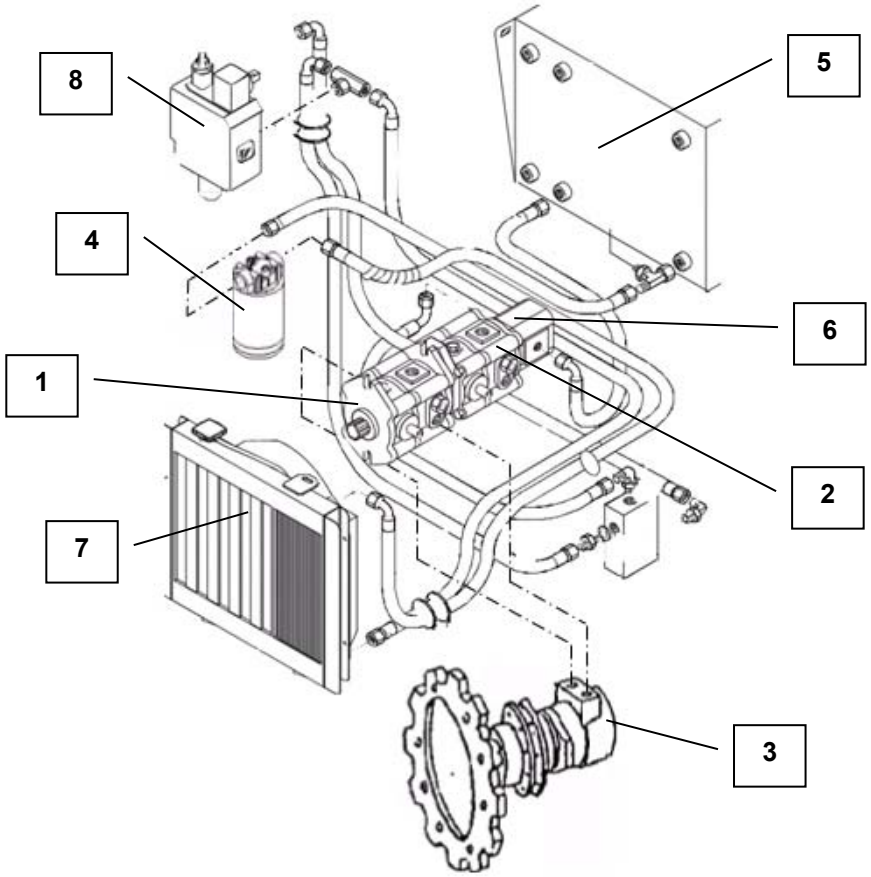
5.10. MAINTENANCE SUMMARY TABLE

OPERATION TO BE CARRIED OUT	COMPONENT INVOLVED	HOURS FOR FIRST REPLACEMENT		
		50	100	200
REPLACE	Oil intake filter cartridge	●		
	Discharge oil filter cartridge	●		
	Air filter cartridge			●
	Hydraulic oil			●

OPERATION TO BE CARRIED OUT	COMPONENT INVOLVED	FREQUENCY OF SUBSEQUENT REPLACEMENTS (in hours)					
		8	50	100	200	500	1000
CLEANING	Track	●					
	Loading bucket	●					
	Pump body protection compartment	●					
	Hydraulic oil tank						●
	Air filter cartridge		●				
INSPECTION AND RESTORE (if necessary)	Track tension		●				
	Hydraulic oil			●			
REPLACE	Oil intake filter cartridge					●	
	Discharge oil filter cartridge					●	
	Air filter cartridge				●		
	Hydraulic oil						●
CLEANING	Grease points	●					

ATTENTION!
Refer to the information provided in the Manufacturer's manual supplied with the vehicle when inspecting the engine.

6. HYDROSTATIC TRANSMISSION SYSTEM



1. RIGHT TRACK HYDRAULIC PUMP
2. LEFT TRACK HYDRAULIC PUMP
3. DRIVE GEARMOTOR
4. DISCHARGE OIL FILTER
5. HYDRAULIC OIL TANK AND OIL INTAKE FILTER
6. SERVICE HYDRAULIC PUMP
7. WATER/OIL COOLER
8. MAIN VALVE FOR HYDRAULIC POWER TAKE-OFF (OPTIONAL)

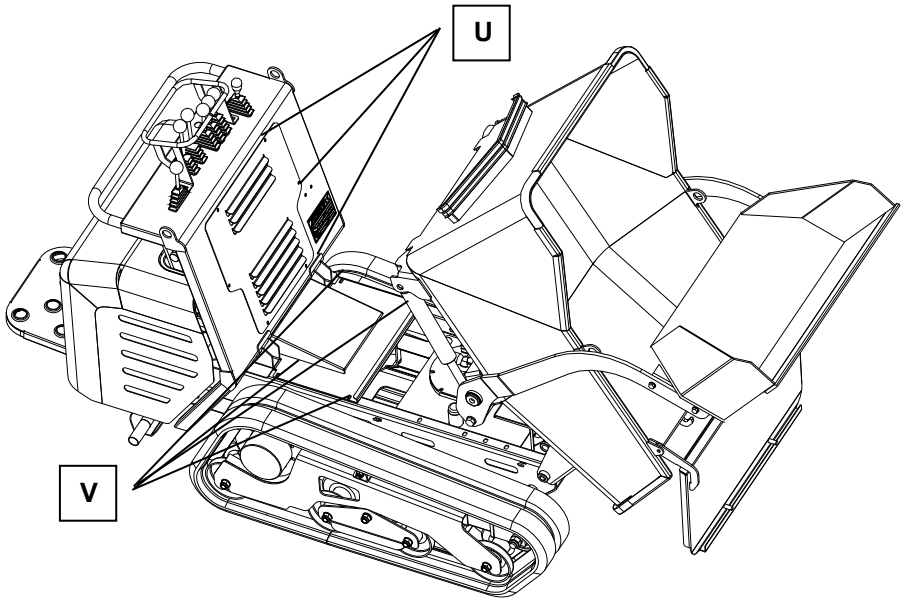
ATTENTION!!!

Refer to the paragraph “CHECKS AND INSPECTIONS” when changing the oil filter.

6.1. PUMPS MAINTENANCE

In order to service the pump and the hydraulic valve once the body is tipped and safely blocked (*see Section* **3.4**), loose the screw **"U"** and **"V"** and then remove the protection carters

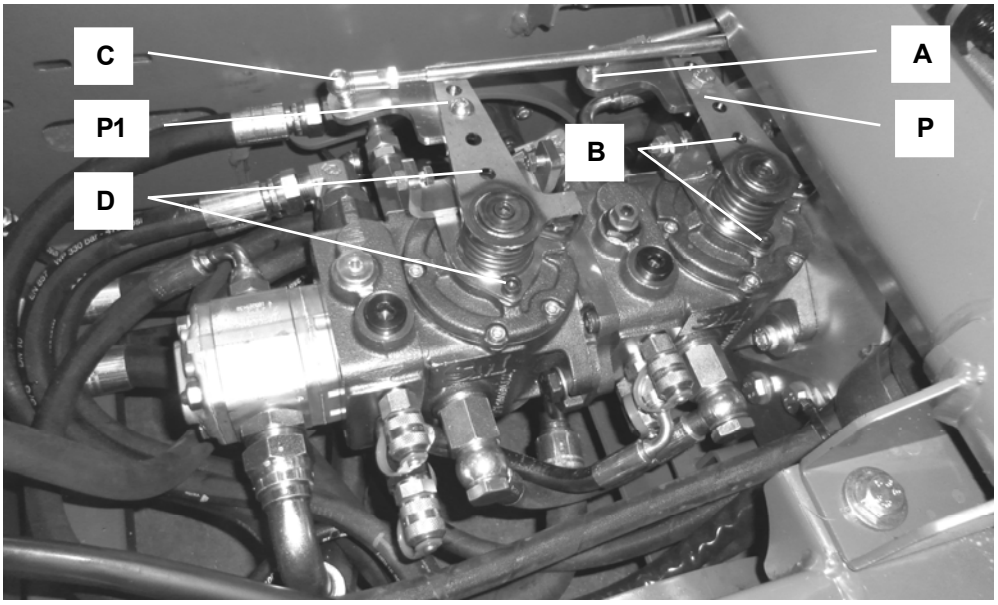
After finished the necessary maintenance, locate again the panels and tie the screws.



6.2. ADJUSTMENT AND ZERO SETTING OF THE HYDRAULIC PUMPS

The track control levers on the control panel automatically return to zero (neutral position), independently of the revolutions of the engine.

If the machine moves slowly forwards or backwards, or rotates slightly, in spite of the fact that the levers are in neutral, it will be necessary to regulate one or both the pumps driving the tracks.



To adjust the pumps and obtain zero setting, proceed in the following order:

- position the machine on a flat horizontal surface;
- unscrew the axle bolt on the control cable from the regulating poles **“A”**, **“C”** or both;
- gently loosen screws **“B”**, **“D”**, or both of them, using the hexagonal key no.5 to release the break on the adjustment plate **“P”** or **“P1**” or both;
- position the plate **“P”**, **“P1”**, or both, in such a way that they lock the tracks and therefore stop the machine;
- tighten screws **“B”**, **“D”** or both, in this position, ensuring the machine is completely immobile;
- reassemble the axle bolt on the control cable onto the respective parts of the regulating poles **“A”** and **“C”**, checking that the speed level of the cable is correct and maintaining the stop position.

ATTENTION!!!

DO NOT INSERT HANDS, PARTS OF THE BODY OR TOOLS IN THE FAN LOCATED ON THE RADIATOR AS IT STARTS AUTOMATICALLY.

IMPORTANT!!!

For proper use of the machine it is recommended to bring the hydraulic oil to work temperature by leaving the engineto idle and slightly accelerated for about 5 – 10 minutes.

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

6.3. HYDRAULIC SYSTEM PRESSURE CHECKS AND CONTROLS

Every part of all the manufactured vehicles is thoroughly checked and tested in order to provide the customer with a perfectly efficient and functional vehicle from a mechanical, electrical and hydraulic aspect.

The vehicle is equipped with quick couplings that facilitate the hydraulic system inspection operations as the calibration values of the pressures of the individual services are verified on these.

ATTENTION!!!

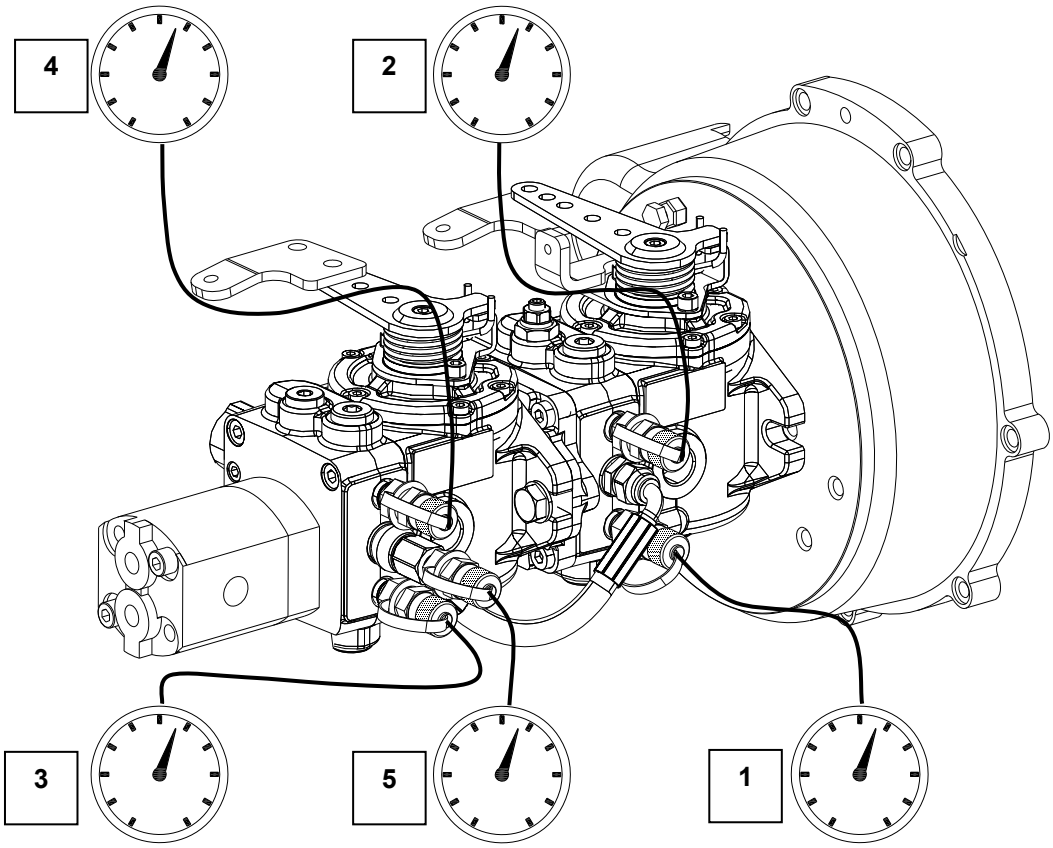
DO NOT INSERT YOUR HANDS, BODY PARTS OR TOOLS NEAR THE RADIATOR FAN AS THIS STARTS-UP AUTOMATICALLY.

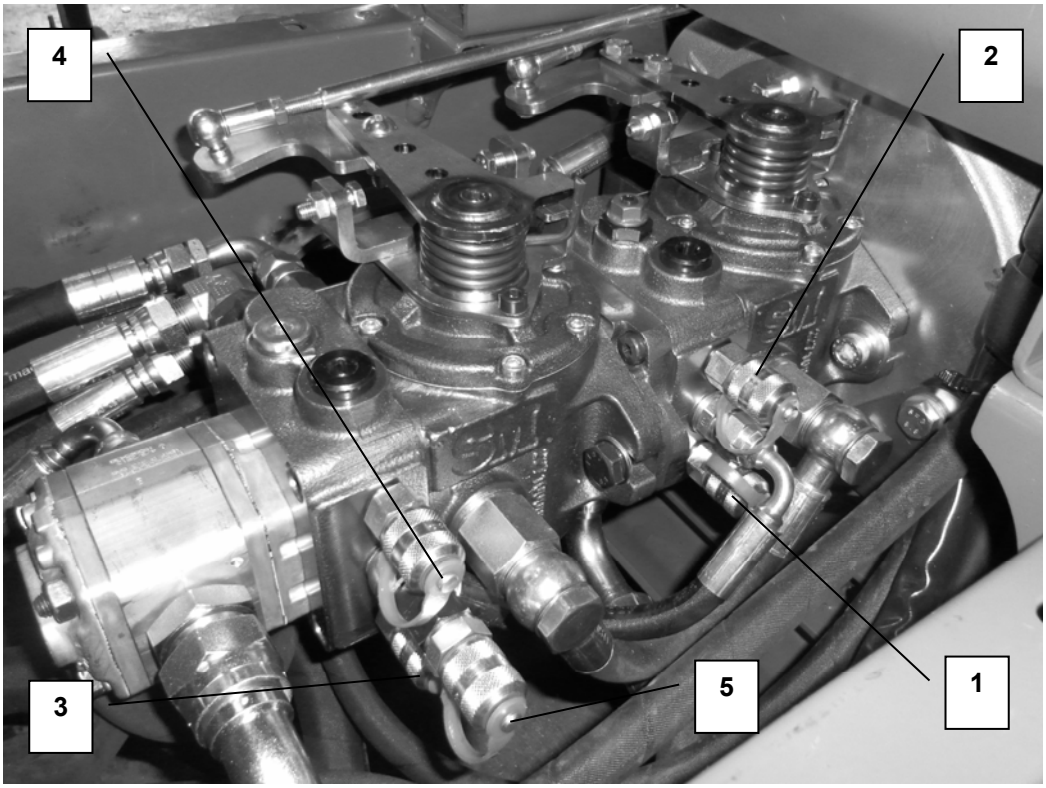
IMPORTANT!!!
For the vehicle to be used correctly it is recommended to bring the hydraulic oil to the operating temperature by letting the endothermic engine run with no load and slightly accelerated for about 5-10 minutes.

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

The track steering control levers on the control panel have an automatic return to zero function (neutral position), regardless of the speed of the endothermic engine.

6.4. CHECK MAX. PRESSURE OF HYDROSTATIC TRANSMISSION SYSTEM





- With the vehicle stationary and the engine off, connect no.4 **400 bar** full scale gauges to points **"1"**, **"2"**, **"3"** e **"4"**, start the endothermic engine and bring it to the max. power allowed (*3600 rpm*).
- Operate the drive lever corresponding to the track to the service of which the gauge has been connected, taking care to block the piloted track and progressively bringing the drive lever completely forwards or backwards.

GAUGE POSITION	CORRESPONDING GEAR	RELATIVE TRACK	PRESS. TO BE READ
1	forward	right	**220 ÷ 230 bar**
2	reverse	right	
3	reverse	left	
4	forward	left	

- The gauge set at points **"1"**, **"2"**,**"3"** or **"4"** must indicate a pressure of **220/ 230 bar**.

ATTENTION!!!

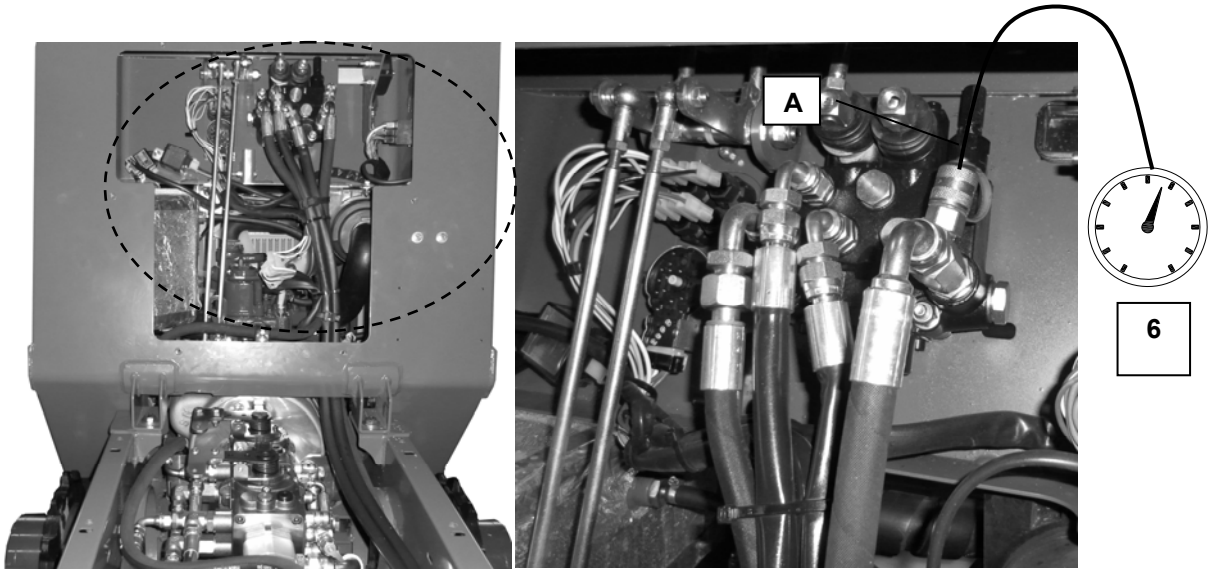
WHEN TESTING THE 4 SERVICES, THE BOOST PRESSURE READ AT POINT **"5"** MUST REMAIN UNALTERED, RANGING BETWEEN THE LIMITS INDICATED BELOW (**12 – 13 bar**).

6.5. CHECK CHARGE PUMP PRESSURE

- With the machine stopped and engine off, connect up a pressure gauge with bottom scale value **40 bar** to point **"5"** after which start the engine and run at max.rpm (*3600 rpm*).
- Under these conditions, the shown pressure should be **between 12 and 13 ba**r.

GAUGE POSITION	FUNCTION	PRESS. TO BE READ
5	Charge pump	**12 ÷ 13 bar**

6.6. CHECK MAX. PRESSURE OF THE HYDRAULIC SYSTEM SERVICE PRESSURES



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

- with the vehicle stationary and the engine off, connect a **250 bar** full-scale gauge to position **"6"**;
- start the engine and bring it to a speed of about 2600 rpm (ACCELERATOR LEVER = ¾ OF THE MAX. RANGE) then read the pressure indicated on the gauge;
- if the detected pressure differs from the calibration value (**160 bar**) by over 5 bar, restore it by acting on the adjusting screw **"A"** 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.

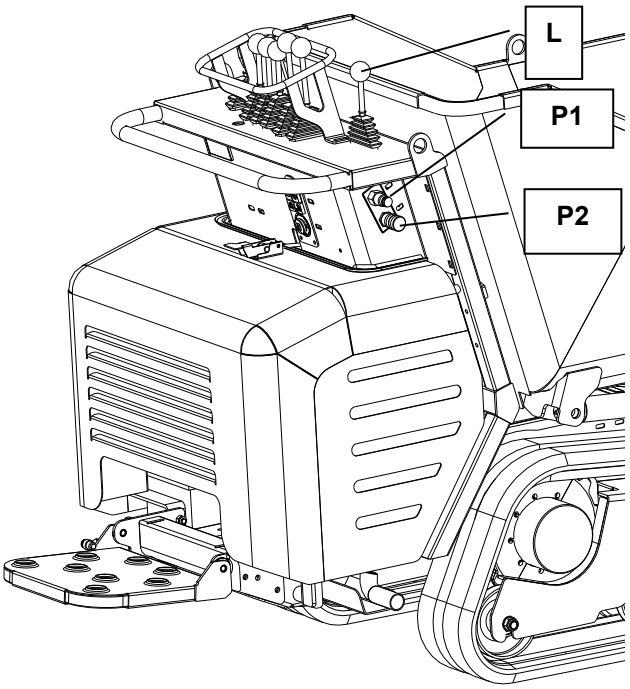
GAUGE POSITION	PRESS. TO BE READ	FULL SCALE GAUGE	TYPE	RPM
6	160 ± 5 bar	250 bar	¼" G	2600 rpm

7. HYDRAULIC POWER TAKE-OFF PTO

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	**28**	**lt/min**
PRESSURE	**155**	**bar**



The PTO flow rate and pressure output is directly proportional to the number of revolutions of the engine. Therefore, the flow rate can vary from a minimum of **0 l/min** up to a maximum of **28**.

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.);
- increase the number of revolutions of the engine by acting on the accelerator lever until the oil flow rate corresponds to the correct operation of the connected equipment.

NOTE: before disconnecting the connections of the quick couplings on the PTO, **ALWAYS** bring the control lever **"L"** of the distributor to the neutral closing position (centre) and bring the number of revolutions of the engine to the minimum. Otherwise, once the engine is stopped, it will not restart.

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

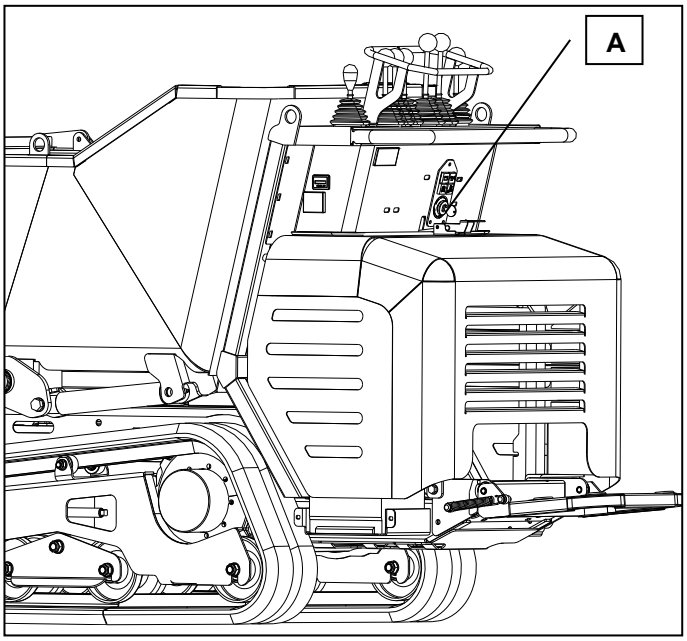
Battery **"B"** is found under the bonnet, on the left side.

BATTERY SPECIFICATIONS:

VOLTAGE: 12 V
CONSUMPTION: 55 Ah
DISCHARGE: 450 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.

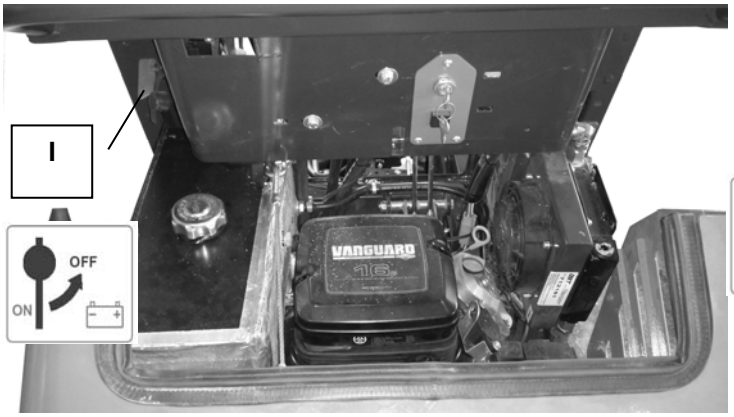
Keep metal tools and objects away from the battery poles as these may short-circuit the terminals and pose a risk of burns.

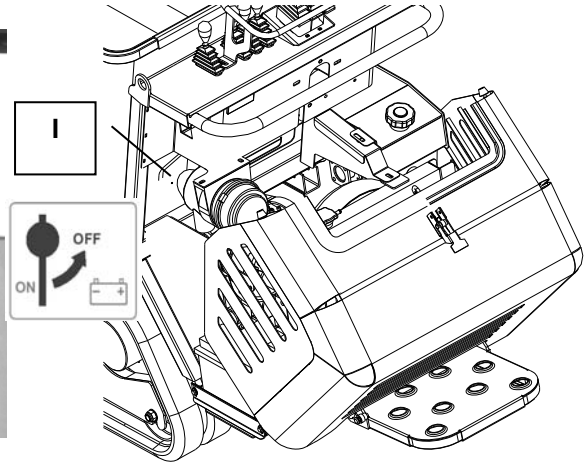
Always contact **Authorised Workshops** to charge the battery.

When parking the machine for a long period of time at low temperatures, the battery should be protected or stored in a dry and protected area.

REMOVE THE COVERING BEFORE IGNITION; FIRE HAZARD.

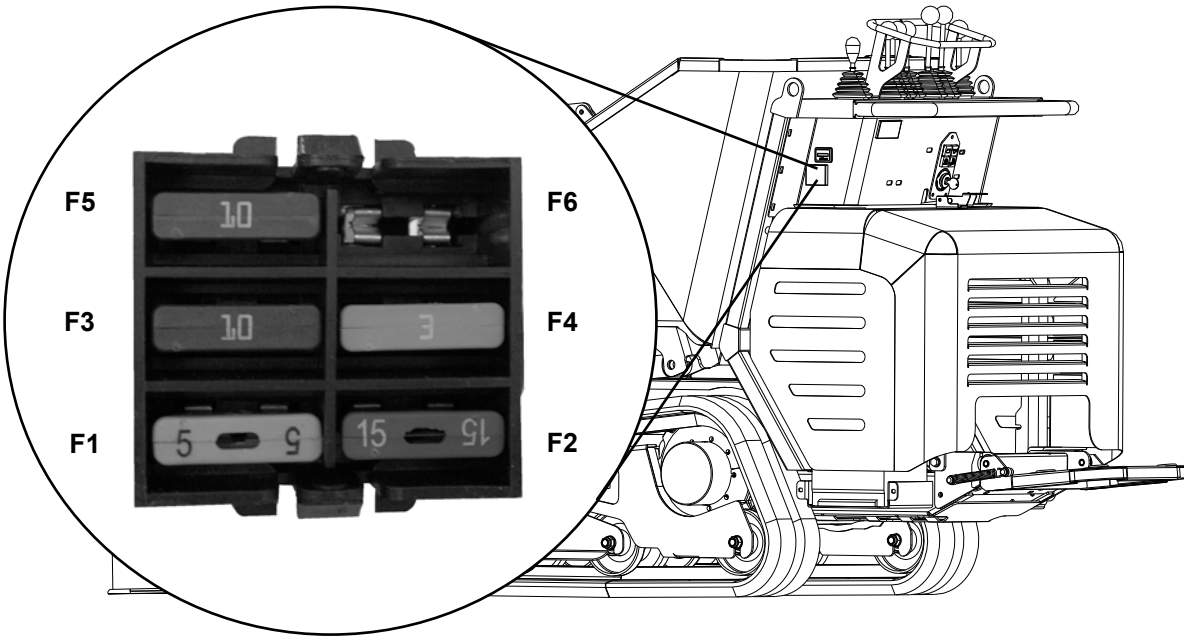
The machine is equipped with a **switch "I"** located on the left side of the machine, it makes it possible to disengage the battery if any **EMERGENCY** required it or if stopping the machine for a long period of time (*more than 4 hours*).
Always contact Authorised Workshops for recharging.





The fuse box is located on the left side of the vehicle, opposite the PTO. Access is immediate.

FUSES



REF.	PROTECTED DEVICE	CAPACITY
F1	Starter fuse	5 A
F2	Engine stop fuse	15 A
F3	Alternator energising fuse	10 A
F4	Meter fuse	3 A
F5	Pre-heating fuse	10 A
F6	Not used	-

9. TROUBLESHOOTING: CAUSES AND SOLUTIONS

PROBLEM	CAUSE	SOLUTION
The vehicle jerks	No oil in the tank	Check the level and top-up, if necessary
	Air in the hydraulic drive system	Verify the efficiency of the pipes and fittings
	Clogged hydrost. oil filter	Replace the filter cartridge
	Control levers operated too abruptly and quickly	Operate the lever gently
The vehicle does not make use of all its power and does not perform at its maximum performance levels	Use different hydrostatic oil from that indicated	Check and replace it with adequate oil, if necessary
	Clogged hydrostatic oil filter	Replace the filter cartridge
The track tends to come out from its housing	Loosened track due to use	Adjust in accordance with the instructions provided in the paragraph CHECKS AND INSPECTIONS of the GENERAL MAINTENANCE
One of the two tracks is blocked	A foreign body is lodged between the track and the chassis	Remove the foreign body
	Faulty hydrostatic motor	Contact an authorised workshop
	Damaged pump	Contact an authorised workshop
	Broken hydraulic pipes	Check and replace, if necessary
The loading tipper door does not open or close	Damaged coupling device	Check the lever, housing, etc. and if necessary, restore the original conditions
The engine does not start	Burnt spark plugs	Verify the integrity of the spark plugs and the electrical circuit and replace, if necessary
	Flat battery / oxidised terminals	Verify and clean or replace
	Empty fuel tank	Check and top-up, if necessary
	Incorrect fuel	Verify and if necessary, replace after cleaning the tank
	Damaged starter or electromagnet	Contact an authorised workshop

PROBLEM	CAUSE	SOLUTION
The loading tipper does not rise or tilt	Faulty joint and/or hydraulic pump	Check and replace, if necessary
	Broken hydraulic pipes	Check and replace, if necessary
	Distributor pressure too low	Verify and restore, if necessary
The vehicle does not move in either direction even though the levers are operated Problems in the drive system (the vehicle does not move or steer)	Damaged cylinder or sealings	Verify and replace, if necessary
	Broken hydraulic pipes between the hydrostatic motor and the pump	Verify and replace, if necessary
	Damaged hydrostatic motor and/or pump	Contact an authorised workshop
	Overheated hydraulic oil	Wait for the hydraulic oil to cool down sufficiently and try again
Despite the lever is operated, the corresponding track does not move	Faulty hydraulic pump	Contact an authorised workshop
	Broken hydraulic pipes	Check and replace, if necessary
Excessively overheated hydraulic oil	Low hydraulic oil level	Verify and restore, if necessary
The loading tipper does not rise or tilt	Faulty joint and/or hydraulic pump	Check and replace, if necessary
	Broken hydraulic pipes	Check and replace, if necessary
	Distributor pressure too low	Verify and restore, if necessary

Refer to the information provided in the relative manual supplied with the vehicle when inspecting the endothermic engine.

10. MAINTENANCE NOTES

DATE	WORK COMPLETED	HOURS OF WORK	PARTS INVOLVED