

# STIGA



## *WORKSHOP MANUAL*

### **PARK 2022**



# **WORKSHOP MANUAL**

# **PARK**

## **EDITION 2022**

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### **INTRODUCTORY NOTES**

The purpose of this manual is to provide a complete set of instructions related to servicing, maintenance, disassembly, repair and installation of the mechanical components for the Stiga PARK machine in its different versions and equipment. All the Servicing personnel in charge must use this manual during all adjustment, disassembly and troubleshooting activities.

**IMPORTANT NOTE** - The information contained herein is destined exclusively to the Service Centres and professional operators, with the required expertise to perform, and use the correct equipment, all the operations described, with the objective of safeguarding machine performance and safety.

The Manufacturer is under no circumstances liable for any damage or injuries due to interventions performed by private individuals or inadequate facilities.

This manual does not contemplate interventions and repair work on the engine and transmission units, as it is necessary to contact the Service Centres of the respective Manufacturers or obtain documentation supplied by the same.

The manual has left out the simplest and quickest operations that can be handled by a good mechanic, while concentrating more on specific aspects with tips and advice on the best servicing procedures.

Please take the time to read through this manual to acquire a basic understanding of the machine, which is necessary for working rationally without making errors or wasting time. All problems related to user procedures are fully covered in the User manual.

All the information provided refers to the original versions of the machines, excluding therefore interventions on machines which have been subject to modifications that have altered their characteristics or components.

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# 1 - INTRODUCTION

## Summary

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## 1.1 CONSULTATION GUIDE

### 1.1.1 Limitation of Responsibility

Despite the efforts made to ensure accuracy in producing this manual, errors and inaccuracies may be found in the content. The author is not responsible for any missing or incorrect information. The Manufacturer reserves the right to make any modifications to the product without warning or any obligation to promptly update this manual.

The introduction of new procedures or indications in addition to those contained in this Manual are reported to the Service Centres by means of ad hoc bulletins and press releases.

All information contained herein is based on data available at the time of publication.

The drawings and photos included herein, may not correspond exactly to the machine on which the intervention is required.

### 1.1.2 Structure of the Manual

The manual is divided into chapters, paragraphs and sub-paragraphs.

- The front inside cover provides the table of contents indicating the various chapters.
- Each chapter is dedicated to a specific topic, and is preceded by an index that marks the various paragraphs contained therein.
- Each paragraph is further divided into sub-paragraphs, relative to a single procedure.

Cross-references to other parts of the manual are indicated by the symbol  followed by the relevant chapter, paragraph or sub-paragraph number.

### 1.1.3 Symbols and Terminology used

#### a) Symbols

They are used to draw the attention of the operator, reminding him to perform the interventions with the necessary attention and caution.



Indicates operations that should be carried out with utmost care to avoid impairing the functionality and safety of the machine.



Indicates operations that should be carried out with utmost care to avoid injury to operators.



Highlights all those operations that require different working methods depending on the type of machine, subsequent modifications and accessories fitted.



Indicates the cross-reference to other parts of the manual, followed by the number of the relevant chapter, paragraph or sub-paragraph.

#### b) Safety terminology and notes

Some paragraphs are preceded by a definition that highlights their importance:

**NOTE** *General reference for the correct maintenance execution and methods.*

**IMPORTANT** *Specific procedures or information necessary to avoid damage to the machine or equipment.*

**WARNING!** *Non-observance will result in the risk of injury to oneself or others.*

**DANGER!** *Non-observance will result in the risk of serious injury or death to oneself or others.*

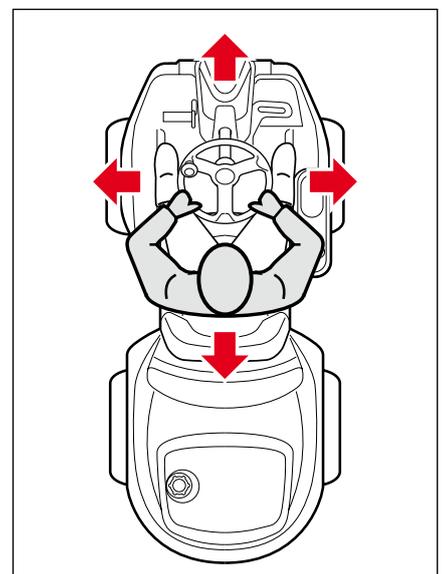
#### c) Spatial references

Whenever reference is made to a position on the machine “front”, “back”, “left” or “right” side, this refers to the positions of the seated operator.

#### d) Abbreviations and glossary

The following abbreviations are used in this manual

Rh / Lh	= Right / Left
Min / Max	= Minimum / Maximum
Chap.	= Chapter
Par.	= Paragraph
HST	= Hydrostatic Transmission
PTO	= Power Take-Off



## 1.2 WORK SAFETY INSTRUCTIONS

### 1.2.1 Qualification of operators

All maintenance, disassembly and repairs must be carried out by expert mechanics who are familiar with all the accident prevention and safety regulations after reading through the procedures in this manual.

### 1.2.2 Basic equipment

All the operations can be carried out with the tools normally available at any good motoring Servicing Centre.

The availability of an adequate lifting platform for the weight and dimensions of the machine makes it more practical to perform the interventions in the lower area of the machine.

### 1.2.3 Preparing to work

Before starting any work, it is very important to provide adequate preparation to achieve more efficient work. A clean work area at the beginning of each intervention allows repairs to be carried out quickly and easily.

To reduce the nuisance of having to search for tools or parts out of place, place the parts removed on a clean work surface, with all the fixing bolts arranged in their order of disassembly.

Organisation is a key element for correct reassembly. The required utensils, tools and components must be gathered before starting work.

Interrupting a job to locate tools or components is a useless waste of time.

### 1.2.4 Precautions during servicing

The operations described in this manual do not entail particularly hazardous situations besides the normal hazard related to mechanical operations and can be avoided by taking the necessary care and attention normally required for this type of work.

As well as following the usual accident prevention regulations that apply to most repair shops, we recommend you:

- remove the ignition key before beginning any repair work;
- protect hands with suitable protective gloves, especially when working near the cutting unit;
- check that you do not cause accidental petrol leaks or other losses;
- do not smoke when working on the tank or when handling petrol;
- do not inhale oil or petrol fumes;
- clean up all traces of spilt petrol immediately;
- let the engine and exhaust system to cool before starting any repair or maintenance work. The engine and the exhaust system heat up considerably during operation.

- test the engine in a well-ventilated environment or where there are adequate exhaust fume extraction systems;
- do not pollute the environment with oil, petrol or other waste which has a strong impact on the environment. Dispose of all waste in accordance with the laws in force;
- ensure that other persons cannot accidentally carry out actions that may physically endanger those working on the machine.

## **1.3 SERVICE CENTRE PROCEDURES**

### **1.3.1 Interventions under Warranty**

The Manufacturer acknowledges the interventions performed under warranty as per the terms, procedures and limits stated in the contract.

As far as the engine and the transmission unit are concerned, the conditions provided by their respective Manufacturers apply.

### **1.3.2 Exceptions to the use of the Warranty**

- The warranty does not cover damages caused by:
  - Lack of knowledge and familiarisation of the accompanying documentation on the part of the user.
  - Carelessness.
  - Incorrect or prohibited use or assembly.
  - Use of non-genuine spare parts.
  - Use of accessories not supplied or approved by the manufacturer.
- Furthermore, the warranty does not apply to:
  - Components subject to wear such as belts, wheels, batteries and cables.
  - Normal wear and tear due to use.
  - Engine and transmission. These components are covered by the warranties of the respective manufacturers, with terms and conditions specified separately.

The purchaser is covered by national legislation of the Country he resides in. The legal rights of the laws that refer to the purchaser are not limited by this product warranty.

### **1.3.3 Service repairs outside warranty**

The Service Centre has to make out a report containing the machine serial number, a summary of the problems, the repairs carried out and any spare parts used for each repair done on the machine.

A copy of these reports must be retained and made available to the Manufacturer together with the replaced parts in case of any subsequent disputes with Customers.

### **1.3.4 Fault notification**

The Manufacturer welcomes any notifications of faults that recur with particular frequency. It gives the opportunity for a careful inspection of the problem and the implementation of corrective action at production level.

Similarly, the Manufacturer will report any faults discovered on the machines produced, with recommendations for the most suitable procedures for their remedy.

### **1.3.5 Spare parts requests**

When requesting spare parts, the code number must be given, referring to the exploded charts for the year of manufacture, shown on the product identification label.

## 2 - INFORMATION FOR SERVICE CENTRES

### Summary

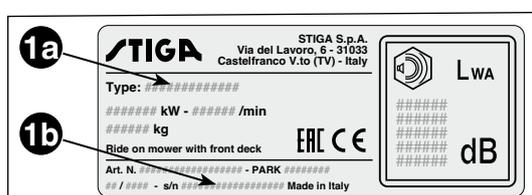
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### 2.1 GENERAL INFORMATION

#### 2.1.1 Machine identification

Each machine has a label (1) which shows the technical specifications, the model (1a) and the serial number (1b).

The model and serial number must be shown when requests are made under Warranty, and are indispensable for spare part orders.

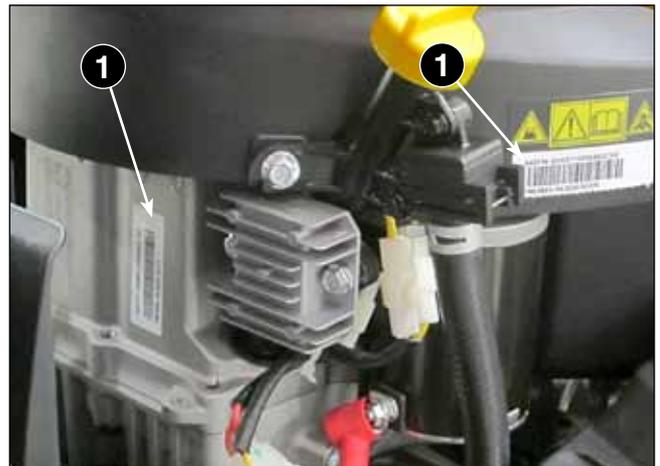


### 2.1.2 Engine identification

The engine is made to precise technical specifications which differentiate it from similar items by this same Manufacturer.

The engine has one or two labels (1) with serial number that clearly identifies the product and its specifications; this number must always be quoted when requesting spare parts or any information from the Manufacturer.

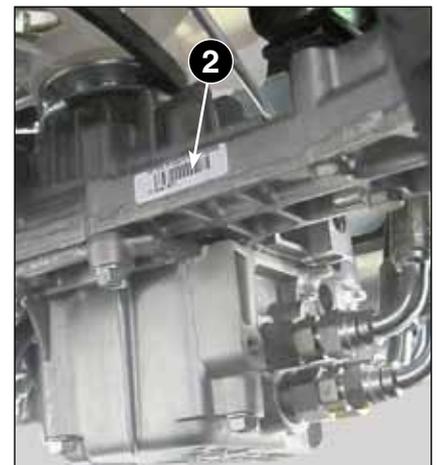
**NOTE** Given the possibility of using different engines, the image is only an example.



### 2.1.3 Transmission Unit identification

Depending on the version, the machine is equipped with one or two hydrostatic transmission units. These units are made by another manufacturer according to precise technical specifications which differentiate them from similar items by this same Manufacturer.

Each transmission unit has a label (1-front, if present) and (2-back) with a serial number that clearly identifies the product and its specifications; this number must always be quoted when requesting spare parts or any information from the Manufacturer.



### 2.1.4 Versions and equipment

This manual includes assistance and maintenance operations for a range of machines, which differ from each other in terms of engines, components and equipment; differences and common elements are highlighted in the technical data table. [👉 2.6.1]

## 2.2 MACHINE PREPARATION AND DELIVERY

### 2.2.1 Preliminary procedures

All STIGA machines have been subjected to an accurate programme of checks before delivery. The machine are supplied at their most complete level and thanks to this the final assembly for the delivery is quick and easy.

The correct and accurate assembly of the machine upon delivery is an easy way to ensure satisfied customers!

**NOTE** The machine has to remain positioned on the pallet during the unpacking and assembly.

Open the case, remove the following parts from the packaging and put them on the floor to verify:

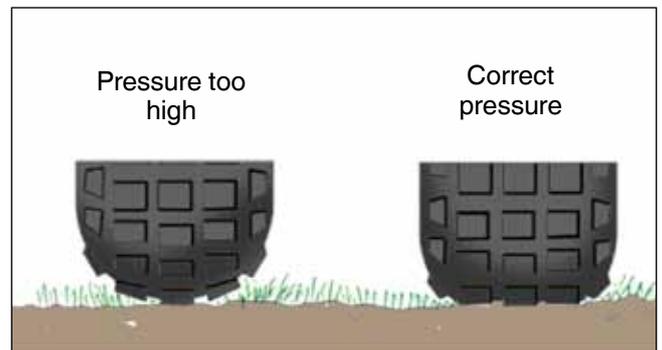
- The battery (some models).
- The steering wheel.
- The plastic bag, containing the user manuals, information supports and mounting screws.

### 2.2.2 Tyre pressure check

Check the tyre inflation pressure, indicated on the footboard cover mat.

The air pressure of the tyres is extremely important for the performance and maneuverability of the machine. The correct pressure for cutting grass is 0.6 bar (9 psi) for the front tires and 0.4 bar (6 psi) for the rear tyres.

When using heavy accessories, such as a snow thrower, it may be necessary to slightly increase the pressure. However, the maximum pressure allowed is 0.8 bar (12 psi).



A too high inflation pressure causes poor driveability of the machine, due to the reduced surface in contact with the ground; a hard tyre has less flexibility to deteriorate self-cleaning characteristics.

### 2.2.3 Battery

**NOTE** This machine uses a hermetic recombination battery, in which the electrolyte of each element is carefully dosed in the production phase and sealed at the origin, in order to ensure maximum efficiency during the entire life of the battery.

**IMPORTANT** A hermetic recombination battery does not need to be refilled with water or acid, it must never be opened and its cover must not be removed.



**WARNING!** Do not wear rings, metal bracelets, necklaces or similar metal objects when working with the battery. This can cause short circuits, cause burns and start a fire.

#### • Storing the battery

**IMPORTANT** The battery voltage must not drop below 12.5V, otherwise it would be severely damaged. During the storage period, make sure that the battery voltage is always above 12.5, and recharge in case it is lower. [👉 9.3.1]

**IMPORTANT** The battery must be fully charged before using the machine for the first time. The battery must always be stored fully charged. If the battery is stored discharged, it can be seriously damaged.

- Recharging the battery

Charge and install the battery, following the specific instructions. [👉 9.3.1]

**IMPORTANT** *The engine must never be operated with the battery disconnected. There is the risk of causing serious damage to the generator and the electrical system.*

## 2.2.4 Axial steering allowance adjustment (solo Park 5xx - 7xx)

The steering column must always have a minimum axial backlash, sufficient to ensure a smooth operation.

If the backlash is excessive, it is possible to reduce it inserting, under the steering column, one or both of the 0.5 and 1 mm shim washers supplied.



## 2.2.5 Final operations

- Removal from the pallet

All the operations described above must be carried out with the machine fixed to the transport pallet; at this point, free the machine from the fixing constraints, push it off the pallet and complete the assembly of the accessories.

- Test driving

**⚠️ WARNING!** *If the machine has to be delivered with a cutting deck or other accessories, they must be assembled before attempting to drive the machine. Do not carry out the test drive without the working equipment (lawn mower deck) connected, to avoid the risk of overturning.*

Drive the machine for some minutes, trying all the functions with special attention to the safety devices.

- Transmission oil

Check the oil level in the rear transmission expansion tank after the test drive, and top up if necessary.

- Engine oil

Check the engine oil level and top up if necessary.

- **Steering chain**

Check that the steering chain is sufficiently tight and adjust it if necessary.

- **Various**

Carry out a general inspection of the machine, asking yourself these last questions:

- Is the machine clean?
- Is there any oil leakage?
- Is there any abnormal noise or rattling?

- **Delivery to the client**

Fill in the warranty certificate to guarantee that the delivery service has been carried out and performed correctly.

Make sure that the client has received all the documentation when the machine is picked up or delivered.

## 2.3 TRANSPORTATION AND HANDLING

### 2.3.1 Machine transportation

Pay utmost attention when loading the machine on or off a trailer or truck, in particular:

- Load the machine with the equipment (if present) in the “Transport” position, making sure not to hit the ramps while climbing.
- Use ramps of adequate strength and length for the means of transport on which the machine has to be loaded.
- During transport, engage the parking brake and place the equipment (if present) on the ground because any violent jolts could break the frame of the cutting deck.
- Use the metal parts of the machine frame as gripping points to secure it to the means of transport.
- Make sure the machine cannot move during transport.
- DO NOT fix the machine to elements of the means of transport which do not offer the necessary strength, or which could be damaged in the event of impact or jolts.

### 2.3.2 Machine lifting



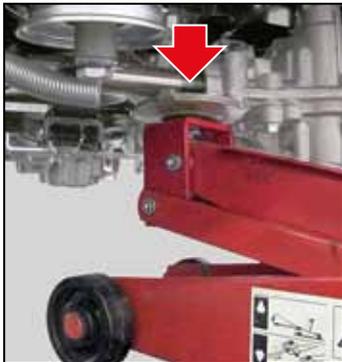
**DANGER!** *The machine must never be lifted by means of a hoist or other means of lifting involving ropes.*

**IMPORTANT** *For all the operations involving the partial lifting of the machine, the cutting deck or other front equipment present must be removed.*

**a) Front part lifting**

**! WARNING!** Engage the parking brake and place two wedges behind the rear wheels to prevent the machine from moving.

**▶▶ Park 4WD machines:**



– Raise the machine using a jack that acts under the front transmission assembly.

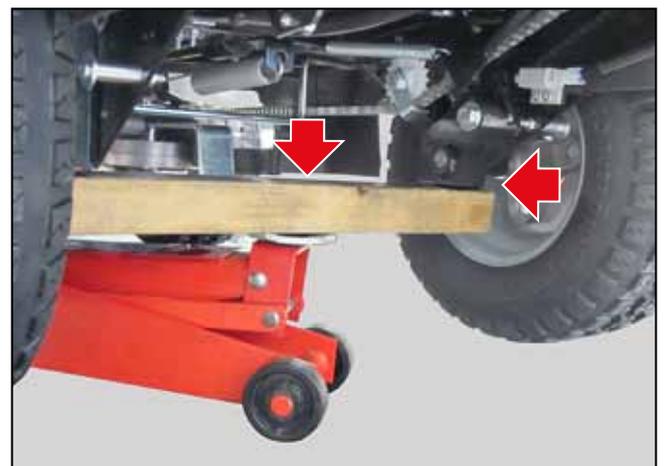


– Stabilize the machine with two stands placed in correspondence of load-bearing elements of the front part of the frame.

**▶▶ Park 2WD machines:**

– Place a wooden beam under the two lower brackets of the frame, and where the axis of the front wheels are

– Lift the machine using a jack that acts in the centre of the beam.

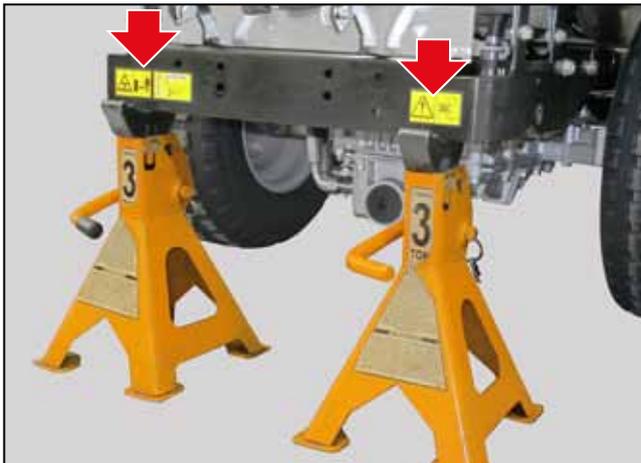


– Stabilize the machine with two stands placed in correspondence of load-bearing elements of the front part of the frame.

## b) Rear part lifting

**!** **WARNING!** *Position two wedges in front of the front wheels to prevent the movement of the machine.*

- Raise the machine using a jack that acts under the rear transmission assembly.



- Stabilize the machine with two stands placed in correspondence of load-bearing elements of the rear part of the frame.

## 2.4 SPARE PARTS

### 2.4.1 Original spare parts

**!** Use only original spare parts, the only ones with design, material and processing characteristics optimized for the use on the machine for which they were intended; these characteristics are not found in so-called “compatible” spare parts, and can compromise the safety of the machine and the regularity of the operation.

### 2.4.2 Non-original spare parts

**!** Replacement of any machine component with anything other than a part authorised by the Manufacturer can adversely affect performance, working life or safety of this machine and will void the Warranty.

The manufacturer disclaims all liability for any claims or damages, albeit under warranty, property damage, personal injury or death resulting from the use of unauthorised spare parts.

## 2.5 MAINTENANCE

### 2.5.1 Criteria for maintenance

The Instruction Handbook has a number of operations to be carried out by the Customer for a minimum of basic maintenance, and other operations not always within his capacity.

For this reason the Service Centre should undertake to keep the machine in perfect working order adopting a routine maintenance schedule.

### 2.5.2 Safety measures to be adopted

All the machines are manufactured in accordance with the strict European safety regulations in force. To maintain these levels of safety in the longer term, the Service Centres should work to this end by making appropriate checks every time there is the chance to do so.

In particular, every time there is work done on the machine the Service Centre should:

● **check:**

- the correct functioning of the safety devices;
- that the casings and protection covers have not been removed;
- that the labels with instructions or provisions have not been removed or have become illegible (these form an integral part of the safety system).

● **and also:**

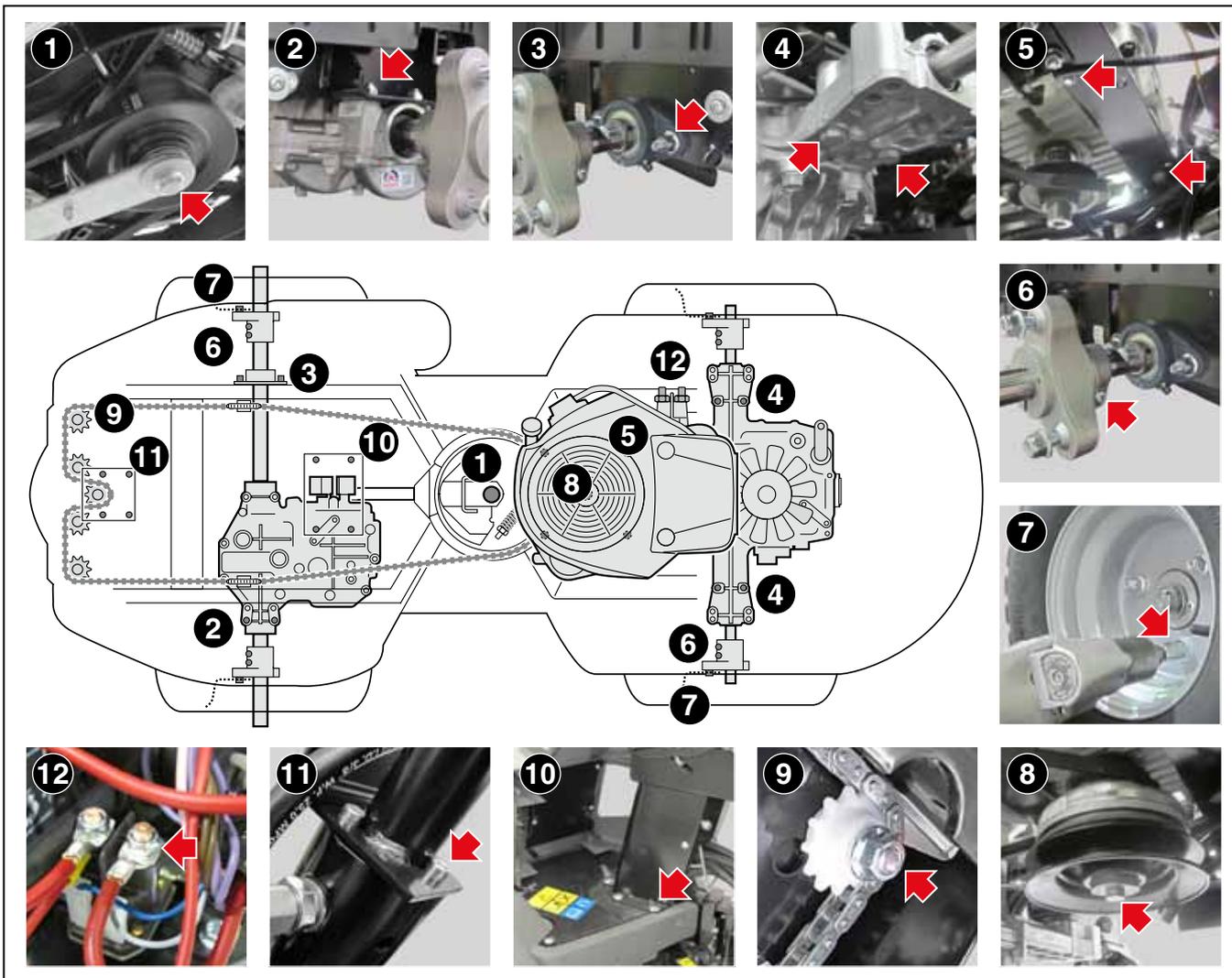
- restore to proper working order any safety devices which have been manipulated or removed;
- reassemble inefficient, damaged or missing casings and protection covers;
- replace illegible labels;
- clean the inside of the cutting deck (if assembled) with water and a non-metal bristle brush;
- touch up the painted parts where the paint is scratched or missing;
- not endorse any repair or modification on the machine or the engine which results in a change in performance or use that is incorrect or different from the purpose for which it was designed and approved;
- warn the Customer that failure to comply with the above points automatically voids the warranty and the responsibility of the Manufacturer.

### 2.5.3 Tightening torque settings

The table shows the standard tightening torque settings for screws and nuts to be applied according to their size, except for different situations indicated in the manual regarding a specific procedure.

Thread	M5	M6	M8	M10	M12
Tightening torque	6 Nm	10 Nm	24 Nm	47 Nm	84 Nm

The following list describes the most common situations to which special attention should be paid.



- |  |          |
|--|----------|
| 1. Articulated joint screw .....                               | 35-50 Nm |
| 2. Front transmission fixing nuts to frame .....               | 20-25 Nm |
| 3. Front transmission fixing nuts to oscillating support ..... | 35-50 Nm |
| 4. Rear transmission fixing nuts to frame .....                | 20-25 Nm |
| 5. Motor fixing screws .....                                   | 35-50 Nm |
| 6. Wheel hub screws (4WD only) .....                           | 20-25 Nm |
| 7. Wheel fixing nuts .....                                     | 35-50 Nm |
| 8. Clutch fixing screw .....                                   | 60-70 Nm |
| 9. Steering chain pinion fixing nuts .....                     | 35-50 Nm |
| 10. Seat column fixing screws .....                            | 20-25 Nm |
| 11. Steering column fixing screws .....                        | 6-8 Nm   |
| 12. Solenoid cable connection nuts (max) .....                 | 4-5 Nm   |

As for the tightening torques of the pipes and fittings of the hydraulic system, see the summary diagram of the hydraulic connections. [👉 8.1.3]

## 2.5.4 Routine maintenance schedule

The routine maintenance schedule includes a series of interventions, distributed according to the following tables, divided by subject and purpose of the interventions.

**IMPORTANT** *It is recommended to always remind the user that the machine operation hours and warranty interventions are memorised and stored on the <stiga.go> app.*

### A) Machine

Intervention Type	First 5 hours	Every 25 hours	Every 50 hours	Every year or 100 hours	[...]
<b>Functionality check</b>					
Check of all the transmission belts	●			●	[6]
Check of the wear of the bearings of all the tension pulleys	●			●	-
Check / adjustment of the steering wheel				●	[4]
Check and adjustment of the accelerator cable (RPM)				●	[5.1.5]
Check and adjustment of the air cable (if mounted)				●	[5.1.6]
Check of the adjustment of the seat and of the steering column				●	[2.2.4]
Check of the tightening of nuts and screws	●			●	[2.5.3]
Check of the tightening torque of the wheel nuts	●			●	[2.5.3]
Check and test of the battery	●			●	[9.3.1]
Test of the charging system output	●			●	-
Cleaning of the battery terminals				●	-
Check of the wear of the front axle shafts and bushings <sup>(1)</sup> .		●		●	-
General lubrication <sup>(1)</sup>		●		●	[2.5.5]
Check of the tyre pressure	●		●	●	[2.6.1]
Check of the lighting system				●	-
<b>Safety check</b>					
Check of the efficiency of the safety devices	●		●	●	[2.5.6]
Check of the conditions of all the fuel lines	●		●	●	-
Check of the conditions of all the hydrostatic oil hoses	●		●	●	-
Check of the electrical system and of the wiring condition	●		●	●	-
Check of the motor wiring connectors and users	●		●	●	-
Cleaning of the area around the exhaust silencer			●	●	-
Check and cleaning of the exhaust system and heat deflector			●	●	-
Check and adjustment of the parking brake			●	●	[7.6.3]
<b>Practical test</b>					
Test driving	●		●	●	[2.5.7]
Check of the controls	●		●	●	-
Check of the smoothness and operation of the steering wheel	●		●	●	[2.2.4]
Check of the speed check and pedal adjustment	●		●	●	[7.5.2]
Braking test and check of the hydrostatic stop response	●		●	●	[7.6]

<sup>(1)</sup> Emphasize to the user the importance of keeping the wheel hubs controlled and well lubricated, to avoid premature wear of the drive shafts and hubs.

### B) Tuff Torq K574t - K57V - KTM10M transmissions

Intervention Type	First 5 hours	Every 25 hours	Every 200 hours	[👉...]
Check of the hydraulic oil level		●		[8.3.2]
Replacement of the hydraulic oil	●		●	[8.3.2]
Check of transmission, oil leakage	●	●		-
Cleaning of the transmission cooling tabs.	●	●		-
Check of the integrity of the transmission cooling fan	●	●		-
Replacement of the transmission hydraulic oil filter <sup>(1)</sup>	●		●	[8.3.1]

<sup>(1)</sup> Only for K574T and K57V transmissions

### C) Stiga ST 450 / 500 engine - See engine manual for running modes

Intervention Type	First 5 hours	Every 25 hours or every season	Every 50 hours or every season	Every 100 hours
Check of the oil level				
Replacement of the oil <sup>(1)</sup>	●			●
Check of the oil pre-filter <sup>(2)</sup>				
Check of the air filter <sup>(2)</sup>		●		
Check of the spark plug			●	
Replacement of the spark plug				●

<sup>(1)</sup> Change the oil every 25 hours if the engine runs at full load or at high temperatures.

<sup>(2)</sup> Clean the air filter more often if the machine works in dusty areas.

### D) Stiga ST 550 / 600 engine - See engine manual for running modes

Intervention Type	First 5 hours	Every 25 hours or every season	Every 50 hours or every season	Every 100 hours	Every 200 hours	Every 100 hours
Check of the oil level						
Replacement of the oil <sup>(1)</sup>	●			●		
Replacement of the oil filter				●		
Check of the oil pre-filter <sup>(2)</sup>						
Check of the air filter <sup>(2)</sup>		●				
Replacement of the air filter			●			
Check of the spark plug			●			
Replacement of the spark plug				●		
Check and replacement of the fuel filter				●		
Replacement of the petrol pipe	Every 2 years (if necessary)					
Check of the valve backlash					●	
Cleaning of the combustion chamber						●

<sup>(1)</sup> Change the oil every 25 hours if the engine runs at full load or at high temperatures.

<sup>(2)</sup> Clean the air filter more often if the machine works in dusty areas.

**E) Briggs & Stratton Vanguard Engine - See engine manual for running modes**

Intervention Type	Every 100 hours or every year	Every 250 hours	Every 400 hours or every year
Check of the engine oil level			
Cleaning of the area around the muffler and controls			
Replacement of the spark plug	●		
Replacement of the engine oil	●		
Replacement of the oil filter (if any)	●		
Cleaning of the air filter <sup>(1)</sup>	●		
Cleaning of the pre-filter (if any) <sup>(1)</sup>	●		
Maintenance of the exhaust system	●		
Check and adjustment of the valve backlash		●	
Replacement of the air filter			●
Replacement of the fuel filter			●
Maintenance of the cooling system <sup>(1)</sup>			●
Cleaning of the oil cooler tabs <sup>(1)</sup>			●

<sup>(1)</sup> Clean more often in dusty conditions or when airborne debris is present.

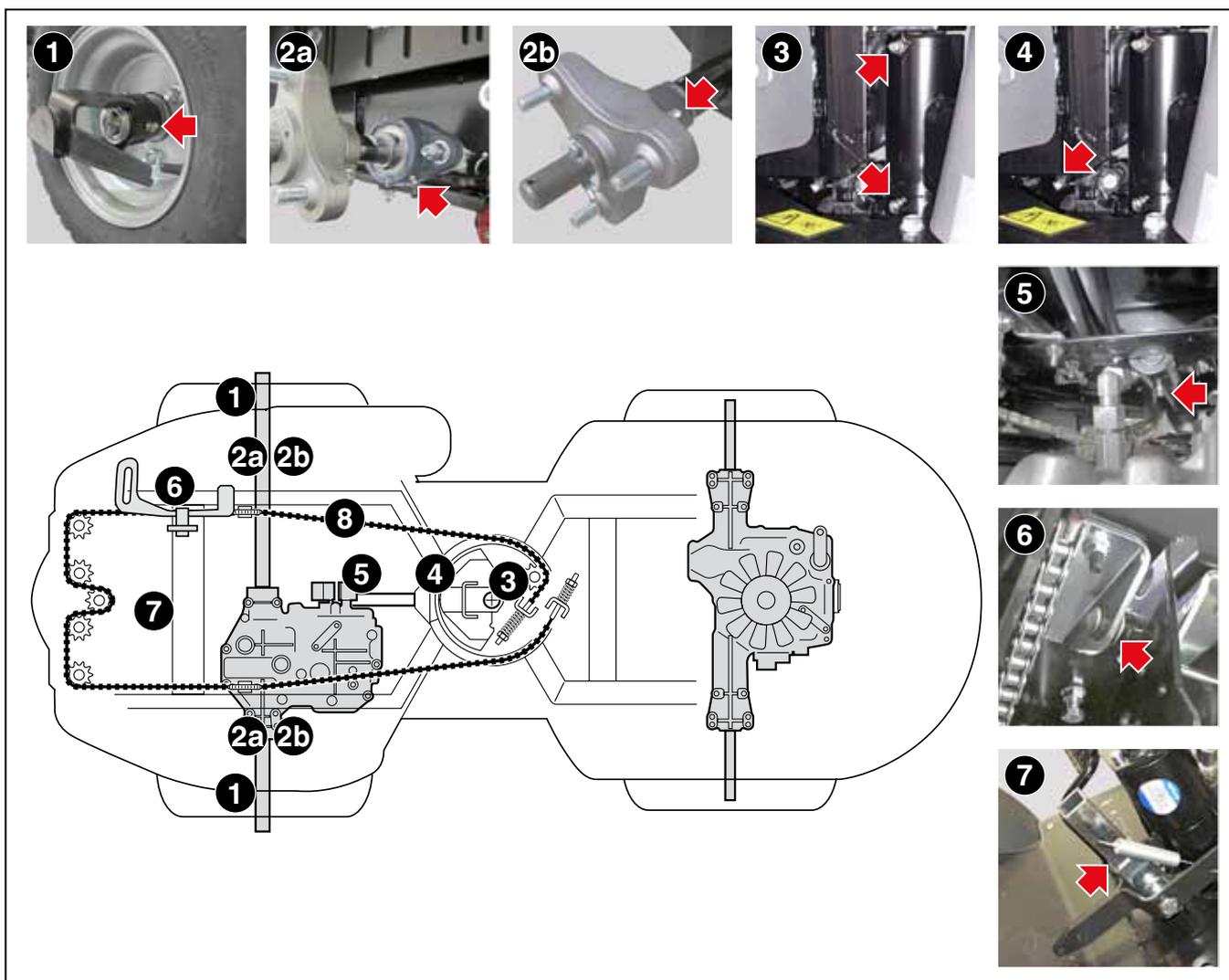
**F) Motore Honda GCV 530 - See engine manual for running modes**

Intervention Type	After 1 month or 20 hours	Every 3 months or 50 hours	Every 6 months or 100 hours	Every year or 200 hours
Check of the oil level				
Replacement of the oil <sup>(1)</sup>	●		●	
Replacement of the engine oil filter (if any)			●	
Check of the air filter				
Cleaning of the air filter		●		
Replacement of the air filter				●
Check / adjustment of the spark plug			●	
Replacement of the spark plug				●
Cleaning of the spark guard (if any)			●	
Check and adjustment of the minimum speed				●
Check and adjustment of the valve backlash				●
Cleaning of the combustion chamber				
Replacement of the fuel filter				●
Check of the fuel lines				

<sup>(1)</sup> Replace the oil more often if the machine works in dusty areas.

<sup>(2)</sup> The maintenance of these items should be performed by the retailer's customer service

### 2.5.5 Lubrication



Point	Object	Frequency	Lubricant
1	Equipment supports	**	General purpose grease
2a	Front axle supports (4WD)	**	General purpose grease
2b	Front axle hubs (2WD)	**	General purpose grease
3	Articulated joint	**	General purpose grease
4	Tilting axis	**	General purpose grease
5	Traction pedal hub	**	General purpose grease
6	Lifting mechanism	**	WD40 grease or equivalent
-	Steering chain	**	General purpose grease

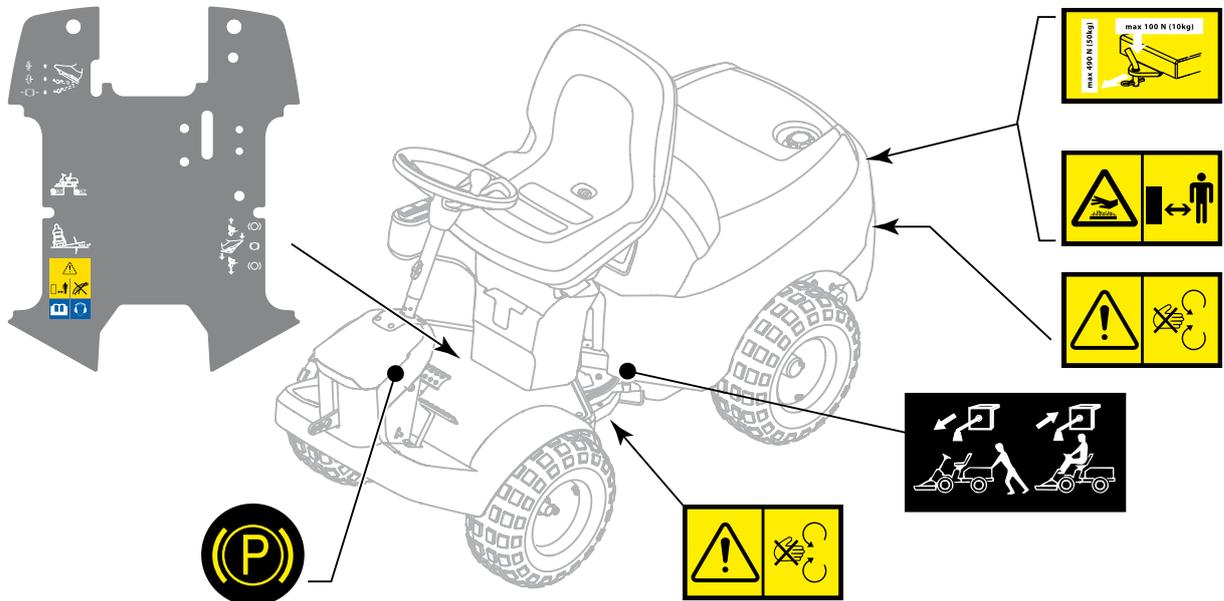
\*\* All lubrication points have to be lubricated every 25 hours of operation, or at least once a year, always after washing the machine

### 2.5.6 Safety devices check

It is of utmost importance that all the safety systems present upon delivery of the machine are kept in efficient working order over time, conducting appropriate checks every time there is the chance to do so. The machine safety system includes:

### a) Checking pictograms and safety labels

These labels are considered an integral part of the safety devices. Always replace unreadable labels and restore missing ones, according to the figure shown here.



### b) Checking safety devices intervention

The safety systems intervene according to two basic criteria:

- to prevent ignition if ALL safety conditions are not met;
- to stop the machine operation if ONE or MORE condition are not met.

The table shows some typical situations.

Situation	Action	Result
<ul style="list-style-type: none"> <li>• Operator seated.</li> <li>• Parking brake engaged.</li> <li>• Power Take-Off deactivated</li> </ul>	Rotate the key in the start position.	The machine is turned on
<ul style="list-style-type: none"> <li>• Machine switched on or in motion.</li> </ul>	The operator gets up from the seat.	The machine stops
<ul style="list-style-type: none"> <li>• Operator not seated.</li> <li>• Parking brake engaged.</li> </ul>	Try turning on the machine	The machine is NOT starting.
<ul style="list-style-type: none"> <li>• Operator seated.</li> <li>• Parking brake not engaged.</li> </ul>	Try turning on the machine	The machine is not starting.
<ul style="list-style-type: none"> <li>• Machine on.</li> <li>• Power Take-Off activated.</li> </ul>	The operator gets up from the seat.	Power Take-Off is deactivated.
	Move the mechanical lifting pedal to the transport position.	Power Take-Off is deactivated.
<ul style="list-style-type: none"> <li>• Machine on.</li> </ul>	Drive the machine forwards and backwards and release the drive pedal.	The machine must slow down to a standstill within 1.90 metres.

### c) Checking operation of electrical safety devices



If one of the above conditions does not occur, check the operation of the safety micro-switches, simulating the different situations of use as indicated in the specific chapter [\[👉 9.3.2\]](#).

## 2.5.7 General checks

### a) Tyres, inflation pressure

Check the pressure and adjust if necessary. The recommended air pressure is indicated on the footboard mat.

### b) Engine oil and oil filter

See the “Instructions for use” supplied with the machine and the engine manufacturer's manual.

### c) Hydrostatic transmission unit oil

See the “Instructions for use” supplied with the machine and the engine manufacturer's manual. For the description of the interventions, see the chapters “Wheels-Transmission-Brake” [\[👉 7\]](#) and “Hydraulic system” [\[👉 8\]](#) of this manual.

### d) Belt transmissions

Check the condition of all the belts and the efficiency of the tensioners.

### e) Steering, control and adjustment

See chapter “Steering” [\[👉 4\]](#) of this manual.

### f) Engine air filter

See the “Instructions for use” supplied with the machine and the engine manufacturer's manual.

### g) Cooling tabs

Remove the protective covers from the engine and clean between the cooling tabs. Use a brush and compressed air. Check the engine Manufacturer's Manual.

### h) Spark plugs

Remove the spark plug (or spark plugs) and clean them or replace them if necessary. Check the engine Manufacturer's Manual.

### l) Valve backlash

Check the engine Manufacturer's Manual.

### j) General lubrication

Lubricate the articulation point (4 lubricators) and all the parts indicated in the appropriate section of this manual. [\[👉 2.5.5\]](#)

### k) Transmission

Check that there are no abnormal noises.

**l) Bearings**

Check for abnormal noises where the bearings are. Check that there are no signs of wear or abnormal backlash...

**m) Exhaust system**

Check for cracks, leaks or other damages. Check the engine Manufacturer's Manual.

**n) Electrical system**

Check for damaged cables, contacts, or other devices. Check that all cables are properly secured to the chassis and with cable ties. Check for situations between cables and chassis, which could damage the cable and cause a short circuit.

**o) Cutting deck and blades**

**WARNING!** *The blades are sharp. Always wear work gloves when working with blades to avoid injury.*

- Check for collision damages or wear on the cutting deck and paintwork. Align, repair and re-touch the paint if necessary.
- Check the tightness of the bearing support screws and tighten if necessary.
- Rotate the blades and check that the shafts rotate correctly, are not bent, and that there are no abnormal noises and backlashes on the bearings.
- Check the condition and tension of the belts.  6
- Check that the lifting mechanism moves smoothly, is not jammed, has no backlashes and that it locks in the desired position.
- Check that the blades are sharp and, if necessary, sharpen as indicated.

**p) Power Take-Off (PTO)**

- Check that the electromagnetic clutch activates the work equipment in the desired time and that it does not slip under normal load conditions. Replace the clutch if necessary.
- Verify that the PTO brake stops the rotation in the required time. Adjust if allowed by the device type or replace.
- Check that the PTO belt activates the work equipment in the desired time and that it does not slip under normal load conditions. Adjust if necessary.

**q) Controls**

Check that all controls are working correctly, that there are no jams or excessive backlashes.

**r) Test driving**

If a cutting device or other equipment is provided, they must be installed before performing the test drive with the machinery. Drive the car for a few minutes at different speeds and with repeated left and right turns, check that everything works smoothly and correctly, without anomalies and without vibrations or strange noises.

Check that all safety devices are properly functioning.

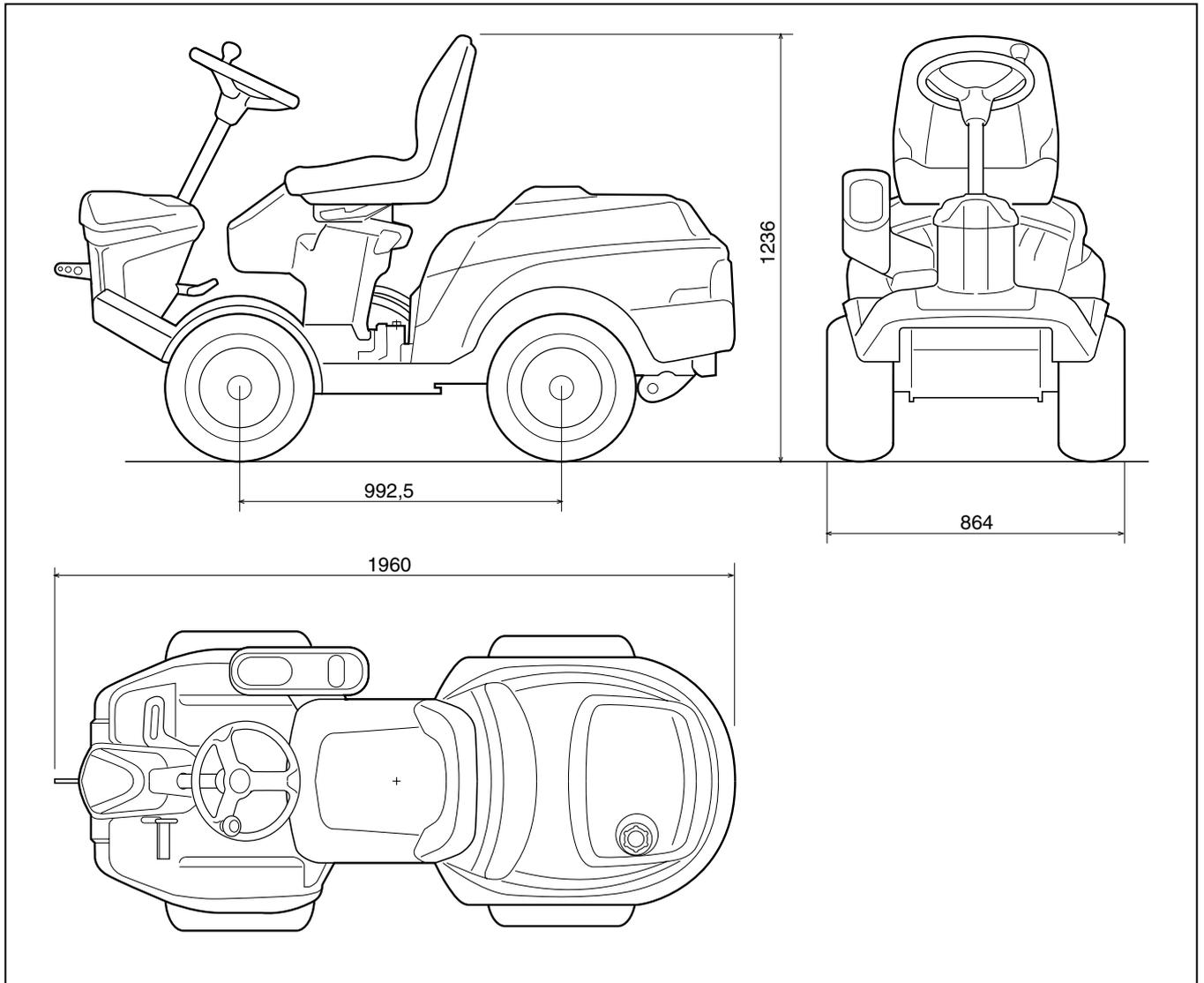
## 2.6 TECHNICAL SPECIFICATIONS AND DIMENSIONS

### 2.6.1 Technical specifications

	Model: Park...	500	500 W	500 WX	Special
Engine		ST 450 (TRE 0701)	ST550 (TRE 586VA)	ST550 (TRE 586VA)	Honda GCV530
Number of cylinders / Displacement	n / cc	1 / 452	2 / 586	2 / 586	2 / 530
Drive		2WD	2WD	4WD	4WD
Power	kW	8.1	11.9	11.9	11
Engine revolutions	rpm	3200	3200	3200	3200
Manual choke control		autochoke	yes	yes	yes
Electrical system		12 V	12 V	12 V	12 V
Battery		VRLA	VRLA	VRLA	VRLA
Fuel		Unleaded petrol			
Fuel tank capacity	litres	12	12	12	12
Engine oil		SAE 10W-30			
Engine oil, service class		SF / SG or higher			SJ or higher
Engine oil change quantity, without filter replacement	litres	1.2	1.7	1.7	1.1
Engine oil change quantity, with filter replacement	litres	-	1.8	1.8	1.2
Rear transmission	Tuff Torq	K57V	K57V	K574T	K574T
Front transmission	Tuff Torq	/	/	KTM10M	KTM10M
Transmission Oil		5W-50	5W-50	5W-50	5W-50
Transmission oil change quantity	litres	1.3	1.3	3.6	3.6
Spark plug (or equivalent)		Champion QC12YC / RC12YC	Champion RN9YC	Champion RN9YC	BPR5ES (NGK) W16EPR-U (DENSE)
Spark plug, electrode distance	mm	0.6÷0.8	0.6÷0.8	0.6÷0.8	0.7÷0.8
Tyres	dim.	16x7.50-8	16x7.50-8	16x7.50-8	16x7.50-8
Front tyre pressure	bar (psi)	0.6 (9.0)	0.6 (9.0)	0.6 (9.0)	0.6 (9.0)
Rear tyre pressure	bar (psi)	0.4 (6.0)	0.4 (6.0)	0.4 (6.0)	0.4 (6.0)
Speed (indicative), forward	km/h	10	10	10	10
Speed (indicative), in reverse	km/h	6	6	6	6
Weight	kg	160÷200			
Measured sound power level	dB(A)	99	100	100	99
Uncertainty	dB(A)	0.38	0.63	0.63	0.61
Guaranteed sound power level	dB(A)	100	100	100	100
Acoustic pressure level	dB(A)	85	86	86	85
Uncertainty	dB(A)	0.43	1.09	1.09	0.34
Operator position vibration level	m/s <sup>2</sup>	0.6	0.7	0.7	0.7
Uncertainty	m/s <sup>2</sup>	0.33	0.23	0.23	0.22
Vibration level on the steering wheel	m/s <sup>2</sup>	3.4	2.6	2.6	2.4
Uncertainty	m/s <sup>2</sup>	1.06	0.72	0.72	1.04
Cutting decks available		95 -105 -100	95 - 100 105 - 110	95 - 105 100-110-125	95 - 100 105 - 110
Connectivity		Optional	Optional	Optional	Standard

Follow: **Technical specifications**

Model: Park...		700 W	700 WX	900 WX
Engine		ST600 (TRE 586V)	ST550 (TRE 586VA)	B&S Vanguard
Number of cylinders / Displacement	cc	2 / 586	2 / 586	2 / 570
Drive		2WD	4WD	4WD
Power	kW	11.9	11.9	11.82
Engine revolutions	rpm	3200	3200	3200
Manual choke control		yes	yes	autochoke
Electrical system		12 V	12 V	12 V
Battery		VRLA	VRLA	VRLA
Fuel		Unleaded petrol		
Fuel tank capacity	litres	12	12	12
Engine oil		SAE 10W-30		
Engine oil, service class		SJ or higher	SF - SG or higher	SJ or higher
Engine oil change quantity, without filter replacement	litres	1.7	1.7	1.6
Engine oil change quantity, with filter replacement	litres	1.8	1.8	1.7
Rear transmission	Tuff Torq	K57V	K574T	K574T
Front transmission	Tuff Torq	/	KTM10M	KTM10M
Transmission Oil		5W-50	5W-50	5W-50
Transmission oil change quantity	litres	3.6	3.6	3.6
Spark plug (or equivalent)		Champion RN9YC	Champion RN9YC	Champion XC12YC
Spark plug, electrode distance	mm	0.6÷0.8	0.6÷0.8	0.75
Tyres	dim.	16x7.50-8	16x7.50-8	16x7.50-8
Front tyre pressure	bar (psi)	0.6 (9.0)	0.6 (9.0)	0.6 (9.0)
Rear tyre pressure	bar (psi)	0.4 (6.0)	0.4 (6.0)	0.4 (6.0)
Speed (indicative), forward	km/h	10	10	10
Speed (indicative), in reverse	km/h	6	6	6
Weight	kg	180 ÷ 230		
Measured sound power level	dB(A)	100	100	100
Uncertainty	dB(A)	0.64	0.64	0.64
Guaranteed sound power level	dB(A)	100	100	100
Acoustic pressure level	dB(A)	85	85	85
Uncertainty	dB(A)	1.45	1.45	1.45
Operator position vibration level	m/s <sup>2</sup>	0.7	0.7	<0.9
Uncertainty	m/s <sup>2</sup>	0.17	0.17	0.3
Vibration level on the steering wheel	m/s <sup>2</sup>	2.8	2.8	<2,5
Uncertainty	m/s <sup>2</sup>	0.55	0.55	0.3
Cutting decks available		95-105 100-110-125	95-105 100-110-125	95-105 100-110-125
Connectivity		Standard	Standard	Standard

**2.6.2 Overall dimensions**

**3 - CASINGS AND FRAME**

**Summary**

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3.2.4 Replacement of the lifting device .....40

**3.1 BODYWORK AND CASINGS**

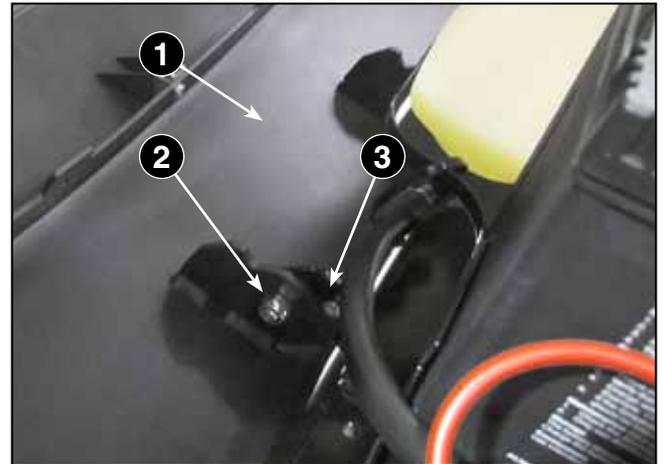
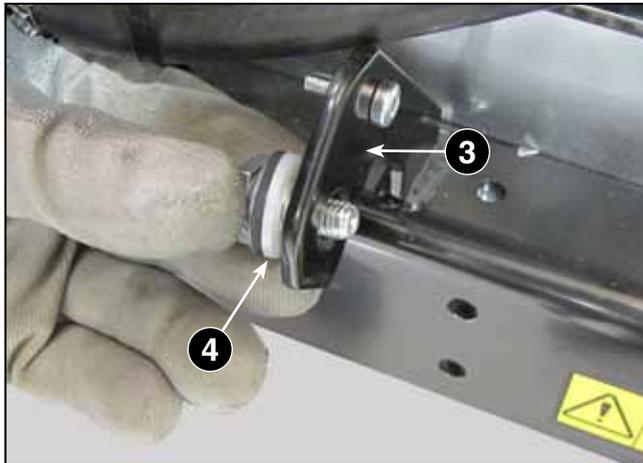
**3.1.1 Removing the rear hood**

**NOTE** *The removal of the rear hood is necessary when removing the engine, muffler and tank and makes work on the tank and the battery easier.*

1. Open the hood (1).



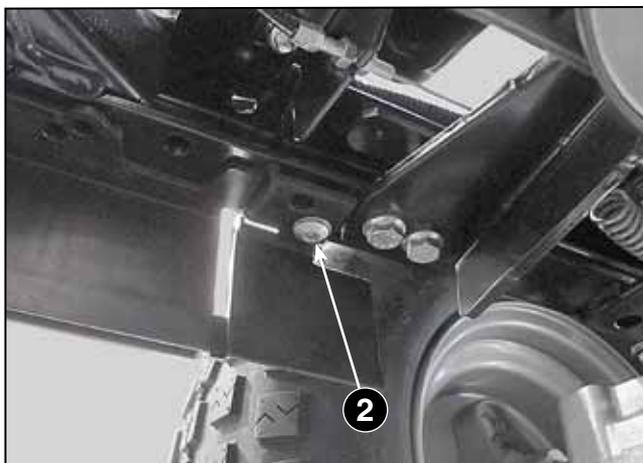
2. Unscrew the two nuts (2) and remove the hood (1) by sliding it off the support hinge (3).



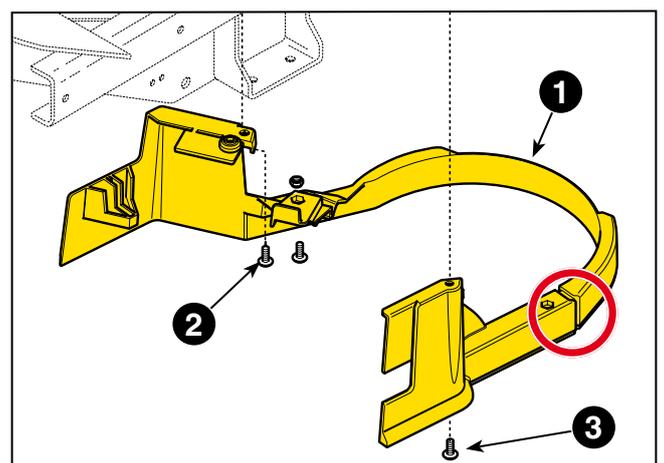
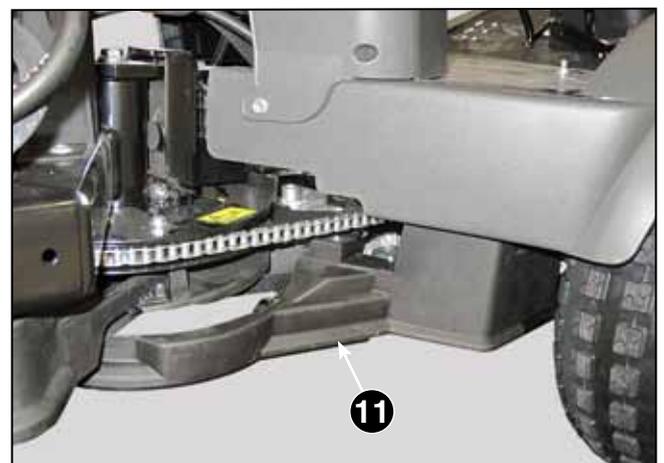
When assembling, pay attention to position the plastic washer (4) on the side of the support (3).

### 3.1.2 Removal of the front casing of the belts

**NOTE** The front casing (1) consists of two elements connected together by a screw, located on the left side. The following procedure provides for the removal of the two assembled elements, which can be separated later.

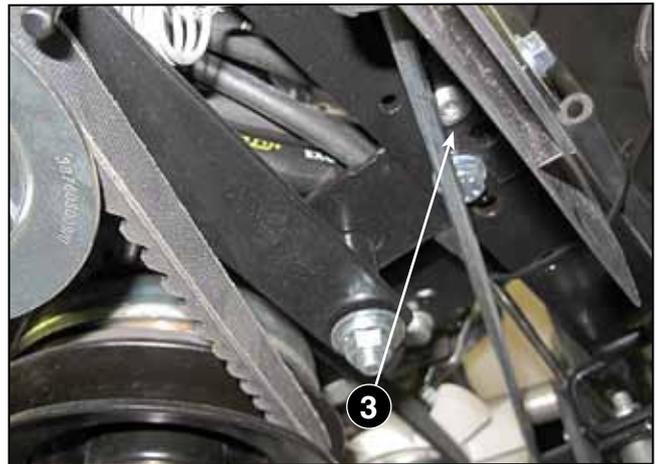


1. Unscrew the right screw (2)

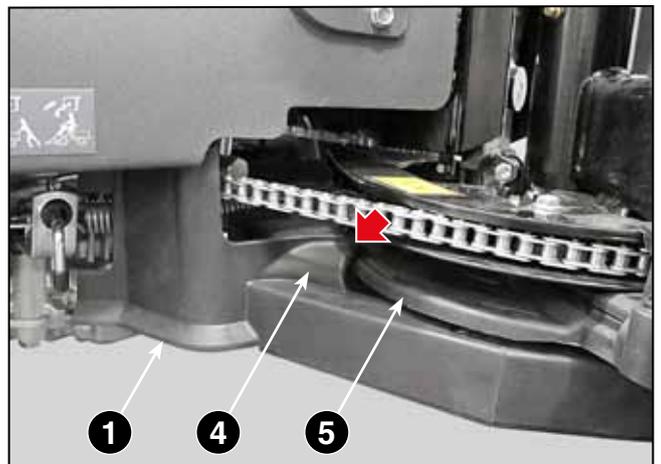


2. Unscrew the left screw (3).

3. Remove the front casing (1) from the left side of the machine.



When assembling, carry out the steps described above in reverse, paying attention to position the hooking tooth (4) over the upper left edge of the right rear casing (5).

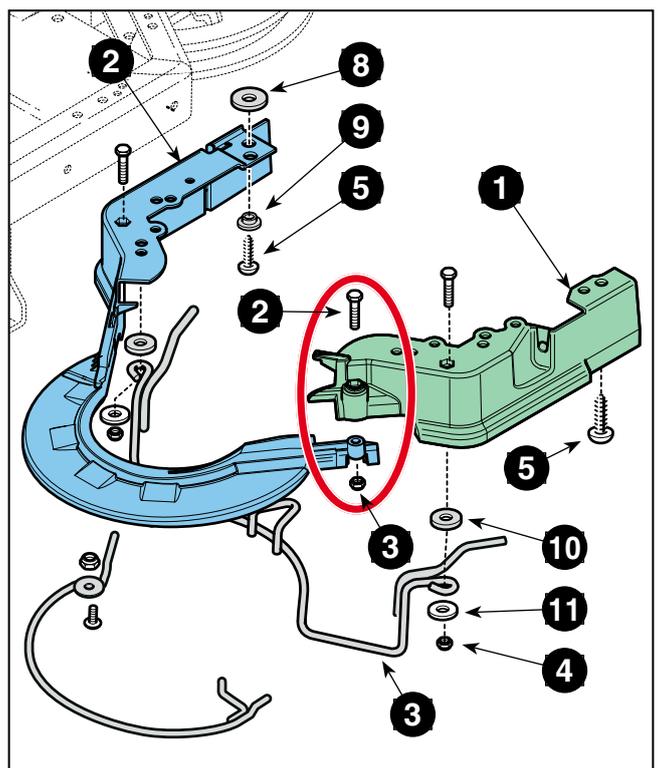


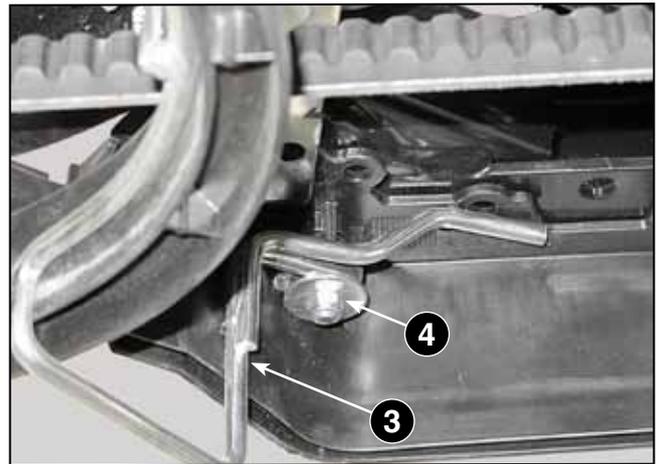
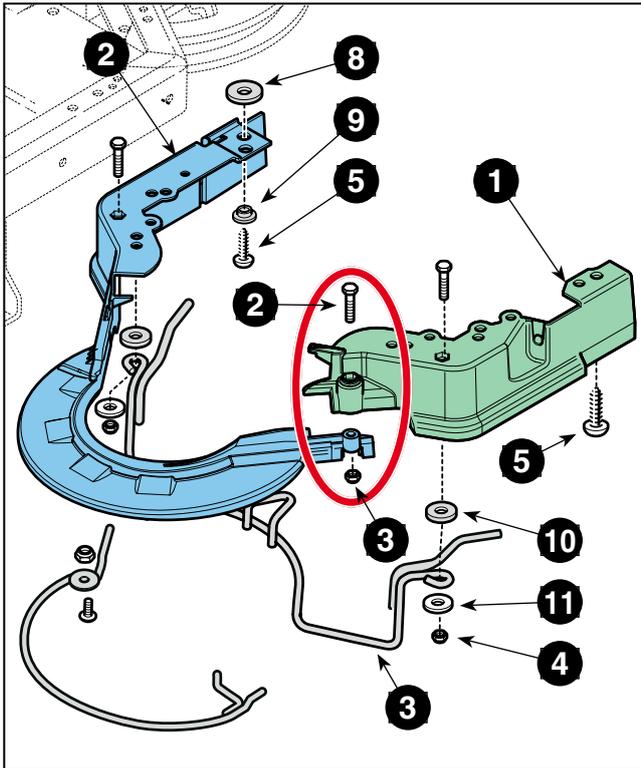
### 3.1.3 Removal of the rear casings of the belts

**NOTE** The rear guards consist of three elements connected to each other: a left casing (1), a right casing (2) which, starting from the right side, wraps the mechanism of the articulated joint and connects to the left casing by means of a screw and, finally, a rear belt guide arch (3) for the fixing of which two elements in common with the left and right casings are used.

1. Remove the front casing. [👉 3.1.2]

2. Unscrew the two front nuts (4) paying attention to the fact that their removal causes the loss of the fixing points of the rear belt guide arch (3).

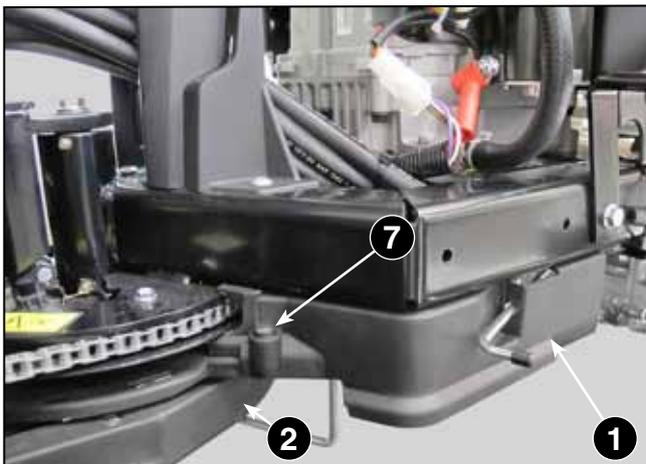
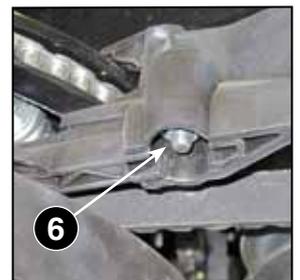




3. Unscrew the two rear screws (5).



4. Unscrew the nut (6) and extract the relative screw (7) that connects the left casing (1) to the right casing (2).

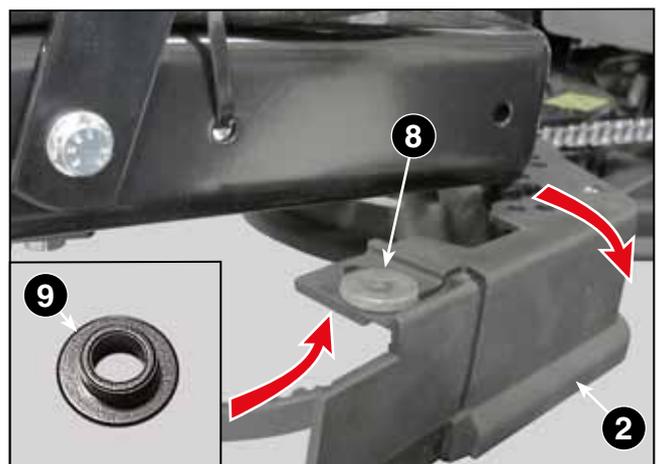


5. Remove the left casing (1).

6. Carefully remove the right casing (2), guiding the protruding front part around the central joint components.

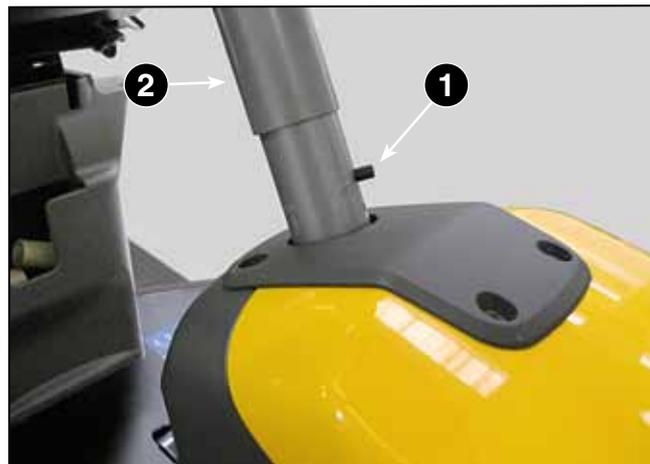
When assembling, repeat the steps described above in reverse order, taking care of:

- reposition the shim washer (8) between the right casing and the frame and the bushing (9) under the rear right screw (5);
- correctly reassemble the belt guide arch (3) with the thicker dark washer (10) at the top and the thin galvanized washer (x) under the nut (11).



**3.1.4 Removing the casings of the steering column**

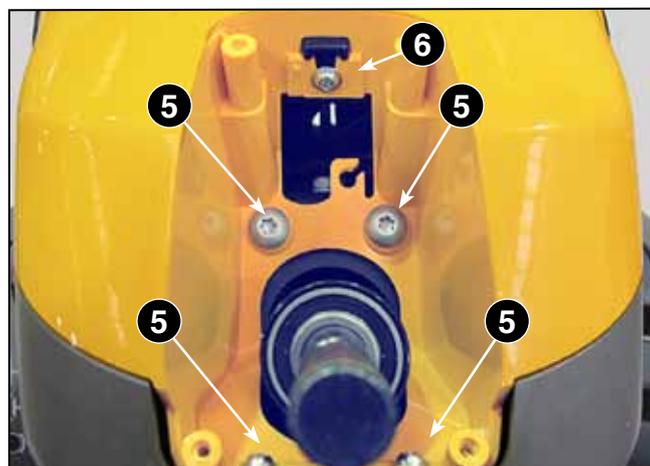
1. With the help of a pin punch, extract the elastic pin (1) and remove the steering column (2).



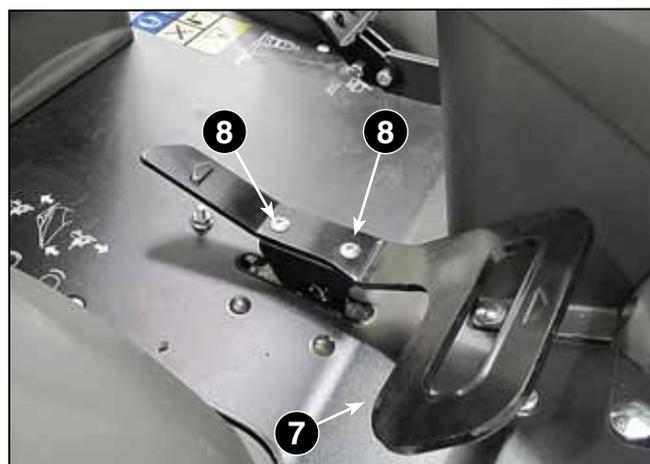
2. Unscrew the four screws (3) and remove the upper casing (4).



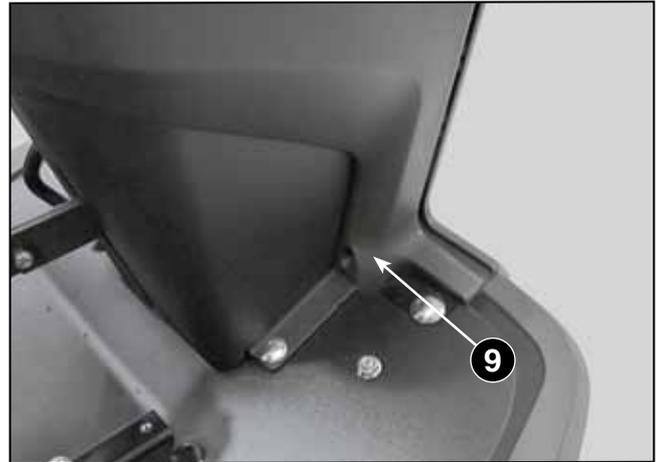
3. Unscrew the four internal screws (5) and the front screw (6) which fix the two parts of the column guard of the steering column together.



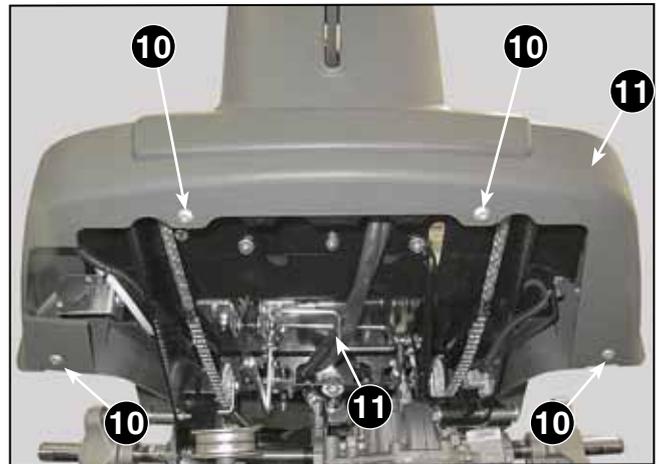
4. Remove the drive pedal (7) secured by the two screws (8).



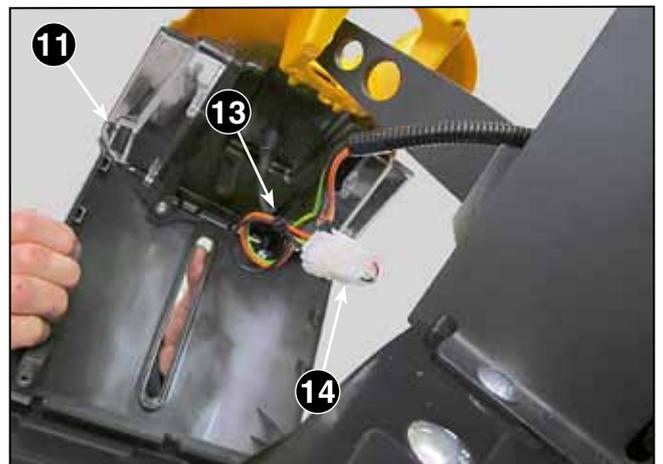
5. Unscrew the two side screws (9).



6. Unscrew the four screws (10) that secure the bumper (11) to the frame.



7. Tilt the front part of the bumper (11) forward, releasing it from the hooks (12) that secure it to the rear of the column.



8. Cut the clamp (13) and disconnect the connector (14), then remove the bumper (11) including the front part of the column.

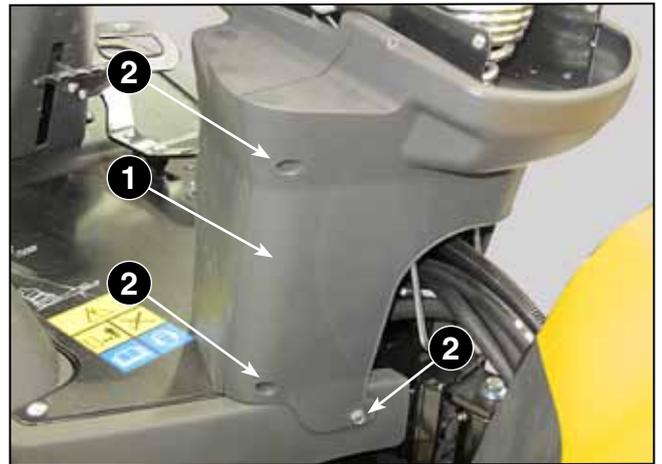
When assembling, carry out the steps described above in reverse order, paying attention to correctly engage the six tabs (12) in their respective seats and to adequately fix the cables of the wiring by restoring the clamp (13).



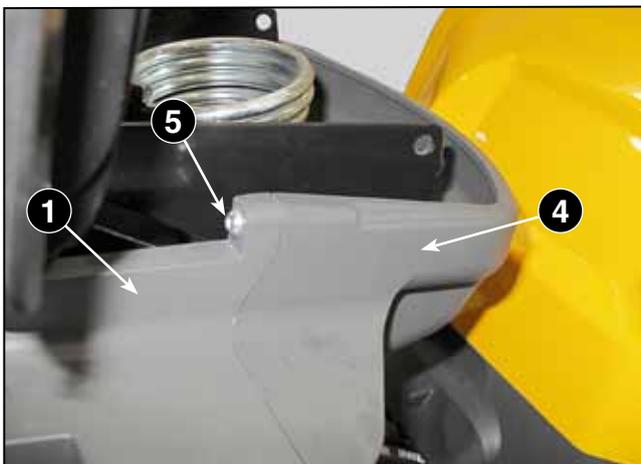
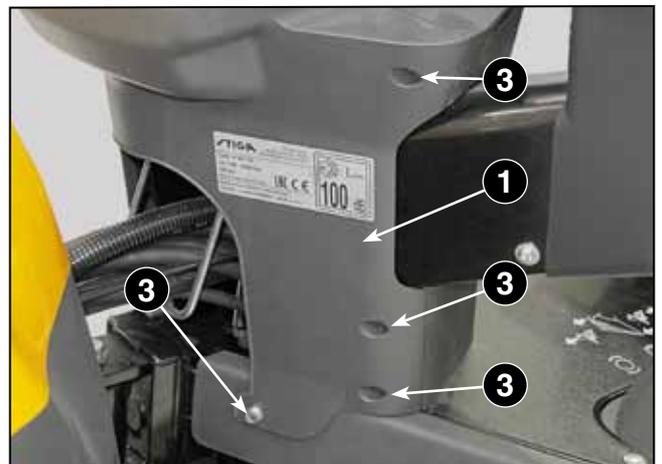
**3.1.5 Remove the cover under the seat**

**NOTE** *The cover under the seat consists of a rear casing and a front casing, connected to each other and fixed to the footboard.*

1. Working from the rear part of the casing (1), unscrew the three screws (2) located on the left side.



2. Unscrew the four screws (3) on the right side.



3. Working from the front, unscrew the two upper screws (5) and separate the front part (4) from the rear part (1).

When assembling, perform the steps described above in reverse order.

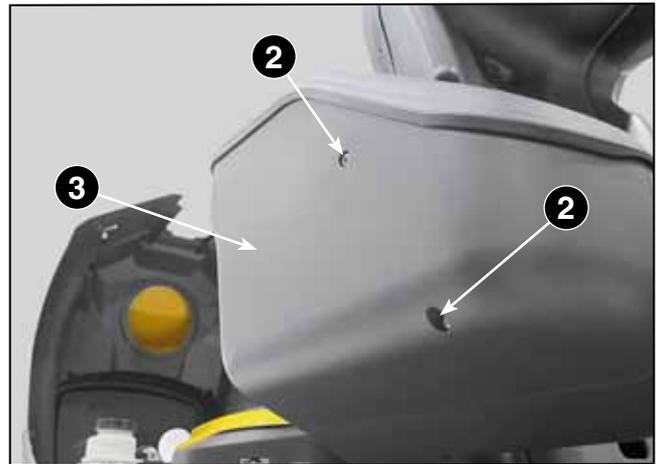
**3.1.6 Disassembly of the dashboard casing**

▶▶ **Park 700 - 900 :**

1. Unscrew the screw (1) on the left side.



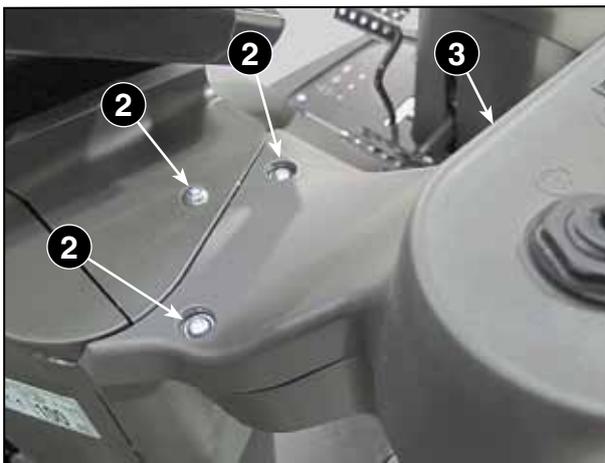
- From the right side, unscrew the two front screws (2) and remove the right casing (3) to access the engine control levers and the electrical components.



When assembling, perform the steps described above in reverse order.

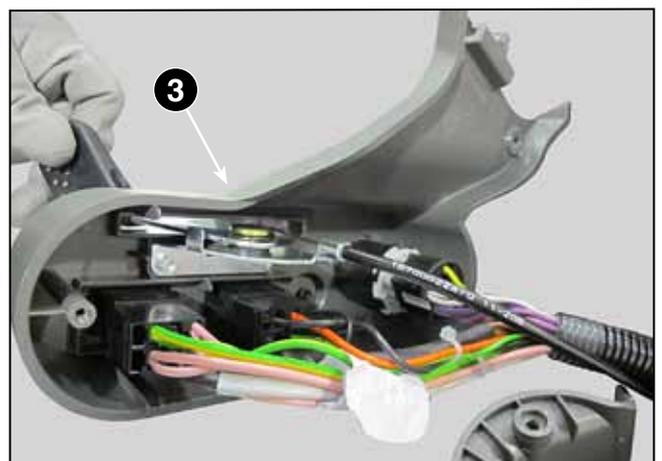
►► **500 - Special :**

- Unscrew the two lower screws (1).



- Unscrew the three upper screws (1).

- Tilt the top panel (3) to access the engine control levers and the electrical components.



When assembling, perform the steps described above in reverse order.

## 3.2 FRAME

## 3.2.1 Disassembly and reassembly of the articulated joint pulleys

**NOTE** This operation is required for pulley replacement and when the front and rear parts of the machine need to be separated.

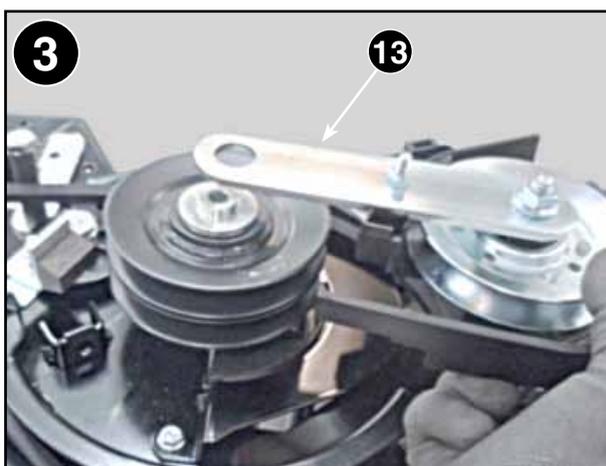
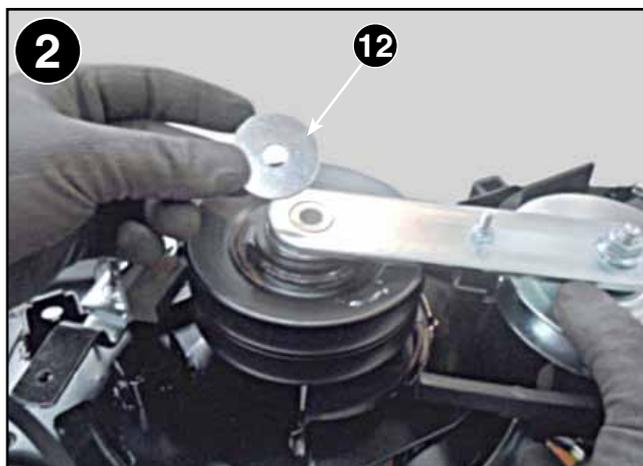
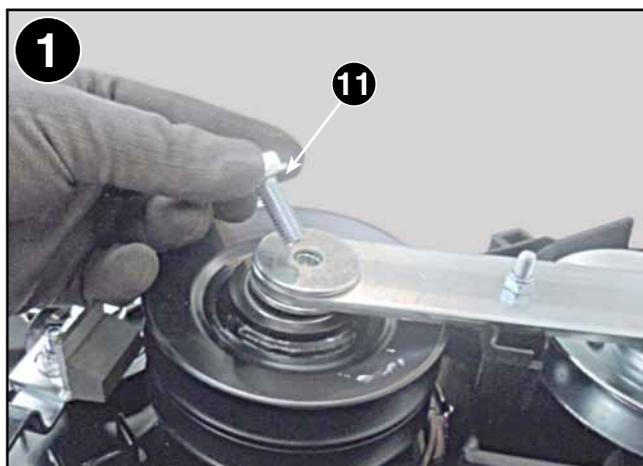
**▶▶ Park 4WD :****● Disassembly**

- Loosen or remove both belts from the double pulley. [👉 6.3.2] [👉 6.3.3]

Follow the photographic sequence of the images that depict the correct and necessary operating steps.

**NOTE** The images are upside down compared to the real situation.

1. Remove the screw (11) that fixes the tightener arm.
2. Recover the washer (12).
3. Remove the tightener arm (13).
4. Remove centering spacer (14).



5. Remove the shim washer (15) placed between the double pulley (16) and the spacer (14).

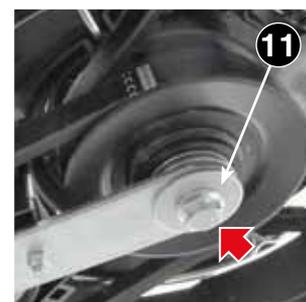
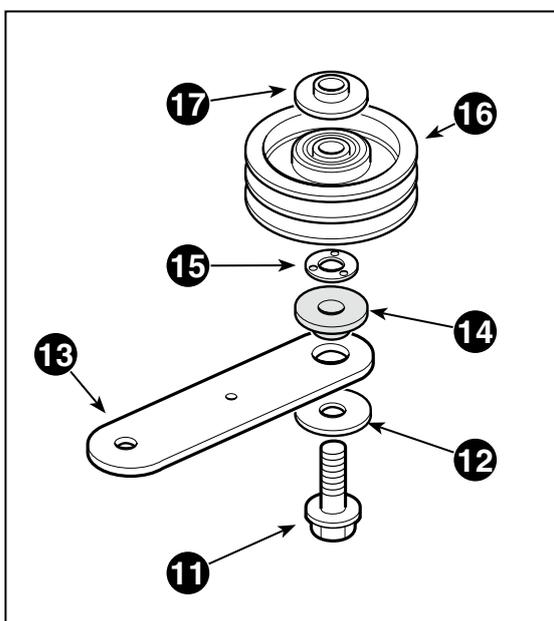
6. Unscrew the double pulley (16).

7. Remove the spacer (17) between the double pulley (16) and the frame.

● **Reassembly**

Perform the steps described above in reverse order, taking care of:

- correctly reposition all the washers and spacers previously removed, according to the sequence shown in the drawing;
- fit the spacer (15) with the three bosses facing the pulley (16).
- Tighten the central screw (11) with a torque wrench set to 35-50 Nm.



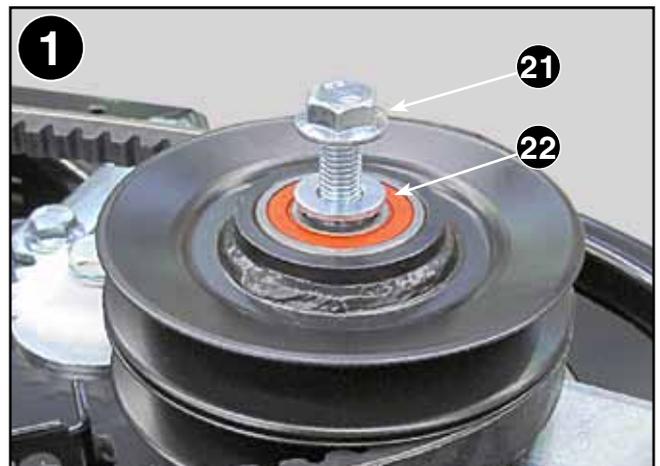
**▶▶ Park 2WD :****● Disassembly**

- Loosen or remove both belts from the double pulley. [👉 6.3.2] [👉 6.3.3]

Follow the photographic sequence of the images that depict the correct and necessary operating steps.

**NOTE** *The images are upside down compared to the real situation.*

1. Remove the double pulley fixing screw (21) and the relative washer (22).



2. Unscrew the double pulley (23).



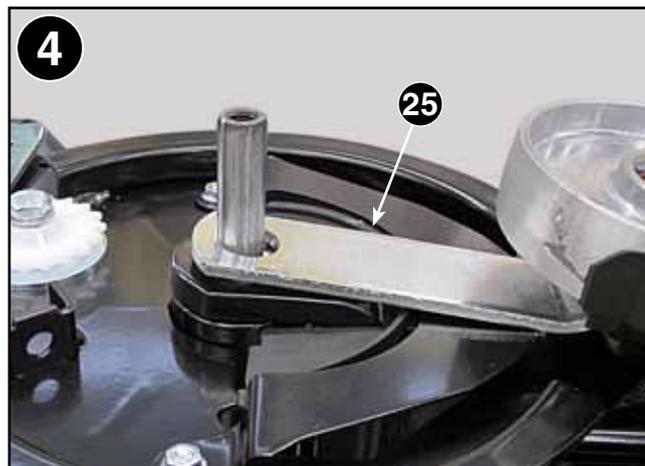
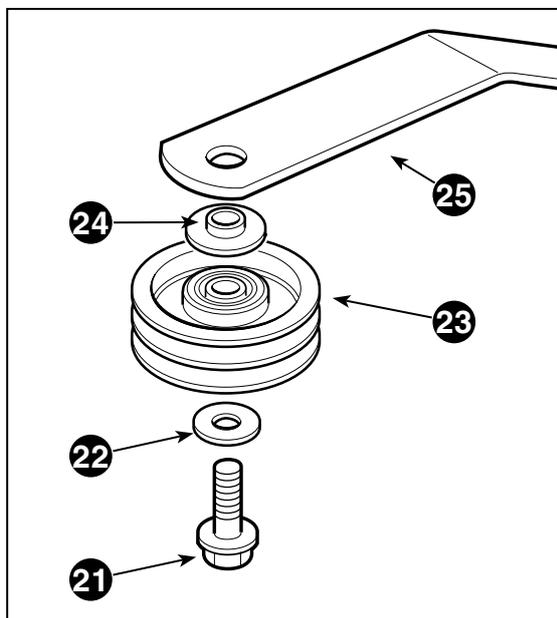
3. Remove centering spacer (24).



4. Remove the tightener arm (25).

### ● Reassembly

Perform the steps described above in reverse order, taking care of:



- correctly reposition all the washers and spacers previously removed, according to the sequence shown in the drawing;
- fit the centering spacer with the protruding part correctly inserted in the hole of the tightener arm



- Tighten the central screw (21) with a torque wrench set to 35-50 Nm.

### 3.2.2 Separation of the two parts of the machine

**⚠ WARNING!** *The operation of separating the front and rear parts of the machine is a particularly demanding operation, which must be performed by implementing all the measures to prevent any event that could put the safety of the operator at risk.*

**NOTE** *This intervention is required only for the replacement of the bearings of the articulated joint, in the face of a noticeable backlash and consequent possibility of reciprocal movement in the coupling between the two parts of the machine.*

1. Remove the front casing of the belts [👉 3.1.2].
2. Remove the rear belt casings [👉 3.1.3].
3. Completely loosen the steering chain [👉 4.2.1]. from 1 to 3
4. Disconnect the throttle [👉 5.1.5] and choke [👉 5.1.6] cables from the engine side , taking care of connecting the two terminals to a cable or a cable pulling probe in order to facilitate the subsequent reset.
5. Remove the clamps securing the cable sheaths and hydraulic pipes where the articulated joint is.
6. ▶▶ **Park 4WD** : Empty the oil circuit [👉 8.3.2] and disconnect the front transmission tubes [👉 7.2.2] at point 6.
7. Remove the pulleys of the articulated joint. [👉 3.2.1].
8. Stabilize the rear part of the machine which bears the greatest weight and is therefore less manageable.

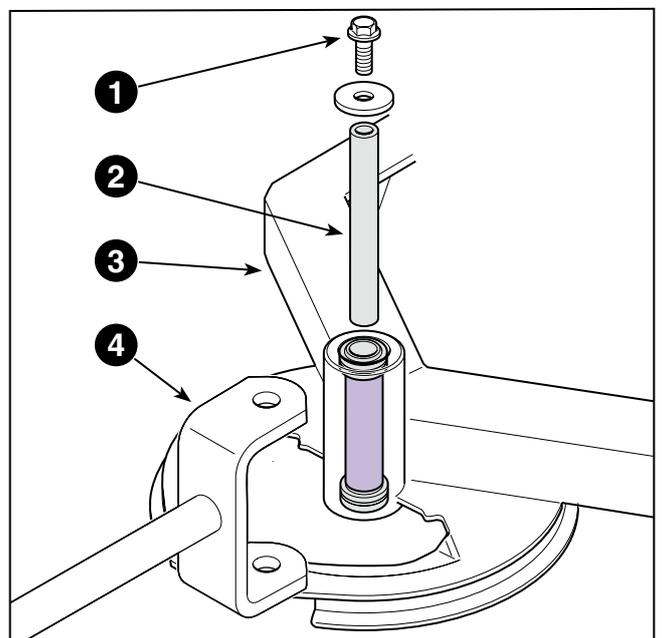


**⚠️ WARNING!** *Ensure stability before separating.*



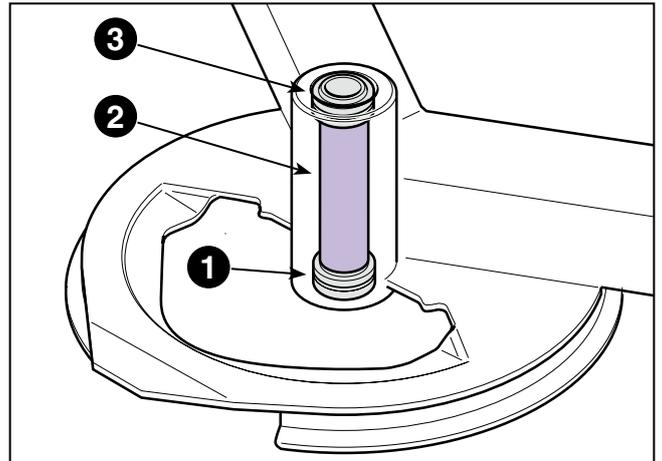
9. Unscrew the screw (1) and remove the internal spacer (2) which holds the rear frame (3) together with the front part of the machine by means of the fork (4).
10. Move the front part as needed and stabilize it.

When assembling, perform the steps described above in reverse order, paying particular attention to restore all the fastening clamps of the wiring sheaths and hydraulic pipes.



### 3.2.3 Replacement of the articulated joint bearings

1. Separate the front part from the rear part and stabilize the rear of the machine [👉 3.2.2]
2. Working from the top of the frame, eject the lower bearing (1) together with the spacer (2).
3. Working from the bottom of the frame, eject the upper bearing (3).



**IMPORTANT** Replacement must always include both bearings.

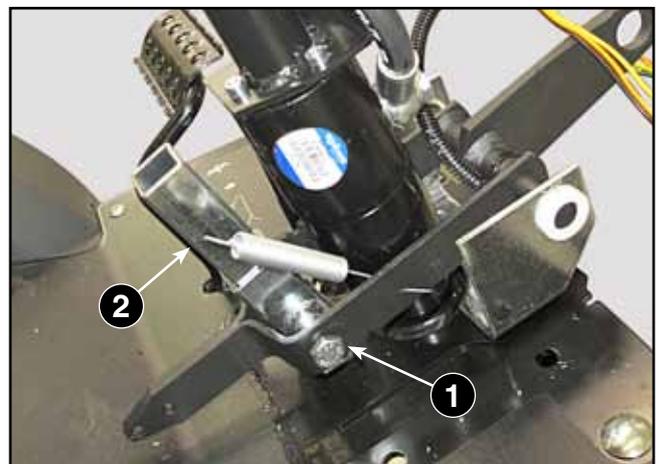
**IMPORTANT** The bearings are of the oscillating type and therefore the assembly must be carried out with the help of a nylon pad, capable of exerting the thrust only on the outer ring of each bearing.

### 3.2.4 Replacement of the lifting device

**NOTE** This device allows the work equipment to be kept raised and acts when the lifting pedal is pressed and released: with a first pressure on the pedal, the equipment is raised and when released it remains in position. With a subsequent pressure on the pedal, the mechanism is released and the equipment is lowered accompanied by the release of the pedal. This locking and unlocking function is implemented inside the device.

1. Remove the casings of the steering column. [👉 3.1.4]
2. Remove the steering column holder. [👉 4.2.3] from 1 to 5
3. Unscrew the screw (1) and remove the lifting device (2).

**NOTE** The lifting device is available as a spare part as an assembled element.



When assembling, perform the steps described above in reverse order, taking care to lubricate the device with a thin film lubricant, such as a silicone spray, WD40 or similar. DO NOT use grease.

## 4 - STEERING

### Summary

<b>4.1 THE STEERING SYSTEM .....</b>	<b>41</b>
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<b>4.2 STEERING SYSTEM INTERVENTIONS .....</b>	<b>43</b>
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4.2.2 Replacement of the steering wheel pinion .....	45
4.2.3 Replacement of the hydraulic steering valve (Booster) .....	45

### 4.1 THE STEERING SYSTEM

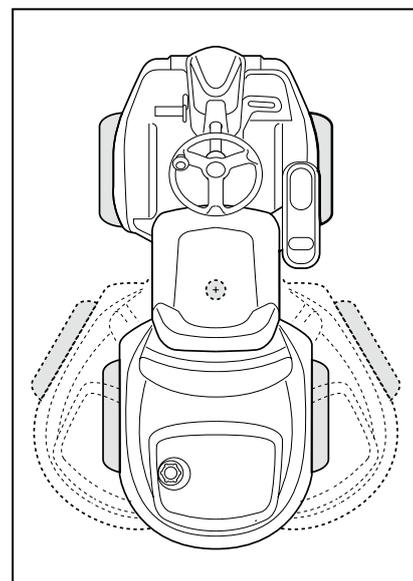
#### 4.1.1 Description of the steering system

The PARK series machines are characterised by the division of the frame into two sections, front and rear, connected to each other by a central articulated joint; for this reason, the steering wheel does not act directly on the front wheels, but it activates a chain wheel that changes the alignment between the axles of the front and rear of the machine, allowing changes of direction.

The steering system uses an hydraulic steering valve, derived from the rear transmission pump, which reduces the effort required for the operation, as well as ensuring greater fluidity in driving and when changing direction.

Since the steering valve is operated by the oil coming from the pump, the engine should always be on and the machine should be in motion when the steering is operated.

The machine can still be steered even with the engine off, requiring, however, a greater effort to operate the steering wheel.



### 4.1.2 Steering system problems and remedies

An essential prerequisite for the operation of the steering valve is the axial backlash in the steering, which however has to exist because otherwise the steering would be difficult.

To check the steering functionality, first make sure the tyres are at the correct pressure, then perform the check with the engine at the maximum rotation speed.

**IMPORTANT** *The machine must always be tested in motion, avoiding turning the steering wheel when the machine is completely stopped; the equipment must not be lowered into the working position without the pivoting wheels.*

The following table shows the main problems, with the actions to be taken to solve them and reference to the operating instructions.

Problem	Probable cause	Solution	...
1. The steering wheel operation presents: <ul style="list-style-type: none"> <li>• difficulty in movement</li> <li>• sudden movements</li> <li>• blocks</li> <li>• strange noises</li> </ul>	The articulated joint is not lubricated	Grease the two lubricators on the central hub and the two lubricators on the tilting axis	[2.5.5]
	The steering wheel has no minimum axial backlash	Remove a washer from under the steering wheel	[2.2.4]
	The chain is dirty, blocked or not lubricated	Remove the chain, clean it with clean gasoline and soak it in oil before reassembling	[2.5.5]
	The pinions are damaged or do not rotate freely	Replace damaged pinions and check that they rotate freely	[4.2.1]
	The articulated joint is not free to move	Lift the machine with a lifting fork positioned in the centre of the machine, so that the rear wheels do not touch the ground and check the free rotation of the rear part of the machine. If the movement is still irregular, it is necessary to intervene on the bearings of the articulated joint	[3.2.3]
2. The steering is not free to turn	The steering wheel does not rotate freely	Check if the steering column comes into contact with other parts (e.g. the elastic fixing plugs).	–
	The steering wheel does not stay in place.	Check if the steering column has been damaged	–
		Check the tightening of all screws	–

## 4.2 STEERING SYSTEM INTERVENTIONS

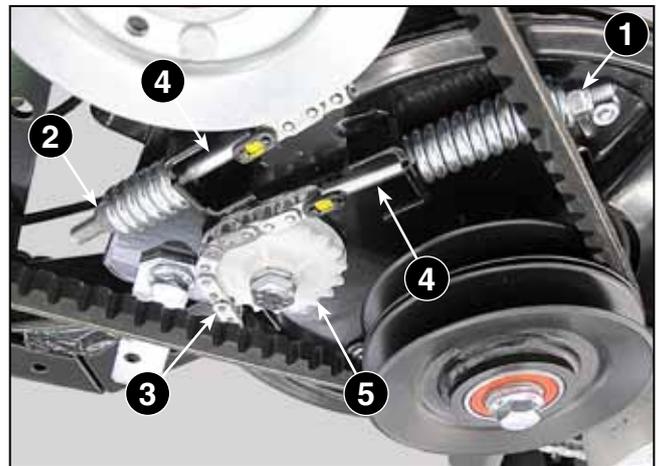
## 4.2.1 Disassembly of the chain and steering pinions

**NOTE** The steering chain, supplied pre-assembled, is composed of three sections with different orientation of the links and two threaded ends; a yellow marking is placed in correspondence of the link in the centre of the entire length. This makes the chain perfectly symmetrical, without constraints in the direction of the assembly.

1. Remove the front casing. [👉 3.1.2]

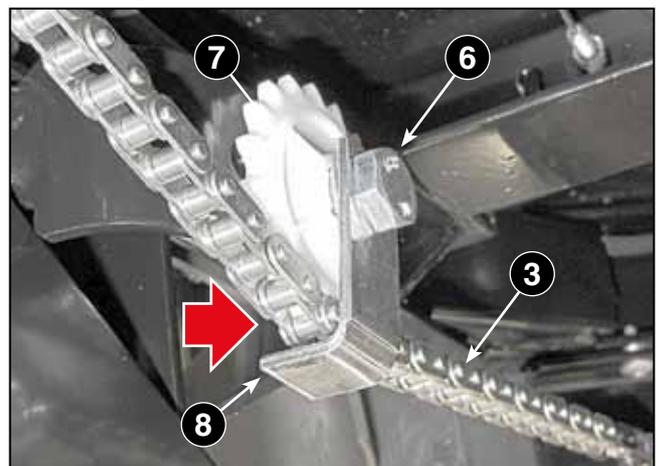
2. Remove the left and right rear casings. [👉 3.1.3]

3. Completely unscrew the two nuts (1) and (2) of the adjusters, respectively of the right and left branches of the chain (3), remove the terminals (4) from the two fixing brackets and release the right branch of the chain from the pinion (5).



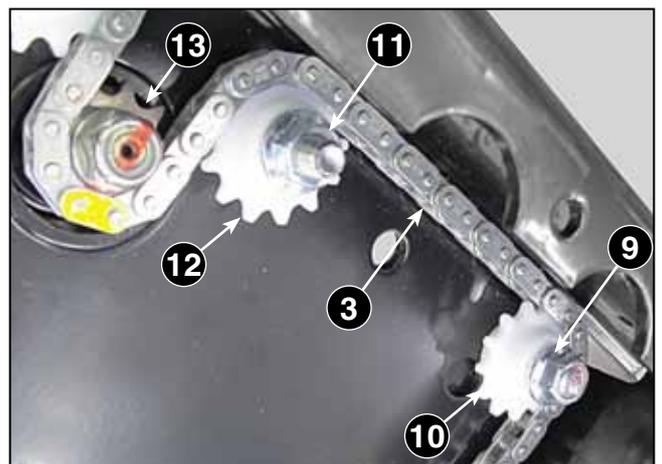
**NOTE** Pay attention to the fact that the adjuster nut of the right branch of the chain is on the left side of the machine and vice versa, and that the springs are of different lengths.

4. Unscrew the two fixing screws (6) of the two side pinions (7) and remove the retaining brackets (8) to allow the chain to be removed (3).



5. Unscrew the two nuts (9) and remove the two front side pinions (10)

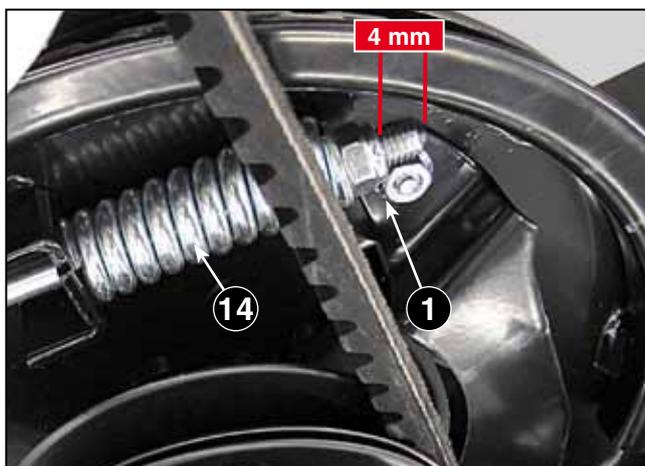
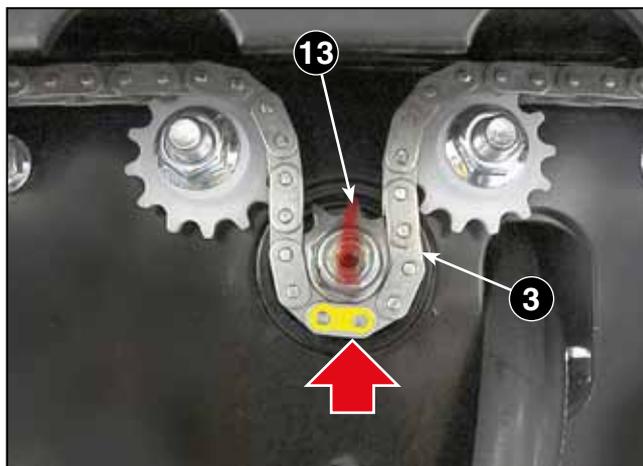
6. Unscrew the two nuts (11) and remove the two front central pinions (12), remove both branches of the chain (3) and release it from the steering column (13).



**IMPORTANT** Check the wear of all the nylon pinions and replace any worn or damaged ones.

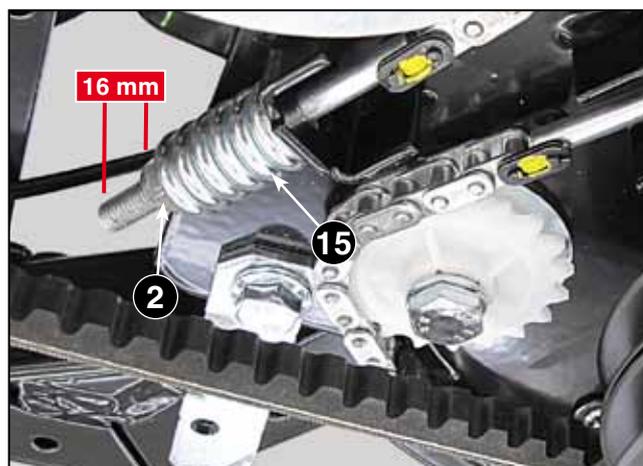
To reassemble, perform the steps described above in reverse order, taking care of:

- lubricate the chain with general purpose grease before the assembly;
- with the steering wheel perfectly aligned, mount the chain (3) with the central yellow link aligned with the pinion (13) of the steering column;
- mount the adjuster of the right branch of the chain in the seat on the left side of the machine and vice versa;



- refit the long spring (14) on the adjuster of the right branch and adjust the relative nut (1) so as to obtain a protrusion of the threaded section of 4 mm;

- refit the short spring (15) on the left branch adjuster and adjust the relative nut (2) so as to obtain a protrusion of the threaded section of 16 mm.
- tighten the nuts (9) and (11) with a torque wrench set to 35-50 Nm.



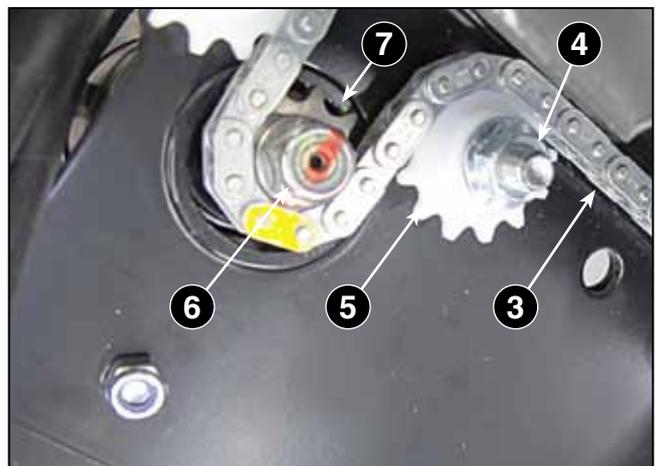
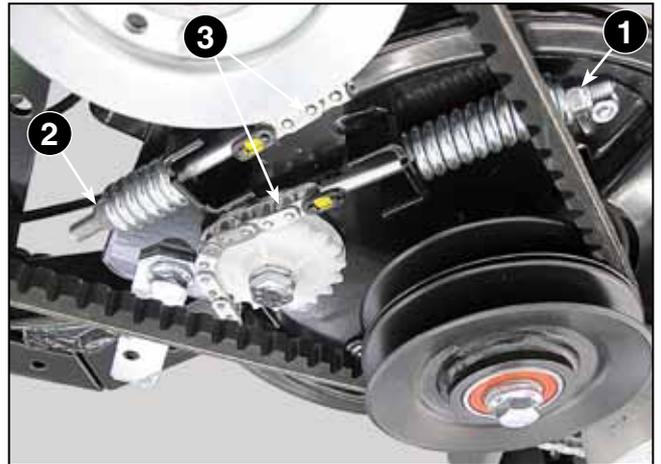
**IMPORTANT** Tighten the nuts (1) and (2) alternately and equally from the right side and the left side, until reaching the values indicated above.

**IMPORTANT** These values refer to the nominal values in the case of a new chain; however, with wear, it's normal for the chain to stretch, requiring subsequent adjustments to obtain the right tension. In any case, do not exceed the tightening of the nuts to prevent the spring from being compressed "like a pack", thus nullifying its damping function, resulting in hardening of the steering and premature wear of the chain and pinions.

After the assembly, carry out a test drive of the machine and check that the machine proceeds in a straight line, with the steering wheel perfectly centred.

### 4.2.2 Replacement of the steering wheel pinion

1. Completely loosen the two nuts (1) and (2) of the adjusters to remove the tension from both the branches of the chain (3).
2. Unscrew the nut (4) and remove one of the two central pinions (5).
3. Holding the steering wheel firmly, unscrew the nut (6) and remove the pinion (7) of the steering column shaft.

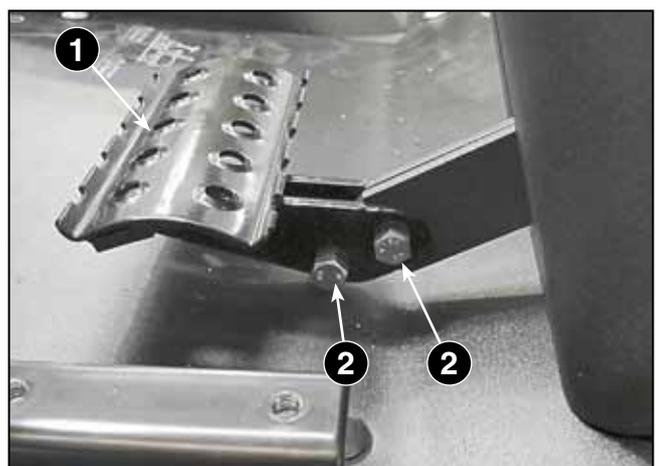
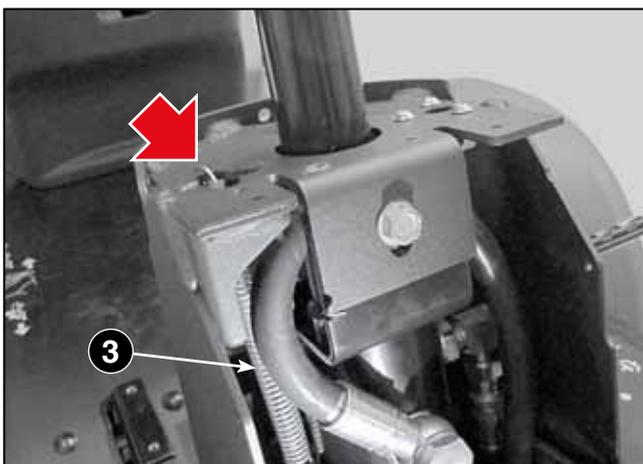


When assembling, perform the steps described above in reverse order, taking care to:

- restore the adjusters (1) and (2) and the correct tension of the chain. [👉 4.2.1]
- check the centering of the yellow link of the chain with respect to the pinion (7). [👉 4.2.1]

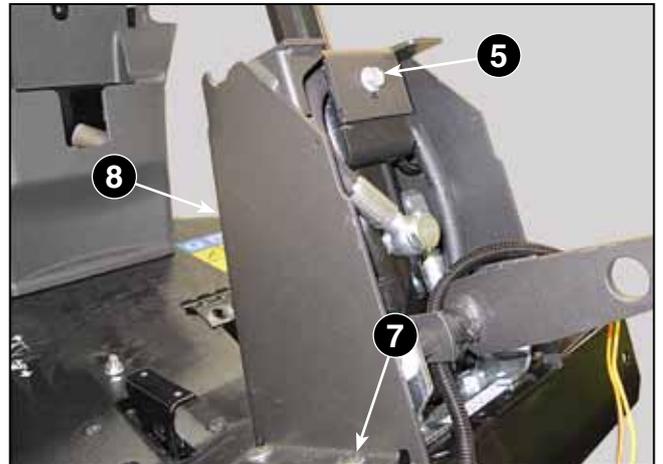
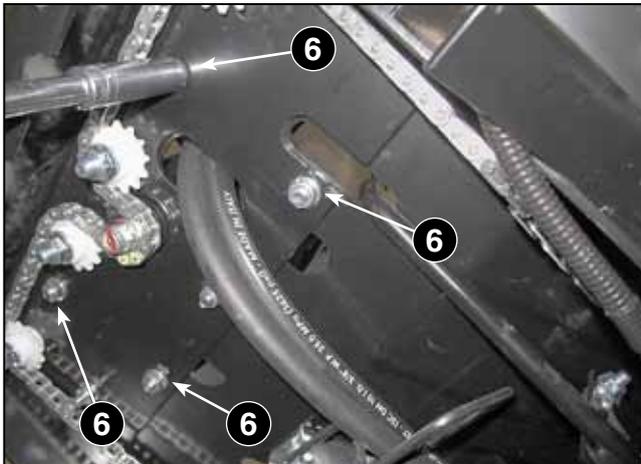
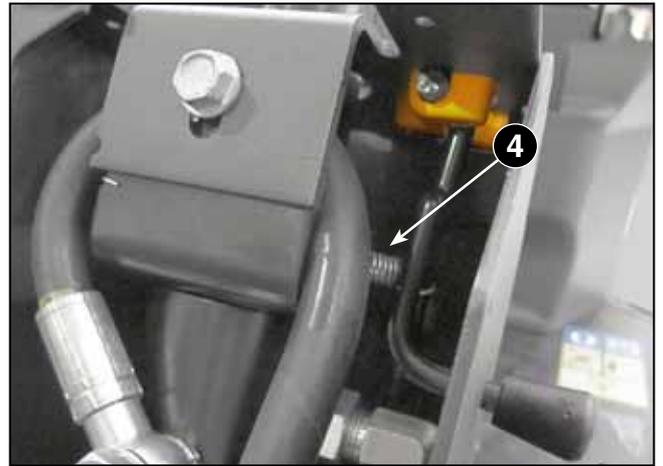
### 4.2.3 Replacement of the hydraulic steering valve (Booster)

1. Completely drain the oil of the hydraulic circuit. [👉 8.3.2]
2. Remove the steering column casings. [👉 3.1.4]

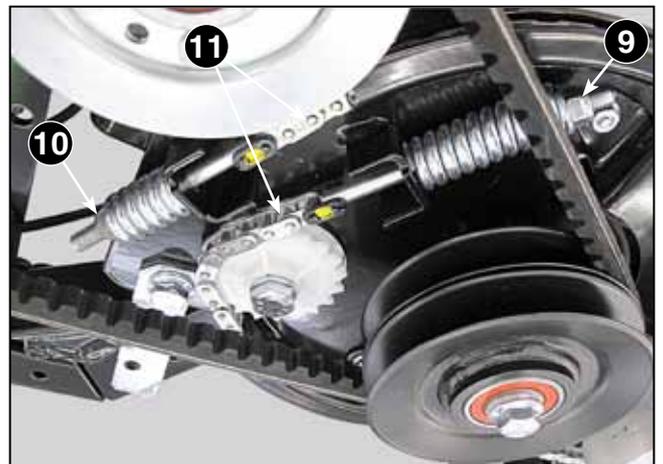


3. Disassemble the pedal (1) for lifting the work equipment fixed by the two screws (2).
4. Unhook the return spring (3) of the lifting system.

5. Release the locking spring (4) of the parking brake lever.
6. Unscrew the front screw (5), unscrew the four nuts (6), located under the footboard in correspondence with the screws (7), and remove the steering column support (8).



7. Completely loosen the two nuts (9) and (10) of the adjusters to remove the tension from both the branches of the chain (11).

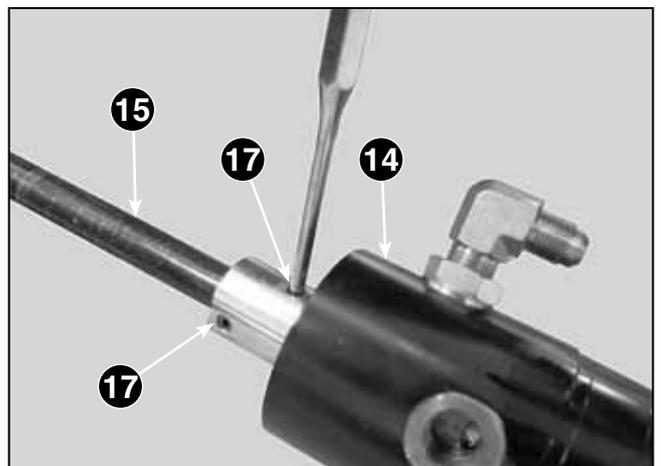
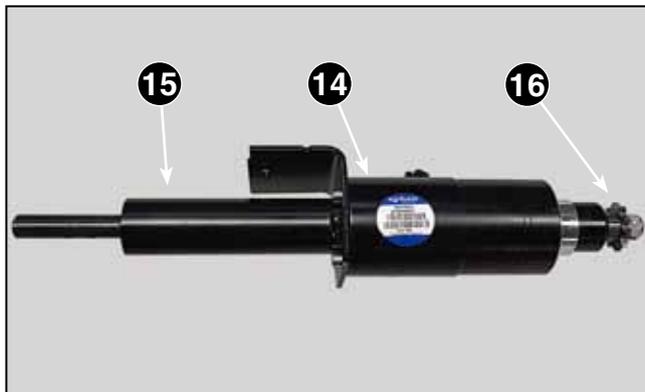
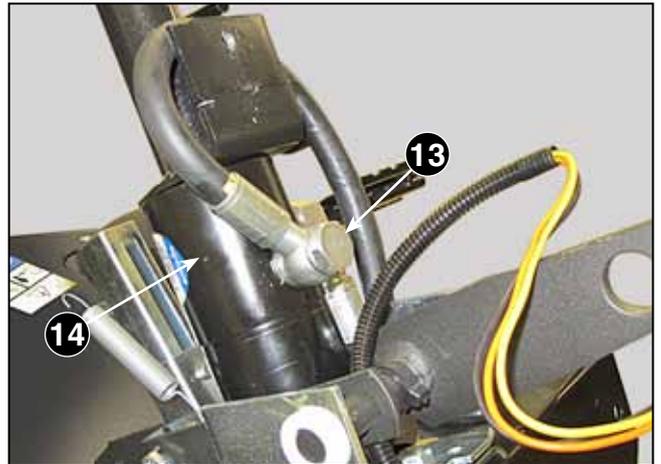


8. Unscrew the nut (12) of the elbow fitting, leaving the elbow mounted



9. Unscrew the screw of the eyelet fitting (13), appropriately collecting the oil still present in the pipes.

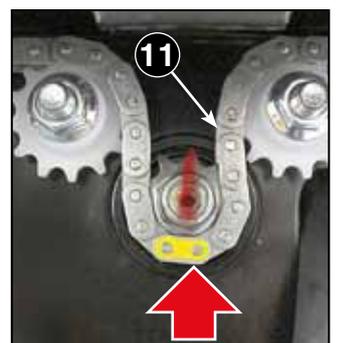
10. Remove the steering valve (14) together with the steering column (15) and the pinion (16).



11. If it is necessary to separate the steering valve (14) from the steering column (15), extract the two elastic pins (17) with the help of a pin punch.

When assembling, perform the steps described above in reverse order, taking care to:

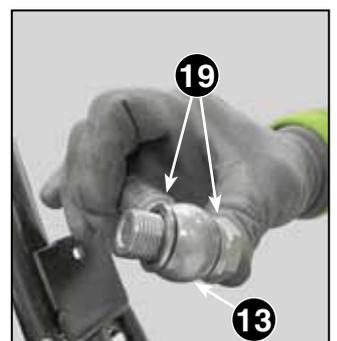
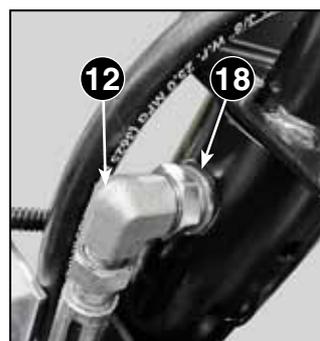
- restore the adjusters (9) and (10) and the correct tension of the chain (11). [👉 4.2.1]



- check the centering of the central link of the chain (11) with respect to the steering pinion [👉 4.2.1]

- always replace the sealing washers (18) and (19);

- tighten the fitting (12) to 30-37 Nm and the screw (13) to 35-42 Nm, to avoid oil leaks or damages to the components. [👉 8.1.3]



- always replace the oil and the filter of the hydraulic system after each replacement of the steering valve (booster) and check the oil level in the tank. [👉 8.3.2]

# 5 - ENGINE AND FUEL TANK

## Summary

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<b>5.2</b>	<b>FUEL TANK</b> .....	<b>56</b>
5.2.1	Removal and replacement of the tank.....	56

## 5.1 ENGINE

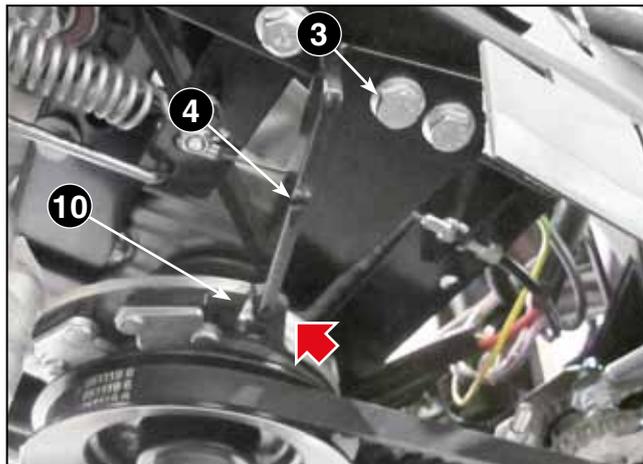
### 5.1.1 Clutch removal

1. Lift the rear part and stabilize the machine  
[👉 2.3.2].

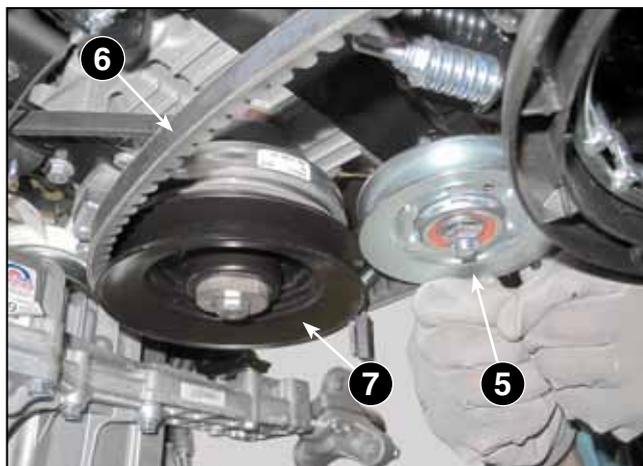
2. Disconnect the connector (1) from the power cable of the electromagnetic clutch (2).



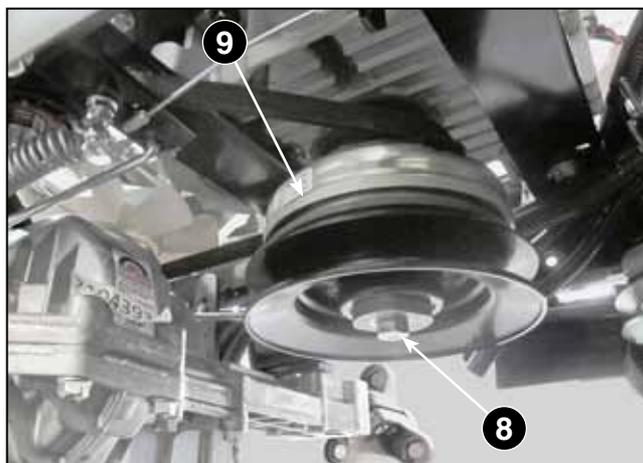
3. Unscrew the two screws (3) and remove the anti-rotational stop (4).



4. Move the tightener (5) towards the centre of the machine, as much as necessary to free the toothed belt (6) from the pulley (7).



5. Using an impact driver, unscrew the central screw (8) and remove the electromagnetic clutch (9) from the crankshaft.

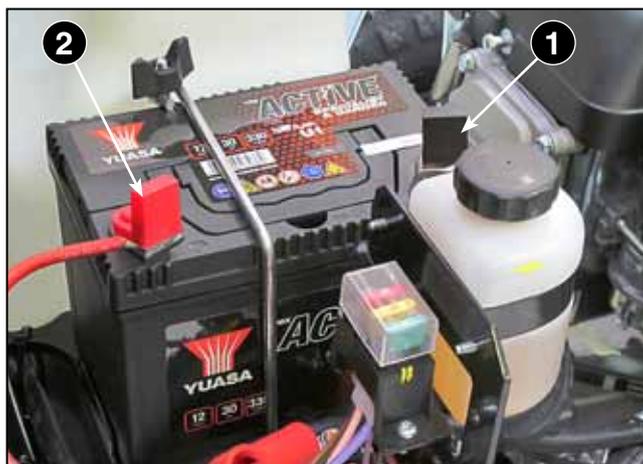


When assembling, perform the steps described above in reverse order, paying attention to correctly insert the anti-rotational stop in the clutch slot (10).

Tighten the screw (8) to a torque of 60-70 Nm.

### 5.1.2 Removal of the engine

1. Disconnect the black ground cable (1) from the battery (2) to avoid causing short circuits when disconnecting the electrical cables.

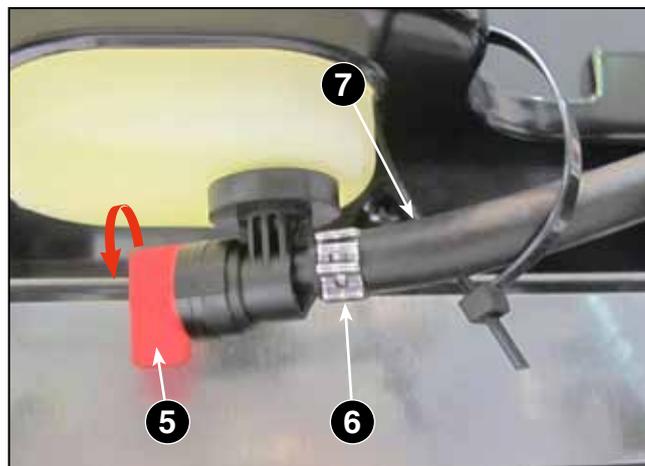


2. Disconnect the engine wiring connectors, the choke motor cable (3) and the ground cables (4).

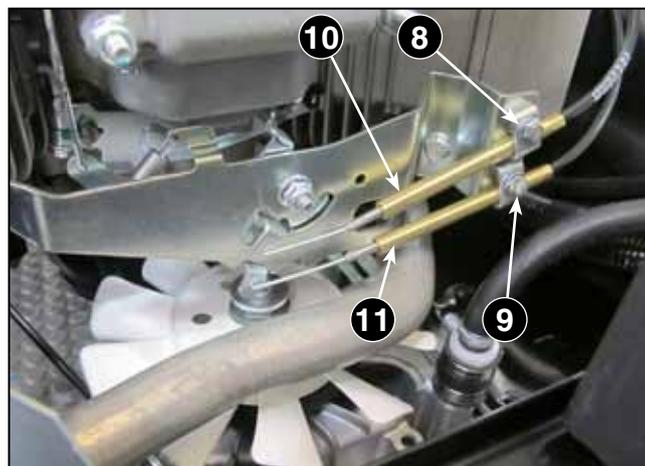
**NOTE** Given the possibility of using different engines, the images are only an example.



3. Close the tank tap (5). Prepare a container and remove the clamp (6) with the help of a screwdriver and pour the petrol in the tube (7) into the container.



4. Loosen the screws of the terminals (8) and (9) and disconnect the throttle (10) and choke (11) cables.

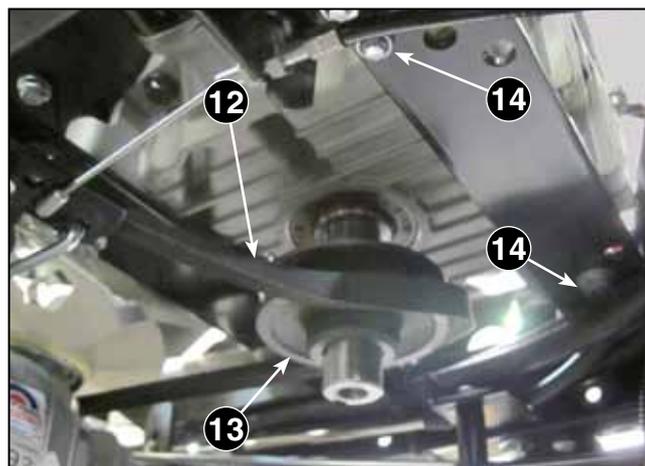


5. Remove the clutch [👉 5.1.1].

6. Press the brake pedal to loosen the belt (12) and be able to free it from the pulley (13) and remove the pulley from the shaft.

7. Unscrew the four screws (14) securing the engine.

**IMPORTANT** The engine screws can be different from each other; for this reason it is advisable to mark them so as not to incur assembly errors.



8. Proceed to harness and remove the engine.

**⚠ WARNING!** *Apply the lifting ropes in points that offer sufficient reliability and proceed with the removal of the engine, taking into account a weight of approximately 50-55 kg.*

When assembling, perform the steps described above in reverse order, taking care to:

– Do not interchange the throttle and choke cables.

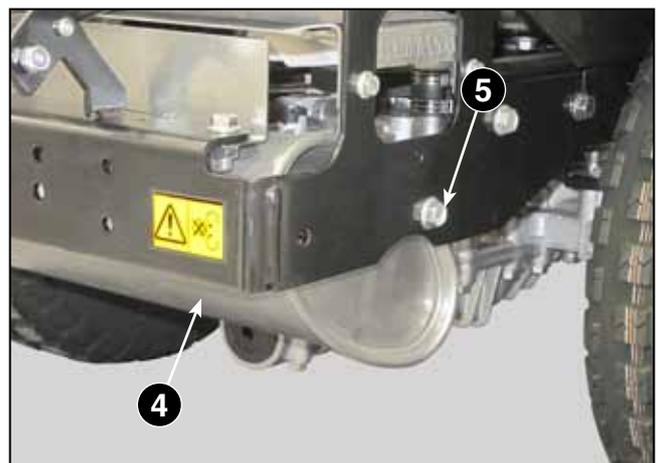
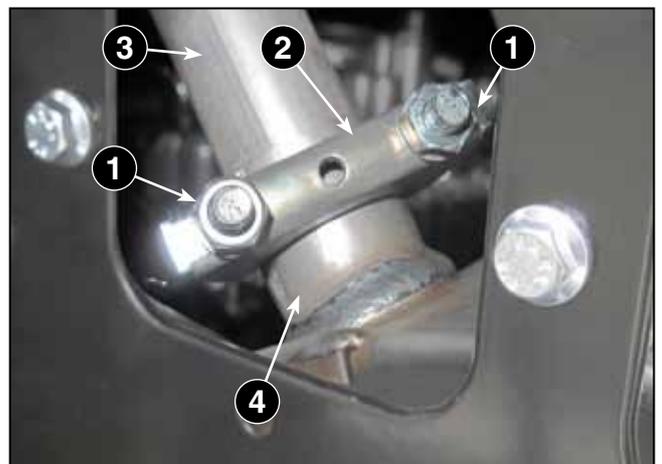
**NOTE** *Replacement cables have a predetermined length and do not require adjustment; for this reason it is necessary to use specific cables for each type of engine and function, without exchanging them or using cables of different engines.*

– Tighten the engine fixing screws (14) using a torque wrench set to 35-50 Nm.

### 5.1.3 Removal and replacement of the exhaust muffler

**⚠ WARNING!** *Wait for the engine and muffler to cool before carrying out any type of work on the rear of the machine.*

1. Remove the rear hood [👉 3.1.1].
2. Remove the fuel tank [👉 5.2.1]
3. Working from the right side of the machine, unscrew the two nuts (1) that lock the clamp (2) that fixes the exhaust manifold (3) of the engine to the muffler (4).
4. Unscrew the screw (5) taking care to support the muffler (4) from the right side.
5. Applying slight movements, cause the disengagement between the manifold (3) and the muffler until it can be removed.



When assembling, perform the steps described above in reverse order.

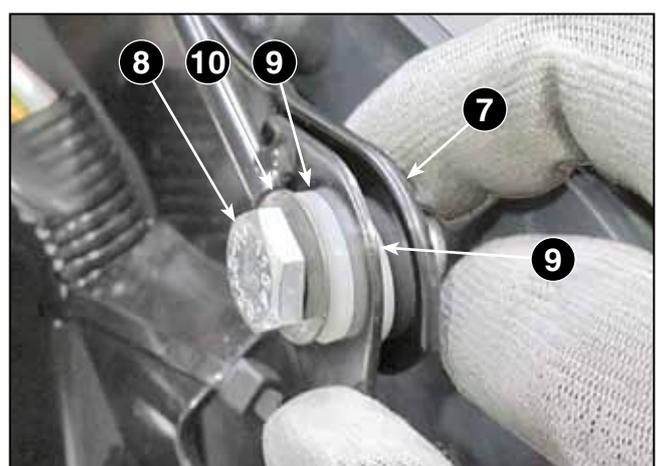
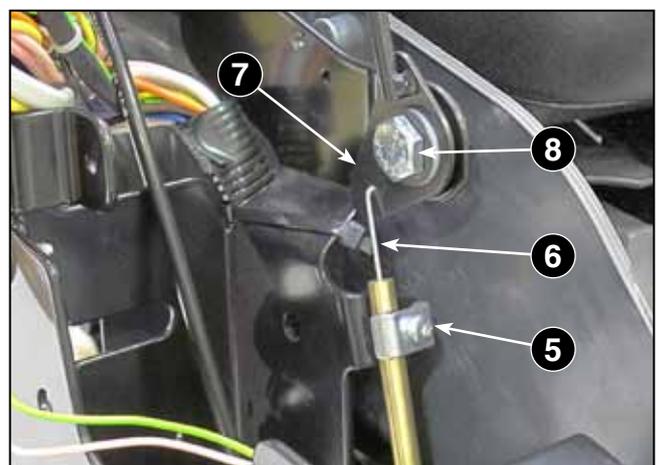
### 5.1.4 Replacement of the throttle

►► **Park 700 - 900 :**

1. Remove the dashboard casing. [👉 3.1.6]
2. Unscrew the screw (1) located in the lower left part of the dashboard.
3. Unscrew the throttle knob (2).
4. Unscrew the four screws (3) and remove the upper dashboard cover (4).
5. Loosen the clamp screw (5) and disconnect the "Z" terminal of the cable (6) from the throttle lever (7).
6. Unscrew the screw (8) and remove all the lever assembly (7) and the pivot components.

When assembling, perform the steps described above in reverse order, taking care to:

- observe the exact assembly sequence of the spacers and plastic washers (9), as well as the cup spring (10) under the head of the screw (8);
- tighten the screw (8) so as to eliminate any residual axial backlash, while maintaining the smoothness of operation and the possibility of stopping the lever in the desired position.



►► **Park 500 - Special :**

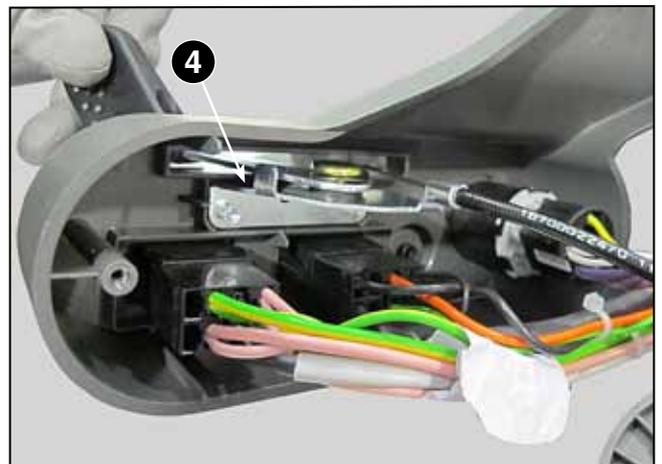
1. Remove the dashboard casing. [👉 3.1.6]
2. Remove the rear hood [👉 3.1.1].
3. Unscrew the screw (1) and remove the throttle knob (2).
4. Unscrew the two screws (3) that secure the throttle (4).
4. Loosen the clamp screw (5) and disconnect the "Z" terminal (6) of the throttle cable and release the cable sheath (7).



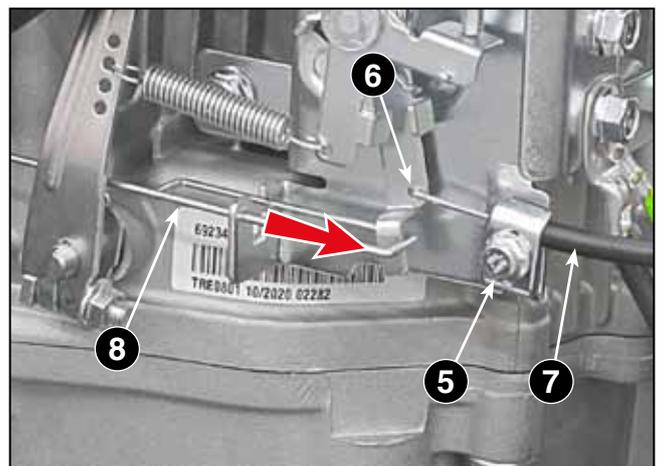
5. Working on the engine side, join the end of the old cable to



of the old cable to a cable or a cable pulling probe, using a sufficiently strong and reliable adhesive tape.



6. Working from the dashboard side, carefully pull the old cable which, in this way, guides the cable pulling probe all the way, from the engine to the exit of the terminal (6).



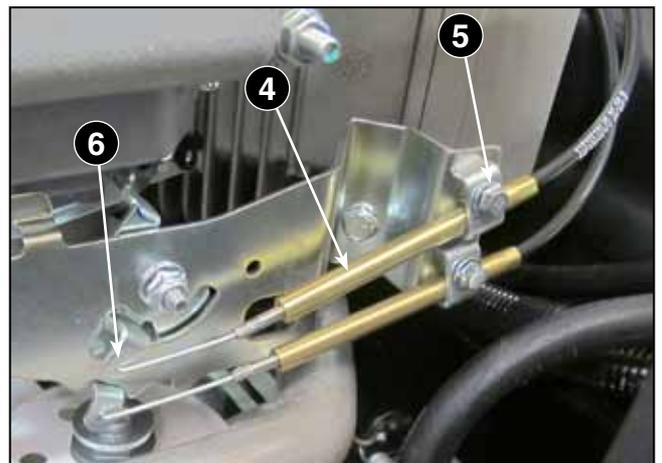
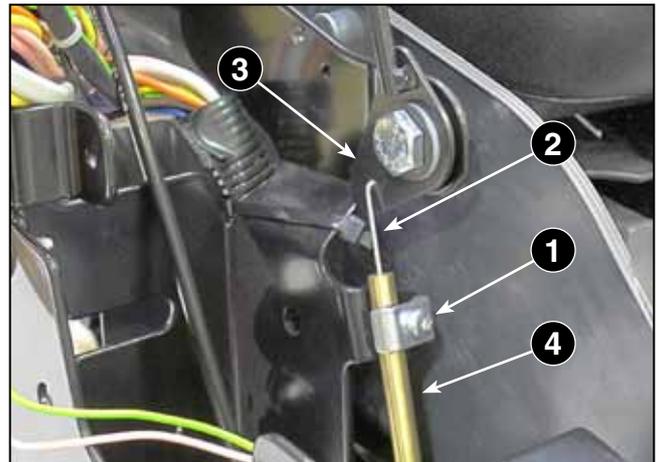
7. In the same way, working from the dashboard side, join the terminal of the new cable to the cable puller probe or to the cable and pull in the opposite direction to bring the terminal of the new cable (6) to the engine.
8. With the throttle in the «MAX» position, connect the terminal (6) of the cable to the engine lever, then pull the sheath completely back and secure it with the clamp (5).

**IMPORTANT** In engines with "autochoke" device and therefore without the choke control, make sure that the sheath is fastened so as to bring the choke rod (8) all the way down, when the throttle lever is in the fully advanced position.

## 5.1.5 Replacement of the throttle cable

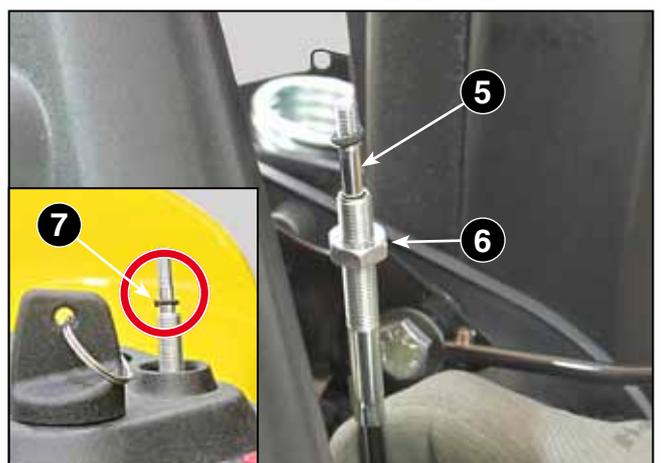
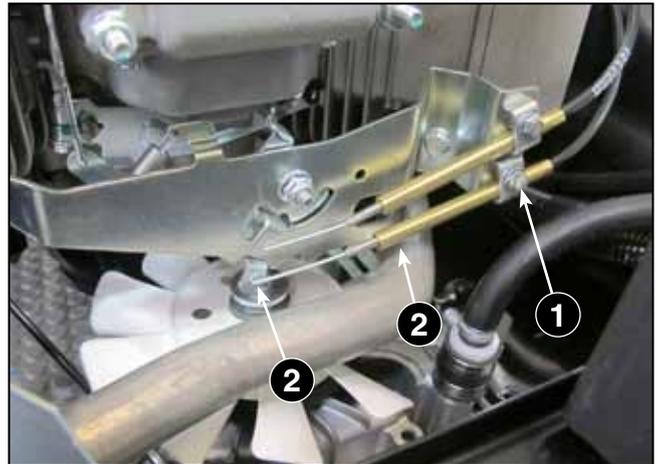
## ▶▶ Park 700 - 900 :

1. Access the throttle levers by removing the upper part of the dashboard. [👉 5.1.4] from 1 to 4.
2. Loosen the clamp screw (1) and disconnect the "Z" terminal of the cable (2) from the throttle lever (3) and release the cable sheath (4).
3. Remove the rear hood [👉 3.1.1].
4. Loosen the clamp screw (5) and disconnect the "Z" terminal (6) of the throttle cable and release the cable sheath (4).
5. Working on the dashboard side, join the dashboard side terminal of the old cable with the engine side terminal of the new cable, using a sufficiently strong and reliable adhesive tape.
6. Working on the engine side, carefully pull the old cable which, in this way, guides the new cable all the way from the dashboard to the exit of the opposite terminal.
7. With the throttle in the «MAX» position, connect the terminal (2) of the cable to the throttle lever and secure the sheath (4) from the dashboard side with the clamp (1).
8. With the throttle lever in the «MAX» position, connect the terminal (6) of the cable to the engine lever, then pull the sheath completely back and secure it with the clamp (5).



### 5.1.6 Replacement of the choke cable

1. Remove the dashboard casing [👉 3.1.6]
2. Remove the rear hood [👉 3.1.1].
3. Loosen the clamp screw (1) and disconnect the "Z" terminal (2) of the throttle cable (3) and release the cable sheath (4).
4. Unscrew the knob (3) after loosening the nut below.
5. Unscrew the nut (4)
6. Extract the cable terminal (5) from underneath.
7. Join the threaded terminal of the old cable with the motor-side terminal of the new cable, using a sufficiently strong and reliable adhesive tape.
8. Working on the engine side, carefully pull the old cable which, in this way, guides the new cable all the way from the dashboard to the exit of the engine.
9. Connect the "Z" terminal (2) of the cable to the engine choke lever and lock the cable sheath (2).
10. When assembling, bring the upper nut (4) all the way down, making sure to reposition the sealing OR ring (7) correctly. Then lock the threaded pin with the lower nut (6).



**IMPORTANT** Apply a film of grease in correspondence with the OR ring (7) and make sure that the command is smooth in both directions.

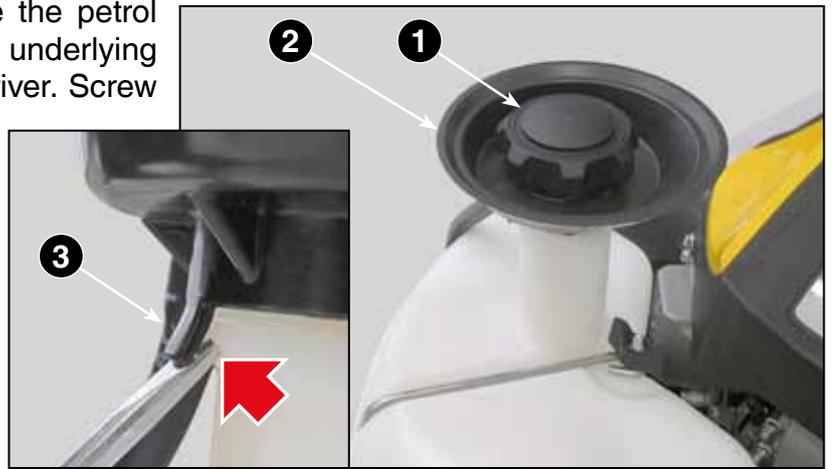
## 5.2 FUEL TANK

## 5.2.1 Removal and replacement of the tank

1. Remove the rear hood [👉 3.1.1]

**! WARNING!** *All operations concerning the tank must be carried out with the cold machine. Do not smoke near the tank and whenever you handle petrol.*

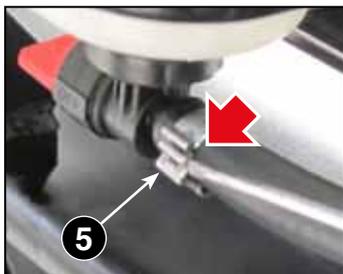
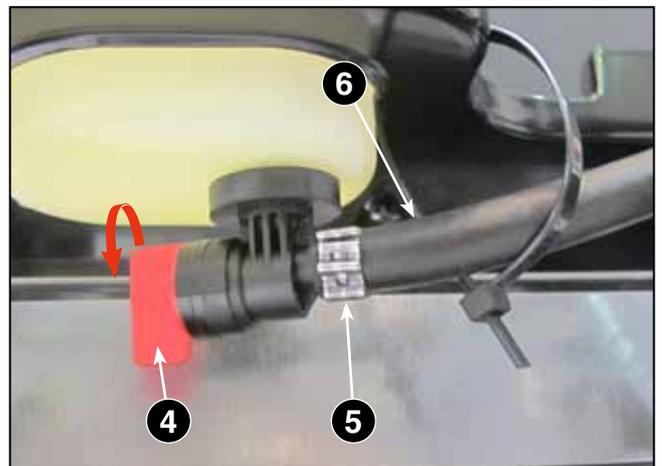
1. Unscrew the cap (1) and remove the petrol collecting tray (2), releasing the underlying tab (3) with the help of a screwdriver. Screw the cap (1) back on to prevent dirt from entering the tank or accidental spills of petrol.



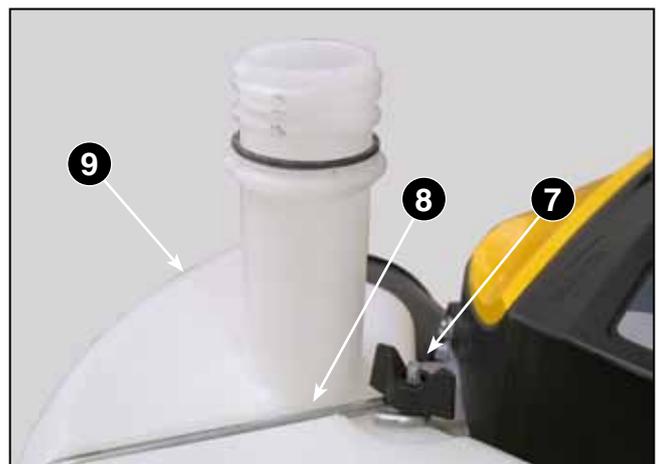
2. Close the tap (4).

3. Prepare a container and remove the clamp (5) with the help of a screwdriver and pour the petrol in the tube (6) into the container.

**IMPORTANT** *The clamp (5) is of the “CLIC” type as it meets the safety criteria required for this application. Therefore, in case of replacement, it is necessary to use an original spare part and NOT a common screw clamp.*

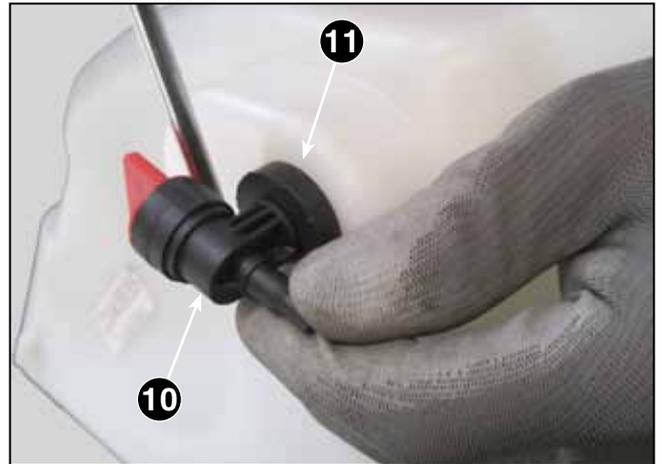


4. Unscrew the wing nut (7), remove the arch (8) and remove the tank (9).

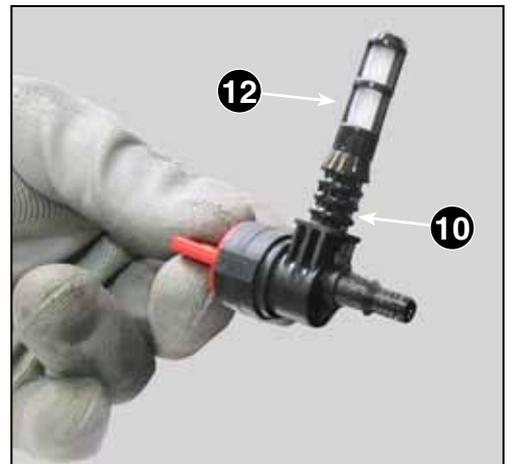


5. Empty the tank of the remaining petrol.

6. With the help of a screwdriver, pull out the tap (10) and the cap (11).

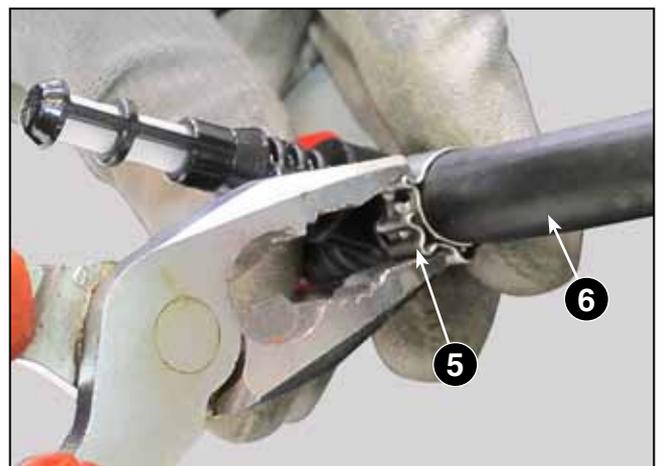


7. Clean the filter (12) thoroughly.



When assembling, perform the steps described above in reverse order, taking care to:

- carefully restore the clamp (5) of the petrol pipe (6) using the appropriate tool or a universal pliers.



- replace the O-ring (13) at the base of the tank filler neck.



## 6 - TRANSMISSION BELTS

### Summary

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### 6.1 BELT REQUIREMENTS

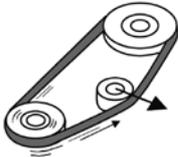
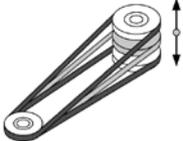
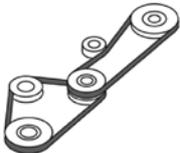
#### 6.1.1 Characteristics of the original belts

The normal belts on the market have different characteristics compared to the requirements of the belts of the power of the engine is distributed to the different users through a system of transmission belts, each kept at the right level of tension by a tightener preloaded by a spring.

The standard belts on the market have different characteristics compared to the requirements of the original spare belts, supplied by the authorised dealer. The latter are designed and manufactured in close cooperation with the belt supplier and the machine manufacturer.

The table emphasises the reasons why it is important to choose an original belt, useful when making such decisions.

Example	Belts available on the market	Original spare belts	Notes
Adhesion on the pulley.  	The belt rests with the sides inclined against the walls of the pulley. There must be a gap between the belt and the bottom of the groove.	The belt rests with the sides inclined against the walls of the pulley. There must be a gap between the belt and the bottom of the groove.	Same requirements. The original spare belts ensure perfect adhesion on the pulley.

Example	Belts available on the market	Original spare belts	Notes
Acceleration. 	Some belts only engage with the pulleys when the engine is running at operating speed and this generates excessive heat.	The belt follows the speed of the engine in continuous acceleration until the maximum speed is reached.	Standard belts are made of natural rubber and only capable of withstanding temperatures up to 70°C. Original spare belts are made of chloroprene rubber capable of withstanding temperatures up to 90°C.
Length. 	Manufactured in standard interval lengths.	Made in a specific length designed to ensure perfect adhesion to the pulley.	The distance between the pulleys is fixed. The belt tensioner ensures that the original belt maintains optimal tension.
Floating pulley on cutting equipment. 	Designed to transmit power between aligned, parallel and fixed pulleys.	The original Power Take Off (PTO) belt is designed to work even if the pulleys move up and down and tilt at the same time.	The equipment follows the ground beneath it and this means that the pulley is constantly moving. To withstand extreme operating conditions, the original belts are made of fibre reinforced rubber.
Curvature in two directions. 	Designed to curve around the pulley in one direction.	Most of the belts installed on the machines have tensioning rollers that act on the outer side of the belt. This means that while the belt is being used it must tilt both inwards and outwards.	All the original belts, which work with tensioning arms acting on the external side, are equipped with reinforcements. The reinforcement is designed specifically for these specific cases.
Noise. 	Made without special requirements for this specific factor.	The original belts are carefully selected to limit the increase in noise produced by the machine during operation.	Depending on the function, one of the following belt types is suitable: <ul style="list-style-type: none"> <li>• Coated</li> <li>• Anti-friction</li> <li>• Open sided</li> </ul>

### 6.1.2 Main causes of belt problems

It is essential to maintain the transmission belts in perfect working order for the machine to function properly.

Premature wear, breakage or deterioration of the V-belts can be caused by:

- Improper tension
- Misalignment
- Damaged pulleys
- Overload

The table shows the possible origins of abnormal situations and the corrective actions to be taken.

Problem	Probable cause	Corrective action
1. Rapid belt wear	Friction	Check the belt path
	Pulleys misalignment	Check
	Worn or damaged pulley grooves	Replace pulleys
	Inadequate belt	Check the parameters and replace the belt with the appropriate original spare part
	Belt slippage	Check the tensioning system
2. Damaged sides and twisted belt in the pulley	Damaged internal structure	Replace the belt and check for correct mounting
	Overload	Check the operating conditions
	“Jerky” operating use	Check the operating conditions
3. Belt slippage	Loosening the belt	Check the tensioning system
	Overload	Check the operating conditions
	Worn pulleys, with the belt resting on the bottom	Replace pulley
	Presence of oil	Clean up any oil or grease residue
4. Belt screeching	Loosening the belt	Check the tensioning system
	Overload	Check the operating conditions
5. Cracked belt	Belt slippage	Check the tensioning system
	Excessive heat	Adapt operating conditions

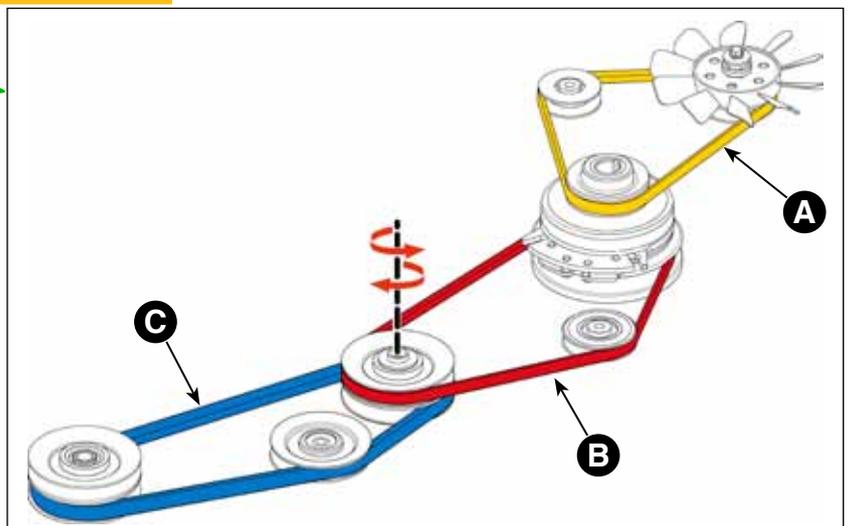
## 6.2 ARRANGEMENT AND FUNCTION OF THE BELTS

### 6.2.1 General information

The number and development of the belts present some differences between two drive wheels (2WD) and four drive wheels (4WD) models; these differences are highlighted in the following drawings, to which reference should be made to identify the belts described in the individual paragraphs.

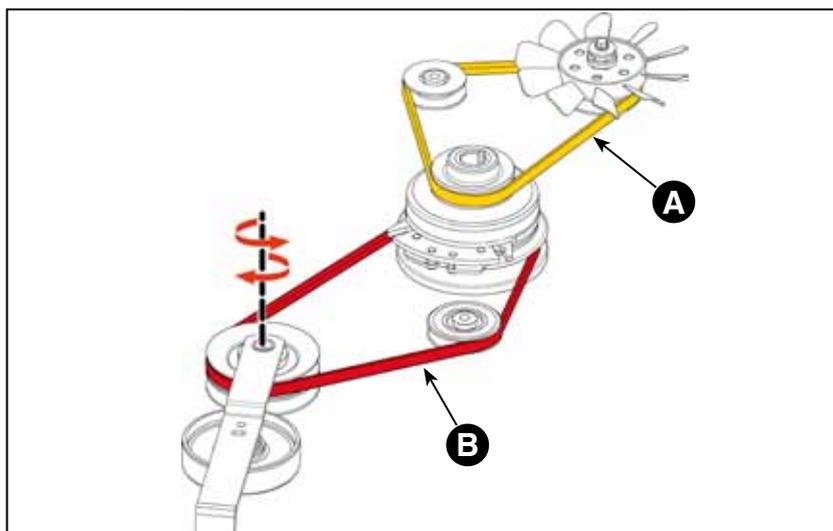
#### ►► Park 4WD machines:

- 
- 
- **A) Engine / transmission belt** [👉 6.3.1].
- **B) Engine / articulated joint axis belt** [👉 6.3.2].
- **C) Articulated joint axis / PTO belt** [👉 6.3.3].
- 
- 
- 
- 



►► Park 2WD machines:

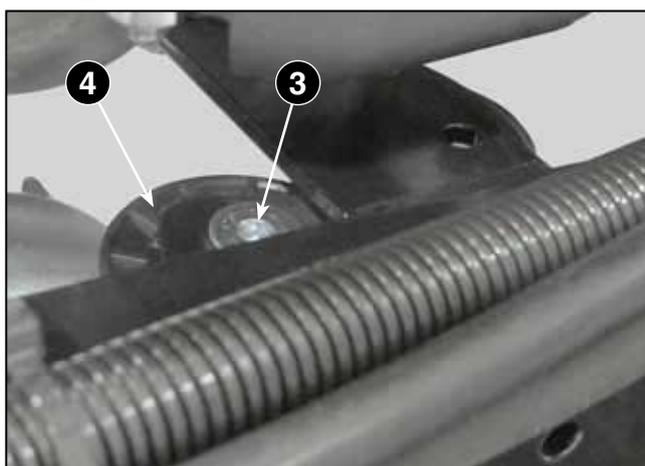
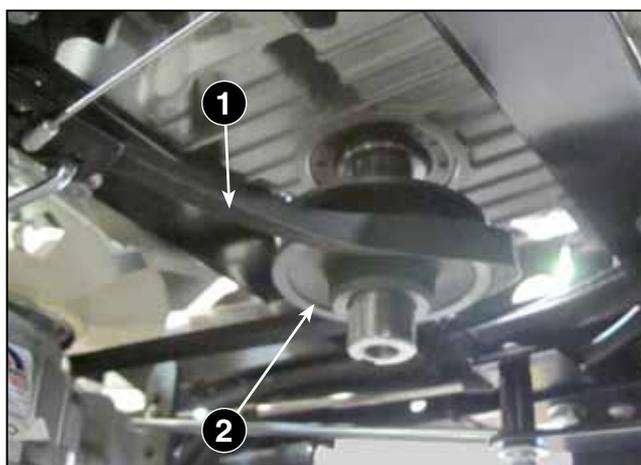
- A) Engine / transmission belt [  6.3.1].
- B) Engine / articulated joint axis belt [  6.3.2].



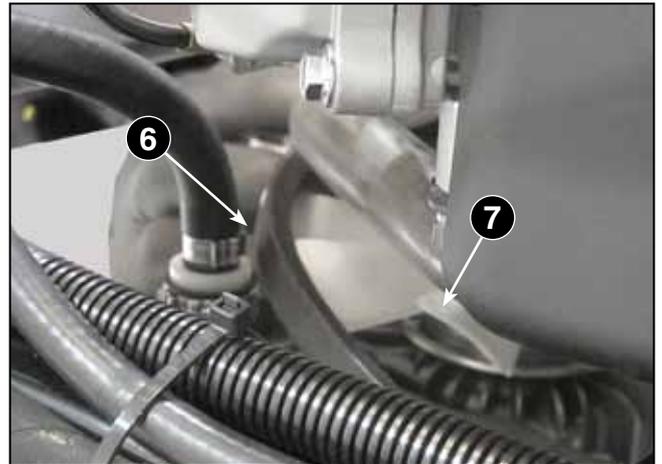
### 6.3 REPLACEMENT OF THE BELTS

#### 6.3.1 Replacement of the engine / transmission belt. (Ref. A)

1. Remove the electromagnetic clutch from the engine shaft [  5.1.1]
2. Press the brake pedal to loosen the belt (1) and be able to free it from the pulley (2).
3. Release the brake to make the screw (3) for securing the tightener (4) accessible, unscrew the nut (5) and remove the tightener (4).



- Remove the belt (6) by passing it over the fan of the rear transmission unit (7).



When assembling, perform the steps described above in reverse order, taking care to reassemble the tightener (4) with the protruding part of the hub facing upwards.

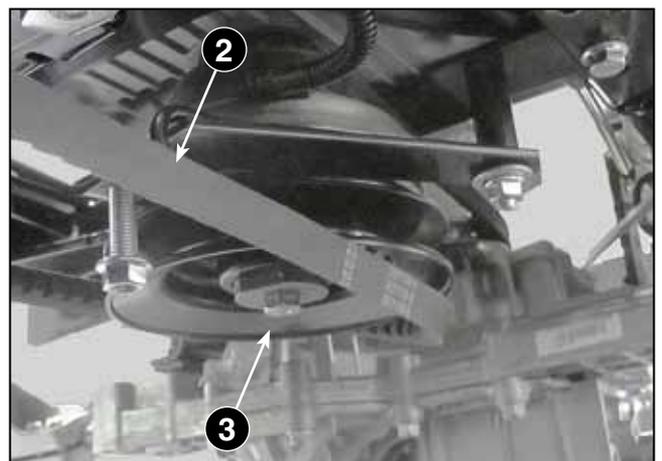
### 6.3.2 Replacement the engine / articulated joint axis belt (Ref. B)

- Remove the left rear casing, paying attention to the fact that its removal causes the loss of the left fixing point of the belt guide arch.  
[👉 3.1.3]

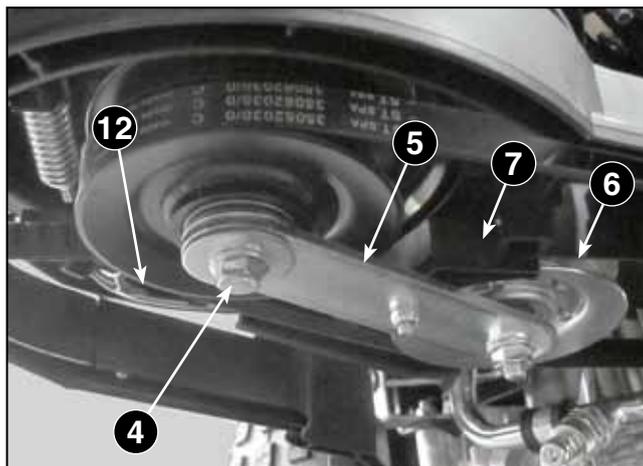


- Using a suitable spring-pulling hook, release the spring (1) of the tightener.

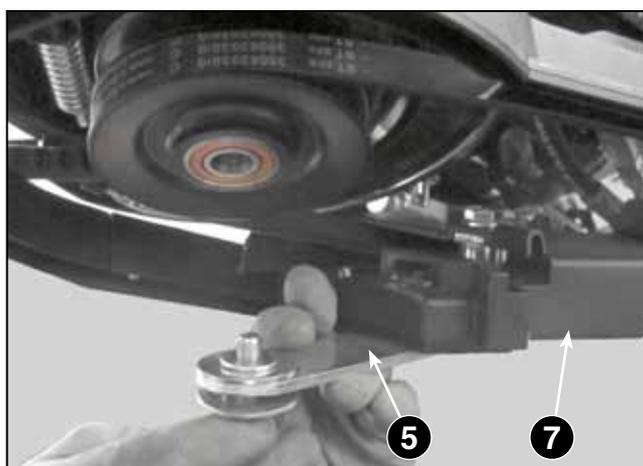
- Release the belt (2) from the electromagnetic clutch pulley (3).



4. Unscrew the central screw (4) to remove the arm (5) of the tightener (6) together with the spring (1) and the protective casing (7).

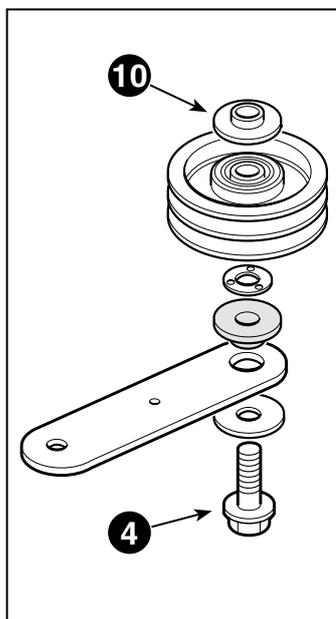


5. Remove the double pulley (8) together with the belt (9).

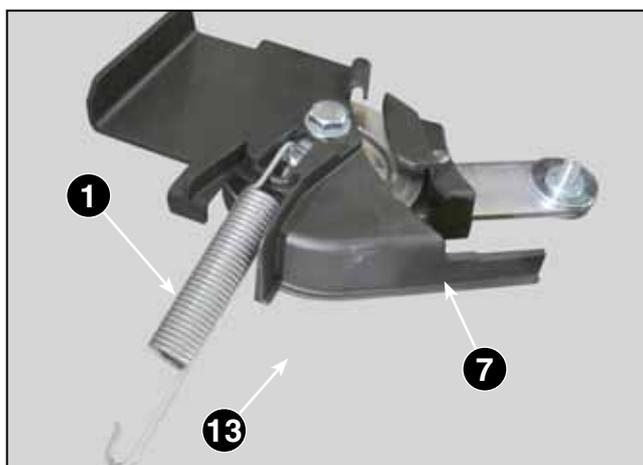


When assembling, perform the steps described above in reverse order, taking care to:

- reassemble the spacer (10) with the stop facing upwards and to observe the correct assembly sequence indicated in the exploded view drawing and described in detail in chapter 3. [👉 3.2.1]



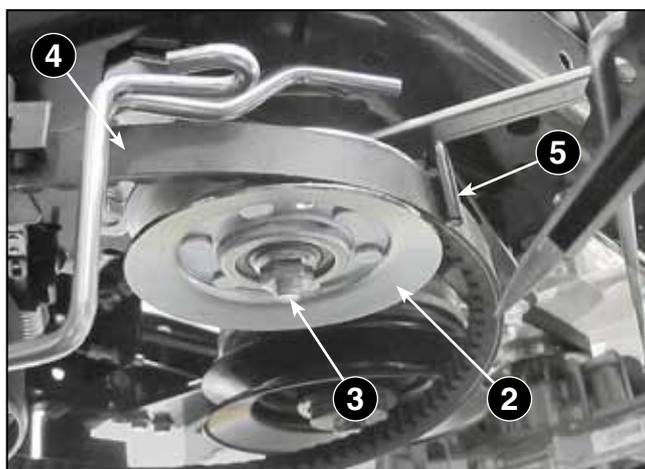
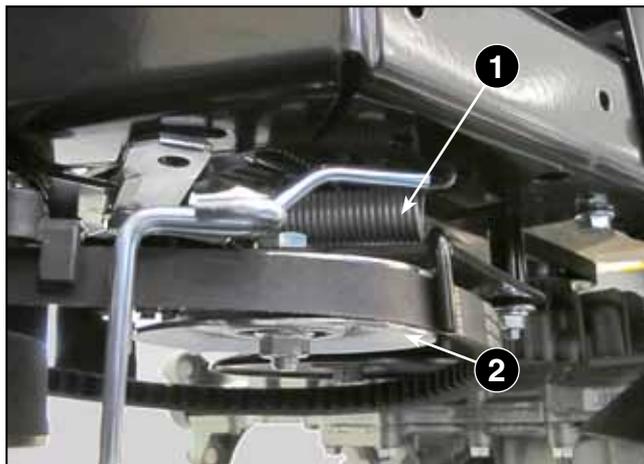
- tighten the screw (4) to a torque of 35-50 Nm.



### 6.3.3 Replacement of the articulated joint / PTO belt (Ref. C)

**▶▶ Park 4WD machines:**

1. Remove the front casing [👉 3.1.2] and the right and left rear casings [👉 3.1.3] paying attention to the fact that their removal causes the loss of the fastening points of the belt guide arch.
2. Release the spring (1) to loosen the tightener (2).
3. Unscrew the nut (3) and remove the tightener (2) to release the belt (4) from the retaining pin (5).



4. Remove the belt (4).

When assembling, perform the steps described above in reverse order, taking care to reassemble the tightener (2) with the protruding part of the hub facing upwards.

### 6.3.4 Removal of the PTO engagement tightener lever

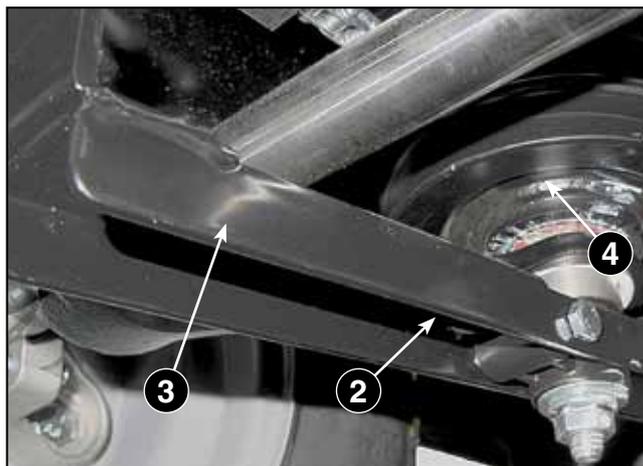
**▶▶ Park 4WD machines:**

1. Release the spring (1).



- 2. Unscrew the nut (2) and remove the lever (3) on which the tightener (4) is fixed.

When assembling, perform the steps described above in reverse order.



**▶▶ Park 2WD machines:**

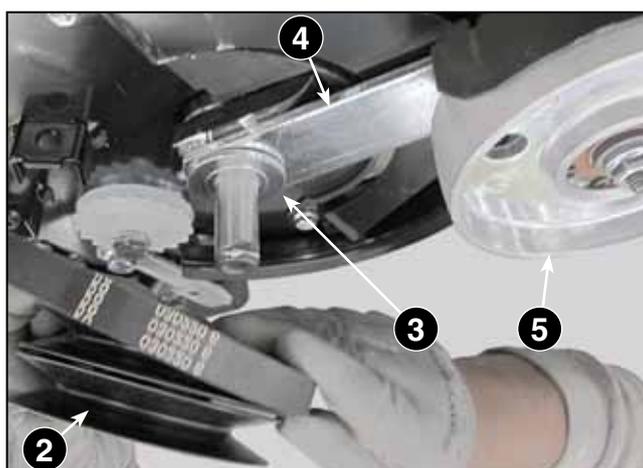
- 1. Remove the belt between the engine and the axle of the articulated joint. [👉 6.3.2] from 1 to 3.

- 2. Unscrew the central screw (1) that secures the double pulley (2).

- 3. Remove the double pulley (2), the spacer (3) and the arm (4) with the tightener (5).

When assembling, perform the steps described above in reverse order.

- Tighten the screw (1) to a torque of 35-50 Nm.



**7 - WHEELS - TRANSMISSION - BRAKE**

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**7.1 WHEELS AND TYRES**

**7.1.1 Disassembly of the rear wheels and hubs**

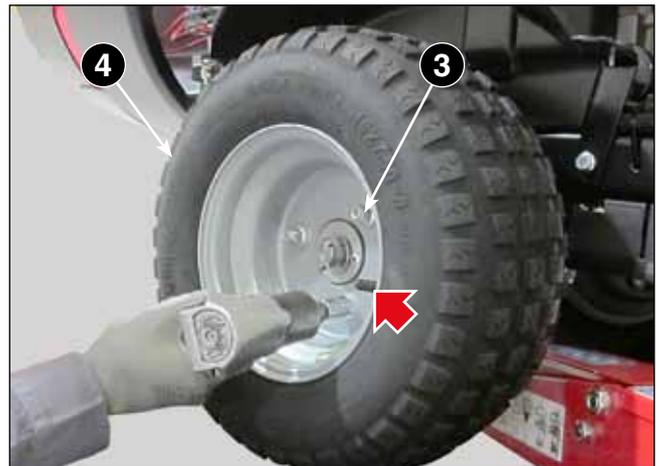
1. Lift the rear part and stabilize the machine  
[👉 2.3.2].

2. Unscrew the screw (1) securing the hub cap  
(2).



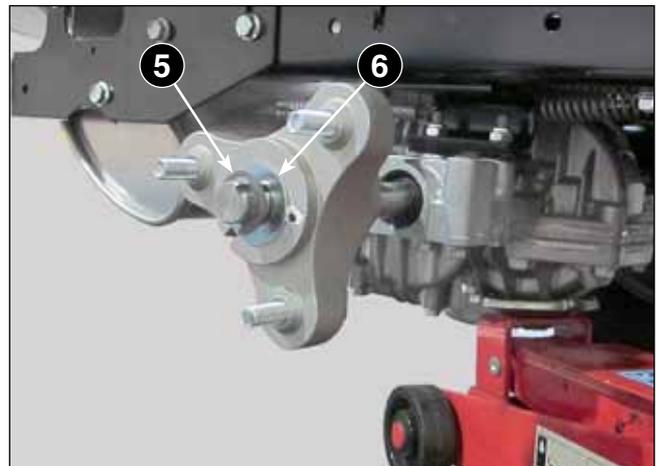
3. Unscrew the three nuts (3).

4. Remove the wheel (4)

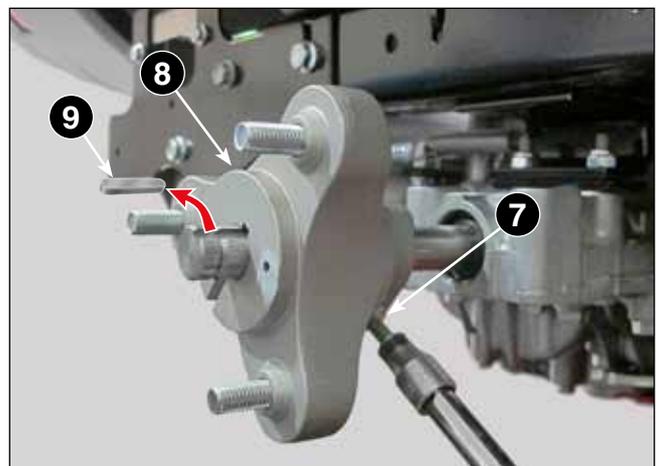


To disassemble the hub:

5. Remove the Benzing ring (5) and remove the shoulder washer (6).



6. Unscrew the two screws (7) and unscrew the hub (8), together with the key (9).



When assembling, perform the steps described above in reverse order, taking care to:

- reposition the key (9) correctly and mount the hub (8) so that the outer flat part is 17.5 mm from the end of the shaft;
- tighten the two screws (7) with a torque wrench set to 25 Nm;
- refit the shoulder washer (6) and the Benzing ring (5);
- reassemble the wheel (4) with the inflation valve on the outside and tighten the three nuts (3) with a torque wrench set to 35-50 Nm.



**!** **WARNING!** Check and restore the correct inflation pressure.

**7.1.2 Disassembly of the front wheels and hubs**

**▶▶ Park 4WD machines:**

1. Lift the front part and stabilize the machine [👉 2.3.2].

2. Remove the Benzring ring (1) and remove the equipment support (2), with the two shoulder washers (3).

3. Unscrew the three nuts (4).

4. Remove the wheel (5)

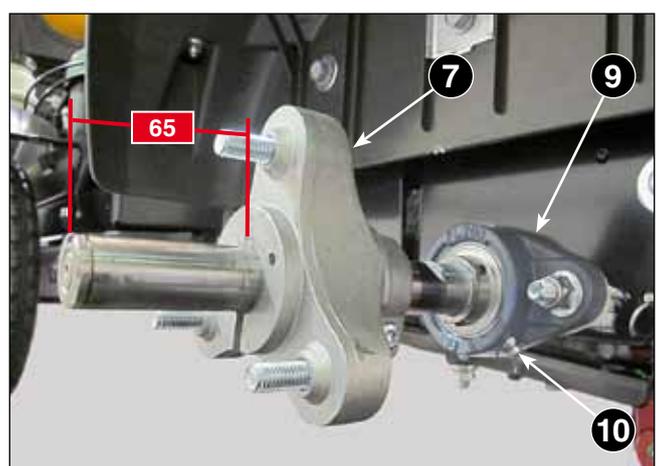
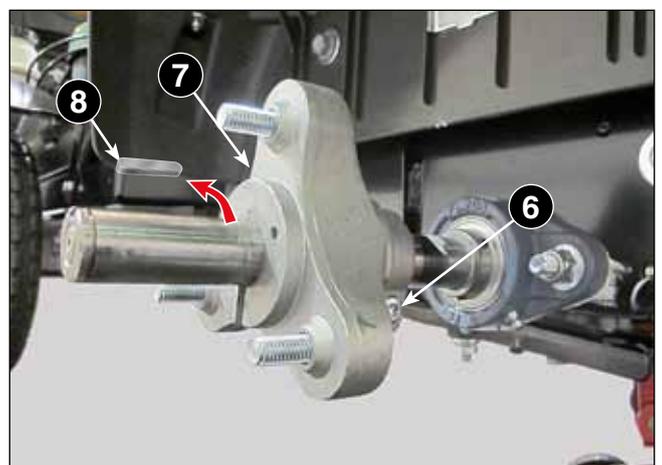
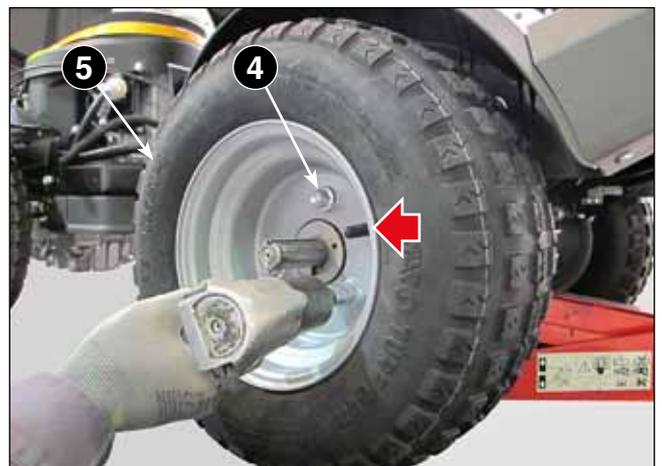
To disassemble the hub:

6. Unscrew the two screws (6) and unscrew the hub (7), together with the key (8).

When assembling, perform the steps described above in reverse order, taking care to:

- reposition the key (8) correctly and mount the hub (7) so that the outer flat part is 65 mm from the end of the shaft;
- fully tighten the two screws (6) with a torque of 20-25 Nm;
- refit the shoulder washers (3) and the Benzring ring (5);
- lubricate the support (9) with grease, using the lubricator (10);
- reassemble the wheel (5) with the inflation valve on the outside and tighten the three nuts (4) with a torque of 30-35 Nm,

**⚠ WARNING!** Check and restore the correct inflation pressure of the tyres.



►► Park 2WD machines:

1. Lift the front part and stabilize the machine  
[👉 2.3.2].

2. Pull out the cotter pin (1) and remove the washer (2) and the tool holder (3).

3. Pull out the outer cotter pin (4) and remove the inner shoulder washer (5).

4. Unscrew the three nuts (6).

5. Remove the wheel (7)

To disassemble the hub:

6. Pull out the inner cotter pin (8) and remove the inner shoulder washer (9).

7. Remove the hub (10), together with the spacer (11) and the shim washers (12).

When assembling, perform the steps described above in reverse order, taking care to:

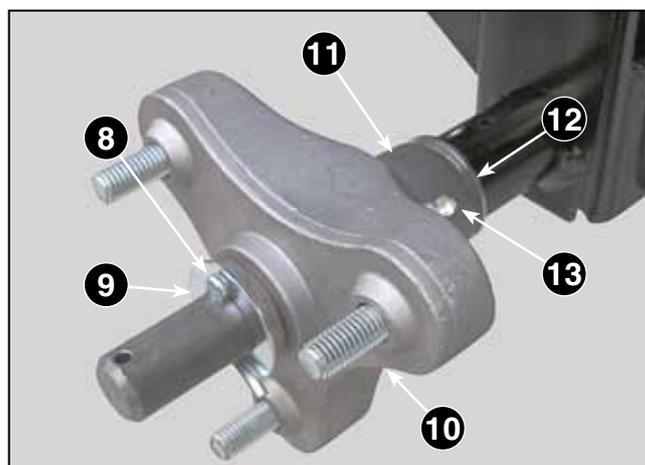
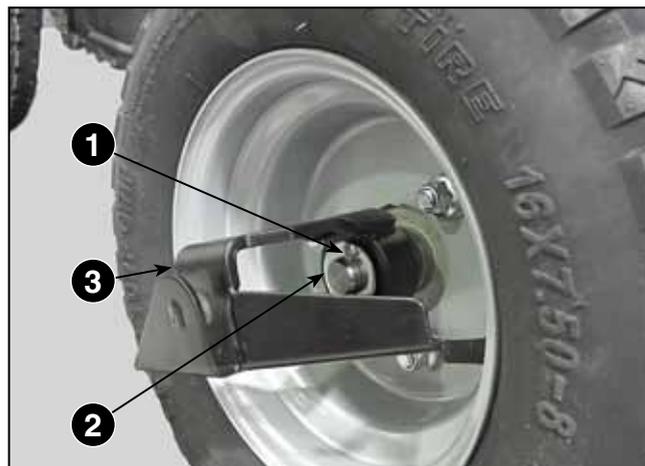
- lubricate the hub (10) with grease, using the lubricator (13);
- reassemble the wheel (7) with the inflation valve on the outside and tighten the three nuts (4) with a torque wrench set to 35-50 Nm,



**IMPORTANT** Always replace broken pins or pins with deformations that may compromise their function.



**WARNING!** Check and restore the correct inflation pressure.



### 7.1.3 Tyres

The tyres used are «Tubeless» type and so any repair following a puncture must be done by a tyre specialist according to the methods used for this type of tyre.

**!** **WARNING!** *Always replace deformed rims as they could impair the hold of the tyre.*

## 7.2 REAR TRANSMISSION UNIT

### 7.2.1 General description

The rear axle consists of a monobloc unit, which includes the pump, the hydraulic drive motor and the differential.

The unit is driven by a belt connected to the pulley mounted on the engine axle.

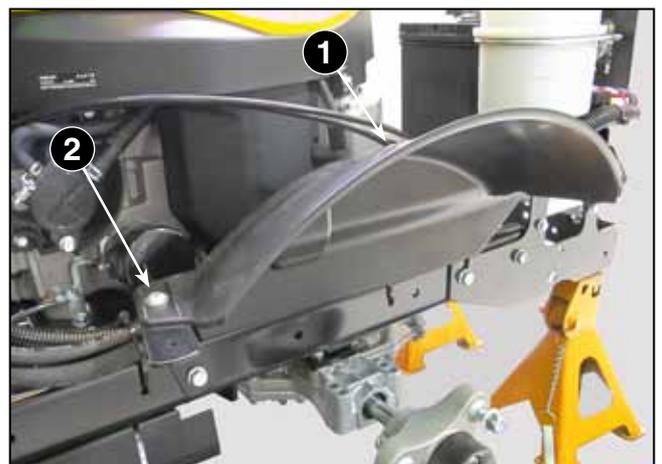
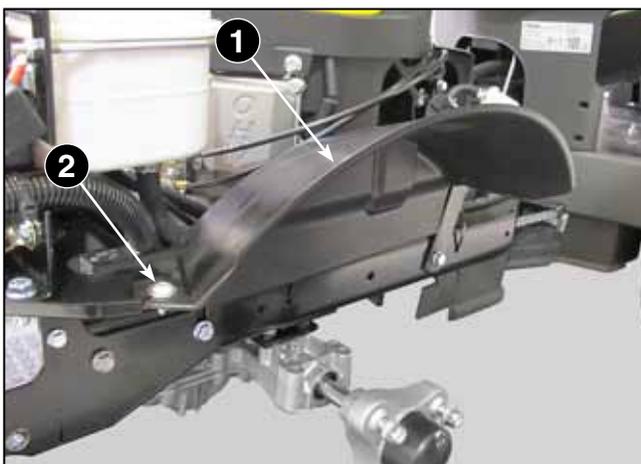
The speed modulation and direction of travel are controlled by the traction pedal, the release of which produces a braking action capable of stopping the machine within 1.9 meters, as required by the regulations.

The removal of the transmission unit from the machine is only required in case of replacement or revision by a Manufacturer's Service Centre.

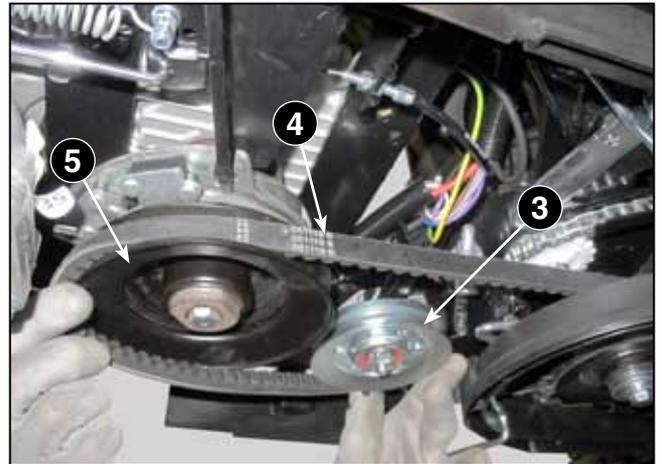
The operating diagrams and management methods of the hydraulic circuit are described in chapter "HYDRAULIC SYSTEM", [👉 8].

### 7.2.2 Removal of the rear transmission unit

1. Lift the front part and stabilize the machine [👉 2.3.2].
2. Remove the rear wheels [👉 7.1.1] from 1 to 4.
3. Remove the exhaust muffler [👉 5.1.3].
4. Remove the right mudguard (1) fixed by two screws (2).



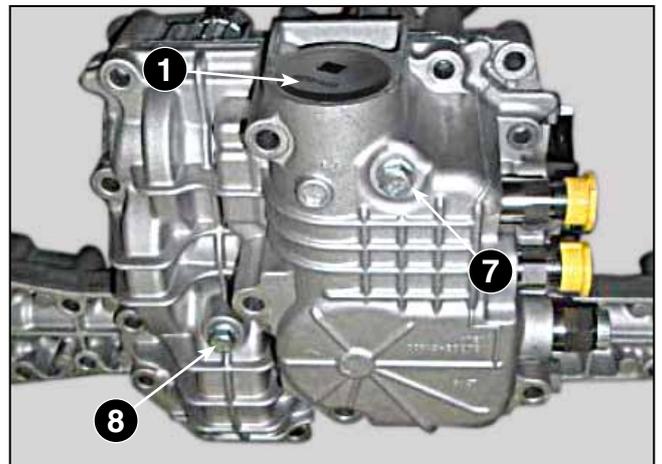
5. Manually move the tightener (3) towards the centre of the machine, as much as necessary to free the belt (4) from the pulley (5).



6. Place a container under the transmission unit and drain all the oil by unscrewing the filter cap (6).

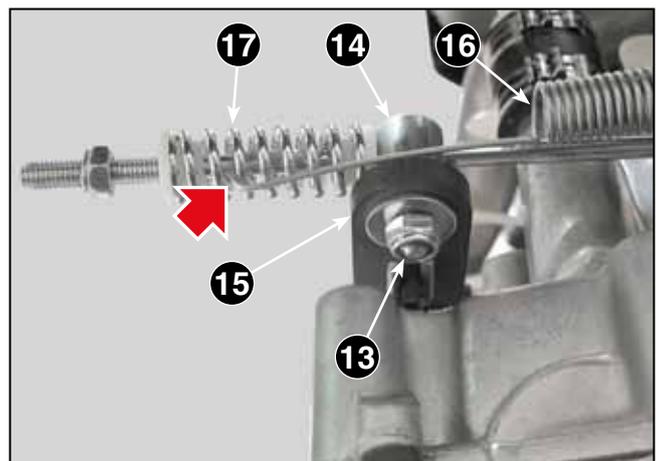
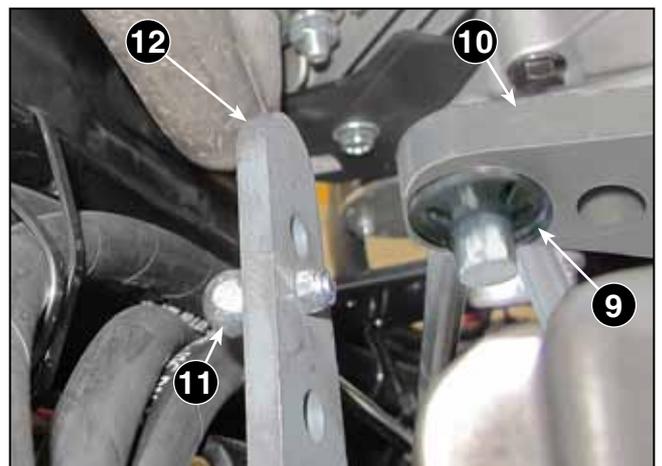
**Only for Park 4WD:**

Unscrew the two drain plugs (7) and (8).



7. Disconnect all mechanical connections of the controls:

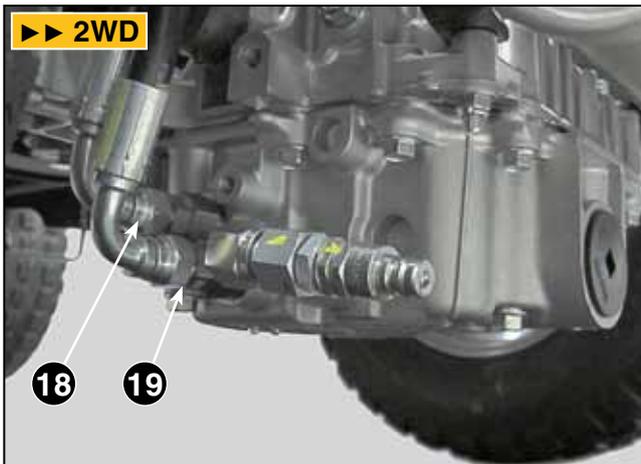
- remove the crown fixer (9) and release the by-pass control lever (10);
- with the lever in the fully retracted position, disconnect the ball joint (11) from the lever (12) of the progress control;
- unscrew the nut (13) and disconnect the pin (14) from the lever (15) of the brake control, leaving the terminal of the spring (16) hooked to the return spring (17).



8. Disconnect all hydraulic connections:

- unscrew the fittings (18 - 19 - 20 - 21) marking them appropriately so as not to make mistakes during assembly;

18 = Hydraulic steering valve return pipe  
19 = Hydraulic steering valve delivery pipe



**Only for Park 4WD:**

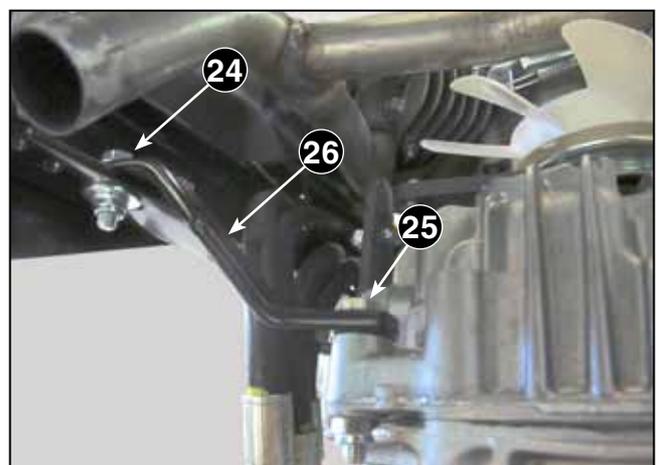
20 = Front transmission return pipe  
21 = Front transmission delivery pipe



**NOTE** for all hydraulic connections, see the overall diagram. [👉 8.1.3]

- remove the upper clamp (22) and disconnect the pipe fitting (23) connecting with the oil tank.

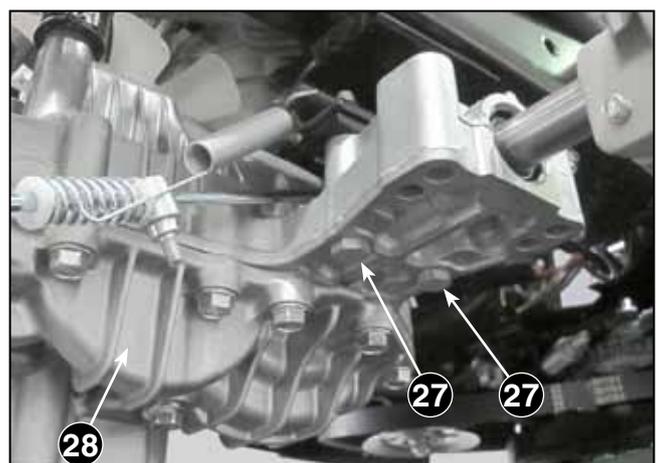
**IMPORTANT** The clamp (22) is of the "CLIC" type as it meets the safety criteria required for this application. Therefore, in case of replacement, it is necessary to use an original spare part and NOT a common screw clamp.



9. Loosen the screw (24) and unscrew the screw (25) of the reaction bracket (26).

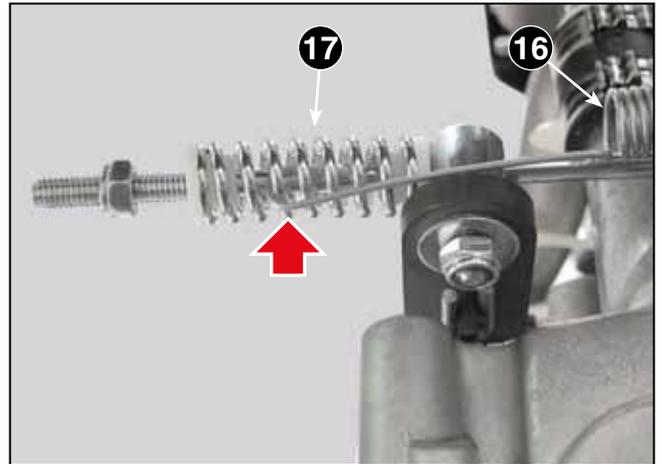
**⚠ WARNING!** The unit is secured to the frame by four screws. Loosen the screws carefully, adequately supporting the transmission unit so as not to cause it to fall.

10. Unscrew the four screws (27) and the transmission unit (28) can be removed from the machine



When assembling, perform the steps described above in reverse order, taking care to:

- ALWAYS replace the crown fastener (9);
- replace all the seals of the hydraulic fittings;
- place the ball joint (11) in the second hole of the lever (12);
- check that the return spring (16) is hooked to the third coil of the brake spring (17)



When assembling, perform the steps described above in reverse order, taken care to tighten the screws (27) with a torque wrench calibrated at 20-25 Nm.

After the assembly,

- tighten the hydraulic fittings to the torque indicated in the “Hydraulic connections diagram” [👉 8.1.3]
- check the correct adjustment of the parking brake spring (17) [👉 7.6.4].
- fill the oil [👉 8.3.2].
- adjust the pedal stroke [👉 7.5.2].

## 7.3 FRONT TRANSMISSION UNIT (Park 4WD only)

### 7.3.1 General description

The front axle consists of a monobloc unit, which includes the hydraulic drive motor and the differential.

The unit is operated by two hydraulic pipes connected to the rear unit and the synchronism of the speeds is ensured by a dynamic balancing valve for the correct balancing of the circuit.

The removal of the transmission unit from the machine is only required in case of replacement or revision by a Manufacturer's Service Centre.

The operating diagrams and management methods of the hydraulic circuit are described in chapter “HYDRAULIC SYSTEM”, [👉 8].

### 7.3.2 Removal of the front transmission unit

1. Lift the front part and stabilize the machine  
 [👉 2.3.2].

2. Remove the front wheels [👉 7.1.2] from 1 to 4.

3. Place a container under the rear transmission unit and drain all the oil by unscrewing the filter cap (1).

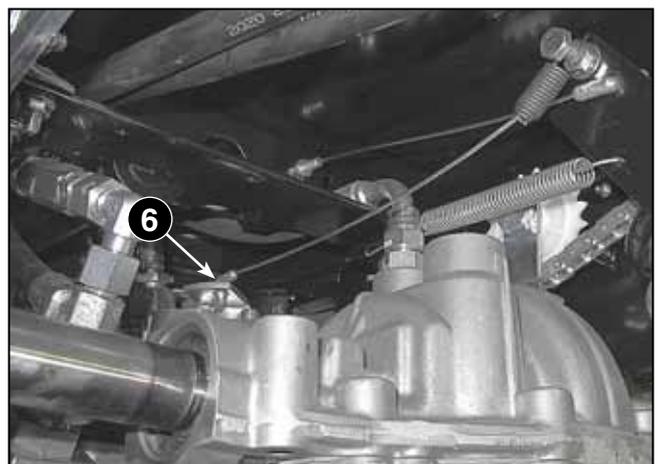
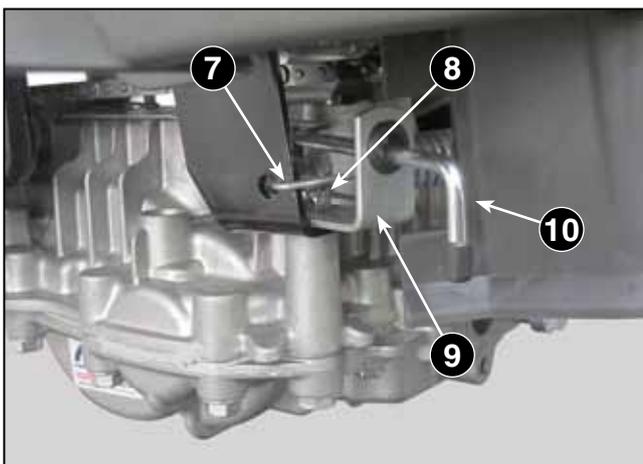
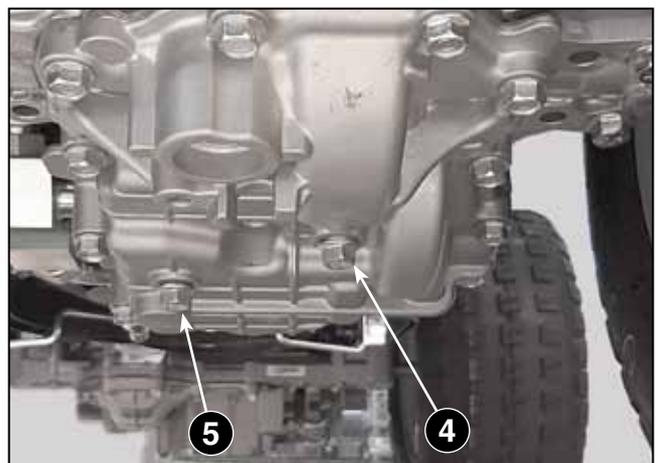
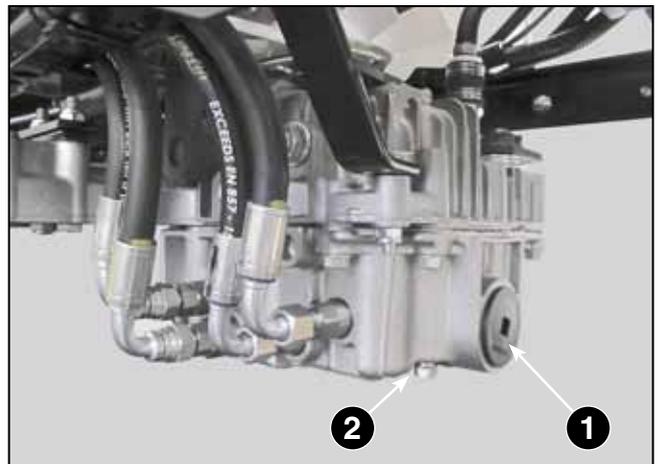
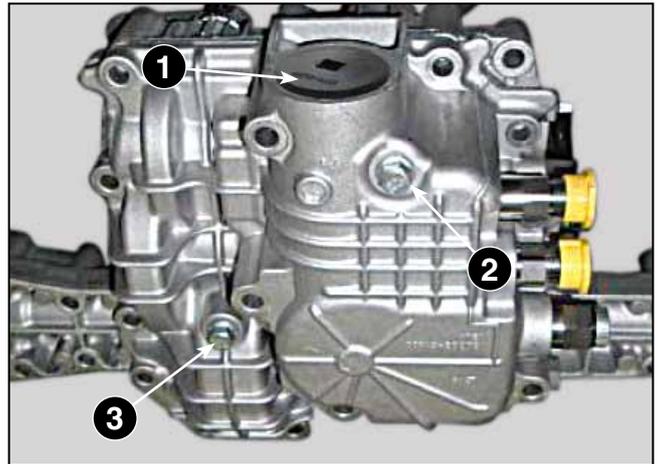
**Only for Park 4WD:**

Unscrew the two drain plugs (2) and (3).

4. Place a container under the front transmission unit and drain all the oil by unscrewing the two caps (4) and (5).

5. Disconnect all mechanical connections:

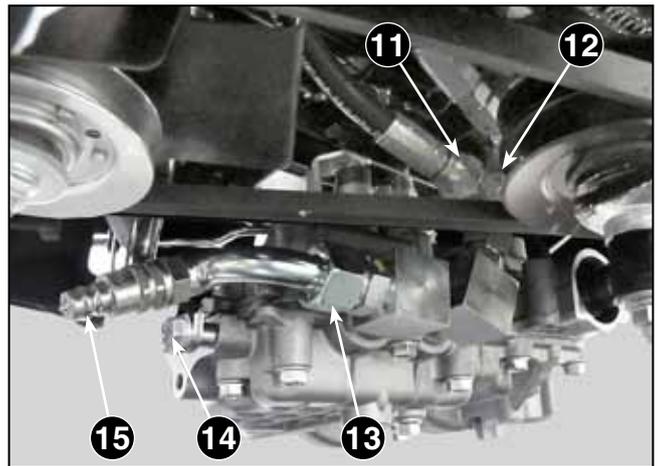
- release the terminal (6) of the brake cable;
- release the spring (7) of the PTO engagement tightener;
- unscrew the nut (8) and remove the support (9) of the by-pass control rod (10).



6. Disconnect all hydraulic connections:

- unscrew the fittings (11) and (12) on the rear part of the transmission unit, marking them appropriately so as not to make mistakes during the assembly:

11 = Rear transmission return pipe;  
12 = Rear transmission delivery pipe;



- unscrew the fitting (13) and the screw (14) to remove the attachment for quick filling (15).

- unscrew the fitting (16) on the rear part of the transmission unit, marking it appropriately so as not to make mistakes during the assembly:

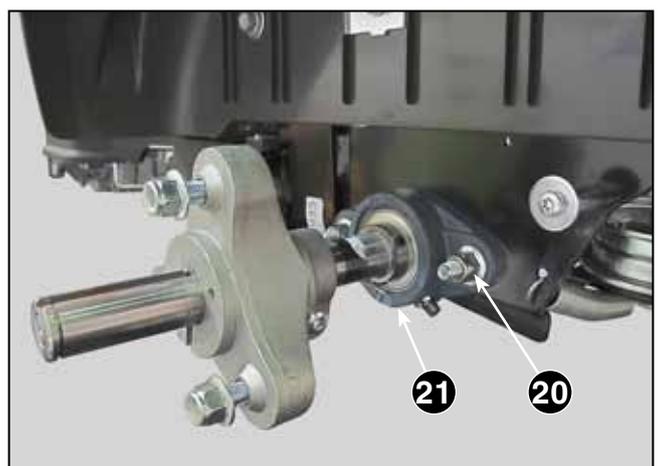
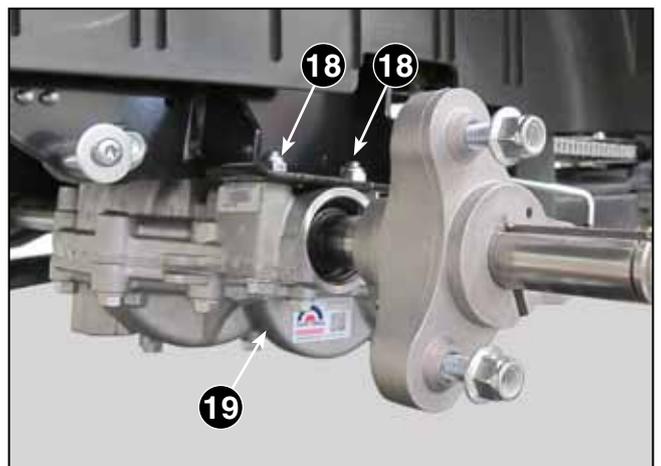
16 = Oil drainage pipe to the tank



7. Remove the transmission unit from the machine

**⚠ WARNING!** *Loosen the screws carefully, adequately supporting the transmission unit so as not to cause it to fall.*

- unscrew the two nuts (18) which directly fix the transmission unit (19) to the frame from the left side;
- unscrew the two nuts (20) that fix the transmission unit (19) to the frame through the support (21) from the right side.



When assembling, perform the steps described above in reverse order, taking care to:

- replace all the seals of the hydraulic fittings;
- tighten the nuts (18) to a torque of 20-25 Nm.
- tighten the nuts (20) to a torque of 35-50 Nm.
- tighten the hydraulic fittings to the torque indicated in the "Hydraulic connections diagram" [👉 8.1.3]



After the assembly,

- fill the oil [👉 8.3.2].
- adjust the pedal stroke [👉 7.5.2].

## 7.4 OIL TANK

### 7.4.1 General Information

The pipes leading to the oil tank are equipped with a “Click” type hose clamp (1).

**IMPORTANT** *This type of clamp (1) is not reusable and the replacement requires a specific tool for the application*

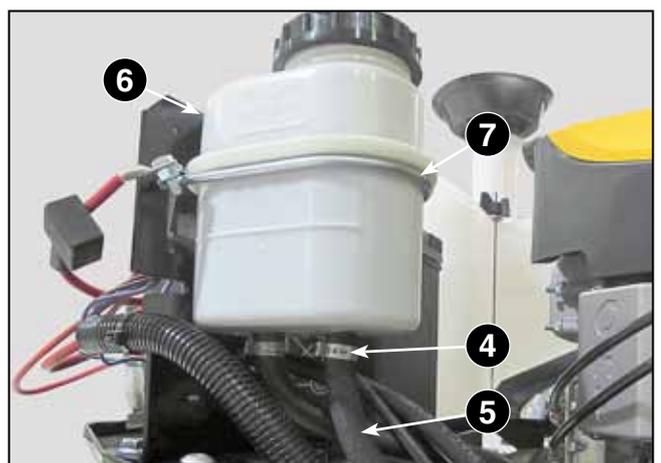
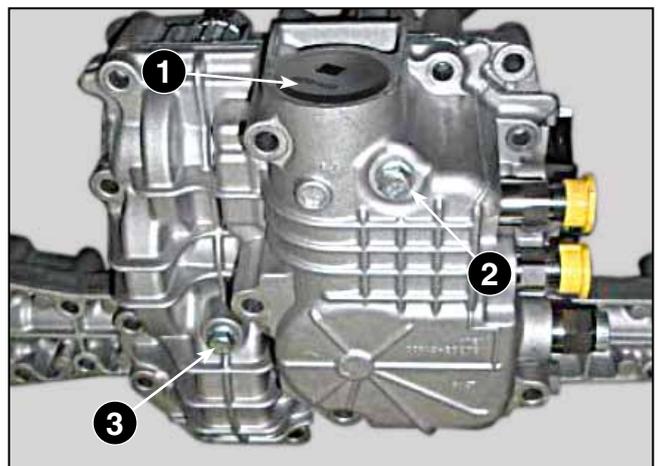
**NOTE** *If this type of clamp and its applicator are not available, use a normal hose clamp of suitable diameter.*



### 7.4.2 Disassembly of the oil tank

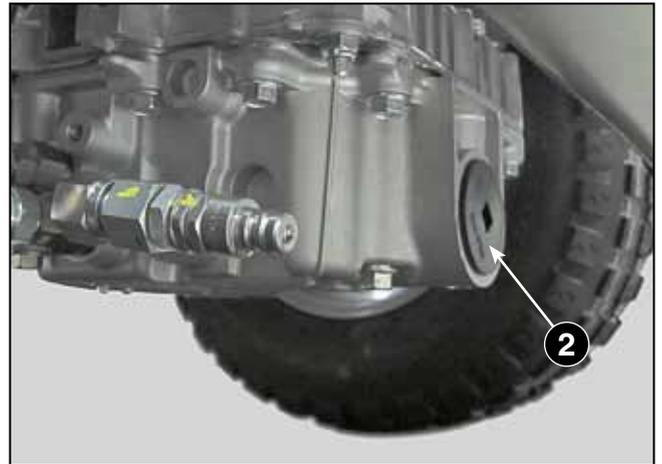
#### ▶▶ Park 4WD machines:

- 1. Place a container under the rear transmission unit and drain all the oil by unscrewing the filter cap (1) and the two drain plugs (2) and (3).
  - 2. Remove the two hose clamps (4) and disconnect the two hoses (5) from the tank (6).
  - 3. Unscrew the two nuts securing the support (7) and remove the tank (6).
- When assembling, perform the steps described above in reverse order.
- After the assembly,
- fill the oil [👉 8.3.2]



**▶▶ Park 2WD machines:**

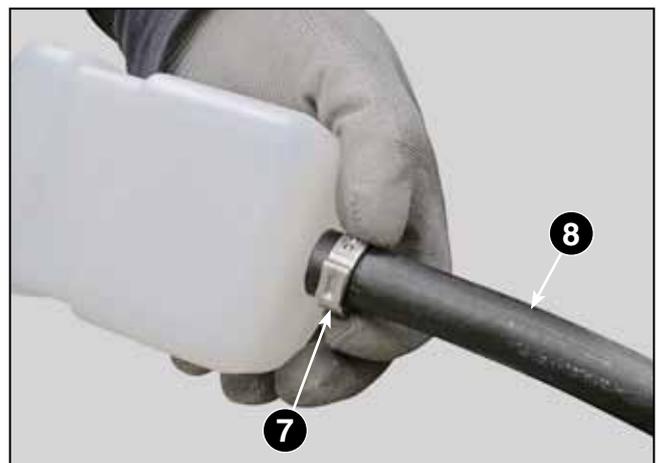
1. Place a container under the rear transmission unit and drain all the oil by unscrewing the filter cap (1).



2. Unscrew the screws (4) that fix the support band (5) and remove the tank (6).



3. Remove the hose clamp (7) and disconnect the hose (8) from the tank.



When assembling, perform the steps described above in reverse order.

After the assembly,

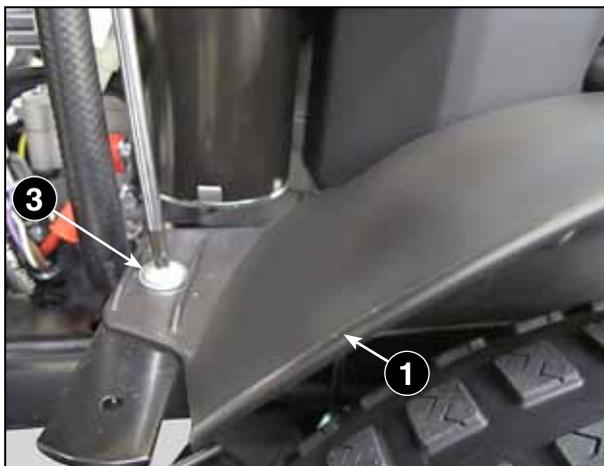
– fill the oil [👉 8.3.2].

**7.5 TRACTION CONTROL CABLE**

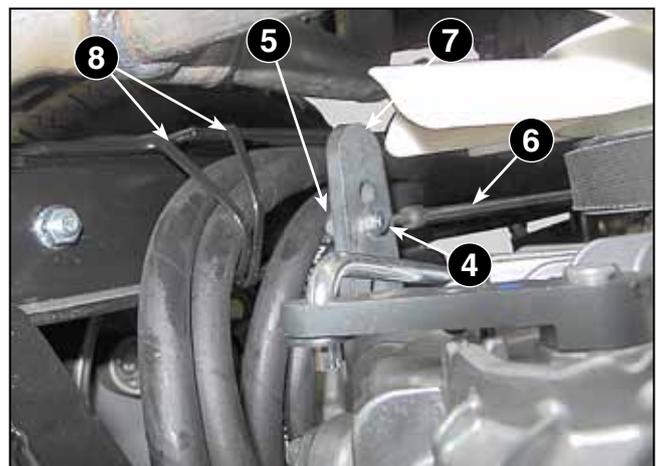
**7.5.1 Replacement and adjustment of the traction control cable**

**▶▶ Park 4WD machines:**

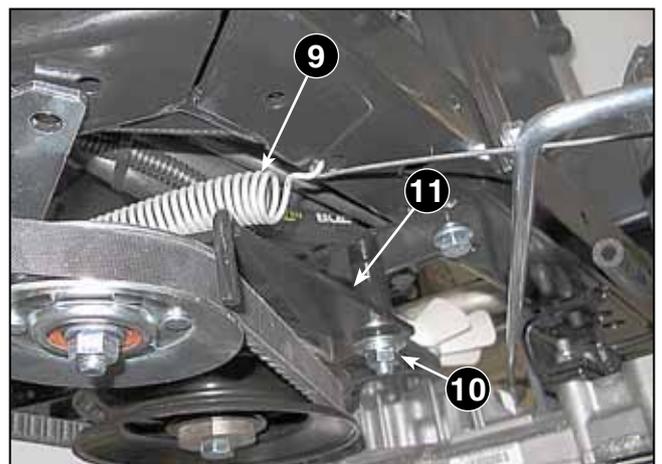
1. Disassemble the exhaust muffler. [👉 5.1.3]
2. Remove the left mudguard (1), fixed by the screws (2) and (3).



3. Unscrew the nut (4) and disconnect the ball joint (5) of the cable (6) from the traction lever (7).



4. Cut the two clamps (8) to ensure the mobility of the hydraulic hoses.
5. Release the spring (9) and unscrew the nut (10) fixing the tightener arm (11), so as to make the plate (12) accessible.



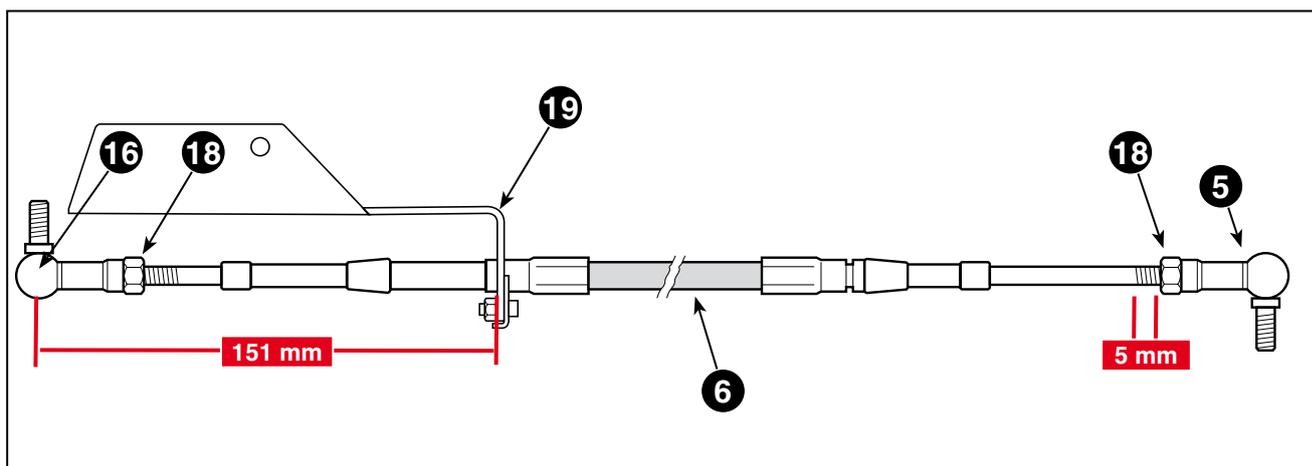
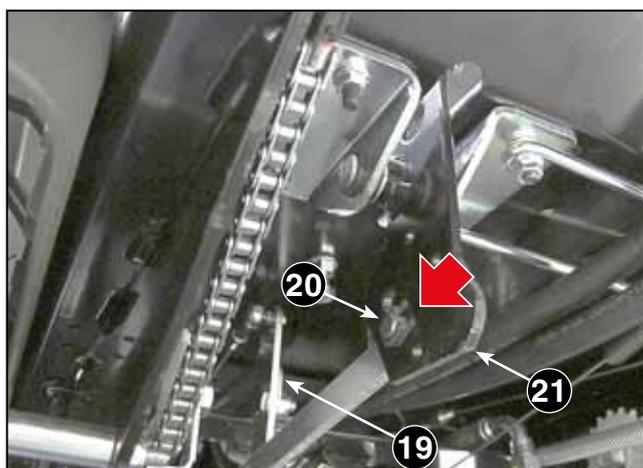
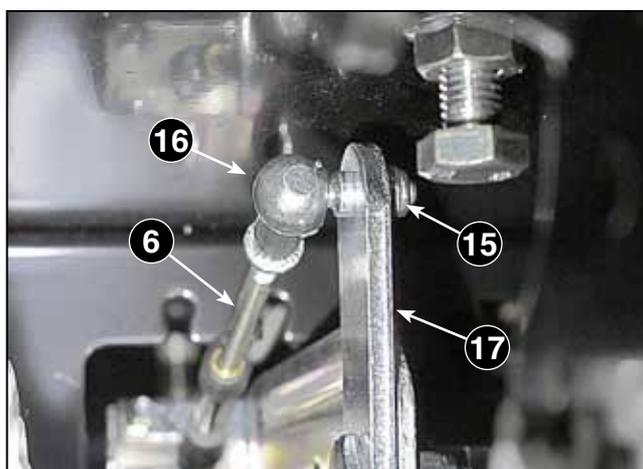
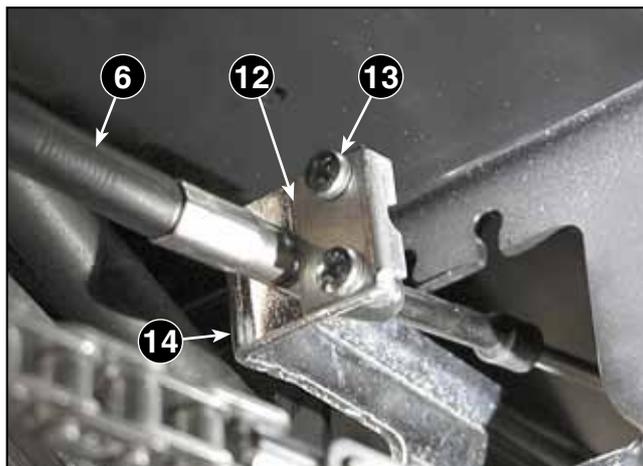
6. Unscrew the two screws (13), remove the plate (12) and release the cable (6) from the ring of the support bracket (14).

7. Unscrew the nut (15) and disconnect the ball joint (16) of the cable (6) from the front lever (17) of the traction.

8. Remove the cable by pulling it from the front of the machine.

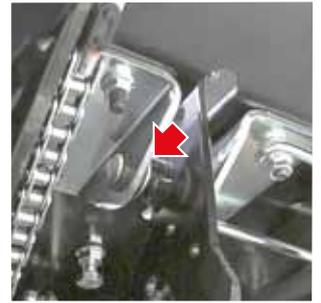
**IMPORTANT** The cable (6) is supplied as spare parts without the two ball joints (5) and (16); therefore, before the assembly, the two joints must be screwed to the two threaded ends of the cable, leaving exposed a threaded section of 5 mm from the rear and placing the centre of the front joint at 151 mm from the joint point on the lever support bracket (19). Compliance with these dimensions allows the cable to be reassembled without the need for subsequent adjustments. Check the dimensions, lock the respective lock nuts (18).

**NOTE** If entire gear lever (19) has been removed, connect the pin (20) to the central hole of the pedal lever (21).



■ When assembling, perform the steps described above in reverse order, taking care to:

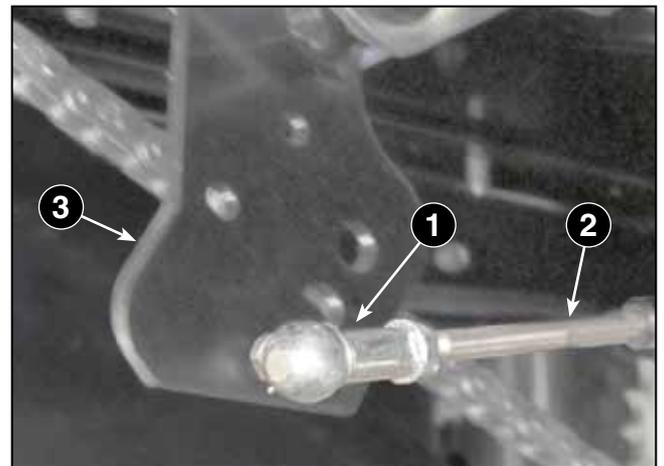
- – Insert the cable starting from the front, with the arrow stamped on the cable facing the front of the machine.
- – restore the clamps (8).



■ Complete the assembly by checking that, when the transmission unit is in neutral position, the forward and reverse traction pedal moves in the right direction [👉 7.5.2] and, if this is not the case, check that the cable positioning levels comply with those indicated on the drawing, and reinstate the correct position using the front joint (16) accordingly.

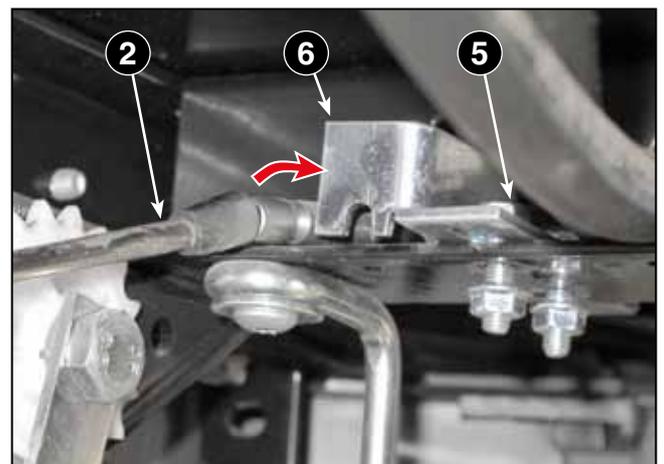
▶▶ **Park 2WD machines:**

1. Remove the ball joint (1) of the cable (2) from the traction control lever (3).



2. Cut the clamp (4) to ease the extraction of the cable (2).

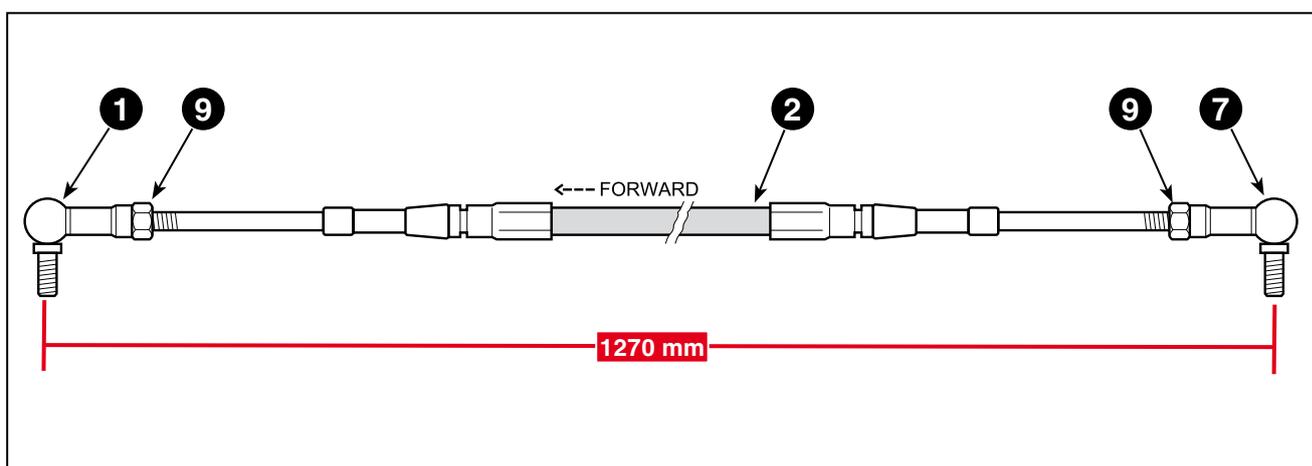
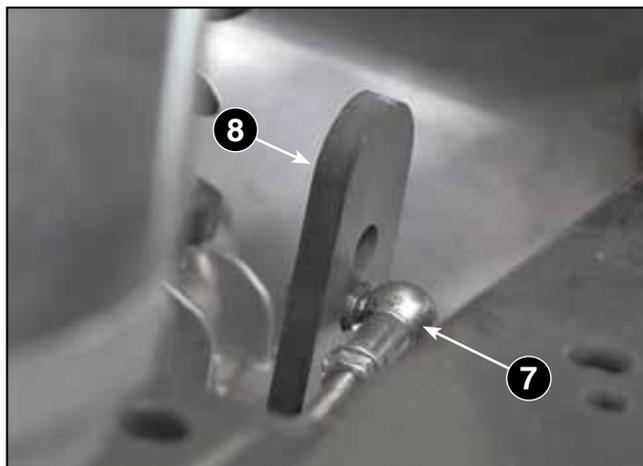
3. Loosen the two screws (5) enough to remove the plate (6) and release the cable (2).



- Remove the ball joint (7) of the cable (2) from the transmission unit lever (8).

**IMPORTANT** The cable (2) is supplied as spare parts without the two ball joints (1) and (7); therefore, before the assembly, the two joints must be screwed to the two threaded ends of the cable, using the entire length of the threaded section of both ends of the cable.

Check that the clearance between the joints is 1270 mm as indicated in the drawing and that the two pins are facing in the same direction. If necessary, adjust the position of the joints and tighten the relative lock nuts (9).

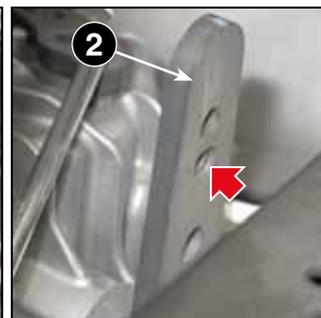
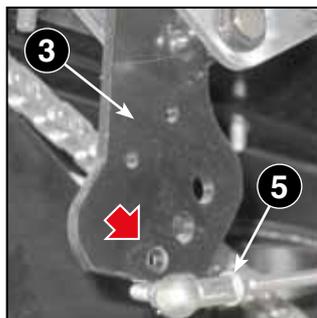


**IMPORTANT** The two ends of the cable (2) are different and must not be inverted.

- Use adhesive tape to couple the front terminal of the new cable (marked with an arrow) to the rear terminal of the cable being replaced and extract it from the front of the machine, paying particular attention when it passes in the vicinity of the machine joint.

When assembling, perform the steps described above in reverse order, taking care to:

- connect the ball joint (1) of the cable (2) to the lowest hole on the traction control lever (3);
- connect the ball joint (7) of the cable (2) to the centre hole of the transmission unit lever (8);
- replace any removed cable binders.



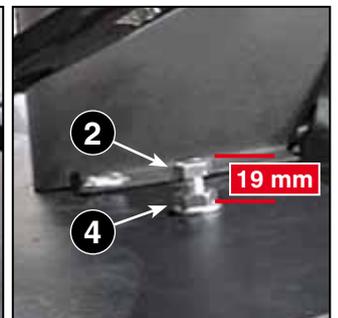
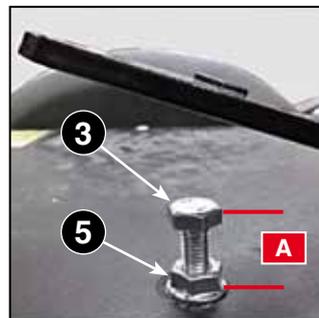
Complete the assembly by checking that, when the transmission unit lever (8) is in neutral position, the forward and reverse traction pedal moves in the right direction [7.5.2] and, if necessary, adjust the rear joint (7) accordingly.

## 7.5.2 Speed adjustment

The stroke of the pedal (1) of the traction determines the achievement of the foreseen speeds and is limited by a limit screw (2) in forward way and a similar one (3) for reversing.

- For the forward adjustment: loosen the lock nut (4) and adjust the projection of the screw head (2) to a height of 19 mm.
- To adjust in reverse: loosen the lock nut (5) and adjust the projection of the head of the screw (3) to a value "A" of:
  - 14 mm for Park 4WD
  - 27 mm for Park 2WD

Fully tighten the lock nuts (4) and (5) after adjustment.



If the expected results are not found, it is necessary to check that the cable positioning measurements are those indicated in the drawings and, if necessary, restore the correct measurements. [

👉 7.5.1]

## 7.6 BRAKE

### 7.6.1 General principles

In a machine with hydrostatic transmission, both two and four-wheel drive, the braking action is given by the return to the “neutral” position of the traction control pedal. With the pedal in “neutral”, the passage of the oil from the pump to the hydraulic motor closes, which, no longer powered and no longer able to allow the oil to return, slows down the stroke of the machine until it stops.

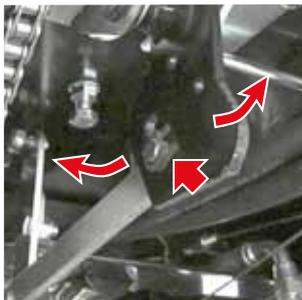
### 7.6.2 Service brake test

1. Remove the work equipment
2. On a flat and uneven path, launch the machine at maximum forward speed, then suddenly release the traction pedal, which will return to the “neutral” position.

**!** **WARNING!** *Braking is considered to comply with the safety requirements if the machine stops within 1.9 meters, WITHOUT the use of the brake pedal, the purpose of which is exclusively to allow the insertion and release of the parking brake.*

**!** **WARNING!** *Finding higher values, it is necessary to carefully check that the control cable does not have any jams and replace it immediately if it has bends or passages in narrow areas that can affect smoothness.*

**IMPORTANT** *Always keep the pivot of the traction pedal well lubricated, so that it can ensure return to “neutral” without any jamming.*



In the case of hardening when operating the pedal, a practical test consists in disconnecting the pedal lever from the linkage; if the pedal movement regains normal smoothness and quickly returns to the central position, it means that the cable must be replaced.

### 7.6.3 Parking brake test

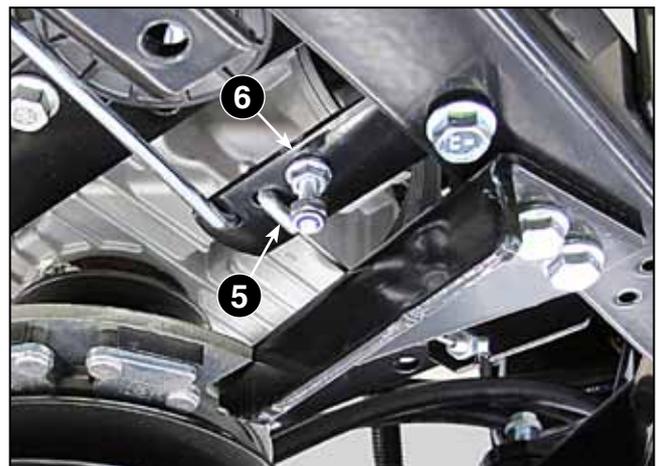
**!** **WARNING!** *The parking brake should prevent the machine from moving on a slope of 30% (16°) with the driver in position.*

1. Remove the work equipment
2. Place the machine on a ramp inclined by 16°, and apply the parking brake.
3. Check that the machine remains stationary and does not make the slightest movement; if not, make adjustments. [\[👉 7.5.1\]](#)

### 7.6.4 Replacement and adjustment of the parking brake cable

**⚠ WARNING!** *With the removal of the brake cable, the parking brake function is completely lost and therefore wedges must be placed in front of the wheels to prevent any accidental movement of the machine.*

1. Disengage the parking brake.
2. Loosen the front adjuster (1) and disconnect the "Z" terminal (2) of the wire from the brake pedal lever (3).
3. Loosen the rear adjuster (4) and disconnect the "Z" terminal (5) of the wire from the gear lever (6).
4. Remove the cable (7).

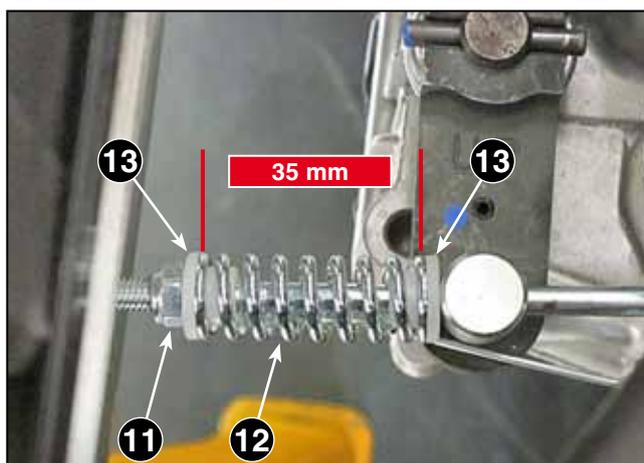


**NOTE** *The two ends of the cable are symmetrical and therefore can be positioned indifferently from the front or the back.*

When assembling, perform the steps described above in reverse order, taking care to reposition the two adjusters (1) and (4) in the centre according to their respective fixing points.

After the assembly, it is always necessary to proceed with:

● **Cable adjustment**



1. Engage the parking brake.
2. Act on the nut (11) until the spring height (12) is 35 mm, measured inside the plastic washers (13).

## ● Pedal adjustment

**IMPORTANT** *The pedal (14) must have a backlash of at least 5-10 mm.*

If there is no backlash or the backlash should exceed the quoted value, it is necessary to act appropriately and in equal measure on adjusters (1) and (4) until the optimal condition is obtained.

Once the adjustments have been made, check the spring dimension (12) again and act accordingly on the nut (11).



## 8 - HYDRAULIC SYSTEM

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### 8.1 GENERAL INFORMATION

#### 8.1.1 Description

Park machines with a two or four-wheel drive are equipped with a hydraulic transmission system, consisting of an internal combustion engine that drives an hydraulic pump; the pump sends the oil under pressure to the rear axle hydraulic motor (2WD models) and to the front axle hydraulic motor (4WD models).

In the 4WD models, the front and rear units are connected in series, which means that the front and rear wheel motors rotate at the same speed; to facilitate steering, both axles are equipped with a differential.

All machines are equipped with an hydraulic steering valve (Booster) connected to the rear transmission.

### 8.1.2 Safety criteria in the maintenance of the hydraulic system

**⚠ WARNING!** *Hydraulic oil under pressure can be very dangerous if pipes, lines or other distribution parts lose oil.  
To avoid personal injury, always wear protective gloves and goggles when working on the hydraulic system.*

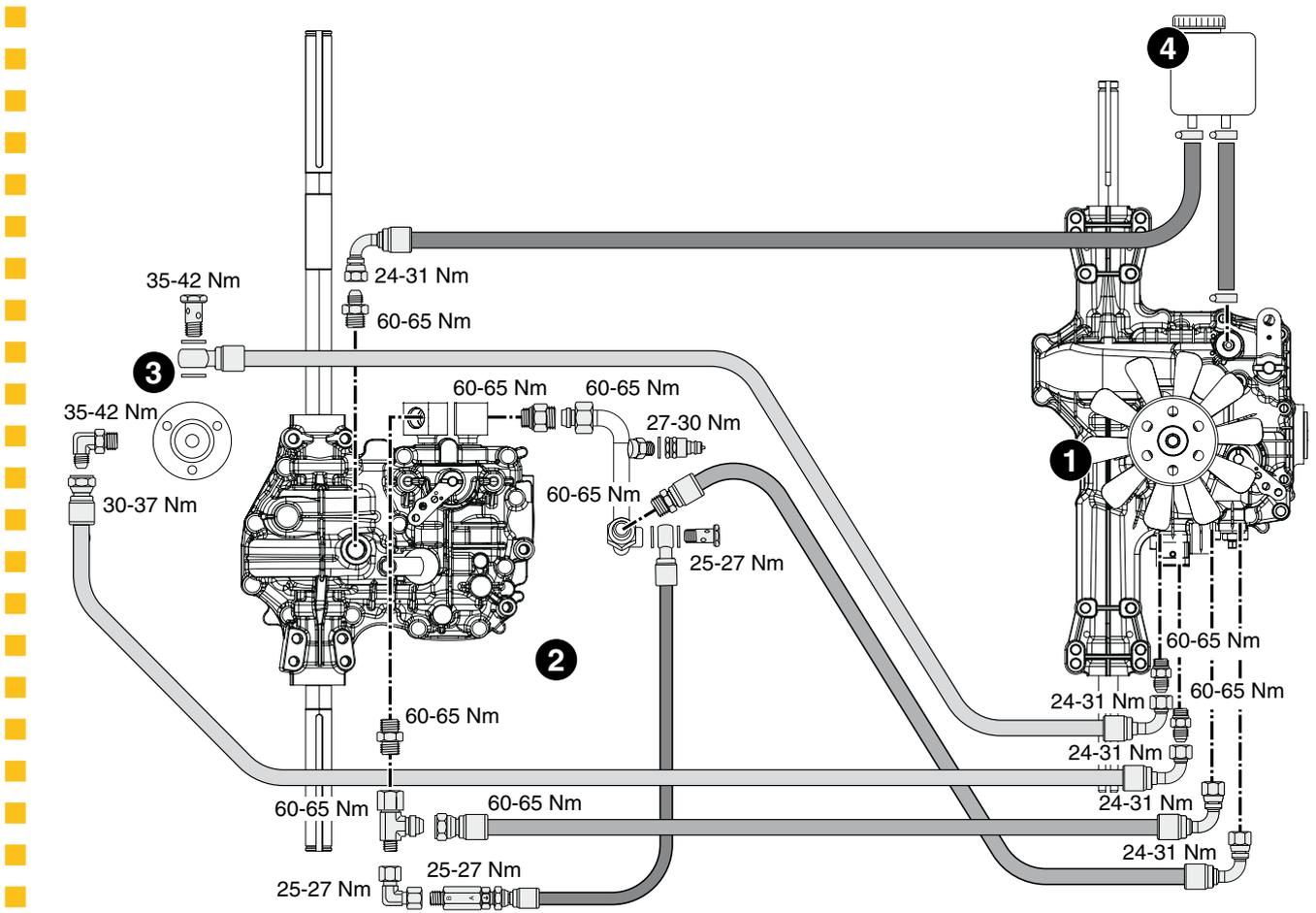
**IMPORTANT** *Maintaining cleanliness is an essential condition in all interventions on the hydraulic system. Foreign substances and contamination compromise the operation and reliability of the system.*

*Always protect and close the openings of hoses, fittings and any other component when disassembling.*

### 8.1.3 Diagram of hydraulic connections

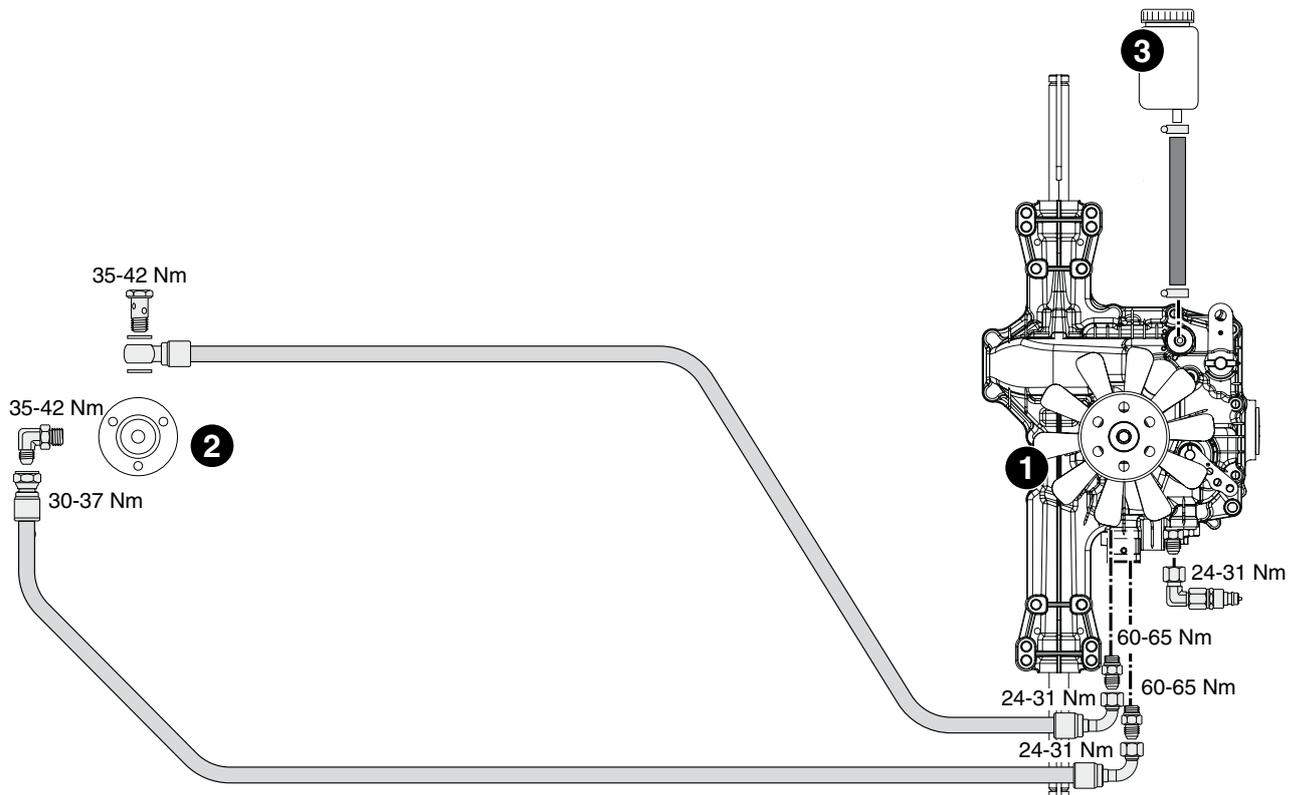
The diagrams show the connections between the various components, with the indication of the correct tightening torques to be applied to ensure the tightness of the various fittings.

**▶▶ Park 4WD machines:**



- 1. Rear transmission unit
- 2. Front transmission unit
- 3. Hydraulic steering valve
- 4. Oil tank

►► Park 2WD machines:



- 1. Rear transmission unit
- 2. Hydraulic steering valve
- 3. Oil tank

### 8.1.4 Configurations

The tables indicate the hydrostatic units mounted on the various machine versions, as well as the quantity and type of oil required.

Model: Park...		320 P	320 PW	340 PWX	345 PWX
Rear transmission	Tuff Torq	K57V	K57V	K574T	K574T
Front transmission	Tuff Torq	/	/	KTM10M	KTM10M
Transmission Oil		5W-50	5W-50	5W-50	5W-50
Transmission oil change quantity	litres	1.3	1.3	3.6	3.6

Model: Park...		520 P	520 PX	620 PW	640 PWX	740 PWX
Rear transmission	Tuff Torq	K57V	K574T	K57V	K574T	K574T
Front transmission	Tuff Torq	/	KTM10M	/	KTM10M	KTM10M
Transmission Oil		5W-50	5W-50	5W-50	5W-50	5W-50
Transmission oil change quantity	litres	3.6	3.6	3.6	3.6	3.6

## 8.2 OPERATION OF THE HYDRAULIC SYSTEM

### 8.2.1 Components description and functioning

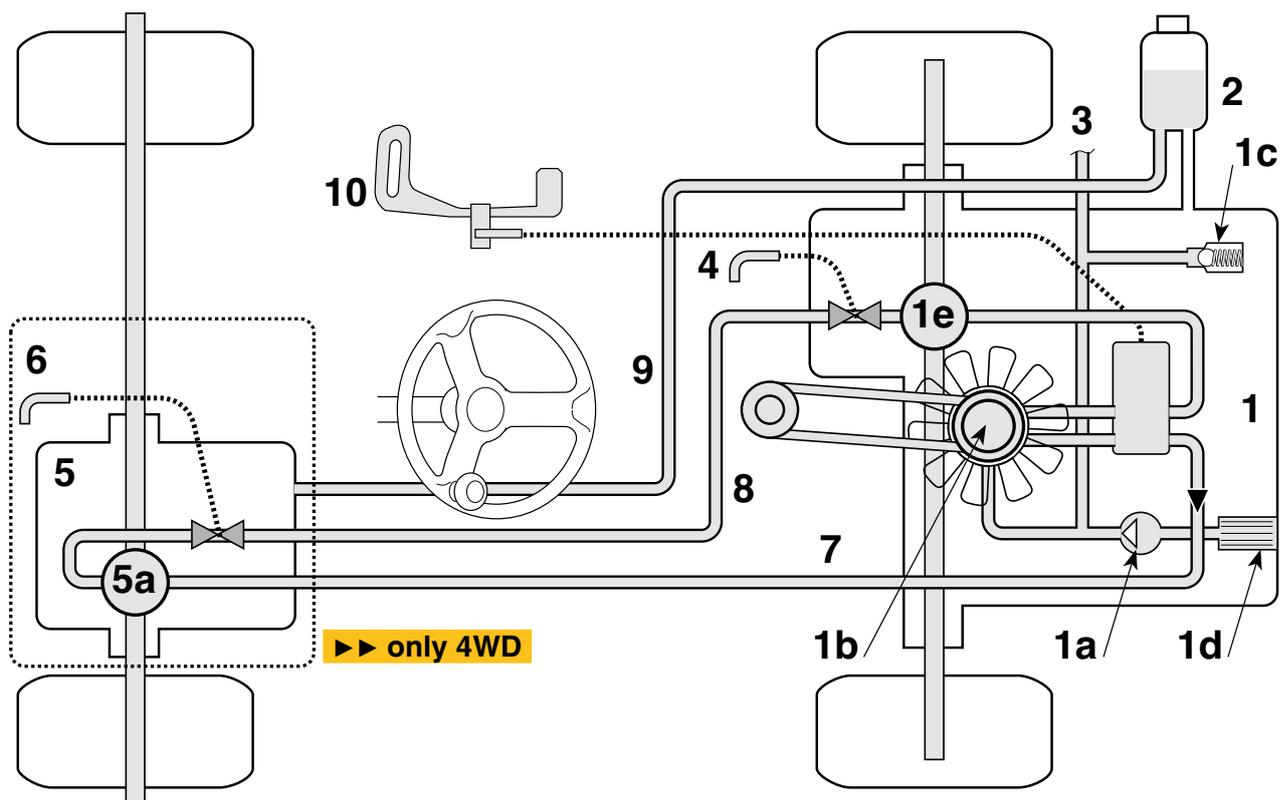
The engine drives the loading pump (1d) which feeds the main pump (1b) at a constant speed.

The oil, introduced into the main pump during operation, replaces the oil leaking from the rear (1) and front (5) axle transmissions.

The loading pump takes the oil from the volume present in the rear axle, through the filter (1d). The rear axle transmission is fed with oil from the tank (2).

The flow and direction of the oil flow through the main pump is controlled by the speed pedal (10), mechanically connected to the main pump (1b) in the rear axle (1). The main pump pressure depends on the power required from the wheel axles and is limited by the engine power.

In the 4WD machines, the hydraulic motors are connected in series, with the rear motor (1e) slightly ahead of the front one (5a). This fact is not noticed by the operator, since the machine is driven with its four wheels.

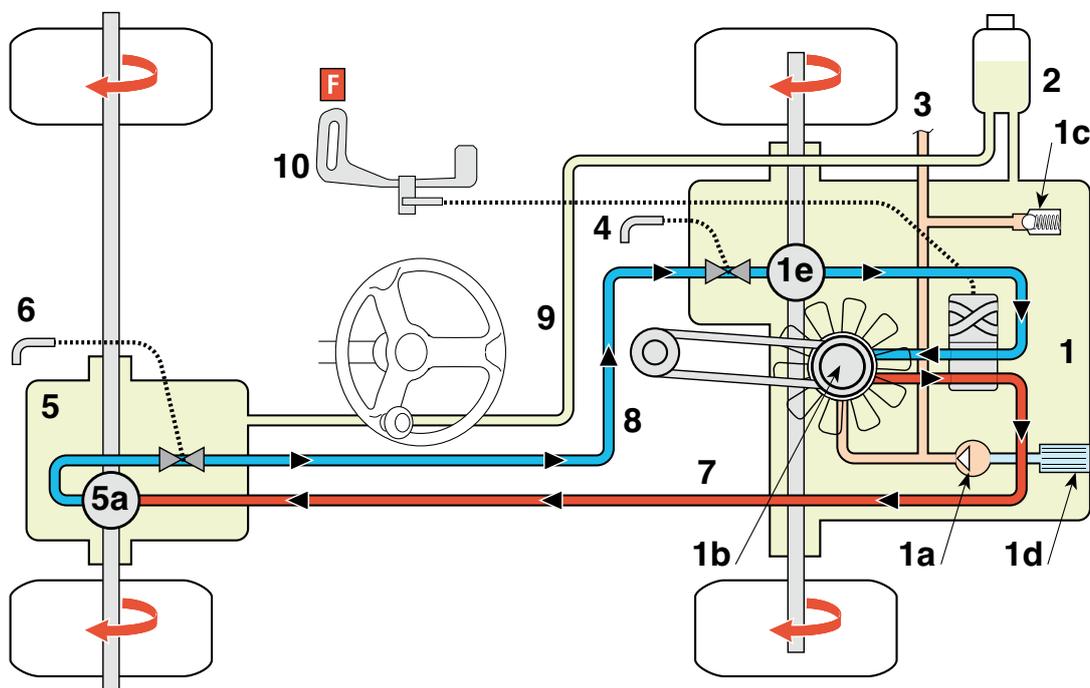


#### Components legend

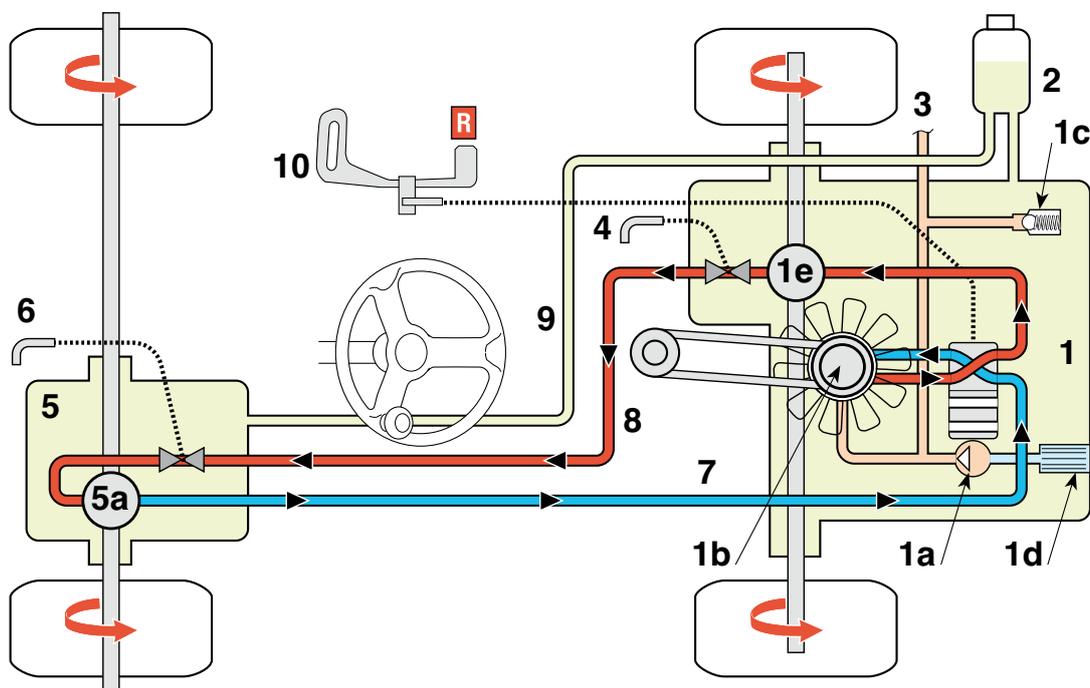
- |   |   |
|---|---|
| 1. Rear axle                            | 3. Connection with the hydraulic steering valve |
| 1a Loading pump (35-45 bar)             | 4. Rear by-pass valve                           |
| 1b Main pump                            | 5. Front axle (4WD)                             |
| 1c Pressure limiter of the loading pump | 5a Front hydraulic motor                        |
| 1d Oil filter                           | 6. Front by-pass valve (4WD)                    |
| 1e Rear hydraulic motor                 | 7. Main line (4WD)                              |
| 2. Oil tank                             | 8. Main line (4WD)                              |
|   | 9. Drainage line (4WD)                          |
|   | 10. Drive pedal                                 |

►► **Park 4WD machines:**

● **Forward operation**



● **Reverse operation**



**Legend components**

- 1. Rear axle
- 1a Loading pump (35-45 bar)
- 1b Main pump
- 1c Pressure limiter of the loading pump
- 1d Oil filter
- 1e Rear hydraulic motor

- 2. Oil tank
- 3. Connection with the hydraulic steering valve
- 4. Rear by-pass valve
- 5. Front axle
- 5a Front hydraulic motor
- 6. Front by-pass valve
- 7. Main line
- 8. Main line

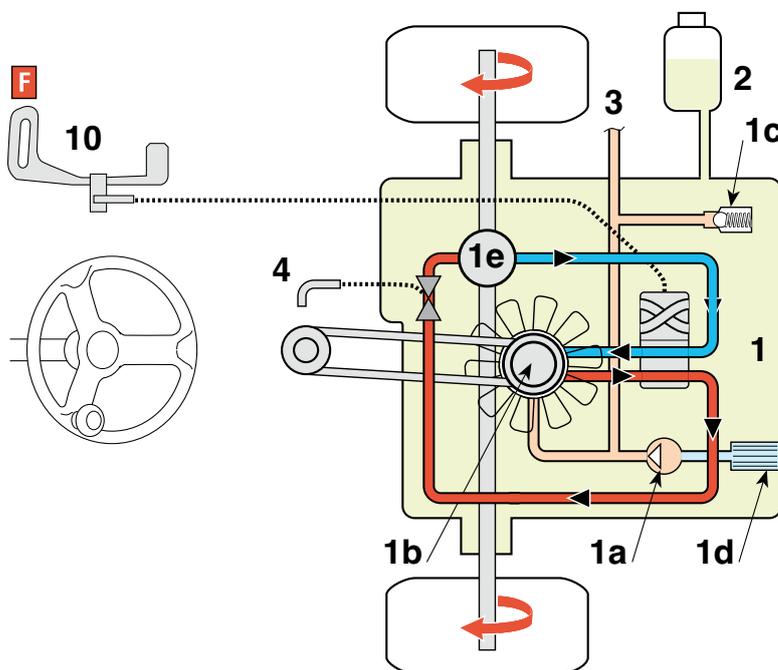
- 9. Drainage line
- 10. Drive pedal

**Colour and pressure legend**

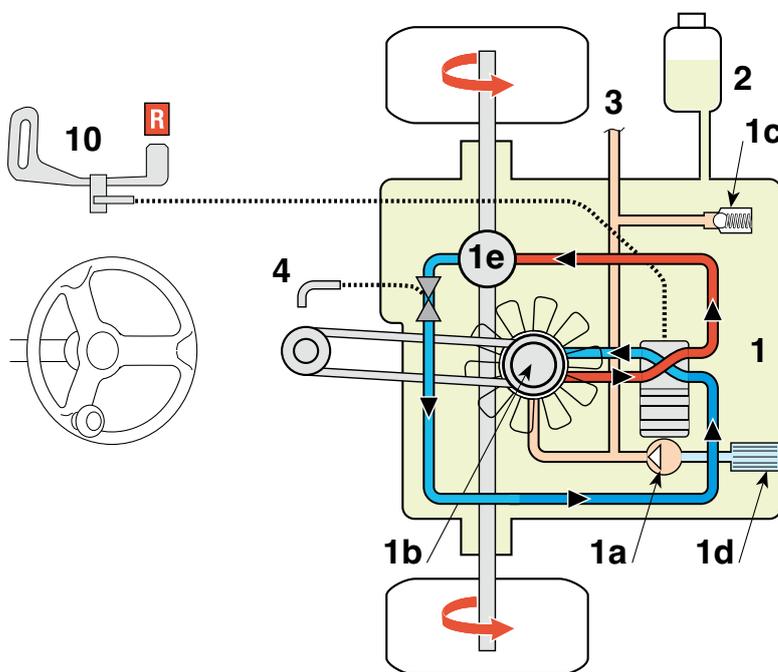
- = Delivery (150 bar)
- = Return
- = Drainage (<1 bar)

**►► Park 2WD machines:**

**● Forward operation**



**● Reverse operation**



**Legend components**

- 1. Rear axle
- 1a Loading pump (35-45 bar)
- 1b Main pump
- 1c Pressure limiter of the loading pump
- 1d Oil filter
- 1e Rear hydraulic motor

- 2. Oil tank
- 3. Connection with the hydraulic steering valve
- 4. Rear by-pass valve
- 10. Drive pedal

**Colour and pressure legend**

- = Delivery (150 bar)
- = Return
- = Drainage (<1 bar)

### 8.2.2 By-pass valves

The by-pass valve has the purpose of making it possible to push the machine by hand, without strong resistance due to the resistance of the oil in the circuits in the absence of pressure.

When a by-pass valve is open, it allows the oil to flow into the engine casing and therefore the pressure drop on the engine is neutralized.

#### ►► Park 4WD machines:

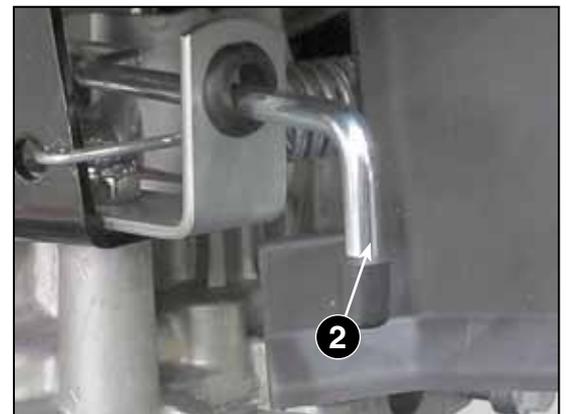
Both transmission units are equipped with a by-pass valve, each of which is connected to the respective operating lever.

The front by-pass valve is equipped with a mechanical interlock that always restores the valve, if previously opened, to attempts to move forward.

Driving the machine forward, with the rear by-pass valve (1) closed and the front by-pass valve (2) open, causes a powerful flow of oil into the front transmission casing.

Because the drain line is not sized for this flow and the main flow line is closed, a dangerous pressure build-up occurs in the front transmission casing. This pressure increase forces the oil to seek a vent from the seals and can cause damage.

**NOTE** *The activation of the parking brake automatically causes the closure of the by-pass valve of the front transmission.*



### 8.2.3 Hydraulic steering valve (Booster)

#### ● Operation description

The hydraulic steering valve is a device designed to facilitate steering by making the steering wheel lighter. Thanks to this device, the driver has to apply less force to be able to operate the steering components.

The system uses a high pressure pump driven directly by the engine, through a belt, to circulate the oil within an hydraulic circuit derived from the rear hydraulic transmission.



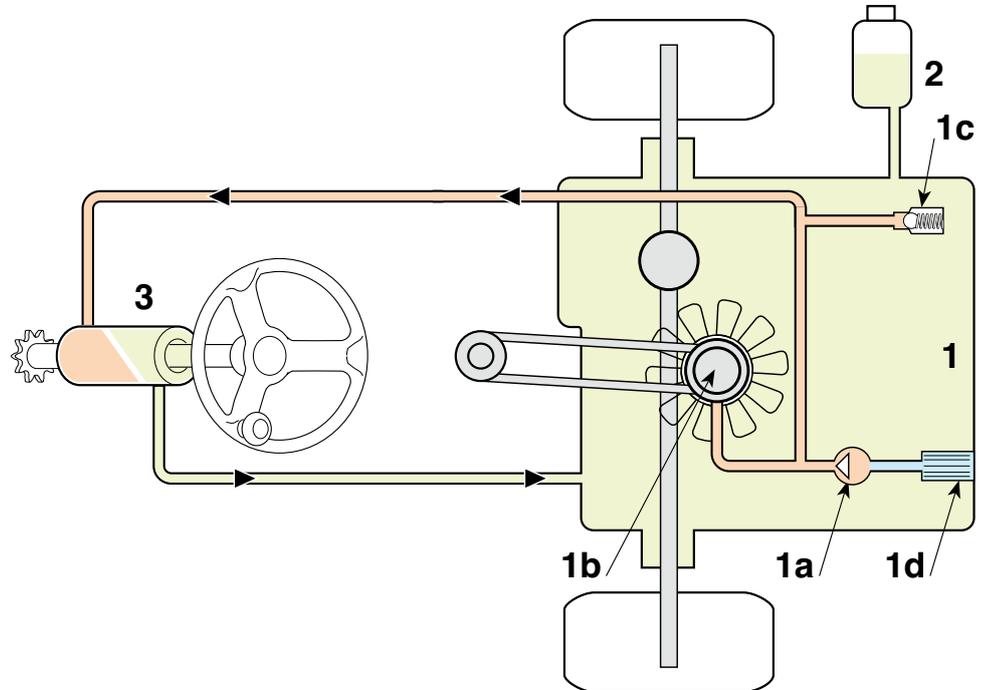
The steering unit is connected to the steering wheel via the steering column. During the steering, the steering wheel moves a gear that has an orbital movement with respect to the external toothed gear. Inside the steering unit, the rotor, which acts as a volumetric dispenser, releases a quantity of oil proportional to the steering angle made by the steering wheel.

### Legend components

1. Rear axle
  - 1a Loading pump (35-45 bar)
  - 1b Main pump
  - 1c Pressure limiter of the loading pump
  - 1d Oil filter
2. Oil tank
3. Hydraulic steering valve

### Colour legend

- = Maximum delivery pressure (50 bar)
- = Return (<1 bar)



### ● Functional description

The operating conditions for the steering valve to fulfil its function are:

- the motor running at full speed;
- the steering wheel rotated to the right or the left.

The loading pump (1) pushes the oil through the steering valve (3). The flow of oil is indicated by the arrows in the figure.

When the hydraulic steering valve (3) comes into operation, a pressure drop is generated, downstream of the steering valve (5), which amplifies the torque applied to the steering wheel.

The pressure drop depends on the effort required and is limited by the built-in valve (1c).

## 8.2.4 Troubleshooting of the hydraulic system



**WARNING!** *Hydraulic oil under pressure can be very dangerous if there are leaks from fittings, pipes or other parts of the system. To avoid personal injury, always wear protective gloves and goggles when working on the hydraulic system.*

Before starting the troubleshooting, it is necessary to check that the following conditions are met:

- by-pass valves of each transmission group in running position;
- oil level in the tank as prescribed;
- absence of air in the hydraulic oil.

Problem	Probable cause	Solution
Reduced speed and irregular driving.	The inlet filter is clogged	Clean the filter
The front wheels don't move	One or more wheel axle keys are broken	Replace
The rear wheels don't move	One or more wheel axle keys are broken	Replace
Reduced speed or lack of speed  Check that the fan of the transmission unit turns smoothly, if it does not turn, ...	Slip of the transmission belt between the engine and the hydrostatic unit.	If the belt is loose: check the tightener
		If the belt is worn: replace
	Serious oil leak in the rear transmission unit	Replace the rear transmission assembly
	Loose or broken speed control cable.	Adjust or replace the cable

### 8.2.5 Troubleshooting of the hydraulic steering valve

A prerequisite for the steering valve function is the backlash in the steering, which must always return to the starting position when the steering wheel is released.

Test by slowly turning the steering wheel in any direction with the engine off.

At first there is a slight resistance, which increases when the machine starts moving. Once the steering wheel has been released, the car is unable to automatically resume a straight trajectory after a curve, just like it occurs with a car.

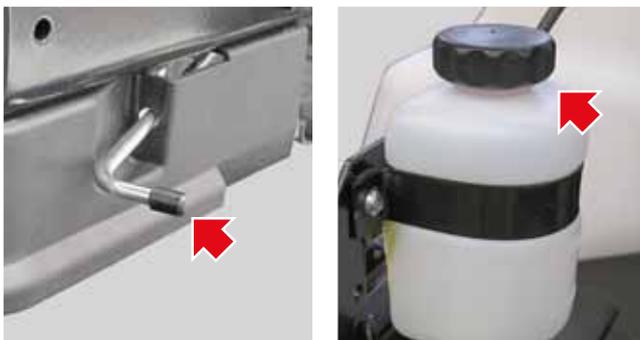
**NOTE** *If the steering fails, this may not always be due to a failure in the steering booster. Failures can also occur in simpler mechanical parts, such as chains, cogwheels and pinions.*

**IMPORTANT** *Transmission replacement does not have to be the first option to fix steering problems.*

**8.3 MAINTENANCE OF THE HYDRAULIC SYSTEM**

**8.3.1 Rear transmission unit filter replacement**

**NOTE** *Draining the oil is facilitated if it is carried out before it cools down completely.*

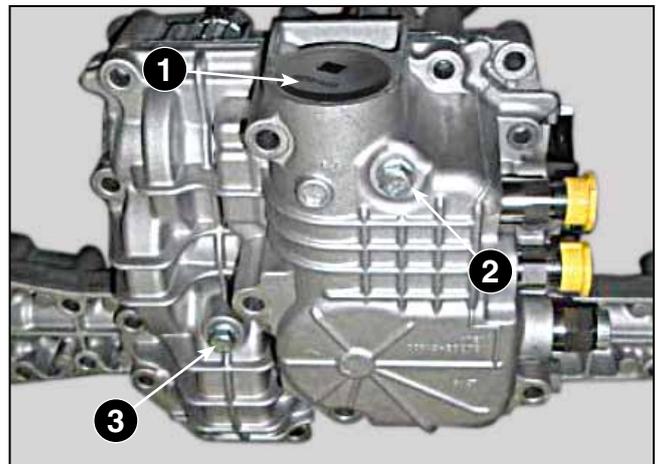


**NOTE** *The oil must be drained with the by-pass open and the cap of the oil tank unscrewed.*

1. Place a container under the rear transmission unit and drain all the oil by unscrewing the filter cap.

**Only for Park 4WD:**

Unscrew the two drain plugs (2) and (3).



2. Remove the filter (4) grabbing it by the spring (5).



3. Let all the oil flow into the container.

**IMPORTANT** *Every time the system is drained, the hydraulic oil must never be put back into the system, but must always be replaced with new Stiga 5W50 oil.*

4. Fit the new filter (6) pushing it fully into its housing.



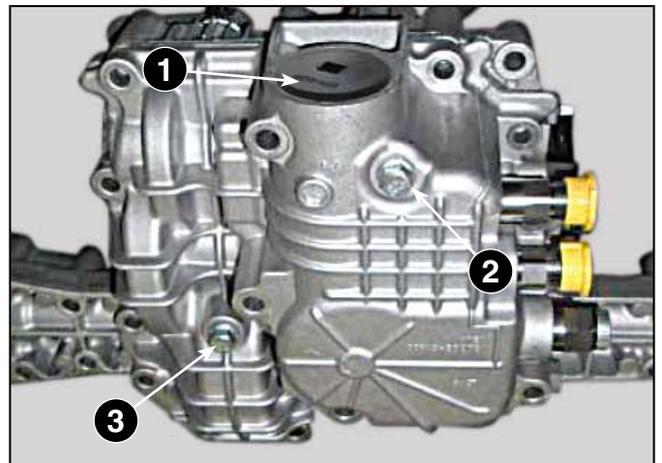
5. Refit the filter cap (1).

**Only for Park 4WD:**

Screw the two drain plugs (2) and (3) back on, taking care to always replace the plugs (2) and (3) if the seals are damaged.



6. Restore the oil level using the quick coupling. [\[👉 8.3.2\]](#)



**8.3.2 System emptying and filling**

**NOTE** *Draining the oil is facilitated if it is carried out before it cools down completely.*

**NOTE** *The oil must be drained with the by-pass open.*

1. Unscrew the cap (1) of the oil tank (2).

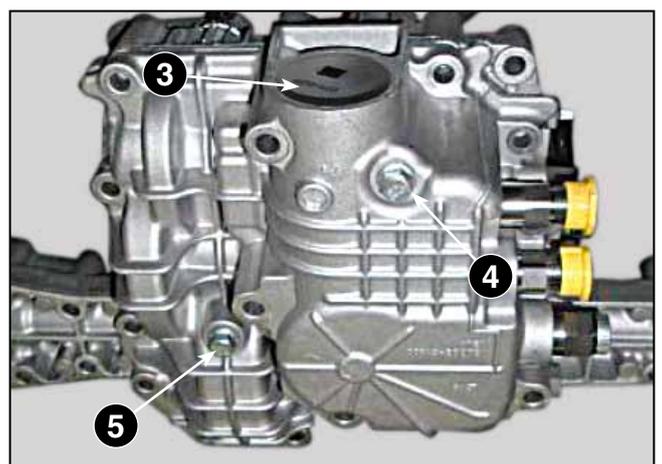


2. Place a container under the rear transmission unit and drain all the oil by unscrewing the filter cap (3).

**Only for Park 4WD:**

Unscrew the two drain plugs (4) and (5).

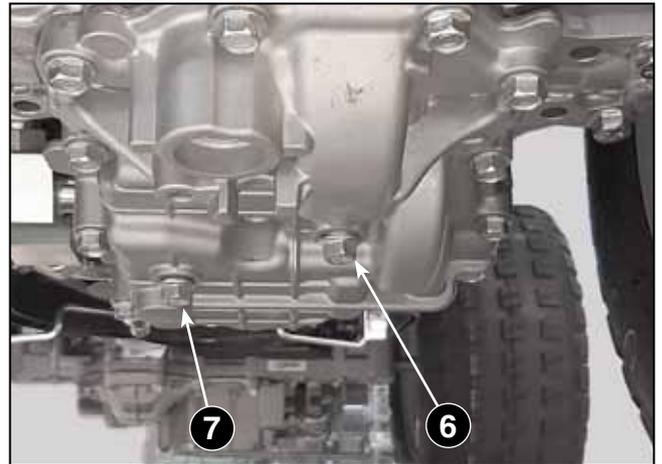
3. Let all the oil flow into the container.



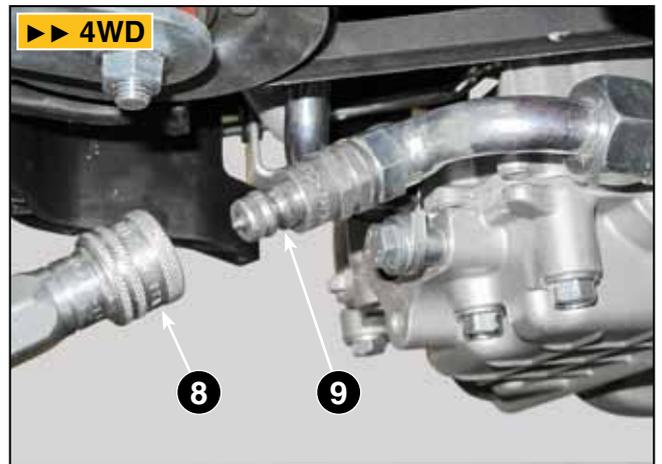
4. Place a container under the front transmission unit and drain all the oil by unscrewing the two drain plugs (6) and (7).

5. Let all the oil flow into the container.

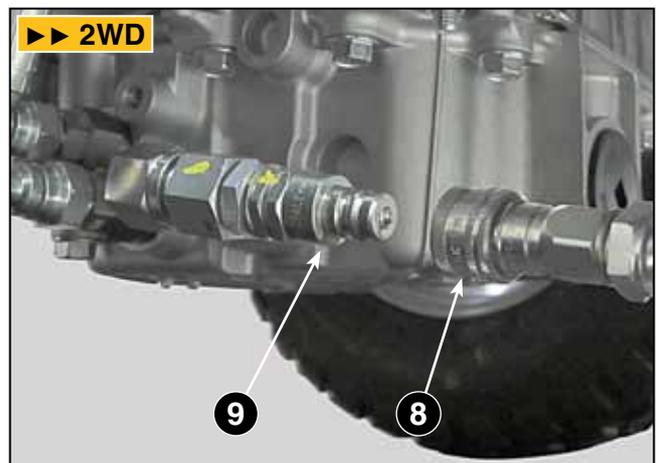
**IMPORTANT** *Every time the system is drained, the hydraulic oil must never be put back into the system, but must always be replaced with new Stiga 5W50 oil.*



6. Prepare the amount of oil necessary for filling the tank of the loading equipment [👉 8.1.4].



7. When the oil has stopped dripping, screw the filter cap (3) and all the caps previously unscrewed (4), (5), (6), (7) again, always taking care of replacing the caps if the seals are damaged.



8. Connect the hose of the loading equipment (8) to the quick coupling (9), mounted on the front unit (for 4WD) or on the rear (2WD).

9. Start the equipment, load the predetermined amount of oil and finally disconnect the hose (8) from the quick coupling (9).



10. Check that the oil level in the tank (2) has reached the correct level.

11. Bleed the air that has entered the system by operating the traction pedal several times in forward and reverse, and steer several times in both directions.
12. At the end of this air purging phase and having obtained the perfect functionality of the machine, top up the hydraulic oil tank with the amount of oil needed to reach the correct level.



**IMPORTANT** *The topping up operation may also be necessary during the purging phase; it is always necessary to avoid that the tank remains empty and the system sucks air. This could result in damage to the transmission components. Frequently check the oil level and top up from the cap (1) of the tank (2), whenever it's necessary to restore the level.*

13. Check that there are no leaks from the drain plugs.

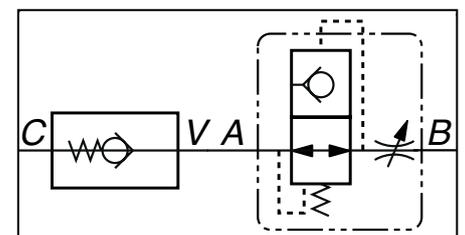
## 8.4 DYNAMIC BALANCING VALVE (Smart by-pass)

### 8.4.1 Description

In the machines with a four-wheel drive, the hydraulic circuit is equipped with a dynamic balancing valve for the correct balancing of the circuit.

When the machine is stationary, the dynamic balancing valve is open and allows the hydraulic steering to rotate smoothly.

When the machine starts to move forward, the dynamic balancing valve closes automatically, the rear drive axle begins to transmit motion and then, a few moments later, the front axle also starts to engage the drive. The rotation of the hydraulic steering remains fluid.

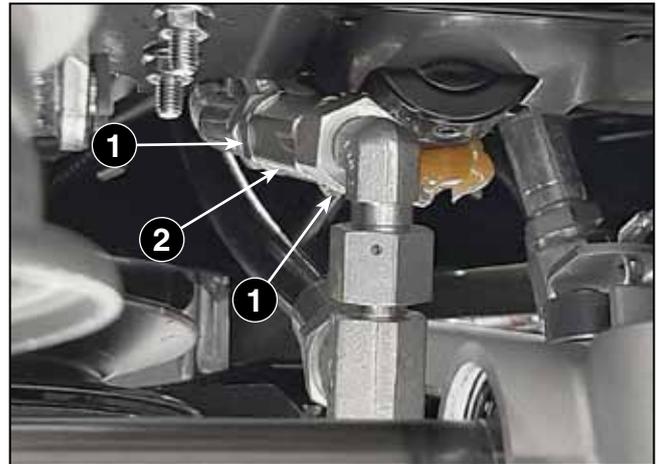


The time that passes between the engagement of the front axle and the rear axle is not normally perceived by the user.

### 8.4.2 Valve disassembly

**NOTE** *The valve must be removed with the bypass open.*

1. Loosen the two nuts (1) of the elbow fitting, appropriately collecting the oil still present in the pipes.
2. Unscrew the balance valve (2).



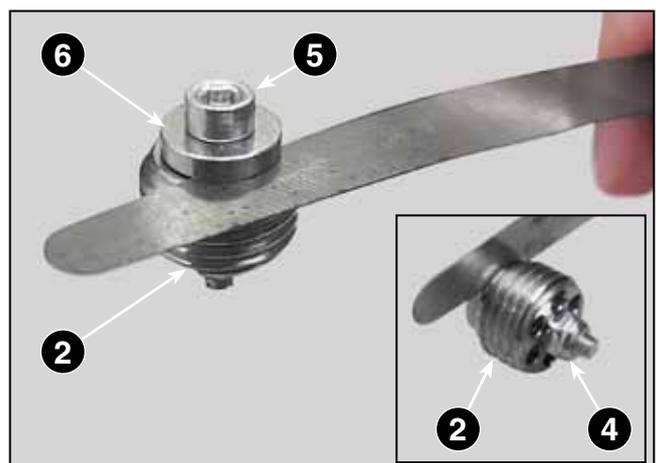
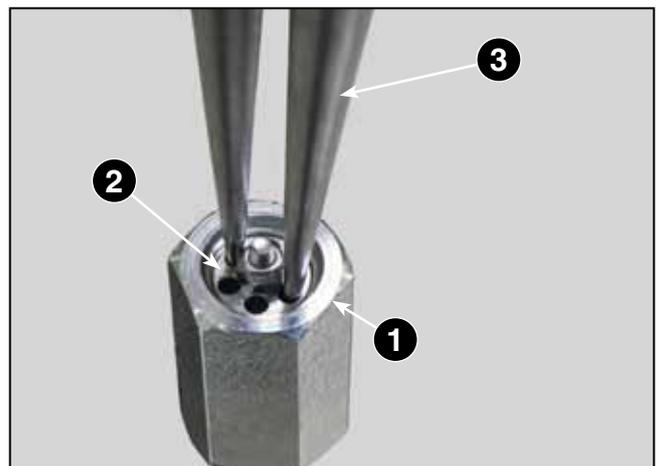
### 8.4.3 Valve calibration

The dynamic balancing valve has a standard setting of 0.15 mm; this value can be adjusted in the range  $\pm 0.05$  mm with respect to the standard calibration.

- With the dynamic balancing valve set at 0.10 mm, the valve closing time is reduced, which means an increase in the traction performance at the expense of smooth steering.
- With the dynamic balancing valve set at 0.20 mm, the valve closing time increases, which means an increase in the fluidity of the steering at the expense of traction performance.

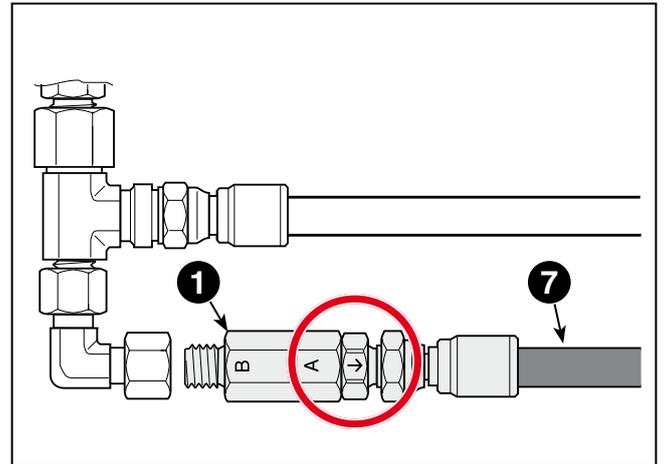
To change the calibration, it is necessary to disassemble the valve and act as follows.

1. Secure the valve body (1) in a vice and unscrew the internal valve (2) with the help of long needle nose pliers (3) or a special tool.
2. Keeping the nut (4) still, turn the screw (5) until the desired gap is obtained under the slide (6) measured with a feeler gauge.
3. Screw the internal valve (2) back into the valve body (1) until the end.



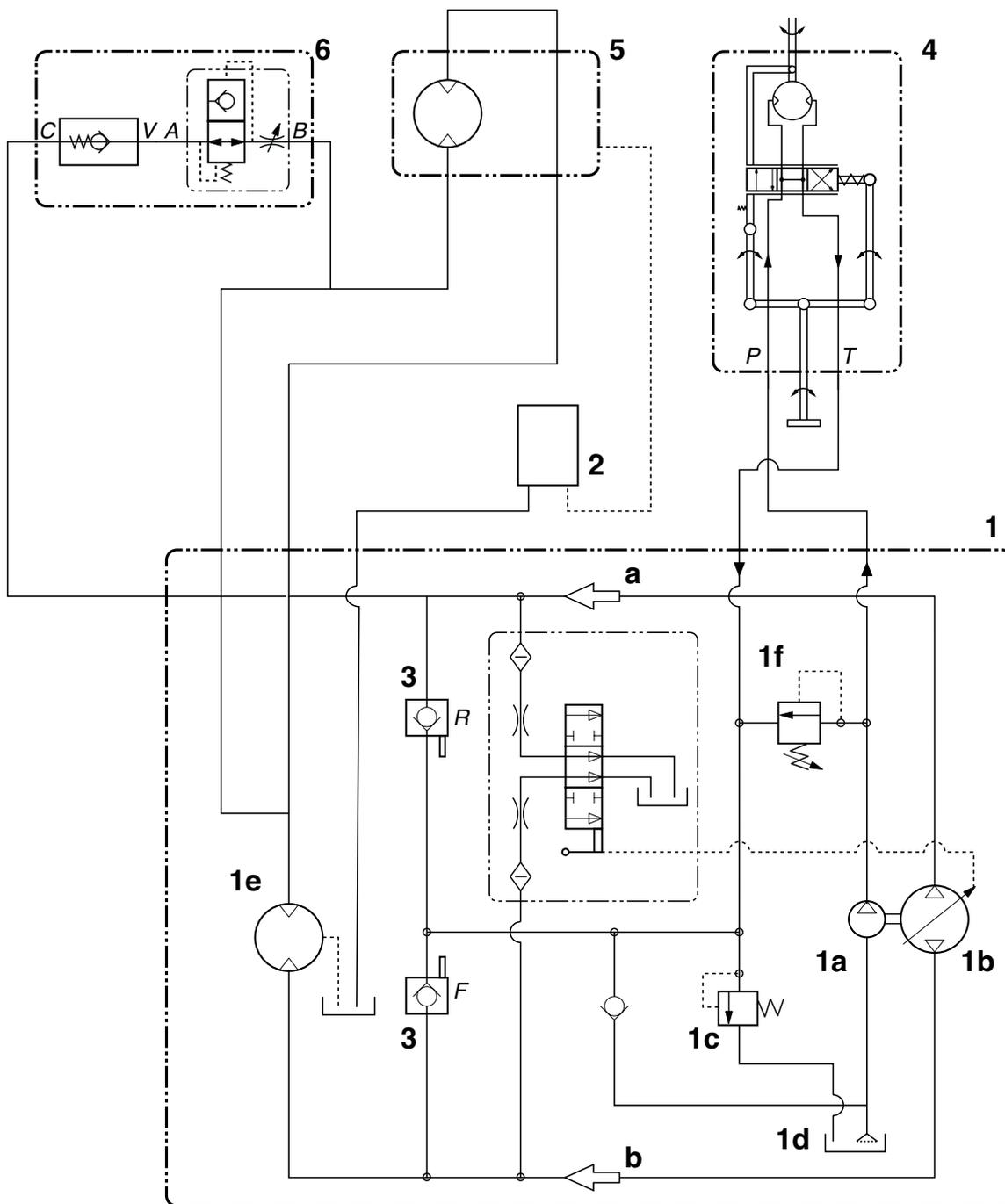
When assembling,

- fit the valve (1) with the reference "A" and the arrow facing the pipe (7);
- tighten the hydraulic fittings to the torque indicated in the "Hydraulic connections diagram" [\[👉 8.1.3\]](#)



**8.5 HYDRAULIC DIAGRAMS**

**8.5.1 Park 4WD**

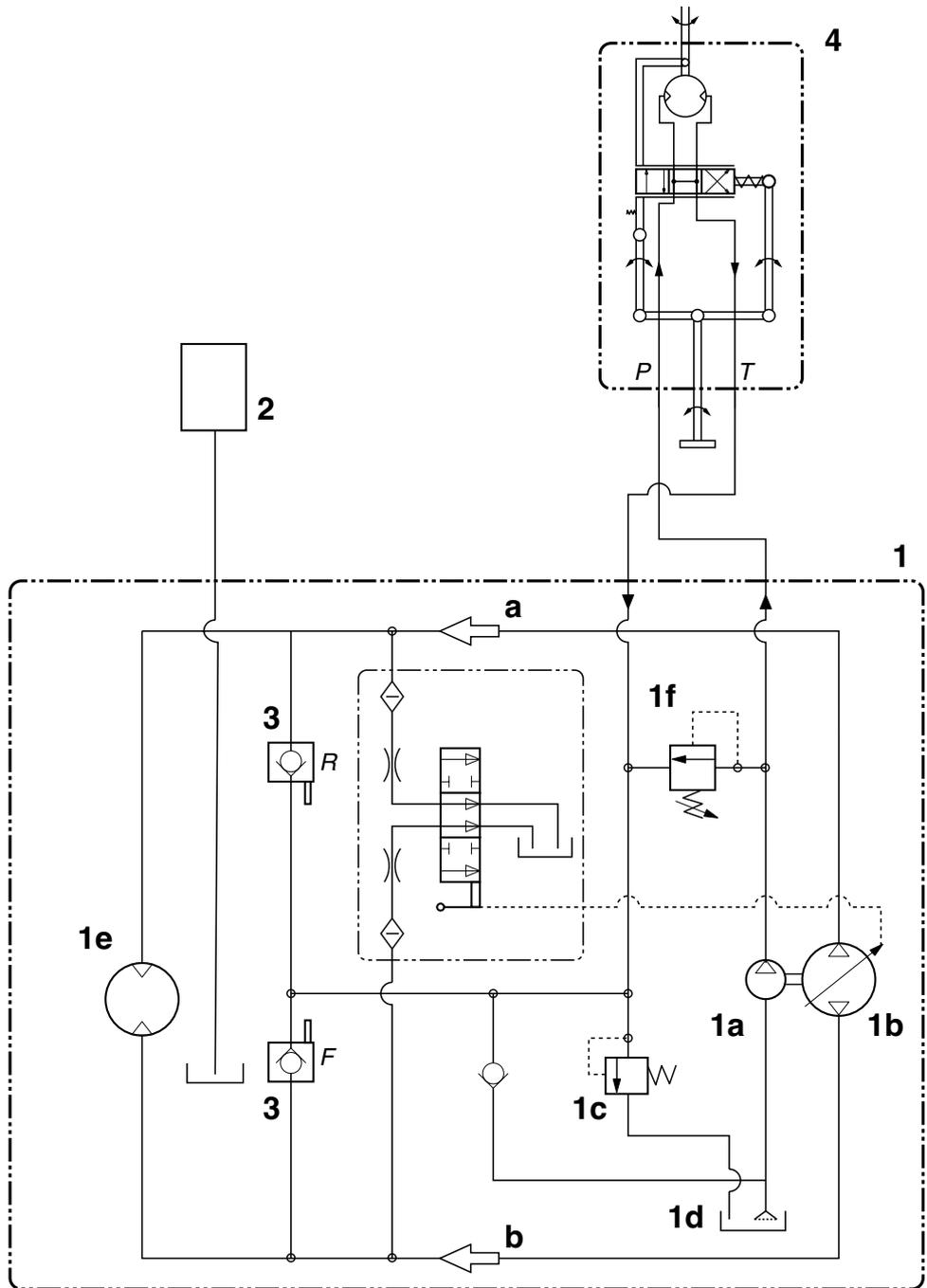


**Components legend**

- 1. Rear transmission unit
- 1a Loading pump (35-45 bar)
- 1b Pump
- 1c Safety valve
- 1d Filter
- 1e Rear motor
- 1f Load limiting valve

- 2. Oil tank
  - 3. By-pass
  - 4. Steering valve (Booster)
  - 5. Front motor
  - 6. Dynamic balancing valve (Smart by-pass)
- a. Direction of the oil flow in forward motion  
b. Direction of the oil flow in reverse

**8.5.2 Park 2WD**



**Components legend**

- 1. Rear transmission unit
- 1a Loading pump (35-45 bar)
- 1b Pump
- 1c Safety valve
- 1d Filter
- 1e Rear motor
- 1f Load limiting valve

- 2. Oil tank
- 3. By-pass
- 4. Steering valve (Booster)

a. Direction of the oil flow in forward motion  
b. Direction of the oil flow in reverse

## 9 - ELECTRICAL SYSTEM

### Summary

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### 9.1 GENERAL INFORMATION

#### 9.1.1 Introductory note

The electrical components are connected with cables, integrated in a fully insulated wiring, so that they are protected against wear, contamination and mechanical stress.

The various components and users are connected to the cables with single connectors or “faston” terminals, or with multiple contact connectors.

The electrical system includes several circuits responsible for the safety of the machine, in which there are microswitches and relays, interconnected in order to prevent incorrect operations.

The wiring diagrams, shown in the specific section of this chapter, allow a quick identification of each component and its correlation with the other components of the system.

### 9.1.2 Safety regulations



**WARNING!** *The presence of live elements requires particular attention when working on electrical components, in order not to create situations of danger while working and to restore the operating safety conditions for the user.*

- Do not wear rings or similar metal objects as this may cause a short circuit or fire due to accidental contact with live parts.
- Do not leave metal tools in areas where accidental contact with live parts may occur, as this may cause a short circuit or fire.
- All electrical cables are fastened to the frame with cable clamps. When an operation involves removing a clamp, then install a new clamp in its original position.
- Do not leave any electrical wiring that is not properly secured. Loose electrical cables can cause unnecessary wear to the insulation and cause short circuits and fire.

### 9.1.3 Equipment

There are some specialised tools and test equipment that are needed for electrical repair work. A brief description of these follows.

- **Needle-nose or long pliers.** Used to connect or bend wires and connectors in tight positions.
- **Diagonal cutters.** Used to cut wires or trim connections.
- **Stripping pliers / crimping pliers.** Available separately or as a combined tool. Used to strip insulation from wires of various sizes, crimp terminals and connector or wires.
- **Soldering iron and soldering gun.** Used to well all the couplings and connections to terminals, connectors etc. A soldering gun is faster and more convenient than a soldering iron, which must heat up first.
- **Multimeter - analog or digital.** To measure voltage, amperage and ohms.
- **Tachometer.** Used to measure engine speed. Required to properly test alternator and charging circuits where output is dependent upon engine speed.
- **Heat gun.** Used to hot shrink insulated tubing in place. Used to replace electrical tape or insulated sleeving. To use, place a piece of shrink tubing over a wire joint, heat with the heat gun, until it shrinks slightly around the joint.
- **Consumable materials.** Electrical tape, resin core solder (never use acid or acid core solder on electrical joints), an assortment of various sized terminals, connectors, insulated or heat shrink tubing (for use on joints and connections), and an assortment of automotive type wire (in several colours).

**IMPORTANT** *STIGA highly recommends that all interventions are performed in a professional manner. The use of the tubing to cover joints and the soldering of connections contribute to a professional looking job. In addition to a pleasing appearance, repairs made in this manner are more likely to withstand vibration. (The weakest points in an electrical system are the joints where wires are attached.)*

**IMPORTANT** *Replace all faulty components with STIGA replacement parts only. Engine parts, such as rectifiers or alternator components should be repaired by the nearest engine service center. STIGA does not recommend attempting to repair electrical components. Most do not lend themselves to repair and you would have more money invested in "time of repair" than the part would cost and the results may not be as good.*

#### 9.1.4 Electrical measure gauges

In many electrical circuits, there is some visible effect which indicates that the circuit is functioning properly.

A switch is turned "ON" and a lamp lights. A key is turned, a starter motor runs and cranks the engine. If the lamp does not light up, or the starter motor does not run, some means of measuring voltage, current flow, resistance and continuity is needed, (continuity means there is a complete electrical path through the circuit or component.)

To know exactly what conditions exist in an electrical circuit requires AC and DC Voltmeter, AC and DC Ammeter, and an Ohmmeter.

Combination meters that do all of these things are available and called a Multimeter or Volt Ohm-multitester (VOM).

Meters of this kind are available in many forms and all change functions and ranges with switches, or by plugging test leads into different jacks. Multimeters are available in two basic types, Analog and Digital.

- **Analog meters**

Analog meters have a needle that provides the reading moving along a scale. The longer the scale, the easier it is to read and more accurate the reading will be. A jewelled movement is used in this type of meter which is more likely to be damaged through rough handling (except for overloaded Protected Meters) or by measuring high values that exceed the range set on the meter, than a digital meter.

They provide excellent service for the money as long as they are used with care.

- **Digital meters**

Digital Meters do not have a movement and are therefore more rugged. The reading shows up directly on a display window of some type. Since they read direct, no skill in reading the scale is required, nor is it necessary to set the range. The meter switches the ranges automatically.

The user only has to select the function volts DC, AC amps, ohms, etc.), connect the test leads and the reading is displayed on the display. Because of the internal circuitry and the lack of a movement, these meters are not likely to be damaged by overloads.

In the discussions that follow, either type of meter may be used. Test procedures are the same. It is best to learn proper procedures, even though some meters may be more forgiving of mistakes. Where differences in use may occur, they will be covered in the discussion.

### 9.1.5 Electrical measurements

#### • Voltage measurement

There are two basic rules to be remembered when using a voltmeter. A voltmeter measures the voltage difference between the test leads and the voltmeter is always connected across the circuit under test.

#### • Current measurement

The two rules to remember when measuring current with an ammeter are; an ammeter measures the current that flows through the meter, and to measure current an ammeter must be connected into the circuit.

The latter rule means that the circuit must be opened, and the ammeter wired into it. Because this procedure is usually difficult, an ammeter is seldom used for troubleshooting.

#### • Resistance measurement

An Ohmmeter is used to make resistance measurements and to check continuity through wires and electrical components.

There is one rule to keep in mind when using an ohm meter. The ohmmeter has a self contained battery and requires no electrical power. Using the ohmmeter on a circuit that has voltage applied may result in damage to the meter.

**IMPORTANT** - *Disconnect the battery from the machine when performing Ohmmeter tests or damage to the Ohmmeter may occur.*

**IMPORTANT:** - *An ohmmeter reads the resistance of whatever component is connected between the test leads. It can be used to check wires, coils, light bulbs, or any item that conducts current.*

## 9.2 TROUBLESHOOTING

### 9.2.1 Diagnosis of electrical system problems

Before searching for an electrical fault, it is advisable to carry out some preliminary checks to exclude the most trivial causes:

- Check that the battery is charged.
- Check the integrity of the fuses and relays.
- Check the wiring for damage, cracks or abrasions in the insulation, and secure the connectors to the components.

**NOTE** *In some cases, after a long period of use or in case of mechanical damage, the cables passing through the articulated joint may be damaged.*

The following table shows the main problems attributable to the components of the electrical system, with the actions to be taken to solve them and reference to the operating instructions.

Problem	Probable cause	Solution	[👉...]
1) With the ignition key in position «  » or «  » the lights remain off.	The battery does not power the board.	Check the connection cables.	–
		Check the battery condition.	[9.3.1]
	Central light: 20 A fuse blown.	Replace the fuse (20 A).	[9.3.10]
	Side lights: 30 A fuse blown.	Replace the fuse (30 A).	[9.3.10]
	Battery terminals crossed.	Check connections.	–
2) The lights turn on, but with the key in the START position the starter motor does not start or lacks power (uncertain starting).	The battery does not supply enough current.	Charge the battery.	[9.3.1]
	Uncertain mass of the battery, or missing battery on the starter relay or motor.	Check and adjust.	–
	Starting conditions have not been met.	Check that all starting conditions are met.	[2.5.6]
		Check all micro switches and their wiring.	[9.3.2]
	Defect in the starter relay (you can't hear the "click").	Replace the starter relay.	[9.3.7]
Starter motor failure (you can hear the "click").	Replace the starter motor.	–	
3) The starter motor runs but the engine does not start.	Lack of fuel supply.	Check the wiring of the carburetor solenoid valve opening command	–
		Check the fuel tap and filter.	–
	Insufficiency in the ignition system.	Check that spark plug cap is securely fitted.	–
		Check that the electrodes of the spark are clean and have the correct gap.	–
4) The starter motor remains on after starting and does not disengage by removing the key.	Mechanical difficulties in returning the moving contacts of the starter relay.	Replace the starter relay.	[9.3.7]
	Irregular operation of the starter motor due to mechanical or electrical causes that cause greater absorption and consequent sticking of the relay contacts.	Check the starter motor.	–
		Repair / replace the starter motor.	–
5) The starter motor is already engaged with the key in the "ON" position, and is deactivated only by removing the key.	Starter block malfunctions.	Replace the starter block.	[9.3.4]
6) The starter motor does not run	Insufficiently charged battery	Charge the battery.	[9.3.1]
	Badly connected battery.	Check connections	[9.3.1]
	20A fuse blown	Replace the fuse (20 A).	[9.3.10]

Problem	Probable cause	Solution	[👉...]
7) Irregular operation of the electrical circuit.	Insufficient charging.	Check that the charging cable is not disconnected and recharge the battery.	-
		Check that there are no leaks caused by cables with deteriorated insulation and recharge the battery.	-
		Check the charging circuit.	-
	Overvoltage charging.	Check the charging circuit.	-
	Battery charger fuse blown.	Replace the fuse (30 A) and check the charging circuit.	[9.3.10]
8) The motor shuts off during use.	Intervention or failure of safety devices.	Check the operation of the microswitches and their wiring.	[9.3.2]
	Random detachment of some electrical cables.	Check all the wiring.	-
	Engine running consent is missing.	Having made sure that the consent conditions are respected, check all the microswitches and the relative wiring.	[2.5.6] [9.3.10]
	Uncertain or missing mass on the charge controller.	Check the ground connections and the fixing screws of the regulator.	-
	Overvoltages from malfunction of the regulator.	Check the charging circuit.	-
	Battery disconnected or damaged during use.	Check the battery and wiring.	[9.3.1]
9) Intervention of the 20 A fuse.	Short circuit or overload on the power side of the system (ignition block, starter relay, lights and charging connector).	Look for the defective user and replace it.	[9.3.2]
	Short circuit on the front socket.	Check the sockets.	[9.3.6]
	20A fuse blown.	Replace the fuse.	[9.3.10]
10) The clutch does not engage.	Power circuit failure	Check and / or replace the PTO relays	[9.3.8]
		Check and / or replace the operator presence switch	[9.3.5]

### 9.3 DESCRIPTION AND CHECKS OF ELECTRICAL COMPONENTS

#### 9.3.1 Battery

**NOTE** - The machine comes equipped with a maintenance-free battery that requires no regular maintenance except the cleaning of the terminals and the recharging in case of a voltage drop.

**! DANGER!** Battery poles, terminals and related accessories contain lead and lead compounds, chemicals known to cause cancer and damage to the reproductive apparatus. Wash hands after handling.

Always remove battery before servicing.

##### a) Battery Removal and Installation

1. Disconnect the negative cable first (1, «-»), then the positive cable (2, «+»).
2. Unscrew the wing nut (3) and remove the bracket (4) holding the battery (5) and remove the battery from the machine.

**NOTE** Several different batteries can be assembled on the machine that involve a different composition of the hold-down bracket.

3. Connect the positive cable first (2, «+»), then the negative cable (1, «-»).
4. Apply petroleum jelly or dielectric grease to battery cable ends and terminals.



##### b) Inspection, cleaning, drying, and maintenance

**NOTE** This machine uses a hermetic recombination battery, in which the electrolyte of each element is carefully dosed in the production phase and sealed at the origin, in order to ensure maximum efficiency during the entire life of the battery.

**IMPORTANT** A hermetic recombination battery does not need to be refilled with water or acid, it must never be opened and its cover must not be removed.

1. Inspect the top of the battery, terminals, cables, poles and the battery unit for any accumulation of dirt, corrosion cracks or loose and broken parts. Keep the battery and its terminals clean. Replace the battery if damaged.
2. Clean or service the battery after removing it from the machine. Remove corrosion from battery terminals and cable connections with a wire brush, then wash with a weak baking soda solution.

3. Scrub the exterior of the battery and cable terminals with a non-metallic brush which has been dipped into a mixture of baking soda and water.
4. After cleaning, apply a thin coat of grease or petroleum jelly to terminals and cable ends to delay corrosion.

### c) Recharging the battery

**NOTE** - ALWAYS follow the information provided on the battery by the battery manufacturer. Contact the battery manufacturer for further instructions on how to charge the battery.

- To charge the battery:
  1. Remove the battery from the machine
  2. Place the battery on bench or other well ventilated place.
  3. Connect the positive (+) lead of the charger to the positive (+) terminal, and the negative (-) lead to the negative (-) terminal.

The approximate charge status can be determined by the remaining open circuit voltage (OCV) at room temperature, and the charge time required can then be estimated, as indicated in the table of examples.

Voltage (OCV)	Charge %	Charging time
12.60	100%	--
12.40	75%	4 hours
12.20	50%	9 hours
12.00	25%	13 hours
11.80	0%	16 hours

**NOTE** The standard battery voltage range is 12.6-13.1V, up to a maximum of 14.4V; 10.5 V is the minimum voltage to be able to recharge.

- If you use a 12 volt automatic battery charger, select a good quality charger with minimum 5-10 Ampere output at 15 VDC and charge depending on the battery charge status (see table).
- If you are using a constant current charger, charge at 1-2 Amperes for the time indicated in the table.

**IMPORTANT** Charging at higher rates will damage the battery and cause excessive gassing and acid spewing.

### d) Charging with an alternator

Under normal conditions the engine alternator will keep the battery charged. If the machine is not used for a prolonged period of time and the battery is completely discharged, it is necessary to recharge it with the battery charger, proceeding as indicated above.

### e) Emergency jump-start with cables

Jump starting, battery charging, or replacement is required when the starter motor will not crank the engine.

**IMPORTANT** - The machine used for jump starting should have a 12 volt battery with at least 500 cold cranking amperes, and a negatively grounded system.

 **DANGER!** *FROZEN BATTERIES CAN EXPLODE and result in death or serious injury. DO NOT charge a frozen battery. Let the battery thaw out before putting on a charger. UNIT MOVEMENT can result in death or serious injury. NEVER jump-start the machine with cables directly on the starter motor or solenoid valves The machine could move forward or backward and injure the person jump starting it.*

To jump-start with the cables:

1. Ensure battery is not frozen. If the fluid is frozen, remove the battery from unit and allow to thaw before charging.
2. Connect the positive (+) jumper cable to the positive (+) terminal of the discharged battery.
3. Connect the other end of the same jumper cable to the positive (+) terminal of the booster battery.
4. Connect one end of the second jumper cable to the negative (-) terminal of the booster battery.
5. Make the final jumper cable connection to the engine block or the furthest ground point away from the discharged battery.

 **WARNING!** - *Make sure the cables are clear of any moving engine parts before starting the engine.*

6. Start the engine. If the engine will not start after several tries, the machine or battery may need servicing.
7. After engine starts, leave cables connected for one to two minutes.
8. Disconnect cables in reverse order.
9. Use the machine normally to charge the battery.

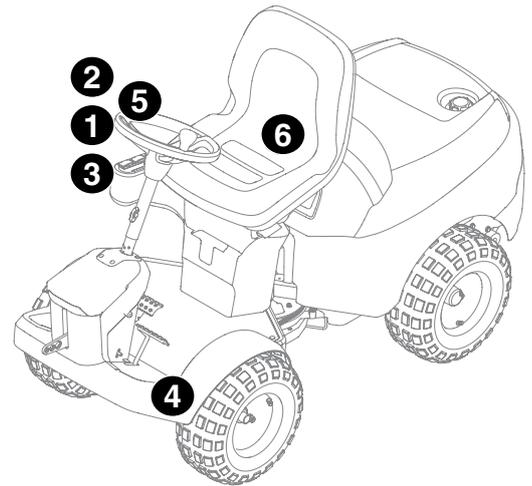
### 9.3.2 Checking the switches and micro switches function

Switches either open a circuit to stop current flow or close and allow current to flow through.

- A normally open (NO) switch prevents current flow until the switch is switched on, completing the circuit and allowing current to flow through it.
- A normally closed switch (NC) allows current to flow until the switch is actuated, breaking the circuit and stopping current flow through it.

To check the operation of a switch or micro switch you must have an Ohmmeter-dependent tester.

Disconnect the connector and connect the tester tips to the different contacts of the component concerned; the reading must correspond to what is indicated in the following table, where the red continuous line indicates the internal electrical continuity.

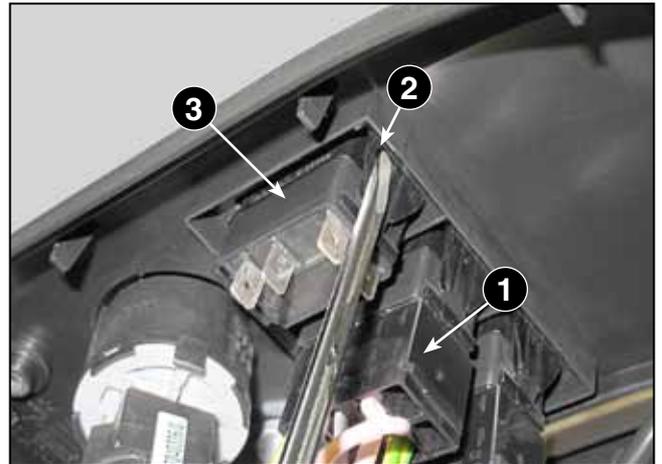


Component	Condition	Diagram	Readings
1. Ignition key	Position «STOP»		M - G - A1 = 0
	Position «>>>»		B - A1 = 0 L - A2 = 0
	Position «<<<»		B - A1 = 0
	Position «<<<»		B - S - A1 = 0
2. PTO switch 3. Lifting switch	Free		3 - 2 = 0 4 - 5 = 0
	Pressed "forward"		2 - 3 = 0 6 - 5 = 0
	Pressed "backward"		1 - 2 = 0 5 - 4 = 0
4. Parking brake micro switch	Free		1 - 2 = ∞
	Pressed		1 - 2 = 0
5. Lights switch	Pressed forward		3 - 2 = 0
	Pressed backward		3 - 2 = ∞
6. Seat micro switch (Operator presence)	Free		1 - 2 = ∞
	Pressed		1 - 2 = 0

### 9.3.3 Replacing the control switches

The switches are press-fitted into their respective housings. To replace a switch:

1. Disconnect the connector (1).
2. Using a screwdriver or a similar tool, press the locking tabs (2) on both sides of the switch (3).
3. Remove the switch (3).



### 9.3.4 Replacement of the starter block.

1. Unscrew the nut (1).
2. Remove the starter block (2) and disconnect the connectors (3), making sure to mark them so as not to incur in assembly errors.

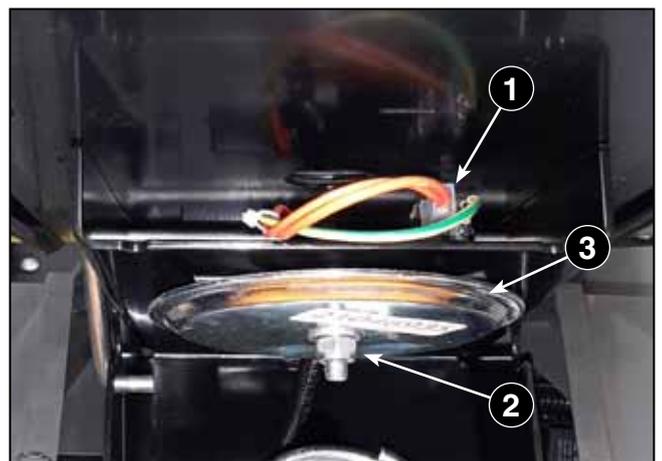


### 9.3.5 Seat switch (Operator presence)

This switch is located under the driver's seat and detects the presence of the operator for safety system intervention.

To disassemble the switch:

1. Disconnect the connector (1).
2. Unscrew the nut (2) and remove the switch (3).



### 9.3.6 Front socket

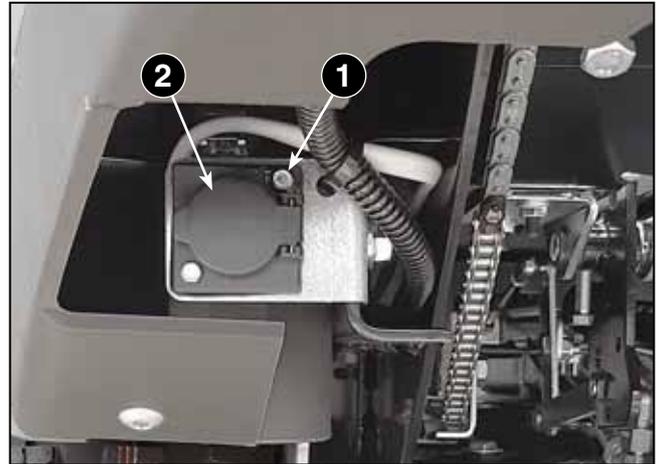
This socket allows the connection of the electrical users of the work equipment with the electrical system of the machine.

To check the functioning of the socket:

1. Turn the ignition key in the «ON» position.
2. Set the tester according to the Voltmeter and insert the test probes into the socket contacts: the battery voltage value must appear on the tester display, with a + or – sign, depending on how the red and black test probes have been inserted.

If the instrument does not indicate any value, the plug must be replaced, proceeding as follows.

3. Turn the ignition key in the «OFF» position.
4. Unscrew the two screws (1).
5. Extract the socket (2) and disconnect the two fastons.

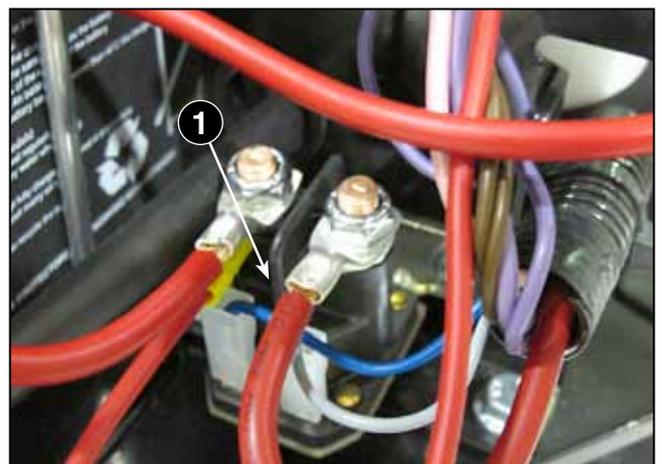


### 9.3.7 Starter solenoid

The starter relay operates on the principle that passing a current of electricity through a coil of wire will create a magnetic field strong enough to attract a piece of iron or steel. Each device uses this principle in a slightly different manner.

A basic solenoid or starter relay consists of a coil of wire wound around a hollow tube. A magnetic core slides inside the tube. When current is passed through the coil, the core is pulled into the solenoid with considerable force. With proper design, a solenoid can exert considerable force over a distance of several inches. A solenoid can therefore, pull a lever, close a heavy contact, or perform other jobs that require a straight line pull.

If a solenoid fails to operate, the cause may be either electrical or mechanical.



To check electrically, connect a voltmeter across the coil of the device and activate the circuit that operates the relay. If the meter indicates no voltage is applied, the cause lies in the control circuit. If the meter indicates proper voltage across the coil but the device does not function, remove the power, disconnect the wiring and check the continuity of the coil with an ohmmeter.

The meter should indicate resistance, in the order of 3 to 5 ohms, if the coil is intact. A high resistance indicates an open coil and a defective device.

There are also a number of mechanical issues that may cause the problem. The starter solenoid used on STIGA machines is a sealed unit used to actuate the starter motor on the engines. These solenoids may have three or four connections. The two major connections carry high current to operate the starter motor. The minor connections are connected to the coil and carry the control current.

To check the solenoid, disconnect the cables to the starter motor, turn the ignition switch to the start position, and listen for the solenoid to snap inside contacts closed.

If no snap is heard, check across the coils with a voltmeter. The voltage should read 12 volts with the ignition switch in the «START» position. If no voltage appears, the defect is in the start circuit.

If the voltage is correct, turn off the power and check continuity of the coil with an ohmmeter. If the coil is open, the solenoid is faulty and must be replaced. If the coil has the proper voltage applied, and the continuity check indicates the coil is intact, the solenoid plunger is stuck or the contacts are welded shut and the solenoid must be replaced.

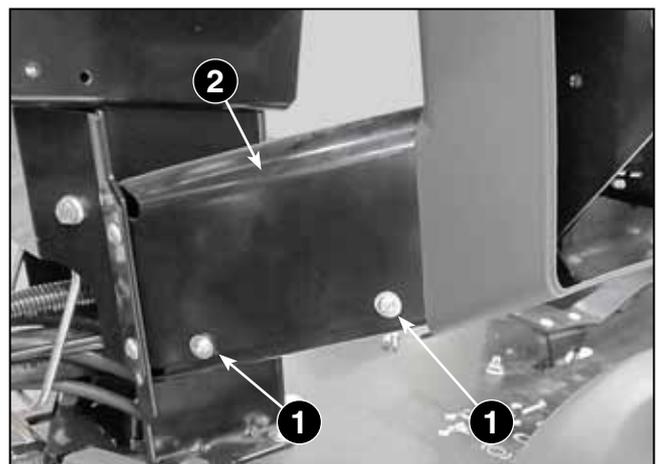
If the solenoid snaps shut, but the starter motor does not work, check the power contacts with an ohmmeter. If there is no continuity when the solenoid snaps shut, the contacts are faulty and the solenoid must be replaced.

### 9.3.8 Relay location and function

**NOTE** *The relays are placed in special compartments, which can be accessed in different ways, according to the type of machine.*

#### ►► Park :

1. Remove the two covers under the seat. [\[👉 3.1.5\]](#)
2. Remove the dashboard casing. [\[👉 3.1.6\]](#)
3. Unscrew the two screws (1) located on the rear part of the dashboard support cross-piece (2).





The table below indicates the functions of each relay, with reference to the colours of the wiring cables.

Connections	Function
<p><b>1</b></p>	PTO relay: it intervenes if the conditions necessary to operate the work equipment are not met during the work phase
<p><b>2</b></p>	Safety relay: it intervenes if the necessary conditions are not met during the work phase (operator presence)
<p><b>3</b></p>	Only with Honda engines - Ignition safety relay: it intervenes as a safety device if the conditions are not met during the ignition phase

### 9.3.9 Checking the function of the relays

A basic relay consists of a coil of wire wound around a soft iron (magnetic) core. When current is passed through the coil, the core is magnetized and pulls down on a magnetic lever.

The lever in turn is attached to several switch contacts which open or close other electrical circuits. In this fashion, a small current can control one or more larger electrical currents and actuate several other devices.

In most cases a relay contact moves only a fraction of an inch and the magnetic pull is low.

To check the operation of a relay you must have an Ohmmeter-dependent tester. Disconnect the relay and connect the tester tips to the various contacts of the component concerned, an initial check with the relay disconnected and another with the power supply contacts connected to an external 12 Volt battery.

The readings shall be as indicated in the table below, where the red continuous line indicates the electrical continuity occurring inside.

Definitions	Condition	Diagram	Readings
<b>1. PTO relay</b>  <b>2. Safety relay</b>	Not powered		$87A-30 = 0$  $87-30 = \infty$
<b>3. Ignition safety relay (only with Honda engines)</b>	Powered		$87A-30 = \infty$  $87-30 = 0$

### 9.3.10 Fuse location and function

Fuses are inserted in electrical circuits to protect the circuits from damage due to overload or short circuits. Fuses are a “weak link” in the circuit. They contain a metal link designed to melt when a certain current value is exceeded thus opening or disconnecting the wiring.

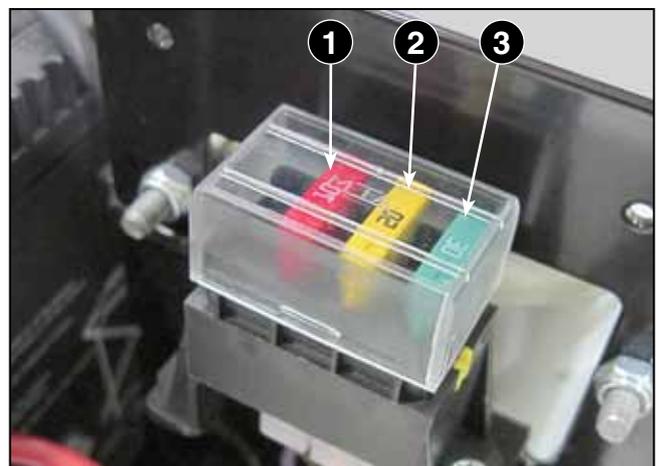
Since the function of the fuse is to protect the circuit, **NEVER** attempt to repair the protective device by bridging or replacing it with one with a higher current rating.

Electrical testing of these devices is simple, as the device either conducts current (and is therefore functioning) or the device is open and is therefore faulty Use an ohmmeter to check for continuity.

The fuses are placed in a container, located near the battery, under the rear hood of the machine.

**IMPORTANT** Once a fuse blows or melts it must be discarded and replaced with a new fuse of the same flow rate.

The table lists all the fuses on the machine, with their capacity and function.



Reference	Flow rate	Colour	Function
<b>1</b>	10 Amp	Red	Services protection
<b>2</b>	20 Amp	Yellow	Central light protection and cutting deck lifting
<b>3</b>	30 Amp	Green	Side lights and charging circuit protection.

### 9.3.11 Front light replacement

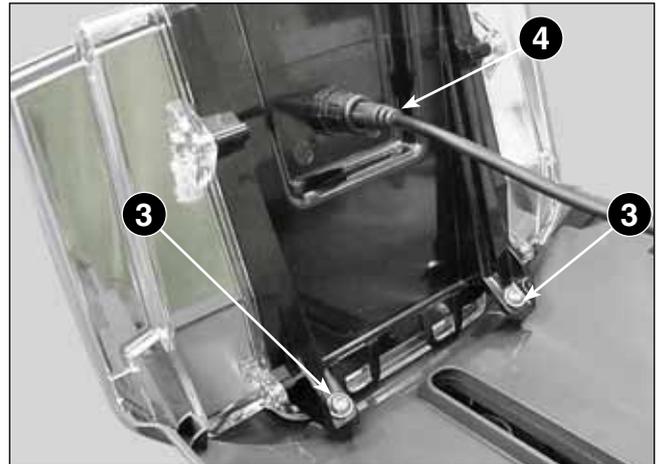
1. Remove the casing of the steering column  
[👉 3.1.4]
2. With the help of a screwdriver, slightly lift the upper casing (1) and slide it backwards to release the fixing tabs.



3. Disconnect the connector (2).

4. Undo the two screws (3) and remove the entire light (4).

**NOTE** *The light is available as a spare part and as an assembled element, therefore it's not possible to disassemble it and replace individual components.*



When assembling, perform the steps described above in reverse order, taking care to correctly insert all the tabs (5) in their respective seats (6).



**9.3.12 Diagnostics of electromagnetic clutch problems**

Problem	Probable cause	Solution
<b>1) Symptom: The clutch does not engage.</b>		
10 A fuse blown	• Low coil resistance	• Replace the clutch
	• Faulty battery	• Replace the battery
	• Faulty charging system	• Repair or replace.
	• Faulty wiring or connections of the PTO switch	• Check, repair or replace
Low supply voltage (less than 12 VDC to the clutch)	• Faulty battery	• Replace the battery
	• Faulty charging system	• Repair or replace.
	• Faulty wiring or connections of the PTO switch	• Check, repair or replace
Incorrect resistance values	• Damaged winding	• Replace the clutch
Inadequate power supply	• Clutch cables broken	• Repair or replace.
	• Faulty electrical system	• Measure the clutch coil resistance and the voltage supply. If both are correct, the electrical system is defective. Repair or replace.
Excessive backlash between rotor and armature	• End of the clutch life	• Replace the clutch

Problem	Probable cause	Solution
<b>2) Symptom: The brake does not start.</b>		
Worn armature / brake poles	• End of the clutch life	• Replace the clutch
Contaminated friction surfaces	• Oil seeping on the brake	• Check and repair leaks
		• Replace the clutch
<b>3) Symptom: Clutch slippage.</b>		
Low supply voltage (less than 12 VDC to the clutch)	• Faulty battery	• Replace the battery
	• Faulty charging system	• Repair or replace.
	• Faulty wiring or connections of the PTO switch	• Check, repair or replace
Inadequate power supply	• Clutch cables broken	• Repair or replace.
	• Faulty electrical system	• Measure the clutch coil resistance and the voltage supply. If both are correct, the electrical system is defective. Repair or replace.
Overloaded clutch	• Clogged cutting deck	• Remove the excess grass
	• Deformed shafts. etc.	• Replace
Contaminated friction surfaces	• Oil seeping on the brake	• Check and repair leaks
		• Replace the clutch
<b>4) Symptom: Clutch noise and vibrations.</b>		
The plate hits against the anti-rotational bracket	• A little bit of noise is normal	• If the noise is excessive, repair or replace the anti-rotational device.
Loose clutch on the motor shaft	• Loose assembly (screw not properly tightened)	• Tighten the mounting screw according to the specifications (60-70Nm)
	• Fastening screw is too long and does not allow to axially lock the clutch	• Use an original replacement screw
	• The mounting washers are too thin and deformed after tightening the screw	• Use original spare parts
Broken spring	• Loose fitting	• Replace the clutch

### 9.3.13 Checking the function of the electromagnetic clutch

The electromagnetic clutch is used to connect or disconnect, via a switch, the equipment used on the machine. In addition, the clutch is designed to activate a brake on the output shaft, when it is disengaged.

- The field coil is mounted to a bearing support and does not rotate.
- The rotor is attached to the power output shaft and rotates around the field assembly.
- The assembly is connected to the output pulley.
- The armature unit is assembled close to the brake unit rotor.



The clutch is engaged by applying current to the coil connection. This results in a current flowing through the coil, magnetizing the coil pulling the armature onto the rotor with sufficient force to hold the two pieces together, connecting the output and the input shafts firmly together. The force of the armature against the rotor pulls it away from the brake, hence releasing the brake.

To check the coil resistance while keeping the clutch mounted, proceed as indicated below.

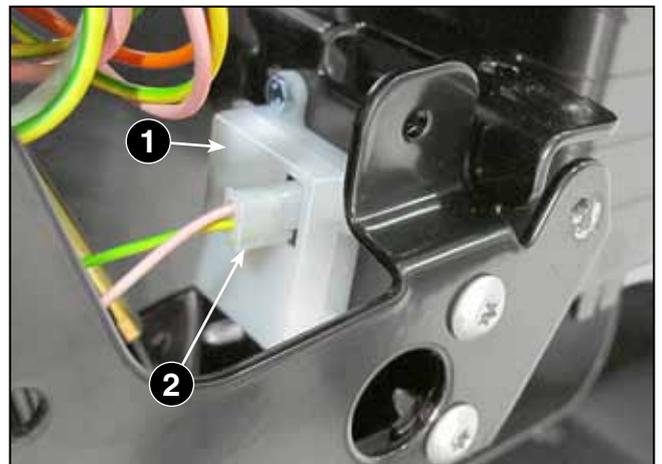
1. Turn off the engine and the PTO switch.
2. Disconnect the clutch from the clutch connector.
3. Set the tester to the Ohmmeter function.
4. Connect the tester probes to the clutch contacts.
5. Check the tester reading which should be 3.02 Ohm, with a  $\pm 5\%$  tolerance.

If the measured value is not within the tolerance indicated above, the clutch must be replaced.

### 9.3.14 Bluetooth module

#### ● Standard installation

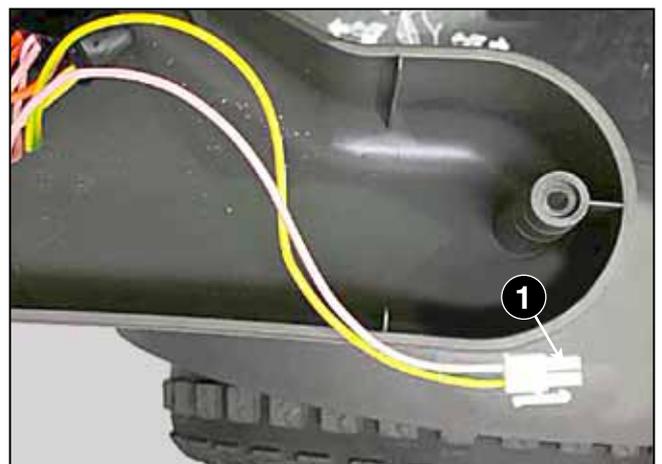
The Bluetooth module (1) is located inside the dashboard, fixed by the screw (2) and connected to the wiring via the connector (3).



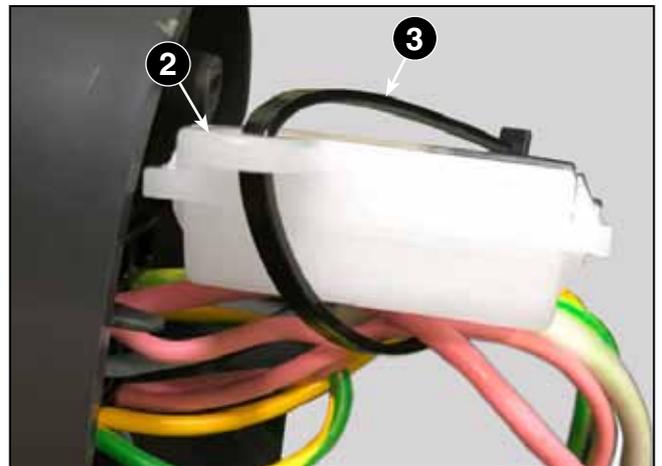
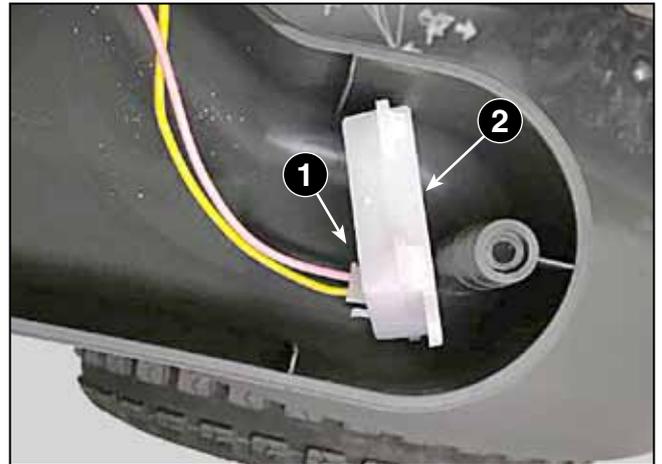
#### ● "After market" installation

**NOTE** The Bluetooth module must be connected to a special flying connector, present inside the dashboard.

1. Open the dashboard casing. [ 3.1.6]



2. Identify the flying connector (1) located inside.
3. Connect the Bluetooth module (2) to the connector (1).
4. Fasten the Bluetooth module (2) to the wiring harness using a clamp (3).
5. Check the connection as indicated in the instructions accompanying the product.
6. Close the dashboard casing. [ 3.1.6]



### 9.3.15 Bluetooth connection

#### ● Default factory connection

If the machine is equipped with a default factory Bluetooth module, download the <STIGA.GO> application via the QR Code located at the base of the seat with your smartphone or other similar devices and follow the steps shown in the various screenshots.

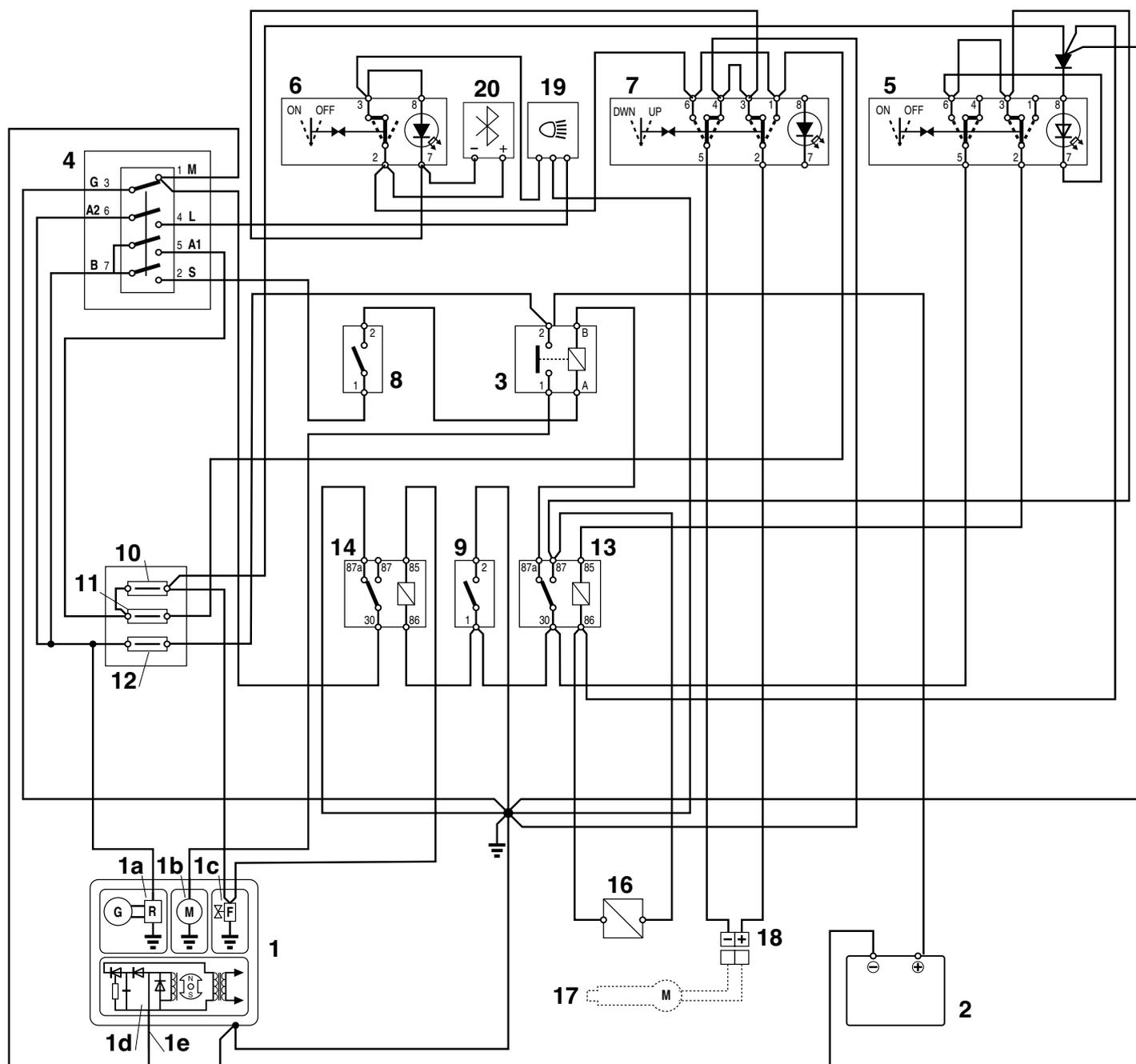
#### ● “Aftermarket” connection

After installing the Bluetooth module [ 9.3.14], download the <STIGA.GO> application from “Play Store” or “iOS App Store” and proceed to pair it with the machine’s serial number by following the steps indicated in the various screenshots.

**IMPORTANT** *The user should always be reminded that the machine’s operating hours are always saved on the <STIGA.GO > app.*

## 9.4 ELECTRICAL WIRING DIAGRAMS

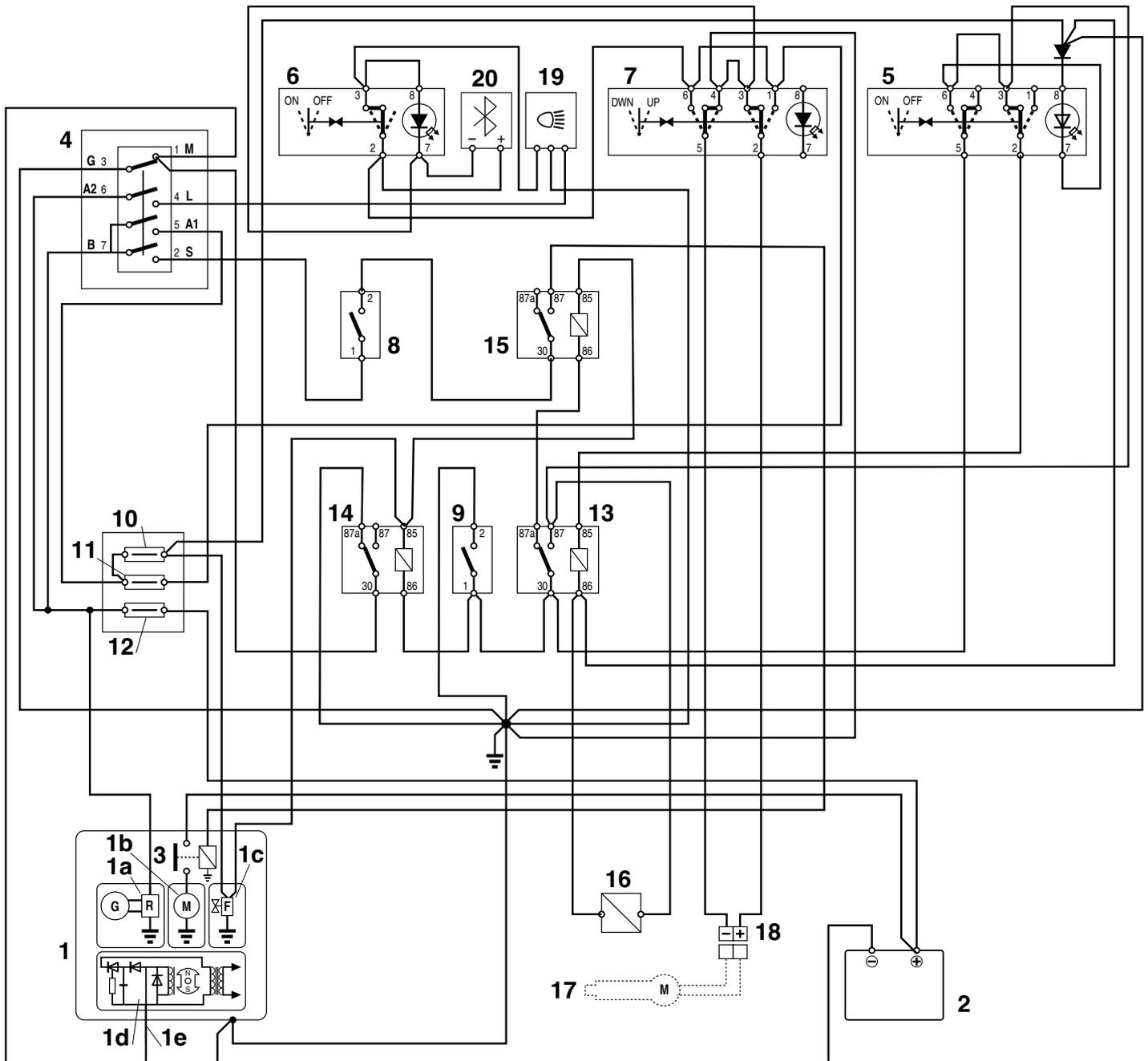
### 9.4.1 Wiring diagram for Stiga - B&S engines



#### Components

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>1. Engine             <ul style="list-style-type: none"> <li>a. Charging regulator</li> <li>b. Starter motor</li> <li>c. Fuel solenoid valve</li> <li>d. Ignition</li> <li>e. Engine stop</li> </ul> </li> <li>2. Battery</li> <li>3. Ignition solenoid</li> <li>4. Key switch</li> <li>5. Blades control switch (PTO)</li> <li>6. Lifting control switch</li> </ul> | <ul style="list-style-type: none"> <li>7. Cutting deck height adjustment switch</li> <li>8. Parking brake switch</li> <li>9. Seat switch (Operator presence)</li> <li>10. 10 A fuse</li> <li>11. 20A fuse</li> <li>12. 30A fuse</li> <li>13. PTO relay</li> <li>14. Safety relay</li> <li>16. Electromagnetic clutch</li> <li>17. Lifting actuator</li> <li>18. Auxiliary attachments socket</li> <li>19. Central light</li> <li>20. Bluetooth module</li> </ul> |
|---|--|

### 9.4.2 Wiring diagram for Honda engines



#### Components

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. Engine                     <ol style="list-style-type: none"> <li>a. Charging regulator</li> <li>b. Starter motor</li> <li>c. Fuel solenoid valve</li> <li>d. Ignition</li> <li>e. Engine stop</li> </ol> </li> <li>2. Battery</li> <li>3. Ignition solenoid</li> <li>4. Key switch</li> <li>5. Blades control switch (PTO)</li> <li>6. Lifting control switch</li> <li>7. Cutting deck height adjustment switch</li> </ol> | <ol style="list-style-type: none"> <li>8. Parking brake switch</li> <li>9. Seat switch (Operator presence)</li> <li>10. 10 A fuse</li> <li>11. 20A fuse</li> <li>12. 30A fuse</li> <li>13. PTO relay</li> <li>14. Safety relay</li> <li>15. Ignition safety relay</li> <li>16. Electromagnentic clutch</li> <li>17. Lifting actuator</li> <li>18. Auxiliary attachments socket</li> <li>19. Central light</li> <li>20. Bluetooth module</li> </ol> |
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**STIGA**

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