



# WORKSHOP MANUAL



**e-Ride C300 - C500**



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## INTRODUCTORY NOTES

The purpose of this manual is to provide complete instructions for service, maintenance, disassembly, repair and installation of mechanical/electrical components for the above-mentioned machine.

Trained Service personnel should use this manual for adjustment, disassembly and troubleshooting operations.



### IMPORTANT:

The information contained herein is intended exclusively for Service Centres and professional operators, who are able to carry out the described operations skilfully and with appropriate equipment, with the aim of safeguarding the performance and safety of the machine.

The manufacturer is not liable for damage or injury resulting from work carried out by private individuals or at unsuitable facilities.

The descriptions of the simplest and most immediate operations typical of the work of a good mechanic/electrician have been intentionally overlooked in favour of a more in-depth analysis of more specific aspects, indicating the most appropriate expedients to optimally carry out the work.

Please read the entire manual in order to acquire a good basic knowledge of the machine, which is indispensable to be able to intervene rationally, without errors and useless waste of time. We would like to remind you that problems associated with use are fully dealt with in the User's Manual.

All the information provided refers to machines in their original versions, therefore excluding any equipment which has undergone work that has altered its characteristics or components.

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## 1. INTRODUCTION

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### 1.1. GUIDE TO MANUAL CONSULTATION

#### 1.1.1. LIMITATION OF LIABILITY

Despite attention has been paid in the drafting of this manual, errors and inaccuracies may be found in its contents. The author is not responsible for any missing or incorrect information. The manufacturer reserves the right to modify the product without prior notice and without the obligation to update this manual in a timely manner.


The introduction of new procedures or indications other than those contained in this manual are notified to the Service Centres by means of *ad hoc* bulletins and notices.

All information contained herein is based on data available at the time of publication. The drawings and photographs of this manual may not exactly correspond to the machine on which the work is to be carried out.

#### 1.1.2. STRUCTURE OF THE MANUAL

The manual is divided into chapters, paragraphs and subsections.

- The inside front cover features the table of contents which
- lists the different chapters that are dedicated to a specific topic and includes the different paragraphs that make it up.
- Each paragraph is in turn subdivided into subsections referring to a single procedure.

References to other parts of the manual are indicated by the symbol  ... followed by the number of the relevant chapter, paragraph or subsection.

### 1.1.3. SYMBOLS AND TERMS USED

#### a) Symbols

Their function is to draw the operator's attention, so that s/he can carry out the operations with the necessary care and caution.



It indicates operations to be carried out with particular care so as not to compromise the operation and safety of the machine.



It indicates operations to be carried out with particular attention so as not to cause injuries to the person carrying out the work.



It highlights all the operations that require different methods of intervention, depending on the machine version, the changes made over time and the accessories fitted.



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

#### b) Safety terminology and notes

Their function is to draw the operator's attention, so that s/he can carry out the operations with the necessary care and caution.

Some paragraphs are preceded by a definition highlighting their relevance:

**NOTE:** General reference on how to correctly perform maintenance operations.

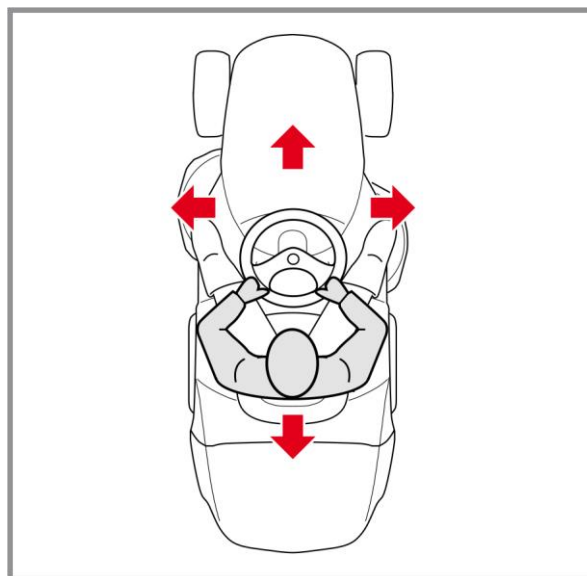
**IMPORTANT:** Specific procedures or information required to avoid damage to the machine or equipment.

**ATTENTION!** Failure to comply with it will result in risk of injury to the operator or third parties.

**DANGER!** Failure to comply with it will result in risk of serious injury or death to the operator or third parties.

#### c) Spatial references

All "front", "rear", "right" and "left" indications refer to the seated operator.



#### d) Abbreviations and glossary

The following abbreviations are used in the manual:

RH / LH = Right / Left

Min / Max = Minimum / Maximum

Chap. = Chapter

Para. = Paragraph

## 1.2. WORK SAFETY REQUIREMENTS

### 1.2.1. OPERATORS' QUALIFICATION

All maintenance, disassembly and repair operations must be carried out by experienced mechanics who are familiar with all the safety and accident prevention rules, after reading the procedures in this manual.

With regard to the electrical system in general, motors and electronic control equipment, operations must be carried out by personnel with suitable electrical and electronic skills and sufficiently familiar with computer systems.

### 1.2.2. WORK PREPARATION

Before starting any work, a correct preparation is very important to perform the work efficiently. A clean work area at the start of any work allows repairs to be carried out easily and quickly.

To reduce the hassle of looking for tools or parts that are out of place, position the removed parts on a clean work surface, with all fastening nuts and bolts in the disassembly order.

Organisation is a key element for correct reassembly. The necessary tools, instruments and components must be collected before starting the work.

Stopping a work to go and get tools or components is an unnecessary waste of time.

### 1.2.3. PRECAUTIONS DURING WORK

In general, the work described here does not involve any particular hazardous situations other than those associated with any mechanical work, which can be avoided with the normal care and caution that should normally be used when carrying out this type of work.

In addition to observing the usual accident prevention rules typical of any mechanical workshop, it is recommended to:

- remove the ignition key before starting any work;
- protect your hands with suitable work gloves, especially when working near the cutting device;
- allow the motors to cool down before starting any repair or maintenance work;
- not wear rings, bracelets, necklaces or similar when working on batteries, as these can cause short circuits or fire;
- pay the utmost attention to avoid making any action which might cause accidental contact with live cables and cause a short circuit or fire when working near batteries and motors;
- not dispose of environmentally harmful waste into the environment. This waste must be disposed of in accordance with the regulations in force;
- make sure that other people cannot inadvertently carry out actions that compromise the safety of those who are performing the work.

### 1.3. SERVICE CENTRE PROCEDURES

#### 1.3.1. VALIDITY AND WORK UNDER WARRANTY

The Manufacturer warranty will cover work carried out during the warranty period in the manner and within the limits of the existing contractual relations.

#### 1.3.2. EXCEPTIONS TO THE USE OF THE WARRANTY

- The warranty does not cover damage due to:
  - lack of knowledge and familiarisation of the user with the accompanying documentation.
  - inattention.
  - incorrect or unauthorised use and assembly.
  - use of non-original spare parts.
  - use of accessories not supplied or approved by the manufacturer.
- The warranty does not apply to components subject to wear such as blades, belts, etc.
- The warranty terms and conditions provided by the manufacturers of the drive unit, motor, batteries and electronic equipment shall apply.

The purchaser is covered by the national regulations in force in his/her country. The legal rights of the purchaser are not limited by this product warranty.

#### 1.3.3. POST-WARRANTY SERVICE INTERVENTIONS

For each intervention on the machine, the Service Centre shall fill in a report containing the serial number, a brief indication of the detected problems, the intervention carried out and any spare parts used.

A copy of these reports must be kept and made available to the Manufacturer, together with the parts replaced, in the event of any complaints by the Customer.

#### 1.3.4. FAULT SIGNALLING

It is desirable and appropriate to notify the Manufacturer of all cases of anomalies that recur with particular frequency; this will allow the problem to be carefully analysed and appropriate corrective actions to be taken during production.

Similarly, the Manufacturer will report any anomalies found on the produced machines, indicating the most suitable procedures to fix them.

#### 1.3.5. SPARE PARTS REQUESTS

When requesting spare parts, it is essential to indicate the code number, referring to the exploded view tables corresponding to the year of manufacture, shown on the product identification label.

## 2. INFORMATION FOR SERVICE

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## 2.1. GENERAL INFORMATION

### 2.1.1. IDENTIFICATION OF THE MACHINE AND MAIN COMPONENTS

#### 1) Machine

Each machine is supplied with a label (1) placed behind the seat indicating technical data, model and serial number.

The model and serial number must be quoted when forwarding a warranty claim and are essential when ordering spare parts.

#### 2) Drive

The machine is equipped with a drive unit operated by a built-in motor. This component is supplied by an external manufacturer and is manufactured according to precise technical specifications that distinguish it from similar products made by the same manufacturer. The serial number on the label (2) allows the product and its features to be correctly identified and must always be mentioned when ordering spare parts or requesting information.

#### 3) Blade motor (No. 2 motors)

The motor that activates the blades is supplied by an external manufacturer and is manufactured according to precise technical specifications that distinguish it from similar products made by the same manufacturer. The serial number on the label (3) allows the product and its features to be correctly identified and must always be mentioned when ordering spare parts or requesting information.

#### 4) Traction (control unit)

 See paragraph 7.5.1 Description of components and functions.

#### 5) VMS

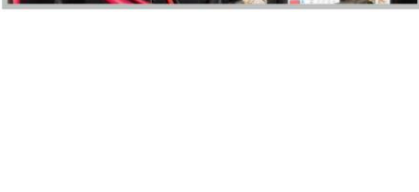
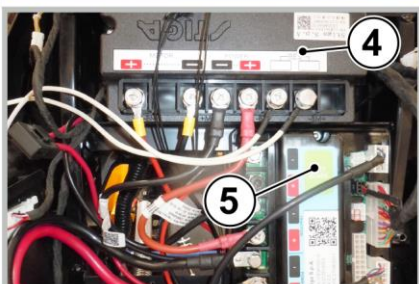
 See paragraph 7.5.1 Description of components and functions.

#### 6) Battery

 See paragraph 7.5.2 Battery.

#### 7) Dashboard

 See paragraph 7.5.1 Description of components and functions.



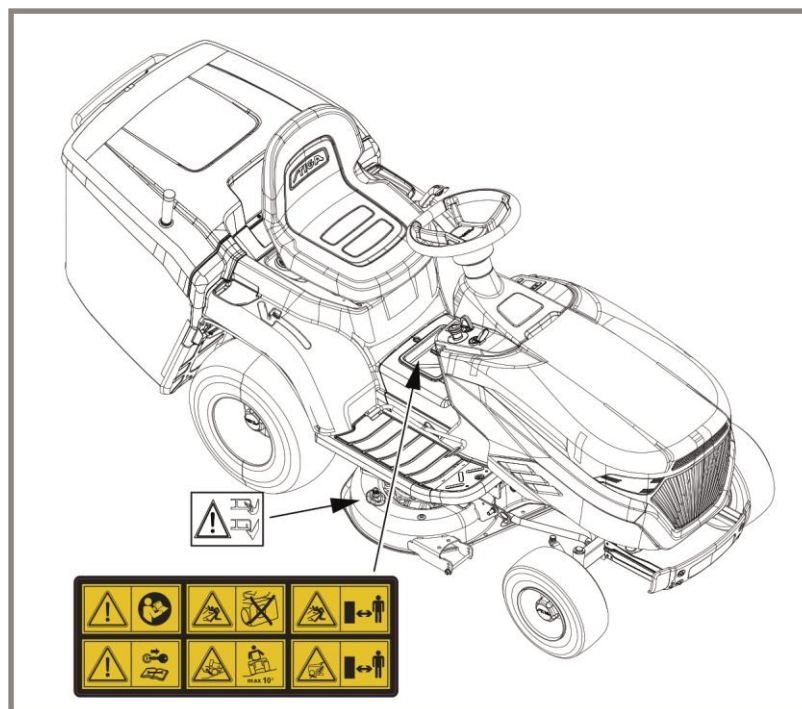


### 2.1.2. SAFETY PRINCIPLES TO IMPLEMENT

All machines are manufactured in accordance with the strict European safety regulations in force. In order to maintain the initial level of safety over time, it is advisable for the Service Centre to act accordingly, carrying out the necessary checks whenever the opportunity arises.


In particular, each time intervention on the machine is requested, it must:

- **check:**
  - the correct operation of the safety devices;
  - that guards and protections have not been removed;
  - that the indication or requirement labels (which are considered an integral part of the safety devices) have not been removed or rendered illegible.
- **it must also:**
  - restore the correct operation of any safety devices that have been tampered with or removed;
  - replace ineffective, damaged or missing guards and protections;
  - replace illegible labels, as shown in the figure below;
  - clean the inside of the cutting deck with water and a non-metallic brush;
  - touch up painted parts where the paint is scratched or missing;
  - do not perform any intervention or change on the machine or motor that leads to changes in performance and improper use or a use other than that it was designed and approved for;
  - inform the Customer that failure to comply with the points listed above automatically voids the Warranty and releases Manufacturer from any liability.



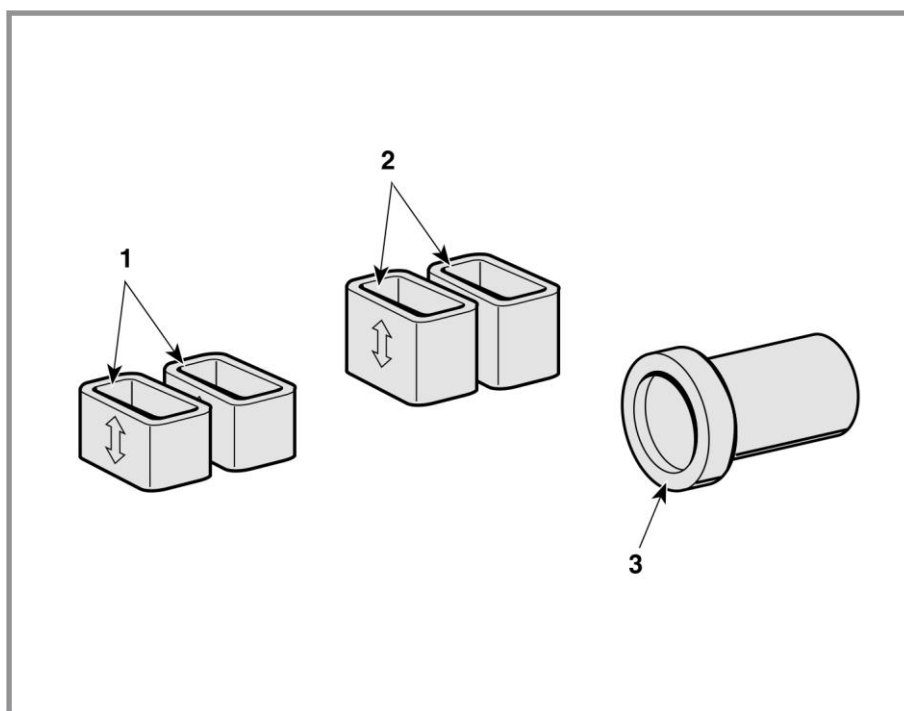
### 2.1.3. BASIC EQUIPMENT

All operations can be carried out with the tools normally available in a good Mechanical Workshop in the automotive sector.

As far as the electrical and electronic parts are concerned, it is necessary to have suitable testers, as indicated specifically in  chapter 7 of this manual.

The use of these tools is indicated in the text.

1. Shims H = 26 mm for cutting deck adjustment
2. Shims H = 32 mm for cutting deck adjustment
3. Drift for wheel bearing installation



## 2.1.4. HANDLING AND LIFTING OF THE MACHINE

### General information

This chapter deals with the general aspects concerning the work to be carried out and the main rules to ensure successful operation and machine safety.

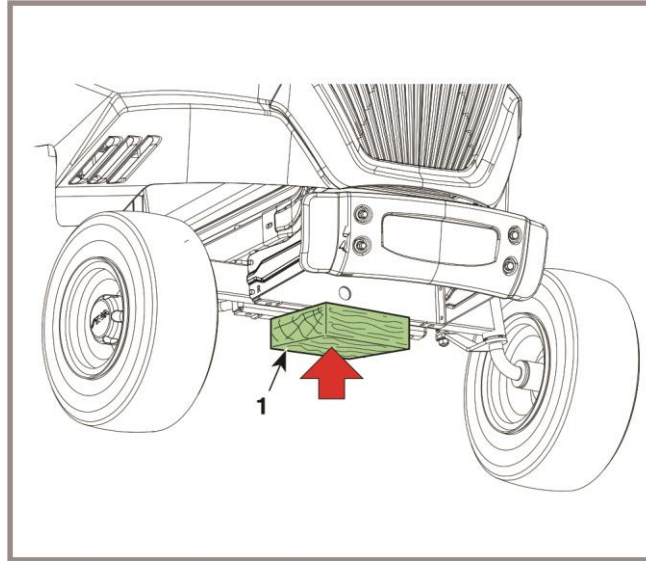


### **DANGER!**

The machine must never be lifted using a hoist or any other lifting means involving the use of ropes.

### Front side

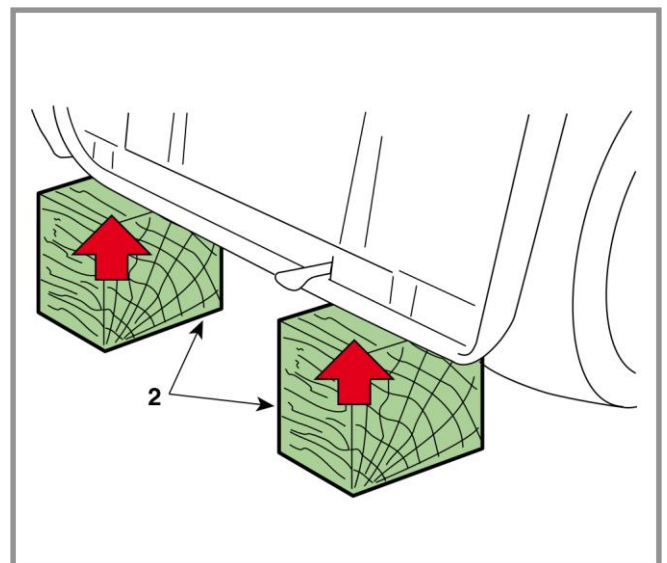
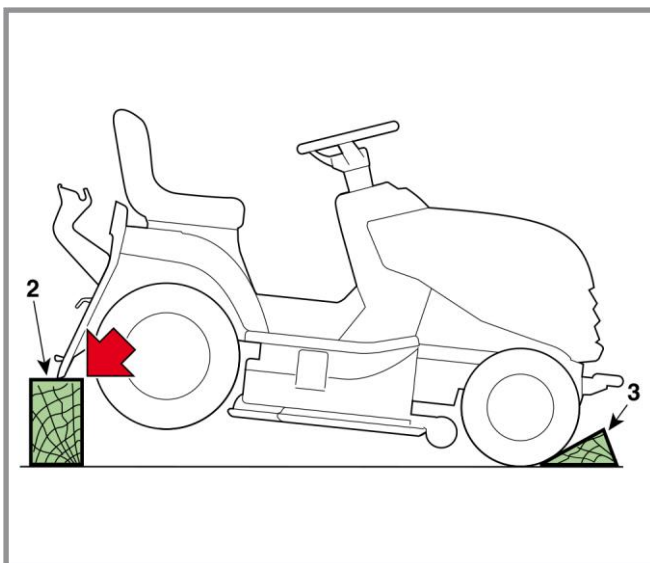
Once the traction locking/unlocking lever is applied, the machine can be raised by means of a jack acting on the lower part of the frame, placing a wooden shim (1) between the base of the jack and the frame itself, making sure not to obstruct the free oscillation of the front rocker arm.



### Rear side

Place two chocks (3) of suitable size in front of the front wheels to prevent uncontrolled movement of the machine. Place a jack under the drive unit and raise it enough to insert two shims (2) of suitable size under the lower edge of the rear plate.

Release the jack and ensure the machine is stable before carrying out any work.



**Vertical positioning****ATTENTION!**

This operation requires the intervention of two people; during lifting and overturning operations, hold the machine only from parts that offer the necessary solidity (steering wheel, frame, rear plate, etc.) and **NEVER** from the plastic parts of the body.

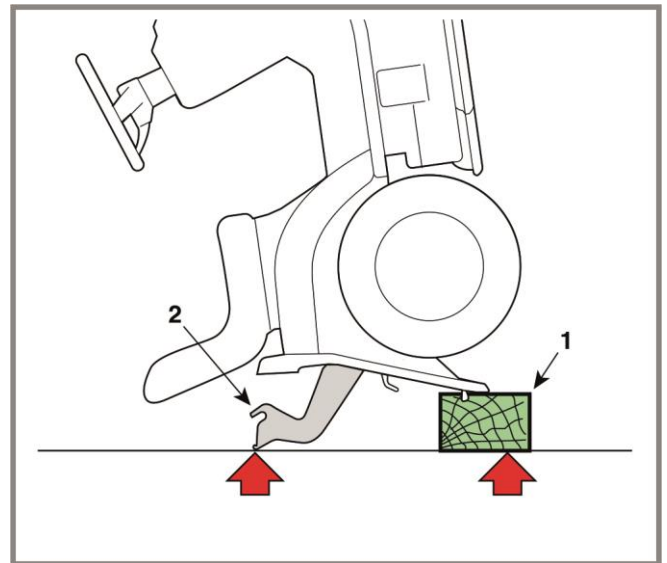
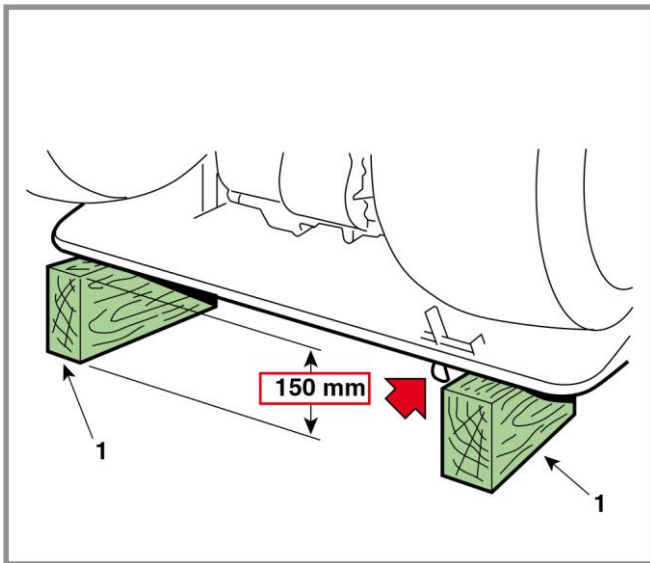
In order to guarantee the necessary stability, support the machine only at the points indicated by inserting two shims (1) of approx. 150 mm under the lower edge of the plate and taking care not to damage the plastic parts and the bag supports (2).

**ATTENTION!**

Ensure that the machine is stable before carrying out any work and avoid operations that could cause it to fall.

**ATTENTION!**

Similar caution must be observed when the two operators set the machine back to its horizontal position.



## 2.2. MAINTENANCE WORK

### 2.2.1. MAINTENANCE SCHEDULE

The Instruction Manual foresees a series of interventions by the Customer to ensure basic maintenance and other operations that often require the intervention of more qualified staff.

For this reason, the Service Centre should be responsible for keeping the machine in perfect working order by means of a periodic maintenance programme, to be carried out at regular intervals (for example at the end of the season or before a long period of inactivity), according to the following table indicating the main operations.

- A) Set the machine up whenever possible.
- B) Propose a periodic maintenance programme to the Customer, to be carried out at regular intervals (e.g. at the end of the season or before a long period of inactivity).

#### A) Sporadic maintenance

Type of intervention	See paragraph
Checking the operation of safety devices and restoring illegible or missing labels, following the layout shown here	2.1.2
Checking the tyre pressure	5.3.1
Aligning the cutting deck	6.1.1
Sharpening and balancing the blades and checking the condition of the hubs	6.1.3
Greasing front wheel bushings and trunnions	( - )
Checking rear axle screws (traction)	5.2.1
Checking and tightening the blade motor fixing screws	( - )

#### B) Periodic maintenance

Everything indicated in point A) plus:

Type of intervention	Maintenance interval	See paragraph
	Hours/months of use	
Checking the battery charge level	50 / 12	( - )
Checking any steering play		4.1.1
Checking the front bearings		5.3.2
General lubrication		( - )
Cleaning any grass residue and external washing		( - )
Cleaning and washing the inside of the cutting deck		( - )
Touching up painted parts, if necessary		( - )
Checking the electrical drive		( - )
Test ride		( - )

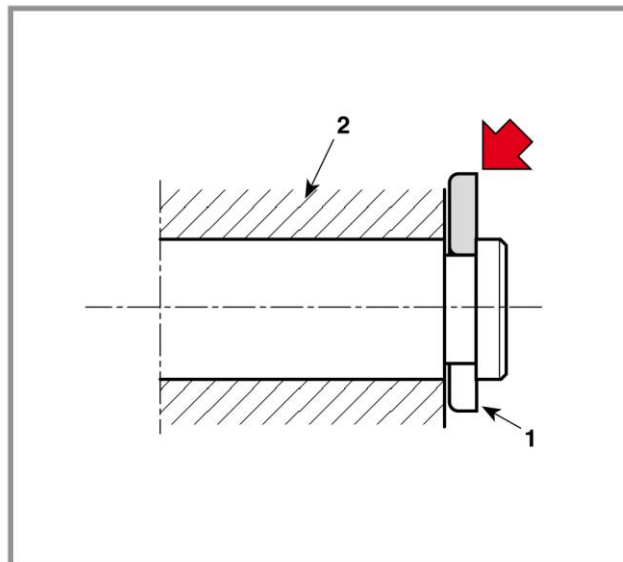
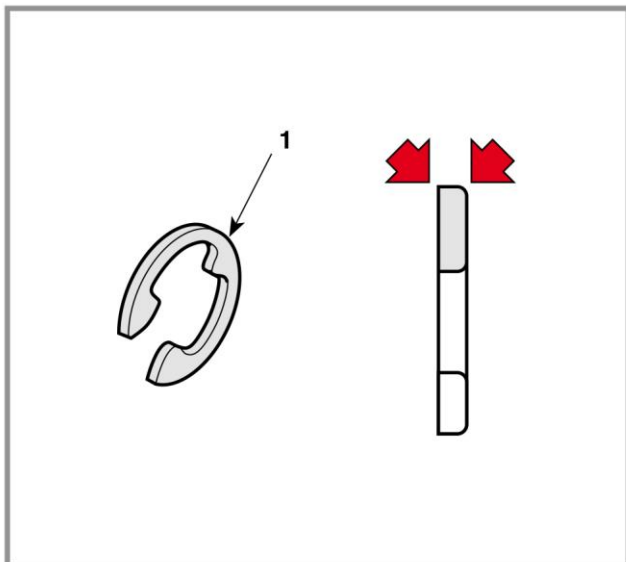
### 2.2.2. TIGHTENING TORQUES

The table shows the tightening torques for screws and nuts to be applied according to their size, unless otherwise indicated in the manual under the relevant procedure.

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

### 2.2.3. SNAP RING FITTING

The “Benzing” type snap rings (1) are characterised by one side with blunt edges and the other with sharp edges. In order to ensure maximum hold, it is necessary that the blunt side faces the element to be held (2), leaving the sharp edge side on the outside.

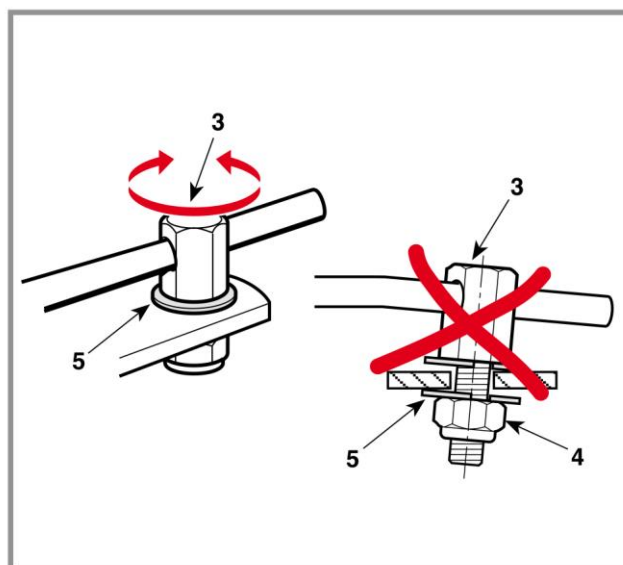
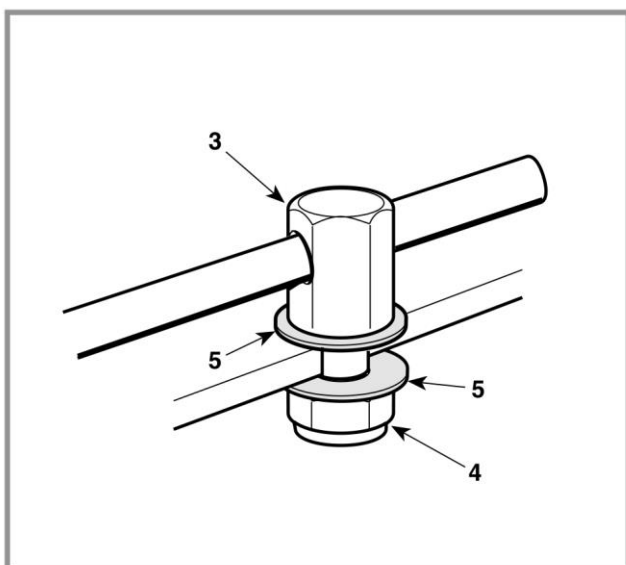


### 2.2.4. TRUNNIONS

There are a large number of trunnions on the machine, usually associated with rods, which require some degree of orientation.

The typical situation is that the trunnion (3) is fixed by means of a self-locking nut (4) with two anti-friction washers (5) between the trunnion (3) and the support element and between the latter and the nut (4).

As these are joints, the nut must never be tightened fully home, but must be screwed in such a way as to guarantee good freedom of rotation of the trunnion around its axis, without creating excessive play that could cause misalignment and malfunctioning of the concerned parts.



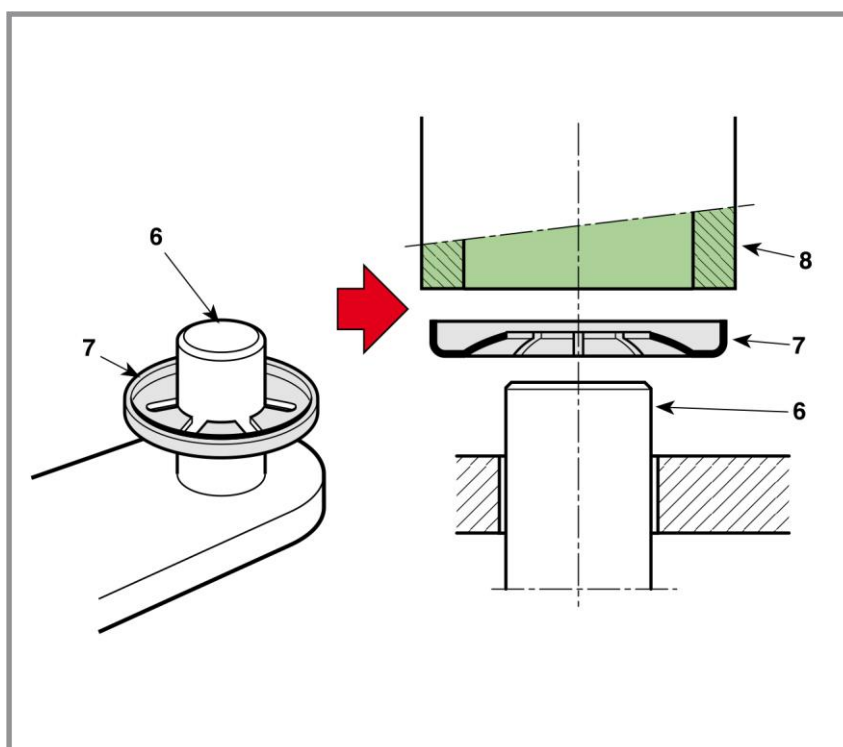
### 2.2.5. CROWN-SHAPED FASTENERS

Some trunnions (6) are fastened at the end by means of crown-shaped fasteners (7); these fasteners are damaged during disassembly losing all retaining capacity, therefore, they must never be reused.

During assembly, pay attention to the direction of insertion and push the fastener (7) onto the trunnion using a tube or box spanner (8) of suitable diameter, so that insertion can take place without deforming the "crown" of the fastener.

**IMPORTANT:**

Always replace a deformed fastener.





## 2.3. SPARE PARTS

### 2.3.1. UNAUTHORISED SPARE PARTS

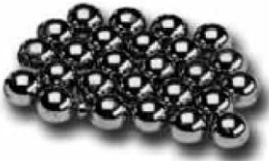


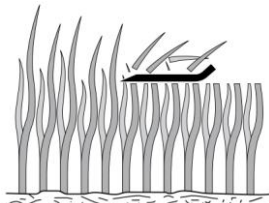
Use only original spare parts. The use of a spare part not authorised by the Manufacturer may adversely affect the performance, life or safety of this machine and will void the Warranty.

The manufacturer accepts no liability for any claims or damage, even under warranty, property damage, personal injury or death resulting from the use of unauthorised spare parts.

### 2.3.2. CHARACTERISTICS OF THE ORIGINAL BLADES

Original blades have design, material and workmanship characteristics that are optimised for use on the equipment for which they were intended; these characteristics are not found in so-called "compatible" parts.

The table shows the reasons why it is important to choose an original blade, which are useful for the assessment process.

Requirement	Comment
No breakage of blade ends. 	By using steel balls, the manufacturer simulates what can happen if the machine passes over foreign bodies in the lawn. The edge of the blades may be damaged but none of the components will become loose, detach or fly away.
No blade breakage. 	The impact test is the most severe endurance test a lawnmower can undergo. An iron pipe is placed right between the blades during operation. The blade can deform but will never, under any circumstances, detach or break. This test verifies that the blades and other components meet the high safety requirements.
Excellent balance. Very low noise. Minimal vibration. 	The authorised dealer's blades and blade ends all have exactly the same weight. The authorised dealer's blades and blade ends are all optimally balanced. This ensures very low noise and vibration for the entire machine life. This also ensures that the machine complies with noise and vibration regulations.
Excellent cutting results. 	The authorised dealer's blades and blade ends are optimised for their intended use. This means that the blades are matched to the shape of the casing and the number of revolutions to provide the best possible cutting result.



## 2.4. SAFETY DEVICE CONTROL

### 2.4.1. SAFETY SYSTEM TRIGGERING LOGIC

Safety systems will be triggered in the following two cases:

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

The table shows some typical scenarios.

Scenario	Action	Result
<ul style="list-style-type: none"> <li>- Operator seated.</li> <li>- Emergency button deactivated.</li> <li>- Traction pedal in neutral position (pedal released).</li> </ul>	Insert the key.	Machine is started without error messages.
<ul style="list-style-type: none"> <li>- Machine is started or moving.</li> </ul>	Operator gets up from the seat.	<p>All services are deactivated and the icon "No operator" is displayed.</p>  <p>To reactivate all services, the operator must sit back down on the seat.</p>
<ul style="list-style-type: none"> <li>- Operator not seated.</li> </ul>	Try to start the machine	The machine does not start.
<ul style="list-style-type: none"> <li>- Operator seated.</li> <li>- Traction pedal in forward movement or reverse position.</li> </ul>	Try to start the machine.	
<ul style="list-style-type: none"> <li>- Machine started.</li> <li>- Blades engaged.</li> </ul>	Operator gets up from the seat.	It turns off.
<ul style="list-style-type: none"> <li>- Emergency button activated.</li> </ul>	Try to start the machine	The machine starts up but the traction control and the blade engagement control do not work.
<ul style="list-style-type: none"> <li>- Machine is started and moving.</li> </ul>	The traction pedal is released.	The machine slows down and stops.
<ul style="list-style-type: none"> <li>- Cutting devices engaged</li> </ul>	The reverse mode is activated without holding down the button enabling cutting in reserve mode.	The cutting devices disengage.
<ul style="list-style-type: none"> <li>- Cutting devices engaged</li> </ul>	Lift the collection bag or remove the rear discharge guard (only for models with rear collection feature).	The cutting devices disengage.

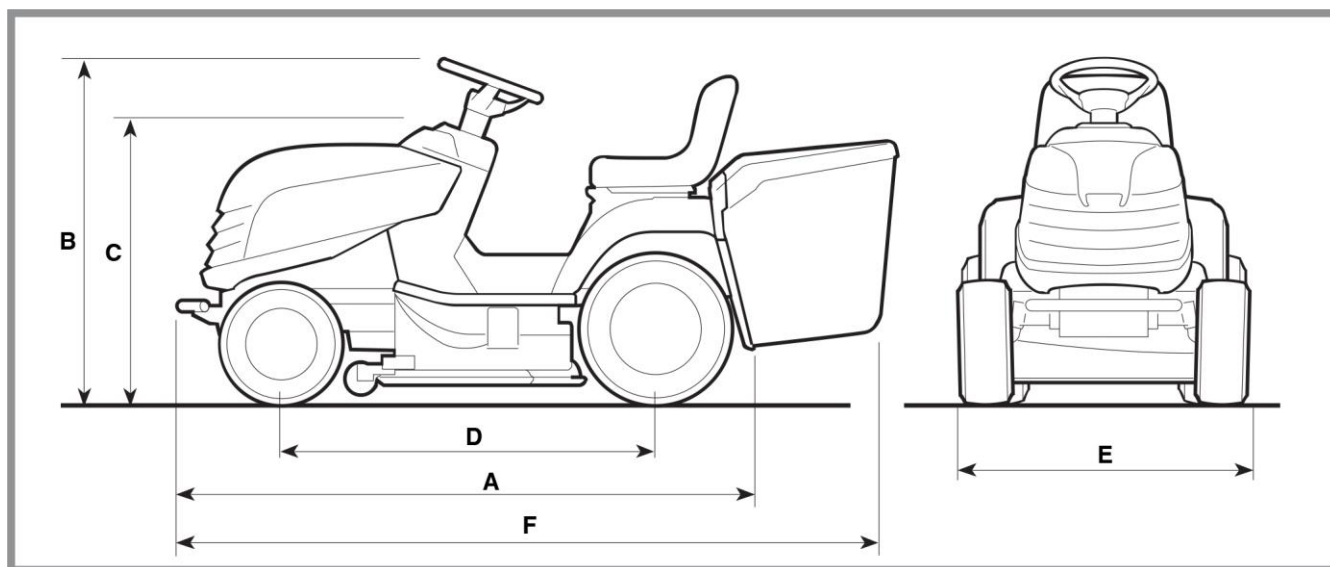
## 2.5. TECHNICAL DATA AND DIMENSIONS

### 2.5.1. TECHNICAL DATA

	C300	C500
Electric system	48V – 30 Ah Li-Ion	48V – 40 Ah Li-Ion
Battery pack	1.5 kWh	2 kWh
Charging time (at 100%)	6.5 ÷ 7 h (220V) 2h boost charge	8.5 ÷ 9h (220 V) 2h 45m boost charge
Work autonomy	up to 45 minutes	Up to 60 minutes
Blade motors	1.5 kW BLDC	
Blade motor speed	3000 rpm	2800 rpm (ECO) 3000 rpm (NORMAL) 3200 rpm (BOOST)
Traction motor	1.2 kW DC	
Forward travelling speed	9 km/h	
Reverse speed	4.5 km/h	
Weight	200 kg	202 kg
Front tyres	13 x 5.00-6 - (15 x 5.00-6)	
Rear tyres	18 x 8.50-8 – (18 x 6.50-8)	
Front inflation pressure	13 x 5.00-6: 1.5 bar 15 x 5.00-6: 1.0 bar	
Front inflation pressure	1.2	

### 2.5.2. DIMENSIONS

A	B	C	D	E	F
1814 mm	1098 mm	872 mm	1151 mm	902 mm	2340 mm



### 3. BODYWORK FRAME AND COVERS

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#### 3.1. REMOVAL OF EXTERNAL PARTS AND MAIN UNITS

##### 3.1.1. FRONT BONNET REMOVAL

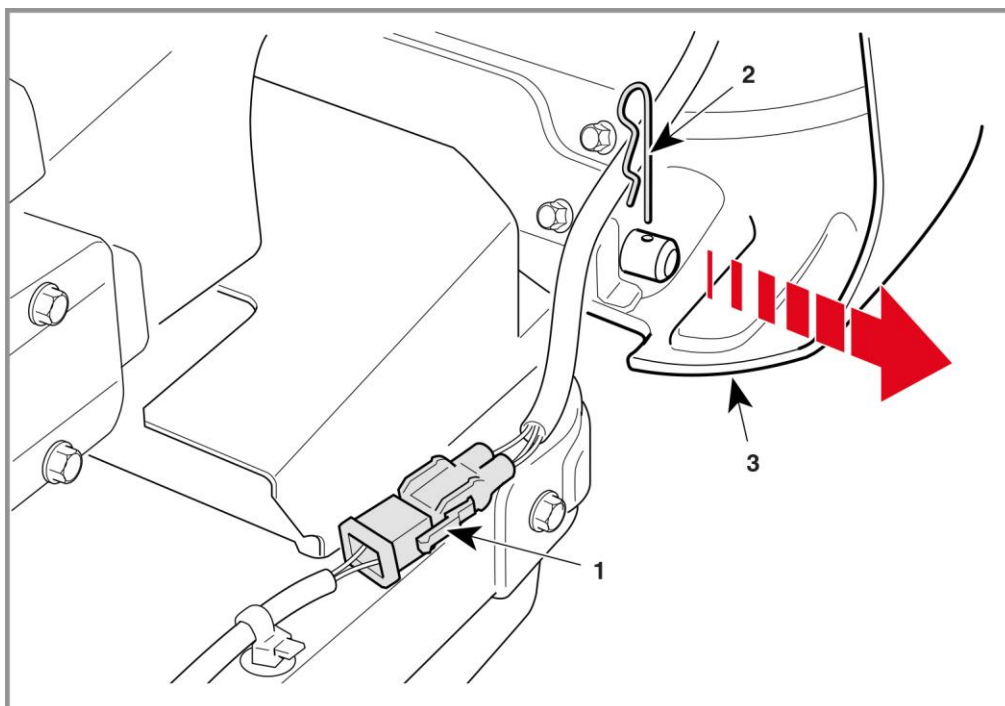
###### General information

Removing the front bonnet makes the electrical control area easier to reach.

###### Procedure

Disconnect the connector (1).

Remove the split pin (2) from the right side and remove the bonnet (3) by moving it to the right.



### 3.1.2. WHEEL COVER REMOVAL

#### General information

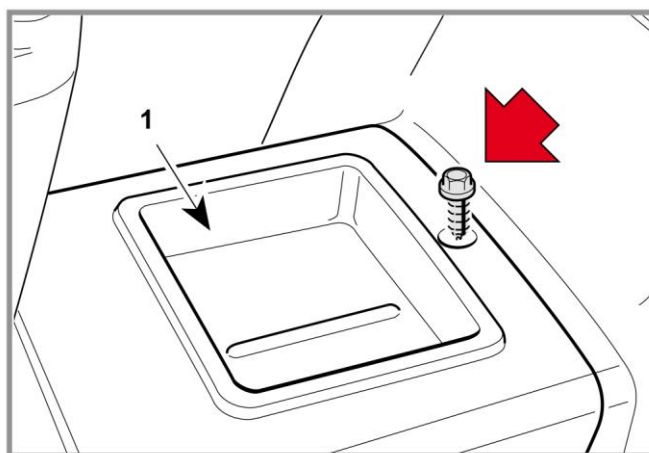
The wheel cover must be completely removed to replace the wheel and to access the seat microswitch, located under the crossbar supporting the two springs.

#### Related topics

... See paragraph 6.2.1 Removing the tunnel.

#### Procedure

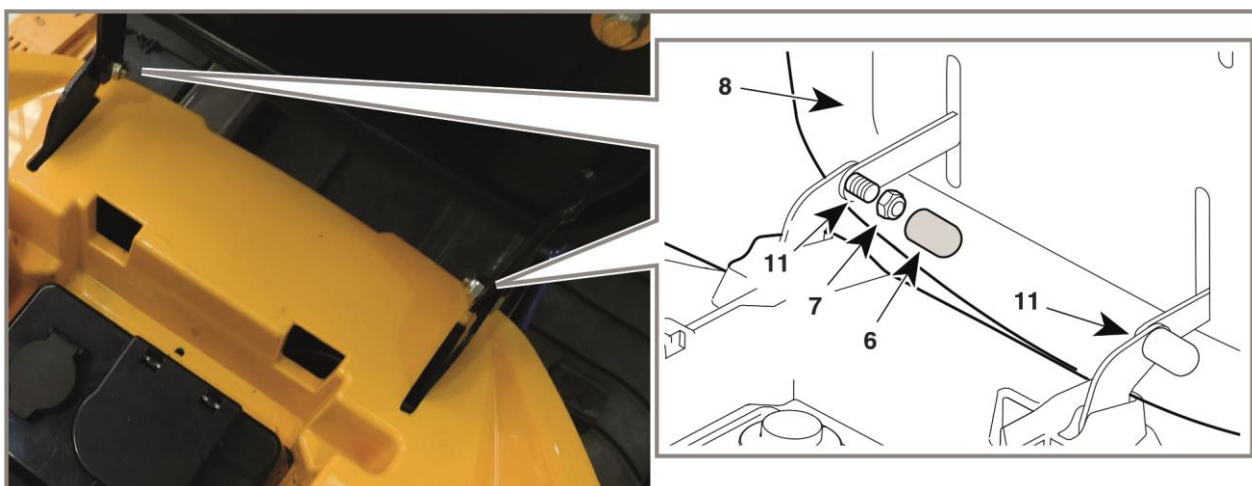
Remove the inspection door (1).



Remove the cover caps (6) and unscrew the two nuts (7) and pins (11) to remove the seat and its support plate (8).

Remove the tunnel.

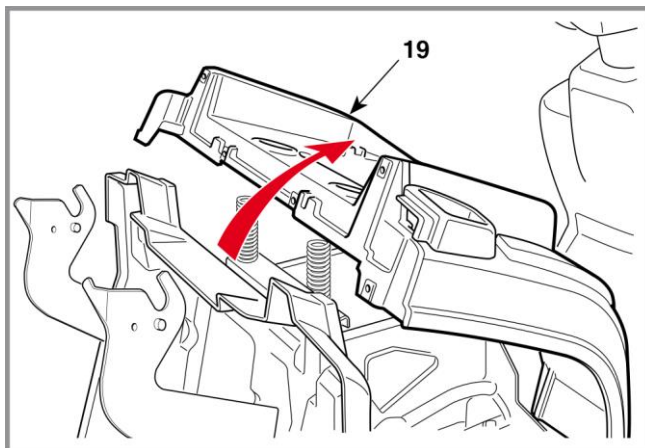
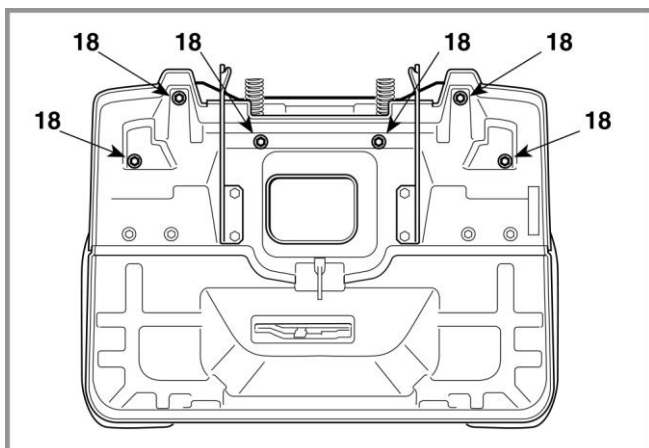
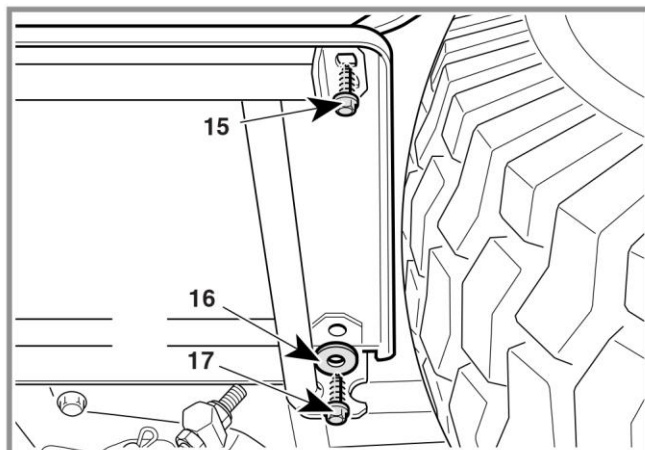
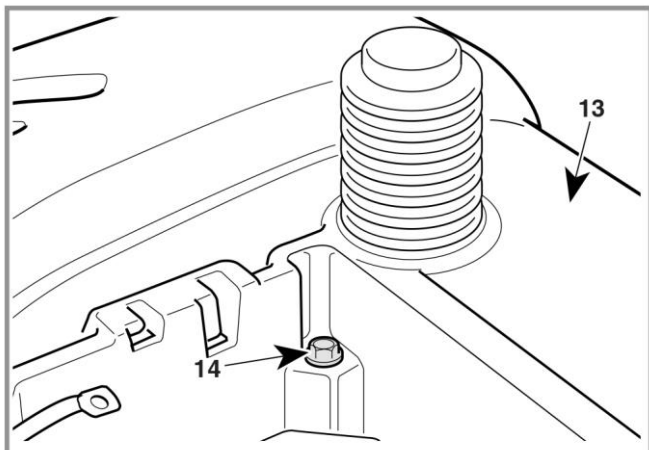
Disconnect the charger and USB cables.



The cover (13) is secured by means of:

- 2 screws (14) placed under the seat,
- 2 lower screws (15) (1 on each side) under the outer edge of the footrests,
- 2 lower screws (16) (1 on each side) with relevant washers (17) under the outer edge of the footrests.
- 6 rear screws (18).

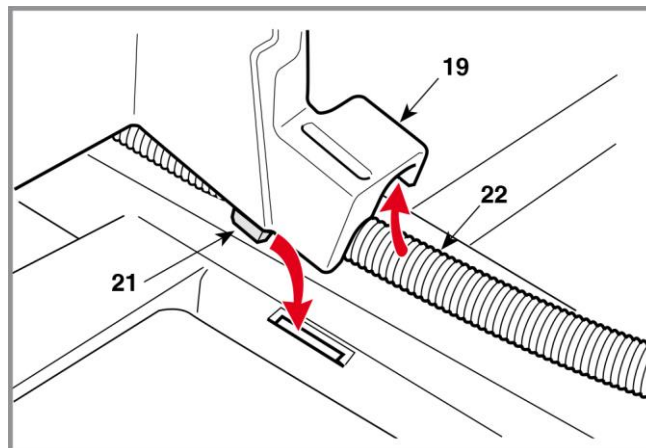
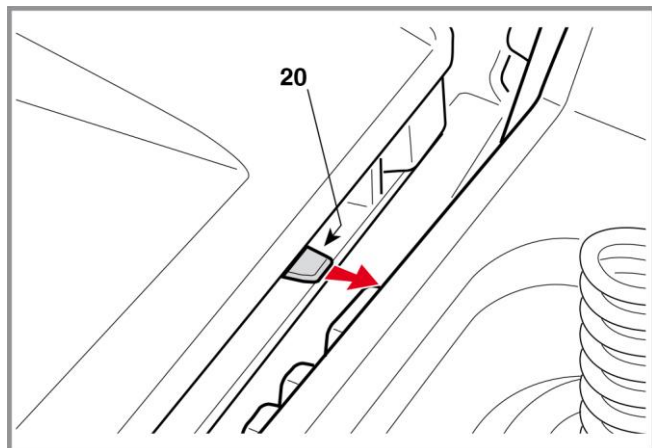
To remove the cover (19) simply push it forward and lift it simultaneously from the back.



Upon assembly, follow the procedures described above in reverse order.

Pay attention to correctly reposition the hook (20) and correctly insert the two side tabs (21) of the cover into the seats in the footrests.

Correctly reposition the wiring sheath (22) in the right-hand side of the cover.



🔧 Refit the left and right side guards (if any).



### 3.1.3. DASHBOARD REMOVAL

#### General information

The dashboard needs to be removed only for its replacement.

#### Tightening torques

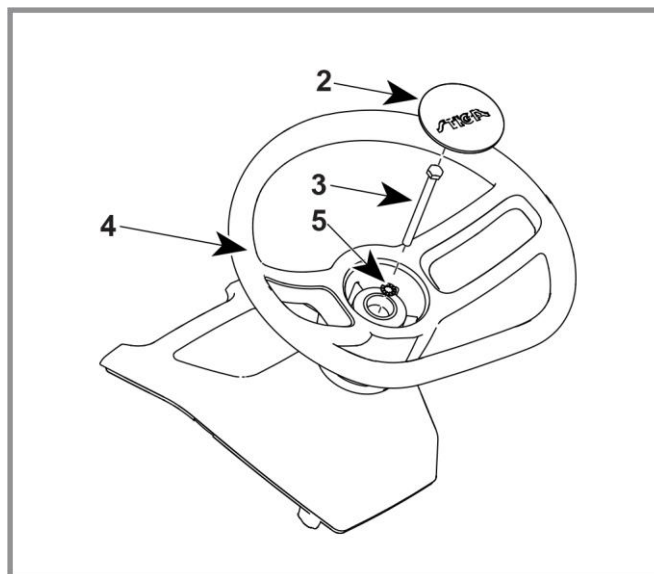
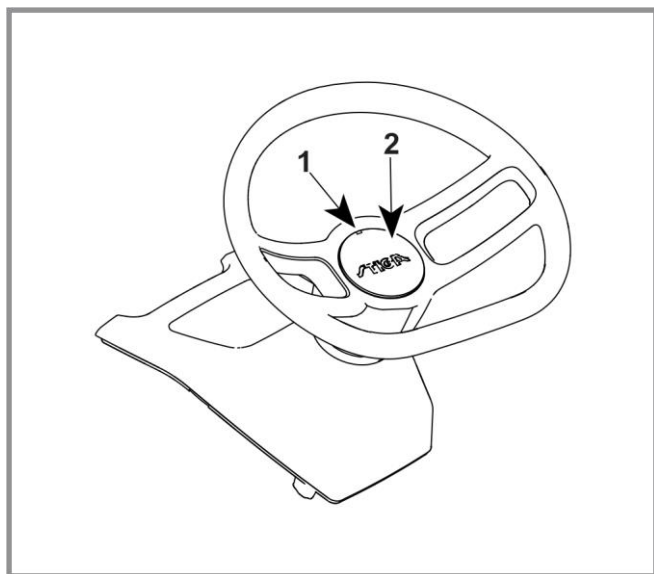
Reference: 11-12-13-14 Dashboard fixing screws

12 ÷ 15 Nm

#### Procedure

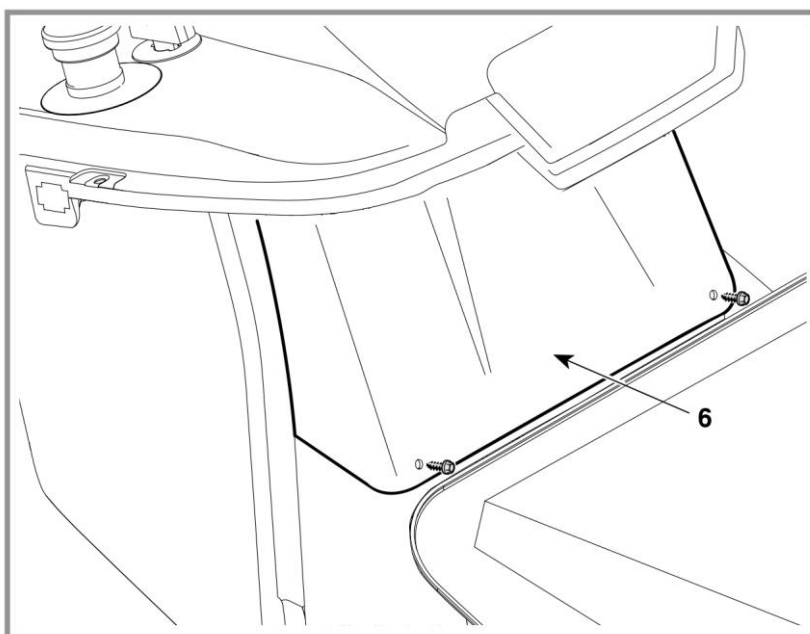
Using a screwdriver, release the central hooks (1) that secure the steering wheel cover (2).

Undo the central screw (3) and remove the steering wheel (4), taking care to collect the spacer and washers (5).



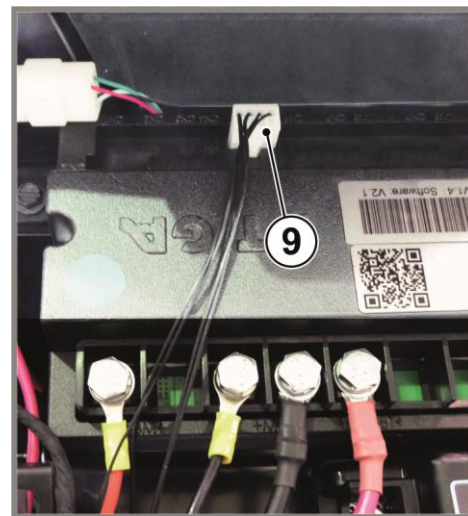
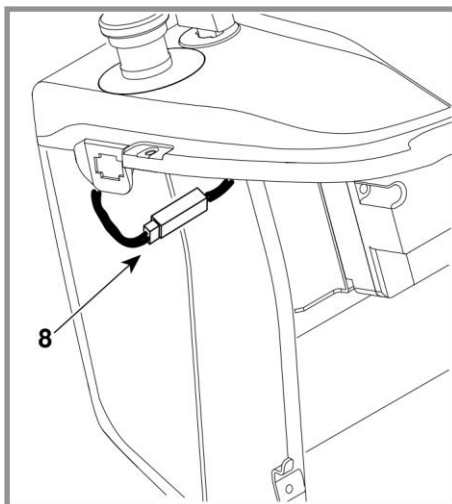
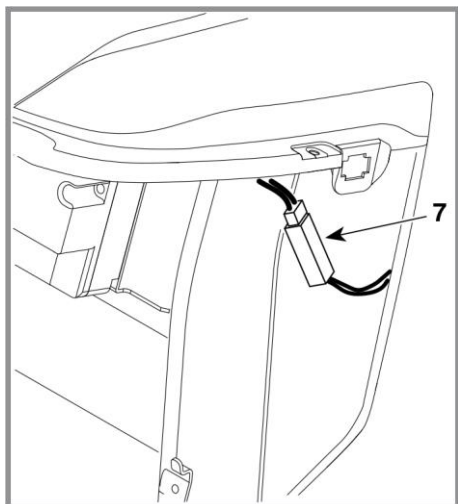
Open the bonnet.

Remove the guard of the electrical parts (6).



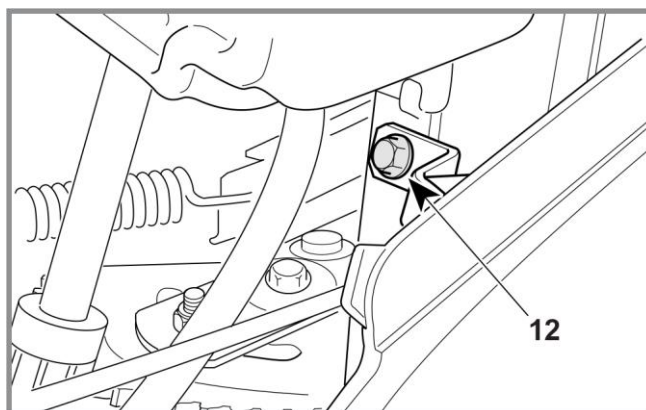
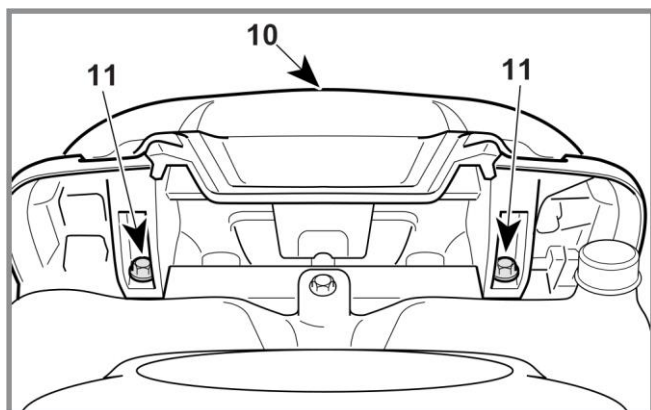
Disconnect all electrical connectors from their respective components:

- connector to the push-button panel (7),
- emergency stop switch (8),
- connector to the enabling key (9),

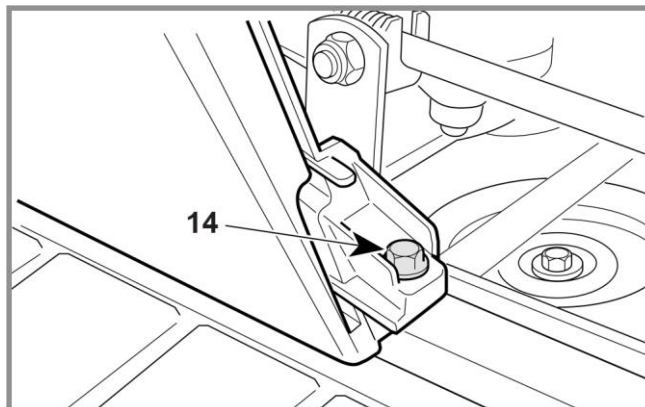
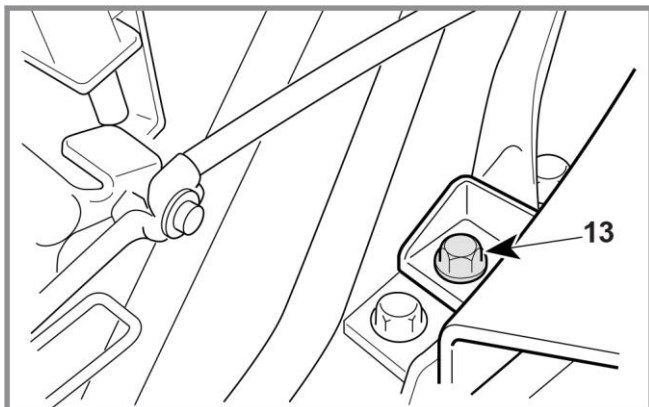


The dashboard (10) is secured by means of:

- 2 upper front screws (11) inside the battery compartment,
- 2 lower front screws (12) (1 on each side) inside the bonnet,



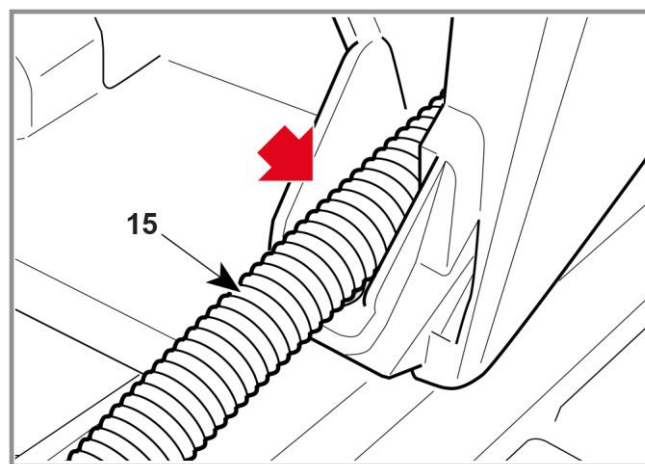
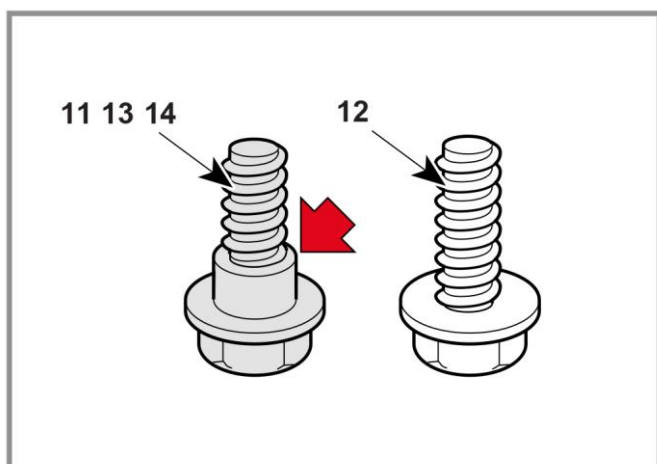
- 2 lower side screws (13) (1 on each side) on the inside of the bonnet, moving the main wiring sheath out of the screw seat,
- 2 lower screws (14) (1 on each side) that can be reached after removing the central cover.



During assembly, follow the operations described above in reverse order, taking care not to invert the screws (11) - (12) - (13) - (14), as:

- the screws (11) - (13) - (14) have a stop feature that optimises their use for fixing plastic components;
- the screws (12) do not have the stop feature and are suitable for fixing metal components.

Correctly reposition the wiring sheath (15) in the relevant seat on the lower right-hand side of the dashboard.



4. STEERING

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4.1. ADJUSTMENT AND SET-UP .....	26
4.1.1. STEERING PLAY ADJUSTMENT .....	26
4.1.2. STEERING GEOMETRY ADJUSTMENT.....	27
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4.2.1. STEERING COMPONENT DISASSEMBLY.....	28
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4.1. ADJUSTMENT AND SET-UP

4.1.1. STEERING PLAY ADJUSTMENT

General information

Steering play should never be excessive so as not to affect riding precision.

Tightening torques

Reference: 3 Sprocket fixing nut	25 ÷ 30 Nm
----------------------------------	------------

Procedure


Check that steering play is not caused by loosened linkage nuts and tighten all linkage and ball joint nuts.

If the play is due to the pinion/sprocket coupling, change the position of the shim provided to raise the sprocket and reduce the play between the teeth.

Remove the inspection door (1).

Unscrew the nuts (2) and (3) and remove the two Belleville washers (4) and (5) and the guide (6).

Remove the sprocket (7) and place the two specific shimming washers (8) and (9) (available as spare parts) under it so that it is positioned higher than the pinion (10), thus reducing the play between the teeth.

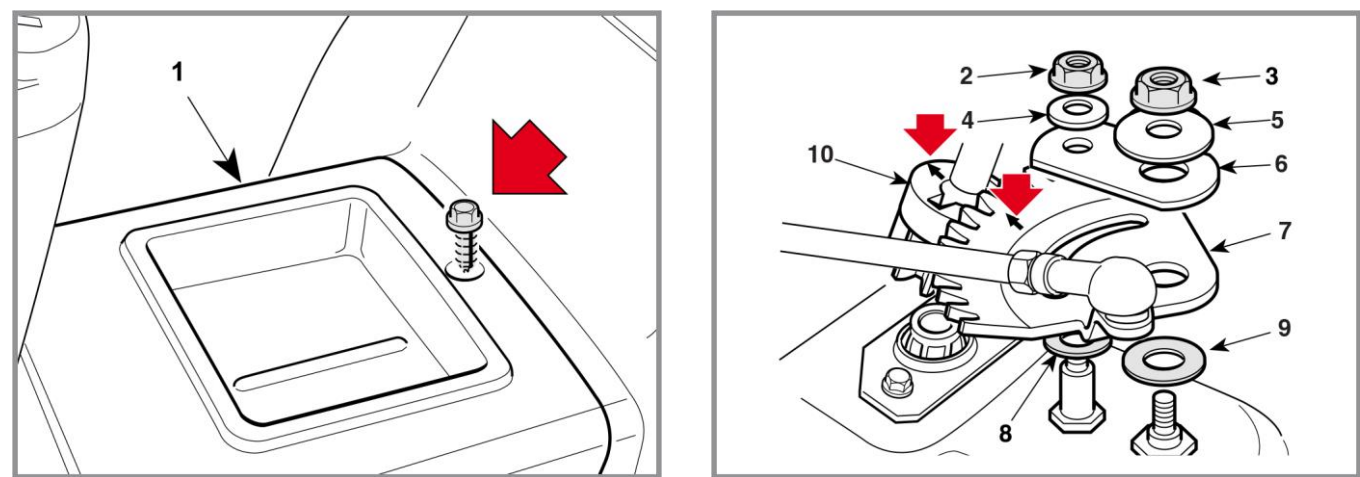


**IMPORTANT:**

Refit the sprocket by matching the two references (⇒ - ⇐) stamped on the sprocket (7) and pinion (10) in the direction of travel.

Refit the nuts (2) and (3) tightening them in such a way as to load the Belleville washers (4) and (5) just enough to ensure smooth steering without excessive play.

If fitting a shim (8) and a shim (9) is not sufficient to eliminate the play between the sprocket pinion teeth, they must be replaced as no further shims can be fitted.



#### 4.1.2. STEERING GEOMETRY ADJUSTMENT

##### General information

The correct steering geometry is given by the distance between the joints of the tie rod and wheel connection rod. Any anomalies due to impacts or accidental causes lead to a reduction in steering precision and increased tyre wear, which can be fixed as follows:

- abnormal or asymmetrical wear of the front tyres = toe-in adjustment,
- the machine does not keep a straight line with the steering wheel straight = tie rod adjustment.

##### Tightening torques

Reference: <b>2</b> Connecting rod fixing nuts	25 ÷ 30 Nm
Reference: <b>8</b> Joint fixing nut	45 ÷ 50 Nm

##### NOTE:

First, check that the joint fasteners have not become loose.

##### Procedure

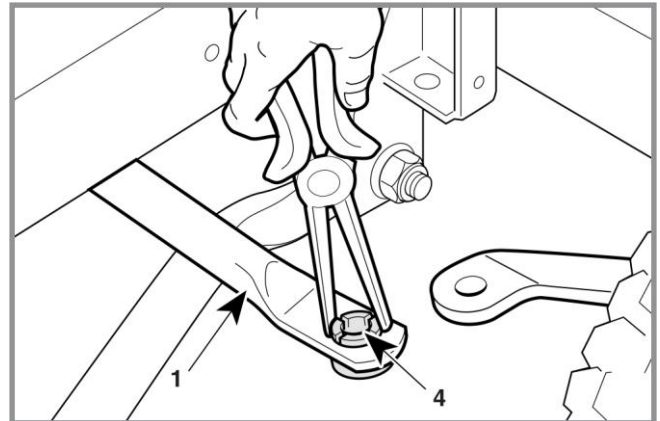
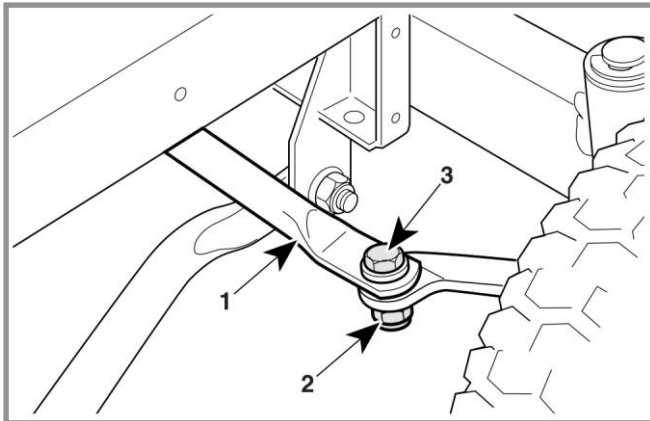
##### A) Toe-in check

The distance between the holes in the wheel connecting rod (**1**) ensures correct toe-in of the front wheels, without the need for adjustment.

The toe-in value can only vary due to deformation of the rod (**1**) or wear of the small spindle bushings.

To replace, unscrew the nut (**2**) with the screw (**3**) and remove the bushing (**4**) using pliers.

Fit the new bushing (**4**) until hearing a "click" and tighten the nut (**2**) to the specified value.



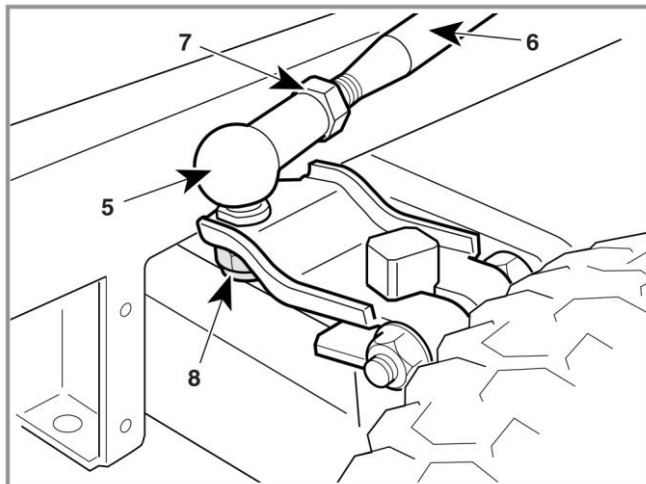


## B) Steering wheel adjustment

Make sure that the toe-in is correct (point «A») and align the front wheels.

If the steering wheel is not straight, remove the joint (5) and screw or unscrew it on the tie rod (6) just as much as necessary.

Upon assembly, tighten the lock nut (7) and the fixing nut (8) fully home.



## 4.2. REMOVAL OF EXTERNAL PARTS AND MAIN UNITS

### 4.2.1. STEERING COMPONENT DISASSEMBLY

#### Related topics

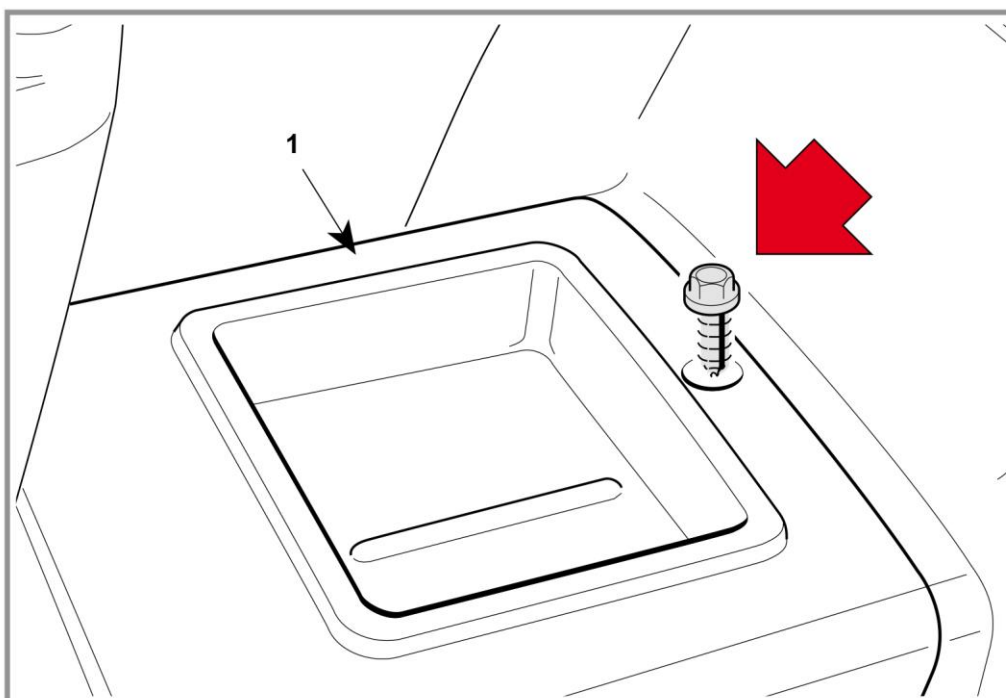
... See paragraph 4.1.2 Adjusting the steering geometry.

#### Tightening torques

Reference: 6 Steering tie rod fixing nut	45 ÷ 50 Nm
Reference: 18 - 19 Pin fixing nuts	25 ÷ 30 Nm

#### Procedure

Remove the inspection door (1).



### A) Removing the steering pinion and sprocket

Unhook the clip (2) and lift the steering column (3) just as much to remove the pinion (4), taking care not to cause the pin (5) to come out.

Unscrew the nut (6) and disconnect the steering tie rod (7).

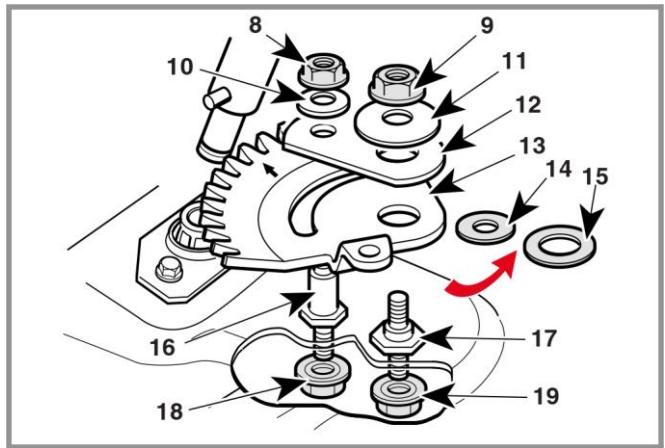
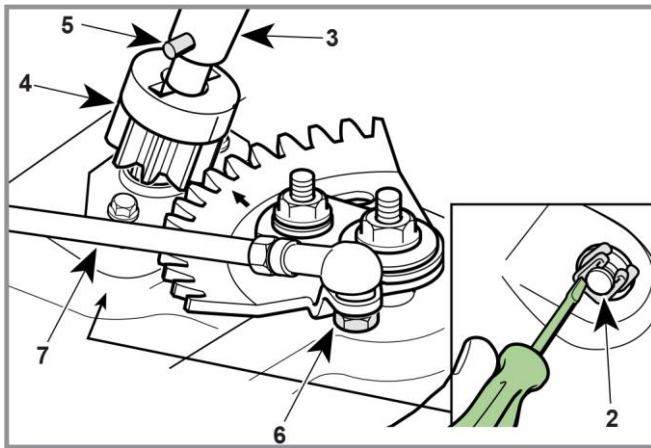
Remove the nuts (8) and (9), the Belleville washers (10) and (11), the guide (12) and remove the sprocket (13).

If replacing the pinion and the sprocket, remove any shims (14) and (15) which may have been previously placed under the sprocket to remove the play.

Check the pins (16) and (17) for wear and replace them, if necessary, by unscrewing the relevant nuts (18) and (19).

During assembly, carry out the operations described above in reverse order, taking care to correctly reposition the pin (5) in the pinion seat (4).

If replacing pins (16) and (17), tighten the relevant nuts (18) and (19) to the specified value.



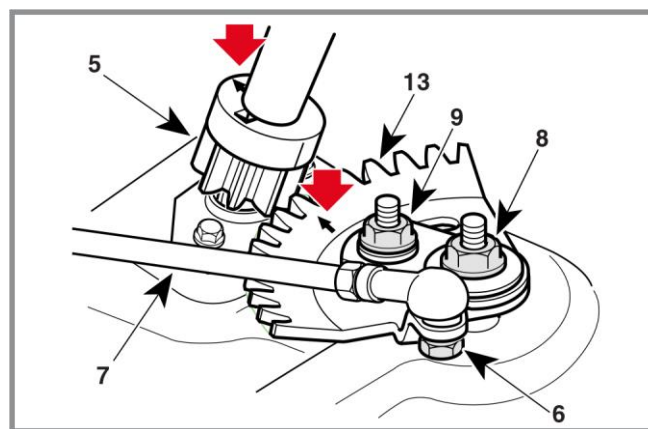
#### IMPORTANT:

Refit the sprocket by matching the two references ( $\Rightarrow$  -  $\Leftarrow$ ) stamped on the sprocket (13) and pinion (5) in the direction of travel.

Refit the nuts (8) and (9) tightening them in such a way as to load the Belleville washers (10) and (11) just enough to ensure smooth steering without excessive play.

Refit the steering tie rod (7) and tighten the nut (6) to the specified value.

Check the steering geometry.






## B) Replacing the lower bushing

Unhook the clip (21) and lift the steering column (22) just as much to remove the pinion (23), taking care not to cause the pin (24) to come out.


Using an articulated spanner, loosen the two screws (25) that secure the plate (26) and remove the lower spherical bushing (27).

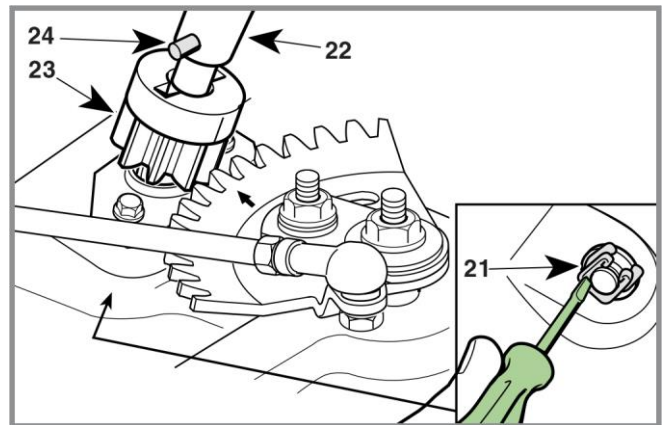
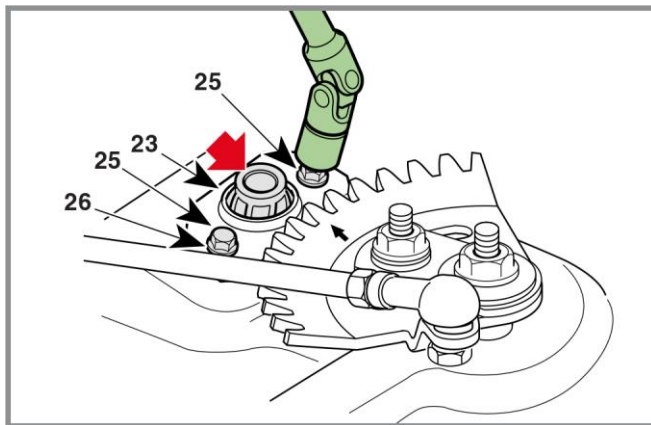
During assembly, make sure that the bushing (27) is installed with the protruding side at the top.

Refit the plate (26) without tightening the screws (25).


Correctly reposition the pin (24) in the pinion seat (23) and align the pinion with the sprocket [  ...] see paragraph 4.1.1 Adjusting the steering play].

Insert the end of the steering column (22) in the hole of the spherical bushing (27) then, after checking that the alignment and rotation of the steering column are correct, tighten the screws (25) fully home.

 Check the steering geometry.



## 4.3. TROUBLESHOOTING

Problem	Possible cause	Solution	
Excessive play on the steering wheel	Wear on pinion and sprocket teeth	Adjust and/or replace	4.1.1
The machine does not keep a straight line with the steering wheel straight	Incorrect tie rod adjustment	Adjust	4.1.2

## 5. WHEELS AND DRIVE UNIT

### CONTENTS

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### 5.1. ADJUSTMENT AND SET-UP

#### 5.1.1. TRACTION PEDAL ADJUSTMENT

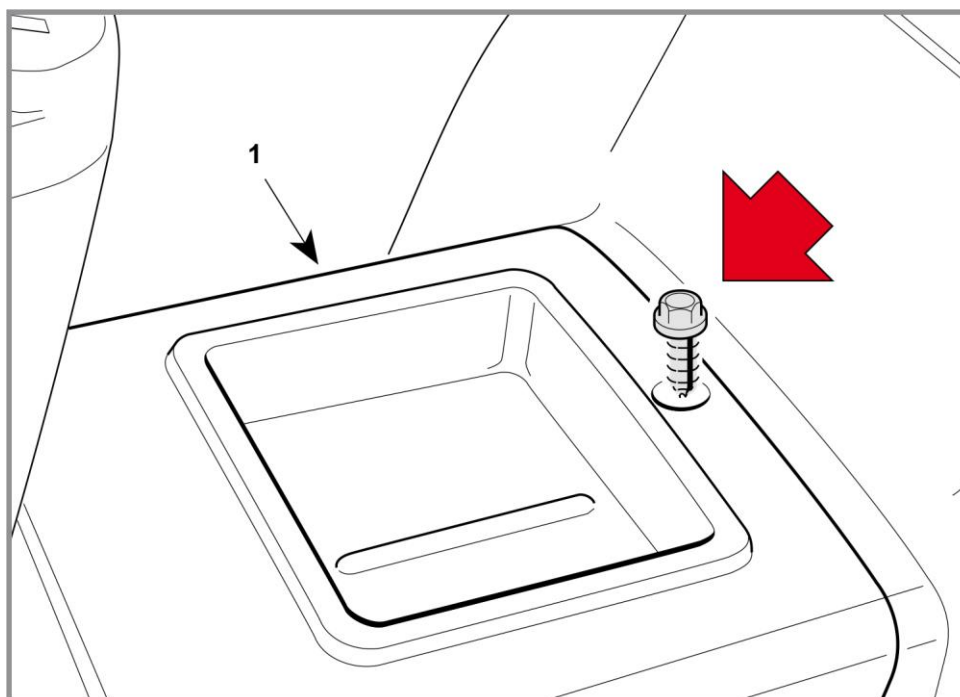
##### General information

Adjustments should be made each time the rear axle, pedal or control rod are removed in order to obtain the correct pedal strokes and achieve the intended speeds in both forward and reverse gears.

##### Procedure

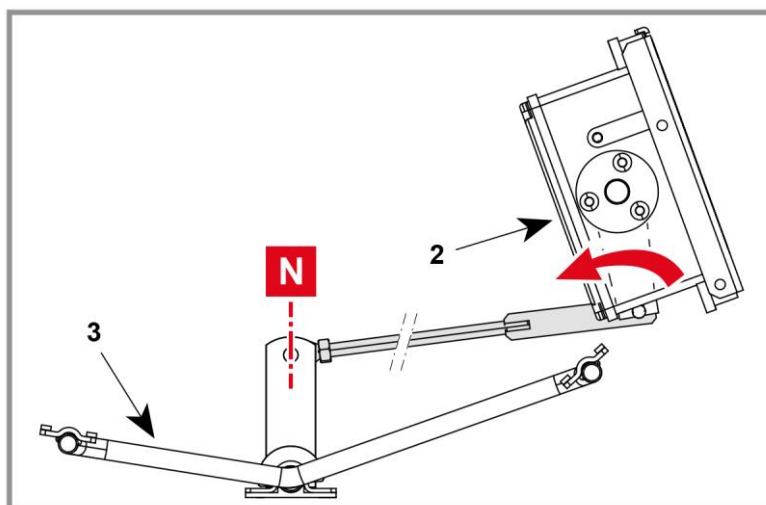
##### **NOTE:**

All adjustment elements can be reached by removing the inspection door (1).



### Adjusting the pedal to the "neutral" position

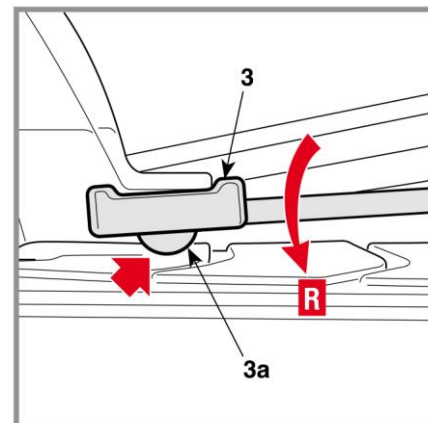
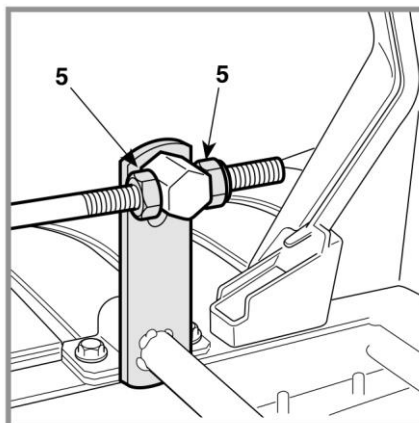
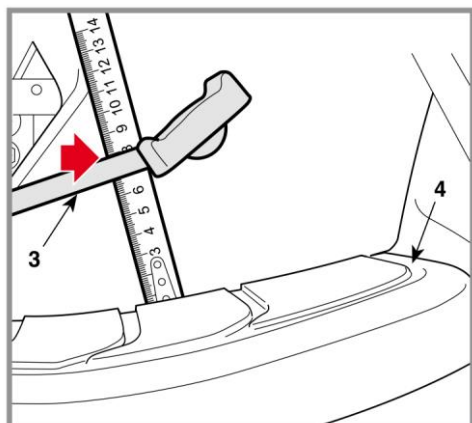
The operation consists in adjusting the position of the pedal (3) in relation to the lever (2) on the electrical unit to the maximum forward speed position by means of a spring.



In order to achieve the speeds required in forward and reverse gears (and consequently the "neutral" position of the pedal), the upper edge of the front tilted section of the pedal (3) must be 75 mm from the metal edge of the footrest (4).

This is achieved by adjusting the nuts (5) until the required measurement is obtained.

Once the adjustment is made, move the pedal (3) into reverse position and check that it touches the footrest with the lower part (3a).



## 5.2. REMOVAL OF EXTERNAL PARTS AND MAIN UNITS

### 5.2.1. REAR AXLE REMOVAL

#### General information

The rear axle consists of a monoblock unit, which includes the traction motor, the drive and the differential. The unit is powered by a 50.4 V DC source that supplies energy to the 1.2 kW three-phase asynchronous AC induction motor with variable speed, coupled to a gearbox and a differential with separate axles. Speed modulation and direction of travel are adjusted via a potentiometer operated by the traction pedal. The motor is equipped with a temperature sensor connected to the control system.

#### Related topics

... See paragraph 2.1.4 Lifting the machine.

... See paragraph 5.3.1 Removing the wheels.

#### Tightening torques

Reference: 9 - 10 Bracket fixing nuts	25 ÷ 30 Nm
Reference: 11 Rear axle fixing screws	25 ÷ 30 Nm
Reference: 4 - 5 Power cable fixing nuts	10 ÷ 15 Nm

#### Procedure

Remove the rear side of the ejection conveyor.

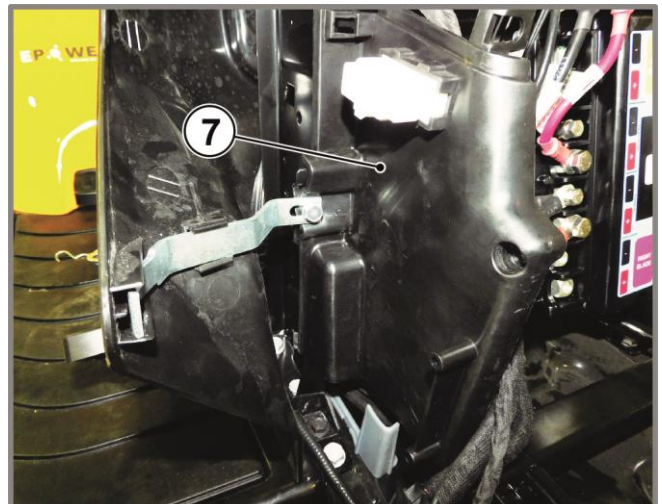
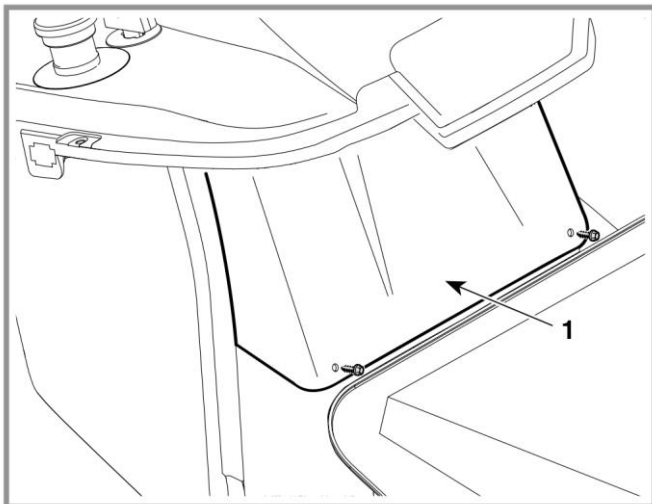
Lift the rear side of the machine.

Remove the rear wheels.

Move the cutting deck to its highest position.

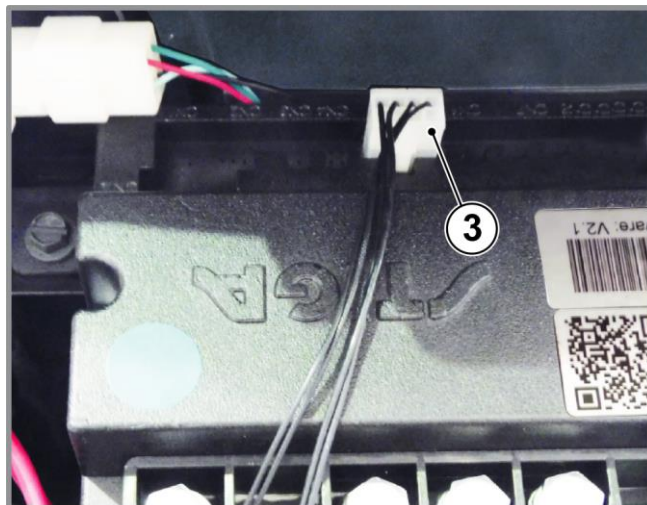
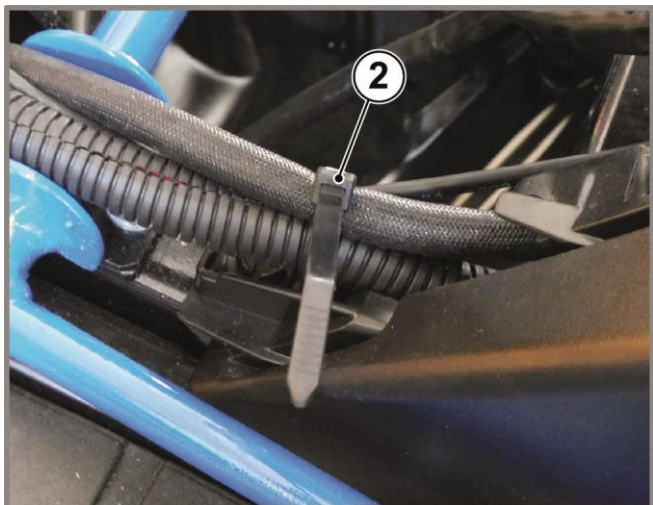
Open the bonnet.

Remove the guard of the electrical parts (1) and the right side guard (7).

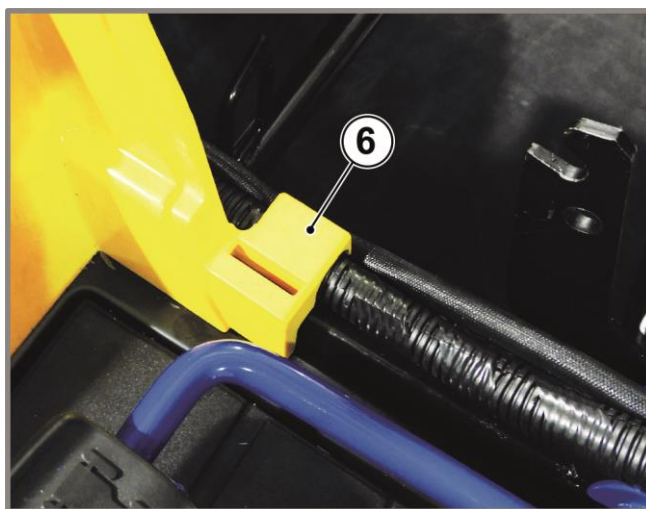
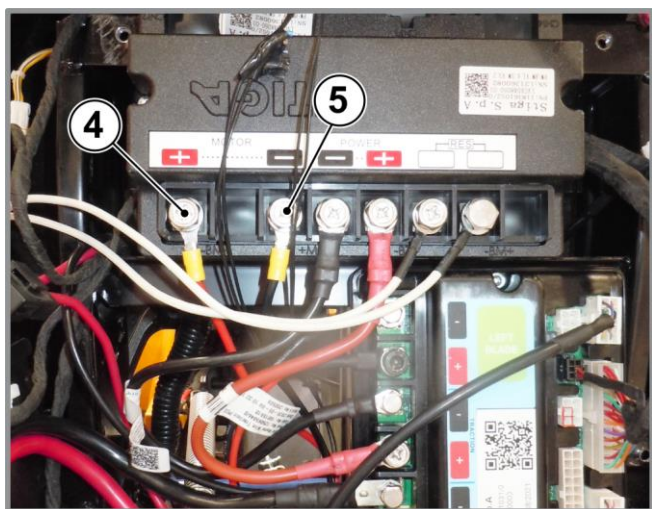




Remove the ties (2) and slide out the wires from the cable guide.  
Disconnect the signal cable (3).



Disconnect the two power cables (4 - 5).  
Pull the cables out of the retainer (6), paying attention to the route.

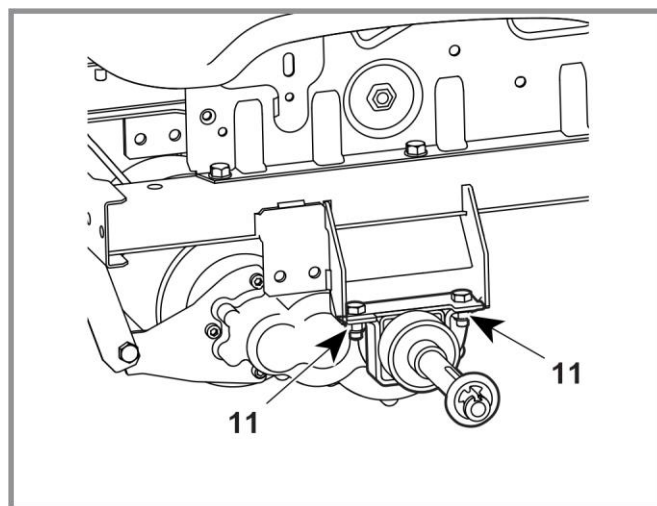
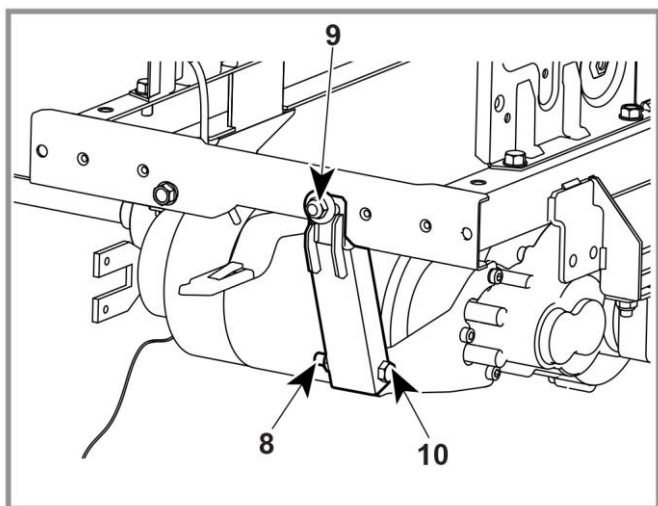


The unit is supported on the rear right-hand side by a bracket (8).

Loosen the upper nut (9) to allow the bracket (8) to swing a little, undo the nut (10) and remove the relevant screw.

Carefully unscrew the two nuts (11) securing the unit to the frame, supporting it adequately to prevent it from falling.

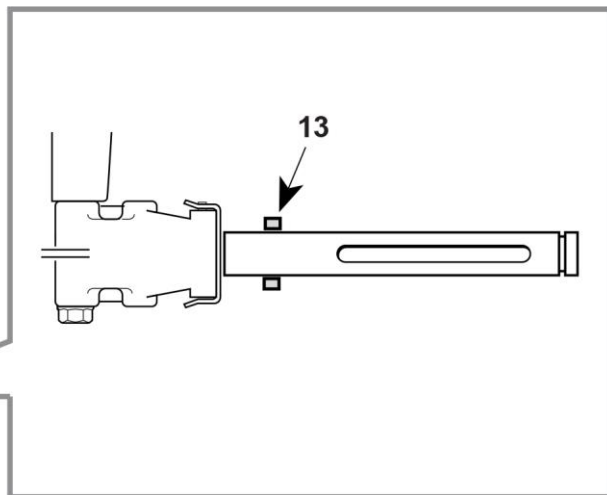
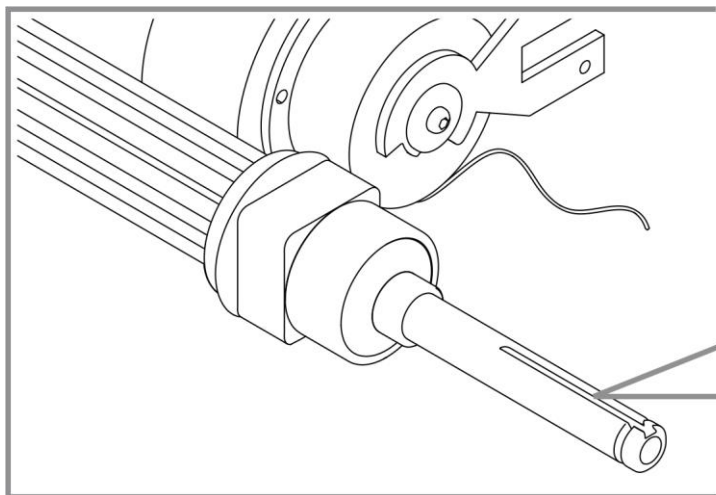
Upon assembly, follow the procedures described above in reverse order.



Check that the spacer (13) is correctly fitted to each shaft.

Restore all connections, then ...

- Refit the rear wheels.
- Refit the rear cover.
- Refit the ejection conveyor.




5.3. REPAIR WORK


5.3.1. TYRE AND WHEEL REPLACEMENT

General information

The tyres used are of the tubeless type, which means that any repair following a puncture must be carried out by a specialised tyre dealer in accordance with the procedures required for this type of tyre.

Related topics

 ... See paragraph 2.1.4 Lifting the machine.

 ... See paragraph 6.1.1 Aligning the cutting deck.

Inflation pressure

Front	(Tyres 13 x 5.00-6) 1.5 bar
	(Tyres 15 x 5.00-6) 1.0 bar
Rear	(Tyres 18 x 8.50-8) 1.2 bar
	(Tyres 18 x 6.50-8) 1.2 bar

Procedure

A) Tyres

After changing one or more tyres or wheels it is always necessary to check the inflation pressure and to check the alignment of the cutting deck.



**ATTENTION!**  
Replace any deformed rims so as not to compromise tyre grip.

B) Wheels

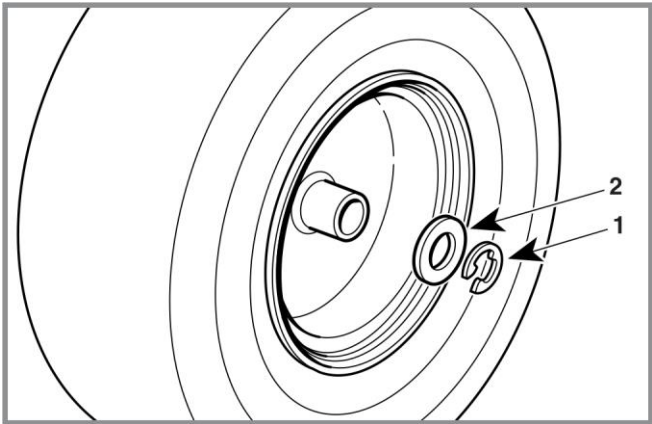
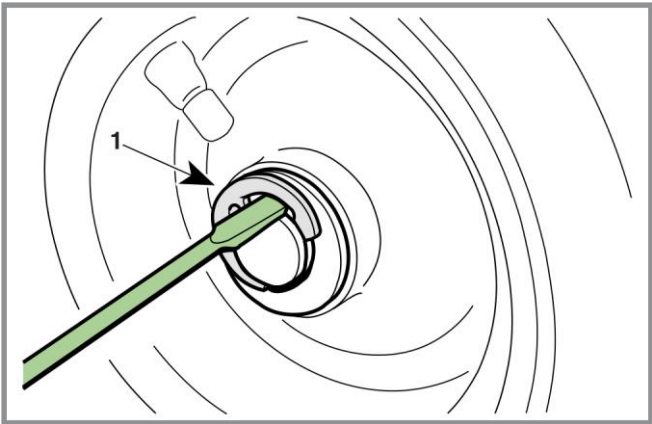
The wheels are held in place by a snap ring (1) which can be removed with the aid of a screwdriver.

NOTE:

If a wheel is stuck on the shaft, apply an unlocking product, directing the spray around the coupling hole.

During assembly it is a good idea to spread grease on the shaft to make next wheel removal operations easier.

- **For front wheels:** place the shoulder washer (2) and snap ring (1) with the chamfer facing inwards.
- **For rear wheels:** place the shoulder washer (2) and snap ring (1) with the chamfer facing inwards and check the axial play of the wheel on the shaft.





### 5.3.2. FRONT WHEEL BEARING REPLACEMENT

#### Related topics

- ... See paragraph 2.1.3 Basic equipment.
- ... See paragraph 2.1.4 Lifting the machine.
- ... See paragraph 5.1.3 Replacing tyres and wheels.

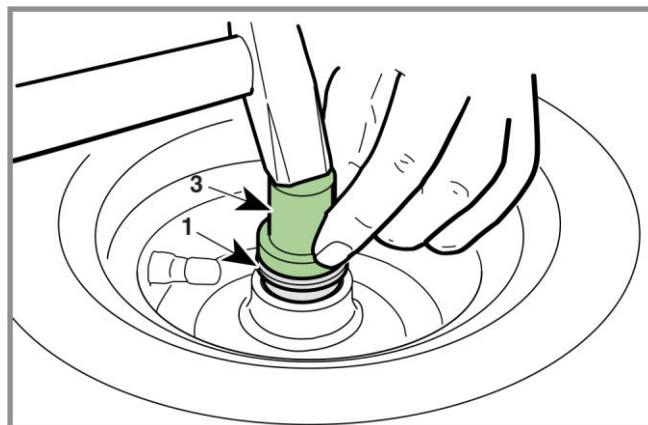
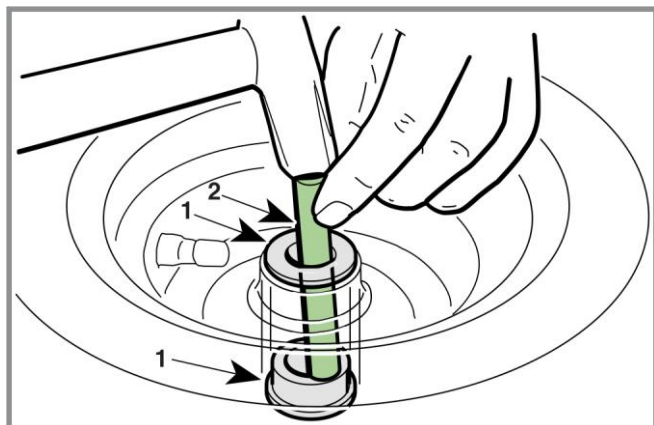
#### Procedure

- Remove the front wheel.

The front wheel bearings (1) are coupled to the front wheel hubs by exerting pressure on them.

To remove a bearing, use a 10 - 12 mm diameter disc (2) inserted from the opposite side and tap with a hammer at various points along the inner circumference of the bearing.

The new bearing should be inserted with the help of a plastic mallet, or a bronze drift (3) acting only on the outer ring of the bearing.



### 5.4. TROUBLESHOOTING

Problem	Possible cause	Solution	
The machine moves slowly, loses power and speed or does not move at all	Loose speed sensor linkage	Adjust	5.1.1
	Problems on the electrical drive	Check and adjust	( - )
The machine does not move in either direction	Problems on the electrical drive	Check	7
Electrical drive overheating	Grass on the drive unit	Clean	( - )
Anomalous noise and vibrations	Loose fasteners	Check and tighten to specified values	( - )
The machine moves with the pedal in "neutral" position	Speed sensor faulty	Check and/or replace	( - )
	Speed sensor linkage damaged	Check and/or replace	5.1.1
	Pedal/Linkage blocked	Check	( - )
The machine proves difficult to be pushed by hand	By-pass partially activated	Check	( - )
Excessive wheel play	Bearings deteriorated	Replace	5.3.2

## 6. CUTTING DECK AND BLADE MOTORS

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### 6.1. ADJUSTMENT AND SET-UP

#### 6.1.1. CUTTING DECK ALIGNMENT

##### General information

The downstroke of the cutting deck is controlled by a lever-operated linkage and is guided by two front connecting rods.

A prerequisite for an even cut is that the cutting deck is parallel to the ground in transverse direction and slightly lowered forward.

There are three types of possible adjustments:

- combined adjustment of parallelism and minimum front and rear height.
- adjustment of transverse parallelism only.
- adjustment of the up and down movement smoothness.

##### Related topics

 ... See paragraph 2.1.3 Special tools.

##### Inflation pressure

Front	(Tyres 13 x 5.00-6) 1.5 Bar
	(Tyres 15 x 5.00-6) 1.0 Bar
Rear	(Tyres 18 x 8.50-8) 1.2 bar
	(Tyres 18 x 6.50-8) 1.2 bar

Check that tyre pressure is correct. If one or more tyres have been replaced and there are differences in diameter, **do not attempt to offset these differences by varying the inflation pressures**, but carry out the adjustments indicated in points «A» and «B».

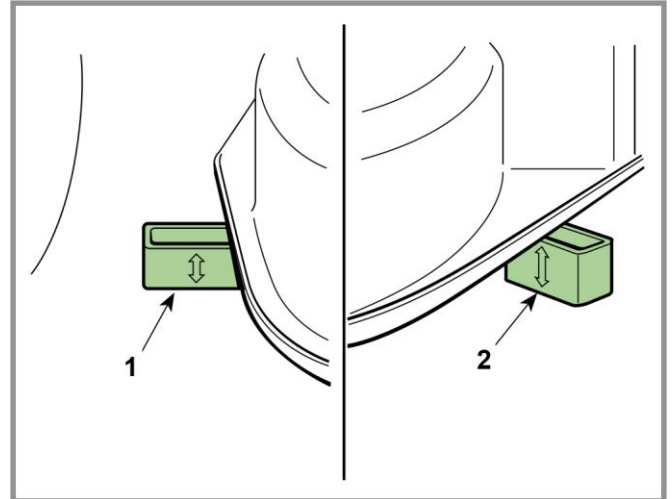
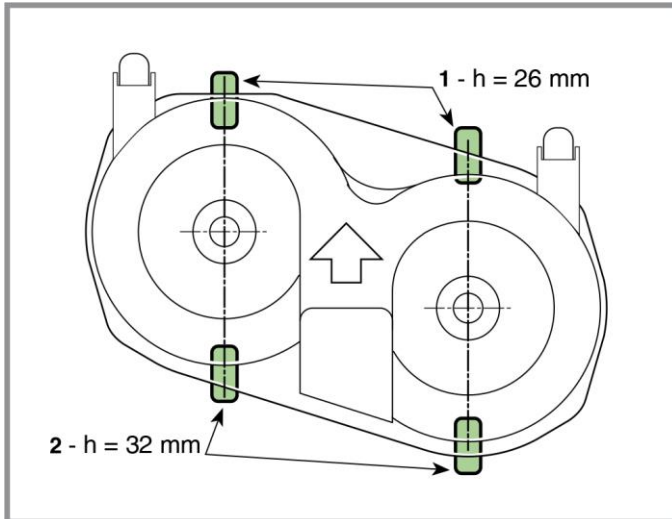
## Procedure

### A) Combined adjustment of parallelism and minimum front and rear height

Place the lawnmower on a flat, sturdy and even surface (e.g. on a workbench) and position shims under the cutting deck at the centre line of the blades:

- 26 mm shim at the front (1)
- 32 mm shim at the back (2)

Set the height adjustment lever to position «1».

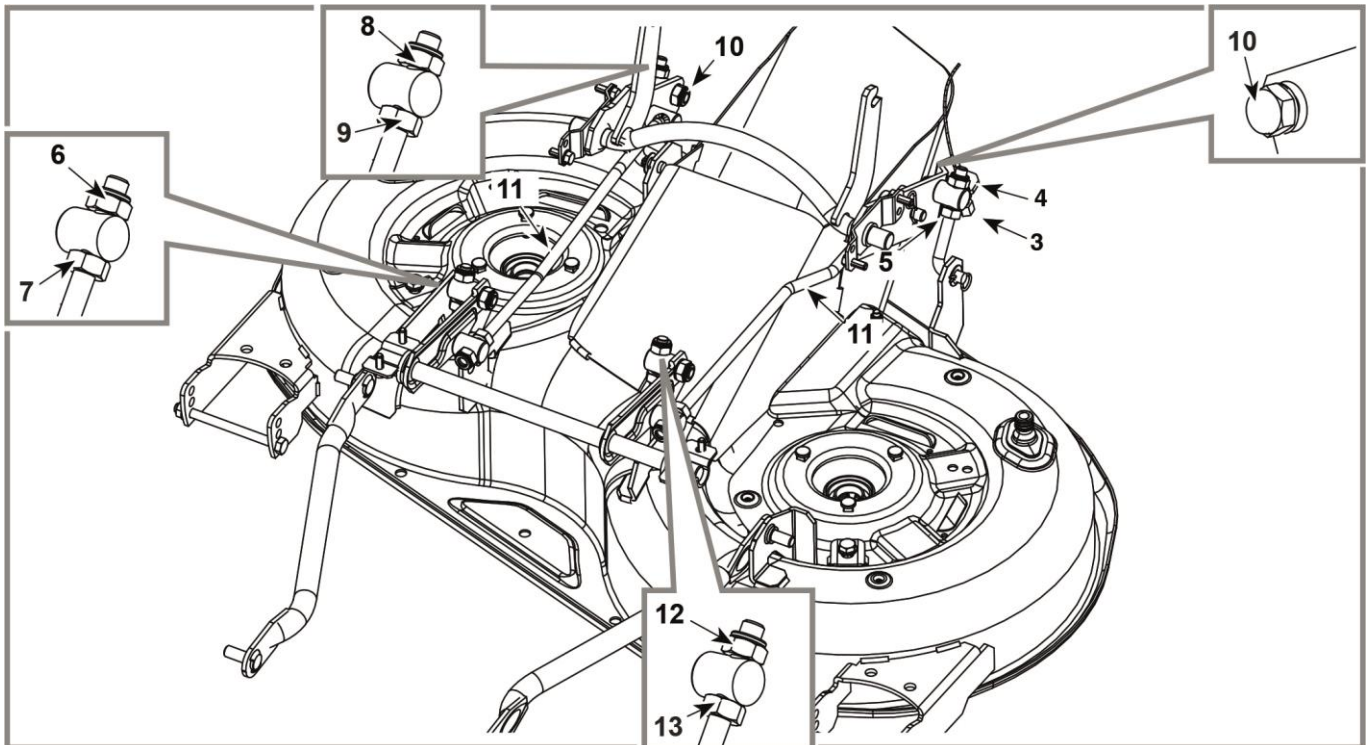


Completely loosen the adjuster (3), the nuts (4 - 6 - 8 - 12) and the lock nuts (5 - 7 - 9 - 13) of the four connecting rods until the cutting deck rests on the shims.

Turn the adjuster (3) until the control cable is well tensioned.

Tighten the two upper right nuts (6 - 8) and the two upper left nuts (4 and 12) until the cutting deck begins to rise, then tighten the four lock nuts (5 - 7 - 9 - 13).

Then check the smoothness of the up and down movement as indicated in point «C».



**B) Adjustment of transverse parallelism only**

The ground clearance of the right and left edge of the cutting deck can be offset by adjusting the two nuts (4 - 8) and lock nuts (5 - 9) on the rear connecting rods only.

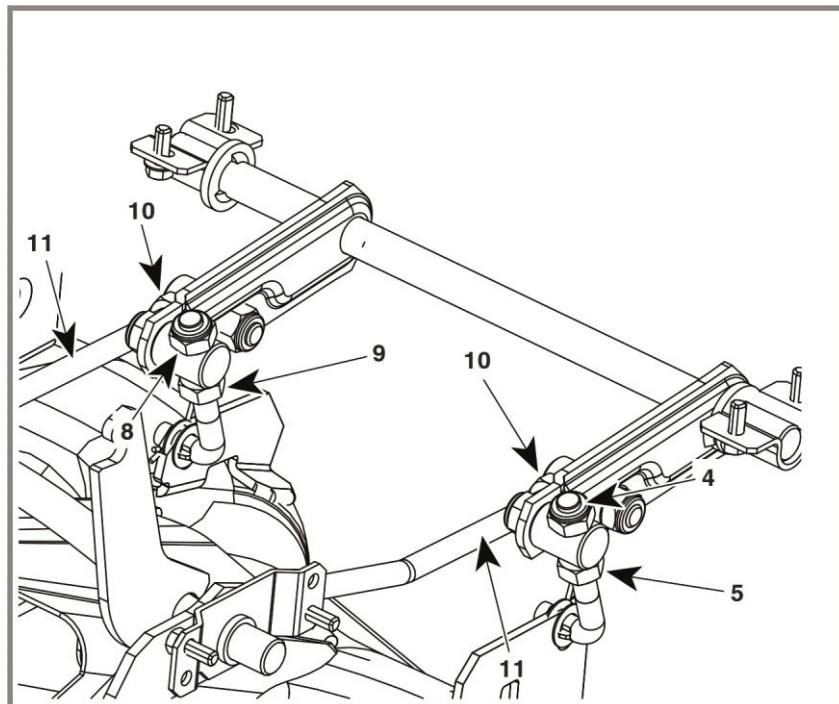
**C) Adjustment of the up and down movement smoothness**

After carrying out the adjustment indicated in point «A», set the control lever to 2 or 3 different positions, checking that the cutting deck rises smoothly and that in each position front and rear edges of the machine maintain a constant ground clearance.

If the front tends to rise earlier or later with respect to the position, the movement can be adjusted by using the nuts (10) on the connecting rods (11).

Tighten the nuts on the rod to lift the front side and anticipate the upstroke, loosen them for the opposite effect.

Always remember to lock all the nuts and lock nuts after adjustment.



## 6.1.2. BLADE ALIGNMENT CHECK

### General information

Excessive vibration during cutting and uneven cutting can be caused by misalignment of the blades due to deformation of the flanges or drive shafts as a result of accidental impacts.

### Related topics

... See paragraph 2.1.4 Vertical positioning.

... See paragraph 6.2.1 Removing the cutting deck.

### Procedure

Position the tractor vertically

or

Remove the cutting deck



#### **ATTENTION!**

Always use work gloves when handling blades.



#### **ATTENTION!**

The blades are connected to each other; the rotation of each blade causes the other to rotate.

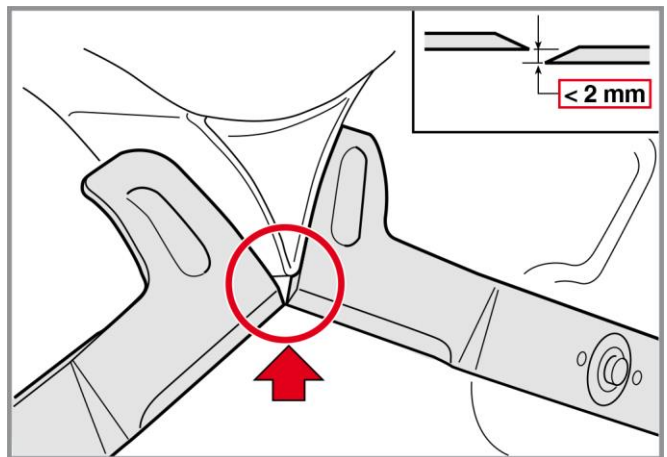
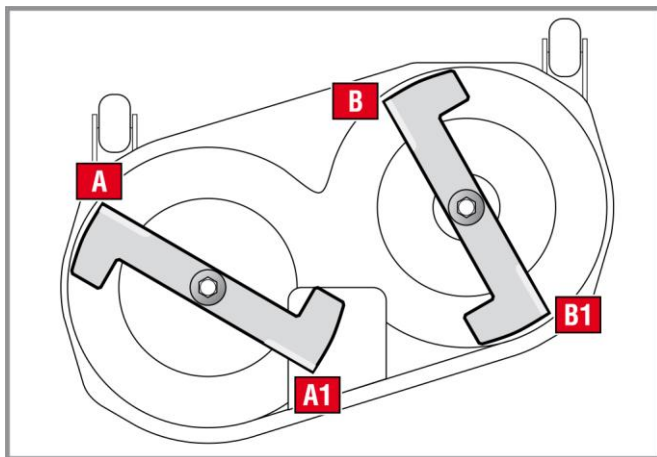
With the blades disengaged, firmly hold each blade and bring the cutting edges together in the different possible positions (A-B; A-B1; A1-B1; A1-B); in all situations, they should be aligned within 2 mm.

If the values are higher, check that the blades are not deformed; if they are undamaged, check the blade supports or shafts and replace them if necessary, and check the condition of the flange support surface on the cutting deck.



#### **IMPORTANT:**

Always replace damaged blades and avoid straightening or repairing them. Always use original blades!





### 6.1.3. BLADE DISASSEMBLY, SHARPENING AND BALANCING

#### General information

A poorly sharpened blade will lead to yellowing of the lawn and reduce collection capacity, and, if unbalanced, will cause excessive vibration during cutting.

Broken, cracked or damaged blade flaps reduce the ability to eject grass and can cause damage and injury.

#### Related topics

... See paragraph 2.1.4 Vertical positioning.

... See paragraph 6.2.1 Removing the cutting deck.

#### Tightening torques

Reference: 1 Blade fixing screw	45 ÷ 50 Nm
---------------------------------	------------

Position the tractor vertically.

or

Remove the cutting deck.



#### ATTENTION!

Always use work gloves when handling blades and protect your eyes during sharpening.



#### ATTENTION!

The blades are connected to each other; the rotation of each blade causes the other to rotate.

#### Procedure

##### A) Removal and refitting

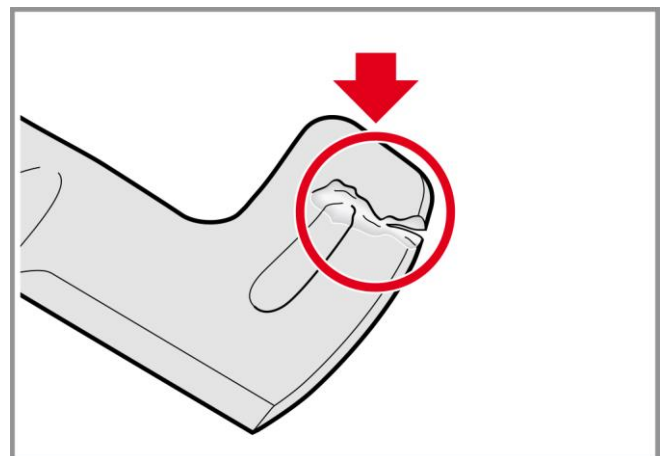
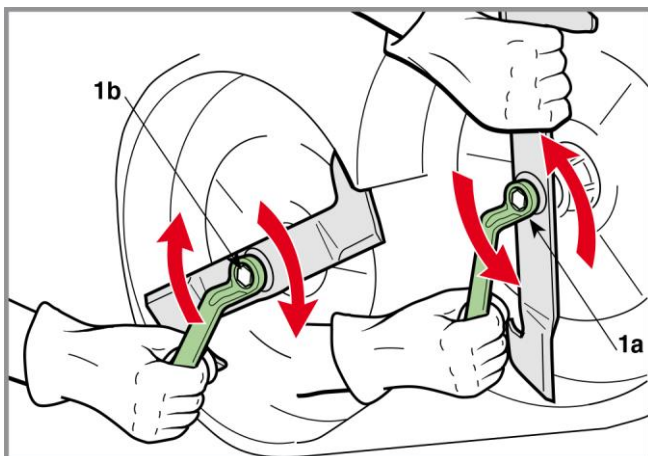
To remove a blade, hold it firmly and unscrew the central screw (1) taking into account that:

- the screw of the left blade (1a) can be loosened by turning it counter-clockwise
- the screw of the right blade (1b) can be loosened by turning it clockwise



#### IMPORTANT:

Always check that the flaps are not damaged, cracked or broken. Always replace damaged blades.



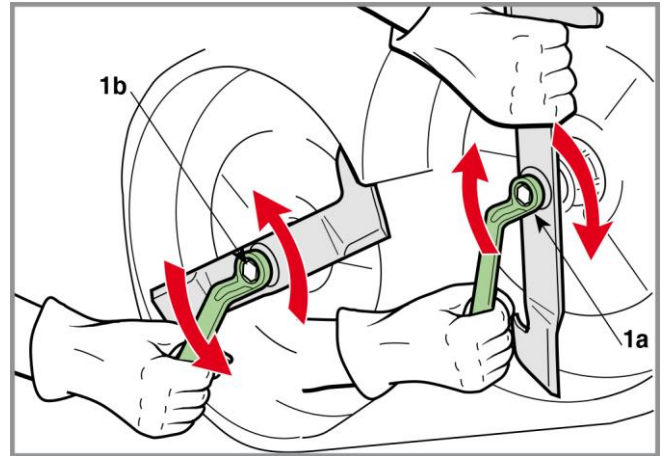
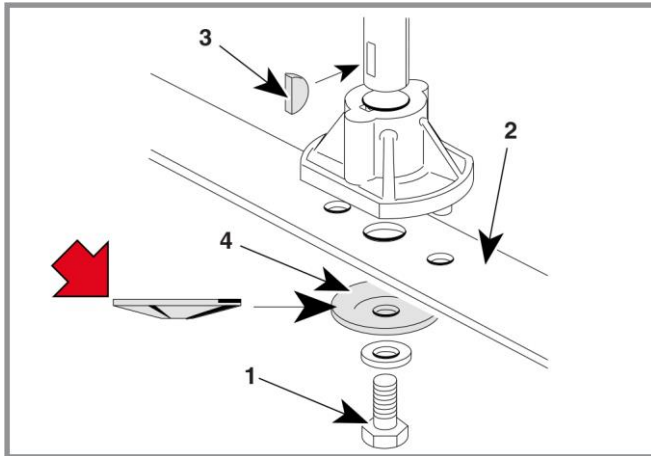




**IMPORTANT:**

During assembly, take care to:

- correctly position the keys (3) on the motor shafts;
- correctly position the left and right blades, with the flaps facing the inside of the cutting deck;
- fit the spring disc (4) so that the concave side presses against the knife;
- tighten the screws (1a - 1b) with a torque wrench set to 45-50 Nm.

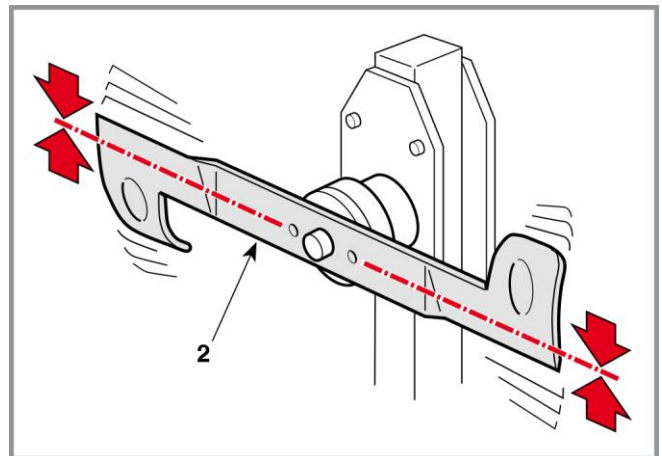
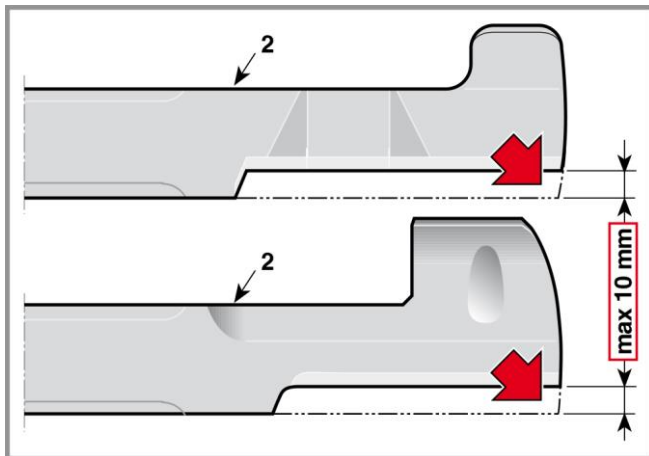


**B) Sharpening and balancing**

Always sharpen both cutting edges of the blade (2) using a medium-grained grinding wheel; sharpening should only be carried out on the blunt side, removing as little material as possible.

The blade should be replaced when the wear on the cutting edge has reached 10 mm.

Check the balancing using the specific tool, until a maximum difference of 2 grams between one side and the other is obtained.





6.2. REMOVAL OF EXTERNAL PARTS AND MAIN UNITS

6.2.1. CUTTING DECK REMOVAL

General information

Removing the cutting deck makes it easier and more comfortable to carry out all the overhaul and the replacement operations of blades, hubs and motors.  
With some practice and experience, it is possible to carry out these operations even with the cutting deck fitted.


Related topics

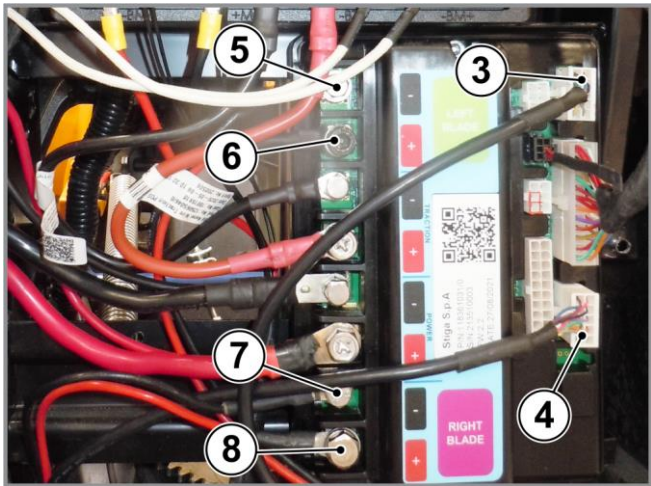
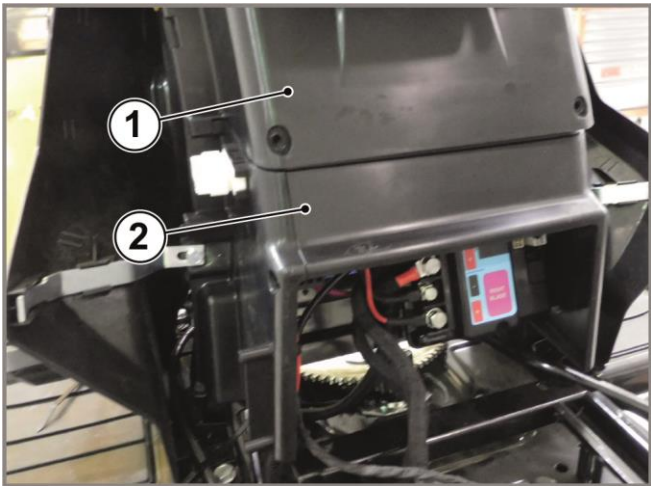
-  ... See paragraph 7.6.5 Removing the battery.
-  ... See paragraph 6.1.1 Aligning the cutting deck.

Tightening torques

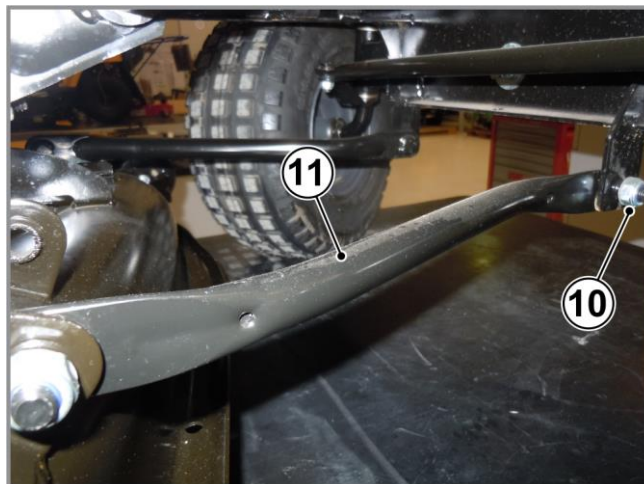
Reference: 5 - 7 Power cable M10 fixing screws	10 ÷ 15 Nm
Reference: 6 - 8 Power cable M8 fixing screws	7 ÷ 10 Nm
Reference: 10 Arm fixing screws	15 ÷ 25 Nm

Procedure

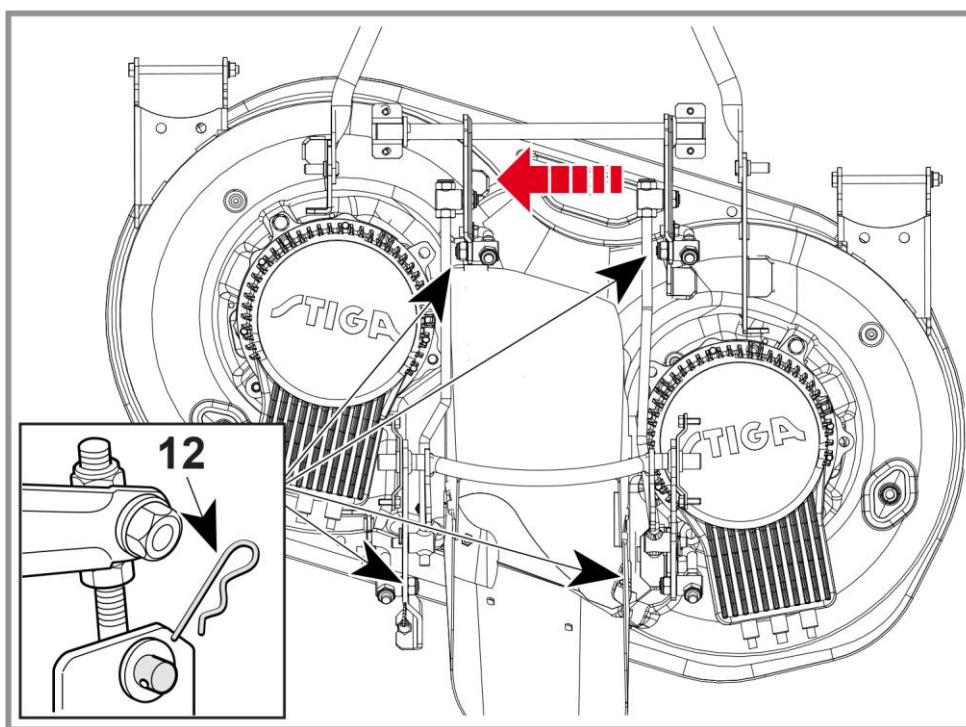
-  Remove the battery.
- Remove the electrical component guards (1 - 2).
- Disconnect the two signal connectors, one for the left motor (3) and one for the right motor (4).
- Remove the power cables (5 - 6 - 7 - 8).



Remove the cables by removing the ties (9).  
Unscrew the two nuts (10) that secure the two arms (11) to the frame.



Release the four spring split pins (12) of the lifting tie rods.



Once you have checked that there are no obstructions, the cutting deck can be removed by turning it slightly anticlockwise so that all pins are out of their seats.

During assembly, carry out the above steps in reverse order, taking care to tighten the nuts (10) to a torque of 15 - 25 Nm so as not to obstruct the correct oscillation of the cutting deck, then loosen the nut by half a turn.

Position the previously removed connectors and power cables and tighten the relevant screws.  
After assembly...

Check the alignment of the cutting deck.

## 6.2.2. EJECTION CONVEYOR REMOVAL

### General information

The front part of the conveyor needs to be removed only for its replacement.

The rear part of the conveyor must be removed when disassembling the cutting deck and if the rear plate must be removed.

### Related topics

... See paragraph 6.2.1 Removing the cutting deck.

... See paragraph 5.3.1 Removing the wheels.

### Tightening torques

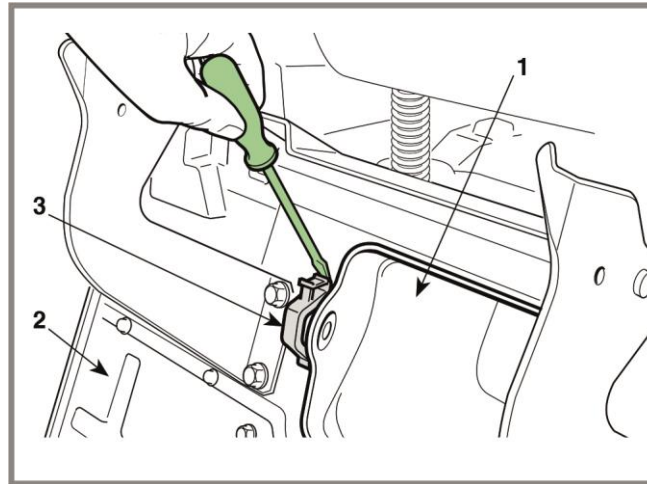
Reference: 11 Front conveyor fixing nuts

8 ÷ 10 Nm

### Procedure

The conveyor (1) is connected to the rear plate (2) by means of two plastic U-bolts (3) which can be removed with a screwdriver.

During assembly, ensure that the conveyor can oscillate freely whenever the height of the cutting deck changes.



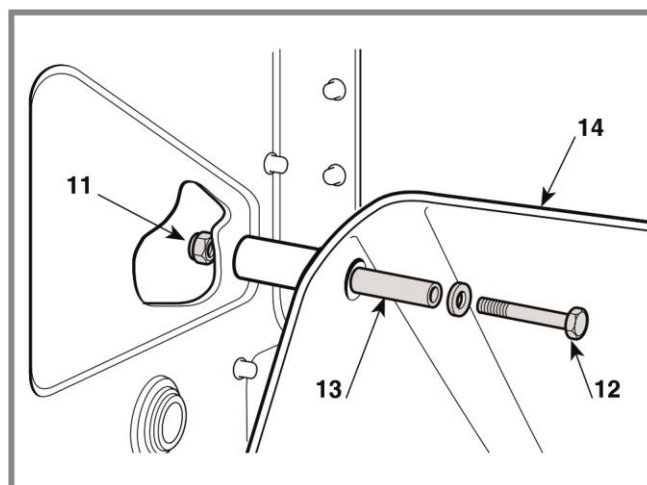
Remove the rear wheels.

Undo the two nuts (11).

Remove the screws (12) and spacers (13) from the inside of the inlet and remove the front part of the conveyor (14).

During assembly, ensure that the conveyor can oscillate freely whenever the height of the cutting deck changes.

Refit the rear wheels.





## 6.3. REPAIR WORK

### 6.3.1. LIFTING ROPE REPLACEMENT

#### Related topics

... See paragraph 6.1.1 Aligning the cutting deck.

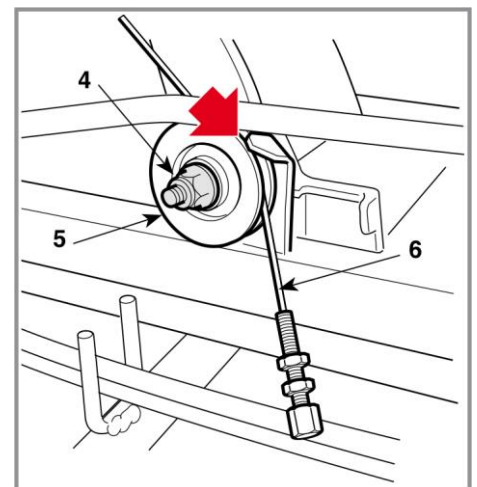
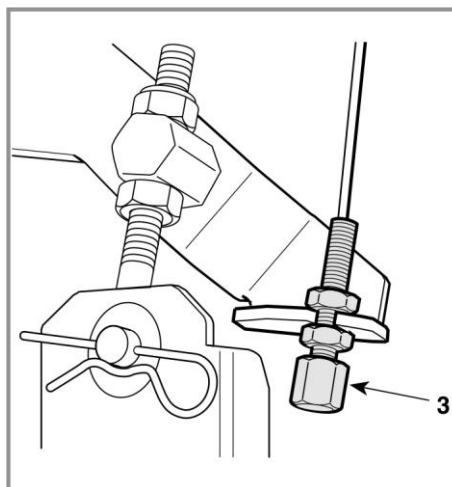
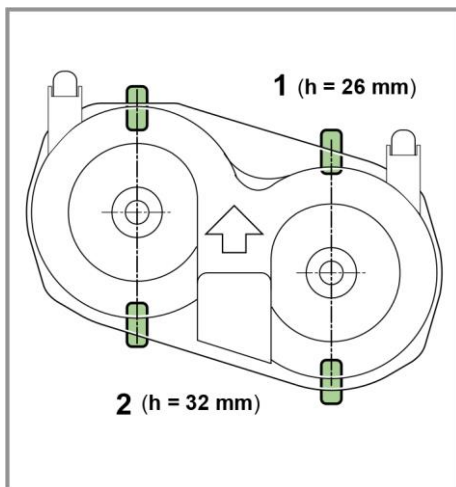
#### Procedure

Place shims underneath the cutting deck at the centre line of the blades:

- 26 mm shim at the front (1)
- 32 mm shim at the back (2)

Set the height adjustment lever to position «1» and fully loosen adjuster (3).

Loosen the nut (4) on the idle pulley (5) just enough to pull out the rope (6).

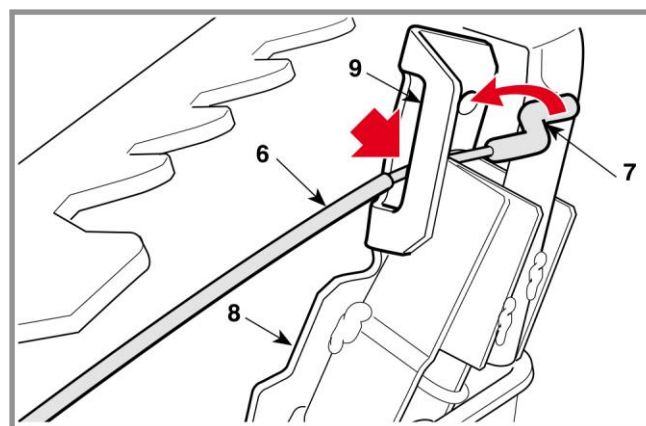


Unhook the end (7) of the rope (6) from the control lever (8) and remove the rope.

During assembly, carry out the steps described above in reverse order, ensuring that the rope (6) passes through the slit (9) in the control lever (8).

Once the adjuster (3) is tensioned again, the cutting deck should return to the alignment condition it was in before the rope was replaced. If this is not the case:

Adjust the alignment of the cutting deck.



### 6.3.2. BLADE MOTOR DISASSEMBLY

#### Tightening torques

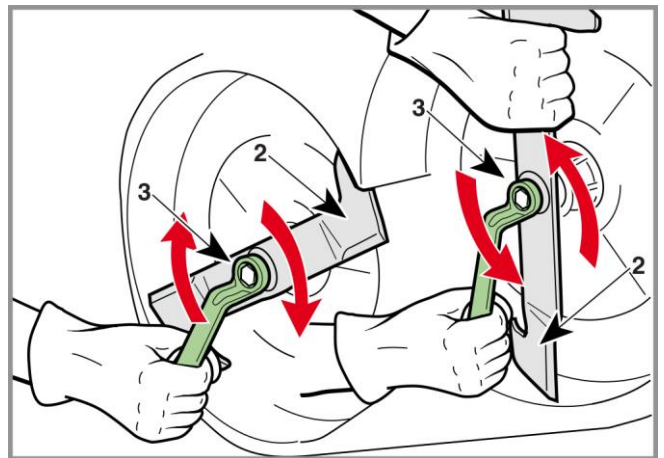
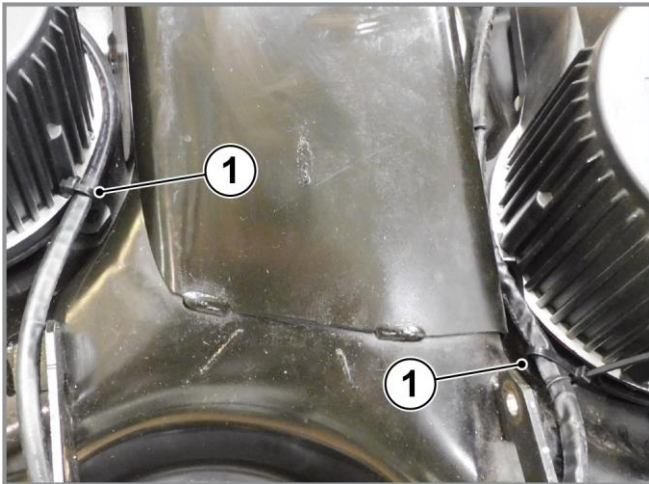
Reference: <b>3</b> Blade fixing nut	45 ÷ 50 Nm
Reference: <b>4</b> Motor fixing screws	
Reference: <b>5</b> Motor fixing screws	
Reference: <b>7</b> Motor support plate fixing screws	

#### Procedure

Remove the cutting deck

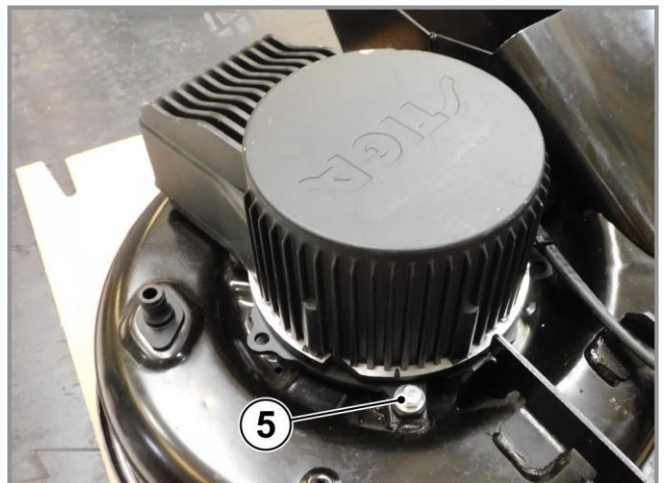
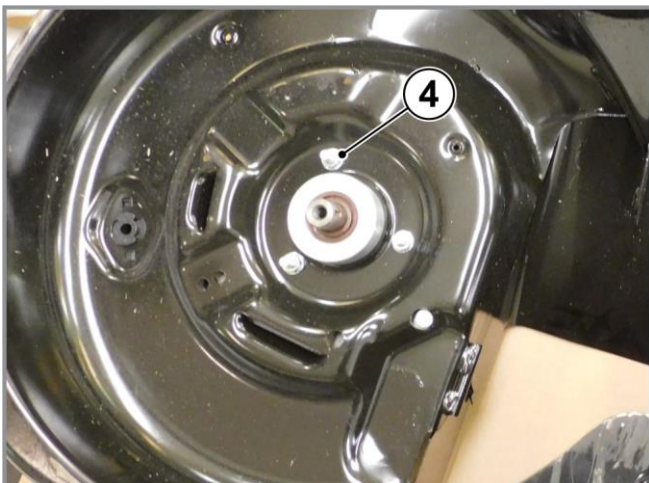
Cut the cable ties (1).

Remove the cutting blade (2) by turning the fastening nut (3) anticlockwise.



Undo the "lower side" fixing screws (4).

Undo the "upper side" fixing screws (5).



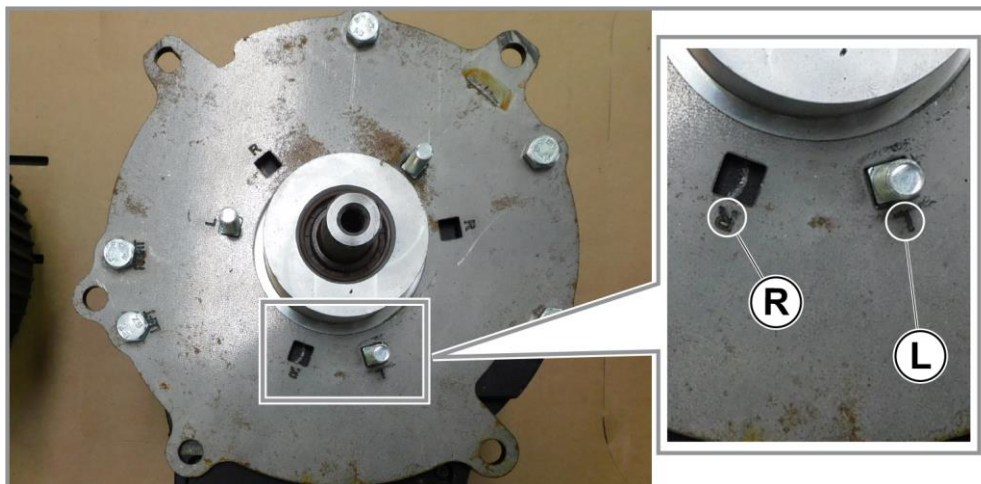


**NOTE:**

Pay particular attention when disassembling the motor and memorise the position of the component on the cutting deck. The motor support plate has specific attachments depending on whether it is to be fixed on the right or left of the cutting deck.

L= Left position

R= Right position



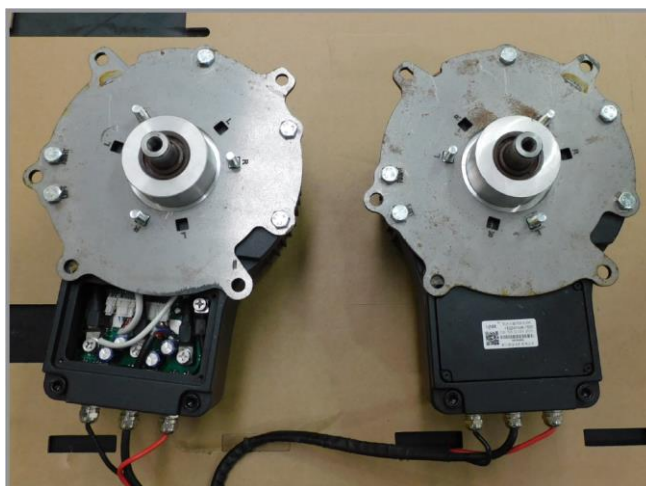
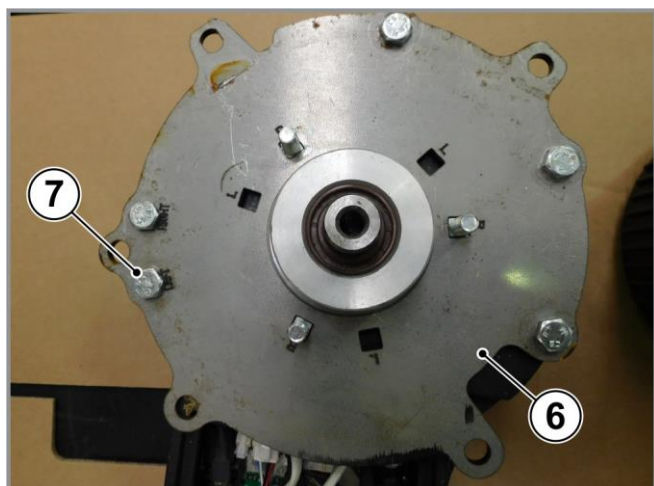
Remove the motor support plate (6) using the five fixing screws (7).

Replace the damaged motor.


Carry out the reassembly procedure in reverse order.

**NOTE:**

Pay attention when reassembling the motor on the cutting deck. The motor support plate has specific attachments depending on whether it is to be fixed on the right or left of the cutting deck.



#### 6.4. TROUBLESHOOTING

Problem	Possible cause	Solution	
Blades do not engage or stop within 5 seconds when disengaged	Problems with the electromagnetic coupling of the motors	Check and/or replace the motor	<b>6.3.2</b> <b>7.7.1</b> <b>BLADE</b>
Uneven cut	Cutting deck not parallel to the ground	Check tyre pressure	<b>5.3.1</b>
		Align the cutting deck with the ground	<b>6.1.1</b>
	Inefficiency of the blades	Check the condition and sharpness of the blades	<b>6.1.3</b>
Anomalous noise or vibrations	Joints with loose fasteners	Check and restore	<b>( - )</b>
	Damaged/unbalanced blades	Sharpen Replace	<b>6.1.3</b>

## 7. ELECTRIC SYSTEM - BATTERY

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## 7.1. GENERAL INFORMATION

### 7.1.1. INTRODUCTORY NOTE

This chapter deals with:

- checks and operations to be performed on the electrical system regarding safety systems, microswitches, fuses and wiring in general.
- electronic control system for traction, blade, control units and battery.

### 7.1.2. SAFETY RULES



#### **ATTENTION!**

The presence of live parts requires particular attention when working on electrical components, in order not to create dangerous situations during work and to restore safe working conditions for the user.

- Do not wear rings or similar metal objects to avoid causing 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 can occur, so as not to cause a short circuit or fire.
- All electrical cables are secured to the frame with cable ties. If a cable tie has to be removed, a new one must be installed in its original position after the operation.
- Do not leave electrical cables unsecured. Loose electrical cables can cause unnecessary wear to the insulation and lead to short circuits and fire.


## 7.2. TROUBLESHOOTING

### 7.2.1. PROBLEMS DURING USE

This table provides a guide for the identification of problems that may occur during use and which are caused by components of the electrical system, with an indication of the corrective actions to be taken to fix them.

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

- Check that fuses are intact, if any.
- Check the wiring harness for deterioration, the insulation for cracks or abrasions, and the connectors, which should be firmly secured to the components.

Problem	Possible cause	Solution	
The blades can not be started	Microswitch problems	Check and/or replace	7.3.1
Blades do not stop when the operator leaves the seat	Seat microswitch not connected or faulty	Check and/or replace	7.3.1
Traction does not start	Release lever engaged	Put the lever in the correct position	(-)

### 7.3. SWITCHES AND WIRINGS

Switches open a circuit to interrupt the flow of current or close it to allow current to flow.


- A normally open (NO) switch prevents current flow until the switch is activated, completing the circuit and allowing current to flow.
- A normally closed (NC) switch allows current to flow until the switch is activated, interrupting the circuit and stopping the flow of current.

#### 7.3.1. WIRING AND CONNECTION CHECK



#### ATTENTION!

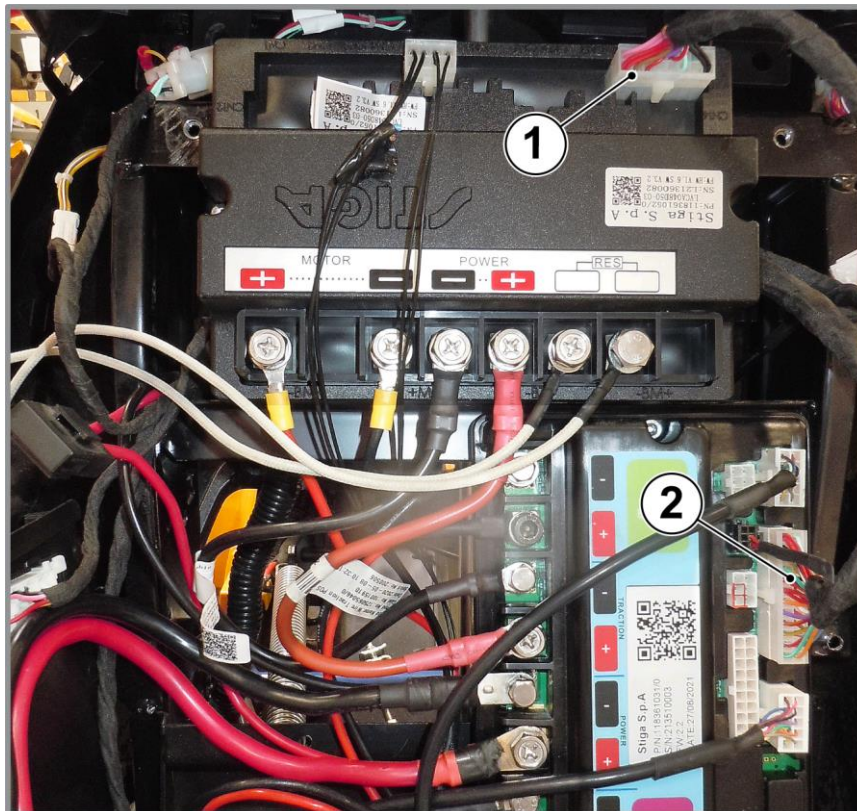
Disconnect the battery before starting any work that requires handling cables and connectors.

To carry out these checks it is necessary to remove the electrical component guards,  see paragraph 7.6.2

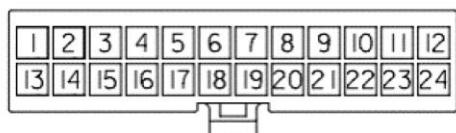
Access to the electronic equipment.

The tests must be carried out using a tester set to the ohmmeter mode.

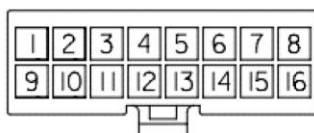
Disconnect the connectors (1 - 2) and connect the test leads of the tester to the various contacts of the terminal blocks.



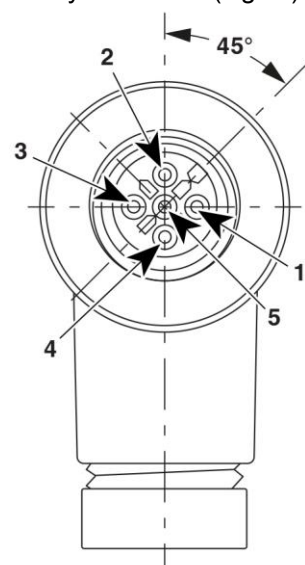
CN14



Traction




Battery connector (signal)



The reading must correspond to what indicated in the following table:

Model		Command	From		To		Tester reading and switch condition	
C300	C500		Connector	Cavity	Connector	Cavity	Status 1	Status 2
x	x	Blades	cn14	8	cn14	11	∞ (released)	0 (pressed)
x	x	Start	cn14	8	cn14	10	∞ (released)	0 (pressed)
x	x	Enable cutting in reverse gear	cn14	8	cn14	12	∞ (released)	0 (pressed)
	x	ECO	cn14	8	cn14	24	∞ (released)	0 (pressed)
x	x	Lights	cn14	8	cn14	22	∞ (released)	0 (pressed)
	x	Cruise control	cn14	18	Traction	14	∞ (released)	0 (pressed)
x	x	Collection container present	cn14	18	cn14	6	∞ (released)	0 (connected)
x	x	Collection container full	cn14	18	cn14	7	∞ (released)	0 (pressed)
x	x	Seat operator presence control	cn14	18	cn14	19	∞ (released)	0 (pressed)
x	x	Pedal	cn14	18	Traction	15	∞ (reverse gear)	0 (forward gear)
x	x	Recharge	cn14	18	cn14	16	∞ (not connected)	0 (connected)
x	x	Emergency button	cn14	1	cn14	2	∞ (released)	0 (pressed)
x	x	Key (battery)	cn14	13	cn14	1	∞ (OFF)	0 (ON)
x	x	Key (VMS)	Battery connector	2	Battery connector	3	∞ (OFF)	0 (ON)

If the values do not match, check that the connection cable is intact; also check the operation of the buttons in the dashboard.

 See section 7.3.2 Functional check of switches and microswitches (dashboard).



### 7.3.2. SWITCH AND MICROSWITCH OPERATION CHECK (DASHBOARD)



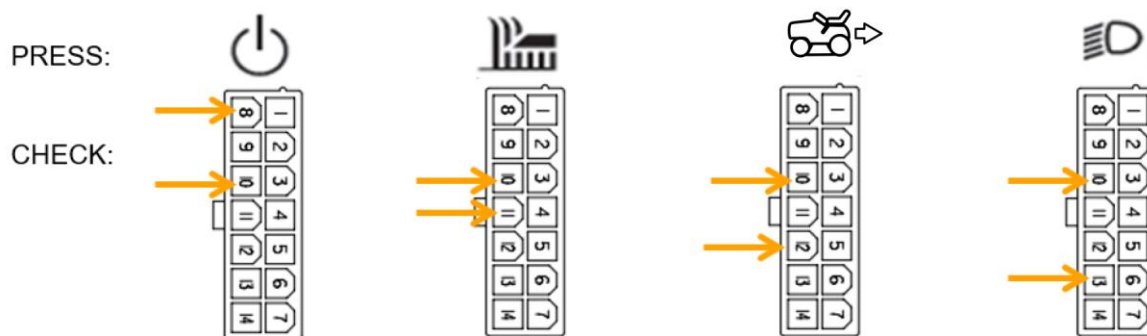
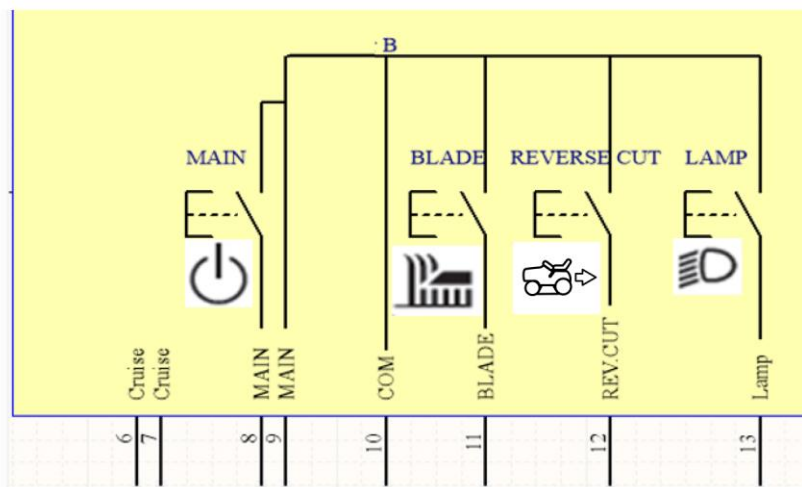
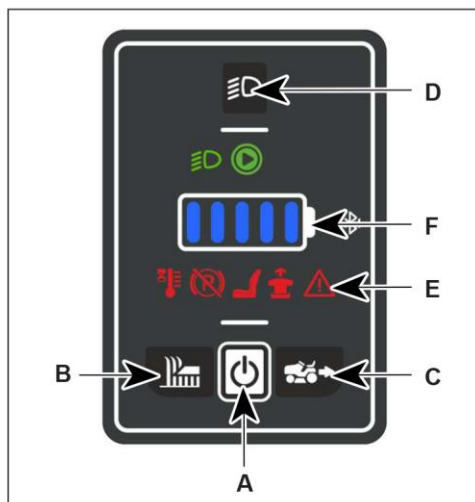
1. Seat
2. Key emergency
3. Dashboard switches

A tester is required to check the operation of a switch or microswitch.

- a) Disconnect the connector from the dashboard (4).
- b) Set the multimeter to the continuity check mode
- c) Press the button you want to check
- d) Use the multimeter to check the closed circuit of the corresponding pin

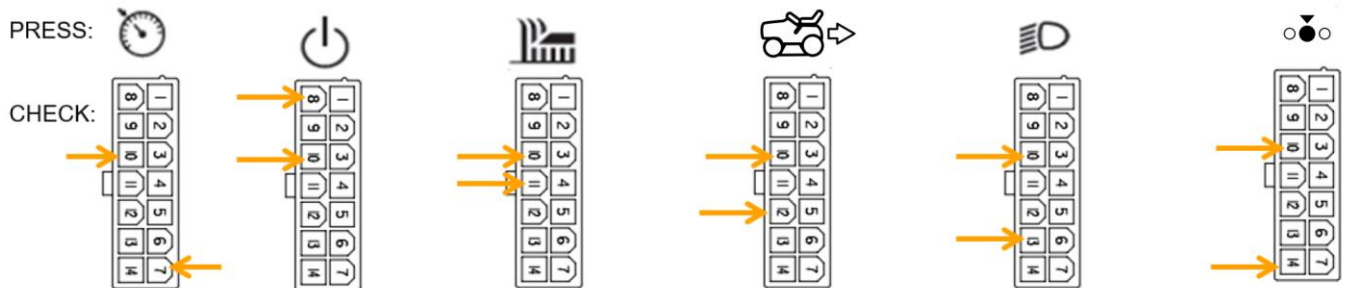
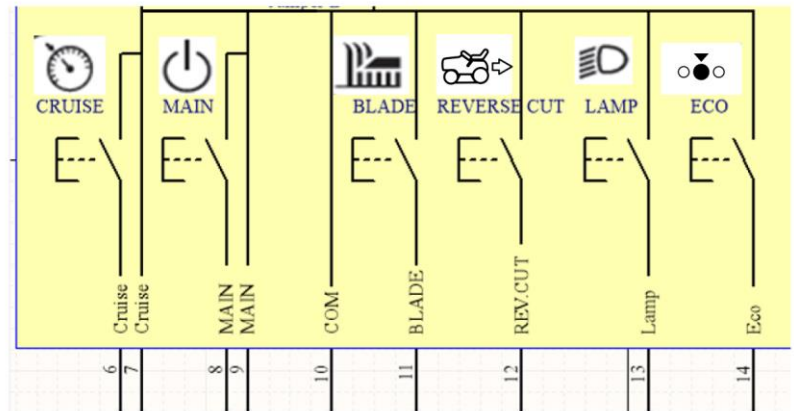
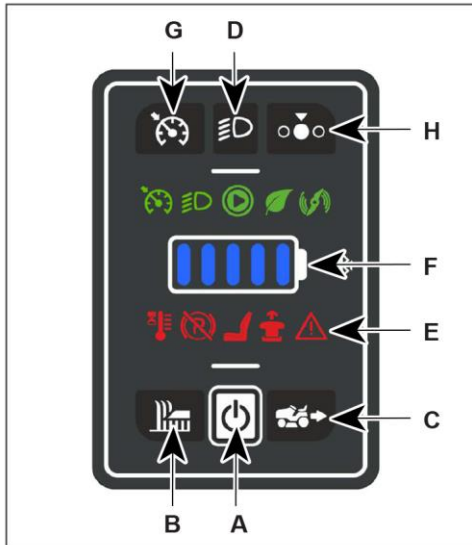


## C300



- A) Start button
- B) Blade engagement / disengagement button
- C) Button enabling cutting in reverse gear
- D) Light switch-on button
- E) Warning light
- F) Battery LED

## C500

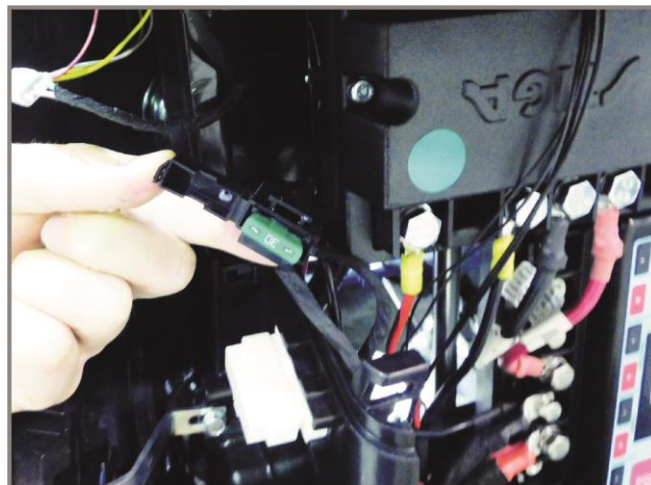
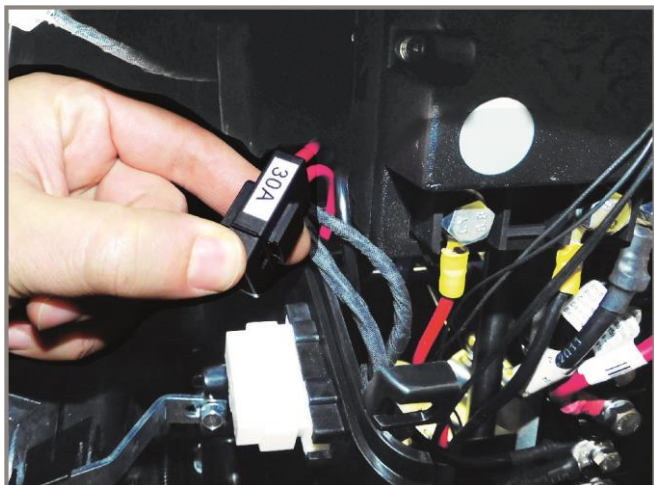


- A) Start button
- B) Blade engagement / disengagement button
- C) Button enabling cutting in reverse gear
- D) Light switch-on button
- E) Warning light
- F) Battery LED
- G) "Cruise Control" button
- H) ECO button

## 7.4. FUSES AND RELAYS

### 7.4.1. FUSE LOCATION AND FUNCTION

There is only one 30 A fuse whose function is to protect the battery charger.

**IMPORTANT:**

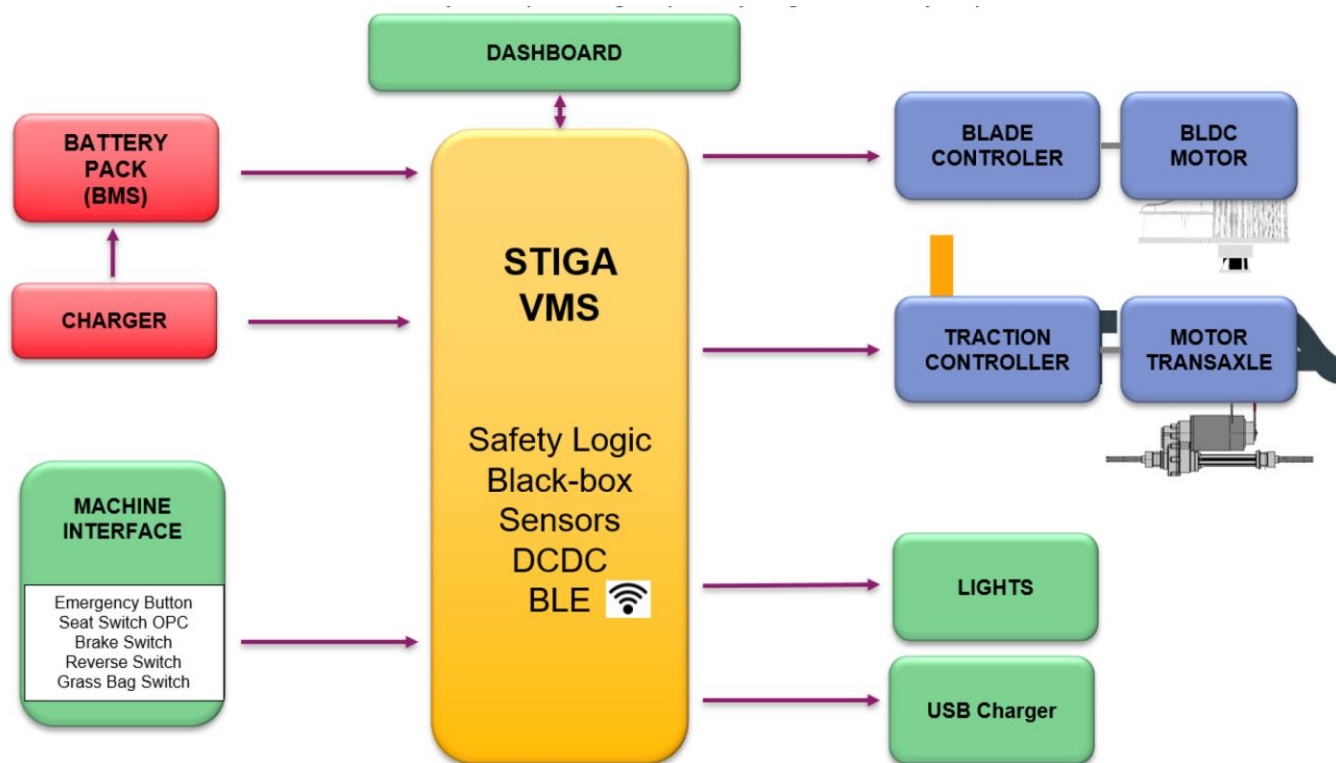
Before replacing a blown fuse, look for the cause of the fault in order to avoid a recurrence.

**ATTENTION!**

Never replace a fuse with one of a different rating; this could cause damage to the electrical system and lead to dangerous situations.

## 7.5. SYSTEM DESCRIPTION

### 7.5.1. COMPONENT AND FUNCTION DESCRIPTION



The block diagram shows the interaction of the main devices that make up the machine control system, the management of the power circuit, the CAN BUS communication system and electrical circuits that ensure the control of the motors in total safety.

The system is controlled by 6 control units that interact with each other with a continuous exchange of input and/or output information.

- **BMS (Battery Management System):**

Control unit that monitors the temperature, current and voltage of the cells that make up the battery pack during the charging and discharging phases of the battery pack.  
In the event of faults, either during charging or discharging, the BMS completely isolates the power line of the battery pack.

- **CHARGER (Battery charger):**

The battery charger is used only for charging the machine.

It is a device that transforms the 230V AC mains voltage into direct current, and supplies the battery pack with the current/voltage required by the BMS.

In the event of overtemperature, the BMS stops the current.

- **TRACTION CONTROLLER:**

The traction motor controller is a control unit that operates the traction motor and brake depending on the input signals it receives: switch status, accelerator pedal position and temperature.

Once switched on, the control unit is in constant communication with other control units via the CAN BUS line.

To increase the safety level of the machine, the VMS outside the controller switches off the controller when the emergency button is pressed or the operator leaves the seat.

The traction controller also implements the Cruise Control function (S500 only).

- **BLADE CONTROLLER:**

The blade motor controller is a control unit that operates the blade motor depending on the input signals it receives: VSM enabling, temperature and motor speed.

Once switched on, the control unit is in constant communication with other control units via the CAN BUS line.

To increase the safety level of the machine, the VMS switches off the external controller (control unit) when the emergency button is pressed or the operator leaves the seat.

When the controller is switched off, the electromechanical brake is automatically engaged. The controller is integrated inside the blade motor.

- **VMS:**

The VMS control unit reads the information of the CAN signals.

The main functions of this module are:

- vehicle power distribution centre;
- traction safety management;
- cutting tool safety management;
- basic and advanced features: lights, management of collection bag, control of the cutting deck, etc.;
- recording of data and usage statistics;
- connectivity.

- **DASHBOARD:**

The lawnmower is equipped with an electronic dashboard featuring:

- Built-in buttons to keep all machine functions under control;
  - Bright screen to show the user all essential information;
  - CAN-bus communication with the entire system;
-



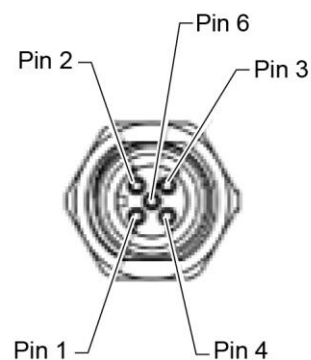
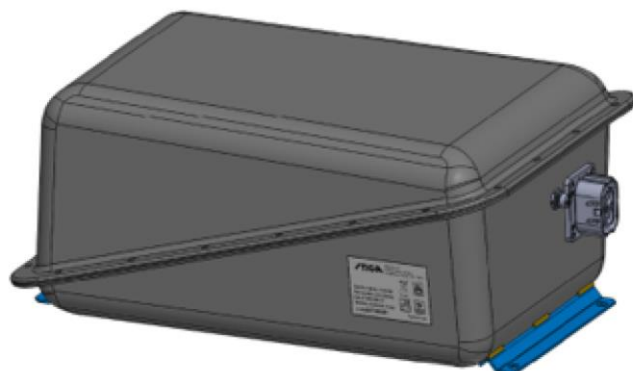
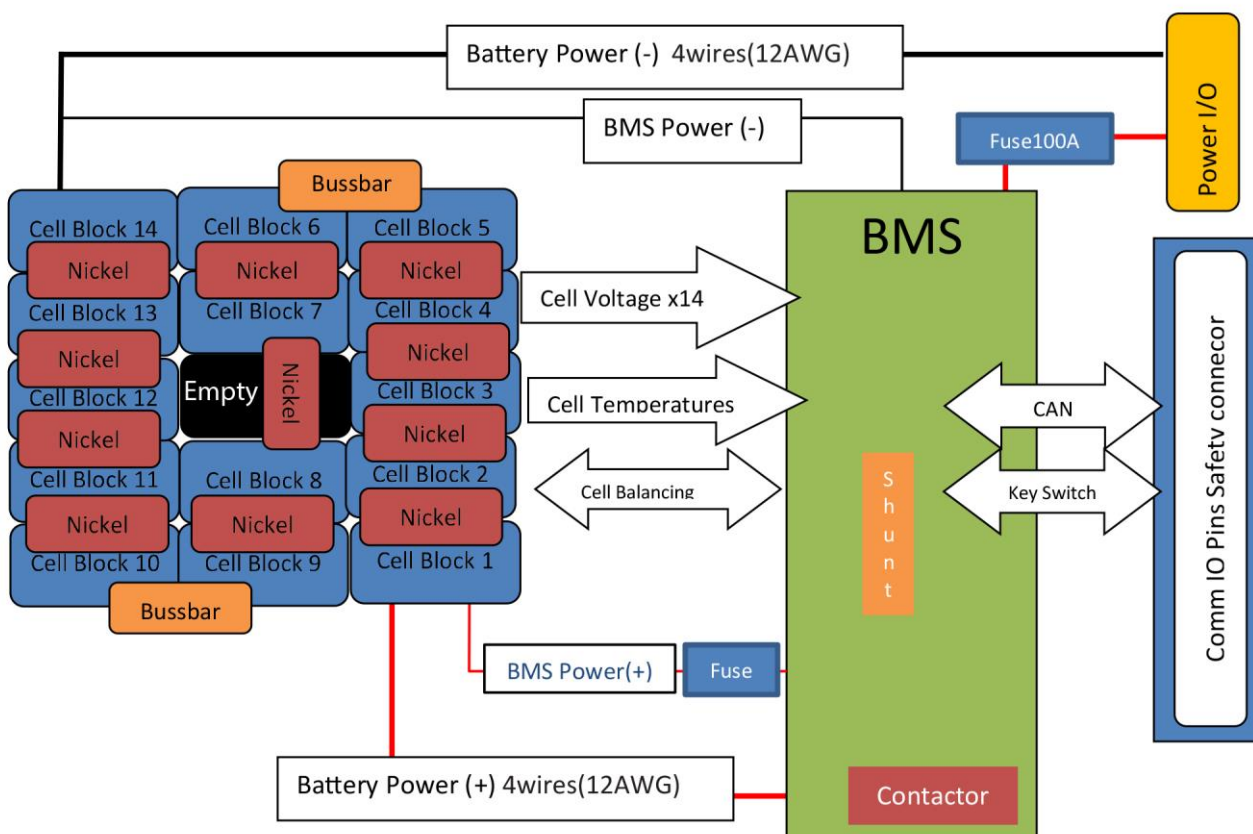
## 7.5.2. BATTERY

The battery is made up of 14 groups of cells connected in series.

Within each group the cells are arranged in parallel and connected to each other with nickel strips.

In the 30Ah battery, each group consists of 12 cells of 2.5Ah.

In the 40Ah battery, each group consists of 16 cells of 2.5Ah.



- Pin 1
- Pin 2: KEY
- Pin 3: GND
- Pin 4: CAN High
- Pin 3: CAN Low

## 7.6. WORK ON ELECTRONIC COMPONENTS

### Tightening torques

Reference: <b>M8</b>	10 ÷ 15 Nm
Reference: <b>M6</b>	7 ÷ 10 Nm

### 7.6.1. MANAGEMENT SOFTWARE


The machine's electronic control system features six software programs, each dedicated to a specific command or control equipment:

- **BMS (Battery Management System)**
- **VMS (Vehicle Management System)**
- **Blades**
- **Traction**
- **Dashboard**
- **Charger (battery charger)**

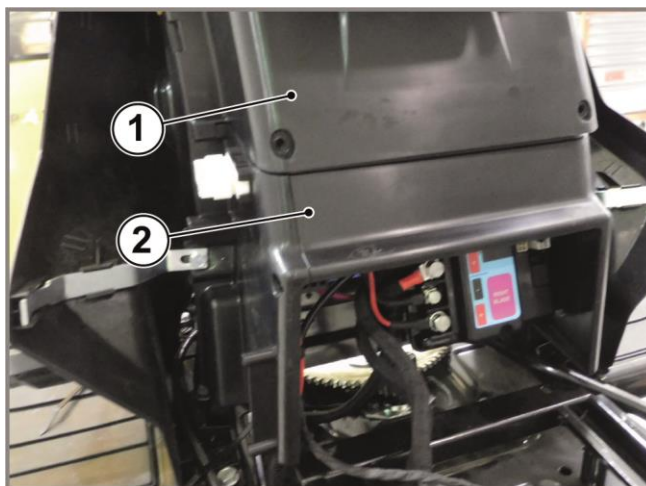
The software resides physically in the individual devices; in the event of replacement of one of the above-mentioned components, the relevant software is already pre-installed in the replacement component.

The availability of or need for any updates is notified through the usual information channels used with the Service Centres, with an indication of how to download them from the Internet and the relative instructions for installing them on the relevant equipment.

### 7.6.2. ACCESS TO ELECTRONIC EQUIPMENT

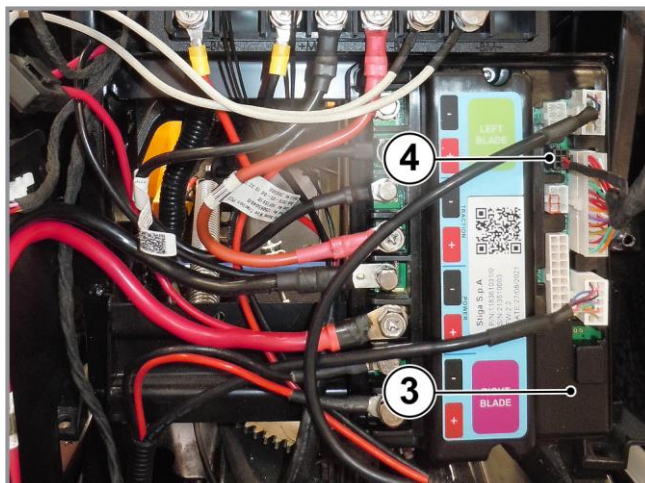
 Remove the battery.

Remove the two electrical component covers (1-2).



### 7.6.3. REPLACEMENT OF VMS BLADE CONTROL UNIT

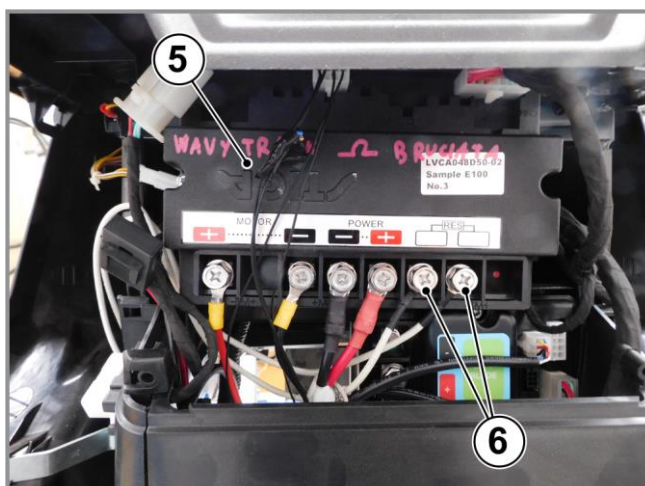
Disconnect all power cables from the control unit (3).  
Disconnect both signal connectors from the control unit.  
Disconnect the key (4) and keep it for later use.  
Remove the control unit (3) using the two fixing screws.



During assembly, ensure that the connectors and cables are correctly repositioned and tighten the contact screws:  
M6= 7-10 Nm  
M8= 10-15 Nm

### 7.6.4. REPLACEMENT OF TRACTION CONTROLLER CONTROL UNIT

Disconnect all power cables from the control unit (5).  
Remove the control unit (5) using the two fixing screws.  
Remove also the two resistor cables (6).



During assembly, ensure that the connectors and cables are correctly repositioned and tighten the contact screws:  
M6= 7-10 Nm  
M8= 10-15 Nm

### 7.6.5. REMOVING THE BATTERY

#### General information

Removing the battery allows reaching the electrical equipment as well as removing the control units (VMS and traction) and diagnostic instruments of the electrical system.  
The battery will be removed together with its mount.

#### Tightening torques

Reference: 1 fixing the mount to the frame	25 ÷ 30 Nm
Reference: 2 fixing the mount to the frame	25 ÷ 30 Nm

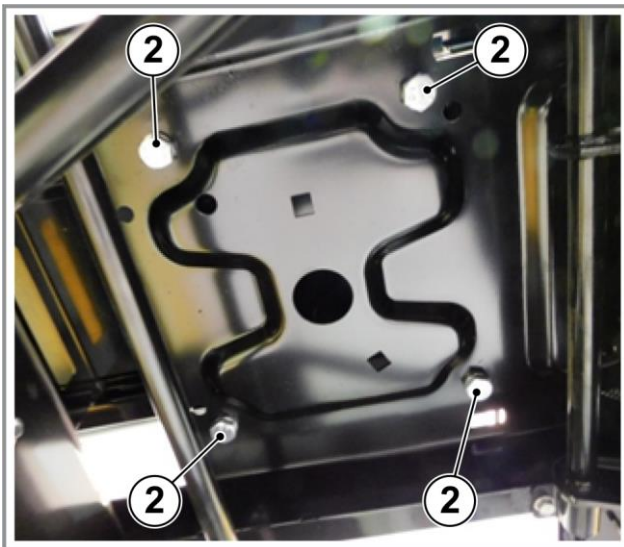
#### Procedure

Remove the bonnet.

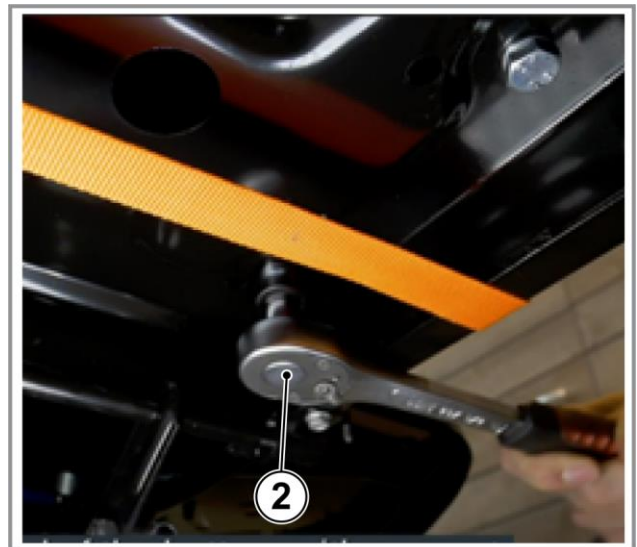
Place a strap (1) as shown in the figure in order to hold the battery in place when the screws (2-3) fixing the battery mount to the frame will have been removed.



Remove the 4 screws (2) that secure the battery mount to the frame.

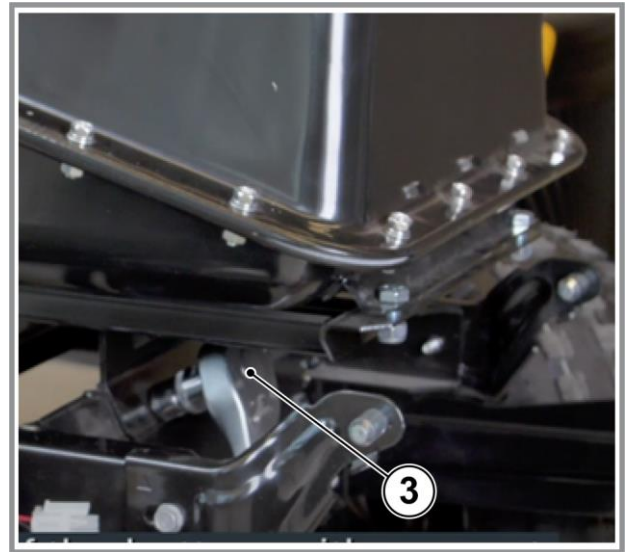
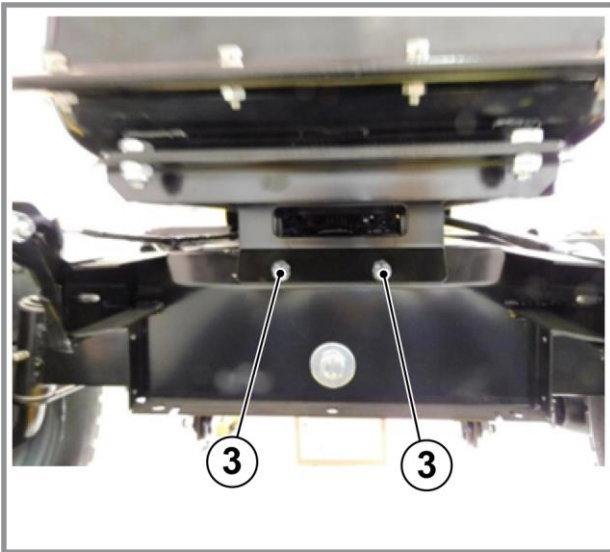


VIEW FROM BELOW

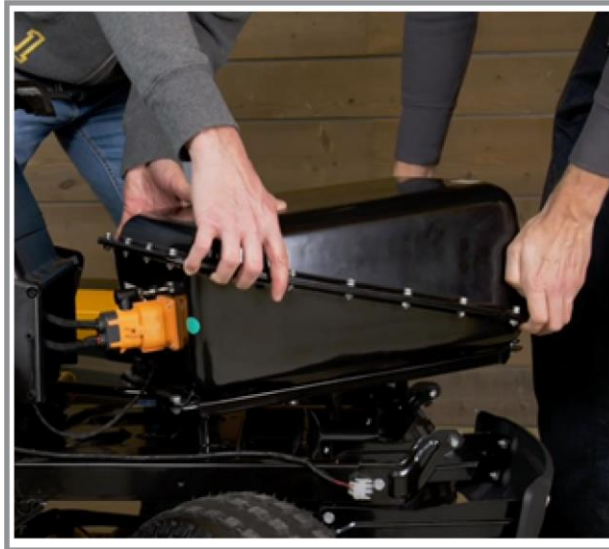




Remove the 2 screws (3) that secure the battery mount to the frame.



Carefully move the battery forward to be able to disconnect the cables.





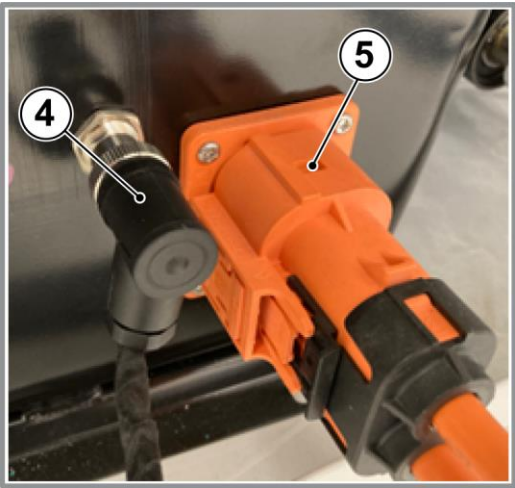
Disconnect the battery following the points (4 - 5).

**ATTENTION:**

Before performing any operation on the battery or management equipment (Blade controllers, VMS, Resistors, Controllers, etc.), disconnect the data connector (4) FIRST, and only THEN the main connector (5).  
When fitting, carry out the above steps in reverse order, taking care to reconnect the main connector (5) FIRST, and the data connector (4) LAST.

**NOTE:**

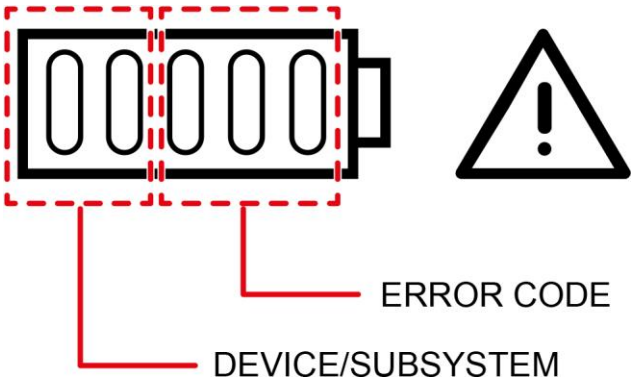
lift and remove the battery with care and using lifting equipment suitable to withstand its weight (approx. 35-40 kg)




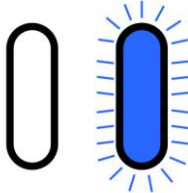
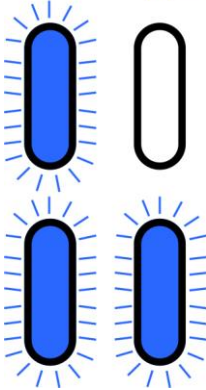
7.7. TROUBLESHOOTING

7.7.1. INTRODUCTION TO DIAGNOSTICS

The user manual contains a “troubleshooting” section dealing with issues that are easy to fix by the end user.  
Below you will find a table that includes error decoding and analyses possible malfunctions, indicating possible actions to be taken to resolve them.  
The “Error Code” is identified by particular combinations of the lighting status of the battery LEDs (normally indicating the battery charge level) according to the following diagram/criteria.  
**The list at the end of troubleshooting describes all possible cases that could occur during normal operation.**



	OFF – OFF -> VMS
--	------------------


	OFF – ON -> <b>BATTERY</b>
	ON – OFF -> <b>BLADE</b>
	ON – ON -> <b>TRACTION</b>

ON = Flashing  
OFF= Off

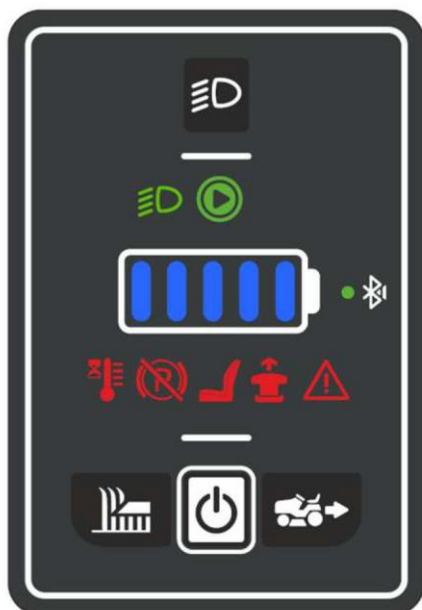
**NOTE:**  
for the whole range of e-Ride models, STIGA has provided a Diagnostic Tool (DT) that will help with diagnostic and fault finding operations

The “Error Code”, which is displayed through the various combinations of battery LEDs, is matched with the numerical reference with which the error is identified in the “Error Log” field of the Diagnostic Tool report.

Below are some examples:


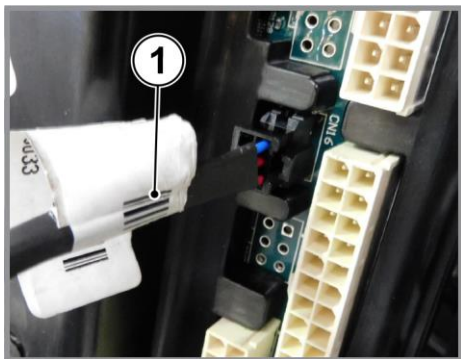

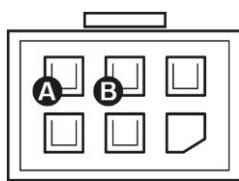
DASHBOARD Error Code	DIAGNOSTIC TOOL REPORT																		
<div><p>BLADE</p><div>This “Error Code” is identified by numeric code 11 - <b>BLADE_COMM</b> in the Diagnostic Tool Report.</div></div>	<div><table><tr><th colspan="6">Error log</th></tr><tr><th>Index</th><th>Date</th><th>Code</th><th>Description</th><th>Subsystem</th><th>Level</th></tr><tr><td>1</td><td>25-6-2021 17:22:26</td><td>11</td><td>BLADE_COMM</td><td>BLADE1</td><td>ALARM</td></tr></table></div>	Error log						Index	Date	Code	Description	Subsystem	Level	1	25-6-2021 17:22:26	11	BLADE_COMM	BLADE1	ALARM
Error log																			
Index	Date	Code	Description	Subsystem	Level														
1	25-6-2021 17:22:26	11	BLADE_COMM	BLADE1	ALARM														



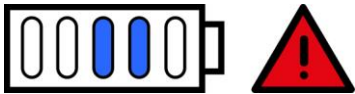

## C300




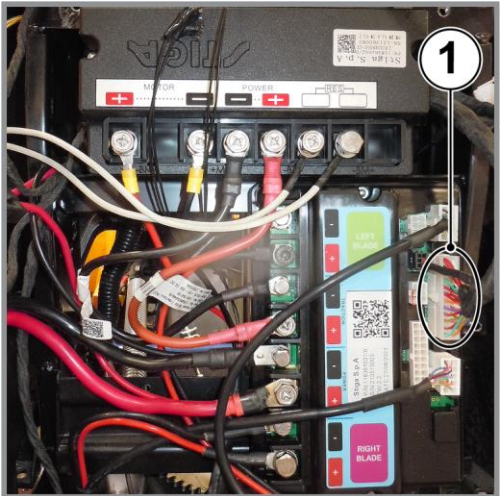
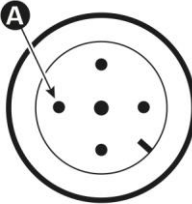
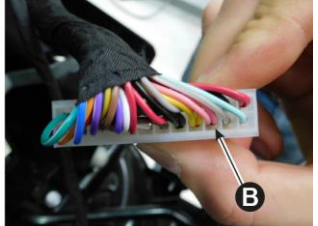
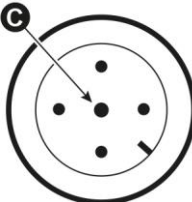
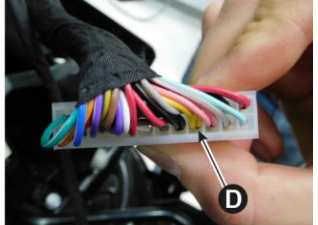
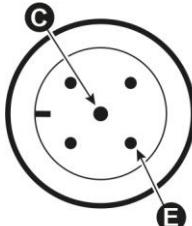

## C500


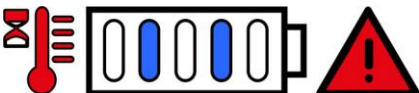
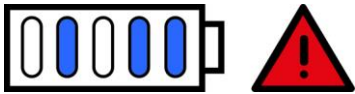





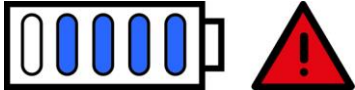
Problem	Cause	Solution
 <p>VMS</p> <div> <p>This "Error Code" is identified by numeric code <b>21</b> - <b>BLADE_DISABLED</b> in the Diagnostic Tool Report.</p> </div>	<p>Model configuration key missing</p>	<p>Check for the presence of the configuration cable (1) and/or its connection; if the connection is OK, the cable may be damaged, use a tester to check for continuity between cavities A and B; if there is no continuity, the cable must be replaced.</p> <div>    </div>


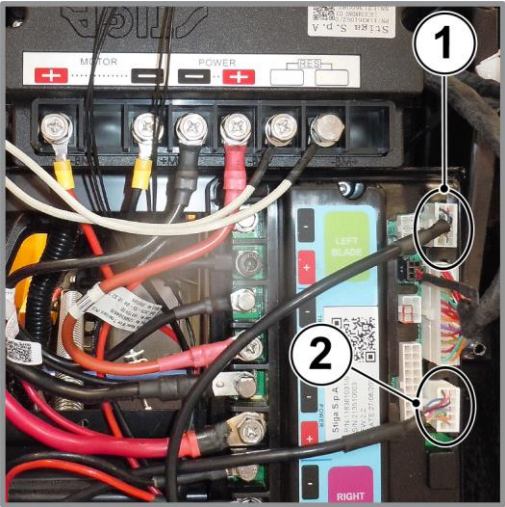
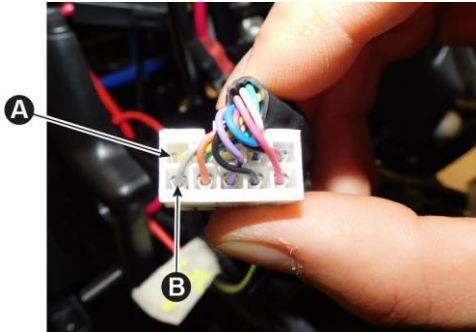
Problem	Cause	Solution
 VMS This "Error Code" is identified by numeric code <b>36</b> - <b>PARAMETER_ERROR</b> in the Diagnostic Tool Report.	Parameter error (ECU)	<p>With the help of the Diagnostic Tool it is possible to identify the wrong parameter and try to reset it. If the error persists replace VMS.</p> <p>👉 See paragraph <b>7.6.3</b> Replacing the VMS blade control unit.</p>
<p>If provided</p>  VMS This "Error Code" is identified by the following numeric codes in the Diagnostic Tool Report: <b>39 - ACTUATOR_ERROR – ERROR_VMS_BAGLIFT</b> <b>40 - ACTUATOR_ERROR – ERROR_VMS_CUTTING DECK</b>	<p>(39) The bag lifting actuator does not activate.</p> <p>(40) The deck lifting actuator does not activate.</p>	<p>- Check the lever system by activating the lifting system without the bag; - Check also the movement of the cutting deck; if it moves, power is correctly supplied; - Change the actuator.</p> <p>- Check lever system; - Check also the movement of the collection bag lifting system; if it moves, power is correctly supplied; - Change the actuator.</p>
<p>If provided</p>  VMS This "Error Code" is identified by numeric code <b>41</b> - <b>ERROR_BATTERY_CONFIG</b> in the Diagnostic Tool Report.	Check the installed batteries Incorrect or unsupported configuration.	Check the table in the <b>Owner Manual</b> and use the recommended battery configurations.
 VMS This "Error Code" is identified by the following numeric codes in the Diagnostic Tool Report: <b>0 - GENERIC_ERROR</b> <b>255 - GENERIC_ERROR</b>	Unforeseen instant error.	Check the error indication in the Diagnostic Tool Report under the "sub-system" column.






Problem	Cause	Solution
 <p><b>BATTERY</b></p> <div> <p>This "Error Code" is identified by numeric code <b>10</b> - <b>BATTERY_DETECTION</b> in the Diagnostic Tool Report.</p> </div>	<p>Battery detection and communication error</p>	<p>Check the connection of the communication cable and its integrity (1); if connection and cable are OK, the cable could be damaged. Using a tester, check for continuity between cavities A - B and C - D, if there is no continuity it must be replaced.</p> <p>If the continuity test is positive, set the tester to "ohmmeter" and check the impedance between cavities C - E, which must be ~ 120 ohm.</p> <p>If the value does not match, the cable must be replaced.</p> <p>Use the Diagnostic Tool to detect/confirm the fault.</p> <div>        </div>

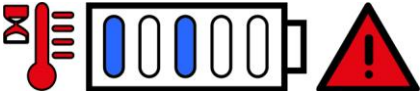
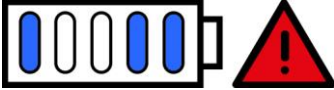


Problem	Cause	Solution
 <p><b>BATTERY</b></p> <p>This "Error Code" is identified by the following numeric codes in the Diagnostic Tool Report:  <b>1 - DSG_OVERCURRENT</b>  <b>2 - CHG_OVERCURRENT</b></p>	<p>Current overload from the battery due to: Too heavy cutting conditions, too high a slope and heavy-duty cutting conditions</p> <p><b>NOTE:</b>  if error is shown under normal operating conditions, check battery absorption</p>	<p>Increase the cutting height. Reduce the forward speed and check the slope of the ground on which you are working.</p>
 <p><b>BATTERY</b></p> <p>This "Error Code" is identified by the following numeric codes in the Diagnostic Tool Report:  <b>3 - CHG_OVERTEMP</b>  <b>4 - DSG_OVERTEMP</b>  <b>5 - CHG_UNDERTEMP</b>  <b>6 - DSG_UNDERTEMP</b>  <b>37 - TRACTION_DISABLED</b></p>	<p>Measured temperature outside the operating limits</p>	<p>Use the Diagnostic Tool to identify the operating condition and detect a battery fault, if any.  Change the battery.</p>
<p>If provided</p>  <p><b>BATTERY</b></p> <p>This "Error Code" is identified by numeric code <b>7</b> - <b>CELL_OVERVOLTAGE</b> in the Diagnostic Tool Report.</p>	<p>Battery overvoltage  This error may appear if the machine is used repeatedly downhill and/or in too steep slopes.</p>	<p>Check the charge level and pack voltage  Use the Diagnostic Tool to highlight these particular conditions.  It may be useful to discharge the battery by using the machine.</p>
<p>If provided</p>  <p><b>BATTERY</b></p> <p>This "Error Code" is identified by numeric code <b>8</b> - <b>CELL_UNDERVOLTAGE</b> in the Diagnostic Tool Report.</p>	<p>Battery low voltage</p>	<p>Check the charge level and pack voltage  Use the Diagnostic Tool to highlight these particular conditions.</p>


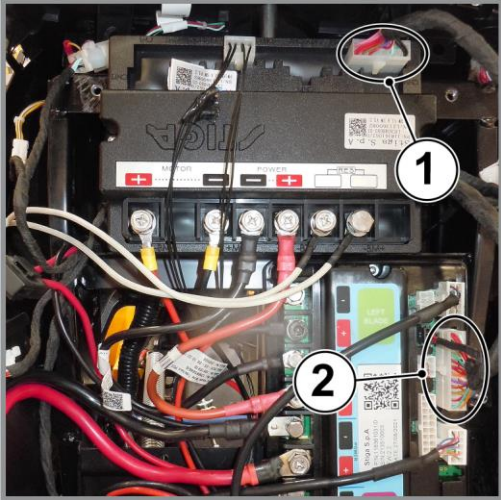
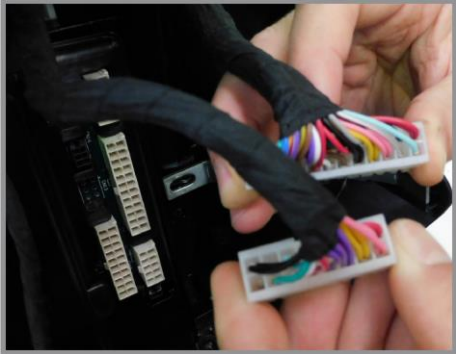
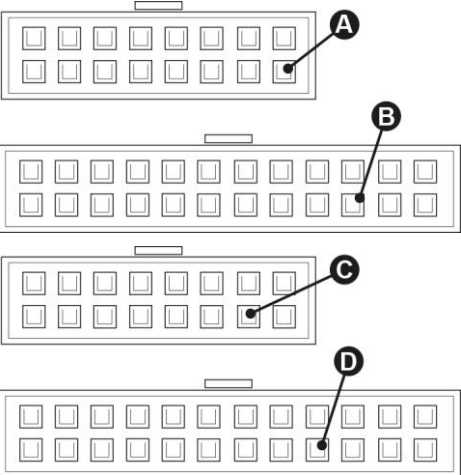
Problem	Cause	Solution
 <b>BATTERY</b> <div> This "Error Code" is identified by  numeric code <b>9</b> -  <b>DSG_SHORT_CIRCUIT</b> in the  Diagnostic Tool Report. </div>	Excessive discharge current.	Check wiring condition. (Check the Diagnostic Tool log as this is an instant error)
If provided  <b>BATTERY</b> <div> This "Error Code" is identified by  numeric code <b>38</b> -  <b>BATTERY_BALANCE</b> in the  Diagnostic Tool Report. </div>	Cell unbalance.	Use the Diagnostic Tool to perform the battery diagnosis
If provided  <b>BATTERY</b> <div> This "Error Code" is identified by  numeric code <b>42</b> -  <b>BATTERY_BALANCE</b> in the  Diagnostic Tool Report. </div>	Current sensor error.	Replace Parallel Module.

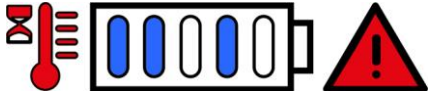
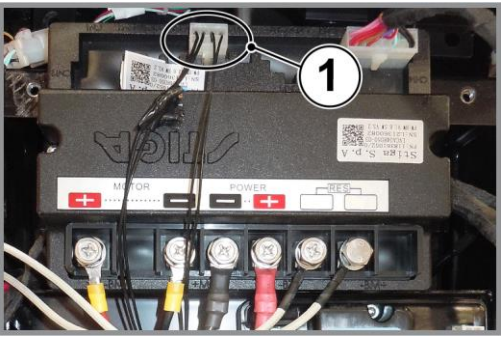
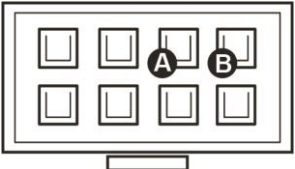
Problem	Cause	Solution
 <p><b>BLADE</b></p> <p>This "Error Code" is identified by numeric code <b>11 - BLADE_COMM</b> in the Diagnostic Tool Report.</p>	<p>CAN communication error</p>	<p>Check the connection of the LH blade (1) and RH blade (2) signal cable and its integrity; if the connection is OK, the cable could be damaged.</p> <p>With the tester set to "ohmmeter", check both blade connectors.</p> <p>The check must be carried out between cavities A and B.</p> <p>Use the Diagnostic Tool to detect whether the fault is on motor A and B.</p>   <p>With Value = 0 (Check cable for presumed short-circuit)</p> <p>With Open circuit: (Connection interrupted)</p>


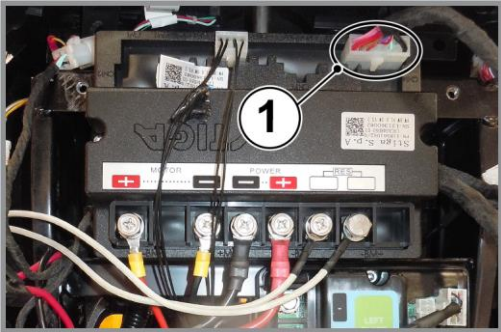

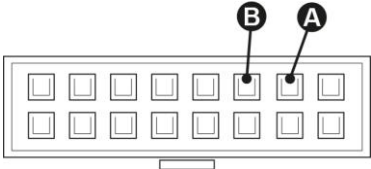
Problem	Cause	Solution
 <p><b>BLADE</b></p> <p>This "Error Code" is identified by the following numeric codes in the Diagnostic Tool Report:  <b>15 - BLADE_DRIVE_VOLTAGE</b>  <b>16 - BLADE_VOLTAGE</b></p>	Voltage error	<p>Check power wiring connections.</p>  <p>Use the Diagnostic Tool to check the status of the cells.  The problem might be on the Blade Controller.</p> <p>➡ See paragraph 6.3.2 Replacing the blade motors</p>
 <p><b>BLADE</b></p> <p>This "Error Code" is identified by numeric code <b>14 - BLADE_BRAKE</b> in the Diagnostic Tool Report.</p>	Electromechanical brake error	<p>Use the Diagnostic Tool to identify which motor is damaged (or both)</p> <p>Replace the motor</p>

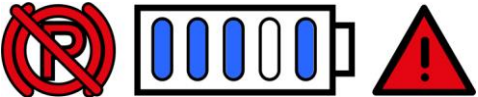
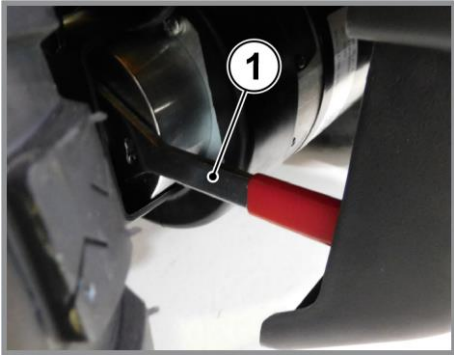
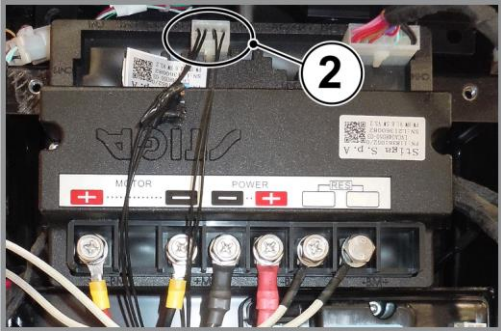
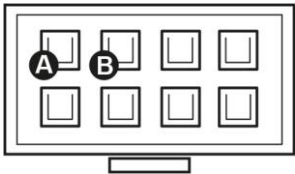



Problem	Cause	Solution
 <p><b>BLADE – Overtemperature</b></p> <p>This “Error Code” is identified by numeric code <b>17</b> - <b>BLADE_OVERTEMP</b> in the Diagnostic Tool Report.</p>	<p>Stalling of cutting device motors due to:</p> <ul style="list-style-type: none"> <li>- Heavy-duty working conditions.</li> <li>- Obstructions preventing rotation of the cutting devices.</li> <li>- The cutting deck is full of grass.</li> </ul>	<p>Reduce the forward speed. Increase the cutting height. Remove the obstructions. Clean the cutting deck.</p> <p>Use the Diagnostic Tool to highlight the actual temperature variation.</p>
 <p><b>BLADE – Overcurrent</b></p> <p>This “Error Code” is identified by the following numeric codes in the Diagnostic Tool Report: <b>12 - BLADE_FLT_MCU</b> <b>13 - BLADE_OVERCURRENT</b></p>		
 <p><b>BLADE</b></p> <p>This “Error Code” is identified by numeric code <b>18 - BLADE_STALL</b> in the Diagnostic Tool Report.</p> <p>(*) Model: C500</p>		
 <p><b>BLADE</b></p> <p>This “Error Code” is identified by the following numeric codes in the Diagnostic Tool Report: <b>19 - BLADE_MOS</b> <b>20 - BLADE_HALL</b></p>	<p>Blade control unit error</p>	<p>Check the rotation of the blades when switching on the machine</p> <p>👉 See paragraph <b>7.6.3</b> Replacing the VMS blade control unit</p>

Problem	Cause	Solution
 <p><b>TRACTION</b></p> <p>This "Error Code" is identified by numeric code <b>22</b> - <b>TRACTION_COMM</b> in the Diagnostic Tool Report.</p>	<p>Communication error</p>	<p>Check the connection of the communication cables (1) and (2) and their integrity; if the connection is OK, the cable could be damaged.</p> <p>Using a tester, check for continuity between A - B and C - D, if there is no continuity the cables must be replaced.</p> <p>Use the Diagnostic Tool to detect/confirm the fault.</p>   

Problem	Cause	Solution
 <p><b>TRACTION</b></p> <p>This "Error Code" is identified by the following numeric codes in the Diagnostic Tool Report:  <b>25 - TRACTION_MOTOR_TEMP</b>  <b>26 - TRACTION_DRIVE_TEMP</b>  <b>34 - TRACTION_OVERCURRENT</b>  <b>35 - TRACTION_SENSOR_TEMP</b></p>	<p>Overtemperature Overload, slope too steep and wheel slip</p>	<p>Use the Diagnostic Tool to identify the operating condition and detect a Traction fault, if any.</p> <p>Disconnect the connector (1) and:</p> <ul style="list-style-type: none"> <li>- Check the wiring in cavities A and B, the connection of the cables and their operation.</li> <li>- Check the connection on the traction connector.</li> <li>- With the tester set to "ohmmeter", check the impedance on cavities A-B of the traction connector</li> </ul> <p>The value should be around 10 kohm</p> <p>Note: if the values do not match, the traction must be replaced.</p>  

Problem	Cause	Solution										
 <p><b>TRACTION</b></p> <p>This "Error Code" is identified by numeric code <b>31</b> - <b>TRACTION_PEDAL_OPEN_SC</b> in the Diagnostic Tool Report.</p>	<p>Traction pedal Pedal fault or wiring</p>	<p>Check the wiring, the connection of the cables (1) and their integrity;</p> <ul style="list-style-type: none"> <li>- Check the connection on the traction connector</li> <li>- Check the connection on the pedal connector</li> <li>- Check pedal impedance</li> </ul> <p>With the tester set to "ohmmeter", check the impedance on cavities A - B of the traction connector.</p> <p>Use the Diagnostic Tool to detect/confirm the fault.</p>    <table border="1"> <thead> <tr> <th>Cavity no.</th><th>Pedal position</th><th>Tester reading</th></tr> </thead> <tbody> <tr> <td rowspan="3">A - B</td><td>In neutral</td><td>2.7 Kohm</td></tr> <tr> <td>All forward</td><td>5 Kohm</td></tr> <tr> <td>All backward</td><td>1 Kohm</td></tr> </tbody> </table> <p>Note: if the values do not match, the cable must be replaced.</p>	Cavity no.	Pedal position	Tester reading	A - B	In neutral	2.7 Kohm	All forward	5 Kohm	All backward	1 Kohm
Cavity no.	Pedal position	Tester reading										
A - B	In neutral	2.7 Kohm										
	All forward	5 Kohm										
	All backward	1 Kohm										

Problem	Cause	Solution
 <p><b>TRACTION</b></p> <p>This "Error Code" is identified by the following numeric codes in the Diagnostic Tool Report:</p> <p><b>32 - TRACTION_BRAKE_POWER</b>  <b>43 - TRACTION_BRAKE_RESISTOR</b>  <b>29 - TRACTION_BRAKE_CONN</b></p>	<p>Electromechanical brake error</p>	<p>Use the Diagnostic Tool to detect/confirm the Traction brake fault</p> <p>Check brake voltage:</p> <p><b>A.</b> Check the position of the traction release lever (1) (high position).</p>  <p><b>B.</b> Disconnect reference connector (2) and check:</p> <ul style="list-style-type: none"> <li>- With lever up = approx. 100-200 Ω</li> <li>- With lever down = open circuit</li> </ul>  
 <p><b>TRACTION</b></p> <p>This "Error Code" is identified by the following numeric codes in the Diagnostic Tool Report:</p> <p><b>30 - TRACTION_RELAY</b>  <b>33 - TRACTION_MOTOR_SC</b></p>	<p>Traction control unit error</p>	<p>Motor short-circuit or damaged driver. Use the Diagnostic Tool to detect/confirm the Controller fault. Replace the controller.</p> <p>➡ See paragraph 7.6.4 Replacing the traction controller control unit.</p>


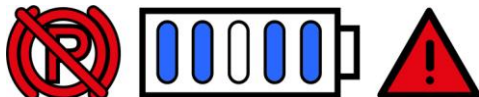
Problem	Cause	Solution
 <p><b>TRACTION</b></p> <p>This "Error Code" is identified by the following numeric codes in the Diagnostic Tool Report:  <b>23 - TRACTION_UNDERVOLTAGE</b>  <b>24 - TRACTION_UNDERVOLTAGE</b>  <b>28 - TRACTION_OVERVOLTAGE</b></p>	Voltage error	<ul style="list-style-type: none"> <li>- Check battery voltage</li> <li>- Check the power supply connection of the traction controller</li> <li>- Use the diagnostic tool to detect/confirm the failure of the controller.</li> </ul>
 <p><b>TRACTION</b></p> <p>This "Error Code" is identified by numeric code <b>27</b> - <b>TRACTION_NEUTRAL</b> in the Diagnostic Tool Report.</p>	"Neutral" pedal not in the correct position.	<ul style="list-style-type: none"> <li>- Check and/or adjust traction pedal to neutral position.</li> </ul>



TABLE OF ERRORS IN THE DIAGNOSTIC TOOL (DT)

DT error code	Error message	Error level	Notes (error)	Possible Cause	Suggestions
0	GENERIC_ERROR	ATTENTION	Undefined or not supported	Unforeseen instant error	Check the error indication in the Diagnostic Tool Report under the "sub-system" column.
1	DSG_OVERCURRENT	ALARM	Battery error - discharge overcurrent	Battery overcurrent due to high work load	Reduce the work load and check battery absorption in standard working conditions.
2	CHG_OVERCURRENT	ALARM	Battery error - charge overcurrent	Excessive battery charge level.	<ul style="list-style-type: none"> <li>- Check the battery charge level: <b>Overvoltage 55 V.</b></li> <li>- Check for any battery issues using the "<i>Diagnostic Tool</i>"</li> <li>- Change the battery.</li> </ul>
3	CHG_OVERTEMP	CRITICAL	Battery error - charge overtemperature	Battery temperature too high (85°C)	<ul style="list-style-type: none"> <li>- Check for any battery issues using the "<i>Diagnostic Tool</i>"</li> <li>- Change the battery.</li> </ul>
4	DSG_OVERTEMP	ALARM	Battery error - discharge overtemperature	Battery overtemperature due to high work load	Reduce the work load and check battery absorption in standard working conditions.
5	CHG_UNDERTEMP	ALARM	Battery error - charge undertemperature	Measured temperature outside the operating limits ( <b>below 0°C</b> )	<ul style="list-style-type: none"> <li>- Check for any battery issues using the "<i>Diagnostic Tool</i>"</li> <li>- Change the battery.</li> </ul>
6	DSG_UNDERTEMP	ALARM	Battery error - discharge undertemperature	Measured temperature outside the operating limits ( <b>below 0°C</b> )	<ul style="list-style-type: none"> <li>- Check for any battery issues using the "<i>Diagnostic Tool</i>"</li> <li>- Change the battery.</li> </ul>
7	CELL_OVERVOLTAGE	CRITICAL	Battery error - cell overvoltage	Battery overvoltage (cells)	Check with the " <i>Diagnostic Tool</i> ": <ul style="list-style-type: none"> <li>- the charge level and pack voltage;</li> <li>- the work conditions.</li> </ul> It may be useful to discharge the battery by using the machine.
8	CELL_UNDERVOLTAGE	ALARM	Battery error - cell undervoltage	Low battery ( <b>Low Voltage: 32.4 V</b> )	Check voltage and battery charge level
9	DSG_SHORT_CIRCUIT	CRITICAL	Battery error - short circuit	Excessive discharge current	Check wiring condition
10	BATTERY_DETECTION	CRITICAL	Battery error - detection failure	Battery detection and communication error	Check the connection of the communication cable and its integrity; if connection and cable are OK, the cable could be damaged.
11	BLADE_COMM	ALARM	Blade error - generic	CAN communication error	Check the connection of the LH blade and RH blade signal cable and its integrity; if the connection is OK, the cable could be damaged.

DT error code	Error message	Error level	Notes (error)	Possible Cause	Suggestions
12	BLADE_FLT_MCU	ALARM	Blade error - vms driver flt	Overcurrent or overvoltage on driver	Check blade controller power supply (no 48 V - VMS present)
13	BLADE_OVERCURRENT	ALARM	Blade error - overcurrent	Overcurrent due to high work load.	Reduce the work load
14	BLADE_BRAKE	CRITICAL	Blade error - brake failure	Electromechanical brake error	Identify the damaged motor and replace
15	BLADE_DRIVE_VOLTAGE	ALARM	Blade error - drive voltage failure	Voltage error	Check the battery voltage
16	BLADE_VOLTAGE	ALARM	Blade error - over or under voltage	Voltage error	Check power wiring connections
17	BLADE_OVERTEMP	ALARM	Blade error - overtemperature	Overtemperature due to high work load.	Reduce the work load
18	BLADE_STALL	ALARM	Blade error - motor stall	High work load or motor in stall	Reduce the work load, check whether the motor is damaged and replace
19	BLADE_MOS	ALARM	Blade error - MOS failure	Blade control unit error; blade controller transistor	Identify the damaged motor and replace
20	BLADE_HALL	ALARM	Blade error - Position sensor failure	Damaged blade position sensor	Identify the damaged motor and replace
21	BLADE_DISABLED	CRITICAL	Blade error - Disabled - missing key	Model configuration key missing	Check for the presence of the configuration cable and/or its connection.
22	TRACTION_COMM	ALARM	Traction error - generic	Communication error	- Check the connection and condition of the communication cables; - Check the continuity between VMS and traction controller
23	TRACTION_FLT_MCU	ALARM	Traction error - vms driver flt	Overcurrent or overvoltage on VMS driver	Check traction controller power supply (no 48 V - VMS present)
24	TRACTION_UNDERVOLTAGE	ALARM	Traction error - undervoltage	Temperature outside the operating limits	Check the battery voltage
25	TRACTION_MOTOR_TEMP	ALARM	Traction error - motor overtemperature	Overload Motor Overtemperature, slope too steep and wheel slip	Check the slopes of the ground on which the unit is working: max. 10° (17%) Reduce the forward speed

DT error code	Error message	Error level	Notes (error)	Possible Cause	Suggestions
26	TRACTION_DRIVE_TEMP	ALARM	Traction error - controller overtemperature	Control unit overtemperature	Check the slopes of the ground on which the unit is working: max. 10° (17%) Reduce the forward speed
27	TRACTION_NEUTRAL	ALARM	Traction error - pedal not in neutral	"Neutral" pedal not in the correct position	Check and/or adjust traction pedal to neutral position.
28	TRACTION_OVERVOLTAGE	ALARM	Traction - error - overvoltage	Temperature outside the operating limits	Check the connection and condition of the power cables
29	TRACTION_BRAKE_CONN	CRITICAL	Traction error - brake disconnected	Electromechanical brake error.	Check brake power supply
30	TRACTION_RELAY	ALARM	Traction error - relay open / short / disconnected	Traction control unit error	Damaged control unit, replace
31	TRACTION_PEDAL_OPEN_SC	CRITICAL	Traction error - pedal open or short circuit	Traction pedal faulty or pedal wiring fault.	Check the wiring, the connection of the cables and their integrity.
32	TRACTION_BRAKE_POWER	CRITICAL	Traction error - brake power	Electromechanical brake error.	Check brake power supply
33	TRACTION_MOTOR_SC	ALARM	Traction error - drive fault or short circuit	Traction control unit error	Motor short-circuit or damaged driver. Replace the controller.
34	TRACTION_OVERCURRENT	ALARM	Traction error - overcurrent	Overcurrent	Conditions of use
35	TRACTION_SENSOR_TEMP	ALARM	Traction error - temp sensor fault or low temperature	Low ambient temperature (detected by the sensor)	Check wiring
36	PARAMETER_ERROR	ATTENTION	WMS ECU error	Parameter error (ECU)	With the help of the Diagnostic Tool it is possible to identify the wrong parameter and try to reset it.
37	TRACTION_DISABLED	ALARM	Traction error	Excessive battery charge level (working on a slope).	NOTE: the machine stops when working on a slope and slows down when working on a flat ground
38	BATTERY_BALANCE	ATTENTION	Battery error - cell unbalance	Cell unbalance	Perform battery diagnosis

DT error code	Error message	Error level	Notes (error)	Possible Cause	Suggestions
39	ACTUATOR_ERROR – ERROR_VMS_BAGLIFT	ATTENTION	Lift control or supply error	The bag lifting actuator does not activate.	<ul style="list-style-type: none"> <li>- Check the lever system by activating the lifting system without the bag;</li> <li>- Check also the movement of the cutting deck; if it moves, power is correctly supplied</li> <li>- Change the actuator.</li> </ul>
40	ACTUATOR_ERROR – ERROR_VMS_CUTTING DECK			The deck lifting actuator does not activate.	<ul style="list-style-type: none"> <li>- Check lever system;</li> <li>- Check also the movement of the collection bag lifting system; if it moves, power is correctly supplied</li> <li>- Change the actuator.</li> </ul>
41	ERROR_BATTERY_CONFIG	ATTENTION	Battery configuration error	Check the installed batteries Incorrect or unsupported configuration.	Check the table in the <b>Owner Manual</b> and use the recommended battery configurations.
42	BATTERY_ECU_FAILURE	ATTENTION	Parallel - Module - ECU- error	Current sensor error	Replace Parallel Module
43	TRACTION_BRAKE_RESISTOR	ATTENTION	Traction – error – brake - resistor	Traction release lever in unlocked position.	Check the position of the traction release lever
255	GENERIC_ERROR	ATTENTION	Undefined or not supported	Unforeseen instant error	Check the error indication in the Diagnostic Tool Report under the “sub-system” column.



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