

102

102 - 122 *hydro*

TC

TCP

TCR

TCB

TCS

TX

TS

WORKSHOP MANUAL

Rel. 11.1

YEAR OF MANUFACTURE 2011→2013

The Manufacture reserves the right to make any improvements to the product of a technical or commercial nature that may be necessary. There may be, therefore, differences between the various series of machines and that described here, though the basic features and various repair methods will remain the same.

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CONTENTS

1. Rules and procedures for Service Centres

This chapter covers all the main aspects of the relationship between the manufacturer and the service centres.

A close collaboration between the manufacturer and the service centres is conclusive for solving problems in the most effective way as well as maintaining an image of efficiency and reliability. Compliance with these brief and simple guidelines will facilitate this task and prevent general misunderstandings and time-wasting for both the manufacturer and the service centre.

2. General and safety regulations

This chapter covers the main aspects of a servicing procedure and the general rules for guaranteeing a successful service which protects the environment and respects the safety of both the serviceman and the user of the apparatus.

3. Maintenance

This chapter deals with the criteria for routine maintenance.

4. Adjustments and tuning

This chapter deals with the adjustments to be made to remedy the more frequent performance failures and are usually resolved by quick checks and tunings.

5. Removal of external parts and main assemblies

For doing more difficult jobs, greater accessibility may be required. This can be done by taking the unit concerned off and working at the bench, or by removing the cover or other external parts. Whether or not this will be useful is at the discretion of the mechanic's experience.

6. Repairs

This chapter deals with all the more complex work connected with the replacement or repair of malfunctioning or worn parts.

The descriptions must follow a logical sequence and can include operations not specifically connected to a particular type of repair.

In this case, careful reading of the entire procedure can help you omit all those operations not connected with the case in hand without, however, overlooking anything that may be necessary.

7. Electrical system

This chapter deals with the problems and checks connected with the electrical system.

All work can be done using a tester without having to use special equipment.

The electrical diagrams can be useful to you for understanding how the system functions and to facilitate the pinpointing of any problems.

8. Technical specifications

This chapter summarises all the main information regarding the machine.

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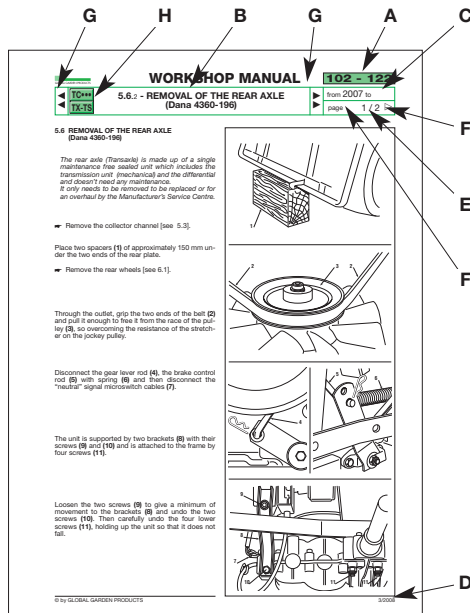
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INTRODUCTION

This manual has been compiled to help Service Centres with the maintenance, dismantling and repair of the following versions of the 102-122 machine:

- mechanical drive with gear box;
- hydrostatic drive (hydro).

Each page of this manual states the following information:



- A)** Machine or machine series to which the page applies.
- B)** Page number, specifically:
 - the first two figures separated by a point indicate the section and the chapter
 - the third figure indicates the modification index.
- C)** Temporary validity of the page, with reference to the year of manufacture or serial numbers.
- D)** Date of release.
- E)** Page number and total number of pages dedicated to the subject.
- F)** Any previous or ensuing pages dedicated to the subject.
- G)** Any chapters before or after the current one.

- H)** Code **TC...** shows that the page applies to the machines so equipped TC - TCP - TCR - TCB - TCX - TCS.
Code **TX-TS** shows that the page applies to the machines so equipped TX-TS.

The manual refers to the following symbols:

⚠ Warns of operations that should be carried out with utmost care to avoid impairing the functionality and safety of the lawnmower.

⚠ Warns of operations that should be carried out with utmost care to avoid injury to the operator.

➔ Reference to another procedure or part of the manual.

➤ This symbol highlights all those operations that require different working methods depending on the type of machine, subsequent modifications or accessories fitted.

NOTE
Whenever a reference is made to a position on the machine "front", "back", "left" or "right" hand side, this is determined by facing the direction of forward travel.

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

You are asked to read through this manual to acquire a basic understanding of the machine, which is necessary for working rationally without making errors or wasting time.

All problems related to use are fully covered in the user manual.

1.1 IDENTIFICATION AND PROCEDURES

A) Identification

1) Machine

Each machine has a label attached **(1)** under the driver's seat which shows the technical specifications, the model and the serial number.

The model and serial number must be shown on each repair sheet when requests are made under guarantee, and are indispensable for spare part orders.

2) Transmission (Rear axle)

The transmission unit (both mechanical and hydrostatic) is made up of an engine block including the rear axle. This unit is made by another manufacturer to our precise technical specifications which differentiate it from similar items by this same Manufacturer.

The serial number on the label (2) clearly identifies the product and its specifications. This number must always be quoted when requesting spare parts or any information from the Manufacturer.

3) Engine

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

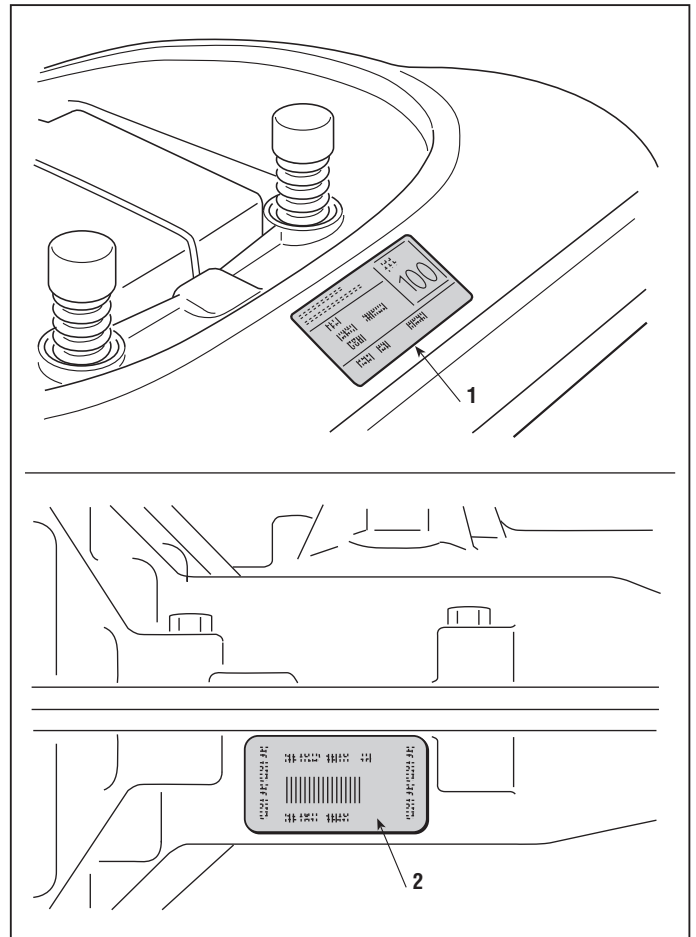
The serial number on the label clearly identifies the product and its specifications. This number must always be quoted when requesting spare parts or any information from the Manufacturer.

B) Guarantee validity

The guarantee is supplied under the terms and the limits of the contractual relations in being. As far as the engine and the transmission unit are concerned, the conditions given by their respective manufacturers apply.

C) Service repairs after guarantee period

The Service Centre has to make out a report containing the machine's serial number, a summary of



the problem, the repairs carried out and any spare parts used for each repair done on the machine.

A copy of this report must be retained to be made available to the Manufacturer together with the parts in case of any subsequent disputes with Customers.

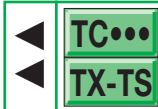
D) Fault notification

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

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

E) Spare parts request

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



2.1.1 SAFETY REGULATIONS

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2.1 SAFETY REGULATIONS

A) Qualification of operators

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

B) Safety measures

All the machines are manufactured in accordance with the strict European safety regulations in force.

To maintain these levels of safety in the longer term, the Service Centres should work to this end by making appropriate checks every time there is the chance to do so.

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

1) check:

- that safety microswitches are working correctly [see 7.3];
- that the casings and protection covers have not been removed;
- that the labels with instructions or provisions have not been removed or have become illegible (these form an integral part of the safety system).

2) they should also:

- restore to proper working order any safety devices which have been manipulated or removed;
- reattach inefficient, damaged or missing casings and protection covers;
- replace illegible labels;
- not endorse any repair or modification on the machine or the engine which results in a change in performance or use that is incorrect or different from the purpose for which it was designed and approved;
- warn the Customer that the failure to comply with the above points results in the automatic annulment of the Guarantee and the Manufacturer declines all responsibility, as also shown in chapter 1 of the Instruction Booklet.

C) Precautions during servicing

The operations described in this manual do not entail particularly hazardous situations besides the

normal hazard related to mechanical operations and that can be avoided by taking the necessary care and attention normally required for this type of work.

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

- taking out the ignition key before beginning any repair work.
- protect hands with suitable working gloves, especially when working near the cutting unit;
- check that you do not cause accidental petrol leaks or other losses;
- do not smoke when working on the tank or when handling petrol;
- do not inhale oil or petrol fumes;
- clean up all traces of spilt petrol immediately;
- test the engine in a well-ventilated environment or where there are adequate exhaust fume extraction systems;
- do not pollute the environment with oil, petrol or other waste and dispose of all waste in accordance with the laws in force;
- ensure that other persons cannot accidentally carry out actions that may physically endanger those working on the machine.

D) Necessary equipment

All the operations can be carried out with the tools normally used in a good garage. Some operations require special equipment and tools [see 2.2].

E) Symbols and terms used for safety purposes

Some paragraphs in this manual are preceded by symbols which indicate the following:



Operations that should be carried out with utmost care to avoid impairing the functionality and safety of the lawnmower.



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

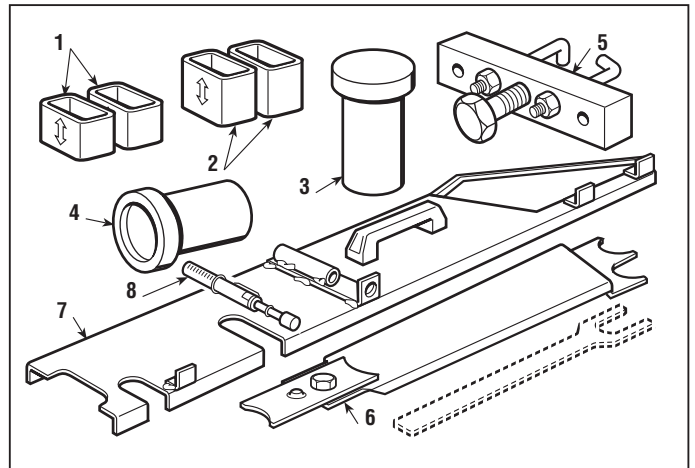
“WARNING” stresses the risk of injury to oneself and others if instructions and regulations are not observed.

2.2 TOOLS

All work can be carried out using the tools normally available from a good workshop. However, it is advisable to have a set of special tools **(1 ÷ 8)**.

These tools **(1 ÷ 8)** are to be used whenever is given in this text.

1. Blocks H = 26 mm for adjusting the cutting deck
2. Blocks H = 32 mm for adjusting the cutting deck
3. Bush for assembly of blades bearings
4. Stopper for assembly of wheel bearings
5. Pulley extractor
6. Pulley centre distance checking template
7. Blades connection belt tension checking template
8. Dynamometer



2.3 LIFTING



The machine must never be lifted using a hoist or other lifting equipment which uses cables.

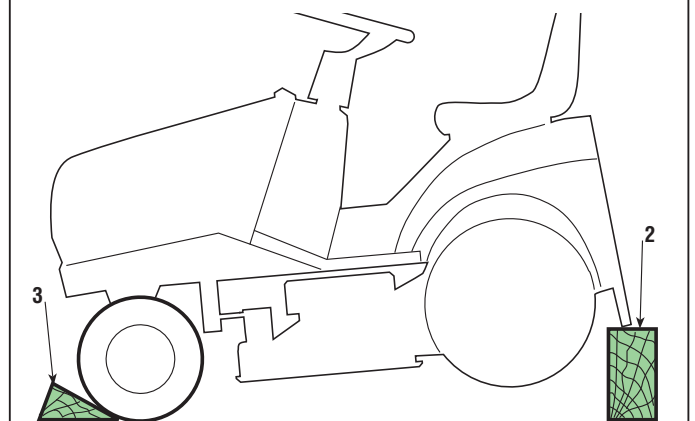
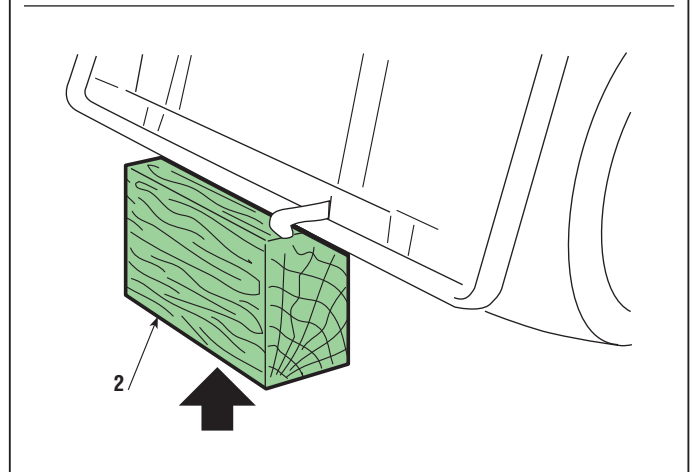
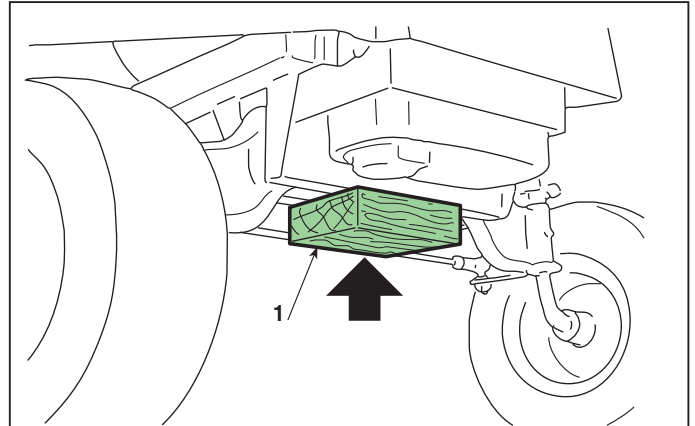


A) Front

ONCE THE PARKING BRAKE HAS BEEN ENGAGED, the machine can be lifted using a jack which pushes on the underside of the frame, placing a wood block **(1)** between the base of the jack and the frame and checking to see that the free movement of the front spring equaliser has not been obstructed.

B) Rear

Place a suitable block **(2)** beneath the lower edge of the plate. In any case, an appropriately sized wedge **(3)** should be placed behind the opposite wheels to stop the machine from accidentally moving backwards.



2.5 PRACTICAL HINTS

A) Fitting snap rings

One side of the “Benzing” snap rings (1) has a rounded edge and the other a sharp edge.

For maximum grip the rounded part needs to be facing towards the element to be held (2), with the sharp edges on the outside.

B) Joint pivot pins

There are a large number of pivot pins, usually connected to rods, that need to be able to move in various directions.

A typical situation has the pin (3) fixed by a self-locking nut (4) with two anti-friction washers (5) in between the pin (3) and the support element, and between this and the nut (4).

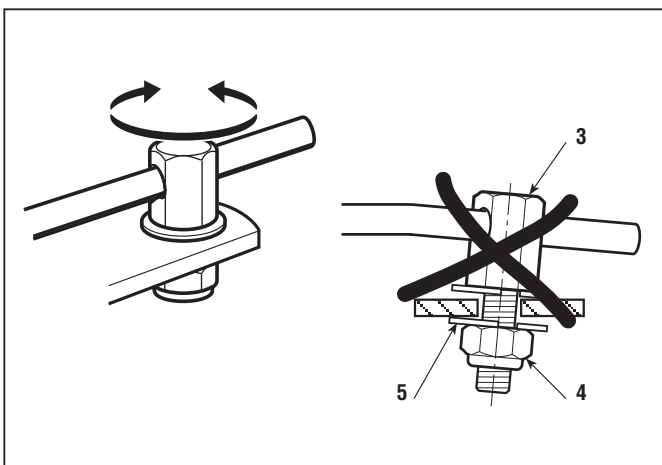
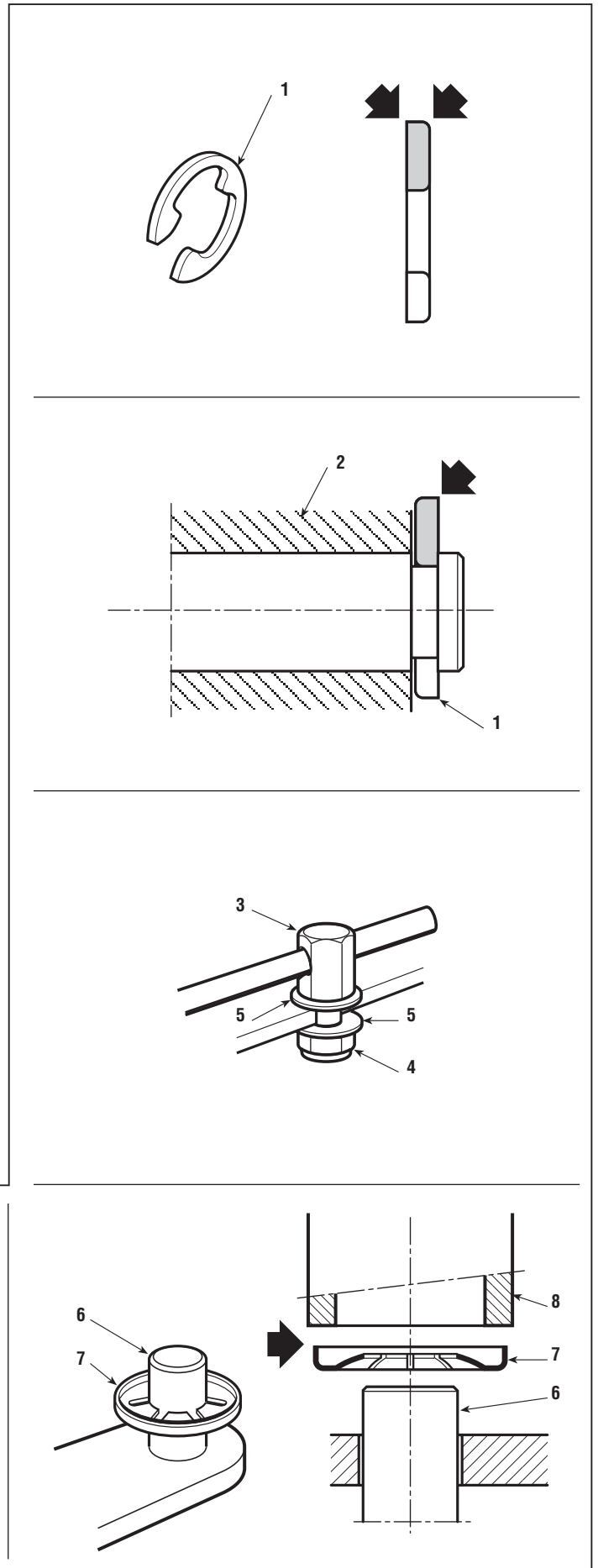
Since these are joints, the nut must never be tightened completely but only so much that it can ensure the free rotational movement of the pin on its axis without, however, creating excessive free play which could result in the parts concerned becoming misaligned and failing to work correctly.

C) Crown fasteners

Some pin ends (6) are secured by crown fasteners (7). During dismantling, these fasteners are always damaged and lose their hold, **so they should never be reused.**

On assembly, make sure it is inserted in the right direction and push the fastener (7) onto the pin using a pipe or socket spanner (8) with the right diameter, so that it can be fitted without deforming the fastener “crown”.

A deformed fastener should always be replaced.



 TC... TX-TS	3.1.1 CRITERIA FOR MAINTENANCE	 from 2000 to page 1 / 1
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3.1 CRITERIA FOR MAINTENANCE

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

For this reason the Service Centre should undertake to keep the machine in perfect working order in two ways:

- a) Tuning the machine whenever possible.
- b) Proposing a regular maintenance programme to the Customer to be carried out at prearranged intervals (for example, at the end of the summer or prior to a long period of inactivity).

a) Occasional tuning

- Check working order of safety devices and renew illegible or missing labels
- Check tyre pressures
- Clean air filter
- Check engine oil level
- Check for fuel leaks
- Aligning the cutting deck
- Sharpen and balance the blades and check the condition of the hubs
- Check for wear in the belts
- Check the blade brake engagement
- Grease front wheels lever joint pins and bushes
- Check tightness of engine screws
- Check all those items indicated in the engine manual

b) Routine maintenance

- **All work carried out in section a), plus:**
 - Check battery charge
 - Check tension of belts
 - Adjust drive engagement (► *mechanical drive models*)
 - Adjust brake
 - Adjust blade engagement
 - Adjust blades brake
 - Check steering allowance
 - Check front bearings
 - General lubrication
 - Clean away grass cuttings and wash exterior
 - Clean and wash inside cutting deck and collector channel
 - Clean and wash grass-catcher
 - Touching up of any damaged paint

4.1 ADJUSTING THE ENGAGEMENT AND CHECKING THE BLADE BRAKE

The blades are driven by the engine by means of a "V" belt and are engaged by an electromagnetic clutch.

After a certain amount of use the belt can become longer which can result in malfunctioning, i.e.:

- belt slipping = belt stretched
- difficulty in disengaging, with the blades continuing to run = belt shortened

In both cases the stretcher needs to be adjusted.

Disengaging the blades causes the cutting in of a brake, incorporated in the electromagnetic clutch, whose task is to stop the blades from rotating within five seconds.

A) Adjusting blade engagement

With the cutting deck in its lowest position, look for the adjuster (1) which is placed under the footboard on the left side and turn the nuts, with the blades engaged, until the spring (2) reaches a variable length «A» according to the different versions of the machine, as follows:

A = 113 ÷ 115 mm - for mod. 102

A = 90 ÷ 91 mm - for mod. 122

NOTE

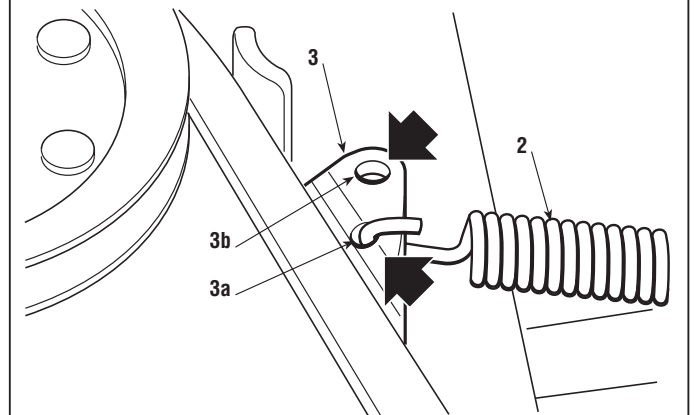
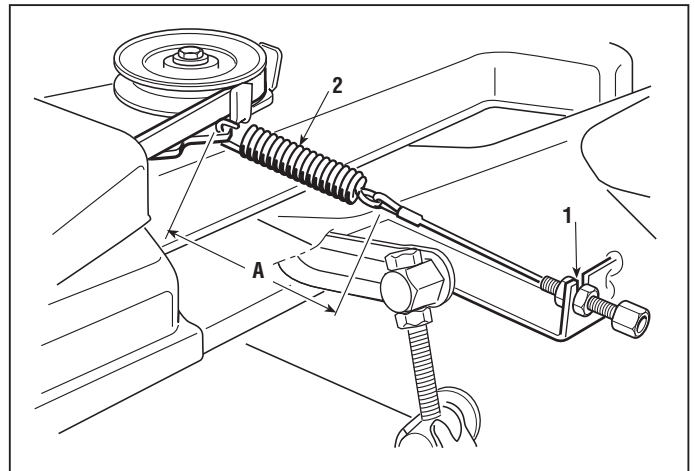
The hook position of the spring (2) on the plate (3) is different for the model 102 (hole 3a) and the model 122 (3b – the only hole on the plate).

B) Checking the blade brake



Correct operation of the brake, which must ensure that the blades stop within 5 seconds from disengagement; **longer stopping times do not comply with the safety standards.**

If the blades do not stop within 5 seconds from disengagement, appropriate checks must be made to the electrical system and the clutch must be replaced if no result is achieved.



4.3 BRAKE ADJUSTMENT

Reduced braking power is corrected by adjusting the spring on the brake rod, which is reached through the inspection hatch beneath the seat.

The adjustment is to be made with the parking brake engaged and consists of altering the length of the spring (4) to the best measurement. The braking capacity is increased by screwing the nut (3) down on the rod (and thus shortening the length of the spring).

Loosen the nut (1) which holds on the bracket (2) and turn the nut (3) until the length of the spring (4) is:

A = 47.5 ÷ 49.5 mm ➤ *for mechanical drive models*

B = 45 ÷ 47 mm ➤ *for hydrostatic drive models:*
measured from the inside of the washers.

When the adjustment has been made, tighten the nut (1).
Never go under these amounts to avoid overloading the brake unit.



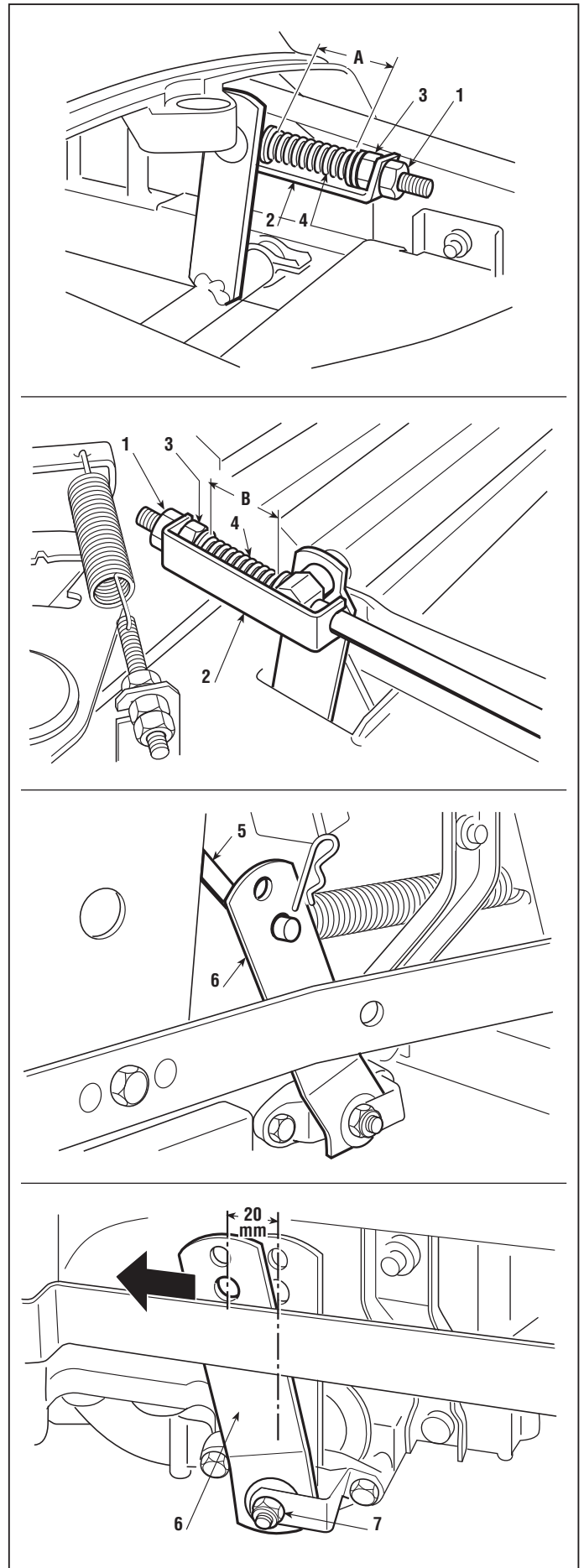
When the adjustments have been made, the parking brake should prevent the machine from moving on a slope of 30% (16°) with the driver in position.

➤ **in mechanical drive models:**



If braking is still poor or unsteady even after making the adjustment, remove the control rod (5) from the lever (6) and check that the latter has an idle stroke of 20 mm (measured on the vertical in correspondence with the pin axis) before braking starts; otherwise the idle stroke can be adjusted using the screw (7), unless the brake pads or disc are so worn that they need replacing [see 6.11].

When connecting the rod (5) be sure to use the **lower** hole in the lever (6) and then check the length of the spring again (4).



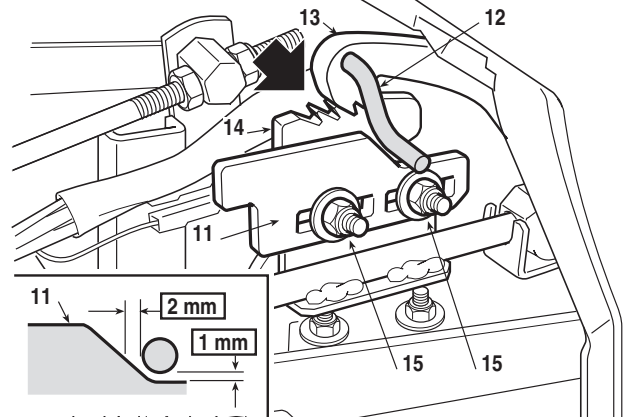
► *in hydrostatic drive models*



If braking is still poor or unsteady even after making the adjustment, you cannot make any further adjustments from the outside. Therefore you need to dismantle the whole rear axle of the machine [see 5.6] and contact one of the manufacturer's Service Centres.

► *In models with cruise control:*

To adjust the release cam (11) position to the pin (12), position the pawl (13) on any tooth on the rack (14), loosen the nuts (15) and adjust the cam (11) to achieve the condition indicated in the illustration.



4.4 DRIVE BELT ADJUSTMENT

If it seems that the forward drive is not working properly after a long period of use or after replacing the belt, this may be caused by a change in the length of the belt.

- *A loose belt reduces output from the drive and limits forward movement power;*
- *a belt which is too tight increases noise and results in jerky movements or tipping up when engaging the drive.*

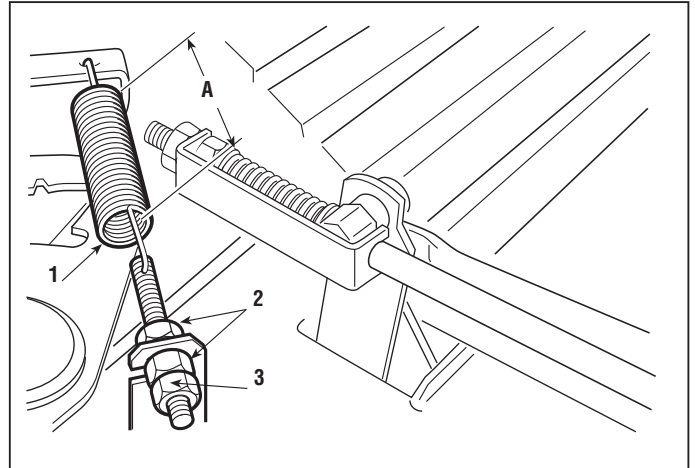
In these cases the stretcher will need to be adjusted.

The stretcher can be accessed from the inspection hatch beneath the seat; adjust the tension of spring **(1)** using nuts **(2)** to set length «**A**» of:

- 114 ÷ 116 mm ► *in mechanical drive models*
- 109 ÷ 111 mm ► *in hydrostatic drive models*

measured from the outer ends of the springs with the drive commands disengaged.

Following adjustment, fully tighten the nuts **(2)** and the locknut **(3)**.



4.5 DRIVE PEDAL ADJUSTMENT (> hydrostatic drive models)

This operation should be carried out every time the rear axle, pedal or control rod is removed, in order to get the correct travel for the pedal and to reach the envisaged speeds both forwards and in reverse.

A) Adjusting the pedal in the “neutral” position

Adjustment of the pedal position must be carried out with the hydraulic unit lever in the “neutral” position (1); this position «N» can be easily recognised as it is forced to stay there by a fastening sphere.

Open the inspection hatch which is placed at the base of the seat; the drive control pedal is in its ideal position when the lever (1) of the hydrostatic unit is in “neutral”, and the internal lever (2) on the pedal axle is perfectly vertical.

This is obtained using a bracket (3), by working on the nuts (4) until reaching the desired situation. Taking care not to accidentally change the position of the lever (1) during the adjustment.

B) Adjusting the “neutral” position of the microswitch



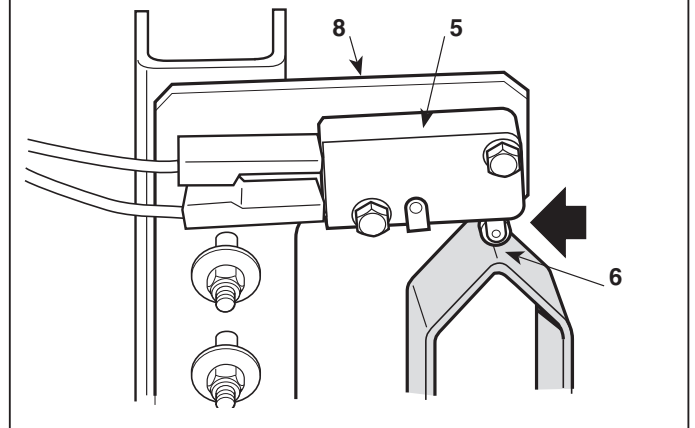
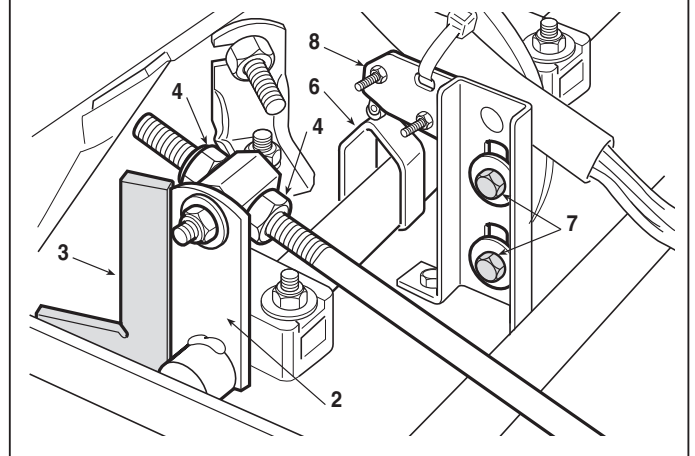
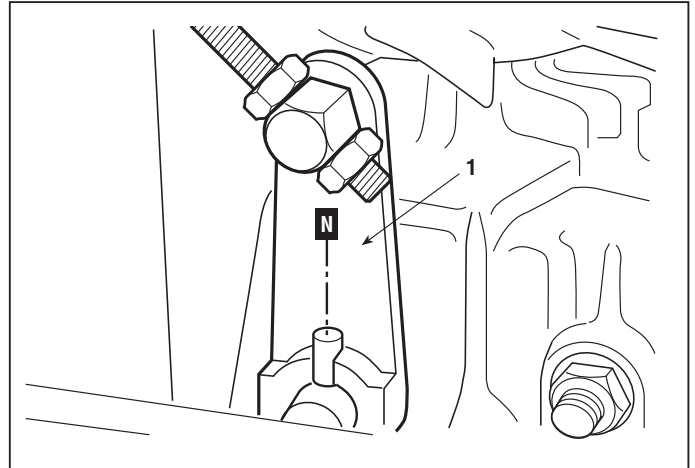
IMPORTANT!

This is a very important adjustment for the correct operation of the safety devices for starting and stopping of the machine during work.

The “neutral” position «N» is indicated by the microswitch (5) of the cam (6), which is reached by the inspection hatch beneath the seat.

After checking that the adjustment “A” has been correctly made, make sure that the pedal is released and in neutral “N” then loosen the screws (7) that fasten the microswitch support (8), until the roller is in line with the tip of the cam, so that the microswitch remains activated [see 7.11].

By moving the pedal in the forward, neutral and reverse positions, make sure that the push-button clicks at every position change before the wheels start moving.



4.6 ALIGNING THE CUTTING DECK

Lowering of the cutting deck is controlled by a linkage operated by the lever and is guided by two front articulation connecting rods.

In order to get a good cut it is essential that the cutting deck is parallel with the ground crosswise, and slightly lower at the front.

Two types of adjustment are possible:

- combined adjustment to the parallel and minimum front and rear height, to be done in the case of cutting irregularities;
- longitudinal deck position adjustment, only needed if the original position was lost during cutting deck replacement and the correct distance from the engine pulley must be reset.

Check the tyre pressures. If one or more tyres have been replaced or you find differences in diameter, **do not attempt to compensate these differences by giving different tyre pressures**, but make the adjustments as in point "A".

A) Combined adjustment to the parallel and the minimum front and rear height

Put the machine onto a flat and stable surface (such as a work bench) and put blocks beneath the cutting deck in line with the centre lines of the blades:

- at the front 26 mm (1)
- at the rear 32 mm (2)

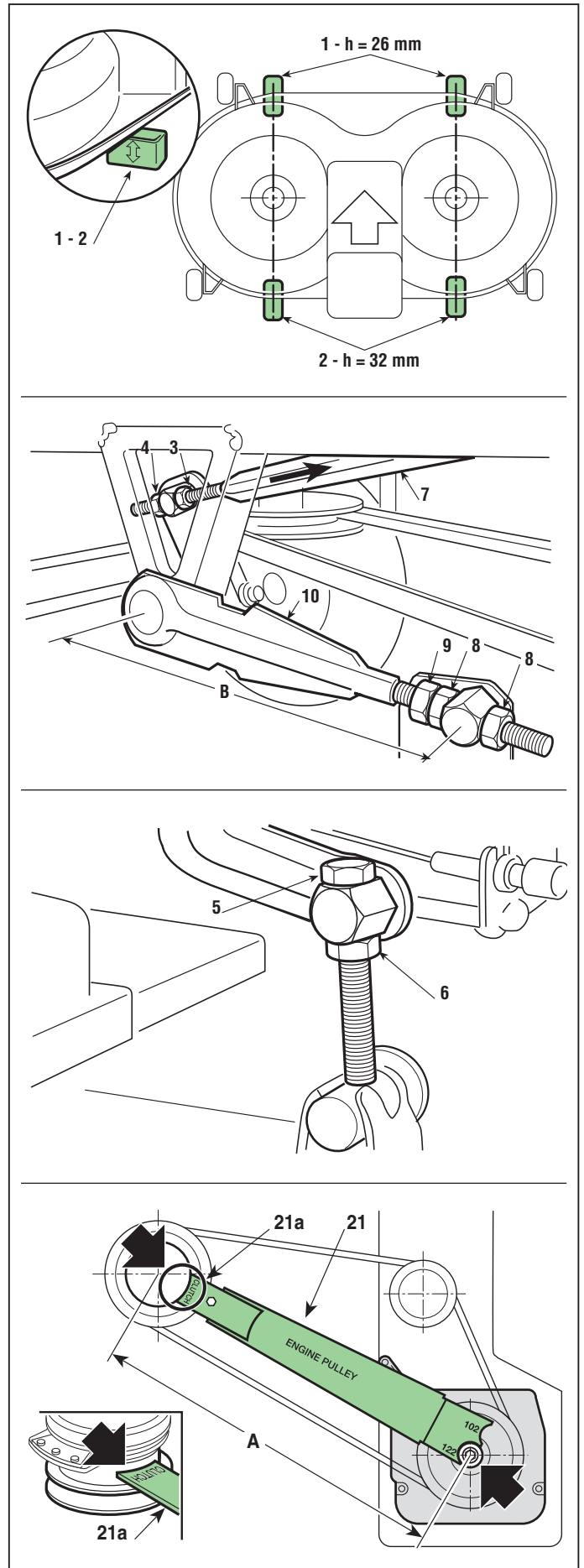
then set the lifting lever to position «1» and slacken off the nuts (3), screws (5) and locknuts (4 - 6) on both the right and left hand sides, so that the deck rests firmly on the blocks.

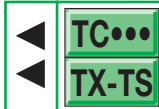
Turn both the rear screws (5) until the rear of the deck begins to rise both at the right and the left, and then tighten the relevant locknuts (6).

Push the two connecting rods (7) to the back and screw down the two nuts (3) on each rod until the front part of the deck just begins to rise both at the right and the left, and then tighten the relevant locknuts (4).

B) Adjustment of the longitudinal position

Put the machine onto a flat and stable surface (such as a work bench) and put blocks beneath the cut-





4.6.0 ALIGNING THE CUTTING DECK

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ting deck in line with the centre lines of the blades:

- at the front 26 mm (1)
- at the rear 32 mm (2)

then set the lifting lever to position «1» and slacken off the nuts (3), screws (5) and locknuts (4 - 6) on both the right and left hand sides, so that the deck rests firmly on the blocks.

Slacken off the nuts (8) and locknut (9) of the two front connecting rods (10) and adjust nuts (8) of the front left connecting rod to set the exact distance «A» of:

- 489 mm (mod. 102)
- 474 mm (mod. 122)

between the centre of the engine pulley hub and the centre of the left blade shaft.

This operation is facilitated by using the checking caliper (11) suitably positioning the engine side terminal (11a) depending on whether the electromagnetic clutch is present or not.

Distance «B» is set by using the corresponding front right connecting rod nuts **to obtain the same measurement, so that the outlet is perfectly centred with respect to the collector channel;** then fully tighten the nuts (8) and locknut (9).

NOTE

It is very important that distance «B» is the same on both the left and right hand sides, to prevent the belt from rubbing against the collector channel.

Turn both the rear screws (5) until the rear of the deck begins to rise both at the right and the left, and then tighten the relevant locknuts (6).

Push the two connecting rods (7) to the back and screw down the two nuts (3) on each rod until the front part of the deck just begins to rise both at the right and the left, and then tighten the relevant locknuts (4).

4.7 STEERING ALLOWANCE ADJUSTMENT

The steering allowance should never be excessive if driving is not to be impaired.

Check that the movement is not caused by loose linkage nuts and tighten all the nuts of the tie-rods and ball joints.

If the movement is due to the ring gear / pinion coupling, it will be necessary to adjust the arrangement of the set of blocks between the ring gear and the frame.

Release the spring (1) and lift the steering column (2) enough to be able to draw out the pinion (3).

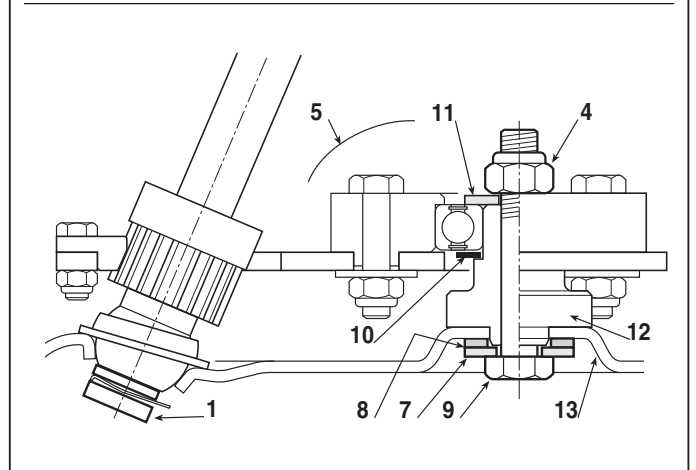
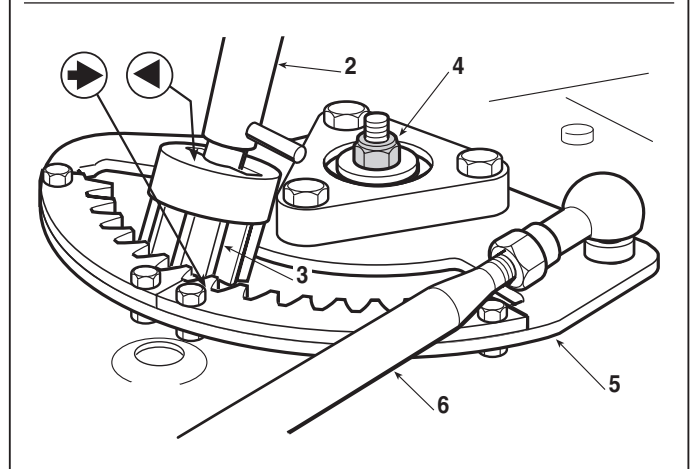
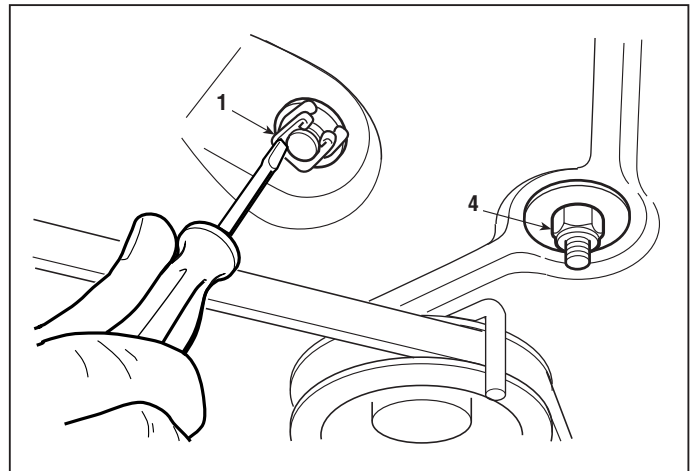
Unscrew the nut (4) and take out the whole ring gear shaft (5) without dismantling the tie-rod (6), being careful not to lose the washers (7) and (8) under the screw head (9).

Remove one or both of the shims (10) under the ring gear according to the amount of allowance to be recovered and reposition those removed under the upper washer (11) to leave them available for future use.

If the movement is still there after having removed all the spacers, check and, if necessary, replace the ring gear/pinion unit [see 6.3], or look for other possible causes.

Upon assembly, make sure the pin (12) is correctly centred to the chassis housing (13), accurately reposition the two washers (7 - small hole) and (8 - large hole) under the screw head (9) and fully tighten the nut (4).

Reassemble the pinion and the ring gear shaft, lining up the two reference points (→ - ◀) punched on them.



Tightening torque

4	Nut for Ring gear	45 ÷ 50 Nm
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4.8 STEERING GEOMETRY ADJUSTMENT

The correct steering geometry is given by the values of the centre distance between the joints of the tension rod and the wheel connecting rod. Any faults caused by knocks or accidents result in reduced driving precision and increased wear on the tyres. These can be overcome as follows:

- uneven or excessive wear on the front tyres = toe-in adjustment
- the machine does not maintain a straight line when the steering wheel is straight = adjustment of tie-rods.

NOTE

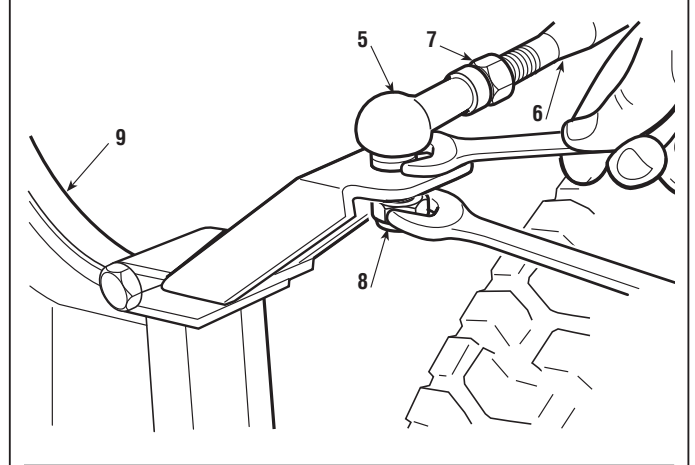
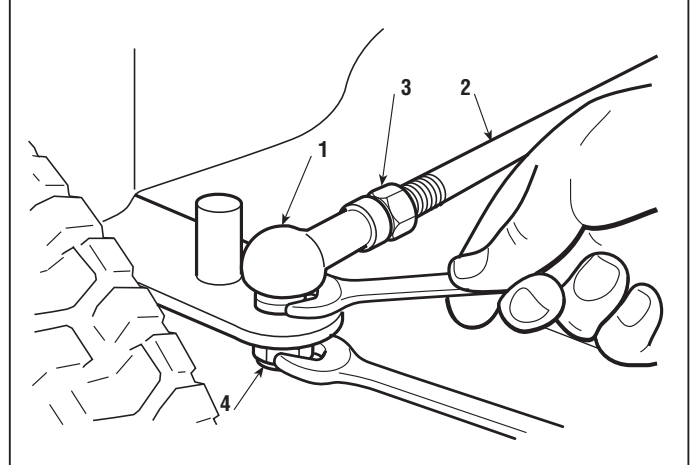
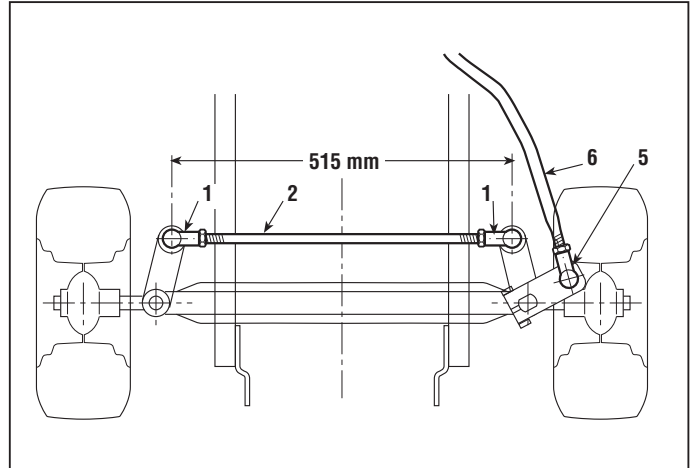
Before any other action, check that the joint fastenings have not become loose.

A) Toe-in adjustment

An exact toe-in is achieved with a centre distance of 515 mm which is measured between the centres of the articulated joints (1) of the wheel connection rod (2). If a different distance is found, dismantle one or both the joints and screw or unscrew them on the rod (6) as much as necessary. On assembly, fully tighten the locknuts (3) and the fastening nuts (4) of the joints.

B) Adjustment of the steering wheel

Firstly check the toe-in (point "A") and align the front wheels. If the steering wheel is not straight, dismantle the articulated joint (5) and screw or unscrew it on the tie-rod (6) as much as necessary. On assembly, fully tighten the locknut (7) and the fastening nut (8) and check that the tie-rod, in its travel, **does not interfere with parts or accessories of the engine** even with the equaliser (9) angled in both directions.



Tightening torques

3 - 7 Locknuts for articulated joints 25 ÷ 30 Nm

4 - 8 Nuts for articulated joints 45 ÷ 50 Nm

4.9 CHECKING BLADES ALIGNMENT

Excessive vibration when cutting and an uneven cut can be due to misalignment of the blades owing to deformation of the flanges or the shafts as a result of accidental knocks.

➡ Put the machine into a vertical position



Always wear strong gloves when handling the blades.

To check the alignment of the blades, one of them must first be removed and refitted after having removed the shaft key (2), to permit independent blade rotation.

NOTE

Take note of the unscrewing and screwing direction of the central screw of each blade (1) [see 4.10]. With the blades disengaged, firmly hold each blade and bring the cutting edges together in the various positions possible (A-B; A-B1; A1-B1; A1-B). At each position they should be aligned to within 2 mm.

If higher amounts are found, check that the blades are not distorted. If this is not the case, check the supports or the shafts for the blades [see 6.9], replacing if necessary, and check the condition of the point where the flanges rest on the cutting deck.

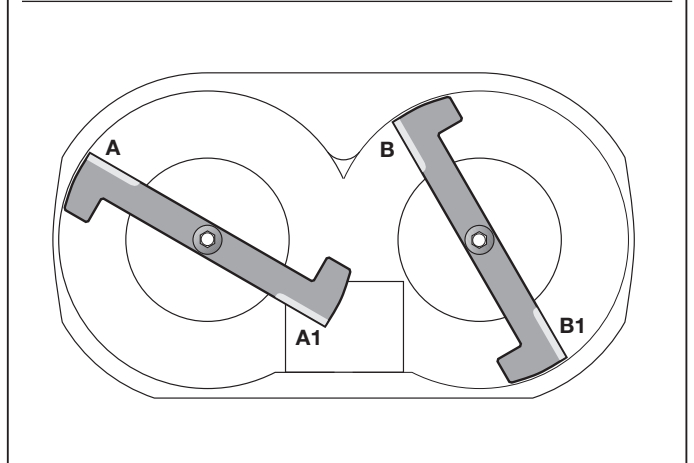
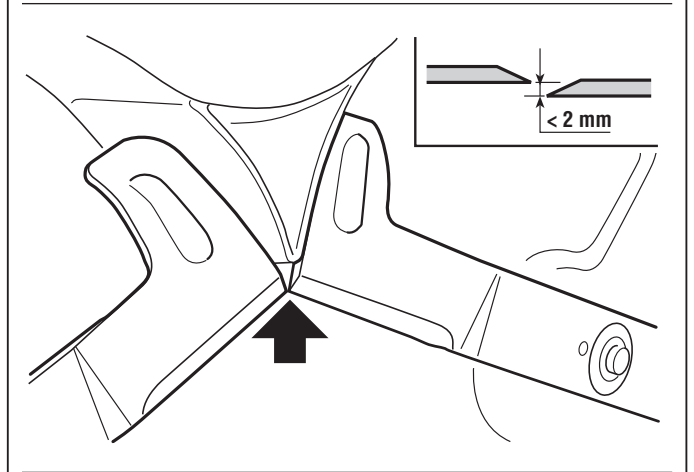
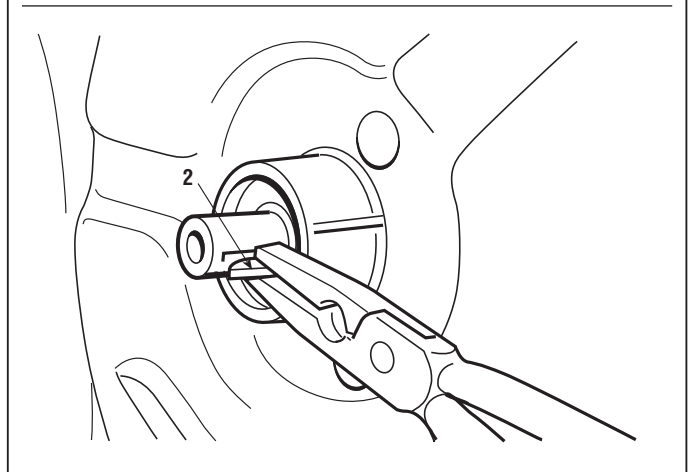
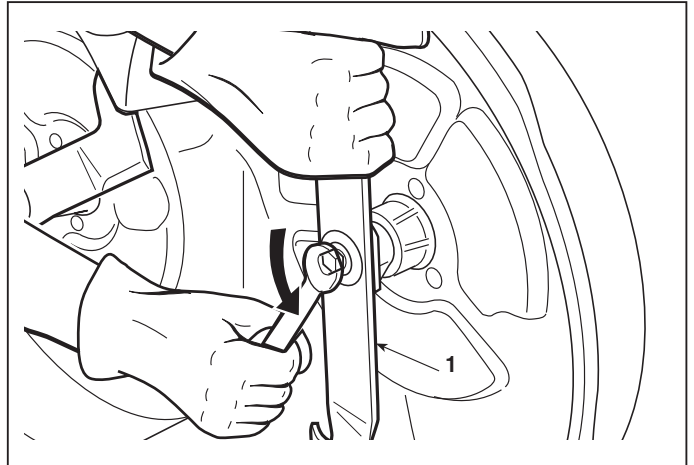


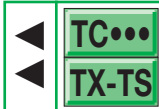
IMPORTANT!

Always replace damaged blades and do not attempt to repair or straighten them. Always use manufacturer's genuine spare parts!



Having made the check, remember to refit the shaft key (2) and check that the rotating blades do not interfere with each other during a whole revolution.





4.10.2 - REMOVING, SHARPENING AND BALANCING THE BLADES

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4.10 REMOVING, SHARPENING AND BALANCING THE BLADES

A badly sharpened blade causes grass to become yellow and reduces grass collection capability. If not balanced, excessive vibration can be caused during use.



Always wear protective gloves when handling the blades and protect eyes when sharpening.

A) Removing and reassembling

For removing a blade it must be firmly held and the central screw **(1)** undone, bearing in mind that:

- the screw on the left blade **(1a)** is unscrewed anti-clockwise
- the screw on the right blade **(1b)** is unscrewed clockwise.



On assembly, be careful to:

- correctly position the keys **(3)** on the shafts;
- correctly locate the right and left blades, with the fins facing towards the inside of the plate;
- fit the flexible disc **(4)** so that the concave part is pressing against the knife;
- tighten the screws **(1 - 1a)** with a torque wrench set to 45-50 Nm.

B) Sharpening and balancing

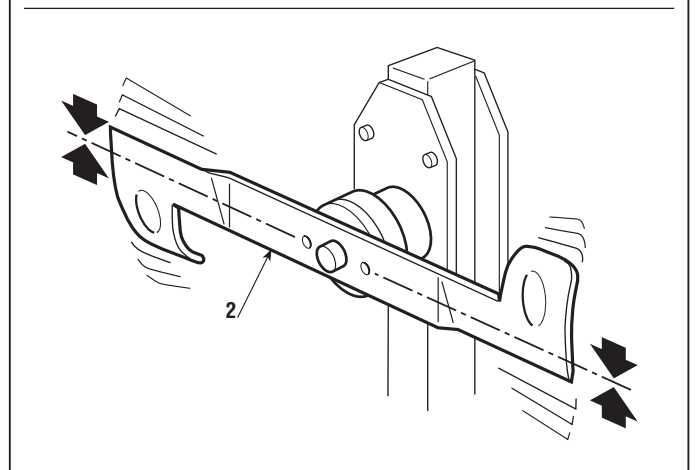
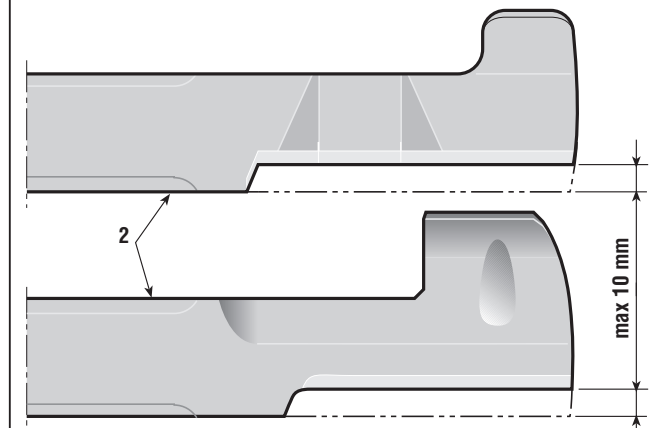
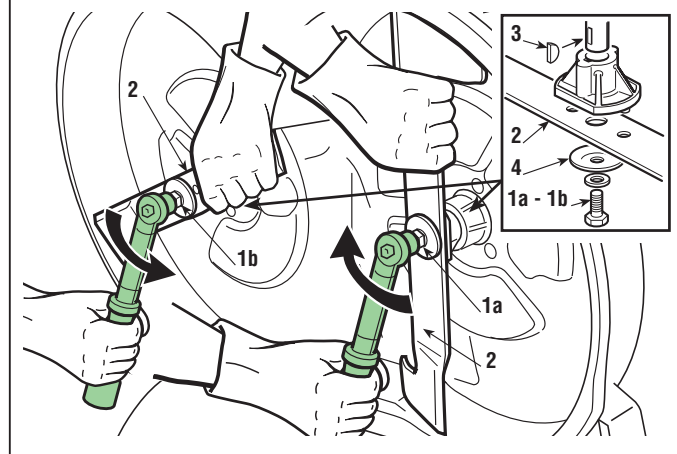
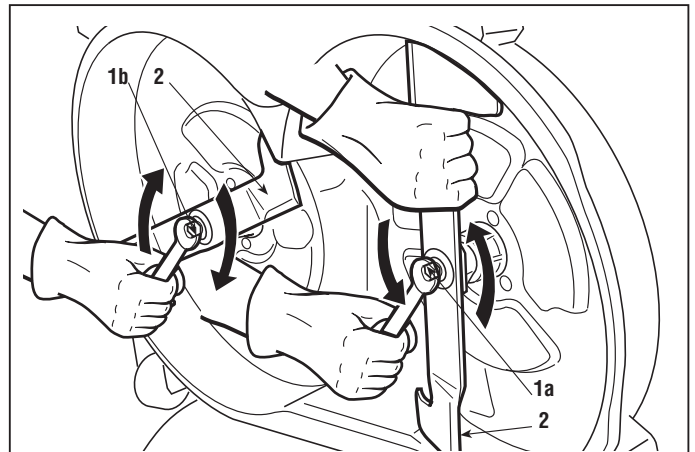
Always sharpen both cutting edges of the blade **(2)** using a medium grade grinder. Sharpening must only be done from the rounded side, removing as little material as possible.

The blade is to be replaced when the cutting edge has worn down to 10 mm.

Using the appropriate equipment, check the balance to make sure that there is a maximum difference of 2 grams between one side and the other.

Tightening torques

1a	Screw for left blade	45 ÷ 50 Nm
1b	Screw for right blade	45 ÷ 50 Nm



5.1 REMOVAL OF FRONT HOOD

The removal of the front hood gives greater accessibility to:

- the engine and its accessories
- the silencer and protection devices

To remove the hood, disconnect the connector to the lights (1).

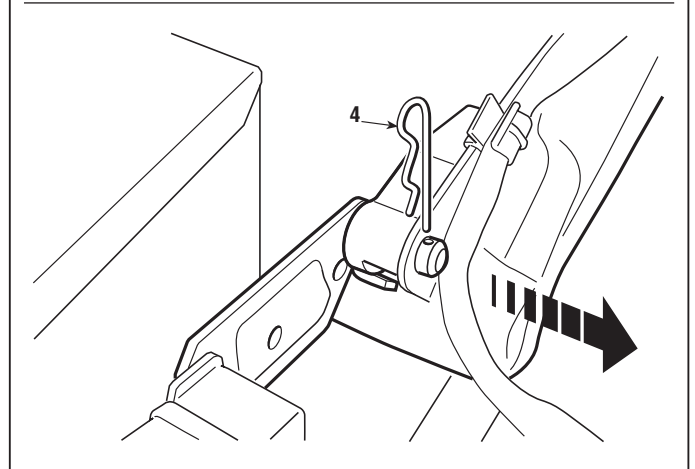
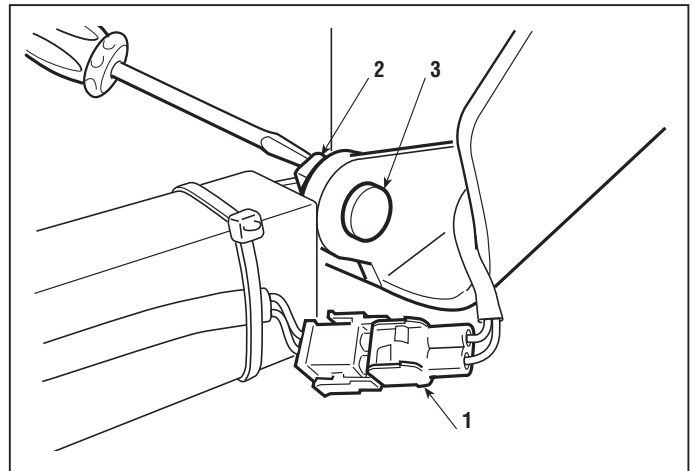
The hood can be secured in two ways.

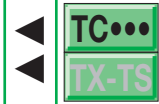
A) Fixing with springs

Unhook the two fastener springs (2) and pull out the pins (3).

B) Fixing with a split pin

Take out the split pin (4) from the right-hand side and remove the hood by moving it to the right.





5.2.3 REMOVAL OF THE WHEEL COVER

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page 1 / 2

5.2 REMOVAL OF THE WHEEL COVER

Removing the wheel cover gives access to:

- the mount for the lever to raise the deck;
- the supports of the footboards.

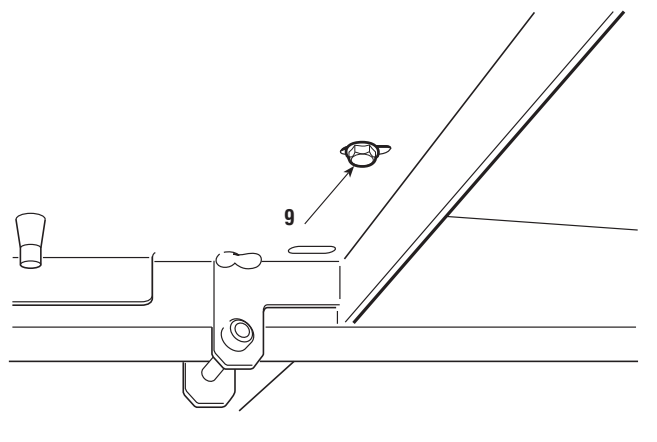
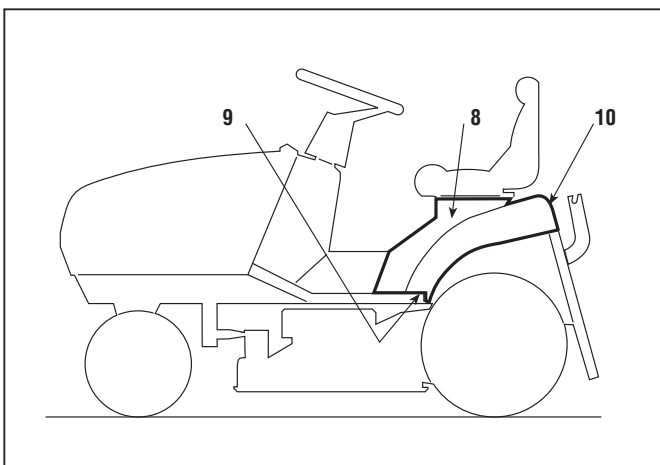
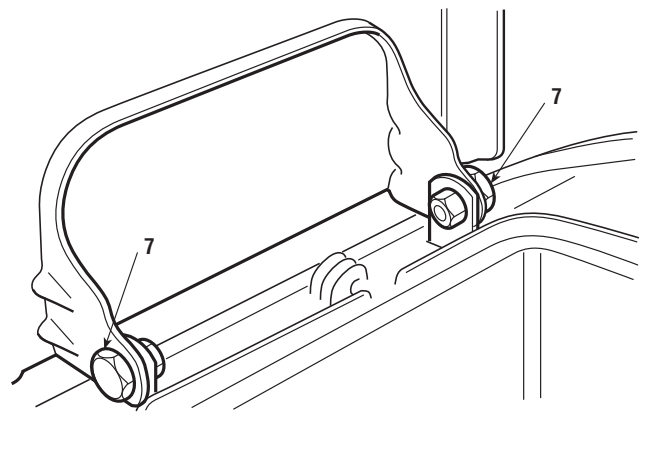
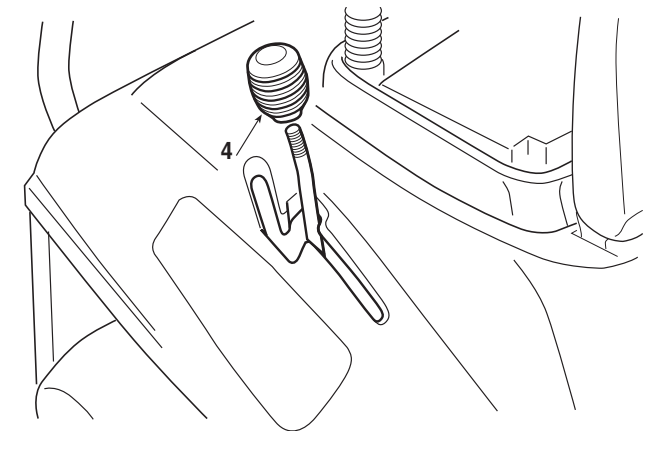
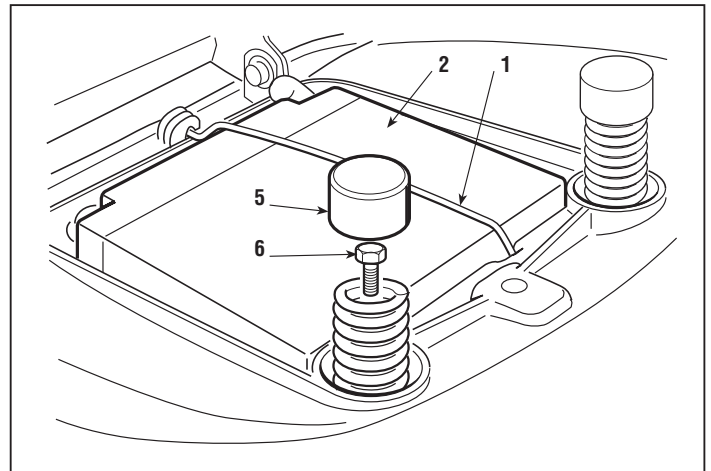
Remove the spring **(1)** fixing the battery, ensuring that accidental short circuits are not caused; first disconnect the black cables (earth), then the red cable (positive) and remove the battery **(2)**.

► **for mechanical drive models:** unscrew the gear lever knob **(4)**.

Remove the caps **(5)** from the springs and undo the screws inside **(6)**.

Remove the seat after having dismantled the two pins **(7)**.

The cover **(8)** is fixed by two screws **(9)** located under the side footboards and two screws **(10)** fixing it to the rear plate.



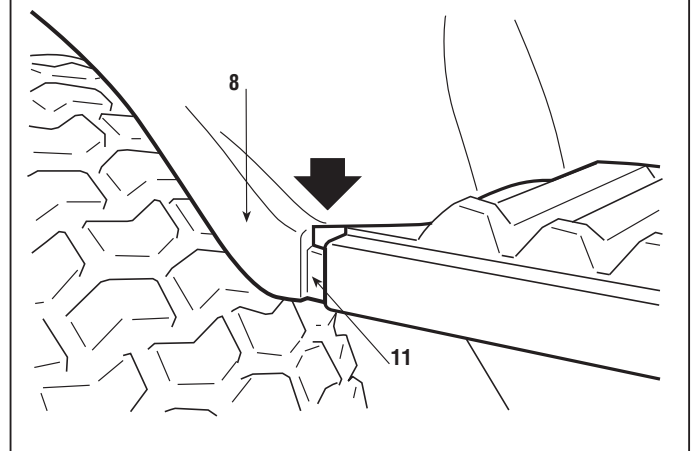
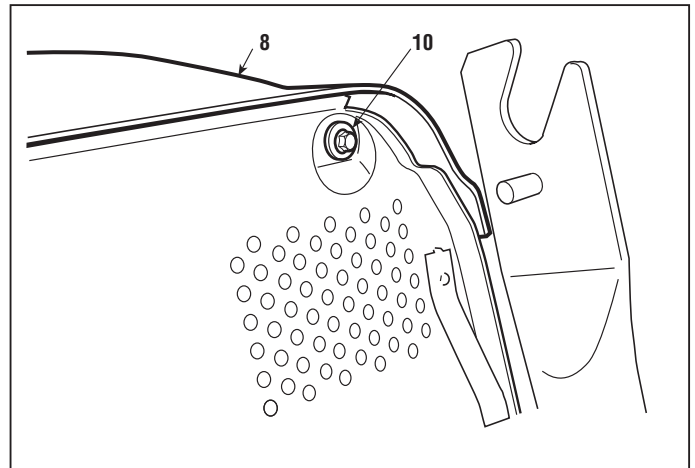


5.2.3 REMOVAL OF THE WHEEL COVER

▶ from 2001 to
▶ page ◀ 2 / 2

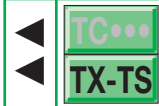
The cover can be removed after the cutting height adjustment lever has been set to its highest position.

On reassembly, ensure that the two side tabs (**11**) of the cover are correctly inserted into the housings in the footboards.



Tightening torques

9	Lower cover fixing screw	4.0 ÷ 4.5 Nm
10	Upper cover fixing screw	4.0 ÷ 4.5 Nm



5.2a.1 REMOVAL OF THE WHEEL COVER

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5.2a REMOVAL OF THE WHEEL COVER

Removing the wheel cover gives access to:

- the mount for the lever to raise the deck;
- the supports of the footboards.

➔ Remove the dashboard and front cover [see 5.4a].

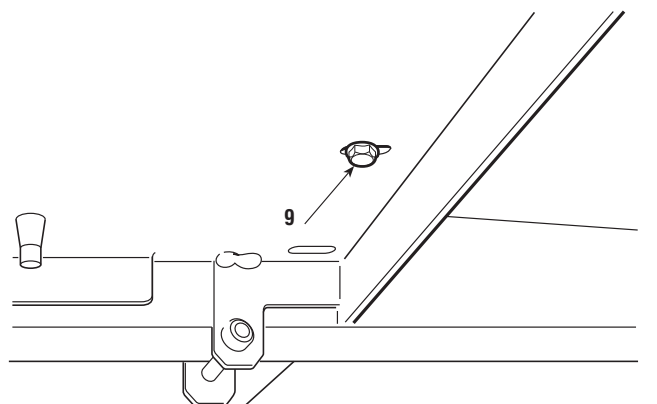
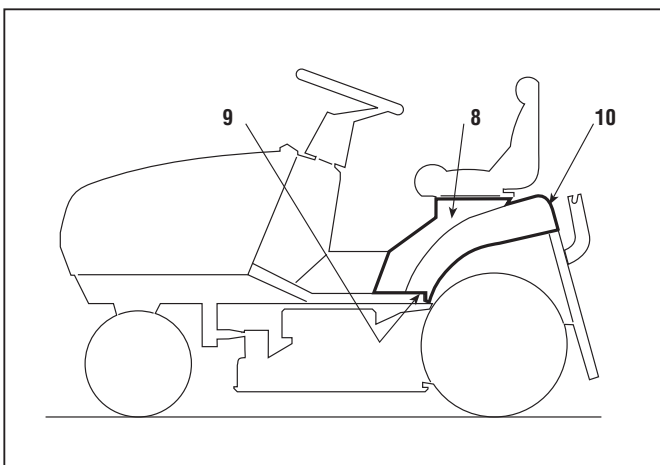
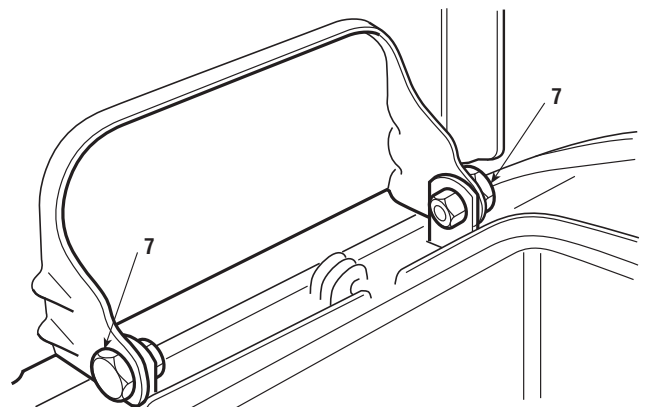
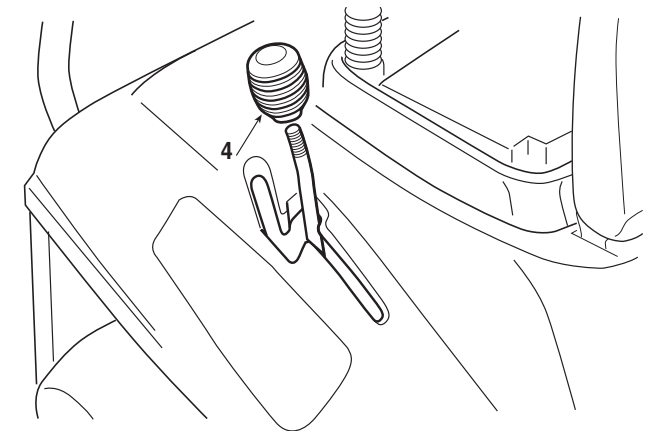
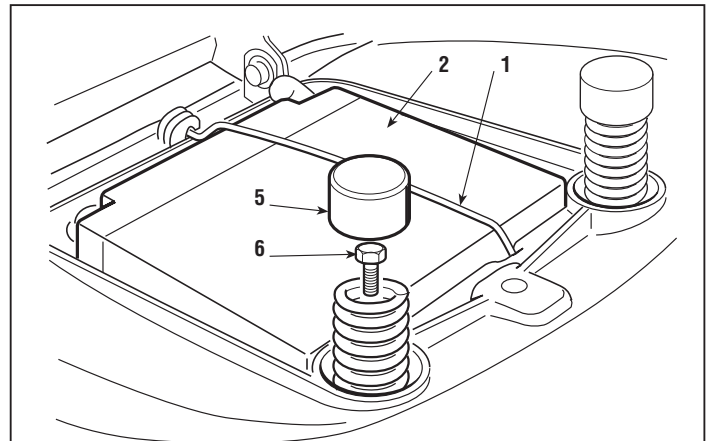
Remove the spring **(1)** fixing the battery, ensuring that accidental short circuits are not caused; first disconnect the black cables (earth), then the red cable (positive) and remove the battery **(2)**.

➤ **for mechanical drive models:** unscrew the gear lever knob **(4)**.

Remove the caps **(5)** from the springs and undo the screws inside **(6)**.

Remove the seat after having dismantled the two pins **(7)**.

The cover **(8)** is fixed by two screws **(9)** located under the side footboards and four screws **(10)** fixing it to the rear plate.





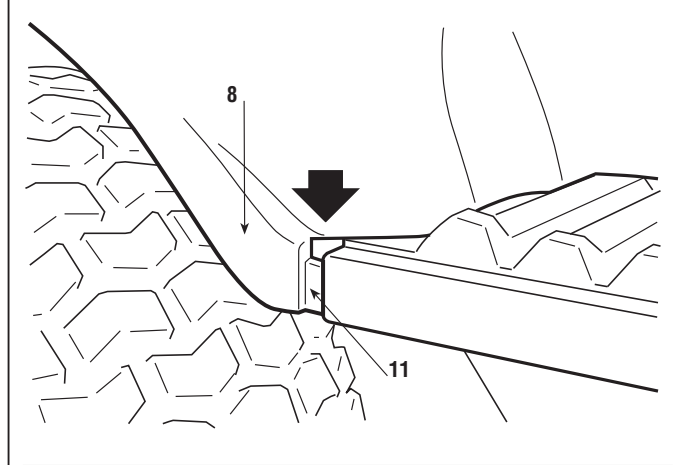
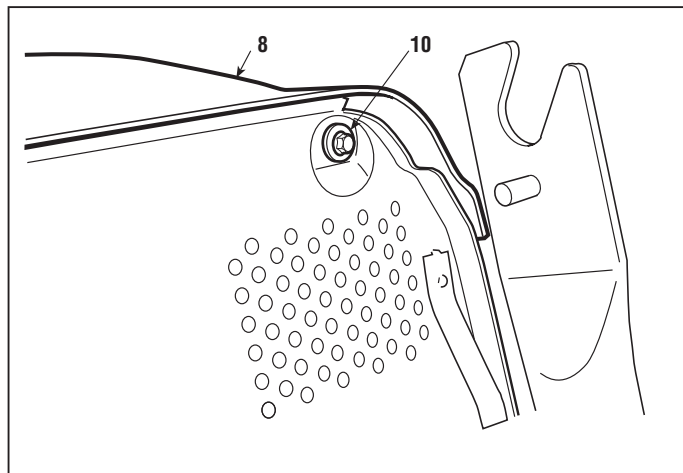
5.2a.1 REMOVAL OF THE WHEEL COVER

▶ from 2006 to
▶ page ◀ 2 / 2

The cover can be removed after the cutting height adjustment lever has been set to its highest position.

On reassembly, ensure that the two side tabs (**11**) of the cover are correctly inserted into the housings in the footboards.

➡ Refit the dashboard and front cover [see 5.4a].



Tightening torques

9 Lower cover fixing screw	4.0 ÷ 4.5 Nm
10 Upper cover fixing screw	4.0 ÷ 4.5 Nm

5.3 REMOVAL OF THE COLLECTOR CHANNEL

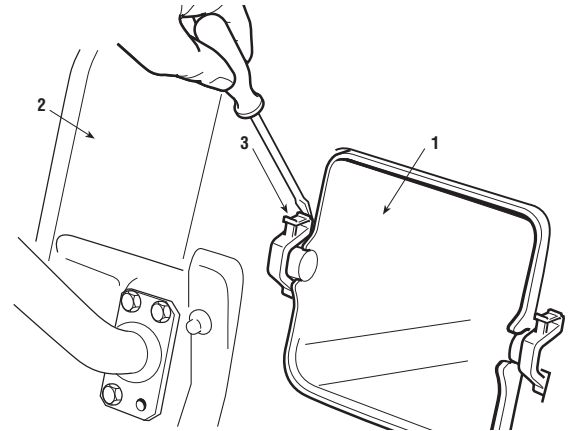
Removing the collector channel gives access to:

- the small side wheels of the drive belt;
- the traction engagement control rod (► in hydrostatic drive models).

Removal of the collector channel is indispensable for dismantling the cutting deck and if the rear plate is to be removed.

The conveyor (1) is connected to the rear plate (2) by two plastic clamps (3), removable with the help of a screwdriver.

On assembly, ensure the free vibration of the conveyor at each plate height variation.



5.4 REMOVAL OF THE DASHBOARD

The dashboard is removed to make the following more accessible:

- the accelerator;
- the ignition block,
- various electrical components.

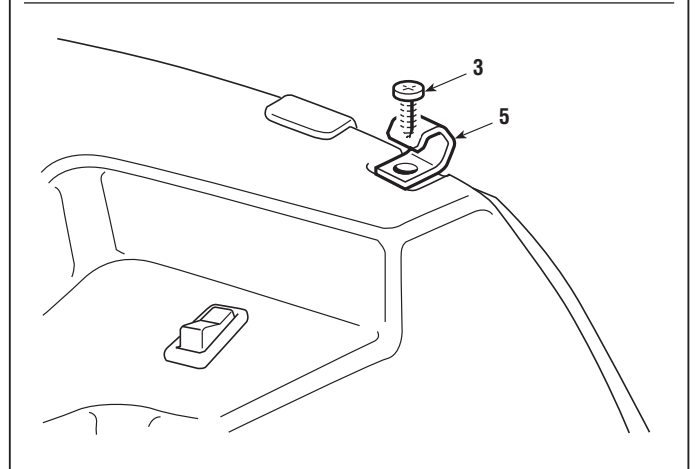
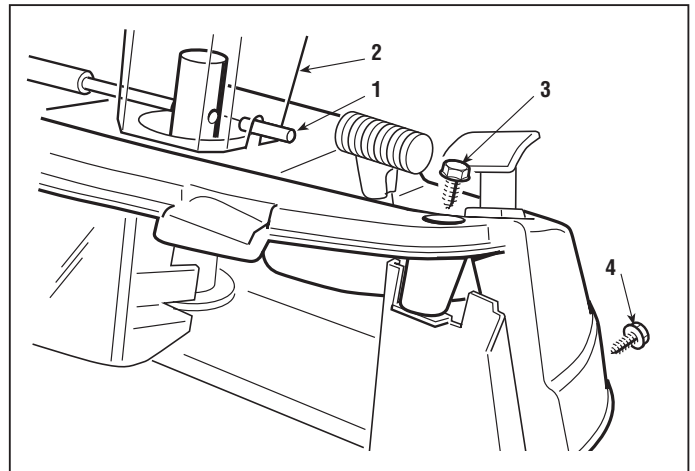
With some drives it could be necessary to remove the dashboard before it is possible to dismantle the fuel tank.

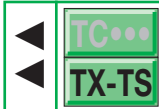
Use a 5 mm diameter round bar to remove the pin **(1)** and take out the steering wheel **(2)**.

Disconnect the end of the accelerator cable from the engine and disconnect all electrical connections and the starter cable (where fitted).

At this point it is possible to remove the dashboard, which is fixed to the frame by four self-threading screws **(3)** and **(4)**. The screws **(3)** are covered by plastic caps on some models.

On reassembly, on some models, the direction of the springs **(5)** must be adjusted in relation to the position of the hood, to ensure fastening.





5.4a.1 - REMOVING THE DASHBOARD AND FRONT COVER

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5.4a REMOVING THE DASHBOARD AND FRONT COVER

Removing the dashboard gives better access to:

- the accelerator
- the ignition block,
- various electrical components.

With some types of engine it could be necessary to remove the dashboard before the tank can be dismantled.

Removal of the dashboard and front cover is necessary before the wheel cover can be dismantled.

A) Removing the dashboard

Use a screwdriver to remove the central cover (1a) of the steering wheel (1), being careful not to damage it.

Unscrew the screw (2), remove the Belleville washer (3) and washer (4) and remove the steering wheel (1).

Unscrew nut (5) and dismantle the ignition key block (6) without disconnecting the electric cables, to prevent reassembly errors.

► **In models with cruise control:**

Loosen the screw (7) and remove the control knob (8).

Disconnect the accelerator cable terminal from the engine and disconnect all remaining electrical connections and the starter cable (where present).

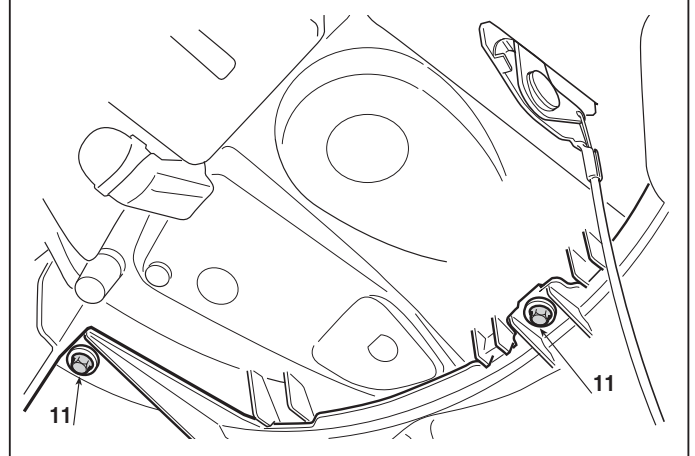
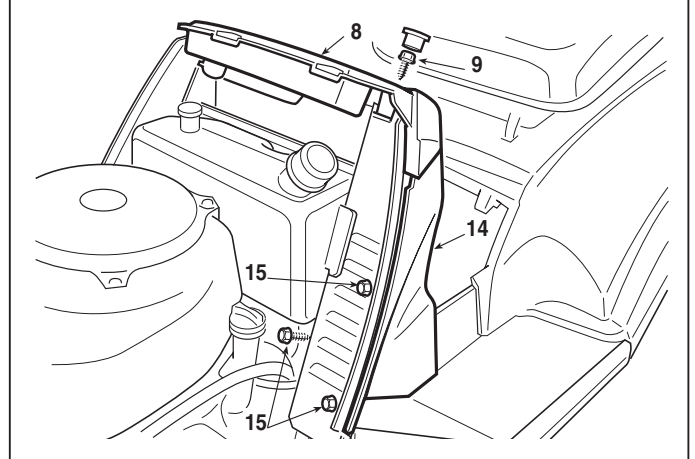
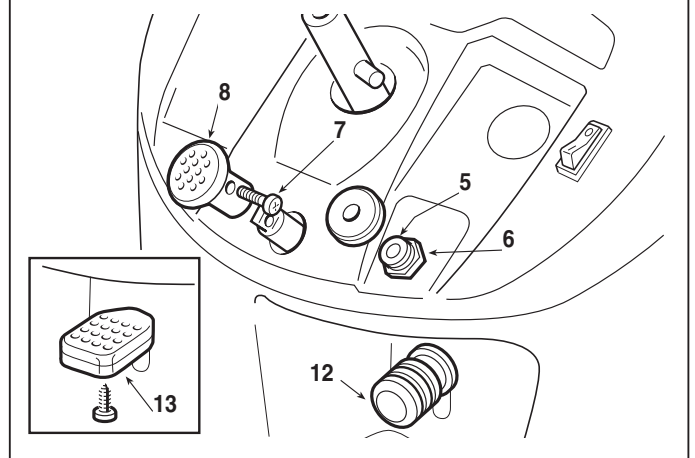
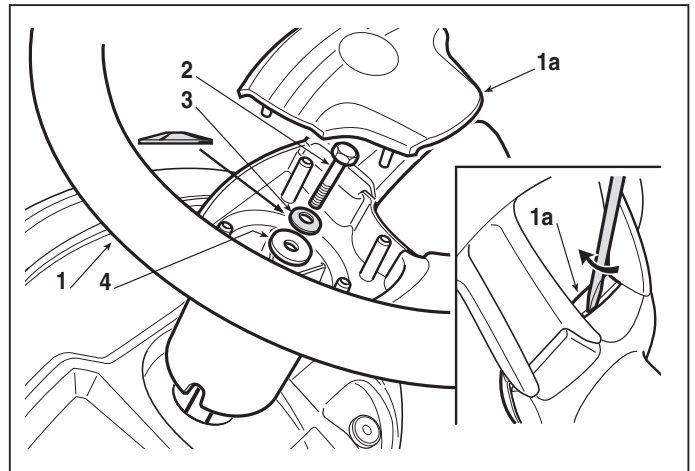
The dashboard (9) can be removed at this point; it is fixed to the chassis by two upper screws (10), covered by plastic caps, and three lower screws (11).

On assembly, follow the steps described in reverse, being careful to restore wheel alignment with the steering wheel, install the Belleville washer (3) with the concave part facing down and fully tighten the screw (2).

B) Removing the front guard

➡ Remove the dashboard [see point "A"].

Remove the parking brake lever knob (12) or (13) and dismantle the front guard (14) fixed to the chassis by six screws (15).



5.5 REMOVAL OF THE ENGINE

Since there are different types of drive, the stages described here refer to those shared or similar in all types of engine.

➔ Remove the front hood [see 5.1].

➤ **for models with electromagnetic clutch:** loosen and detach the adjuster (1) to slacken the belt.

It is also advisable to slacken the transmission belt for easier access to the parts involved; this is done by ...

➤ **in mechanical drive models:** engaging the parking brake.

➤ **in hydrostatic drive models:** slackening the stretcher [see 4.4].

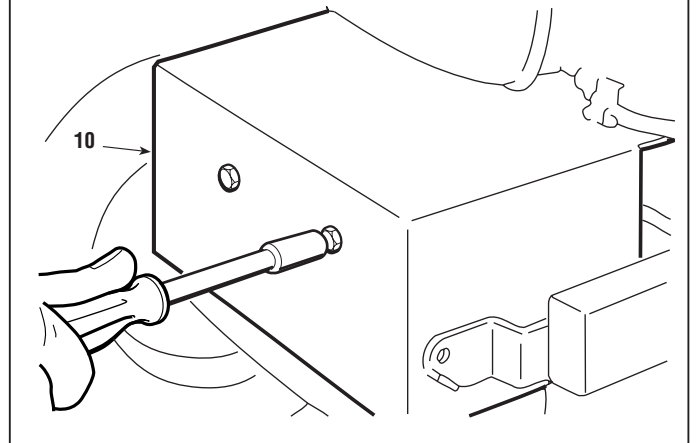
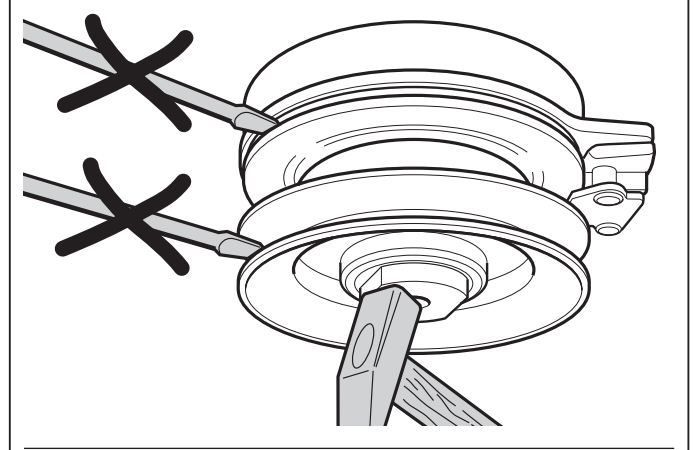
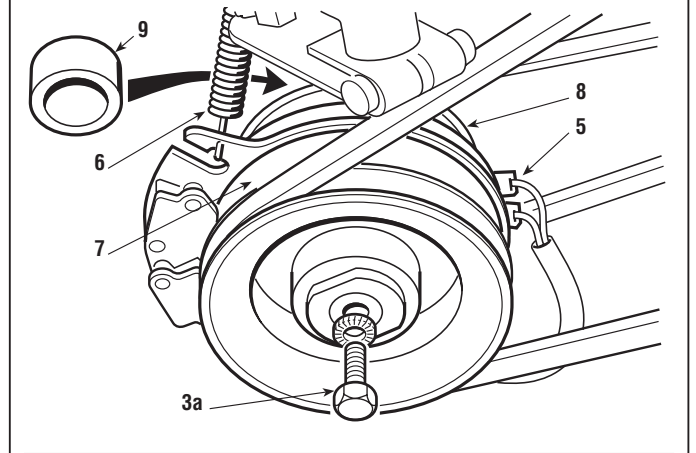
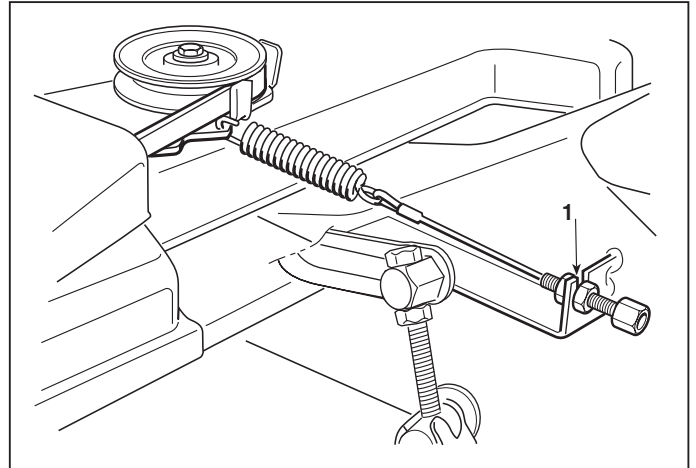
➤ **for models with electromagnetic clutch:** disconnect the connector (5), unhook the check spring (6) from the clutch side and undo the central screw (3a); remove the clutch (7) from the shaft, together with the transmission control pulley (8) and spacer (9).

IMPORTANT - To remove the clutch (7) from the engine shaft, **absolutely do not use a lever to force the pulleys or the outer cover.** In case of difficulty, apply an unlocking spray and gently tap on the hub with a hammer, to facilitate extraction.

Remove the protection from the exhaust (10) and disconnect the cable control from the accelerator and all the electrical wires.



Detach the fuel line pipe, **taking care not to spill fuel.**




Find and undo all the screws holding the engine to the frame, grip the engine firmly and lift it, taking the necessary care bearing in mind that its weight is around 35 - 45 kg.

NOTE

Some engines are held with screws of different length and in different positions, so it is best to label them so that no errors are made on reassembly.

On reassembly, fully tighten the screws for the engine and the pulley to the amounts shown.

► **for models with electromagnetic clutch:** Reassemble the spacer (9), with the countersink facing the engine. Ensure that the pin (11) is inserted into the clutch spline (7) and remember to refit the spring (6).

 Remember to fit the clamps back on the fuel pipe and **check that it does not leak**. Reattach all the electrical and earth contacts and refit the protection covers.

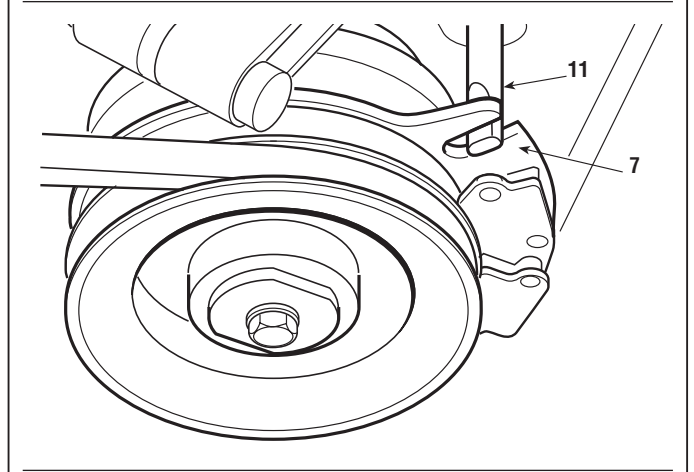
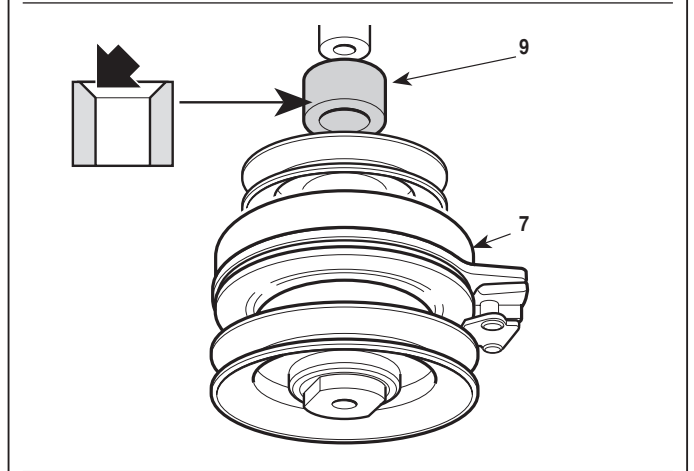
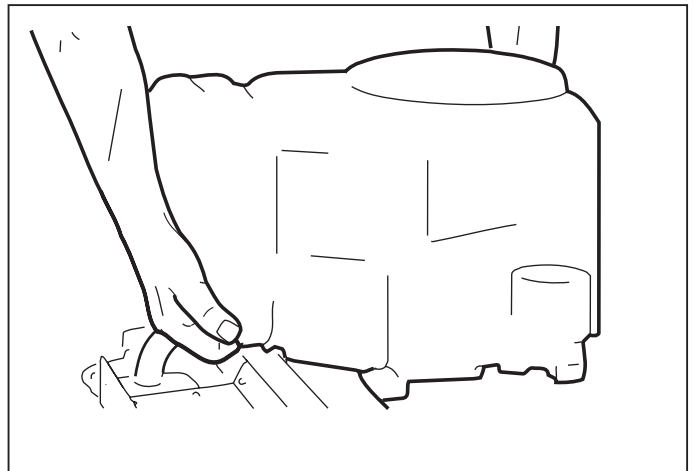
► **for hydrostatic drive models:** reset the stretcher spring tension should it have been slackened [see 4.4].

- Reattach the accelerator cable and ...
- ➡ Adjust the «MINIMUM» position [see 6.10].
 - ➡ Refit the front hood [see 5.1].

► **for models with electromagnetic clutch:** reset the adjuster (1) and check the spring tension [see 4.1].

Tightening torques

- 3-3a** Screw for pulley 45 ÷ 50 Nm
- Screws for engine fastening 25 ÷ 30 Nm



5.6 REMOVAL OF THE REAR AXLE (Dana 4360-196)

The rear axle (Transaxle) is made up of a single maintenance free sealed unit which includes the transmission unit (mechanical) and the differential and doesn't need any maintenance.
It only needs to be removed to be replaced or for an overhaul by the Manufacturer's Service Centre.

➡ Remove the collector channel [see 5.3].

Place two spacers **(1)** of approximately 150 mm under the two ends of the rear plate.

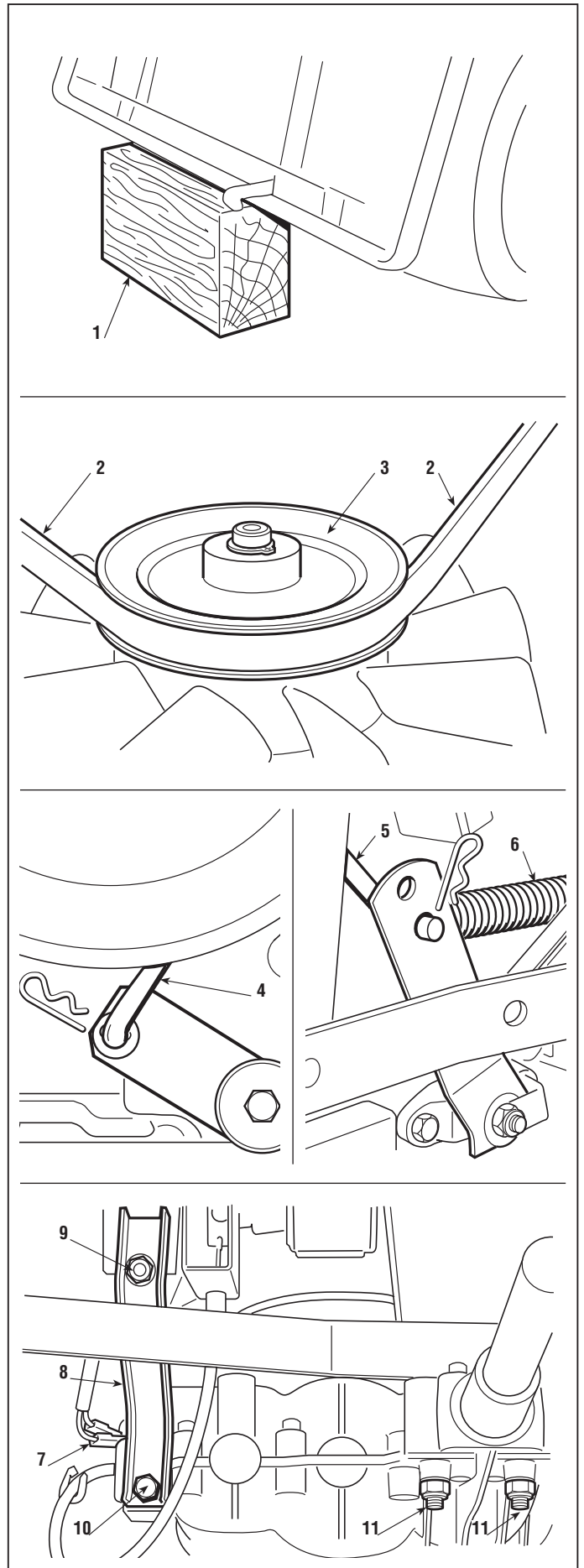
➡ Remove the rear wheels [see 6.1].

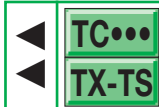
Through the outlet, grip the two ends of the belt **(2)** and pull it enough to free it from the race of the pulley **(3)**, so overcoming the resistance of the stretchers on the jockey pulley.

Disconnect the gear lever rod **(4)**, the brake control rod **(5)** with spring **(6)** and then disconnect the "neutral" signal microswitch cables **(7)**.

The unit is supported by two brackets **(8)** with their screws **(9)** and **(10)** and is attached to the frame by four screws **(11)**.

Loosen the two screws **(9)** to give a minimum of movement to the brackets **(8)** and undo the two screws **(10)**. Then carefully undo the four lower screws **(11)**, holding up the unit so that it does not fall.





5.6.2 - REMOVAL OF THE REAR AXLE (Dana 4360-196)

▶ from 2007 to
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Reassemble in the reverse order, being particularly careful with the two self-tapping screws **(10)** which, if not screwed in correctly, can damage the internal thread preventing correct fastening.

Check that the spacers **(33 - 34 - 35)** are correctly fitted to the shafts, in the sequence given.

Reattach all the connections, and then ...

☛ Check the brake [see 4.3]

When assembly is completed ...

☛ Refit the rear wheels [see 6.1].

☛ Refit the collector channel [see 5.3].



IMPORTANT

If the Peerless group needs to be replaced with a Dana group ALWAYS also replace:

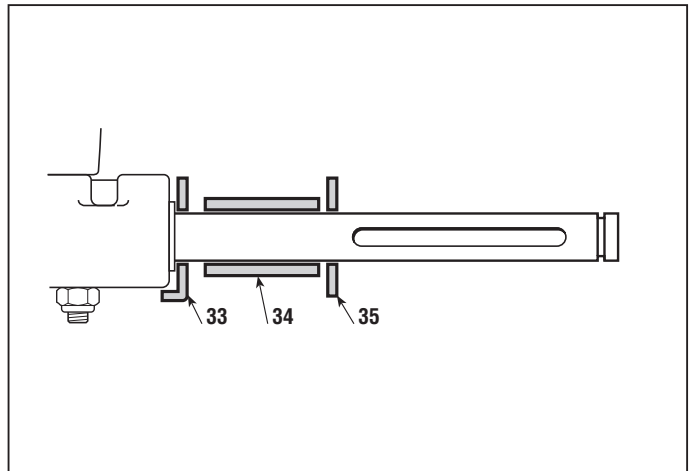
- the gear control shaft **(4)**;
- the fastening screws **(13)**;
- the spacers **(15 - 16 - 17 - 18)**;

as indicated in the Spare parts catalogue.

Furthermore, ALWAYS:

☛ Proceed with the brake adjustment [see 4.3]

☛ Adjust the drive engagement [see 4.4].



Tightening torques

9 Screws for brackets 25 ÷ 30 Nm

10 Self-tapping screws 25 ÷ 30 Nm

11 Screws for rear axle fastening 25 ÷ 30 Nm

5.6 REMOVAL OF THE REAR AXLE (Tuff Torq K46F)

The rear axle (Transaxle) is made up of a single maintenance free sealed unit which includes the transmission unit (hydrostatic) and the differential and doesn't need any maintenance.

It only needs to be removed to be replaced or for an overhaul by the Manufacturer's Service Centre.

➤ Remove the collector channel [see 5.3].

Place two spacers **(1)** of approximately 150 mm under the two ends of the rear plate.

➤ Remove the rear wheels [see 6.1].

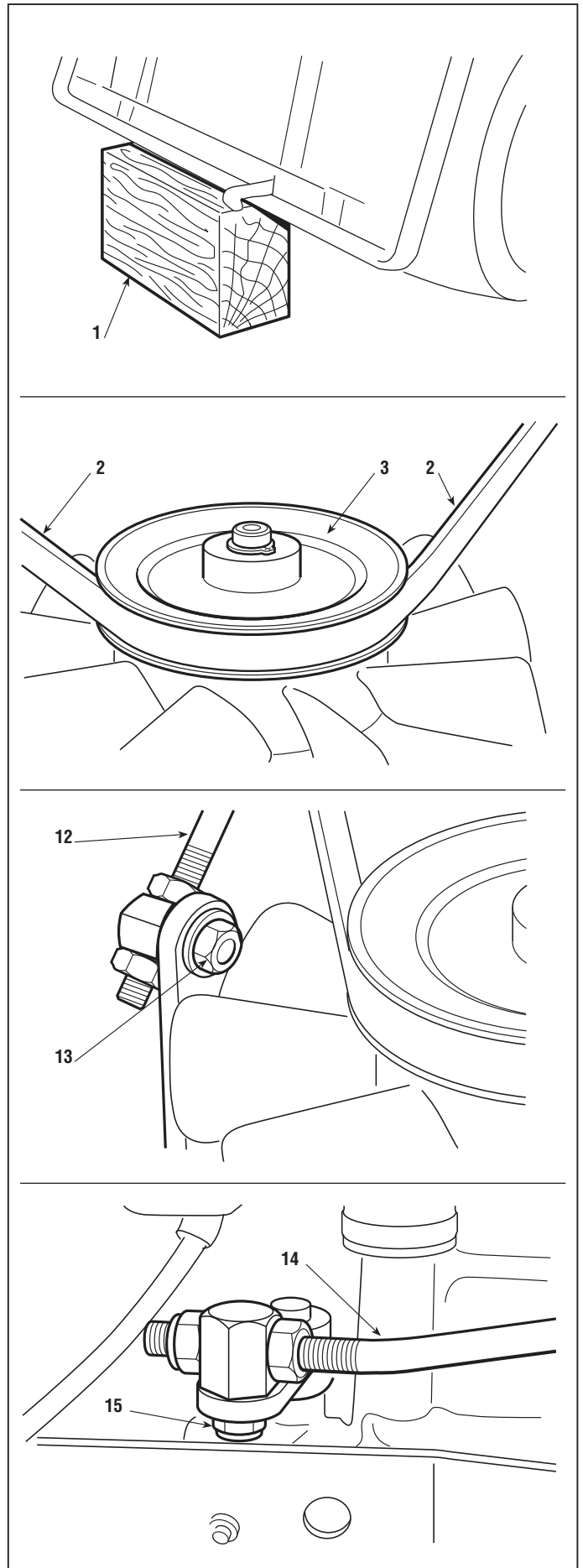
Through the outlet, grip the two ends of the belt **(2)** and pull it enough to free it from the race of the pulley **(3)**, so overcoming the resistance of the stretch-er on the jockey pulley.

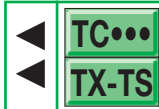
Remove the drive control rod **(12)** by unscrewing the relative pin nut **(13)** and the brake rod **(14)** by unscrewing the nut **(15)** under the lever.

Unscrew the release lever nut **(16)** to disconnect the rod **(17)** from the lever **(18)**.

The unit is held up by a support **(19)** and fastened to it by a screw with a nut **(20)**, and it is attached to the frame by four screws **(21)**.

Undo the nut **(20)** and then carefully undo the four lower screws **(21)**, holding up the unit so that it does not fall.





5.6a.0 - REMOVAL OF THE REAR AXLE (Tuff Torq K46F)

▶ from 2007 to
▶ page ◀ 2 / 2

Repeat the above operations in reverse for reassembly, taking the following precautions.

Refit the blade engagement cable (22) (▶ *in lever operated engagement models*) so that it is under the release lever (18) and do not fully tighten nut (16), so that correct movement of lever (18) is guaranteed.

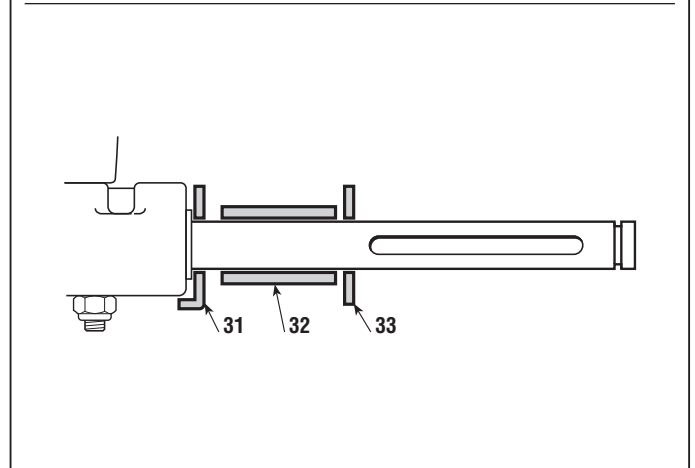
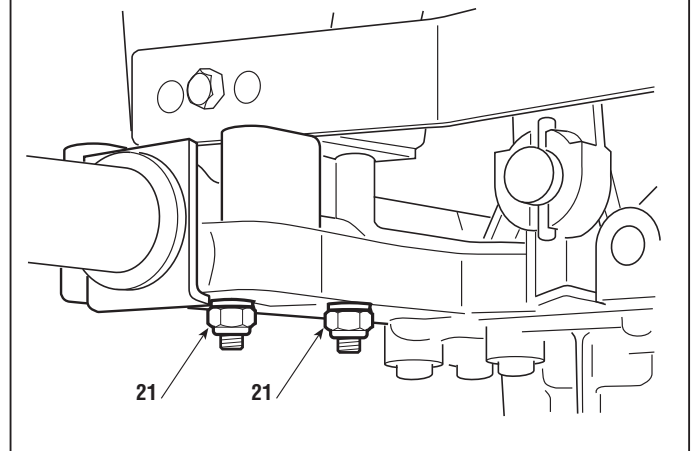
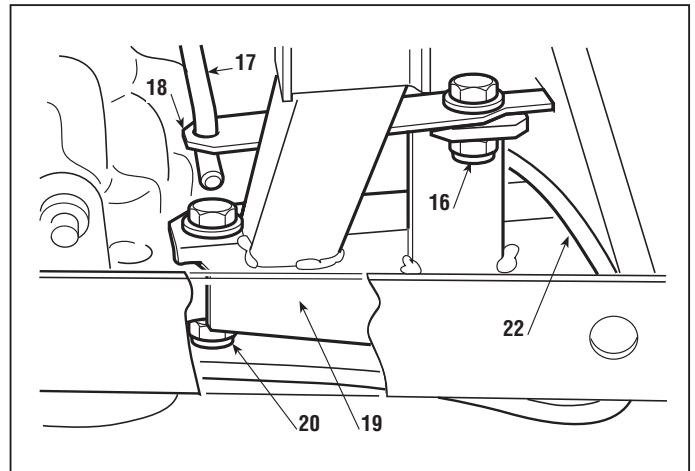
Check that the spacers (31 - 32 - 33) are correctly fitted to the shafts, in the sequence given.

Reattach all the connections, and then ...

- Check the brake [see 4.3]
- Refit the collector channel [see 5.3].
- Refit the rear wheels [see 6.1].

If the control rod has been replaced or completely pulled down:

- Adjust the travel and the position of “neutral” for the pedal [see 4.5].



Tightening torques

20 Rear axle support nut.....	25 ÷ 30 Nm
21 Screws for rear axle fastening	25 ÷ 30 Nm

5.7 REMOVAL OF THE CUTTING DECK

Removing the cutting deck facilitates all operations involving the blade connecting toothed belt and the overhaul and replacement of the hubs, bearings or blade shafts.

With some practice and experience it is possible to do this work with the deck still in position.

➡ Remove the collector channel [see 5.3]

After having put the cutting height lever in position «1», loosen the engagement cable adjuster (1) and take it out.

Unscrew the two nuts (6) of the two front connecting rod pins (7), without loosening or changing the position of the nuts (8) and locknuts (9).

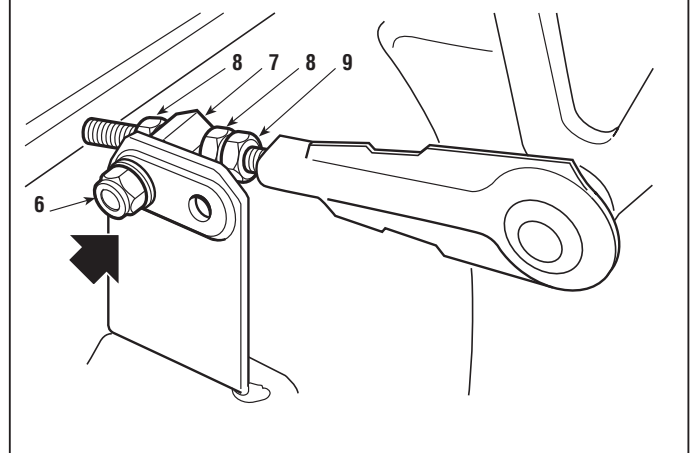
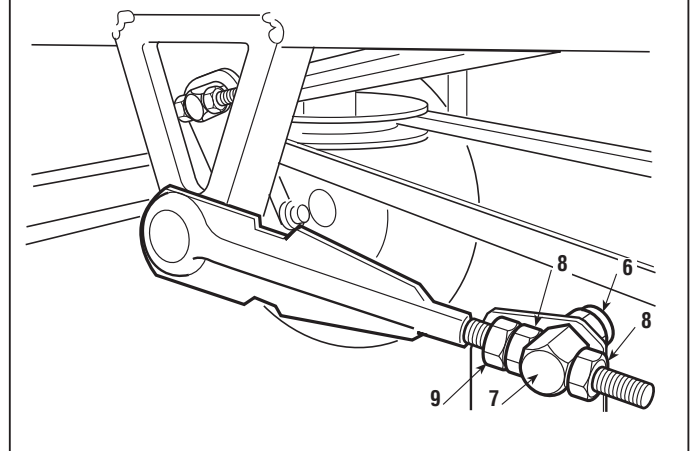
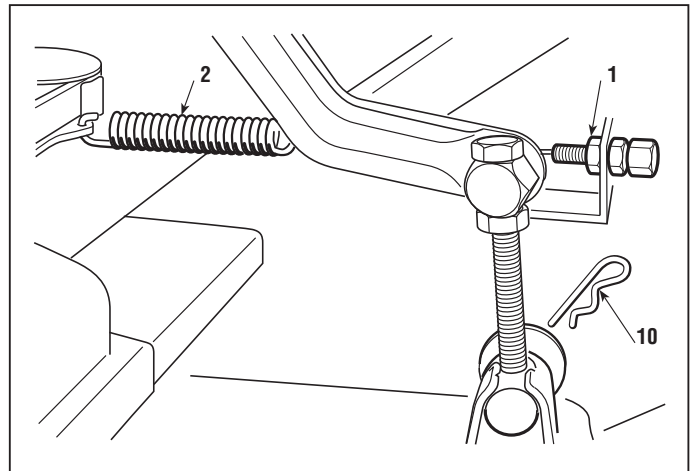
Remove the two split-pins (10) of the rear pins and then, having checked that there are no obstructions, the deck can be removed by extracting it in such a way that all the pins leave their housings.

On reassembly ensure that the two rear holes of the corner joints are used for fixing the pins (7), without locking the relative nuts (6).

After having restored all the connections, ...

➡ Refit the collector channel [see 5.3].

➡ The deck must be properly adjusted [see 4.6] if the nuts and locknuts (8 - 9) were accidentally moved.



6.1 REPLACEMENT OF TYRES AND WHEELS

A) Tyres

The tyres used are of the "Tubeless" type and so every repair of a hole in the tyre must be done by a tyre specialist according to the methods used for this type of tyre.

After replacing one or more tyres or the wheels, it is always necessary to check the pressure and to check the alignment of the cutting deck [see 4.6].



WARNING

Replace distorted wheel rims as they could impair the tyre's hold.

B) Wheels

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

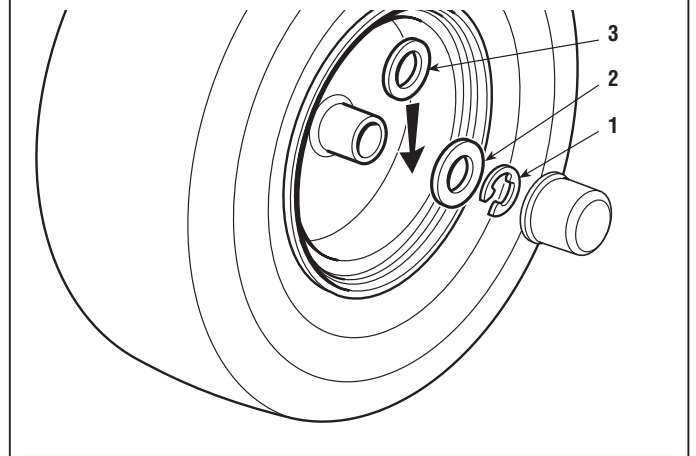
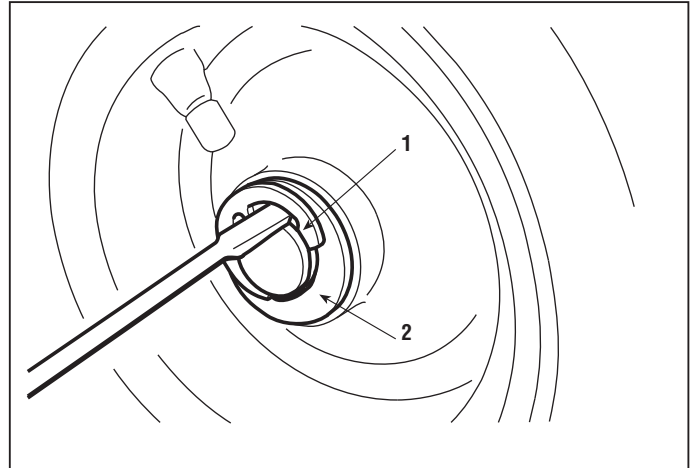
NOTE

If a wheel is jammed onto the shaft, use a releasing spray, directing it around the splining hole.

On assembly it is advisable to spread grease on the shaft to facilitate the next wheel removal.

For the front wheels: replace the shoulder washer (2) and the flexible ring (1) with the bevel facing inwards.

For the rear wheels: replace the shoulder washer (2) and the flexible ring (1) with the bevel facing inwards and check the axial gap of the wheel on the shaft; if it is greater than 3 mm, a spacer (3) must be fitted between the wheel hub and the shoulder washer (2).



Tyre pressures

Front	(Tyres 13 x 5.00-6) 1,5 Bar
	(Tyres 15 x 5.00-6) 1,0 Bar
Rear	1,2 Bar

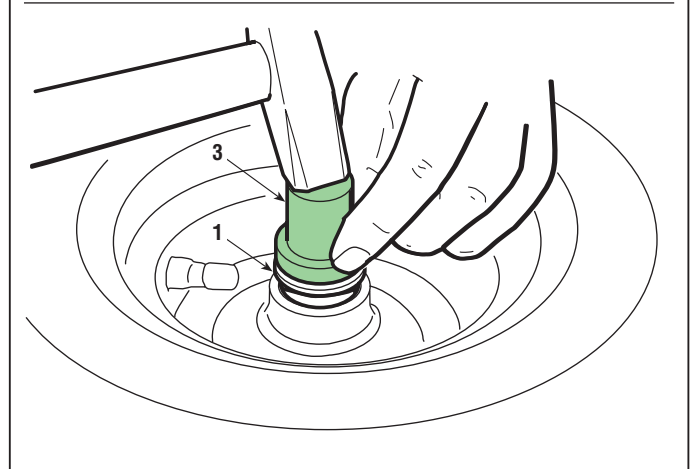
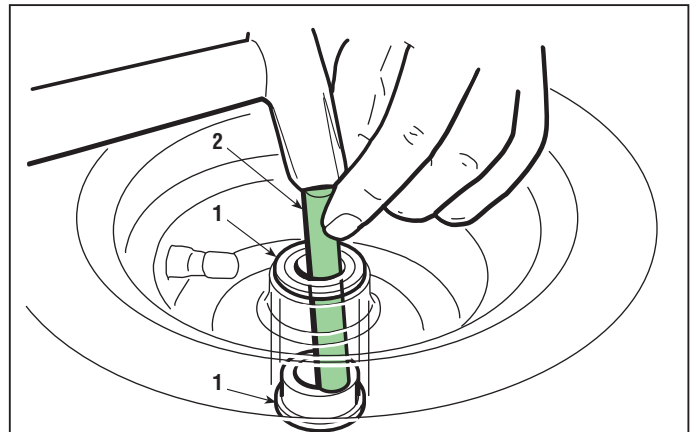
6.2 REPLACEMENT OF FRONT WHEEL BEARINGS

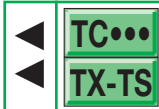
➡ Dismantle the front wheel [see 6.1].

The front wheel bearings **(1)** are force splined into the front wheel hub.

A 10 - 12 mm diameter round bar **(2)** must be used to extract a bearing, inserted from the opposite side and struck with a hammer around various points of the inner circumference of the bearing.

The new bearing must be fitted with the help of a plastic mallet or of a bronze pad **(3)** that **only acts on the bearing's outer ring**.





6.3.2 - DISMANTLING OF THE STEERING COMPONENTS

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6.3 DISMANTLING OF THE STEERING COMPONENTS

Unhook the spring (1) and lift the steering column (2) just enough to be able to draw out the pinion (3).

A) Dismantling the steering pinion and ring gear

Remove the tie-rod (6), unscrew the nut (4) and take out the whole ring gear shaft (5) being careful not to lose the washers (7) and (8) under the screw head (9).

Toothed sectors (10) are secured to the ring gear (5) by screws and nuts (11).

When replacing, be careful to assemble sectors with the flared part of the teeth facing down.

Check ring gear allowance (5) compared to the pin (12); if excessive, replace the bearing.

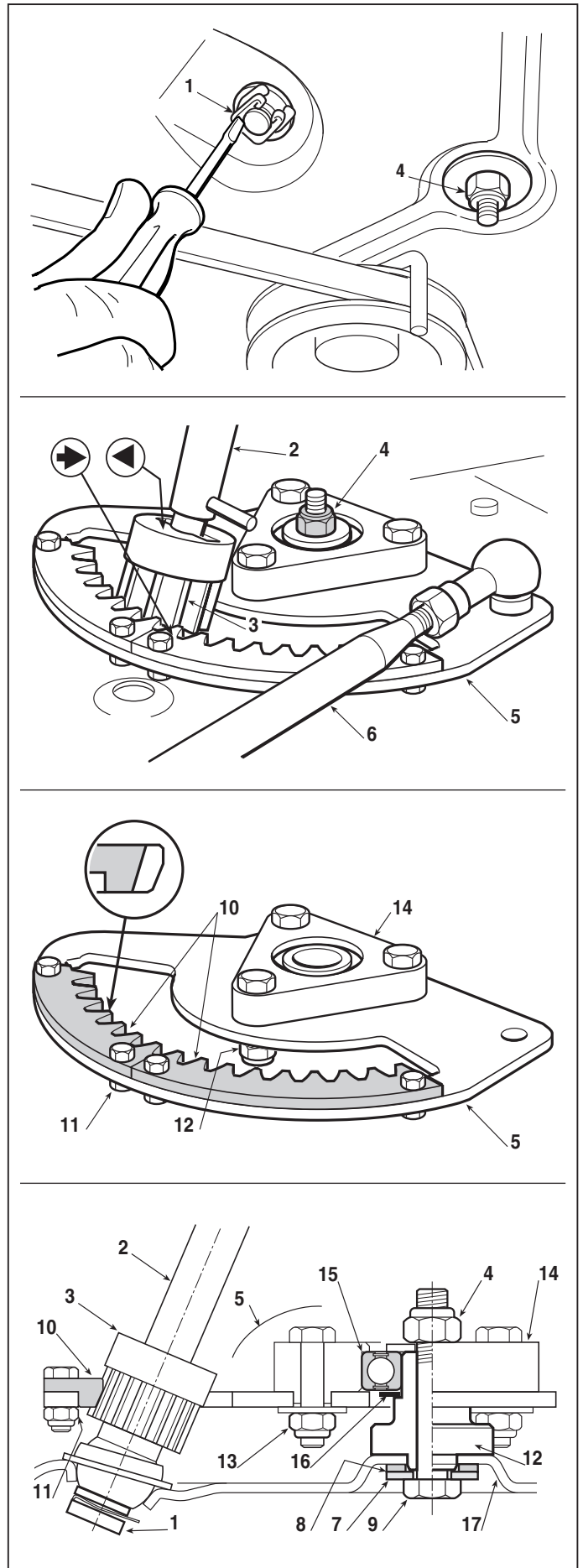
Unscrew the three nuts (13), remove the support (14) and slide out the bearing (15) to replace.

During assembly, please note that to replace both the ring gear teeth and pinion simultaneously, shims (16) (removed earlier) must be replaced under the bearing (15) to restore correct allowance between teeth.

Make sure the pin (12) is correctly centred to the chassis housing (17), accurately reposition the two washers (7 - small hole) and (8 - large hole) under the screw head (9) and fully tighten the nut (4).



Reassemble the pinion and the ring gear shaft, lining up the two reference points (→ - ◀) punched on them.



B) Lower bush replacement

Use a universal socket wrench to unscrew the two screws (21) that fix the plate (22) and remove the spherical lower bush (23).

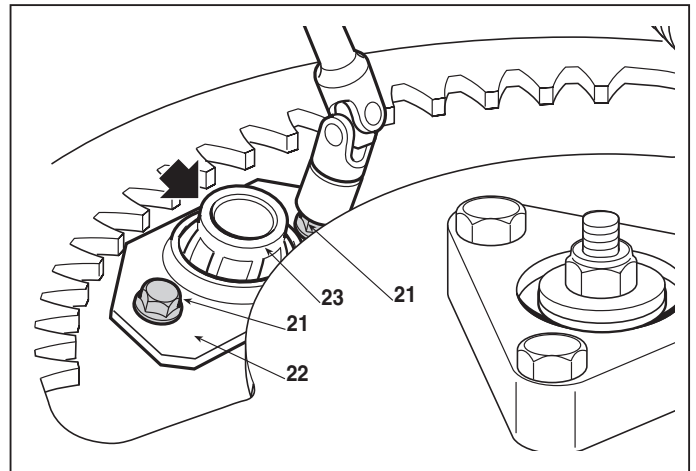
On reassembly ensure that the bush (23) is fitted with the protuberant part upwards.

Refit the plate (22) without tightening the screws (21).

Align the pinion with the crown wheel [see 6.3.A] and insert the end of the steering wheel column (2) in the hole in the spherical bush (23); fully tighten the screws (21) after having checked the correct alignment and regular rotation of the steering wheel column.

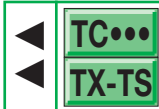
When reassembled ...

➡ Check the steering geometry [see 4.8].



Tightening torques

4	Nut for Ring gear	45 ÷ 50 Nm
11	Nuts for toothed sector fastening ...	10 ÷ 15 Nm
13	Nuts for bearing fastening	25 ÷ 30 Nm



6.4.0 REPLACEMENT OF THE DRIVE BELT

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6.4 REPLACEMENT OF THE DRIVE BELT

- Dismantle the engine pulley [see 5.5] to release the belt.
- Remove the collector channel [see 5.3].

It is advisable to slacken the transmission belt to work on the parts involved more easily.

This is done by ...

➤ **in mechanical drive models:** engaging the parking brake.

➤ **in hydrostatic drive models:** slackening the stretcher [see 4.4].

Dismantle the drive pulley (1) and the stretcher pulley (2), fixed by nuts (3) and (4) respectively, and slacken the belt guide (5) enough to free the belt (6).

➤ **in mechanical drive models:** only slacken off the fixing nuts (7) of the two small front wheels (8).

➤ **in hydrostatic drive models:** slacken off the fixing nuts (7) of both small wheels (8a) and remove the pin (9) from the brake rod to allow passage of the belt.

On reassembly ensure the exact positioning of the belt (6) with respect to the pulleys, the small side wheels and the containment guides [see 8.2.4], with special reference to its passage through the belt guide fork (5).

Always refit the dust covers (10) of the wheels (8).

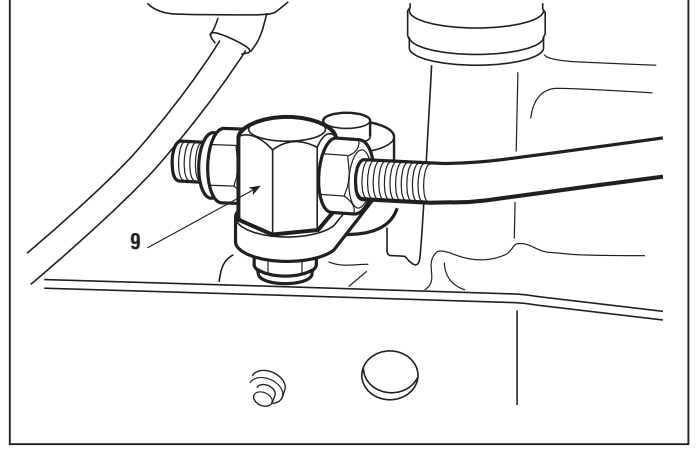
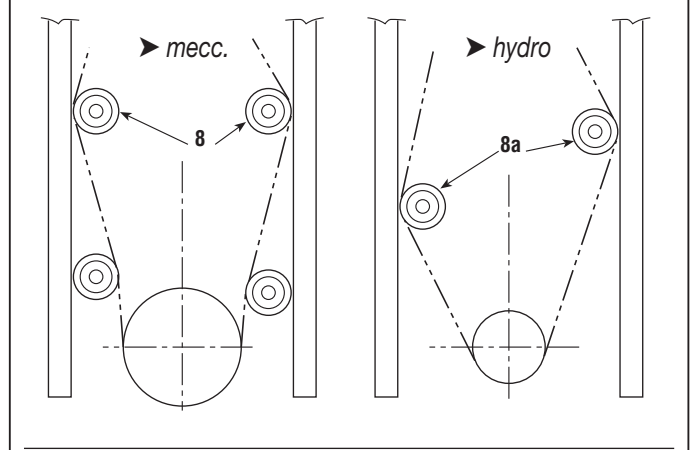
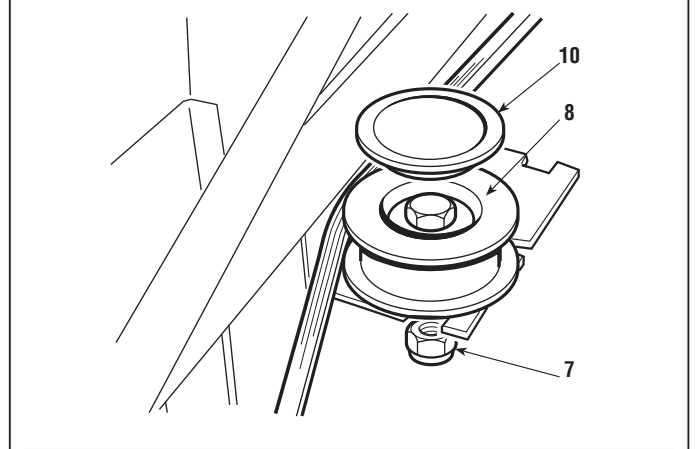
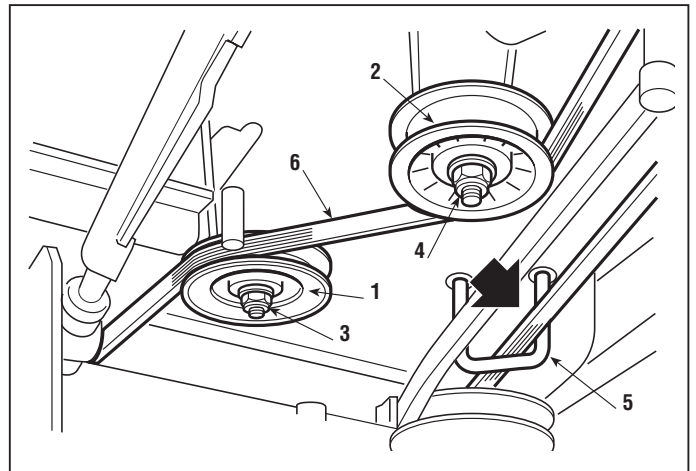
When assembly is completed ...

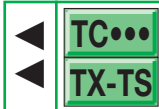
- Refit the engine pulley [see 5.5].
- Adjust the drive engagement [see 4.4].
- Refit the collector channel [see 5.3].

➤ **on hydrostatic drive models:** tighten the spring of the stretcher [see 4.4].

Tightening torques

3 - 4 Nuts for pulleys.....	25 ÷ 30 Nm
7 Nuts for small wheels	25 ÷ 30 Nm





6.5.0 - REPLACEMENT OF THE SMALL WHEELS FOR THE DRIVE BELT

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6.5 REPLACEMENT OF THE SMALL WHEELS FOR THE DRIVE BELT

➡ Remove the collector channel [see 5.3].

It is advisable to slacken the transmission belt to work on the parts involved more easily.

This is done by ...

➤ **in mechanical drive models:** engaging the parking brake.

➤ **in hydrostatic drive models:** slackening the stretcher [see 4.4].

The small side wheels (1), two or four depending on the type of drive, are fixed to the frame by a nut (2), with a spacer (3) between which is of different height, (3a) or (3b), depending on the assembly position and type of drive.

When reassembling, you should bear in mind that:

➤ **in mechanical drive models:** the tall spacer (3a) must be fitted under the small right front wheel (1a) and the low one (3b) under the other three (1b).

➤ **in hydrostatic drive models:** the tall spacer (3a) must be fitted under the small right wheel (1a) and the low one (3b) under the left wheel (1b).

Always refit the dust covers (4) of the wheels (1).

Once assembly is completed ...

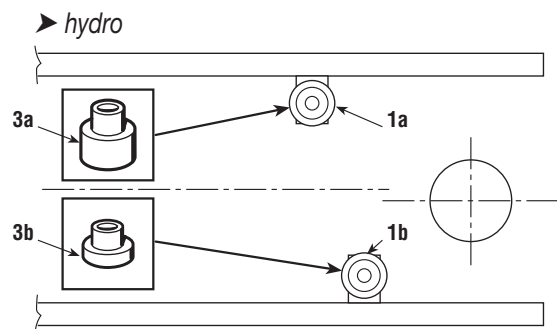
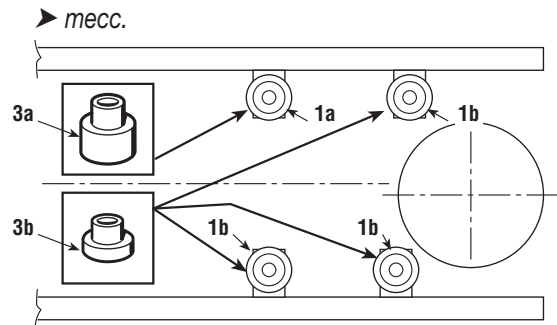
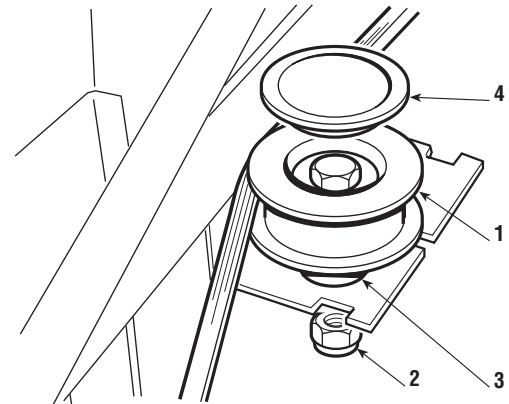
➡ Adjust the drive engagement [see 4.4].

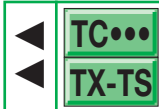
➡ Refit the collector channel [see 5.3].

➤ **in hydrostatic drive models:** tighten the spring of the stretcher [see 4.4].

Tightening torque

2 Nuts for small wheels 25 ÷ 30 Nm





6.6.2 - REPLACEMENT OF THE BLADES CONTROL BELT

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6.6 REPLACEMENT OF THE BLADES CONTROL BELT

Tug at a section of the belt (2) to free it from the pulley.

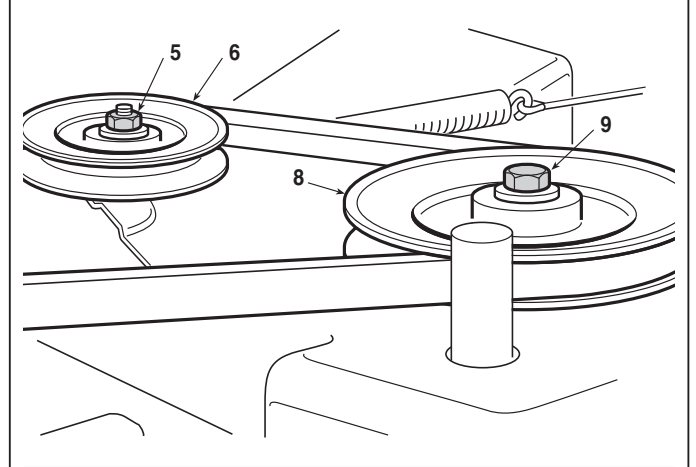
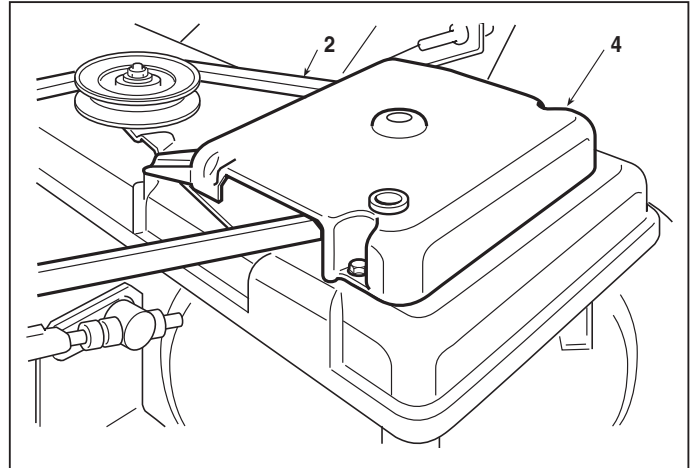
Set the cutting deck to the lowest position to obtain greater access, then dismantle the upper casing (4) and almost totally undo the nut (5) without dismantling the jockey pulley (6) so that the belt can be removed.

Keeping the blade locked, undo the screw (9) and dismantle the control pulley (8) to remove the belt.

On reassembly, ensure that the belt is positioned perfectly in line with respect to the pins and rims.

When it has been reassembled, it is a good idea to ...

☛ Check the adjustment of the blade engagement lever [see 4.1].



Tightening torques

5 Nut for idle pulley	20 ÷ 25 Nm
9 Screw for pulley	20 ÷ 25 Nm

6.7 REPLACEMENT OF THE BLADES CONNECTION BELT

Set the cutting deck to the lowest position to obtain greater access, then slacken off and uncouple the adjuster (1) to unload the spring (2).

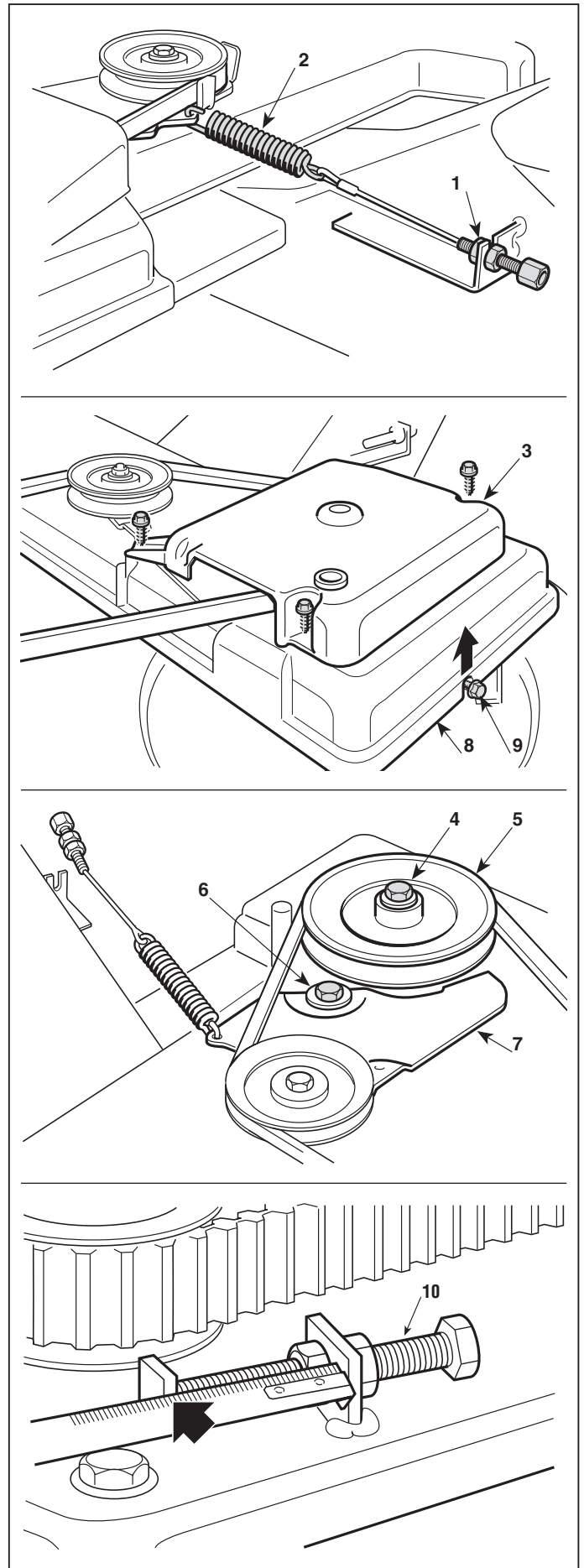
Dismantle the upper casing (3), undo screw (4) and dismantle the control pulley (5); undo the articulation screw (6) and remove the stretcher plate (7).

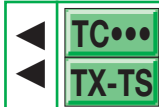
Remove the protection casing (8), slackening off the six surround screws (9) and extract it from its slots.

Record the reading on the adjuster (10) (this must be reset at reassembly to give a preliminary belt adjustment) and slacken it off completely.

Dismantle the pin (11), slacken off the fixing nuts of the three pins (12) and the pulleys (13) and (14) to allow removal of the belt.

Fit the new belt so that, when the two long sections are held taut, the two blades are at 90° to each other.





6.7.1 REPLACEMENT OF THE BLADES CONNECTION BELT

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Refit everything by reversing the operations described above. Reset the adjuster reading recorded previously and check that the blades are at 90° to each other before locking the pin (11) and pulleys (13) and (14).

NOTE

On reassembly, check that the washer under the pin (11) is not damaged and that the outer pin rollers run freely.

Use the specific tool (15) to check the piston (16) for the belt give values and the force applied, and use the stretcher until a give of 9 ÷ 10 mm is obtained, exerting a force of:

- 3.5 kg mod. 102
- 4.2 kg mod. 122

Reassemble the casing, stretcher and blades control belt, taking care over their exact positioning with respect to the pins and containment guides [see 8.2.6].

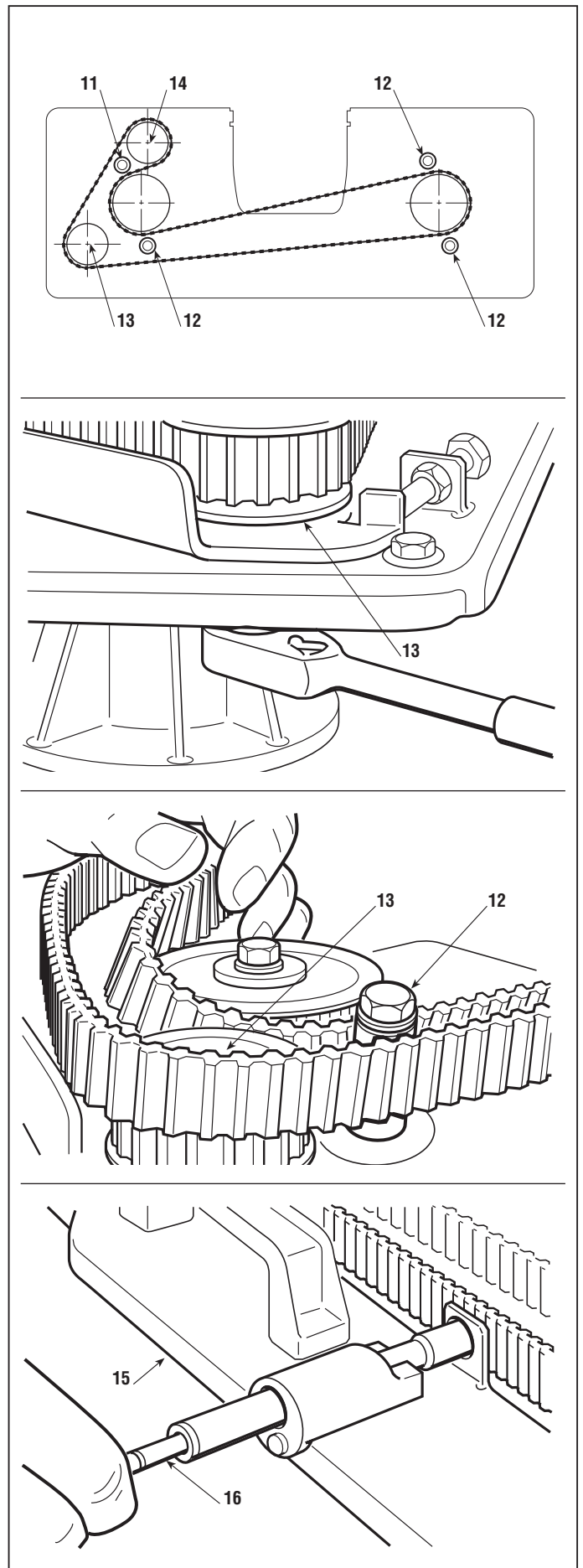
When refitting the spring (2), make sure that it is connected to the hole provided for each model [see 4.1].

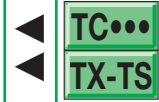
Finally, when reassembly is complete, it is advisable to ...

- ➔ Check the adjustment of the blades engagement spring [see 4.1]

Tightening torques

4 Blade pulley screws	20 ÷ 25 Nm
6 Stretcher plate articulation screw	35 ÷ 40 Nm
11 - 12 Pin fixing nuts	30 ÷ 35 Nm
13 - 14 Pulley fixing nuts	30 ÷ 35 Nm





6.9.0 - REPLACEMENT OF THE SUPPORTS AND SHAFTS OF THE BLADES

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6.9 REPLACEMENT OF THE SUPPORTS AND SHAFTS OF THE BLADES

➡ Remove the cutting deck [see 5.7].

NOTE

This operation is not strictly necessary since, with a little practice and experience, it is possible to dismantle the deck supports without removing the deck.

➡ Remove the blades control belt and the blades connection belt [see 6.6 - 6.7]

➡ Remove the blades [see 4.10] and take off the hubs.

Extract the two toothed pulleys **(1)** from the blade shafts, undo the seven screws **(2)** fixing the plate **(3)** and remove it.

Dismantle the flanged support **(4)** by unscrewing the three fixing screws **(5)**.

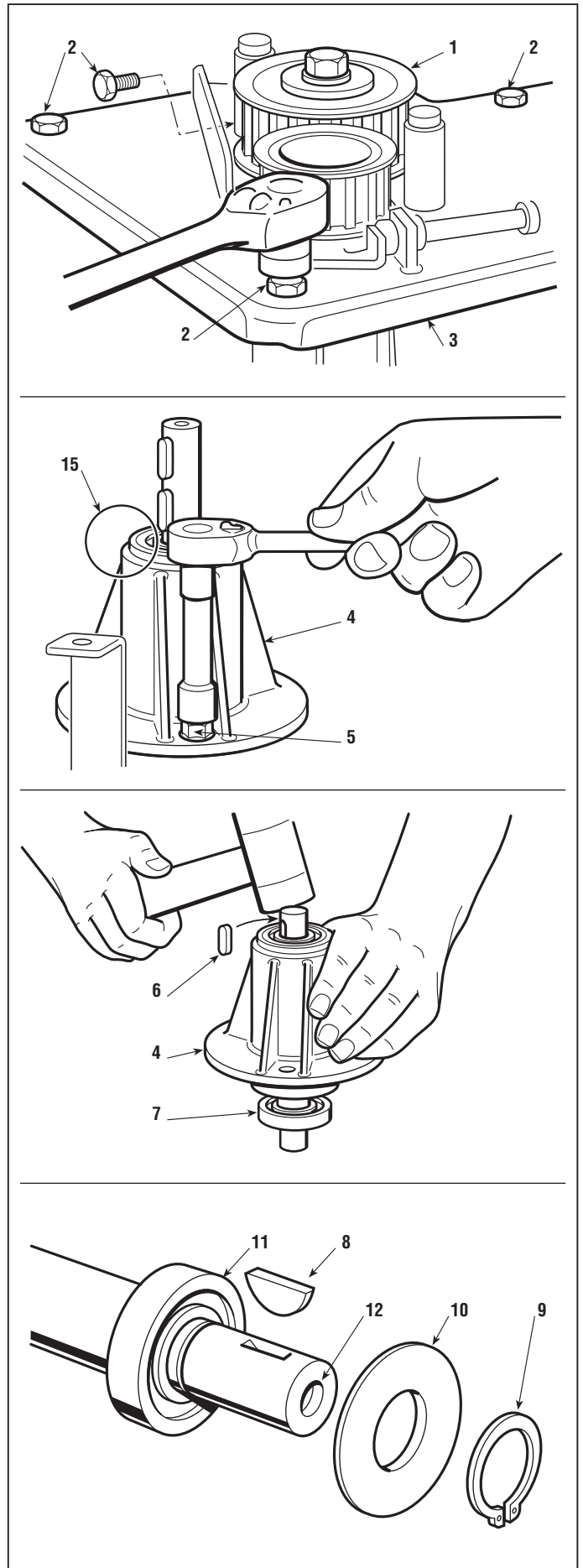
The entire support (4), including shafts and bearings, is a spare part available as a single assembly unit.

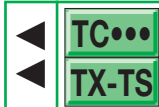
If only the shaft or bearings are to be replaced, remove the key or the two keys **(6)** and hit the shaft on the pulley side with a plastic mallet to extract the shaft together with the lower bearing **(7)**.

After having removed the key **(8)**, the snap ring **(9)** and the dust cover **(10)**, the bearing **(11)** splined onto the shaft can be removed using a normal extractor, being careful to close the threaded hole **(12)** with a suitable screw to prevent the tip of the extractor from damaging the thread.

The second bearing still in place must be removed by hitting it from the inside of the flange using a 12 ÷ 15 mm diameter round bar **(13)**.

On reassembly, having first inserted the shaft in the lower bearing hole and inserted everything into the support, fit the upper bearing using the specific stopper **(14)** that acts on the inner ring, hitting it squarely with a mallet until the bearing is fully driven home.



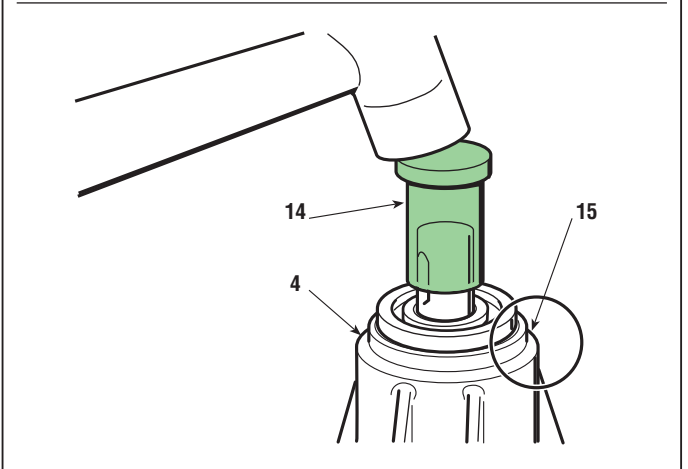
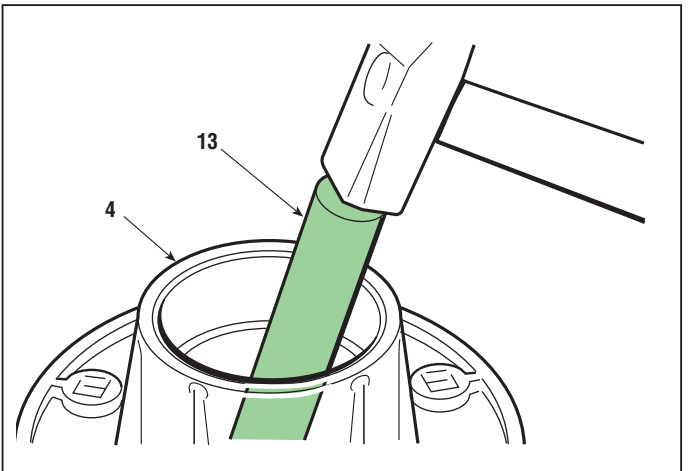


6.9.0 - REPLACEMENT OF THE SUPPORTS AND SHAFTS OF THE BLADES

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Refit the flanged supports onto the deck, **fully tightening the nuts (5)** and checking that the support with the longer shaft is on the left.

When refitting the plate (3), **the holes corresponding to the support axes must meet perfectly in the centring step (15)** cut into the upper part of each support.



Tightening torques

2	Plate fixing screws	30 ÷ 35 Nm
5	Flanged support fixing nuts	25 ÷ 30 Nm

6.10 REPLACEMENT OF THE ACCELERATOR

➔ Remove the dashboard [see 5.4].

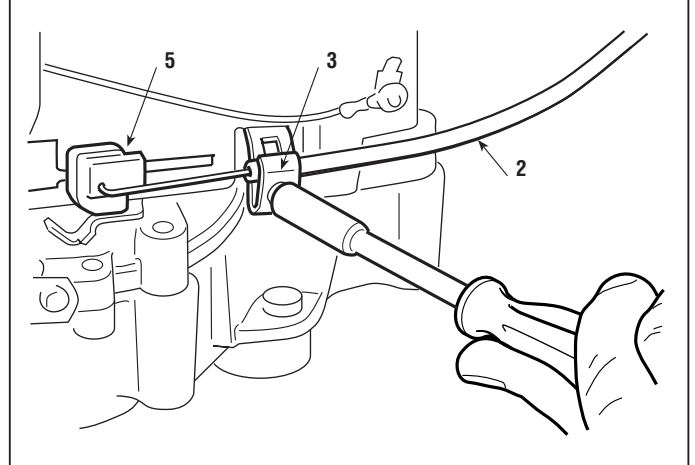
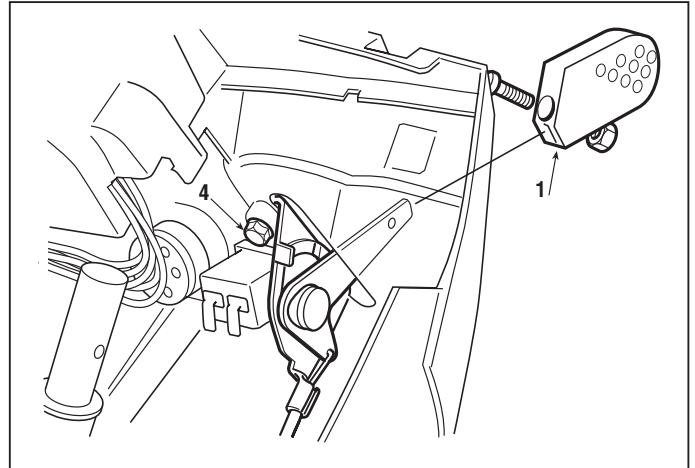
Take off the knob **(1)** and disconnect the cable **(2)** from the connection terminal **(3)** on the engine.

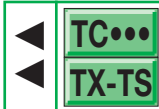
Undo the two fixing screws **(4)** and take out the accelerator together with the wire.

On reassembling, put the accelerator lever in the «MINIMUM» position, connect the end of the cable **(2)** to the terminal **(3)** on the engine after having moved the cursor **(5)** in the same «MINIMUM» position specific to each type of engine and shown in the instruction booklet.

When assembly is completed ...

➔ Refit the dashboard [see 5.4].





6.11.0 - REPLACEMENT OF THE BRAKE PADS AND DISC

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6.11 REPLACEMENT OF THE BRAKE PADS AND DISC (► *mechanical drive models*)

➡ Remove the left-hand rear wheel [see 6.1].

Disconnect the control rod (1) from the lever (2) and undo the two screws (3) which hold on the support (4).

The support (4) contains a pad (5a) separated from the control pistons (6) by a plate (7). The other pad (5b) can be reached by taking off the disc (8).

If there is oil on the pads, clean with solvent and go over them with fine-grade abrasive paper.



Both pads should be replaced if the depth of either of them is less than 5 mm.



Renew the disc if it is damaged, distorted or less than 4 mm thick.

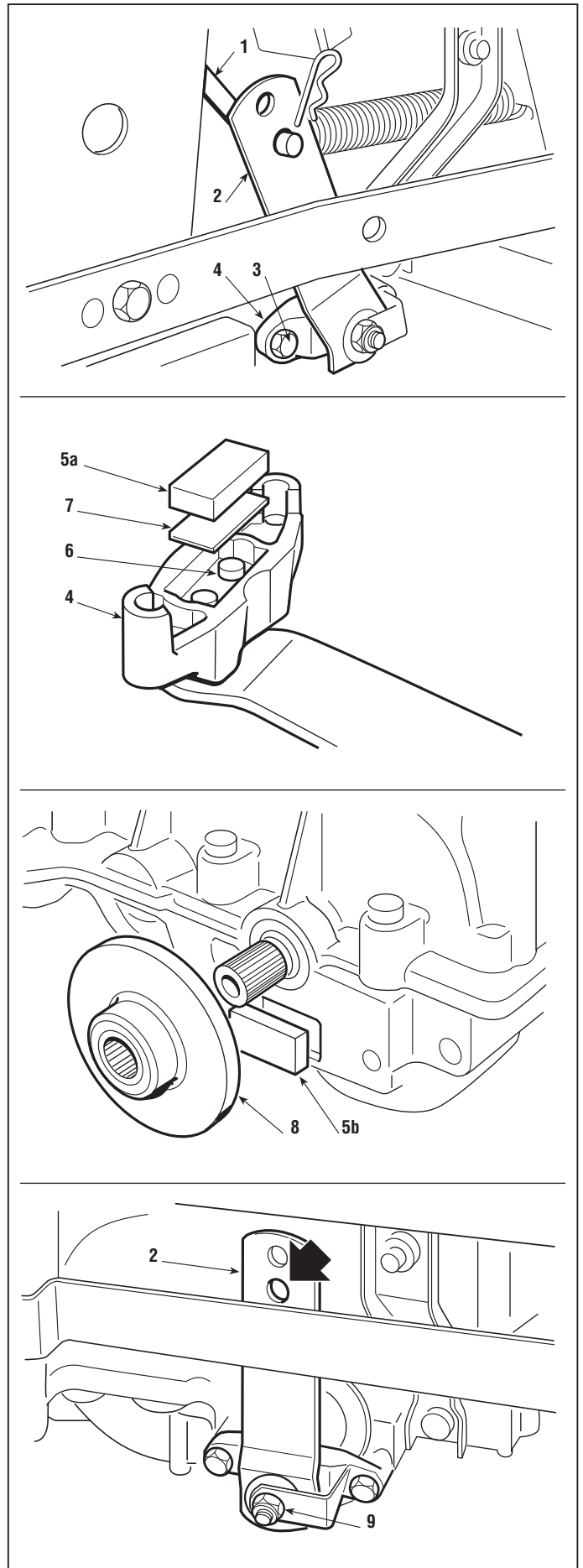
On reassembly, carefully reposition all the components and refit the complete support. When connecting the rod (1) be sure to use the lower hole in the lever (2).

NOTE

During all these operations it is better to not unscrew or loosen the central screw (9) to avoid altering the calibration of the cam driving the pistons. If it has been moved, the lever's free movement will have to be checked [see 4.3].

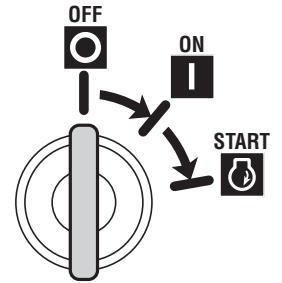
When fully reassembled ...

➡ Check the brake adjustment [see 4.3].



7.1 GUIDE TO THE IDENTIFICATION OF PROBLEMS IN THE ELECTRICAL SYSTEM

In the following some of the problems connected to the malfunctioning of the electrical system are shown, with their probable cause and the remedial action to be taken. Should the problem continue after the appropriate checks, seek assistance from your local Service Centre.



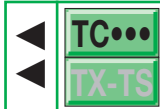
Faulty electronic cards must always be replaced without trying to repair them or replace single components.

PROBLEM	CAUSE	REMEDY
1. Activation of the self-resetting protection ¹⁾		
a) on inserting the key in position «ON»	Battery terminal crossed	Check the battery connections
	Short circuit to earth	Check the connectors and wiring of the microswitches
b) ... in position «START» or after a few seconds use:	Sulphated battery (it no longer accepts recharging)	Replace the battery
	Faulty or wet electronic card	Check and dry with low pressure tepid air (hair-dryer)
	Disconnected or missing battery	Reconnect the battery. It must always be connected.
	Battery terminals corroded or with poor contact	Check and clean the connections
c) ... after several minutes' use:	Poor or missing earth contact on the charge regulator	Check the earth connections and the screws fastening the regulator
	Overvoltage from a malfunction in the regulator	Check the recharge circuit [see 7.9]
	Battery disconnected or faulty during use	Check the battery or wiring
2. The dashboard remains off with the key in position «ON»	The battery is not supplying the card	Check the connection cables Check the battery's condition [see 7.10]
	Battery or card not earthed to frame	Check and put right
	10 A fuse blown	Replace fuse (10 A)
	Battery terminal crossed	Check connections

¹⁾ The cutting in of the self-resetting protection of the electronic card is signalled by a beep, except in cases where the battery is missing, flat or with the terminal crossed. The signal stops when the key is returned to position «OFF»; then wait a few seconds before returning to position «ON».

	<h2>7.1.2 - GUIDE TO THE IDENTIFICATION OF PROBLEMS IN THE ELECTRICAL SYSTEM</h2>	from 2006 to page ◀ 2 / 3 ▶
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PROBLEM	CAUSE	REMEDY
3. The dashboard switches on but, with the key in position «START», the starter does not turn or lacks power (poor starting)	The battery is not supplying sufficient current	Recharge the battery [see 7.10]
	Badly earthed battery, or the starter relay or engine not earthed	Check and put right
	Starting not permitted [see summary logic table 7.2]	After checking that the conditions are met, check all the microswitches [see 7.3] and the relative wiring.
	Malfunction in the electronic card	Try replacing the card with one that is known to work
	Starter relay is faulty	Check that the starter relay is activated [see 7.6]
4. The starter turns but the engine does not start	No fuel flow	Check the leads for the carburettor solenoid valve opening control (if provided) or check the fuel stopcock and filter.
	Impaired starter system	Check that the spark plug cap is positioned correctly Check that the spark plug electrodes are clean and have the correct gap
5. The starter continues to turn after engine has started, and does not stop when the key is removed	Mechanical difficulties with the contact breakers of the starter relay	Replace the starter relay
	Starter works erratically for mechanical or electrical reasons taking excessive current and causing binding of relay contacts	Check the starter
6. The starter operates as soon as the key is in the «ON» position, and can be turned off only by removing the key	Fault in the card	Replace the card
	Starter block operating faults	Replace the block
7. The battery warning light does not come on with the key in position «ON» but the machine operates	Fault in the electronic circuit or in the signalling LED	Replace the card (NOTE: You can finish the work in any case, but you need to replace the card)
8. The battery warning light remains on	Insufficient charge	Check that the charging cable has not detached
		Check that there are no current leakages caused by cables with damaged insulation
		Check the recharge circuit [see 7.9]
	Charger fuse blown	Replace fuse (25 A) and check the recharge circuit [see 7.9]
9. Abnormal, uncontrolled lighting up of the LEDs or irregular card operation	Faulty or wet electronic card	Check and dry with low pressure tepid air (hair-dryer)
	Bad earthing of the electronic card	Check and put right



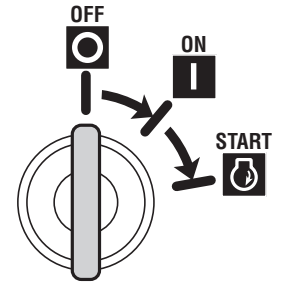
7.1.2 - GUIDE TO THE IDENTIFICATION OF PROBLEMS IN THE ELECTRICAL SYSTEM

from 2006 to
page 3 / 3

PROBLEM	CAUSE	REMEDY
10. The engine stops while in use for reasons not due to the safety devices cutting in	The safety devices have cut in or are faulty	Check the operation of the microswitch operation and the relevant wiring [see 7.3 and 7.8]
	Accidental detaching of an electrical wire	Check all wiring
	Starting of engine not permitted [see summary logic table 7.2]	After checking that the conditions are met, check all the microswitches [see 7.3] and the relative wiring.
11. The 10 A fuse cuts in	Short circuit or overload on the power side of the card (ignition block, starter relay, headlamps and recharger connector)	Find and replace the defective user [see 7.4 - 7.5 and 7.6]
	Short circuit or damage to the electronic card protection (power side)	Try changing the card with one that is known to work. If the problem stops, replace the faulty card
12. The 25 A fuse cuts in	Faults in the battery charging circuit	Replace fuse (25 A) and check the recharge circuit [see 7.9]
13. No audible signal for the "grass-catcher full" condition	Malfunctioning or faulty blade microswitches and grass-catcher signalling	Check the microswitches and wiring. WARNING! - Check that the blades microswitch stops the engine or prevents it from being started if the acknowledgement conditions are not met [see 7.2]
	Malfunctioning or faulty electronic card	Try changing the card with one that is known to work. If the problem stops, replace the faulty card

7.1a GUIDE TO THE IDENTIFICATION OF PROBLEMS IN THE ELECTRICAL SYSTEM

In the following some of the problems connected to the malfunctioning of the electrical system are shown, with their probable cause and the remedial action to be taken. Should the problem continue after the appropriate checks, seek assistance from your local Service Centre.



Faulty electronic cards must always be replaced without trying to repair them or replace single components.

PROBLEM	CAUSE	REMEDY
1. Activation of the self-resetting protection ¹⁾		
a) on inserting the key in position «ON»	Battery terminal crossed	Check the battery connections
b) ... in the «START» position or after a few seconds of use, following an attempt at starting with outside means:	Sulphated battery (it no longer accepts recharging)	Replace the battery
	Faulty or electronic card	Check
	Disconnected or missing battery	Reconnect the battery. It must always be connected.
	Battery terminals corroded or with poor contact	Check and clean the connections
c) ... after several minutes' use:	Poor or missing earth contact on the charge regulator	Check the earth connections and the screws fastening the regulator
	Overvoltage from a malfunction in the regulator	Check the recharge circuit [see 7.9]
	Battery disconnected or faulty during use	Check the battery or wiring
2. The dashboard remains off with the key in position «ON»	The battery is not supplying the card	Check the connection cables Check the battery's condition [see 7.10]
	Battery or card not earthed to frame	Check and put right
	10 A fuse blown	Replace fuse (10 A)
	Battery terminal crossed	Check connections

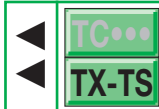
¹⁾ The cutting in of the self-resetting protection of the electronic card is signalled by a beep, except in cases where the battery is missing, flat or with the terminal crossed. The signal stops when the key is returned to position «OFF»; then wait a few seconds before returning to position «ON».

NOTE

The self-setting protection reaches very high temperatures (around 180 °C) which are to be considered normal. Similarly, there might be some smoke inside the box which is due to the overheating of the powder inside.



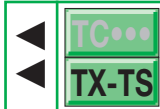
WARNING! Do not touch this component of the card until it has cooled down



7.1a.0 - GUIDE TO THE IDENTIFICATION OF PROBLEMS IN THE ELECTRICAL SYSTEM

from 2006 to
page ◀ 2 / 3 ▶

PROBLEM	CAUSE	REMEDY
3. The dashboard switches on but, with the key in position «START», the starter does not turn or lacks power (poor starting)	The battery is not supplying sufficient current	Recharge the battery [see 7.10]
	Badly earthed battery, or the starter relay or engine not earthed	Check and put right
	Starting not permitted [see summary logic table 7.2a]	After checking that the conditions are met, check all the microswitches [see 7.3a] and the relative wiring
	Malfunction in the electronic card	Try replacing the card with one that is known to work
	Starter relay is faulty	Check that the starter relay is activated [see 7.6a]
4. The starter turns but the engine does not start	No fuel flow	Check the leads for the carburettor solenoid valve opening control (if provided) or check the fuel stopcock and filter.
	Impaired starter system	Check that the spark plug cap is positioned correctly
		Check that the spark plug electrodes are clean and have the correct gap
5. The starter continues to turn after engine has started, and does not stop when the key is removed	Mechanical difficulties with the contact breakers of the starter relay	Replace the starter relay.
	Starter works erratically for mechanical or electrical reasons taking excessive current and causing binding of relay contacts	Check the starter
6. The starter operates as soon as the key is in the «ON» position, and can be turned off only by removing the key	Fault in the card	Replace the panel/board group (NOTE: it is possible to complete the work in any case, but the panel/board group must be replaced as soon as possible)
	Starter block operating faults	Replace the block
7. The battery warning light does not come on with the key in position «ON» but the machine operates	Fault in the electronic circuit or in the signalling LED	Replace the panel/board group (NOTE: it is possible to complete the work in any case, but the panel/board group must be replaced as soon as possible)
8. The battery warning light remains on	Insufficient charge	Check that the charging cable has not detached
		Check that there are no current leakages caused by cables with damaged insulation
		Check the recharge circuit [see 7.9]
9. The battery indicator light is blinking	Charger fuse blown	Replace fuse (25 A) and check the recharge circuit [see 7.9]
	Recharge overvoltage	Check the recharge circuit [see 7.9]
10. Abnormal, uncontrolled lighting up of the LEDs or irregular card operation	Battery insufficiently charged at start-up	Recharge the battery [see 7.10]
	Faulty electronic card	Check
	Bad earthing of the electronic card	Check and put right



7.1a.0 - GUIDE TO THE IDENTIFICATION OF PROBLEMS IN THE ELECTRICAL SYSTEM

from 2006 to
page ◀ 3 / 3

PROBLEM	CAUSE	REMEDY
11. The engine stops while in use for reasons not due to the safety devices cutting in	The safety devices have cut in or are faulty	Check the operation of the microswitch operation and the relevant wiring [see 7.3a and 7.8]
	Accidental detaching of an electrical wire	Check all wiring
	Starting of engine not permitted [see summary logic table 7.2a]	After checking that the conditions are met, check all the microswitches [see 7.3] and the relative wiring
12. The 10 A fuse cuts in	Short circuit or overload on the power side of the card (ignition block, starter relay, headlamps and recharger connector)	Find and replace the defective user [see 7.4a - 7.5a and 7.6a]
	Short circuit or damage to the electronic card protection (power side)	Replace the panel/board group with one that is known to work; if the problem does not reoccur replace the faulty group definitively
13. The 25 A fuse cuts in	Faults in the battery charging circuit	Replace fuse (25 A) and check the recharge circuit [see 7.9]
14. No audible signal for the "grass-catcher full" condition	Malfunctioning or faulty blade microswitches and grass-catcher signalling	Check the microswitches and wiring. WARNING! - Check that the blades microswitch stops the engine or prevents it from being started if the acknowledgement conditions are not met [see 7.2a]
	Malfunctioning or faulty electronic card	Replace the panel/board group with one that is known to work; if the problem does not reoccur replace the faulty group definitively
15. The clock does not keep time after the machine is switched off	Buffer battery flat	Replace [see 7.14a]

		7.2.1 - SUMMARY TABLE FOR THE CUTTING IN OF THE SAFETY DEVICES		from 2005 to page 1 / 1
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7.2 SUMMARY TABLE FOR THE CUTTING IN OF THE SAFETY DEVICES



This table shows the various situations in which the safety devices intervene.

Note

- Pilot lamp on
- Pilot lamp off
- * Pilot lamp uninfluential

-/- = Uninfluential

A) STARTING («START» position)



OPERATOR	GRASSCATCHER	BLADES	DRIVE	PARKING	ENGINE	PILOT LAMPS
-/-	-/-	-/-	Engaged	-/-	DOESN'T start	* * * * * ○
-/-	-/-	Engaged	-/-	-/-	DOESN'T start	● * * * * *
Absent	-/-	-/-	-/-	Disengaged	DOESN'T start	* ○ ● * * * *

B) WHILE CUTTING



OPERATOR	GRASSCATCHER	BLADES	DRIVE	PARKING	ENGINE	PILOT LAMPS
Absent	-/-	-/-	Engaged	-/-	Stops	* * ● * * * * ○
Absent	-/-	Engaged	-/-	-/-	Stops	● * ● * * * *
-/-	Missing	Engaged	-/-	-/-	Stops	● * * * * ● * *
-/-	-/-	Engaged	-/-	Engaged	Stops	● ● * * * * *
Absent	-/-	-/-	-/-	Disengaged	Stops	* ○ ● * * * *

	7.2a.0 - SUMMARY TABLE FOR THE CUTTING IN OF THE SAFETY DEVICES	from 2006 to page 1 / 1
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7.2a SUMMARY TABLE FOR THE CUTTING IN OF THE SAFETY DEVICES



This table shows the various situations in which the safety devices intervene.

Note

- Pilot lamp on
- Pilot lamp off
- * Pilot lamp uninfluential

-/- = Uninfluential

A) STARTING («START» position)



OPERATOR	GRASSCATCHER	BLADES	DRIVE	PARKING	ENGINE	PILOT LAMPS
-/-	-/-	-/-	Engaged	-/-	DOESN'T start	* * * * ○ * *
-/-	-/-	Engaged	-/-	-/-	DOESN'T start	* * ● * * * *
Absent	-/-	-/-	-/-	Disengaged	DOESN'T start	● * * * ● * * *

B) WHILE CUTTING



OPERATOR	GRASSCATCHER	BLADES	DRIVE	PARKING	ENGINE	PILOT LAMPS
Absent	-/-	-/-	Engaged	-/-	Stops	* * * * ● ○ * *
Absent	-/-	Engaged	-/-	-/-	Stops	* * ● * * * *
-/-	Missing	Engaged	-/-	-/-	Stops	* ● ● * * * *
-/-	-/-	Engaged	-/-	Engaged	Stops	● * ● * * * *
Absent	-/-	-/-	-/-	Disengaged	Stops	○ * * * ● * * *

7.3 SAFETY MICROSWITCHES AND SWITCHES OPERATION CHECK

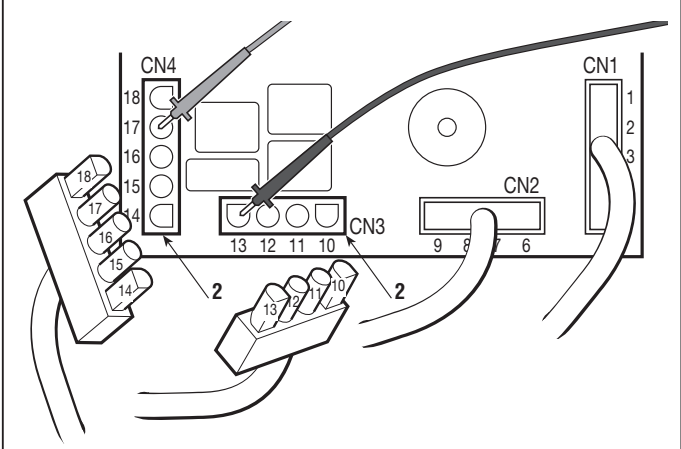
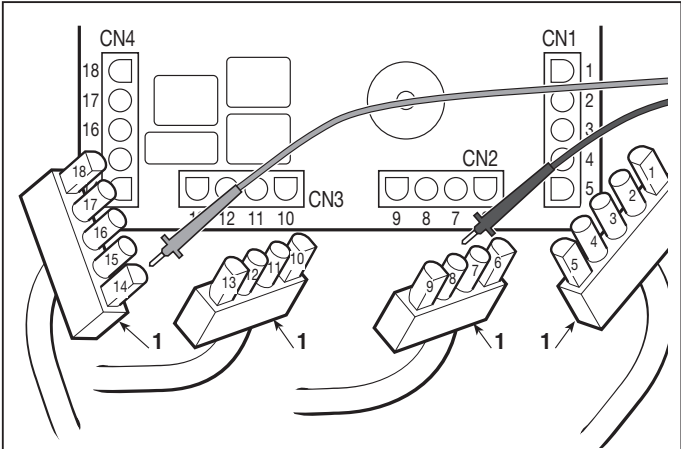
This check is made by detaching all the connectors and by using the tester in the Ohm-meter function. This operation must be performed without the operator aboard, making contact with the ferrules on the contacts of the wiring connector (1) and must give these results:

No. of Contacts	Tester reading and condition		
GRASS-CATCHER ATTACHED MICROSWITCH			
6 - 7	∞ (without g.catc.)	O (with g.catcher)	
OPERATOR PRESENCE			
6 - 3	∞ (absent)	O (seated)	
PARKING MICROSWITCH			
6 - 2	O (free)	∞ (engaged)	
BLADES MICROSWITCH (OR PUSH-BUTTON)			
6 - 1	∞ (engaged)	O (disengaged)	
"IN NEUTRAL" SIGNAL			
17 - 8	O (drive)	∞ (neutral)	
GRASS-CATCHER FULL MICROSWITCH			
17 - 9	∞ (empty)	O full	
FUEL WARNING LIGHT			
6 - 4	O (reserve)	∞ (full)	
OIL PRESSURE WARNING LIGHT			
17 - 16	O (always)		
IGNITION KEY			
+ Battery - 18	∞ (OFF)	O (ON)	O (START)
+ Battery - 15	∞ (OFF)	∞ (ON)	O (START)

ENGINE STOP

This operation must be done making contact with the ferrules on the contacts of connector CN3 and CN4 (2) of the card, keeping all other connectors connected, and must give this result:

No. of Contacts	Tester reading and condition
17 - 13	O (Always)



7.3a SAFETY MICROSWITCHES AND SWITCHES OPERATION CHECK

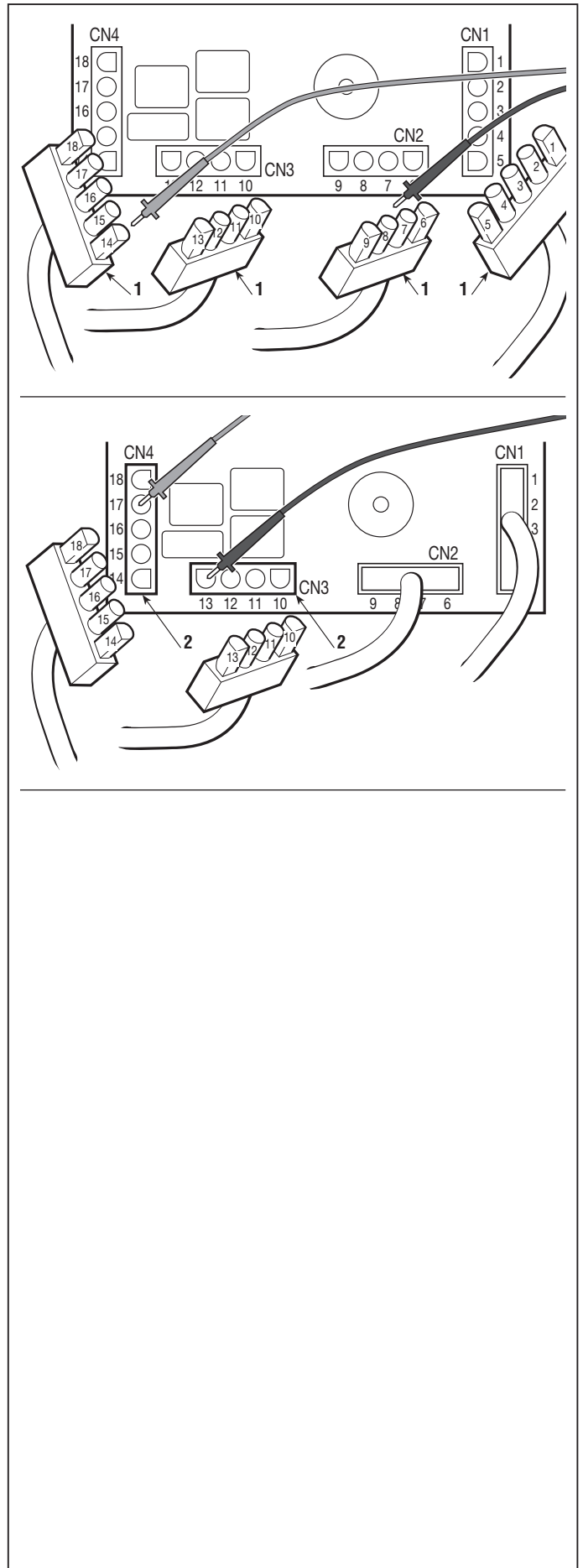
This check is done by disconnecting connector CN1 and using the tester in Ohmmeter mode. This operation must be performed without the operator aboard, making contact with the ferrules on the contacts of the wiring connector (1) and must give these results:

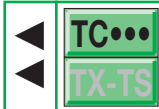
No. of Contacts	Tester reading and condition		
GRASS-CATCHER ATTACHED MICROSWITCH			
1 - 6	∞ without g.catc.)	O (with g.catcher)	
OPERATOR PRESENCE			
1 - 14	∞ (absent)	O (seated)	
PARKING MICROSWITCH			
1 - 17	O (free)	∞ (engaged)	
BLADES MICROSWITCH (OR PUSH-BUTTON)			
1 - 16	∞ (engaged)	O (disengaged)	
"IN NEUTRAL" SIGNAL			
1 - 7	O (drive)	∞ (neutral)	
GRASS-CATCHER FULL MICROSWITCH			
1 - 13	∞ (empty)	O (full)	
FUEL LEVEL GAUGE (if present)			
1 - 5	O (reserve)	∞ (from 1/2 to full)	
1 - 8	O (full)	∞ (from reserve to 1/2)	
OIL WARNING LIGHT (if present)			
1 - 15	O (always)		
IGNITION KEY			
+ Battery - 11	∞ (OFF)	O (ON)	O (START)
+ Battery - 12	∞ (OFF)	∞ (ON)	O (START)

ENGINE STOP

This operation must be done making contact with the ferrules on the contacts of connector CN1 of the card, keeping all other connectors connected, and must give this result:

No. of Contacts	Tester reading and condition
1 - 3	O (Always)





7.4.1 TERMINAL BOARD SUPPLY CHECK

from 2006 to

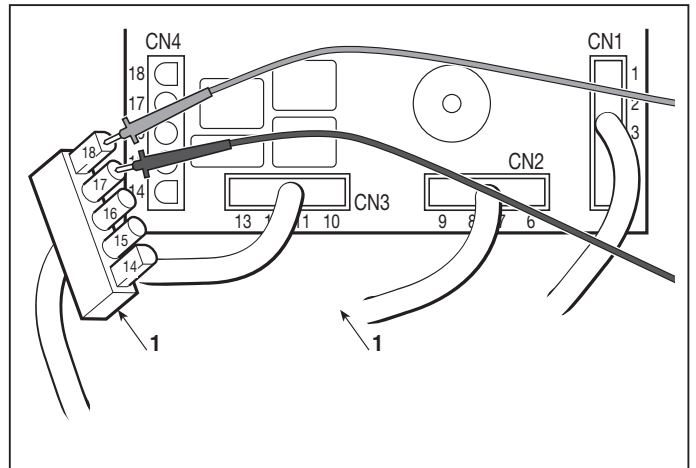
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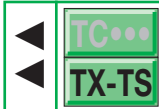
7.4 TERMINAL BOARD SUPPLY CHECK

This check is made with the tester operating as a Voltmeter (Volts DC 0 ÷ 20), with the black ferrule on terminal 17 and the red one on terminal 18 of the CN4 connector (**1**) of the wiring.

- The key in the «ON» position

The reading shows the battery voltage, which should never go below 11 Volts.





7.4a.0 TERMINAL BOARD SUPPLY CHECK

from 2006 to

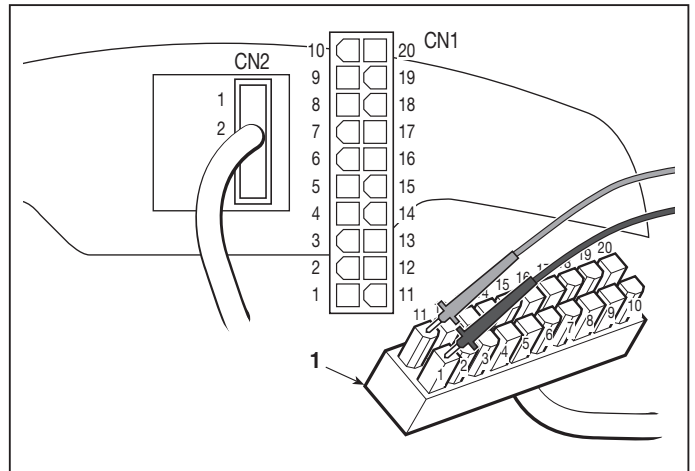
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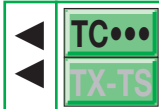
7.4a TERMINAL BOARD SUPPLY CHECK

This check is made with the tester operating as a Voltmeter (Volts DC 0 ÷ 20), with the black ferrule on terminal 1 and the red one on terminal 11 of the connector (1) of the wiring.

- The key in the «ON» position

The reading shows the battery voltage, which should never go below 11 Volts.





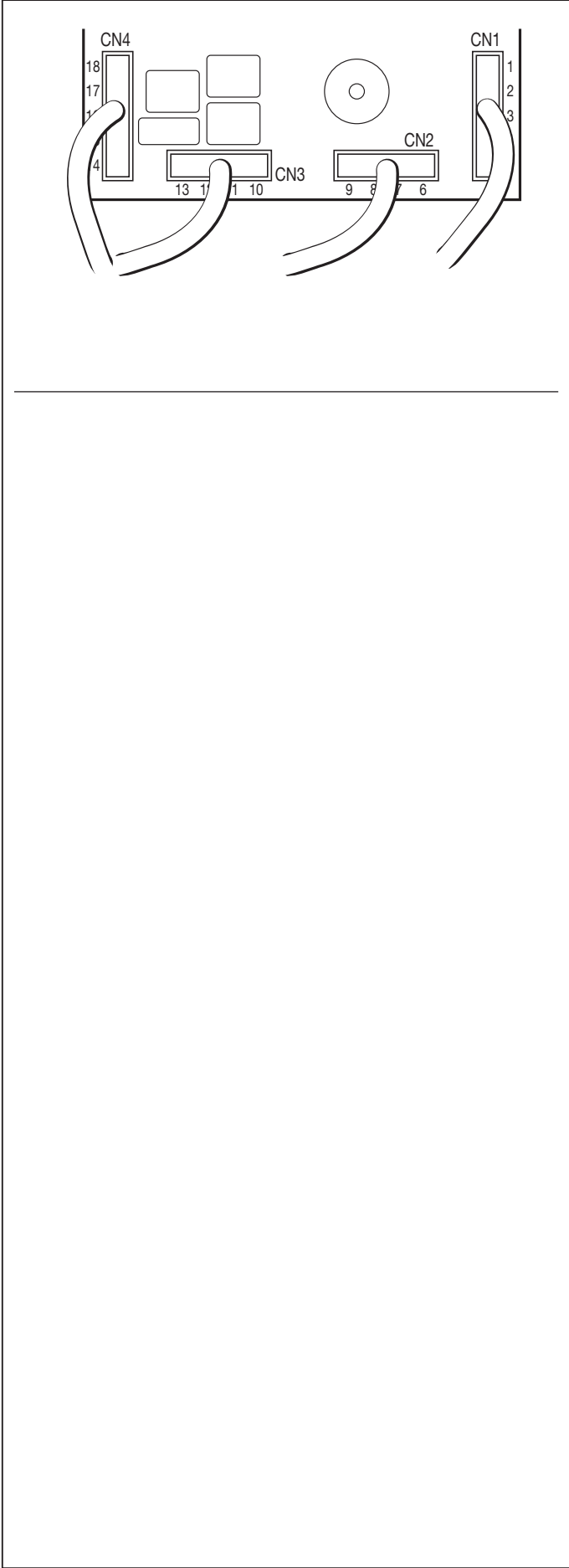
7.5.1 - CARBURETTOR SOLENOID VALVE OPERATION CHECK

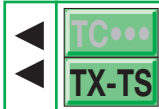
from 2006 to
page 1 / 1

7.5 CARBURETTOR SOLENOID VALVE OPERATION CHECK (where fitted)

All the connectors must be connected to make this check.

When the key is set to «ON», a click must be heard from the carburettor solenoid valve coil.





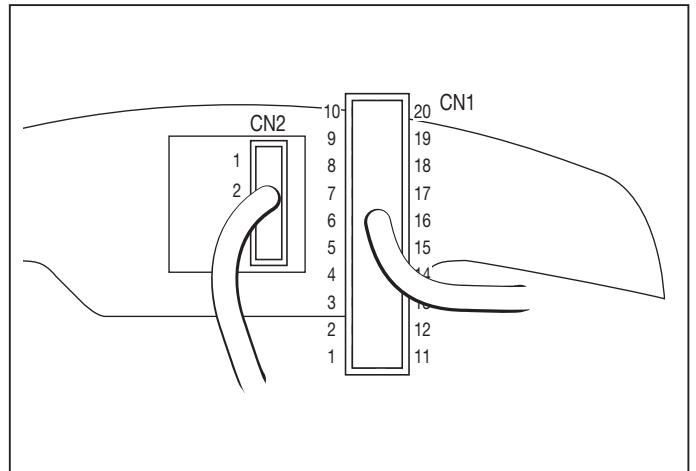
7.5a.0 - CARBURETTOR SOLENOID VALVE OPERATION CHECK

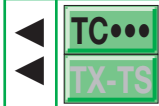
▶ from 2006 to
▶ page 1 / 1

7.5a CARBURETTOR SOLENOID VALVE OPERATION CHECK (where fitted)

Connector CN1 must be connected to make this check.

When the key is set to «ON», a click must be heard from the carburettor solenoid valve coil.





7.6.2 STARTER RELAY OPERATION CHECK

from 2006 to
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7.6 STARTER RELAY OPERATION CHECK



WARNING! - Remove the cap of the sparking plug (or plugs), since the safety systems that normally prevent accidental starting of the engine are cut out when the checking procedure is carried out.

To do this requires:

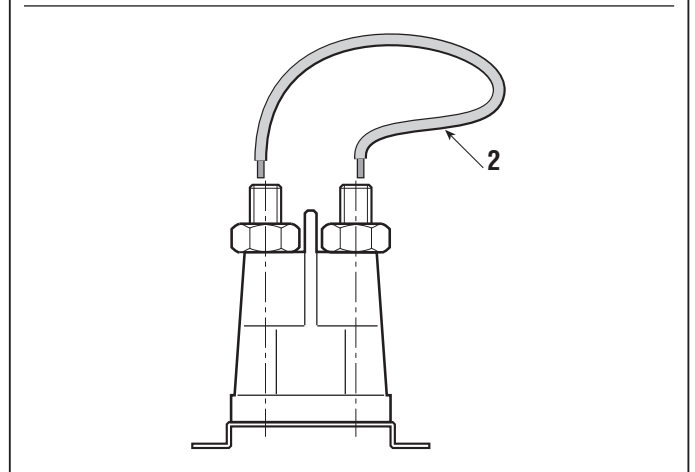
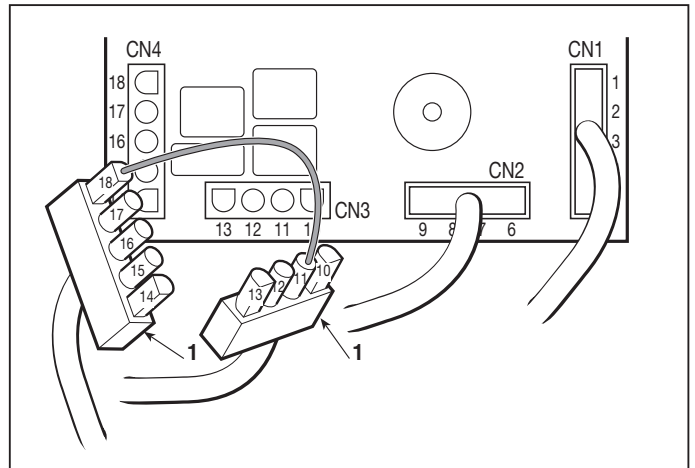
- engaging the parking brake;
- disengaging the blade;
- connectors CN1 and CN2 disconnected **(1)**;
- the key in the «ON» position.

In making a bridge between the terminals 11 (CN3) and 18 (CN4) of the wiring connectors **(1)**, the click of the relay bobbin should be heard and the starter motor should come into action.

► **only with B&S and Tecumseh engines:**

If the bobbin clicks but the starter does not start, make a bridge **(2)** with a large section cable (5 mm²) between the power contacts of the relay.

If the starter comes into operation, look for the fault within the relay or replace it. Otherwise, check the starter together with its wiring.





7.6a.0 STARTER RELAY OPERATION CHECK

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7.6a STARTER RELAY OPERATION CHECK



WARNING! - Remove the cap of the sparking plug (or plugs), since the safety systems that normally prevent accidental starting of the engine are cut out when the checking procedure is carried out.

To do this requires:

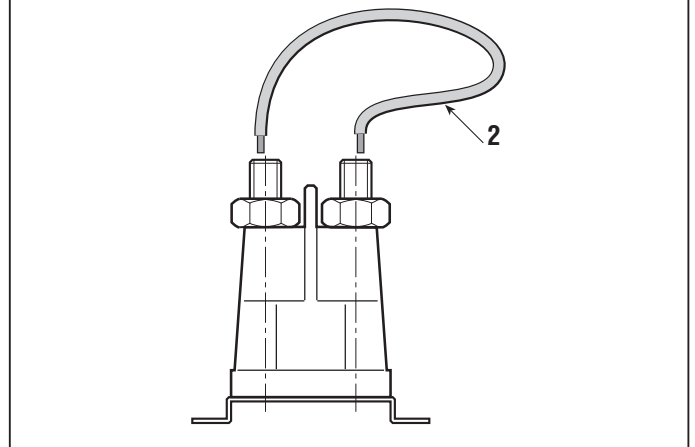
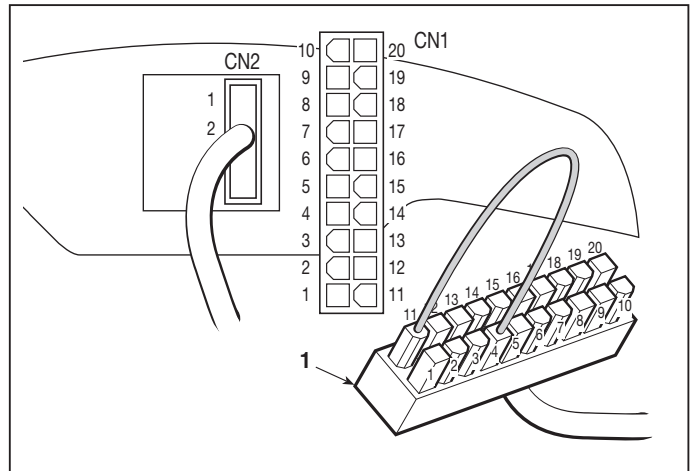
- engaging the parking brake;
- disengaging the blade;
- the key in the «ON» position.

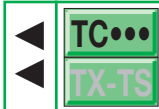
Detach connector CN1 and then, when a bridge is made between terminals 11 and 4 of connector CN1 of the wiring **(1)**, the relay bobbin must be heard to click and the starter must start.

► **only with B&S and Tecumseh engines:**

If the bobbin clicks but the starter does not start, make a bridge **(2)** with a large section cable (5 mm²) between the power contacts of the relay.

If the starter comes into operation, look for the fault within the relay or replace it. Otherwise, check the starter together with its wiring.





7.7.1 - ELECTROMAGNETIC CLUTCH OPERATION CHECK

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7.7 ELECTROMAGNETIC CLUTCH OPERATION CHECK (► *in models with electromagnetic engagement*)

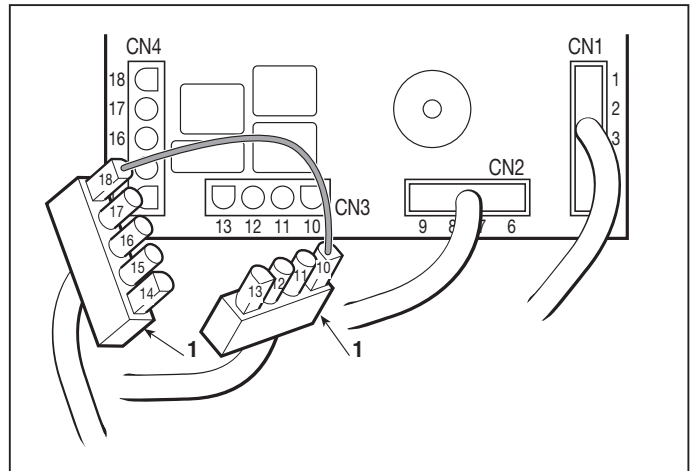
To make this test it is necessary to have:

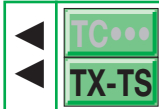
- Connectors CN1 and CN2 disconnected **(1)**
- The key in the «ON» position

When bridging between terminals 10 (CN3) and 18 (CN4) of the cabling connectors **(1)**, a click must be heard from the moving part of the clutch, due to excitation of the electric winding.

If this does not occur, check the wiring and the operation of the control push-button [see 7.3] and ensure that the card is operating correctly [see 7.8].

The clutch must be replaced if engagement does not take place after these checks.





7.7a.0 - ELECTROMAGNETIC CLUTCH OPERATION CHECK

from 2006 to

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7.7a ELECTROMAGNETIC CLUTCH OPERATION CHECK (▶ *in models with electromagnetic engagement*)



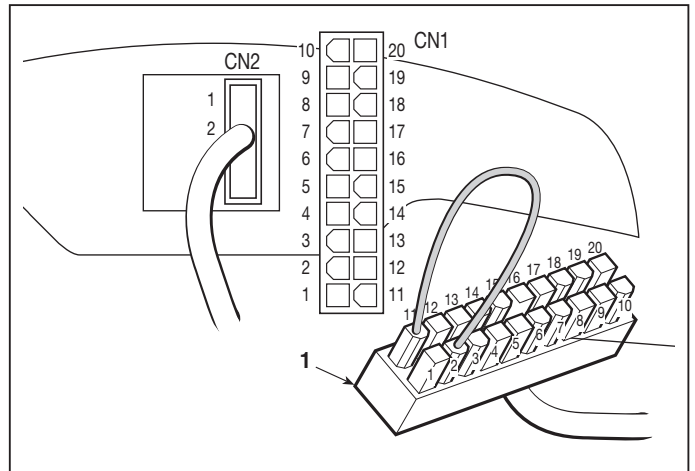
WARNING! - This check must be made with the engine off.

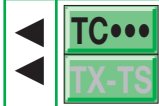
Disconnect connector CN1 and bridge terminals 2 and 11 of cabling connector CN1 **(1)**.

With the key set to «ON», when the switch is operated a click must be heard from the moving part of the clutch, due to excitation of the electric wiring.

If this is not so, check the operation of the cabling and control switch [see 7.3a].

The clutch must be replaced if engagement does not take place after these checks.





7.8.2 ELECTRONIC CARD OPERATION CHECK

from 2006 to

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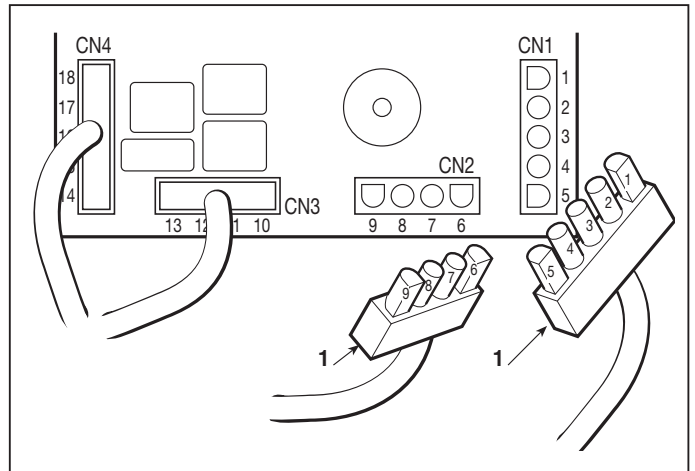
7.8 ELECTRONIC CARD OPERATION CHECK

A) Card power supply

To make this test it is necessary to have:

- The key in the «ON» position
- Connectors CN1 and CN2 disconnected (1)

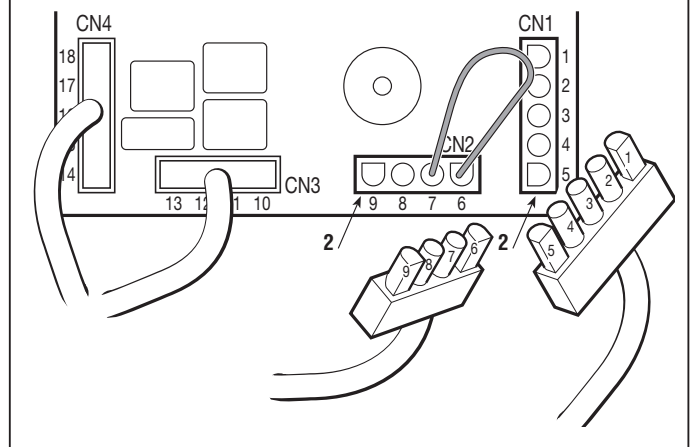
In this situation all the indicator lights (excluding the petrol and oil ones – if active) and the battery indicator, if in good charge conditions, should light up.



B) Pilot lamps switch-on test

Making a bridge between the following terminals of connectors CN1 and CN2 of the card (2) should produce the following effects:

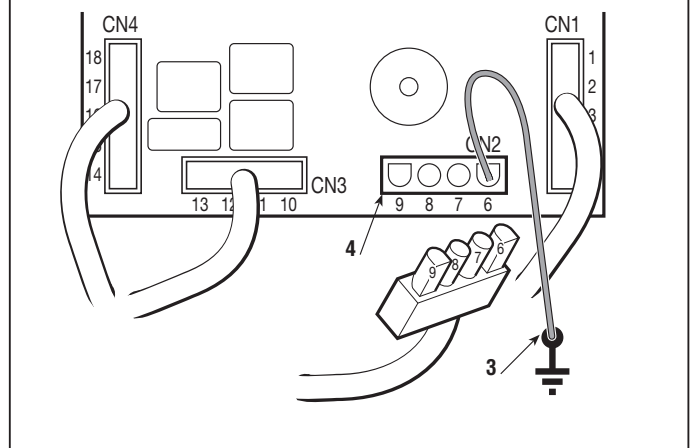
- | | | |
|---------------------------|-------------------|-----|
| Gr.-catcher warning light | = Terminals 6 - 7 | off |
| Seat warning light | = Terminals 6 - 3 | off |
| Brake warning light | = Terminals 6 - 2 | off |
| Blades warning light | = Terminals 6 - 1 | off |
| Fuel warning light | = Terminals 6 - 4 | on |
| “Neutral” warning light | = Earth - 8 | off |



C) Self-resetting protection operation check

For this test, put everything in the same situation as in point «A».

On connecting terminal 6 of connector CN2 of the card (4) to the frame earth (3), everything should switch off and the warning buzzer should start operating.



NOTE

During this test, the self-setting protection reaches very high temperatures (around 180 °C) which are to be considered normal. Similarly, there might be some smoke inside the transparent box which is due to the overheating of the powder inside.



WARNING! Do not touch this component of the card until it has cooled down.

◀	TC...	7.9.2	▶	from 2006 to
◀	TX-TS	RECHARGE CIRCUIT CHECK	▶	page 1 / 1

7.9 RECHARGE CIRCUIT CHECK

The job of the voltage regulator is to supply a flow of current to the battery at a constant voltage of about 14 -15 Volts, cutting in every time that the output voltage from the generator exceeds this threshold.

A faulty regulator may recharge the battery insufficiently (therefore needing frequent recharging) or, otherwise, may supply overloading that causes the self-resetting protection to cut in.

Before checking the recharge circuit, make sure that:

- all connections are correct;
- the earth connections are firmly connected, especially the earth connection to the regulator;
- the battery is charged and not sulphated [see 7.10];
- the charger fuse is not blown.

A) Checking the lower charging limit

Start the engine and keep running at minimum with the headlights on.

With the voltmeter tester, measure the voltage at the battery terminals. If the value does not rise but tends to fall, even slowly, it means that the regulator is not charging sufficiently and must be replaced.

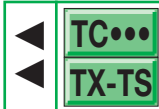
If the voltmeter shows no value it means that the charger fuse is blown.

➤ **only with a Honda engine:** check the recharge relay. On moving the key from "OFF" to "ON" and vice versa, the ticking of the relay contacts should be heard; otherwise it should be replaced.

B) Checking the upper charging limit

Start the engine and take it to maximum speed. With the tester in the voltmeter function, measure the voltage at the battery terminals. The amount should slowly rise and settle at 14-15 Volts after about 10-15 minutes.

If this value is exceeded to the extent that the engine stops due to the self-resetting protection cutting in (at approximately 16 Volts) it means that the regulator is charging too much and must be replaced.



7.10.1 - CARE AND MAINTENANCE OF THE SEALED BATTERY

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7.10 CARE AND MAINTENANCE OF THE SEALED BATTERY

A) General information

In a sealed “dual” battery, the electrolyte for each element is carefully measured out during manufacture and sealed at source, in order to ensure maximum performance during the battery’s entire life.

With a battery of this type, it is not necessary to add water or acid, and the cover must never be opened or removed.

B) Recommendations for correct use

To keep the battery performing at optimum levels and to increase its life, various precautions should be taken:

- always keep the battery fully charged;
- always recharge a flat battery within 1 month, otherwise the elements could be damaged and no longer able to take the charge (sulphated);
- always recharge the battery before and after periods of prolonged inactivity or storage.

WARNING!

Only recharge with a constant voltage battery charger. Use of other types of battery charger could damage the battery.

C) Rules for recharging the battery

Recharging is a particularly important operation for the life of the battery and must be carried out according to these instructions:

- do not recharge the battery when its case is broken or damaged;
- carefully read the instructions for using the battery charger and the battery;
- use a suitable battery charger;
- recharge at a room temperature of between +10 and +30 °C;
- check that the battery does not heat to beyond 50 °C while recharging. If it should do so, stop recharging immediately and dispose of the battery since it will be unusable.

With the battery disconnected (and at rest for at least 12 hours) and the tester in voltmeter function, measure the voltage between the terminals. The amount given (open circuit voltage) gives an indication of the operations to be carried out, as per the following table:

Battery voltage with open circuit	Battery state	Operation to be carried out
> 12.6 Volt	Fully charged	None
< 12.4 Volt	Flat	Recharge

Check the battery voltage at least 12-24 hours after recharging.

7.11 FITTING SAFETY MICROSWITCHES

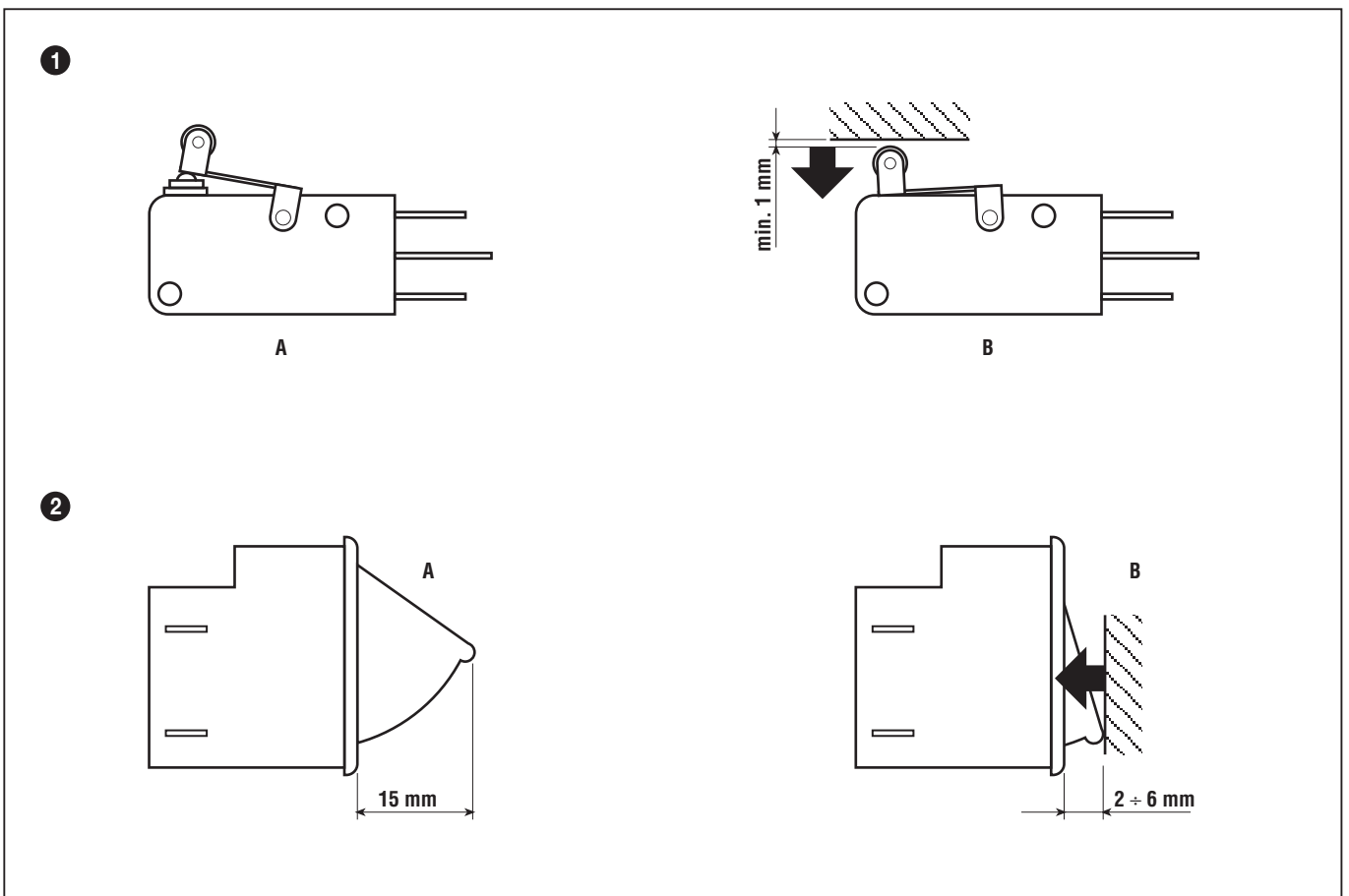


IMPORTANT

If the microswitches are to function correctly, it is important to follow the exact assembly positions by referring to the drawings that indicate the various usages of each type.

A = Free

B = Activated

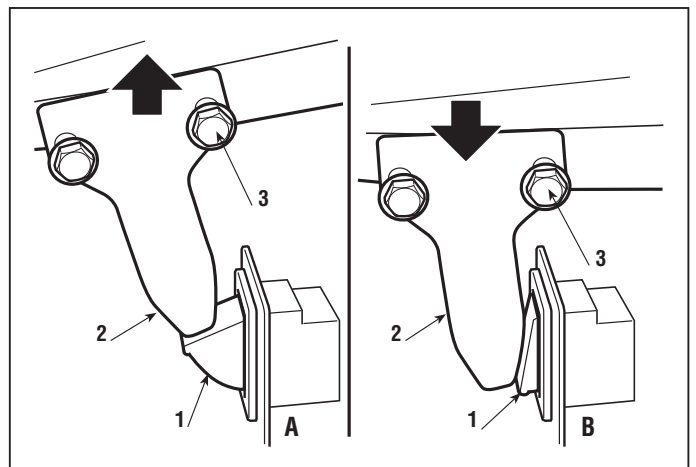


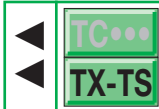
Adjust the seat safety microswitch **(1)** only by changing the position of the cam **(2)**, after loosening the two fixing screws **(3)**.

This adjustment is correct when you have checked the following:

A = seat free: the lower edge of the cam **(2)** should be touching the microswitch button without activating it.

B = seat with the driver in position: the lateral edge of the cam **(2)** should press the push-button, leaving at least 2-3 mm more travel.





7.13a.0 - CHECKING THE OPERATION OF THE BAG EMPTYING CONTROL

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7.13a CHECKING THE OPERATION OF THE BAG EMPTYING CONTROL

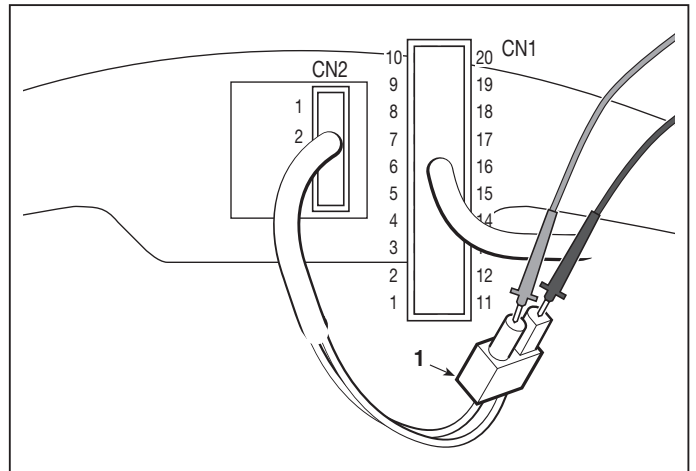
The following conditions must be ensured to make this check:

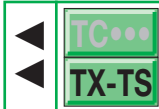
- key set to «ON»,
- connector CN2 connected,
- operator seated,
- blades disengaged.

The check is made with the tester in Voltmeter mode (0 ÷ 20 Volts DC) and with the probes on the connector **(2)** output cabling terminals.

When one of the two keys is pressed the instrument reading shows the battery voltage (positive or negative); this value must never fall below 11.5 Volts.

If no power is detected it means that the 15 A fuse has blown or that there is a fault in the actuator board.





7.14a.0 - REPLACING THE CLOCK'S BUFFER BATTERY

from 2006 to

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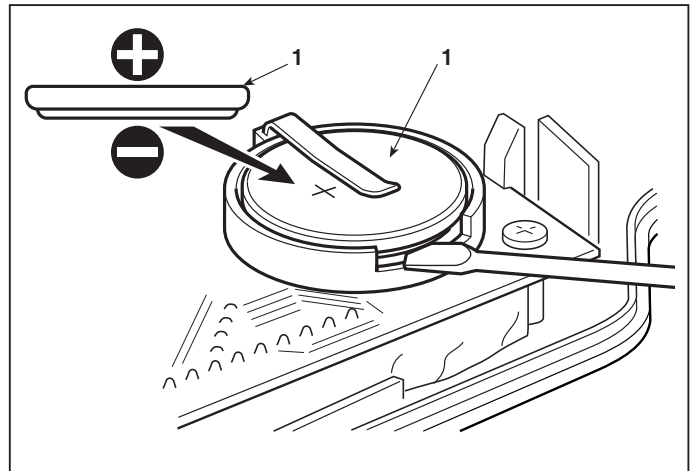
7.14A REPLACING THE CLOCK'S BUFFER BATTERY

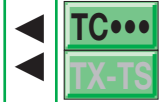
NOTE - The lower panel/board group guard, fixed by two nuts, must be removed to carry out this operation.

Use a screwdriver to remove the flat battery **(1)**.

Only use 3 Volt 24 mm Ø batteries of types CR 2450 or CR 2430.

When fitting the new battery make sure that the end marked «+» faces towards the check spring.

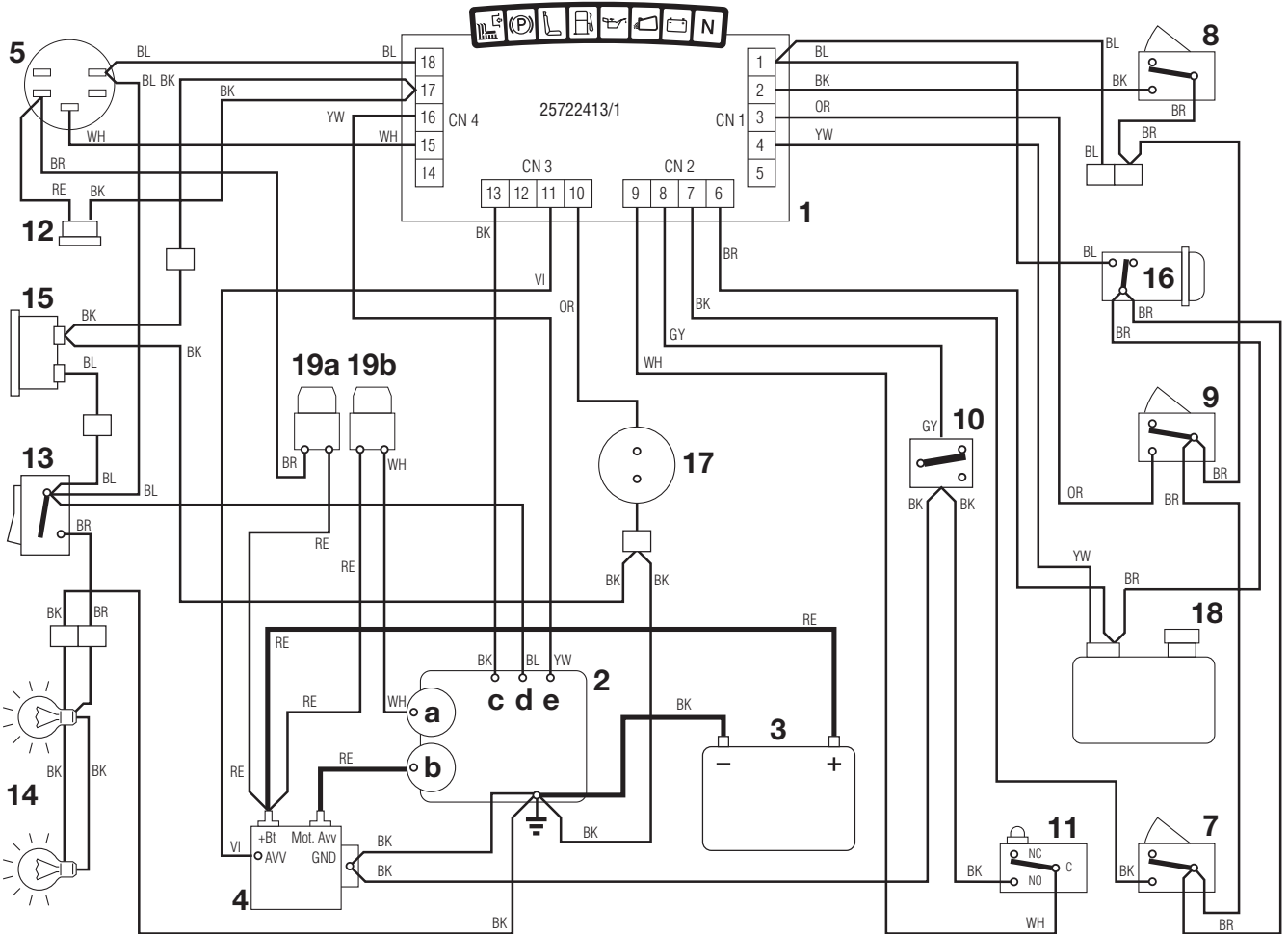




7.15.1 ELECTRICAL DIAGRAMS

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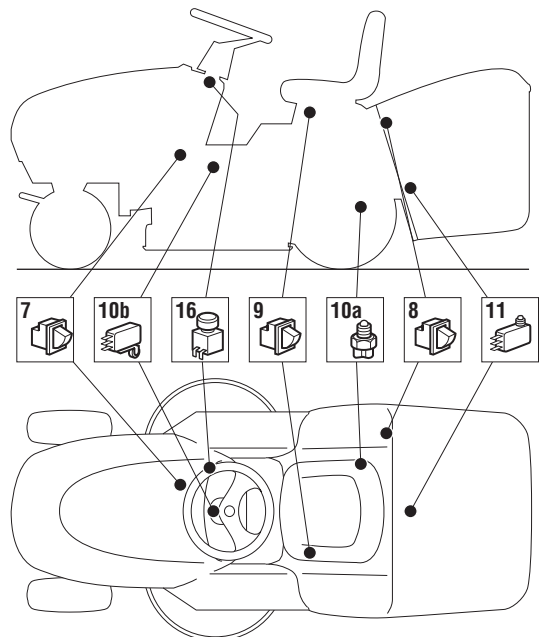
1 ▶ 8 led - Engines: B&S



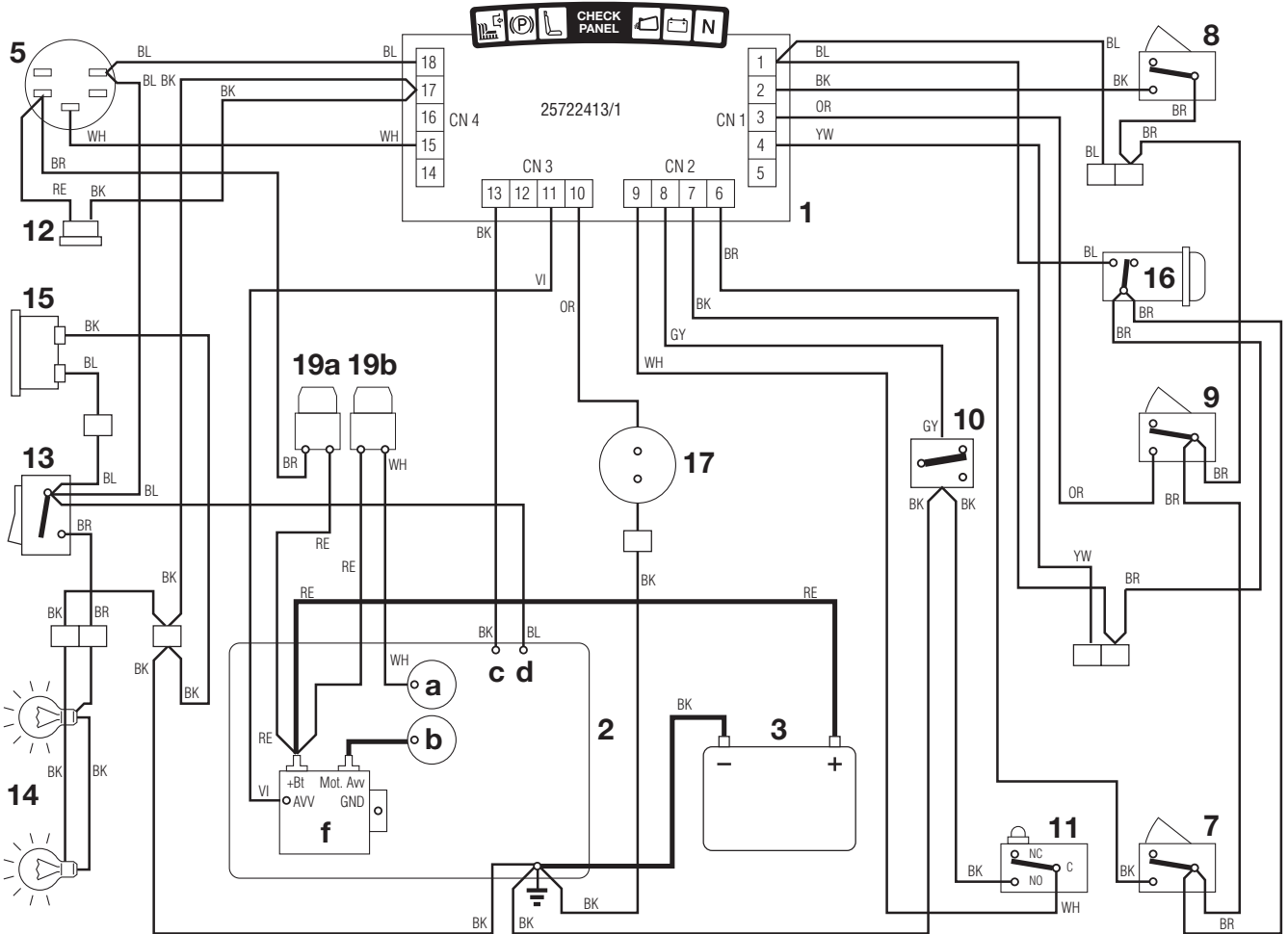
- 1 Electronic card
- 2 Engine
- 2a Generator
- 2b Starter
- 2c Engine stop
- 2d Carburettor
- 2e Oil
- 3 Battery
- 4 Starter relay
- 5 Key ignition switch
- 7 Brake microswitch
- 8 Grasscatcher microswitch
- 9 Microswitch operator present
- 10a Neutral microswitch (▶ mechanical drive models)
- 10b Neutral microswitch (▶ hydrostatic drive models)
- 11 Grass-catcher full microswitch
- 12 Recharge connector
- 13 Lightss switch
- 14 Light
- 15 Hour counter
- 16 Clutchswitch
- 17 Clutch
- 18 Fuel tank
- 19a 10 A Fuse
- 19b 25 A Fuse

CABLE COLOURS

- BK Black
- BL Blue
- BR Brown
- GY Grey
- OR Orange
- RE Red
- VI Violet
- YW Yellow
- WH White



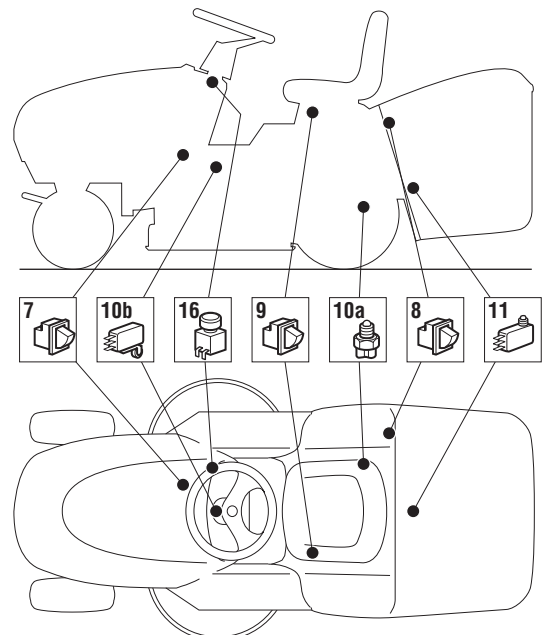
2 ▶ 6 led - Engines: B&S - GGP



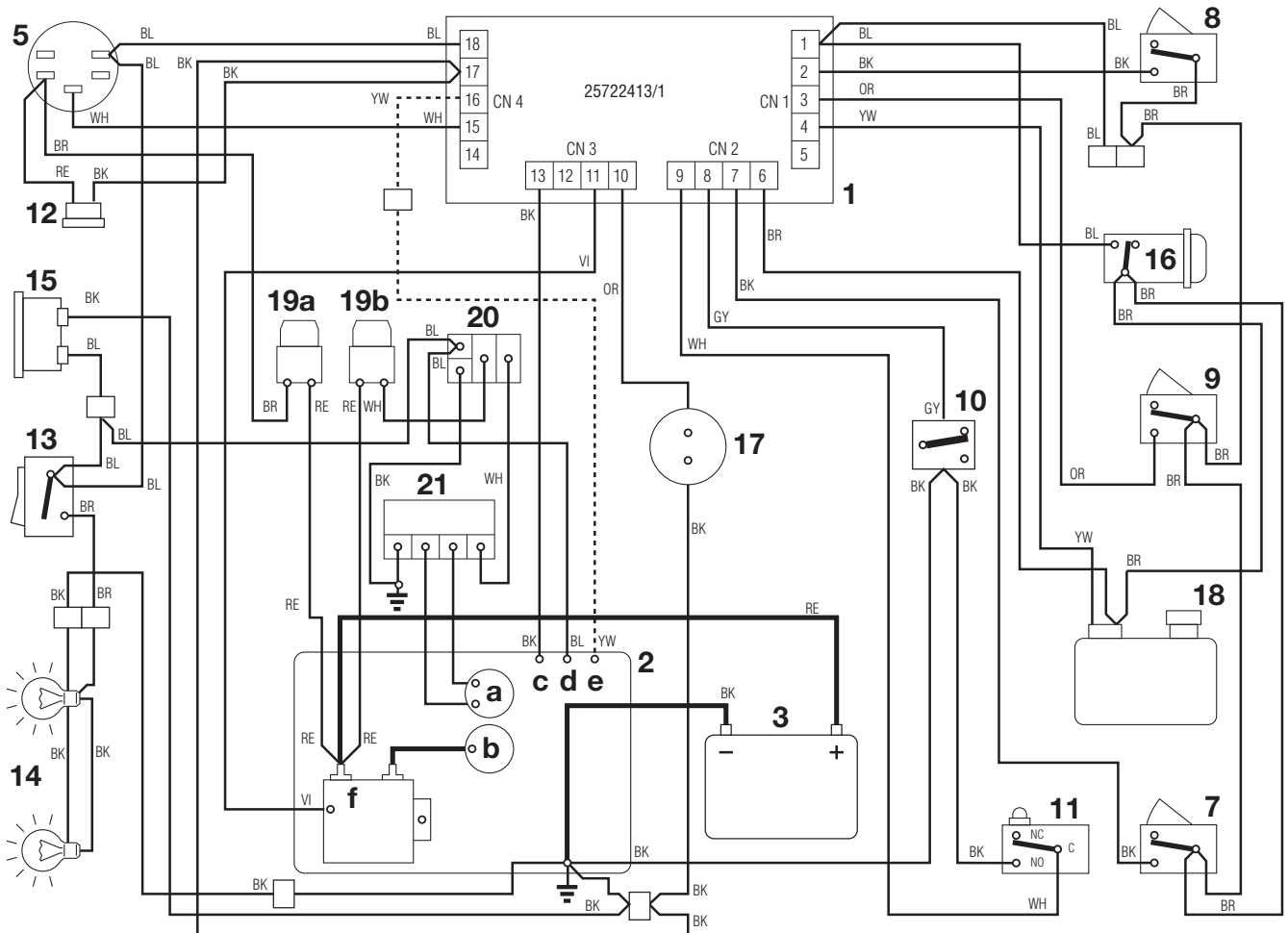
- 1 Electronic card
- 2 Engine
- 2a Generator
- 2b Starter
- 2c Engine stop
- 2d Carburettor
- 2f Starter relay
- 3 Battery
- 5 Key ignition switch
- 7 Brake microswitch
- 8 Grasscatcher microswitch
- 9 Microswitch operator present
- 10a Neutral microswitch (▶ *mechanical drive models*)
- 10b Neutral microswitch (▶ *hydrostatic drive models*)
- 11 Grass-catcher full microswitch
- 12 Recharge connector
- 13 Lightss switch
- 14 Lights
- 15 Hour counter
- 16 Clutchswitch
- 17 Clutch
- 19a 10 A Fuse
- 19b 25 A Fuse

CABLE COLOURS

- BK** Black
- BL** Blue
- BR** Brown
- GY** Grey
- OR** Orange
- RE** Red
- VI** Violet
- YW** Yellow
- WH** White



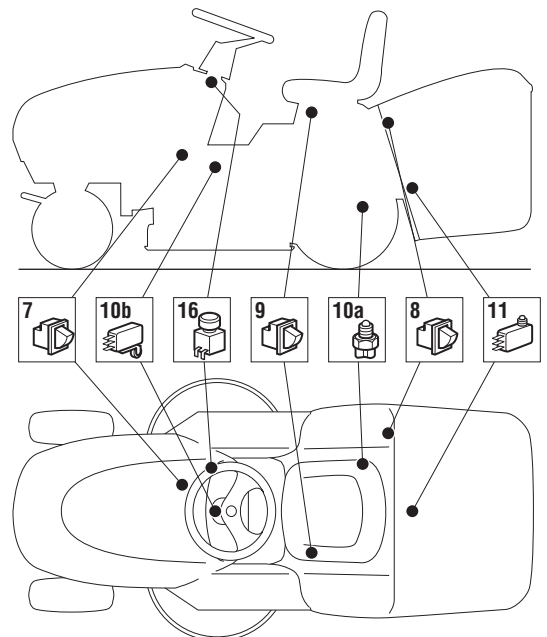
3 ▶ 8 led - Engines: Honda

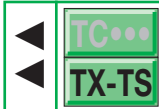


- 1 Electronic card
- 2 Engine
- 2a Generator
- 2b Starter
- 2c Engine stop
- 2d Carburettor
- 2e Oil
- 2f Starter relay
- 3 Battery
- 5 Key ignition switch
- 7 Brake microswitch
- 8 Grasscatcher microswitch
- 9 Microswitch operator present
- 10a Neutral microswitch (▶ *mechanical drive models*)
- 10b Neutral microswitch (▶ *hydrostatic drive models*)
- 11 Grass-catcher full microswitch
- 12 Recharge connector
- 13 Lightss switch
- 14 Lights
- 15 Hour counter
- 16 Clutchswitch
- 17 Clutch
- 18 Fuel tank
- 19a 10 A Fuse
- 19b 25 A Fuse
- 20 Recharge relay
- 21 Recharge regulator

CABLE COLOURS

- BK Black
- BL Blue
- BR Brown
- GY Grey
- OR Orange
- RE Red
- VI Violet
- YW Yellow
- WH White

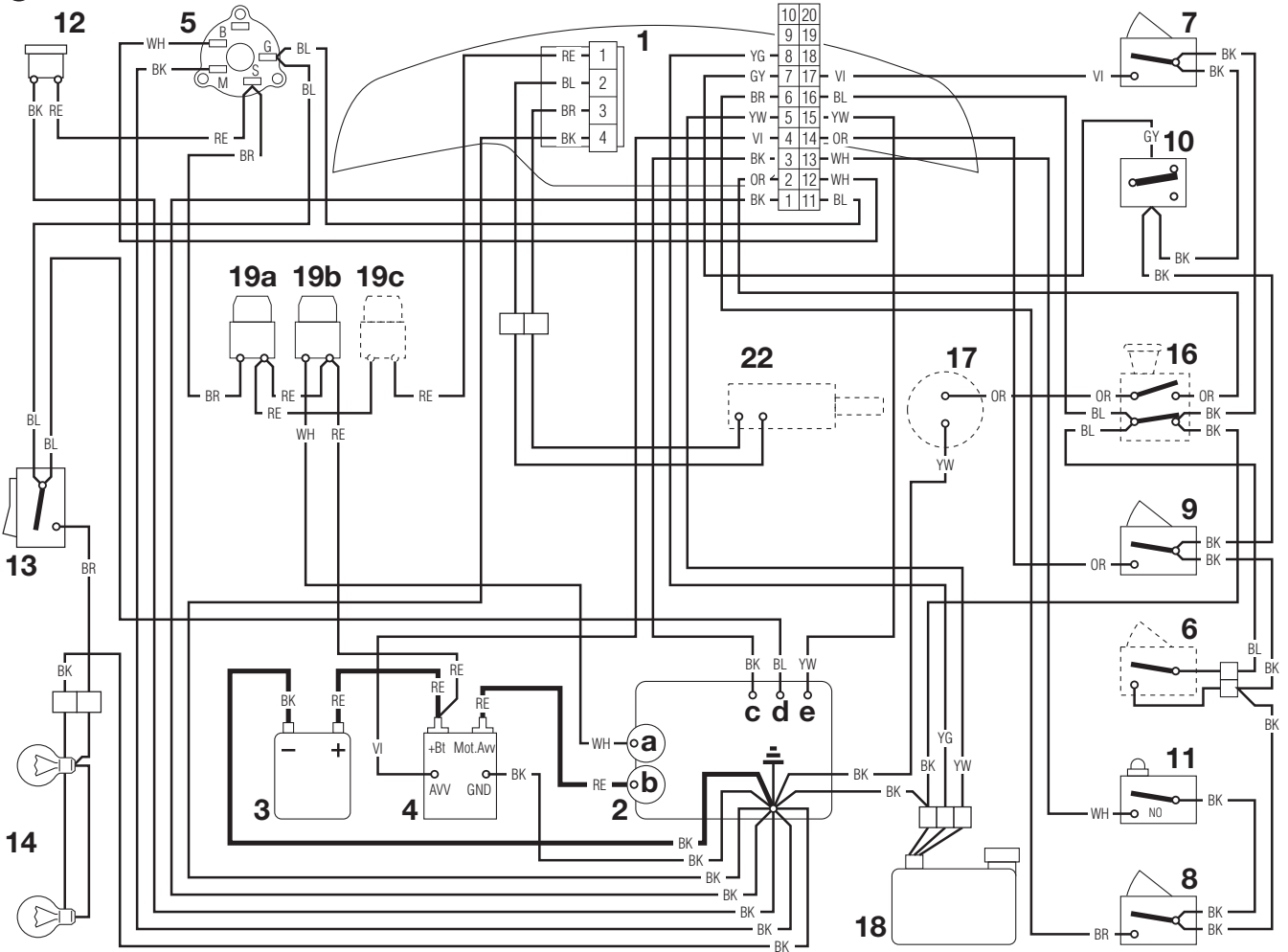




7.15a.2 ELECTRICAL DIAGRAMS

from 2008 to
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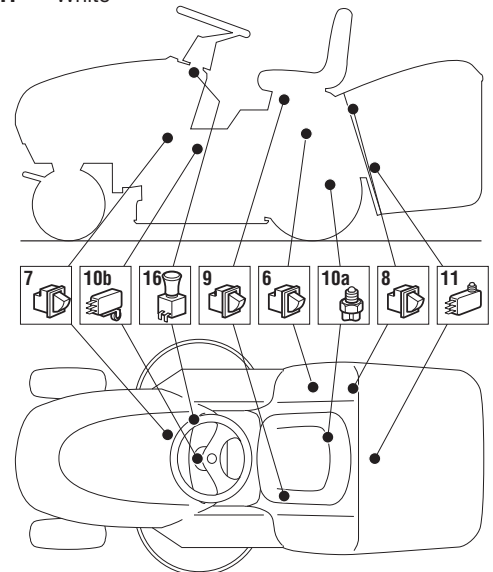
1 Engines: B&S - GGP



- 1 Electronic card
- 2 Engine
- 2a Generator
- 2b Starter
- 2c Engine stop
- 2d Carburettor
- 2e Oil
- 3 Battery
- 4 Starter relay
- 5 Key ignition switch
- 6 Blades microswitch (▶ models with lever operated engagement)
- 7 Brake microswitch
- 8 Grasscatcher microswitch
- 9 Microswitch operator present
- 10a Neutral microswitch (▶ mechanical drive models)
- 10b Neutral microswitch (▶ hydrostatic drive models)
- 11 Grass-catcher full microswitch
- 12 Recharge connector
- 13 Lightss switch
- 14 Light
- 16 Clutchswitch (▶ models with electromagnetic engagement)
- 17 Clutch (▶ models with electromagnetic engagement)
- 18 Fuel tank
- 19a 10 A Fuse
- 19b 25 A Fuse
- 19c 15 A Fuse (▶ models with electric tipping)
- 22 Actuator (▶ models with electric tipping)

CABLE COLOURS

BK	Black
BL	Blue
BR	Brown
GY	Grey
OR	Orange
RE	Red
VI	Violet
YW	Yellow
WH	White

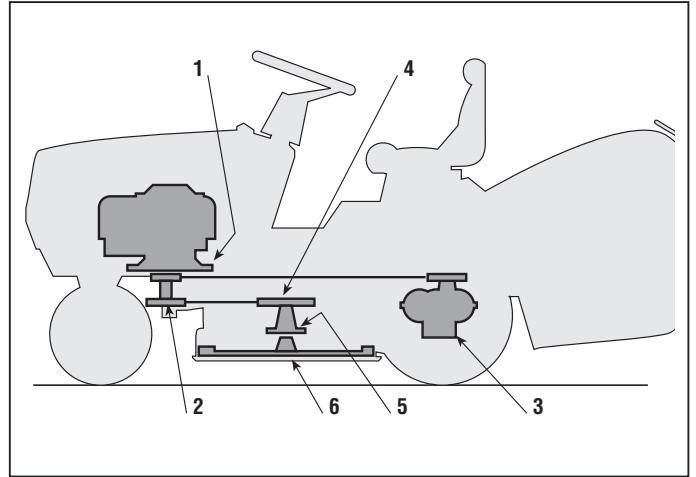


8.1 TIGHTENING TORQUES AND ADJUSTMENTS SUMMARY

A) Tightening torques

Below are the specified tightening torques for the fixing bolts on the main parts.

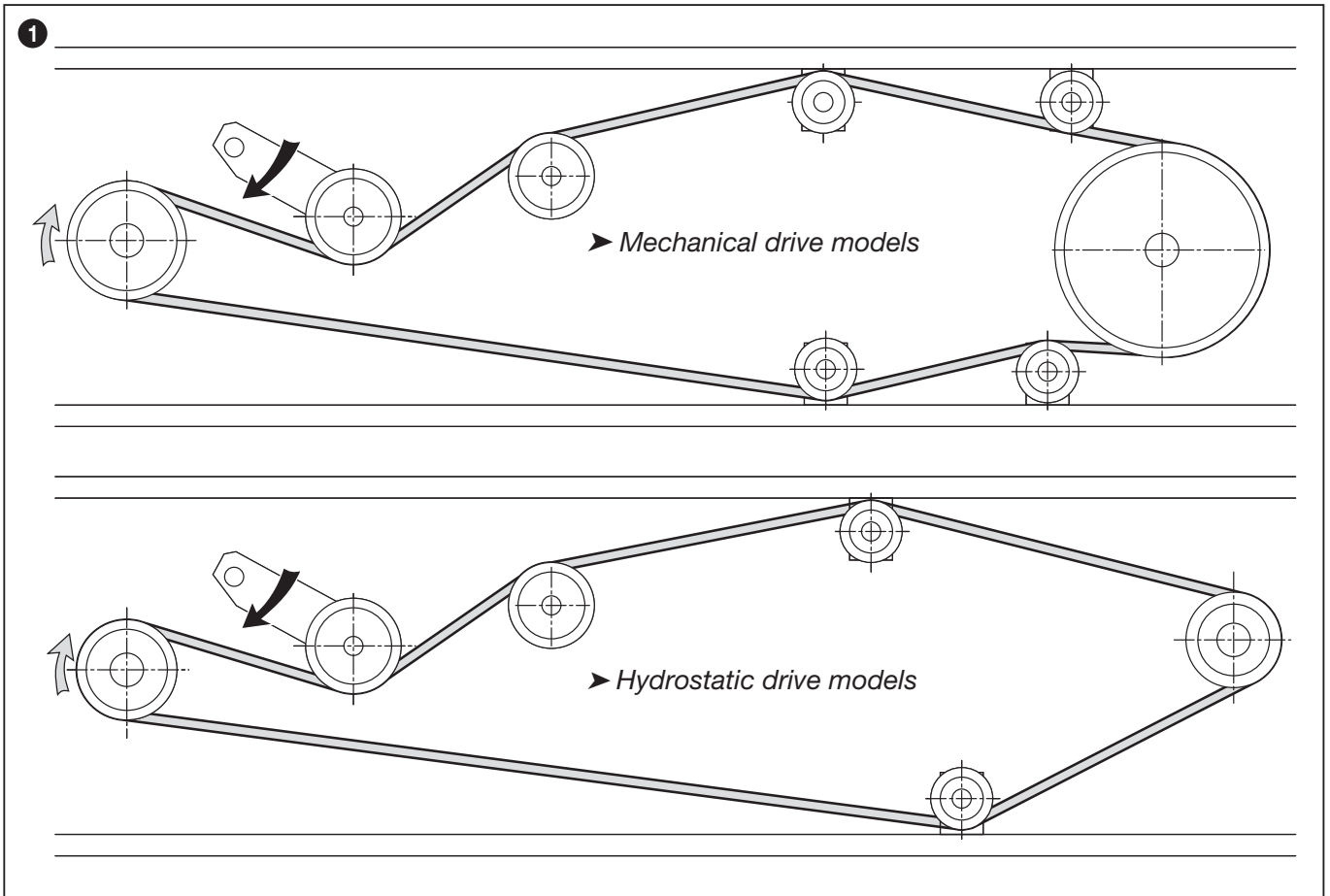
- 1 Screws for engine fastening 25 ÷ 30 Nm
- 2 Screw for pulley 45 ÷ 50 Nm
- 3 Screws for rear axle fastening 25 ÷ 30 Nm
- 4 Blade pulley screws 25 ÷ 30 Nm
- 5 Flanged support fixing nuts 25 ÷ 30 Nm
- 6 Screw for blade 45 ÷ 50 Nm



Every section in this manual gives values for all the components involved in each operation.

B) Adjustments

Operation	Position	Position of controls	Adjustment
a) Brake adjustment [see 4.3]			Dana 4360-196 47,5 - 49,5
			Tuff Torq K46F 45-47
b) Drive belt adjustment [see 4.4]			Dana 4360-196 114-116
			Tuff Torq K46F 109-111
c) Blades engagement adjustment [see 4.1]			Mod. 102 A = 94-96 Mod. 122 A = 92,5-93,5
			Mod. 102 A = 113-115 Mod. 122 A = 90-91



8.2 BELTS ASSEMBLY

- 1 Drive belt development
- 2 Blades control belt development
- 3 Blades connection belt development

