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Workshop manual

2007

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WORKSHOP MANUAL

Rel. 5.0

YEAR OF MANUFACTURE **2007**

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

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MAIN CHAPTERS

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 that are usually resolved by quick checks and tunings.

5. Removal of external parts and main assemblies

Greater access may be required for more difficult jobs. This can be done by taking off the unit concerned and working at the bench, or by removing the covers and external parts.

It is up to the mechanic with experience to decide whether these operations are useful.

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 regarding the electrical system.

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




The electrical diagrams, inserted in the spare parts pamphlet, can be useful in understanding how the system functions and to facilitate trouble-shooting.

8. Technical data

This chapter summarises all the technical information regarding the machine.

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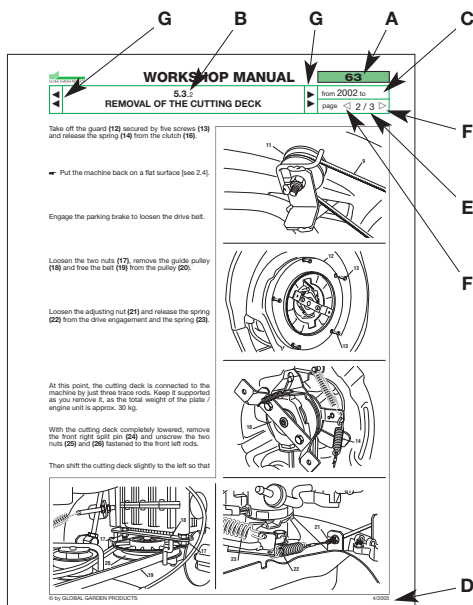
- 8.1 2 Tightening torques and adjustments summary
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INTRODUCTION

This manual has been compiled to help Service Centres with the maintenance, dismantling and repair of the following versions of "Rider" 63 riding mower:

- electric start models;
- manual start models.

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.

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.

1.1.1 IDENTIFICATION AND PROCEDURES

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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) Motor

The engine is made to precise technical specifications which differentiate it from similar products by this 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 limits of the contractual relations in force. As far as the engine is concerned, the conditions given by the manufacturer apply.

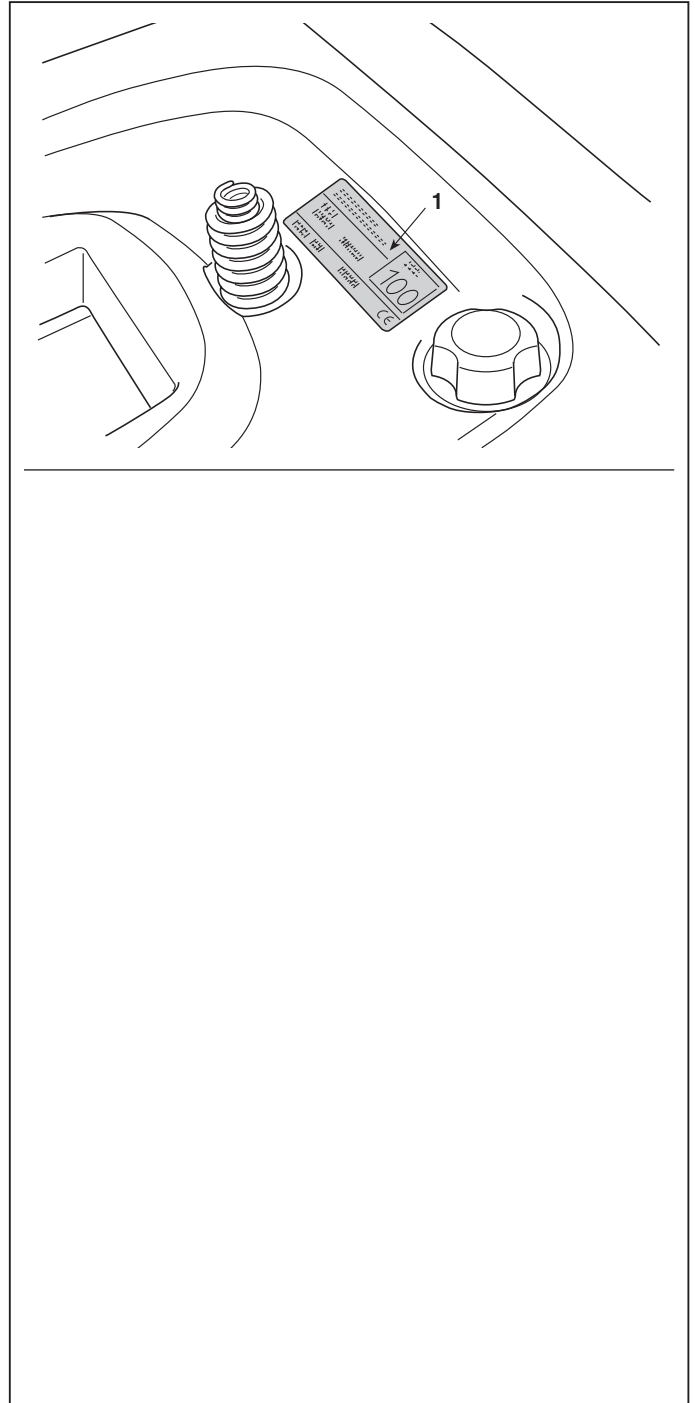
C) Service repairs after guarantee period

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:

- disconnect the ignition key (► *in electric start models*) and the spark plug cap before starting any work on the machine;
- 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 [► 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.



2.2.2 TOOLS



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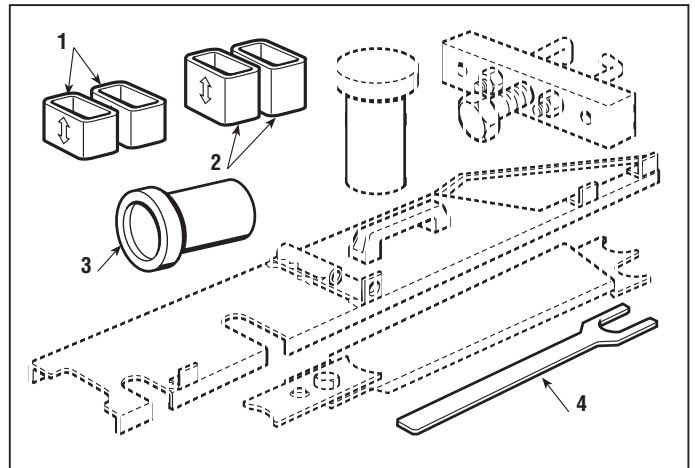
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2.2 TOOLS

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 ÷ 4)**.

These tools **(1 ÷ 4)** 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. Stopper for assembly of front wheel bushes
4. Wrench for dismantling the clutches





2.3.1 LIFTING

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2.3 LIFTING



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

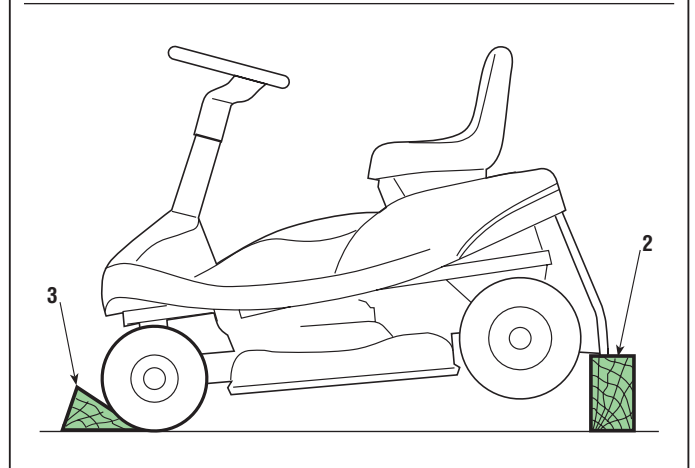
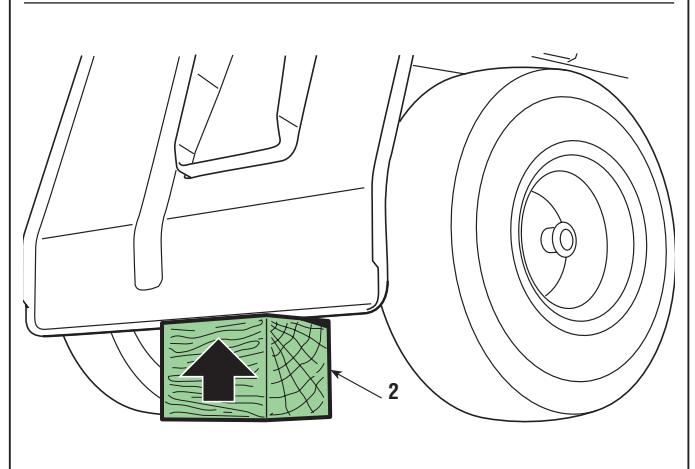
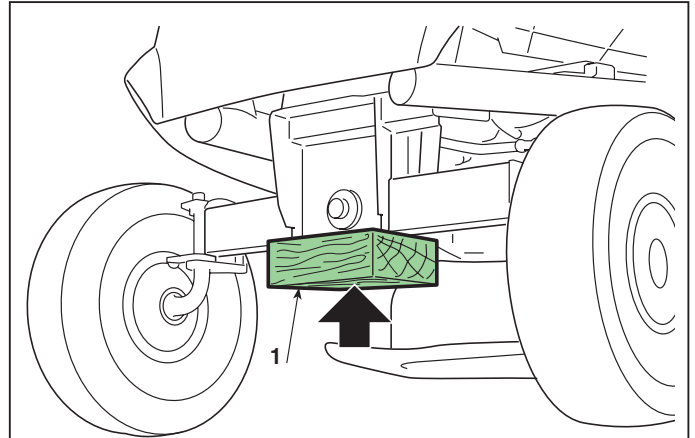


A) Front

ONCE THE PARKING BRAKE HAS BEEN ENGAGED, the machine can be lifted using a jack which pushes on the underside of the frame. Place a wooden block (1) between the base of the jack and the frame and check 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.



2.4.1 POSITIONING THE MACHINE VERTICALLY

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2.4 POSITIONING THE MACHINE VERTICALLY

For easier access to the lower part of the machine it is possible to lift it vertically.



WARNING! Two people will be needed for this job. When lifting the front of the machine, only grip the firm parts (like the seat or frame, etc.) and NEVER the plastic parts of the body.

Empty the fuel tank.

Put the machine onto a flat and firm surface, remove the grass-catcher, engage the parking brake and raise the cutting deck to its maximum height.

Fit a block **(1)** of about 60 mm underneath the rear plate, taking care to place it between the plate edge and the collector channel outlet.

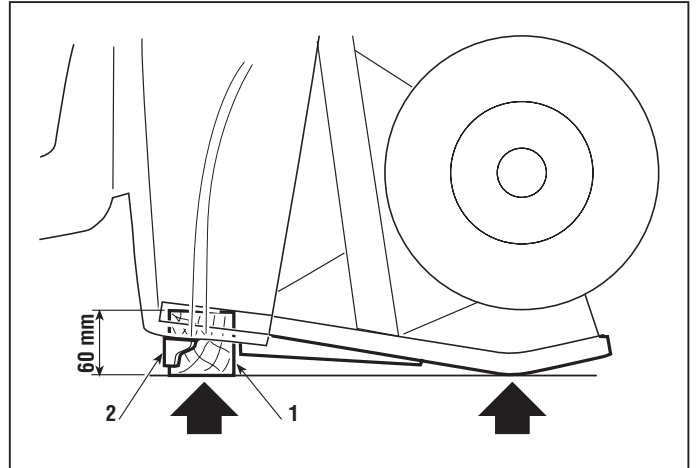
Lift the machine from the front, holding it by the parts with a firm grip (**not by the steering wheel**) and rest it in the points shown, in such a way that it does not damage the grass-catcher supports **(2)**.



WARNING! Be sure of the good stability of the machine before carrying out any type of work on the machine and avoid operations that may cause it to fall over.



WARNING! Be just as careful when putting the machine back on a flat surface; two people are needed for this operation.





2.5.1 PRACTICAL HINTS

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2.5 PRACTICAL HINTS

A) Fitting snap rings

“Benzing” snap rings (1) have a rounded edge on one side and a sharp edge on the other.

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) between the pin (3) and the support element, and between this and the nut (4).

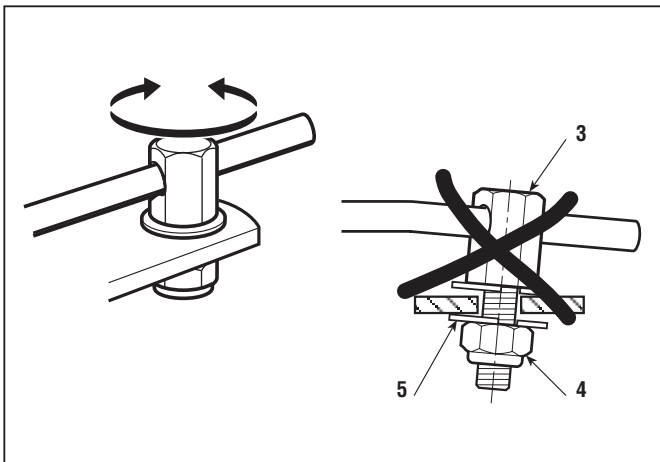
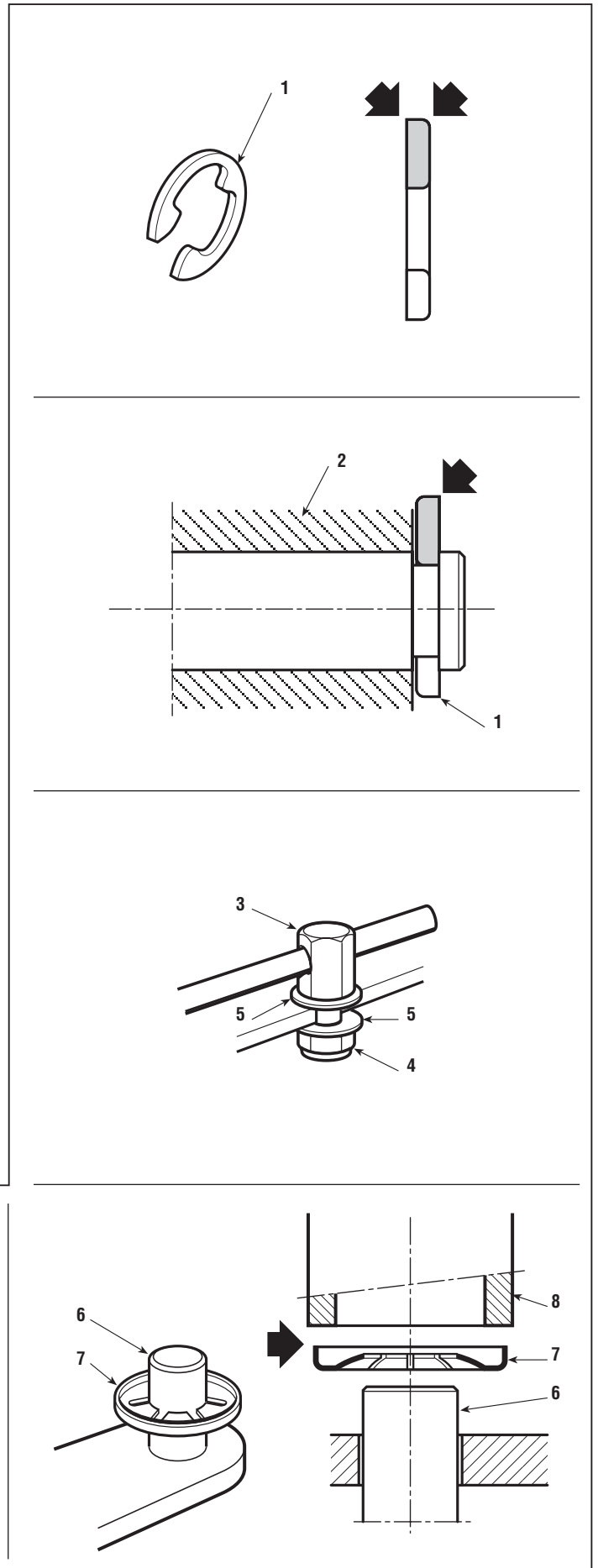
Since these are joints, the nut must never be tightened completely but only so much that it can ensure the free rotational movement of the pin on its axis without, however, creating excessive play which could result in the parts concerned becoming misaligned and failing to work correctly.

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.



3.1.1 CRITERIA FOR MAINTENANCE

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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 any illegible or missing labels
- Check the tyre pressure
- Clean air filter
- Check engine oil level
- Check for fuel leaks
- Align the cutting deck
- Sharpen and balance the blade
- Check the wear of the drive belt
- Check the blade brake and engagement
- Grease the joint pins of the front wheels
- Check and tighten the engine screws
- Check all those items indicated in the engine manual

b) Routine maintenance

- **All work carried out in point a), plus:**
- Check the battery charger (► *in electric start models*)
- Check the drive belt tension
- Adjust the drive engagement
- Adjust the brake
- Adjust the blade engagement
- Adjust the blade brake
- Replace the front wheel bushes
- General lubrication
- Clean away grass cuttings and wash the exterior
- Clean and wash the inside of the cutting deck and collector channel
- Clean and wash the grass-catcher
- Touch up any damaged paint

4.1.2 ENGAGEMENT AND BLADE BRAKE ADJUSTMENT

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4.1 ENGAGEMENT AND BLADE BRAKE ADJUSTMENT

The blade receives movement directly from the engine when the clutch is engaged. The motor is connected via a lever-controlled cable.

► **In the case of a Tecumseh engine**, blade engagement is only possible by keeping the specific pedal pressed.

On disengaging the motor, a brake should stop the blade almost immediately. After using it for a certain period of time, you may need to adjust the engagement point of the clutch in relation to the control lever.

A) Engagement system check

Check that the control lever (1), in the rest position (blade disengaged), shows a certain mobility.

➡ Remove the blade [see 4.7].

The blade engagement adjustment must be done with the blade engaged.

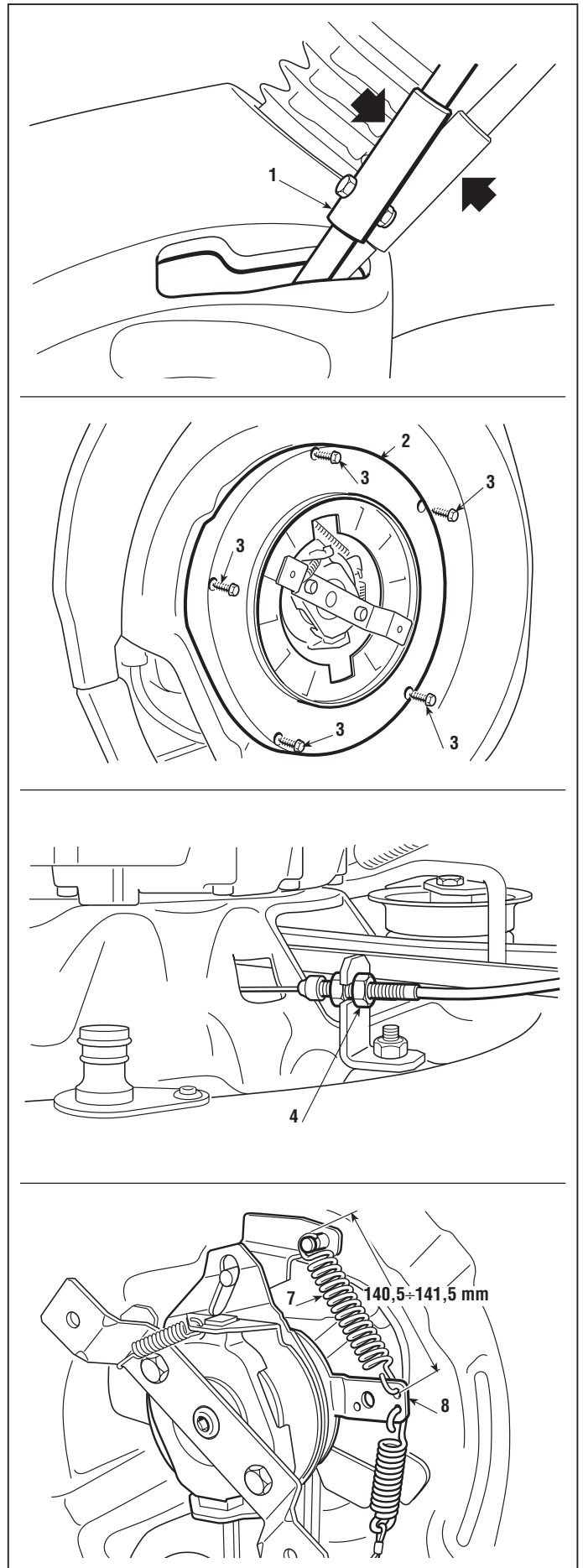
Remove the guard (2) fixed by 5 screws (3).

Work suitably on the cable engagement register (4) until the spring (7) length of 140.5-141.5 mm, measured on the outside of the eyelets, is obtained.

With this adjustment, the clutch lever (8) can cover the whole stroke needed to obtain regular engagement and disengagement.

A considerable increase in blade braking time can be caused by wear or damage to the clutch friction elements, which should therefore be replaced as a block or limited to one of the two main elements [see 6.4].

➡ Refit the blade [see 4.7] by tightening the nuts to the prescribed values.



4.1.2 ENGAGEMENT AND BLADE BRAKE ADJUSTMENT

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B) Check pedal operation (► *only with a Tecumseh engine*)

If a delay in blade disengagement occurs, the condition of the pedal group components must be checked.

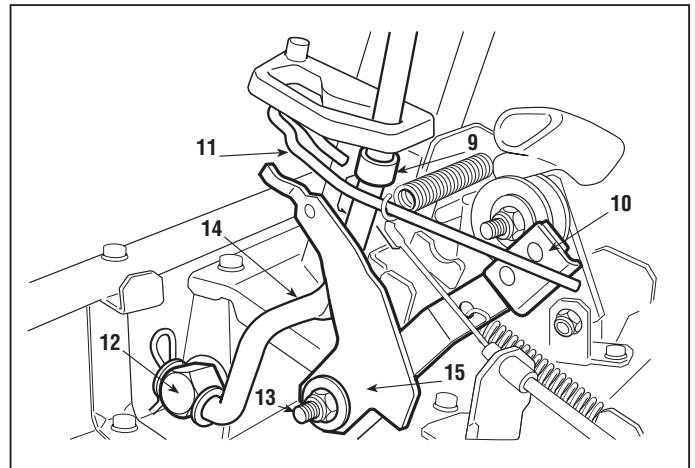
➡ Remove the wheel cover [see 5.1].

Check that the roller (9) and runner (10) are not worn and that the rod (11) is not distorted.

Check that the two clevis pins (12) and (13) permit the regular and complete stroke of the lever (14) and pedal (15).

➡ Refit the wheel cover [see 5.1].

➡ Check correct blade engagement and brake [see 4.1.A].



4.2.1 BRAKE ADJUSTMENT

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4.2 BRAKE ADJUSTMENT

The machine's reduced braking capacity is regained by regulating the control cable's adjuster.

➡ Remove the collector channel [see 5.2].

Only make the adjustment when the parking brake is engaged.

Remove the engine housing (1) and unscrew the adjuster (2).

Through the rear outlet, lift the brake lever (3) with one hand until the lever is blocked by the pads that touch the brake disc.

Keep the lever (3) raised and regulate the adjuster (2) until the control cable (4) is taut.

Release the lever (3) and loosen the front nut of the adjuster (2) with three complete turns, in order to lower the lever (3) and move the pads away from the disc.

Tighten the adjuster (2) in this position and check that the wheels are not in braking mode.

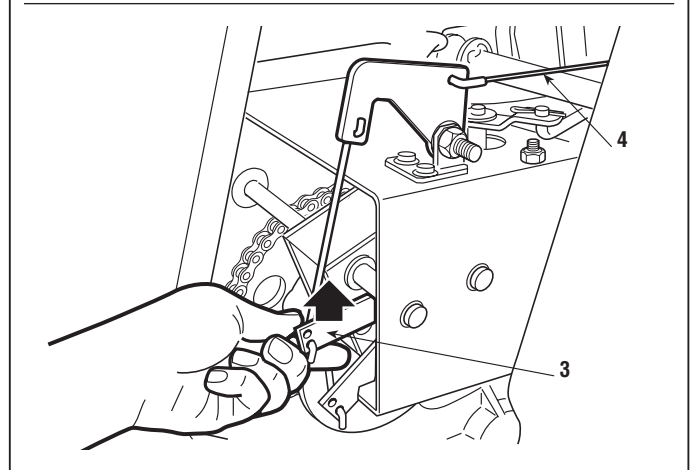
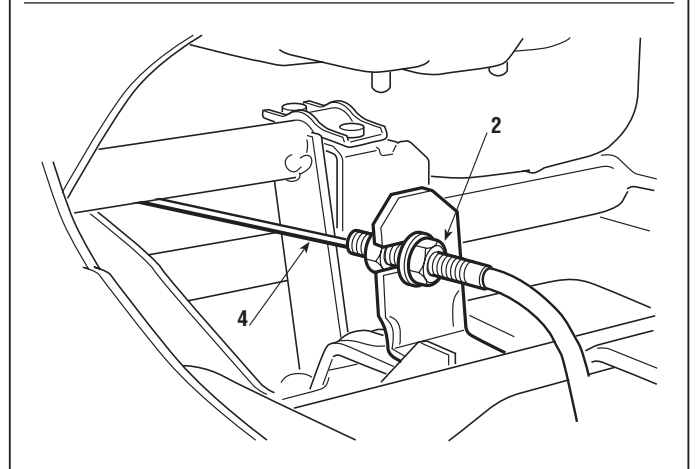
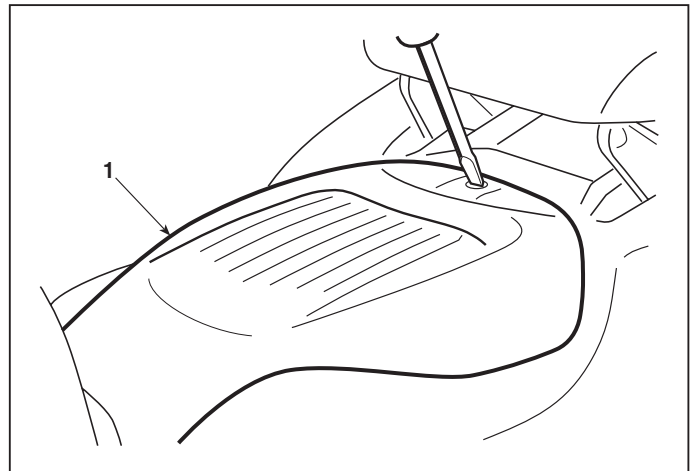


If braking is still poor or irregular after adjustment, check that the brake pads and disc are not damaged or worn to the point that they need replacing [see 6.10 and 6.11 C].



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.

➡ Remove the collector channel [see 5.2].



4.3.0 DRIVE ENGAGEMENT ADJUSTMENT

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4.3 DRIVE ENGAGEMENT ADJUSTMENT

If the forward drive fails to work 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 transmission and limits forward movement power;
- A belt that 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.

➡ Remove the collector channel [see 5.2].

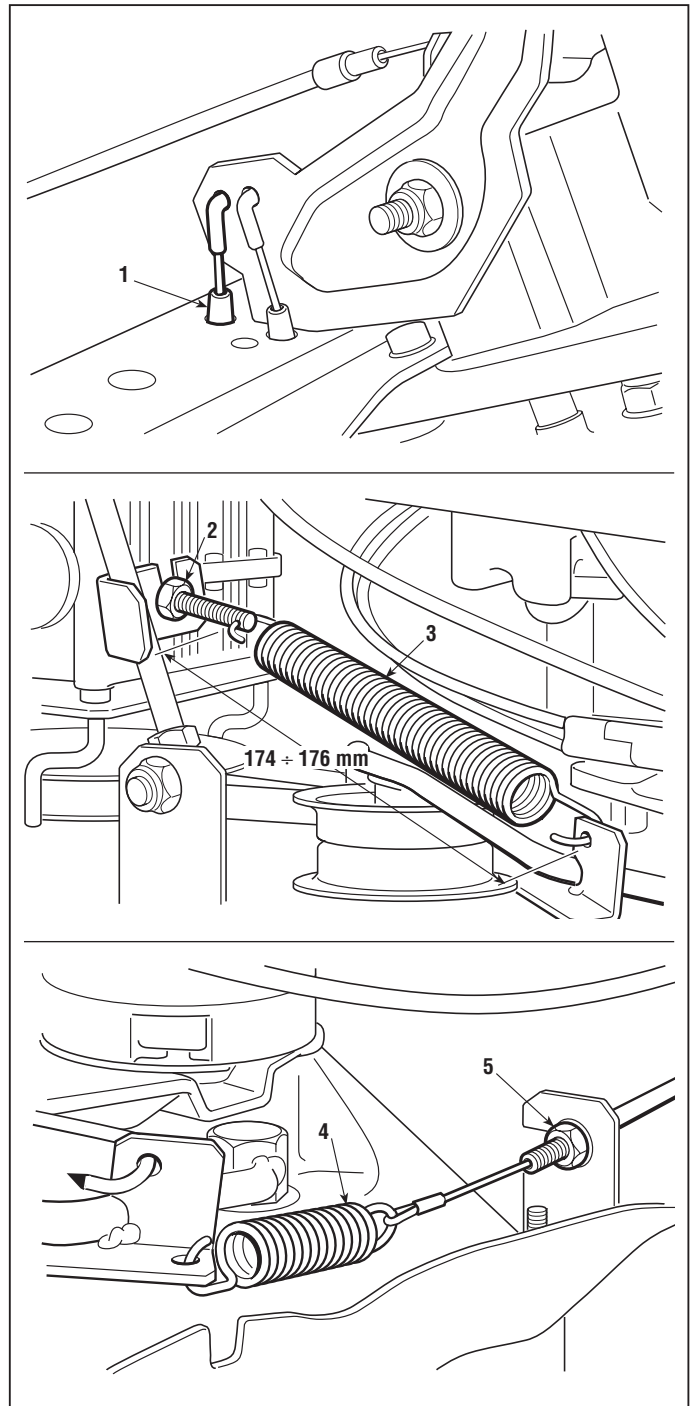
The adjustment must be made with the parking brake disengaged and the cutting deck in position «3».

Check that the engagement cable cap **(1)** (near the pedal) is securely engaged in its housing and adjust the nuts **(2)** until the spring length **(3)** is 174 - 176 mm, measured on the outside of the eyelets.

After adjustment, check that the engagement cable spring **(4)** is not too taut or too loose and allows enough play. Otherwise, turn the adjusting nut **(5)** until you obtain the right conditions previously described.

Finally, check the length of the spring **(3)** again.

➡ Remove the collector channel [see 5.2].



4.4.0 CUTTING DECK ALIGNMENT

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4.4 CUTTING DECK ALIGNMENT

The cutting deck descent is controlled by a lever and guided by two connecting-rods at the front and one at the back, all connected by another rod.

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

Two adjustments can be made on the jointed system of the cutting deck:

- a) combined adjustment of the parallel and the minimum height front and back
- b) adjustment of the parallel across the cutting deck

Check the tyre pressures.

If one or more tyres have been replaced and there are found to be differences in diameter, **do not attempt to compensate these differences by giving different tyre pressures**, but make the adjustments as in points "A" and "B".

A) Combined adjustment of the parallel and the minimum height front and back

With the machine resting on a flat, stable surface (e.g. on a work bench), put blocks under the cutting deck:

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

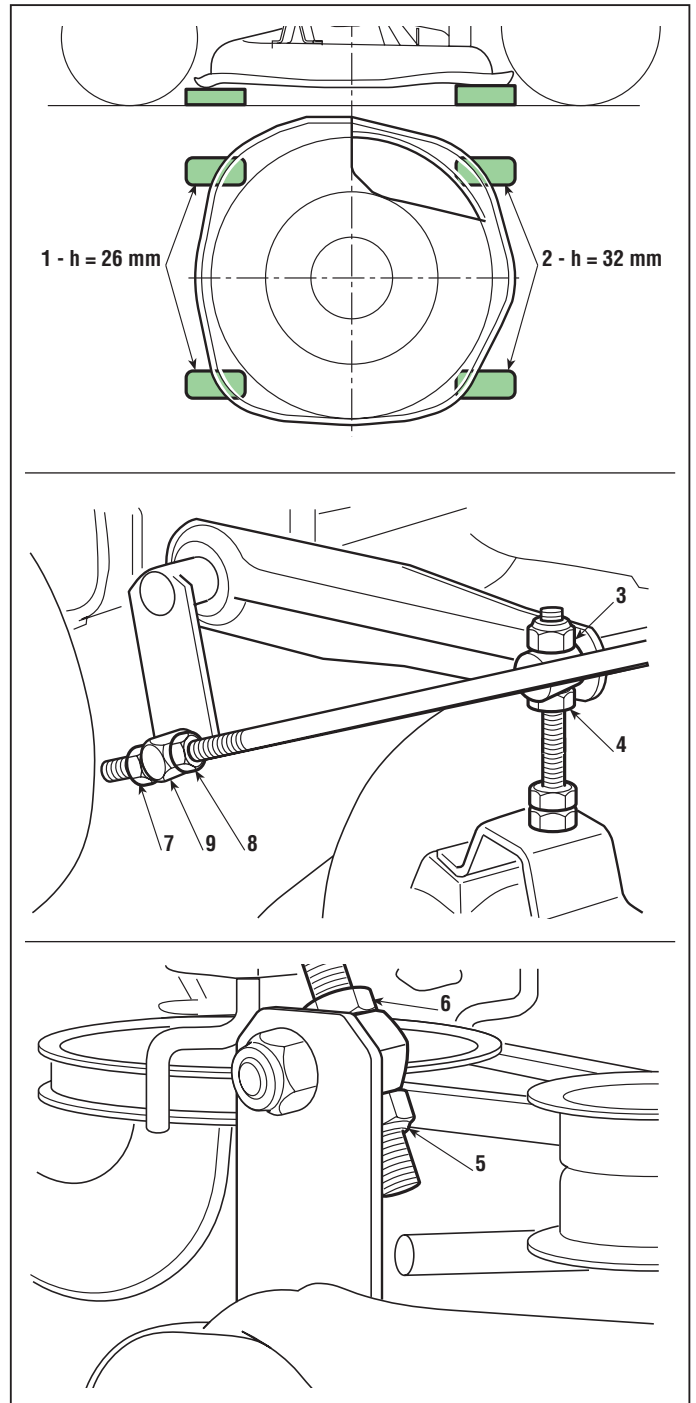
Move the cutting height adjustment lever to position «1» by engaging it in its notch.

Loosen the nuts (3-5) and locknuts (4-6) on the right and left, as well as nuts (7-8), so that the plate rests firmly on the blocks when all the fastenings are loosened.

Fully tighten the nut (3) and locknut (4) and adjust the nut (7) until the front part of the deck starts to rise.

Adjust the nut (5) until the rear part of the deck starts to rise and fully tighten the locknut.

Check the front, and if necessary, adjust the nut (7) and fully tighten nut (8) on the pin (9).



B) Adjustment of the parallel across the cutting deck

A difference in height from the ground between the left and right sides of the deck can be compensated by adjusting the nut (3) and the locknut (4) at the front left coupling point.

NOTE

Remember to tighten all the nuts and locknuts once these adjustments have been made, allowing the pins to rotate freely [see 2.5.B].

4.5.0 STEERING GEOMETRY ADJUSTMENT

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4.5 STEERING GEOMETRY ADJUSTMENT

The correct steering geometry is given by the centre distance of the tie-rod connecting the stub axles and centre distance of the control tie-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 check,
- the machine does not maintain a straight line when the steering wheel is straight = adjustment of tie-rod.

A) Toe-in check

The exact toe-in is determined by the value of the centre distance of the connecting tie-rod (1) (378 mm) [see 8.2.5].

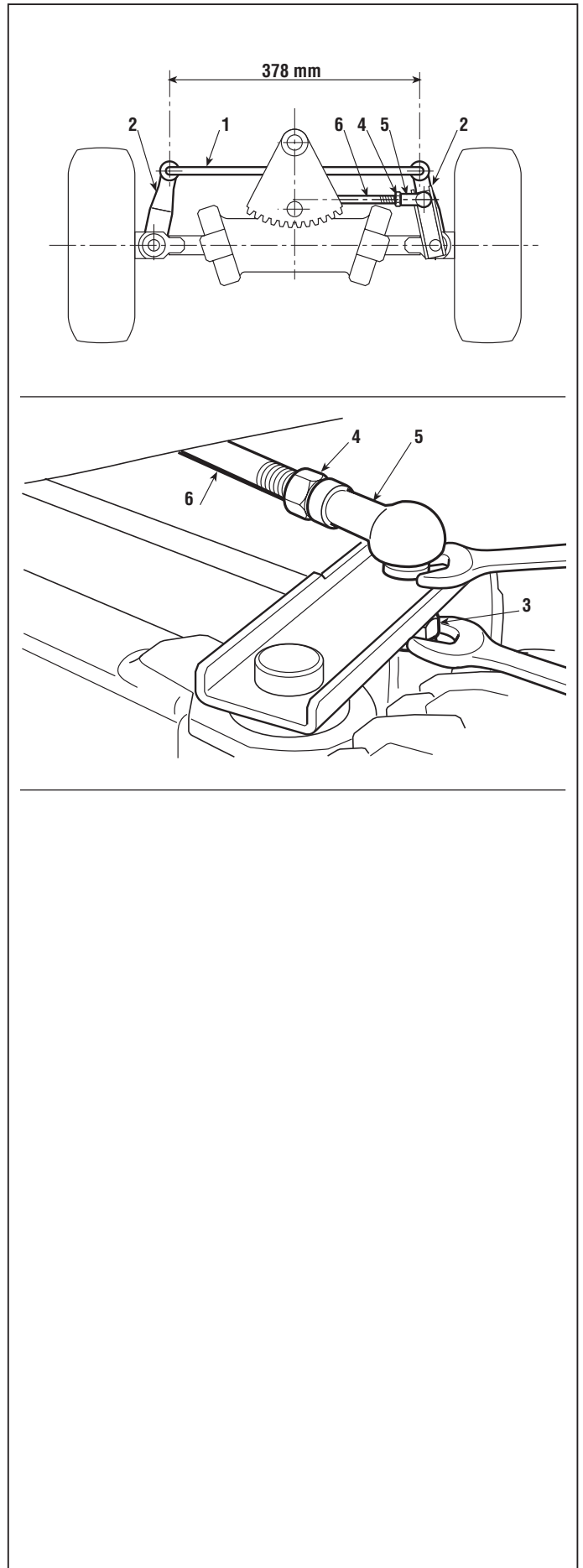
If values are over the indicated tolerance limits, check that the stub axles (2) are intact and replace the tie-rod.

B) Adjusting the steering wheel position

Firstly check the toe-in (point "A") and align the front wheels.

If the steering wheel is not straight, loosen both the nut (3) and the locknut (4), then tighten or unscrew the joint (5) on the rod (6) until the steering wheel is aligned.

When the adjustment is completed, fully tighten the nut (3) and locknut (4).



Tightening torques

3 Joint nut	45 ÷ 50 Nm
4 Joint locknut	25 ÷ 30 Nm

4.6.0 BLADE ALIGNMENT CHECK

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4.6 BLADE ALIGNMENT CHECK

Excessive vibration when cutting and an uneven cut can be due to misalignment of the blade resulting from accidental knocks, or deformation of the bracket.

☛ Position the machine vertically [see 2.4].



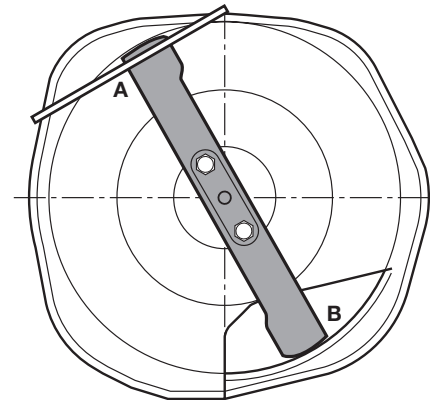
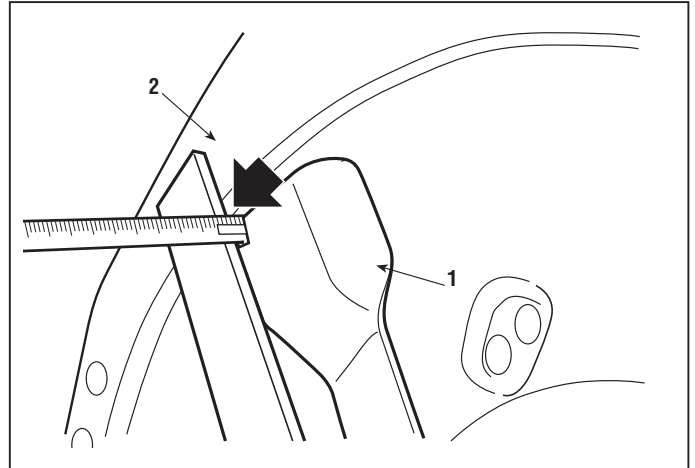
Always wear strong gloves when handling the blade.

Disengage the blade, place a straight metal rod (1) on a point around the edge of the deck (2), turn the blade by hand and check the distance between the rod and the two ends "A" and "B". The distance should be the same, and any difference should not exceed 2 - 3 mm.

If you note higher values, check that the blade is not deformed. If it is intact, check and if necessary replace the bracket mounted on the clutch [see 6.4].



IMPORTANT!
Always replace a damaged blade and do not attempt to repair or straighten it. Always use the manufacturer's genuine spare parts!



4.7.1 - REMOVING, SHARPENING AND BALANCING THE BLADE

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4.7 REMOVING, SHARPENING AND BALANCING THE BLADE

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



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

A) Removing and reassembling

To dismantle the blade (1), hold it firmly and undo the two nuts (2) of the screws.



On assembly, respect the assembly sequence of the nuts and bolts and tighten the two nuts (2) with a torque wrench set to 60-65 Nm.



Since the nuts and bolts have specific characteristics, replace them with only original spare parts.

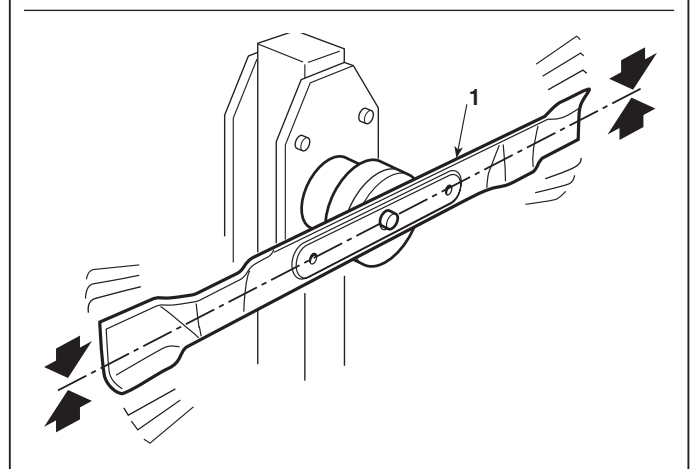
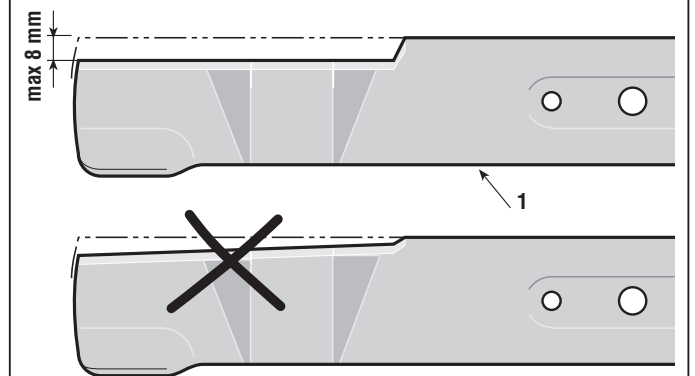
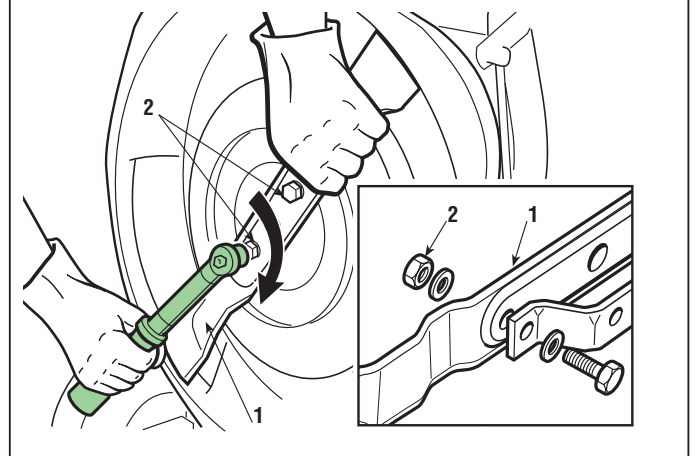
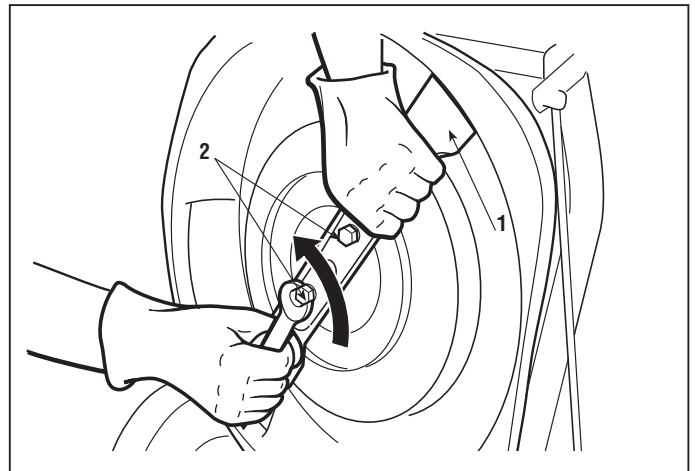
B) Sharpening and balancing

Always sharpen both cutting edges of the blade (1) using a medium grade grinder.

Sharpening must only be done from the rounded side, removing as little material as possible. Make sure that the cutting edge is parallel to the blade axle.

The blade is to be replaced when the cutting edge has worn down to 8 mm.

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



Tightening torques

2	Blade nuts	60 ÷ 65 Nm
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5.1.1 REMOVAL OF THE WHEEL COVER

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5.1 REMOVAL OF THE WHEEL COVER

Removing the wheel cover gives access to:

- fuel tank;
- the pinion and the ring gear of the steering.

Dismantle the seat (1) by pulling out the pin (2), which is held by a split pin (3).

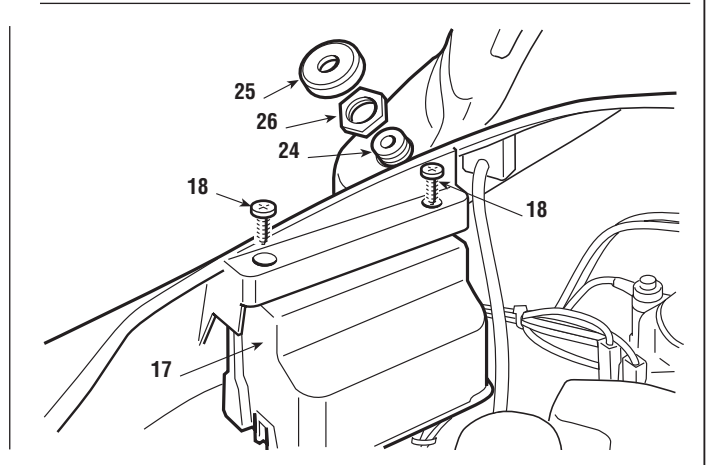
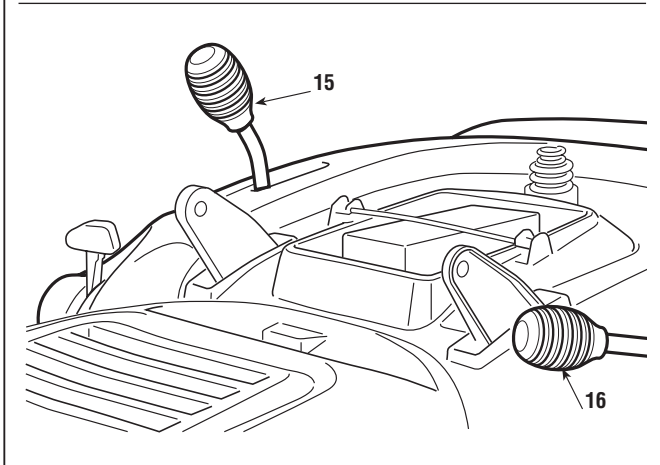
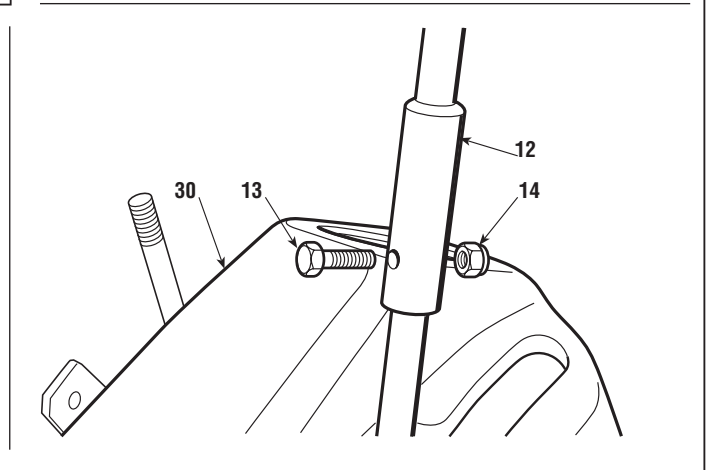
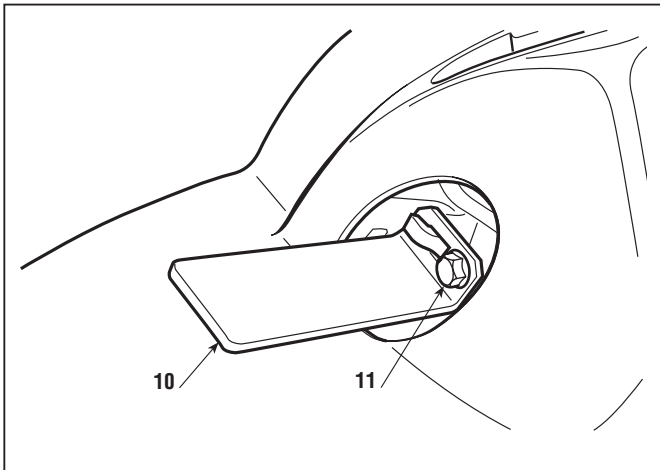
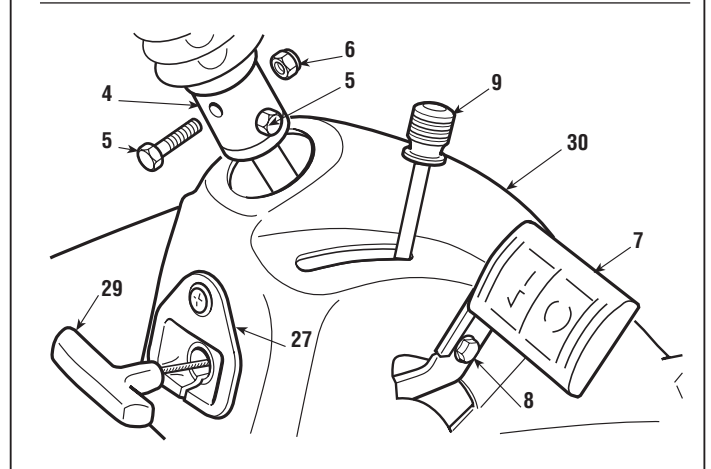
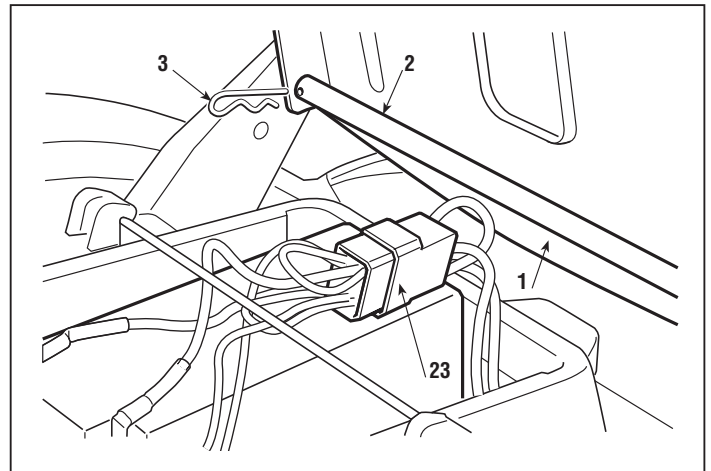
Dismantle the steering wheel column (4) after having unscrewed the screws (5) and nuts (6).
Dismantle the pedal (7) fixed by two screws (8) and unscrew the handle (9) of the parking brake lever.

► **Only with a Tecumseh engine:** Dismantle the pedal (10) fixed by the screw (11).

Dismantle the blade engagement lever (12) secured by the screw (13) and the nut (14).

Unscrew the lever handles (15) of the gear change and the lifting lever (16) of the cutting deck.

Remove the box (17) protecting the card, which is secured by two screws (18), leaving all the connectors attached.





5.1.1 REMOVAL OF THE WHEEL COVER

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Loosen the terminal (19) securing the accelerator cable (20) to the engine and disconnect the end of the wire (21) from the carburettor lever (22).

► **In electric start models:** disconnect the battery connector (23) and dismantle the starter unit (24) after removing the protective cap (25) and the nut (26).
We advise against disconnecting the electric cable terminals from the starter unit, as it could result in assembly errors.

► **In manual start models:** remove the mask (27) and the peg (28) to free the handle (29) from the starter cable.

The cover (30) is secured to the front by two self-threading screws (31), to the side by two self-threading (32) and to the rear by two screws (33) for fastening to the plate.

It is always best to loosen the two screws (33) from the rear plate, leaving the bracket (34) attached to the cover.

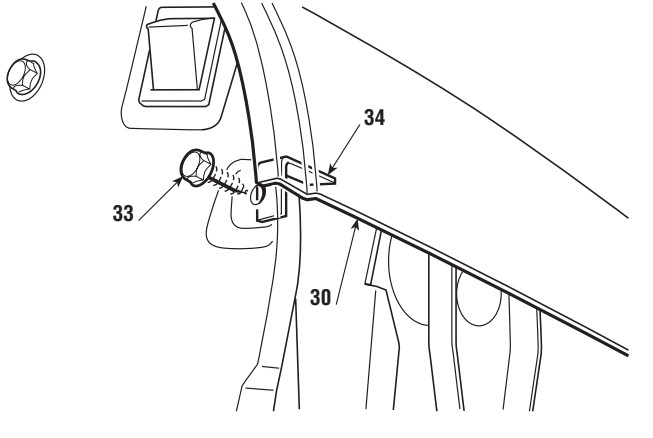
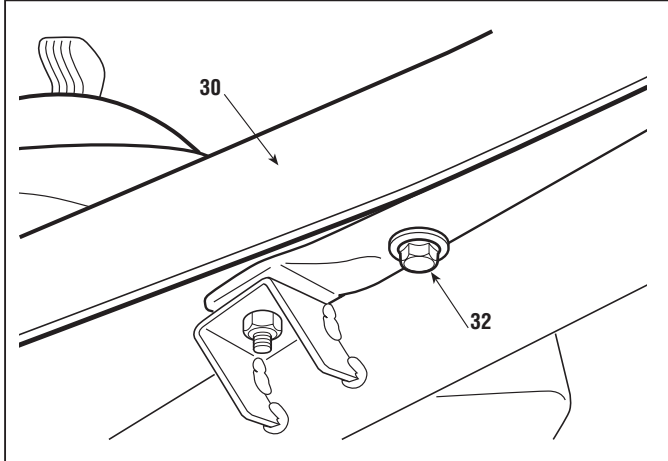
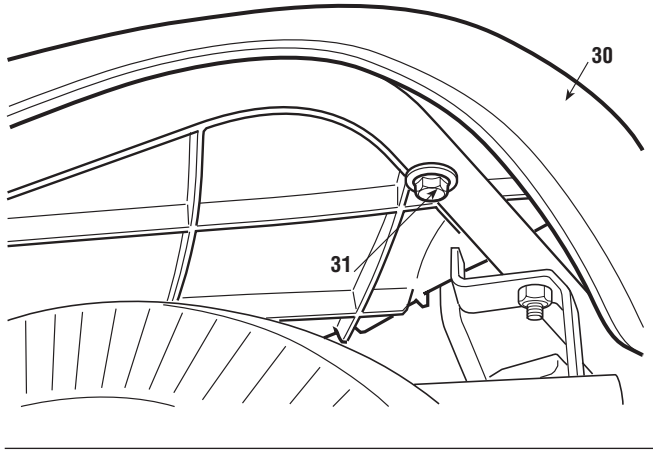
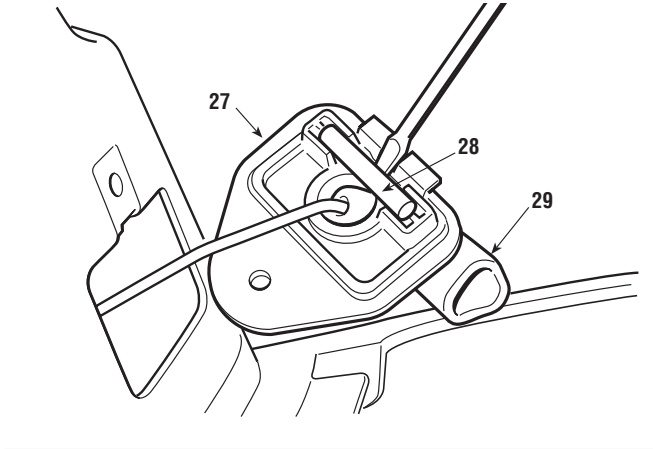
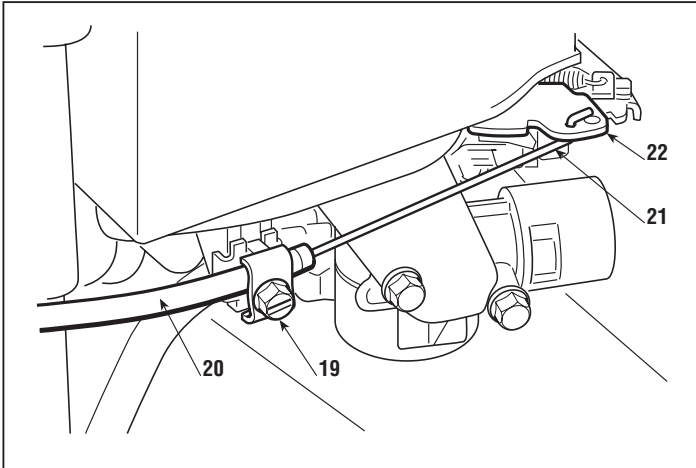
On assembly, reverse the order of the above operations, remembering to check and restore any disconnected wiring.

Reattach the accelerator cable (20) and ...

➡ Adjust the «STARTER» position [see 6.6].

Tightening torques

31-32 Cover screws	6,5 Nm
33 Cover screws	6,5 Nm



5.2.0	from 2002 to
REMOVAL OF THE COLLECTOR CHANNEL	page 1 / 1

5.2 REMOVAL OF THE COLLECTOR CHANNEL

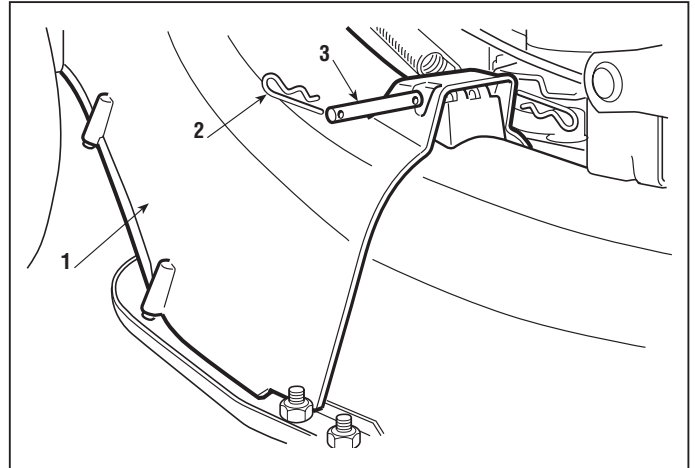
Removing the channel is necessary for:

- adjusting the brake;
- adjusting the drive engagement.

The channel **(1)** can be removed by pulling out one of the two split pins **(2)** that hold the pin **(3)**.



The first part of the channel protects the blade. When refitting the channel, always fit the two split pins first and replace any that look deformed or unusable with the same type.



5.3.2 REMOVAL OF THE CUTTING DECK

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5.3 REMOVAL OF THE CUTTING DECK

The cutting deck needs to be removed in order to reach the engine.

- Remove the collector channel [see 5.2].
- Remove the wheel cover [see 5.1].

Empty the fuel tank by disconnecting the pipe (1) from the petrol filter (2) after removing the clamp (3), taking care not to cause a petrol leak.

Loosen the blade engagement adjusting nut (4).

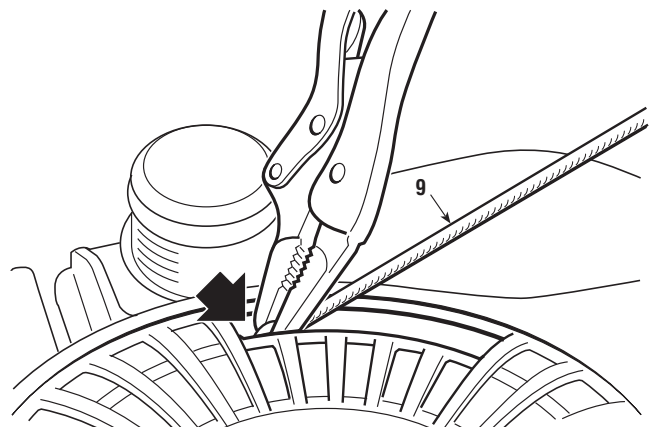
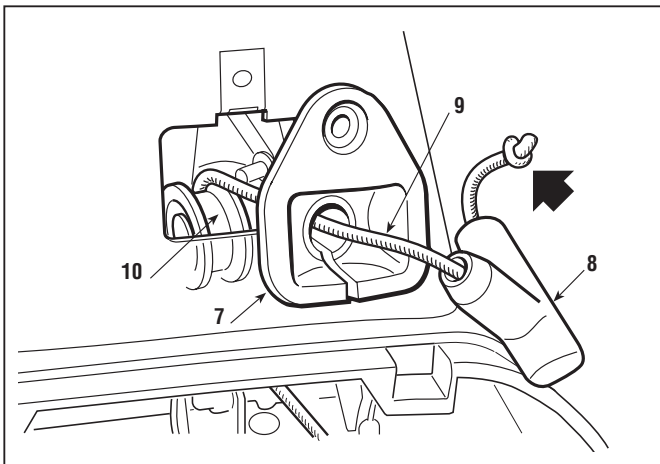
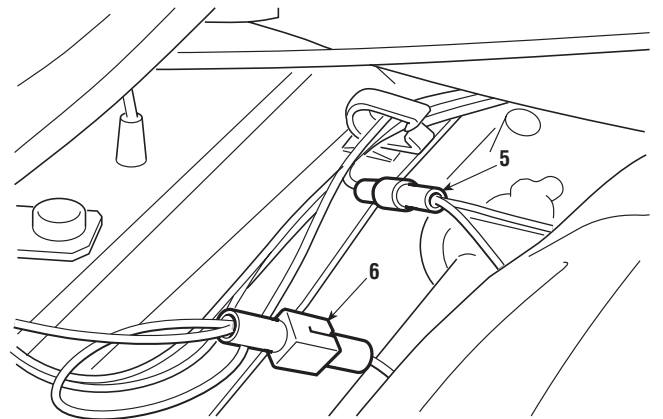
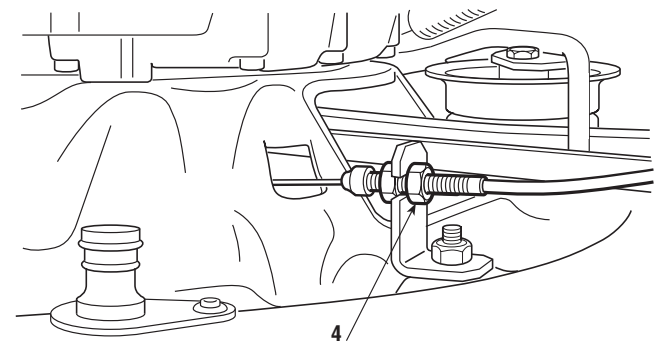
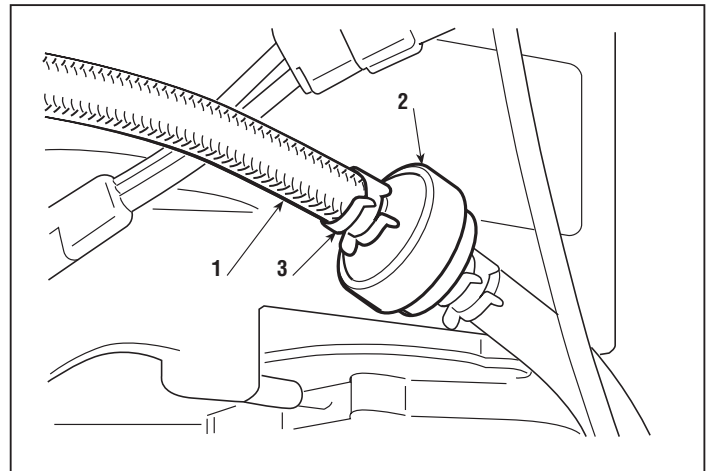
➤ **In electric start models:** disconnect the engine stop connector (5).

➤ **In manual start models:** disconnect the connectors (5) of the engine stop (6) and the wiring. Remove the front mask (7) covering the housing of the handle (8) of the starter cable (9). Pull out the end of the cable (9) from the handle (8) and loosen the knot to free the cable.

Block the cable (9) at the level of the engine using pliers to prevent it from rewinding.

Pull the cable (9) out of the two drive pulleys (10) and (11 - ➤ **only with a B&S engine**).

- Position the machine vertically [see 2.4].
- Remove the blade [see 4.7].



5.3.2 REMOVAL OF THE CUTTING DECK

from 2002 to

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Take off the guard (12) secured by five screws (13) and release the spring (14) from the clutch (16).

➡ Put the machine back on a flat surface [see 2.4].

Engage the parking brake to loosen the drive belt.

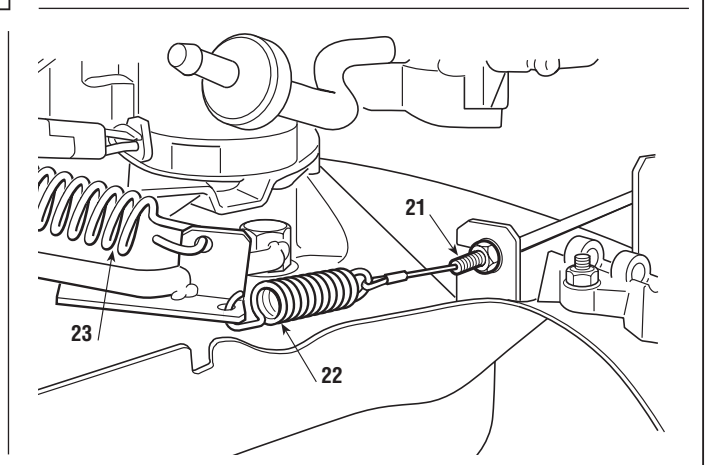
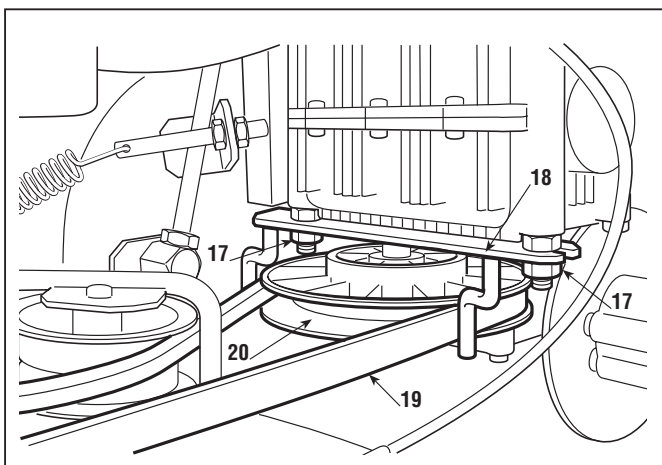
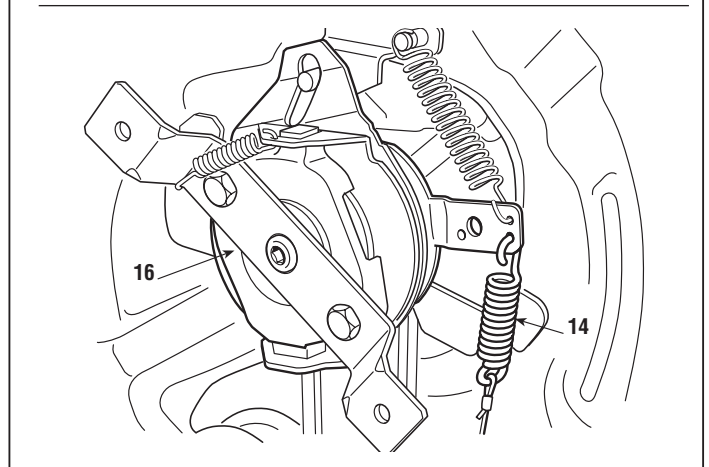
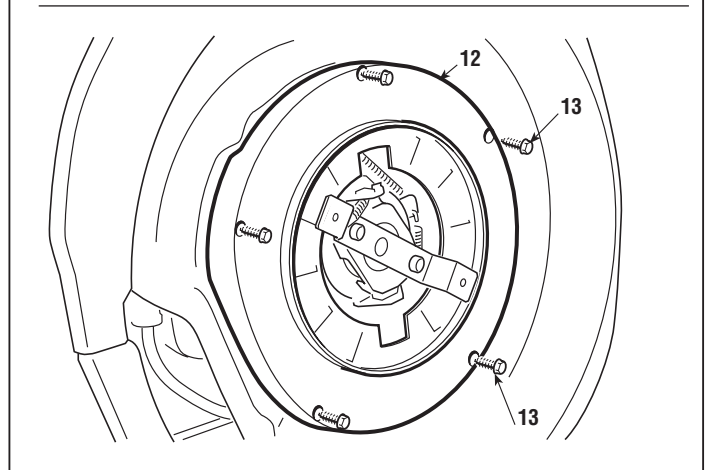
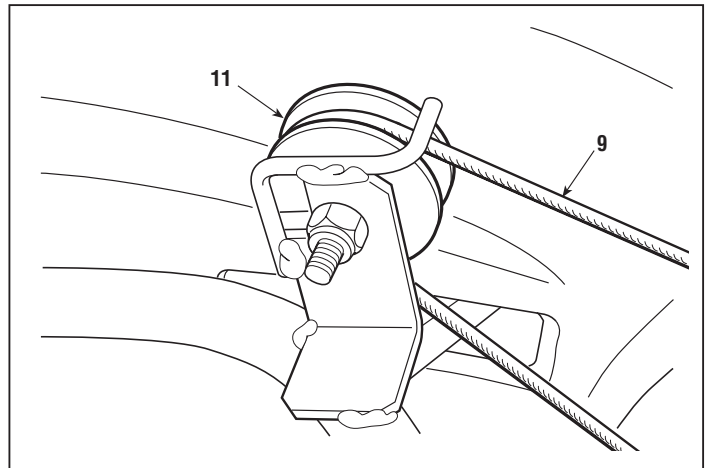
Loosen the two nuts (17), remove the guide pulley (18) and free the belt (19) from the pulley (20).

Loosen the adjusting nut (21) and release the spring (22) from the drive engagement and the spring (23).

At this point, the cutting deck is connected to the machine by just three trace rods. Keep it supported as you remove it, as the total weight of the plate / engine unit is approx. 30 kg.

With the cutting deck completely lowered, remove the front right split pin (24) and unscrew the two nuts (25) and (26) fastened to the front left rods.

Then shift the cutting deck slightly to the left so that



5.3.2 REMOVAL OF THE CUTTING DECK

from 2002 to

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the three pins come out of their trace rods, and rest it on the work surface.

Lift the front of the machine to pull the entire cutting deck out of the engine.

Move the flat lifting lever to position «1» and lock it in this position with pliers to prevent it from shifting during the operations that follow.

Follow the previous steps in reverse to refit the cutting deck, whilst checking that the joint pins have enough free movement [see 2.5.B]. Next,...

- Remount the blade [see 4.7] by tightening the nuts to the amount shown.
- Remount the wheel cover [see 5.1].
- Remount the collector channel [see 5.2].

➤ **In manual start models:** reposition the starter cable (9), fit the cable end in the handle (8) and knot it so that the handle cannot slip out.

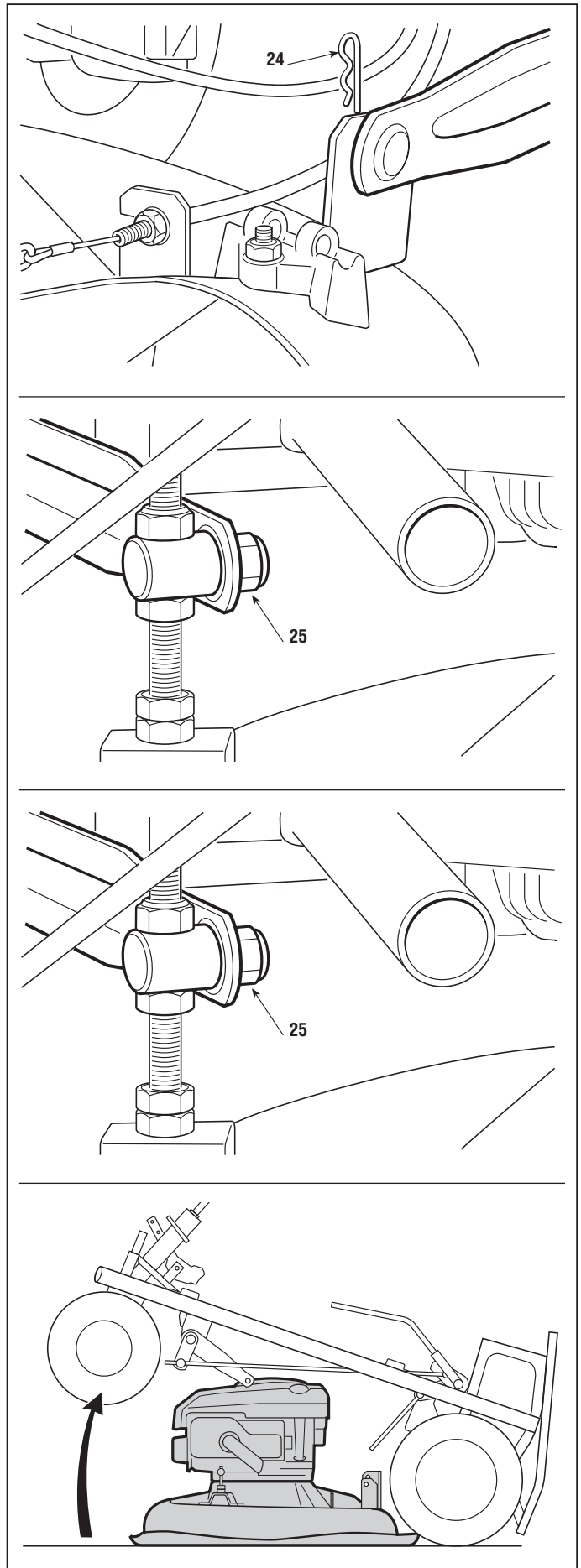
Ensure that the cable is correctly wound around the two drive pulleys (10) and (11 - ➤ **only with a B&S engine**), so that it is secured by the respective containment pegs.



Remember to fit the clamps (3) for the fuel pipe (1) and check for any leaks.

Finally, if necessary, ...

- Adjust the blade engagement [see 4.1].
- Adjust the drive engagement [see 4.3].
- Check that the cutting deck is aligned [see 4.4].





5.4.0 REMOVAL OF THE ENGINE



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5.4 REMOVAL OF THE ENGINE

*The engine can only be dismantled after removing the cutting deck.
Since there are different types of drive, the steps described below refer to typical or similar operations for all engines.*

- Remove the clutch [see 6.4].
- Remove the cutting deck [see 5.3].

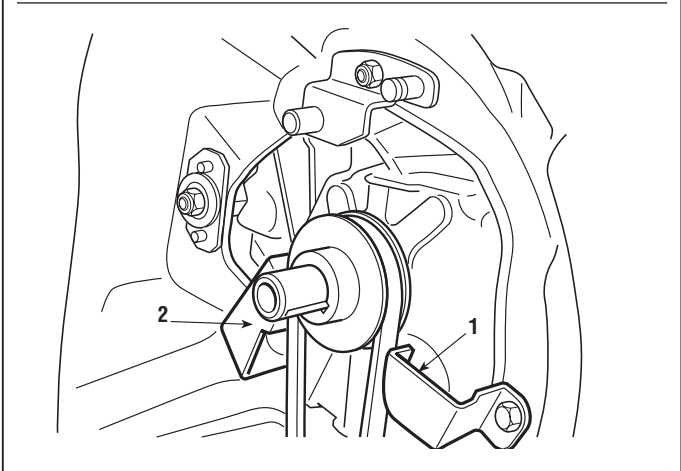
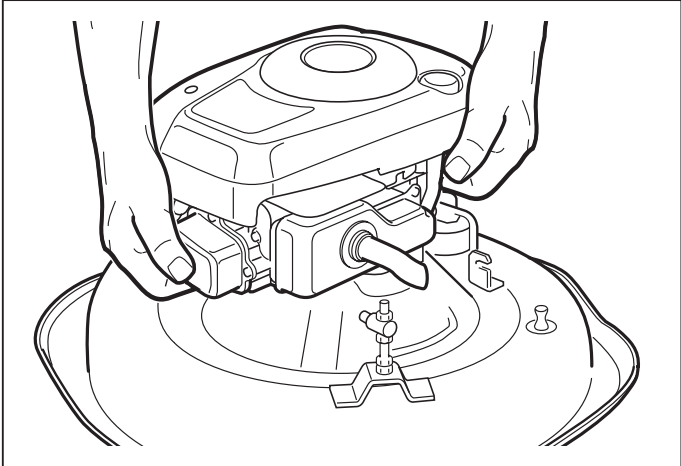
Find and undo all the screws fastening the engine to the cutting deck, grip the engine firmly and lift it carefully, bearing in mind that its weight is around 18 kg.

NOTE

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

On assembling the engine, make sure that the guide pulley plates **(1)** and **(2)** are positioned correctly and tighten the screws to the amount shown.

- Refit the cutting deck [see 5.3].
- Refit the clutch [see 6.4].



Tightening torque

- Engine screws 25 ÷ 30 Nm



5.5.1 REMOVAL OF THE TRANSMISSION UNIT

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5.5 REMOVAL OF THE TRANSMISSION UNIT

The transmission unit consists of the gear change, chain drive, differential, brake and axle shaft, which are fitted on a bracket.
It always needs to be removed from the machine if one of the above components needs repairing or replacing.

➔ Remove the collector channel [see 5.2].

Position the two blocks (1) of approx. 120 mm underneath the two ends of the rear plate.

➔ Dismantle the rear wheels [see 6.1].

Engage the parking brake to loosen the drive belt.

Loosen the two nuts (2), remove the guide pulley (3) and free the belt (4) from the pulley (5).

Pull out the split pin (6), disconnect the gear change control rod (7) and disconnect the two electric cables (8) of the neutral signaller.

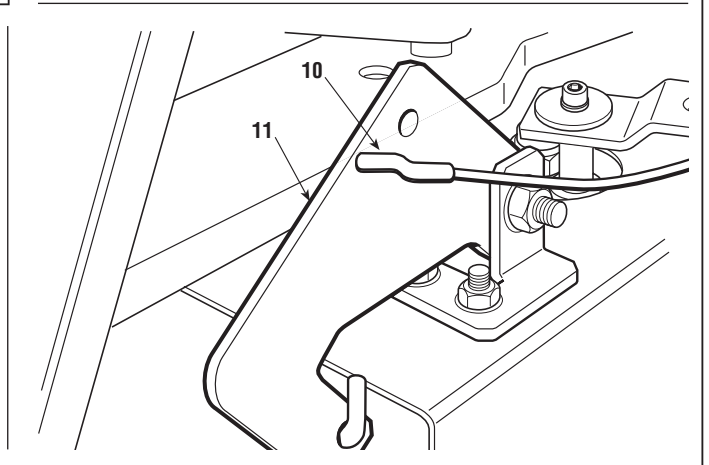
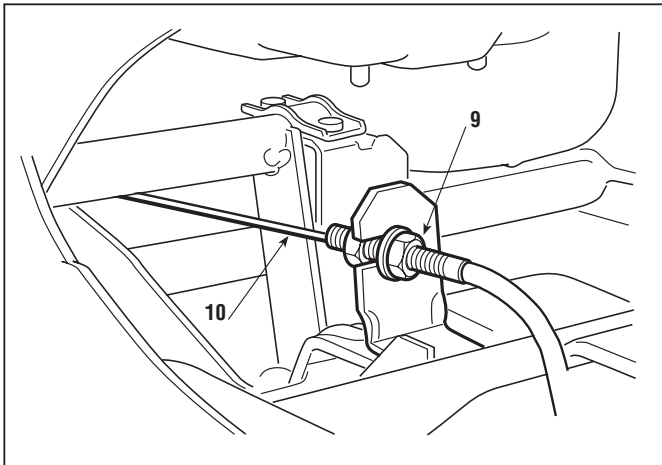
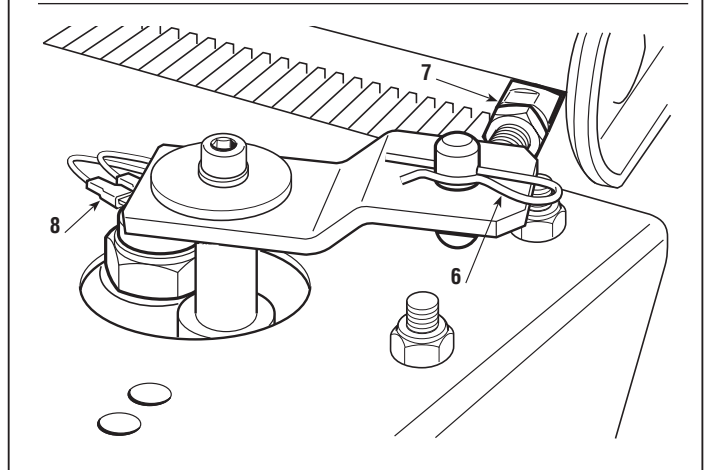
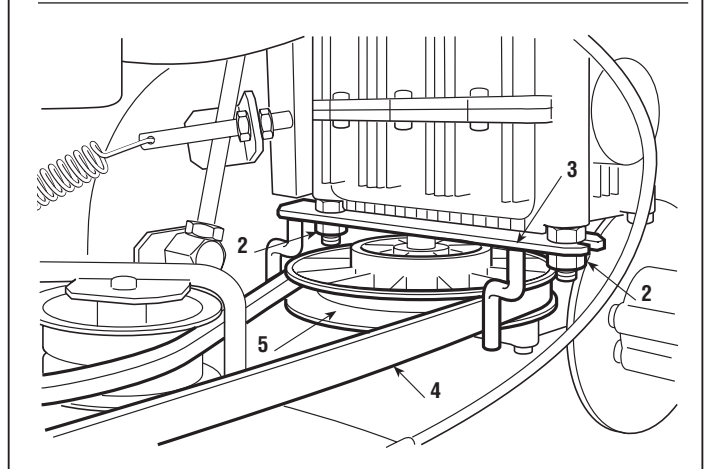
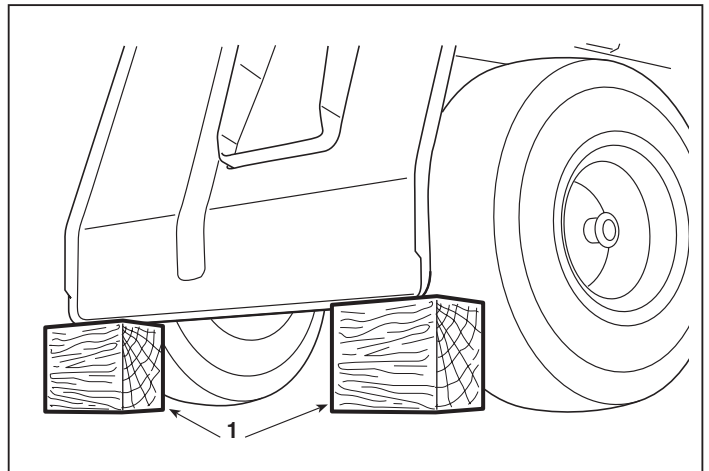
Loosen the adjuster (9) and disconnect the wire (10) from the lever (11).

Dismount the tie-rod (12) secured by two nuts (13).

Loosen the two upper nuts (14) fixing the brackets (15) and unscrew the two nuts (16) fastening the gear change to the brackets.

NOTE

Loosen the brackets (15) to reposition the transmission unit more easily during assembly.



5.5.1 REMOVAL OF THE TRANSMISSION UNIT

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The transmission unit is fastened to the frame by four screws (17) with their nuts (18). Carefully loosen and unscrew the four nuts (18) of the supports (18), keeping it supported to prevent it from falling.

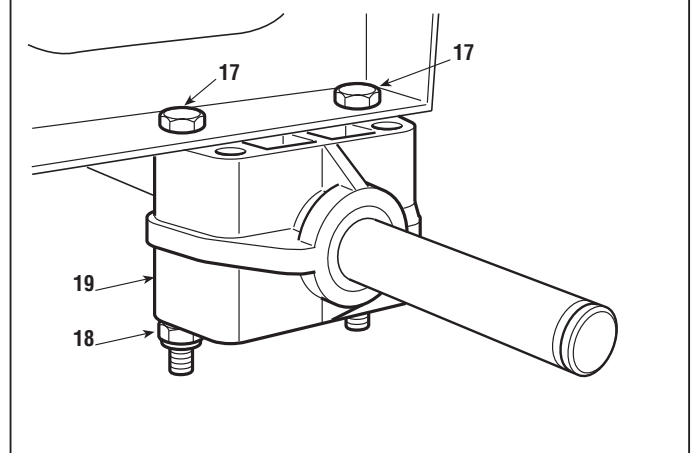
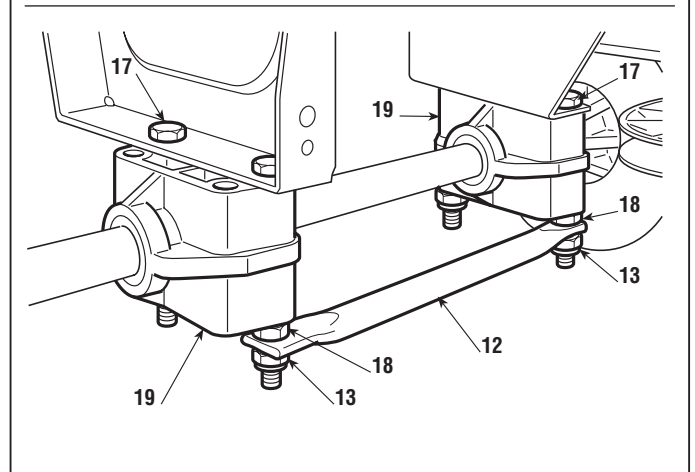
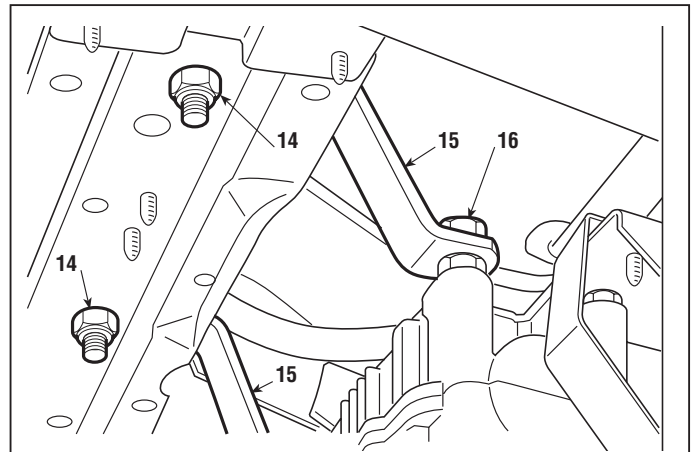
On assembly, follow the steps described in reverse.

NOTE

It is advisable to reposition the tie-rod (12) before fully tightening the nuts (18) of the right-hand support. Finally tighten the nuts (13).

Tighten all the nuts to the amount shown. When assembly is complete, ...

- Refit the rear wheels [see 6.1].
- Check the brake adjustment [see 4.2].
- Refit the collector channel [see 5.2].



Tightening torques

13 Tie-rod nuts	25 ÷ 30 Nm
14 Bracket screws	25 ÷ 30 Nm
16 Gear change nuts	25 ÷ 30 Nm
18 Nuts for fixing supports to frame ..	10 ÷ 15 Nm

6.1.0
REPLACEMENT OF TYRES AND WHEELS

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6.1 REPLACEMENT OF TYRES AND WHEELS

A) Tyres

The tyres used are of the traditional type with an air chamber, so every repair after a puncture 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 tyre pressure and the alignment of the cutting deck [see 4.4].



WARNING

Replace broken or distorted wheel rims, as they could impair the positioning of the tyre in relation to the rim.

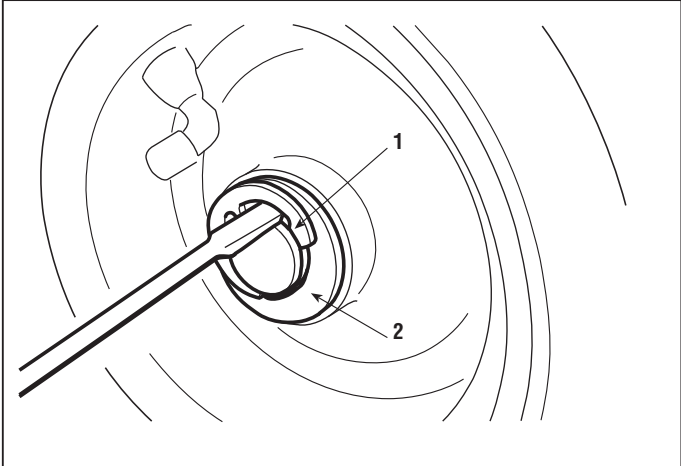
B) Wheels

The wheels are held by a snap ring (1) which can be eased off with a screwdriver.

NOTE

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

On assembly, smear grease over the shaft, to help the next time the wheel needs to be removed; reposition the spacer washer (2) and the snap ring (1) with the rounded edge facing inwards.



Tyre pressure

Front	1.8 Bar
Rear	1.3 Bar

6.2.0 REPLACEMENT OF THE FRONT WHEEL BUSHES

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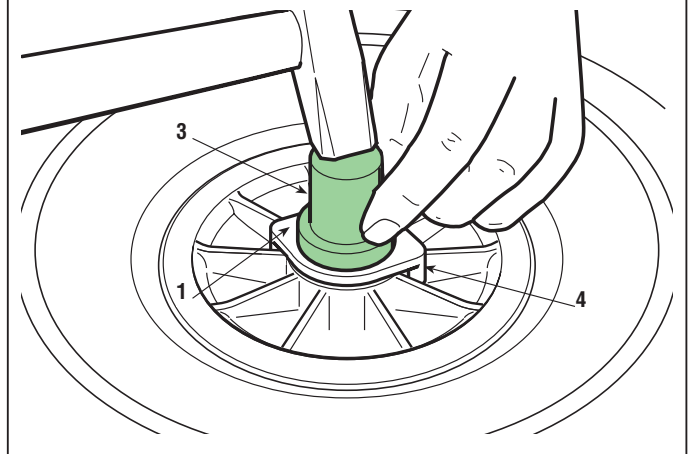
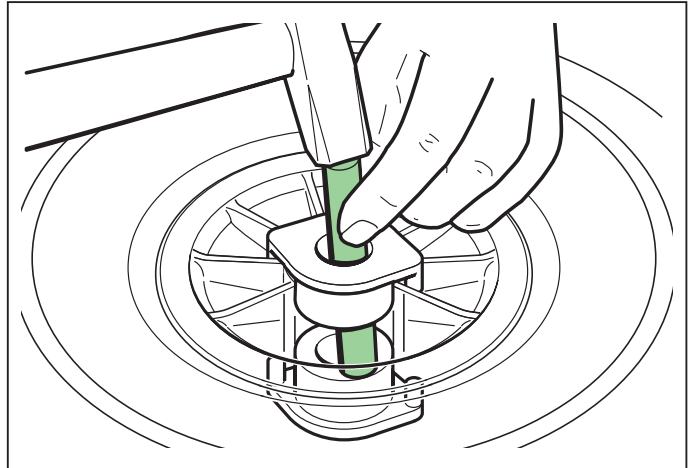
6.2 REPLACEMENT OF THE FRONT WHEEL BUSHES

➤ Dismantle the front wheel [see 6.1].

The front wheels bushes (1) are force splined into the rim hub.

In order to remove a bush, use a 10 -12 mm diameter round bar (2) inserted from the opposite side and hit it with a hammer around the internal circumference.

Insert the new bush using a plastic mallet or a bronze pad (3) that works evenly on the surface, taking care to position the two pins (4) correctly between the ribs of the rim.



6.3.1 REPLACEMENT OF THE STEERING COMPONENTS

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6.3 REPLACEMENT OF THE STEERING COMPONENTS

- Remove the wheel cover [see 5.1].
- Position the machine vertically [see 2.4].

NOTE

The vertical position allows greater visibility of the steering components.

Unhook the spring (1) which holds the pinion (2) and lift the column (3) in order to pull out the pin (4) and remove the pinion (2).

Take out the split pin (5) that fastens the tie-rod (6) to the pin (7) and unscrew the locknut (8) and the nut (9) securing the entire ring gear shaft (10) to the frame.

At this point, each component can be dismantled for any necessary checks or replacements.

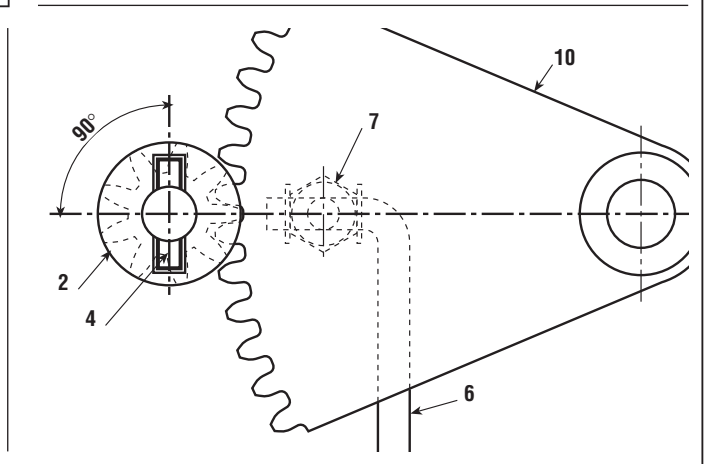
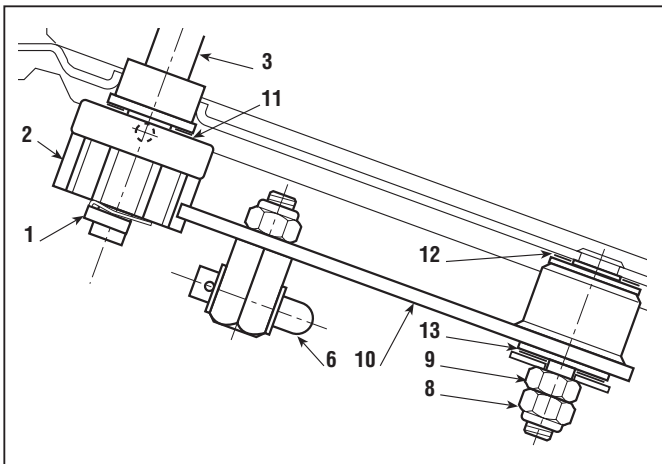
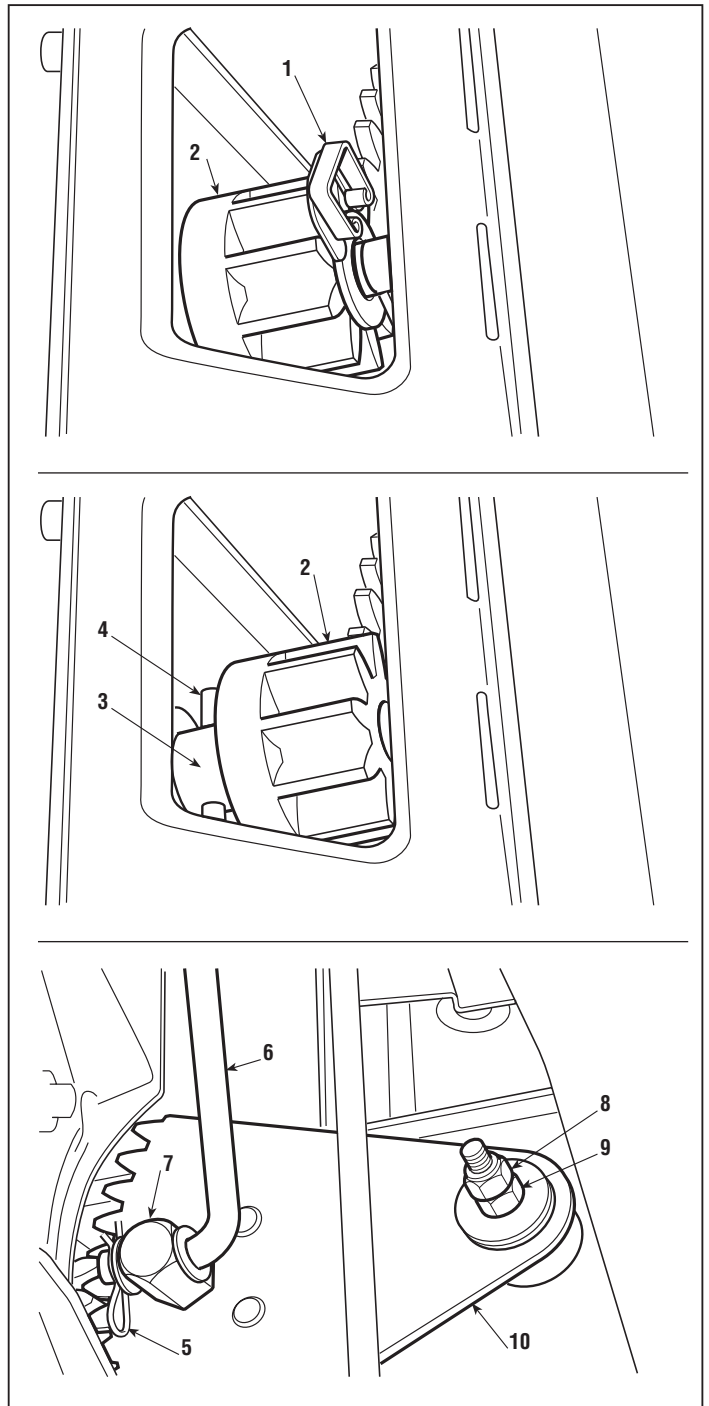
On assembly, check that with the front wheels aligned, the position of the pin (7) is exactly in line with the longitudinal axis of the machine and that the pinion (2) is positioned with the pin (4) fitted at 90° to the machine axle.

Check that the anti-friction washers (11), (12) and (13) are positioned correctly. When refitting the ring gear shaft (10), tighten the nut (9) to ensure a good rotation without too much play, then fully tighten the locknut (8).

- Remount the wheel cover [see 5.1].
- When assembly is complete, ...
- Check the steering geometry [see 4.5.B].

Tightening torque

8 Locknut for fixing ring gear shaft 25 ÷ 30 Nm



6.4.2 REPLACEMENT OF THE BLADE ENGAGEMENT CLUTCH

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6.4 REPLACEMENT OF THE BLADE ENGAGEMENT CLUTCH

NOTE

The clutch has a dual function of engaging the blade and stopping it at the moment of disengagement.

In the case of any fault deriving from the deterioration or wear of the friction surface, replace the outer clutch element.

➡ Position the machine vertically [see 2.4].

➡ Dismantle the blade [see 4.7].

Remove the guard (1) secured by five screws (2). Unhook the engagement cable spring (3) and the return spring (4).

Unhook the brake spring (5) and dismantle the blade bracket (6), which is secured by two screws (7).

Using the wrench supplied (12) for securing the pulley (13), loosen the central screw (8) and pull out the whole clutch unit (9).

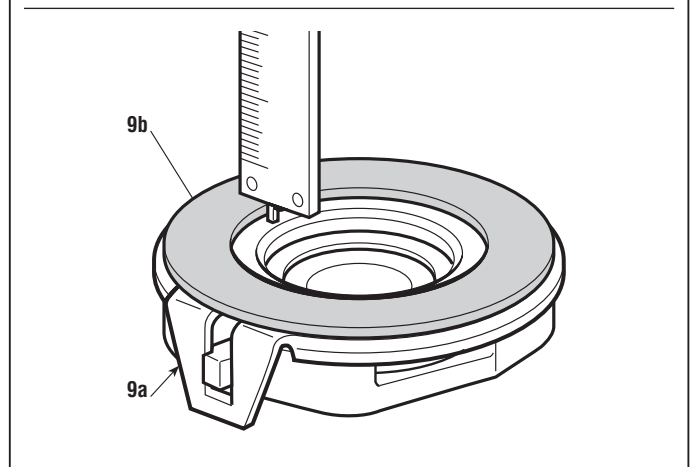
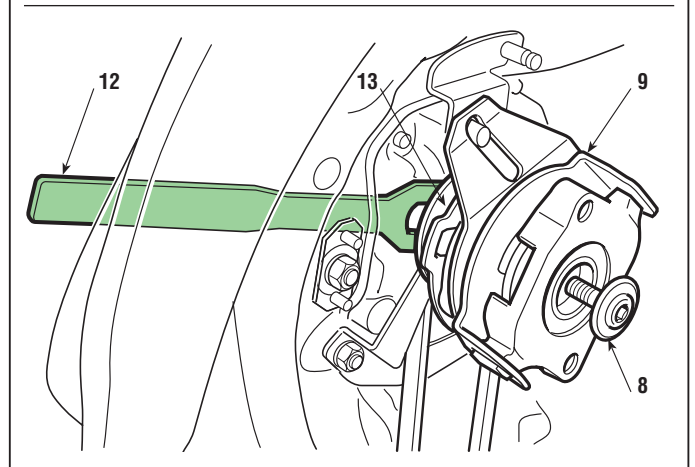
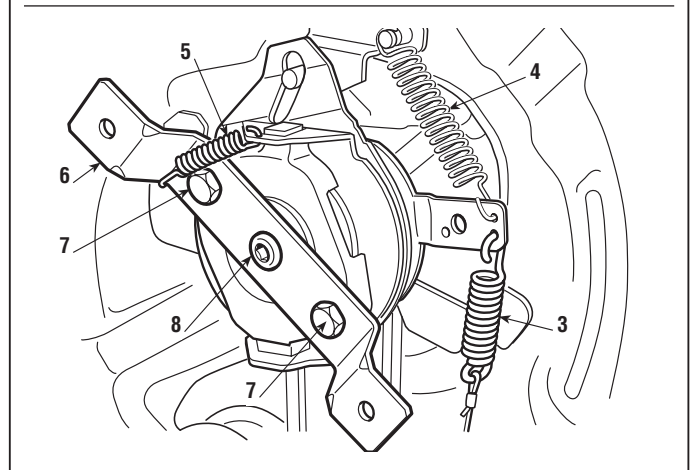
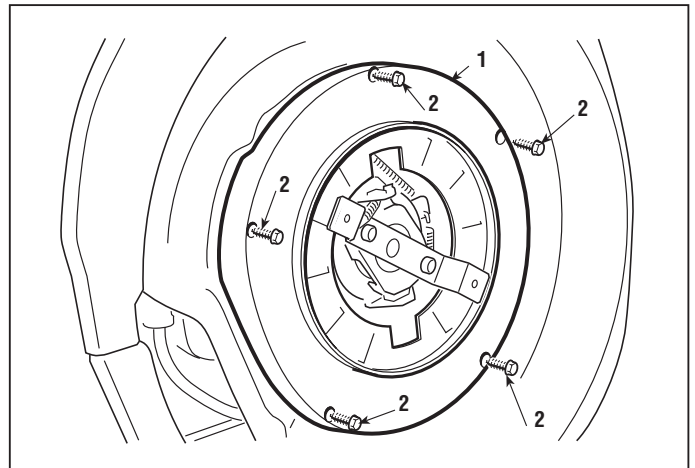
NOTE

If you do not have the wrench (12) with you, you can undo the central screw (8) with **only an impact screwdriver**.



For safe and reliable operation, do not attempt to dismantle or repair the clutch unit parts.

Check that the friction surface (9b) of the outer element (9a) is in good condition, not worn and with a minimum thickness of 1.8 mm; otherwise it must be replaced.



6.4.2 REPLACEMENT OF THE BLADE ENGAGEMENT CLUTCH

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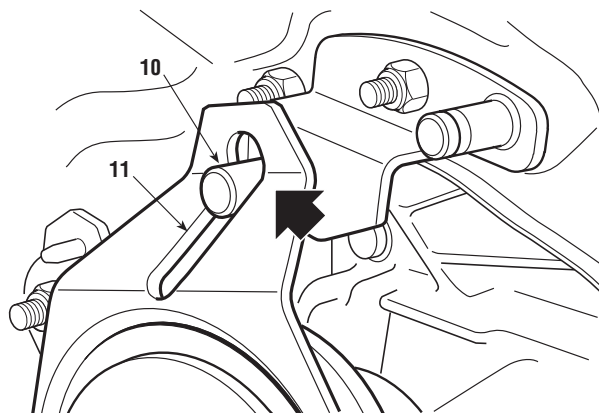
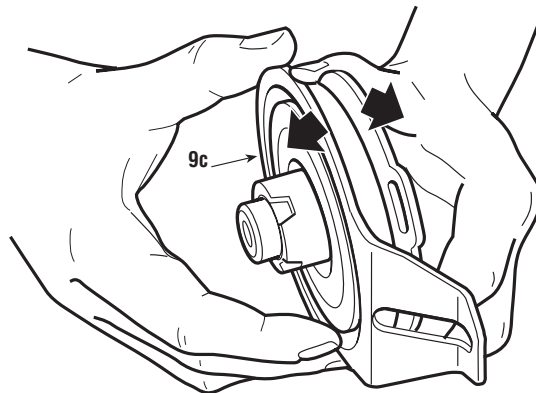
Grasp the inner part **(9c)** with both hands and check that there are no gaps between the components other than those due to the action of the internal springs; otherwise both parts must be replaced **(9a and 9c)**.

On assembly, check that the peg **(10)** fits securely in the slot **(11)** of the reaction arm.

Tighten the screws **(7)** and **(8)** to the amount shown.

➡ Refit the blade [see 4.7] by tightening the nuts to the amount shown.

➡ Adjust the blade engagement [see 4.1].



Tightening torques

7 Screws for blade bracket	25 ÷ 30 Nm
8 Clutch screw	55 ÷ 65 Nm

6.5.0 REPLACEMENT OF THE DRIVE BELT

from 2002 to

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6.5 REPLACEMENT OF THE DRIVE BELT

- Position the machine vertically [see 2.4].
- Dismantle the blade engagement clutch [see 6.4].

Remove the pulley (1) from the engine shaft, using an extractor if dismantling proves difficult.

In this case, close the threaded hole (2) of the engine shaft with a screw, to prevent the extractor from damaging the internal thread.

- Put the machine back on a flat surface [see 2.4].

Engage the parking brake to loosen the drive belt.

Loosen the two nuts (3), remove the guide pulley (4) and free the belt (5) from the pulley (6).

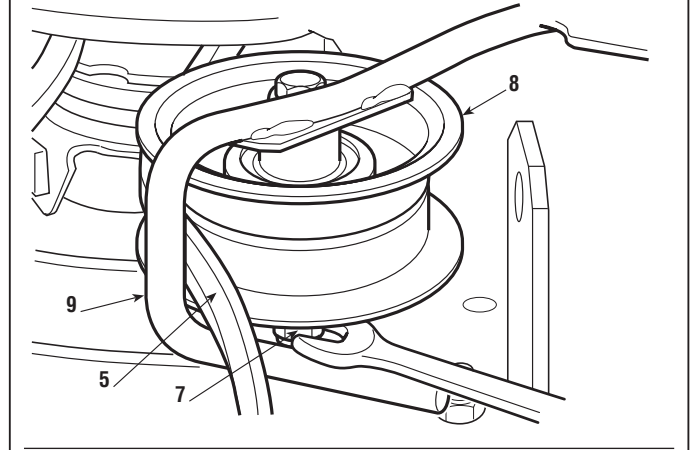
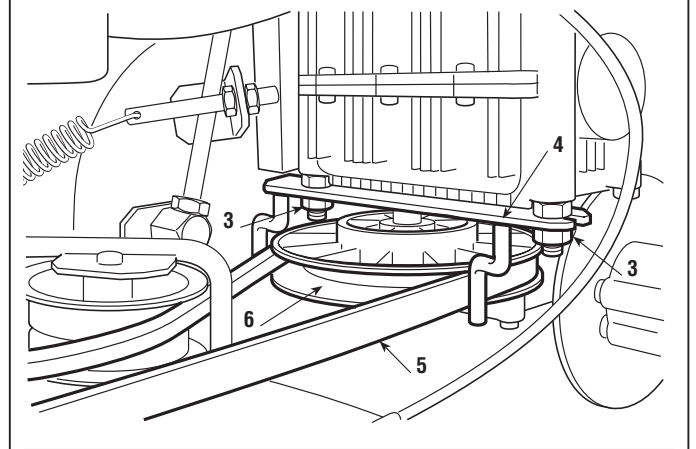
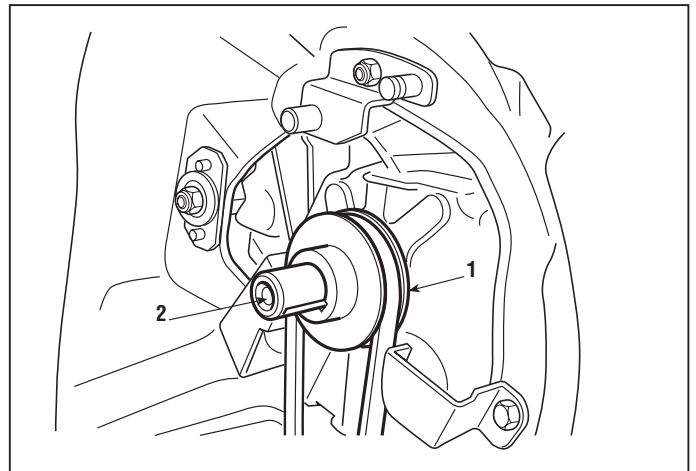
Loosen the nut (7) of the stretcher's idle pulley (8), just enough to pull the belt (5) out of the guide pulley (9).

At this point the belt can be removed.

On assembly, check that the belt (5) is positioned correctly in the guide pulley and follow the above steps in reverse.

When assembly is complete, ...

- Remount the blade engagement clutch [see 6.4].
- Adjust the drive engagement [see 4.3].



Tightening torque

7 Nut for stretcher idle pulley 25 ÷ 30 Nm

6.6.1 REPLACEMENT OF THE ACCELERATOR CABLE

from 2002 to

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6.6 REPLACEMENT OF THE ACCELERATOR CABLE

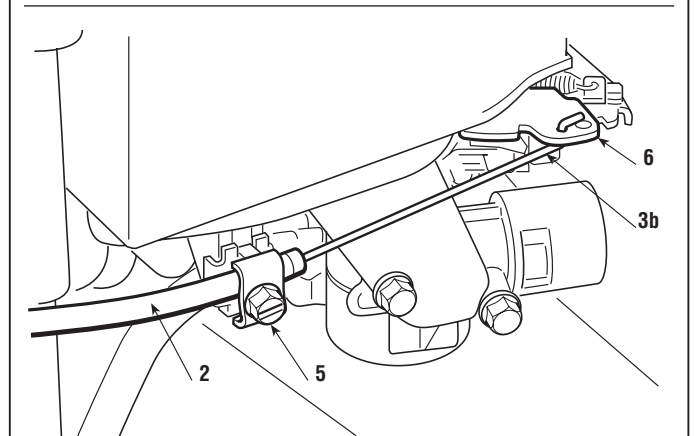
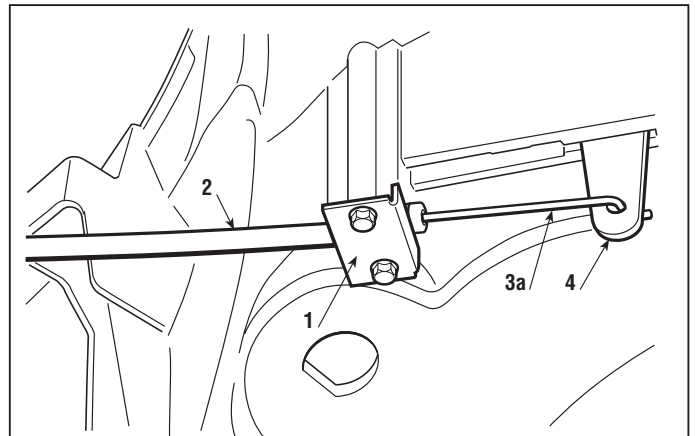
Remove the plate **(1)** underneath the cover, which secures the cable **(2)** and disconnect the end of the wire **(3a)** from the accelerator lever **(4)**.

On the engine side, loosen the terminal **(5)**, disconnect the end of the wire **(3b)** carburettor lever **(6)** and remove the cable **(2)**.

On assembly, put the accelerator lever in the «STARTER» position shown on the label. Connect the end of the wire **(2)** to the terminal **(5)** on the engine after shifting the lever **(6)** to the same «STARTER» position. This position depends on the type of engine and is shown in the instruction hand-book.



► **In manual start models:** ensure that the engine switches off and stops correctly when the accelerator is set to «STOP».



6.7.0	from 2002 to
REPLACEMENT OF THE BLADE ENGAGEMENT CABLE	page 1 / 1

6.7 REPLACEMENT OF THE BLADE ENGAGEMENT CABLE

➤ Remove the wheel cover [see 5.1].

Disengage the blade to loosen the cable.

Loosen the adjusting nut **(1)** and take it out of its seat.

Unhook the end **(2)** of the cable **(3)** from the engagement control lever hole **(4)**.

➤ Position the machine vertically [see 2.4].

➤ Remove the blade [see 4.7].

Remove the protection cover **(5)** secured by five screws **(6)**. Release the spring **(7)** of the engagement cable **(3)** and pull out the cable.

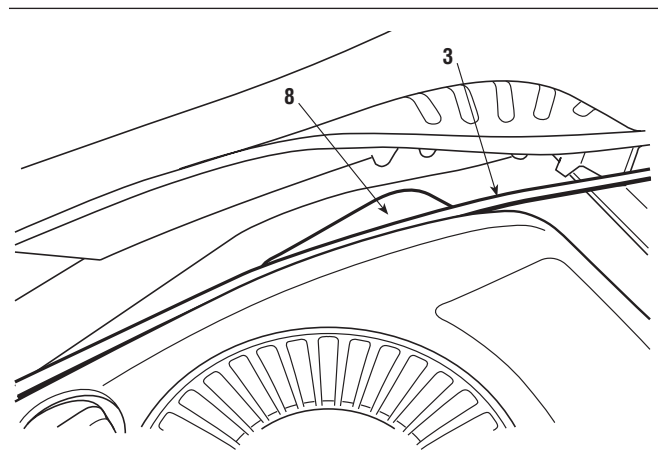
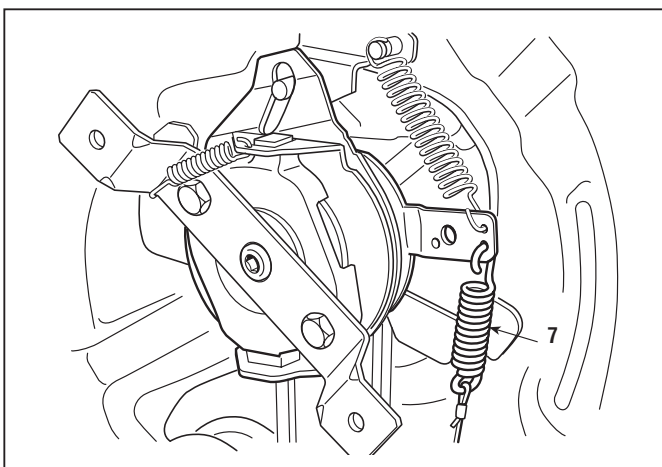
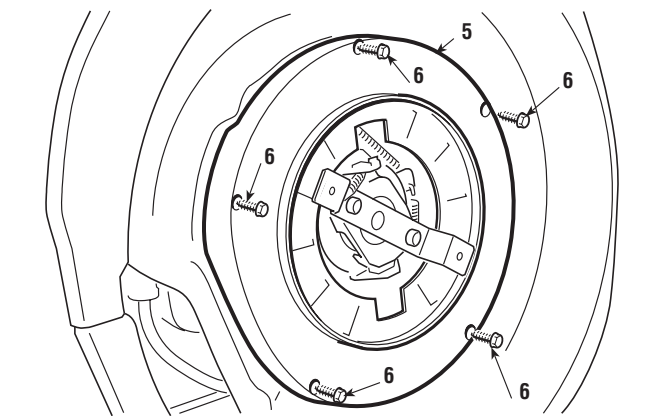
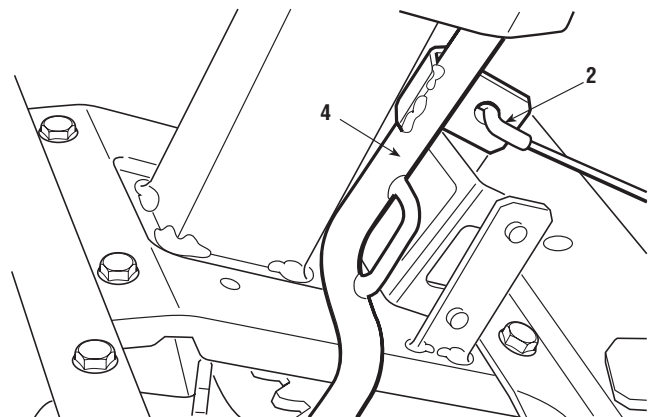
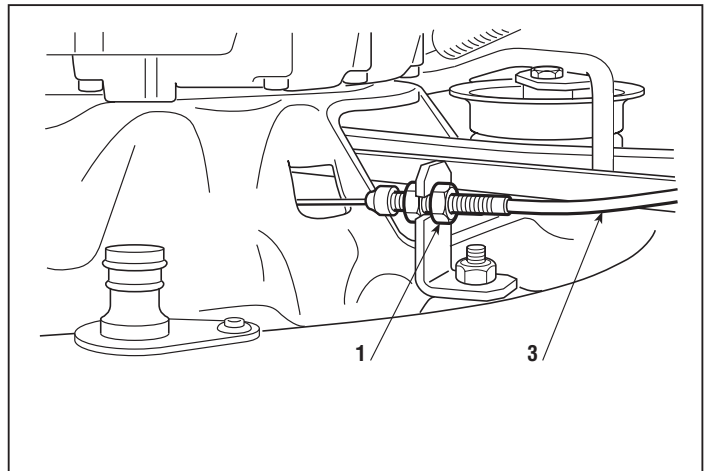
On assembly, follow the above steps in reverse, making sure that the cable **(3)** remains above the protection cover **(8)** to prevent it from coming into contact with hot engine parts.

Next, ...

➤ Refit the blade [see 4.7] by tightening the nuts to the amount shown.

➤ Reassemble the wheel cover [see 5.1].

➤ Adjust the blade engagement [see 4.1].



6.8.1 REPLACEMENT OF THE BRAKE CABLE

from 2003 to

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6.8 REPLACEMENT OF THE BRAKE CABLE

- Remove the collector channel [see 5.2].
- Remove the wheel cover [see 5.1].

Disengage the parking brake to loosen the cable.

Loosen the adjuster **(1)** and unhook the terminal **(2)** of the control cable **(3)** from the lever **(4)**.

Unhook the end **(5)** of the cable **(3)** from the pedal hole **(6)** and pull out the cable.

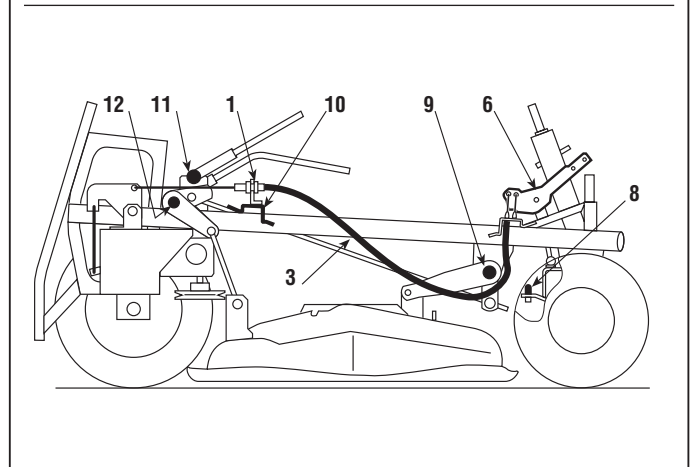
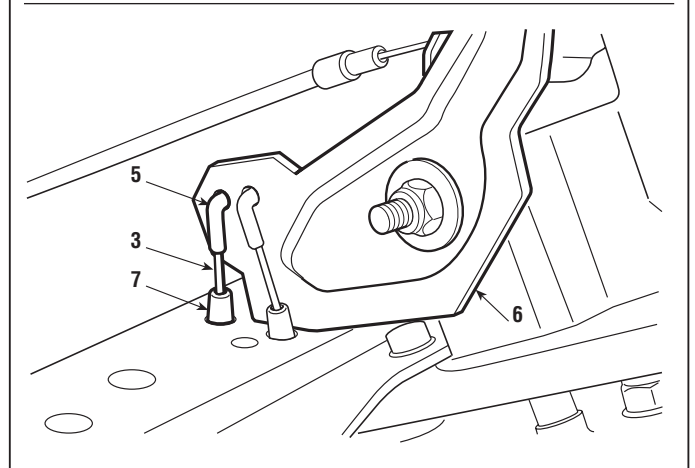
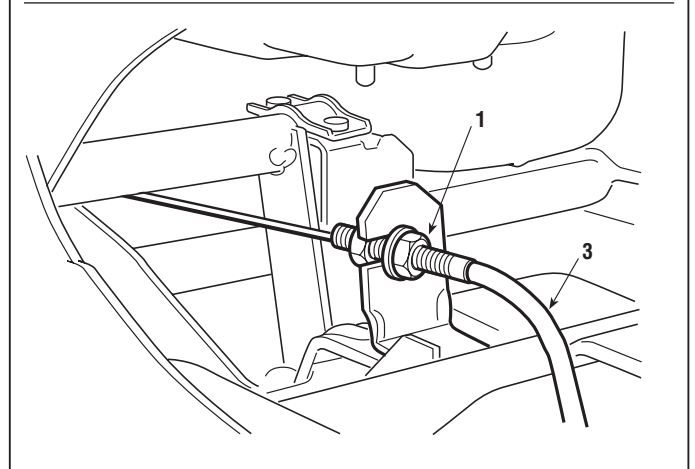
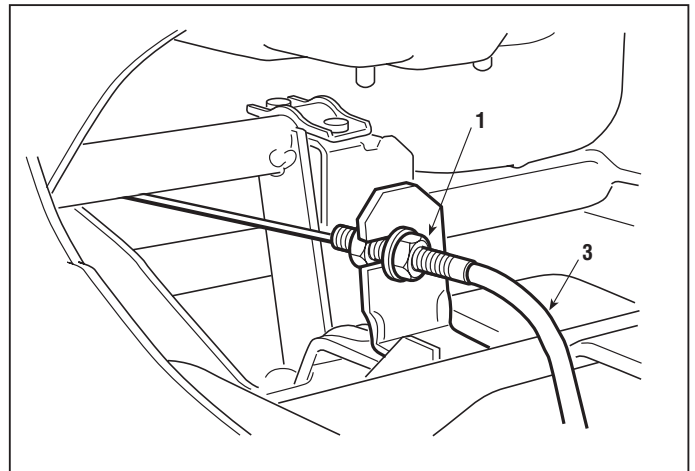
On assembly, check that the cable **(3)** is hooked onto the rear hole of the pedal **(6)** and that the protective cap **(7)** is secured in the hole.

Position the cable **(3)** in such a way as to pass the tie-rod **(8)** connecting the stub axles underneath the front lifting axle **(9)** of the cutting deck. Make sure that the adjuster **(1)** is fitted securely in the support on top of the rear cross bar **(10)**.

The wire should pass between the gear lever axle **(11)** and the rear lifting axle **(12)** of the cutting deck.

Next, ...

- Remount the wheel cover [see 5.1].
- Check the brake adjustment [see 4.2].
- Remount the collector channel [see 5.2].



6.9.0	from 2002 to
REPLACEMENT OF THE DRIVE ENGAGEMENT CABLE	page 1 / 1

6.9 REPLACEMENT OF THE DRIVE ENGAGEMENT CABLE

- Remove the collector channel [see 5.2].
- Remove the wheel cover [see 5.1].

Disengage the parking brake to loosen the cable.

Loosen the adjusting nut **(1)** and unhook the spring **(2)** of the drive engagement cable **(3)** from the stretcher lever **(4)**.

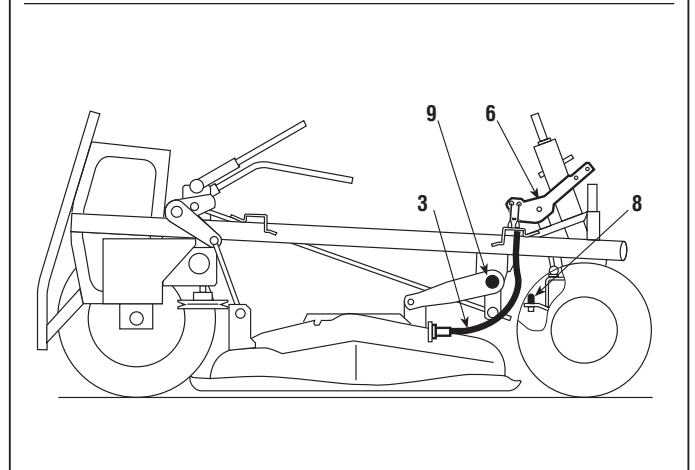
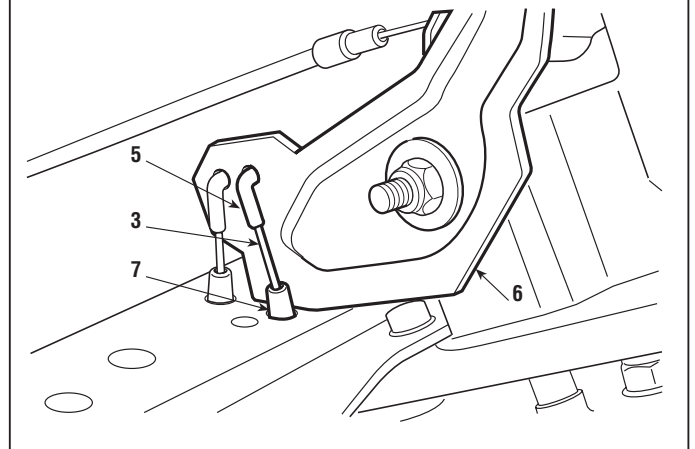
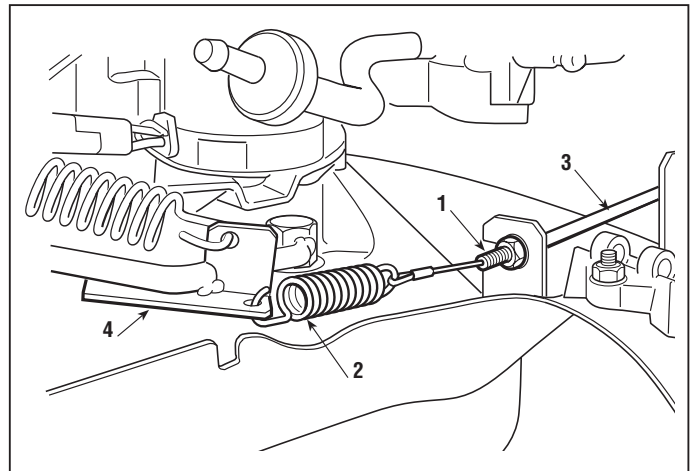
Unhook the end **(5)** of the cable **(3)** from the pedal hole **(6)** and pull out the cable.

On assembly, check that the cable **(3)** is hooked onto the front hole of the pedal **(6)** and that the protective cap **(7)** is secured in the hole.

The cable must be positioned in such a way as to pass the tie-rod **(8)** connecting the stub axles underneath the lifting axle **(9)** of the cutting deck.

Next, ...

- Remount the wheel cover [see 5.1].
- Regulate the drive engagement [see 4.3].
- Remount the collector channel [see 5.2].



6.10.1 REPLACEMENT OF THE BRAKE PADS AND LEVER

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6.10 REPLACEMENT OF THE BRAKE PADS AND LEVER

➡ Remove the rear left wheel [see 6.1].

Remove the engine housing and loosen the adjuster (1).

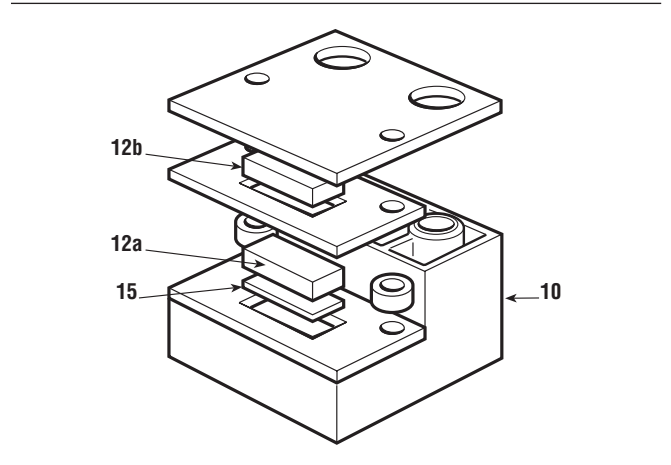
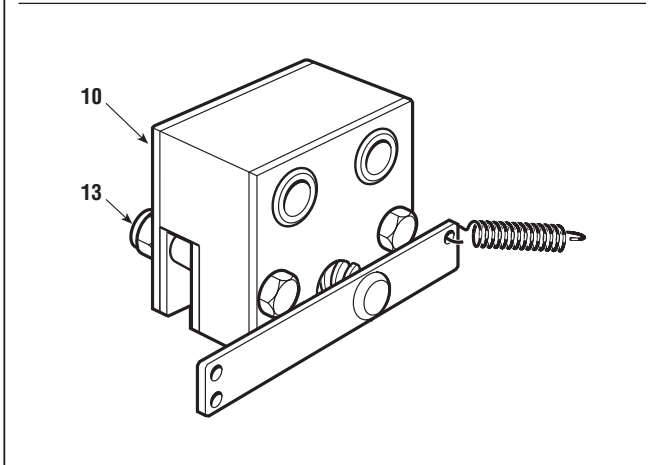
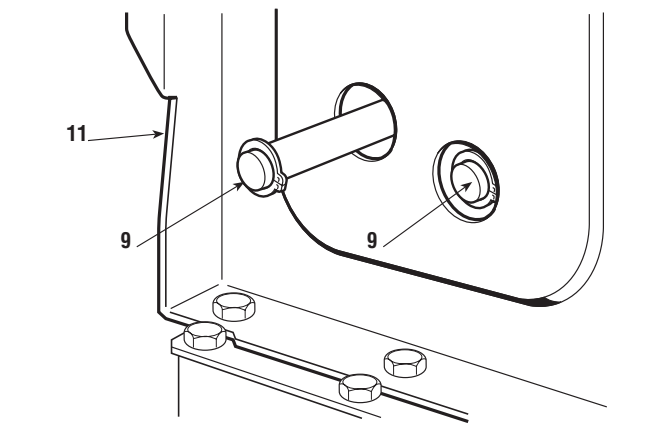
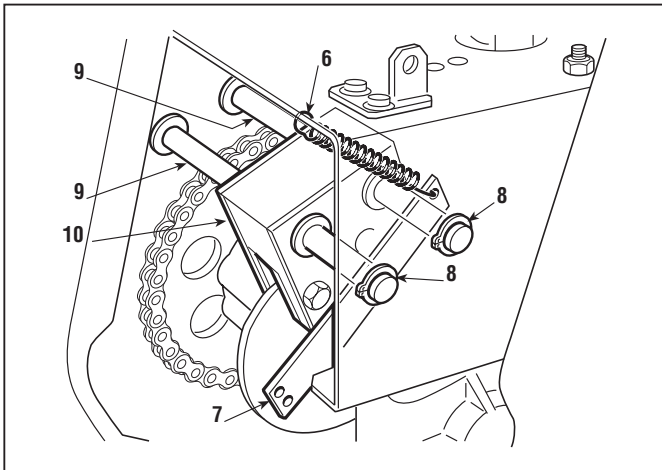
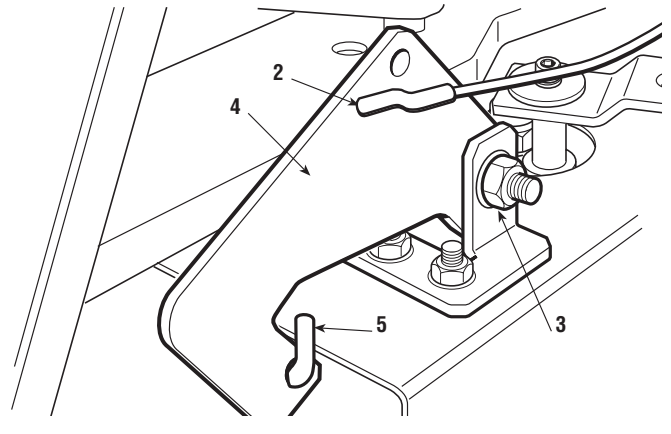
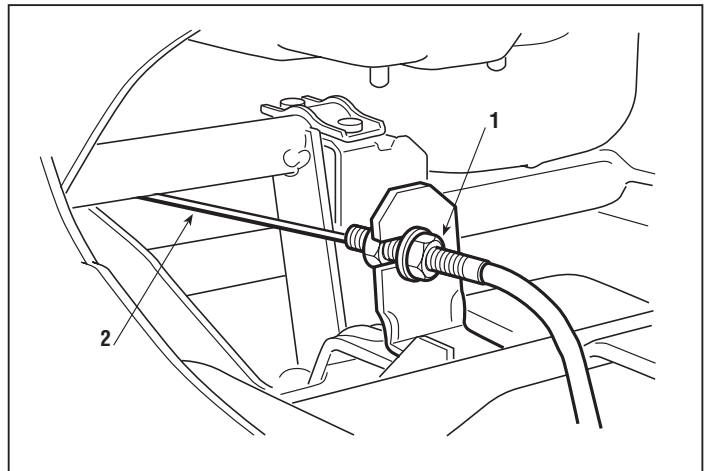
Disconnect the control cable (2), loosen the nut (3), remove the lever pin (4) and disconnect the rod (5).

Unhook the return spring (6) of the lever (7) and remove the two snap rings (8). Pull out the two pins (9) supporting the caliper unit (10) through the two holes in the frame's left support (11).

Undo the two nuts (12) to reach the pads (13).

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

Check that the four-threaded screw (13) of the lever



6.10.1 REPLACEMENT OF THE BRAKE PADS AND LEVER

from 2003 to

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(7) does not have too much play in relation to the nut screw (14). If so, replace both components.

Remount the components of the caliper unit (10), following the steps shown and taking care to position the metal plate (15) correctly between the screw (13) and the pad (12a).

When screwing down the nut screw, remember to rotate the lever by 360° to obtain the correct direction after assembly.

To reposition the caliper more easily, fit a 7 - 8 mm block (16) between the pads (12a) and (12b) so that they do not slip out of their seats during reassembly.

Check that the brake disc is intact and not deformed or worn. If it is, replace it [see 6.11.C].

Remount everything following the instructions in reverse in addition to the operations below:

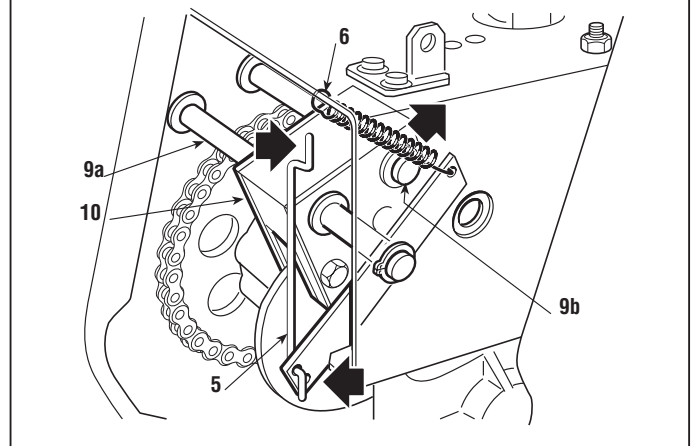
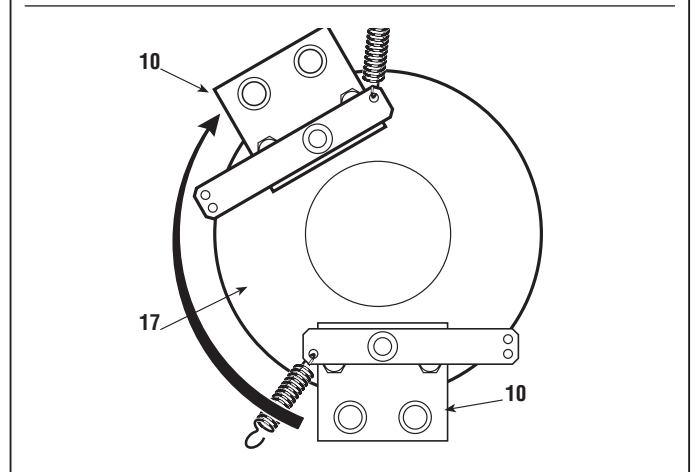
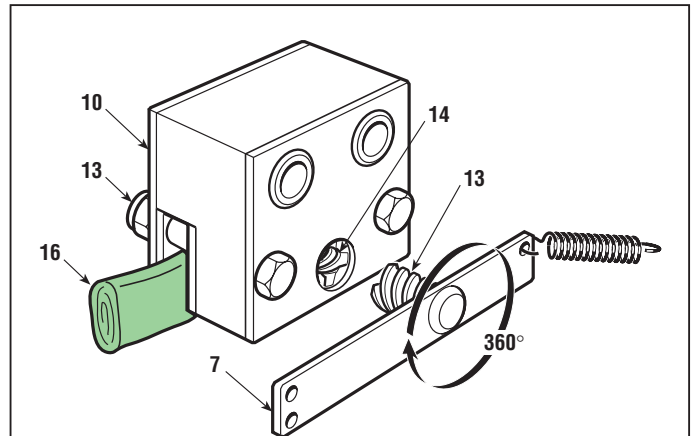
- fit the lower part of the brake disc (17) between the two caliper unit pads (10), then line up the unit with the pin holes (9);
- first insert the rear pin (9a) and hook on the spring (6). Bend this spring forward slightly to insert the front pin (9b), which should go underneath the spring.
- the rod (5) should be positioned with the two terminals bent to the right.

When assembly is complete, ...

- ➡ Remount the rear left wheel [see 6.1].
- ➡ Adjust the brake [see 4.2].

Tightening torques

3	Lever pin fastening nut	10-15 Nm
13	Brake caliper nuts	6,5 Nm



6.11.0 - DISMANTLING AND REPLACEMENT OF TRANSMISSION COMPONENTS

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6.11 DISMANTLING AND REPLACEMENT OF TRANSMISSION COMPONENTS

NOTE

The following procedure refers to the complete dismantling of the transmission unit elements, that is, the gear change, the chain transmission and the differential with axle shaft with supports. Your decision as to whether to carry out some or all of the steps below depends on the type and purpose of the operation.

In any case, you need to ...

➔ Remove the transmission unit [see 5.5].

A) Dismantling and replacing the gear change

Remove the chain tightener (1), the "neutral" signaller (2) and the gear change lever (3).

Unscrew the four nuts (4) and remove the gear change, freeing the pinion from the chain.

On assembly, tighten the chain slightly by sliding the stud bolts (5) along the bracket slots (6), then tighten the nuts (4). Do not tighten the chain too much, to allow the chain tightener (2) to function.

B) Dismantling and replacing the supports

The central and left supports (11) are fastened to the bracket by two screws (12) and their nuts (13). The right-hand support can be positioned anywhere on the axle shaft for fixing onto the frame.

Unscrew the nuts (13) and pull out the supports.

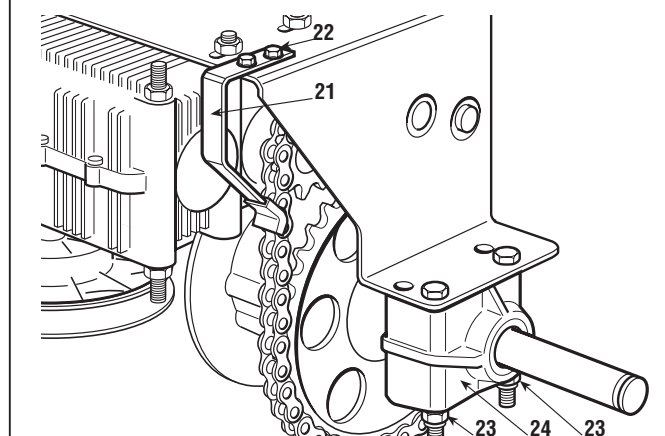
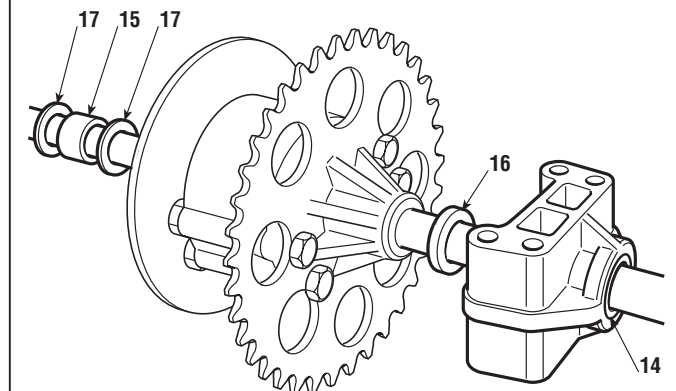
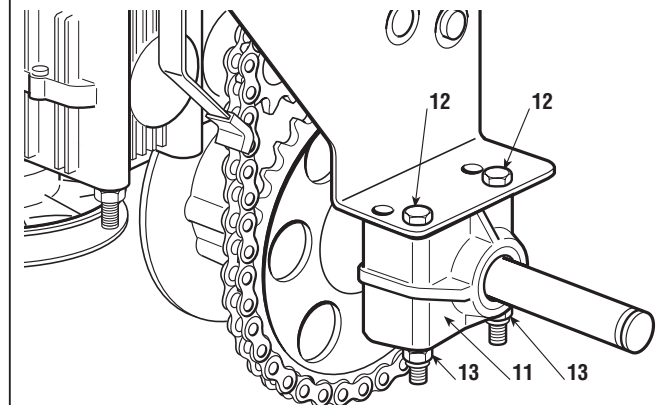
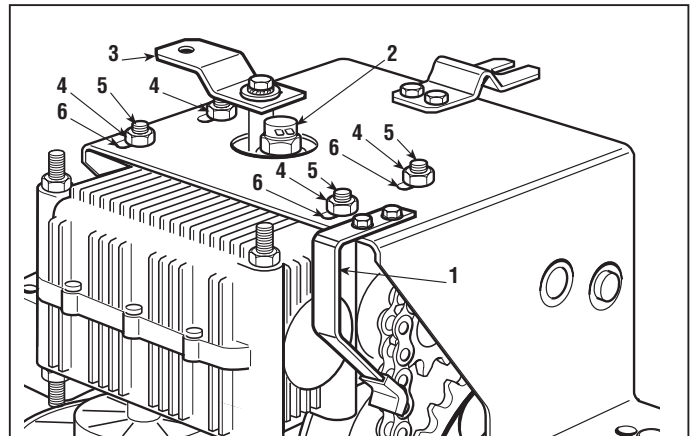
On assembly, check that the dust cover rings (14) are intact and securely fitted in their seats. Put the spacers (15) and (16) and the washers (17) back in their positions.

C) Dismantling and replacing the brake disc

➔ Remove the brake caliper [see 6.10].

Remove the chain tightener (21) secured by two screws (22).

Unscrew the four nuts (23) securing the supports



6.11.0 - DISMANTLING AND REPLACEMENT OF TRANSMISSION COMPONENTS

from 2002 to
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(24) and remove the whole axle, freeing the ring gear from the chain.

The brake disc (25) is fastened onto the differential by four nuts (26). Undo the four nuts (26) without loosening the four nuts underneath (27), which secure the ring gear (28) and fix the two halves of the differential box together (29).

D) Dismantling and replacing the differential and/or ring gear

- Remove the brake caliper [see 6.10].
- Remove the supports [see point "B"].
- Remove the brake disc [see point "C"].

Undo the four nuts (27), which secure the ring gear (28) and fix the two halves of the differential box (29) together.

When handling the axle shaft and the differential, take care not to open the two halves of the box (29) to prevent the internal components from slipping out or being badly positioned.

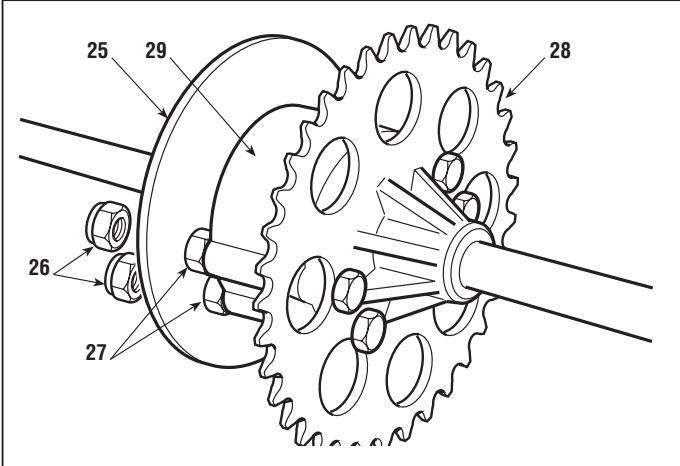
E) Replacing the chain

- Remove the gear change [see point "A"].
- Remove the supports [see point "B"].

Before mounting the new chain, check that the pinion and the ring gear are not worn or damaged. If they are, replace them.

NOTE

It is generally advisable to replace the chain along with the pinion and the ring gear.



Tightening torques

4	Gear change nuts	8 Nm
13	Support nuts	8 Nm
26	Brake disc nuts	10 Nm
27	Differential and ring gear nuts	10 Nm

6.12.1 REPLACEMENT OF THE STARTER CABLE

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6.12 REPLACEMENT OF THE STARTER CABLE (► *Only in manual start models*)

Remove the front mask (1) covering the housing of the handle (2) of the starter cable (3).

Pull out the cable terminal (3) from the handle (2) and loosen the knot in order to free the cable.

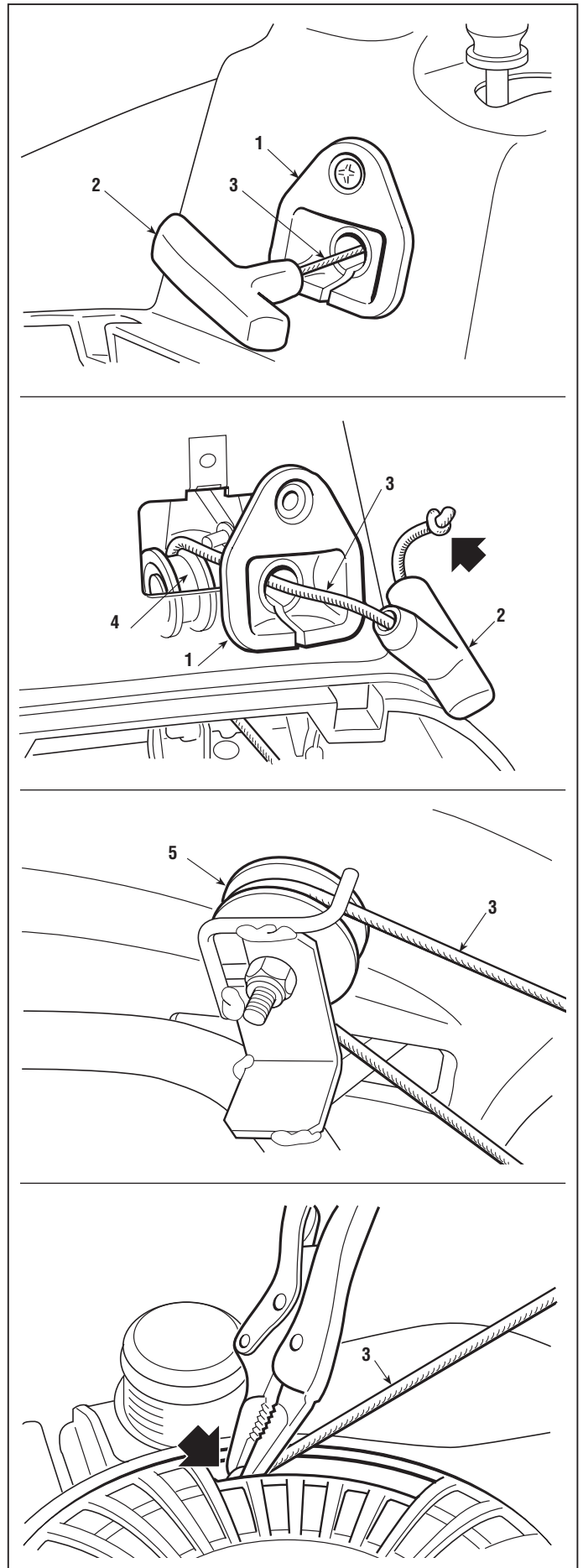
Block the cable at the level of the engine using pliers to prevent it from rewinding, and then pull it out of the two drive pulleys (4) and (5 - ► *only with a B&S engine*).

Replace the cable following the procedures indicated by the engine manufacturer, then unwind it for a length of approx. 90 - 100 cm and block it with pliers so that it does not hinder the following operations.

Reposition the starter cable (3).

Ensure that the cable (3) is correctly wound around the two drive pulleys (4) and (5 - ► *only with a B&S engine*), so that it is secured by the respective containment pegs.

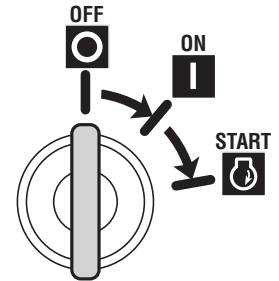
Fit the end of the cable (3) in the handle (2) and knot it so that the handle cannot slip out.



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TROUBLE-SHOOTING IN THE ELECTRICAL SYSTEM	page 1 / 2

7.1 TROUBLE-SHOOTING IN THE ELECTRICAL SYSTEM

Some problems related to the malfunctioning of the electrical system are shown below, with their probable causes and the remedial action to be taken. Should the problem continue after the necessary checks, seek assistance from your local Service Centre.



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

PROBLEM	CAUSE	SOLUTION
► In electric start models:		
1. With the key in the «START» position, the starter motor lacks power (poor starting)	The battery is not supplying enough current	Recharge the battery [see 7.8]
	Badly earthed battery, or the starter relay or motor not earthed	Check and put right
	Starter relay is faulty	Check that the starter relay activates [see 7.5]
2. With the key in the «START» position, the starter motor does not run	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.
	Fault in the electronic card	Try replacing the card with one that is known to work
	Starter relay is faulty	Check that the starter relay activates [see 7.5]
	The battery is not supplying the card	Check the connection cables and the battery connector. Check the battery's condition [see 7.8]
	Battery or card not earthed to frame	Check and put right
	10 A fuse blown	Replace fuse (10 A)
	Battery terminal crossed	Check wiring. WARNING! In this case, the card is irreparably damaged and needs replacing since it is no longer usable! The recharge circuit is also damaged.
3. The starter motor runs but the engine does not start	No fuel flow	Check the stop cock and the fuel filter
	Impaired starter system	Check that spark plug caps are fastened correctly
		Check that the spark plug electrodes are clean and that the gap is correct
4. The starter motor 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 motor

7.1.2 TROUBLE-SHOOTING IN THE ELECTRICAL SYSTEM

from 2006 to

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PROBLEM	CAUSE	SOLUTION
5. The starter motor 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
6. The engine stops while in use	Insufficient charge	Check that the charging cable has not detached
		Check that there are no current leakages caused by cables with damaged insulation
		Check that the regulator is working properly [see 7.7]
	The safety devices have cut in or are faulty	Check the functioning of the microswitches and their wiring [see 7.3]
	Accidental disconnection 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 their wiring.	
7. The 10 A fuse blows	Short circuit or overload on the power side of the electronic card (start-up unit, starter relay and recharger connector)	Find and replace the defective user [see 7.4 and 7.5]
	Faults in the battery charging circuit	Check that the regulator is working properly [see 7.7]

► *In manual start models:*

11. The engine does not start	Starting not permitted [see summary logic table 7.2]	After checking that the conditions are met, check all the microswitches [see 7.3] and their wiring.
	Malfunction in the electronic card	Try replacing the card with one that is known to work
	No fuel flow	Check the stop cock and the fuel filter
	Impaired starter system	Check that spark plug caps are fastened correctly
Check that the spark plug electrodes are clean and that the gap is correct.		
12. The engine stops while in use	The safety devices have cut in or are faulty	Check the microswitch's operation and the relevant wiring [see 7.3]
	Accidental disconnection 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.

7.2.2 - SUMMARY TABLE FOR THE CUTTING IN OF THE SAFETY DEVICES

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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 cut in.

-/- = Uninfluential

► *In electric start models*

A) STARTING («START» position)

OPERATOR	GRASS-CATCHER	BLADE	TRANSMISSION	PARKING	ENGINE
Absent	-/-	-/-	-/-	Disengaged	Does NOT start
-/-	-/-	-/-	Engaged	-/-	Does NOT start
-/-	-/-	Engaged	-/-	-/-	Does NOT start

B) WHILE CUTTING

OPERATOR	GRASS-CATCHER	BLADE	TRANSMISSION	PARKING	ENGINE
Absent	-/-	-/-	Engaged	-/-	Stops
Absent	-/-	Engaged	-/-	-/-	Stops
Absent	-/-	-/-	-/-	Disengaged	Stops
-/-	Missing	Engaged	-/-	-/-	Stops
-/-	-/-	Engaged	-/-	Engaged	Stops

► *In manual start models*

A) STARTING («START» position)

OPERATOR	GRASS-CATCHER	BLADE	TRANSMISSION	PARKING	ENGINE
Absent	-/-	Engaged	-/-	-/-	Does NOT start
-/-	-/-	-/-	Engaged	-/-	Does NOT start
-/-	Missing	Engaged	-/-	-/-	Does NOT start
-/-	-/-	Engaged	-/-	Engaged	Does NOT start

B) WHILE CUTTING

OPERATOR	GRASS-CATCHER	BLADE	TRANSMISSION	PARKING	ENGINE
Absent	-/-	-/-	Engaged	-/-	Stops
Absent	-/-	Engaged	-/-	-/-	Stops
-/-	Missing	Engaged	-/-	-/-	Stops
-/-	-/-	Engaged	-/-	Engaged	Stops

7.3.2 - SAFETY MICROSWITCHES OPERATION CHECK AND SWITCHES

from 2006 to
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7.3 SAFETY MICROSWITCHES OPERATION CHECK AND SWITCHES

► **In electric start models:**

This check is made by detaching all the connectors and using the Ohm-meter tester. This operation should be done without the driver on board, by making contact with the ferrules on the contacts of the wiring connector **(1)** and should give this result:

No Contacts	Tester reading and condition		
"GRASS-CATCHER ATTACHED" MICROSWITCH			
1 - 6 (CN1)	∞ (without g.catcher)	O (with g.catcher)	
SEAT MICROSWITCH			
7 - 6 (CN1)	∞ (absent)	O (seated)	
BLADE MICROSWITCH			
4 - 6 (CN1)	∞ (engaged)	O (disengaged)	
"IN NEUTRAL" SIGNALLER			
8 - 4 (CN1)	∞ (drive)	O (neutral)	
PARKING MICROSWITCH			
5 - 6 (CN1)	O (out)	∞ (engaged)	
STARTER UNIT			
+ Battery - 10	∞ (OFF)	O (ON)	O (START)
+ Battery - 11	∞ (OFF)	∞ (ON)	O (START)

ENGINE STOP

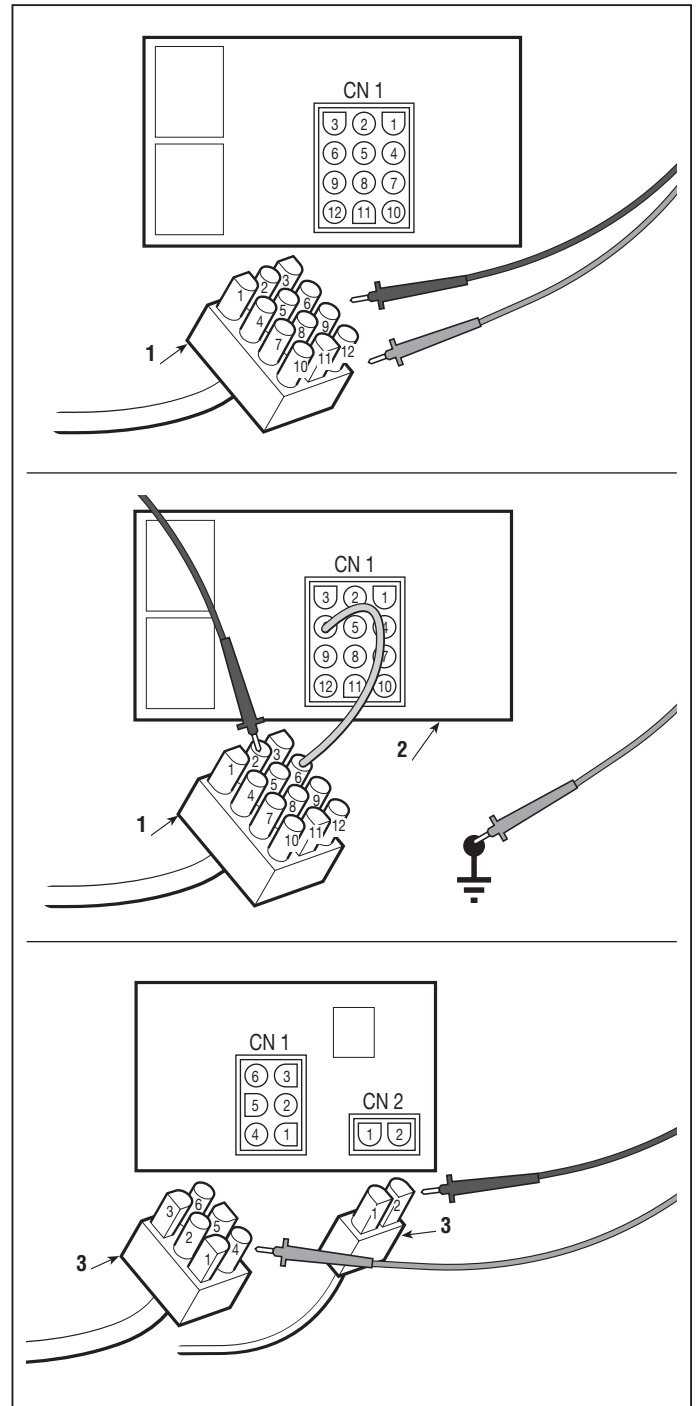
This operation must be done by making a bridge between contacts 5 (CN1) of the wiring connector **(1)** and the card connectors **(2)**, so making contact with the ferrules of the electronic card **(2)**. You should obtain the following result:

No Contacts	Tester reading and condition
2 - Earthing to frame	O (Always)

► **In manual start models:**

This check is made by detaching all the connectors and by using the Ohm-meter tester. This operation should be done without the driver on board, by making contact with the ferrules on the contacts of the wiring connectors **(3)** and should give this result

No Contacts	Tester reading and condition	
"GRASS-CATCHER ATTACHED" MICROSWITCH		
1 - 3 (CN1)	∞ (without g.catcher)	O (with g.catcher)
SEAT MICROSWITCH		
1 - 5 (CN1)	∞ (absent)	O (seated)



BLADE MICROSWITCH		
1 - 6 (CN1)	∞ (engaged)	O (disengaged)
"IN NEUTRAL" SIGNALLER		
1 - 4 (CN1)	∞ (drive)	O (neutral)
PARKING MICROSWITCH		
1 (CN1) - 2 (CN2)	O (out)	∞ (engaged)

7.4.2 TERMINAL BOARD SUPPLY CHECK

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7.4 TERMINAL BOARD SUPPLY CHECK

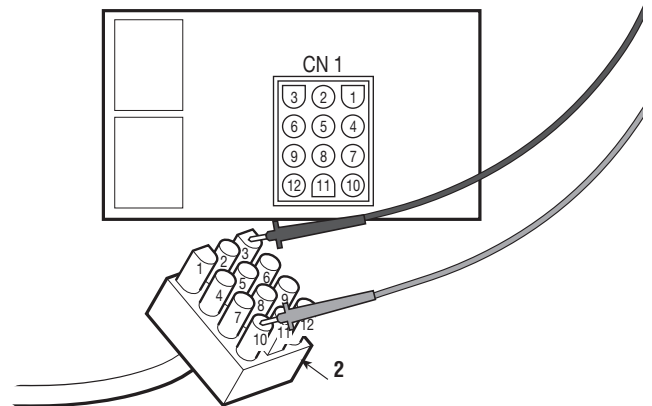
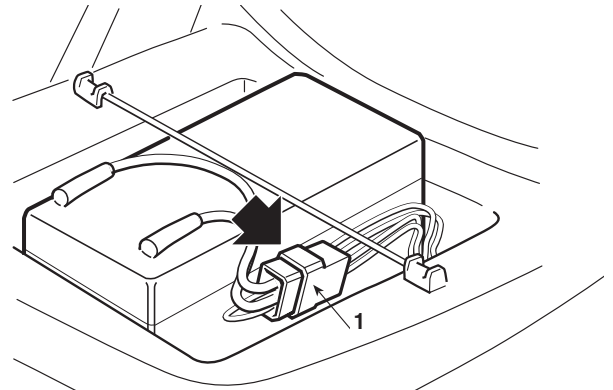
(► Only in electric start models)

Check that the battery connector (1) is connected correctly.

- The key in the «ON» position

This check is done with the Voltmeter tester (Volt DC 0 - 20), with the red ferrule on terminal 10 and the black one on terminal 6 of the wiring connector (2).

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



7.5.2 STARTER RELAY OPERATION CHECK

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7.5 STARTER RELAY OPERATION CHECK

(► Only in electric start models)



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

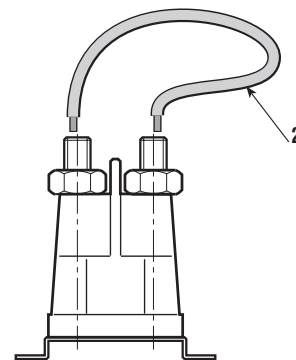
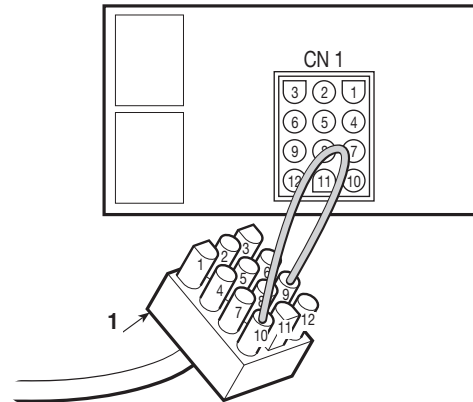
To do this requires:

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

Disconnect connector CN1. On making a bridge between terminals 10 and 9 of the wiring connector **(1)**, you should hear the click of the relay bobbin and the starter motor should come into action.

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

If the starter motor comes into operation, look for the fault in the relay or replace it.





7.6.2 ELECTRONIC CARD OPERATION CHECK



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7.6 ELECTRONIC CARD OPERATION CHECK

(► Only in electric start models)

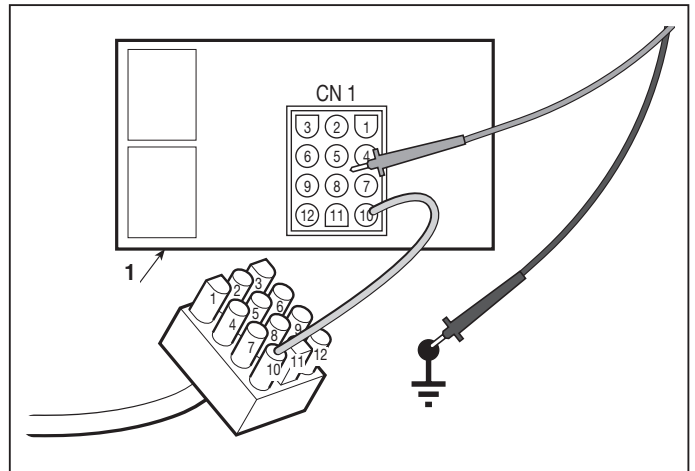
Safety and service supply check

This check is done by positioning a jumper between terminal 10 of the wiring (2) and terminal 10 of the card (1) in order to supply power to the card.

- The key in the «ON» position.

With the Voltmeter tester (Volt DC 0 ÷ 20), earth the black ferrule and the red one on terminals 4 - 5 - 7 - 8 of the wiring connector (1). In every case, the tester should indicate the battery's voltage.

This value should never go under 11 Volts.



 	<p>7.7.2</p> <p>RECHARGE CIRCUIT CHECK</p>	 	<p>from 2006 to</p> <hr/> <p>page 1 / 1</p>
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7.7 RECHARGE CIRCUIT CHECK (► *Only in electric start models*)

The recharge system serves to supply a flow of current to the battery at voltage of about 14 -16 Volts. A faulty system may charge the battery poorly (needing frequent recharges).

Before checking the recharge circuit, make sure that:

- the connections are correct;
- the earth connections are firmly attached;
- the battery is charged and not sulphated [see 7.8];
- the fuse is not blown.

Checking the lower charging limit

Start the engine and keep it running at a minimum.

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 fuse is blown.

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CARE AND MAINTENANCE OF THE SEALED BATTERY	page 1 / 1

7.8 CARE AND MAINTENANCE OF THE SEALED BATTERY (► *Only in electric start models*)

A) General information

In a sealed “dual” battery, the electrolyte for each element is carefully measured out during manufacture and is 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) Advice 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 get 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 battery charger at a constant voltage. Using other battery charger types may 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 the right battery charger;
- recharge at a room temperature of between +10° and +30 °C;
- check that the battery does not heat to over 50 °C during recharging. If it should do so, stop recharging immediately and dispose of the battery as it will be unusable.

With the battery disconnected (and at rest for at least 12 hours) and the voltmeter tester, 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.

7.9.1 FITTING SAFETY MICROSWITCHES

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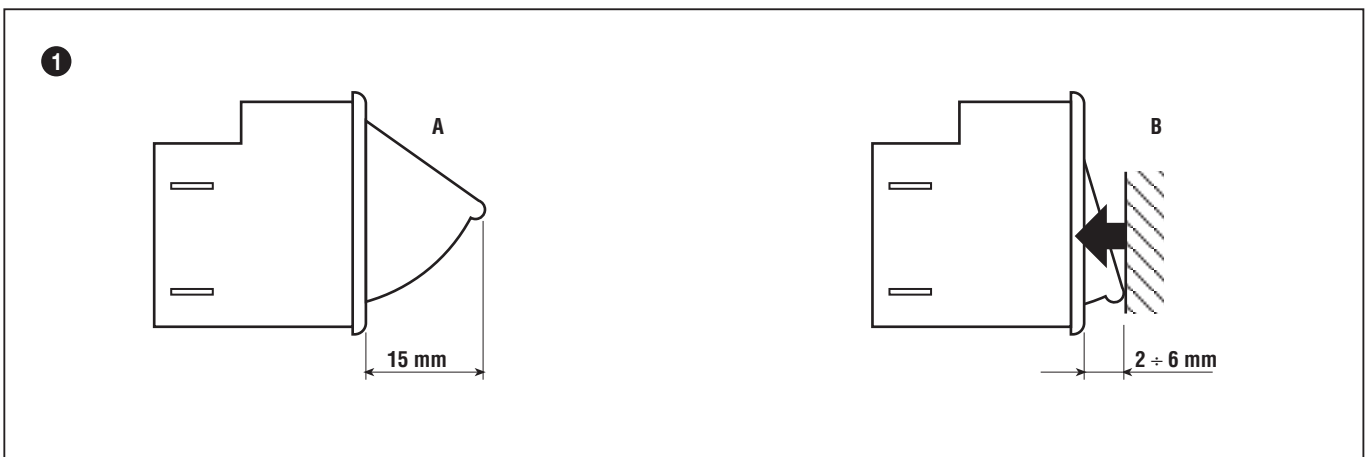
7.9 FITTING SAFETY MICROSWITCHES



IMPORTANT

Since the microswitches should always function correctly, it is important to follow the exact assembly positions by referring to the drawings indicating the various usages.

- A** = Free
- B** = Activated

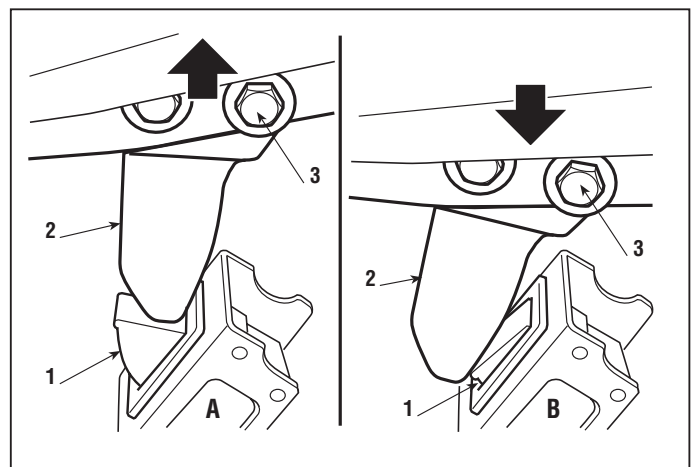


Adjust the seat safety microswitch **(1)** only by changing the position of the cam **(2)**, after loosening the two fixing screws **(3)**.

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.

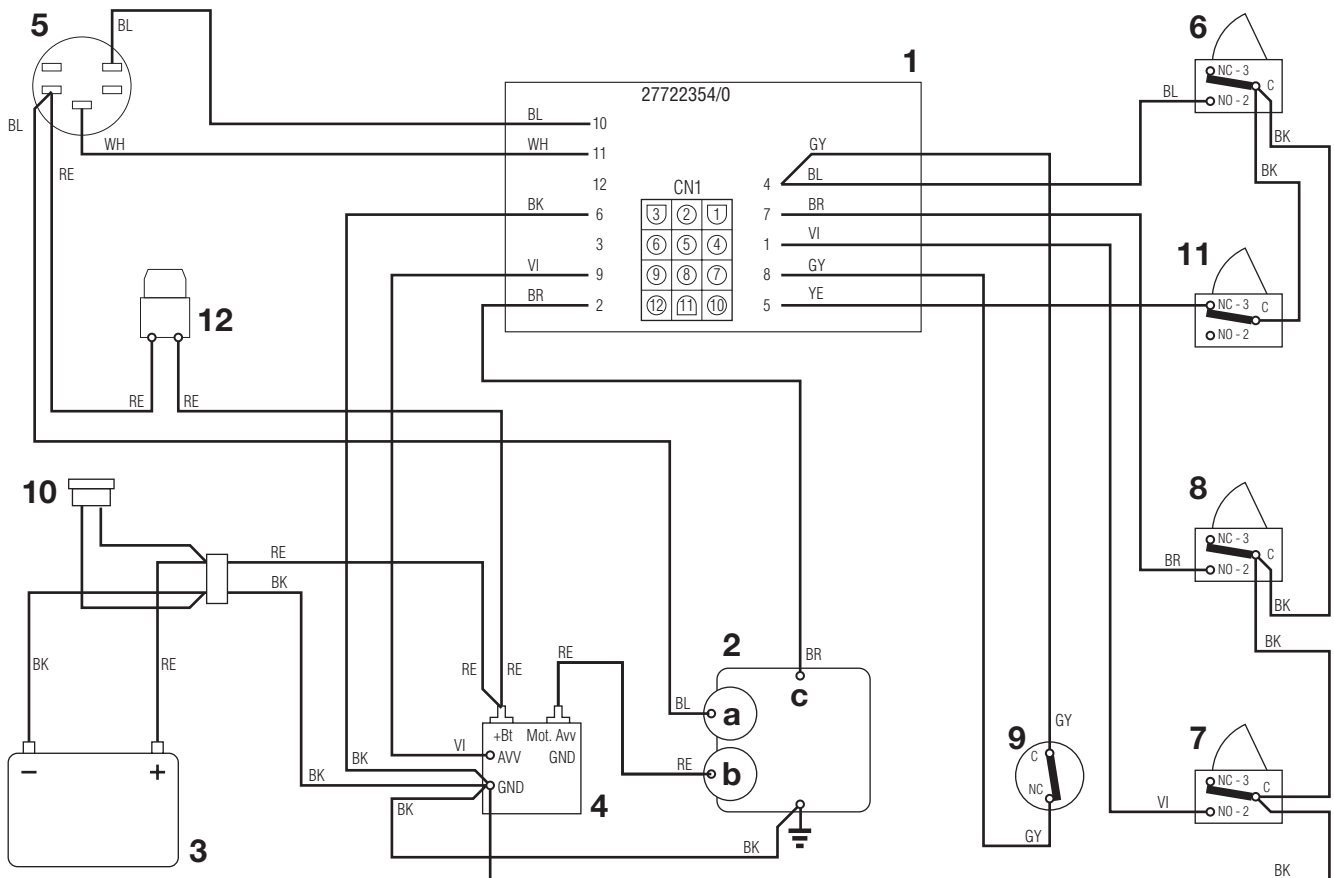


7.10.3 ELECTRICAL DIAGRAMS

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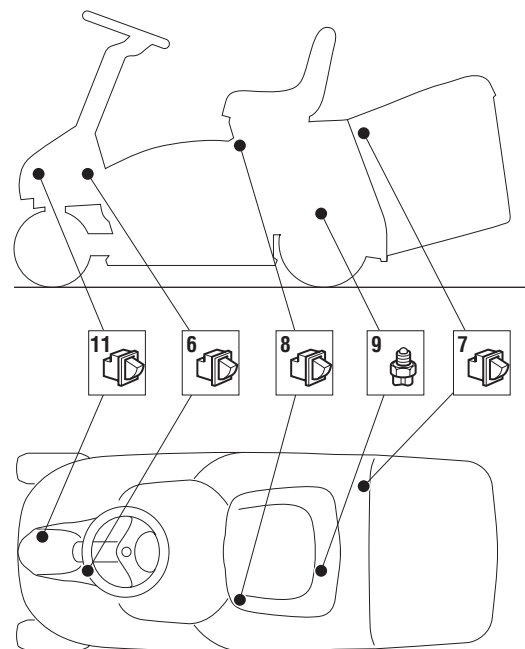
1 ▶ Electric start models



- 1 Electronic card
- 2 Engine
- 2a Generator
- 2b Starter motor
- 2c Motor stop
- 3 Battery
- 4 Starter relay
- 5 Key ignition switch
- 6 Blade microswitch
- 7 Grass-catcher microswitch
- 8 Seat microswitch
- 9 Neutral microswitch
- 10 Recharger connector
- 11 Brake microswitch
- 12 Fuse (10 A)

CABLE COLOURS

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

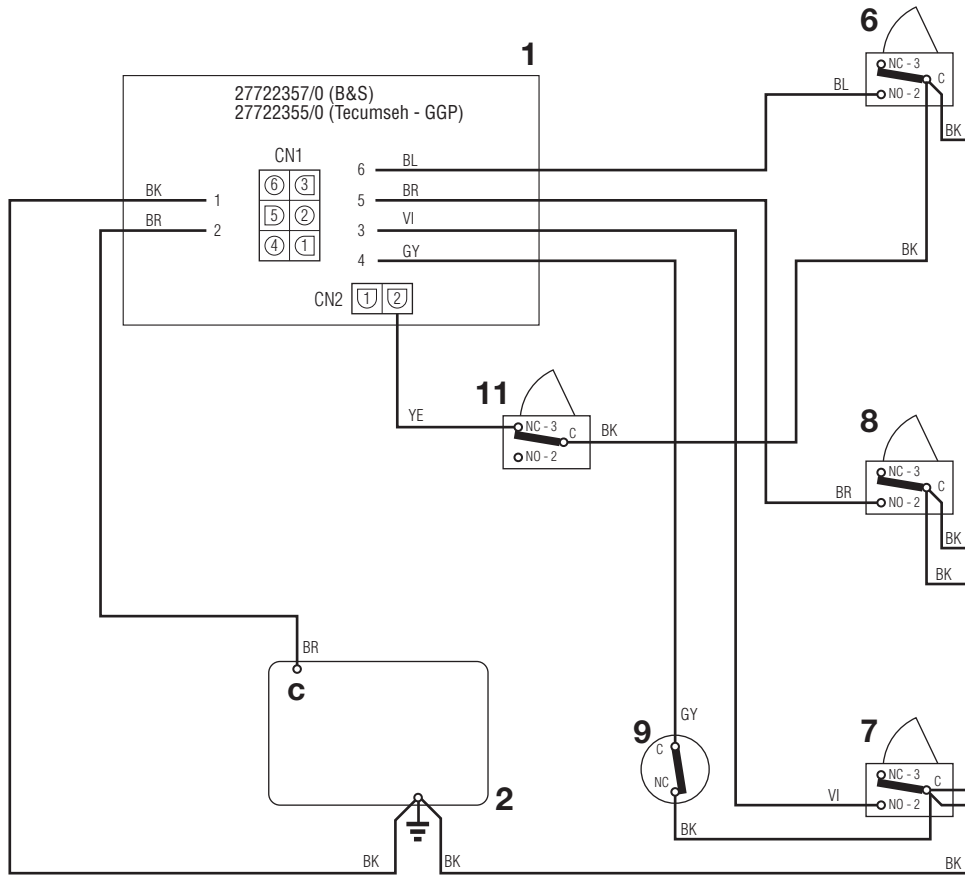




7.10.3 ELECTRICAL DIAGRAMS

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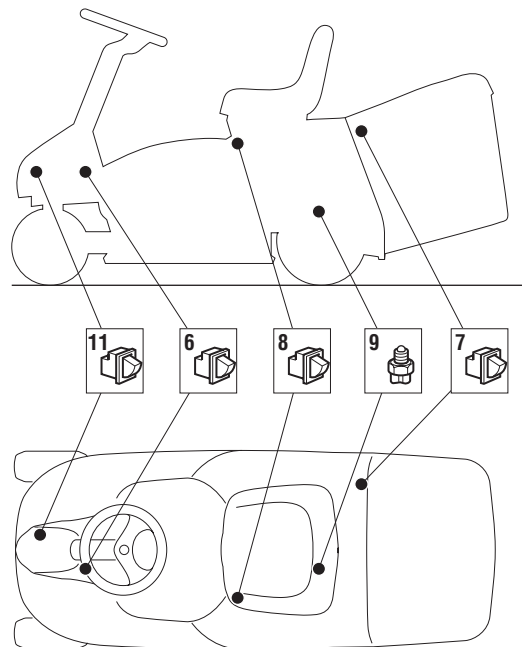
2 Manual start models



- 1 Electronic card
- 2 Engine
- 2c Motor stop
- 6 Blade microswitch
- 7 Grass-catcher microswitch
- 8 Seat microswitch
- 9 Neutral microswitch
- 11 Brake microswitch

CABLE COLOURS

- BK** Black
- BL** Blue
- BR** Brown
- GY** Grey
- VI** Violet
- YE** Yellow





8.1.2 - TIGHTENING TORQUES AND ADJUSTMENTS SUMMARY



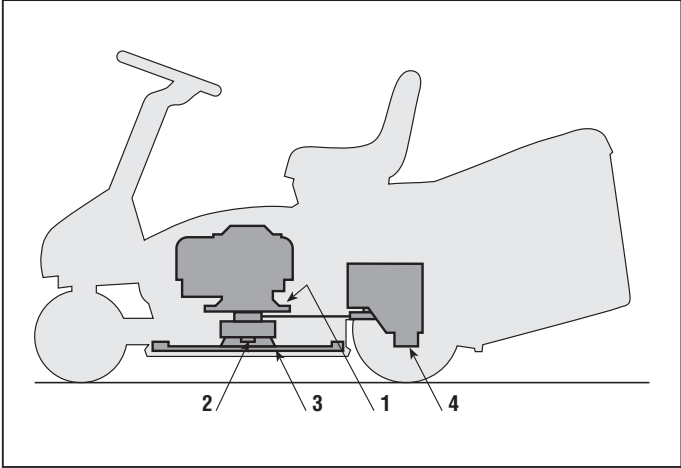
from 2007 to
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8.1 TIGHTENING TORQUES AND ADJUSTMENTS SUMMARY

A) Tightening torques

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

- 1 Engine screws 25 ÷ 30 Nm
- 2 Clutch screw 55 ÷ 65 Nm
- 3 Blade nuts 60 ÷ 65 Nm
- 4 Nuts for fixing supports to frame ... 10 ÷ 15 Nm



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

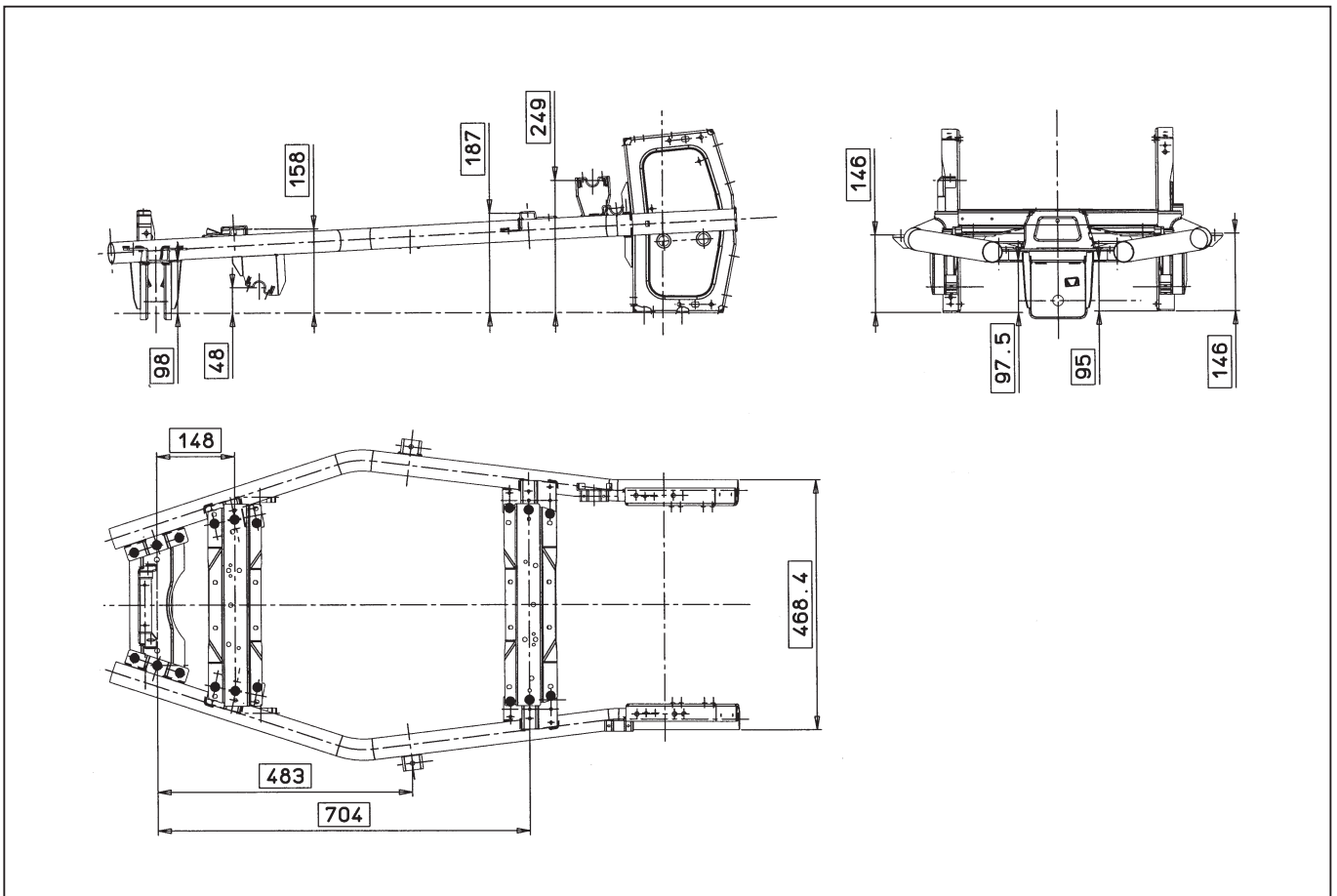
B) Adjustments

Operation	Position	Position of controls	Adjustment
a) Drive engagement adjustment [see 4.3]			
b) Engagement and blade brake adjustment [see 4.1]			

<p>◀</p> <p>◀</p>	<p>8.2.0</p> <p>SUMMARY OF MAIN ASSEMBLY AMOUNTS AND CHECKS</p>	<p>from 2002 to</p>
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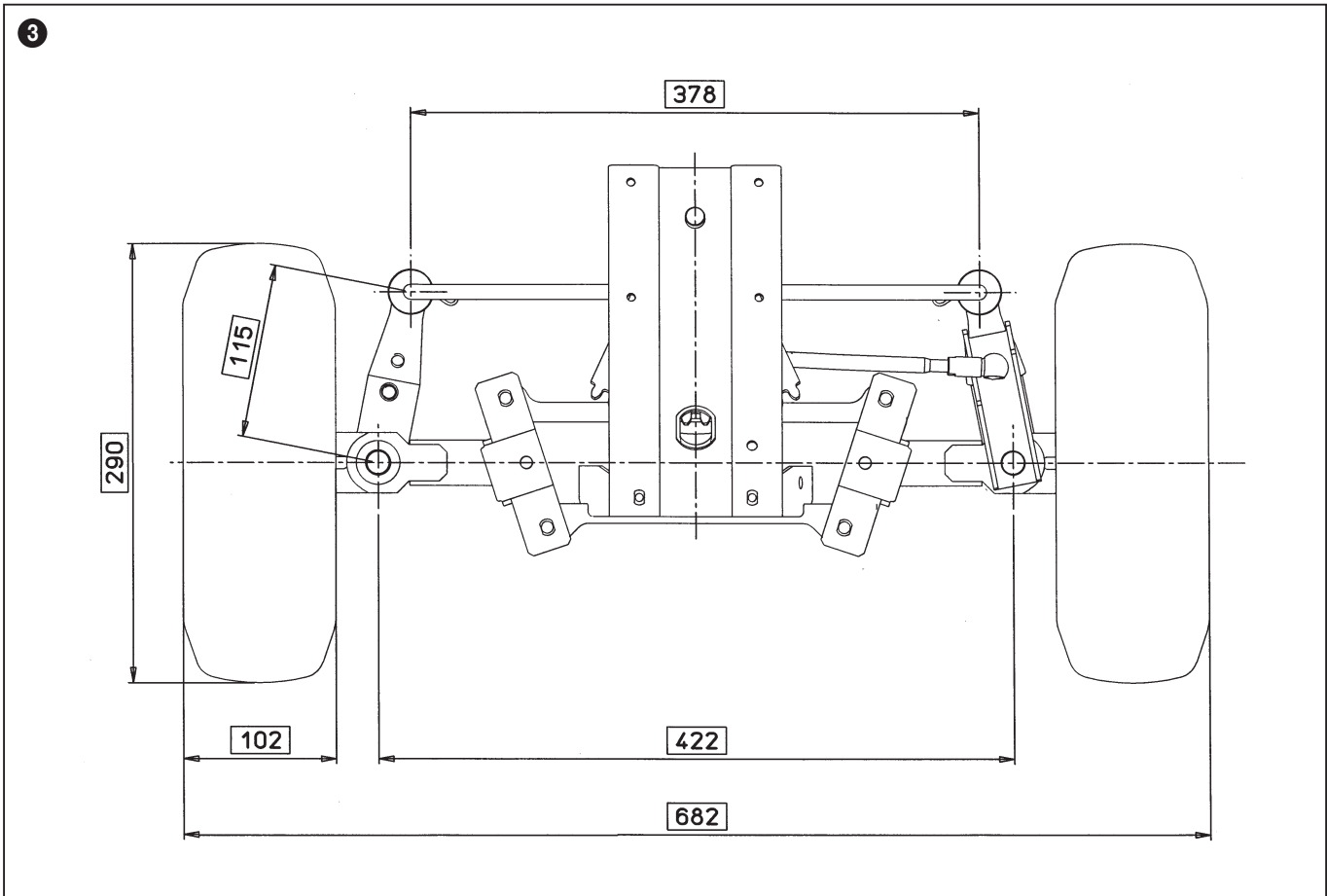
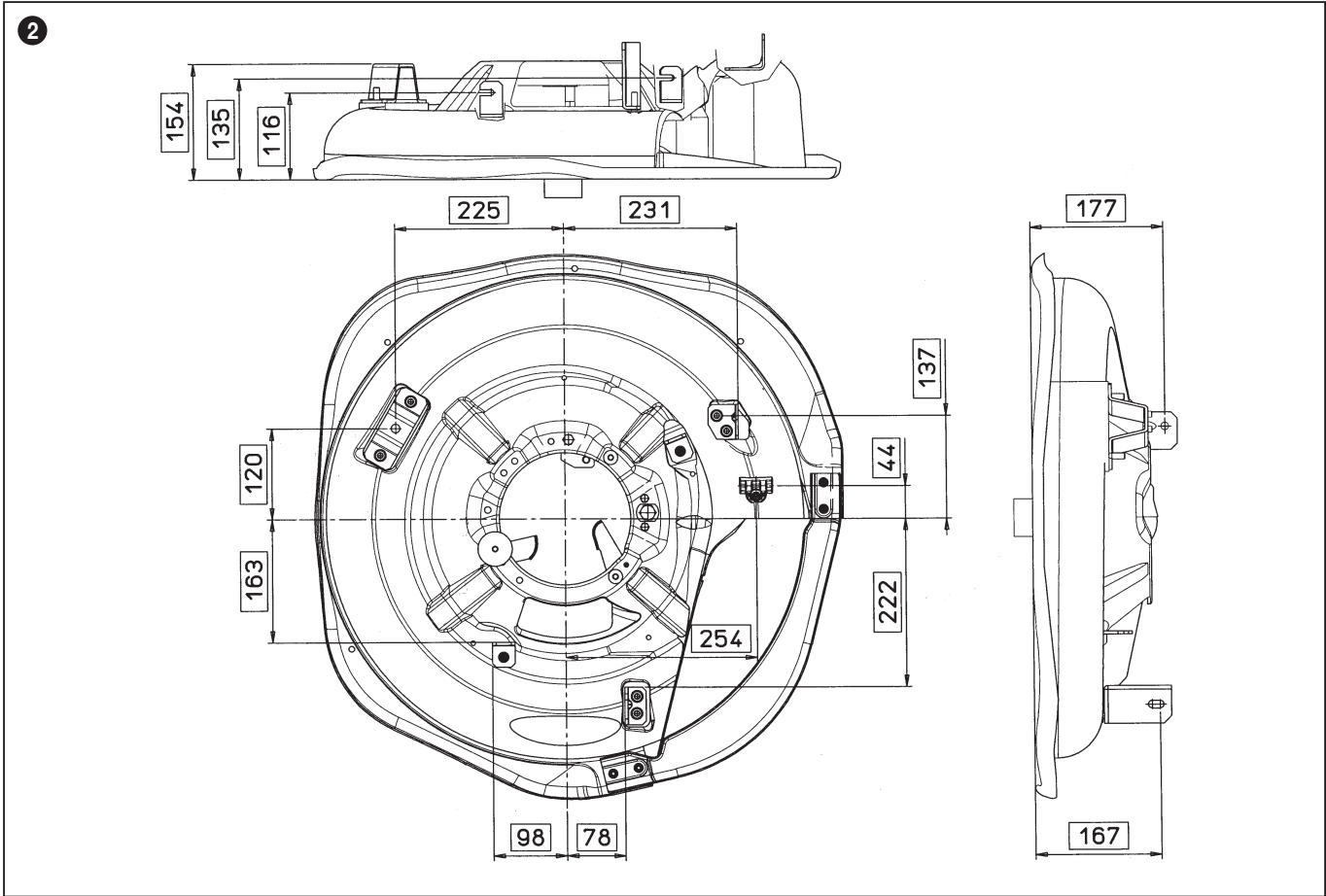
8.2 SUMMARY OF MAIN ASSEMBLY AMOUNTS AND CHECKS

- 1 Frame
- 2 Cutting deck
- 3 Steering geometry
- 6 Assembly of steering tie-rods
- 6 Tie-rod connecting steering steering stub axles
- 4 Drive belt development
- 7 Assembly of gear lever rod



8.2.0
SUMMARY OF MAIN ASSEMBLY AMOUNTS AND CHECKS

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SUMMARY OF MAIN ASSEMBLY AMOUNTS AND CHECKS

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