STIGA

WORKSHOP MANUAL

IMPORTANT NOTICE

The information contained herein is intended for Service Operations and professionals only, able to competently perform the operations described herein, using the appropriate equipment in order to safeguard se-curity and performance of the machine.

The manufacturer is not liable for damages or injuries arising from operations performed by individuals or inadequate facilities.

TCNS 92 Hydro - Edition 2023

ALPINA Mountfield ATCO CASTELGARDEN

GENERAL INFORMATIONS

The purpose of this manual is to assist Service Centres service, disassemble and repair machines.

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

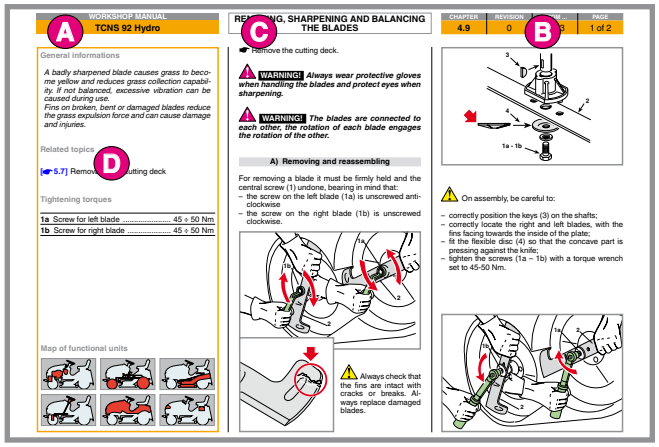
Please take time to read through this manual to acquire a basic understanding of the machine, which is necessary for working rationally without making errors or wasting time.

All problems related to the use of the machine are fully covered in the User manual.

STRUCTURE OF THE MANUAL

The manual is divided into sections and chapters.
Each page of this manual states the following information:

A) Machines or series of machines to which the contents of the chapter are applicable.



B) Identification and number of the page based on the following criteria:
- the first field indicates the section and chapter;
- the second field indicates the revision index;
- the third field indicates the chapter validity start date, i.e. the year of manufacture of the machine;
- the fourth field indicates the page number and total number of pages dedicated to the subject.

C) Chapter title.

D) General information, references to other chapters in the manual, technical information related to the topic, and buttons with links to the machine operating units map can be found in the left column on each initial page.

SECTIONS OF THE MANUAL

The content of the manual is divided into sections which correspond to the various subjects and the different types of servicing.

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 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 covers the main aspects of a servicing procedure.
A specific chapter is dedicated to a quick troubleshooting guide on the most frequent questions and the chapter references providing information on the interventions required to resolve the same.

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

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

6. Repairs
This chapter deals with all the more complex work connected with the replacement or repair of malfunctioning or worn parts.
The descriptions must follow a logical sequence and can include operations not specifically connected to a particular type of repair.
In this case, careful reading of the entire procedure can help you omit all those operations not connected with the case in hand without, however, overlooking anything that may be necessary.

7. Electrical system
This chapter deals with the problems and checks connected with the electrical system.
All work can be done using a tester without having to use special equipment.

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

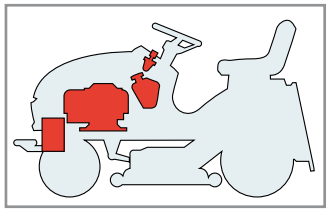
8. Technical specifications

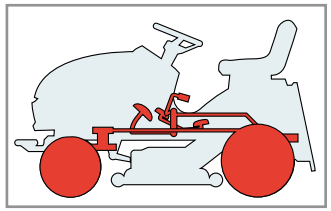
This chapter summarises all the main information regarding the machine.

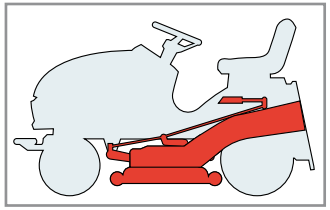
FUNCTIONAL UNITS MAP

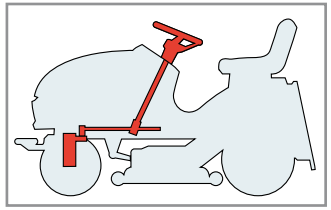
The map is a search tool that provides instant access to all information concerning machine operational unit or element.

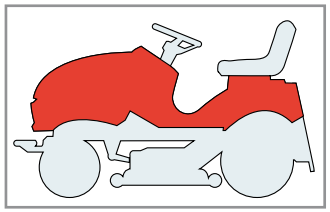
Identification is simplified by the use of icons resembling the various units, each of which is linked to a table of contents that lists all related topics.

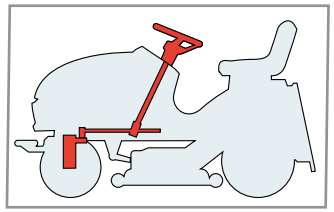

ENGINE - FUEL TANK


TRANSMISSION - BRAKE - WHEELS


CUTTING DECK


STEERING


BODY


ELECTRICAL SYSTEM

SYMBOLS

In the manual some symbols are present. They are used to draw the attention of the operator, reminding him to perform the interventions with the necessary attention and caution.

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

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

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

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

TERMINOLOGY AND ABBREVIATIONS

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

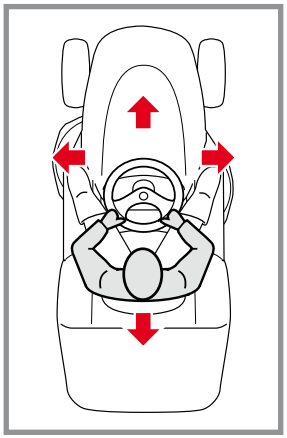
NOTE *General reference for the correct maintenance execution and methods..*

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

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

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

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



The following abbreviations are used in this manual

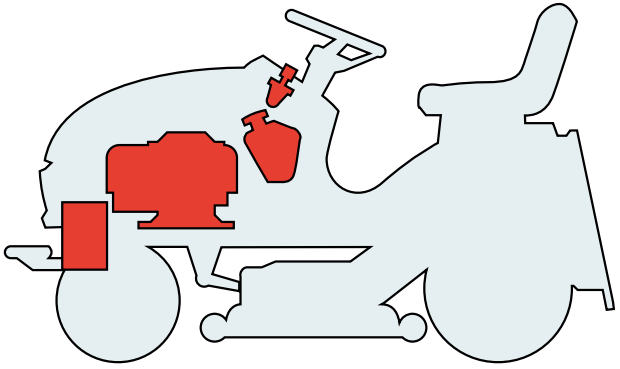
Dx / Sx	= Right / LeftV
Min / Max	= Minimum / Maximum
Chap.	= Chapter
PTO	= Power Take Off
HST	= Hydrostatic Transmission

General informations

Different fittings are foreseen for this machine which can imply the use of different engines within the same.
This manual only describes the operations relating to the application of the machine engine; reference to the engine's Manufacturer's Manual is recommended for information regarding servicing, disassembly and replacement of components.

Related topics

[☛ 1.1] Identification of components



RELATED TOPICS:

Adjustments and tuning

Removal of external parts and main assemblies

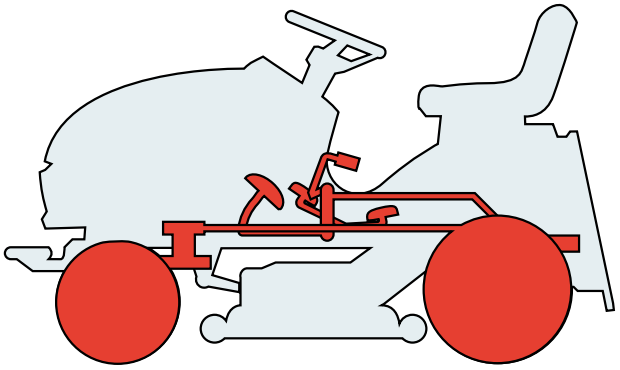
Repairs

General informations

The use of outsourced third-party hydrostatic drive units is foreseen on this machine.
This manual only describes the operations relating to the application of the machine units; reference to the drive unit's Manufacturer's Manual is recommended for information regarding servicing, disassembly and replacement of components.

Related topics

[☛ 1.1] Identification of components



RELATED TOPICS:

Adjustments and tuning

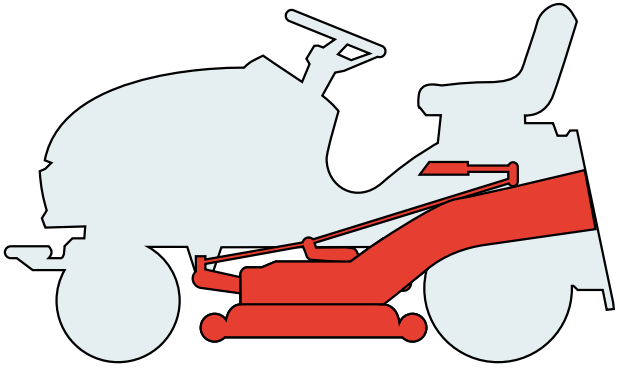
Removal of external parts and main assemblies

Repairs

General informations

The terms “Cutting deck” or “Equipment” refer to the cutting-means assembly, connected to the machine PTO by means of a belt.

Related topics



RELATED TOPICS:

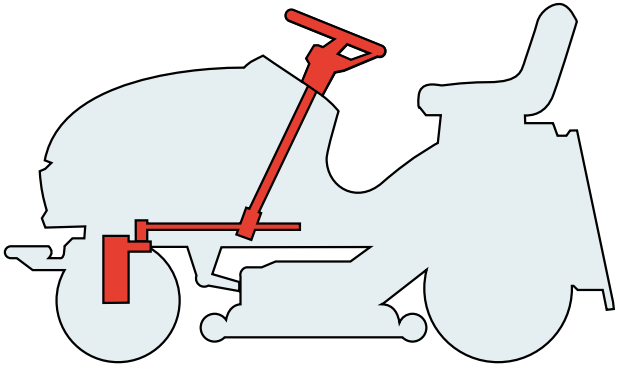
Adjustments and tuning

Removal of external parts and main assemblies

Repairs

General informations

Related topics



RELATED TOPICS:

Adjustments and tuning

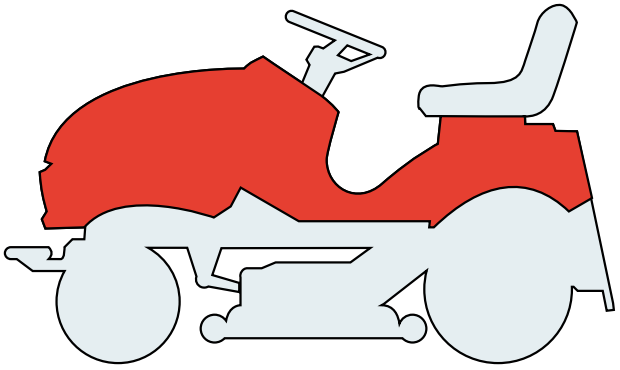
Removal of external parts and main assemblies

Repairs

General informations

Different outfittings are foreseen for this machine which can imply the use of different bodywork designs.
The operations described herein are applicable to all versions, except for instructions provided for each specific outfitting.

Related topics



RELATED TOPICS:

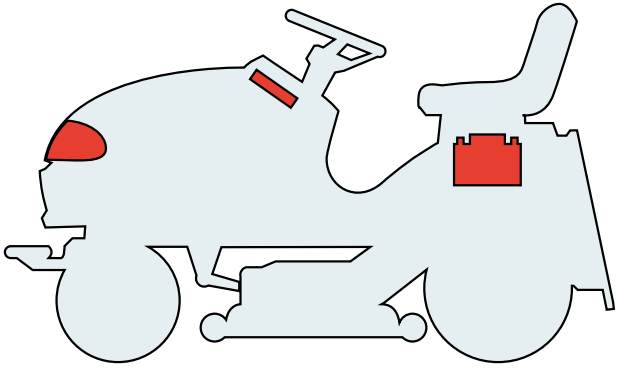
Adjustments and tuning

Removal of external parts and main assemblies

Repairs

General informations

Related topics



RELATED TOPICS:

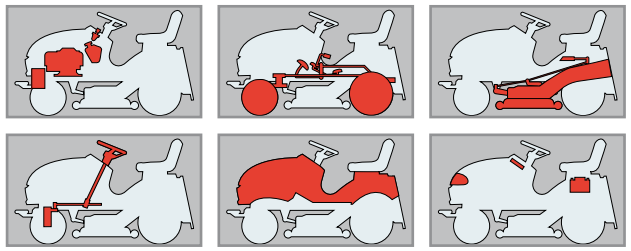
Information and Verifications

General informations

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.

Related topics

Map of functional units

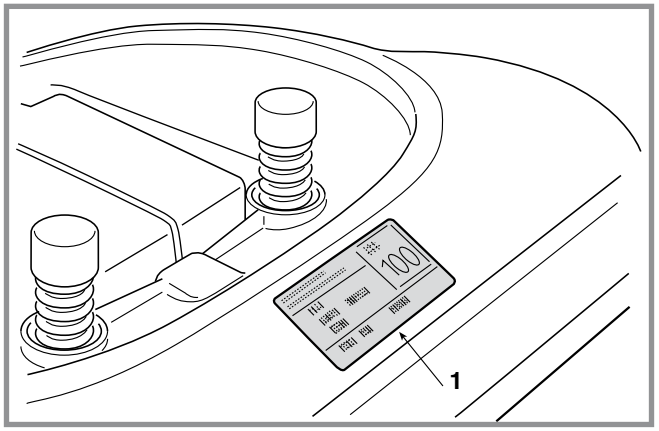


A) Identification

1) Machine

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

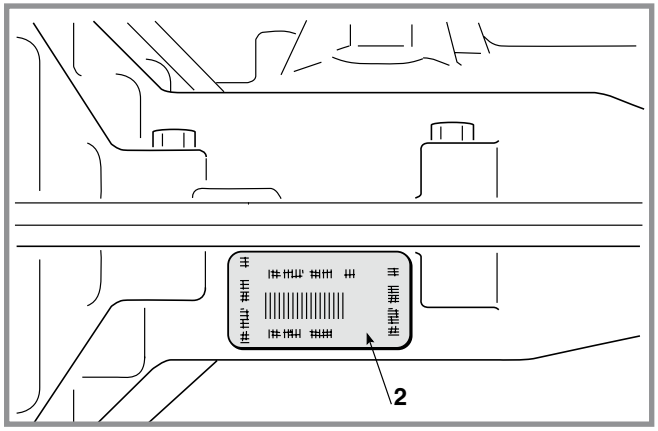
The model and serial number must be shown on each repair sheet when requests are made under guarantee, and are indispensable for spare part orders.



2) Transmission (Rear axle)

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

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



3) Engine

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

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

B) Guarantee validity

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

C) Service repairs after guarantee period

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

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

D) Fault notification

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

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

E) Spare parts request

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

General informations

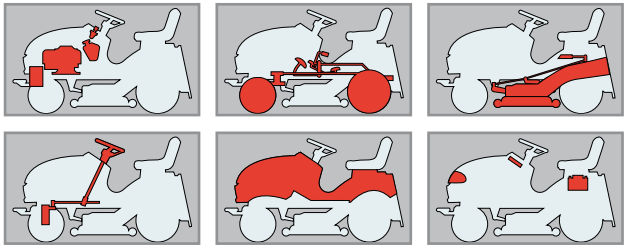
This chapter covers the main aspects of a servicing procedure and the general rules for guaranteeing a successful service which respects the safety of the machine.

Related topics

[☛ 2.2] Tools

[☛ 7.3] Safety microswitches operation check

Map of functional units



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;
- 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 the Instruction Booklet.

C) Precautions during servicing

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

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

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

– ensure that other persons cannot accidentally carry out actions that may physically endanger those working on the machine.

D) Necessary equipment

All the operations can be carried out with the tools normally used in a good garage.

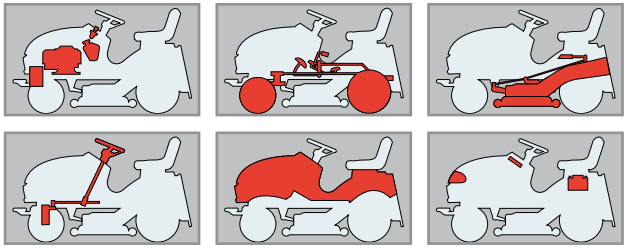
Some operations require special equipment and tools.

General informations

This chapter covers the main aspects of a servicing procedure and the general rules for guaranteeing a successful service which respects the safety of the machine.

Related topics

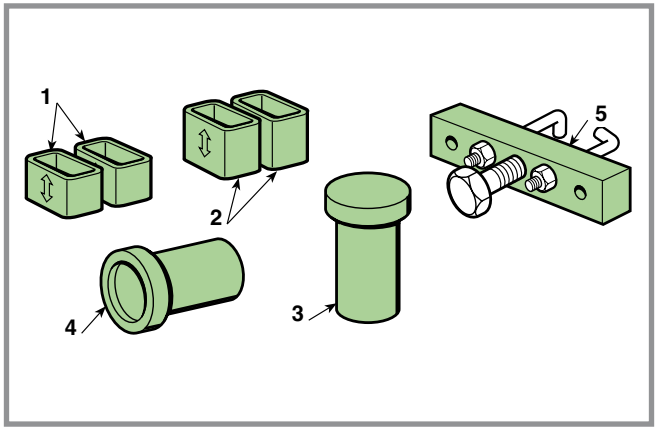
Map of functional units



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.

These tools are to be used whenever is given in the text.

1. Blocks H = 26 mm for adjusting the cutting deck
2. Blocks H = 32 mm for adjusting the cutting deck
3. Bush for assembly of blades bearings
4. Stopper for assembly of wheel bearings
5. Pulley extractor

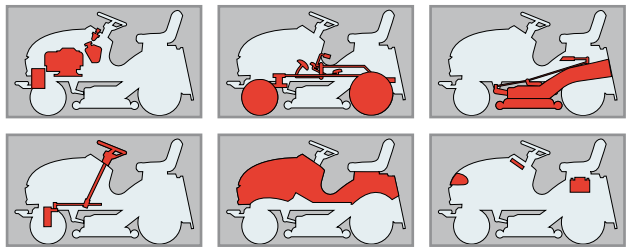


General informations

This chapter covers the main aspects of a servicing procedure and the general rules for guaranteeing a successful service which respects the safety of the machine.

Related topics

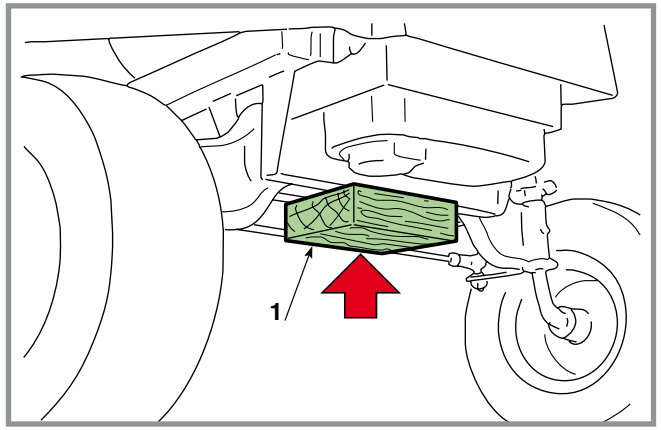
Map of functional units



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

A) Front

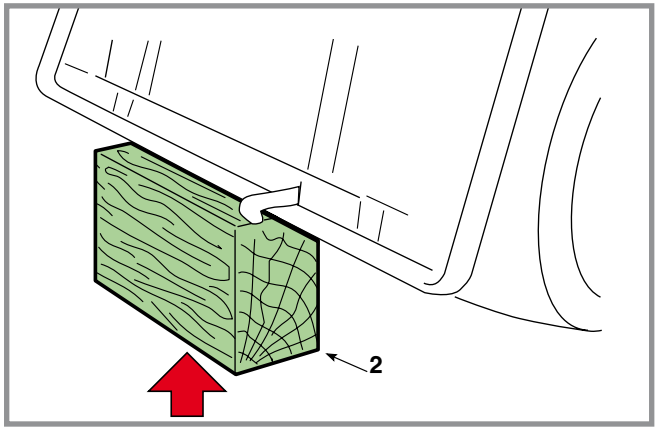
Once the parking brake has been engaged, the machine can be lifted using a jack which pushes on the underside of the frame, placing a wood block (1) between the base of the jack and the frame and checking to see that the free movement of the front spring equaliser has not been obstructed.

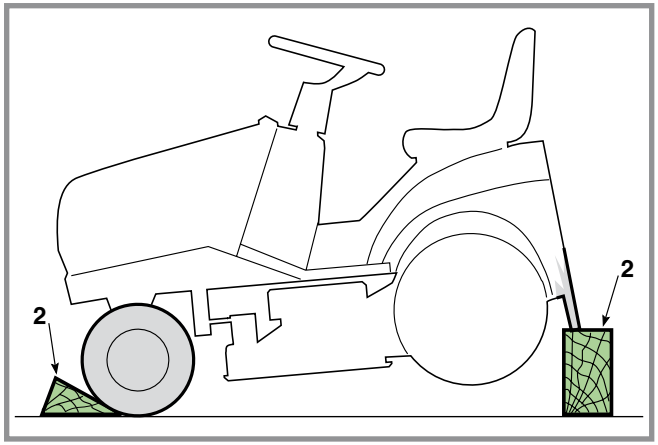


B) Rear

Place a suitable block (2) beneath the lower edge of the plate.

In any case, an appropriately sized wedge (3) should be placed behind the opposite wheels to stop the machine from accidentally moving backwards.



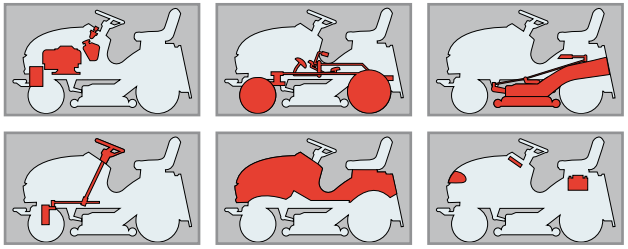


General informations

This chapter covers the main aspects of a servicing procedure and the general rules for guaranteeing a successful service which respects the safety of the machine.

Related topics

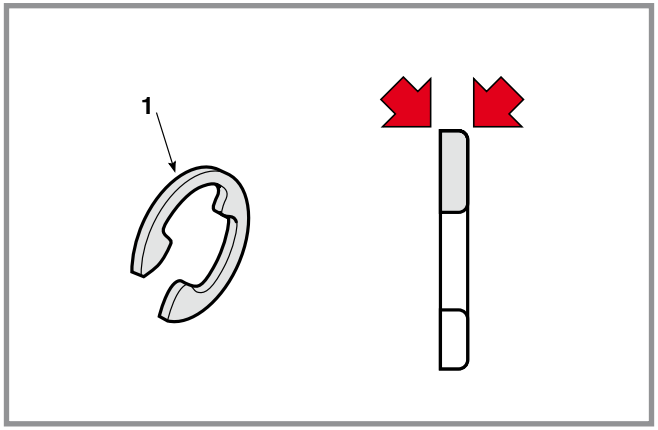
Map of functional units

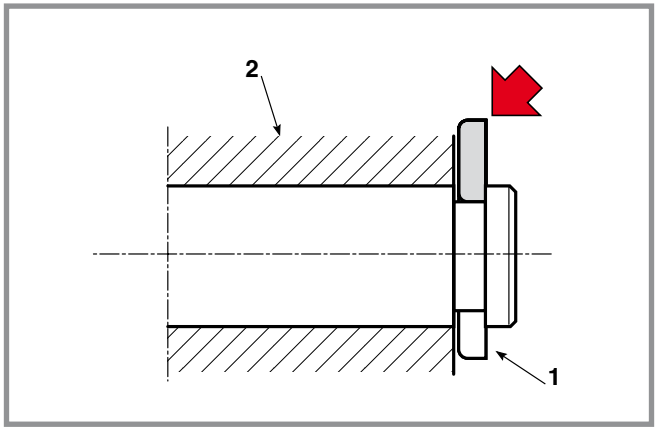


A) Fitting snap rings

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

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



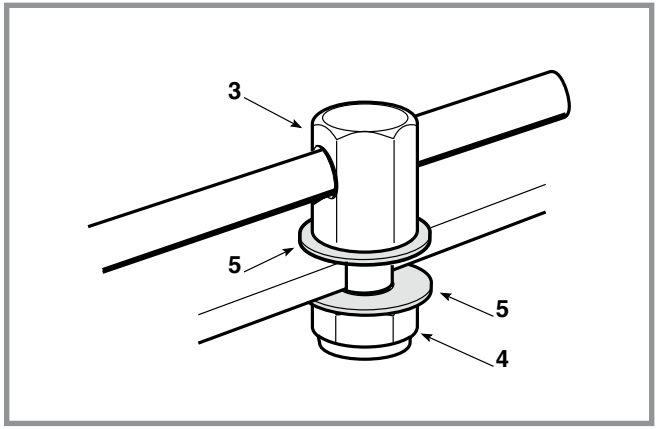


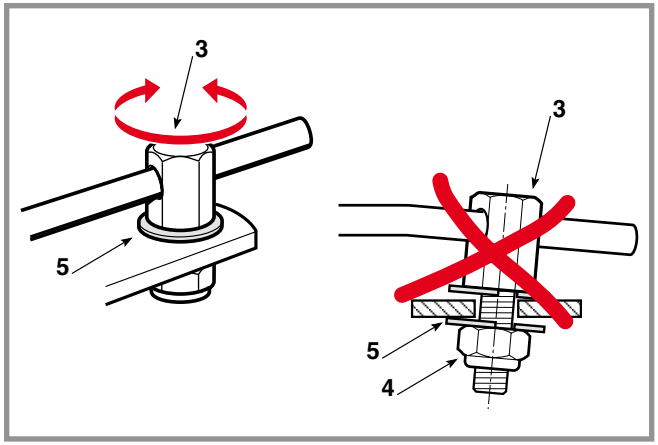
B) Joint pivot pins

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

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

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



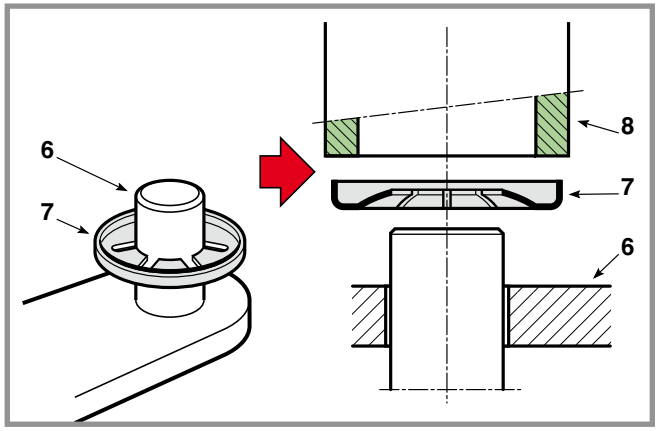


C) Crown fasteners

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

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

IMPORTANT *A deformed fastener should always be replaced.*

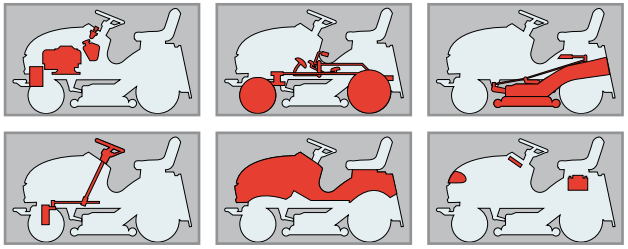


General informations

In questo capitolo vengono trattati i criteri di intervento per la manutenzione ordinaria.

Related topics

Map of functional units

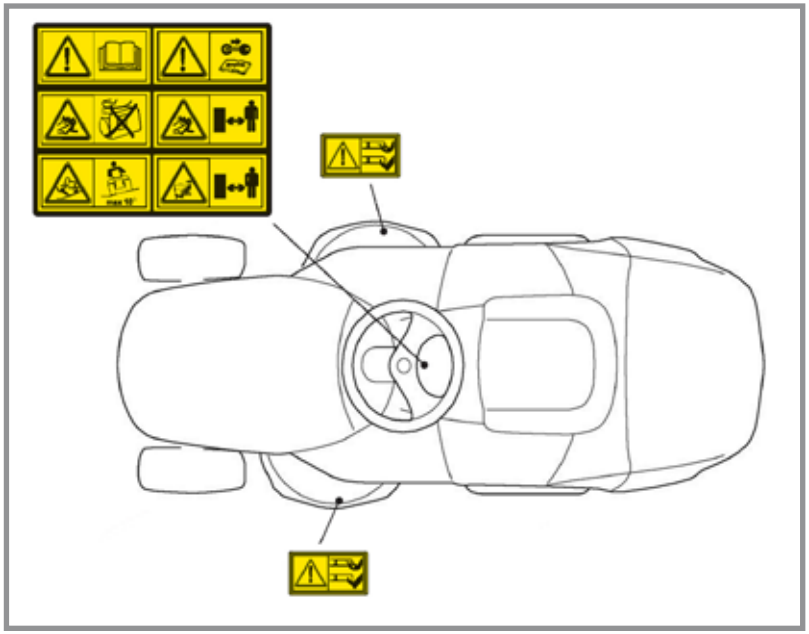


The Instruction Handbook has a number of operations to be carried out by the Customer for a minimum of basic maintenance, and other operations not always within his capacity.

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

A) Tuning the machine whenever possible.

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



A) Occasional tuning

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

B) Routine maintenance

- All work carried out in section a), plus:

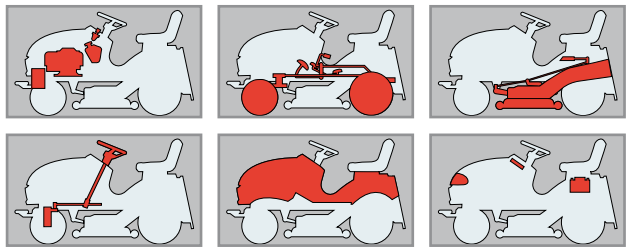
- Check battery charge
- Check tension of belts
- Adjust brake
- Adjust blade engagement
- Adjust blades brake
- Check steering allowance
- Check front bearings
- General lubrication
- Clean away grass cuttings and wash exterior
- Clean and wash inside cutting deck and collector chnnel
- Clean and wash grass-catcher
- Touching up of any damaged paint

General informations

This chapter helps achieve a rapid identification and solution to the most recurrent problems, classified according to the operating unit in question.

Related topics

Map of functional units



1. Engine and Tank

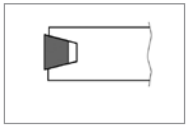
Problem	Probable cause	Solution	☛
Starter motor does not run	Low battery	Recharge	[7.10]
	No starter relay contact	Check	[7.6]
	Faulty connector and/or starter motor failure	Check and/or replace	[*]
The starter motor runs but the engine does not start	Blown spark plug electrode	Replace the spark plugs	[*]
	Uncertain connections	Check the connectors	–
	Coil failure	Check and/or replace	[*]
	The carburettor solenoid valve does not open	Check	[7.5]
	No fuel is pumped to the carburettor	Check the filter, fuel pump (if applicable) and the carburettor	[*]
The engine runs irregularly and/or lacks power Dense and/or blue exhaust fumes	Faulty ignition	Check the spark plugs and ignition system	[*]
	Low fuel level in the tank	Top up	–
	Dirty or old fuel	Empty the fuel tank and add fresh fuel	–
	Clogged carburettor filter	Check and clean	[*]
Black exhaust fumes	Excessively oily carburetion	Check the starter and command cable	[*]
Engine overheating	Spark plugs with inadequate heat rating	Check	[*]
	Carburetion problems	Check the carburettor	[*]
	Insufficient oil level	Check and top up	[*]
	Clogged suction system	Check and clean the air filter and the suction pipe	[*]
	Dirty cooling flaps	Clean	[*]
	Broken cooling fan	Replace	[*]
Engine idling speed is too high or too low.	Incorrect cable adjustment	Adjust	[6.8]
Abnormal noise and vibrations	Loose bolts and screws	Check and tighten to the prescribed values	[5.5]

[*] Check the engine Manufacturer's Manual

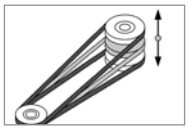
Important informations

Characteristics of the original belts

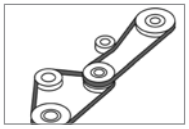
The standard belts on the market have different characteristics compared to the requirements of the original spare belts, supplied by the authorised dealer. The latter are designed and manufactured in close cooperation with the belt supplier and the machine manufacturer.
Here are the reasons why it is important to choose an original belt, useful when making such decisions..



a) Adhesion on the pulley. *The belt rests with the sides inclined against the walls of the pulley. There must be a gap between the belt and the bottom of the groove.*



b) Floating pulley on cutting equipment. *The original Power Take Off (PTO) belt is designed to work even if the pulleys move up and down and tilt at the same time.*



c) Curvature in two directions. *All the original belts, which work with tensioning arms acting on the external side, are equipped with reinforcements. The reinforcement is designed specifically for these specific cases..*

2. Transmission - Brakes - Wheels

Problem	Probable cause	Solution	☛
The machine moves slowly, looses power or doesn't move at all	Slack belt	Adjust	[4.3]
	Worn or oily belt	Replace	[6.4]
	Broken pulleys	Replace	[5.5] [*]
	The brake is not adjusted correctly	Check and adjust	[4.2]
	Hydrostatic unit failure	Check the Manufacturer's Instruction Manual.	[*]
The machine will not move in either direction	Pulley splines broken	Replace	[*]
	Hydrostatic unit failure	Check the Manufacturer's Instruction Manual.	[*]
The machine does not reach the foreseen speed in forward drive	Incorrect pedal adjustment	Adjust	[4.4]
Uncertain or ineffective braking	The brake is not adjusted correctly	Check and adjust	[4.2]
Hydrostatic unit over-heating	Insufficient oil level	Top up	[*]
	Clogged oil filter	Clean and/or replace	[*]
Abnormal noise and vibrations	Slack or worn belt	Check and/or replace	[6.4]
	Irregular fan rotation	Check the condition of the fan, that it is securely fastened in place and that nothing interferes with the rotation movement	[*]
	Incorrect positioning of the by-pass valve	Check and adjust	[*]
	Loose bolts and screws	Check and tighten to the prescribed values	[5.5]
The machine moves in neutral gear	Incorrect micro-switch adjustment	Adjust	[4.4]
	Slack or worn linkage system	Check and/or replace	[4.4]
Pushing the machine by hand is difficult	By-pass partially enabled	Check	[*]
The parking brake does not stop the machine on a 30% slope	Incorrect brake adjustment	Adjust	[4.2]
Excessive clearance on the front wheels	Worn bearings	Replace	[6.2]

[*] Check the transmission unit Manufacturer's Instruction Manual

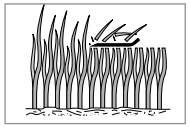
Important informations

Characteristics of the original blades

The original blades have design, material and processing characteristics optimised for use on the equipment for which they were designed; these characteristics are not present in so-called "compatible" spare parts.
Here are the reasons why it is important to choose an original blade, useful when making such decisions.

a) No breakage of the blade ends. *Using steel balls, the manufacturer simulates what can happen when mowing over any foreign bodies on the lawn. This can ruin the blade edge, but no component can come loose, fall off or be hurled away.*

b) No breakage of the blades. *The impact test is the most severe durability test that any lawnmower can be subjected to. An iron tube is placed exactly inside the blades when the mower is running. The blade may deform but it will never, under any circumstances, fall off or break. This test verifies that blades and other components meet the high safety requirements.*



c) Excellent cutting result. *The blades and blade ends supplied by the authorised dealer are optimised for the application for which they are intended. In short, this means that the blades are suitable for the shape of the casing and to the number of revolutions to provide the best possible cutting result.*

3. Cutting deck

Problem	Probable cause	Solution	☛
The blades do not engage or do not stop promptly within 5 seconds when they are disengaged	Slack belt	Adjust the engagement	[4.1]
	Incorrect adjustment of the engagement spring	Adjust the engagement	[4.1]
	Electromagnetic engagement problems	Check and/or replace	[7.7]
Uneven mowing and poor grass collection	Cutting deck not parallel to the ground	Check the tyre pressures	[6.1]
		Align the cutting deck with the ground	[4.5]
	Blades cutting badly	Check their condition and that they are well sharpened	[4.9]
	Misaligned blades	Check the blade shafts and flanges	[4.8]
Abnormal noise or vibrations	Loose joint bolts and screws	Check and adjust	[5.7]
	Pulleys or guide pulleys are worn and do not rotate correctly	Check and/or replace	–

4. Steering

Problem	Probable cause	Solution	☛
Excessive clearance on the steering wheel	Worn pinion and crown teeth	Reinstate the correct clearance	[4.6]
The machine does not maintain a straight line when the steering wheel is straight	Incorrect tie-rod adjustment	Adjust	[4.7]
Anomalous or uneven wear on the front tyres	Incorrect toe-in adjustment	Adjust	[4.7]

ADJUSTING THE ENGAGEMENT AND CHECKING THE BLADE BRAKE

General informations

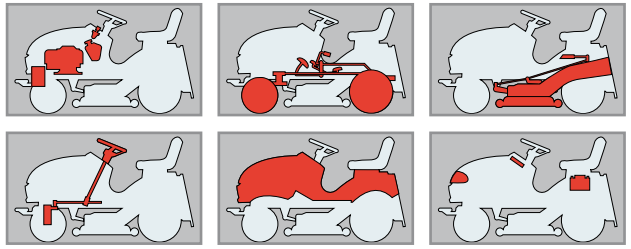
The blades are driven by the engine by means of a "V" belt and are engaged by an electromagnetic clutch.
After a certain amount of use the belt can become longer which can result in malfunctioning, i.e.:
– *belt slipping = belt stretched*
– *difficulty in disengaging, with the blades continuing to run = belt shortened*
In both cases the stretcher needs to be adjusted.
Disengaging the blades causes the cutting in of a brake, incorporated in the electromagnetic clutch, whose task is to stop the blades from rotating within five seconds.

Related topics

[☛6.6] Replacement of the blades control belt

[☛7.7] Electromagnetic clutch check

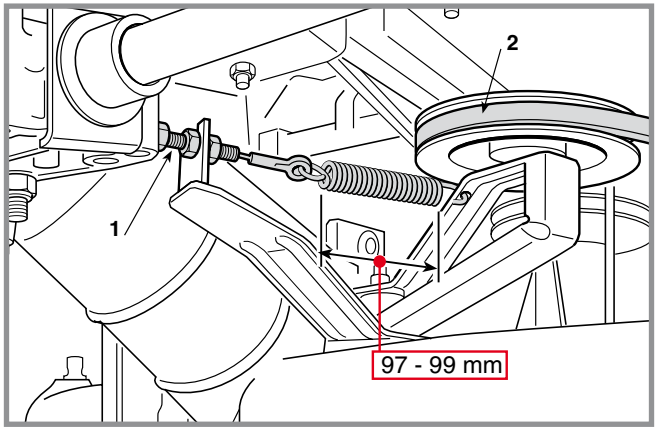
Map of functional units



A) Adjusting blade engagement

WARNING! ***When adjusting the engagement it could be necessary to remove the belt guards; in this case the guards must always be replaced after adjustment.***

With the cutting deck in its lowest position, look for the adjuster (1) which can be reached from the wheel arch of the right-hand rear wheel. Turn the nuts until the spring (2) reaches the length 97 ÷ 99 mm, measured from the outer edge of the eyelet with the blades engaged.



B) Checking the blade brake

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

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

BRAKE ADJUSTMENT

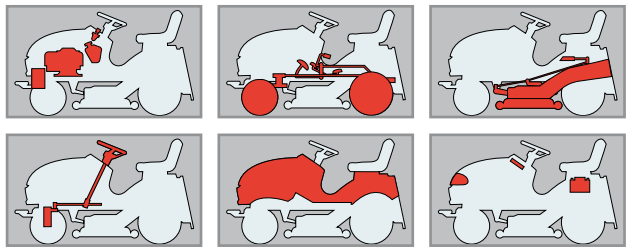
General informations

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

Related topics

[☛ 5.6] Removal of the rear axle

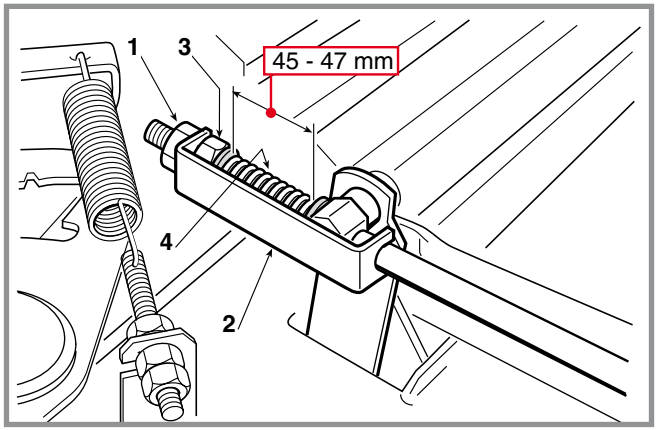
Map of functional units



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

Loosen the nut (1) which holds on the bracket (2) and turn the nut (3) until the length of the spring (4) is 45 ÷ 47 mm, measured from the inside of the washers.

When the adjustment has been made, tighten the nut (1).



NOTE *Never go under these amounts to avoid overloading the brake unit.*

WARNING! ***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.***

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

DRIVE BELT ADJUSTMENT

General informations

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

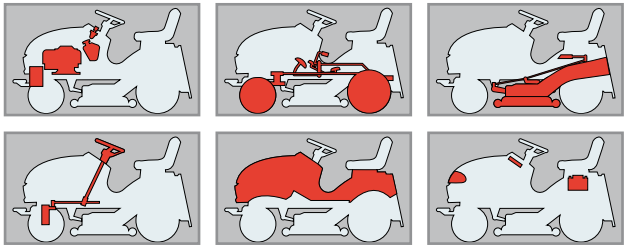
- *A loose belt reduces output from the drive and limits forward movement power;*
- *a belt which is too tight increases noise and results in jerky movements or tipping up when engaging the drive.*

In both cases the stretcher needs to be adjusted.

Related topics

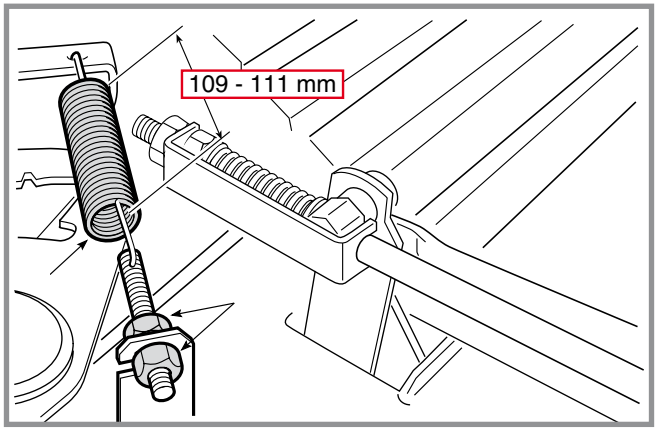
[☛ 6.4] Replacement of the drive belt

Map of functional units



The stretcher can be accessed from the inspection hatch beneath the seat; adjust the tension of spring (1) using nuts (2) to set length «A» of 109 ÷ 111 mm, measured from the outer ends of the springs with the drive commands disengaged.

Following adjustment, fully tighten the nuts (2)



DRIVE PEDAL ADJUSTMENT

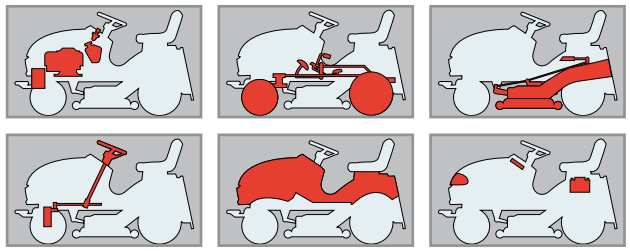
General informations:

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

Related topics

[☛7.12] Fitting safety microswitches

Map of functional units

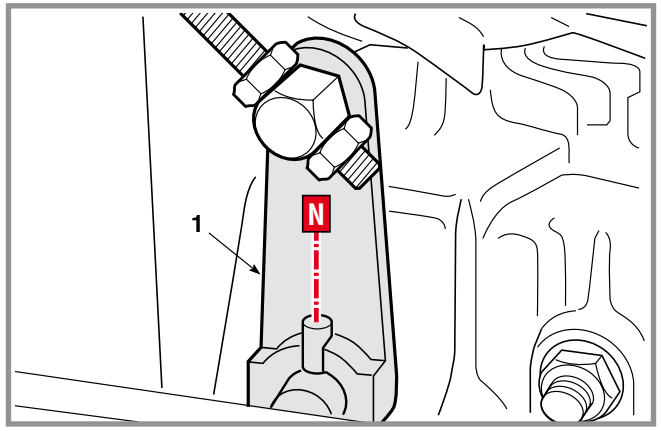


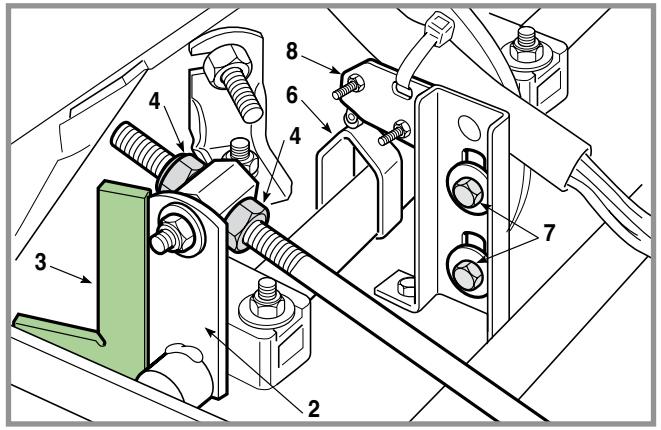
A) Adjusting the pedal in the “neutral” position

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

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

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



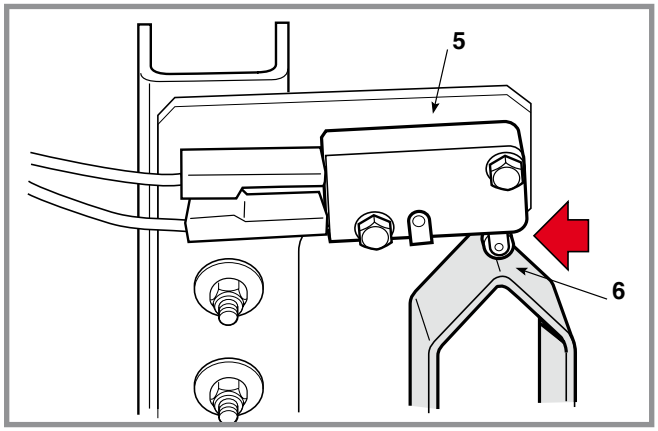


B) Adjusting the “neutral” position of the microswitch

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

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

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



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

General informations

The cutting deck is lowered by a lever controlled rod, and is moved by two trace links at the front and one at the back.
In order to achieve a good cut it is essential that the cutting deck is parallel with the ground cross-wise, and slightly lower at the front.

There three types of possible adjustments:
a) a combined adjustment to the parallel and the minimum front and back height, to be carried out if the cutting is irregular;
b) adjusting the parallel across the cutting deck;
c) adjusting the regularity of raising and lowering.

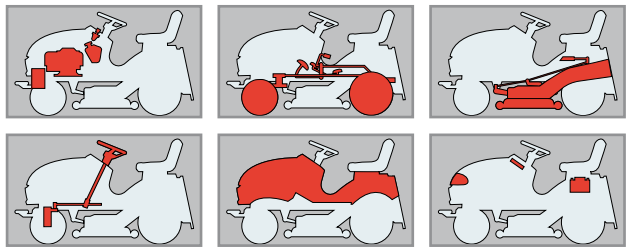
Related topics

[☛ 2.2] Tools

Tightening torques

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

Map of functional units



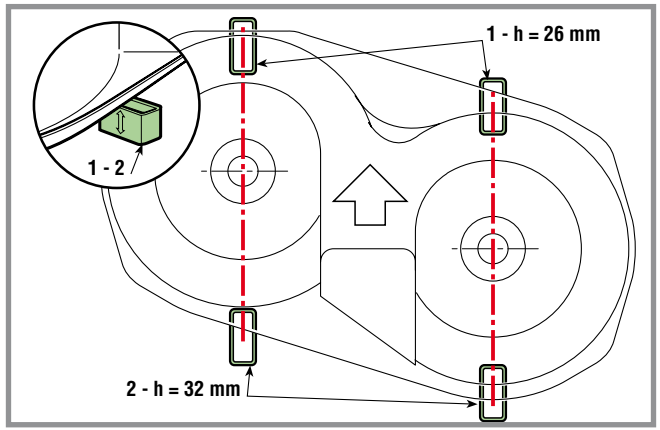
WARNING! ***When aligning the cutting plate it could be necessary to remove the belt guards; in this case the guards must always be replaced after adjustment.***

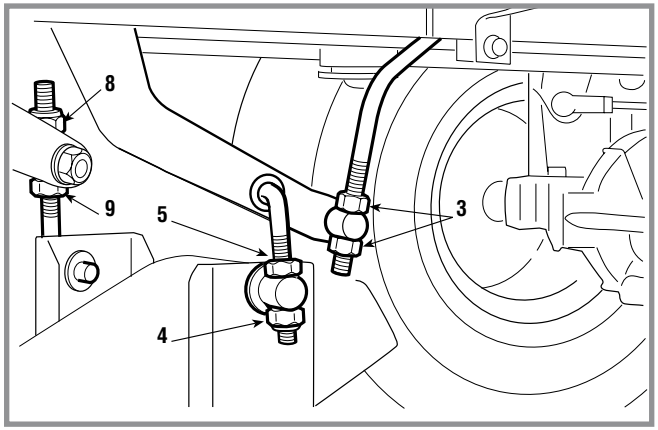
Check the tyre pressures. If one or more tyres have been replaced or you find differences in diameter, do **not attempt to compensate these differences by giving different tyre pressures**, but make the adjustments as in points “A” and “B”.

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

Put the lawn-tractor onto a flat and stable surface (such as a work bench) and put blocks beneath the cutting deck in line with the centre lines of the blades:
- at the front 26 mm (1)
- at the rear 32 mm (2).

Put the height lever in position «1».



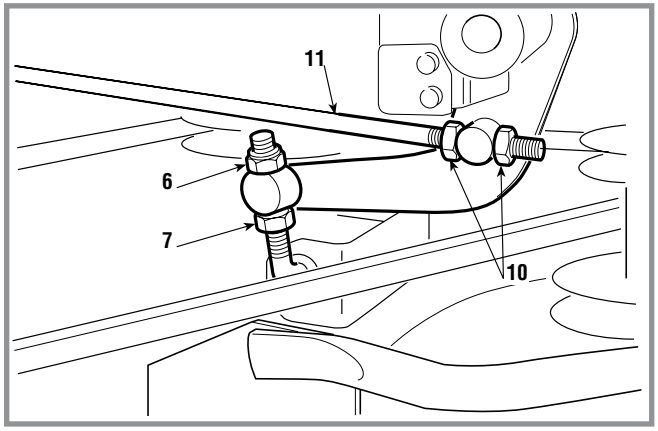


Completely loosen the dadi (3), the nuts (4 - 6 - 8) and the locknuts (5 - 7 - 9) of the three connecting rods until the deck is resting on the blocks.

Turn the two rear nuts (4 - 8) and the front nut (6) to the point where the deck just begins to lift.

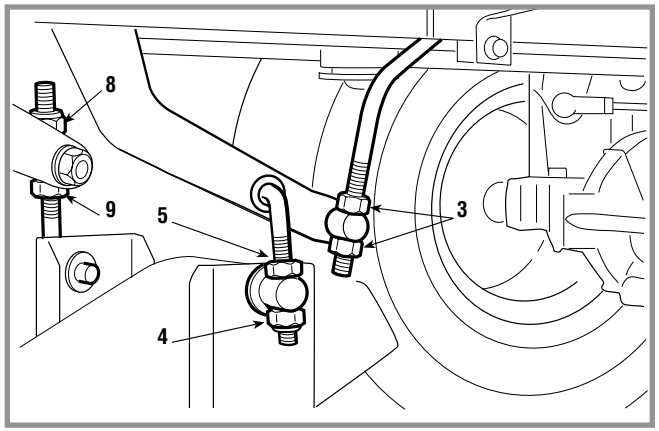
Tighten the three locknuts (5 - 7 - 9) and turn the nuts (3) until the slightest movement of the lifting lever brings about a similar movement of all the lifting rods.

Check that the deck rises and lowers regularly as indicated in point “C”.



B) Adjusting the transversal parallelism

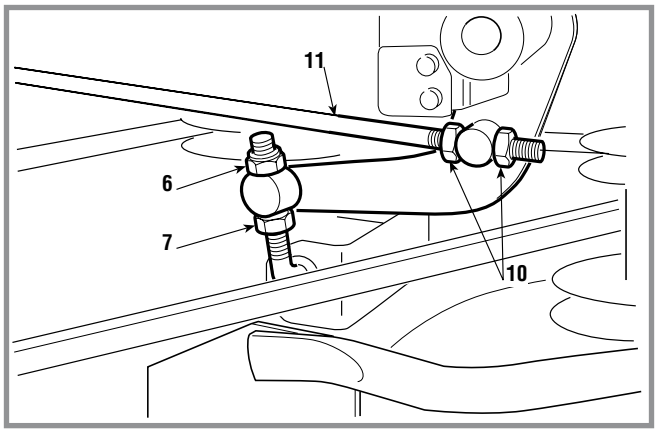
Any difference in height from the ground between the left and right sides of the deck can be compensated by turning the two nuts (4 - 8) and locknuts (5 - 9) on the back rods only.



C) Adjusting the regularity of rising and lowering

When the adjustment as at point “A” has been made, put the control lever in 2 or 3 different positions and check that the deck rises evenly and that at each position it constantly maintains the difference in height from the ground between the front and back edges.

If the front part tends to rise faster or slower it can be adjusted by turning the nuts (10) on the link rod (11).



Turning the nuts clockwise will lift the front part and make it rise faster, and turning anti-clockwise will give the opposite effect.

The right distance between the two centres is 356 ÷ 357.5 mm, which will give an even rise and descent.

IMPORTANT *Remember to tighten all the nuts and locknuts once these adjustments have been made.*

STEERING ALLOWANCE ADJUSTMENT

General informations:

Steering play must never be excessive in order not to effect driving precision.

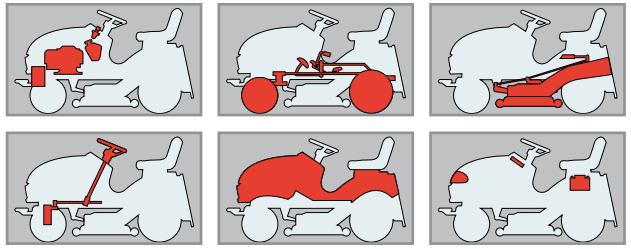
Related topics

[☛ 6.3] Dismantling of the steering components

Tightening torques

4	Nut for Ring gear	45 ÷ 50 Nm

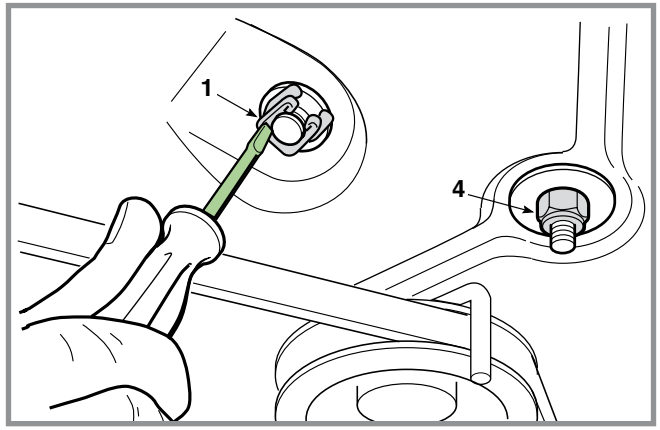
Map of functional units



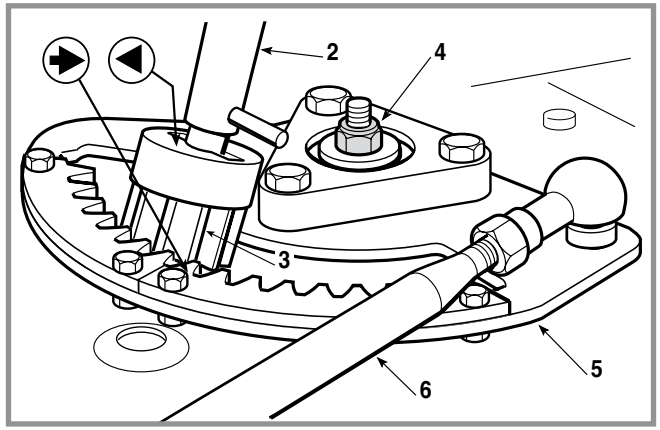
Check that the movement is not caused by loose linkage nuts and tighten all the nuts of the tie-rods and ball joints.

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

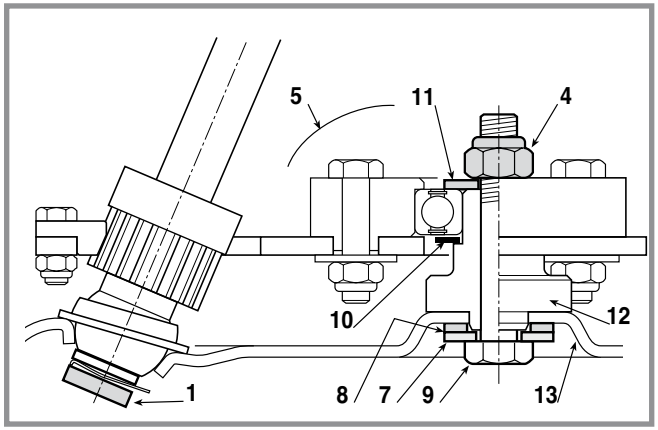
Release the spring (1) and lift the steering column (2) enough to be able to draw out the pinion (3).



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



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



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

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

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

STEERING GEOMETRY ADJUSTMENT

General informations

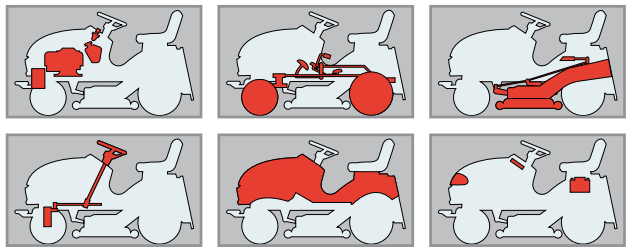
The correct steering geometry is given by the values of the centre distance between the joints of the tension rod and the wheel connecting rod. Any faults caused by knocks or accidents result in reduced driving precision and increased wear on the tyres. These can be overcome as follows:
- *uneven or excessive wear on the front tyres = toe-in adjustment*
- *the machine does not maintain a straight line when the steering wheel is straight = adjustment of tie-rods.*

Related topics

Tightening torques

3 - 7	Locknuts for articulated joints	....25 ÷ 30 Nm
4 - 8	Nuts for articulated joints	.....45 ÷ 50 Nm

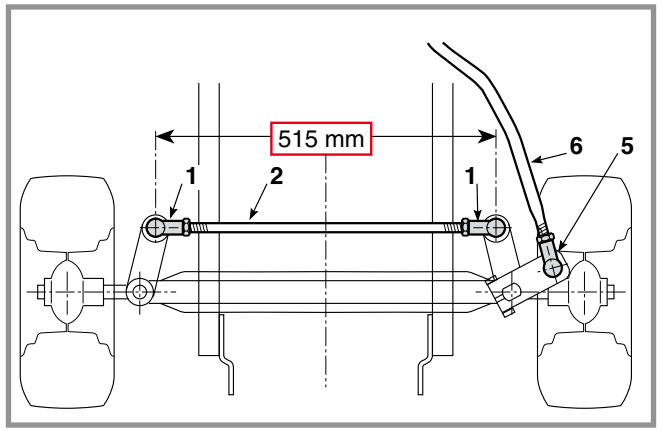
Map of functional units



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

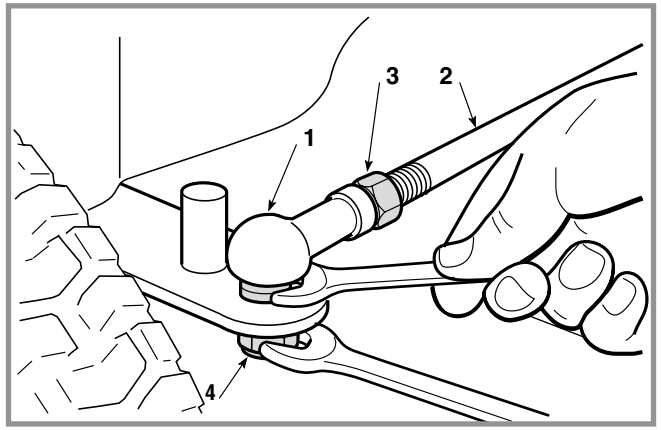
A) Toe-in adjustment

An exact toe-in is achieved with a centre distance of 515 mm which is measured between the centres of the articulated joints (1) of the wheel connection rod (2).



If a different distance is found, dismantle one or both the joints and screw or unscrew them on the rod (6) as much as necessary.

On assembly, fully tighten the locknuts (3) and the fastening nuts (4) of the joints.

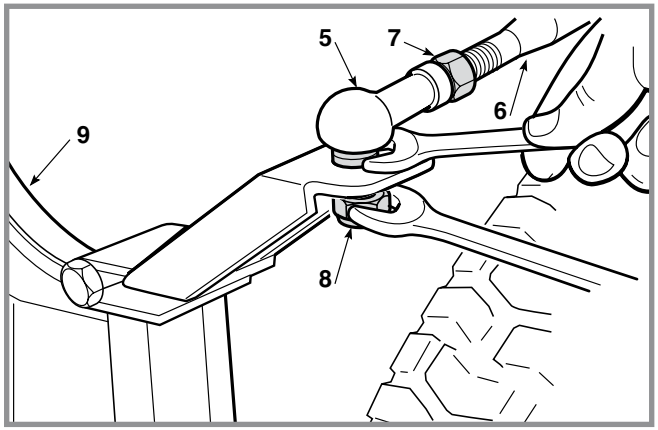


B) Adjustment of the steering wheel

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

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

On assembly, fully tighten the locknut (7) and the fastening nut (8) and check that the tie-rod, in its travel, does not interfere with parts or accessories of the engine even with the equaliser (9) angled in both directions.



CHECKING BLADES ALIGNMENT

General informations

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

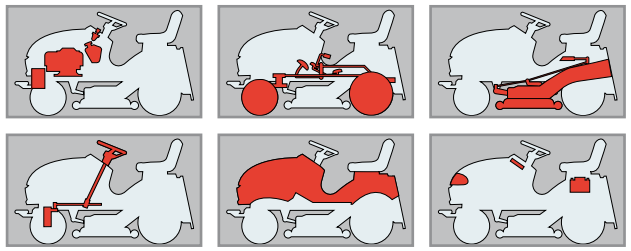
Related topics

[☛ 4.9] Removing, sharpening and balancing the blades

[☛ 5.7] Removal of the cutting deck

[☛ 6.7] Replacement of the supports and shafts of the blades

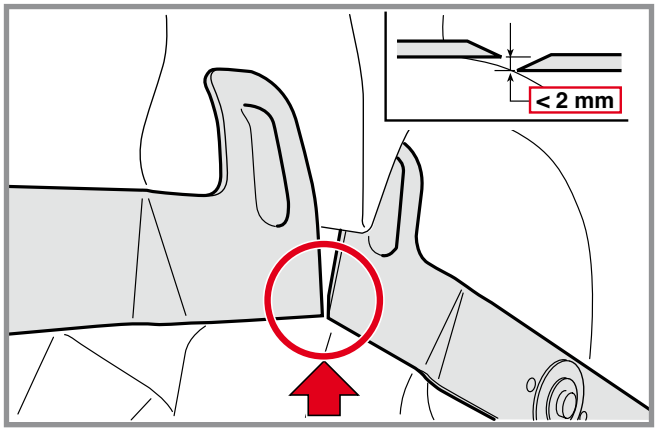
Map of functional units



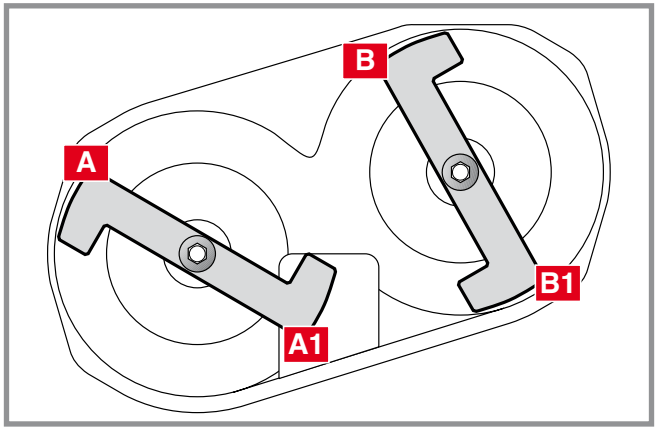
☛ Remove the cutting deck.

WARNING! ***Always wear strong gloves when handling the blades.***

WARNING! ***The blades are connected to each other, the rotation of each blade engages the rotation of the other.***



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



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

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

General informations

A badly sharpened blade causes grass to become yellow and reduces grass collection capability. If not balanced, excessive vibration can be caused during use.
Fins on broken, bent or damaged blades reduce the grass expulsion force and can cause damage and injuries.

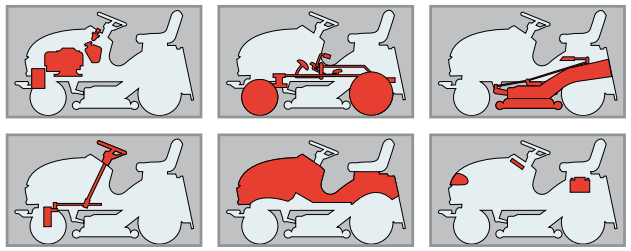
Related topics

[☛ 5.7] Removal of the cutting deck

Tightening torques

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

Map of functional units



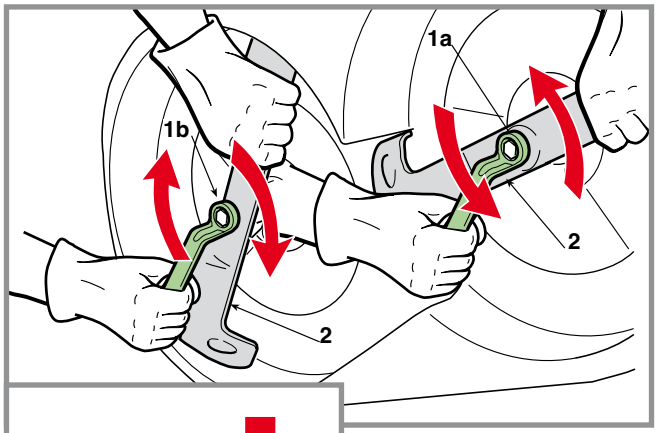
☛ Remove the cutting deck.

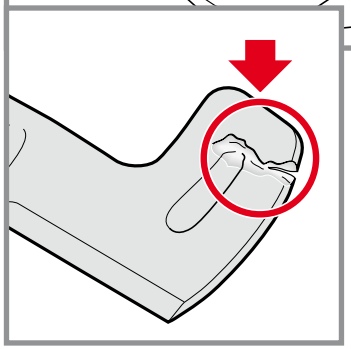
WARNING! ***Always wear protective gloves when handling the blades and protect eyes when sharpening.***

WARNING! ***The blades are connected to each other, the rotation of each blade engages the rotation of the other.***

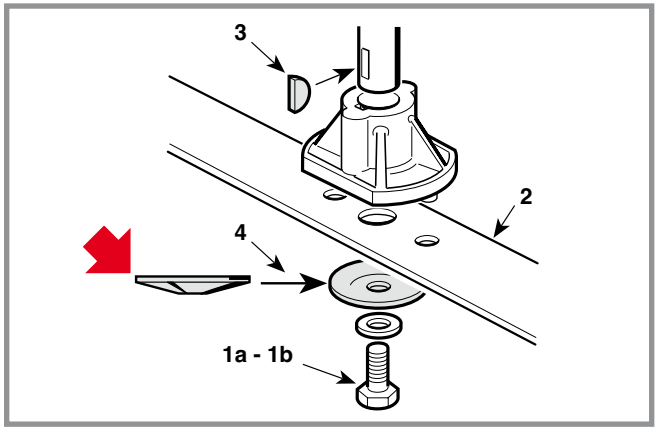
A) Removing and reassembling

For removing a blade it must be firmly held and the central screw (1) undone, bearing in mind that:
– the screw on the left blade (1a) is unscrewed anti-clockwise
– the screw on the right blade (1b) is unscrewed clockwise.



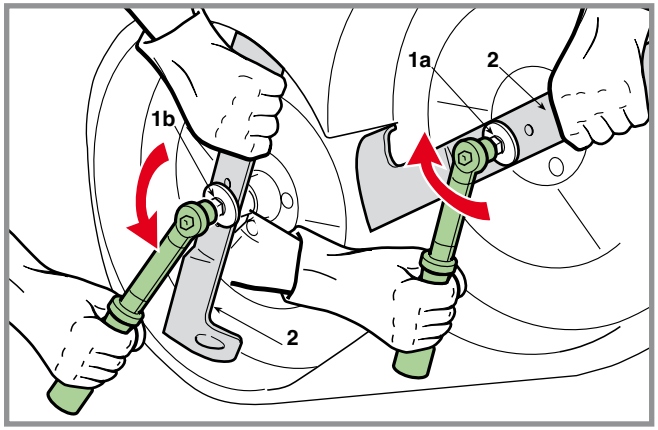


Always check that the fins are intact with cracks or breaks. Always replace damaged blades.



On assembly, be careful to:

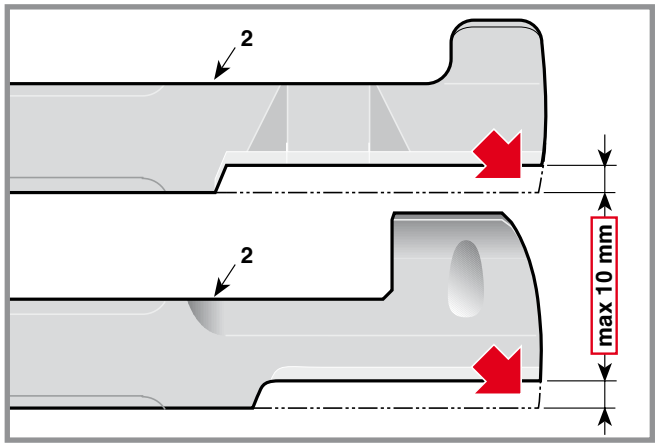
– correctly position the keys (3) on the shafts;
– correctly locate the right and left blades, with the fins facing towards the inside of the plate;
– fit the flexible disc (4) so that the concave part is pressing against the knife;
– tighten the screws (1a – 1b) with a torque wrench set to 45-50 Nm.



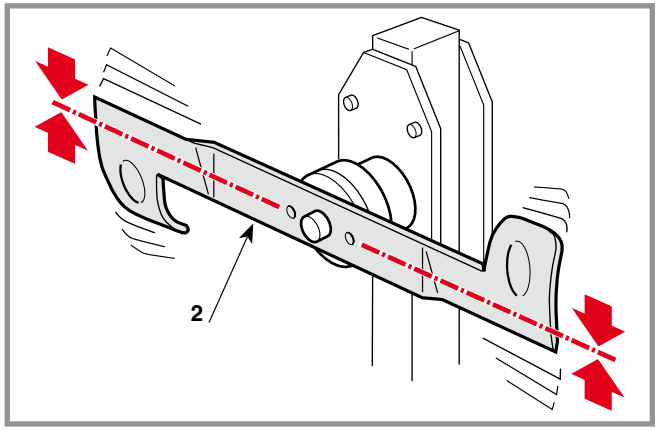
B) Sharpening and balancing

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

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



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



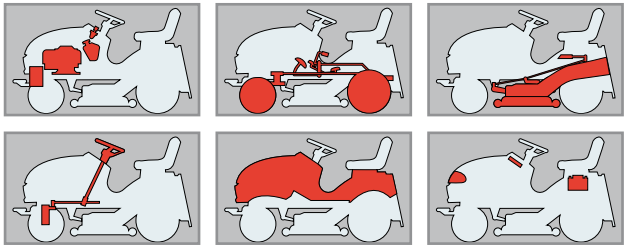
REMOVAL OF FRONT HOOD

General informations

The removal of the front hood gives greater accessibility to:
- *the engine and its accessories*
- *the silencer and protection devices*

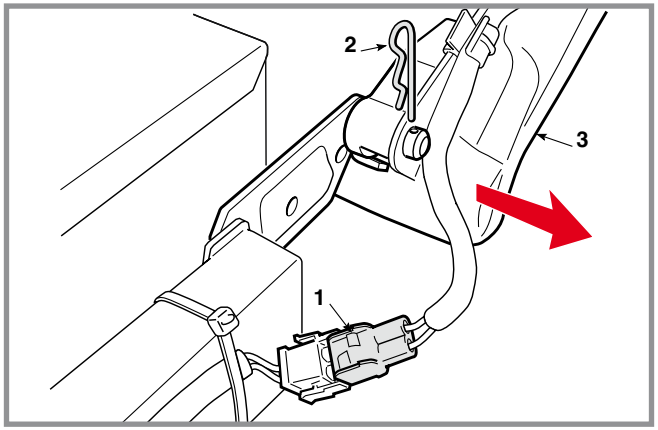
Related topics

Map of functional units



Disconnect the connector (1).

Take out the cotter pin (2) from the right-hand side and remove the hood (3) by moving it to the right.



REMOVAL OF THE WHEEL COVER

General informations

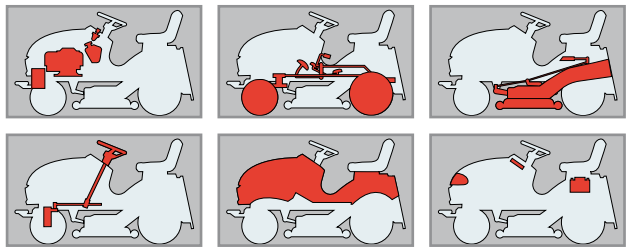
Removing the wheel cover gives access to:
- *the mount for the lever to raise the deck;*
- *the supports of the footboards.*

Related topics

Tightening torques

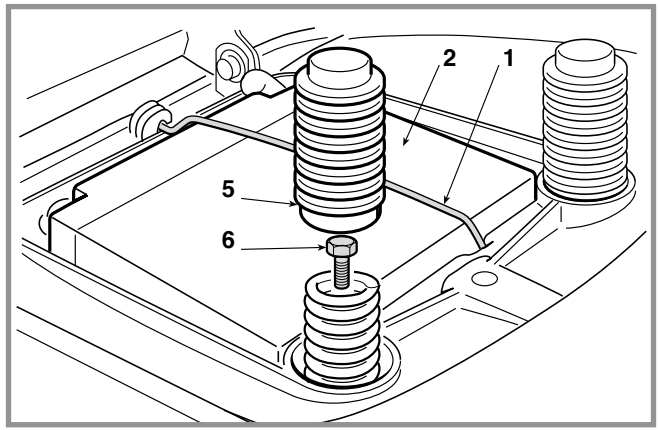
9	Lower cover fixing screw .....4,0 ÷ 4,5 Nm
10	Upper cover fixing screw ..... 4,0 ÷ 4,5 Nm

Map of functional units

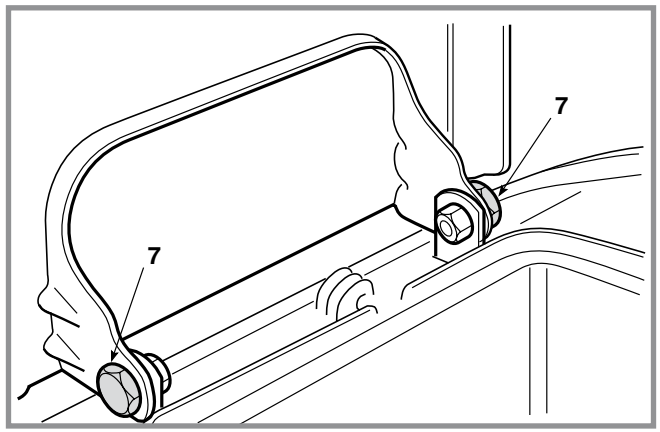


Remove the spring (1) fixing the battery, ensuring that accidental short circuits are not caused; first disconnect the black cables (earth), then the red cable (positive) and remove the battery (2).

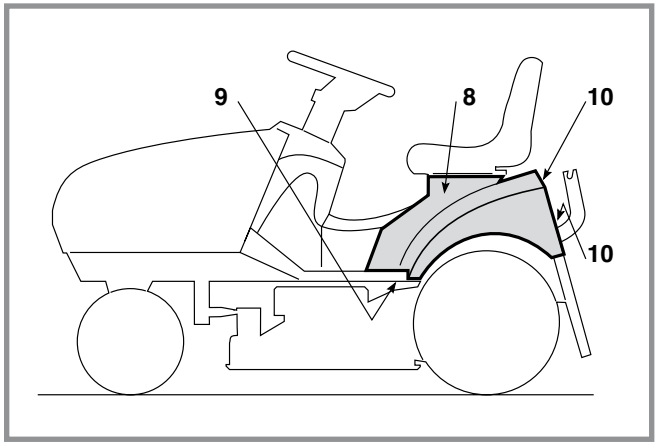
Remove the caps (5) from the springs and undo the screws inside (6).

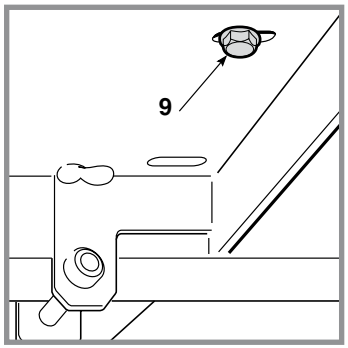


Remove the seat after having dismantled the two pins (7).

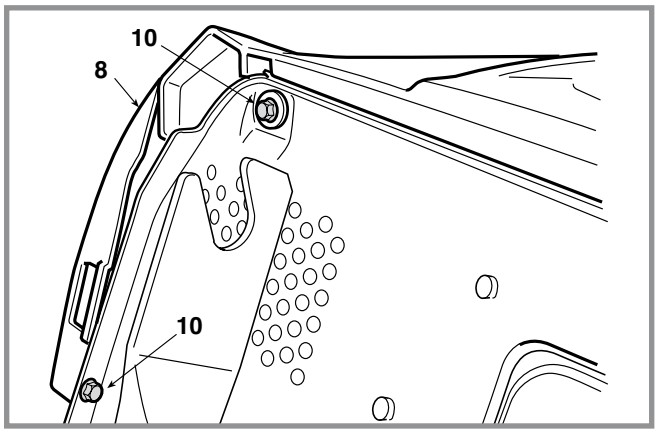


The cover (8) is fixed by two screws (9) located under the side footboards and four screws (10) fixing it to the rear plate.

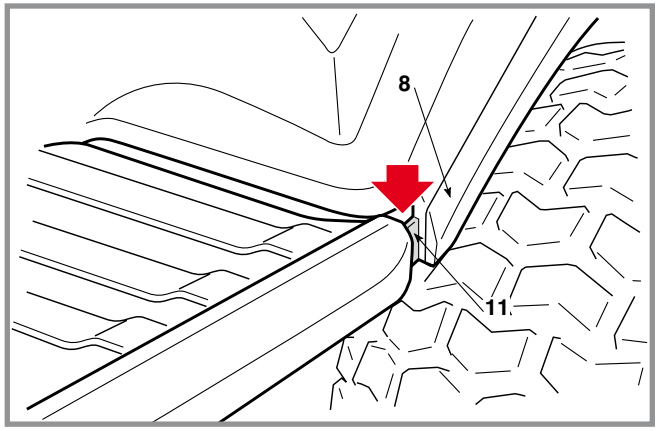




The cover (8) can be removed after the cutting height adjustment lever has been set to its highest position.



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



REMOVAL OF THE EJECTION CONVEYOR

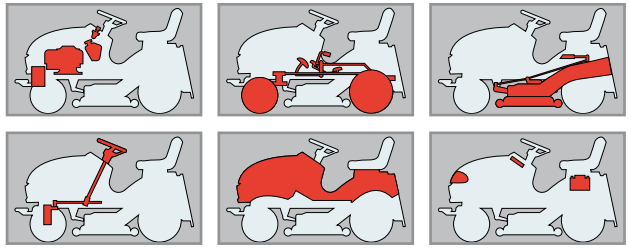
General informations

Removing the collector channel gives access to:
– the small side wheels of the drive belt;
– the traction engagement control rod

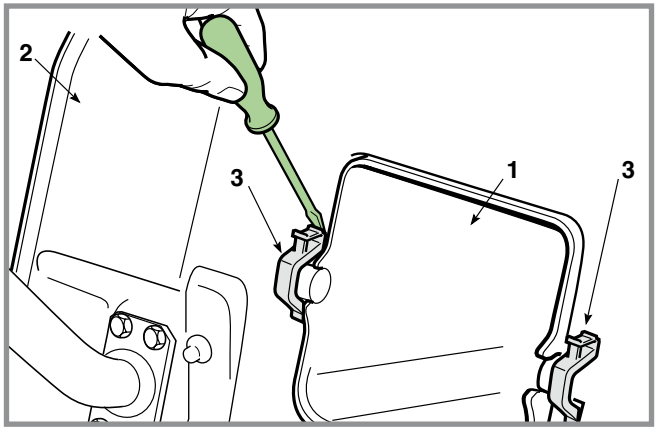
Removal of the collector channel is indispensable for dismantling the cutting deck and if the rear plate is to be removed.

Related topics

Map of functional units



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



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

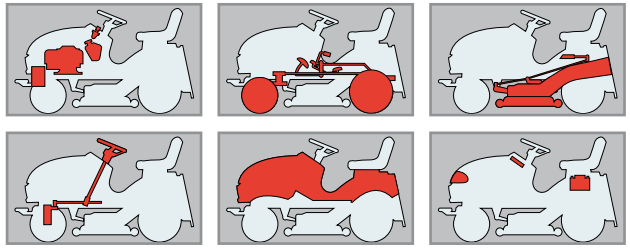
REMOVAL OF THE DASHBOARD

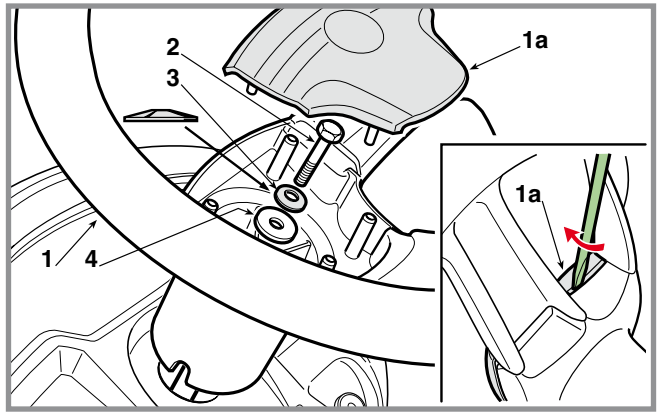
General informations:

Removing the dashboard gives better access to:
– the accelerator
– the ignition block,
– various electrical components.
With some types of engine it could be necessary to remove the dashboard before the tank can be dismantled.
Removal of the dashboard and front cover is necessary before the wheel cover can be dismantled.

Related topics:

Map of functional units

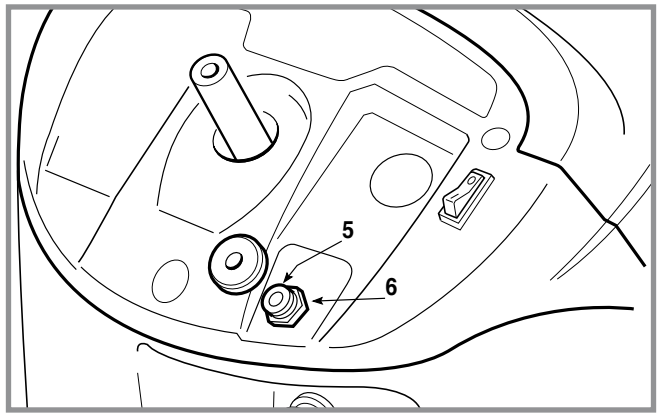




Use a screwdriver to remove the central cover (1a) of the steering wheel (1), being careful not to damage it.

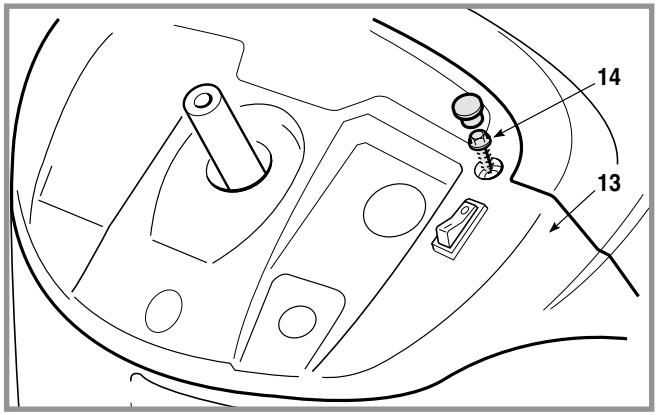
Unscrew the screw (2), remove the Belleville washer (3) and washer (4) and remove the steering wheel (1).

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

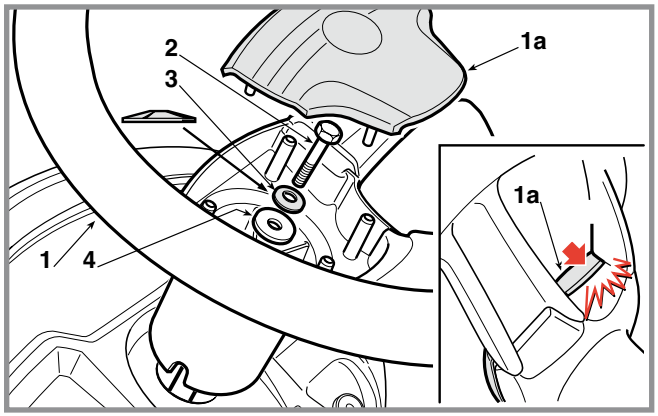


Disconnect the accelerator cable terminal from the engine and disconnect all remaining electrical connections and the starter cable (where present).

The dashboard (13) can be removed at this point; it is fixed to the chassis by two upper screws (14) covered by plastic caps.



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



REMOVAL OF THE ENGINE

General informations

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

Related topics

[☛ 4.1] Adjusting the engagement and checking the blade brake

[☛ 4.3] Drive belt adjustment

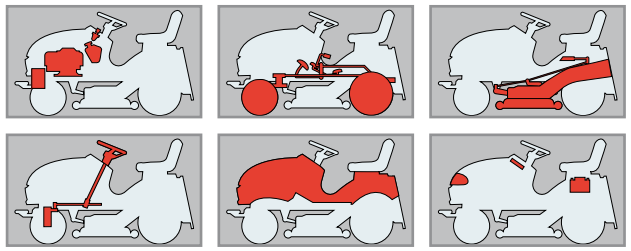
[☛ 5.1] Removal of front hood

[☛ 6.8] Replacement of the accelerator and adjustment of the carburettor

Tightening torques

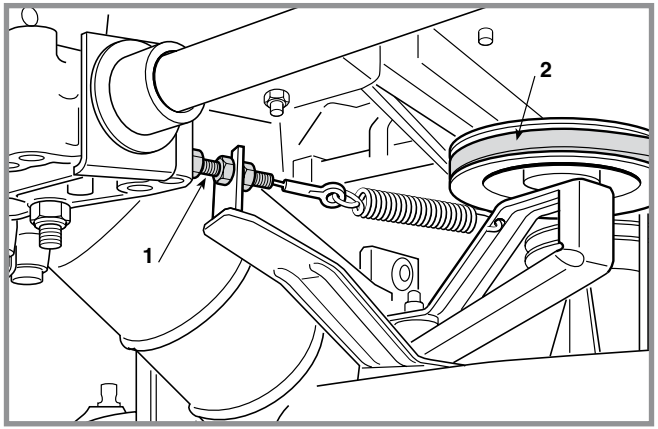
3-3a	Screw for pulley	45 ÷ 50 Nm
-	Screws for engine fastening	25 ÷ 30 Nm

Map of functional units



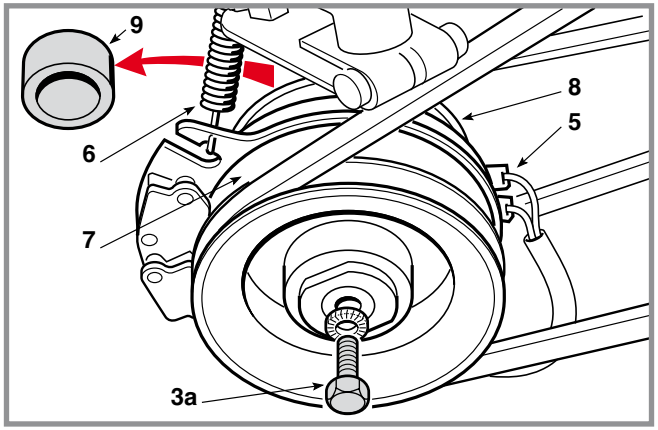
☛ Remove the front hood.

Loosen and detach the adjuster (1) to slacken the belt (2).

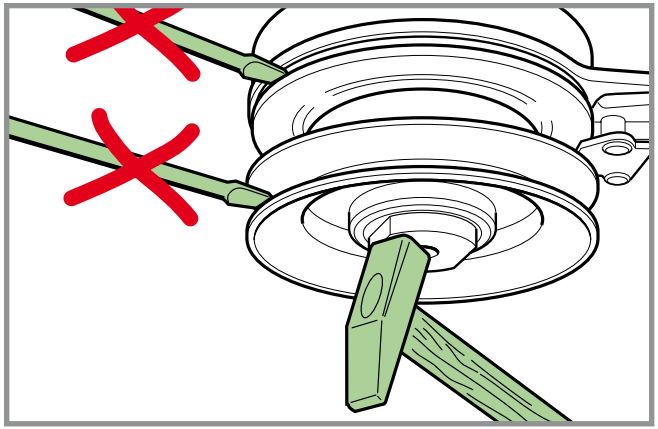


It is also advisable to slacken the transmission belt for easier access to the parts involved; this is done by slackening the stretcher.

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

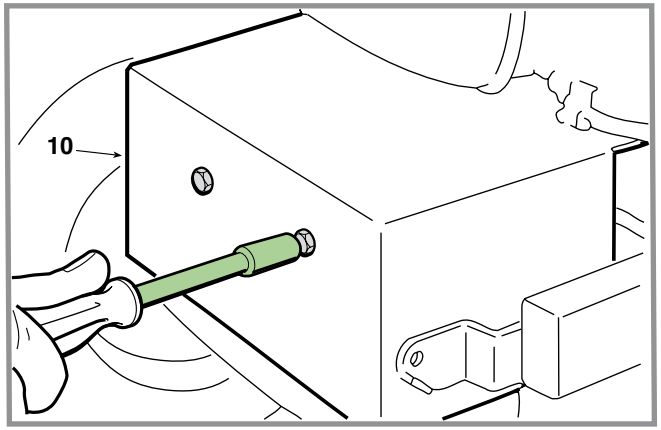


IMPORTANT *To remove the clutch (7) from the engine shaft, absolutely do not use a lever to force the pulleys or the outer cover. In case of difficulty, apply an unlocking spray and gently tap on the hub with a hammer, to facilitate extraction.*

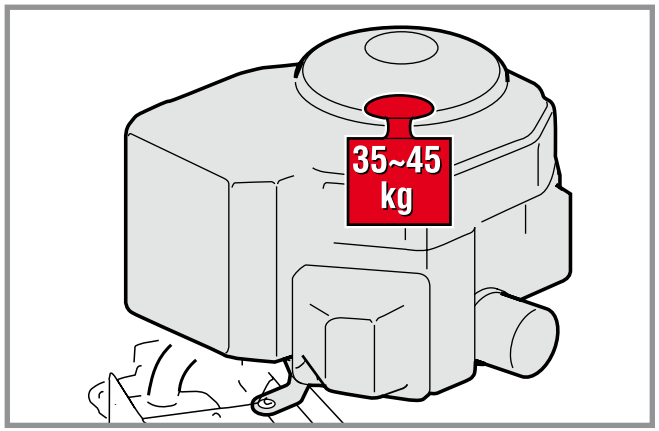


Remove the protection from the exhaust (10) and disconnect the cable control from the accelerator and all the electrical wires.

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



Identify and undo all the screws that fasten the engine to the chassis, then carefully lift and remove the engine using equipment suitable for the weight of the engine (about 35-45 kg) and the designated lifting points to guarantee safe working conditions.



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

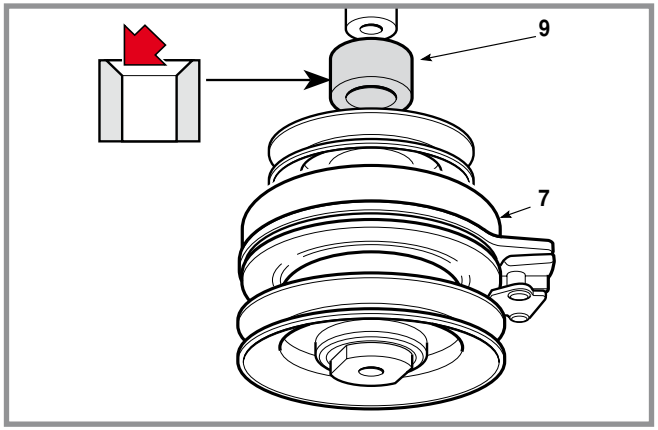
On reassembly, fully tighten the screws for the engine and the pulley to the amounts shown.

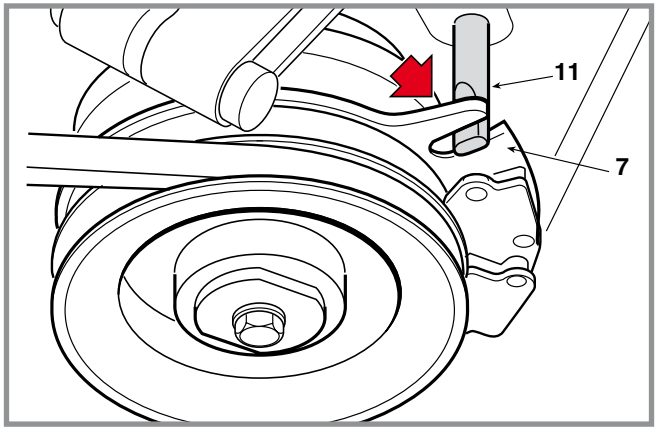
Reassemble the spacer (9), with the countersink facing the engine. Ensure that the pin (11) is inserted into the clutch spline (7) and remember to refit the spring (6).

Remember to fit the clamps back on the fuel pipe and check that it does not leak.

Reattach all the electrical and earth contacts and refit the protection covers.

Reset the stretcher spring tension should it have been slackened.





Reattach the accelerator cable and ...

☛ Adjust the «MINIMUM» position.

☛ Refit the front hood.

☛ Reset the adjuster (1) and check the spring tension.

REMOVAL OF THE REAR AXLE

General informations:

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

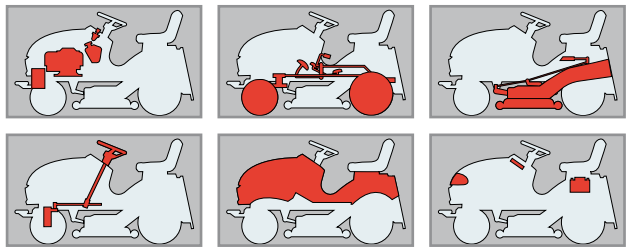
Related topics

[☛ 4.2] Brake adjustment
[☛ 4.4] Drive pedal adjustment
[☛ 5.3] Removal of the collector channel
[☛ 6.1] Replacement of tyres and wheels

Tightening torques

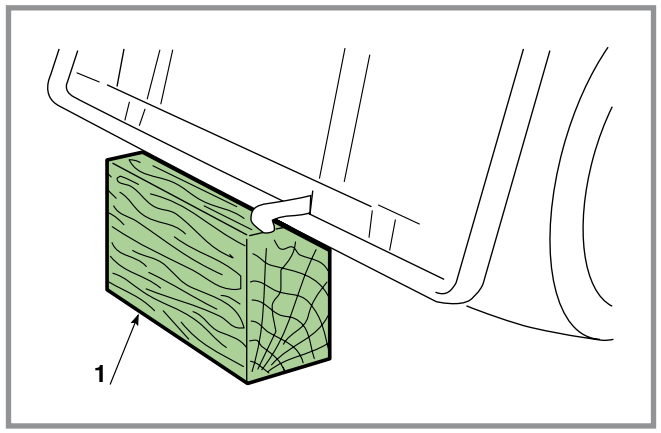
20	Rear axle support nut	25 ÷ 30 Nm
21	Screws for rear axle fastening	25 ÷ 30 Nm

Map of functional units



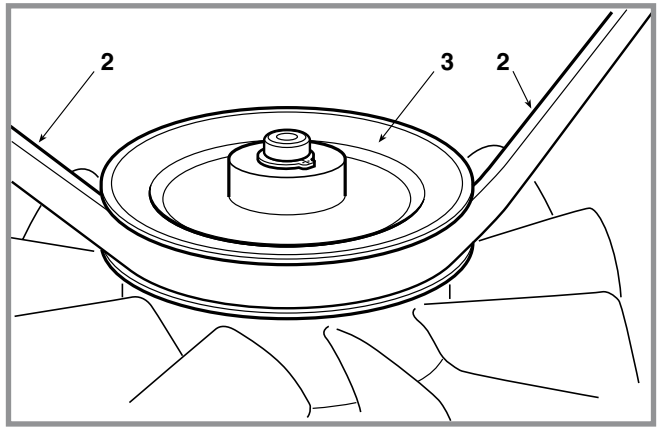
☛ Remove the collector channel.

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

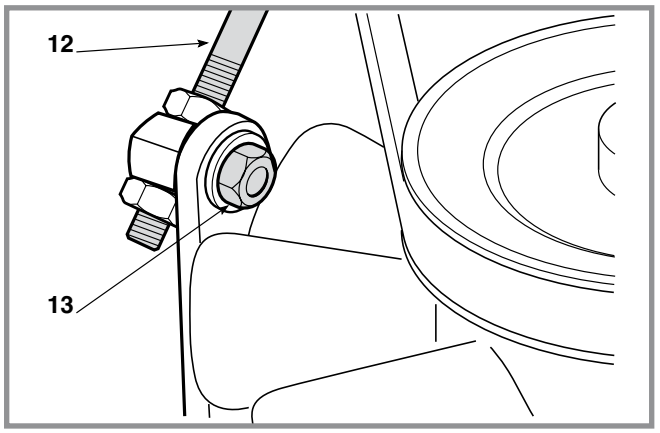


☛ Remove the rear wheels.

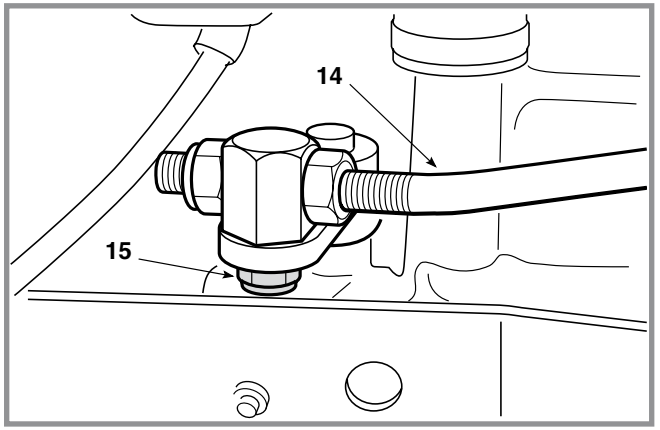
Through the outlet, grip the two ends of the belt (2) and pull it enough to free it from the race of the pulley (3), so overcoming the resistance of the stretcher on the jockey pulley.



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

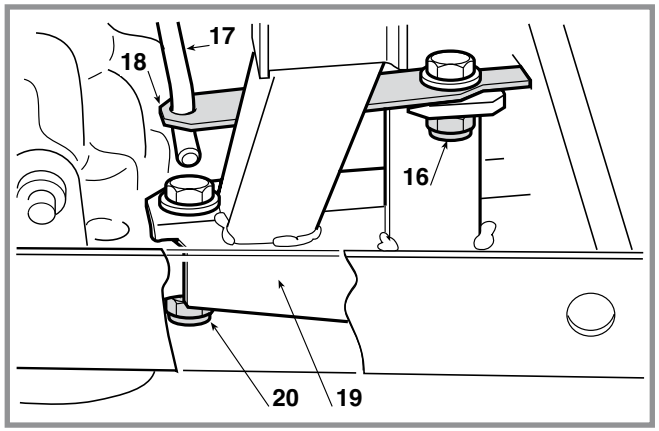


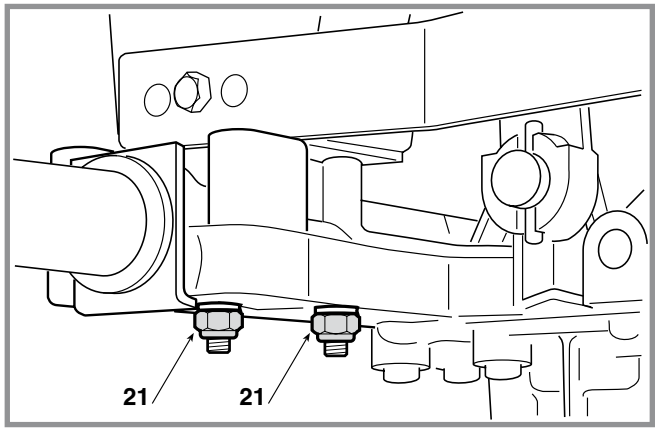
Unscrew the release lever nut (16) to disconnect the rod (17) from the lever (18).



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

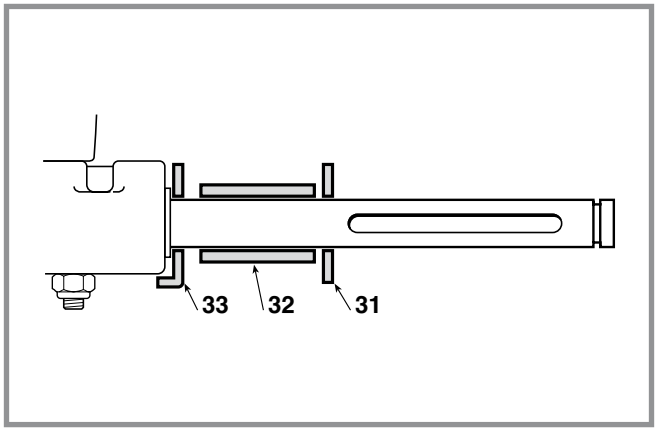
Undo the nut (20) and then carefully undo the four lower screws (21), holding up the unit so that it does not fall.





Repeat the above operations in reverse for reassembly, avoiding to fully tighten the nut (16), so that correct movement of lever (18) is guaranteed.

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



Reattach all the connections, and then …

☛ Check the brake.

☛ Refit the collector channel.

☛ Refit the rear wheels.

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

☛ Adjust the travel and the position of “neutral” for the pedal.

REMOVAL OF THE CUTTING DECK

General informations

Removing the cutting deck facilitates all the overhaul and replacement of hubs, bearings and blade shafts.
With some practice and experience it is possible to do this work with the deck still in position.

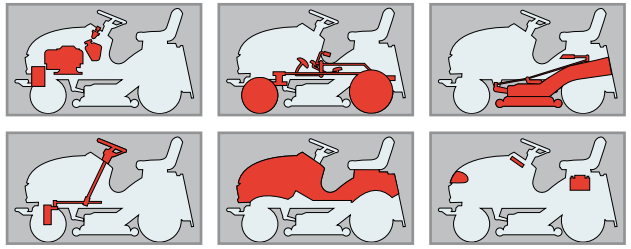
Related topics

[☛ 4.5] Aligning the cutting deck

[☛ 5.3] Removing the ejection conveyor

Tightening torques

Map of functional units



☛ Remove the collector channel

Free the blade belt (1) from the clutch pulley (2) and set the cutting height adjustment lever to position «1».

Unscrew the two nuts (3) fastening the two rods (4) to the frame and loosen the two nuts (5) fastening the cutting deck.

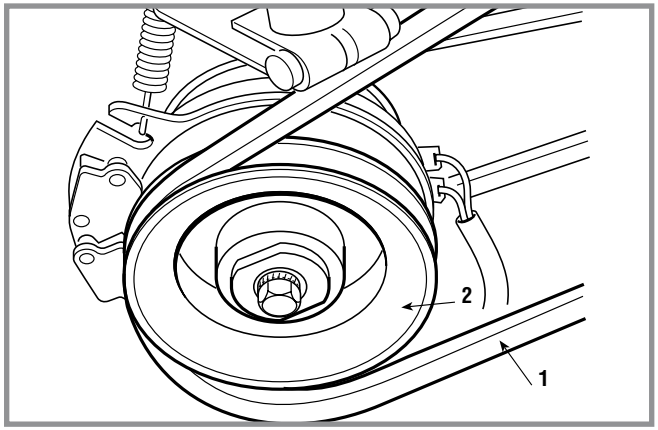
Unscrew the three locknuts (6) holding the pins onto the lifting lever, being careful not to touch the nuts and locknuts so that, on reassembly, it is as parallel as it was before.

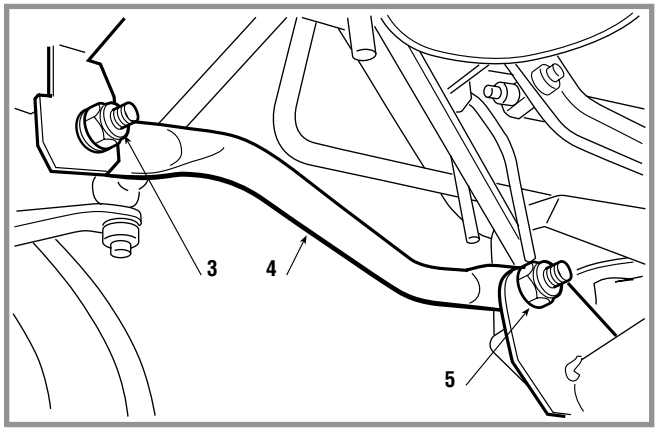
Having checked that there are no obstacles, the plate can be removed, slightly rotating it anticlockwise, so that all the pins come out of their housings.

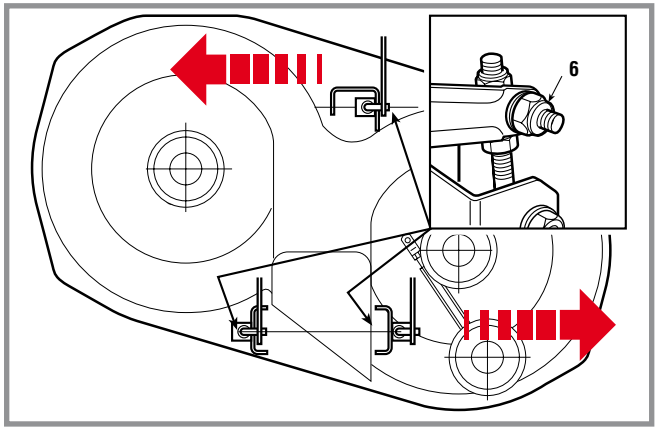
For reassembly perform the operations described above in reverse.

When assembly is completed …

☛ Check the alignment of the cutting deck.
☛ Refit the collector channel.







REPLACEMENT OF TYRES AND WHEELS

General informations

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

Related topics

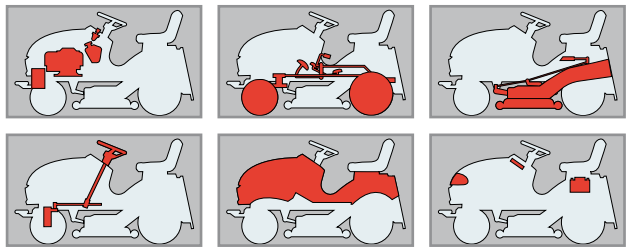
[☛ 2.3] Lifting of the machine

[☛ 4.5] Aligning the cutting deck

Tyre pressures

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

Map of functional units



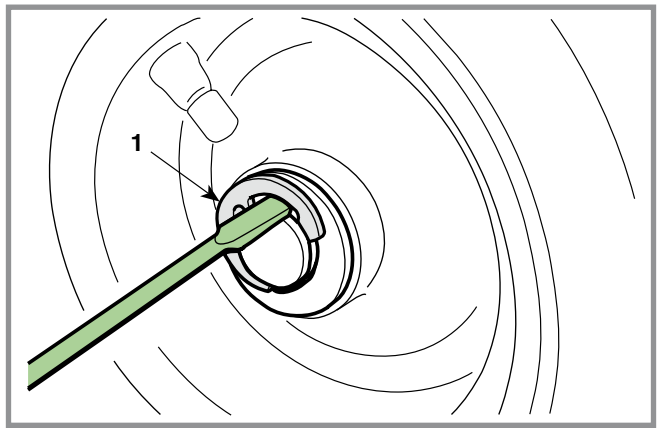
A) Tyres

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

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

B) Wheels

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

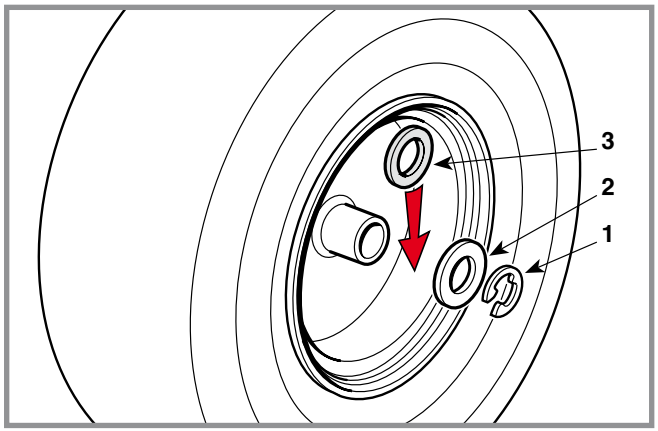


NOTE *If a wheel is jammed onto the shaft, use a releasing spray, directing it around the splining hole.*

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

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

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



REPLACEMENT OF FRONT WHEEL BEARINGS

General informations

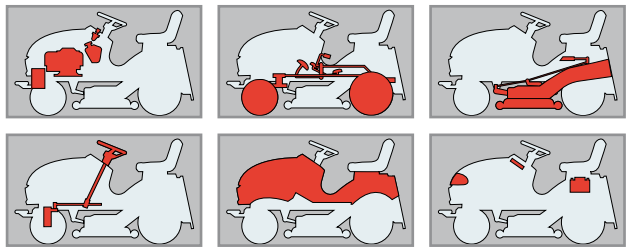
Related topics

[☛2.2] Tools

[☛2.3] Lifting of the machine

[☛6.1] Replacement of tyres and wheels

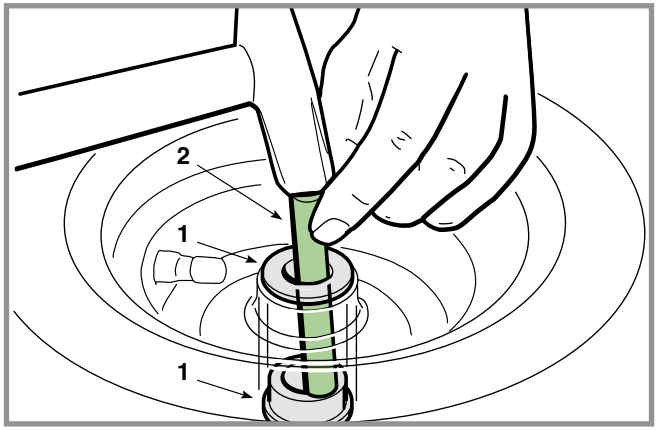
Map of functional units



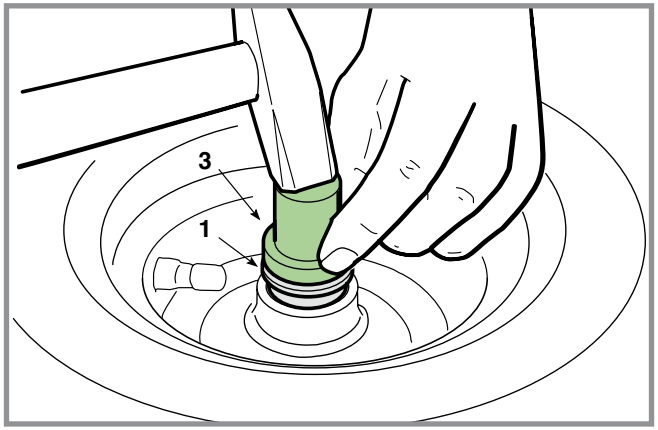
☛ Dismantle the front wheel.

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

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



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



General informations

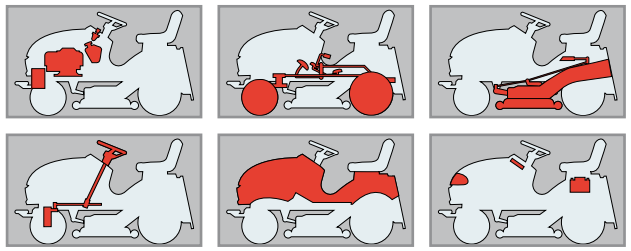
Related topics

[☛ 4,7] Steering geometry adjustment

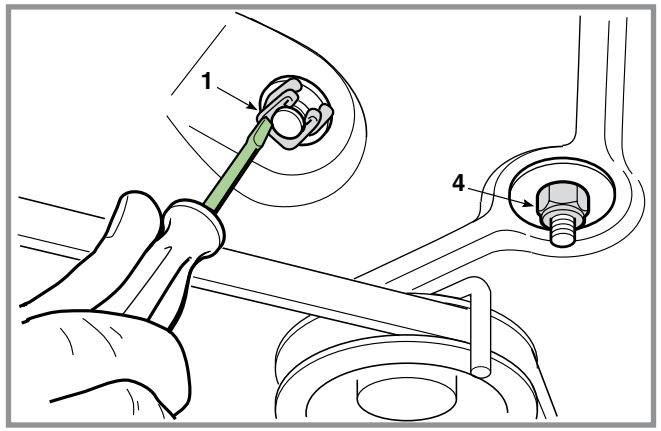
Tightening torques

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

Map of functional units

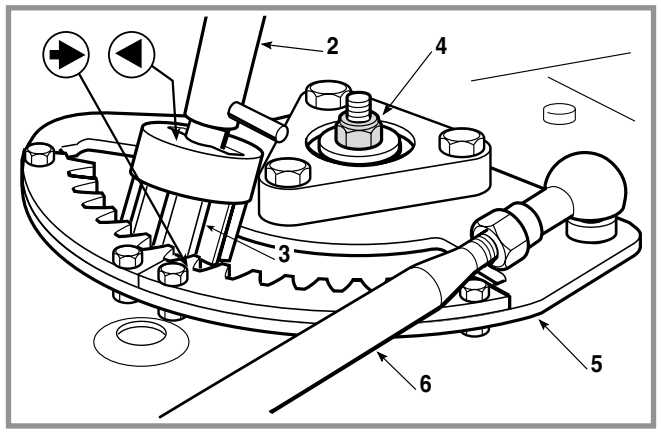


Unhook the spring (1) and lift the steering column (2) just enough to be able to draw out the pinion (3).

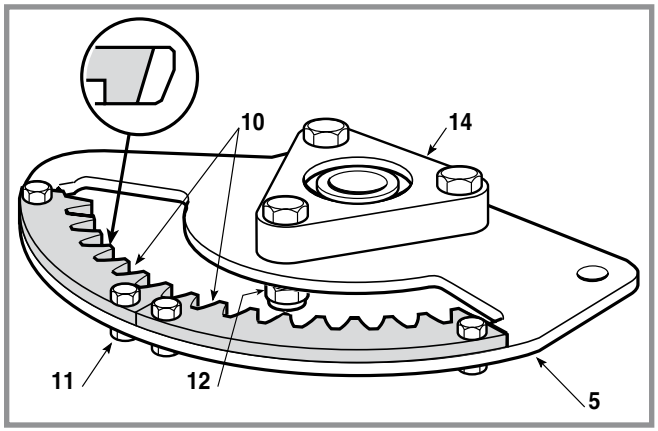


A) Dismantling the steering pinion and ring gear

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



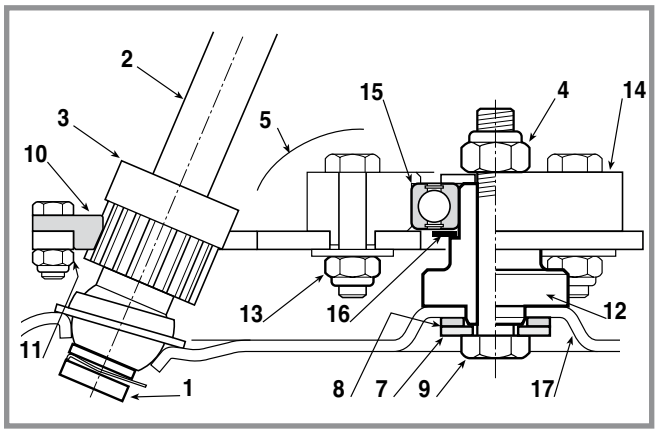
Toothed sectors (10) are secured to the ring gear (5) by screws and nuts (11).



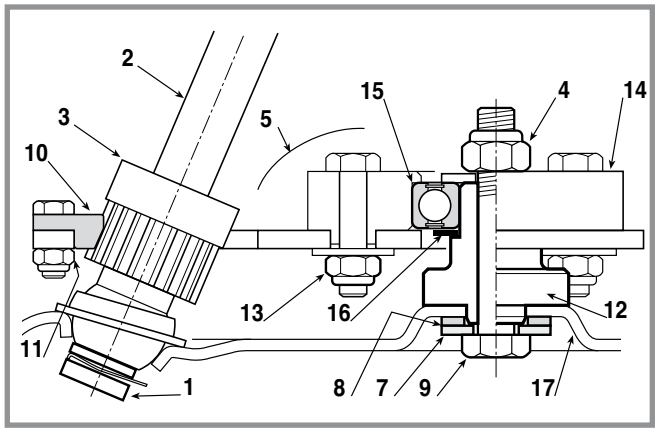
When replacing, be careful to assemble sectors with the flared part of the teeth facing down.

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

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



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

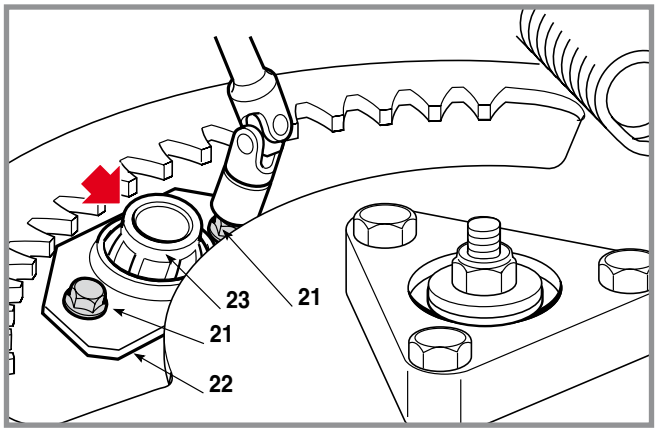


Make sure the pin (12) is correctly centred to the chassis housing (17), accurately reposition the two washers (7 - small hole) and (8 - large hole) under the screw head (9) and fully tighten the nut (4).

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

B) Lower bush replacement

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



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

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

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

When reassembled ..

.

☛ Check the steering geometry.

REPLACEMENT OF THE DRIVE BELT

General informations

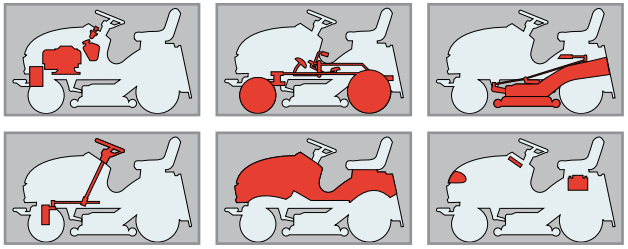
Related topics

[☛ 4.3] Drive belt adjustment
[☛ 5.3] Removing the ejection conveyor
[☛ 5.5] Removal of the engine
[☛ 8.2] Belts assembly

Tightening torques

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

Map of functional units

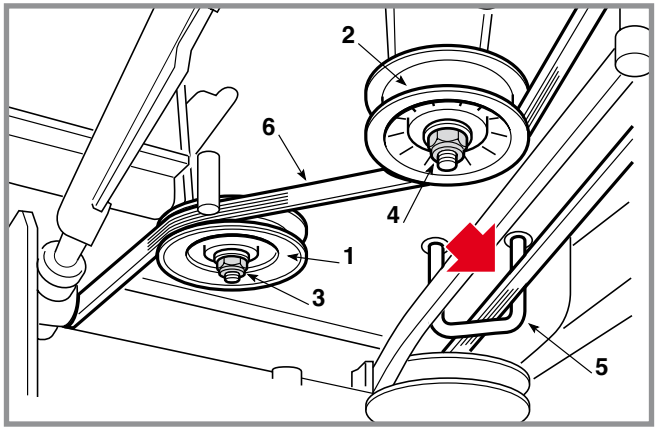


☛ Dismantle the engine pulley

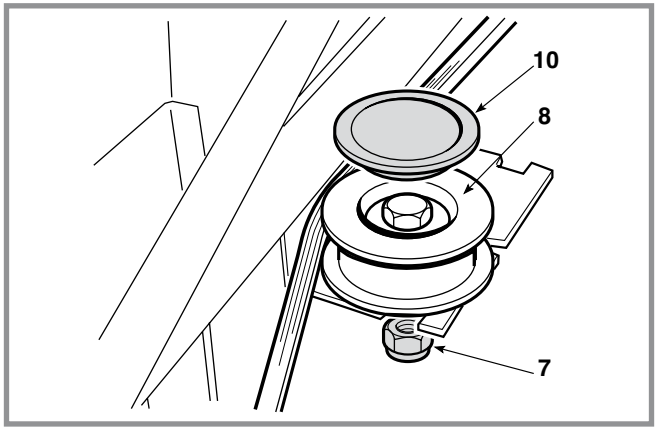
☛ Remove the collector channel.

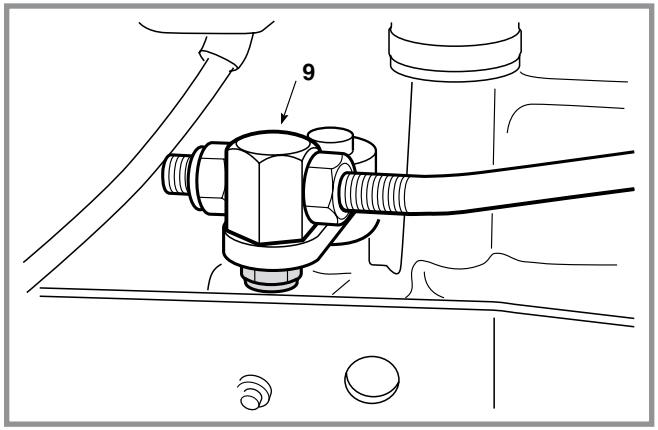
It is advisable to slacken the transmission belt to work on the parts involved more easily. This is done by slackening the stretcher.

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



Slacken off the fixing nuts (7) of both small wheels (8) and remove the pin (9) from the brake rod to allow passage of the belt.





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

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

When assembly is completed …

☛ Refit the engine pulley.

☛ Adjust the drive engagement.

☛ Refit the collector channel.

☛ Tighten the spring of the stretcher.

REPLACEMENT OF THE SMALL WHEELS FOR THE DRIVE BELT

General informations:

Related topics:

[☛ 4.3] Drive belt adjustment

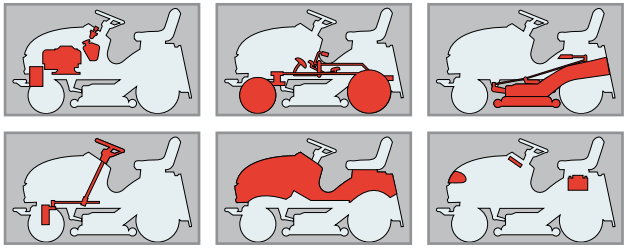
[☛ 5.3] Removal of the collector channel

[☛ 8.2] Belts assembly

Tightening torques

2 Nuts for small wheels ..... 25 ÷ 30 Nm

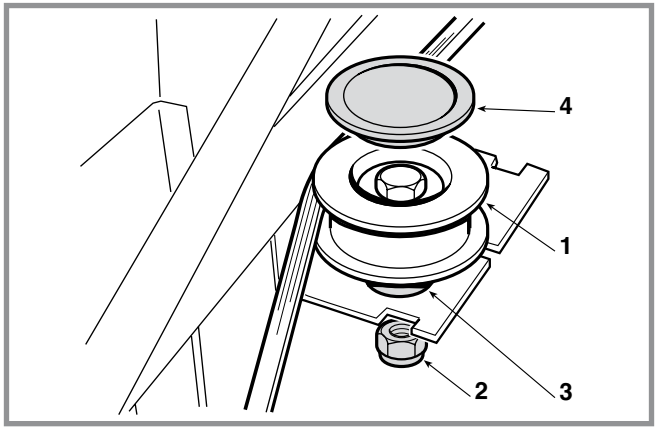
Map of functional units



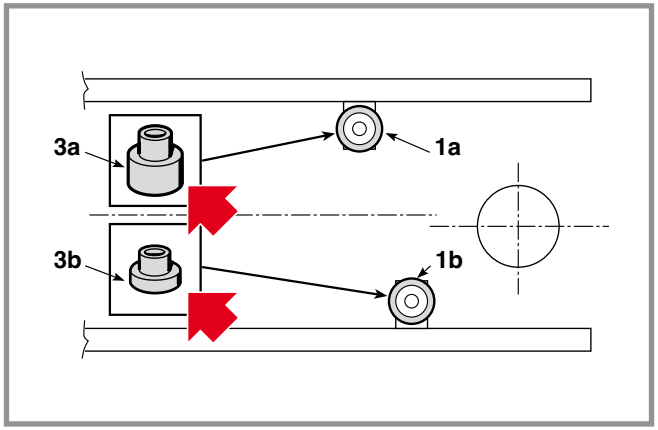
☛ Remove the collector channel.

It is advisable to slacken the transmission belt to work on the parts involved more easily. This is done by slackening the stretcher.

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



When reassembling, you should bear in mind that the tall spacer (3a) must be fitted under the small right wheel (1a) and the low one (3b) under the left wheel (1b).



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

Once assembly is completed ...

☛ Adjust the drive engagement.

☛ Refit the collector channel.

☛ Tighten the spring of the stretcher.

REPLACEMENT OF THE BLADES CONTROL BELT

General informations

Related topics

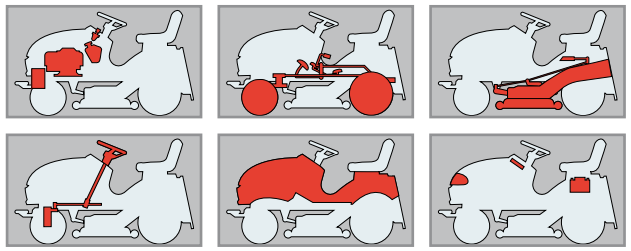
[☛ 4.1] Adjusting the engagement and checking the blade brake

[☛ 8.2] Belts assembly

Tightening torques

15	Nut for idle pulley	25 ÷ 30 Nm

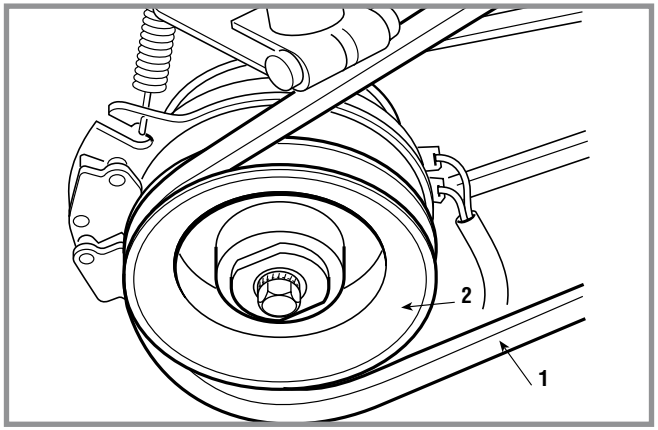
Map of functional units



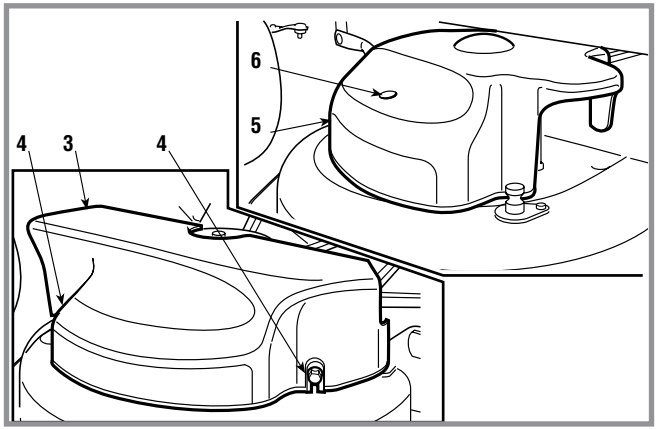
WARNING! ***When replacing the blades control belt it is necessary to remove the belt guards; in this case the guards must always be refit after the replacement of the belt.***

Put the cutting deck in its lowest position to facilitate access and disengage the blades to slacken the belt.

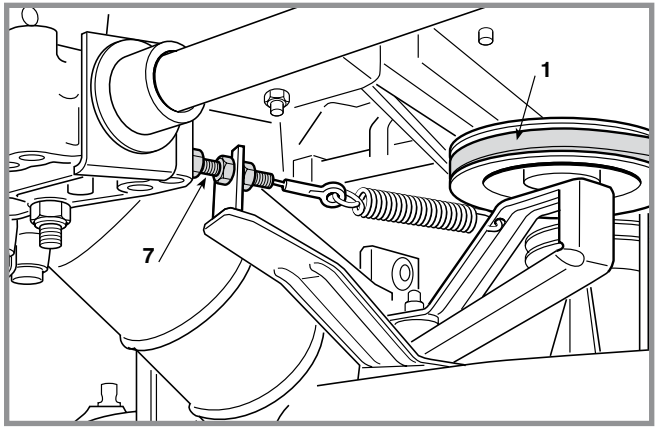
Free the blade belt (1) from the clutch pulley (2) and set the cutting height adjustment lever to position «1».



Remove the right-hand protective guard (3) by loosening the four screws (4).



Take off the left-hand guard (5) held by four screws (6).



Loosen and detach the adjuster (7) to slacken the belt (1).

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

At this point the belt can be taken off.

On reassembling, take care to exactly position the new belt in the pulley rims.

Once assembly is completed ...

☛ Adjust the blade engagement.

Always reassemble the side safety guards.

REPLACEMENT OF THE SUPPORTS AND SHAFTS OF THE BLADES

General informations

Related topics

[☛ 2.2] Special tools

[☛ 4.9] Removing, sharpening and balancing the blades

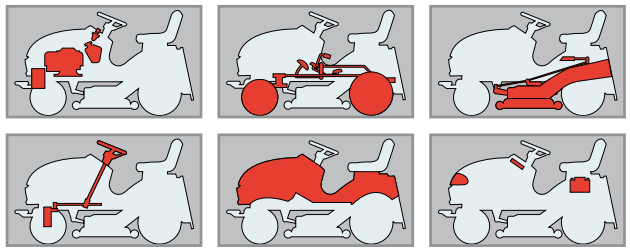
[☛ 5.7] Removal of the cutting deck

[☛ 6.6] Replacement of the blades control belt

Tightening torques

7 Screws for pulleys fastening	20 ÷ 25 Nm
10 Flanged support fixing nuts	25 ÷ 30 Nm

Map of functional units



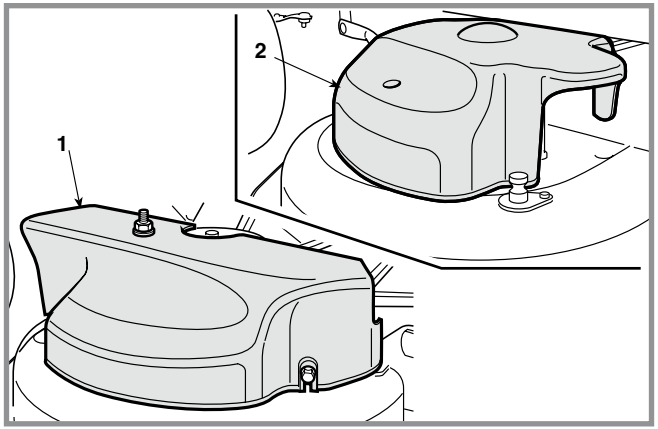
☛ Remove the cutting deck.

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

Set the cutting height adjustment lever to position «1».

☛ Remove the blade control belt.
☛ Remove the blades and take off the hub

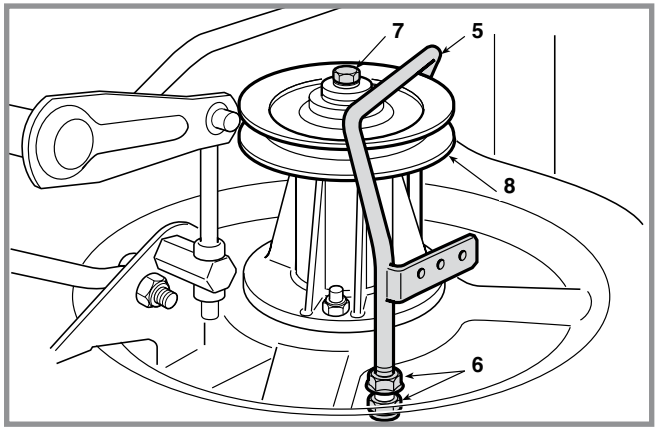
Remove the right and left guards fixed by the relative screws and/or nuts



NOTE *The blade belt guards could have different configurations and fixings; in any case they must all be removed, after having identified all the fixing points.*

A) Replacement of the supports of the blades

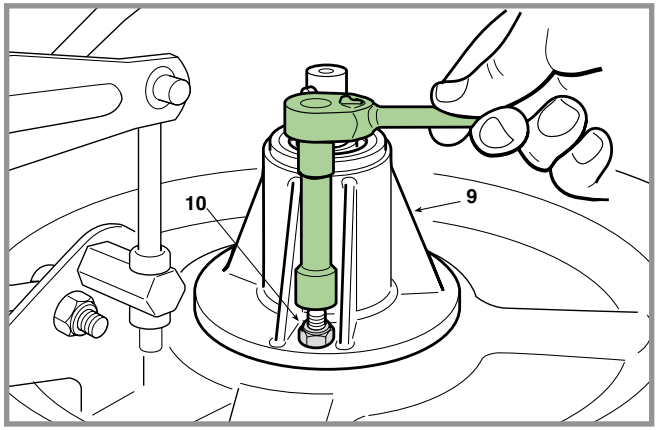
Remove the left belt guide (5) fixed by two nuts (6).



Unscrew the central screws (7) and unthread the pulleys (8).

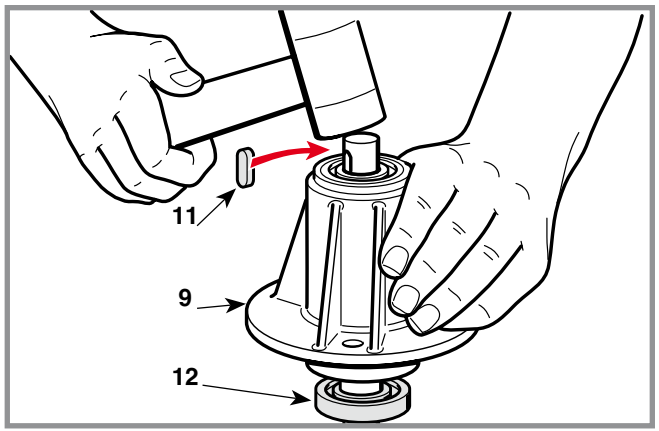
Dismantle the flange support (9) by unscrewing the three nuts (10).

NOTE *- The entire support (9), including shafts and bearings, is a spare part available as a single assembly unit.*

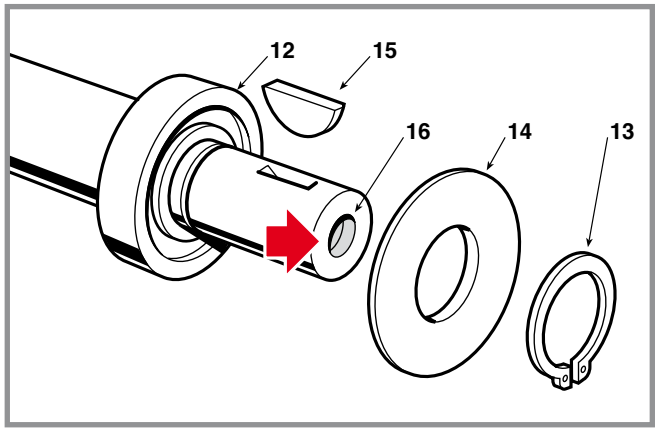


B) Replacement of the bearings and the shafts of the blades

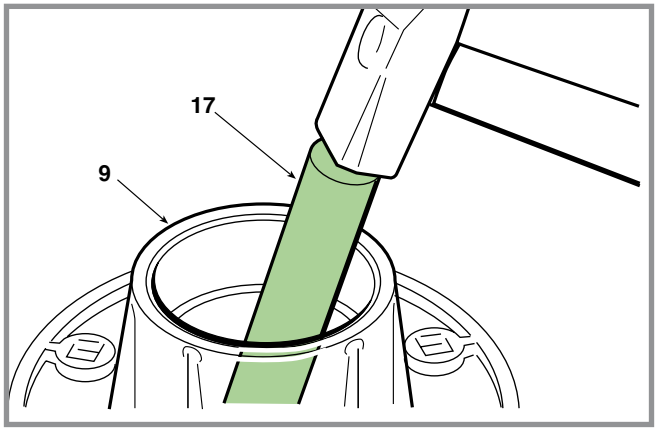
Remove the key or the two keys (11) and hit the shaft with a plastic mallet on the pulley side in order to remove the shaft together with the lower bearing (12).



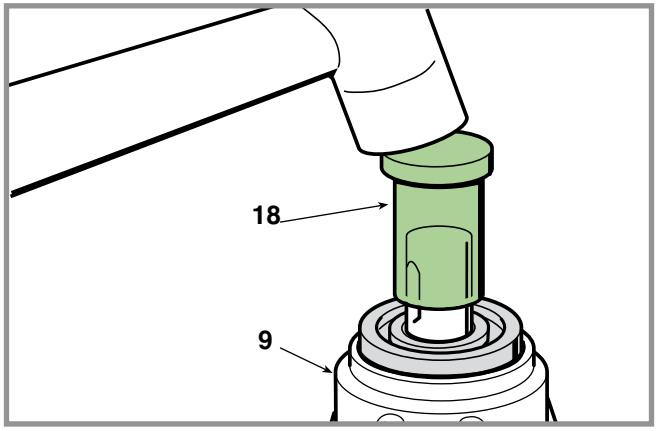
After having removed the snap ring (13), the dust cover (14) and the spline (15), the bearing (12) splined onto the shaft can be removed using a normal extractor, taking care to close up the threaded hole (16) with a screw to prevent the point of the extractor from damaging the thread.



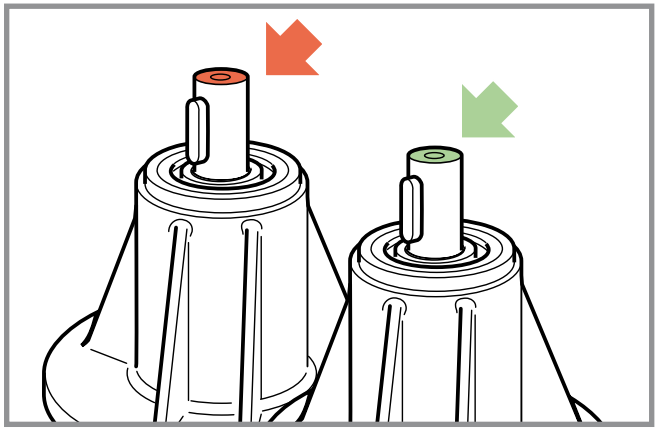
The second bearing still in place must be removed by hitting it from the inside of the flange using a 12 ÷ 15 mm diameter round bar (17).



On reassembling, first put the shaft into the hole of the lower bearing and insert this into the support. Fit on the upper bearing and, using the special bush (18) which works on the inner ring, hit it squarely with a mallet until the bearing is fully driven home.



IMPORTANT *The right and left shafts seem to be the same, but can be differentiated as follows:*
– right shaft: red paint on the pulley side;
– left shaft: green paint on the pulley side.
Before refitting the support assembly, check that these positions are correct.



Fit the flange supports onto the deck, fully tightening the nuts (10).

On completion of assembly of the supports, ...

☛ Reassemble the blades.

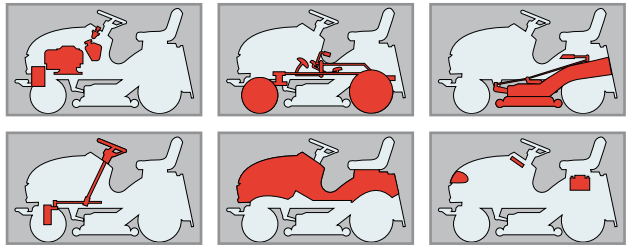
REPLACEMENT OF THE ACCELERATOR AND ADJUSTMENT OF THE CARBURETTOR

General informations

Related topics

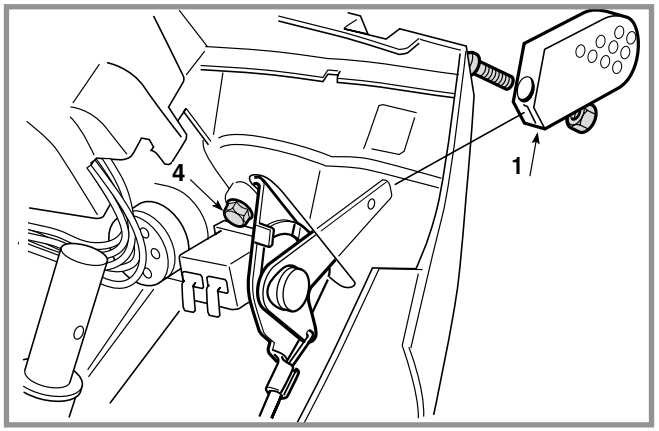
[☛ 5.4] Removal of the dashboard

Map of functional units



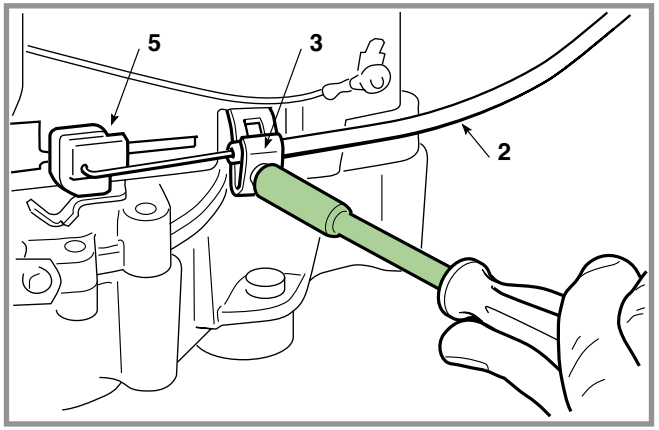
☛ Remove the dashboard.

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



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

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

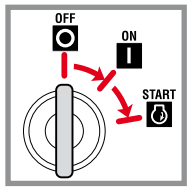


When assembly is completed ...

☛ Refit the dashboard.

General informations

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



Related topics

[☛7.2] Ttable for the cutting in of the safety devices

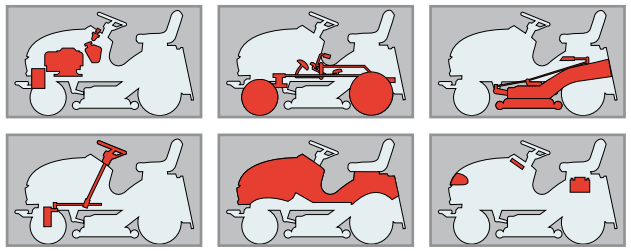
[☛7.3] Safety microswitches operation check

[☛7.6] Starter relay operation check

[☛7.9] Recharge circuit check

[☛7.10] Maintenance of the sealed battery

Map of functional units



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

WARNING! *The self-setting guard reaches very high temperatures (around 180 °C) which are to be considered normal. Similarly, there might be some smoke inside the box which is due to the overheating of the powder inside.* ***Do not touch this component of the circuit board until it has cooled down.***

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

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

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

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

PROBLEM	CAUSE	REMEDY
9. The battery indicator light is blinking	Recharge overvoltage	Check the recharge circuit
	Battery insufficiently charged at start-up	Recharge the battery
10. Abnormal, uncontrolled lighting up of the LEDs or irregular card operation	Faulty electronic card	Check
	Bad earthing of the electronic card	Check and put right
11. The engine stops while in use for reasons not due to the safety devices cutting in	The safety devices have cut in or are faulty	Check the operation of the microswitch operation and the relevant wiring
	Accidental detaching of an electrical wire	Check all wiring
	Starting of engine not permitted	After checking that the conditions are met, check all the microswitches and the relative wiring
12. The 10 A fuse cuts in	Short circuit or overload on the power side of the card (ignition block, starter relay, headlamps and recharger connector)	Find and replace the defective user
	Short circuit or damage to the electronic card protection (power side)	Replace the panel/board group with one that is known to work; if the problem does not reoccur replace the faulty group definitively
13. The 25 A fuse cuts in	Faults in the battery charging circuit	Replace fuse (25 A) and check the recharge circuit
14. No audible signal for the “grass-catcher full” condition”	Malfunctioning or faulty blade microswitches and grass-catcher signalling	Check the microswitches and wiring. **WARNING!** - Check that the blades microswitch stops the engine or prevents if from being started if the acknowledgement conditions are not met
	Malfunctioning or faulty electronic card	Replace the panel/board group with one that is known to work; if the problem does not reoccur replace the faulty group definitively
15. The clock does not keep time after the machine is switched off	Buffer battery flat	Replace

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

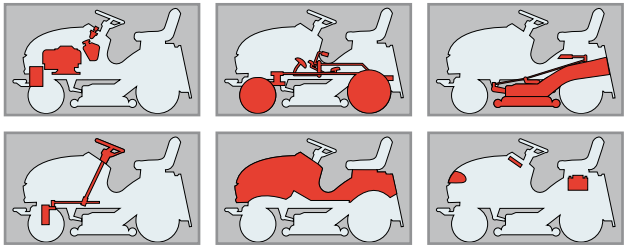
CUTTING IN OF THE SAFETY DEVICES

General informations

Related topics

[☛ 7.3] Safety microswitches operation check

Map of functional units



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

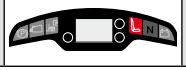
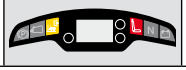
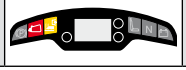
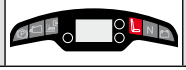
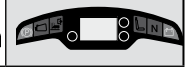
A) STARTING («START» position)

The engine DOES NOT start, when:

Operator	–/–	–/–	Absent
Grass-Catcher	–/–	–/–	–/–
Blades	–/–	Engaged	–/–
Drive	Engaged	–/–	–/–
Parking	–/–	–/–	–/–
Indication on the Dashboard			

B) WHILE CUTTING

The engine STOPS start, when:

Operator	Absent	Absent	–/–	–/–	Absent	Seated
Grass-Catcher	–/–	–/–	Missing	–/–	–/–	Fitted
Blades	–/–	Engaged	Engaged	Engaged	–/–	Engaged
Drive	Engaged	–/–	–/–	–/–	–/–	Reverse
Consent Button	–/–	–/–	–/–	–/–	–/–	Released
Parking	–/–	–/–	–/–	Engaged	–/–	–/–
Indication on the Dashboard						

–/– Irrelevant condition for the triggering of safety devices

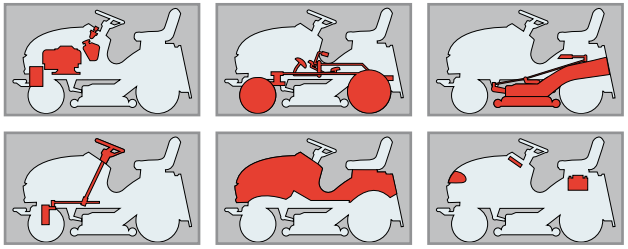
= Pilot lamp on = Pilot lamp off = Pilot lamp uninfluential

SAFETY MICROSWITCHES OPERATION CHECK

General informations

Related topics

Map of functional units



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

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

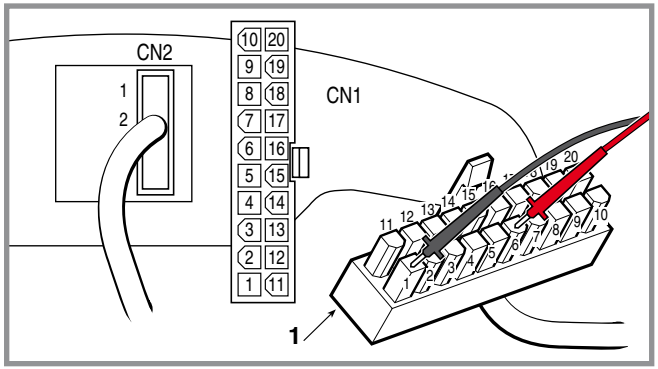
Engine Stop

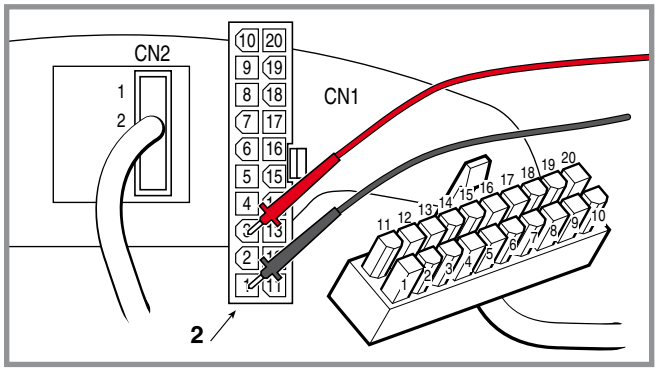
This operation must be done making contact with the ferrules on the contacts of connector CN1 of the card, keeping all other connectors connected, and must give this result:

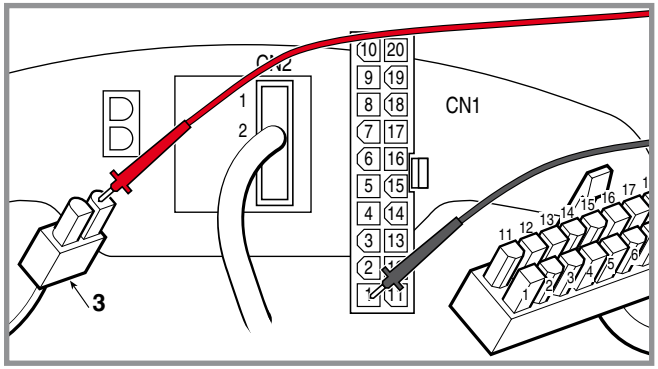
No. of Contacts	Tester reading and condition
1 - 3	O (Always)

Reverse Consent

This check is made by detaching all the connector (3). The following results must be achieved using the Ohm-meter function tester with the probes in contact with the contacts of circuit board connector (3) and the contact «1-CN1» of the card:







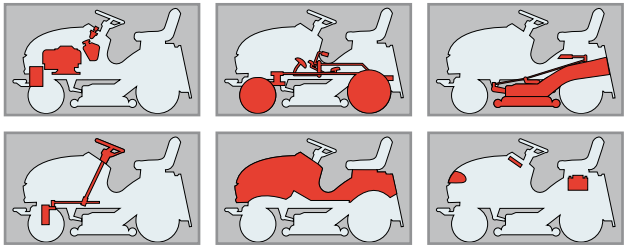
No. of Contacts	Tester reading and condition	
REVERSE CONSENT BUTTON		
1 (CN1) - 3 violet	∞ (released)	O (pressed)
REVERSE GEAR MICROSWITCH		
1 (CN1) - 3 bleu	O (free)	∞ (pressed)

TERMINAL BOARD SUPPLY CHECK

General informations

Related topics

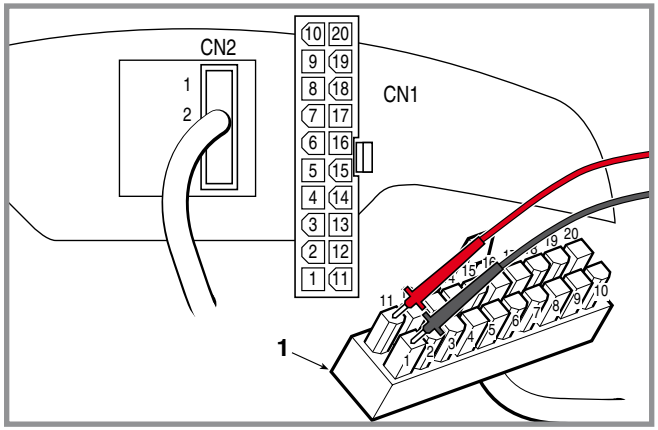
Map of functional units



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

– The key in the «ON» position

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

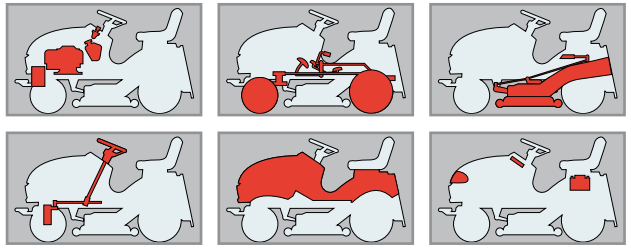


CARBURETTOR SOLENOID VALVE OPERATION CHECK

General informations

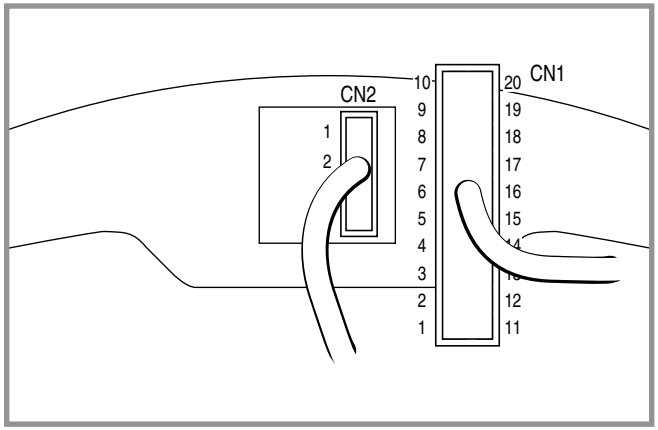
Related topics

Map of functional units



Connector CN1 must be connected to make this check.

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

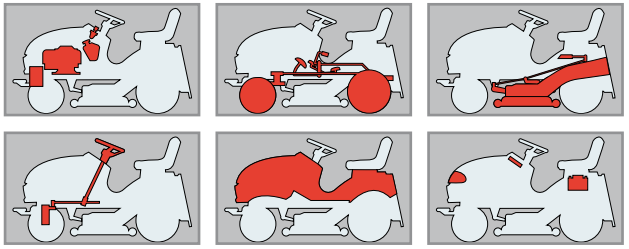


STARTER RELAY OPERATION CHECK

General informations

Related topics

Map of functional units



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

To do this requires:

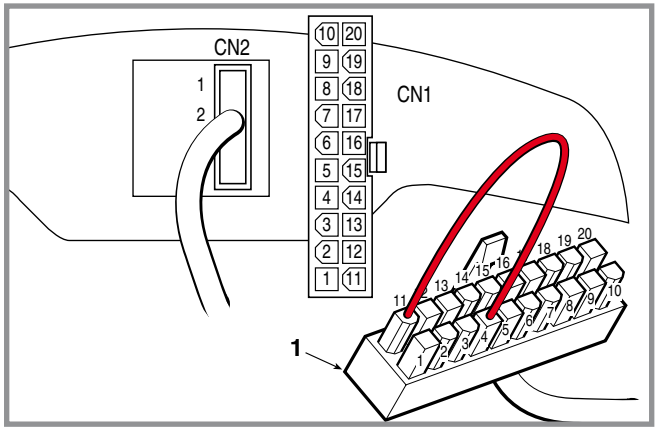
– operator seated,
– blades disengaged,
– the key in the «ON» position.

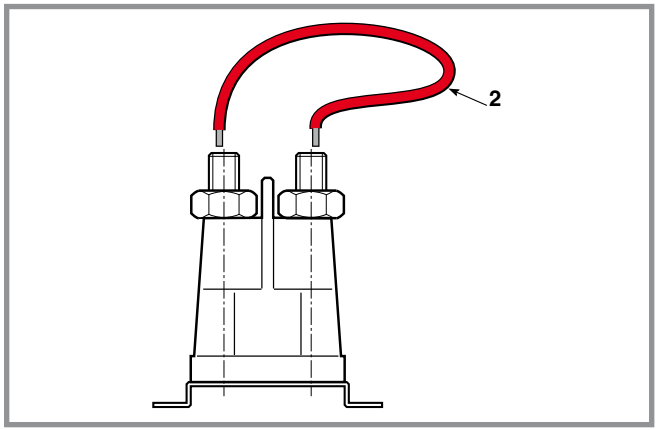
Disconnect the connector (1).

In making a bridge between the terminals 11 and 4 of the wiring connector (1), the click of the relay bobbin should be heard and the starter motor should come into action.

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

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





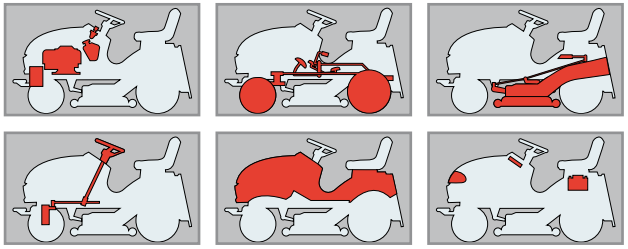
ELECTROMAGNETIC CLUTCH OPERATION CHECK

General informations:

Related topics

[☛7.3] Safety microswitches operation check

Map of functional units



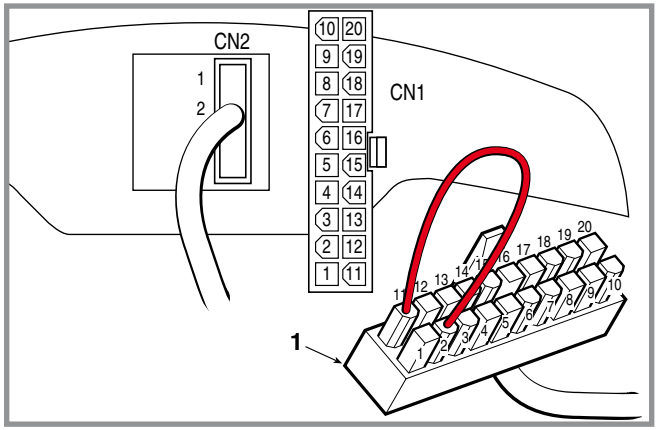
WARNING! ***This check must be made with the engine off.***

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

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

If this is not so, check the operation of the cabling and control switch.

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

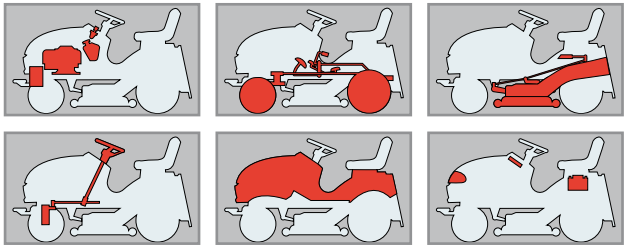


CHECKING THE OPERATION OF THE BAG EMPTYING CONTROL

General informations:

Related topics:

Map of functional units



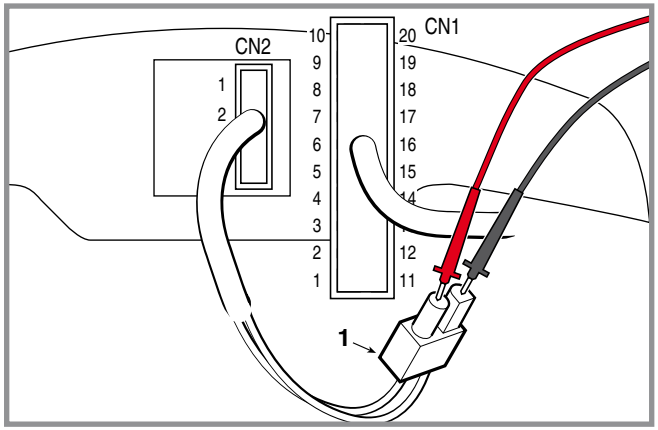
The following conditions must be ensured to make this check:

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

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

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

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

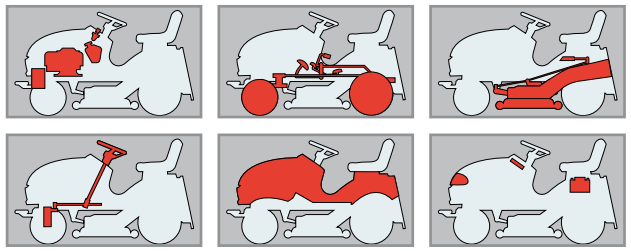


RECHARGE CIRCUIT CHECK

General informations

Related topics

Map of functional units



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

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

Before checking the recharge circuit, make sure that:

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

A) Checking the lower charging limit

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

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

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

B) Checking the upper charging limit

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

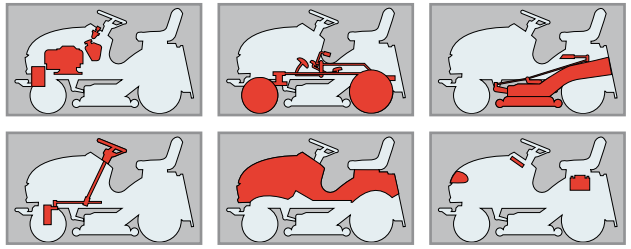
If this value is exceeded to the extent that the engine stops due to the self-resetting protection cutting in (at approximately 16 Volts) it means that the regulator is charging too much and must be replaced.

MAINTENANCE OF THE SEALED BATTERY

General informations

Related topics

Map of functional units



A) General information

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

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

B) Recommendations for correct use

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

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

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

C) Rules for recharging the battery

La ricarica è una operazione particolarmente IMPORRecharging is a particularly important operation for the life of the battery and must be carried out according to these instructions:

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

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

Battery voltage with open circuit	Battery state	Operation to be carried out
> 12.6 Volt	Fully charged	None
< 12,4 Volt	Flat	Recharge

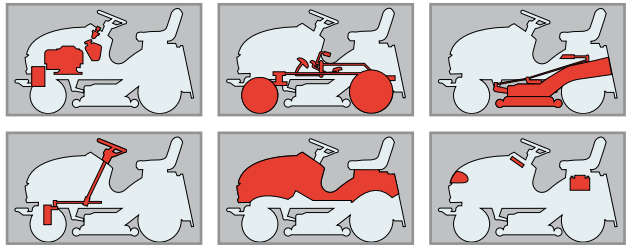
Check the battery voltage at least 12-24 hours after recharging.

REPLACING THE CLOCK'S BUFFER BATTERY

General informations:

Related topics:

Map of functional units

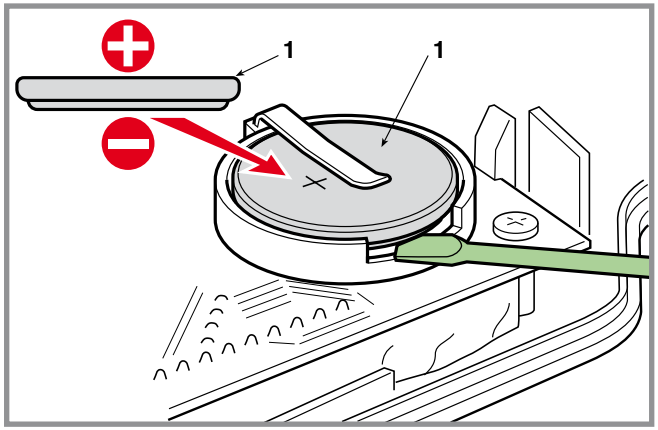


NOTE *The lower panel/board group guard, fixed by two nuts, must be removed to carry out this operation.*

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

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

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

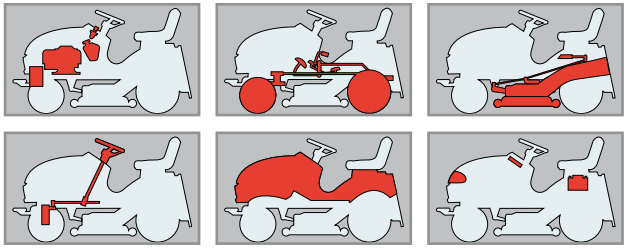


FITTING SAFETY MICROSWITCHES

General informations

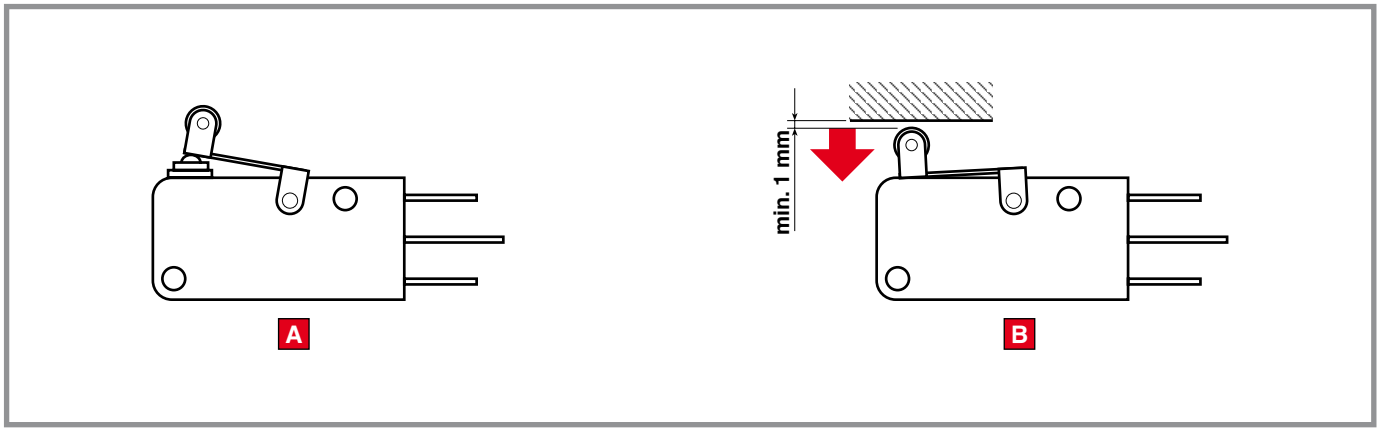
Related topics

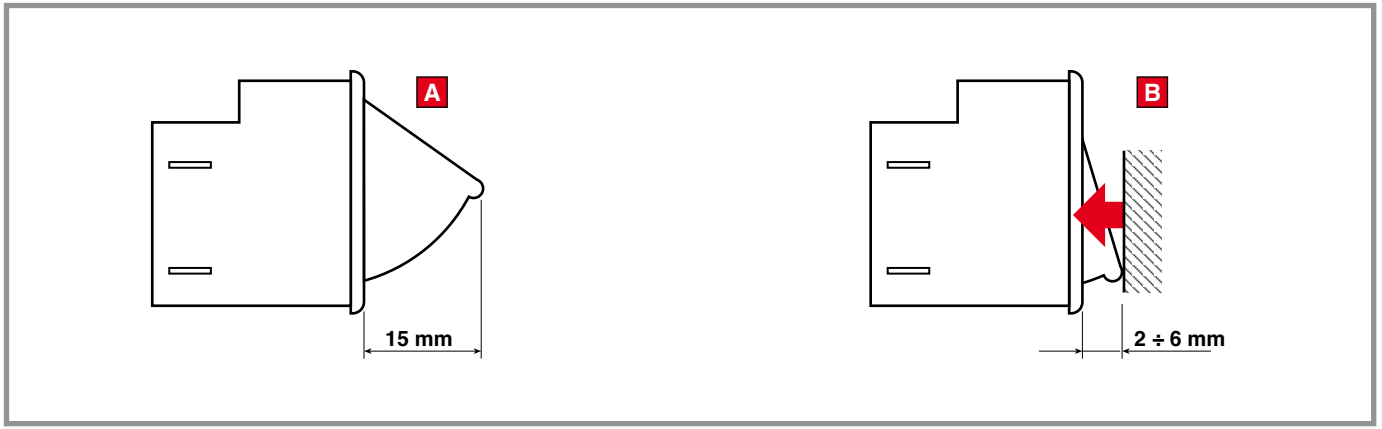
Map of functional units



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

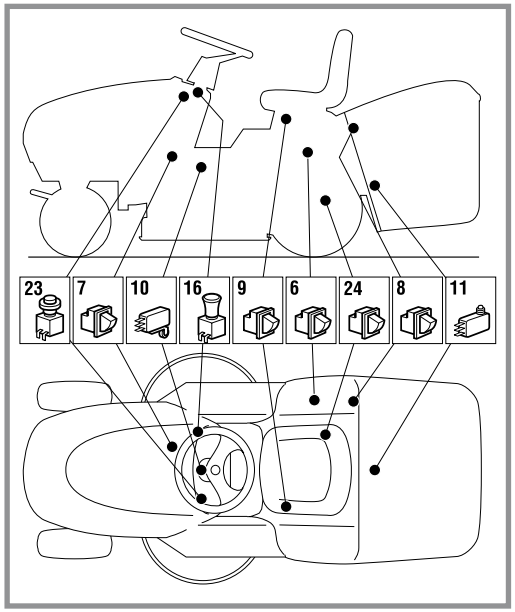
A = Free
B = Activated



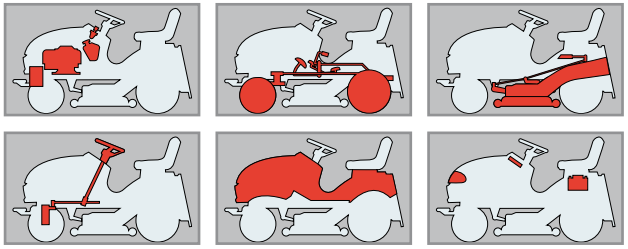


General informations

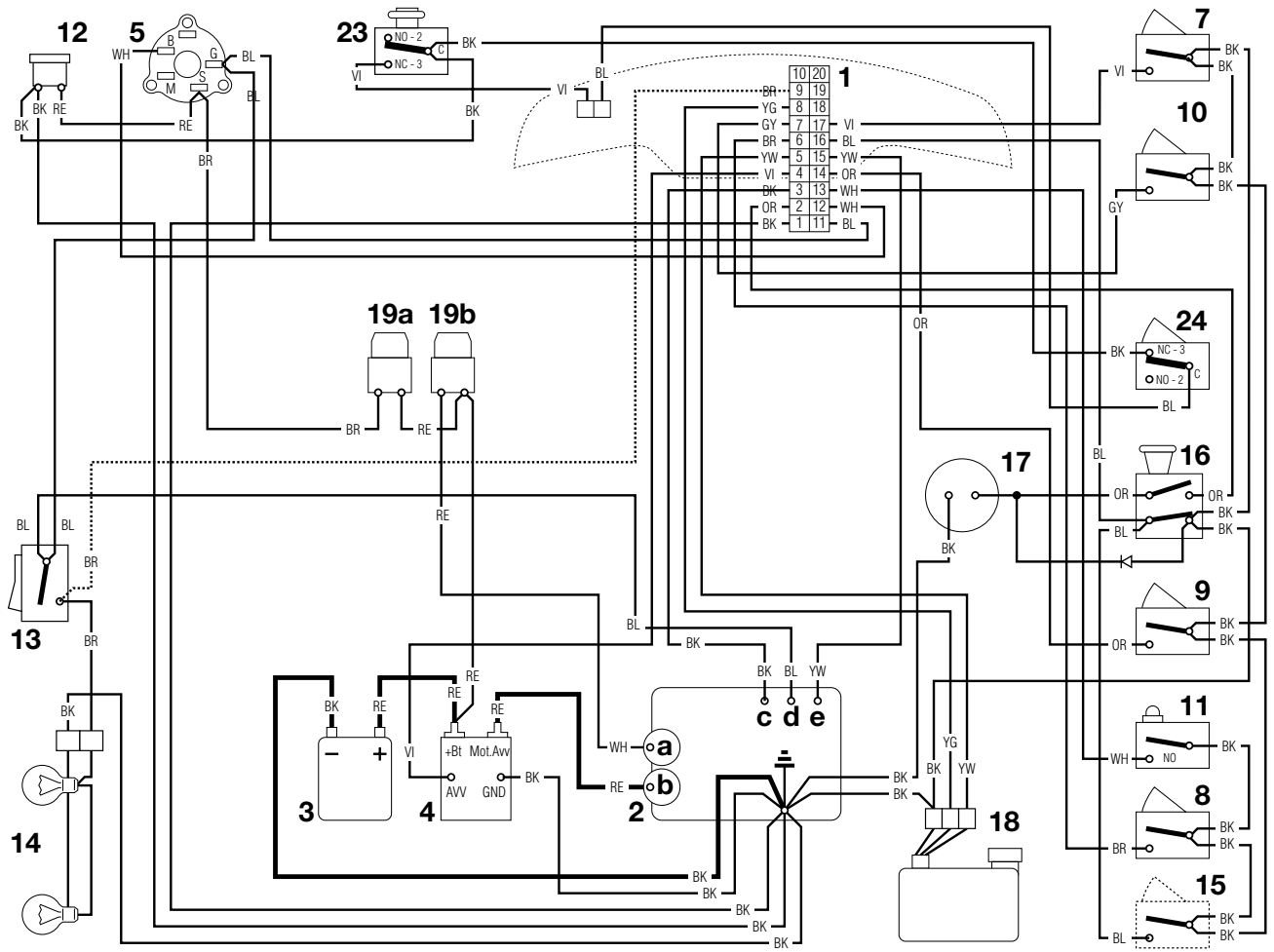
Related topics



Map of functional units



➤ *Engines: B&S - Stiga - Kawasaki*



1	Electronic Card	10	Neutral microswitch
2	Engine	11	Grass-catcher full microswitch
2a	Generator	12	Recharge connector
2b	Starter	13	Lights switch
2c	Engine stop	14	Light
2d	Carburettor	15	Blade microswitch (if fitted)
2e	Oil	16	Clutch switch
3	Battery	17	Clutch
4	Starter relay	18	Fuel tank
5	Key ignition switch	19a	10 A Fuse
7	Brake microswitch	19b	25 A Fuse
8	Grasscatcher microswitch	23	Reverse consent button
9	Microswith operator present	24	Reverse gear microswitch

CABLE COLOURS

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

General informations

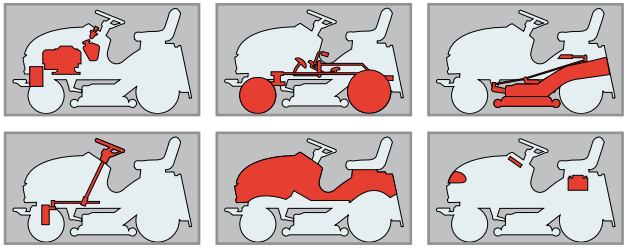
Related topics

[☛ 4.1] Adjusting the engagement and checking the blade brake

[☛ 4.2] Brake adjustment

[☛ 4.3] Drive belt adjustment

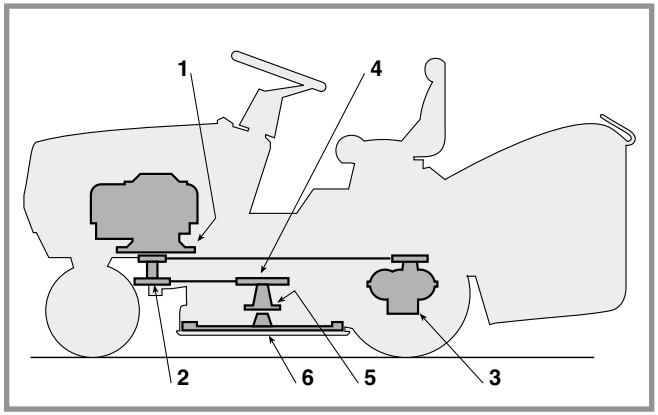
Map of functional units



A) Tightening torques

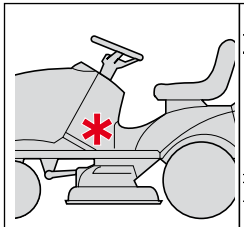
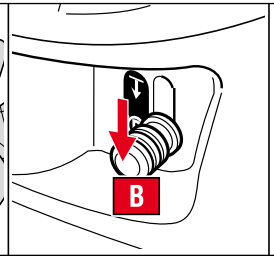
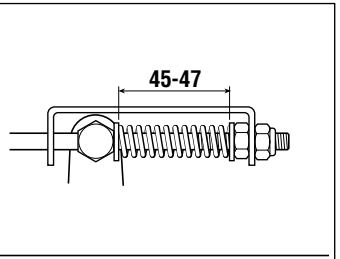
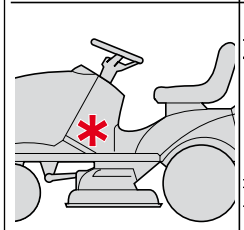
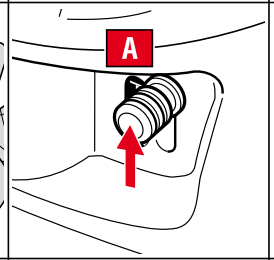
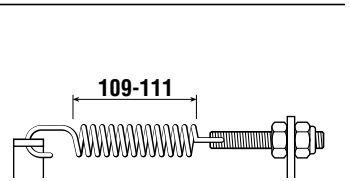
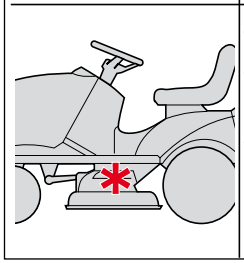
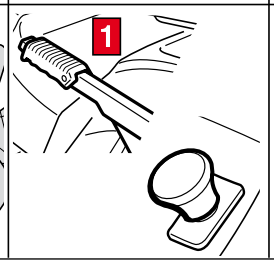
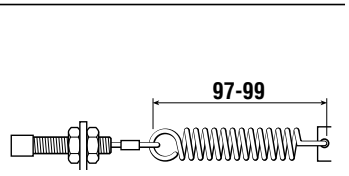
Below are the specified tightening torques for the fixing bolts on the main parts.

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



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

B) Adjustments

Operation	Position	Position of controls	Adjustment
a) Brake adjustment			
b) Drive belt adjustment			
c) Blades engagement adjustment			

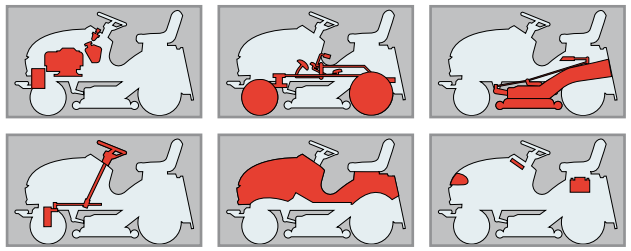
BELTS ASSEMBLY

General informations:

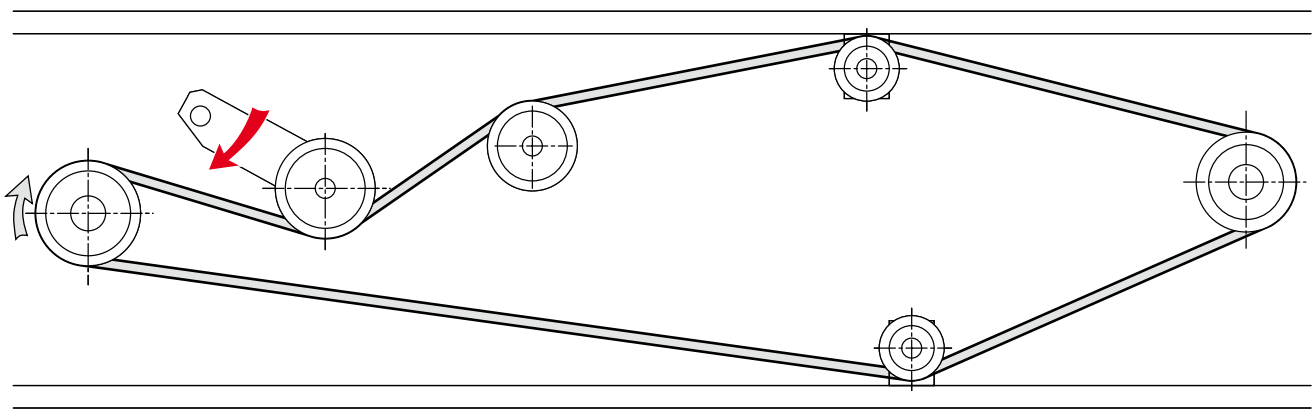
Related topics

[☛ 6.4] Replacement of the drive belt
[☛ 6.6] Replacement of the blades control belt

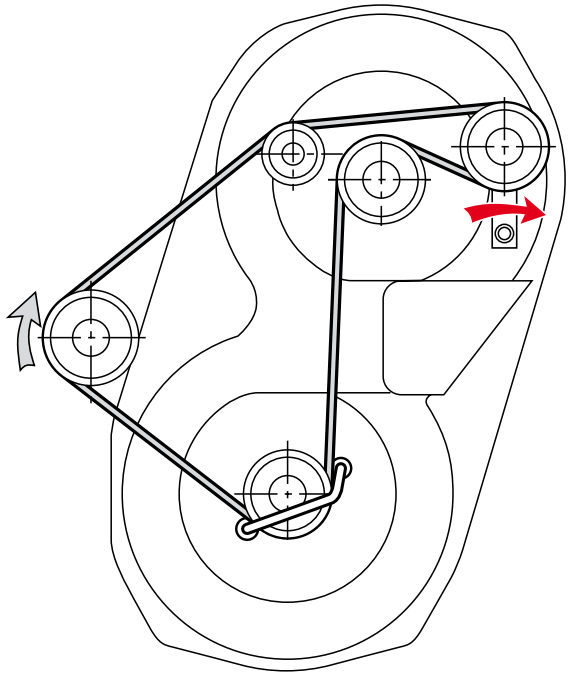
Map of functional units



1



2



1 Drive belt development

2 Blades control belt development