

WORKSHOP MANUAL

Rel. 3.1

YEAR OF MANUFACTURE 2015 - 2018

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

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MAP OF INTERVENTIONS

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 security and performance of the machine. The manufacturer is not liable for damages or injuries arising from operations performed by individuals or inadequate facilities.



i.3 INDEX

1 / 2

1. Rules and procedures for Service Centres

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

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

2. General and safety regulations

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

3. Maintenance

This chapter deals with the criteria for routine maintenance.

4. Adjustments and tuning

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

5. Removal of external parts and main assemblies

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

6. Repairs

This chapter deals with all the more complex work connected with the replacement or repair of malfunctioning or worn parts. The descriptions must follow a logical sequence and can include operations not specifically connected to a particular type of repair.

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

7. Electrical system

This chapter deals with the problems and checks connected with the electrical system. All work can be done using a tester without having to use special equipment. The electrical diagrams can be useful to you for understanding how the system functions and to facilitate the pinpointing of any problems.

8. Technical specifications

This chapter summarises all the main information regarding the machine.

i.3 INDEX

2 / 2

GENERAL INDEX

1. Rules and procedures for Service Centres

1.1 0 Identification and procedures

2. General and safety regulations

2.1 0 Safety regulations

2.2 0 Tools

2.3 0 Lifting

2.4 0 Practical hints

3. Maintenance

3.1 0 Criteria for maintenance

4. Adjustments and tuning

4.1 1 Adjusting the engagement and checking the blade brake

4.2 1 Brake adjustment

4.3 0 Drive belt adjustment

4.4 1 Drive pedal adjustment
(*hydrostatic drive models*)

4.5 0 Aligning the cutting deck

4.6 0 Adjusting the steering play

4.7 0 Steering geometry adjustment

4.8 0 Checking blades alignment

4.9 0 Removing, sharpening and balancing the blades

5. Removal of external parts and main assemblies

5.1 0 Removal of front hood

5.2 1 Removal of the wheel cover

5.3 1 Removal of the dashboard

5.4 2 Removal of the engine

5.5 1 Removal of the rear axle
(*Peerless MST 205-535 E*)

5.5a 0 Removal of the rear axle
(*Hydro-Gear T2-ADBF-2X3C-17X1*)

5.6 0 Removal of the cutting deck

6. Repairs

6.1 0 Replacement of tyres and wheels

6.2 0 Replacement of front wheel bearings

6.3 0 Dismantling the steering components

6.4 2 Replacement of the drive belt

6.5 0 Replacement of the blades belt

6.6 0 Replacement of the supports and shafts of the blades

6.7 2 Replacing the accelerator and adjusting the carburettor

6.8 0 Replacement of the lifting cable

6.9 0 Replacement of the brake pads and disc
(*mechanical drive models*)

7. Electrical system

7.1 0 Troubleshooting of the electrical system

7.2 1 Table for the cutting in of the safety devices

7.3 1 Safety microswitches operation check

7.4 0 Terminal board supply check

7.5 0 Electromagnetic clutch operation check

7.6 0 Starter relay operation check

7.7 1 Electronic card operation check

7.7 8 Recharge circuit check

7.9 0 Care and maintenance of the sealed battery

7.10 0 Fitting safety microswitches

7.11 3 Electrical diagrams

8. Technical specifications

8.1 2 Tightening torques and adjustments summary

8.2 2 Belts Assembly

ii.0 INTRODUCTION

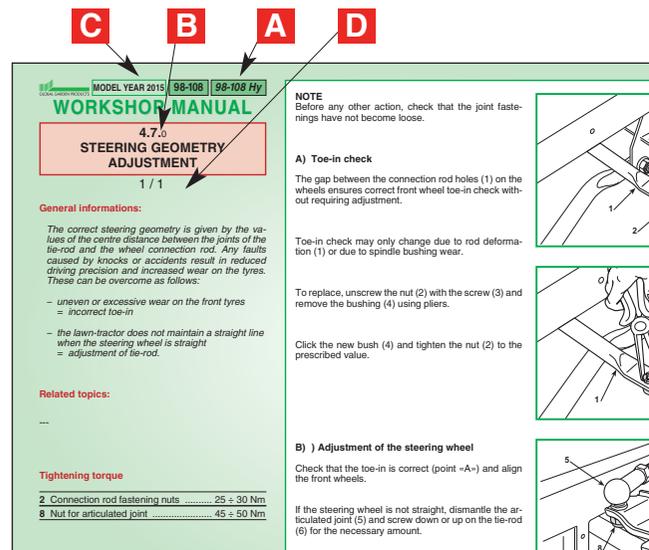
1 / 1

This manual has been compiled to help Service Centres with the maintenance, dismantling and repair of the following versions of the SD98 lawn-tractor:

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

Each page of this manual states the following information:

A) Machine or machine series to which the page applies.



plies.

B) Page number, specifically:

- the first two figures separated by a point indicate the section and the chapter
- the third figure indicates the modification index.

C) Temporary validity of the page, with reference to the year of manufacture or serial numbers.

D) Page number and total number of pages dedicated to the subject.

The manual refers to the following symbols:

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

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

Reference to another procedure or part of the manual.

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

NOTE

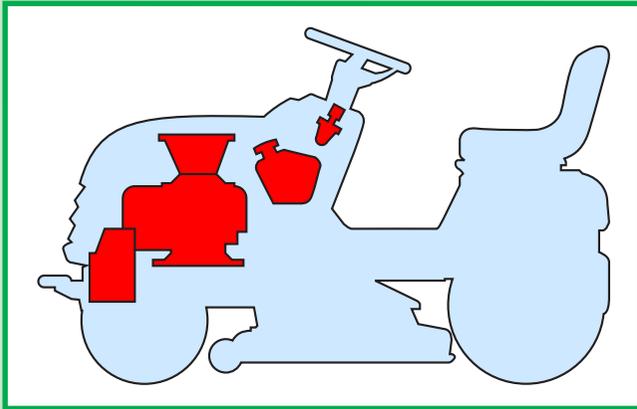
Whenever a reference is made to a position on the machine “front”, “back”, “left” or “right” hand side, this is determined by facing the direction of forward travel.

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

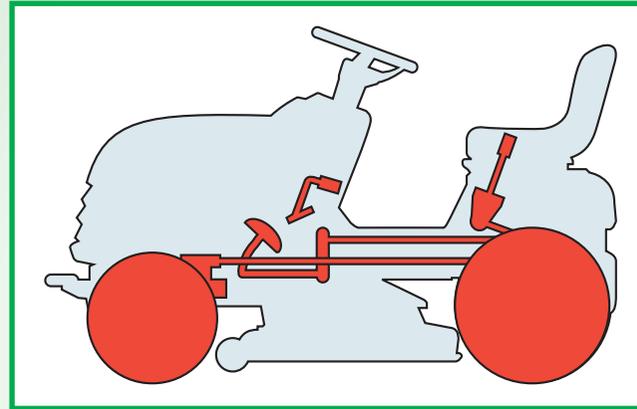
You are asked to read through this manual to acquire a basic understanding of the machine, which is necessary for working rationally without making errors or wasting time.

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

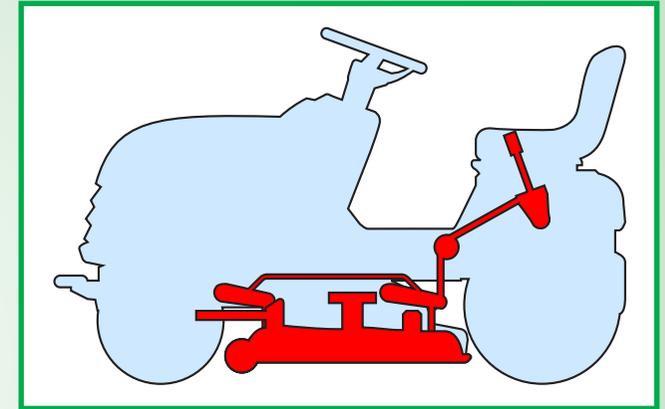
iii.0 MAP OF INTERVENTIONS



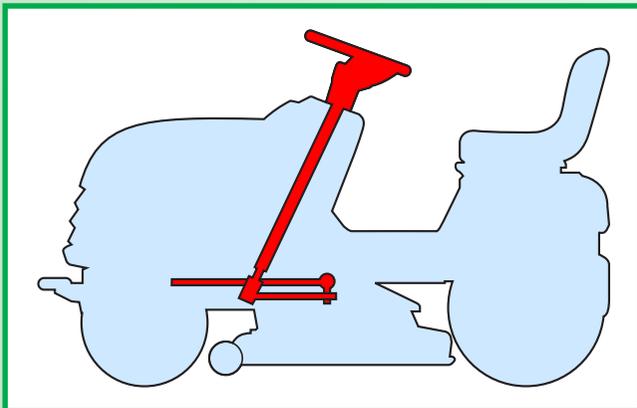
ENGINE - FUEL TANK



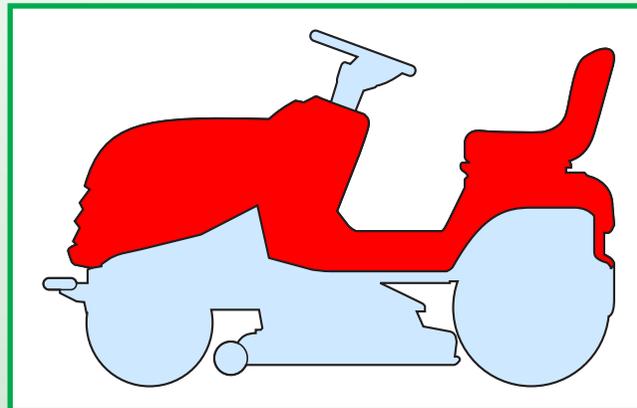
TRANSMISSION - BRAKE - WHEELS



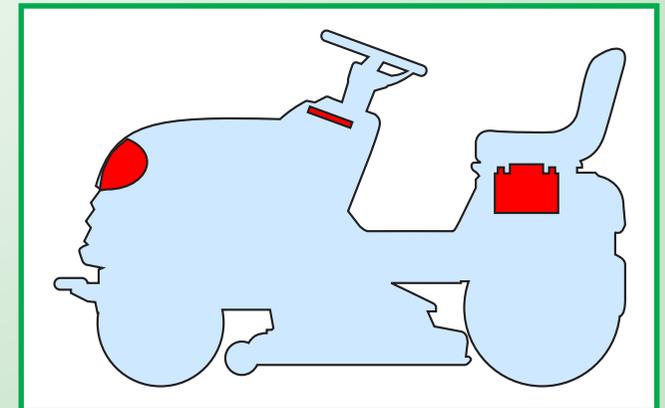
CUTTING DECK



STEERING



BODY

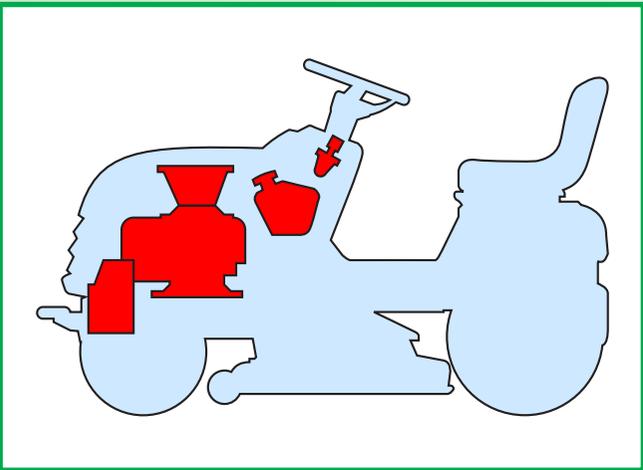


ELECTRICAL SYSTEM

WORKSHOP MANUAL

**iv.0
ENGINE - FUEL TANK**

1 / 6



MAP

INDEX OF RELATED TOPICS:

Removal of external parts and main assemblies

Removing the front hood	[5.1]
Removal of the engine	[5.4]

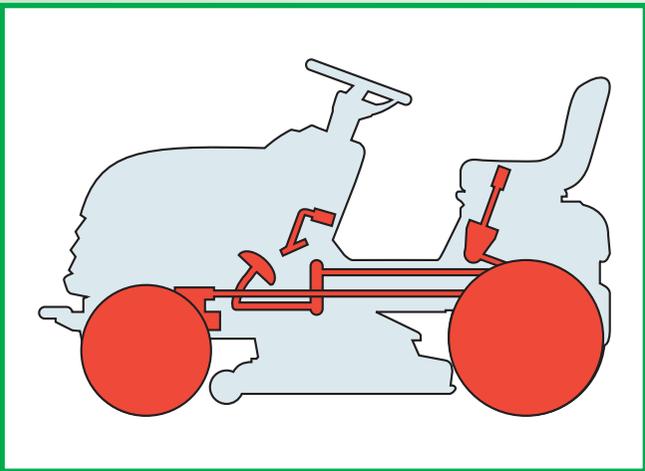
Repairs

Replacement of the accelerator	[6.7]
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WORKSHOP MANUAL

iv.0
**TRANSMISSION - BRAKE
 WHEELS**

2 / 6



MAP

INDEX OF RELATED TOPICS:

Adjustments and tuning

Brake adjustment	[4.2]
Drive belt adjustment	[4.3]
Drive pedal adjustment (<i>hydrostatic drive models</i>)	[4.4]

Removal of external parts and main assemblies

Removal of the rear axle (<i>Peerless MST 205-535 E</i>)	[5.5]
Removal of the rear axle (<i>Hydro-Gear T2-ADBF-2X3C-17X1</i>)	[5.5a]

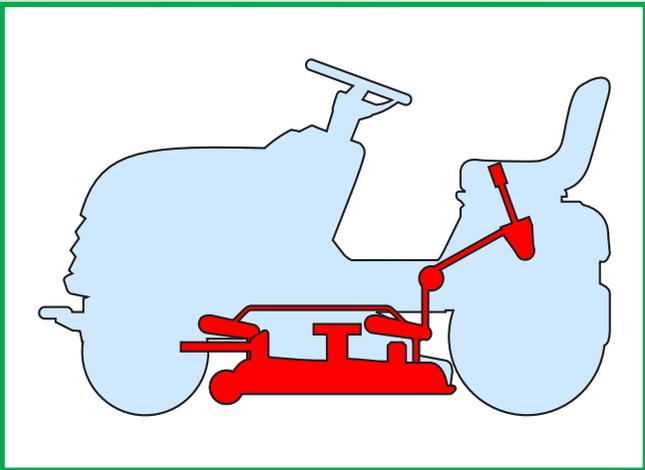
Repairs

Replacement of tyres and wheels	[6.1]
Replacement of front wheel bearings	[6.2]
Replacement of drive belt	[6.4]
Replacement of small wheels for the drive belt (<i>mechanical drive models</i>)	[6.9]

WORKSHOP MANUAL

**iv.0
CUTTING DECK**

3 / 6



MAP

INDEX OF RELATED TOPICS:

Adjustments and tuning

Adjusting the engagement and checking the blade brake	[4.1]
Aligning the cutting deck	[4.5]
Checking blades alignment	[4.8]
Removing, sharpening and balancing the blades	[4.9]

Removal of external parts and main assemblies

Removal of the cutting deck	[5.6]
-----------------------------------	--------

Repairs

Replacement of blade control belt	[6.5]
Replacement of the supports and shafts of the blades	[6.6]
Replacement of the lifting cable	[6.8]

WORKSHOP MANUAL

iv.0 STEERING

4 / 6

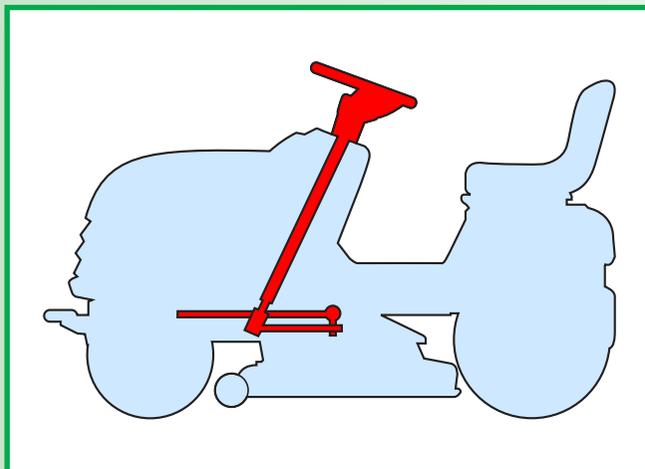
INDEX OF RELATED TOPICS:

Adjustments and tuning

Adjusting the steering play	[4.6]
Steering geometry adjustment	[4.7]

Repairs

Dismantling of the steering components	[6.3]
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WORKSHOP MANUAL

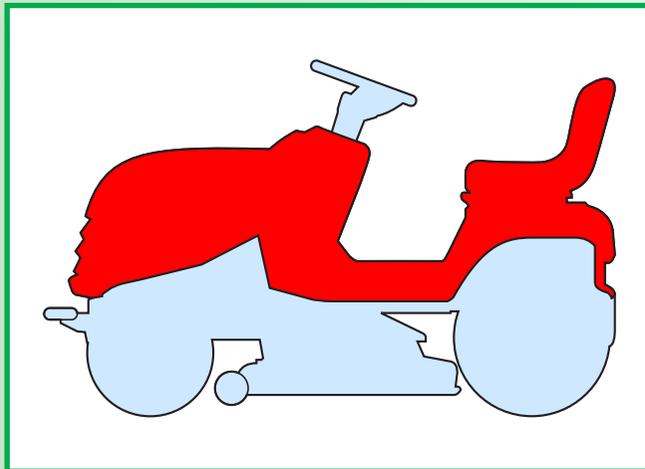
**iv.0
BODY**

5 / 6

INDEX OF RELATED TOPICS:

Removal of external parts and main assemblies

Removing the front hood	[5.1]
Removal of wheels cover	[5.2]
Removal of the dashboard and front cover	[5.3]



WORKSHOP MANUAL

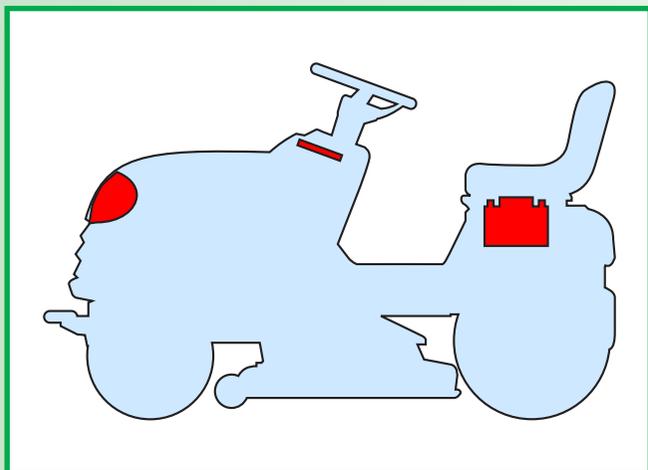
iv.0 ELECTRICAL SYSTEM

6 / 6

INDEX OF RELATED TOPICS:

Info

Troubleshooting of the electrical system	[7.1]
Table for the cutting in of the safety devices	[7.2]
Safety microswitches operation check	[7.3]
Terminal board supply check	[7.4]
Electromagnetic clutch operation check	[7.5]
Starter relay operation check	[7.6]
Electronic card elettronica operation check	[7.7]
Recharge circuit check	[7.8]
Care and maintenance of the sealed battery	[7.9]
Fitting safety microswitches	[7.10]
Electrical diagrams	[7.11]



WORKSHOP MANUAL

1.1.0 IDENTIFICATION AND PROCEDURES

1 / 2

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.

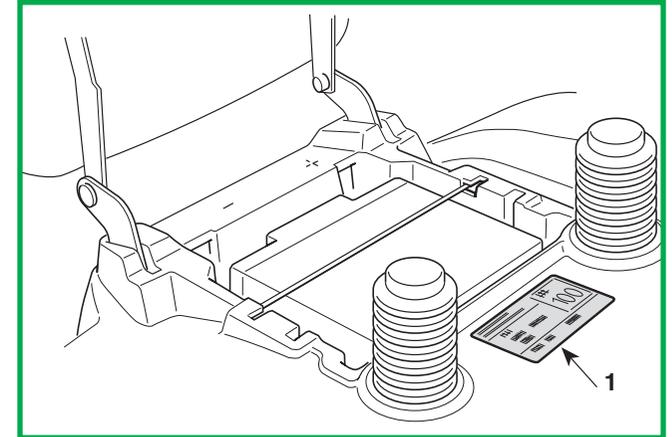
Related topics:

A) Identification

1) Machine

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

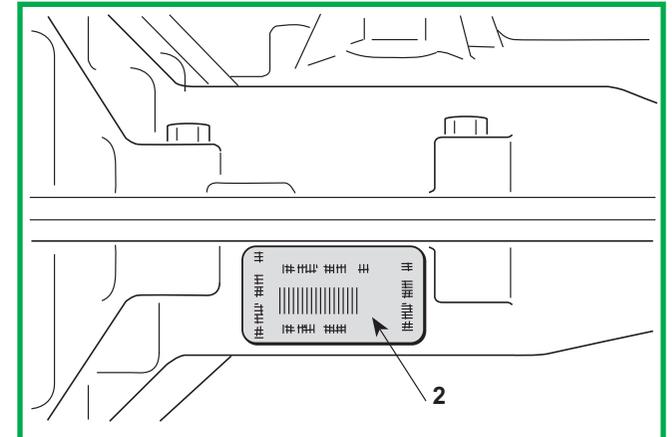
The model and serial number must be shown on each repair sheet when requests are made under guarantee, and are indispensable for spare part orders.



2) Transmission (Rear axle)

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

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



3) Engine

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

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

B) Guarantee validity

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

WORKSHOP MANUAL

1.1.0 IDENTIFICATION AND PROCEDURES

2 / 2

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:

C) Service repairs after guarantee period

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

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

D) Fault notification

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

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

E) Spare parts request

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

WORKSHOP MANUAL

2.1.0 SAFETY REGULATIONS

1 / 2

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:

Tools [[2.2](#)]

Safety microswitches operation check [[7.3](#)]

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 chapter 1 of the Instruction Booklet.

C) Precautions during servicing

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

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

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

D) Necessary equipment

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

E) Symbols and terms used for safety purposes

WORKSHOP MANUAL

2.1.0 SAFETY REGULATIONS

2 / 2

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:

Tools [[2.2](#)]

Safety microswitches operation check [[7.3](#)]

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

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

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

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

WORKSHOP MANUAL

2.2.0 TOOLS

1 / 1

General informations:

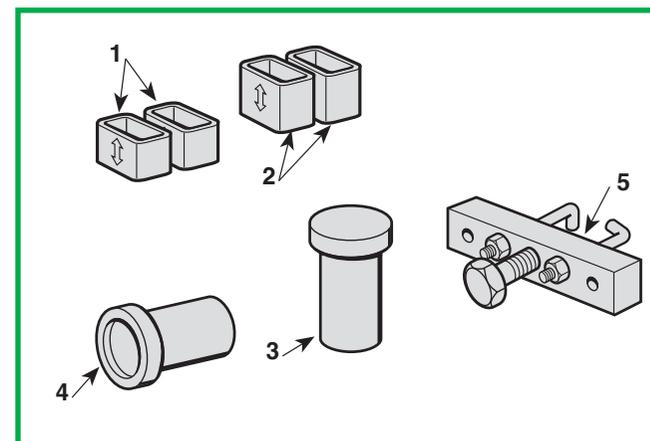
This chapter covers the main aspects of a servicing procedure and the general rules for guaranteeing a successful service which respects the safety of the machine.

Related topics:

All work can be carried out using the tools normally available from a good workshop. However, it is advisable to have a set of special tools (1 ÷ 5).

These tools (1 ÷ 5) are to be used whenever is given in this text.

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



WORKSHOP MANUAL

2.3.0 LIFTING

1 / 1

General informations:

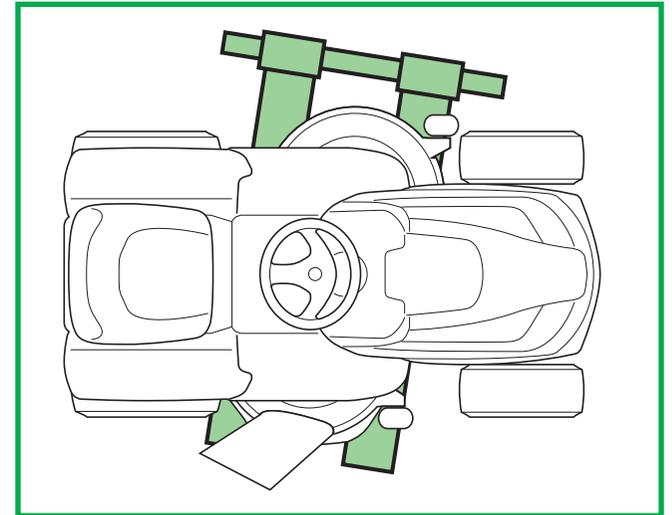
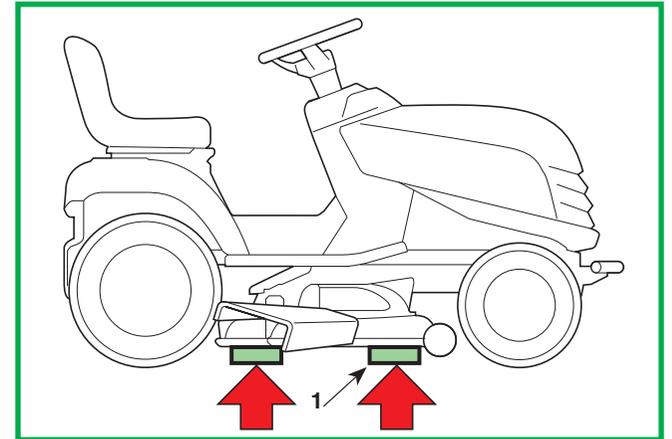
This chapter covers the main aspects of a servicing procedure and the general rules for guaranteeing a successful service which respects the safety of the machine.

Related topics:

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

This machine IS NOT DESIGNED to be positioned vertically with it resting on the rear plate.

This machine features a “support” cutting deck, able to support the entire machine weight. Therefore, the machine can be lifted using a forklift (1), placing the forks under the lower edge of the cutting deck and making sure the forks are sufficiently long to permit the entire width of the cutting deck to rest against them so that the machine does not tip when lifted.



WORKSHOP MANUAL

2.4.0 PRACTICAL HINT

1 / 2

General informations:

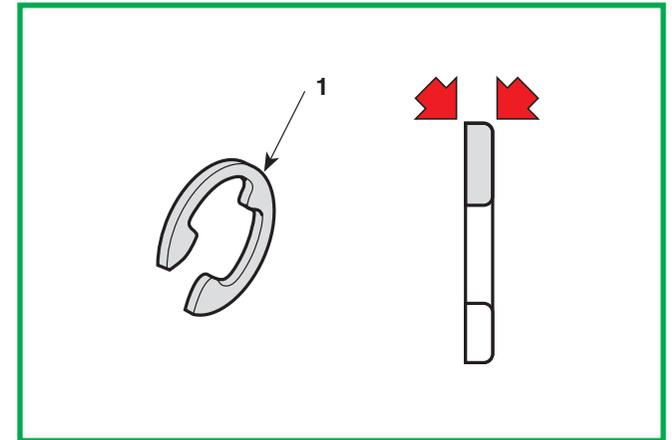
This chapter covers the main aspects of a servicing procedure and the general rules for guaranteeing a successful service which respects the safety of the machine.

Related topics:

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.

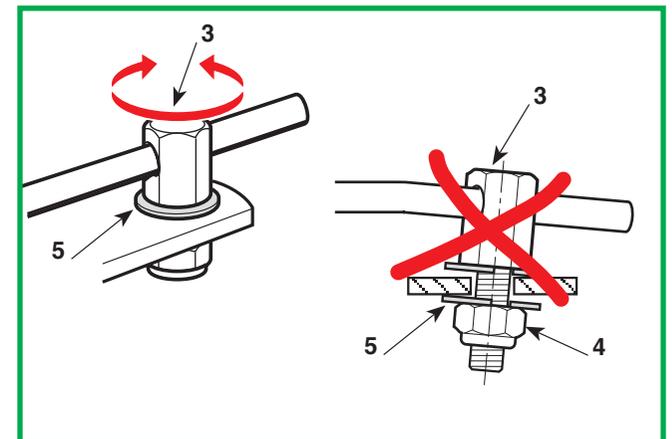
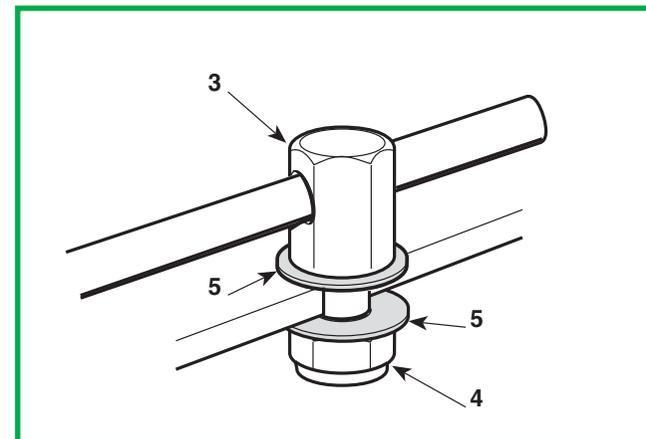
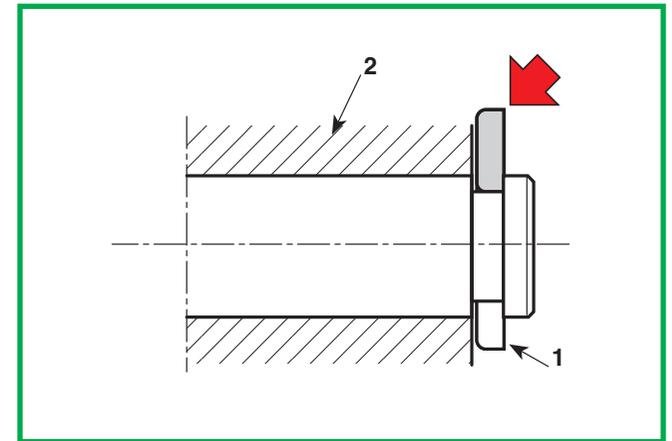


B) Joint pivot pins

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 (2), 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.



WORKSHOP MANUAL

2.4.0 PRACTICAL HINT

2 / 2

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.

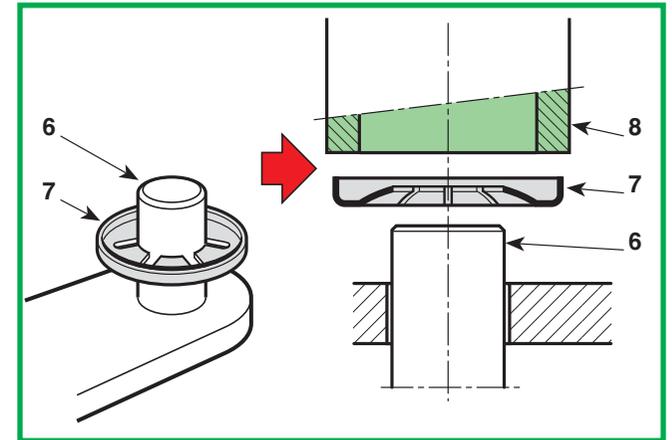
Related topics:

C) Crown fasteners

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

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

A deformed fastener should always be replaced.



WORKSHOP MANUAL

3.1.0 CRITERIA FOR MAINTENANCE

1 / 1

General informations:

This chapter deals with the criteria for routine maintenance.

Related topics:

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

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

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

a) Occasional tuning

- Check working order of safety devices and renew illegible or missing labels
- Check type pressures
- Clean air filter
- Check engine oil level
- Check for fuel leaks
- Align 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) Regular maintenance

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

WORKSHOP MANUAL

4.1.1

ADJUSTING THE ENGAGEMENT AND CHECKING THE BLADE BRAKE

1 / 1

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 period of use possible dimensional changes in the length of the belt could lead to operating irregularities, namely:

- belt slipping = belt elongated
- disengagement difficulties with the blades that will not stop = belt shortened.

The tension regulator must be adjusted in both cases.

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:

Replacement of the blades belt [6.5]

Electromagnetic clutch operation check [7.5]

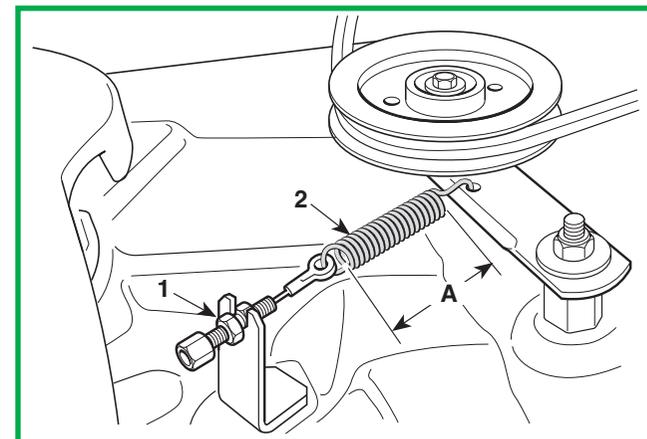
A) Adjusting blade engagement

With the cutting deck in its lowest position, suitably turn the adjuster nuts (1) until the spring (2) reaches the length "A":

82 - 85 mm for the model 98

83 - 85 mm for the model 108

measured from the outer edge of the eyelet with the blades engaged.



B) Checking the blade brake

Correct operation of the brake, which must ensure that the blades stop within 5 seconds of 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.

WORKSHOP MANUAL

4.2.1 BRAKE ADJUSTMENT

1 / 2

General informations:

Reduced braking power is corrected by adjusting the spring on the brake rod.

Related topics:

Safety regulations [1.1]

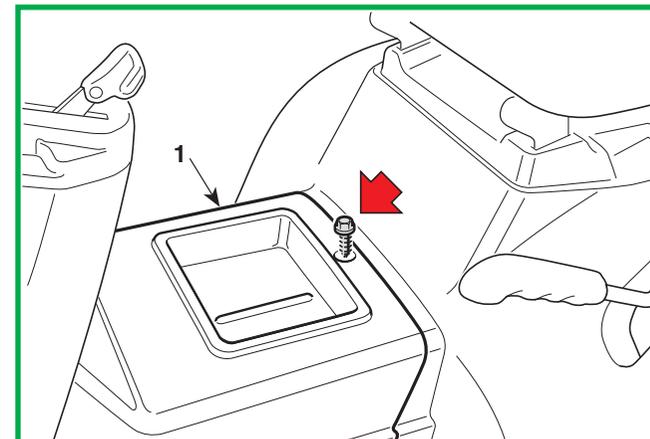
Removal of the rear axle [5.5]

[5.5a]

Replacement of the brake pads and disc

(in mechanical drive models) [6.9]

The brake adjustment spring can be accessed by removing the inspection hatch (1).

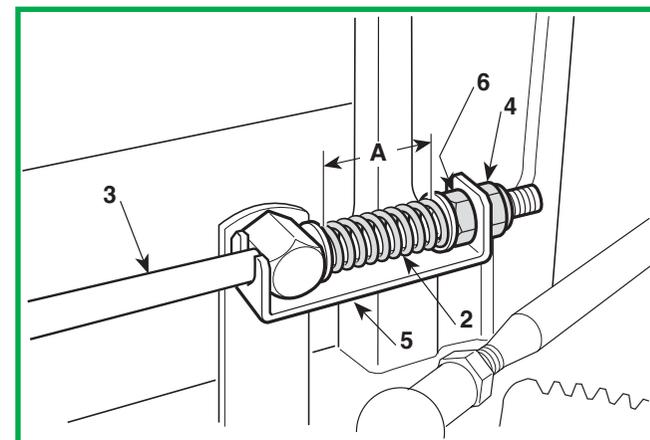


The adjustment is to be made with the parking brake engaged and consists of altering the length of the spring (2) to the best measurement. The braking capacity is increased by screwing the nut down on the rod (and thus shortening the length of the spring).

Loosen the nut (4) which retains the bracket (5) and then turn the nut (6) so that the length "A" of the spring (2) is:

mechanical drive models
43.5 - 45.5 mm

hydrostatic drive models
40 - 42 mm



measured from the inside of the washers. When the adjustment has been made, tighten the nut (4).

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

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

WORKSHOP MANUAL

4.2.1 BRAKE ADJUSTMENT

2 / 2

General informations:

Reduced braking power is corrected by adjusting the spring on the brake rod.

Related topics:

Safety regulations [1.1]

Removal of the rear axle [5.5]

[5.5a]

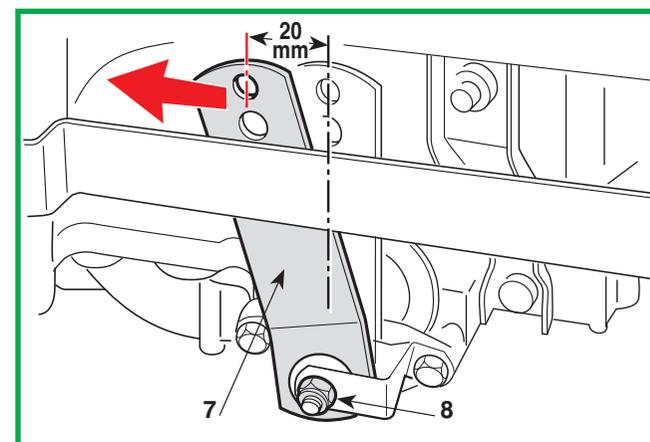
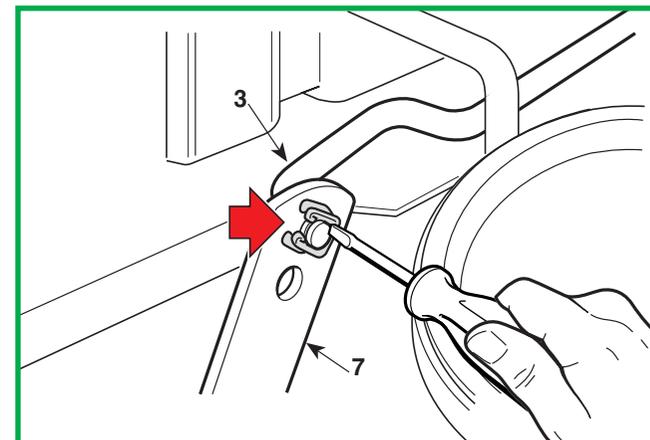
Replacement of the brake pads and disc

(in mechanical drive models) [6.9]

mechanical drive models

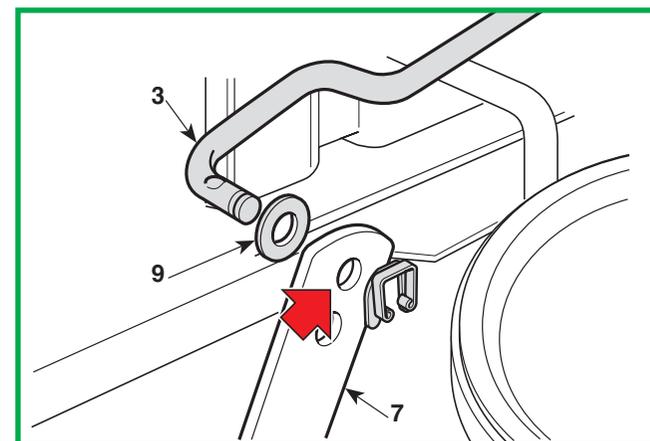
If braking is still poor or uneven even after having made the adjustment, remove the control rod (3) from the lever (7) and check that this lever has a free movement of 20 mm (measured vertically next to the pin rod) before beginning the braking action. If this is not the case, the free movement can be adjusted with the screw (8), unless the brake pads or discs are so worn that they need replacing.

When connecting the rod (3) be sure to use the uppermost hole (9) in the lever (7) and then check the length of the spring again (2).



hydrostatic drive models

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



WORKSHOP MANUAL

4.3.0 DRIVE BELT ADJUSTMENT

1 / 1

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 transmission and limits forward movement power;
- a belt which is too tight increases noise and results in jerky movements or tipping up when engaging the drive.

In these cases the stretcher will need to be adjusted.

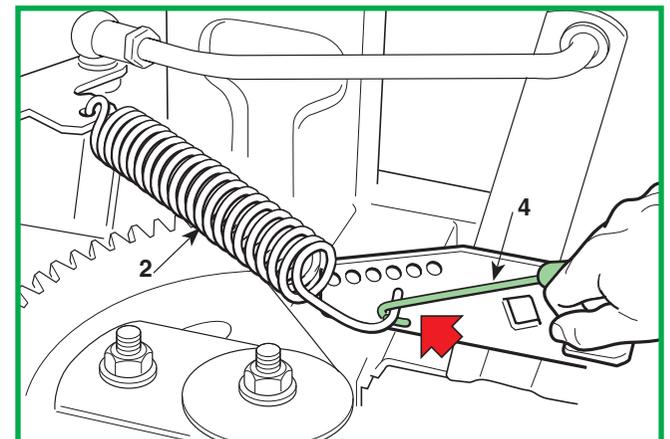
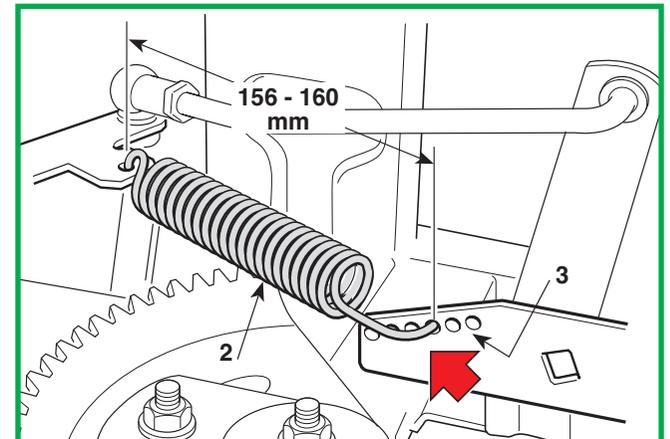
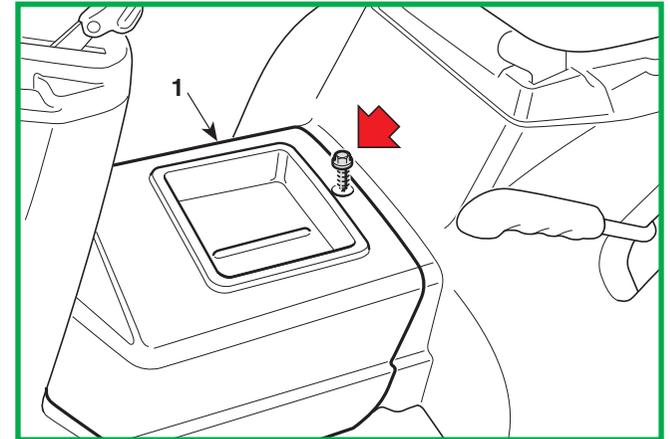
Related topics:

Replacement of the drive belt [6.4]

The adjustment spring can be accessed by removing the inspection hatch (1).

Correct spring tension (2) is obtained by moving the hook to one of the slots (3) until a measure of 156-160 mm is obtained, measured on the outside of the fittings, with the transmission commands disengaged and parking brake off.

Moving the spring (2) requires a certain effort and is easier when a specific tool (4) is used to hook and move the end of the spring.



WORKSHOP MANUAL

4.4.1 DRIVE PEDAL ADJUSTMENT

1 / 2

General informations:

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

Related topics:

Fitting safety microswitches [7.10]

hydrostatic drive models

All the adjustment elements can be accessed by removing the inspection hatch (1).

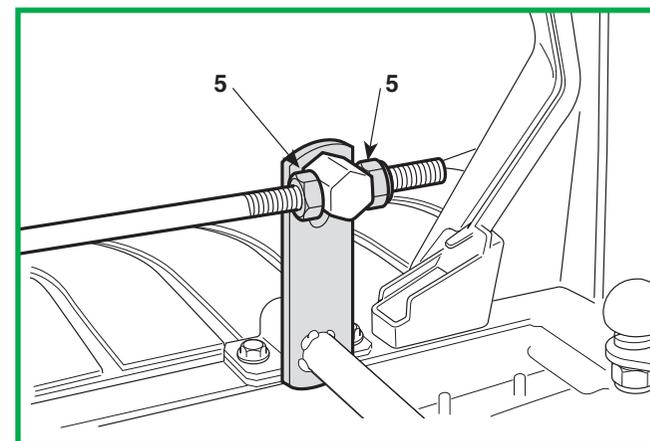
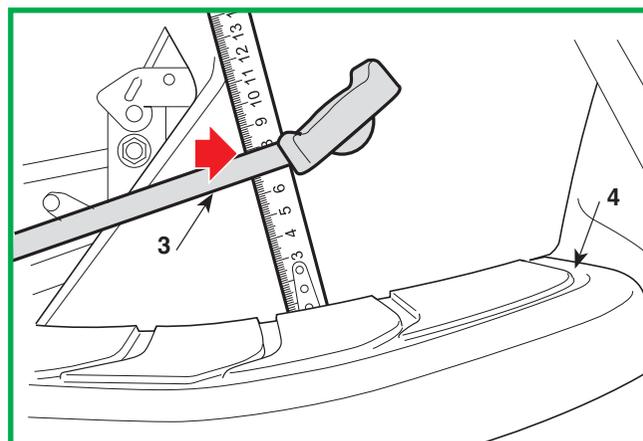
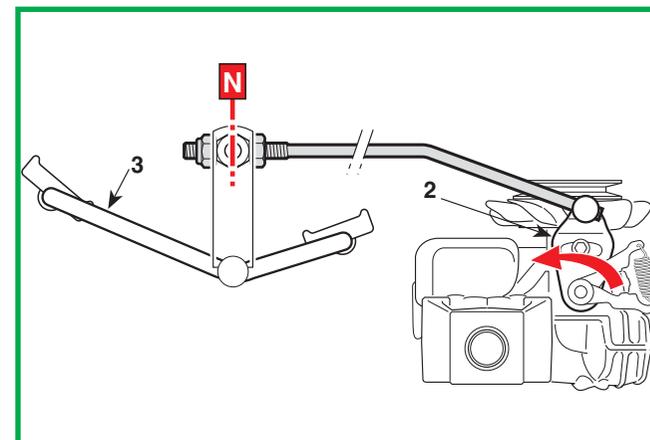
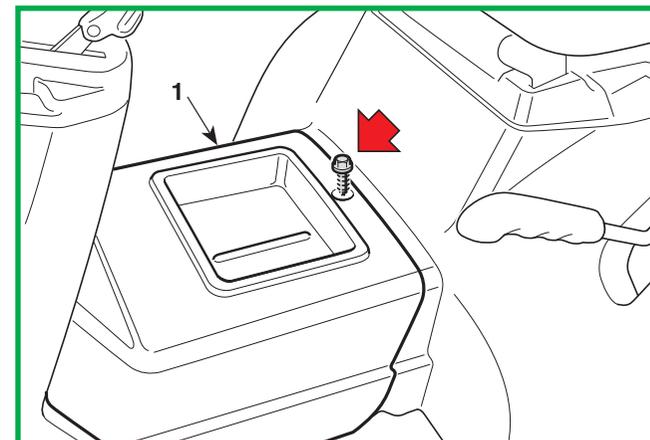
A) Adjusting the pedal in the “neutral” position

Regulating consists of adjusting the position of the pedal (3) with the hydrostatic group lever (2), which is brought to the forward maximum speed position by a spring.

To get the speeds that both forward and reverse gears provide (and consequently “neutral” position for the pedal), the upper edge of the front inclined section of the pedal itself (3) must be 80 mm from the metal edge of the footboard (4).

This is obtained by working on the nuts (5) until reaching the desired measurement.

When adjustment has been completed, move the pedal (3) to the reverse position and check that the lower section (3a) touches the footboard.



WORKSHOP MANUAL

4.4.1 DRIVE PEDAL ADJUSTMENT

2 / 2

General informations:

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

Related topics:

Fitting safety microswitches [[7.10](#)]

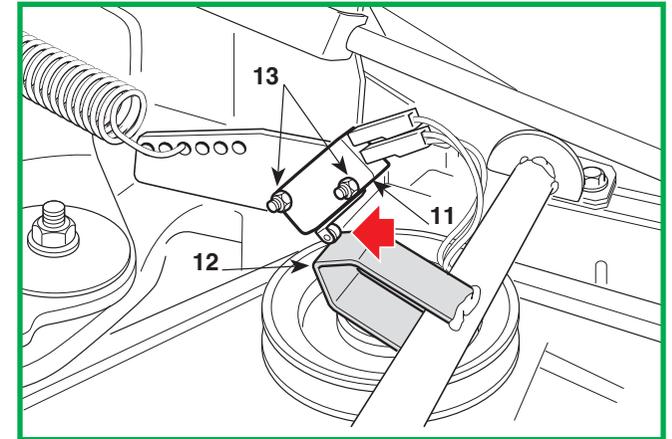
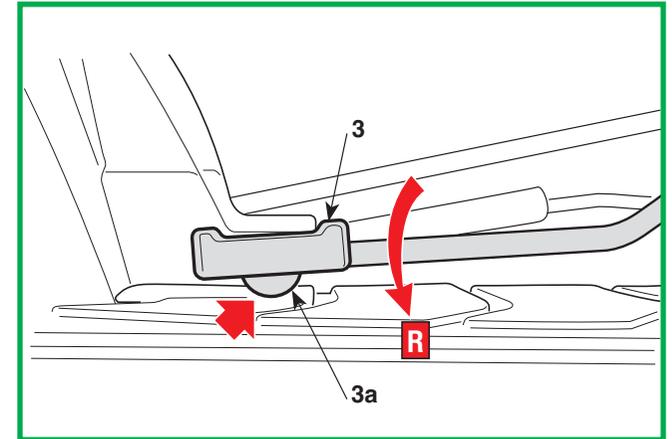
B) Adjusting the “neutral” position of the microswitch

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

The neutral position "N" is signalled by the microswitch (11) of the cam (12).

After checking that the adjustment “A” has been correctly completed, make sure that the pedal is released and in neutral "N" then loosen the fastening screws (13) of the microswitch and position it in line with the tip of the cam, so that it stays pressed down.

By moving the pedal to the forward gear, neutral position and reverse gear you should hear the click of the button at each gear change before the wheels start moving.



WORKSHOP MANUAL

4.5.0 ALIGNING THE CUTTING DECK

1 / 2

General informations:

The cutting deck is lowered by a level controlled cable, and is moved by two trace rods at the front and back.

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

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

- a) a combined adjustment to the parallel and the minimum height front and back
- b) an adjustment to just the parallel across the cutting deck
- c) adjusting the regularity of raising and lowering.

Related topics:

Tools [2.2]

Tyre pressures

Front	..... (Tyres 13 x 5.00-6)	1.5 Bar
	..... (Tyres 15 x 5.00-6)	1.0 Bar
Rear	.....	1.2 Bar

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

A) The combined adjustment to the parallel and the minimum height front and back

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» and completely loosen the adjuster (3), the nuts (4 - 6 - 8) and the locknuts (5 - 7 - 9) of the three trace rods until the deck is resting on the blocks.

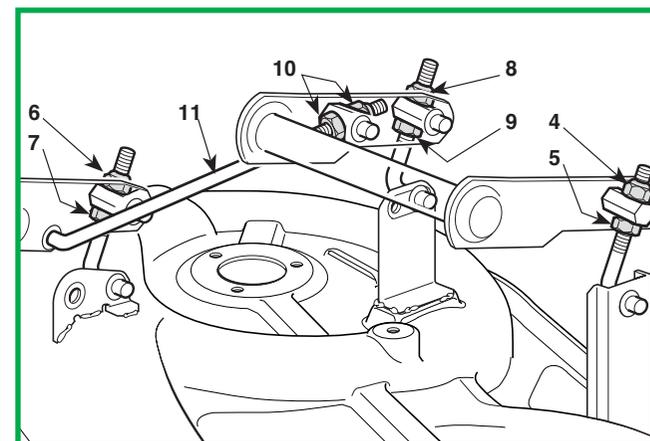
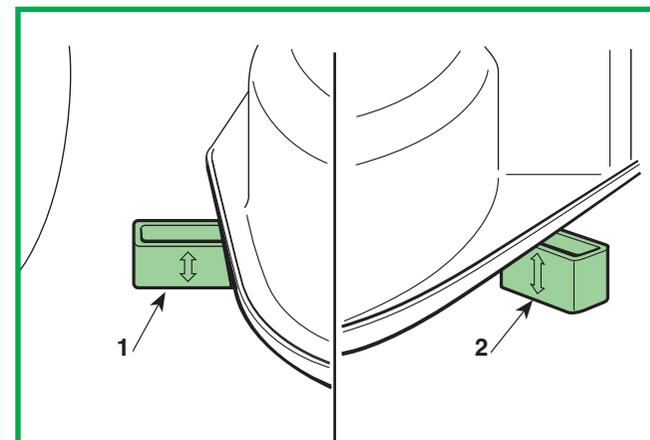
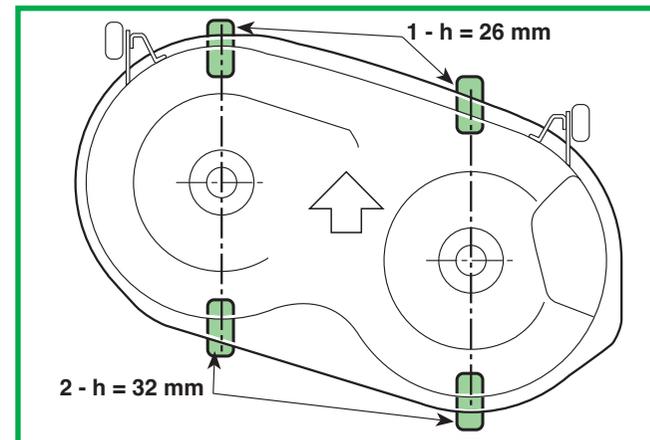
Turn the adjuster (3) until the control cable is taut.

Tighten the two right upper nuts (6 - 8) and the left upper nut (4) to the point where the deck just begins to lift, then tighten the three locknuts (5 - 7 - 9).

Check that the deck rises and lowers regularly as indicated in point «C».

B) Adjusting the parallel across the cutting deck

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) of **just the back rods**.



WORKSHOP MANUAL

4.5.0 ALIGNING THE CUTTING DECK

2 / 2

General informations:

The cutting deck is lowered by a level controlled cable, and is moved by two trace rods at the front and back.

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

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

- a) a combined adjustment to the parallel and the minimum height front and back
- b) an adjustment to just the parallel across the cutting deck
- c) adjusting the regularity of raising and lowering.

Related topics:

Tools [2.2]

Tyre pressures

Front	..... (Tyres 13 x 5.00-6)	1.5 Bar
	..... (Tyres 15 x 5.00-6)	1.0 Bar
Rear	.....	1.2 Bar

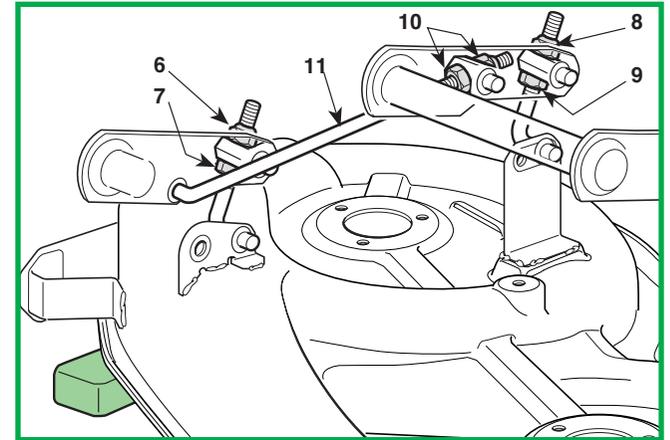
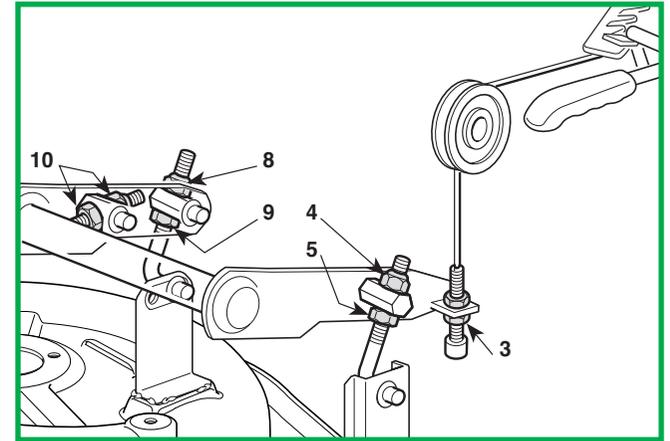
C) Adjusting the regularity of rising and lowering

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.

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



WORKSHOP MANUAL

**4.6.0
ADJUSTING
THE STEERING PLAY**

1 / 1

General informations:

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

Related topics:

Tightening torque

3 Nut for ring gear	25 ÷ 30 Nm
----------------------------------	------------

Check that the steering play is not caused by the slackening off of the tie-rod system and fully tighten all the tie-rod and ball joint nuts.

If the play is due to the crown wheel/pinion pairing, the position of the spacer, fitted to lift the crown wheel and reduce the gap between the teeth, must be changed.

Remove the inspection hatch (1).

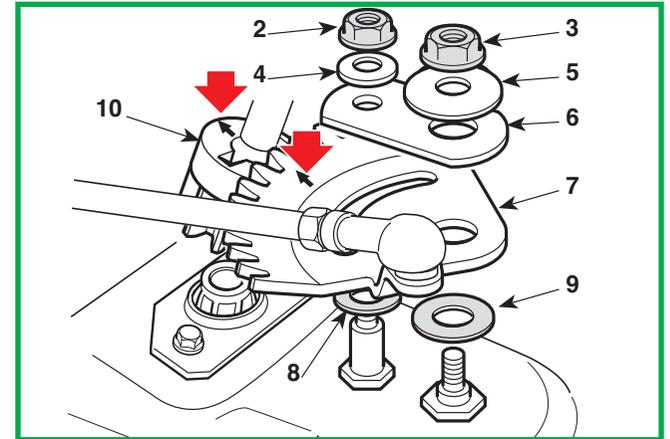
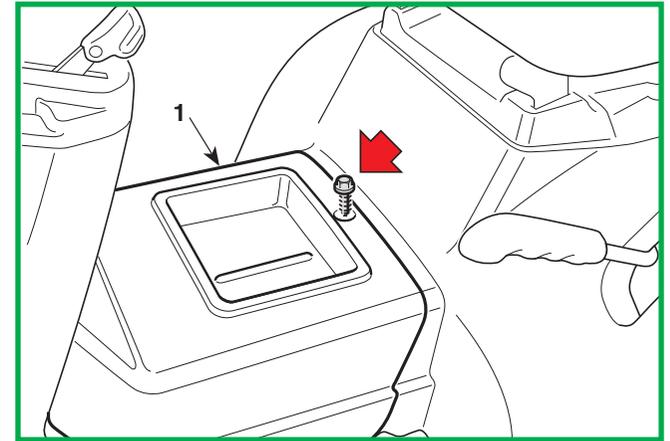
Unscrew the nuts (2) and (3) and remove the two cup washers (4) and (5) and the guide (6).

Remove the ring gear (7) and fit the two block washers (available as spare parts) (8) and (9) under it so as to place it in a higher position with respect to the pinion (10), reducing the gap between the teeth.

Reassemble the ring gear matching the two references (), punched on the ring gear (7) with the pinion (10) in the drive direction.

Reassemble the nuts (2) and (3), tightening them to load the cup springs (4) and (5) as much as need to ensure steering manageability, without creating excessive play.

If the addition of a block (8) and another block (9) do not eliminate the play between ring gear pinion teeth, replace them since other block may not be added.



WORKSHOP MANUAL

4.7.0 STEERING GEOMETRY ADJUSTMENT

1 / 1

General informations:

The correct steering geometry is given by the values of the centre distance between the joints of the tie-rod and the wheel connection 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
= incorrect toe-in
- the lawn-tractor does not maintain a straight line when the steering wheel is straight
= adjustment of tie-rod.

Related topics:

Tightening torque

2 Connection rod fastening nuts 25 ÷ 30 Nm

8 Nut for articulated joint 45 ÷ 50 Nm

NOTE

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

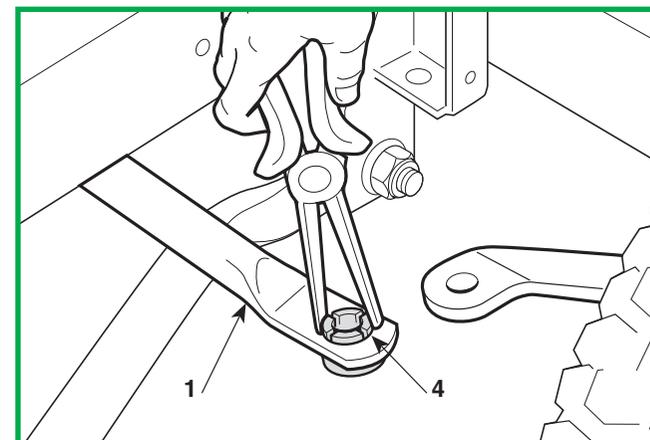
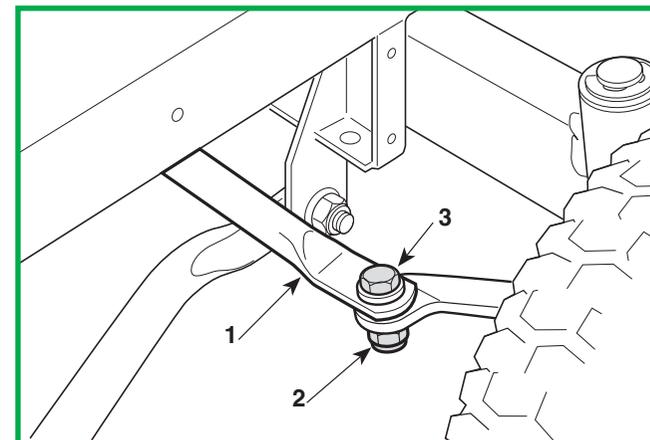
A) Toe-in check

The gap between the connection rod holes (1) on the wheels ensures correct front wheel toe-in check without requiring adjustment.

Toe-in check may only change due to rod deformation (1) or due to spindle bushing wear.

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

Click the new bush (4) and tighten the nut (2) to the prescribed value.

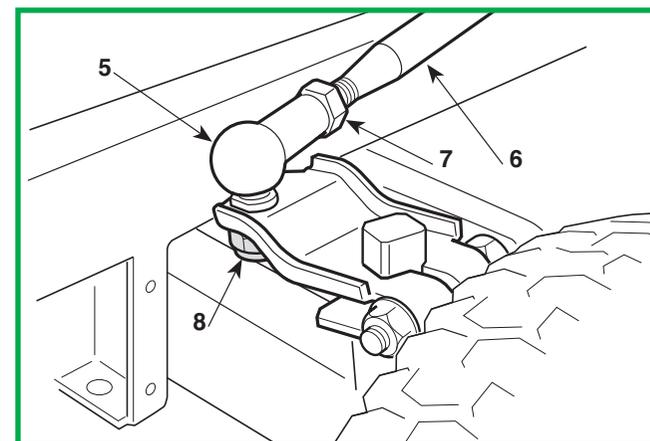


B) Adjustment of the steering wheel

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

If the steering wheel is not straight, dismantle the articulated joint (5) and screw down or up on the tie-rod (6) for the necessary amount.

On assembly, fully tighten the locknut (7) and the fastening nut (8).



WORKSHOP MANUAL

4.8.0 CHECKING BLADES ALIGNMENT

1 / 1

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:

Lifting [2.3]

Replacement of the supports and shafts of the blades [6.6]

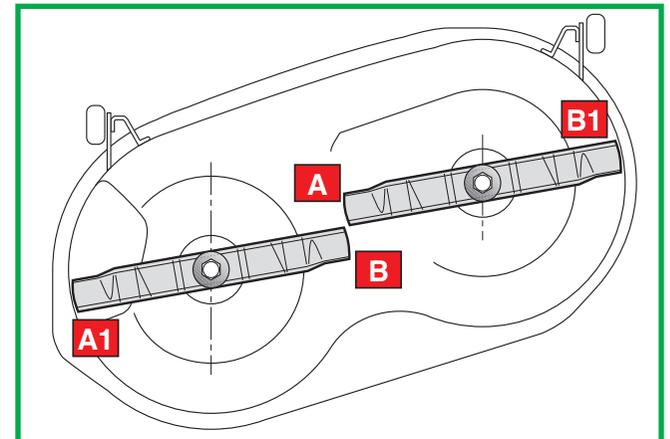
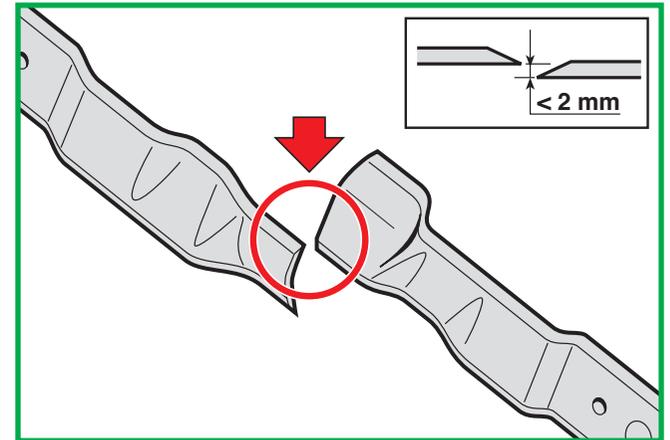
- Lift the machine.

Always wear strong gloves when handling the blades.

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 flange rests on the cutting deck.

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



WORKSHOP MANUAL

4.9.0
REMOVING, SHARPENING
AND BALANCING THE BLADES

1 / 2

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.

Related topics:

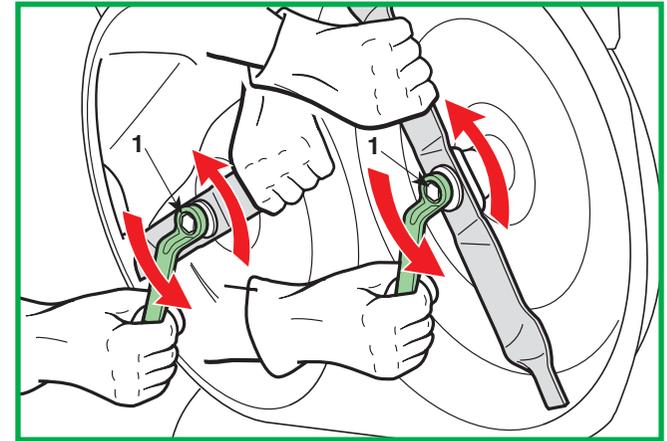
Tightening torque

1 Screw for blade	45 ÷ 50 Nm
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Always wear protective gloves when handling the blades and protect eyes when sharpening.

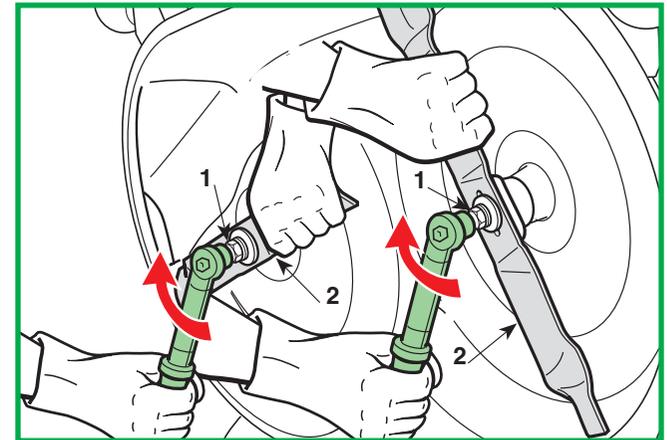
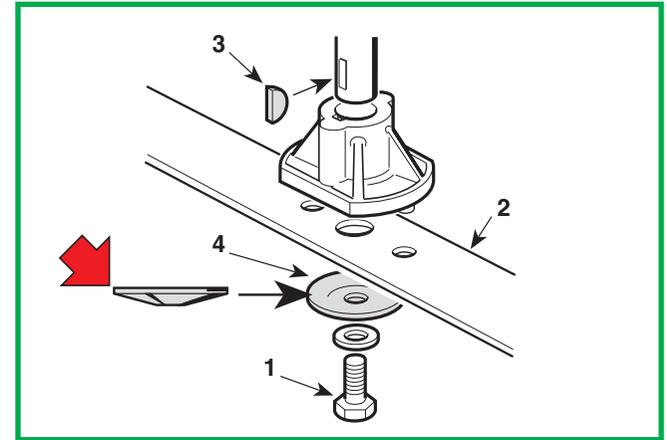
A) Removing and reassembling

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



On assembly, be careful to:

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



WORKSHOP MANUAL

4.9.0
REMOVING, SHARPENING
AND BALANCING THE BLADES

2 / 2

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.

Related topics:

Tightening torque

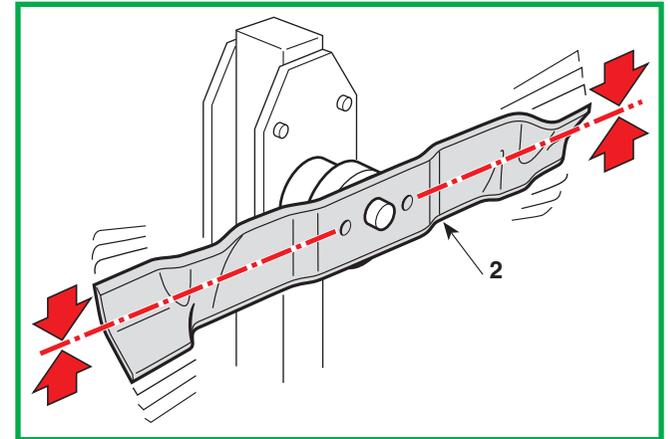
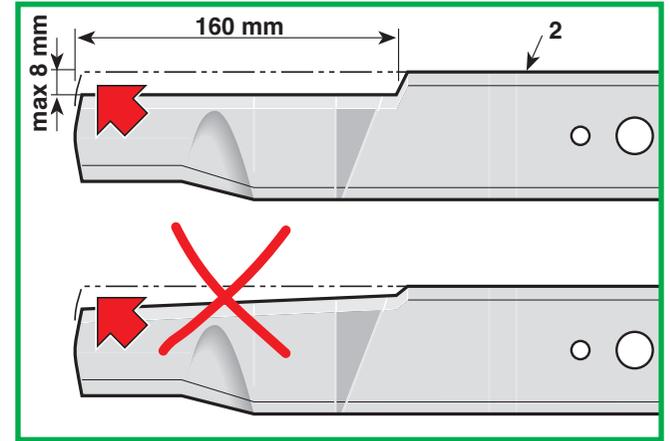
1 Screw for blade	45 ÷ 50 Nm
-------------------------	------------

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 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.



WORKSHOP MANUAL

5.1.0 REMOVAL OF FRONT HOOD

1 / 1

General informations:

The removal of the front hood gives greater accessibility to:

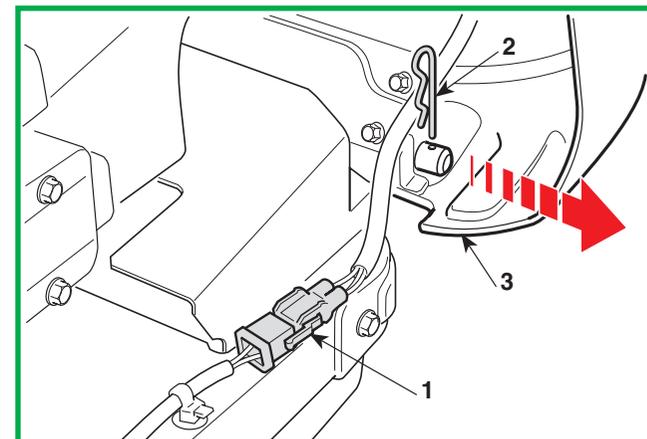
- the engine and its accessories
- the silencer and protection devices.

Related topics:

models with lights

Disconnect the connector (1).

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



WORKSHOP MANUAL

5.2.1 REMOVAL OF THE WHEEL COVER

1 / 2

General informations:

Full wheel cover removal is only required for its replacement. Removal of the sole rear cover is required to remove the rear axle and to replace the transmission belt.

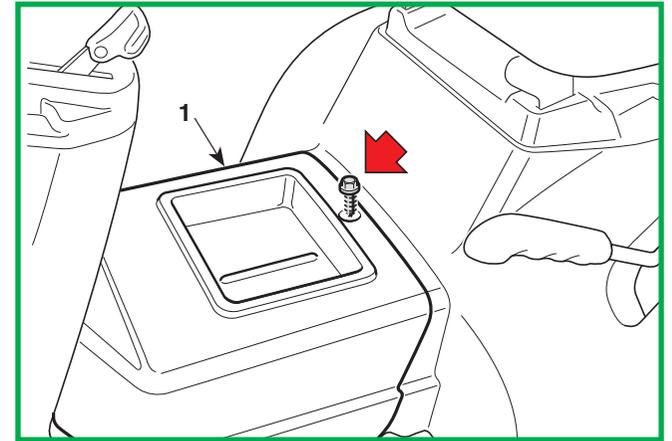
Related topics:

- Remove the inspection hatch (1).

Unscrew the two rear screws below (3) and the two upper screws (4) and remove the rear cover (5).

Remove the covering caps (6) and unscrew the two nuts (7) to remove the seat and the relative support plate (8).

Take off the spring (9) which holds the battery (10), taking care to prevent it accidentally short-circuiting. Disconnect and remove the battery (10).

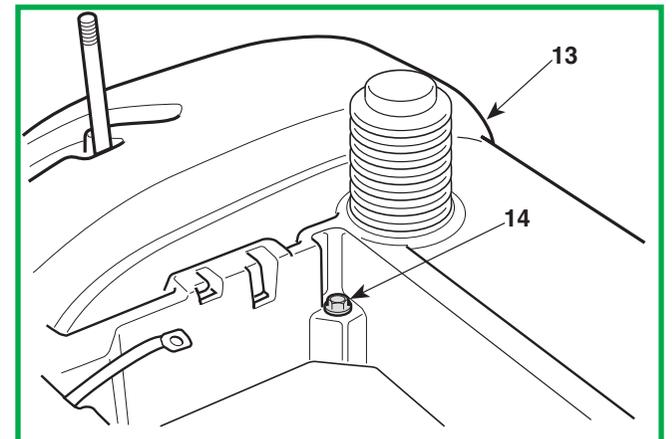
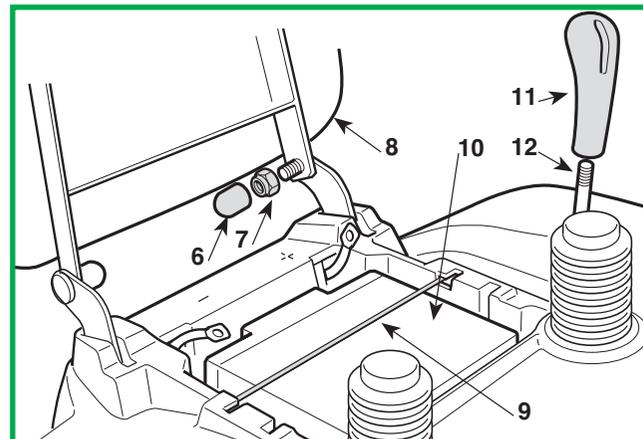
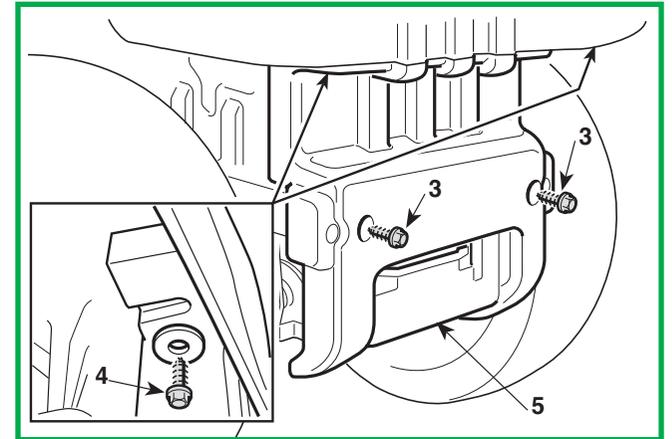


mechanical drive models

Remove the gear lever knob (11) from the lever (12).

The cover (13) is held by:

- 2 screws (14) inside the battery compartment,
- 2 lower screws (15) (1 for each side) located under the external edge of the footboards,



WORKSHOP MANUAL

5.2.1 REMOVAL OF THE WHEEL COVER

2 / 2

General informations:

Full wheel cover removal is only required for its replacement. Removal of the sole rear cover is required to remove the rear axle and to replace the transmission belt.

Related topics:

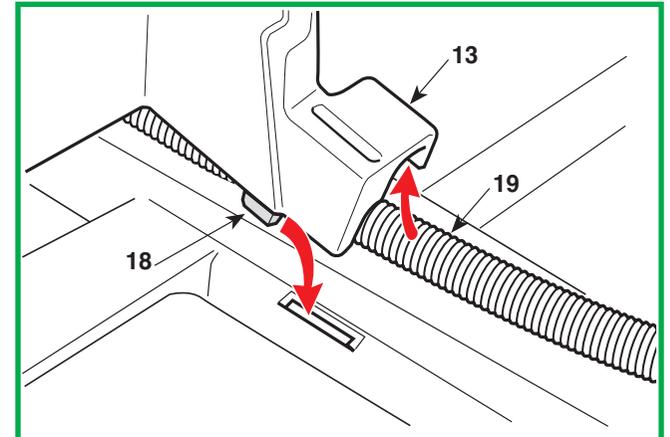
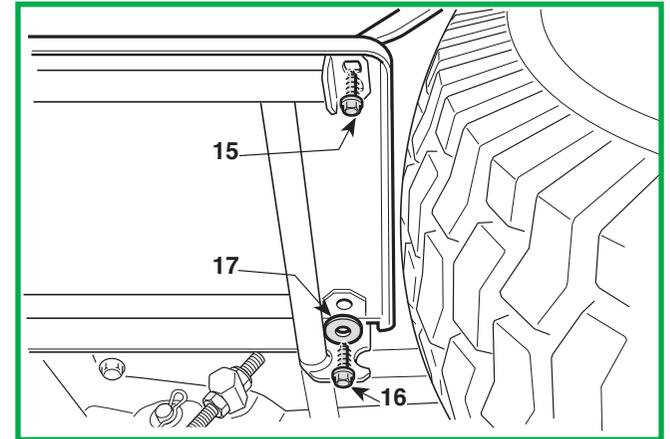
- 2 lower screws (16) (1 for each side) with their washers (17) located under the internal edge of the footboards.

The cover can be removed after the cutting height adjustment lever has been set to position «7».

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

Be careful to correctly insert the two side tongues (18) of the cover in the housings in the footboards.

Correctly reposition the wiring sheath (19) in its housing on the right side of the cover.



WORKSHOP MANUAL

5.3.1 REMOVAL OF THE DASHBOARD

1 / 3

General informations:

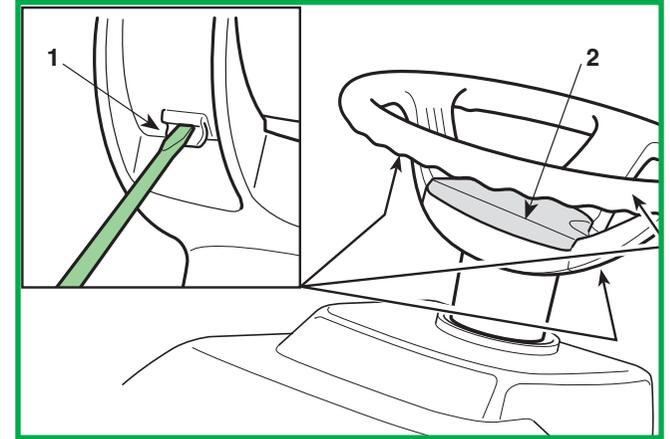
Dashboard removal is only required for its replacement.

Related topics:

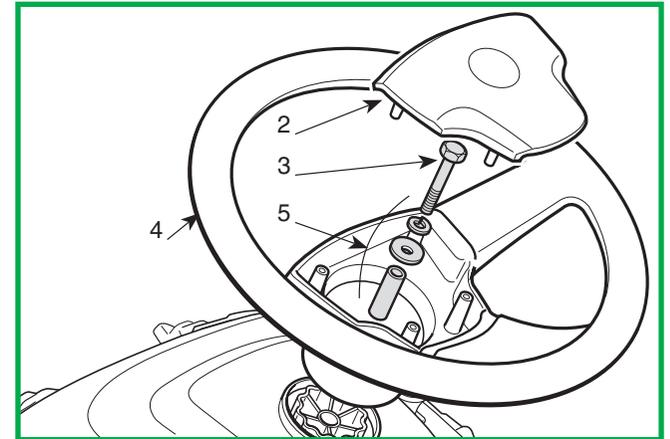
Tightening torque

11-12-13-14 Dashboard fastening screws	12 ÷ 15 Nm
--	------------

Using a screwdriver, unhook the two central hooks and two right and left hooks (1) that secure the steering wheel cover (2).



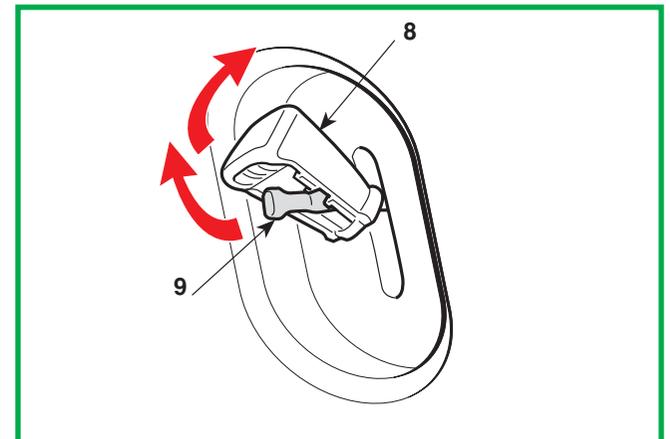
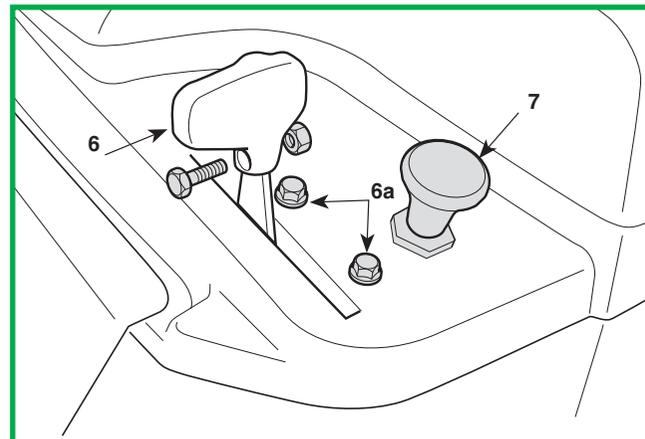
Unscrew the central screw (3) and remove the steering wheel (4) making sure to recover the spacer and washer (5).



Unscrew the screw, take off the accelerator knob (6), then unscrew the accelerator fixing screws (6a).

Remove the starter control (7), where appropriate.

Lift the parking brake knob (8) and rotate it 90° to remove it from the wire (9).



WORKSHOP MANUAL

5.3.1 REMOVAL OF THE DASHBOARD

2 / 3

General informations:

Dashboard removal is only required for its replacement.

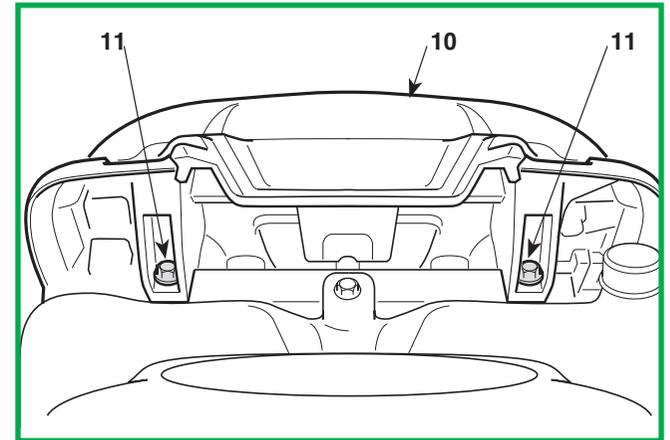
Related topics:

Tightening torque

11-12-13-14	Dashboard fastening screws	12 ÷ 15 Nm
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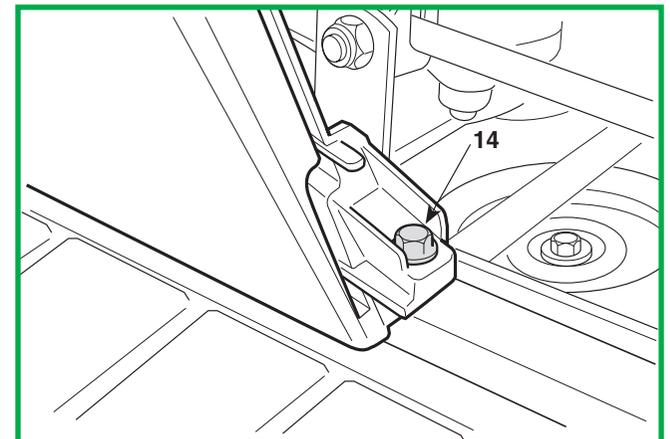
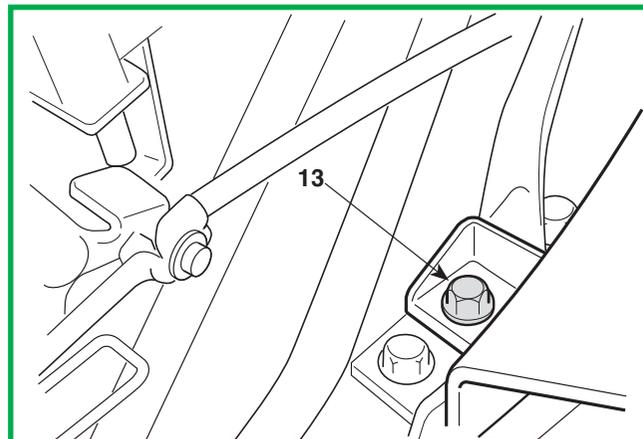
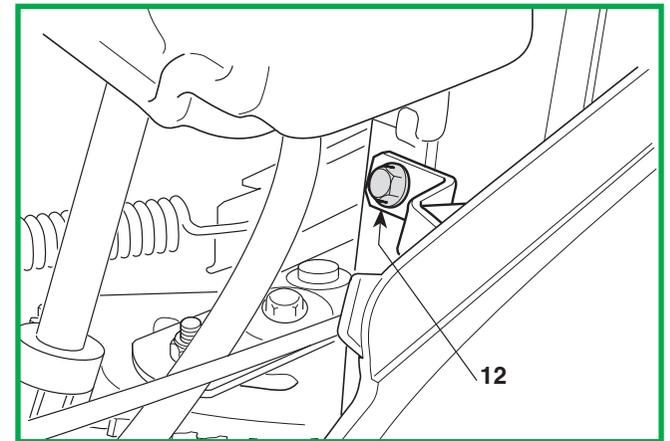
Disconnect all electrical connectors from their respective components:

- ignition key,
- blade engagement clutch switch,
- battery charge connector,
- fuses,
- electronic circuit board.



The dashboard (10) is held by:

- 2 upper frontal screws (11) inside the engine compartment,
- 2 lower frontal screws (12) (1 for each side) located inside the engine compartment,
- 2 lower side screws (13) (1 for each side) located inside the engine compartment,
- 2 lower screws (14) (1 for each side) accessible after removing the central cover.



WORKSHOP MANUAL

5.3.1 REMOVAL OF THE DASHBOARD

3 / 3

General informations:

Dashboard removal is only required for its replacement.

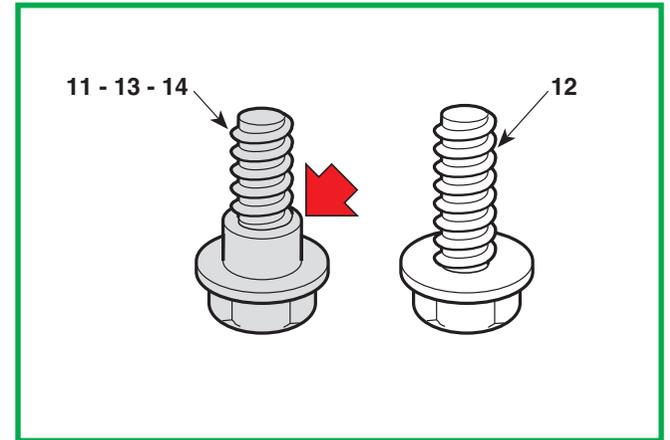
Related topics:

Tightening torque

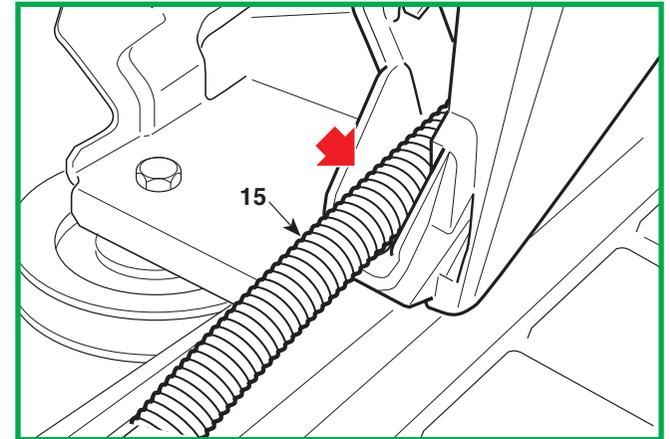
11-12-13-14	Dashboard fastening screws	12 ÷ 15 Nm
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For assembly follow the operations described above in reverse order, making sure not to confuse the order of the screws (11) - (12) - (13) - (14) since:

- screws (11) - (13) - (14) have a stop that optimises use for plastic components;
- screws (12) do not have stops and are suited for metallic components.



Correctly reposition the wire sheath (15) in its housing on the lower right-hand side of the dashboard.



WORKSHOP MANUAL

5.4.2 REMOVAL OF THE ENGINE

1 / 3

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:

Removal of front hood [5.1]

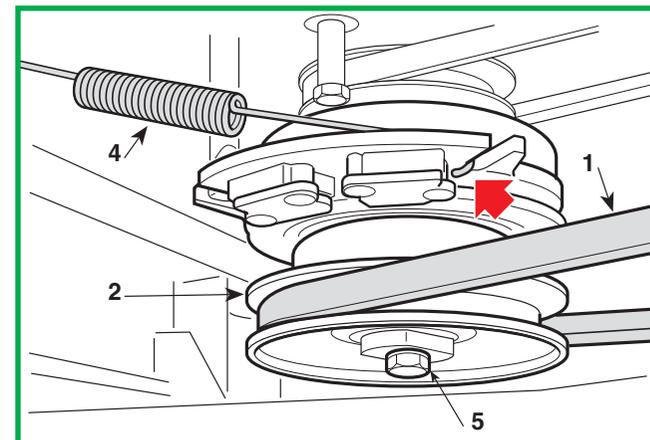
Replacing the accelerator and adjusting the carburettor [6.7]

Tightening torque

5 Screw for pulley	45 ÷ 50 Nm
– Screws for engine fastening	35 ÷ 40 Nm

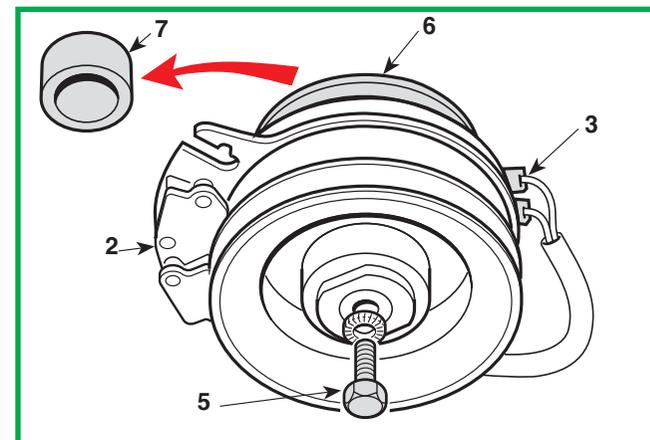
- Remove the front hood.

For greater operating convenience it is recommended that the transmission belt is slackened off; this is done by.



FIRST disconnect the black earth cable from the battery, and THEN the red cable, to prevent possible short circuits and dangerous situations.

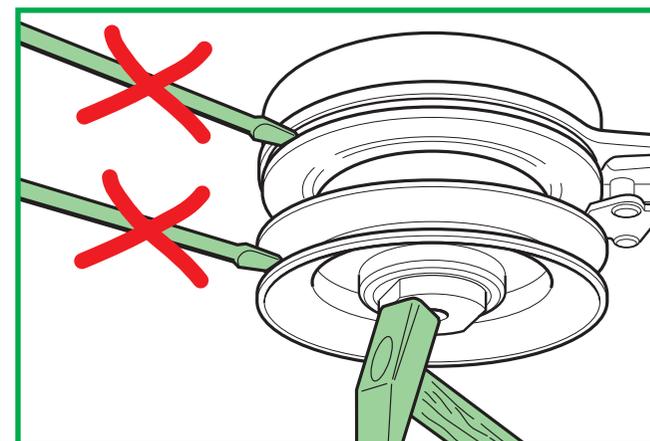
Free the blade belt (1) from the clutch pulley (2).



Disconnect the connectors (3) from the clutch contacts (2), unhook the return spring (4) from the clutch side and unscrew the central screw (5) with the help of a power screwdriver.

Remove the clutch (2) from the shaft, together with the transmission command pulley (6) and the spacer (7).

IMPORTANT - To remove the clutch (2) 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.



WORKSHOP MANUAL

5.4.2 REMOVAL OF THE ENGINE

2 / 3

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:

Removal of front hood [5.1]

Replacing the accelerator and adjusting the carburettor [6.7]

Tightening torque

5 Screw for pulley 45 ÷ 50 Nm

– Screws for engine fastening 35 ÷ 40 Nm

Remove the exhaust guard (8).

Disconnect the accelerator cable control and the electrical cables.

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.

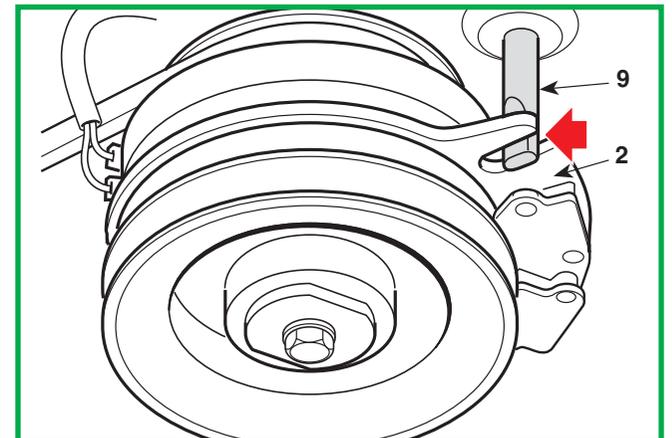
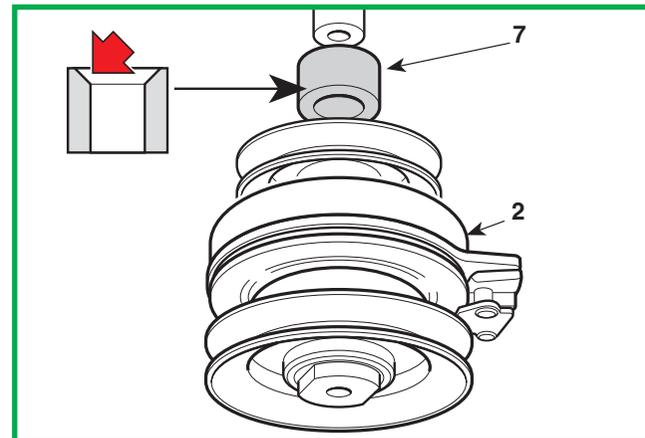
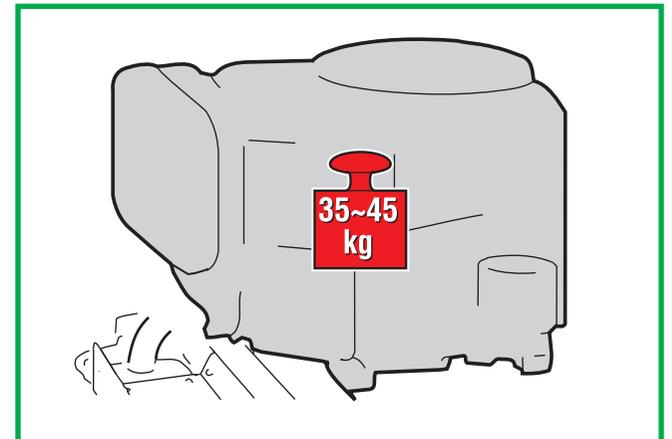
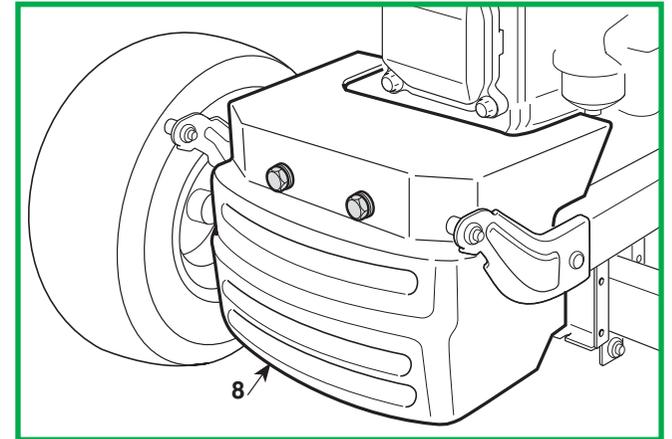
NOTE

Some types of engine can be fixed with screws of a different length and in a different position, so it is advisable to mark them, to prevent errors on reassembly.

For reassembly follow the operations described above in reverse.

Reassemble the spacer (7), with the countersink facing the engine.

Ensure that the pin (9) is inserted in the groove in the



WORKSHOP MANUAL

5.4.2 REMOVAL OF THE ENGINE

3 / 3

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:

Removal of front hood [5.1]

Replacing the accelerator and adjusting the carburettor [6.7]

Tightening torque

5 Screw for pulley	45 ÷ 50 Nm
– Screws for engine fastening	35 ÷ 40 Nm

clutch (2) and remember to replace the spring (4).

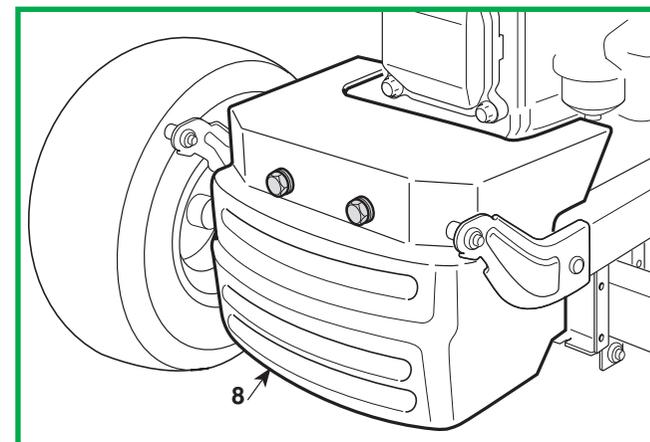
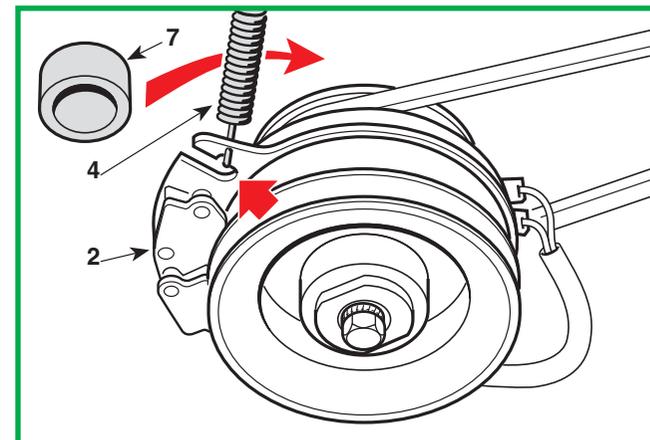
Fully tighten the engine and pulley fixing screws to the prescribed values.

Remember to replace the fuel pipe fastening clamps and **check that there are no leaks.**

Carefully restore all electric and earth contacts and always refit the exhaust guard (8).

Refit the accelerator cable and...

- Adjust the "TICK-OVER" position.
- Refit the front bonnet.



WORKSHOP MANUAL

5.5.1
REMOVAL OF THE REAR AXLE
Peerless MST 205-535 E

1 / 2

General informations:

The rear axle (Transaxle) is made up of single maintenance free sealed unit which includes the transmission unit and the differential. It only needs to be removed to be replaced or for an overhaul by the Manufacturer's Service Centre.

Related topics:

Lifting [2.3]

Brake adjustment [4.2]

Removal of the wheel cover [5.2]

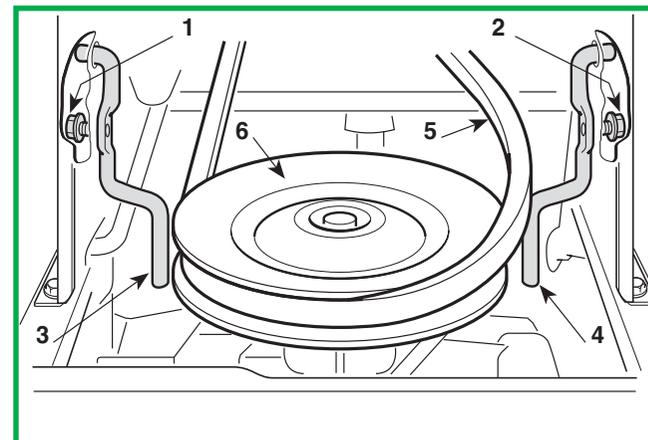
Removal of the wheels [6.1]

Tightening torque

14	Screw for bracket fastening	25 ÷ 30 Nm
15	Self-tapping screw	25 ÷ 30 Nm
17	Rear axle fastening nut	25 ÷ 30 Nm

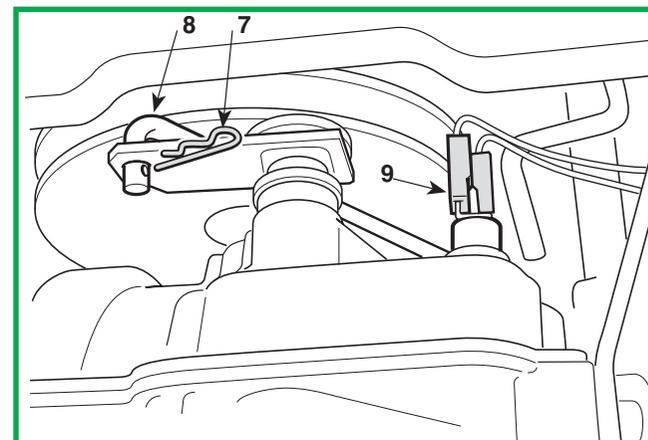
- Lift the rear part of the machine.
- Remove the rear wheels.
- Remove the rear cover.

Engage the parking brake to slacken off the belt and obtain greater operating convenience.



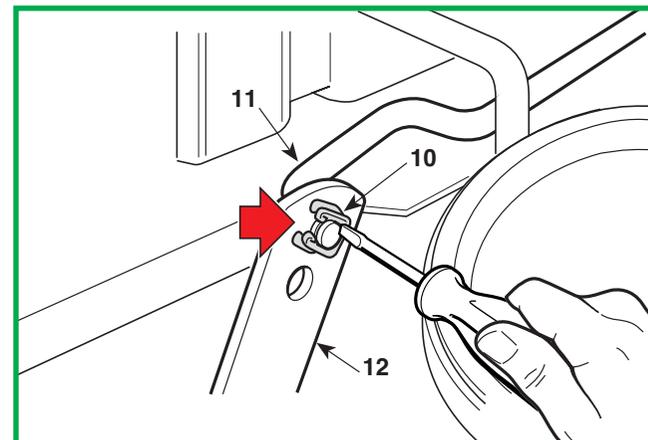
Bring the cutting deck to the highest position.

Loosen the two side screws (1) and (2) and move the two belt guides (3) and (4) forward until the belt (5) is released from the pulley (6).



Remove the split pin (7) and disconnect the gear control rod (8).

Disconnect the "neutral" signal microswitch cables (9).



Release the parking brake to reduce spring tension on the rod, then remove the plate (10) and disconnect the brake control rod (11) from the lever (12).

WORKSHOP MANUAL

5.5.1 REMOVAL OF THE REAR AXLE Peerless MST 205-535 E

2 / 2

General informations:

The rear axle (Transaxle) is made up of single maintenance free sealed unit which includes the transmission unit and the differential.

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

Related topics:

Lifting [2.3]

Brake adjustment [4.2]

Removal of the wheel cover [5.2]

Removal of the wheels [6.1]

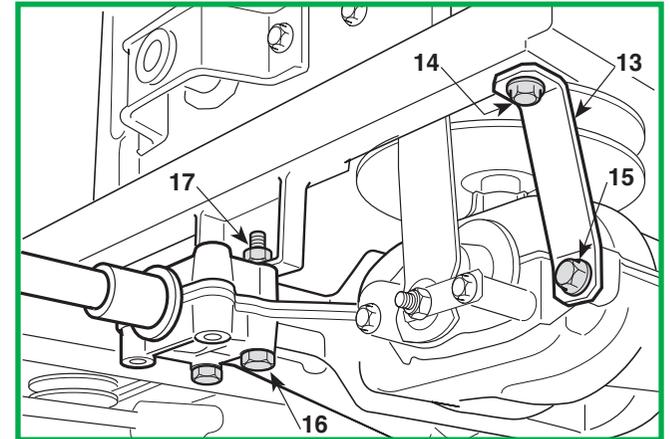
Tightening torque

14 Screw for bracket fastening 25 ÷ 30 Nm

15 Self-tapping screw 25 ÷ 30 Nm

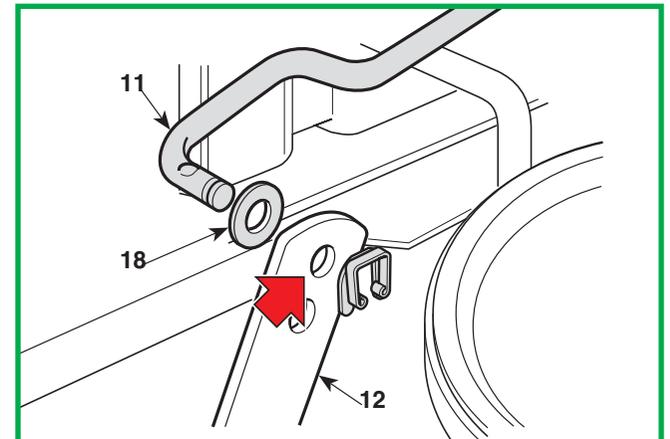
17 Rear axle fastening nut 25 ÷ 30 Nm

The unit is supported on the left by a bracket (13) with their screws (14) and (15) and is attached to the frame by four screws (16) with their nuts (17).



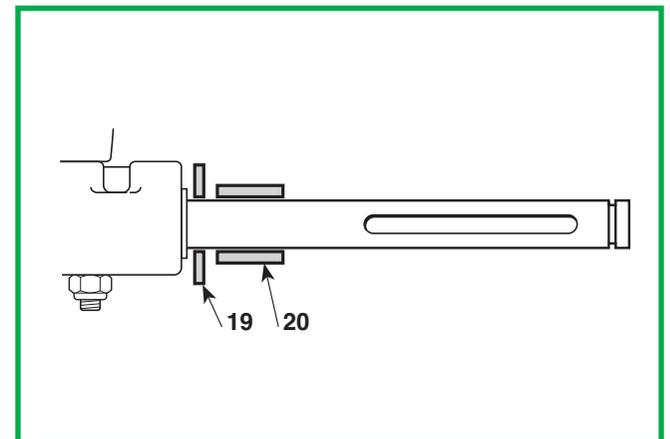
Loosen the screw (14) to give a minimum of movement to the bracket (13) and undo the two screws (16). Then carefully loosen the four nuts (17), holding up the unit so that it does not fall.

To reassemble, reverse the order of the previous operations, taking particular care with the self-tapping screw (15) which, if not screwed in correctly, could damage the threads inside so preventing it from being fastened properly.



When connecting the rod (11) be sure to use the uppermost hole in the lever (12) and replace the washer (18).

Check that the spacers (19 - 20) are correctly fitted to the shafts, in the sequence given.



Reattach all the connections, and then ...

- Check the brake.
- Refit the rear wheels.
- Replace the rear cover.

WORKSHOP MANUAL

5.5a.0
REMOVAL OF THE REAR AXLE
Hydro-Gear T2-ADB-2X3C-17X1

1 / 2

General informations:

The rear axle (Transaxle) is made up of single maintenance free sealed unit which includes the transmission unit and the differential. It only needs to be removed to be replaced or for an overhaul by the Manufacturer's Service Centre.

Related topics:

- Lifting [2.3]
- Brake adjustment [4.2]
- Removal of the wheel cover [5.2]
- Removal of the wheels [6.1]

Tightening torque

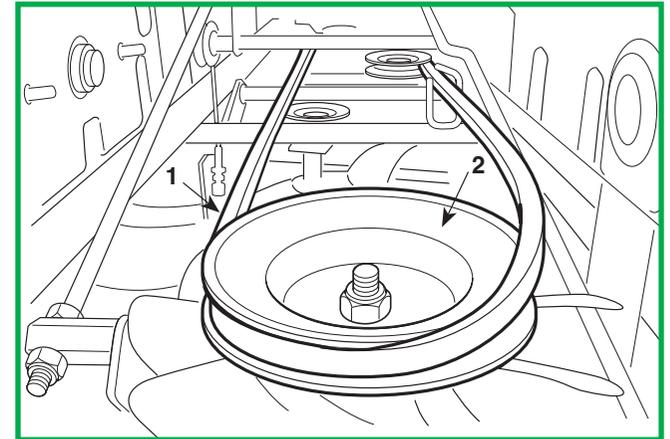
9-10 Nuts for bracket fastening	25 ÷ 30 Nm
11 Rear axle fastening nut	25 ÷ 30 Nm

- Lift the rear part of the machine.
- Remove the rear wheels.
- Remove the rear cover.

Engage the parking brake to slacken off the belt and obtain greater operating convenience.

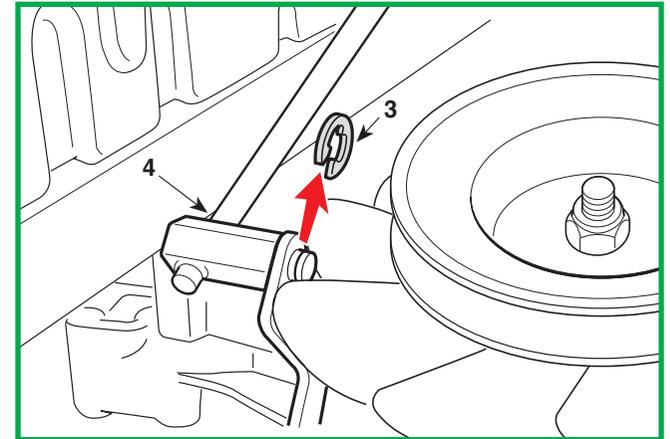
Bring the cutting deck to the highest position.

Hold the two parts of the belt (1) and release it from the pulley (2).



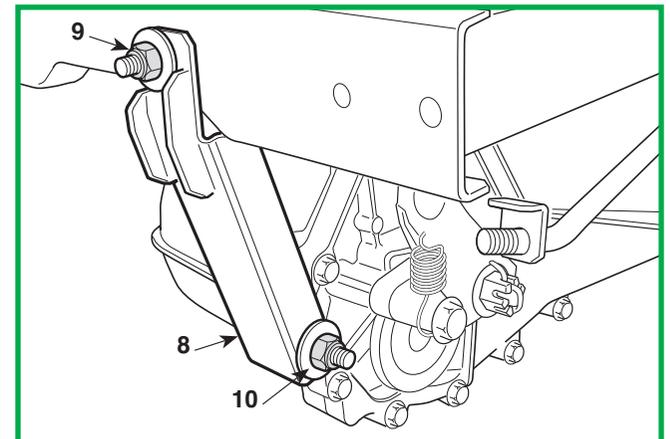
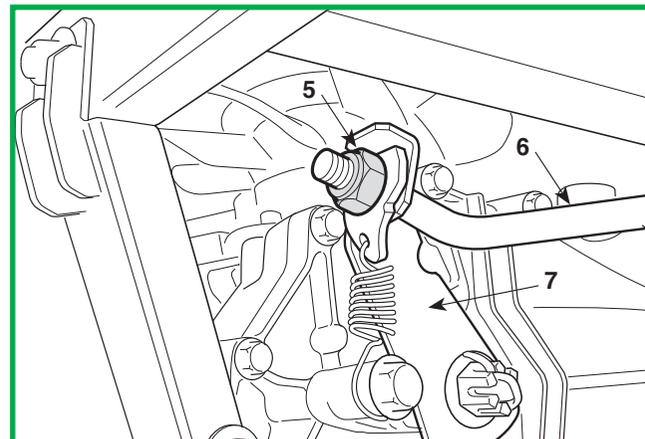
Remove the snap ring (3) and disconnect the drive control lever (4).

Release the parking brake to reduce spring tension on the rod, then remove the nut (5) and disconnect the brake control rod (6) from the lever (7).



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

Loosen the upper nut (9) to give a minimum of movement to the bracket (9), unscrew the nut (10) and slide out the relative screw.



WORKSHOP MANUAL

5.5a.0
REMOVAL OF THE REAR AXLE
Hydro-Gear T2-ADB-2X3C-17X1

2 / 2

General informations:

The rear axle (Transaxle) is made up of single maintenance free sealed unit which includes the transmission unit and the differential. It only needs to be removed to be replaced or for an overhaul by the Manufacturer's Service Centre.

Related topics:

Lifting [2.3]

Brake adjustment [4.2]

Removal of the wheel cover [5.2]

Removal of the wheels [6.1]

Tightening torque

9-10 Nuts for bracket fastening 25 ÷ 30 Nm

11 Rear axle fastening nut 25 ÷ 30 Nm

Carefully unscrew the four frame fastener nuts (11), adequately supporting the unit so it does not fall.

To reassemble, reverse the order of the previous operations.

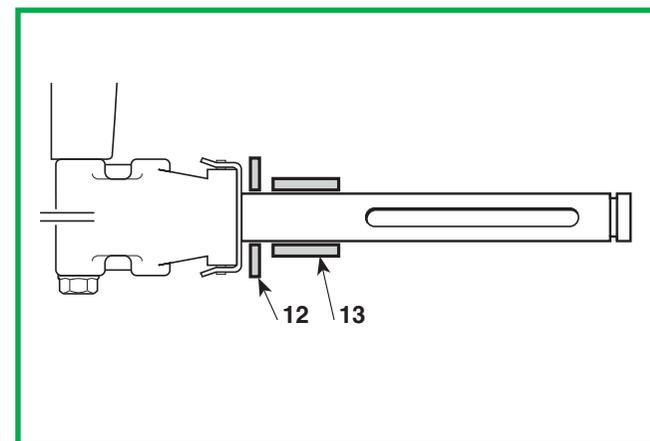
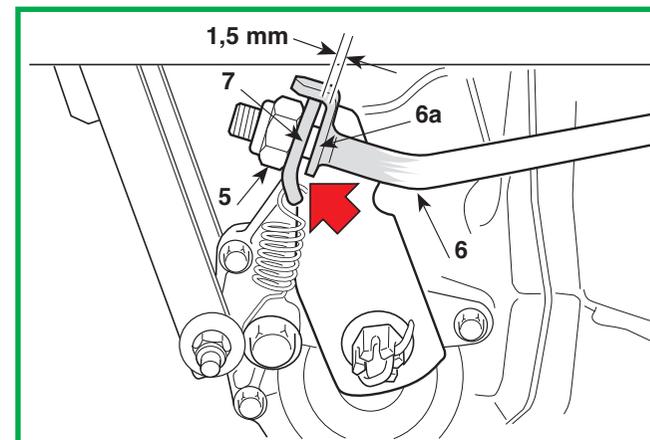
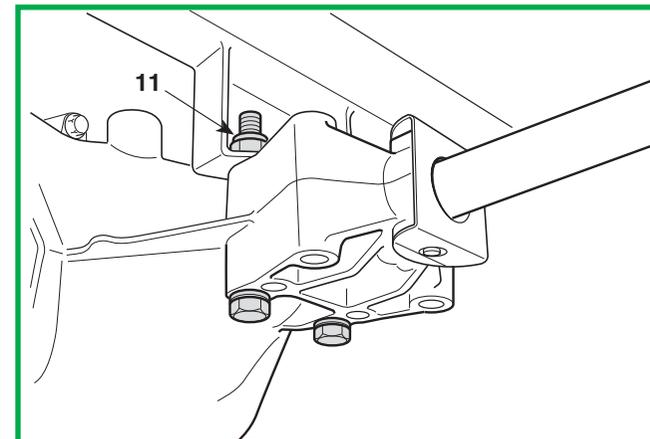
When you come to connect the brake rod (6), it is necessary to screw the nut (5) on as far as possible, along the entire rod thread.

After completing the screwing phase, engage the parking brake and check that there is a 1.5 mm gap between the rod plate (6a) and the lever (7).

Check that the spacers (12 – 13) are correctly fitted to the shafts, in the sequence given.

Reattach all the connections, and then ...

- Check the brake.
- Remount the rear wheels.
- Remount the rear cover.



WORKSHOP MANUAL

5.6.0 REMOVAL OF THE CUTTING DECK

1 / 1

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:

Aligning the cutting deck [4.5]

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 arms (4) to the frame.

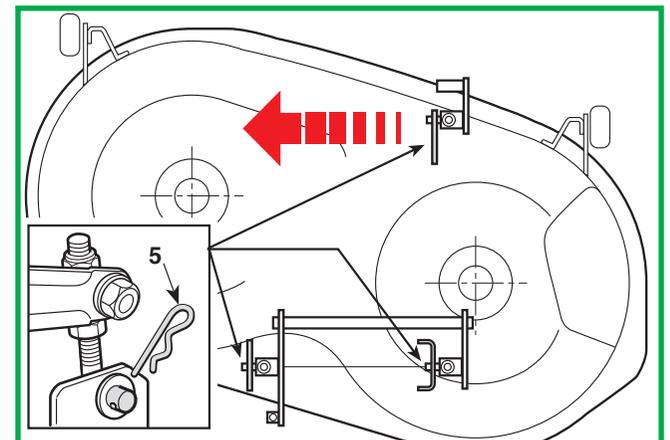
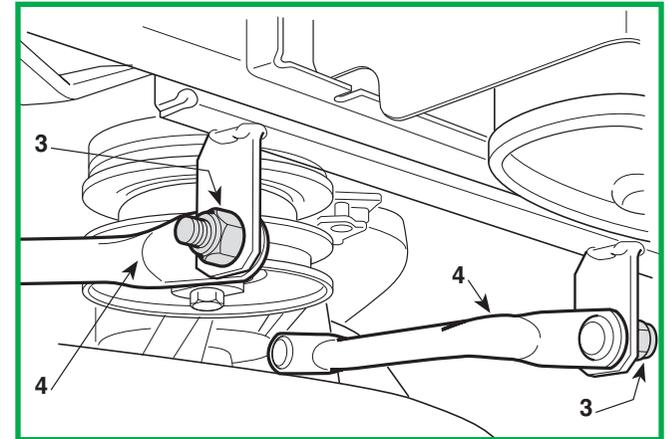
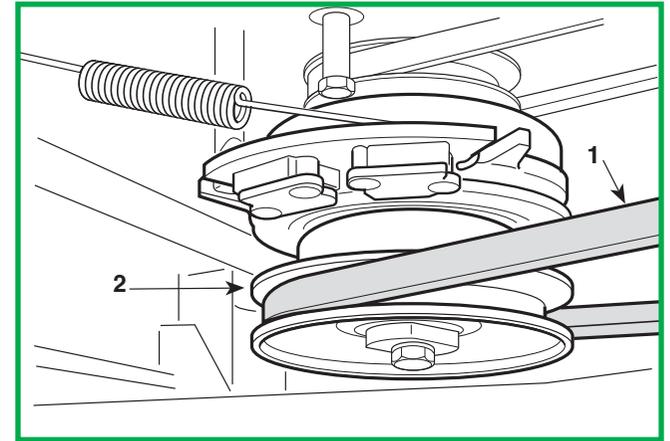
Release the three flexible split pins (5) of the lifting tie-rods.

Having checked that there is nothing in the way, the deck can be removed, turning it anti-clockwise so that all the pins come out of their positions.

To assemble, perform the operations described above in reverse order making sure to tighten the nuts (3) so as not to hinder correct cutting deck oscillation.

When assembly is completed ...

- Check the alignment of the cutting deck.



WORKSHOP MANUAL

6.1.0 REPLACEMENT OF TYRES AND WHEELS

1 / 1

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:

Aligning the cutting deck [4.5]

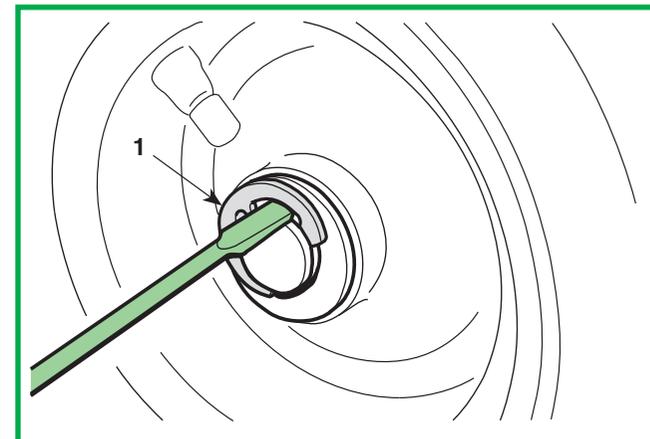
Tyre pressures

Front	..... (Tyres 13 x 5.00-6)	1.5 Bar
	..... (Tyres 15 x 5.00-6)	1.0 Bar
Rear	.....	1.2 Bar

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.

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



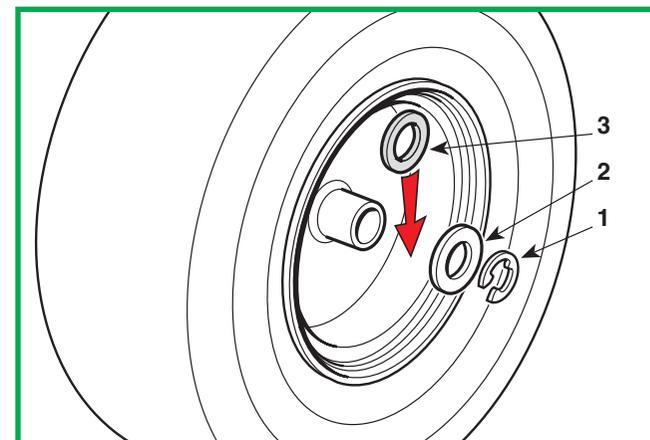
B) Wheels

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 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).

WORKSHOP MANUAL

6.2.0 REPLACEMENT OF FRONT WHEEL BEARINGS

1 / 1

General informations:

Related topics:

Tools [2.2]

Lifting [2.3]

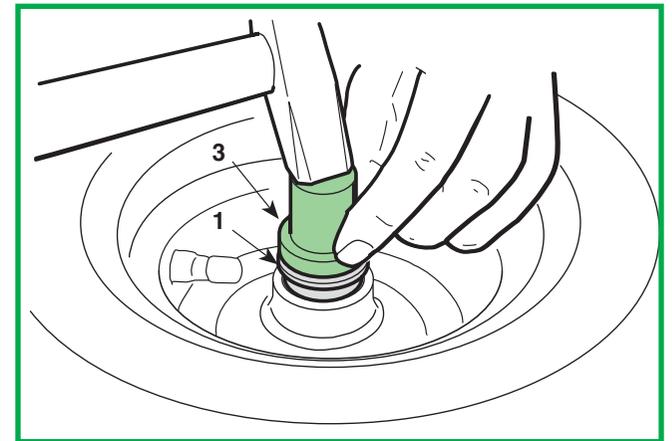
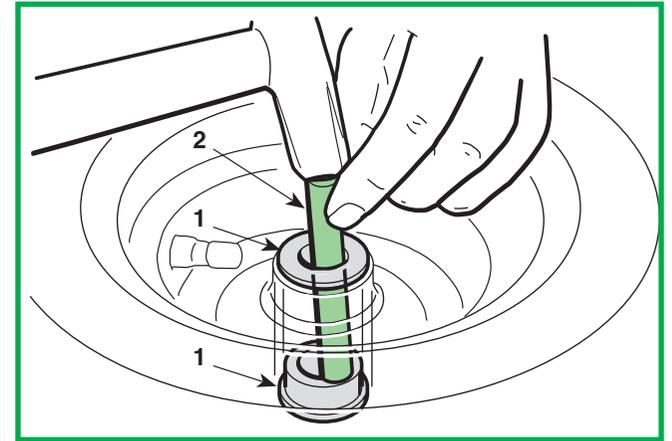
Removal of the wheels [6.1]

- Dismantle the front wheel.

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

To be able to remove a bearing a 10 - 12 mm round bar (2) is needed. Insert this from the opposite side and hammer it on various points around the internal circumference of the bearing.

The new bearing must be inserted with the help of a plastic mallet or a bronze pad (3) **working only on the outer ring of the bearing.**



WORKSHOP MANUAL

6.3.0 DISMANTLING THE STEERING COMPONENTS

1 / 2

General informations:

Related topics:

Steering geometry adjustment [4.7]

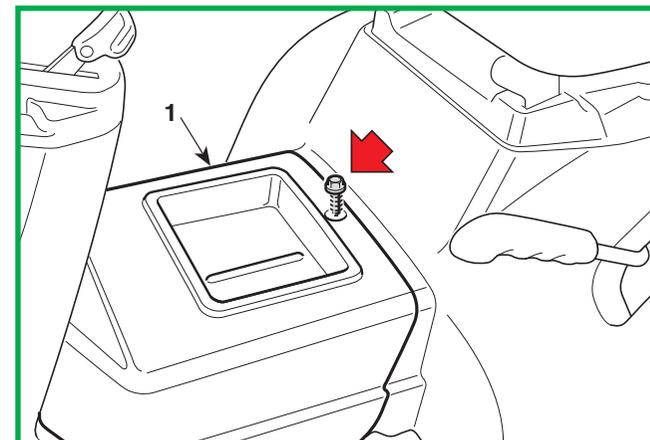
Tightening torque

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

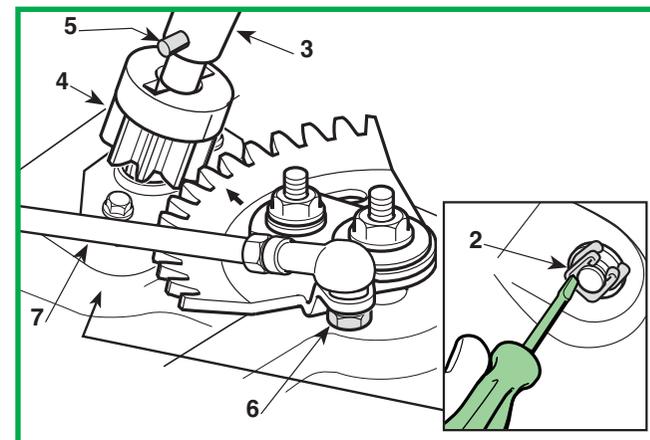
- Remove the inspection hatch (1).

A) Dismantling steering pinion and ring gear

Unhook the spring (2) and lift the steering column (3) just enough to be able to draw out the pinion (4), taking care not to take out the pin (5).

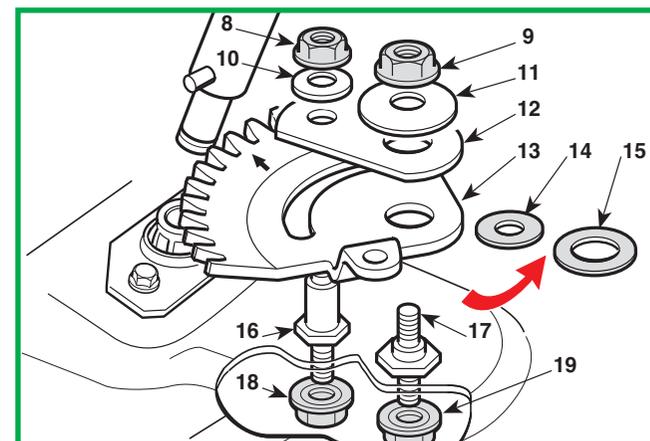


Unscrew the nut (6) and disconnect the steering tie-rod (7).



Remove the nuts (8) and (9), the cup washer (10) and (11), the guide (12) and dismantle the ring gear (13).

In the case of replacement of the ring gear and pinion, the blocks (14) and (15), that might have been placed under the ring gear previously, must be removed.



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

To assemble, perform the operations described above in reverse order being careful to correctly reconnect the pin (5) in the pinion housing (4).

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

WORKSHOP MANUAL

**6.3.0
DISMANTLING
THE STEERING COMPONENTS**

2 / 2

General informations:

Related topics:

Steering geometry adjustment [4.7]

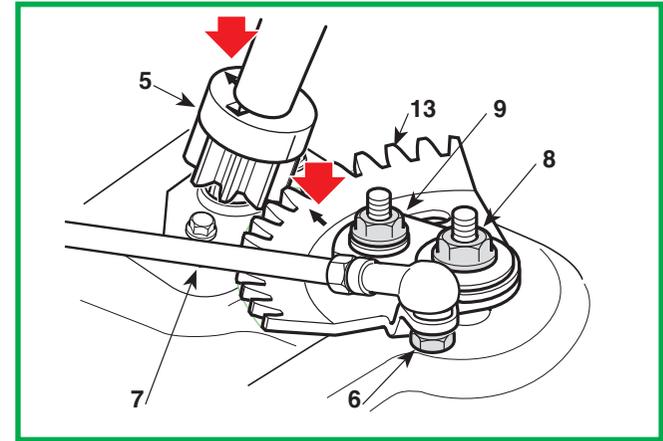
Tightening torque

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

Reassemble the ring gear matching the two references (), punched on the ring gear (13) with the pinion (5) in the drive direction.

Reassemble the nuts (8) and (9), tightening them to load the cup springs (10) and (11) as much as need to ensure steering manageability, without creating excessive play.

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



B) Lower bush replacement

Unhook the spring (21) and lift the steering column (22) just enough to be able to draw out the pinion (23), taking care not to take out the pin (24).

Use a universal socket wrench to unscrew the two screws (25) that fix the plate (26) and remove the spherical lower bush (27).

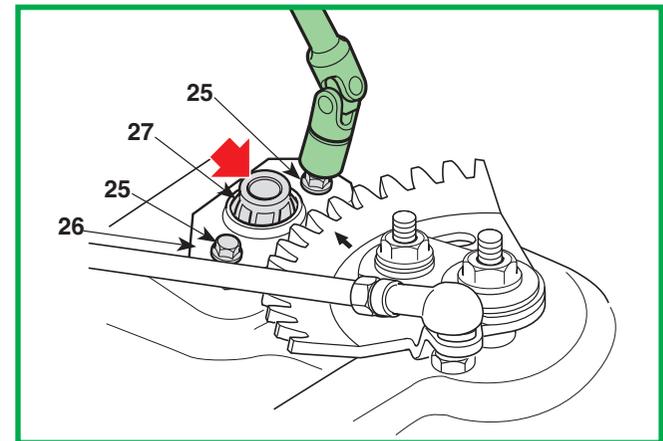
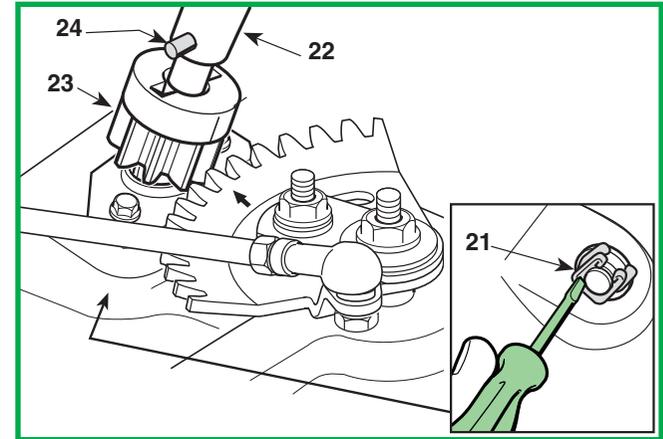
On reassembly ensure that the bush (27) is fitted with the protuberant part upwards.

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

Correctly reposition the pin (24) in the pinion housing (23) and align the pinion to the ring gear.

Insert the end of the steering column (22) in the hole in the spherical bush (27); fully tighten the screws (25) after having checked the correct alignment and regular rotation of the steering column.

- Check the steering geometry.



WORKSHOP MANUAL

6.4.2 REPLACEMENT OF THE DRIVE BELT

1 / 2

General informations:

Related topics:

Drive belt adjustment [4.3]

Removal of the wheel cover [5.2]

Removal of the engine [5.4]

Tightening torque

7 Drive pulley fastening nut 25 ÷ 30 Nm

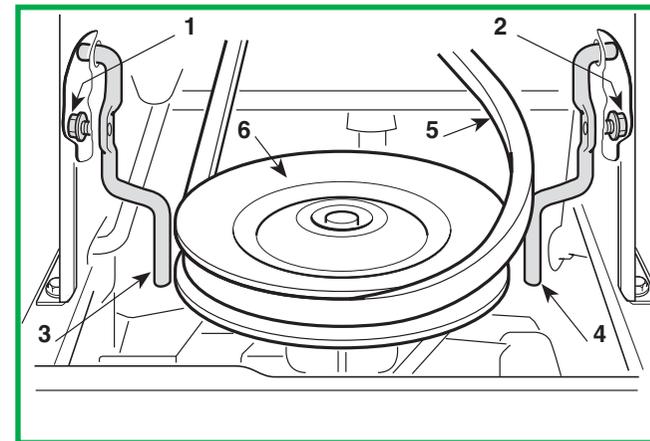
9 Nut for pulley of the guide pulley 25 ÷ 30 Nm

- Dismantle the rear cover.
- Dismantle the engine pulley and the clutch to free the belt.

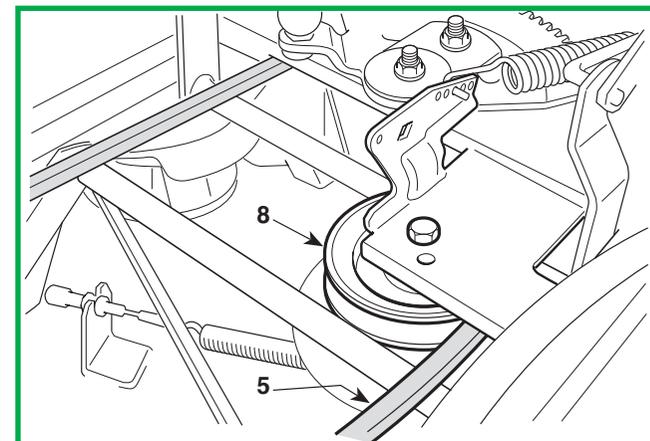
Engage the parking brake to slacken off the belt and obtain greater operating convenience.

mechanical drive models

Loosen the two side screws (1) and (2) and move the two belt guides (3) and (4).

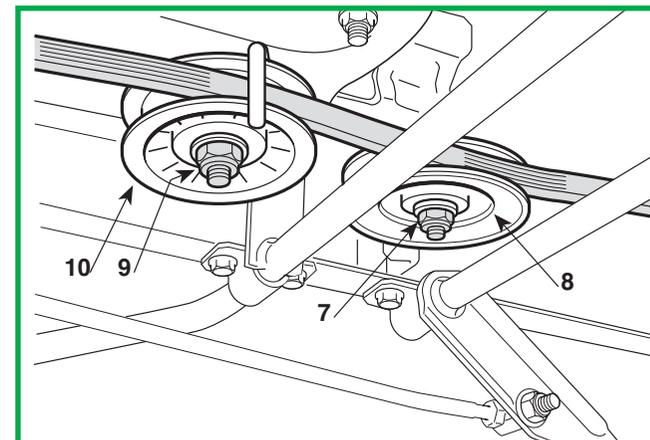


Hold the two parts of the belt (5) to release it from the pulley (6).



Loosen the nut (7) for the drive pulley (8) to the point where the passage of the belt is allowed (5).

Unscrew the nut (9) and take off the pulley of the guide pulley (10).



On assembling, make sure that the belt is correctly positioned to the pulleys and in the pulley rims.

WORKSHOP MANUAL

6.4.2 REPLACEMENT OF THE DRIVE BELT

2 / 2

General informations:

Related topics:

Drive belt adjustment [4.3]

Removal of the wheel cover [5.2]

Removal of the engine [5.4]

Tightening torque

7 Drive pulley fastening nut 25 ÷ 30 Nm

9 Nut for pulley of the guide pulley 25 ÷ 30 Nm

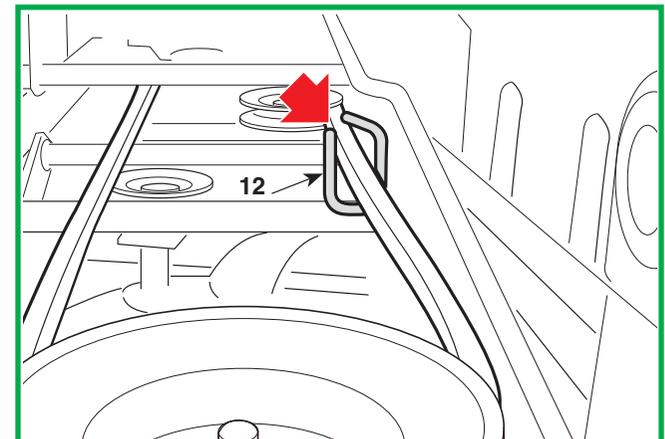
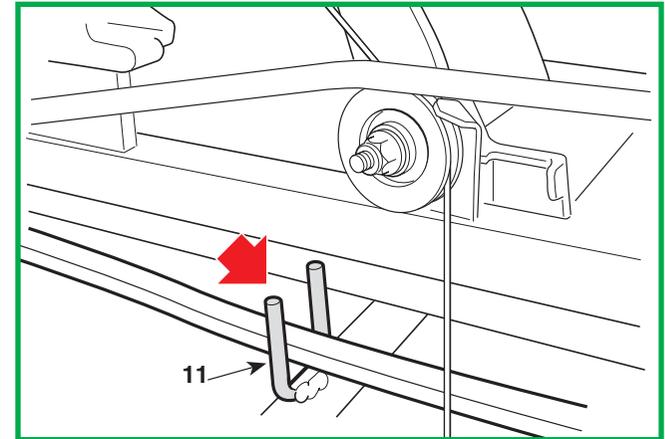
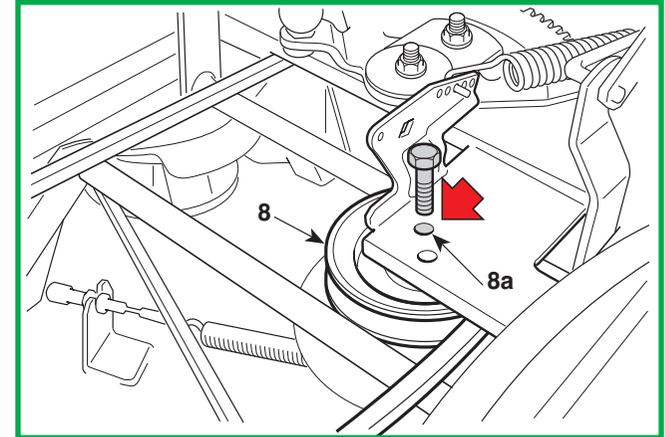
If previously removed, reassemble the pulley (8) using the hole (8a) available on the plate.

mechanical drive models

Make sure it is fed through the two forks (11).

hydrostatic drive models

Make sure it is fed through the right fork (12).



When assembly is completed, ...

- Refit the engine pulley and the clutch.
- Adjust the drive engagement.
- Remount the rear cover.

WORKSHOP MANUAL

6.5.0 REPLACEMENT OF THE BLADES BELT

1 / 1

General informations:

Related topics:

Adjusting the engagement and checking

the blade brake [4.1]

Belts Assembly [8.2]

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

Remove the right (1) and left (2) guards.

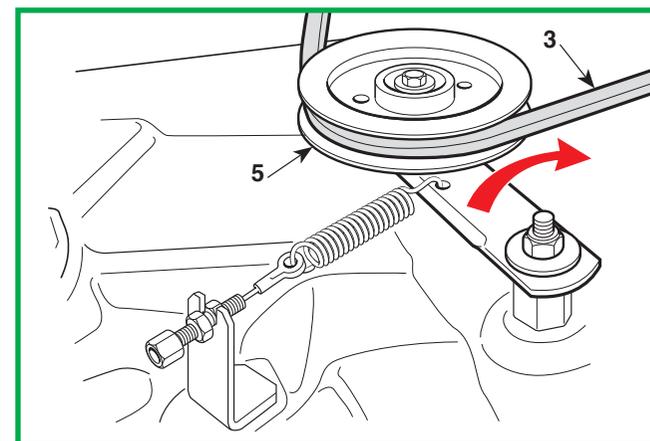
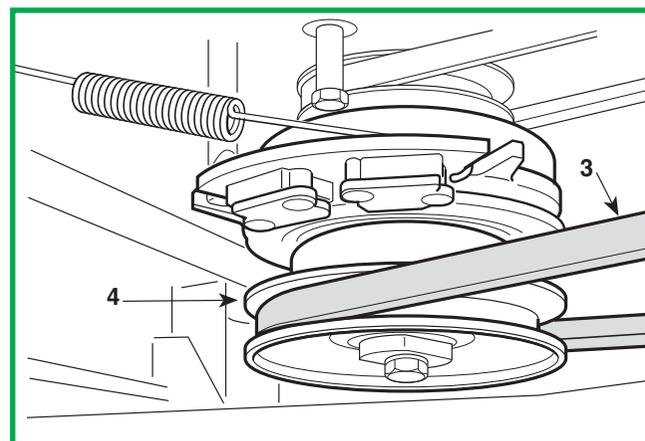
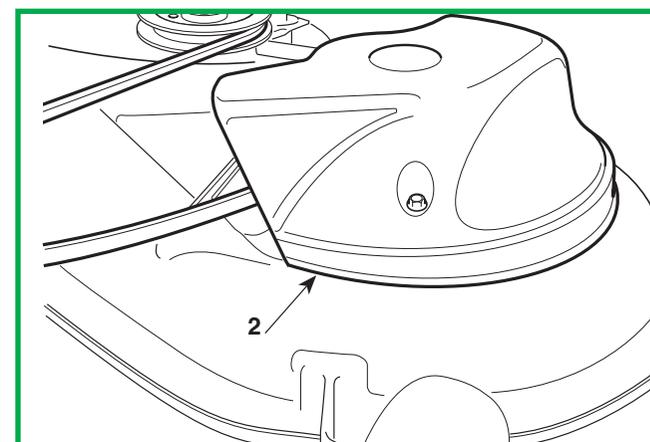
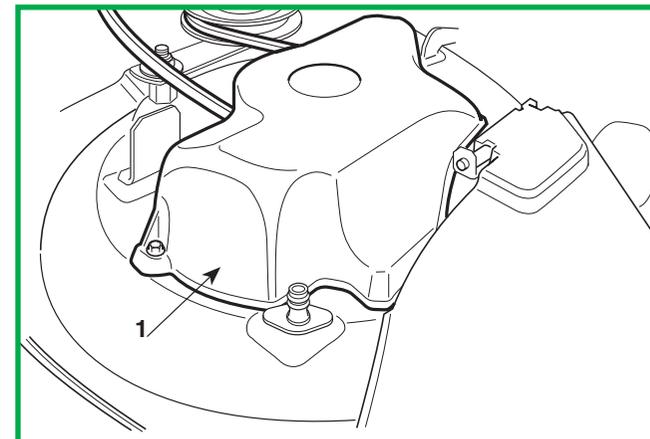
Free the blade belt (3) from the clutch pulley (4).

At this point the tension regulator guide pulley (5) can be distanced manually and the belt (3) unthreaded and replaced.

When reassembling the right (1) and left (2) guards, keep the belt (3) taut so that it is well-inserted in the pulley grooves and do not interfere with the belt guides inside the guards.

Once assembly is completed ...

- Adjust the blade engagement.



WORKSHOP MANUAL

6.6.0 REPLACEMENT OF THE SUPPORTS AND SHAFTS OF THE BLADES

1 / 3

General informations:

Related topics:

Tools [2.2]

Checking blades alignment [4.8]

Removing, sharpening and balancing the blades [4.9]

Removal of the cutting deck [5.6]

Tightening torque

7 Screws for pulleys fastening 20 ÷ 25 Nm

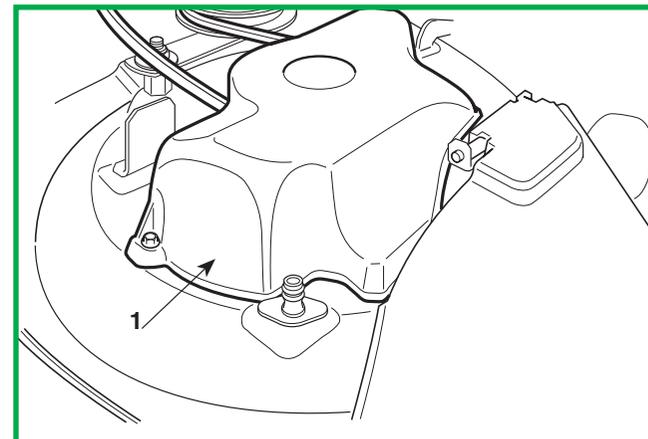
10 Nuts for flanged support..... 25 ÷ 30 Nm

- 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 deck.

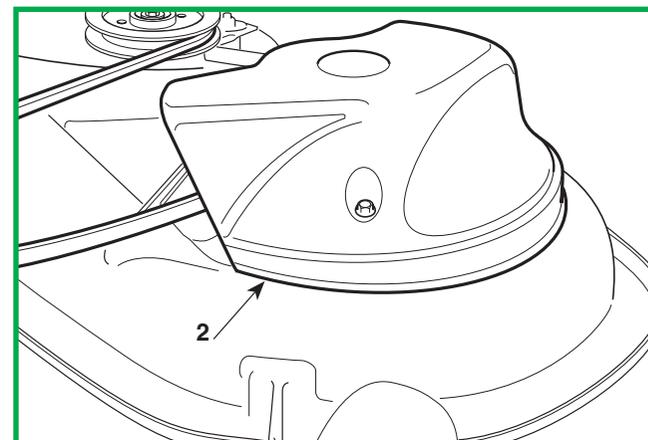
Remove the blades and take off the hubs.

Remove the right (1) and left (2) guards fixed by the relative screws and/or nuts.

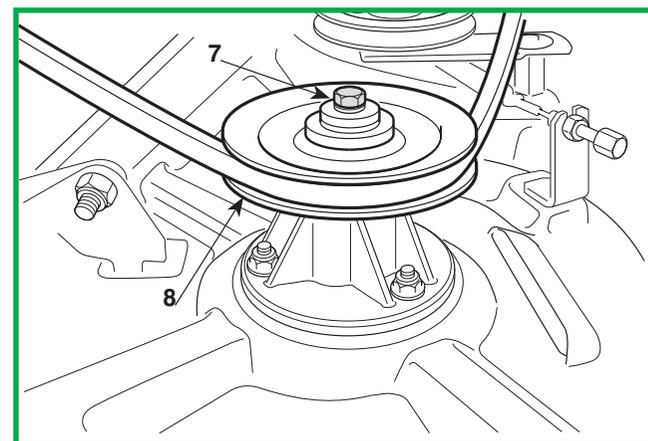
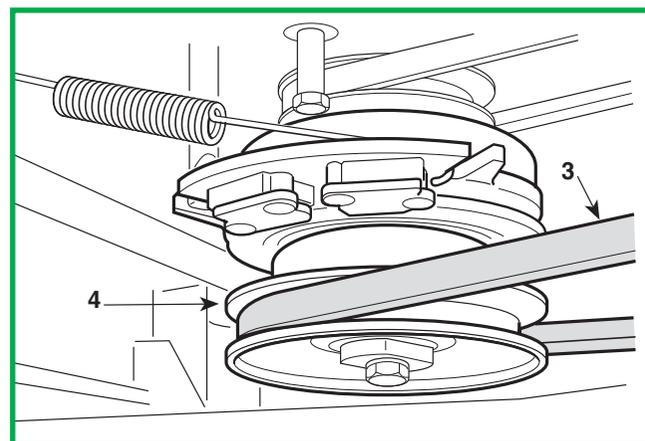


NOTE - The blade guards could have different configurations and fixings; in any case they must both be removed, after having identified all the fixing points.

Free the blade belt (3) from the clutch pulley (4) and set the cutting height adjustment lever to position «1».



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



WORKSHOP MANUAL

6.6.0 REPLACEMENT OF THE SUPPORTS AND SHAFTS OF THE BLADES

2 / 3

General informations:

Related topics:

Tools [2.2]

Checking blades alignment [4.8]

Removing, sharpening and balancing the blades [4.9]

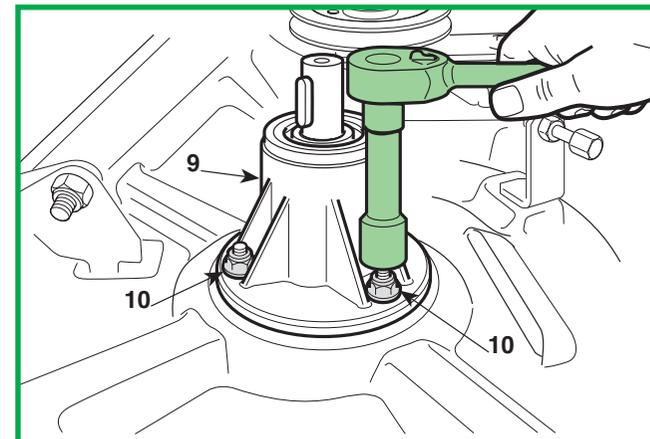
Removal of the cutting deck [5.6]

Tightening torque

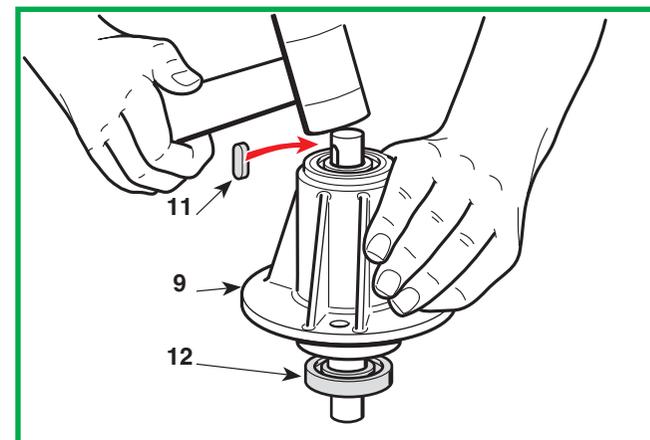
7 Screws for pulleys fastening 20 ÷ 25 Nm

10 Nuts for flanged support..... 25 ÷ 30 Nm

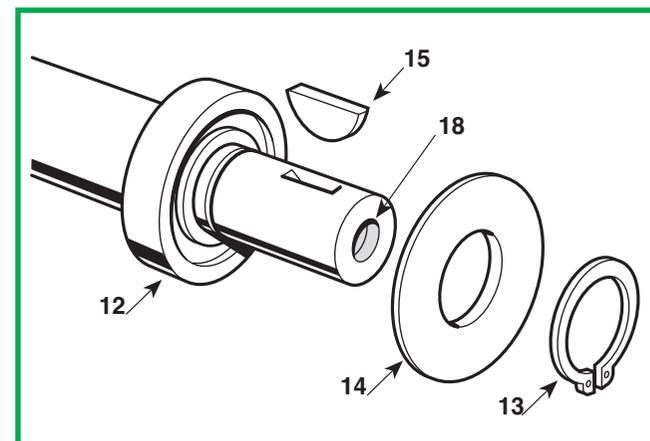
Dismantle the flange support (9) by unscrewing the three nuts (10).



The entire support (11), including shafts and bearings, is a spare part available as single assembly unit.



If you should want to just replace the shaft or bearings, remove the key (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.

WORKSHOP MANUAL

6.6.0
REPLACEMENT OF THE SUPPORTS
AND SHAFTS OF THE BLADES

3 / 3

General informations:

Related topics:

Tools [2.2]

Checking blades alignment [4.8]

Removing, sharpening and balancing the blades [4.9]

Removal of the cutting deck [5.6]

Tightening torque

7 Screws for pulleys fastening 20 ÷ 25 Nm

10 Nuts for flanged support..... 25 ÷ 30 Nm

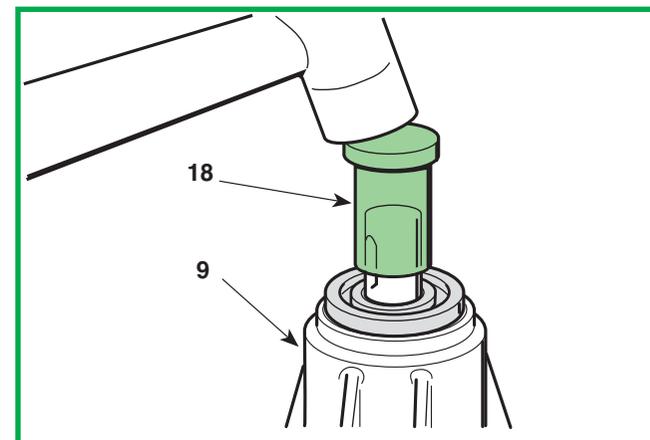
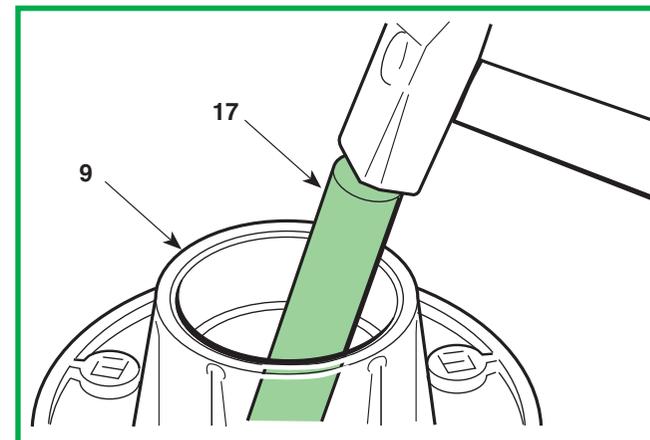
The second bearing still in place must be removed by hitting it from the inside of the flange using a 12 ÷ 15 mm diameter round bar (17).

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.

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

On completion of assembly of the supports, ...

- Reassemble the hubs and start sharpening, balancing and assembling the blades.



WORKSHOP MANUAL

6.7.2 - REPLACING THE ACCELERATOR AND ADJUSTING THE CARBURETTOR

1 / 1

General informations:

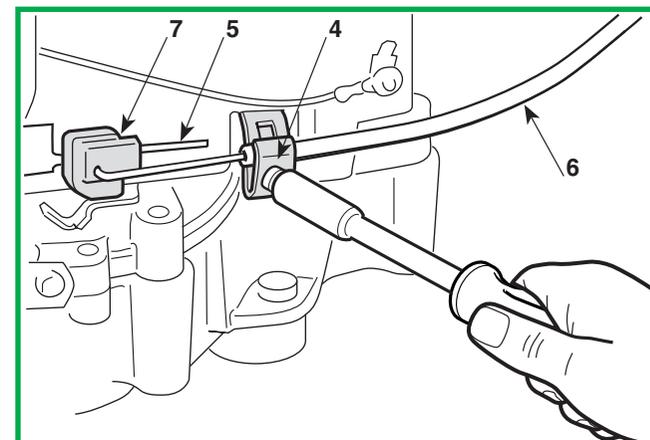
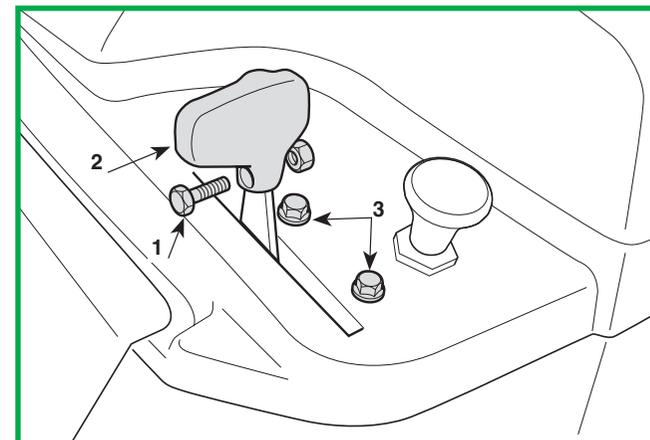
Related topics:

Unscrew the screw (1), take off the knob (2) and undo the two screws (3) which hold the accelerator on the dashboard.

From the motor side, loosen the terminal screw (4), disconnect the wire (6) terminal (5) from the slider (7) and remove the accelerator with the wire.

To assemble, put the accelerator lever in «MIN» and connect the wire (6) terminal (5) to the slider (7).

Move the slider (7) to the specific «MIN» position for each type of motor and indicated in the relevant instruction booklet. Then secure the wire (6) to the terminal (4).



WORKSHOP MANUAL

6.8.0 REPLACEMENT OF THE LIFTING CABLE

1 / 1

General informations:

Related topics:

Aligning the cutting deck [4.5]

Put blocks beneath the cutting deck in line with the centre lines of the blades:

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

Put the height lever in position «1» and completely loosen the adjuster (3).

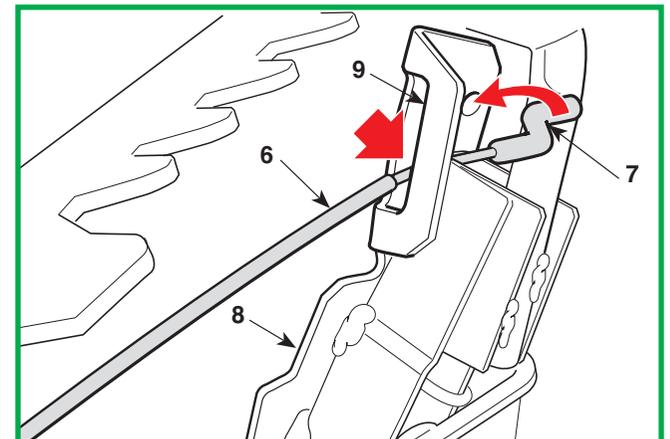
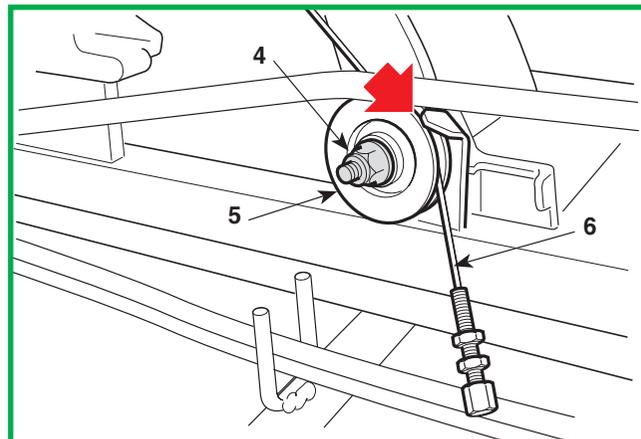
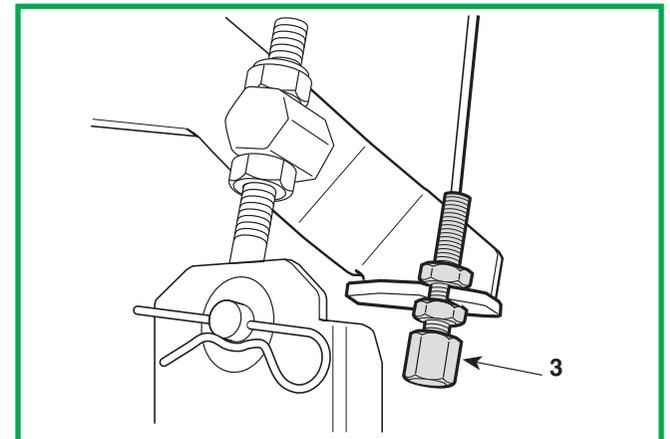
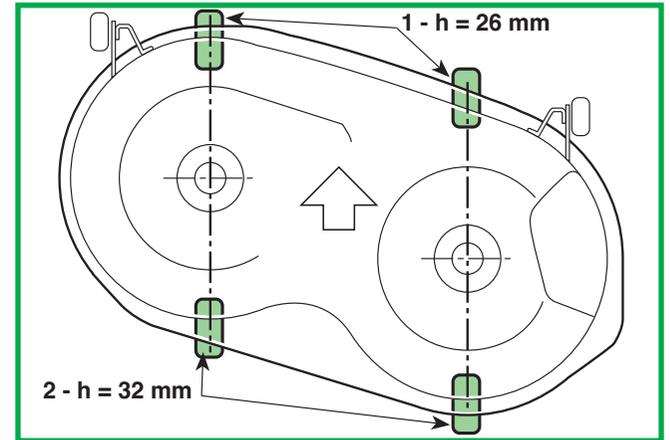
Loosen the nut (4) for the drive pulley (5) in order to be able to take off the cable (6).

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

To assemble, perform the operations described above in reverse order, making sure the cable (6) correctly passes through the slot (9) on the control lever (8).

After restoring adjuster tension (3), the cutting deck should return to the alignment conditions previous to cable replacement. If this is not the case...

Adjust the alignment of the deck .



WORKSHOP MANUAL

6.9.0 REPLACEMENT OF THE BRAKE PADS AND DISC

1 / 2

General informations:

Related topics:

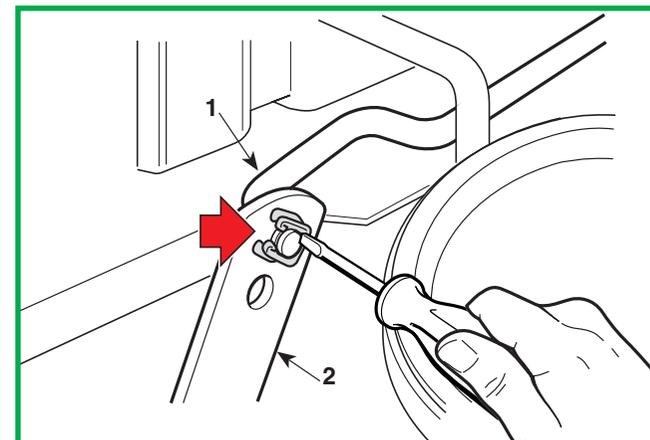
Brake adjustment [4.2]

Removal of the [6.1]

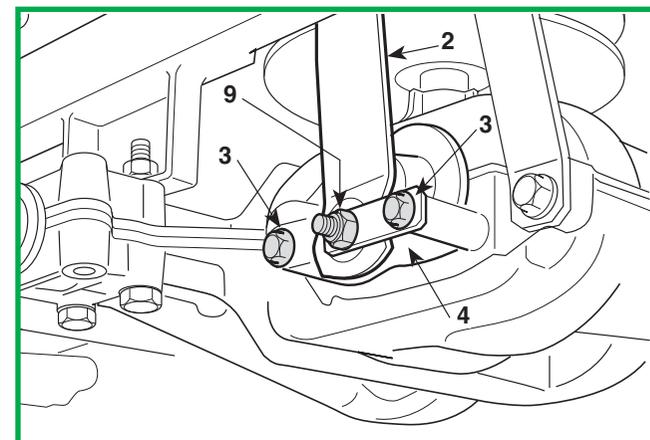
mechanical drive models

Remove the left-hand rear wheel.

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



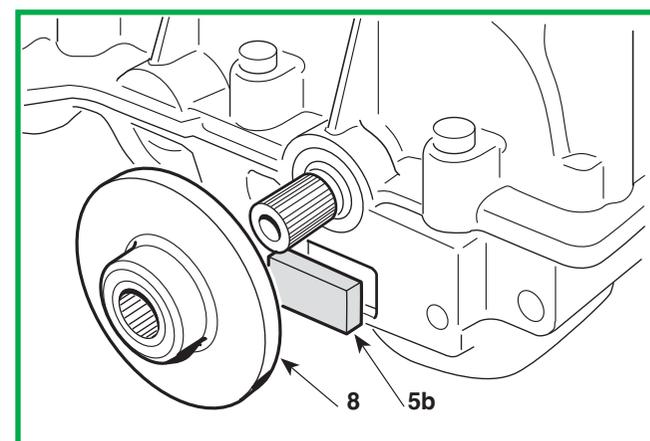
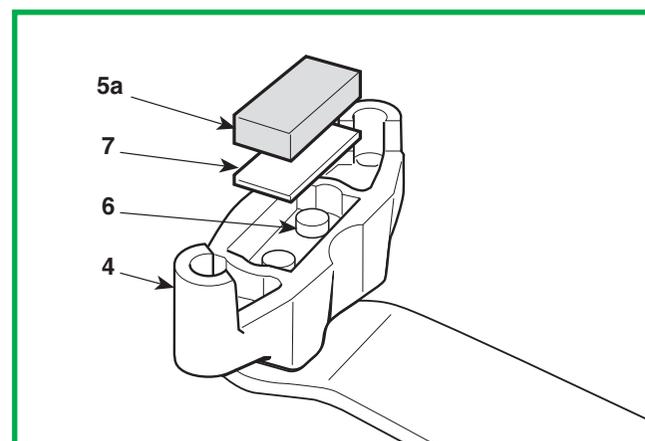
The support (4) contains a pad (5a) separated from the control pistons (6) by a plate (7).



The other pad (5b) can be reached by taking off the disc (8).

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

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



WORKSHOP MANUAL

6.9.0 REPLACEMENT OF THE BRAKE PADS AND DISC

2 / 2

General informations:

Related topics:

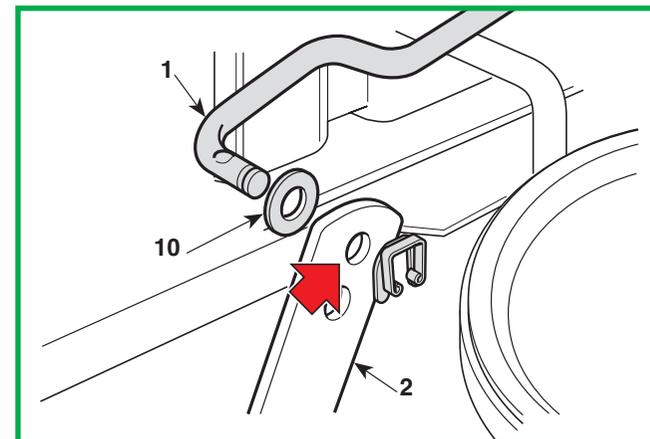
Brake adjustment [4.2]

Removal of the [6.1]

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

On reassembly, carefully reposition all the components and refit the complete support.

When connecting the rod (1) be sure to use the uppermost hole in the lever (2) and replace the washer (10).



NOTE

During all these operations it is better to not unscrew or loosen the central screw (9) to avoid altering the calibration of the cam driving the pistons.

If it has been moved, the lever's free movement will have to be checked.

When fully reassembled ...

- Check the brake adjustment.

WORKSHOP MANUAL

**7.1.0
TROUBLESHOOTING
OF THE ELECTRICAL SYSTEM**

1 / 2

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.

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

Related topics:

- Table for the cutting in of the safety devices [7.2]
- Safety microswitches operation check [7.3]
- Terminal board supply check [7.4]
- Starter relay operation check [7.6]
- Electronic card operation check [7.7]
- Recharge circuit check [7.8]
- Care and maintenance of the sealed battery [7.9]

PROBLEM	CAUSE	REMEDY
1. With the key on «START» the starter motor doesn't run or lacks power	Blown protection fuse (10A)	Replace the fuse (10 A)
	Battery terminal crossed	Check the battery connections
	Flat battery	Recharge the battery
	Sulphated battery (it no longer accepts recharging)	Replace the battery
	Disconnected or missing battery	Reconnect the battery, which must always be connected
	Battery connections oxidized or with poor contacto incerte	Check and clean the connections
	Faulty or wet electronic circuit board	Check and dry with low pressure tepid air (hair-dryer)
	The battery is not supplying the board	Check the connection cables Check the battery's condition
	Battery or board not earthed to frame	Check and put right
	Badly earthed battery, or the starter relay or motor not earthed	Check and put right
Defect in the starter relay	Check that the starter relay is activated	
Starting not permitted	After checking that the conditions are met, check all the microswitches and the relative wiring	
2. Put the key in position «START» the starter motor turns but the engine does not start	The battery is not supplying sufficient current	Recharge the battery
	No fuel flow	Check the wiring of 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 securely fastened Check that the spark plug electrodes are clean and have the correct gap

WORKSHOP MANUAL

**7.1.0
TROUBLESHOOTING
OF THE ELECTRICAL SYSTEM**

2 / 2

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.

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

Related topics:

Table for the cutting in of the safety devices [7.2]

Safety microswitches operation check [7.3]

Terminal board supply check [7.4]

Starter relay operation check [7.6]

Electronic card operation check [7.7]

Recharge circuit check [7.8]

Care and maintenance of the sealed battery [7.9]

PROBLEM	CAUSE	REMEDY
3. The starter motor continues to turn after engine has started, and does not stop when the key is removed	Mechanical difficulties with the contact breakers of the starter relay	Replace the starter relay
	Starter works erratically for mechanical or electrical reasons taking excessive current and causing binding of relay contacts	Check the starter motor
4. The starter motor operates as soon as the key is in the «ON» position, and can be turned off only by removing the key (pilot lamp on)	Faults in the board	Replace the board
	Starter block operating faults	Replace the unit
5. The engine stops while in use for reasons not due to the safety devices cutting in	Insufficient charge	Check that the charging cable has not detached Check that there are no current leakages caused by cables with damaged insulation Check that the regulator is working properly
	Blown charger fuse (25 A)	Replace fuse (25 A) and check the recharge circuit
	Blown protection fuse (10A)	Replace the fuse (10 A)
	The safety devices have cut in or are faulty	Check the microswitch's operation and the relevant wiring
	Accidental detaching of an electric cable	Check all wiring
	Starting of engine not permitted	After checking that the conditions are met, check all the microswitches and the relative wiring
6. The 10 A fuse blows	Short circuit or overload on the power side of the electronic circuit board (start-up unit, starter relay, lights and recharger connector)	Find and replace the defective user
	Short circuit to earth	Try changing the card with one that is known to work. If the problem stops, replace the faulty card
7. The 25 A fuse blows	Faults in the battery charging circuit	Replace fuse (25 A) and check the recharge circuit

WORKSHOP MANUAL

7.2.1

TABLE FOR THE CUTTING IN OF THE SAFETY DEVICES

1 / 1

General informations:

Related topics:

Safety microswitches operation check [[7.3](#)]

The following tables show the various situations in which the safety devices intervene.

-/- = Uninfluential

A) STARTING («START» position)

OPERATOR	BLADES	DRIVE	PARKING	ENGINE	PILOT LAMP
-/-	-/-	Engaged	-/-	DOES NOT start	Flashing
-/-	Engaged	-/-	-/-	DOES NOT start	Flashing
Absent	-/-	-/-	-/-	DOES NOT start	Flashing

B) WHILE CUTTING

OPERATOR	BLADES	DRIVE	CONSENT BUTTON	PARKING	ENGINE	PILOT LAMP
Absent	-/-	Engaged	-/-	-/-	Stops	ON
Absent	Engaged	-/-	-/-	-/-	Stops	ON
Absent	-/-	-/-	-/-	-/-	Stops	ON
-/-	Engaged	-/-	-/-	Engaged	Stops	ON
Seated	Engaged	Reverse	Released	-/-	Stops	ON

WORKSHOP MANUAL

**7.3.1
SAFETY MICROSWITCHES
OPERATION CHECK**

1 / 1

General informations:

Related topics:

This check is done by disconnecting the connector and using the tester in Ohmmeter mode.

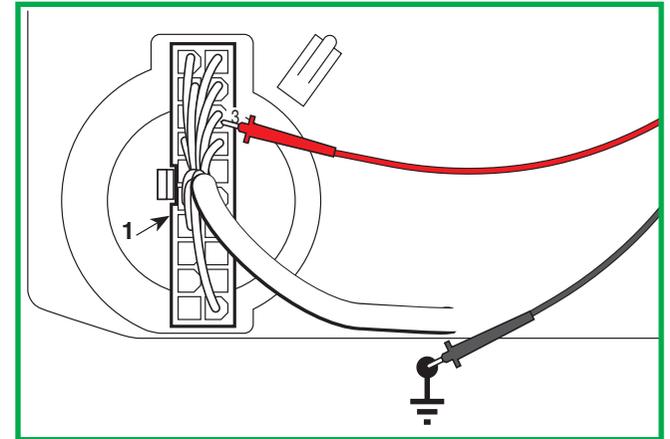
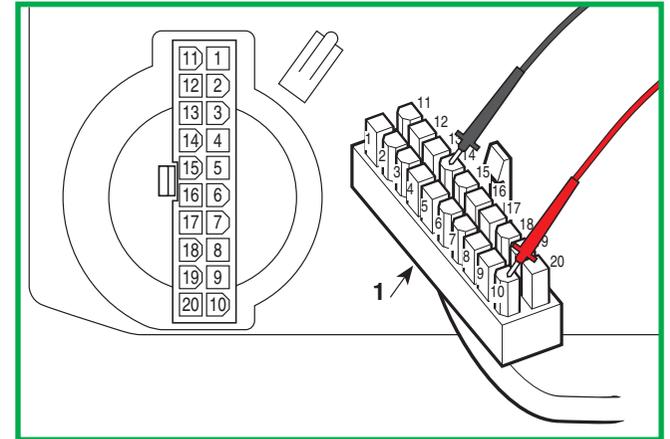
This operation should be done, without the driver on board, by making contact with the ferrules on the contacts of the connector of the wiring (1) and should give this result:

N° Contacts	Tester reading and condition		
SEAT MICROSWITCH			
10 - 14	∞ (absent)	O (seated)	
PARKING MICROSWITCH			
10 - 17	O (free)	∞ (engaged)	
BLADES SWITCH			
10 - 16	∞ (engaged)	O (disengaged)	
"IN NEUTRAL" SIGNAL			
10 - 7	∞ (drive)	O (neutral)	
REVERSE GEAR MICROSWITCH			
10 - 15	∞ (Pressed)	O (Released)	
REVERSE CONSENT BUTTON			
8 - 9	O (Pressed)	∞ (Released)	
STARTER UNIT			
+ Battery - 11	∞ (OFF)	O (ON)	O (START)
+ Battery - 12	∞ (OFF)	∞ (ON)	O (START)

ENGINE STOP

This operation must be done by keeping the connector (1) attached and should give this result:

N° Contacts	Tester reading and condition
3 - Earth	O (Always)



WORKSHOP MANUAL

7.4.0 TERMINAL BOARD SUPPLY CHECK

1 / 1

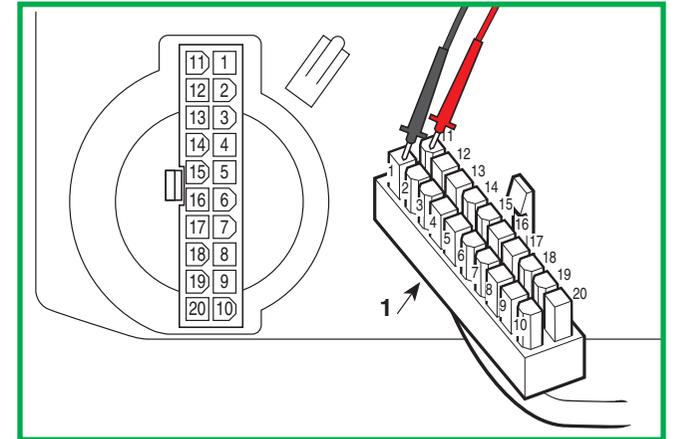
General informations:

Related topics:

This check is done with the tester in Voltmeter function (Volt DC 0 ÷ 20), with the black ferrule on terminal 1 and the red ferrule on terminal 11 of the wiring connector (1).

- The key in the «ON» position.

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



WORKSHOP MANUAL

7.5.0 ELECTROMAGNETIC CLUTCH OPERATION CHECK

1 / 1

General informations:

Related topics:

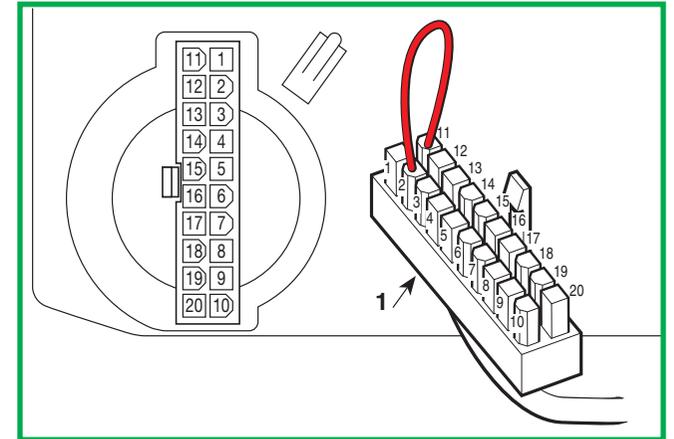
This check must be made with the engine off.

Disconnect connector and bridge terminals 2 and 11 of cabling connector (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.



WORKSHOP MANUAL

7.6.0 STARTER RELAY OPERATION CHECK

1 / 1

General informations:

Related topics:

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

To do this requires:

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

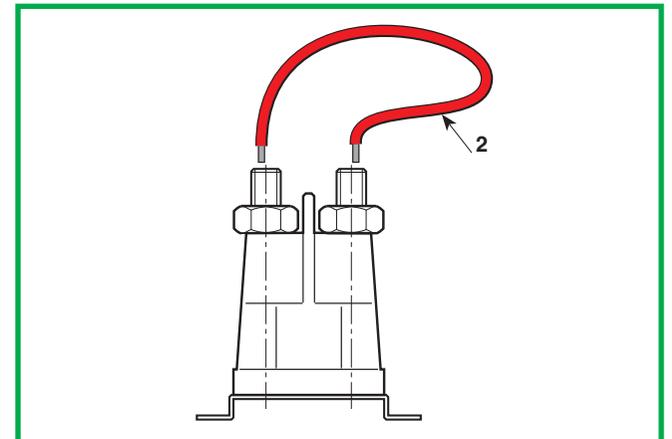
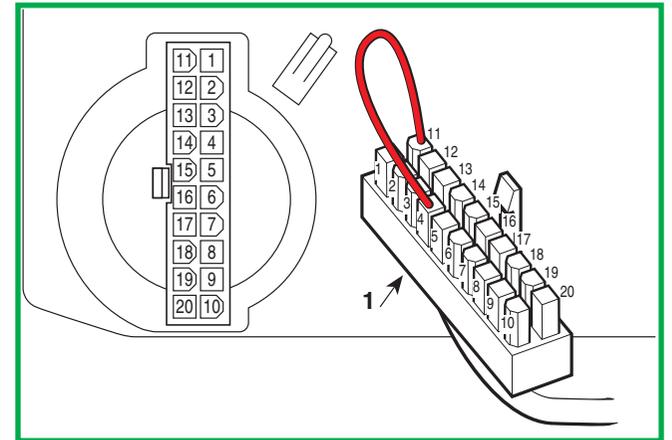
Disconnect the connector (1).

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.

only with B&S engines

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

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



WORKSHOP MANUAL

7.7.0 ELECTRONIC CARD OPERATION CHECK

1 / 1

General informations:

Related topics:

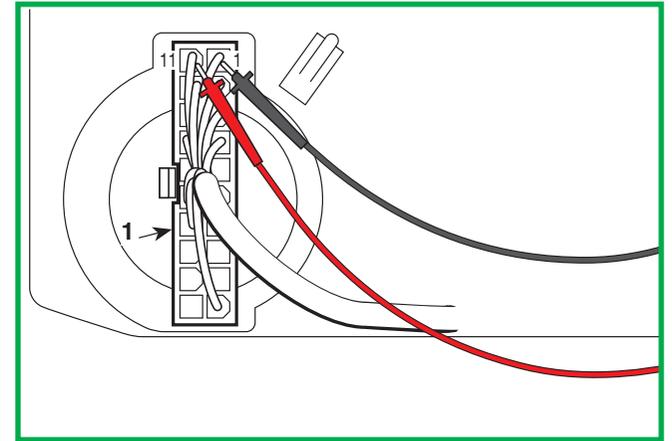
A) Card supply

To make this test it is necessary to have:

- The key in the «ON» position
- Connector (1) connected to the card.

This check is done with the tester in Voltmeter function (Volt DC 0 ÷ 20), with the black ferrule on terminal 1 and the red ferrule on terminal 11 of the wiring connector (1).

The reading on the tester shows the battery's voltage.



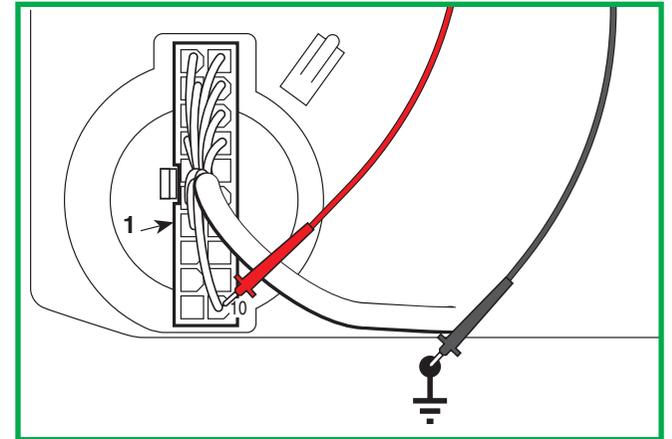
B) Safety and service supply check

To make this test it is necessary to have:

- The key in the «ON» position
- Connector (1) connected to the card.

This check is done with the tester in Voltmeter function (Volt DC 0 ÷ 20), with the black ferrule **to earth** and the red ferrule on terminal 10 of the wiring connector (1).

The reading on the tester shows a slightly lower battery voltage value than that produced by the test described in section "A".



WORKSHOP MANUAL

7.8.0 RECHARGE CIRCUIT CHECK

1 / 1

General informations:

Related topics:

Care and maintenance
of the sealed battery [[7.9](#)]

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 overvoltage.

Before checking the recharge circuit, make sure that:

- all connections are correct;
- the earth connections are firmly connected, especially the earth connections 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 - *if fitted*).

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 rise and settle at 14-15 Volts after about 10-15 minutes.

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

WORKSHOP MANUAL

7.9.0

CARE AND MAINTENANCE OF THE SEALED BATTERY

1 / 1

General informations:

Related topics:

A) General information

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

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

B) Recommendations for correct use

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

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

WARNING!

Recharge only with a constant voltage battery charger. Using other types of battery chargers could damage the battery.

C) Rules for recharging the battery

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

- do not recharge the battery when its case is broken or damaged;
- carefully read the instructions for using the battery charger and the battery;
- use the appropriate 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	Low charge	Recharge

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

WORKSHOP MANUAL

7.10.0 FITTING SAFETY MICROSWITCHES

1 / 1

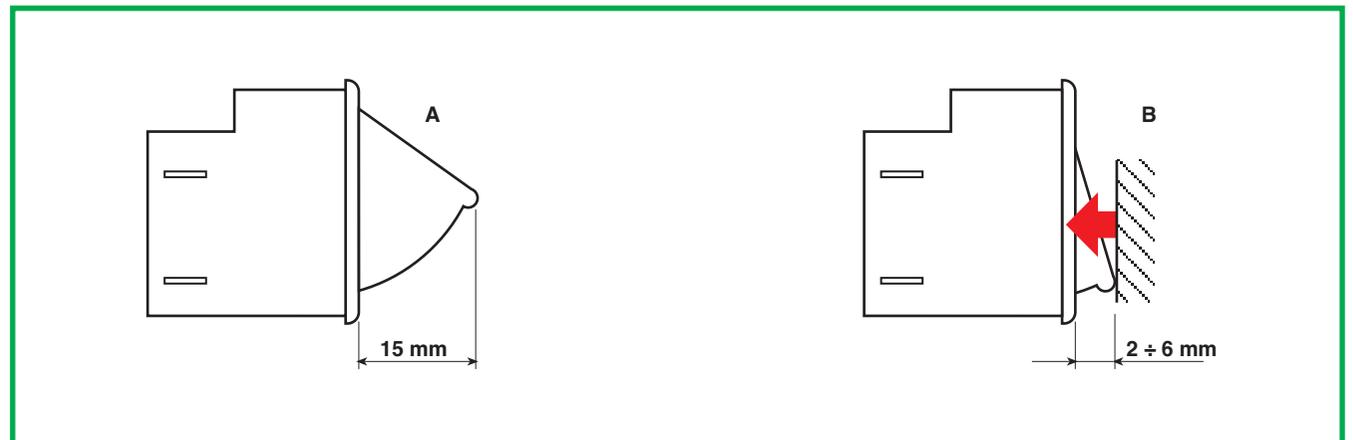
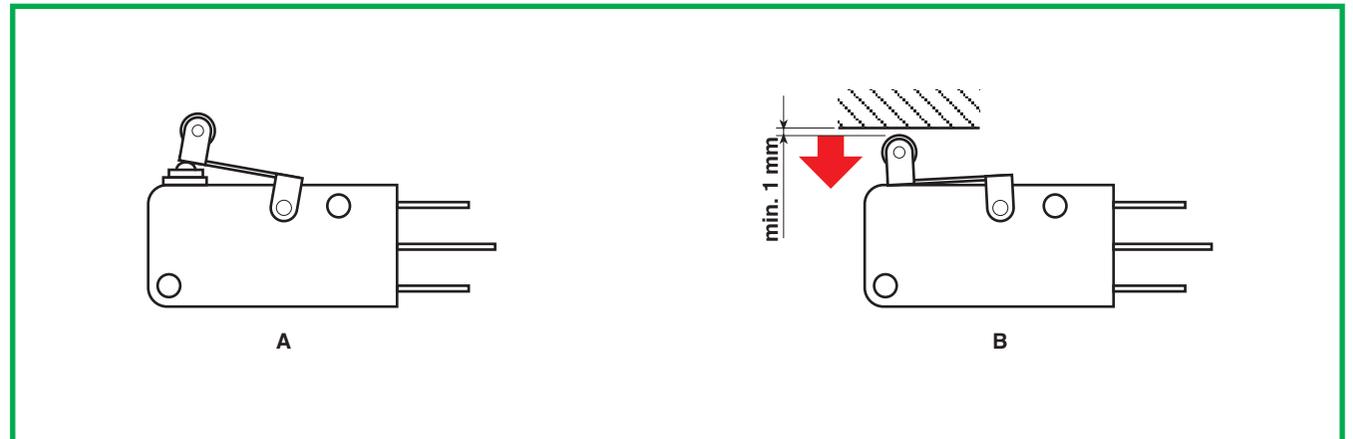
General informations:

Related topics:

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



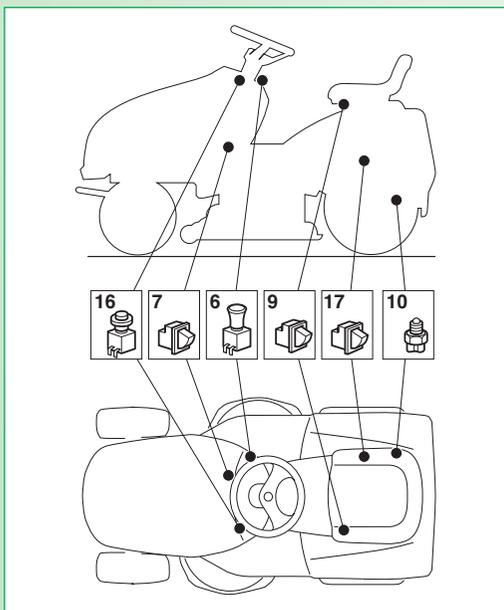
WORKSHOP MANUAL

7.11.3 ELECTRICAL DIAGRAMS

1 / 1

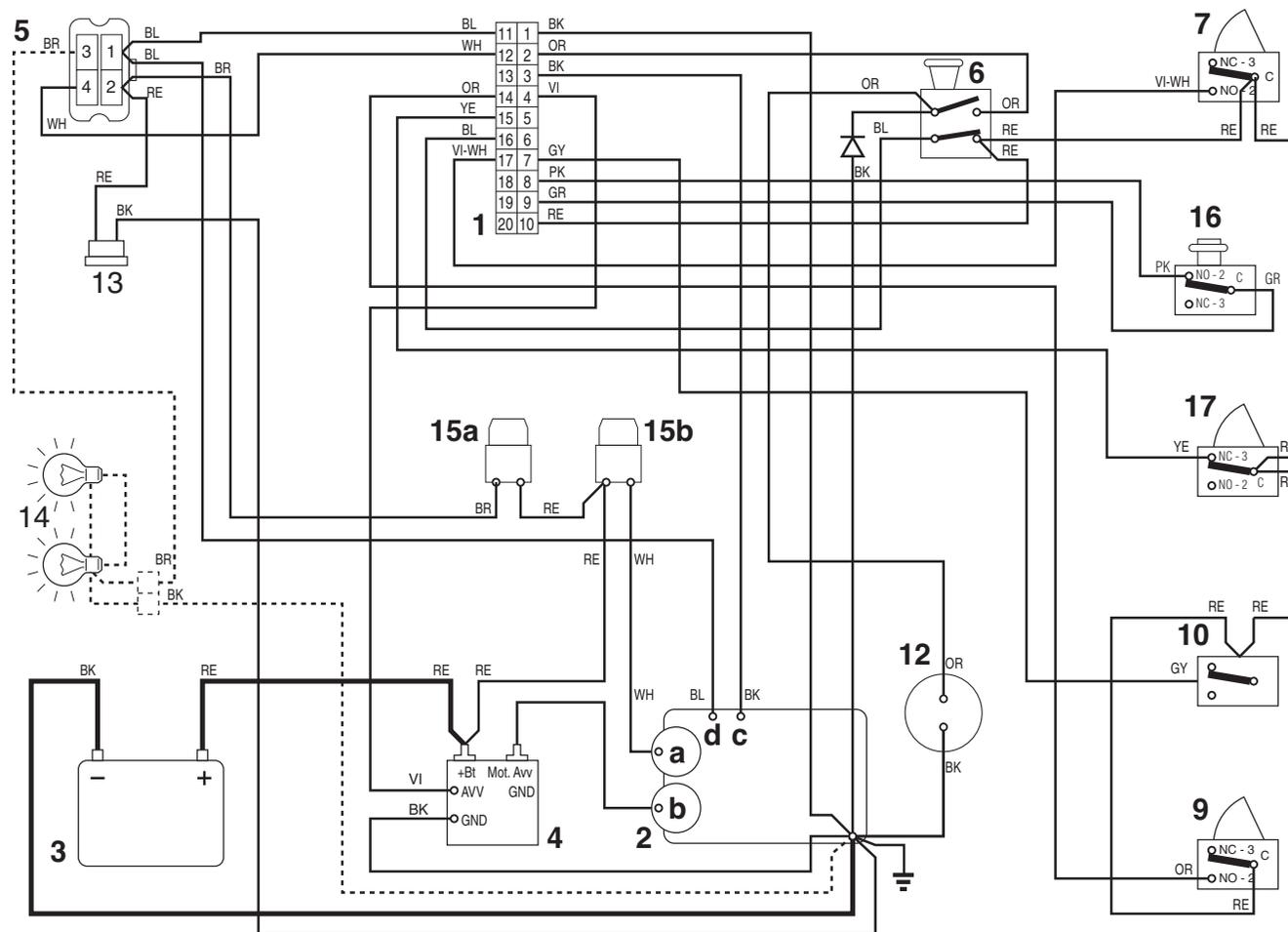
General informations:

Related topics:



MAP

Engines B&S - GGP - Kawasaki



- 1 Electronic card
- 2 Engine
- 2a Generator
- 2b Starter motor
- 2c Engine stop
- 2d Carburattor
- 3 Battery
- 4 Starter relay
- 5 Key ignition switch
- 6 Blades switch
- 7 Brake microswitch
- 9 Seat microswitch
- 10 Neutral microswitch
- 12 Clutch
- 13 Recharge connector
- 14 Headlight switch
- 15a 10 A fuse
- 15b 25 A fuse

- 16 Reverse consent button
- 17 Reverse gear microswitch

CABLE COLOURS

- BK Black
- BL Blue
- BR Brown
- GR Green
- GY Grey
- OR Orange
- PK Pink
- RE Red
- VI Violet
- WH White
- VI-WH Violet / White
- YE Yellow

WORKSHOP MANUAL

8.1.2 TIGHTENING TORQUES AND ADJUSTMENTS SUMMARY

1 / 1

General informations:

Related topics:

Adjusting the engagement and checking

the blade brake [4.1]

Brake adjustment [4.2]

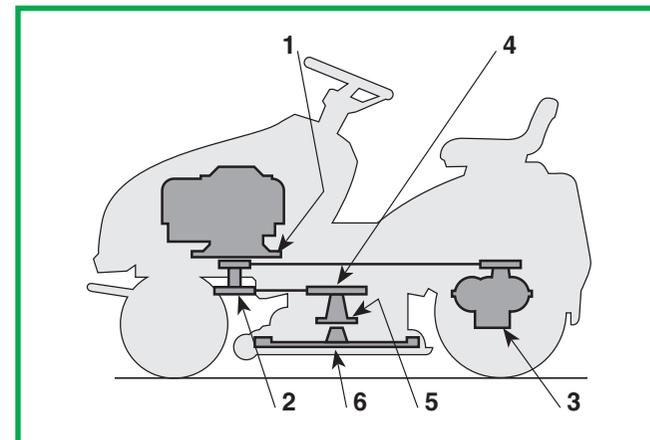
Drive belt adjustment [4.3]

A) Tightening torque

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

- 1 Screws for engine fastening 35 ÷ 40 Nm
- 2 Screw for engine pulley 45 ÷ 50 Nm
- 3 Rear axle locknut 25 ÷ 30 Nm
- 4 Screws for blades pulleys fastening 20 ÷ 25 Nm
- 5 Nuts for flange support 25 ÷ 30 Nm
- 6 Screw for blades 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			43,5 - 45,5 (Peerless) 40 - 42 (Hydro Gear)
b) Drive belt adjustment			156 - 160
c) Adjustment the engagement and checking the blade brake			82 - 85 (Mod. 98) 83 - 85 (Mod. 108)

WORKSHOP MANUAL

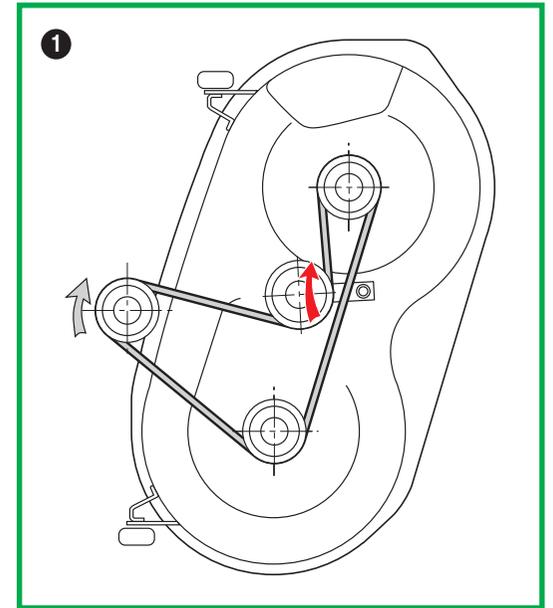
8.2.1 BELTS ASSEMBLY

1 / 1

General informations:

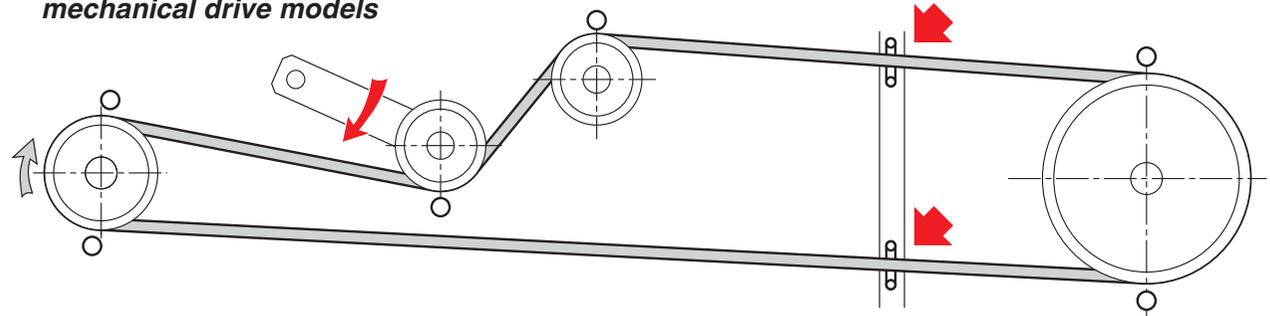
Related topics:

- 1 Blades belt development
- 2 Drive belt development



2

mechanical drive models



hydrostatic drive models

