

Workshop Manual
LiHD50 / LiHD60X / LiHD70X



English



Workshop Manual

Husqvarna LiHD50 / LiHD60X / LiHD70X

Contents

Index	4
Introduction and safety regulations	6
Technical data	10
Service tools LiHD60X / LiHD70X	11
Service data LiHD50	12
Diagnosis and troubleshooting	16
Basic dismantle/assembly	22
Safety equipment	26
Repair instructions - LiHD50	34
Repair instructions LiHD60X / LiHD70X	40

Husqvarna AB has a policy of continuous product development and therefore reserves the right to modify the design and appearance of products without prior notice.

Index

D

Diagnosis and troubleshooting 16

- Remove the battery 17
- Connect the diagnostic tool 17
- No signal to diagnostic tool 17
- Troubleshooting Guide 18
- Troubleshooting the main switch 19
- Troubleshooting the keypad 19
- Troubleshooting the control unit PMDC - LiHD50 20
- Troubleshooting the control unit BLDC - LiHD60 LiHD70 20
- Overhaul 20

F

Troubleshooting 18

- Troubleshooting guide 18
- Troubleshooting the main switch 19
- Troubleshooting the keypad 19
- Troubleshooting the control unit PMDC - LiHD50 20
- Troubleshooting the control unit BLDC - LiHD60 LiHD70 20

G

Basic dismantling/assembly 22

- Battery 23
- Wear guard LiHD50 23
- Front handle LiHD50 23
- Chassis LiHD50 24
- Front handle LiHD60X / LiHD70X 25
- Chassis LiHD60X / LiHD70X 25
- Threads 55**
- Repairing damaged threads 55

I

Introduction and safety regulations 7

- General 7
- Safety 7
- Target group 7
- Modifications 7
- Tool 7
- Structure 7
- Numbering 7
- General Instructions 8
- Special Instructions 8
- Boundaries 8
- Symbols on the machine 9
- Symbols in the Workshop Manual 9

R

Repair instructions LiHD50 34

- General repair instructions 35
- Replacing the shears 35
- Dismantling the motor and gear package 36
- Assembling the motor and gear package 36
- Dismantling the keypad and control unit 37
- Assembling the keypad and control unit 37
- Repairing damaged threads 38

Repair instructions LiHD60X / LiHD70X 40

- General repair instructions 41
- Dismantling the gear housing and motor out of the chassis 41
- Dismantling gears, cutting unit and motor out of the gear housing 41
- Cutting unit 42
- Gears 44
- Assembling gears, cutting unit and motor in the gear housing 45
- Dismantling the control unit and battery contact 46
- Assembling the control unit and battery contact 46
- Dismantling the rear handle 47
- Dismantling the keypad 49
- Assembling the keypad 50
- Dismantling the main switch and main cabling 51
- Assembling the main switch and main cabling 51
- Assembling the rear handle 52
- Assembling the gear housing and motor in the chassis 54
- Repairing damaged threads 55

S

Service data 12

Service tools 11

Safety equipment 27

- Dismantling the front handle LiHD50 27
- Dismantling the hand guard LiHD50 27
- Assembling the hand guard LiHD50 27
- Dismantling the throttle trigger LiHD50 28
- Assembling the throttle trigger LiHD50 28
- Dismantling the front handle and start inhibitor - LiHD60X / LiHD70X 29
- Assembling the front handle and start inhibitor - LiHD60X / LiHD70X 30
- Dismantling the throttle trigger and handle stop LiHD60X / LiHD70X 32
- Assembling the throttle trigger and handle stop LiHD60X / LiHD70X 32
- Replacing the blade guard - LiHD60X / LiHD70X 33

T

Technical data 10

2 Introduction and safety regulations

Contents

2.1	General.....	7
2.2	Safety.....	7
2.3	Target group.....	7
2.4	Changes.....	7
2.5	Tools.....	7
2.6	Structure.....	7
2.7	Numbering.....	7
2.8	General instructions.....	8
2.9	Special instructions.....	8
2.10	Limitations.....	8
2.11	Symbols on the machine.....	9

2 Introduction and safety regulations

2.1 General

This Workshop Manual provides a comprehensive description of how to trouble shoot, repair and test the machine. A description of different safety steps that must be taken during repair work is also given.

2.2 Safety

Note! The section dealing with safety must be read and understood by all those carrying out repair work or service on the machine.

Warning symbols can be found in this Workshop Manual and on the machine. See "Symbols on the machine" and "Symbols in the Workshop Manual". A new warning symbol decal must be applied as soon as possible if a warning symbol on the machine has been damaged or is missing so that the greatest level of safety can be maintained when using the machine.

2.3 Target group

This Workshop Manual is written for personnel with general knowledge about the repair and service of Husqvarna machines.

The Workshop Manual must be read and understood by personnel who will carry out repair work and service on the machine. The Manual is also suitable for use when training new employees.

2.4 Changes

Any modifications to the machine will be gradually introduced into ongoing production. As these modifications affect service and/or spare parts, specific service information will be sent out on each occasion. This means that in time this Workshop Manual will become out of date. In order to prevent this, the Manual should be read together with all service information concerning the machine in question.

2.5 Tools

Special tools are required for some stages. All service tools are listed in the Workshop Manual. Usage is made evident in each section.

Always use original Husqvarna:

- Spare parts
- Service tools
- Accessories

2.6 Structure

This Workshop Manual can be used in two different ways:

- For the repair of a particular system on the machine.
- Dismantling and assembly of the entire machine.

Repair of a particular system

When a particular system on the machine is to be repaired, proceed as follows:

1. Look up the page for the system in question.
2. Carry out the following steps:
 - Dismantling
 - Cleaning and inspection
 - Assembling

Dismantling and assembly of the entire machine

When taking apart the whole machine and assembling it again, proceed as follows:

1. Open the chapter "Basic dismantle" and carry out **Dismantling** in the order set out in the sections.
2. Open the chapter "Repair instructions" and carry out **Dismantling** in the order set out in the sections.
3. Carry out **Cleaning and inspection** in the order set out in the sections.
4. Carry out **Diagnostic troubleshooting** if a fault in the electrical system is suspected.
5. Order or collect all requisite spare parts from the stores.
6. Carry out **Assembly** in the order set out in the sections.

2.7 Numbering

Position references to components in the figures are designated A, B, etc.

The figures are numbered 1, 2 etc.

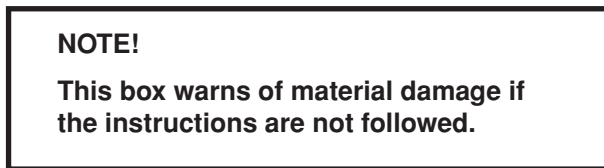
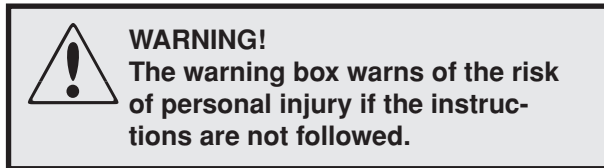
The position references and figure numbers restart in each new section.

2.8 General instructions

The workshop where the machine is to be repaired must be equipped with safety equipment in accordance with local regulations.

No one may repair the machine without having read and understood the contents of this Workshop Manual.

This Workshop Manual contains the following warning boxes in relevant places.



2.9 Special instructions

Remove the battery from the machine before dismantling and troubleshooting.

The battery must not be connected while the machine is dismantled.

Never unscrew the battery. Replace a damaged battery.

Use a brush/compressed air when cleaning the machine.

Water, cleaning fluid and petroleum products may only be used when cleaning the cutting unit.

When using compressed air, do not direct the air jet toward your body. Air can penetrate into the blood circulation, which means mortal danger.

Use ear protection during testing.

2.10 Limitations

This Workshop Manual is mainly intended for repair work on LiHD60X and LiHD70X but in certain cases also covers LiHD50.

2.11 Symbols on the machine

The machine keypad has the following symbols.



Starting/Stopping



savE / Battery saver mode



Warning lamp/Fault indicator

The symbols below are embedded on the machine.



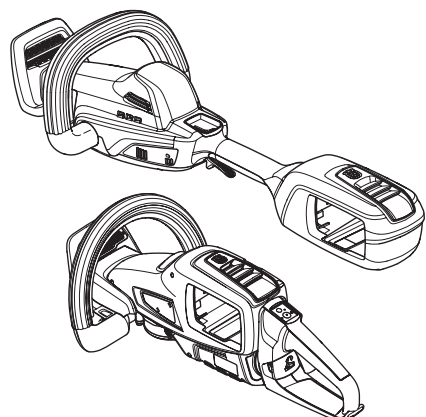
Adjustable handle

2.12 Symbols in the Workshop Manual



This symbol warns of personal injury when the instructions are not followed.

3 Technical data



Weight without battery
lbs/kg

LiHD50	6.6 / 3.0
LiHD60X	8.4 / 3.8
LiHD70X	8.6 / 3.9

Cutting speed
for normal operation
cuts/min

LiHD50	3200
LiHD60X	4000
LiHD70X	4000

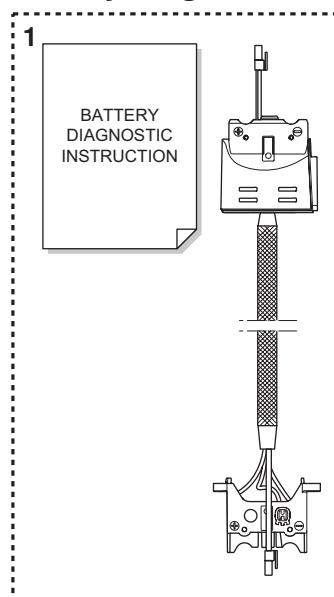


Cutting speed
for savE
cuts/min

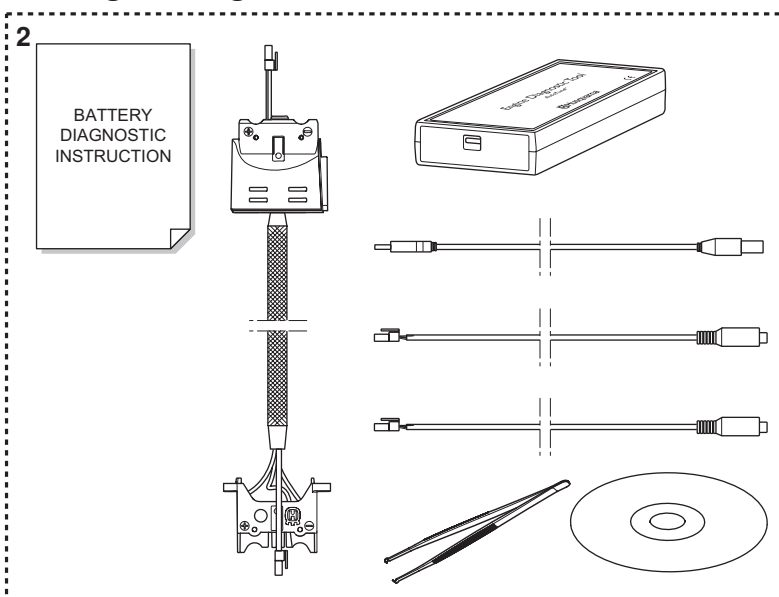
LiHD50	2700
LiHD60X	3200
LiHD70X	3200

4 Service tools LiHD60X / LiHD70X

Battery Diagnostic Tool



Engine Diagnostic Tool kit - AutoTune™



Battery Diagnostic Tool

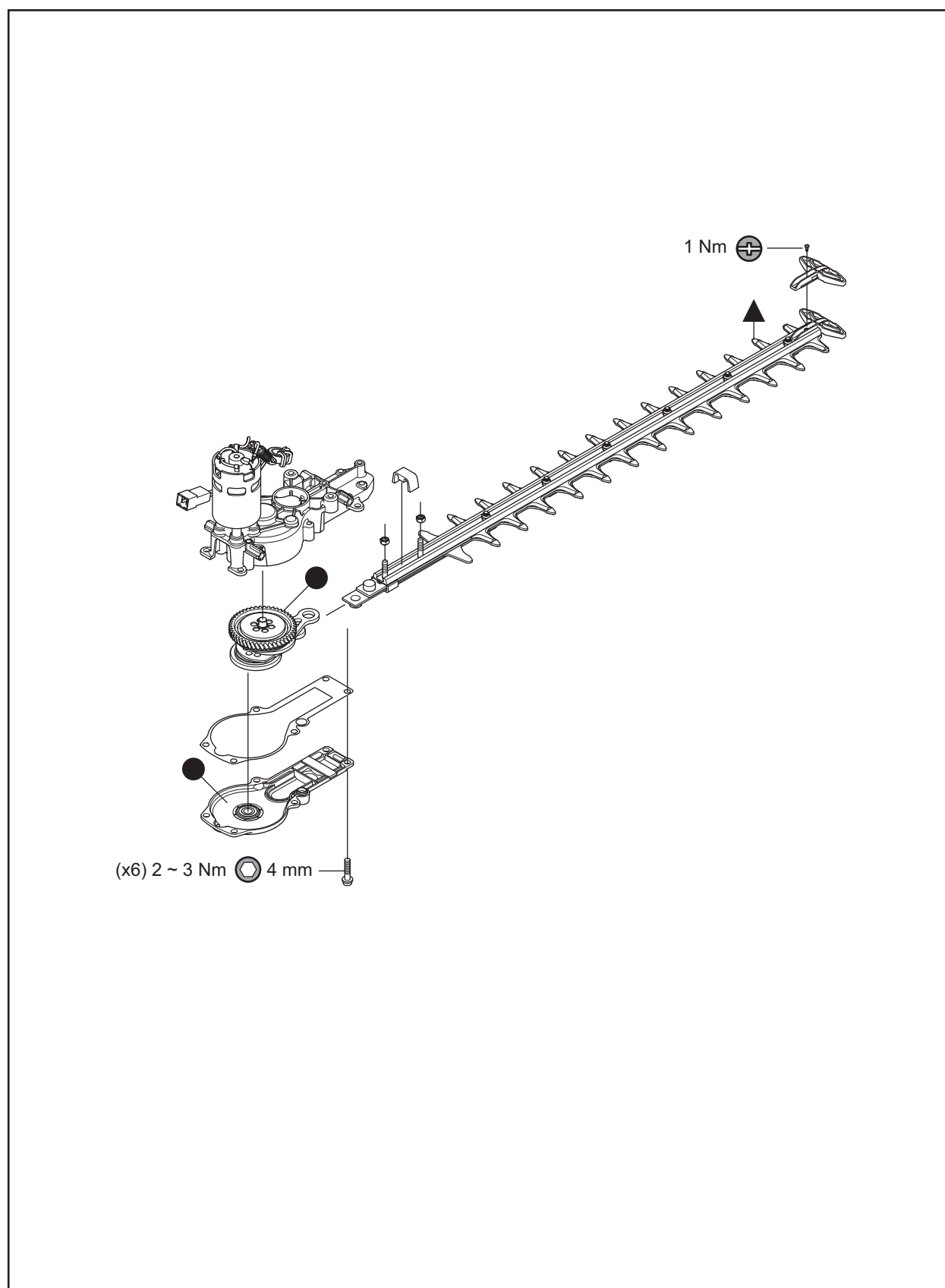
The Battery Diagnostic Tool is a service tool for Husqvarna's battery powered products. It is intended to be used with a computer (PC), which is not included.

The service tool transmits various data from the product and battery to the computer, such as product ID. There is also a troubleshooting guide in the form of a diagnostic tool and a list of saved error codes.

The software in battery powered products can also be updated with the Battery Diagnostic Tool.

Pos	Designation	Used with	Order No.
1	Diagnostic tool - Battery	Diagnosis and troubleshooting	581 19 23-01
2	Diagnostic tool - AutoTune™	Diagnosis and troubleshooting	576 69 23-01

5 Service data LiHD50



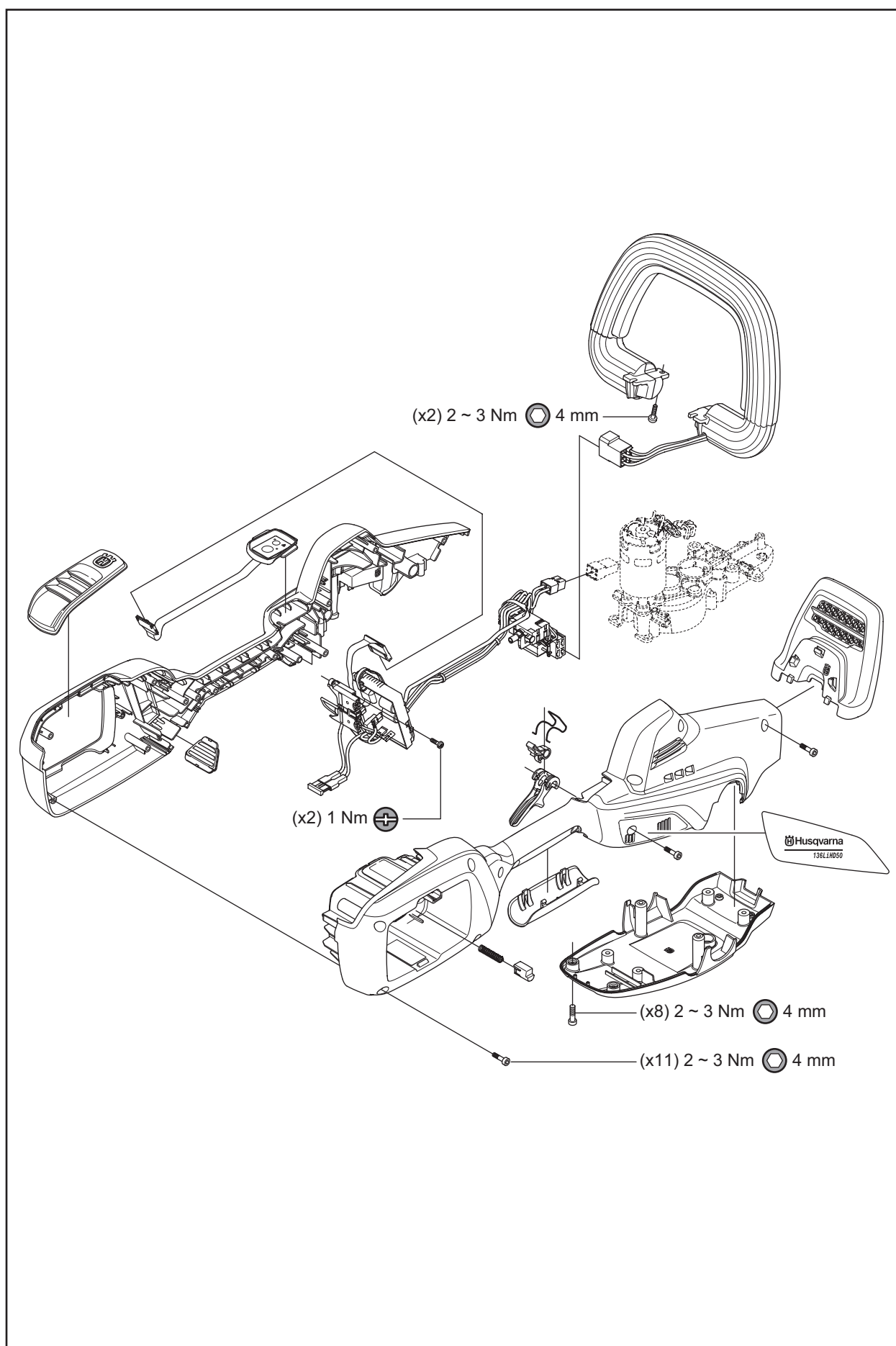
Key

The numbers by bolted components represent the tightening torque in Nm.

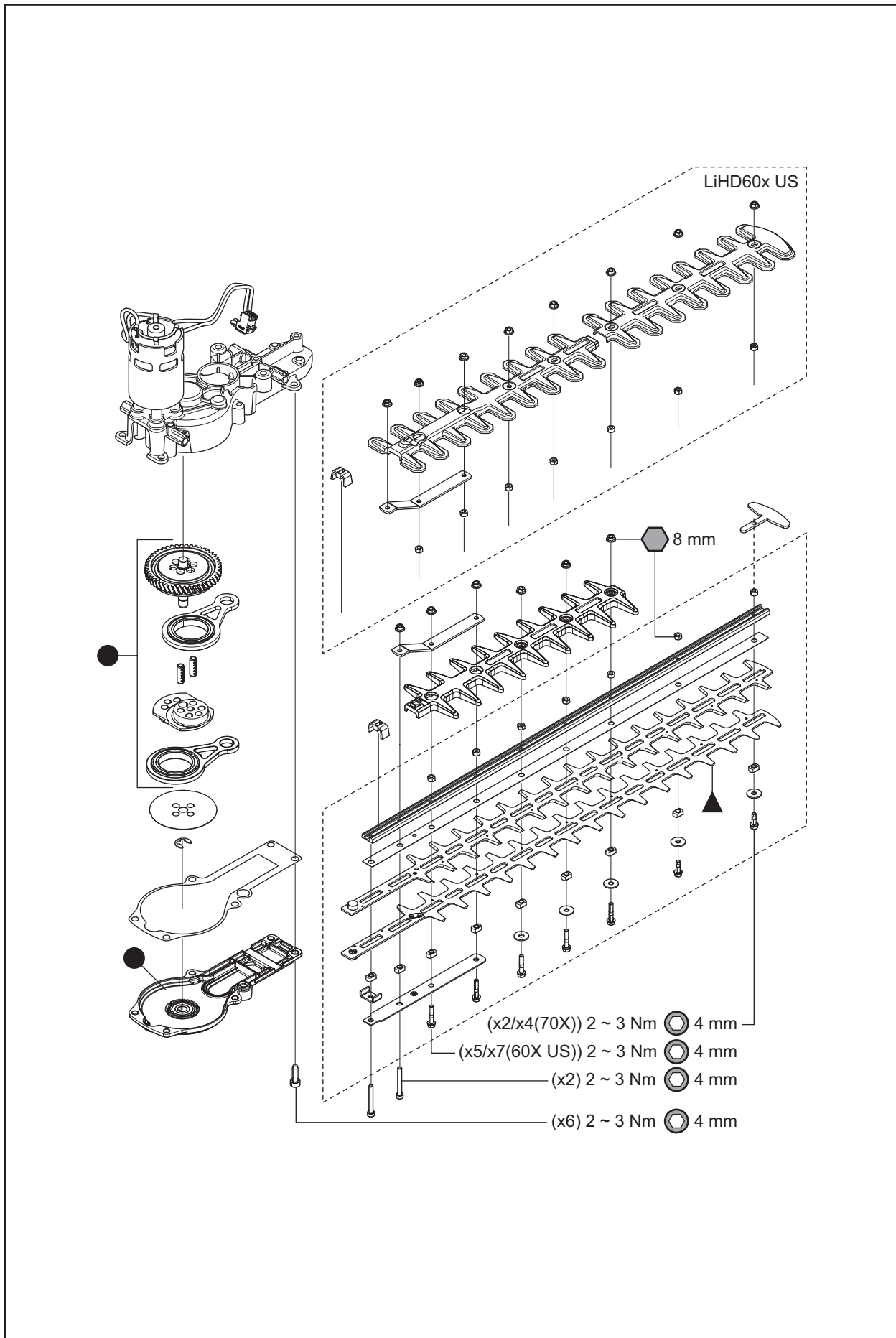
▲ Lubricate chain saw oil.

● Lubricate with grease.

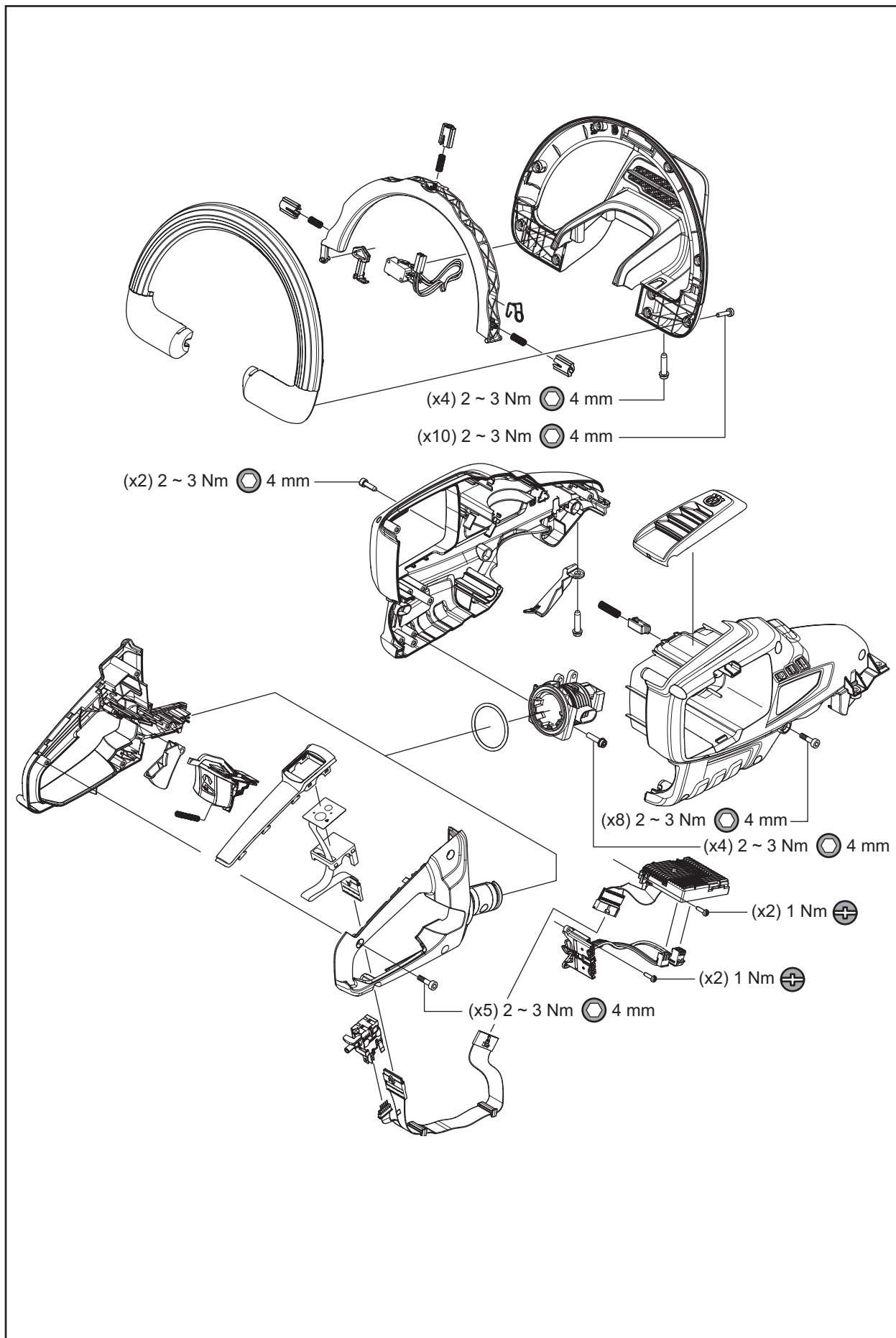
Service data LiHD50



Service data LiHD60X / LiHD70X



Service data LiHD60X / LiHD70X



6 Diagnosis and troubleshooting


Contents


6.1	Remove the battery.....	17
6.2	Connect the diagnostic tool - LiHD60X / LiHD70X.....	17
6.3	No signal to diagnostic tool	17
6.4	Troubleshooting diagram - LiHD50	18
6.5	Troubleshooting the main switch	19
6.6	Troubleshooting the keypad	19
6.7	Troubleshooting the control unit PMDC - LiHD50.....	20
6.8	Troubleshooting the control unit PMDC - LiHD60X / LiHD70X.....	20
6.9	Overhaul.....	20

6 Diagnosis and troubleshooting

6.1 Remove the battery

Press in the catches and remove the battery.
See figure 1.

 **WARNING!**
The battery must always be removed for service/repair work and may only be replaced once the machine has been completely assembled again!

 **WARNING!**
Do not short circuit the battery!
Never unscrew the battery!
Never fit a damaged battery!
Replace a damaged battery!

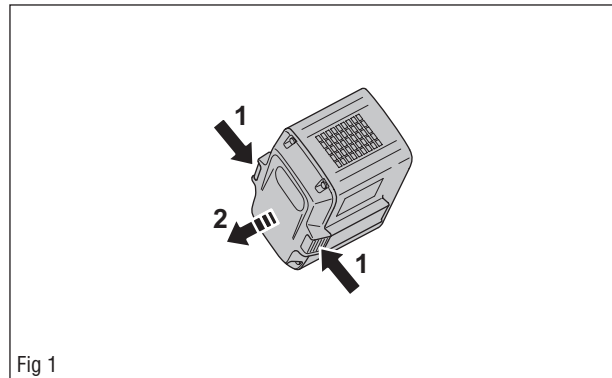


Fig 1

6.2 Connect the diagnostic tool - LiHD60X / LiHD70X

1

Connect the adapter cable for the diagnostic tool to the battery and the battery contact on the machine. Connect cable (A) to the diagnostic tool for troubleshooting the machine.

Connect cable (B) to the diagnostic tool for troubleshooting the battery.

NB! Refer to the manual for the Diagnostic Tool Battery for detailed instructions and follow the instructions in the diagnostic tool.

See figure 2.

2

Diagnose/troubleshoot according to the diagnostic tool instructions and make any necessary repairs as instructed in the relevant chapter in this manual.

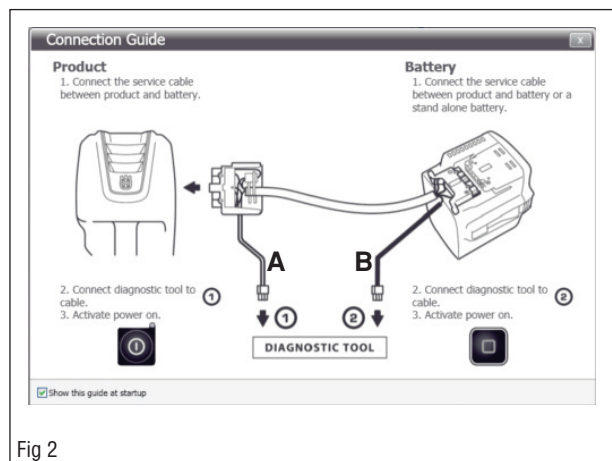


Fig 2

6.3 No signal to diagnostic tool

1

Check that the contact on the battery and the battery contact on the machine are intact and clean. Replace the battery or alternatively the control unit on the machine if there is any damage to the contact.

2

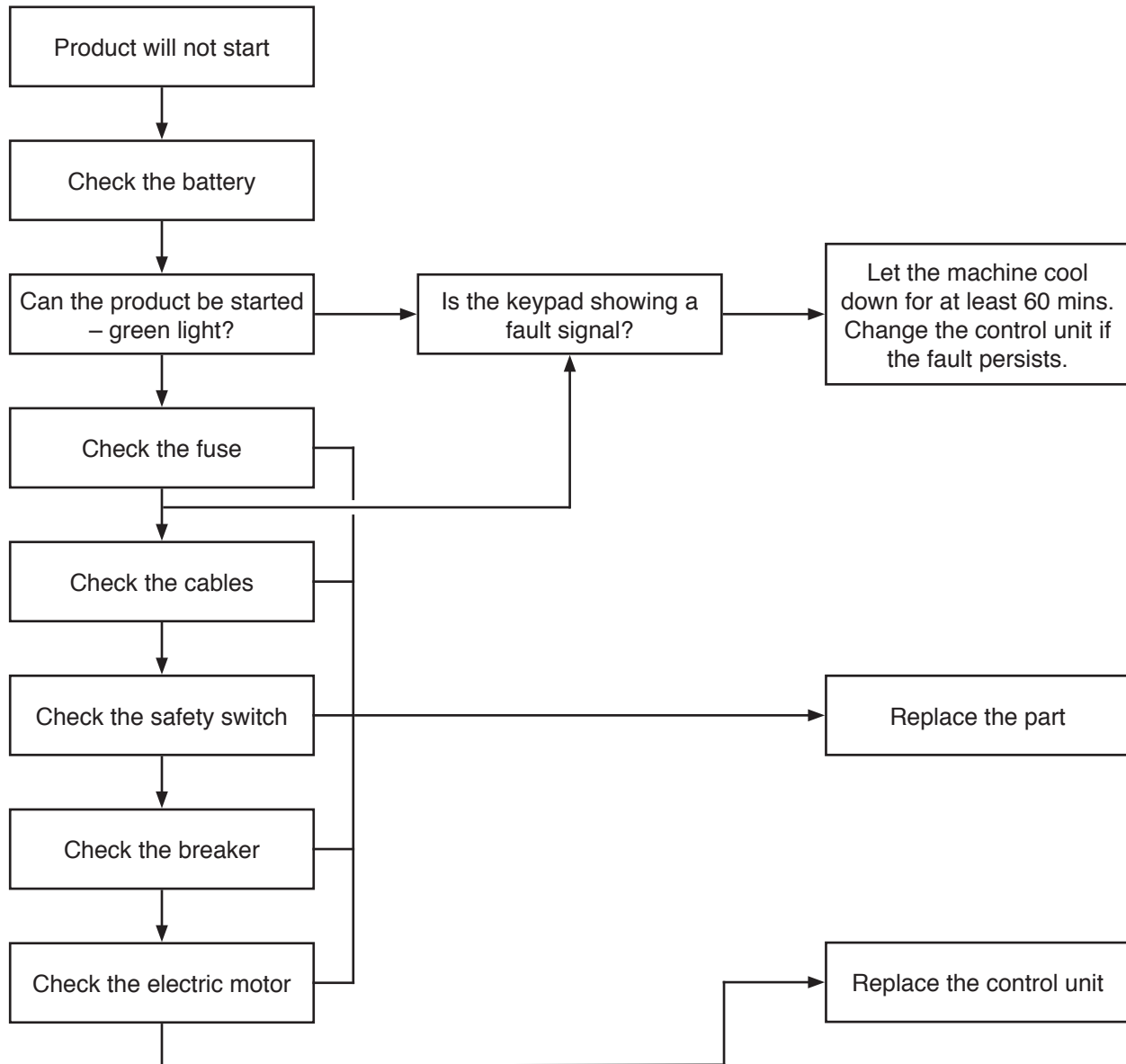
Check that the cable to the diagnostic tool is intact and clean. Replace the cable if it is damaged.

3

Restart the computer/Reinstall the software.

6.4 Troubleshooting diagram - LiHD50

The diagnostic tool cannot be used to troubleshoot LiHD50. Therefore, troubleshoot the electrical system as shown in the diagram below and in Chapter 6.5-6.8.



In addition to troubleshooting with the diagnostic tool, a potentiometer can be used to troubleshoot certain parts manually.
 Replace damaged parts as described in the relevant chapter.

6.5 Troubleshooting the main switch

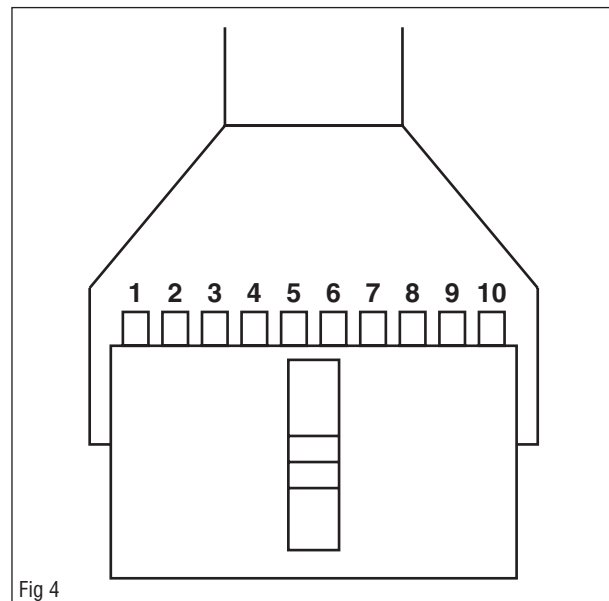
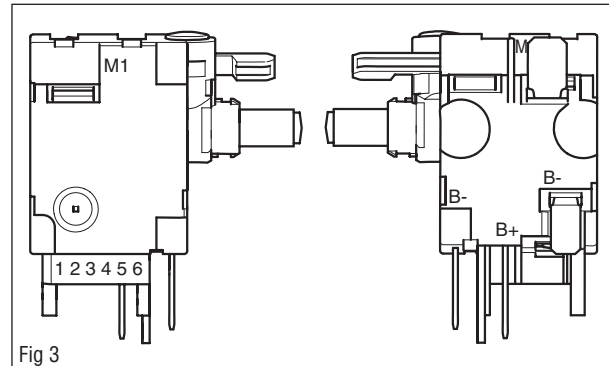
The switch used in professional battery products from Husqvarna has two functions, to supply current to the control unit and the electric motor, and act as a position sensor for the variable speed control. All these functions can easily be tested and verified using a resistance meter.

NB! The switch should not be depressed more than 6 mm and not to its end position when testing.

- Measure between B+ and B1 when the switch is not depressed. The result should be open circuit.
- Measure between B+ and B1 when the switch is depressed. The result should be closed circuit.
- Measure between pin 2 and pin 5 when the switch is not depressed. The result should be closed circuit.
- Measure between pin 2 and pin 5 when the switch is depressed. The result should be 50 kΩ ± 25%.
- Measure between B1 and Pin 1. The result should always be closed circuit.

See figure 3.

If all readings are within specified limits, the switch is OK.



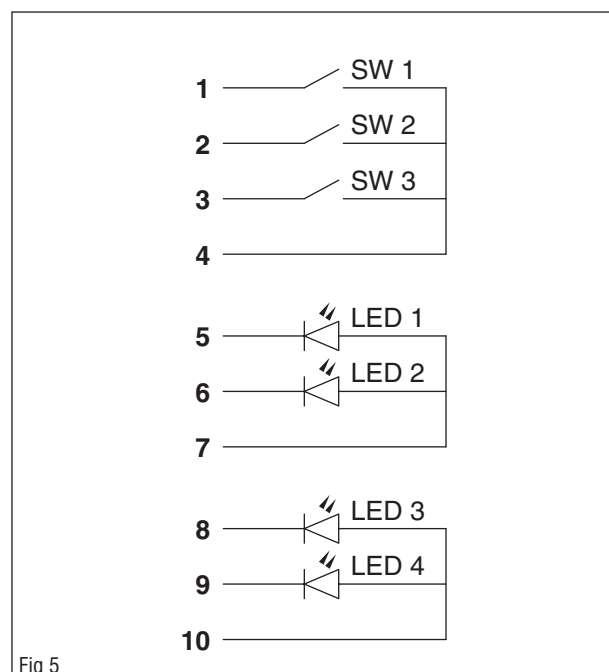
6.6 Troubleshooting the keypad

It is only possible to troubleshoot the keys on the keypad. Measure pin 1-10 on the FPC on top of the contact.

See figure 4.

The measuring points are shown in the diagram on the right.

- (1) Switch 1: On/Off
- (2) Switch 2: Save E
- (3) Switch 3: Pivoting (option)
- (4) **Supply**
- (5) LED 1, Green: On/Off
- (6) LED 2, Green: savE
- (7) **Supply**
- (8) LED 3, Red: Fault/optional chain brake
- (9) LED 4, Green: Pivoting (option)
- (10) **Supply**



6.7 Troubleshooting the control unit PMDC - LiHD50

Check that the blade terminals and associated wires are not bent or damaged.

- (A) 6.3x0.8mm M- (Black wire)
- (B) 6.3x0.8mm M+ (Red wire)
- (C) 6.3x0.8mm PCB + (Yellow wire)
- (D) 6.3x0.8mm PCB 0V (Black wire)
- (E) 4.8x0.8mm Shutdown (blue wire)

See figure 6.

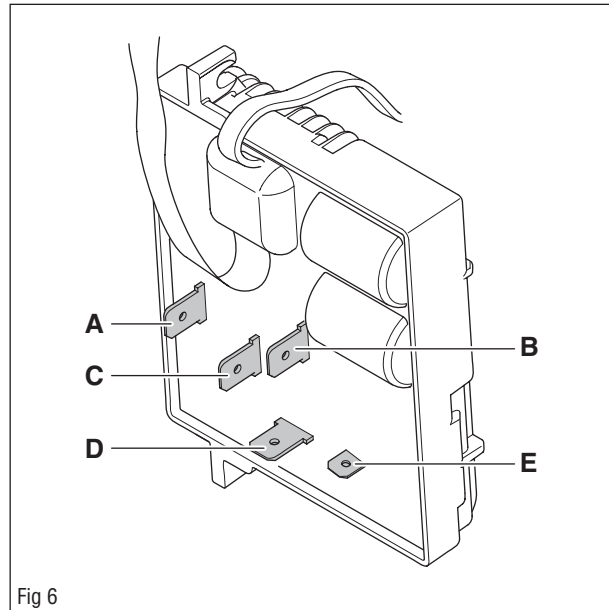


Fig 6

6.8 Troubleshooting the control unit PMDC - LiHD60X / LiHD70X

Check that the blade terminals and associated wires are not bent or damaged.

- (A and B) 2.8 mm blade terminal to hand guard, power switch (black wires).
- (C) Battery communication (red, black and blue wires).
- (D) Power supply (red wire).
Shares connector with 0V.
- (E) OV supply (black wire).
Shares connector with POWER.
- (F) Motor + supply (gray wire).
Shares connector with Motor (-).
- (F) Motor - supply (black wire).
Shares connector with Motor (+).

See figure 7.

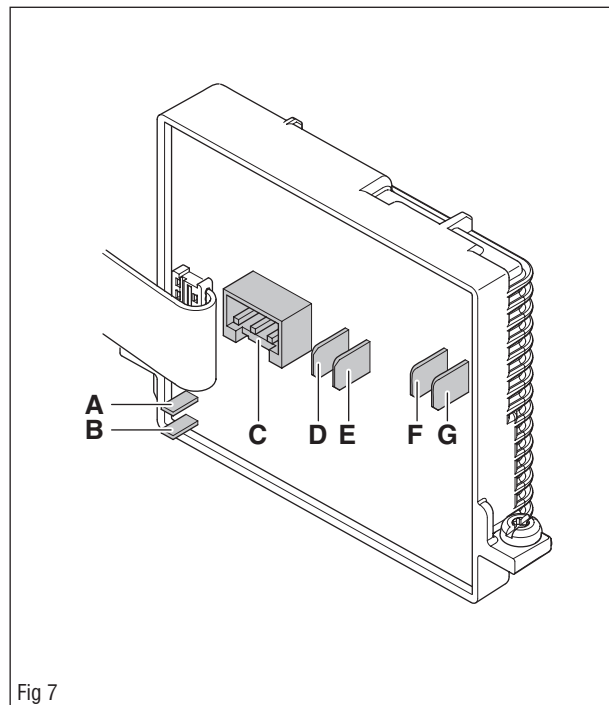


Fig 7

6.9 Overhaul

Inspect the component parts of the machine. Replace damaged parts as described in the relevant chapter.

7 Basic dismantle/assembly

Contents

7.1	Battery	23
7.2	Wear guard - LiHD50	23
7.3	Front handle- LiHD50	23
7.4	Chassis - LiHD50.....	24
7.5	Front handle- LiHD60X / LiHD70X.....	25
7.6	Chassis - LiHD60X / LiHD70X	25

7 Basic dismantle/assembly

The steps described below are the basic steps that must be carried out before any other service or repair work or final assembly is possible.

7.1 Battery

Press in the catches and remove the battery.
See figure 1.

Replace the battery once assembly has been completed.



WARNING!
The battery must always be removed for service/repair work and may only be replaced once the machine has been completely assembled again!

NOTE!

Note how wires, components, etc., are positioned before dismantling.
Make sure to position them correctly to avoid pinching when the machine is reassembled.

7.2 Wear guard - LiHD50

Loosen the screws (8x) and lift off the wear guard under the machine.

Assemble in the reverse order.

Tightening torque 2 ~ 3 Nm.

See figure 2.

7.3 Front handle- LiHD50

1

Dismantle the wear guard as above.

2

Loosen the screws (2x) holding the handle.

Assemble in the reverse order.

Tightening torque 2 ~ 3 Nm.

See figure 3.

3

Lift the contact for the handle out of the chassis and disconnect it. Lift the handle off the machine

Assemble in the reverse order.

See figure 4.

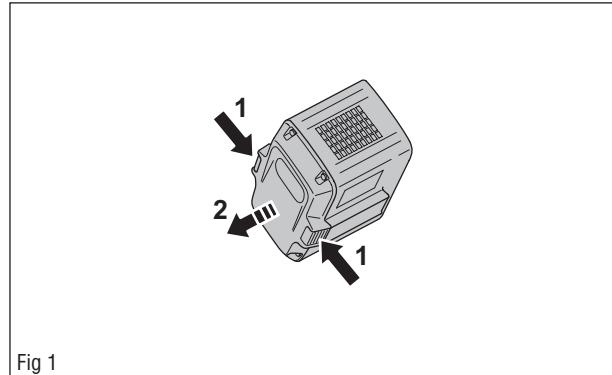


Fig 1

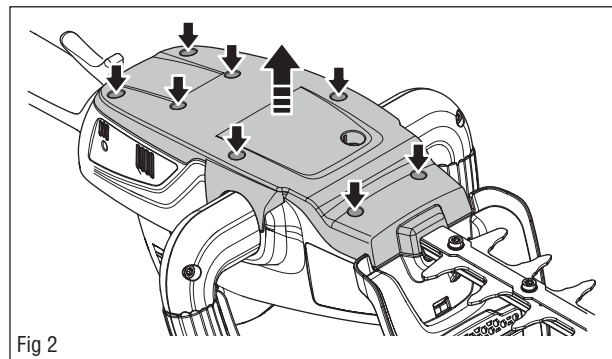


Fig 2

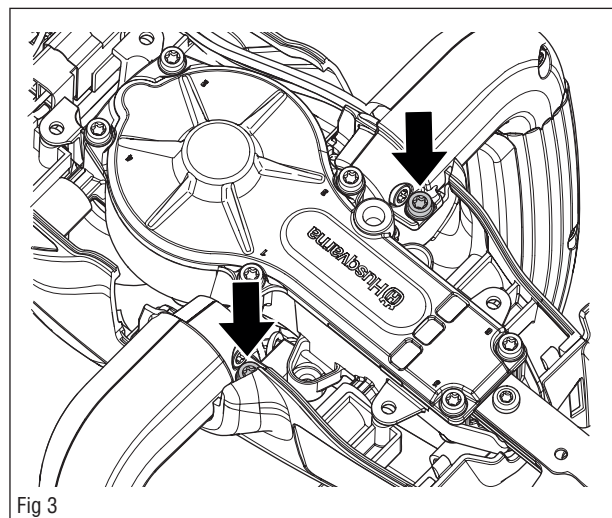


Fig 3

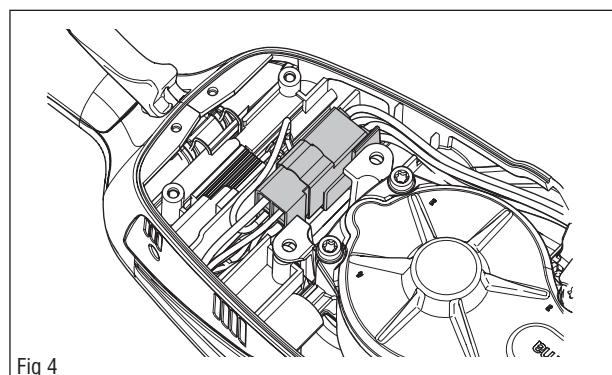


Fig 4

7.4 Chassis - LiHD50

1

Poke off the grip protection (A) using a screwdriver. Assemble in the reverse order. See figure 5.

2

Loosen the screws (11x) and lift off the right chassis half.

NB! One screw (A) is concealed under the decal (B).

See figure 6.

Cleaning and inspection

Clean and thoroughly check the chassis halves as well as the vent covers. Parts must be replaced if cracked or showing signs of other defects. Always use original spare parts.

See figure 7.

Assemble in the reverse order.

NOTE!

It should be easy to put together the chassis halves. Make sure cables and such are positioned correctly if this is difficult.

Tightening torque 2 ~ 3 Nm.

Replace the damaged decal.

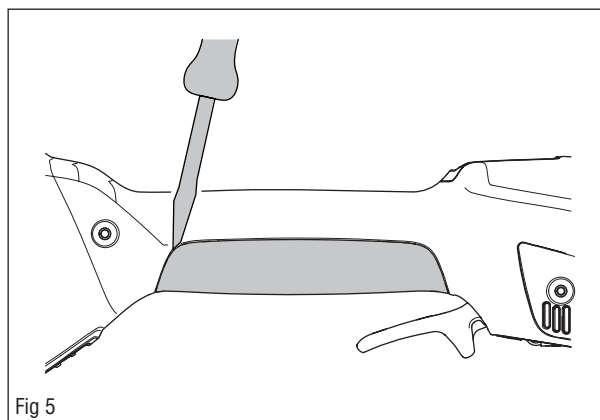


Fig 5

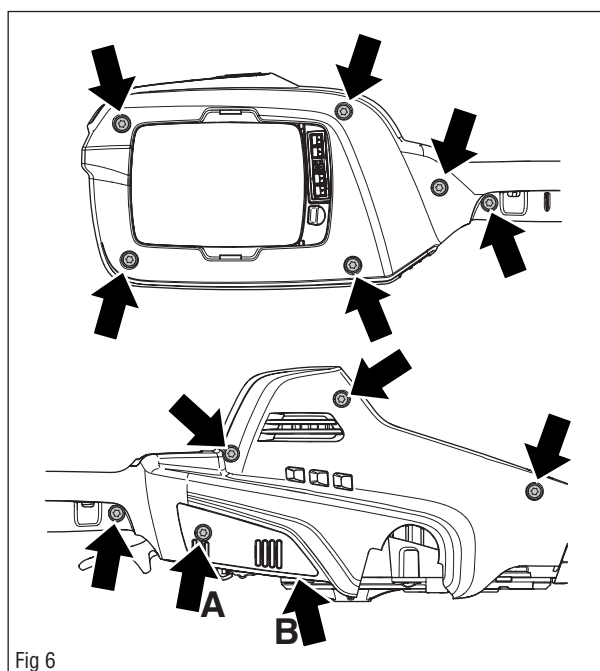


Fig 6

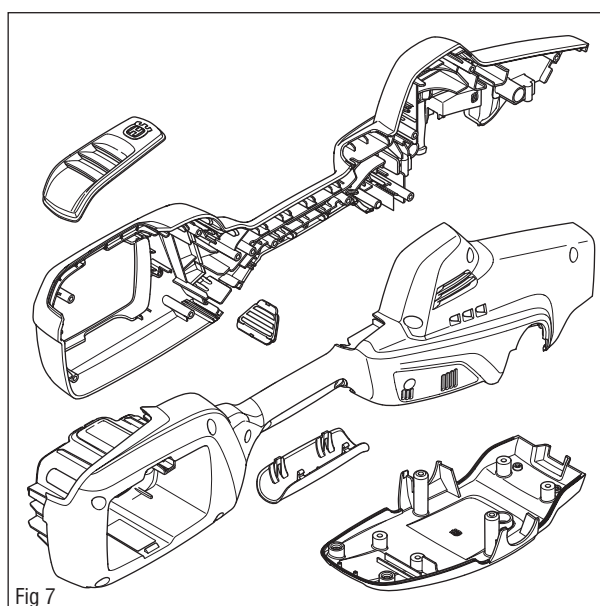


Fig 7

7.5 Front handle- LiHD60X / LiHD70X

1

Loosen screw (A) and lift off the cover (B) over the handle cables.

Assemble in the reverse order.

NOTE!

Make sure the cables to the handle are tucked in under the cover so they are not pinched.

Tightening torque 2 ~ 3 Nm.

See figure 8.

2

Loosen the screws (3x) holding the handle.

Assemble in the reverse order.

Tightening torque 2 ~ 3 Nm.

See figure 9.

3

Lift off the handle and place it next to the machine.

Make sure the cables are not damaged.

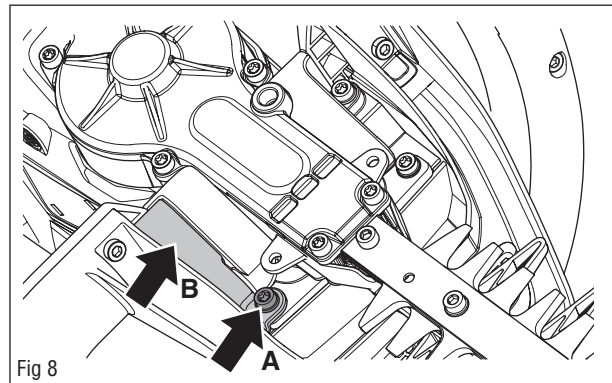


Fig 8

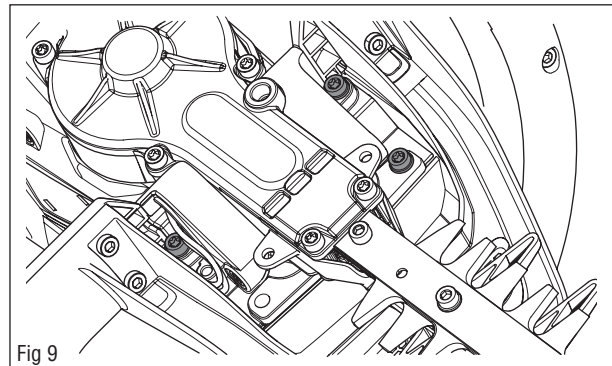


Fig 9

7.6 Chassis - LiHD60X / LiHD70X

Loosen the screws (8x) and lift off the right chassis half.

See figure 10.

Cleaning and inspection

Clean and thoroughly inspect the chassis halves, vent cover and handle cable protection. Parts must be replaced if cracked or showing signs of other defects. Always use original spare parts.

See figure 11.

Assemble in the reverse order.

NOTE!

It should be easy to put together the chassis halves. Make sure cables and such are positioned correctly if this is difficult.

Tightening torque 2 ~ 3 Nm.

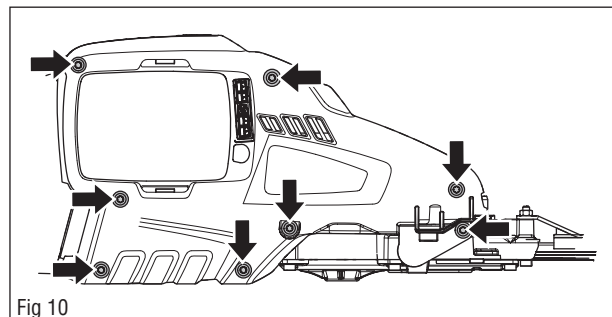


Fig 10

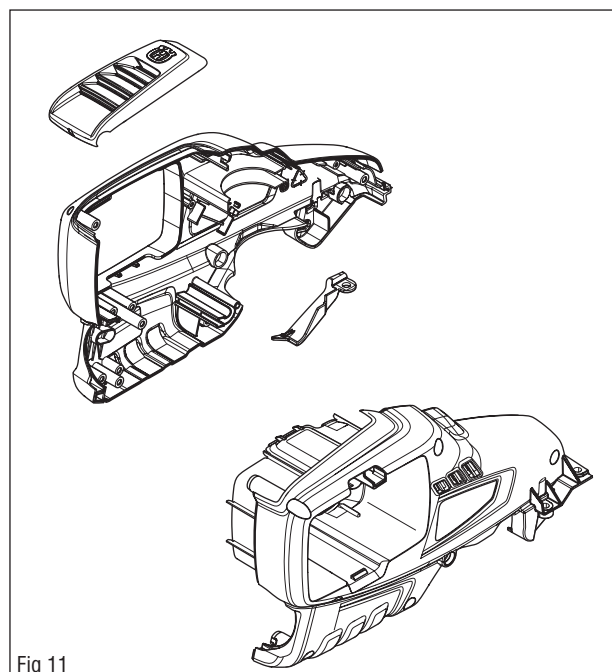


Fig 11

8 Safety equipment

Contents

8.1	Dismantling the front handle- LiHD50.....	27
8.2	Assembling the front handle- LiHD50.....	27
8.3	Dismantling the hand guard - LiHD50.....	27
8.4	Assembling the hand guard - LiHD50.....	27
8.5	Dismantling the throttle trigger - LiHD50.....	28
8.6	Assembling the throttle trigger - LiHD50.....	28
8.7	Dismantling the front handle and start inhibitor - LiHD60X / LiHD70X.....	29
8.7	Assembling the front handle and start inhibitor - LiHD60X / LiHD70X.....	30
8.9	Dismantling the throttle trigger and handle stop - LiHD60X / LiHD70X.....	32
8.10	Assembling the throttle trigger - LiHD60X / LiHD70X.....	32
8.11	Replacing the blade guard - LiHD60X / LiHD70X.....	33

8 Safety equipment

8.1 Dismantling the front handle - LiHD50

See Chapter 7.2 - 7.3.

Cleaning and inspection

Clean and check the handle thoroughly. It must always be replaced with a new one if cracked or showing signs of other defects. Always use original spare parts.

See figure 1.

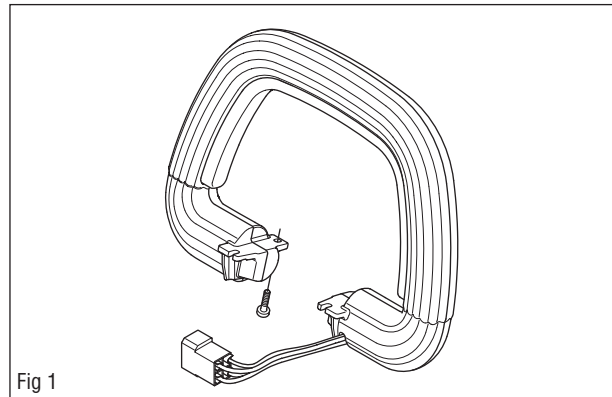


Fig 1

8.2 Assembling the front handle - LiHD50

See Chapter 7.2 - 7.3.

8.3 Dismantling the hand guard - LiHD50

1

Dismantle the front handle and the right chassis half.

See Chapter 7.2 - 7.4.

2

Unhook the hand guard from the chassis

See figure 2.

Cleaning and inspection

Clean and check the hand guard. The hand guard must always be replaced with a new one if cracked or showing signs of other defects.

Always use original spare parts.

See figure 3.

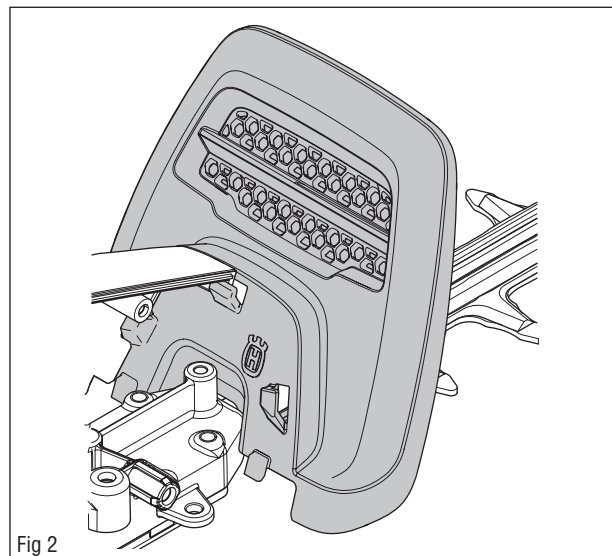


Fig 2

8.4 Assembling the hand guard - LiHD50

1

Make sure the hand guard fits into the respective grooves in the chassis.

See figure 2.

2

Assemble the right chassis half and the front handle.

See Chapter 7.2 - 7.4.

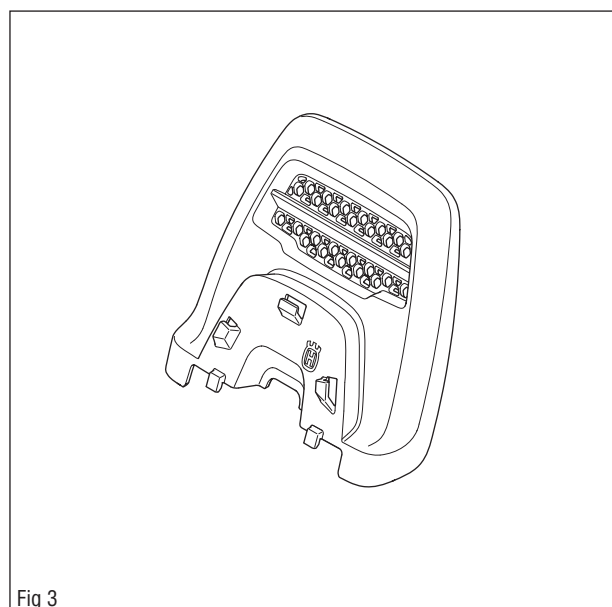


Fig 3

8.5 Dismantling the throttle trigger - LiHD50

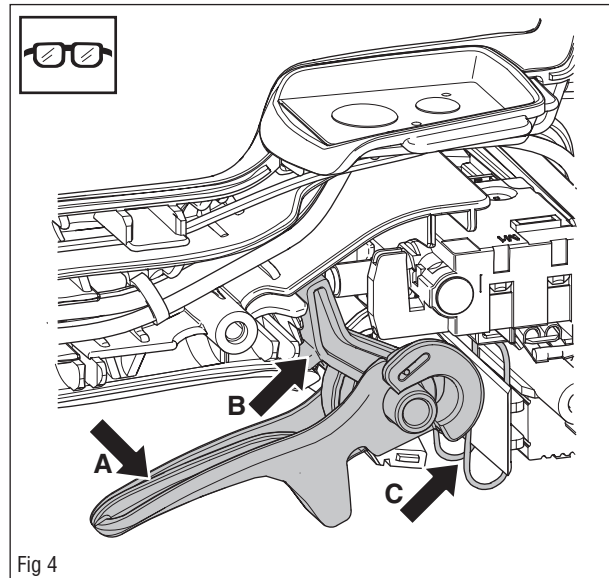
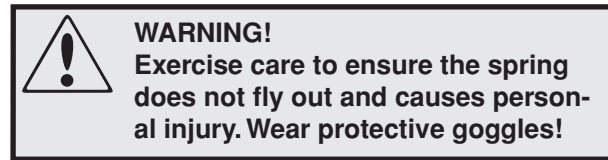
1

See Chapter 7.2 - 7.4.

2

Lift out the throttle trigger (A), catch (B) and spring (C) from their attachments in the chassis.

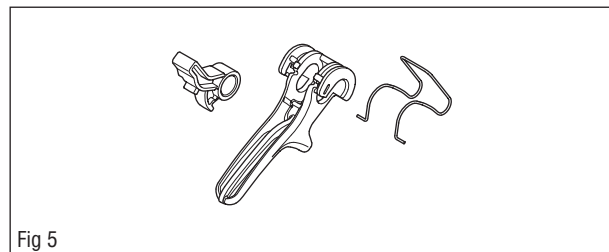
See figure 4.



Cleaning and inspection

- Clean and check all parts thoroughly. Parts must be replaced if cracked or showing signs of other defects. Always use original spare parts.
- Check that the spring is intact and retains all its tension.

See figure 5.



8.6 Assembling the throttle trigger - LiHD50

1

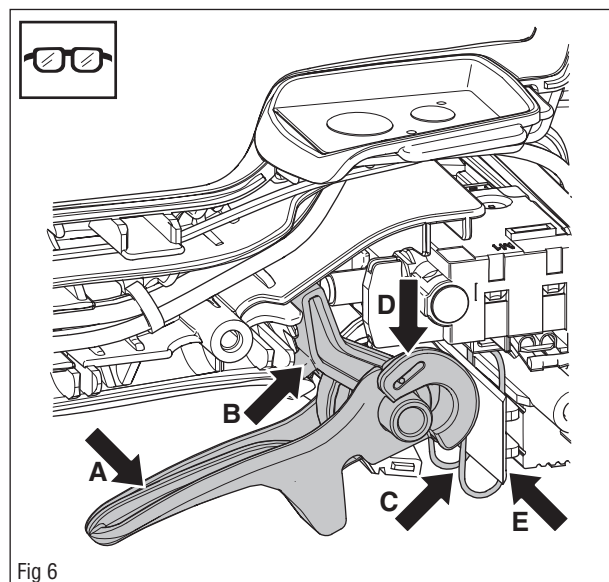
Assemble the throttle trigger (A), catch (B) and spring (C) on their attachments in the chassis. Make sure the inhibitor is positioned correctly against the main switch and that the spring is in the groove (D) on the throttle trigger and behind the gap (E).

See figure 6.

2

Assemble the right chassis half and the front handle.

See Chapter 7.2 - 7.4.



8.7 Dismantling the front handle and start inhibitor - LiHD60X / LiHD70X

1
Dismantle the front handle and the right chassis half.
See Chapter 7.5 - 7.6.

2
Dismantle the gear housing and motor.
See Chapter 10.2.

3
Uncouple the handle cables (A) from the control unit and remove them through the hole (B) in the chassis.
See figure 7.

WARNING!
Exercise care to ensure the spring does not fly out and causes personal injury. Wear protective goggles!

4
Loosen the screws (10x) and carefully lift off the handle half.
See figure 8.

5
Lift the relay with cables (C) and the loop (D) out of the handle.
See figure 9.

6
Lift the start inhibitor (E), plastic clips (F 3x), springs (G 3x) and spring (H) over the screw tower out of the handle.
See figure 10.

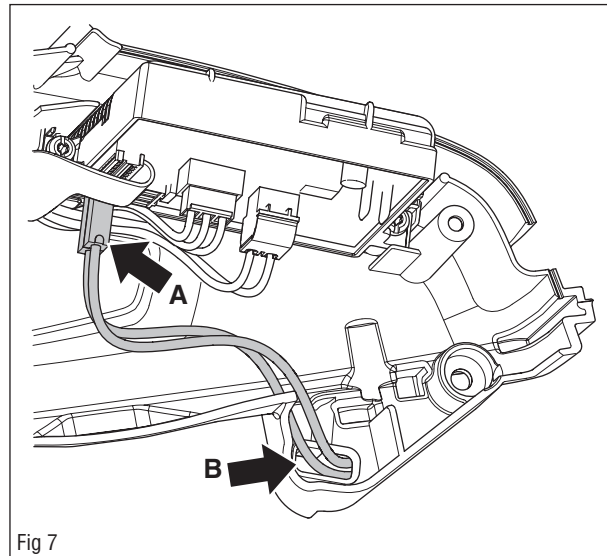


Fig 7

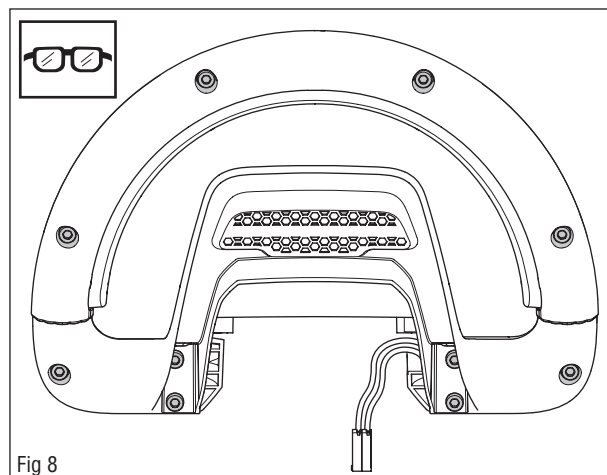


Fig 8

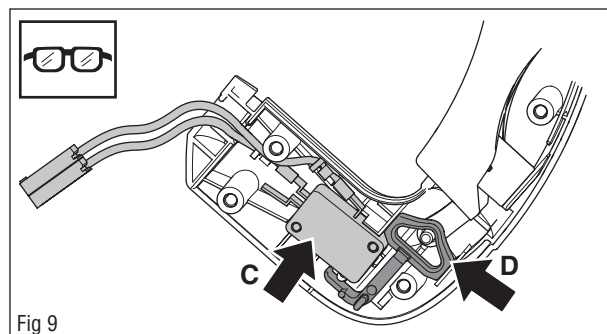


Fig 9

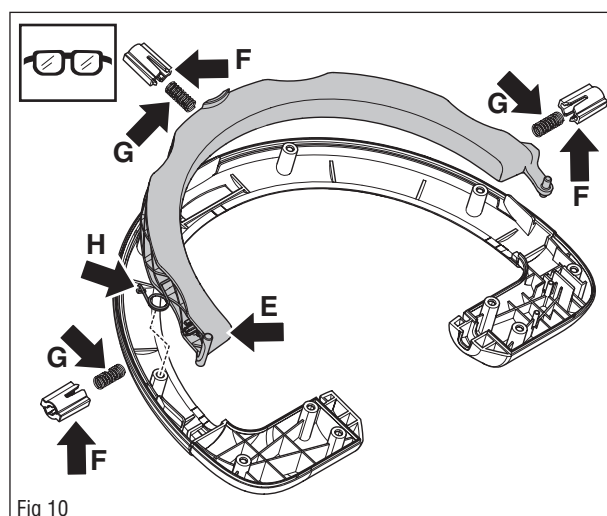


Fig 10

Cleaning and inspection

Clean and check carefully all components on the handle. Components must be replaced with new ones if cracked or showing signs of other defects. Make sure the springs have retained their tension. Always use original spare parts. See figure 11.

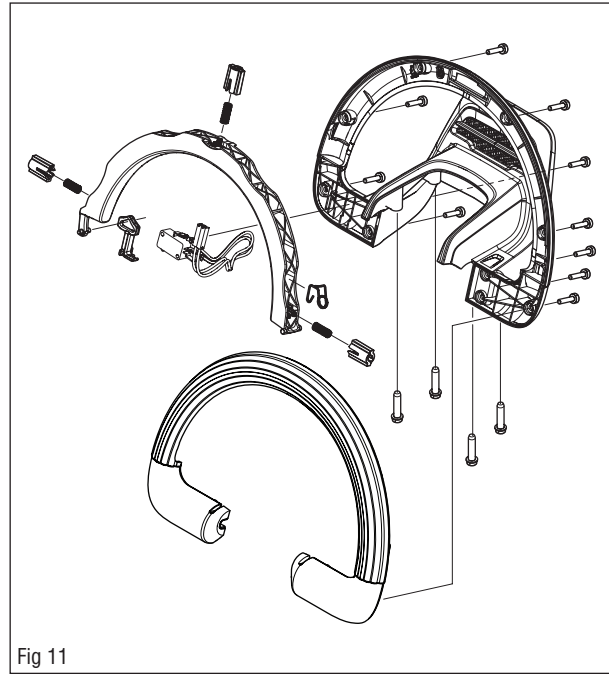


Fig 11

8.7 Assembling the front handle and start inhibitor - LiHD60X / LiHD70X

1

Place the start inhibitor (F), plastic clips (G) and springs (H) in the handle. See figure 12.

2

Place the relay with cables (D) and the loop (E) in the handle. See figure 13.

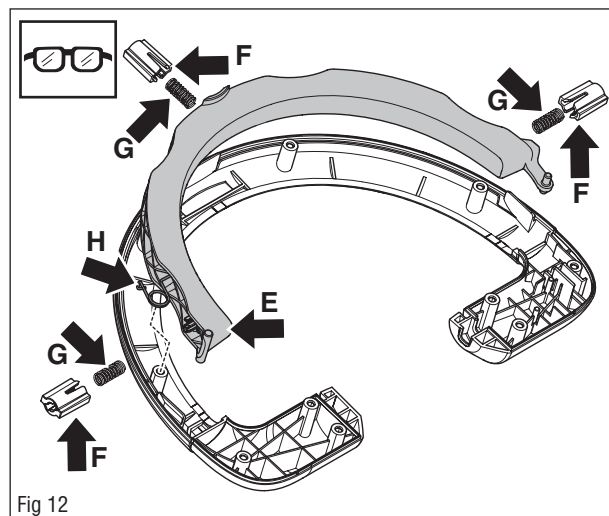


Fig 12

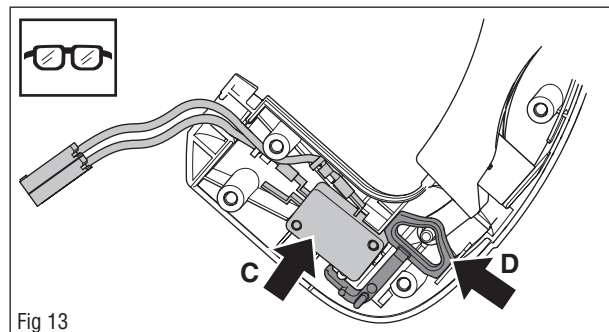


Fig 13

- 3**
Screw on the handle halves (10x screws).

NOTE!
Ensure cables, etc., are positioned correctly to avoid pinching.

Tightening torque 3 ~ 4 Nm.
See figure 14.

- 4**
Ensure the safety catch springs back in all directions.
See figure 15.

- 5**
Insert the cables through the hole (B) in the chassis and connect the contacts (A) to the control unit.
NB! The safety catch works irrespective of the order in which the contacts (A) are connected.
See figure 16.

- 6**
Assemble the gear housing and motor in the chassis.
See Chapter 10.15.

- 7**
Assemble the right chassis half and the front handle.
See Chapter 7.5 - 7.6.

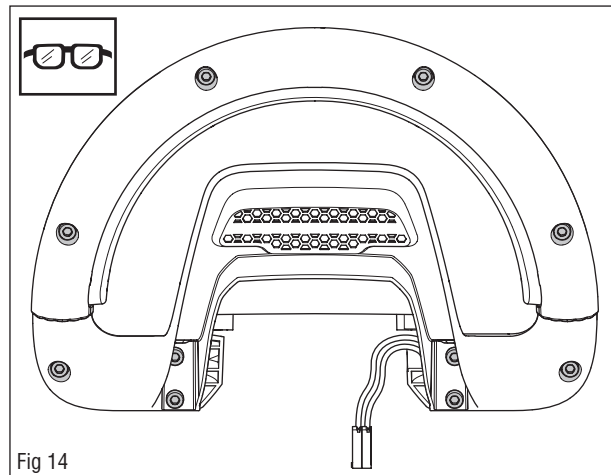


Fig 14

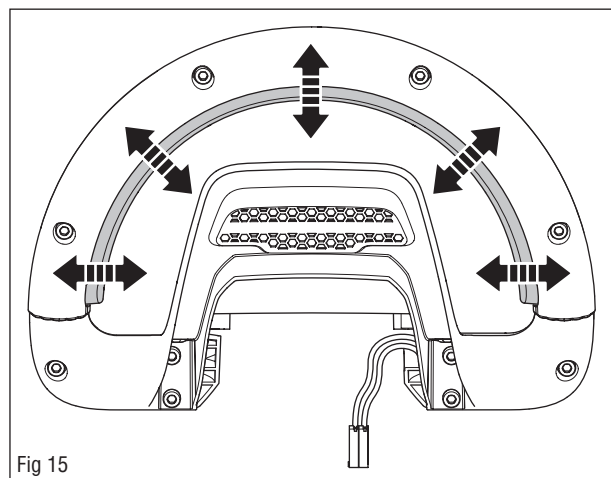


Fig 15

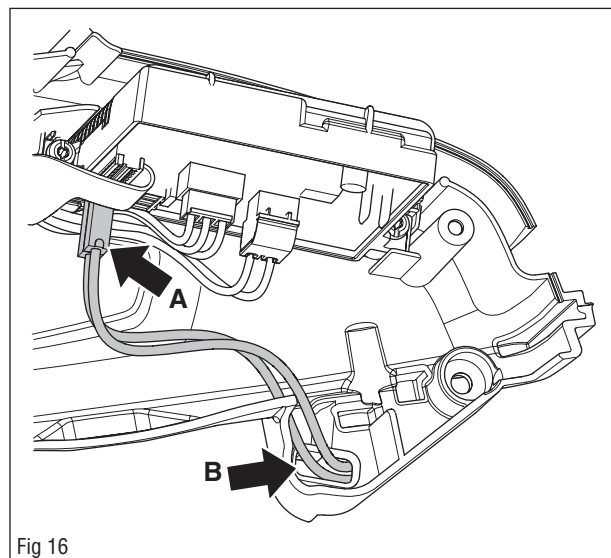


Fig 16

8.9 Dismantling the throttle trigger and handle stop - LiHD60X / LiHD70X

1

Dismantle the front handle and the right chassis half.

See Chapter 7.5 - 7.6.

2

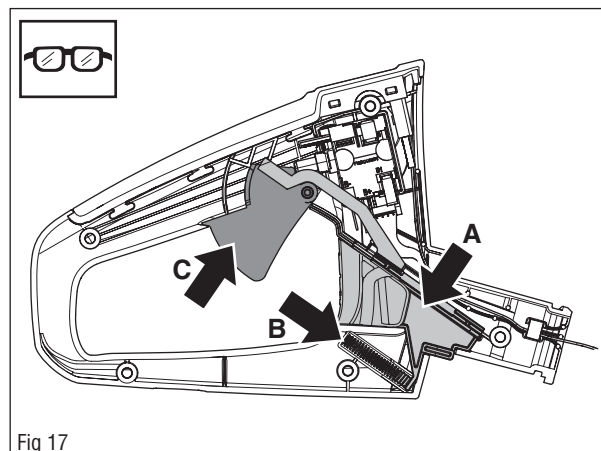
Dismantle the rear handle.

See Chapter 10.9.

3

Lift the handle stop (A) and spring (B) out of the handle followed by the throttle trigger.

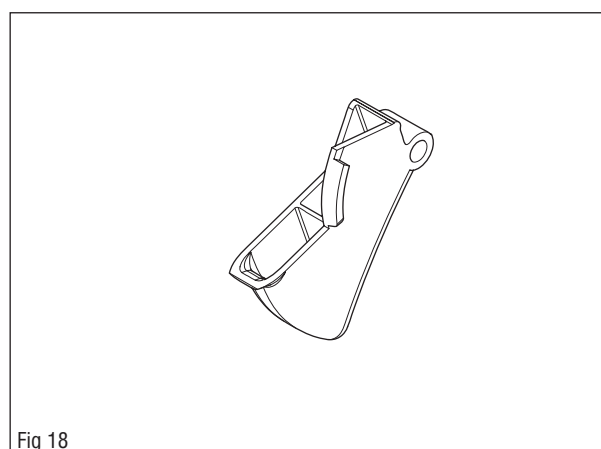
See figure 17.



Cleaning and inspection

Clean and check the throttle trigger thoroughly. It must always be replaced with a new one if cracked or showing signs of other defects. Always use original spare parts.

See figure 18.



8.10 Assembling the throttle trigger - LiHD60X / LiHD70X

1

Place the throttle trigger (C) into the handle followed by the handle stop (A) and spring (B).

See figure 17.

2

Assemble the rear handle.

See Chapter 10.14.

3

Assemble the right chassis half and the front handle.

See Chapter 7.5 - 7.6.

8.11 Replacing the blade guard - LiHD60X / LiHD70X

Always replace a damaged blade guard with a new one.

Loosen the nut (A) holding the anchor plate (B).
Loosen the nuts (C 5x for 60X/70X, 7x for 60X
US). Lift off the blade guard (D) with anchor plate
(B) and separate them.

Assemble in the reverse order.

Tightening torque 3 ~ 4 Nm.

See figure 19.

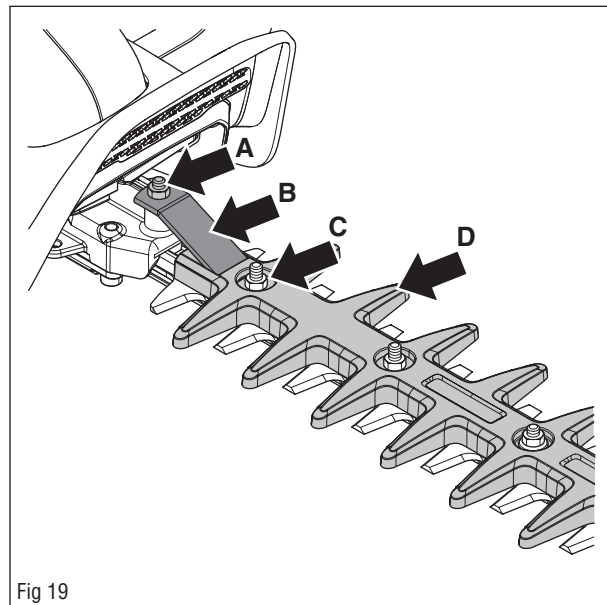


Fig 19

9 Repair instructions - LiHD50

Contents

- 9.1 General repair instructions..... 35
- 9.2 Replacing the shears..... 35
- 9.3 Dismantling the motor and gear package..... 36
- 9.4 Assembling the motor and gear package..... 36
- 9.5 Dismantling the keypad and control unit 37
- 9.6 Assembling the keypad and control unit 37
- 9.7 Repairing damaged threads 38

9 Repair instructions - LiHD50

9.1 General repair instructions



WARNING!
The battery must always be removed for service/repair work and may only be replaced once the machine has been completely assembled again!

NOTE!

Note how wires, components, etc., are positioned before dismantling.
Make sure to position them correctly to avoid pinching when the machine is reassembled.

9.2 Replacing the shears

1

Dismantle the wear guard under the machine.
See Chapter 7.2.

2

Loosen the screws (6x) and lift off the gear housing bottom plate.
See figure 1.

3

Loosen screws (2x) and lift out the gears and cutting unit from the gear housing.
See figure 2.

4

Loosen the circlip (A), lift off the washer (B), carefully lift up the "hook" (C) and lift off the cutting unit.
See figure 3.

5

Place the cutting unit on the "hook" (C), put on the washer (B) and fasten the circlip (A).
See figure 3.

6

Place the gear and cutting unit in the gear housing.
Screw the cutting unit into the gear housing (2x screws).
Tightening torque 3 ~ 4 Nm.

NOTE!

Lubricate moving parts on gears and the cutting unit with grease so that they move easily!

See figure 2.

7

Assemble the bottom plate with gasket on the gear housing and fasten with screws (6x).
Tighten the screws crosswise according to the numbering on the bottom plate.
Tightening torque 3 ~ 4 Nm.

NB! Always replace the gasket with a new one after dismantling the gear housing.

See figure 4.

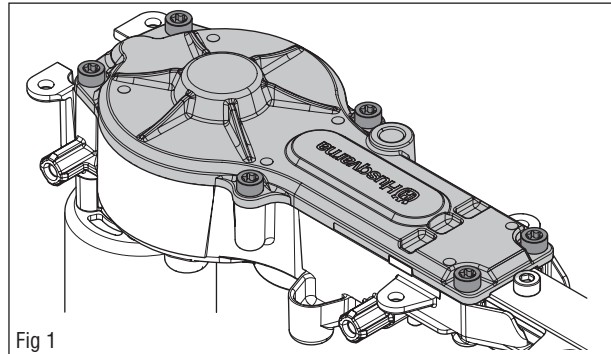


Fig 1

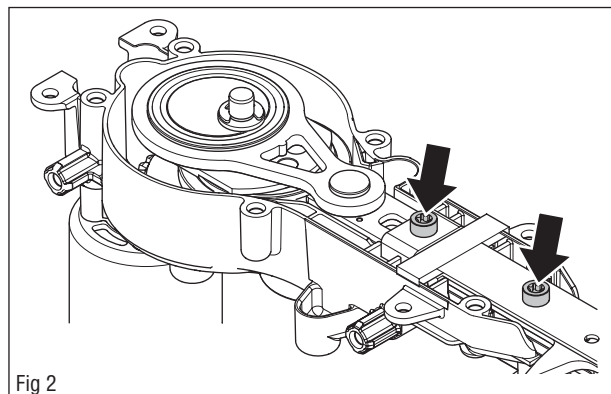


Fig 2

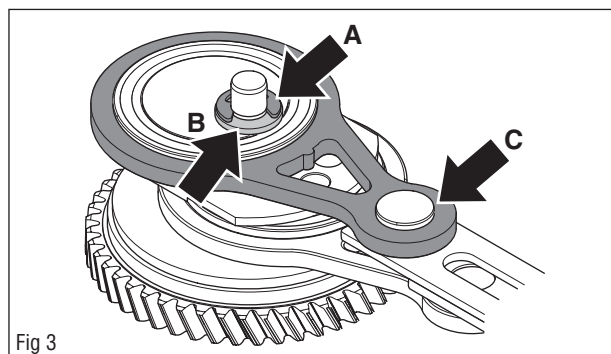


Fig 3

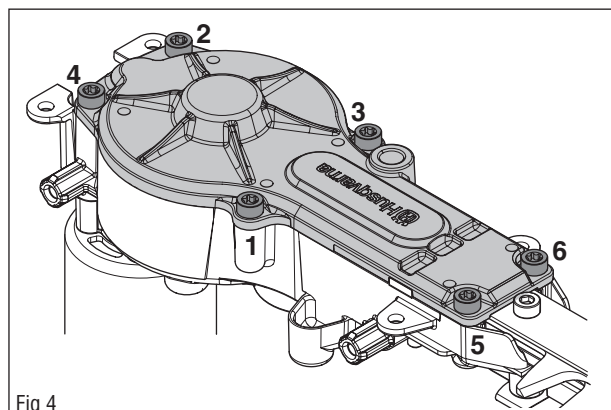


Fig 4

9.3 Dismantling the motor and gear package

- 1
Dismantle the front handle and the right chassis half.
See Chapter 7.2 - 7.4.
- 2
Lift the gear housing and motor out of the chassis and disconnect the contact.
See figure 5.
- 3
Dismantle the gear housing and lift out the gear package and cutting unit
See Chapter 9.2.

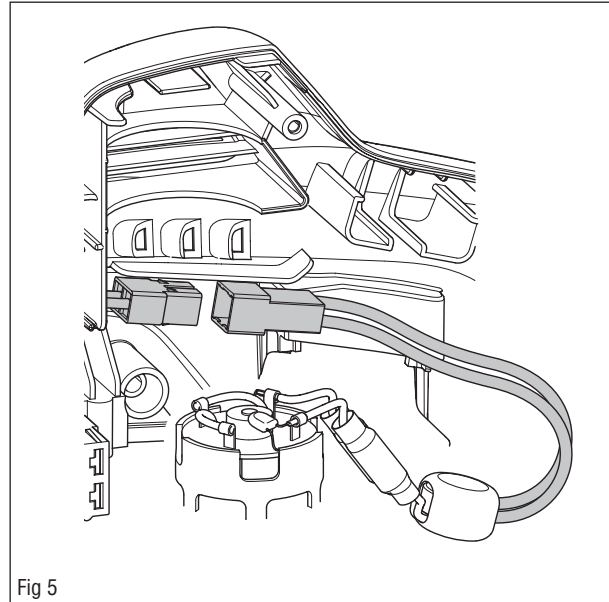


Fig 5

Cleaning and inspection

Clean and check all parts thoroughly. Parts must be replaced if cracked or showing signs of other defects. Always use original spare parts.
See figure 7.

9.4 Assembling the motor and gear package

- 1
Place the motor on the gear housing.
- 2
Place the gear package and cutting unit in the gear housing and assemble the bottom plate on the gear housing.
See Chapter 9.2.
- 3
Connect the contact and place the gear housing and motor in the chassis. Make sure the cables from the contact to the motor are positioned correctly in the chassis and that the resistor is placed on the "shelf" in front of the engine.
See figure 8.
- 4
Assemble the right chassis half and the front handle.
See Chapter 7.2 - 7.4.

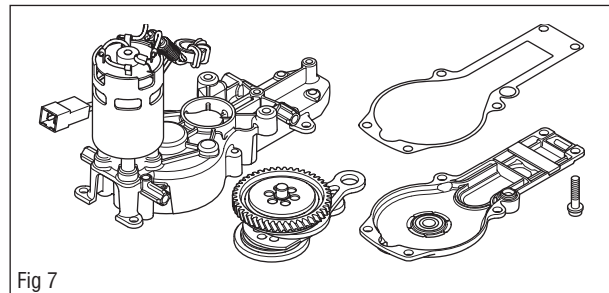


Fig 7

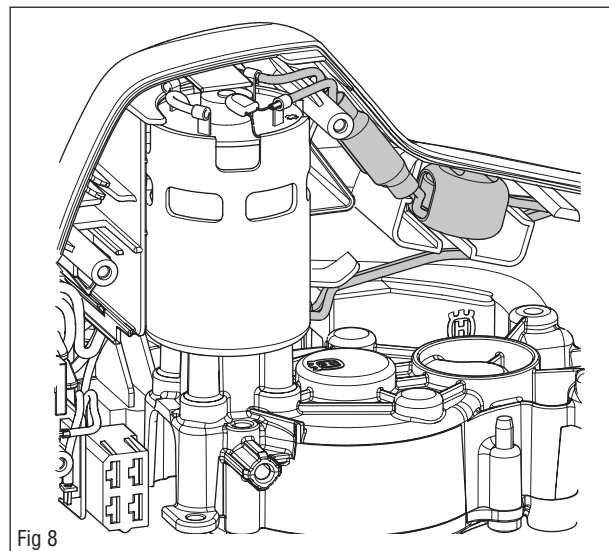


Fig 8

9.5 Dismantling the keypad and control unit

1

Dismantle the front handle and the right chassis half.

See Chapter 7.2 - 7.4.

2

Lift out the throttle trigger, catch and spring from their attachments in the chassis.

See Chapter 8.5.

3

Disconnect the contact to the motor.

See Chapter 9.3.

4

Loosen the screws (2x) for the battery contact and lift out the control unit and cables with main switch and keypad from the chassis.

See figure 9.

5

Uncouple the keypad from the control unit.

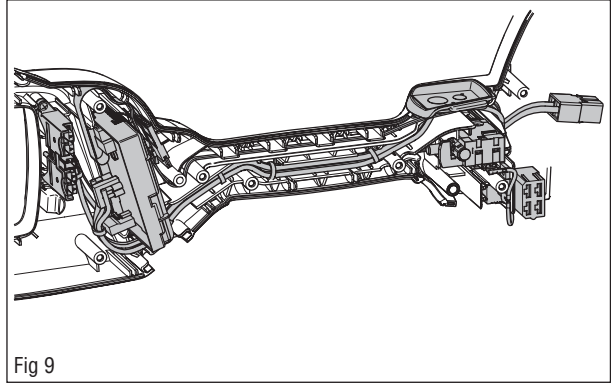


Fig 9

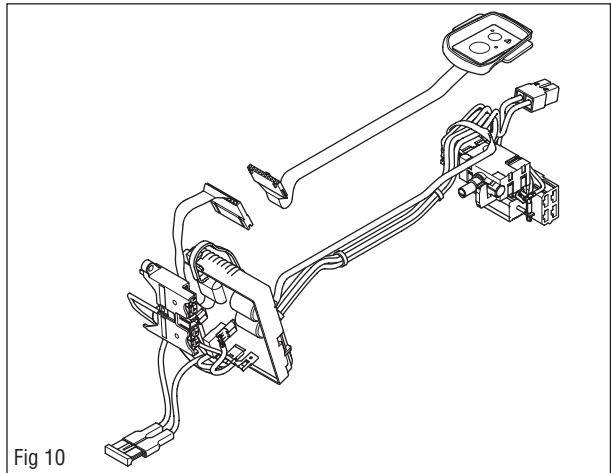


Fig 10

Cleaning and inspection

Clean and check all parts thoroughly. Parts must be replaced if cracked or showing signs of other defects. Always use original spare parts.

See figure 10.

NOTE!

The flat cable to the keypad is very fragile.



WARNING!

The "button" on the main switch may only be tested when it is assembled in the handle!

9.6 Assembling the keypad and control unit

1

Connect the keypad to the control unit.

2

Place (capitalise) the control unit with cables, main switch and keypad into the chassis. Screw on the battery contact (2x screws).

See figure 9.

3

Connect the contact to the motor.

See Chapter 9.4.

4

Assemble the throttle trigger, catch and spring on their attachments in the chassis.

See Chapter 8.6.

5

Assemble the right chassis half and the front handle.

See Chapter 7.2 - 7.4.

9.7 Repairing damaged threads

If the plastic threads in the chassis are damaged, drill out the hole with a 4.5 mm drill bit.

Then replace the original screw with screw:
503 21 74-16 - IHSCT MT5x16.



10 Repair instructions LiHD60X / LiHD70X

Contents

10.1	General repair instructions.....	41
10.2	Dismantling the gear housing and motor out of the chassis.....	41
10.3	Dismantling gears, cutting unit and motor out of the gear housing.....	41
10.4	Cutting unit.....	42
10.5	Gears.....	44
10.6	Assembling gears, cutting unit and motor in the gear housing.....	45
10.7	Dismantling the control unit and battery contact.....	46
10.8	Assembling the control unit and battery contact.....	46
10.9	Dismantling the rear handle.....	47
10.10	Dismantling the keypad.....	49
10.11	Assembling the keypad.....	50
10.12	Dismantling the main switch and main cabling.....	51
10.13	Assembling the main switch and main cabling.....	51
10.14	Assembling the rear handle.....	52
10.15	Assembling the gear housing and motor in the chassis.....	54
10.16	Repairing damaged threads.....	55

10 Repair instructions LiHD60X / LiHD70X

10.1 General repair instructions

WARNING!
The battery must always be removed for service/repair work and may only be replaced once the machine has been completely assembled again!

NOTE!
Note how wires, components, etc., are positioned before dismantling. Make sure to position them correctly to avoid pinching when the machine is reassembled.

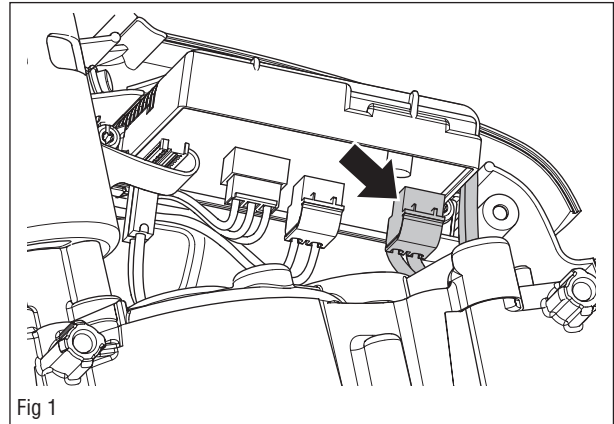


Fig 1

10.2 Dismantling the gear housing and motor out of the chassis

- 1
Dismantle the front handle and the right chassis half.
See Chapter 7.5 - 7.6.
- 2
Disconnect the motor contact from the control unit.
See figure 1.
- 3
Loosen the screws (2x) holding the gear housing and motor in the chassis.
See figure 2.
- 4
Lift the gear housing and motor out of the chassis.

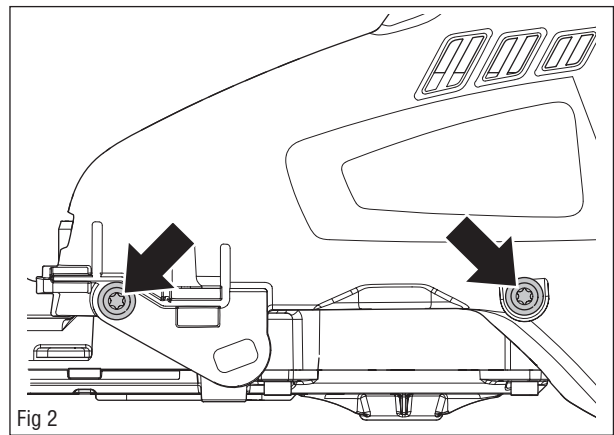


Fig 2

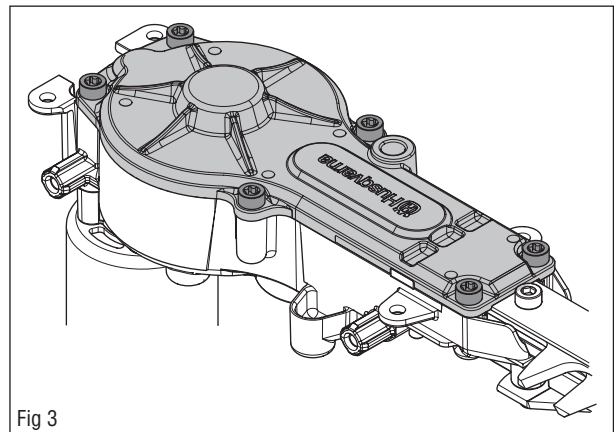


Fig 3

10.3 Dismantling gears, cutting unit and motor out of the gear housing

- 1
Loosen the screws (6x) and lift off the gear housing bottom plate.
See figure 3.
- 2
Loosen screws (2x) and lift out the gears and cutting unit from the gear housing. Note that the front screw also locks the safety bail with associated nut.
See figure 4.

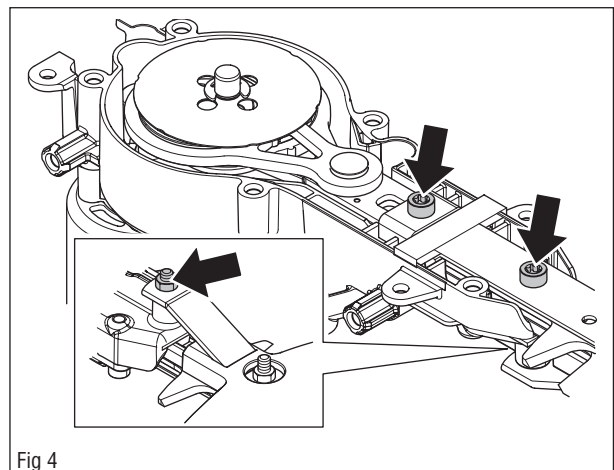


Fig 4

10.4 Cutting unit

1

Loosen the circlip (A), lift off the washer (B), carefully lift up the "hook" (C) and lift off the cutting unit. See figure 6.

2

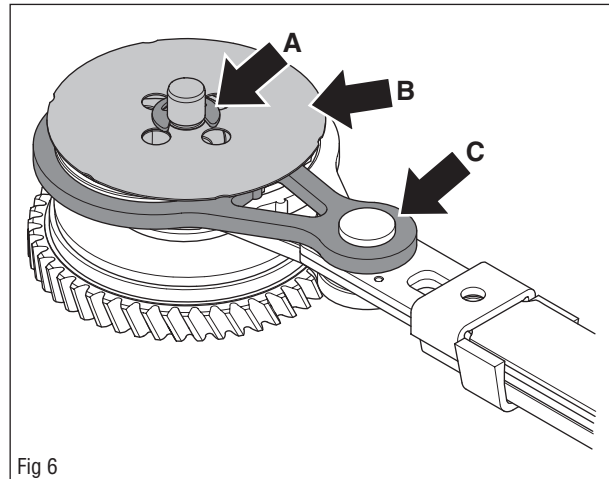
Loosen all the screws on the cutting unit and separate the parts as shown in the exploded view drawing. See figs. 7, 8 and 9.

Cleaning and inspection

Clean and check all parts thoroughly. Parts must be replaced if cracked or showing signs of other defects. Always use original spare parts.

3

Assemble in the reverse order.
Tightening torque: See service data.



LiHD60X US

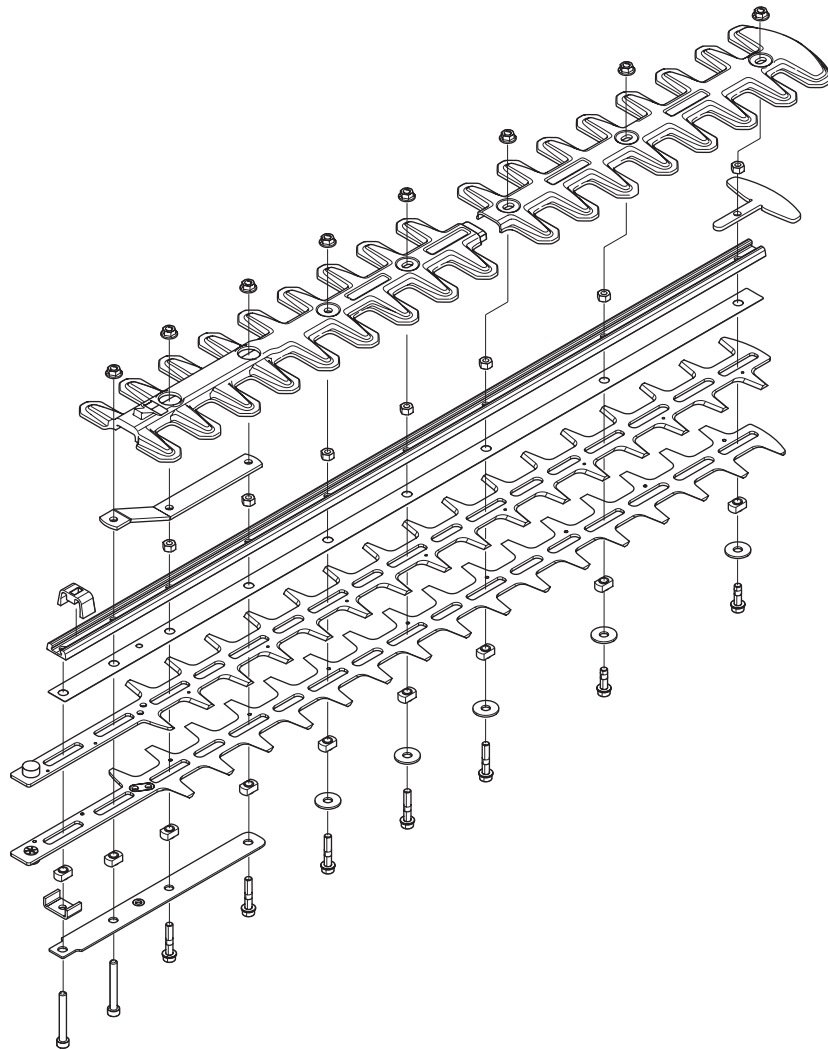
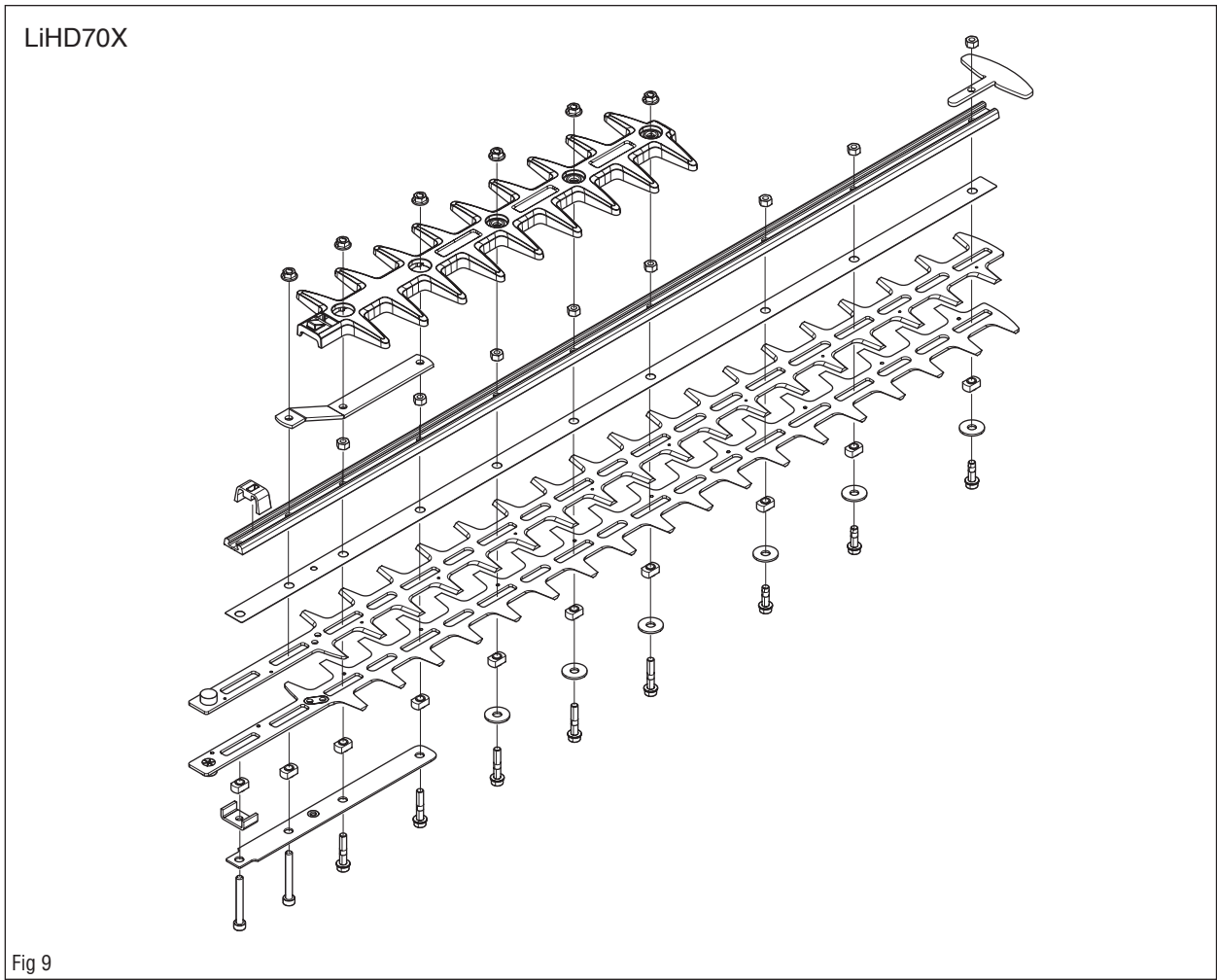
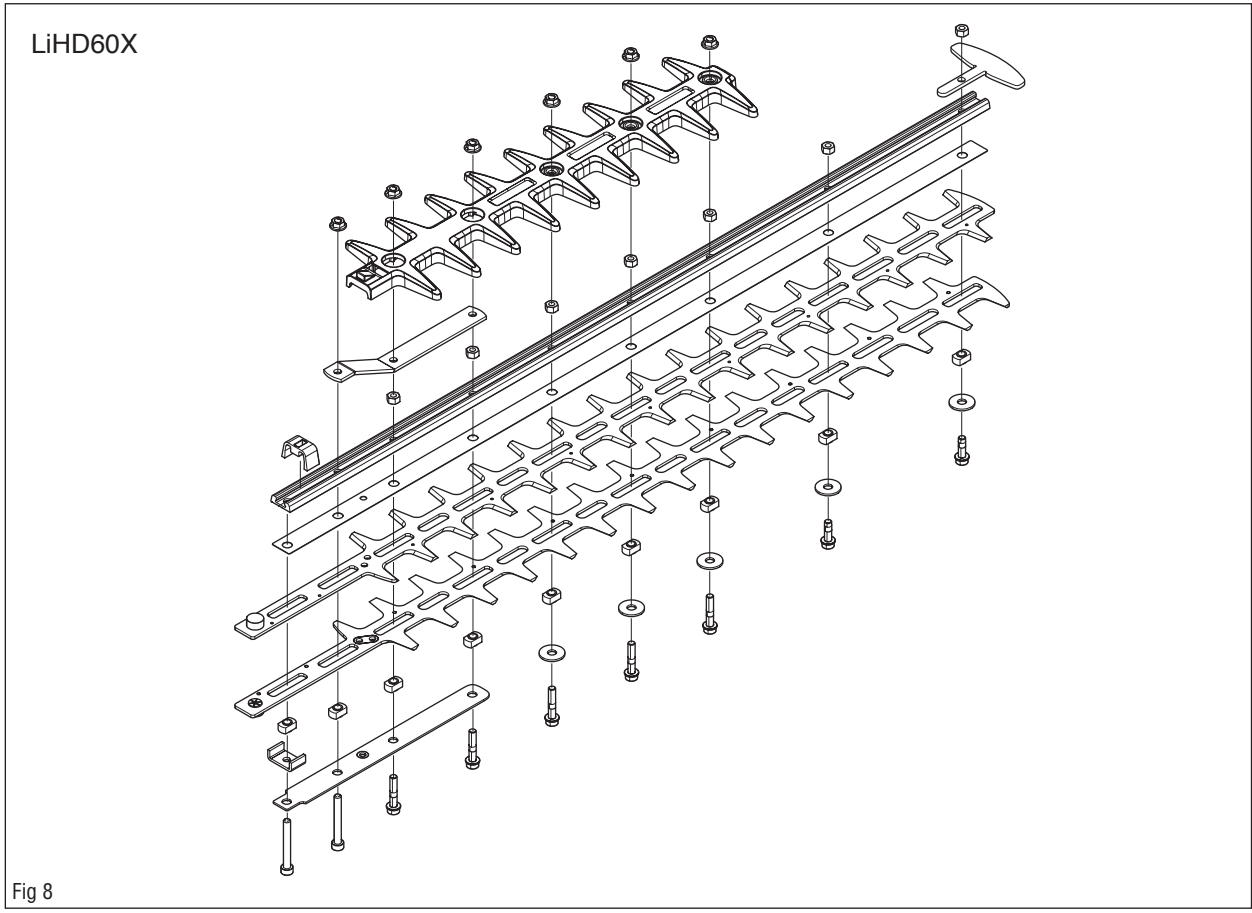


Fig 7



10.5 Gears

1

Loosen the circlip (A), lift off the washer (B), carefully lift up the "hook" (C) and lift off the cutting unit. See figure 10.

2

Separate the parts as shown in the exploded view drawing. See figure 11.

Cleaning and inspection

Clean and check all parts thoroughly. Parts must be replaced if cracked or showing signs of other defects. Always use original spare parts.

3

Assemble in the reverse order.

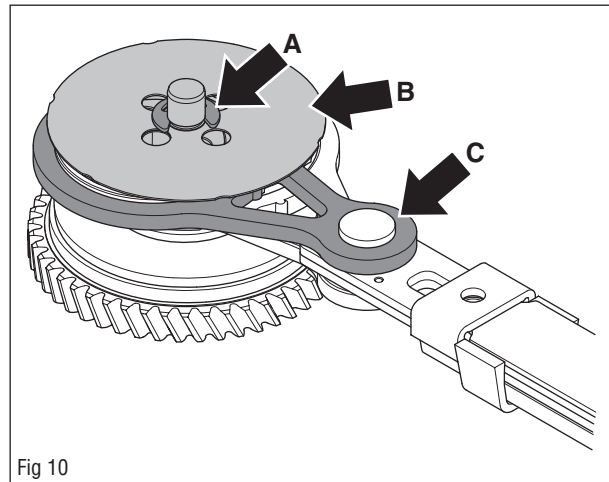


Fig 10

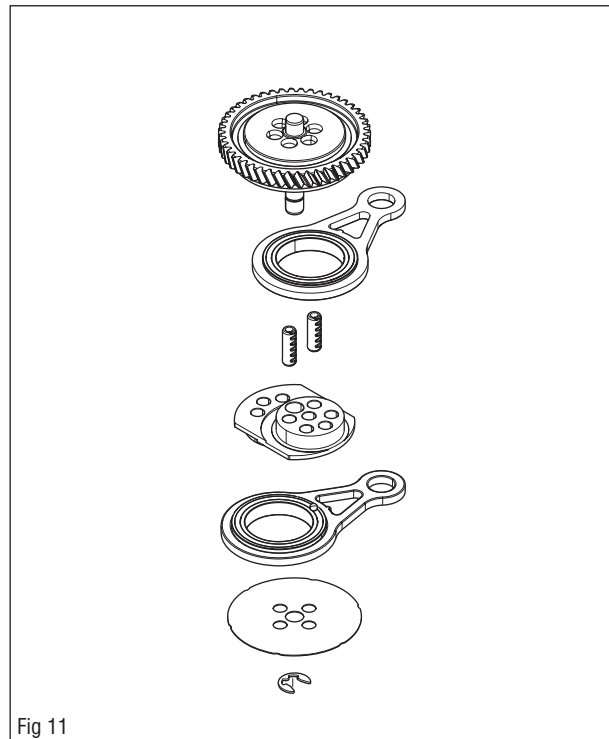


Fig 11

10.6 Assembling gears, cutting unit and motor in the gear housing

Cleaning and inspection

Clean and check all parts of the motor and gear housing thoroughly. Parts must be replaced if cracked or showing signs of other defects. Always use original spare parts.

1
Place the motor on the gear housing.

2
Place the gear and cutting unit in the gear housing. Screw the cutting unit into the gear housing (2x screws). Note that the front screw also locks the safety bail with associated nut. Tightening torque 3 ~ 4 Nm. See figure 13.

3
Assemble the bottom plate with gasket on the gear

NOTE!
Lubricate moving parts on gears and the cutting unit with grease so that they move easily!

housing and fasten with screws (6x). Tighten the screws crosswise according to the numbering on the bottom plate. Tightening torque 3 ~ 4 Nm.

NB! Always replace the gasket with a new one after dismantling the gear housing.

See figure 14.

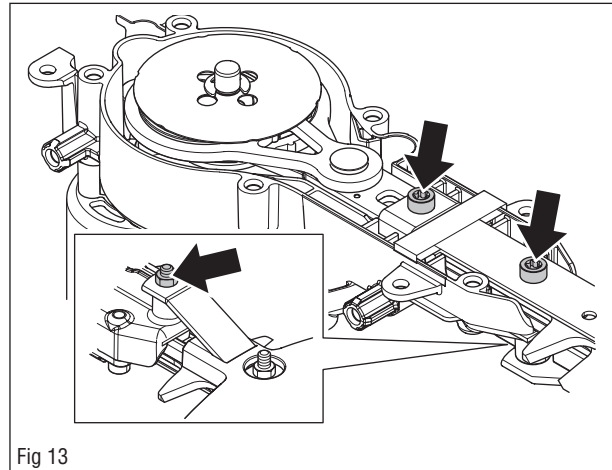


Fig 13

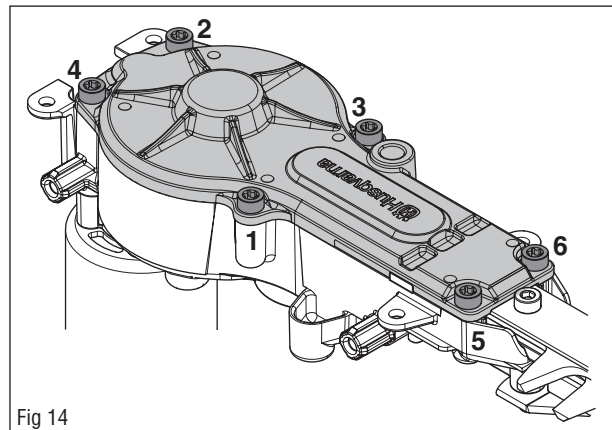


Fig 14

10.7 Dismantling the control unit and battery contact

- 1
Disconnect the contacts to the front handle from the control unit.
See Chapter 8.7.
- 2
Loosen screws (A) on the control unit and screws (B) on the battery contact. Loosen the contact (C) and lift out the control unit, battery contact and cables from the chassis.
See figure 15.
- 3
Loosen the contacts (D and E) in order to separate the control unit and battery contact.
See figure 16.

Cleaning and inspection

Clean and inspect all parts. They must always be replaced with new ones if cracked or showing signs of other defects. Always use original spare parts.
See figure 17.

10.8 Assembling the control unit and battery contact

- 1
Connect contacts (D and E) on the battery contact to the control unit.

NOTE!

**Connect the contacts the right way round!
The contacts should be turned so that the cables (F) and (G) are red!
The cables must hang straight down from the contacts so they are not bent excessively.**

See figure 18.

- 2
Place the control unit, battery contact and cables into the chassis.
Connect the contact (C). Fasten screws (A) on the control unit and screws (B) on the battery contact.

NOTE!

It is very important the cables are positioned correctly in the chassis so that they are not pinched when the machine is reassembled.

Tightening torque 3 ~ 4 Nm.
See figure 15.

- 3
Connect the contacts for the front handle to the control unit.
See Chapter 8.8.

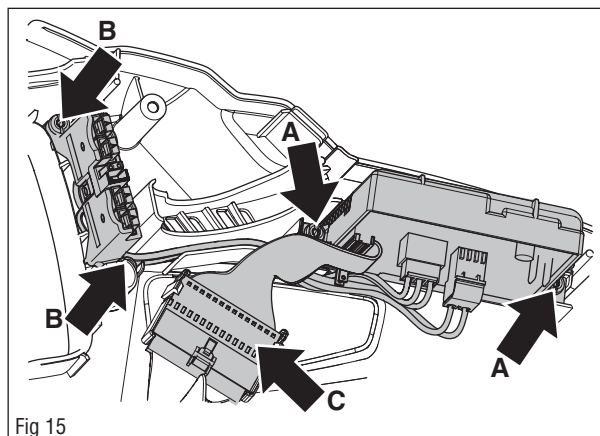


Fig 15

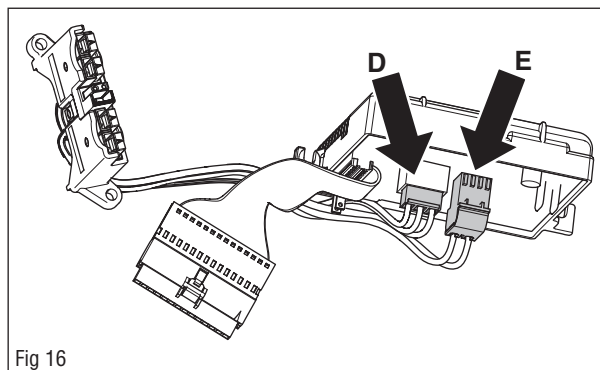


Fig 16

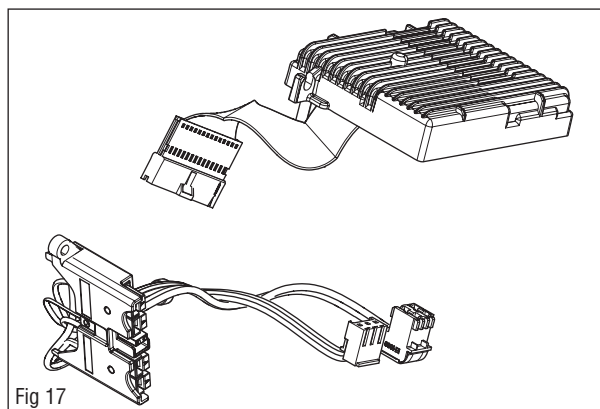


Fig 17

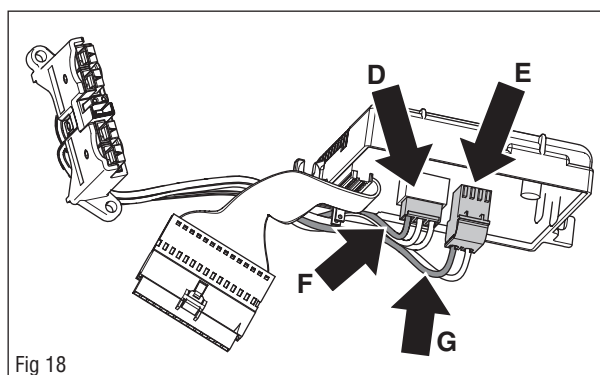


Fig 18

10.9 Dismantling the rear handle

1

Carefully lift out the cables, contact (A) and clips (B).
Uncouple the contact.
See figure 19.

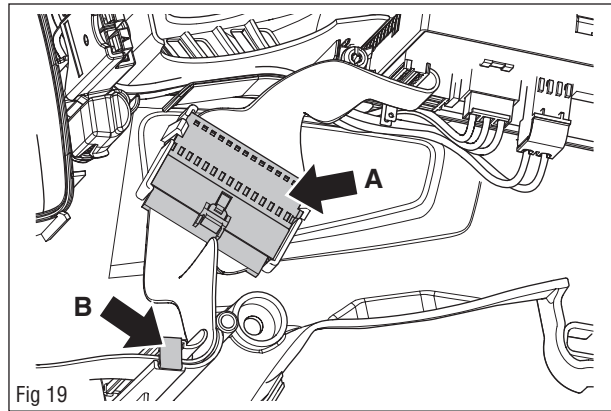


Fig 19

2

Loosen the screws (4x) and lift off the handle from the chassis.
See figure 20.

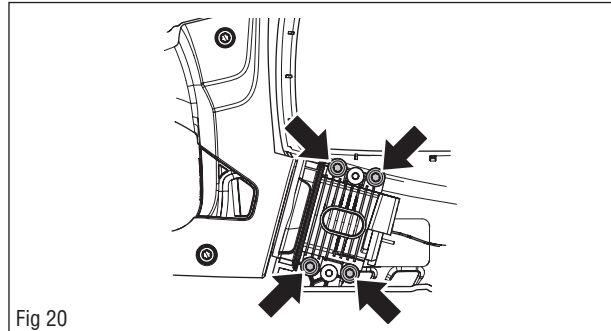


Fig 20

3

Pull out the handle stop (C) and turn the fastener (D) a quarter of a revolution until it stops.
See figure 21.

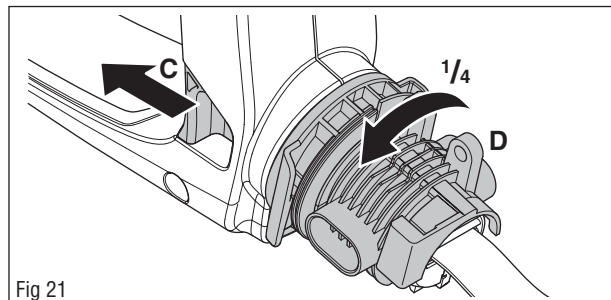


Fig 21

4

Lift up the plastic catch (E) with a screwdriver so that it goes over the heel and continue turning the fastener anticlockwise one quarter of a revolution until it stops.
See figure 22.

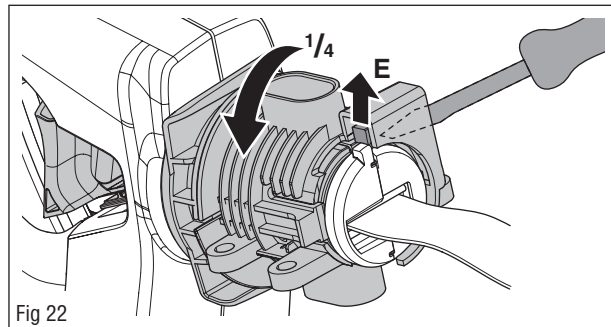


Fig 22

5

Use a screwdriver to carefully press off the fastener from the handle and remove it from the cables together with the O-ring.

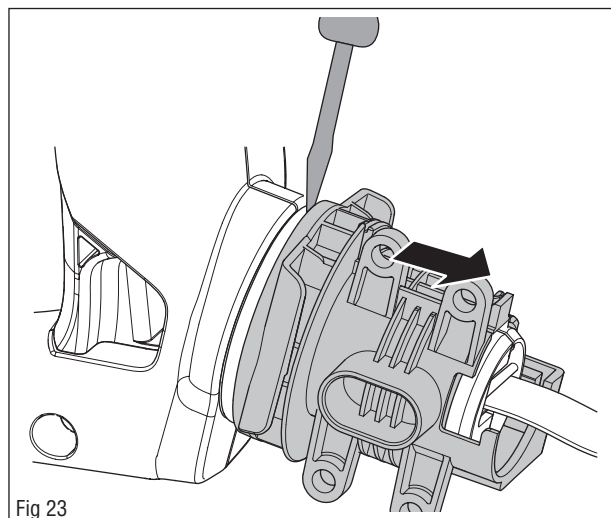



Fig 23

NOTE!

The fastener may be tight so be careful not to damage cables/contacts.

See figure 23.

 **WARNING!**
Exercise care to ensure the spring does not fly out and causes personal injury. Wear protective goggles!

6
Loosen the screws (5x) and lift off the right handle half.

NB! Hold the parts in place in the handle when dismantling it.

See figure 24.

7
Lift the handle stop (F) and spring (G) out of the handle followed by the throttle trigger (H).
See figure 25.

8
Lift out the keypad including fixings, main switch and cables from the handle.

NOTE!
The flat cable to the keypad is very fragile.

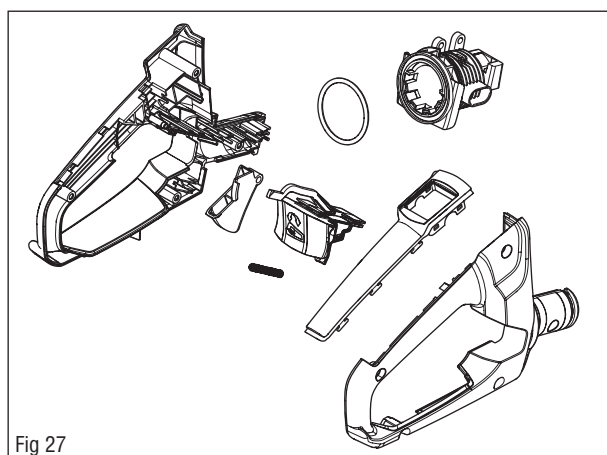
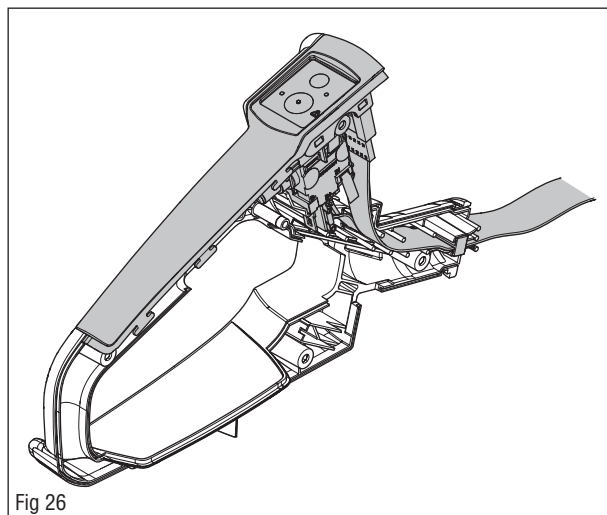
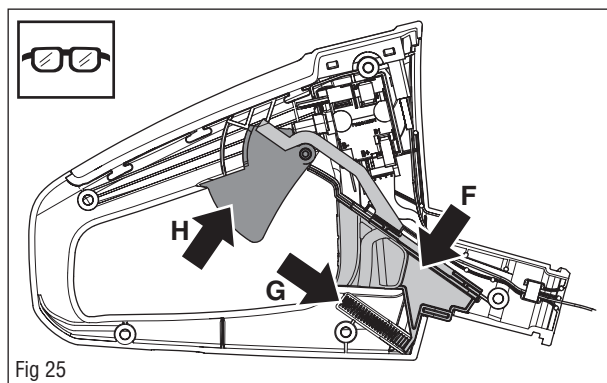
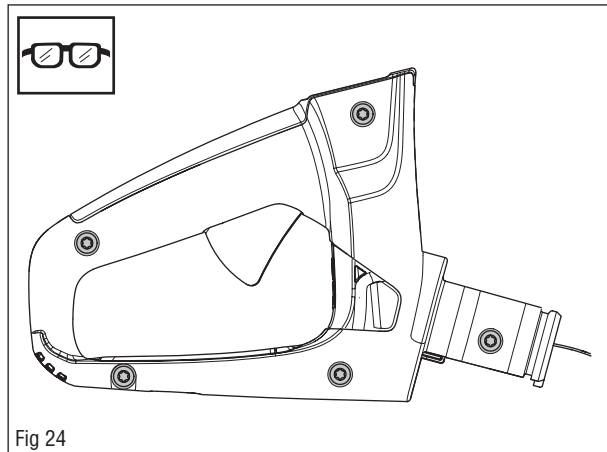
See figure 26.

Cleaning and inspection

Clean and check all handle parts. Parts must be replaced if cracked or showing signs of other defects.

Always use original spare parts.

See figure 27.



10.10 Dismantling the keypad

The keypad need only be dismantled if there is any damage on the rear handle, keypad attachment or when diagnosing/troubleshooting indicated a defect.

- 1
Disconnect the contact (A) by holding in the catch (B) and carefully pulling apart the contact.

NOTE!
The flat cable to the keypad is very fragile.

See figure 28.

- 2
Depress one catch (C 4x) at a time from below with a screwdriver and carefully remove the keypad with holder from the bracket (D).
See figure 29.

Cleaning and inspection

Clean and check all parts of the keypad thoroughly. They must always be replaced with new ones if cracked or showing signs of other defects. Always use original spare parts.

See figure 30.

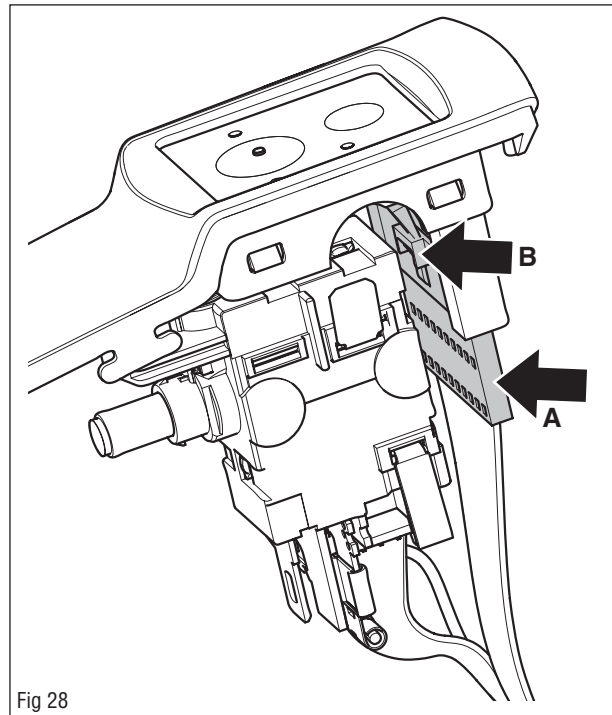


Fig 28

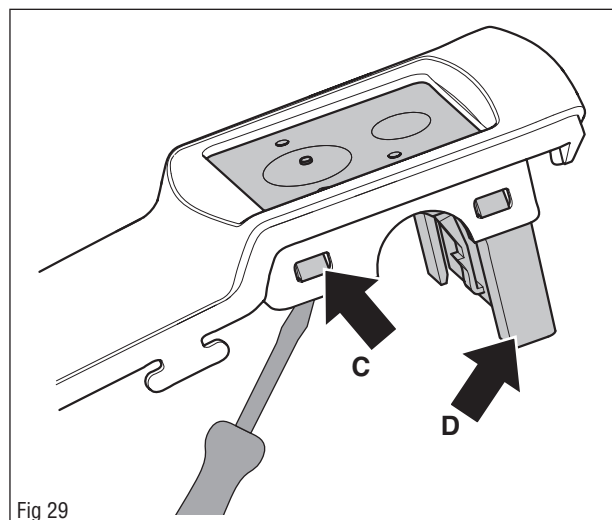


Fig 29

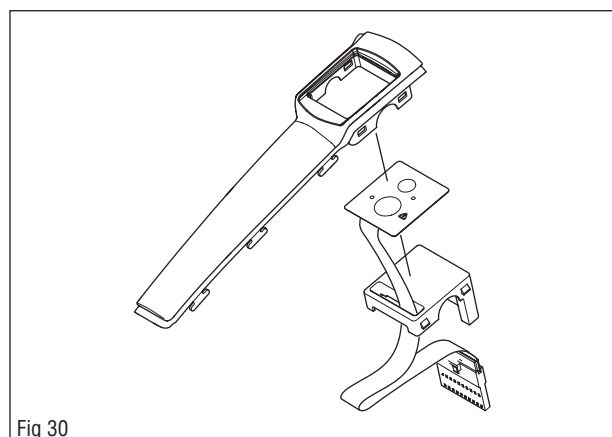


Fig 30

10.11 Assembling the keypad

Steps 1-3 should only be carried out when replacing the keypad with a new one.

1
Clean/degrease the surface where the keypad is mounted.
See figure 31.

2
Make sure the temperature is at least 15°C and the surface where the keypad is mounted differs no more than $\pm 3^\circ\text{C}$ from the ambient temperature.
See figure 32.

3
Remove the protective tape from the new keypad and press it onto the holder. Press on the keypad with 10 N/cm² for at least 10 seconds.
See figure 33.

NOTE!
Do not bend the keypad when assembling.

See figure 33.

4
Snap on the keypad with holder in the bracket (D) and place the flat cable into the grooves in the bracket.
See figure 34.

NOTE!
The flat cable to the keypad is very fragile.

See figure 34.

5
Plug in connector (A).
See figure 35.

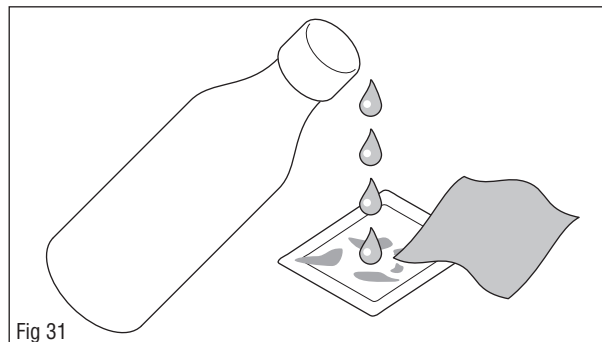


Fig 31

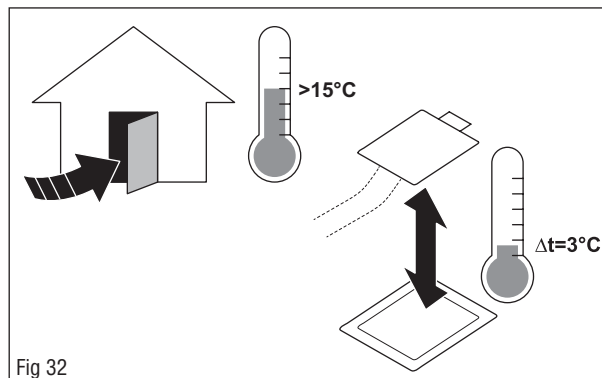


Fig 32

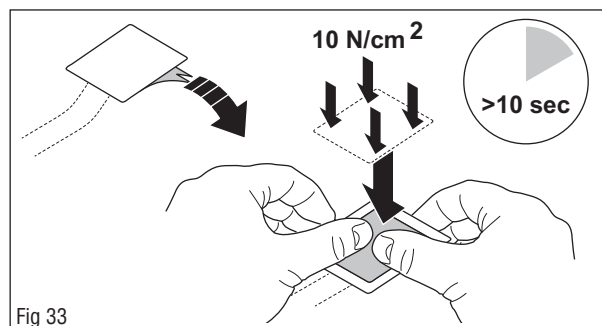


Fig 33

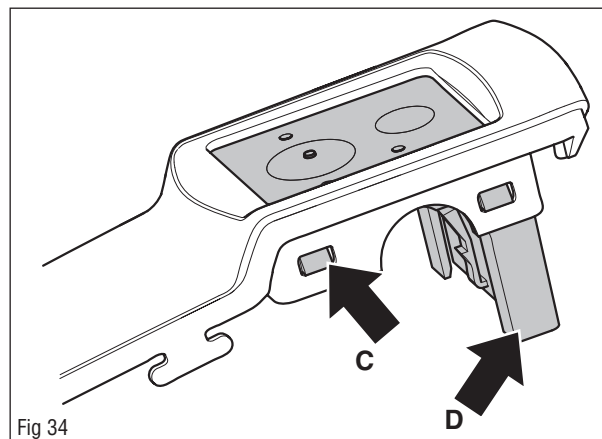


Fig 34

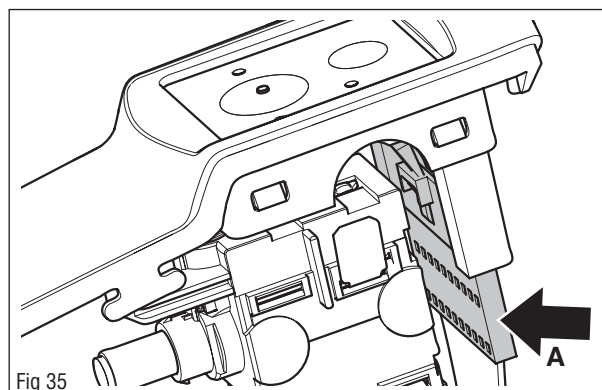


Fig 35

10.12 Dismantling the main switch and main cabling

The keypad should be disconnected to facilitate dismantling.
See Chapter 10.10.

1
Loosen contact (A) from pin B+ on the main switch.
See figure 36.

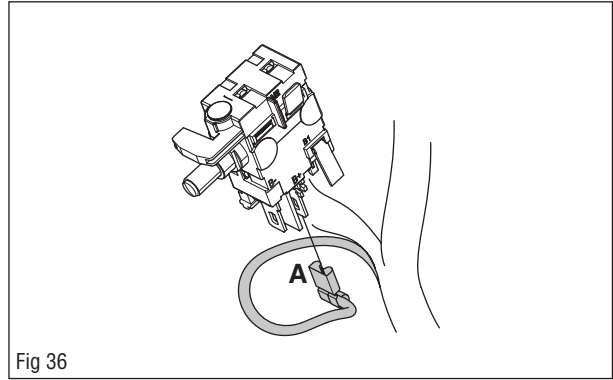


Fig 36

2
Take loose the connector (B) using a small screwdriver to carefully free the heels (C) on each end of the connector and main switch from each other.

NOTE!
Do not pull the wires. Take special care to avoid damaging the contact (B).

See figure 37.

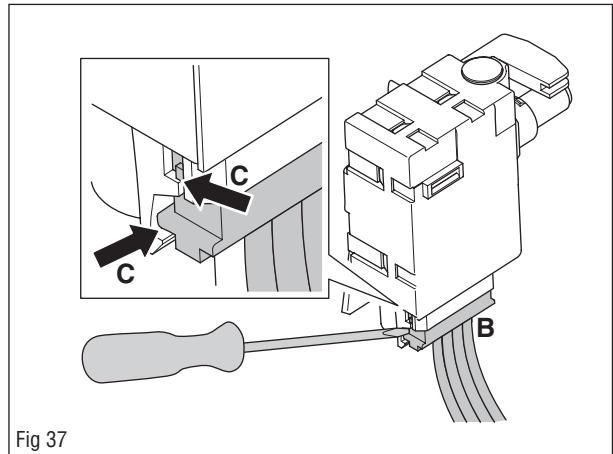


Fig 37

Cleaning and inspection

Clean and inspect the main switch and cables. They must always be replaced with new ones if cracked or showing signs of other defects. Always use original spare parts.

WARNING!
The "button" on the main switch may only be tested when it is assembled in the handle!

See figure 38.

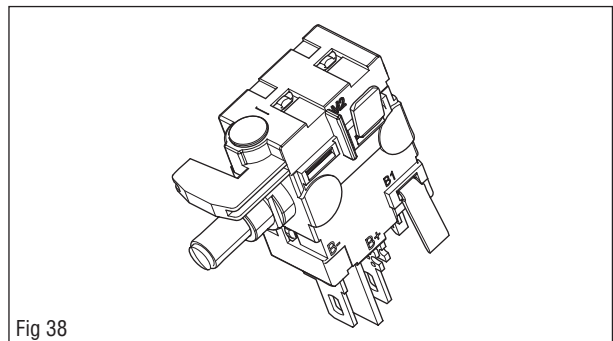


Fig 38

10.13 Assembling the main switch and main cabling

1
Connect the contact (B) to the main switch.
See figure 39.

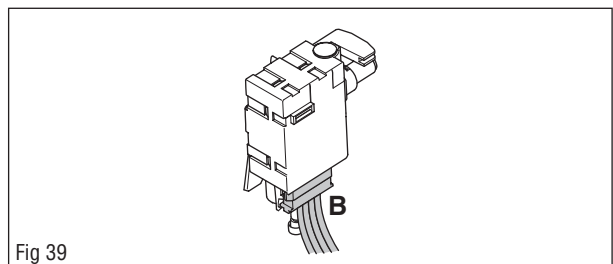


Fig 39

2
Connect contact (A) and the yellow wire (A) and place the main switch in the chassis.
See figure 36.

10.14 Assembling the rear handle

1

Place the keypad including fixings, main switch and cables in the handle.
Make sure the cables and clips are positioned correctly in the grooves in the handle.

NOTE!
The flat cable to the keypad is very fragile.

See figure 40.

2

Place the throttle trigger (H) into the handle followed by the handle stop (F) and spring (G).

WARNING!
Exercise care to ensure the spring does not fly out and causes personal injury. Wear protective goggles!

See figure 41.

3

Put the right handle half in place and fasten with screws (5x).

NOTE!
It should be easy to put together the handle halves. Make sure cables and such are positioned correctly if this is difficult.

Tightening torque 3 ~ 4 Nm.
See figure 42.

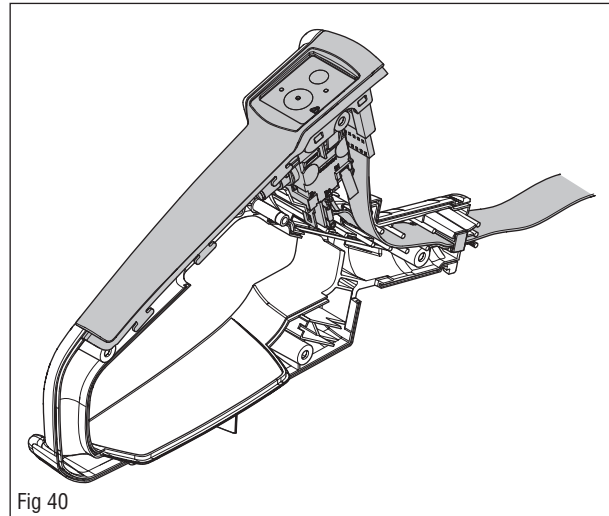


Fig 40

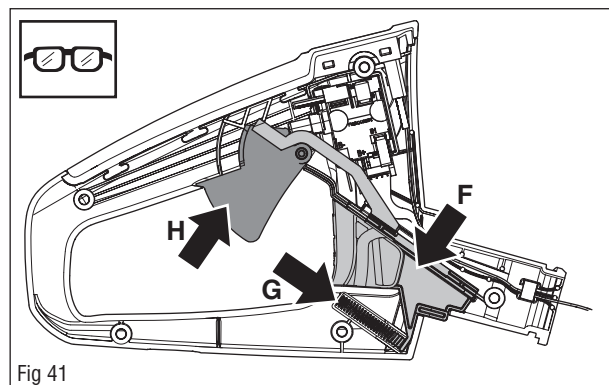


Fig 41

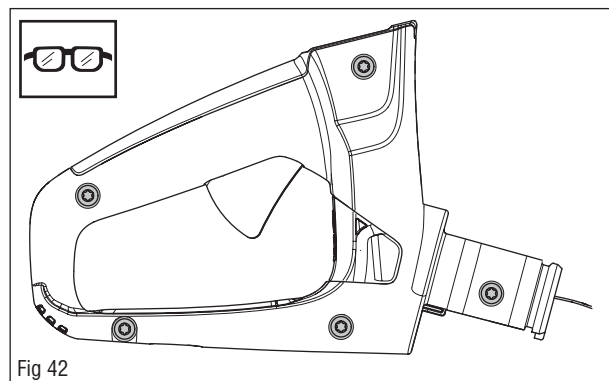
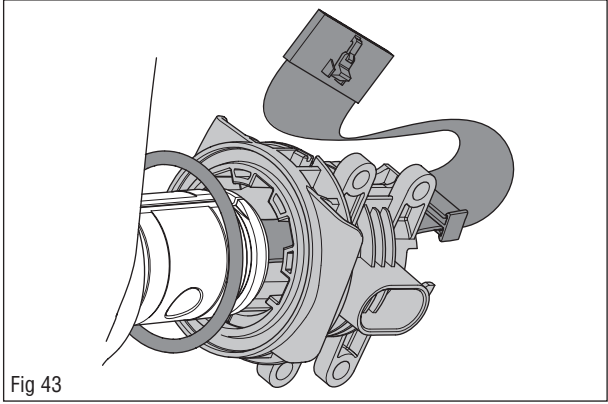


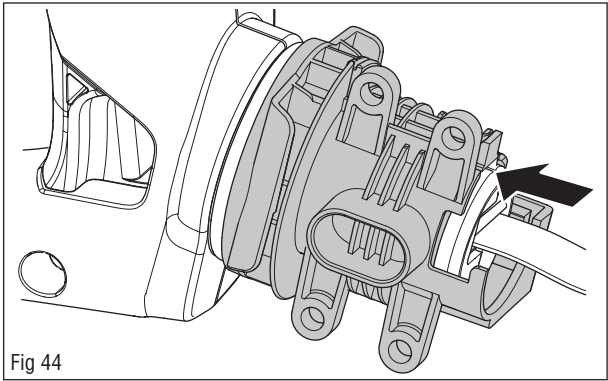
Fig 42

4
Thread the cable through the O-ring and the fastener. Lubricate the O-ring sparingly with grease to facilitate assembly.
See figure 43.

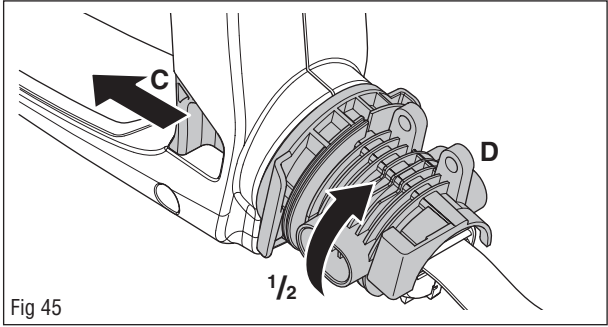
NOTE!
The fastener can only be pressed onto the handle when the groove in the fastener and the heel on the handle engage. Also check that the O-ring is positioned correctly in the fastener.



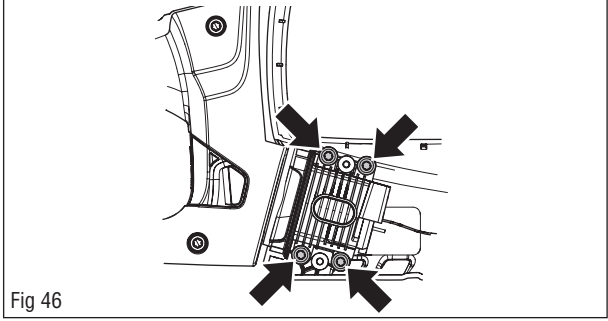
5
Press the fastener onto the handle.
See figure 44.



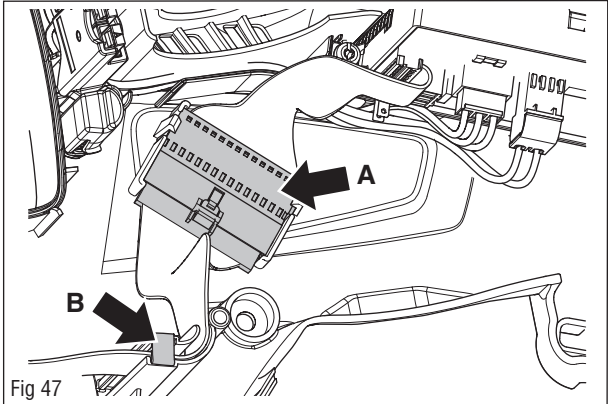
6
Pull out the handle stop and turn one half revolution clockwise until the handle stop comes into place.
See figure 45.



7
Place the handle in the chassis and fasten with screws (4x).
Tightening torque 3 ~ 4 Nm.
See figure 46.



8
Connect contact (A) and place the cables with clips (B) in the chassis.
See figure 47.



10.15 Assembling the gear housing and motor in the chassis

1

Place the gear housing and motor in the left chassis half. Make sure the motor cables are placed with the "ferrites" on the "shelf" (A) at the vent holes in the chassis and that the cables follow the "channel" (B) in the chassis above the control unit.

NOTE!

The cables must not get pinched when the gear housing and motor are placed on top.

See figure 48.

2

Fasten the gear housing and motor in the chassis with screws (2x).

Tightening torque 3 ~ 4 Nm.

See figure 49.

3

Connect contact from the motor to the control unit.

NOTE!

**Connect the contact the right way round!
The contact should be turned so that the cable (C) is gray!
The cables must hang straight down from the contact so they are not bent excessively.**

See figure 50.

4

Assemble the right chassis half and the front handle.

See Chapter 7.5 - 7.6.

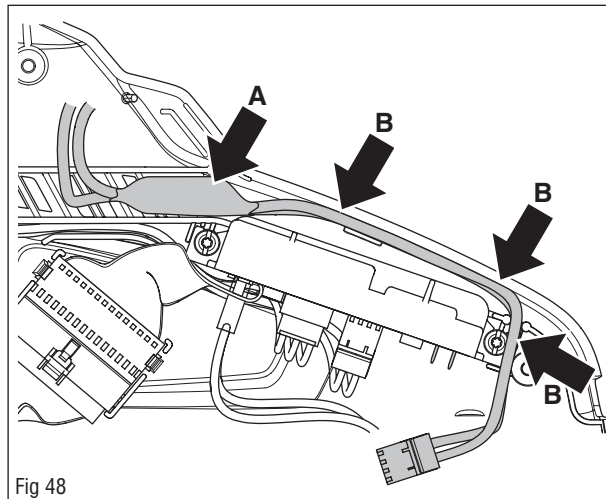


Fig 48

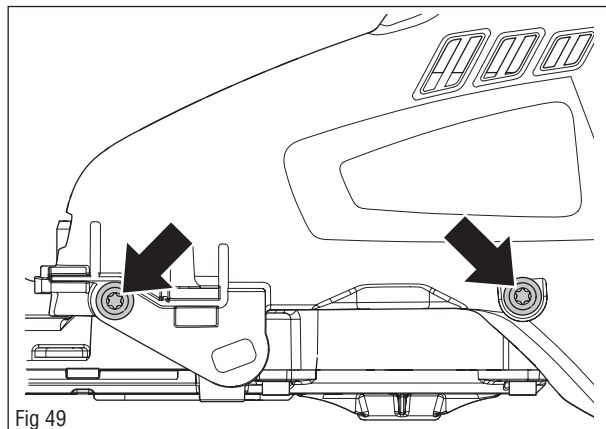


Fig 49

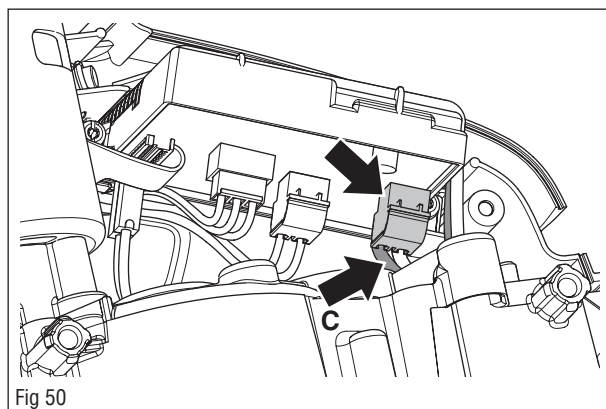


Fig 50

10.16 Repairing damaged threads

If the plastic threads in the chassis or handle are damaged, drill out the hole with a 4.5 mm drill bit.

Then replace the original screw with screw:
503 21 74-16 - IHSCT MT5x16.

11 Troubleshooting - LiHD 50, 60X, 70X

Symptom	Possible causes	Recommended actions
Product cannot be activated. No LED's light up when pressing the on/off button.	Broken battery	1. Check battery by pressing the status button. Minimum 1 green LED should be visible. See also Battery and charger
	Bad connection between battery and product	2. Make sure power connectors between battery and product are not damaged and free from dirt. See picture #1 in appendix.
	Bad connection in keypad connector	3. Make sure the keypad connector is properly assembled, dry, not damaged and free from corrosion. See picture #2 in appendix.
	Broken keypad	4. Replace keypad
	Damage to multiwire cable between control unit and keypad/trigger switch	5. Repair/replace multiwire cable. (Only if visible damage are present)
	Short circuit in control unit	6. Replace control unit
Electric motor does not react when applying the trigger	Front handle not activated	1. Activate and hold the front handle when applying trigger
	Bad connection in trigger switch signal connector	2. Make sure the trigger switch signal connector is properly assembled, dry, not damaged and free from corrosion. See picture #3 in appendix
	Motor connector not correctly assembled	3. Make sure the motor connector(s) are correctly assembled. See picture #6 in appendix.
	Internal damage to trigger switch	4. Replace trigger switch
	Short circuit in control unit	5. Replace control unit
Electric motor jerks shortly when applying the trigger, then stops	Short circuit in control unit	Replace control unit
Product shuts off when applying load	Bad connection between battery and product	Make sure power connectors between battery and product are not damaged and free from dirt. See picture #1 in appendix.
Keypad lights flicker	Bad connection in keypad connector	1. Make sure the keypad connector is properly assembled, dry, not damaged and free from corrosion. See picture #2 in appendix.
	Short circuit in keypad	2. Replace keypad
Unstable motor speed	Bad connection in trigger switch signal connector	1. Make sure the trigger switch signal connector is properly assembled, dry, not damaged and free from corrosion. See picture #3 in appendix
	Damaged or worn trigger switch	2. Replace trigger switch
Warning triangle on keypad blinks continuous	Over temperature	1. Wait until product cools off (Max. 5 min)
	Too low temperature on control unit or battery	2. Make sure product or battery are not colder than -10°C
	Front handle safety switch jammed in active position	3. Disassemble front handle and remove possible dirt

Troubleshooting

Warning triangle on keypad blinks shortly after activation, where after the product shuts off	Trigger is applied during activation	1. Activate the product without applying the trigger simultaneously
	Water in trigger switch signal connector	2. Disconnect and dry trigger switch signal connector, reassemble. See picture #3 in appendix
	Short circuit in keypad	3. Replace keypad
	Short circuit in trigger switch	4. Replace trigger switch
Warning triangle on keypad blinks shortly after activation, where after the product hangs up with the green led on	Bad communication signal between battery and product	1. Make sure power connectors between battery and product are not damaged and free from dirt. See picture #1 in appendix.
		2. Make sure the small cables between power connector and control unit are not loose or damaged. See picture #6 in appendix
Product works but there are no indication light on the keypad	Bad connection in keypad connector	1. Test the keypad function in Battery Diagnostic Tool. Make sure the keypad connector is properly assembled, dry, not damaged and free from corrosion. See picture #2 in appendix.
	Broken keypad	2. Replace keypad
Product activates immediately when battery is inserted, without pressing the keypad	Short circuit in keypad	Replace keypad
Warning triangle on keypad shows a fixed red light	Permanent error codes prevents the product from running	1. Erase error codes in diagnostic tool
	Broken control unit	2. Replace control unit
Product shows fixed red light after installing a new control unit	Spare part comes without software	Use diagnostic tool to install software

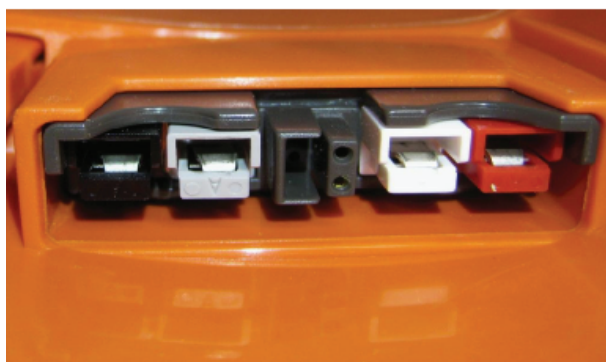
12 Troubleshooting - battery & chargers

Symptom	Possible causes	Recommended actions
No LED's light up on battery when pressing the status button	Broken battery	Replace battery
Solid red warning triangle on battery when pressing the status button	Broken battery	Replace battery
Flashing red warning triangle on battery when pressing the status button	Over temperature	1. Wait until battery cools off (or put in the charger for faster cooling)
	Under voltage	2. Charge
	Too low temperature	3. Make sure battery temperature is above -10°C
	Broken battery	4. Replace battery
Backpack battery shows less than 100% after a full charge. (Typically 96-97%)	Since the battery is on for a period of time after finished charge. A small percentage can be lost in the electronics.	None, charge level is still close to 100%. Charger will restart if the charge status drops below 95%.
Charger does not start and no LEDs on the charger are shown when battery is inserted.	Bad connection between charger and battery	1. Make sure power connectors between charger and battery are not damaged and free from dirt. See picture #1 in appendix.
	Broken battery	2. Check battery status (see above)
	Broken charger	3. Disconnect charger from mains for >1 min then reconnect to mains outlet. Make sure the fan and the green LED comes on for ~3sec. If not, replace charger.
Flashing red warning triangle on charger when battery is inserted	Bad connection between charger and battery	1. Make sure power connectors between charger and battery are not damaged and free from dirt. See picture #1 in appendix.
	Over temperature on battery	2. Leave battery in the charger to cool off. (1-5minutes)
	Too low ambient temperature	3. Make sure ambient temperature is above 5°C
	Too low temperature on battery	4. Make sure battery temperature is above 5°C
	Broken battery	5. Make sure battery works by pressing the battery status button. Minimum 1 green LED should be visible. If not, replace battery.
	Broken charger	6. Disconnect charger from mains for >1 min. then reconnect to mains outlet. Make sure the fan and the green LED comes on for ~3sec. If not, replace charger.
Solid red warning triangle on charger when put into mains outlet	Broken charger	Replace charger
Solid red warning triangle on charger during charging	Broken charger	Replace charger
Green light on charger for approx. 5-15 s when battery is inserted, thereafter flashing red warning triangle. The behaviour then repeats from the beginning.	Broken battery	Place the battery in a known OK QC330 charger. If same problem occur, replace battery.
	Broken charger	Place a known OK battery in the charger. If same problem occur, replace charger.

13 Troubleshooting Appendix

1. Power connectors

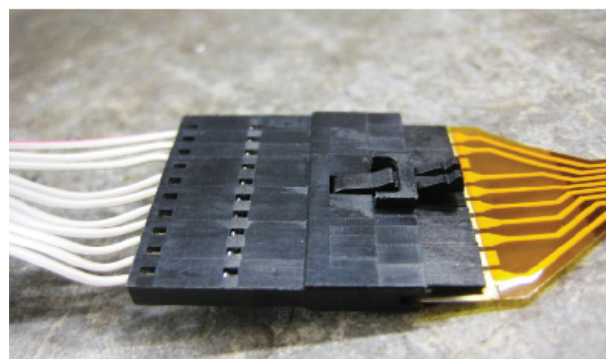
Make sure connectors are free from dirt and that metal surfaces are not damaged. Pay certain attention to the connection tabs. Power connectors have the same basic design on product, battery and charger. Only colors may vary.



Pic 1

2. Keypad connector

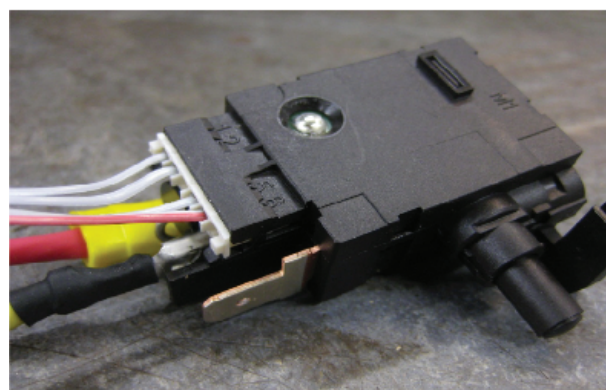
Make sure the two connector parts are fully attached. Look for broken or loose cables.



Pic 2

3. Trigger switch signal connector

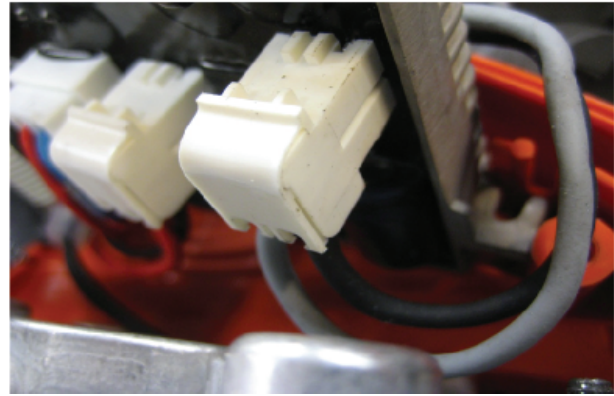
Make sure the white female connector is fully attached to the trigger switch. Look for broken or loose cables. Also look for signs of water, corrosion or shortcircuit on connector and pins when disassembled.



Pic 3

4. Motor connector

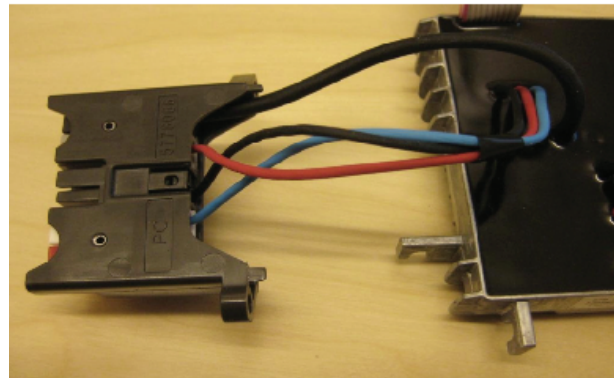
Make sure the motor connector is assembled with a tight fit to the control unit.



Pic 4

5. Communication cables

Make sure the three small communication cables are not loose or damaged.



Pic 5



www.husqvarna.com

• 115 73 09-26

2012W33