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INTRODUCTION



NOTE

The numbers in brackets refer to the components shown in Machine Description chapter.

MANUAL PURPOSE AND CONTENTS

The purpose of this Manual is to provide the operator with all necessary information to use the machine properly in a safe and autonomous way. It contains information about technical data, safety, operation, storage, maintenance, spare parts and disposal. Before performing any procedure on the machine, the operators and qualified technicians must read this Manual carefully. Contact Nilfisk in case of doubts regarding the interpretation of the instructions and for any further information.

TARGET

This Manual is intended for operators and technicians qualified to perform the machine maintenance. The operators must not perform procedures reserved for qualified technicians. Nilfisk will not be answerable for damages coming from the non-observance of this prohibition.

HOW TO KEEP THIS MANUAL

The User Manual must be kept near the machine, inside an adequate case, away from liquids and other substances that can cause damage to it.

DECLARATION OF CONFORMITY

The declaration of conformity, supplied with the machine, certifies the machine conformity with the law in force.



NOTE

Two copies of the original declaration of conformity are provided together with the machine documentation.

IDENTIFICATION DATA

The machine model and serial number are marked on the plate (33).

The machine model year is written in the declaration of conformity and it is also indicated by the first two figures of the machine serial number.

This information is useful when requiring machine spare parts. Use the following table to write down the machine identification data.

MACHINE model
MACHINE serial number

OTHER REFERENCE MANUALS

- Spare Parts List (supplied with the machine)
- Service Manual (that can be consulted at Nilfisk Service Centers)

SPARE PARTS AND MAINTENANCE

All necessary operating, maintenance and repair procedures must be performed by qualified personnel or by Nilfisk Service Centers. Only original spare parts and accessories must be used.

Contact Nilfisk for service or to order spare parts and accessories, specifying the machine model and serial number.

CHANGES AND IMPROVEMENTS

Nilfisk constantly improves its products and reserves the right to make changes and improvements at its discretion without being obliged to apply such benefits to the machines that were previously sold.

Any change and/or addition of accessories must be approved and performed by Nilfisk.

OPERATION CAPABILITIES

This sweeper has been designed and built to clean (by sweeping and vacuuming) smooth and solid floors, in civil and industrial environments and to collect dust and light debris under safe operation conditions by a qualified operator.

CONVENTIONS

Forward, backward, front, rear, left or right are intended with reference to the operator's position, that is to say with the hands on the handlebar (6).

UNPACKING/DELIVERY

Upon delivery check that the packing and the machine were not damaged during transportation. In case of visible damages, keep the packing and have it checked by the carrier that delivered it. Call the carrier immediately to fill in a damage claim.

Check that the machine is equipped with the following features:

- Technical documents:
 - Sweeper User Manual
 - Sweeper Spare Parts List
 - No. 1 vacuum system motor fuse

SAFETY

The following symbols indicate potentially dangerous situations. Always read this information carefully and take all necessary precautions to safeguard people and property.

The operator's cooperation is essential in order to prevent injury. No accident prevention program is effective without the total cooperation of the person responsible for the machine operation. Most of the accidents that may occur in a factory, while working or moving around, are caused by failure to comply with the simplest rules for exercising prudence. A careful and prudent operator is the best guarantee against accidents and is essential for successful completion of any prevention program.

SYMBOLS

**DANGER!**

It indicates a dangerous situation with risk of death for the operator.

**WARNING!**

It indicates a potential risk of injury for people.

**CAUTION!**

*It indicates a caution or a remark related to important or useful functions.
Pay careful attention to the paragraphs marked by this symbol.*

**NOTE**

It indicates a remark related to important or useful functions.

**CONSULTATION**

It indicates the necessity to refer to the User Manual before performing any procedure.

GENERAL INSTRUCTIONS

Specific warnings and cautions to inform about potential damages to people and machine are shown below.

**DANGER!**

- *Before performing any maintenance, cleaning or replacement procedure turn the main switch to "0" and, if necessary, disconnect the battery.*
- *This machine must be used by properly trained operators only. Children or disabled people cannot use this machine.*
- *Keep the battery away from sparks, flames and incandescent material.*
- *Do not wear jewels when working near electrical components.*
- *Do not work under the lifted machine without supporting it with safety stands.*
- *Do not operate the machine near toxic, dangerous, flammable and/or explosive powders, liquids or vapours. This machine is not suitable for collecting dangerous powders.*

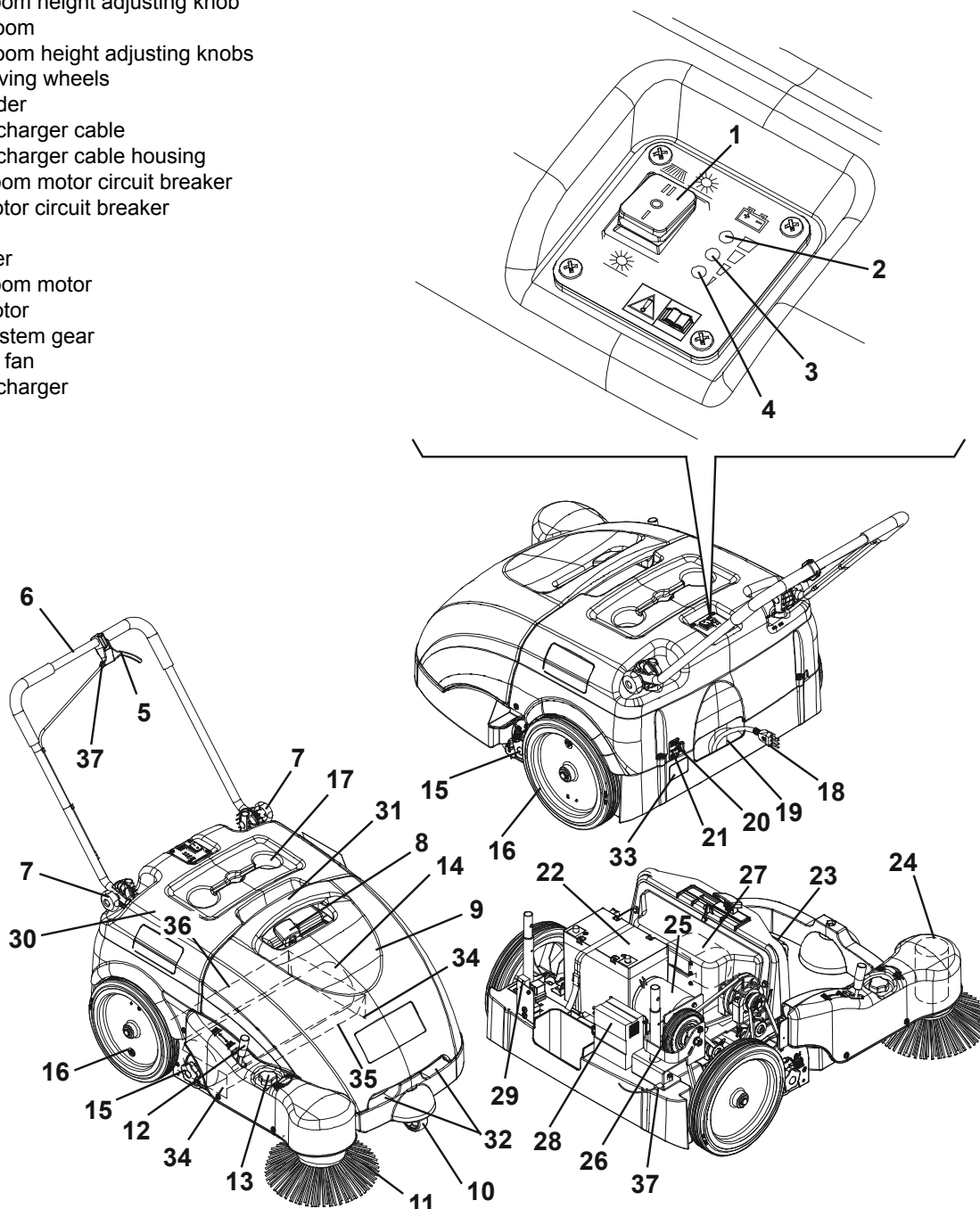
**WARNING!**

- Before using the battery charger, ensure that frequency and voltage values, shown on the machine serial number plate, match the electrical mains voltage.
- Do not pull or carry the machine by the battery charger cable and never use the battery charger cable as a handle. Do not close a door on the battery charger cable, or pull the battery charger cable around sharp edges or corners. Do not run the machine on the battery charger cable.
- Keep the battery charger cable away from heated surfaces.
- Do not charge the batteries if the battery charger cable or the plug are damaged. If the battery charger cable is damaged, contact Nilfisk Service Center.
- To reduce the risk of fire, electric shock, or injury, do not leave the machine unattended when it is plugged in. Before performing any maintenance procedure, disconnect the battery charger cable from the electrical mains.
- If the machine is not working as it should, has been damaged, left outdoors or dropped into water, return it to the Service Center.
- Do not smoke while charging the batteries.
- Do not leave the machine unattended without being sure that it cannot move independently.
- Always protect the machine against the sun, rain and bad weather, both under operation and inactivity condition. Store the machine indoors, in a dry place. This machine must be used in dry conditions, it must not be used or kept outdoors in wet conditions.
- Before using the machine, close all doors and/or covers.
- Do not use the machine in excessively dusty areas.
- Do not allow to be used as a toy. Close attention is necessary when used near children.
- Use only as shown in this Manual. Use only Nilfisk's recommended accessories.
- Take all necessary precautions to prevent hair, jewels and loose clothes from being caught by the machine moving parts.
- Do not wash the machine with direct or pressurised water jets, or with corrosive substances. Do not use compressed air to clean this type of machine.
- While using this machine, take care not to cause damage to other people, and children especially.
- Do not put any can containing fluids on the machine.
- The machine storage temperature must be between 0°C and +40°C.
- The machine working temperature must be between 0°C and +40°C.
- The humidity must be between 30% and 95%.
- Do not use the machine as a means of transport.
- Do not use the machine on slopes with a gradient exceeding the specifications.
- Do not allow the brooms to operate while the machine is stationary to avoid damaging the floor.
- In case of fire, possibly use a powder fire extinguisher, not a water one.
- Do not bump into shelves or scaffoldings, especially where there is a risk of falling objects.
- Adjust the operation speed to suit the floor conditions.
- This machine cannot be used on roads or public streets.
- Do not remove or modify the plates affixed to the machine.
- Do not tamper with the machine safety guards and follow the routine maintenance procedures scrupulously.
- Use only brooms supplied with the machine and those specified in the User Manual. Using other brooms could reduce safety.
- In case of machine malfunctions, ensure that these are not due to lack of maintenance. Otherwise, request assistance from the authorised personnel or from an authorised Service Center.
- Carefully read all the instructions before performing any maintenance/repair procedure.
- To ensure machine proper and safe operation, the scheduled maintenance shown in the relevant chapter of this Manual must be performed by the authorised personnel or by an authorised Service Center.
- If parts must be replaced, require ORIGINAL spare parts from an Authorised Dealer or Retailer.
- The machine must be disposed of properly, because of the presence of toxic-harmful materials (batteries, plastics, etc.), which are subject to standards that require disposal in special centres (see the Scrapping chapter).

MACHINE DESCRIPTION

MACHINE STRUCTURE AND CONTROLS

1. Main switch:
 - when turned to "I" the vacuum system and main broom are turned on;
 - when turned to "II" the vacuum system, main broom and side broom are turned on.
2. Charged battery warning light (green)
3. Semi-discharged battery warning light (yellow)
4. Discharged battery warning light (red)
5. Drive control lever
6. Handlebar
7. Handlebar adjusting knobs
8. Filter shaker knob
9. Hopper
10. Front steering wheel
11. Side broom
12. Side broom lifting/lowering lever
13. Side broom height adjusting knob
14. Main broom
15. Main broom height adjusting knobs
16. Rear driving wheels
17. Can holder
18. Battery charger cable
19. Battery charger cable housing
20. Side broom motor circuit breaker
21. Main motor circuit breaker
22. Battery
23. Dust filter
24. Side broom motor
25. Main motor
26. Drive system gear
27. Vacuum fan
28. Battery charger
29. Vacuum system motor lamellar fuse (7.5 A)
30. Hood
31. Hopper upper handle
32. Hopper lower handles
33. Serial number plate/technical data/conformity certification
34. Side skirts
35. Front skirt
36. Rear skirt
37. Drive belt adjuster



ACCESSORIES/OPTIONS

In addition to the standard components, the machine can be equipped with the following accessories/options, according to the machine specific use:

1. Brooms of different materials
2. 80 Ah battery
3. Non-marking skirts



NOTE

For further information concerning the optional accessories, contact an authorised Retailer.

TECHNICAL DATA

General	Values
Cleaning width (without side broom)	500 mm
Cleaning width (with side broom)	720 mm
Machine size with folded handlebar and without side broom (length x width x height)	998 x 797 x 501 mm
Minimum distance from the floor (skirts not included)	25 mm
Main broom size (diameter x length)	200 x 500 mm
Side broom diameter	315 mm
Main broom speed	335 rpm
Side broom speed	100 rpm
Gradeability	2%
Hopper capacity	60 litres
Total machine weight (with standard battery)	68 kg
Front steering wheel size (diameter x length)	75 x 32 mm
Rear wheel size (diameter x length)	300 x 45 mm
Maximum drive speed	3.7 km/h
Sound pressure level at workstation (ISO 11201, ISO 4871) (LpA)	59.3 ±3 dB(A)
Machine output acoustic power (ISO 3744, ISO 4871) (LwA)	78 dB(A)
Vibration level at the operator's arms (ISO 5349-1)	< 2.5 m/s ²

Electrical components	Values
Electrical system voltage	12 V
Standard battery	GEL, 12 V, 45 Ah
Optional battery	GEL, 12 V, 80 Ah
Battery charger	6 A
Main motor	200 W, 1,500 rpm
Side broom motor	40 W
Vacuum system motor	70 W

Dust vacuuming and filtering	Values
Dust filter	5–10 µm (polyester)
Dust filter surface	1 m ²
Main broom compartment vacuum	12 mm H ₂ O

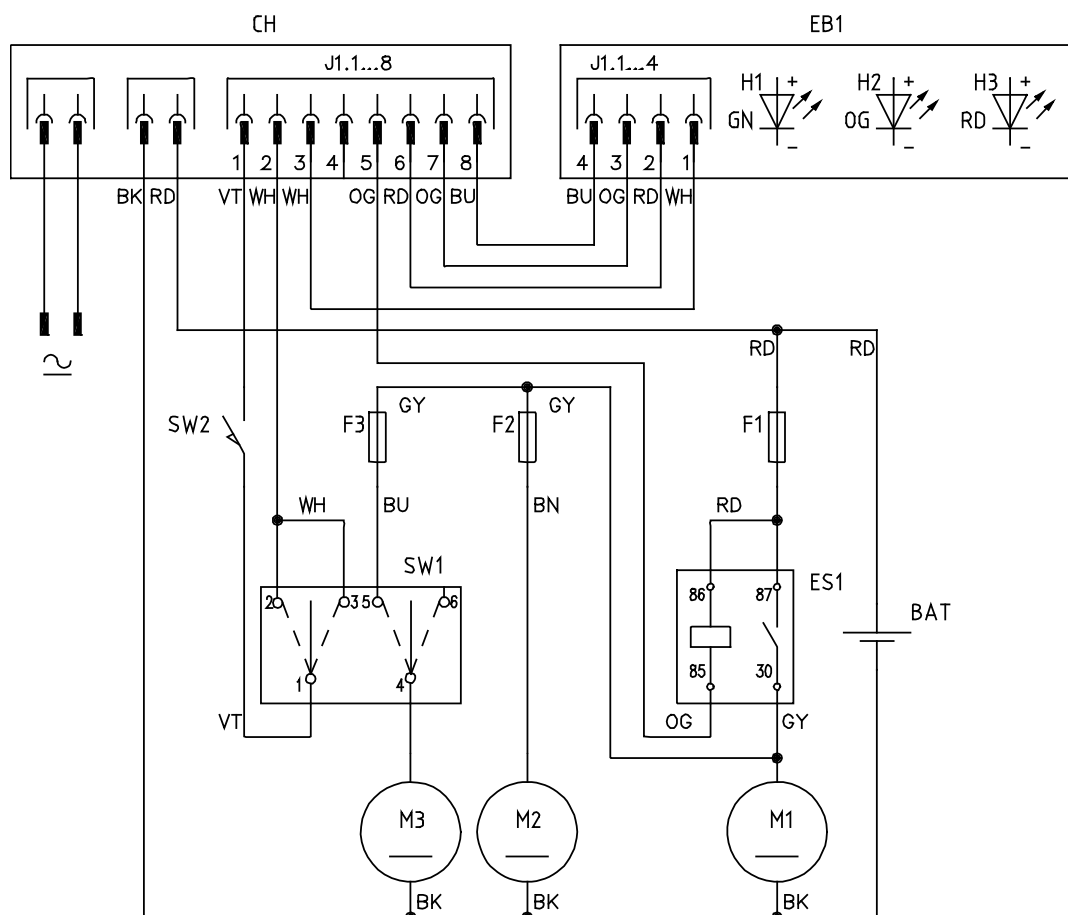
WIRING DIAGRAM

Key

BAT	Batteries
CH1	Battery charger
EB1	Electronic board LED
ES1	Relay
F1	Main fuse
F2	Vacuum fan fuse
F3	Side broom fuse
M1	Main motor
M2	Vacuum system motor
M3	Side broom motor
SW1	Main switch
SW2	Hopper microswitch

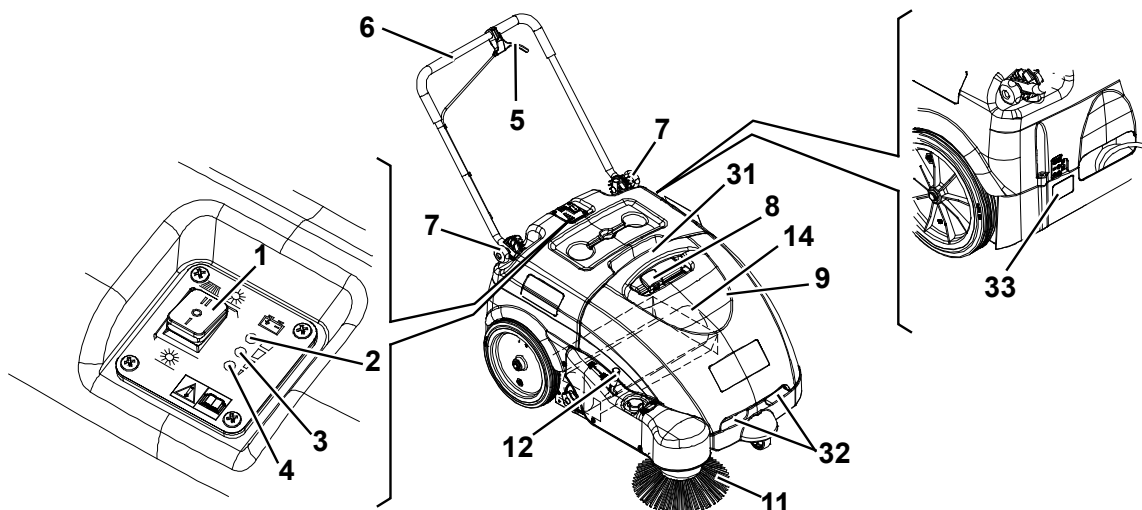
Colour code

BK	Black
BU	Blue
BN	Brown
GN	Green
GY	Grey
OG	Orange
PK	Pink
RD	Red
VT	Violet
WH	White
YE	Yellow



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USE



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**WARNING!**

On some points of the machine there are some adhesive plates indicating:

- **DANGER**
- **WARNING**
- **CAUTION**
- **NOTE**

While reading this Manual, the operator must pay careful attention to the symbols shown on the plates. Do not cover these plates for any reason and immediately replace them if they are damaged.

BATTERY CHECK ON A NEW MACHINE

The machine is supplied with a standard 12 V, 45 Ah GEL battery (which does not require maintenance).

BEFORE STARTING THE MACHINE

1. Make sure that there are no open doors/hoods and that the machine is in normal operating conditions.
2. If the machine has not been used after being transported, check that all the blocks used for the transportation have been removed.
3. Check that side and main broom are installed, otherwise install them (see the procedure in Maintenance chapter).

STARTING AND STOPPING THE MACHINE**Starting the machine**

1. Adjust the handlebar (6) to reach a comfortable position, by loosening the knobs (7).
When the adjustment is completed, tighten the knobs.
2. To use the main broom only (14), turn the main switch (1) to "I".
To use also the side broom (11), turn the main switch (1) to "II", then lower the side broom by disengaging the lever (12).
Check that the green warning light (2) (charged battery) turns on.
If the yellow or red warning light (3 or 4) turns on, turn the main switch (1) back to "0" and charge the batteries (see the procedure in Maintenance chapter).

**NOTE**

The side broom (11) can be lifted and lowered even if it is turned on.

3. Start sweeping by grasping the handlebar (6) and pulling the drive control lever (5) gradually.

Stopping the machine

4. Release the drive control lever (5) to stop the drive system.
5. Turn off the vacuum system and the brooms, by turning the main switch (1) to "0".
6. Lift the side broom (11) by pulling the lever (12) backwards and by engaging it to the fastener.

MACHINE OPERATION

1. Avoid stopping for a long time with the machine in the same position and the brooms turning: this could create unwanted marks on the floor.
2. For machine proper operation, the dust filter must be as clean as possible. Therefore the filter shaker must be used at regular intervals (every 10 minutes, but this interval may vary according to the floor conditions), according to the following procedure.
 - Stop the machine and turn the main switch (1) to "0".
 - To shake the filter, move the filter shaker knob (8) to the right and then to the left several times.
 - Turn the main switch (1) to "I" or to "II" and start sweeping again.



NOTE

When the dust filter is clogged, the machine cannot collect dust and debris anymore.



CAUTION!

If the machine is to be used on wet floors, use it only for short intervals.

3. The hopper (9) should be emptied after each working cycle and whenever it is full.



NOTE

When the hopper is full, the machine cannot collect dust and debris anymore.

HOPPER EMPTYING

Stop the machine and turn the main switch (1) to "0".

Remove the hopper (9) by using the handles (31) and (32), then empty it at the waste collection centre.

Then install the hopper.

The machine is ready to start sweeping again.



NOTE

When the hopper is removed, all machine functions are disabled.

AFTER USING THE MACHINE

After working, before leaving the machine:

1. Turn the main switch (1) to "0".
2. Turn on the filter shaker with the knob (8).
3. Empty the hopper (9) (see the procedure in the previous paragraph).
4. Lift the side broom (11) by pulling the lever (12) backwards and by engaging it to the fastener.
5. Make sure that the machine cannot move independently.
6. Charge the batteries (see the procedure in Maintenance chapter).

MACHINE LONG INACTIVITY

If the machine is not going to be used for more than 30 days, proceed as follows:

1. Perform the daily maintenance procedures (see the Maintenance chapter).
2. Check that the machine storage area is dry and clean.
3. Slightly lift the machine so that the skirts, the main broom and the wheels do not touch the ground.

FIRST PERIOD OF USE

After the first 8 hours, check the machine fastening and connecting parts for proper tightening and check the visible parts for integrity and leakage.

MAINTENANCE

The lifespan of the machine and its maximum operating safety are ensured by proper and regular maintenance. The following table provides the scheduled maintenance. The intervals shown may vary according to particular working conditions, which are to be defined by the person in charge of the maintenance.



WARNING!

To perform maintenance procedures, the machine must be off and, if necessary, the batteries must be disconnected.

Moreover, carefully read the instructions in Safety paragraph.

All scheduled or extraordinary maintenance procedures must be performed by qualified personnel, or by an authorised Service Center.

This Manual describes only the easiest and most common maintenance procedures.



NOTE

For other maintenance procedures shown in the Scheduled Maintenance Table, refer to the Service Manual that can be consulted at any Service Center.

SCHEDULED MAINTENANCE TABLE

Procedure	Every 10 hours	Every 50 hours	Every 200 hours	Every 400 hours
Battery charger cable check				
Side and main broom height check and adjustment				
Skirt height and operation check				
Dust filter cleaning and integrity check				
Hopper gasket check				
Filter shaker operation check			(*)	
Driving belt and clutch visual inspection			(*)	
Driving belt tensioner adjustment			(*)	
Nut and screw tightening check			(*) (1)	
Motor carbon brush check or replacement				(*)

(*) For the relevant procedure, see the Service Manual.

(1) And after the first 8 hours.

BATTERY CHARGER CABLE CHECK

Carefully check the battery charger cable (18) and the relevant plug for wear, cuts, cracks or other damages. If the battery charger cable or the relevant plug is damaged, contact the Nilfisk Service Center.

SIDE BROOM HEIGHT CHECK AND ADJUSTMENT

1. Check the side broom distance from the floor as shown below:
 - Drive the machine on a level ground and lower the side broom.
 - Keep the machine stationary and turn on the side broom for a few seconds.
 - Turn off the side broom by pressing the switch (1), then lift it and move the machine.
 - Check that the side broom print is as shown in the figure (A, Fig. 1): the side broom must touch the ground along a circle arc ranging from "10 o'clock" position to "3 o'clock" position.
 - If the print is not within specifications, adjust the broom height as shown in step 2.
2. Turn the knob (13) clockwise and counter-clockwise to adjust the broom height.
3. Perform step 1 again to check the proper adjustment of the side broom height.
4. When the broom is too worn to be adjusted, replace it as shown in the next paragraph.

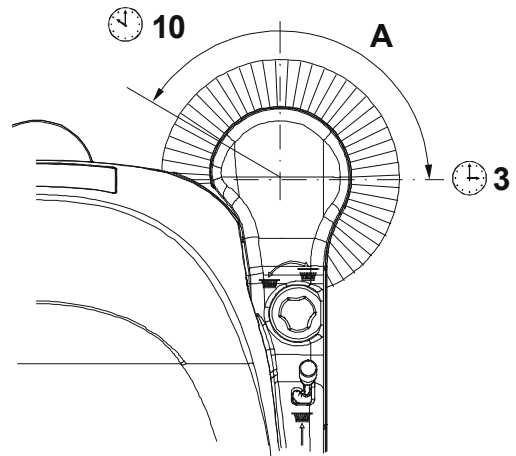


Figure 1

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SIDE BROOM DISASSEMBLY/ASSEMBLY



CAUTION!

It is advisable to wear protective gloves when replacing the side broom because there can be sharp debris between the bristles.

1. Drive the machine on a level floor.
2. Turn the main switch (1) to "0".
3. Lift the side broom.
4. Loosen the knob (A, Fig. 2) inside the side broom, then remove the broom (B) by disengaging it from the pins (C).
5. Install the new broom by engaging it on the pins (C), then tighten the knob (A).
6. Adjust the new broom height as shown in the previous paragraph.

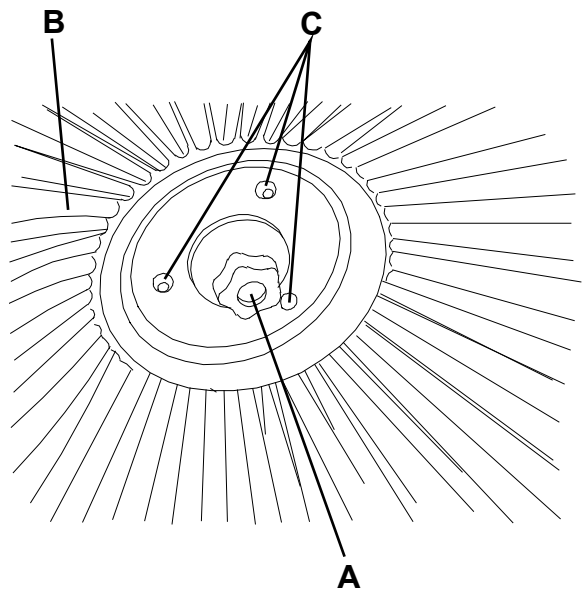


Figure 2

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MAIN BROOM HEIGHT CHECK AND ADJUSTMENT

1. Check the main broom distance from the floor as shown below:
 - Drive the machine on a level floor.
 - Keep the machine stationary and turn on the main broom for a few seconds.
 - Turn off the main broom by pressing the switch (1), then move the machine.
 - Check that the main broom print (A, Fig. 3), along its length, is 3-5 cm wide.
 - If the print is not within specifications, adjust the broom height as shown in step 2.
2. Turn the main switch (1) to "0".
3. Loosen the knob (A, Fig. 4) on both sides of the machine.
4. Grasp the support (B) on the points (C) and move it upwards, then lift it or lower it to change the main broom height. For height variation, refer to the indicator (D). Then tighten the knob (A) on both sides of the machine.
5. Perform step 1 again to check the proper adjustment of the main broom height.
6. When the broom is too worn to be adjusted, replace it as shown in the next paragraph.

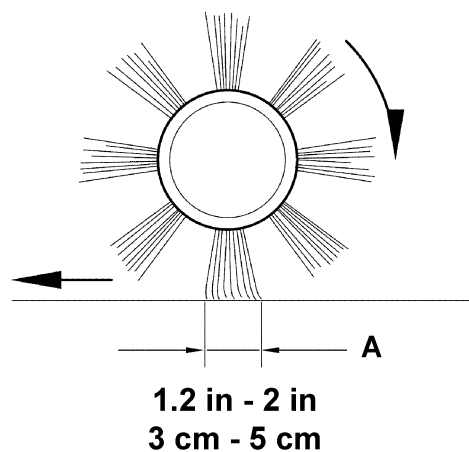


Figure 3

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CAUTION!

If the main broom print is excessive (larger than 5 cm), the machine regular operation is affected and the moving or electrical parts can overheat, thus reducing machine life.

Pay careful attention when performing the above-mentioned checks, and always use the machine according to the indicated conditions.

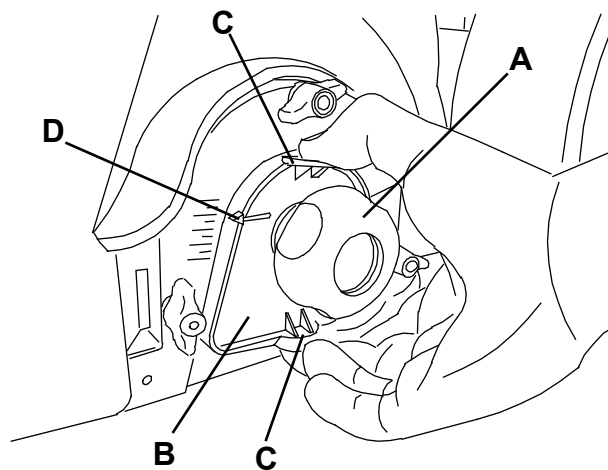


Figure 4

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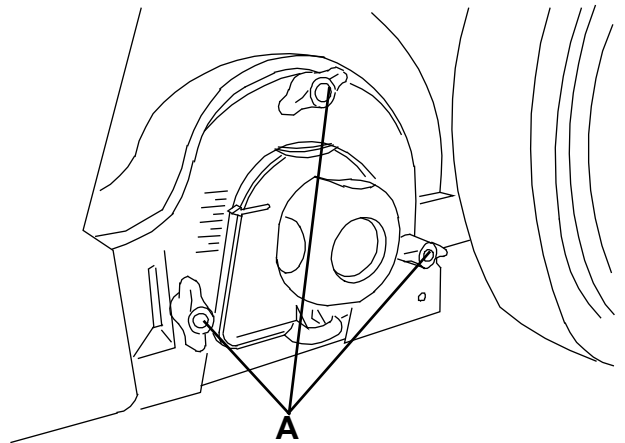
MAIN BROOM DISASSEMBLY/ASSEMBLY



CAUTION!

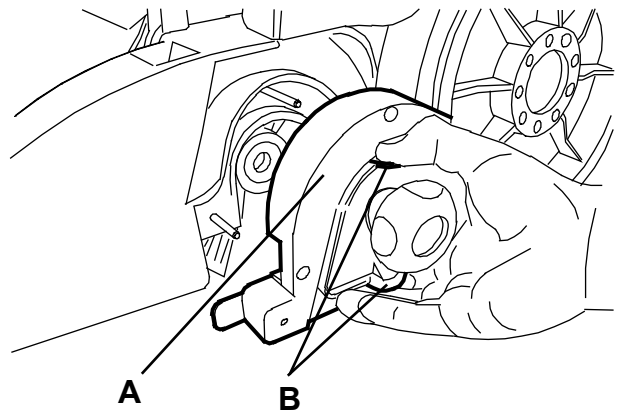
It is advisable to wear protective gloves when replacing the main broom because there can be sharp debris between the bristles.

1. Drive the machine on a level floor.
2. Turn the main switch (1) to "0".
3. Remove the hopper (9).
4. Loosen the handwheels (A, Fig. 5) completely on the left side of the machine.
5. Remove the lid (A, Fig. 6) by grasping it on the points (B).
6. Grasp the main broom (A, Fig. 7) on the points (B) and (C), then disconnect it from the drive hub (D) by pulling it in the direction shown by the arrow (E); then remove it in the direction shown by the arrow (F).
7. The new main broom must be installed with the bristles rows bent as shown in the figure.
8. Install the new broom by performing steps 3 to 6 in the reverse order.
9. Adjust the new broom height as shown in the previous paragraph.



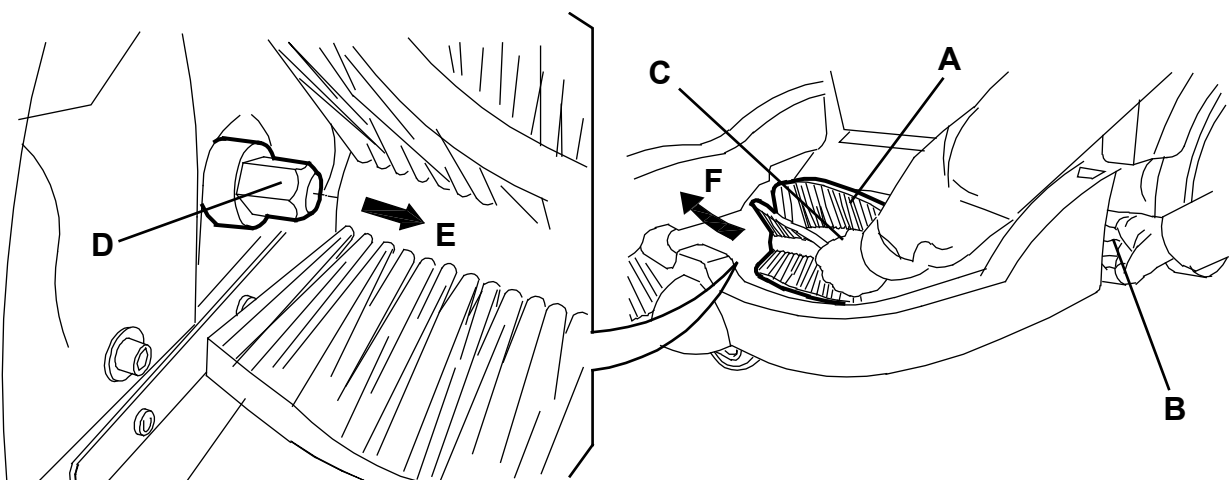
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Figure 5



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Figure 6

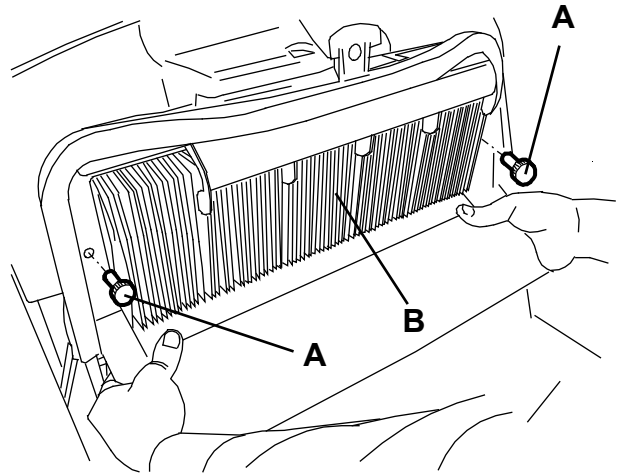


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Figure 7

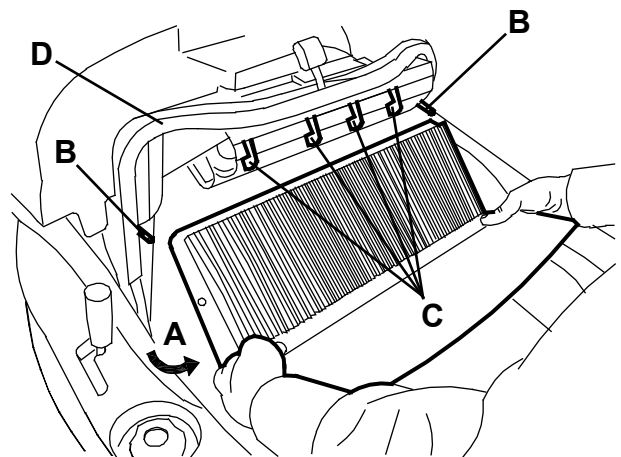
DUST FILTER CLEANING AND INTEGRITY CHECK, HOPPER GASKET CHECK

1. Drive the machine on a level floor.
2. Turn the main switch (1) to "0".
3. Remove the hopper (9).
4. Loosen the knobs (A, Fig. 8).
5. Grasp the dust filter (B) as shown in the figure.
6. Remove the dust filter by turning it in the direction shown by the arrow (A, Fig. 9) to disengage it from the pins (B), then lower the filter to disengage it from the filter shaker combs (C).
7. Remove the filter (A, Fig. 10) from the frame (B) by disengaging the 2 rubber bands (C).
8. In an appropriate outdoor area, clean the filter by shaking it on a level and clean surface, tapping the side (D) opposite to the gasket (E).
Complete the cleaning procedure by using compressed air (F) at maximum 6 Bar, blowing only from the side of the gasket (E), at a minimum distance of 30 cm.
Check the filter body for tears. If necessary, replace it.
For a better cleaning, it is allowed to wash the filter with water and non-lathering detergents. This provides better quality cleaning but reduces the life of the filter, which will have to be replaced more frequently. The use of inadequate detergents can damage the filter.
9. Clean the bearing surface of the filter rubber gasket (E) and check it for integrity and sealing capabilities. If necessary, replace the filter.
10. Clean the bearing surface of the hopper gasket (D, Fig. 9) and check it for integrity and sealing capabilities. If necessary, replace it.
11. Assemble the components in the reverse order of disassembly.



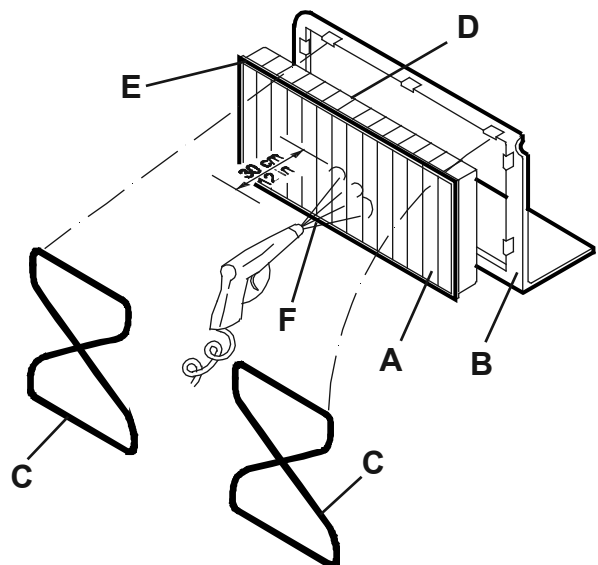
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Figure 8



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Figure 9



S311359

Figure 10



NOTE

Assemble the filter with the gasket (E, Fig. 10) positioned as shown in the figure.

SKIRT HEIGHT AND OPERATION CHECK

1. Drive the machine on a level floor that is suitable for checking the skirt height.
2. Turn the main switch (1) to "0".
3. Check that the distance from the ground of the side skirts (A and B, Fig. 11) is 0 - 2 mm.
Check the skirts for integrity, cuts or tears, which can reduce the machine vacuum capabilities. If necessary replace the side skirts (see the procedure in the Service Manual).
4. Check that the front and rear skirts (C and D, Fig. 11) slightly rub on the ground. Check the skirts for integrity, cuts or tears, which can reduce the machine vacuum capabilities. Note that the front skirt has typical vertical cuts (E). If necessary replace the front and rear skirts (see the procedure in the Service Manual).

BATTERY CHARGING

1. Drive the machine to the appointed recharging area and ensure that it cannot move independently.
2. Turn the main switch (A, Fig. 12) to "0".
3. Remove the battery charger cable (B) from the housing (C) and connect it to the electrical mains.



CAUTION!

Before connecting the battery charger (B), ensure that frequency and voltage values, shown on the machine serial number plate (33), match the electrical mains voltage.

In case of doubt, do not connect the plug to the electrical mains, but contact the qualified personnel.

4. While charging the batteries, the red warning light (D) and the yellow warning light (E) turn on in sequence. When the green warning light (F) turns on, the batteries are charged.
5. Disconnect the battery charger cable (B) from the electrical mains and place it in the housing (C).



NOTE

When the battery charger is connected to the electrical mains, all machine functions are automatically disabled.

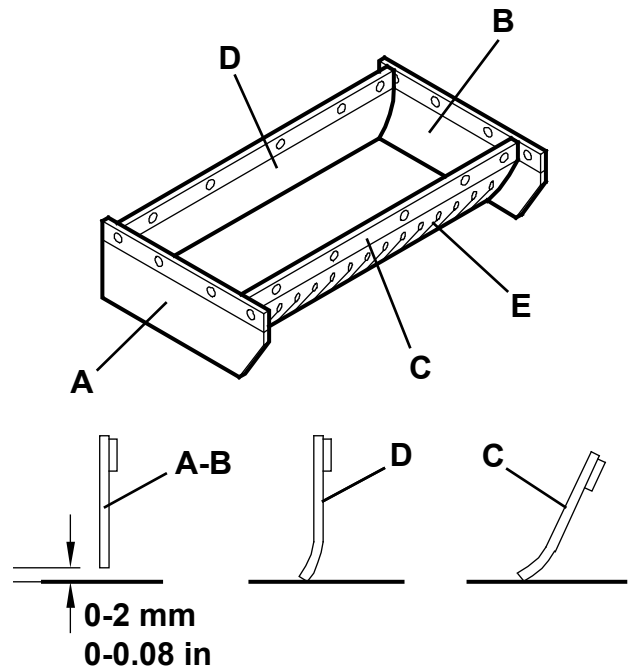


Figure 11

S311360

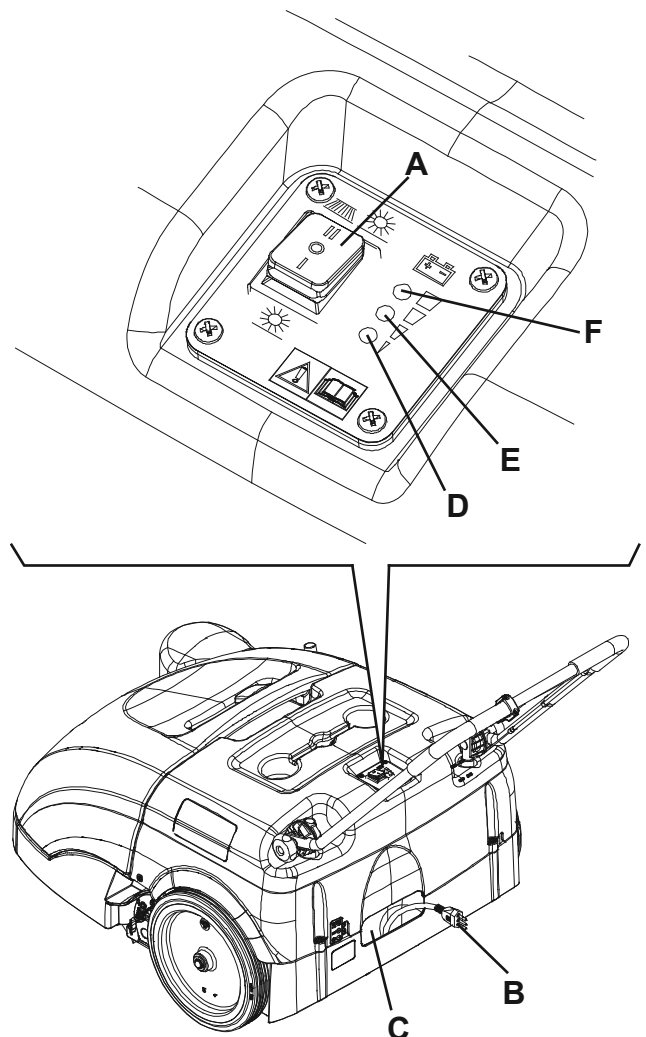


Figure 12

S311361

TROUBLESHOOTING

Trouble	Possible cause	Remedy
The machine does not start when turning the main switch to "I" or to "II".	There is an open in the fuse (21).	Reset the fuse by pressing the relevant push-button.
	The battery charger cable is connected to the electrical mains.	Disconnect it and place it in the housing.
	The batteries are discharged.	Charge the batteries.
The side broom does not operate.	There is an open in the fuse (20).	Reset the fuse by pressing the relevant push-button.
The machine operates only when stationary, otherwise the red warning light turns on.	The batteries are discharged.	Charge the batteries. If the trouble persists, have the batteries replaced at Nilfisk Service Center.
The battery autonomy is low.	The batteries are dead.	Have the batteries replaced at Nilfisk Service Center.
The batteries do not charge: the red warning light (4) does not turn on when the plug is inserted in the electrical mains socket.	There is no power supply at the electrical mains socket.	Check the electrical mains socket by trying to connect another domestic appliance.

For further information, refer to the Service Manual, available at any Nilfisk Service Center.

SCRAPPING

Have the machine scrapped by a qualified scrapper.

Before scrapping the machine, remove and separate the following materials, which must be disposed of properly according to the Law in force:

- Battery
- Brooms
- Plastic hoses and components
- Electrical and electronic components (*)

(*) Refer to the nearest Nilfisk Center especially when scrapping electrical and electronic components.