

BA 651 / 751 / 851 / 751C

Instructions for use

Bedienungshandbuch
Instructions d'utilisation
Instructions for use
Gebruiksaanwijzing

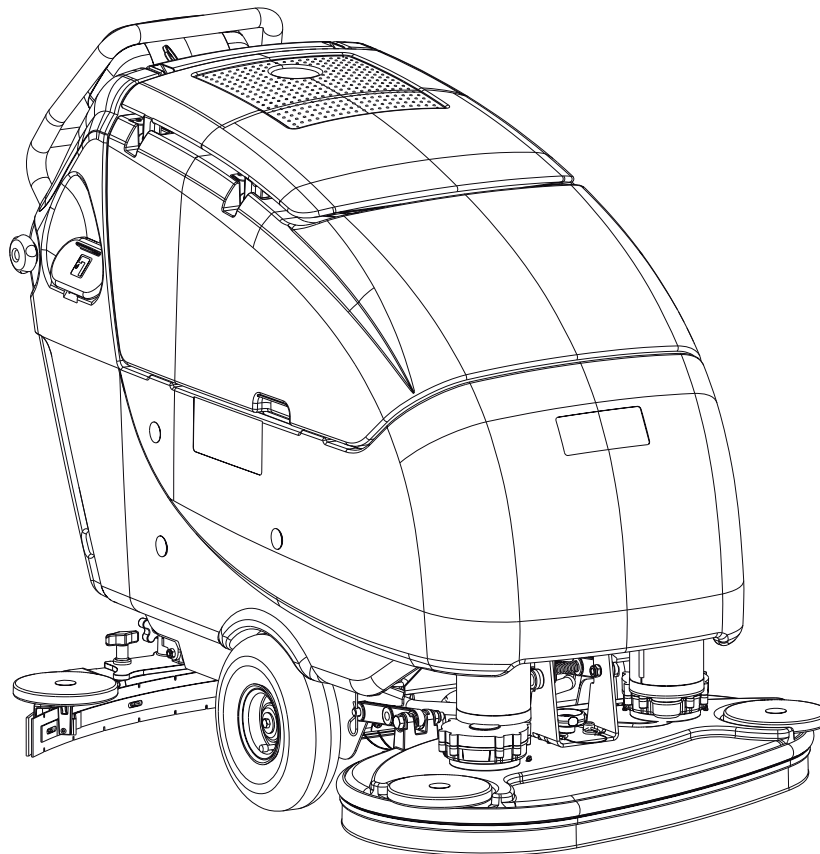


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ecoflex™

Deutsch
Français
English
Nederlands



Model:
9087240020 - 9087241020 - 9087243020 - 9087244020
9087246020 - 9087247020 - 9087248020

Сертификат за съответствие
Osvédění o shodě
Konformitätserklärung
Overensstemmelsecertifikat
Declaración de conformidad
Vastavussertifikaat
Déclaration de conformité
Yhdenmukaisuustodistus
Conformity certificate

Ποτοποιητικό συμμόρφωσης
Megfelelősségi nyilatkozat
Potvrda sukladnosti
Dichiarazione di conformità
Atitikties deklaracija
Atbilstības deklarācija
Konformitetssertifisering
Konformiteitsverklaring
Declaração de conformidade

Deklaracija zgodności
Certificat de conformitate
Заявление о соответствии
Överensstämmelsecertifikat
Certifikát súladu
Certifikat o ustreznosti
Uyumluluk sertifikası



Модел / Model / Modell / Model / Modelo / Model / Modèle / Malli / Model
/ Μοντέλο / Model / Model / Modello / Modelis / Modelis / Modell / Model
/ Modelo / Model / Model / Модель / Modell / Model / Model / Model :

BA 651 - BA 751 - BA 851 - BA 751C

Тип / Typ / Typ / Type / Tipo / Tüüp / Type / Tuuppi / Type / Τύπος /
Típus / Vrsta / Tipo / Tipas / Tips / Type / Type / Tipo / Typ / Tip / Тип /
Typ / Typ / Tip / Tip :

SCRUBBER-DRYER

Сериен номер / Výrobní číslo / Seriennummer / Seriennummer / Número de serie / Seerianumber / Numéro de série / Sarjanumero / Serial number /
Σειριακός αριθμός / Sorozatszám / Serijski broj / Numero di serie / Serijos numeris / Sérijas numurs / Seriennummer / Seriennummer / Número de série /
Numer seryjny / Număr de serie / Серийный номер / Seriennummer / Výrobné číslo / Sérijska številka / Seri Numarası :

Година на производство / Rok výroby / Baujahr / Fabrikationsår / Año de fabricación / Våljalaskeaasta / Année de fabrication / Valmistusvuosi / Year of
construction / Έτος κατασκευής / Gyártási év / Godina izgradnje / Anno di costruzione / Pagaminimo metai / Izgatavošanas gads / Byggeår / Bauwjaar /
Año de fabrico / Rok produkcji / Anul fabricației / Год выпуска / Tillverkningsår / Rok výroby / Leto izdelave / Leto izdelave / İmal yılı :

BG Долуподписаният потвърждава, че гореспоменатият модел е произведен в съответствие със следните директиви и стандарти. Техническият файл е съставен от производителя.

CZ Níže podepsaný stvrzuje, že výše uvedený model byl vyroben v souladu s následujícími směrnici a normami. Autorem technického listu je výrobce.

D Der Unterzeichner bestätigt hiermit dass die oben erwähnten Modelle gemäß den folgenden Richtlinien und Normen hergestellt wurden. Die technische Dokumentation wird vom Hersteller erstellt.

DK Undertegnede attesterer herved, at ovennævnte model er produceret i overensstemmelse med følgende direktiver og standarder. Den tekniske fil er udarbejdet af fabrikanten.

E El abajo firmante certifica que los modelos arriba mencionados han sido producidos de acuerdo con las siguientes directivas y estándares. El fascículo técnico está redactado por el fabricante

EST Allakirjutanu kinnitab, et ülalnimetatud mudel on valmistatud kooskõlas järgmiste direktiivide ja normidega. Tehnilise dokumentatsiooni koostab tootja.

F Je soussigné certifie que les modèles ci-dessus sont fabriqués conformément aux directives et normes suivantes. Le dossier technique est rédigé par le fabricant.

FIN Allekirjoittaja vakuuttaa että yllämainittu malli on tuotettu seuraavien direktiivien ja standardien mukaan. Valmistaja kääntää teknisen tiedoston.

GB The undersigned certify that the above mentioned model is produced in accordance with the following directives and standards. The technical file is compiled by the manufacturer.

GR Ο κάτωθι υπογεγραμμένος πιστοποιεί ότι η παραγωγή του προαναφερθέντος μοντέλου γίνεται σύμφωνα με τις ακόλουθες οδηγίες και πρότυπα. Το τεχνικό αρχείο συντάσσεται από τον κατασκευαστή.

H Alulírottak igazoljuk, hogy a fent említett modellt a következő irányelvek és szabványok alapján hoztuk létre. A műszaki fájlt a gyártó készítette.

HR Potpisani potvrđujem da gore spomenuti model proizveden u skladu sa sljedećim direktivama i standardima. Tehničku dokumentaciju sastavlja proizvođač.

I Il sottoscritto dichiara che i modelli sopra menzionati sono prodotti in accordo con le seguenti direttive e standard. Il fascicolo tecnico è redatto dal costruttore.

LT Toliau pateiktu dokumentu patvirtinama, kad minėtas modelis yra pagamintas laikantis nurodytų direktyvų bei standartų. Techninę bylą sudarė gamintojas.

LV Ar šo tiek apliecināts, ka augstākminētais modelis ir izgatavots atbilstoši šādām direktīvām un standartiem. Tehnisko aprakstu ir sastādījis ražotājs.

N Undertegnede attesterer att ovennevnte modell är produceret i överensstämmelse med följande direktiv och standarder. Den tekniska filen är upprettad av produsenten.

NL Ondergetekende verzekert dat de bovengenoemde modellen geproduceerd zijn in overeenstemming met de volgende richtlijnen en standaards. Het technische bestand is door de fabrikant samengesteld.

P A presente assinatura serve para declarar que os modelos supramencionados são produtos em conformidade com as seguintes directivas e normas. A ficha técnica é redigida pelo fabricante.

PL Niżej podpisany zaświadcza, że wymieniony powyżej model produkowany jest zgodnie z następującymi dyrektywami i normami. Dokumenty techniczne zostały przygotowane przez producenta.

RO Subsemnatul atest că modelul susmenționat este produs în conformitate cu următoarele directive și standarde. Fișierul tehnic este redactat de către producător.

RUS Настоящим удостоверяется, что машина вышеуказанной модели изготовлена в соответствии со следующими директивами и стандартами. Техническая документация составлена производителем.

S Undertecknad intygar att ovannämnda modell är producerad i överensstämmelse med följande direktiv och standarder. Den tekniska filen är sammanställd av tillverkaren.

SK Dolu podpísaný osvedčuje, že hore uvedení model sa vyrába v súlade s nasledujúcimi smernicami a normami. Technický súbor vytvoril výrobca.

SLO Spodaj podpisani potrjujem, da je zgoraj omenjeni model izdelan v skladu z naslednjimi smernicami in standardi. Spis s tehnično dokumentacijo pripravi izdelovalec.

TR Aşağıda imzası olan kişi, yukarıda bahsedilen model cihazın aşağıda verilen direktiflere ve standartlara uygunlukta imal edildiğini onaylar. Teknik dosya üretici tarafından derlenmiştir.

EC Machinery Directive 2006/42/EC

EN ISO 12100, EN ISO 13857, EN 349, EN 982

EN 60335-1, EN 60335-2-72, EN 50366

EC EMC Directive 2004/108/EC

EN 55022, EN 55014-2, EN 61000-6-2

Производителя / Výrobce / Hersteller / Fabrikanten /
Fabricante / Tootja / Fabricant / Valmistaja / Manufacturer
/ Κατασκευαστή / Gyártó / Proizvođač / Costruttore
/ Gamintojas / Ražotājs / Produsenten / Fabrikant /
Fabricante / Producenta / Producător / Производителем /
Tillverkaren / Výrobca / Izdelovalec / Üretici :

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Date: Signature:

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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 (34).

The machine production 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

- Electronic Battery Charger Manual (if equipped), to be considered as integral part of this Manual
- Moreover, the following Manuals are available:
- Service Manual (that can be consulted at Nilfisk Service Centers)
 - Spare Parts List (supplied with the machine)

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 accessory must be approved and performed by Nilfisk.

OPERATION CAPABILITIES

These scrubber-dryers are used to clean (scrubbing and drying) smooth and solid floors, in civil or industrial environment, under safe operation conditions by a qualified operator.

The scrubber-dryers cannot be used for fitted carpet and carpet cleaning.

CONVENTIONS

Forward, backward, front, rear, left or right are intended with reference to the operator's position, that is to say in driving position with the hands on the handlebar (2).

UNPACKING/DELIVERY

To unpack the machine, carefully follow the instructions on the packing.

Upon delivery carefully check that the machine and its packing have not been 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:

1. Technical documents:
 - Scrubber-dryer User Manual
 - Electronic Battery Charger Manual (if equipped)
 - Scrubber-dryer Spare Parts List
2. No. 1 connector for battery charger (for machines without on board battery charger)
3. No. 2 lamellar fuses

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 or damage to objects.



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, repair, cleaning or replacement procedure disconnect the battery connector and remove the ignition key.
- 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. During the normal operation explosive gases are released.
- 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.
- Battery charging produces highly explosive hydrogen gas. Keep the tank assembly open during battery charging and perform this procedure in well-ventilated areas and away from naked flames.



WARNING!

- Carefully read all the instructions before performing any maintenance/repair procedure.
- Before using the battery charger, ensure that frequency and voltage values, indicated 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 use the machine if the battery charger cable or plug is damaged. If the machine is not working as it should, has been damaged, left outdoors or dropped into water, return it to the 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.
- Do not smoke while charging the batteries.
- To avoid any unauthorised use of the machine, remove the ignition key (if equipped).
- 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 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 use the machine on slopes with a gradient exceeding the specifications.
- Do not use the machine in particularly dusty areas.
- While using this machine, take care not to cause damage to people or objects.
- Do not bump into shelves or scaffoldings, especially where there is a risk of falling objects.
- Do not lean liquid containers on the machine, use the relevant can holder.
- The machine working temperature must be between 0 °C and +40 °C.
- The machine storage temperature must be between 0 °C and +40 °C.
- The humidity must be between 30% and 95%.

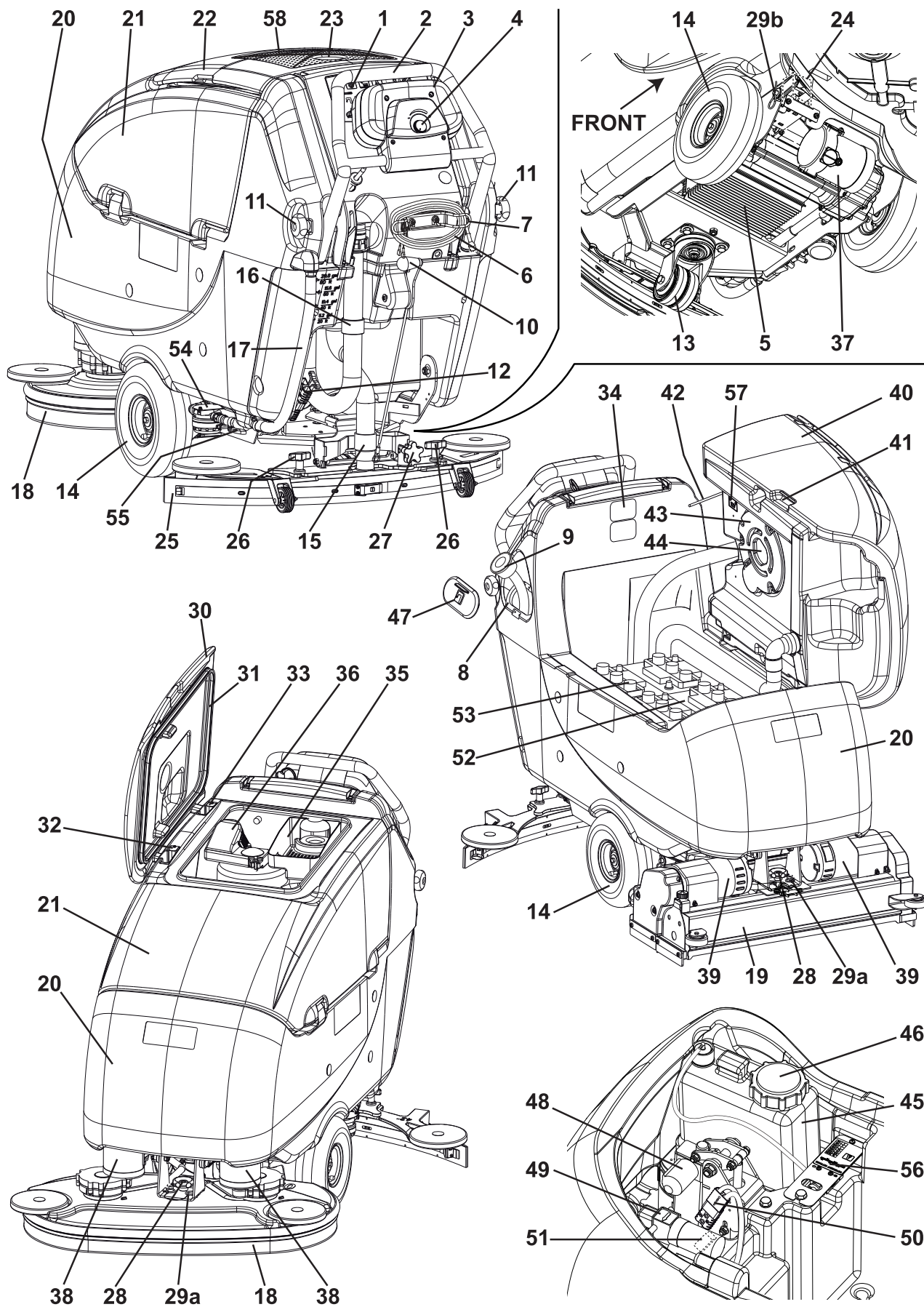
**WARNING!**

- *When using floor cleaning detergents, follow the instructions on the labels of the detergent bottles.*
- *To handle floor cleaning detergents, wear suitable gloves and protections.*
- *Do not use the machine as a means of transport.*
- *Do not allow the brushes to operate while the machine is stationary to avoid damaging the floor.*
- *In case of fire, use a powder fire extinguisher, not a water one.*
- *Do not tamper with the machine safety guards and follow the ordinary maintenance instructions scrupulously.*
- *Do not allow any object to enter into the openings. Do not use the machine if the openings are clogged. Always keep the openings free from dust, hairs and any other foreign material which could reduce the air flow.*
- *Do not remove or modify the plates affixed to the machine.*
- *When the machine is to be pushed for service reasons (missing or discharged batteries, etc.), the speed must not exceed 4 km/h.*
- *This machine cannot be used on roads or public streets.*
- *Pay attention during machine transportation when temperature is below freezing point. The water in the recovery tank or in the hoses could freeze and seriously damage the machine.*
- *Use brushes and pads supplied with the machine and those specified in the User Manual. Using other brushes or pads 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.*
- *If the machine*
 - *does not work properly*
 - *is damaged*
 - *has water or foam leaks*
 - *has been left outdoors exposed to bad weather conditions*
 - *is wet or has been dropped into water**turn it off immediately and contact the Nilfisk Service Center or a qualified technician.*
- *If parts must be replaced, require ORIGINAL spare parts from an Authorised Dealer or Retailer.*
- *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.*
- *Carefully read all the instructions before performing any maintenance/repair procedure.*
- *Do not wash the machine with direct or pressurised water jets, or with corrosive substances.*
- *The machine must be disposed of properly, because of the presence of toxic-harmful materials (batteries, etc.), which are subject to standards that require disposal in special centres (see Scrapping chapter).*

MACHINE DESCRIPTION

MACHINE STRUCTURE

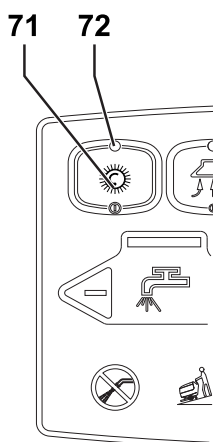
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|--|---|
| <ol style="list-style-type: none"> 1. Control panel 2. Adjustable handlebar 3. Forward/reverse gear paddle 4. Forward/reverse speed adjuster 5. Battery charger (optional) 6. Battery charger cable (optional) 7. Battery charger cable holder (optional) 8. Solution/clean water filler neck 9. Water removable filler hose (optional) 10. Squeegee lifting/lowering lever 11. Handlebar inclination adjusting knobs 12. Battery connector (red). This connector also works as EMERGENCY push-button, to stop immediately all functions. 13. Rear steering wheel 14. Front driving wheels 15. Squeegee vacuum hose 16. Recovery water drain hose 17. Solution/clean water drain and level check hose 18. Deck with two brushes/pad-holders 19. Deck with two cylindrical brushes 20. Solution/clean water tank 21. Recovery tank 22. Recovery tank cover 23. Can holder 24. Solenoid valve 25. Squeegee 26. Squeegee mounting handwheels 27. Squeegee adjusting handwheel 28. Deck fastening/releasing handwheel 29a. Deck safety cotter pin 29b. Deck lever cotter pin | <ol style="list-style-type: none"> 30. Recovery tank cover (open) 31. Tank cover gasket 32. Cover movable retaining plate 33. Cover fixed retaining plate (do not remove!) 34. Serial number plate/technical data/conformity certification 35. Recovery tank debris tray 36. Vacuum grid with automatic shut-off float 37. Drive system motor 38. Brush/pad-holder motor 39. Cylindrical brush motor 40. Recovery tank (open) 41. Tank lifting handle 42. Tank safety cable 43. Vacuum system motor cover 44. Vacuum system motor sound-deadening filter 45. Detergent tank (*) 46. Detergent tank filler plug (*) 47. Filler shut-off plug 48. Deck lifting/lowering motor 49. Water pump (*) 50. Brush/pad-holder deck connector (red) 51. Cylindrical brush deck connector (white) 52. Batteries 53. Battery caps 54. Solution/clean water filter 55. Solution/clean water tap 56. Reference table for detergent proportioning (*) 57. Battery connection diagram 58. Pocket (optional) 59. Detergent pump (*) <p>(*) Only for machine with EcoFlex™ system (optional)</p> |
|--|---|



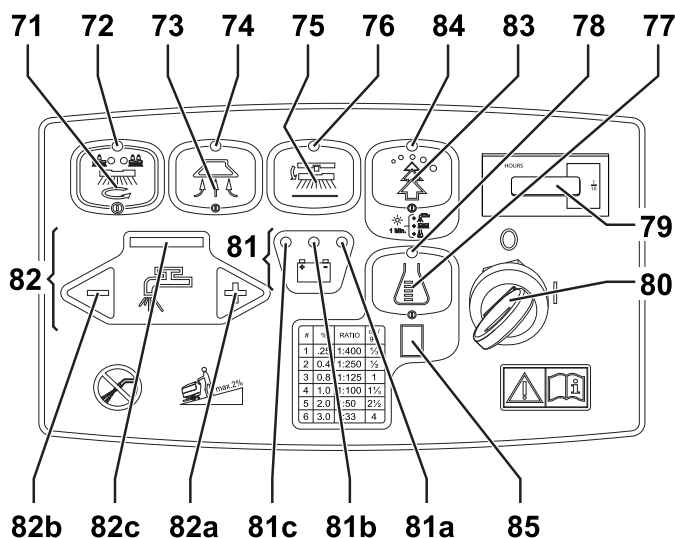
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CONTROL PANEL

71. Brush/pad/cylindrical brush-holder deck lifting/lowering switch
If held for 1 second, the extra pressure function turns on (only for **BA 651**, **BA 751**, **BA 851**)
 72. Deck lifting/lowering switch led:
 - Green led - Brush/pad/cylindrical brush-holder deck lifting/lowering
 - Red led - Extra pressure (only for **BA 651**, **BA 751**, **BA 851**)
 73. Vacuum system switch
 74. Vacuum system switch warning light
 75. Brush/pad-holder release switch
 76. Brush/pad-holder release switch warning light
 77. Washing detergent flow control switch (*)
 78. Washing detergent flow control switch warning light (*)
 79. Hour counter (optional)
 80. Ignition key
 81. Battery charge indicator
 - 81a. Charged battery warning light (green)
 - 81b. Semi-discharged battery warning light (yellow)
 - 81c. Discharged battery warning light (red)
 82. Solution flow control switches
 - 82a. Flow increase switch
 - 82b. Flow decrease switch
 - 82c. Solution flow indicator
 83. EcoFlex™ system switch (*)
 84. EcoFlex™ system switch led indicator (**):
 - Led ON - EcoFlex™ system ON
 - Led flashing - Temporary override
 85. Detergent concentration level display (**)
- (*) Only for machine with EcoFlex™ system (optional)



BA 751C



BA 651, BA 751, BA 851

P100173B

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. GEL batteries
2. Electronic battery charger
3. Brushes and cylindrical brushes of different materials
4. Pads of different materials
5. Deck with two 24"-brushes/pad-holders and 33"-squeegee
6. Polyurethane squeegee blades
7. EcoFlex™
8. Front and rear wheels of different materials
9. Hour counter
10. Solution/clean water removable filler hose
11. Pocket

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

TECHNICAL DATA

General technical data

Model	BA 601(*) (2 brushes/pad- holders)	BA 651 (2 brushes/pad- holders)	BA 751 (2 brushes/pad- holders)	BA 851 (2 brushes/pad- holders)	BA 751C (2 cylindrical brushes)
Machine height	1,072 mm				
Solution/clean water tank capacity	80 litres				
Recovery tank capacity	80 litres				
EcoFlex™ system detergent flow	0.25% ÷ 3%				
Front wheel diameter	267 mm				
Front wheel specific pressure on the floor	1.9 N/mm ²				
Rear wheel specific pressure on the floor	1.5 N/mm ²				
Rear wheel diameter	100 mm				
Vacuum system motor power	500 W				
Drive system motor power	200 W				
Drive speed (variable)	0 to 5.6 km/h				
Gradeability	2% (1°)				
Sound pressure level at workstation (ISO 11201, ISO 4871) (LpA)	58 dB(A) ± 3 dB(A)				
Machine sound pressure level (ISO 3744, ISO 4871) (LwA)	62 dB(A)				
Vibration level at the operator's arms (ISO 5349-1)	< 2.5 m/s ²				
Standard batteries	(4 x 6 V) 180 Ah@5h				
Battery compartment size (width x length x height)	375 x 355 x 615 mm				
Vacuum system circuit capacity	0.012 MPa				

(*) Optional model

Technical data for machines with brush/pad-holder deck

Model	BA 601(*) (2 brushes/pad- holders)	BA 651 (2 brushes/pad- holders)	BA 751 (2 brushes/pad- holders)	BA 851 (2 brushes/pad- holders)
Cleaning width	610 mm	660 mm	710 mm	860 mm
Brush diameter	305 mm	330 mm	355 mm	430 mm
Deck right/left offset	21/21 mm	35/35 mm	75/75 mm	132/132 mm
Brush distance from the floor (when lifted)	125 mm			
Squeegee width	838 mm	890 mm		1,040 mm
Machine maximum length	1,500 mm			1,574 mm
Machine width without squeegee	748 mm			860 mm
Weight without batteries and with empty tanks	167 kg			
Maximum weight with batteries (maximum capacity) and full tanks	463 kg			
Brush motor power	2 x 400 W			
Brush speed	220 rpm			
Brush/pad-holder pressure with extra-pressure function turned off	32 kg			
Brush/pad-holder pressure with extra-pressure function turned on	52 kg			

(*) Optional model

Technical data for machines with cylindrical brush deck

Model	BA 751C (2 cylindrical brushes)
Cleaning width	710 mm
Cylindrical brush size (diameter x length)	145 x 690 mm
Deck right/left offset	91/91 mm
Cylindrical brush deck distance from the floor (when lifted)	60 mm
Squeegee width	889 mm
Machine maximum length	1,472 mm
Machine width without squeegee	785 mm
Weight without batteries and with empty tanks	167 kg
Maximum weight with batteries (maximum capacity) and full tanks	468 kg
Brush motor power	2 x 600 W
Cylindrical brush speed	613 rpm
Cylindrical brush pressure	35 kg

WIRING DIAGRAM

Key

BAT	24 V batteries
C1	Battery connector
C2	Battery charger main connector
C3	Battery charger sub-connector
C4	Deck connector
CH	Battery charger (optional)
CSC	Cylindrical brush deck secondary connector
EB1	Function electronic board
EB2	Drive system electronic board
ES1	Brush motor electromagnetic switches
ES2	Vacuum system relay
EV1	Solenoid valve
F1	Deck fuse
F2	Vacuum system fuse
F3	Drive system fuse
F4	Signal circuit fuse
F5	Brush/pad-holder release fuse
F6	Pump fuse
F7	Actuator fuse
HM	Hour counter (optional)
K1	Ignition key
M1.1,2	Brush/pad-holder motors
M2	Vacuum system motor
M3	Drive system motor
M4	Water pump (optional)
M5	Detergent pump (optional)
M6	Actuator motor
m0	Actuator position 0 microswitch
m1	Actuator position 1 microswitch
m2	Actuator position 2 microswitch
RV1	Speed potentiometer
RV2	Maximum speed potentiometer
SW1	Brush/drive system enabling microswitch

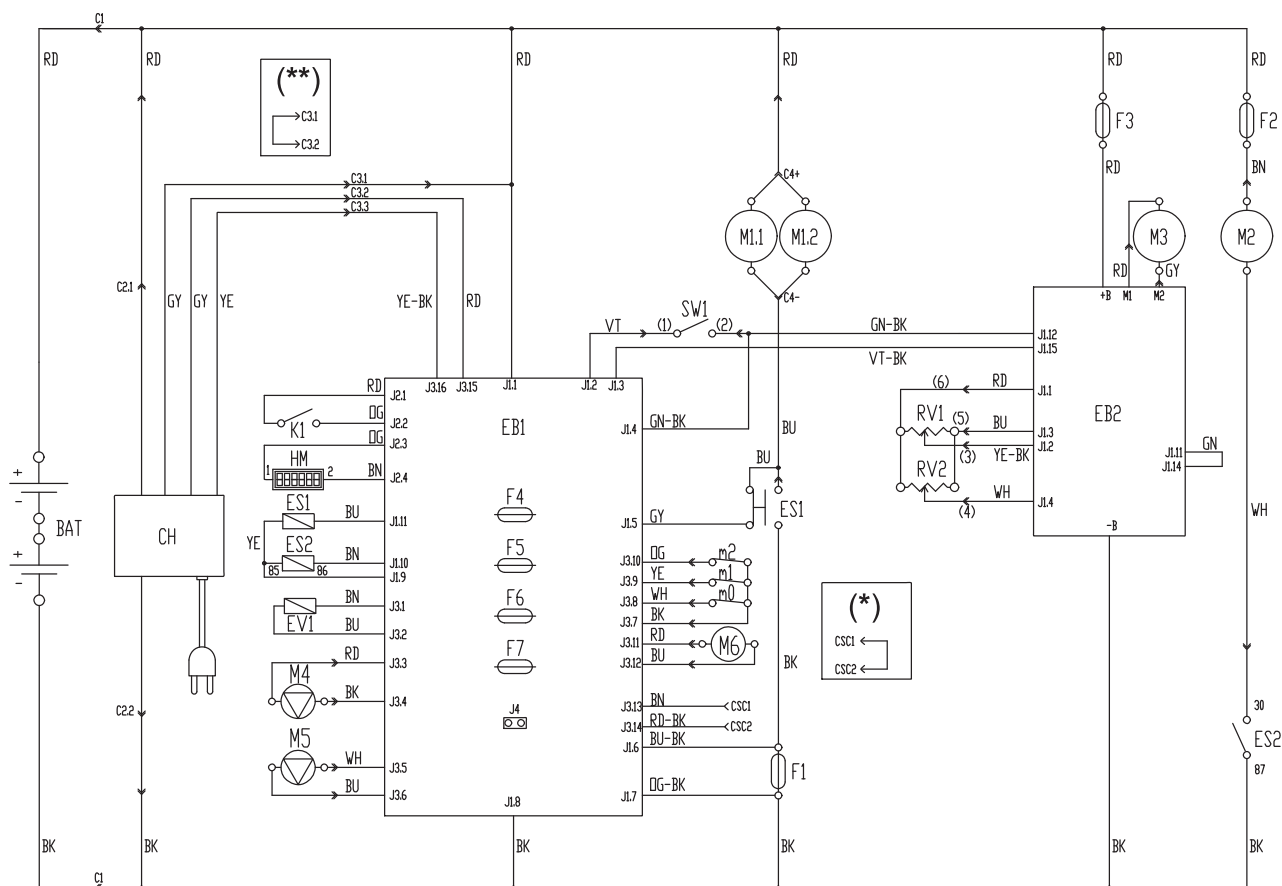
M5	Detergent pump (optional)
M6	Actuator motor
m0	Actuator position 0 microswitch
m1	Actuator position 1 microswitch
m2	Actuator position 2 microswitch
RV1	Speed potentiometer
RV2	Maximum speed potentiometer
SW1	Brush/drive system enabling microswitch

(*) Only for machines with cylindrical brush deck

(**) Only for machines without on-board battery charger

Colour codes

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



P100174

USE

**WARNING!**

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

- **DANGER**
- **WARNING**
- **CAUTION**
- **CONSULTATION**

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

BATTERY CHECK/SETTING ON A NEW MACHINE**WARNING!**

The electric components of the machine can be seriously damaged if the batteries are either improperly installed or connected. The batteries must be installed by qualified personnel only. Set the function electronic board according to the type of batteries installed (WET or GEL).

Check the batteries for damage before installation.

Disconnect the battery connector and the battery charger plug.

Handle the batteries with great care.

Install the battery terminal protection caps supplied with the machine.

The machine can be equipped with:

- one 24 V battery
- two 12 V batteries
- four 6 V batteries

connected according to the diagram shown in Fig. 1.

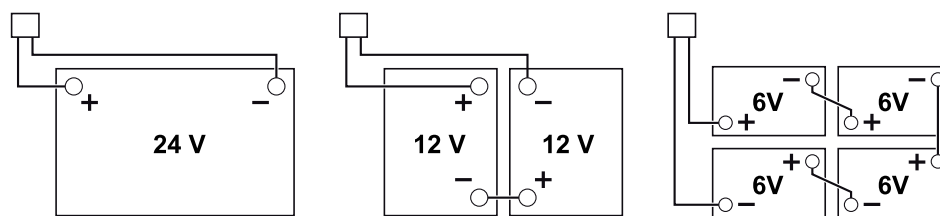


Figure 1

P100175

The machine can be supplied in one of the following modes:

Batteries (WET or GEL) already installed and ready to be used

1. Check that the batteries are connected to the machine with the connector (12).
2. Insert the ignition key (80) and turn it to "I".
If the green warning light (81a) turns on, the batteries are ready to be used.
If the yellow or red warning light (81b or 81c) turns on, the batteries must be charged (see the procedure in Maintenance chapter).

Batteries (WET) installed on the machine, but without electrolyte

1. Open the cover (22) and check that the recovery tank (21) is empty, otherwise empty it with the drain hose (16).
2. Grasp the handle (41) and carefully lift the tank (40).
3. Remove the caps (53) of the batteries (52).

**WARNING!**

Pay attention when using sulphuric acid, as it is corrosive. If it comes in contact with skin or eyes, rinse thoroughly with water and consult a physician.

Batteries have to be filled in a well-ventilated area. Wear protective gloves.

4. Fill up the battery cells with sulphuric acid for batteries (density 1.27 to 1.29 kg at 25 °C) as shown in the Battery Manual. The correct quantity of sulphuric acid is shown in the Battery Manual.
5. To avoid damaging the floor, dry with a cloth both acid and water on the top of the batteries after charging.
6. Let the batteries rest and fill in with sulphuric acid in accordance with the instructions shown in the Battery Manual.
7. Charge the batteries (see the procedure in Maintenance chapter).

Without batteries

1. Buy appropriate batteries (see the Technical Data paragraph).
2. For battery choice and installation, apply to qualified battery Retailers.
3. Set the machine according to the type of batteries installed (WET or GEL) as shown in the following paragraph.

BATTERY INSTALLATION AND BATTERY TYPE SETTING (WET OR GEL)**Battery installation**

1. Open the cover (22) and check that the recovery tank (21) is empty, otherwise empty it with the drain hose (16).
2. Grasp the handle (41) and carefully lift the tank (40).
3. Install the batteries.

Battery type setting

Set the electronic board of the machine according to the type of batteries installed (WET or GEL) as shown below:

1. Turn the ignition key (80) to "I" and, in the very first seconds of machine operation, detect the current setting by counting the number of flashes of the warning lights (81a), (81b), (81c), as shown in the following table:

SETTING	INDICATION	BATTERY TYPE	CHARGING CURRENT
1	4 flashes of the red warning light (81c)	WET	STANDARD
2	4 flashes of the green warning light (81a)	GEL-AGM	
3	4 flashes of the yellow warning light (81b)	GEL EXIDE® type	
4	2 flashes of the red warning light (81c)	WET	REDUCED (see note)
5	2 flashes of the green warning light (81a)	GEL-AGM	
6	2 flashes of the yellow warning light (81b)	GEL EXIDE® type	

2. If the setting is to be changed, perform the following procedure.
3. Turn off the machine by turning the ignition key (80) to "0".
4. Press and hold the switches (71) and (73) at the same time, then turn the ignition key (80) to "I".
5. Release the switches (71) and (73) at least 8 seconds after starting the machine.
6. Within 3 seconds, shortly press the switch (73) to go to the next setting (1 to 6 in cyclic sequence).

**NOTE**

When performing steps 8 and 9, the settings shown in the table are shown also on the flow indicator (82c) (1st LED on the left ON = setting 1, 2nd LED on the left ON = setting 2, etc.)

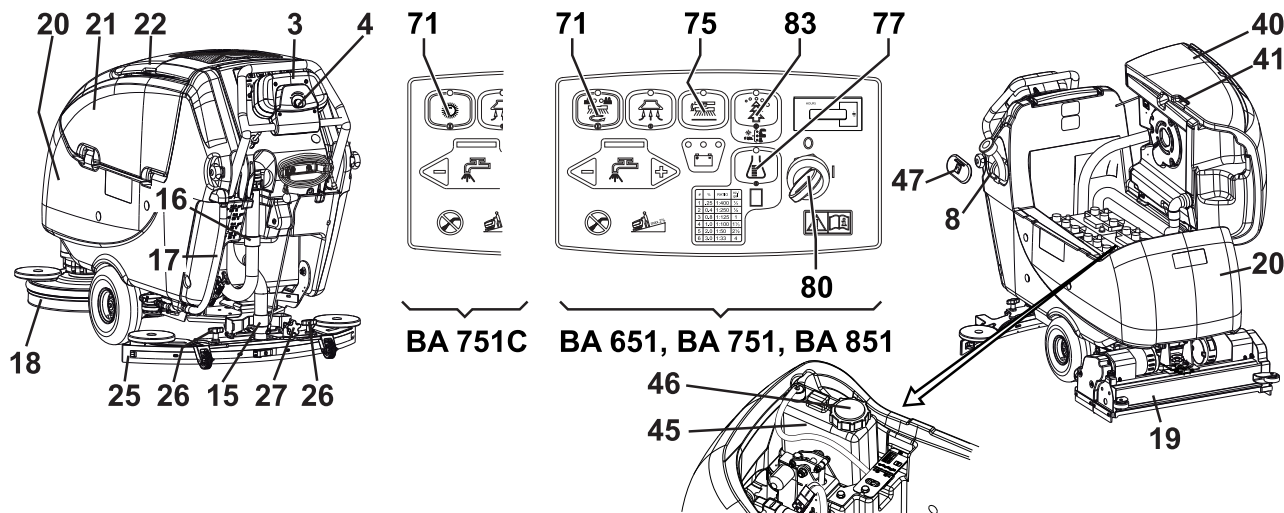
**NOTE**

When using batteries with a capacity lower than 160Ah@5h (in case of doubt, refer to the battery documents), to avoid battery overheating during charging procedure, use the REDUCED charging current with setting 4, 5 or 6 shown in the table, according to the type of batteries installed.

Battery charging

1. Charge the batteries (see the procedure in Maintenance chapter).

BEFORE MACHINE START-UP



P100172B

**WARNING!**

When the machine is to be started by turning the ignition key (80) to "I", make sure that, between the deck (18 or 19) and the above tank assembly, there is no foreign material which may prevent the deck from lifting. This procedure must be performed because if the machine has been turned off without lifting the deck, the deck would lift automatically at next machine start-up.

**WARNING!**

Before turning on the deck lifting/lowering switch (71), always check that, between the deck (18 or 19) and the above tank assembly, there is no foreign material which may prevent the deck from lifting.

Brush/pad-holder deck or cylindrical brush deck installation/removal

The machine can be equipped with either the brush/pad-holder deck (18) or the cylindrical brush deck (19). For deck installation/removal see the procedure in Maintenance chapter.

**NOTE**

When the deck is installed/removed, it may be necessary to change the squeegee too, because they must have the same width. For correct matching of deck and squeegee, see the Squeegee Installation paragraph.

Brush/pad-holder installation/removal (only for BA 601^(*), BA 651, BA 751, BA 851)

1. According to the kind of cleaning to be performed, the machine can be equipped either with brushes (A, Fig. 2) or pad-holders (B) with pads (C) together with the appropriate deck.
2. Insert the ignition key (80) and turn it to "I".
3. Turn the speed adjuster (4) to idle by turning it counter-clockwise.
4. Place the brushes (A) or the pad-holders (B) under the deck (18).
5. Lower the deck on the brushes/pad-holders by pressing the switch (71).
6. To engage the brushes/pad-holders, press the drive paddle (3) and then release it. If necessary, repeat the procedure until the brushes/pad-holders are engaged.

**WARNING!**

Turn the speed adjuster (4) counter-clockwise to run the machine at idle speed.

Do not press the paddle (3) completely, otherwise the machine will start moving.

A slight pressure on the paddle is enough to engage the brush/pad-holder and to turn on the relevant motor.

7. To remove the brushes/pad-holders, the deck must be lifted by pressing the switch (71), then press the switch (75) and wait for the brush/pad-holder to fall on the floor.
8. Turn the ignition key (80) to "0".

(*) Optional model

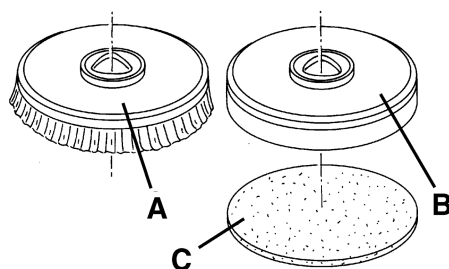


Figure 2

S311334

Available brushes and their relevant application guides (suggestions only)

Models	MIDLITE GRIT 180	MIDGRIT 240	PROLENE	PROLITE	UNION MIX
General cleaning:					
Concrete					
Terrazzo floor					
Ceramic tiles/quarzystones					
Marble					
Vinyl tiles					
Rubber tiles					
Polishing:					
Rubber tiles					
Marble					
Vinyl tiles					

Cylindrical brush installation/removal (only for BA 751C)

1. Turn the ignition key (80) to "I".
2. Lift the cylindrical brush deck by pressing the switch (71).
3. Turn the ignition key (80) to "0".
4. Remove the handwheels (A, Fig. 3) and the lids (B) by pushing them downwards and pressing on the handwheels.
5. Install the cylindrical brushes (C).
The cylindrical brushes can be installed on either sides.
6. Install the lids (B) and fasten them with the handwheels (A).
7. To remove the cylindrical brushes, perform steps 1 to 6 in the reverse order.

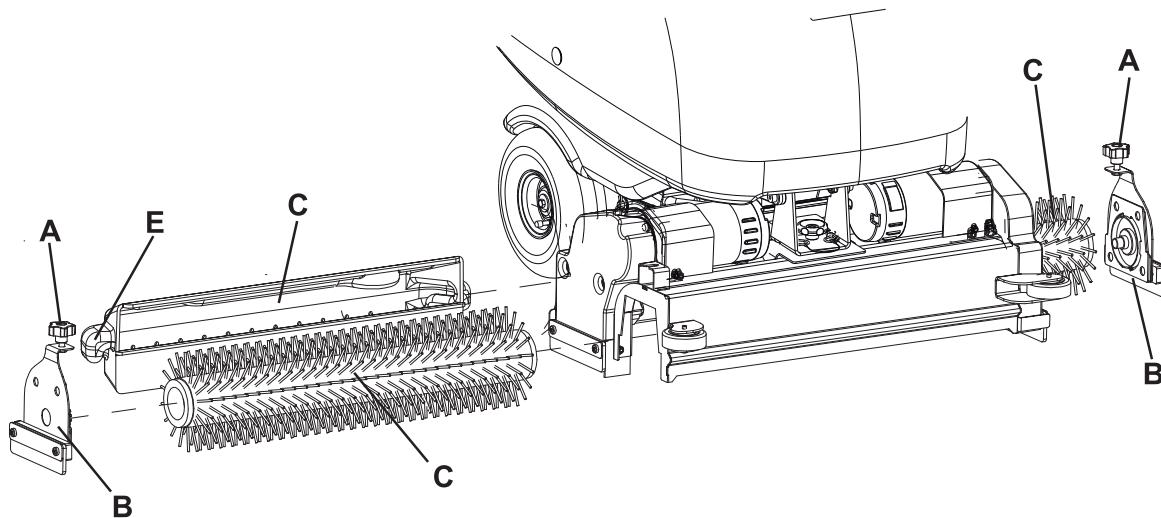


Figure 3

P100176

Available cylindrical brushes and their relevant application guides (suggestions only)

Models	MAGNA GRIT 46	DYNA GRIT 80	MIDLITE GRIT 180	PROLENE	PROLITE	UNION MIX
General cleaning:						
Concrete						
Terrazzo floor						
Ceramic tiles/quarrrystones						
Marble						
Vinyl tiles						
Rubber tiles						

Squeegee installation

1. Install the squeegee (25) and fasten it with the handwheels (26), then connect the vacuum hose (15) to the squeegee.
2. Adjust the squeegee with the handwheel (27) so that the rear blade - in all its length - touches the floor.

Guide to match squeegees and brush/pad-holder decks

Model	Deck	Squeegee model
BA 601 ^(*)	Deck with two brushes (18), brush diameter 305 mm	Aluminium width 838 mm
BA 651	Deck with two brushes (18), brush diameter 330 mm	Aluminium width 889 mm
BA 751	Deck with two brushes (18), brush diameter 355 mm	Aluminium width 889 mm
BA 851	Deck with two brushes (18), brush diameter 430 mm	Aluminium width 1,067 mm
BA 751C	Deck with two cylindrical brushes (19), brush length 690 mm	Aluminium width 889 mm

(*) Optional model

Solution or washing water tank filling



NOTE

If the machine is equipped with EcoFlex™ system (optional) (switches (83 and 77) activated) pour clean water in the tank, otherwise pour solution.

1. Remove the plug (47) to reach the filler (8).
2. **(For machine without EcoFlex™ system)**
Fill the tank (20) with a solution suitable for the work to be performed.
Do not fill the tank completely, leave a few inches from the edge. Use the removable hose (17) as reference.
Always follow the dilution instructions on the label of the chemical product used to prepare the solution.
The solution temperature must not exceed 40 °C.



WARNING!

Use only low-foam and non-flammable detergents, intended for automatic scrubber applications.

(For machine with EcoFlex™ system)

Fill the tank (20) with clean water by using the filler neck (8).
Do not fill the tank completely, leave a few inches from the edge. Use the removable hose (17) as reference.
The water temperature must not exceed 40 °C.

Detergent tank filling

(For machine with EcoFlex™ system)

1. Open the cover (22) and check that the recovery tank (21) is empty, otherwise empty it with the drain hose (16).
2. Grasp the handle (41) and carefully lift the tank (40).
3. Open the plug (46).
4. Fill the tank (45) with a detergent suitable for the work to be performed (highly concentrated detergent).
Do not fill the detergent tank completely, leave a few inches from the edge.



CAUTION!

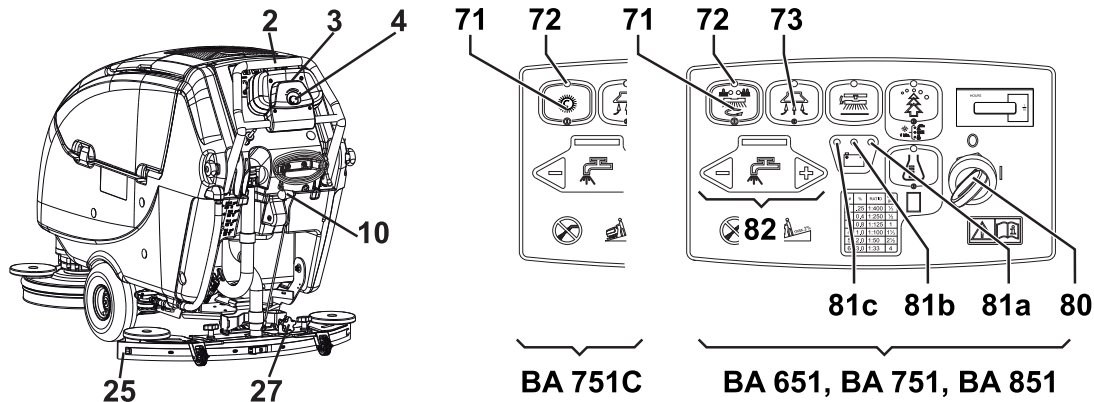
Use only low-foam and non-flammable detergents, intended for automatic scrubber applications.



NOTE

In case of new system, system emptied for cleaning, etc., wait for the hoses to fill up completely before turning on. In order to fill the system quickly it may be useful to drain the EcoFlex™ system once or several times (see the procedure in Maintenance chapter).

MACHINE START AND STOP



P100172C

Starting the machine

1. Prepare the machine as shown in the previous paragraph.
2. Insert the ignition key (80) and turn it to "I".
Check that the green warning light (81a) turns on (charged batteries).
If the yellow or red warning light (81b or 81c) turns on, turn the ignition switch back to "0" and charge the batteries (see the procedure in Maintenance chapter).
3. Drive the machine to the working place:
 - By starting it with the hands on the handlebar (2) and pushing the paddle (3) forward to move forward, and backwards to move in reverse. The maximum forward speed can be adjusted with the adjuster (4).
4. Lower the squeegee (25) with the lever (10).
5. Lower the brush/pad-holder deck by pressing the switch (71).
6. Press the vacuum system switch (73).
7. Press the solution flow control switches (82) as necessary, depending on the type of cleaning to be performed.
8. Start cleaning, by moving the machine as shown in step 3. If necessary, adjust the maximum speed with the adjuster (4).

Stopping the machine

1. Stop the machine by releasing the paddle (3).
2. Turn off the vacuum system by pressing the switch (73).
3. Lift the brush/pad-holder deck by pressing the switch (71).
4. Lift the squeegee (25) with the lever (10).
5. Turn off the machine by turning the ignition key (80) to "0".
6. Make sure that the machine cannot move independently.

MACHINE OPERATION (SCRUBBING/DRYING)

1. Start the machine as shown in the previous paragraph.
2. If necessary, press the solution flow control switches (82) as necessary, depending on the type of cleaning to be performed.
3. If necessary, stop the machine and turn the squeegee adjusting handwheel (27) so that the rear blade (25) - in all its length - touches the floor.



CAUTION!

To avoid any damage to the floor surface, turn off the brushes/pad-holders when the machine stops in one place, especially when the extra pressure function is on.

Adjustment of the detergent concentration in the solution

(For machine with EcoFlex™ system)

The system used to mix the detergent with the washing water can be activated by pressing the detergent flow control switch (A, Fig. 4): when the led indicator (B) is ON, the detergent is added to the washing water.

The display (C) shows the detergent concentration level (1 to 6) in the solution: for the related percentage values refer to the table (D).

In order to change the actual detergent concentration, proceed as follows:

1. Turn off the detergent flow control switch (A) (the led indicator (B) must be OFF).
2. Press and hold the detergent flow control switch (A) until the led indicator (B) flashes.
3. Release the switch (A). Press it again shortly to go to the next level shown by the display (C); repeat the operation until the desired setting is reached.
4. Wait until the led indicator (B) stops flashing: the new level is now set.



NOTE

Detergent percentage setting is stored into memory, even if the machine is turned off.

EcoFlex™ switch

Press the EcoFlex™ switch (E, Fig. 4) whenever you temporarily need a greater washing power.

When you press the switch (E) (the led indicator (F) is flashing) the solution flow increases (for machine with EcoFlex™ system), the brush/pad-holder extra pressure is activated and the detergent concentration in the solution increases (moreover, if the detergent mixing function is not activated, it is automatically activated).

The original settings can be restored by pressing the switch (E) once again (the led indicator (F) is ON).



NOTE

If the switch (E) is not pressed once again, the original settings are restored automatically after 60 seconds.

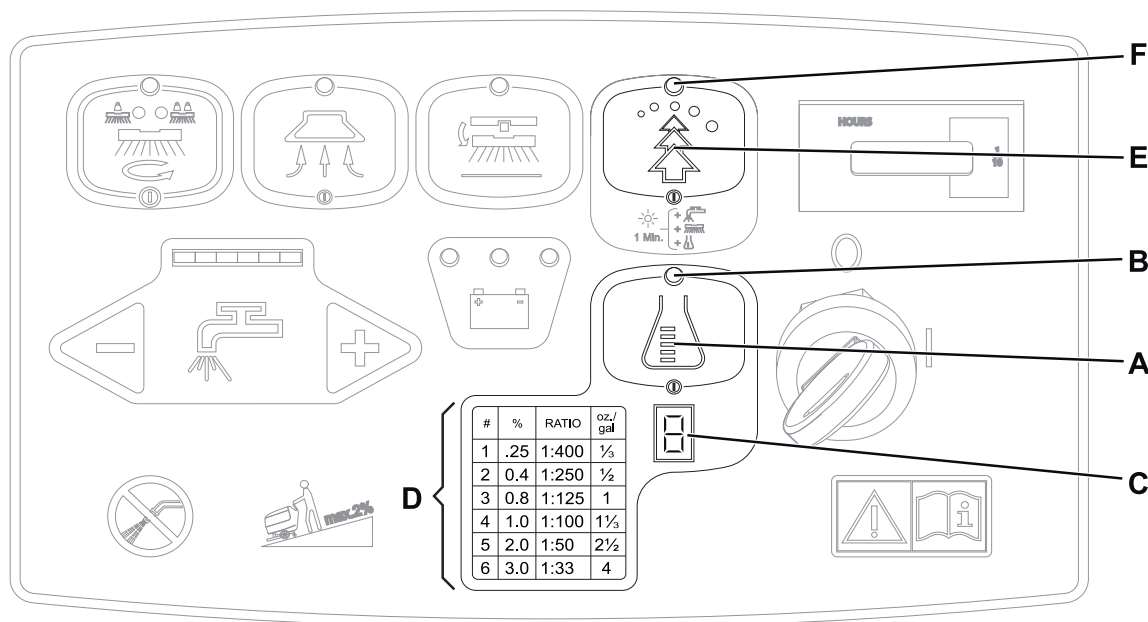


Figure 4

P100177

Working with brush/pad-holder extra pressure function turned on (only for BA 651, BA 751, BA 851)

If the floor proves to be particularly difficult to clean, it is possible to turn on the brush/pad-holder extra pressure function, according to the following procedure:

1. Press the switch (71) to lower the brush/pad-holder deck as shown in Starting The Machine paragraph.
2. Press and hold the switch (71) for more than 1 second. The extra pressure function activation is shown by the warning light (72) which turns from green to red.

To return to normal pressure, press and hold the switch (71) for more than 1 second.

To lift the brush/pad-holder deck without returning to the normal pressure, press the switch (71) and release it immediately.

**CAUTION!**

In case of brush/pad-holder motor overload, due to foreign bodies which prevent them from turning, or to excessively aggressive floors/brushes, the safety system stops the brushes/pad-holders after about one minute of continuous overload.

The overload is shown by the three warning lights (81a, 81b, 81c) flashing simultaneously.

If the overload takes place when the extra pressure function is on, the system automatically reduces the pressure on the brushes/pad-holders, thus turning the extra pressure function off.

If the overload persists, the brushes/pad-holders stop.

To start scrubbing again after a brush/pad-holder stop due to overload, stop the machine by turning the ignition key (80) to "0". Turn on the machine by turning the ignition key (80) to "I".

Battery discharge during operation

Until the green warning light (81a) stays on, the batteries allow the machine to work normally.

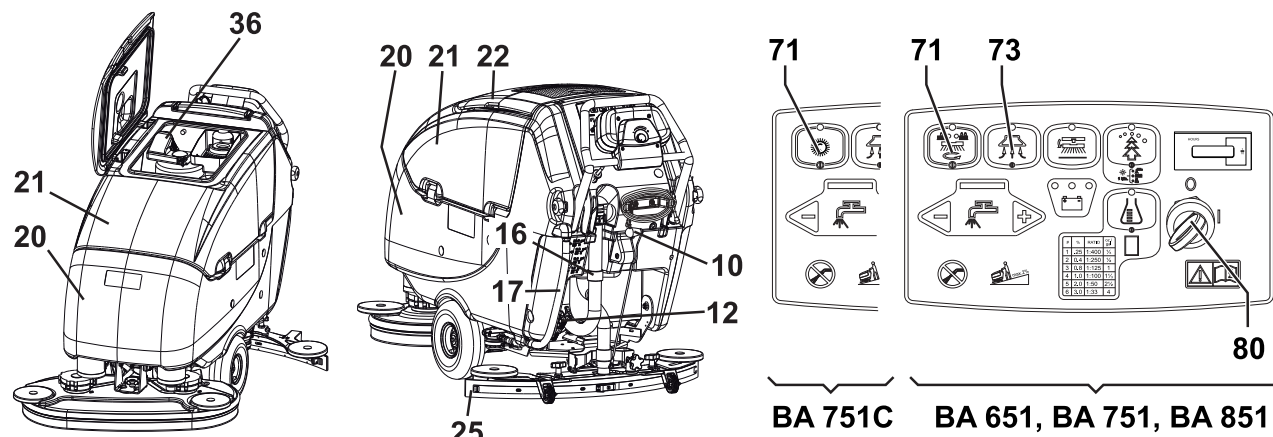
When the green warning light (81a) turns off, and the yellow warning light (81b) turns on, it is advisable to charge the batteries, because the residual autonomy will last for a few minutes (depending on battery characteristics and work to be performed).

When the red warning light (81c) turns on, the autonomy is over. After a few seconds the brushes/pad-holders automatically stop; only vacuum and drive systems still operate, just to dry the wet floor and move the machine to the appointed charging area.

**CAUTION!**

Do not use the machine with discharged batteries, to avoid damaging the batteries and reducing the battery life.

TANK EMPTYING



P100172D

An automatic float shut-off system (36) turns off the vacuum system when the recovery tank (21) is full.

The vacuum system deactivation is signalled by a sudden increase in the vacuum system motor noise frequency, and the floor is not dried.



CAUTION!

If the vacuum system turns off accidentally (for example, when the float is activated because of a sudden machine movement), to resume the operation: turn off the vacuum system by pressing the switch (73), then open the cover (22) and check that the float inside the grid (36) has gone down to the water level. Then close the cover (22) and turn on the vacuum system by pressing the switch (73).

When the recovery tank (21) is full, empty it according to the following procedure.

Recovery tank emptying

1. Lift the brush/pad-holder deck by pressing the switch (71).
2. Lift the squeegee (25) with the lever (10).
3. Drive the machine to the appointed disposal area.
4. Turn off the machine by turning the ignition key (80) to "0".
5. Empty the recovery tank with the hose (16). Then, rinse the tank with clean water.

Solution/clean water tank emptying

6. Perform steps 1 to 4.
7. Empty the solution tank with the hose (17). Then, rinse the tank with clean water.

Cylindrical brush debris container emptying (only for cylindrical brush deck)

8. Turn the ignition key (80) to "I".
9. Lower the cylindrical brush deck by pressing the switch (71).
10. Turn off the machine by turning the ignition key (80) to "0".
11. Lower the cylindrical brush deck and remove the debris container (D, Fig. 3) by pulling it on one side with the handle (E).
12. Empty and wash the debris container (D), and then install it by engaging it on the fasteners.

AFTER USING THE MACHINE

After working, before leaving the machine:

1. Remove the brushes/pad-holders and the cylindrical brushes as shown in the relevant paragraph.
2. Empty the tanks (20 and 21) according to the procedure shown in the relevant paragraphs.
3. Perform the daily maintenance procedures (see the Maintenance chapter).
4. Store the machine in a clean and dry place, with the brushes/pad-holders and the squeegee lifted or removed.

MACHINE LONG INACTIVITY

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

1. Perform the procedures shown in After using the machine paragraph.
2. Disconnect the battery connector (12).

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 correct 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!

The procedures must be performed with the machine off and the battery disconnected.

Moreover, read carefully the instructions in the Safety chapter before performing any maintenance procedure.

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.

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	Daily, after using the machine	Weekly	Every six months	Yearly
Battery charging				
Squeegee cleaning				
Brush/pad cleaning				
Recovery tank and debris tray cleaning, and cover gasket check				
EcoFlex™ system cleaning and draining (optional)				
Squeegee blade check and replacement				
Solution filter cleaning				
Vacuum system motor filter cleaning				
Battery (WET) fluid level check				
Screw and nut tightening check			(1)	
Check and adjustment of driving belts between motors and cylindrical brushes (only for BA 751C)			(2)	
Brush/pad-holder motor carbon brush check or replacement				(2)
Vacuum system motor carbon brush check or replacement				(2)
Drive system motor carbon brush check or replacement				(2)

(1) And after the first 8 working hours.

(2) This maintenance procedure must be performed by an authorised Nilfisk Service Center.

MACHINE WORKING HOUR CHECK

(Only if the machine is equipped with hour counter)

1. Turn the ignition key (80) to "I".
2. Press the switch (73) and read on the hour counter (79) the total number of working hours (scrubbing/drying) performed by the machine.
3. Press the switch (73) again.
4. Turn the ignition key (80) to "0".

BATTERY CHARGING



NOTE

Charge the batteries when the yellow or red warning light (81b or 81c) turns on, or at the end of every working cycle.



CAUTION!

Keeping the batteries charged make their life last longer.



CAUTION!

When the batteries are discharged, charge them as soon as possible, as that condition makes their life shorter. Check for battery charge at least once a week.



WARNING!

WET battery charging produces highly explosive hydrogen gas. Charge the batteries in well-ventilated areas and away from naked flames. Do not smoke while charging the batteries.

While charging the battery, always keep the tank assembly open.



WARNING!

Pay careful attention when charging the batteries as there may be battery fluid leakages. The battery fluid is corrosive. If it comes in contact with skin or eyes, rinse thoroughly with water and consult a physician.

Preliminary procedures

1. Open the cover (22) and check that the recovery tank (21) is empty, otherwise empty it with the drain hose (16).
2. Drive the machine to the appointed recharging area.
3. Turn the ignition key (80) to "0".
4. Grasp the handle (41) and carefully lift the tank (40).
5. For WET batteries only:
 - Check the level of electrolyte inside the batteries (52); if necessary, top up through the caps (53).
 - Then leave all the caps (53) open for battery charging.
 - If necessary, clean the upper surface of the batteries.
6. Charge the batteries according to one of the following procedures, depending on the presence of the battery charger (90).

Charging the batteries with an external battery charger

1. Check that the battery charger is suitable by referring to the Battery Charger Manual. The battery charger voltage rating is 24 V.
2. Disconnect the battery connector (12) and connect it to the external battery charger.
3. Connect the battery charger to the electrical mains.
4. After charging, disconnect the battery charger from the electrical mains and from the battery connector (12).
5. (For WET batteries only): Check the level of electrolyte inside the batteries and close all the caps (53).
6. Connect the battery connector (12) to the machine.
7. Grasp the handle (41) and carefully lower the tank (40).

Battery charging with (optional) battery charger installed on the machine

1. Connect the battery charger cable (6) to the electrical mains (the electrical mains voltage and frequency must be compatible with the battery charger values shown on the machine serial number plate (34)).
When the battery charger is connected to the electrical mains, all machine functions are automatically cut off.
The red warning light (81c) is on when the battery charger is charging the batteries.
2. When the green warning light (81a) turns on, the battery charging is completed.
3. When the battery charging is completed, disconnect the battery charger cable (6) from the electrical mains and wind it round its housing (7).
4. Grasp the handle (41) and carefully lower the tank (40).



NOTE

For further information about the operation of the battery charger (5), see the relevant Manual.

SQUEEGEE CLEANING



NOTE

The squeegee must be clean and its blades must be in good conditions in order to get a good drying.



CAUTION!

It is advisable to wear protective gloves when cleaning the squeegee because there may be sharp debris.

1. Drive the machine on a level floor.
2. Turn the ignition key (80) to "0".
3. Lower the squeegee (25) with the lever (10).
4. Loosen the handwheels (26) and remove the squeegee (25).
5. Disconnect the vacuum hose (15) from the squeegee.
6. Wash and clean the squeegee (Fig. 5). Clean the compartments (A, Fig. 5) and the hole (B) especially. Check the front blade (C) and the rear blade (D) for integrity, cuts and tears; if necessary replace them (see the procedure in the following paragraph).
7. Install the squeegee in the reverse order of removal.

SQUEEGEE BLADE CHECK AND REPLACEMENT

1. Clean the squeegee (Fig. 5) as shown in the previous paragraph.
2. Check that the edges (E) of the front blade (C) and the edges (F) of the rear blade (D) lay down on the same level, along their length; otherwise adjust their height according to the following procedure:
 - Remove the tie rod (G), disengage the fasteners (M) to adjust the rear blade (D); then engage the fasteners and install the tie rod.
 - Loosen the handwheels (I) and adjust the front blade (C); then tighten the handwheels.
3. Check the front blade (C) and rear blade (D) for integrity, cuts and tears; if necessary replace them as shown below. Check the front corner (J) of the rear blade for wear; if necessary, overturn the blade to replace the worn corner with an integral one. If the other corners are worn too, replace the blade according to the following procedure:
 - Disengage the tie rod (G), disengage the fasteners (M), remove the retaining strip (K) and replace/overturn the rear blade (D). Install the blade in the reverse order of removal.
 - Unscrew the handwheels (I) and remove the retaining strip (L), then replace the front blade (C). Install the blade in the reverse order of removal.

After the blade replacement (or overturning), adjust the height as shown in the previous step.

4. Connect the vacuum hose (15) to the squeegee.
5. Install the squeegee (25) and screw down the handwheels (26).
6. If necessary, adjust the squeegee balance adjusting handwheel (27).

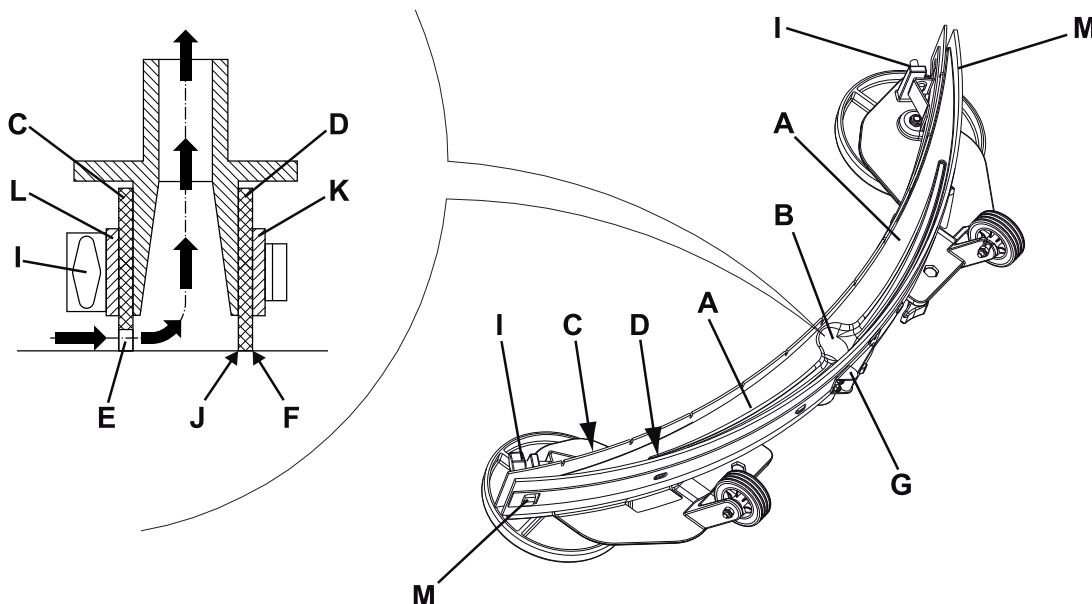


Figure 5

P100178

BRUSH/PAD CLEANING



CAUTION!

It is advisable to wear protective gloves when cleaning the brushes/pads because there may be sharp debris.

1. Remove the brushes/pads from the machine, as shown in Use chapter.
2. Clean and wash the brushes/pads with water and detergent.
3. Check the brushes/pads for integrity and wear; if necessary replace them.
4. On the machines equipped with the cylindrical brush deck, remove the debris container (D, Fig. 3) by pulling it on one side with the handle (E).
5. Empty and wash the debris container (D), and then install it by engaging it on the fasteners.

TANK AND VACUUM GRID WITH FLOAT CLEANING, AND COVER GASKET CHECK

1. Drive the machine to the appointed disposal area.
2. Turn the ignition key (80) to "0".
3. Open the cover (A, Fig. 6).
4. Drain the water from the tanks with the hoses (16 and 17).
5. Wash with clean water the cover (A), the tanks (B and C) and the vacuum grid with automatic shut-off float (D).
If necessary, release the fasteners (E) and open the grid (D), recover the float (F), clean all the components and then reinstall them.
6. Remove and clean the debris tray (M).
7. Check the tank cover gasket (G) for integrity.



NOTE

The gasket (G) creates vacuum in the tank that is necessary for vacuuming the recovery water.

If necessary replace the gasket (G) by removing it from its housing (H). When assembling the new gasket, install the joint (I) in the rear central area, as shown in the figure.

8. Check that the seating surface (J) of the gasket (G) is integral and adequate for the gasket itself.



NOTE

The hole (K), allowing to compensate the air in the cover air gap, contributes to create vacuum in the tank.

9. Close the cover (A).

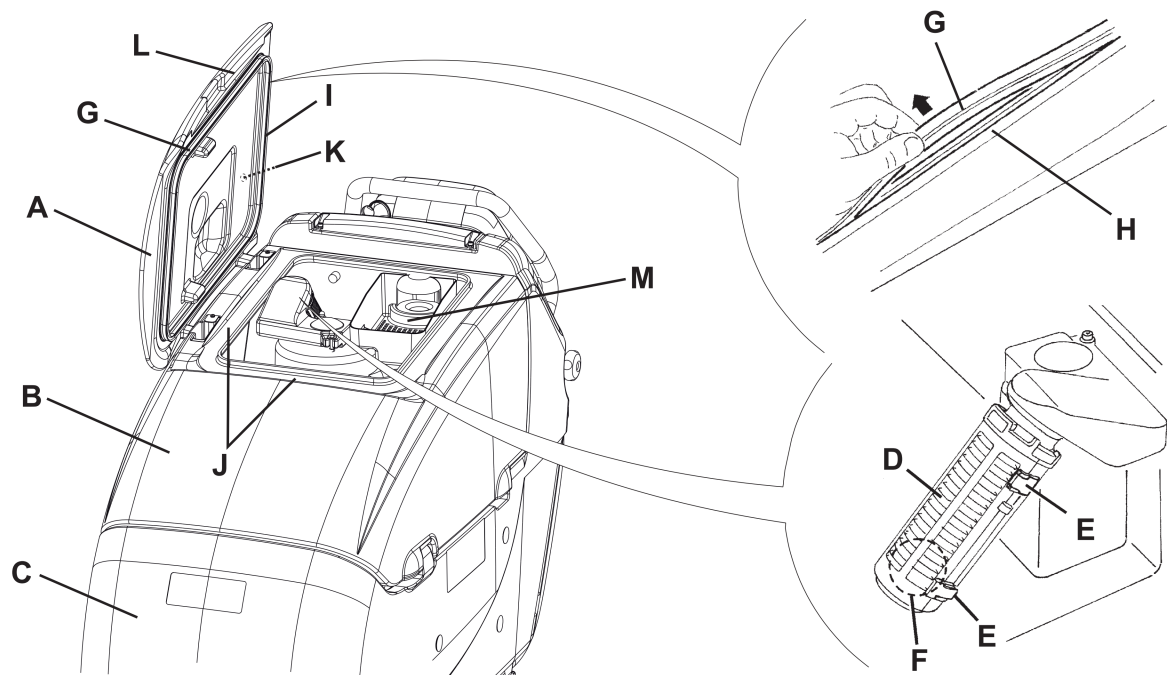


Figure 6

P100179

BRUSH/PAD-HOLDER/CYLINDRICAL BRUSH DECK DISASSEMBLY/ASSEMBLY

The machine can be equipped with either the brush/pad-holder deck (18) or the cylindrical brush deck (19).



NOTE

When the deck is installed/removed, it may be necessary to change the squeegee too, because they must have the same width. For correct matching of deck and squeegee, see the Squeegee Installation paragraph.

Disassembly

1. Drive the machine on a level floor.
2. Remove the brushes/pad-holders according to the procedure shown in the relevant paragraph. Do not remove the cylindrical brushes.
3. Turn the ignition key (80) to "I".
4. Lower the brush/pad-holder deck by pressing the switch (71).
5. Turn the ignition key (80) to "0".
6. Remove the safety pins (A, Fig. 7) and [for brush/pad-holder deck (18) only] the mounting pin (B).
7. Open the cover (22) and check that the recovery tank (21) is empty, otherwise empty it with the drain hose (16). Close the cover (22).
8. Grasp the handle (41) and carefully lift the tank (40) to reach the deck electrical connection.
9. Disconnect the red connector (C) and (for cylindrical brush deck only) the white connector (D).
10. Disconnect the solution hose union (E).
11. Unscrew the mounting handwheel (F), then remove the brush/pad-holder deck (G).

Assembly

12. Assemble the components in the reverse order of disassembly, and note the following:
 - When the cylindrical brush deck (19) is installed, the white connector (D) must be connected.
 - When the brush/pad-holder deck (18) is installed, fasten the lever with the pin (B).

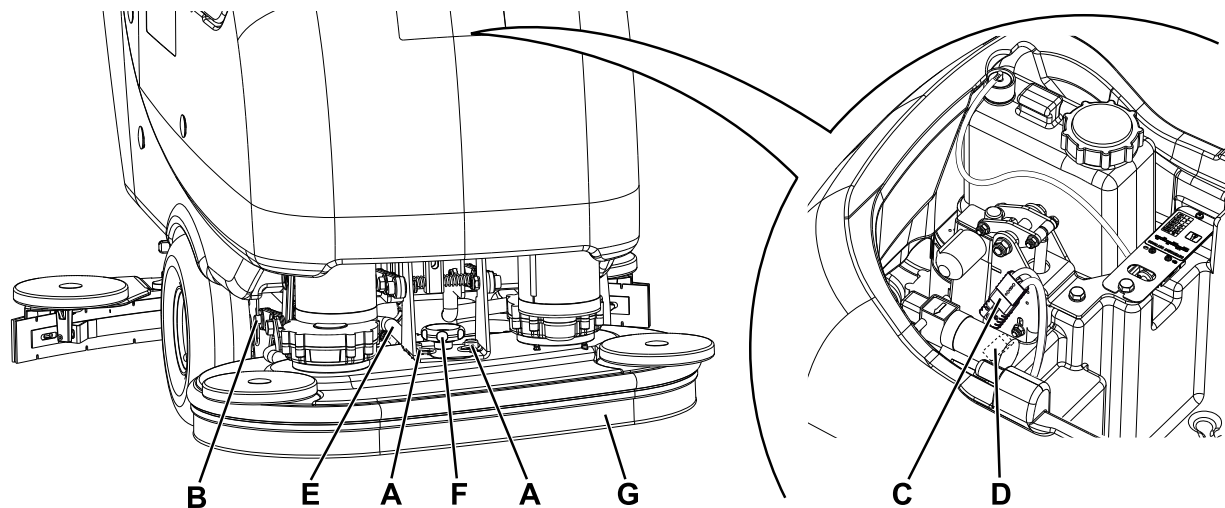


Figure 7

P100181

VACUUM SYSTEM MOTOR FILTER CLEANING

1. Drive the machine on a level floor.
2. Turn the ignition key (80) to "0".
3. Open the cover (22) and check that the recovery tank (21) is empty, otherwise empty it with the drain hose (16).
4. Grasp the handle (41) and carefully lift the tank (40).
5. Check that the pre-filter is clean. If necessary clean it with water and compressed air, then install it.
6. Perform steps 1, 2, 3 and 4 in the reverse order.

SOLUTION/CLEAN WATER FILTER CLEANING

1. Drive the machine on a level floor.
2. Turn the ignition key (80) to "0".
3. Close the solution tap (A, Fig. 8) under the machine, behind the left rear wheel.
The tap (A) is closed when it is in the position (B) and it is open when it is in the position (C).
4. Remove the transparent cover (D) and the gasket (E), then remove the filter strainer (F). Clean and install them on the support (G).



NOTE

Install the gasket (E) and the filter strainer (F) properly on the cover (D) and on the support (G).

5. Open the tap (A) by turning it to position (C).

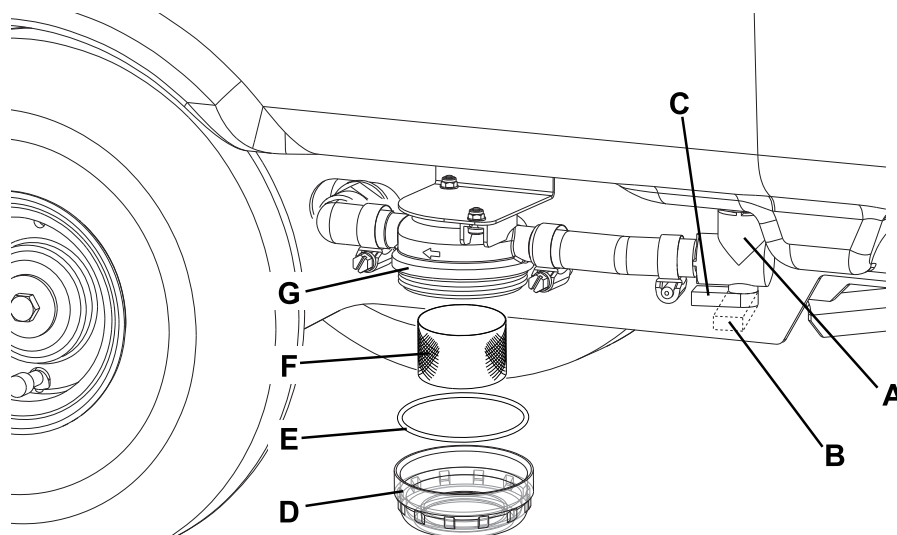


Figure 8

P100180

DETERGENT TANK CLEANING

(For machine with EcoFlex™ system)

Clean the detergent tank (45) according to the following procedure:

1. Drive the machine to the appointed disposal area.
2. Open the cover (22) and check that the recovery tank (21) is empty, otherwise empty it with the drain hose (16). Close the cover (22).
3. Grasp the handle (41) and carefully lift the tank (40).
4. Unscrew the plug (46) and disconnect the hose from the tank (45).
5. Remove the tank.
6. Wash the tank in the appointed disposal area.
7. Install the tank (45) and connect the hose.
8. When the detergent tank has been drained, the system must be drained too by running the system with clean water only (see the procedure in the following paragraph).

ECOFLEX™ SYSTEM DRAINING

(For machine with EcoFlex™ system)

1. Clean the detergent tank according to the procedure shown in the previous paragraph. To remove the detergent remained in the hoses and in the pump, perform the following procedure.
2. Grasp the handle (41) and carefully lower the tank (40).
3. Turn on the machine by turning the ignition key (80) to "I".
4. Turn on the system by pressing the switch (77). Check that the switch warning light (78) turns on.
5. Press the switches (77) and (82a) at the same time, until the switch warning light (78) starts flashing (after about 5 seconds).
6. Release the switches and wait for the warning light (78) to stop flashing and for the vacuum system to turn on.
7. Collect the detergent remained on the floor.
8. Turn the ignition key (80) to "0".
9. Grasp the handle (41) and carefully lift the tank (40), then check that the hose (48) is empty, otherwise perform steps 3 to 9 again.



NOTE

The draining cycle lasts about 30 seconds, then the vacuum function automatically turns on, which allows to remove the detergent remained.

The draining cycle can also be performed with the detergent tank (45) full of water, thus cleaning the system thoroughly. It is advisable to perform this type of draining to clean the system from dirt and deposits if the machine has not been used/cleaned for a long time.

The draining cycle can be performed also to quickly fill the detergent supply hose when the tank (45) is full but the system is still empty.

If necessary, the draining cycle can be repeatedly performed.

FUSE CHECK/REPLACEMENT

1. Disconnect the battery connector (12).
2. Move aside the recovery water drain hose (16).
3. Remove the battery charger cable (L, Fig. 9) from the cable holder (J).
4. Remove the screws (A) and carefully move aside the panel (B) by disengaging the grommet (K) from its housing on the panel (B).
5. Check/replace the following fuses:
 - C) Brush deck fuse F1: (50 A)
 - D) Vacuum system fuse F2: (30 A)
 - E) Drive system fuse F3: (60 A)
 - F) Signal circuits fuse F4: (3 A)
 - G) Brush/pad-holder release fuse F5: (20 A)
 - H) Pump fuse F6: (3 A)
 - I) Actuator fuse F7: (10 A)
6. Perform steps 1 to 4 in the reverse order.

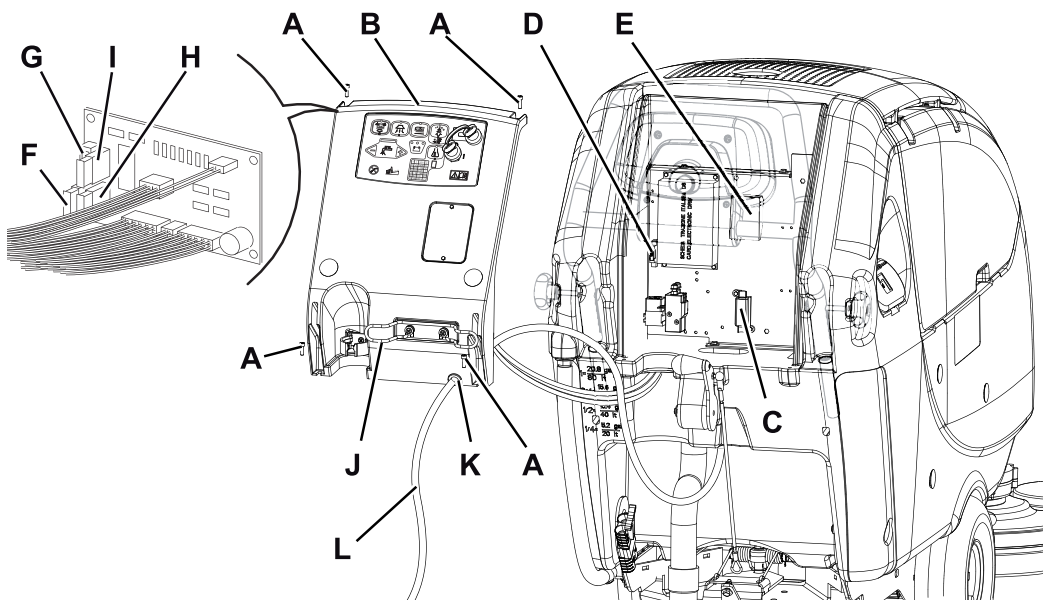


Figure 9

P100182

TROUBLESHOOTING

Trouble	Possible Cause	Remedy
The motors do not work; no warning light turns on.	The battery connector is disconnected.	Connect.
	The batteries are discharged.	Charge the batteries.
The machine does not move.	The machine has been turned on by using the ignition key (80) and by keeping the paddle (3) pressed.	Turn the ignition key (80) to "0", then try to start the machine without pressing the paddle (3).
The brushes do not work, the red warning light is on.	The batteries are discharged.	Charge the batteries.
The warning lights (81) flash simultaneously.	The brush motors are overloaded.	Use less aggressive brushes and/or avoid working with extra pressure turned on.
	There are foreign materials (tangled threads, etc.) preventing the brushes from rotating.	Clean the brush hubs.
The recovery water vacuuming is insufficient.	The recovery tank is full.	Empty the tank.
	The hose is disconnected from the squeegee.	Connect.
	The vacuum grid is clogged or the float is closing.	Clean the grid or check the float.
	The debris tray is clogged.	Clean.
	The squeegee is dirty, or the squeegee blades are worn or damaged.	Clean and check the squeegee.
	The tank cover is not properly closed, or the gasket is damaged.	Close the cover properly or replace the gasket.
The solution flow is insufficient.	The solution/clean water tap is closed.	Open the tap.
	The solution/clean water filter is dirty.	Clean the filter.
	Dirty/encrusted EcoFlex™ system tank (optional).	Drain.
The squeegee leaves marks on the floor.	There is debris under the squeegee blades.	Remove the debris.
	The squeegee blades are worn, chipped or torn.	Replace the blades.
	The squeegee is not balanced with the handwheel.	Adjust.



NOTE

If the machine has an optional battery charger installed, the machine cannot operate if the charger is not on board. In case of battery charger malfunction, contact an authorised Service Center.

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:

- Batteries
- Brushes/pads
- Plastic hoses and components
- Electrical and electronic components (*)

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