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Operations & Maintenance Manual
For Commercial Use Only



**BD 26/27 RIDE ON SCRUBBER
MODEL NO: 99772**

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Save These Instructions

NOTES

For warranty information go to www.tornadovac.com

**Within 30 days, to activate the warranty, go to;
<https://tornadovac.com/services/warranty-registration-form.aspx>**

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Your new Tornado unit is a high quality, precision-made product. All parts used in the manufacturing of this unit have passed rigid quality control standards prior to assembly. Please safeguard the original receipt / invoice. If you experience any problems with your unit during the warranty period, the original receipt / invoice will act as proof of purchase. Contact Tornado for any warranty inquiries.

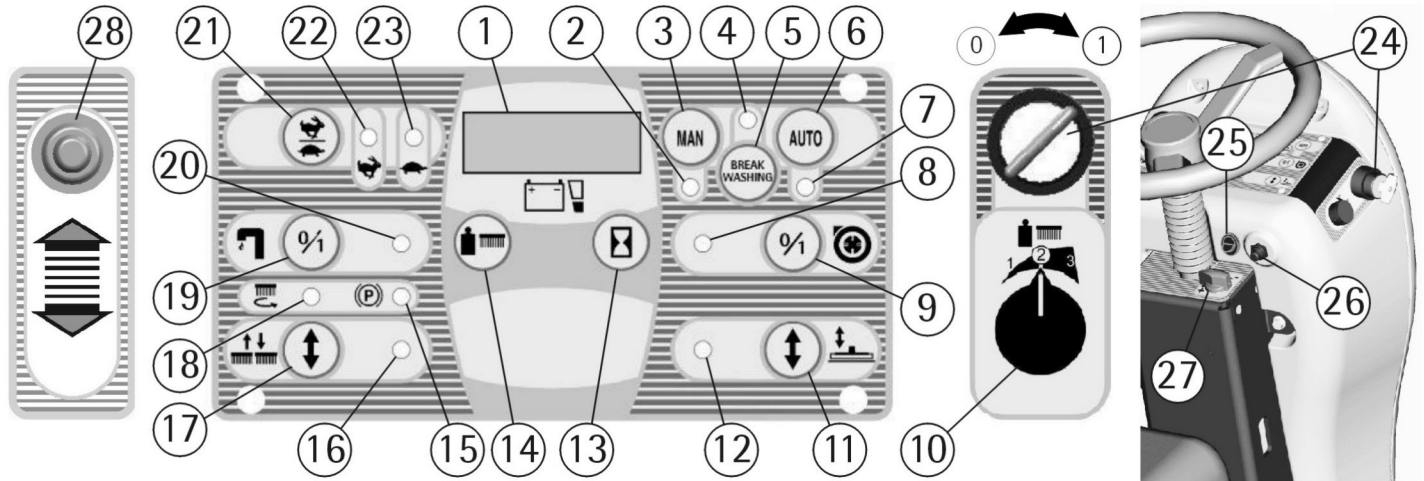
INTRODUCTORY COMMENT

This floor cleaning machine is used for the industrial and civil cleaning and is able to clean any type of floor. During its forward movement, the combined action of the brushes and the detergent solution removes the dirt which is aspirated through the rear suction assembly, giving a perfectly dry surface.

The machine must be used only for such purpose. It gives the best performance if it is used correctly and maintained in perfect efficiency. We therefore ask you to read this instruction booklet carefully whenever difficulties arise in the course of the machine’s use. In case of need, we ask you to contact our service department for all advice and servicing as may prove necessary.

TECHNICAL DESCRIPTION	U/M	BD 26/27
Cleaning width	in/mm	26/660
Squeegee width	in/mm	33/835
Working capacity, up to	sq.ft./h/sqm/h	35,521/3300
Brushes diameter	in/mm	2 x 14/345
Brushes rpm	rpm	190
Pressure on the brushes	lbs./kg	132/60 max
Brushes motor	A/W	27/650
Traction motor	A/W	25/600
Vacuum motor	A/W	24/580
Vacuum Motor	in/mbar	64/160
Type of drive		autom.
Movement speed	mph/km/h	3.1/5
Maximum gradient	%	10
Solution tank	gallon/l	26/100
Recovery tank	gallon/l	27/105
Machine length	in/mm	60/1520
Machine height	in/mm	52/1320
Machine width (without squeegee)	in/mm	29/730
Weight of the machine (empty and without batteries)	lbs./kg	525/238
Capacity of the batteries	Ah 5	240
Weight of the batteries	lbs./kg	441/200
Compartment of the batteries	in/mm	16x20.5x15/415x520x385
Acoustic pressure level	dB (A)	< 70
Class		III
Protection level	IP	23
Voltage	V	24

LEGEND PANEL OF CONTROLS	
1. DISPLAY	15. SIGNAL LAMP PARKING BRAKE ON
2. SIGNAL LAMP MANUAL MODE ON	16. SIGNAL LAMP UP/DOWN BRUSHES
3. PUSH BUTTON CONNECTION MANUAL MODE	17. PUSH BUTTON UP/DOWN BRUSHES
4. SIGNAL LAMP MODE BREAK WASHING ON	18. SIGNAL LAMP STARTING BRUSHES ROTATION
5. PUSH BUTTON CONNECTION MODE BREAK WASHING	19. PUSH BUTTON WATER OPENING SOLENOID VALVE
6. PUSH BUTTON CONNECTION MODE AUTOMATIC	20. SIGNAL LAMP WATER OPEN (SOLENOID VALVE)
7. SIGNAL LAMP AUTOMATIC MODE ON	21. PUSH BUTTON FOR SPEED SELECTION
8. SIGNAL LAMP SUCTION MOTOR ON	22. SIGNAL LAMP SELECTION MAXIMUM SPEED
9. SWITCH SUCTION MOTOR	23. SIGNAL LAMP SELECTION SLOW SPEED
10. ADJUSTMENT KNOB BRUSHES PRESSURE	24. KEY SWITCH MACHINE ON
11. PUSH BUTTON UP/DOWN SQUEEGEE	25. SWITCH FOR FRONT LIGHT (OPTIONAL)
12. SIGNAL LAMP UP/DOWN SQUEEGEE	26. PUSH BUTTON HORN
13. PUSH BUTTON VISUALIZATION HOUR METER (DISPLAY)	27. KNOB FOR SOLUTION VALVE
14. PUSH BUTTON VISUALIZATION BRUSHES PRESSURE SET (DISPLAY)	28. SELECTOR DIRECTION OF DRIVE



LEGEND MACHINE

- | | | | |
|----|-------------------------------|----|---------------------------------|
| 1 | RECOVERY TANK | 11 | EXHAUST HOSE RECOVERY TANK |
| 2 | SOLUTION TANK | 12 | SQUEEGEE ASSEMBLY |
| 3 | SEAT | 13 | CONTROL PANEL |
| 4 | DRIVE WHEEL | 14 | ELECTRICAL LAYOUT COVER |
| 5 | CAP FOR DETERGENT SOLUTION | 15 | ACCELERATOR PEDAL |
| 6 | SUCTION HOSE | 16 | SOLUTION DRAIN PLUG |
| 7 | SUCTION COVER | 17 | DETERGENT SOLUTION OUTER FILTER |
| 8 | BLOCKING LEVERS SUCTION COVER | 18 | TRACTION MOTOR WHEEL |
| 9 | SQUEEGEE HOSE | 19 | BOTTOM PLATE |
| 10 | RECOVERY TANK HOSE PLUG | 20 | BRUSHES BASE GROUP |
| | | 21 | REAR WHEELS |



IMPORTANT SAFETY INSTRUCTIONS
READ AND UNDERSTAND ALL INSTRUCTIONS BEFORE USING THIS UNIT

Read and understand this owner's manual and all labels on the unit before operating. Safety is a combination of common sense, staying alert and knowing how your unit works. Use this unit only as described in this manual.

Use only manufacturer's recommended attachments. To reduce the risk of personal injury or damage to your unit use only Tornado recommended accessories.

GENERAL RULES OF SECURITY

The rules below have to be followed carefully in order to avoid damages to the operator and to the machine.

- Read the labels carefully on the machine. Do not cover them for any reason and replace them immediately if damaged.
- The machine must be used exclusively by authorized staff that has been instructed for its use.
- During the working of the machine, pay attention to other people and especially to children.
- In case of danger act immediately upon the emergency brake.
- Leaving the machine in parking position, take off the key and act upon the parking brake.
- Do not mix different detergents, avoiding harmful odors. - Signal the areas of moist floors with suitable signs.

Do not place any liquid containers onto the machine.- Storage temperature: between -13°F and 131° F (25°C and +55°C)..

- Perfect operating temperature: between 32°F and 104°F (0°C and 40°C).
- The humidity should be between 30 and 95%.
- Do not use the machine in explosive atmosphere.
- Do not use the machine as a means of transport.
- Do not use acidic solutions in such concentrations that could damage the machine and/or the persons.
- Do not use the machine on surfaces covered with inflammable liquids or dusts (for example hydrocarbons, ashes or soot).
- In case of fire, use a powder fire-extinguisher. Do not use water.
- Do not strike shelvings or scaffoldings, where there is danger of falling objects.
- Adapt the working speed to the conditions.
- Do not use the machine on areas having a higher gradient than the one stated on the number plate.
- The machine has to carry out simultaneously the operations of washing and drying. Different operations must be carried out in restricted areas prohibited to non-authorized personnel. Signal the areas of moist floors with suitable signs.
- If the machine does not work properly, check by conducting simple maintenance procedures. Otherwise, ask for technical advice to an authorized assistance center.

- Where parts are required, ask for ORIGINAL spare parts to the distributor and/or to an authorized dealer.
- Use only ORIGINAL brushes indicated in the paragraph RECOMMENDED BRUSHES .
- For any cleaning and/or maintenance operation take off the power supply from the machine.
- Do not take off the protections which require the use of tools to be removed.
- Do not wash the machine with direct water jets or with high water pressure nor with corrosive material.
- Every 200 working hours have a machine check through an authorized service department.
- In order to avoid scales on the solution tank filter, do not fill the detergent solution many hours before the machines' use.
- Before using the machine, check that all panels and coverings are in their position as indicated in this use and maintenance catalogue.
- Be sure the recovery tank is empty before lifting it.
- Restore all electrical connections after any maintenance operation.
- Provide for the scrapping of the material of normal wear following strictly the respective rules.
- When your machine has to stop activity, provide for the appropriate waste disposal of its materials, especially oils, batteries and electronic components, and considering that the machine itself has been, where possible, constructed using recyclable materials.

Symbol denoting the solution valve.



Indicates the solution valve lever. Indicates the signal lamp of the solenoid valve functioning.



Symbol denoting the brush.

Indicates the switch of the brush motor.



Symbol denoting the suction motor.

Indicates the switch of the suction motor.



Symbol denoting up – down of the squeegee.



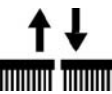
Indicates the squeegee lever.



Symbol denoting the selection switch of the driving speed.



Symbol denoting the selection switch of the driving speed.



Symbol that indicates the lever for the brush base lifting or the push button up/down brush base.



Symbol denoting the charge level of the batteries.



Symbol denoting the hour meter.

Indication of the maximum temperature of the solution detergent.



It is placed near the charging hole of the solution tank.

Symbol denoting the crossed bin. Indicates that at the end of its activity, the machine has to be disposed conforming to the laws in force.



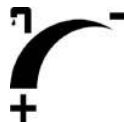
Symbol denoting the open book.



Indicates that the operator has to read the manual before the use of the machine.



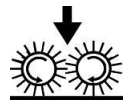
Warning symbol. Read carefully the sections marked with this symbol, for the security of both the operator and the machine.



Symbol denoting the functioning of the solution valve adjusting the flow of the detergent solution.



Symbol denoting the selection switch of the operation mode manual/automatic.



Symbol denoting the push button and the signal lamp up/down brushes.



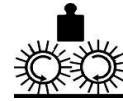
Symbol denoting the push button and the signal lamp of the break wash mode.



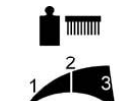
Symbol denoting the drive selector forwards/backwards.



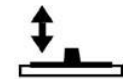
Symbol denoting the signal lamp of the starting of the brushes rotation.



Symbol denoting the push button to visualize on the display the brush pressure set.



Symbol denoting the functioning of the adjustment knob of the brush pressure.



Symbol denoting the push button and the signal lamp up/down of the squeegee.

BEFORE USE HANDLING OF THE PACKED MACHINE

The machine is supplied with suitable packing for fork lift truck handling.

The total weight is 591 lbs./268 kg.

Packing dimensions:

Base: 70"/178 cm x 37"/93 cm.

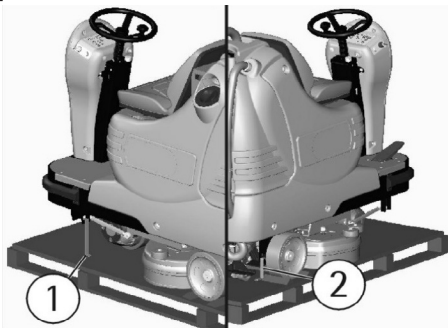
Height: 54"/138 cm.



ATTENTION:

UNPACKING OF THE MACHINE

1. Remove the external packing.
2. Unscrew the brackets (1+2) that secure the machine to the pallet.

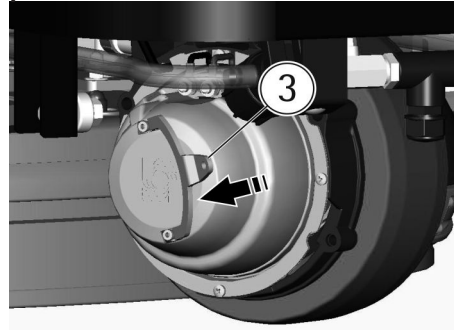


3. Before moving the machine from the pallet, it is necessary to unblock the parking brake that blocks the traction motor wheel. To do this, keep the lever (3) lifted. With the delivery of the machine we also supply a cord that permits the lever operation (3). After having moved the machine, take off the cord and keep it for eventual re-use.

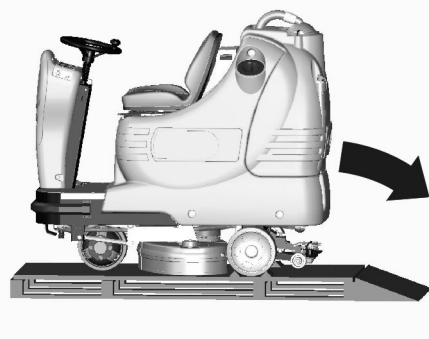


ATTENTION:

When the parking brake is released manually, for example when the machine has to be moved without batteries, avoid covering slopes and do not park on them either.



4. Move the machine backwards, as indicated in the figure, avoiding heavy contacts to mechanical parts.

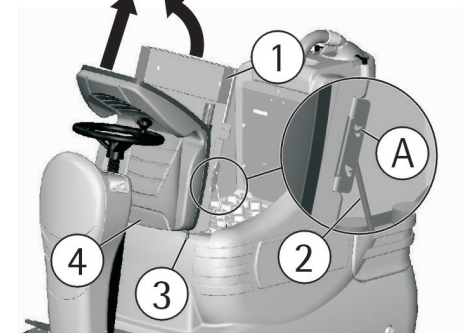


5. Keep the pallet and the brackets for eventual transport.
- ### ACCESS TO THE BATTERY COMPARTMENT
1. Bring the machine on a level surface.
 2. Rotate the seat platform forward and hook the bar. When the operation is finished close the battery compartment and reposition the seat platform.



To install a battery into the compartment it is necessary to :

1. Rotate the seat platform forward and hook the bar (2) into position A.
2. Remove the holder (1) by unscrewing the two wing nuts under the platform.
3. Pull the releasing lever of the seat outwards (3) sliding the seat (4) up to the highest position.



4. Rotate the platform further in order to hook the bar (2) into position B. This position allows batteries to be handled using suitable lifting equipment. In this way it will be possible to handle the batteries with suitable lifting equipment.

BATTERY INSTALLATION

The machine is equipped either with batteries in serial connection or elements of DIN-type assembled together and connected in series for a total of 24 Volt, placed in its appropriate compartment under the seat platform and must be handled using suitable lifting equipment (due to weight, considering the type of batteries chosen, and coupling system).

The batteries must be in accordance with CEI 21-5 Norms.



ATTENTION:

The machine and its battery check card foresee the use of traditional lead batteries.

CHECK THE SETTING OF THE CHECK CARD (see under paragraph "BATTERIES CHARGE LEVEL INDICATOR").

In case of GEL batteries installation, it is necessary to MODIFY THE SETTING of the electronic check card (see under paragraph SETTING OF THE BATTERY CHECK CARD").



ATTENTION:

Strictly follow manufacturer/distributor indications for the maintenance and recharge of the batteries. All installation and maintenance operations must be executed by specialized staff, using suitable protection accessories.

For batteries installation it is necessary to reach the battery compartment as indicated under paragraph "ACCESS TO THE BATTERY COMPARTMENT".

1. Place the batteries in its compartment.
2. Connect the terminals, respecting the polarities, avoiding contact with other parts that could create short circuit.

BATTERY CHARGER

Make sure that the battery recharger is suitable for the installed batteries both for their capacities and type (lead/acid or GEL and equivalent).

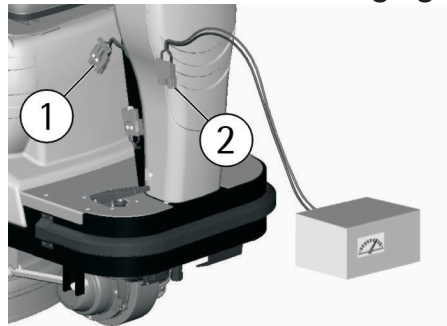


ATTENTION:

This operation must be carried out by qualified staff. A wrong or faulty cable connection can cause serious damages to persons or things.

BATTERIES RECHARGING

1. Plug the connector (2) of the battery recharger into the battery connector (1).
2. Proceed for the recharging.



ATTENTION:

Never charge a WET battery with a non-suitable recharger. Strictly follow the instructions supplied by the battery and recharger manufacturer.

In order not to cause permanent damage to the battery, it is necessary to avoid their complete discharge, providing for the recharging within a few minutes after that the battery discharge signal starts blinking.

NOTE: Never leave the battery completely discharged even if the machine is not used. In case of traditional battery, please check the electrolyte level every 20 recharging cycles and eventually top them up with distilled water. Never leave the battery discharged for more than two weeks.



ATTENTION:

For the recharging of the battery it is necessary to follow strictly all the indications given by the manufacturer/distributor. All the installation and maintenance operations must be carried out by qualified staff. Danger: gas exhalations and emission of corrosive liquids. Do not approach in case of fire.

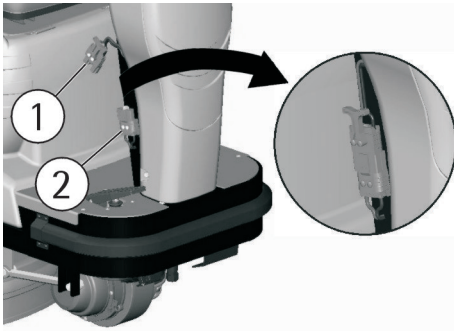
BATTERY DISPOSAL

Hand over exhausted battery, classified as dangerous waste, to an authorized institution according to the current laws.

CONNECTING BATTERY CONNECTOR AND SWITCHING ON THE MACHINE

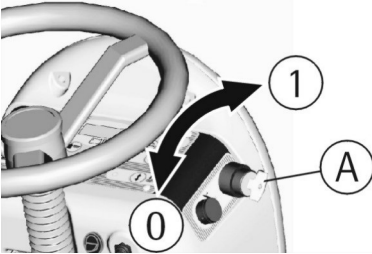
Once the battery recharging has been completed:

1. Disconnect the connector of the battery recharger from the battery connector (1).
2. Connect instead the machine connector (2).



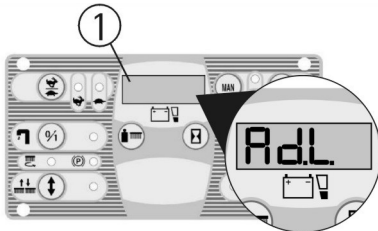
SWITCHING ON THE MACHINE

To start any function of the machine, rotate the key switch clock-wise. Rotating it counterclockwise will turn off all functions (see “LEGEND PANEL OF CONTROLS”).

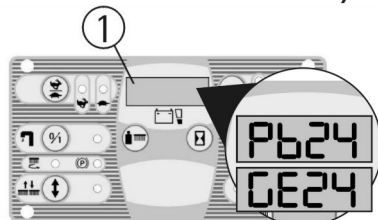


WHEN THE MACHINE IS SWITCHED ON, ON THE DISPLAY (1) APPEAR IN ORDER THE FOLLOWING INFORMATION:

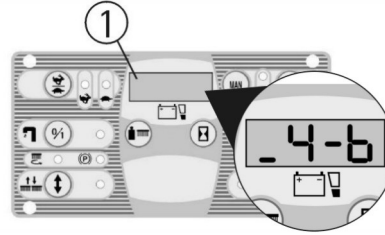
1. The machine model (for example AdL).



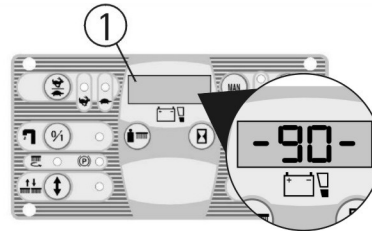
2. The setting of the battery check card which can be: GE 24 (check card set for AGM batteries). or Pb 24 (check card set for lead batteries).



3. The version of the software program of the card (for example 4-6).

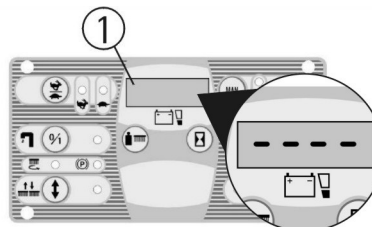


4. The batteries charge level indicator is digital and remains fixed on the display. The battery charge level starts from -100-, which indicates the 100% of the total charge and decreases from 100 to 10. When the charge level reaches -20-, the display starts blinking, so you are about the end of working.



ATTENTION:

When the indication -10- appears blinking, automatically the brushes stop, while the suction continues to work. When there are four lines blinking, the suction will also stop automatically. The traction system remains functioning to enable movement to transfer the machine to the place provided for the tank emptying and for the recharge of the batteries.



SETTING OF THE BATTERY CHECK CARD

The setting of the battery check card can be: GE 24 (check card set for AGM batteries) or Pb 24 (check card set for lead batteries).

The machine is supplied with the battery check card set for the installed batteries.

To modify this setting, it is necessary to:

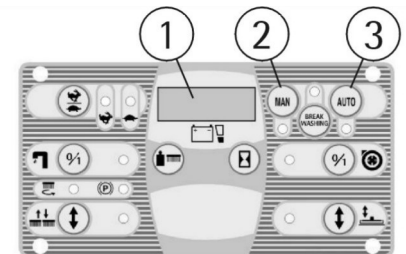
1. Switch the machine off and then back on.
2. Immediately after having switched on, when on the display (1) the writing Pb24 appears, press and hold the push buttons (2) and (3) until the display starts to blink.
3. When the display starts to blink, release the push buttons (2) and (3) and press once the push button (3).
4. The display 'GE24' starts to blink.
5. When the display stops blinking, the setting is modified.

To change from GEL to Lead-Acid, repeat the procedure pressing button (2) instead of button (3).



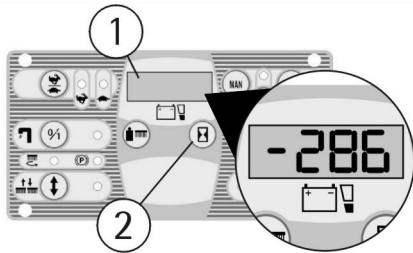
ATTENTION:

As the machine is a 24V model, do not set the batteries at 36V.



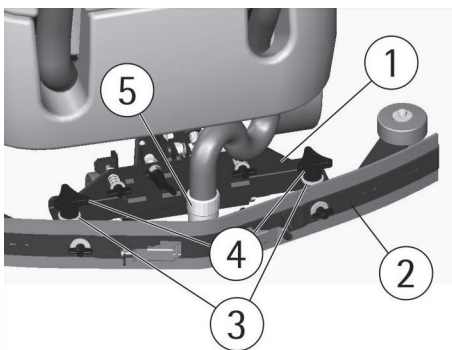
HOUR METER

The machine is equipped with an hour meter located on the same display (1) of the battery charge level indicator. Keeping the button (2) pressed, the first data indicates the working hours and after a few seconds the working minutes are shown.



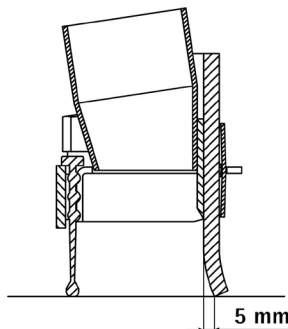
SQUEEGEE ASSEMBLY

1. Hold the squeegee support (1) lifted from the floor.
2. Insert the threaded parts of the two knobs (4) making them slide inside the two slots on the support placed on the upper part of the squeegee (2).
3. Put the washers (3) into position, there are two for each knob, so that they are assembled one under and the other on top of the two slots on the support.
4. Secure the squeegee by rotating the two knobs (4) clockwise.
5. Insert the squeegee hose (5) into its coupling, as indicated in the figure.



ADJUSTMENT OF THE SQUEEGEE

In order to have a perfect drying result through the squeegee, the rear rubber must have the lower bending uniformly adjusted in all its length. For the adjustment, it is necessary to put the machine in working condition and the vacuum motor has to be switched on and the brushes have to function together with the detergent solution.

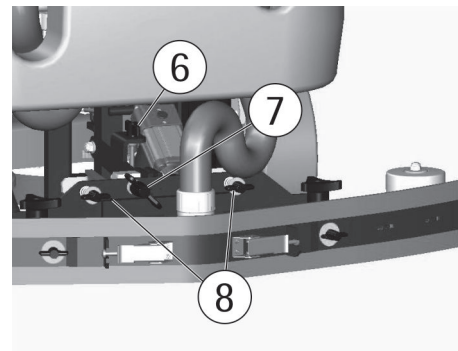


The lower part of the rubber is too much bent
Take off the pressure rotating the wing nut (6) counterclockwise.
The lower part of the rubber is not much bent
Increase the pressure rotating the wing nut (6) clockwise.
Check that the wheels which adjust the height do not rest on the floor, in this case adjust them as indicated in paragraph "Height adjustment".

The bending is not uniform
Adjust the squeegee inclination rotating counterclockwise the wing nut (7) to increase the bending in the central part, or clockwise to increase the bending on the extremities.

Height adjustment
Once the pressure and inclination of the squeegee have been adjusted, it is

necessary to fix this optimum condition making touch slightly the wheels onto the floor. Rotate the registers (8): clockwise to lower the wheels or counterclockwise to raise them. Both wheels must be adjusted in the same measure.



ATTENTION:

Every type of floor requires a specific adjustment. For example, concrete floors (where the friction results to be high) need little pressure, while smooth floors (ceramics) need higher pressure.
If the cleaning operations are made always on the same type of floor, the adjustment can change only in function of the rubber wear.

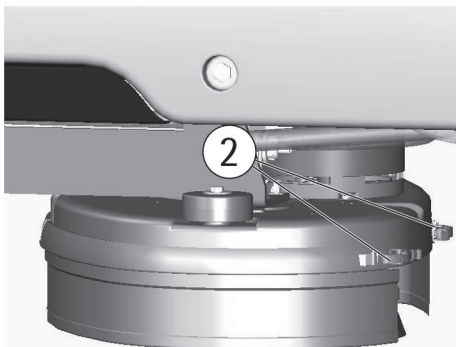
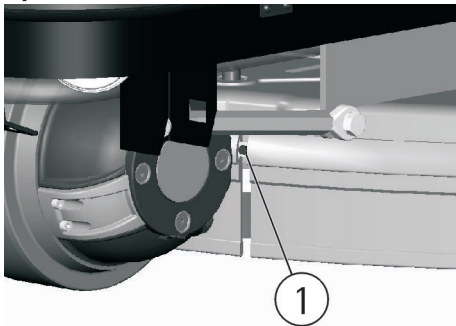
SPLASH GUARD ASSEMBLY

The two splash guards have to be assembled onto the brushes base group as indicated in the following figures. Insert the metal strips inside the suitable slots present on the rubber. Place the round hole at the extremity of the strip onto the pin (1) placed in the front part of the brushes base group. Secure the strips through the nut blocking it.

Block the coupling lever (2) in the rear part of the brushes base group to the ring placed at the extremity of the metal strip still free. Please act as above for both splash guard rubbers.

With the brushes assembled, the splash guard must slightly touch the floor.

For the disassembly it is necessary to proceed inversely with above-mentioned operations.



BRUSHES ASSEMBLY

To assemble the brushes it is necessary that the brushes base is in the lifted position. If it is not lifted, proceed as follows:

Without the operator seated, turning the key switch clockwise, the display comes on and after 3 seconds all working groups come off automatically and are lifted from the floor.

Switch off the machine turning the key counterclockwise. Spring until they get blocked. The figure shows the rotating direction for brushes coupling.



ATTENTION:

To carry out brushes assembly operations with the electric supply on, may cause damages to hands.

With the brushes base group in lifted position, insert the brushes into their plate seat underneath the brushes base turning them until the three metal buttons are properly seated in their slots; quickly rotate the brushes to push the button towards the coupling spring until they get blocked. The figure shows the rotating direction for brushes coupling.



For a longer life of the brushes we suggest to invert daily their position. Whenever brushes become de-formed we suggest to reassemble them in the same position, in order to avoid the different inclination of the bristles to cause excessive motor overload or troublesome vibrations.



ATTENTION:

Use only brushes supplied with the machine or the ones indicated in the paragraph "RECOMMENDED BRUSHES".

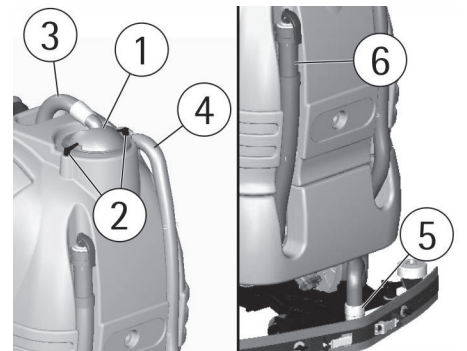
The use of other brushes can compromise the result.

FLOOR CLEANING

RECOVERY TANK

Check that the cover of the suction filter (1) is correctly secured, after rotating the levers (2) and that the suction motor hose (3) is correctly connected to it.

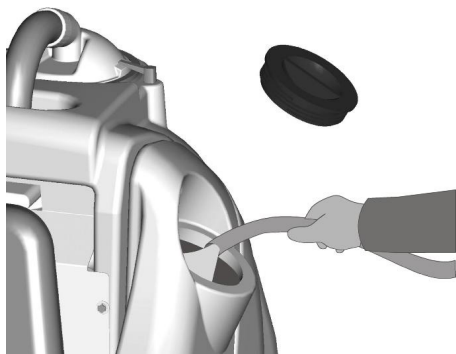
Verify also that the squeegee hose couplings (4/5) are correctly inserted into their seats and that the exhaust hose plug (6) placed in the rear part of the machine is well closed.



DETERGENT SOLUTION TANK

The capacity of the detergent solution tank is indicated in the technical data.

Open the screw plug placed in the left part of the machine and fill the detergent solution tank with clean water at a maximum temperature of 122°F (50°C). Add the liquid detergent in the percentage and conditions recommended by the manufacturer. To avoid excessive foam, which could cause problems to the vacuum motor, use the minimum percentage of detergent. Screw down the plug to close the tank.



ATTENTION:

Always use low foam detergent. To avoid foaming, before starting operations, introduce into the recovery tank a minimum quantity of anti-foam product. Never use pure acid.

STARTING THE MACHINE

A safety device avoids the machine's movement if the operator is not seated correctly on the guiding place. To switch on the machine:

1. Sit on the seat.
2. Turn the key switch (1) clockwise to switch on the machine. Automatically, the machine gets ready in manual (MAN) mode and in forward movement with the fast speed (signal lamp 2).
3. Check the charge level of the batteries on the display (3).
4. Pressing the push button (7) the functioning of BREAK WASHING is chosen and the transfer operations of the machine are carried out (see under paragraph "FORWARD AND BACKWARD MOVEMENT"). When the signal lamp (6) is on, then the machine is in BREAK WASHING mode.

5. Pressing the push button (8) the automatic (AUTO) functioning is chosen, while pressing the push button (5), the functioning of the machine becomes manual (MAN).

A. When the signal lamp (9) is on, the machine is functioning in automatic (AUTO) mode and the machine activates and deactivates all the working functions in an automatic mode (see under paragraph "WORKING IN AUTOMATIC MODE").

B. When the signal lamp (4) is on, the machine is functioning in manual (MAN) mode and it is possible to choose if:

I. To carry out the only transfer of the machine without activating or deactivating the working functions.

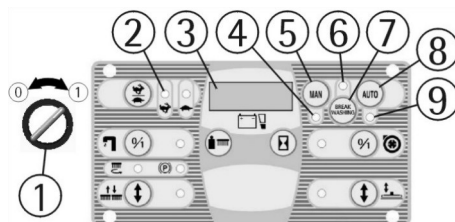
II. To activate separately only the controls relative to the washing function with the brushes (see under paragraph "WORKING IN MANUAL MODE").

III. To activate separately only the controls relative to the drying function with the squeegee (see under paragraph "WORKING IN MANUAL MODE").



ATTENTION:

In manual mode every function of the machine has to be activated or deactivated manually.

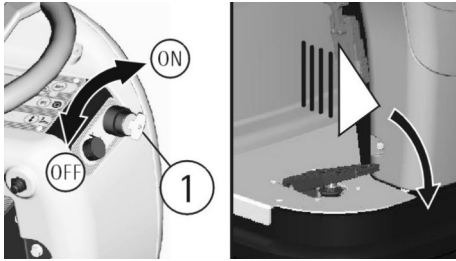
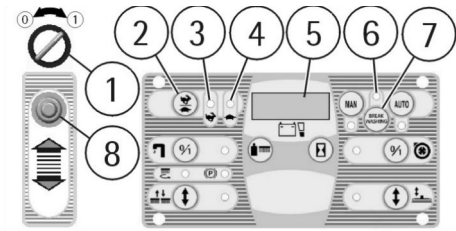


FORWARD AND BACKWARD MOVEMENT

It is recommended to always carry out the mere transfer of the machine in mode (BREAK WASHING).

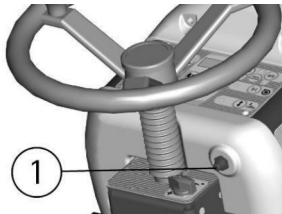
To proceed to activate the movement of the machine:

1. Sit on the seat.
2. Turn the key switch (1) clockwise to switch on the machine.
3. Check the charge level of the batteries on the display (5).
4. Pressing the push button (7) the functioning of BREAK WASHING is chosen to carry out the mere transfer of the machine. In fact, in this mode the washing functions of the machine are not working and only the traction system functions. When the signal lamp (6) is on, then the machine is in BREAK WASHING mode.
5. Positioning the selector (8) forward, the forward drive is chosen, while positioning it back, the reverse drive is chosen.
6. Press the accelerator pedal placed on the right part of the platform to start the machine.
7. Adjust the movement speed in forward pressing by push button (2) to choose the slow one (at the maximum 1.9 mph (3,6 km/h) is reached) or the fast one (at the maximum 3.1 mph (5 km/h) is reached). The signal lamp (3) indicates that the fast drive is selected, while signal lamp (4) indicates that the slow drive is selected.
8. In backward movement, when the machine is moving, an intermittent warning device is activated.



HORN

The machine is equipped with a horn which is activated pressing the push button (1). with the brake inserted, the lamp (2) comes on.



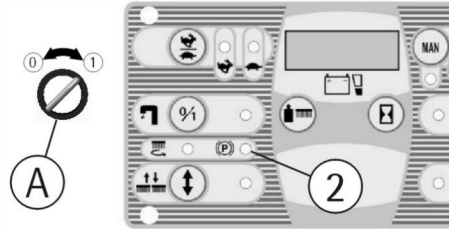
WORKING BRAKE

To stop the machine during normal working situations, it is sufficient to release the accelerator pedal, because the machine has an electronic brake system. To restart, press again the accelerator pedal.

PARKING BRAKE

The machine is equipped with a parking brake on the traction motor wheel that operates at the complete release of the accelerator pedal or when the machine is without batteries. In case of an emergency or simply to stop the machine, it is sufficient to release the accelerator pedal. The brake remains on until the accelerator pedal is pressed again.

When the batteries are connected and when the key switch (A) is positioned on 1, with the brake inserted, the lamp (2) comes on.



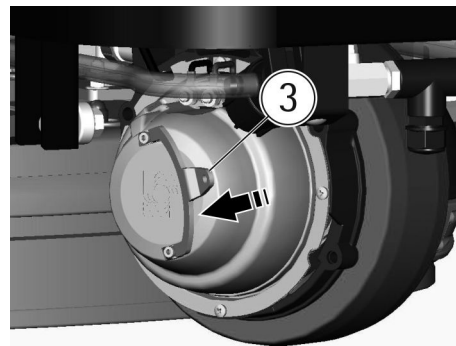
MANUAL MOVEMENT OF THE MACHINE

To move the machine manually, it is necessary to unblock the parking brake that blocks the traction motor wheel. To do this, keep the lever (3) lifted. With the delivery of the machine we also supply a cord that permits the lever operation (3). After having moved the machine, take off the cord and keep it for eventual re-use.



ATTENTION:

When the parking brake is released manually, for example when the machine has to be moved without batteries, avoid slopes and do not park on them either.



AUTOMATIC SQUEEGEE LIFTING WHEN GOING BACKWARDS

When the backwards movement is selected the squeegee is brought automatically to the upper position. It will then lower again in the following forward movement. This happens both in automatic and in manual mode in order to protect the integrity of the squeegee.

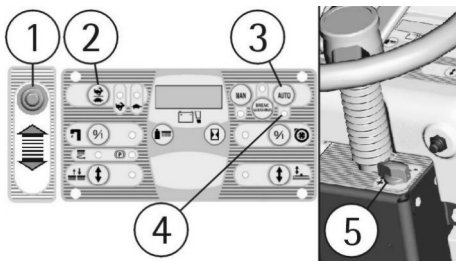
WORKING IN AUTOMATIC MODE

The automatic operation is useful to simplify the operator's work.

1. Activate the machine (see under paragraph "STARTING OF THE MACHINE").
2. Pressing the push button (3) the automatic (AUTO) functioning is chosen. When the signal lamp (4) is on, then the machine is functioning in automatic (AUTO) mode.
3. Check that the knob of the solution valve (5) is in the position of optimum flow, depending on the type of floor and the type of dirt (see under the paragraph "FLOW ADJUSTMENT OF THE DETERGENT SOLUTION").
4. Position the selector (1) forward to choose the forward drive.
5. Adjust the movement speed in forward with the push button (2) (see under paragraph "FORWARD AND BACKWARD MOVEMENT").

6. Pressing the accelerator pedal, the machine begins to move and in automatic mode all the working functions are activated. Automatically both the brushes base and the squeegee go down, the brushes begin to turn, the solenoid valve opens to permit the detergent solution to flow down onto the brushes and the suction system is activated to recover the dirty water from the floor.

Move the selector backwards (1) to choose the reverse drive and pressing the accelerator pedal the reverse drive starts, the squeegee lifts automatically and will then lower itself during the next forward movement. If the accelerator pedal is released for more than 3 seconds, automatically all the functions are switched off and both the brushes base and the squeegee are lifted. Pressing the pedal again, the machine starts to move again and in automatic mode all the working functions are reactivated.



WORKING IN MANUAL MODE

The manual mode is useful when, in special cases, it is necessary to carry out separately only the washing with the brushes or only the drying of the floor.



ATTENTION:

The washing and drying functions, when they are not carried out simultaneously, represent an improper use of the machine (see under paragraph "GENERAL RULES OF SECURITY"). If they are carried out separately, it is necessary to forbid the working areas to the passage of non-authorized personnel and to signal the areas of moist floors with suitable signs.

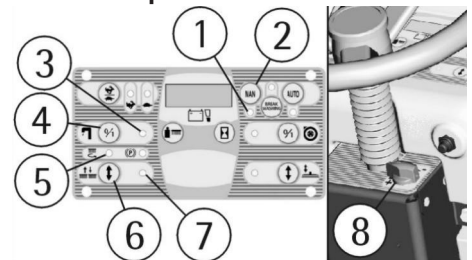
1. Activate the machine (see under paragraph "STARTING OF THE MACHINE").
2. Pressing the push button (2) the functioning of manual (MAN) mode is chosen. When the signal lamp (1) is on, then the machine is functioning in manual (MAN) mode.

TO CARRY OUT THE WASHING WITH ONLY THE BRUSHES:

1. Check that the knob of the solution valve (8) is in the position of optimum flow, depending on the type of floor and the type of dirt (see under the paragraph "FLOW ADJUSTMENT OF THE DETERGENT SOLUTION").
2. Press the push button (6) of up/down of the brushes base to lower the brushes.

Once it is lowered, the brushes begin to turn. The blinking signal lamp (7) indicates that the brushes base is lowering or lifting (it remains on when the brushes base is in working position), while the signal lamp (5) signals that the brushes are turning.

3. Press the switch (4) to open the solenoid valve and permit the detergent solution to lower onto the brushes. The signal lamp (3) will come on, to indicate that the solenoid valve is open.



TO CARRY OUT THE FUNCTION OF ONLY DRYING:

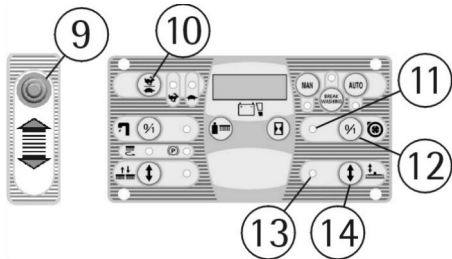
1. Press the push button (14) of up/down squeegee to lower the squeegee. The blinking signal lamp (13) indicates that the squeegee is lowering or lifting (it remains on when the squeegee is in working position).
2. Press the switch (12) of the suction motor to start the suction system. The signal lamp (11) indicates that the machine is drying.

Position the selector (9) forward to choose the forward drive. Adjust the movement speed in forward with the push button (10) (see under paragraph "FORWARD AND BACKWARD MOVEMENT"). Pressing the accelerator pedal, the machine begins to move forward and to work according to the set functions.



ATTENTION:

In manual mode every function of the machine has to be activated or deactivated manually.



WORKING ADJUSTMENTS

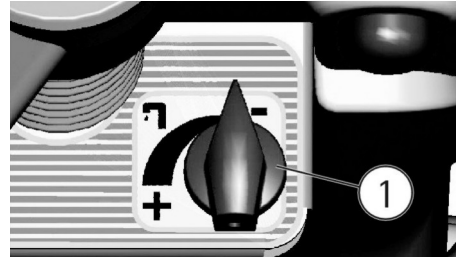
Both in automatic and in manual mode, during the first feet (metres) check:

1. that the squeegee adjustment guarantees a perfect drying result (see under paragraph "ADJUSTMENT OF THE SQUEEGEE").
2. that the adjustment of the detergent solution flow is sufficient to wet the floor uniformly avoiding the leakage of detergent from the splash guards (see under paragraph "FLOW ADJUSTMENT OF THE DETERGENT SOLUTION").
3. that the brushes pressure permits an efficient washing action in function of the dirt and the speed (see under paragraph "ADJUSTMENT OF THE BRUSHES PRESSURE").

FLOW ADJUSTMENT OF THE DETERGENT SOLUTION

To adjust the detergent solution quantity that flows down onto the brushes it is necessary to rotate the solution valve knob (1) placed on the right of the steering column, rotating counterclockwise to increase it and clockwise to reduce it

up to close the flow. It is better to adjust the water flow during work and at every adjustment of the brushes pressure.



ADJUSTMENT OF THE BRUSHES PRESSURE

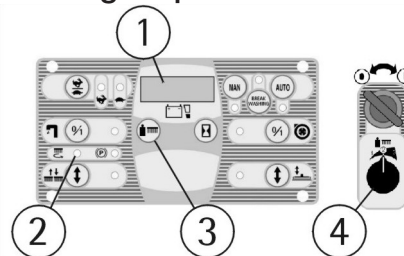
Through the knob (4) it is possible to adjust the brushes pressure onto the floor in three pre-set pressure levels. We can visualize on the display (1) the pressure in kg previously set by pressing the push button (3).

The adjustment occurs in this way both in automatic and in manual mode.



ATTENTION:

In order not to overload the brushes motor, it is convenient to reduce the brushes pressure going from smooth floors to rough ones (ex. concrete). The visualization of the blinking led (2) indicates an overload of the brushes motor. It is therefore necessary to reduce the pressure up to the level where the blinking warning stops.



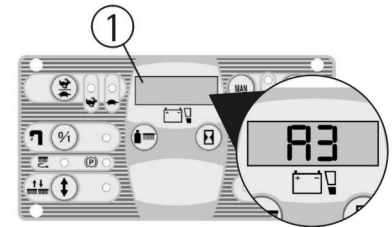
ELECTRIC PROTECTION

The machine is equipped with an electronic system of protection for all components that carry out functions of power or control. This device blocks the defective component and indicates on the display (1) the corresponding alarm from "A1", "A2" and on.



ATTENTION:

To restore the functioning of the component, turn off and on again the machine acting upon the key switch. If the problem persists, please contact the authorized technical assistance.



OVERFLOW DEVICE

In order to avoid serious damages to the suction motor, the machine is equipped with a mechanical float that intervenes when the recovery tank is full, closing the air flow of the suction. When this happens, it is necessary to empty the recovery tank (see under paragraph "RECOVERY TANK EMPTYING AND CLEANING").

STOP OF THE MACHINE AFTER CLEANING OPERATION

IN AUTOMATIC OR MANUAL WORKING MODE:

1. At the end of the washing cycle, pressing the push button (1), the functioning of BREAK WASHING is chosen. When the signal lamp (2) is on, then the machine then the machine is in BREAK WASHING mode. In this way automatically the brushes lift, the solenoid valve shuts down and it is possible to finish the drying operation for a total time of about 15 seconds, afterwards also the squeegee is lifted and the suction stops.

NOTE: all these phases are carried out with the machine operating, so that the squeegee can dry the cleaning area from the “drying phase of the brushes” and furthermore can dry the suction hose of its dirty water.

At any time it is possible to interrupt the procedure BREAK WASHING by stopping the drive.

2. During the phase of BREAK WASHING, when the accelerator pedal is released for more than 3 seconds, the squeegee raises itself and the suction switches off automatically.

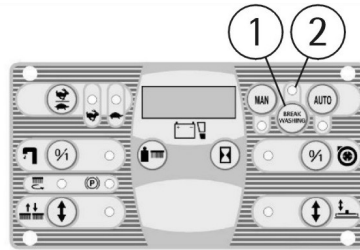
3. After three seconds, the accelerator can be pressed again, if a machine's transfer has to be made (you can make the transfer even if the pedal is not lifted once the 15 seconds have passed).

4. Turn the switch key counterclockwise to switch off the machine.



ATTENTION:

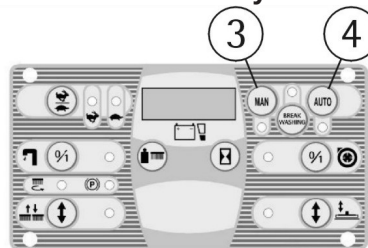
The mode (BREAK WASHING) is specific for the transfer at the end of the cleaning operation.



Re-start the cleaning operation:

A. by pressing the push button (4) the automatic (AUTO) functioning is chosen to start working in automatic mode.

B. by pressing the push button (3) the manual (MAN) functioning is chosen to start working in manual mode and all functions have to be re-established manually.



DAILY MAINTENANCE



ATTENTION:

All the following maintenance and cleaning operations that refer to the following components that are in contact with liquids and therefore:

- Solution and recovery tanks
- Solution and recovery filters
- Squeegee with their rubbers and hoses
- Brushes

must be carried out using gloves to protect from contact with dangerous solutions.

RECOVERY TANK EMPTYING AND CLEANING

1. Remove the exhaust hose (1) from the holding bracket.

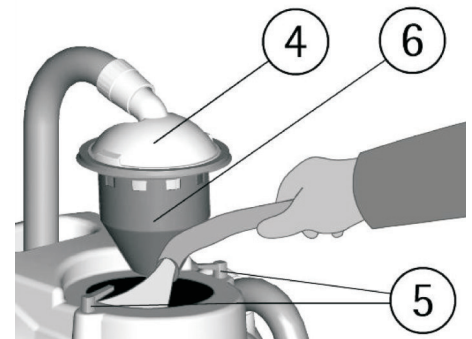
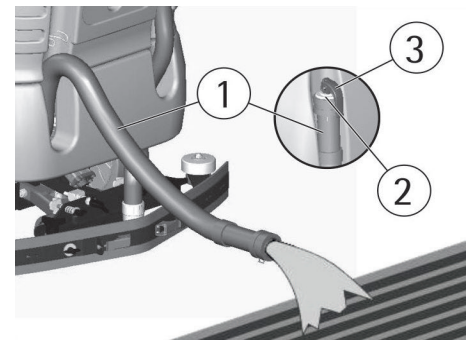
2. Remove the plug (2) from the exhaust hose by pulling on the lever (3) and empty the recovery tank into appropriate containers, in compliance with the respective rules.

3. Take off suction cover (4) after rotating the blocking levers (5).

4. Take off the filter and filter protection (6).

5. Rinse the inside of the tank with a water jet.

6. Reassemble all parts.



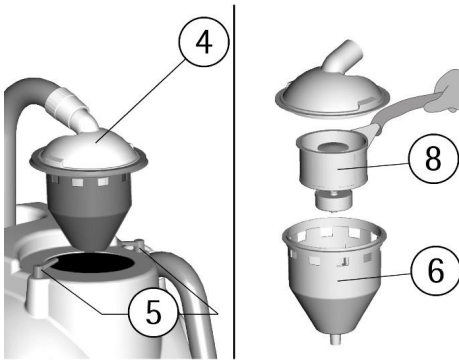
SUCTION FILTER CLEANING

1. Take off suction cover (4) after rotating the blocking levers (5).

2. Take off the filter (8) and the filter protection (6).

3. Clean all parts with a water jet, especially the inside surfaces and the filter bottom.

4. Reassemble all parts.



BRUSHES CLEANING

Disassemble the brushes and clean them with a water jet (for the brushes disassembly see under paragraph "BRUSHES DISASSEMBLY").

BRUSHES DISASSEMBLY

With the brushes base in lifted position (see under paragraph "BRUSHES ASSEMBLY"), rotate the brushes sharply in order to release the button from the coupling spring until it becomes free and wash them with a water jet. The figure shows the rotating sense for brushes release.



ATTENTION:

To carry out brushes disassembly operations with the electric supply on, may cause damages to hands.



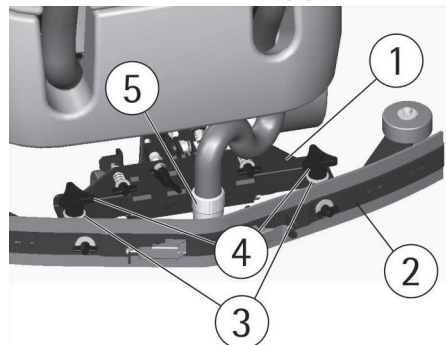
SQUEEGEE CLEANING

Keeping the squeegee clean guarantees the best drying result.

For cleaning it is necessary to:

1. Take off the squeegee hose (5) from the coupling.

2. Disassemble the squeegee (2) from its support (1) by loosening the knobs (4) counterclockwise.
3. Clean the internal part of the squeegee inlet.
4. Clean the squeegee rubbers.
5. Reassemble all parts paying attention to put the washers (3) into position, they are two for each knob, so that they are assembled one under and the other on top on each of the two slots on the support.



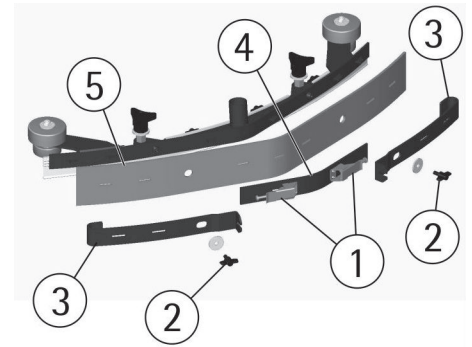
WEEKLY MAINTENANCE

REAR SQUEEGEE RUBBER CHECK

Check the squeegee rubber wear and turn or replace it if needed.

For the replacement it is necessary to:

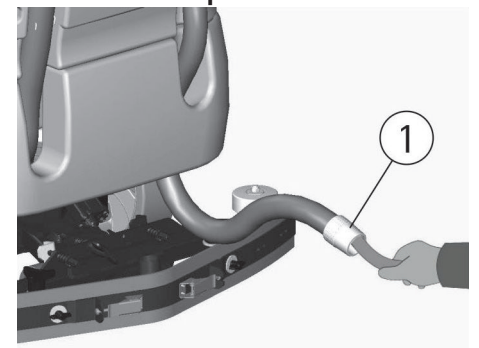
1. Lift the squeegee (see under paragraph "STOP OF THE MACHINE AFTER CLEANING OPERATION").
2. Unhook the latches (1).
3. Unscrew the wing nuts (2) to take off the terminals of the outer rubber holder blades (3) and then take off the central rubber holder blade (4).
4. Take off the rubber (5), turn it to a new side or replace it. To reassemble the squeegee reverse the operations.



SQUEEGEE HOSE CLEANING

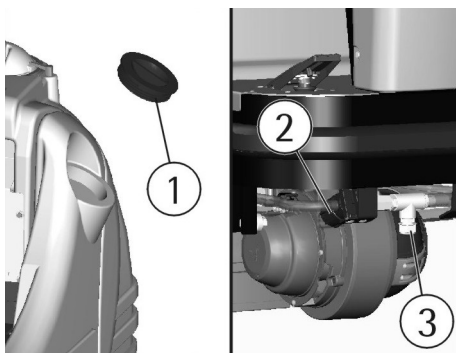
Weekly or in case of insufficient suction, it is necessary to check that the squeegee hose is not obstructed. To clean it, proceed as follows:

1. Take off the hose (1) from the squeegee coupling.
2. Wash the inside of the hose with a water jet.
3. To reassemble the hose reverse the operations.



CLEANING OF THE SOLUTION TANK AND OF THE OUTER FILTER

1. Bring the machine to an appropriate place for the detergent solution draining.
2. Unscrew the solution tank cap (1).
3. Unscrew the filter cap (2) and take off the filter. Be careful not to lose the gasket of the cap.
4. Unscrew the drain plug of the detergent solution (3).
5. Rinse the solution tank and the components of the filter with a water jet.
6. Reassemble all parts.

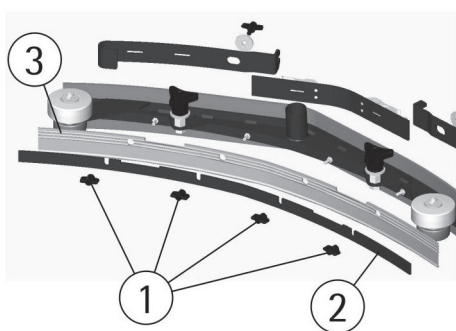


TWO-MONTH MAINTENANCE

FRONT SQUEEGEE RUBBER CHECK

Check the wear of the squeegee rubber and eventually replace it. For the replacement it is necessary to:

1. Take off the squeegee (see under paragraph "SQUEEGEE CLEANING").
2. Disassemble the rear part of the squeegee (see under paragraph "REAR SQUEEGEE RUBBER CHECK").
3. Unscrew the wing nuts (1) and take off the front rubber holder blade (2).
4. Replace the front rubber (3). To reassemble the squeegee reverse the operations.



SIX-MONTH MAINTENANCE

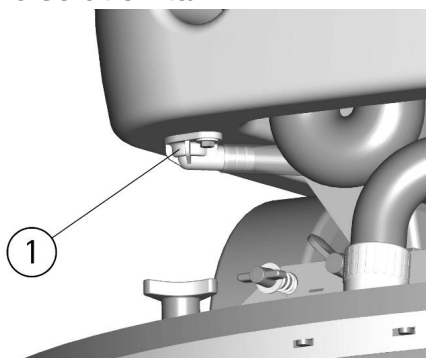
SPLASH GUARD RUBBER CHECK

With the brushes assembled, the splash guards must slightly touch the floor.

If they are worn, they have to be replaced. Just release the springs placed in the rear part of the brushes base group from the slots placed at the free ends of the metal strips to remove the rubbers and to reinsert the new ones (see under paragraph "SPLASH GUARD ASSEMBLY").

CLEANING OF THE INNER FILTER SOLUTION TANK

Empty the solution tank, remove the fitting (1) of the water outlet by taking off the two screws that fix it to the tank in the rear part of the machine. Clean the inside filter part of the fitting. Pour some water into the tank to clean it. Reassemble the fitting onto the solution tank.



TROUBLESHOOTING GUIDE

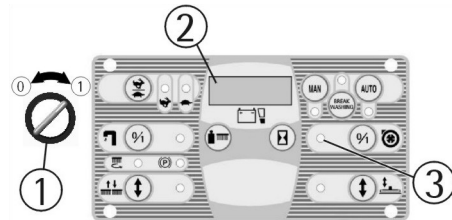


ATTENTION:

If, with the key switch positioned clockwise to switch on the machine the display and other functions are not activated, it is necessary to check the batteries' connection to the machine (see under paragraph "CONNECTION BATTERIES' CONNECTION AND SWITCHING ON OF THE MACHINE"). If the problem persists, please contact the authorized technical assistance.

THE VACUUM MOTOR DOES NOT WORK

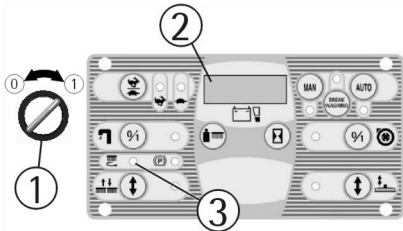
1. Verify that the key switch (1) is positioned clockwise to switch on the machine. If alarm signals are displayed, it is necessary to switch off and on again the machine to restore the functionality.
2. Check the charge level of the batteries on the display (2).
3. Verify having correctly activated the function of drying (see under paragraph "STARTING OF THE MACHINE").
4. Check that the recovery tank is not full.
5. If, both in mode (MAN) and (AUTO), the signal lamp (3) is on but the suction system does not work, please contact the authorized technical assistance.



THE BRUSHES MOTOR DOES NOT WORK

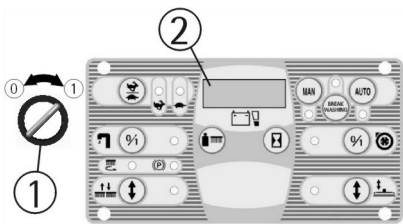
1. Verify that the key switch (1) is positioned clockwise to switch on the machine. If alarm signals are displayed, it is necessary to switch off and on again the machine to restore the functionality.
2. Check the charge level of the batteries on the display (2).
3. Verify of having correctly activated the function of washing with the brushes (see under paragraph "STARTING OF THE MACHINE").

4. If, both in mode (MAN) and (AUTO), the signal lamp (3) is on but the brushes do not turn, please contact the authorized technical assistance.



THE TRACTION MOTOR DOES NOT WORK

1. Sit on the seat.
 2. Verify that the key switch (1) is positioned clockwise to switch on the machine. If alarm signals are displayed, it is necessary to switch off and on again the machine to restore the functionality.
 3. Check the charge level of the batteries on the display (2).
 4. Press the accelerator pedal placed on the right side to start the machine.
- If the problem persists, please contact the authorized technical assistance.

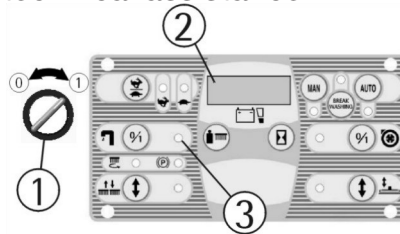


THE WATER DOES NOT COME DOWN ONTO THE BRUSHES OR IS INSUFFICIENT

1. Verify that the key switch (1) is positioned clockwise to switch on the machine.
2. Check the charge level of the batteries on the display (2).
3. Verify of having correctly activated the function of washing with the brushes (see under paragraph "STARTING OF THE MACHINE").

4. Check that the solution valve is open (see under paragraph "FLOW ADJUSTMENT OF THE DETERGENT SOLUTION").
5. If, both in mode (MAN) and (AUTO), the signal lamp (3) is on but the detergent solution does not come down onto the brushes, it is necessary to:
 - a. check the level of the liquid in the tank.
 - b. check that the solution filter is clean (see under paragraph "CLEANING OF THE SOLUTION TANK AND OF THE OUTER FILTER").
 - c. check that the inner filter of the solution tank is clean (see under paragraph "CLEANING OF THE INNER FILTER SOLUTION TANK").

If the problem persists, please contact the authorized technical assistance.



THE MACHINE DOES NOT CLEAN PROPERLY

1. The brushes do not have the suitable bristle dimension: contact the authorized technical assistance.
2. The brushes have got worn bristles. Check the brushes wear condition and eventually replace them (the brushes have to be replaced when the bristles have reached a height of about 1/2" (15 mm).

- To replace the brushes, see instructions under paragraph "BRUSHES DISASSEMBLY" and "BRUSHES ASSEMBLY".
3. The detergent solution is insufficient: further open the solution valve (see under paragraph "FLOW ADJUSTMENT OF THE DETERGENT SOLUTION").
 4. Check that the liquid detergent is in the recommended percentage.
 5. Increase the brushes base pressure (see under paragraph "ADJUSTMENT OF THE BRUSHES PRESSURE"). Contact the authorized technical assistance for advice.

THE SQUEEGEE DOES NOT DRY PERFECTLY

1. Check that the suction function is on and that the recovery tank is not full.
2. Check that the squeegee rubbers are clean (see under paragraph "SQUEEGEE CLEANING").
3. Check the adjustment of the height and the inclination of the squeegee (see under paragraph "ADJUSTMENT OF THE SQUEEGEE").
4. Check that the suction and the squeegee hoses are correctly inserted in their proper seats on the recovery tank.
5. Clean the suction filter (see under paragraph "SUCTION FILTER CLEANING").
6. Clean the squeegee hose (see under paragraph "SQUEEGEE HOSE CLEANING").
7. Turn of replace the rubbers if worn out.

EXCESSIVE FOAM PRODUCTION

Check that low foam detergent has been used. Add small quantities of anti foam liquid into the recovery tank. Please be aware that a bigger quantity of foam is produced when the floor is not very dirty. In this case please dilute detergent solution.

PROGRAMMED MAINTENANCE

INTERVENTION	DAILY	20 HOURS *	200 HOURS *	1000 HOURS *
RECOVERY TANK CLEANING	•			
SUCTION FILTER CLEANING	•			
SOLUTION TANK FILTER CLEANING		•		
BRUSH CLEANING	•			
BRUSH DISASSEMBLY AND CLEANING	•			
SQUEEGEE CLEANING	•			
FRONT SQUEEGEE RUBBER REPLACEMENT			•	
REAR SQUEEGEE RUBBER REPLACEMENT		•		
SPLASH GUARD RUBBER REPLACEMENT				•
CHECK SQUEEGEE ADJUSTMENT		•		
SQUEEGEE HOSE CLEANING		•		
SOLUTION TANK CLEANING		•		
CHECK BATTERIES ELECTROLYTE		•		
TRACTION MOTOR CHECK				•
BRUSH MOTOR CHECK				•
SUCTION MOTOR CHECK			•	
CHECK BRUSH BASE GROUP			•	
SCREW TIGHTENING				•

* The hours refer to the ones indicated on the display (see under paragraph "HOUR METER").

RECOMMENDED BRUSHES

Brushes must be chosen depending on type of floor and dirt to be removed. The employed material and the bristles diameter are the elements that distinguish different types of brushes.

MATERIAL	CHARACTERISTICS
PPL (Polypropylene)	Good wear resistance. Maintains characteristics with hot water up to 50°C. It is not hygroscopic.
NYLON	Excellent wear resistance, even with hot water. It is hygroscopic.
TYNEX	Nylon bristles with grains of abrasive material. Use with caution in order not to mark the floor or ruin the polishing.
BRISTLES THICKNESS	Thicker bristles are more rigid and must be used on smooth floor or floor with small joints. On irregular floors with deep joints or relieves, it is recommended to use softer bristles which penetrate more easily and deeper. Please be aware that when brush bristles are worn out and therefore too small, they become rigid and unable to penetrate and clean deeper. This may also happen with thicker bristles creating brush vibration.
PAD HOLDER	It is equipped with anchor points which permit the blocking of the abrasive pad during work. The pad is recommended to clean smooth floors.

MACHINE	CODE	QTY	DESCRIPTION	USE
BD 26/27	48903020	2	Brush PPL 0,6 Ø 345	Normal floors.
	48903030	2	Brush PPL 0,9 Ø 345	Smooth floors with small joints and persistent dirt.
	48903040	2	Brush TYNEX Ø 345	Floors of resistant material and particularly dirty.
	48903050	2	Brush 5-mix Ø 345	For all types of floors.
	48803010	2	Pad holder Ø 330	For pads of 14", for smooth surfaces cleaning.
	48803030	2	Pad holder Ø 330 + center lock green	For pads of 14", for smooth surfaces cleaning.
	48803040	2	Pad holder Ø 330 + center lock black	For pads of 14", for smooth surfaces cleaning.