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Operations & Maintenance Manual  
For Commercial Use Only



MODEL NO.  
**TS560-W28-U**

**GB**

**09 2023**

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Within 30 days of purchase, to activate product warranty, go to:

<https://tornadovac.com/services/warranty-registration-form.aspx>

For warranty information go to [www.tornadovac.com](http://www.tornadovac.com)

## INTRODUCTION

Thank you for having chosen our machine. This floor-scrubbing machine is designed for commercial use and is used for industrial and civil cleaning operations on any type of floor or paving. During forward motion, the combined action of the brush and of the detergent solution removes dirt, which is then collected by the rear suction unit, leaving the surface perfectly dry.

The machine must only be used for this aim. It performs at its best when used correctly and kept in efficient working order. Please read this user and maintenance manual carefully and store it for reference.

If necessary, please contact our technical support service.

**WARNING:** this machine is built for indoor use only.

**WARNING:** this machine must be put away only in closed environments.

## Contents

<b>INTRODUCTION .....</b>	<b>3</b>
<b>GENERAL SAFETY RULES .....</b>	<b>4</b>
Transfer .....	4
Storage and decommissioning .....	4
Correct use .....	4
Maintenance .....	4
Transporting the machine .....	4
<b>GENERAL RULES FOR BATTERIES .....</b>	<b>4</b>
<b>TECHNICAL DESCRIPTION.....</b>	<b>5</b>
<b>DISPLAY AND CONTROL PANEL LEGEND .....</b>	<b>6</b>
<b>MACHINE LEGEND .....</b>	<b>6</b>
<b>DISPLAY READING.....</b>	<b>7</b>
View upon switch-on .....	7
Software release.....	7
Controls display .....	7
Type of water system.....	7
Battery setting .....	7
<b>NAVIGATION CONTROLS .....</b>	<b>8</b>
General setting .....	8
Language selection .....	8
Display tune .....	8
Display brightness .....	8
<b>SYMBOLS IN THE MANUAL .....</b>	<b>9</b>
<b>OPTIONAL EQUIPMENT .....</b>	<b>9</b>
<b>BEFORE USE.....</b>	<b>10</b>
Handling of the packed machine.....	10
Unpacking and manual handling of the machine .....	10
Accessing the battery compartment .....	10
Installing the batteries.....	10
Battery charger.....	11
On-board battery charger (optional) .....	11
Battery charge indicator .....	11
Charging the batteries .....	11
Charging the batteries with the incorporated battery charger (optional) .....	11
Battery disposal.....	12
Mounting the squeegee.....	12
Adjusting the squeegee .....	12
Assembling and dismantling the splash guard.....	12
Mounting the brushes .....	13
<b>FLOOR CLEANING .....</b>	<b>14</b>
Connecting the battery connector and switching the machine on... 14	14
Recovery tank.....	14
Detergent solution tank.....	14
3S "solution saving system" (optional) .....	14
3SD "solution saving system dispenser" (optional) .....	14
Selecting the flow rate level – 3S and 3SD systems.....	15
Selecting the detergent percentage – 3SD system .....	15
Using the standard mode on a machine equipped with the 3SD "solution saving system dispenser" .....	15
Ozone selection (optional) .....	15
Selecting the Ozone function with the 3S or 3SD system (optional). 15	15
Work mode with ozone (optional) .....	15
<b>WORK .....</b>	<b>16</b>
Manual mode .....	16
Speed adjustment, forward and reverse motion .....	17
Adjusting the detergent solution flow.....	17
Work in automatic mode .....	17
Aspirator in silent mode .....	17
Stand-by mode .....	17
Hooter .....	18
Parking brake.....	18
Brush motor overload protection device.....	18
Overflow device .....	18
Water (H <sub>2</sub> O) reserve notice .....	18
<b>STOPPING THE MACHINE AFTER CLEANING .....</b>	<b>20</b>
Break washing mode .....	20
Emptying and cleaning the detergent tank (3SD) .....	20
<b>DAILY MAINTENANCE .....</b>	<b>20</b>
Emptying and cleaning the recovery tank .....	20
Emptying and cleaning the solution tank .....	20
Cleaning and suction filter .....	21
Automatic dismantling of the brush.....	21
Cleaning the brush.....	21
Cleaning the squeegee.....	21
<b>WEEKLY MAINTENANCE.....</b>	<b>21</b>
Checking the rear squeegee rubber element.....	21
Cleaning the squeegee pipe .....	21
<b>BIMONTHLY MAINTENANCE .....</b>	<b>22</b>
Inspecting the front squeegee rubber element .....	22
<b>HALF-YEARLY MAINTENANCE.....</b>	<b>22</b>
INSPECTING THE SPLASH GUARD RUBBER ELEMENTS .....	22
<b>OPERATION CHECK .....</b>	<b>22</b>
The suction motor is not working .....	22
The drive motor is not working.....	22
The solution does not descend onto the brush .....	22
The machine does not clean properly .....	23
The squeegee does not dry.....	23
Excessive foam production .....	23
Service warning .....	23
<b>SCHEDULED MAINTENANCE .....</b>	<b>24</b>
Routine periodic maintenance table .....	24
<b>SERIAL NUMBER PLATE KEY .....</b>	<b>25</b>
Understanding the serial number (Pos. 12) .....	25
Position of the serial number plate on the machine .....	25
Understanding the model number (Pos. 13).....	25

## GENERAL SAFETY RULES

The rules specified below must be followed carefully to prevent harm to the operator and damages to the machine.

- Carefully read the labels on the machine, do not cover them for any reason and replace them immediately if they get damaged.
- **WARNING:** the machine must only be used by authorised personnel.
- **WARNING:** the operators must be adequately instructed on how to use these machines.
- **WARNING:** the appliance is not intended for being used by people, including children, with reduced physical, sensory or mental abilities, or who lack adequate knowledge or experience.
- **WARNING:** do not use the machine on surfaces with a greater inclination than that indicated on the machine.
- During the machine's operation, watch out for other people, especially children.
- Children must be supervised to ensure that they do not play with the appliance.
- Children cannot perform cleaning and maintenance operations reserved for the user.

## TRANSFER

- **WARNING:** do not use the machine in areas where the operator is likely to get struck by falling objects, because the appliance is not equipped with any protective structure against falling objects (FOPS).
- Do not bump against scaffolding or shelving where objects may fall.
- Remove the key from the machine when parking it.
- Do not use the machine as a means of transport.
- Adapt the speed of use to the grip conditions: in particular, slow down before taking tight bends.

## STORAGE AND DECOMMISSIONING

- Storage temperature: between 0°C and +55°C (32°F and 131°F).
- Optimal work temperature: between 0°C and +40°C (32°F and 104°F).
- The humidity must not exceed 95%.
- Dispose of consumables by strictly complying with the applicable laws.
- The batteries must be removed from the machine before it is scrapped.
- When your machine reaches the end of its life, appropriately dispose of the materials contained in it, especially oils, batteries and electronic components; bear in mind that the machine was built, as far as possible, using recyclable materials.

## CORRECT USE

- Do not use the machine on surfaces covered by flammable liquids or powders (for example hydrocarbons, ash or soot).
- In case of fire use suitable fire extinguishers. Do not use water.
- Do not use the machine in an explosive atmosphere.
- The machine must perform washing and drying operations simultaneously. Different operations must be carried out in zones with access forbidden to unauthorised people and the operator must wear adequate footwear.
- Signal damp zones of the floor using appropriate signs.
- Do not mix different types of detergents to avoid producing hazardous gases.
- Do not let the brush work with the machine stationary to avoid damaging the floor.

## MAINTENANCE

- When the machine evidences operating anomalies, make sure that these do not derive from lack of routine maintenance. If this is the case, contact the authorised technical support centre.
- Before every cleaning and/or maintenance operation, disconnect the power supply from the machine.
- If any parts must be replaced, request ORIGINAL spare parts from a dealer and/or authorised retailer.
- Only use ORIGINAL brushes.
- Do not remove any protections that require the use of tools for being removed.
- Do not wash the machine with direct water jets or power washes, or with corrosive substances.
- Have the machine checked by an authorised technical support centre every 200 hours of operation.
- Before using the machine, verify that all the doors and covers have been positioned as shown in this user and maintenance manual.
- Restore all electrical connections after every maintenance intervention.

## TRANSPORTING THE MACHINE

**WARNING:** before transporting the machine on a lorry or open trailer, make sure that:

- All the tanks are empty.
- The cover of the recovery tank is firmly locked.
- The machine is firmly tied.
- The machine's electromagnetic brake is engaged (not released manually).

## GENERAL RULES FOR BATTERIES



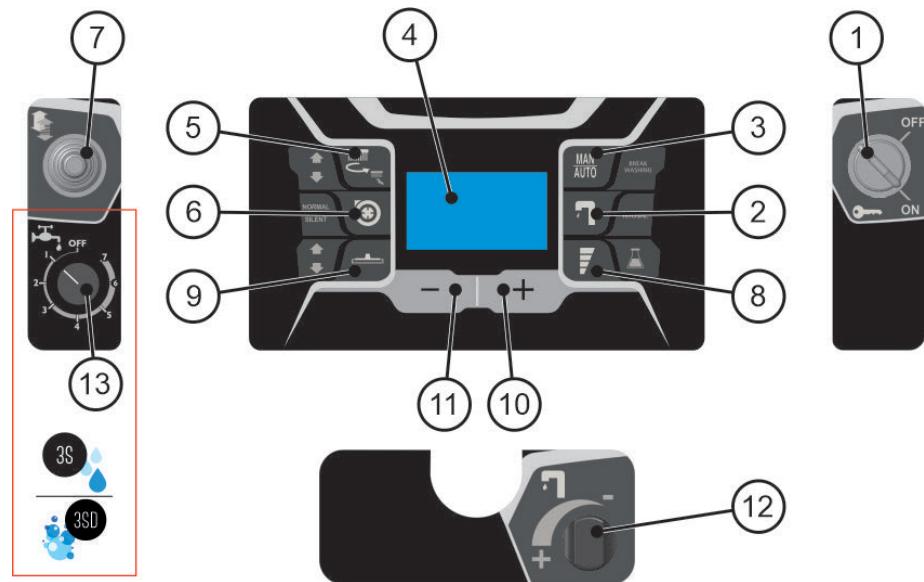
- Whenever you intervene on the batteries, wear gloves resistant to acids and safety glasses.
- Do not smoke and do not use open flames near the batteries.
- Verify whether there is a suitable fire extinguisher nearby.
- Be very careful in case of liquid leakages or spills, as the liquid is corrosive.
- Do not place metal tools on the batteries as this may trigger a short circuit!
- Worn-out batteries, which are classified as hazardous waste, must be delivered to an authorised body that complies with the waste disposal laws.

## TECHNICAL DESCRIPTION

Working width .....	in	28
Squeegee width .....	in	34
Cleaning capacity up to .....	sq.ft/h	37.673
Brush diameter .....	in	2x 14
Brush revolutions .....	rpm	160
Pressure on the brushes .....	lbs	132
Brush motors .....	W	2x 350
Suction motor .....	W	580
Suction motor negative pressure .....	mbar	160
Drive motor .....	W	600
Type of drive .....		automatic
Maximum gradient .....	%	10
Solution tank capacity .....	gal	26,4
Solution tank reserve capacity .....	gal	2,64
Detergent tank capacity (optional 3SD) .....	gal	1,84
Recovery tank capacity .....	gal	27,7
Machine length .....	in	60
Machine length (with optional 3SD) .....	in	62
Machine height .....	in	52
Machine width (without squeegee) .....	in	30
Machine weight (no-load and without batteries) .....	lbs	507
Gross machine weight (in conformity to EN 60335-2-72 Art. 5.z102) .....	lbs	1334
Battery voltage .....	V	24
Battery capacity .....	Ah <sub>5</sub>	240
Battery compartment dimensions .....	in	21 x 16 x 15
Sound pressure level (in conformity to EN 60335-2-72 Art. 60704-1) LpA .....	dB	/
Hand vibration level .....	m/s <sup>2</sup>	/
Uncertainty k .....	m/s <sup>2</sup>	/
Class .....		III
Protection rating .....	IP	23
Weight of packed machine .....	lbs	573
Packaging dimensions (WxDxH) .....	in	70 x 37 x 54

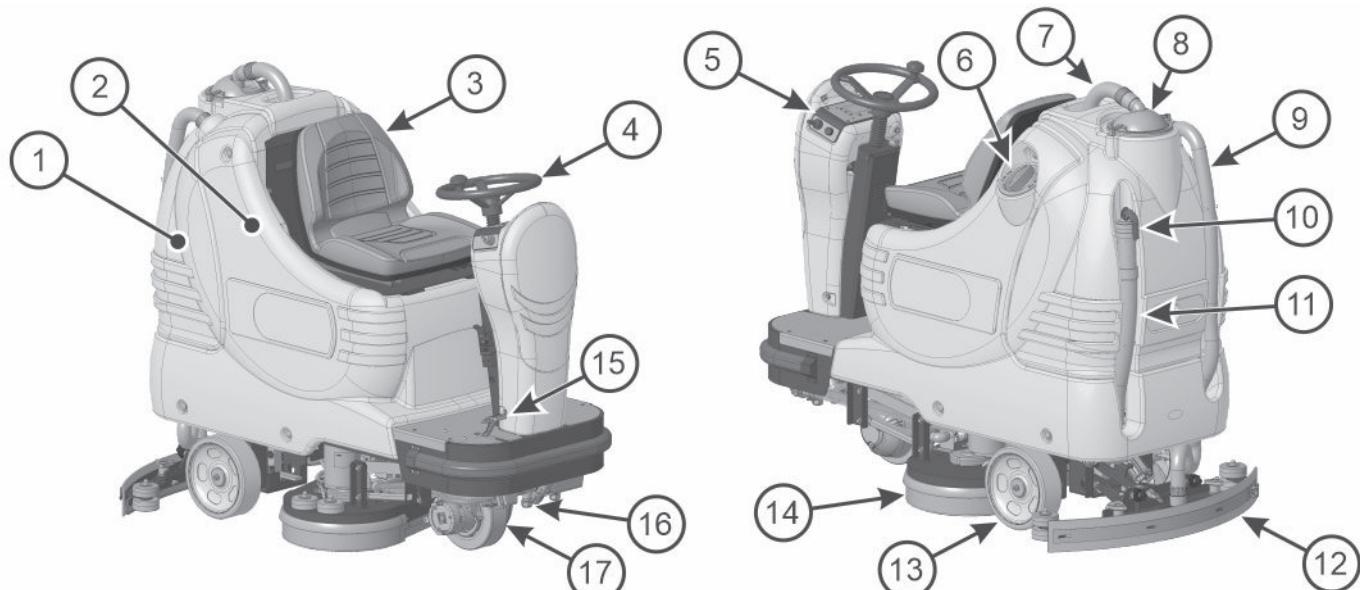
## DISPLAY AND CONTROL PANEL LEGEND

1. OFF/ON KEY SWITCH
2. WORK MODE SELECTION/SOLENOID VALVE ON BUTTON
  - STANDARD
  - 3S
  - 3SD
3. WASHING MODE SELECTION BUTTON:
  - AUTOMATIC
  - MANUAL
  - BREAK WASHING
4. DISPLAY
5. BRUSH UP/DOWN AND BRUSH DETACH BUTTON
6. SUCTION MOTOR BUTTON
  - ON/OFF
  - SILENT MODE
7. FORWARD/BACK MOTION JOYSTICK
8. DETERGENT LEVEL BUTTON (3SD ONLY)
9. SQUEEGEE UP/DOWN BUTTON
10. MAXIMUM SPEED / DETERGENT LEVEL INCREASE BUTTON
11. MAXIMUM SPEED / DETERGENT LEVEL REDUCE BUTTON
12. SOLUTION FLOW REGULATION VALVE (STANDARD/3S ONLY)
13. SOLUTION FLOW REGULATION SELECTOR (3S/3SD ONLY)



## MACHINE LEGEND

1. RECOVERY TANK
2. SOLUTION TANK
3. SEAT
4. STEERING WHEEL
5. DASHBOARD AND CONTROLS
6. SOLUTION LOADING CAP
7. SUCTION PIPE
8. SUCTION UNIT COVER
9. SQUEEGEE PIPE
10. DISCHARGE CAP
11. RECOVERY TANK DISCHARGE PIPE
12. SQUEEGEE ASSEMBLY
13. REAR WHEELS
14. BRUSH BASE ASSEMBLY
15. ACCELERATOR PEDAL
16. SOLUTION DISCHARGE CAP
17. TRACTION WHEEL



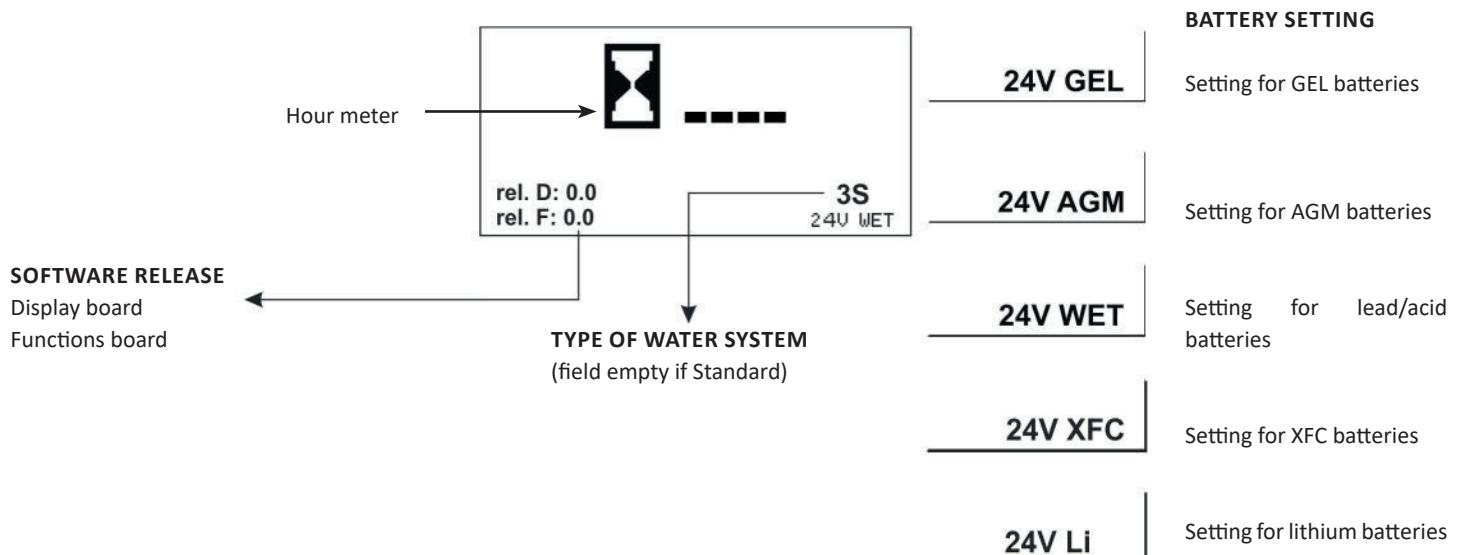
## DISPLAY READING

### VIEW UPON SWITCH-ON

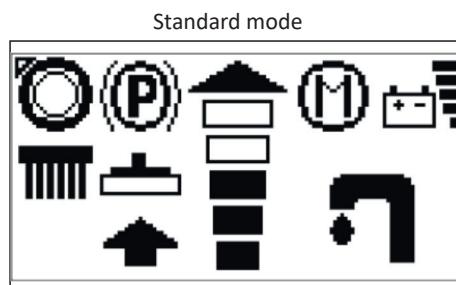
When the machine is switched on, the display shows the following screen.



The next screen will appear as follows:

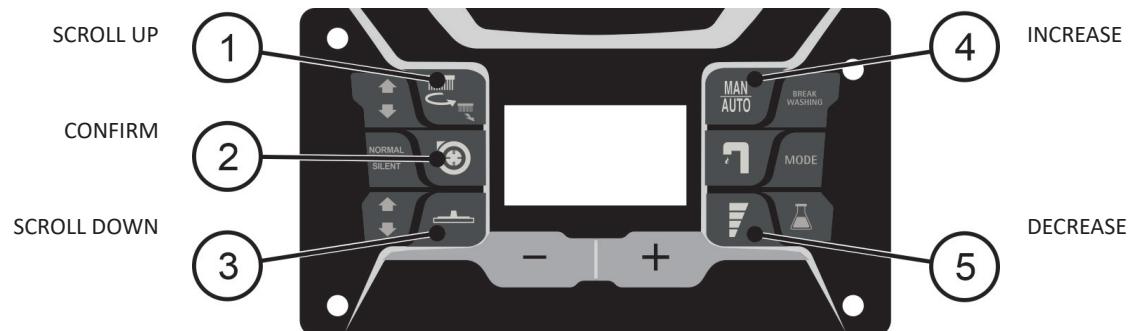


### CONTROLS DISPLAY



Parking brake engaged	(P)	Base up		Maximum speed level set		Standard mode selection	
Automatic mode	(A)	Base down				Solenoid valve activated	
Manual mode	(M)	Brush in function				Solenoid valve deactivated	
Battery charge level						3S mode selection	
						3SD mode selection	
Aspirator off		Squeegee high				Ozone mode selection	
Aspirator on		Squeegee low				Ozone + 3S mode selection	
Aspirator in silent mode							

## NAVIGATION CONTROLS



### GENERAL SETTING

To access the settings menu, use the keypad on the dashboard and proceed as follows:

1. Simultaneously press and hold buttons (1) and (5).
2. Turn the ignition key.

After entering the GENERAL SETTING menu, it will be possible to change the following pre-defined settings by simply scrolling the menu with controls (1) and (3).

### LANGUAGE SELECTION

English is the default language, but it can be changed.

To select the language, scroll with buttons (1) and (3) until "Language" appears. Press buttons (4) and (5) to select the language. Press button (2) to confirm.

### DISPLAY TUNE

After accessing the General Setting menu, it is possible to modify the display's colour contrast. Scroll with buttons (1) and (3) until "Display Tune" appears. Press buttons (4) and (5) to select. Press button (2) to confirm.

### DISPLAY BRIGHTNESS

After accessing the General Setting menu, it is possible to modify the display's brightness.

Scroll with buttons (1) and (3) until "Display Brightness" appears. Press buttons (4) and (5) to select. Press button (2) to confirm.

## SYMBOLS IN THE MANUAL



Open-book symbol.  
Indicates to the operator to read the manual before using the machine.



Obligation symbol that obliges the user to wear protective glasses.



Obligation symbol that obliges the user to wear protective gloves.



Open-book symbol.  
For the efficient operation of the incorporated battery charger (optional), consult the user manual of the manufacturer.



Symbol preceding information on correct use of the machine.



Warning symbol.  
Carefully read the sections marked with this symbol, for the safety of the operator and of the machine.



Symbol indicating operations to be performed only by qualified personnel.

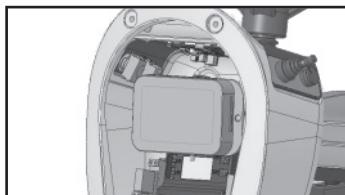


Warning symbol.  
Risk of acid leakage from the batteries.

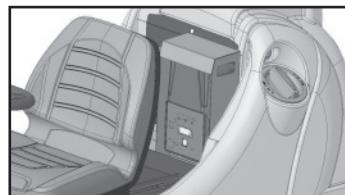


Symbol indicating that the system must be disconnected from the batteries by detaching the connector before any operation on the machine.

## OPTIONAL EQUIPMENT



TELEMATICS



ON-BOARD BATTERY CHARGER



3S SYSTEM



OZONE GENERATOR



3SD SYSTEM

## BEFORE USE

### HANDLING OF THE PACKED MACHINE

The machine is supplied with the packaging configured for its handling by means of a forklift truck.

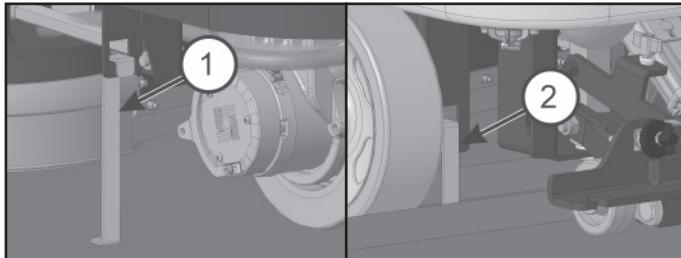
For the dimensions of the packaging, consult the "TECHNICAL DESCRIPTION" table.



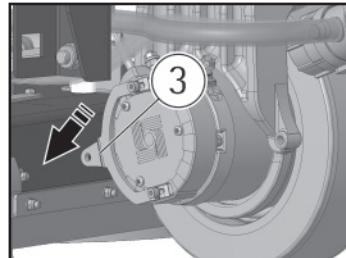
Do not stack more than two packaging boxes.

### UNPACKING AND MANUAL HANDLING OF THE MACHINE

1. Remove the outer packaging.
2. Loosen the brackets (1+2) fastening the machine to the platform.



3. Before freeing the machine from the platform, it is necessary to release the parking brake locking the traction wheel. To do this, raise and hold lever (3). The machine comes with a cord that can be used to move the lever (3).



After moving the machine, remove the cord and store it for future use.



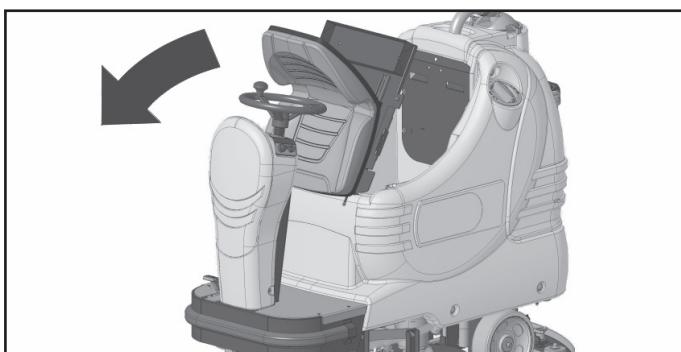
When the parking brake is disengaged manually, for example when the machine must be moved without its batteries installed, avoid moving over inclined ramps or stopping on them.

4. Free the machine from the platform by pulling it in reverse, taking care to protect the mechanical parts against heavy impacts.
5. Store the platform and the brackets for any future transport operations.

### ACCESSING THE BATTERY COMPARTMENT

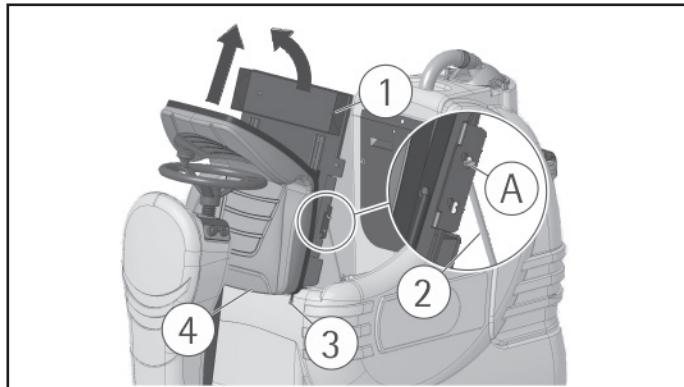
1. Bring the machine on a horizontal surface.
2. Flip the seat bed forward and attach the prop.

After every intervention, close the battery compartment by putting the seat bed back in place.

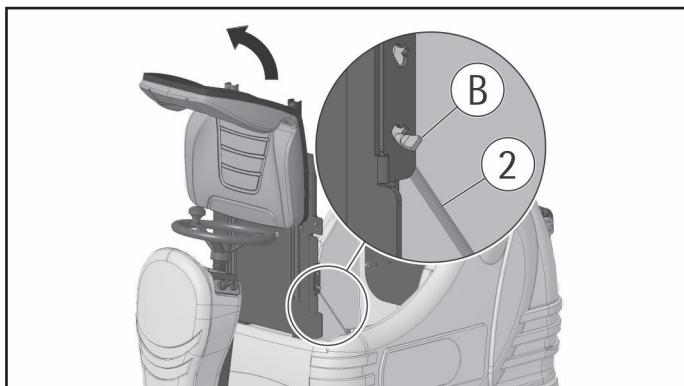


To install case-type batteries in the compartment, it is necessary to:

1. Flip the seat bed forward and attach the prop (2) in position A.
2. Detach the tool compartment (1) by loosening the two wing nuts securing it to the seat bed.
3. Pull the lever (3) that releases the seat bed outwards then slide the seat body (4) up to its highest position.



4. Flip the seat bed further forward to attach the prop (2) in position B.



In this way it will be possible to handle the batteries using adequate lifting systems.

### INSTALLING THE BATTERIES

The machine works with series-connected batteries or DIN-type elements grouped and connected in series for a total of 24 volts, housed in the appropriate compartment under the seat bed, which must be handled using suitable (in terms of the weight, to be assessed in relation to the chosen batteries, and the attachment system) lifting equipment.

The batteries must also fulfil the requirements specified in the CEI 21-5 standard.



For battery maintenance and charging, strictly observe the indications provided by the manufacturer or retailer. All installation and maintenance operations must be carried out by specialised personnel, using adequate protection devices.

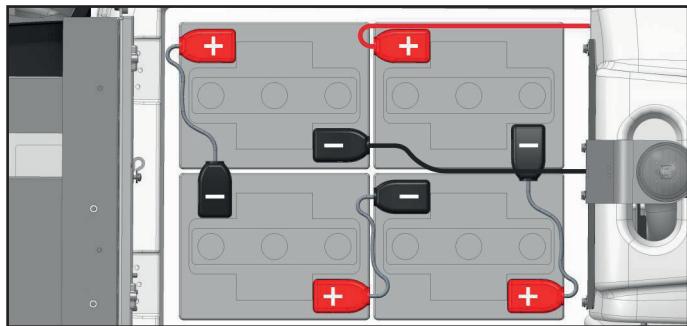
To install the batteries it is necessary to access the battery compartment (see "ACCESSING THE BATTERY COMPARTMENT" chapter).

1. Place the batteries in their housing.
2. **Connect the terminals, while observing the pole markings and taking care not to short-circuit the batteries with tools.**

If the machine mounts a case with 24 V 240 Ah5 tubular batteries,

connect the battery cables to the relative free terminals.

If the machine mounts 6 V 210 Ah5 tubular batteries, connect them as follows:



#### BATTERY CHARGER



Make sure that the battery charger is suitable for the installed batteries with regard to their capacity and type (lead/acid, GEL or XFC).

The bag containing the user and maintenance manual also includes the coupling connector for the battery charger. This connector must be mounted on the cables of your battery charger according to the relevant instructions given by the battery charger manufacturer.

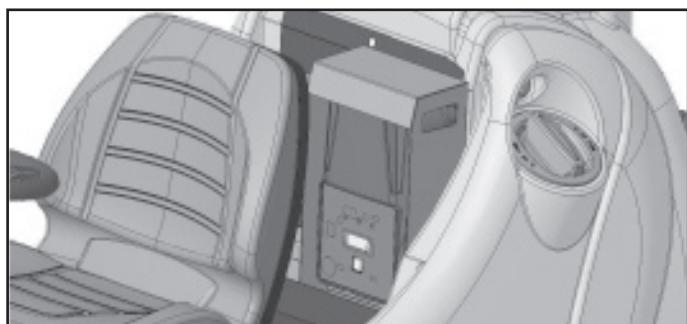
#### ON-BOARD BATTERY CHARGER (OPTIONAL)

If the machine is supplied with an incorporated battery charger (see "OPTIONAL EQUIPMENT"), please consult the manufacturer's instructions for this accessory for information on battery charging.

The battery charger is connected directly to the battery poles.

During charging operations a device activates that does not allow the machine to work.

The battery charger's power cord is maximum two metres long and must be connected to a single-phase CEE 7/7 TYPE socket.



#### BATTERY CHARGE INDICATOR

The battery charge indicator appears on the display with the relevant symbol (see "CONTROLS DISPLAY").



When the last charge segment starts flashing, it means that the battery is almost completely flat; the brush rotation function is disabled and the base rises. The squeegee will remain on the floor for 30 seconds; it will then lift up and the aspirator will switch off.



When also the last charge segment switches off, the battery is completely flat.

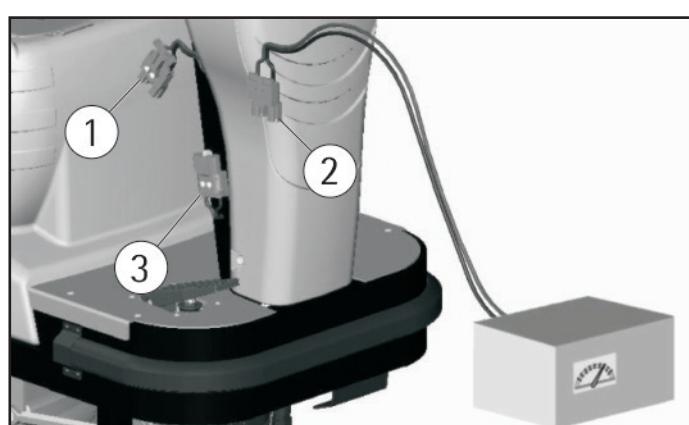
All the functions will be deactivated.

#### CHARGING THE BATTERIES

1. Insert the battery charger connector (2) into the battery connector (1).
2. Charge the batteries.

Once the batteries have been charged:

3. Disconnect the battery charger connector (2) from the battery connector (1).
4. Connect the battery connector (1) to the machine connector (3).



#### CHARGING THE BATTERIES WITH THE INCORPORATED BATTERY CHARGER (OPTIONAL)



Move the machine to a level surface near a mains power outlet.

1. Switch the machine off with the key switch.
2. Insert the plug into the mains power outlet.
3. Charge the batteries while keeping the recovery tank raised.
4. Do not unplug the charger until the end-of-charging indicator appears.

Unplug the charger once the batteries have been charged.

**Never charge a battery using an unsuitable battery charger. Strictly observe the instructions provided by the battery and battery charger manufacturers.**

NOTES: Never leave the batteries completely flat for long periods of time. If traditional batteries are used, every 20 charges check the level of electrolyte and top it up with distilled water if necessary.

If lead/acid batteries are used, there is a risk of gas leaks and corrosive liquid spills.

Risk of fire: do not approach the batteries with open flames.

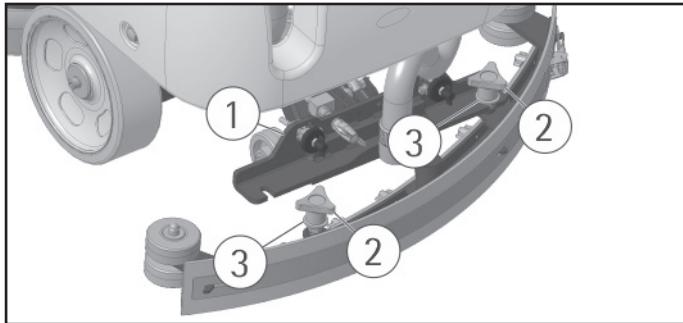


## BATTERY DISPOSAL

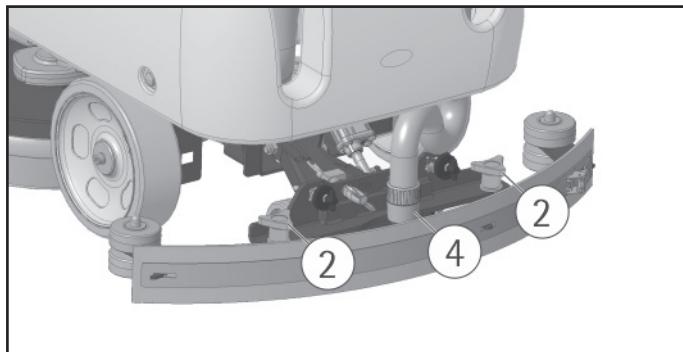
Worn-out batteries, which are classified as hazardous waste, must be delivered to an authorised body that complies with the waste disposal laws.

## MOUNTING THE SQUEEGEE

1. Keep the squeegee support (1) raised above the ground.
2. Slide the threaded parts of the two knobs (2) through the two slots on the support, after placing the washers (3) above the two slots on the support.



3. Secure the squeegee by turning the two knobs (2) clockwise.
4. Attach the pipe (4) to the squeegee by observing the position indicated in the figure.



## ADJUSTING THE SQUEEGEE

For the squeegee to dry properly, the rear rubber element must have a uniform curvature of the lower lip along the entire length. To adjust the squeegee, it is necessary to be in work conditions with the aspirator on and the brushes working with the detergent solution.



The lower lip is too curved.

Release pressure by turning the wing nut (1) anti-clockwise.

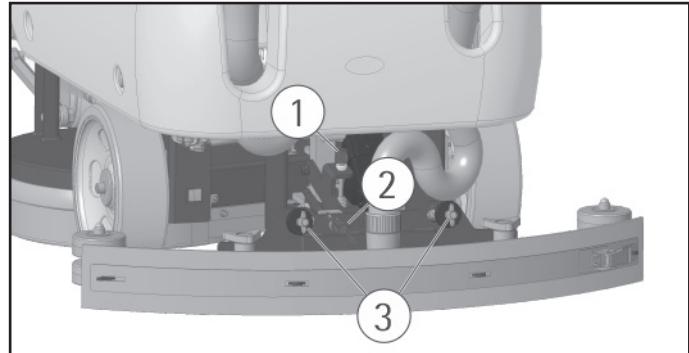
The lower lip is curved too little.

Increase pressure by turning the wing nut (1) clockwise. Check that the small wheels regulating the height do not touch the floor; if they do, adjust them as indicated in the next paragraph "Adjusting the height". The curvature is not uniform.

Adjust the squeegee's inclination by turning the wing nut (2) anti-clockwise to increase the curvature in the central part, or clockwise to increase the curvature at the sides.

### Adjusting the height

Once the squeegee pressure and inclination have been adjusted, this optimal situation must be stabilised by letting the wheels touch the floor. Turn, by moving the adjusters (3): clockwise to lower the wheels or anti-clockwise to raise them. The small wheels must both be adjusted by the same measure.



Each type of floor requires a specific adjustment. Concrete floors (subject to a lot of friction), for example, require little pressure, while smooth floors (ceramic) require a higher pressure.

If the machine is always used on the same type of floor, the adjustment may vary only in relation to wheel wear.

## ASSEMBLING AND DISMANTLING THE SPLASH GUARD



The two splash guards must be mounted on the washing assembly as shown.

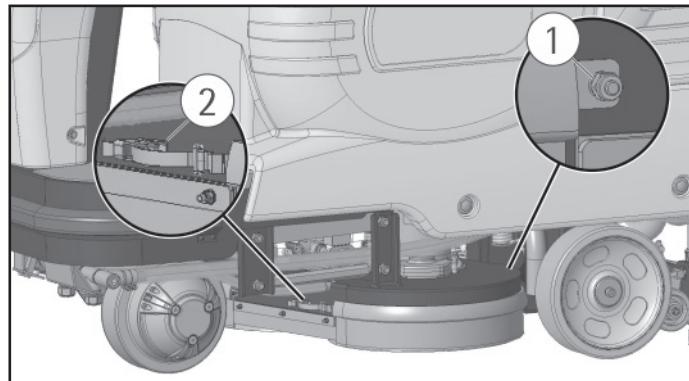
Insert the metal slats into the appropriate slots on the rubber element. Fasten the perforated end of the slat to the screw (1).

Lock the lever hooking device (2) to the ring located at the free end of the metal slat.

The operation must be carried out for both splash guard rubber elements.

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

To dismantle them, perform the same operations in reverse order.



## MOUNTING THE BRUSHES

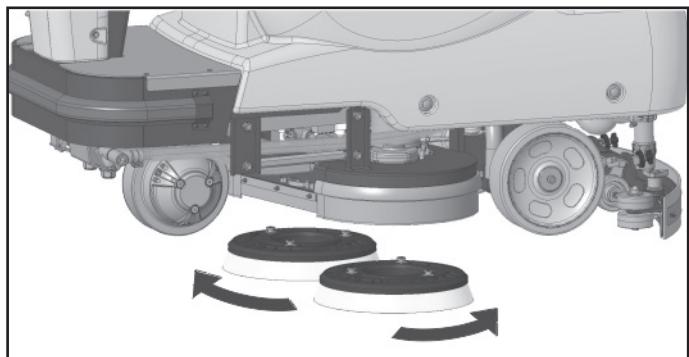


In order to mount the brushes, the washing base must be in the raised position. Should it not be in this position, proceed as follows:

Without the operator on board, turning the key clockwise switches on the display then after 3 seconds all working assemblies are automatically switched off and raised from the floor.

Switch the machine off by turning the key anti-clockwise.

With the base in the raised position, attach the brushes by turning them as shown in the figure.



We suggest inverting the position of the brushes daily to ensure a longer-lasting life. Should the brushes inevitably deform, we suggest putting them back on in the same position so that the different inclination of the bristles does not cause excessive strain on the motor or bothersome vibrations.



Only use the brushes supplied with the machine or those specified in the "BRUSHES AND OPTIONAL ACCESSORIES" manual. The use of other brushes may deteriorate the washing results.

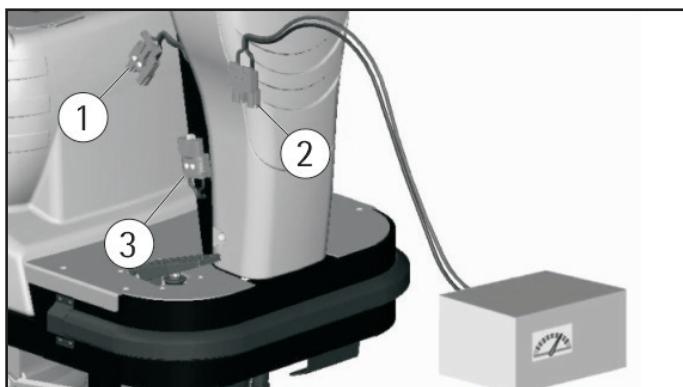
## FLOOR CLEANING

### CONNECTING THE BATTERY CONNECTOR AND SWITCHING THE MACHINE ON

Once the batteries have been charged:

Remove the battery charger connector (2) from the battery connector (1).

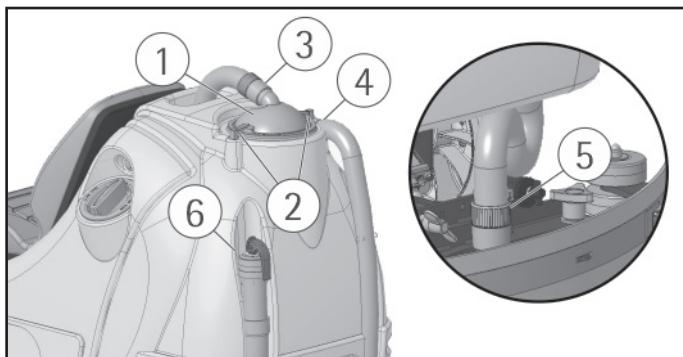
Connect the battery connector (1) to the machine connector (3).



### RECOVERY TANK

Check that the suction filter cover (1) is properly secured, after having turned the levers (2), and that it is properly connected to the suction motor pipe (3).

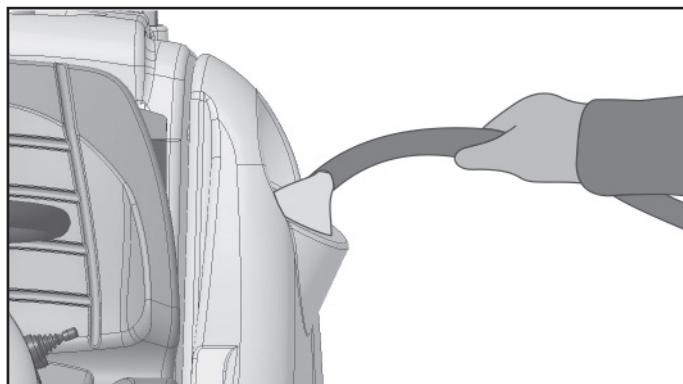
Also verify that the sleeves (4/5) of the squeegee pipe are correctly inserted into their housings and that the cap of the discharge pipe (6), located at the rear of the machine, is firmly closed.



### DETERGENT SOLUTION TANK

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

Open the screw cap located on the left side of the machine and fill the solution tank with clean water, at a temperature not exceeding 50°C. Add liquid detergent with the concentration and in the manner indicated by the manufacturer. To prevent excessive foam build-up, which could cause problems for the suction motor, use as less detergent as possible. Screw the cap onto the solution tank.



Always use detergent with retarded foam. To safely avoid foam the production of foam, before starting work introduce a small amount of anti-foam liquid into the recovery tank.

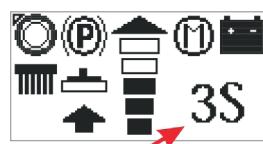
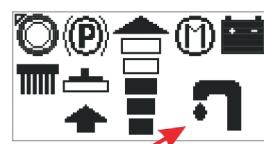
Do not use pure acids.

### 3S "SOLUTION SAVING SYSTEM" (OPTIONAL)

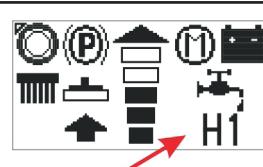
This system allows for controlled use of the detergent solution during work.

To activate it, press button (1) twice: the water symbol will flash on the display.

Select the 3S system using the "+" and "-" navigation buttons.



When "3S" stops flashing, the system is selected.

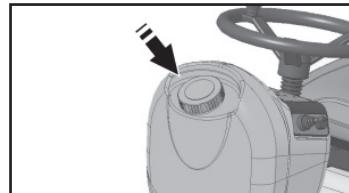


### 3SD "SOLUTION SAVING SYSTEM DISPENSER" (OPTIONAL)

This system allows for the pre-defined dosing of the percentage quantity of detergent which will then mix with the water coming from the solution tank.

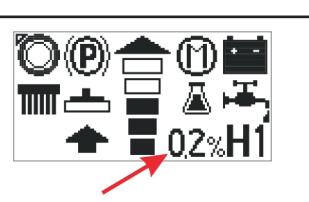
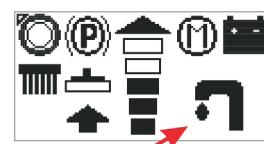
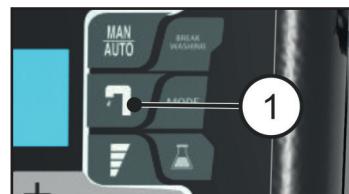
The detergent is contained in a tank with 7-litre capacity located in the rear part of the machine.

To load the detergent, loosen the cap shown in the figure.



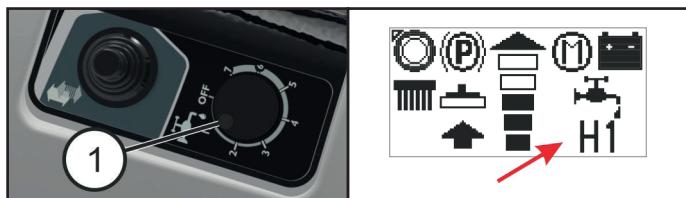
To activate it, press button (1) twice: the water symbol will flash on the display.

Select the 3SD system using the "+" and "-" navigation buttons.



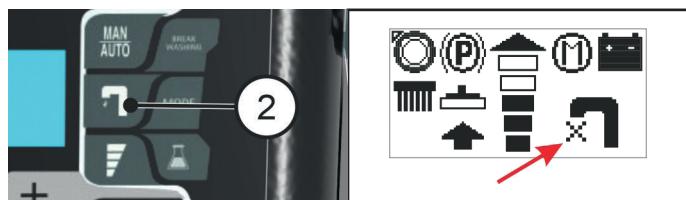
## SELECTING THE FLOW RATE LEVEL – 3S AND 3SD SYSTEMS

Moving the level selection joystick (1) allows for varying the H value from H1 to H7.



If the machine is equipped with the 3SD system, to stop the solution from pouring out, shift the joystick (1) to "OFF".

If the machine is equipped with the 3S system, set to "Standard" mode and to "Manual" operation, disable the detergent solution by pressing the solenoid valve button (2) and the indication of the solenoid valve's deactivation will appear on the display.



## SELECTING THE DETERGENT PERCENTAGE – 3SD SYSTEM

A pump defines 6 fixed percentages of detergent:  
0.0%, 0.3%, 0.6%, 1.2%, 2.4%, 4.5%.

With 0.0% washing takes place with water only.

The various detergent percentages can be selected by pressing and holding the level button (1) for a few seconds, until the value appearing on the display flashes.

At this point, press the "+" and "-" navigation buttons to select the desired value.

Wait for a few seconds and the indicated value will stop flashing.

At this point, the selection will

have been completed and pressing the button again will modify the water flow rate.

## USING THE STANDARD MODE ON A MACHINE EQUIPPED WITH THE 3SD "SOLUTION SAVING SYSTEM DISPENSER"

When the machine is equipped with the 3SD system, it also implements a different approach to traditional cleaning.

Since there is a pump that regulates the water to a constant flow rate, the traditional valve is absent and the solution flow is adjusted by moving the joystick (1).

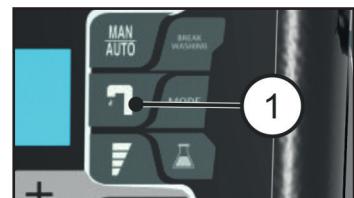
The selected flow level will appear on the display.

## OZONE SELECTION (OPTIONAL)

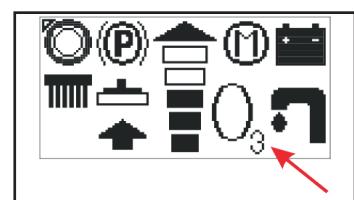
The machine can produce water with a sufficiently high level of ozone to create a disinfectant action on treated surfaces.

To activate it, press button (1) twice: the water symbol will flash on the display.

Select the Ozone system using the "+" and "-" navigation buttons.



When "O3" stops flashing, the system is selected.

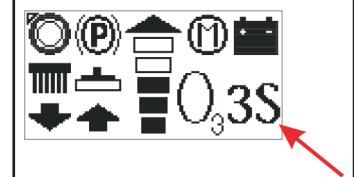


## SELECTING THE OZONE FUNCTION WITH THE 3S OR 3SD SYSTEM (OPTIONAL)

The machine, if equipped with these optional systems, can combine cleaning with ozone production and 3S / 3SD.

Work in ozone mode can be selected in the same way as standard cleaning with ozone – see "OZONE SELECTION" chapter.

To treat the floor with ozone and use the 3S mode, scroll the menu until the cleaning icon combined with O3 3S appears.



If the machine is equipped with the optional 3SD system, in the list of modes it is possible to select the "O3 + 3S" mode only.

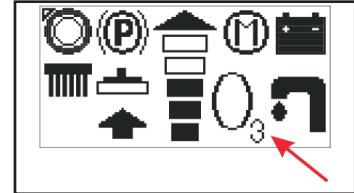
## WORK MODE WITH OZONE (OPTIONAL)

To optimally use the ozone system, proceed as follows:

1. Make sure that the inside of the solution tank is clean and, if necessary, fill it at least twice and then rinse it out.
2. Fill the solution tank with tap water (do not add any detergent).
3. Select cleaning with ozone – consult the chapter "OZONE SELECTION".
4. Start the job.

Ozone is produced instantly and only when water is dispensed.

During work, the system's symbol flashes during ozone production.





Ozone is a gas with a very pungent odour that can be an irritant.

Ozone-enriched water is highly oxidising; therefore, in order to protect the machine's metal parts against oxidation (rust), the entire lower part of the machine should be rinsed with water at least once a week.

The solution tank does not need to be emptied at the end of the job.

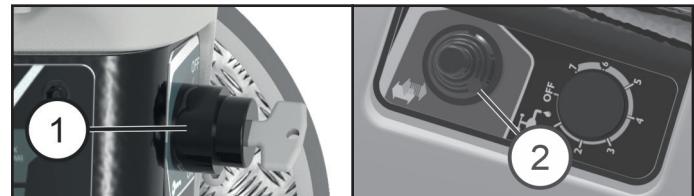
## WORK

A safety device prevents the machine from moving if the operator is not positioned **correctly on the seat**.

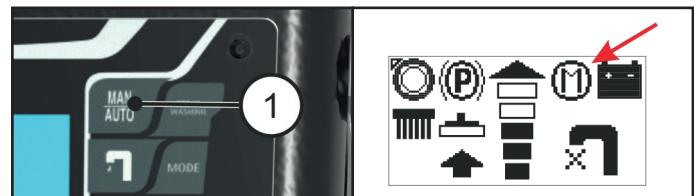
To start the machine:

1. Sit in the driver's seat.
2. Turn the ignition key (1) clockwise to switch the machine on.
3. Check the charge status of the batteries on the display.
4. The machine will automatically prepare for working in manual mode (MAN).
5. Select the direction by moving the joystick (2).

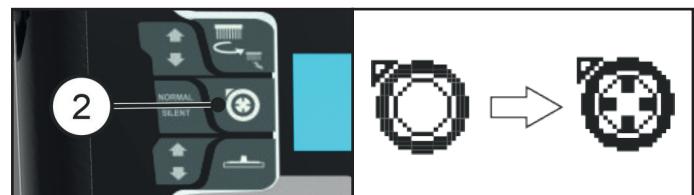
### MANUAL MODE



1. Check that the machine has been set to manual mode; if not, press button (1) and the corresponding symbol will appear on the display.
2. Press the suction motor button (2); the suction motor symbol will switch from off to on and the suction motor will start aspiring.



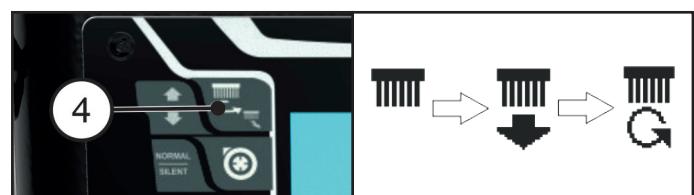
3. Press the solenoid valve button (3) or turn the flow selector (3S/3SD); the symbol of the solenoid valve will switch from disabled to enabled.



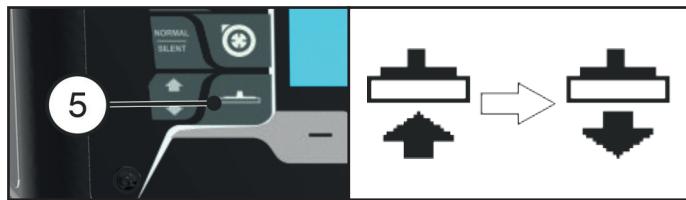
4. Lower the brush base to the floor by pressing button (4); the display will show the down symbol first and then the brush motor activation symbol.



5. Lower the squeegee by pressing button (5).
6. During the first few metres check that the squeegee adjustment guarantees perfect drying and that the detergent solution flow is



adequately regulated. It must be sufficient for uniformly wetting the



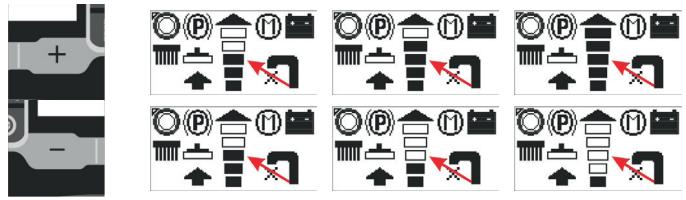
floor without having detergent leaking out of the splash guard. Bear in mind that the correct quantity of detergent solution always depends on the type of floor being treated, the entity of the dirt and the speed used.

#### SPEED ADJUSTMENT, FORWARD AND REVERSE MOTION

Before working with the machine, select the maximum desired speed level. Press the "+" and "-" buttons so that the speed level will appear on the display.

#### ADJUSTING THE DETERGENT SOLUTION FLOW

1. Turn the valve knob (1) to open and adjust the detergent solution flow.



To move the machine, select the direction by moving the joystick (1) located on the dashboard panel.

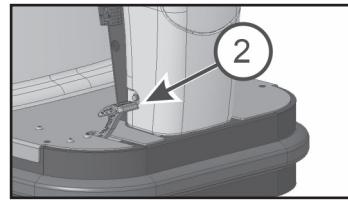
Press the pedal (2) positioned on the footrest to enable motion.

Use the pedal (2) to adjust the speed during work. The speed will vary from the minimum to the maximum speed set previously and shown on the display.

2. On models equipped with the 3S/3SD (optional) systems, the user will have to press the relevant selector to activate dispensing of the detergent solution by choosing between the traditional valve-based adjustment system or the fixed optimal dispensing system (see "3S Solution Saving System").

In the Standard mode, the flow is regulated through the lever (1) in both the MAN and AUTO modes.

In the 3S and 3SD modes, the flow is adjusted as explained in the chapter "SELECTING THE FLOW RATE LEVEL – 3S AND 3SD SYSTEMS", and depends on the instantaneous speed.



#### WORK IN AUTOMATIC MODE

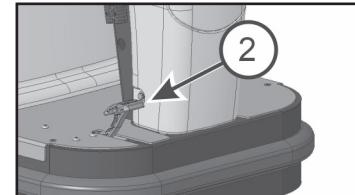
Working in automatic mode is useful for simplifying the operator's task.

1. Check that the machine has been set to automatic mode; if not, press button (1) and the corresponding symbol will appear on the display.



2. Press the motion pedal (2) positioned on the footrest.

Once pressed, the machine will move forward, the base lowers together with the squeegee and, when the solenoid valve is



enabled, the brush starts turning and the aspirator switches on.

Before starting the machine, and thus before pressing the motion pedal, the following parameters can be set: maximum speed, water level and/or detergent level (versions 3S and 3SD).

The set values will instantly appear on the display.

To adjust the detergent flow, consult the chapter "ADJUSTING THE DETERGENT SOLUTION FLOW".

When the motion pedal is released: the motor brush stops, the solenoid valve closes and after roughly 30 seconds the base and the squeegee both rise.

If during work in automatic mode:

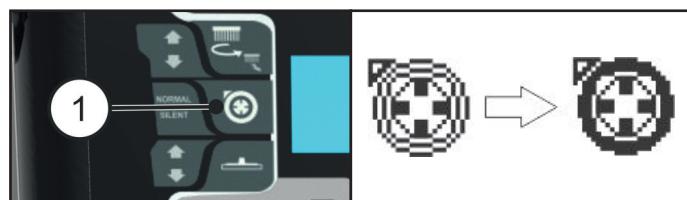


- the base, solenoid valve or aspirator buttons are pressed, the machine switches to manual mode;
- the squeegee lever is raised, the aspirator switches off after a few seconds, and when it is lowered again, the aspirator switches on.

#### ASPIRATOR IN SILENT MODE

The suction motor can be started in silent mode by pressing and holding the motor power-up button (1) for a few seconds.

Once the silent mode has started, the symbol on the display changes.



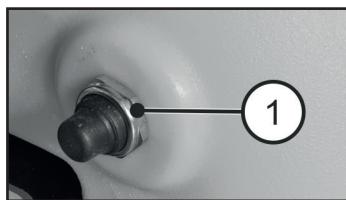
#### STAND-BY MODE

After 10 minutes of inactivity, if the machine is on it will enter the stand-by mode: all the functions stop, the base rises and the machine switches off. To resume work, turn the key switch to switch the machine on again.



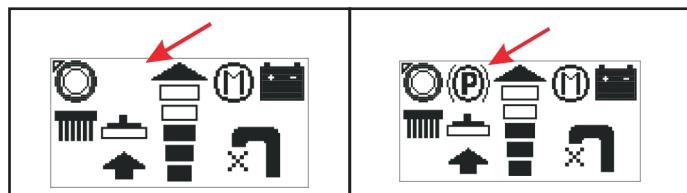
## HOOTER

The machine is equipped with a hooter that can be activated by pressing button (1).



## PARKING BRAKE

The machine is equipped with a parking brake on the traction wheel, which intervenes when the pedal is fully released or when the machine is without batteries. In case of emergency or simply to stop the machine, it is sufficient to release the pedal. The brake will remain engaged until the pedal is pressed again. When the batteries are connected and when the key switch is positioned on "1", the brake engaged indicator will appear on the display.



## BRUSH MOTOR OVERLOAD PROTECTION DEVICE

The machine is equipped with a brush motor overload protection device. This device stops the motor to preserve it and indicates the overload condition on the display with the message "ALARM 1".

If the problem persists, contact the technical assistance service.

## OVERFLOW DEVICE



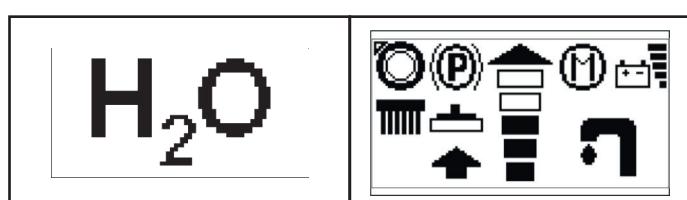
In order to avoid serious damage to the suction motor, the machine is equipped with an overload device that intervenes when the recovery tank is full. When this occurs, the recovery tank must be emptied. Grip the machine's discharge pipe. Unscrew the cap and empty the recovery tank into the relevant containers, in accordance with the regulations in force concerning the disposal of liquids.

## WATER (H<sub>2</sub>O) RESERVE NOTICE

The machine is fitted with a level sensor that intervenes when the detergent solution reaches the minimum level.

All the functions will nonetheless remain active.

"H<sub>2</sub>O" will appear on the display alternately with the functions screen.



When the solenoid valve button or the level button is pressed (to make an adjustment or setting), "H<sub>2</sub>O" disappears and the wording relative to the circuit remains visible.

When the adjustment or setting has been made, H<sub>2</sub>O will reappear alternately with the circuit wording.



## STOPPING THE MACHINE AFTER CLEANING

### BREAK WASHING MODE

IN BOTH AUTOMATIC AND MANUAL WORK MODE:

1. At the end of the washing cycle, pressing and holding button (1) will select the BREAK WASHING mode.
2. When this mode is engaged, "BREAK WASHING" will appear on the display.



Consequently, the solenoid valve shuts, the base and squeegee both rise after a few seconds, and the aspirator switches off.

**NOTE:** all these phases take place with the machine moving, so that the squeegee can dry the interested portion of the floor and the dirty liquid suction pipe can dry.

The BREAK WASHING procedure can be interrupted at any time by stopping the machine's motion.

During the BREAK WASHING phase, when the motion pedal is released for more than three seconds, the machine is restored to manual mode (MAN).

The BREAK WASHING mode is specifically used for transferring the machine at the end of cleaning operations.



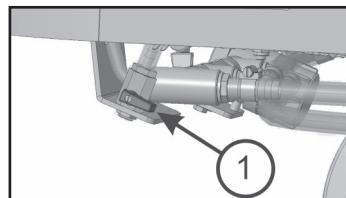
### EMPTYING AND CLEANING THE DETERGENT TANK (3SD)



Only for machines equipped with the optional 3SD system. Should it be necessary to clean with another type of detergent or if the machine must be left inactive for long periods, the detergent tank must be emptied out.

To empty the tank, open the valve (1) of the discharge pipe located on the tank and empty the latter into the detergent recovery container.

1. Rinse out the tank with a water jet.
2. Once the tank has been completely emptied, close the valve (1).

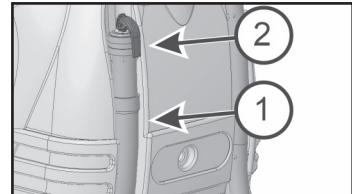


## DAILY MAINTENANCE

### EMPTYING AND CLEANING THE RECOVERY TANK



1. Grip the discharge pipe (1) located on the front part of the machine after having extracted it from its relevant support seat.
2. Unscrew the cap of the discharge pipe by moving the lever (2) on the pipe and empty the recovery tank into the relevant containers, in accordance with the regulations in force concerning the disposal of liquids.
3. Rinse out the tank with a water jet.

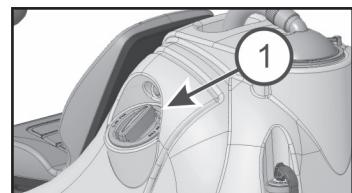


### EMPTYING AND CLEANING THE SOLUTION TANK



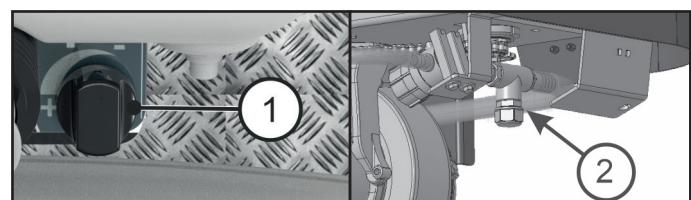
Move the machine to the place where the detergent solution will be discharged.

Unscrew the cap for filling the solution tank (1).



For standard machines:

1. Unscrew the cap (1).
2. Open the detergent solution valve (2).
3. Clean the solution tank.
4. Close the valve and reassemble all the components.

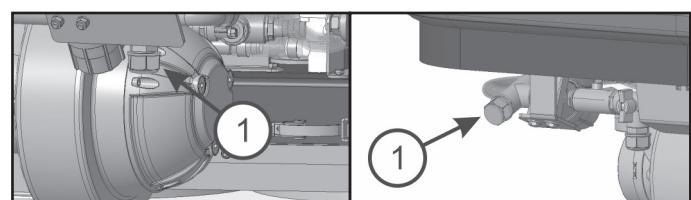


For machines with 3S and 3SD systems:

1. Unscrew the cap (1).
2. Clean the solution tank.
3. Reassemble all the components.

3S

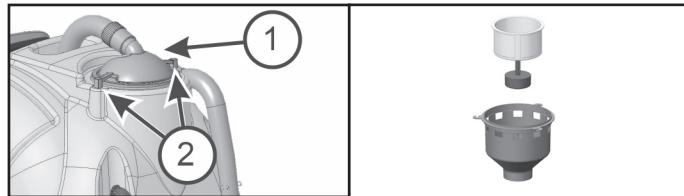
3SD



## CLEANING AND SUCTION FILTER



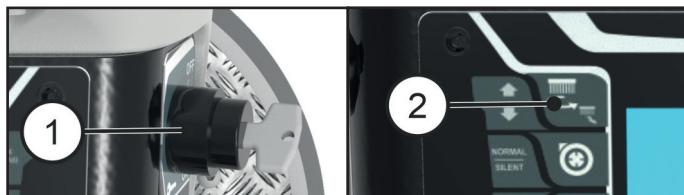
1. Remove the suction cap (1) after turning the levers (2) that secure it.
2. Remove the filter and the relative protection.
3. Clean all components with a water jet, especially the walls and bottom of the filter.
4. Perform cleaning very carefully.
5. Reassemble all the components.



## AUTOMATIC DISMANTLING OF THE BRUSH



1. Position the motion direction joystick in the central position.
2. Switch the machine on by turning the key (1) clockwise.
3. Press and hold the button (2) for long to activate the detachment function.
4. Switch the machine off.



## CLEANING THE BRUSH



Dismantle the brush and clean it with a water jet (to dismantle the brush, consult the chapter "AUTOMATIC DISMANTLING OF THE BRUSH").

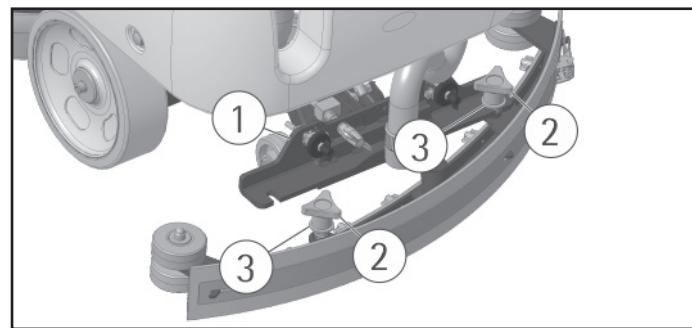
## CLEANING THE SQUEEGEE



Keeping the squeegee clean guarantees improved drying results.

To clean it:

1. Slide the squeegee pipe (5) off the sleeve.
2. Detach the squeegee (2) from the support (1) by loosening the knobs (4) anti-clockwise and sliding the threaded parts out of the relevant slots until they are free.
3. Thoroughly clean the fitting on the squeegee by eliminating any dirt deposits.
4. Thoroughly clean the squeegee's rubber components.
5. Reassemble all the components while making sure that the washers (3) – two for every knob – are placed one below and the other above each of the two slots present on the support.



## WEEKLY MAINTENANCE

### CHECKING THE REAR SQUEEGEE RUBBER ELEMENT

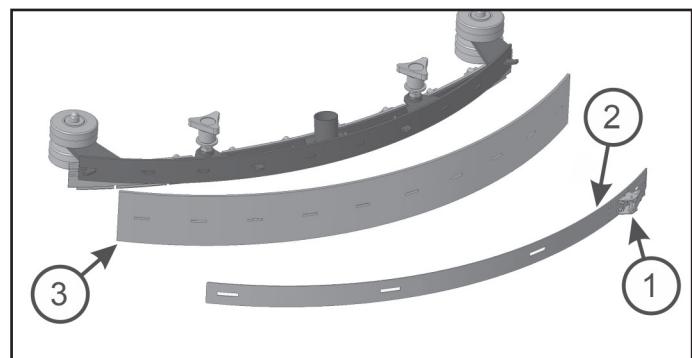


Check the state of wear of the squeegee rubber element and, if necessary, turn it around or replace it.

To replace it:

1. Raise the squeegee (consult the chapter "STOPPING THE MACHINE AT THE END OF WORK").
2. Detach the closure (1).
3. Unscrew the rubber-holder blade (2).
4. Remove the rubber element (3) to turn it or replace it.

To reassemble the squeegee, repeat the above operations in reverse order.

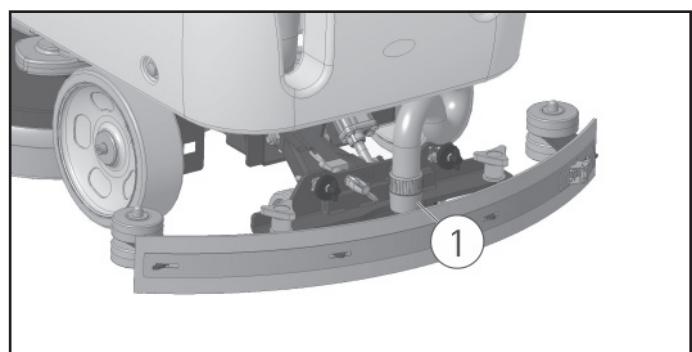


### CLEANING THE SQUEEGEE PIPE



Every week, or in case of insufficient suction power, the squeegee pipe must be checked for possible obstructions. If it must be cleaned, proceed as follows:

1. Slide the pipe (1) off the squeegee sleeve.
2. Wash the inside of the pipe with a water jet.
3. To reassemble the pipe, repeat the above operations in reverse order.



## BIMONTHLY MAINTENANCE

### INSPECTING THE FRONT SQUEEGEE RUBBER ELEMENT

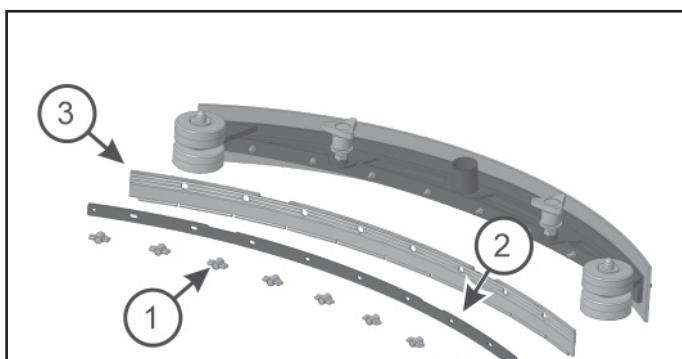


Check the state of wear of the squeegee rubber element and, if necessary, replace it.

To replace it:

1. Dismantle the squeegee (consult the chapter "CLEANING THE SQUEEGEE").
2. Dismantle the rear part of the squeegee (consult the chapter "INSPECTING THE REAR SQUEEGEE RUBBER ELEMENT").
3. Unscrew the wing nuts (1) and remove the front rubber-holder blade (2).
4. Replace the front rubber element (3).

To reassemble the squeegee, repeat the above operations in reverse order.



## HALF-YEARLY MAINTENANCE

### INSPECTING THE SPLASH GUARD RUBBER ELEMENTS



With the brushes assembled, the splash guards must barely touch the floor. If they are worn, the rubber elements must be replaced. Simply release the lever mechanism in the rear part of the washing assembly from the ring located at the free end of the metal slat to slide off the worn rubber elements and insert the new ones (consult the chapter "ASSEMBLING THE SPLASH GUARD"). The operation must be carried out for both splash guard rubber elements.

## OPERATION CHECK



The inspection of the machine's operating condition is conducted by the authorised technical assistance centre.

Never leave the batteries flat for long periods of time.

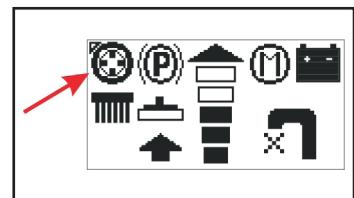
If alarm signals appear, contact the technical assistance centre.



If, with the ignition key inserted and turned clockwise to switch the machine on, the display and any other functions fail to activate, it is necessary to check whether the batteries are connected to the machine (see chapter "CONNECTING THE BATTERY CONNECTOR AND SWITCHING THE MACHINE ON"). If the fault persists, contact the authorised technical assistance centre.

### THE SUCTION MOTOR IS NOT WORKING

1. Check the charge status of the batteries on the display.
2. Check that the suction motor start signal activates on the display.
3. Verify the correct connection of the suction motor.



If the fault persists, contact the authorised technical assistance centre.

### THE DRIVE MOTOR IS NOT WORKING

1. Check the position of the joystick (1).
2. If alarm signals appear, the machine must be switched off and then on again to restore its functions.
3. Check the charge status of the batteries on the display.



4. Press the motion pedal (2) located on the footrest to start the machine.

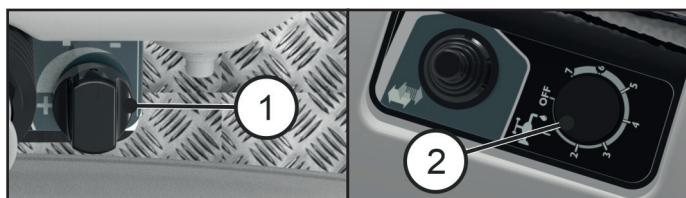
If the fault persists, contact the authorised technical assistance centre.

### THE SOLUTION DOES NOT DESCEND ONTO THE BRUSH

The machine is equipped with a solenoid valve, therefore the brush must turn for the detergent solution to descend onto it.



1. Check on the display that the solenoid valve is enabled.
2. For standard versions: Check that the valve lever (1) is open.
3. For 3S/3SD versions: Check that the detergent solution joystick (2) is at least on level 1.



#### THE MACHINE DOES NOT CLEAN PROPERLY

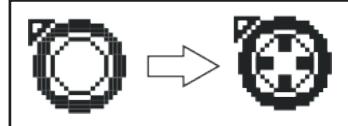
1. The brush does not have bristles of the right size: contact the authorised technical assistance centre.
2. The brush has worn bristles. Check the state of wear of the brush and replace it if necessary (the brush must be replaced when the bristles reach a height of around 15 mm).
3. To replace the brush, consult the chapters "AUTOMATIC DISMANTLING OF THE BRUSH" and "MOUNTING THE BRUSH".
4. The detergent solution is insufficient: open the valve more (consult the chapter "ADJUSTING THE DETERGENT SOLUTION FLOW").
5. Check that the detergent is in the recommended percentage.

Contact the authorised technical assistance centre for further advice.

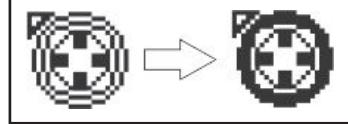
#### THE SQUEEGEE DOES NOT DRY

1. Check that the squeegee's rubber elements are clean.
2. Check the adjustment of the squeegee height and inclination (see "ADJUSTING THE SQUEEGEE" under "BEFORE USE").
3. Check that the suction pipe is correctly inserted in its housing on the recovery tank and on the squeegee or that it is not obstructed.
4. Clean the suction filter.
5. Replace the rubber elements if they are worn out.

6. Check that the suction motor symbol is active on the display.



7. If the motor is in silent mode, put it in standard mode.



8. Check that the aspirator cover is closed.
9. Check that the recovery tank is not full causing the overflow device to shut.

If the fault persists, contact the authorised technical assistance centre.

#### EXCESSIVE FOAM PRODUCTION

Check that detergent with retarded foam was used. If necessary, add a small amount of anti-foam liquid in the recovery tank.

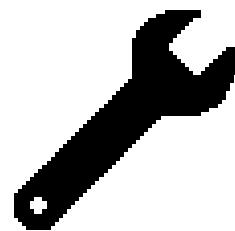
Bear in mind that more foam is produced when the floor is not very dirty. In such case, dilute the detergent solution more.

#### SERVICE WARNING

The following screen will flash for roughly 20 seconds 500 hours after the machine has been switched on.

Subsequently, the standard display will appear and the machine will be ready for work.

Contact the authorised technical assistance centre to perform scheduled maintenance. After this intervention, the "Service warning" screen will no longer appear upon start-up.



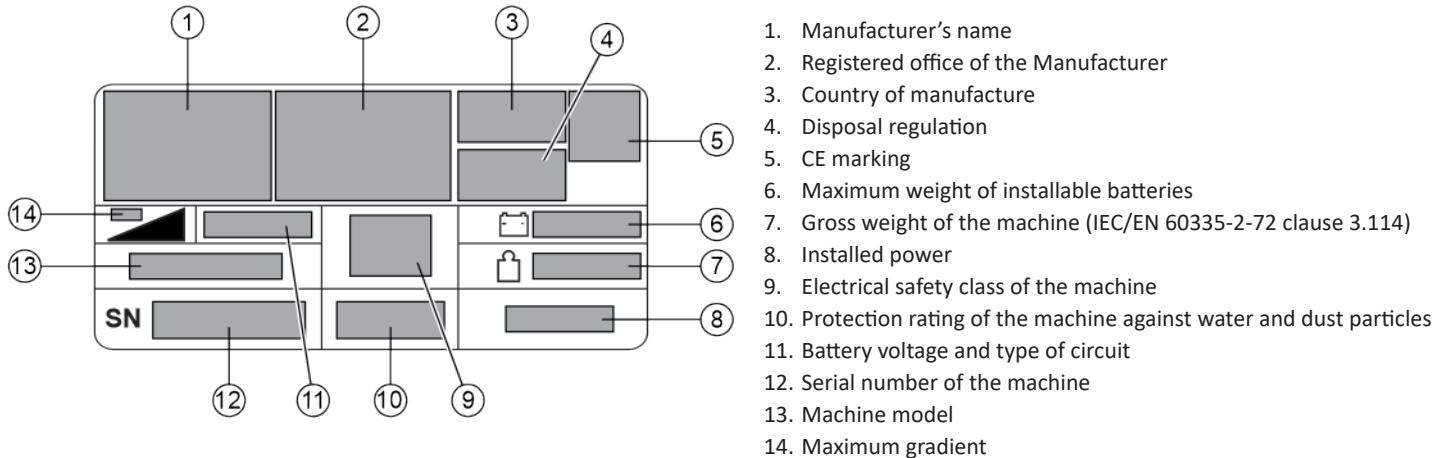
## SCHEDULED MAINTENANCE

## ROUTINE PERIODIC MAINTENANCE TABLE



INTERVENTION	DAILY	PERIODIC
CLEANING OF THE RECOVERY TANK	•	
CLEANING OF THE SUCTION FILTER	•	
CLEANING OF THE SOLUTION FILTER		•
CLEANING OF THE BRUSH	•	
DISMANTLING AND CLEANING OF THE BRUSH	•	
CLEANING OF THE SQUEEGEE	•	
INSPECTION OF THE FRONT SQUEEGEE RUBBER ELEMENT		•
INSPECTION OF THE REAR SQUEEGEE RUBBER ELEMENT		•
INSPECTION OF THE SPLASH GUARD RUBBER ELEMENT		•
INSPECTION AND ADJUSTMENT OF THE SQUEEGEE		•
CLEANING OF THE SQUEEGEE PIPE		•
CLEANING OF THE SOLUTION TANK		•
INSPECTION OF THE BATTERY ELECTROLYTE		•

## SERIAL NUMBER PLATE KEY



### UNDERSTANDING THE SERIAL NUMBER (POS. 12)

SN	2	0	x	x	z	z	z	z
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**20xx** = they refer to the **year of manufacture** of the machine.  
**zzzzzz** = they refer to the progressive number of the machine manufactured in the year of manufacture.

### UNDERSTANDING THE MODEL NUMBER (POS. 13)

xxxx	zz
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**xxxx** = name of the machine range  
**zz** = number identifying the model

### POSITION OF THE SERIAL NUMBER PLATE ON THE MACHINE

