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Tornado® Operations & Maintenance Manual



MODEL NO.
99760 BD26/30 & 99780 BD33/30

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Long-term buyer protection warranties

Tornado Standard Warranty Program*	
<p style="text-align: center;">Warranties do not cover components subject to normal wear or abuse and misuse, and have other limitations not specified here. For full details, contact your Authorized Tornado Distributor, Service Center, or the Tornado Service Department.</p> <p style="text-align: center;">Tornado sales and services representatives are not authorized to waive or alter the terms of this warranty, or to increase the obligations of Tornado under the warranty.</p>	<p>10 Years: <i>All plastic tanks and rotationally-molded bodies</i></p>
	<p>2 Year: <i>On all Tornado components *except as shown below</i></p>
	<p>1 Year: <i>Labor on all Tornado cleaning equipment *except as shown below</i></p>
	<p>1 Year: <i>Warranty on batteries and chargers, one year, pro-rated</i> All battery warranties are handled by the battery manufacturer, please call customer service for more information.</p>

Thank you for choosing Tornado products. We are proud to offer the most complete line of commercial and industrial cleaning equipment in the industry. Our reputation for quality, innovation and durability is unsurpassed.

* Effective January 1st, 2007. Terms subject to change without notice.

1)Windshear™ Blower-Dryers, Insulation Blowers, CK LW 13/1, CK 14/1, CV 30, CV 38, Pro PAC Vacs, PV 6 Back Pack Duo-Upright Carpetkeepers™, and all chargers are warranted for 1 (one) year for both parts and labor.

2)Warranties on the EB30 are 90 days (batteries, charger, parts, accessories)

3)Warranties on all riding sweepers including the ICC1, KM 100/100 R, KMR 1250, and KMR 1700 are 24 months parts/6 months labor OR 1000 hours of operation, whichever comes first. Warranties on all riding scrubbers including the 75/140 & 90/140 are 24 months parts/12 months' labor OR 1,000 hours of operation whichever comes first.

4)All non-wear item parts purchased after warranty expiration are warranted for 90 days.

5)Warranty starts from the date of sale to the consumer 6 months after dealer purchased the unit from Tornado, whichever comes first.

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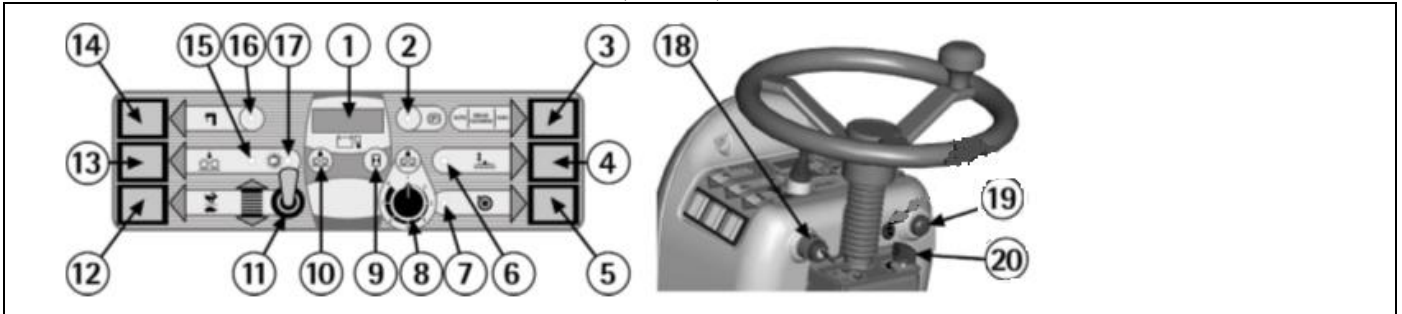
Form# F2665-Rev.4/01/07 IH
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Note: Tornado, The Latest Dirt, Floorkeeper, Carpetkeeper, Carpetrinser, Carpetrinser/Dryer, Headmaster, Taskforce, PAC-VAC, T-Lite, Glazer, Windshear, Max-Vac, CV 30, CV 38, and Trot-Mop are trademarks of Tornado Industries.

PRODUCT SPECIFICATIONS – RIDER SCRUBBERS		
Model	BD 26/30	BD 33/30
Machine Dimensions		
L X W X H	65" X 28" X 67"	65" X 35" X 67"
Net Weight	679 lbs.	690 lbs.
Solution / Recovery Tank	30 / 32 gal.	30 / 32 gal.
Squeegee Width	39"	45"
Design Characteristics		
Tank Construction	Polyethylene	Polyethylene
Cleaning System		
Brush Type	Disk	Disk
Brush Width	26"	33"
Brush RPM	170	162
Brush Pressure	176 lbs. (max)	187 lbs. (max)
Cleaning Path	26"	33"
Productivity		
Cleaning Rate (Sq. Ft Per Hour)	11,132	14,851
Motors		
Vacuum Motor	.7 hp	.7 hp
Brush Motor	1.2 hp	1.5 hp
Sound Level	70 dB	70 dB
Battery		
Voltage	36	36
Amps	240	240

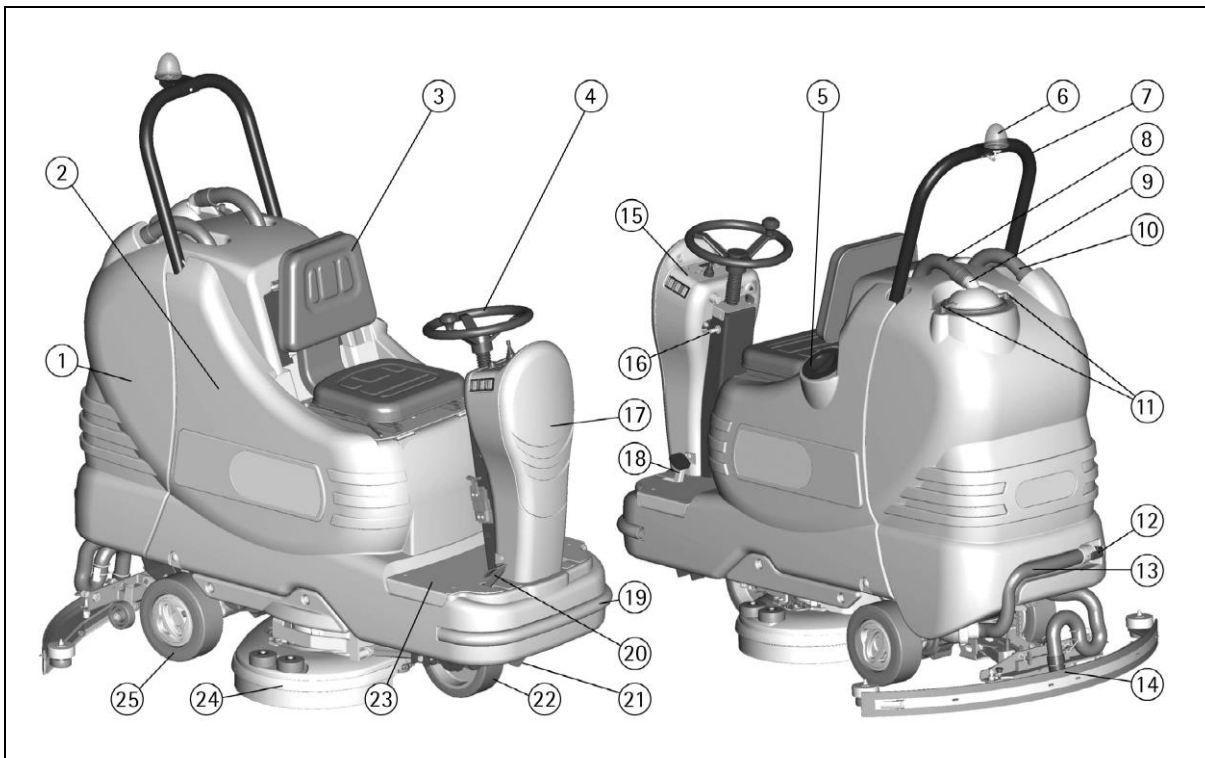
LEGEND: PANEL OF CONTROLS

- | | |
|---|--|
| 1. DISPLAY | 11. SELECTOR: FORWARDS/BACKWARDS |
| 2. SIGNAL LAMP: PARKING BRAKE | 12. SELECTOR: SPEED |
| 3. SELECTOR: AUTOMATIC/MANUAL | 13. PUSH BUTTON: UP/DOWN BRUSH |
| 4. PUSH BUTTON: UP/DOWN SQUEEGEE | 14. WATER OPENING SWITCH (SOLENOID VALVE) |
| 5. VACUUM MOTOR SWITCH | 15. SIGNAL LAMP: UP/DOWN BRUSH |
| 6. SIGNAL LAMP: UP/DOWN SQUEEGEE | 16. SIGNAL LAMP: WATER OPEN (SOLENOID VALVE) |
| 7. SIGNAL LAMP: VACUUM MOTOR ON | 17. SIGNAL LAMP: STARTING BRUSH ROTATION |
| 8. BRUSH PRESSURE ADJUSTMENT KNOB | 18. KEY SWITCH |
| 9. PUSH BUTTON: VISUALIZATION HOUR METER (DISPLAY) | 19. PUSH BUTTON HORN |
| 10. PUSH BUTTON: VISUALIZATION BRUSH PRESSURE SET (DISPLAY) | 20. KNOB FOR SOLUTION VALVE |



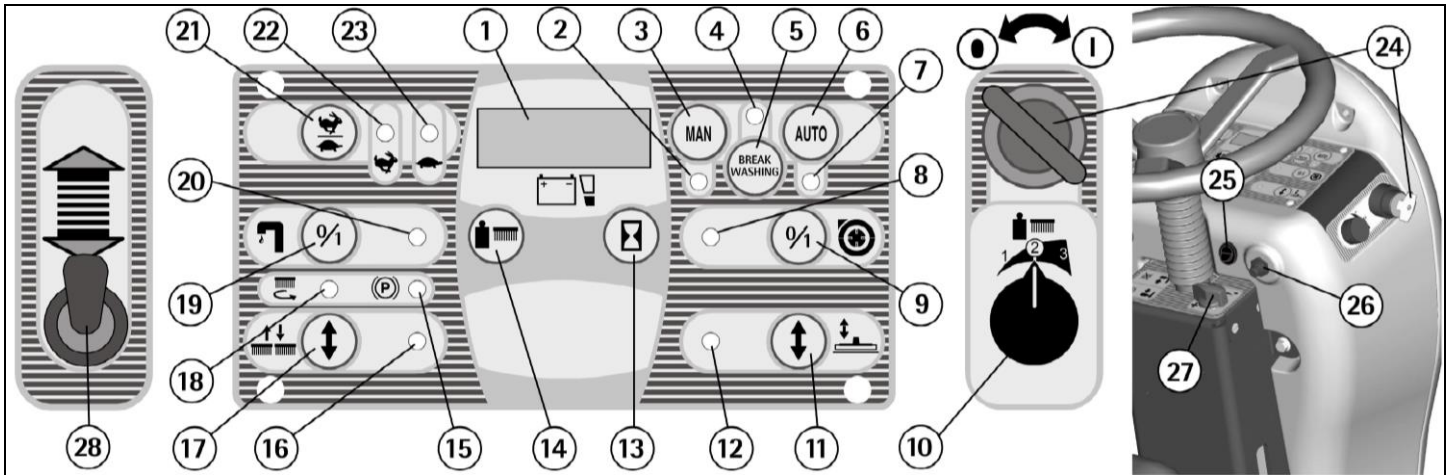
LEGEND: MACHINE

- | | |
|---|---------------------------------------|
| 1. RECOVERY TANK | 12. RECOVERY TANK EXHAUST HOSE PLUG |
| 2. SOLUTION TANK | 13. RECOVERY TANK EXHAUST HOSE |
| 3. SEAT | 14. SQUEEGEE ASSEMBLY |
| 4. DRIVE WHEEL | 15. PANEL CONTROLS |
| 5. SCREW CAP FOR INLET DETERGENT SOLUTION | 16. BLOCK/RELEASE PARKING BRAKE LEVER |
| 6. BLINKING LIGHT | 17. ELECTRICAL LAYOUT COVER |
| 7. ROLLBAR | 18. BRAKE PEDAL |
| 8. SUCTION HOSE | 19. BUMPER |
| 9. SUCTION COVER | 20. PEDAL ACCELERATOR |
| 10. SQUEEGEE HOSE | 21. OUTER FILTER DETERGENT SOLUTION |
| 11. SUCTION COVER BLOCKING LEVERS | 22. STEERING WHEEL |
| | 23. BOTTOM PLATE |
| | 24. BRUSH BASE GROUP |
| | 25. TRACTION WHEELS |



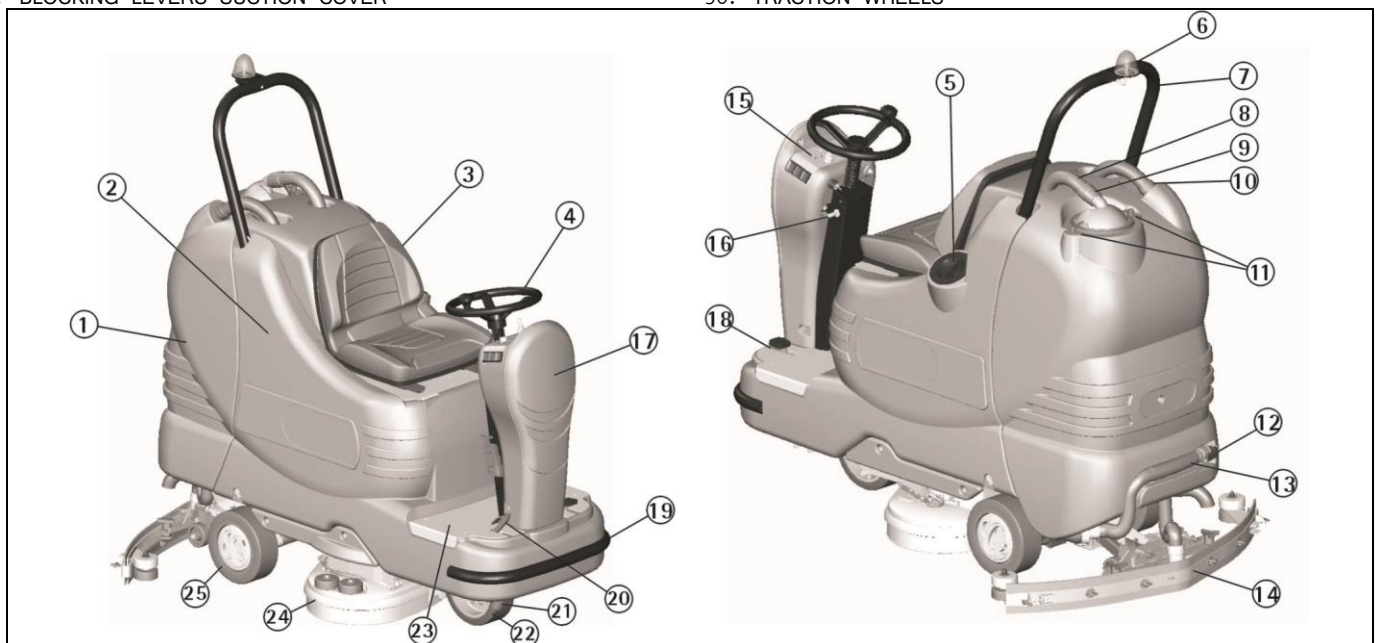
LEGEND PANEL OF CONTROLS

- 21. DISPLAY
- 22. SIGNAL LAMP MANUAL MODE ON
- 23. PUSH BUTTON CONNECTION MANUAL MODE
- 24. SIGNAL LAMP MODE BREAK WASHING ON
- 25. PUSH BUTTON CONNECTION MODE BREAK WASHING
- 26. PUSH BUTTON CONNECTION MODE AUTOMATIC
- 27. SIGNAL LAMP AUTOMATIC MODE ON
- 28. SIGNAL LAMP SUCTION MOTOR ON
- 29. SWITCH SUCTION MOTOR
- 30. ADJUSTMENT KNOB BRUSHES PRESSURE
- 31. PUSH BUTTON UP/DOWN SQUEEGEE
- 32. SIGNAL LAMP UP/DOWN SQUEEGEE
- 33. PUSH BUTTON VISUALIZATION HOUR METER (DISPLAY)
- 34. PUSH BUTTON VISUALIZATION BRUSHES PRESSURE SET (DISPLAY)
- 35. SIGNAL LAMP PARKING BRAKE ON
- 36. SIGNAL LAMP UP/DOWN BRUSHES
- 37. PUSH BUTTON UP/DOWN BRUSHES
- 38. SIGNAL LAMP STARTING BRUSHES ROTATION
- 39. PUSH BUTTON WATER OPENING (SOLENOID VALVE) or PUSH BUTTON ADJUSTMENT DETERGENT DOSAGE 3SD system (OPTIONAL)
- 40. SIGNAL LAMP WATER OPEN (SOLENOID VALVE)
- 41. PUSH BUTTON FOR SPEED SELECTION
- 42. SIGNAL LAMP SELECTION MAXIMUM SPEED
- 43. SIGNAL LAMP SELECTION SLOW SPEED
- 44. KEY SWITCH MACHINE ON
- 45. SWITCH FOR FRONT LIGHT (OPTIONAL)
- 46. PUSH BUTTON HORN
- 47. KNOB FOR SOLUTION VALVE
- 48. SELECTOR DIRECTION OF DRIVE



LEGEND MACHINE

- 26. RECOVERY TANK
- 27. SOLUTION TANK
- 28. SEAT
- 29. DRIVE WHEEL
- 30. SCREW CAP FOR INLET DETERGENT SOLUTION
- 31. BLINKING LIGHT
- 32. ROLLBAR
- 33. SUCTION HOSE
- 34. SUCTION COVER
- 35. SQUEEGEE HOSE
- 36. BLOCKING LEVERS SUCTION COVER
- 37. PLUG EXHAUST HOSE RECOVERY TANK
- 38. EXHAUST HOSE RECOVERY TANK
- 39. SQUEEGEE ASSEMBLY
- 40. PANEL CONTROLS
- 41. LEVER BLOCK/RELEASE PARKING BRAKE
- 42. COVER ELECTRICAL LAYOUT
- 43. BRAKE PEDAL
- 44. BUMPER
- 45. PEDAL ACCELERATOR
- 46. OUTER FILTER DETERGENT SOLUTION
- 47. STEERING WHEEL
- 48. BOTTOM PLATE
- 49. BRUSHES BASE GROUP
- 50. TRACTION WHEELS



INTRODUCTORY COMMENT

Thank you for choosing our machine. This floor-cleaning machine is used for industrial and commercial cleaning and is able to clean any type of floor. During its forward movement, the action of the brush and detergent solution removes the dirt, which is picked up by the suction system, resulting in a dry surface. The machine must be used only for this purpose. It gives the best performance if it is used correctly and properly. Therefore, we ask you to read this instruction booklet carefully whenever difficulties arise in the course of the machine's use. If needed, please contact our service department for advice and/or service.

GENERAL RULES

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

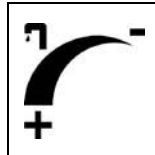
- Read the labels carefully on the machine. Do not cover them for any reason and replace them immediately if damaged.
- The machine must be used exclusively by authorized staff that has been instructed for its use.
- When using the machine, pay attention to other people, especially children.
- In case of danger, immediately use the emergency brake.
- To park the machine, take off the key and put on the parking brake.
- Do not mix different detergents to avoid harmful odors.
- Do not place any liquid containers onto the machine.
- The storage temperature has to be between -13°F and +131°F.
- The operating temperature should be between 32°F and 104°F.
- The humidity should be between 30 and 95%.
- Do not use the machine in an explosive atmosphere.
- Do not use the machine as a means of transportation.
- Do not use acidic solutions, which could damage the machine and/or injure people.
- 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.
- Watch out for shelves and/or scaffoldings, when operating the machine.
- Use the appropriate speed based on floor conditions (type of floor, dirtiness, etc).
- Do not use the machine on areas that have 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, contact an authorized technical assistant for advice.
- Where parts are required, ask for ORIGINAL spare parts to the distributor or an authorized dealer.
- Use only ORIGINAL brushes.
- When cleaning and performing maintenance operations, disconnect the power supply plug from the machine.
- Do not wash the machine with corrosive material, direct water jets or high water pressure.

- Every 200 working hours, have the machine checked by an authorized service center.
- In order to avoid scales on the solution tank filter, do not fill the detergent solution hours before it is used.
- Before using the machine, check that all panels and coverings are in position as indicated in this use and maintenance catalog.
- Be sure the recovery tank is empty before lifting it.
- Restore all electrical connections after any maintenance operation.
- When your machine has to stop activity, provide the appropriate waste disposal for its materials, especially oils, battery and electronic components. Consider that the machine itself has been constructed by recyclable materials.

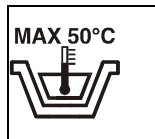
SYMBOLS



Symbol denoting the switch for the water opening and the signal lamp that the water is open.



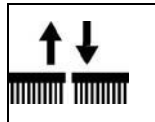
Symbol denoting the function of the solution valve adjusting the flow of the detergent solution.



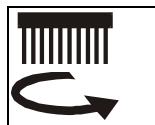
Indication of the maximum temperature of the detergent solution. It is placed near the charging hole of the solution tank.



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



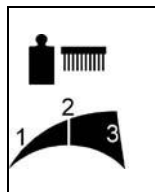
Symbol denoting the push button and the signal lamp up/down brush.



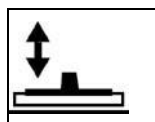
Symbol denoting the signal lamp starting the brush rotation.



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



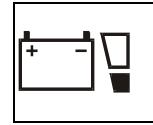
Symbol denoting the functioning of the adjustment knob of brush pressure.



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



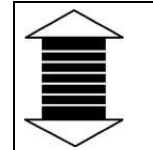
Symbol denoting the switch of the vacuum motor.



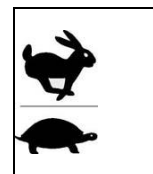
Symbol denoting the charge level of the battery.



Symbol denoting the push button to visualize the hour meter on the display.



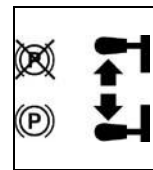
Symbol denoting the drive selector forwards/backwards.



Symbol denoting the selection switch of the operation speed.



Symbol denoting the signal lamp of the parking brake switched on.



Symbol denoting the lever position for the connection of the parking brake.



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.

BEFORE USE

HANDLING THE PACKED MACHINE

The machine is supplied with suitable packing for forklift truck handling.

The total weight is 756 lbs.

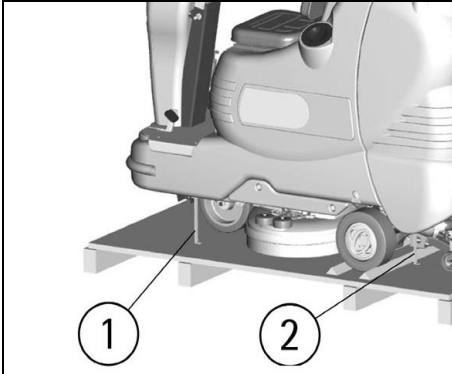
Packing dimensions:

Base: 70 in x 37 in

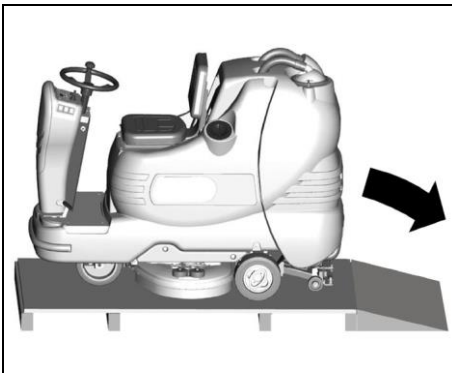
Height: 54 in

UNPACKING THE MACHINE

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



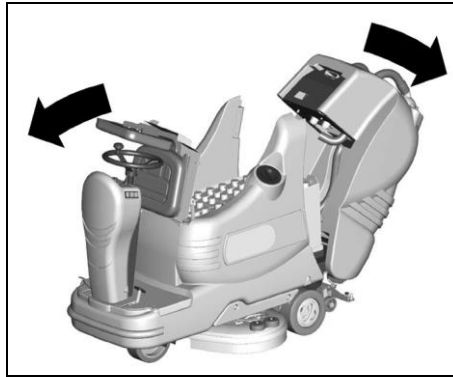
3. Move the machine backwards, as indicated in the figure, avoiding heavy contacts to mechanical parts.



4. Keep the pallet and the brackets for future transport.

ACCESS TO THE BATTERY COMPARTMENT

1. Bring the machine on a leveled surface.
2. Pull the seat platform forward up to the blocking of the support.
3. Make sure that the recovery tank is empty; otherwise proceed to its emptying (see "RECOVERY TANK EMPTYING AND CLEANING").
4. Pull the recovery tank.
5. To close the battery compartment, reposition the recovery tank. Then, release the support of the seat platform and carefully pull the seat back into its proper place.



BATTERY INSTALLATION AND SETTING THE BATTERY TYPE

The machine is equipped either with a battery in serial connection or elements of DIN-type assembled together and connected in series for a total of 36 Volts, placed in its appropriate compartment under the seat platform. It must be handled using suitable lifting equipment (due to weight, considering the type of battery chosen, and coupling system).

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



ATTENTION:
CHECK THE SETTING OF THE CHECK CARD (see "BATTERY CHARGE LEVEL INDICATOR").

In case of WET battery installation, it is necessary to set the battery check card. Please contact an authorized technical assistant.



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

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

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

ASSEMBLING THE ROLLBAR

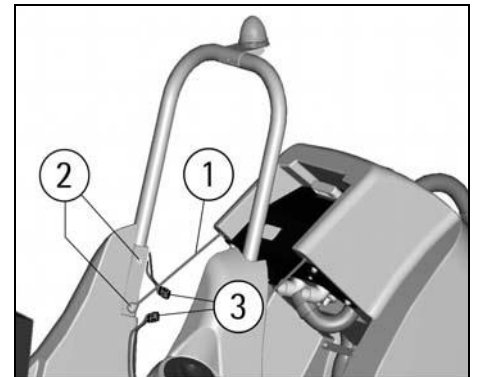
For packing reasons, the support of the blinking light is supplied disassembled.

In each seat on the solution tank there are two screws. On the lower screw the safety cable (1) is fixed to prevent the overturn of the recovery tank when this is being opened.

Proceed as follows:

1. Take off the two screws (2) from the seats on the tank.
2. Place the roll bar in its position so that the side, where the cable of the blinking light comes out, corresponds to the side of the machine where the cable on the tank is present.
3. Fasten the screws through the holes of the roll bar.
4. Complete the assembly connecting the connectors (3) to supply the blinking light. To remove the battery from the machine, take off only the upper screws (where the cable is not fixed) from their seats and rotate the roll bar

backwards.



BATTERY RECHARGER

Make sure that the battery recharger is suitable for the installed battery both for their capacities and for type (WET and equivalent).

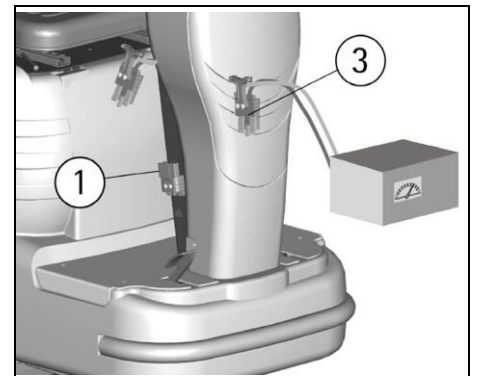
In the plastic bag containing the use and maintenance you will find the coupling connector for the recharger. It must be assembled onto the cables of your recharger, following the instructions given by the manufacturer.



ATTENTION:
This operation must be carried out by qualified staff. A wrong or faulty cable connection can cause serious damage.

BATTERY RECHARGING

1. Plug the connector (3) of the battery recharger into the battery connector (1) fixed on the steering column.
2. Proceed to 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.**

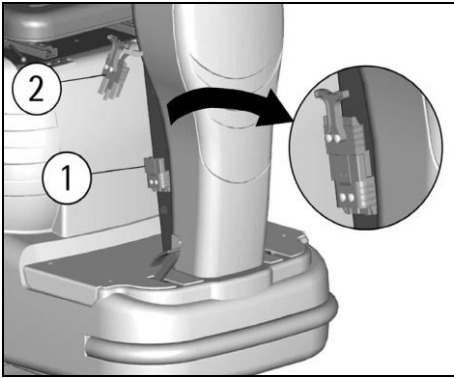
BATTERY DISPOSAL

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). 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").

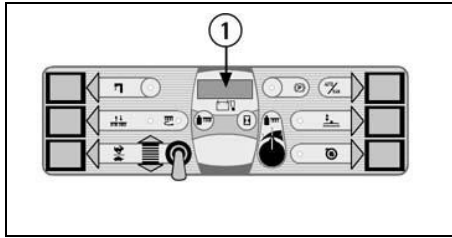


BATTERY CHARGE LEVEL INDICATOR WHEN THE MACHINE IS SWITCHED ON, THE SCREEN (1) DISPLAYS THE FOLLOWING INFORMATION:

1. the version (for example A003) of software installed on the machine.
2. the setting of the battery check card, which can be:
GE 36: check card set for WET battery.
or
3. The battery 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 10 to 10. When the charge level reaches 20%, the display starts blinking.

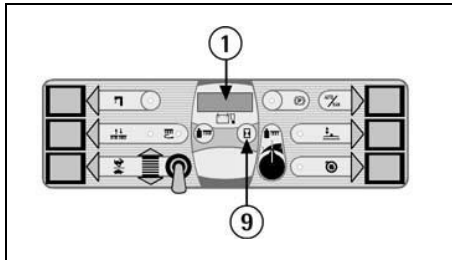
⚠ ATTENTION:

A few seconds after the 10% indication, the blinking of four lines will appear. All the functions stop automatically. With the remaining charge, it is possible to finish the drying operation before proceeding to the recharge.



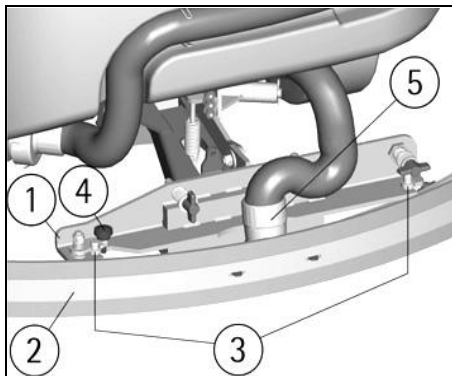
HOUR METER

The machine is equipped with an hour meter located on the same display (1) of the battery charge level indicator. Hold the button (9) to show the working hours on the screen. Hold the button a few more seconds for the working minutes to appear.



SQUEEGEE ASSEMBLY

1. Keep the squeegee support (1) slightly lifted from the floor.
2. Insert the two stud bolts (3) placed on the upper part of the squeegee (2) inside the slots on the support.
3. Block the squeegee by rotating the lever (4) clockwise.
4. Insert the squeegee hose (5) into its coupling, respecting its position as indicated in the figure.



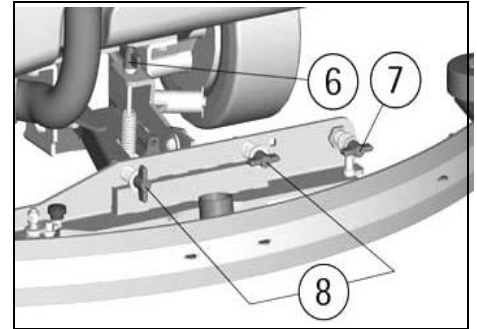
SQUEEGEE ADJUSTMENT

In order to have better drying result with the squeegee, the rear rubber must have its lower bending uniformly adjusted in all its length. For the adjustment, the vacuum motor has to be switched on and the brushes have to function together with the detergent solution.
Adjusting the bend: lower part of the rubber
Adjust the pressure by rotating the wind nut (6). To increase: rotate clock-wise. To decrease, rotate the lever counter-clockwise.
The bending is not uniform
Adjust the squeegee inclination by rotating counter-clockwise the wing nut (7) to increase

the bend in the central part, and clockwise to increase the bend on the extremities.

Height adjustment

Once the pressure and inclination of the squeegee have been adjusted, make sure that the wheels slightly touch the floor. Rotate the registers (8) counter-clockwise to lower the wheels or clockwise 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 friction results to be high) need little pressure, while smooth floors (ceramics) need higher pressure. If the cleaning operations are always made on the same type of floor, adjust according to rubber wear.

SPLASH GUARD ASSEMBLY

(BD 26/30)

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

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

With the brush assembled, the splashguard must slightly touch the floor.

For above disassembly, it is necessary to follow the directions in reverse order.

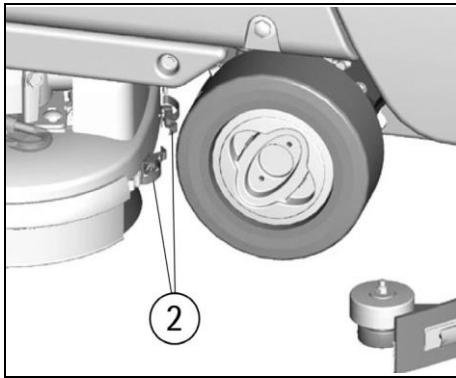
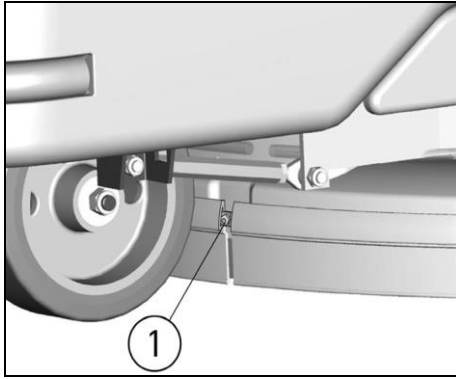
(BD 33/30)

The two splashguards have to be assembled onto the brush base group. Insert the metal strips inside the slots present on the rubber. Place the round hole at the flat extremity of the strip onto the pins placed in the rear part of the brush base group. Secure the strips through the nuts blocking them.

Block the coupling lever (2) in the front part of the brush base group to the ring placed at the extremity of the metal strips. Please act as above for both splashguard rubbers.

With the brush assembled, the splashguard must slightly touch the floor.

For above disassembly, it is necessary to follow the directions in reverse order.



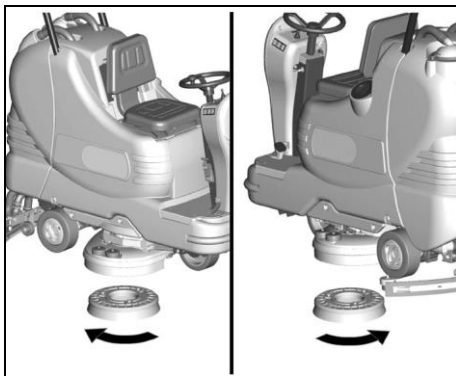
BRUSH ASSEMBLY

To assemble the brush it is necessary that the brush base is in the lifted position. If it is not lifted, proceed as follows:
Without the operator seated, turn 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 by turning the key counter-clockwise.



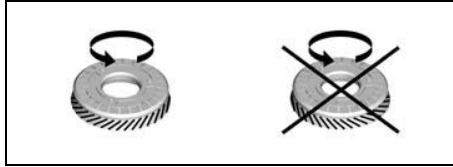
ATTENTION:
Carrying out brush assembly operations with the electric supply on may cause damages.

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



For longer brush life, invert them daily. If brushes seem to be deformed, reassemble them

in the same position. Avoid having different inclinations of the bristles, which cause excessive motor overload or troublesome vibrations.

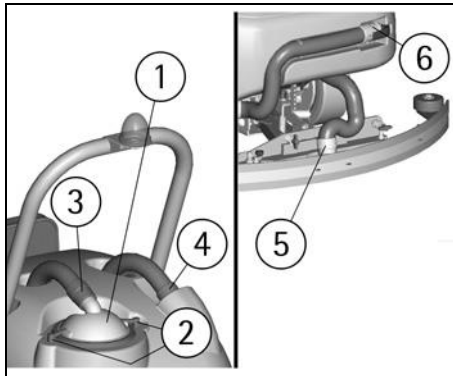


ATTENTION:
Use only brushes supplied with the machine. The use of other brushes may damage the machine.

FLOOR CLEANING

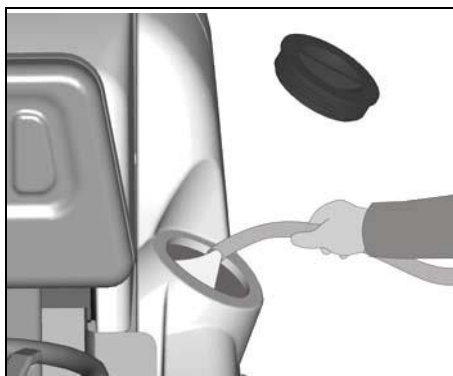
RECOVERY TANK

Rotate the levers (2). Check that the cover of the suction filter (1) is correctly secured, and that the vacuum 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) is placed in the lower rear part of the machine.



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. Add the liquid detergent in the percentage and conditions shown by the manufacturer. To avoid excessive foam presence, use the minimum percentage of detergent. Screw down the plug to close the tank.



ATTENTION:
Always use low foam detergent. To avoid foam presence, pour into the recovery tank a minimum quantity of anti-foam product. Never use pure acid.

STARTING THE MACHINE

A safety device prevents the machine from moving when the operator is not seated correctly.

To switch on the machine:

1. Sit on the guiding place.
2. Turn the key switch clock-wise to switch on the machine.
3. Check the charge level of the battery on the display (1).
4. Click the switch (3) upwards to choose automatic operation (AUTO) and downwards to use the manual function (MAN).

A. If the selector (3) is in "AUTO," the machine activates and deactivates all the working functions in an automatic mode (see under paragraph "WORKING IN AUTOMATIC MODE").

B. If the selector (3) is in "MAN", you may choose to:

- I. carry out the only transfer of the machine without activating or deactivating the working functions.
- II. activate separately only the controls relative to the washing function with the brush (see under paragraph "WORKING IN MANUAL MODE").
- III. activate separately only the controls relative to the drying function with the squeegee (see under paragraph "WORKING IN MANUAL MODE").



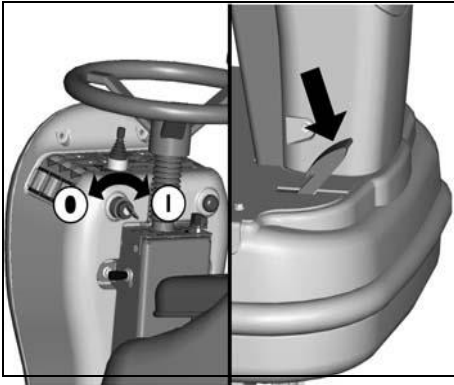
ATTENTION:
In manual mode every function of the machine has to be activated or deactivated manually.



ATTENTION:
This function of the machine can only be carried out in manual mode.

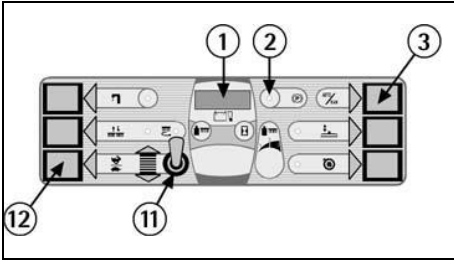
To activate the movement of the machine, proceed as follows:

5. Check through the signal lamp (2) that the parking brake is not in place. (see "EMERGENCY-PARKING BRAKE" to release parking brake).
 6. Select whether to go forward or backwards using the switch (11).
 7. Press onto the accelerator pedal placed on the right side to start the machine.
 8. Pressing the speed selector (12). For a faster speed, press upwards. For a slower speed, press downwards.
- When in reverse, an intermittent warning device is activated.



HORN

The machine is equipped with a horn, press push button (1) to use it.



BRAKE

To stop the machine during normal working situations, release the accelerator pedal. The machine has an electronic brake system. To restart, press the accelerator pedal.

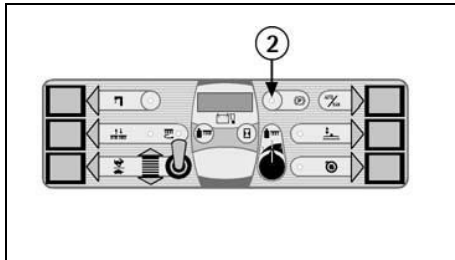
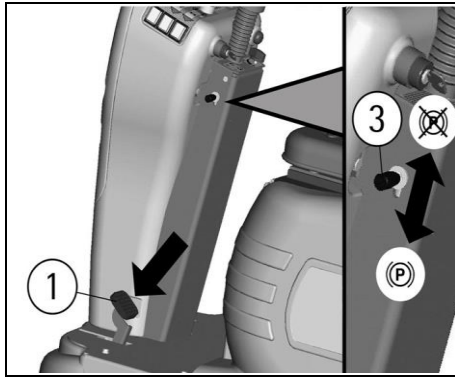
EMERGENCY AND PARKING BRAKE

In case of an emergency press the pedal of the emergency and parking brake (1) placed on the left side.

To insert the parking brake press the brake pedal (1) and simultaneously move downwards the lever (3) placed on the left side of the steering column.

On the instrument board the signal lamp (2) comes on which signals that the parking brake is inserted.

To release the parking brake press the brake pedal (1) and simultaneously lift the lever (3) upwards.



AUTOMATIC SQUEEGEE LIFT WHEN GOING BACKWARDS

By selecting the backward movement, the squeegee is lifted up automatically. It will lower itself during forward movement.

This feature is both for automatic and manual modes.

WORKING IN AUTOMATIC MODE

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

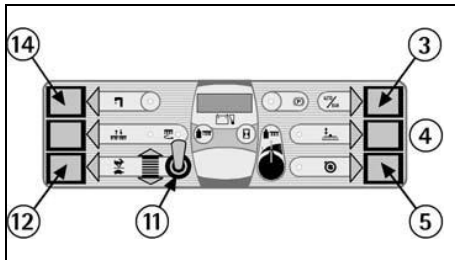
1. Activate the machine by pressing the selector (3) upward to choose the automatic function (AUTO), (see "STARTING THE MACHINE").
2. Adjust the movement speed in forward with the selector (12) (see "STARTING THE MACHINE").

Use the selector (11) to go forward and press the accelerator pedal. The machine starts to move and all working functions are activated automatically.

During backward movement, the squeegee lifts automatically and will then return to lower itself during the next forward movement.

If the accelerator pedal is released for more than 3 seconds, all functions are switched off and both the brush base and squeegee are lifted.

To reactivate the machine, just press the pedal and proceed with the operation.



WORKING IN MANUAL MODE

The manual mode is useful when the operator wants to carry out separately the washing and drying of the floor.

⚠ ATTENTION:
Washing and drying functions that are not carried out simultaneously represent an improper use of the machine ("GENERAL RULES"). If they are carried out separately, forbid the working areas to the passage of non-authorized personnel. Signal the areas of moist floors with suitable signs.

⚠ ATTENTION:
This function can only be carried out only in manual mode (see under paragraph "STARTING THE MACHINE").

To activate the machine in manual mode (MAN), press the selector (3) downward. (see under paragraph "STARTING THE MACHINE").

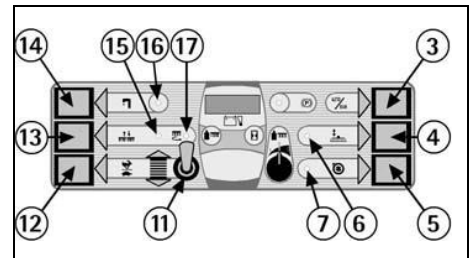
TO CARRY OUT THE WASHING FUNCTION:

1. Press the push button (13) of the brush base to lower the brush. Once it is lowered, the brushes begin to turn. The signal lamp (15) indicates that the brush base is lowering or lifting, while the signal lamp (17) signals that the brushes are turning.
2. Press the switch (14) to open the solenoid valve, allowing the detergent solution to flow onto the brush. The signal lamp (16) will indicate that the solenoid valve is open.

TO CARRY OUT THE DRYING FUNCTION:

1. Press the push button (4) to lower the squeegee. The signal lamp (6) will indicate the lowering or lifting of the squeegee.
 2. Press the switch (5) of the vacuum motor to start the suction system. The signal lamp (7) indicates that the machine is drying.
- Adjust the movement speed using the selector (12) (see "STARTING THE MACHINE"). When the selector (11) is turned on and the accelerator pedal is pressed, the machine begins to move forward. It works according to the set functions.

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



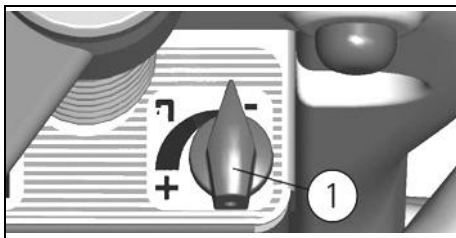
WORKING ADJUSTMENTS

Check whether the following is working properly:

1. The squeegee adjustment results in a dry floor (see "ADJUSTMENT OF THE SQUEEGEE").
2. The adjustment of the detergent solution flow is sufficient to wet the floor uniformly avoiding the leakage of detergent from the splashguards (see "FLOW ADJUSTMENT OF THE DETERGENT SOLUTION").
3. The brush pressure permits an efficient washing action. (see "BRUSH PRESSURE ADJUSTMENT").

FLOW ADJUSTMENT OF DETERGENT SOLUTION

To adjust the detergent solution quantity that flows down onto the brush, turn the solution valve knob (1) placed on the right of the steering column. Rotate counter-clockwise to increase the flow, clock-wise to reduce the flow.

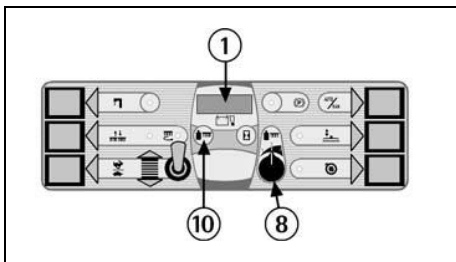


BRUSH PRESSURE ADJUSTMENT

Turn the knob (8) to adjust the brush pressure onto the floor in three pre-set pressure levels. The display (1) shows the pressure in lbs., which was previously set by pressing the push button (10).

⚠ ATTENTION:

To avoid overload of the brush motor, reduce the brush pressure when going from smooth floors to rough ones (ex. concrete).

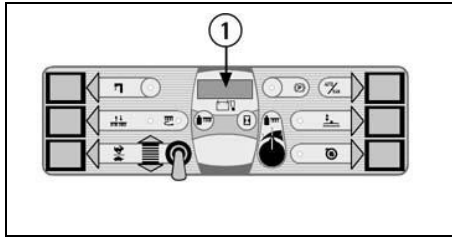


ELECTRIC PROTECTION

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 "AL01" to "AL20".

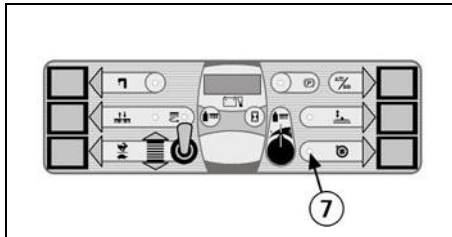
⚠ ATTENTION:

To restore the function of the component, turn off the machine and restart it using the key switch. If the problem persists, please contact an authorized technical assistant.



OVERFLOW DEVICE

In order to avoid serious damage to the vacuum motor, the machine is equipped with a float that intervenes when the recovery tank is full, closing the suction, switching off the signal lamp (7) and consequently the drying stops. When this happens, empty the recovery tank (see "RECOVERY TANK EMPTYING AND CLEANING").



STOPPING THE MACHINE AFTER CLEANING OPERATION

IN AUTOMATIC WORKING MODE:

If the selector (3) is in position (AUTO):

1. Release the foot from the accelerator pedal for more than 3 seconds.
2. Turn the switch key counter-clockwise to switch off the machine.
3. Insert the parking brake (see under paragraph "EMERGENCY-PARKING BRAKE").

⚠ ATTENTION:

This function can only be carried out in manual mode.

IN MANUAL WORKING MODE:

If the selector (3) is in position (MAN):

TO SWITCH OFF THE WASHING FUNCTION

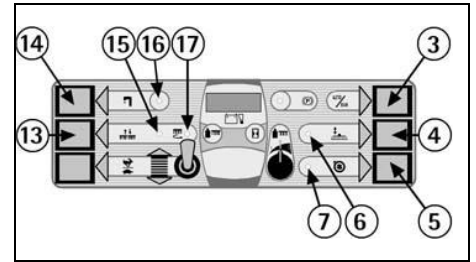
1. Press upwards the switch (14) to close the solenoid valve. The signal lamp (16) has to come off.
2. Press the push button (13) up/down of the brush base to lift the brushes in rest position. The signal lamp (15) indicates that the brush base is lifting, while the signal lamp (17) turns off and the brushes stop turning.

TO SWITCH OFF THE DRYING FUNCTION

1. Press the push button (4) up/down squeegee to lift the squeegee in rest position. The signal lamp (6) indicates that the squeegee is lifting.
2. Wait for a few seconds and then press the switch (5) of the vacuum motor to switch off the suction system. The signal lamp (7) turns off.

When all the functions are switched off:

1. Carry out any possible transfer of the machine.
2. Turn the key switch counter-clockwise to switch off the machine.
3. Insert the parking brake (see "EMERGENCY-PARKING BRAKE").



DAILY MAINTENANCE

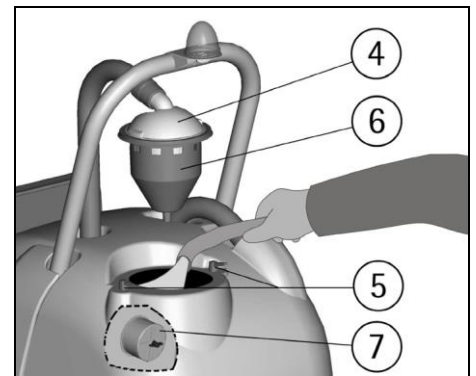
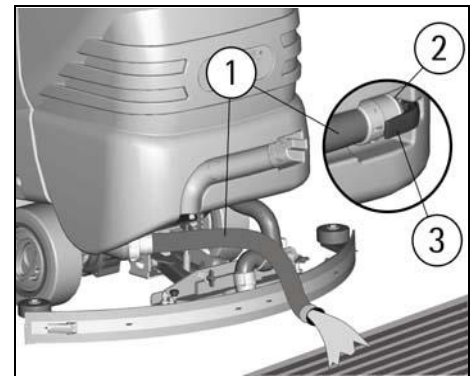
⚠ ATTENTION:

For protection against dangerous solutions, all the following maintenance and cleaning operations that refer to the following components must be carried out using gloves:

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

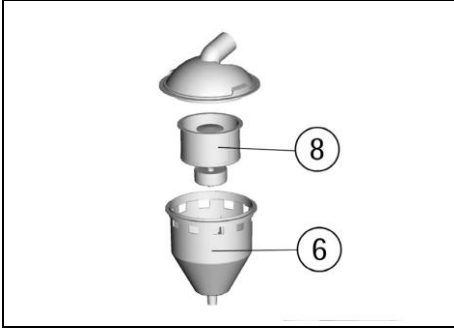
RECOVERY TANK EMPTYING AND CLEANING

1. Hold the exhaust hose (1) placed in the rear lower part of the machine after having taken it off from its fixing support.
2. Take off the plug (2) from the exhaust hose by pulling its lever (3). Empty the recovery tank into appropriate containers. Comply rules concerning liquid disposal.
3. Take off the 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 through the tank opening and clean the float screen.
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 its filter protection (6).
3. Clean all parts with a water jet, especially the inside surfaces and the filter bottom.
4. Carry out cleaning operations carefully.
5. Reassemble all parts.



BRUSH CLEANING

Disassemble the brush and clean them with a water jet (see "BRUSH DISASSEMBLY").

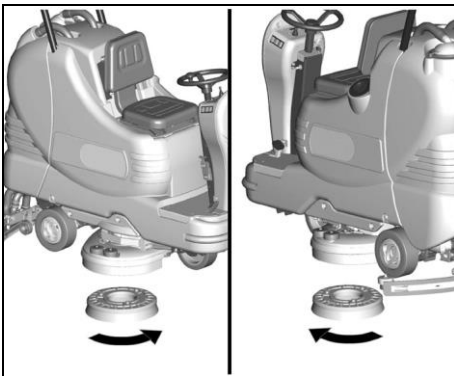
BRUSH DISASSEMBLY

With the brush base in the lifted position, rotate the brush until it becomes free from the coupling spring. Wash them with a water jet. The figure shows the direction to rotate the brush.



ATTENTION:

Carrying out brush disassembly operations with the electric supply on may cause injury.

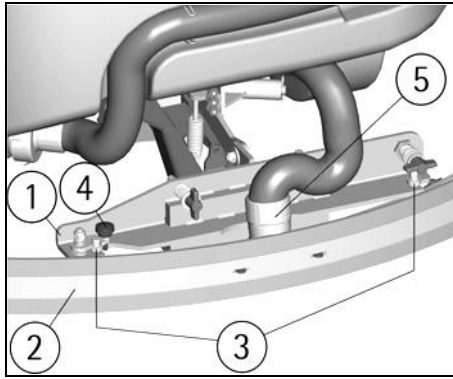


SQUEEGEE CLEANING

Keep the squeegee clean for the best drying results.

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 rotating the lever (4) counter-clockwise, making slide the stud bolts (3) in the slots up to their release.
3. Clean with care the internal part of the squeegee inlet eliminating dirt residuals.
4. Clean with care the squeegee rubbers.
5. Reassemble all parts.



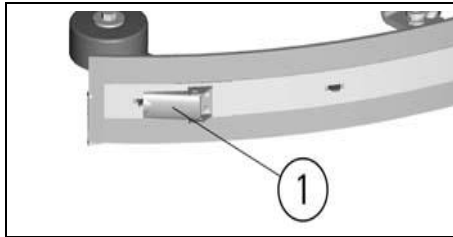
WEEKLY MAINTENANCE

REAR SQUEEGEE RUBBER CHECK

Check the wear of the squeegee rubber.

For the replacement, it is necessary to:

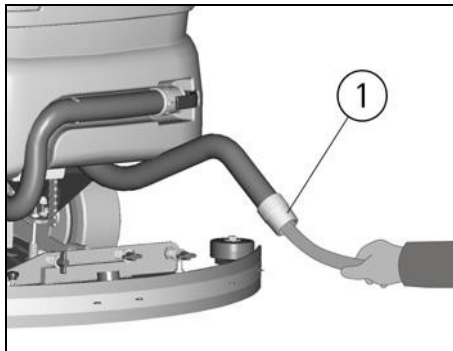
1. Lift the squeegee (see "STOP OF MACHINE AFTER CLEANING OPERATION").
2. Release the hook (1) of the rubber holder blade and take off the rubber.
3. Turn the rubber to a new side or replace it. To reassemble the squeegees follow the directions above in reverse, inserting the rubber on the guides and blocking it with the rubber holder blade.



SQUEEGEE HOSE CLEANING

Weekly or in case of insufficient suction, 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 follow the directions above in reverse.



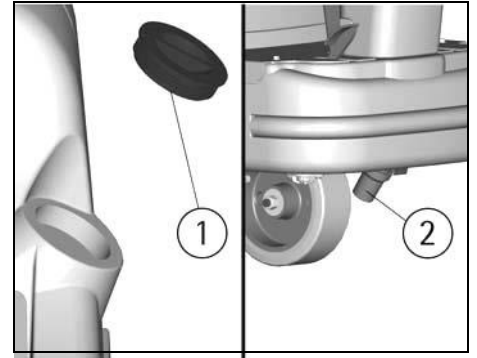
CLEANING THE SOLUTION TANK AND THE OUTER FILTER

1. Bring the machine to an appropriate place to drain the detergent solution
2. Unscrew the solution tank cap (1).
3. Unscrew the cap of the exhaust filter (2) and take off the filter. Be careful not to lose the gasket of the cap.
4. Open the solution valve (see "FLOW ADJUSTMENT OF DETERGENT

SOLUTION"), so that the detergent solution flows down into appropriate containers.

5. Rinse with a water jet the solution tank and the components of the filter.
6. Reassemble all parts.

NOTE: if needed it is possible to wash only the components of the outer solution filter as above-mentioned by closing the solution valve adjustment (see "FLOW ADJUSTMENT OF THE DETERGENT SOLUTION"), so that the detergent solution remains in the solution tank.



TWO-MONTH MAINTENANCE

FRONT SQUEEGEE RUBBER CHECK

Check the wear of the squeegee rubber.

For replacement it is necessary to:

1. Take off the squeegee (see "SQUEEGEE CLEANING").
2. Unscrew the wing nuts in the front part of the squeegee.
3. Take off the rubber holder blade.
4. Replace the front rubber.
5. Reassemble all parts.

SIX-MONTH MAINTENANCE

SPLASH GUARD RUBBER CHECK

With the brush assembled, the splashguards must slightly touch the floor. If they are worn, they have to be replaced. It is necessary to release the springs from the slots placed at free extremities of the metal strips to take off the rubbers and to reinsert the new ones. The springs are placed in the rear part of the brush base group for model BD 26/30 and in the front part for the model BD 33/30. (see "SPLASH GUARD ASSEMBLY").

CLEANING THE INNER FILTER SOLUTION TANK

Empty the solution tank; remove the fitting of the water outlet by taking off the two screws that fix it to the tank in the front part of the machine. Clean the inside filtrating part of the fitting from dirt. Pour some water into the tank to clean it. Reassemble the fitting onto the solution tank.

CHECKING THE BRAKE

Check the braking efficiency of both rear wheels. Should the braking be insufficient, please contact an authorized technical assistant.

TROUBLESHOOTING GUIDE

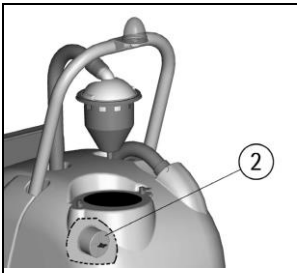
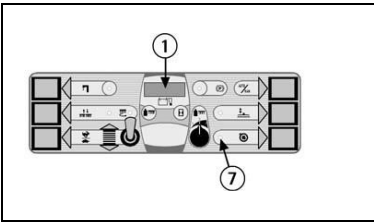


ATTENTION:

If the machine is on, and the display and/or other functions are not activated, check the battery connection of the machine (see “CONNECTING BATTERY” AND SWITCHING ON THE MACHINE”). If the problem persists, please contact an authorized technical assistant.

THE VACUUM MOTOR DOES NOT WORK

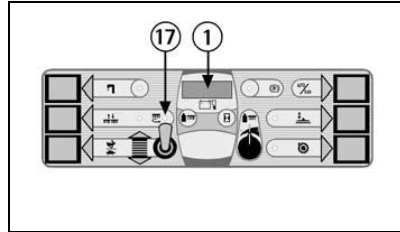
1. Verify that the machine is on. If alarm signals appear, turn off the machine and restart it.
2. Check the charge level of the battery on the display (1).
3. Verify that the drying function is activated correctly (see “STARTING THE MACHINE”).
4. Check that the recovery tank is not full.
5. Check that the float switch (2) in the recovery tank is assembled correctly.
6. For both in mode (MAN) as (AUTO), if the signal lamp (7) is on but the suction system does not work, it is necessary to rotate the recovery tank (see “ACCESS TO THE BATTERY COMPARTMENT”). Check the connection of the vacuum motor plug at the bottom of the tank. If the problems persist, please contact an authorized technical assistant.



THE BRUSH MOTOR DOES NOT WORK

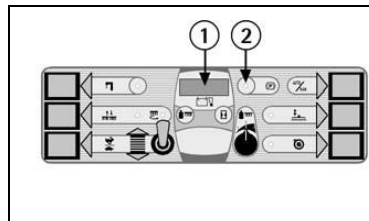
1. Verify that the machine is on. If alarm signals appear, turn off the machine and restart it.
2. Check the charge level of the battery on the display (1).

3. Verify that the function of washing with the brush is activated (see “STARTING THE MACHINE”).
4. If the signal lamp (17) is on but the brush does not turn, please contact an authorized technical assistant. If problems persist, please contact an authorized technical assistant.



THE TRACTION MOTOR DOES NOT WORK

1. Sit on the guiding place.
2. Verify that the machine is on. If alarm signals appear, turn off the machine and restart it.
3. Check the charge level of the battery on the display (1).
4. Check through the signal lamp (2) that the parking brake is not inserted. (see “EMERGENCY-PARKING BRAKE”).
5. Press the accelerator pedal placed on the right side to start the machine. If problems persist, please contact an authorized technical assistant.

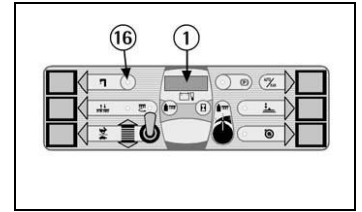


THE WATER DOES NOT COME DOWN ONTO THE BRUSH OR IS INSUFFICIENT

1. Verify that machine is on.
2. Check the charge level of the battery on the display (1).
3. Verify that the function of washing with the brush is activated correctly (see “STARTING THE MACHINE”).
4. Check that the solution valve is open (see “FLOW ADJUSTMENT OF DETERGENT SOLUTION”).
5. If the signal lamp (16) is on but the detergent solution does not come down onto the brush, do the following:
 - a. check the level of the liquid in the tank.
 - b. check that the solution filter is clean (see “CLEANING THE SOLUTION TANK AND OF THE OUTER FILTER”).

- c. check that the inner filter of the solution tank is clean (see under paragraph “CLEANING THE INNER FILTER SOLUTION TANK”).

If the problem persists, please contact an authorized technical assistant.



THE MACHINE DOES NOT CLEAN PROPERLY

1. The brushes do not have suitable bristle dimension, contact an authorized technical assistant.
2. The brushes have worn bristles. Check the brush wear condition. If needed, replace them (the brushes have to be replaced when the bristles have reached a height of .60 in). To replace the brushes, see instructions under “BRUSH DISASSEMBLY” and “BRUSH ASSEMBLY”.
3. The detergent solution is insufficient: open more the solution valve (see “FLOW ADJUSTMENT OF DETERGENT SOLUTION”).
4. Check that the liquid detergent is in the recommended percentage.
5. Increase the brush base pressure (see “BRUSH PRESSURE ADJUSTMENT”). Contact authorized technical assistance for advice.

THE SQUEEGEE DOES NOT DRY PROPERLY

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 “SQUEEGEE CLEANING”).
3. Check the height and the inclination of the squeegee (see “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 “SUCTION FILTER CLEANING”).
6. Clean the squeegee hose (“SQUEEGEE HOSE CLEANING”).
7. 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 BATTERY ELECTROLYTE		•		
CHECK THE BRAKE				•
TRACTION MOTOR CHECK				•
BRUSH MOTOR CHECK				•
VACUUM MOTOR CHECK				•
CHECK BRUSH BASE GROUP			•	
SCREW TIGHTENING				•

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

WARRANTY REGISTRATION FORM

Please provide additional information on Tornado equipment: (Check choices below)

<input type="checkbox"/> Automatic Scrubbers	<input type="checkbox"/> Sweepers
<input type="checkbox"/> Propane Floor Machines	<input type="checkbox"/> Rotary Floor Machines
<input type="checkbox"/> High Speed Burnishers	<input type="checkbox"/> Carpet Vacuums
<input type="checkbox"/> Carpet Extractors & Spotters	<input type="checkbox"/> Wet/Dry Vacs
<input type="checkbox"/> Steam Cleaners	<input type="checkbox"/> Jumbo Vacs
<input type="checkbox"/> Ride-on Equipment	<input type="checkbox"/> Pressure Washers

See complete product info at www.tornadovac.com

SELLING DEALER: (required)

Please print clearly.

COMPANY/INSTITUTION	
CONTACT NAME	TITLE
ADDRESS	CITY/STATE/ZIP CODE
PHONE	FAX
DATE OF PURCHASE	EMAIL

See white metal plate or sticker on unit for this information.

MACHINE TYPE/MODEL NUMBER:	MACHINE SERIAL NUMBER:
1.	1.
	2.

Facility Description (please circle all that apply)

1. School	9. Hospital	17. U.S. Govt.
2. Retail Store	10. Nursing Home	18. Other Govt.
3. Restaurant	11. Religious Institution	19. Auto Service
4. Office Building	12. Airport	20. Shopping Ctr.
5. Contract Cleaning	13. Warehouse	21. Non-Profit
6. Light Manufacturing	14. Apartment/Condo	22. Other (specify)
7. Heavy Manufacturing	15. Warehouse	_____
8. College/University	16. Supermarket	_____

How did you first learn about Tornado cleaning and maintenance equipment?	In square feet (meters)	
	Total Hard Floor Area	Total Carpeted Area Square feet (square meters)
<input type="checkbox"/> Contacted by local dealer	<input type="checkbox"/> 0-10,000 (0-930)	<input type="checkbox"/> 0-10,000 (0-930)
<input type="checkbox"/> Previous experience with Tornado products	<input type="checkbox"/> 10-50,000 (930-4,650)	<input type="checkbox"/> 10-50,000 (930-4,650)
<input type="checkbox"/> Reputation/Recommendation	<input type="checkbox"/> 50-250,000 (4,650-23,250)	<input type="checkbox"/> 50-250,000 (4,650-23,250)
<input type="checkbox"/> Advertising <input type="checkbox"/> Direct mail	<input type="checkbox"/> Over 250,000 (over 23,250)	<input type="checkbox"/> Over 250,000 (over 23,250)
<input type="checkbox"/> Internet		
<input type="checkbox"/> Other _____		

Damage or defect arising from abuse, neglect, or other misuse is excluded from this warranty. Other items may or may not apply based on your specific machine. If any defect occurs, the warranty is voided if service is attempted by non-Authorized Tornado Service Centers.

Return to:
Tornado Industries
7401 W. Lawrence Avenue
Chicago, IL 60706
Fax: (708) 867-6968

Tornado®

Today's Innovative Leader in Cleaning and Maintenance Equipment