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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*

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.

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.

10 Years:
All plastic tanks and rotationally-molded bodies

2 Year:
On all Tornado components
****except as shown below***

1 Year:
Labor on all Tornado cleaning equipment
****except as shown below***

1 Year:
Warranty on batteries and chargers, one year, pro-rated
All battery warranties are handled by the battery manufacturer, please call customer service for more information.

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 inluding 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.

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.

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Form# F2665-Rev.4/01/07 IH
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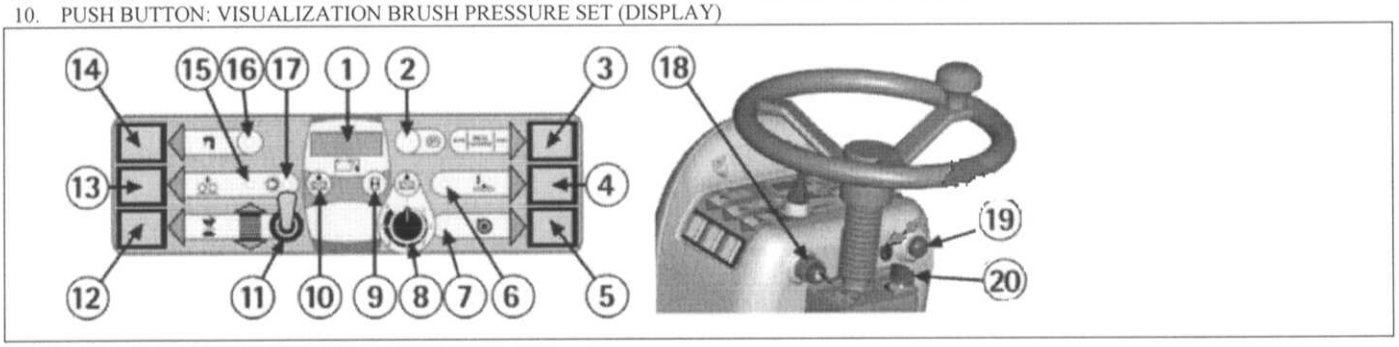
PRODUCT SPECIFICATIONS – RIDER SCRUBBERS		
Model	BD 26/30	BD 33/30
Machine Dimensions		
L X W X H	65" X 28" X 67"	65" X 35" X 67"
Net Weight	679 lbs.	690 lbs.
Solution / Recovery Tank	30 / 32 gal.	30 / 32 gal.
Squeegee Width	39"	45"
Design Characteristics		
Tank Construction	Polyethylene	Polyethylene
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

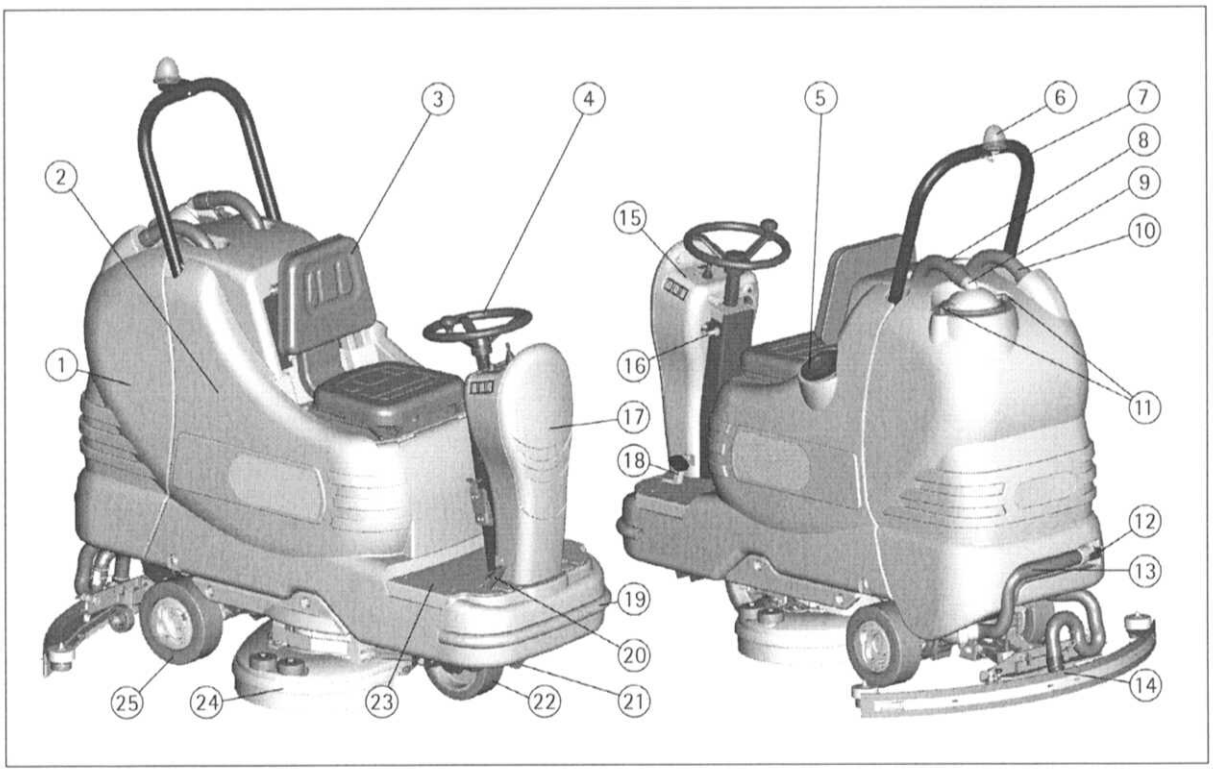
LEGEND: PANEL OF CONTROLS

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



LEGEND: MACHINE

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



INTRODUCTORY COMMENT

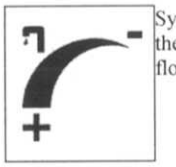
Thank you for choosing our machine. This floor-cleaning machine is used for industrial and commercial cleaning and is able to clean any type of floor. During its forward movement, the action of the brush and detergent solution removes the dirt, which is picked up by the suction system, resulting in a 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 perso[illegible]
- 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.

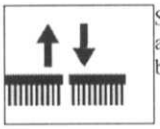
SYMBOLS

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.

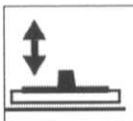
Indication of the maximum temperature of the detergent solution. It is placed near the charging hole of the solution tank.

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

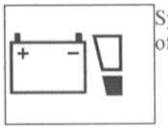

Symbol denoting the push button and the signal lamp up/down brush.

Symbol denoting the signal lamp starting the brush rotation.

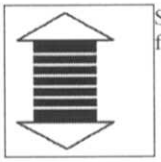
Symbol denoting the push button

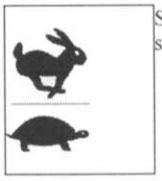

Symbol denoting the push button and the signal lamp up/down of the squeegee.

Symbol denoting the switch of the vacuum motor.

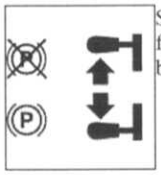

Symbol denoting the charge level of the battery.

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.

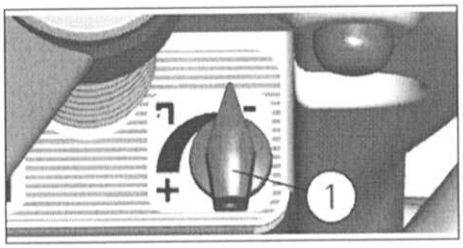
WORKING ADJUSTMENTS

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.

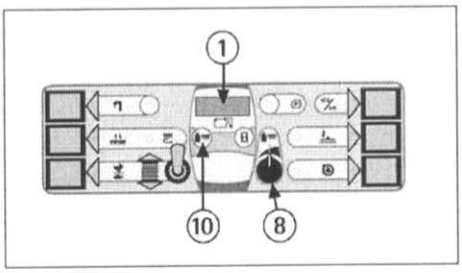


BRUSH PRESSURE ADJUSTMENT

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).

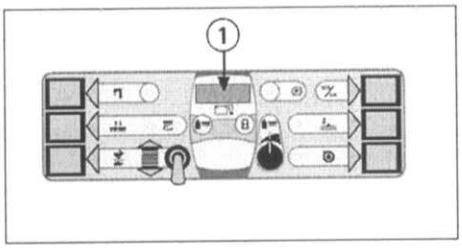


ELECTRIC PROTECTION

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".

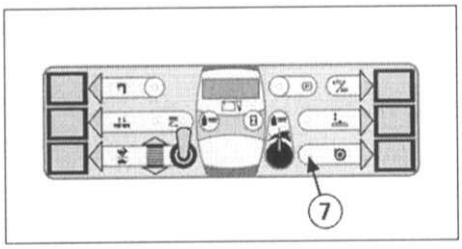
ATTENTION:

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

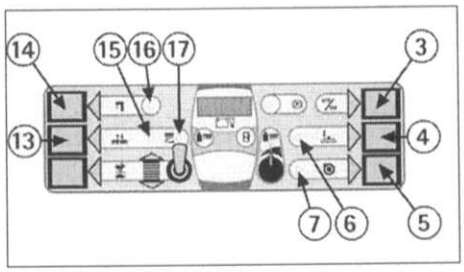
1. Press upwards the switch (14) to close the solenoid valve. The signal lamp (16) has to come off.
2. Press the push button (13) up/down of the brush base to lift the brushes in rest position. The signal lamp (15) indicates that the brush base is lifting, while the signal lamp (17) turns off and the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

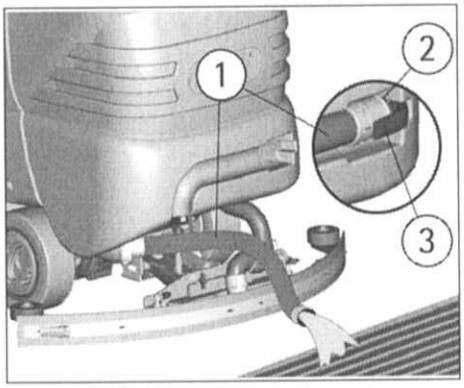
ATTENTION:

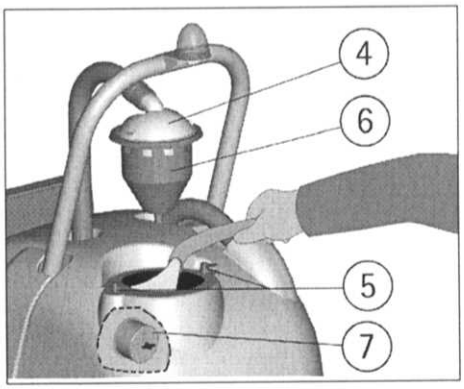
For protection against dangerous solutions, all the following maintenance and cleaning operations that refer to the following components must be carried out using gloves:

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

RECOVERY TANK EMPTYING AND CLEANING

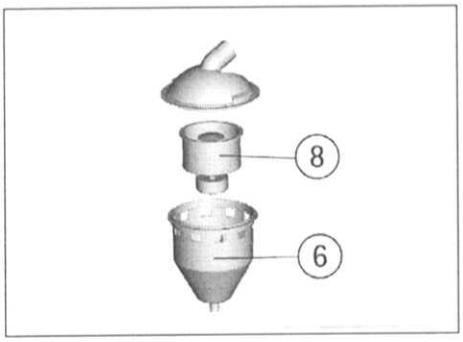
1. Hold the exhaust hose (1) placed in the rear lower part of the machine after having taken it off from its fixing support.
2. Take off the plug (2) from the exhaust hose by pulling its lever (3). Empty the recovery tank into appropriate containers. Comply rules concerning liquid disposal.
3. Take off 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

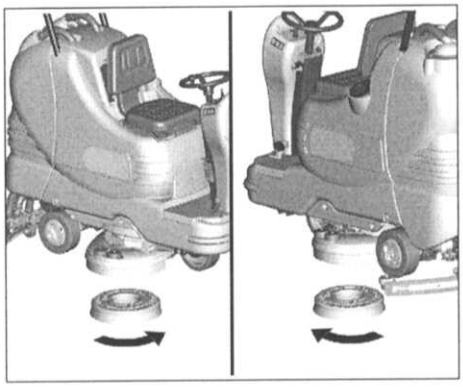
Disassemble the brush and clean them with a water jet (see "BRUSH DISASSEMBLY").

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.

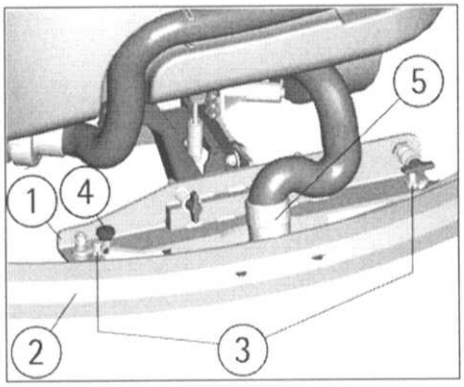


SQUEEGEE CLEANING

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

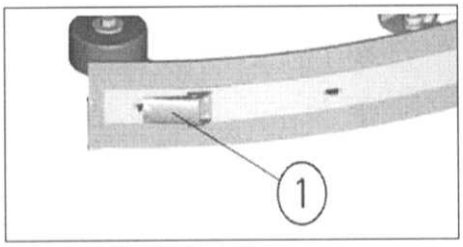
REAR SQUEEGEE RUBBER CHECK

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.

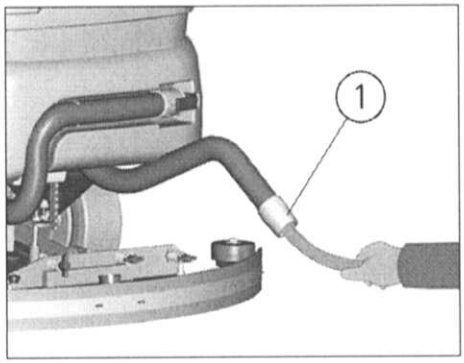
To reassemble the squeegees follow the directions above in reverse, inserting the rubber on the guides and blocking it with the rubber holder blade.



SQUEEGEE HOSE CLEANING

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

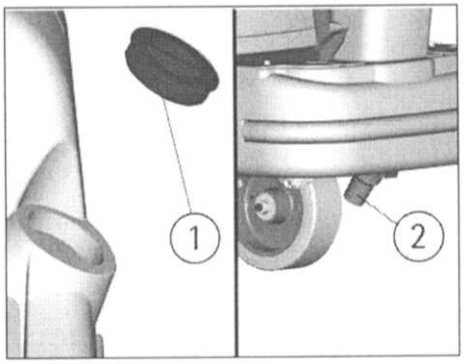
1. Take off the hose (1) from the squeegee coupling.
2. Wash the inside of the hose with a water jet.
3. To reassemble the hose follow the directions above in reverse.



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.

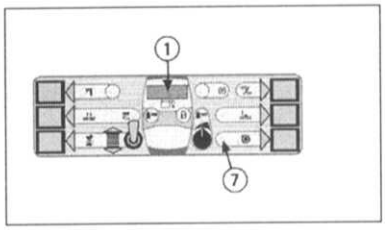
TROUBLESHOOTING GUIDE

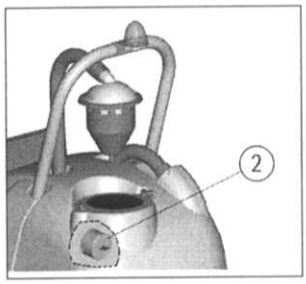
⚠ ATTENTION:
If the machine is on, and the display and/or other functions are not activated, check the battery connection of the machine (see "CONNECTING BATTERY' AND SWITCHING ON THE MACHINE"). If the problem persists, please contact an authorized technical assistant.

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.

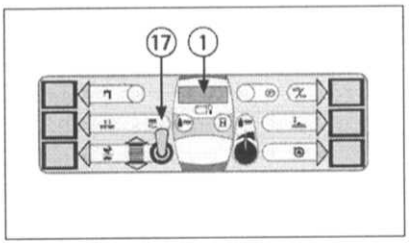




THE BRUSH MOTOR DOES NOT WORK

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.

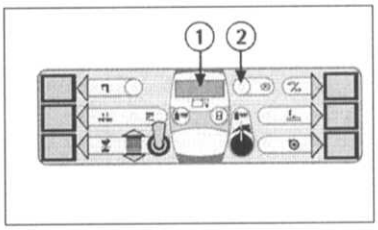
If problems persist, please contact an authorized technical assistant.



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.

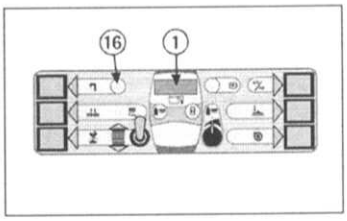
If problems persist, please contact an authorized technical assistant.



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").