

SERVICE MANUAL



For the **ERide 21** **Micro Rider**



For:
Training
Troubleshooting
Adjustments

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CHAPTER 1

1.1 OPERATOR POSITION

All references to forward, back, front, rear, right, left indicated in this manual shall be deemed to refer to the operator in the driving position on the seat (12, **Figure 3-4**)

1.2 LIFTING THE MACHINE



WARNING!

Do not work under the raised machine, without adequate fixed safety supports.

1.3 TRANSPORTING THE MACHINE



WARNING!

Before transporting the machine with a means of transport, make sure that:

- * All the doors and flaps are closed**
- * The ignition key is turned off on the control panel**
- * The machine is properly secured for transporting.**

CHAPTER 2 SAFETY

The following symbols are used to indicate potential hazardous conditions. Always read this information with attention and take any precautions necessary to protect the people and things.

2.1 SYMBOLS USED



DANGER! Indicates a danger with risk, even deadly, for the user.



WARNING! Indicates a potential risk of injury to persons or damage to things.



CAUTION! Indicates a caution or a note on key functions or on useful features. Pay careful attention to text blocks indicated by this symbol.



NOTE Indicates a note on key functions or on useful features.



CONSULT MANUAL Indicates the need to consult the User Manual before carrying out any operation.

2.2 GENERAL INSTRUCTIONS

Specific cautions and warnings are described below to highlight the potential dangers of damage to the machine and people.



•**DANGER!** – Before carrying out any maintenance/repair, disconnect the battery, using the special connector.

This machine should only be used by properly trained and authorized personnel.

•Do not operate this machine in environments where there are harmful, hazardous, flammable and/or explosive powders, liquids or vapors.

Keep sparks, flames and incandescent material, away from the batteries.

•When charging lead batteries (WET) highly explosive hydrogen gas is produced, so only perform the operation in well ventilated areas and away from open flames.

•Remove all jewelry when working near electrical components.

•Do not work under the raised machine, without adequate fixed safety supports.



WARNING!

- Before performing any maintenance/repair, carefully read all the instructions relevant to the maintenance / repair.
- Do not use the machine for purposes other than those listed in this manual. Only use accessories recommended by the manufacturer.
- Always protect the machine from sun, rain and other weather conditions, both when on and off. Do not use the machine as a means of transport.
- Do not leave the machine unattended without making sure that the machine itself cannot move independently.
- Do not leave the machine unattended without having removed the ignition key.
- Do not use the machine in particularly dusty environments.
- Do not use the machine on ramps or inclinations greater than 6%.
- Do not knock shelves or scaffolding, especially if there is a danger of falling objects.
- Do not let any object penetrate the openings of the machine. Do not use the machine if the openings are blocked; keep the openings of the machine free of dust, lint, hair and any other foreign body that can reduce air flow.
- To avoid the risk of electric shock, do not expose the machine to rain. Store the machine indoors.
- Do not remove or alter the plates affixed to the machine by the Manufacturer.
- The usage temperature of the machine must be between 0°C and +40 °C (32° to 104° Fahrenheit).



WARNING!

- The storage temperature of the machine must be between 0°C and +40 °C. (32° to 104° Fahrenheit).
- The humidity must be between 30% and 95%.
- Do not tamper with the protections in place for the machine, for any reason.
- Do not wash the machine with direct jets of water or pressure or with corrosive substances.
- Before using the external battery charger appliance, make sure that the frequency and voltage as indicated on the machine's registration plate match the mains voltage.
- Do not charge the batteries if the power cord or plug are damaged.
- Do not smoke when charging the batteries.
- To reduce the risk of fire, electric shock, or injury, do not leave the machine connected to the mains when unattended. Disconnect the machine from the socket when not being used and before maintenance.
- Do not use the battery charging cable to pull or transport the machine. Do not leave the power cable squashed by a door and do not pull over sharp surfaces or corners.
- Do not drive or move the machine over the power cord.
- Keep the power cord away from hot surfaces.



WARNING!

- Take the appropriate precautions to ensure that hair, jewelry, parts not stuck to clothing are not caught by the machine's moving parts.
- If replacing parts, ask a Dealer or Authorized Minuteman dealer for ORIGINAL spare parts.
- In conditions of use comply with correct use; the vibrations will not cause dangerous situations. The level of machine's vibrations is within the legal limits.
- This machine is not approved for use on roads or public highways.
- When transferring the machine with temperatures below freezing point, be careful because the water in the tanks or tubes may freeze and seriously damage the machine.
- Only use the brushes supplied with the machine and those specified in User Manuals. The use of other brushes can compromise your safety.
- If lead batteries (WET) are installed in the machine, do not tilt the machine beyond 30° horizontally, so that the highly corrosive liquid in the batteries does not leak. When it is necessary to tilt the machine for maintenance, remove the batteries first.
- The machine must not be abandoned, at the end of its life cycle, due to the presence inside of toxic- poisonous materials (batteries, etc.), subject to the regulations which provide for the disposal at appropriate centers in the area (see the chapter on Scrapping in the User Manual).

CHAPTER 3 MACHINE DESCRIPTION

3.1 TECHNICAL CHARACTERISTICS

Description	Disk Brush	Cyl. Deck
Voltage	24 V	24 V
Washed track	53 cm	51 cm
Vacuum	1168 mm H2O	1168 mm H2O
Tank for the detergent solution (or washing water), capacity	55 L/14.5 Gal.	55 L/14.5 Gal
Water recovery tank, capacity	55 L/14.5 Gal.	55 L/14.5 Gal.
Disc brush rpm	175 rpm	-
Cylindrical Brush rpm	-	830 rpm
Number of Disc brushes	1	-
Number Cylindrical Brushes		2
Disc brush pressure	23 Kg	-
Cylindrical brush pressure	-	25 Kg
Washing speed	3-5 Km/h	3-5 Km/h
Maximum speed	5 Km/h	5 Km/h
Maximum floor slope for using the machine	6 %	6 %
Maximum slope that can be overcome by the pull of the machine, in transfers	25 %	25 %
No. of batteries	2	2
Built-in battery charger	Yes (optional)	Yes (optional)
Theoretical hourly yield	2120 mq/h	2120 mq/h
Estimated hourly yield	1270 mq/h	1270 mq/h
Autonomy	2.30 h	2.30 h
MIT (Injection Technology)	Yes	Yes
MIT, capacity	0,4-3,8 L/min	0,4-3,8 L/min
MCS (Chemical System)	Optional	Optional
MCS, ratio	1-5 %	1-5 %
Width of machine passage	65 cm	65 cm
Machine body dimensions, with squeegee and brush (length , height, width)	1200 x 1130 x 600 mm	1200 x 1130 x 600 mm
Machine weight empty (without batteries, with empty tanks, without operator on-board)	148 Kg	148 Kg
Machine weight heavy (with batteries, with a full tank, without an operator on-board)	250 Kg	250 Kg
Traction motor	400 W	400 W
Disc brush motor	400 W	-
Cylindrical brush motor	-	600 W
Vacuum motor	400 W, 3 stages	400 W, 3 stages
Construction standards	CE	CE
Protection class	IPX 4	IPX 4
Sound pressure level A in the operating position	72,4 dB (A)	72,4 dB (A)
Sound power level A	87,6 dB (A)	87,6 dB (A)

3.2 DESCRIPTION

Control panel and controls

(See Figure 3-1)

1. Control panel and controls
2. Emergency stop button
3. Display: indicating:
 - 3a. "READY": machine ready, or "SIT DOWN": sit on seat
 - 3b. Total hours of work done
 - 3c. Battery charge status in %
 - 3d. Battery charge status in graphic scale
4. Adjustment buttons (+ and -) for the flow rate of the detergent solution (or of the washing water) (*)
5. Light indication of the detergent solution level (or washing water)
6. Adjustment buttons (+ and -) of the percentage of detergent depending on the water flow of (optional) (*)
7. Light indication of the percentage of detergent depending on the water flow of (optional).
8. Turbo button, activation of the maximum cleaning solution level (or washing water) and detergent, for 30 seconds.
9. Light indication for the 30 seconds.
10. Button for adjusting the maximum speed of the machine (*)
11. Light indication of the instantaneous speed of the machine
12. Button for activating the lowering and the rotation of the disc brush (or cylindrical brushes)
13. Light indication of the disc brush (or cylindrical brushes) enabled; the light indication flashes when moving from enabled to disabled and vice versa
14. Button for activating the lowering of the squeegee and the water recovery vacuum.
15. Light indication of squeegee and vacuum activated; the light indication flashes when moving from disabled to enabled and vice versa
16. Activation button simultaneously both for the squeegee and vacuum and the disc brush (or cylindrical brushes).
17. Light indication of squeegee, vacuum and disc brush (or cylindrical brushes) activated; the light indication flashes when moving from disabled to enabled and vice versa
18. Reverse activation button. The speed is halved compared to moving forward. For the reverse activation time, an audible warning signal is also activated
19. Light Indication of reverse enabled
20. Button which activates the acoustic signal.
21. Disc brush release button

(*): When the machine is switched on using the key, these adjustments are positioned on previously set values.

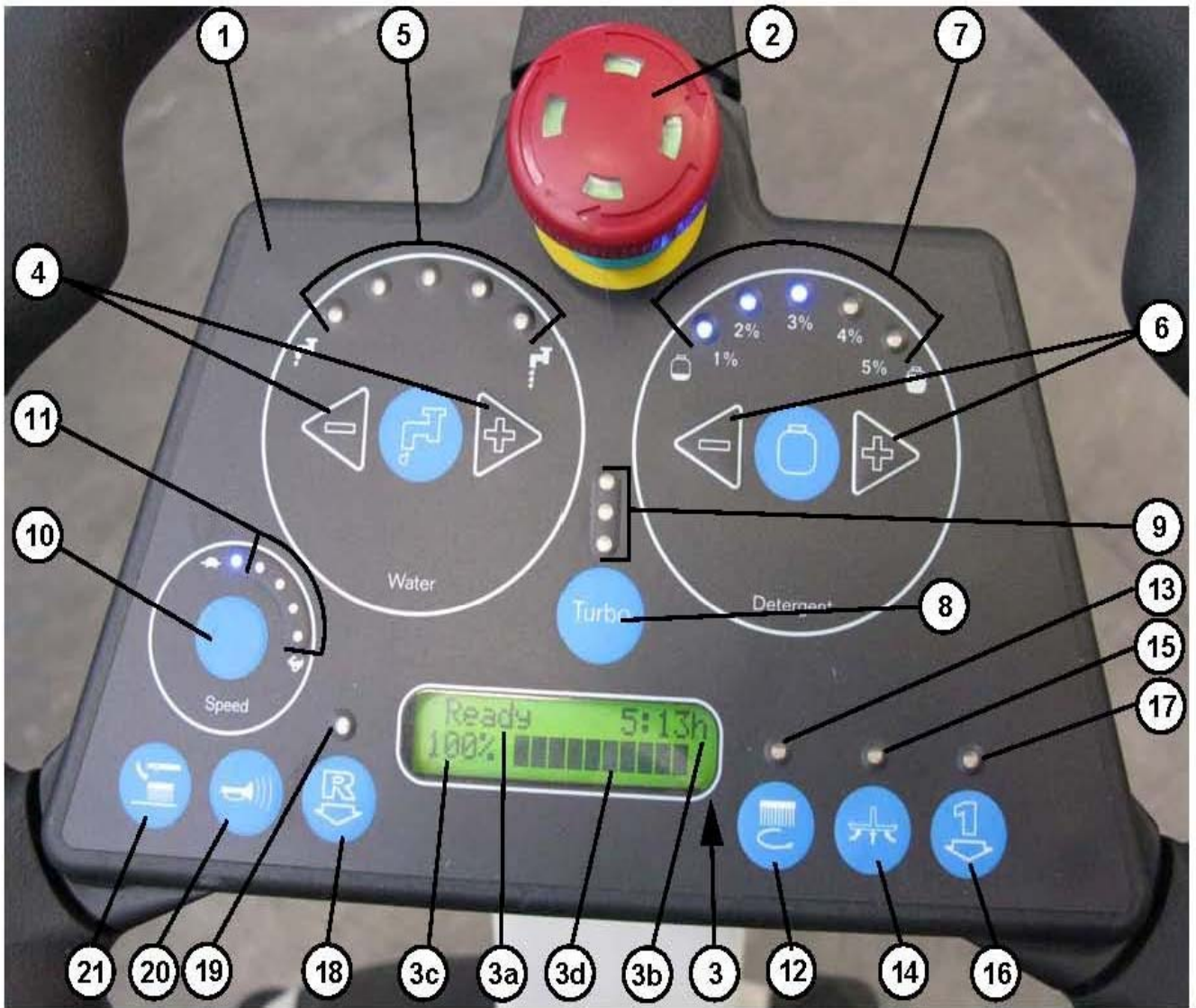


Figure 3-1

External views

- **(See Figure 3-2 and Figure 3-3)**
- 1. Steering wheel
- 2. Ignition key: 0: off
I: on
- 3. Start pedal and acceleration
- 4. Level indicator of the detergent solution (or washing water)
- 5. Front Wheel, traction and steering
- 6. Rear wheels
- 7. Disc brush
- 8. Throttle Pedal
- 9. Squeegee
- 10a. Tank for the detergent solution (or washing water),
- 10b. Recovery water tank
- 11. Tank cover
- 12. Operator's seat
- 13. Detergent tank with handle (optional)
- 14. Cap for detergent tank.
- 15. Cap for the detergent solution (or washing water)
- 16. Recovery water drain hose
- 17. Detergent solution drain hose (or washing water)
- 18. Battery holder drum
- 19. Flashing light (optional)
- 20. Drink holder container (only usable if the flashing light is not installed)
- 21. Storage container (only usable if the detergent tank is not installed)
- 22. Protective panel of the electric-electronic compartment
- 23. Filter for the detergent solution (or washing water)
- 24. Registration plate / technical data . CE mark
- 25. Handle for lifting the tanks cover
- 26. Heel unit
- 27. Cover for rear wheel
- 28. Mudguard for rear wheel
- 29. Emergency and parking brake

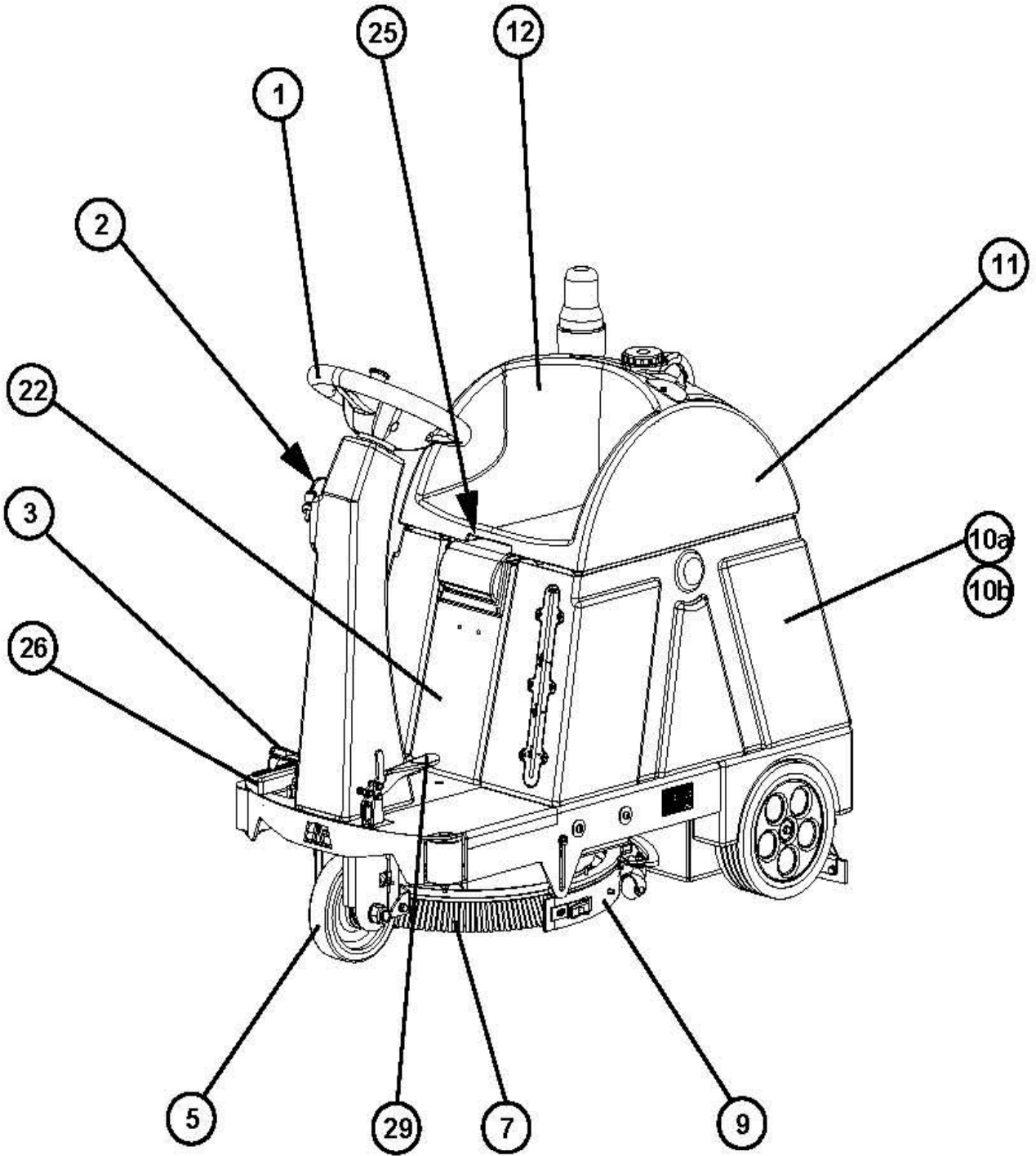


Figure 3-2

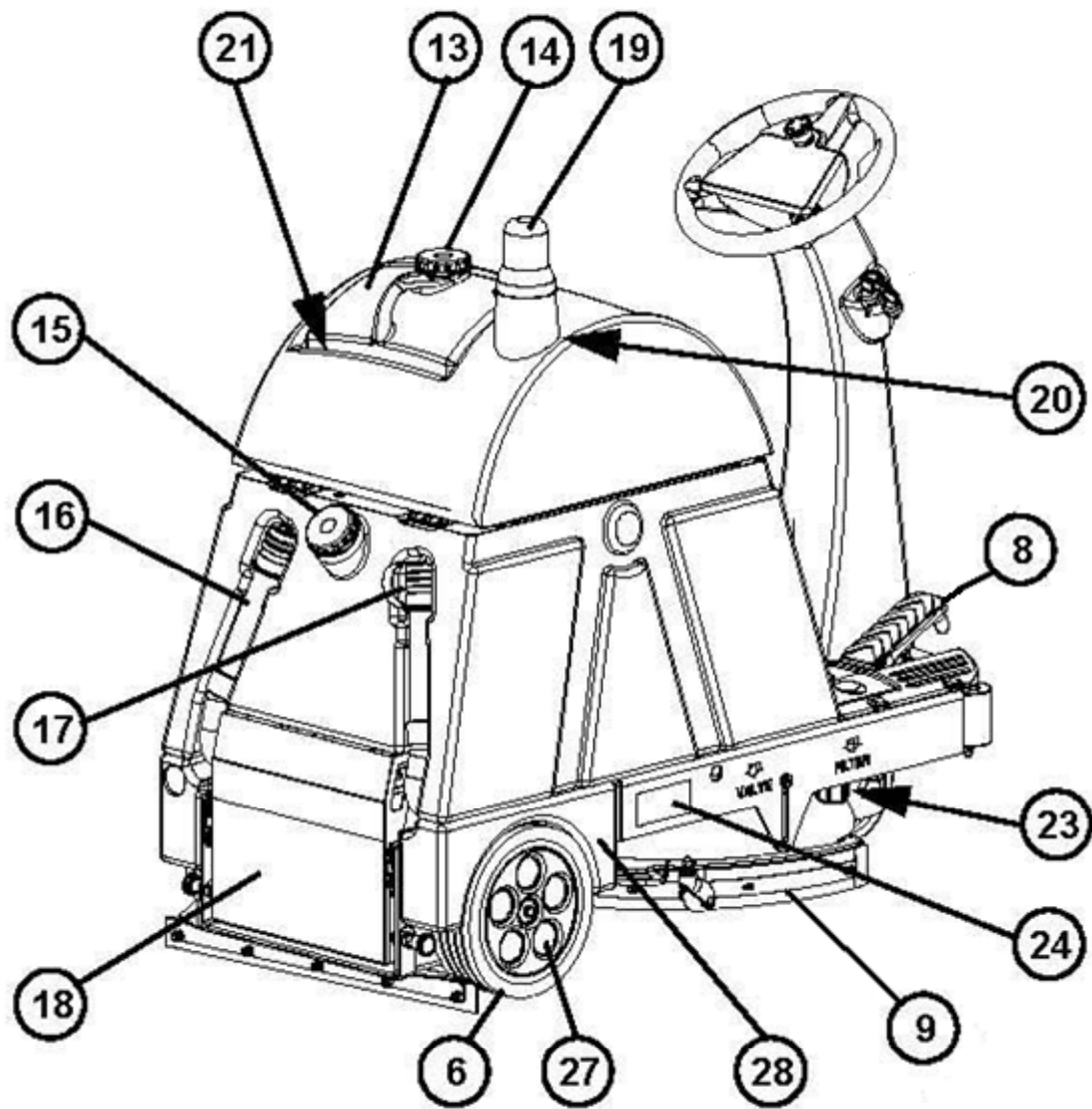


Figure 3-3

**View internal parts
(See Figure 3-4)**

1. Cover for tanks (in raised position)
2. Handle for the opening the cover
3. Recovery water tank
4. Recovery water tank float
5. Batteries
6. Battery connector
7. Connector for connecting the machine's battery charger to the mains (optional)

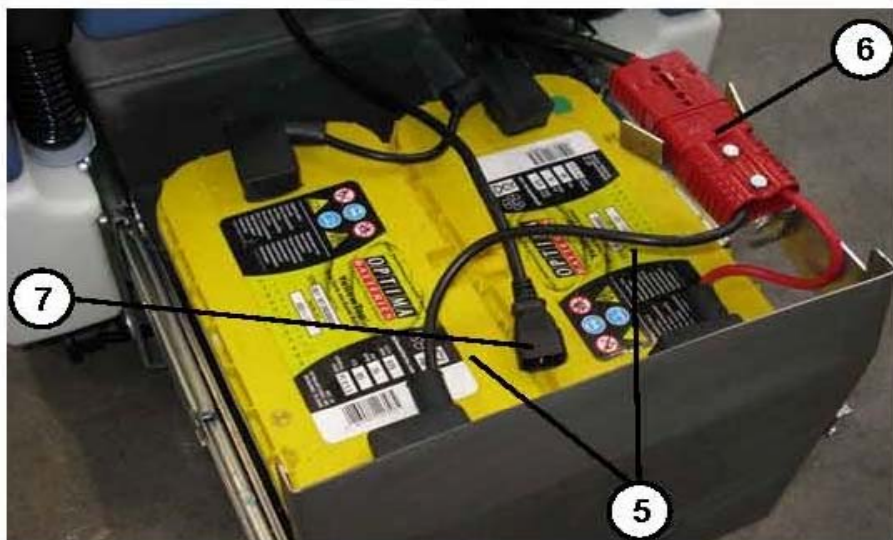
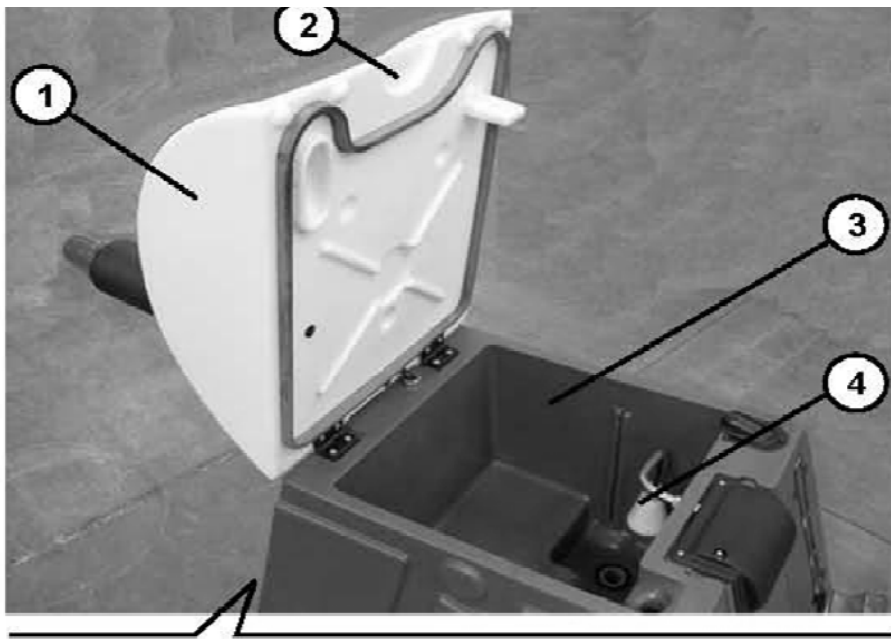


Figure 3-4

CHAPTER 4 SCHEDULED MAINTENANCE

The service life of the machine and its maximum safety of operation are guaranteed by careful and regular maintenance.



WARNING!
See the chapters **GENERAL INFORMATION AND SAFETY**.

Shown below is the Scheduled Maintenance Plan. The frequency specified may be subject to change depending on particular work conditions, to be defined by the maintenance manager.

The maintenance instructions listed in the following Scheduled Maintenance Plan, are described in subsequent chapters describing maintenance/replacement procedures.

4.1 SCHEDULED MAINTENANCE PLAN

Operation	Daily operation, after using the machine	Monthly or every 100 hours	Every six months or every 400 hours	Yearly or every 800 hours
Squeegee cleaning	●			
Clean disc brush (or cylindrical brushes)	●			
Charge batteries	●			
Check/replace squeegee blades		●		
Clean filter for the detergent solution (or washing water)		●		
Clean nozzles and filters		●		
Check efficiency of the emergency and parking brake			● (1)(2)	
Check tightening of screws and nuts			● (1)(2)	
Check vacuum filter (Hepa)			● (2)	
Check/replace brush rotation belt				● (2)
Check/clean drive chain				● (2)

(1): and after the first 8 hours of operation

(2): maintenance to be carried out by an Minuteman authorized service center

CHAPTER 5

5. CLEANING SOLUTION SUPPLY SYSTEM

The significant maintenance/replacement procedures relating to the detergent solution (or washing water) supply system are described in this chapter. In addition Troubleshooting is described in the final section.

5.1 TANK CLEANING AND DETERGENT SOLUTION (OR WASHING WATER) SYSTEM

1. Operating as described in the User and Maintenance Manual, drain the detergent solution (or washing water) tank.
2. Operating as described in the User and Maintenance Manual, run the machine until the detergent solution (or washing water) in the machine runs out.
3. Cleaning the solution filter (or washing water). See 5.2 for the specific procedure.

5.2 CLEANING FILTER FOR THE DETERGENT SOLUTION (OR WASHING WATER)

1. Make sure that the machine cannot move independently.
2. Operating on the machine's controls as provided for in the User and Maintenance Manual, lower the squeegee and the disc brush (or cylindrical brushes), then turn the ignition key to "0" and take it out.
3. Locate the solution shut off valve on the right side of the machine and turn off (1, **Figure 5-1**) for the water flow/detergent solution.
4. Unscrew and remove the transparent cover with filter (2).
5. Remove filter (3) from transparent cover (4).
6. Clean filter (3) and transparent cover (4).
7. Replace the filter (3) in its housing of the transparent cover (4).
8. Screw the transparent cover with filter in place (2). 9.
9. Turn on the solution valve (1).
10. Turn the ignition key to the "I" and wait for the squeegee and the disc brush (or cylindrical brushes), and then turn the ignition key to "0" and take it out.

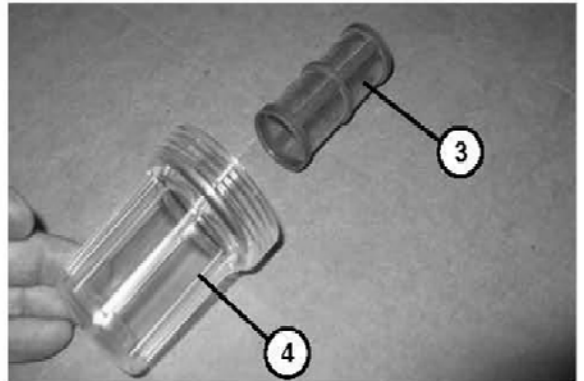
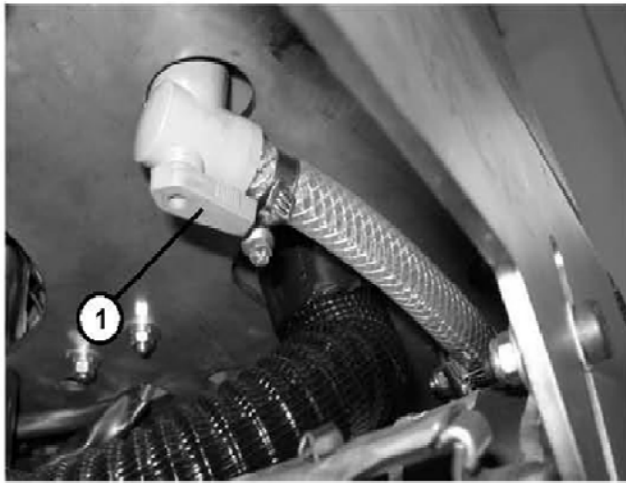
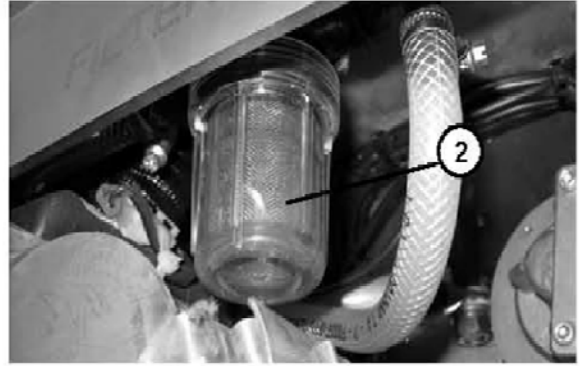
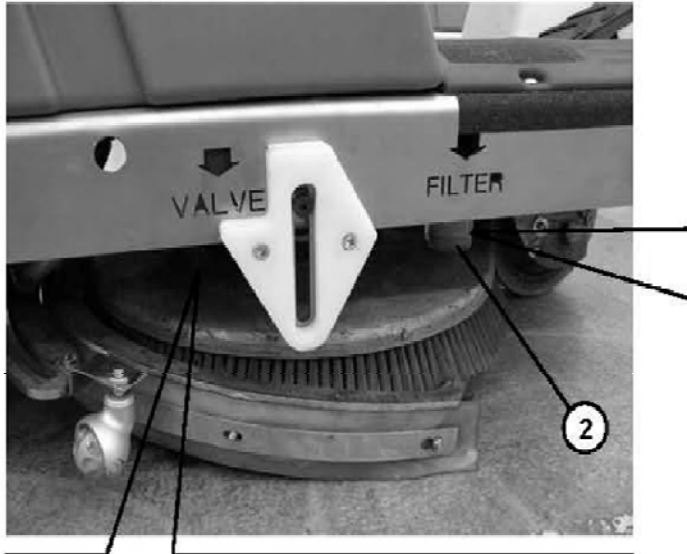


Figure 5-1

5.3 DISASSEMBLY/ASSEMBLY DETERGENT SOLUTION (OR WASHING WATER) SUPPLY SYSTEM FILTER UNIT

Removal

1. If available, place the machine on a lifting platform, then lift. Otherwise, place the machine on a level floor.
2. Operating on the machine's controls as provided for in the User and Maintenance Manual, lower the squeegee and the disc brush, then turn the ignition key to "0" (off) and take it out.
3. Operating on the right side of the machine, close the tap (1, **Figure 5-2**) for the detergent solution flow (or washing water).
4. Loosen the straps (2) and disconnect the pipes (3) from the filter unit (4).
5. Unscrew the screws with nut (5).
6. Remove the filter unit (4).
7. If necessary break the filter unit (4).

Assembly

8. Assemble, by reversing the sequence of operations performed for disassembly

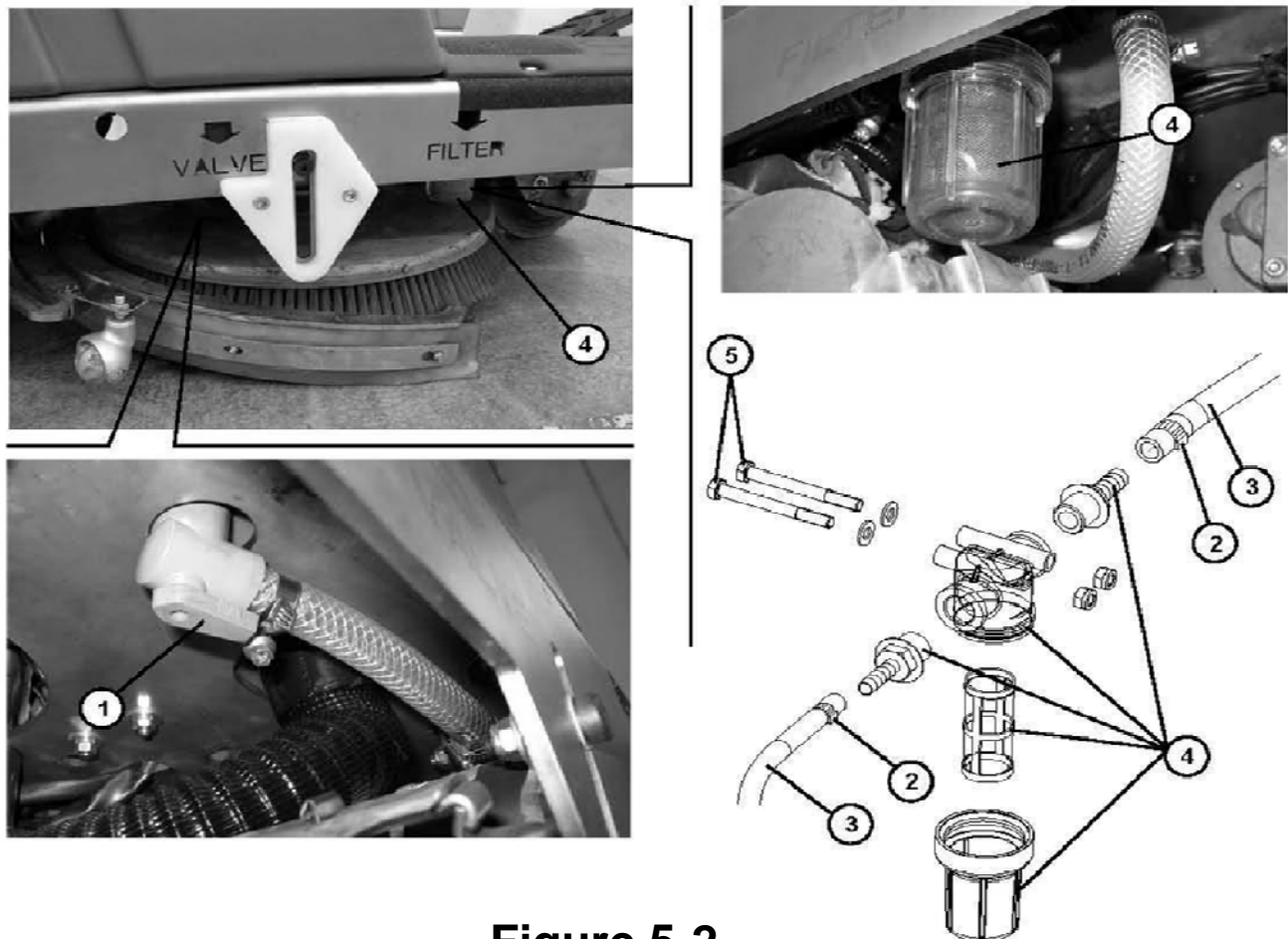


Figure 5-2

5.4 REMOVAL/INSTALLATION OF THE SOLUTION PUMP

Removal

1. If available, place the machine on a lifting platform, then lift. Otherwise, place the machine on a level floor.
2. Operating on the machine's controls as provided for in the User and Maintenance Manual, lower the squeegee and the disc brush (or cylindrical brushes), then turn the ignition key to "0" and take it out.
1. Remove the battery holder drum and disconnect the battery connector (6, **Figure 3-4**) (For the procedure User and Maintenance Manual).
2. Operating on the right side of the machine, close the tap (1, **Figure 5-3**) for the detergent solution flow (or washing water).
3. Operating on the front left side of the machine, loosen the straps (2) and disconnect the pipes (3) from the pump (4).
4. Remove the non-slip mat (5) by releasing the adhesive surface.
5. Unscrew the screws with nut (6).
6. Disconnect the electrical connector (7) from the pump.
9. Remove the pump (4).

Assembly

10. Assemble, by reversing the sequence of operations performed for disassembly.

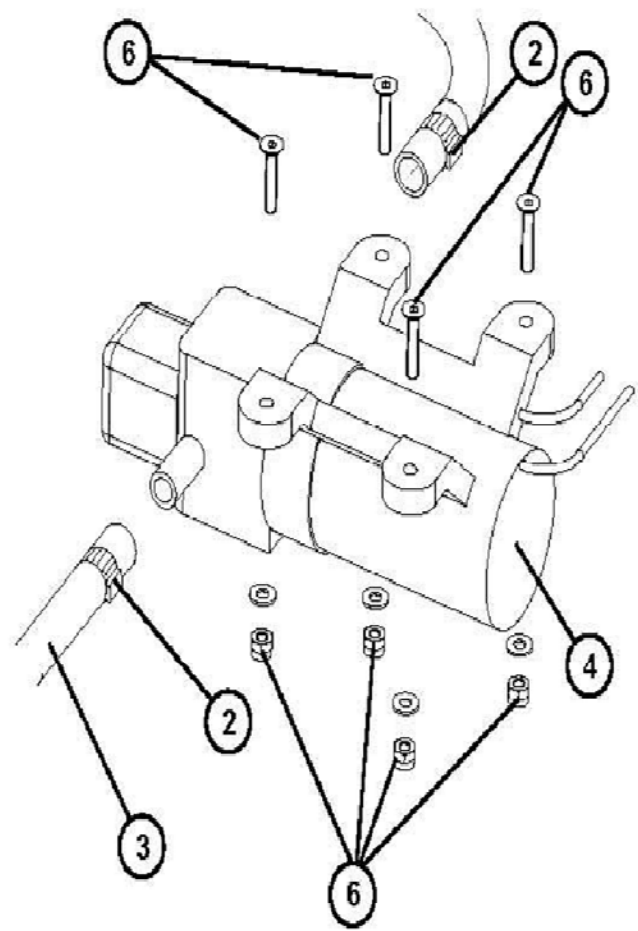
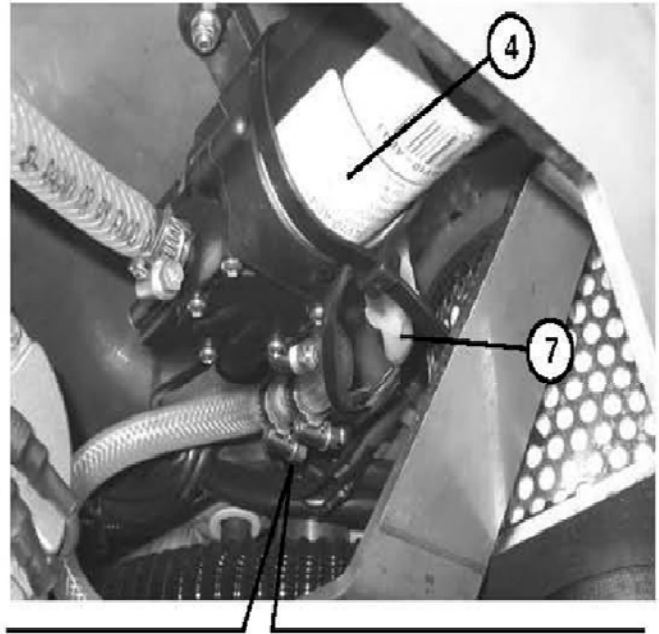
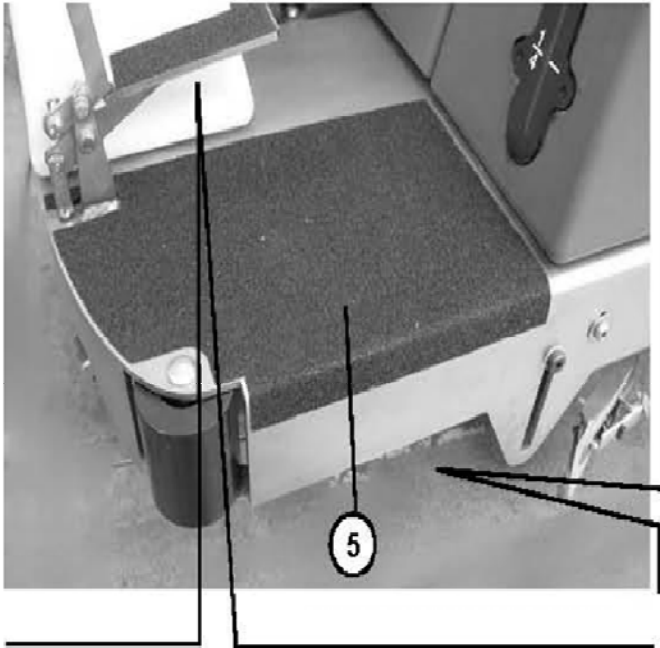


Figure 5-3

5.5 CLEANING NOZZLE AND FILTER FOR DISPENSING CLEANING SOLUTION TO DISC BRUSH

1. Remove the brush (For the procedure, see the User and Maintenance Manual).
2. If available, place the machine on a lifting platform, then lift. Otherwise, place the machine on a level floor.
3. Turn the ignition key (2, **Figure 3-2**) to position "0".
4. Locate the nozzle in the center of the brush hub (1, **Figure 5-4**) unscrew the nut (2) and retrieve the nozzle (3) and the seal (4).
5. Remove the filter from the housing (5).
6. Clean the nozzle (3) and the filter (5).
7. Correctly reposition the filter (5) in its housing.
8. Position the nozzle in the housing (3) and the seal (4), then screw the ring nut (2).
9. If positioned, remove the machine from the lifting platform.
10. Reinstall the brush (For the procedure, see the User and Maintenance Manual).

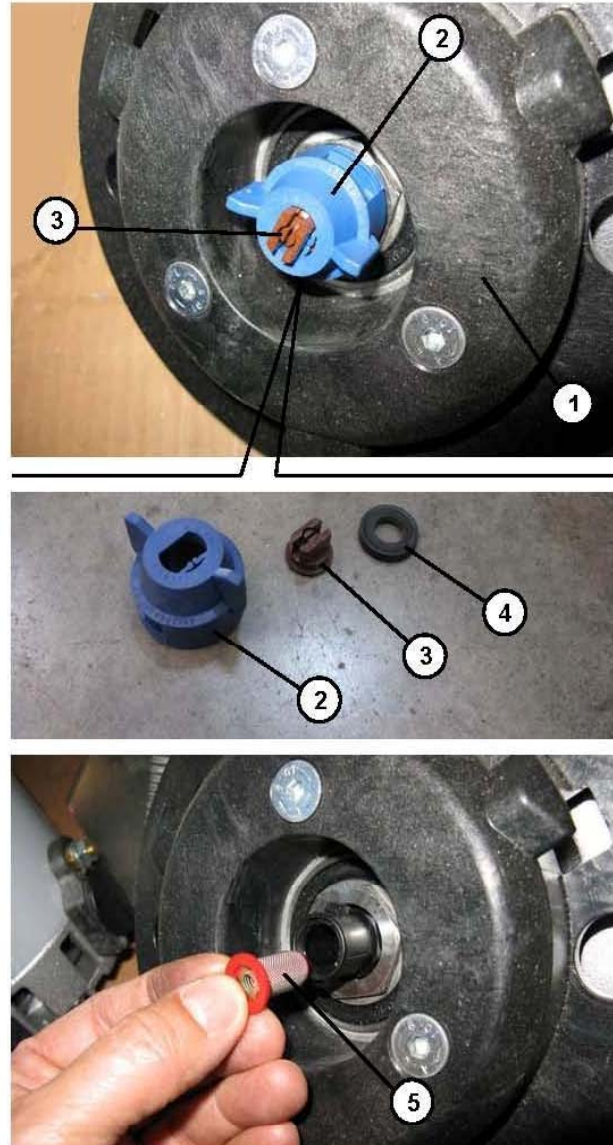


Figure 5-4

5.6 CLEANING THE SPRAY NOZZLE AND FILTER ON CYLINDRICAL BRUSH DECKS

1. If available, place the machine on a lifting platform, then lift. Otherwise, place the machine on a level floor.
2. Operating on the machine's controls as provided for in the User and Maintenance Manual, lower the cylindrical brush deck, then turn the ignition key to "0" (off) and remove key.
3. Locate the spray nozzle in the front of the cylindrical brush head head, unscrew the ring nut (1, **Figure 5-5**) and recover the nozzle (2) and the seal (3).
4. Remove the filter from the housing (4).
5. Clean the nozzle (2) and the filter (4).
6. Correctly reposition the filter (4) in its housing.
7. Position the nozzle in the housing (2) and the seal (3), then screw the ring nut (1).
8. Turn the ignition key to the "I" (on) and wait for the lifting of the cylindrical brushes, and then turn the ignition key to "0" and take it out.

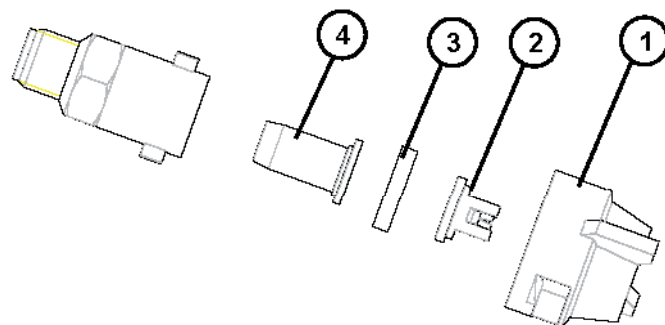
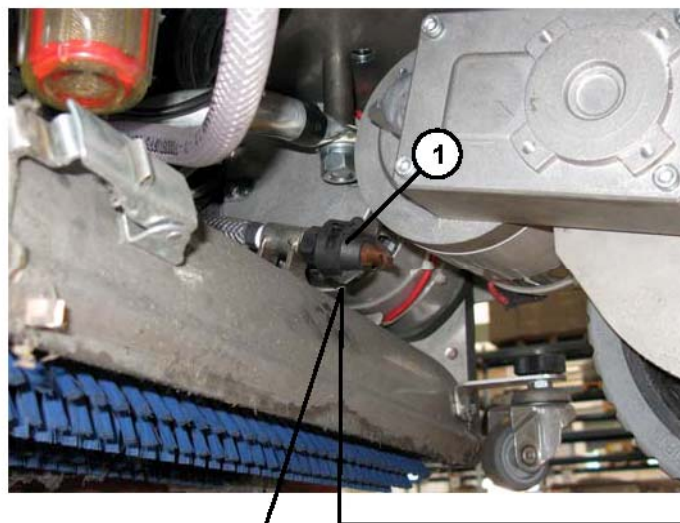


Figure 5-5

5.7 TROUBLESHOOTING

REDUCED OR NO CLEANING SOLUTION REACHING THE BRUSH(S)

Possible causes can be

1. Filters for the detergent solution clogged/dirty (clean the filters)
2. Solution valve turned off. (open the valve)
3. Pump broken or electrical connection interrupted (replace the pump/restore the electrical connection)
4. Debris in the detergent solution/water tank that is obstructing the exit hole (clean the tank)
5. Debris in the spray nozzle or filter. (clean the nozzle and filter)

CHAPTER 6 CHEMICAL MIXING SYSTEM (OPTIONAL)

This chapter describes the significant maintenance/replacement procedures related to the chemical and washing water mixing system. The last paragraph also describes Troubleshooting.

6.1 CLEANING THE CHEMICAL TANK AND THE CORRESPONDING VALVE

1. Make sure that the machine cannot move independently, and then turn the ignition key to "0" (off) and remove the key.
2. Remove the detergent tank from the machine (1, **Figure 6-1**), by gripping its handle (2) and lifting.
3. Unscrew the cap (3) and drain the washing detergent from the tank, in the area for disposing of the washing detergent.
4. Wash the washing detergent tank (1) and the corresponding one-way valve (4).
5. Operating in the tank compartment (1), lift the valve with pusher (5) by inserting a plate under the edge (6) of the support, then wash it and wipe it clean. Reposition it in the housing.
6. Screw on the cap (3) and place the tank (1) in its housing in the machine.

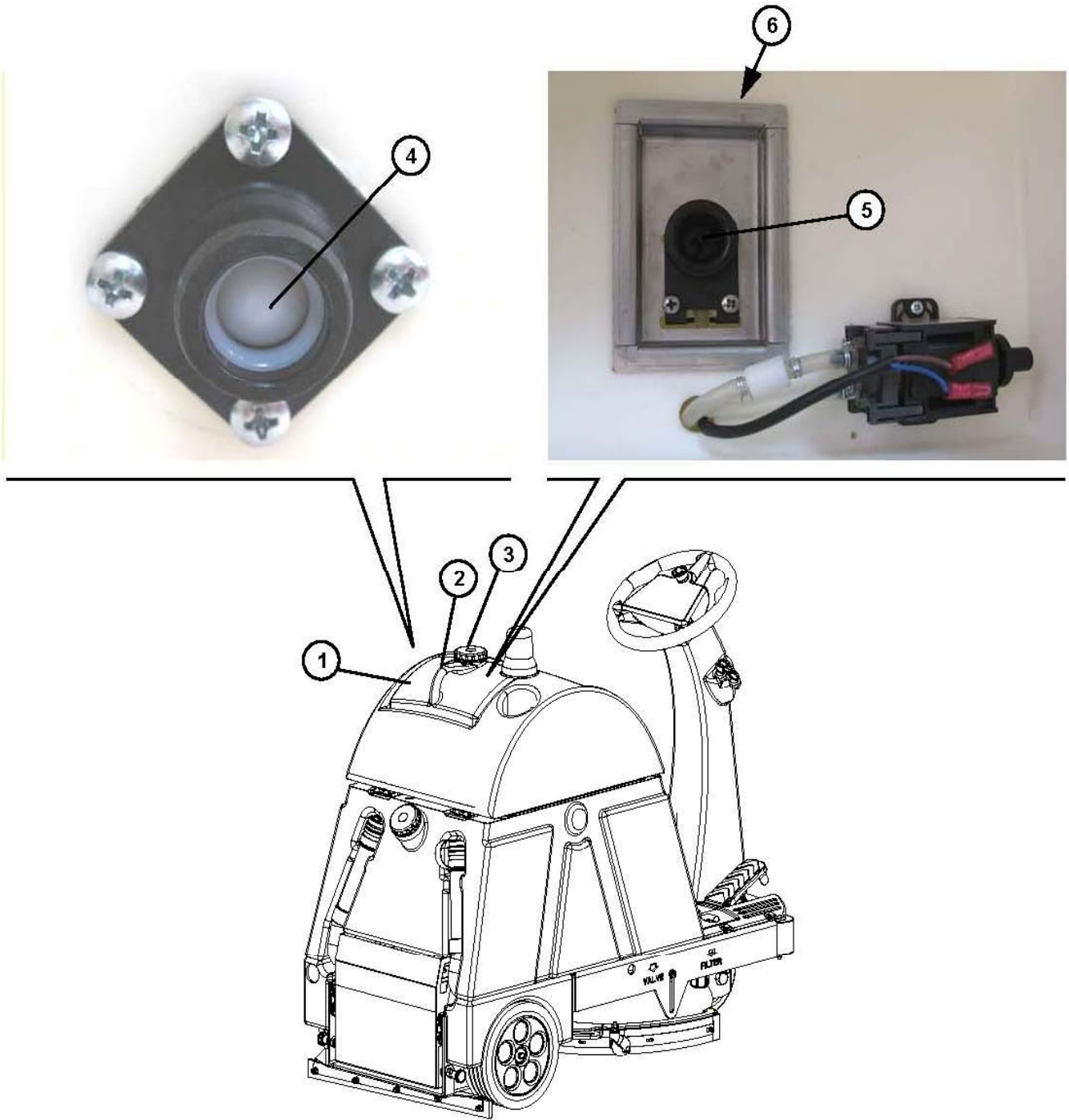


Figure 6-1

6.2 DISASSEMBLY/ASSEMBLY CHEMICAL PUMP AND ONE-WAY VALVE

1. Make sure that the machine cannot move independently, and then turn the ignition key to "0" (off) and remove the key.
2. Remove the detergent tank from the machine (1, **Figure 6-2**), by gripping its handle (2) and lifting.
3. Remove the battery holder drum and disconnect the battery connector (6, **Figure 3-4**) (For the procedure, see the User and Maintenance Manual).
4. Operating on the tank housing compartment (1, **Figure 6-2**), disconnect the electrical connections (2) from the pump (3).
5. Release the retaining straps (4) and disconnect the pipes (5) from the pump.
6. Unscrew the screws (6) and remove the pump (3).
7. If necessary, remove the straps (7) and disconnect the unidirectional valve (8) from the corresponding

Assembly

8. Assemble, by reversing the sequence of operations performed for disassembly, with the following instruction: – reinstall the one-way valve (8) with the arrow (9) facing the direction of the detergent flow (as in **Figure 6-2**).

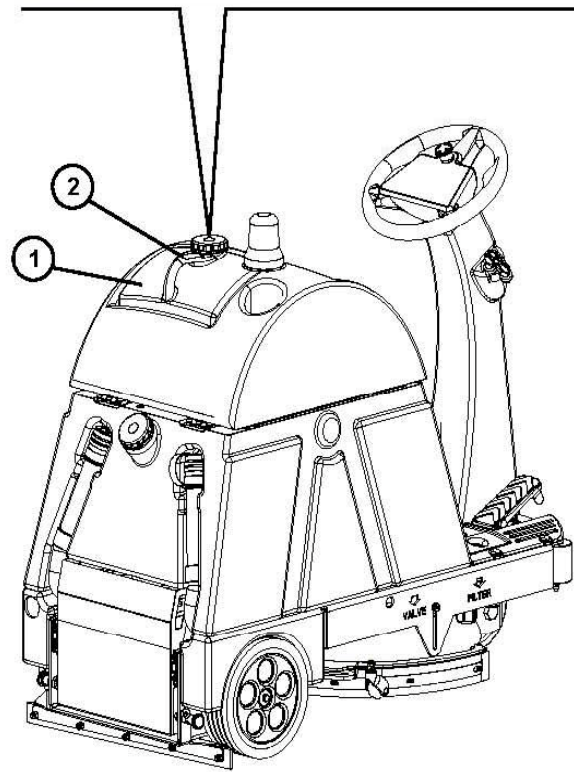
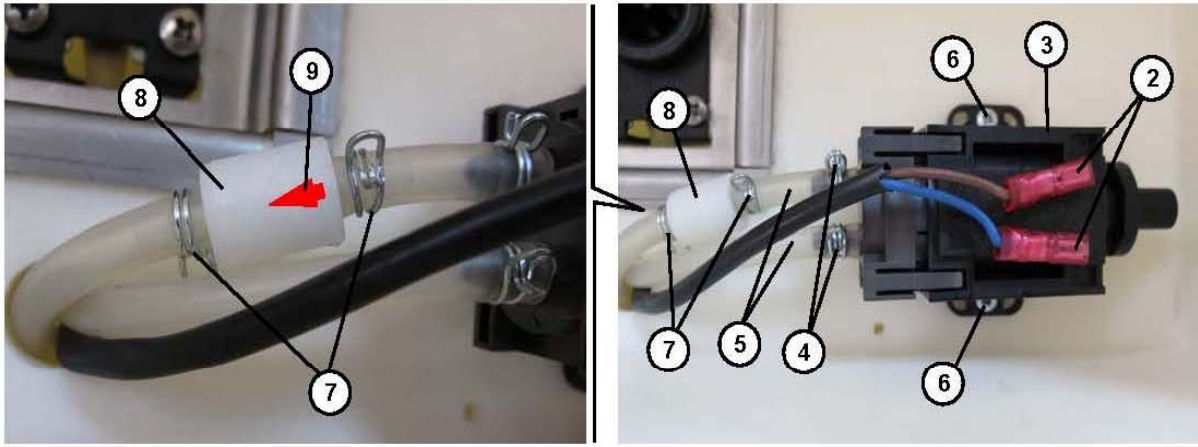


Figure 6-2

6.3 TROUBLESHOOTING

LITTLE OR NO DETERGENT MIXING WITH THE CLEANING SOLUTION

Possible causes can be:

1. Percentage of detergent set too low (check/change the percentage by operating as described in the User and Maintenance Manual)
2. Detergent tank valve dirty (clean it)
3. Pump broken or electrical connection interrupted (replace the pump/restore the electrical connection)
4. Debris in the detergent hose, obstructing the passage (clean the hose)
5. The detergent adjustment button is inefficient (check the led on the button is on, otherwise change electronic board functions)
6. The electronic board functions are not working (replace it)

WATER IS ENTERING THE DETERGENT TANK

Possible causes can be:

1. The one-way valve for the detergent tank is broken (replace it)

CHAPTER 7 BRUSH SYSTEM

- The significant maintenance/replacement procedures relating to the Brush system are described in this chapter.
- In addition troubleshooting is described in the final section.

7.1 CLEANING DISC BRUSHES



CAUTION! The use of work gloves is recommended when cleaning the disc brush, due to the possible presence of sharp debris.

1. Remove the disc brush (See the procedure in the User and Maintenance Manual).
2. Wash and clean the disc brush (1, **Figure 7-1**) of dirt and debris; use water and detergent solution.
3. Fit the disc brush (See the procedure in the User and Maintenance Manual).
4. The disc brush must be replaced due to excessive wear, when in the condition of brush lowered, the side pins (2, **Figure 7-1**) rest on the lower ends (3) of the slots.

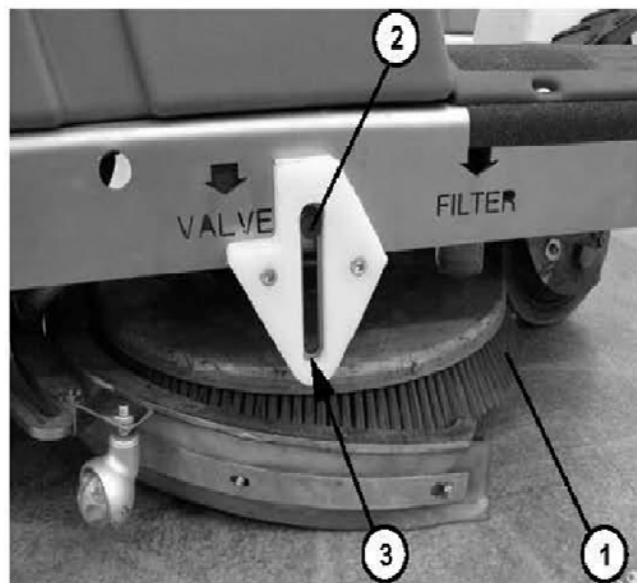


Figure 7-1

7.1 CLEANING THE CYLINDRICAL BRUSHES



CAUTION!

The use of work gloves is recommended when cleaning the cylindrical brushes, due to the possible presence of sharp debris.

1. Remove the cylindrical brushes (See the procedure in the User and Maintenance Manual).
2. Wash and clean the cylindrical brushes of dirt and debris, use water and detergent solution.
3. Also wash and clean the housings (1, **Figure 7-2**) of the cylindrical brushes.
4. Check that the hubs (2) driving the cylindrical brushes are free of debris dirt or intertwined objects (cords, etc.).
5. Reassemble the cylindrical brushes (See the procedure in the User and Maintenance Manual).
6. The cylindrical brushes must be replaced due to excessive wear, when in the condition of brushes lowered, the side pins (1, **Figure 7-3**) rest on the lower ends (2) of the slots.

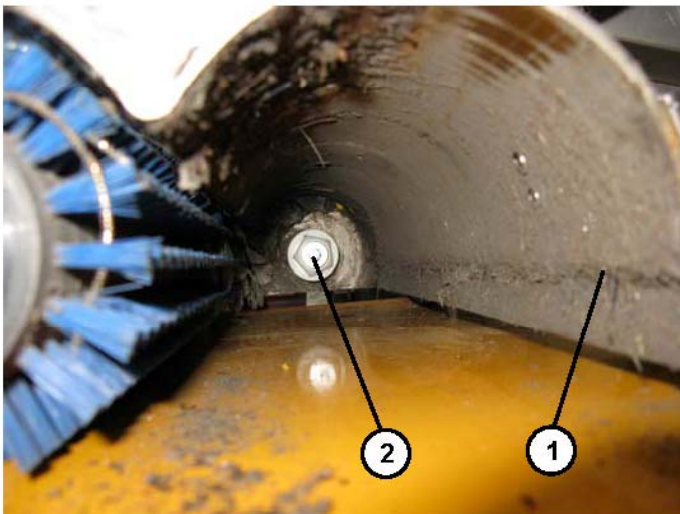


Figure 7-2



Figure 7-3

7.2 DISASSEMBLY/ASSEMBLY OF THE DISC BRUSH HEAD

Removal

1. Remove the brush (For the procedure, see the User and Maintenance Manual).
2. If available, place the machine on a lifting platform, then lift it.
3. Otherwise, place the machine on a level floor.
4. Operating on the control panel lower brush holder head, and then place the ignition key (2, **Figure 3-2**) in the position "0".
5. Remove the battery holder drum and disconnect the battery connector (6, **Figure 3-4**) (For the procedure, see the User and Maintenance Manual).
6. Operating on both sides of the machine, unscrew the (1, **Figure 7-4**).
7. Unscrew the screw with nut (2, **Figure 7-5**) securing the actuator to the head.
8. Disconnect the electrical connector from the disc brush motor.
9. Remove the disc brush holder head.

Assembly

10. Assemble, by reversing the sequence of operations performed for disassembly.

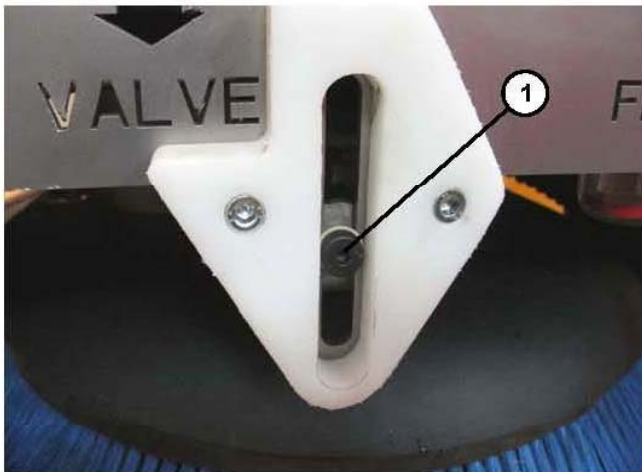


Figure 7-4

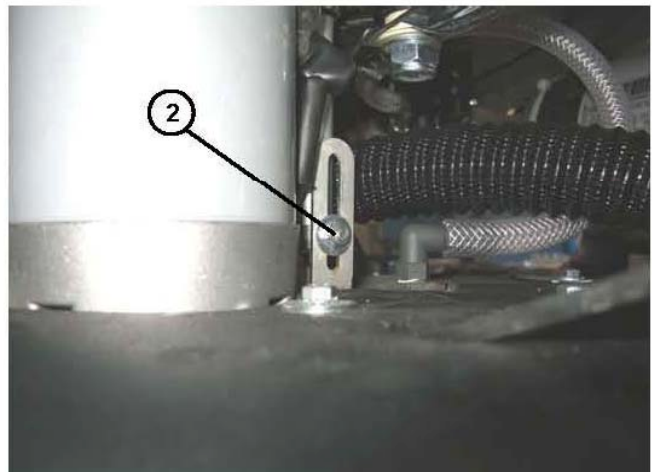


Figure 7-5

7.3 DISK BRUSH MOTOR TEST



WARNING! This procedure must be performed by qualified personnel.

1. Remove the disc brush (1, **Figure 7-6**), operating as indicated in the User and Maintenance Manual.
2. Turn the ignition key to "0".
3. Place a wooden block (2, **Figure 7-6**) 6-7 cm high under the rear wheels of the machine. Also apply wedges (3, **Figure 7-6**) on both of the rear wheels, to securely lock the machine.
4. Apply two suitable wooden shims (4, **Figure 7-6**) under the front chassis of the machine, high enough to also lift the front wheel by 6-7 cm.



WARNING! Keep the wooden shims (4, **Figure 7-6**) at an appropriate distance from the disc brush hub. Make sure that all the wooden shims are completely stable to be able to mount the machine and operate the controls.

5. Open the cover (5, **Figure 7-6**) and remove the panel (6) by lifting it up. Lower the cover back down (5).
6. Apply the current clamp (7, **Figure 7-6**) to one of the power leads (8) for the disc brush motor.
7. Cautiously sit on the seat of the machine.



WARNING! Do not touch any electrical components that are not protected by the panel (6, **Figure 7-6**), as removed!

8. Turn the ignition key to "I" and wait for the word "READY" on the display.
9. Operating on the machine's controls as indicated in the User and Maintenance Manual, lower and rotate the disc brush, and then check on current clamp that the absorption of the motor is approximately 5 amps at 24 volts.
10. Stop the rotation of the brush.
11. Turn the ignition key to the "0".
12. Get off the machine and remove the current clamp.
13. If the absorption is greater, perform the steps below in sequence to locate and eliminate the cause of the anomalous absorption:
 - check that there is no debris or dirt (cords, cables, etc.) on the brush fastening hub.
 - check the carbons of the electric motor (see procedure in the specific paragraph)
 - if necessary, disassemble the motor (See procedure in the specific paragraph) then check the state of its parts.

In the case where the operations described above do not lead to a proper absorption of the motor, it will need replacing (see procedure in the specific paragraph).
14. Reverse steps 1 to 5.

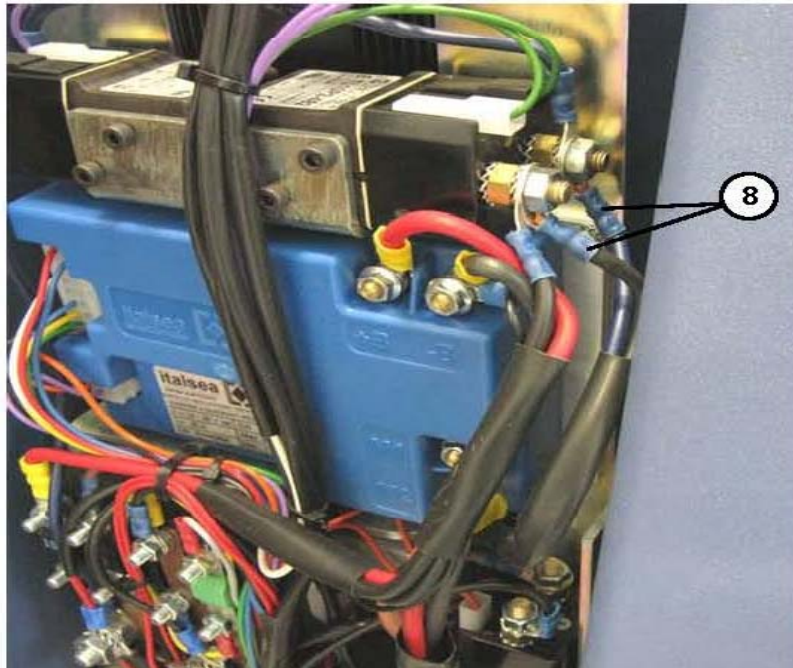
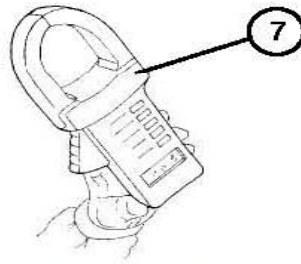
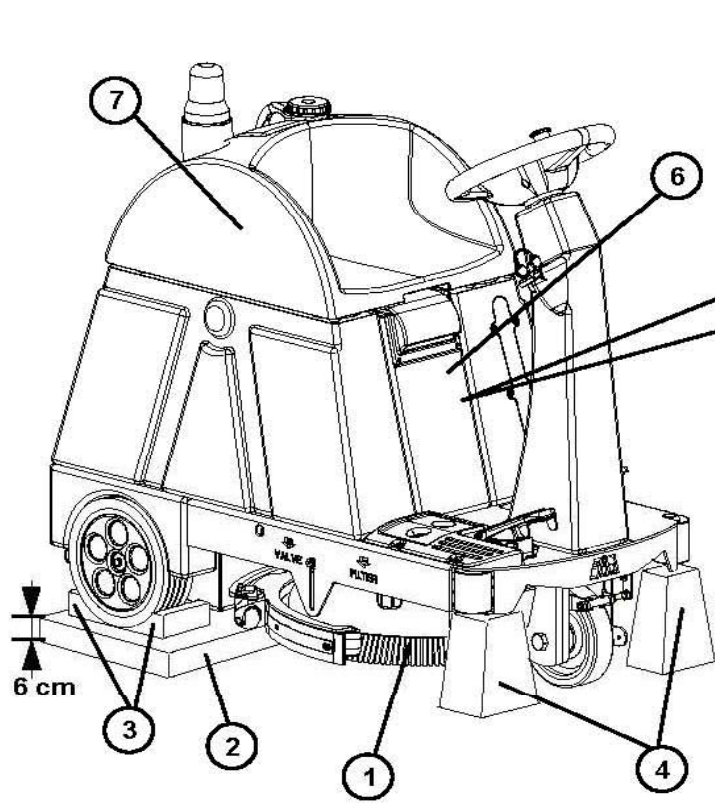


Figure 7-6

7.4 CHECK AND REPLACEMENT OF DISC BRUSH MOTOR CARBONS

Removal

1. Remove the disc brush, operating as provided for in the User and Maintenance Manual).
2. Remove the disc brush holder head (See procedure in the specific paragraph).
3. Remove the disc brush drive belt (See the procedure in the specific paragraph).
4. Unscrew the screws (1, **Figure 7-9**) and remove the brush holder hub (2).
5. Disconnect the tensioning spring (2, **Figure 7-10**) from the stud (3).
6. Unscrew the screw (4) and remove the tensioner (5).
7. Unscrew the screws (6, **Figure 7-10**) and remove the motor (7) from the disc brush.

Assembly

8. Assemble, by reversing the sequence of operations performed for disassembly, with the following instruction:
 - place the engine orientated with the red element (8, **Figure 7-10**), oriented toward the forks (9), as shown in the figure.



Figure 7-9

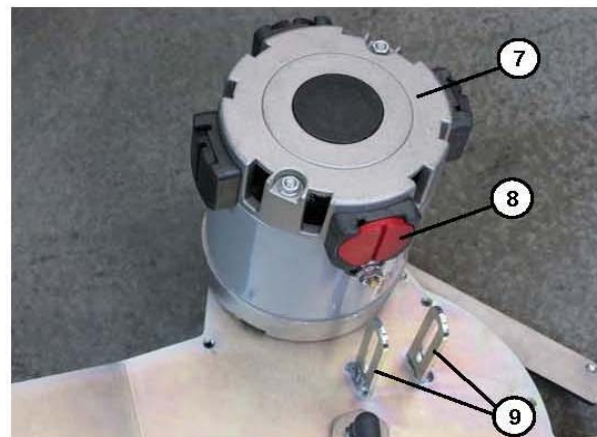
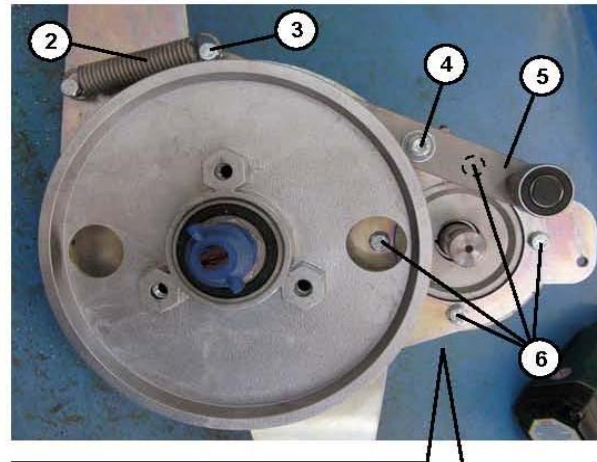


Figure 7-10

7.4 CHECK AND REPLACEMENT OF THE CARBON BRUSHES FOR THE DISK BRUSH MOTOR

1. Remove the disc brush holder head (see procedure in the specific paragraph).
2. Externally cleaning the motor or dirt and dust, in the area of the carbon supports (1, **Figure 7-7**).
3. Remove the four carbon supports (1) after having disengaged the retainers (2) and (3). If necessary, disconnect the electrical connections (4).
4. Check the state of wear of the four carbons (5); the carbons are worn when sufficient contact with the armature of the motor is not provided because of their consumption, the non-integrity of the contact surfaces, broken thrust spring, etc. The minimum length of the carbons (5) is 15 mm, which, when reached must be replaced.
5. If necessary, disconnect the connections (6) and remove the carbons complete with support (1) to replace them. The carbons should be replaced all together.
6. For the reassembly, reverse the sequence of operations performed for disassembly, with the following caution: when fixing the terminals (6) pay particular attention to their isolation from the surrounding chassis parts.

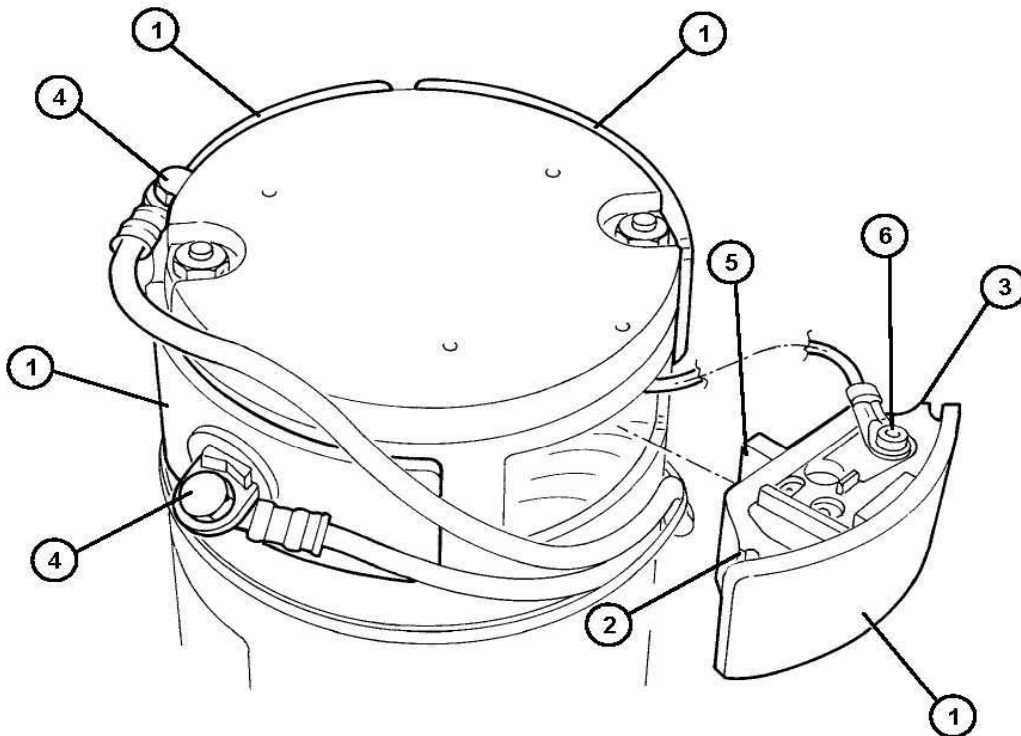


Figure 7-7

7.5 DISASSEMBLY/ASSEMBLY DISC BRUSH DRIVE BELT

Removal

1. Remove the disc brush (See the procedure in the User and Maintenance Manual).
2. Remove the disc brush holder head (See procedure in the specific paragraph).
3. Operating on the disc brush holder head, manually rotate the brush holder hub (1, **Figure 7-8**) progressively the lifting belt (2) until it disengages from the pulleys (3) and (4) and from the brush holder hub (1).

Assembly

4. By means of a clamp disconnect the end (5) of the tensioning spring (6) from the stud (7).
5. Insert the belt in the housing (2) making it engage the pulleys (3) and (4) and to the brush holder hub (1).
6. By means of a clamp on the end (5) pull the tensioning spring (6) and make it engage with the stud (7).
7. Check the efficiency of the tensioner, and then manually turn the brush holder hub a few turns (1) and check the correct belt drive (2).
8. Assemble the disc brush holder head (See procedure in the specific paragraph).
9. Fit the disc brush (See procedure in the User and Maintenance Manual).

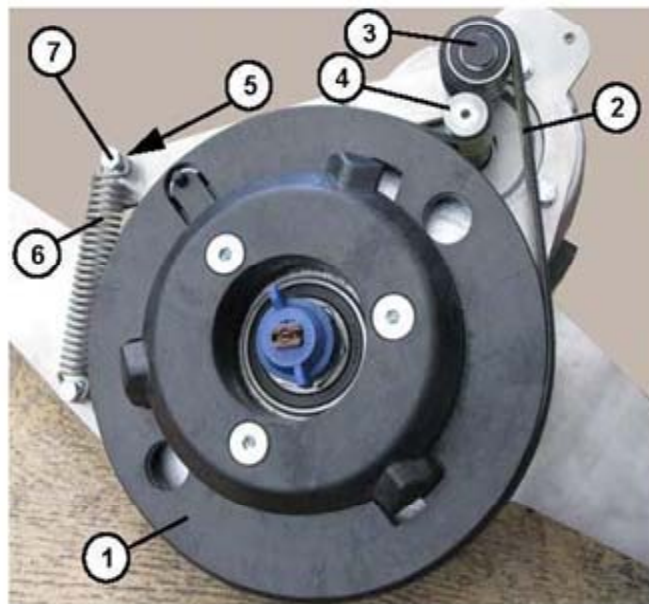


Figure 7-8

7.6 DISASSEMBLY/ASSEMBLY DISC BRUSH LIFT ACTUATOR

Disassembly

1. Remove the disc brush (7, **Figure 3-2**), operating as indicated in the User and Maintenance Manual.
2. If available, place the machine on a lifting platform; otherwise, place the machine on a level floor. Make sure that the machine cannot move independently.
3. Operating on the machine's controls as provided for in the User and Maintenance Manual, lower the disc brushes, then turn the ignition key to "0" and take it out.
4. Remove the battery holder drum and disconnect the battery connector (6, **Figure 3-4**) (For the procedure, see the User and Maintenance Manual).
5. Operating above the brush head (1, **Figure 7-11**) unscrew the nut (2)
6. and remove the lower retaining screw (3) of the actuator to the brush head.
6. Open the tank covers (11, **Figure 3-2**) and remove the panel (22) by lifting it up. Lower the cover back down (11).
7. Unscrew the screws (4, **Figure 7-12**) securing the support (5) of the electrical components.
8. Carefully move the support forward slightly (5, **Figure 7-12**).
9. Remove the split pin (6, **Figure 7-12**) and pull the upper retaining pin (7) for the actuator (8).
10. Remove the actuator (8, **Figure 7-12**) after having disconnected the electrical connection.

Assembly

11. Assemble, by reversing the sequence of operations performed for disassembly.

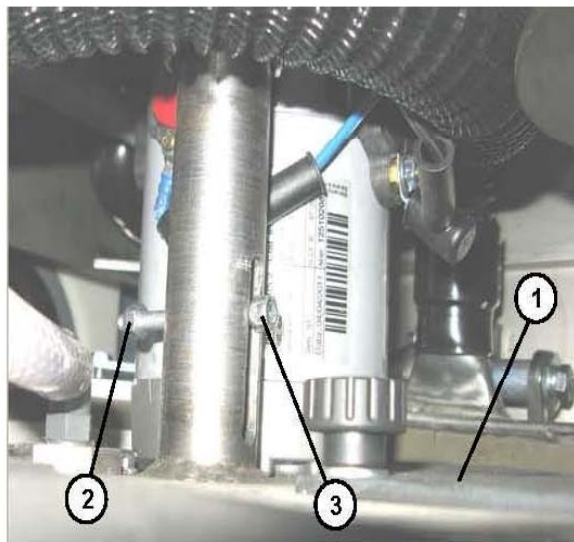


Figure 7-11

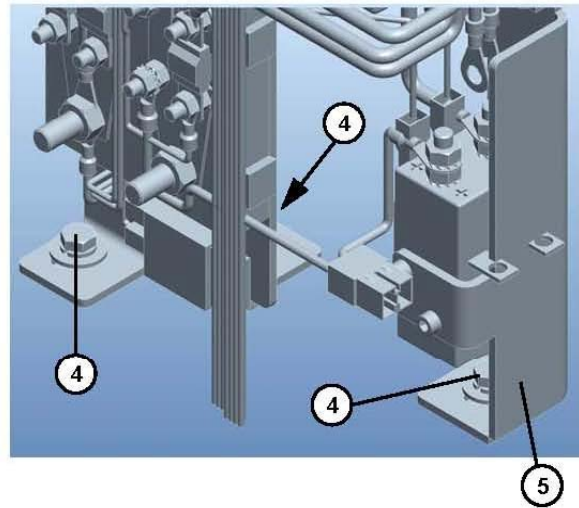
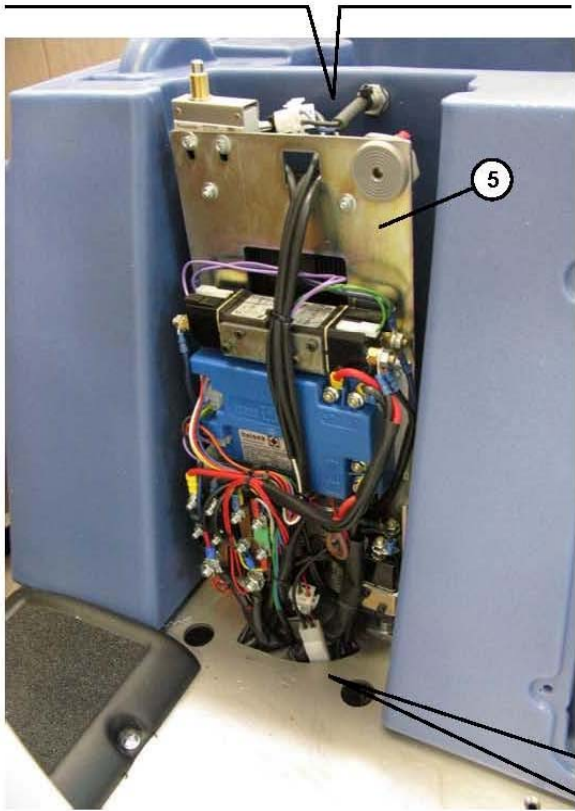


Figure 7-12

7.7 TROUBLESHOOTING

THE BRUSH DOES NOT ROTATE

Possible causes can be:

1. Large debris or cords around the brush or between the brush and its attachment flange (remove the brush and remove debris or cords)
2. Blown fuse for motor (replace/check for cause of overload)
3. Electric motor with the worn carbons (replace the electric motor carbons)
4. Faulty brush relay (replace if defective)
5. Electric motor in the event of a failure (repair or replace the electric motor)
6. Electronic board functions damaged (replace it if defective)
7. Damaged wiring (repair it)

THE BRUSH DOES NOT REACH THE "RAISED" or "LOWERED" POSITION.

Possible causes can be:

1. Electric actuator to raise/lower brush head, broken (replace it)
2. Actuator wiring interrupted (check the wiring)

CHAPTER 8

RECOVERY SYSTEM

Maintenance/replacement procedures relating to the water recovery system are described in this chapter. In addition Troubleshooting is described in the final section.

8.1 CLEANING THE RECOVERY WATER TANK AND GRATES

1. Bring the machine to the area responsible for disposing of the recovery water, in compliance with the applicable emission standards.
2. Disengage the hose (1, **Figure 8-1**) from the housing and lift it over the upper lip of the tank, until its area (2) is free of water, and then keeping it in this position, unscrew the cap (3).
3. Manually bend the hose in the area (2) to obtain a water-tight bend (13), and then keeping it bent lower it into the drain area.
4. Gradually (to avoid unwanted splashing) release the bend (13) by draining the dirty water from the tank in the drain area.
5. By means of the grip (4) lift the tank covers (5).
6. Remove the grate (10) by lifting it, then get rid of any debris and wash it.
7. Remove the grate (11) by lifting it, then get rid of any debris and wash it. Particularly clean the lower hole (12).
8. Wash the recovery water tank (6); also wash the lower side (7) of the cover and the perimeter seal (8).

Check that the perimeter seal (8) is undamaged: if damaged it can compromise the proper functioning of the dirty water vacuum.

If necessary, remove the seal (8) disengaging it from the housing, and then replace it.



CAUTION! Do not damage the float (9).

NOTE: The float must be placed in the lowest part in the tank.

9. Drain all the washing water from the hose (1), then screw on the cap (3) and engage the hose (1) into the machine's housing.
10. Reinstall the grates in the housing (10) and (11).
11. Close the tank cover (5).

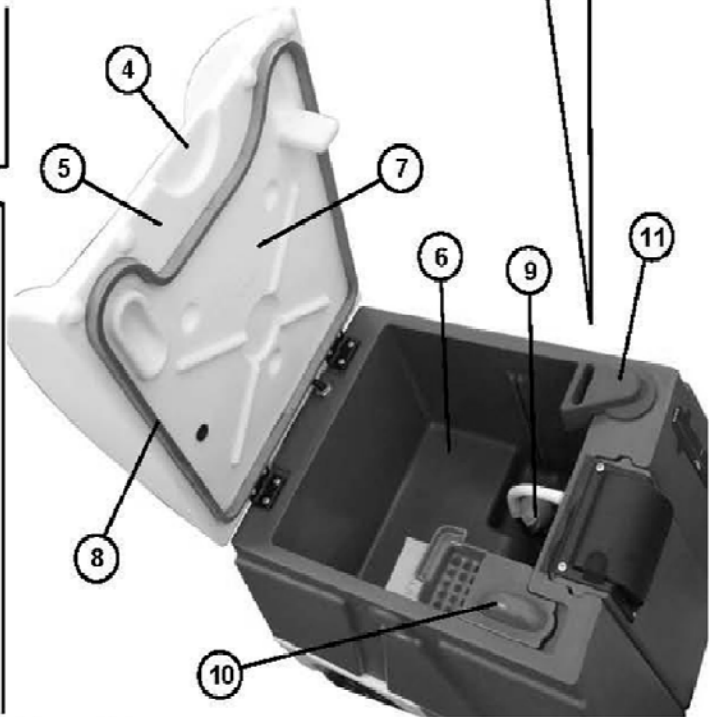
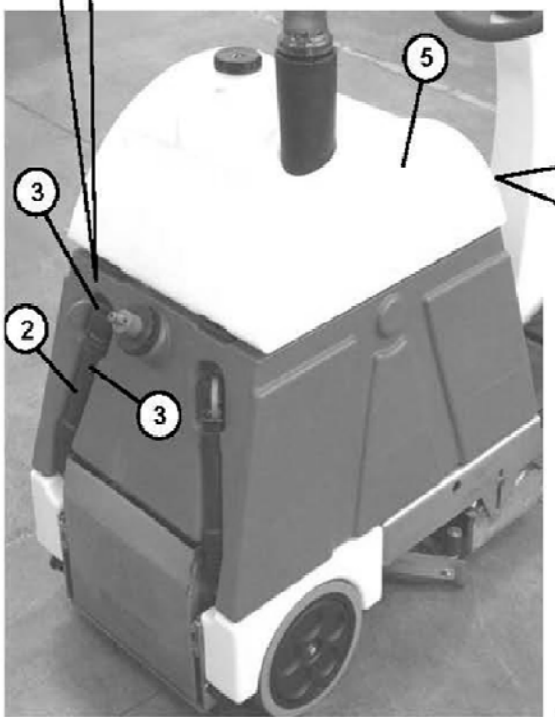
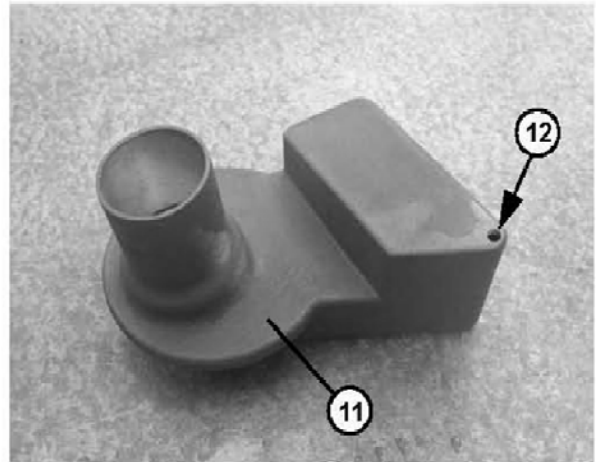


Figure 8-1

8.2 CHECKING THE AMPERAGE OF THE VACUUM MOTOR



WARNING! This procedure must be performed by qualified personnel.

1. Install a new vacuum filter on the machine (see procedure in specific paragraph).
2. Disconnect the vacuum hose from the squeegee's attachment (10, **Figure 8-6**).
3. Open the tank covers (11, **Figure 3-2**) and remove the panel (22) by lifting it up. Lower the cover back down (11).
4. Apply the current clamp (1, **Figure 8-2**) to one of the power leads (2) for the vacuum motor.
5. Sit on the seat of the machine.



WARNING! Do not touch any electrical components that are not protected by panel (22, **Figure 3-2**), as removed!

6. Operating on the machine's controls as indicated in the User and Maintenance Manual, lower the squeegee and the disc brush, by activating the vacuum and then check on current clamp that the absorption of the vacuum motor is approximately 20 amps at 24 volts.
7. Lift the squeegee and the disc brush.
8. Turn the ignition key to the "0".
9. Remove the current clamp.
10. If the absorption is greater, perform the steps below in sequence to locate and eliminate the cause of the anomalous absorption:
 - check that the motor is properly positioned and that there is no debris or dirt on the air inlet of the aspirator area.
 - check the charcoals of the electric motor (see procedure in the specific paragraph)
 - if necessary, disassemble the motor (See procedure in the specific paragraph) then check the state of its parts. In the case where the operations described above do not lead to a proper absorption of the motor, it will need replacing (see procedure in the specific paragraph).
11. Open the cover (11, **Figure 3-2**) and put the panel in the housing (22). Lower the cover back down (11).

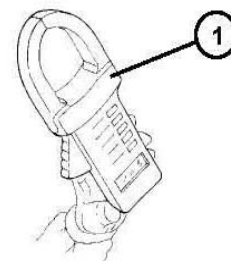
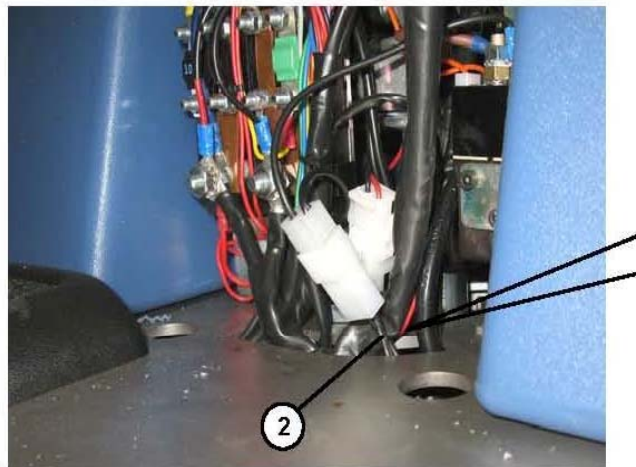


Figure 8-2

8.3 CHECKING AND REPLACEMENT OF VACUUM MOTOR CARBON BRUSHES

1. Remove the vacuum motor (See the procedure in the specific paragraph).
2. Remove the cover (1, **Figure 8-3**) from the vacuum motor (2), by disengaging the inner retainers.
3. Unscrew the screws (3).
4. Disconnect the electrical connections (4).
5. Remove the carbons (5).
6. Check the state of wear of the carbons; which ones are worn when sufficient contact with the armature of the motor is not provided because of their consumption, the non-integrity of the contact surfaces, broken thrust spring, etc.
7. If necessary, replace the carbons. The carbons should be replaced together.
8. For the reassembly, reverse the sequence of operations performed for disassembly.

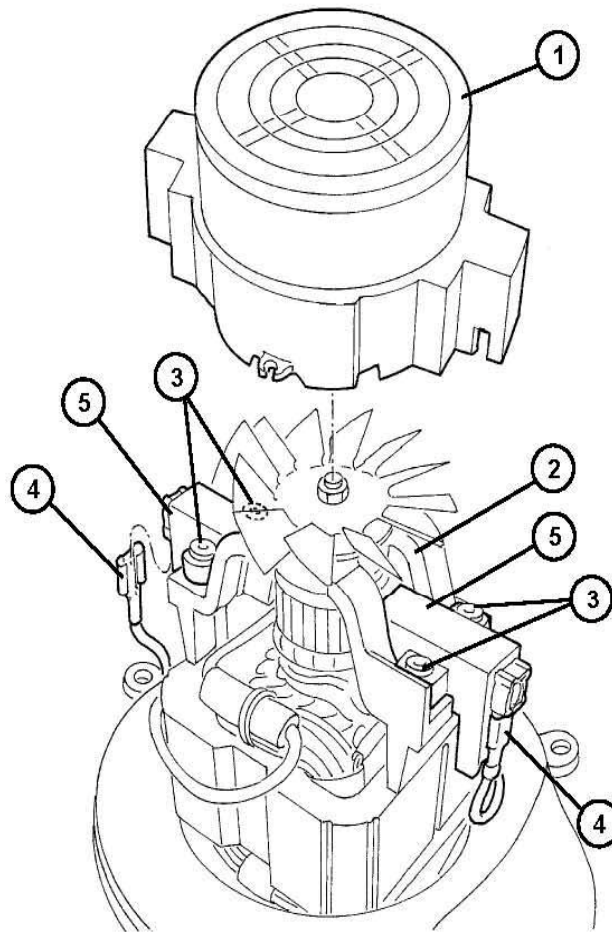


Figure 8-3

8.4 DISASSEMBLY/ASSEMBLY OF THE SUCTION MOTOR

Removal

1. If available, place the machine on a lifting platform; otherwise, place the machine on a level floor. Make sure that the machine cannot move independently.
2. Operating on the machine's controls as provided for in the User and Maintenance Manual, lower the brush and the squeegee, then turn the ignition key to "0" and take it out.
3. Remove the battery holder drum and disconnect the battery connector (6, **Figure 3-4**) (For the procedure, see the User and Maintenance Manual).
4. Operating on the left side of the machine, unscrew the screws (1, **Figure 8-4**).
5. Remove the support unit with the vacuum motor and filter (2), after you have disconnected the electrical connector (3) of the vacuum motor.
6. Remove the sound insulating seal from the bench (4).
7. Remove the vacuum motor (5).

Assembly

8. Reassemble, by reversing the sequence of operations performed for disassembly.

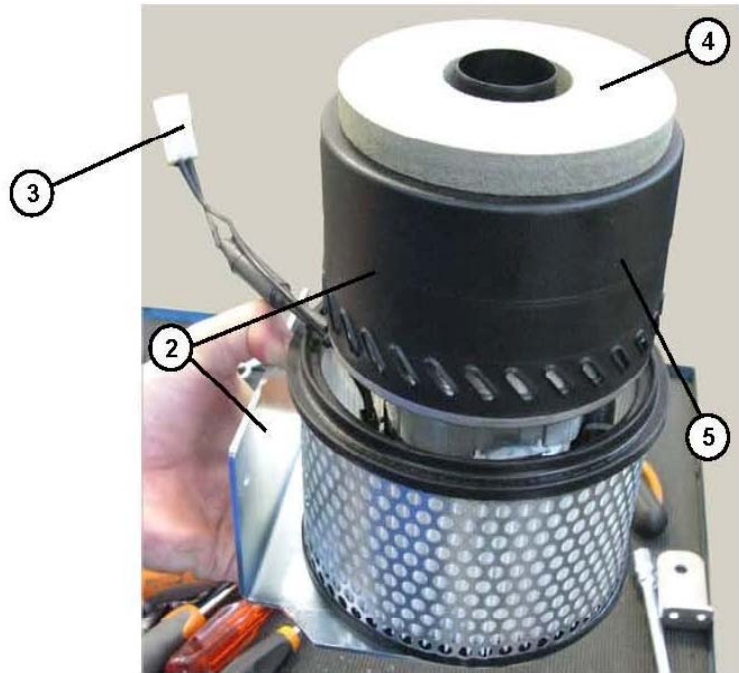
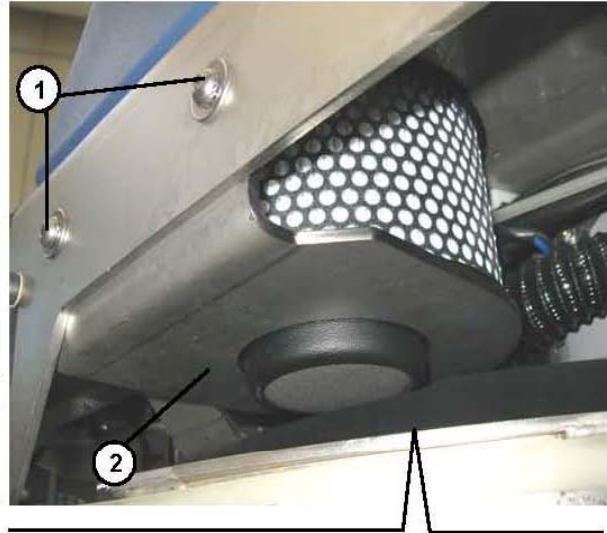
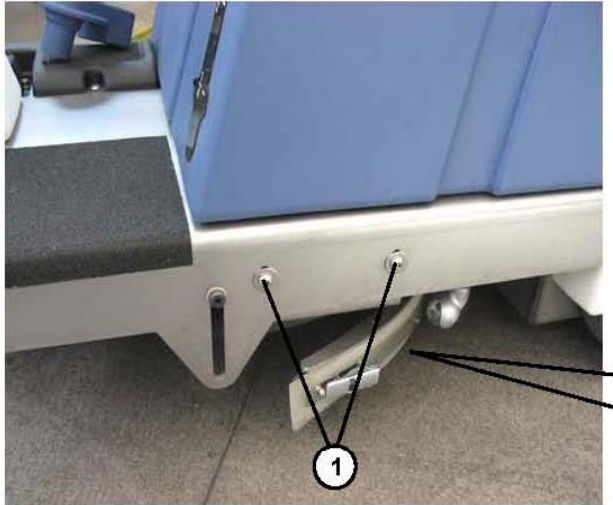


Figure 8-4

8.5 CLEANING/CHECK THE SQUEEGEE AND REPLACEMENT OF THE SQUEEGEE BLADES

Cleaning



CAUTION! The use of work gloves is recommended when cleaning the squeegee, due to the possible presence of sharp debris.

1. Remove the squeegee (See the procedure in the specific paragraph).
2. Wash and clean the squeegee(1, **Figure 8-5**); in particular clean dirt and debris from the compartments (2) and the hole (3). Check that the front blade (4) and the rear blade (5) are undamaged and have no cuts or tears, otherwise replace them (see the procedure below).
3. Refit the squeegee (See the procedure in the specific paragraph).

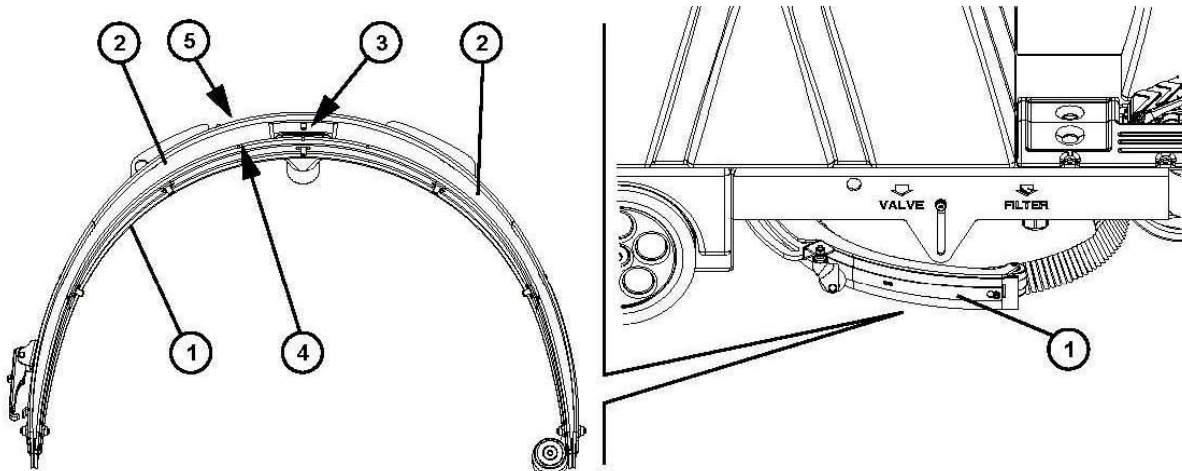


Figure 8-5

8.5 Inspection and Replacement of Squeegee Blades Cont.

4. Remove and clean the squeegee, operating as described above.

5. Check that the front blade (1, **Figure 8-6**) and the rear blade (2) are undamaged and have no cuts or tears, otherwise replace them, as described on the following page.

Also check that the front edge (3) of the rear blade (2) is not worn; otherwise turn the blade over, putting one of the other three corners in its place, if it is still undamaged. Even if the other three corners are worn, replace the blade, by operating as described below:

– Replace (or invert) the rear blade (2) after having disengaged the retainer (4), released the eccentric (5), and removed the retainer strip (7) disengaging them from the pins with nut (6); finally put the blade back, operating in the reverse order of removal.

– Replace the front blade (1) after having unscrewing the nuts (8) and removed the retainer strip (9), and finally put the blade back by operating in reverse order of removal.

6. Reinstall the squeegee, as described in the specific paragraph.

7. If necessary, adjust the height of the squeegee, operating as described in the following pages.

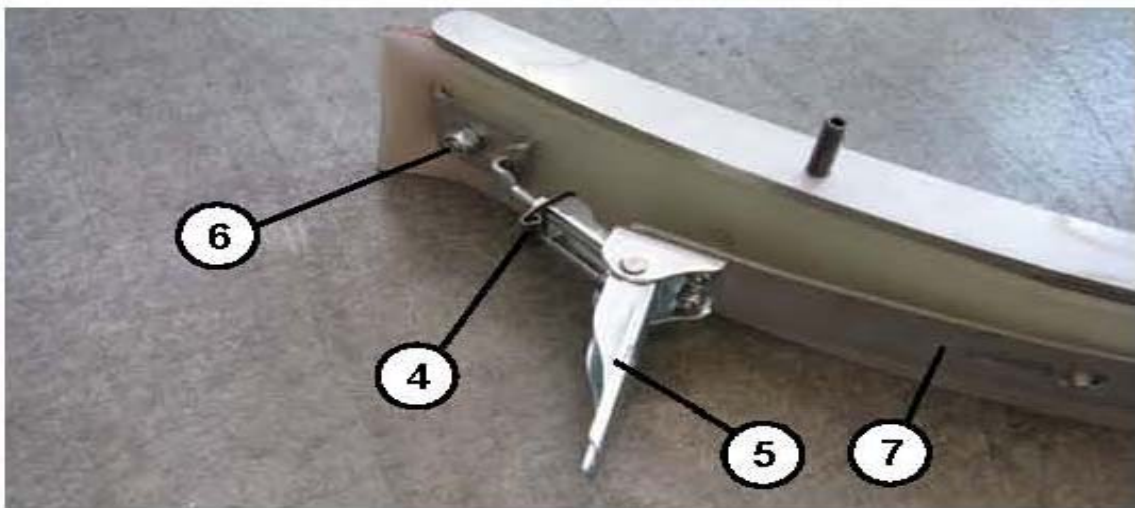
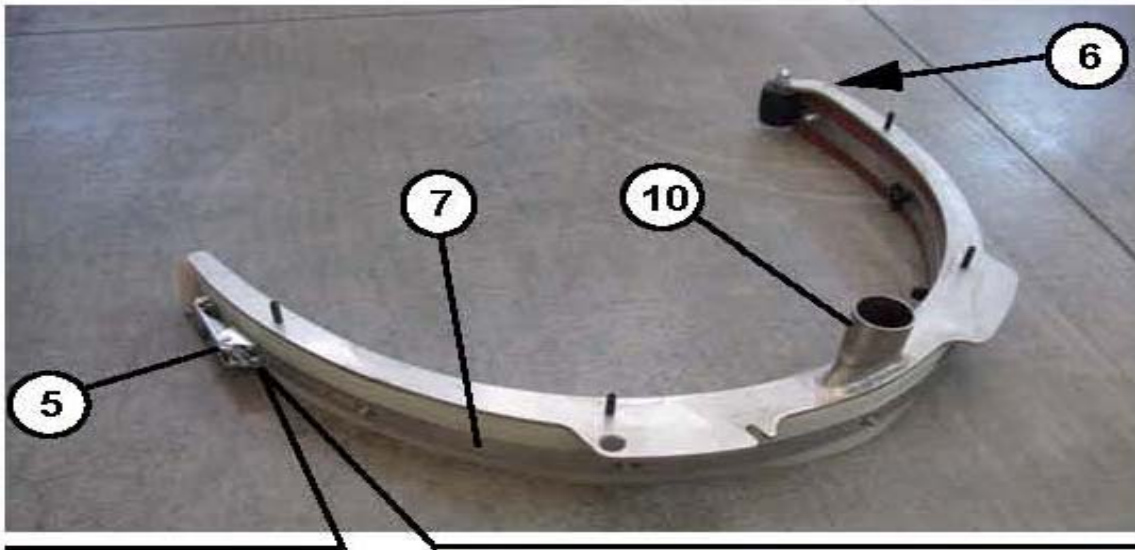
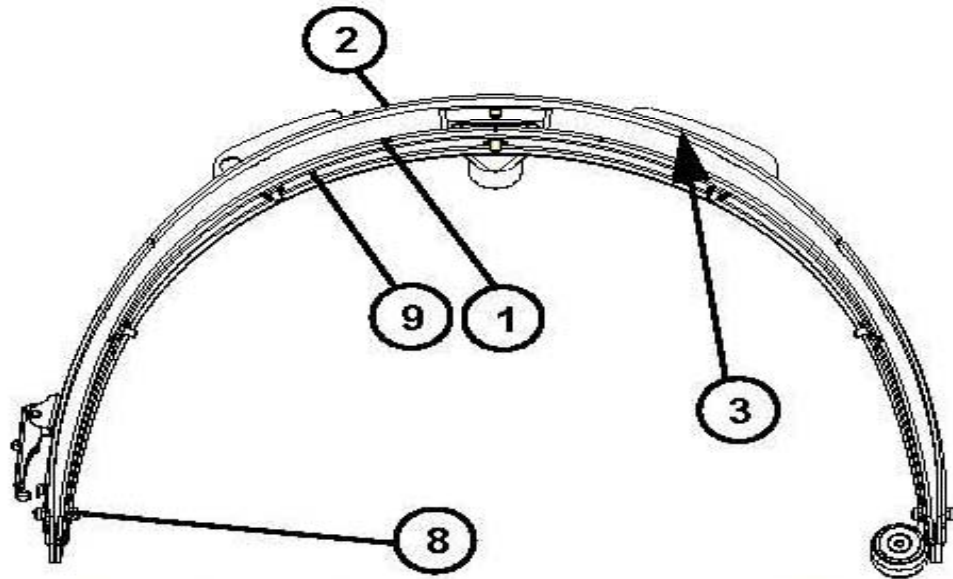


Figure 8-6

8.5 Squeegee Height Adjustment

Note: Adjusting the height of the squeegee is required when the machine does not dry properly, leaving streaks of water in the central region, or on the ends.

8. To adjust the height of the squeegee, loosen the nuts (1, **Figure 8-7**) and adjust the height of the right and left wheel (2).
9. At the end of the adjustment, tighten the nuts.

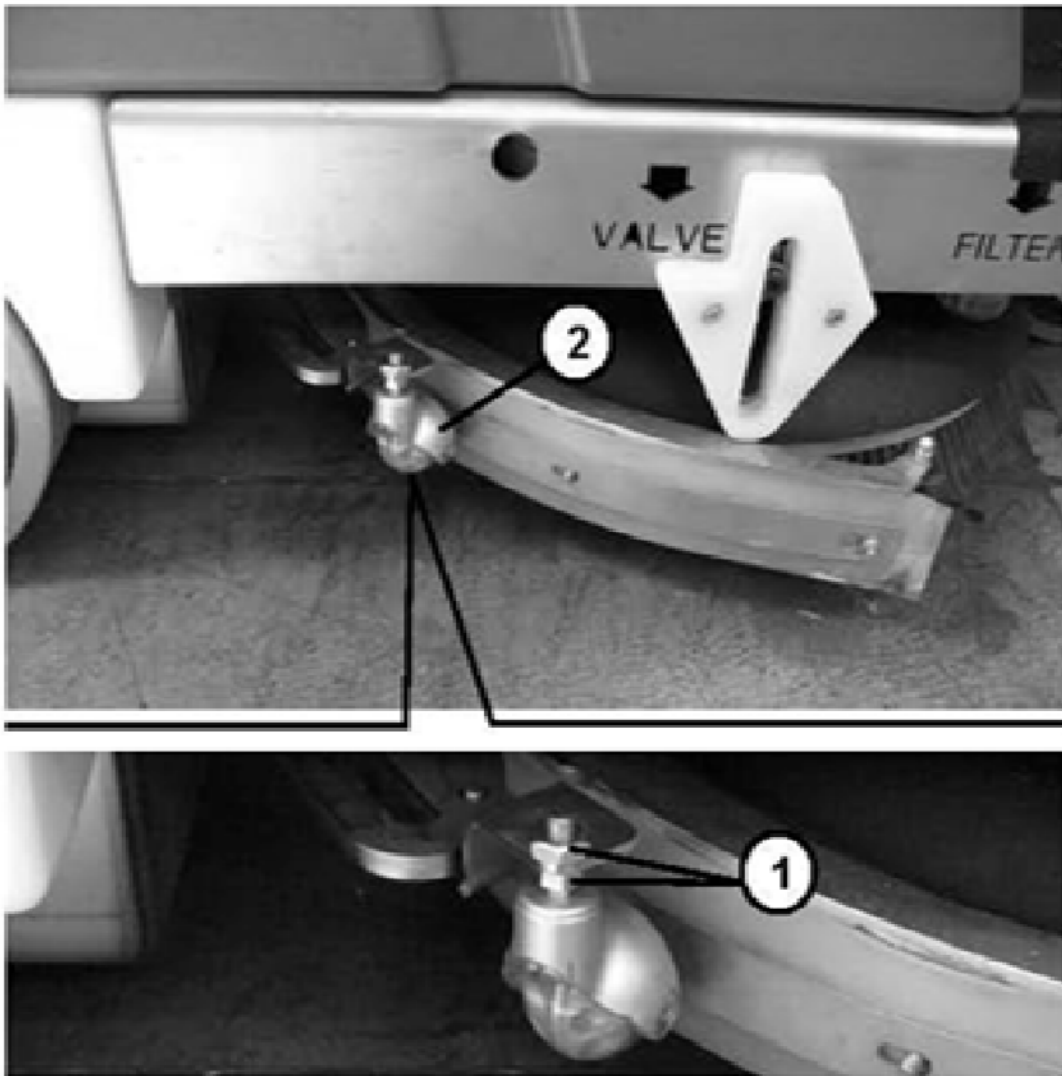


Figure 8-7

8.6 DISASSEMBLY/ASSEMBLY AND CLEANING/REPLACING THE SUCTION FILTER

Removal

1. Remove the vacuum motor (See the procedure in the specific paragraph).
2. Remove the vacuum filter (1, **Figure 8-8**) by detaching it from the other parts of the unit.
3. Clean the vacuum filter with brush and compressed air (max. 5 Bar). If the filter is damaged replace it.



WARNING! Adequately protecting parts of the body (eyes, hair, hands, etc.) when performing cleaning Operations using compressed air guns.

Assembly

4. Reassemble, by reversing the sequence of operations performed for disassembly.

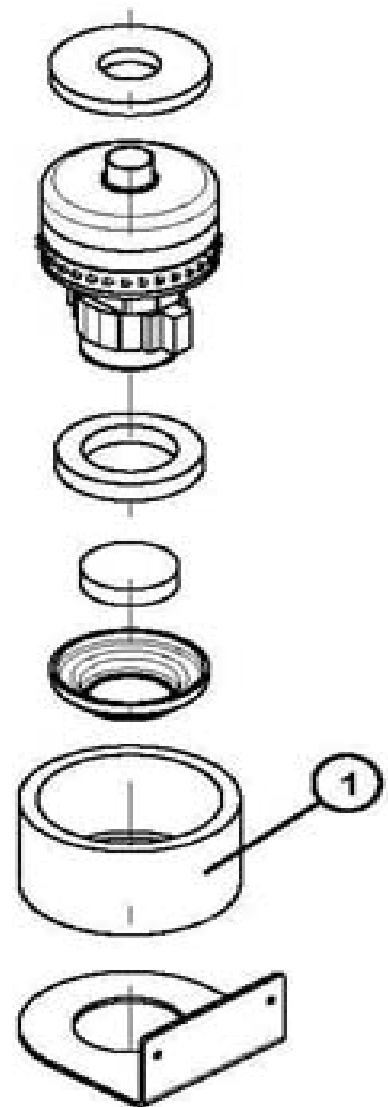


Figure 8-8

8.7 DISASSEMBLY/ASSEMBLY - SQUEEGEE ACTUATOR

Removal

1. If available, place the machine on a lifting platform; otherwise, place the machine on a level floor. Make sure that the machine cannot move independently.
2. Operating on the machine's controls as provided for in the User and Maintenance Manual, lower the squeegee, then turn the ignition key to "0" and take it out.
3. Remove the battery holder drum and disconnect the battery connector (6, **Figure 3-4**) (For the procedure, see the User and Maintenance Manual).
4. Operating on the squeegee (1, **Figure 8-9**) unscrew the nut (2) and remove the screw (3) with a retaining washer, lower squeegee actuator rod (4).
5. Operating on the machine's controls as instructed in the User and Maintenance Manual, operate the squeegee's lift control, so as to raise the rod (4) (to facilitate the subsequent removal of the actuator). Turn the ignition key to the "0" and take it out.
6. Remove the batteries from the machine (See procedure in the specific paragraph).
6. By operating at the top front side of the battery compartment, remove the split pin (5) and pull the upper pin (6) securing the actuator (7).
8. Disconnect the electrical connector (8) of the squeegee's actuator.
9. Remove the actuator (7) from the squeegee.

Assembly

10. Assemble, by reversing the sequence of operations performed for disassembly.

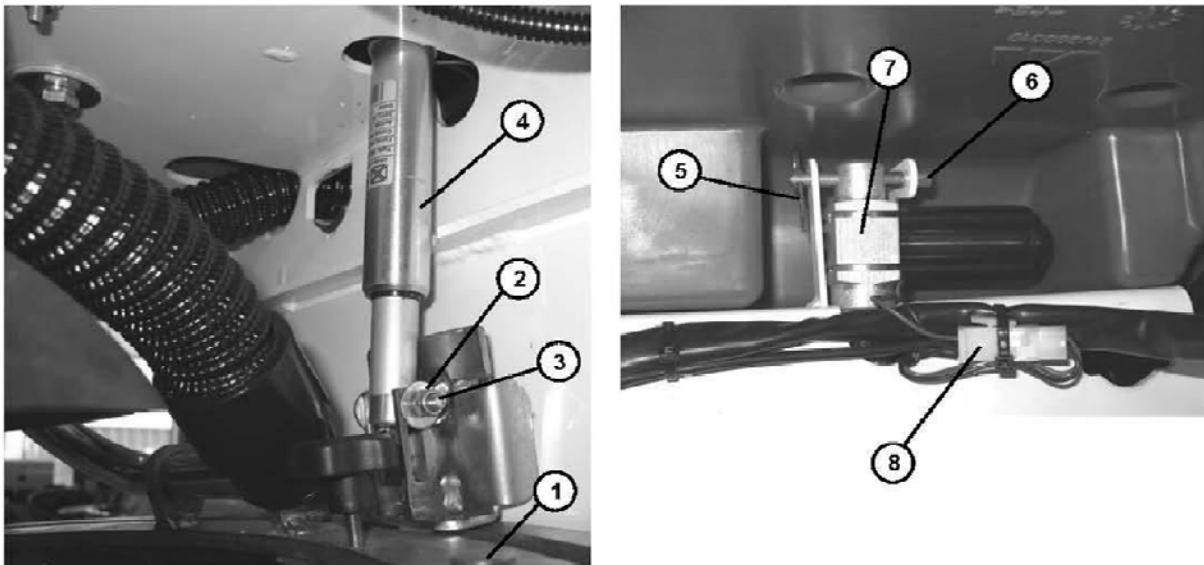


Figure 8-9

8.8 TROUBLE SHOOTING

THE ELECTRIC SUCTION MOTOR DOES NOT TURN ON

Possible causes can be:

1. Electric vacuum motor with worn carbons (replace the electric motor carbons)
2. Electric vacuum motor failure (check the motor's absorption)
3. Electronic board functions damaged (replace it)
4. Recovery water tank, full and float activated (empty the recovery water tank)

THE SUCTION OF THE DIRTY WATER IS INSUFFICIENT OR NOT TAKING PLACE

Possible causes can be:

1. Cover for the tanks (11, **Figure 3-2**) incorrectly positioned (position it correctly)
2. Seal of the cover for the tanks, not efficient (eliminate the causes)
3. Squeegee or vacuum hose clogged or damaged (clean or repair/replace them)
4. Squeegee blades flaps torn or worn (replace them)

THE SQUEEGEE LEAVES MARKS OR DOES NOT COLLECT WATER

Possible causes can be:

1. Debris under the edge of the squeegee blades (remove it)
2. Squeegee blades flaps torn or worn (replace them)
3. Squeegee height not adjusted properly (adjust it)
4. The closure tap for the recovery water drain hose (16, **Figure 3-3**) is open (close it)

THE SQUEEGEE CANNOT BE LIFTED/LOWERED

Possible causes can be:

1. Actuator failure (repair it/replace it)
2. Electronic board functions damaged (replace it)

CHAPTER 9

DRIVE SYSTEM

The significant maintenance/replacement procedures relating to the Drive system are described in this chapter. In addition Troubleshooting is described in the final section.

9.1 PROCEDURE TO CHANGE THE MAXIMUM DRIVE SPEED OF THE MACHINE



WARNING! This procedure can only be performed by the person responsible for the machine, who must adjust the maximum speed of the machine, taking into account the experience of the operator to whom the machine is entrusted, for the washing/drying activity.

The operator is absolutely prohibited from varying the maximum speed of the machine.

1. Turn the ignition key to "I" while holding down the button (1, **Figure 9-1**) and wait for the display (2) the setting (3), and then release the button (1). The value (4) indicates the maximum pre-set speed on the machine. The maximum speed can be set from a minimum value of 1/5 to a maximum value of 5/5.
2. Press the button (1) several times until the maximum speed value desired is set on area (4) of the display.
3. Wait for the machine to reset; the new maximum speed is set.



Figure 9-1

9.2 DISASSEMBLY/ASSEMBLY OF THE DRIVE WHEEL

Removal

1. If available, place the machine on a lifting platform; otherwise, place the machine on a level floor. Make sure that the machine cannot move independently.
2. Turn the ignition key to the "0" and take it out.
3. Apply wedges (1, **Figure 9-2**) to both rear wheels, to securely lock the machine.
4. Apply two suitable wooden shims (2) under the front frame of the machine, high enough to lift the front wheel by 5-6 cm (space necessary to then be able to remove the front wheel).
5. Unscrew the nut (3) and remove the retaining screw (4) for the front wheel.
6. Remove the spacers (5) and (6).
7. Remove the front wheel assembly (7) by releasing the pinion (8) from the chain (9).

Assembly

8. Assemble, by reversing the sequence of operations performed for disassembly, with the following instruction:
 - tighten the nut (3) of the screw (4) taking the wheel (7) thrust downwards; use a lever for this positioned between the top of the front wheel and the wheel support (11) compartment (10).

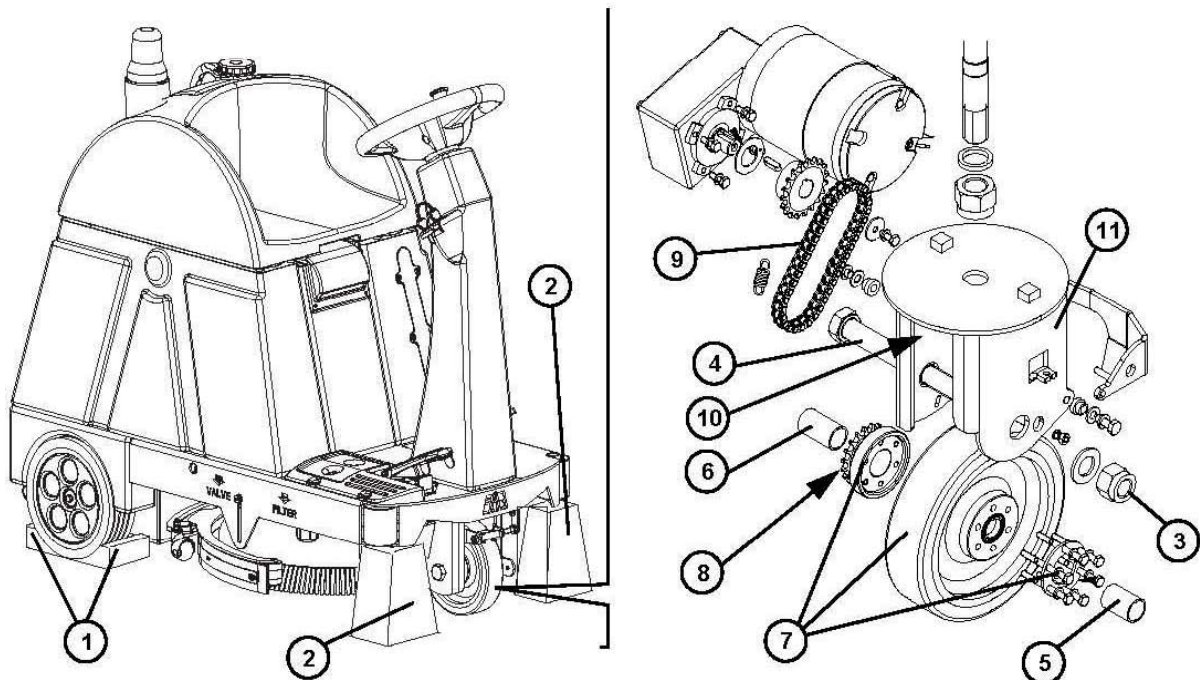


Figure 9-2

9.3 DISASSEMBLY/ASSEMBLY OF THE DRIVE CHAIN

Removal

1. Remove the drive wheel (See the procedure in the specific paragraph).
2. Unscrew the screw (1, **Figure 9-3.**) and retrieve the washers.
3. Remove the pinion (2) and retrieve the lug (3).
4. Retrieve the self-lubricating bearing (4).
5. Retrieve the chain (5).

Assembly

6. Assemble, by reversing the sequence of operations performed for disassembly.



CAUTION!

Do not lubricate the chain (5), in order to prevent dust and debris from mixing with the lubricant.

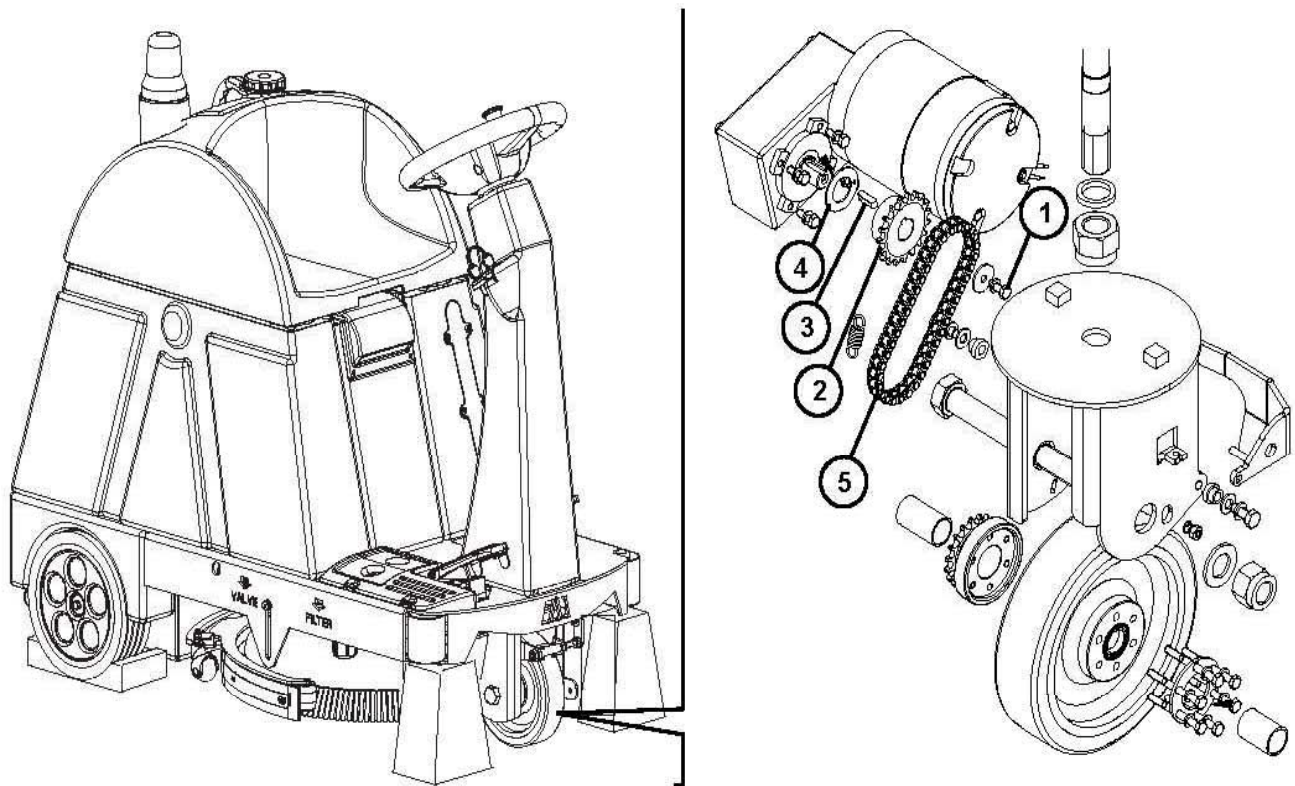


Figure 9-3

9.4 DRIVE MOTOR ELECTRICAL ABSORPTION CHECK



WARNING!

This procedure must be performed by qualified personnel.

1. Turn the ignition key to the "0".
2. Apply wedges (1, **Figure 9-4**) to both rear wheels, to securely lock the machine.
3. Apply two suitable wooden shims (2) under the front chassis of the machine, high enough to also lift the front wheel by 6-7 cm.



WARNING! Make sure that the wooden shims are completely stable to be able to mount the machine and operate the controls.

4. Open the cover (3) and remove the panel (4) by lifting it up.
Lower the cover back down (3).
5. Apply the current clamp (5) to one of the power leads (6) for the drive motor.
6. Cautiously sit on the seat of the machine.



WARNING!

Do not touch any electrical components that are not protected by the panel (4), as removed!

7. Turn the ignition key to "I" and wait for the word "READY" on the display.



WARNING!

Pay attention to the rotation of the drive wheel (7) when performing the next steps.

8. Operate the start pedal (8) and reach the maximum speed (corresponding to the five lights on the control panel), then check on current clamp that the absorption of the drive motor is approximately 5 amps at 24 volts.
9. Stop the drive by releasing the accelerator pedal (8).
10. Turn the ignition key to the "0".
11. Get off the machine and remove the current clamp.
12. If the absorption is greater, perform the steps below in sequence to locate and eliminate the cause of the anomalous absorption:
 - check that there is no debris or dirt (cords, cables, etc.) on the drive wheel hub or on the drive chain.
 - check that the emergency and parking brake is not engaged and that it is not hindering the free rotation of the drive wheel.
 - check the charcoals of the electric motor (see procedure in the specific paragraph)
 - if necessary, disassemble the motor (See procedure in the specific paragraph) then check the state of its parts. In the case where the operations described above do not lead to a proper absorption of the motor, it will need replacing (see procedure in the specific paragraph).
13. Reverse steps 1 to 4.

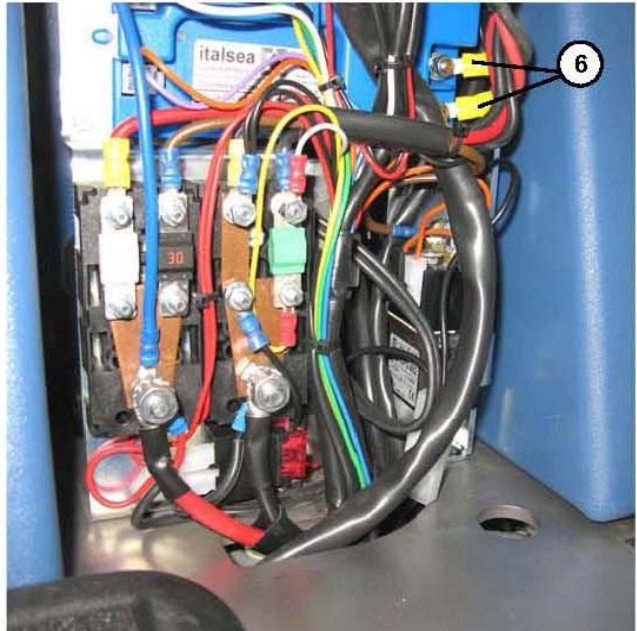
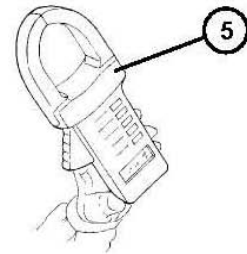
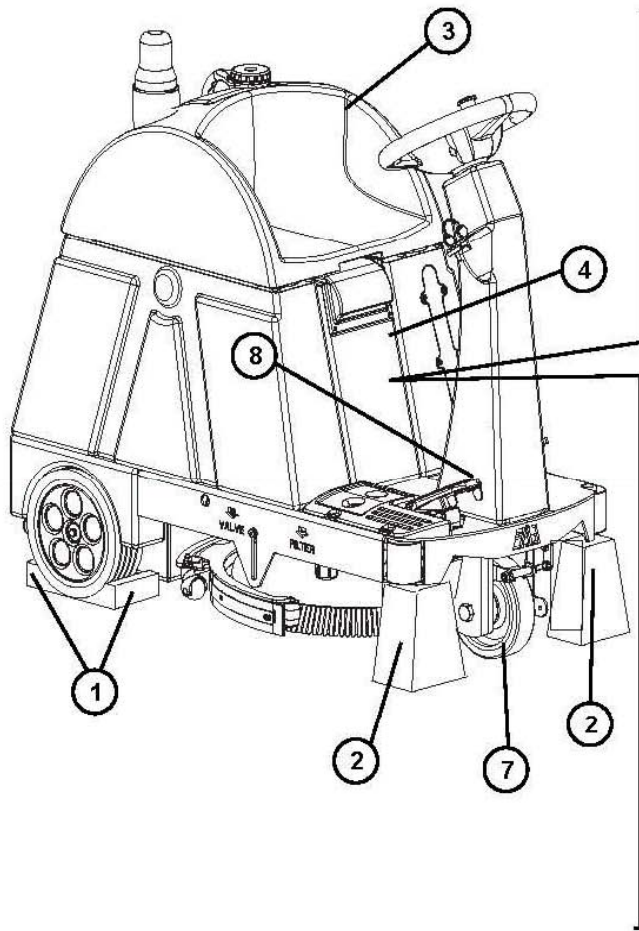


Figure 9-4

9.5 DRIVE MOTOR CARBON BRUSHES

Check

1. If you need to check all four carbons, remove the drive motor (See the procedure in the specific paragraph).
2. Release and remove the strap (1, **Figure 9-5**) of the drive motor (2) after you have cleaned externally the motor of dirt and dust.
3. For each of the four carbons, lift the retaining clip (3) and extract the carbons (4).
4. Check the state of wear of the four carbons; the carbons are worn when sufficient contact with the armature of the motor is not provided because of their consumption, the non-integrity of the contact surfaces, broken thrust spring, etc.

Replacement

5. If necessary, remove the carbons to replace them, after having unscrewing the nuts (D) and freed the terminal lug (6).

Restoring

6. Reassemble, by reversing the sequence of operations performed for disassembly.

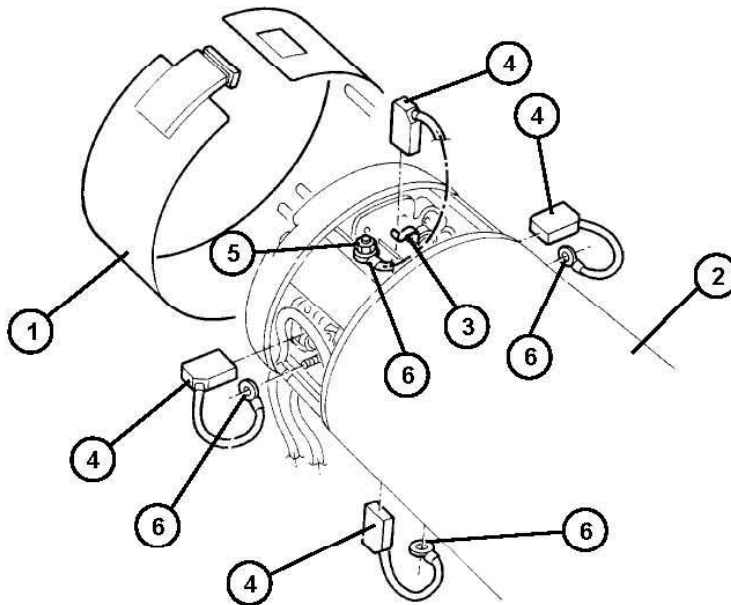


Figure 9-5

9.6 DISASSEMBLY/ASSEMBLY OF THE DRIVE MOTOR

Removal

1. Remove the drive wheel (See the procedure in the specific paragraph).
2. Remove the drive chain (See the procedure in the specific paragraph).
3. Remove the battery holder drum and disconnect the battery connector (6, **Figure 3-4**) (For the procedure, see the User and Maintenance Manual).
4. Open the cover (1, **Figure 9-6**) and remove the panel (2) by lifting it up. Lower the cover back down (1).
5. Disconnect the electrical connections (3) of the drive motor from the drive electronic board.
6. Unscrew the retaining screws (4) for the drive motor.
7. Remove the drive motor. (5).
8. Assemble, by reversing the sequence of operations performed for disassembly.

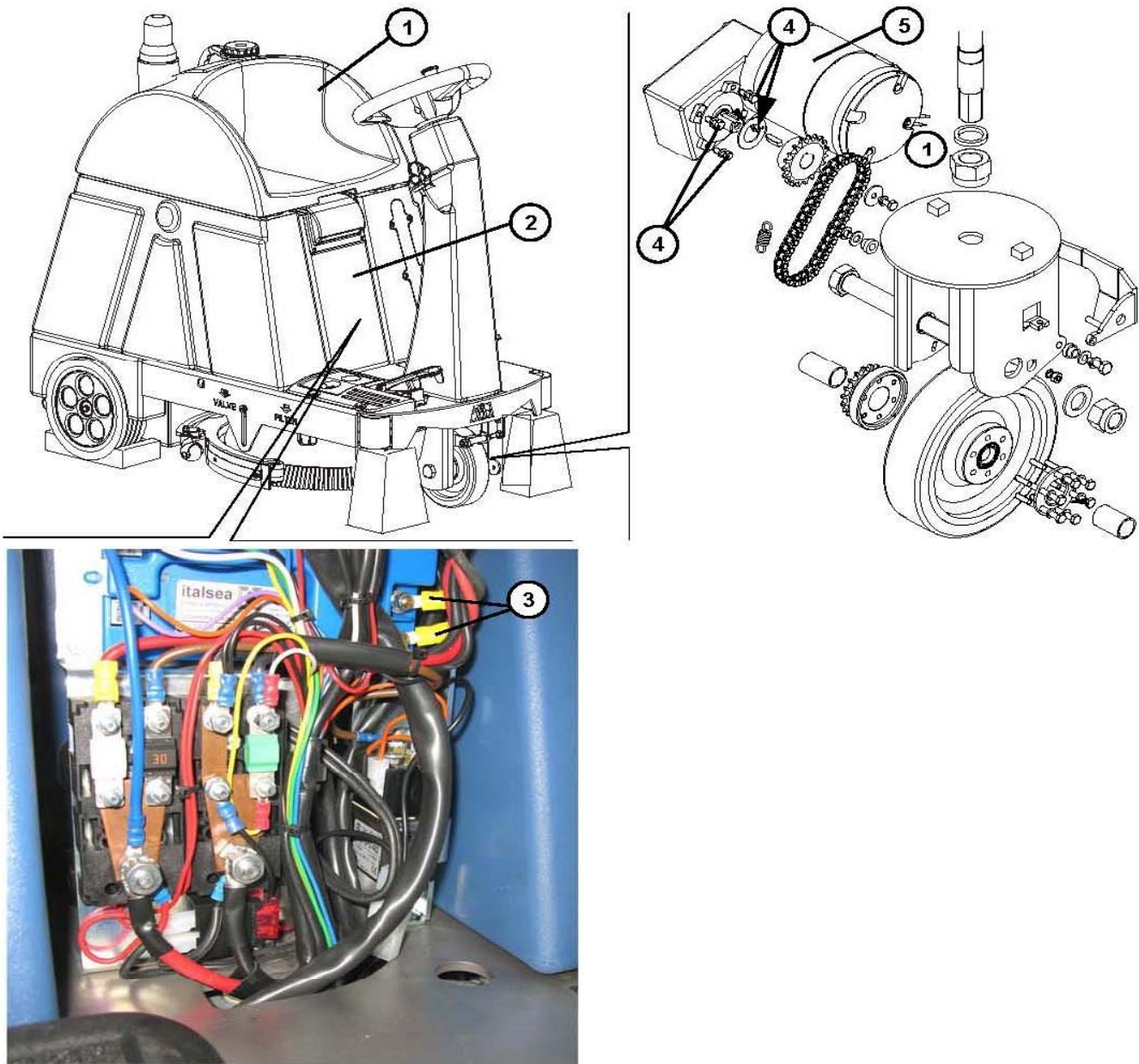


Figure 9-6

9.7 DISASSEMBLY AND ASSEMBLY OF DRIVE PEDAL

Removal

1. Make sure that the machine cannot move independently, and then turn the ignition key to " 0" and take it out.
2. Remove the battery holder drum and disconnect the battery connector (6, **Figure 3-4**) (For the procedure, see the User and Maintenance Manual).
3. Unscrew the retaining screws (1, **Figure 9-7**) of the drive pedal (2).
4. Lift the drive pedal and disconnect its electrical connector (3).

Assembly

5. Assemble, by reversing the sequence of operations performed for disassembly.
6. Adjust the drive pedal, operating according to the following procedure:



CAUTION! In the context of the procedure described below, concerning the "adjustment of the drive pedal", make sure you do not vary any other setting of the machine. The machine settings are set by the manufacturer to optimize the functional characteristics of the machine itself, and are then saved before selling the machine. Changing the machine settings (except those covered by this manual) by anyone not authorized to do so, may lead to the voiding of the warranty of the machine and any other service contracts by the manufacturer.

9.7 ADJUSTING THE DRIVE PEDAL



NOTE: Perform each operation within 10 seconds of the previous operation otherwise the board will be reset and you will have to resume operations from the start.

1. Turn on the machine.
2. During the start-up phase simultaneously press and hold down the (-) button of the water dosage and the (+) button of the detergent dosage – the display shows "USER CHECK - PASSWORD:0"
3. Press the button (+) of the detergent dosage until you reach the number 61
4. Press the button (TURBO) to confirm - the display shows "MONITOR: FUNCTIONS BOARD"
5. Press the button (+) of the water dosage 3 times - the display shows "SET TARGET: TRACTION BOARD"
6. Press the button (TURBO) to confirm - the display shows "T_SET: PAR 0 - RESET: 0"
7. Press the button (+) of the water dosage 8 times - the display shows "SINGLE ENDED"
8. Press the button "TURBO" TO CONFIRM - the display shows "CALIBRATION – STOP POS = 1.2 V"
9. Press the button "TURBO" to confirm - the display shows "CALIBRATION - MAX POS = 1.2 V"
10. Fully press the drive pedal - the display shows "CALIBRATION - MAX POS = 3.0 V"
11. While holding down the drive pedal press the button "TURBO" - the display shows "T_SET: PAR 9 - REF.DB: 200 MV"
12. Release the drive pedal and wait for the machine to reset
13. Turn the machine off and on again



Figure 9-7

9.8 SEAT SAFETY SWITCH ADJUSTMENT

Functionality check

1. Turn the ignition key to "I" without sitting on the seat of the machine and check that the control panel display shows "Sit down" (2, **Figure 9-8**).
2. Operating as indicated in the User and Maintenance Manual, check the correct operation of forward and backward motion of the machine. Check that the control panel display shows "Ready" (1).
3. Get off the machine and check that the control panel display shows "Sit down" (2).
4. If necessary, carry out the procedure described below (points from 5 to 8.) to adjust the micro-switch.

Adjusting micro-switch

5. Open the cover (3) and remove the panel (4) by lifting it up.



WARNING!

Do not touch any electrical components that are not protected by the panel (4), as removed!

6. Loosen the nuts (5) and adjust the position of the micro-switch (6). Tighten the nuts (5).
7. Insert the panel in the housing (4), and then close the cover (3).
8. Check the functionality of the micro-switch by performing the previous points from 1 to 4.

Replacing the micro-switch

9. Remove the battery holder drum and disconnect the battery connector (6, **Figure 3-4**) (For the procedure, see the User and Maintenance Manual).
10. Open the cover (3, Fig. 10-8) and remove the panel (4) by lifting it up.
11. Unscrew the nuts (5) and move the micro-switch (6).
12. Retrieve the micro-switch (6) after you have disconnected its electrical connections from the drive electronic board (7).
13. Assemble, by reversing the sequence of operations from step 9 to step 12, performed for disassembly.
14. Check the functionality of the micro-switch by performing the previous points from 1 to 4.

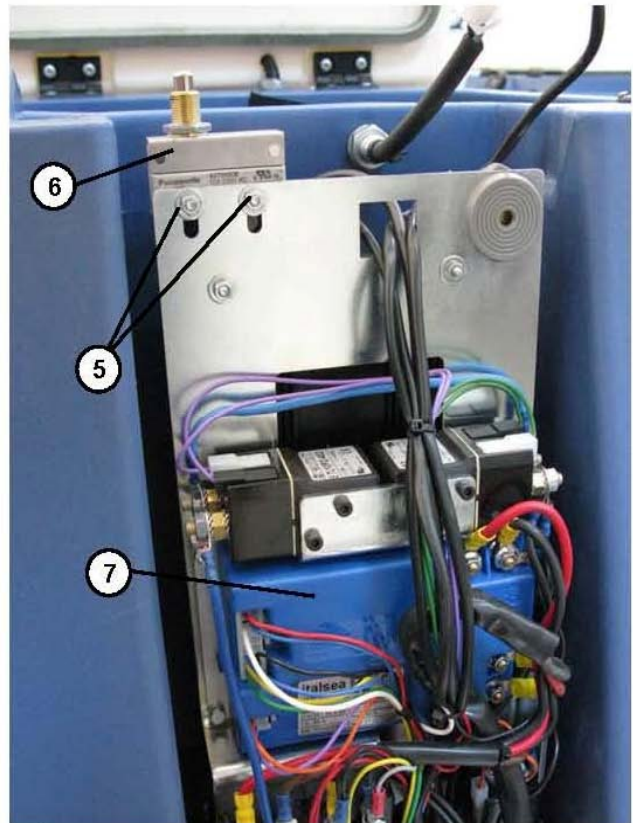
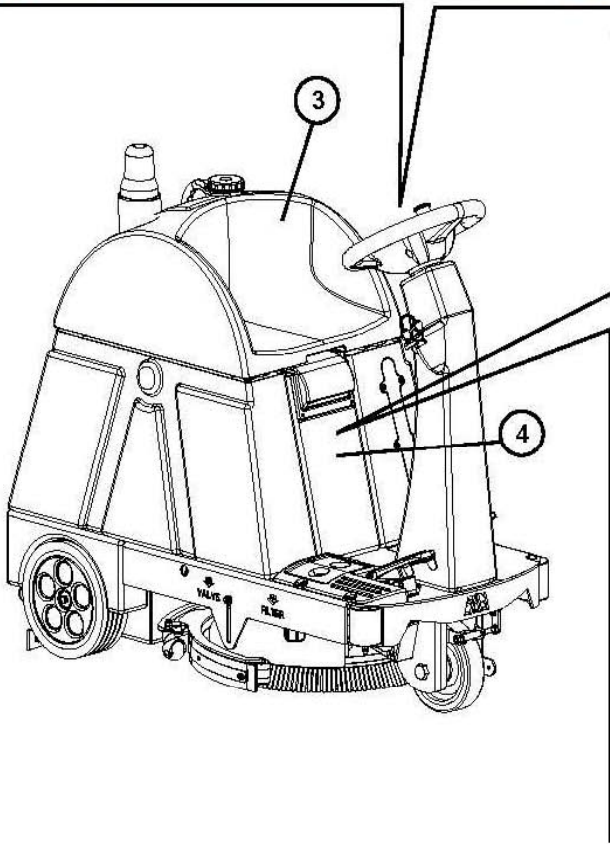


Figure 9-8

9.9 TROUBLESHOOTING

THE MACHINE IS MOVING SLOWLY OR NOT MOVING

Possible Causes can be:

1. Large debris or cords around the drive wheel or the drive chain (remove any debris/cords)
2. Excessive slope of floor (do not use traction to go over slopes higher than that provided for)
3. The drive pedal (15) is poorly adjusted or broken (adjust or replace it)
4. The voltage of the batteries has dropped excessively (charge the batteries)
5. The drive safety micro-switch is faulty (repair/replace it)
6. The parking brake does not turn off (see the chapter on the Parking brake system)
7. The drive electronic board is not working (replace it)
8. The electronic board functions are faulty (see the chapter on the Electrical System)
9. The drive motor has worn carbons (replace them)
10. The drive motor is faulty (replace it).

10. Miscellaneous Systems

The significant maintenance/replacement procedures relating to Miscellaneous systems are described in this chapter

10.1 TIGHTENING SCREWS AND NUTS CHECK

1. If there is recovery water and cleaning solution (or washing water) in the corresponding tanks, empty them (See the procedure on the User and Maintenance Manual).
2. If available, place the machine on a lifting platform; otherwise, place the machine on a level floor.
Make sure that the machine cannot move independently.
3. Turn the ignition key to the "0" and take it out.
4. Remove the battery holder drum and disconnect the battery connector (6, **Figure 3-4**) (For the procedure, see the User and Maintenance Manual).
5. Lift the cover (1, **Figure 10-1**), and remove the panel (2) by lifting it up.
Continue with the check the following:
 - of the tightening of the screws and nuts accessible
 - of the correct position of the various fastening elements
 - that there are no visible faults of various parts and components
 - that there are no leaks of various liquids
6. Refit the various parts, by reversing the sequence of operations performed for disassembly.

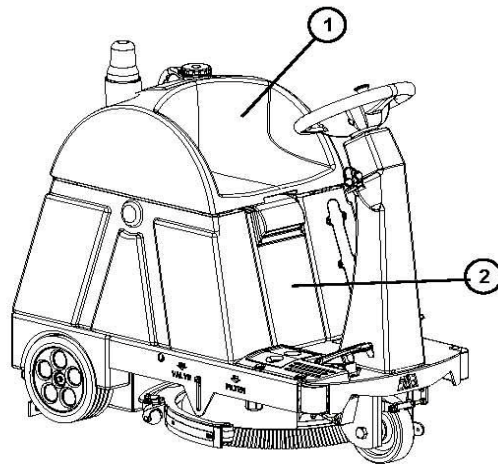


Figure 10-1

10.2 DISASSEMBLY/ASSEMBLY CONTROL PANEL KEYBOARD

Removal

1. If available, place the machine on a lifting platform, otherwise, place the machine on a level floor. Make sure that the machine cannot move independently.
2. Turn the ignition key to the "0" and take it out.
3. Remove the battery holder drum and disconnect the battery connector (6, **Figure 3-4**) (For the procedure, see the User and Maintenance Manual.
4. Operating under the steering wheel, unscrew the screws (1, **Figure 10-2**)
5. Carefully lift the keyboard assembly with a functions electronic board (2).
6. Disconnect the electrical connections (3) of the keyboard from the electronic board functions (4).
7. Turn the lever (5) and disconnect the electrical connector (6) from the emergency stop switch (7).
8. Turn the ring nut (8) and remove the emergency stop switch (7).
9. Carefully remove the keyboard (9) from support panel, disengaging its adhesive surface and Maintenance Manual.



NOTE

The removed keyboard is no longer usable.

ASSEMBLY

10. Assemble, by reversing the sequence of operations performed for disassembly, with the following instruction:
 - before you install the keyboard (9), remove any adhesive residue and clean the surface of the support panel and accession of the keyboard with solvent.
 - before positioning the keyboard assembly in the housing with an electronic board functions (2), check that the perimeter seal (10) is efficiently and correctly positioned in the housing.

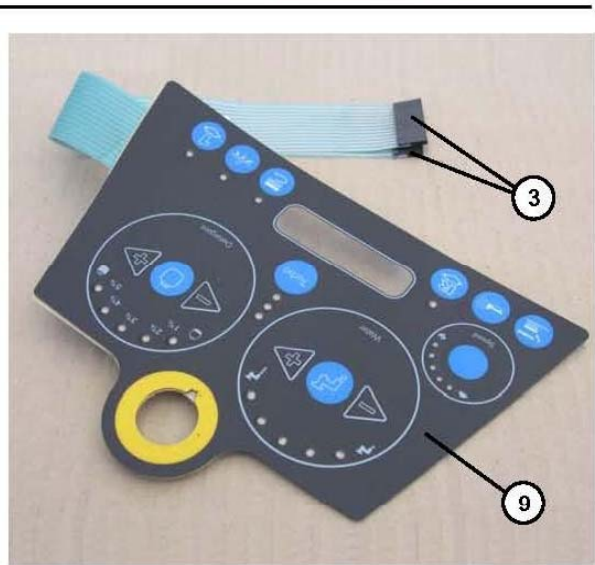
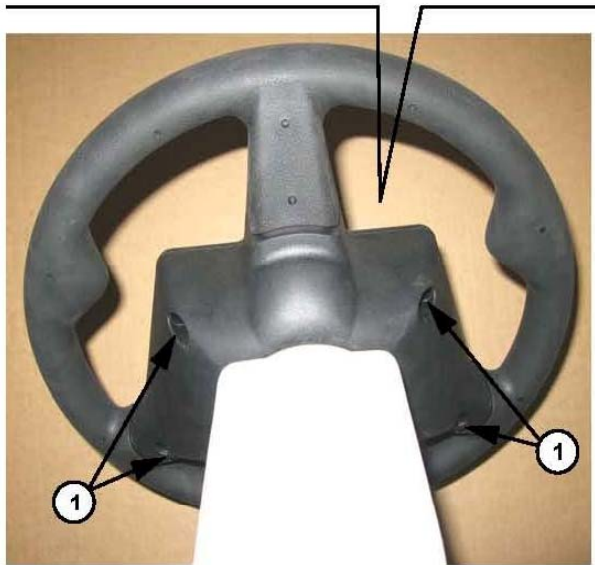
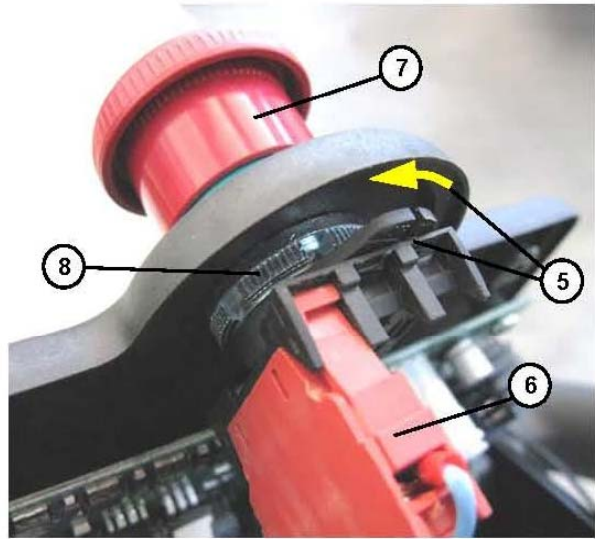
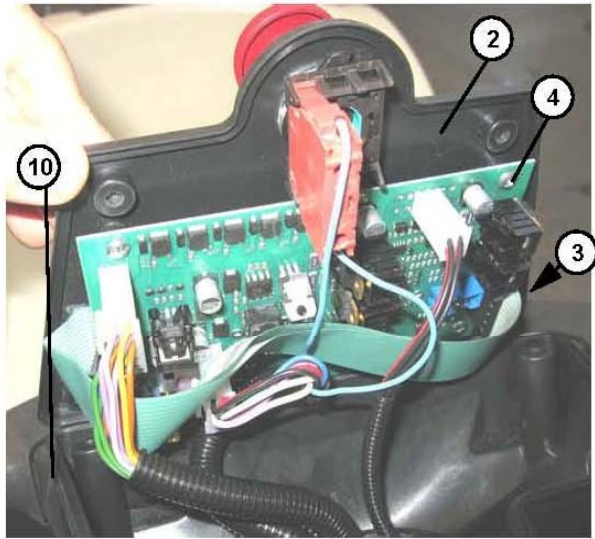


Figure 10-2

10.3 STEERING WHEEL DISASSEMBLY/ASSEMBLY

Removal

1. Remove the electronic functions (see the procedure in the specific paragraph), but without separating the function board (1, **Figure 10-3**) from the support with the keyboard.
2. Operating on the steering wheel, disconnect the electrical cables (3) from the electrical connector (4) of the emergency stop switch.
3. Unscrew the central nut (5) of the steering wheel (6).
4. Using a workshop extractor, pull off the steering wheel (6) from the conical engagement with a key, exerting force on the point (7) opposite the points (8). To prevent damage to the steering wheel, apply force distribution shims to the areas (8).
5. Retrieve the conical engagement key.

Assembly

6. Assemble, by reversing the sequence of operations performed for disassembly.

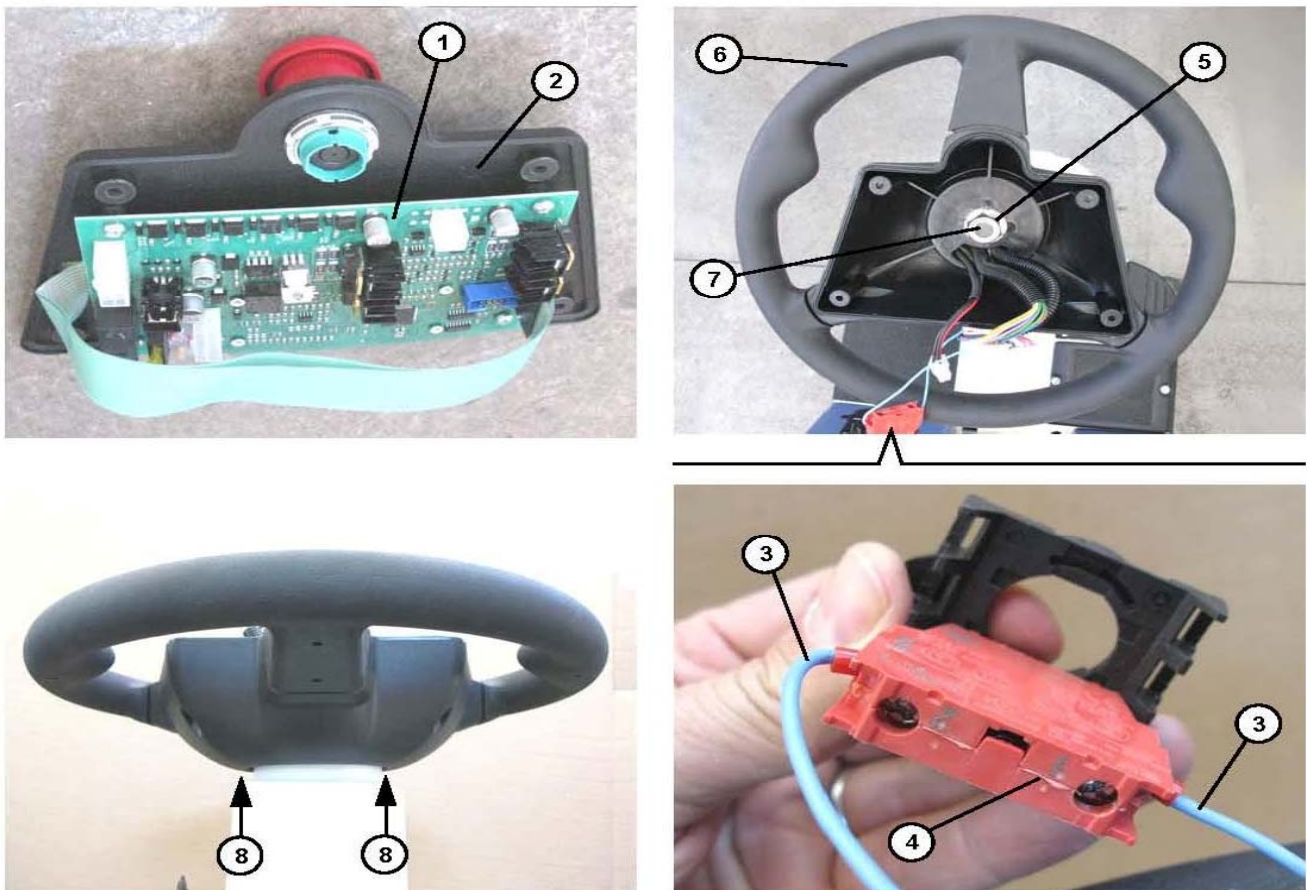


Figure 10-3

10.4 STEERING COLUMN DISASSEMBLY/ASSEMBLY

Removal

1. Remove the steering wheel (See the procedure in the specific paragraph).
2. Unscrew the screws (1, **Figure 10-4**) and gently lift the steering column (2).
3. Disconnect the electrical connector (3) of the ignition key, and then remove The steering column (2).

Assembly

4. Assemble, by reversing the sequence of operations performed for disassembly.

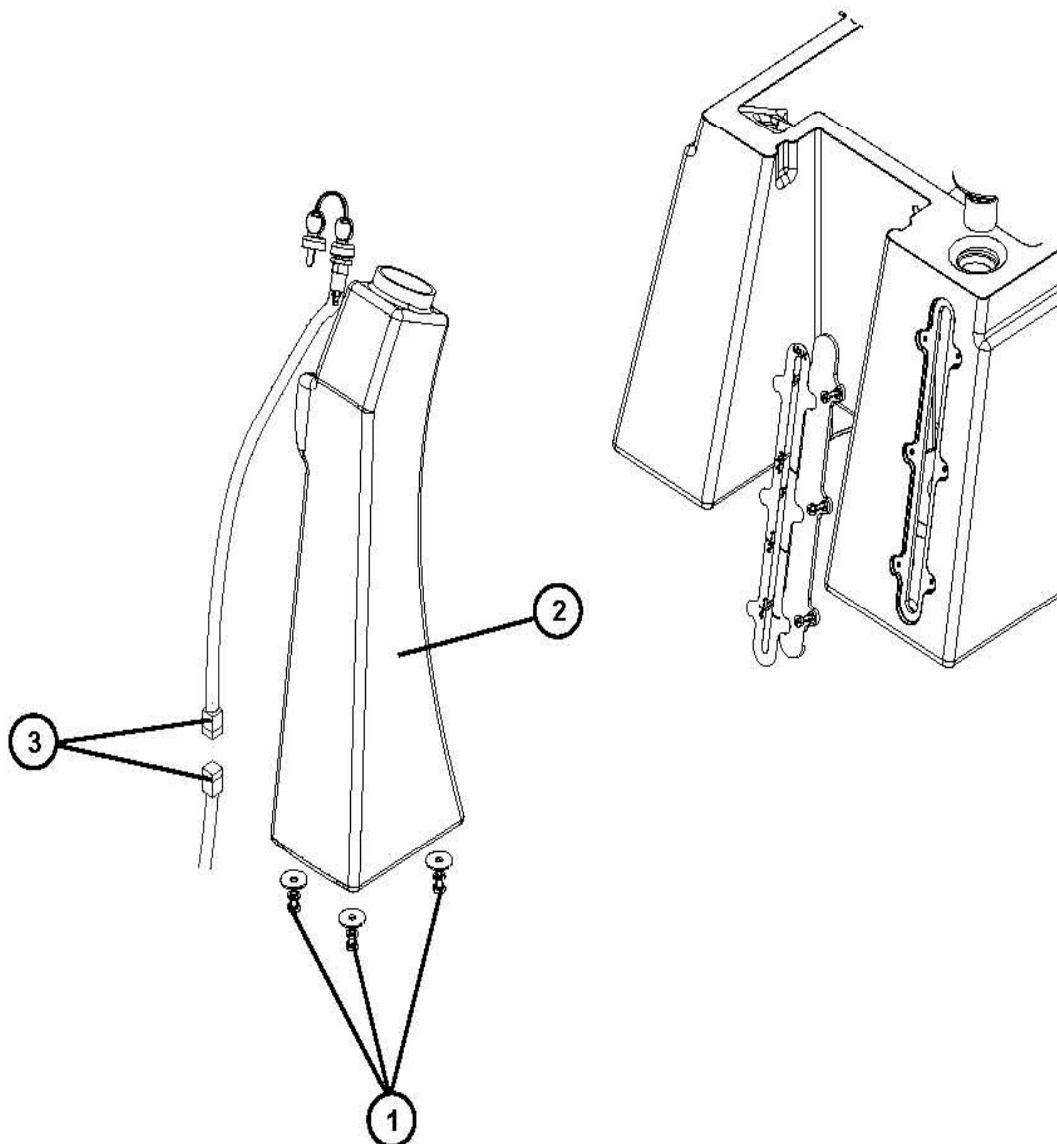


Figure 10-4

10.5 DISASSEMBLY/ASSEMBLY OF THE CLEAN WATER SIGHT GAUGE

REMOVAL

1. Empty the detergent solution tank (or washing water) (See the procedure in the User and Maintenance Manual).
2. Make sure that the machine cannot move independently, and then turn the ignition key to "0" and take it out.



WARNING

Wear gloves and protective clothing suitable for the task.

3. Operating carefully, using a sharp knife, remove the dipstick (1, **Figure 10-5**) to be replaced.

ASSEMBLY

4. Operating on the tank of the machine, clean the adhesive residue from the dipstick housing; if necessary degrease the bonding area by means of a solvent. Clean and degrease the gluing perimeter of the new dipstick to be fitted.
5. Apply a uniform bead of "Gelson 30430 MS-Flex 445 Auto glass Repair Technicians MS-polymer based sealant" adhesive, or equivalent, without interruption, to the entire gluing perimeter of the new dipstick to be mounted.
6. Place the dipstick in the tank housing (1) and make the adhesive stick by pressing gently.
7. Apply the adhesive tapes positioning the dipstick on the tank.
8. Let the adhesive dry for 18 hours with the machine off.

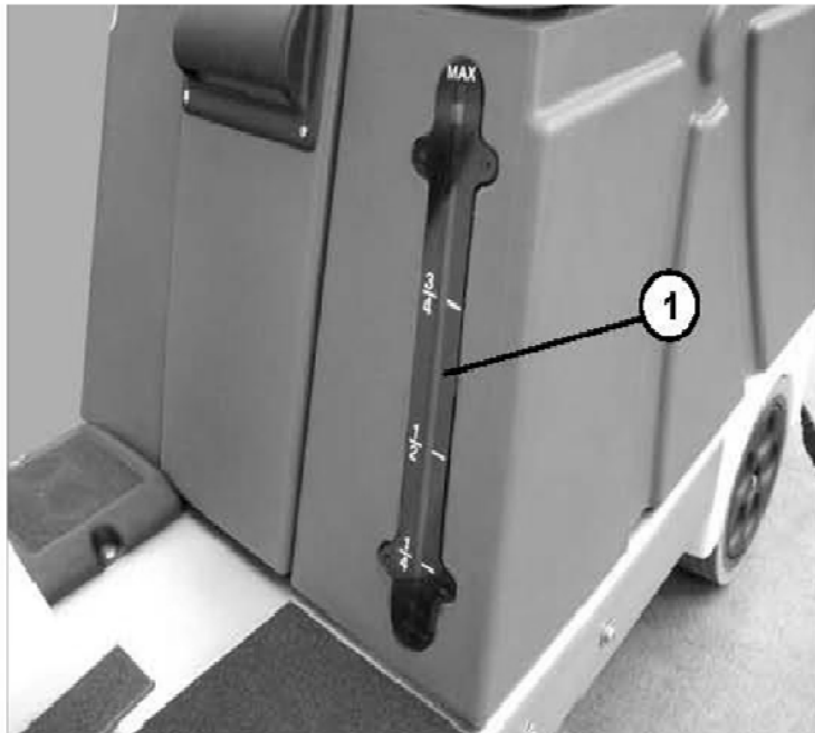


Figure 10-5

10.6 DISASSEMBLY/ASSEMBLY OF DRAIN HOSE FOR THE CLEAN WATER TANK

Removal

1. Empty the detergent solution tank (or washing water) (See the procedure in the User and Maintenance Manual).
2. If available, place the machine on a lifting platform; otherwise, place the machine on a level floor. Make sure that the machine cannot move independently.
3. Turn the ignition key to the "0" and take it out.
4. Operating on the right side of the machine, loosen the strap (1, **Figure 10-6**) and then disconnect the detergent solution (or washing water) drain hose (2) from the tank coupling.
5. Remove the hose (2) from the machine.

Assembly

6. Assemble, by reversing the sequence of operations performed for disassembly.



Figure 10-6

10.7 DISASSEMBLY/ASSEMBLY RECOVERY WATER DRAIN HOSE

DRAIN HOSE

Removal

1. Empty the recovery water tank (see the procedure in the User and Maintenance Manual).
2. If available, place the machine on a lifting platform, and raise it up; otherwise, place the machine on a level floor. Make sure that the machine cannot move independently.
3. Turn the ignition key to the "0" and take it out.
4. Operating on the left side of the machine, loosen the strap well (1, **Figure 10-7**) and then disconnect the recovery water drain hose (2) from the tank coupling. If necessary, to facilitate the removal of the hose from the tank, open the battery drum (3) (See the procedure in the User and Maintenance Manual).
5. Remove the hose (2) from the machine.

Assemble

6. Assemble, by reversing the sequence of operations performed for disassembly.

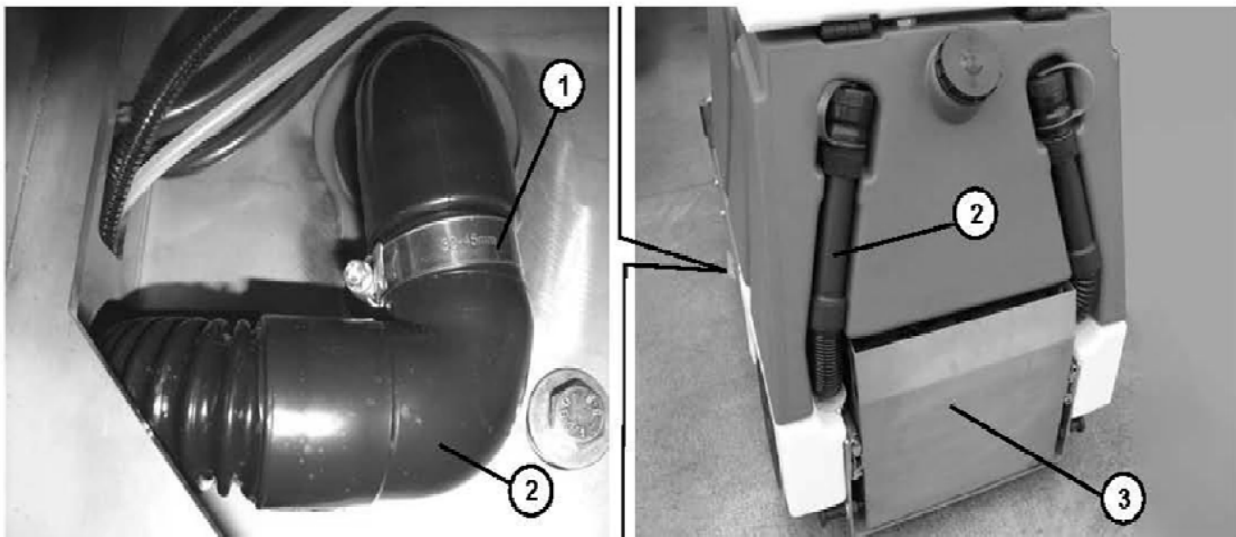


Figure 10-7

11. ELECTRICAL SYSTEM

The significant maintenance/replacement procedures relating to the Electrical system are described in this chapter.

Troubleshooting and arrangement of the components of the electrical system is also described; the Wiring Diagram has also been inserted.

11.1 BATTERY CHARGING

See procedure in the User and Maintenance Manual

11.2 BATTERY DISASSEMBLY/ASSEMBLY

Removal

1. Remove the battery holder drum and disconnect the battery connector (1, **Figure 11-1**) (See the procedure in the User and Maintenance Manual).
2. Disengage the blade guards of the poles (2) of the batteries.
3. Disconnect the terminals from the poles (2) of the batteries and move the electrical cables (3).
4. Carefully remove the batteries (4).
5. Assemble, by reversing the sequence of operations performed for disassembly, with the following instruction:
 - the batteries need to be reconnected according to the diagram (5).
 - if you install another type of battery other than the batteries removed, the machine must be adjusted for the type of batteries installed, operating according to the following procedure:

11.2 Battery Wiring

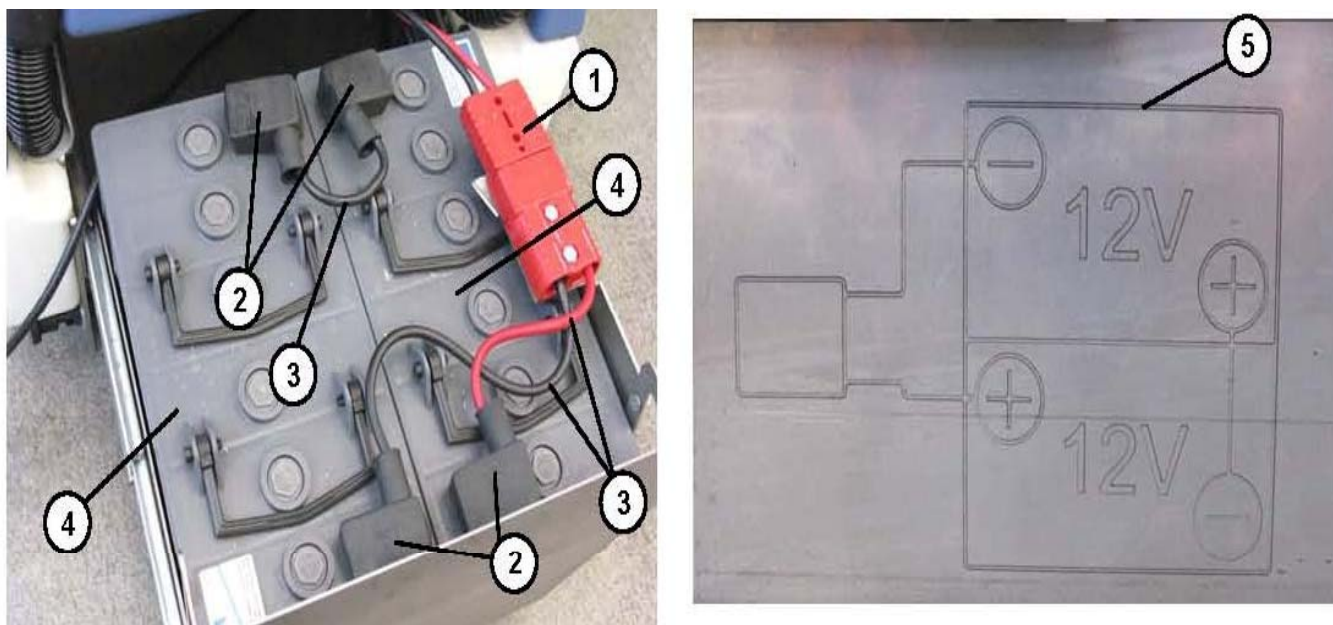


Figure 11-1

11.3 Adjusting the machine for the type of batteries installed



Caution!

In the context of the procedure described on the next page, concerning the "adjustment of the machine for the type of batteries installed", make sure you do not vary any other setting of the machine. The machine settings are set by the manufacturer to optimize the functional characteristics of the machine itself, and are then saved before selling the machine. Changing the machine settings (except those covered by this manual) by anyone not authorized to do so, may lead to the revocation of the warrant of the machine and any other service contracts by the manufacturer.

11.3 Battery Charger settings



NOTE: Perform each operation within 10 seconds of the previous operation otherwise the board will be reset and you will have to resume operations from the start.

1. Turn the machine on.
2. During the start-up simultaneously press and hold down the (-) button of the water dosage and the (+) button of the detergent dosage - the display shows "USER CHECK - PASSWORD:0"
3. Press the button (+) of the detergent dosage until you reach the number **61**.
4. Press (Turbo) button.
5. Press the button (+) of the water dosage until the display shows "SET TARGET: FUNCTION BOARD"
6. Press the button (TURBO) to confirm - the display will show the type of battery the machine is set for.
"PB24", corresponding to WET lead acid batteries
"GeE24", corresponding to GEL batteries
"Optima", corresponding to Optima AGM batteries
"AGM", corresponding to AGM batteries
7. Press water (+) button to select a different battery type.
See above.
8. **Wait** for the machine to reset.
9. Turn the machine off and on again.
10. The new setting will take effect.

11.4 CHECKING/REPLACING FUSES

1. Make sure that the machine cannot move independently.
2. Turn the ignition key to the "0" and take it out.
3. Remove the battery holder drum and disconnect the battery connector (6, **Figure 3-4**)
(See the procedure in the User and Maintenance Manual).
4. Open the cover (1, **Figure 11-2**) and remove the panel (2) by lifting it up. Lower the cover back down (1). Checking / replacing fuses:
 - 10 A fuse, for protecting auxiliary services (3, **Figure 11-2**)
 - 80 A fuse, drive protection board (4, **Figure 11-2**)
 - 30 A fuse, for vacuum motor protection (5, **Figure 11-2**)
 - 40 A fuse, for brush motor protection (6, **Figure 11-2**)
5. Reinstall the panel (2).
6. Connect the battery connector and close the battery holder drum.

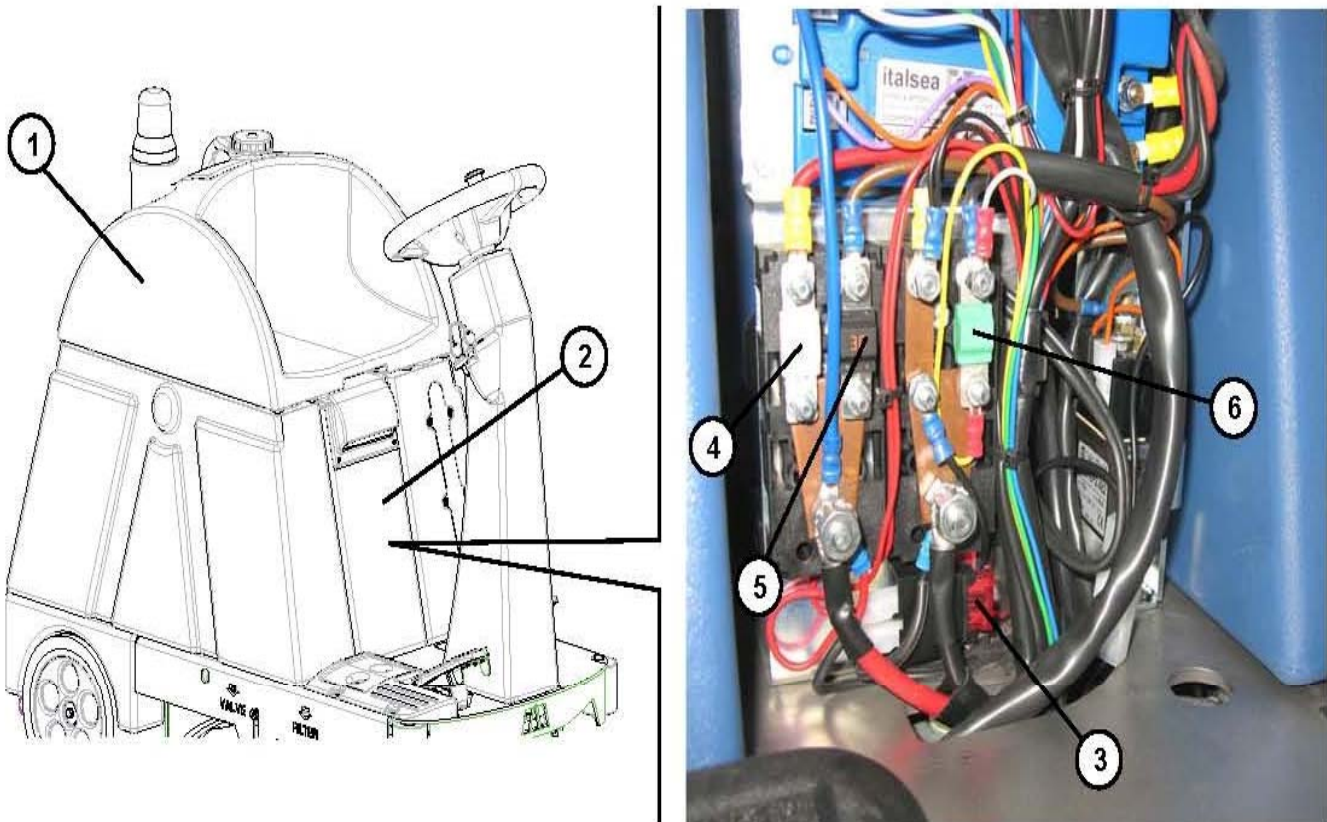
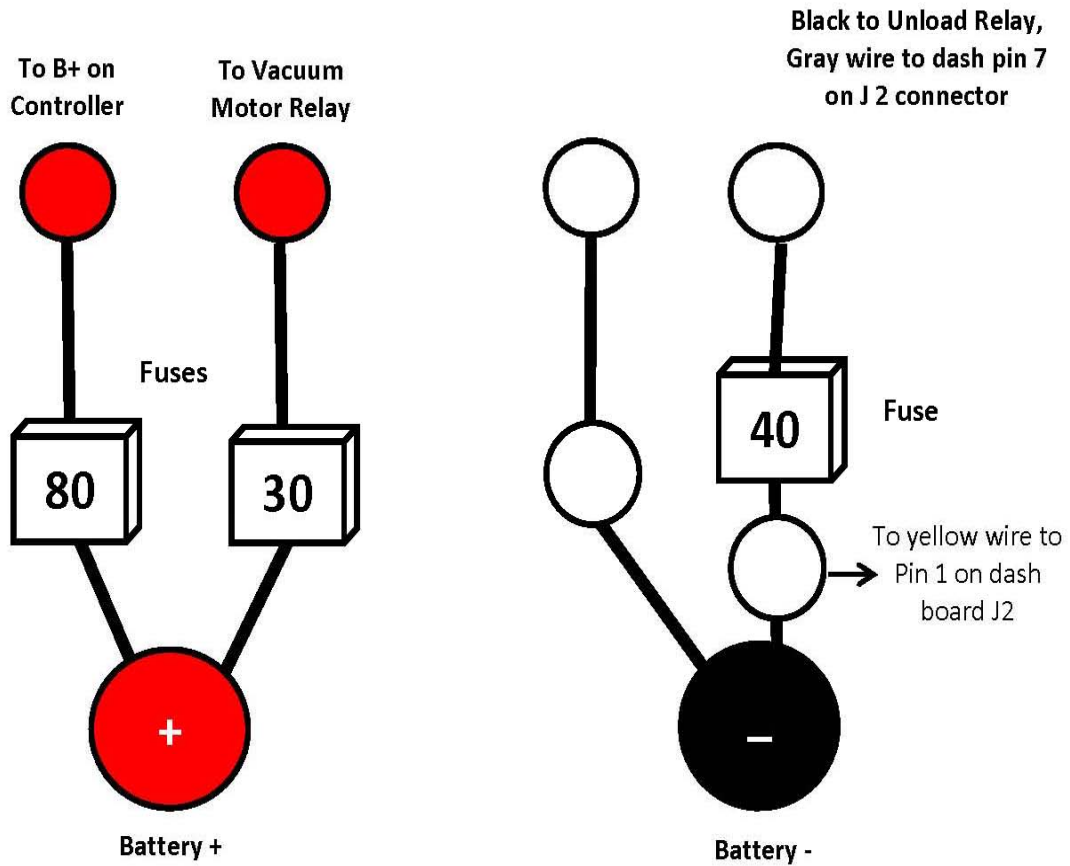


Figure 11-2

11.4 Fuses



From Battery +, Charger B+,
Pin 1 on Dash Board , to 10
amp fuse, Blue wire to
vacuum relay contact

From Battery B- ,
to charger B-

11.5 DISASSEMBLY/ASSEMBLY DRIVE ELECTRONIC BOARD

Remove

1. Remove the battery holder drum and disconnect the battery connector (6, **Figure 3-4**) (For the procedure, see the User and Maintenance Manual).
2. Open the cover (1, **Figure 11-3**) and remove the panel (2) by lifting it up. Lower the cover back down (1).
3. Disconnect the electrical connections (5) from the drive electronic board (4).
4. Disconnect the electrical connections (5) from the drive electronic board (4).
5. Unscrew the screws (6) and remove the electronic drive board (4).

Assembly

6. Assemble, by reversing the sequence of operations performed for disassembly.

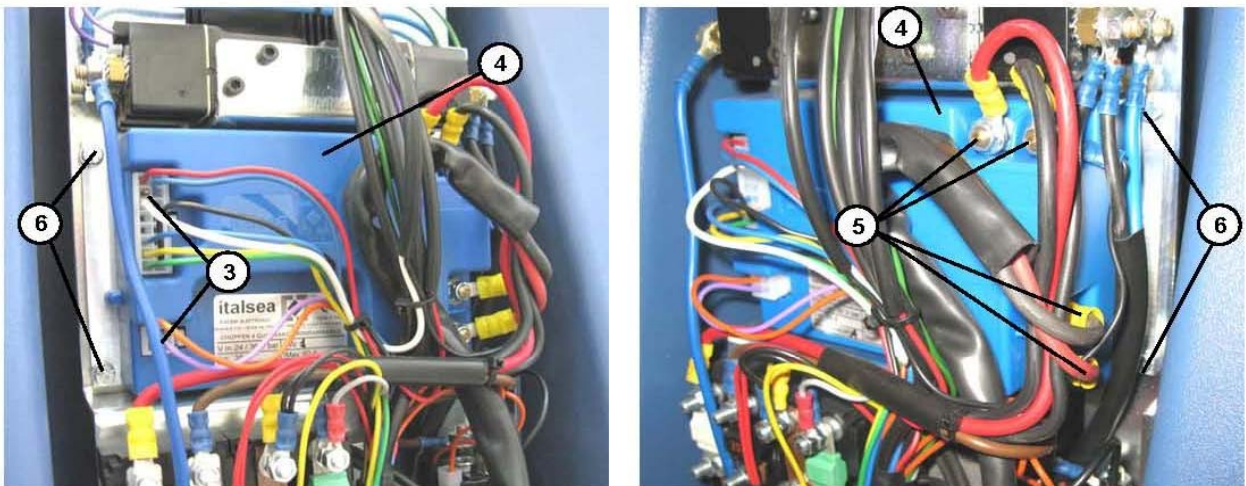
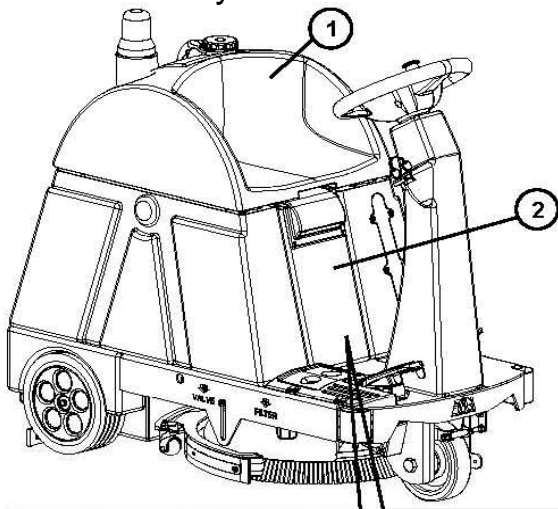


Figure 11-3

11.6 DISASSEMBLY/ASSEMBLY FUNCTIONS ELECTRONIC BOARD

Removal

1. If available, place the machine on a lifting platform, otherwise, place the machine on a level floor. Make sure that the machine cannot move independently.
2. Turn the ignition key to the "0" and take it out.
3. Remove the battery holder drum and disconnect the battery connector (6, **Figure 3-4**) (For the procedure, see the User and Maintenance Manual).
4. Operating under the steering wheel, unscrew the screws (1, **Figure 11-4**)
5. Carefully lift the keyboard assembly with an electronic board functions (2).
6. Disconnect the electrical connections (5) from the functions electronic board (4).
7. Turn the lever (5) and disconnect the electrical connector (6) from the emergency stop switch (7).
8. Retrieve the keyboard assembly with functions electronic board (2).
9. On a workbench, disconnect the electrical connectors (9) for the keyboard wiring from the functions electronic board (8) of the keyboard.
10. Unscrew the 10 screws
11. Separate functions electronic board (8) from the support with keyboard (13).

Assembly

Assemble, by reversing the sequence of operations performed for disassembly, with the following instruction.

- Before positioning the keyboard assembly in the housing with functions electronic board (12), check that the perimeter seal (11) is efficiently and correctly positioned in the housing.

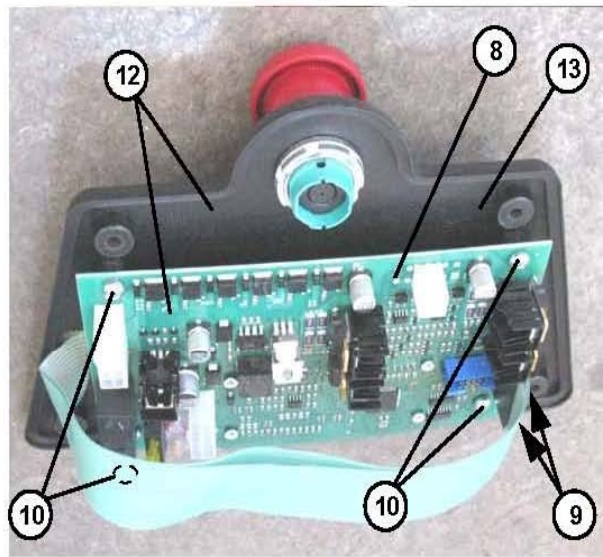
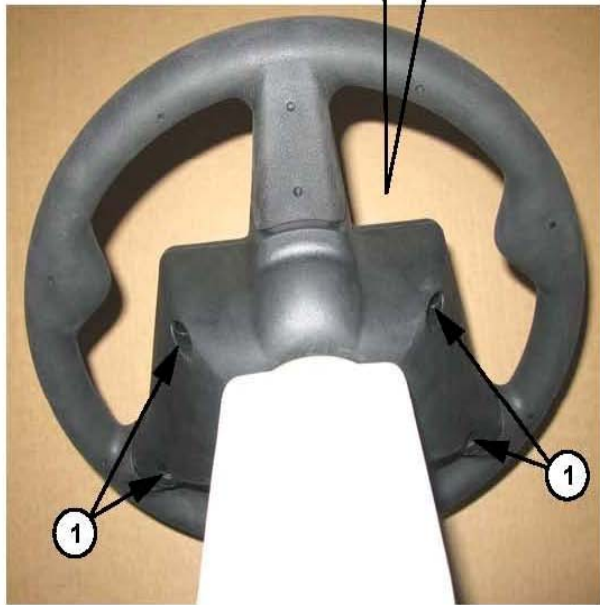
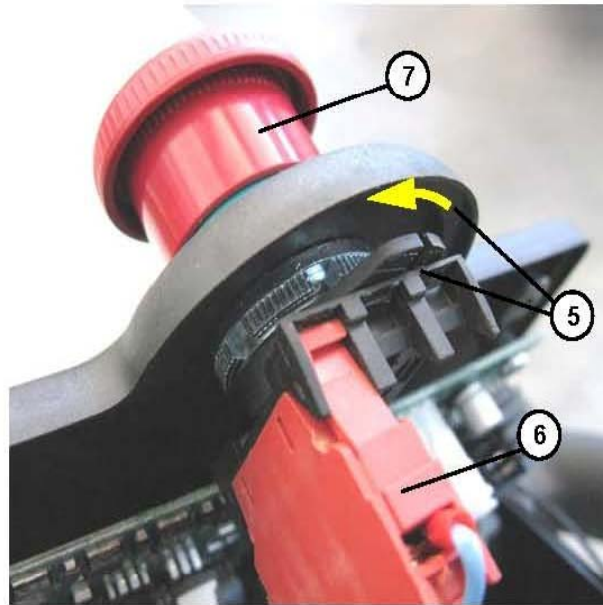
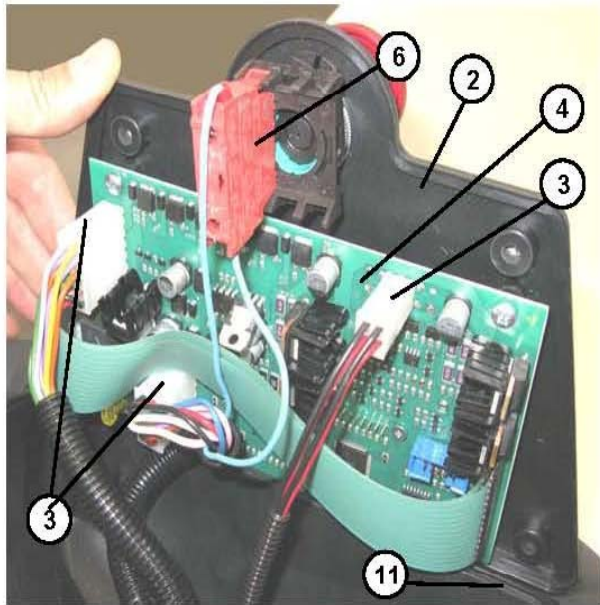


Figure 11-4

11.7 KEY SWITCH INSTALLATION

Removal

1. Remove the steering column (See the procedure in the specific paragraph).
2. Operating from inside the steering column (1, **Figure 11-5**), loosen the lock nut (2) and remove the ignition key (3).

Assembly

3. Assemble, by reversing the sequence of operations performed for disassembly

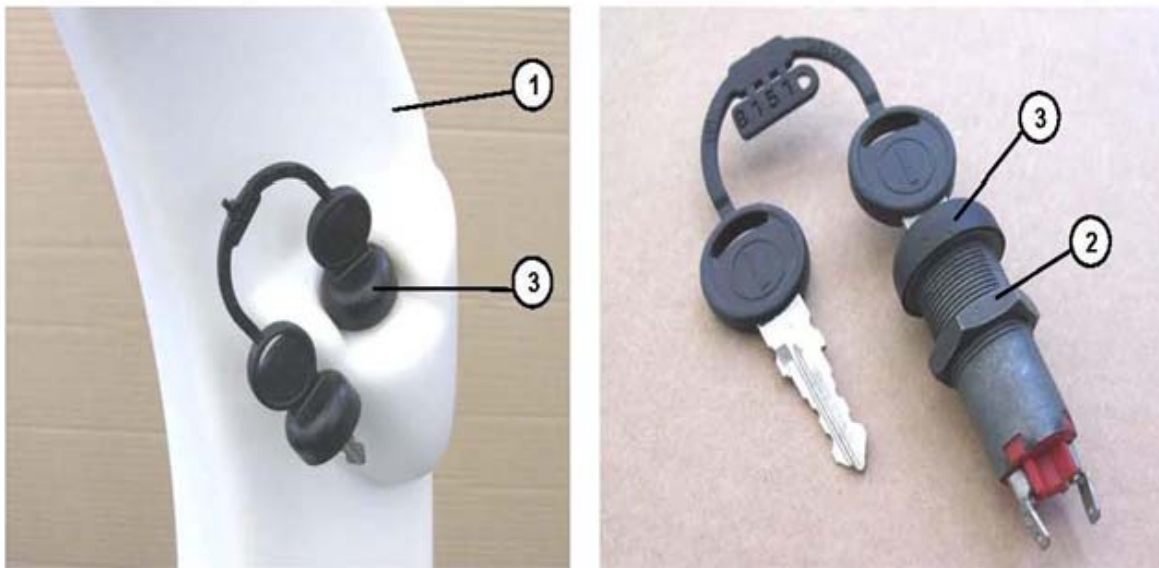


Figure 11-5

11.8 TROUBLE SHOOTING

See the other chapters, as already indicated for other systems that use the electrical system.

Also other possible causes of failure can be:

1. Flat batteries or their connections not efficient (charge battery or clean the connections)
2. Broken batteries (check flat battery voltage)
3. Battery Charger failure (replace it) (only for the version with the charger in the machine)
4. Interrupted fuses (replace them)
5. Electrical wiring cut or crushed in short circuit (repair it)

11.9 ALARM CODES

Any active alarms on the machine are displayed using the display (3, **Figure 3-1**) of the control panel. Alarms can relate to the functions board (CFI0000, identified as "Control Alarm#") or drive board (7CH4Q90A, identified as "Drive Alarm#"). The following are two examples of alarms by board type and the summary tables of alarms with instructions/solutions.

Functions alarms board example



Summary Functions Alarm Board

Alarm #id	Meaning	Solution
CONTROL A1	Amperometric Protection	Check usage mode of brushes function. Operating current detected high by the brushes motor.
CONTROL A2	Float	Recovery tank full.

11.9 ALARM CODES

Drive alarms board example

DRIVE ALARM A3
POT. FAULT

Summary Drive Alarms Board

Alarm #id	Meaning	Solution
DRIVE A3	Potentiometer Tear	Check accelerator pedal connections
DRIVE A4	Potentiometer zero out at ignition	Release the pedal. In the event of a first ignition check pedal calibration.
DRIVE A5	Thermal Alarms	High and ongoing power consumption for the drive part. Check mechanics and usage.
DRIVE A6	Power Stage damaged	Replace drive board.
DRIVE A7	Over-current	Check drive motor board wiring. If connections are normal replace drive board.
DRIVE A8	Power fuse damaged	Probable drive power fuse damaged. If the fuse is intact replace the drive board.
DRIVE A9	Under-voltage	Check battery charge status.
DRIVE A10	Over-voltage	Check battery status.
DRIVE A11	Overload	High and ongoing power consumption for the drive part. Check mechanics and usage.
DRIVE A12	Micro open seat	Check connections and seat micro-switch status.
DRIVE A13	Shut-down sequence	Check key switch connection.
DRIVE A14	Internal memory reset	Replace board.

11.10 WIRING DIAGRAM

Key

7CH4Q90A: Drive board

7CFI0000: Functions board

CA: Battery charger

FE: Emergency stop button

RC: Battery charger relay

SW2: Water float

TX2: Drive board TX serial connection

RX2: Drive board RX serial connection

RX1 : Battery charger RX serial connection

K1: Brush contactor

K2: Vacuum contactor

K3: Brush release contactor

M3: Chemical Pump (detergent) M4: Water pump

M1: Brush actuator

M2: Squeegee actuator

BR: Reverse horn

SW2: Seat micro switch

SW1: Ignition key switch

LAMP: Flashing

SPEED REFERENCE: Drive pedal potentiometer

SP: Brush motor ASP: Vacuum motor M: Drive motor

F2: Blade fuse 10A (auxiliary) F1: Fuse midi 80 A (drive)

F3: Fuse midi 30 A (vacuum) F4: Fuse midi 40A (brush)

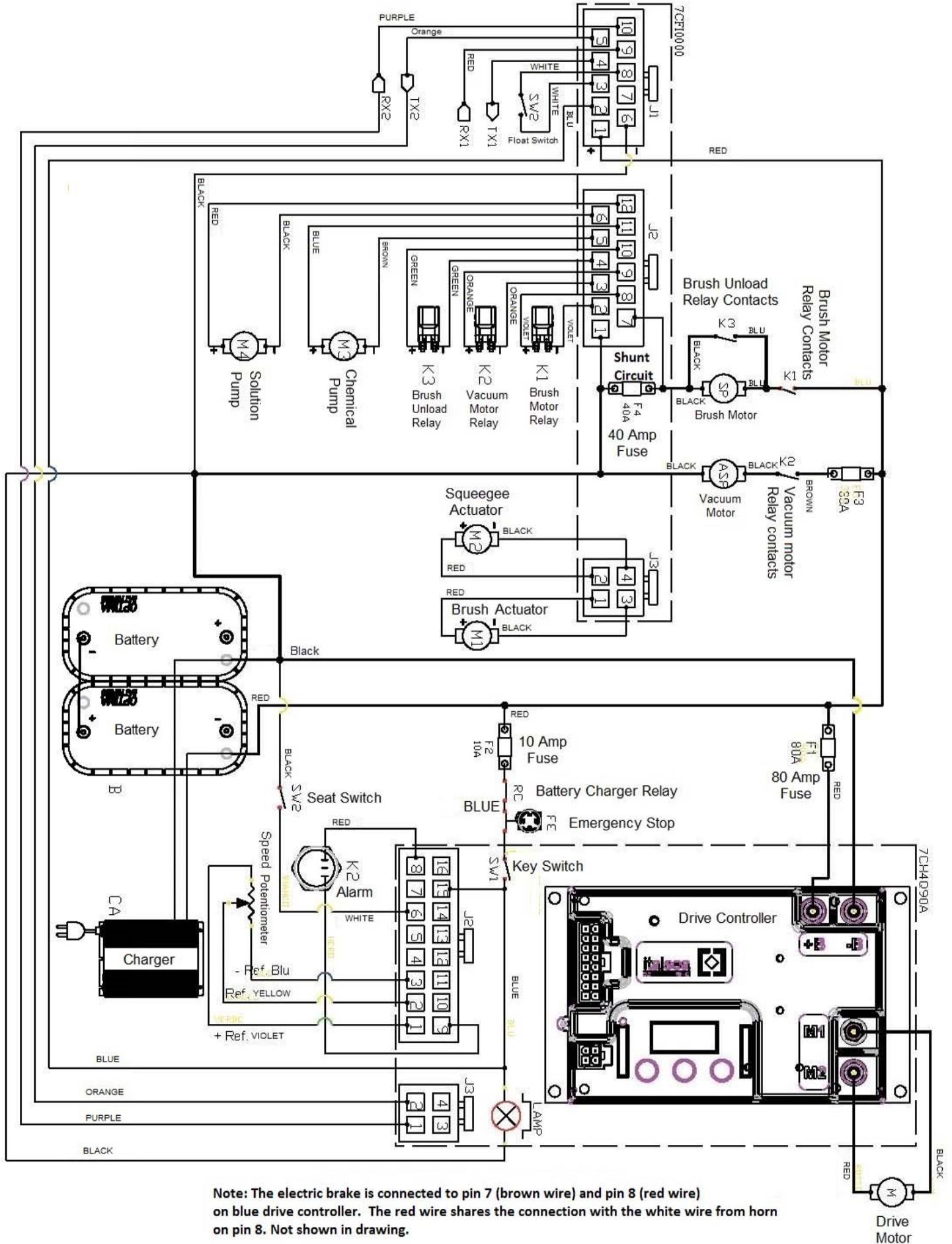
K3: Brush release contactor NA contact

K2: Vacuum contactor NA contact

K1: Brush contactor NA contact

B: Battery

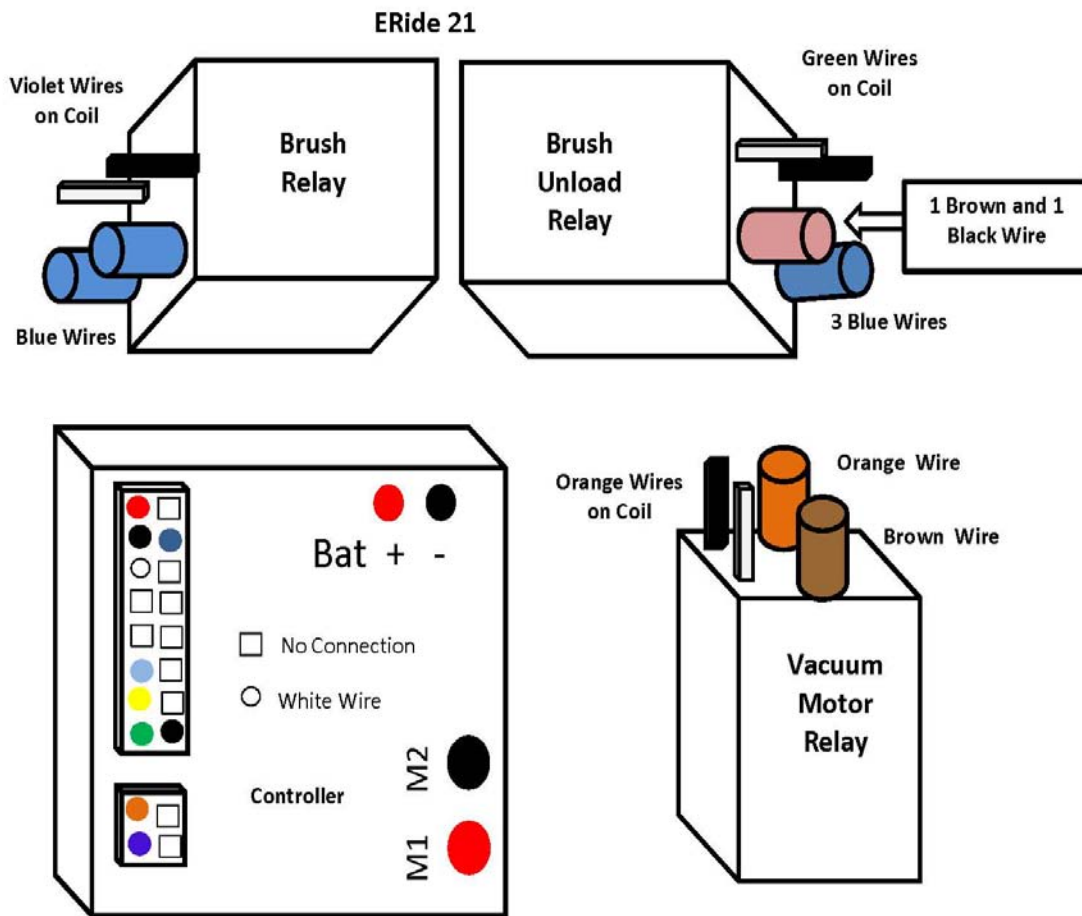
ERIDE 21 WIRING DIAGRAM



Note: The electric brake is connected to pin 7 (brown wire) and pin 8 (red wire) on blue drive controller. The red wire shares the connection with the white wire from horn on pin 8. Not shown in drawing.

Figure 11-6 Wiring diagram

12. Relays and Drive Controller



**Note: Coil wires have white and black connectors.
Connect as shown in picture .**

13. Notes