



## Electronic Service Manuals

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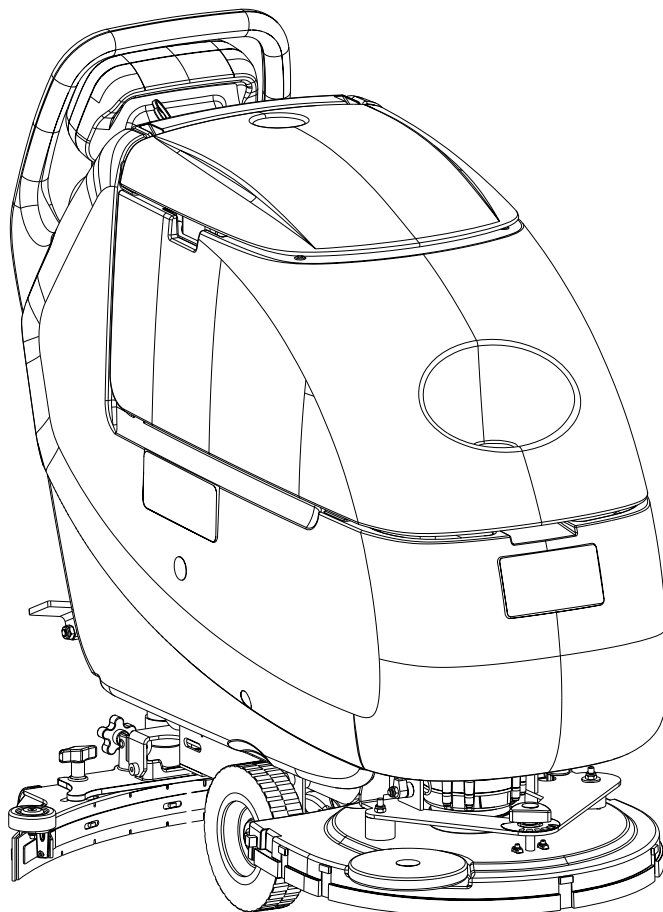
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# Razor™ 20

# Razor™ 20T

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## SERVICE MANUAL

Kent model: 908 7200 020

908 7201 020

# KENT

Simple. Clean.

9097065000(1) 2007-08

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## GENERAL INFORMATION

### GENERAL INFORMATION

#### CONVENTIONS

Forward, backward, front, rear, left or right are intended with reference to the operator's position, that is to say in driving position with the hands on the handlebar.

#### MACHINE LIFTING

**WARNING!**

*Do not work under the lifted machine without supporting it with safety stands.*

#### MACHINE TRANSPORTATION

**WARNING!**

*Before transporting the machine, make sure that:*

- *All covers are closed.*
- *The ignition key is removed.*
- *The machine is securely fastened to the means of transport.*

#### OTHER REFERENCE MANUALS

The following manuals are available at KENT Literature Service Department:

- KENT Razor 20 - Razor 20T: User Manual - Form Number 9097063000
- KENT Razor 20 - Razor 20T: Spare Parts List - Form Number 9097064000

#### SAFETY

The following symbols indicate potentially dangerous situations. Always read this information carefully and take all necessary precautions to safeguard people and property.

#### SYMBOLS

**DANGER!**

*It indicates a dangerous situation with risk of death for the operator.*

**WARNING!**

*It indicates a potential risk of injury for people or damage to objects.*

**CAUTION!**

*It indicates a caution related to important or useful functions.*

*Pay careful attention to the paragraphs marked by this symbol.*

**NOTE**

*It indicates a remark related to important or useful functions.*

**CONSULTATION**

*It indicates the necessity to refer to the User Manual before performing any procedure.*

**GENERAL INFORMATION****GENERAL INSTRUCTIONS**

Specific warnings and cautions to inform about potential damages to people and machine are shown below.

**DANGER!**

- *This machine must be used by properly trained and authorised personnel only. Children or disabled people cannot use this machine.*
- *Do not wear jewelry when working near electrical components.*
- *Do not work under the lifted machine without supporting it with safety stands.*
- *Do not operate the machine near toxic, dangerous, flammable and/or explosive powders, liquids or vapours.*
- *Disconnect the batteries before performing any maintenance/repair procedure.*
- *Keep the battery far from sparks, flames and incandescent material. During the normal operation explosive gases are released.*
- *Battery charging produces highly explosive hydrogen gas. Keep the tanks lifted during battery charging and perform this operation in well-ventilated areas and away from bare flames.*

**WARNING!**

- *Always protect the machine against the sun, rain and bad weather, both under operation and inactivity condition. Store the machine indoors.*
- *Do not allow to be used as a toy. Close attention is necessary when used near children.*
- *Use only as shown in this Manual. Only KENT recommended accessories must be used.*
- *Take all necessary precautions to prevent hair, jewelry and loose clothes from being caught by the machine moving parts.*
- *Do not leave the machine unattended without being sure that it cannot move independently.*
- *Do not use the machine on slopes with a gradient exceeding the specifications.*
- *Do not use the machine in particularly dusty areas.*
- *While using this machine, take care not to cause harm to people or objects.*
- *Do not bump into shelves or scaffoldings, especially where there is a risk of falling objects.*
- *Do not put any can containing fluids on the machine.*
- *The machine working temperature must be between +32°F and +104°F (0°C and +40°C).*
- *The machine storage temperature must be between +32°F and +104°F (0°C and +40°C).*
- *The humidity must be between 30% and 95%.*
- *Do not use the machine as a means of transport.*
- *Do not use the machine on slopes with an inclination higher than 2%.*
- *In case of fire, use a powder fire extinguisher, not a water one.*
- *Do not tamper with the machine safety guards and follow the ordinary maintenance instructions scrupulously.*
- *Do not allow any object to enter into the openings. Do not use the machine if the openings are clogged. Always keep the openings free from dust, hairs and any other foreign material which could reduce the air flow.*
- *Do not remove or modify the plates affixed to the machine.*
- *If the machine is used according to the instructions, the vibrations are not dangerous. The machine vibration level is less than 2.5 m/s<sup>2</sup> (98/37/EEC-EN 1033/1995).*
- *This machine cannot be used on roads or public streets.*
- *Pay attention during machine transportation when temperature is below freezing point. The water in the recovery tank or in the hoses could freeze and seriously damage the machine.*
- *Use brushes and pads supplied with the machine and those specified in the User Manual. Using other brushes or pads could reduce safety.*
- *If parts must be replaced, require ORIGINAL spare parts from a Dealer or Authorised Retailer.*
- *Carefully read all the instructions before performing any maintenance/repair procedure.*
- *Do not wash the machine with direct or pressurised water jets, or with corrosive substances.*
- *The machine must be disposed of properly, because of the presence of toxic-harmful materials (batteries, etc.), which are subject to standards that require disposal in special centers (see the User Manual).*
- *Do not pull or carry the machine by the battery charger cable and never use the battery charger cable as a handle. Do not close a door on the battery charger cable, or pull the battery charger cable around sharp edges or corners. Do not run the machine on the battery charger cable.*
- *Keep the battery charger cable away from heated surfaces.*
- *Do not charge the batteries if the battery charger cable or the plug are damaged. If the machine is not working as it should, has been damaged, left outdoors or dropped into water, return it to the Service Center.*
- *Before using the battery charger, ensure that frequency and voltage values, indicated on the machine serial number plate, match the electrical mains voltage.*
- *Do not smoke while charging the batteries.*
- *To reduce the risk of fire, electric shock, or injury, do not leave the machine unattended when it is plugged in. Before performing any maintenance procedure, disconnect the battery charger cable from the electrical mains.*

# GENERAL INFORMATION

## TECHNICAL DATA

Modello	RAZOR 20 (1 brush/padholder, without drive system)	RAZOR 20T (1 brush/padholder, with drive system)
Machine height	41.7 in (1.058,5 mm)	
Solution tank capacity	11.1 US gal (42 litri)	
Recovery water tank capacity	11.1 US gal (42 litri)	
Front wheel diameter	7,9 in (200 mm)	
Front wheel specific pressure on the floor (*)	130 psi (0.9 N/mm <sup>2</sup> )	
Rear wheel specific pressure on the floor (*)	435.1 psi (3 N/mm <sup>2</sup> )	
Rear wheel diameter	3.9 in (100 mm)	
Vacuum system motor power	0.44 hp (330 W)	
Drive system motor power	—	0.27 hp (200 W)
Drive speed (variable)	—	da 0 a 2.8 mph (da 0 a 4,5 km/h)
Gradeability	2 %	
Sound pressure level at workstation	65,8 dB(A)	
Standard batteries	WET (2 x 12 V) 24V 105Ah	
Battery compartment size (width x length x height)	13.8 x 13.8 x 11.8 in (350 x 350 x 300 mm)	
Vacuum system circuit capacity	41.5 in H <sub>2</sub> O (1.055 mm H <sub>2</sub> O)	
Cleaning width	20.9 in (530 mm)	
Squeegee width	29.9 in (760 mm)	
Machine maximum length	48.3 in (1.228 mm)	
Machine width without squeegee	21.3 in (540,8 mm)	
Brush diameter	20.9 in (530 mm)	
Weight without batteries and with empty tanks	178.6 lbs (81 kg)	211.6 lbs (96 kg)
Maximum weight with batteries and full tanks	469.6 lbs (213 kg)	504.5 lbs (229 kg)
Brush motor power	0.64 hp (480 W)	
Brush speed	153 rpm	
Brush/pad-holder pressure with extra-pressure function turned off	45.2 lbs (20,5 kg)	
Brush/pad-holder pressure with extra-pressure function turned on (Optional)	-	61.3 lbs (27,8 kg)

(\*) Machine test have been performed under the following conditions:

- Battery maximum size
- Brush and squeegee maximum size
- Full solution tank
- Optional equipment installed
- Wheel weight checked
- Each wheel print checked on cement
- Result expressed as maximum value for both front and rear wheels

**GENERAL INFORMATION****MAINTENANCE**

The lifespan of the machine and its maximum operating safety are ensured by correct and regular maintenance

**WARNING!**

*Read carefully the instructions in the Safety chapter before performing any maintenance procedure.*

The following tables provides the scheduled maintenance. The intervals shown may vary according to particular working conditions, which are to be defined by the person in charge of the maintenance.

For instructions on maintenance procedures, see the following paragraphs.

**SCHEDULED MAINTENANCE TABLE**

Procedure	Daily, after machine use	Weekly	Every six months	Yearly
Battery charging				
Squeegee cleaning				
Brush/pad cleaning				
Tank and vacuum grid with float cleaning, and cover gasket check				
Squeegee blade check and replacement				
Solution filter cleaning				
Battery (WET) fluid level check				
Vacuum system motor filter cleaning				
Screw and nut tightening check			(1)	
Brush/pad-holder motor carbon brush check or replacement				
Vacuum system motor carbon brush check or replacement				
Drive system motor carbon brush check or replacement (For Razor 20T)				

(1): And after the first 8 working hours.

## GENERAL INFORMATION

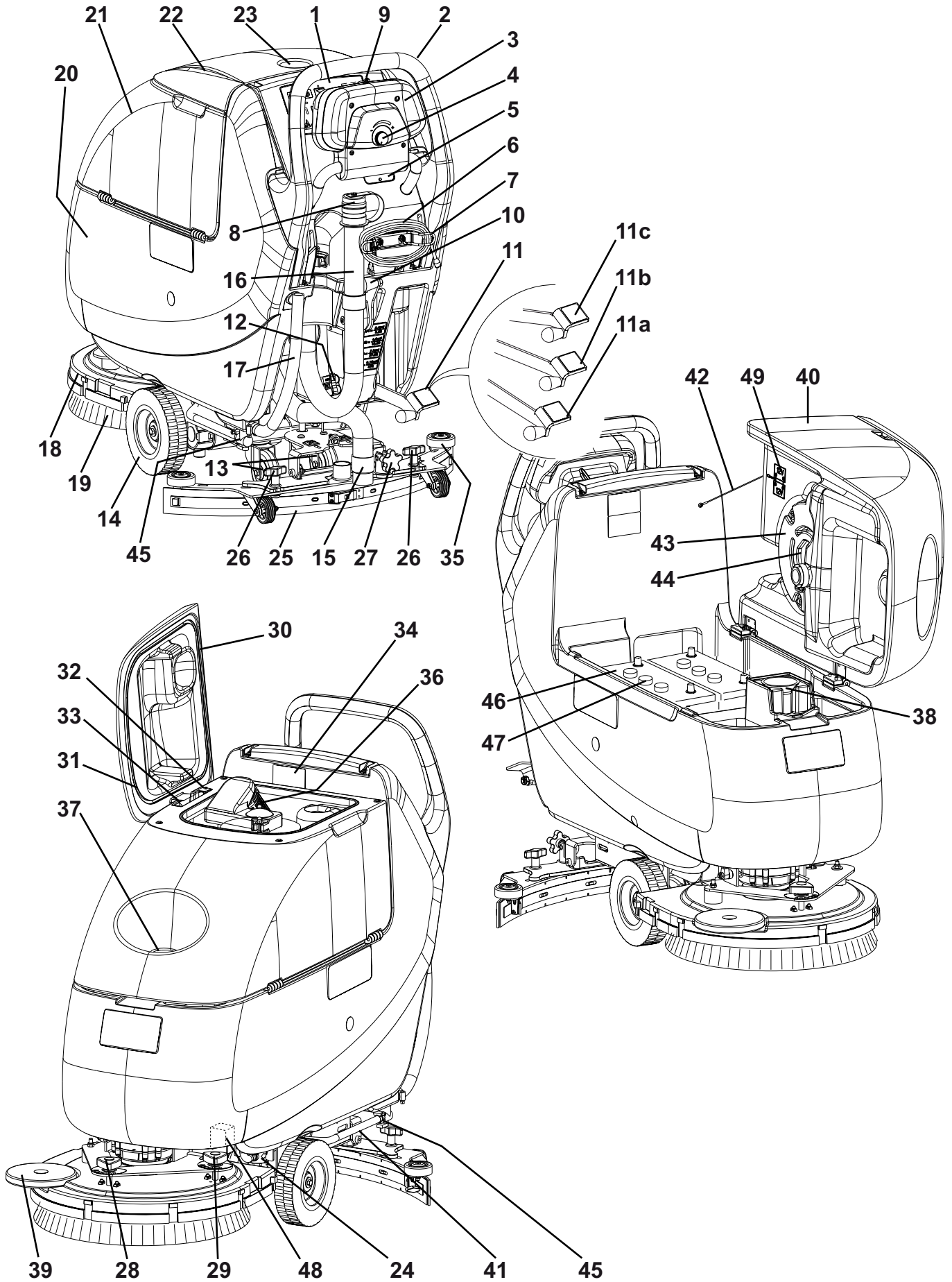
### MACHINE NOMENCLATURE

Throughout this Manual you will find numbers in brackets – for example: (2). These numbers refer to the components indicated in these two nomenclature pages. Refer to these pages whenever you need to identify a component mentioned in the text..

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Control panel</li> <li>2. Handlebar</li> <li>3. Drive paddle (*)</li> <li>4. Speed adjuster (*)</li> <li>5. Battery charger data inspection window</li> <li>6. Battery charger cable</li> <li>7. Battery charger cable holder</li> <li>8. Recovery water drain hose plug</li> <li>9. Ignition key</li> <li>10. Squeegee lifting/lowering lever</li> <li>11. Deck lifting/lowering pedal</li> <li>11a. Pedal position when deck is lifted</li> <li>11b. Pedal position when deck is lowered</li> <li>11c. Pedal position when the extra pressure function is on (if applicable)</li> <li>12. Battery connector (red). This connector also works as EMERGENCY switch, to stop immediately all functions.</li> <li>13. Rear steering wheel</li> <li>14. Front wheels on fixed axle (**) Front traction wheels (*)</li> <li>15. Squeegee vacuum hose</li> <li>16. Recovery water drain hose</li> <li>17. Solution drain and level check hose</li> <li>18. Deck with one brush/pad-holder</li> <li>19. Brush/pad-holder</li> <li>20. Solution tank</li> <li>21. Recovery water tank</li> <li>22. Recovery water tank cover</li> <li>23. Can holder</li> <li>24. Solution filter</li> <li>25. Squeegee</li> <li>26. Squeegee mounting handwheels</li> <li>27. Squeegee balance adjusting handwheel</li> <li>28. Machine straight forward movement adjusting handwheel</li> <li>29. Machine forward speed adjustment handwheel (**)</li> <li>30. Recovery water tank cover (opened to be cleaned)</li> <li>31. Tank cover gasket</li> <li>32. Cover movable retaining plate</li> <li>33. Cover fixed retaining plate (do not remove!)</li> <li>34. Serial number plate/technical data</li> <li>35. Squeegee bumper wheels</li> <li>36. Vacuum grid with automatic shut-off float</li> <li>37. Solution front filler neck</li> <li>38. Filter</li> <li>39. Deck bumper wheels</li> <li>40. Recovery water tank (open)</li> <li>41. Detergent hose</li> <li>42. Lifted tank tie rod</li> <li>43. Vacuum system motor cover</li> <li>44. Vacuum system motor sound-deadening filter</li> <li>45. Solution tap</li> <li>46. Batteries</li> <li>47. Battery caps</li> <li>48. Solenoid valve</li> <li>49. Battery connection diagram</li> <li>71. Brush/pad-holder and vacuum system switch</li> <li>72. Brush/pad-holder and vacuum system switch warning light</li> <li>73. Vacuum system switch</li> <li>74. Vacuum system switch warning light</li> <li>75. Brush/pad-holder release switch</li> <li>76. Brush/pad-holder release switch warning light</li> </ol> | <ol style="list-style-type: none"> <li>77. Forward/reverse gear paddle (*)</li> <li>78. Forward/reverse speed adjuster (*)</li> <li>79. Hour counter (optional)</li> <li>80. Ignition key (0 - 1) (*)</li> <li>81. Battery charge indicator</li> <li>81a. Charged battery warning light (green)</li> <li>81b. Semi-discharged battery warning light (yellow)</li> <li>81c. Discharged battery warning light (red)</li> <li>82. Washing water flow control switches</li> <li>82a. Flow increase switch</li> <li>82b. Flow decrease switch</li> <li>82c. Washing water flow indicator</li> <li>90. Electronic battery charger</li> <li>91. Lead (WET) or gel (GEL) battery selector</li> <li>92. Green warning light (ON: the battery charger is on and batteries are charged)</li> <li>93. Yellow warning light (ON: the battery charger is on and batteries are semi-discharged)</li> <li>94. Red warning light (ON: the battery charger is on and it is charging the batteries)</li> </ol> <p>(*) <b>Only for RAZOR 20T</b></p> <p>(**) <b>Only for RAZOR 20</b></p> |
|---|---|

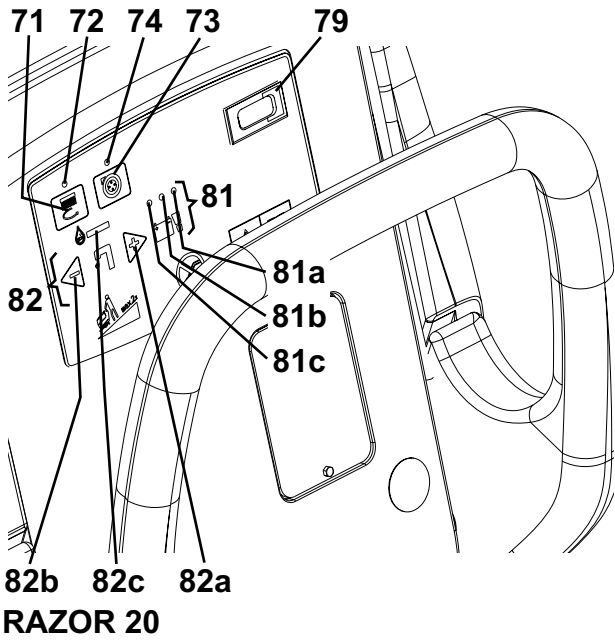
GENERAL INFORMATION

MACHINE NOMENCLATURE (Continues)

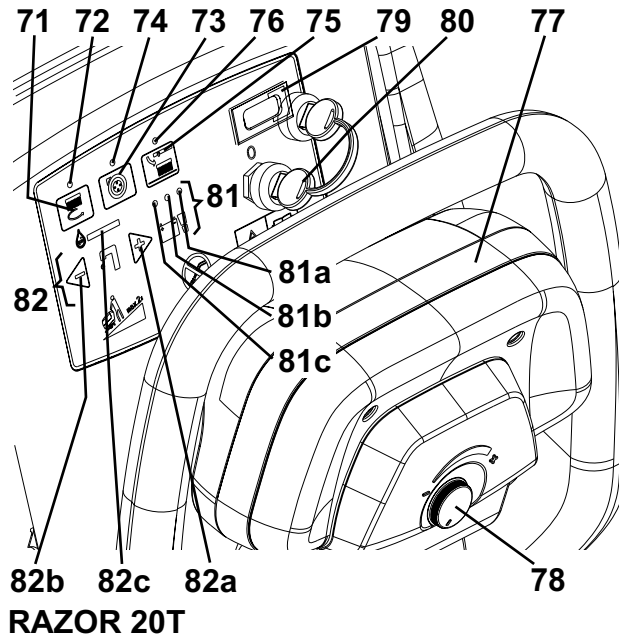


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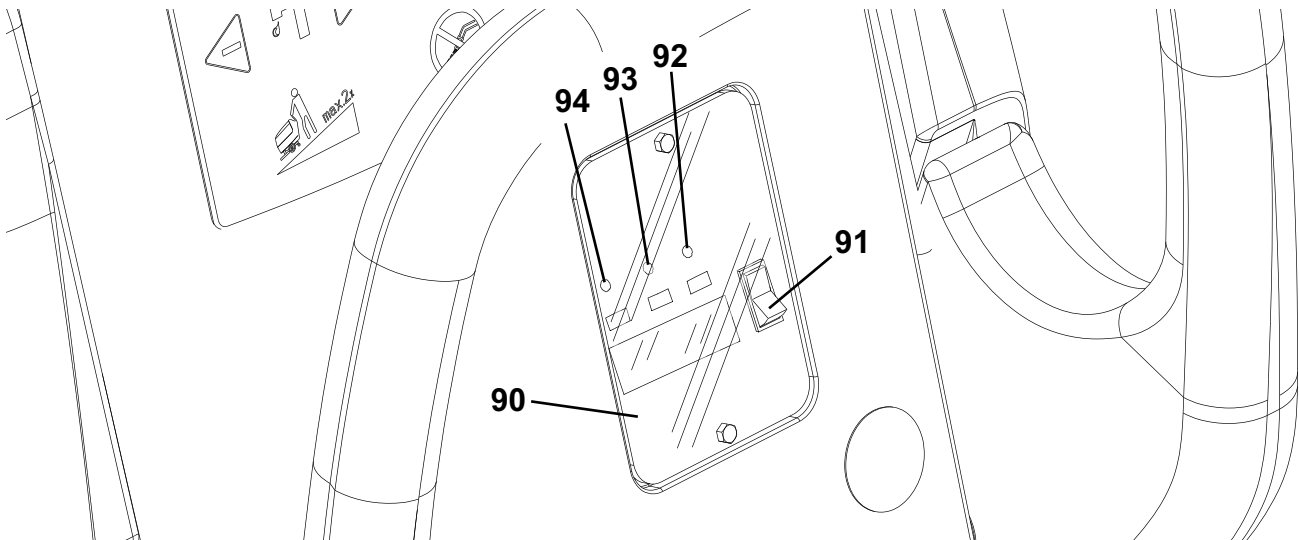
## MACHINE NOMENCLATURE (Continues)



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# SOLUTION SUPPLY SYSTEM

## SOLUTION SUPPLY SYSTEM

### SOLUTION TANK AND SUPPLY SYSTEM CLEANING

1. Drive the machine to the appointed solution disposal area.
2.
  - (For Razor 20T) Turn the ignition key (80) to "0".
  - (For Razor 20) Turn off the switches (71) and (73).
3. Empty the solution tank (20) with the hose (17).
4. Start the machine (as shown in the User Manual) and keep it running until the solution tank is completely empty.
5.
  - (For Razor 20T) Turn the ignition key (80) to "0".
  - (For Razor 20) Turn off the switches (71) and (73).
6. Clean the tank (20) with clean water.
7. Start the machine (as shown in the User Manual) and keep it running until the solution tank is completely empty.
8. Clean the solution filter (see the following procedure).

### SOLUTION FILTER CLEANING

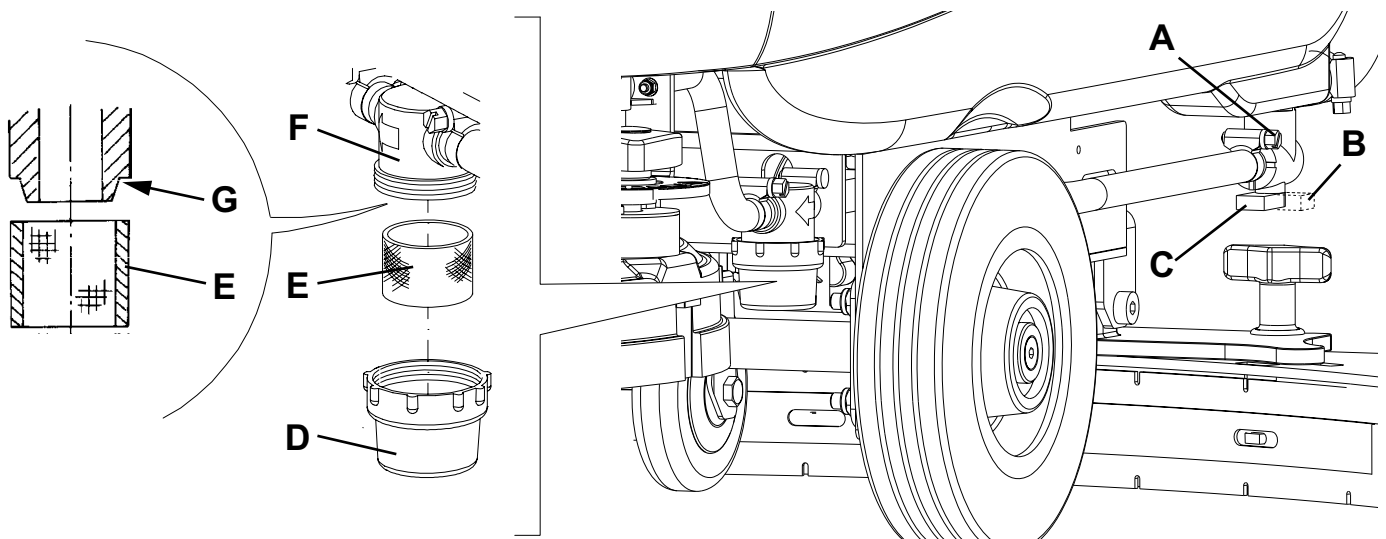
1. Drive the machine on a level floor.
2. Turn off the switches (71) and (73).
3. Close the solution tap (A) under the machine left lower side. The tap (A) is closed when it is on the position (B) and it is open when it is on the position (C).
4. Remove the transparent cover (D), then remove the filter strainer (E). Clean and install them on the support (F).



#### NOTE

*The filter strainer (E) must be correctly positioned on the housing (G) of the support (F).*

5. Open the tap (A).



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## SOLUTION SUPPLY SYSTEM

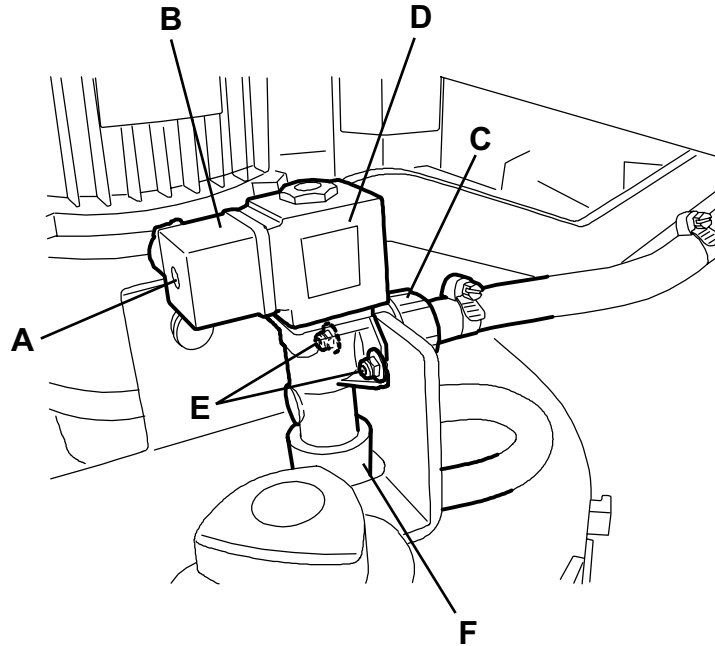
### SOLENOID VALVE DISASSEMBLY/ASSEMBLY

#### Disassembly

1. Remove the brush.
2. Lower the deck by pressing the pedal (11).
3. Remove the screw (A), disconnect the connector (B) and recover the gasket.
4. Disconnect the union (C) from the solenoid valve (D) and recover the gasket.
5. Remove the screws (E).
6. Slightly lift the solenoid valve (D), disconnect the union (F) and recover the gasket.
7. Recover the solenoid valve (D).

#### Assembly

8. Assemble the components in the reverse order of disassembly.



S301522

## TROUBLESHOOTING

### SMALL AMOUNT OF SOLUTION OR NO SOLUTION REACHES THE BRUSH

#### Possible causes

1. The solution filter is clogged/dirty (clean).
2. The solution tap is stuck closed (replace).
3. The solenoid valve is broken or there is an open in the electrical connection (replace the solenoid valve/repair the electrical connection).
4. There is debris in the solution tank clogging the output hole (clean the tank).
5. There are debris in the solution hoses clogging the flow (clean the hoses).

### THE SOLUTION REACHES THE BRUSH ALSO WHEN THE MACHINE IS OFF

#### Possible causes

1. There is dirt or calcium deposit on the solenoid valve gasket (clean).
2. The solenoid valve is broken (replace).

**BRUSHING SYSTEM****BRUSHING SYSTEM****BRUSH/PAD CLEANING****CAUTION!**

*It is advisable to wear protective gloves when cleaning the brushes/pads because there may be sharp debris.*

1. Remove the brushes/pads, as shown in the User Manual.
2. Clean and wash the brushes/pads with water and detergent.
3. Check that the brush/pads are integral and not excessively worn; otherwise replace them.

**BRUSH/PAD-HOLDER BRUSH DECK DISASSEMBLY/ASSEMBLY**

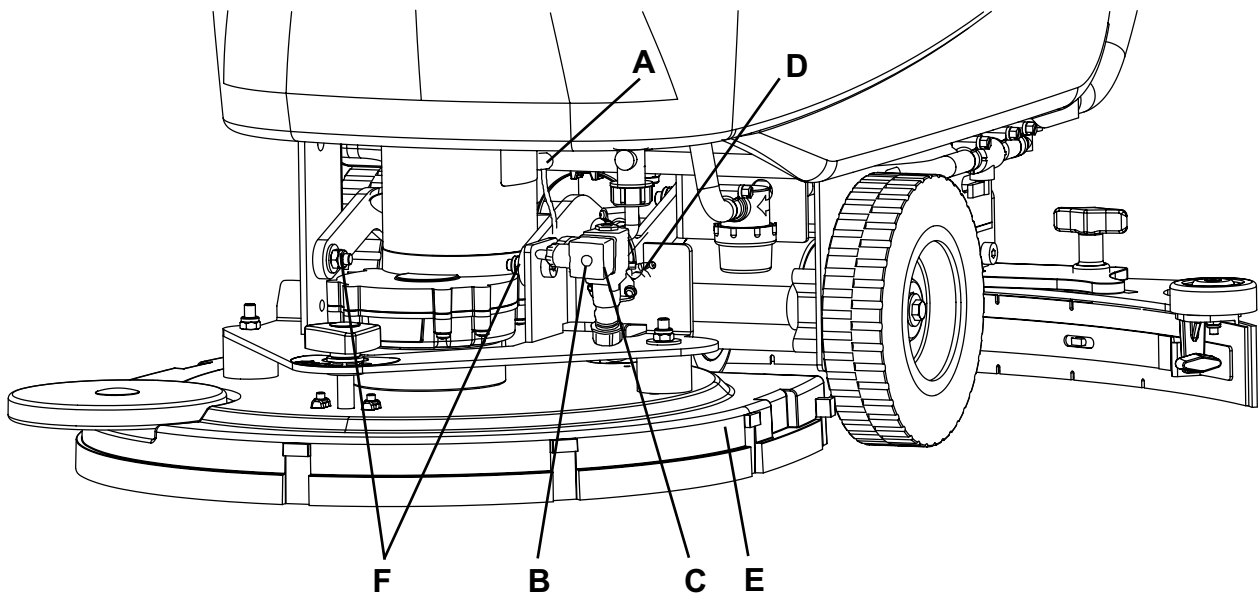
The machine can be equipped with either the brush/pad-holder deck or the cylindrical brush deck.

**Disassembly**

1. Drive the machine on a level floor.
2. Remove the brushes/pad-holders, as shown in the User Manual.
3. Lower the brush/pad-holder deck by pressing the pedal (11).
4. Disconnect the brush/pad-holder motor electrical connection (A).
5. Remove the screw (B) and disconnect the electrical connection (C).
6. Disconnect the solution hose connection (D).
7. Remove the screws (F), then remove the brush/pad-holder deck (E).

**Assembly**

8. Assemble the components in the reverse order of disassembly.



S301530A

## BRUSHING SYSTEM

### BRUSH MOTOR ELECTRICAL INPUT CHECK


**WARNING!**

*This procedure must be performed by qualified personnel only.*

**Check**

1. If the tank (21) contains recovery water:
  - Drive the machine to the appointed recovery water disposal area.
  - (For Razor 20T) Turn the ignition key (80) to "0".
  - (For Razor 20) Turn off the switches (71) and (73)
  - Empty the recovery water tank (21) with the hose (16).
2. Drive the machine on a level floor.
3. Remove the brush/pad-holder.
4. Lower the deck by pressing the pedal (11).
5. Turn off the switches (71) and (73).
6. Grasp the handle (41) and carefully lift the tank (40).
7. Apply the amperometric pliers (A) on one cable (B) of the brush motor (C).
8. (For Razor 20T). Turn the speed adjuster (84) to idle and turn the ignition key (80) to "I".
9. Turn on the brush/pad-holder by pressing the switch (71) and check that the motor electrical input is 3 - 4 A at 24 V. Turn off the brush/pad-holder by pressing the switch (71).  
Remove the amperometric pliers (A).

If the electrical input is higher, perform the following procedures to detect and correct the abnormal input:


**NOTE**

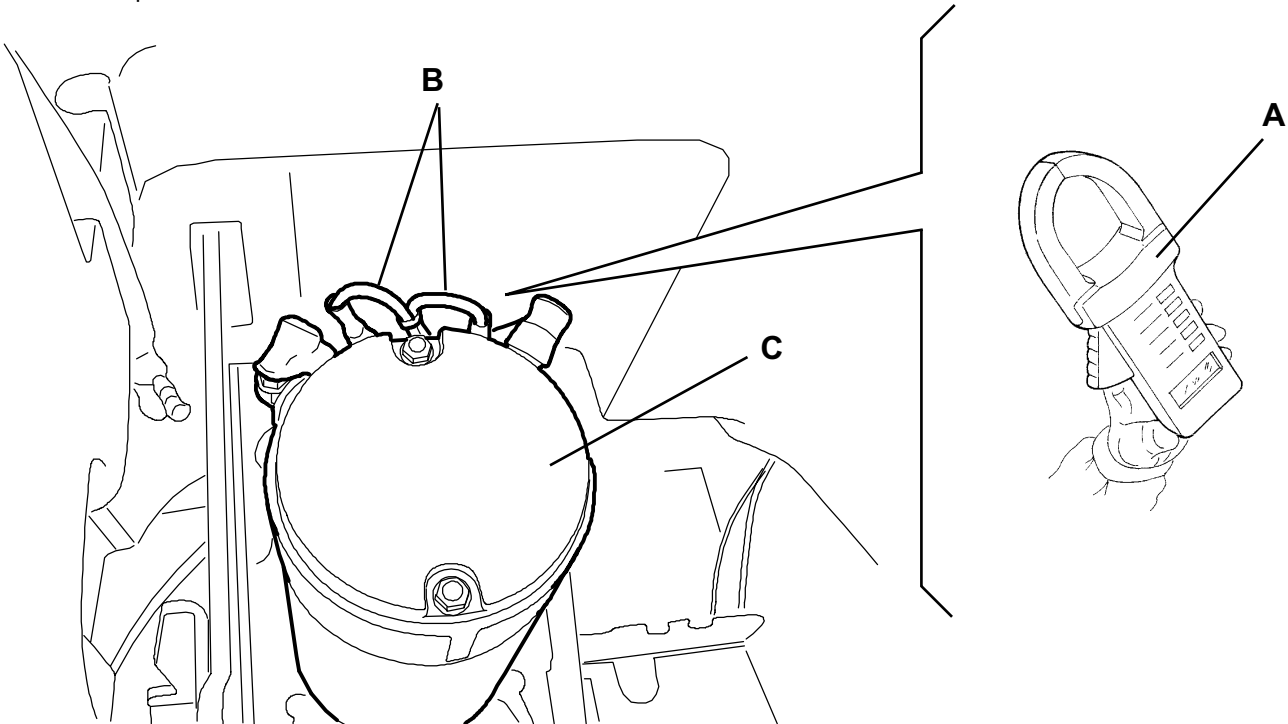
*If the electrical input is higher than the maximum allowed value, the 3 battery warning lights (81) flash simultaneously.*

- Check the tightening of F1 fuse screw (see the procedure in Fuse Check/Replacement paragraph).
- Check if there is dust or dirt (ropes, cables, etc.) on the brush/pad-holder hub.
- Check the motor carbon brushes (see the procedure in the relevant paragraph).
- Disassemble the motor (see the procedure in the relevant paragraph), and check the condition of all its components.

If the above-mentioned procedures do not lead to a correct electrical input, the motor must be replaced (see the procedure in the relevant paragraph).

**Reset**

10. Perform steps 3 to 7 in the reverse order.



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## BRUSHING SYSTEM

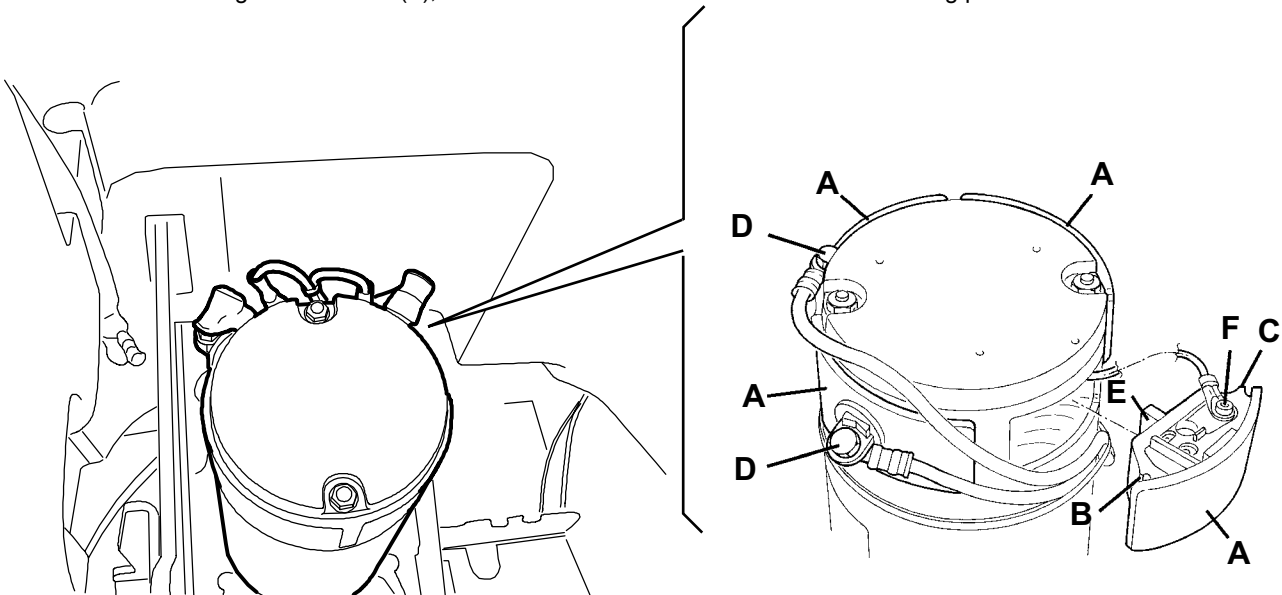
## BRUSH MOTOR CARBON BRUSH CHECK/REPLACEMENT

## Check

1. If the tank (21) contains recovery water:
  - Drive the machine to the appointed recovery water disposal area.
  - (For Razor 20T) Turn the ignition key (80) to "0".
  - (For Razor 20) Turn off the switches (71) and (73)
  - Empty the recovery water tank (21) with the hose (16).
2. Drive the machine on a level floor.
3. Remove the brush/pad-holder.
4. Lower the deck by pressing the pedal (11).
5. Turn off the switches (71) and (73).
6. Grasp the handle (41) and carefully lift the tank (40).
7. Disconnect the battery connector (12).
8. Remove dust and dirt from the motor carbon brush support area (A).
9. Disengage the fasteners (B) and (C) and remove four carbon brush supports (A). If necessary, disconnect the electrical connections (D).
10. Check if the carbon brushes (E) are worn. Replace the carbon brushes when: the contact with the motor armature is insufficient, the carbon brushes are worn, the carbon brush contact surface is not integral, the thrust spring is broken, etc.
11. If necessary, disconnect the connections (F) and remove the carbon brushes with their supports (A) to replace them. Replace the carbon brushes as an assembly.

## Reset

12. Assemble the components in the reverse order of disassembly, and note the following:
  - When connecting the terminals (F), take care of their insulation from the surrounding parts of the frame.



S301539A

## BRUSHING SYSTEM

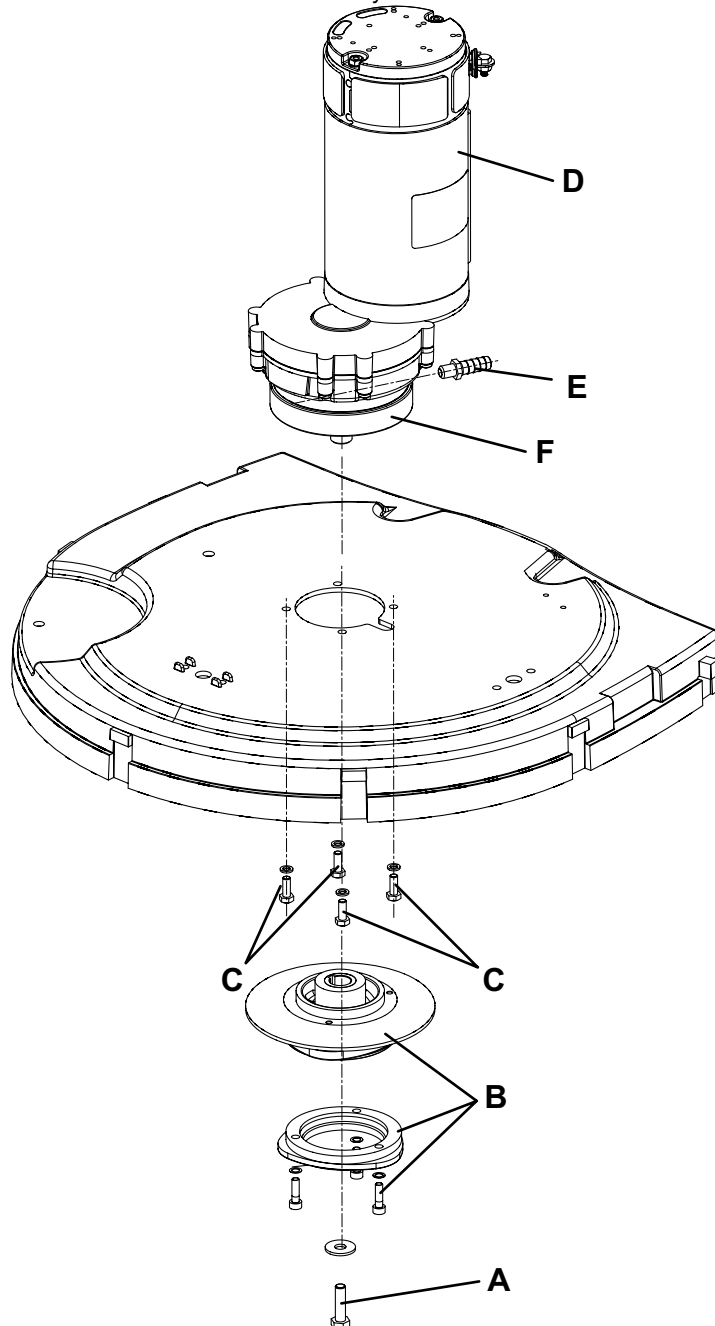
### BRUSH MOTOR DISASSEMBLY/ASSEMBLY

#### Disassembly

1. Remove the deck (see the procedure in the relevant paragraph).
2. At the workbench, remove the screw (A) from the deck.
3. Remove the hub assembly (B) with a puller.
4. Remove the screws (C).
5. Remove the reduction unit (D).
6. If necessary, remove the water distribution union (E) and flange (F) from the reduction unit.

#### Assembly

7. Assemble the components in the reverse order of disassembly.



S301544

## BRUSHING SYSTEM

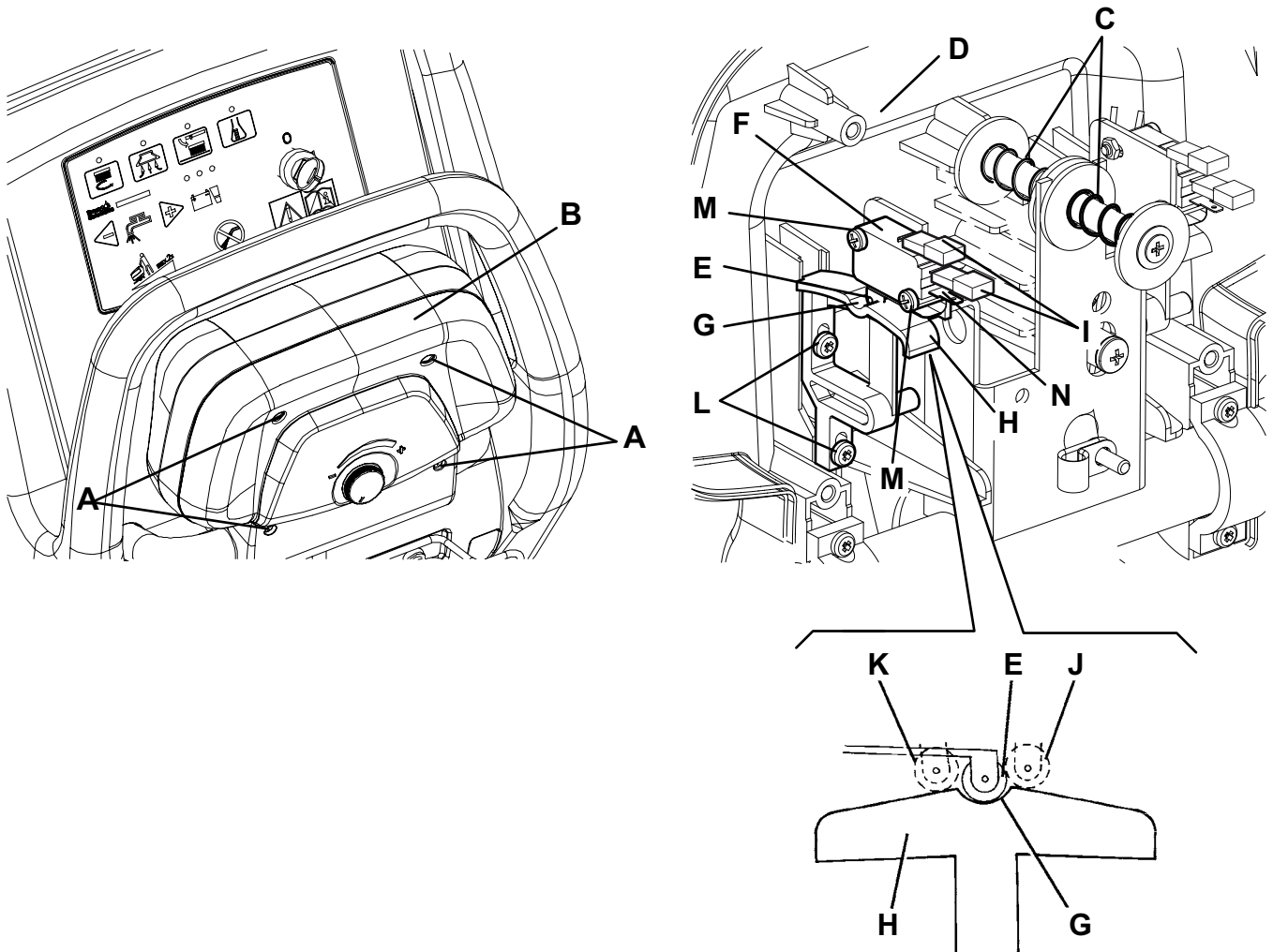
## BRUSH ENABLING MICROSWITCH ADJUSTMENT/REPLACEMENT (For Razor 20T)

1. Drive the machine on a level floor.
2. Turn the ignition key (80) to "0".
3. Disconnect the battery connector (12).
4. Remove the screws (A) and move the drive paddle cover (B).
5. Check that the springs (C) operate correctly when releasing the drive paddle (D).
6. If necessary, replace the microswitch (F) according to the following procedure:
  - Mark the position of the connectors (I) and disconnect them from the microswitch.
  - Remove the screws (M).
  - Remove the microswitch (F).
  - Install the new microswitch and fasten it with the screws, then connect the connectors (I).
7. Check that the actuator (E) of the microswitch (F) is in the housing (G) of the cam (H) when the drive paddle is released (D). Also check that the cable contacts (I) are all open (use a tester).
8. Press the drive paddle (D) and check that the actuator (E), in the positions (J) and (K) activates the microswitch (F) (a clicking sound must be heard). Also check that the cable contacts (I) are all closed (use a tester).  
If necessary, to reach the above-mentioned condition, loosen the screws (L) and adjusting the position of the cam (H), and/or by loosening the screws (M) and adjusting the position of the microswitch (F). Retighten the screws.

**CAUTION!**

*If the microswitch connections (I) are disconnected, pay attention to reconnect them on the same terminals and to leave the terminal (N) free.*

9. Assemble the components by performing steps 3 and 4 in the reverse order.
10. Test the brush operation.



S301549A

## BRUSHING SYSTEM

### TROUBLESHOOTING

#### ALL BRUSHES DO NOT ROTATE

##### Possible causes

1. The brush enabling microswitch is misadjusted or broken (adjust or replace).
2. The wiring harness between microswitch and function electronic board is damaged (repair).
3. The brush motor electromagnetic switch wiring harness is damaged (repair).
4. The function electronic board is damaged (replace).
5. The wiring harness between function electronic board and brush motor electromagnetic switch is damaged (repair).
6. The brush motor electromagnetic switch is damaged (replace).
7. The brush motor fuse is open (replace).

## RECOVERY WATER SYSTEM

## RECOVERY WATER SYSTEM

## RECOVERY WATER TANK AND VACUUM GRID CLEANING, AND COVER GASKET CHECK

1. Drive the machine to the appointed recovery water disposal area.
2.
  - (For Razor 20T) Turn the ignition key (80) to "0".
  - (For Razor) Turn off the switches (71) and (73).
3. Lift the cover (A) to washing position (L).
4. Wash with clean water the cover (A), the tank (B) and the vacuum grid with automatic shut-off float (D).  
Drain the water in the tank through the hose (16).
5. If necessary, release the fasteners (E) and open the grid (D), recover the float (F), clean all the components and then reinstall them.
6. Check the tank cover gasket (G) for integrity.



## NOTE

The gasket (G) creates vacuum in the tank that is necessary for vacuuming the recovery water.

If necessary replace the gasket (G) by removing it from its housing (H). When assembling the new gasket, install the joint (I) in the rear central area, as shown in the figure.

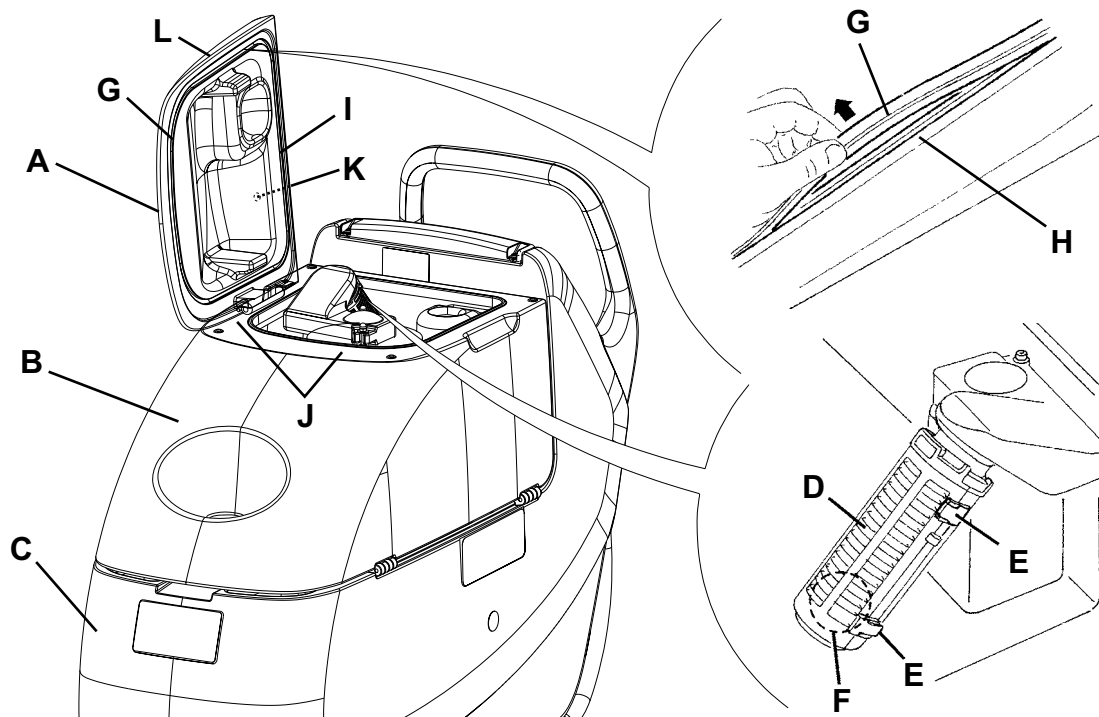
7. Check that the bearing surface (J) of the gasket (G) is integral and adequate for the gasket itself.
8. Check the compensation hole (K) for clogging, and clean it if necessary.



## NOTE

The hole (K), allowing to compensate the air in the cover interspaces, contributes to create vacuum in the tank.

9. Close the cover (A).



P100142

# RECOVERY WATER SYSTEM

## SQUEEGEE CLEANING/CHECK/REPLACEMENT AND SQUEEGEE BLADE REPLACEMENT


**CAUTION!**

*It is advisable to wear protective gloves when cleaning the squeegee because there may be sharp debris.*

### Disassembly and cleaning

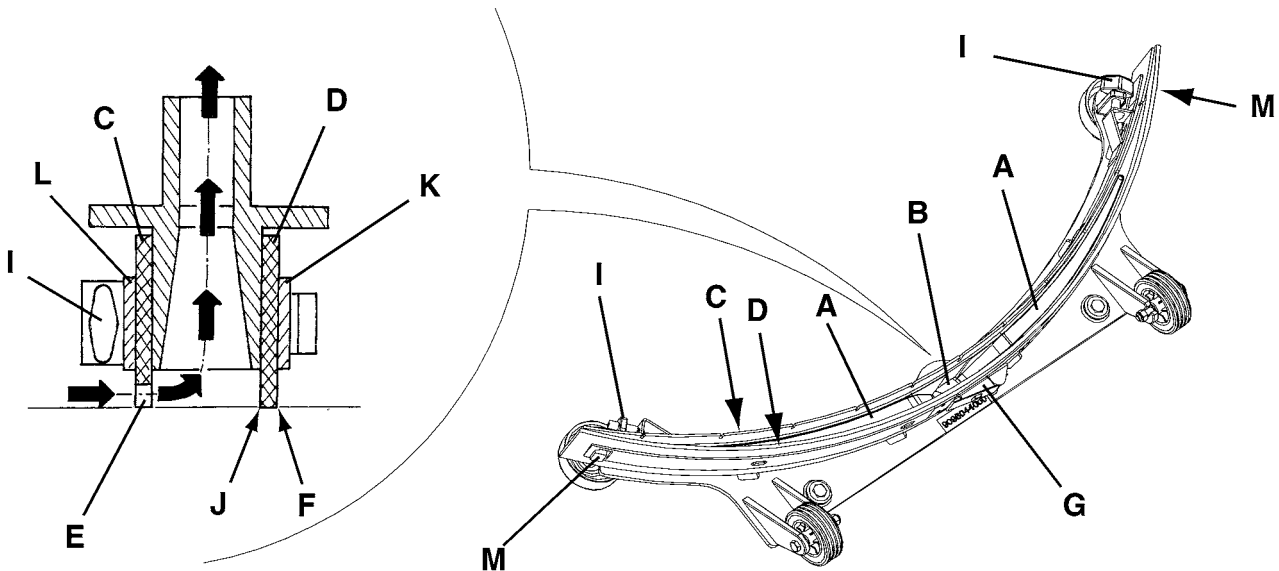
1. Drive the machine on a level floor.
2.
  - (For Razor 20T) Turn the ignition key (80) to "0".
  - (For Razor 20) Turn off the switches (71) and (73).
3. Lower the squeegee (25) with the lever (10).
4. Loosen the handwheels (26) and remove the squeegee (25).
5. Disconnect the vacuum hose (15) from the squeegee.
6. Clean the squeegee. Clean the compartments (A) and the hole (B) especially. Check the front blade (C) and the rear blade (D) for integrity, cuts and tears; otherwise replace them (see the procedure in the following paragraph).
7. Install the squeegee in the reverse order of removal.

### Check and replacement

1. Clean the squeegee, according to the procedure shown in the previous paragraph.
2. Check that the edges (E) of the front blade (C) and the edges (F) of the rear blade (D) lay down on the same level, along their length; otherwise adjust their height according to the following procedure:
  - Release the tie rod (G), disengage the fasteners (M) and adjust the rear blade (D), then tighten the wing nuts, or engage the fasteners, and then engage the tie rod.
  - Loosen the handwheels (I) and adjust the front blade (C); then tighten the handwheels.
3. Check the front blade (C) and rear blade (D) for integrity, cuts and tears; if necessary replace them according to the following procedure. Check that the front corner (J) of the rear blade is not worn; otherwise, overturn the blade to replace the worn corner with an integral one. If the other corners are worn too, replace the blade according to the following procedure:
  - Release the tie rod (G), remove the wing nuts (H) or disengage the fasteners (M), remove the retaining strip (K), then replace/overturn the rear blade (D). Then install the blade in the reverse order of removal.
  - Unscrew the handwheels (I) and remove the retaining strip (L), then replace the front blade (C). Install the blade in the reverse order of removal.

After the blade replacement (or overturning), adjust the height as shown in the previous step.

4. Connect the vacuum hose (15) to the squeegee.
5. Install the squeegee (25) and screw down the handwheels (26).
6. If necessary, adjust the squeegee balance adjusting handwheel (27).



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## RECOVERY WATER SYSTEM

## VACUUM SYSTEM MOTOR FILTER CLEANING

## Disassembly and cleaning

1. If the tank (21) contains recovery water:
  - Drive the machine to the appointed recovery water disposal area.
  - (For Razor 20T) Turn the ignition key (80) to "0".
  - (For Razor 20) Turn off the switches (71) and (73).
  - Empty the recovery water tank (21) with the hose (16).
2. Drive the machine on a level floor.
3.
  - (For Razor 20T) Turn the ignition key (80) to "0".
  - (For Razor 20) Turn off the switches (71) and (73).
4. Grasp the handle (41) and carefully lift the tank (40).
5. Remove the vacuum system motor filter (44) and clean it with water and compressed air.
6. Install the filter (44).

## Assembly

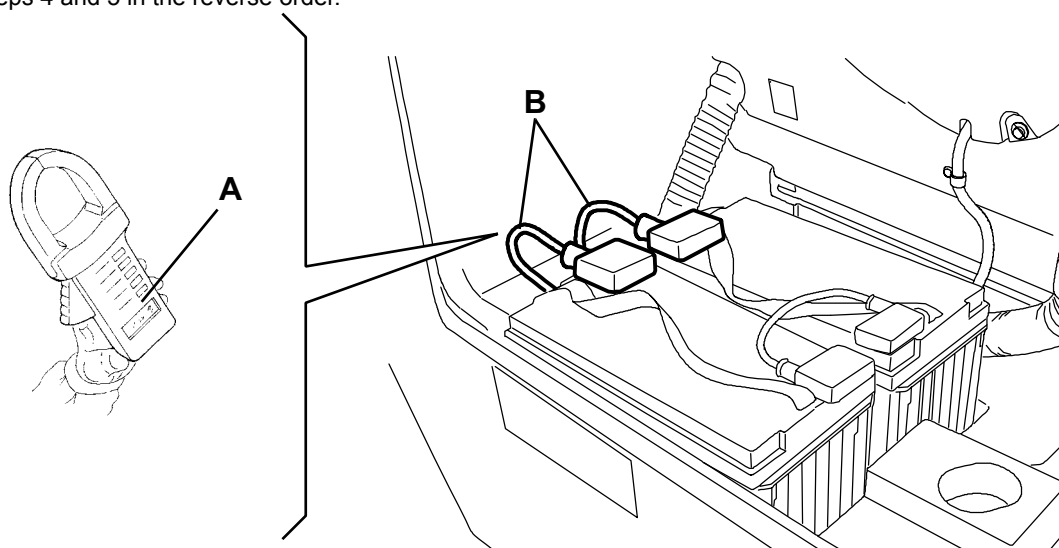
7. Assemble the components in the reverse order of disassembly.

## VACUUM SYSTEM MOTOR ELECTRICAL INPUT CHECK

**WARNING!**

*This procedure must be performed by qualified personnel only.*

1. If the tank (21) contains recovery water:
  - Drive the machine to the appointed recovery water disposal area.
  - (For Razor 20T) Turn the ignition key (80) to "0".
  - (For Razor 20) Turn off the switches (71) and (73).
  - Empty the recovery water tank (21) with the hose (16).
2. Drive the machine on a level floor.
3.
  - (For Razor 20T) Turn the ignition key (80) to "0".
  - (For) Turn off the switches (71) and (73).
4. Disconnect the battery connector (12).
5. Grasp the handle (41) and carefully lift the tank (40).
6. Apply the amperometric pliers (A) on one cable (B) of the batteries.
7.
  - (For Razor 20T) Turn the ignition key (80) to "I".
8.
  - Turn on the vacuum system by pressing the switch (73) and check that the motor electrical input is 16 - 19 A at 24 V.
  - Turn off the vacuum system by pressing the switch (73).
  - Remove the amperometric pliers (B).
  - If the electrical input exceeds the specifications, check the motor carbon brushes (see the procedure in the relevant paragraph).
  - If necessary, disassemble the vacuum system motor (see the procedure in the relevant paragraph), and check the condition of all its components.
  - If the above-mentioned procedures do not lead to a correct electrical input, the motor must be replaced (see the procedure in the relevant paragraph).
9. Perform steps 4 and 5 in the reverse order.

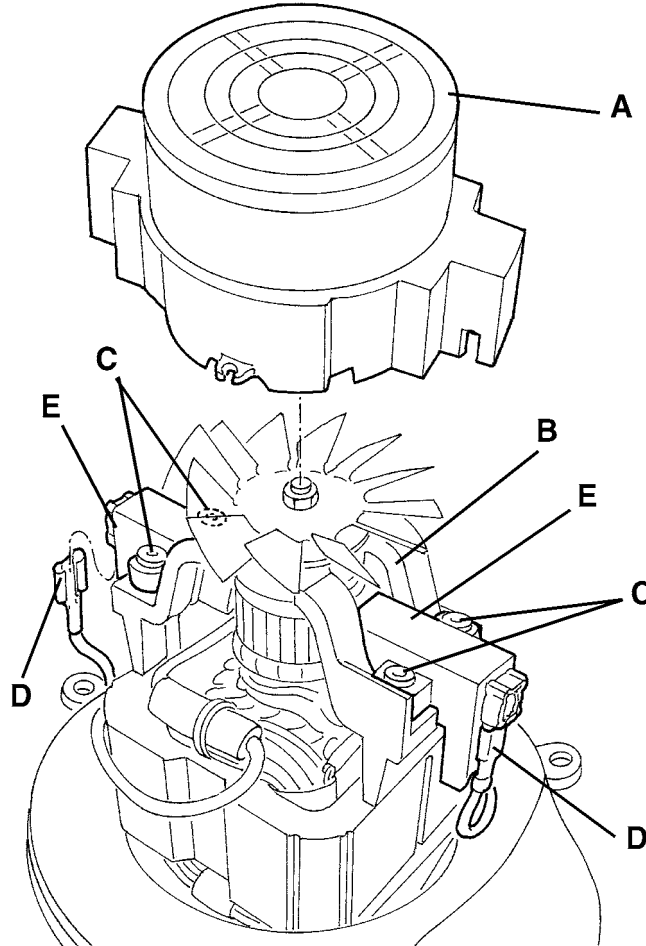


S301553

## RECOVERY WATER SYSTEM

### VACUUM SYSTEM MOTOR CARBON BRUSH CHECK/REPLACEMENT

1. Remove the vacuum system motor (see the procedure in the relevant paragraph).
2. At the workbench, remove the cover (A) (press-fitted) from the vacuum system motor (B).
3. Remove the screws (C).
4. Disconnect the electrical connections (D).
5. Remove the carbon brushes (E).
6. Check the carbon brushes for wear. Replace the carbon brushes when: the contact with the motor armature is insufficient, the carbon brushes are worn, the carbon brush contact surface is not integral, the thrust spring is broken, etc.
7. If necessary, replace the carbon brushes. Replace the carbon brushes as an assembly.
8. Assemble the components in the reverse order of disassembly.



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## RECOVERY WATER SYSTEM

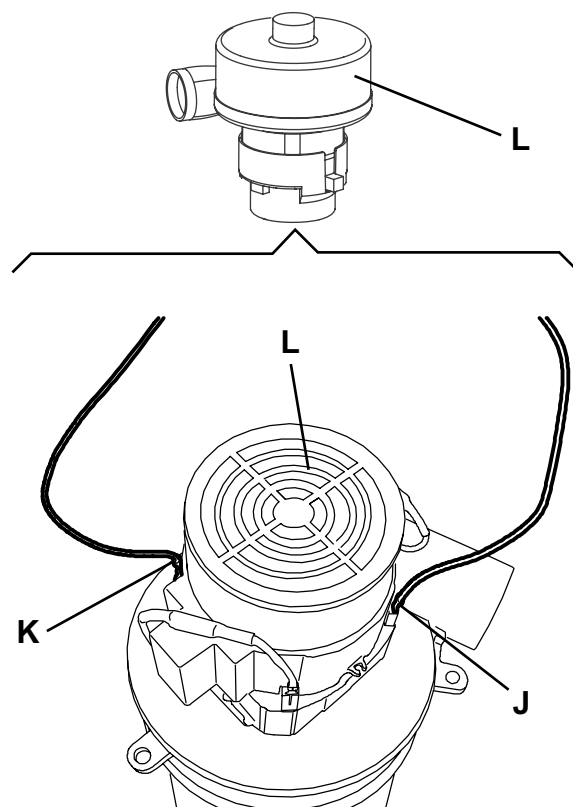
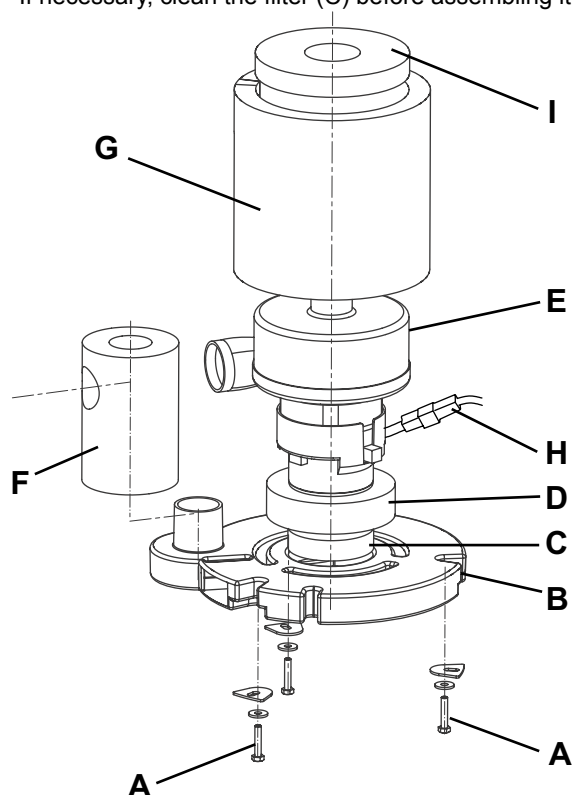
## VACUUM SYSTEM MOTOR DISASSEMBLY/ASSEMBLY

## Disassembly

1. If the tank (21) contains recovery water:
  - Drive the machine to the appointed recovery water disposal area.
  - (For Razor 20T) Turn the ignition key (80) to "0".
  - (For Razor 20) Turn off the switches (71) and (73).
  - Empty the recovery water tank (21) with the hose (16).
2. Drive the machine on a level floor.
3.
  - (For Razor 20T) Turn the ignition key (80) to "0".
  - (For Razor) Turn off the switches (71) and (73).
4. Disconnect the battery connector (12).
5. Grasp the handle (41) and carefully lift the tank (40).
6. Remove the screws (A) and recover the washers.
7. Remove the motor cover (B).
8. Remove the filter (C) and the gasket (D).
9. Remove the motor (E), the sound-deadening pipe (F) and the sound-deadening panel (G).
10. Disconnect the electrical connector (H) of the motor (E).
11. Check the efficiency of the gasket (I) and, if necessary, replace it.

## Assembly

12. Assemble the components in the reverse order of disassembly, and note the following:
  - If necessary, clean the filter (C) before assembling it (see the procedure in the relevant paragraph).



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## RECOVERY WATER SYSTEM

### SQUEEGEE SPRING CHECK/REPLACEMENT (All models, with aluminium squeegee)

#### Check

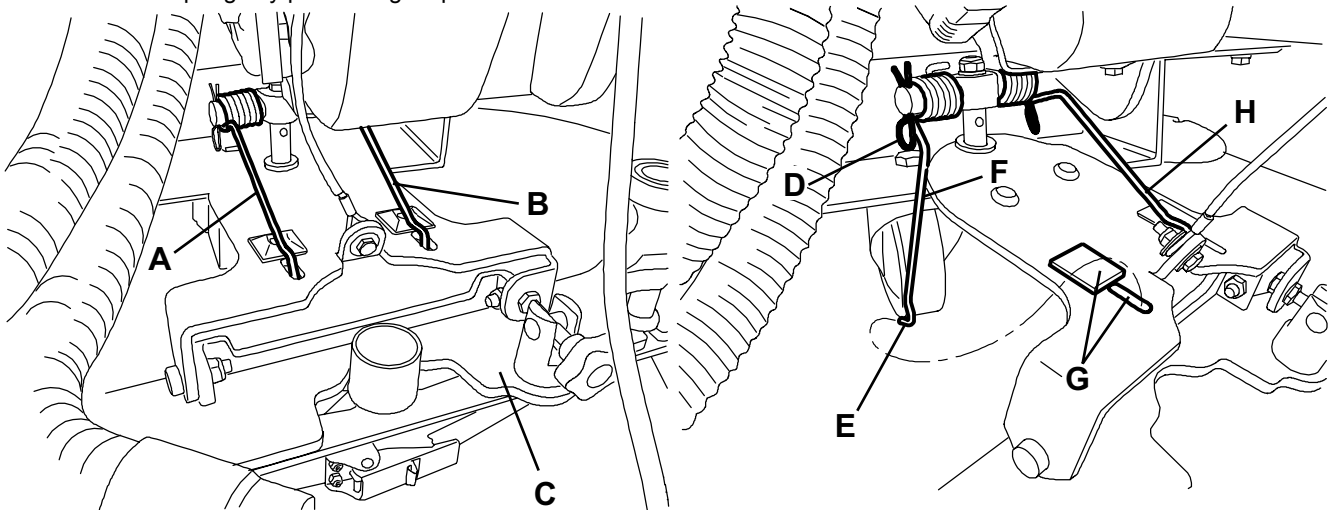
1. Drive the machine on a level floor.
2. • (For Razor 20T) Turn the ignition key (80) to "0".  
• (For Razor 20) Turn off the switches (71) and (73).
3. Check that the springs (A) and (B) push the squeegee (C) on the floor correctly.
4. If necessary, disassemble and replace the springs according to the following procedure.

#### Disassembly

5. Remove the squeegee (see the procedure in the relevant paragraph).
6. Lift the deck by pressing the pedal (11).
7. Grasp the handlebar (2) and lower the front part of the machine.
8. Remove the cotter pin (D).
9. Disengage the end (E) of the left spring (F) from the housing (G).
10. Remove the left spring (F).
11. Repeat steps 8, 9 and 10 for the right spring (H).

#### Assembly

12. Assemble the springs by performing steps 5 to 11 in the reverse order.



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**RECOVERY WATER SYSTEM****TROUBLESHOOTING****THE VACUUM SYSTEM MOTOR DOES NOT TURN ON**

1. The wiring harness between the function electronic board and the vacuum system relay is damaged or short-circuited (check and repair).
2. The vacuum system relay is damaged (replace).
3. The wiring harness between relay and motor is damaged (repair).
4. The vacuum system fuse is open (replace).
5. The vacuum system motor carbon brushes are worn (replace).
6. The vacuum system motor is faulty (check the electrical input).
7. The function electronic board is damaged (replace).

**DIRTY WATER VACUUMING IS INSUFFICIENT OR THERE IS NO VACUUMING****Possible causes**

1. The vacuum grid with automatic shut-off float is activated because the recovery water tank is full (empty the recovery water tank).
2. The vacuum grid with automatic shut-off float is dirty, or the vacuum pre-filter is dirty (clean).
3. The tank cover is not correctly positioned (adjust).
4. The tank cover gasket is not efficient, or the compensating hole is clogged (repair/clean).
5. The vacuum system motor filter is dirty (clean).
6. The squeegee or the vacuum hose is clogged or damaged (clean or repair/replace).
7. The vacuum gaskets are damaged or do not match perfectly (repair or replace).

**THE SQUEEGEE LEAVES LINING ON THE FLOOR OR DOES NOT COLLECT WATER****Possible causes**

1. There is debris under the blade (remove).
2. The squeegee blade edges are torn or worn (replace).
3. The squeegee is not balanced (adjust it with the relevant handwheel).
4. (For aluminium squeegee) The squeegee springs are not efficient (check/replace)

# DRIVE SYSTEM

## DRIVE SYSTEM

### TRACTION ENABLING MICROSWITCH ADJUSTMENT/REPLACEMENT (For Razor 20T)

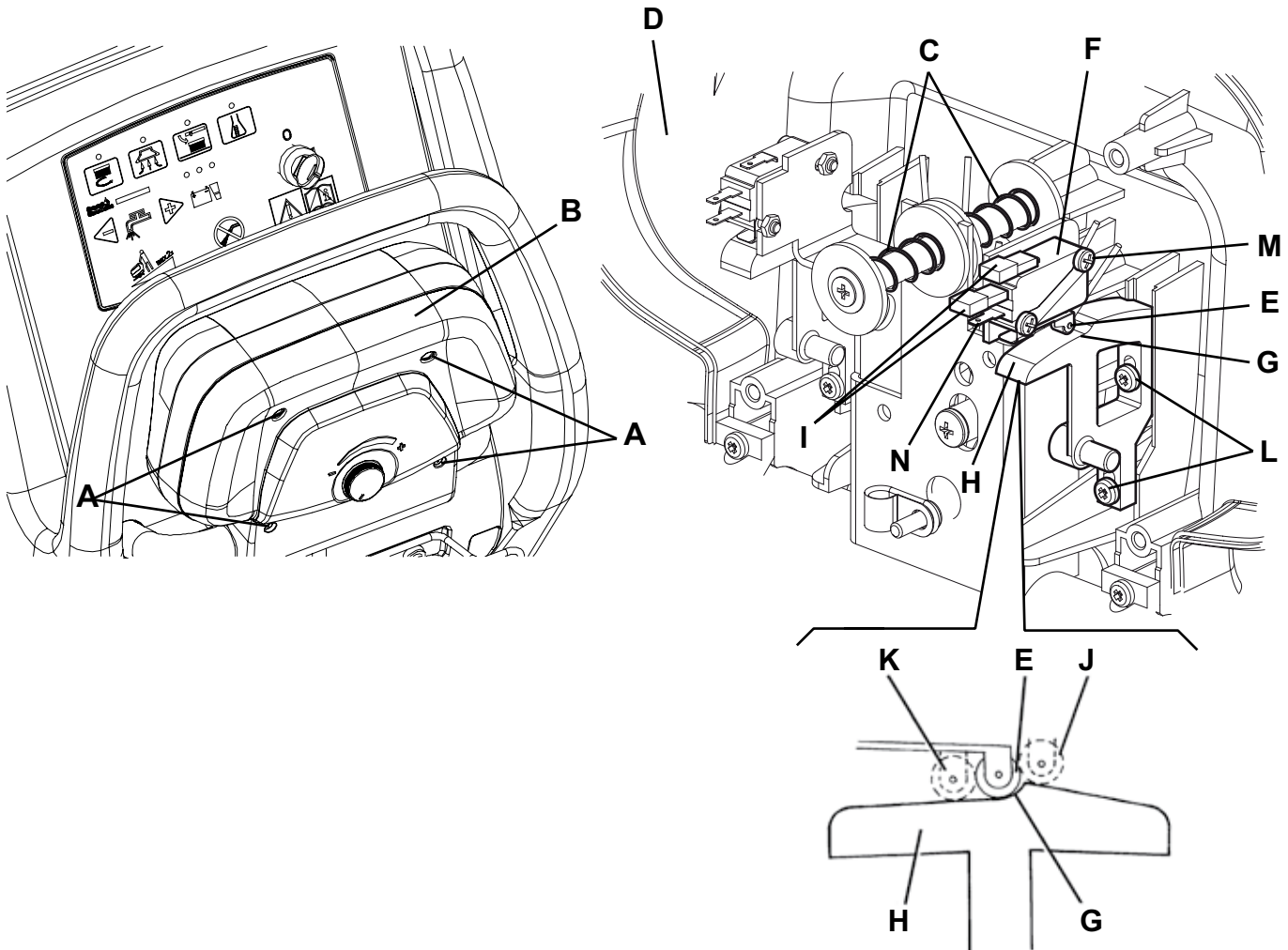
1. Drive the machine on a level floor.
2. Turn the ignition key (80) to "0".
3. Disconnect the battery connector (12).
4. Remove the screws (A) and move the drive paddle cover (B).
5. Check that the springs (C) operate correctly when releasing the drive paddle (D).
6. If necessary, replace the microswitch (F) according to the following procedure:
  - Mark the position of the connectors (I) and disconnect them from the microswitch.
  - Remove the screws (M).
  - Remove the microswitch (F).
  - Install the new microswitch and fasten it with the screws, then connect the connectors (I).
7. Check that the actuator (E) of the microswitch (F) is in the position (G) of the cam (H) when the drive paddle is released (D).
8. Press the drive paddle (D) and check that the actuator (E), in the position (K) doesn't activate the microswitch (F). Also check that the cable contacts (I) are all open (use a tester).
9. Press the drive paddle (D) and check that the actuator (E), in the position (J) activates the microswitch (F) (a clicking sound must be heard). Also check that the cable contacts (I) are all closed (use a tester).  
If necessary, to reach the above-mentioned condition, loosen the screws (L) and adjusting the position of the cam (H), and/or by loosening the screws (M) and adjusting the position of the microswitch (F). Retighten the screws.



#### CAUTION!

*If the microswitch connections (I) are disconnected, pay attention to reconnect them on the same terminals and to leave the terminal (N) free.*

10. Assemble the components by performing steps 3 and 4 in the reverse order.
11. Test the traction operation.



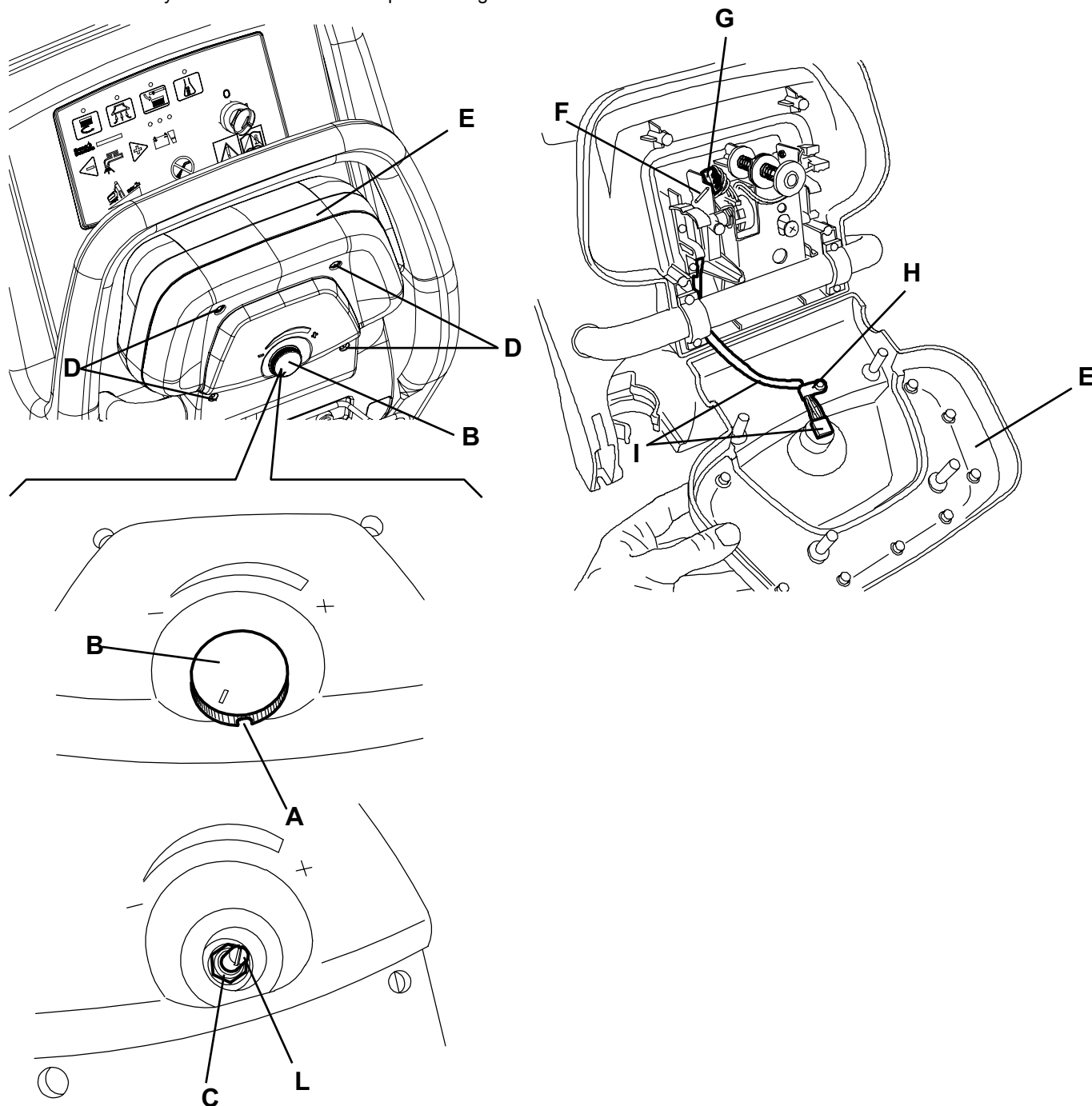
S301559A

**MAXIMUM SPEED POTENTIOMETER DISASSEMBLY/ASSEMBLY (For Razor 20T)****Disassembly**

1. Disconnect the battery connector (12).
2. Operating inside the hole (A), loosen the threaded dowel and remove the maximum speed adjuster knob (B).
3. Unscrew the potentiometer mounting nut (C).
4. Remove the screws (D) and move the cover (E).
5. Cut the fastening clamp (F) and disconnect the potentiometer connector (G).
6. Open the clamp (H).
7. Remove the potentiometer with the relevant wiring harness (I). Check and replacement

**Assembly**

8. Assemble the components in the reverse order of disassembly, and note the following:
  - Fasten the knob (B) with the potentiometer shaft (L) completely turned to the left and the hole (A) in the lower centre part of the panel as shown in the figure.
9. Test the drive system and the maximum speed change.



S301559A

## DRIVE SYSTEM

### DRIVE SYSTEM MOTOR ELECTRICAL INPUT CHECK (For Razor 20T)


**WARNING!**

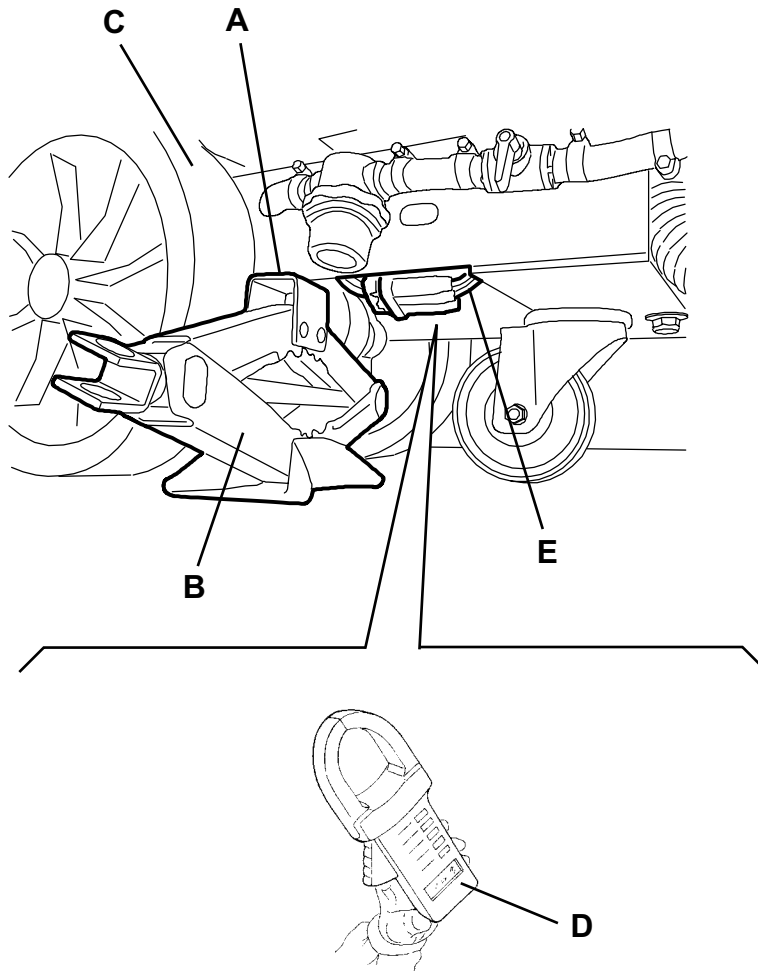
*This procedure must be performed by qualified personnel only and with the help of an assistant.*

1. Check that the batteries are completely charged, otherwise charge them as shown in the User Manual.
2. If the tank (21) contains recovery water:
  - Drive the machine to the appointed recovery water disposal area.
  - Turn the ignition key (80) to "0".
  - Empty the recovery water tank (21) with the hose (16).
3. Drive the machine on a level floor.
4. Lower the deck by pressing the pedal (11).
5. Under the left side the machine, install a suitable jack (C) in the position (A), and slightly lift the machine so that the left wheel (C) can turn freely, without touching the floor or the jack.


**WARNING!**

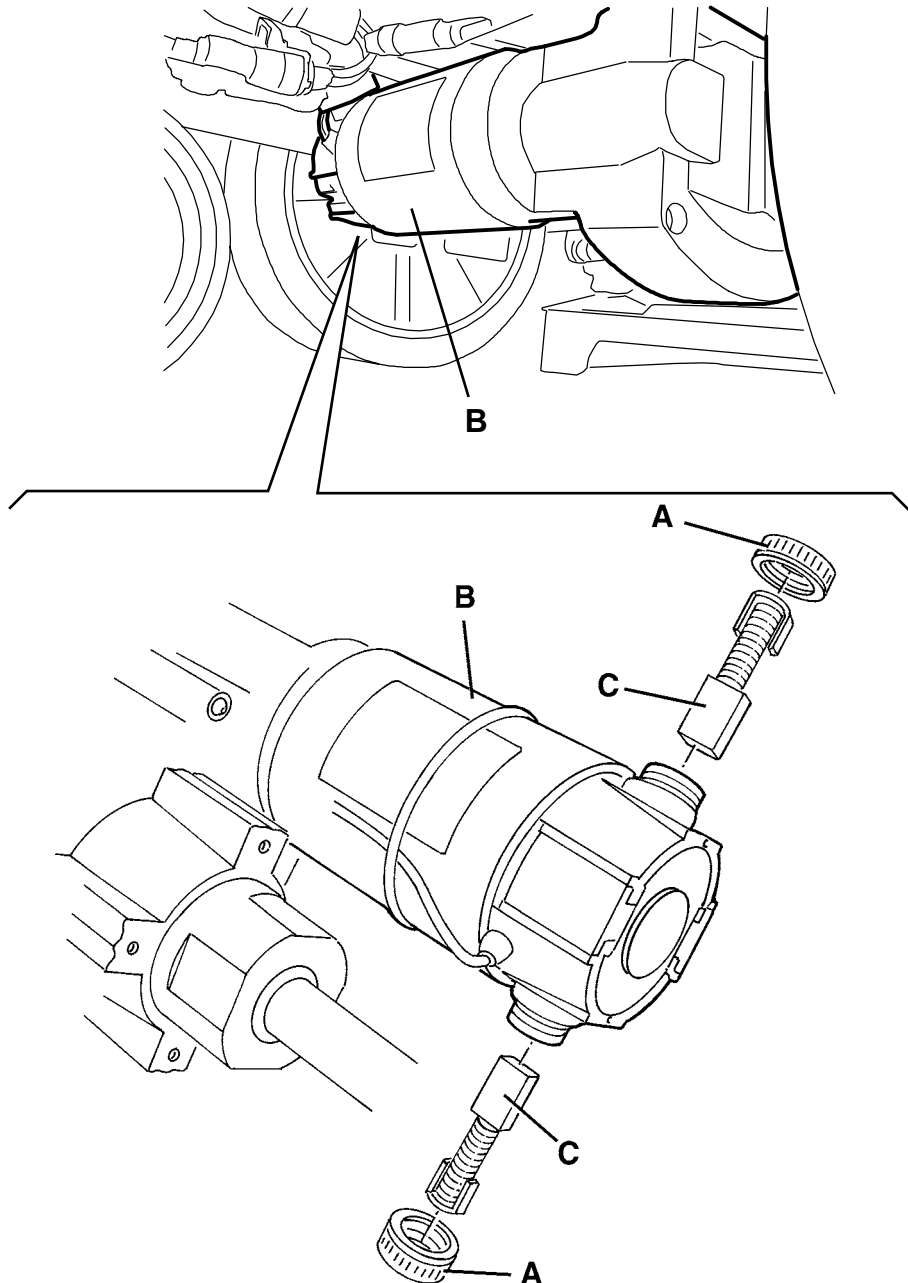
*While performing this procedure, pay attention to the rotation of the driving wheel (C).*

6. Apply the amperometric pliers (D) on one cable (E) of the drive system motor.
7. Turn the ignition key (80) to "I".
8. Turn the speed adjuster (84) to the maximum speed.
9. With the help of an assistant who firmly keeps the machine by the handlebar, push the drive paddle (3) completely forward and check that the electrical input is 1.5 - 2.5 A at 24 V. Release the drive paddle (3). Turn the ignition key (80) to "0" and remove the amperometric pliers (D).  
If the electrical input is higher, perform the following procedures to detect and correct the abnormal input:
  - Check if there is dust or debris preventing the component rotation. The lifted wheel (C) must turn freely with a slight resistance of the differential.
  - If necessary, disassemble the motor-differential (see the procedure in the relevant paragraph) then check for hub correct alignment and bearing smooth running.
 If the above-mentioned procedures do not lead to a correct electrical input, the motor must be replaced (see the procedure in the relevant paragraph).
10. Perform steps 4 and 5 in the reverse order.



**DRIVE SYSTEM****DRIVE SYSTEM MOTOR CARBON BRUSH CHECK AND REPLACEMENT (For Razor 20T)**

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (21) with the hose (16).
2. Place the machine on a hoisting system (if available).  
Otherwise, drive the machine on a level floor.
3. Turn the ignition key (80) to "0".
4. Disconnect the battery connector (12).
5. Operating on the left side of the machine, clean the drive system motor (B) in the area of the covers (A).
6. Unscrew the covers (A) and remove the carbon brushes (C).
7. Check if the carbon brushes (C) are worn. Replace the carbon brushes when: the contact with the motor armature is insufficient, the carbon brushes are worn, the carbon brush contact surface is not integral, the thrust spring is broken, etc.  
If necessary, replace the carbon brushes. Replace the carbon brushes as an assembly.
8. Assemble the components in the reverse order of disassembly.



S301563A

## DRIVE SYSTEM

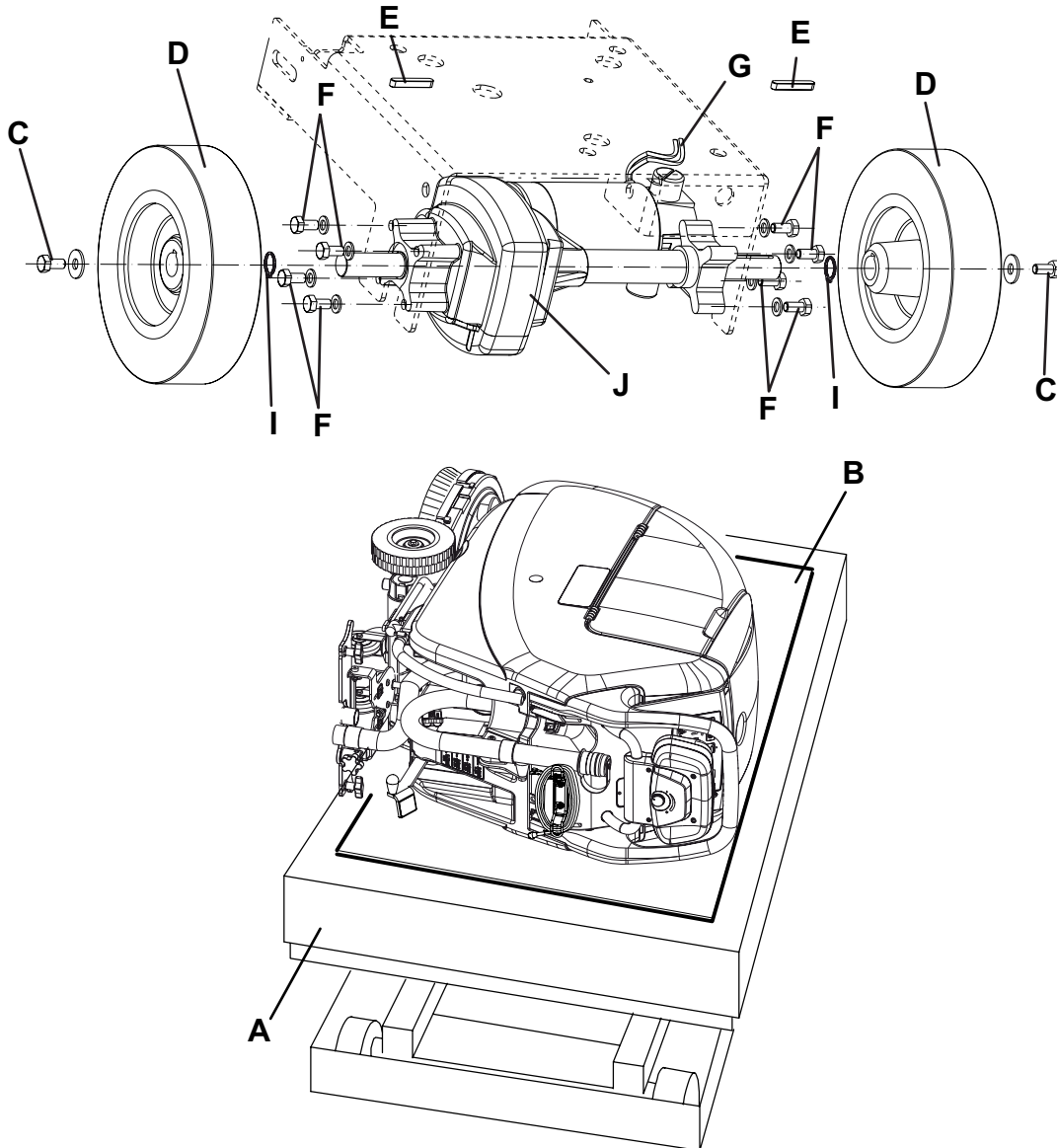
### DRIVE SYSTEM MOTOR-DIFFERENTIAL DISASSEMBLY/ASSEMBLY (For Razor 20T)

#### Disassembly

1. If the tank (21) and/or (20) contains recovery water:
  - Drive the machine to the appointed disposal area.
  - Turn the ignition key (80) to "0".
  - Empty the recovery water tank (21) with the hose (16).
  - Empty the solution tank (20) with the hose (17).
2. Remove the squeegee (see the procedure in the relevant paragraph).
3. Remove the batteries (see the procedure in the relevant paragraph).
4. Prepare an hoisting system (A) on which the machine is to be laid on one side. Place a panel (B) on the hoisting system to avoid damaging the machine.
5. With the help of an assistant, tilt the machine on one side and lay it on the panel (B).
6. Remove the screws (C), then remove the wheels (D) and recover the keys (E).
7. Remove the screws (F) on both sides.
8. Disconnect the connectors (G) of the drive system motor.
9. If necessary, remove the spacers (I) and the retaining rings.
10. Remove the motor-differential (J).

#### Assembly

11. Assemble the components in the reverse order of disassembly.



P100155K

**TROUBLESHOOTING (For Razor 20T)****OPEN CIRCUIT****Possible causes:**

1. There are bulky debris or cords under the machine or around the driving wheels (remove the debris).
2. The motor is damaged (check the motor electrical input).
3. The floor gradient is excessive (do not use the drive system on slopes with a gradient exceeding the specifications).
4. There is a short circuit in the drive system electronic board harness (repair).
5. The drive system electronic board is faulty (replace).

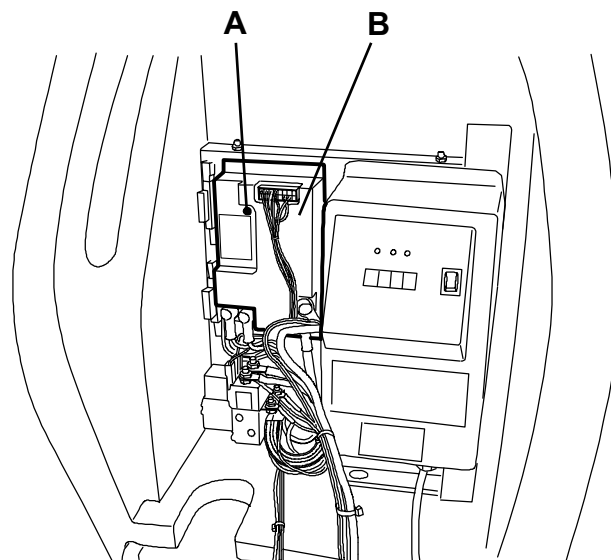
**THE MACHINE DOES NOT MOVE****Possible causes:**

1. The battery voltage is too low (charge the batteries).
2. The drive paddle potentiometer is misadjusted or broken (adjust or replace).
3. The speed adjuster is broken (replace).
4. The drive system enabling microswitch is misadjusted or broken (adjust or replace).
5. The drive system electronic board is faulty (replace).
6. There is an open in the fuse (repair).
7. The wiring harness is damaged (repair).
8. The drive system motor carbon brushes are worn (replace).
9. The drive system motor is faulty (replace).

**DRIVE SYSTEM****TROUBLESHOOTING (For Razor 20T) (Continues)****DRIVE SYSTEM ELECTRONIC BOARD DIAGNOSTIC TABLE**

No. of flashes (*)	Meaning	Action
1	Drive system/brush enabling microswitch closed when starting the machine	Check the microswitch adjustment
2	Faulty speed potentiometer	Check both speed potentiometers
3	Faulty speed potentiometer	Check both speed potentiometers
4	Speed potentiometer off neutral when starting the machine	Check the speed potentiometer adjustment
5	Thermal protection	Check the drive system motor electrical input
6	Faulty drive system electronic board	Replace the drive system electronic board
7	Overcurrent output	Check the drive system motor electrical input; if the electrical input is normal, replace the drive system electronic board
8	Missing power connection	Check the drive system fuse and the drive system electronic board wiring harness; if the fuse and the wiring harness are normal, replace the drive system electronic board
9	Low battery voltage	Charge the batteries
10	High battery voltage	Check the batteries
11	Overload output	Check the drive system motor electrical input
12	(Not applicable)	--
13	Ignition key wrong sequence	Check for false contacts in the ignition key – function electronic board – drive system electronic board circuit (orange cables)
14	Software error	Replace the drive system electronic board (B)

(\*) Flashing of led (A) of the drive system electronic board (B)



S301565

**OTHER SYSTEMS****SCREW AND NUT TIGHTENING CHECK**

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (21) with the hose (16).
2. Place the machine on a hoisting system (if available).  
Otherwise, drive the machine on a level floor.
3.
  - (For Razor 20T) Turn the ignition key (80) to "0".
  - (For Razor 20) Turn off the switches (71) and (73).
4. Grasp the handle (41) and carefully lift the tank (40).
5. Check:
  - Tightening of mounting screws and nuts;
  - Correct position of fasteners;
  - Visible faults in the components;
  - Leaks of fluids.
6. Carefully lower the tank (40).
7. Remove the machine from the hoisting system.

## ELECTRICAL SYSTEM

### ELECTRICAL SYSTEM

#### MACHINE WORKING HOUR CHECK (optional)

1. (For Razor 20T) Turn the ignition key (80) to "I".
2. Press the vacuum system switch (73) and read on the hour counter (79) the total number of working hours (scrubbing/drying) performed by the machine.
3. Turn off the vacuum system by pressing the switch (73).
4. (For Razor 20T) Turn the ignition key (80) to "0".

#### BATTERY CHARGE AND MAINTENANCE

See the User Manual.

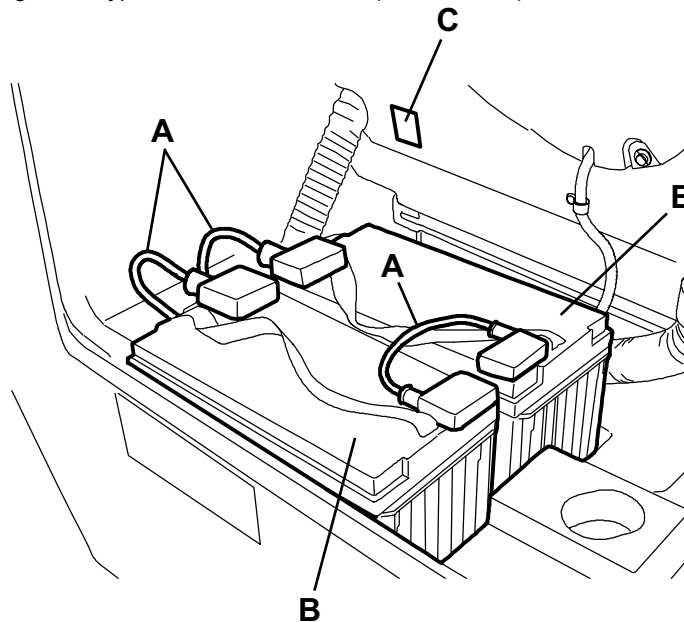
#### BATTERY DISASSEMBLY/ASSEMBLY

##### Disassembly

1. If the tank (21) contains recovery water:
  - Drive the machine to the appointed recovery water disposal area.
  - (For Razor 20T) Turn the ignition key (80) to "0".
  - (For Razor) Turn off the switches (71) and (73).
  - Empty the recovery water tank (21) with the hose (16).
2. Drive the machine on a level floor.
3.
  - (For Razor 20T) Turn the ignition key (80) to "0".
  - (For Razor 20) Turn off the switches (71) and (73).
4. Disconnect the battery connector (12).
5. Grasp the handle (41) and carefully lift the tank (40).
6. Disconnect the cables (A) from the battery terminals.
7. Remove the battery shims, if present.
8. Carefully remove the batteries (B).

##### Assembly

9. Assemble the batteries in the reverse order of disassembly, referring to the installation diagram (C), and note the following:
  - Set the machine according to the type of batteries installed (WET or GEL) as shown in the relevant paragraph.



S301566

**ELECTRICAL SYSTEM****BATTERY TYPE SETTING (WET OR GEL) (For Razor 20)**

Set the electronic board of the machine and of the battery charger according to the type of batteries installed (WET or GEL) as shown below:

**Machine setting**

1. Press the switch (71) or (73) and pay attention to the following in the very first seconds of machine operation:
  - If the green warning light (81a) is flashing, the machine is set to GEL.
  - If the red warning light (81c) is flashing, the machine is set to WET.
2. If the setting is to be changed, perform the following procedure.
3. Make sure that the switches (71) and (73) are turned off.
4. Press and hold the switches (71) and (73) at the same time.
5. Release the switches (71) and (73) at least 8 seconds after starting the machine.
6. Within three seconds, press the switch (73) again for a few seconds and check that the warning light for the required setting is flashing (as shown in step 1).

**Battery charger setting**

7. Remove the battery charger data inspection window screws (A).
8. Remove the window (B).
9. Turn the battery charger selector (C) to WET position for lead batteries, or to GEL position for gel batteries.
10. Install the window (B) and tighten the screws (A).

**BATTERY TYPE SETTING (WET OR GEL) (For Razor 20T)**

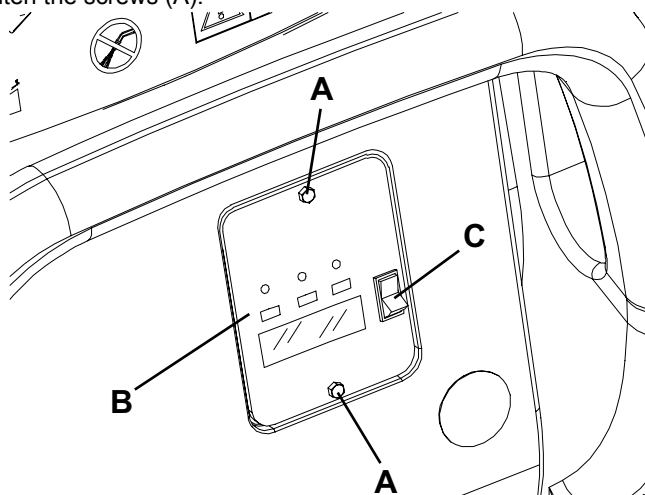
Set the electronic board of the machine and of the battery charger according to the type of batteries installed (WET or GEL) as shown below:

**Machine setting**

1. Turn the ignition key (80) to "I" position and pay attention to the following in the very first seconds of machine operation:
  - If the green warning light (81a) is flashing, the machine is set to GEL.
  - If the red warning light (81c) is flashing, the machine is set to WET.
2. If the setting is to be changed, perform the following procedure.
3. Turn off the machine by turning the ignition key (80) to "0".
4. Press and hold the switches (71) and (73) at the same time, then turn the ignition key (80) to "I".
5. Release the switches (71) and (73) at least 8 seconds after starting the machine.
6. Within three seconds, press the switch (73) again for a few seconds and check that the warning light for the required setting is flashing (as shown in step 1).

**Battery charger setting**

7. Remove the battery charger data inspection window screws (A).
8. Remove the window (B).
9. Turn the battery charger selector (C) to WET position for lead batteries, or to GEL position for gel batteries.
10. Install the window (B) and tighten the screws (A).



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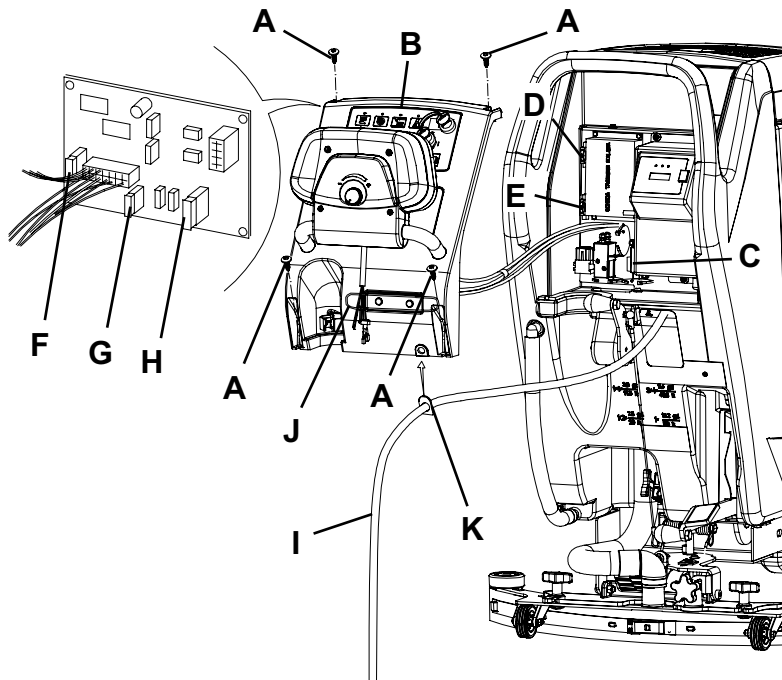
## ELECTRICAL SYSTEM

### FUSE CHECK/REPLACEMENT

1. Disconnect the battery connector (12).
2. Move aside the recovery water drain hose (16).
3. Remove the battery charger cable (I) from the cable holder (J).
4. Remove the screws (A) and carefully move aside the panel (B) by disengaging the grommet (K) from its housing on the panel (B).
5. Check/replace the following fuses:
  - (C) - F1 fuse, deck: (40 A)
  - (D) - F2 fuse, vacuum system: (30 A)
  - (E) - F3 fuse, drive system: (30 A) (\*)
  - (F) - F4 fuse, signal circuits: (3 A)
  - (G) - F5 fuse, brush/pad-holder release: (20 A) (\*)
  - (H) - F6 fuse, pumps: (3 A) (\*)

(\*) Only for Razor 20T

6. Perform steps 1 to 4 in the reverse order.



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## ELECTRICAL SYSTEM

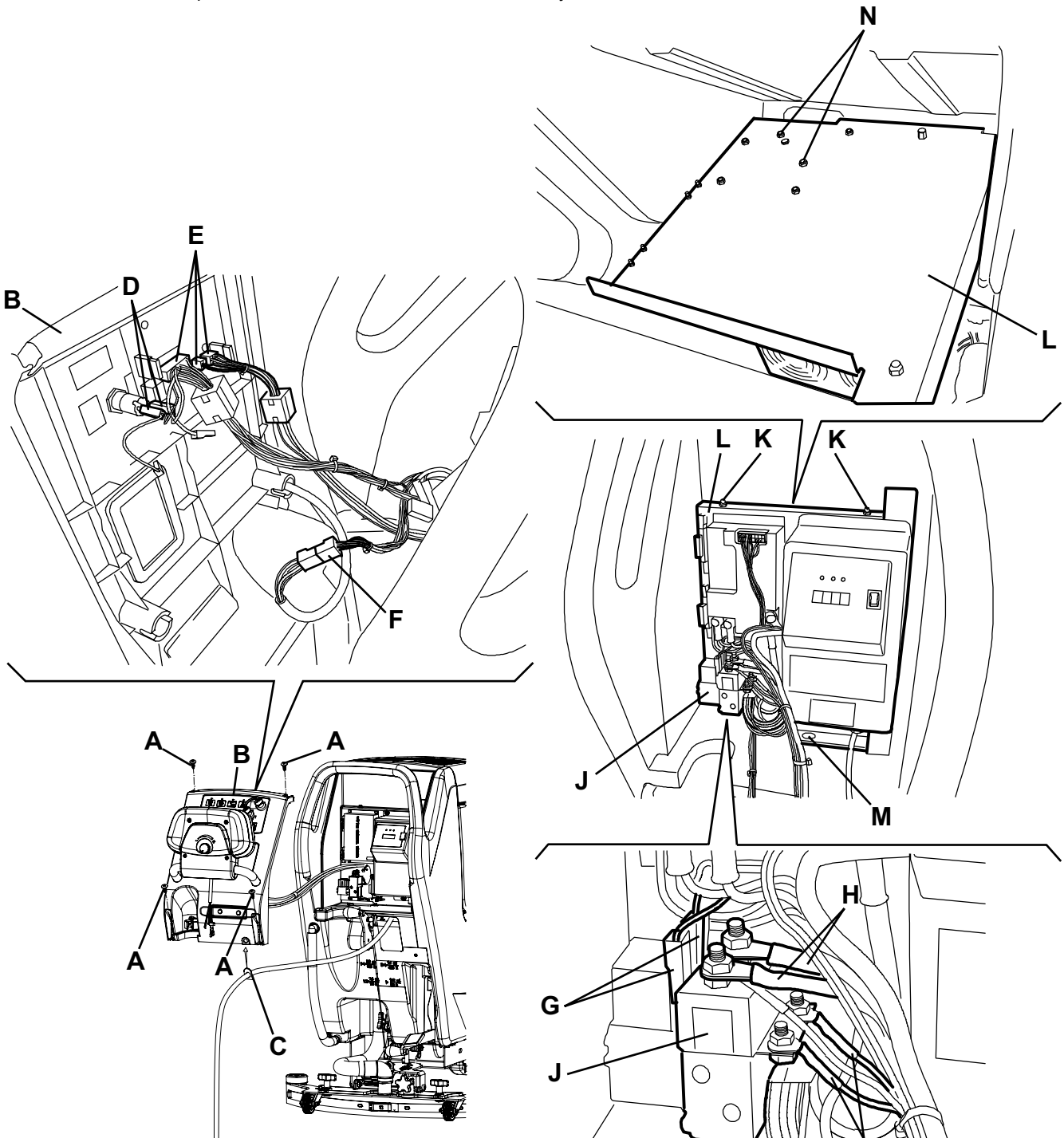
## BRUSH MOTOR ELECTROMAGNETIC SWITCH DISASSEMBLY/ASSEMBLY

## Disassembly

1. Disconnect the battery connector (12).
2. Move aside the recovery water drain hose (16).
3. Remove the battery charger cable (6) from the cable holder (7).
4. Remove the screws (A) and carefully move aside the panel (B) by disengaging the cable grommet (C) from its housing on the panel (B).
5. Disconnect the connectors (D), (E), (F), and remove the panel (B).
6. Disconnect the terminals (G) and (H) from the electromagnetic switch (J). Disconnect also the terminals (I), which are present only on the models with drive system.
7. Remove the screws (K) and move the electrical panel (L) by disengaging it from the lower fastener (M).
8. Remove the screws (N) on the rear side of the electrical panel (L), then remove the electromagnetic switch (J).

## Assembly

9. Assemble the components in the reverse order of disassembly.



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S301572

## ELECTRICAL SYSTEM

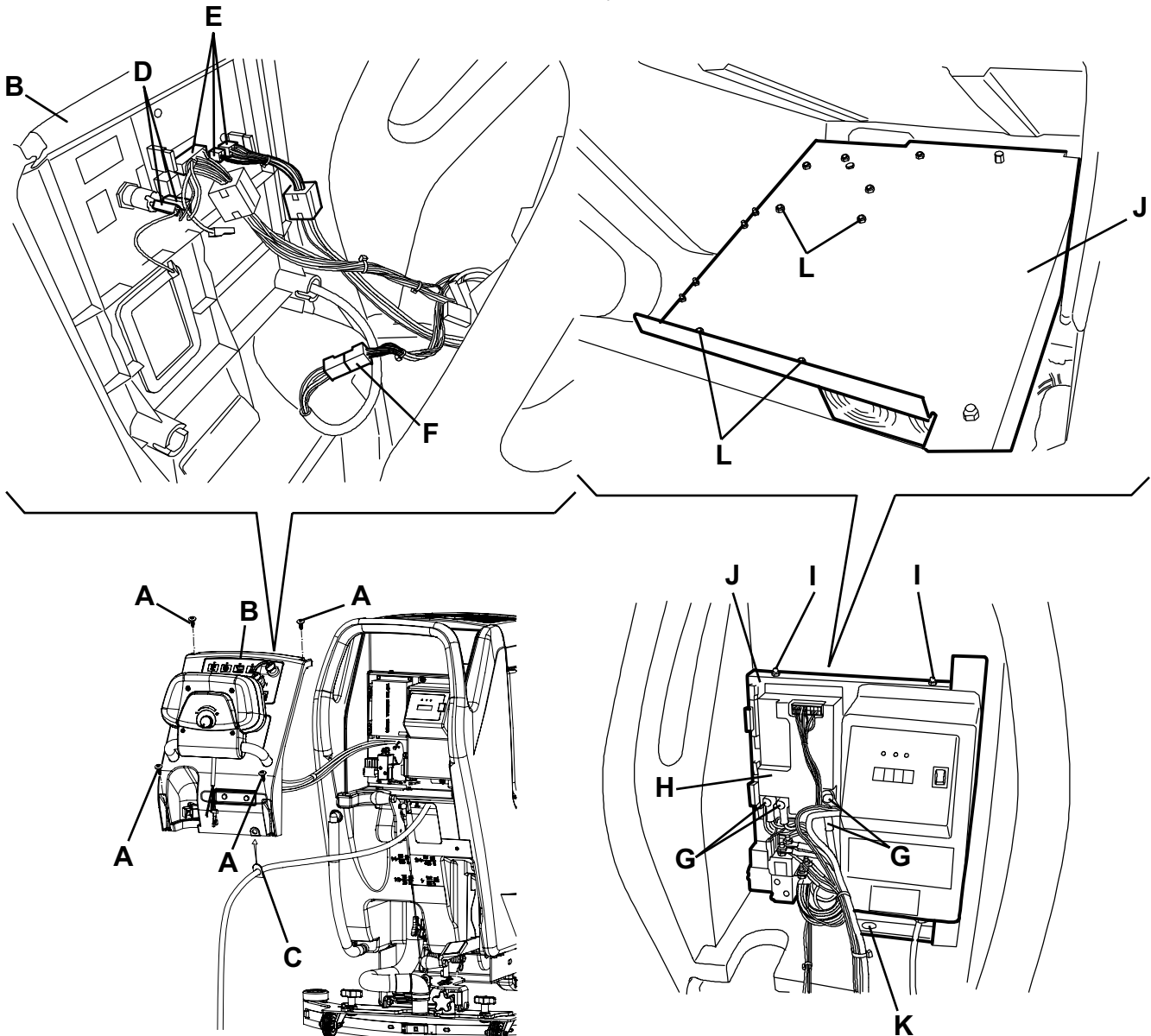
### DRIVE SYSTEM ELECTRONIC BOARD DISASSEMBLY/ASSEMBLY (For Razor 20T)

#### Disassembly

1. Disconnect the battery connector (12).
2. Move aside the recovery water drain hose (16).
3. Remove the battery charger cable (6) from the cable holder (7).
4. Remove the screws (A) and carefully move aside the panel (B) by disengaging the cable grommet (C) from its housing on the panel (B).
5. Disconnect the connectors (D), (E), (F), and remove the panel (B).
6. Disconnect the connectors (G) of the drive system electronic board (H).
7. Remove the screws (I) and move the electrical panel (J) by disengaging it from the lower fastener (K).
8. Remove the screws (L) on the rear side of the electrical panel (J), then remove the drive system electronic board (H).

#### Assembly

9. Assemble the components in the reverse order of disassembly.



S301573A

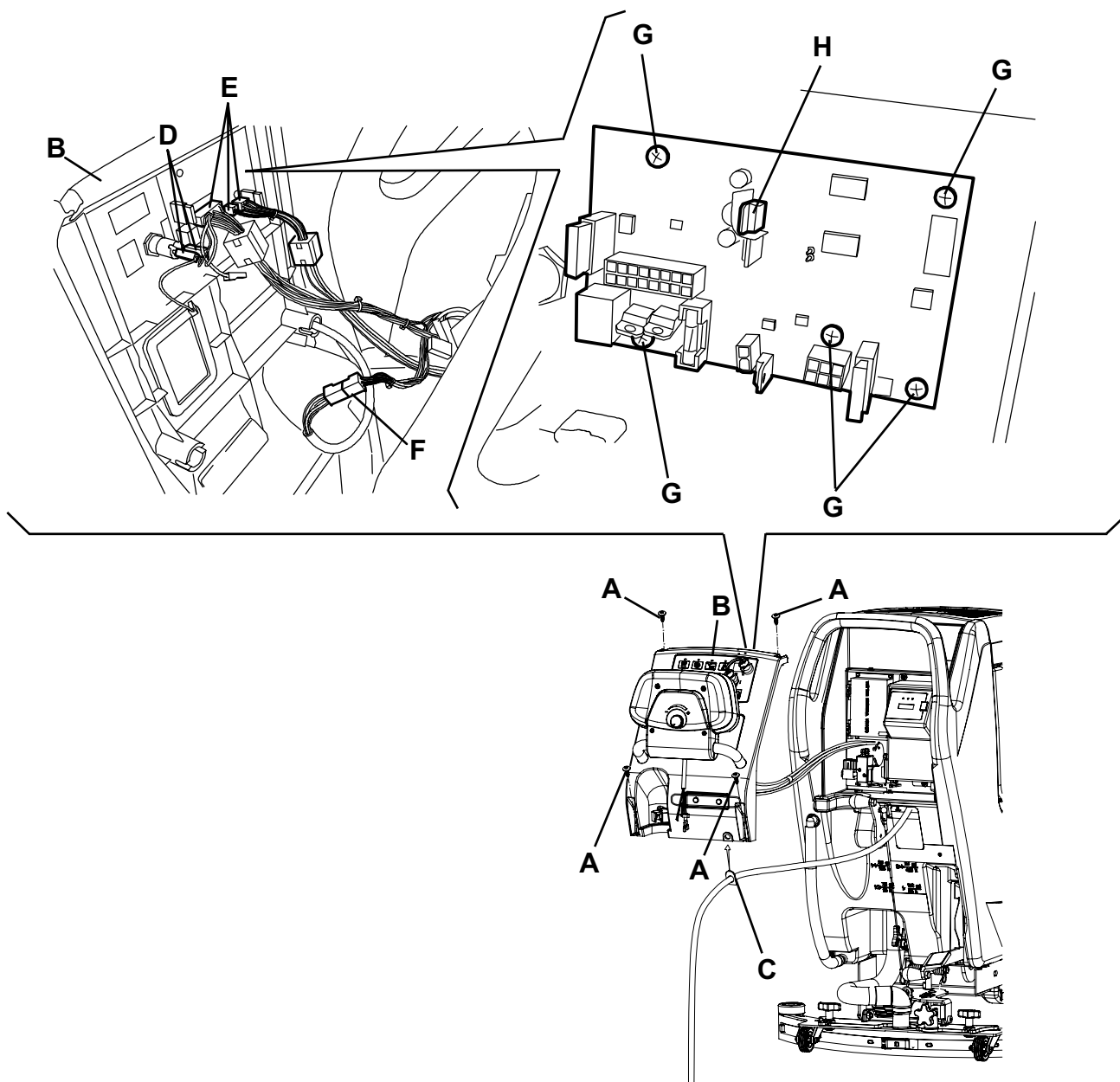
S301574A

**ELECTRICAL SYSTEM****FUNCTION ELECTRONIC BOARD DISASSEMBLY/ASSEMBLY****Disassembly**

1. Disconnect the battery connector (12).
2. Move aside the recovery water drain hose (16).
3. Remove the battery charger cable (6) from the cable holder (7).
4. Remove the screws (A) and carefully move aside the panel (B) by disengaging the cable grommet (C) from its housing on the panel (B).
5. Disconnect the connectors (D), (E), (F), and remove the panel (B).
6. On the panel, remove the screws (G), then remove the function electronic board (H).

**Assembly**

9. Assemble the components in the reverse order of disassembly.



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## ELECTRICAL SYSTEM

### TROUBLESHOOTING

See the previous chapters related to the use of the electrical system.

Other possible causes:

1. The batteries are discharged or the connections are not efficient (charge the batteries or clean the connections).
2. The batteries are broken (check the battery no-load voltage). Assembly



#### NOTE

*A fault in the battery charger and relevant connections can affect the machine operation.*

3. The battery charger is broken (replace).
4. There is an open in the fuses (replace).
5. The harness is cut, pressed or short-circuited (repair).
6. Error codes indicated by LEDs (81a - 81b - 81c):

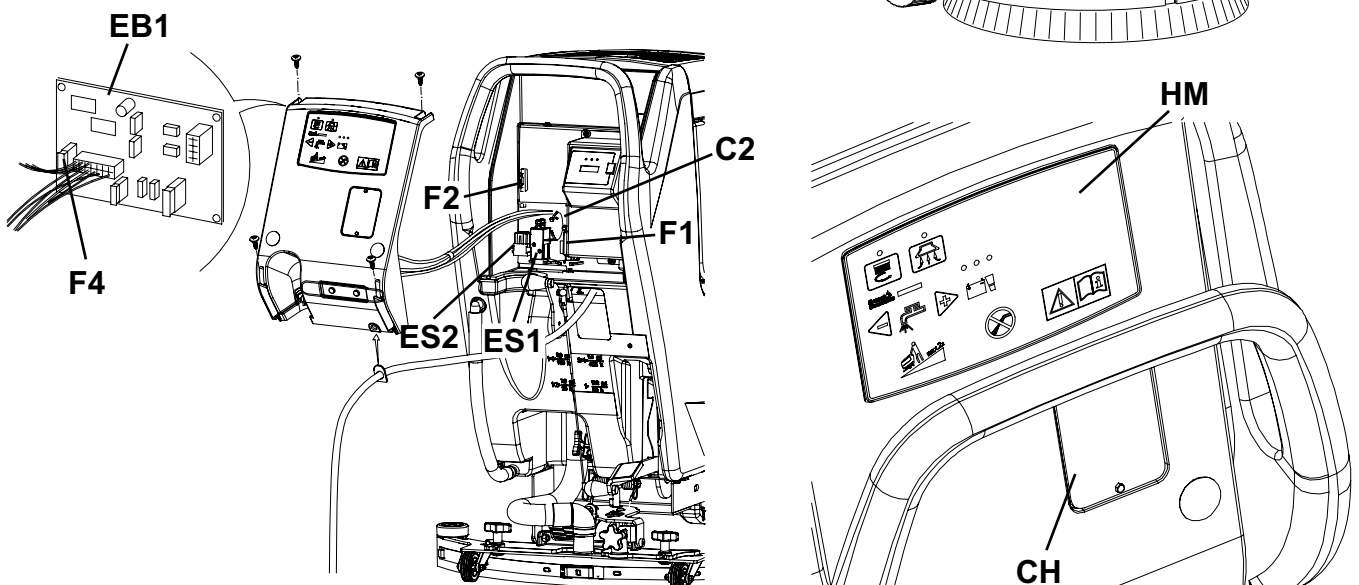
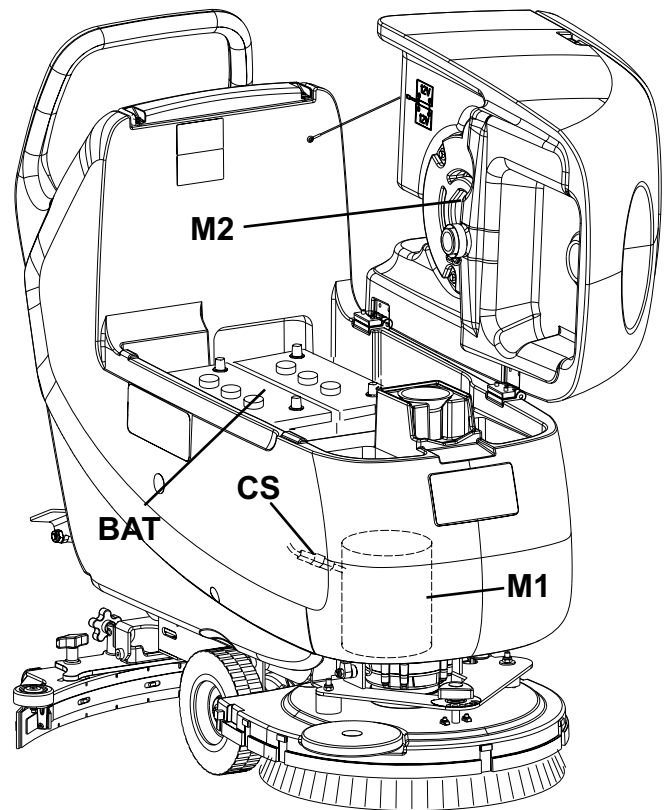
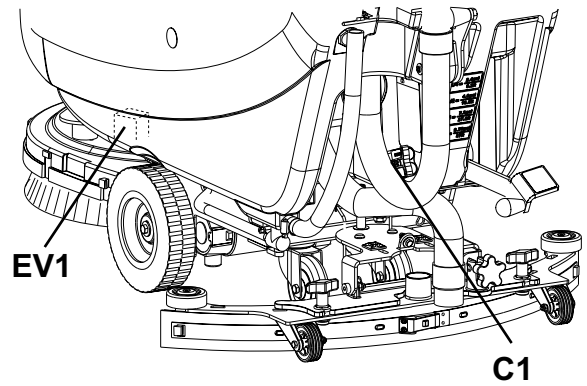
Flashes	Meaning	Action
Green, yellow and red LED flashing simultaneously.	Problem related to brush motor overload.	Perform checks shown in BRUSH MOTOR ELECTRICAL INPUT CHECK.
		If check results are negative, check the F1 fuse for integrity and its nut tightness.
Red LED flashing.	The batteries are discharged.	Charge the batteries.
		If the problem persists, replace them.

## ELECTRICAL SYSTEM

## COMPONENT LAYOUT - RAZOR 20

## Key:

- BAT: 24 V battery
- C1: Battery connector
- C2: Battery charger connector
- CH: Battery charger (optional)
- CS: Deck connector
- EB1: Function electronic board
- ES1: Brush electromagnetic switches
- ES2: Vacuum system relay
- EV1: Detergent solenoid valve
- F1: Deck fuse
- F2: Vacuum system fuse
- F4: Signal circuit fuse
- HM: Hour counter (optional)
- M1: Brush/pad-holder motor
- M2: Vacuum system motor



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# ELECTRICAL SYSTEM

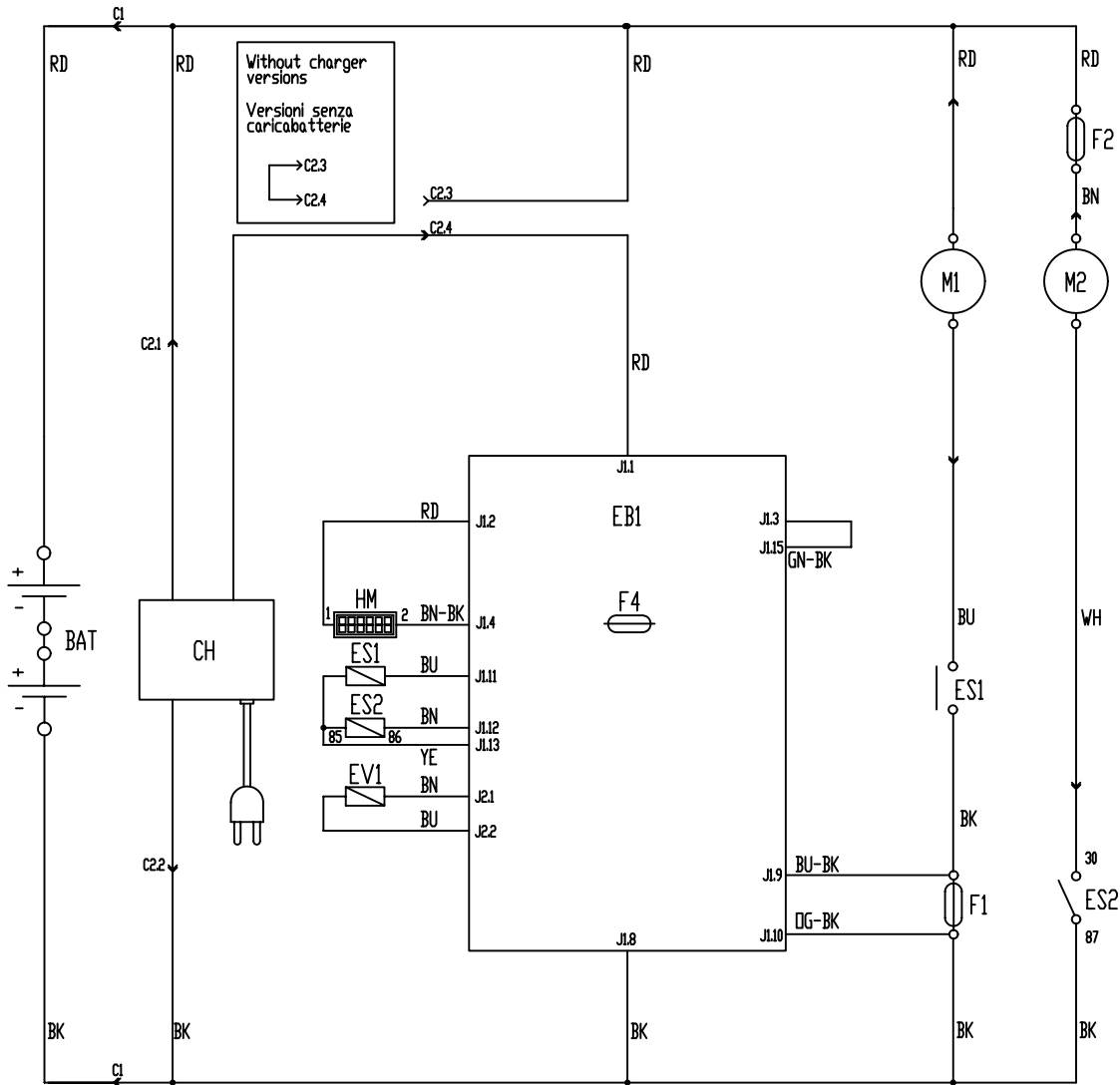
## WIRING DIAGRAM - RAZOR 20

**Key:**

- BAT: 24 V battery
- C1: Battery connector
- C2: Battery charger connector
- CH: Battery charger (optional)
- CS: Deck connector
- EB1: Function electronic board
- ES1: Brush electromagnetic switches
- ES2: Vacuum system relay
- EV1: Detergent solenoid valve
- F1: Deck fuse
- F2: Vacuum system fuse
- F4: Signal circuit fuse
- HM: Hour counter (optional)
- M1: Brush/pad-holder motor
- M2: Vacuum system motor

**Colour codes:**

- BK: Black
- BU: Blue
- BN: Brown
- GN: Green
- GY: Grey
- OG: Orange
- PK: Pink
- RD: Red
- VT: Violet
- WH: White
- YE: Yellow



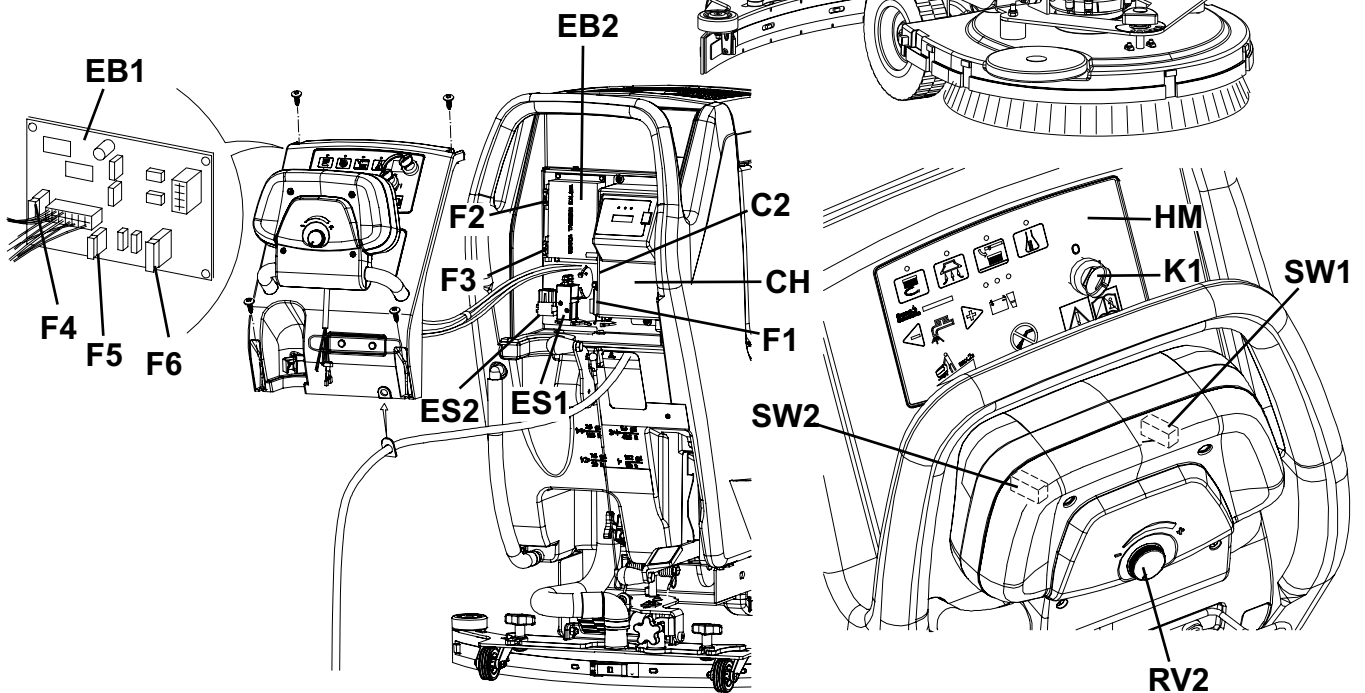
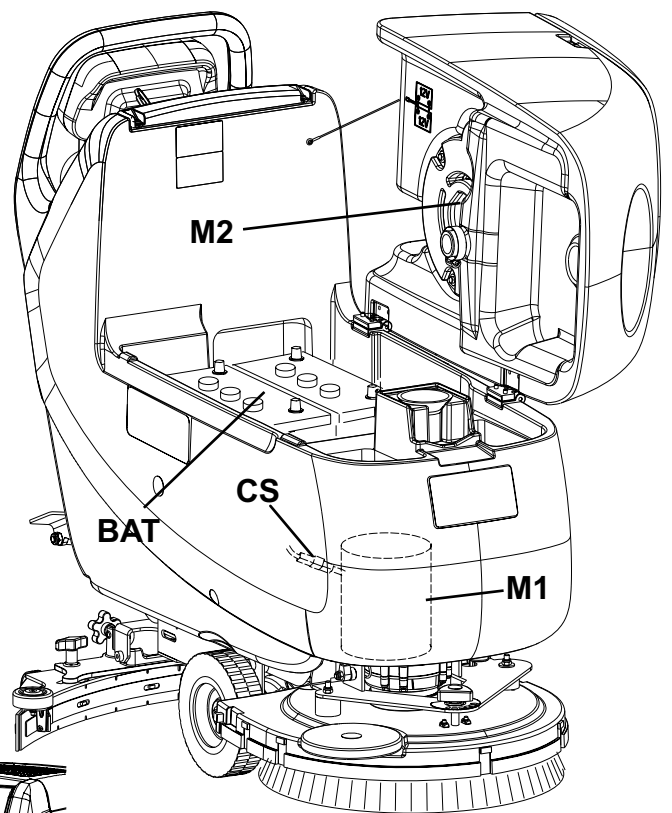
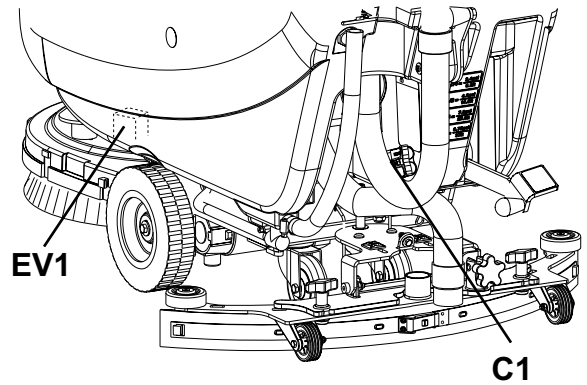
S301575A

**ELECTRICAL SYSTEM**

**COMPONENT LAYOUT - RAZOR 20T**

**Key:**

- BAT: 24 V battery
- C1: Battery connector
- C2: Battery charger connector
- CH: Battery charger
- EB1: Function electronic board
- EB2: Drive system electronic board
- ES1: Brush electromagnetic switches
- ES2: Vacuum system relay
- EV1: Detergent solenoid valve
- F1: Deck fuse
- F2: Vacuum system fuse
- F3: Drive system fuse
- F4: Signal circuit fuse
- F5: Brush/pad-holder release fuse
- F6: Pump fuse
- HM: Hour counter (optional)
- K1: Ignition key
- M1: Brush/pad-holder motor
- M2: Vacuum system motor
- M3: Drive system motor
- RV1: Speed potentiometer
- RV2: Maximum speed potentiometer
- SW1: Drive system/brush enabling microswitch
- SW2: Reverse enabling microswitch



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# ELECTRICAL SYSTEM

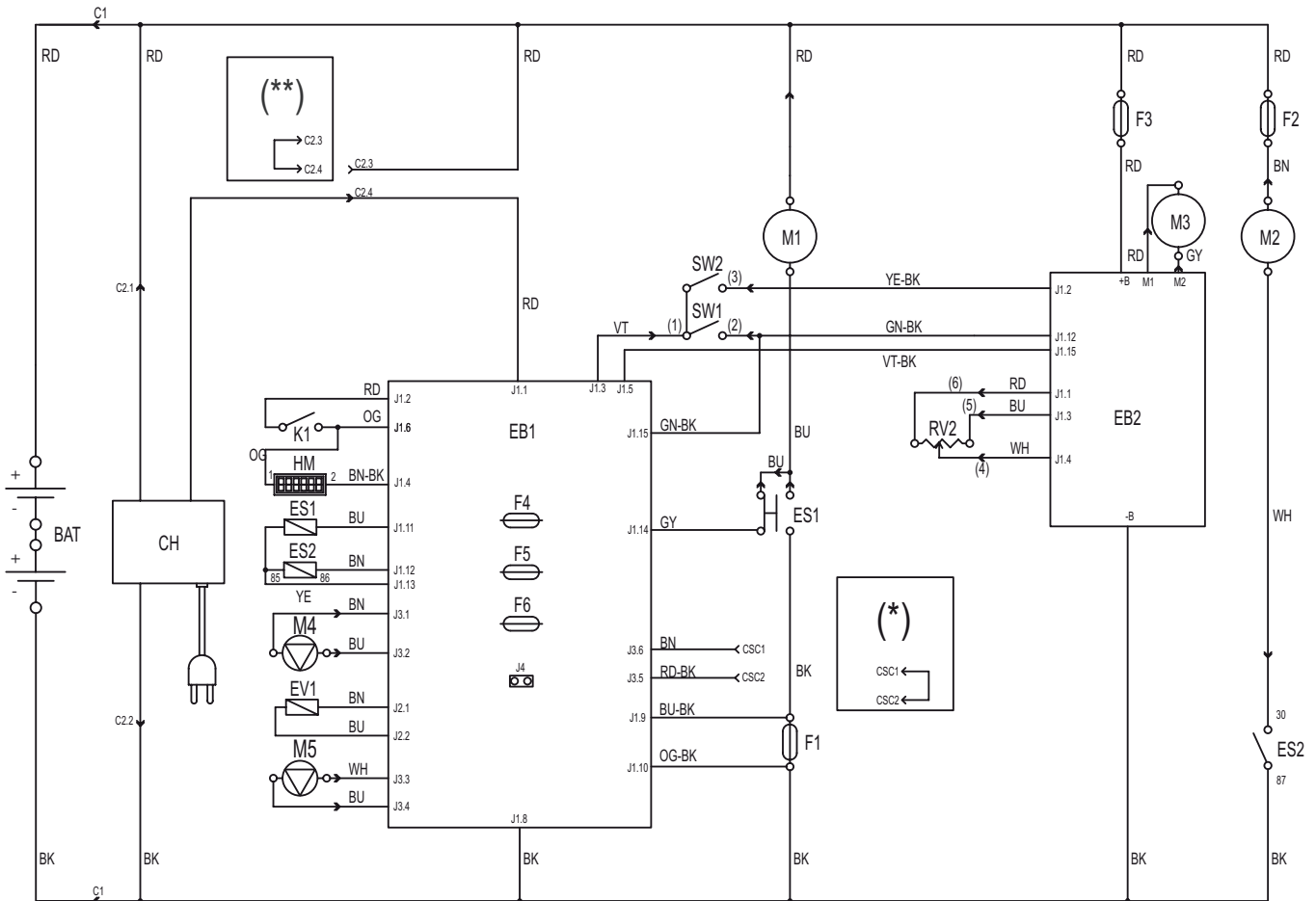
## WIRING DIAGRAM - RAZOR 20T

**Key:**

- BAT: 24 V battery
- C1: Battery connector
- C2: Battery charger connector
- CH: Battery charger
- EB1: Function electronic board
- EB2: Drive system electronic board
- ES1: Brush electromagnetic switches
- ES2: Vacuum system relay
- EV1: Detergent solenoid valve
- F1: Deck fuse
- F2: Vacuum system fuse
- F3: Drive system fuse
- F4: Signal circuit fuse
- F5: Brush/pad-holder release fuse
- F6: Pump fuse
- HM: Hour counter (optional)
- K1: Ignition key
- M1: Brush/pad-holder motor
- M2: Vacuum system motor
- M3: Drive system motor
- RV1: Speed potentiometer
- RV2: Maximum speed potentiometer
- SW1: Drive system/brush enabling microswitch
- SW2: Reverse enabling microswitch

**Colour codes**

- BK: Black
- BU: Blue
- BN: Brown
- GN: Green
- GY: Grey
- OG: Orange
- PK: Pink
- RD: Red
- VT: Violet
- WH: White
- YE: Yellow



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