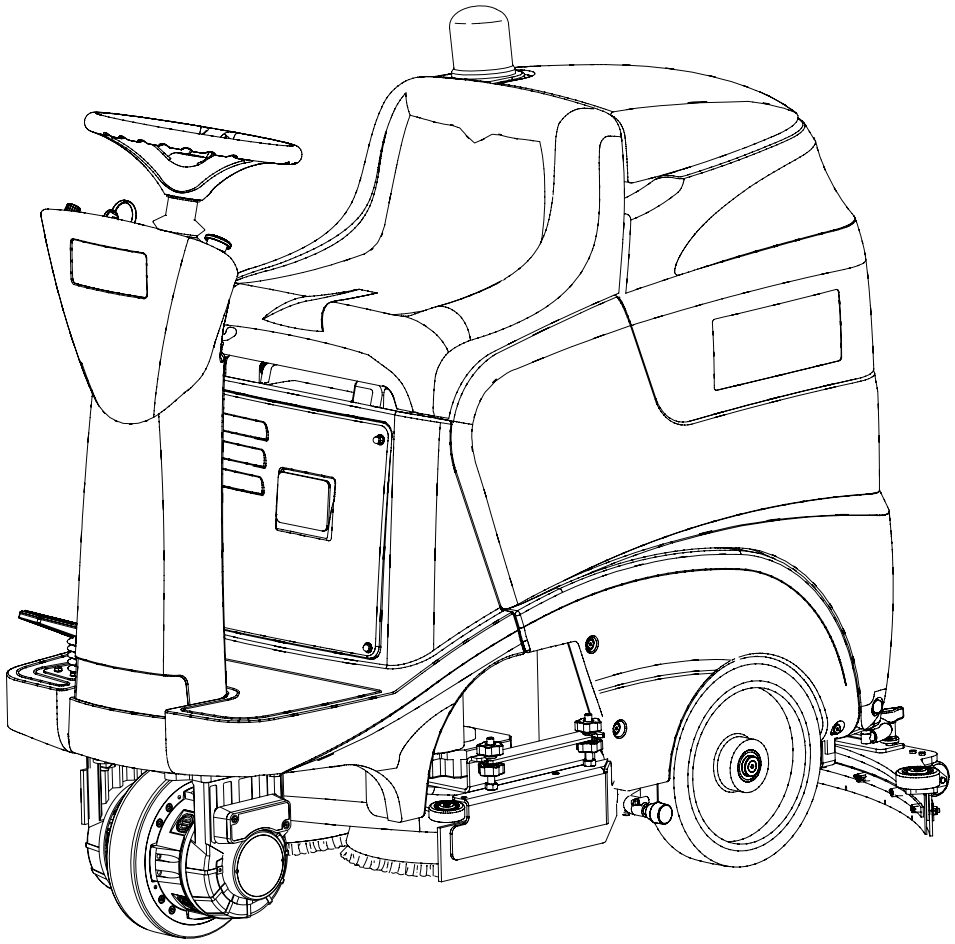
Razor Blade 26D/28D/28C



SERVICE MANUAL

KENT

Simple. Clean.

909 6510 000(2) 2007-07

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TABLE OF CONTENTS

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.

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 doors and cases are closed.***
- ***The ignition key is removed.***
- ***The machine is securely fastened to the means of transport.***

OTHER AVAILABLE MANUALS

The following manuals are available at Kent Literature Service Department:
- RAZOR BLADE Instructions for Use Manual 26D-28D-28C – 909 6457 000
- RAZOR BLADE Spare Parts List 26D-28D-28C – 909 6458 000

GENERAL INFORMATION

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 or a remark 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 SAFETY PRECAUTIONS

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

DANGER!

- ***Before performing any maintenance/repair procedure drive the machine on a level ground, remove the ignition key and disconnect the battery.***
- ***This machine must be used by properly trained and authorized personnel only.***
- ***Keep the battery away from sparks, flames and incandescent material. During the normal operation, explosive gases are released.***
- ***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 vapors.***
- ***Battery charging produces highly explosive hydrogen gas. Keep the tanks open during battery charging and perform this procedure in well-ventilated areas and away from naked flames.***

GENERAL SAFETY PRECAUTIONS (Continues)

WARNING!

- ***Carefully read all the instructions before carrying out any maintenance/repair procedure.***
- ***Before using the battery charger, ensure that frequency and voltage values, indicated on the machine serial number plate, match the electrical mains voltage.***
- ***To reduce the risk of fire, electric shock, or injury, do not leave the machine unattended when it is plugged in. Unplug the machine from the electrical mains when not in use and before performing maintenance procedures.***
- ***To avoid electric shock, do not expose to rain. Store the machine indoors.***
- ***Do not allow to be used as a toy. Close attention is necessary when used near children.***
- ***Use only as described in this Manual. Use only Kent's recommended accessories.***
- ***Do not use with damaged power supply cable or plug. If the machine is not working as it should, has been damaged, left outdoors or dropped into water, return it to the Service Center.***
- ***Do not pull or carry the machine by the supply cable; never use the power supply cable as a handle. Do not close a door on the supply cable, or pull the supply cable around sharp edges or corners. Do not run the machine on the supply cable.***
- ***Keep the power supply cable away from heated surfaces.***
- ***Take all necessary precautions to prevent hair, jewelry and loose clothes from being caught by the machine moving parts.***
- ***Do not smoke while charging the batteries.***
- ***Do not leave the machine unattended with the ignition key inserted and without being sure that it cannot move independently.***
- ***Do not use the machine on slopes with a gradient exceeding the specifications.***
- ***Do not wash the machine with direct or pressurised water jets, or with corrosive substances.***
- ***Do not use the machine in particularly dusty areas.***
- ***While using this machine, take care not to cause damage to people or objects.***
- ***The machine storage temperature must be between +32°F and +104°F (0°C and +40°C).***
- ***The machine operating temperature must be between +32°F and +104°F (0°C and +40°C).***
- ***The humidity must be between 30% and 95%.***
- ***Always protect the machine against the sun, rain and bad weather, both under operation and inactivity condition.***
- ***Do not use the machine as a means of transport.***
- ***Do not use the machine on slopes with a gradient exceeding the specifications.***
- ***Do not allow the brushes to operate while the machine is stationary to avoid damaging the floor.***
- ***In case of fire, use a powder fire extinguisher, not a water one.***
- ***Do not bump into shelves or scaffoldings, particularly where there is a risk of falling objects.***
- ***Do not remove or modify the plates affixed to the machine.***
- ***If parts must be replaced, require ORIGINAL spare parts from a Dealer or Authorised Retailer.***
- ***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 Scrapping chapter in the User Manual).***
- ***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.***
- ***This machine cannot be used on roads or public streets.***
- ***Pay attention during machine transport 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.***

GENERAL INFORMATION

TECHNICAL DATA

GENERAL TECHNICAL DATA		
Description	**26D**	**28D - 28C**
Cleaning width	26.0 in (660 mm)	29.1 in (740 mm)
Squeegee width	32.7 in (830 mm)	33.9 in (860 mm)
Solution tank capacity	20 gal (75 liters)	
Recovery water tank capacity	20 gal (75 liters)	
Rear wheel diameter (on fixed axle)	11.8 in (300 mm)	
Front wheel specific pressure on the ground (*)	116 psi (0.8 N/mm^2)	
Rear wheel specific pressure on the ground (*)	145 psi (1.0 N/mm^2)	
Front steering, driving and braking wheel diameter	9.8 in (250 mm)	
Vacuum system motor power	0.68 hp (500 W)	
Drive system motor power	0.80 hp (600 W)	
Drive speed (variable)	0 to 3.7 mph (0 to 6 km/h)	
Gradeability	16%	
Sound pressure level at the operator's position (ISO 11201, ISO 4871) (LpA)	67.5 dB(A) ± 3 dB(A)	
Sound pressure level to the machine (ISO 3744, ISO 4871) (LwA)	83 dB(A)	
Vibration level at the operator's arms (ISO 5349-1) (**)	9.05 - 295.27 in/s^2 (0.23 – 7.5 m/s^2)	
Vibration level at the operator's body (ISO 2631-1) (**)	Less than 47.24 in/s^2 (1.2 m/s^2)	
Batteries	24 V battery box, 240 Ah/5 h (WET) 240 Ah C5	
	24 V battery box, 240 Ah/5 h (GEL) (optional) 240 Ah C5	
	4 6 V batteries, 180 Ah/5 h (WET) 180 Ah C5	
	4 6 V batteries, 180 Ah/5 h (GEL) (optional) 240 Ah C5	
Maximum battery compartment size	24 V battery box: 14.0 x 23.9 x 14.6 in (355 x 606 x 370 mm)	
	4 6 V batteries, with case: 20.8 x 15.0 x 11.8 in (530 x 380 x 300 mm)	
Vacuum system capacity	70.8 in H_2O (1,800 mm H_2O)	
Machine height	49.2 in (1,250 mm)	
Machine maximum length	57.0 in (1,450 mm)	
Machine width without squeegee	26.8 in (681.5 mm)	30.0 in (758 mm)

(*) Machine test have been performed under the following conditions:
- with operator [165.3 lb (75 kg)] if ride-on
- 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

(**) Under normal working conditions, on a level asphalt surface.

TECHNICAL DATA (Continues)

TECHNICAL DATA FOR MACHINES WITH BRUSH/PAD-HOLDER DECK		
Description	**26D**	**28D**
Brush diameter	13.0 in (330 mm)	14.5 in (370 mm)
Weight without batteries and with empty tanks	308 lb (140 kg)	
Maximum weight with batteries and full tanks	With 4 6 V batteries: 849 lb (385 kg)	
	With 24 V battery box: 1,036 lb (470 kg)	
Brush/pad-holder motor power	0.54 hp (400 W)	
Brush/pad-holder rotation speed	190 rpm	
Brush/pad-holder pressure with extra-pressure deactivated	66 lb (30 kg)	
Brush/pad-holder pressure with extra-pressure activated	110 lb (50 kg)	

TECHNICAL DATA FOR MACHINES WITH CYLINDRICAL BRUSH DECK	
Description	**28C**
Cylindrical brush size (diameter x length)	5.7 x 27.1 in (145 x 690 mm)
Weight without batteries and with empty tanks	308 lb (140 kg)
Maximum weight with batteries and full tanks	With 4 6 V batteries: 849 lb (385 kg)
	With 24 V battery box: 1,036 lb (470 kg)
Cylindrical brush motor power	0.81 hp (600 W)
Cylindrical brush rotation speed	748 rpm
Cylindrical brush pressure	73.48 lb (33.4 kg)

MAINTENANCE

MAINTENANCE

SCHEDULED MAINTENANCE

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

WARNING!
See the GENERAL INFORMATION and SAFETY paragraphs.

The following table 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
Squeegee cleaning	■			
Brush cleaning	■			
Tank and vacuum grid with float cleaning	■			
Battery charging	■			
Squeegee blade check and replacement		■		
Side skirt check		■		
Solution filter cleaning		■		
WET battery fluid level check		■		
Screw and nut tightening check			(1)	
Check and adjustment of driving belts between motors and cylindrical brushes			■	
Squeegee cable sliding shoe lubrication			■	
Electromagnetic parking brake efficiency check			■	
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				■

(1) And after the first 8 working hours.

MACHINE NOMENCLATURE

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

1. Control panel
2. Emergency push-button
3. Horn
4. Brush/pad-holder deck and cylindrical brush deck lifting/ lowering switch
5. Brush/pad-holder extra-pressure switch. With the cylindrical brush deck installed, this switch is disabled.
6. Squeegee lifting/lowering and vacuum system on/off switch
7. Battery charge indicator

7a. Charged battery warning light (green)
7b. Semi-discharged battery warning light (yellow)
7c. Discharged battery warning light (red)

8. Hour counter and solution level display:
   - When the machine is started, it displays for a few seconds the number of working hours which have been performed.
   - While using the machine, it displays the solution level in the tank (measured in percentage terms, compared with the full tank). When the level is below 20%, the display starts blinking. The display could indicate “000 %” even if the tank is not completely empty, thus allowing to complete the cleaning cycle; in any case, it is recommended to check the actual solution flow supplied to the brushes.

10. Solution flow control switches

10a. Flow increase switch
10b. Flow decrease switch

11. Maximum speed adjuster (enabled only when the brushes are operating)
12. Ignition key
13. Steering wheel tilting control lever
14. Steering wheel
15. Forward/reverse gear pedal
16. Brush/pad-holder deck
17. Cylindrical brush deck
18. Side skirts
19. Battery charger cable housing
20. Battery charger cable
21. Solution filter
22. Recovery water drain hose
23. Squeegee vacuum hose
24. Squeegee
25. Bumper wheels
26. Squeegee support wheels
27. Squeegee mounting handwheels
28. Squeegee balance adjusting handwheel
29. Front squeegee blade
30. Rear squeegee blade
31. Squeegee rear blade fastening hook
32. Solution tank
33. Recovery water tank
34. Recovery water tank cover
35. Flashing light (optional)
36. Solution tap
37. Seat
38. Battery charger
39. Electromagnetic parking brake
40. Front steering, driving and braking wheel

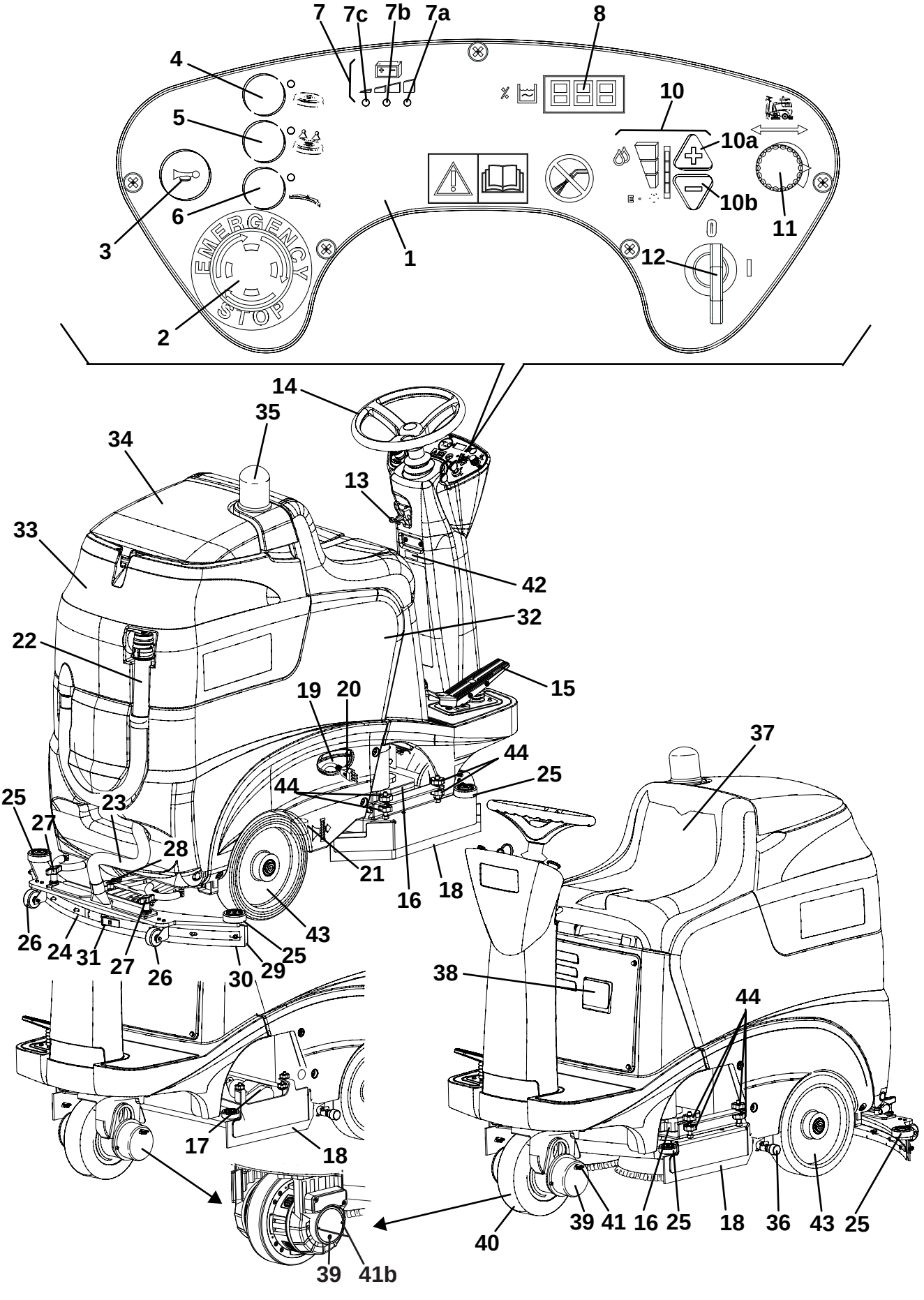
41a. Electromagnetic brake unlock handwheel (*)
41b. Electromagnetic brake unlock handwheel (**)

42. Serial number plate/technical data
43. Rear wheels
44. Side skirt height adjustment knobs
45. Recovery water tank cover (open)
46. Recovery water tank cover gasket
47. Recovery water vacuum duct
48. Vacuum grid with automatic shut-off float
49. Float
50. Grid fasteners
51. Solution tank filler neck
56. Solution tank cover
57. Cover support rod
58. Recovery water tank
59. Solution tank
60. Tank assembly (open)
61. Batteries
62. Battery case
63. Battery connector
64. Battery caps
65. Battery connection diagrams
69. Brush/pad-holder deck
70. Brush/pad-holder motors
71. Brush/pad-holder deck or cylindrical brush deck connector
72. Solution hose
73. Deck mounting knob
74. Deck fastening cotter pins
75. Deck support
76. Brush
77. Pad-holder
78. Pad
79. Cylindrical brush deck connector
80. Connector protection cover
81. Brush/pad-holder deck side skirt
82. Cylindrical brush deck
83. Cylindrical brush motors
84. Cylindrical brush deck side skirt
85. Skirt upper mounting knob
86. Skirt lower mounting knob
87. Cylindrical brush
88. Cylindrical brush lids
89. Lid mounting knobs
90. Cylindrical brush debris container
91. Debris container handle
92. Electrical component cover
93. Cover mounting nuts
94. Battery charger
95. Battery type selector (“WET” or “GEL”)
96. Drive system electronic board protection fuse (F2) (60 A)
97. Low power circuit protection fuse (F3) (5 A)
98. Function electronic board protection fuse (F1) (100 A)
99. Warning LED
100. Electrical component panel
101. Red LED (upper)
102. Green LED
103. Red LED (lower)

(*) Machines up to January 2007
(**) Machines after January 2007

MAINTENANCE

MACHINE NOMENCLATURE (Continues)



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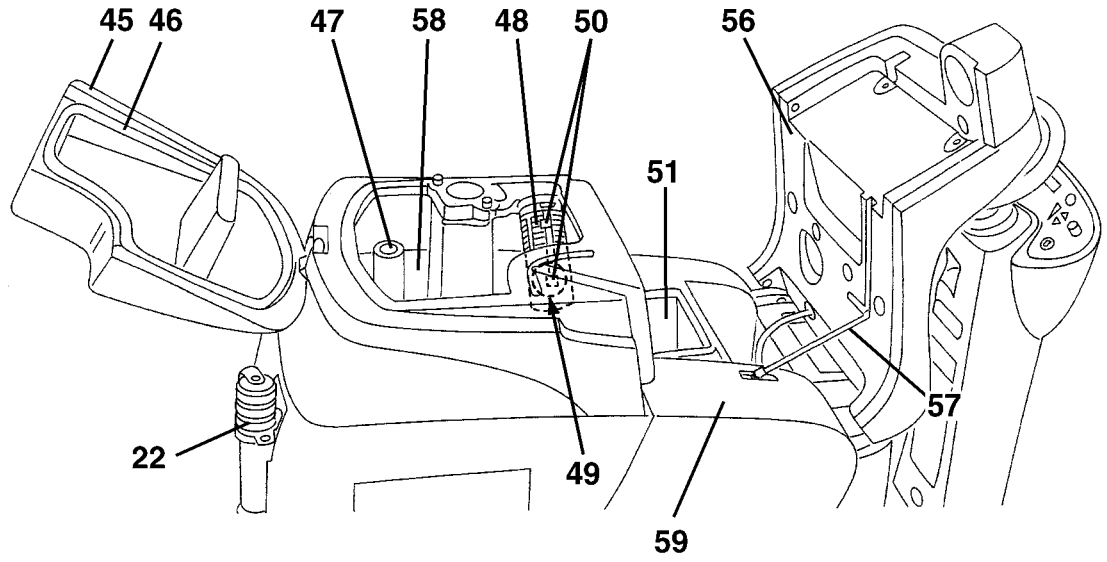
MACHINE NOMENCLATURE (Continues)



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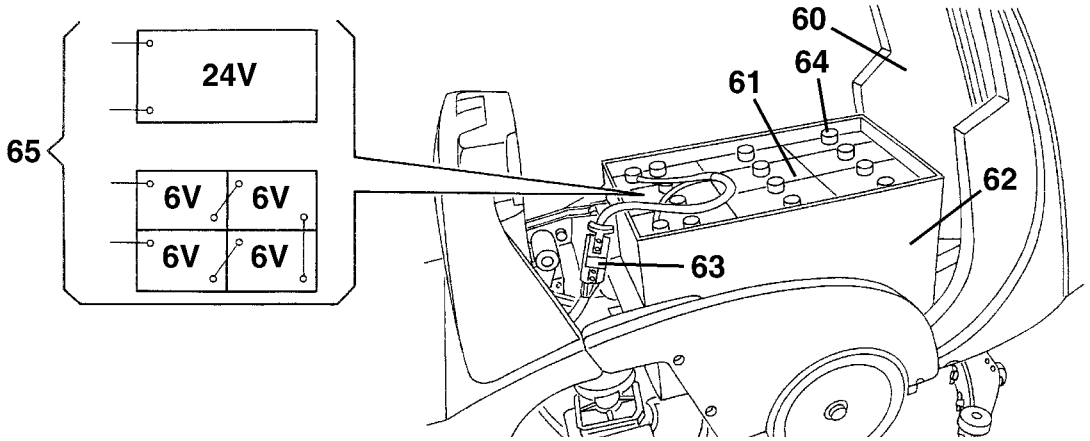

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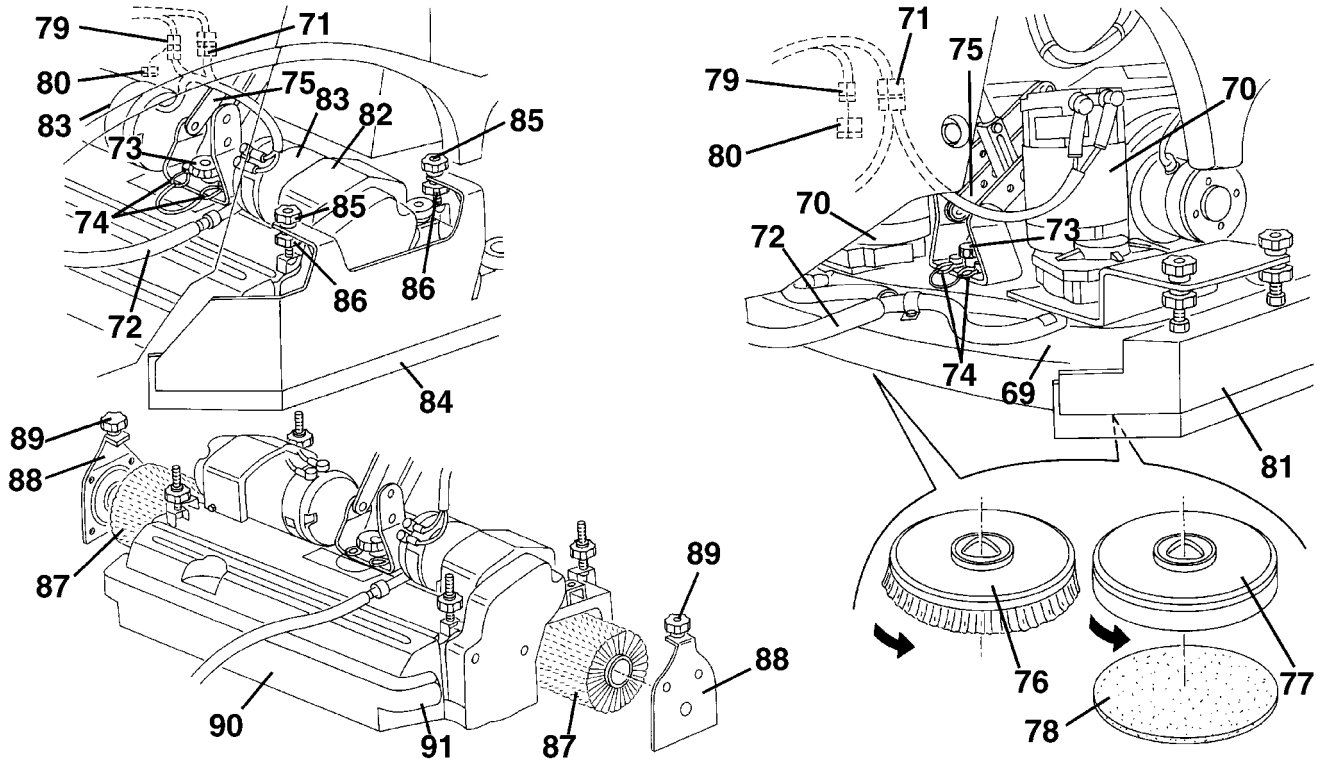

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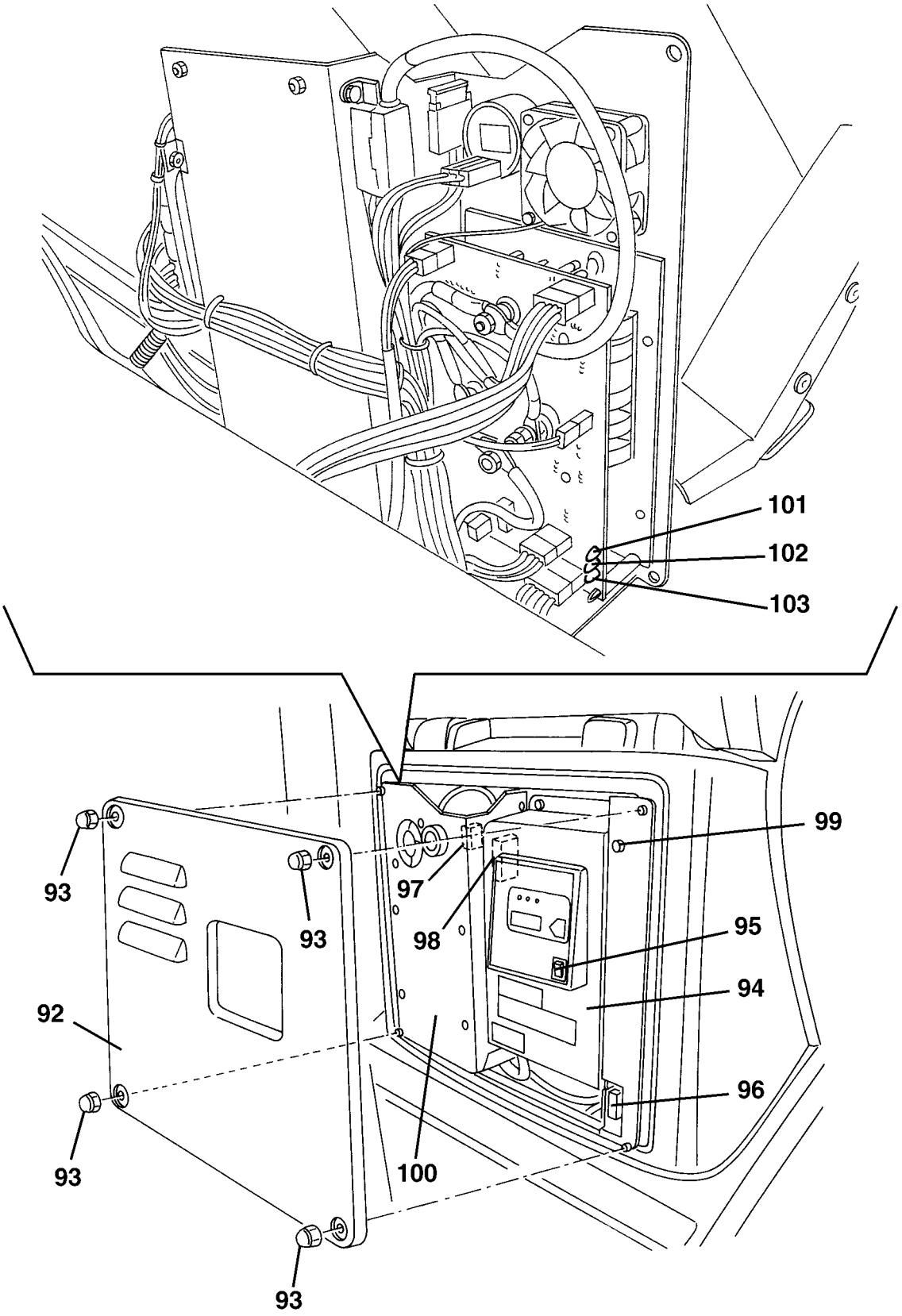
MAINTENANCE

MACHINE NOMENCLATURE (Continues)



S301619

DETERGENT SUPPLY SYSTEM

SOLUTION TANK CLEANING

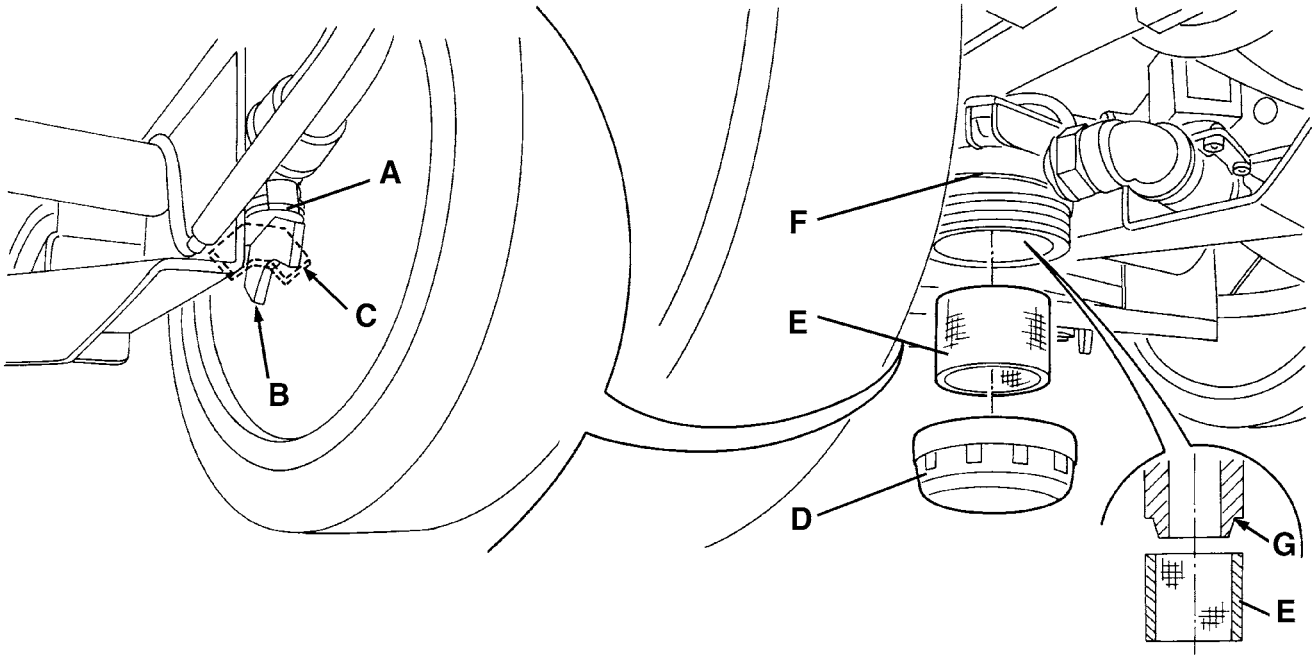
1. Drive the machine to the appointed disposal and washing area.
2. Turn the ignition key (12) to "0".
3. Empty the solution tank (59) with the tap (36).
4. Start the machine (as shown in the User Manual) and keep it running until the solution tank is completely empty.
5. Open the cover (56) and install the support rod (57).
6. Clean and wash with clean water the cover (56), the tank (59) and the filler (51).
7. Drain the water in the tank with the tap (36).
8. Start the machine (as shown in the User Manual) and keep it running until the solution tank is completely empty.
9. Remove the support rod (57) and close the cover (56).
10. Clean the solution filter (see the following procedure).

SOLUTION FILTER CLEANING

1. Drive the machine on a level floor.
2. Turn the ignition key (12) to "0".
3. Close the solution tap (A) under the machine, behind the right rear wheel. The tap (A) is closed when it is in the position (B) and it is open when it is in the position (C).
4. Remove the transparent cover (D), then remove the filter strainer (E) under the machine, in front of the right rear wheel. 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).



S301320

DETERGENT SUPPLY SYSTEM

SOLUTION SYSTEM SOLENOID VALVE/TAP/FILTER DISASSEMBLY/ASSEMBLY

Disassembly

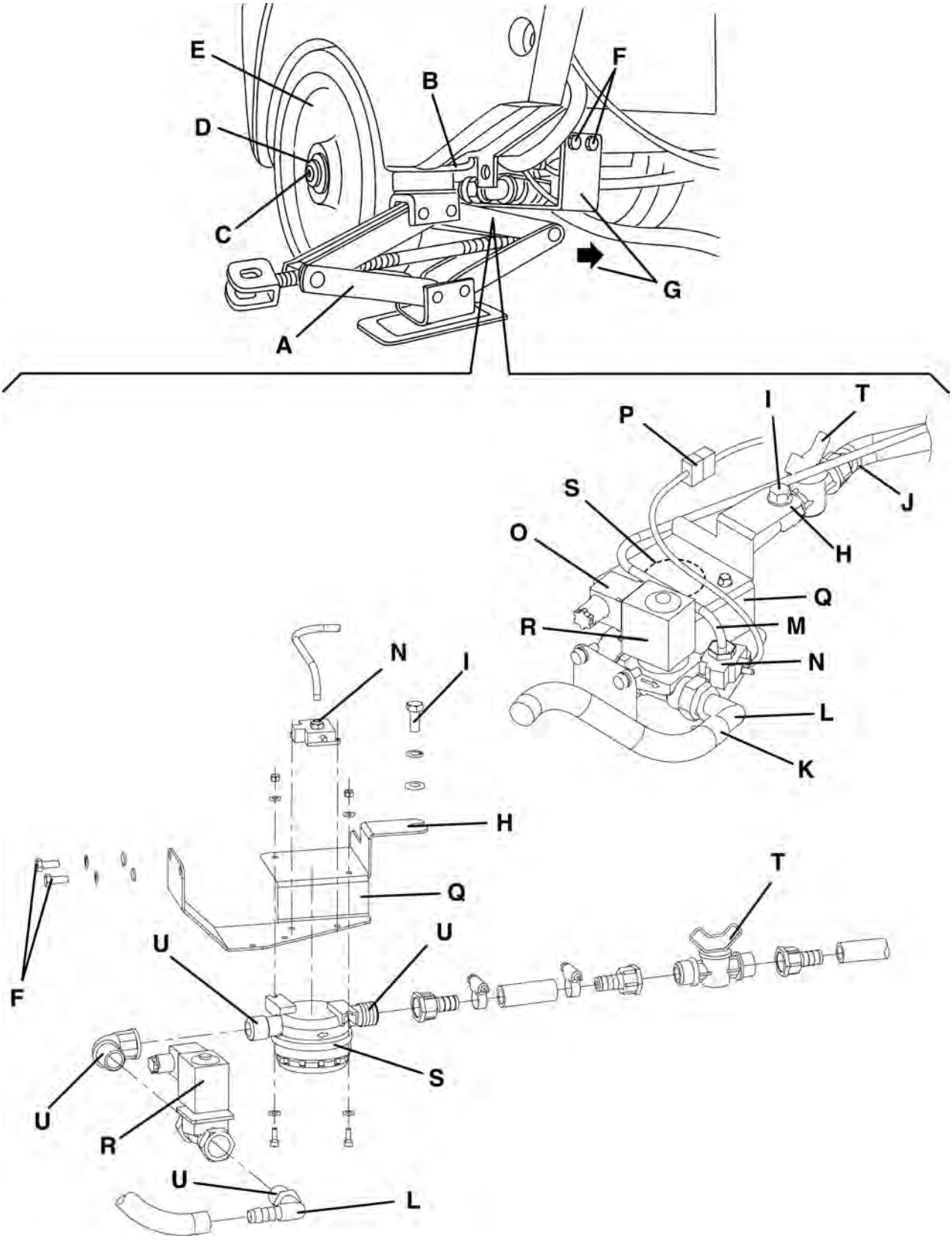
1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Place the machine on a hoisting system (if available), then lift it. Otherwise, drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Place a suitable jack (A) under the machine right side bracket (B).
6. Lift the machine for 0.78 in (2 cm) with the jack.
7. Remove the screw (C) and recover the washer (D).
8. Remove the right wheel (E).
9. Remove the screws (F).
10. Move the support (G) forward, by disengaging the fastener (H) from the screw (I).
11. Disconnect the hoses (J) and (K) from their fittings (L).
12. Disconnect the hose (M) from the pressure switch (N) by pulling it.
13. Disconnect the connectors (O) of the solenoid valve (P) and of the pressure switch.
14. Recover the whole assembly (G) and, at the workbench, remove the solenoid valve (R), or the filter assembly (S), or the tap (T), by disconnecting/unscrewing the connecting/fastening components.

Assembly

15. Assemble the components in the reverse order of disassembly, and note the following:
    - Before screwing the threaded fittings (U) clean them, then apply Teflon tape, according to the screwing direction;
    - when assembling the solenoid valve (R), the stamped arrow must be tuned in the direction of the solution flow.

DETERGENT SUPPLY SYSTEM

SOLUTION SYSTEM SOLENOID VALVE/TAP/FILTER DISASSEMBLY/ASSEMBLY (Continues)



S301321

DETERGENT SUPPLY SYSTEM

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 closed/semi-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

BRUSH/CYLINDRICAL BRUSH CLEANING

CAUTION!
It is advisable to wear protective gloves when cleaning the brushes because there may be sharp debris.

1. Remove the brushes from the machine, as shown in the User Manual.
2. Clean and wash the brushes with water and detergent.
3. Check the brush bristles for integrity and wear; if necessary, replace the brushes.

SIDE SKIRT CHECK (AND REPLACEMENT)

Check

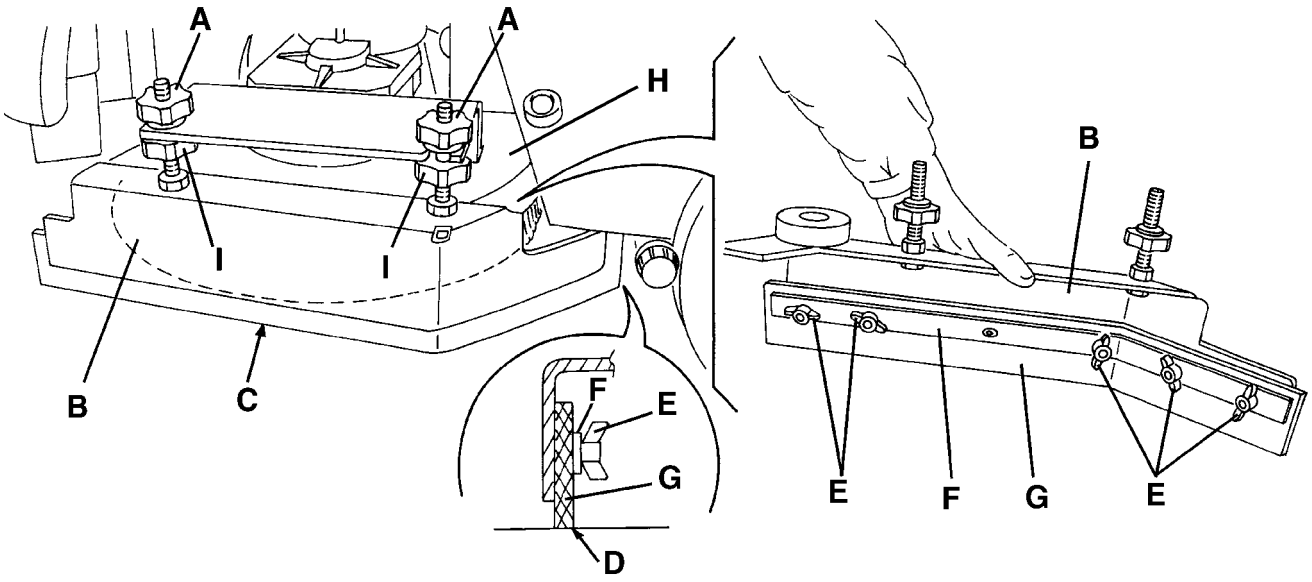
1. Drive the machine on a level floor.
2. Turn the ignition key (12) to "0".
3. On both sides of the machine, unscrew the knobs (A) and remove the side skirt assembly (B).
4. Wash and clean the side skirts.
5. Check that the side skirt lower edge (C):
   - lays down on the same level, along all its length;
   - is integral and free from cuts and lacerations;
   - has the inner corner (D) that is not worn;
     Otherwise overturn or replace the skirts according to the following procedure.

Overturning or replacement

6. Remove the wing nuts (E), then remove the retaining strip (F).
7. Remove the skirt blade (G) and, if possible, overturn the blade to replace the lower inner corner (D) with an integral one. If the other three corners are worn too, replace the blade.

Assembly and height adjustment

8. Assemble the blades (G) and skirt (B) in the reverse order of disassembly.
9. Start the machine (according to the procedure shown in the User Manual) and lower the deck (H), then check that the side skirt blades (G):
   - slightly touch the floor;
   - the side blades (G) collect the solution;
     otherwise stop the machine and adjust the skirt height with the knobs (A) and (I).
     After adjusting, tighten the knobs (A) and (I).



S301325

BRUSHING SYSTEM

BRUSH/PAD-HOLDER DECK OR CYLINDRICAL BRUSH DECK DISASSEMBLY/ASSEMBLY

NOTE
The machine can be equipped with either the brush/pad-holder deck (69) or the cylindrical brush deck (82), according to the following procedure.
To assemble/disassemble the deck it is not necessary to remove the brushes/pad-holders.

Disassembly

1. Drive the machine on a level floor.
2. Lower the deck (69) or (82) by pressing the switch (4).
3. Turn the ignition key (12) to "0".
4. (For brush/pad-holder deck) Disconnect the connector (71). (For cylindrical brush deck) Disconnect the connectors (71) and (79), then install the protection cover (80) on the connector (79).
5. Disconnect the solution hose (72).
6. Remove the two split pins (74).
7. Unscrew the knob (73) and remove the brush/pad-holder deck (69), or the cylindrical brush deck (82).

Assembly

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

BRUSH MOTOR ELECTRICAL INPUT CHECK

WARNING!
This procedure must be performed by qualified personnel only.

1. Drive the machine on a level floor.
2. Remove the brush (76) or (87), or the pad-holder (77) as shown in the User Manual.
3. Place two wooden shims (A) under the brush/pad-holder deck sides (B), or the cylindrical brush deck (C), as shown in the figure. The wooden shim height must be 1.5 in (40 mm).

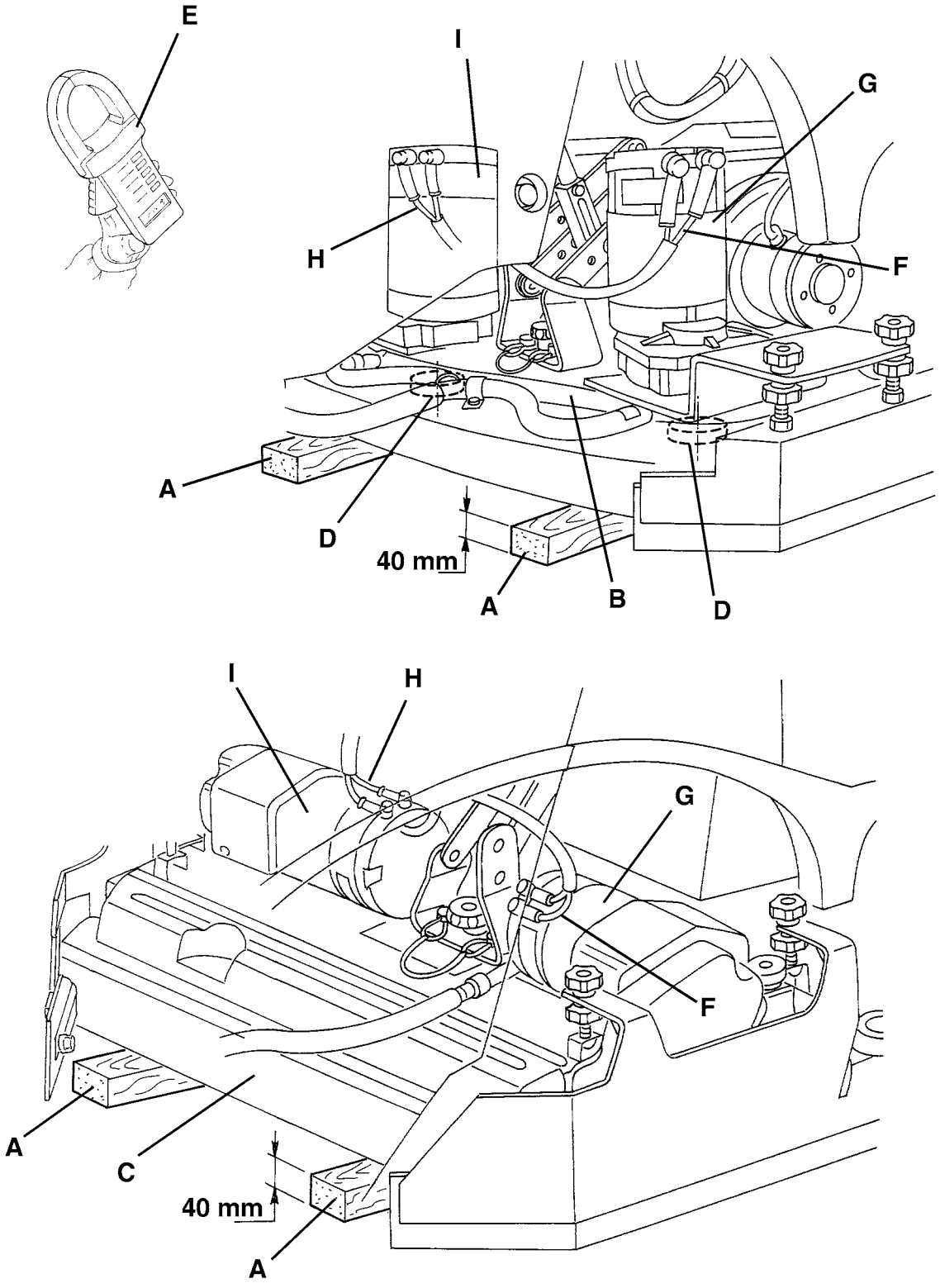
WARNING!
Keep the wooden shims (A) at a proper distance from the brush hubs (D).

4. Apply the amperometric pliers (E) on one cable (F) of the right motor (G), or on one cable (H) of the left motor (I).
5. Turn the ignition key (12) to "I".
6. Press the switch (4) to lower the deck (B) or (C) on the wooden shims (A). When lowering the deck, the brush motors (G) and (I) start running, then check that the electrical input of the right (G) or left motor (I) is as follows:
   - 3 to 5 A at 24 V, for the brush/pad-holder deck motors;
   - 5 to 6 A, at 24 V, for the cylindrical brush deck motors.

   Lift the deck (B) or (C) by pressing the switch (4). Turn the ignition key (12) to "0" and remove the amperometric pliers (E).
   If the electrical input is higher, perform the following procedures to detect and correct the abnormal input:
   - Check if there is dust or dirt (ropes, cables, etc.) on the brush/pad-holder hubs.
   - Check the motor carbon brushes (see the procedure in the relevant paragraph).
   - If necessary, 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).
7. Perform steps 2 and 3 in the reverse order.

BRUSH MOTOR ELECTRICAL INPUT CHECK (Continues)

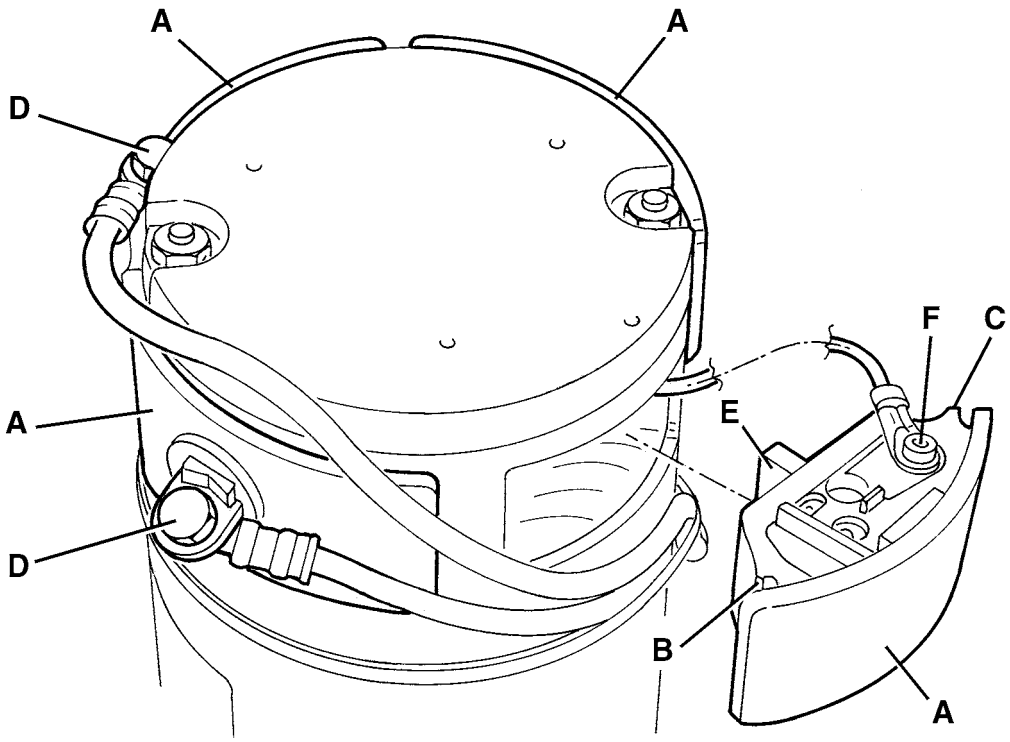


S301326

BRUSHING SYSTEM

BRUSH MOTOR CARBON BRUSH CHECK AND REPLACEMENT

1. Remove the brush/pad-holder deck (see the procedure in the relevant paragraph).
2. (For cylindrical brush deck only) Remove the brush motor (see the procedure in the relevant paragraph).
3. Remove dust and dirt from the motor carbon brush support area (A).
4. Disengage the fasteners (B) and (C), then remove the four carbon brush supports (A). If necessary, disconnect the electrical connections (D).
5. Check the carbon brushes (E) 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. The minimum length of the carbon brushes (E) is 0.59 in (15 mm). When this length is reached, the carbon brushes must replaced.
6. If necessary, disconnect the connections (F) and remove the carbon brushes with their supports (A) and replace them. Replace the carbon brushes as an assembly.
7. 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.



S301327

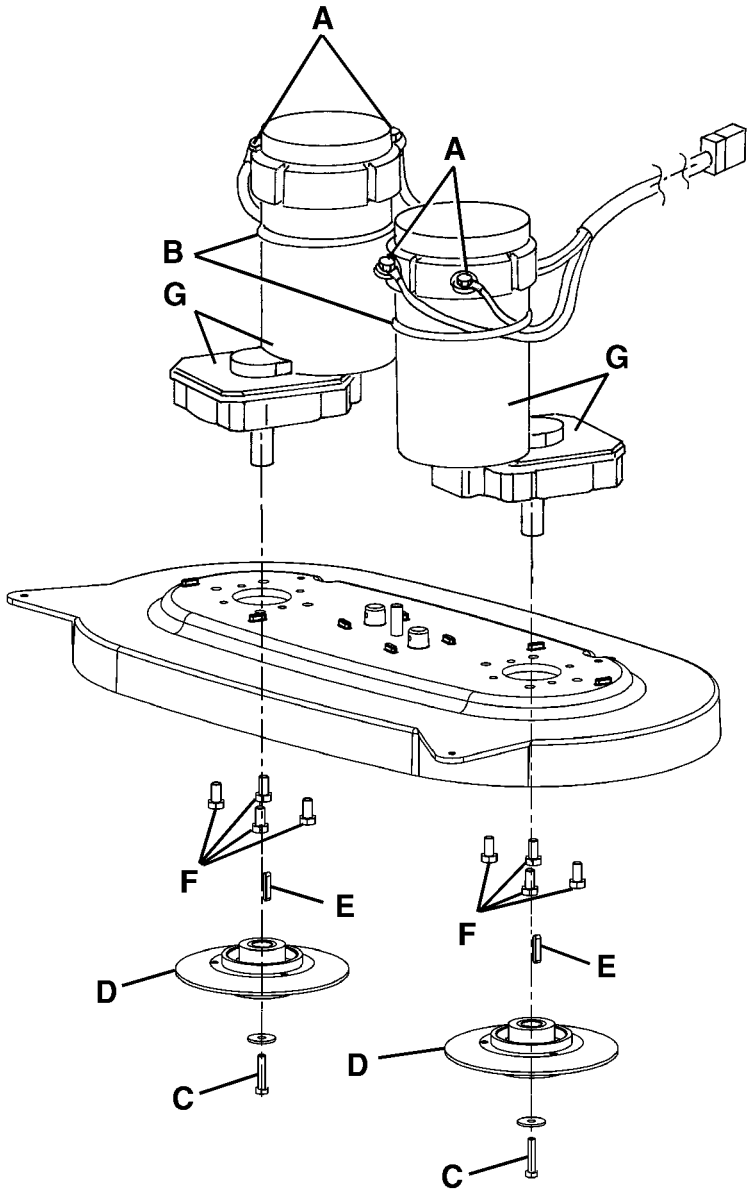
BRUSH/PAD-HOLDER MOTOR DISASSEMBLY/ASSEMBLY

Disassembly

1. Remove the brushes/pad-holders, as shown in the User Manual.
2. Remove the brush/pad-holder deck (see the procedure in the relevant paragraph).
3. At the workbench, disconnect the motor electrical connections (A).
4. Cut the motor clamp (B).
5. Remove the motor screw (C), then remove the relevant hub assembly (D). Recover the key (E).
6. Remove the four motor screws (F).
7. Remove the reduction unit (G).

Assembly

8. Assemble the components in the reverse order of disassembly, and note the following:
   - Place the reduction units (G) as shown in the figure.



S301328

BRUSHING SYSTEM

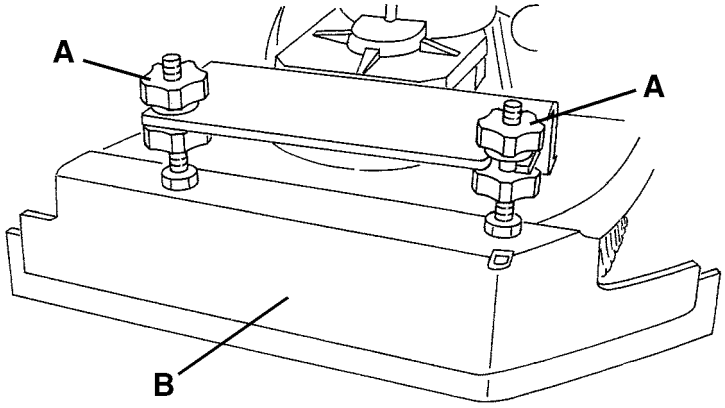
CYLINDRICAL BRUSH MOTOR DISASSEMBLY/ASSEMBLY

Disassembly

1. Remove the deck (see the procedure in the relevant paragraph).
2. Unscrew the knobs (A) and remove the side skirt assembly (B) on the side of the machine where the motor must be removed.
3. Remove the screw (C), then remove the cover (D).
4. Loosen the nuts (E) and remove the cover (F).
5. Loosen the nut (I) and move the pulley (J) to loosen the belt (K).
6. Remove the belt (K) from the brush motor pulley (L).
7. Disconnect the brush motor electrical connections (M).
8. Remove the screws (G), then remove the motor (H).

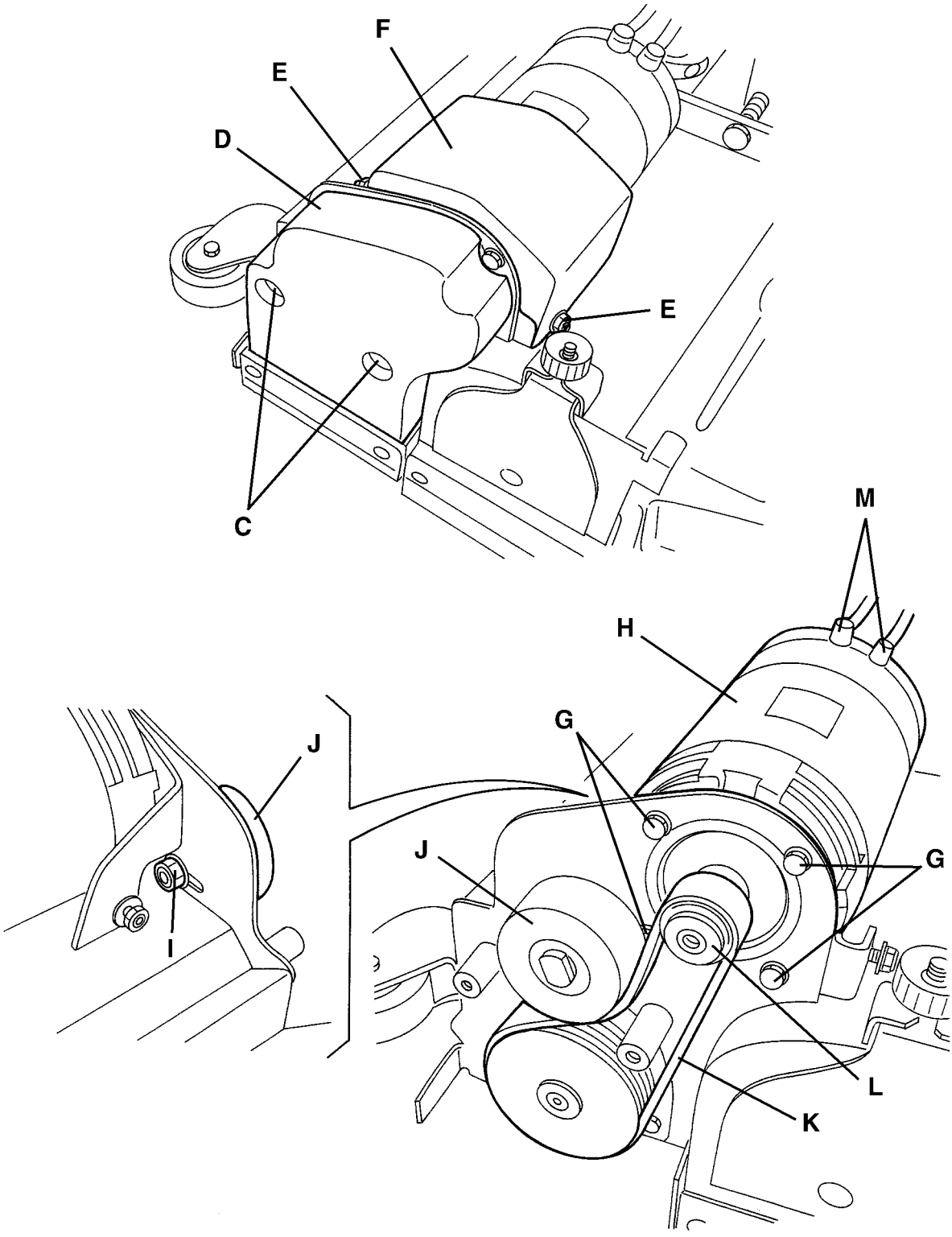
Assembly

9. Assemble the components in the reverse order of disassembly, and note the following:
   - The electrical connections (M) of the motor must be turned upwards;
   - Install the belt (K) and tension it properly (see the procedure in the relevant paragraph).



S301329

CYLINDRICAL BRUSH MOTOR DISASSEMBLY/ASSEMBLY (Continues)



S301330

BRUSHING SYSTEM

CHECK/REPLACEMENT/ADJUSTMENT OF DRIVING BELTS BETWEEN MOTORS AND CYLINDRICAL BRUSHES

Check

1. Drive the machine on a level floor.
2. Turn the ignition key (12) to "0".
3. On both sides of the machine, unscrew the knobs (A) and remove the side skirt assembly (B).
4. Remove the screw (C), then remove the covers (D).
5. Loosen the nuts (E) and remove the covers (F).
6. Visually inspect the belt (G) for integrity, cuts, tears or cracks and, if necessary, replace it according to the following procedure.
7. Check the belt tension (G) according to the following procedure.

Replacement

8. If the belt (G) must be replaced, loosen the nut (J) and move the pulley (K) to loosen the belt.
9. Tension the belt (G) according to the following procedure.

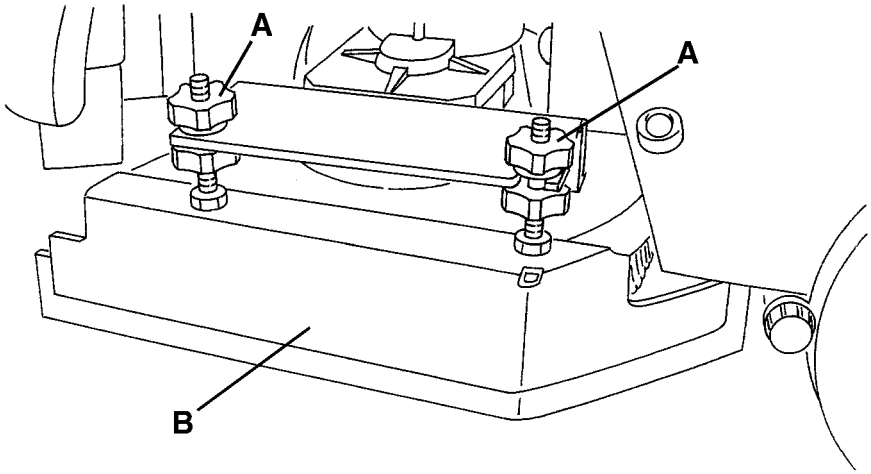
Belt tensioning

10. Check the tension of the belt (G) between motor and brush. The tension is correct:
    - when pressing the belt in its centre with a force of 22 lb (10 kg) (H), the belt bends for 0.35 in (9 mm).

    If necessary, tension the belt according to the following procedure:
11. Loosen the nut (J) and adjust the position of the pulley (K). When tensioning procedure has been performed, tighten the nut (J).
12. Repeat step 10.

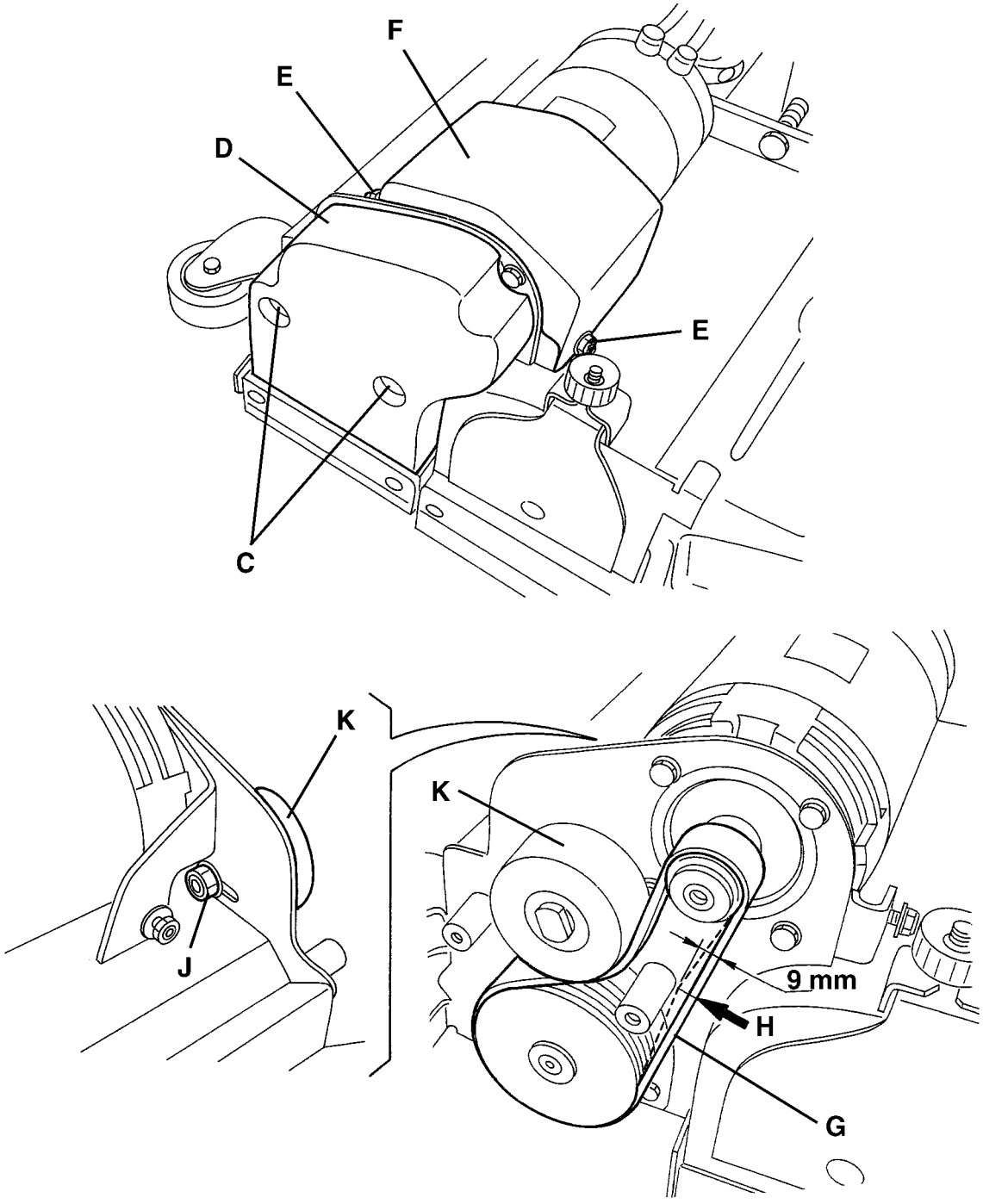
Reset

13. Perform steps 3 to 5 in the reverse order.



S301331

CHECK/REPLACEMENT/ADJUSTMENT OF DRIVING BELTS BETWEEN MOTORS AND CYLINDRICAL BRUSHES (Continues)



S301332

BRUSHING SYSTEM

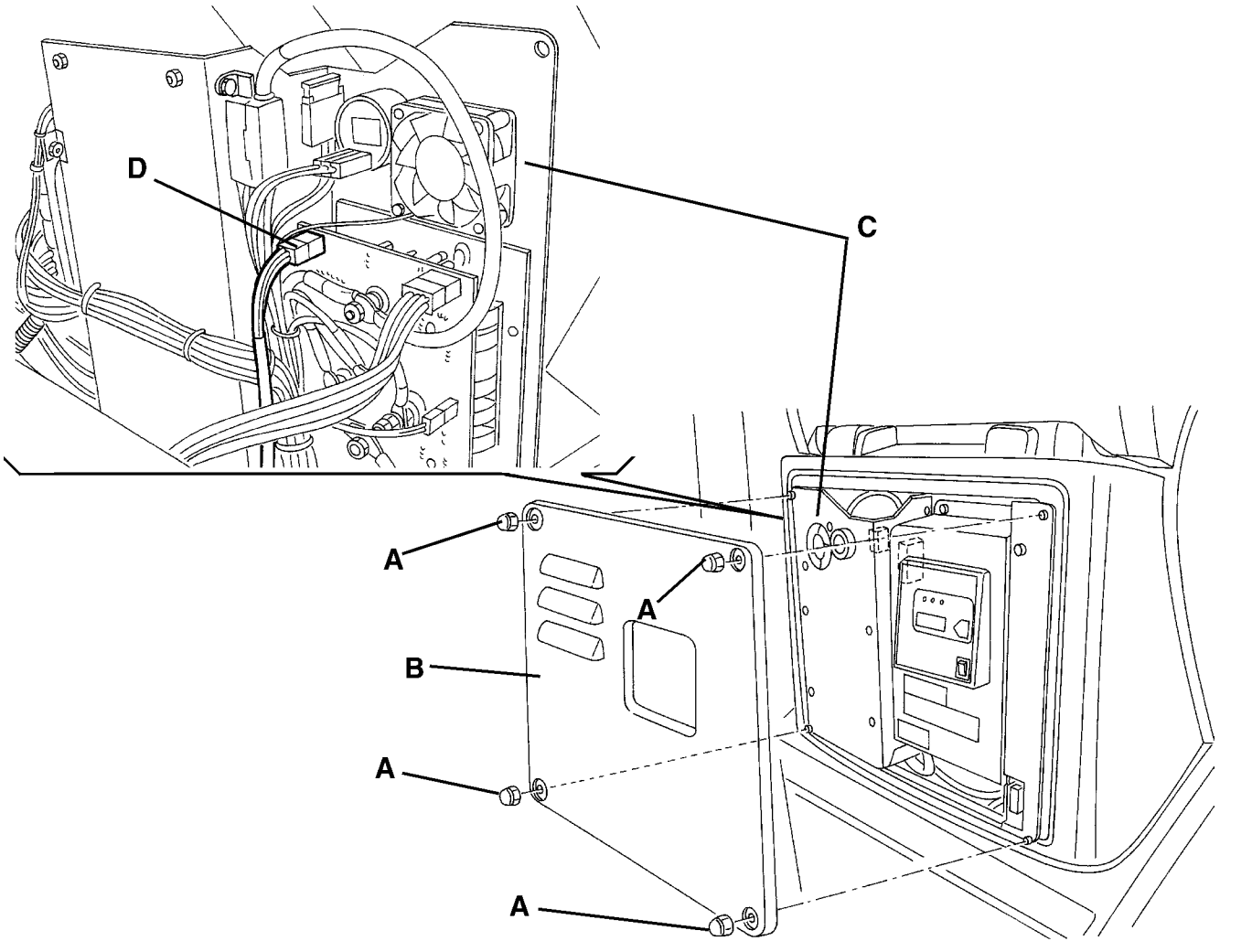
BRUSH DECK LIFTING/LOWERING ACTUATOR DISASSEMBLY/ASSEMBLY

Disassembly

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Carefully lift the tank assembly (60) to reach the batteries.
6. Disconnect the battery connector (63).
7. Remove the deck (see the procedure in the relevant paragraph).
8. Remove the nuts (A), then carefully remove the cover (B).
9. Carefully move the electrical component panel (C) and disconnect the deck lifting/lowering actuator connector (D).
10. Remove the lower mounting screw (E) of the actuator (F).
11. Remove the screw (G).
12. Remove the actuator (F).

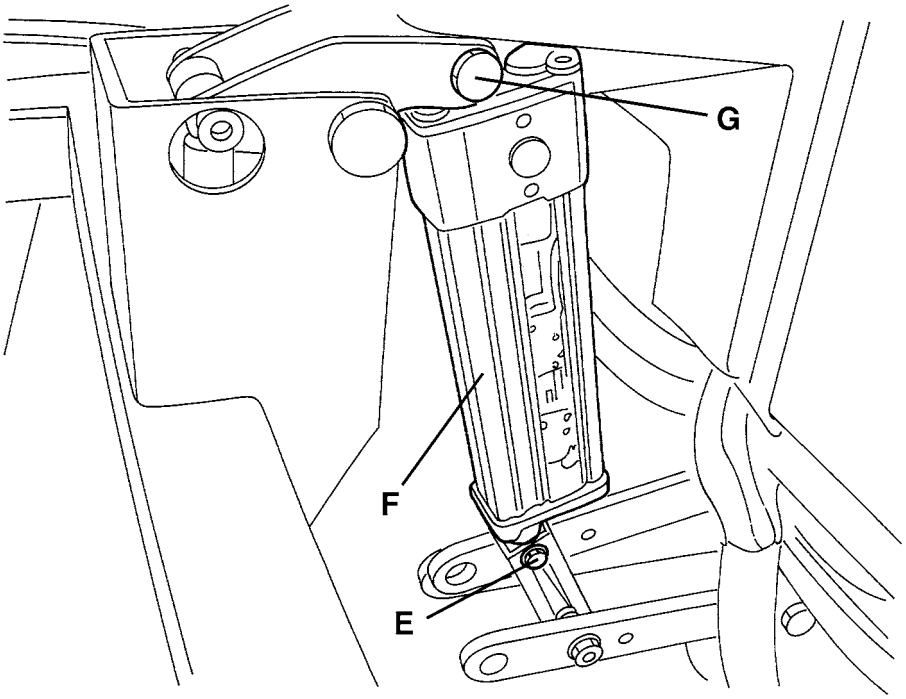
Assembly

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



S301333

BRUSH DECK LIFTING/LOWERING ACTUATOR DISASSEMBLY/ASSEMBLY (Continues)



S301334

BRUSHING SYSTEM

TROUBLESHOOTING

OPEN CIRCUIT

The fuse (F1) causes an open in the function electronic board supply circuit. This system prevents the circuits from being damaged in case of failure.
If there is an open in the fuse, the possible causes are:
1. The function electronic board wiring harness is damaged or shorted (check the power cables on the function electronic board and the relevant connections).
2. The function electronic board is damaged (replace).

ALL BRUSHES DO NOT TURN

Possible causes (see also the Electrical System chapter, function electronic board diagnosis):
1. The function electronic board wiring harness or the brush motors are damaged (repair).
2. The function electronic board is damaged (replace).
3. The brush motor is shorted (replace).

ONE BRUSH DO NOT TURN

Possible causes:
1. The motor carbon brushes are worn (replace).
2. There are bulky debris or cords around the brushes or between the brushes and their flanges (remove the brushes and the debris).
3. The motor is faulty (repair or replace).
4. The wiring harness is damaged (repair).

THE BRUSHES CANNOT BE LIFTED/LOWERED OR THE EXTRA PRESSURE FUNCTION CANNOT BE TURNED ON

Possible causes (see also the Electrical System chapter, function electronic board diagnosis):
1. The deck lifting/lowering actuator end-of-strokes are not properly adjusted (adjust).
2. The deck lifting/lowering actuator end-of-stroke microswitches are broken (replace the actuator).
3. The deck lifting/lowering actuator is broken (replace).
4. There is an open in the actuator wiring harness (check the connections according to the procedures shown in the Electrical System chapter, Troubleshooting paragraph).

THE MACHINE DOES NOT COLLECT THE SOLUTION COMPLETELY

Possible causes:
1. The side skirts are not properly adjusted (adjust/replace).

RECOVERY WATER SYSTEM

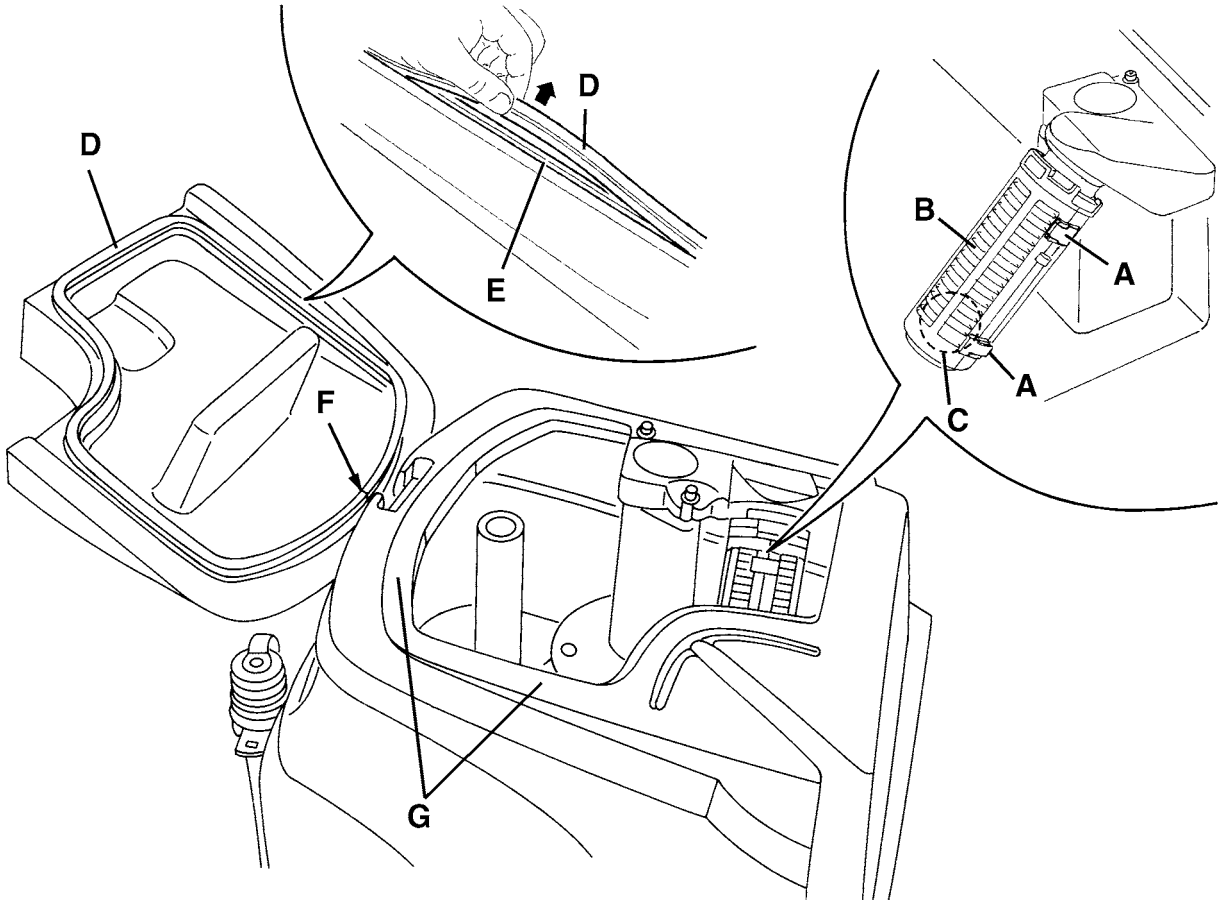
RECOVERY WATER TANK AND VACUUM GRID AUTOMATIC SHUT-OFF FLOAT CLEANING

1. Drive the machine to the appointed disposal area.
2. Turn the ignition key (12) to "0".
3. Lift the cover (45).
4. Wash with clean water the cover (45), the tank (58) and the vacuum grid (48) with automatic shut-off float. Drain the water in the tank through the hose (22).
5. If necessary, release the fasteners (A) and open the grid (B), recover the float (C), clean all components and then reinstall them.
6. Check the tank cover gasket (D) for integrity.

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

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

7. Check the bearing surface (D) of the gasket (G) for integrity and sealing capabilities.
8. Close the cover (H).



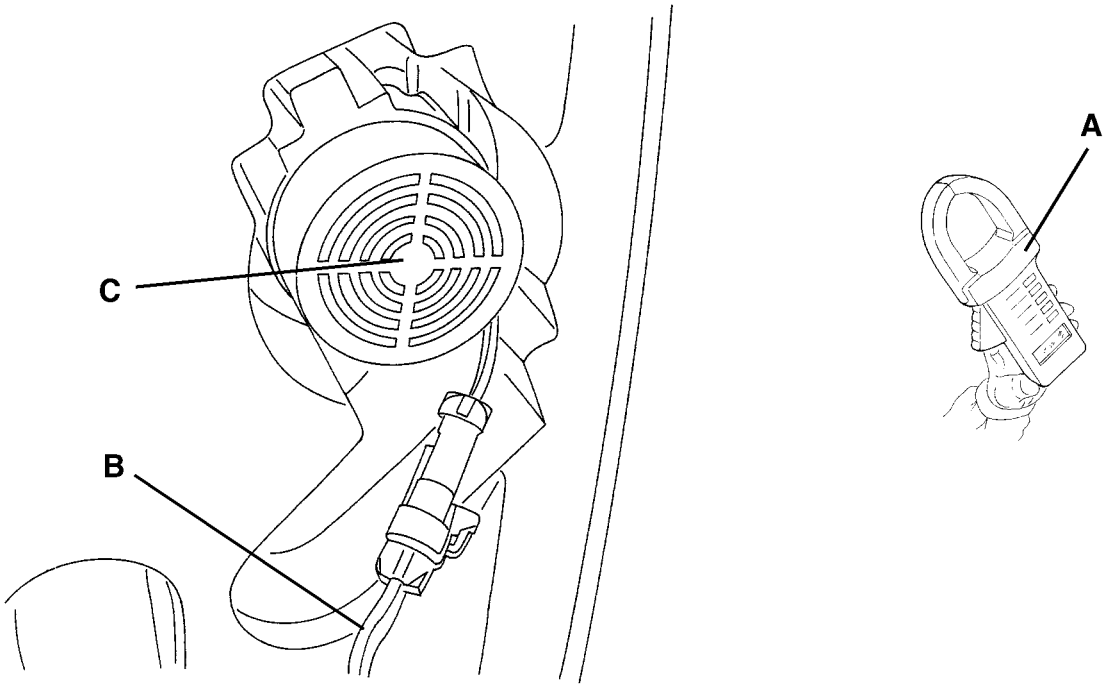
S301335

RECOVERY WATER SYSTEM

VACUUM SYSTEM MOTOR ELECTRICAL INPUT CHECK

WARNING!
This procedure must be performed by qualified personnel only.

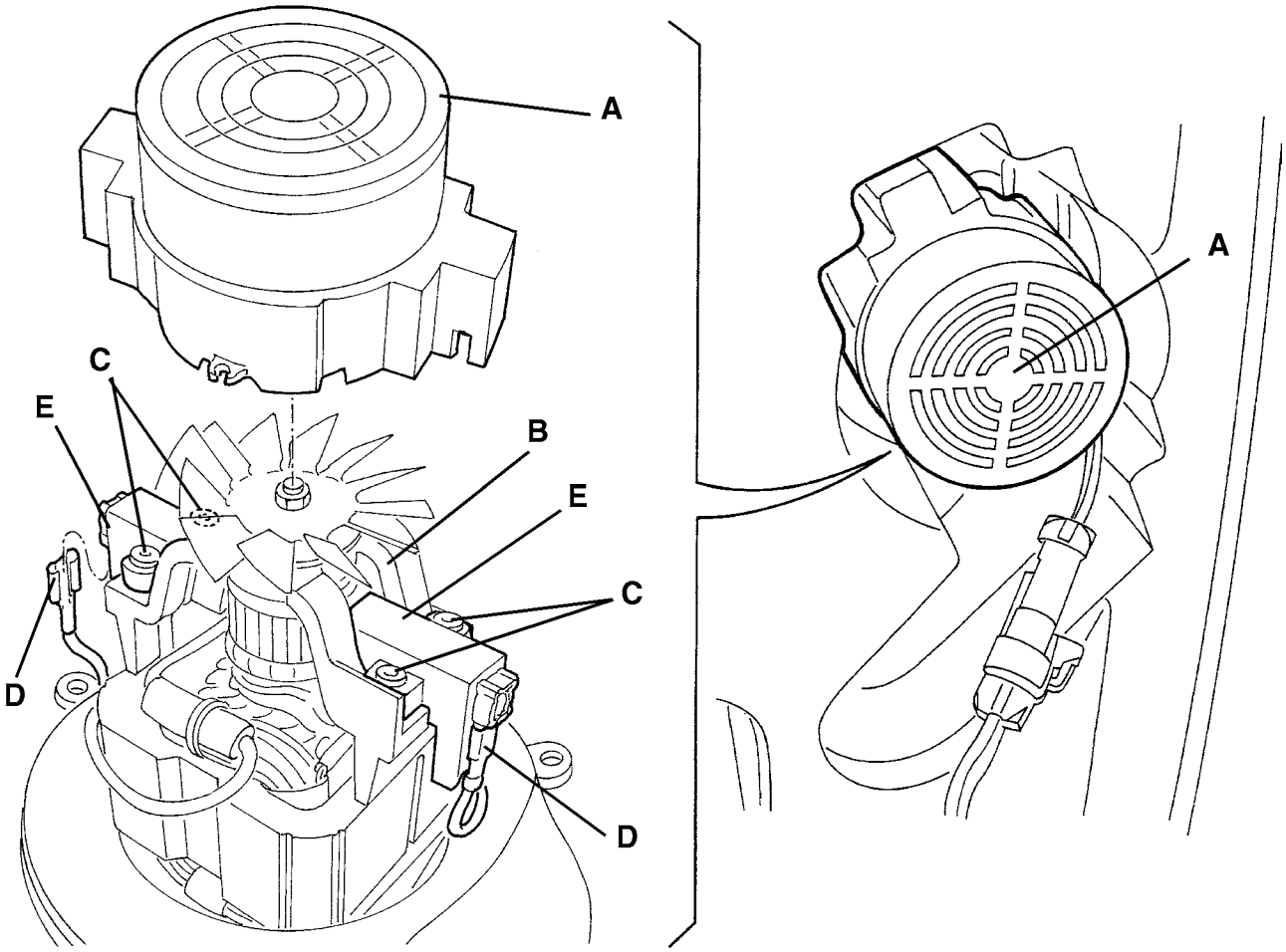
1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Carefully lift the tank assembly (60).
6. Apply the amperometric pliers (A) on one cable (B) of the vacuum system motor (C).
7. Turn the ignition key (12) to "I".
8. Turn on the vacuum system motor by pressing the switch (6) and check that the motor electrical input is 18 - 22 A at 24 V. Turn off the vacuum system motor by pressing the switch (6). Turn the ignition key (12) to "0" and remove the amperometric pliers (A). 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 its moving parts. 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. Carefully lower the tank assembly (60).



S301336

VACUUM SYSTEM MOTOR CARBON BRUSH CHECK AND REPLACEMENT

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Carefully lift the tank assembly (60) to reach the batteries.
6. Disconnect the battery connector (63).
7. Remove the cover (A) from the vacuum system motor (B).
8. Remove the screws (C).
9. Disconnect the electrical connections (D).
10. Remove the carbon brushes (E).
11. 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.
12. If necessary, replace the carbon brushes. Replace the carbon brushes as an assembly.
13. Assemble the components in the reverse order of disassembly.



S301337

RECOVERY WATER SYSTEM

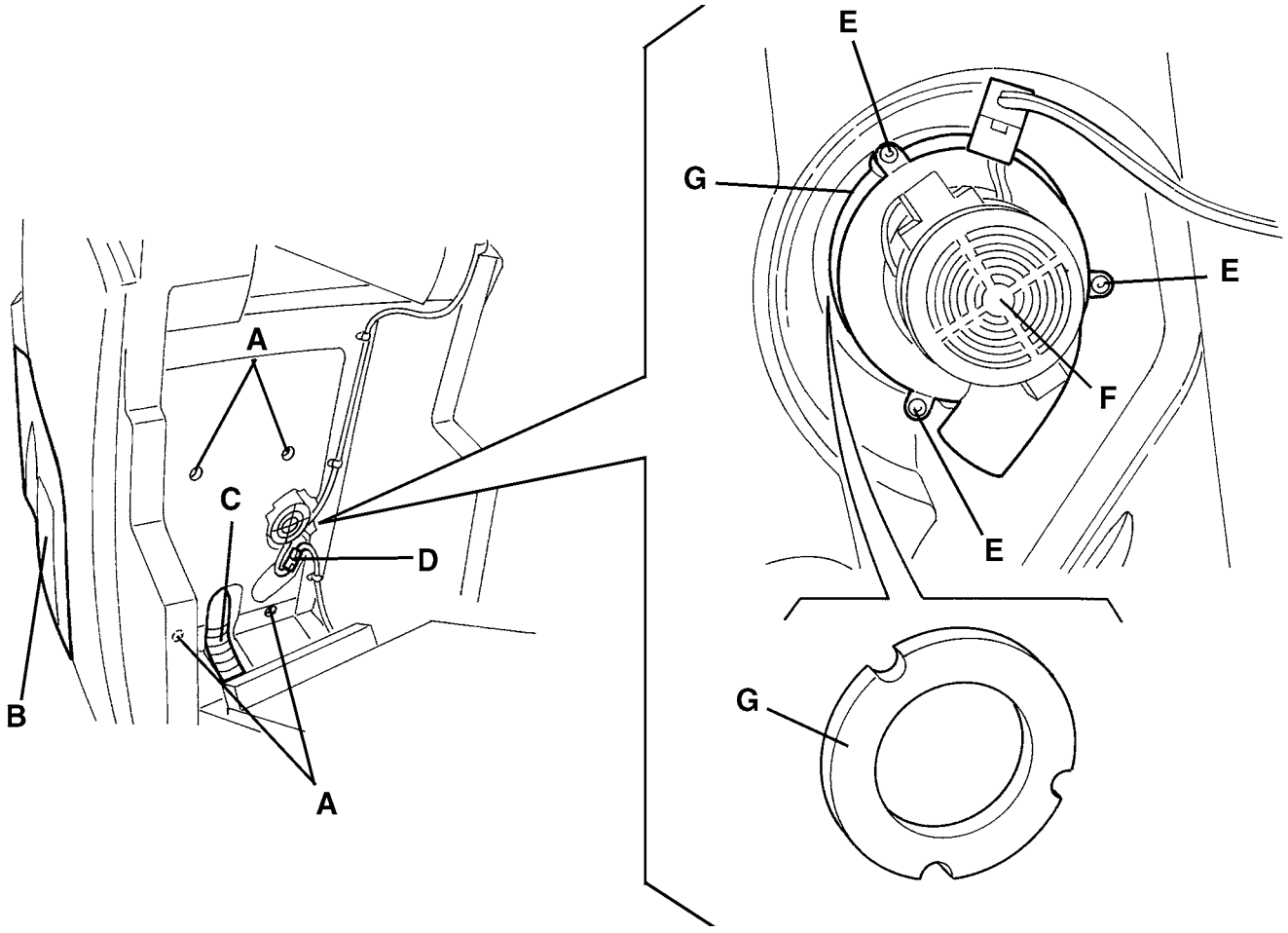
VACUUM SYSTEM MOTOR DISASSEMBLY/ASSEMBLY

Disassembly

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Disconnect the vacuum hose (23) from the squeegee (24).
6. Carefully lift the tank assembly (60).
7. Disconnect the battery connector (63).
8. Disconnect the connector (D) from the vacuum system motor.
9. Remove the screws (A), then remove the recovery water tank (B) with the vacuum hose (C).
10. Remove the screws (E).
11. Remove the vacuum system motor (F).
12. Recover the gasket (G).

Assembly

13. Assemble the components in the reverse order of disassembly, and note the following:
    - Check the gasket (G) for integrity and efficiency, otherwise replace it.



S301338

SQUEEGEE CLEANING/CHECK AND BLADE REPLACEMENT

CAUTION!
It is advisable to wear protective gloves when cleaning the brushes because there may be sharp debris.

Disassembly and cleaning

1. Drive the machine on a level floor.
2. Turn the ignition key (12) to "I".
3. Lower the squeegee (24) by pressing the switch (6).
4. Turn the ignition key (12) to "0".
5. Disconnect the vacuum hose (23) from the squeegee.
6. Loosen the handwheels (27) and remove the squeegee (24).
7. Wash and clean the squeegee. In particular, clean the compartments (A) and the vacuum hole (B) from dirt and debris. Check the front blade (C) and rear blade (D) for integrity, cuts and tears; if necessary replace them as shown below.
8. Assemble the components in the reverse order of disassembly.

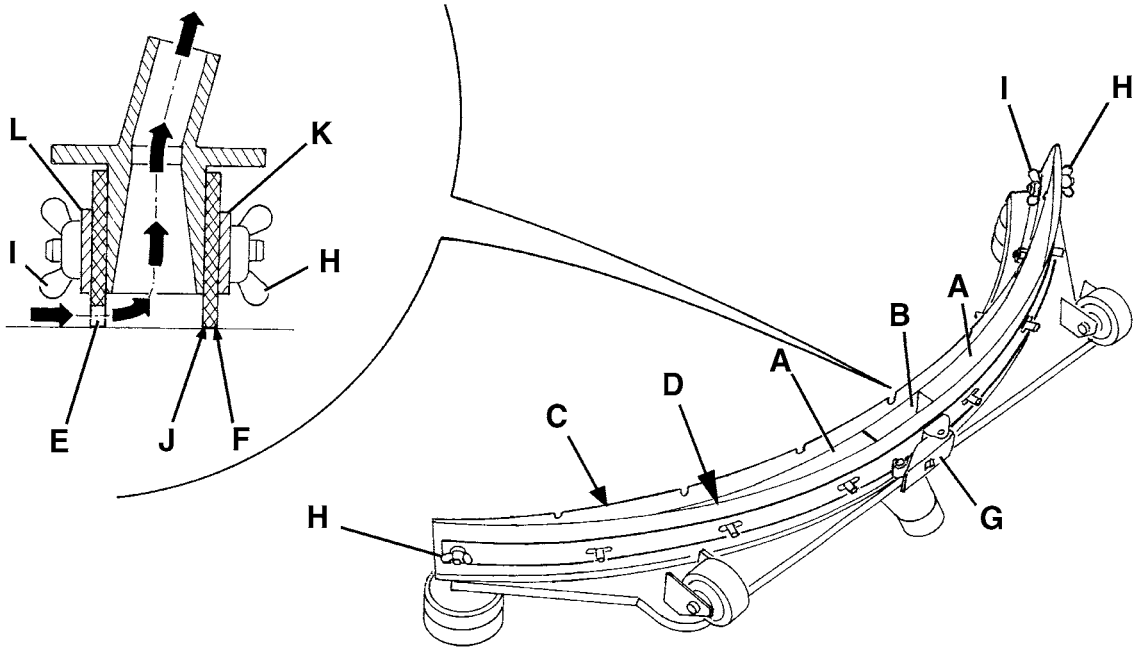
Check and replacement

9. Clean the squeegee as shown in the previous paragraph.
10. Check that the edges (E) of the front blade and the edges (F) of the rear blade lay down on the same level, along their length; otherwise adjust their height according to the following procedure:
    - Disengage the fastener (G) and loosen the wing nuts (H) to adjust the rear blade (D); then tighten the wing nuts and engage the fastener.
    - Loosen the wing nuts (I) to adjust the front blade (C); then tighten the wing nuts.
11. Check the front blade (C) and rear blade (D) for integrity, cuts and tears; if necessary replace them as shown below. 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:
    - Disengage the fastener (G), remove the wing nuts (H) and the retaining strip (K), then replace (or overturn) the rear blade (D). Install the blade in the reverse order of removal.
    - Remove the wing nuts (I) and 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.

Assembly

12. Install the squeegee (24) and screw down the handwheels (27).
13. Connect the vacuum hose (23) to the squeegee (24).
14. If necessary, adjust the squeegee balance adjusting handwheel (28).
15. Lift the squeegee (24) by pressing the switch (6).

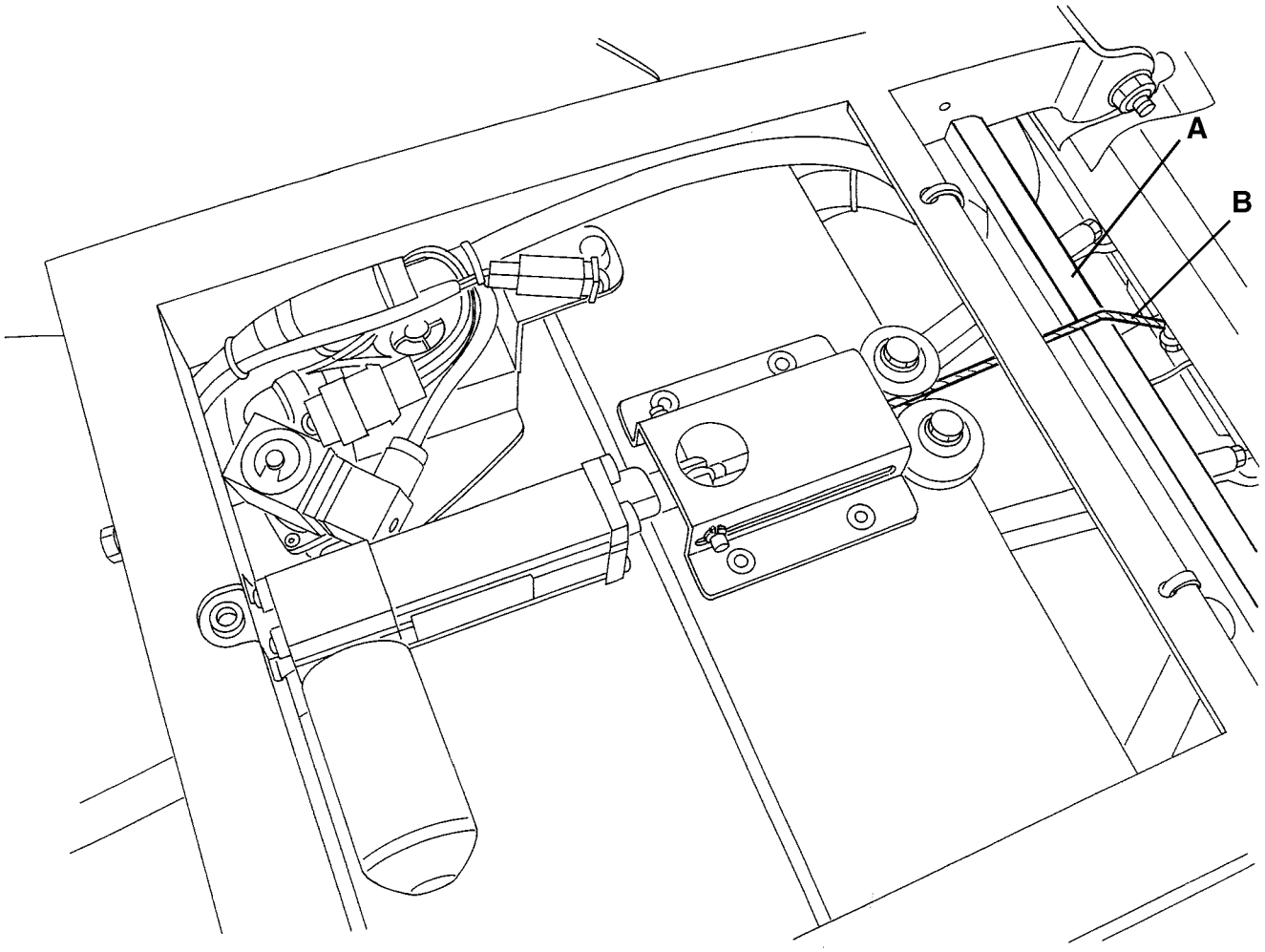


S301339

RECOVERY WATER SYSTEM

SQUEEGEE LIFTING CABLE SLIDING SHOE LUBRICATION

1. Lower the squeegee (24), according to the procedure shown in the User Manual.
2. Remove the batteries and the battery case (see the procedure in the Electrical System chapter).
3. Clean and lubricate the sliding shoe (A) of the squeegee lifting cable (B) with graphite grease.
4. Install the batteries and the battery case (see the procedure in the Electrical System chapter).
5. Lift the squeegee (24).



S301340

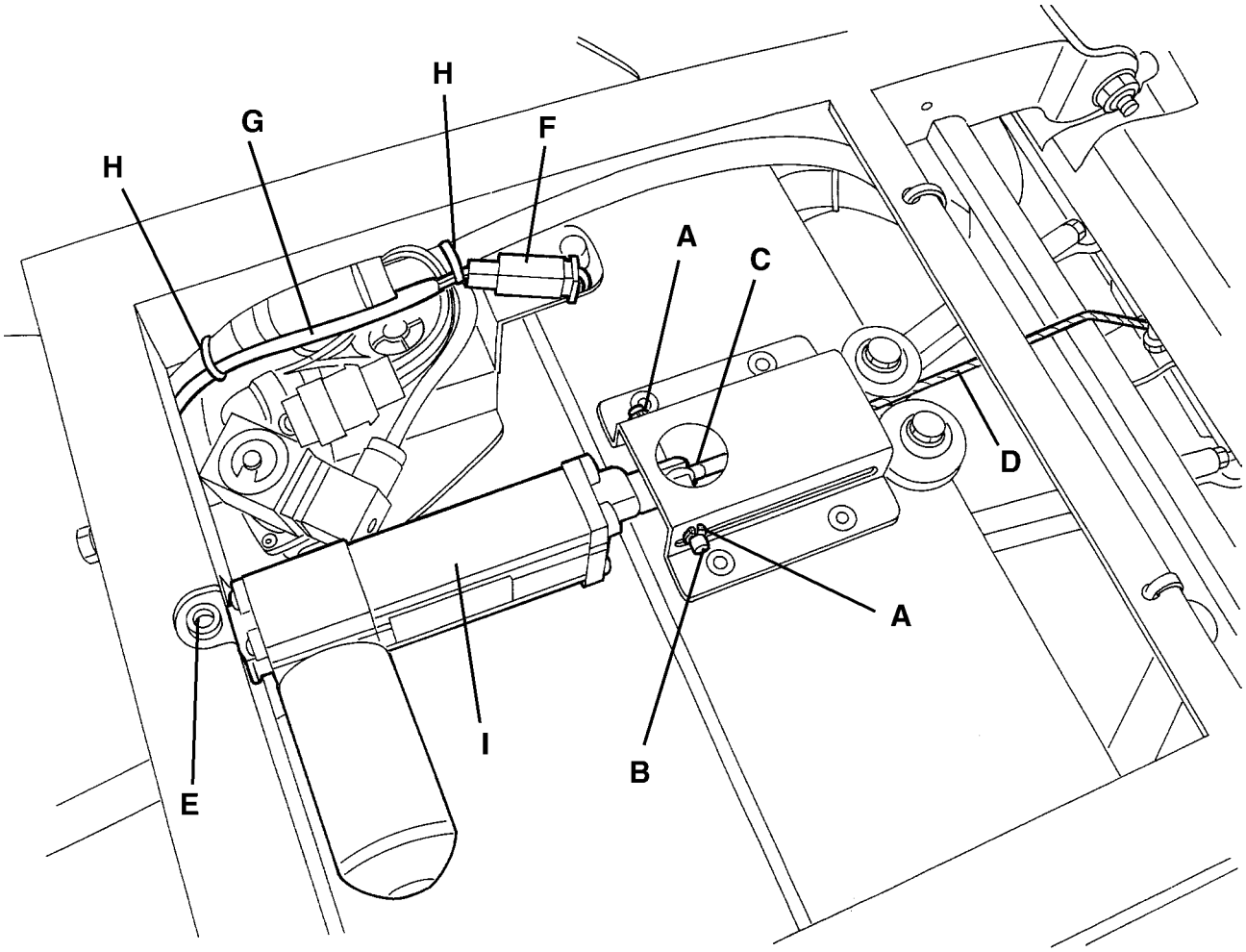
SQUEEGEE LIFTING ACTUATOR DISASSEMBLY/ASSEMBLY

Disassembly

1. Lift the squeegee (24), according to the procedure shown in the User Manual.
2. Remove the batteries and the battery case (see the procedure in the Electrical System chapter).
3. Remove the retaining rings (A) and the pin (B), thus disconnecting the terminal (C) of the squeegee lifting cable (D).
4. Remove the screw (E).
5. Disconnect the connector (F) of the actuator (I).
6. Disconnect the actuator connector (G) from the clamps (H).
7. Remove the squeegee lifting actuator (I).

Assembly

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



S301341

RECOVERY WATER SYSTEM

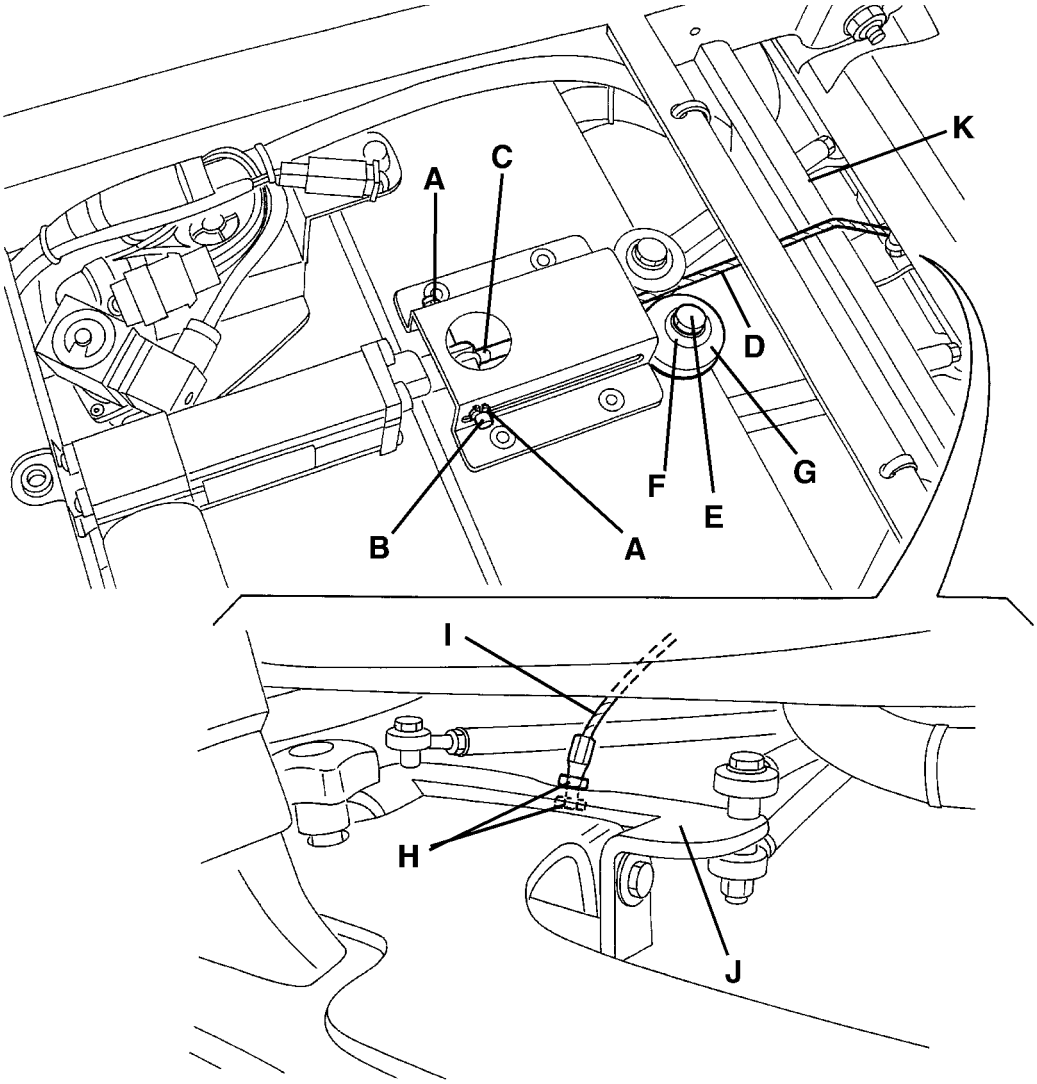
SQUEEGEE LIFTING CABLE DISASSEMBLY/ASSEMBLY

Disassembly

1. Lift the squeegee (24), according to the procedure shown in the User Manual.
2. Remove the batteries and the battery case (see the procedure in the Electrical System chapter).
3. Remove the retaining rings (A) and the pin (B), thus disconnecting the terminal (C) of the squeegee lifting cable (D).
4. Remove the screw (E) and recover the washer (F).
5. Remove the guide (G).
6. Carefully lower the tank assembly (59).
7. Remove the nut and the locknut (H), then remove the lifting cable (I) from the squeegee assembly (J).

Assembly

8. Assemble the components in the reverse order of disassembly, and note the following:
   - Before assembling the lifting cable (I), lubricate the squeegee lifting cable sliding shoe (K) with graphite grease.
   - After installing the squeegee lifting cable, adjust the nut and the locknut (I) so that, when the squeegee is completely lifted, the distance from the floor is 0.78 in (20 mm).



S301342

TROUBLESHOOTING

THE VACUUM SYSTEM MOTOR DOES NOT TURN ON

The function electronic board supplies current to the vacuum system motor directly; if the motor does not work, possible causes are the following (see also the Electrical System chapter, function electronic board diagnosis):

1. The vacuum system motor carbon brushes are worn (replace).
2. The vacuum system motor is faulty (check the electrical input).
3. 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 grid is dirty (clean).
3. The tank cover is not correctly positioned (adjust).
4. The tank cover gasket is not efficient (replace).
5. The squeegee or the vacuum hose is clogged or damaged (clean or repair/replace).
6. 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. The recovery water drain hose plug is open (close).

THE SQUEEGEE DOES NOT LIFT/LOWER

Possible causes (see also the Electrical System chapter, function electronic board diagnosis):

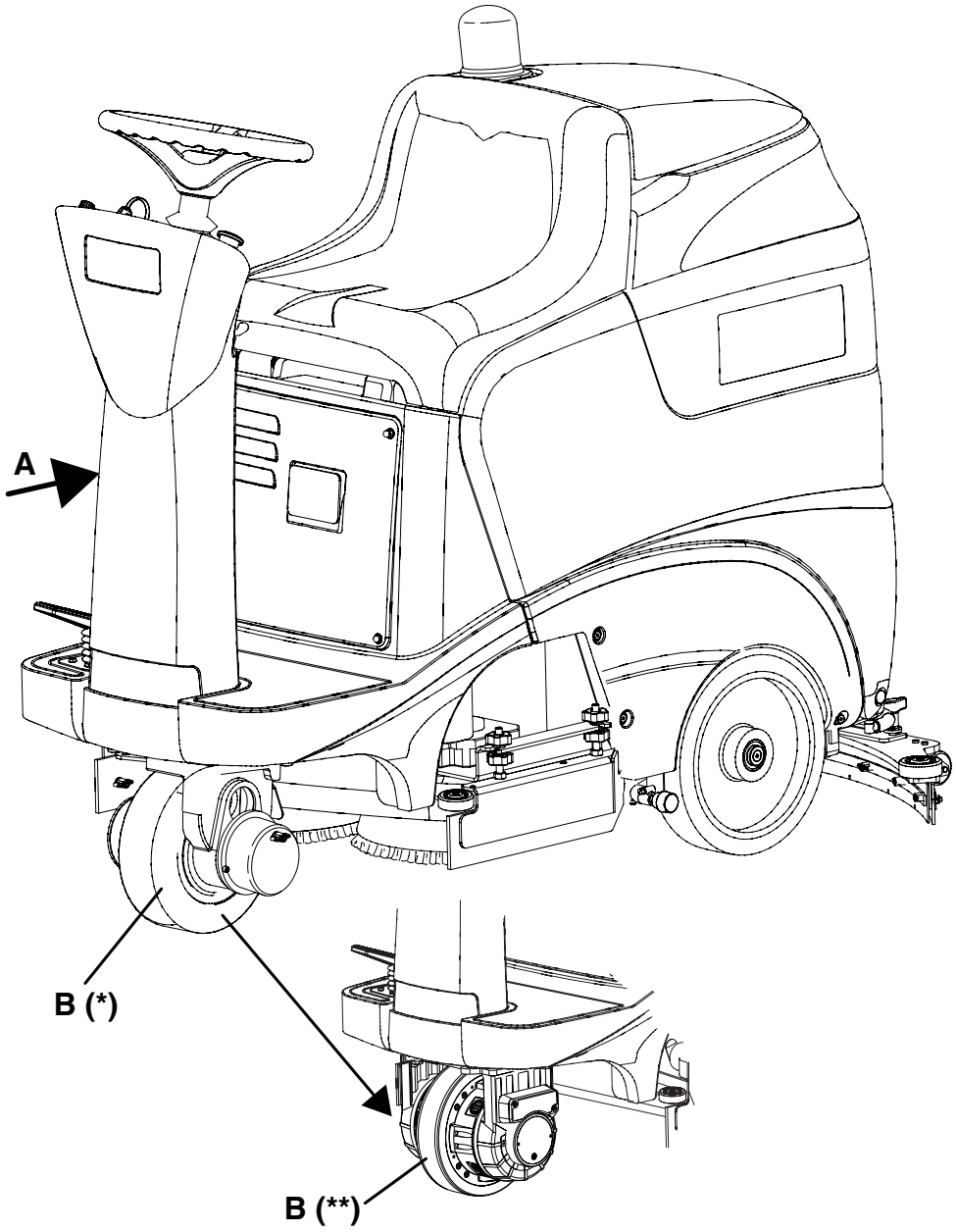
1. The actuator is faulty (repair/replace).

PARKING BRAKE SYSTEM

PARKING BRAKE SYSTEM

PARKING BRAKE CHECK

1. Lift the brushes and the squeegee, then drive the machine on a dry floor that offers a good grip.
2. Turn the ignition key (12) to "0".
3. Get off of the machine and push it manually in the direction shown by the arrow (A), then check that the front wheel (B) is locked.
   If necessary, replace the electromagnetic brake (see the procedure in the relevant paragraph).



S301640

(*) Machines up to January 2007
(**) Machines after January 2007

ELECTROMAGNETIC BRAKE DISASSEMBLY/ASSEMBLY (Machines up to January 2007)

Disassembly

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Place the machine on a hoisting system (if available). Otherwise, drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Carefully lift the tank assembly (60).
6. Disconnect the battery connector (63).
7. Apply proper wedges to right and left rear wheels (43), so that the machine cannot move when the electromagnetic brake (39) is disassembled.
8. Disconnect the electromagnetic brake connector (A).
9. Disconnect the wiring harness (B) from the clamps (C).
10. Remove the self-locking nut (D) and the unlocking handwheel (E).
11. Remove the screws (F), then remove the cover (G).
12. Remove the electromagnetic brake mounting screws (H).
13. Remove the electromagnetic brake (I).
14. Remove the brake pad (J).

Assembly

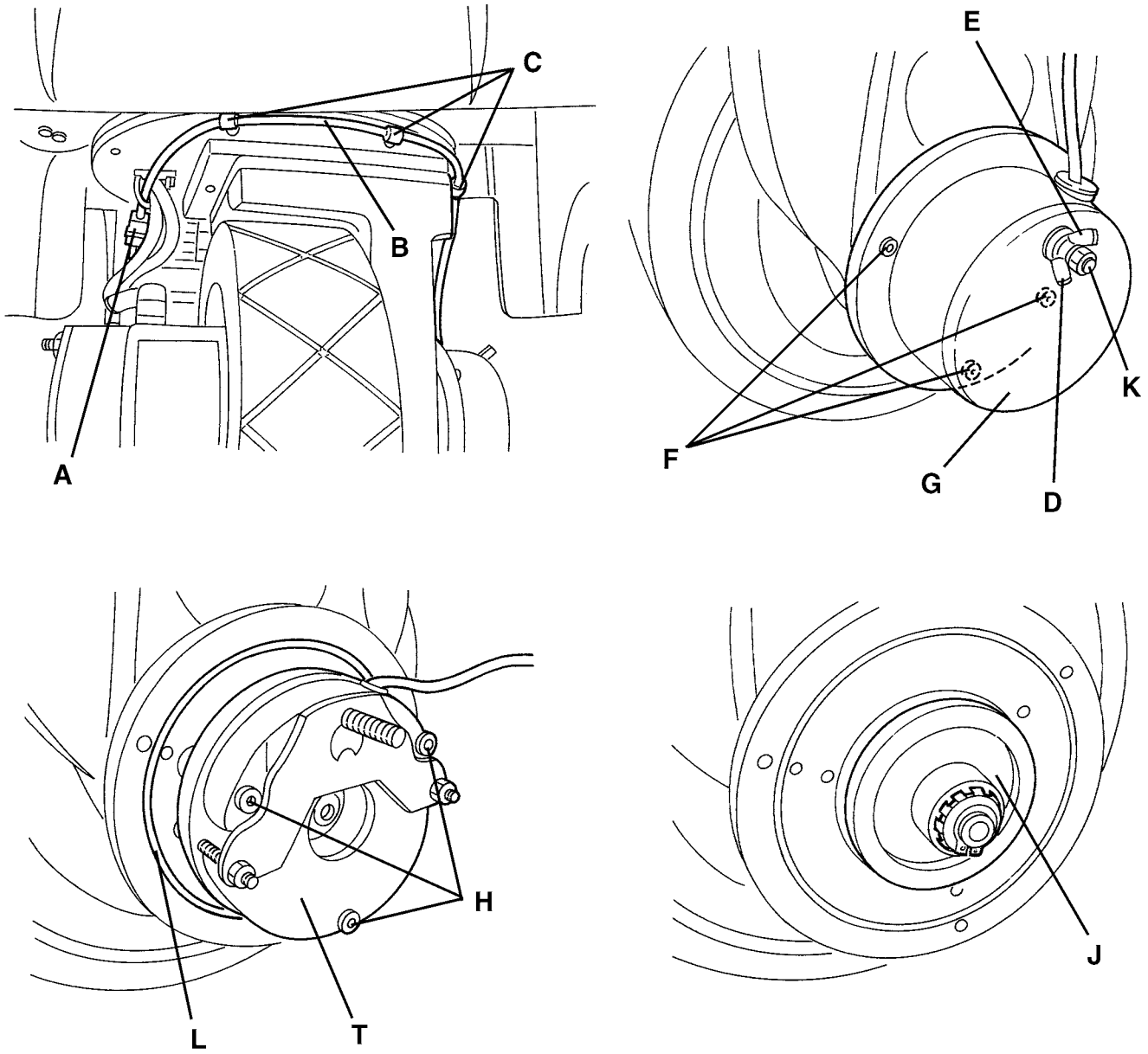
15. Assemble the components in the reverse order of disassembly, and note the following:
    - Before assembling the cover (G), check the gasket (L) for dirt, integrity and correct positioning.
    - To activate the electromagnetic brake, the self-locking nut (D) must be flush with the threaded tie rod (K), while the unlocking handwheel (E) must be unscrewed until it contacts the nut (D) (as shown in the figure).

WARNING!
When the unlocking handwheel (E) is unscrewed, the electromagnetic brake is activated; when the unlocking handwheel (E) is screwed, the electromagnetic brake is deactivated.

16. Check the parking brake (see the procedure in the relevant paragraph).

PARKING BRAKE SYSTEM

ELECTROMAGNETIC BRAKE DISASSEMBLY/ASSEMBLY (Machines up to January 2007) (Continues)



S301344

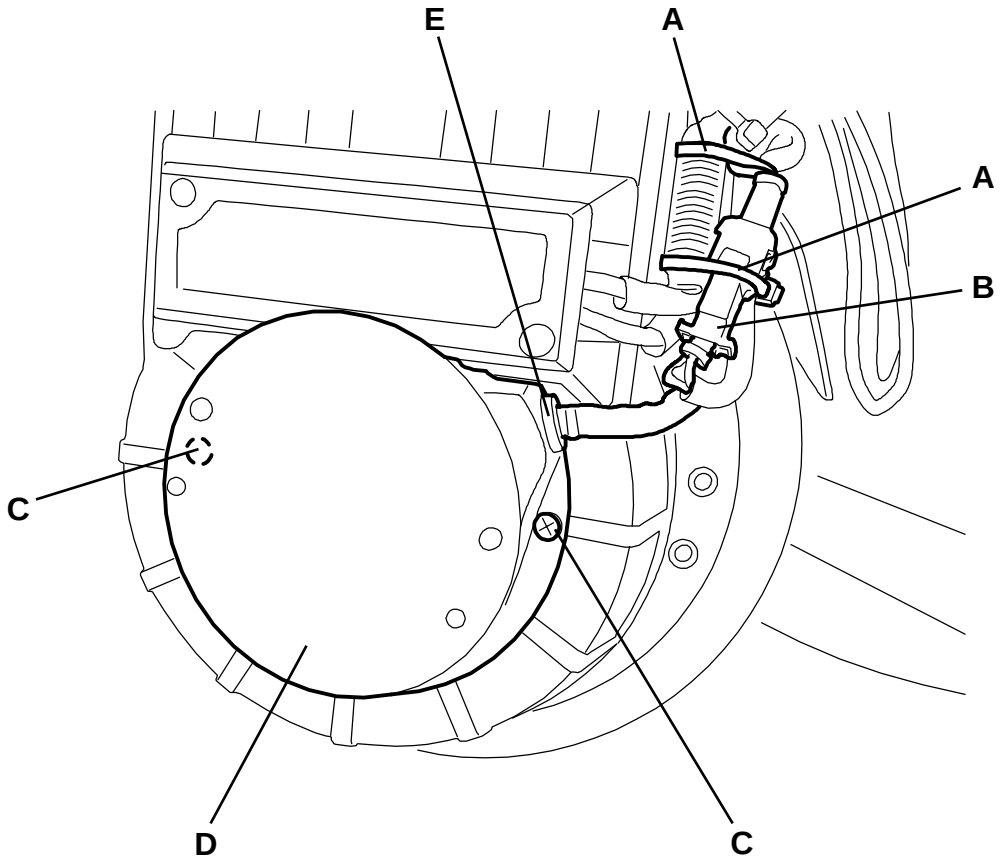
ELECTROMAGNETIC BRAKE AND DISC WITH BRAKING MASSES DISASSEMBLY/ASSEMBLY (Machines after January 2007)

Disassembly

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Place the machine on a hoisting system (if available).
   Otherwise, drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Carefully lift the tank assembly (60).
6. Disconnect the battery connector (63).
7. Apply proper wedges to right and left rear wheels (43), so that the machine cannot move when the electromagnetic brake (39) is disassembled.
8. Cut the fastening clamps (A).
9. Disconnect the electromagnetic brake connector (B).
10. Remove the screws (C), then remove the case (D) by disengaging the wiring harness grommet (E).
11. Remove the screws (F), then remove the electromagnetic brake (G).
12. Remove the disc with braking masses (H). Check the thickness (J) of the braking masses (K) and, if it is lower than 0.039 in (1 mm), the disc (H) must be replaced.
13. If necessary, remove the flange (I).

Assembly

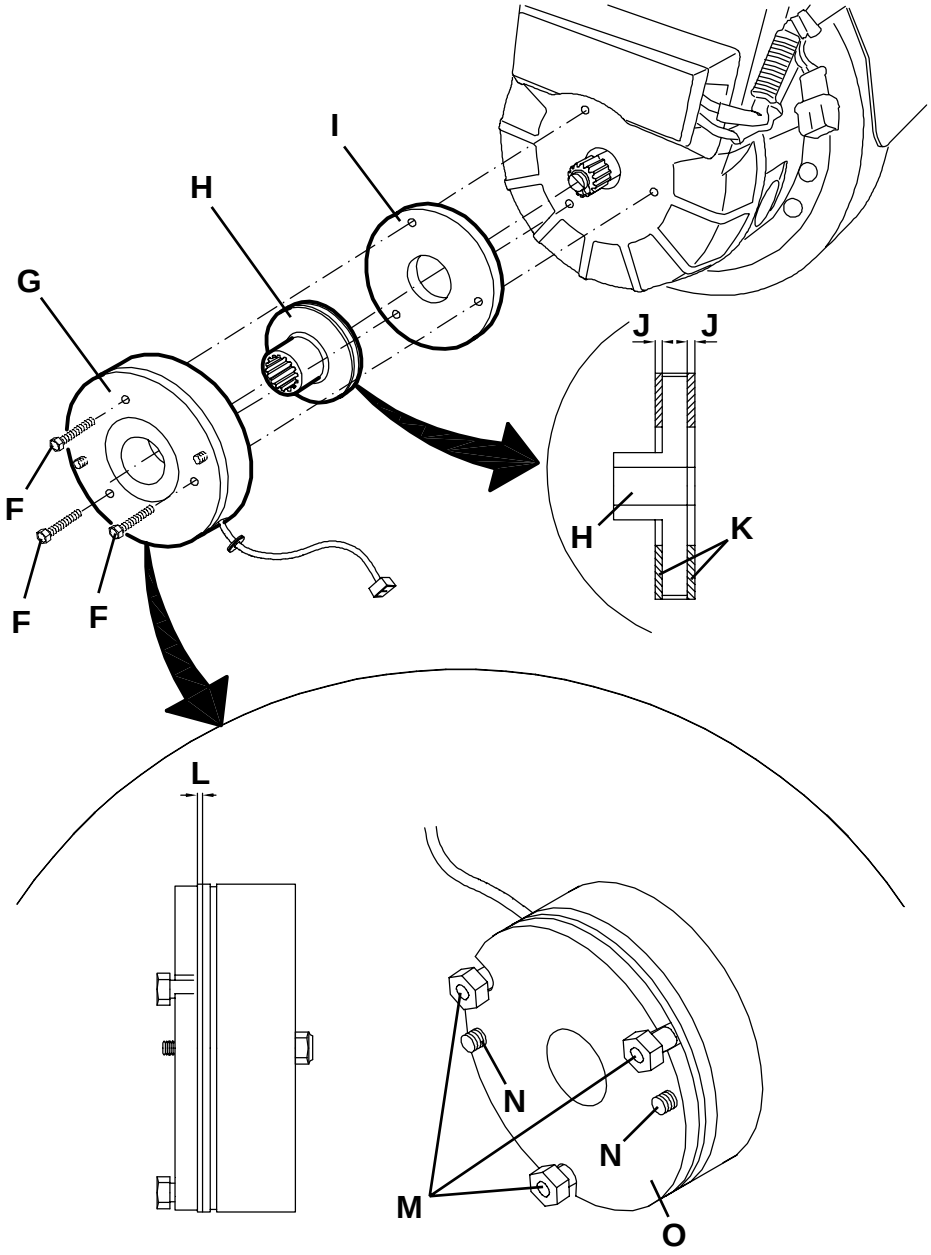
14. Assemble the components in the reverse order of disassembly, and note the following:
    - Before assembling the electromagnetic brake (G), clean it with compressed air; then install the threaded dowels (N) so that they are flush with the surface (O).
    - After assembling the electromagnetic brake (G), check that the air gap (L) is 0.007 to 0.012 in (0.19 to 0.31 mm); if necessary adjust the air gap (L) by using the adjusting spacers (M).
15. Check the parking brake (see the procedure in the relevant paragraph).



S301641

PARKING BRAKE SYSTEM

ELECTROMAGNETIC BRAKE AND DISC WITH BRAKING MASSES DISASSEMBLY/ASSEMBLY (Machines after January 2007) (Continues)



S301642

TROUBLESHOOTING

THE BRAKE DOES NOT OPERATE

Possible causes:

1. The electromagnetic brake unlocking handwheel (41) is screwed (unscrew and remove).
2. The braking masses are not efficient (replace the electromagnetic brake).
3. (Machines after January 2007) The electromagnetic brake air gap is not properly adjusted (adjust).

THE BRAKE DOES NOT DEACTIVATE WHEN PRESSING THE FORWARD/REVERSE GEAR PEDAL

Possible causes:

1. There is an open in the wiring harness between the drive system electronic board and the electromagnetic brake (check/repair the wiring harness/electrical connections).
2. The electromagnetic brake is faulty (replace).
3. The drive system electronic board is faulty (replace).

DRIVE SYSTEM

DRIVE SYSTEM

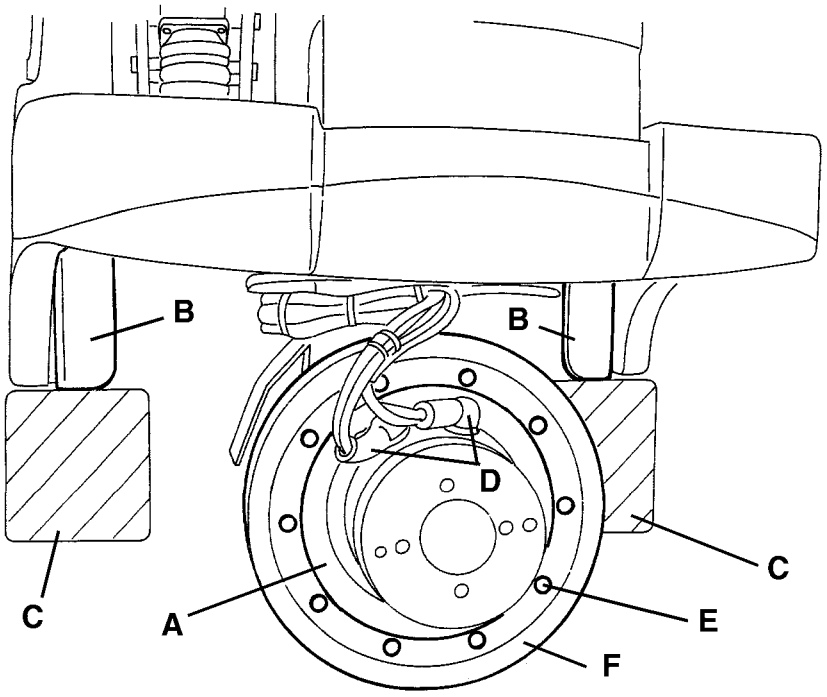
DRIVING WHEEL COVER DISASSEMBLY/ASSEMBLY (Machines up to January 2007)

Disassembly

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Place the machine on a hoisting system (if available). Otherwise, drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Remove the brush/pad-holder deck (16) or the cylindrical brush deck (17) (see the procedure in the relevant paragraph).
6. Turn the front wheel (A) completely to the left.
7. Apply proper wedges to right and left rear wheels (43), so that the machine cannot move when the front wheel (A) is lifted.
8. With the help of an assistant, slightly lift the front part of the machine and apply to the frame brackets (B) two proper wooden shims (C) high enough to keep the front wheel (A) lifted for about 1.18 in (3 cm) from the floor.
9. Lift the tank assembly (60) and disconnect the battery connector (63).
10. Disconnect the electrical connections (D) from the drive system motor.
11. Remove the screws (E), then remove the driving wheel cover (F).

Assembly

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



S301345

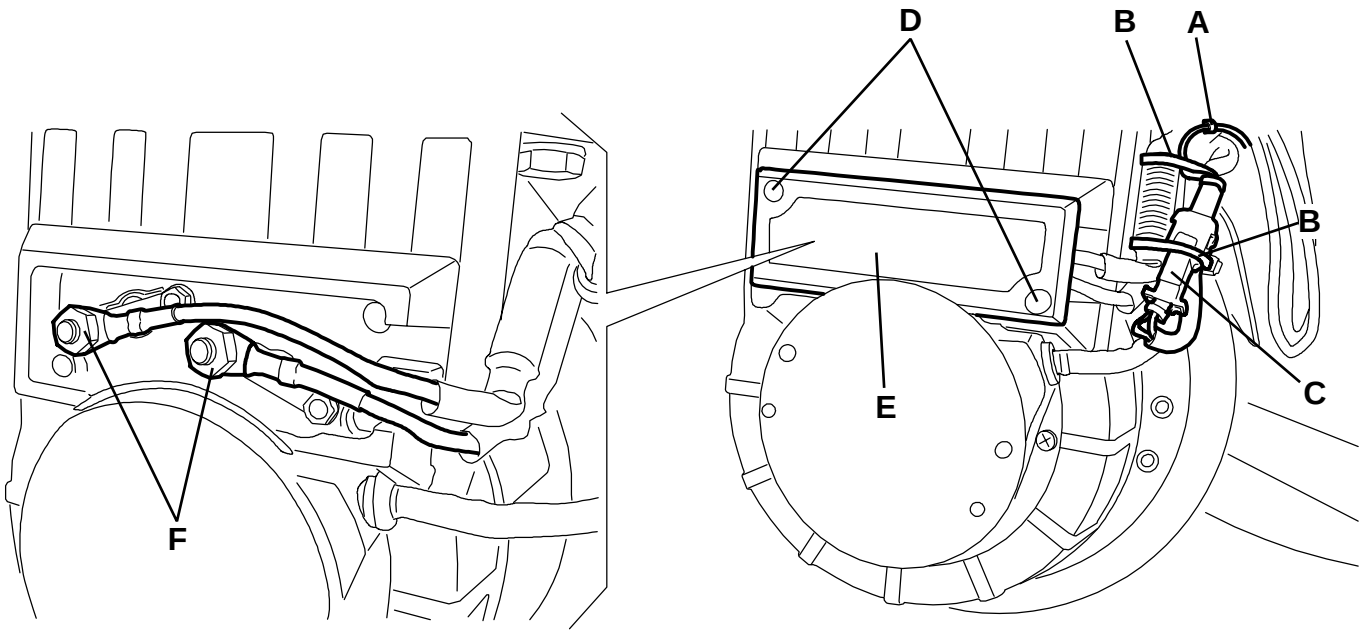
DRIVING WHEEL COVER DISASSEMBLY/ASSEMBLY (Machines after January 2007)

Disassembly

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Place the machine on a hoisting system (if available).
   Otherwise, drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Remove the brush/pad-holder deck (16) or the cylindrical brush deck (17) (see the procedure in the relevant paragraph).
6. Turn the front wheel (R) completely to the left.
7. Apply proper wedges to right and left rear wheels (43), so that the machine cannot move when the front wheel (R) is lifted.
8. With the help of an assistant, slightly lift the front part of the machine and apply to the frame brackets (S) two proper wooden shims (T) high enough to keep the front wheel (R) lifted for about 1.18 in (3 cm) from the floor.
9. Lift the tank assembly (60) and disconnect the battery connector (63).
10. Remove the wiring harness fastening clamp (A).
11. Cut the fastening clamps (B) of the connector (C).
12. Disconnect the electromagnetic brake connector (C).
13. Remove the screws (D), then remove the cover (E).
14. Disconnect the electrical connections (F).
15. Remove the screws (G), then remove the driving wheel assembly (H).
16. At the workbench, remove the electromagnetic brake (see the procedure in the relevant paragraph).
17. Remove the screws (I), then remove the plate (J).
18. With a puller (K) remove the brush side bracket (L).
19. Remove the mounting screws (M) of the driving wheel cover (N). Recover the nuts (P) and washers (O).
20. Remove the cover (N) from the reduction unit (Q).

Assembly

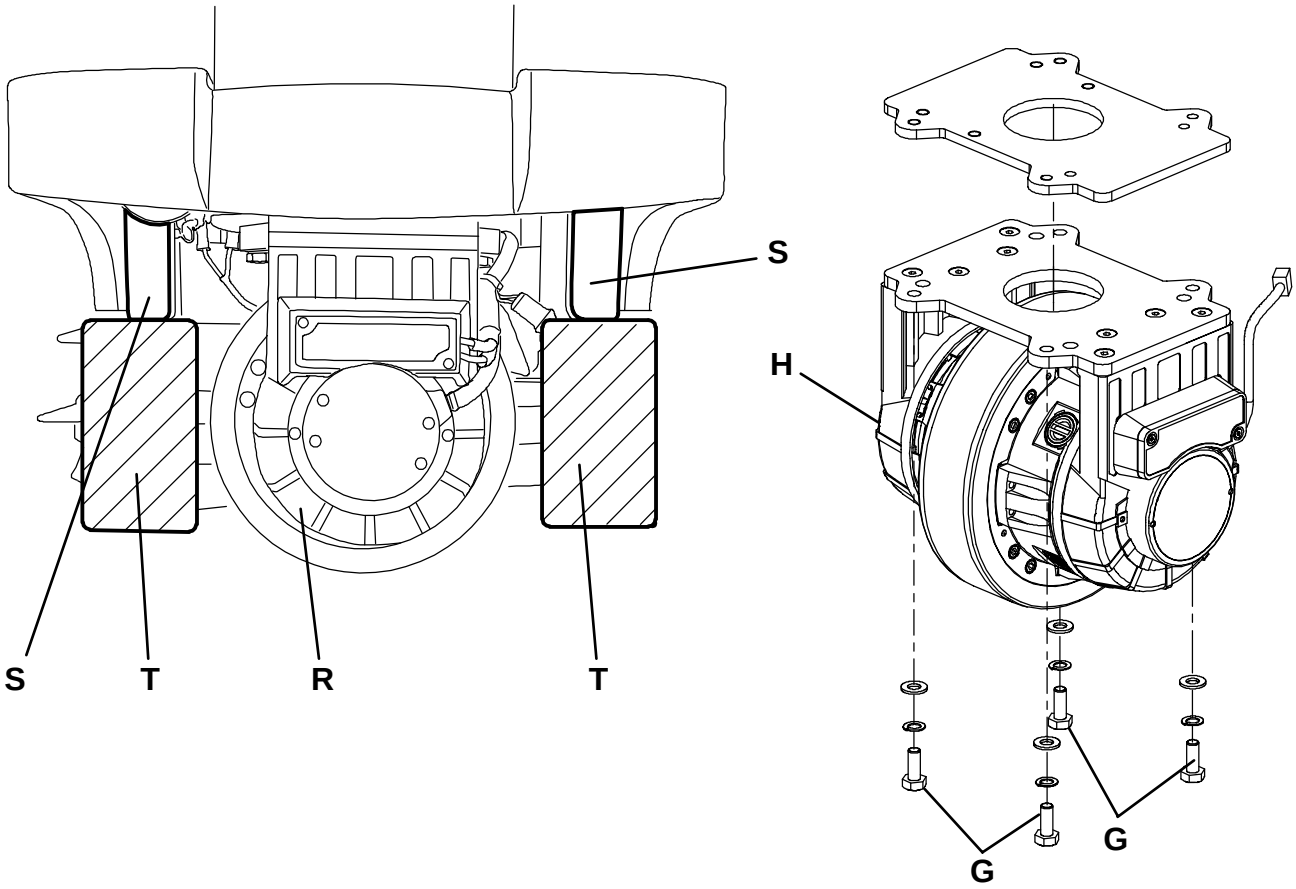
21. Assemble the components in the reverse order of disassembly, and note the following:
    - If necessary, use a rubber mallet to install the cover (N).
    - Tighten the screws (M) at 141.61 lbf·in (16 N·m; 1.63 kgf·m).
    - Tighten the screws (I) at 194.71 lbf·in (22 N·m; 2.24 kgf·m).

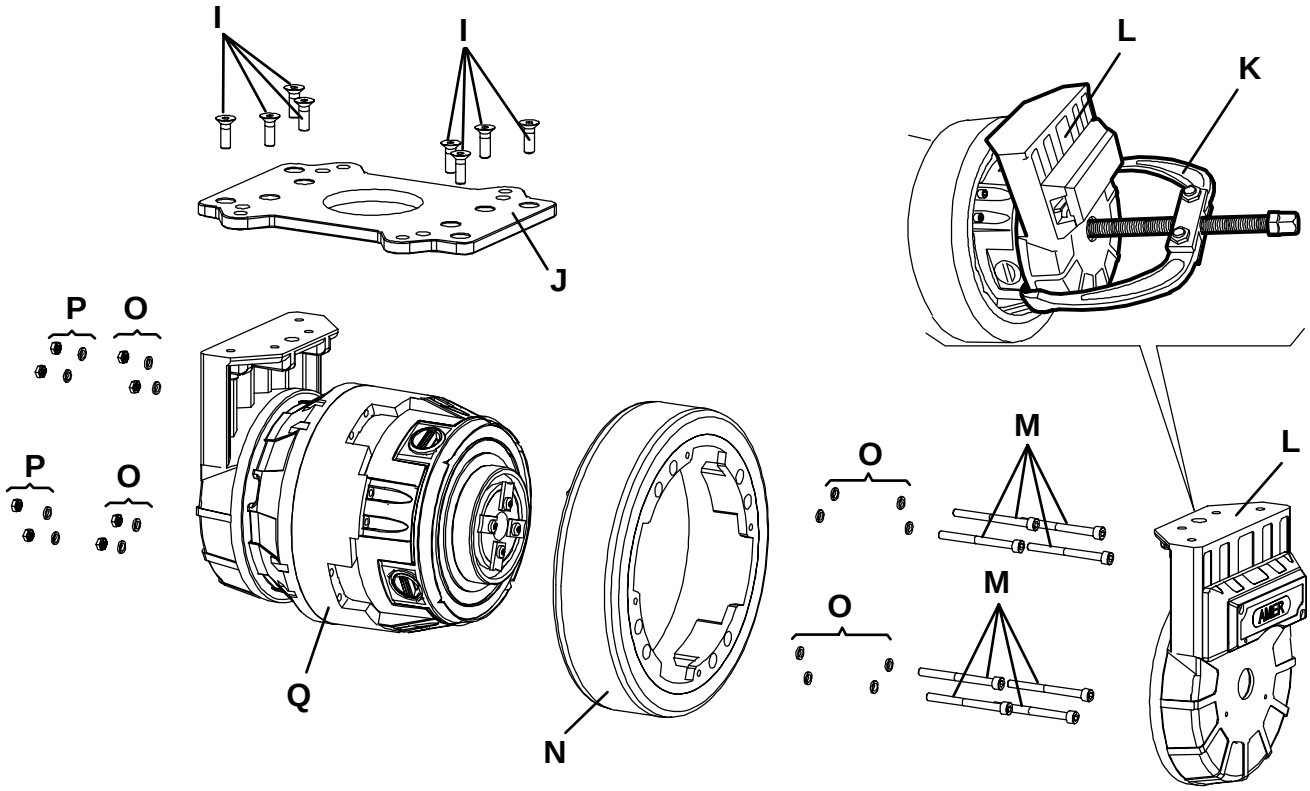


S301643

DRIVE SYSTEM

DRIVING WHEEL COVER DISASSEMBLY/ASSEMBLY (Machines after January 2007) (Continues)





S301644

DRIVE SYSTEM MOTOR ELECTRICAL INPUT CHECK (Machines up to January 2007)

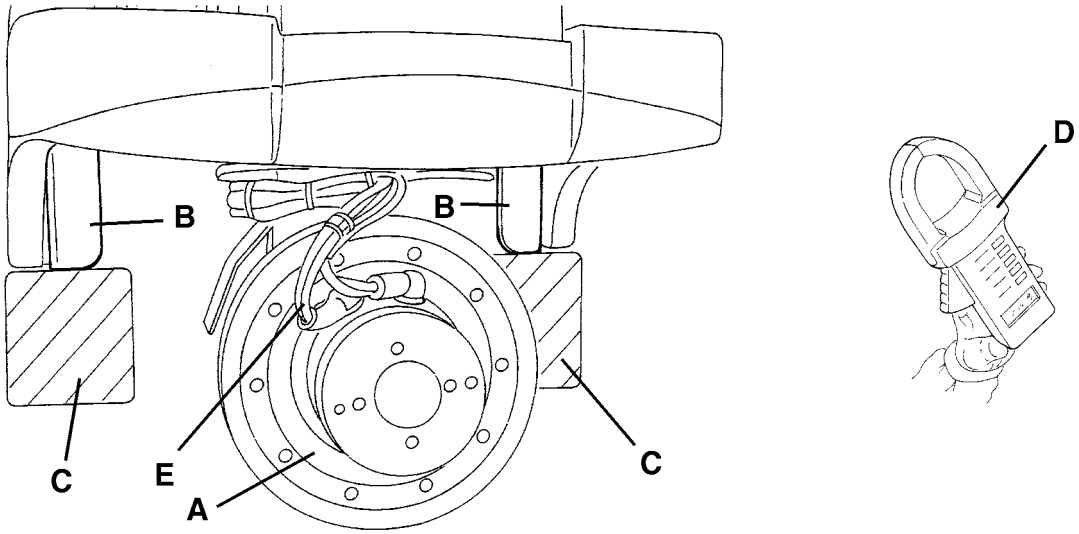
WARNING!
This procedure must be performed by qualified personnel only.

1. Drive the machine on a level floor.
2. Turn the ignition key (12) to "0".
3. Remove the brush/pad-holder deck (16) or the cylindrical brush deck (17) (see the procedure in the relevant paragraph).
4. Turn the front wheel (A) completely to the left.
5. Apply proper wedges to right and left rear wheels (43), so that the machine cannot move when the front wheel (A) is lifted.
6. With the help of an assistant, slightly lift the front part of the machine and apply to the frame brackets (B) two proper wooden shims (C) high enough to keep the front wheel (A) lifted for about 1.18 in (3 cm) from the floor.

WARNING!
When performing the following procedure, pay attention to the rotation of the driving wheel (A).

7. Apply the amperometric pliers (D) on the positive cables (red) (E). The amperometric pliers must not touch the wheel.
8. Seat on the machine driver's seat (37).
9. Turn the ignition key (12) to "I".
10. Drive the machine at the maximum forward speed by pressing the pedal (15) and check that the electrical input is 10 - 15 A at 24 V. Release the pedal (15). Turn the ignition key (12) 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 wheel rotation.
    - Check if the electromagnetic brake slows down the wheel when the drive system motor is operating (remove the electromagnetic brake and repeat the electrical input check (see the procedure in the relevant paragraph)).
    - Check the motor carbon brushes (see the procedure in the relevant paragraph).
    - If necessary, 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).
11. Perform steps 3 to 6 in the reverse order.



S301346

DRIVE SYSTEM

DRIVE SYSTEM MOTOR ELECTRICAL INPUT CHECK (Machines after January 2007)

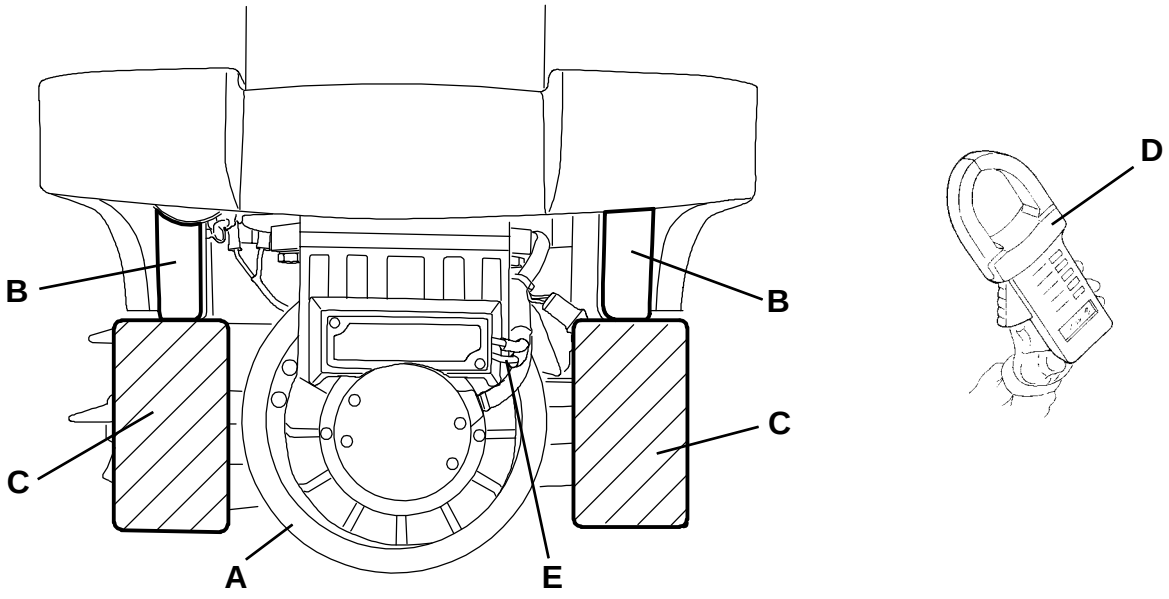
WARNING!
This procedure must be performed by qualified personnel only.

1. Drive the machine on a level floor.
2. Turn the ignition key (12) to "0".
3. Remove the brush/pad-holder deck (16) or the cylindrical brush deck (17) (see the procedure in the relevant paragraph).
4. Turn the front wheel (A) completely to the left.
5. Apply proper wedges to right and left rear wheels (43), so that the machine cannot move when the front wheel (A) is lifted.
6. With the help of an assistant, slightly lift the front part of the machine and apply to the frame brackets (B) two proper wooden shims (C) high enough to keep the front wheel (A) lifted for about 1.18 in (3 cm) from the floor.

WARNING!
When performing the following procedure, pay attention to the rotation of the driving wheel (A).

7. Apply the amperometric pliers (D) on the positive cables (red) (E). The amperometric pliers must not touch the wheel.
8. Seat on the machine driver's seat (37).
9. Turn the ignition key (12) to "I".
10. Drive the machine at the maximum forward speed by pressing the pedal (15) and check that the electrical input is 10 - 15 A at 24 V. Release the pedal (15). Turn the ignition key (12) 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 wheel rotation.
    - Check if the electromagnetic brake slows down the wheel when the drive system motor is operating (remove the electromagnetic brake and repeat the electrical input check (see the procedure in the relevant paragraph)).
    - Check the motor carbon brushes (see the procedure in the relevant paragraph).
    - If necessary, 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).
11. Perform steps 3 to 6 in the reverse order.



S301645

DRIVE SYSTEM MOTOR CARBON BRUSH CHECK AND REPLACEMENT (Machines up to January 2007)

Check

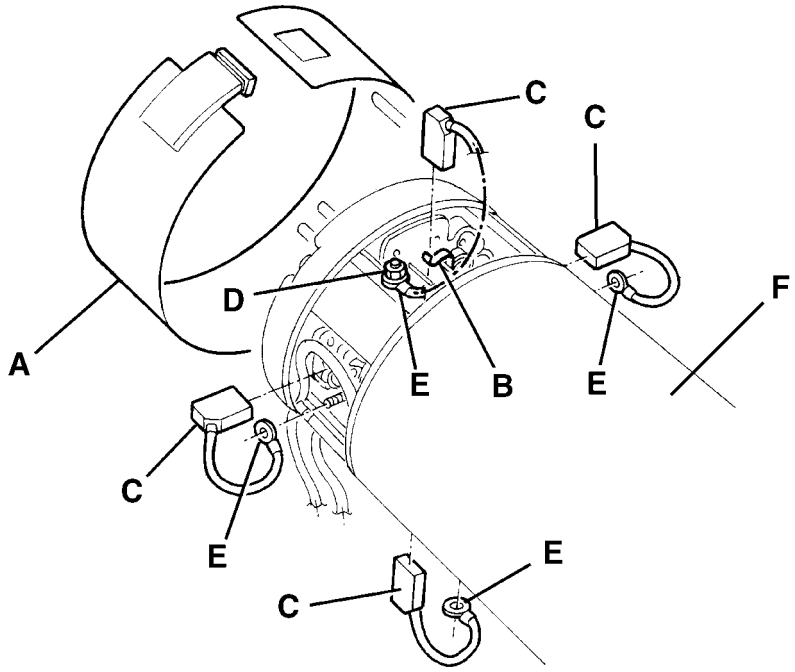
1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Place the machine on a hoisting system (if available). Otherwise, drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Carefully lift the tank assembly (60).
6. Disconnect the battery connector (63).
7. Remove dust and debris from the drive system motor outer part (F), then disengage and remove the clamp (A) from the motor.
8. Lift the retaining springs (B) and remove the four carbon brushes (C).
9. 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.

Replacement

10. If necessary, remove the nuts (D) and disengage the lead-in wires (E), then remove the carbon brushes.

Reset

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



S301347

DRIVE SYSTEM

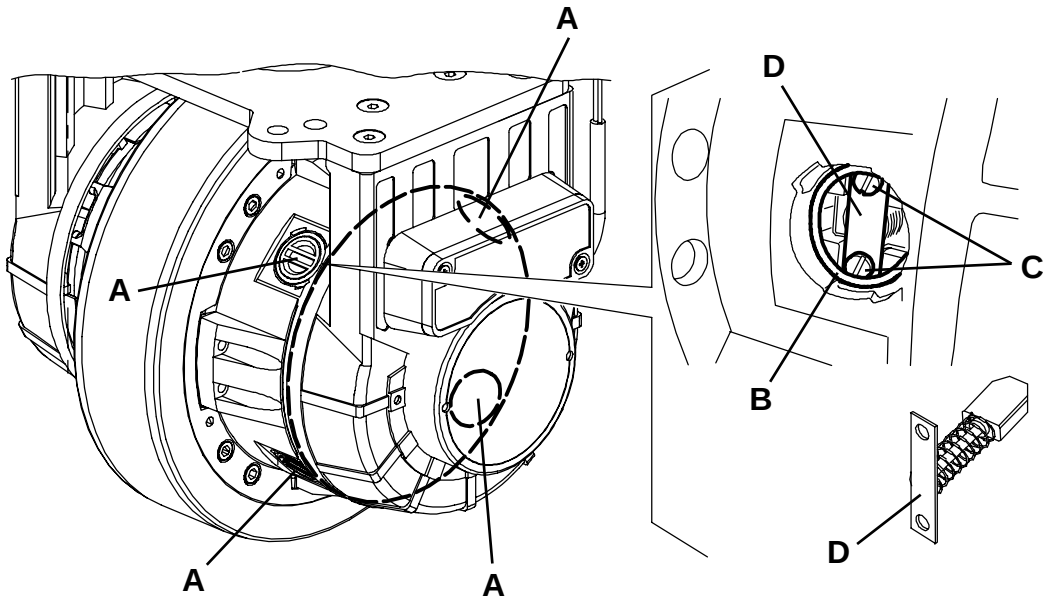
DRIVE SYSTEM MOTOR CARBON BRUSH CHECK AND REPLACEMENT (Machines after January 2007)

Check and replacement

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Place the machine on a hoisting system (if available).
   Otherwise, drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Carefully lift the tank assembly (60).
6. Disconnect the battery connector (63).
7. Remove the drive system motor carbon brush covers (A) (bayonet joint).
8. Remove the gasket (B) and check them for integrity and efficiency; if necessary, replace them.
9. Remove the screws (C), then remove the four carbon brushes (D).
10. Check the carbon brushes (D) 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.
    If necessary, replace the carbon brushes.

Reset

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



S301646

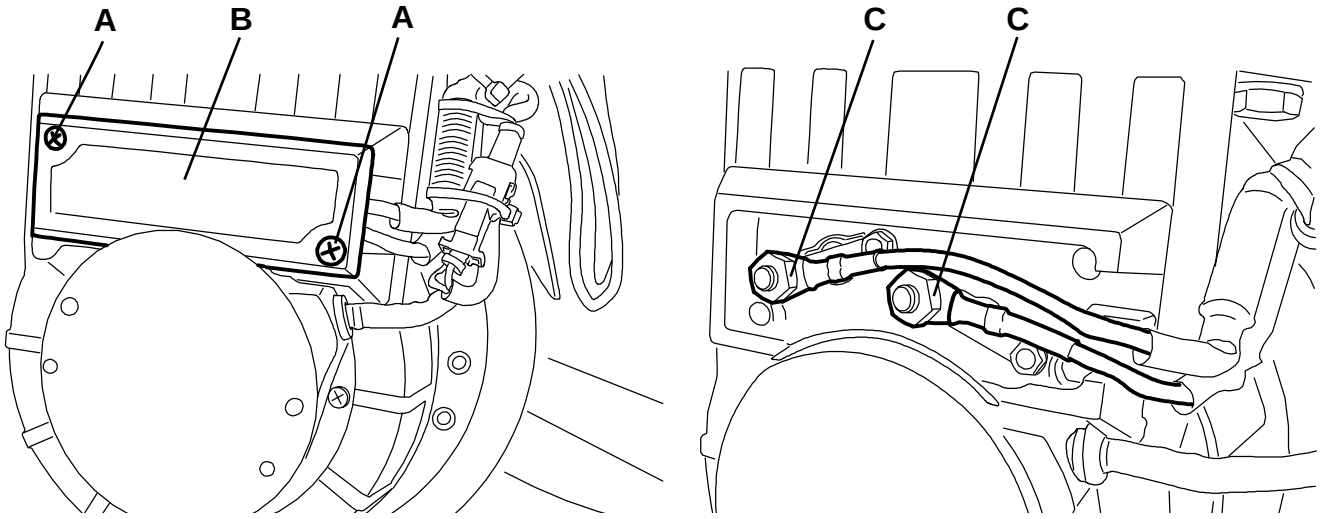
DRIVE SYSTEM MOTOR SLIDING CONTACT CHECK AND REPLACEMENT (Machines after January 2007)

Check and replacement

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Place the machine on a hoisting system (if available).
   Otherwise, drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Carefully lift the tank assembly (60).
6. Disconnect the battery connector (63).
7. Remove the screws (A), then remove the sliding contact cover (B).
8. Disconnect the sliding contact connections (C).
9. Remove the sliding contact mounting screws (D) and nuts (E). Recover the washer (E).
10. Remove both sliding contacts (G).
11. Check the sliding contacts (D) for wear. Replace the sliding contacts when: the contact with the sliding ring is insufficient, the sliding contacts are worn, the contact surface is not integral, the thrust spring is broken, etc.
    If necessary, replace the sliding contacts.

Reset

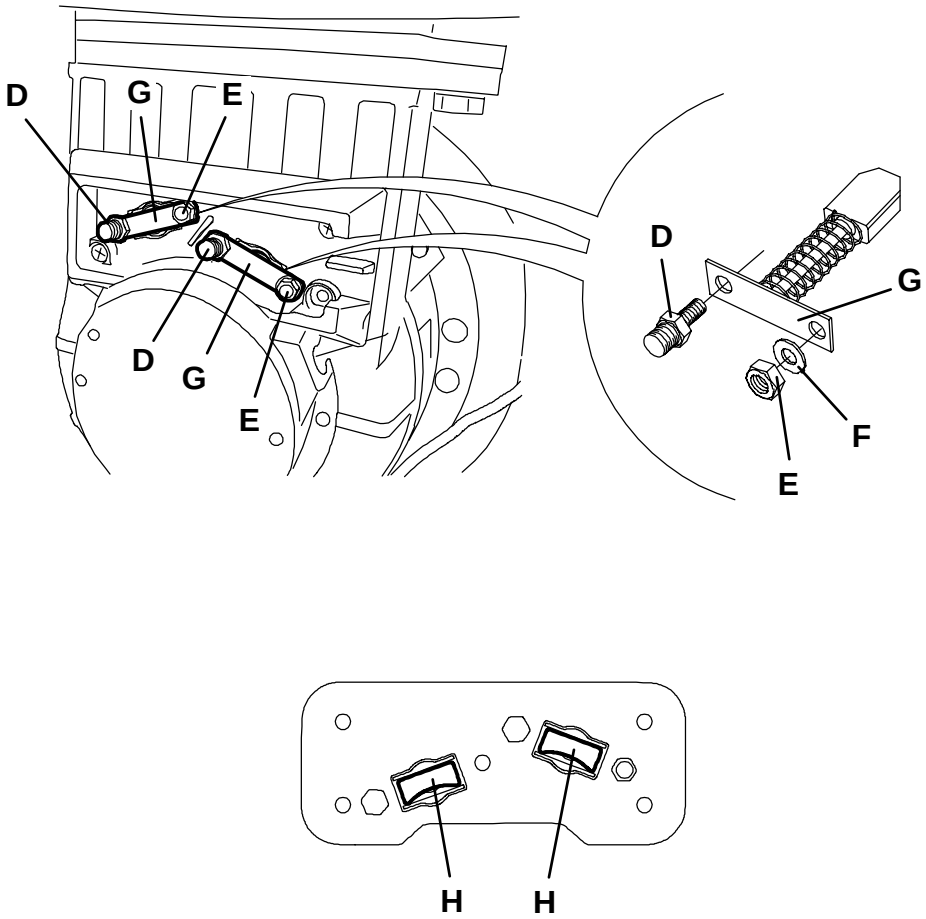
12. Assemble the components in the reverse order of disassembly, and note the following:
    - The sliding contact surface (H) must be turned downwards, as shown in the figure.



S301647

DRIVE SYSTEM

DRIVE SYSTEM MOTOR SLIDING CONTACT CHECK AND REPLACEMENT (Machines after January 2007) (Continues)



S301648

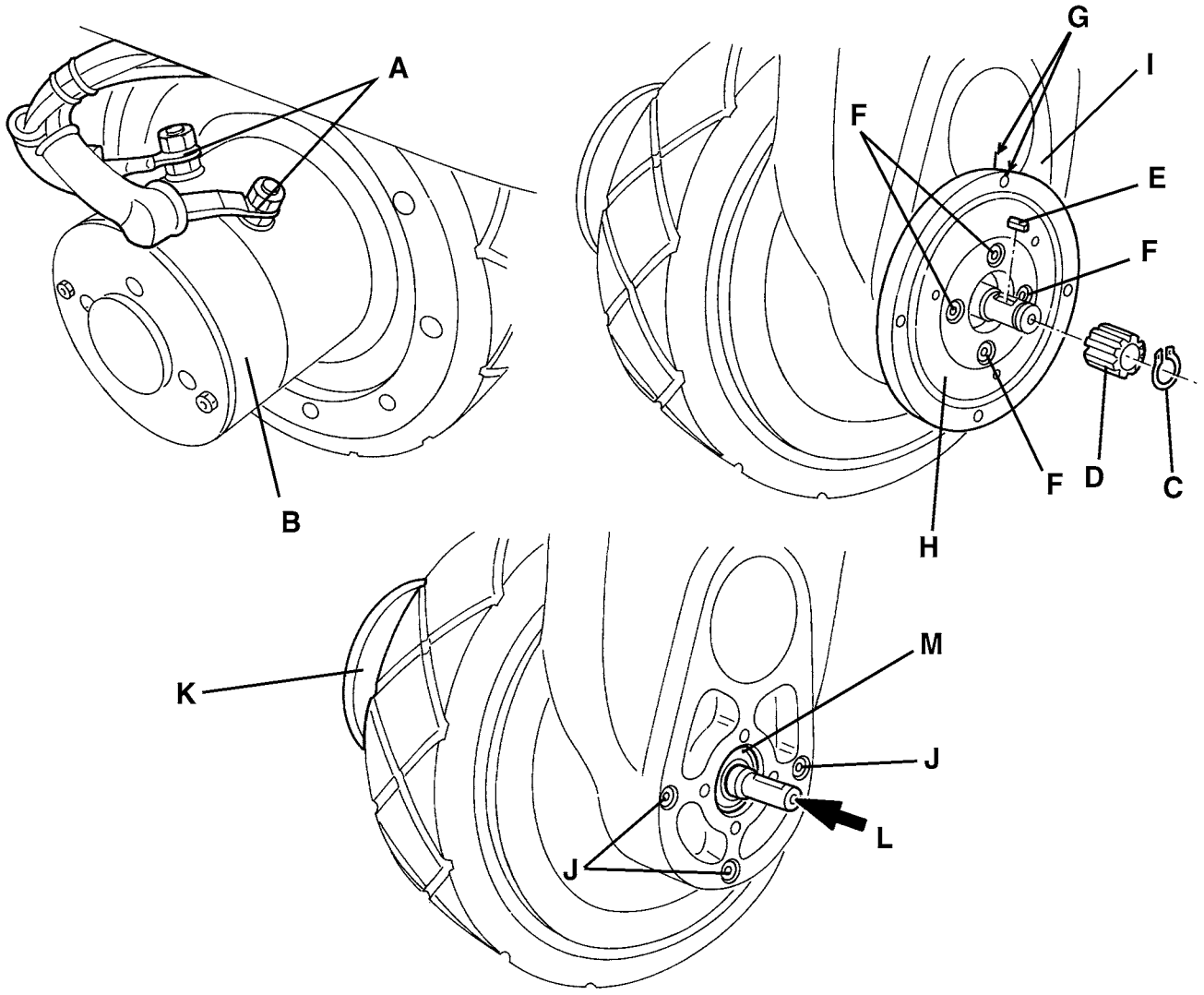
DRIVE SYSTEM MOTOR DISASSEMBLY/ASSEMBLY (Machines up to January 2007)

Disassembly

1. Remove the electromagnetic brake (see the procedure in the relevant paragraph).
2. Remove the connectors (A) from the drive system motor (B).
3. Remove the retaining ring (C) on the electromagnetic brake side.
4. Remove the ring gear (D) and recover the key (E).
5. Mark the position (G) of the flange (H) on the wheel support (I), for proper reassembly.
6. Remove the screws (F), then remove the flange (H).
7. Remove the screws (J).
8. If necessary, to remove the drive system motor (K), hit the shaft (L) with a plastic mallet.

Assembly

9. Assemble the components in the reverse order of disassembly, and note the following:
   - The connectors (A) of the drive system motor (K) must be turned upwards.
   - If the bearing (M) comes out of its seat, reinsert it by pushing it on the outer ring by using a bush with appropriate diameter.



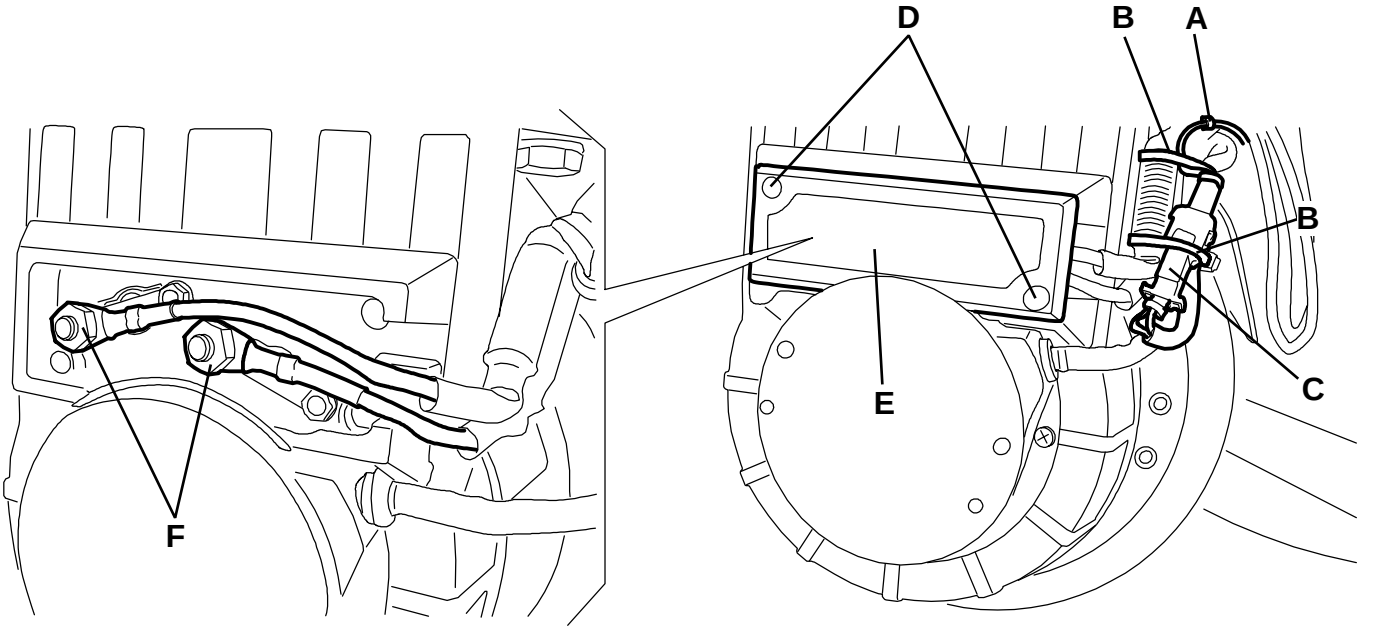
S301348

DRIVE SYSTEM

DRIVE SYSTEM MOTOR, BEARING AND GASKET DISASSEMBLY/ASSEMBLY (Machines after January 2007)

Disassembly

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Place the machine on a hoisting system (if available).
   Otherwise, drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Remove the brush/pad-holder deck (16) or the cylindrical brush deck (17) (see the procedure in the relevant paragraph).
6. Turn the front wheel (AG) completely to the left.
7. Apply proper wedges to right and left rear wheels (43), so that the machine cannot move when the front wheel (AG) is lifted.
8. With the help of an assistant, slightly lift the front part of the machine and apply to the frame brackets (AH) two proper wooden shims (AI) high enough to keep the front wheel (AG) lifted for about 1.18 in (3 cm) from the floor.
9. Lift the tank assembly (60) and disconnect the battery connector (63).
10. Remove the wiring harness fastening clamp (A).
11. Cut the fastening clamps (B) of the connector (C).
12. Disconnect the electromagnetic brake connector (C).
13. Remove the screws (D), then remove the cover (E).
14. Disconnect the electrical connections (F).



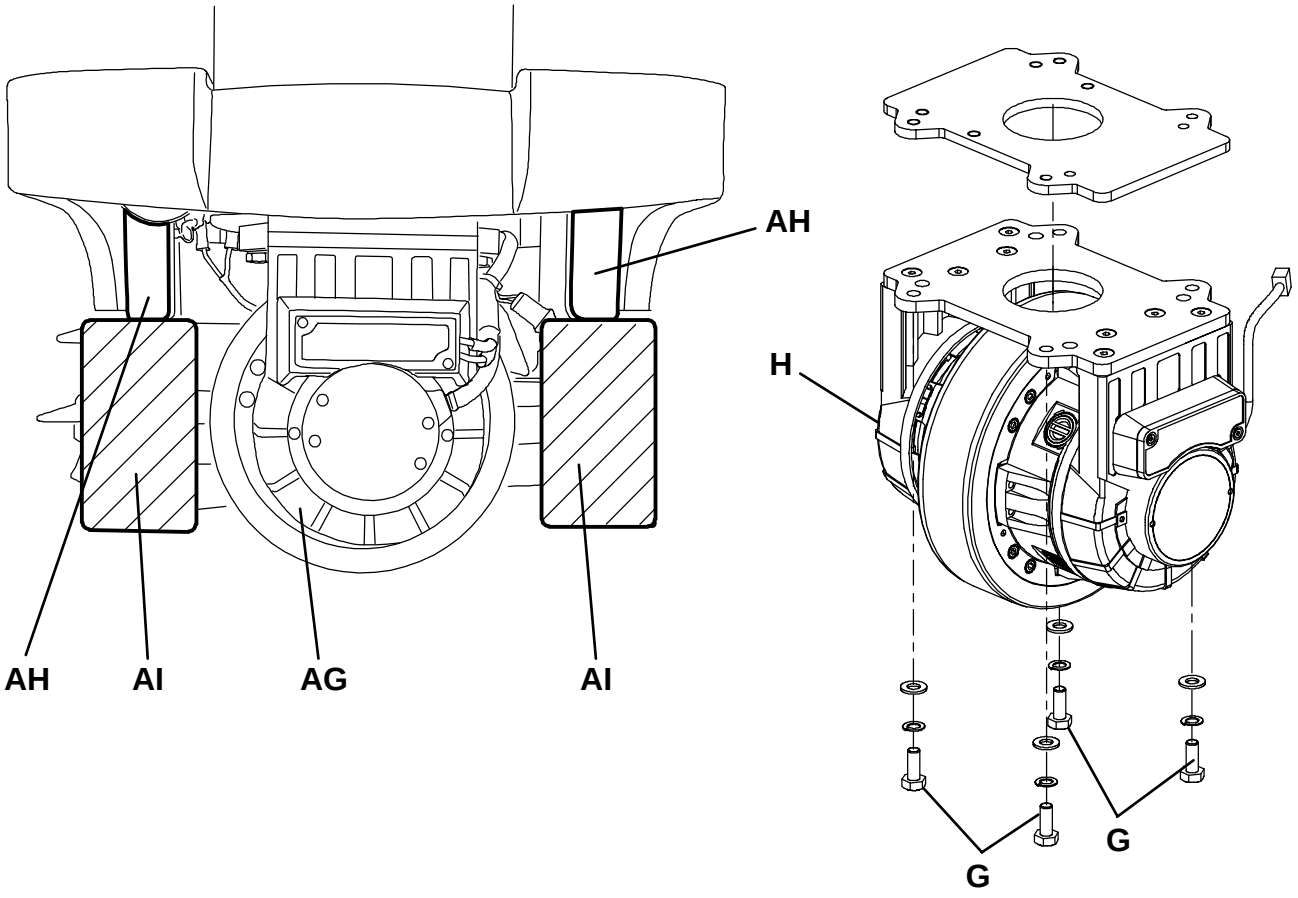
S301643

DRIVE SYSTEM MOTOR, BEARING AND GASKET DISASSEMBLY/ASSEMBLY (Machines after January 2007) (Continues)

15. Remove the screws (G), then remove the driving wheel assembly (H).
16, At the workbench, remove the electromagnetic brake (see the procedure in the relevant paragraph).
17. Remove the screws (I), then remove the plate (J).
18. With a puller (K) remove the brush side bracket (L).
19. Remove the mounting screws (M) of the driving wheel cover (N). Recover the nuts (P) and washers (O).
20. Remove the cover (N) from the reduction unit (Q).
21. If necessary, remove the screws (S) and the fasteners (T), then remove the bearing (R); if necessary, use a puller.
22. Remove the four screws (U), then remove the carbon brushes holder assembly (V).
23. If necessary, remove the bearing (W).
24. With a puller (K) remove the brush side bracket (X).
25. If necessary, remove the screws (Z) and the fasteners (AA), then remove the bearing (Y); if necessary, use a puller.
26. Remove the motor (AB) from the reduction unit (AC). Do not let the oil coming out of the hole (AF). Do not let dust and dirt enter the reduction unit through the hole (AF).
27. If necessary, remove the bearing (AD).
28. If necessary, remove the oil seal (AE).

Assembly

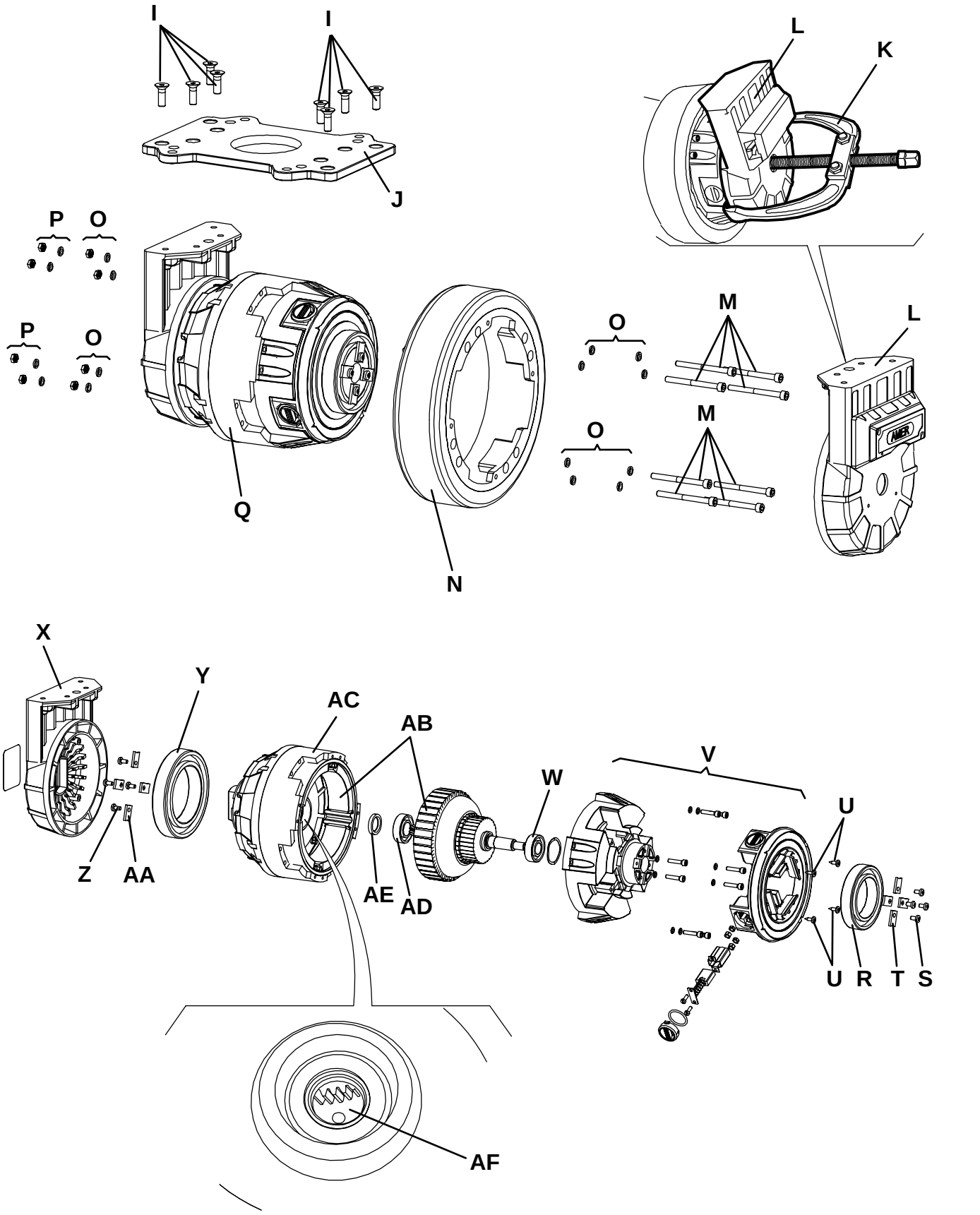
29. Assemble the components in the reverse order of disassembly, and note the following:
    - the reduction unit spare part (AC) is already filled with oil (AGIP BLASIA 150; quantity 21 cl).
    - If necessary, use a rubber mallet to install the cover (N).
    - Tighten the screws (M) at 141.61 lbf·in (16 N·m; 1.63 kgf·m).
    - Tighten the screws (I) at 194.71 lbf·in (22 N·m; 2.24 kgf·m).



S301649

DRIVE SYSTEM

DRIVE SYSTEM MOTOR, BEARING AND GASKET DISASSEMBLY/ASSEMBLY (Machines after January 2007) (Continues)



S301650

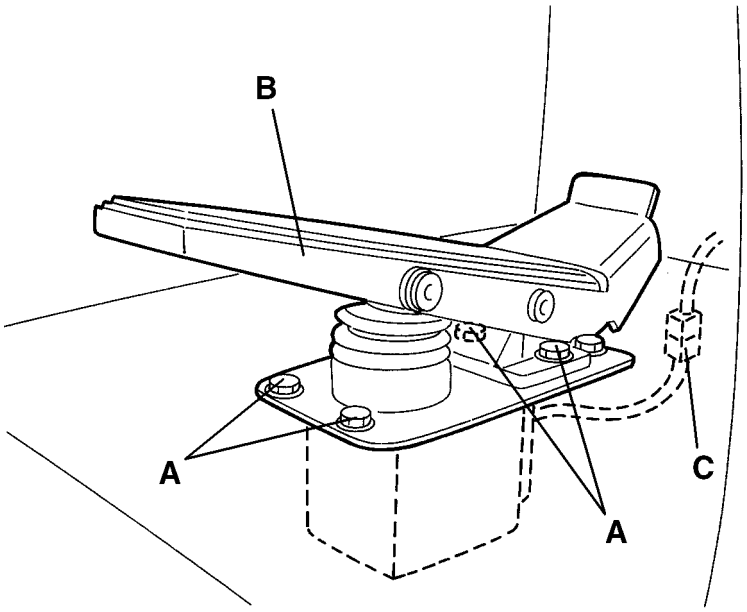
FORWARD/REVERSE GEAR PEDAL DISASSEMBLY/ASSEMBLY

Disassembly

1. Drive the machine on a level floor.
2. Engage the parking brake.
3. Remove the pedal mounting screws (A).
4. Slightly lift the pedal (B) and disconnect the connector (C).

Assembly

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

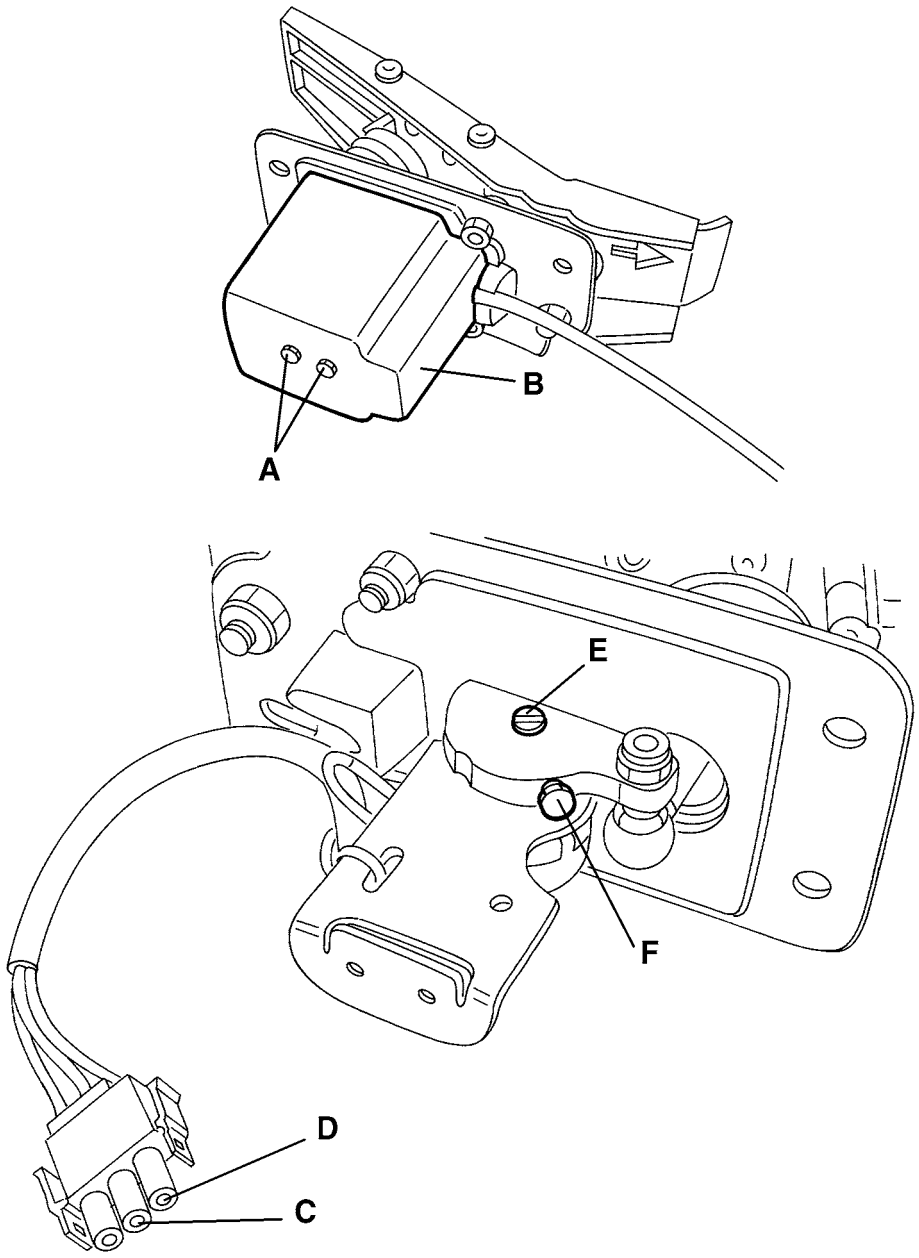


S301349

DRIVE SYSTEM

FORWARD/REVERSE GEAR PEDAL POTENTIOMETER CHECK AND ADJUSTMENT

1. Remove the forward/reverse gear pedal (see the procedure in the relevant paragraph).
2. At the workbench, remove the screws (A), then remove the protection (B).
3. Apply a tester on the connector centre contact (C) and on the side contact (D), then check that the resistance is 2,500 ± 500 Ω (Ohm) when the pedal is released. If necessary, reset the resistance correct value by loosening the screw (F) and operating on the potentiometer screw (E). Then tighten the screw (F).
4. Install the protection (B) and tighten the screws (A).
5. Install the forward/reverse gear pedal (see the procedure in the relevant paragraph).



S301350

SPEED REDUCTION SENSOR CHECK/ADJUSTMENT

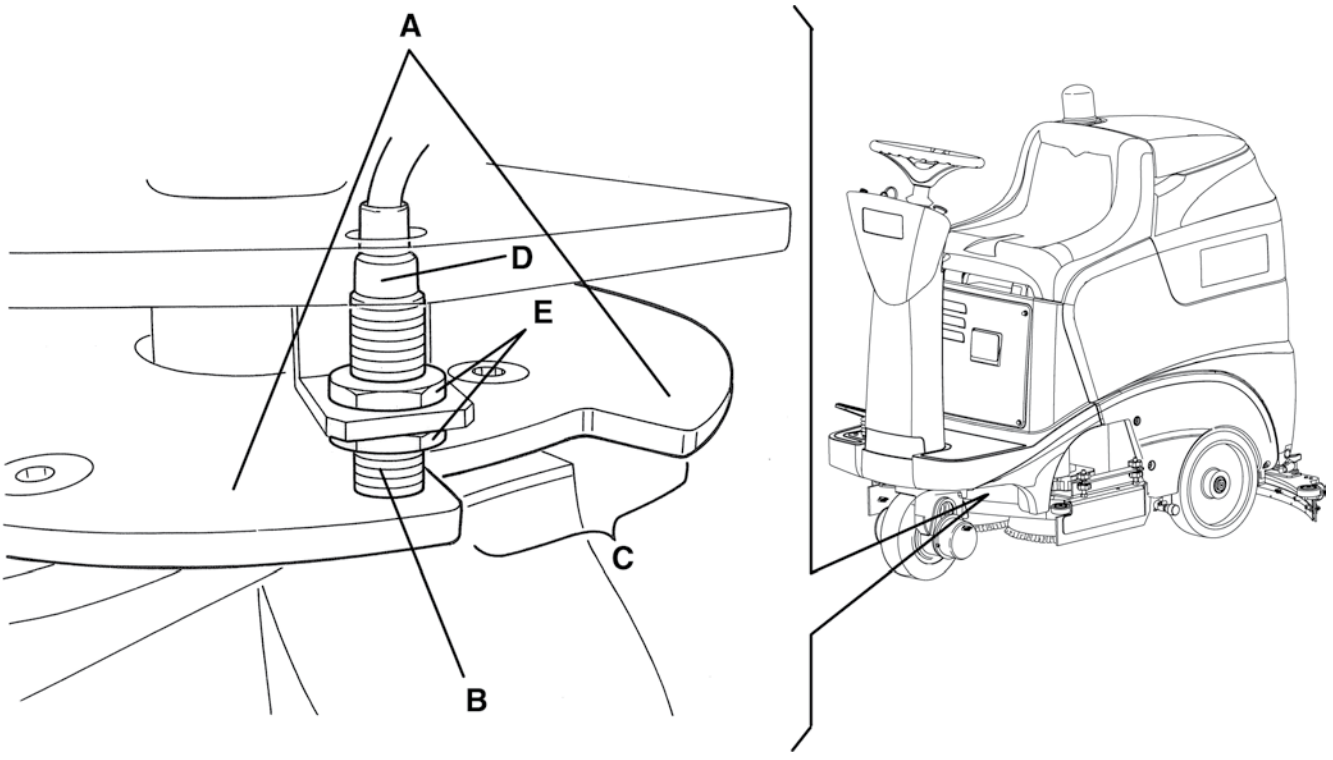
Check

1. According to the procedure shown in the User Manual, lift the brush/pad-holder deck and the squeegee, then start the machine, drive it at high speed, make turns both on the right and on the left, and check the following:
   - When the steering wheel (14) is turned for more than 1/4 turn (approximately), both on the right and on the left, the machine speed automatically decreases consistently.

   The machine is equipped with an anti-tilting safety system that reduces the speed when turning, irrespectively of the pressure on the pedal.
   The reduction of speed when turning is not a malfunction but a characteristic that improves the machine stability in every condition.
2. If necessary, adjust the speed reduction sensor according to the following procedure.

Adjustment

3. Place the machine on a hoisting system (if available). Otherwise, drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Clean the flange (A) in the area where the speed reduction sensor (B) operates.
6. Turn the steering wheel until the sensor (B) moves out of the deactivation area (C).
7. Temporarily turn the ignition key (12) to “I” with care, and check the area (D) to see if the sensor is active.
8. Turn the ignition key (12) to "0".
9. Turn the steering wheel to the right and to the left and check that the maximum distance between the sensor (B) and the flange (A) is 0.059 in (1.5 mm). Check that the sensor (B) never comes into contact with the flange (A).
10. If necessary, loosen the nuts (E) and adjust the position of the sensor (B). After adjusting, tighten the nuts (E).
11. Remove the machine from the hoisting system and check again (steps 1 and 2).



S301351

DRIVE SYSTEM

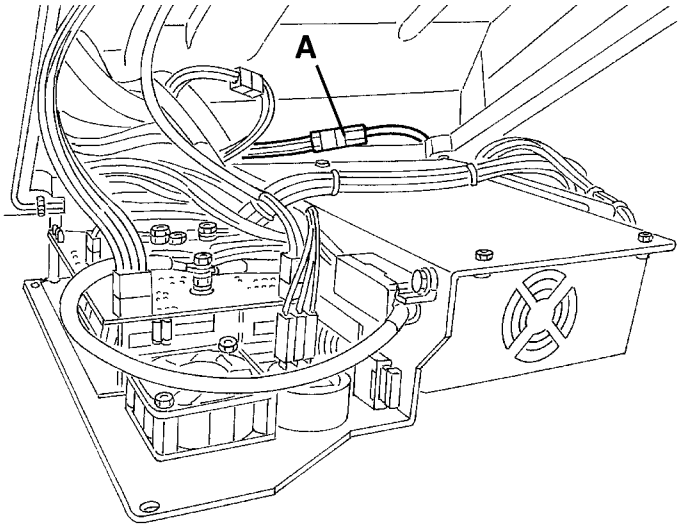
SPEED REDUCTION SENSOR REPLACEMENT

Disassembly

1. Remove the front fairing (see the procedure in the relevant paragraph).
2. Remove the nuts (93), then remove the cover (92).
3. Slightly move the electrical component panel (100).
4. Disconnect the speed reduction sensor connector (A).
5. Remove two mounting screws (H) of the foot board (I).
6. Lift the foot board (J) and remove the sensor cable (K) through the passage (L).
7. Remove the nuts (M), then remove the speed reduction sensor (N) with the cable.

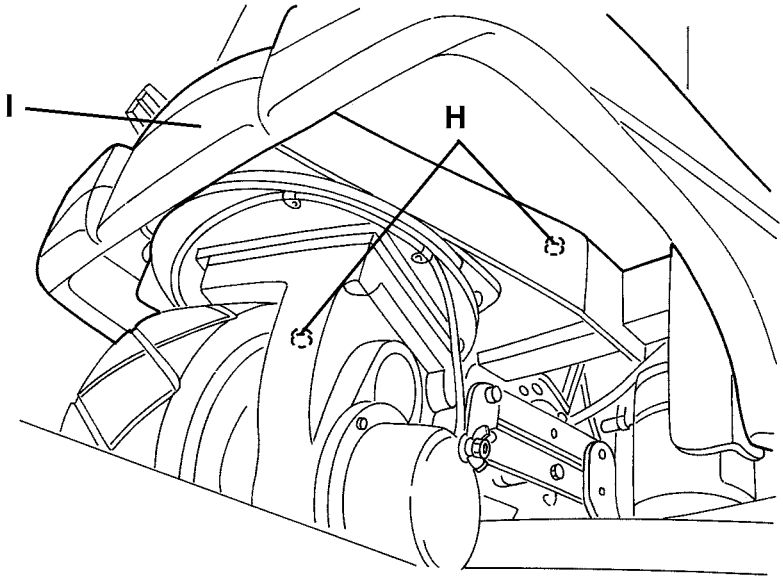
Assembly

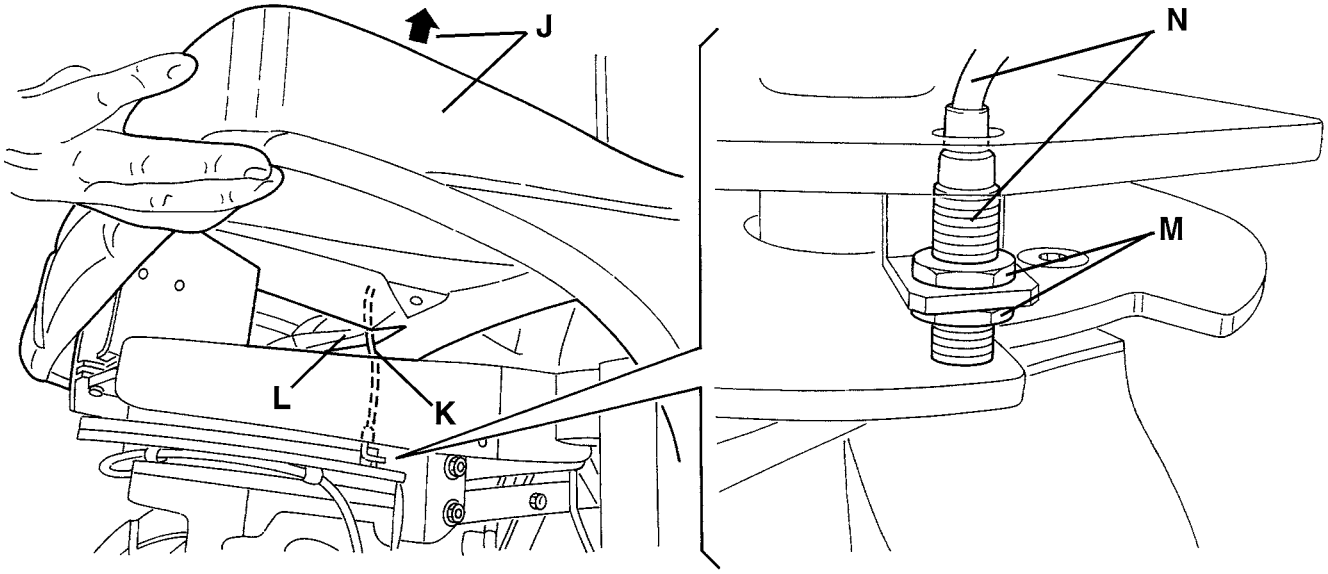
8. Assemble the components in the reverse order of disassembly, and note the following:
   - Insert the speed reduction sensor wiring harness (O) with the connector (P) disconnected; then connect the wiring harness to the connector (P), paying attention to the cable colours.
   - Adjust the speed reduction sensor (see the procedure in the relevant paragraph).

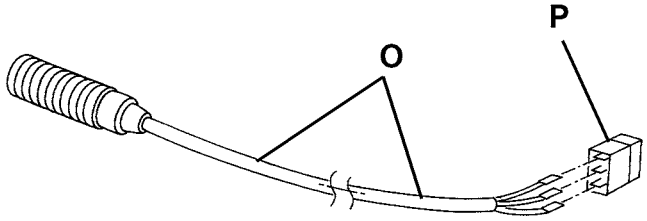


S301398

SPEED REDUCTION SENSOR REPLACEMENT (Continues)







S301353

DRIVE SYSTEM

DRIVER'S SEAT SAFETY MICROSWITCH OPERATION CHECK

1. Check for proper machine operation in forward and reverse gear, as shown in the User Manual.
2. Check that the ignition key (12) is turned to “I” and that the battery green warning light (7a) is on.
3. Slightly lift from the seat (37) and try to start the machine with the hands on the steering wheel and by gradually pressing the pedal (15), both in forward and in reverse gear: Check that the machine can move neither forward nor backward. Otherwise, check the proper operation of the safety system that prevents the machine movement if the operator is not seating on the driver's seat, according to the following procedure:
   - Check for driver's seat microswitch proper operation, otherwise replace it according to the following procedure.
   - If necessary, check the driver's seat microswitch wiring harness.

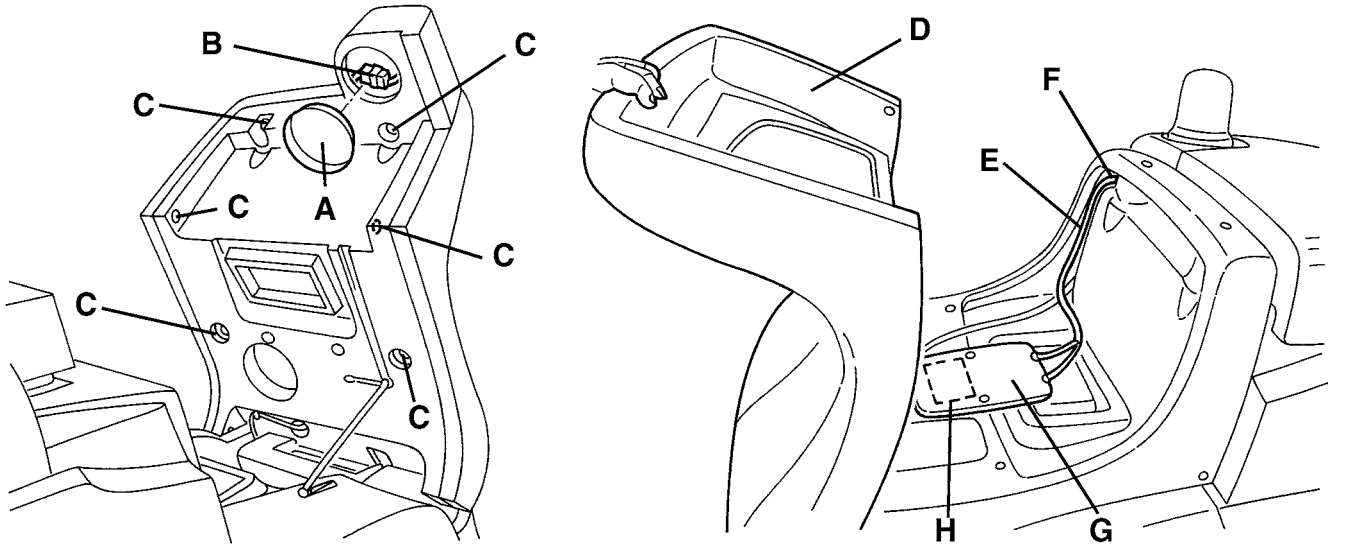
DRIVER'S SEAT SAFETY MICROSWITCH REPLACEMENT

Disassembly

1. Drive the machine on a level floor.
2. Turn the ignition key (12) to "0".
3. Open the cover (56) and install the support rod (57).
4. Remove the cover (A) and disconnect the microswitch connector (B).
5. Remove the screws (C).
6. Remove the support rod (57) and close the cover (56).
7. Slightly move the seat (D).
8. Remove the wiring harness (E) from the hole (F).
9. Remove the driver's seat microswitch (G) by detaching the adhesive (H).

Assembly

10. Assemble the components in the reverse order of disassembly.
11. Check that the machine cannot move if the operator is not on the driver's seat (37) (see the above-mentioned procedure).



S301354

TROUBLESHOOTING

OPEN CIRCUIT

The fuse (F2) causes an open in the circuit. This system allows to prevent the drive system motor and its circuits from being damaged under overload conditions.
If there is an open in the circuit, the possible causes are:

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 wiring harness (repair).
5. The drive system electronic board is faulty (replace).
6. The parking brake is faulty (see the Parking Brake chapter).

THE MACHINE DOES NOT MOVE

Possible causes:

1. The battery voltage is too low (charge the battery).
2. The forward/reverse gear pedal potentiometer is misadjusted or broken (adjust or replace).
3. The speed adjuster is broken (replace).
4. The drive system electronic board is faulty (replace).
5. The wiring harness is damaged (check all connections inside the electrical component compartment, included those of the function electronic board).
6. The drive system motor carbon brushes are worn (replace).
7. The drive system motor is faulty (replace).
8. The microswitch of the safety system that prevents the machine movement if the operator is not seating on the driver's seat, is broken (repair/replace).
9. The parking brake cannot be disengaged (see the Parking Brake chapter).
10. There is an open in the drive system electronic board fuse F2 (replace).
11. The function electronic board is faulty (see the Electrical System chapter).

DRIVE SYSTEM ELECTRONIC BOARD ERROR CODES

The warning LED (99) stays on, when the drive system operates properly and the machine is in the following condition:

- Ignition key (12) turned to "I".

If the warning LED (99) is off or flashing, it indicates an error. Check the error code according to the following table.

DRIVE SYSTEM

TROUBLESHOOTING (Continues)

DRIVE SYSTEM ELECTRONIC BOARD ERROR CODE TABLE			
LED CODES			DESCRIPTION (REMEDY)
Note	Reference	LED flashing pattern	
		LED off	Broken drive system electronic board, or burned drive system fuse (FT), or disconnected cable (check the drive system electronic board wiring harness).
		LED on	Control system operating; no failure reported.
	1.1	¤ ¤	Activated thermal protection (wait few minutes to allow the electronic board to cool down. If the problem persists, check the drive system motor electrical input).
	1.2	¤ ¤¤	Faulty forward/reverse gear pedal (check).
	1.3	¤ ¤¤¤	Wrong programming of drive system electronic board (replace).
	1.4	¤ ¤¤¤¤	Voltage too low (check the batteries).
	1.5	¤ ¤¤¤¤¤	Voltage too high (check the batteries).
	2.1	¤¤ ¤	Faulty main contact OFF function (replace the electronic board).
	2.3	¤¤ ¤¤¤	Faulty main contact (replace the electronic board).
	2.4	¤¤ ¤¤¤¤	Faulty main contact ON function (replace the electronic board).
*	3.1	¤¤¤ ¤	Forward/reverse gear pedal pressed when starting the machine (check).
	3.2	¤¤¤ ¤¤	Wrong programming of drive system electronic board (replace).
	3.3	¤¤¤ ¤¤¤	Forward/reverse gear pedal pressed when starting the machine (check).
	3.4	¤¤¤ ¤¤¤¤	Wrong programming of drive system electronic board (replace).
	3.5	¤¤¤ ¤¤¤¤¤	Forward/reverse gear pedal pressed when starting the machine (check).
*	4.1	¤¤¤¤ ¤	Drive system motor short circuit (check the motor and the relevant wiring harness).
*	4.2	¤¤¤¤ ¤¤	Drive system motor short circuit (check the motor and the relevant wiring harness).
*	4.3	¤¤¤¤ ¤¤¤	The electronic board is faulty (replace).
*	4.4	¤¤¤¤ ¤¤¤¤	Faulty electronic board (replace), or drive system motor short circuit (check the motor and the relevant wiring harness).
* = Reset the system by turning the ignition key to “0” and then to “I”. NOTE: the LED signals only one error code at a time; other errors are not queued.			

OTHER SYSTEMS

SCREW AND NUT TIGHTENING CHECK

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Carefully lift the tank assembly (60).
6. Check:
   - Tightening of mounting screws and nuts;
   - Correct position of fasteners;
   - Visible faults in the components;
   - Leaks of fluids.
7. Carefully lower the tank assembly (60).

OTHER SYSTEMS

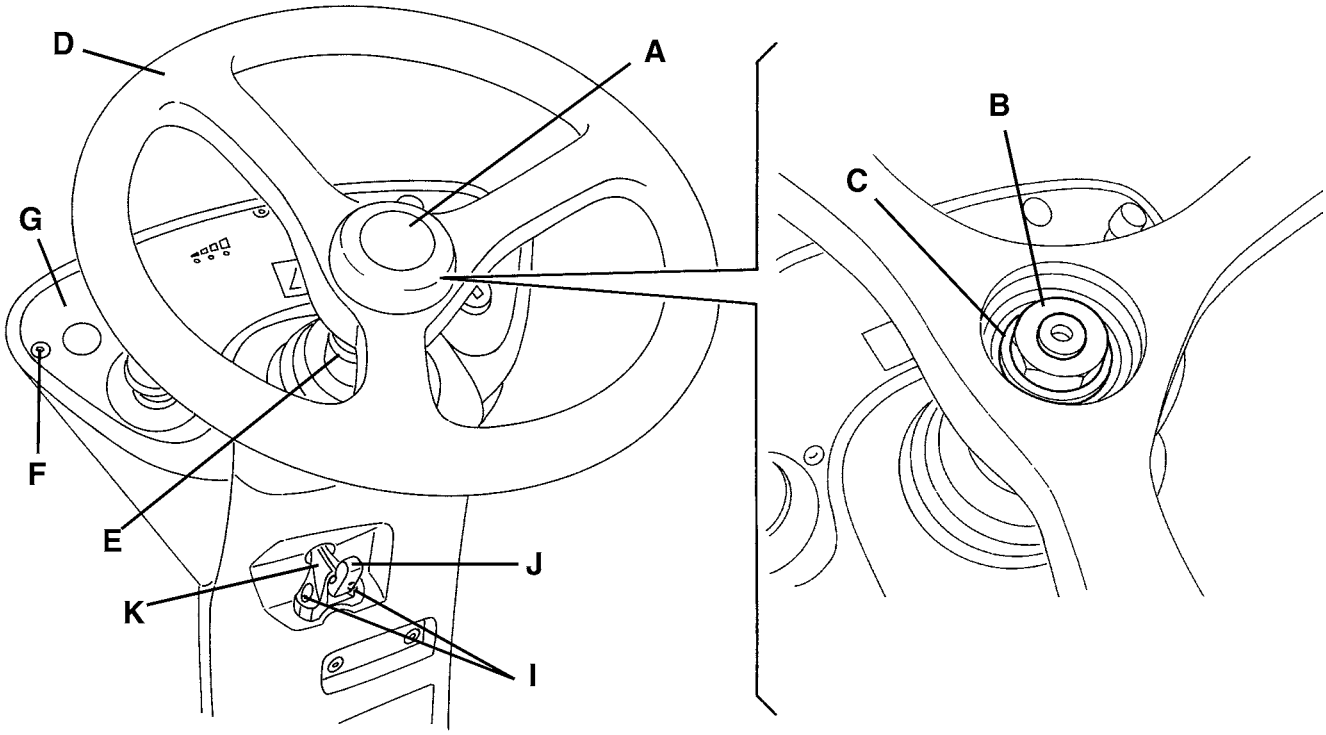
FRONT FAIRING DISASSEMBLY/ASSEMBLY

Disassembly

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Carefully lift the tank assembly (60).
6. Disconnect the battery connector (63).
7. Remove the cover (A) (the cover is press-fitted).
8. Remove the steering wheel nut (B) and recover the washer (C).
9. Remove the steering wheel (D).
10. Remove the clamp (E).
11. Remove the screws (F) and slightly lift the control panel (G) with care.
12. Disconnect the connectors (H) and recover the control panel.
13. Remove the steering wheel tilting control lever support screws (I).
14. Slightly pull the lever (J) upwards, and remove the support (K).
15. Disconnect the lever (M) from the cable terminal (N).
16. Remove the screws (O).
17. Lift and remove the fairing (P).

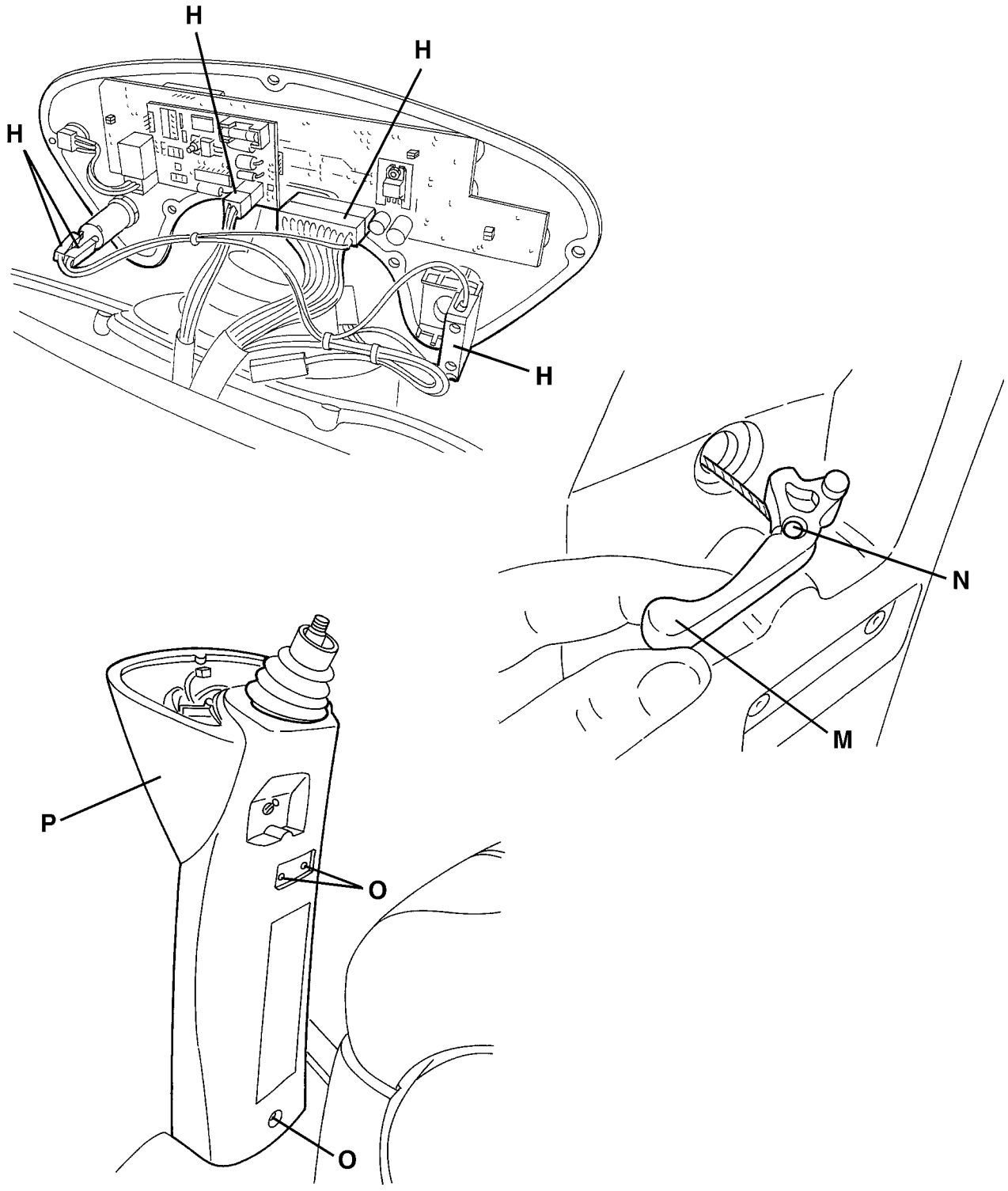
Assembly

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



S301355

FRONT FAIRING DISASSEMBLY/ASSEMBLY (Continues)



S301356

ELECTRICAL SYSTEM

ELECTRICAL SYSTEM

MACHINE WORKING HOUR CHECK

1. Turn the ignition key (12) to "I".
2. In the first 5 seconds of machine operation, the display (8) shows the total number of working hours (scrubbing/drying) performed by the machine.
3. Turn the ignition key (12) to "0".

HOUR COUNTER RESET PROCEDURE

NOTE
Perform this procedure only in case this cannot compromise warranties or scheduled maintenance intervals.

1. Turn the ignition key (12) to "0".
2. Press and hold the switch (9) and turn the ignition key (12) to “I”.
3. Press and hold the switch (9) until the working hours are shown on the display (8) (after 15 seconds approximately).
4. Press and release the switch (9) 5 times, within 5 seconds.
5. The hour counter is reset.

BATTERY MAINTENANCE AND RECHARGING

See the User Manual.

BATTERY DISASSEMBLY/ASSEMBLY

Disassembly

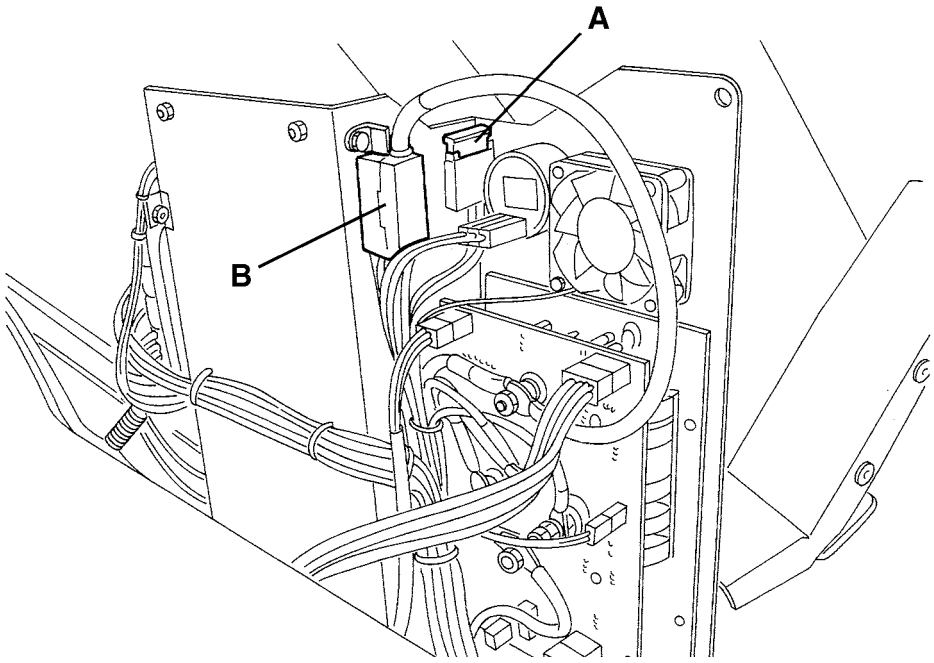
1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Carefully lift the tank assembly (60) to reach the batteries.
6. Disconnect the battery connector (63).
7. Disconnect the battery terminals (61).
8. Remove the batteries (61).
9. If necessary, remove the battery case (62).

Assembly

10. Assemble the components in the reverse order of disassembly, and note the following:
    - If a battery box is installed, place it on the left side of the machine, to allow the tank assembly (60) to be closed correctly.

FUSE CHECK/REPLACEMENT

1. Turn the ignition key (12) to "0".
2. Remove the nuts (93), then remove the cover (92).
3. Check/replace the following fuse:
   - Drive system electronic board protection fuse (F2) (60 A) (96)
4. Carefully move the electronic component panel (100) and check/replace the following fuses:
   - Low power circuit protection fuse (F3) (5 A) (A)
   - Function electronic board protection fuse (F1) (100 A) (B)
5. Install the electrical component panel (100) and the cover (92), then tighten the nuts (93).



S301400

ELECTRICAL SYSTEM

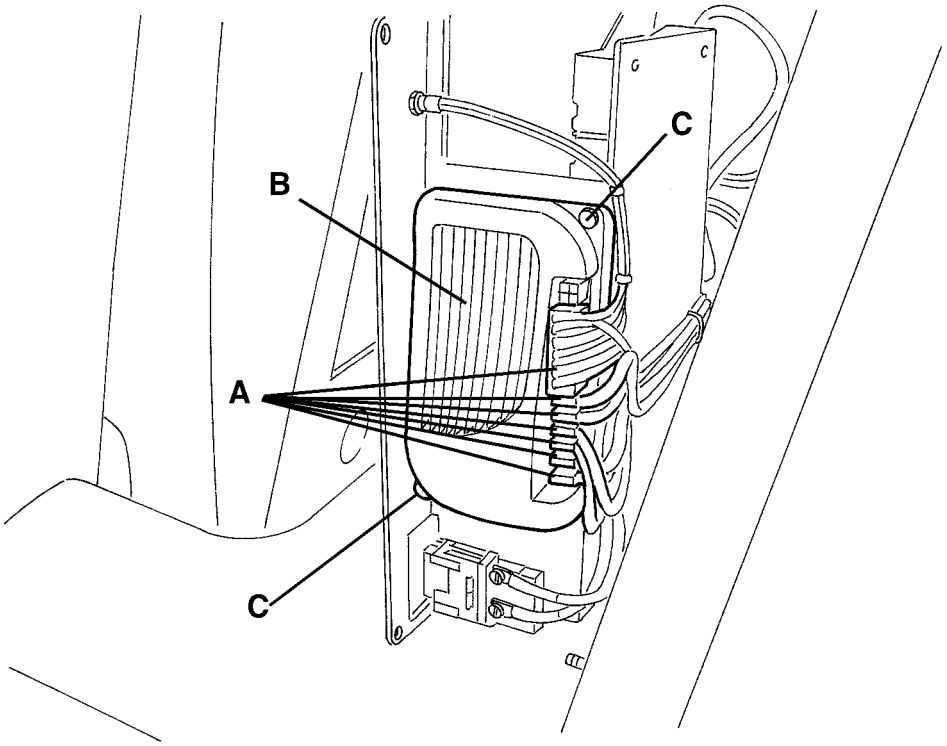
DRIVE SYSTEM ELECTRONIC BOARD REPLACEMENT

Disassembly

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Carefully lift the tank assembly (60).
6. Disconnect the battery connector (63).
7. Remove the nuts (93), then remove the cover (92).
8. Slightly move the electrical component panel (100).
9. Disconnect the connectors (A) from the drive system electronic board (B).
10. Remove the screws (C).
11. Remove the drive system electronic board (B).

Assembly

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



S301358

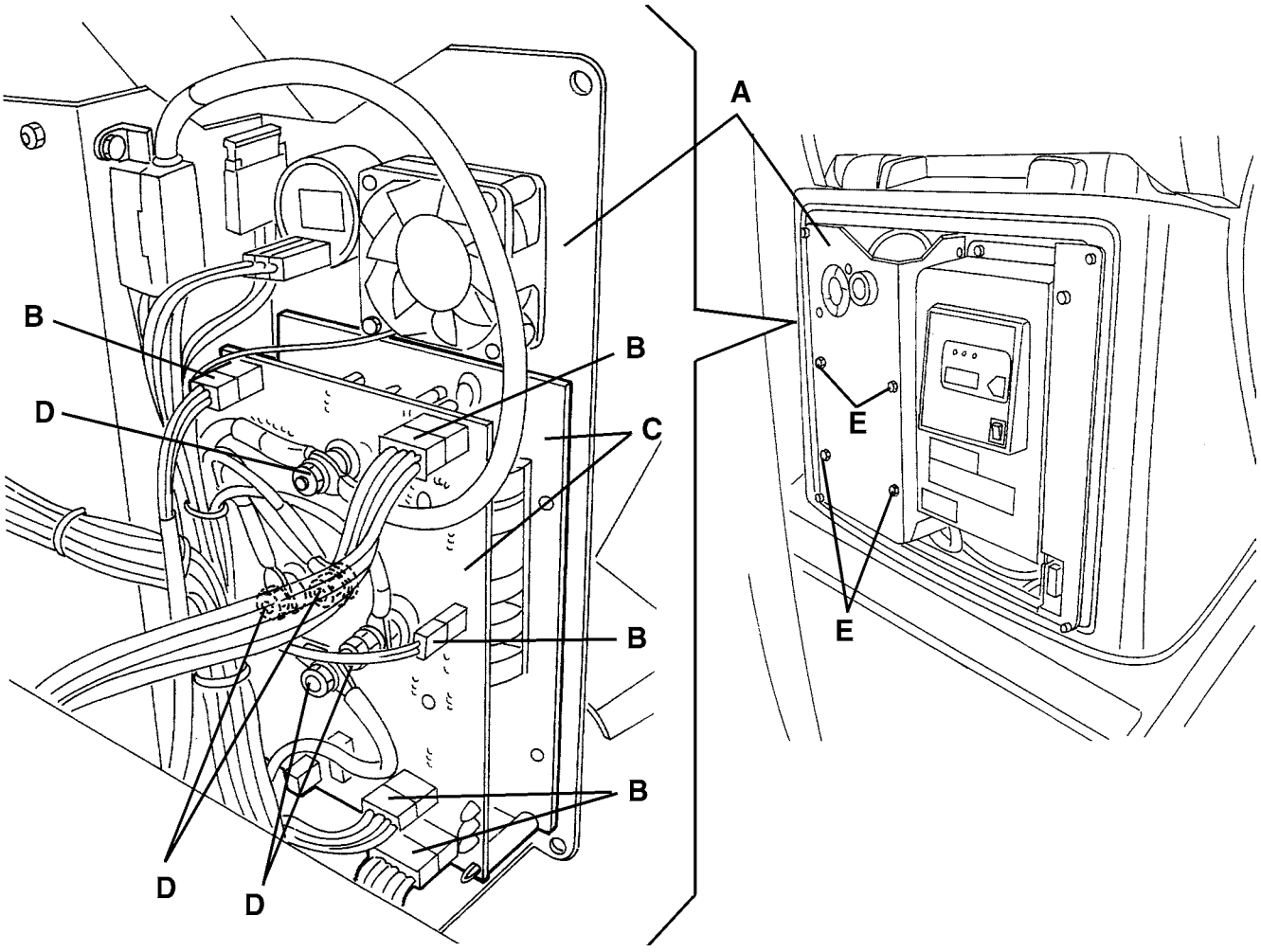
FUNCTION ELECTRONIC BOARD REPLACEMENT

Disassembly

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Carefully lift the tank assembly (60).
6. Disconnect the battery connector (63).
7. Remove the nuts (93), then remove the cover (92).
8. Slightly move the electrical component panel (A).
9. Disconnect the connectors (B) of the function electronic board (C).
10. Disconnect the lead-in wires (D).
11. Remove the screws (E).
12. Remove the function electronic board (C).

Assembly

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



S301359

ELECTRICAL SYSTEM

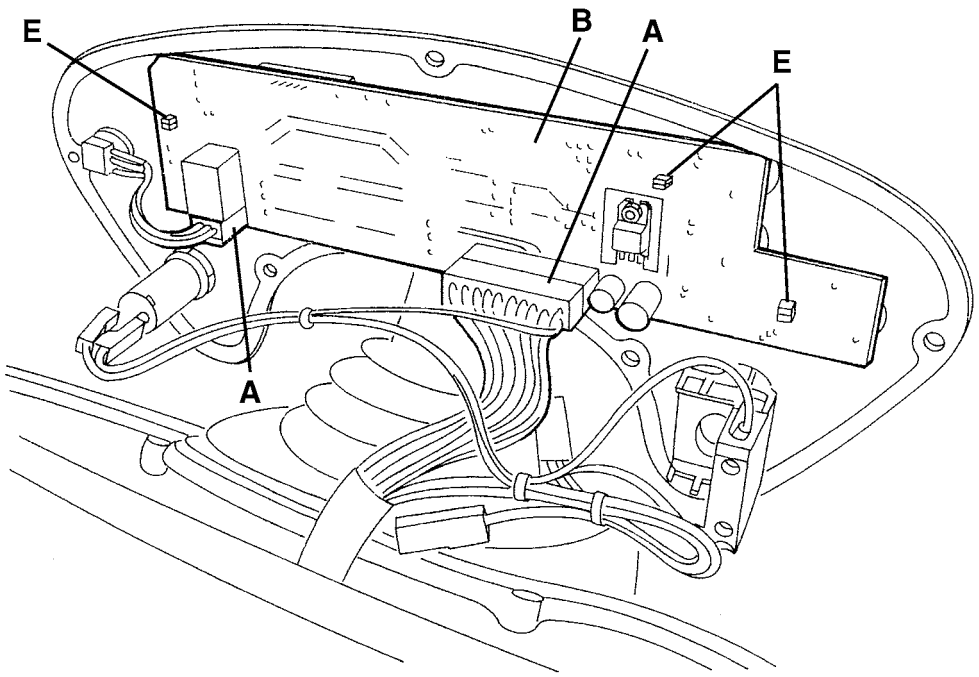
DASHBOARD ELECTRONIC BOARD REPLACEMENT

Disassembly

1. Drive the machine to the appointed disposal area, and empty the recovery water tank (58) with the hose (22).
2. Empty the solution tank (59) with the tap (36).
3. Drive the machine on a level floor.
4. Turn the ignition key (12) to "0".
5. Carefully lift the tank assembly (60).
6. Disconnect the battery connector (63).
7. Remove the mounting screws, then slightly lift the control panel (1).
8. Disconnect the connectors (A) of the dashboard electronic board (B).
9. Remove the dashboard electronic board (B) by disengaging the fasteners (E).

Assembly

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



S301360

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).

NOTE
In the machines equipped with on-board battery charger, a fault in the battery charger and relevant connections can affect the machine operation.

3. The battery charger is broken (replace) (only for machine equipped with on-board battery charger).
4. There is an open in the fuses (replace).
5. The wiring harness is cut or pressed (repair).

FUNCTION ELECTRONIC BOARD ERROR CODES

On the function electronic board there are the following warning LEDs:
– Red LED (upper) (101)
– Green LED (102)
– Red LED (lower) (103)

Under normal conditions (ignition key turned to “I” and batteries connected), only the green LED (102) must be on.
If the green LED (102) is off, the possible causes are:
– The batteries are disconnected (connect/check the wiring harness).
– The batteries are broken (replace).
– The ignition key circuit is faulty (check the emergency push-button, the ignition switch, the battery charger).
– There is an open in the fuse (97) (replace).
– There is an open in the fuse (98) (replace).

If the green warning LED (102) is on, but the red LED (101) or (103) is flashing, it indicates an error. Check the error code according to the following table.

ELECTRICAL SYSTEM

TROUBLESHOOTING (Continues)

FUNCTION ELECTRONIC BOARD ERROR CODE TABLE					
Electronic board LEDs	**Flashing pattern**	**Meaning**	**Possible causes**	**Lock**	**Reset**
Green LED (102)	Always on	Power supplied electronic board	-	-	-
Red LED (upper) (101)	Slow flashing	Deck actuator time-out	Mechanical obstacle to the deck actuator movement, or faulty deck actuator, or open in the deck actuator cable (check the connections), or broken deck actuator microswitch (replace the actuator).	None	By switch (4)
	Fast flashing	Abnormal reading of deck actuator position	Open in the deck actuator cable (check the connections), or broken deck actuator microswitch (replace the actuator).	Deck actuator	By ignition key
Red LED (lower) (103) and dashboard yellow LED	1 flash	CC MOS at start-up	Short circuit in function electronic board wiring harness (check power cables on function electronic board), or faulty function electronic board (replace).	All except Out *	By ignition key
	2 flashes	Deck actuator CC1 (lowering overcurrent)	Short circuit in deck actuator cable (check), or faulty deck actuator (replace), or faulty function electronic board (replace).	Deck actuator	By switch (4)
	3 flashes	Deck actuator CC2 (lifting overcurrent)		Deck actuator	By switch (4)
	4 flashes	Overvoltage	Wrong battery voltage (check battery voltage and battery series/parallel connection).	General relay	By ignition key
	5 flashes	Brush motor CC (overcurrent)	Short circuit in brush motor wiring harness (check), or faulty brush motors (replace), or faulty function electronic board (replace).	Brush motor output	By ignition key
	6 flashes	Vacuum system motor CC (overcurrent)	Short circuit in vacuum system motor wiring harness (check), or faulty vacuum system motor (replace), or faulty function electronic board (replace).	Vacuum system motor output	By ignition key
	7 flashes	IMAX_SPAZZ. (>5s at 100 A)	Mechanical obstacle to brush motor rotation (check), or faulty brush motor (replace).	Brush motor output	By ignition key
	8 flashes	IMAX_ASP. (>5s at 50 A)	Mechanical obstacle to vacuum system motor rotation, or faulty vacuum system motor (replace).	Vacuum system motor output	By ignition key

TROUBLESHOOTING (Continues)

FUNCTION ELECTRONIC BOARD ERROR CODE TABLE					
Electronic board LEDs	**Flashing pattern**	**Meaning**	**Possible causes**	**Lock**	**Reset**
Red LED (lower) (103) and dashboard yellow LED	9 flashes	Probe 1 overtemperature	Faulty cooling fan (check M9), or too heavy working conditions (let the machine cool down), or faulty function electronic board (replace).	All except Out *	By ignition key
	10 flashes	Probe 2 overtemperature		All except Out *	By ignition key
	11 flashes	Ignition key turned to "0"	False contact from ignition key circuit (check connections of dashboard, function electronic board, ignition switch, emergency push-button and battery charger).	All except Out *	By ignition key
	12 flashes	EEPROM (software failure)	Faulty function electronic board (replace).	All except Out *	By ignition key
	13 flashes	Squeegee actuator CC (lowering overcurrent)	Short circuit in function electronic board or squeegee actuator (check), or faulty squeegee actuator (replace), or stuck squeegee actuator (check), or faulty function electronic board (replace).	Squeegee actuator	By switch (6)
	14 flashes	Squeegee actuator CC (lifting overcurrent)		Squeegee actuator	By switch (6)

ELECTRICAL SYSTEM

TROUBLESHOOTING (Continues)

FUNCTION ELECTRONIC BOARD CONNECTION REFERENCE

Connectors

Key:	
J1	Dashboard inputs/outputs
J2	Auxiliary inputs/outputs 1
J3	Auxiliary inputs/outputs 2
J4	Brush deck actuator
J5	Fan

J1			
PIN	**Description**	**Reference voltage**	**Electronic board in/out**
1	Logical power from key (+)	24 V	In
2	Dashboard power supply (-)	0 V	Out(**)
3	Return from brush deck lifting/lowering switch	Indef (0 V)	In
4	Return from extra pressure switch	Indef (0 V)	In
5	Return from vacuum system on/off switch	Indef (0 V)	In
6	Brush deck lifting/lowering switch LED power supply (LED1)	Indef (0 V)	Out
7	Extra pressure function switch LED power supply	Indef (0 V)	Out
8	Vacuum system on/off switch LED power supply	Indef (0 V)	Out
9	Battery GREEN LED power supply	Indef (0 V)	Out
10	Battery YELLOW LED power supply	Indef (0 V)	Out(**)
11	Battery RED LED power supply	Indef (0 V)	Out
12	Pressure switch output	0 - 5 V	Out(**)
13	Solenoid valve adjustment input 1	Indef (0 V)	In
14	Solenoid valve adjustment input 2	Indef (0 V)	In
15	Horn input	Indef (0 V)	In
16	Solenoid valve output (repetition of J2.2)	Indef (0 V)	Out

J2			
PIN	**Description**	**Reference voltage**	**Electronic board in/out**
1	Solenoid valve power supply	24 V	Out
2	Solenoid valve power supply	Indef (0 V)	Out
3	Squeegee actuator power supply	24 V	Out
4	Squeegee actuator power supply	Indef (0 V)	Out
5	Return from driver's seat microswitch	Indef (0 V)	In
6	Pressure switch input	0 - 5 V	In
7	Auxiliary power supply (+)	+24 V	Out(**)
8	Auxiliary power supply (-)	0 V	Out(**)

Connectors (Continues)

J3			
PIN	**Description**	**Reference voltage**	**Electronic board in/out**
1	Auxiliary power supply (+)	24 V	Out(**)
2	Auxiliary power supply (+)	24 V	Out(**)
3	Auxiliary power supply (-)	0 V	Out(**)
4	Input from machine moving signal	Indef (0 V)	In
5	Input from reverse gear signal	Indef (0 V)(*)	In
6	Cylindrical brush deck enabling input	Indef (0 V)	In
7	Drive system inhibition output	Indef (0 V)	Out(**)
8	Horn output	Indef (0 V)	Out(**)

J4			
PIN	**Description**	**Reference voltage**	**Electronic board in/out**
1	Deck jack power supply	Indef	Out
2	Deck jack power supply	Indef	Out
3	Jack return microswitch m0	Indef (0 V)	In
4	Jack return microswitch m1	Indef (0 V)	In
5	Jack return microswitch m2	Indef (0 V)	In
6	Jack microswitch common power supply	0 V	Out

J5			
PIN	**Description**	**Reference voltage**	**Electronic board in/out**
1	Fan power supply	24 V	Out
2	Fan power supply	Indef (0 V)	Out

(*) Pull-up at 24 V
(**) Outputs allowed also in case of ALARM, see the error code table

ELECTRICAL SYSTEM

COMPONENT LAYOUT

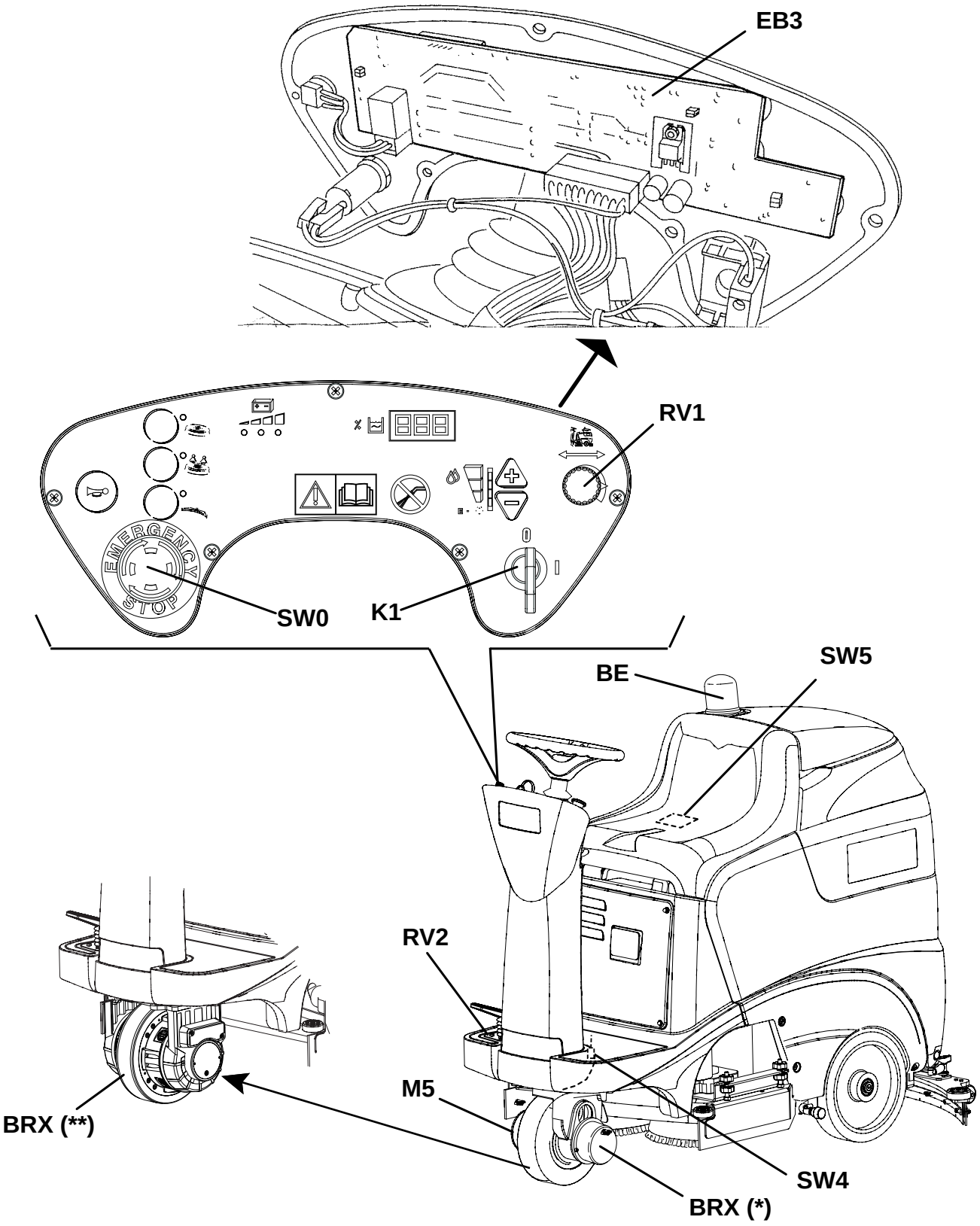
Key

BAT	24 V battery
BE	Flashing light
BRX	Electromagnetic brake
BZ1	Reverse gear warning buzzer/horn
C1	Battery connector
C2	Battery charger auxiliary connector
C3	Battery charger external fan auxiliary connector
CH	Battery charger (optional)
CS	Brush deck connector
CSC	Cylindrical brush deck secondary connector
EB1	Function electronic board
EB2	Drive system electronic board
EB3	Electronic board under the control panel
EB3/2	Electronic board under control panel (optional)
EV1	Water solenoid valve
F1	Function electronic board fuse
F2	Drive system electronic board fuse
F3	Low power circuit fuse
F4	Pump fuse (optional)
K1	Ignition switch
LD1	Drive system electronic board diagnostic warning light
M1	Left brush motor
M2	Right brush motor
M3	Vacuum system motor
M4	Brush deck actuator
M5	Drive system motor
M6	Squeegee actuator
M7	Water pump (optional)
M8	Detergent pump (optional)
M9	Cooling fan
PR1	Water level sensor
RV1	Working speed potentiometer
RV2	Speed potentiometer (pedal)
SW0	Emergency push-button
SW1	Actuator position 0 microswitch
SW2	Actuator position 1 microswitch
SW3	Actuator position 2 microswitch
SW4	Steering sensor
SW5	Driver's seat microswitch
SW6	Reverse gear switch (if equipped)

Colour codes

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

COMPONENT LAYOUT (Continues)



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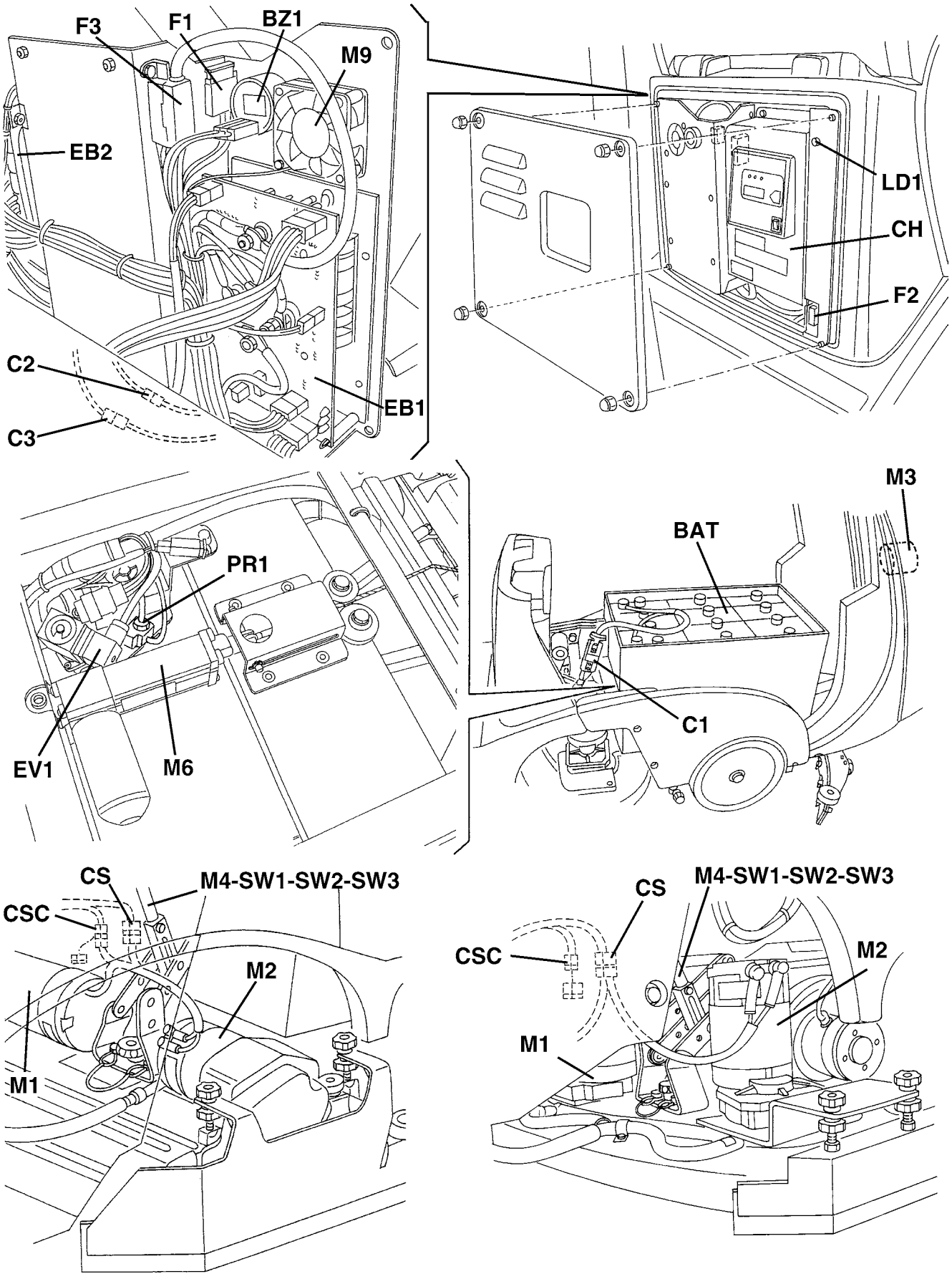
(*) Machines up to January 2007
(**) Machines after January 2007

ELECTRICAL SYSTEM

COMPONENT LAYOUT (Continues)



S301403

WIRING DIAGRAM

Key

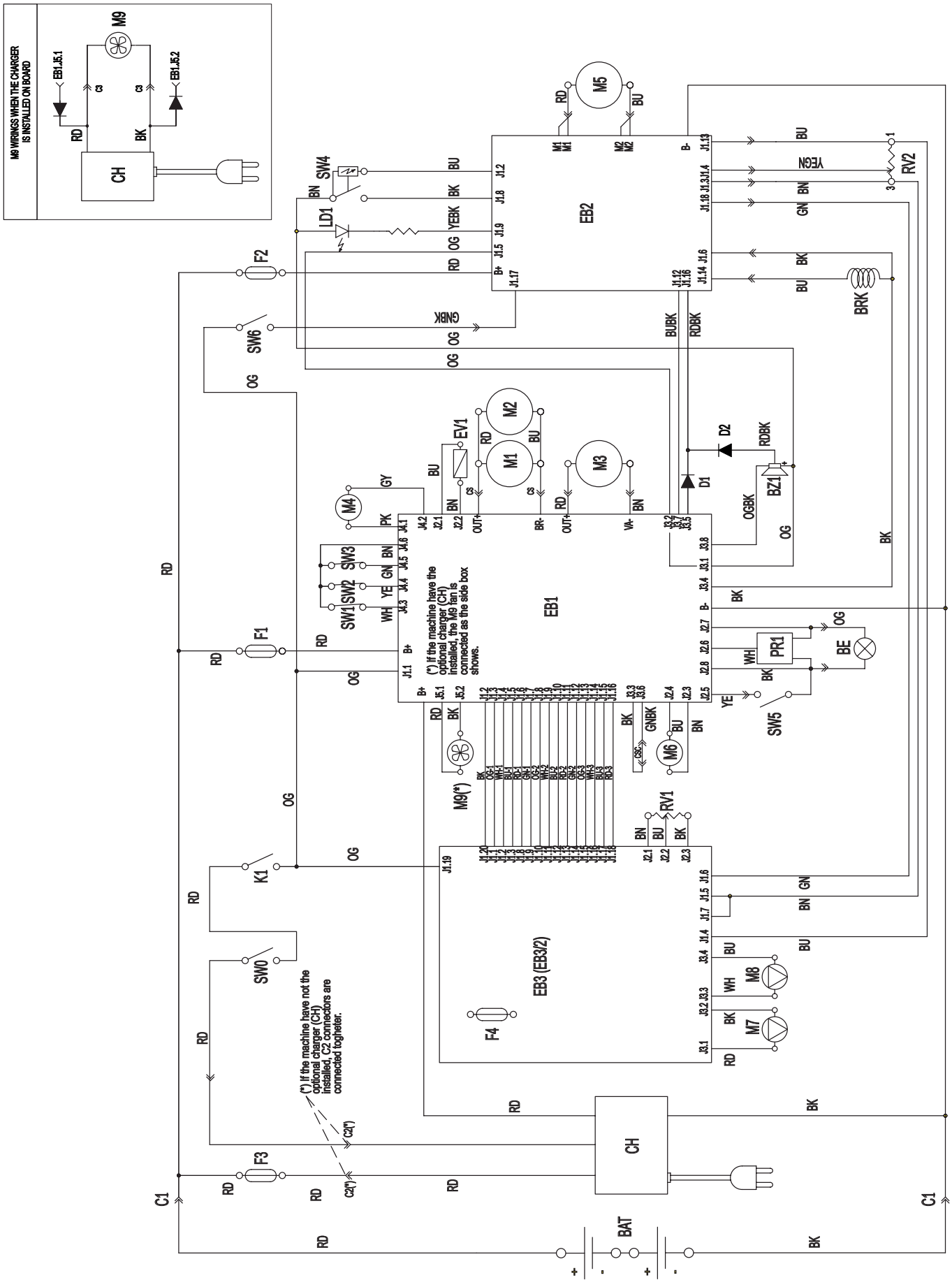
BAT	24 V battery
BE	Flashing light
BRX	Electromagnetic brake
BZ1	Reverse gear warning buzzer/horn
C1	Battery connector
C2	Battery charger auxiliary connector
C3	Battery charger external fan auxiliary connector
CH	Battery charger (optional)
CS	Brush deck connector
CSC	Cylindrical brush deck secondary connector
EB1	Function electronic board
EB2	Drive system electronic board
EB3	Electronic board under the control panel
EB3/2	Electronic board under control panel (optional)
EV1	Water solenoid valve
F1	Function electronic board fuse
F2	Drive system electronic board fuse
F3	Low power circuit fuse
F4	Pump fuse (optional)
K1	Ignition switch
LD1	Drive system electronic board diagnostic warning light
M1	Left brush motor
M2	Right brush motor
M3	Vacuum system motor
M4	Brush deck actuator
M5	Drive system motor
M6	Squeegee actuator
M7	Water pump (optional)
M8	Detergent pump (optional)
M9	Cooling fan
PR1	Water level sensor
RV1	Working speed potentiometer
RV2	Speed potentiometer (pedal)
SW0	Emergency push-button
SW1	Actuator position 0 microswitch
SW2	Actuator position 1 microswitch
SW3	Actuator position 2 microswitch
SW4	Steering sensor
SW5	Driver's seat microswitch
SW6	Reverse gear switch (if equipped)

Colour codes

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

ELECTRICAL SYSTEM

WIRING DIAGRAM (Continues)



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