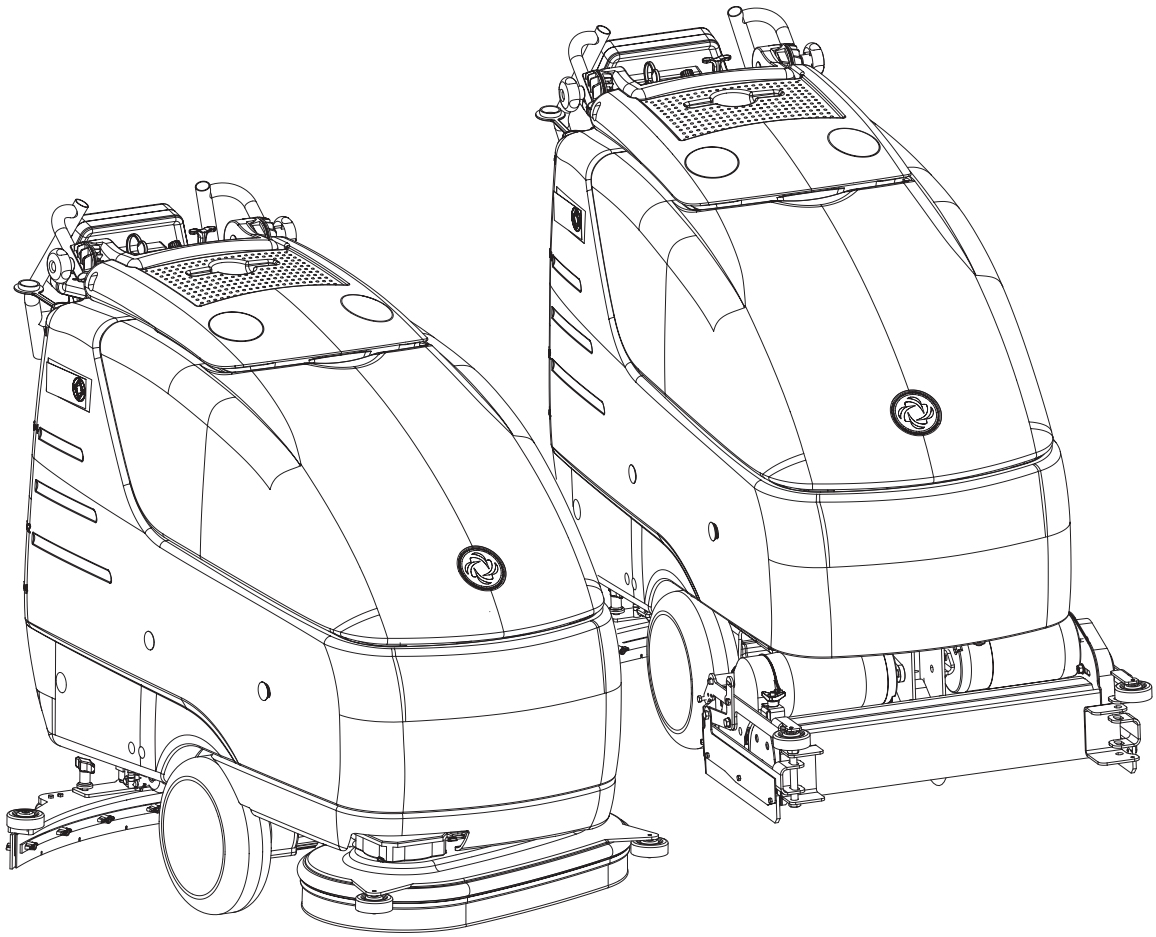
Razor™ Plus 24D-26D-28D



SERVICE MANUAL

KENT/Euroclean models:

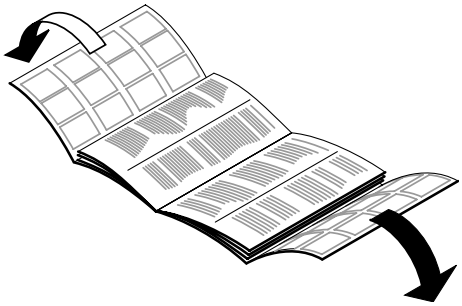
908 7041 020 - 908 7038 020 - 908 7039 020

ENGLISH

909 5485 000(1)2004-08

KENT Euroclean

Working For A Cleaner World



NOTE
Forward, backward, front, rear, left or right are intended with reference to the operator's position.

GENERAL INFORMATION

MACHINE LIFTING

WARNING!
Do not work under the lifted machine, if it is not securely fixed.

MACHINE TRANSPORTATION

WARNING!
Before transporting the machine, ensure that:

- **All doors and carters are closed.**
- **The ignition key is not inserted.**
- **The machine is firmly fastened to the means of transport.**

OTHER AVAILABLE MANUALS FOR RAZOR™ PLUS 24D-26D-28D

The following manuals are available at KENT/Euroclean Literature Service Department:

– Spare Part List of Razor™ Plus 24D-24D-28D - KENT/Euroclean 909 5429 000.
– Instructions for Use of Razor™ Plus 24D-26D-28D - KENT/Euroclean 909 5428 000.

SAFETY

The following symbols indicate potentially dangerous situations. Always read this information carefully and take the necessary precautions to protect people and objects.

DANGER!
It indicates a dangerous situation (risk of death) for the User.

WARNING!
It indicates the risk for people of being injured and for objects of being damaged.

CAUTION!
It indicates a caution or a remark related to important or useful functions. Pay particular attention to the paragraphs marked by this symbol.

GENERAL SAFETY RULES

The following specific warnings and cautions inform you of any potential danger of damaging people or machines.

DANGER!

- **Position the machine on a level ground; before performing any maintenance/repair procedures, turn the machine ignition key to OFF position and disconnect the battery through the special connector.**
- **This machine must be used by fully trained and authorized personnel only.**
- **Keep sparks, flames and other sources of ignition away from the battery. During the normal operation explosive gases are released.**
- **Do not wear jewels when working near electrical components.**
- **Do not work under the lifted machine, if it is not securely fixed.**
- **Do not operate the machine near toxic, dangerous, inflammable and/or explosive powders, liquids or vapors.**
- **Battery charging produces highly explosive hydrogen gas. Keep the tank assembly open during battery charging and perform this procedure only in well-ventilated areas and away from naked flames.**

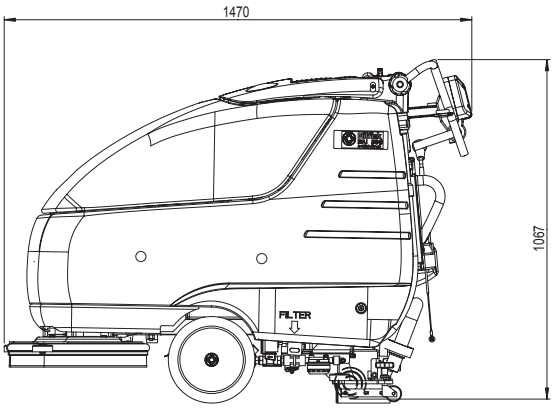
WARNING!

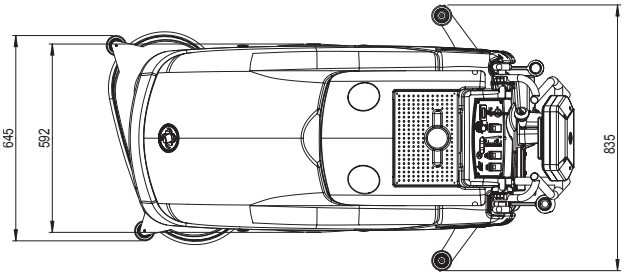
- **Carefully read all maintenance/repair instructions before performing any maintenance/repair procedure.**
- **Before using the battery charger, ensure that frequency and voltage values, indicated in the machine serial number plate, match the mains voltage.**
- **Take all necessary precautions to prevent hair, jewels and loose clothes from being caught by the machine moving and vacuuming parts.**
- **Do not smoke during battery charging.**
- **Before leaving the machine unattended, make sure that the machine cannot move and remove the ignition key.**
- **Do not use the machine on surfaces with a gradient greater than the one indicated on the machine.**
- **Do not wash the machine with direct or pressurized 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 other people.**
- **The 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).**
- **Humidity must be between 30% and 95%.**
- **Always protect the machine from the sun, rain and bad weather, when it is both in the operating and stationary state.**
- **Do not use the machine as a means of transport.**
- **Do not use the machine on ramps or slopes with an inclination higher than 2%.**
- **Do not allow the broom to operate while the machine is stationary to avoid damaging the floor.**
- **In case of fire, possibly use a powder fire extinguisher, not a water fire extinguisher.**
- **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, contact an Authorized Dealer or Retailer for ORIGINAL spare parts.**
- **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 chapter “Scrapping”).**
- **Do not let any object enter the openings. Do not use the machine in case 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 public roads or streets.**
- **Pay attention during the machine transfers when temperature is below the freezing point. The water in the recycling tank or in the pipes could freeze and seriously damage the machine.**
- **Only use the brooms and pads/cylindrical brooms supplied with the machine and those specified in the Instructions for Use Manuals. Using other brooms or pads/cylindrical brooms could reduce safety.**

TECHNICAL DATA

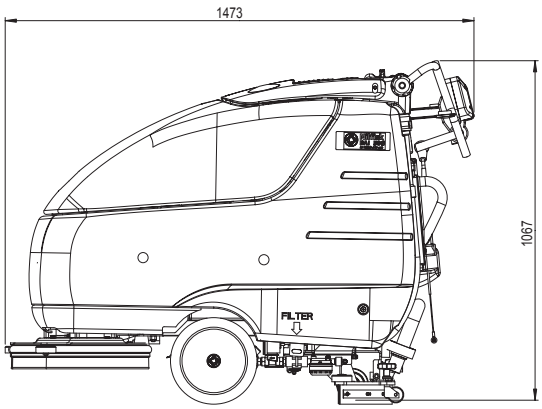
Dimensions	24D	26D	28D
Scrubbing width	24.0 in (610 mm)	26.0 in (660 mm)	29.0 in (740 mm)
Squeegee width	32.0 in (812 mm)		34.0 in (860 mm)
Machine length (max)	59 in (1,500 mm)		
Machine height	42 in (1,065 mm)		
Machine width without squeegee	26.0 in (658 mm)	26.8 in (681.5 mm)	30.0 in (758 mm)
Broom diameter	12.0 in (305 mm)	13.0 in (330 mm)	14.5 in (370 mm)
Fresh water tank capacity	21 gal (80 liters)		
Dirty water tank capacity	21 gal (80 liters)		
Weight without batteries and with empty tanks	264 lb (120 kg)		
Front wheels on fixed axle	Ø 10.5 in (267 mm)		
Front wheels, specific ground pressure	Less than 0.5 N/mm^2		
Rear pivoting wheel	Ø 3.9 in (100 mm)		
Vacuum motor power	0.68 HP (500 W)		
Rated power broom motor	0.54 HP (400 W)		
Broom speed	0 to 220 rpm		
Broom ground pressure	66 to 110 lb (30 to 50 kg) with gas spring		
Drive motor power	0.27 HP (200 W)		
Drive speed (variable)	0 to 3.2 mph (0 to 5.2 km/h)		
Maximum gradient	2%		
Sound pressure level (at the Operator's position)	65 dBA		
Standard batteries (with case)	24V 195Ah (WET)/24V 238Ah (WET)		
Battery compartment dimensions (with case)	20.8 x 15.0 in, height 14.7 in (530 x 380 mm, height 375 mm)		
Vacuum circuit	59.8 in H_2O (1,520 mm H_2O)		

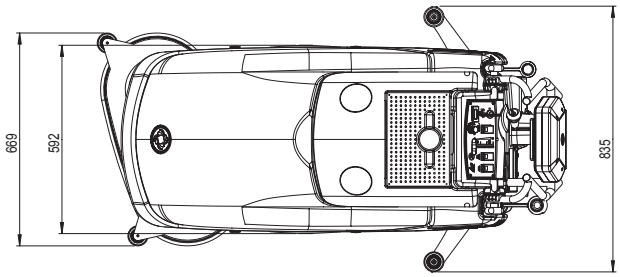
Razorô Plus 24D



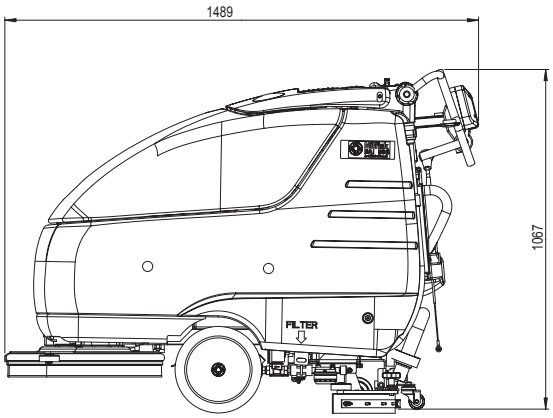


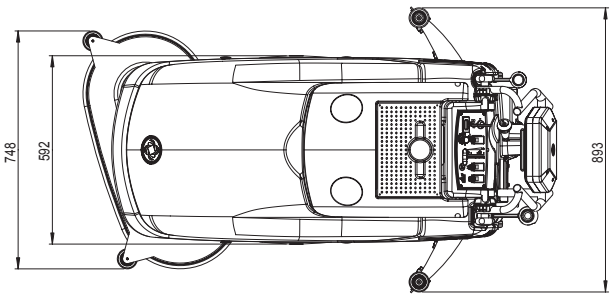
Razorô Plus 26D





Razorô Plus 28D





S300617

MAINTENANCE

Scheduled Maintenance

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

WARNING!
See “GENERAL INFORMATION” and “SAFETY” paragraphs.

The following chart 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 maintenance operation instructions, see the following paragraphs.

SCHEDULED MAINTENANCE CHART

Operation	Daily, after machine use	Weekly	Every six months	Yearly
Squeegee cleaning				
Squeegee blade check (and replacement)				
Broom/pad/cylindrical broom cleaning				
Tank, vacuum grid with float and recycling water filter cleaning (optional)				
Solution filter cleaning				
Battery charging				
Lead (WET) battery liquid level check				
Broom-holder deck lifting/lowering actuator adjustment check			(1)	
Vacuum motor seal efficiency check				
Screw and nut tightening check			(1)	
Broom/pad/cylindrical broom electric motor carbon brush check or replacement				
Vacuum electric motor carbon brush check or replacement				
Drive electric 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 indicated in these two nomenclature pages. Refer to these pages whenever it will be necessary to identify a component mentioned in the text.

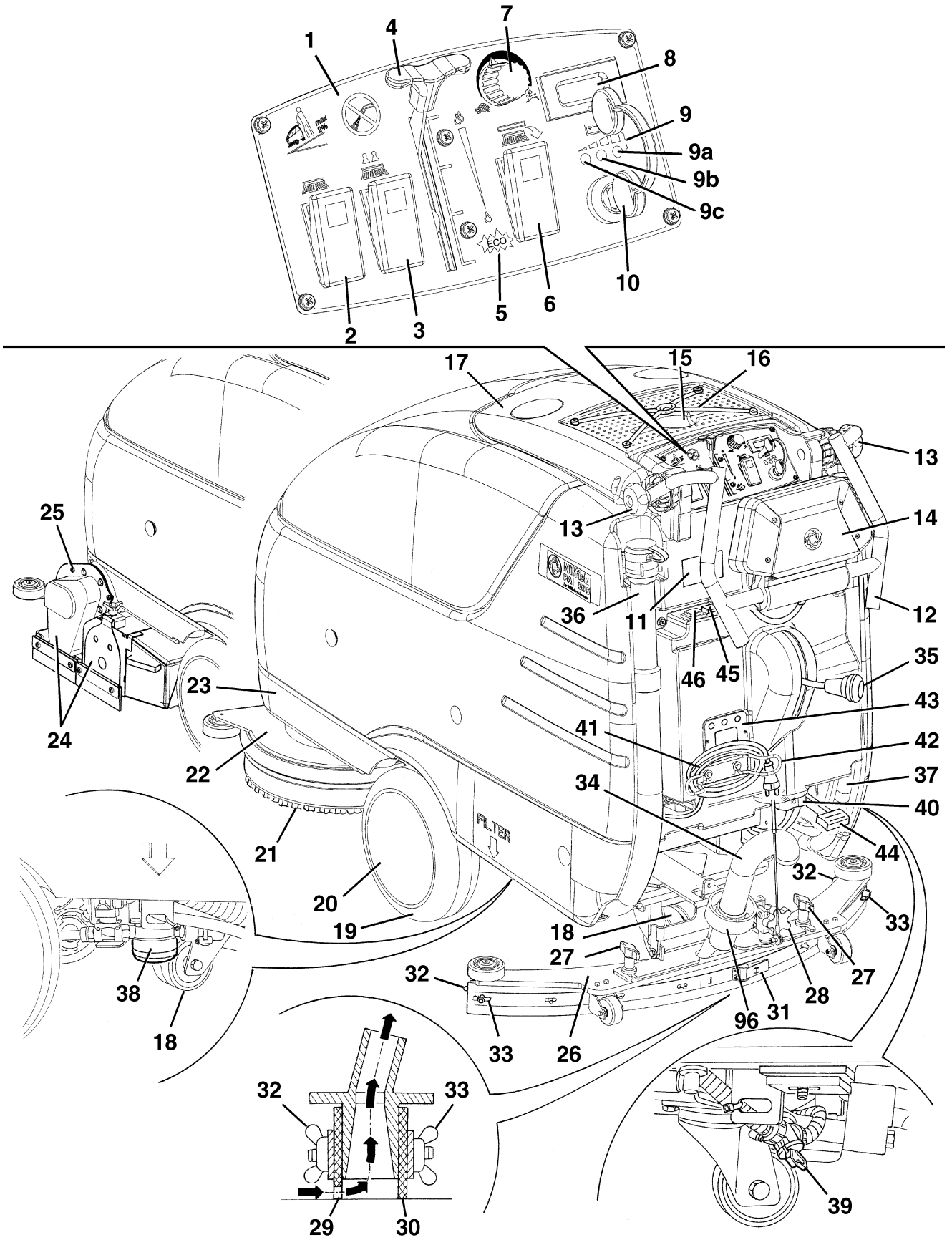
1. Control panel and commands
2. Broom/pad/cylindrical broom-holder deck lifting/lowering switch
3. Broom/pad extrapressure switch
4. Solution flow control lever
5. ECO position of the solution flow control lever (water “economy” usage, for a washing autonomy of about 66 minutes)
6. Broom/pad control switch
7. Machine forward/reverse speed adjuster
8. Hour counter
9. Battery charge status indicator

9a. Green warning light (when ON: charged batteries)

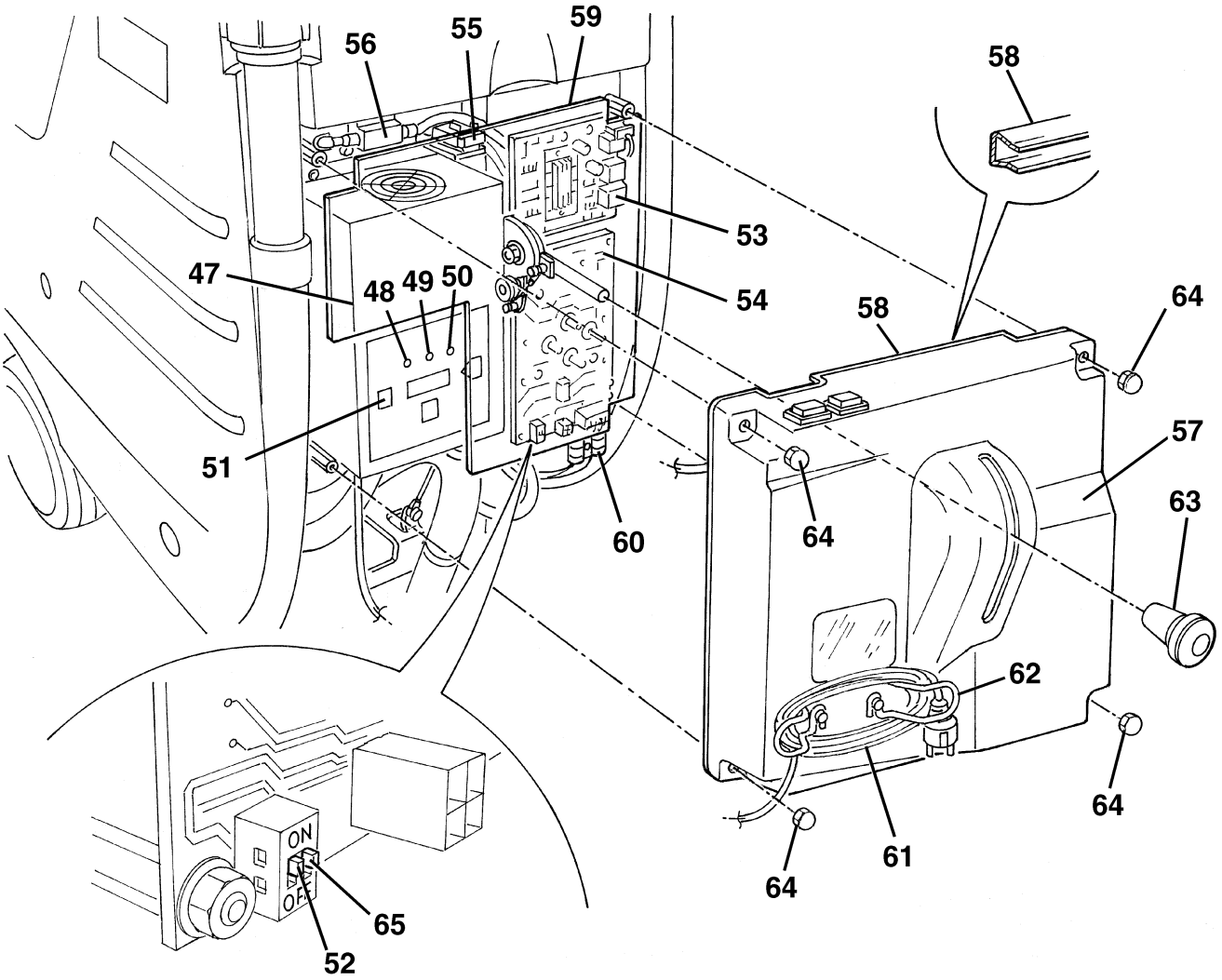
9b. Yellow warning light (when ON: nearly discharged batteries)

9c. Red warning light (when ON: discharged batteries)

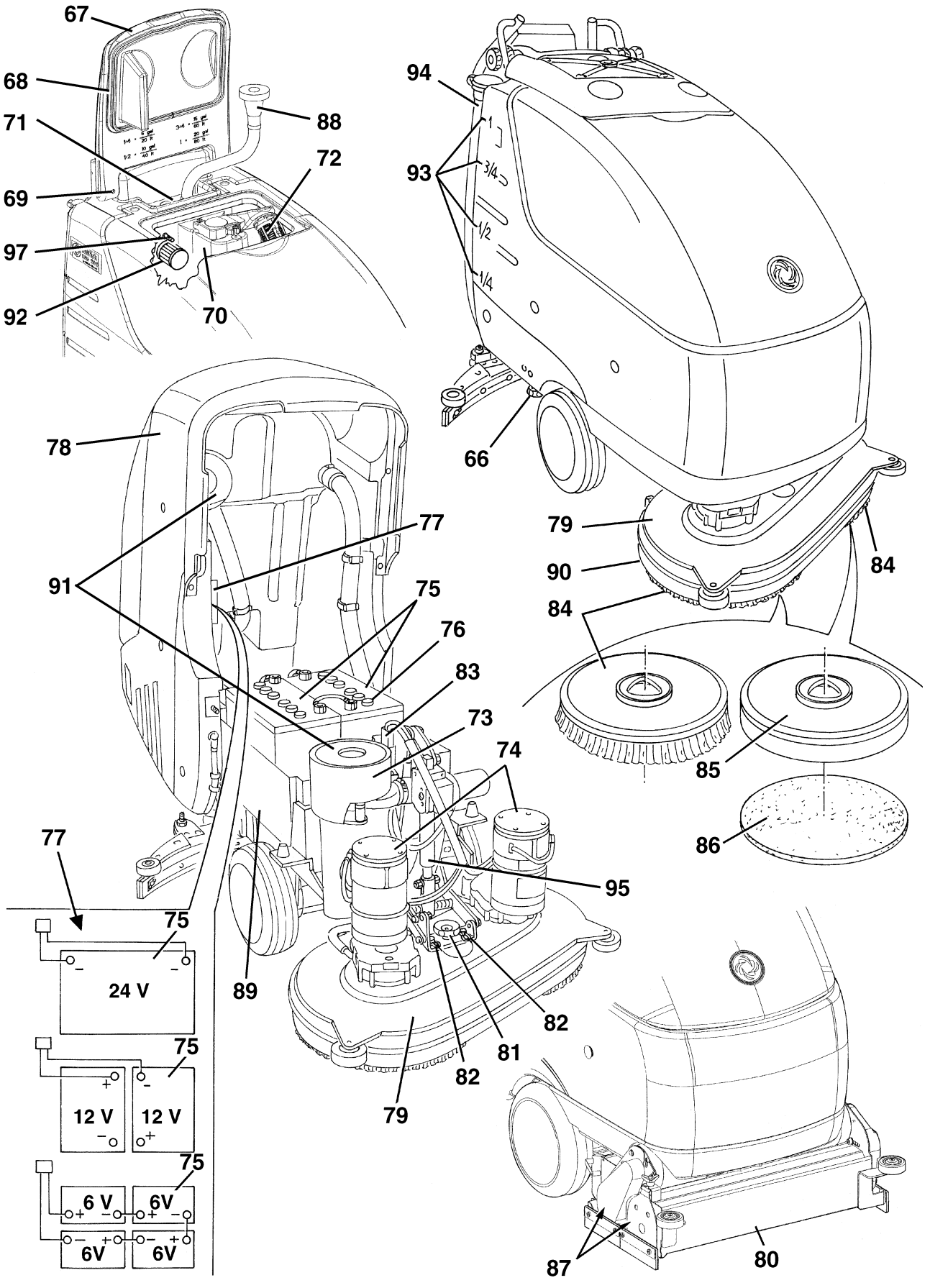
10. Ignition key (0 - I)
11. Serial number plate / technical data
12. Machine handlebar
13. Handlebar inclination adjusting handles
14. Machine forward/reverse and broom/pad/cylindrical broom rotation paddle
15. Glove compartment
16. Pocket
17. Tank cover
18. Rear pivoting wheel
19. Front wheels on fixed axle
20. Wheel cover
21. Broom or pad-holder with pad
22. Broom/pad-holder deck
23. Front spoiler
24. Cylindrical broom
25. Roller-holder deck
26. Squeegee
27. Squeegee fixing handwheels
28. Squeegee balance adjusting handwheel
29. Front squeegee blade
30. Rear squeegee blade
31. Rear blade fixing hook
32. Front squeegee blade fixing wing nuts
33. Rear squeegee blade fixing wing nuts
34. Squeegee vacuum pipe
35. Squeegee lifting lever
36. Recycling water drain pipe
37. Solution drain pipe
38. Solution filter
39. Solution faucet
40. Battery (red) connector
    This connector also serves as EMERGENCY switch to immediately stop all functions.
41. Battery charger cable
42. Battery charger cable holder
43. Battery charger data inspection window
44. Parking brake (optional)
45. Recycling water switch (optional)
46. Drive on/off switch
    (for pushing/towing the machine)
47. Electronic battery charger
48. Red warning light (when ON: battery charging)
49. Yellow warning light (when ON: battery charging almost completed)
50. Green warning light (when ON: charged battery)
51. Lead (WET) or gel (GEL) battery selector switch, positioned on the electronic battery charger
52. Lead (WET) or gel (GEL) battery selector switch, located on the Function electronic board
53. Drive electronic board
54. Function electronic board
55. Drive electronic board protection fuse
56. Function electronic board protection fuse
57. Electrical component cover
58. Cover gasket
59. Rubber protection panel
60. Battery connector
61. Battery charger cable
62. Battery charger cable holder
63. Squeegee lifting lever handle
64. Cover fixing nuts
65. Vacuum automatic cut-off switch
66. Tank assembly release handwheel
67. Tank cover (open position)
68. Tank cover gasket
69. Compensation hole
70. Recycling water tank
71. Solution tank
72. Vacuum grid with float-type automatic shut-off
73. Vacuum motor
74. Broom/pad/cylindrical broom motors
75. Batteries
76. Battery caps
77. Possible battery assembly diagrams
78. Tank assembly (in lifted position)
79. Broom/pad-holder deck
80. Roller-holder deck
81. Broom/pad deck fixing handwheel
82. Broom/pad deck retaining split pins
83. Broom/disk motor connector
84. Broom
85. Pad-holder
86. Pad
87. Cylindrical brooms
88. Solution feed (removable) pipe
89. Battery case
90. Splash-guard
91. Vacuum motor seals
92. Recycling water filter (optional)
93. Solution tank marks
94. Solution drain pipe
95. Broom-holder deck lifting/lowering actuator
96. Vacuum pipe trap rubber
97. Recycling water floating switch (optional)


1
4
7
8
9
9a
9b
9c
10
2
3
5
6
ECO
17
15
16
13
14
25
13
36
11
12
46
45
35
23
43
41
42
24
22
37
34
40
44
21
FILTER
32
20
19
18
33
27
38
32
27
28
18
96
31
33
26
32
33
39
29
30

S300618


56
55
59
58
53
47
48
49
50
54
58
64
51
57
60
64
63
62
64
61
64
ON
OFF
65
52

S300619


67
68
71
88
72
69
97
92
70
94
1
3/4
93
1/2
1/4
66
78
77
91
75
76
83
73
74
79
90
84
84
85
86
95
77
75
24 V
89
82
81
82
79
75
12 V
12 V
75
6 V
6V
6V
6V
87
80

S300620

SOLUTION SUPPLY SYSTEM

SOLUTION TANK AND SUPPLY SYSTEM CLEANING

1. Place the machine in the area designed for the solution and recycling water disposal.
2. Empty the solution tank (71) through the pipe (94).
3. Turn the solution flow control lever (4) to the wide-open position, then operate the machine until the solution inside the machine runs out.
4. Turn the ignition key (10) to “0” position.
5. Wash the tank (71) by using fresh water.
6. Operate the machine until the solution inside the machine runs out.
7. Carry out the solution filter cleaning (see the following procedure).

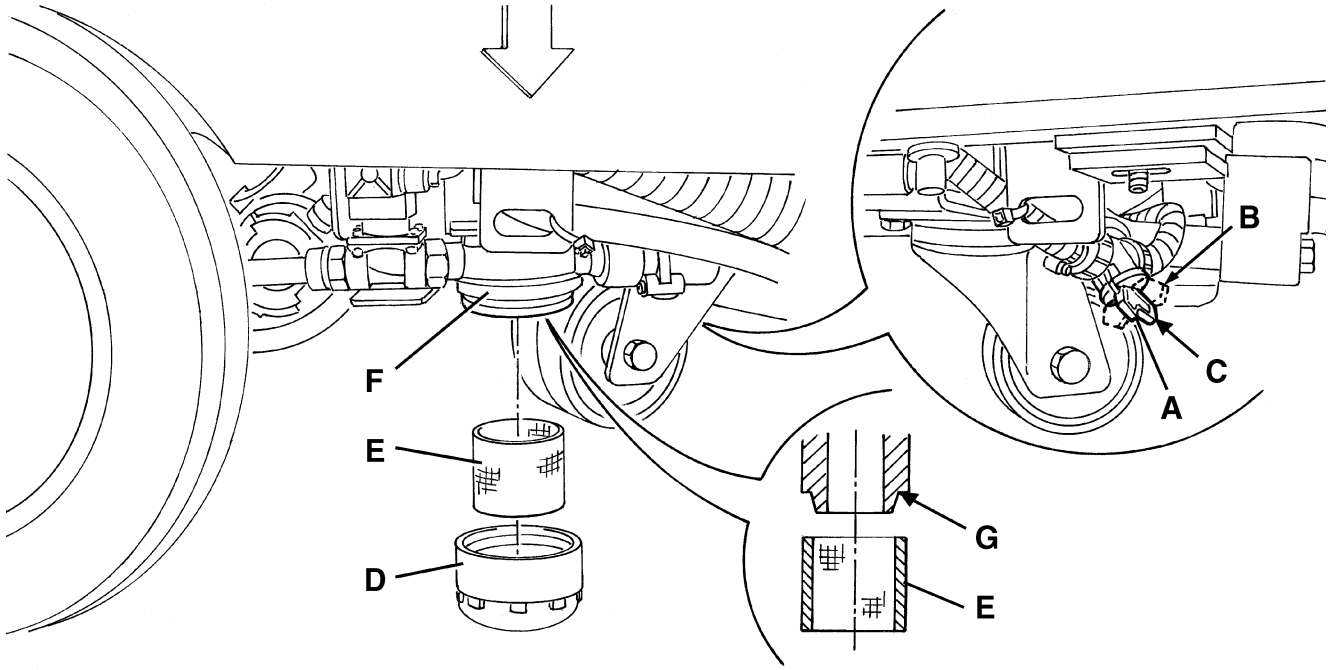
SOLUTION FILTER CLEANING

1. Position the machine on a level ground.
2. Turn the ignition key (10) to “0” position.
3. Close the solution faucet (A) from the right lower side of the machine. The faucet (A) is closed when it is in position (B) as to the pipeline; it is open when it is in position (C).
4. Remove the transparent cover (D) and the strainer (E) from the left lower side of the machine (at the “FILTER” mark); then clean and reinstall them on the holder (F).

NOTE
Correctly position the strainer (E) in the holder (F) housing (G).

5. Re-open the faucet (A).

Figure 1



S300621

SOLUTION FLOW SYSTEM SOLENOID VALVE/FAUCET/FILTER UNIT DISASSEMBLY

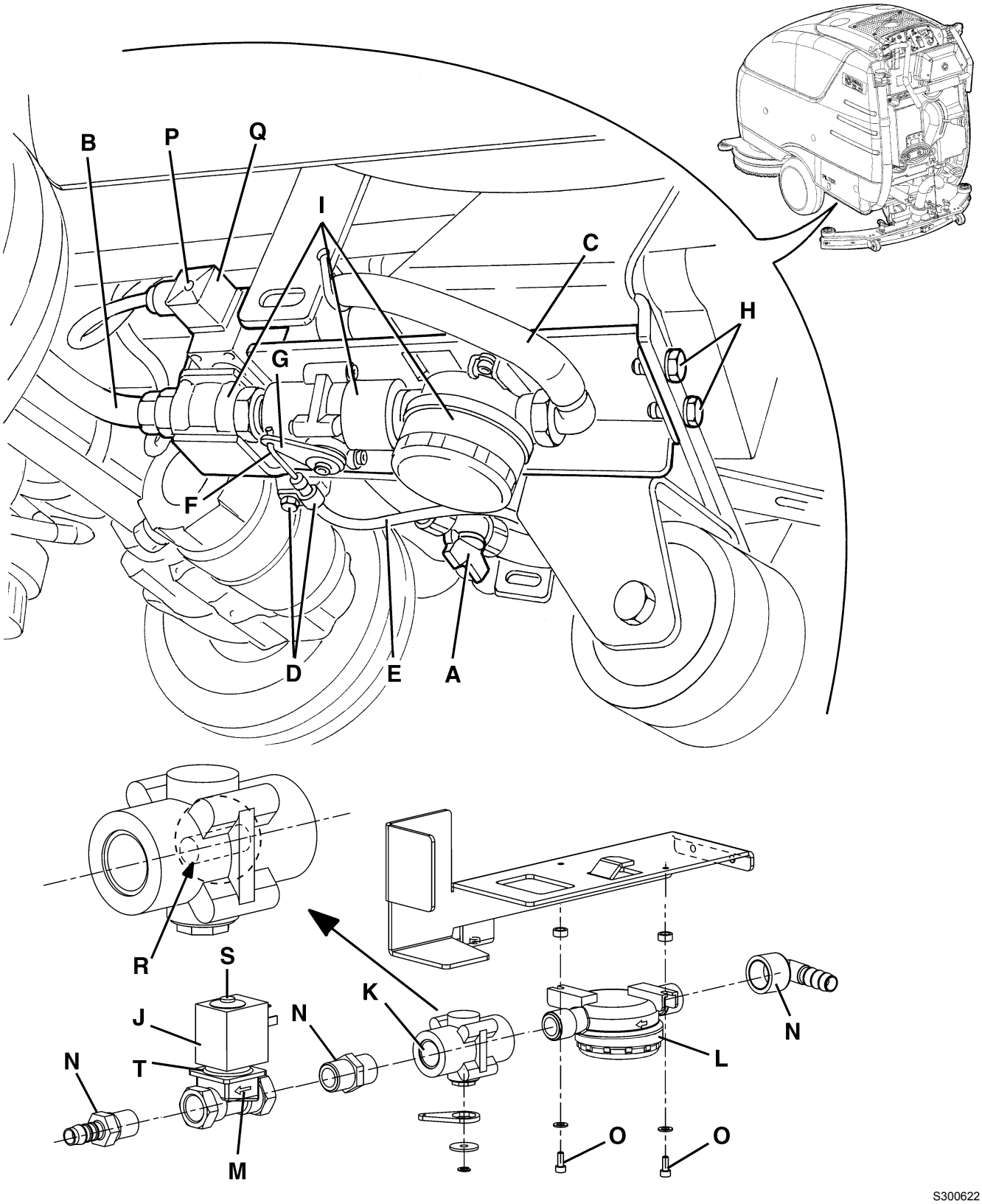
1. Drain the recycling water, if any, from the related tank (70) by using the pipe (36).
2. Drain the solution, if any, from the related tank (71) by using the pipe (37).
3. Position the machine on a level ground.
4. Turn the ignition key (10) to “0” position.
5. Disconnect the battery connector (40).
6. Close the solution faucet (A) from the right lower side of the machine.
7. Slightly lift the machine left side and remove the hoses (B) and (C) from their fittings.
8. Mark the position of the clamp (D) on the faucet control cable sheath (E); loosen the clamp (D) and release the sheath (E).
   Remove the cable (F) from the lever (G).

NOTE
When reassembling, tighten the sheath (E) through the clamp (D) into its position, by using the reference marks made before disassembly, not to change the adjustment of the faucet control.

9. Unscrew the screw (P) and disconnect the solenoid valve (Q).
10. Unscrew the fixing screws (H) of the solenoid valve-faucet-filter assembly holder.
11. Remove the solenoid valve-faucet-filter assembly (I).
12. Place the assembly on the workbench, and unscrew the fittings (N) / screws (O) to remove the solenoid valve (J) / the faucet (K) / the filter unit (L).
13. If necessary, remove dirt or limestone from the solenoid valve (J) inner seal, after disassembling it according to the following procedure:
    – Loosen the retainer ring (S), then remove the coil.
    – Unscrew the four solenoid valve fixing screws (T) and its seal.
    – After cleaning the inner seal, reassemble the solenoid valve by carrying out the disassembly operations in the reverse order. Make sure that you correctly replace the seal into its seat.
14. If necessary, remove dirt or limestone from the faucet (K); in particular, clean the solution “ECO” flow inner hole (R).
15. Reassemble by carrying out the disassembly operations in the reverse order.

NOTE
When reassembling the solenoid valve (D), the orientation of the arrow (M) must be as shown in the figure (in the direction of the solution flow); furthermore, before installing the previously removed fittings (N), clean the related threads and apply LOCTITE 572 sealant.

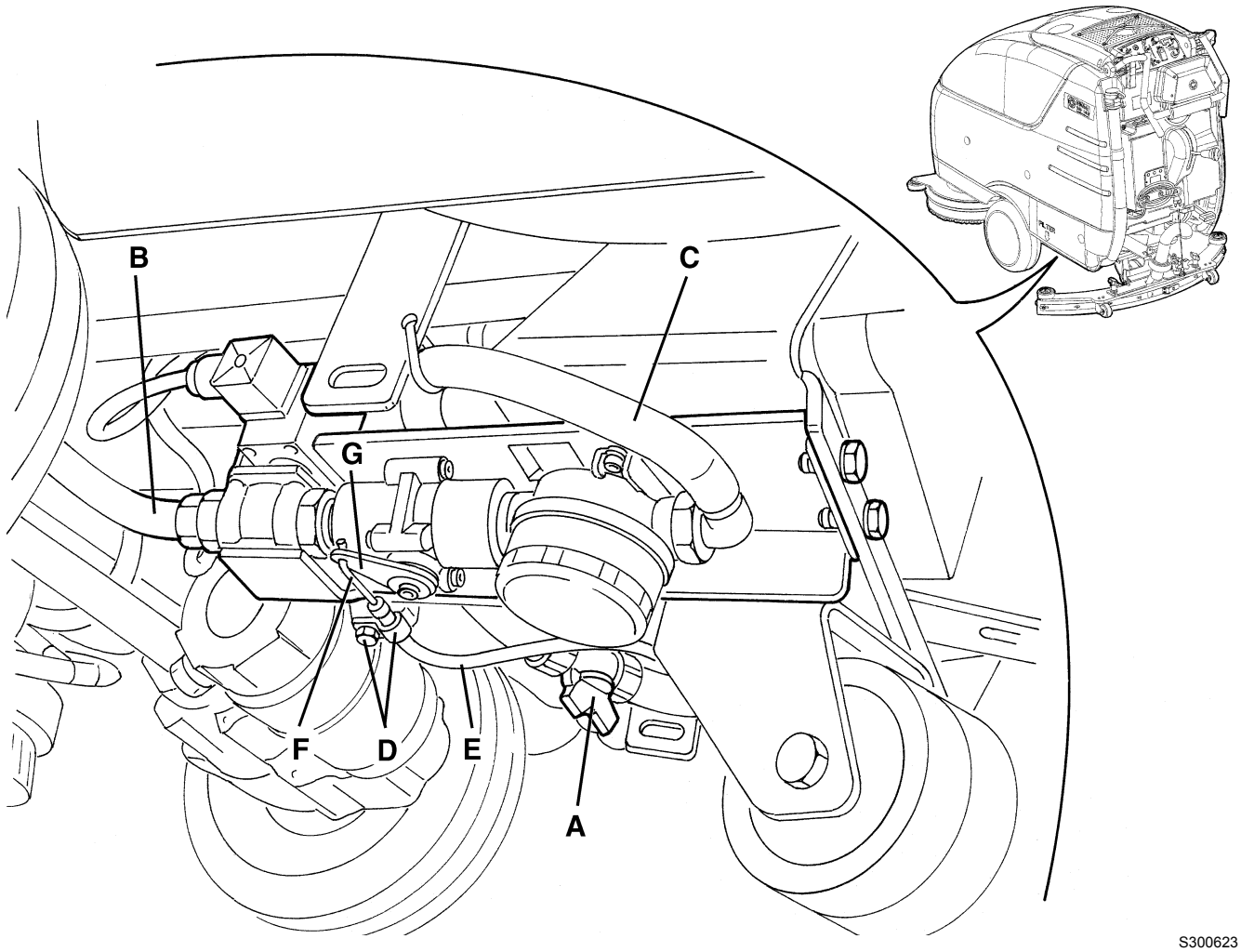
Figure 2



SOLUTION FLOW CONTROL CABLE AND LEVER DISASSEMBLY

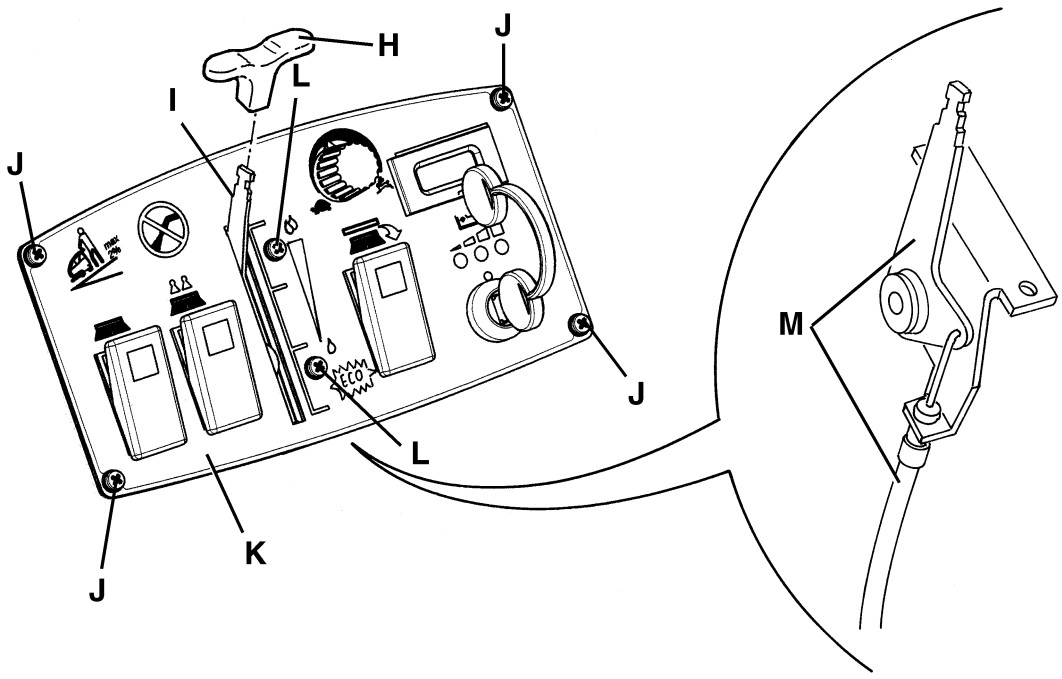
1. Drain the recycling water, if any, from the related tank (70) by using the pipe (36).
2. Drain the solution, if any, from the related tank (71) by using the pipe (37).
3. Position the machine on a level ground.
4. Turn the ignition key (10) to “0” position.
5. Disconnect the battery connector (40).
6. Close the solution faucet (A) from the right lower side of the machine.
7. Slightly lift the machine left side and remove the hoses (B) and (C) from their fittings.
8. Loosen the clamp (D) and release the sheath (E).
9. Remove the cable (F) from the lever (G).
10. Connect a probe (cord or equivalent) to the cable end (F) (this operation is necessary to facilitate the insertion of the cable inside the machine).
11. Lower the machine left side to the floor.
12. Remove the handle (H) from the lever (I), by using the control panel.
13. Unscrew the screws (J) and slightly lift the panel (K).
14. Unscrew the screws with the nut (L) and remove the lever assembly (I) from the panel (K).
15. Take the control cable (M) and the lever out of the machine, leaving the probe in its place (to facilitate the control cable insertion).
16. Reassemble by carrying out the disassembly operations in the reverse order, by placing the clamp (D) on the sheath (E) without tightening it.
17. Perform the Cable Adjustment, as described in the following procedure.

Figure 3



S300623

Figure 4

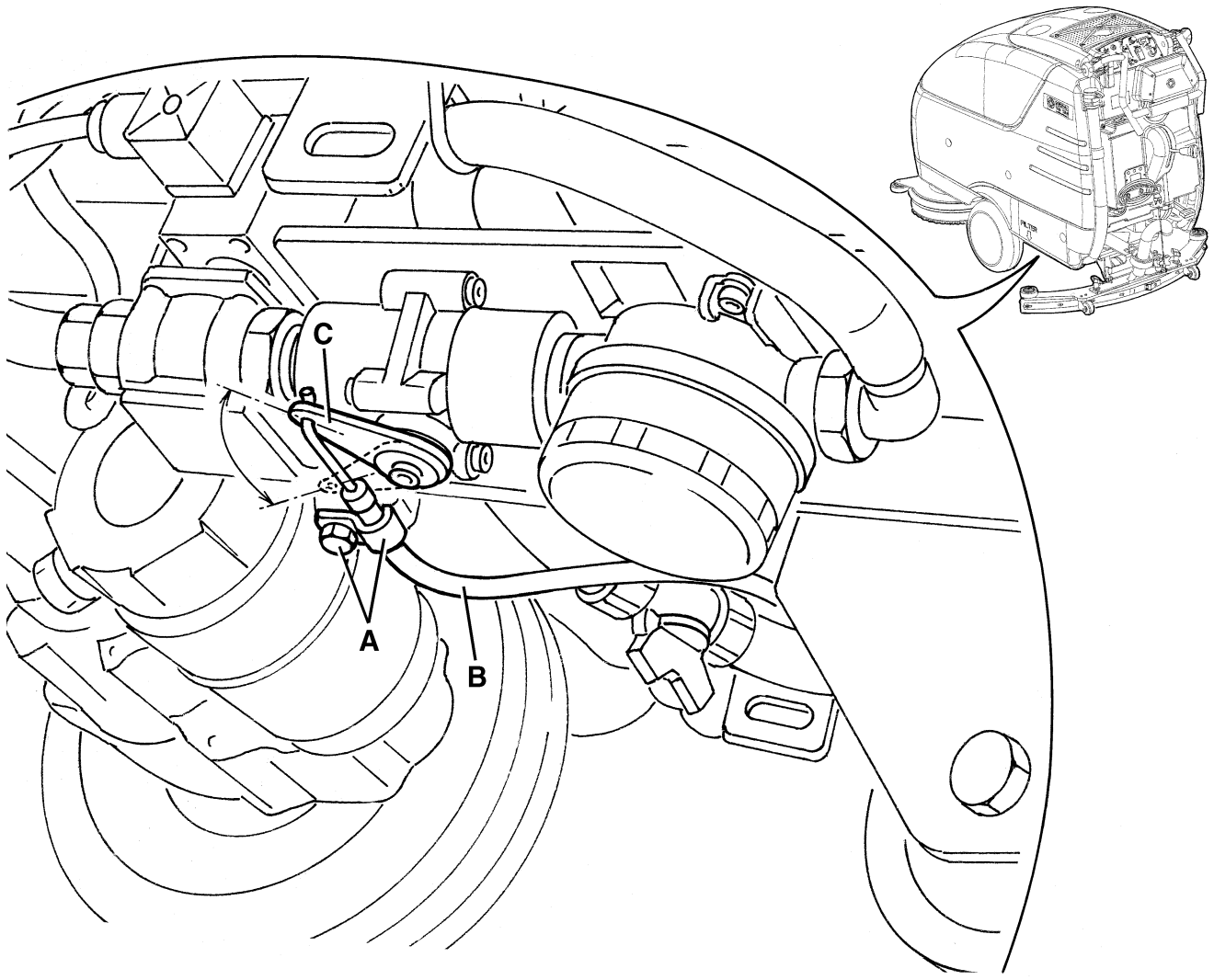


S300624

SOLUTION FLOW CONTROL CABLE AND LEVER CHECK AND ADJUSTMENT

1. Drain the recycling water, if any, from the related tank (70) by using the pipe (36).
2. Drain the solution, if any, from the related tank (71) by using the pipe (37).
3. Position the machine on a level ground.
4. Turn the ignition key (10) to “0” position.
5. Turn the solution flow control lever (4) to the “ECO” position (5).
6. Slightly lift the machine left side and loosen the clamp (A) by releasing the sheath (B).
7. Check that the faucet flow control lever (C) is at the left end (as shown in the figure), if not, turn it to the left end and tighten the sheath (B) by using the clamp (A).
8. Lower the machine left side to the floor.

Figure 5



TROUBLESHOOTING

Small amount of solution or no solution flows to the broom

Possible cause:

1. The broom switch (2) is not in the ON position or it is faulty (turn ON or repair/replace).
2. The solution filter is clogged/dirty (clean).
3. The solution flow control lever does not control the related faucet (check the operation of the control cable from the lever to its faucet).
4. The solution supply faucet is stuck closed (replace).
5. The solenoid valve is faulty or there is an open circuit in the connection (replace the solenoid valve/restore the connection).
6. There is debris in the solution tank obstructing the output hole (clean the tank).
7. There is debris in the pipe obstructing the solution passage (clean the pipe).

The solution flows to the broom even when the machine is off

Possible cause:

1. There is dirt or limestone on the solenoid valve seals (clean the solenoid valve inner seals)
2. The solenoid valve is faulty (replace).

The “ECO” system does not work

Possible cause:

1. There is dirt in the ball inside the faucet (remove any deposit)

SWEEPING SYSTEM

BROOM CLEANING

CAUTION!
It is advisable to use protective gloves when cleaning the brooms/pads/cylindrical brooms as there may be cutting debris.

1. Remove the brooms (84) by using the switch (6).
2. Clean and wash the brooms with water and solution.
3. Check that the broom bristles are integral and not excessively worn; otherwise replace the brooms.
   The brooms are to be considered worn when their bristles reach a length of 20 mm (that is, half their original length).

BROOM MOTOR ELECTRICAL INPUT CHECK

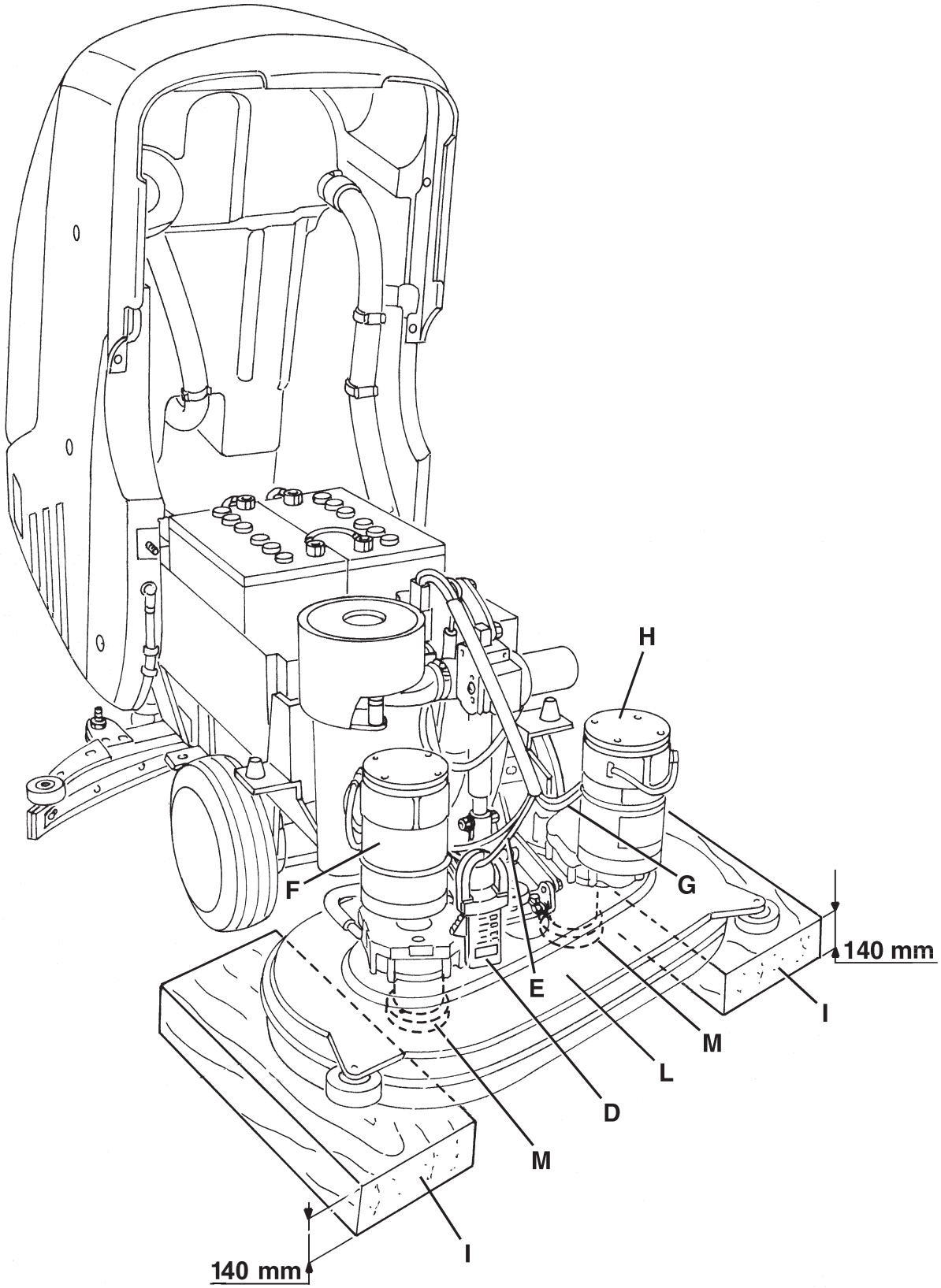
WARNING!
This procedure must be performed by qualified personnel only.

1. Drain the recycling water, if any, from the related tank (70) by using the pipe (36).
2. Drain the solution, if any, from the related tank (71) by using the pipe (37).
3. Position the machine on a level ground.
4. Remove the brooms (84) by using the switch (6).
5. Turn the ignition key (10) to “0” position.
6. Turn the drive on/off switch (46) to “0” position.
7. Unscrew the handwheel (66).
8. Hold the handlebar (12) and carefully lift the tank assembly (78) to be able to work on the deck (79).
9. Apply ammetric pliers (D) on the motor (F) electrical cable (E) or on the motor (H) electrical cable (G).
10. Turn the ignition key (10) to “I” position.
11. Remove the brooms (84) or the pad-holders (85) by using the switch (6).
12. Place two wooden shims (I) under the deck sides (L), as shown in the figure.
    The wooden shim thickness must be about 140 mm

WARNING!
Keep the wooden shims (I) at a proper distance from the hubs (M).

13. Lower the deck (L) on the wooden shims (I) by using the switch (2). Check the hubs (M) do not touch the floor.
14. Push the forward/reverse and broom/pad/cylindrical broom rotation paddle (14) and check that the electrical input of the motor (F) or (H) at 24 V is between 3 and 5A. Release the forward/reverse and broom/pad/cylindrical broom rotation paddle (14). Turn the ignition key (10) to “0” position and remove the ammetric pliers (D).
    If the electrical input exceeds the specifications, perform the following operations to identify and eliminate the cause of the faulty input:
    – Check the broom/pad-holder hub (M) for debris or dirt (cords, cables, etc.).
    – Check the motor carbon brushes (see the procedure on the following page).
    – If necessary, disassemble the motor (see the procedure on the following pages) and check all its parts.
    If the above-mentioned procedures do not lead to a correct electrical input, it is necessary to replace the motor (see the procedure on the following pages).
15. Carry out steps from 4 to 13 in the reverse order.

Figure 1

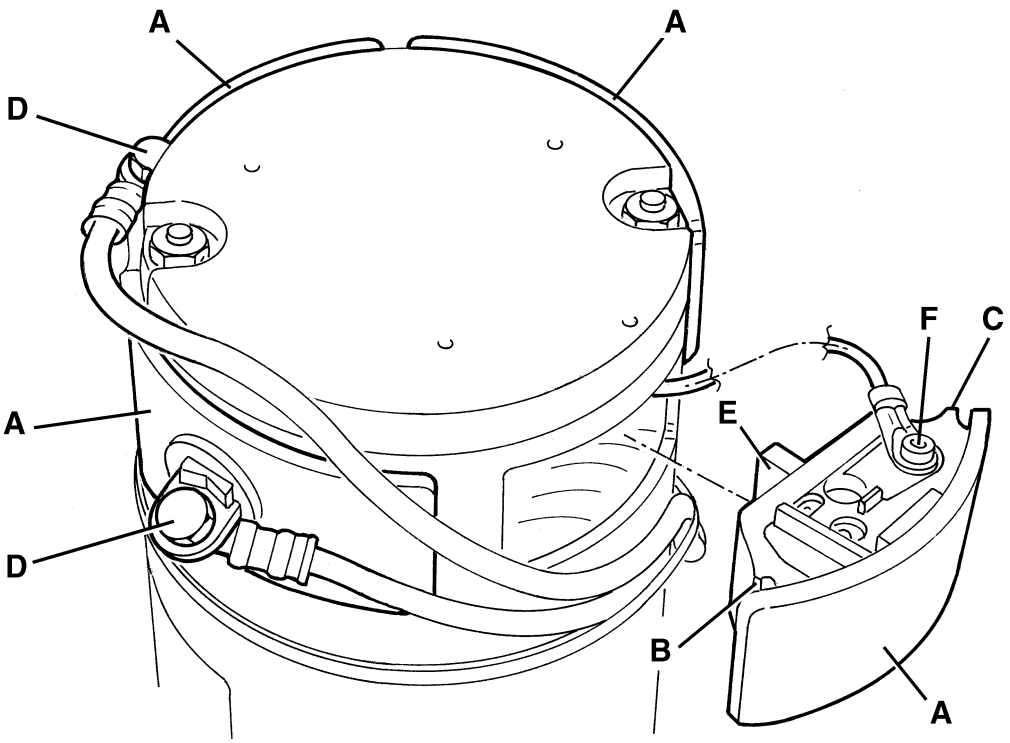


S300626

BROOM MOTOR CARBON BRUSH CHECK AND REPLACEMENT

1. Drain the recycling water, if any, from the related tank (70) by using the pipe (36).
2. Drain the solution, if any, from the related tank (71) by using the pipe (37).
3. Position the machine on a level ground.
4. Turn the ignition key (10) to “0” position.
5. Disconnect the battery connector (40).
6. Unscrew the handwheel (66).
7. Hold the handlebar (12) and carefully lift the tank assembly (78) to be able to work on the deck (79).
8. Remove dirt and dust from the motor outer part in the carbon brush holder (A) area.
9. Remove the four carbon brush holders (A) after releasing the retainers (B) and (C). If necessary, disconnect the connectors (D).
10. Check the four carbon brushes (E) for wear; the carbon brushes are worn when there is not sufficient contact with the motor armature, because of the carbon brush wear, the contact surface deterioration, the thrust spring breakage, etc. The carbon brush (E) minimum length is 15 mm: when this length is reached, the carbon brushes have to be replaced.
11. If necessary, disconnect the connectors (F) and remove the carbon brushes with their holders (A) to replace them. Replace all carbon brushes as an assembly.
12. Reassemble by carrying out the disassembly operations in the reverse order, with the following caution:
    – when connecting the terminals (F), make sure that they are insulated from the surrounding parts of the frame.

Figure 2

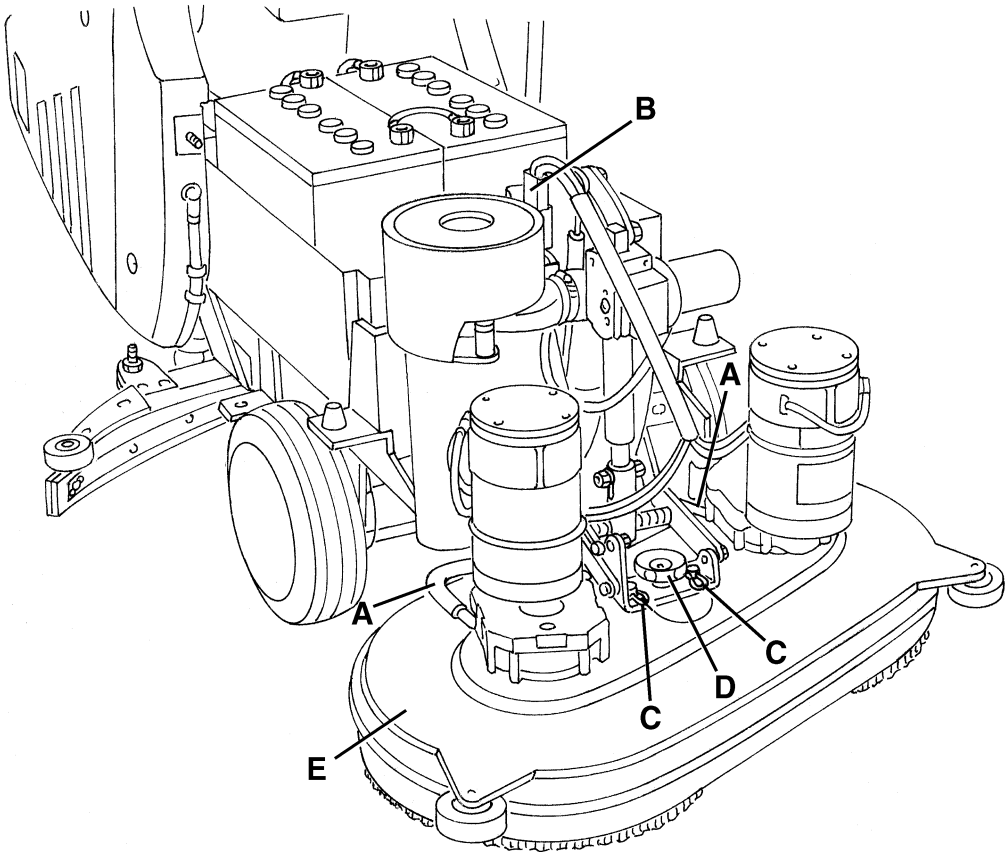


S300627

BROOM MOTOR DISASSEMBLY

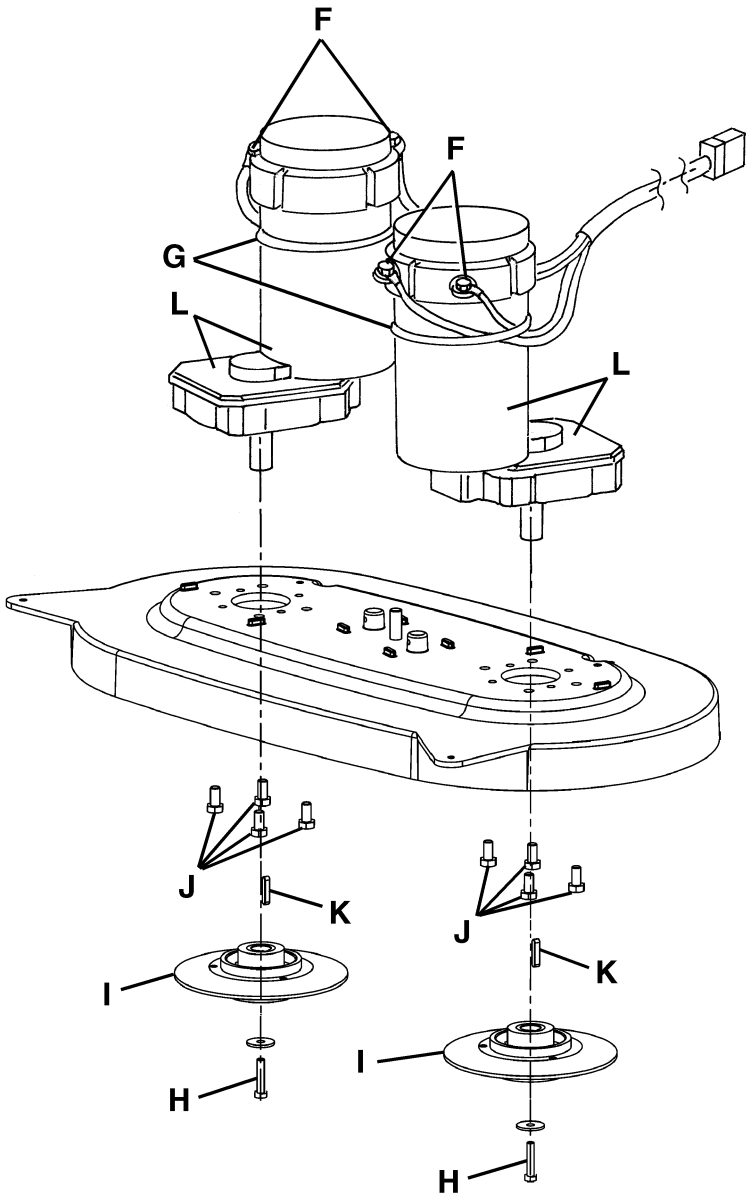
1. Drain the recycling water, if any, from the related tank (70) by using the pipe (36).
2. Drain the solution, if any, from the related tank (71) by using the pipe (37).
3. Position the machine on a level ground.
4. Remove the brooms (84) by using the switch (6).
5. Turn the ignition key (10) to “0” position.
6. Disconnect the battery connector (40).
7. Unscrew the handwheel (66).
8. Hold the handlebar (12) and carefully lift the tank assembly (78) to be able to work on the deck (79).
9. Remove the solution hoses (A) from the deck.
10. Disconnect the motor connector (B).
11. Remove the two split pins (C).
12. Unscrew the handwheel (D) and remove the broom deck (E).
13. Place the motor to be disassembled on the workbench and disconnect the connectors (F).
14. Cut the motor clamp (G).
15. Unscrew the motor screw (H) and remove the hub assembly (I); extract the key (K).
16. Unscrew the four screws (J) of the motor to be disassembled.
17. Remove the reduction motor (L).
18. Reassemble by carrying out the disassembly operations in the reverse order, with the following caution:
    – position the reduction motors (L) in the direction shown in the figure.

Figure 3



S300628

Figure 4



S300629

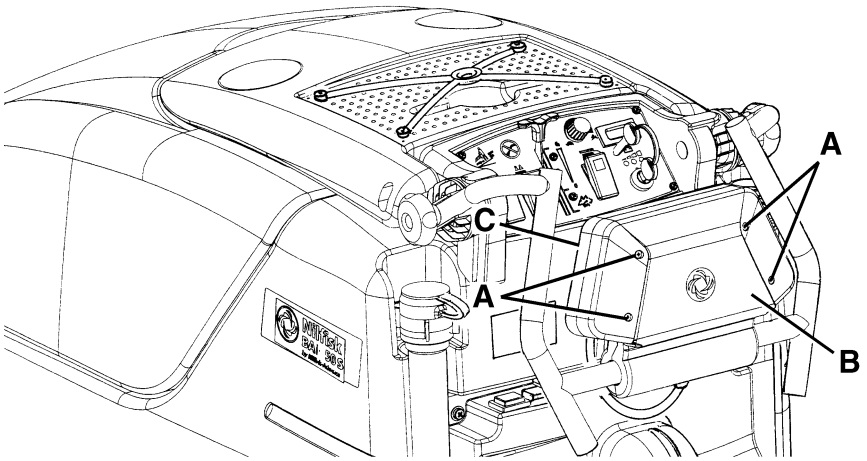
BROOM ROTATION MICROSWITCH ADJUSTMENT

1. Position the machine on a level ground.
2. Turn the ignition key (10) to “0” position.
3. Disconnect the battery connector (40).
4. Unscrew the screws (A) and remove the paddle (C) cover (B).
5. With the paddle (C) released, check that the microswitch (E) actuator (D) is in the cam (I) housing (F); also check that the contacts connected to the cables (N) are open (use a tester).
6. Push the paddle (C) and check that the actuator (D) in positions (G) and (H) activates the microswitch (E) (a “click” must be heard); also check that the contacts connected to the cables (N) are closed (use a tester).
   If necessary, reach the required condition by loosening the screws (L) and adjusting the cam (I) position and/or loosening the screws (M) and adjusting the microswitch (E) position. Tighten the screws.

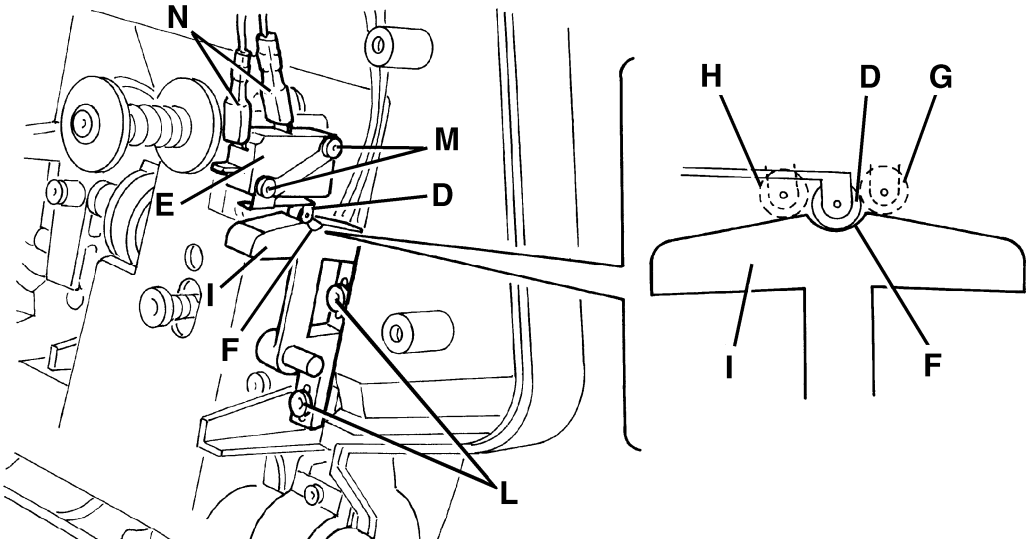
CAUTION!
When reconnecting the microswitch connectors (N), make sure you reposition them on the same contacts (contact “C” and contact “NO”).

7. Reassemble by carrying out the disassembly operations in the reverse order.
8. Carry out some tests to check the broom rotation.

Figure 5



S300630



S300631

ON-BOARD ADJUSTMENT OF THE BROOM DECK LIFTING/LOWERING ACTUATOR LIMIT SWITCH POSITIONS

1. Drain the recycling water, if any, from the related tank (70) by using the pipe (36).
2. Drain the solution, if any, from the related tank (71) by using the pipe (37).
3. Position the machine on a level ground.
4. Make sure that the brooms (I) are installed on the machine.

NOTE
To perform this adjustment, new brooms (not worn ones) should be used. See the note at step 12 below.

5. Turn the ignition key (10) to “0” position.
6. Unscrew the handwheel (66).
7. Hold the handlebar (12) and carefully lift the tank assembly (78) to be able to work on the deck (79).

Lifted deck position inspection

8. Turn the ignition key (10) to “I” position and lift the broom deck (22) by using the switch (2). Turn the ignition key (10) to “0” position.
9. When the broom deck (A) is in the lifted position, check that the deck contacts the rubber pad (B) and the deck upper side (C) is horizontally positioned. If necessary, restore this condition by proceeding as follows.
10. Unscrew the screws (D) and remove the cover (E) with the gasket (F).
    Loosen the cam dowel (G) and rotate the cam by varying the microswitch (H) actuation point as necessary; tighten the cam dowel.

NOTE
When advancing or retarding the cams, remember that they rotate clockwise during the actuator descent.

Turn the ignition key (10) to “I” position and lower and lift the broom deck (A) by using the switch (2), then turn the ignition key (10) to “0” position and repeat the inspection described at step 8.

Lowered deck position inspection

11. Turn the ignition key (10) to “I” position and lower the broom deck (22) by using the switch (2). Turn the ignition key (10) to “0” position.
12. When the broom deck is in the lowered position (A), check that the screw (L) is approximately in position (M) on the slot (N). If necessary, restore this condition by proceeding as follows.

NOTE
Position (M) refers to the deck positioning when new brooms are installed. The slot (N) upper space reduces by the same amount as the broom wear.

13. Unscrew the screws (D) and remove the cover (E) with the gasket (F), if you haven't done it yet.
    Loosen the cam dowel (O) and rotate the cam by varying the microswitch (P) actuation point as necessary; tighten the cam dowel.
    Turn the ignition key (10) to “I” position and lift and lower the broom deck (A) by using the switch (2), then turn the ignition key (10) to “0” position and repeat the inspection described at step 12.

Extrapressure deck position inspection

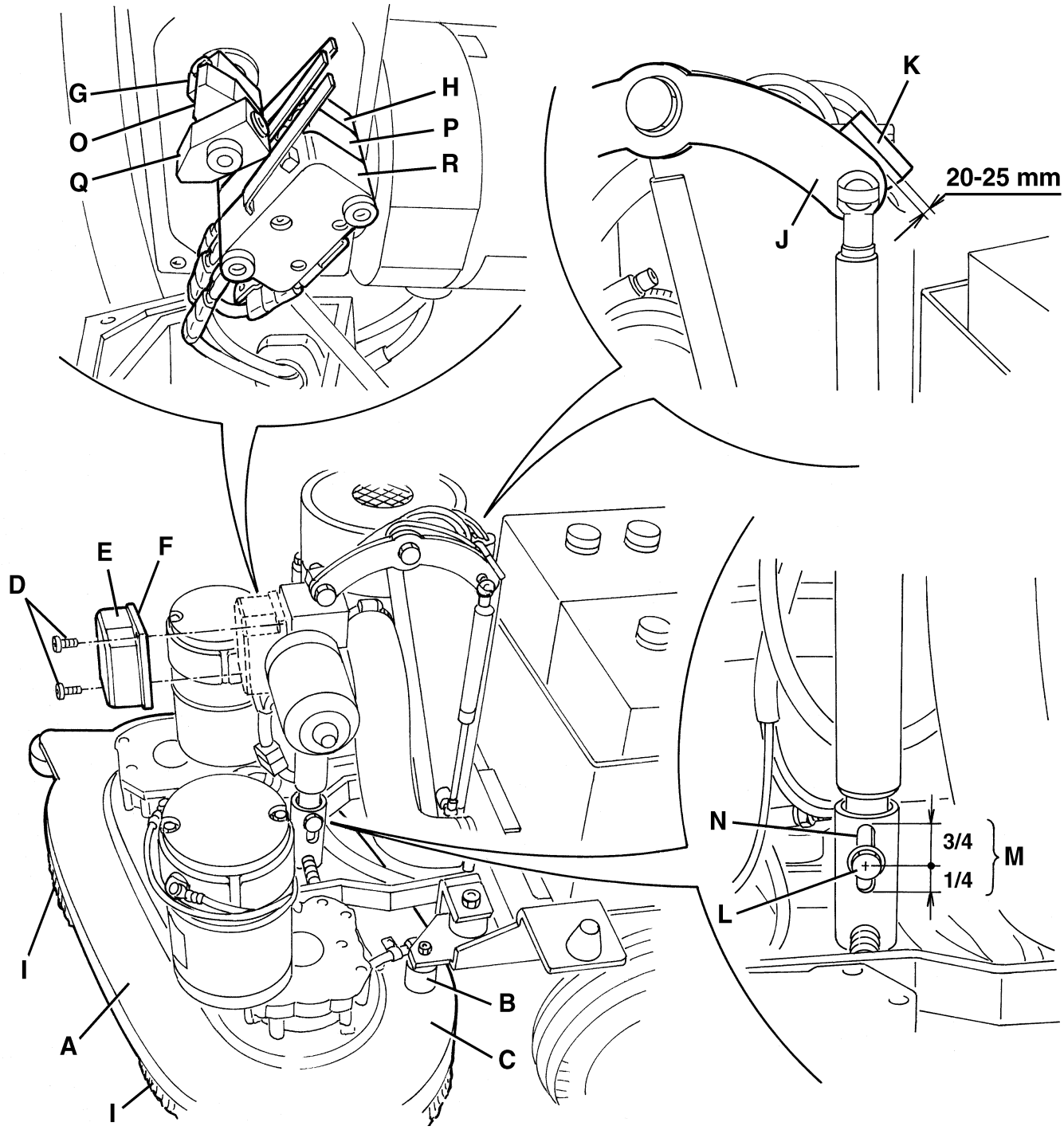
14. Turn the ignition key (10) to “I” position and lower the broom deck (22) in the extrapressure position by using the switch (3). Turn the ignition key (10) to “0” position.
15. When the broom deck (A) is lowered in the extrapressure position, check that the lever (J) is at about 20-25 mm from the stop (K), as shown in the figure. If necessary, restore this condition by proceeding as follows.
16. Unscrew the screws (D) and remove the cover (E) with the gasket (F), if you haven't done it yet.
    Loosen the cam dowel (Q) and rotate the cam by varying the microswitch (R) actuation point as necessary; tighten the cam dowel.
    Turn the ignition key (10) to “I” position and lift and lower the broom deck (A) in the extrapressure position by using the switch (3), then turn the ignition key (10) to “0” position and repeat the inspection described at step 15.

NOTE
If necessary, the actuator limit switch positions can also be adjusted at the workbench; see the procedure in the relevant paragraph.

Reassembly

17. Position the cover (E) with the gasket (F) into its seat, then tighten the screws (D).
18. Carry out steps from 1 to 7 in the reverse order.

Figure 6



ADJUSTMENT OF THE BROOM DECK LIFTING/LOWERING ACTUATOR LIMIT SWITCH POSITIONS AT THE WORKBENCH

NOTE
The spare actuator has already been adjusted by the Manufacturer.
When performing the following adjustment at the workbench, it is not necessary to adjust the actuator after installing it on the machine.

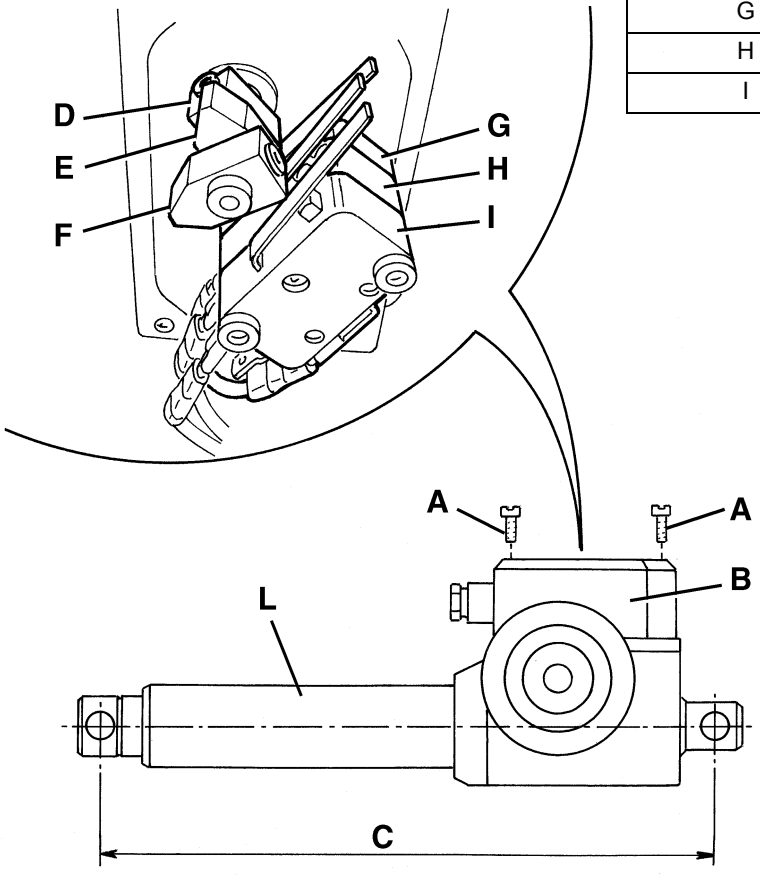
1. Unscrew the screws (A) and remove the cover (B) with the gasket.
2. Check the actuator (L) dimensions (C) in the different conditions described in the following adjustment chart.
   To activate the actuator at the workbench, supply it with 24V voltage on the red and blue cables.
   To adjust the various positions of the limit switches, loosen the dowel of the related cam (D, E, F) and rotate the cam by varying the related microswitch (G, H, I) actuation point as necessary; then tighten the cam dowel.

NOTE
When advancing or retarding the cams, remember that they rotate clockwise during the actuator extension.

NOTE
After adjusting, stop the actuator in the working position, to facilitate the reassembly procedure.

Figure 7

MICROSWITCH (G, H, I) ADJUSTMENT		
Microswitch activated	**Dimension (C)**	**Related actuator position**
G	268 ± 2	lifted
H	342 ± 2	working
I	385 ± 2	extrapressure



S300652

DISASSEMBLY OF THE BROOM DECK LIFTING/LOWERING ACTUATOR LIMIT MICROSWITCHES

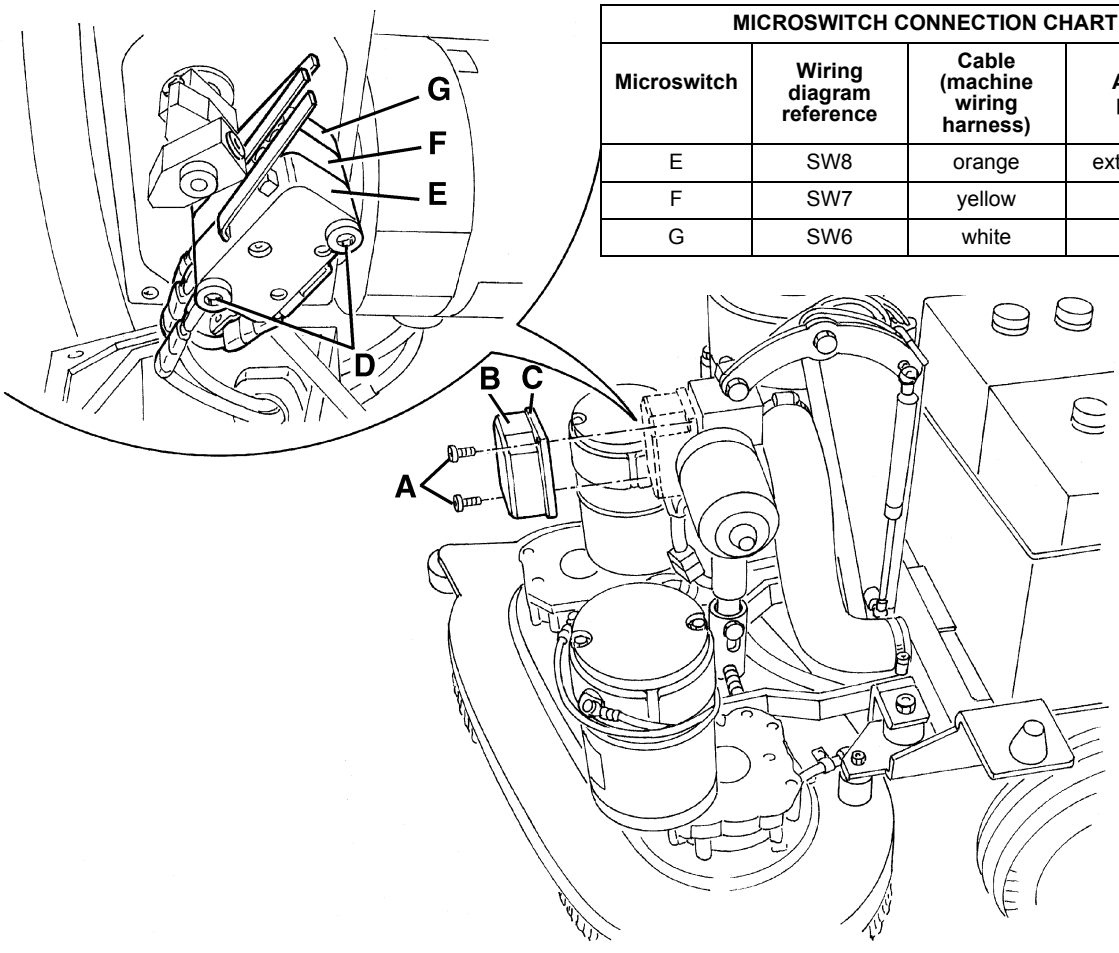
1. Drain the recycling water, if any, from the related tank (70) by using the pipe (36).
2. Drain the solution, if any, from the related tank (71) by using the pipe (37).
3. Position the machine on a level ground.
4. Make sure that the brooms (I) are installed on the machine.

NOTE
To perform the actuator adjustment described at step 11 below, new brooms (not worn ones) should be used.

5. Turn the ignition key (10) to “0” position.
6. Unscrew the handwheel (66).
7. Hold the handlebar (12) and carefully lift the tank assembly (78) to be able to work on the deck (79).
8. Unscrew the screws (A) and remove the cover (B) with the gasket (C).
9. Unscrew the microswitch fixing screws (D).
10. Disconnect the connectors of the microswitches (E), (F) or (G) to be replaced, then remove the microswitches. When reassembling, make sure you don't invert the connectors of the microswitches (E, F, G); see the chart below providing the correct microswitch connectors.
11. Perform the Adjustment of the Broom Deck Lifting/Lowering Actuator Positions, as described in the previous pages.

NOTE
If necessary, the actuator limit switch positions can also be adjusted at the workbench; see the procedure in the relevant paragraph.

Figure 8



MICROSWITCH CONNECTION CHART			
Microswitch	**Wiring diagram reference**	**Cable (machine wiring harness)**	**Adjusted position**
E	SW8	orange	extrapressure
F	SW7	yellow	working
G	SW6	white	lifted

S300633

BROOM DECK LIFTING/LOWERING ACTUATOR DISASSEMBLY

Disassembly

1. Drain the recycling water, if any, from the related tank (70) by using the pipe (36).
2. Drain the solution, if any, from the related tank (71) by using the pipe (37).
3. Position the machine on a level ground.
4. Make sure that the brooms (I) are installed on the machine.

NOTE
To perform the actuator adjustment described at step 11 below, new brooms (not worn ones) should be used.

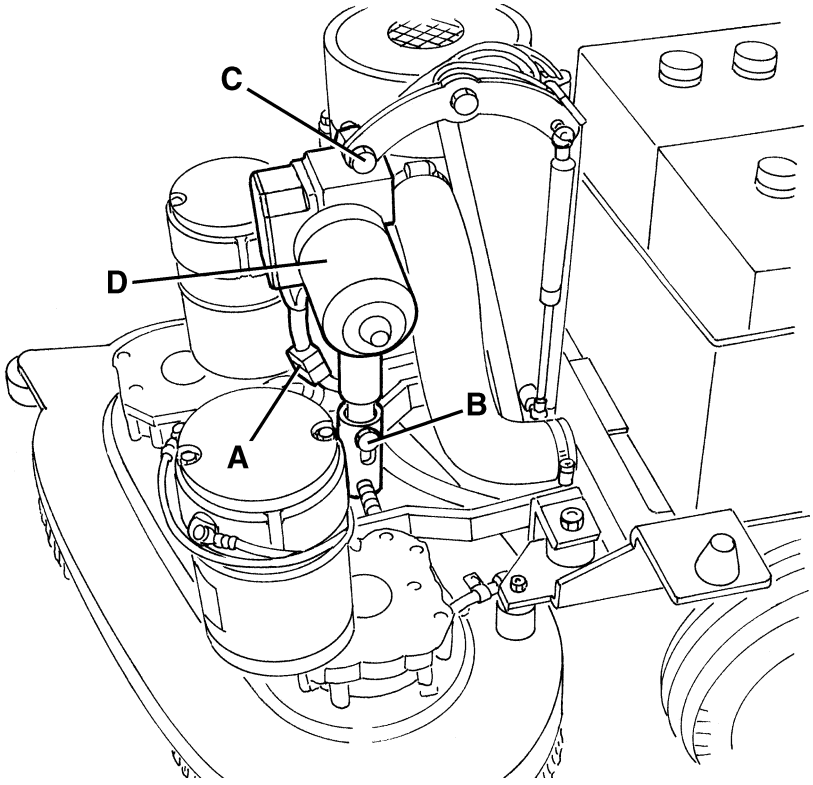
5. Turn the ignition key (10) to “0” position.
6. Unscrew the handwheel (66).
7. Hold the handlebar (12) and carefully lift the tank assembly (78) to be able to work on the deck (79).
8. Disconnect the actuator electrical connector (A).
9. Unscrew the bolts (B) and (C), then remove the actuator (D).

Reassembly

10. Position the actuator (D) into its seat, then screw the bolts (B) and (C); do not tighten the nuts, but leave the necessary play for the articulation to rotate.
11. Connect the actuator connector (A).
12. Perform the Adjustment of the Broom Deck Lifting/Lowering Actuator Positions, as described in the previous pages.

NOTE
If necessary, the actuator limit switch positions can also be adjusted at the workbench; see the procedure in the relevant paragraph.

Figure 9



S300634

TROUBLESHOOTING

Open circuit

The fuse (56) causes an open in the circuit supplying the Function electronic board (54). This system allows to prevent the circuits from being damaged in case of failure.
If there is an open in the fuse, the possible causes are the following.

1. Function electronic board (54) wiring harness damaged or short-circuit (inspect the function electronic board (54) power cables and their connectors).
2. Function electronic board (54) damaged (replace).

None of the brooms rotates

Possible cause:

1. Broom rotation microswitch not correctly adjusted or faulty (adjust or replace).
2. Microswitch - Function electronic board wiring harness damaged (repair).
3. Function electronic board - broom motor wiring harness damaged (repair).
4. Function electronic board damaged (replace).

One broom does not rotate

Possible cause:

1. Motor carbon brushes worn (replace the motor carbon brushes).
2. Bulky debris or cords around the brooms or between the brooms and their flanges (remove the brooms and the debris or cords).
3. Motor malfunction (repair or replace the motor).
4. Wiring harness damaged (repair).

The brooms do not reach correctly the lifted, lowered or extrapressure position (one or more positions are wrong)

Possible cause:

1. Broom deck lifting/lowering actuator limit switch positions not correctly adjusted (adjust the actuator limit switch positions).
2. Broom deck lifting/lowering actuator limit microswitches faulty (replace them).
3. Broom deck lifting/lowering actuator faulty (replace).
4. Actuator wiring harness open (check the connections in the chapter Electrical System, paragraph Troubleshooting).

RECYCLING SYSTEM

RECYCLING WATER TANK, VACUUM GRID WITH FLOAT AND RECYCLING WATER FILTER CLEANING (OPTIONAL)

1. Place the machine in the area designed for water disposal and washing.
2. Turn the ignition key (10) to “0” position.
3. Lift the cover (A).
4. Clean and wash with fresh water the cover (A), the tank (B) and the vacuum automatic shut-off screen (C). Drain the water from the tank (B) by using the pipe (36).
5. If necessary, release the retainers (D) and open the shield (C); then extract the float (E), clean all the components and reinstall them.
6. Check the tank cover gasket (F) for deterioration.

NOTE
The gasket (F) creates vacuum in the tank that is necessary for the vacuum of recycling water.

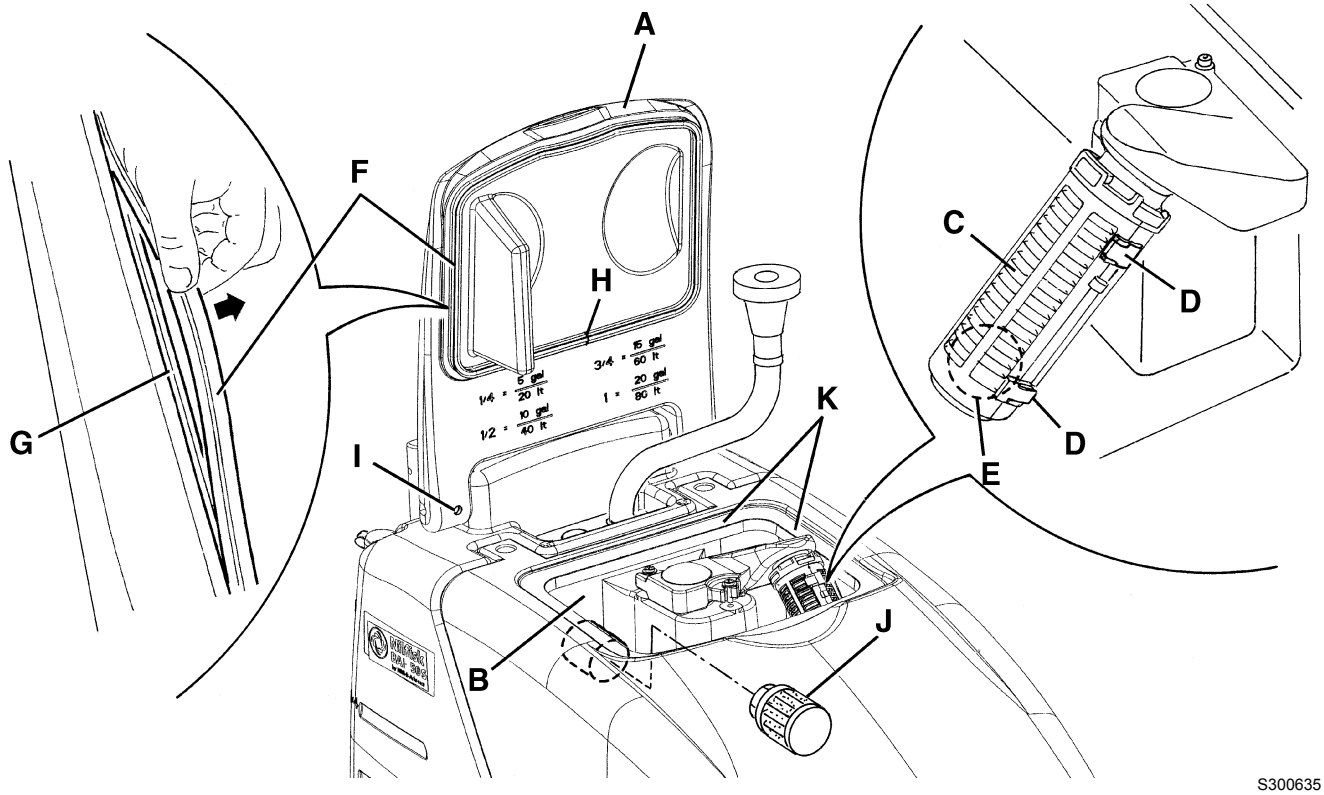
If necessary replace the gasket (F) after removing it from its housing (G). When reassembling the new gasket, install its joint (H) in the rear center area as shown in the figure.

7. Make sure that the gasket (F) mating surface (K) is integral and adequate for the gasket seal.
8. Make sure that the compensation hole (I) is not clogged, otherwise clean it.

NOTE
The hole (I), allowing the air compensation in the cover cavity, generates vacuum in the tank.

9. Unscrew the recycling filter (J), if equipped, by turning it counter-clockwise. Clean and wash the filter with fresh water, then reinstall it.
10. Close the cover (A).

Figure 1

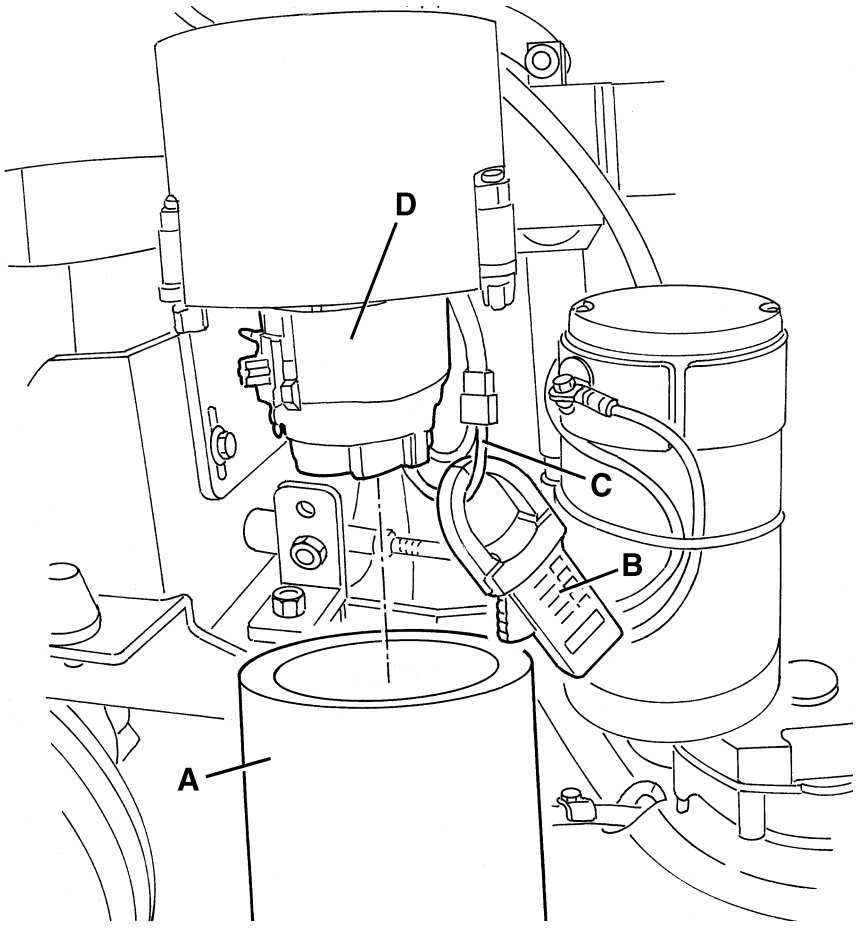


VACUUM MOTOR ELECTRICAL INPUT CHECK

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

1. Drain the recycling water, if any, from the related tank (70) by using the pipe (36).
2. Drain the solution, if any, from the related tank (71) by using the pipe (37).
3. Position the machine on a level ground.
4. Turn the ignition key (10) to “0” position.
5. Unscrew the handwheel (66).
6. Hold the handlebar (12) and carefully lift the tank assembly (78) to be able to work on the deck (79).
7. Release the acoustic insulation assembly (A).
8. Apply the ammetric pliers (B) to a vacuum motor (D) cable (C).
9. Turn the ignition key (10) to “I” position.
10. Activate the vacuum motor by pushing down the lever (35) and check that the motor electrical input is within 18-22A at 24V. Stop the vacuum motor by pulling the lever (35). Turn the ignition key (10) to “0” position and remove the ammetric pliers (B).
    If the input exceeds the specified value, perform the motor carbon brush check (see the procedure on the following page). If necessary, disassemble the vacuum motor (see the procedure on the following pages), then clean the motor properly and inspect the condition of its moving parts.
    If the above-mentioned procedures do not lead to a correct motor input, it is necessary to replace the motor (see the procedure on the following pages).
11. Carry out steps from 1 to 7 in the reverse order.

Figure 2



S300636

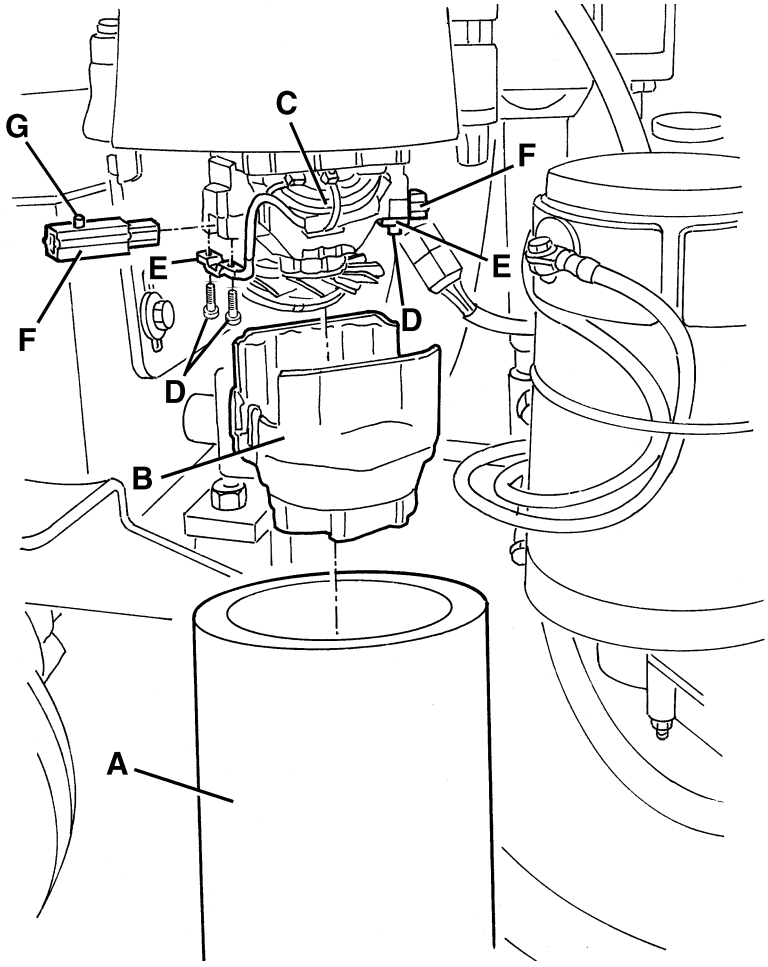
VACUUM MOTOR CARBON BRUSH CHECK AND REPLACEMENT

1. Drain the recycling water, if any, from the related tank (70) by using the pipe (36).
2. Drain the solution, if any, from the related tank (71) by using the pipe (37).
3. Position the machine on a level ground.
4. Turn the ignition key (10) to “0” position.
5. Disconnect the battery connector (40).
6. Unscrew the handwheel (66).
7. Hold the handlebar (12) and carefully lift the tank assembly (78) to be able to work on the deck (79).
8. Remove the acoustic insulation assembly (A).
9. Remove the press-fitted cover (B) from the vacuum motor (C).
10. Partially unscrew the screws (D) by lowering the plates (E).
11. Extract the carbon brushes (F).

NOTE
When reassembling, insert the carbon brushes with the retainers (G) facing upwards.

12. Check the carbon brushes for wear; the carbon brushes are worn when there is not sufficient contact with the motor armature, because of the carbon brush wear, the contact surface deterioration, the thrust spring breakage, etc. The carbon brush (F) minimum length is 22 mm: when this length is reached, the carbon brushes have to be replaced.
13. If necessary, replace the carbon brushes. Replace all carbon brushes as an assembly.
14. Reassemble by carrying out the disassembly operations in the reverse order.

Figure 3

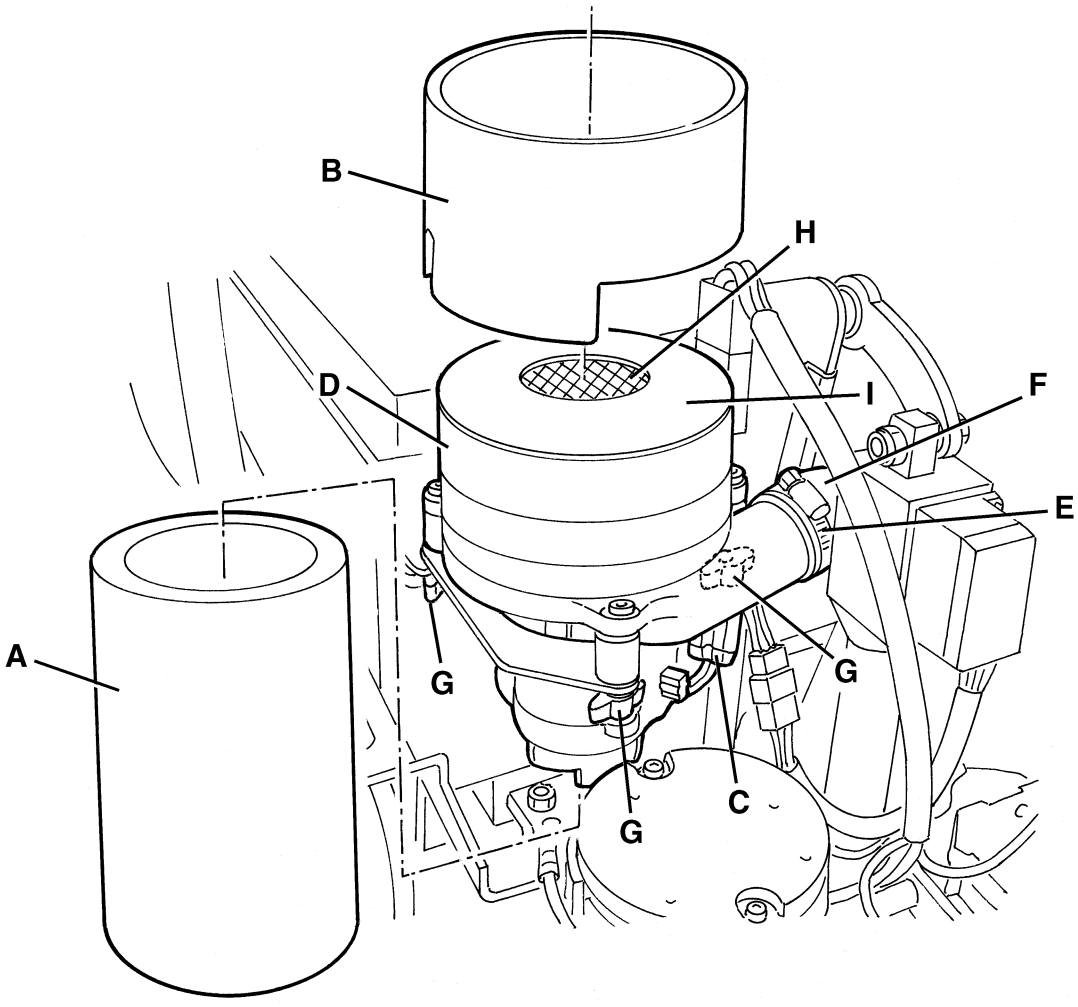


S300637

VACUUM MOTOR DISASSEMBLY

1. Drain the recycling water, if any, from the related tank (70) by using the pipe (36).
2. Drain the solution, if any, from the related tank (71) by using the pipe (37).
3. Position the machine on a level ground.
4. Turn the ignition key (10) to “0” position.
5. Disconnect the battery connector (40).
6. Unscrew the handwheel (66).
7. Hold the handlebar (12) and carefully lift the tank assembly (78) to be able to work on the deck (79).
8. Remove the acoustic insulation assembly (A).
9. Remove the acoustic insulation assembly (B).
10. Disconnect the vacuum motor (D) connector (C).
11. Loosen the clamp (E) and remove the hose (F).
12. Unscrew the handwheels (G) and remove the vacuum motor (D).
13. Reassemble by carrying out the disassembly operations in the reverse order, paying attention to what follows:
    – when a new motor is installed, it is necessary to reuse the protection net (H) and install it on the new motor with a new gasket (I).

Figure 4



S300638

SQUEEGEE CLEANING/CHECK AND BLADE REPLACEMENT

CAUTION!
It is advisable to use protective gloves when cleaning the squeegee as there may be cutting debris.

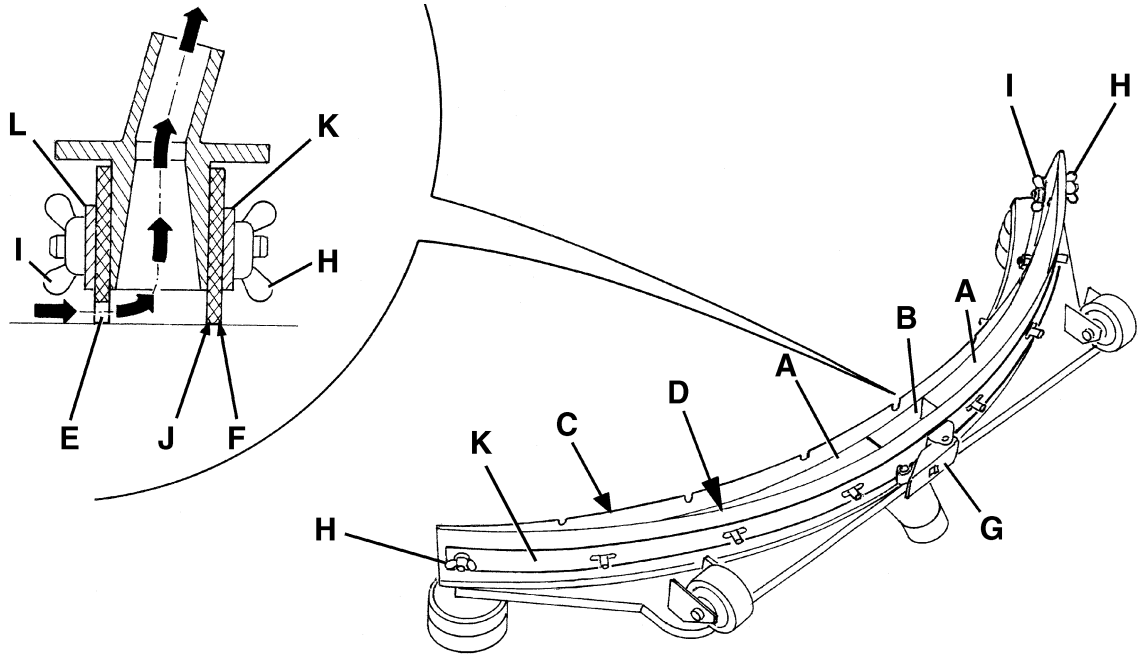
Disassembly and cleaning

1. Position the machine on a level ground.
2. Turn the ignition key (10) to “0” position.
3. Lower the squeegee (26) by means of the lever (35).
4. Disconnect the vacuum pipe (34) from the squeegee (26).
5. Loosen the handwheels (27) and remove the squeegee (26).
6. Wash and clean the squeegee; in particular, remove dirt and debris from the compartments (A) and the hole (B).

Check and adjustment

7. Check that the edge (E) of the front blade and the edge (F) of the rear blade contact simultaneously a plane surface along their entire length; otherwise adjust their height as described below:
   – Disengage the retainer (G) and loosen the wing nuts (H) to adjust the rear blade (D); then tighten the wing nuts and engage the retainer again.
   – Loosen the wing nuts (I) to adjust the front blade (C); then tighten the nuts.
8. Check that the front blade (C) and the rear blade (D) are integral and free from cuts and tears; otherwise replace them as described below. Check the rear blade front corner (J) for wear; if it is worn, overturn the blade to replace the worn corner with an integral one. If the other corners are worn too, replace the blade as described below:
   – Replace (or overturn) the rear blade (D), disengage the retainer (G), unscrew the wing nuts (H) and remove the retaining strip (K), then install in the reverse order of removal.
   – Replace the front blade (C), unscrew the wing nuts (I) and remove the retaining strip (L), then install in the reverse order of removal.
   – After the blade replacement (or overturning), adjust their height as described at the previous step.
9. Reposition the squeegee (26) into its seat and screw down the handwheels (27).
10. Connect the vacuum pipe (34) to the squeegee (26).
11. If necessary, adjust the squeegee balancing handwheel (28).
12. Lift the squeegee (26) by means of the lever (35).

Figure 5



S300639

TROUBLESHOOTING

The vacuum motor does not turn on

The electronic board directly powers the vacuum motor; the possible causes of the motor failure are:
1. Malfunction of the microswitch positioned on the squeegee lever (35) (check it for proper operation).
2. Microswitch - Function electronic board wiring harness damaged (inspect and repair).
3. Function electronic board - vacuum motor wiring harness damaged or short-circuit (for inspection, see the paragraph Troubleshooting in the chapter Electrical System).
4. Vacuum motor carbon brushes worn (replace the motor carbon brushes).
5. Vacuum motor malfunction (check the motor electrical input).
6. Function electronic board damaged (replace).

The vacuum motor turns on, but it turns off after a few seconds

Possible cause:
1. Malfunction of the microswitch positioned on the squeegee lever (35) (check it for proper operation as follows):
   – Microswitch closed = motor on.
   – Microswitch open = motor off (5 seconds after contact opening).
2. Automatic float-type shut-off system (72) on (eliminate the causes).
3. Float shield (72) dirty (clean).
4. Squeegee or vacuum pipe clogged (clean).
5. Vacuum motor malfunction (replace).
6. Electronic dirty water tank sensing system malfunction - full (deactivate the system by turning OFF the dip-switch (65)).

Insufficient or no dirty water vacuum

Possible cause:
1. The automatic float shut-off (72) is activated because the recycling water tank (70) is too full (empty the tank).
2. Float shield (72) or vacuum pre-filter dirty (clean).
3. Tank cover (67) not correctly positioned (place it correctly).
4. Tank cover gasket not efficient or compensation hole clogged (eliminate the causes).
5. Squeegee or vacuum pipe clogged or damaged (clean or repair/replace).
6. Vacuum seals (91) damaged or not matching (repair or replace).

The squeegee leaves lining or it does not pick up water

Possible cause:
1. Debris under the blade edge (remove).
2. Squeegee blade edges torn or worn (replace them).
3. Squeegee unbalanced (balance it by means of the handwheel (28)).
4. Recycling water drain pipe (36) plug open (close).

DRIVE SYSTEM

DRIVE MOTOR ELECTRICAL INPUT CHECK

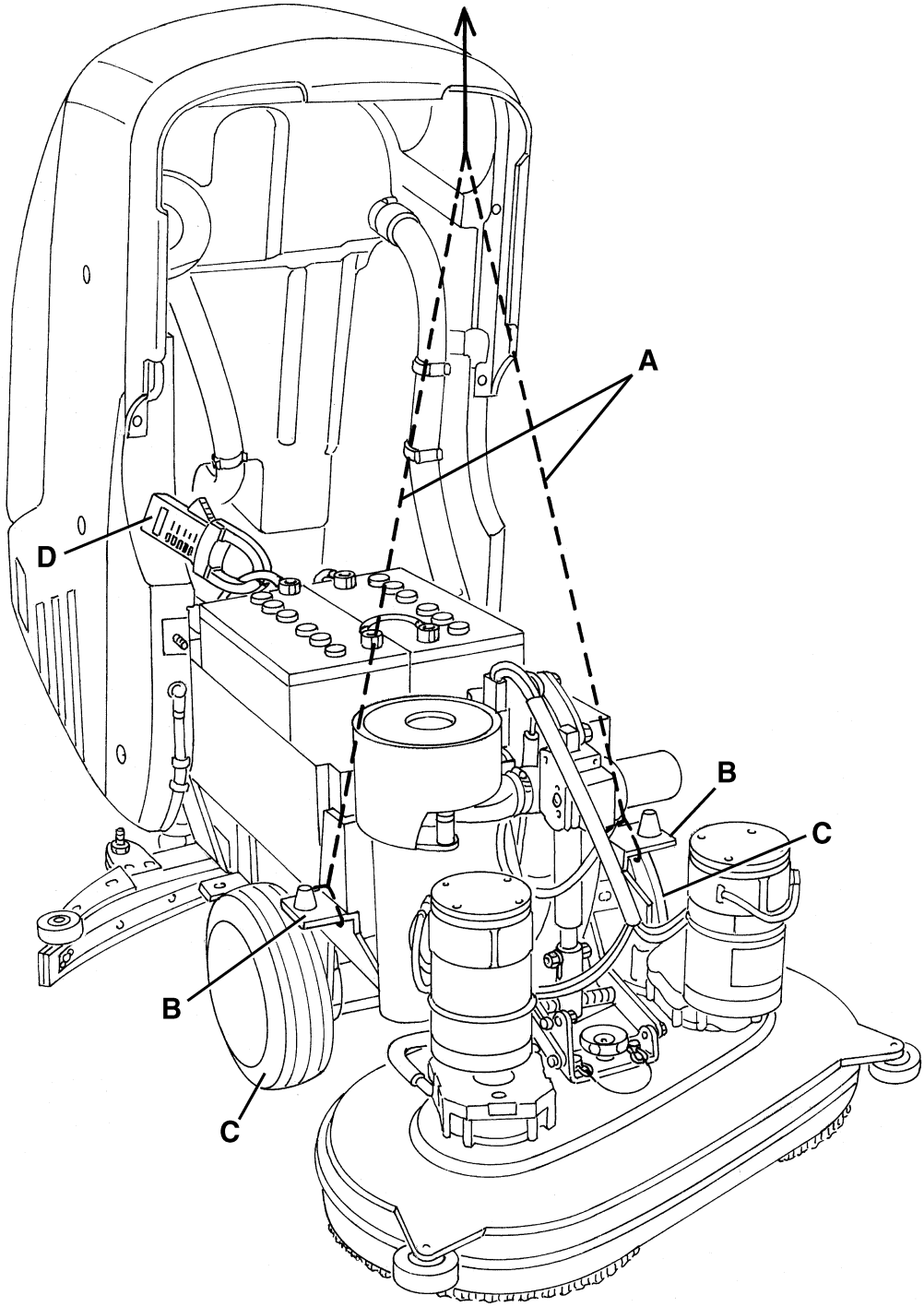
WARNING!
This procedure must be performed by qualified personnel only.

1. Drain the recycling water, if any, from the related tank (70) by using the pipe (36).
2. Drain the solution, if any, from the related tank (71) by using the pipe (37).
3. Position the machine on a level ground.
4. Remove the brooms (84) by using the switch (6).
5. Turn the ignition key (10) to “0” position.
6. Unscrew the handwheel (66).
7. Hold the handlebar (12) and carefully lift the tank assembly (78) to be able to work on the battery (75).
8. Sling the machine by means of two ropes (A) of the same length (as shown in the figure) to hoist the machine front part.
   Attach the ropes (A) to the brackets (B) so that they cannot come out.
9. Slightly tension the sling (A) by using a proper hoisting system, then lift the machine front part, until the drive wheels (C) are a few centimeters from the ground, so that they do not touch the ground when rotating.
   Safely hold the hoisting system in this position.

WARNING!
Pay attention to the drive wheel (C) rotation while performing the following steps.

10. Apply the ammetric pliers (D) to the battery (red) positive cable.
11. Turn the ignition key (10) to “I” position.
12. Set the forward speed adjuster (7) to the maximum speed.
13. Push the forward/reverse and broom/pad/cylindrical broom rotation paddle (14) and check that the electrical input at 24 V is between 2 and 3A. Release the forward/reverse and broom/pad/cylindrical broom rotation paddle (14).
    Turn the ignition key (10) to “0” position and remove the ammetric pliers (D).
    If the electrical input exceeds the specifications, perform the following operations to identify and eliminate the cause of the faulty input:
    – Check for debris or dirt preventing the component rotation.
    – If necessary, disassemble the drive motor (see the procedure on the following pages), then check the hubs for proper alignment and the bearings for smoothness.
    – If necessary, disassemble the motor, then inspect the condition of all its parts.
    If the above-mentioned procedures do not lead to a correct electrical input, it is necessary to replace the motor (see the procedure on the following pages).
14. Carry out steps from 4 to 9 in the reverse order.

Figure 1

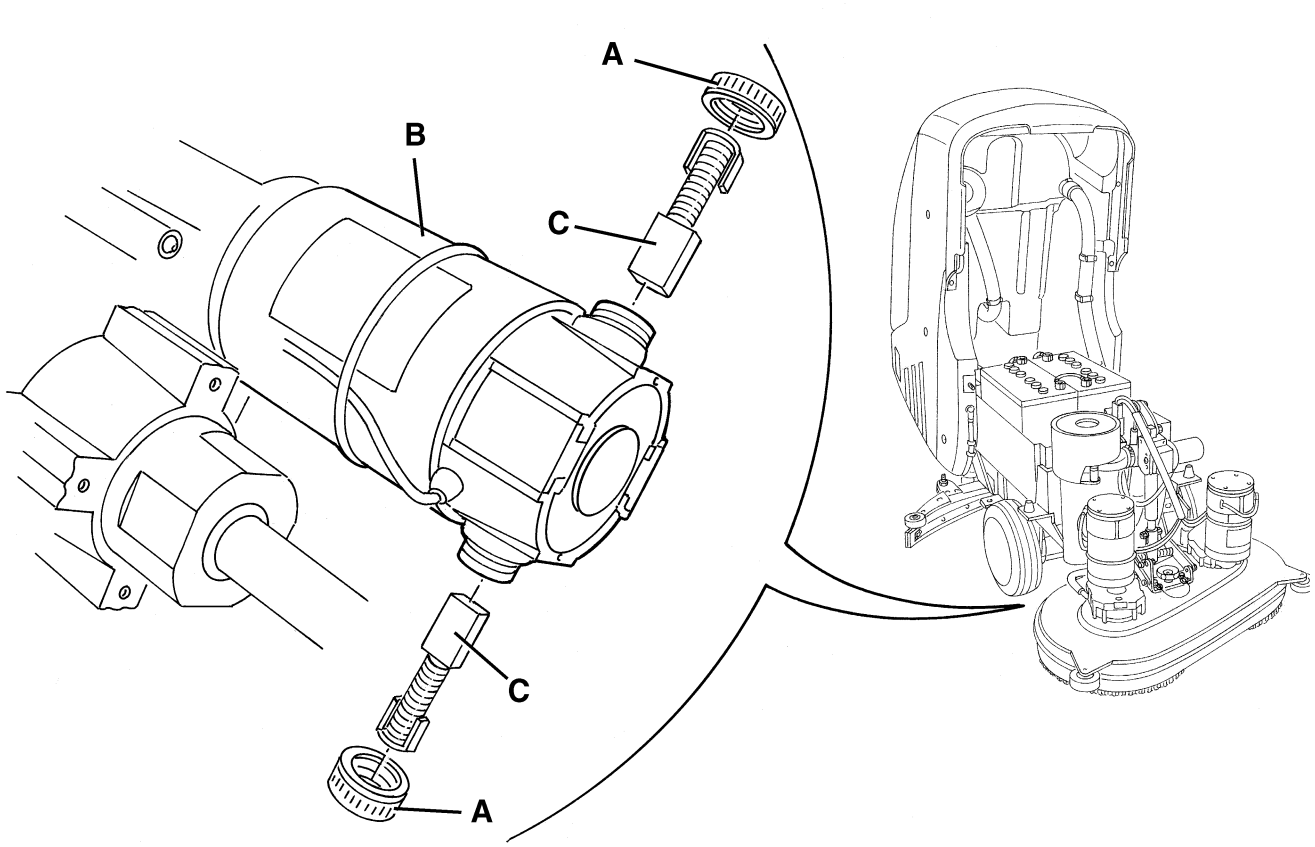


S300640

DRIVE MOTOR CARBON BRUSH CHECK AND REPLACEMENT

1. Drain the recycling water, if any, from the related tank (70) by using the pipe (36).
2. Drain the solution, if any, from the related tank (71) by using the pipe (37).
3. Position the machine on a level ground.
4. Turn the ignition key (10) to “0” position.
5. Disconnect the battery connector (40).
6. Unscrew the handwheel (66).
7. Hold the handlebar (12) and carefully lift the tank assembly (78) to be able to work on the drive motor.
8. Working under the machine, remove dirt and dust from the drive motor (B) outer part from the cover side (A).
9. Unscrew the covers (A) and extract the carbon brushes (C).
10. Check the two carbon brushes (C) for wear; the carbon brushes are worn when there is not sufficient contact with the motor armature, because of the carbon brush wear, the contact surface deterioration, the thrust spring breakage, etc. The carbon brush (C) minimum length is 13 mm: when this length is reached, the carbon brushes have to be replaced.
11. If necessary, replace the carbon brushes.
    Replace all carbon brushes as an assembly.
12. Reassemble by carrying out the disassembly operations in the reverse order.

Figure 2

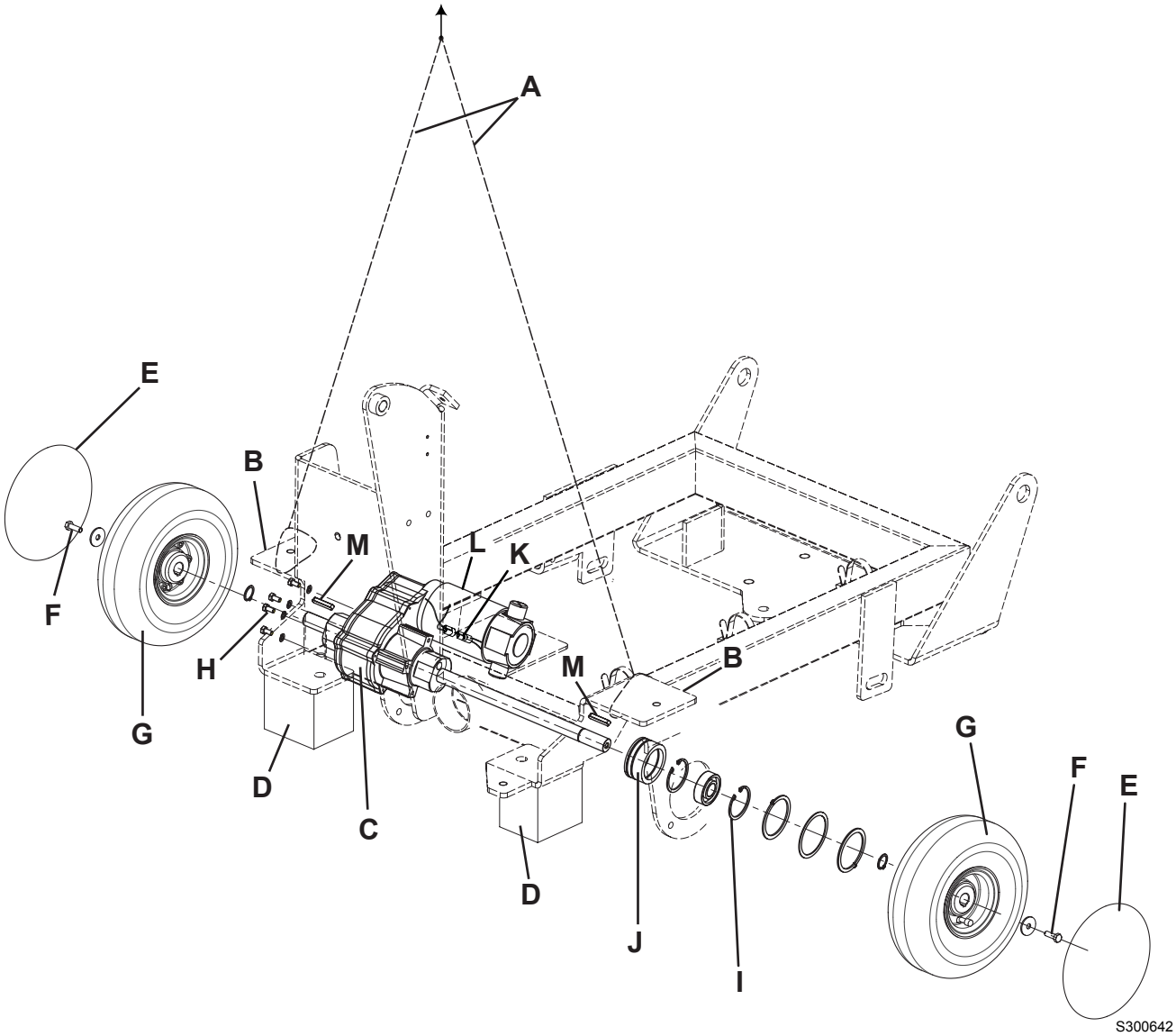


S300641

DRIVE MOTOR REMOVAL

1. Remove the battery and its frame (see the procedure in the related paragraph).
2. Sling the machine by means of two ropes (A) of the same length (as shown in the figure) to hoist the machine front part.
   Attach the ropes (A) to the brackets (B) so that they cannot come out.
3. Slightly tension the sling (A) by using a proper hoisting system, then lift the machine front part, until the drive wheels (G) are a few centimeters from the ground, so that it is possible to disassemble the drive motor (C).
   Safely hold the hoisting system in this position.
4. Place wooden blocks (D) under the machine, as shown in the figure, in order to prevent the machine from falling accidentally.
5. Extract the wheel covers (E).
6. Remove the screws (F).
7. Remove the wheels (G) and extract the keys (M).
8. Remove the screws (H).
9. Remove the snap ring (I) and move the bearing holder bush (J) towards the drive motor (C).
10. Disconnect the motor (K) connector.
11. Remove the drive motor (C) with the shafts.
12. Reassemble by carrying out the disassembly operations in the reverse order.

Figure 3



POTENTIOMETER ADJUSTMENT

1. Position the machine on a level ground.
2. Turn the ignition key (10) to “0” position.
3. Disconnect the battery connector (40).
4. Unscrew the screws (A) and remove the paddle (C) cover (B).
5. Disconnect one of the two microswitch (H) terminals.
6. Connect a 20 K Ohm tester to the potentiometer (G) connectors (D) and (E) and check the following values under the following conditions:
   – With the paddle (C) deactivated: from 2.40 to 2.60 K Ohm.
   – With the paddle (C) set to forward: from 4.80 to 5.00 K Ohm.
   – With the paddle (C) set to reverse: from 0.00 to 0.25 K Ohm.

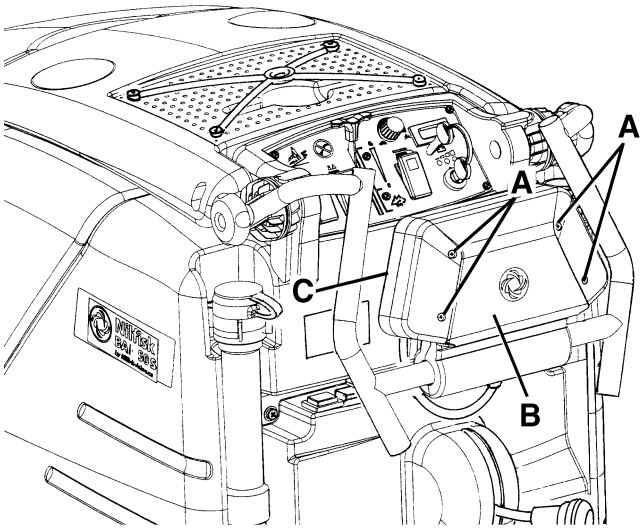
CAUTION!
Do not invert the cables to the potentiometer (G) connectors (D), (E), (F).

7. To obtain the above conditions, loosen the nut (K) and turn the potentiometer (G) as necessary. Tighten the nut. If the specified values can not be obtained by rotating the potentiometer (G), it is also possible to adjust the cam (J) position after loosening the screws (I); in that case it will be necessary to adjust the machine forward microswitch (H) (see the procedure on the following page).
8. Carry out steps 3 to 5 in the reverse order.

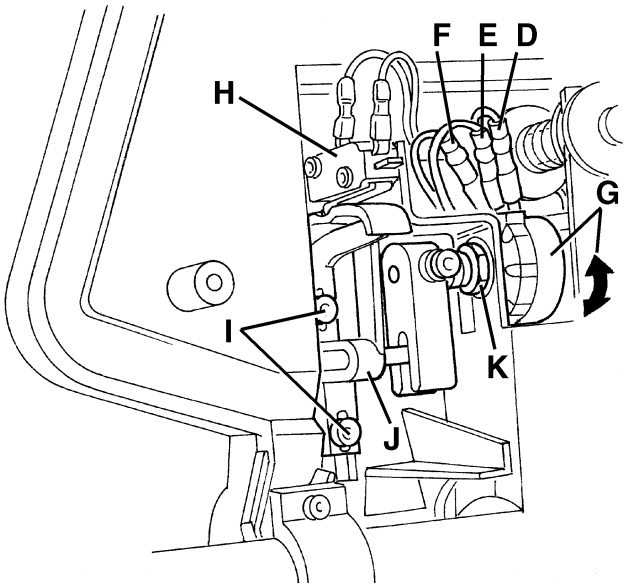
CAUTION!
Reconnect the microswitch (H) disconnected cable to the correct terminal (microswitch terminals “C” and “NO”).

9. Carry out speed change tests.

Figure 4



S300643



S300644

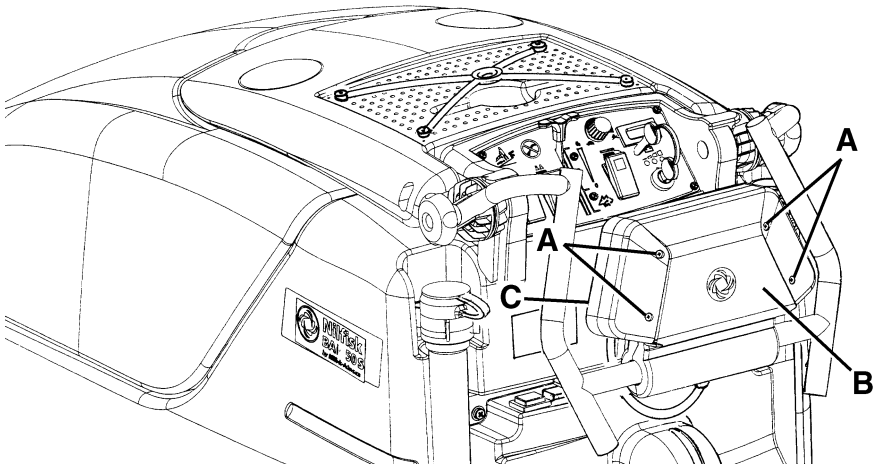
DRIVE MICROSWITCH ADJUSTMENT

1. Position the machine on a level ground.
2. Turn the ignition key (10) to “0” position.
3. Disconnect the battery connector (40).
4. Unscrew the screws (A) and remove the paddle (C) cover (B).
5. With the paddle (C) released, check that the microswitch (E) actuator (D) is in the cam (I) housing (F); also check that the contacts connected to the cables (N) are open (use a tester).
6. Push the paddle (C) and check that the actuator (D) in positions (G) and (H) activates the microswitch (E) (a “click” must be heard); also check that the contacts connected to the cables (N) are closed (use a tester).
   If necessary, reach the required condition by loosening the screws (M) and adjusting the microswitch (E) position. Tighten the screws.
   If the actuator (D) correct position can not be obtained by adjusting the microswitch (E), it is also possible to adjust the cam (I) position after loosening the screws (L); in that case it will be necessary to adjust the machine drive potentiometer (O) (see the procedure on the following page).

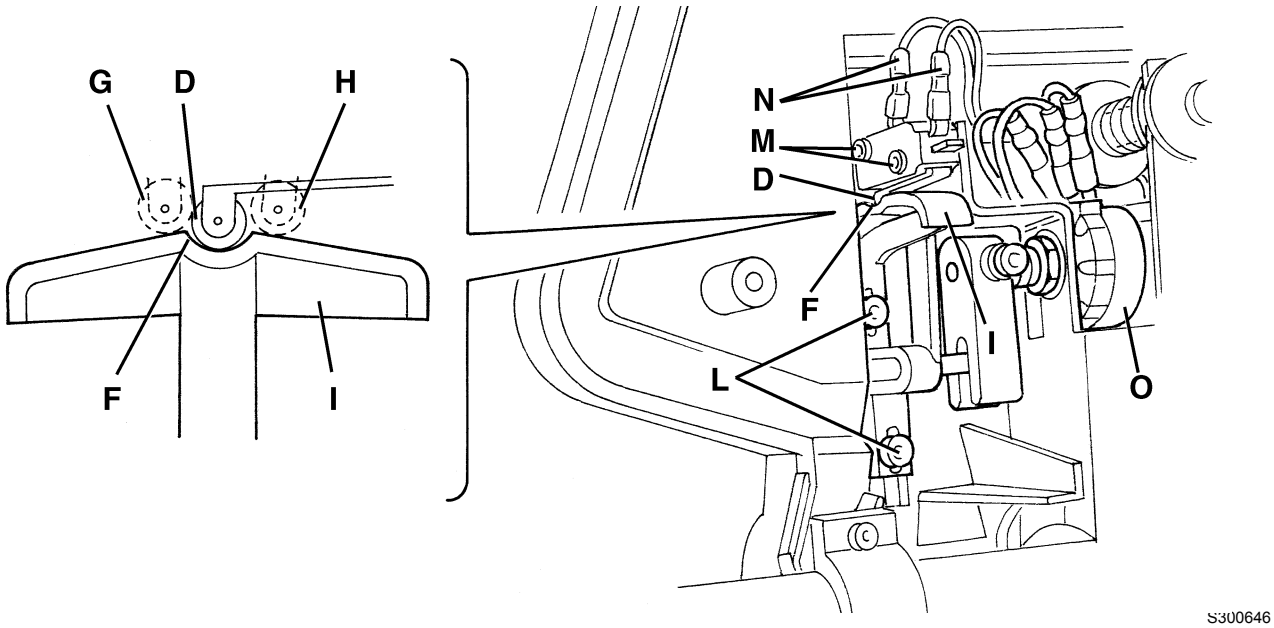
CAUTION!
When reconnecting the microswitch connectors (N), make sure you reposition them on the same contacts (contact “C” and contact “NO”).

7. Reassemble by carrying out the disassembly operations in the reverse order.
8. Carry out drive tests.

Figure 5



S300645



S300646

TROUBLESHOOTING

Open circuit

The fuse (55) determines the open circuit. This system allows to prevent the circuits and the drive motor from being damaged under overload conditions.
If there is an open in the electrical circuit, the possible causes are the following.

Drive motor: the fuse opens the circuit

Possible cause:
1. Bulky debris or cords under the machine or around the driving wheels (remove the debris).
2. Motor damaged (check the motor electrical input).
3. Excessive floor gradient (do not use the drive function to overcome excessive slopes).
4. Drive board wiring harness short-circuit (repair).
5. Drive board malfunction (replace).

The machine does not move

Possible cause:
1. Battery voltage too low (charge the battery).
2. Drive on/off switch (46) turned to “0” or damaged.
3. Potentiometer inside the paddle (14) misadjusted or faulty (adjust or replace).
4. Speed adjuster (7) faulty (replace).
5. Drive microswitch misadjusted or faulty (adjust or replace).
6. Drive electronic board malfunction (replace).
7. Fuse (55) open (eliminate the cause of the open circuit).
8. Wiring harness damaged (repair).
9. Drive motor carbon brushes worn (replace them).
10. Drive motor malfunction (replace).

CAUTION!
When turning on the machine through the key (10), the drive system blocks if the paddle (14) is activated, and the related microswitch is closed.

Drive electronic board diagnostic LED

The following chart shows the meaning of the number of flashes of the red LED, situated on the drive electronic board, in the event of a system malfunction.

MEANING OF RED LED FLASH NUMBER AND REMEDY		
Number of flashes	**Meaning**	**Remedy**
1	Drive electronic board malfunction	Replace
2	Thermal fuse activation	Wait for the electronic board to cool down, then check the drive motor electrical input and determine the causes of the overheating
3	System activated when turning on the machine	Check the adjustment of the drive microswitch in the paddle (14)
4	Potentiometer inside the paddle (14) - drive board wiring harness open	Check the connections

ELECTRICAL SYSTEM

BATTERY REMOVAL

1. Drain the recycling water, if any, from the related tank (70) by using the pipe (36).
2. Drain the solution, if any, from the related tank (71) by using the pipe (37).
3. Position the machine on a level ground.
4. Turn the ignition key (10) to “0” position.
5. Disconnect the battery connector (40).
6. Unscrew the handwheel (66).
7. Hold the handlebar (12) and carefully lift the tank assembly (78) to be able to work on the battery.
8. Disconnect the battery cables.
9. Remove the batteries (75).
10. If necessary, remove the battery frame (89).
11. Reassemble by carrying out the disassembly operations in the reverse order.

BATTERY MAINTENANCE AND RECHARGING

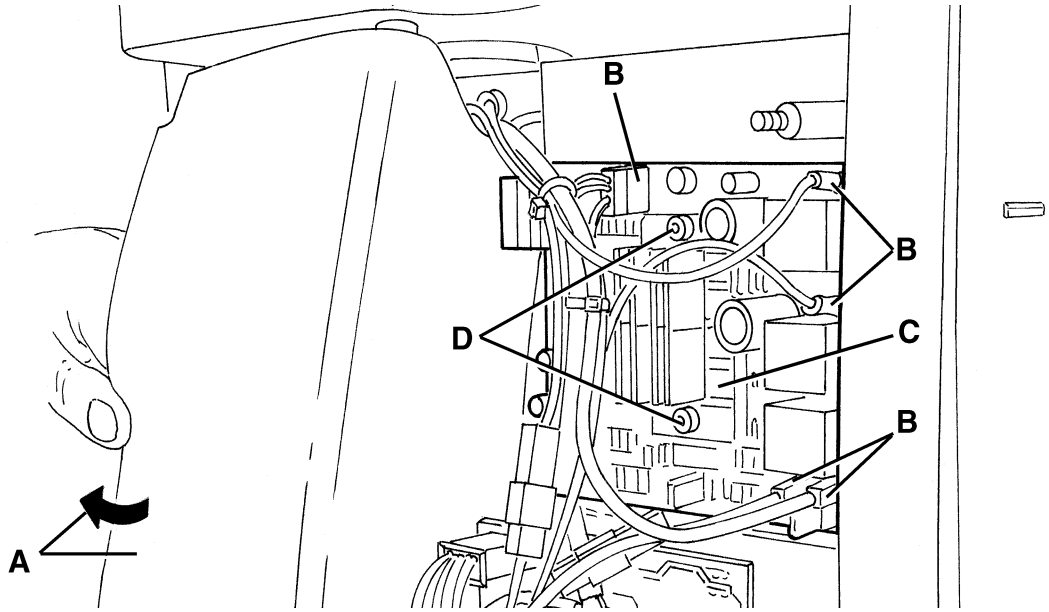
See the Instructions for Use Manual.

DRIVE ELECTRONIC BOARD REPLACEMENT

NOTE
It is not necessary to perform the electronic programming of the new board.

1. Position the machine on a level ground.
2. Turn the ignition key (10) to “0” position.
3. Disconnect the battery connector (40).
4. Pull the handle out (63) from the squeegee lifting lever.
5. Remove the screws (64) and carefully move the cover (57) moving as necessary the rubber panel (A).
6. Disconnect the electrical connections (B) of the drive electronic board (C) (See the wiring diagram).
7. Remove the screws (D) and the drive electronic board (C).
8. Reassemble by carrying out the disassembly operations in the reverse order.

Figure 1



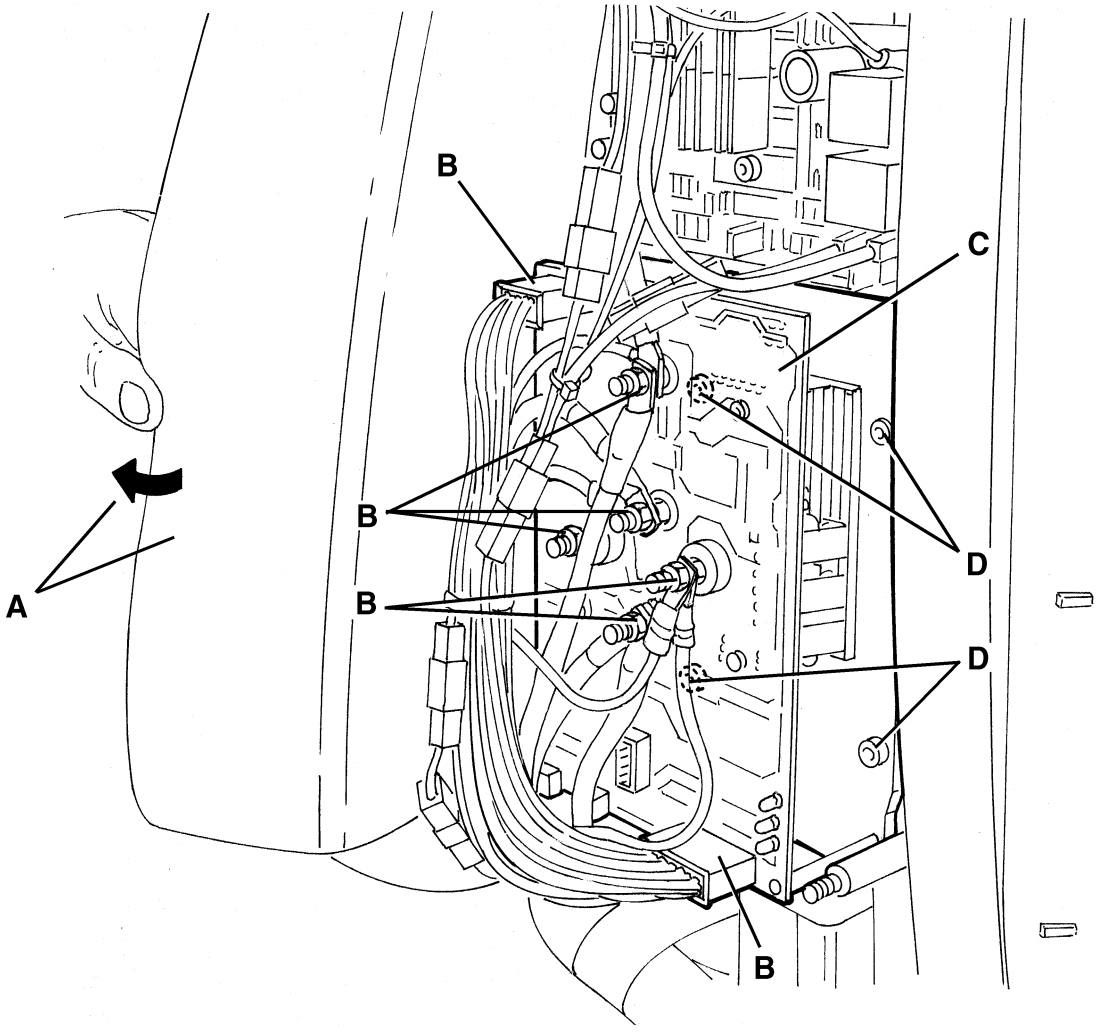
S300647

FUNCTION ELECTRONIC BOARD REPLACEMENT

NOTE
It is not necessary to perform the electronic programming of the new board.

1. Position the machine on a level ground.
2. Turn the ignition key (10) to “0” position.
3. Disconnect the battery connector (40).
4. Pull the handle out (63) from the squeegee lifting lever.
5. Remove the screws (64) and carefully move the cover (57) moving as necessary the rubber panel (A).
6. Disconnect the electrical connections (B) of the function electronic board (C) (See the wiring diagram).
7. Remove the screws (D) and the function electronic board (C).
8. Reassemble by carrying out the disassembly operations in the reverse order, with the following caution.
   Set the new electric board according to battery type (75): turn the selector (52) to “WET” for lead batteries and to “GEL” for gel batteries.

Figure 2



S300648

FUSE CHECK/REPLACEMENT

1. Position the machine on a level ground.
2. Turn the ignition key (10) to “0” position.
3. Disconnect the battery connector (40).
4. Pull the handle out (63) from the squeegee lifting lever.
5. Remove the screws (64) and carefully move the cover (57) moving as necessary the rubber panel (59).
6. Check/replace the fuses:
   – 100A function electronic board fuse (55).
   – 30A drive electronic board fuse (56).
7. Reassemble by carrying out the disassembly operations in the reverse order.

TROUBLESHOOTING

See the previous chapters related to the use of the electrical system.
Other possible malfunction causes are:

1. The battery is discharged or its connections are not efficient (charge the battery or clean the connections).
2. Broken battery (check the battery voltage).

NOTE
A fault in the battery charger or its connections can cause a malfunction of the machine.

3. Faulty battery charger (replace).
4. Open fuses (replace).
5. Cut or pinched short-circuit wiring harness (repair).

For failure or open wiring harness testing, refer to the wiring diagram and following connection tables.

Function board connectors

C1 (see next figures)			
PIN	**Description**	**Ref. voltage (*)**	**Board IN/OUT**
1	Logic power supply from key (+)	24V	IN
2	Logic power supply for drive board (+)	24V	OUT
3	Return from paddle microswitch	Undef. (0V)	IN
4	Return from broom switch	Undef. (0V)	IN
5	Return from extrapressure switch	Undef. (0V)	IN
6	Return from float	Undef. (0V)	IN
7	Return from click-off switch	Undef. (0V)	IN
8	Control panel power supply	0V	OUT
9	Broom switch LED neg. power supply	Undef. (0V)	OUT
10	Extrapressure switch LED neg. power supply	Undef. (0V)	OUT
11	Return from vacuum microswitch	Undef. (0V)	IN
12	Vacuum microswitch power supply	0V	OUT
13	GREEN battery LED neg. power supply	Undef. (0V)	OUT
14	YELLOW battery LED neg. power supply	Undef. (0V)	OUT
15	RED battery LED neg. power supply	Undef. (0V)	OUT
16	LED common pos. power supply	24V	OUT

C2 (see next figures)			
PIN	**Description**	**Ref. voltage (*)**	**Board IN/OUT**
1	Jack power supply	Undef.	OUT
2	Jack power supply	Undef.	OUT
3	Recycling pump pos. power supply	24V	OUT
4	Recycling pump neg. power supply	Undef. (0V)	OUT
5	Solenoid valve pos. power supply	24V	OUT
6	m0 micro return jack	Undef. (0V)	IN
7	m1 micro return jack	Undef. (0V)	IN
8	m2 micro return jack	Undef. (0V)	IN
9	Jack micro common power supply	0V	OUT
10	Solenoid valve neg. power supply	Undef. (0V)	OUT

(*) machine with key on “I” position, stand-by (broom deck stopped), discharged battery.

SCREWED CONNECTIONS (M6)		
Screw (**)	**Description**	**Connected cables**
+B	Battery positive	- red cable from fuse (9) - red cable from battery charger - red cable from C2 connector
OUT+	Motor positive	- broom motor red cable marked (OUT +) - vacuum motor red cable marked (OUT +)
VA-	Vacuum negative output	- vacuum motor brown cable - hour counter brown/black cable
BR-	Brooms negative output	- broom motor blue cable
-B	Battery negative	- black cable from battery connector - black cable from battery charger

Microswitch (**)	OFF	ON
DIP1	Gel battery	Lead battery (Wet)
DIP2	Vacuum automatic cut-off deactivated	Vacuum automatic cut-off activated

(**) see next figures.

Diagnostic LED on function board

The following table shows the meaning of the number of flashes of the red diagnostic LEDs, located on the function electronic board, in the event of a system malfunction.

LED on board	Signal	Meaning	Causes and solutions
ON (green central)	Fixed	Supplied board	(no malfunction)
ACTUATOR (red high)	Slow flasher	Deck actuator time-out	(*)
	Fast flasher	Incorrect deck actuator position	(**)
ALARM (red low)	Fixed	Recycling water tank, full	
	1 flash	Fault electronic board	Replace
	2 flashes	Jack lowering overcurrent	
	3 flashes	Jack raising overcurrent	
	4 flashes	Overvoltage	Incorrect battery voltage
	5 flashes	Broom motor overcurrent	
	6 flashes	Vacuum motor overcurrent	
	7 flashes	Broom motor overload (>5s to 100A)	
	8 flashes	Vacuum motor overload (>5s to 50A)	
	9 flashes	Probe 1 overtemperature	
	10 flashes	Probe 2 overtemperature	
	11 flashes	Power supply incorrect sequence	Check the battery connections to the electronic board
	12 flashes	Faulty electronic board	Replace

(*) The deck actuator has not reached the set position after 10 seconds from the (lifting/lowering) input.

Possible cause:
– Open jack cable (red and blue).
– Foreign material prevents the correct movement of the deck actuator.
– Faulty deck actuator.
– Microswitch cams misadjusted.
– Faulty microswitch.

(**) The microswitch status is not compatible with deck actuator potentiometer.

Possible cause:
– Open microswitch wiring harness.
– Microswitch cams misadjusted.
– Faulty microswitch.

NOTE
The microswitch permitted positions are those indicated in the table below.

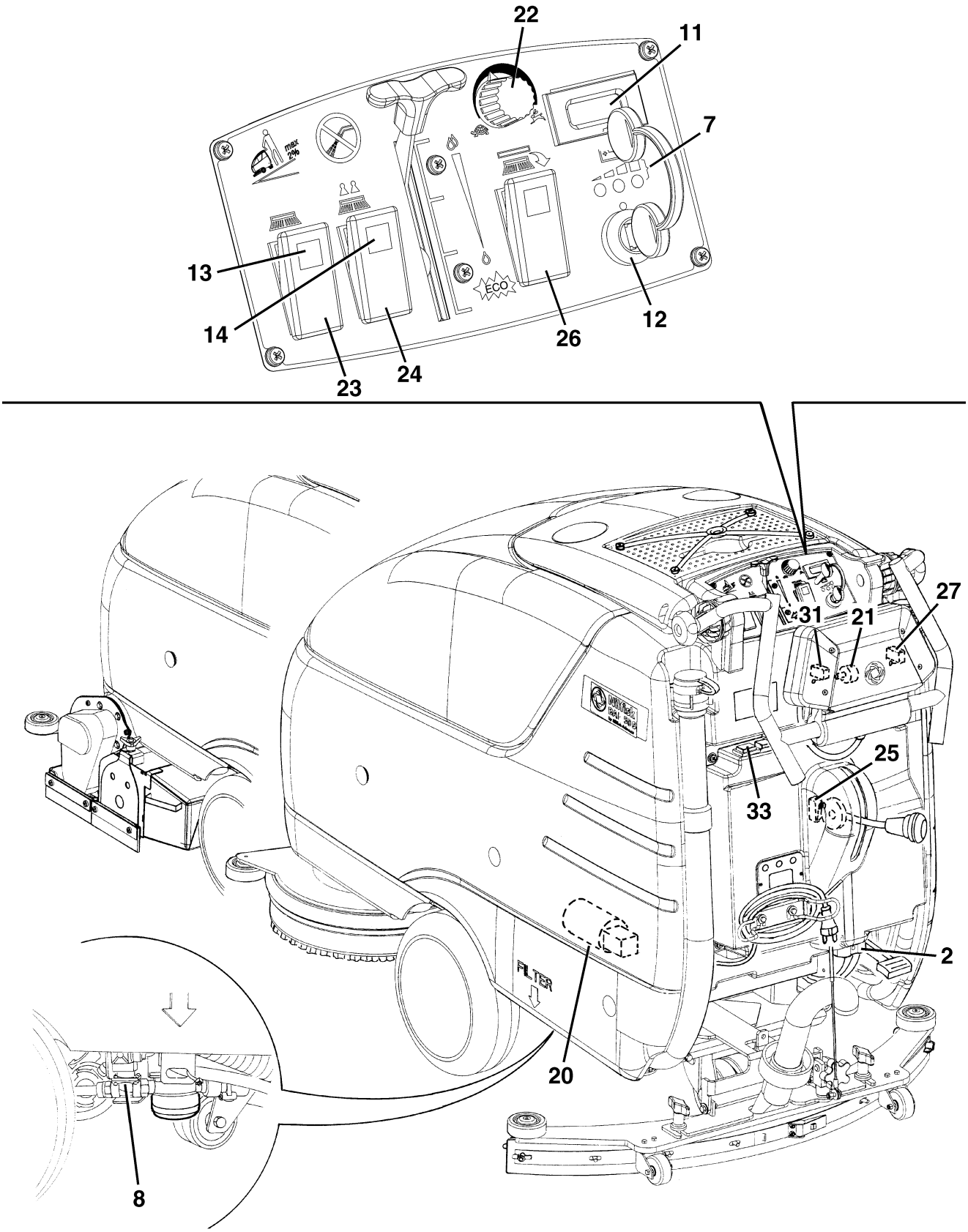
DECK ACTUATOR LIMIT MICROSWITCH POSITIONS AND CONTROL PANEL WARNING LIGHT					
Deck actuator position	Microswitch position			Control panel switch LEDs position	
	(28)	(29)	(30)	(13)	(14)
Deck up	OPEN	CLOSED	CLOSED	OFF	OFF
Deck between up and working positions	CLOSED	CLOSED	CLOSED	FLASHING	OFF
Deck in the working position	CLOSED	OPEN	CLOSED	ON	OFF
Deck between working and extrapressure positions	CLOSED	CLOSED	CLOSED	ON	FLASHING
Deck in the extrapressure position	CLOSED	CLOSED	OPEN	ON	ON

COMPONENT LAYOUT

NOTE
The symbol in brackets (...) after the name of the component refers to the wiring diagram (see the following page).

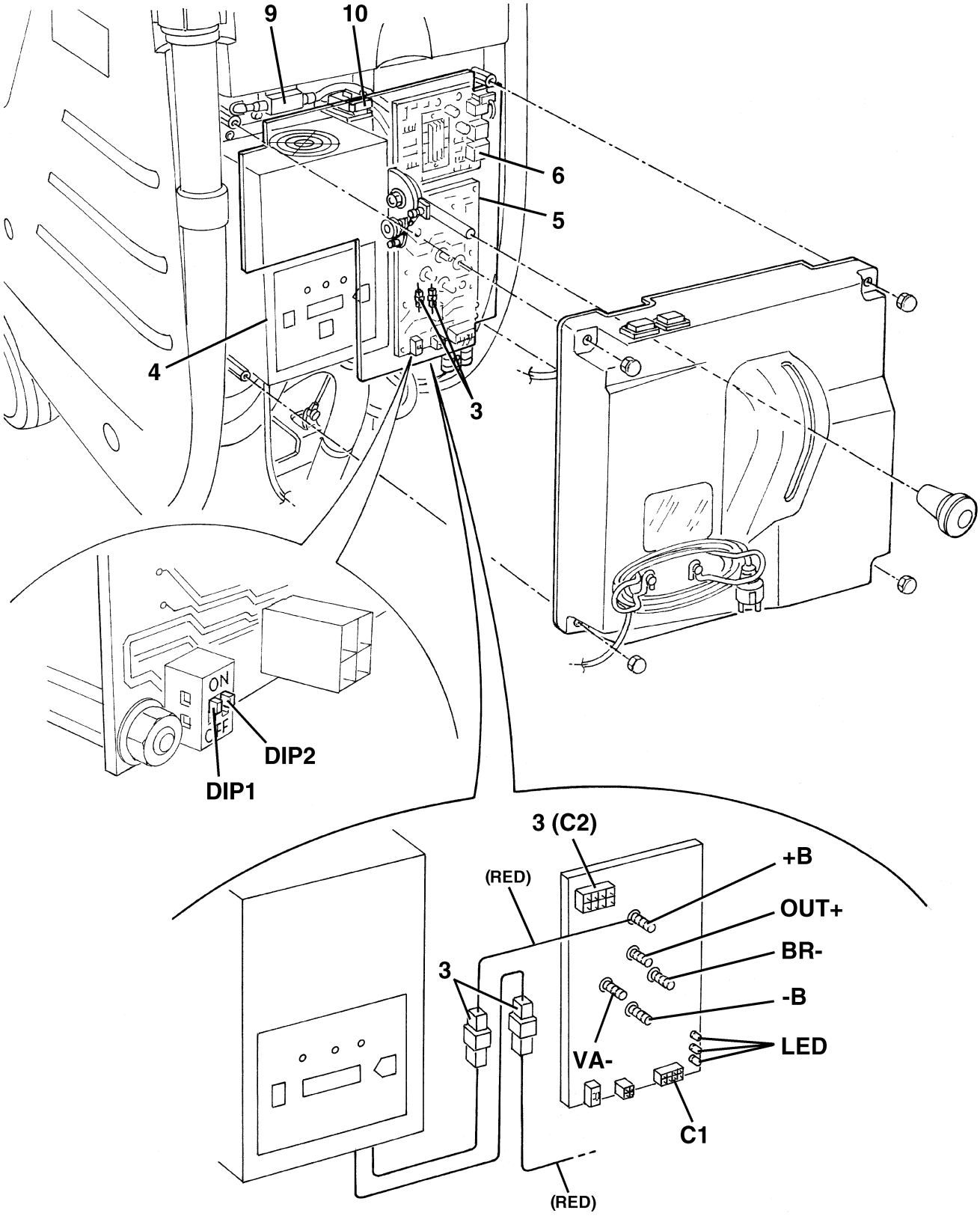
1. 24V battery (BAT)
2. Battery connector (C1)
3. Battery charger signal connector (C2)
4. 24V, 25A battery charger (CH)
5. Function electronic board (EB1)
6. Drive electronic board (EB2)
7. LED electronic board (EB3)
8. Water solenoid valve (EV1)
9. Function electronic board fuse (F1)
10. Drive electronic board fuse (F2)
11. Hour counter (HM)
12. Key switch (K1)
13. Broom switch warning light (LD1)
14. Extrapressure warning light (LD2)
15. Left broom motor (M1)
16. Right broom motor (M2)
17. Vacuum motor (M3)
18. Broom deck actuator (M4)
19. Machine drive motor (M5)
20. Recycling water pump (optional) (M6)
21. Drive speed potentiometer (R1)
22. Machine drive maximum speed potentiometer (R2)
23. Broom switch (SW1)
24. Extrapressure switch (SW2)
25. Vacuum microswitch (SW3)
26. Broom control switch (SW4)
27. Broom microswitch (SW5)
28. Actuator “0” position microswitch (SW6) (deck in lifted position)
29. Actuator “1” position microswitch (SW7) (deck in working position)
30. Actuator “2” position microswitch (SW8) (deck in extrapressure position)
31. Drive microswitch (SW9)
32. Drive motor control switch (SW10)
33. Recycling water control switch (optional) (SW11)
34. Recycling water floating switch (optional) (SW12)

Figure 3



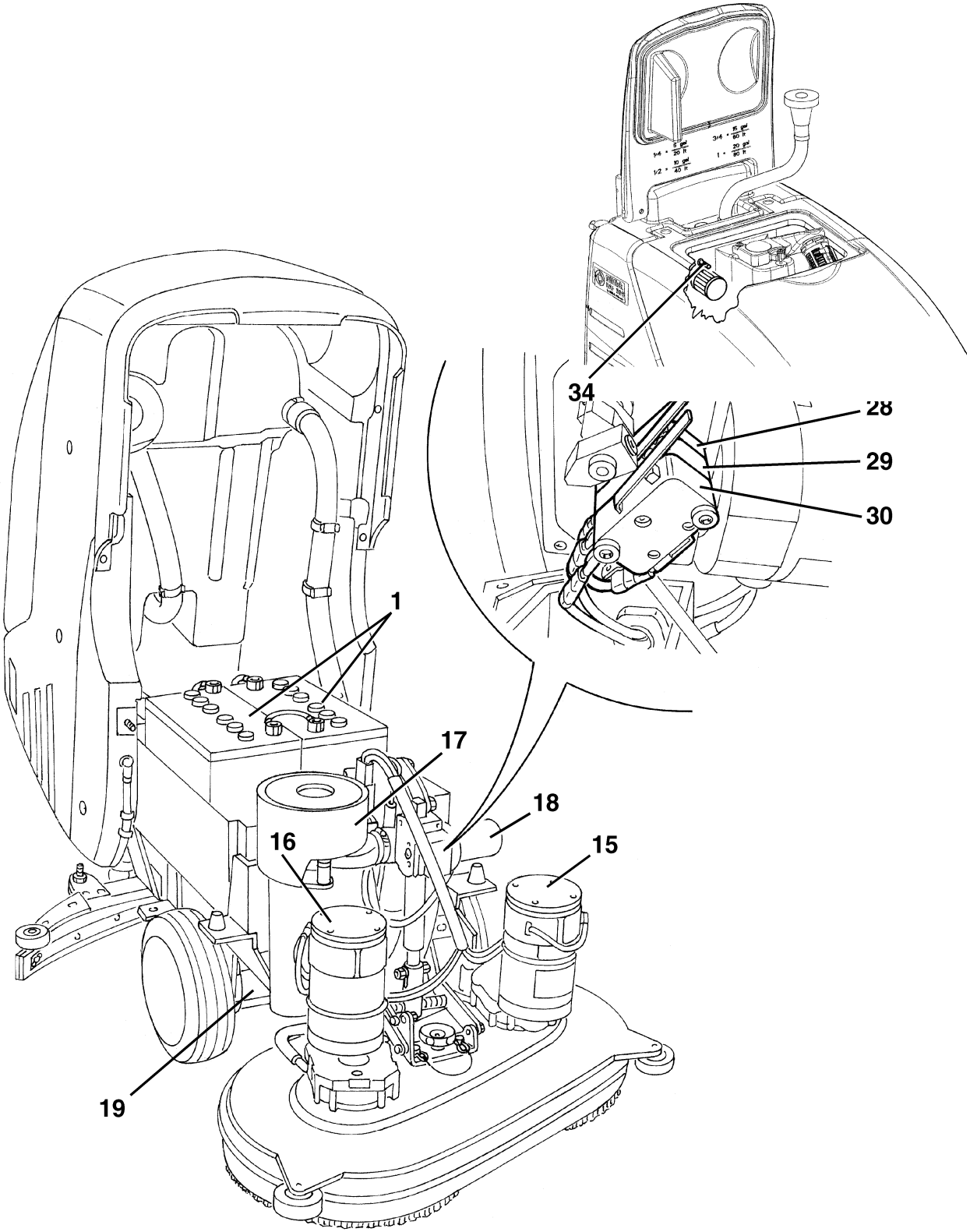
S300649

Figure 4



S300650

Figure 5



S300651

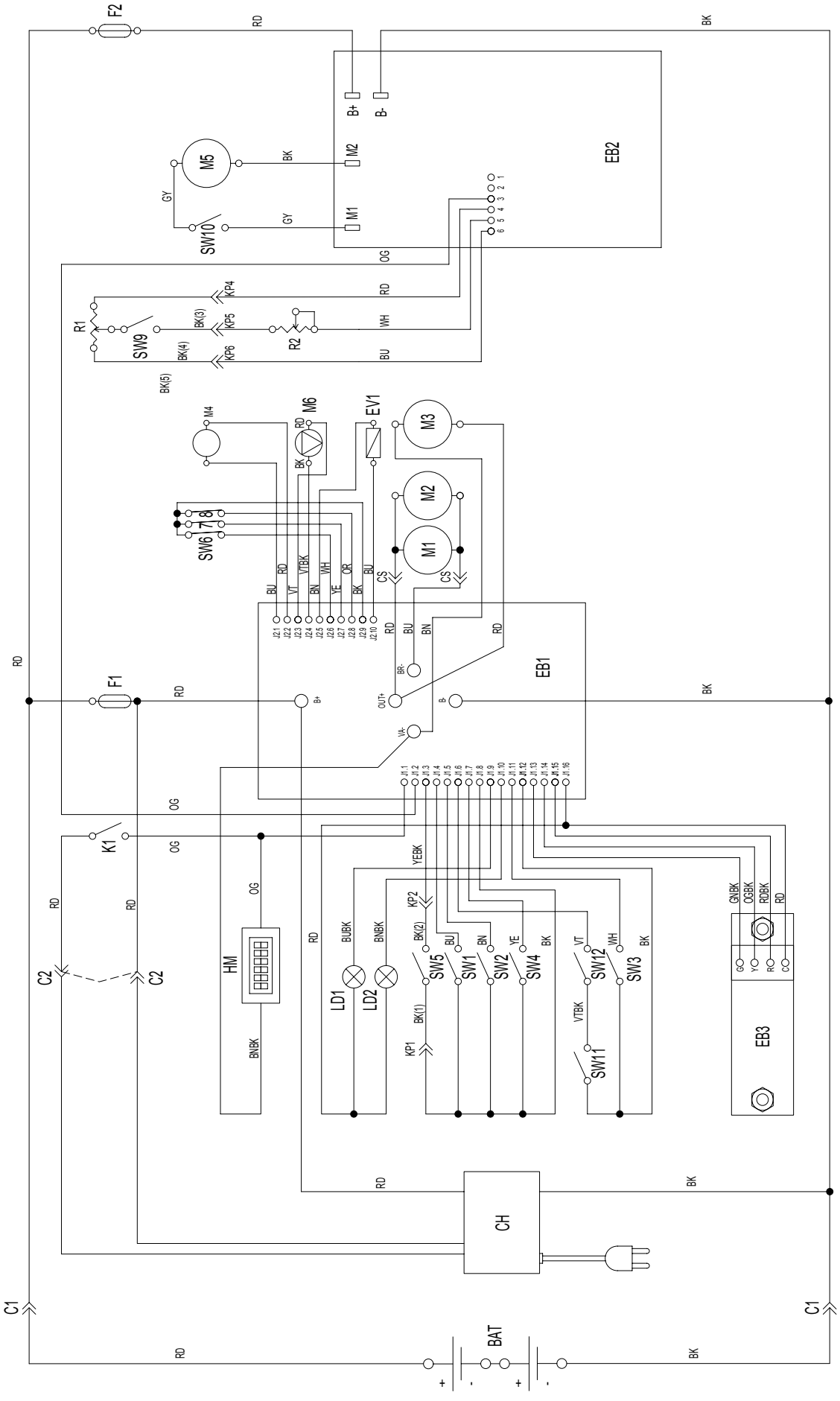
WIRING DIAGRAM

Legend

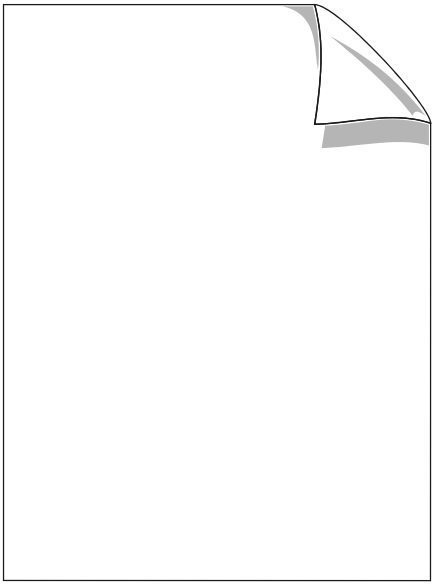
BAT	24V battery
C1	Battery connector
C2	Battery charger signal connector
CH	24V, 25A battery charger
EB1	Function electronic board
EB2	Drive electronic board
EB3	LED electronic board
EV1	Water solenoid valve
F1	Function electronic board fuse
F2	Drive electronic board fuse
HM	Hour counter
K1	Key switch
LD1	Broom switch warning light
LD2	Extrapressure warning light
M1	Left broom motor
M2	Right broom motor
M3	Vacuum motor
M4	Broom deck actuator
M5	Machine drive motor
M6	Recycling water pump (optional)
R1	Drive speed potentiometer
R2	Machine drive maximum speed potentiometer
SW1	Broom switch
SW2	Extrapressure switch
SW3	Vacuum microswitch
SW4	Broom control switch
SW5	Broom microswitch
SW6	Actuator “0” position microswitch
SW7	Actuator “1” position microswitch
SW8	Actuator “2” position microswitch
SW9	Drive microswitch
SW10	Drive motor control switch
SW11	Recycling water control switch (optional)
SW12	Recycling water floating switch (optional)

Color code:

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


F2
RD
BK
B+
B-
EB2
M5
M2
M1
SW10
GY
OG
KP4
KP5
KP6
R1
SW9
R2
BK(3)
BK(4)
BK(5)
WH
BU
M4
M6
EV1
M3
SW6
BU
RD
VT
VTBK
BN
WH
YE
OR
BK
CS
J2.1
J2.2
J2.3
J2.4
J2.5
J2.6
J2.7
J2.8
J2.9
J2.10
BR-
EB1
F1
B+
OUT+
B-
VA-
J1.1
J1.2
J1.3
J1.4
J1.5
J1.6
J1.7
J1.8
J1.9
J1.10
J1.11
J1.12
J1.13
J1.14
J1.15
J1.16
K1
C2
HM
BNBK
LD1
LD2
BUBK
BNBK
YEBK
KP2
KP1
BK(2)
BK(1)
SW5
SW1
SW2
SW4
SW12
SW3
SW11
VTBK
GNBK
OGBK
RDBK
G
Y
R
C
EB3
CH
C1
BAT
+
-

S300642



KENT
Euroclean
Working For A Cleaner World

Kent/Euroclean
14600 21st Avenue North
Plymouth, MN, 55447-3408
www.kenteuroclean.com
Phone: 800-334-1083
Fax: 866-261-4779