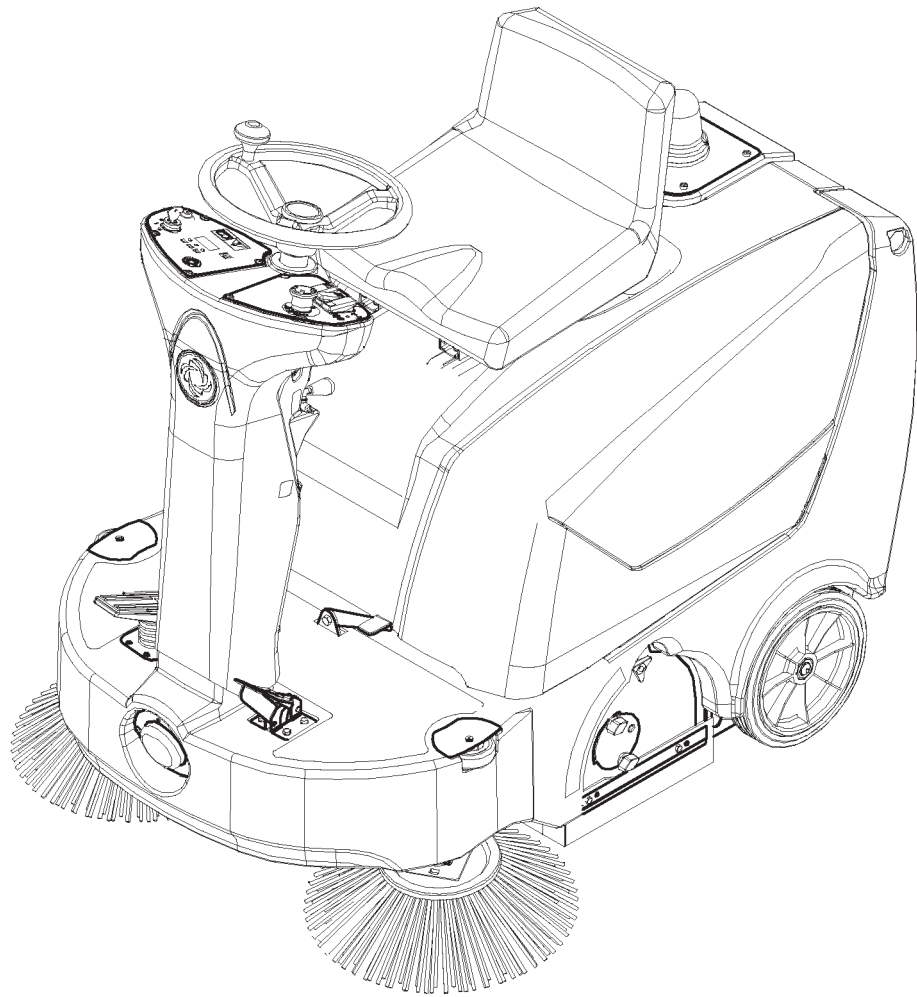


# Terra™ 3700B

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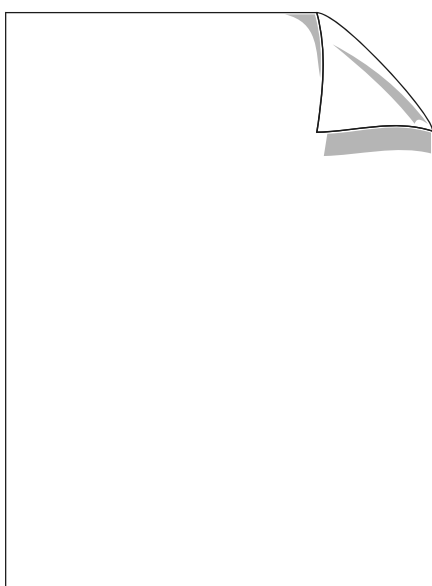
## SERVICE MANUAL

Advance Model: 908 4203 010



**Advance**  
*by Nilfisk-Advance*

146 1995 000(1)2005-08



<b>GENERAL INFORMATION .....</b>	<b>2</b>
MACHINE LIFTING .....	2
MACHINE TRANSPORT .....	2
PUSHING OR TOWING THE MACHINE .....	2
<b>SAFETY .....</b>	<b>3</b>
GENERAL SAFETY PRECAUTIONS .....	3
<b>TECHNICAL DATA .....</b>	<b>5</b>
<b>MAINTENANCE .....</b>	<b>7</b>
SCHEDULED MAINTENANCE .....	7
SCHEDULED MAINTENANCE TABLE .....	7
<b>MACHINE NOMENCLATURE .....</b>	<b>8</b>
MACHINE NOMENCLATURE .....	9
<b>SWEEPING SYSTEM .....</b>	<b>11</b>
MOTOR-TO-MAIN BROOM BELT CHECK .....	11
MOTOR-TO-MAIN BROOM BELT REPLACEMENT .....	11
MAIN BROOM HEIGHT CHECK AND ADJUSTMENT .....	12
MAIN BROOM REPLACEMENT .....	13
SIDE BROOM HEIGHT CHECK AND ADJUSTMENT .....	14
SIDE BROOM REPLACEMENT .....	16
MAIN MOTOR ELECTRICAL INPUT CHECK .....	17
MAIN MOTOR CARBON BRUSH CHECK AND REPLACEMENT .....	18
MAIN MOTOR AND REDUCTION UNIT REMOVAL/INSTALLATION .....	19
SIDE BROOM MOTOR ELECTRICAL INPUT CHECK .....	22
SIDE BROOM MOTOR REMOVAL/INSTALLATION .....	23
TROUBLESHOOTING .....	24
<b>SKIRT .....</b>	<b>25</b>
SKIRT HEIGHT CHECK AND ADJUSTMENT AND OPERATION CHECK .....	25
SIDE SKIRT REPLACEMENT .....	27
FRONT AND REAR SKIRT REPLACEMENT .....	28
FRONT SKIRT LIFTING CABLE ADJUSTMENT .....	29
FRONT AND REAR SKIRT REPLACEMENT .....	30
FRONT SKIRT LIFTING CABLE REPLACEMENT .....	31
<b>DUST AND DEBRIS COLLECTION SYSTEM .....</b>	<b>32</b>
DUST FILTER CLEANING AND INTEGRITY CHECK .....	32
FILTER SHAKER OPERATION CHECK .....	33
FILTER SHAKER MOTOR ELECTRICAL INPUT CHECK .....	33
TROUBLESHOOTING .....	34
<b>MANUAL VACUUM SYSTEM .....</b>	<b>35</b>
MANUAL VACUUM SYSTEM MOTOR CARBON BRUSH CHECK AND REPLACEMENT .....	35
MANUAL VACUUM SYSTEM MOTOR REMOVAL/INSTALLATION .....	36
TROUBLESHOOTING .....	37
<b>BRAKE SYSTEM .....</b>	<b>38</b>
BRAKE ADJUSTMENT .....	38
BRAKE REPLACEMENT .....	39
<b>DRIVE SYSTEM .....</b>	<b>41</b>
DRIVE MOTOR ELECTRICAL INPUT CHECK .....	41
DRIVE MOTOR CARBON BRUSH CHECK AND REPLACEMENT .....	42
DRIVE MOTOR REMOVAL/INSTALLATION .....	43
FORWARD/REVERSE GEAR PEDAL CHECK AND ADJUSTMENT .....	44
TROUBLESHOOTING .....	46
<b>OTHER SYSTEMS .....</b>	<b>47</b>
SCREW AND NUT TIGHTENING CHECK .....	47
<b>ELECTRICAL SYSTEM .....</b>	<b>48</b>
BATTERY MAINTENANCE AND RECHARGING .....	48
(WET OR GEL) BATTERY INSTALLATION AND SETTING .....	48
DRIVE ELECTRONIC BOARD REPLACEMENT .....	49
HOUR COUNTER AND BATTERY CHARGE STATUS DISPLAY ELECTRONIC BOARD REPLACEMENT .....	50
MACHINE SHOULD NOT START WHEN THERE IS NO OPERATOR ON THE DRIVER'S SEAT .....	51
HOOD SAFETY SWITCH OPERATION CHECK .....	51
MACHINE SHOULD NOT START IF THE BATTERY CHARGER PLUG IS CONNECTED TO THE OUTLET .....	51
COMPONENT LAYOUT .....	52
WIRING DIAGRAM .....	55

## GENERAL INFORMATION

### MACHINE LIFTING

**WARNING!**

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

### MACHINE TRANSPORT

**WARNING!**

Before transporting the machine, make sure that:

- All doors and guards are closed.
- The key is not inserted in the ignition switch.
- The machine is securely fastened to the means of transport.

### PUSHING OR TOWING THE MACHINE

**WARNING!**

When pushing or towing the machine, carefully follow the relevant instructions given in the Instructions for use manual. If you do not follow the given instructions the machine can be damaged.

## SAFETY

The following symbols indicate potentially dangerous situations.

Always read this information carefully and take all necessary precautions to safeguard people and property.

**DANGER!**

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

**WARNING!**

It indicates a potential risk of injury for people.

**CAUTION!**

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

**NOTE**

Consult the Instructions for use manual before performing any operation.

## GENERAL SAFETY PRECAUTIONS

Specific warnings and cautions used to indicate potential damage to people and machines are shown below.

**DANGER!**

- Remove the ignition key and disconnect the batteries before performing any maintenance/repair operation.
- This machine must be used by properly trained and authorised personnel only. Children or disabled people cannot use this machine.
- Keep sparks, flames and smoking materials away from the batteries. 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 vapours.
- Battery charging produces highly explosive hydrogen gas. Keep the hood open during battery charging and perform this operation in well-ventilated areas and away from naked flames.

**WARNING!**

- Carefully read all maintenance/repair instructions before performing any maintenance/repair procedure.
- Take all necessary precautions to prevent hair, jewellery and loose clothes from being caught by the machine moving parts.
- Do not smoke while charging the batteries.
- Do not leave the machine unattended while the ignition key is inserted without being sure that the machine cannot move independently.
- Do not use the machine on slopes with a gradient exceeding the value shown on the machine.
- Do not wash the machine with direct water jets or corrosive substances. Do not clean the machine using compressed air.
- Do not use the machine in particularly dusty areas.
- While using this machine take care not to injure 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).
- The humidity must be between 30% and 95%.
- Always protect the machine against the sun, rain and bad weather, both under operation or inactivity condition.
- Do not use the machine as a means of transport.
- Do not allow the brooms 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 one.
- Do not remove or modify the plates affixed to the machine.
- In case of part replacement, order **ORIGINAL** spare parts from an authorised Dealer or Retailer.
- After its lifespan, the machine must be disposed of properly, due to toxic-harmful materials (batteries, oils, etc.), which are subject to standards that require disposal in special centres (see the Instructions for use manual).
- Be very careful when operating the machine at high speeds: sudden steering could cause this three-wheel machine to become unstable due to weight distribution.  
Always reduce the speed before steering.
- When lead (WET) batteries are installed on the machine, do not tilt the machine of more than 30° from the horizontal plane to prevent the highly corrosive acid from leaking out of the batteries. When the machine is to be tilted for maintenance operations, remove the batteries.

## TECHNICAL DATA

Dimensions	Values
Minimum machine length	49.4 in (1,255 mm)
Machine width (without side brooms)	31.3 in (795 mm)
Machine maximum height	45.47 in (1,155 mm)
Working width (with/without side brooms)	39.4/23.6 in (1000/600 mm)
Minimum ground clearance (skirts not included)	1.6 in (40 mm)
Main broom size	10.43 x 23.62 in (265 mm x 600 mm)
Side broom size	13.66 in (347 mm)
Front drive and steering wheel size	7.87 x 1.97 in (200 x 50 mm)
Rear wheels	9.84 x 1.97 in (250 x 50 mm)
Machine total weight	327.07 lb (148.49 Kg)
Forward speed	3.4 mph (5.5 km/h)
Reverse speed	2.7 mph (4.4 km/h)
Gradeability	16%
Waste container capacity	13.2 gal (50 L)
Main broom and fan motor	600 W
Side broom motors	60 W
Drive motor	400 W
Filter shaker motor	12 W
Sound level ( $L_{pa}$ )	71.6 dB(A)
Vibration level at the operator's arms (*)	< 2.5 m/s <sup>2</sup>
Vibration level at the operator's body (*)	< 0.6 m/s <sup>2</sup>

Batteries	Values
Voltage	24 V
Standard	Lead (WET), with acid electrolyte
Optional	Gel (GEL), hermetic
Capacity	100 - 240 Ah C5
Battery compartment max. size	357x375x385 mm (14.1x14.8x15.2 in)

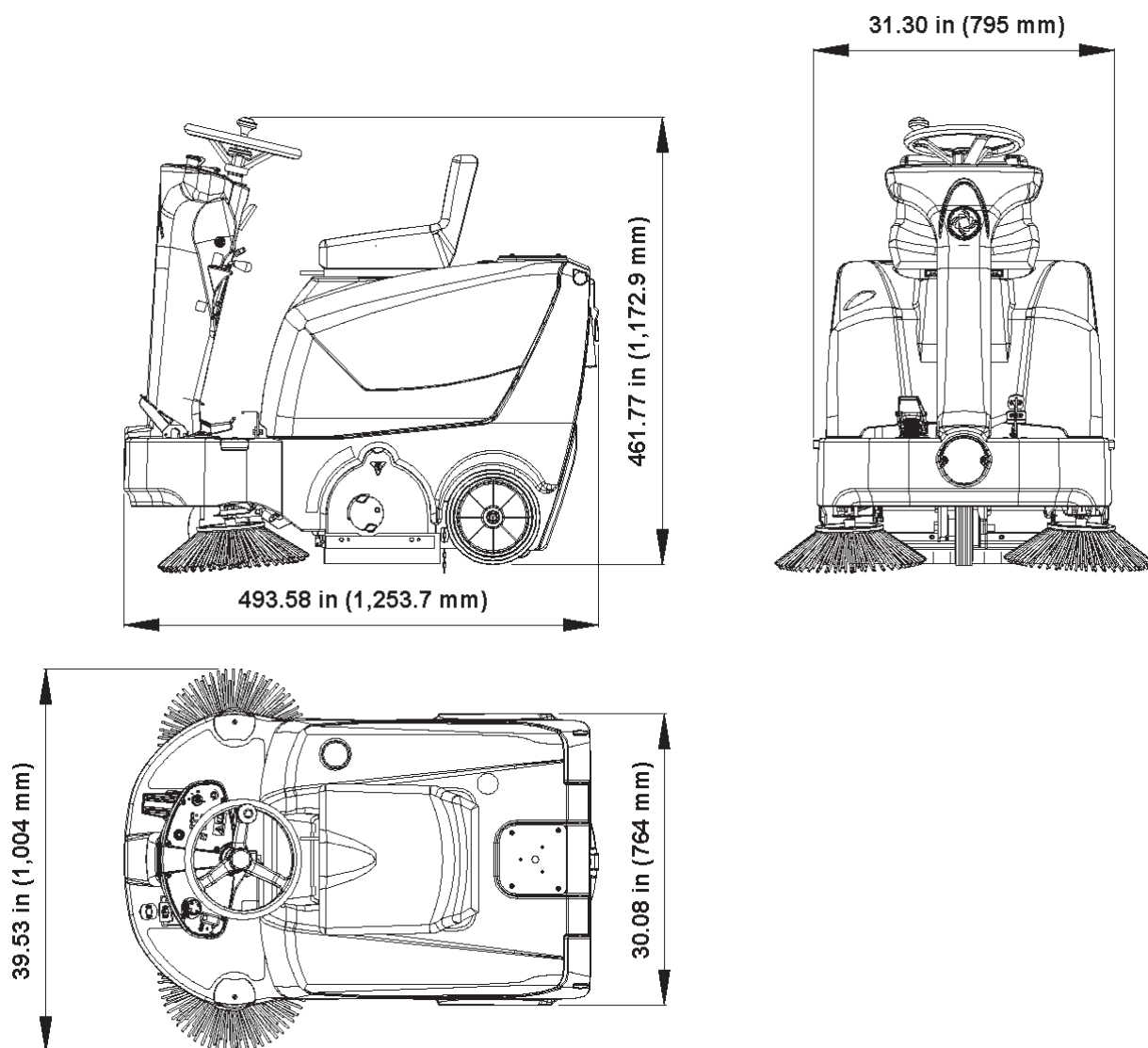
Dust vacuuming and filtering	Values
Paper dust filter, 5-10 $\mu$ m	3 m <sup>2</sup> (32.3 ft <sup>2</sup> )
Main broom compartment vacuum	0.72 inH <sub>2</sub> O (18.3 mmH <sub>2</sub> O)

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



### NOTE

For other petrol engine data/values, see the relevant Instructions for use manual.



S300796



## 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** chapters.

Provided below is the Scheduled Maintenance Table. 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 relating to maintenance operations, see the following paragraphs.

### SCHEDULED MAINTENANCE TABLE

Maintenance operation	On delivery	Every 10 hours	Every 50 hours	Every 100 hours	Every 200 hours	Every 400 hours
Battery fluid level check						
Side and main broom height check and adjustment						
Dust filter cleaning and integrity check						
Skirt height and operation check						
Filter shaker operation check						
Hood safety switch operation check						
Main broom drive belt check						
Nut and screw tightening check				(1)		
Service and parking brake check and adjustment						
Main broom drive belt replacement						
Main and drive motor carbon brush check and replacement						

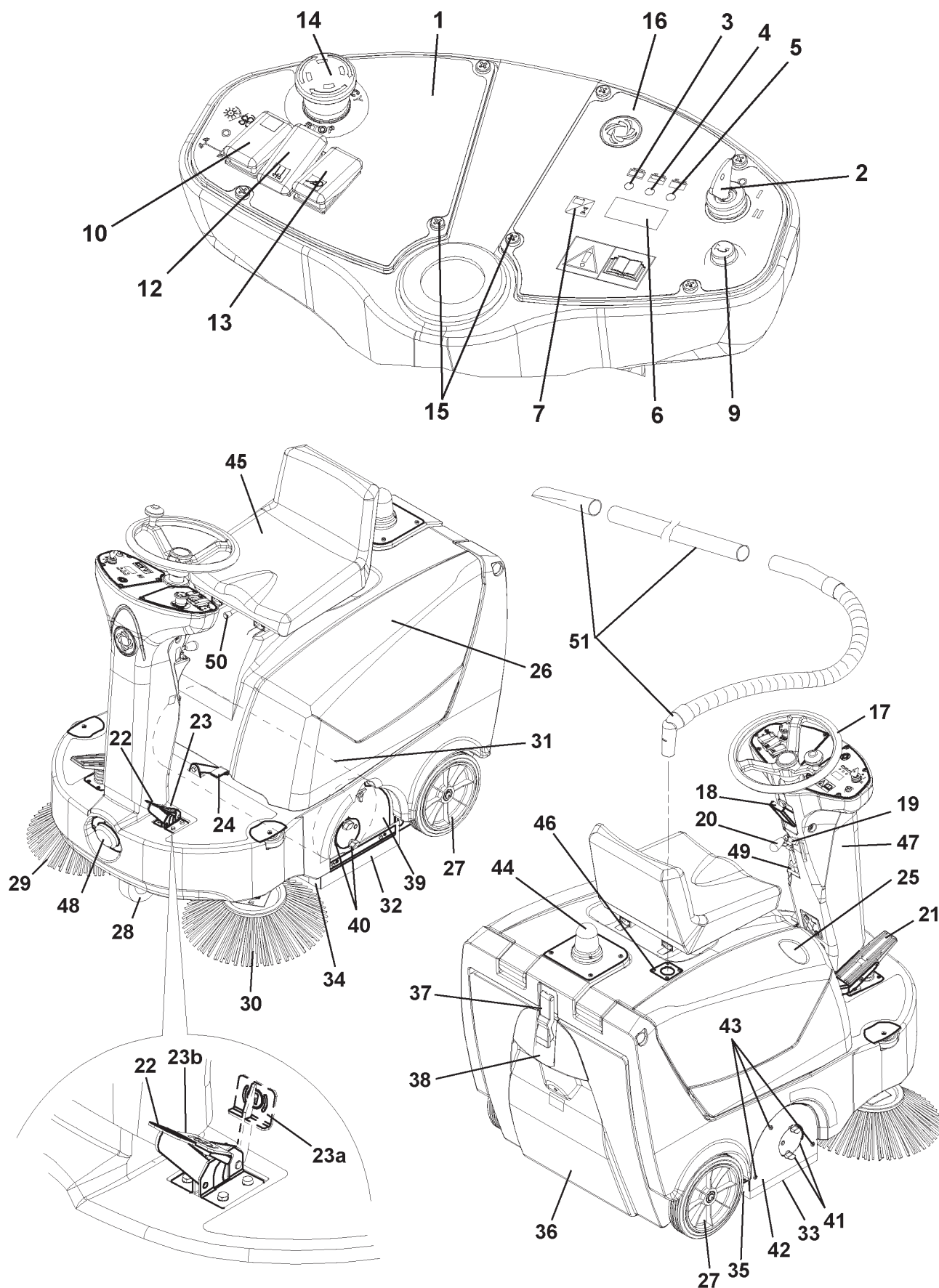
(1): and after the first 8 running-in hours

## MACHINE NOMENCLATURE

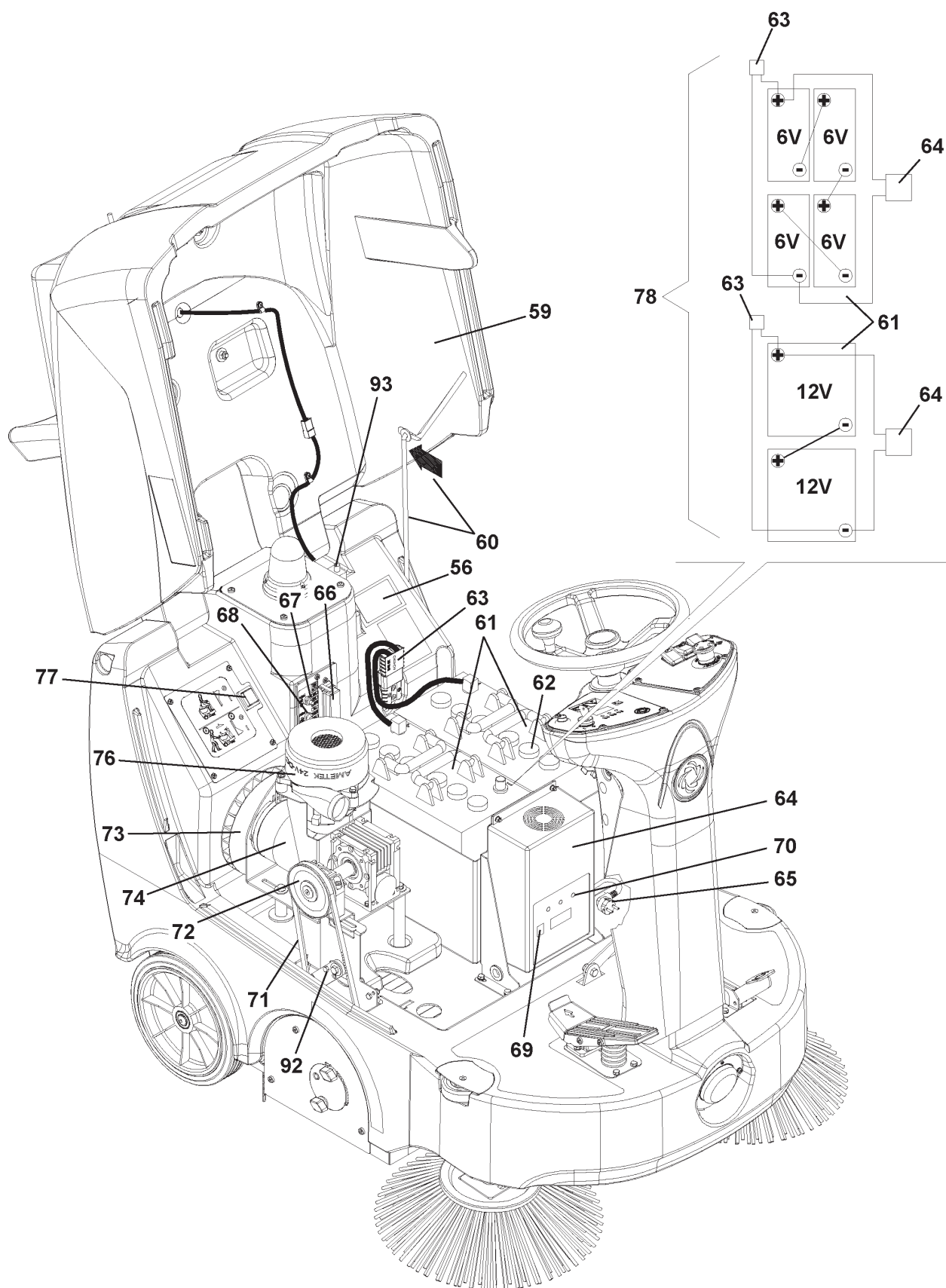
Throughout this Manual you will find numbers in brackets – for example: (2). These numbers refer to the components indicated in these two nomenclature pages. Refer to these pages whenever it will be necessary to identify a component mentioned in the text.

1. Left control panel
2. Ignition key
3. Discharged battery warning light
4. Semi-discharged battery warning light
5. Charged battery warning light
6. Display
7. Display selection button: hour counter/ hour and minutes counter / battery voltage (V)
9. Horn push-button
10. Switch having the following functions:
  - in the central position: it is off
  - pushed forward (fixed): it activates the main broom rotation and the vacuum fan
  - pushed backward (not fixed): it activates the filter shaker
12. Manual vacuum system switch (optional)
13. Working light switch (optional)
14. Emergency push-button
15. Control panel mounting screws
16. Right control panel
17. Steering wheel
18. Steering column inclination adjusting lever
19. Vacuum activation/deactivation lever
20. Side broom lifting/lowering lever
21. Forward/reverse gear pedal
22. Service brake pedal
23. Parking brake lever (it acts on the front wheel)
- 23a. Lever in the position of brake engaged (rotated backward)
- 23b. Lever in the position of brake disengaged (rotated forward)
24. Front skirt lifting pedal
25. Can holder
26. Hood
27. Rear wheels on fixed axle
28. Front drive and steering wheel
29. Right side broom
30. Left side broom
31. Main broom
32. Left side skirt
33. Right side skirt
34. Front skirt
35. Rear skirt
36. Waste container
37. Waste container hook
38. Waste container handle
39. Removable door for main broom extraction
40. Main broom height left adjuster
41. Main broom height right adjuster
42. Main broom right door
43. Main broom right door mounting screws
44. Pivoting light (always on when the ignition key is turned to "I" position) (optional)
45. Driver's seat with safety microswitch
46. Additional hole for manual vacuum system kit (optional)
47. Adjustable steering column
48. Working light (optional)
49. Side broom height adjusting block
50. Seat longitudinal position adjusting lever
51. Manual vacuum system kit (optional)
56. Serial number plate/technical data/EC certification
59. Hood (open position)
60. Hood support rod
61. Batteries
62. Battery caps (for lead batteries)
63. Battery connector
64. Electronic battery charger
65. Battery charger electrical cable
66. Lamellar fuse box (services)
67. Drive circuit breaker
68. Main broom/fan motor circuit breaker
69. Lead (WET) or gel (GEL) battery selector switch located on the optional electronic battery charger
70. Charged battery warning light
71. Main broom belt
72. Drive pulley to main broom
73. Vacuum fan
74. Main motor
76. Manual vacuum system (optional)
77. Switch for machine pushing
78. Battery connection diagrams
92. Main broom belt tensioner
93. Hood safety switch

## MACHINE NOMENCLATURE



S300797



S300798

## SWEEPING SYSTEM

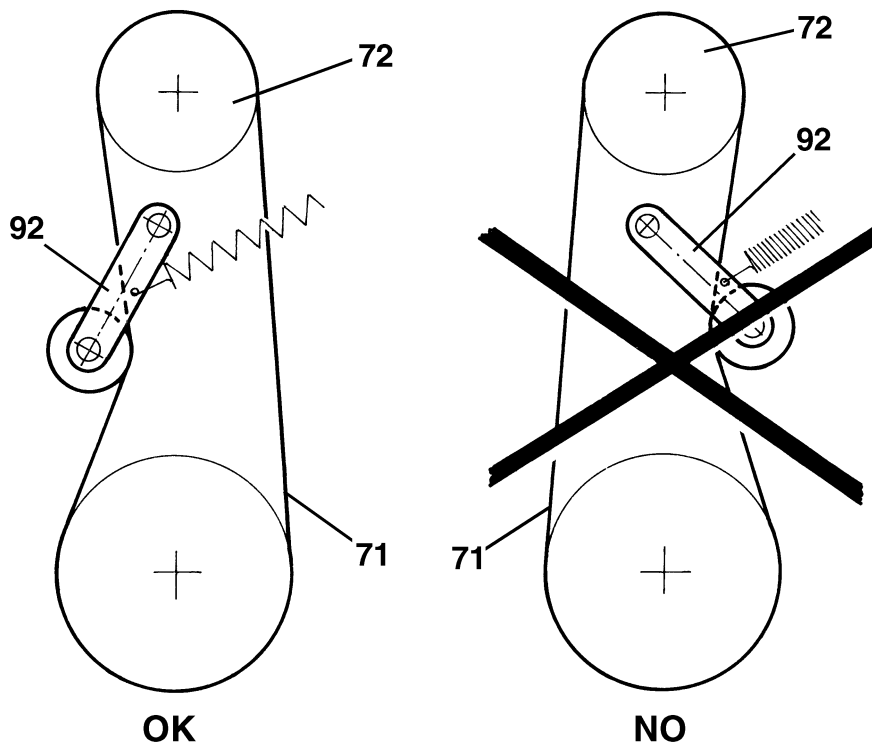
### MOTOR-TO-MAIN BROOM BELT CHECK

1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Raise the hood (26) and engage the hood support rod (60).
4. Check the motor-to-main broom belt (71) condition. To check the pulley, make it rotate operating on the fan (73).
5. If the belt is worn out, replace it.
6. Check that the belt tensioner (92) is in good condition.
7. Disengage the support rod (60) and lower the hood (26).

### MOTOR-TO-MAIN BROOM BELT REPLACEMENT

1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position.
3. Remove the main broom.
4. Remove the belt (71) from the pulley (72). To make the operation easier, rotate the pulley (72) operating on the fan (73).
5. Remove the screws (43) and the right door (42) together with the belt (71) to be replaced.
6. Install the parts in the reverse order of removal.  
Position the belt (71) tensioner (92) as shown in the figure below.

Figure 1



S300801

## MAIN BROOM HEIGHT CHECK AND ADJUSTMENT



### NOTE

Brooms of various hardness are available. This procedure is applicable to all types of brooms.

### Check

1. Check the main broom for proper ground clearance, proceeding as follows:
  - Drive the machine on a level ground;
  - Keep the machine stationary and rotate the main broom for a few seconds;
  - Stop the main broom, then move the machine and switch it off;
  - Check that the main broom print (A), along its length, is from 2 to 4 cm wide.

If the print (A) is not within specifications, it is necessary to adjust the broom height by proceeding as described later.



### CAUTION!

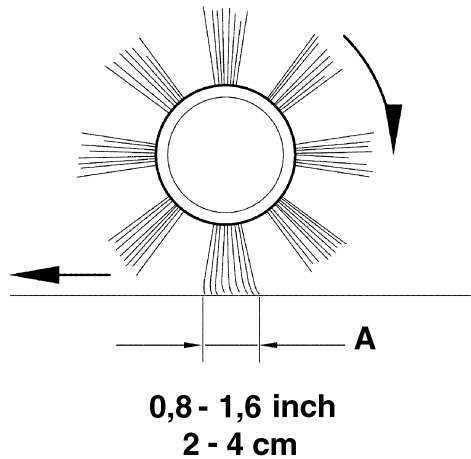
An excessive print (larger than 4 cm) of the main brush can lead to machine malfunction and overheating of its moving and electrical parts, thus reducing machine life.

Be extremely careful when performing the above-mentioned checks and always use the machine according to the indicated conditions.

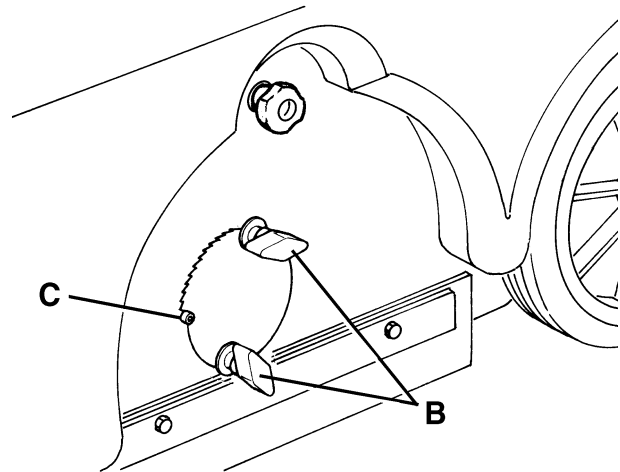
### Adjustment

2. Drive the machine on a level ground and engage the parking brake (23).
3. Turn the ignition key (2) to "0" position.
4. Loosen the knobs (B) on both sides of the machine.
5. Move the broom height variation indicator (C) as necessary on both sides of the machine by using the knobs (B), then screw down the knobs (B).  
The indicator (C) must be at the same position on both sides of the machine; the maximum difference allowed to obtain the print (A) described in step 1 (2 - 4 cm wide) is 2 notches.
6. Perform step 1 again to check proper adjustment of main broom ground clearance.
7. When the main broom is too worn out to be adjusted, replace it as shown on the next page.

Figure 2



S300802



S300803

# MAIN BROOM REPLACEMENT



## NOTE

Brooms of various hardness are available. This procedure is applicable to all types of brooms.

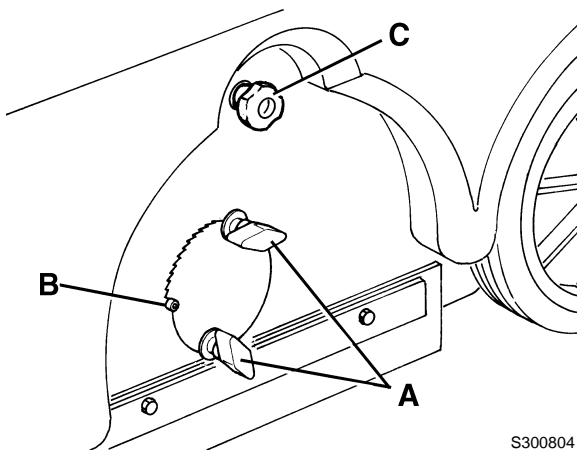


## CAUTION!

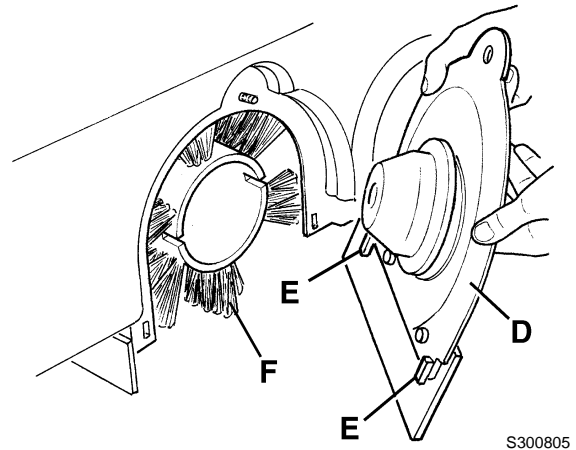
It is advisable to use protective gloves when replacing the main broom because there can be cutting debris between the bristles.

1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Loosen the knobs (A) on both sides of the machine.
4. Move the broom height variation indicators (B) until the broom is at the maximum height from the ground. Screw down the knobs (A).
5. Loosen the knob (C) on the left side of the machine.
6. Remove the broom door (D) by pushing it downwards to disengage the fasteners (E).
7. Pull out the broom (F).
8. Install the new broom with the bristles rows (G) bent as shown in the figure (top view).
9. Install the new broom on the machine and ensure that its opening (H) fits into the related drive hub (I). Check that the drive hub (I) is free from dirt or foreign materials (cords, rags, etc.) accidentally rolled up.
10. Install the broom door (D) by engaging the fasteners (E).
11. Screw down the knob (C).
12. Carry out the main broom height adjustment as described in the previous paragraph.

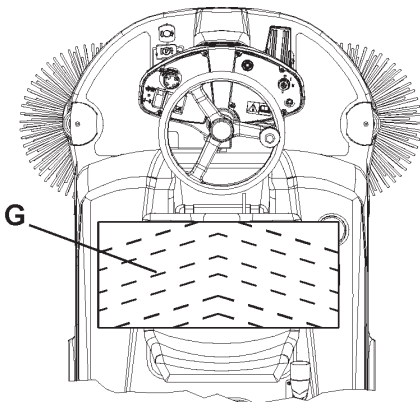
Figure 3



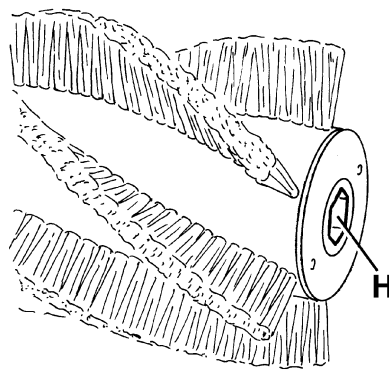
S300804



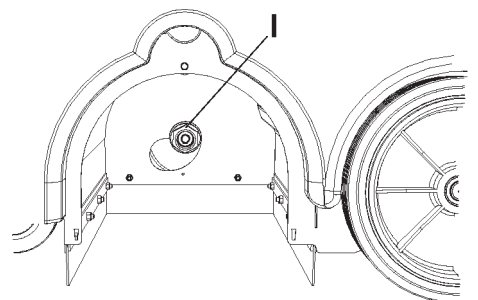
S300805



S300806



S300807



S300808



## SIDE BROOM HEIGHT CHECK AND ADJUSTMENT

**NOTE**

Brooms of various hardness are available. This procedure is applicable to all types of brooms.

**Check**

1. Check the side brooms for proper ground clearance, proceeding as follows:
  - Drive the machine on a level ground and lower the side brooms;
  - Keep the machine stationary and rotate the side brooms for a few seconds.
  - Lift the side brooms, then move the machine;
  - Check that the size and the orientation of the prints left by the side brooms (A) match with (A) and (B) areas. If the prints are not within specifications, it is necessary to adjust the broom height by proceeding as described in step 2 below.

**Height adjustment of both side brooms**

2. Disengage the lever (20) and rotate the block (49) clockwise or counterclockwise to adjust the broom height from the ground.  
Perform step 1 again to check proper adjustment of side broom ground clearance.  
When the brooms are too worn out to be adjusted, replace them as shown in the next paragraph.  
If it is necessary to adjust side brooms individually, proceed as follows.

**Height adjustment of either side broom**

3. Drive the machine on a level ground and engage the parking brake (23).
4. Turn the ignition key (2) to "0" position, then remove it.
5. Remove the waste container (36) by following the instructions given in the Instructions for use manual.
6. Remove the batteries (61) and the battery holder.

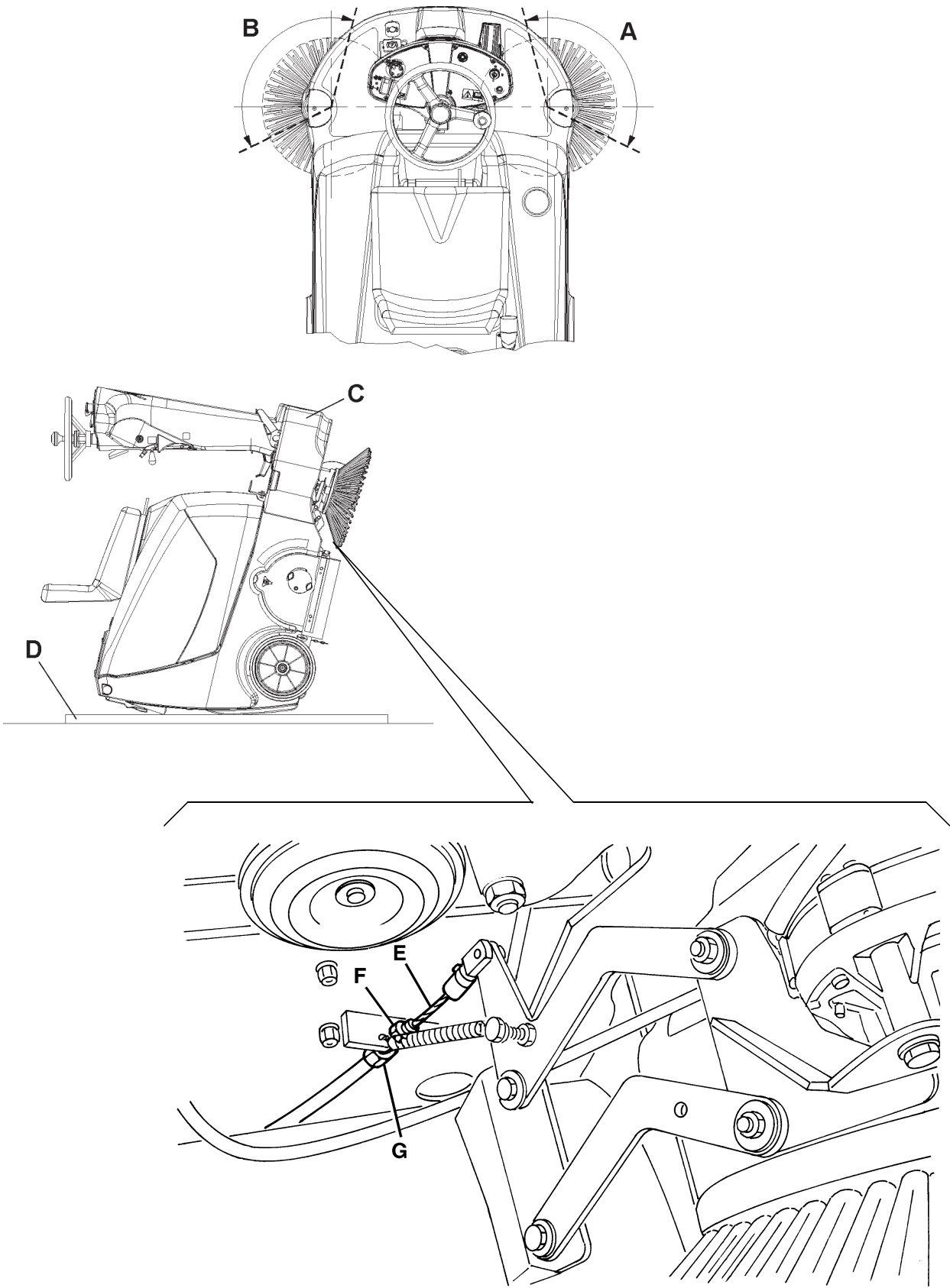
**WARNING!**

**If you do not remove the batteries before tilting the machine, you could cause serious damage to people or the machine.**

7. Carefully raise the machine front side (C) with the help of another person, then lean its back side on the ground (as shown in the figure), supporting it on a safety stand (D).
8. Loosen the locknut (F) and screw down/out the screw (G) by using the control cable (E) of the broom which needs adjusting; then tighten the locknut (F).  
When the brooms are too worn out to be adjusted, replace them as shown in the next paragraph.
9. Perform steps 3 - 8 in reverse order.



Figure 4



S300809

## SIDE BROOM REPLACEMENT

**NOTE**

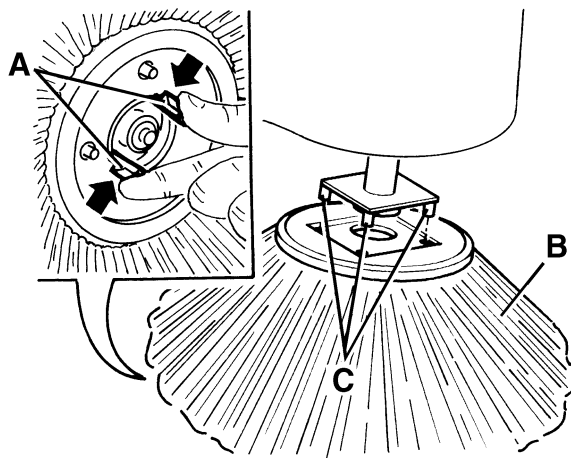
Brooms of various hardness are available. This procedure is applicable to all types of brooms.

**CAUTION!**

It is advisable to use protective gloves when replacing the side brooms because there can be cutting debris between the bristles.

1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Put your hand into the side broom and press the tabs (A) inwards, then remove the broom (B) disengaging it from the four pins (C).
4. Install the new broom on the machine engaging it on the pins (C) and on the tabs (A).
5. Carry out the side broom height adjustment as described in the previous paragraph.

**Figure 5**



S300810

## MAIN MOTOR ELECTRICAL INPUT CHECK



### WARNING!

This procedure must be performed by qualified personnel only.

### Preliminary operations

1. Carry out the main broom height check and adjustment.
2. Drive the machine on a level ground and engage the parking brake (23).
3. Turn the ignition key (2) to "0" position, then remove it.
4. Raise the hood (26) and engage the hood support rod (36).
5. Connect the main motor (74) to the battery (61) as shown in the underlying diagram (A), by inserting the 30 A fuse (B), for safety's sake.

Connect an ammeter (C) to the connection (A) and arrange it so as to close the hood (26) and perform the test described at the next step. In this way, the ammeter (C) can be seen while operating the machine.

### Main motor electrical input check

6. Start the machine and perform a sweeping simulation, following the instructions given in the Instructions for use manual. The following conditions are required:
  - main broom: correctly adjusted
  - side brooms: raised
  - machine speed: highest
  - suction filter: cleaned using the filter shaker
  - drive the machine on a stretch of level ground (in both directions while recording both values)

With above conditions met, record the main motor electrical input using the ammeter (C).

Stop the machine and compare the readings with the values listed in the table below, according to the kind of ground the test has been performed on.

Kind of surface	A
Smooth concrete base	20 — 22
Light carpet	20 — 22
Heavy carpet	20 — 26

If the electrical input is higher, perform the following operations to detect and eliminate the cause of the abnormal input:

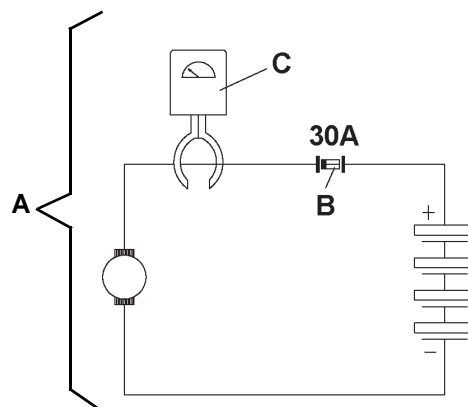
- Remove from the main broom drive system any dirt or foreign materials obstructing or slowing down the machine movement.
- If necessary, check the motor carbon brushes.
- Furthermore, remove, clean and check the main motor, if necessary.

If the above-mentioned procedures do not lead to a correct electrical input, it is necessary to replace the motor.

### Reset

7. Carry out steps 4 and 5 in reverse order.

Figure 6

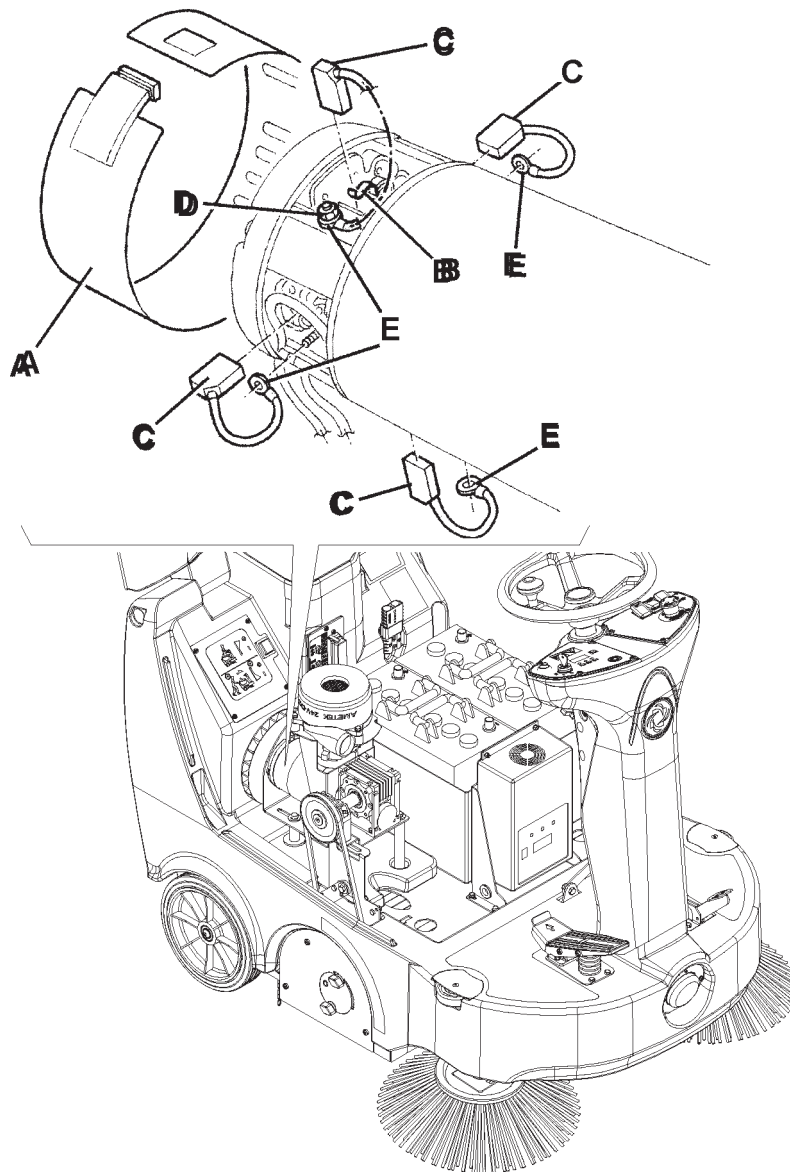


S300811

## MAIN MOTOR CARBON BRUSH CHECK AND REPLACEMENT

1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Raise the hood (26) and engage the hood support rod (36).
4. Disconnect the battery electrical connector (63).
5. Remove dust and dirt from the outside of the motor; then disengage and remove the clamp (A).
6. Lift the retaining spring (B) of each carbon brush, then remove the four carbon brushes (C).
7. Check the four carbon brushes for wear. The carbon brushes are worn when there is not sufficient contact with the motor armature, because of their use, of the contact surface which is not integral or because the thrust spring is broken, etc.
8. If necessary, remove the carbon brushes to replace them, by removing the nuts (D) and disengaging the lead-in wires (E).  
Replace the carbon brushes as an assembly.
9. Install the parts in the reverse order of removal, taking care to the connections of terminals (E) and to their insulation from the surrounding parts of the frame.

Figure 7



S300812

## MAIN MOTOR AND REDUCTION UNIT REMOVAL/INSTALLATION

### Removal

1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Raise the hood (26) and engage the hood support rod (36).
4. Disconnect the battery electrical connector (63).
5. Remove the belt (71) from the pulley (72). To make the operation easier, rotate the pulley (72) operating on the fan (73).
6. Remove the four screws (5) and carefully lift the panel (B).
7. Disconnect the main motor (D) negative "black" cable (C) from the contact (E).
8. Remove the two screws (F) and carefully move the panel (G).
9. Disconnect the main motor (D) positive "red" cable (H) from the fusible link (I).
10. Remove the main motor (D) electrical cable (L) from the frame.
11. Remove the three screws (M) and the nut (N), then remove the motor/reduction unit (O) together with the manual vacuum system (P), if provided.

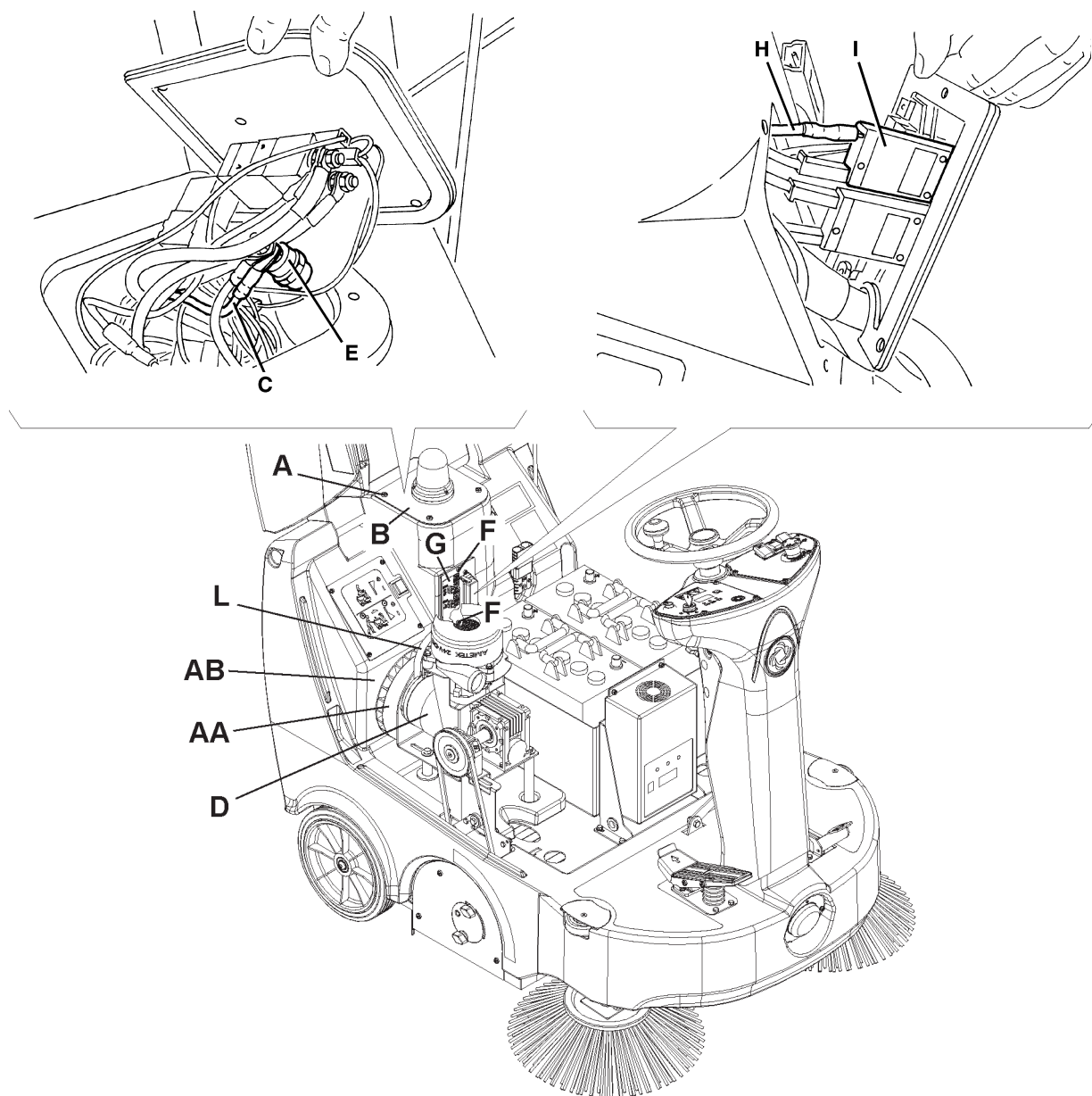
### Disassembly at the workbench

12. At the workbench, remove the complete manual vacuum system (P) (if provided), after removing the screw and nut (Q) and disconnecting the electrical connector (R).
13. Remove the nuts (S).
14. Remove the screws (T), then remove the reduction unit (U) by disengaging it from the motor (V). Take out the key (W).
15. Remove the screw (X) and the fan (Y).
16. Remove the screws (Z) and the main motor (V).

### Installation

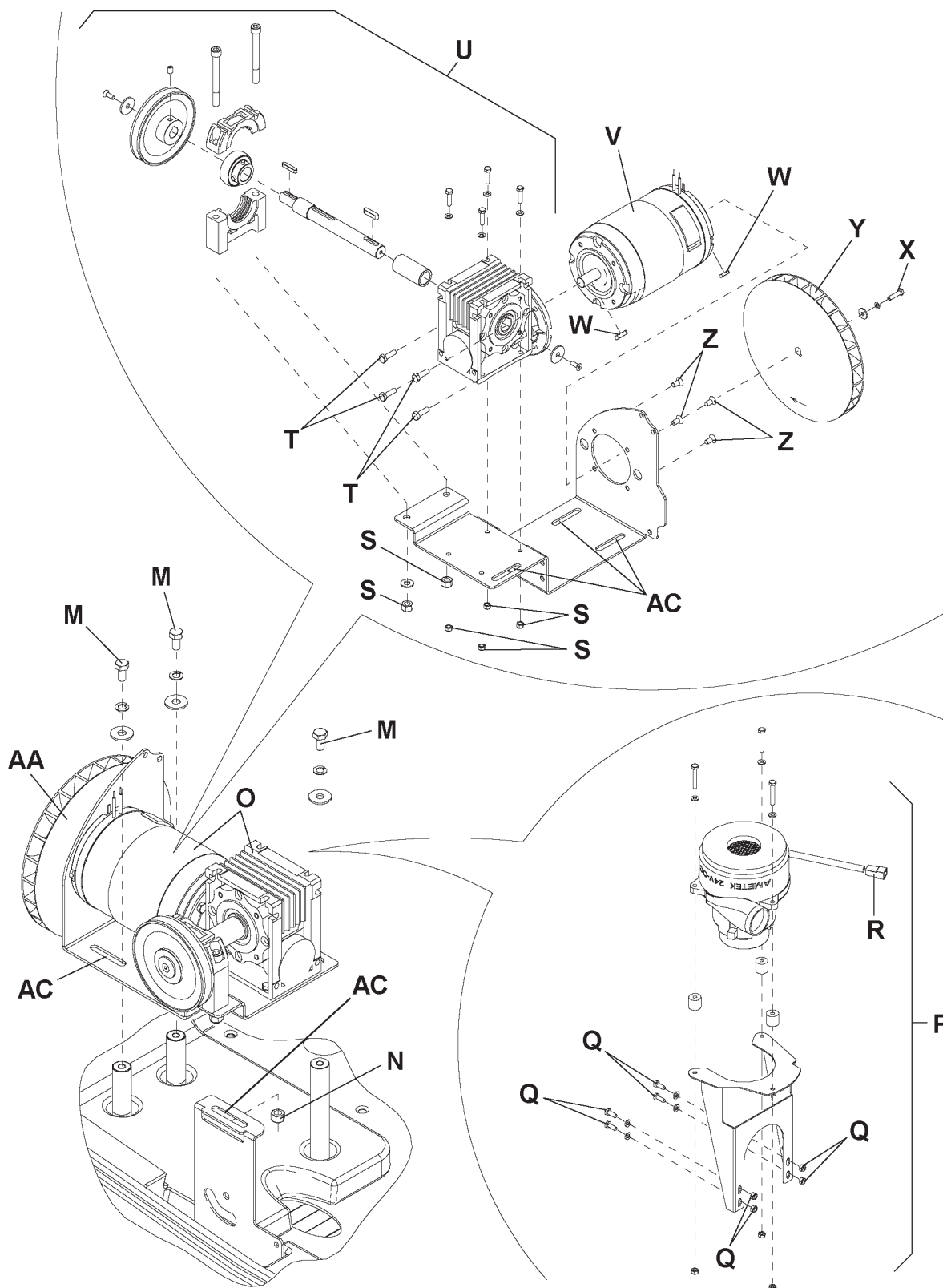
17. Install the parts in the reverse order of removal.  
When installing the motor/reduction unit (O) with the three screws (M) and the nut (N), use the slots (AC) in order to place the unit (O) and the fan (AA) as close as possible to the machine cover (AB) without touching it.

Figure 8



S300813

### Figure 9



S300814

## SIDE BROOM MOTOR ELECTRICAL INPUT CHECK



### WARNING

This procedure must be performed by qualified personnel only.

### PRELIMINARY OPERATIONS

1. Carry out the side brooms height check and adjustment.
2. Drive the machine on a level ground and engage the parking brake (23).
3. Turn the ignition key (2) to "0" position, then remove it.
4. Raise the hood (26) and engage the hood support rod (36).
5. Connect either the right (29) or left (30) broom motor to the battery (61) as shown in the underlying diagram (A), by inserting the 5 A fuse (B), for safety's sake.

Connect an ammeter (C) to the connection (A) and arrange it so as to close the hood (26) and perform the test described at the next step. In this way, the ammeter (C) can be seen while operating the machine.

### Side broom motor electrical input check

6. Start the machine and perform a sweeping simulation, following the instructions given in the Instructions for use manual. The following conditions are required (to ensure test consistency):

- side brooms: lowered
- machine speed: highest
- suction filter: cleaned using the filter shaker
- drive the machine on a stretch of level ground (in both directions while recording both values)

With above conditions met, record the side motor electrical input using the ammeter (C).

Stop the machine and compare the readings with the values listed in the table below, according to the kind of ground the test has been performed on.

Kind of surface	A
Smooth concrete base	$2 \div 2.5$
Asphalt	$2 \div 3$
Light carpet	$2 \div 3$
Heavy carpet	$2 \div 3.5$

If the electrical input is higher, perform the following operations to detect and eliminate the cause of the abnormal input:

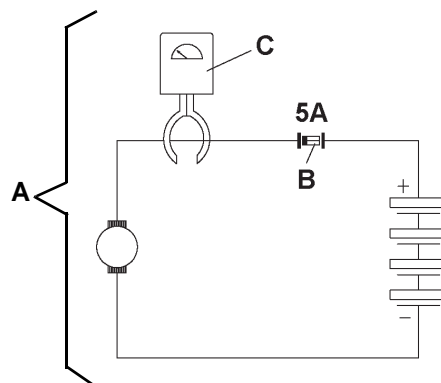
- Remove from the side broom drive system any dirt or foreign materials obstructing or slowing down the machine movement.
- If necessary, remove, clean and check the side broom motors.

If the above-mentioned procedures do not lead to a correct electrical input, it is necessary to replace the motors.

### Reset

7. Carry out steps 4 and 5 in reverse order.

Figure 10



S300817



## SIDE BROOM MOTOR REMOVAL/INSTALLATION

1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Remove the waste container (36) by following the instructions given in the Instructions for use manual.
4. Remove the batteries (61) and the battery holder.

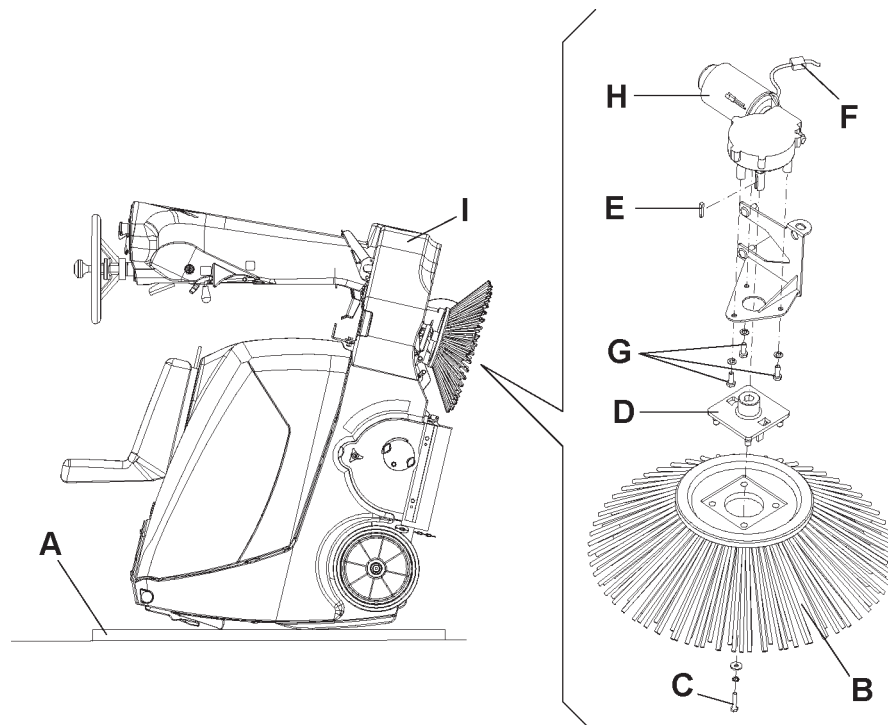


### WARNING!

If you do not remove the batteries before tilting the machine, you could cause serious damage to people or the machine.

5. Carefully raise the machine front side (I) with the help of another person, then lean its back side on the ground (as shown in the figure), supporting it on a safety stand (A).
6. Remove the side broom (B).
7. Remove the screw (C).
8. Remove the hub (D) and take out the key (D).
9. Disconnect the electrical connector (F).
10. Remove the screws (G).
11. Remove the side broom motor (H).
12. Install the parts in the reverse order of removal.

Figure 11



S300818

## TROUBLESHOOTING

### THE MACHINE DOES NOT START

When turning the ignition key (2) to "I" position (no activation of the control panel).

Possible causes:

1. Battery connector (63) not properly connected (connect)
2. Hood (26) not properly closed (close)
3. Discharged battery (charge)
4. Electrical cable under the left (1) or right (16) control panel disconnected (check connection)

### THE CONTROL PANEL ACTIVATES BUT THE MOTORS DO NOT START

Possible cause: electromagnetic switch malfunction (replace).

### THE MAIN BROOM DOES NOT ROTATE

Possible causes:

1. Dust or foreign materials preventing the operation of the main broom drive system (remove).
2. Worn main motor brushes (replace)
3. Main motor failure (repair or replace)
4. Main motor drive belt is broken (replace).
5. Damaged wiring harness (repair)
6. Fuse (68) disconnected (connect)

### THE SIDE BROOM DO NOT ROTATE

Possible causes:

1. Dust or foreign materials between the broom and the motor (remove)
2. Failure in the motor (repair or replace)
3. Blown F6 fuse (replace)
4. Damaged wiring harness (repair)

### THE MOTORS KEEP TURNING WITH THE IGNITION KEY ON "0" POSITION

Possible cause: electromagnetic switch malfunction (replace).



**WARNING:**

In this case, disconnect the battery connector (63) with great care, as the hood safety device is turned off.

## SKIRT

### SKIRT HEIGHT CHECK AND ADJUSTMENT AND OPERATION CHECK

1. Drive the machine on a level ground that is suitable for checking the skirt height.
2. Engage the parking brake (23).
3. Turn the ignition key (2) to "0" position, then remove it.

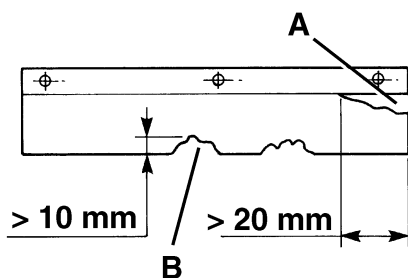
#### Side skirt check

4. Check the side skirt (32 and 33) integrity.  
Replace the skirts when they have cuts (A) larger than 20 mm or cracks/tears (B) larger than 10 mm (for skirt replacement, see the relevant paragraph).
5. Check that the side flap (C) ground clearance is within 0 - 3 mm (as shown in the figure). If necessary, adjust the skirt height, proceeding as follows:
  - left side skirt:**
    - Raise the hood (26) and engage the hood support rod (36).
    - Loosen the knob (D) and remove the broom left door (E) by pulling it upwards to disengage the fasteners (F).
    - Adjust the skirt (G) height by using its slots (H).
    - Install the parts in the reverse order of removal.
  - right side skirt:**
    - Remove the main broom, as described in the related paragraph.
    - Remove the belt (71) from the pulley (72). To make the operation easier, rotate the pulley (72) operating on the fan (73).
    - Remove the screws (43) and the right door (42) together with the belt (71).
    - On the machine, adjust the skirt (I) height by using its slots (L).
    - Install the parts in the reverse order of removal.

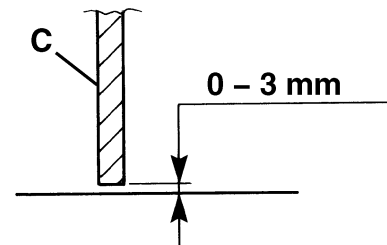
#### Front and rear skirt check

6. Remove the main broom, as described in the related paragraph.
7. Check the front (M) and rear (N) skirt integrity.
8. Replace the skirts when they have cuts (A) larger than 20 mm or cracks/tears (B) larger than 10 mm (for skirt replacement, see the relevant paragraph).
9. Check that:
  - The front skirt (O) drags on the ground slightly and that there is no gap between it and the ground (as shown in the figure).
  - The rear skirt (C) ground clearance is within 0 - 3 mm (as shown in the figure).
 If necessary, adjust the skirt height by using its slots (P).
10. Press the front skirt lifting pedal (24) and check that the front skirt (Q) rotates upwards of about 90° (as shown in the figure); release the pedal and check that the skirt does not remain in an intermediate position but returns to its initial position. If necessary, refer to the following pages for the front skirt control cable adjustment or replacement.
11. Install the parts in the reverse order of removal.

Figure 1

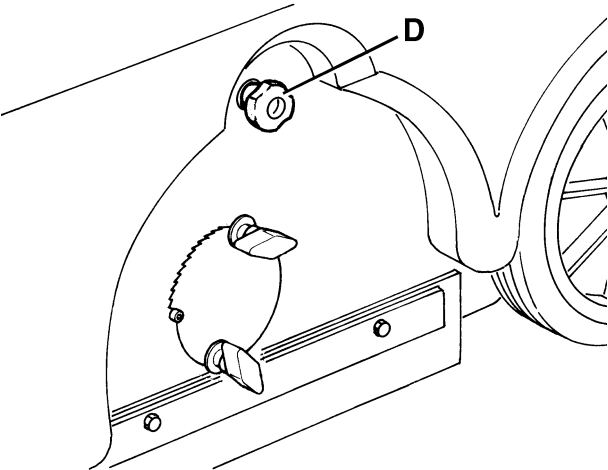


S300246

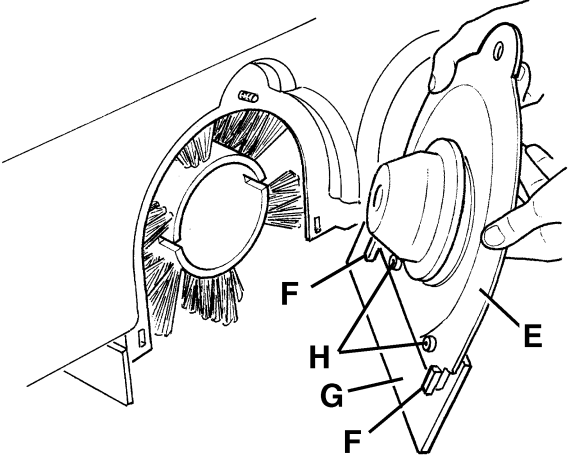


S300247

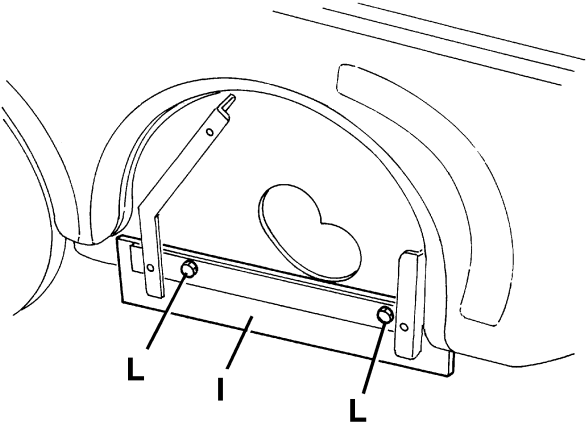
Figure 2



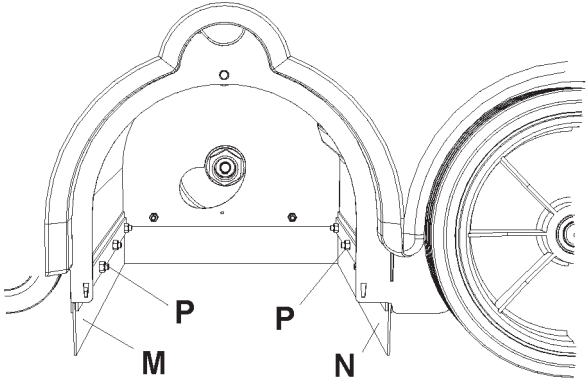
S300248



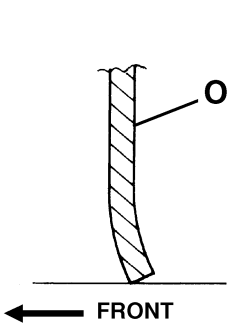
S300249



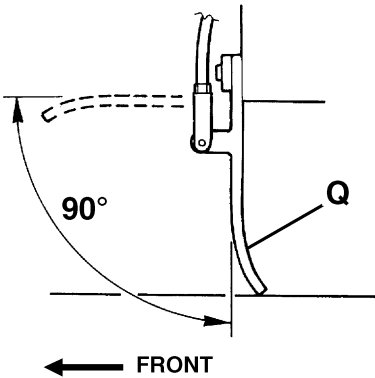
S300250



S300251



S300376



S300377

## SIDE SKIRT REPLACEMENT

1. Drive the machine on a level ground that is suitable for checking the skirt height.
2. Engage the parking brake (23).
3. Turn the ignition key (2) to "0" position, then remove it.

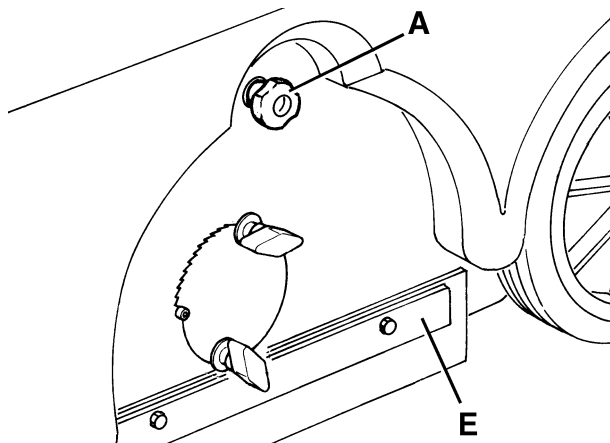
### Left side skirt

4. Loosen the knob (A) and remove the broom left door (E) by pulling it upwards to disengage the fasteners (C).
5. Remove the screws (D), the strap (E) and the side skirt (F).
6. Install the new skirt (F) with the strap (E) and the screws (D).
7. Adjust the side skirt height as indicated in the previous paragraph.
8. Install the parts in the reverse order of removal.

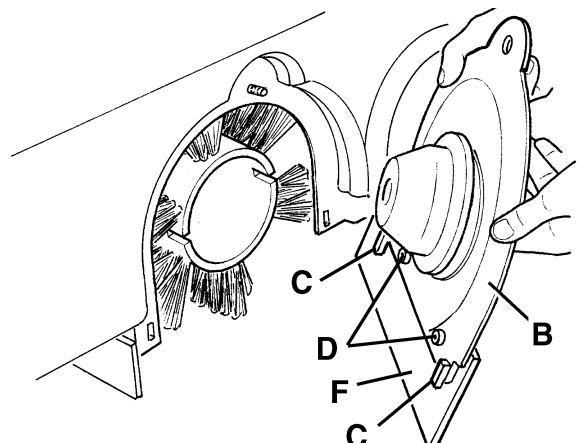
### Right side flap

9. Remove the main broom, as described in the related paragraph.
10. Remove the belt (71) from the pulley (72). To make the operation easier, rotate the pulley (72) operating on the fan (73).
11. Remove the screws (43) and the right door (42) together with the belt (71).
12. Remove the screws (G), the strap (H) and the side skirt (I).
13. Install the new skirt (I) with the strap (H) and the screws (G).
14. Adjust the side skirt height as indicated in the previous paragraph.
15. Install the parts in the reverse order of removal.

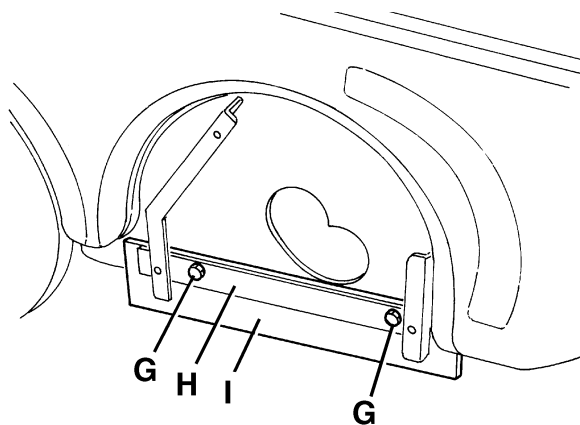
Figure 3



S300253



S300254



S300255

## FRONT AND REAR SKIRT REPLACEMENT

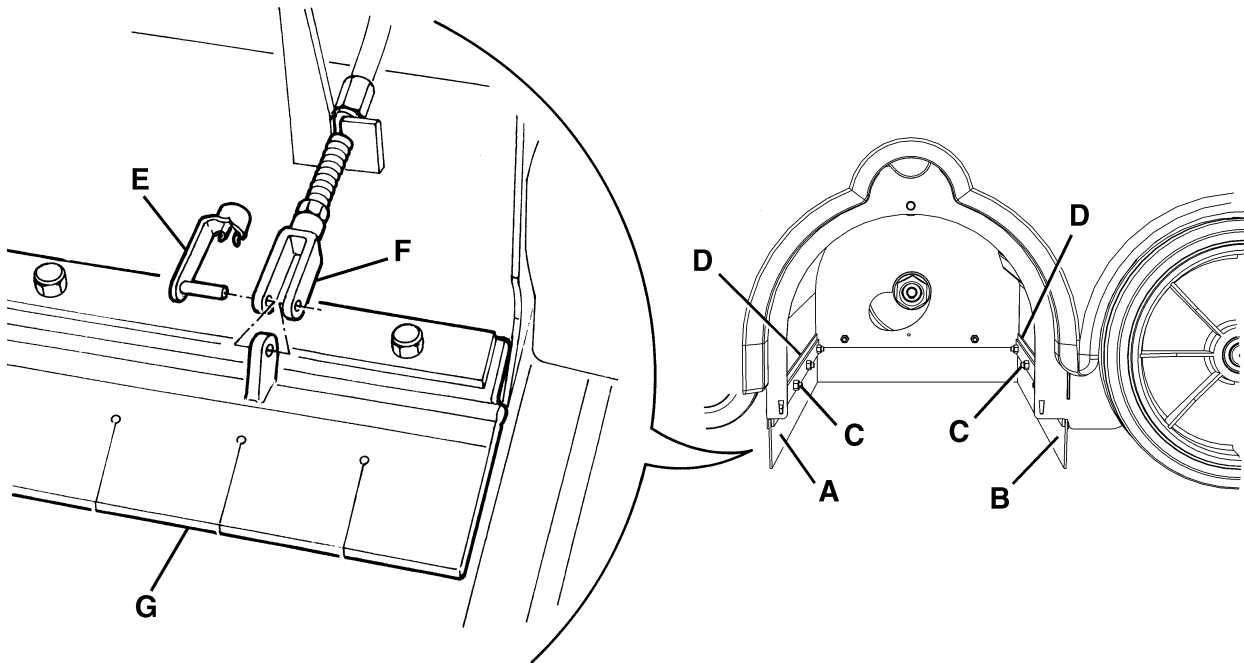
1. Drive the machine on a level ground that is suitable for checking the skirt height.
2. Engage the parking brake (23).
3. Turn the ignition key (2) to "0" position, then remove it.
4. Remove the main broom, as described in the related paragraph.
5. Slightly lift the machine front side observing the cautions below, then remove the clip (E) and disconnect the lifting cable terminal (F) from the front skirt (G).

**CAUTION!**

When lead (WET) batteries are installed on the machine, do not tilt the machine of more than 30° from the horizontal plane to prevent the highly corrosive acid from leaking out of the batteries.

6. Remove the screws (C) and the strap (D), then remove the front (A) and/or the rear skirt (B).
7. Install the new skirt (A and/or B) with the strap (D) and the screws (C).
8. Adjust the rear skirt height as indicated in the relevant paragraph.
9. Install the parts in the reverse order of removal.
10. If necessary, refer to the paragraph relating to the front skirt control cable adjustment.

Figure 4



S300819

## FRONT SKIRT LIFTING CABLE ADJUSTMENT

### Adjustment check

1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Remove the main broom, as described in the related paragraph.
4. Press the front skirt lifting pedal (24) and check that the front skirt (A) rotates upwards of about 90° (as shown in the figure); release the pedal and check that the skirt does not remain in an intermediate position but returns to its initial position.
5. If necessary, adjust the front skirt lifting cable as shown below.

### Cable adjustment

6. Remove the waste container (36) by following the instructions given in the Instructions for use manual.
7. Remove the batteries (61) and the battery holder.

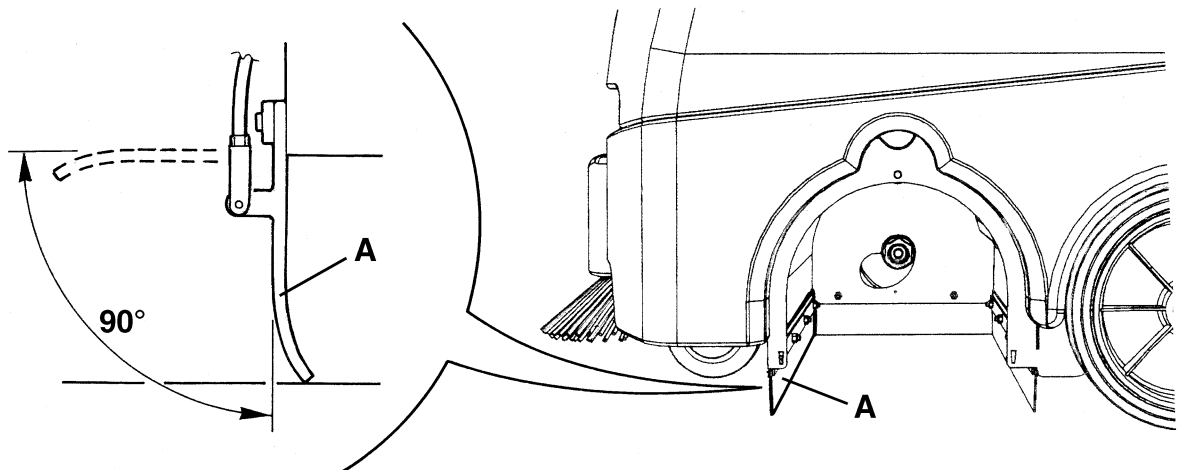


#### CAUTION!

**If you do not remove the batteries before tilting the machine, you could cause serious damage to people or the machine.**

8. Carefully raise the machine front side (F) with the help of another person, then lean its back side on the ground (as shown in the figure), supporting it on a safety stand (B).
9. In order to adjust the front skirt (E) lifting cable, loosen the lock nut (C) and turn the terminal (D) as much as necessary, then tighten the lock nut (C).
10. Perform step 4 again to check adjustment.
11. Install the parts in the reverse order of removal.

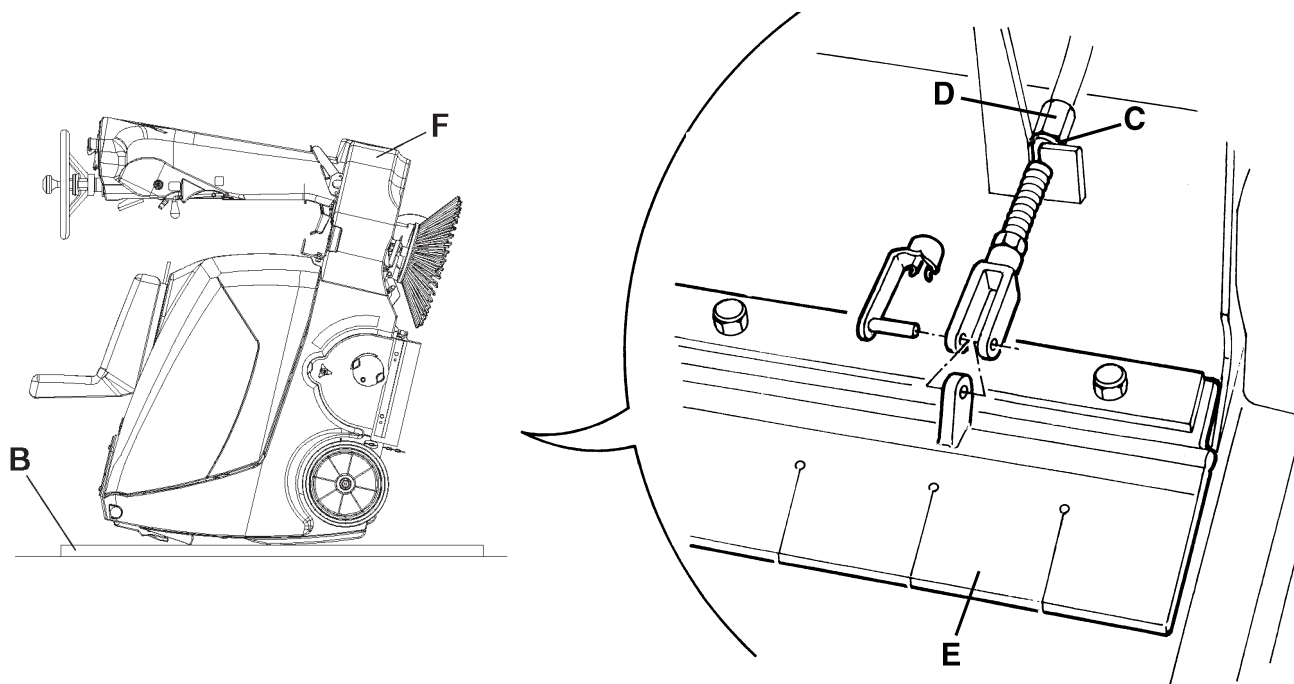
Figure 5



S300820

## FRONT AND REAR SKIRT REPLACEMENT

Figure 6



S300821



## FRONT SKIRT LIFTING CABLE REPLACEMENT

1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Remove the waste container (36) by following the instructions given in the Instructions for use manual.
4. Remove the batteries (61) and the battery holder.

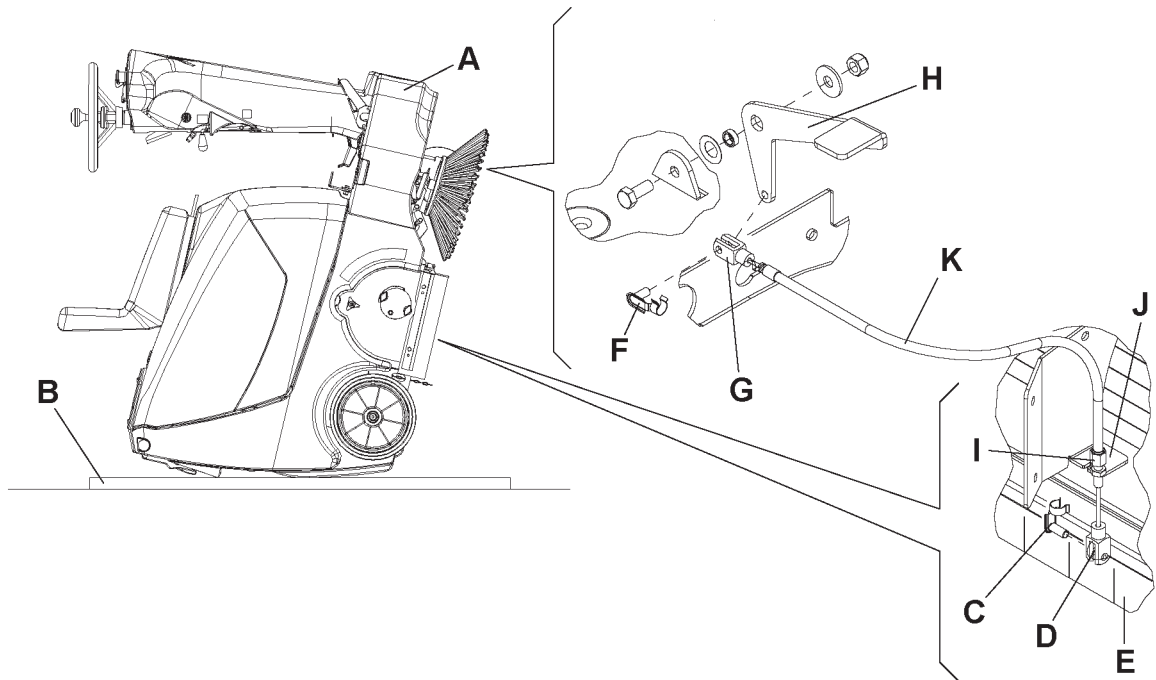


### CAUTION!

If you do not remove the batteries before tilting the machine, you could cause serious damage to people or the machine.

5. Carefully raise the machine front side (A) with the help of another person, then lean its back side on the ground (as shown in the figure), supporting it on a safety stand (B).
6. Loosen the locknut (I), then remove the cable terminal (J).
7. Remove the clip (C) and disconnect the lifting cable terminal (D) from the front skirt (E).
8. Remove the clip (F) and disconnect the lifting cable terminal (G) from the pedal (H).
9. Remove the front skirt lifting cable (K).
10. Install the parts in the reverse order of removal.
11. Adjust the front skirt lifting cable (see the procedure in the relevant paragraph).

Figure 7



S300822

## DUST AND DEBRIS COLLECTION SYSTEM

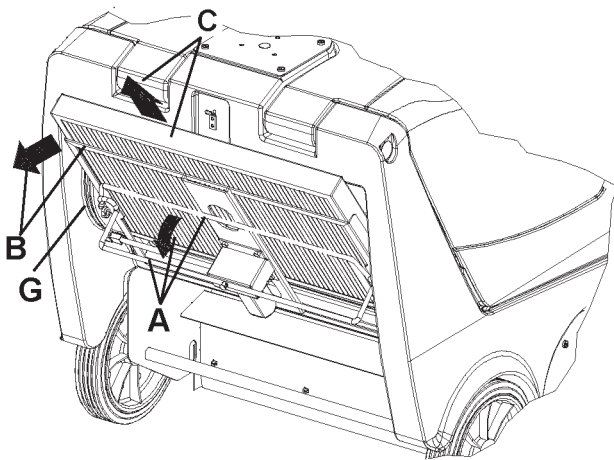
### DUST FILTER CLEANING AND INTEGRITY CHECK


**NOTE**

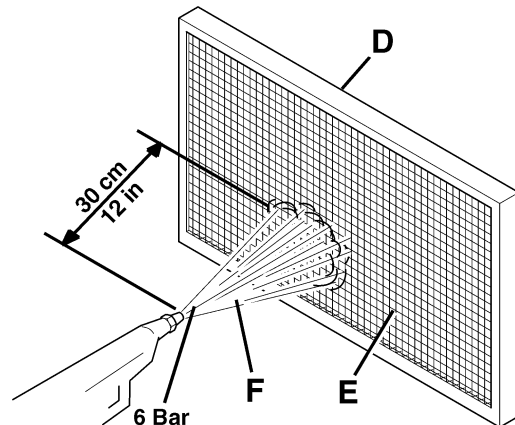
Besides the standard paper filter, optional polyester filters are also available. The following procedure is applicable to each type of filter.

1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Disengage the waste container hook (37).
4. Remove the waste container (36) by using the handle (38).
5. Turn the handle (A) downwards (90° approximately) and let the filter frame (B) rotate outwards.
6. Pull out the dust filter (C) upwards.
7. In an outdoor area, clean the filter shaking it on a level and clean surface, tapping the side (D) opposite the wire gauze (E). Complete the cleaning with compressed air (F) of max. 6 bars, blowing only from the side protected by the wire gauze (E), at a minimum distance of 30 cm (see figure).  
According to the filter type, observe the following cautions:
  - Paper filter (standard), do not use water or detergents to clean it; the filter can be damaged.
  - Polyester filter (optional): to clean it, see the above-mentioned instructions. For a better cleaning, it is allowed to wash the filter with water and non-lathering detergents. This provides better quality cleaning but reduces the life of the filter, which will have to be replaced more frequently. The use of unsuitable detergents can damage the filter.
8. Check the filter body for tears.
9. If necessary, clean all along the filter compartment rubber seal (G) and check its integrity. If necessary, replace it.
10. Install the parts in the reverse order of removal.  
Install the filter with the gauze (E) facing the fan (73).

Figure 1



S300823



S300824

## FILTER SHAKER OPERATION CHECK

1. Start the machine. When the panel filter shaker is considered to be clogged, activate the filter shaker by pressing the filter shaker switch (10) for a short while and check that the typical noise is audible.
2. Restart the machine and check that the filter has been properly shaken. If so, it should result in an appreciable improvement in the machine vacuum capability.
3. If necessary, check and replace the filter shaker (see the procedures in the relevant paragraphs).

## FILTER SHAKER MOTOR ELECTRICAL INPUT CHECK

**WARNING!**

This procedure must be performed by qualified personnel only.

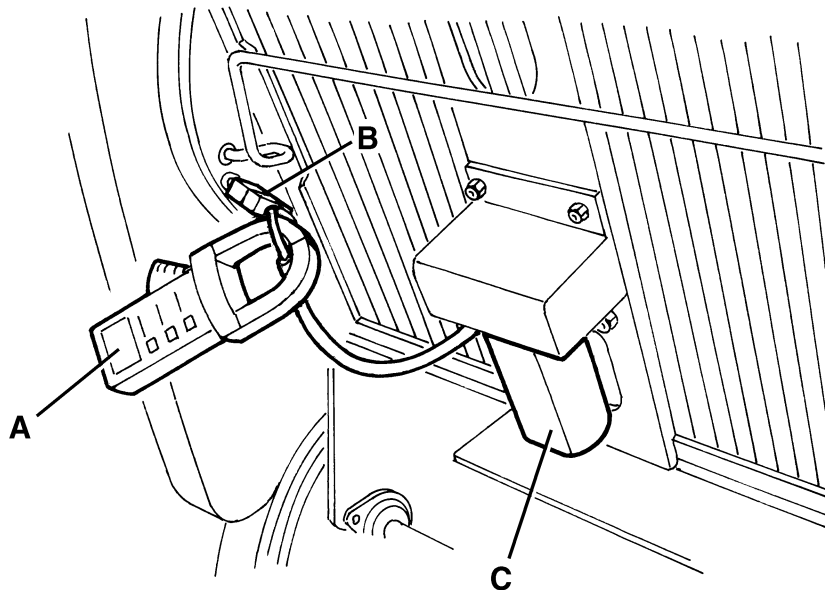
1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position.
3. Remove the waste container (36) by following the instructions given in the Instructions for use manual.
4. Check the brooms are lifted.

**WARNING!**

Carry out the following operations very carefully.

5. Without pressing the forward/reverse gear pedal (21) turn the ignition key (2) to "I" position.
6. Activate the filter shaker motor using the filter shaker switch (10), while checking with an ammeter (A) that the filter shaker motor (C) electrical input is about 3 - 5 A at 24 V.  
Turn the ignition key (2) to "0" position. Remove the ammeter.  
If the electrical input is higher, replace the motor.
7. Install the waste container (36) by following the instructions given in the Instructions for use manual.

Figure 2



S300259

## TROUBLESHOOTING

### THE FAN DOES NOT ROTATE

Possible causes:

1. Discharged battery (charge).
2. Worn main motor brushes (replace)
3. Main motor failure (repair or replace)
4. Foreign materials obstructing the fan (remove)
5. Damaged wiring harness (repair)

### THE FILTER SHAKER MOTOR DOES NOT OPERATE

Possible causes:

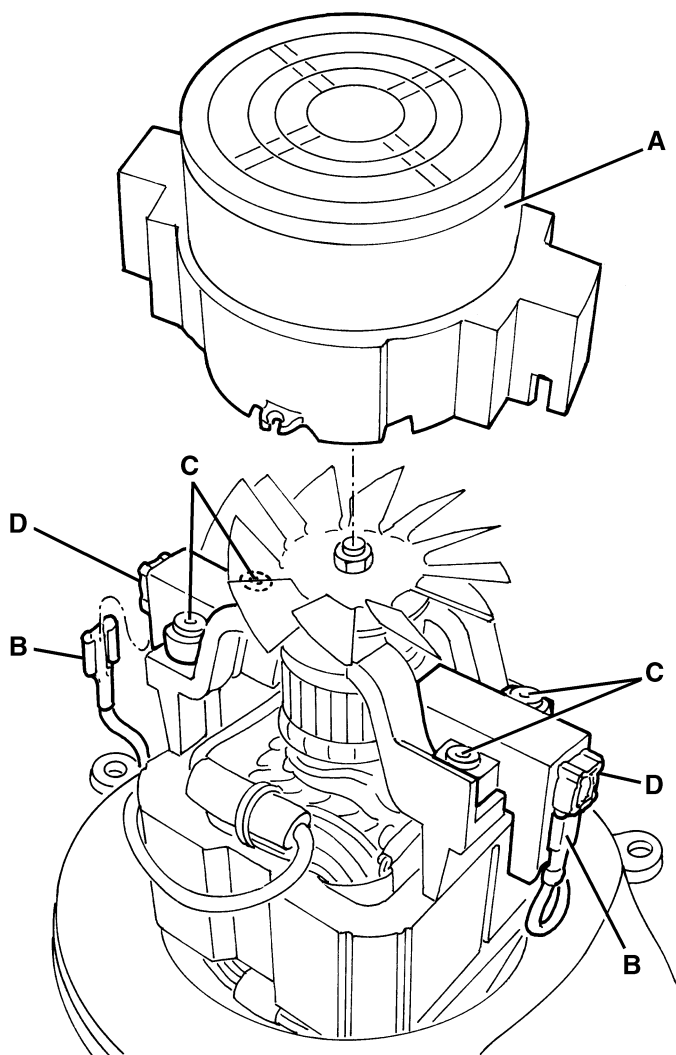
1. Motor failure (repair or replace)
2. Broken filter shaker switch (10) (replace)
3. Filter shaker relay failure (replace)
4. Damaged wiring harness (repair)
5. Blown fuse in the filter shaker motor (replace)
6. Dust in the filter shaker motor vibrating mass case (disassemble and clean the filter shaker)
7. Filter shaker motor overheating (let it cool down and try again)

## MANUAL VACUUM SYSTEM

### MANUAL VACUUM SYSTEM MOTOR CARBON BRUSH CHECK AND REPLACEMENT

1. Remove the manual vacuum system motor.
2. At the workbench, pull out the guard (A) by disengaging the inner fasteners.
3. Disconnect the carbon brush electrical connections (B).
4. Remove the carbon brush fastening screws (C).
5. Remove the carbon brushes (D).
6. Check the two carbon brushes for wear. The carbon brushes are worn when there is not sufficient contact with the motor armature, because of their use, of the contact surface which is not integral or because the thrust spring is broken, etc.
7. If necessary, replace the carbon brushes. Replace the carbon brushes as an assembly.
8. Install the parts in the reverse order of removal.

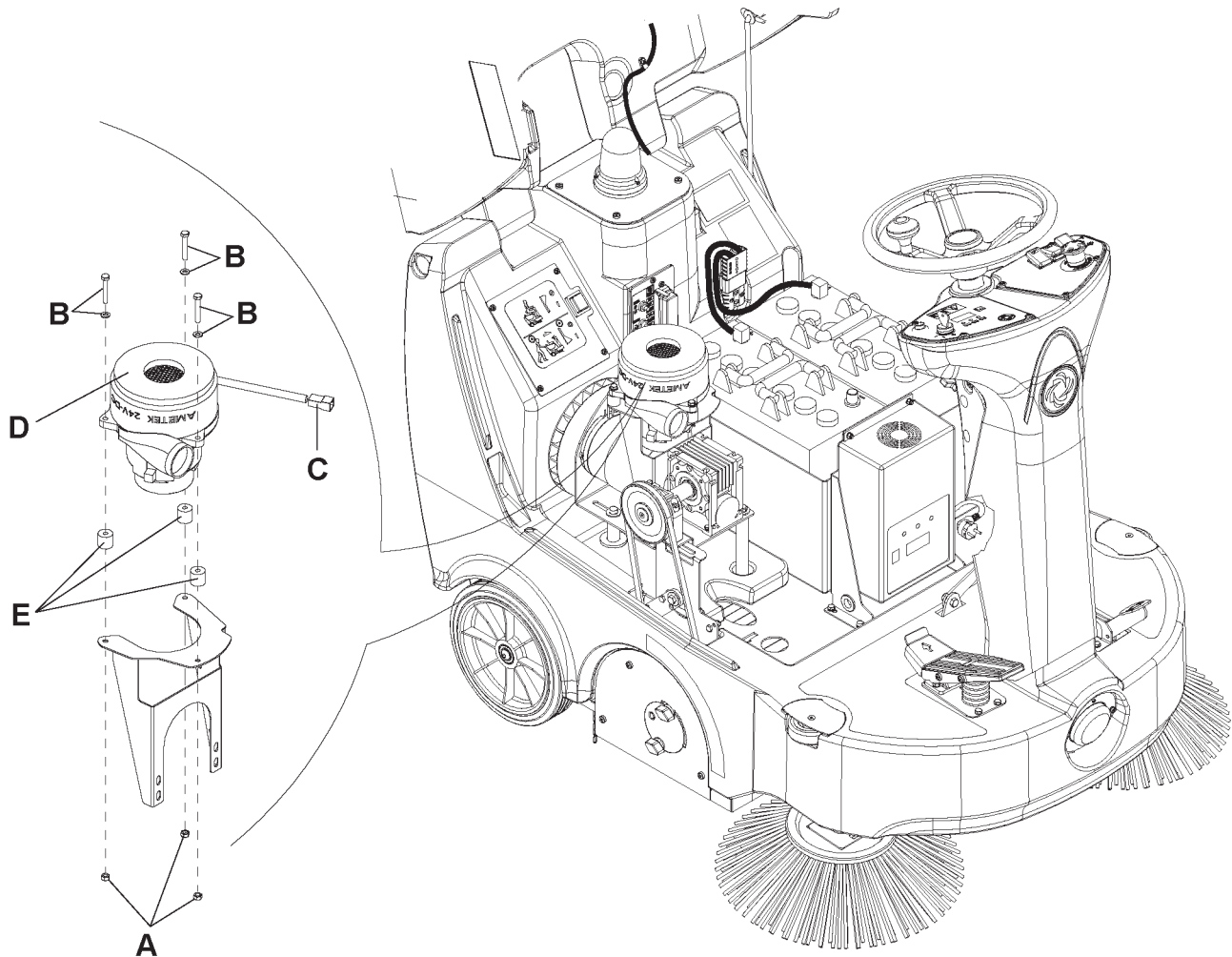
Figure 1



S301196

**MANUAL VACUUM SYSTEM MOTOR REMOVAL/INSTALLATION**

1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Raise the hood (26) and engage the hood support rod (60).
4. Remove the nuts (A), then remove the screws and the washers (B).
5. Disconnect the manual vacuum system motor electrical connection (C).
6. Remove the manual vacuum system motor (D) and take out the spacer (E).
7. Install the parts in the reverse order of removal.

**Figure 2**

S301197

## TROUBLESHOOTING

### POOR VACUUMING PERFORMANCE OF THE MANUAL VACUUM SYSTEM

Possible causes:

1. Dust or foreign materials slowing down the manual vacuum system performance (remove).
2. Worn motor carbon brushes (substitute).
3. Damaged motor (repair or replace).

### THE MANUAL VACUUM SYSTEM DOES NOT START

Possible causes:

1. Dust or foreign materials preventing the manual vacuum system performance (remove).
2. Worn motor carbon brushes (substitute).
3. Motor failure (repair or replace).
4. Blown fuse (replace).
5. Manual vacuum system switch is broken (replace).
6. Damaged wiring harness (repair).

## BRAKE SYSTEM

### BRAKE ADJUSTMENT

#### Check

1. Engage the parking brake with the lever (23a) and check the brake performance.



#### NOTE

The service and parking brake adjustment should be performed while engaging the parking brake as indicated above. The service brake travel will be adjusted accordingly.

2. If necessary, adjust both brakes as indicated below.

#### Adjustment

3. Drive the machine on a level ground without engaging the parking brake (23).
4. Turn the ignition key (2) to "0" position, then remove it.
5. Remove the waste container (36) by following the instructions given in the Instructions for use manual.
6. Remove the batteries (61) and the battery holder.



#### CAUTION!

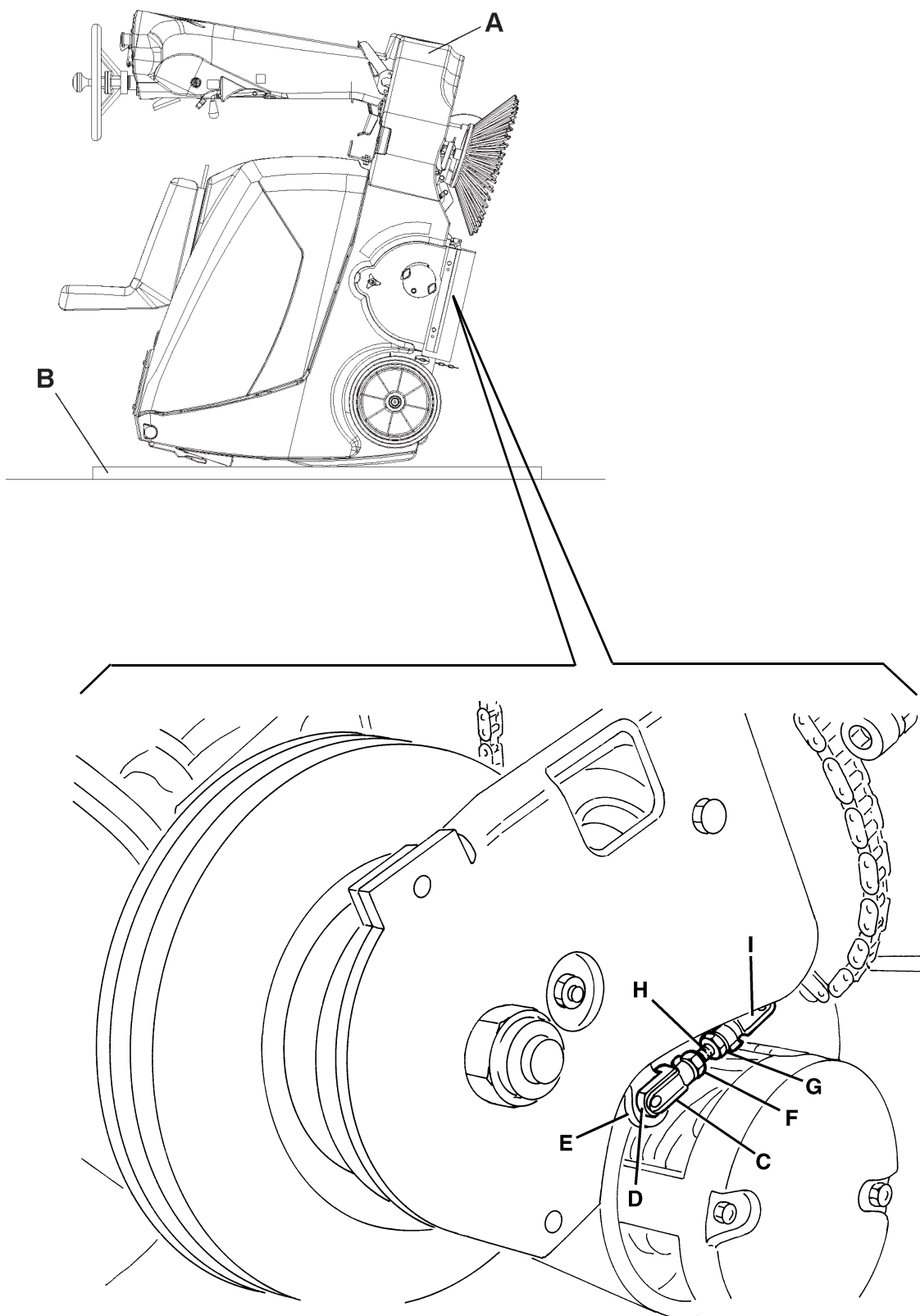
If you do not remove the batteries before tilting the machine, you could cause serious damage to people or the machine.

7. Carefully raise the machine front side (A) with the help of another person, then lean its back side on the ground (as shown in the figure), supporting it on a safety stand (B).
8. Remove the clip (C) from the brake tie rod.
9. Remove the fork (D) from the brake lever (E).
10. Loosen the locknut (F or G), then screw the threaded tie rod (H) as needed out/down on the fork (D or I). After performing adjustment, tighten the locknut (F or G).
11. Perform steps 5 - 9 in reverse order.
12. Carry-out hands-on tests to check parking and service brake operation.



# BRAKE REPLACEMENT

Figure 1



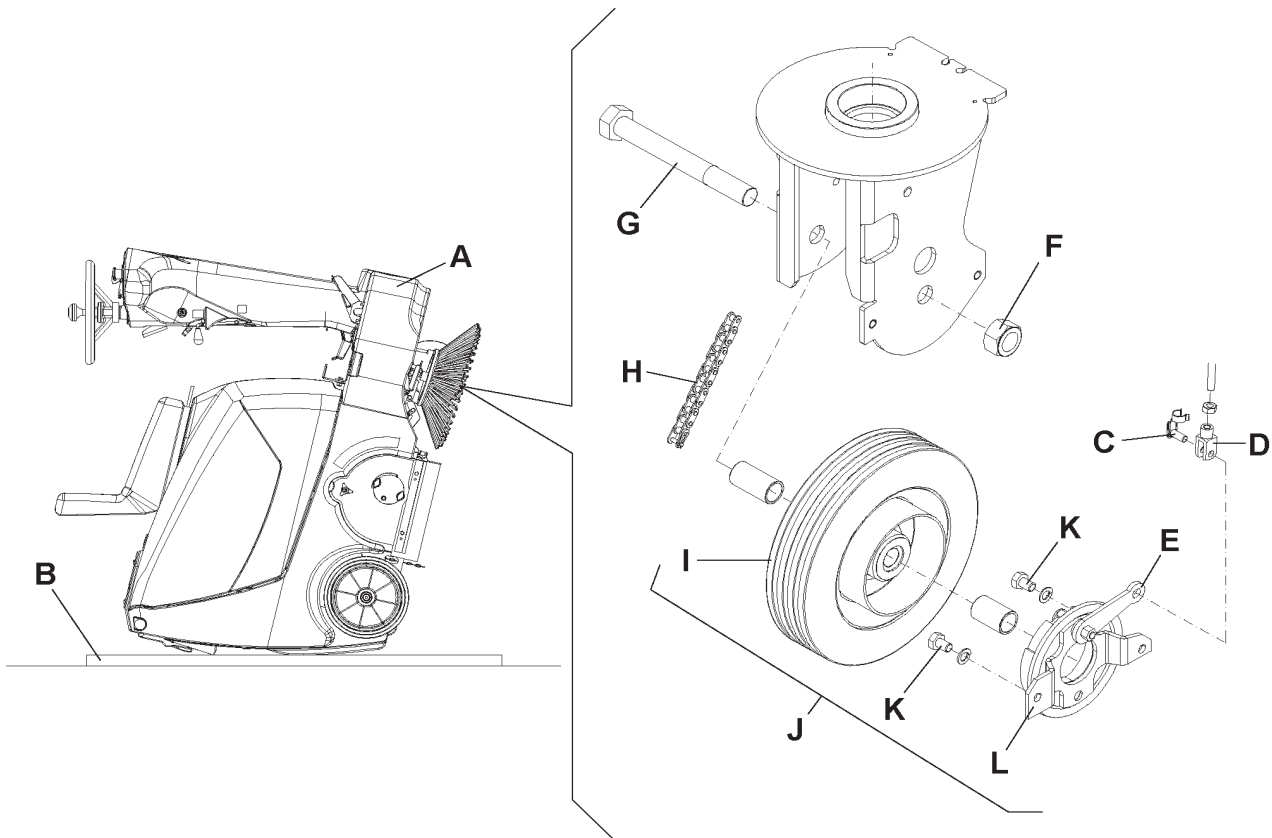
S300826

1. Drive the machine on a level ground without engaging the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Remove the waste container (36) by following the instructions given in the Instructions for use manual.
4. Remove the batteries (61) and the battery holder.

**CAUTION!**

**If you do not remove the batteries before tilting the machine, you could cause serious damage to people or the machine.**

5. Carefully raise the machine front side (A) with the help of another person, then lean its back side on the ground (as shown in the figure), supporting it on a safety stand (B).
6. Remove the clip (C) from the brake tie rod.
7. Remove the fork (D) from the brake lever (E).
8. Remove the self-locking nut (F) and take out the wheel pin (G).
9. Disconnect the drive chain (H) from the wheel (I) pinion, then remove the wheel-and-brake unit (J).
10. At the workbench, remove the screws (K) and the brake (L).
11. Install the parts in the reverse order of removal.
12. Perform brake adjustment (see the procedure in the previous paragraph).

**Figure 2**

S300825

## DRIVE SYSTEM

### DRIVE MOTOR ELECTRICAL INPUT CHECK



**WARNING!**

This procedure must be performed by qualified personnel only.

#### PRELIMINARY OPERATIONS

1. Drive the machine on a level ground.
2. Turn the ignition key (2) to "0" position, then remove it.
3. Raise the machine front side, then lean its back side on two fixed stands. In this way, the front drive wheel (28) is slightly off the ground and the following test can be safely performed.  
Make sure that the machine cannot move independently. If necessary, keep the machine stationary by applying wedges to the rear wheels.
4. Raise the hood (26) and engage the hood support rod (36).
5. Connect the drive motor to the battery (61) as shown in the underlying diagram (A), by inserting the 5 A fuse (B), for safety's sake.  
Connect an ammeter (C) to the connection (A) and arrange it so as to close the hood (26) and perform the test described at the next step. In this way, the ammeter (C) can be seen while operating the machine.

#### Drive motor electrical input check

6. Start the machine and make it reach the maximum forward and reverse speed, then measure the drive motor electrical input in both directions with the ammeter (C).  
Stop the machine and check that the readings match with the values listed in the table below.

Movement	A
Concrete/asphalt	$8 \div 10$
Carpet	$10 \div 18$

If the electrical inputs are higher, perform the following operations to detect and eliminate the cause of the abnormal input:

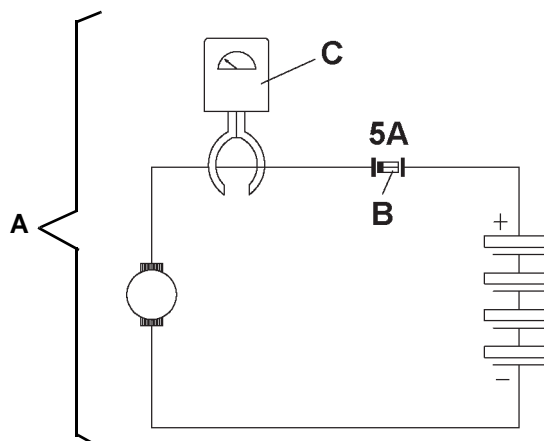
- Remove from the drive wheel drive system any dirt or foreign materials preventing or slowing down the machine movement.
- If necessary, check the motor carbon brushes.
- Furthermore, remove, clean and check the drive motor, if necessary.

If the above-mentioned procedures do not lead to a correct electrical input, it is necessary to replace the motor (see the relevant paragraph).

#### Reset

7. Perform steps 3 - 5 in reverse order.

**Figure 1**

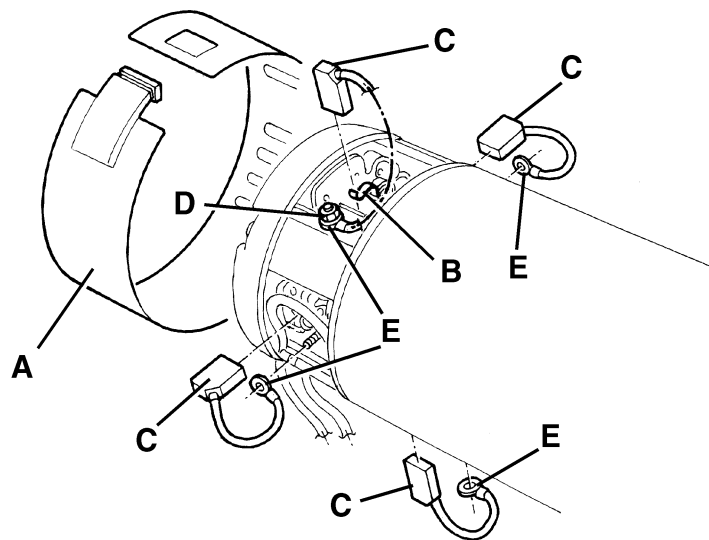


S300827

## DRIVE MOTOR CARBON BRUSH CHECK AND REPLACEMENT

1. Remove the drive motor.
2. At the workbench, remove dust and dirt from the outside of the motor, then disengage and remove the clamp (A).
3. Lift the retaining spring (B) of each carbon brush, then remove the four carbon brushes (C).
4. Check the four carbon brushes for wear. The carbon brushes are worn when there is not sufficient contact with the motor armature, because of their use, of the contact surface which is not integral or because the thrust spring is broken, etc.
5. If necessary, remove the carbon brushes to replace them, by removing the nuts (D) and disengaging the lead-in wires (E).  
Replace the carbon brushes as an assembly.
6. Install the parts in the reverse order of removal, taking care to the connections of terminals (E) and to their insulation from the surrounding parts of the frame.

Figure 2



S300239

## DRIVE MOTOR REMOVAL/INSTALLATION

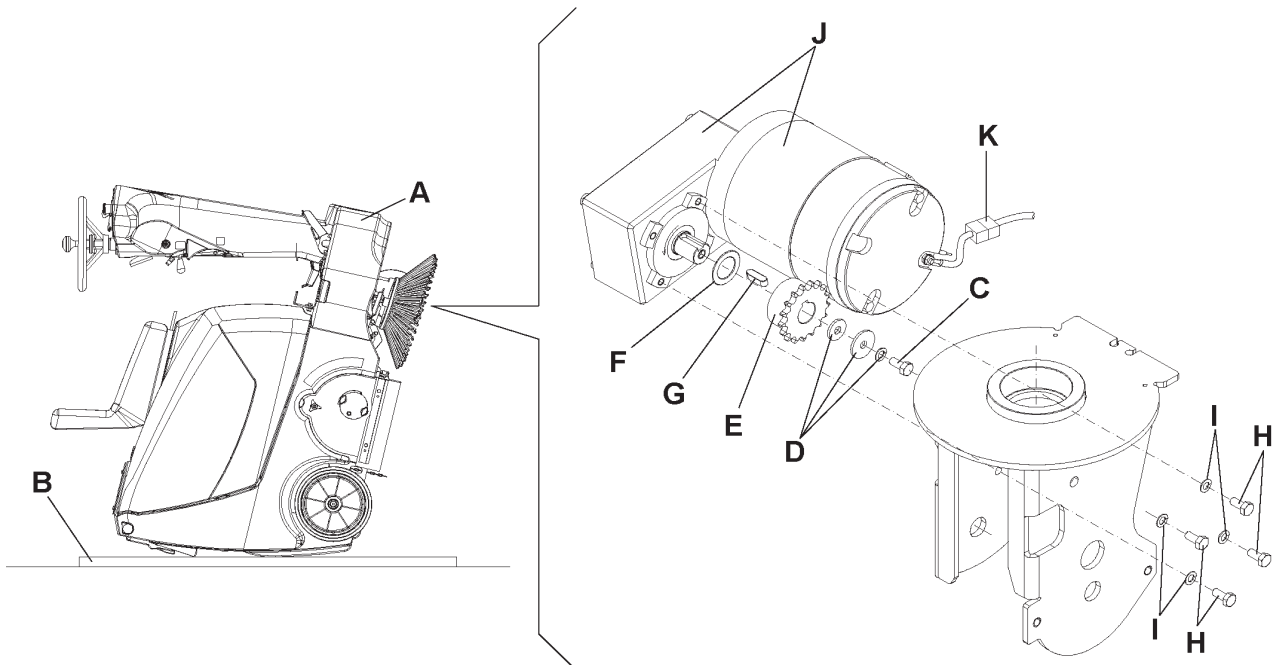
1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Remove the waste container (36) by following the instructions given in the Instructions for use manual.
4. Remove the batteries (61) and the battery holder.

**WARNING!**

If you do not remove the batteries before tilting the machine, you could cause serious damage to people or the machine.

5. Carefully raise the machine front side (A) with the help of another person, then lean its back side on the ground (as shown in the figure), supporting it on a safety stand (B).
6. Remove the screw (C).
7. Remove the washers (D), the pinion (E), the spacer (F) and take out the key (G).
8. Remove the screws (H) and take out the washers (I).
9. Move the reduction unit (J) and disconnect the electrical connector (K).
10. Install the parts in the reverse order of removal.

Figure 3



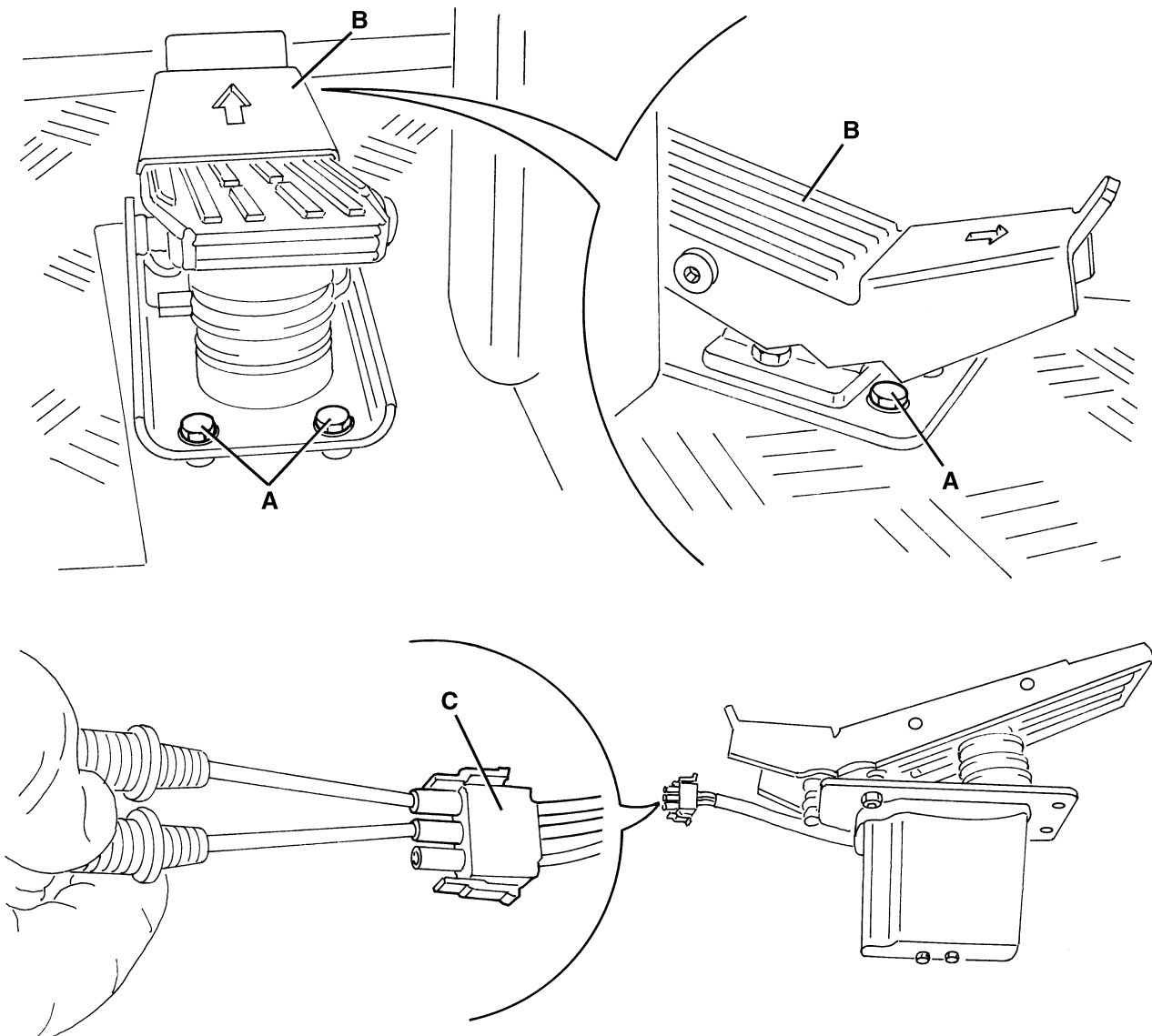
S300828

## FORWARD/REVERSE GEAR PEDAL CHECK AND ADJUSTMENT

1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Remove the screws (A), then remove the forward/reverse gear pedal (B) after disconnecting the gear pedal electrical connector.
4. At the workbench, connect a multimeter's probes to black wires N° 1 and N° 2 on the forward/reverse gear pedal connector (C). Set the multimeter to Ohm.
5. With a screwdriver, loosen the threaded dowel (E) locking the potentiometer (F) shaft (K).
6. Lock the microswitch (H) actuator (G) (if provided\*) to close position, as shown in the figure, then check the multimeter reading is between 2,300 and 2,700 Ohm.  
If necessary, reset the reading by turning the screw (I) with a screwdriver (J) while pressing the actuator (G). After resetting, screw down the threaded dowel (E) locking the potentiometer shaft (K).
7. Carry out steps 3 and 4 in reverse order.
8. Carry out hands-on tests to check the forward/reverse gear pedal operation.

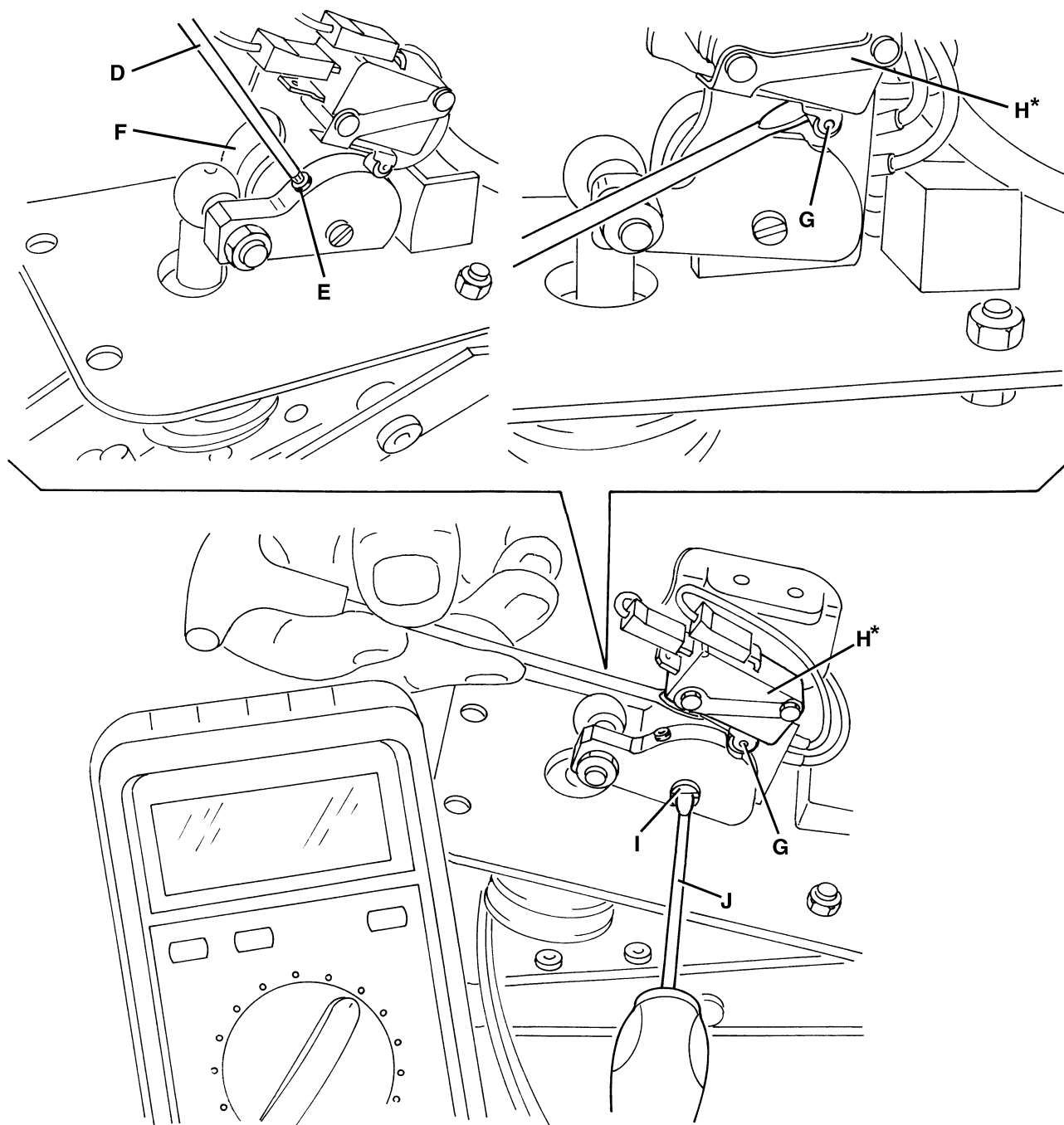
\* The microswitch (H) is no longer provided on this machine after the change dated February 2005.

Figure 4



S300829

Figure 5



S300830

## TROUBLESHOOTING

### THE MACHINE DOES NOT MOVE

Possible causes:

1. Discharged battery (charge).
2. Worn drive motor brushes (replace)
3. Drive motor failure (repair or replace)
4. Foreign materials obstructing the front wheel (remove)
5. Damaged wiring harness (repair)
6. Electronic board warning indication (check the red warning light flashing, according to the following table)

The warning light is red and it is on the drive electronic board, which is under the panel (1, Fig. 6).

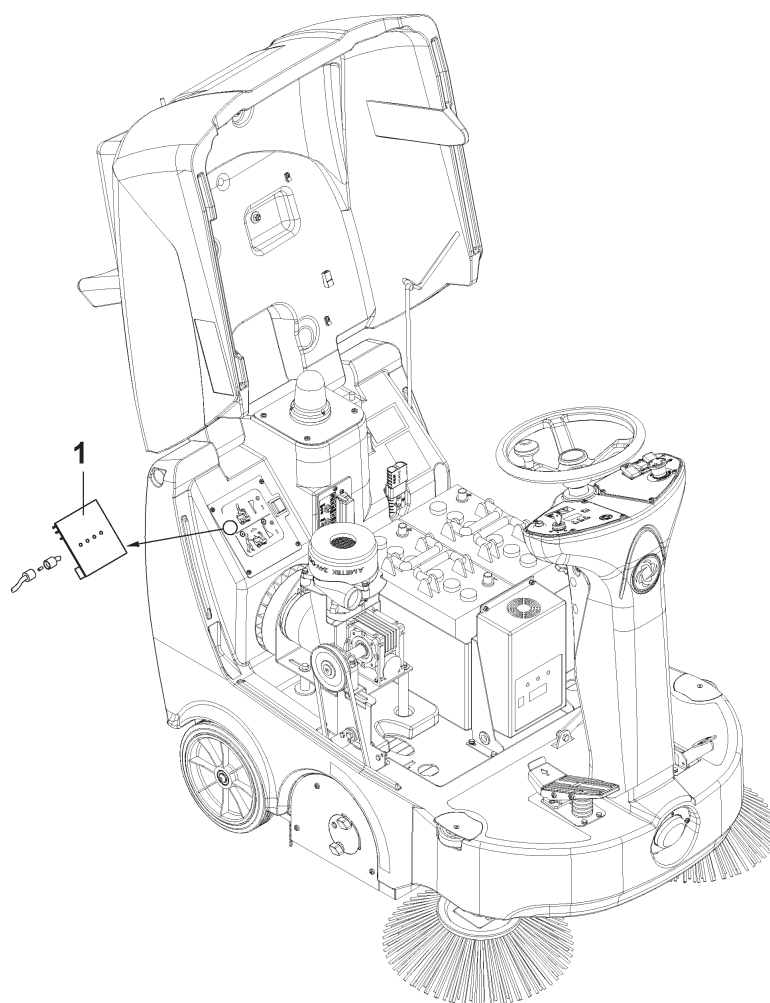
No. of flashings	Meaning	Remedy
1	Internal short circuit	Replace the board
2	Thermal protection	Allow the machine to cool down and check the drive motor input
3	Pedal pressed upon ignition	Check the pedal adjustment
4	Pedal disconnected	Check the pedal harness



#### NOTE

To keep the warning indication on, the machine must be kept on and the seat microswitch must be closed.

Figure 6



S30084



## OTHER SYSTEMS

### SCREW AND NUT TIGHTENING CHECK

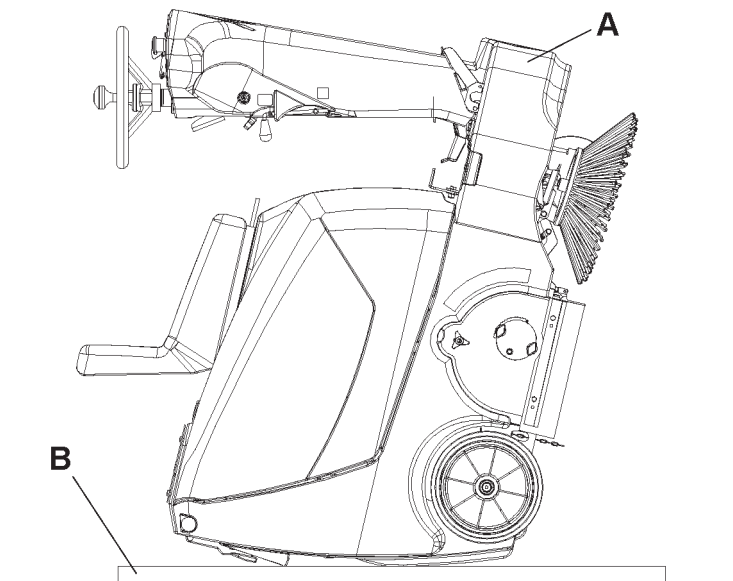
1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Remove the waste container (36) by following the instructions given in the Instructions for use manual.
4. Raise the hood (26) and engage the hood support rod (36).
5. Remove the batteries (61) and the battery holder.

**WARNING!**

**If you do not remove the batteries before tilting the machine, you could cause serious damage to people or the machine.**

6. Check the following:
  - Accessible mounting screw and nut tightening
  - Mounting component position
  - Part and component visible faults
7. Disengage the hood support rod (60) and close the hood (26).
8. Carefully raise the machine front side (A) with the help of another person, then lean its back side on the ground (as shown in the figure), supporting it on a safety stand (B).
9. Under the frame, check the following:
  - Accessible mounting screw and nut tightening
  - Mounting component position
  - Part and component visible faults
10. Carry out steps 3 and 8 in reverse order.

**Figure 1**



S300835

## ELECTRICAL SYSTEM

### BATTERY MAINTENANCE AND RECHARGING

See the Instructions for use manual

#### (WET OR GEL) BATTERY INSTALLATION AND SETTING

##### Battery choice

1. The machine can be equipped with the following battery types:
  - Lead batteries, with acid electrolyte (WET)
  - Gel batteries, hermetic (GEL)
2. As for battery voltage and capacity, see the Technical Data chapter.
3. As for battery installation diagrams, see diagram (78).

##### Battery removal

4. Drive the machine on a level ground and engage the parking brake (23).
5. Turn the ignition key (2) to "0" position, then remove it.
6. Raise the hood (26) and engage the hood support rod (36).
7. Disconnect the battery electrical connector (63).
8. Disconnect the battery terminals, then remove the batteries (61).

##### Battery installation

9. Before connecting the battery to the machine electrical system, it is necessary to set the electronic board of the machine and of the battery charger according to the type of battery installed (lead or gel). Proceed as follows:

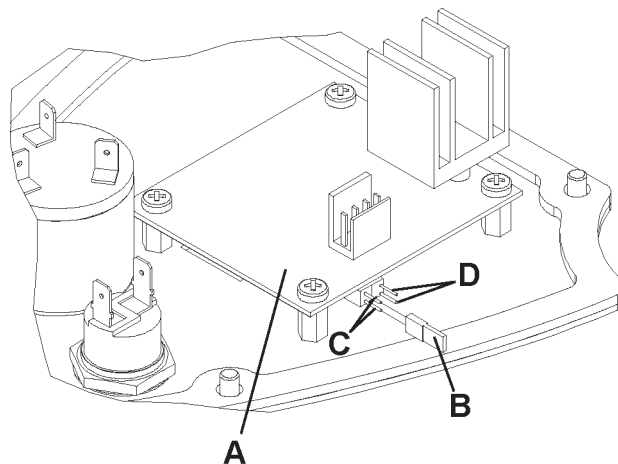
##### Machine electronic board setting

10. Unscrew the control panel mounting screws (15) and carefully remove the right control panel (16).
11. On the electronic board, install a jumper wire (A) on the WET connectors (C) for lead batteries or on the GEL connectors (D) for gel batteries.
12. Carefully reinstall the right control panel (16) and tighten the mounting screws (15).

##### Battery charger setting

13. Position the battery selector switch (69) to WET for lead batteries or to GEL for gel batteries.
14. Install the batteries on the machine according to the diagram (78), then connect the electrical cables.
15. Connect the battery electrical connector (63).
16. Charge the batteries (for the relevant procedure, see the Instructions for use manual).

Figure 1

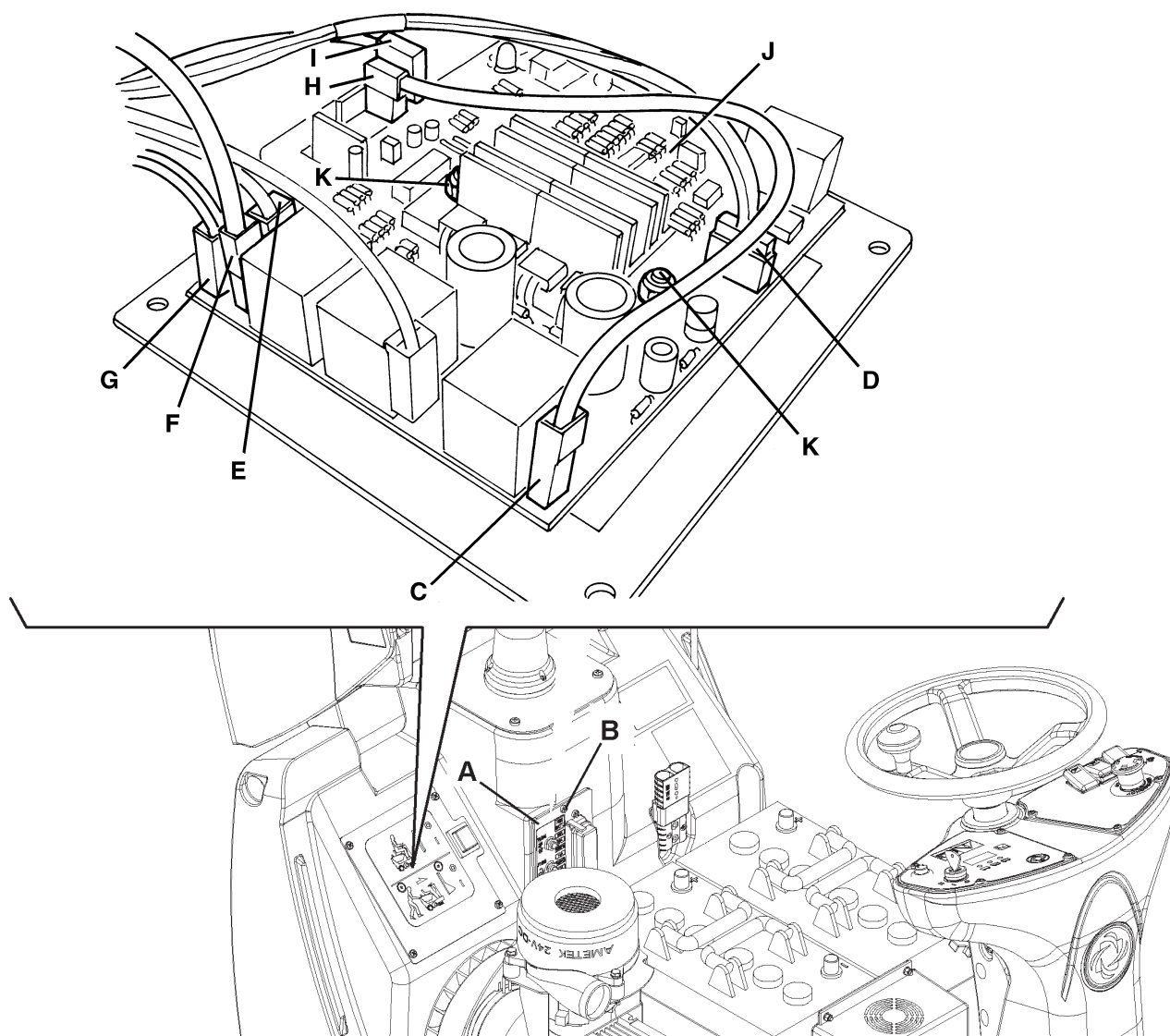


S300836

## DRIVE ELECTRONIC BOARD REPLACEMENT

1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Raise the hood (26) and engage the hood support rod (36).
4. Disconnect the battery electrical connector (63).
5. Carefully move the fuse panel (A) after removing the panel screws (B).
6. Disconnect the electrical connections (C, D, E, F, G, H, I) from the drive electronic board (J).
7. Remove the nuts (K), then remove the drive electronic board (J).
8. Install the new electronic board in the reverse order of removal.

Figure 2

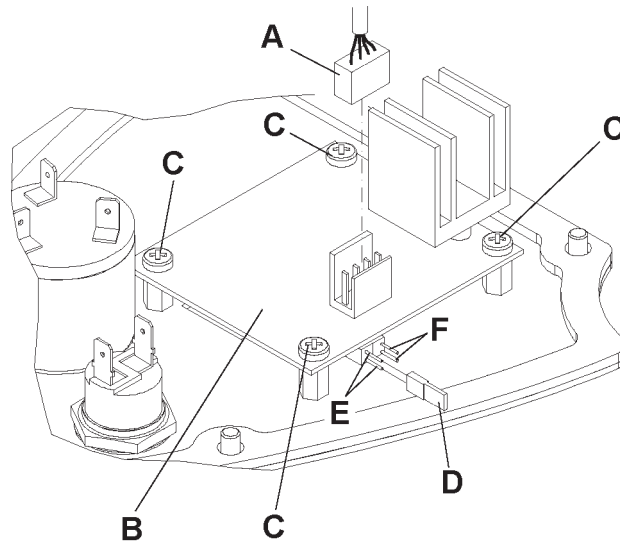


S300837

## HOUR COUNTER AND BATTERY CHARGE STATUS DISPLAY ELECTRONIC BOARD REPLACEMENT

1. Drive the machine on a level ground and engage the parking brake (23).
2. Turn the ignition key (2) to "0" position, then remove it.
3. Raise the hood (26), disconnect the battery electrical connector (63), then close the hood again.
4. Unscrew the control panel mounting screws (15) and carefully move the right control panel (16).
5. Disconnect the electrical connection (A) from the hour counter and battery charge status display electronic board (B).
6. Remove the screws (C), then remove the hour counter and battery charge status display electronic board (B).
7. Install the new electronic board in the reverse order of removal.  
The new electronic board must be aligned (set) according to the type of batteries (61) installed on the machine.  
Install a jumper wire (D) on the WET connectors (E) for lead batteries or on the GEL connectors (F) for gel batteries respectively.

Figure 3



S300838

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**MACHINE SHOULD NOT START WHEN THERE IS NO OPERATOR ON THE DRIVER'S SEAT**

1. When the machine is off and there is no operator on the driver's seat (45), try and start the machine by turning the ignition key (2) to "I" position. The machine should not start.

**HOOD SAFETY SWITCH OPERATION CHECK**

1. Raise the hood (26) while the machine is off.
2. Try and start the machine by turning the ignition key (2) to "I" position. The machine should not start.
3. Lower the hood (26).
4. Start the machine by turning the ignition key (2) to "I" position.
5. Raise the hood (26). The machine should turn off immediately.
6. Turn the ignition key (2) to "0" position.
7. Lower the hood (26).

**MACHINE SHOULD NOT START IF THE BATTERY CHARGER PLUG IS CONNECTED TO THE OUTLET**

1. With the machine off, insert the battery charger electrical cable plug (65) in the outlet.
2. Try and start the machine by turning the ignition key (2) to "I" position. The machine should not start.
3. Disconnect the electrical cable plug (65) from the outlet.

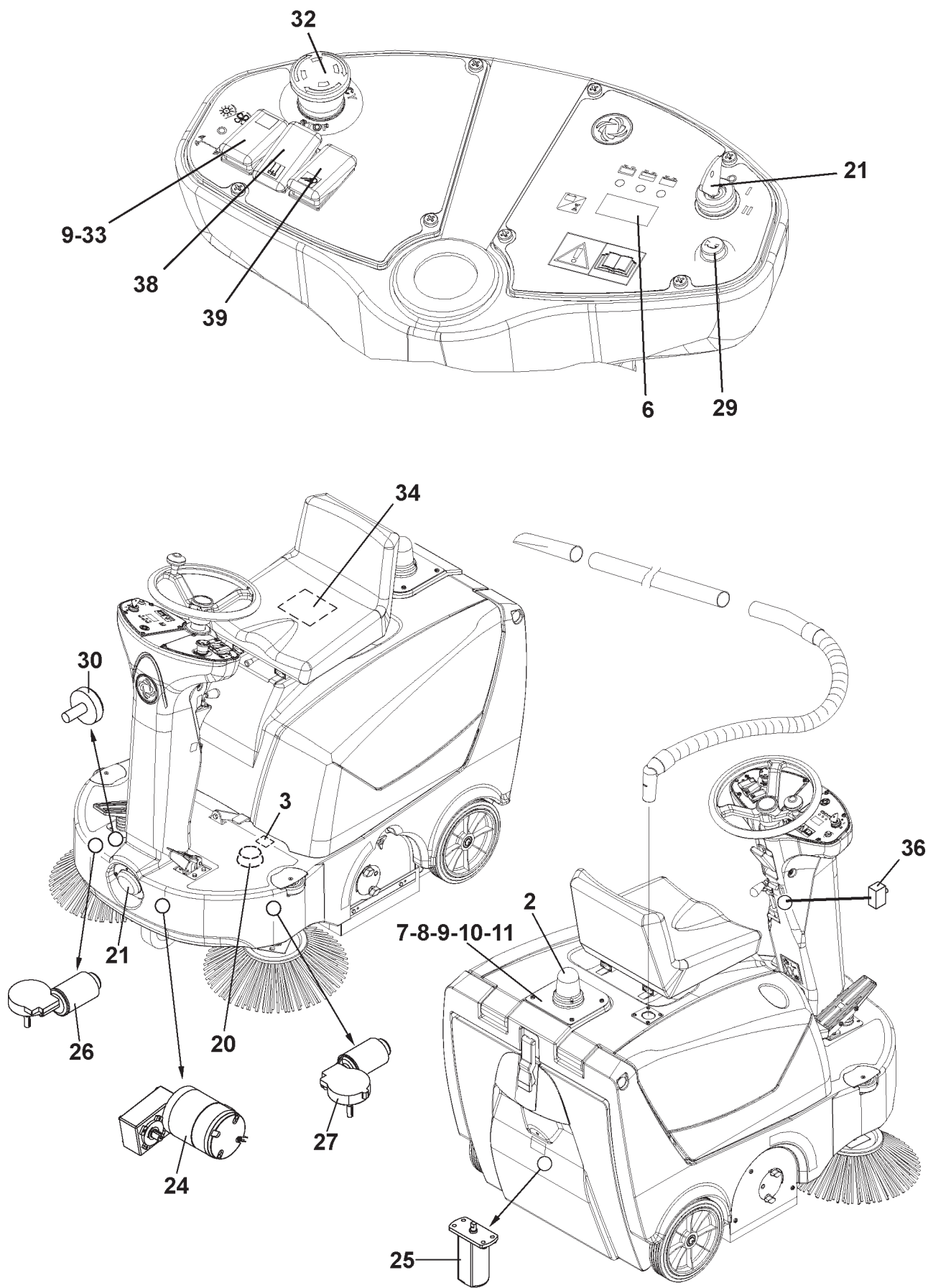
## COMPONENT LAYOUT

**NOTE**

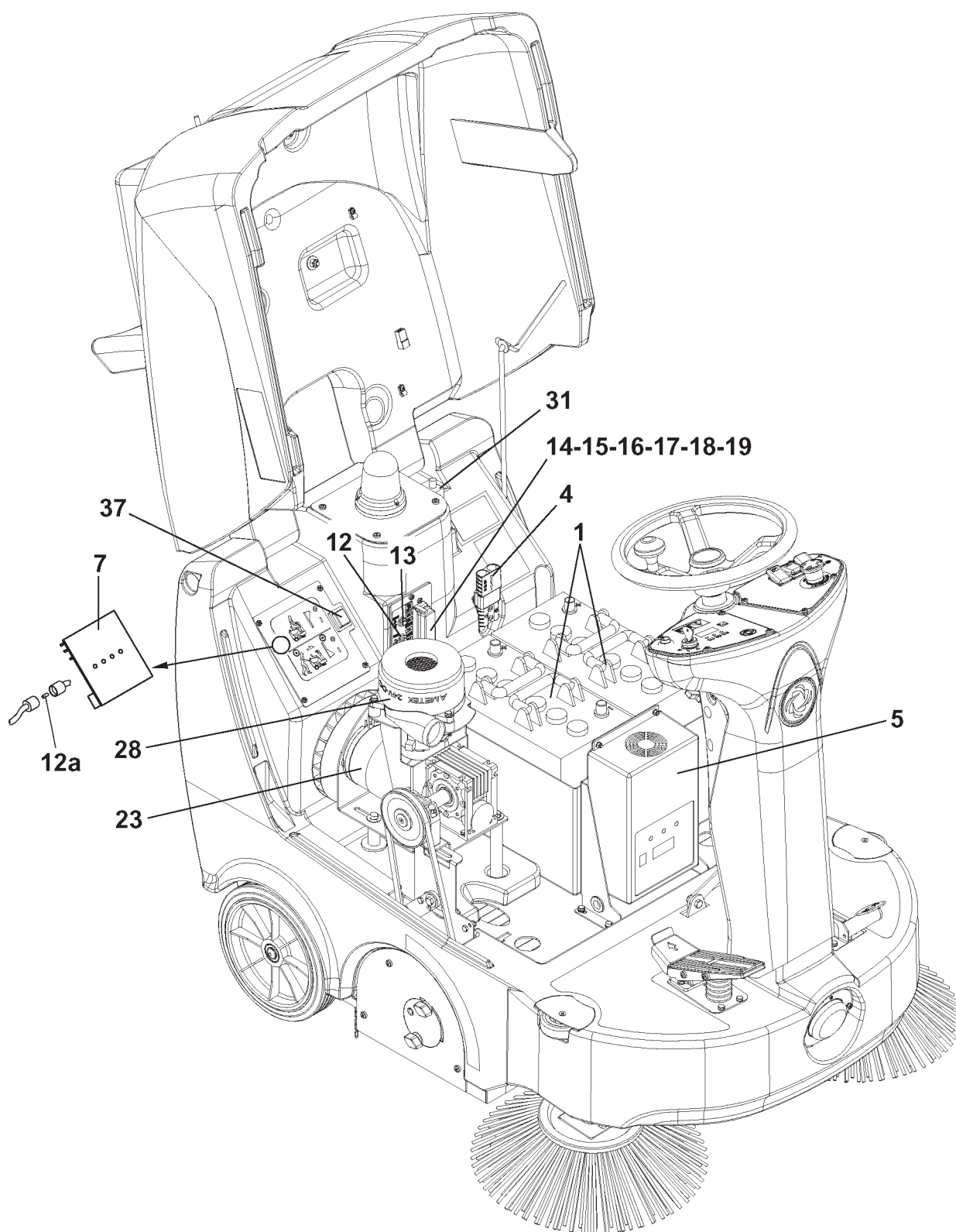
The symbol in brackets after the name of the component refers to the wiring diagram (see the following pages).

**List of abbreviations used**

1. Batteries (BAT)
2. Pivoting light (BE1)
3. Reverse gear alarm (BZ1)
4. Battery connector (C1)
5. Battery charger (H1)
6. Hour counter and battery voltage display (EB1)
7. Drive electronic board (EB2)
8. Starting relay (ES0)
9. Main broom switch (ES1)
10. Filter shaker relay (ES2)
11. Manual vacuum system relay (ES3)
12. Main broom/fan fuse (FA)
- 12a. Drive electronic board fuse (3A) (FL)
13. Drive fuse (FT)
14. Main fuse (key circuit) (25A) (F1)
15. Filter shaker motor fuse (25A) (F2)
16. Manual vacuum system fuse (40A) (optional) (F3)
17. Horn and pivoting light fuse (optional) (10A) (F4)
18. Working light fuse (10A) (optional) (F5)
19. Side broom motor fuse (10A) (F6)
20. Horn (HN1)
21. Ignition key (K1)
22. Working light (optional) (L1)
23. Main broom motor (M1)
24. Drive motor (M2)
25. Filter shaker motor (M3)
26. Right side broom motor (M4)
27. Left side broom actuator (M5)
28. Manual vacuum system motor (optional) (M6)
29. Horn push-button (P1)
30. Drive speed potentiometer (R1)
31. Hood safety switch (SWC)
32. Emergency push-button (SWS)
33. Main broom, vacuum fan and filter shaker switch (SW1)
34. Driver's seat safety microswitch (SW2)
36. Side broom microswitch (SW4)
37. Drive switch (SW5)
38. Manual vacuum system switch (optional) (SW6)
39. Working light switch (SW7)



S300839



S300840



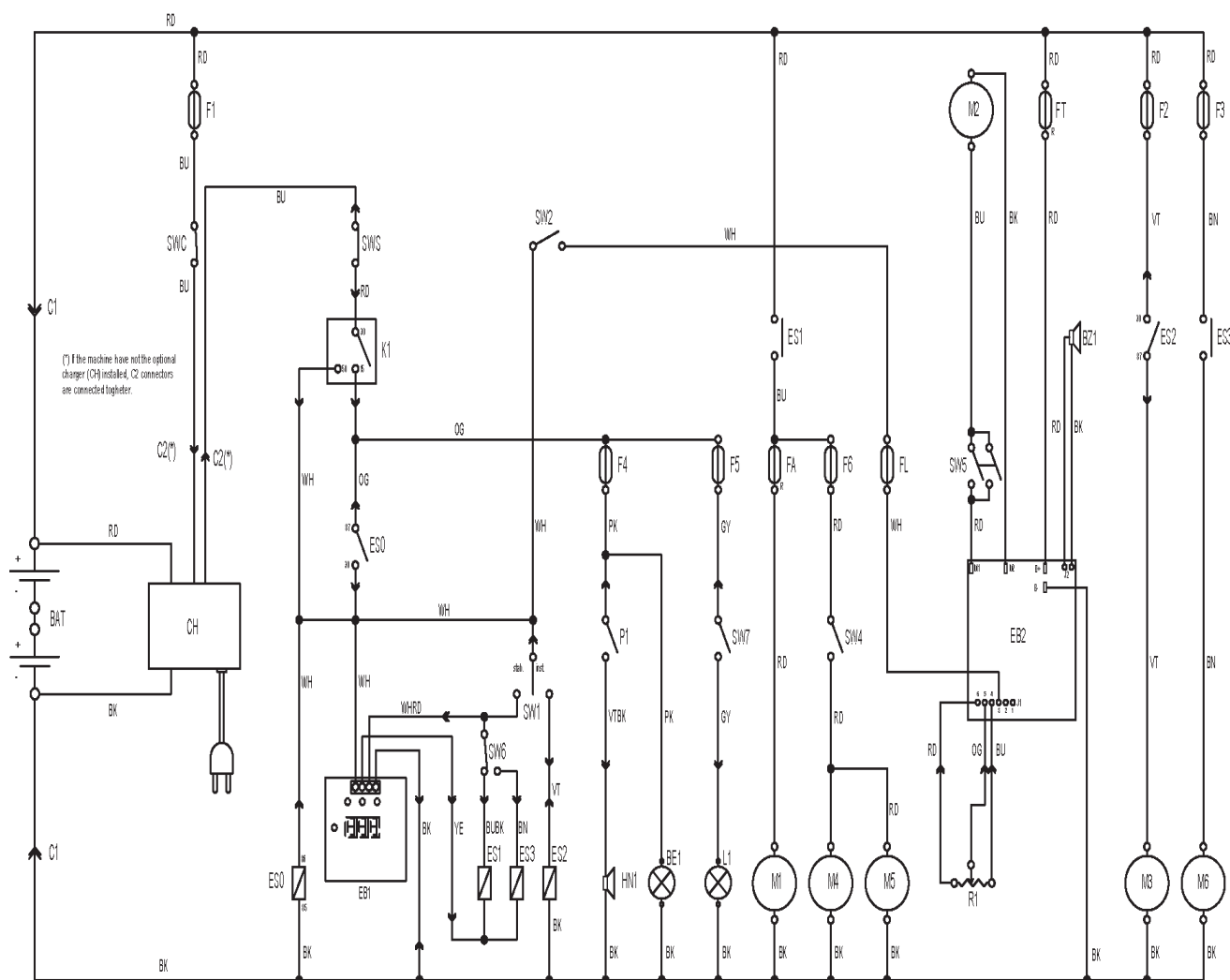
## WIRING DIAGRAM

### List of abbreviations

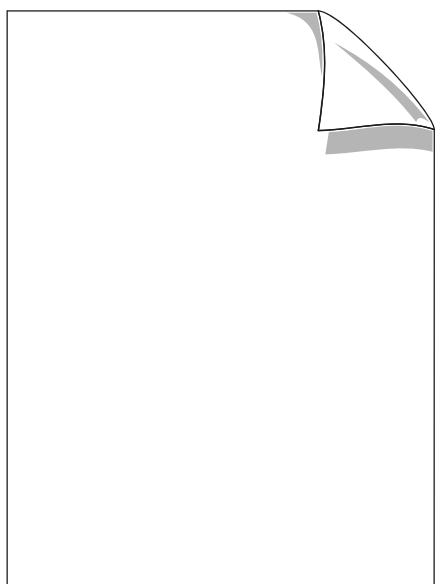
BAT:	Batteries
BE1:	Pivoting light
BZ1:	Reverse gear warning buzzer
C1:	Battery connector
CH1:	Battery charger
EB1:	Hour counter and battery voltage display
EB2:	Drive electronic board
ES0:	Starting relay
ES1:	Main broom switch
ES2:	Filter shaker relay
ES3:	Manual vacuum system relay
FA:	Main broom/fan fuse
FL:	Drive electronic board fuse (3A)
FT:	Drive fuse
F1:	Main fuse (key circuit) (25A)
F2:	Filter shaker motor fuse (25A)
F3:	Manual vacuum system fuse (40A) (optional)
F4:	Horn and pivoting light fuse (optional) (10A)
F5:	Working light fuse (10A) (optional)
F6:	Side broom motor fuse (10A)
HN1:	Horn
K1:	Ignition key
L1:	Working light (optional)
M1:	Main broom motor
M2:	Drive motor
M3:	Filter shaker motor
M4:	Right side broom motor
M5:	Left side broom motor
M6:	Manual vacuum system motor (optional)
P1:	Horn push-button
R1:	Drive speed potentiometer
SWC:	Hood safety switch
SWS:	Emergency push-button
SW1:	Main broom, vacuum fan and filter shaker switch
SW2:	Driver's seat safety microswitch
SW4:	Side broom microswitch
SW5:	Drive switch
SW6:	Manual vacuum system switch (optional)
SW7:	Working light switch (SW7)

### Color codes

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



S300843





**Nilfisk  
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