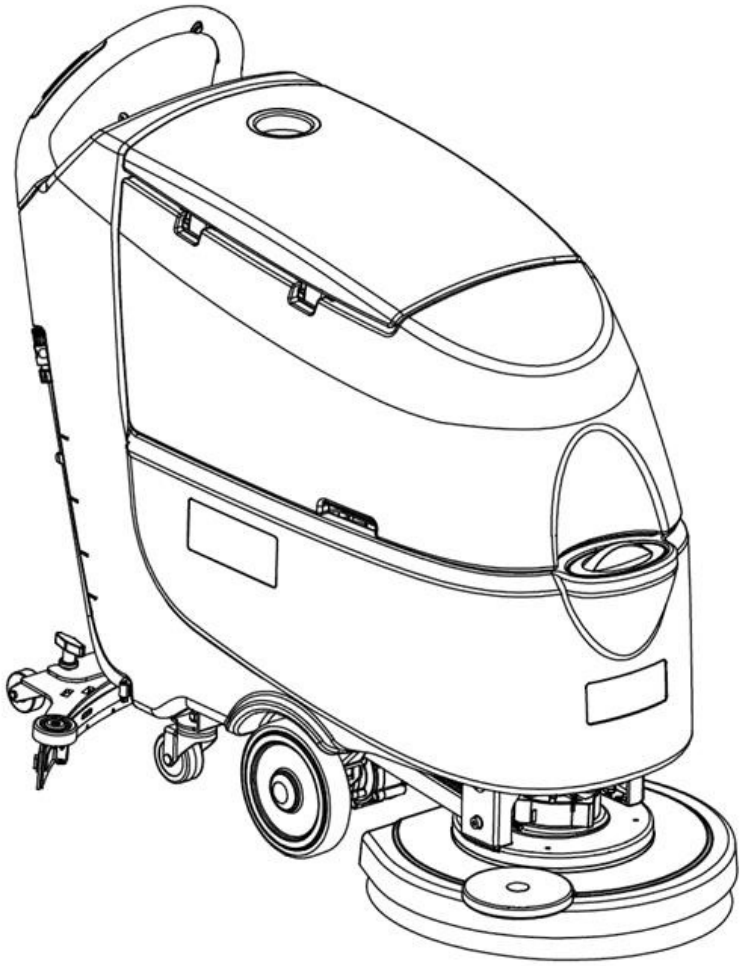
SC530



Service Manual

Model numbers:

Nilfisk

Nilfisk
trusted since 1906

English

Table of Contents

General Information

Machine General Description

The SC530 is a walk-behind commercial floor scrubbing machine designed to wash and dry commercial floors. The machine is powered by on-board batteries. The machine is equipped with a single-disc scrubbing pad, a controlled solution flow dosing system, and a rear squeegee with vacuum suction. The machine also has an on-board solution tank and wastewater recovery tank. This machine is not to be used outdoors, on carpets, or on coarse floors.

Service Manual Purpose and Field of Application

This Service Manual is a technical resource intended to aid service personnel in maintaining and repairing the SC530 to ensure optimum performance and long service life. Please read this manual carefully before performing any maintenance and repair procedure on the machine.

Other Reference Manuals

Document name	Document number	Document type
SC530 53 BD GO / SC530 53 B GO, Instructions for Use	VS13009	Instructions for Use
SC530 53 BD GO / SC530 53 B GO, Parts List	VS13014	Parts List

These manuals are available at:
– Local Nilfisk Retailer
– Nilfisk website: www.nilfisk.com

Conventions

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

Service and Spare Parts

Service and repairs must be performed only by authorized personnel or Nilfisk Service Centers. The authorized personnel is trained directly at the manufacturer's premises and has original spare parts and accessories. Contact Nilfisk Retailer indicated below for service or to order spare parts and accessories, specifying the machine model and serial number.

(Apply Retailer label here)

Serial Number Label

The Model Number and Serial Number of your machine are shown on the Nameplate on the machine. This information is needed when ordering repair parts for the machine. Use the space below to note the Model Number and Serial Number of your machine for future reference.

MODEL NUMBER _____

SERIAL NUMBER _____

Safety

Symbols

It is important for you to read and understand this manual. The information it contains relates to protecting your safety and preventing problems. The symbols below are used to help you recognize this information.

Warning: ***Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury***

Caution: ***Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.***

Caution: ***When used without the Safety Alert Symbol, indicates a potential situation which, if not avoided, could result in property or machine damage.***

Nota: ***Indicates an important informational message.***

General Safety Instructions

These safety instructions are included to warn you of potential bodily injury or property damage.

Caution! ***Read and understand all safety warnings and instructions. Failure to follow the warnings and instructions may result in electric shock, fire, and/or serious injury.***

- ***To avoid personal injury, this machine should be used only by properly trained and authorized persons.***
- ***Do not operate the machine near toxic, dangerous, flammable and/or explosive materials. This machine is not suitable for collecting dangerous or hazardous materials.***
- ***In case of fire, use a powder fire extinguisher, not a water-based extinguisher.***
- ***Do not use on surfaces having a gradient exceeding that marked on the machine. While on ramps or inclines, avoid sudden stops when loaded. Avoid abrupt sharp turns.***
- ***Disconnect the power source and/or batteries before servicing electrical components***
- ***Never work under a machine without safety blocks or stands to support the machine.***
- ***Do not dispense flammable cleaning agents, operate the machine on or near these agents, or operate in areas where flammable liquids exist.***
- ***When using floor cleaning detergents, follow all safety and handling instructions of the respective manufacturer.***
- ***Battery charging may produce highly explosive hydrogen gas. Charge the batteries only in well-ventilated areas and away from ignition sources or open flames.***
- ***When operating this machine, ensure that third parties, particularly children, are not endangered.***
- ***Take precautions to prevent hair, jewelry, or loose clothing from becoming caught in moving parts.***

Property Damage Messages

- *Storage and operation temperature must be above 0°C and a humidity between 30% and 95%, non-condensing.*
- *Before use, all doors and hoods should be properly latched.*
- *This machine is not approved for use on public paths or roads.*
- *This machine is only approved for hard surface use.*
- *Use brushes and pads supplied with the machine or those specified in the User Manual. Using other brushes or pads could reduce safety.*
- *Do not wash the machine with direct or pressurised water jets, or with corrosive substances.*
- *Do not allow the brush/pad to operate while the machine is stationary to avoid damaging the floor.*
- *Use only factory authorized parts and accessories.*
- *This machine must be properly disposed of in accordance with local laws and regulations.*

Machine Lifting

Caution! ***Never work under a machine without safety stands or blocks to support the machine.***

Transporting The Machine

Caution! ***Before transporting the machine on an open truck or trailer, make sure that . . .***

- *All covers are closed*
- *The recovery tank and detergent tank are empty*
- *Batteries (if so equipped) are disconnected*
- *The machine is securely fastened in place on the transport.*

Technical Data

MODEL	Units	SC530 53 B GO	SC530 53 BD GO
Packing dimensions (Lx W x H)	mm	1370x600x1300	
Machine height	mm	1080	
Machine length	mm	1260	
Machine width (without squeegee)	mm	550	
Machine weight with empty tanks (without batteries)	Kg	91	97
Gross vehicle weight (GVW)	Kg	208	214
Shipping weight	Kg	121	127
Solution tank capacity	Liter	61	
Recovery tank capacity	Liter	61	
Vacuum motor power	Watt	350	
Vacuum capacity	mm H_2O	1200	
Climbing capacity (Max)	%	2%	
Front wheel diameter	mm	200	
Rear wheel diameter	mm	76	
Sound level	dB(A)	69±3	
Solution/water Flow	CL/M	0 – 240	
Working width	MM	530	
Squeegee width	MM	760	
Brush/pad diameter	MM	530/508	
Brush motor power	Watt	450	
Brush speed	Rpm	150	
Brush/pad pressure(Max)	Kg	27	23
Brush type	/	1Disc	
Drive motor power	Watt	/	150
Working speed	Km/h	/	0-4.5
Voltage	V	24V	
Battery	Ah	12V 115AhC20	
Battery charger	V/A	24V/13A	
Battery compartment size (L x W x H)	mm	350X350X300	

Maintenance Schedule

Procedure	Daily, after use	Weekly/ Monthly	Every 6 Months	Annually
Charge Battery	X			
Clean squeegee blades	X			
Inspect pad/brush	X			
Clean solution and recovery tanks	X			
Inspect recovery tank seal	X			
Inspect squeegee blades for damage		X		
Clean the solution filter		X		
Inspect for loose fasteners and electrical connections			X[1]	
Inspect/replace scrub motor brushes (battery model)				X

1 Also perform this inspection after the initial 10 hours of new machine usage.

Machine Nomenclature (machine structure)

1. Recovery tank cover
2. Can holder
3. Handlebar
4. Control panel
5. Squeegee lifting/lowering lever
6. Gardena coupling
7. Power supply cable holder
8. Power cable
9. Solution drain and level check hose
10. Deck lifting/lowering pedal
    a) Pedal position when deck is lifted
    b) Pedal position when deck is lowered
11. Squeegee knobs
12. Serial number plate/technical data
13. Squeegee vacuum hose
14. Squeegee
15. Squeegee balance adjusting knob
16. Solution/clean water tap
17. Rear steering wheels
18. Solution filter
19. Front wheels on fixed axle (A).
    Driving wheels (B)
20. Brush/pad-holder
21. Brush/pad-holder deck
22. Recovery water drain hose
23. Solution tank
24. Hinge
25. Recovery tank
26. Metal filter
27. Filler hose holder
28. Clean water inlet
29. Recovery tank cover
30. Tank cover gasket
31. Debris collection box (*)
32. Bend tube
33. Float ball filter
34. Mop and trash kit (*)
35. Solenoid valve

(*): Optional
(A): Only for machine without traction
(B): Only for machine with traction

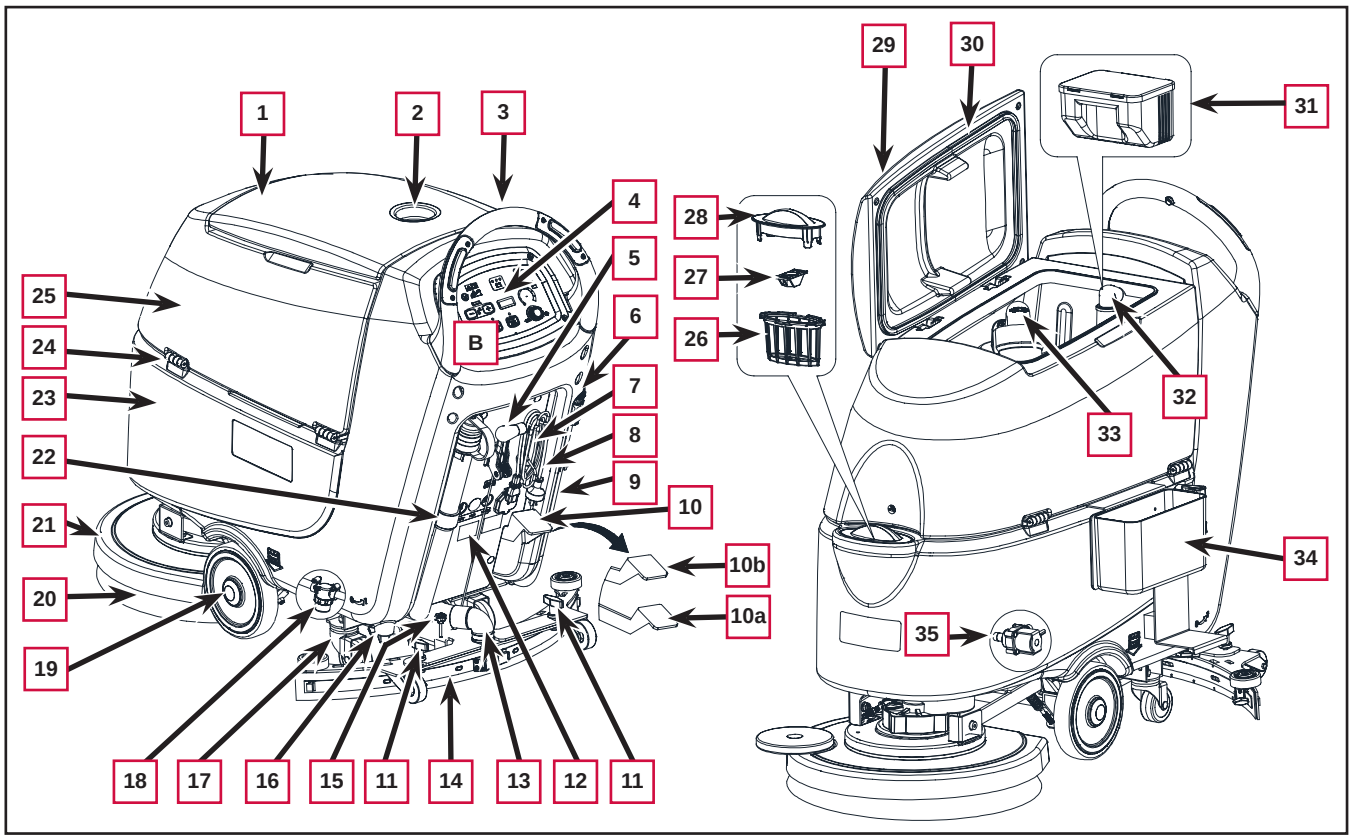


Figure 1

Machine Nomenclature (control panel)

36. Machine backward switch (B)
37. Tank safety cable
38. Battery connector (red)
39. Detergent tank filler plug (**)
40. Detergent tank (**)
41. Reference table for detergent proportioning (**)
42. Detergent pump (**)
43. Detergent tank - pump connecting hose (**)
44. Detergent feed hose (**)
45. Batteries
46. Battery caps
47. Flow increase switch
48. Flow decrease switch
49. Solution flow indicator
50. Safe switch
51. Discharged battery warning light (red)
52. Semi-discharged battery warning light (yellow)
53. Charged battery warning light (green)
54. Ignition key (0 - I)
55. Detergent flow control knob (**)
56. Speed adjuster (B)
57. Hour meter
58. Brush/pad-holder release switch
59. Vacuum system switch
60. Brush/pad-holder and vacuum system switch
61. Charging red LED
62. Charging yellow LED
63. Charging green LED
64. Security cover of charging jack
65. Overload protector of brush
66. Overload protector of main (B)
67. Overload protector of vacuum

(*): Optional
(**): Only for machines with Chemical Mixing System (optional)
(A): Only for machine without traction
(B): Only for machine with traction

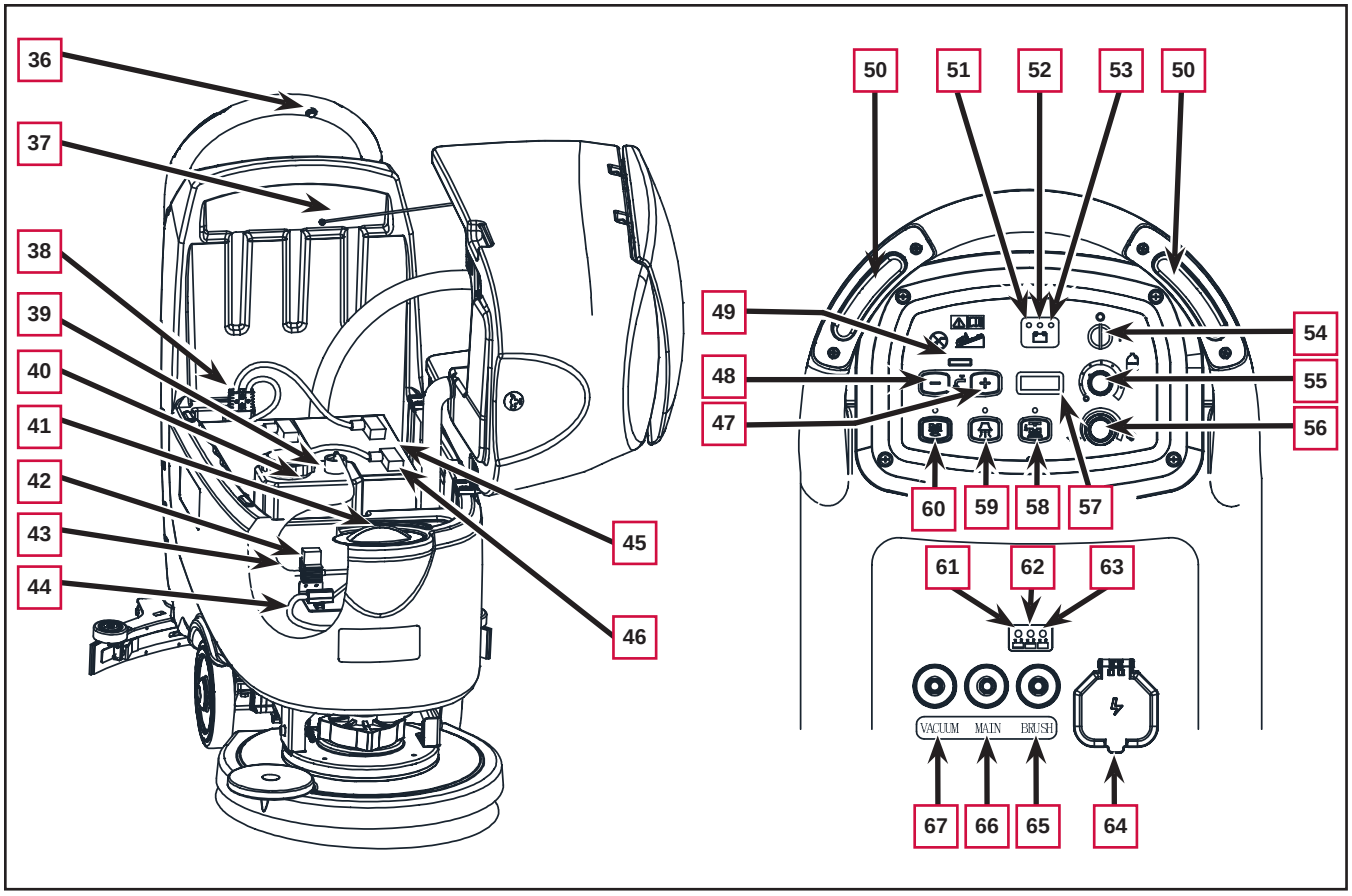


Figure 2

Service and Diagnostic Equipment

Besides a complete set of standard meters, the following instruments are necessary to perform fast checks and repairs on Nilfisk-Advance machines:
Laptop computer charged with the current version of EzParts, Adobe Reader and (if possible) Internet connection

- Digital Volt Meter (DVM)
- Amp clamp with possibility of making DC measurements
- Battery charge tester to check 12 V batteries
- Dynamometric wrench set
- A copy of the User Manual and Spare Parts List of the machine to be serviced (provided with the machine or available at www.advance-us.com or other Nilfisk-Advance websites).

Control System

Wiring diagram (machine without drive)

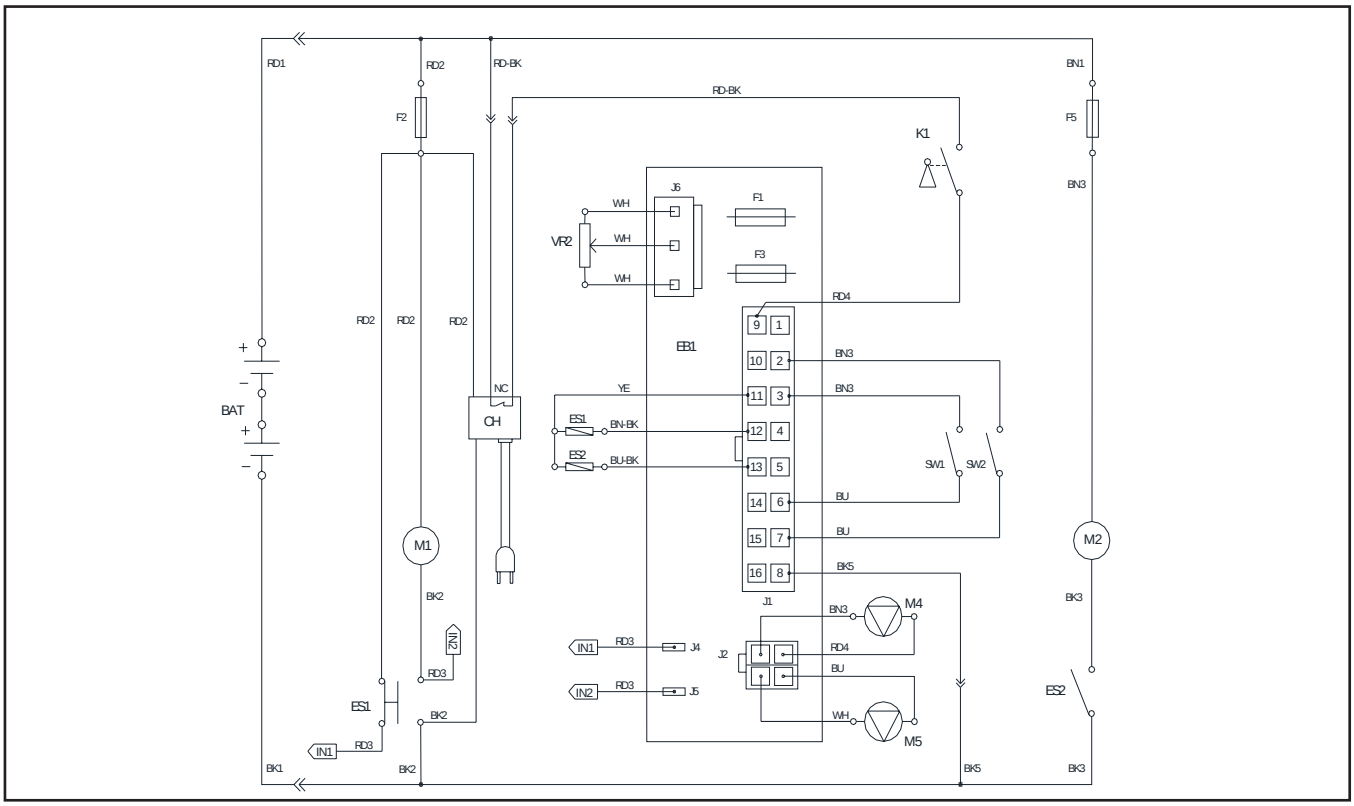


Figure 1

COMPONENTS		
Key	CODE	Description
BAT	N/A	24V BATTERIES
CH	VS10204	BATTERY CHARGER
EB1	VS13201	CONTROL PANEL BOARD
ES1	9095127000	BRUSH MOTOR ELECTROM SWITCH
ES2	VS10201	VACUUM MOTOR ELECTROM SWITCH
F1	VS13208	LOW POWER CIRCUIT FUSE
F2	ZD48320	BRUSH MOTOR CIRCUIT BREAKER
F3	VS13209	BRUSH RELEASE FUSE
F5	ZD48320	VACUUM MOTOR CIRCUIT BREAKER
K1	VR13436	KEY SWITCH
M1	VS10702	BRUSH MOTOR
M2	VF90520	VACUUM MOTOR
M4	VF90282	SOLENOID VALVE
M5	N/A	DETERGENT PUMP (**)
SW1	VS10202	BRUSHS/DRIVE MICRO SWITCH
SW2	VS10202	BRUSHS/DRIVE MICRO SWITCH
VR2	N/A	DETERGENT PUMP POTENTIOMETER (**)

WIRE ROD	
RD1	RED/6AWG
RD2	RED/10AWG
RD3	RED/16AWG
RD4	RED/20AWG
BK1	BLACK/6AWG
BK2	BLACK/10AWG
BK3	BLACK/12AWG
BK5	BLACK/20AWG
RD-BK	RED-BLACK/20AWG
BN1	BROWN/12AWG
BN3	BROWN/20AWG
BN-BK	BROWN-BLACK/20AWG
BU	BLUE/20AWG
BU-BK	BLUE-BLACK/20AWG
YE	YELLOW/20AWG
WH	WHITE/20AWG

(**)= For machines with Chemical Mixing System (Optional)

Wiring diagram (machine with drive)

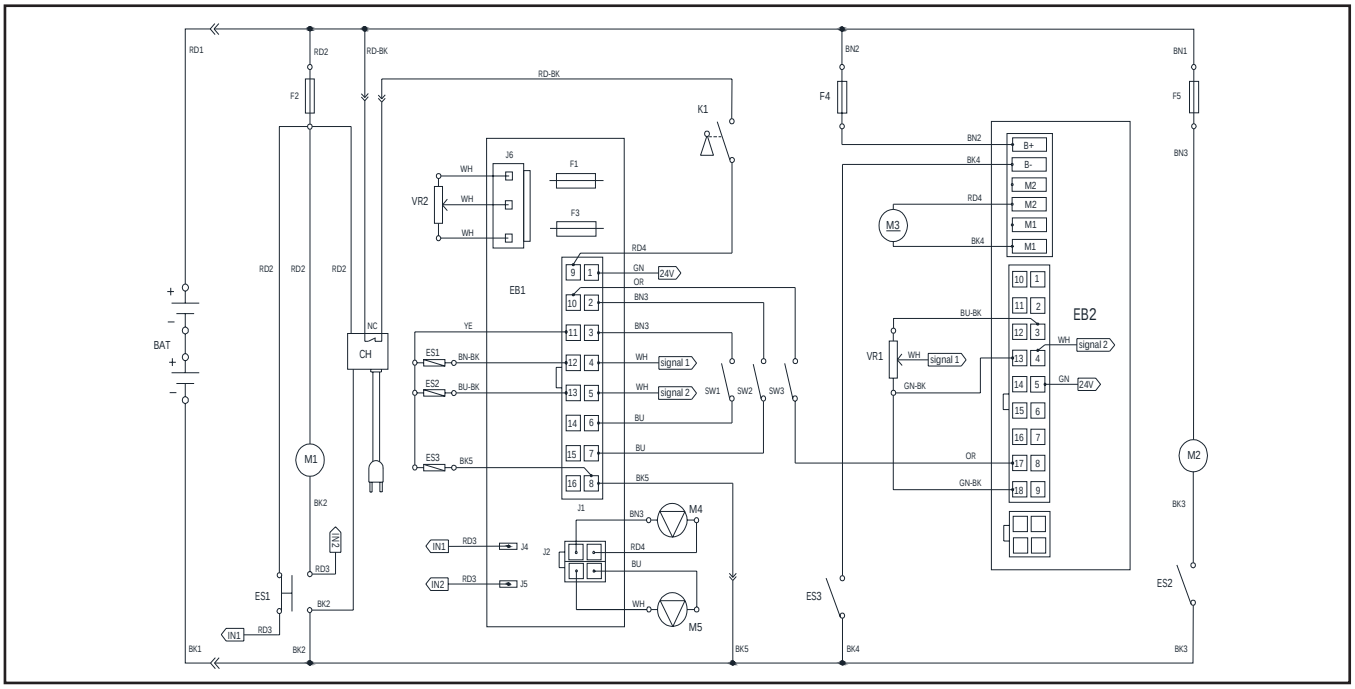


Figure 2

COMPONENTS		
Key	CODE	Description
BAT	N/A	24V BATTERIES
CH	VS10204	BATTERY CHARGER
EB1	VS13201	CONTROL PANEL BOARD
EB2	VS10209	DRIVE ELECTRONIC BOARD
ES1	9095127000	BRUSH MOTOR ELECTROM SWITCH
ES2	VS10201	VACUUM MOTOR ELECTROM SWITCH
ES3	VS10201	DRIVE SYSTEM ELECTROM SWITCH
F1	VS13208	LOW POWER CIRCUIT FUSE
F2	ZD48320	BRUSH MOTOR CIRCUIT BREAKER
F3	VS13209	BRUSH RELEASE FUSE
F4	VF99012	DRIVE SYSTEM CIRCUIT BREAKER
F5	ZD48320	VACUUM MOTOR CIRCUIT BREAKER
K1	VR13436	KEY SWITCH
M1	VS10702	BRUSH MOTOR
M2	VF90520	VACUUM MOTOR
M3	VS11702	DRIVE MOTOR
M4	VF90282	SOLENOID VALVE
M5	N/A	DETERGENT PUMP (**)
SW1	VS10202	BRUSHS/DRIVE MICRO SWITCH
SW2	VS10202	BRUSHS/DRIVE MICRO SWITCH
SW3	VS10202	REVERSING SWITCH
VR1	VS10213	SPEED POTENTIOMETER
VR2	N/A	DETERGENT PUMP POTENTIOMETER (**)

WIRE ROD	
RD1	RED/6AWG
RD2	RED/10AWG
RD3	RED/16AWG
RD4	RED/20AWG
BK1	BLACK/6AWG
BK2	BLACK/10AWG
BK3	BLACK/12AWG
BK4	BLACK/14AWG
BK5	BLACK/20AWG
RD-BK	RED-BLACK/20AWG
GN	GREEN/20AWG
GN-BK	GREEN-BLACK/20AWG
BN1	BROWN/12AWG
BN2	BROWN/14AWG
BN3	BROWN/20AWG
BN-BK	BROWN-BLACK/20AWG
BU	BLUE/20AWG
BU-BK	BLUE-BLACK/20AWG
OR	ORANGE/20AWG
YE	YELLOW/20AWG
WH	WHITE/20AWG

(**)= For machines with Chemical Mixing System (Optional)

Troubleshooting

Trouble	Possible causes	Remedy
The machine is not working	The batteries (BAT) are discharged or its connections are not efficient	Charge the batteries or clean/repair the connections
	Batteries faulty	Check the battery no-load voltage
	Battery charger faulty	Replace
	The fuses (F1, F2, F3) are open	Replace
	The wiring harness is cut or pressed or short circuited	Repair
	Control electronic board faulty	Replace
The three battery charge indicators flash simultaneously	Brush motor overloaded	Use less aggressive brushes
	Debris or wires/cords entangled in the brush hub, slowing its rotation	Remove the brush and remove any debris/wires/cords

Removal and Installation

Control panel and control electronic board disassembly/assembly (EB1)

Disassembly

1. Drain the recovery tank.
2. Turn the ignition key to “0” and remove it.
3. Make sure that the machine cannot move independently.
4. Turn the recovery tank sideways, then disconnect the battery connector.
5. Unscrew the screws (A) and carefully move the control panel (B).
6. Disconnect the electrical connections (C) from the control electronic board (D).
7. Unscrew the screws (E), then remove the control electronic board (D) from the control panel.
8. If necessary, disconnect the electrical connections (F) and remove the control panel.

Assembly

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

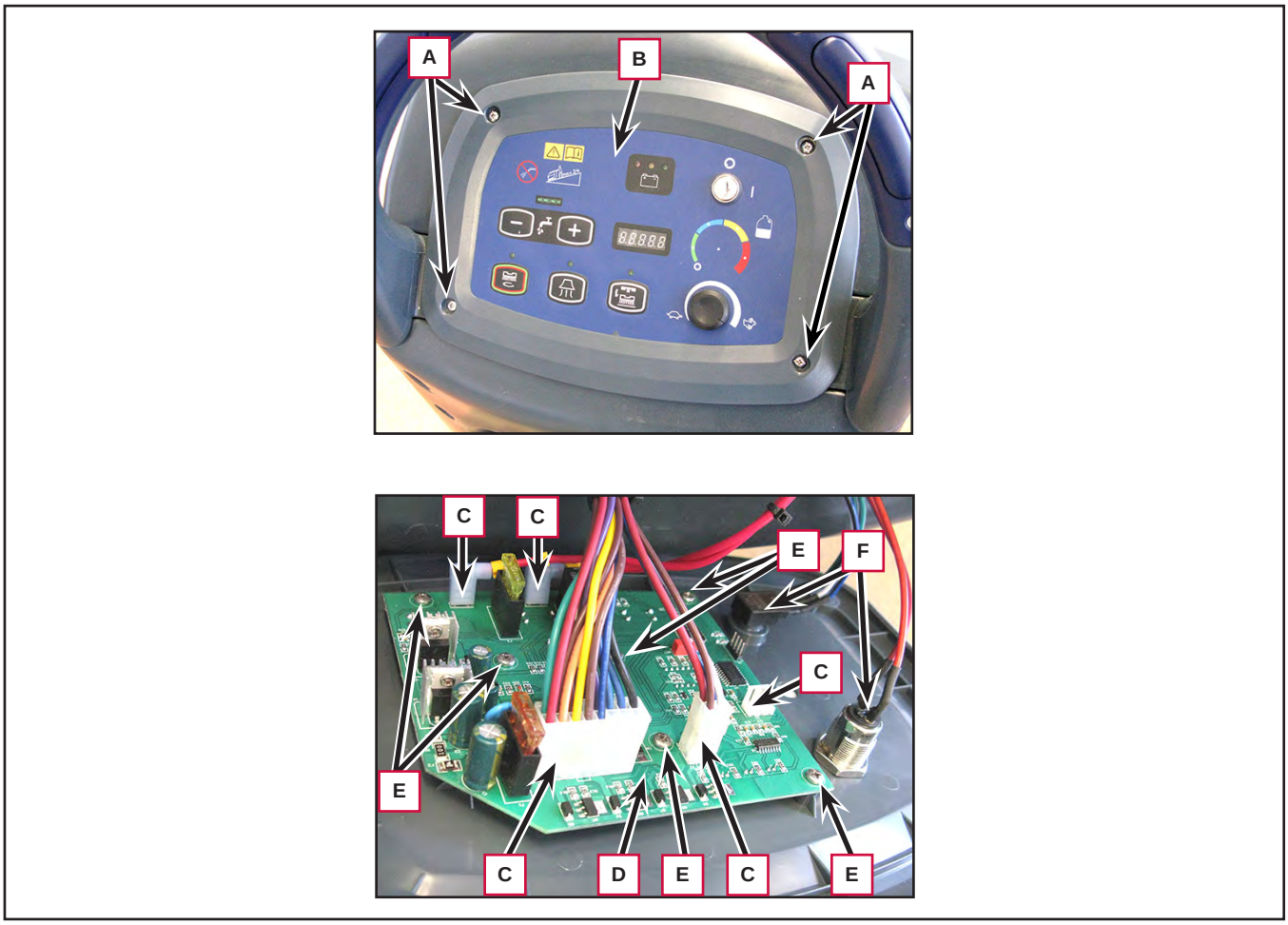


Figure 3

Handlebar and drive switches disassembly/assembly (ES3)

Disassembly

1. Drain the recovery tank.
2. Turn the ignition key to “0” and remove it.
3. Make sure that the machine cannot move independently.
4. Turn the recovery tank sideways, then disconnect the battery connector.
5. Unscrew the screws (A) and carefully move the control panel (B).
6. Unscrew the screws and detach the retaining clamps (C) from the wiring.
7. In zone (D), disconnect the electrical connections for the wiring (E), ensuring you note down the colors of the individual wires for reference during reassembly.
8. Loosen the screws inside the holes (F) (with a 6 mm hex socket wrench), then remove the handlebar (G) from its seat.
9. If necessary, proceed as follows to remove the drive switches (H).
   - Unscrew the screws (I) and detach the switch assembly.
   - Unscrew the inner screws (J) and remove the plate (K) and the springs (L).
   - Apply a feeler to the end (M) of the cable of the switch (H) concerned, then remove the switch with cable and leave the feeler in its place (to be used to reinsert the cable during reassembly).
10. If necessary, proceed as follows to remove the reverse switch (N).
    - Remove the switch (N) from its seat using a small blade screwdriver.
    - Apply a feeler to the end (P) of the cable of the switch (N), then remove the switch with cable and leave the feeler in its place (to be used to reinsert the cable during reassembly).

Assembly

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

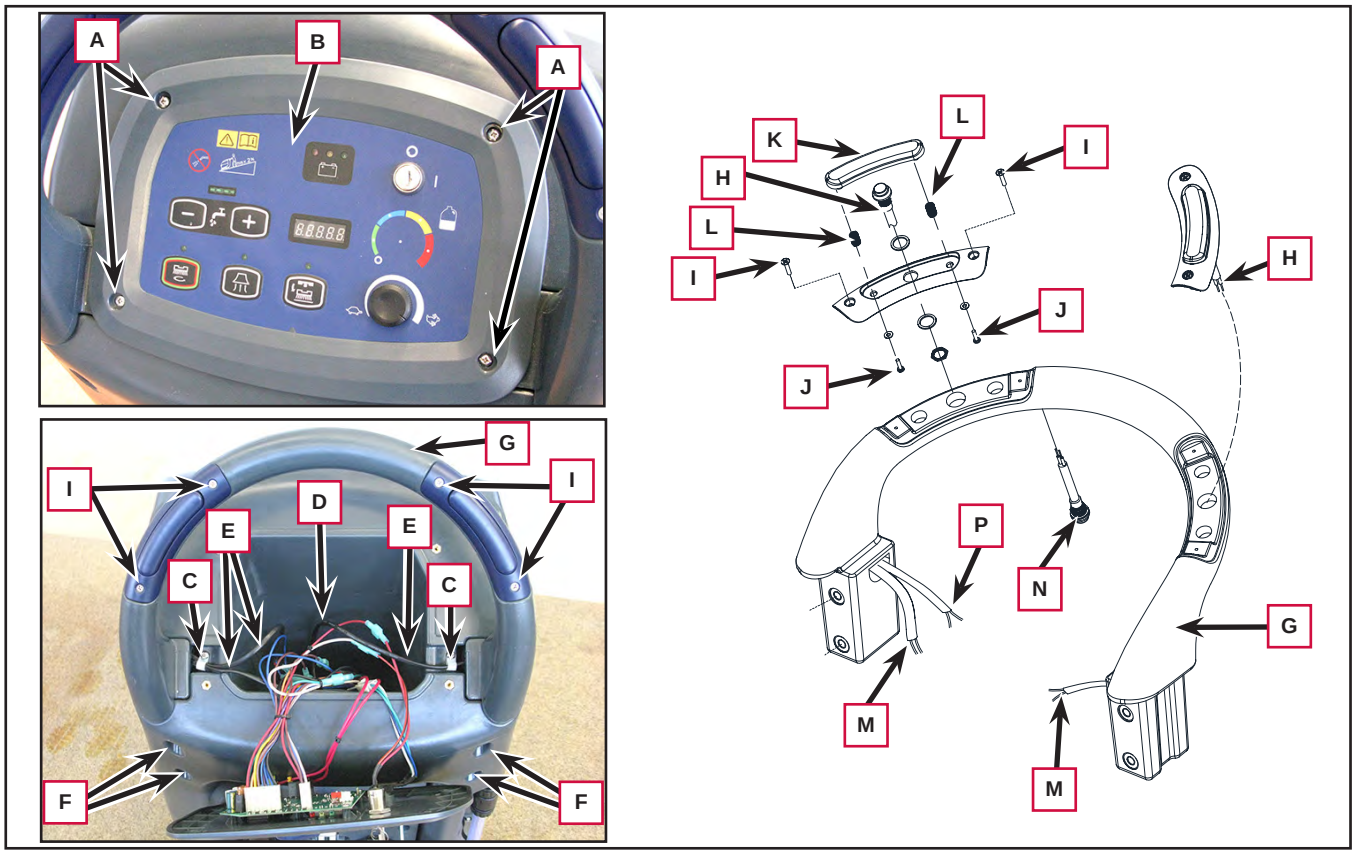


Figure 3

Rear panel disassembly/assembly

Disassembly

1. Drain the recovery tank.
2. Turn the ignition key to “0” and remove it.
3. Make sure that the machine cannot move independently.
4. Turn the recovery tank sideways, then disconnect the battery connector.
5. Lower the squeegee (A) with the lever (B).
6. Disconnect and lower the recovery water drain hose (C).
7. Unscrew and remove the caps (D) of the thermal fuses.
8. Lift the cover (E) and unscrew the electrical connection fastening screws (F).
9. Unscrew the screws (G), then move the rear panel (H).
10. Disconnect the electrical connection (I) from the rear panel (H), after rotating it 90°.
11. Remove the rear panel (H).

Assembly

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

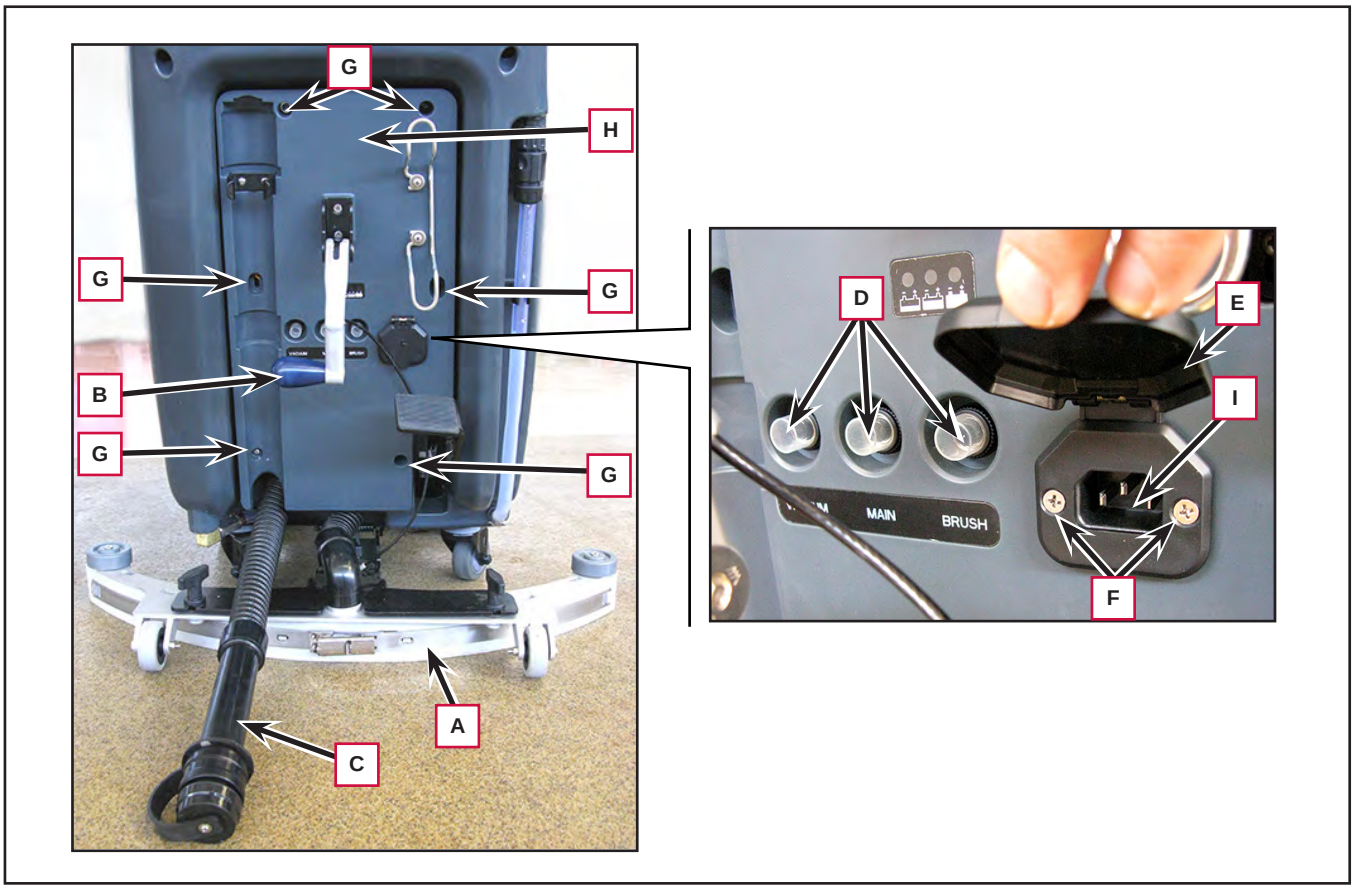


Figure 4

Drive system electronic board disassembly/assembly

Disassembly

1. Remove the rear panel (see the procedure in the relevant paragraph).
2. Disconnect the electrical connections (A) on the drive system electronic board (B), then move the wiring out of the way.
3. Unscrew the two screws (C) and remove the drive system electronic board (B).

Assembly

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

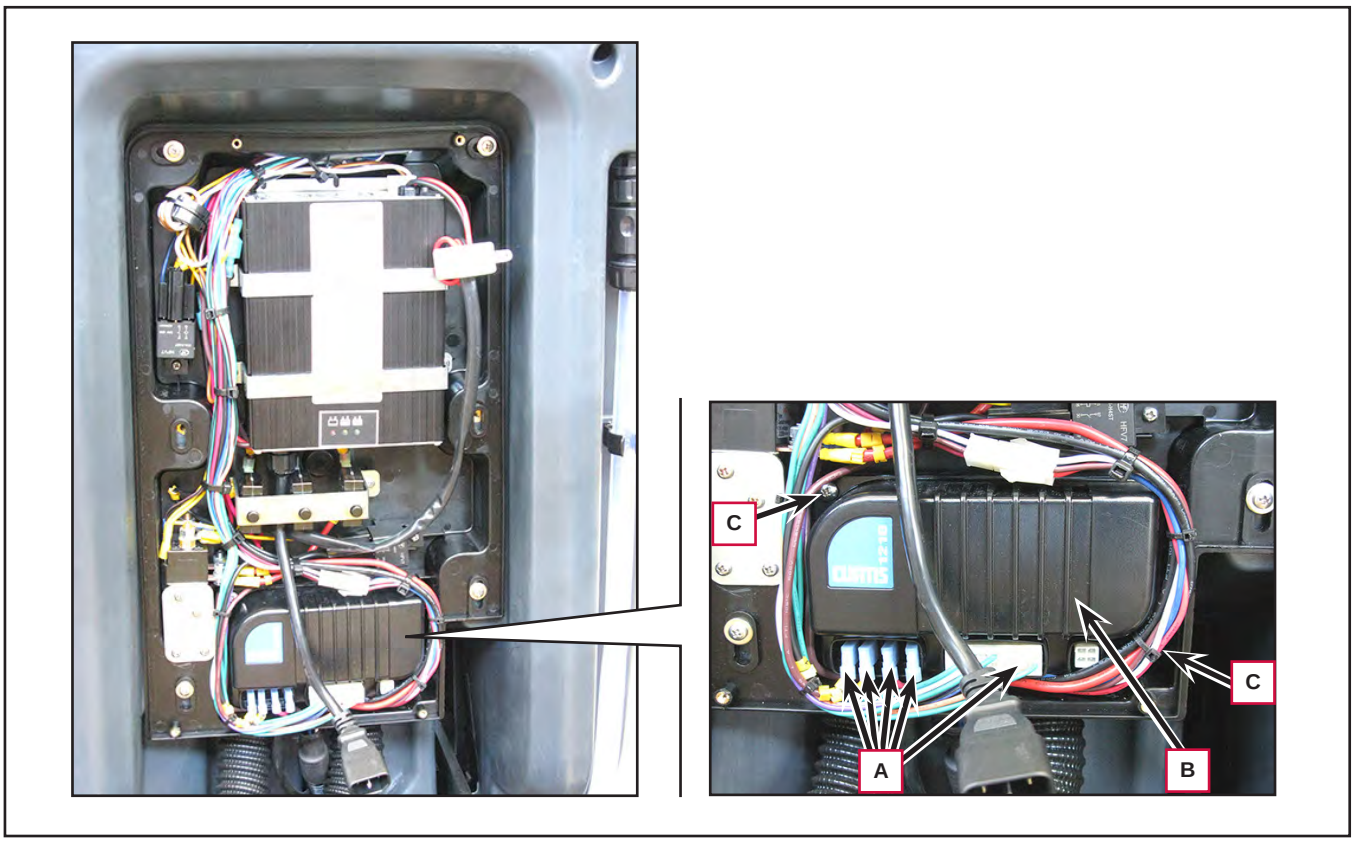


Figure 5

Battery charger disassembly/assembly

Disassembly

1. Drain the recovery tank.
2. Turn the ignition key to “0” and remove it.
3. Make sure that the machine cannot move independently.
4. Turn the recovery tank sideways, then disconnect the battery connector.
5. Disconnect the terminals of the right-hand battery (A), then remove it using suitable lifting equipment.
6. Unscrew the screws (B) and disconnect the battery connector (C).
7. Remove the rear panel (see the procedure in the relevant paragraph).
8. Unscrew the fastening screws (D) for the battery charger (E), then move it.
9. Disconnect the battery charger electrical connection (F).
10. Disengage the battery charger wiring (G) from its seat.
11. Disengage the battery charger wiring (H) from its seat.
12. Remove the battery charger (E).

Assembly

13. Assemble the components in the reverse order of disassembly, and note the following.
    - If a new battery charger is installed, it must be set for the type of batteries installed on the machine, WET or GEL/AGM, before use.

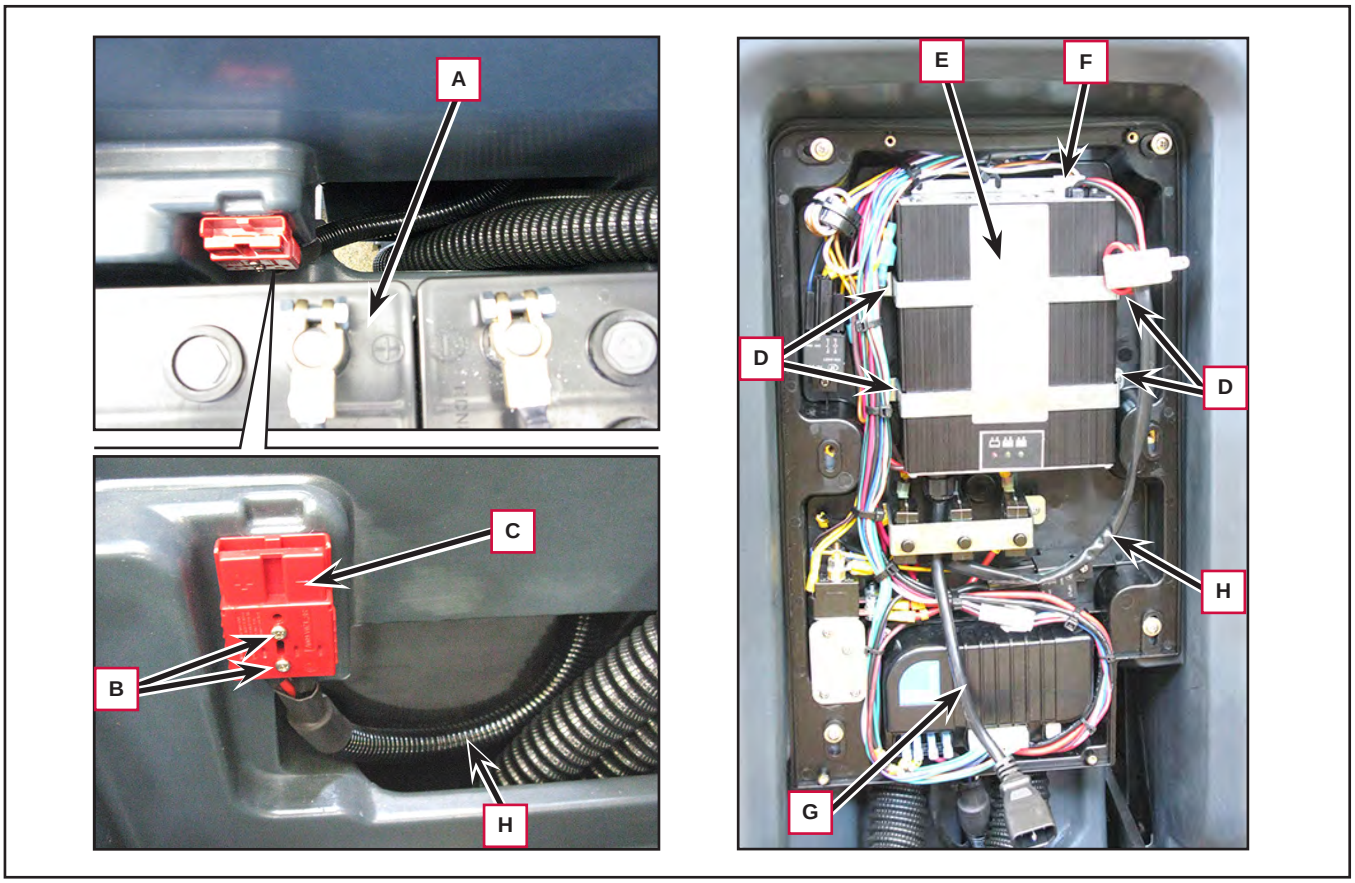


Figure 6

Checking/Replacing Fuses

Fuses on control panel (F1), (F3)

1. Drain the recovery tank.
2. Turn the ignition key to “0” and remove it.
3. Make sure that the machine cannot move independently.
4. Turn the recovery tank sideways, then disconnect the battery connector.
5. Unscrew the screws (A) and carefully move the control panel (B).
6. Check/replace the following fuses:
   - (C): fuse (F1), rated 5 A, for protection of the control electronic board
   - (D): fuse (F3), rated 20 A, for protection of the brush motor
7. Perform steps .4 and .5 in reverse order.

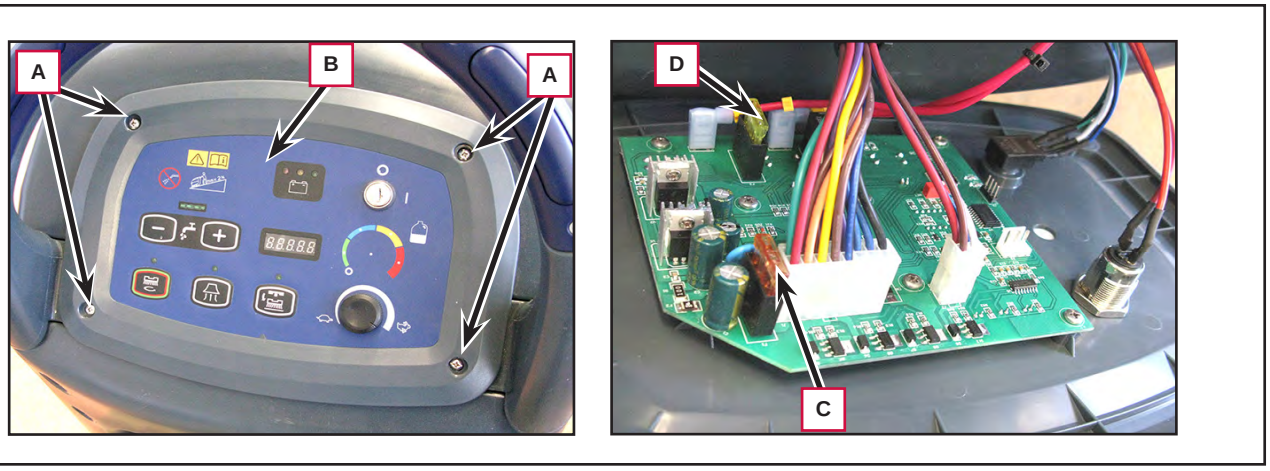


Figure 7

Fuses on control panel (F2), (F4), (F5)

1. Remove the rear panel (see the procedure in the relevant paragraph).
2. Remove the following thermal fuses (resettable):
   - (E): fuse (F5), rated 30 A, for protection of the vacuum motor
   - (F): fuse (F4), rated 12 A, for protection of the drive motor (*)
   - (G): fuse (F2), rated 30 A, for protection of the brush rotation motor

(*): Only on machines with drive system

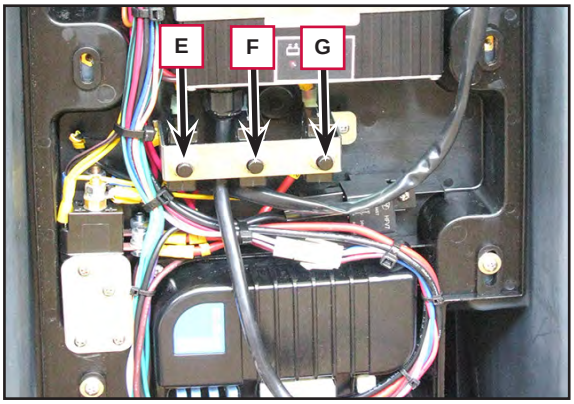


Figure 8

Recovery Water System

Troubleshooting

Trouble	Possible causes	Remedy
The vacuum system motor does not turn on	The switch is broken	Replace
	The vacuum system motor is faulty	Check the amperage.
	The fuse is blown	Replace.
The recovery water vacuuming is insufficient or there is no vacuuming	The recovery tank is full	Drain the recovery tank
	The vacuum hose is disconnected from the squeegee	Connect.
	The vacuum grid is dirty or the float is blocked	Clean the grid/reactivate the float
	The tank cover is not correctly positioned	Adjust
	The tank cover gasket is not in good condition	Clean/replace
	The vacuum gaskets are damaged or do not match perfectly	Repair or replace
	The squeegee vacuum hose is broken	Replace
	The vacuum tank is broken	Repair/replace

Removal and Installation

Vacuum System Amperage Check

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

1. Drain the recovery tank.
2. Make sure that the machine cannot move independently.
3. Turn the recovery tank (A) sideways.
4. Apply the amp clamp on the cable from the positive pole of the batteries (B).
5. Turn on the machine with the ignition key.
6. Turn on the vacuum system and check that the motor power draw is around 16 A at 24V.
   - Stop the vacuum system.
   - Turn the ignition key to “0”.
   - Remove the amp clamp.

   If the amperage is higher, perform the following procedures to detect and correct the abnormal amperage:
   - Check that the relevant fuse (F5) is properly fastened.
   - Check there is no debris or dirt inside the vacuum hose.
   - If necessary, disassemble the motor (see procedure in the relevant paragraph), and check the condition of all its components.

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

Reassembly

7. Perform step 3 in reverse order.

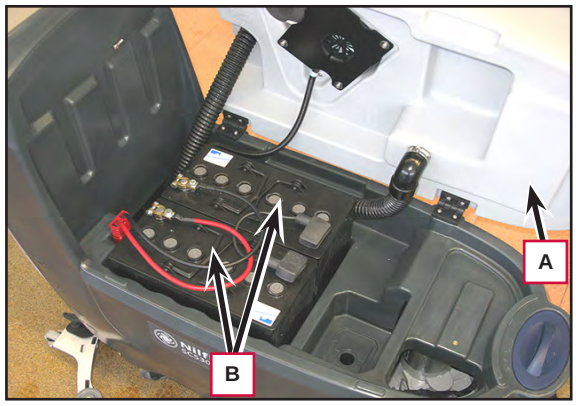


Figure 1

Vacuum System Motor disassembly/assembly (M2)

Disassembly

1. Drain the recovery tank.
2. Turn the ignition key to “0” and remove it.
3. Make sure that the machine cannot move independently.
4. Turn the recovery tank sideways, then disconnect the battery connector.
5. Working from the bottom of the recovery tank, unscrew the screws (A) and remove the vacuum motor retention plate (B).
6. Remove the vacuum motor (C) with the shock absorbing ring (D) and shock absorber casings (E) and (F).
7. Disconnect the vacuum motor electrical connection (G).
8. Extract the vacuum motor (C), and if necessary separate it from parts (D), (E) and (F).

Assembly

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

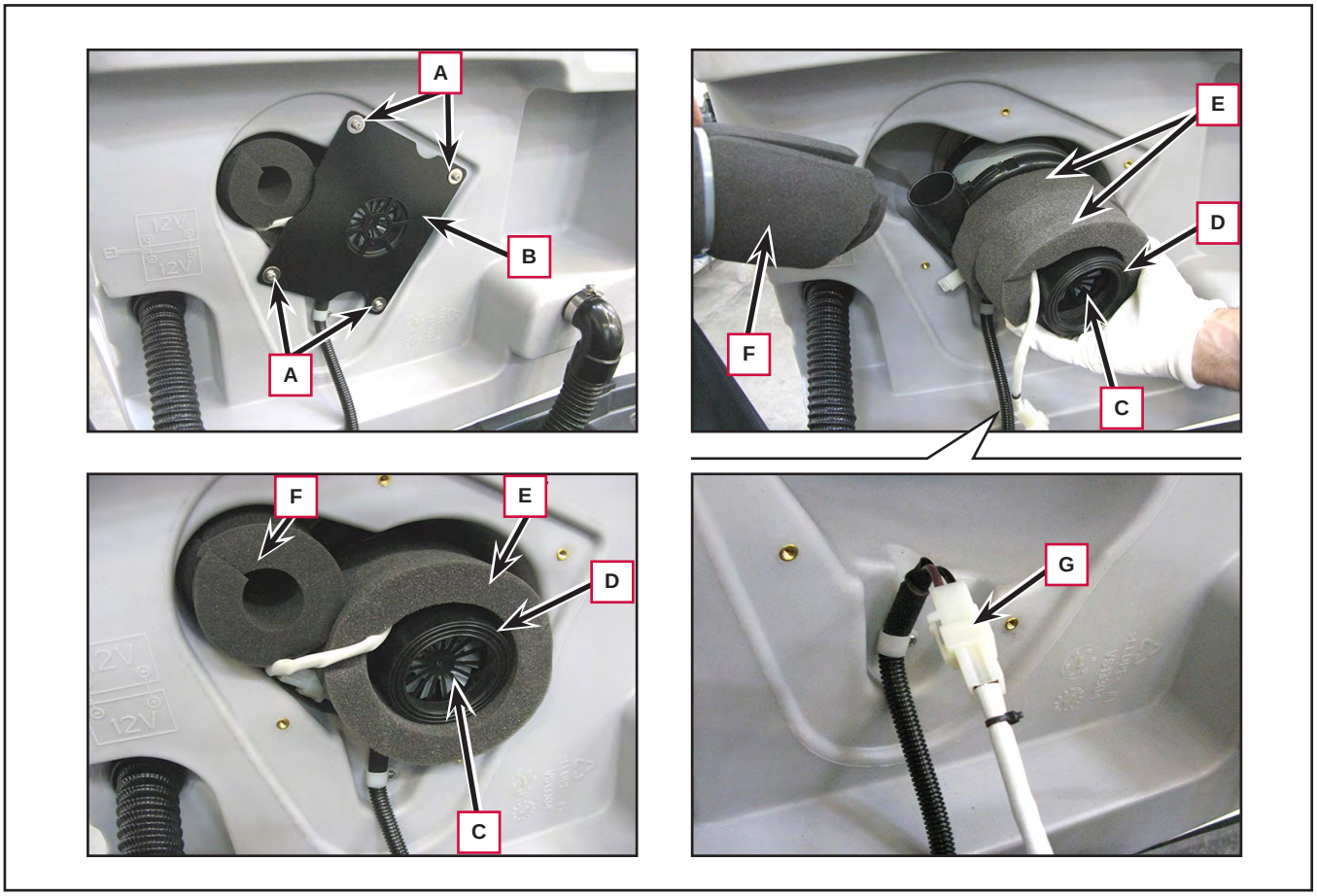


Figure 2

Brushing System

Troubleshooting

Trouble	Possible causes	Remedy
The brush does not clean properly	The brush is excessively worn	Replace
One brush does not turn	The batteries are discharged.	Charge them
	The motor carbon brushes are worn	Replace
	The motor is faulty	Check the motor amperage/replace the motor
	There are ropes or debris restraining the brush rotation	Remove and clean
	The brush motor thermal fuse has blown	Reset it
	The motor electromagnetic switch is damaged	Replace
	The wiring harness is damaged	Repair

Removal and Installation

Brush Motor Amperage Check

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

1. Drain the recovery tank.
2. Remove the brush.
3. Make sure that the machine cannot move independently.
4. Turn the recovery tank (A) sideways.
5. Apply the amp clamp on the cable from the positive pole of the batteries (B).
6. Turn on the machine with the ignition key.
7. Start brush rotation and check that the motor power draw is around 3 A at 24V.
   - Stop brush rotation.
   - Turn the ignition key to “0”.
   - Remove the amp clamp.

   If the amperage is higher, perform the following procedures to detect and correct the abnormal amperage:
   - Check that the relevant fuse (F2) (F3) is properly fastened.
   - Check that there is no dirt, debris or entangled cords on the brush hub.
   - If necessary, disassemble the motor (see procedure in the relevant paragraph), and check the condition of all its components.

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

Reassembly

8. Perform steps 2 and 4 in reverse order.

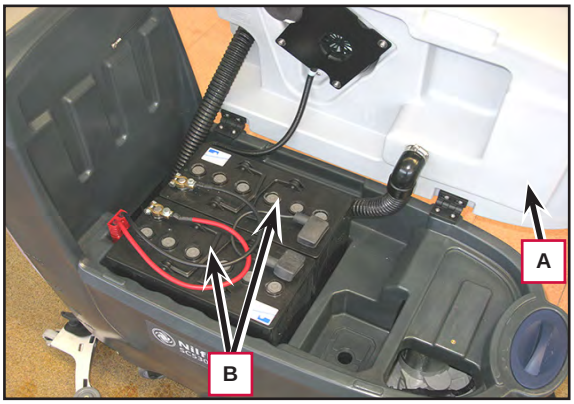


Figure 1

Brush Deck Disassembly/Assembly

Disassembly

1. Drain the recovery tank.
2. Drain the clean water tank.
3. Remove the brush.
4. Remove the squeegee.
5. Remove the machine's batteries.
6. Position a flattened cardboard box the same size as the machine's side. With the assistance of a second person, turn the machine over sideways and rest its right-hand side on the box positioned on the floor.
7. Remove the screws (A) and remove the splash guard (B).
8. Loosen the clamp (C) and disconnect the water hose (D) from the brush deck.

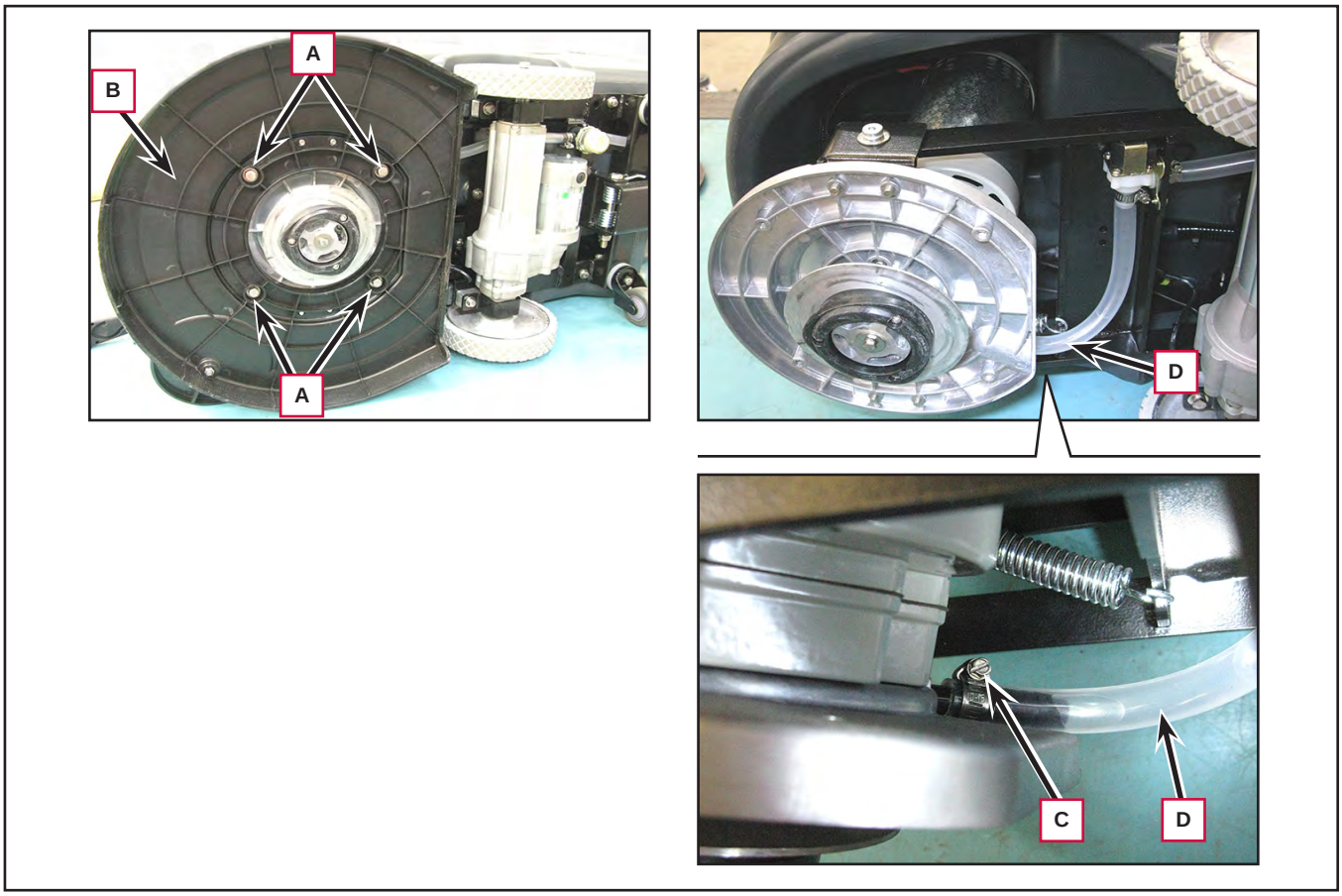


Figure 2

Brush Deck Disassembly/Assembly (Continues)

9. Mark the position of the nut (E) with respect to the threaded tie rod (F) of the spring (G) (position to be used during reassembly).
10. Unscrew the nut (E), then disconnect the tie rod (F) from the support (S).
11. Unscrew the left-hand retaining screw (H) with self-locking nut (I) of the brush deck.
12. Unscrew the right-hand retaining screws (M) with self-locking nut (N) of the brush deck.
13. Retain the flat washers (J), the spring washers (K) and the bearing bushes (L).
14. Move the brush deck (P) from its seat.
15. Cut and remove the heat-shrink tubing (Q), then disconnect the electrical connection below for the brush motor (R).

Assembly

16. Assemble the components in the reverse order of disassembly, and note the following.
    - If, during reassembly, it is not possible to identify the position of the nut (E) with respect to the threaded tie rod (F), or the spring must in any case be adjusted, proceed as follows:
    - Tension the spring using the nut (E) until the brush deck (P) is parallel to the floor, looking at it from the front.
    - Also check that the deck moves smoothly by operating the lifting/lowering pedal; if necessary, slightly adjust the tension of the spring using the nut (E), ensuring that the brush deck (P) remains parallel to the floor.

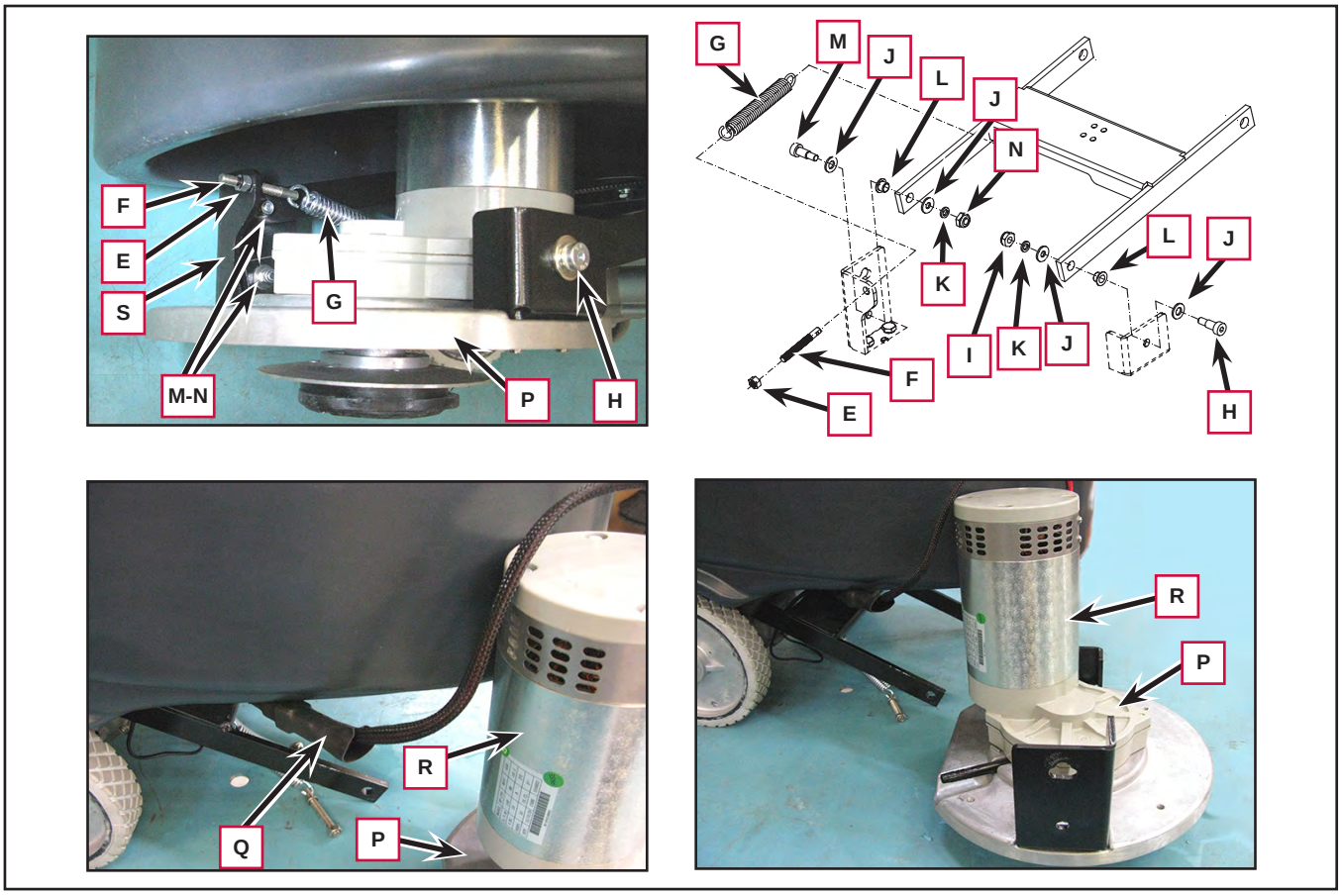


Figure 3

Brush Motor Carbon Brushes Disassembly/Assembly

Disassembly

1. Remove the brush deck (see procedure in the relevant paragraph); it is not necessary to disconnect the brush motor electrical connection.
2. Unscrew the screws (A) and remove the brush motor (C) protection strip (B).
3. For each of the motor's four carbon brushes, disengage the spring (D) and remove the carbon brush (E) from its seat, then detach the carbon brush by disengaging its electrical connection (F).
4. Check the condition of the four carbon brushes (E). Replace the carbon brushes when the contact with the motor armature is insufficient or if the carbon brush contact surface is not intact due to wear, or if the thrust spring is broken, etc. If the residual length of the carbon brushes is minimal, they must be replaced in any case.
   Replace all motor carbon brushes at the same time.
5. Assemble the components in the reverse order of disassembly.

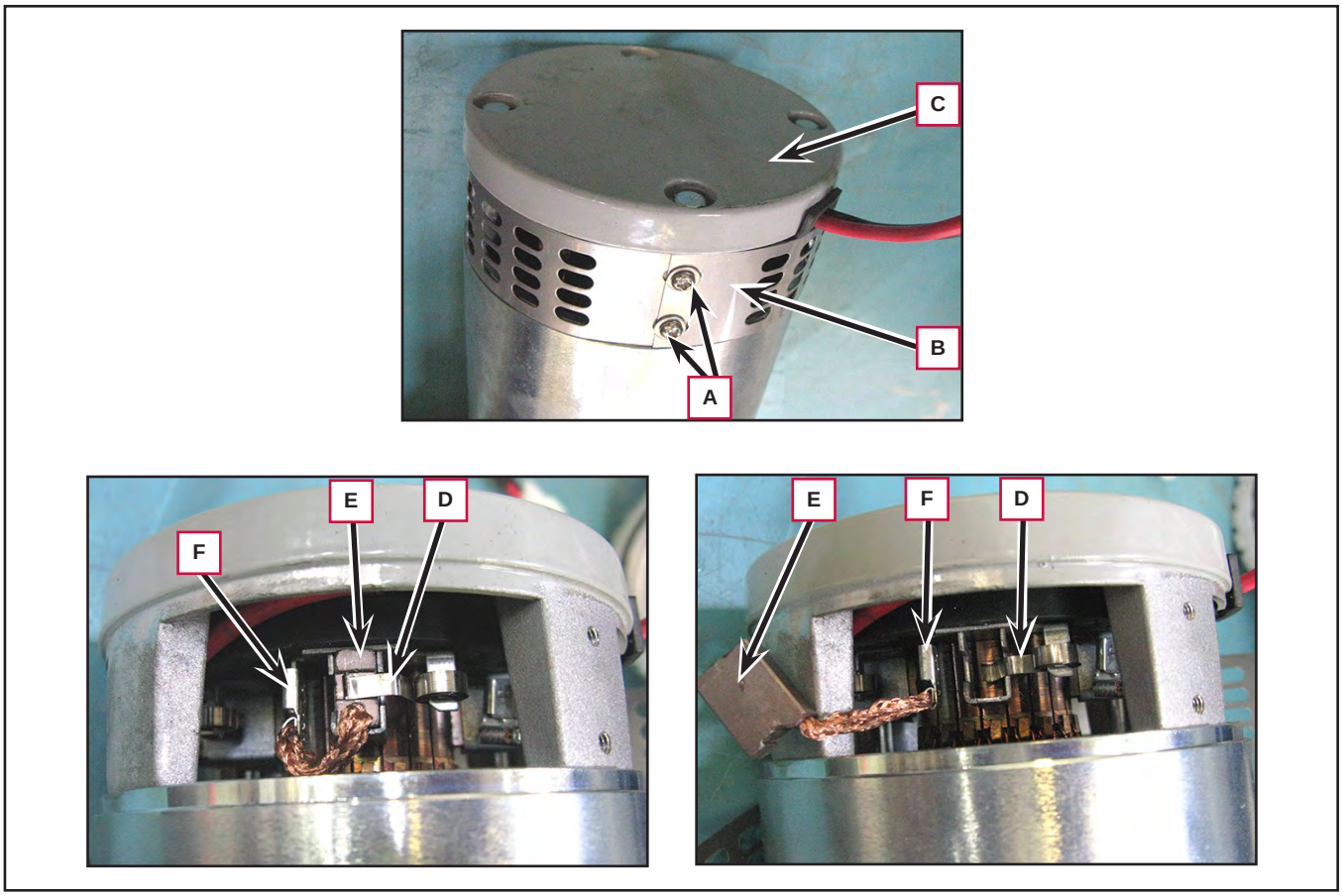


Figure 4

Brush Motor Disassembly/Assembly (M1)

Disassembly

1. Remove the brush deck (see procedure in the relevant paragraph).
2. Unscrew the screw (A) and remove the brush hub (B), along with the flange.
3. Remove the brush motor (D) fastening screws (C).
4. Remove the brush motor (D) from the brush deck (E).

Assembly

5. Assemble the components in the reverse order of disassembly, and note the following.
   - Position the brush motor (D) in the position shown in the figure with respect to the brush deck (E).

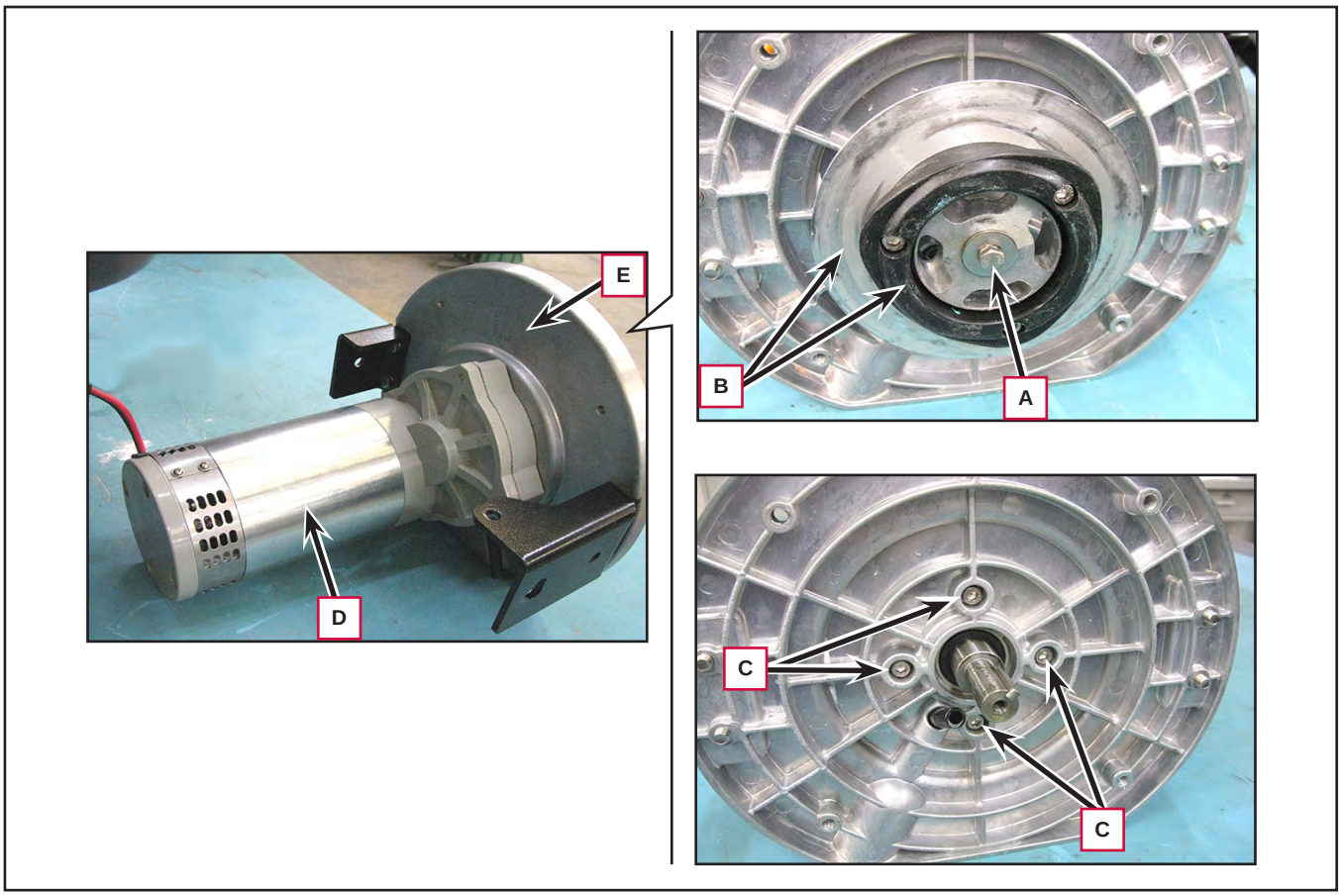


Figure 5

Solution Supply System

Troubleshooting

Trouble	Possible causes	Remedy
Small amount of solution or no solution reaches the brush	The solution filter is clogged/dirty	Clean
	Solenoid valve faulty or electrical connection broken	Replace the solenoid valve or repair the electrical connection
	There is dust/debris in the tank or in the detergent hoses, obstructing the solution flow	Clean the tank/hoses
The solution reaches the brush also when the machine is off	There is dirt or calcium deposit on the solenoid valve gaskets (EV1)	Replace the solenoid valve
	The solenoid valve is faulty	Replace the solenoid valve

Removal and Installation

Solenoid Valve Disassembly/Assembly (M4)

Disassembly

1. Remove the wheels assembly with drive system motor (see the procedure in the relevant paragraph).
2. Loosen the clamps (A) and disconnect the hoses (B) from the solenoid valve (C).
3. Unscrew the screws (D) and move the solenoid valve (C).
4. Cut the wiring retaining clamp (E).
5. Cut the heat-shrink tubing (F) then disconnect the electrical connections (G) on the solenoid valve (C).
6. Remove the solenoid valve (C).

Assembly

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

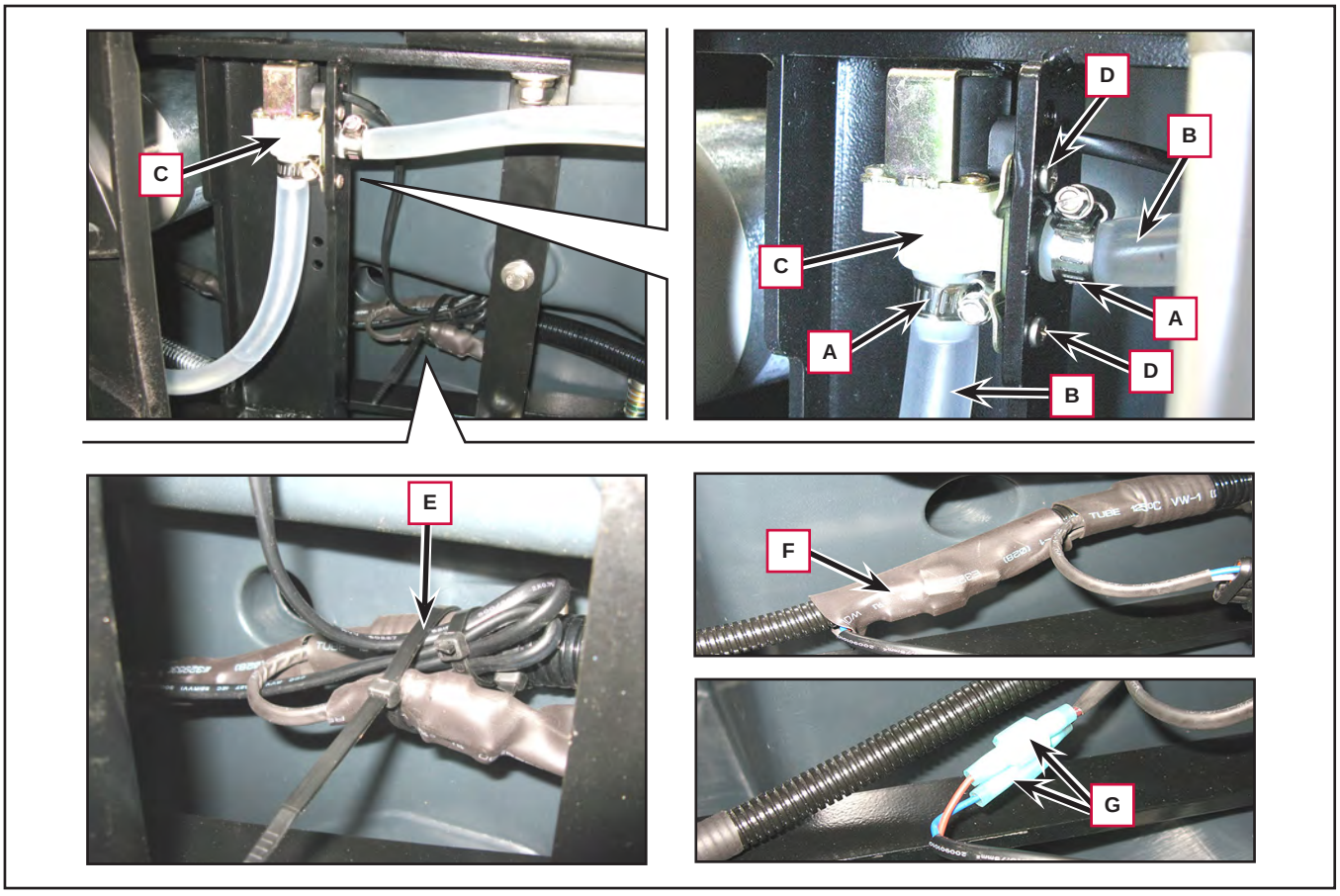


Figure 1

Squeegee System

Functional Description

The squeegee suction hose draws air/water from the squeegee assembly. The squeegee consists of two squeegee blades: a forward, notched blade, and a rear scraping blade. The notched blade permits water to pass into the space between the two blades, where it is drawn into the suction hose.

Troubleshooting

Trouble	Possible causes	Remedy
The recovery water vacuuming is insufficient or there is no vacuuming	The squeegee or the vacuum hose is clogged or damaged	Clean or repair/replace
The squeegee leaves water marks on the floor	There is debris under the blade	Remove
	The squeegee blade edges are torn or worn	Replace
	The squeegee springs are not efficient	Replace
	The squeegee is not correctly adjusted	Adjust it

Maintenance and Adjustment

Squeegee Blade Changing

The two squeegee blades periodically need to be changed as they wear. The blades may be flipped or reversed to a fresh edge up to 3 times before replacement is required. During replacement, it is important for the blades to be installed flat without waves, and then also adjusted to rest flat against the floor.

1. Remove the squeegee suction hose (C) from the squeegee assembly (A).
2. Loosen the two thumbscrews (B) and slide the squeegee assembly out of the mounting slots, and remove the squeegee.

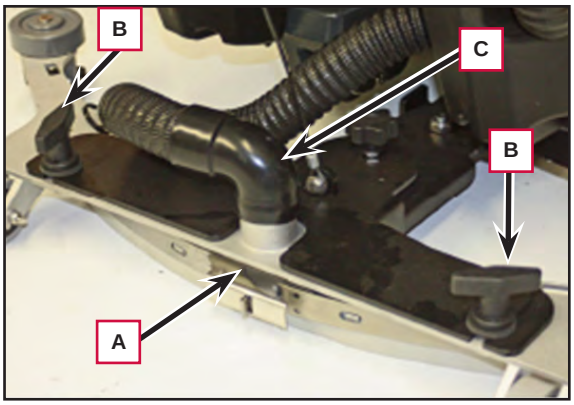


Figure 1

3. Pull out on the latch (D) to release the tension on the retaining strap.
4. Separate the retaining hooks (E) from the two halves of the retaining strap.
5. Slide each retaining strap (G) toward the outside, and lift them off the edge retaining hooks (H).
6. Remove the backing pad (F), and retain it for placement after rotating or replacing the squeegee blade.
7. Remove the squeegee blade from the squeegee frame.
   - The squeegee can be rotated and/or flipped 3 times to expose a new edge (4 edges total) to the lower front. If all 4 edges are worn, replace the squeegee blade with a new one.
8. Lay the squeegee blade (H) over the frame (K), and make sure the tabs and slots (J) are aligned.
9. Replace the strap (G) and make sure the backing pad (F) is positioned at the seam between the straps.
10. Before tightening the latch, make sure the blade is straight without waves.

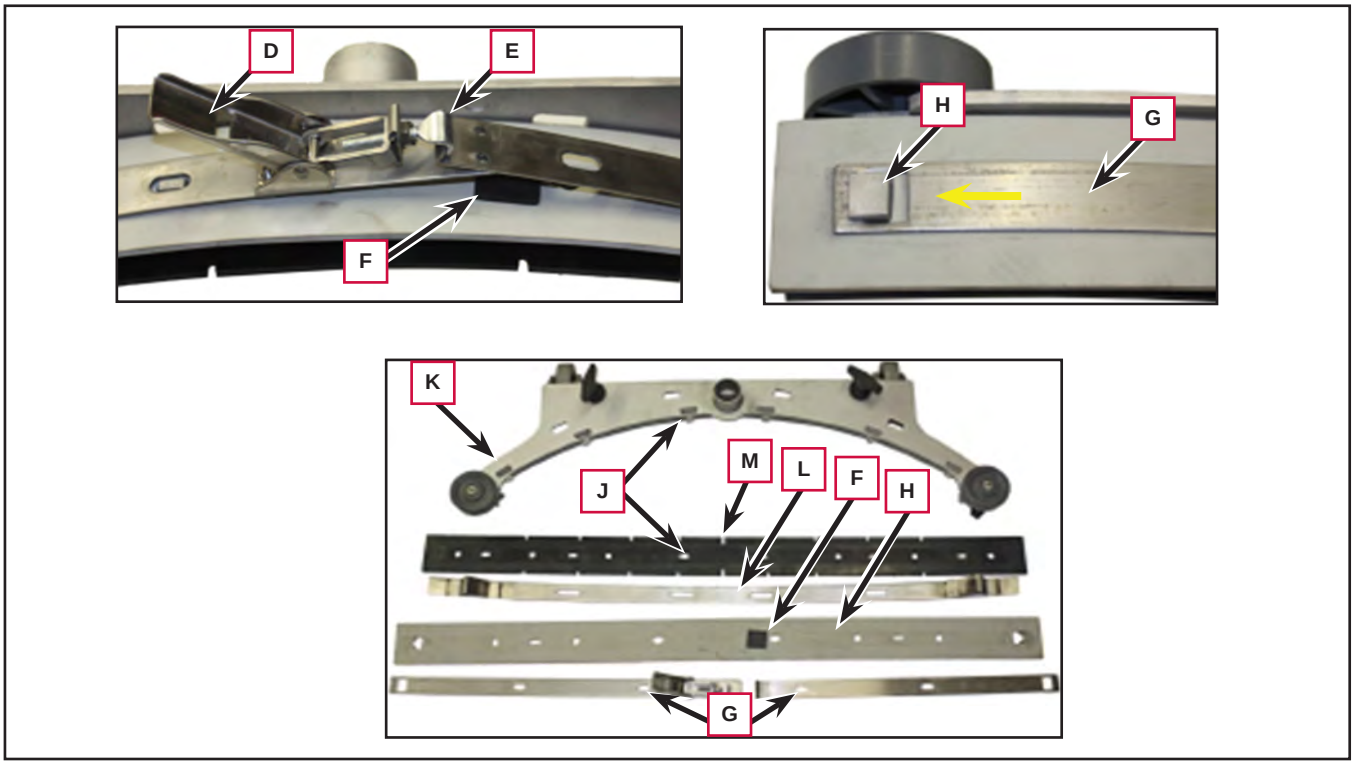


Figure 2

11. Loosen the clamping thumbscrew (P) on the rear strap (L), and remove the strap from the frame.

12. Remove the rear squeegee blade.
    – The squeegee can be rotated and/or flipped 3 times to expose a new edge (4 edges total) to the lower front. If all 4 edges are worn, replace the squeegee blade with a new one.

13. Lay the squeegee blade (M) over the frame (H), and make sure the tabs and slots (J) are aligned.

14. Replace the strap (L) and retighten the clamping thumbscrew until the strap is tight against the frame.

15. Rest the squeegee assembly flat on the floor and examine the edge of each blade (front/rear) to make sure it is flat without any waves (N).
    – Make this examination with the squeegee assembly still removed from the machine. There should be no unnecessary downward force on the squeegee blades.
    – If there are waves, loosen the strap and straighten the blade.

16. Examine both front and rear squeegee blades to make sure they are the same height, and that both blades rest flat on the floor when the squeegee frame is sitting level.
    – Because the squeegee is curved, it is important that the blades be level with the frame, and then the frame will be adjusted level to the floor in the next procedure.

17. Reinstall the squeegee assembly to the machine.

18. Perform the Squeegee Trim AdjustmentSqueegee Trim Adjustment described on page 37 Instruction for Use.

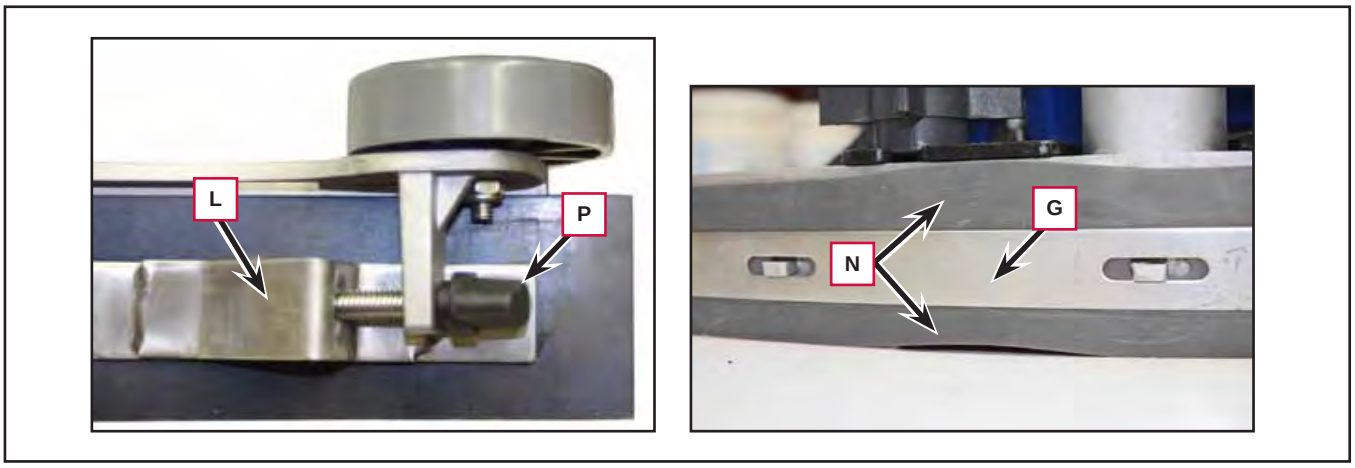


Figure 3

Squeegee Trim Adjustment

The squeegee trim adjustment ensures that the squeegee frame is level with the floor when the squeegee is in the lowered, operating position. If the trim is out of adjustment, the squeegee can leave streaks of water at either the center or the edges of the squeegee.

1. If this procedure is not being performed as a follow-up to replacing the squeegee blade(s), then make the blade examinations.
2. With the machine parked on a level surface, lower the squeegee to the floor.
3. Examine the contact area between the squeegee blades and the floor. The squeegee blades should be in even contact with the floor.
   – A small bubble level (B) may be used to set the frame of the squeegee to be level with the floor.
4. If the squeegee is tilted up, there will be a gap at the center, and the level's bubble will be toward the rear of the machine.
   – Turn the adjustment knob (A) counterclockwise.
5. If the squeegee is tilted down, there will be a gap at the outsides of the squeegee, and the level's bubble will be toward the front of the machine.
   – Turn the adjustment knob (A) clockwise.

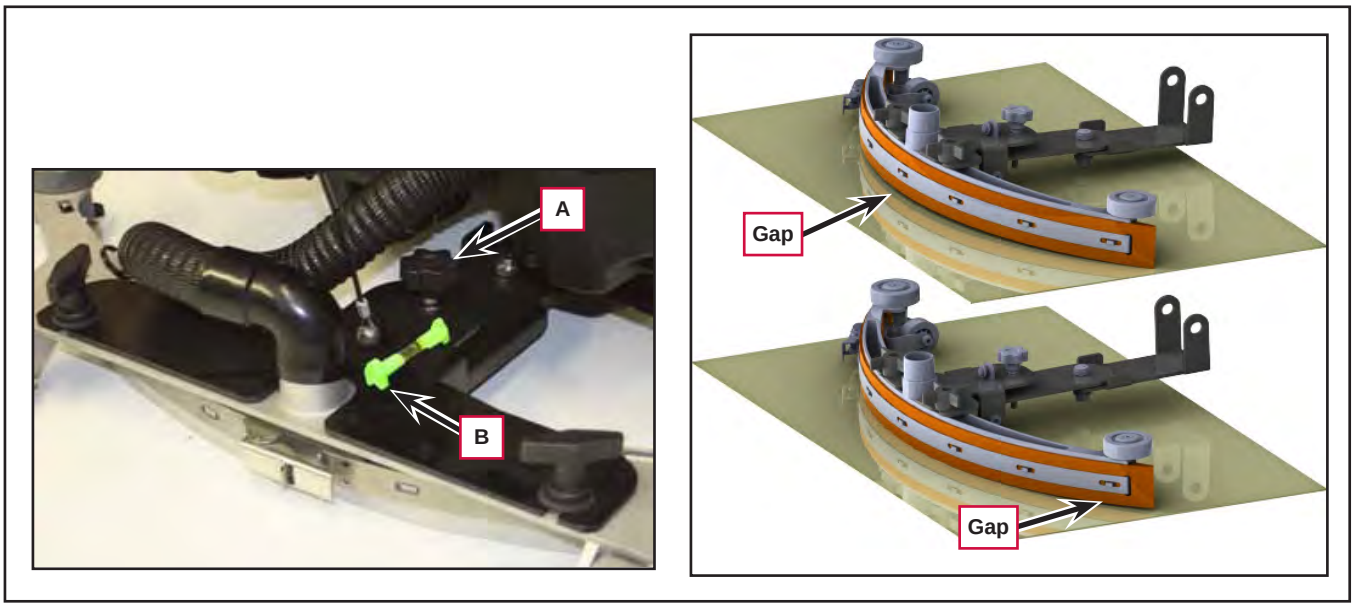


Figure 4

Removal and Installation

Squeegee spring disassembly/assembly

Disassembly

1. Drain the recovery tank.
2. Drain the clean water tank.
3. Remove the brush.
4. Remove the squeegee.
5. Remove the machine's batteries.
6. Position a flattened cardboard box the same size as the machine's side. With the assistance of a second person, turn the machine over sideways and rest its right-hand side on the box positioned on the floor.
7. Remove the screw with the nut (A) and free the squeegee lifting tie rod (B).
8. Rotate the frame (C) and release the spring tension (D).
9. Unscrew the self-locking nut (E) and remove the screw (F), then remove the spring (D) on the squeegee.

Assembly

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

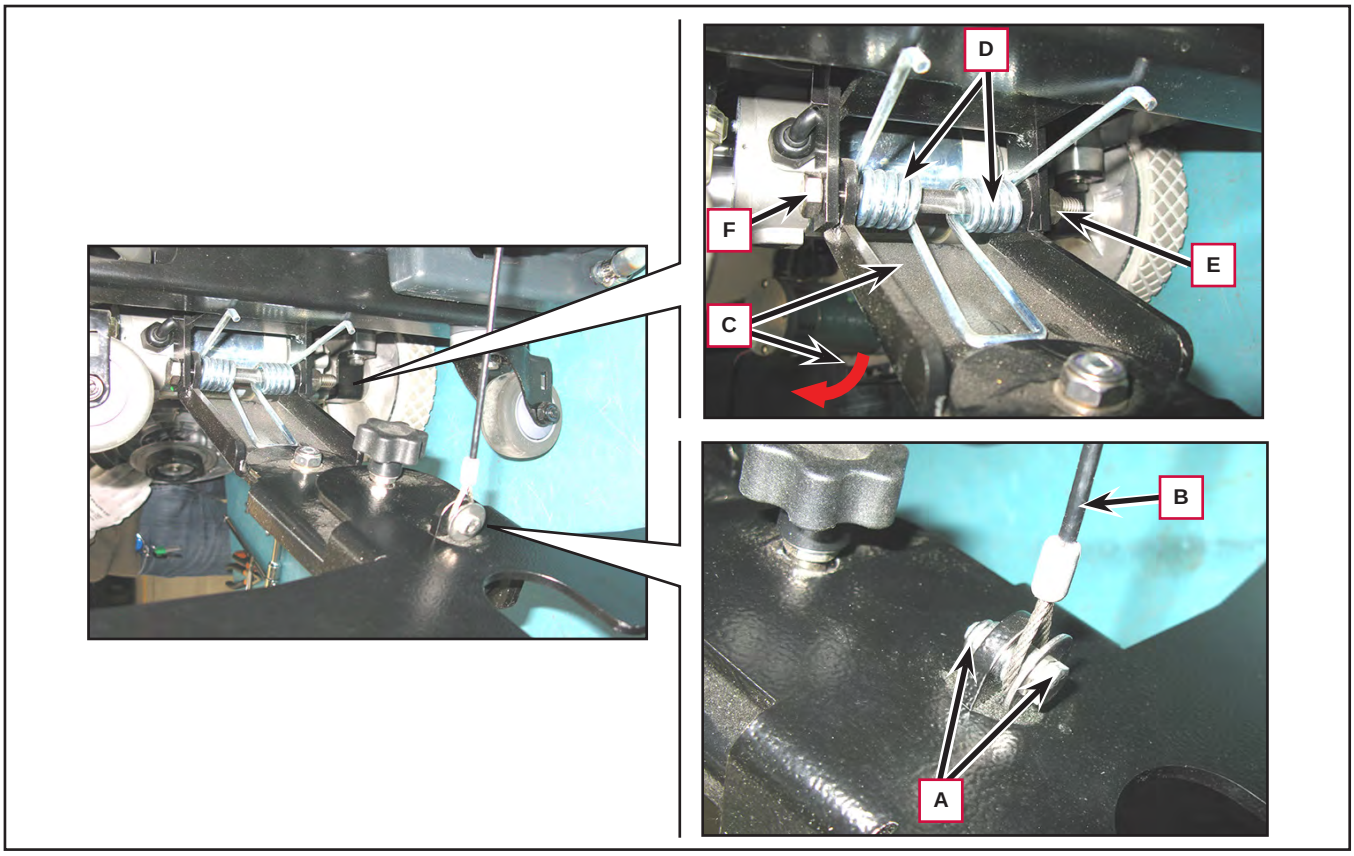


Figure 5

Drive System

Troubleshooting

Trouble	Possible causes	Remedy
The machine does not move	Thermal fuse blown/broken	Reset/Replace
	The machine has been started using the ignition key, keeping one of the switches pressed.	Turn the ignition key to “0”, then restart the machine without pressing the switches.
Drive is weak or non-existent	Cord entangled in wheel hubs	Remove
	The motor is faulty	Check the motor amperage/replace the motor
	Drive system electronic board faulty	Replace

Removal and Installation

Drive System Motor Amperage Check

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

1. Drain the recovery tank.
2. Drain the clean water tank.
3. Drive onto a smooth, flat floor.
4. Lift the squeegee.
5. Lift the brush.
6. Turn the recovery tank (A) sideways.
7. Apply the amp clamp on the cable from the positive pole of the batteries (B).
8. Turn on the machine with the ignition key.
9. Taking great care and ensuring safety conditions allow, drive the machine at minimum speed and check that the motor power draw is around 2.5 A at 24 V. Then drive the machine at the maximum possible speed and check that the motor power draw is around 15 A at 24 V. Repeat the test driving at least two different directions across the floor to compensate for any unevenness.
   - Stop the machine.
   - Turn the ignition key to “0”.
   - Remove the amp clamp.
     If the amperage is higher, perform the following procedures to detect and correct the abnormal amperage:
   - Check that the relevant fuse (F4) is properly fastened.
   - Check that there is no dirt, debris or entangled cords on the drive wheel hubs and the rear steering wheels.
   - If necessary, disassemble the drive system motor (see the procedure in the relevant paragraph), and check the condition of all its components.
     If the above-mentioned procedures do not produce the correct readings for the drive system motor power draw, the motor must be replaced (see the procedure in the relevant paragraph).

Reassembly

10. Perform step 6 in reverse order.

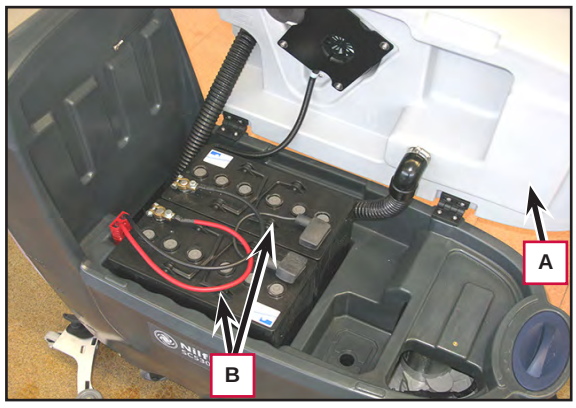


Figure 1

Wheels Assembly with Drive System Motor disassembly/assembly (M3)

Disassembly

1. Drain the recovery tank.
2. Drain the clean water tank.
3. Remove the brush.
4. Remove the squeegee.
5. Remove the machine's batteries.
6. Remove the rear panel (see the procedure in the relevant paragraph).
7. Disconnect the electrical connections (B) of the drive motor wiring from the drive system electronic board (A).

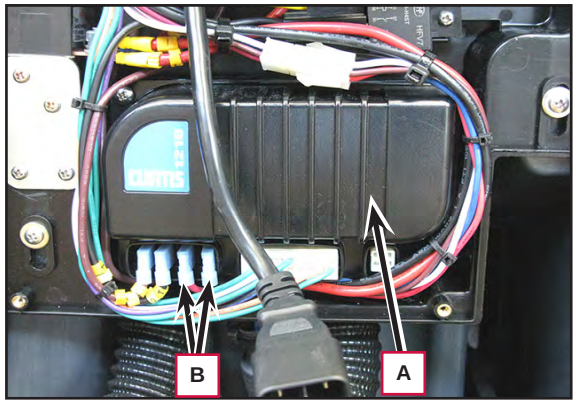


Figure 2

Wheels Assembly with Drive System Motor disassembly/assembly (M3) (Continues)

8. Position a flattened cardboard box the same size as the machine's side. With the assistance of a second person, turn the machine over sideways and rest its right-hand side on the box positioned on the floor.
9. Remove the wheels assembly with drive motor (D) fastening screws (C).
10. Move the wheels assembly with drive motor (D).
11. Cut the retaining clamp (E) on the wheel assembly with drive motor (D) wiring.
12. Remove the wheels assembly with drive motor (D).

Assembly

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

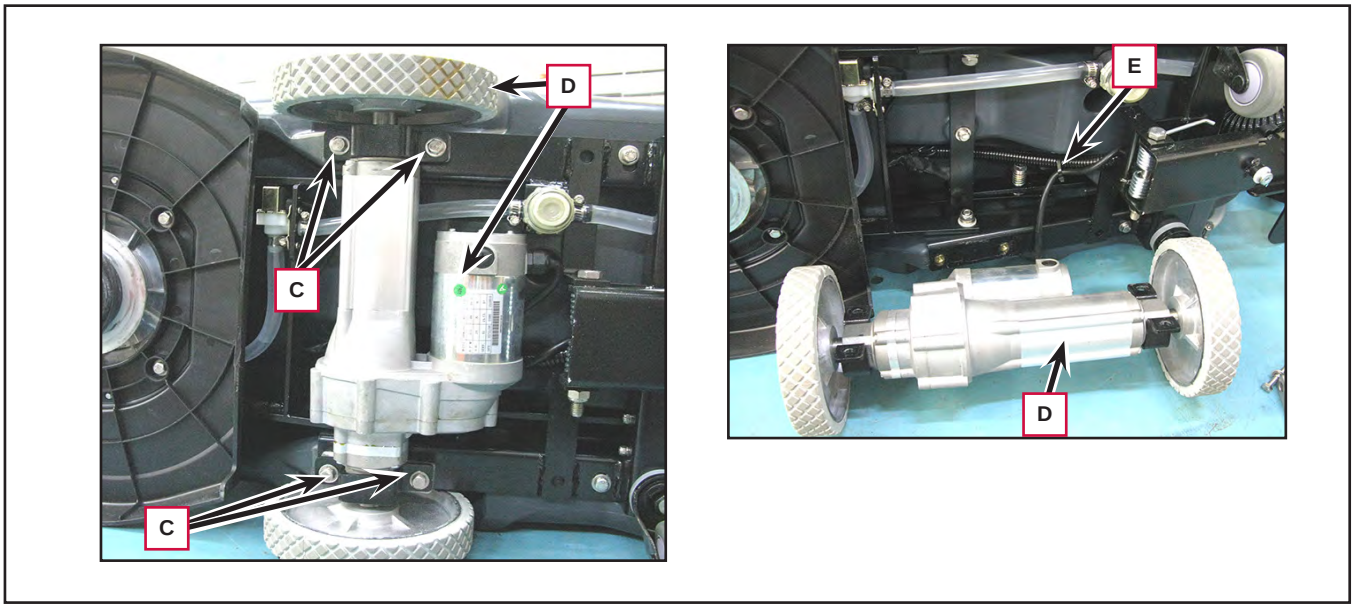


Figure 3

Wheels Disassembly/Assembly

Disassembly

1. Drain the recovery tank.
2. Drain the clean water tank.
3. Remove the brush.
4. Remove the squeegee.
5. Remove the machine's batteries.
6. Position a flattened cardboard box the same size as the machine's side. With the assistance of a second person, turn the machine over sideways and rest its right-hand side on the box positioned on the floor.
7. Unscrew the screws (A) inside the wheel.
8. Remove the outer cover (B) of the wheel.
9. Unscrew the screw (C) and remove the wheel (D).

Assembly

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

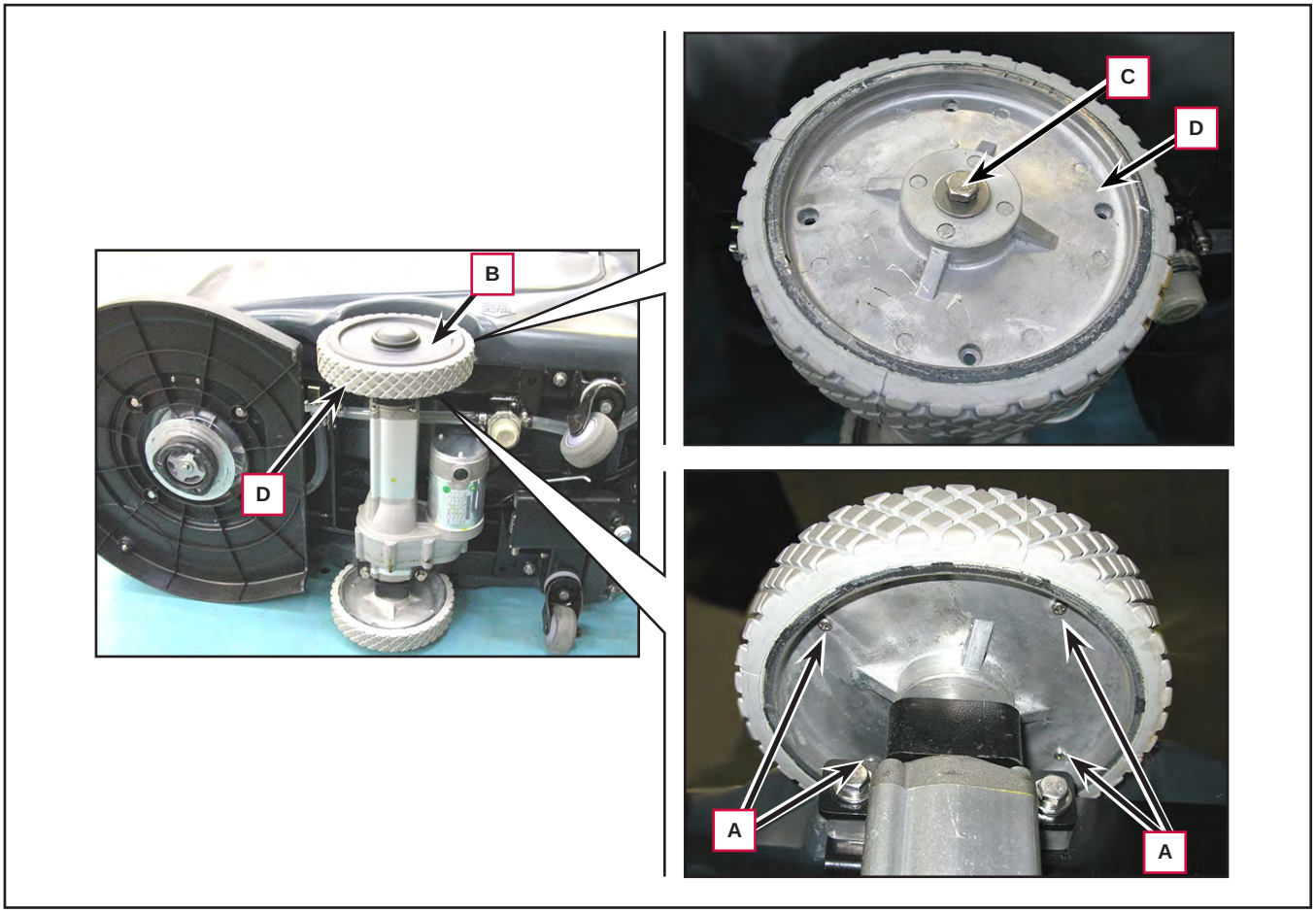


Figure 4

Drive System Motor disassembly/assembly (M3)

Disassembly

1. Remove the wheels assembly with drive system motor (see the procedure in the relevant paragraph).
2. Unscrew the screws (A) inside the two wheels.
3. Remove the outer cover (B) of the wheels.
4. Unscrew the screws (C) and remove the wheels (D).
5. Remove the drive motor.

Assembly

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

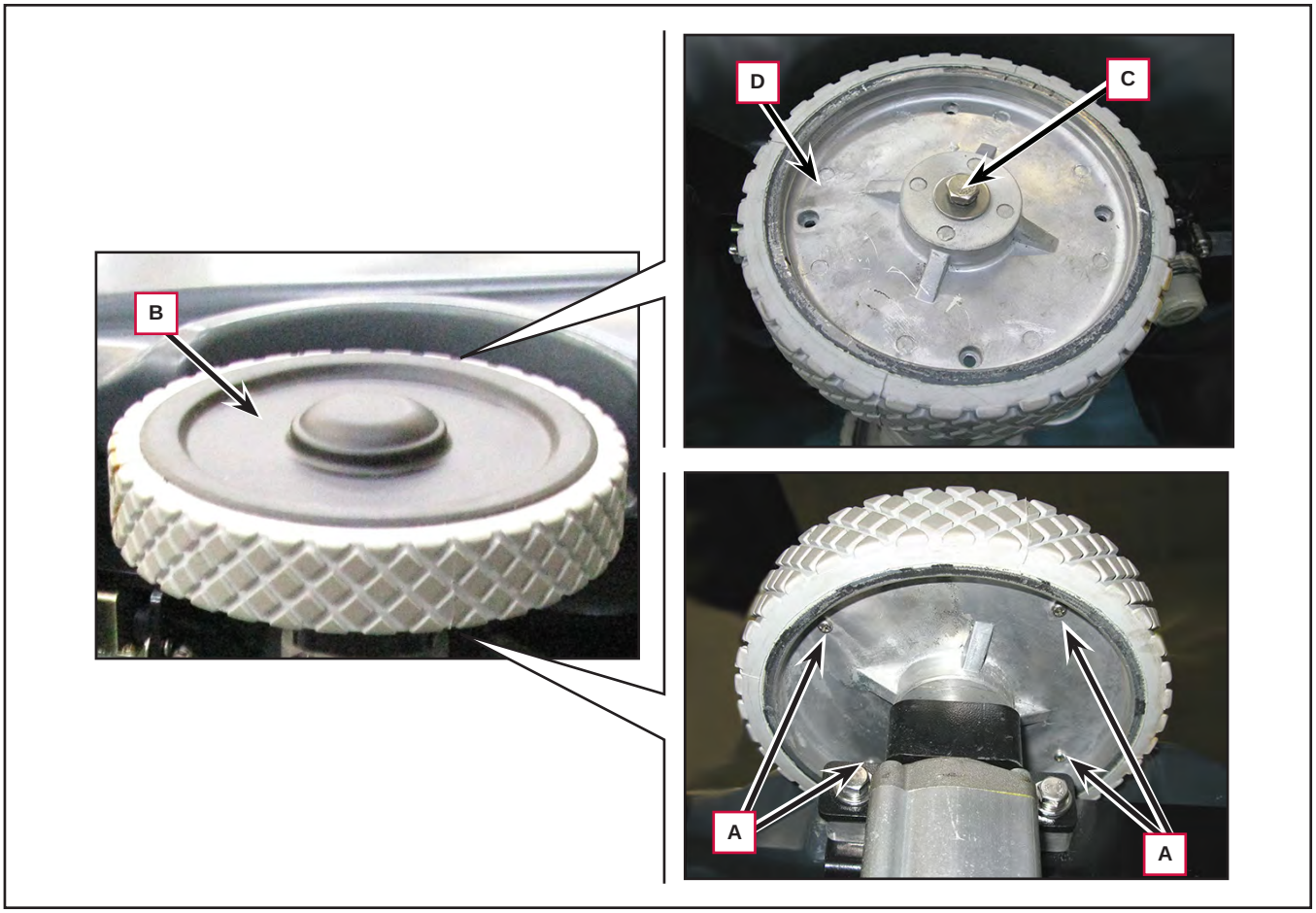


Figure 5