

USE AND MAINTENANCE MANUAL



INNOVA 2011
60-65-75-85 B
70 S

ED. 06-2012

EN

ORIGINAL
INSTRUCTIONS
Doc. 10029401
Ver. AB



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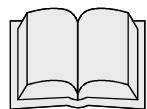
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Symbols used in the manual



Open book symbol with an "i"
Indicates the need to consult the instruction manual



Open book symbol
Used to tell the operator to read the manual before using the machine



Warning symbol
Carefully read the sections marked with this symbol and observe the indications, for the safety of the operator and the machine



Warning symbol
Indicates danger of gas exhalation and leakage of corrosive liquids



Warning symbol
Indicates the danger of fire
Do not go near with free flames



Warning symbol
Indicates that the packed product should be handled with suitable lifting means that comply with the legal requirements



Disposal symbol
Carefully read the sections marked with this symbol, for machine disposal



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On consignment of the machine

When the machine is consigned to the customer, an immediate check must be performed to ensure all the material mentioned in the shipping documents has been received, and also to check the machine has not suffered damage during transportation. If this is the case, the carrier must ascertain the extent of the damage at once, informing our customer service office. It is only by prompt action of this type that the missing material can be obtained, and compensation for damage successfully claimed.

Introductory comment

INNOVA 2011 is a scrubbing machine that is able to clean a wide variety of types of flooring and types of dirt by using the mechanical action of two disc or cylindrical brushes, depending on the model, and the chemical action of a water-detergent solution. As it advances, it also collects the dirt removed and the detergent solution not absorbed by the floor.

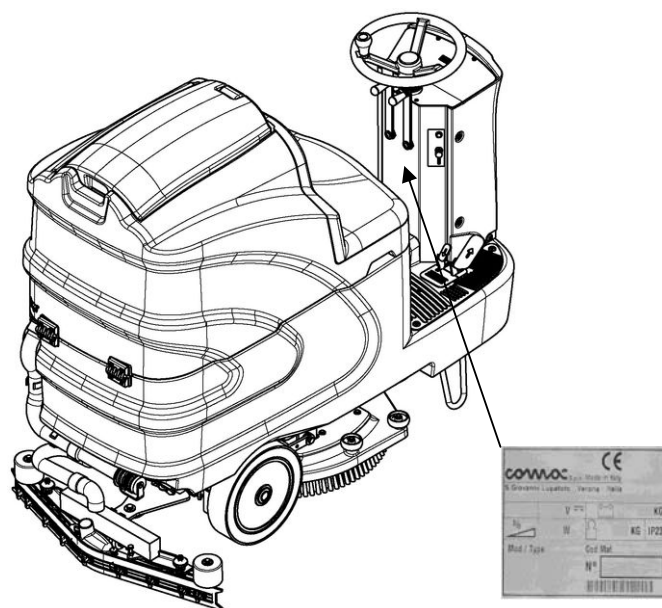
The machine must be only used for this purpose. Even the best machines will only work well if used correctly and kept in good working order. We therefore suggest you read this instruction booklet carefully and read it again whenever difficulties arise while using the machine. If necessary, remember that our customer assistance service (organised in collaboration with our dealers) is always available for advice or direct intervention.

Intended use

The scrubbing machine is exclusively designed for the professional cleaning of surfaces and floors in industrial, commercial and public environments. The machine is only suitable for use in closed (or at least covered) places.

The machine is not suitable for use in the rain, or under water jets. It is FORBIDDEN to use the machine for picking up dangerous dusts or inflammable liquids in places with a potentially explosive atmosphere. In addition, it is not suitable as a means of transport for people or objects.

Serial number plate

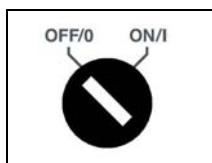




TECHNICAL DESCRIPTION	U/M	60 B	65 B	75 B	85 B	70 S
Working width	mm	610	650	750	850	690
Squeegee width	mm	780	970	970	1085	970
Work capacity, up to	m ² /h	3660	3900	4500	5100	4100
Disc brush	Nr / Ø mm	1 / 610	2 / 340	2 / 390	2 / 430	-
Cylindrical brushes	Nr / Ø mm	-	-	-	-	1 / 210
Brush rotations	giri/min.	170	170	170	170	520
Brush motor	V / W	24 / 450	24 / 450	24 / 450	24 / 450	24 / 560
Pressure on the brushes	kg	30	30 – 60	30 – 60	30 – 60	20
Traction motor	V / W	24 / 400	24 / 400	24 / 400	24 / 400	24 / 400
Traction wheel	Ø mm	220	220	220	220	220
Forward speed	km/h	0÷6	0÷6	0÷6	0÷6	0÷6
Maximum gradient with full load	%	10	10	10	10	10
Suction motor	V / W	24 / 310	24 / 310	24 / 310	24 / 310	24 / 310
Suction vacuum	mbar	160	160	160	160	160
Rear elastic wheels	Ø mm	300x70	300x70	300x70	300x70	300x70
Solution tank	l	110	110	110	110	110
Recovery tank	l	125	125	125	125	125
Detergent tank (CDS version only)	l	-	5	5	5	5
Steering diameter	mm	1910	1910	1910	1910	1910
Machine length	mm	1495	1495	1495	1495	1495
Machine height	mm	1320	1320	1320	1320	1320
Machine width (without squeegee)	mm	680	680	770	855	805
Battery compartment (l x L x h)	mm	384x520x340				
Rated battery voltage	V	24	24	24	24	24
Battery weight (max)	kg	136	136	136	136	136
Machine weight (empty and without batteries)	kg	223	223	223	223	233
Machine weight in running order (machine + batteries + water + operator)	kg	545	544	544	544	554
Noise level (ISO 11201)	dB (A)	-	-	-	-	-
Hand vibration level (ISO 5349-1)	m/s ²	-	-	-	-	-
Body vibration level (ISO 2631)	m/s ²	-	-	-	-	-



SYMBOLS USED ON THE MACHINE



Main switch symbol (key switch)
Used on the instrument panel, to indicate the key switch for machine operation on (I) or off (O)



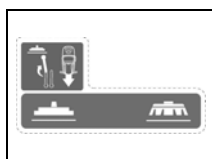
Indicator showing battery charge level on the upper line and hour-counter on the lower line



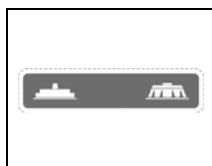
Indicator showing the type of hour-counter (total) on the upper line and the type of service (none) on the lower line



Indicator showing the type of technology of the batteries used (lead)



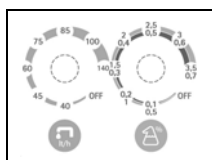
Brush head / squeegee motion symbol (idle position)
Used to indicate the movement levers of the brush head and squeegee



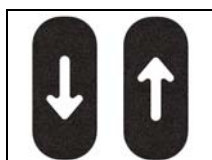
Brush head / squeegee motion symbol (working position)
Used to indicate the movement levers of the brush head and squeegee



Brush head/squeegee operating symbols
Used to indicate the I-DRIVE programs selector



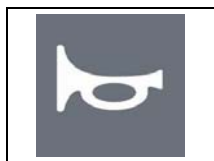
Symbol denoting regulation of water quantity (l/h) and detergent (%), CDS system
Used on the instrument panel, to indicate the adjustment of the detergent percentage dissolved in the water, and the amount of water distributed on the brushes



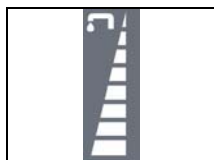
Pedal labels that indicate the forward and reverse direction of the machine
Used to indicate the direction of the machine



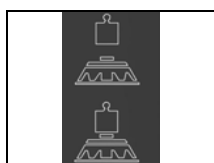
SYMBOLS USED ON THE MACHINE



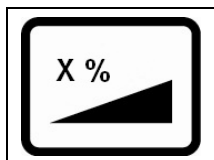
Symbol denoting acoustic alarm
Used to indicate the acoustic alarm button



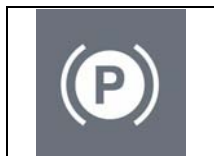
Water quantity adjustment symbol
Used on the steering column to indicate the knobs for adjusting the quantity of water distributed on the brushes



Symbol denoting pressure applied to the brushes
Used to indicate the pedal to increase the pressure on the brushes



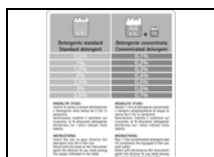
Indicates the maximum gradient



Parking brake symbol
Used on the instrument panel to indicate the red warning light showing parking brake on. Used to indicate the machines brake lever



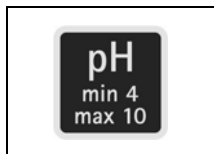
Indicates the risk of crushed hands



Label with instructions for the use of standard or concentrated detergents (CDS system only)



Label with warnings on the type of detergent to use (CDS system only)



Label with Ph value of the detergent to use (CDS system only)



GENERAL SAFETY REGULATIONS

The regulations below must be carefully followed in order to avoid harm to the operator and damage to the machine.

- Read the labels on the machine carefully. Do not cover them for any reason and replace them immediately if they become damaged.
- The machine must be exclusively used by authorised, trained personnel.
- The machine is designed for dry use only and should not be used or kept outdoors in damp conditions.
- Disconnect from the mains/battery before performing cleaning or maintenance operations on the machine.
- If the machine is used where there is a risk of falling objects, the machine must be equipped with protections against falling objects.
- During the working of the machine, pay attention to other people and especially to children.
- The machine is not suitable for cleaning carpets.
- Do not mix different types of detergent as this may produce harmful gases.
- Do not place any liquid containers on the machine.
- The storage temperature must be between -25°C and +55°C; do not store outdoors in damp conditions.
- Conditions of use: room temperature between 0°C and 40°C with relative humidity between 30 and 95%
- Do not use the machine in an explosive atmosphere.
- Do not use the machine as a means of transport.
- Do not use acid solutions that could damage the machine and/or harm people.
- Do not vacuum inflammable liquids.
- Do not use the device to collect dangerous powders.
- In the event of a fire, use a powder extinguisher. Do not use water.
- Do not knock against shelving or scaffolding, where there is a danger of falling objects. Use protective devices (helmet).
- Adapt the speed to the adhesion conditions.
- Do not use the machine on surfaces with an inclination greater than the one shown on the plate.
- When the machine is in parking mode, remove the key and insert the parking brake.
- If you notice any damage to the battery charger cable, contact a **COMAC** technical assistance centre immediately.
- The machine is designed to carry out the washing and drying operations simultaneously. Different operations should only be carried out in areas where the passage of unauthorised persons is prohibited. Signal the presence of damp floors with suitable signs.
- If the machine does not work properly, check this is not caused by failure to carry out routine maintenance. Otherwise, request the intervention of the **COMAC** technical assistance centre.
- If you need to replace any components, request the ORIGINAL spare parts from a **COMAC** dealer and/or Authorised Retailer.
- Use original **COMAC** brushes only indicated in the paragraph "CHOOSING AND USING THE BRUSHES".
- In the event of danger, activate the emergency lever (connector placed under the operator's seat) immediately.
- Before carrying out any maintenance work, switch off the machine and disconnect the battery connector.
- Restore all electrical connections after any maintenance interventions.
- Do not remove any protection devices which require the use of tools in order to be removed.
- Do not wash the machine with direct water jets or with pressurised water, nor with corrosive substances.
- After at least every 200 hours of operation, have the machine checked by a **COMAC** assistance centre
- To prevent scaling in the solution tank filter, do not fill the tank with detergent solution many hours before using the machine.
- Before using the machine, check that all the hatches and covers are positioned as shown in this Use and Maintenance Manual.
- Make sure the recovery tank is empty before lifting.
- When disposing of consumption materials, observe the laws and regulations in force.
- The machine does not cause harmful vibrations.
- When your **COMAC** machine has reached the end of its long working life, dispose of the materials it contains (especially oils, batteries and electronic components) in an appropriate manner, and bearing in mind that the machine itself was constructed using 100% recyclable materials.
- The batteries must be removed from the machine before its disposal.
- The batteries must be disposed of in a safe manner, fully observing the laws and regulations in force.
- The machine is not suitable for use by children and persons with reduced physical, mental and sensory capabilities, or people who lack experience and knowledge.
- Children must be supervised to ensure they do not play with the device.
- When the machine is left unattended, engage the parking brake for safety against unintentional movements.



MACHINE PREPARATION

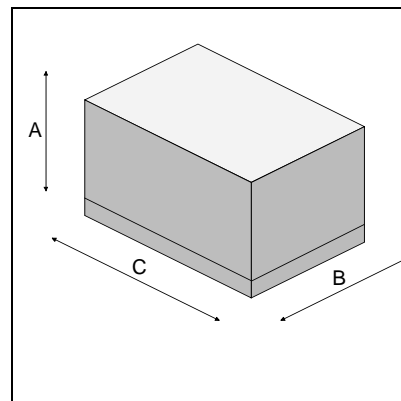
1. HANDLING THE PACKAGED MACHINE

The machine is contained in specific packaging with a pallet for the handling with fork trucks. The packages cannot be placed on top of each other.

The total mass of the machine with packaging is 240 kg (without batteries).

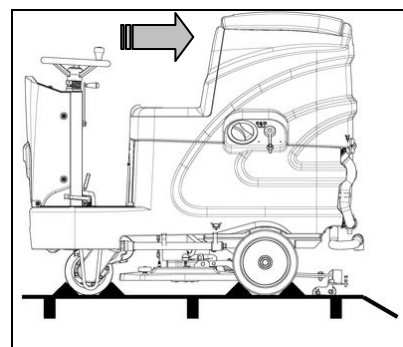
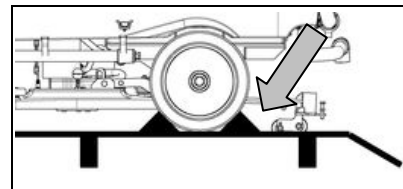
The dimensions of the packaging is as follows:

60-65-75-85 B	70 S
A: 1610mm	A: 1610mm
B: 730mm	B: 730mm
C: 1600mm	C: 1600mm



2. HOW TO UNPACK THE MACHINE

1. Remove the outer packaging.
2. The machine is fixed to the pallet with wedges which block the wheels.
3. Remove the wedges.
4. Use a chute to get the machine down from the pallet, pushing it backwards. Do not assemble the rear squeegee before unloading the machine, and avoid violently jolting the brush head. To assemble the squeegee, read the "ASSEMBLING THE SQUEEGEE" paragraph.
5. Keep the pallet for any future transport needs.



ATTENTION: if the product is delivered in cardboard containers, handle the packed product with suitable lifting means that comply with the legal requirements.

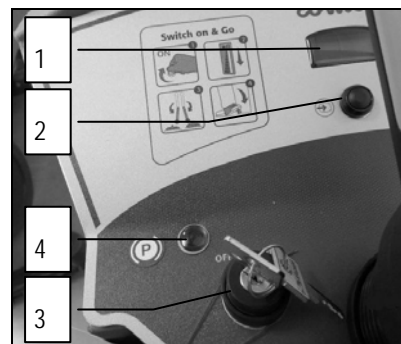
3. HOW TO MOVE THE MACHINE

1. Make sure the recovery tank and the solution tank are empty
2. Make sure that the detergent can is empty (CDS version)
3. Check that the brush head and squeegee are lifted off the ground
4. Place it on a pallet using a chute
5. Check that the key switch is on OFF and remove the key
6. Engage the parking brake
7. Secure the machine to the pallet using wooden wedges

4. INSTRUMENT PANEL COMPONENTS (INNOVA 2011 60 B VERSIONS)

The instrument panel components are identified as follows:

1. Battery level / hour-counter display
2. Battery level hour-counter display command button
3. Main key switch.
4. Red warning light indicating that the parking brake is on



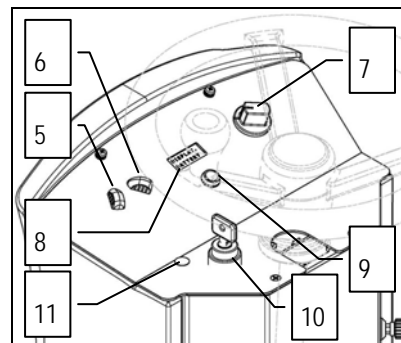


MACHINE PREPARATION

5. INSTRUMENT PANEL COMPONENTS (INNOVA 2011 65 -75-85 B INNOVA 2011 70 S)

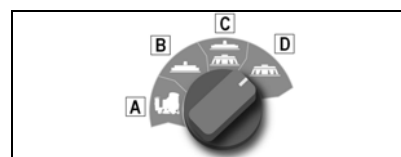
The instrument panel components are identified as follows:

5. Water outlet regulation switch (CDS versions)
6. Detergent outlet regulation switch (CDS versions)
7. Working program adjustment switch, I-Drive device
8. Battery level / hour-counter display
9. Battery level hour-counter display command button
10. Main key switch.
11. Red warning light indicating that the parking brake is on



Choose the desired operating program with the I-Drive device:

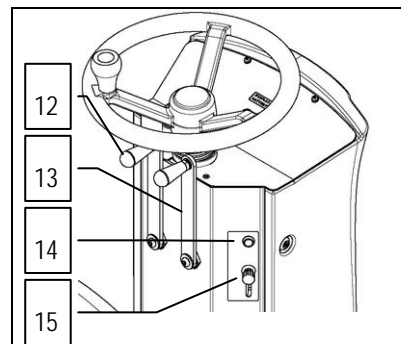
- A. Transfer: movement of the machine without working
- B. Drying: use the squeegee only
- C. Washing / Drying: use both the brushes and the squeegee
- D. Washing only: use brushes only



6. INSTRUMENT PANEL COMPONENTS (INNOVA 2011 60 B VERSIONS)

The steering column components are identified as follows:

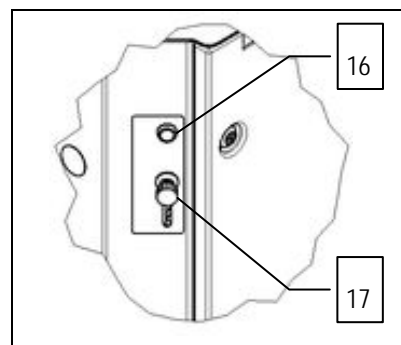
12. Squeegee body lifting lever
13. Brush head body lifting lever
14. Horn button
15. Detergent solution adjustment lever



7. INSTRUMENT PANEL COMPONENTS (INNOVA 2011 65 -75-85 B INNOVA 2011 70 S)

The steering column components are identified as follows:

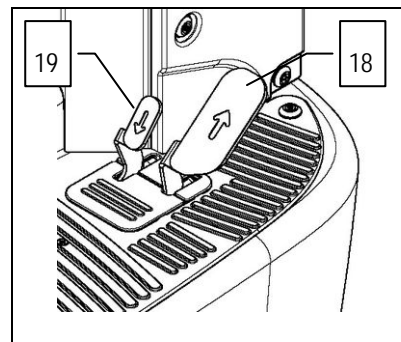
16. Horn button
17. Detergent solution adjustment lever (version without CDS) - clean water adjustment lever (version with CDS)



8. FOOTBOARD FRONT-RIGHT COMPONENTS

The components at the front right of the footboard are identified as follows:

18. Accelerator pedal, forward
19. Accelerator pedal, reverse



WARNING: Only by simultaneously pressing the pedals is the reverse made

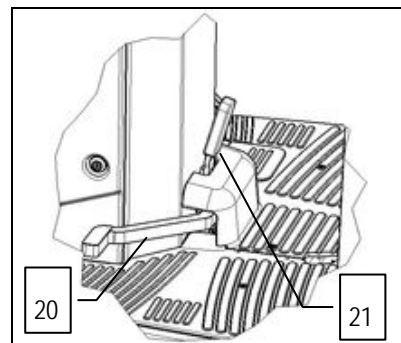


MACHINE PREPARATION

9. FOOTBOARD FRONT-LEFT COMPONENTS

The components at the front right of the footboard are identified as follows:

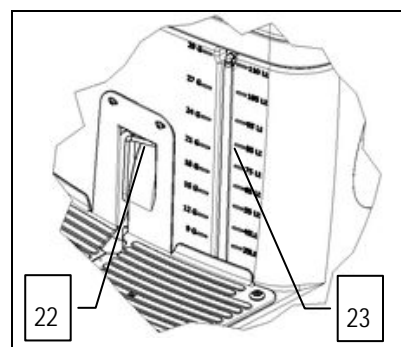
- 20. Brake pedal
- 21. Parking brake lever



10. FOOTBOARD REAR COMPONENTS

The components at the rear of the footboard are identified as follows:

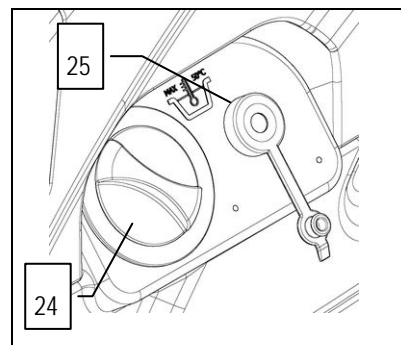
- 22. The brush head extra-pressure pedal is present on the Innova 2011 65-75-85 B versions only (see paragraph BRUSH HEAD EXTRA-PRESSURE)
- 23. Water level pipe (versions with CDS) or solution level pipe (versions without CDS)



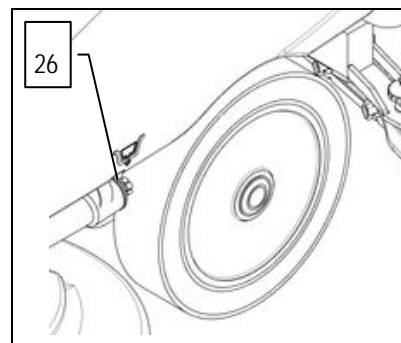
11. MACHINE'S SIDE COMPONENTS

The side components of the machine are identified as follows:

- 24. Water-detergent filler cap (versions without CDS), water filler (versions with CDS)
- 25. Water filler cap



- 26. Water-detergent discharge cap (versions without CDS), water discharge (versions with CDS)



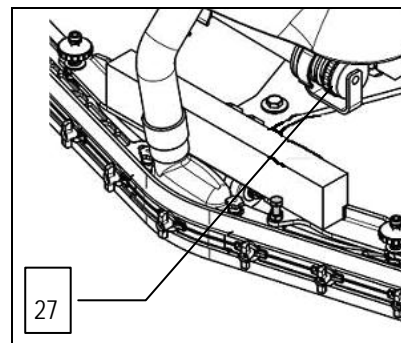


MACHINE PREPARATION

12. MACHINE'S REAR COMPONENTS

The rear components of the machine are identified as follows:

27. Recovery tank discharge cap



13. TYPE OF BATTERY

To power the machine it is necessary to use:

- liquidelectrolyte lead traction batteries;
- sealed traction batteries with gasrecombination or gel technology.

OTHER TYPES MUST NOT BE USED.

The batteries must meet the requirements laid out in the norms: CEI EN 60254-1:2005-12 (CEI 21-5) + CEI EN 60254-2:2008-06 (CEI 21-7).

The battery compartment can house four 6V or two 12V batteries

For a good operating performance, we suggest the use of four 6V/210 Ah C5 batteries

14. BATTERY MAINTENANCE AND DISPOSAL

For maintenance and recharging, comply with the instructions provided by the battery manufacturer.

Particular attention must be paid when choosing the battery charger, if not supplied, since there are different kinds according to the type and capacity of the battery.

When the battery reaches the end of its working life, it must be disconnected by expert, trained personnel, then lifted (using the grips and suitable lifting devices) to remove it from the battery compartment. DEAD BATTERIES ARE CLASSIFIED AS DANGEROUS WASTE AND MUST BE DELIVERED TO THE AUTHORISED BODIES FOR CORRECT DISPOSAL.



ATTENTION: you are advised to always wear protective gloves, to avoid the risk of serious injury to your hands



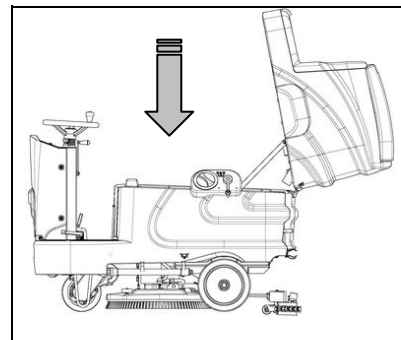
ATTENTION: You are advised to only lift and move the batteries with lifting and transportation means suitable for the specific weight and size

15. FITTING THE BATTERIES INTO THE MACHINE

The batteries must be housed in the special compartment beneath the recovery tank. They should be handled using lifting equipment that is suitable in terms of both weight and hook-up system. They must also satisfy the requirements of Standard CEI 21-5. The dimensions of the battery compartment are: 384 x 520 x H340 mm.



WARNING: For battery maintenance and daily recharging, you must fully respect the indications provided by the manufacturer or retailer. All installation and maintenance operations must be carried out by specialised personnel.





MACHINE PREPARATION

To insert the batteries you must:

1. Lock the machine engaging the brake lever
2. Make sure that the key switch is in the "OFF" position
3. Make sure the recovery tank is empty, otherwise empty it completely
4. Grip the handle under the seat to open the recovery tank.
5. Lift the recovery tank until it hooks to the end of the safety clamp.
6. house the batteries in the compartment, positioning the poles "+" and "-" opposite each other



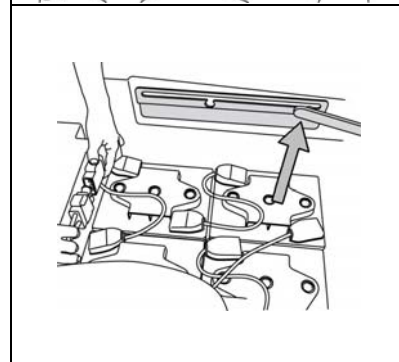
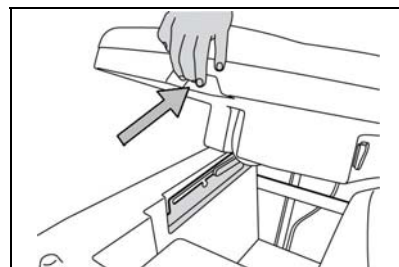
WARNING: you are advised to use airtight batteries only, to avoid the leakage of acids!



ATTENTION: you are advised to always wear protective gloves, to avoid the risk of serious injury to your hands



ATTENTION: You are advised to only lift and move the batteries with lifting and transportation means suitable for the specific weight and size



16. BATTERY CONNECTION AND BATTERY CONNECTORS

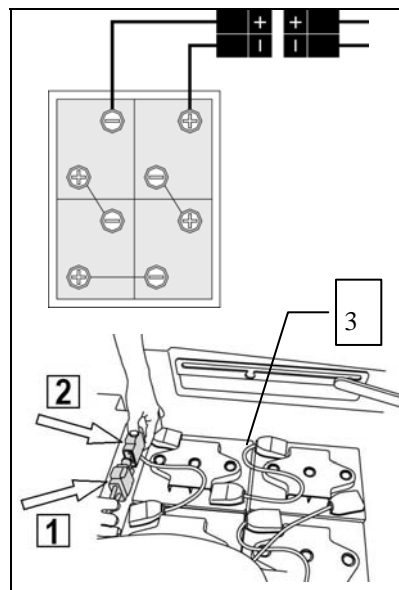
1. connect the batteries in series - using the jumper cables supplied (3) - to the poles "+" and "-"
2. Connect the battery connector cable (1) to the terminal poles "+" and "-" to obtain a voltage of 24V on the clamps
3. Connect the battery connector (1) to the machine connector (2).



ATTENTION: you are advised to have the electric connections made by a qualified, COMAC-trained technician



ATTENTION: you are advised to always wear protective gloves, to avoid the risk of serious injury to your hands

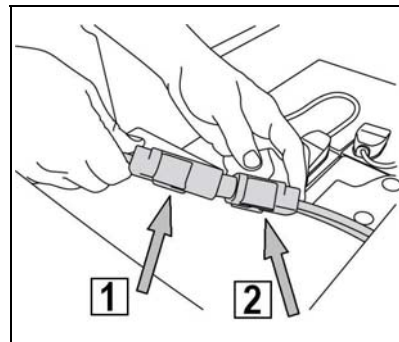


17. BATTERY CHARGER CONNECTION (VERSIONS WITHOUT CB)

In order not to cause permanent damage to the batteries it is essential to avoid their complete discharge: arrange the recharge within a few minutes of the switching on of the flashing "discharged batteries" signal.



ATTENTION: never leave the batteries completely discharged, even if the machine is not being used. Check the battery charger is suitable for the batteries installed, in terms of both capacity and type.

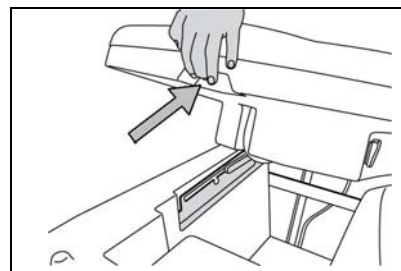




MACHINE PREPARATION

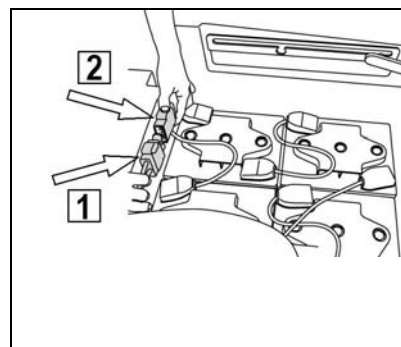
To connect the batteries you must:

1. Make sure the recovery tank is empty, otherwise empty it completely
2. Make sure that the key switch is in the "OFF" position
3. Move the machine near to the battery charger
4. Engage the parking brake
5. Grip the handle under the seat to open the recovery tank.
6. Lift the recovery tank until it hooks to the end of the safety clamp.



7. Disconnect the electrical connector from the battery connector (1) from the machine connector (2)
8. Connect the battery charger cable connector
9. Close the recovery tank until the prop is hooked in the first point of the safety stop

The coupling connector of the battery charger is consigned inside the bag containing this instruction booklet, and must be assembled on the cables of the battery charger as indicated in the instructions.



ATTENTION: this process must be carried out by qualified personnel. An incorrect connection of the connector may cause problems with machine functioning.

10. Connect the recently wired cable to the external battery charger



ATTENTION: Carefully read the use and maintenance instructions of the battery charger that is used for charging.

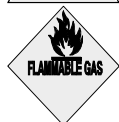


ATTENTION: Keep the recovery tank open for the duration of the battery recharging cycle to allow gas fumes to escape

11. After recharging the batteries completely, the battery connector (1) must be connected to the machine connector (2).



ATTENTION: danger of exhalation of gas and leakage of corrosive liquids



ATTENTION: danger of fire: do not go near with free flames

18. BATTERY CHARGER CONNECTION (VERSIONS WITH CB)

In order not to cause permanent damage to the batteries it is essential to avoid their complete discharge: arrange the recharge within a few minutes of the switching on of the flashing "discharged batteries" signal.



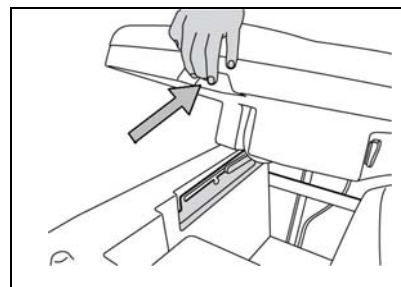
ATTENTION: never leave the batteries completely discharged, even if the machine is not being used. Check the battery charger is suitable for the batteries installed, in terms of both capacity and type.



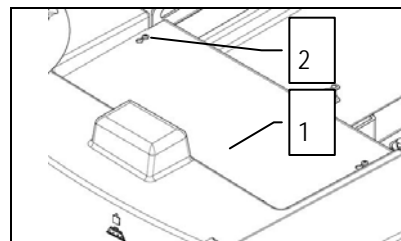
MACHINE PREPARATION

To connect the batteries you must:

1. Make sure the recovery tank is empty, otherwise empty it completely
2. Make sure that the key switch in the "0" position
3. Move the machine near to the battery charger
4. Engage the parking brake
5. Grip the handle under the seat to open the recovery tank.
6. Lift the recovery tank until it hooks to the end of the safety clamp.



7. Remove the protective sheath (1), pulling it toward the rear of the machine until the screw (2) can pass through the slot present on the sheath
8. Connect the battery charger cable to the socket on the charger itself
9. Close the recovery tank until the prop is hooked in the first point of the safety stop
10. Plug the battery charger cable into the mains socket



The charger power cable is delivered inside the bag containing this instruction booklet.



ATTENTION: this process must be carried out by qualified personnel. An incorrect connection of the connector may cause problems with machine functioning.



WARNING: Carefully read the use and maintenance manual of the charger that is delivered inside the bag containing this instruction booklet.



WARNING: Before inserting the charger power cable into the socket, verify that there is no condensate or other forms of liquids.



ATTENTION: the machine is equipped with an automatic system that disconnects the power supply from the electrical system while the batteries are being recharged

ATTENTION: in order not to cause permanent damage to the batteries it is essential to avoid their complete discharge: arrange the recharge within a few minutes of the switching on of the flashing "discharged batteries" signal

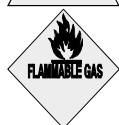
ATTENTION: never leave the batteries completely discharged, even if the machine is not being used

ATTENTION: for the daily recharging of the batteries, you must fully respect the indications provided by the manufacturer or retailer. All installation and maintenance operations must be carried out by specialised personnel

ATTENTION: Always make sure the green LED of the battery charger is on before using the machine again



ATTENTION: danger of exhalation of gas and leakage of corrosive liquids



ATTENTION: danger of fire: do not go near with free flames



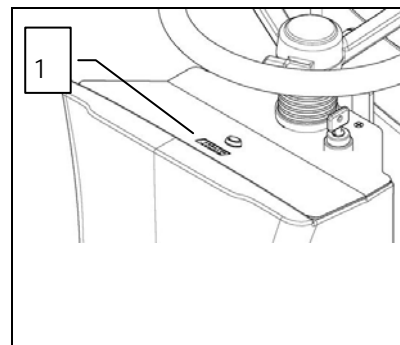
MACHINE PREPARATION

19. BATTERY CHARGE LEVEL INDICATOR

On the instrument panel of the machine there is a monitor (1) indicating (amongst other things) the battery charge status. If the upper line contains 8 light indicators, the battery charge level is 100%. If the edges of the indicators are flashing, this means the batteries are run down.



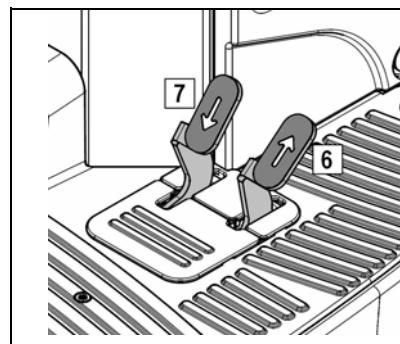
ATTENTION: a few seconds after the last indicator on the monitor has flashed, the brush motor will automatically switch off. With the remaining charge it is possible to complete the drying process before recharging



20. WORKING FORWARD SPEED

This machine is equipped with electronic traction control.

To move the machine, after having turned the key in the ON position, push the drive pedal (6) adjusting the speed by pressing and releasing the pedal. The machine will then start moving.



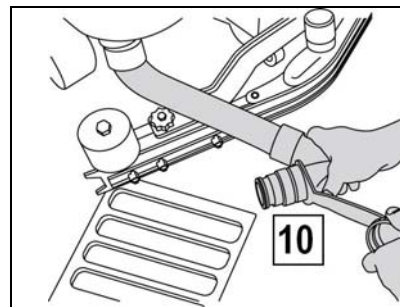
21. REVERSE FUNCTION

To make a reversing manoeuvre, press both pedals (6 and 7) the machine will then start moving backwards. During reverse motion, the machine emits an acoustic signal.

22. RECOVERY TANK

Make sure the recovery tank is empty, otherwise empty it completely.

Check the cap of the drainage tube (10) (on the rear of the machine) is correctly closed.

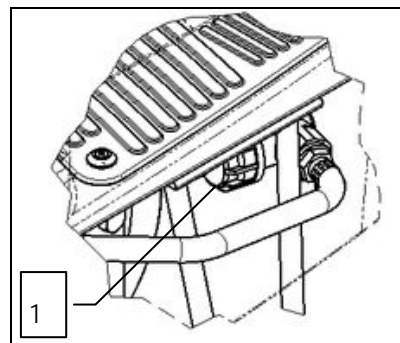


23. SOLUTION TANK (INNOVA 2011 60-65-75-85 B)

The recovery tank must be completely empty each time the solution tank is filled.

Remove the front inlet cap and check the solution filter is correctly fitted.

Check that the solution filter cap (1), under the solution tank in the front right of the machine, is properly closed.





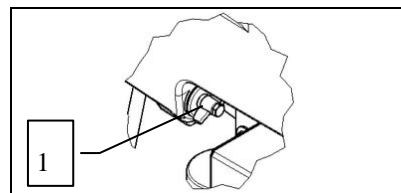
MACHINE PREPARATION

24. SOLUTION TANK (70S VERSIONS)

The recovery tank must be completely empty each time the solution tank is filled.

Remove the front inlet cap and check the solution filter is correctly fitted.

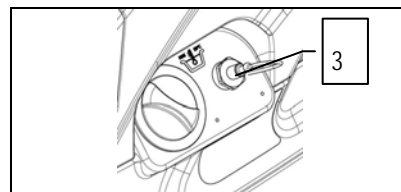
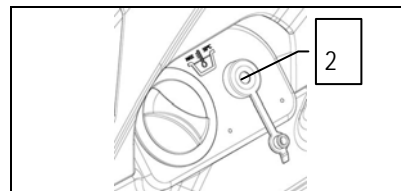
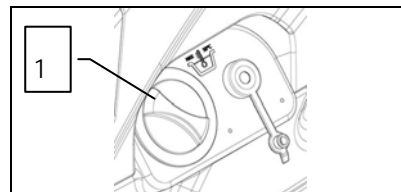
Check that the solution tank discharge cap (1), under the solution tank in the front left of the machine, is properly closed.



25. FILLING THE SOLUTION TANK

The solution tank can be filled in three different ways:

1. Unscrew the filler cap (1) and fill using a hose.
2. Using the rubber cap (2), this supports the water hose on its own, be sure to unscrew the cap to allow the proper vent of air.
3. Using on request (optional) a tank clean water refilling system via a quick coupling (3), FFF with float to control the overflow.

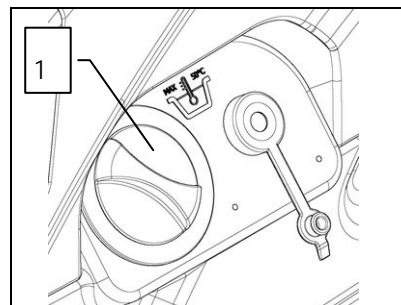


26. DETERGENT SOLUTION (VERSIONS WITHOUT CDS)

Remove the filler cap and check the solution filter (1) is correctly assembled.

Check that the filter cap, under the solution tank in the front right of the machine, is properly closed.

Fill it with clean water at a temperature not exceeding 50°C. The amount inside the tank can be seen by means of the level pipe on the front left of the seat. The solution tank has a maximum capacity of about 110 litres. Add the liquid detergent to the tank in the concentration and manner indicated on the detergent manufacturer's label. The formation of excess foam could damage the suction motor, so use only the minimum amount of detergent that is necessary.



WARNING: Always use detergents whose manufacturer's label indicates their suitability for scrubbing machines. Do not use acid or alkaline products or solvents without this indication.



ATTENTION: Protective gloves should always be worn before handling detergents or acidic or alkaline solutions to avoid serious injury to hands.



ATTENTION: always use low foam detergent. To avoid the production of foam, before starting to clean, put a minimum quantity of antifoam liquid into the recovery tank. Do not use pure acids.



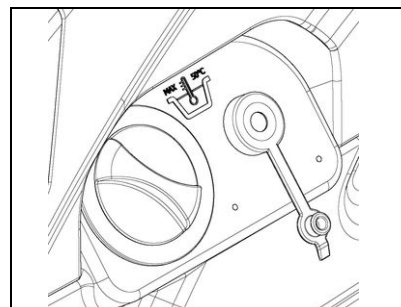
MACHINE PREPARATION

27. DETERGENT SOLUTION (VERSIONS WITH CDS)

Remove the filler cap and check the solution filter (1) is correctly assembled.

Check that the filter cap, under the solution tank in the front right of the machine, is properly closed

Fill it with clean water at a temperature not exceeding 50°C. The amount inside the tank can be seen by means of the level pipe on the front left of the seat. The solution tank has a maximum capacity of about 110 litres.



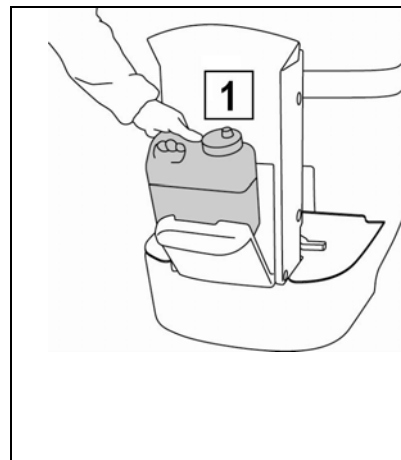
Insert the detergent as follows:

1. Check the switch key is on "OFF".
2. Open the detergent canister compartment (1) located in front of the steering column
3. Unscrew the cap of the canister in the compartment and fill it with liquid detergent in the manner indicated on the label supplied with the machine. Make sure to properly close the screw cap to prevent leakage during operation, and that the detergent suction filter is properly positioned on the bottom of the canister
4. Close the detergent canister compartment



ATTENTION: always use low foam detergent. To avoid the production of foam, before starting to clean, put a minimum quantity of antifoam liquid into the recovery tank. Do not use pure acids.

5. To regulate the water/detergent mixture, carefully read the "REGULATING THE DETERGENT WITH THE CDS SYSTEM" paragraph.



ATTENTION: always use detergents whose manufacturer's label indicates their suitability for scrubbing machines. Do not use acid or alkaline products or solvents without this indication.

In addition, you are advised to always use low foam detergents. Do not use pure acids or detergents with a stronger gradation than that indicated on the label supplied.



ATTENTION: Protective gloves should always be worn before handling detergents or acidic or alkaline solutions to avoid serious injury to hands.

Detergente standard Standard detergent	Detergente concentrato Concentrated detergent
0.5%	0.1%
1%	0.2%
1.5%	0.3%
2%	0.4%
2.5%	0.5%
3%	0.6%
3.5%	0.7%

MODALITÀ D'USO:
Inserire la tanica o versare direttamente il detergente nella tanica da 5 litri in dotazione.
Selezionare, tramite il selettore sull'oroscopo, la % diluizione detergente desiderata tra i valori indicati nella tabella.

INSTRUCTIONS:
Insert the can or pour directly the detergent into the 5 liter can.
Select with the knob on the instrument panel the dilution % you need among the values indicated in the table.

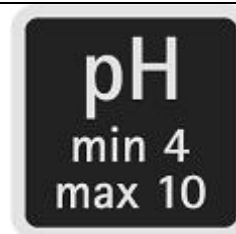
MODALITÀ D'USO:
Versare 1 litro di detergente concentrato e riempire completamente di acqua la tanica da 5 litri in dotazione.
Selezionare, tramite il selettore sull'oroscopo, la % diluizione detergente desiderata tra i valori indicati nella tabella.

INSTRUCTIONS:
Pour 1 liter concentrated detergent and fill completely the equipped 5 liter can with water.
Select with the knob on the instrument panel the dilution % you need among the values indicated in the table.



WARNING: The dosing system is suitable for frequent maintenance cleaning. Acid or alkaline maintenance detergent tank be used with pH values between 4 and 10 and that do not contain: oxidising agents, chlorine or bromine, formaldehyde, mineral solvents.

The detergents used must be suitable for use with scrubbing machines. Wash the circuit with water after use if the system is not used daily. The system can be excluded. In case of sporadic use of detergents with pH between 1-3 or 11-14, use the scrubbing machine in the traditional way by adding the detergent in the clean water tank and excluding the dosing circuit.

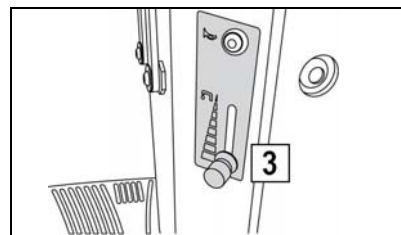




MACHINE PREPARATION

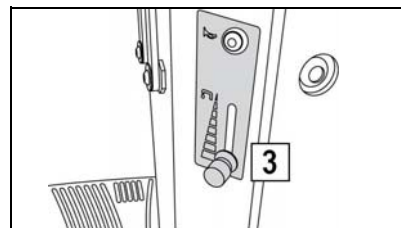
28. DETERGENT ADJUSTMENT (VERSIONS WITHOUT CDS)

Firstly, fully open the outflow of the tap, by means of the lever (3) on the steering column. During the first few meters, check that the amount of solution to wet the floor is sufficient, but not too much that it exits the splash-guard, the adjustment of the detergent application is made by means of lever (3) (shifting it downwards increases the flow, shifting it upwards decreases it). Bear in mind that the correct amount of solution is always depends on the nature of the floor, the degree of dirt and the forward speed.

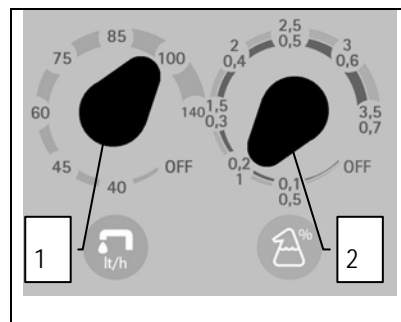


29. REGULATING THE DETERGENT (VERSIONS WITH CDS)

Firstly, fully open the outflow of the tap, by means of the lever (3) on the steering column. Position the water flow adjustment knob (1) on zero. Position the detergent adjustment knob (2) on zero. By pressing the accelerator pedal the brushes start, the machine begins to move and the detergent is distributed. During the first few meters:



1. Regulate the flow of detergent solution to the brushes by rotating the knob (1) clockwise. The quantity of solution varies from a minimum of 30 litres/hour to a maximum of 75 litres/hour, with 7 set measurement points. The right solution flow should be proportional to the degree of dirt on the floor. In addition, remember that the time available for continuous working depends on the quantity of water in the tank: for example, work autonomy with a full tank (about 85 litres) and the selector (1) on 30 is about 3 hours.
2. Regulate the percentage of detergent in the solution by rotating the knob (2) clockwise. The lower value is equal to 0.5% (for standard detergents) or 0.1% (for a concentrated detergent, diluted as indicated on the label supplied with the machine), while the higher value is equal to 3.5% or 0.7%, with 7 set points. Use high detergent percentages to remove very greasy dirt from the floor.



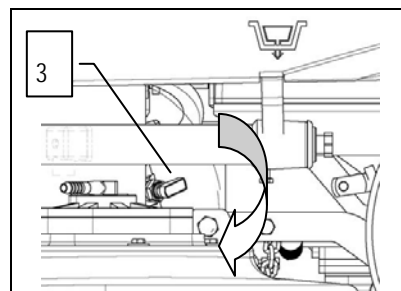
When you have finished regulating the quantities, you can remove the knobs and cover the holes with the rubber caps supplied.

WARNING: If the CDS system does not work, or you want to clean without using this device, you can intervene on the tap (3) on the brush head near the solenoid valve, rotating the lever by 180° as shown in the figure. Rotate the knobs (1) and (2) anticlockwise, to "OFF".

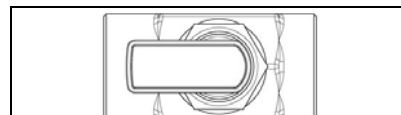
ATTENTION: before regulating the solution, check there is detergent in the inner can, and that the side water tap is turned on.

To avoid any tampering with the set regulation, you can remove the two switches and cover the two holes with the plastic caps supplied with the machine.

To resolve any malfunctioning of the CDS system, contact the COMAC assistance centre.



WARNING: By positioning the tap lever in this way the CDS dosing system is excluded and the detergent solution is deposited on the brushes. Rotate the knobs (2) and (3) anticlockwise, to the "0" position.



WARNING: By positioning the tap lever in this way, the detergent solution is not distributed on the brushes. Rotate the knobs (2) and (3) anticlockwise, to the "0" position.



WARNING: By positioning the tap lever in this way the CDS dosing system is activated.



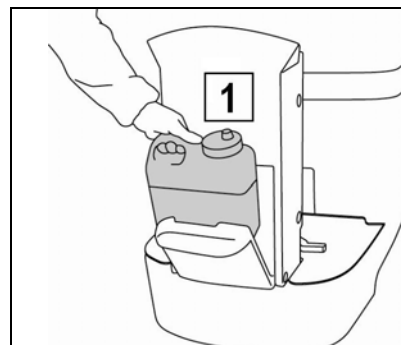


MACHINE PREPARATION

30. DETERGENT PUMP PRIMING (VERSIONS WITH CDS)

Before starting work the detergent pump must be primed, to do so proceed as follows:

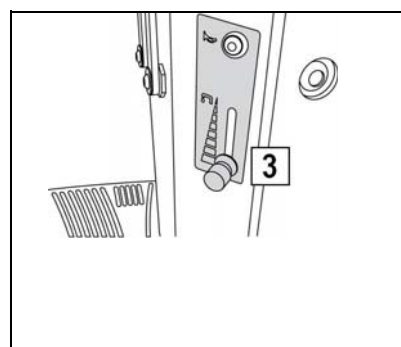
1. Check that the main switch is in the "Off – 0" position
2. Check that the battery connector is disconnected from the machine connector
3. Check the parking brake is correctly engaged
4. Make sure the recovery tank is empty, otherwise empty it
5. Open the detergent canister compartment (1) located in front of the steering column



6. Unscrew the detergent tank cap and fill the tank with the desired product

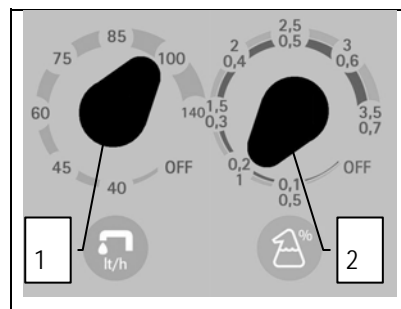


ATTENTION: always use low foam detergent. To avoid the production of foam, before starting to clean, put a minimum quantity of antifoam liquid into the recovery tank. Do not use pure acids.



7. Close the lid of the detergent tank, taking care that the suction filter is positioned at the bottom of the tank. Reposition it in the tank compartment
8. Check there is clean water in the solution tank

9. Check that the water tap is turned on fully (3)
10. Check that the by-pass tap is in the "dosing system" position
11. Turn the water flow rate adjustment knob (1) to the maximum position
12. Turn the detergent percentage adjustment knob (2) to the maximum position
13. Insert the battery connector into the machine connector.
14. Place the main switch in position "ON – I"
15. Disengage the parking brake



16. Select the "Wash only" program with the I-Drive device
17. Press the forward movement pedal to activate the brush head and the dosing system
18. Wait a few moments with the dead man's lever pressed (normally 20 to 40 seconds) to allow the insertion of the system
19. Proceed with the desired adjustment for normal cleaning



WARNING: The machine will deliver solution during this operation



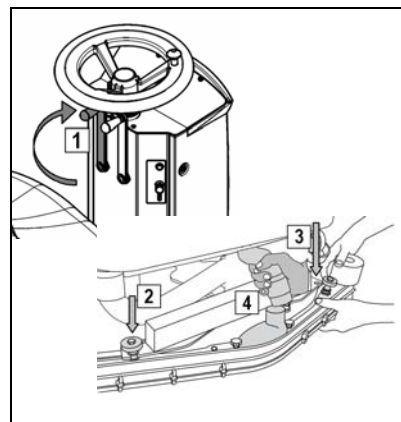
MACHINE PREPARATION

31. SQUEEGEE ASSEMBLY (INNOVA 2011 60 B VERSIONS)

For packaging reasons, the squeegee is supplied disassembled from the machine, and must be assembled as shown in the figure.

Raise the squeegee connector by means of the lefthand lever (1), turning it clockwise until in the vertical position. Make sure the parking brake is engaged and that the main switch is OFF. First thread left pin (2) of the squeegee into the left slot on the arm and then right pin (3) into the right slot, being careful to keep the spring and the washer above the arm's flat bar. This can be simplified by first loosening the handwheel on the pin. Then re-tighten the handwheel to block the squeegee in place.

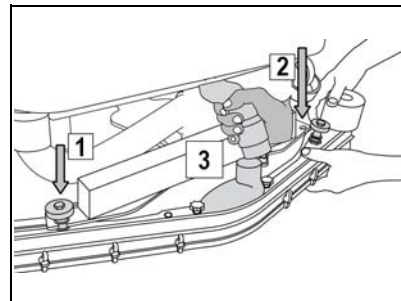
Insert the squeegee tube in the appropriate sleeve (4).



32. SQUEEGEE ASSEMBLY (INNOVA 2011 65 -75-85 B INNOVA 2011 70 S)

For packaging reasons, the squeegee is supplied disassembled from the machine, and must be assembled as shown in the figure. Make sure the parking brake is engaged and that the main switch is OFF. Make sure that the squeegee support is raised, the selected working program is the transportation program.

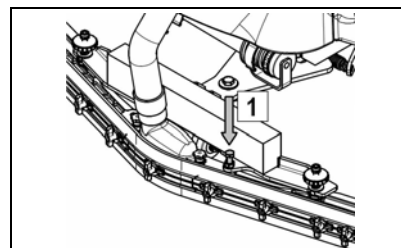
First threading left pin (1) of the squeegee into the left slot on the arm and then right pin (2) into the right slot, being careful to keep the spring and the washer above the arm's flat bar. This can be simplified by first loosening the handwheel on the pin. Then re-tighten the handwheel to block the squeegee in place. Insert the squeegee tube in the appropriate sleeve (3).



33. SQUEEGEE INCLINATION

During working operation, the rear rubber is slightly tilted backwards (by about 5mm) in a uniform way for its whole length.

If it is necessary to increase the bend of the rubber in the central part, you must tilt the squeegee backwards, rotating the adjuster screw (1) clockwise.



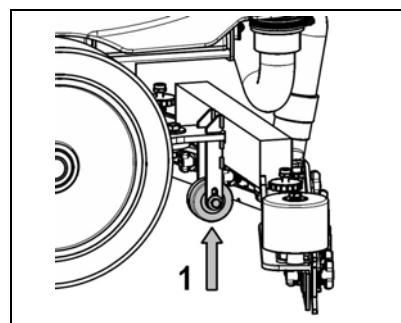
34. ADJUSTING THE SQUEEGEE SUPPORT HEIGHT

The height of the squeegee must be adjusted on the basis of the state of wear and tear of the rubber.

Carry out the following operations for adjustment:

1. unscrew the locking nut
2. raise or lower the wheel (1) by sliding it on the slot of the support
3. block it by tightening the locking nut once the required height is reached.

Note: To facilitate the operation, completely lower the squeegee and put a spacer of a few millimetres (2 to 4 mm depending on the type of rubber) under the wheel.

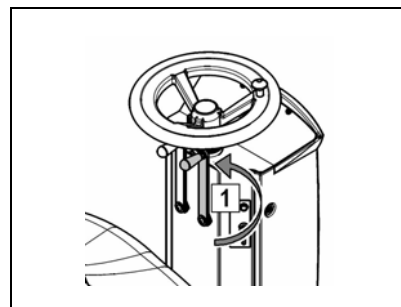


35. BRUSH ASSEMBLY (INNOVA 2011 60 B VERSIONS)

1. Make sure the parking brake is engaged and that the main switch is OFF
2. Raise the brush head by turning the righthand lever (1) for the counter-clockwise movement of the brush head.



WARNING: during this operation, verify that there are no people or objects near the brush.



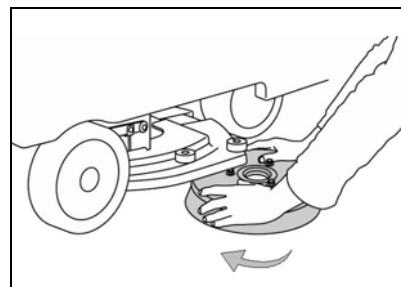


MACHINE PREPARATION

3. With the brush head up, insert the brushes in the plate housing beneath the brush head, turning them until the three pins enter the niches in the plate itself; turn the brush clockwise until the pin is pushed towards the coupling spring and is locked into place.

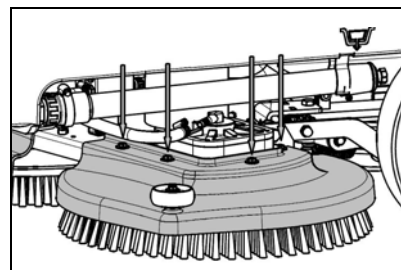


ATTENTION: you are advised to always wear protective gloves, to avoid the risk of serious injury to your hands



36. BRUSH HEAD CASING ASSEMBLY (INNOVA 2011 65-75-85 B VERSIONS)

The casing of the brushing base that for reasons of packaging are supplied disassembled from the machine, must be mounted as shown. Make sure the parking brake is engaged and that the main switch is OFF. Unscrew the 8 screws on the brush head (4 per side). Position the two casings (right and left) and secure them with the previously removed screws.

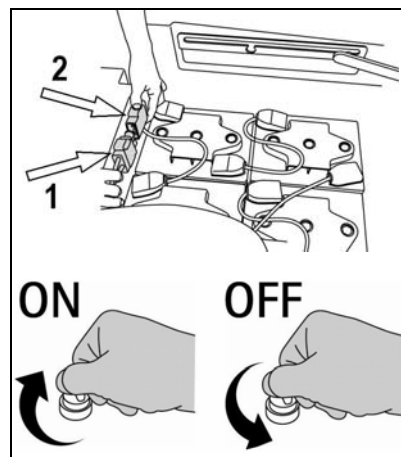


37. DISC BRUSH ASSEMBLY (INNOVA 2011 65-75-85 B VERSIONS)

1. Make sure the parking brake is engaged and that the main switch is OFF
2. Connect the battery connector
3. Turn the key to the "ON/I" position The brush head raises automatically.
4. Turn the key to the "OFF/O" position and remove it from the electrical board.



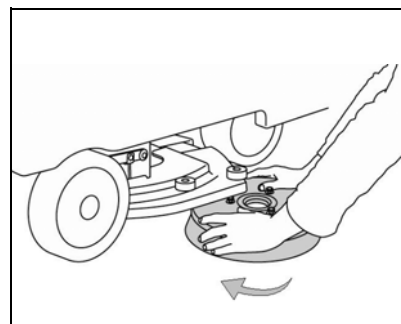
WARNING: during this operation, verify that there are no people or objects near the brush.



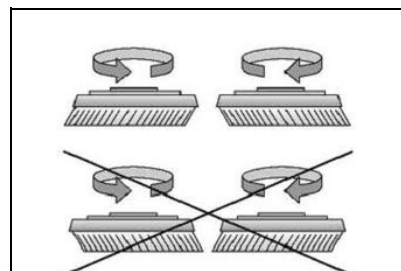
5. With the brush head up, insert the brushes in the plate housing beneath the brush head, turning them until the three pins enter the niches in the plate itself; turn until the pin is pushed towards the coupling spring and is locked into place. The photo shows the rotation direction to hook up the right-hand brush; for the left-hand one, rotate in the opposite direction.



ATTENTION: You are advised to always wear protective gloves, to avoid the risk of serious injury to your hands.



You are advised to invert the right and left-hand brushes every day. If the brushes are not new however, and have deformed bristles, it is better to reassemble them in the same position (the right-hand one on the right, and the left-hand one on the left), to prevent the different inclination of the bristles producing an overload on the brush motor as well as excessive vibrations.





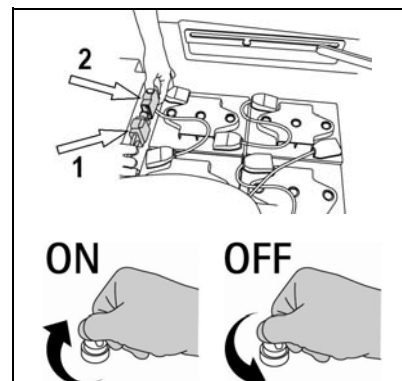
MACHINE PREPARATION

38. CYLINDRICAL BRUSH ASSEMBLY (INNOVA 2011 70 S)

1. Make sure the parking brake is engaged and that the main switch is OFF
2. Connect the battery connector
3. Turn the key to the "ON/I" position. The base raises automatically.
4. Turn the key to the "OFF/O" position and remove it from the electrical board.



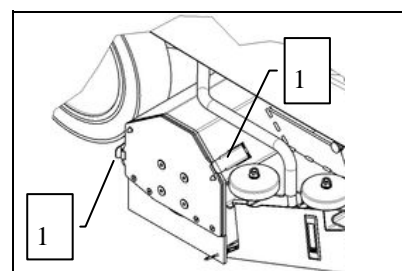
WARNING: during this operation, verify that there are no people or objects near the brush.



5. With the base in the high position, release the casing preassembly hinges stop (1) on the right of the base
6. Disconnect the right base casing from its location in the body of the base



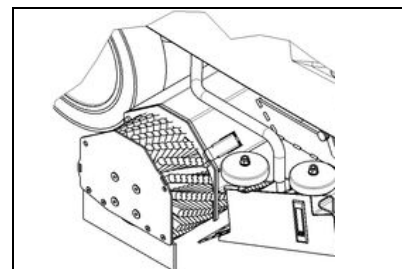
ATTENTION: you are advised to always wear protective gloves, to avoid the risk of serious injury to your hands



7. Insert the brush (the side with 5 teeth) in the tunnel until it couples with the dragging device hub on the opposite side of the tunnel.
8. Insert the idler wheel of the right base casing in the brush
9. Attach the casing preassembly stop hinges (1) on the right of the base



WARNING: Pay attention to the direction of the brush bristles during assembly, the point of the brush viewed from the above should be towards the front of the machine.



39. BRUSH HEAD EXTRA-PRESSURE (INNOVA 2011 65-75-85 B VERSIONS)

The pressure on the brushes can be increased by pressing pedal (8) located under the seat. Simply release the pedal to return to the initial condition.

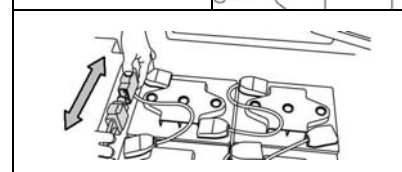
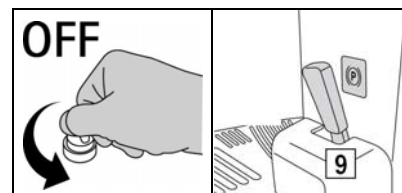
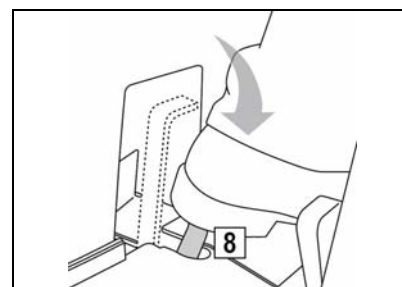
The pedal can also be locked in the maximum pressure position.

WARNING: The pedal must be released before lifting the brush head.

The pressure must be chosen according to the type of floor and the extent of the dirt. A pressure increase causes greater wear and tear of the brushes and higher energy consumption (for further information, read "CHOOSING AND USING THE BRUSHES")

If problems occur during work, turn the machine off, turn the key in the OFF position, engage the parking brake by moving the lever (9) to the left to stop the machine and disconnect the battery connector located under the operator. These commands block all moving machine parts. To resume work, once the problem has been resolved, reconnect the connector, start the machine, turning the key in the ON position, release the parking brake lever.

The machine will not start if the operator is not properly seated.





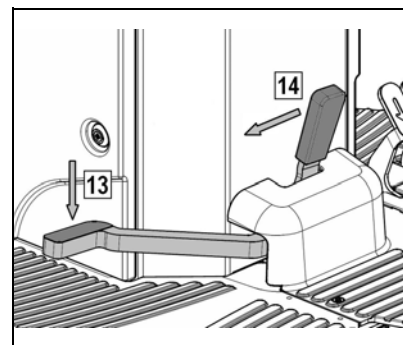
MACHINE PREPARATION

40. SERVICE BRAKE AND PARKING BRAKE

The machine has an electronic braking system. To brake, in normal conditions, just remove your foot from the accelerator pedal. If this service brake is working badly, or if necessary, activate the brake pedal (13) pushing it downwards. To engage the parking brake, press the brake pedal (13) and lock it by pulling the lever (14) to the left. The red indicator light on the instrument panel will switch on.



WARNING: to avoid any damage to the machine, always disengage the parking brake before beginning to work or before making any transfer manoeuvres.



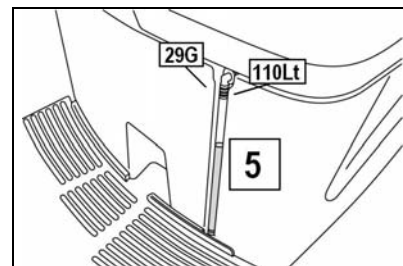
41. FLASHING LIGHT (OPTIONAL)

The machine can be equipped with a flashing light that turns on automatically when the key in the main switch is turned on.



42. EMPTY SOLUTION TANK DEVICE

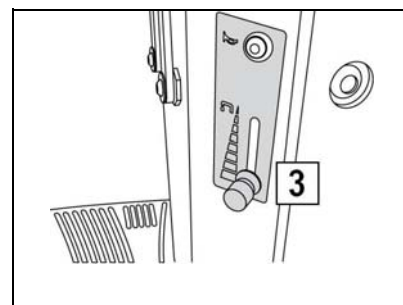
To check the quantity of water in the solution tank there is a suitable level indicator pipe (5) placed in front of the driver seat.



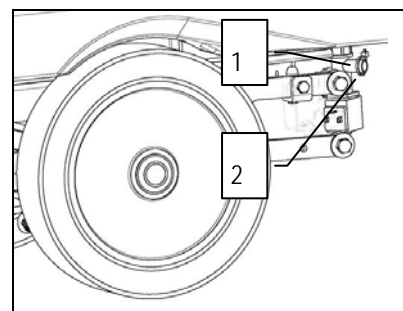
43. KIT WATER MANAGEMENT (INNOVA 2011 60 B VERSIONS)

If you want to increase the working capacity of the machine, you can replace the detergent solution choke bushing on the solenoid valve (optional) with the more suitable one included in the water management kit. To do this, proceed as follows:

1. Make sure the solution tank is empty, otherwise empty it completely
2. Check that the main switch of the machine is set to "OFF"
3. Disconnect the battery connector cable from the machine connector.
4. Close the detergent solution tap (3)



5. Remove the screw tie (1) that fixes the solution distribution tube to the solenoid valve
6. Remove the solution distribution tube from the solenoid valve
7. If present, remove the solution choke bushing (2) and replace it with the more suitable one, or insert the more suitable choke bushing at the required working capacity (the choke bushings are included in the water management kit)
8. Reassemble all the elements

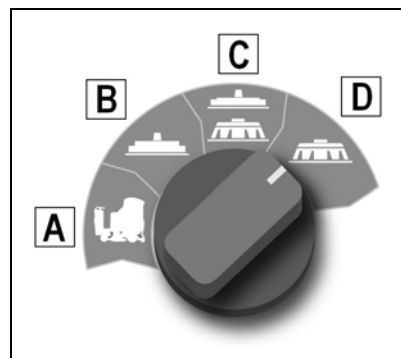
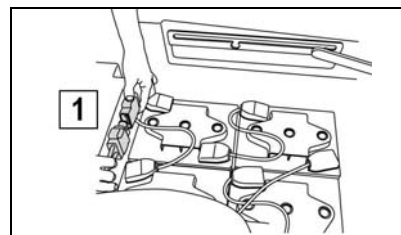




WORK

44. PREPARING TO WORK

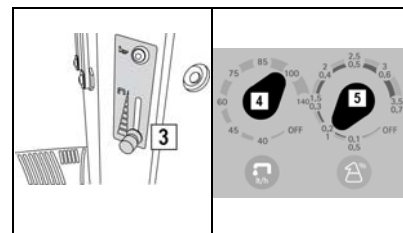
1. Make sure the recovery tank is empty, otherwise empty it completely
2. Check that the main switch of the machine is set to "0"
3. Connect the connector to the batteries (1)
4. Sit on the driver's seat
5. Check the parking brake is released (2).
6. Turn the key of the main switch a quarter of a turn clockwise (to position ON). Immediately, on the instrument panel, the display will turn on indicating the charge level of the batteries.
7. With switch-on, three consecutive screens are visualised on the monitor. The first screen shows (on the top line) what type of hour-counter has been set; in this case it's a total hour-counter (to visualise a different type - for instance partial - contact the qualified, COMAC-trained personnel). The bottom line shows the "service" setting (in this case there is no setting).
8. The second screen visualises what battery technology has been set for machine operation; in this case it's lead batteries (to set another type of battery - for instance gel - contact the qualified, COMAC-trained personnel).
9. The third and last screen (known as "work") visualises the battery charge status and the total functioning time. When the batteries supplied are fully charged, the upper line contains 8 light indicators that represent a battery. As the batteries gradually run down, the indicators go out and, with the batteries completely run down, only the battery outline flashes. The bottom line indicates the hours and minutes of functioning. The flashing ":" symbol indicates that the hour-counter is counting the machine functioning time.
10. For Innova 2011 65-75-85 B versions, select the desired working program with the I-Drive device:
 - A. Transfer: movement of the machine without working
 - B. Drying: use the squeegee only
 - C. Washing / Drying: use both the brushes and the squeegee
 - D. Washing only: use brushes only



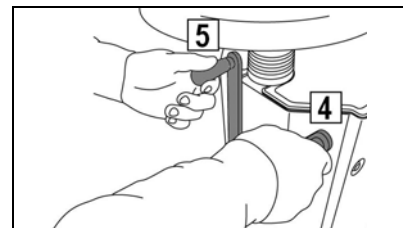


WORK

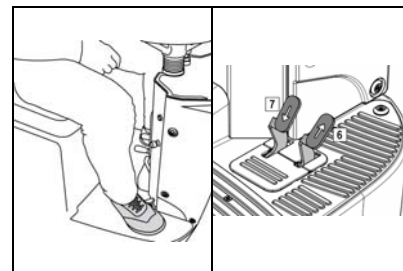
11. If the machine does not have the CDS device, move the tap lever (3) downwards and adjust the amount of desired solution.
12. If the CDS dosing system is present, the tap lever (3) must be opened full downwards completely opening the flow of water. This lever should not be touched to make adjustments. To obtain the correct dose to the brushes, use the knobs only to adjust the amount of water solution (4) and detergent (5). See paragraph "DETERGENT ADJUSTMENT WITH CDS SYSTEM".



13. For Innova 2011 60 B versions, lower the brush head by turning the righthand lever (4) clockwise, then lower the squeegee by turning the lefthand lever (5) counter-clockwise.



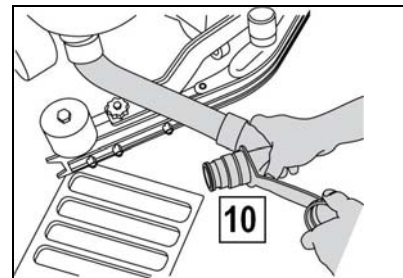
14. Pressing the accelerator pedal (6 - right pedal), the machine starts moving, both the squeegee and the brush head lower and the brushes start to turn (if the i-drive switch is on the third working program)
15. To perform a reversing manoeuvre, press both pedals (6 and 7), the squeegee will rise automatically and the machine starts to move backwards



During the first meters, check there is sufficient solution and that the squeegee dries perfectly. The machine will start working in good working order up to run out of detergent solution or until the battery is discharged.

45. OVERFLOW DEVICE (INNOVA2011 60 B)

The machine is not equipped with an overfill device, because the capacity of the recovery tank is greater than the capacity of the solution tank. In extraordinary cases, there is a mechanical device (float) on the lid that, when the recovery tank is full, shuts off the air to the suction motor intake TO protect it; the sound of the vacuum motor will then be deeper. If this happens, raise the squeegee by turning the left-hand lever clockwise. After about 15-25 seconds, switch off the suction motor by making a 1/4 turn of the key, anticlockwise. Make a 1/4 turn of the key clockwise, and take the machine to the designated water drainage area. Then proceed with emptying the recovery tank through a special drainage pipe (10). It is good practice when restoring the level of the solution tank, to empty the recovery tank through the special drainage pipe (10).

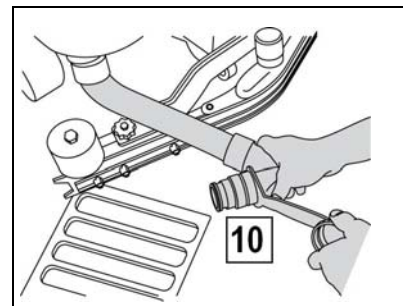


WARNING: during machine switch-on, do not keep the accelerator pedal pressed down.

46. OVERFLOW DEVICE (INNOVA2011 65-75-85 B INNOVA2011 70 S)

The machine is not equipped with an overfill device, because the capacity of the recovery tank is greater than the capacity of the solution tank. In extraordinary cases, there is a mechanical device (float) on the lid that, when the recovery tank is full, it shuts off the air to the suction motor intake protecting it, in this case the sound of the suction motor will be deeper. In this case, turn the working knob to transfer (movement of the machine without working), and the engine turns off after about 15-25 seconds. Then proceed with emptying the recovery tank through a special drainage pipe (10).

It is good practice when restoring the level of the solution tank, to empty the recovery tank through the special drainage pipe (10).

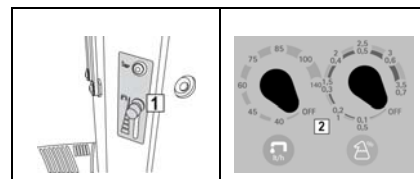




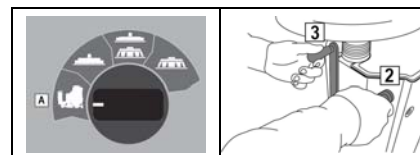
AT THE END OF THE WORK

At the end of the work, and before carrying out any type of maintenance, perform the following operations:

1. Close the tap (1) or turn the knob (2) to OFF in case of CDS dosing system.
2. Turn the I-DRIVE selector to the "Transfer" position for Innova 2011 65-75-85 B versions. Both the brush head and the squeegee rise and after a few seconds the suction motor will turn off.



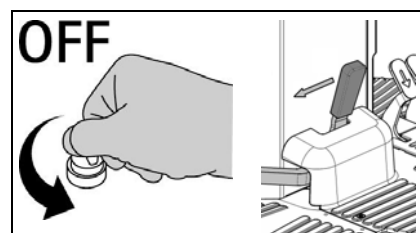
For Innova 2011 60 B versions, Raise the brush head by turning the right-hand lever (2) anticlockwise. Then raise the squeegee by turning the left-hand lever (3) clockwise. After about 15-25 seconds, switch off the suction motor by making a 1/4 turn of the key, anticlockwise.



3. Make a 1/4 turn of the key clockwise, and take the machine to the designated water drainage area
4. Turn the machine off by turning the key one quarter turn counter-clockwise and remove it from the panel.
5. Engage the parking brake



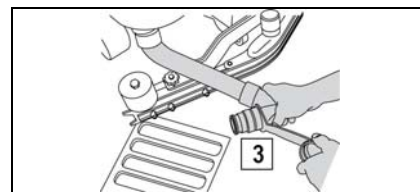
ATTENTION: Before performing any maintenance, remove the keys from the panel and disconnect the battery connector of the machine.



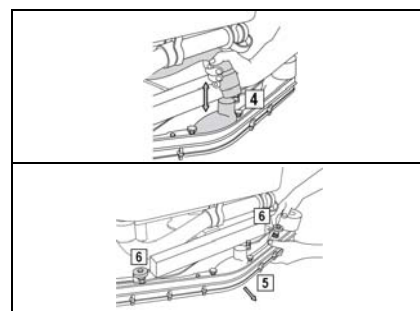
6. Disconnect the tube (3) from its seat, unscrew the drainage cap and empty the recovery tank.



WARNING: this operation must be carried out by using gloves in order to protect against contact with dangerous solutions



7. Slide the suction tube (4) from the squeegee sleeve
8. Remove the squeegee (5) from the support arm by unscrewing the handwheel (6).
9. Clean well both the squeegee and the rubbers with a jet of water.
10. After cleaning the squeegee and rubbers, replace the squeegee on the initial support, firstly inserting the left pin of the squeegee in the left slot of the arm, then the right pin in the right slot, being careful to keep the spring and washer on the plate of the arm. This can be simplified by first loosening the handwheel on the pin. Then re-tighten the handwheel to block the squeegee in place.
11. Finally insert the squeegee tube in the special sleeve.
12. Lift the recovery tank and connect the battery connector
13. Sit on the driver's seat



14. Insert the key into the ignition switch and turn it a quarter turn clockwise (to position ON)
15. Disengage the parking brake
16. Park the machine in a closed place, in an area where it cannot cause damage to people or other property, but also be protected from an accidental fall of objects.
17. Engage the parking brake
18. Turn the ignition key a quarter turn counter-clockwise (OFF position) and remove the key
19. Lift the recovery tank and disconnect the battery connector



ATTENTION: do not leave the machine unattended without first removing the start-up switch key and applying the parking brake. In addition, do not park the machine in open places or on sloping floors



DAILY MAINTENANCE

PERFORM ALL MAINTENANCE OPERATIONS IN SEQUENCE

47. CLEANING THE RECOVERY TANK

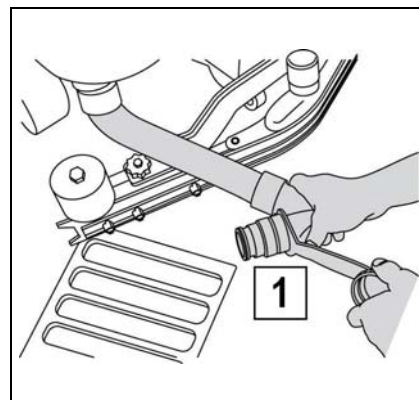
1. Disconnect the tube (1) from its seat, unscrew the drainage cap and empty the recovery tank.



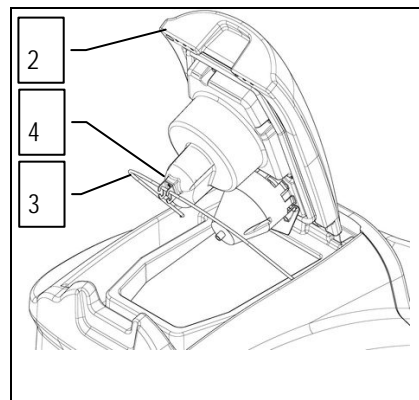
ATTENTION: Before performing any maintenance, remove the keys from the panel and disconnect the battery connector of the machine.



WARNING: this operation must be carried out wearing gloves to protect against contact with dangerous solutions.

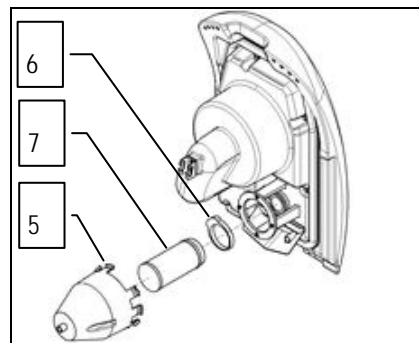


2. Raise the cap (2) until the hook (4) is secured to the prop (3) of the recovery tank.
3. Clean and rinse the recovery tank and the suction pipe (connecting pipe between the squeegee and the tank).
4. Reposition the cap on the drainage tube and lower the suction cap. To lock the prop (3) just slightly raise the cap, release the prop (3) and lower the cap up to close it.



48. CLEANING THE SUCTION MOTOR FILTER

1. Raise the suction cover (2) and block it with the stop (3)
2. Remove the suction filter protection (5) by rotating it clockwise
3. Release the retaining clips (6)
4. Remove the suction filter (7) from its seat
5. Use a jet of water to clean the walls and brush head of the filter
6. Reassemble all the elements



ATTENTION: These operations must be carried out using gloves to protect against contact with dangerous solutions



ATTENTION: Before performing any maintenance, remove the keys from the panel and disconnect the battery connector of the machine.



DAILY MAINTENANCE

49. CLEANING THE SQUEEGEE

The careful cleaning of the whole suction group ensures better drying and cleaning of the floor as well as greater duration of the suction motor. Proceed as follows for cleaning:

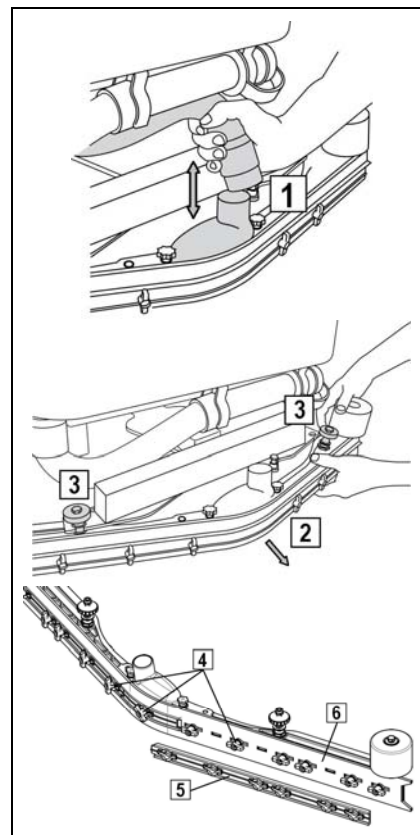
1. Slide the suction tube (1) from the squeegee sleeve.
2. Remove the squeegee (2) from the support arm by unscrewing the handwheel (3).
3. Check the wear of the rubbers. If the edge of the rubber is ruined, the rear rubber can be turned on all four corners. If the rubbers are completely worn proceed with the replacement. To remove the rubber, turn the wing nuts (4) in a horizontal position, remove the rubber-pressing blade (5) and then remove the rubber to turn it or replace it.
4. Proceed in reverse to replace the rubber.
5. After cleaning, replace the squeegee (2) on the initial support, firstly inserting the left pin of the squeegee in the left slot of the arm, then the right pin in the right slot, being careful to keep the spring and washer on the plate of the arm. This can be simplified by first loosening the handwheel (3) on the pin. Then re-tighten the handwheel (3) to block the squeegee in place.
6. Finally insert the squeegee tube in the special sleeve.



ATTENTION: Before performing any maintenance, remove the keys from the panel and disconnect the battery connector of the machine.



ATTENTION: These operations must be carried out using gloves to protect against contact with dangerous solutions



50. CLEANING THE SOLUTION TANK AND FILTER

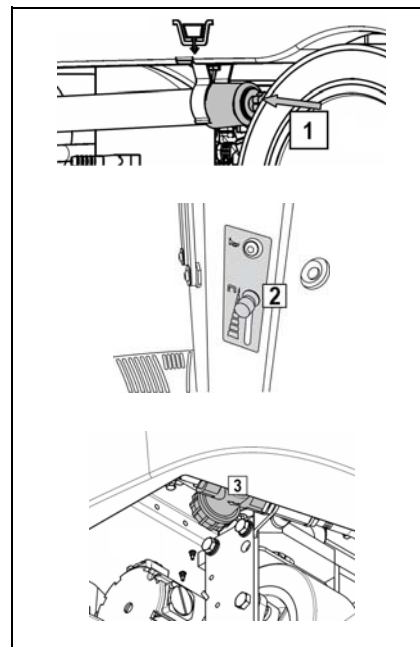
1. Disconnect the clean water drainage pipe (1) from its housing on the left side of the machine, unscrew the cap and empty the tank.
2. Remove the plug from the solution tank refill opening.
3. Rinse the inside of the tank with a jet of water.
4. Close the drainage pipe with the cap and put it in place.
5. Close the water tap (2).
6. Unscrew the filter (3) at the front of the machine.
7. Remove the internal filter cartridge and rinse everything thoroughly with running water.
8. Reassemble all the elements.



ATTENTION: Before performing any maintenance, remove the keys from the panel and disconnect the battery connector of the machine.



ATTENTION: These operations must be carried out using gloves to protect against contact with dangerous solutions





DAILY MAINTENANCE

51. CLEANING THE FILTER AND SOLUTION TANK (S VERSION)

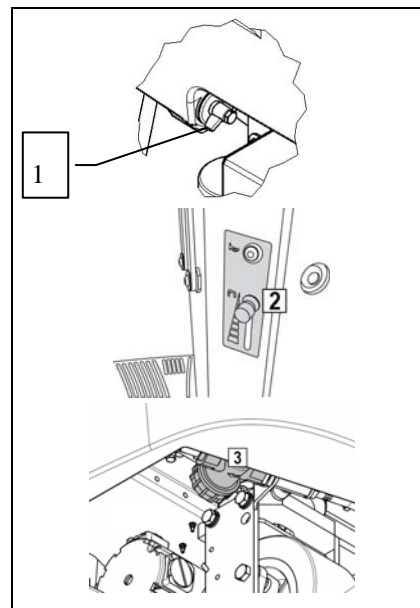
1. Remove the drainage cap (1) and empty the tank
2. remove the plug from the solution tank refill opening
3. rinse the inside of the tank with a jet of water
4. Close the drainage pipe with the cap and put it in place.
5. Close the water tap (2).
6. Unscrew the filter (3) at the front of the machine.
7. Remove the internal filter cartridge and rinse everything thoroughly with running water.
8. Reassemble all the elements.



ATTENTION: Before performing any maintenance, remove the keys from the panel and disconnect the battery connector of the machine.



ATTENTION: These operations must be carried out using gloves to protect against contact with dangerous solutions



52. DISC BRUSH ASSEMBLY (INNOVA 2011 60 B VERSIONS)

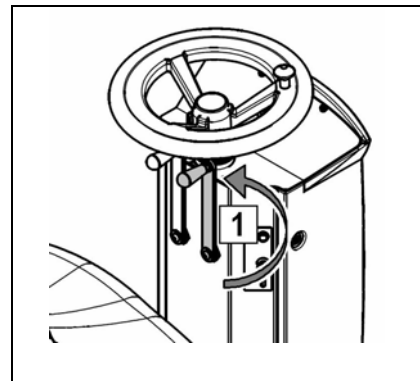
1. Raise the brush head by turning the righthand lever (1) for the counter-clockwise movement of the brush head.



ATTENTION: Before performing any maintenance, remove the keys from the panel and disconnect the battery connector of the machine.



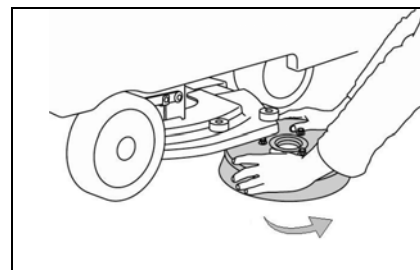
WARNING: during this operation, verify that there are no people or objects near the brush.



2. Rotate the brush counter-clockwise until it comes out of the brush-holder plate seat, as shown in the figure.

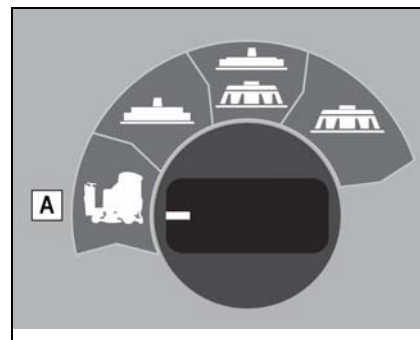


ATTENTION: you are advised to always wear protective gloves, to avoid the risk of serious injury to your hands



53. DISC BRUSH DISASSEMBLY (INNOVA 2011 65-75-85 B VERSIONS)

1. Turn the key to the ON/I position.
2. Turn the I-DRIVE selector to the "Transfer" position. The brush head will lift if not already lifted.
3. Turn the key to the "OFF/O" position and remove it from the electrical board.
4. Rotate the brush counter-clockwise until it comes out of the brush-holder plate seat, as shown in the figure. The photo shows the direction of rotation for releasing the right brush. Rotate in the opposite direction for the left brush.





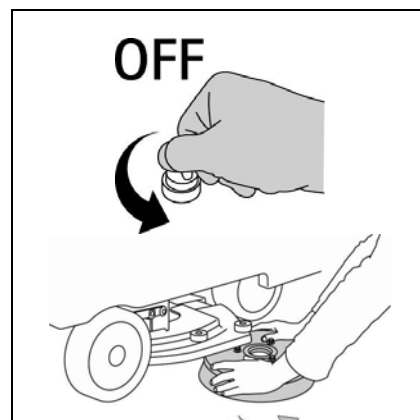
DAILY MAINTENANCE



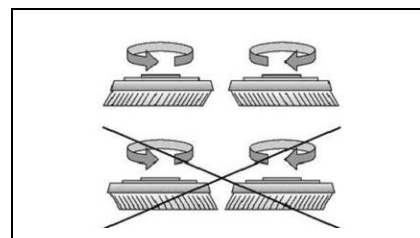
WARNING: Before performing any maintenance, remove the keys from the panel and disconnect the battery connector of the machine.



WARNING: This operation must be carried out using gloves to protect against contact with dangerous solutions.



You are advised to invert the right and left-hand brushes every day. If the brushes are not new however, and have deformed bristles, it is better to reassemble them in the same position (the right-hand one on the right, and the left-hand one on the left), to prevent the different inclination of the bristles producing an overload on the brush motor as well as excessive vibrations.



54. DISASSEMBLY OF CYLINDRICAL BRUSHES (S VERSIONS)

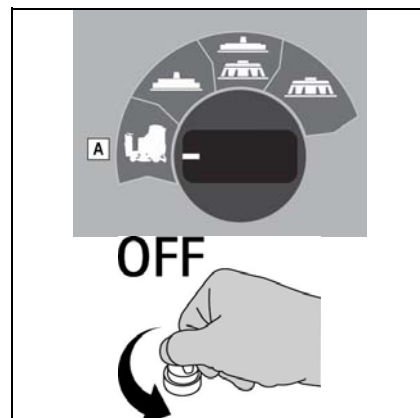
1. Turn the key to the ON/I position.
2. Turn the I-DRIVE selector to the "Transfer" position. The base will lift if not already lifted.
3. Turn the key to the "OFF/O" position and remove it from the electrical board.



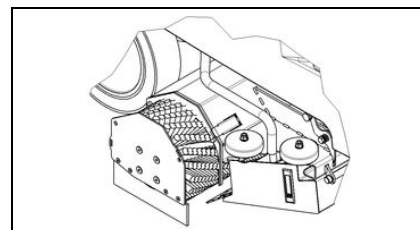
WARNING: Before performing any maintenance, remove the keys from the panel and disconnect the battery connector of the machine.



WARNING: This operation must be carried out using gloves to protect against contact with dangerous solutions.

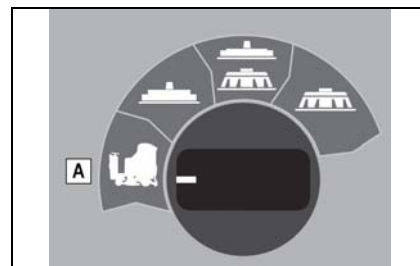


4. With the base in the high position, release the casing preassembly hinges stop on the right of the base
5. Disconnect the right base casing from its location in the body of the base
6. Remove the brushes from the tunnel, clean with a water jet and replace them. Check the bristles are not worn; in the event of excessive wear, replace the brushes (the bristles should be at least 10mm long)
7. Clean the side rubber splash guards of the base
8. reassemble all the elements.



55. CLEANING DEBRIS HOPPER (S VERSIONS)

1. Turn the key to the ON/I position.
2. Turn the I-DRIVE selector to the "Transfer" position. The base will lift if not already lifted.
3. Turn the key to the "OFF/O" position and remove it from the electrical board.





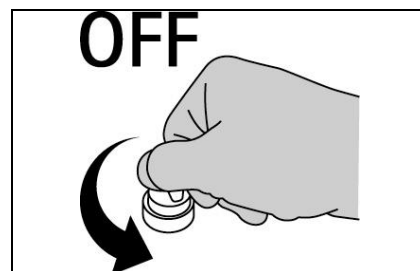
DAILY MAINTENANCE



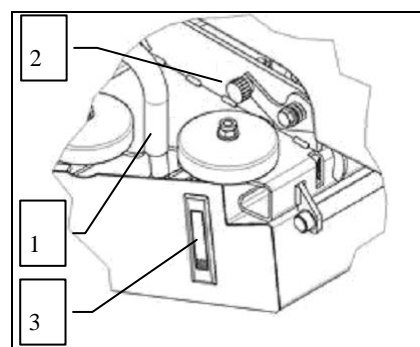
WARNING: Before performing any maintenance, remove the keys from the panel and disconnect the battery connector of the machine.



WARNING: This operation must be carried out using gloves to protect against contact with dangerous solutions.



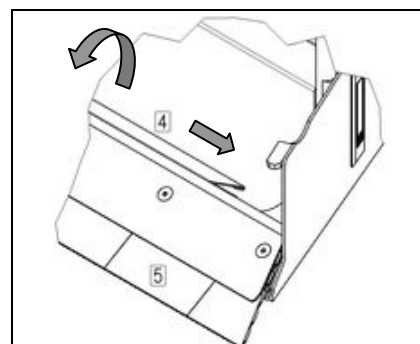
4. Disconnect the hopper suction hose (1)
5. Turn the knob (2) counter-clockwise until the hopper locking lever allow its extraction
6. Using the flush handle (3) remove the hopper and empty it



7. Check the wear of the rubber (5) and clean it with a jet of water
8. Turn the hopper suction filter (4) counter-clockwise, pulling it towards the suction hose and extract it from the retainer pin
9. Clean underneath with a jet of water and check it is working correctly
10. reassemble all the elements.



WARNING: If the rubber is worn, contact a qualified FIMAP technician for its replacement



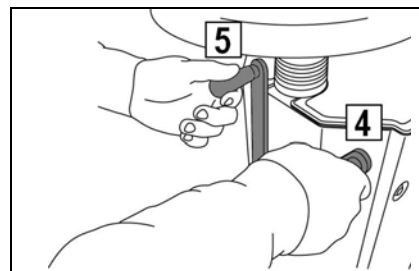


WEEKLY MAINTENANCE

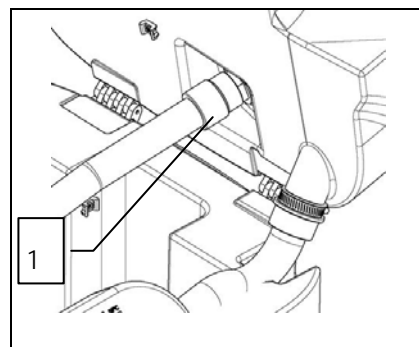
56. CLEANING OF THE SUCTION HOSE (INNOVA 2011 60 B VERSIONS)

Whenever suction seems to be unsatisfactory, check that the suction tube (1) is not obstructed. If necessary clean with a jet of water as follows:

1. Make sure the recovery tank is empty, otherwise empty it
2. Turn the key to the "OFF/0" position and remove it from the electrical board.
3. Raise the squeegee body from the ground by turning lever (5) clockwise
4. Raise the brush head body from the ground by turning lever (4) counter-clockwise



5. Remove the tube from the squeegee suction nozzle
6. Grip the handle under the seat to open the recovery tank.
7. Lift the recovery tank until it hooks to the end of the safety clamp.
8. Detach the aspiration tube from the seat on the recuperation tank (1)
9. Clean it with a water jet introduced from the side where it is connected to the tank
10. Reassemble all the elements



WARNING: Before performing any maintenance, remove the keys from the panel and disconnect the battery connector of the machine.

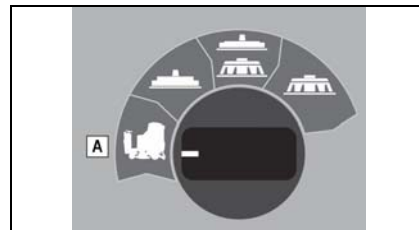


WARNING: This operation must be carried out using gloves to protect against contact with dangerous solutions.

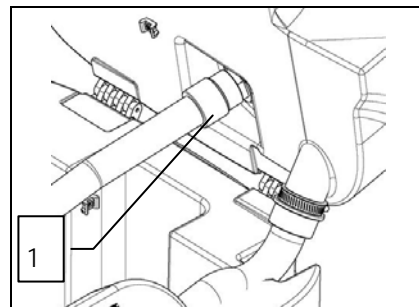
57. CLEANING OF THE SUCTION HOSE (INNOVA 2011 65-75-85 B VERSIONS)

Whenever suction seems to be unsatisfactory, check that the suction tube (1) is not obstructed. If necessary clean with a jet of water as follows:

1. Make sure the recovery tank is empty, otherwise empty it completely
2. Turn the key to the ON/I position.
3. Turn the I-DRIVE selector to the "Transfer" position. The brush head will lift if not already lifted.
4. Turn the key to the "OFF/0" position and remove it from the electrical board.



5. Remove the tube from the squeegee suction nozzle
6. Make sure the recovery tank is empty, otherwise empty it completely
7. Grip the handle under the seat to open the recovery tank.
8. Lift the recovery tank until it hooks to the end of the safety clamp.
9. Detach the aspiration tube from the seat on the recuperation tank (1)
10. Clean it with a water jet introduced from the side where it is connected to the tank
11. Reassemble all the elements.





WEEKLY MAINTENANCE



WARNING: Before performing any maintenance, remove the keys from the panel and disconnect the battery connector of the machine.



WARNING: This operation must be carried out using gloves to protect against contact with dangerous solutions.

58. CLEANING OF THE SUCTION HOSE (S VERSIONS)

Whenever suction seems to be unsatisfactory, check that the suction tube (1) is not obstructed. If necessary clean with a jet of water as follows:

1. Turn the key to the ON/I position.
2. Turn the I-DRIVE selector to the "Transfer" position. The base will lift if not already lifted.
3. Turn the key to the "OFF/O" position and remove it from the electrical board.

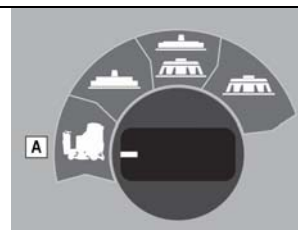


WARNING: Before performing any maintenance, remove the keys from the panel and disconnect the battery connector of the machine.

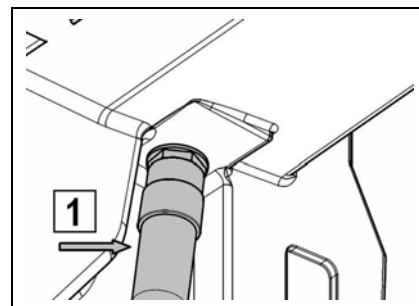


WARNING: This operation must be carried out using gloves to protect against contact with dangerous solutions.

4. Remove the suction hose from the squeegee nozzle
5. Remove the suction hose from the waste collection tray
6. Make sure the recovery tank is empty, otherwise empty it completely
7. Grip the handle under the seat to open the recovery tank.
8. Lift the recovery tank until it hooks to the end of the safety clamp.
9. Detach the aspiration tube from the seat on the recuperation tank (1)
10. Clean it with a water jet introduced from the side where it is connected to the tank
11. Reassemble all the elements.



OFF



59. CLEANING OF THE DETERGENT CANISTER (VERSIONS WITH CDS)

The detergent canister must be carefully cleaned at least once a week in order to keep the machine in perfect working order:

1. Turn the key to the "OFF/O" position and remove it from the electrical board.
2. Open the compartment at the front of the machine (2)
3. Unscrew the detergent filler cap
4. Remove the tank and clean any residue of detergent.
5. Place the canister in the compartment and tighten the cap, making sure that the detergent suction pipe touches the bottom.
6. Close the compartment door.



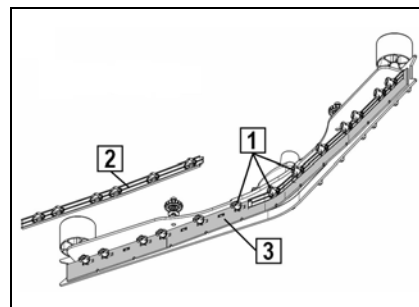


EXTRAORDINARY MAINTENANCE

60. REPLACING THE FRONT SQUEEGEE RUBBER

Suction will be poor and the machine will not dry perfectly if the front squeegee rubber is worn. Proceed as follows to replace:

1. Turn the key to the "OFF/0" position and remove it from the electrical board.
2. Remove the squeegee from the support arm by unscrewing the handwheel.
3. Turn the wing nuts (1) in the horizontal position.
4. Remove the front rubber-pressing blades (2).
5. Remove the rubber (3) and replace it.
6. Proceed in reverse to replace the rubber.

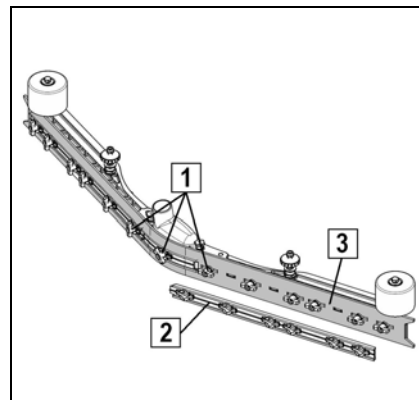


61. REPLACING THE REAR SQUEEGEE RUBBER

If the squeegee rear rubber is worn and does not dry well, it is possible to change the drying edge using one of the 4 edges of the rubber.

This operation can be done both with a squeegee fitted or removed as follows:

1. Turn the key to the "OFF/0" position and remove it from the electrical board.
2. Turn the wing nuts (1) in the horizontal position.
3. Remove the rear rubber-pressing blades (2).
4. Remove the rubber (3) and replace it.
5. Proceed in reverse to replace the rubber
6. adjust the height of the squeegee depending on the rubber (see "ADJUSTING THE HEIGHT OF THE SQUEEGEE SUPPORT")



62. REPLACEMENT OF THE BRUSH HEAD CASING

Periodically check the condition of the brush head casings that serve as protection to the rotation of the brushes. To replace proceed as follows:

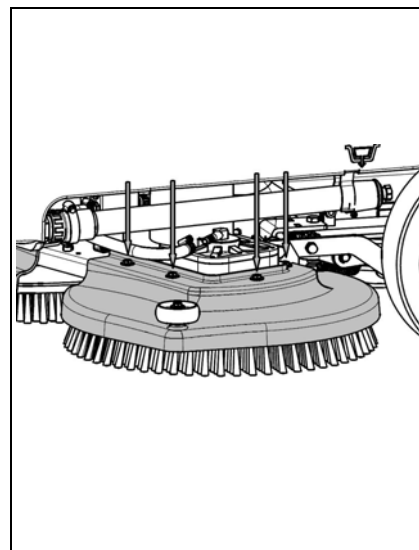
1. Make sure that the brush head body is lowered, otherwise lower it
2. Turn the key to the "OFF/0" position and remove it from the electrical board.
3. Ensure to remove the screws securing the casing
4. Dismantle the casings
5. Fit the new casings with the screws previously removed



WARNING: Before performing any maintenance, remove the keys from the panel and disconnect the battery connector of the machine.



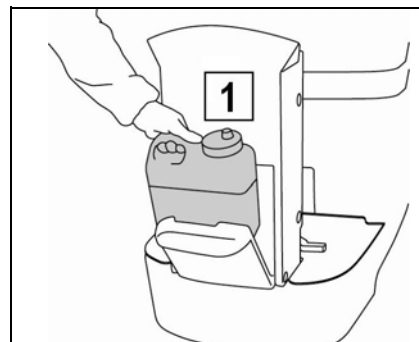
WARNING: The housing can prevent damage to persons or property. Always check for wear.



63. CLEANING OF THE DOSING SYSTEM (VERSIONS WITH CDS)

The dosing system should be cleaned when the machine is not used for a long period (more than 48 hours); to do so, proceed as follows:

1. Check that the main switch is in the "Off - 0" position
2. Check that the battery connector is disconnected from the machine connector
3. Check the parking brake is correctly engaged
4. Make sure the recovery tank is empty, otherwise empty it
5. Open the detergent canister compartment (1) located in front of the steering column



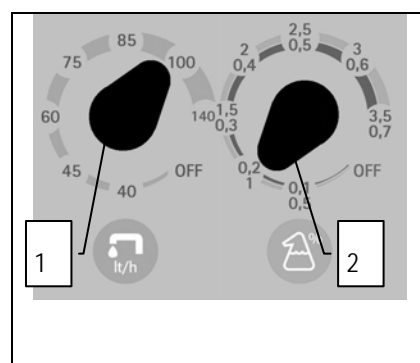
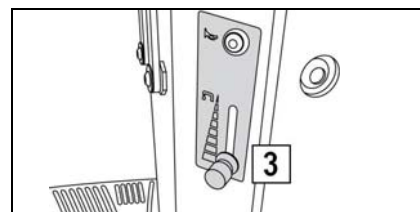


EXTRAORDINARY MAINTENANCE

6. Unscrew the detergent tank cap and fill the tank with clean water
7. Close the lid of the detergent tank, taking care that the suction filter is positioned at the bottom of the tank. Reposition it in the tank compartment
8. Check there is clean water in the solution tank
9. Check that the water tap is turned on fully (3)
10. Check that the by-pass tap is in the "dosing system" position
11. Turn the water flow rate adjustment knob (1) to the maximum position
12. Turn the detergent percentage adjustment knob (2) to the maximum position
13. Insert the battery connector into the machine connector.
14. Place the main switch in position "ON – I"
15. Disengage the parking brake
16. Select the "Wash only" program with the I-Drive device
17. Press the forward movement pedal to activate the brush head and the dosing system
18. Wait a few moments with the dead man's lever pressed (normally 2 to 4 seconds) to allow the cleaning of the dosing system
19. Completely empty the solution tank and the detergent canister
20. Park the machine in a safe manner



WARNING: The machine will deliver solution during this operation

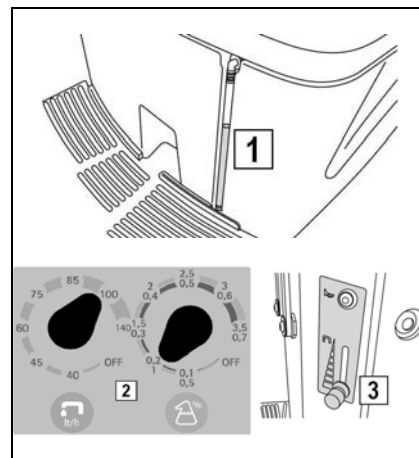




TROUBLESHOOTING

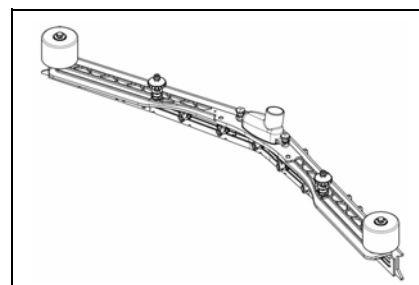
64. INSUFFICIENT WATER ON THE BRUSHES

1. Check there is water in the solution tank (1).
2. Check that the water / detergent selectors (2) and tap (3) are open for the CDS versions.
3. Check that the tap (3) is turned on for versions without CDS.
4. Clean the solution filter located at the front of the machine.
5. Check if the choke bushing is not blocked for the Innova 2011 60 B versions with "KIT WATER MANAGEMENT"



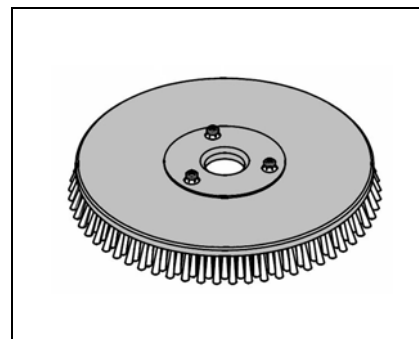
65. THE SQUEEGEE DOES NOT DRY PERFECTLY

1. Check the squeegee is clean
2. Check the regulation of the squeegee (see "MACHINE PREPARATION")
3. Clean the entire suction unit (see "WEEKLY MAINTENANCE")
4. Replace the rubbers, if worn



66. THE MACHINE DOES NOT CLEAN WELL

1. Check the state of wear and tear of the brushes and, if necessary, replace them. The brushes should be changed when the bristles are about 15mm long. To replace them, see "REPLACING THE BRUSHES", or "DISASSEMBLING THE BRUSHES" and "ASSEMBLING THE BRUSHES". Working with over-worn brushes may cause damage to the floor.
2. Use a different kind of brush to the one fitted as standard. For cleaning floors where the dirt is particularly resistant, we recommend the use of special brushes supplied upon request and according to needs (see "CHOOSING AND USING THE BRUSHES").



67. EXCESSIVE FOAM PRODUCTION

Check that a low foam detergent has been used. If necessary, add a small quantity of antifoam liquid to the recovery tank.

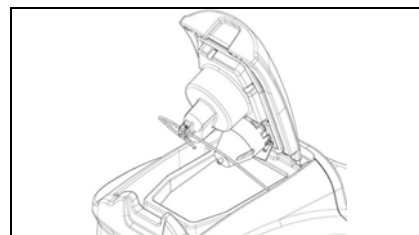
Remember that, when the floor is not very dirty, more foam is generated. In this case the detergent solution should be more diluted.



TROUBLESHOOTING

68. THE SUCTION DOES NOT FUNCTION

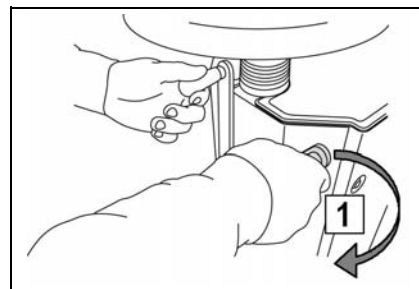
1. Check whether the recovery tank is full and, if necessary, empty it.
2. Check the float switch on the suction cap (see also "CLEANING THE RECOVERY TANK" in the chapter "DAILY MAINTENANCE").



69. THE BRUSHES MOTOR DOES NOT FUNCTION (INNOVA 2011 60 B VERSIONS)

ATTENTION To avoid damaging the floor, the motor only starts up when the machine is moved forwards

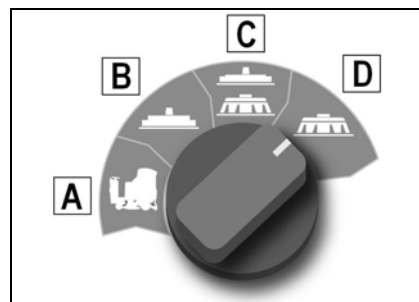
1. Check that during the forward movement of the brush head is lowered using the righthand lever (1) rotated clockwise.
2. The operator must be properly seated in the driving position
3. Check no thermal protection device has intervened.
4. Check the correct connection of the motor to the terminal under the footboards.



70. THE BRUSHES MOTOR DOES NOT FUNCTION (INNOVA 2011 65 -75-85 B VERSIONS)

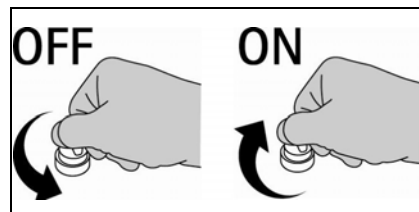
ATTENTION To avoid damaging the floor, the motor only starts up when the machine is moved forwards

1. Check that the brush head is lowered during start-up.
2. The operator must be properly seated in the driving position.
3. Check that the I-DRIVE selector is on "C" or "D" (brushes operating function).
4. Check no thermal protection device has intervened.
5. Check the correct connection of the motor to the terminal under the footboards.



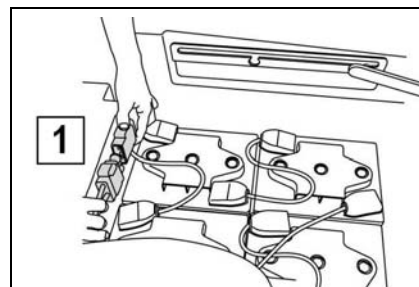
71. IT IS IMPOSSIBLE TO RAISE OR LOWER THE BRUSH HEAD OR SQUEEGEE

The machine is fitted with electrical protection devices that control the brush head and squeegee ascent/descent motor reducers. In the event of overloading, the fuses interrupt the power supply. After checking and removing the reason for the problem, to reset them just switch the machine off then on again. If the problem persists, contact the COMAC technical assistance centre.



72. THE MACHINE DOES NOT START

1. Check that connector (1) is connected to the batteries.
2. Check the key switch is ON/I.
3. Check that batteries are charged.



73. ELECTRIC FUSES AND THERMAL CUT-OUTS

In addition to general 80 A fuses, the machine is also fitted with self-restoring safety fuses located on the boards in the electric system that interrupt the power supply to the brush and suction motors when the machine exceeds the predetermined load. To restore the power supply to the motor, switch off the machine and wait for the fuses to cool down (about 40 seconds). If the switch disconnects the current several times in a row, contact the COMAC technical assistance centre.



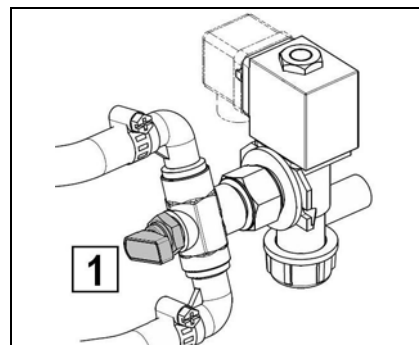
TROUBLESHOOTING

74. THE AUTOMATIC WATER/DETERGENT DOSING SYSTEM DOES NOT WORK

The automatic water/detergent dosing system has been designed with criteria of extreme sturdiness and reliability, but there is a special by-pass system that allows you to use the machine even if the system is out-of-use.

To by-pass the automatic water/detergent dosing system, you must rotate the tap lever (1) on the rear-centre of the brush head downwards; in this way you can go on working even with the system out-of-use. Remember, however, to put not only water in the solution tank, but the right quantities of both water and detergent. With the dosing system out-of-use, the water flow is regulated via the tap on the steering column.

Contact an Authorised Retailer to have the system repaired.





DISPOSAL

To dispose of the machine, take it to a demolition centre or an authorised collection centre.

Before scrapping the machine it is necessary to remove and separate the following materials and send them to the appropriate collection centres in accordance with the environmental hygiene regulations currently in force:

- brushes
- filter
- electric and electronic parts*
- batteries
- plastic parts (tanks and handlebars)
- metal parts (levers and frame)

(*) In particular, to scrap the electric and electronic parts, contact your area distributor



CHOOSING AND USING THE BRUSHES

POLYPROPYLENE BRUSH (PPL)

Used on all types of floors. Good resistance to wear and tear, and hot water (no greater than 60°C). The Polypropylene brush is non-hygroscopic and therefore retains its characteristics even when working in wet conditions.

NYLON BRUSH

Used on all types of floors. Excellent resistance to wear and tear, and hot water (even over 60°C). The nylon is hygroscopic and so tends to lose its characteristics over time when working in wet conditions.

ABRASIVE BRUSH

The bristles of this type of brush are charged with highly aggressive abrasives. It is used to clean very dirty floors. To avoid floor damage, work only with the pressure strictly necessary.

THICKNESS OF THE BRISTLES

Thicker bristles are more rigid and are therefore used on smooth floors or floors with small joints.

On uneven floors or those with deep joints, it is advisable to use softer bristles which can enter the gaps more easily.

Remember that when the bristles are worn and therefore too short, they will become rigid and are no longer able to penetrate and clean deep down. In this case, like with overlarge bristles, the brush tends to jump.

PAD HOLDER

The pad holder is recommended for cleaning shiny surfaces.

There are two types of pad holder:

1. the traditional pad holder is fitted with a series of anchor points that allow the abrasive floor pad to be held and dragged while working
2. the CENTRE LOCK type pad holder not only has anchor points, but also a snap-type central locking system in plastic that allows the abrasive floor pad to be perfectly centred and held without any risk of it becoming detached. This type of dragging device is recommended above all for machines with more than one brush, where the centring of the abrasive discs is difficult.

TABLE FOR CHOOSING THE BRUSHES

Machine	No. Brush	Code	Type of bristles	Ø Bristl	Ø Brush.	Length	Notes
INNOVA 60	1	405630 405629 405627 405628 405519	PPL PPL NYLON TYNEX (ABRASIVE) PAD HOLDER	0.6 0.9 0.9	610 610 610 610 585		CENTER LOCK
INNOVA 65	2	422189 422971 422972 422981 422973	PPL PPL PPL TYNEX (ABRASIVE) PAD HOLDER	0.3 0.6 0.9	340 340 340 340 330		CENTER LOCK
INNOVA 75	2	427715 427716 427717 427719 427718	PPL PPL PPL TYNEX (ABRASIVE) PAD HOLDER	0.3 0.6 0.9	390 390 390 390 380		CENTER LOCK
INNOVA 85	2	430696 430697 430698 430699 431122	PPL PPL PPL TYNEX (ABRASIVE) PAD HOLDER	0.3 0.6 0.9	430 430 430 430 410		CENTER LOCK
INNOVA 70	1	431774 432423 432425	PPL PPL TYNEX MIXED STEEL	0.8 1 0.6 + 1	210	690	



EC DECLARATION OF CONFORMITY

The undersigned manufacturer:
COMAC S.p.A.
Via Maestri del Lavoro, 13
37059 Santa Maria di Zevio (VR)
declares under its sole responsibility that the product

SCRUBBING MACHINES
mod. INNOVA 2011 60 B - INNOVA 2011 65 B - INNOVA 2011 75 B - INNOVA 2011 85 B

complies with the requirements of the following Directives:

- 2006/42/EC: Machinery Directive
- 2006/95/EC: Low Voltage Directive
- 2004/108/EC: Electromagnetic Compatibility Directive

They also comply with the following standards:

- EN 60335-1: Household and similar electrical appliances - Safety. Part 1: Generic standards
- EN 60335-2-72: Household and similar electrical appliances. Part 2: Generic standards for automatic machines for floor treatment for commercial and industrial use
- EN 60335-2-29: Household and similar electrical appliances. Part 2: Special standards for battery chargers.
- EN 12100-1: Machine safety - Fundamental concepts, fundamental principles of design - Part 1: Basic terminology and methodology
- EN 12100-2: Machine safety - Fundamental concepts, fundamental principles of design - Part 2: Technical principles
- EN 61000-6-2: Electromagnetic compatibility (EMC) - Part 6-2: Generic standards – Immunity for industrial environments.
- EN 61000-6-3: Electromagnetic compatibility (EMC) - Part 6-3: Generic standards — Standard emission for residential, commercial and light-industrial environments.
- EN 61000-3-2: Electromagnetic compatibility (EMC) - Part 3-2: Limits – Limits for harmonic current emissions (Equipment with input current ≤ 16 A per phase).
- EN 61000-3-3: Electromagnetic compatibility (EMC) - Part 3-3: Limits – Restriction of voltage variations and flicker in low voltage power supply systems for devices with a rated current ≤ 16 A.
- EN 55014-1: Electromagnetic compatibility - Regulations for household appliances, electrical devices and similar equipment. Part 1: Emission - Regulation for product family.
- EN 55014-2: Electromagnetic compatibility - Regulations for household appliances, electrical devices and similar equipment. Part 2: Immunity - Regulation for product family.
- EN 62233: Household and similar electrical appliances - Electromagnetic fields Methods for evaluation and measurement

The person authorised to compile the technical file:

Sig. Giancarlo Ruffo
Via Maestri del Lavoro, 13
37059 Santa Maria di Zevio (VR) - ITALY

Santa Maria di Zevio (VR), 08/06/2012

COMAC S.p.A.
Legal representative
Giancarlo Ruffo

COMAC spa
Via Maestri del Lavoro, 13 – 37059 Santa Maria di Zevio – Verona – ITALY
Tel. +39 045 8774222 – Fax +39 045 8750303 - E-mail: com@comac.it or info@comac.it - www.comac.it



EC DECLARATION OF CONFORMITY

The undersigned manufacturer:
COMAC S.p.A.
Via Maestri del Lavoro, 13
37059 Santa Maria di Zevio (VR)
declares under its sole responsibility that the product

SCRUBBING MACHINES
mod. INNOVA 2011 70 S

comply with the requirements of the following Directives:

- 2006/42/EC: Machinery Directive
- 2006/95/EC: Low Voltage Directive
- 2004/108/EC: Electromagnetic Compatibility Directive
- 2000/14/EC: Directive by the European Parliament and Council date 8th May, 2000. Noise emission by machines and equipment for outdoor use.

Falling into the category of roadsweeper as defined in Annex 46 of Directive 2000/14/EC of the European Parliament and the Council, is subject to noise marking only.

The conformity evaluation was carried out in accordance with enclosure III.B.46 of the said directive.

MODEL	LwA [dB(A)]	LwA, guaranteed [dB(A)]

They also comply with the following standards:

- EN 60335-1: Household and similar electrical appliances - Safety. Part 1: Generic standards.
- EN 60335-2-72: Household and similar electrical appliances. Part 2: Generic standards for automatic machines for floor treatment for commercial and industrial use.
- EN 60335-2-29: Household and similar electrical appliances. Part 2: Special standards for battery chargers.
- EN 12100-1: Machine safety - Fundamental concepts, fundamental principles of design - Part 1: Basic terminology and methodology.
- EN 12100-2: Machine safety - Fundamental concepts, fundamental principles of design - Part 2: Technical principles.
- EN 61000-6-2: Electromagnetic compatibility (EMC) - Part 6-2: Generic standards – Immunity for industrial environments.
- EN 61000-6-3: Electromagnetic compatibility (EMC) - Part 6-3: Generic standards — Standard emission for residential, commercial and light-industrial environments.
- EN 61000-3-2: Electromagnetic compatibility (EMC) - Part 3-2: Limits – Limits for harmonic current emissions (Equipment with input current ≤ 16 A per phase).
- EN 61000-3-3: Electromagnetic compatibility (EMC) - Part 3-3: Limits – Restriction of voltage variations and flicker in low voltage power supply systems for devices with a rated current ≤ 16 A.
- EN 55014-1: Electromagnetic compatibility - Regulations for household appliances, electrical devices and similar equipment. Part 1: Emission - Regulation for product family.
- EN 55014-2: Electromagnetic compatibility - Regulations for household appliances, electrical devices and similar equipment. Part 2: Immunity - Regulation for product family.
- EN 62233: Household and similar electrical appliances - Electromagnetic fields Methods for evaluation and measurement.

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