



READ THE USE AND MAINTENANCE MANUAL

PROGRAMMING CONSOLE

Service offered by the console

The console allows you to:

- set the chopper to obtain the personalised behaviour of the traction motor
- read the type of alarm, to correctly and easily identify the fault
- test the electric values and the status of the electric circuit with regard to traction

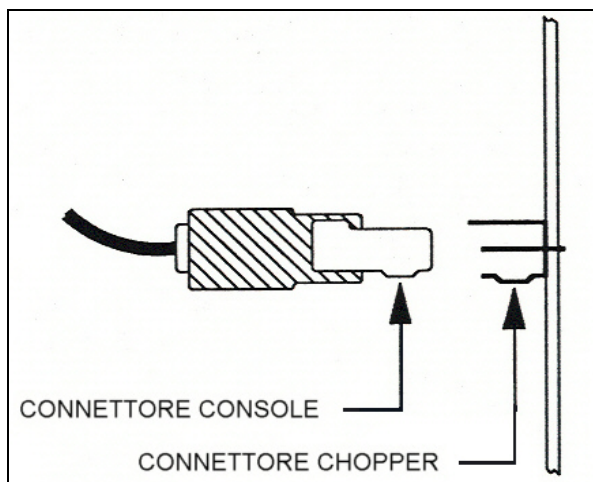
Using the console

The console is extremely easy to use, like the commonest electronic devices (for instance, a mobile phone).

The sequence *that must always be respected* in order to connect the console is:

1. **SWITCH OFF** the general machine key;
2. disconnect the connector E from the chopper;
3. connect the console in place of the connector E. If the connection operation seems difficult, check the connector is positioned in the right direction;
4. switch on the key and work with the console;
5. exit all programs (main switch-on header) and **SWITCH OFF** the general machine key;
6. disconnect the console connector and connect the connector E.

**AN INCORRECT SEQUENCE OF OPERATIONS CAN EASILY COMPROMISE
THE WORKING OF THE CHOPPER OR CONSOLE**



Console menu

The figure below shows how to move around the console menus. There is also a brief description of the menus (some only contain information for the correct working of the chopper, that cannot be modified without Comac authorisation).

For a more detailed description, see the chopper manual. The basic concepts to fine tune the machine are outlined below.

To enter the menus, use the ENTER key. To move within the menus, use the ROLL key. To alter the set values, use the PARAM SET key. To exit a program, use the OUT key.

For any variation made in a menu, when you exit that menu the console will ask you to confirm the modification (ARE YOU SURE? YES=ENTER, NO=OUT).

HEADER: the main characteristics of the console and chopper are read: the name of the connected machine, voltage and maximum current of the chopper, the work hours of the chopper card.

PARAMETER CHANGE: in this menu you can alter the parameters to personalise the machine. The parameters you can alter are: CUT BACK SPEED 1 (minimum machine speed) and CUT BACK SPEED 2 (average machine speed). **All the other parameters are set by Comac in relation to the driving wheel assembled, and it is forbidden to change them unless authorised by Comac.**

TESTER: in this menu you can read the measurement units that are characteristic of the electric circuit (motor plate voltage, motor field current, power switch status = on/off, etc.).

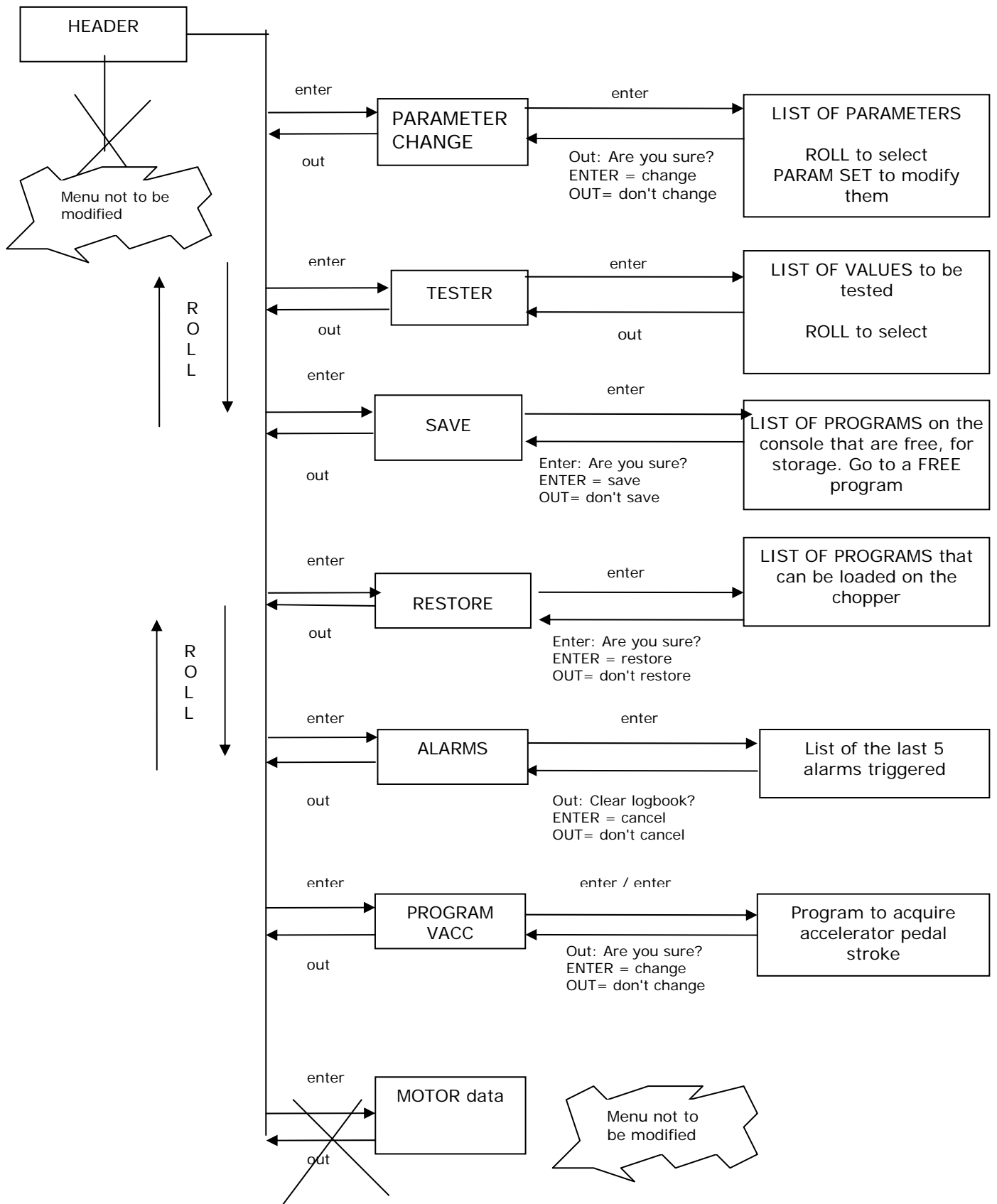
SAVE: once the parameters have been altered, this allows you to record the new settings in a storage area of the console. Be careful, as certain parameter settings have already been registered on the console, and these mirror the correct configuration for the driving wheel supplied.

RESTORE: this allows you to restore on the chopper a set of parameters registered on the console.

ALARMS: this indicates a list of the last five alarms triggered on the machine. A specific corrective action is applied, on the basis of the alarm highlighted (see the following paragraph).

PROGRAM VACC: this section enables the chopper to recognise the potentiometer assembled on the machine. **This operation should be carried out in the event of Alarm Vacc not OK, when replacing the potentiometer, or when replacing the chopper.** The incorrect recognition of the potentiometer by the chopper results in machine stoppage.

Console flow chart



Alarms and Decoding

The chopper visualises an irregularity on two information levels:

1. via a red alarm LED (on the machine instrument panel) that flashes for a number of times corresponding to the type of irregularity;
2. via a message on the console specifying the type of irregularity in more detail.

The table below indicates, for each alarm, the possible irregularity and the interventions to be made on the machine.

ALARM DIAGNOSIS TABLE


(to understand better the table, refer also to the electric diagram of the machine)

Number of flashes	MESSAGE	NOTES
1	LOGIC FAILURE #1	<p>The chopper self-diagnosis test performed in resting mode highlights an irregularity</p> <p><u>Possible causes</u></p> <ul style="list-style-type: none"> - the chopper's internal current sensor is faulty - the chopper logic is damaged <p><u>Actions</u></p> <ul style="list-style-type: none"> - replace the chopper
1	WATCH DOG	<p>The chopper self-diagnosis test, performed in both resting and working mode, highlights an irregularity</p> <p><u>Possible causes</u></p> <ul style="list-style-type: none"> - the chopper logic is damaged <p><u>Actions</u></p> <ul style="list-style-type: none"> - replace the chopper
1	EEPROM KO	<p>The chopper memory has lost adjustment and functioning data</p> <p><u>Actions</u></p> <ul style="list-style-type: none"> - switch off the key, then switch it on again. If the problem persists, replace the chopper

Number of flashes	MESSAGE	NOTES
2	INCORRECT START	<p>Incorrect start-up sequence</p> <p><u>Possible causes</u></p> <ul style="list-style-type: none"> - the operator made an error in the sequence - the pedal microswitch and/or operating microswitch are stuck - wiring error <p><u>Actions</u></p> <ul style="list-style-type: none"> - check the start-up sequence is as follows: - sit on the machine, to close the seat microswitch - key ignition - select operating direction (forwards/backwards) - press the accelerator - check the operating microswitch no.29 and the operating lever no.13 are working correctly, and that their contacts are not stuck - check the continuity of the circuit connecting the operating pedal microswitch, the chopper and the operating lever - check the continuity of the connections between the seat microswitch and the chopper (points 5A and 7A on the chopper)
2	FORW + BACK	<p>This alarm is triggered when two forwards and backwards operating requests are activated simultaneously</p> <p><u>Possible causes</u></p> <ul style="list-style-type: none"> - wiring error - the forwards or backwards microswitch is stuck - wrong operation applied by the user <p><u>Actions</u></p> <ul style="list-style-type: none"> - check the contacts of lever no.13 are working correctly - check the wiring relating to the lever (cables that connect clamps 1A and 2A of the relay card with the lever, and those connecting clamps 4A and 5A of the card with points 4B and 6B of the chopper) - If the problem persists, replace the chopper
3	CAPACITOR CHARGE	<p>The power part of the internal chopper circuit is damaged</p> <p><u>Actions</u></p> <ul style="list-style-type: none"> - replace the chopper

Number of flashes	MESSAGE	NOTES
3	VMN NOT OK	<p>Incorrect voltage on the rotor</p> <p><u>Possible causes</u></p> <ul style="list-style-type: none"> - incorrect motor wiring - motor dispersion to earthing <p><u>Actions</u></p> <ul style="list-style-type: none"> - check the motor clamps are well insulated from the motor frame, both inside and outside the motor. Check there is no dirt causing dispersion between the clamps and the motor body - check the motor is not damp (if necessary, dry with an air jet) - check the wiring on the motor and chopper is correct (check the type of driving wheel assembled, the correct wiring and the connections on the chopper VMN, positive and negative) - if the problem persists, replace first the chopper then, if necessary, the motor
3	VFIELD NOT OK	<p>Incorrect voltage on the motor field</p> <p><u>Possible causes</u></p> <ul style="list-style-type: none"> - incorrect motor wiring - motor dispersion to earthing <p><u>Actions</u></p> <ul style="list-style-type: none"> - check the motor clamps are well insulated from the motor frame, both inside and outside the motor. Check there is no dirt causing dispersion between the clamps and the motor body - check the motor is not damp (if necessary, dry with an air jet) - check the wiring on the motor and chopper is correct (check the type of driving wheel assembled, the correct wiring and the connections on the chopper VMN, positive and negative) - if the problem persists, replace first the chopper then, if necessary, the traction motor
4	PEDAL WIRE KO	<p>The chopper does not detect the presence of the accelerator</p> <p><u>Possible causes</u></p> <ul style="list-style-type: none"> - the electric cables between the accelerator potentiometer and the chopper are interrupted <p><u>Actions</u></p> <ul style="list-style-type: none"> - check there are no interruptions in the connecting cables of the electric circuit

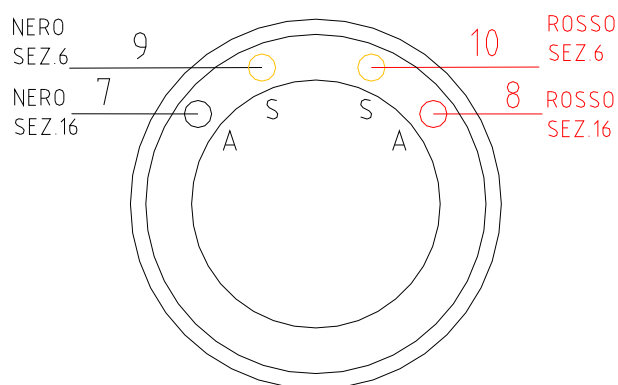
Number of flashes	MESSAGE	NOTES
4	VACC NOT OK	<p>The chopper recognises an irregularity in the mechanical stroke of the accelerator</p> <p><u>Possible causes</u></p> <ul style="list-style-type: none"> - the operator has switched on the machine with the accelerator pressed - the potentiometer and/or the chopper have been changed, and the values linking the two components need to be reprogrammed - a cable between the potentiometer and the chopper card is interrupted - the potentiometer is faulty - the PROGRAM VACC (see the Adjustments and Testing chapter) has not been correctly performed <p><u>Actions</u></p> <ul style="list-style-type: none"> - check the continuity of the connections between the accelerator potentiometer and the chopper (points 3B, 1B and 2B on the chopper) - reprogram the chopper with the PROGRAM VACC (see the Adjustments and Testing chapter) - check the potentiometer is working correctly (it may be broken) and replace it if necessary (reprogramming the chopper)
5	NO FIELD CUR. HIGH FIELD CUR.	<p>The chopper does not recognise the correct value of the motor field current</p> <p><u>Possible causes</u></p> <ul style="list-style-type: none"> - the chopper's internal transducer is faulty - the field cables are not well connected - the chopper power session relating to the field is damaged <p><u>Actions</u></p> <ul style="list-style-type: none"> - check the correct wiring of cables 9-10 (see page 9), and the correct connections on clamps F1 and F2 of the chopper and on the clamps of the motor field (D1 and D2 for the CIMA and S-S for the METALROTA, see also the next paragraph) - If the problem persists, replace the chopper
5	STBY I HIGH	<p>The chopper tests whether the current signal is nil in the resting mode. If this is not the case, it blocks the traction</p> <p><u>Possible causes</u></p> <ul style="list-style-type: none"> - faulty current sensor - a defect in the retroactivity circuits, or in the logic, or on the chopper <p><u>Actions</u></p> <ul style="list-style-type: none"> - replace the chopper

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Number of flashes	MESSAGE	NOTES
5	I=0 EVER	<p>The chopper tests whether the current absorbed by the motor is greater than a minimum threshold level during operation. If this is not the case, it blocks the traction.</p> <p><u>Possible causes</u></p> <ul style="list-style-type: none"> - the current transducer, or power session of the chopper, is damaged <p><u>Actions</u></p> <ul style="list-style-type: none"> - replace the chopper
6	CONTACTOR DRIVER COIL SHORTED	<p>The chopper's contactor (no. 33 electric circuit) is not excited for closing (with seat microswitch no.36 closed)</p> <p><u>Possible causes</u></p> <ul style="list-style-type: none"> - the contactor coil short-circuits or is not connected - irregularity inside the chopper <p><u>Actions</u></p> <ul style="list-style-type: none"> - disconnect the terminals from the contactor coil no. 33 and check the continuity of the connection with points 7A and 3A of the chopper - remove the contactor no. 33 and test it works by exciting it directly with 36V - if the problem persists, replace the chopper
6	CONTACTOR CLOSED	<p>The chopper's contactor (no.33 electric circuit) never opens, even if the contactor coil is not excited</p> <p><u>Possible causes</u></p> <ul style="list-style-type: none"> - the power contact of the contactor is stuck - a fault on the field circuit <p><u>Actions</u></p> <ul style="list-style-type: none"> - check the contact is not stuck - check the field circuit wiring is correct
7	TH. PROTECTION	<p>The chopper does not work outside the temperature range (-10°C + 70°C). If this alarm is generated when the chopper is at room temperature (higher than 0 degrees):</p> <p><u>Possible causes</u></p> <ul style="list-style-type: none"> - chopper malfunctioning <p><u>Actions</u></p> <ul style="list-style-type: none"> - replace the chopper
32	BATTERY LOW	<p>The battery level is too low: the chopper cuts the power from the traction motor, to safeguard it</p> <p><u>Actions</u></p> <ul style="list-style-type: none"> - check the batteries are charged

Adjustment and calibration of the driving wheel

METALROTA



PARAMETER	VALUE
ACCELER. DELAY	4
DECELER. DELAY	2
RELEASE BRAKING	3
INVERSE BRAKING	4
SOFT BRAKING	6
SOFT ACCELERATION	9
CUTBACK SPEED 1	4
CUTBACK SPEED 2	3
H & S CUTBACK	5
MAX SPEED FORW.	9
MAX SPEED FORW. FINE	0
MAX SPEED BACK	6
MAX SPEED BACK FINE	0
COMPENSATION	0
MAXIMUM CURRENT	0
ARMA NOM. CURR.	0
WEAK DROPOUT	0
FIELD NOM. CURR.	7
CREEP SPEED	2
BACKING TIME	6
BACKING SPEED	6

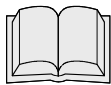
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Adjusting with the console

Connecting the console
<ol style="list-style-type: none"> 1. Check all the switches are OFF. 2. Lift the front wheel and position it on a safety stand. 3. Remove the connector (E) from the chopper (the connector with two brown/blue wires = alarms LED). 4. Insert the console in the special connector (E) <u>with the key switched off</u>. 5. Use the key to switch on. 6. When switched on, the words "Comac Cofi 36V 100A ver.1.62" or "*Alarm* abcdef ..." will appear. 7. Press the seat. 8. Press ENTER to access the main menu.
<p>For a more detailed description, consult the Use Manual and the functional description of the Zapi chopper.</p>

Acquisition of accelerator pedal stroke			
<ol style="list-style-type: none"> 1. Scroll though the list using the <i>ROLL UP</i> key, and select "PROGRAM VACC" (attention: the machine is idle when programming): 	* MAIN MENU * PROGRAM VACC		
<ol style="list-style-type: none"> 2. Press <i>ENTER</i> to access the function "PROGRAM VACC"; all the current minimum and maximum values relating to forwards and backwards operation will appear: 	VACC SETTINGS 0.7 10.0		
<ol style="list-style-type: none"> 3. Press ENTER to zero-set; the chopper is now ready to register the minimum and maximum values of the potentiometer signal: 	MIN 0.0	VACC -	MAX 0.0
<ol style="list-style-type: none"> 4. Select forwards operation and slowly press the pedal right down, without any halfway stops. This type of value will appear: 	MIN 0.6	VACC ↑	MAX 10.0
<ol style="list-style-type: none"> 5. Repeat for backwards operation. 	MIN 0.6	VACC ↓	MAX 10.0
<ol style="list-style-type: none"> 6. Press <i>OUT</i>; the request to acquire the new values will appear: 	ARE YOU SURE? YES = ENTER NO = OUT		
<ol style="list-style-type: none"> 7. Press <i>ENTER</i> to confirm. 			

Tester function



ATTENTION: lift the traction wheel before performing this type of test.

After connecting the console, the header will appear, indicating chopper model, the machine for which it is set, and the chopper work hours.
Enter the TESTER sub-menu and scroll through all the items using the ROLL UP key.

COMAC COFI 1.62
36V 100A 00000

Check the **battery voltage** read by the tester is the same as the battery voltage measured with a multimeter, in volts with a full scale of 50V or greater.

BATTERY VOLTAGE
36V

In the event of an error (compromising machine autonomy), it is necessary to replace the chopper as the control stage is damaged.

Check the **voltage on the motor**.

MOTOR VOLTAGE
0.0V

Check the voltage on the motor is nil in resting mode, and that it equals the battery voltage at maximum speed and with the pedal fully pressed down. If this is not the case, check the pedal programming and the speed reduction operation

Check the **rotor current**.

MOTOR CURRENT
0A

Check the **field current**.

FIELD CURRENT
0A

Check the current running through the motor is nil in resting mode, and that it is in line in standard working conditions. In the event of irregularities, check the status of the traction motor (paying special attention to the carbon brushes) and the condition of the cables and the connections for the traction motor.

Check the **VMN**.

VMN
38.2V

Check the VMN is roughly equivalent to the battery voltage.

Check the **temperature** detected by the chopper on its power stage.
The detected temperature must only be equal to the room temperature if the machine was switched off for at least 1 hour before taking the measurement.

TEMPERATURE
19°C

In the event of irregularities or excessive temperatures, check the connections are well tightened and check also the conditions of the traction motor. If the problem cannot be solved, you must replace the chopper.

Press the pedal fully down to check the **potentiometer** is working well. With the pedal right down, the message on the console must be the one shown in the figure. Check the value increase is linear.

ACCELERATOR

10.0V 100%

In the event of irregularities, check the potentiometer connections, and replace it if necessary. To make this check, it is not necessary to press the seat microswitch or set the operation selector.

Check the good working condition of the **microswitch that enables operation**. Check that, in the resting mode, the console displays the message shown in the figure.

ENABLE SWITCH

OFF GND

To check functioning:

- press the operation selector on forwards or backwards operation
- press the accelerator pedal

The words shown in the figure must appear on the console.

ENABLE SWITCH

ON +VB

In the event of malfunctioning, check the operation lever and the microswitches in the pedal unit.

Check the good working condition of the **microswitch that enables forwards operation**. Check that, in the resting mode, the console displays the message shown in the figure.

FORWARD SWITCH

OFF GND

To check functioning:

- press the operation selector on forwards operation
- press the accelerator pedal

The words shown in the figure must appear on the console.

FORWARD SWITCH

ON +VB

In the event of malfunctioning, check the operation lever and the forwards operation microswitch in the pedal unit.

Check the good working condition of the **microswitch that enables backwards operation**. Check that, in the resting mode, the console displays the message shown in the figure.

BACKWARD SWITCH

OFF GND

To check functioning:

- press the operation selector on backwards operation
- press the accelerator pedal

The words shown in the figure must appear on the console.

BACKWARD SWITCH

ON +VB

In the event of malfunctioning, check the operation lever and the backwards operation microswitch in the pedal unit.

Check the good working condition of the **seat microswitch**.

HANDLE/SEAT SW

OFF GND

Press the seat microswitch and check the status changes from OFF to ON.

HANDLE/SEAT SW

ON +VB

In the event of malfunctioning, check the status of the seat microswitch and its connections.

NOT AVAILABLE.

QUICK INVERSION

OFF GND

Check the good working condition of **speed reducer** Switch 1:

CUTBACK SWITCH 1

ON GND

Check the good working condition of **speed reducer** Switch 2:

CUTBACK SWITCH 2

ON GND

Check the values of cutback switch 1 and cutback switch 2 correspond to the following table.

Speed	Switch 1	Switch 2
Minimum	ON GND	ON GND
Average	OFF +VB	ON GND
Maximum	OFF +VB	OFF +VB

NOT AVAILABLE

H&S / BACKING

OFF GND

Check the **residual charge of the battery** is in line with the indications on the battery check card.

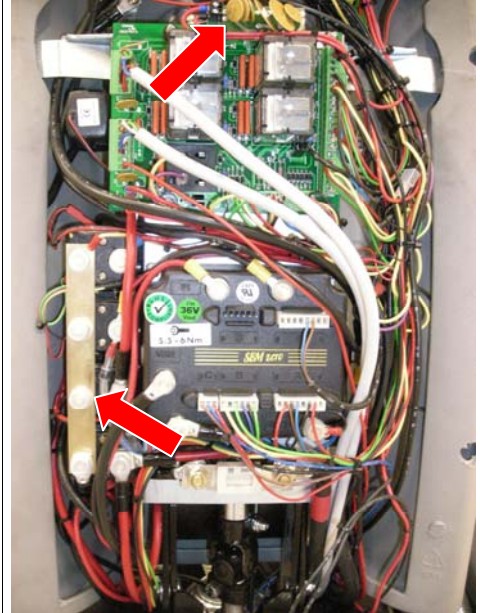
BATTERY CHARGE

100%

In the event of irregularities, check the connections of the chopper power cables, the conditions of the battery cables and the jumper cables, the cleaning and tightening of the battery clamps.

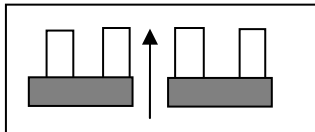
Working test of the electric system

1. Disconnect the battery connector.
2. Check the battery connection cables are clean and well tightened.
3. Check the power cables are connected and tightened:
contactors, fuses, motors, etc.
4. Reconnect the battery connector.
5. Switch on the machine by turning the key, and check the hour-counter flashes at least three times.
6. Check the indicator lights and the switches:
 - check the green ignition indicator light;
 - check the battery check display is working;
 - check the hour-counter is working;
 - check the clacson and buzzer for backwards operation are working;
 - check the AUT-MAN relating to squeegee activation is working;
 - check the indicator light and the functioning of the front, rear and flashing lights;
 - check the reserve indic. light of the solution tank float;
 - check the brake activation indicator light;
 - check the forwards and backwards operation lever is working correctly;
 - check the squeegee up/down levers are working correctly;
 - check the indicator light switch and the good working condition of the suction motor;
 - check the extra pressure green indicator light is working correctly (no present on the BS version);
 - check the indicator light switch and the good working condition of the solenoid valve (with the machine running);
 - check the brush base up/down lever;
 - check the recovery tank float and the consequent switch-off of the suction motor;
 - check the seat microswitch is working correctly;
 - check forwards and backwards operation, speed reduction, acceleration and braking.

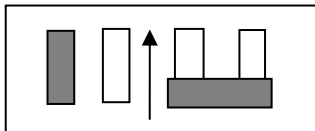


Adjusting the battery check card

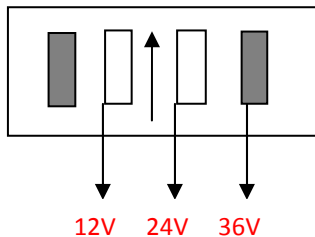
1. Check the battery check card is correctly set. Use the **jumper** for the set-up.
2. **Lead - Gel setting**: with the jumper inserted in the first pin, the card is set for lead, otherwise it is set for gel.
3. **Voltage setting**: if the jumper is not inserted in one of the three pins, the card automatically recognises the machine voltage; otherwise (from the left) the second pin is for 12V, the third for 24V and the fourth for 36V.
4. The configurations are as follows:



Gel batteries
automatic voltage



Pb acid batteries
automatic voltage



STANDARD
Pb acid batteries
voltage of 36V

The battery display will visualise the following initials:



Software version



12V



24V



36V (standard)



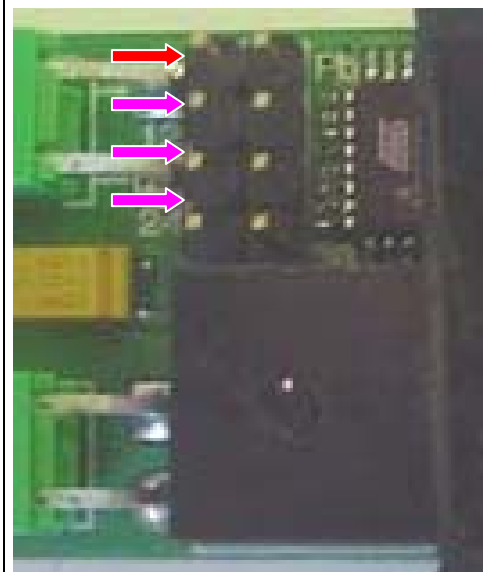
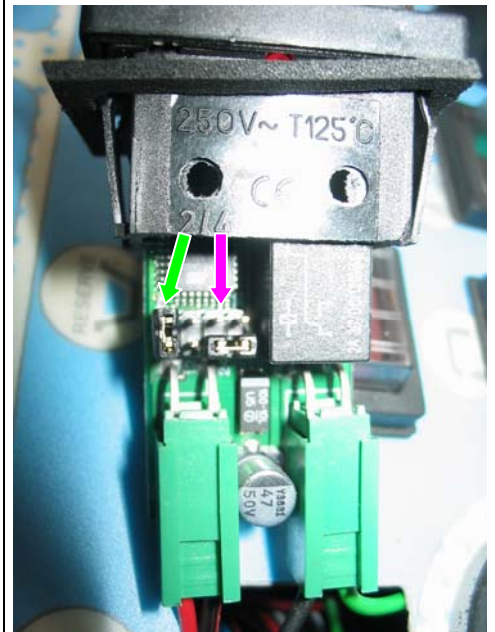
Gel batteries



Pb acid batteries

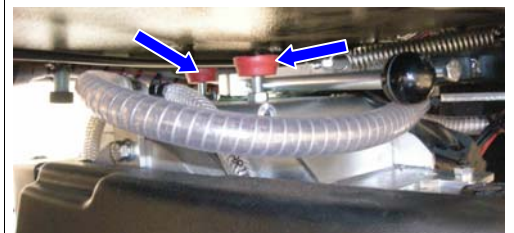
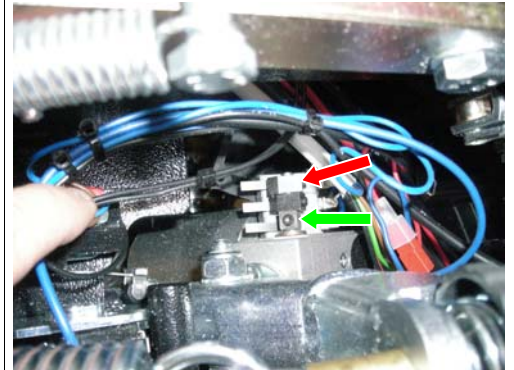


Battery charge level

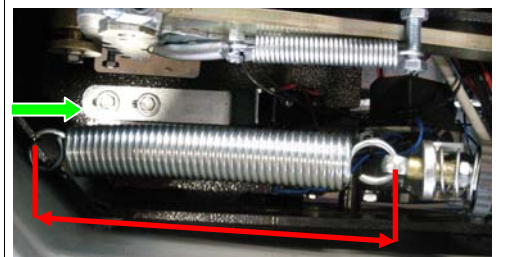
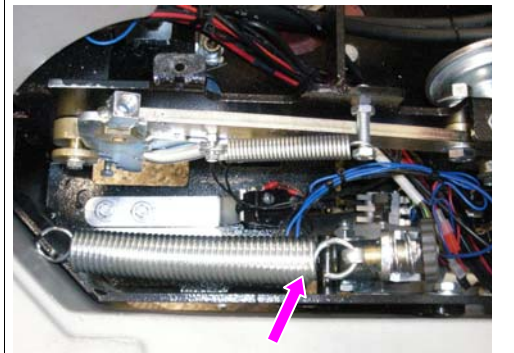


Adjusting the base microswitches (FLEXY 75B – 85B)

1. Disassemble the footrest and brushes from the machine.
2. Disassemble the microswitch cover of the jack.
3. Activate the base ascent until the two red end stop caps (adjusted to about 1cm from the base support) are resting on the frame; at this point, adjust the cam of the **maximum ascent microswitch** (the one furthest from the motor).
4. Activate the base descent until the stem of the jack is fully out, and advance it by about 1cm, checking that the brush plate does not touch the floor; at this point, adjust the cam of the **maximum descent microswitch** (the one nearest the motor).
5. Reassemble the jack cover.

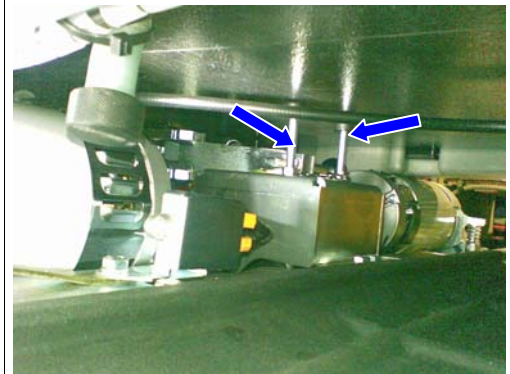
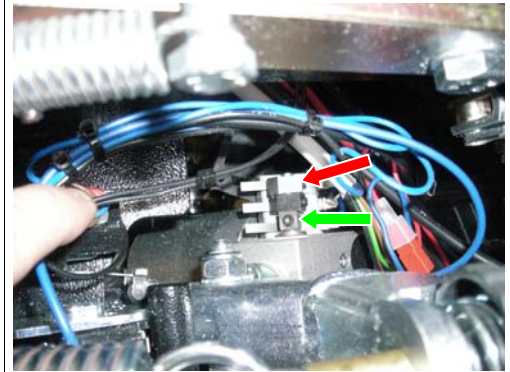


6. Reassemble the brushes on the machine.
7. Both roller microswitches must be positioned so that a 1 mm gap remains between them and the roller command lever when the latter is pressed by the cam.
8. Check that, under normal pressure (obtained by pressing the base descent switch), the spring is free (if necessary, use the hand-wheel to adjust the spring tension) and check the functioning of the **microswitch** that acts on the jack support.
9. Check that, under extra pressure (obtained by pressing the extra pressure switch on the instrument panel), the fully extended spring measures **260 mm**. If necessary, loosen the **support** of the extra pressure microswitch, sliding it along its slots until the required length is obtained.

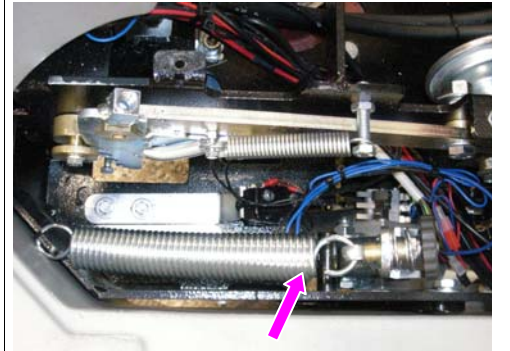


Adjusting the base microswitches (FLEXY 70BS - 85BS)

1. Disassemble the footrest and brushes from the machine.
2. Disassemble the microswitch cover of the jack.
3. Activate the base ascent until the two black end stop caps (adjusted to about 63-64 mm from the base support) are resting on the frame; at this point, adjust the cam of the **maximum ascent microswitch** (the one furthest from the motor).
4. Activate the base descent until the stem of the jack is fully out and advance it by about 1 cm., checking that the brush plate does not touch the floor; at this point, adjust the cam of the **maximum descent microswitch** (the one nearest the motor).
5. Reassemble the jack cover.

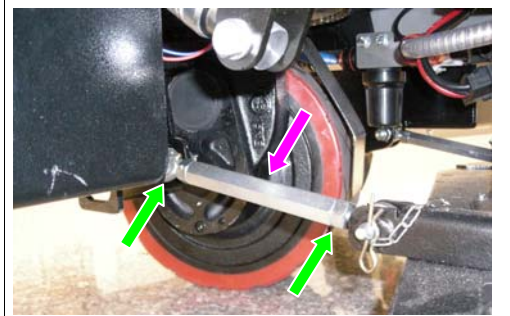


6. Reassemble the brushes on the machine.
7. Both roller microswitches must be positioned so that a 1 mm. gap remains between them and the roller command lever when the latter is pressed by the cam.
8. Check that, under normal pressure (obtained by pressing the base descent switch), the spring is free (if necessary, use the hand-wheel to adjust the spring tension) and check the functioning of the **microswitch** that acts on the jack support.
9. Check that the extra pressure function is not activated.



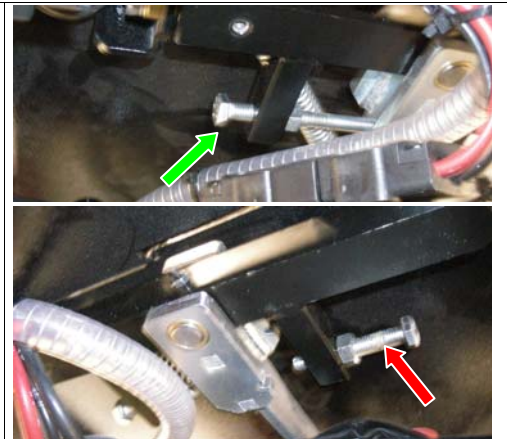
Adjusting and checking the base (FLEXY 75B – 85B)

1. Lower the base and check the inclination of the brushes. They must be 5-7mm higher at the front; if necessary, adjust by means of the base **guide arms**: loosen the **locknuts** (one with a right-hand thread and the other left-hand), rotate the arms and retighten the locknuts.



2. Adjust the two M10 end stop screws for the swing of the brush base:

- right-hand screw emerges by **20 mm**
- left-hand screw emerges by **42 mm**



3. Check the height of the lateral splash guards. If necessary, adjust the **knobs** so that in forwards operation the rubber is tilted on the rear part and only lightly touches the floor at the front and sides.



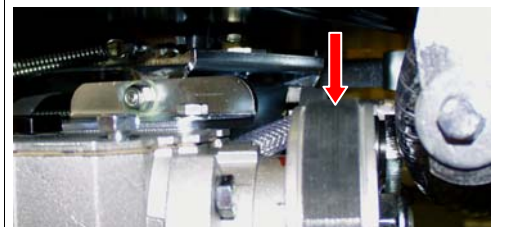
4. Check that when the clip is removed on the other side of the base support, and the **bar with the knob** is removed, you can disassemble the base.



5. Look through the transparent **level caps** to check for the presence of reducer oil, and that it reaches the red level indicator. Use Shell Omala 460 or equivalent oils (oil quantity 0.35kg). Top up via the upper cap.

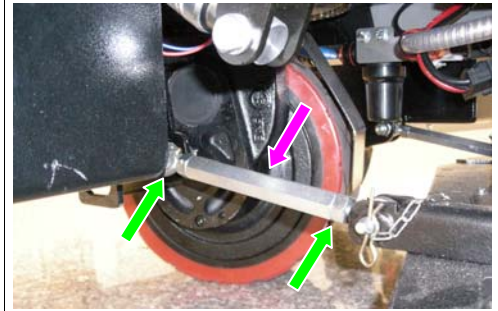


6. After testing the machine, disassemble the protective casing and check the position of the brush motor **belts**: they must remain in their original housing (the best condition is where a gap remains on both sides of the belt). Reassemble the protective casing.



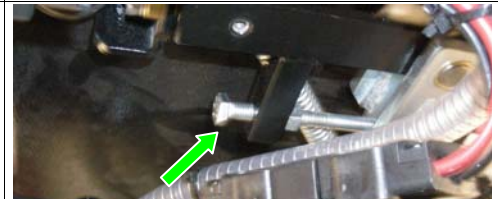
Adjusting and checking the base (FLEXY 70BS - 85BS)

1. Lower the base and check the planarity of the brushes (check that the two motors have the same ampere consumption). If necessary, adjust by means of the base **guide arms** : loosen the **lock nuts** (one with a right-hand thread and the other left-hand), rotate the arms and retighten the lock-nuts.



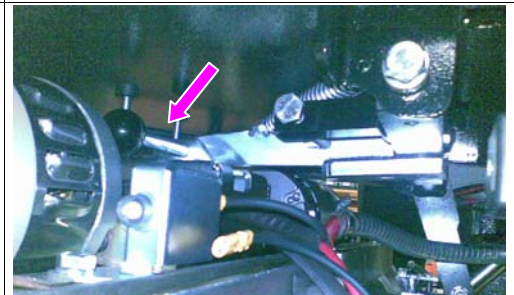
2. Adjust the two M10 end stop screws for the swing of the brush base :

- Right-hand screw out of :
 - **20 mm.** on Flexy 85BS;
 - **13 mm.** on Flexy 70BS;
- Left-hand screw out of :
 - **42 mm.** on Flexy 85BS;
 - **32 mm.** on Flexy 70BS.



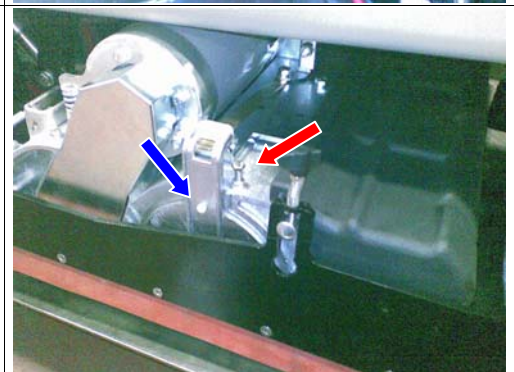
NB: After the adjustment, check that the side splashguards don't touch the rear wheels.

3. Check that when the clip is removed in the other side of the base support and the **bar with the knob** is removed, you can disassemble the base.

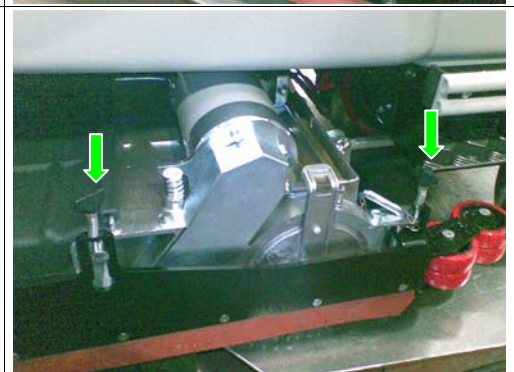


4. Check if the mark on the floor of both brushes is regular in both sides; if necessary **adjust** the corresponding **screws**.

5. If vibrations are observed on the brush support cover : adjust the corresponding **nylon dowels** until the elimination of the noise.



6. Adjust the height of the lateral splashguard rubber, until it touches the floor uniformly, acting the **knobs**.

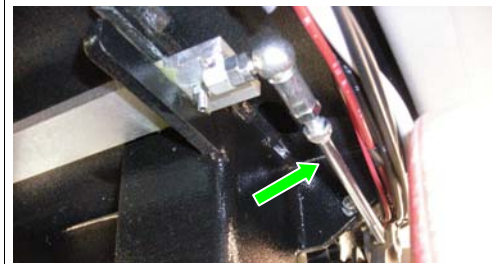
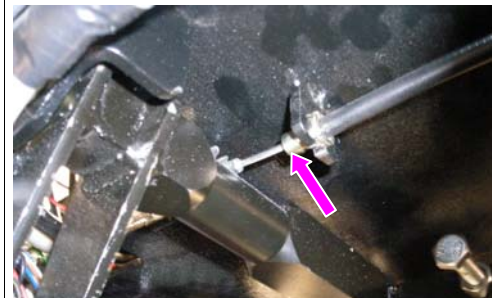


Adjusting the steering wheel and brakes

1. Check the tension of the steering wheel chain. If necessary, adjust the chain as follows:
 - loosen the locknut;
 - tighten the **M8 screw** as far as necessary (rotate the steering wheel completely to the right and left, and check it does not stick due to excessive chain tension);
 - tighten the locknut.

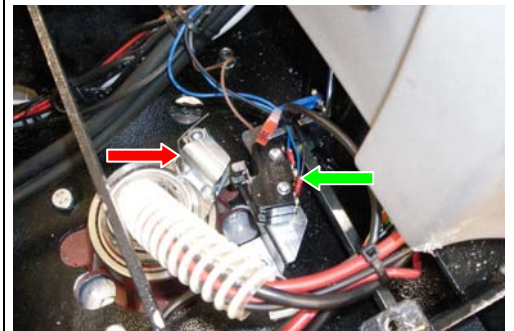


2. Restore the correct range of the parking and emergency brake pedal via the **cab**le:
 - loosen the locknut;
 - tighten the sheath and check the wheels are not blocked; check that, after pressing two or three times, the pedal is safely locked;
 - tighten the locknuts.
3. Check the wheels brake simultaneously; if necessary, adjust the **tie-rods** of the brake forks.



Adjusting the microswitch for speed reduction on curves

1. On the crown of the front wheel, there is a **cam** and a **microswitch** to regulate the speed on the curves. Check that with the wheel on the forward direction, the micro wheel is in the center of the cam, eventually adjust the position of the cam along the slot. Then you must regulate the cam and microswitch so that in forwards and backwards operation the microswitch is pressed (leaving a small gap of 3-3,5 mm.) and when turning right or left the microswitch opens. Ensure the cam does not stick on the microswitch roller.



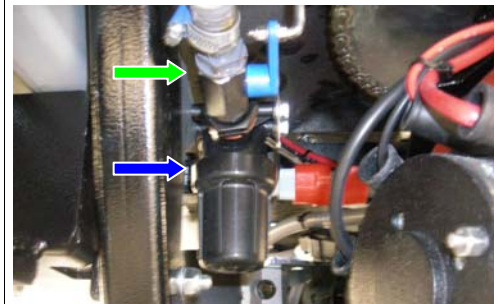
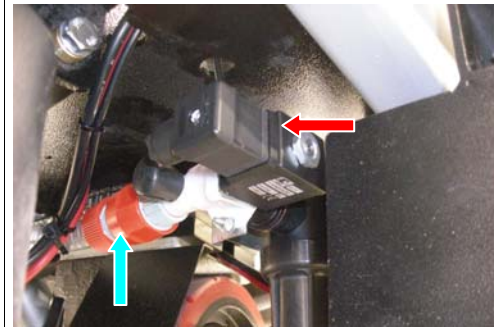
Adjusting the operator seats

1. Check the good working condition of the knob to adjust the back of the operator seat.

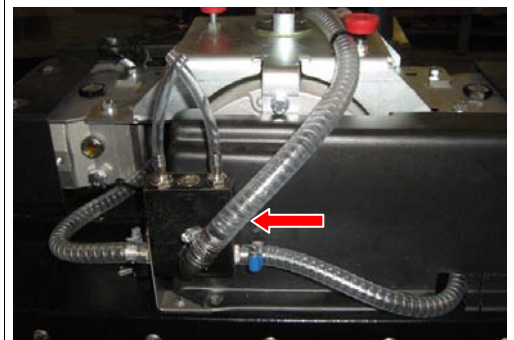


Testing the water system

1. Check the cleaning and positioning of the **solution filter**.
2. Fill the solution tank with water and check there are no water leakages in the water circuit.
3. Check the seal of the tubes, the functioning of the **solenoid valve** and water cock regulation.
4. Check the seal of the **water connector** of the base.
5. Fill the recovery tank and check its seal.
6. Check the seal of the drainage tube and cap.
7. Check the seal of the **tap** when turned off, and the OR gasket on the conical connector.



8. Check the cleanness and the functionality of the **water distributor** (only on the scrubbing units).
9. With the tap turned on, check the solution flows continuously onto the floor, and is evenly distributed on the two brushes.

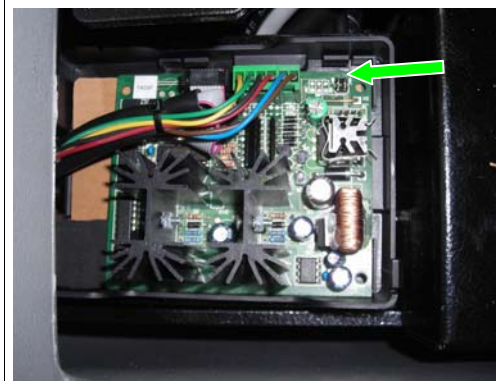


- 8 Check the functioning of the **microswitch** to stop the water on the curve.

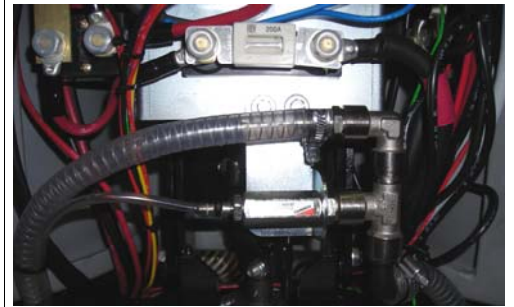


Inspection chemical dosing system (OPTIONAL)

1. Remove the black cover of the card box (positioned underneath the bottom plate of the machine) and check the cleanness of the contacts and of the place of the chemical dosing card.
1. Check that on the card, on the left down side, there is **any jumper** to bridge the positions J4A and J4B.



2. Check the cleanness and the functionality of the **tubes and fittings** of the dosing system.
3. Check the functionality and the connections of the water and chemical pumps.



4. Check by a test the functionality of the **knobs** to set the dosing system (pay attention to keep the water robinet completely open).



5. Check that, with the robinet lever in the position like on the picture (downward), the dosing system is activated.



6. Check that, with the robinet lever in the position like on the picture (central position), there is no water out (neither water neither chemical).

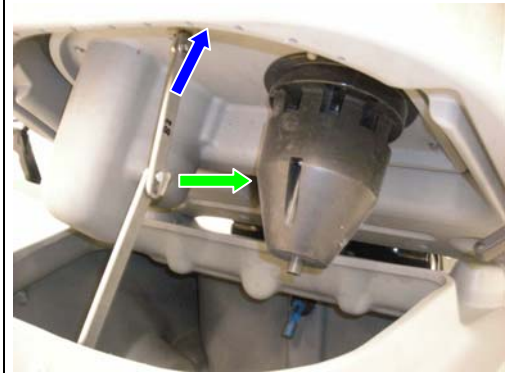


7. Check that, with the robinet lever in the position like on the picture (upward), the dosing system is bypassed and comes out the solution from the clean water tank.

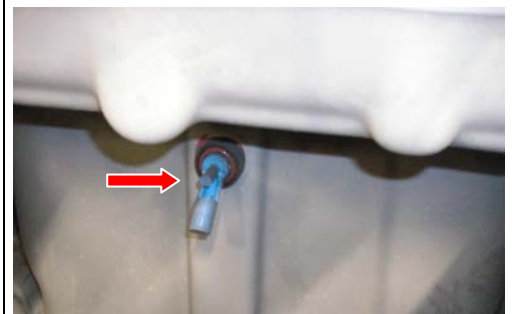


Suction test

1. Check the cleaning and functioning of the **seal** of the suction motor support box.
2. Check the connections and seal of the suction tubes and the squeegee tube.
3. Check the water drainage holes beneath the suction box are not clogged up.
4. Check the cleaning of the floating **filter** that protects the suction starter.

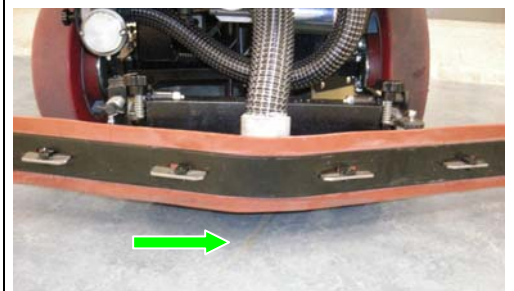
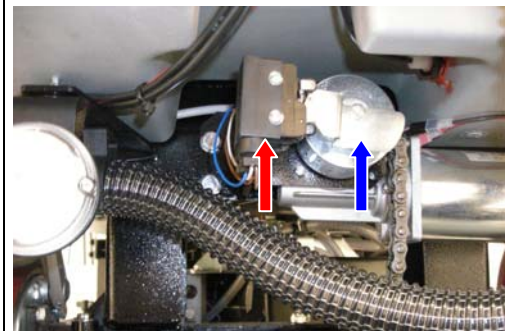


4. Check the functioning of the **float** in the recovery tank.



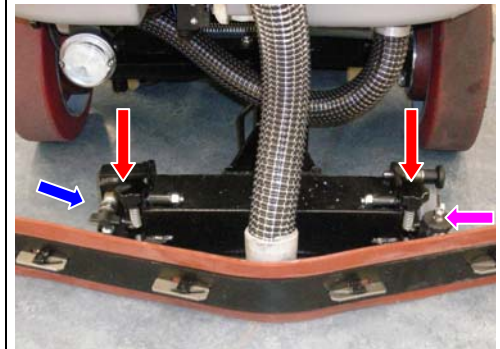
Adjusting the squeegee microswitches

1. Both microswitches must be positioned so that a 1mm gap remains between them and the roller command lever when the latter is pressed by the cam.
2. Adjust the squeegee ascent (with the base raised) by means of the jack **cam**. Loosen the locknut and rotate the cam until the **ascent microswitch** (internal microswitch) is triggered, when the lower part of the squeegee rubber is **45-50 mm** from the floor. Tighten the locknut to fix the cam in place.
3. The descent is automatically regulated by the cam.
4. Retest ascent and descent.

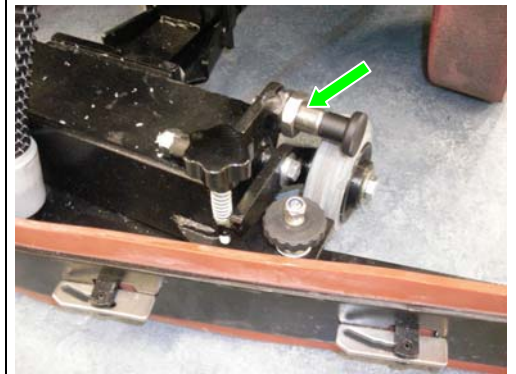


Adjusting the squeegee

1. Fully loosen the **knobs** that regulate wheel height.
2. Adjust the inclination via the **adjuster**, so that the rubber on the floor is evenly tilted at the sides and centre.
3. Tighten the **knobs** that regulate wheel height, ensuring that the rubber is not pushed down too far on the floor, but has an inclination of about 30°.
4. Adjust the automatic **release hand-wheel** relating to the pressure of the release system in the event the squeegee is jolted. To increase the release force, turn clockwise (to reduce, turn anticlockwise).



5. Check the functioning of the release/connection **pin** for the rotation of the squeegee in the vertical position.



Working test of the machine

- ☐ Check the functioning of the seat microswitch;
- ☐ Check the functioning of the accelerator pedal;
- ☐ Check the functioning of the base;
- ☐ Check the functioning of the brush motor;
- ☐ Check the functioning of the brushing unit motor;
- ☐ Check the functioning of the solenoid valve;
- ☐ Check the functioning of the squeegee in manual and automatic mode;
- ☐ Check the functioning of the suction motor;
- ☐ Check the functioning of the emergency and parking brake;
- ☐ Check the functioning of the steering wheel;
- ☐ Check the status of the batteries, clamps and cables;
- ☐ Check the functioning of the backwards operation clacson and buzzer;
- ☐ Check the functioning of the headlights and flashing light.

Functional tests on the machine

- ☐ Fill the tanks with water and check for any leakages.
- ☐ Check the seal of the water system, and that the water flow on the two brushes is even.
- ☐ Adjust the inclination and wheels of the squeegee, carrying out a functional test.
- ☐ Adjust the inclination of the base, carrying out a functional test.
- ☐ Check the traces left by the brushing unit and adjust it, carrying out a functional test.
- ☐ Adjust the lateral splash guards by means of the knobs, and carry out a functional test.
- ☐ Check the functioning of the seat microswitch.
- ☐ Check the efficiency of the parking and emergency brake: brake at maximum speed and check the wheels block simultaneously.
- ☐ Fill the tank, then launch the machine at maximum speed and check it stops within 90-95cm when the acceleration pedal is released. If this does not happen, check the console parameters again (in particular "Release Braking").
- ☐ Check forwards/backwards operation, acceleration and braking.

Final test

Check all the functions: washing, drying, forwards operation, backwards operation and braking.