



READ THE USE AND MAINTENANCE HANDBOOK

PROGRAMMING WITH THE CONSOLE

Service of the console

The console allows to:

- Set the chopper card for a personalised behaviour of the traction motor;
- read the type of the alarm for a correct and easy trouble shooting;
- test the different electric values and the state of the electric circuit relative to the traction.

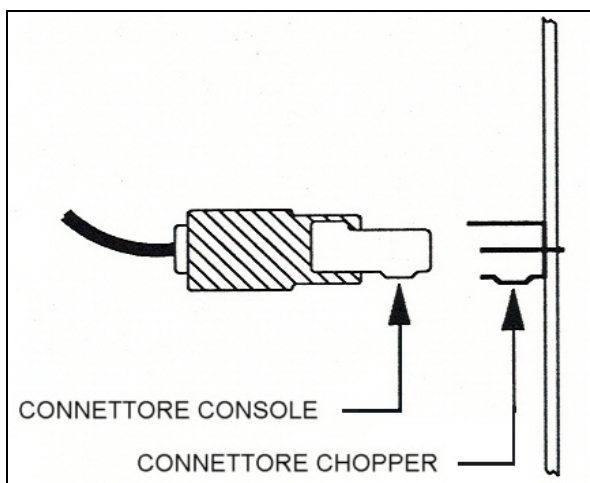
Use of the console

The use of this instrument is very easy and comparable to the most common electronic devices (such as mobile phones).

The sequence to follow always for the connection of the console is:

1. **SWITCH OFF THE GENERAL KEY** of the machine;
2. Disconnect the Chopper from the LED alarm connection;
3. Connect the console instead of the LED alarm connection with the connection of the chopper card. If this operation results to be difficult, check if the connector is positioned in the correct direction
4. Switch on the general key of the machine and work with the console;
5. Quit from all the programs (main menu of the ignition) and **SWITCH OFF THE GENERAL KEY** of the machine;
6. Disconnect the console and reconnect with the LED alarm connection.

THE WRONG OPERATION SEQUENCE CAN EASILY COMPROMISE THE FUNCTIONALITY OF THE CHOPPER CARD OR OF THE CONSOLE



Menu of the console

The following illustration indicates how to move inside the menu of the console and a short description of the menu (some menus provide only necessary information's for the correct functioning of the chopper and can not be modified without written authorisation from Comac).

For a detailed description, consult the chopper handbook. In the following we give you the basis information's for the debugging of the machine.

Press ENTER to get inside of the menu, in order to move inside of the different menus use the ROLL buttons, for changing the insert values use the button PARAM SET and OUT in order to quit one program.

For every modification of values in one menu the console will ask to confirm the modification when quitting the menu (ARE YOU SURE? YES=ENTER, NO=OUT).

HEADING: One reads the main characteristics of the console and of the chopper card: the name of the machine to which one is connected, voltage and maximum current of the chopper card, the working hours of the chopper card.

PARAMETER CHANGE: In this menu the parameters can be changed to personalise the machine. The adjustable parameters are: CUT BACK SPEED 1 (first speed limit of the machine) and CUT BACK SPEED 2 (second speed limit of the machine). **All the other parameters are chosen from Comac relative to the assembled traction motor and it is forbidden to change them without previous authorisation of Comac.**

TESTER: In this menu one can read the qualities of the electric characteristics (voltage traction motor, current motor, state of power switch = on/off).

SAVE: This permits, once the parameters have been changed, to enter the new setting in the memory of the console. Attention: in the console exists already AN parameter set MOD 00, which contain the correct configurations for the assembled traction wheel.

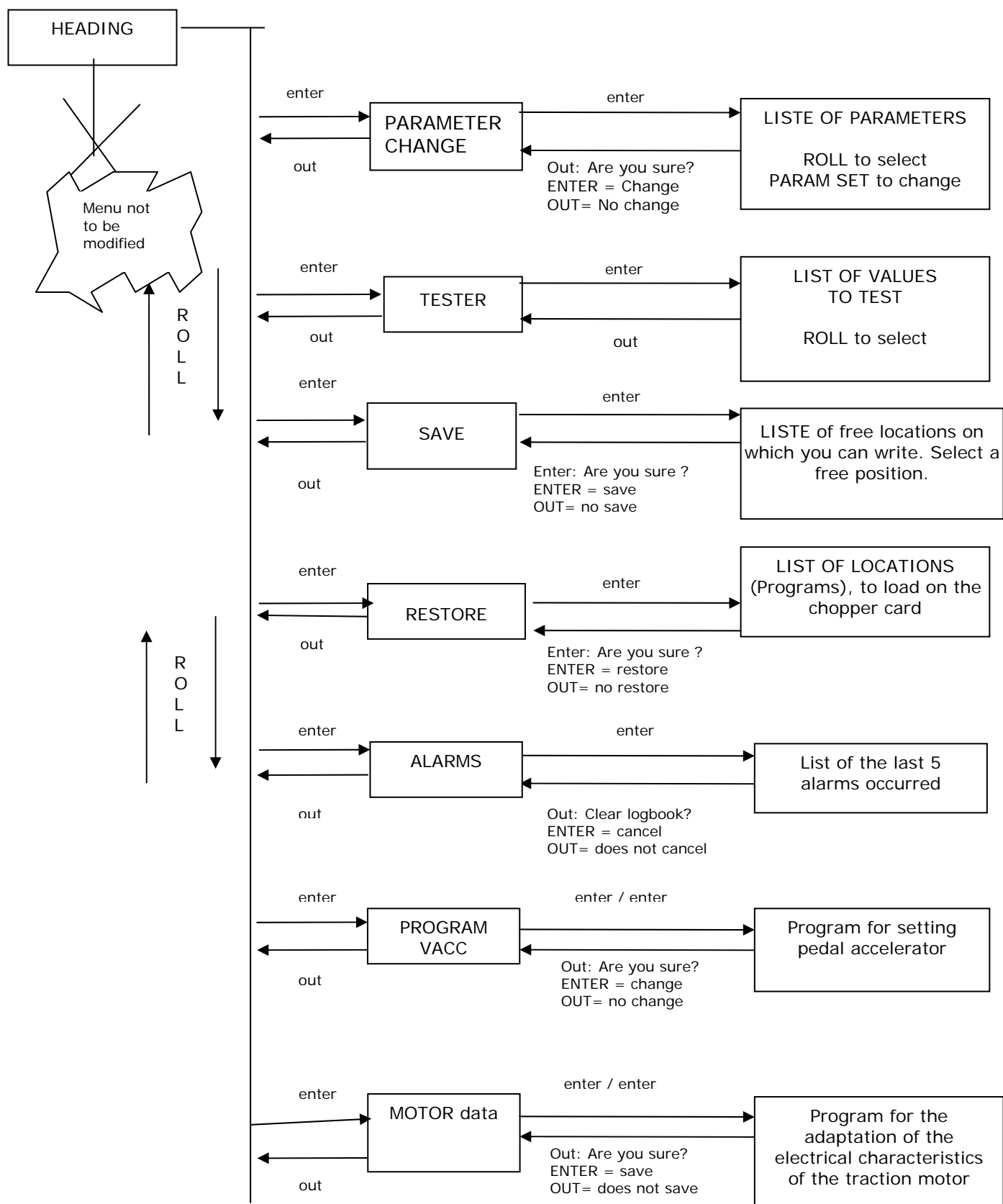
RESTORE: This permits to restore on the chopper card a parameter set, which has been entered in the console. The standard program MOD 00 refers to the standard traction wheel CIMA of the ULTRA85B.


ALARMS: Indicates a list of the last five alarms occurred on the machine; according to the alarm a specific corrective action is adopted (see following paragraph).

PROGRAM VACC: This section is used to teach the chopper about the potentiometer which is assembled on the machine; **this operation must be carried out when the alarm Vacc not ok appears or when the potentiometer or the chopper card is replaced;** a wrong recognition of the potentiometer from the chopper card will block the machine.

MOTOR DATA: This section serves for the adaptation of the parameters according to the motor characteristics.

Flow chard of the console



	ADJUSTMENTS AND INSPECTIONS	ULTRA85B ULTRA100B	Doc. 10013540 Issued 04/2009 Vers. AC Pag. 4 di 31
--	-----------------------------------	-----------------------	---

Alarms and decoding

The chopper card visualises an anomaly on two information levels:

1. Through a red LED alarm (on the machine's instrument board), which blinks for a quantity of times relative to the type of anomaly;
2. Through a message on the console, that specifies more details on the nature of the anomaly.

Following table reports for each alarm the possible anomaly and how to proceed on the machine.


DIAGNOSIS LIST ALARMS

(for a better understanding of the list refer also to the electrical layout of the machine)

Number of blinking	MESSAGE	NOTES
1	EEPROM KO	<p>The chopper card memory ha lost the adjustment parameters.</p> <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Switch off and switch on the key. If the alarm occurs again, replace the chopper. If the alarm does not occur anymore, reprogram the chopper card (the parameters memorised were cancelled and replaced by default dates).
1	LOGIC FAILURE #1	<p>The chopper card memory ha lost the adjustment parameters.</p> <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Check the batteries. - Switch off and switch on the key. If the alarm occurs again, replace the chopper. If the alarm does not occur anymore, reprogram the chopper card (the parameters memorised were cancelled and replaced by default dates).
1	LOGIC FAILURE #2	<p>The chopper memory does not work correctly.</p> <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Switch off and switch on the key. If the problems occurs again, replace the chopper card.
1	LOGIC FAILURE #3	<p>The chopper memory does not work correctly.</p> <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Switch off and switch on the key. If the problems occurs again, replace the chopper card.
1	WATCH-DOG	<p>Self-diagnosis of the chopper under restino or working conditions has registrate dan irregularity.</p> <p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - The logic of the chopper card is damaged. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Verify that the motor is connetced. - Verify the continuity of the 3 phases of the motor. - Replace the chopper.

Number of blinking	MESSAGE	NOTES
2	INCORRECT START	<p>Incorrect starting sequence.</p> <p><u>Possible causes:</u></p> <ul style="list-style-type: none"> - Error in the sequence made by the operator; - The pedal microswitch and/or drive-selection microswitch are sticking; - Wiring not correct. <p><u>Actions:</u></p> <ul style="list-style-type: none"> - Check, that the starting sequence was carried out as follows: <ul style="list-style-type: none"> ▪ Sit down on the machine and close the seat-microswitch ▪ Switch on the general key ▪ Select gear (forward/backward) ▪ Push the acceleration pedal - Check that the microswitch of drive and drive manipulator don't have the contacts stuck and can work correctly; - Check the continuity in the circuit between pedal-microswitch, chopper and gear selector; - Check the continuity between the microseat and the chopper; - If you have not found any irregularities and the problem persists, replace the chopper card.
2	FORW + BACK	<p>Incorrect starting sequence.</p> <p><u>Possible causes :</u></p> <ul style="list-style-type: none"> - Micro of forward and backward directions activated at the same time. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Check the cables until the microswitches of forward and backward directions; - Check the state of the microswitches; - Replace the chopper card.
3	CAPACITOR CHARGE.	<p>The test is executed in total conduction.</p> <p><u>Possible causes :</u></p> <ul style="list-style-type: none"> - The voltage is low and does not increase when the main remote control switch is open. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - One phase of the motor is not correctly connected at the chopper card or is broken. - If the problem continues, replace the chopper card.

Number of blinking	MESSAGE	NOTES
3	VMN LOW	<p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - General remote control switch broken; - Metal parts that make a shortcircuit; - Mosfet in shortcircuit or broken; - Sticked contacts. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Check the right wiring of the cables 9-10 and the good connections of the chopper holdfast and of the motor holdfast; - Check if there are shortcircuits; - If the problem continues, replace the chopper.
3	VMN HIGH	<p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - Wrong wiring; - Current leakage or motor shortcircuit; - Chopper power system damaged; - Sticked contacts of the remote control switch. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Check if one phase of the motor is not connected at the card or if it is broken; - Check leakage or shortcircuit taking out the cable of the phase. If the alarm disappear, replace the motor; - If the problem continues, replace the chopper.
4	VACC NOT OK	<p>The chopper checks if under resting conditions the voltage of the accelerator is under the memorised min. value with the function PROGRAM VACC. If the value exceeds 1 Volt the alarm will be released.</p> <p><u>Possibile causes:</u></p> <ul style="list-style-type: none"> - A cable of the potentiometer is interrupted; - The potentiometer is not connected; - The potentiometer is damaged. <p><u>Actions:</u></p> <ul style="list-style-type: none"> - Check the continuity of the connection between potentiometer, accelerator, and chopper; - Reprogram the chopper with PROGRAM VACC (see paragraph adjustments and inspections); - Check the functionality of the potentiometer (can be damaged) and if necessary replace this part (afterward reprogram the chopper).


	ADJUSTMENTS AND INSPECTIONS	ULTRA85B ULTRA100B	Doc. 10013540 Issued 04/2009 Vers. AC Pag. 7 di 31
--	-----------------------------------	-----------------------	---

Number of blinking	MESSAGE	NOTES
4	PEDAL WIRE KO	<p>The chopper checks continuously the endstroke of the accelerator pedal and appears the alarm when the minimum value is below 0,3V or the maximum value is more than 2V.</p> <p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - One wire of the potentiometer is interrupted; - The resistance of the potentiometer is broken; - The potentiometer is overcharged. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Verify the wiring of the potentiometer; - Verify the potentiometer by the function TESTER.
5	ENCODER ERROR	<p>The chopper checks the functionality of the encoder and its reading.</p> <p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - The encoder is damaged; - The encoder wiring is damaged. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Check the encoder using the TESTER function of the console; - Replace the encoder.
5	STBY I HIGH	<p>The chopper checks the closure and opening of the remote control switch of the chopper card.</p> <p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - The remote control switch is damaged; - The chopper memory s damaged. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Verify the functionality of the remote control switch of the chopper card and eventually replace it. - Replace the chopper.
5	I=0 EVER	<p>The chopper tests if working the current is more than a minimum value. In the opposite case the machine stops and appears an alarm.</p> <p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - Wrong wiring between the motorwheel and the chopper card; - The resistance of the motor is too high because of a motor problem; - The current sensor s broken. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Check the right connection of the cables of the motor on the chopper card; - Replace the motor; - If the problem continues, replace the chopper.

Number of blinking	MESSAGE	NOTES
6	COIL SHORTED	<p>There is an overcurrent due to a shortcircuit of the logic of the chopper card.</p> <p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - Overcharging of the main remote control switch of the chopper; - The chopper is damaged. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Switch off and switch on the machine; - Verify the main remote control switch of the chopper; - Replace the chopper.
6	DRIVER SHORTED	<p>There is an overcharging of the current.</p> <p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - The logici s damaged. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Switch off and switch on the machine; - Replace the chopper.
6	CONTACTOR DRIVER	<p>There i san overcharging of current due to a shortcircuit of the loc on the chopper card.</p> <p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - The logici s damaged. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Switch off and switch on the machine; - Replace the chopper.
6	CONTACTOR CLOSED	<p>One remote control switch or both don't open.</p> <p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - Remote control switch broken or overcharged - Power of the chopper broken. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Check the contacts of the remote control switch and eventually replace it; - Replace the chopper.

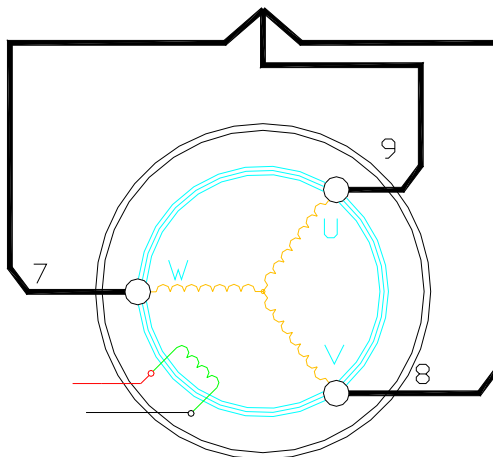
Number of blinking	MESSAGE	NOTES
6	CONTACTOR OPEN	<p>One or both remote control switches are not closed, when the traction is activated.</p> <p><u>Possible causes:</u></p> <ul style="list-style-type: none"> - Dirt, Dust or anything else does prevent a good connection to the remote control switch; - Motor-Isolation or interrupted contacts; - Remote control switch damaged or overloaded; - Damaged chopper. <p><u>Actions:</u></p> <ul style="list-style-type: none"> - Clean the contacts with compressed air and if necessary scrub off the dirt slightly; - Check wiring and connections to the remote control switch; - Check the motor wiring and replace if necessary; - Replace the chopper.
7	HIGH TEMPERATURE	<p>The chopper works with a temperature under 78°. After this value, the maximum current will be reduced until the value zero will be achieved at a temperature of 100°.</p> <p><u>Possible causes:</u></p> <ul style="list-style-type: none"> - If the alarm occur at environment temperature ($\pm 20^\circ$): <ul style="list-style-type: none"> ▪ Malfunction of the chopper; ▪ Machine blocked through the brakes; ▪ Thermal sensor damaged or loosened; ▪ Interrupted connections; ▪ Damaged chopper; - Stressing working conditions with high environment temperature; - Insufficient heat derivation. <p><u>Actions:</u></p> <ul style="list-style-type: none"> - Check the thermal sensor inside the chopper; - Check the brakes of the machine; - Check the connections to the motor; - Let the chopper in dormant state and let it cool down; - Check if the nuts are fixed and the right installation; - If the problem persists replace the chopper.

Number of blinking	MESSAGE	NOTES
7	MOTOR TEMPERATURE	<p>The chopper works with a temperature under 78°. After this value, the maximum current will be reduced until the value zero will be achieved at a temperature of 100°.</p> <p><u>Possible causes:</u></p> <ul style="list-style-type: none"> - If the alarm occur at environment temperature ($\pm 20^\circ$): <ul style="list-style-type: none"> ▪ Malfunction of the chopper; ▪ Machine blocked through the brakes; ▪ Thermal sensor damaged or loosened; ▪ Interrupted connections; ▪ Damaged chopper; - Stressing working conditions with high environment temperature; - Insufficient heat derivation. <p><u>Actions:</u></p> <ul style="list-style-type: none"> - Check the thermal sensor inside the chopper; - Check the brakes of the machine; - Check the connections to the motor; - Let the chopper in dormant state and let it cool down; - Check if the nuts are fixed and the right installation; - If the problem persists replace the chopper.
7	THERMIC SENS KO	<p>The chopper checks the output of the thermic sensor, that has to be between 4,95 V and 0,1 V. When it is out of that range the chopper shows an alarm.</p> <p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - The logic of the chopper is damaged. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Replace the chopper.
32	BATTERY LOW	<p>The battery voltage is going below the 10% of the charging. The machine stops.</p> <p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - The battery is discharged. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Check the charging of the batteries; - Try to restart pressing the pedal.
32	WRONG SET BATT	<p>The chopper verify the battery voltage.</p> <p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - The battery is no correct. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Check the battery and eventually replace it with a correct one.

	ADJUSTMENTS AND INSPECTIONS	ULTRA85B ULTRA100B	Doc. 10013540 Issued 04/2009 Vers. AC Pag. 11 di 31
--	-----------------------------------	-----------------------	--

Number of blinking	MESSAGE	NOTES
NO BLINKS	WRONG CONFIG	<p>The chopper verify the program of the logic of the chopper card.</p> <p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - The logici s damaged; - The logic has lost the memory. <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Switch off and switch on the machine and eventually reprogram the chopper; - Replace the chopper.
NO BLINKS	CURRENT SENS KO	<p>The chopper does not read the current.</p> <p><u>Possibile causes :</u></p> <ul style="list-style-type: none"> - The logici s damaged; <p><u>Actions :</u></p> <ul style="list-style-type: none"> - Replace the chopper.

Adjustments and setting of the motorwheel



INVERTER ZAPI ACO


PARAMETERS		PROGRAM 00
ACCELER. DELAY	ACCELERATION	3
RELEASE BRAKING	BREAKING AT RELEASING	8
INVERS. BRAKING	BREAKING AT INVERSION	8
PEDAL BRAKING	BREAKING OF THE PEDAL	9
SPEED LIMIT BRK.	PARTIAL BREAKING AT RELEASING	2
BRAKE CUTBACK	BREAKING WITH REDUCTION	8
MAX SPEED FORW	MAXIMUM SPEED FORWARD	155 Hz
MAX SPEED BACK	MAXIMUM SPEED BACKWARD	100 Hz
CUTBACK SPEED	REDUCTION SPEED	60%
CUTBACK SPEED 2	REDUCTION 2° SPEED	75%
CUTBACK SPEED 3	REDUCTION 1° SPEED	50%
CURVE CUTBACK	SPEED LIMIT TURNING	60%
HS CUTBACK	HARD & SOFT REDUCTION	26%
FREQUENCY CREEP	MINIMUM SPEED	1,20 Hz
MAXIMUM CURRENT	MAXIMUM CURRENT	7
INCHING SPEED	-	0 Hz
INCHING TIME	-	0
AUXILIARY TIME	TIME CLIMBING RAMP	0,4
TOOTHs	TOOTHs ENCODER	1

Calibration with console

Connection with the console

1. Check, if all switches are switched off.
2. Lift the front wheel on a security stand.
3. Remove the connection of the LED alarm from the chopper.
4. Connect the console with the corresponding connection with **key in off-position**.
5. Turn the key and switch the machine on.
6. After switching on the machine appears the message "ACOT2AE CO1.01" or "**Alarm* abcdef ...".
7. Press onto the seat.
8. In any case Push ENTER in order to get access to the main menu.

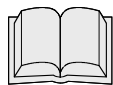
For a more detailed description consult also the manual and the function description of the chopper Zapi.

	ADJUSTMENTS AND INSPECTIONS	ULTRA85B ULTRA100B	Doc. 10013540 Issued 04/2009 Vers. AC Pag. 14 di 31
--	-----------------------------------	-----------------------	--

Chopper programming	Display Console
1. With Cima motorwheel appears the alarm "PROG. TOOTHES" .	
2. Press <i>ENTER</i> to get into the main menu. 3. It appears the menu: "PARAMETER CHANGE" = CHANGE THE PARAMETERS. 4. Press <i>ENTER</i> and check, scrolling with <i>ROLL</i> the single values, if they correspond to the above mentioned values. 5. Set the parameter "THOOTS = 1".	* MAIN MENU * PARAMETER CHANGE
6. At the end press <i>OUT</i> and confirm with <i>ENTER</i> (after the request "ARE YOU SURE?") if you changed parameters (Use the button PARAM SET on the console). ATTENTION: THE SECURITY PARAMETERS, AS ACCELERATION, BRAKING, ETC. CAN NOT BE MODIFIED ONLY THE SPEED REDUCTIONS CAN BE MODIFIED (CUTBACK SPEED 1 AND 2).	
7. Switch off and switch on the machine.	

Align the chopper card to the movement of the acceleration pedal	Display Console
1. Scroll through the list with the button <i>ROLL UP</i> to "PROGRAM VACC" and select (attention : the machine is blocked during the programming) :	* MAIN MENU * PROGRAM VACC
2. Press <i>ENTER</i> , in order to access to the function "PROGRAM VACC"; the current min. and max. values corresponding to the forward and reverse gear appear :	VACC SETTING 0,2 1,5
3. Press <i>ENTER</i> .	
4. The chopper is now prepared to record the new min. and max. values, which will be signalled from the potentiometer :	MIN VACC MAX 0.0 - 0.0
5. Select the forward gear and press the pedal, take care to move the pedal slowly at the beginning of this process and to move the pedal until stop:	MIN VACC MAX 0,2 ↑ 1,5
6. Repeat the process for the reverse gear.	MIN VACC MAX 0,2 ↓ 1,5
7. Press <i>OUT</i> .	
8. It appears the confirmation request in order to load the new values :	ARE YOU SURE? YES=ENTER NO=OUT
9. Press <i>ENTER</i> for confirmation.	

Function Tester



ATTENTION : lift up the traction wheel before this test.

After the connection of the console, it will appear the initial message, that show the chopper model, the machine and the working hours of the chopper.
Enter on the submenu TESTER and pass all the points with the button ROLL UP.

ACOT2AE C01.01

36V 150A 00000

Check the **batteries voltage**.

Compare the voltage read from the chopper and the voltage read by a tester set on Volt with end scale of 50V or more.

BATTERY VOLTAGE

VOLT = 37.5V

In case of anomalies it is necessary verify the connectors of the chopper card and the state of the bornes and the cables on the batteries. In case the problem is not solved, it is necessary replace the chopper card.

Check the **motor voltage**. The value shows the percentage of instantaneous voltage on the motor, with reference at the actual value of the batteries voltage.
With machine stopped, it has to be zero.

MOTOR VOLTAGE

0 %

At the maximum speed, the percentage of the voltage on the motor has to be close at 100%.

MOTOR VOLTAGE

100 %

In caso di anomalie verificare le connessioni tra chopper e motoruota, la correttezza dei parametri del chopper, le connessioni delle riduzioni di velocità.

Check the **amplification voltage**. The value indicates the percentage of the instantaneous voltage really given to the motor, with reference at the actual value of the batteries voltage that has to be added at the motor voltage.
With machine stopped, it has to be zero.

VOLTAGE BOOSTER

0 %

Increasing the speed the value goes up, then it gets stable and goes down.

VOLTAGE BOOSTER

8 %

In case of anomalies, check the connections between the chopper and the motorwheel and the correct value of the chopper parameters.

Check the **motor frequency**. The value indicates the frequency of the alternating current applied at the motor.
With machine stopped, the frequency has to be zero.

FREQUENCY

0.00 Hz

<p>At the maximum speed, in forward direction, the value has to be the same as set on the parameter "max speed forw" of the chopper. In backward direction the value has to be the same of the "max speed back".</p>	<div>FREQUENCY</div> <div>155 Hz</div>
<p>In the case of anomalies, it is necessary to verify the traction motor and eventually replace the chopper.</p>	
<p>Verify the frequency of the encoder. The value shows the motor speed measured with the encoder. With the machine stopped, the frequency has to be zero.</p>	<div>ENCODER</div> <div>0.00 Hz</div>
<p>Increasing the speed, the value has to be the same as indicated on the parameter "max speed forw" of the chopper. In backward direction has to be the same at the value of "max speed back".</p>	<div>ENCODER</div> <div>155 Hz</div>
<p>In the case of anomalies, it is necessary to verify the traction motor, the encoder and eventually replace the chopper.</p>	
<p>Verify the slipping. The value shows the difference between the motor frequency (FREQUENCY) and the encoder frequency (ENCODER). With the machine stopped, the value has to be zero.</p>	<div>SLIP VALUE</div> <div>0.00 Hz</div>
<p>Increasing the speed, the value has to grow and then get stable.</p>	<div>SLIP VALUE</div> <div>3 Hz</div>
<p>In the case of anomalies, it is necessary to verify the traction motor, the encoder and eventually replace the chopper.</p>	
<p>Verify the motor current. The value indicates the efficient value of the current on the motor. With the machine stopped, the current has to be zero.</p>	<div>CURRENT RMS</div> <div>0 A</div>
<p>Increasing the speed, the value has to grow up.</p>	<div>CURRENT RMS</div> <div>32 A</div>
<p>In the case of anomalies, it is necessary to verify the traction motor and eventually replace the chopper.</p>	

<p>Verify the batteries current. The value indicated the approximated value of the batteries current. With the machine stopped, the current has to be zero.</p>	<div>BATTERY CURRENT</div> <div>0 A</div>
<p>Increasing the speed, the value has to grow up.</p> <p>In the case of anomalies, it is necessary to verify the state of the batteries, the traction motor and eventually replace the chopper.</p>	<div>BATTERY CURRENT</div> <div>42 A</div>
<p>Verify the batteries charge. The value indicates the residual charge of the batteries.</p> <p>In the case of anomalies, it is necessary to verify the state of the batteries, the batteries cables and the chopper.</p>	<div>BATTERY CHARGE</div> <div>70 %</div>
<p>Verify the temperature measured on the aluminium base of the chopper. The temperature measured has to be the same of the surrounding temperature, on the case the machine, before the measure, has been switched off at least for 1 hour.</p> <p>In the case of anomalies or high temperatures, verify the tightness of the connections and the state of the traction motor. In the case the problem stays, replace the chopper.</p>	<div>TEMPERATURE</div> <div>29 °C</div>
<p>Verify the motor temperature shows by the console. The temperature has to be the same at the surrounding one, on the case the machine, before the measure, has been switched off at least for 1 hour.</p> <p>In the case of anomalies or high temperatures, verify the tightness of the connections and the state of the traction motor. In the case the problem stays, replace the chopper.</p>	<div>MOTOR TEMPERATURE</div> <div>31 °C</div>
<p>Verify the potentiometer : without press the pedal, the console must shows a message as in the picture.</p>	<div>ACCELERATION</div> <div>0,2 V</div>
<p>Press the pedal at the top to verify the state of the potentiometer. With the pedal totally down, the message of the console has to be the same as in the picture. Verify that the value increases linearly.</p>	<div>ACCELERATION</div> <div>1,7 V</div>

In the case of anomalies verify the connections of the potentiometer and eventually replace it. To do this check it is not necessary press the microseat and neither the direction joystick.

NOT AVAILABLE

LIFTING SWITCH

NOT AVAILABLE

DESCENT SWITCH

Verify the **microswitches forward direction** :

FORWARD SWITCH

OFF GND

Verify the forward direction :

- Press the direction manipulator forward;
- Press the accelerator pedal;

The console display has to show the message like in the picture.

FORWARD SWITCH

ON +VB

In the case of anomalies verify the functionality of the microseat, of the direction microswitches (on the pedal box) and the joystick for forward and backward direction.
ATTENTION : lift up the motorwheel before this check.

Verify the **microswitches backward direction** :

BACKWARD SWITCH

OFF GND

Verify the backward direction :

- Press the direction manipulator backward;
- Press the accelerator pedal;

The console display has to show the message like in the picture.

BACKWARD SWITCH

ON +VB

In the case of anomalies verify the functionality of the microseat, of the direction microswitches (on the pedal box) and the joystick for forward and backward direction.
ATTENTION : lift up the motorwheel before this check.

Verify the right functionality of the **seat microswitch**.
Normally the message has to be like in the picture.

HANDLE/SEAT SW

OFF GND

Sit down on the seat and press the microswitch and verify the message on the console is like in the picture.

HANDLE/SEAT SW

ON +VB

NOT AVAILABLE

H&S CUTBACK

OFF GND

Verify the functionality of the **speed reduction 1**.

CUTBACK SWITCH 3

ON GND

Verify the functionality of the **speed reduction 2**.

CUTBACK SWITCH 2

ON GND

Verify that the value of cutback switch 1 and cutback switch 2 are as in the list below :

Speed	Switch 3	Switch 2
Minimum	ON GND	ON GND
Medium	OFF +VB	ON GND
Maximum	OFF +VB	OFF +VB

Verify the **working brake microswitch**. It appears the message as shown in the picture.

BRAKE SWITCH

OFF GND

Press the working pedal and verify that the message on the console display is like in the picture.

BRAKE SWITCH

ON +VB

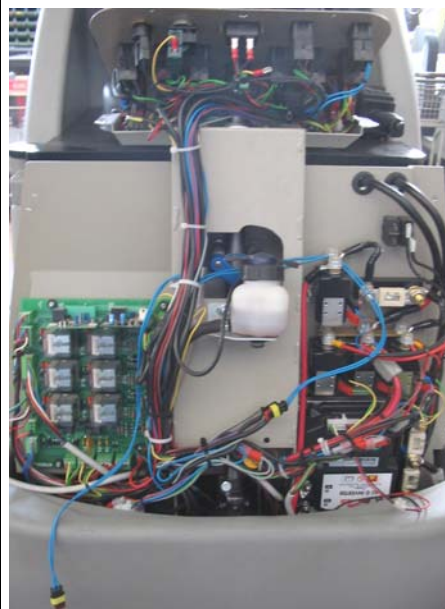
In the case of anomalies, verify the functionality of the working brake microswitch.

NOT AVAILABLE

STEER ANGLE

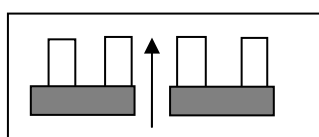
Inspection of the electrical equipment

1. Remove the battery connection positioned under the panel.
2. Check the cleanness and the tightness of the battery connection cables.
3. Check the connection and tightness of the current cables: **remote control switch, fuses, motors** and so on.
4. Restore the battery connection.
5. Switch the machine on with the key and check, if the red control light blinks 5 times.
6. Check the control lamps and switches:
 - Check the lamp and the functionality of the front and back lights (the winking light is always on);
 - Check the red lamp of the oil level brake indicator;
 - Check the red lamp of the brake on;
 - Check the functionality of the hourmeter;
 - Check the functionality of the key switch;
 - Check the functionality of the horn;
 - Check the functionality AUT-MAN of the squeegee up and down;
 - Check the switch lamp and the functionality of the suction motor;
 - Check the green lamp of the squeegee completely down;
 - Check the functionality of the batteries level display;
 - Check the lamp of the reserve – float of the solution tank;
 - Check the float on the recovery tank and the following switch off of the suction motor;
 - Check the red lamp of brush motor alarm;
 - Check the orange lamp up-down of the brush base;
 - Check the green lamp of the brush deck completely inside;
 - Check the functionality of the joystick forward and backward direction;
 - Check the functionality of the speed selector;
 - Check the manipulator and the functionality up-down of the squeegee;
 - Check the switch lamp and the functionality of the solenoid valve (with machine and brush motor on in forward direction);
 - Check the green switch lamp of the extra pressure;
 - Check the switch lamp and the functionality of the brush motor (with the machine on and the brush base lowered);
 - Check the functionality of the manipulator up-down of the brush base and the lateral displacement to the right side and back;
 - Check the functionality of the seat microswitch;
 - Check the forward gear, reverse gear, speed reductions, acceleration and braking.

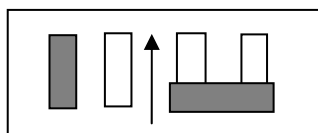


Adjustemnt check card batteries

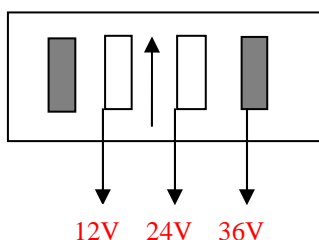
1. Check the right setting of the check card. The setup is done by the **jumpers**.
2. **Setting Lead acid – Gel** : with the jumper on the first pin, the card is set for lead acid, without is for gel.
3. **Setting of the voltage** : if the jumper is not inserted in one of the three pinss, the card recognize automatically the voltage of the machine; otherwise, from the left side, the second pin is for 12V, the third one is for 24V, the fourth one is for 36V.
4. The configurations are the followings:



Gel batteries
Automatic voltage



Lead acid batteries
Automatic voltage



STANDARD
Lead acid batteries
Voltage 36V

12V 24V 36V

On the batteries display will appear the followings :



Software version



12 V



24 V



36 V

(standard)



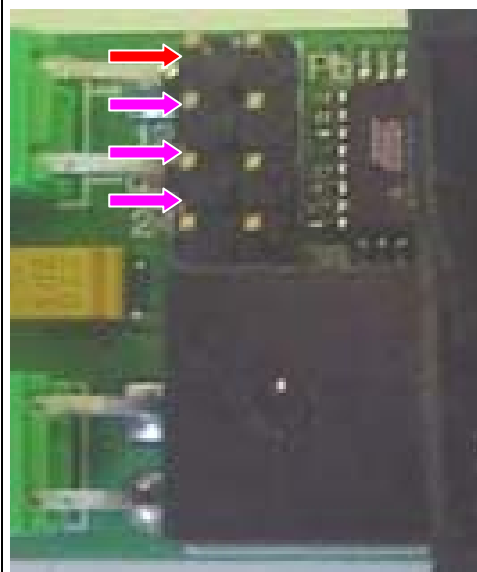
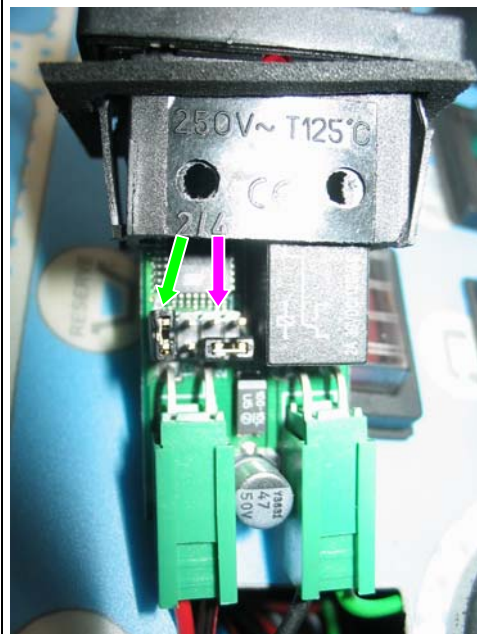
Gel batteries



Lead acid batteries

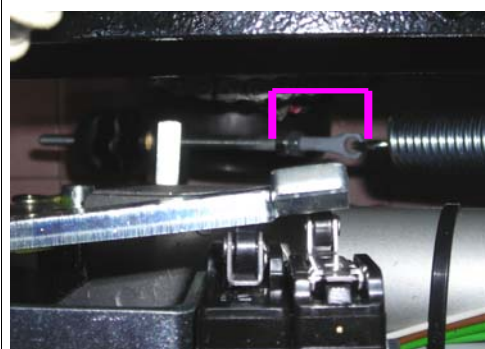
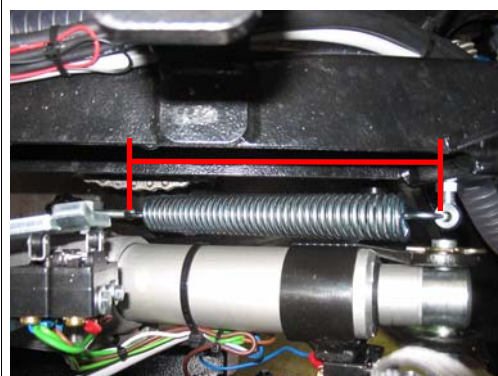
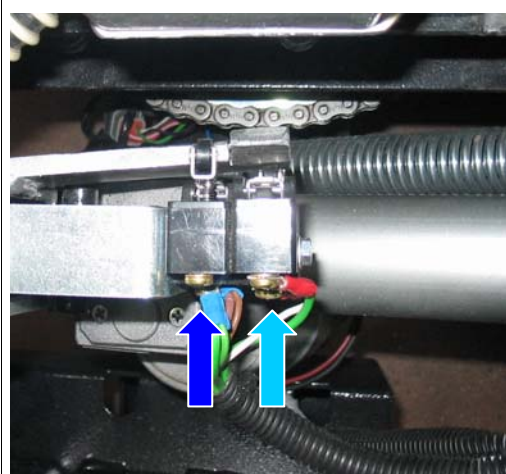
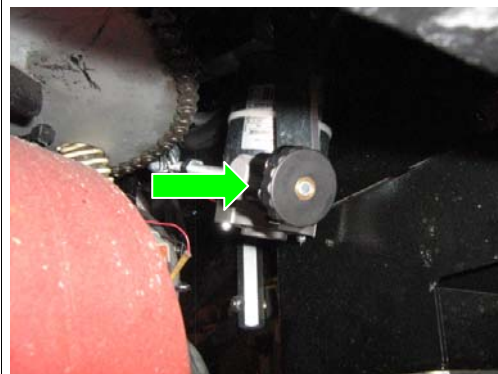


Batteries charging level



Adjustment of the microswitches brush base

1. Remove the footboard of the machine.
2. Place both microswitches, so that there remains a play of 1 mm. between the casing and the level with the wheel, when the cam pushes on the lever.
3. Place the **knob** that stops the knob that adjust the brushes pressure at the end screw level, so that with the first pressure the spring is free (attention that screwing the knob the brushes pressure increase).
4. Check that with standard brushes pressure (obtained pressing the manipulator of the base down), the **spring** is free, otherwise adjust the **first micro** of base down acting on the micro support. Test the movement and check the measure.
5. Check that with the standard extra brushes pressure (obtained pressing the interruptor of the extra pressure of the brushes base), the **spring** totally extended measure **245 mm** between the two extern ring sides of the spring and adjust the **second micro** of descent of the base acting on the micro support. Test the movement and recheck the measure.
6. Check the position of the **endstroke nuts** of the knob (that allow to obtain the values of maximum pressure), is at **45 mm.** from the center hole of the spring.

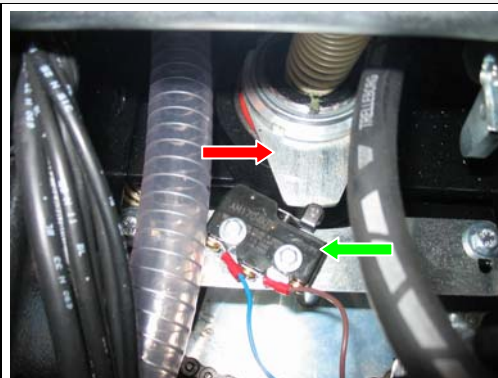


- Adjust the **micro support** lifting of the base, so that the wheels of the base can place on the chassis, avoiding the wobbling of the base and the shaft stay out for about 20 mm.



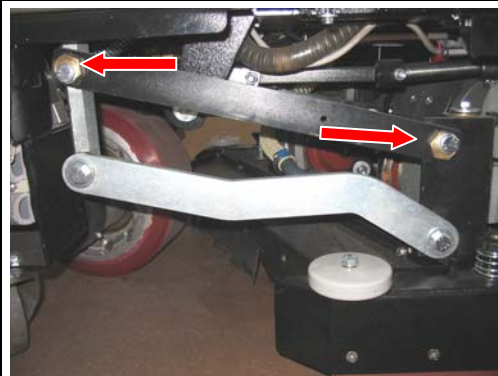
Adjustment microswitch reduction speed turning

- On the crown of the front wheel there is a **support** and a **microswitch** to adjust the speed turning. It has to adjust the support and the microswitch so that in forward or backward speed the micro is pressed (leaving a small space of 3-3,5 mm.) and when the machine is turning on left or right side the micro open. Pay attention that the support doesn't block on the wheel of the microswitch.



Adjustments and inspections brush base ULTRA85B

- Lower the base and verify that the brushes, rotating, touch the floor with the rear side, still remaining up of 5-6 mm. in the front.
- In the case the adjustment is not correct, loosen the **excentric bushing** of the base arms, rotate them, keeping the same direction and verifying the inclination base.
- Tight the nuts and check again.

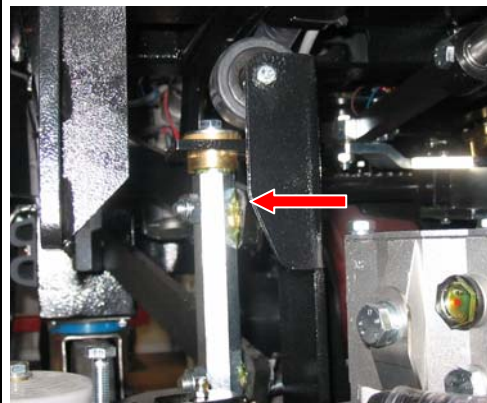


- Loosen the knobs of the side splashguards.
- Adjust the height of the side splashguards by the **knobs** on the splashguards, so that, in forward direction, the rubber touch the floor on the rear side and is a little bit up on the front side.
- Check that the lock nut underneath the side splashguard on the front side is adjusted in the lowest position, to allow the adjustment of the knob.
- Tight the knobs.



Adjustments and inspections brush base ULTRA100B

1. Lower the base and verify that the brushes, turning, touch the floor with the rear side remaining still up of 5-6 mm. on the front side.
2. In the case that the adjustment is not correct, loosen the **excentric bushing** of the arms base, rotate them, keeping the same direction and verifying the inclination of the base.
3. Tight the lock nuts and check again.

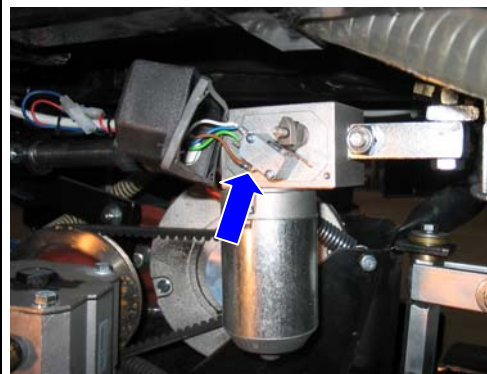


4. Loosen the nuts of the side splashguards.
5. Adjust the height of the side splashguards by the **screws M6** that hold up the splashguards, so that, in forward direction, the rubber touch the floor on the rear side and is a little bit up on the front side.
6. Tight the nuts.

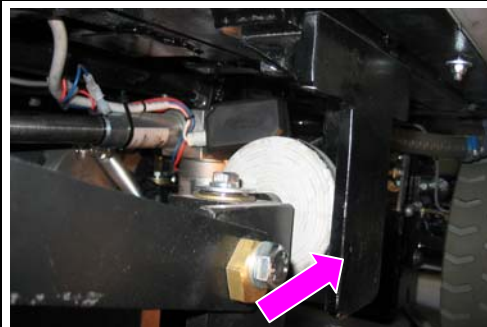


Adjustment of the microswitches of the lateral displacement

1. Adjust the cam of the **microswitch** lateral displacement (the most external) so that the actuator has the shaft out of 5 cm. and the base is out of 15 cm.
2. Adjust the cam of the **microswitch** back displacement (the most internal), so that the actuator is at 2-3 mm. from the end stroke (totally extended).



3. (**ULTRA85B**) – Check, with the deck inside, that the wheel is touching the **lateral blade**.



4. (ULTRA100B) – Check, with the deck inside, that the wheel is touching the **lateral blade**.



5. Adjust the **knob** positioned on the rear side of the machine to adjust the spring anti vibrations and shocks of the base, verifying that the threaded is out of about 40 mm.



Calibration of the ammeter card of the brush motor

1. Insert the **ammeter pincers** on the current cables of the brush motor (cable n° 4).
2. Let down the brush base and the squeegee.
3. Push the button for the activation of the brushes.



4. When the control lamp starts to blink check that the pincer indicates :

- 53-55A for the ULTRA85B
- 68-70A for the ULTRA100B.

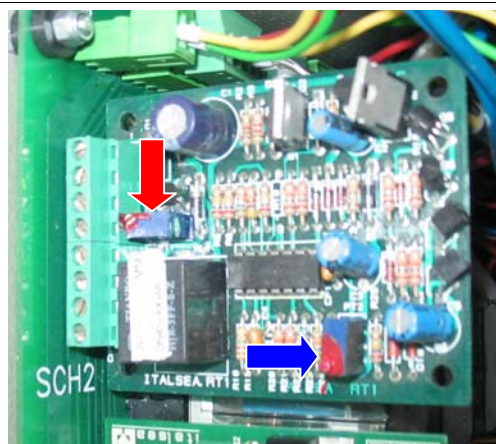
If necessary adjust the **trimmer (Ampere)** of the motor control card.

5. Increase the pressure (press the brush base on the floor) until the ammeter indicates :

- 58-60A for the ULTRA85B
- 73-75A for the ULTRA100B

and check, that the motor switches off after 15-20 blinking signals; in case of deviations repeat the process, after the adjustment of the **trimmer (time)** on the card, until the intervention in the right moment is achieved.

6. Seal the trimmer.



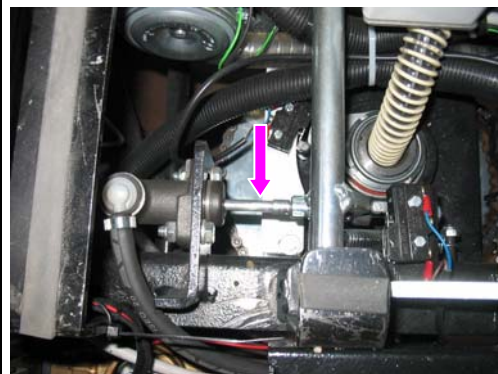
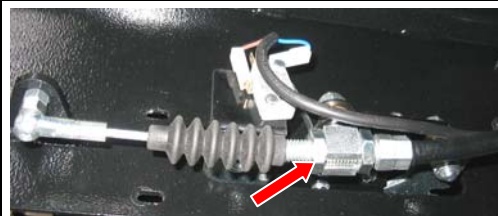
Calibration of the float-check card for the suction motor

1. Start the suction motor and check if the manual lifting of the float recovery tank leads to the shut down of the motor in 4 seconds (± 1 sec.), if necessary adjust the **trimmer** of the card.
2. Seal the trimmer.



Check and adjustment of the brakes

1. Check the right functionality of the parking brake, so that the machine is stopped when the pedal is on the second tooth. Eventually adjust the **nut M10** till obtain the right range.
2. Check that the wheels don't be blocked and that they brake at the same time. If necessary adjust the **rods**.
3. Check the correct functionality of the working brake, so that the machine stops in a determinate braking space. Eventually adjust the **fork** of the threaded rod of the oil pump.
4. Check and, if necessary, reset the level of the **oil brakes** (use oil brakes DOT 4).



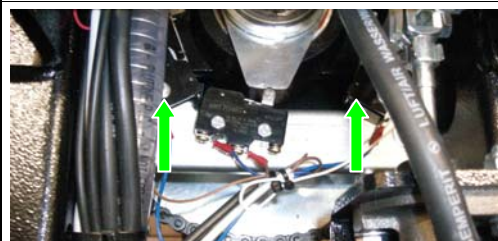
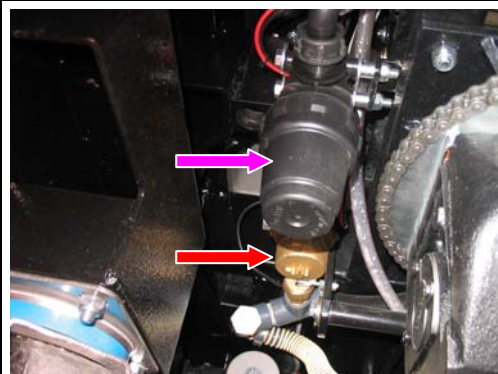
Adjustment steering

1. Set the right tension of the chain by the tender :
 - Losen the nut;
 - Screw on the **screw M8** (try to turn the steering completely on the right and left side and check that it doesn't block because of the excessive tension);
 - Tight the nut.



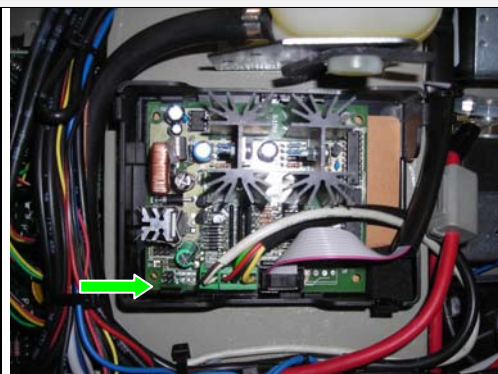
Inspection of the water system

1. Check the cleanness and the positioning of the **solution filter**.
2. Fill the tank completely with water and check the tightness.
3. Check the tightness of the tubes, **solenoid valve** and the adjustment of the water cock.
4. Check, if the solution runs out continuously and regularly on both brushes, when the cock is open.
5. Fill the recovery tank and check the tightness.
6. Check the tightness of the exhaust pipe and plug.
7. Check the functionality of the microswitches to stop the water when turning.

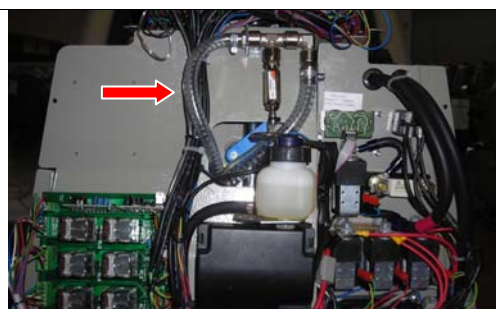


Inspection chemical dosing system (OPTIONAL)

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



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



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



6. Check that with the lever in the position like on the picture the dosing system is bypassed.



Suction inspection

1. Check the cleanliness and the functionality of the **gasket** of the suction head.
2. Check the connection and the tightness of the suction hoses and the squeegee hose.
3. Check that the holes to drain the water under the suction head are not constipated.
4. Check the cleanliness of the **float filter** that protect the suction motor.

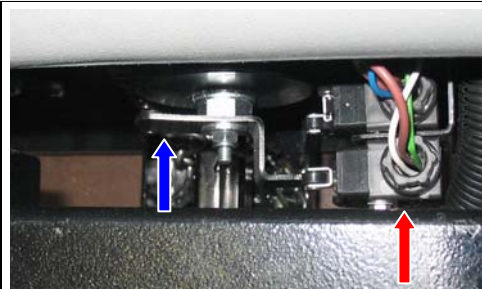


4. Check the functionality of the **float** positioned on the recovery tank.



Regolazione dei microinterruttori tergipavimento

1. Both micro switches have to be positioned, so that 1 mm play remains between the casing and the lever with control wheels, if the cam presses this one.
2. Adjustment squeegee lifting (with lifted brush base) through the actuator's **cam**. Unscrew the central screw, turn the cam until the **microswitch for the upwards movement** snaps (internal micro) until you achieve a distance of **45-50 mm** between the squeegee rubber and the floor. Screw on the central screw of the cam attachment.
3. The downward movement is controlled automatically.
4. Retry upward and downward movement.



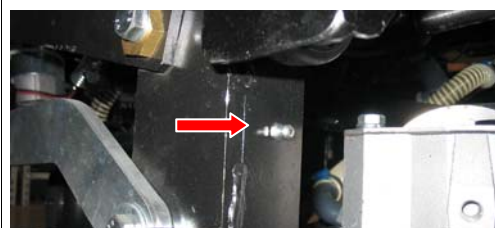
Squeegee adjustment

1. Unscrew the blocking **adjuster nuts**.
2. Screw on the support of the wheels lift them up so that the squeegee rubber on the floor has an uniform inclination on the sides and the center.
3. Loosen the **nut** and adjust the inclination by the screw so that the rubber is not too pressed on the floor, but has an inclination of about 30°.
4. Block the nut.
5. Check the functionality of the **lever** for the rotation of the squeegee in vertical position.

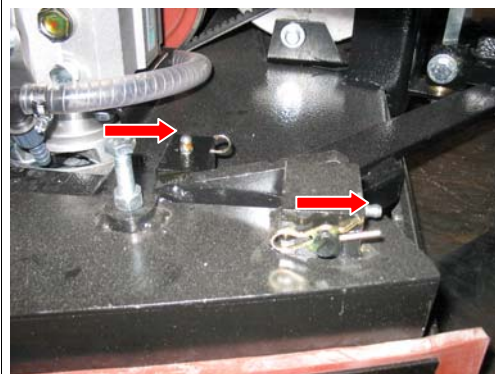


Points to grease for maintenance

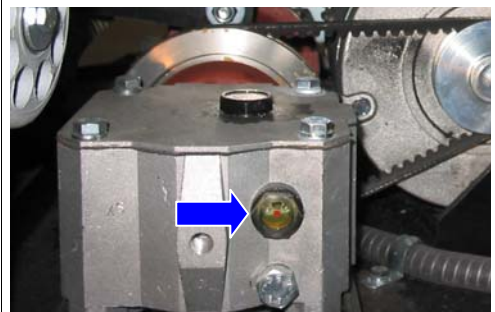
1. (ULTRA85B) - Grease the **support pins** of the brush base arms.



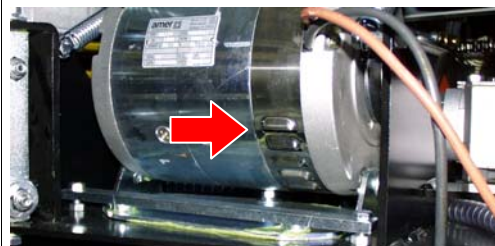
2. (ULTRA100B) - Grease the **support pins** of the brush base arms.



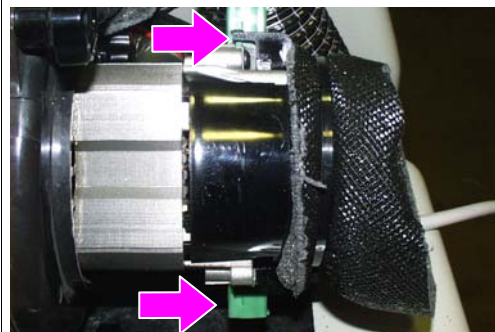
3. Check the presence of reduction oil in the transparent **oil level plug** and arrives at the red mark. Use Shell Omala 460 (Oil quantity Kg. 0.35). Fill up through the upper plug.



4. Check the cleanness and the functionality of the air-openings for the cooling of the **brush motor**.
5. Check the wear and the gliding of the carbon brushes.



6. Check the wear and the gliding of the **carbon brushes** of the suction motor.



Function inspection of the machine

- ☐ Check the functions of the switches and lamps;
- ☐ Check the function of the seat microswitch;
- ☐ Check the function of the acceleration pedal;
- ☐ Check the function of the cylindrical brush unit;
- ☐ Check the functionality of the brush motor;
- ☐ Check the function of the actuator for the lateral displacement of the brush base;
- ☐ Check the function of the solenoid valve;
- ☐ Check the squeegee function operating it manually or automatically;
- ☐ Check the functionality of the suction motor;
- ☐ Check the function of the emergency and parking brake;
- ☐ Check the function of the steer;
- ☐ Check the battery conditions, holdfast and cables;
- ☐ Check the function of the horn;
- ☐ Check the function of the headlights and the winking light.

Test the machine functions

- ☐ Fill the tanks with water and check if there are any leakages.
- ☐ Check the tightness of the water supply and the regularly water flow on both brushes.
- ☐ Adjust the inclination and the wheels of the squeegee and carry out a test.
- ☐ Adjust the brush pressure and the inclination of the basement and carry out a test.
- ☐ Check the lateral displacement and replacement of the brush base.
- ☐ Adjust the lateral splashguard through the knobs and carry out a test.
- ☐ Adjustment of the front splash guard with subsequent function control.
- ☐ Check the automatic function.
- ☐ Check the seat microswitch.
- ☐ Check the function of the lever for the adjustment of the seat position.
- ☐ Check the function of the selector of the water outflow.
- ☐ Check the function of the selector of the brush pressure.
- ☐ Check the effectiveness of the park and emergency brake: brake with max. speed and check, if the wheels are braked simultaneous.
- ☐ Check, if the machine starting with max. speed, full tank, after releasing the accelerator pedal stands after 165-170 cm. Otherwise control the console parameters again, in particular "Release Braking".
- ☐ Check the forward gear, reverse gear, acceleration and brakes.

Final inspection

Check all functions: Scrubbing, Vacuum, forward and reverse gear, brakes.