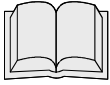# ADJUSTMENTS AND INSPECTIONS

READ THE OPERATING AND MAINTENANCE MANUAL

Electrical Equipment Inspection

1. Disconnect the battery plug.

2. Verify the cleanliness and the tightening of the battery terminals.

3. Check the connection and the tightening of the power cables: remote control switches, fuses, motors, etc.

4. Re-connect the battery connector.

5. Check the signal lamps and the switches:

   - Check the functioning of the manipulators of the rise and descent of the brushes base (on models where the actuator is provided)

   - Check the switch with signal lamp and the brushes motor (with the machine functioning).

   - Check the signal lamp of the water cock and the solenoid valve (with the machine functioning).

   - Check the switch with signal lamp and the suction motor.

   - Verify the forward and backward movement, the acceleration and the braking.

   - Check the operation of the hourmeter.

   - Check the operation of the solenoid valve.

Inspection Water Supply

Check the cleanliness and positioning of the *solution filter*:

1. Fill completely with water the solution tank
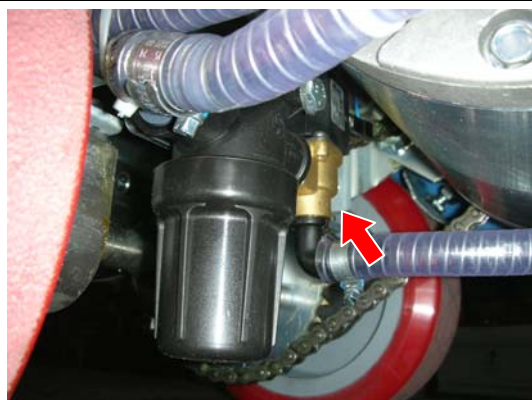
2. Check the tightness of the hoses and the adjustment of the water *cock*

3. Check that the detergent solution, when the cock is open, arrives with continuity onto the floor and that there are not any leakages.

4. Check then that with the closed water cock there is not any solution outlet.

Inspection Suction

1. Check the cleanliness and functionality of the *filter float*.

2. Check the tightness of the *gasket* on the filter cap

3. Check the air seal of the *cover* on the recovery tank.

4. Check the connections and the tightness of the *suction hose* and the *squeegee hose*.

5. Check the tightness of the *hose* and of the *exhaust plug*.

Adjustment Brake

Adjustment hand and working brake:

1. Check that the releases of the lever are not more than 3.

2. If necessary, re-establish the correct range adjusting the *lock nuts* of the brake cable.

3. Check that the red signal lamp of the brake is connected with the first release.
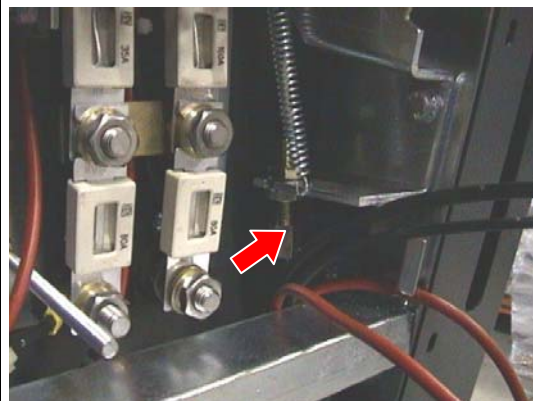
4. Adjustment *brake pads*: check the braking uniformity, with the brake inserted

5. trying with the drive, and checking that, the wheels remain blocked at the same time.

6. Block the lock nuts.

Adjustment Squeegee

1. Adjust the *inclination register* of the rear squeegee rubber when the squeegee is in function, so that this has an even bending through the whole squeegee. Block the *ring nut*.

2. Adjust the height of the wheels with the suitable *wing nut* checking that the rubber has an inclination of around 30°-45° and that it is not too much pressed down onto the floor nor too much lifted. The rubber has to be uniformly tilted backwards in its whole length of the squeegee.
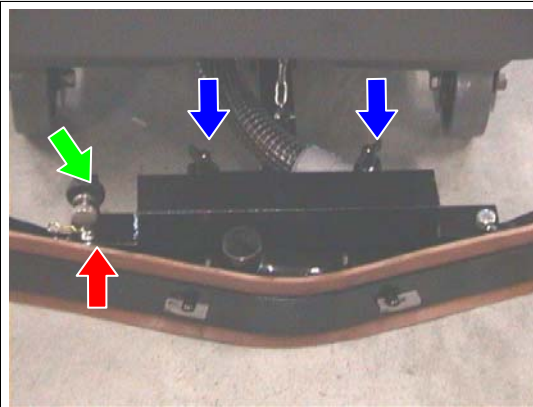
Adjustment Brushes Gamma 66 / Gamma 83

1. Adjustment inclination during working operation: lower the brushes base and adjust the *support* so that the brush during the descent touches the floor in the rear part; in the front part it should remain lifted about 5/8mm. To increase the inclination, loosen the *four screws*, move the support *forwards or backwards* depending on the specific necessity and lock the screws.
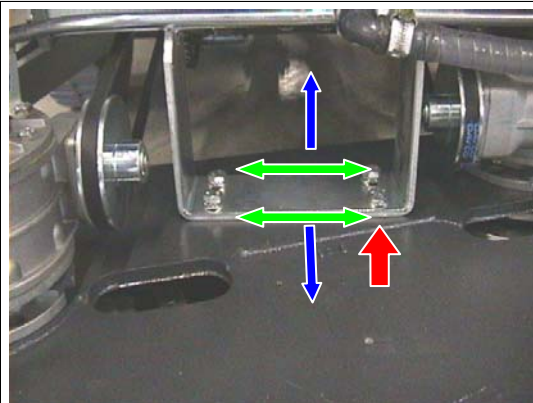
2. Adjust the uniformity of the two brushes unscrewing the two *lock nuts* placed on the two lower arms of the pressure screws.

3. Leaving a light print of the brushes on the floor, check their uniformity. In case of need, act upon the *screws right and left* previously loosened from the lock nut: screwing down more pressure will be on the related brush.

4. Block the two lock nuts at the end of the operation.
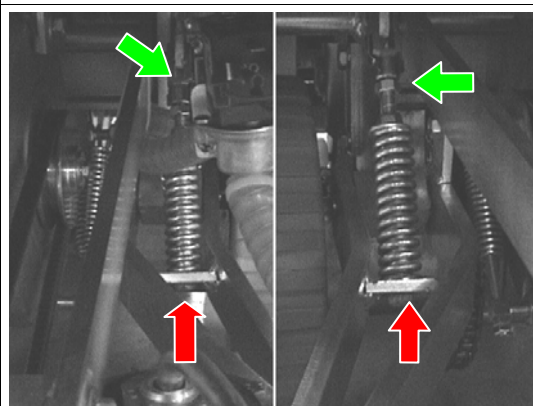
## Tension screw belt Gamma 66

Check the *tension screw*:

1. The screw head must rest on the reduction gear.

2. Between the screw head and the reduction gear there does not have to be any clearance, and it should not force too much against the reduction gear.

This screw permits to maintain a correct belt tension, and at the same time a correct alignment of the transmission shaft is given.
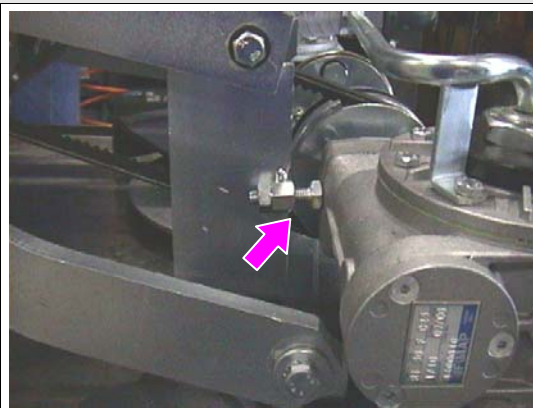
Adjustment Brushes Gamma 108

In case an uniform alignment of the brushes is not achieved, and therefore the cleaning is not perfect in its whole width, carry out the following operation:

1. Take off the front cover that covers the brushes base, then take off the central brush.

2. Unscrew the two *lock nuts* of the *screws M10* for the pressure, adjust the length of the spring, that has to be of *30mm* in neutral position.
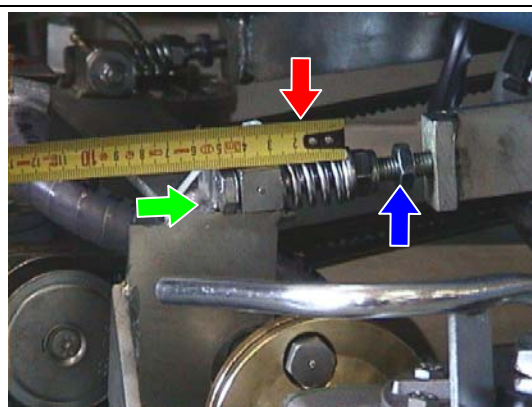
3. Screw down the two screws until an inclination in the upper front part of the brushes base is obtained, then check when lowering the base that the two brushes touch simultaneously in the rear part; if it is necessary to align the brushes, unscrew the two *lock nuts* on the screws of the right and left arms; *screw down* if it is necessary to lift or *unscrew* if the contrary has to be obtained.
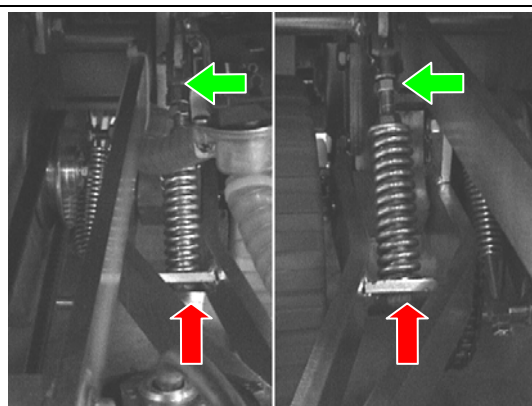
4. Lift the brushes base, couple the central brush, then lower it
5. unscrew the two *screws of M10* and make work the pressure springs. Between the screw head and the support there should be *about 2mm .*
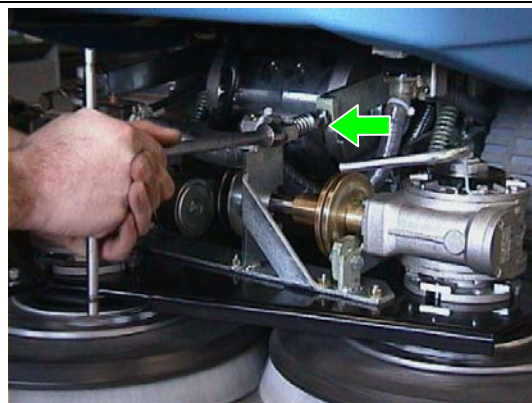
Block then all the lock nuts, and try with the brushes base in pressure the steadiness of the machine.

Menu of the Console

HEADING: the features of the console and of the chopper card: 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 parameters that can be modified are : CUT BACK SPEED 1 (minimum speed machine) and the CUT BACK SPEED 2 (medium speed machine). **All the other parameters are decided in Fimap and they are related to the traction motor. It is forbidden to change them without previous Fimap authorisation.**

TESTER: the quantities of the electric characteristics (traction motor voltage, state of power switch = closed/open …) are showed in this menu.

SAVE: this permits, once the parameters have been changed, to enter the new setting in a storage location of the console.

RESTORE: this permits to restore on the chopper card a parameter setting which has been entered in the console.

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. **It is an operation to be carried when there is the alarm Vacc not ok, when the pedal accelerator is being replaced, when the chopper card is being replaced**. A wrong relation between the potentiometer and the chopper card causes the machine stop.

Alarms and Decoder

The chopper card visualises an anomaly on two levels of information

1. through a red alarm led 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 of how to proceed on the machine.

Number of blinkings	MESSAGE	NOTES
1	WATCH DOG	The test of self-diagnosis of the chopper card carried out both on rest as in drive verifies an anomaly Possible causes - the logic of the chopper card is damaged Actions - replace the chopper card
1	EEPROM DATA KO	**The data of the hourmeter inside the chopper card** Actions - switch off and on again the key. If the problem will be solved the counter will be reset.

1	EEPROM OFF LINE	**The data of the hourmeter and of the alarm stored in the chopper card are not correct** Actions - switch off and on again the key. If the problem persists replace the chopper card - if the problem will be solved the data will be cancelled
1	EEPROM PAR KO	**The memory of the chopper card has lost the adjustment and operation data** Actions - switch off and on again the key. If the problem persists replace the chopper card - if the problem will be solved the data will be replaced with the standard data
2	INCORRECT START	**Incorrect starting sequence** Possible causes - error in the sequence Key/drive selection made by the operator - the micro pedal and/or micro drive are stuck - wiring not correct Actions check the starting sequence which is: - switch on the key - select drive (forwards/backwards) - press the accelerator - check that the drive microswitch and the manipulator forward/backward traverse selector do not have the contacts stuck and that they work correctly - verify the continuity of the circuit that connects the micro drive pedal, the chopper card and the drive manipulator.
3	VMN LOW	**The first check recognises a voltage VMN lower than the 25% of the battery voltage** Possible causes - wrong connections on the motor - motor current leakage to the ground Actions - check that the motor terminals are well isolated from the motor casing both inside and outside the motor. Verify that there is not dirt that causes current leakage between the terminals and the motor body - verify that the motor is not wet and in case dry with an air flow - check that the connections on the motor and on the chopper card are correct (verify the type of traction motor assembled, the correct wiring and the connections on the chopper VMN, positive and negative) if the problem persists replace first the chopper card and, if necessary, also the motor

3	VMN HIGH	**Starting test check possible faults on the power circuit branch .** Possible causes - chopper power branch damaged - MOSFET logic control damaged Action - replace the chopper card
4	VACC NOT OK	The chopper card recognizes an anomaly in the mechanical stroke of the accelerator Possible causes - the operator switched on the machine with the accelerator pressed down or he pressed down the accelerator before the selection of forward or backward traverse - the seat microswitch does not work - the potentiometer and/or the chopper card has been changed and the relating values between the two components are to be re-programmed - a cable between the potentiometer and the chopper card is interrupted - the potentiometer is faulty - the PROGRAM VACC (see chapter Adjustment and Inspection) has not been carried out correctly Actions - check the correct sequence to get traverse - check the continuity of connections between the potentiometer accelerator and chopper card - re-program the chopper card with PROGRAM VACC (see chapter Adjustment and Inspection) - check the functionality of the potentiometer (it could be broken) and replace it if necessary (re-programming then the chopper card)
5	I HIGH AT STAND	The chopper card tests if on rest the signal of the current is zero. Otherwise, it blocks the traction Possible causes - defective current sensor - fault in the feedback circuits, or in the logic or on the chopper card Actions - replace the chopper card

6	NPOT NOT OK	**Test on working condition: the negative point brings is at a wrong** Possible causes - the potentiometer is not well connected to the chopper card - potentiometer defected Actions - check the good connections potentiometer – chopper card - check the potentiometer efficiency
7	TH PROTECTION	**The chopper card works out of the temperature range** **(-30°C + 70°C)** Possible causes - chopper card faulty - the machine runs in braking condition and the chopper gets overheated Actions - check the temperature of the site where the machine works - check the consumption of the traction motor
8	DRIVER SHORTED COIL SHORTED	The driver that controls the driver power switch do not operate properly Possible causes - the driver is defected Actions - replace the chopper card
32 permanent blink	BATTERY LOW	Battery level too low: the chopper card cuts the power to the traction motor for its safeguard Actions check the charge of the batteries check the cleanliness and the good connections on the chopper card of the cable that come from the battery
permanent switched on	FORW BACK	The alarm is indicated when both the forward and backward requests are activated simultaneously Possible causes - wiring not correct - microswitch forward or backward stuck Actions - check the correct functionality of the contacts of the manipulator - verify the wiring relative to the manipulator - if the defect persists replace the chopper card

Programming of the Chopper card

FOR A MORE DETAILED DESCRIPTION CONSULT THE USER MANUAL AND THE FUNCTIONAL DESCRIPTION OF THE CHOPPER ZAPI.

1. **Switch OFF** the general key and plug the console in the special *connector*. The OFF condition is necessary to save the memory card from loss of data.
2. Switch on the machine (key ON).

3. It appears: model of the chopper card, voltage, ampere – working hours of the machine

```
MX        v.2.1
HOURS     .0
```

4. Press ENTER to get the main menu

5. You read the first option of the main menu: PROGRAM = CHANGE OF PARAMETERS

6. Press ENTER and check, using the button ROLL, if the values of the parameters are the ones indicated in the below chart:

```
SELECT    MENU
PROGRAM
```

CHOPPER MX GAMMA 66/83/108	GAMMA 66/83	GAMMA 108
ACCELERATION DELAY	3	3
CUTBACK SPEED 1	0	0
CUTBACK SPEED 2	6	6
COMPENSATION	4	4
TRACTION IMAX	9	9
BRAKING	5	5
RELEASE BRAKING	2	1
SPEED LIMIT BRAKING	4	1
MAX SPEED FORWARD	9	9
MAX SPEED BACKWARD	8	8
CREEP SPEED	2	2

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7. At the end press OUT and confirm ENTER if some parameters have been changed.

   ATTENTION: YOU ARE FORBIDDEN TO CHANGE ANY PARAMETERS RELATED TO THE SAFETY USE CONDITION OF THE MACHINE LIKE THE ONES RELATED TO ACCELERATION, BRAKING, ETC. ONLY THE DIFFERENT SPEED REDUCTION VALUES CAN BE MODIFIED (CUTBACK SPEED 1 – 2)

8. Select with ROLL "RESTORE PARAM." (in case of memory loss of the chopper) = REPROGRAMMING CHOPPER PARAMETERS

```
SELECT   MENU
RESTORE PARAM.
```

9. Press ENTER

10. It appears the code of the program 00 (it is possible to store inside the console up to 5 programs numbered from 01 to 05)

```
SELECT: Mod. 00
```

11. Press ENTER to confirm the restoring of the program

12. The confirmation request of the operation appears:
    ENTER = SI, OUT = NO

```
ARE YOU SURE?
YES=ENTER  NO=OUT
```

13. Press ENTER to confirm the restoring operation

14. The message WAIT appears

```
WAIT!
```

15. At the end of the operation it appears

```
SELECT  MENU
RESTORE
```

16. Run through the menus with ROLL UP from RESTORE to PROGRAM VACC = PROGRAMMING VOLT ACCELERATOR PEDAL

```
SELECT  MENU
RESTORE PARAM.
```

17. Stop your run when you read "PROGRAM VACC"
18. Press ENTER to go into the menu "PROGRAM VACC"

```
SELECT   MENU
PROGRAM VACC
```

19. The actual maximum values appear which refer to the forward and backward movement

```
VACC SETTING
4,8       4,8
```

20. Press ENTER

21. Now the chopper is ready to read the minimum and maximum value of the potentiometer signal

```
0.0              0.0
```

22. Press the lever for the forward movement paying attention to move slowly at the beginning of the stroke and to get at the

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end of the stroke

23. Repeat the operation with the backward movement

24. On the screen the new values min and max appear on both forward and backward movement

```
FORW            BACK
  4,4             4,4
```

25. Press ENTER

26. The request of confirmation for the new value appears

```
      ARE YOU SURE?
YES = ENTER   NO = OUT
```

27. Press ENTER to confirm

28. Run through the different menus with ROLL UP or ROLL DOWN from "PROGRAM VACC" up to the heading

```
SELECT    MENU
     PROGRAM
```

29. Press OUT to come back to the main heading. Switch off the key and then disconnect the console from the chopper card

```
     MX   V.2.1
      HOURS
```

General check of the machine

Check that all switches and signal lamps operate properly:

- Brushes base

- Suction motor

- Solenoid valve (if the optional kit is present)

- Brushes motor

- Parking brake

- Check the display for the charge level of the batteries

- Check the good operation of the hourmeter

- Check the good operation of the speed commutator

- Check the condition of the batteries, terminals and cables

Functional tests of the machine

- Fill the tanks with water and check eventual leakages

- Check the sealing of the whole water unit and the uniform falling of the water onto the brushes

- Make the correct adjustments of the squeegee and test

- Adjust the brushes base inclination and test

- Adjust the front splash guard and test

- Check the efficiency of the brake system

- Brake at the maximum speed and check that the wheels stop simultaneously

- Verify: forward and backward movement, speed reductions, acceleration and braking

Periodic check differential

1. Differential: check the quantity of grease in the differential. If necessary, add through the *grease nipple*. Use grease of type SHELL Super Grease EPO or another type with the similar characteristics.

2. Check the clearance of the *chain* adjusting it if necessary, through the adjuster in the rear lower part.

Final check

Check all the functions: scrubbing, drying and drive