



SERVICE MANUAL

ORBITIZER



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Part I

Product Introduction

Chapter 1

General Info

1.1 Service Manual Purpose

Good customer service requires in-depth training and well-structured training materials.

This service manual has been created to assist certified service technicians through instructions and reference guide. It is recommended to read it thoroughly before servicing your machine.

1.1.1 Other reference Documents

DOCUMENT	TYPE	DOC. NO.	VERS.	DESCRIPTION
Spare Parts Catalogue	RIC	10101601	AA	ORBITIZER
Use and Maintenance Manual	UM	10100648	AA	ORBITIZER

1.2 Configurations

Orbitizer is a single disc machine powered by a 36V Lithium battery. It is able to clean a wide variety of floors with different types of dirt thanks to the 34cm washing base with orbital technology.

1.2.1 Products related to this Manual

109940 FIMAP ORBITIZER

1.3 Positioning Conventions

By convention, all the forward and backward reference, front and rear, right and left indicated in this manual, are meant as referring to the operator in the driving position with the right hand on the trigger handle and the left hand on the grab handle.

1.4 The Serial Number Plate

- 1 Serial Number
- 2 Part Number



The machine serial number is located on the back of the device near the battery housing.



1.5 General Safety Instructions

Always wear the appropriate personal protective equipment for each operation.

In order to avoid short-circuits when working in the vicinity of electrical components, do the following: avoid the use of non-insulated tools; do not place or allow metallic objects to fall upon the electrically powered components; remove any rings, watches and/or clothing with metallic parts that might come into contact with the electrically powered components.

Restore and double check all electrical connections after any maintenance interventions.

For any maintenance work, turn off the machine using the main switch and then remove the battery from its housing.

Avoid contact with moving parts. Do not wear loose clothing or jewellery and tie long hair back.

1.6 Technical Data

Orbitizer Technical Data

TECHNICAL DESCRIPTION	U/M		U/M	
Theoretical maximum productivity	$\frac{m^2}{h}$	500	$\frac{ft^2}{h}$	5382
Nominal input power	KW	0,31	KW	0,31
Working width	mm	340	in	13.4
Brushdeck motor rated power	W	300	W	300
Oscillations per minute	Nr	3800	Nr	3800
Maximum weight on the deck ¹	Kg	7	lb	15.5
Gradeability during work GVW	%	2	%	2
Solution tank capacity	L	1	gal	0.26
Dimensions (<i>length - width - height</i>)	mm	330x320x1290	inch	13.0x12.6x50.8
Battery weight	Kg	1,5	lb	3.3
Machine net weight	Kg	10	lb	22
Machine weight during transport	Kg	11	lb	24,5
GVW	Kg	12	lb	26,5
Level of acoustic pressure (<i>ISO 11201</i>)	LpA dB (A)	≤ 70	LpA dB (A)	≤ 70
Vibration level operator arm (<i>ISO 5349</i>)	$\frac{m}{s^2}$	≤ 2.5	$\frac{m}{s^2}$	≤ 2.5
Vibration level operator body (<i>ISO 5349</i>)	$\frac{m}{s^2}$	≤ 0.5	$\frac{m}{s^2}$	≤ 0.5

¹with shoulder strap and base; the handle at a distance of one meter from the ground

1.7 Diagnostic and necessary Service Tools

In addition to a full set of metric and standard tools, the following items are required in order to successfully and quickly perform troubleshooting and repair.

- Digital voltmeter

1.8 Fastener Torque Specifications

Nominal Diameter	Standard Screws	Stainless Steel Screws
M4	3.1 Nm - 27.4 lb/in	2.1 Nm - 18.6 lb/in
M5	6 Nm - 53.1 lb/in	4 Nm - 35.4 lb/in
M6	10.4 Nm - 92 lb/in	7 Nm - 62 lb/in

1.9 Scheduled Maintenance

Maintenance of	Daily	Weekly	Monthly	Yearly
Charge batteries	X			
Check/Clean Tank and Hoses & Hoses	X			
Check/Clean the Brushes/Pads	X			
Check/Clean Recovery Tank Float	X			
Check/Clean Nozzles/Tips	X			
Lubricate Machine			X	
**Check/Tightening Electrical Contacts				X

* The carbon brushes of the brush motor and traction motor must be checked every 500 hours or once a year.

** Perform the operation after each replacement of an electrical component or once a year.

1.10 Main Components



- 1 Water Pump
- 2 Water Group
- 3 Frame
- 4 Nozzles/Tips
- 5 Washing scrubdeck

- 6 Main Card
- 7 Battery
- 8 Battery Charger
- 9 Charger Cable

1.11 PDI

1.11.1 Before delivering the machine, carry out all the operations described below:

- Install the batteries and perform a complete recharge cycle (check the setting of the machine and of the battery charger)
- Fill the Solution Tank completely with water; check for eventual leaks and the correct water supply on the deck
- Check the Washing function (brushdeck movement and water supply)
- Once the demo has been completed, immediately perform the daily maintenance (see the Use and Maintenance manual).

1.11.2 Demo Tips:

Pad

You need to have various PAD at different hardness (see section [6.1](#) at page [33](#)).

Chemical

You Always need to have the detergent available.

Part II

Anomalies Resolution Guide

Chapter 2

Trouble-shooting for the most common anomalies.

2.1 Electrical system: what to do if...

The machine doesn't switch on

- | | | |
|---|---|---|
| 1. The On/Off button is switched off | ⇒ | <i>Switch the machine On pressing the On/Off button.</i> |
| 2. Upon switching on, the red and yellow battery level LEDs flash | ⇒ | <i>Check what alarm message is shown and solve the related issue by following the proper instructions (see section 3.3 at page 21).</i> |
| 3. The battery is not correctly inserted in the machine | ⇒ | <i>Insert the battery correctly.</i> |
| 4. The battery charge level is low | ⇒ | <i>If the battery charge level is critical, carry out a complete charge cycle.</i> |
-

the machine has a very low work autonomy

- | | | |
|---|---|--|
| 1. Check the battery charge level; check the battery Level LEDs | ⇒ | <i>If the battery charge level is critical, carry out a full charging cycle.</i> |
|---|---|--|
-

The battery don't work properly

- | | | |
|---|---|---|
| 1. The battery are not properly connected | ⇒ | <i>Insert the battery until it clicks.</i> |
| 2. Battery is discharged | ⇒ | <i>Perform a complete charge cycle.</i> |
| 3. The battery charger doesn't work | ⇒ | <i>Check the proper section (see section 2.1 at page 13).</i> |
-

The battery charger doesn't work

- | | | | |
|----|---|---|---|
| 1. | The battery charger is not connected to the power supply | ⇒ | Connect the charger to a supplied electric socket. |
| 2. | The charger has the power switch in position 0 | ⇒ | Move the power switch in position 1. |
| 3. | The battery charger has the Red LED blinking | ⇒ | The battery charger is in error conditions, verify the alarm tables and solve the issue by following the related instructions (see section 3.2.6 at page 20). |
| 4. | The battery charger plugged in and turned on does not activate the Green LED (electrical continuity) | ⇒ | Replace the battery charger. |
| 5. | The battery charger plugged in and turned on with battery inserted does not activate the Red LED (charging) | ⇒ | Make sure the battery is properly positioned inside the slot and the terminals have a good contact.
The battery may be already charged. |
-

2.2 Mechanical scrubbing system: what to do if...

The machine doesn't clean well

- | | | | |
|----|---|---|---|
| 1. | The machine is switched off | ⇒ | Switch the machine On. |
| 2. | The machine doesn't switch on | ⇒ | Refer to the proper section (see section 2.1 at page 12). |
| 3. | Not enough detergent solution comes out | ⇒ | Refer to the proper section (see section 2.3 at page 14). |
| 4. | The type of pad in use is not suitable for the dirt to be tackled | ⇒ | Check that the pad selected is suitable for the work to be carried out. |
| 5. | The pad is excessively worn | ⇒ | Check the state of wear of the pad and, if necessary, replace it. |
| 6. | The solution flow rate is not correct or not enough | ⇒ | Refer to the proper section (see section 2.3 at page 14). |
-

The brush motor doesn't work properly

- | | | | |
|----|--|---|---|
| 1. | The brush motor is not powered properly | ⇒ | Check the power connections on the brush motor (see section 3.2 at page 17). |
| 2. | The On/Off button doesn't work | ⇒ | Replace the On/Off button (see section 3.2 at page 17). |
| 3. | The brush motor is not powered even if the On/Off button works | ⇒ | Verify the electrical wiring and proper operation of the Main Board and replace it if necessary (see section 3.2 at page 17). |
| 4. | The brush motor is not working even if powered | ⇒ | Replace the motor. |
-

2.3 Solution delivery system: what to do if...

The delivered solution is not correct or not enough

- | | | | |
|----|---|---|--|
| 1. | The machine is switched off | ⇒ | <i>Switch on the machine.</i> |
| 2. | The machine doesn't switch on | ⇒ | <i>Refer to the proper section (see section 2.1 at page 12).</i> |
| 3. | The quantity of detergent solution present in the solution tank is not suitable for the job to be performed | ⇒ | <i>Fill the solution Tank.</i> |
| 4. | The nozzles in the deck body are clogged | ⇒ | <i>Clean the nozzles and the entire water system of the machine.</i> |
-

Excessive foam production

- | | | | |
|----|--|---|---|
| 1. | The detergent being used is not suitable | ⇒ | <i>Check that a low foam detergent has been used.</i> |
| 2. | The floor is not very dirty | ⇒ | <i>Dilute the detergent more.</i> |
-

Part III

Functional Groups

Chapter 3

Electrical System



3.1 Description

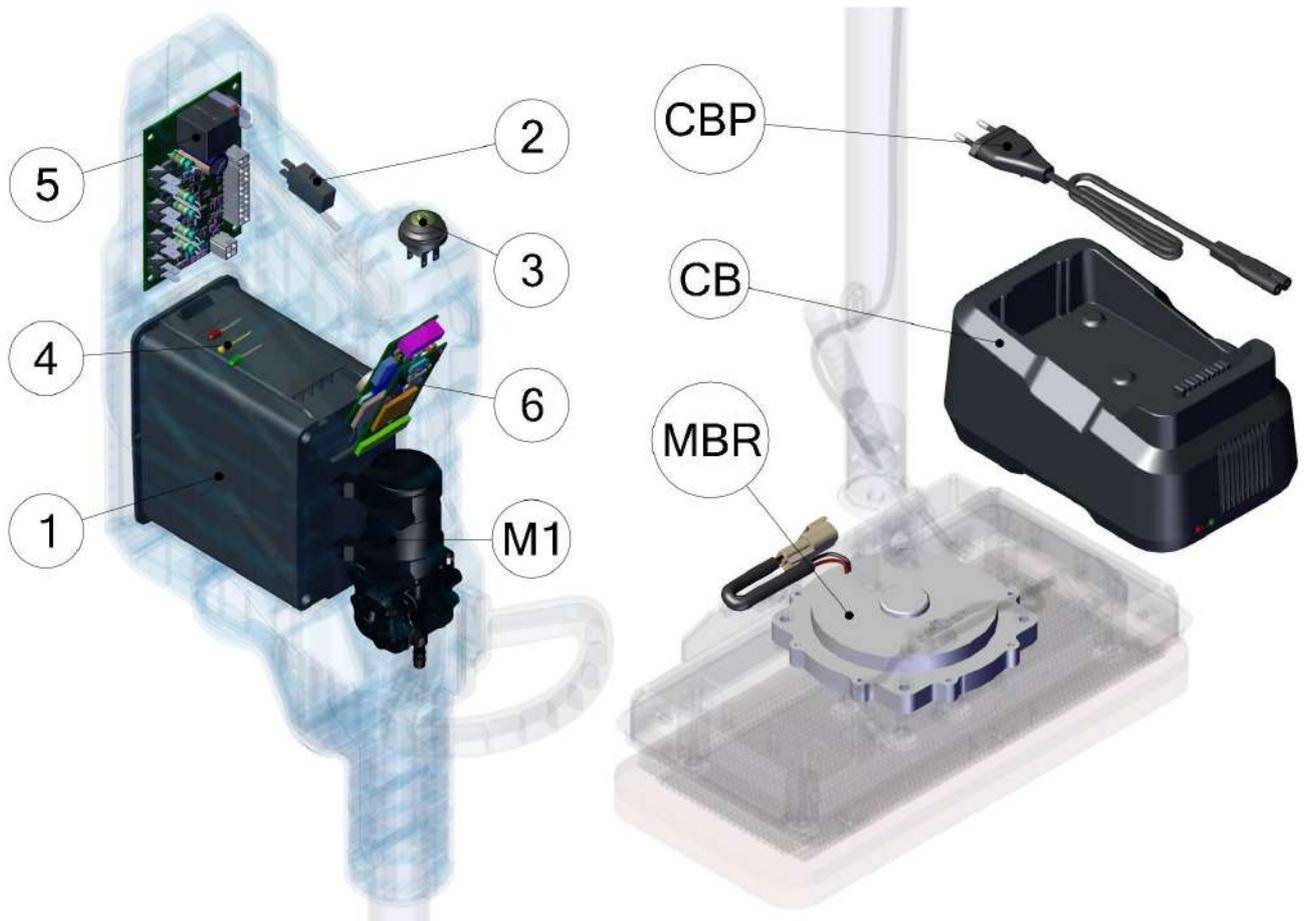
A main board runs all the functions of the machine.

The main board receive as input, all the information from all the electronic devices of the machine.

These signals are translated from the main board to run correctly the machine and to prevent any safety problem to the operator.

The switches allow to activate or deactivate the deck function, and the Nozzles supply.

3.2 Location of Electrical components



3.2.1 List of Components

1 Battery

2 Water Microswitch

3 On/Off Button

4 Battery indicator LEDs

5 Main Card

6 FFM Light Card

M1 Water Pump

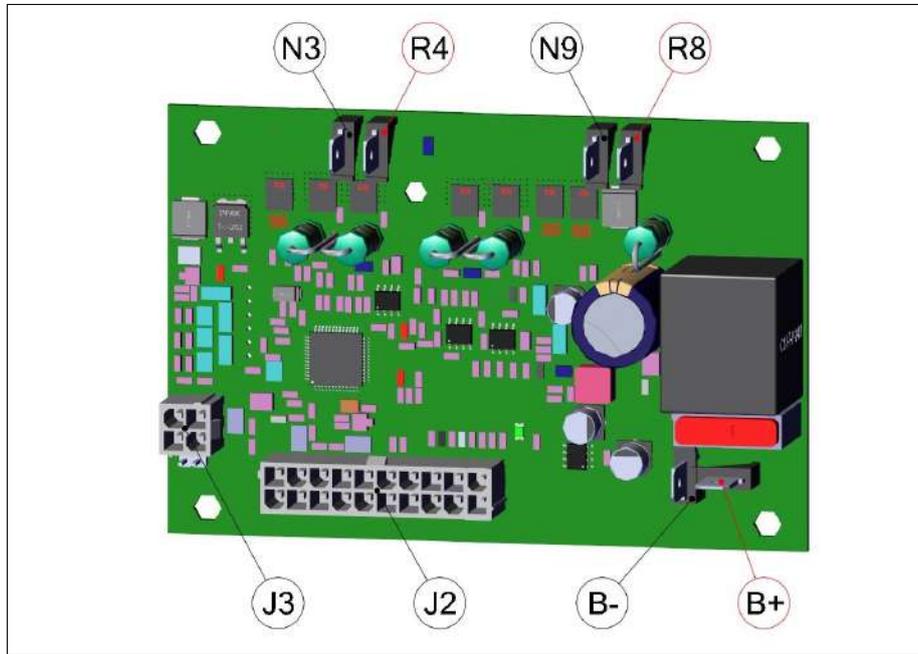
CBP Battery Charger Cable

CB Battery Charger

MBR Orbital deck motor

3.2.2 Main Board

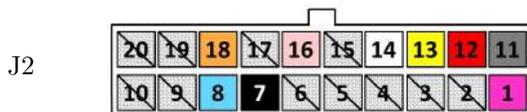
The Main Board is the heart of the machine and, depending of the input information, decides how to use the devices of the machine during normal work. On the table here below, is possible to identify the cable legend for each single connector and the contact legend.



Board Cables Legend

Power Contacts

N3/R4	Deck Motor
N9/R8	Water Pump
B-/B+	Main Card Supply



J2

1	Transmission (RX BMS)	17	Purple	
7	On/Off Button	7	Black	Negative
8	Water Microswitch	7	Light Blue	Negative
11	Receiving (TX BMS)	7	Gray	
12	Green LED	7	Red	
13	Yellow LED	7	Yellow	
14	Red LED	7	White	
16	Common	7	Pink	Negative
18	Buttons Common	7	Orange	Negative

J3

1	FFM Transmitting		Green	
2	FFM Receiving		Gray	
3	FFM Key		Orange	Positive
4	FFM		Brown	Negative

3.2.3 Battery Indicator LEDs (L)

The residual charge value is read from the board through communication with BMS.

Alert threshold: when the battery level 10% is reached, the deck motor and pump functions are disabled.

% V	100	90	80	70	60	50	40	30	≤ 25	≤ 15
	Green	Yellow	Red							

Alert threshold 1: when the battery level 25% is reached, the green LED turns Off and the yellow LED turns On.

Alert threshold 2: when the battery level 15% is reached, the yellow LED turns Off and the red LED turns On.

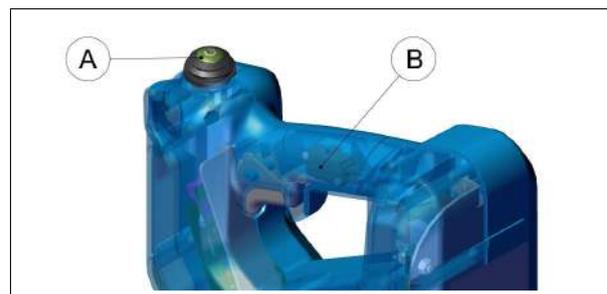
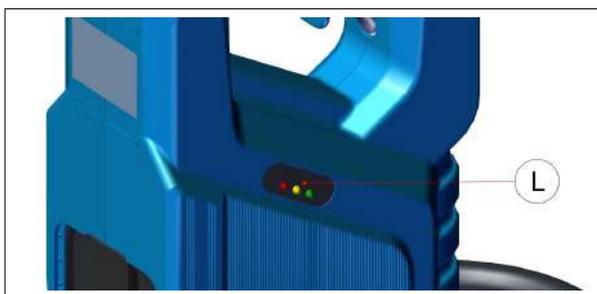
3.2.4 On/Off Button (A)

The main switch powers the machine.

When the machine is in the ON state, the deck motor is powered.

3.2.5 Water Microswitch (B)

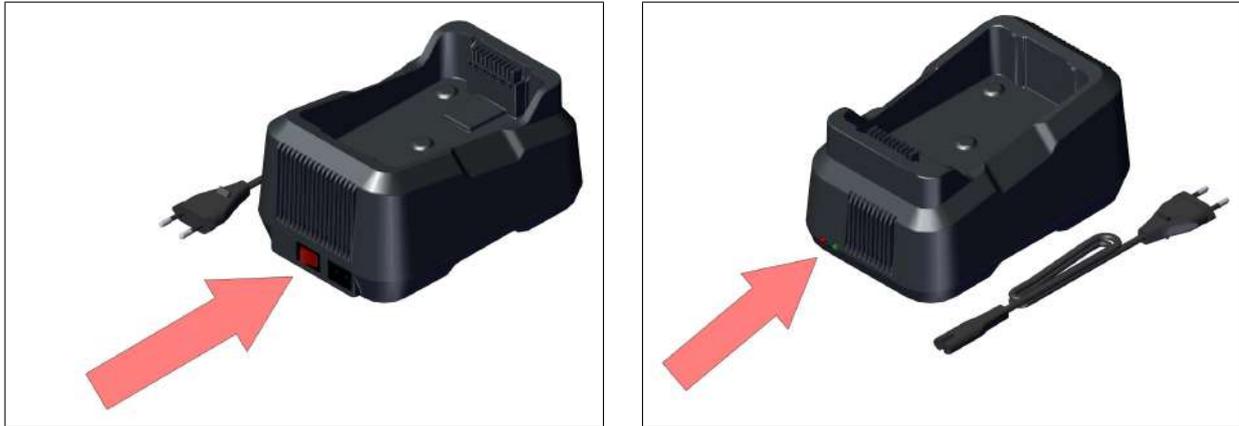
The microswitch can be activated by the trigger on the handle. When the micro is pressed the water pump is powered.



3.2.6 Battery and battery charger

The machine is available with charger base.

To charge the battery it is necessary to remove it from the machine, position it correctly in the charger base, which is plugged in and powered up, and set the switch to "I". Recharging starts automatically.



A correct Charging cycle follows the below series of illumination stages of the LEDs.

Phase	LED	Description
1	Red	Battery charging
2	Green	Battery charged

Attention

If when inserting the battery, the Green LED is still On:

- Make sure the battery is properly positioned inside the slot and that contacts properly connect.
- The battery may be already charged.

Error Codes of Charger

The charger have an alarm system. The alarm code is shown by blinks of the Red LED.

Error Codes	
Flash	Description
1	Timeout alarm, Defect of the battery
2	Overvoltage Alarm, Defect of the Charger
2	Overcurrent Alarm, Defect of the Charger
4	Overtemperature alarm

Restore

In case of alarm 1, 2, or 3, the alarm is reset by disconnecting the power. If it appears again, replace the charger. In case of alarm 4, the alarm is reset when the charger cools down.

3.3 Alarm Table

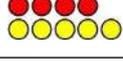
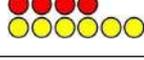
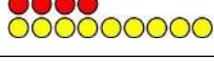
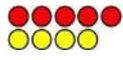
With the machine in an alarm state, the following coding is used with the LED.

- 1- Red flashes = first digit Alarm
- 2- Yellow flashes = Second digit Alarm

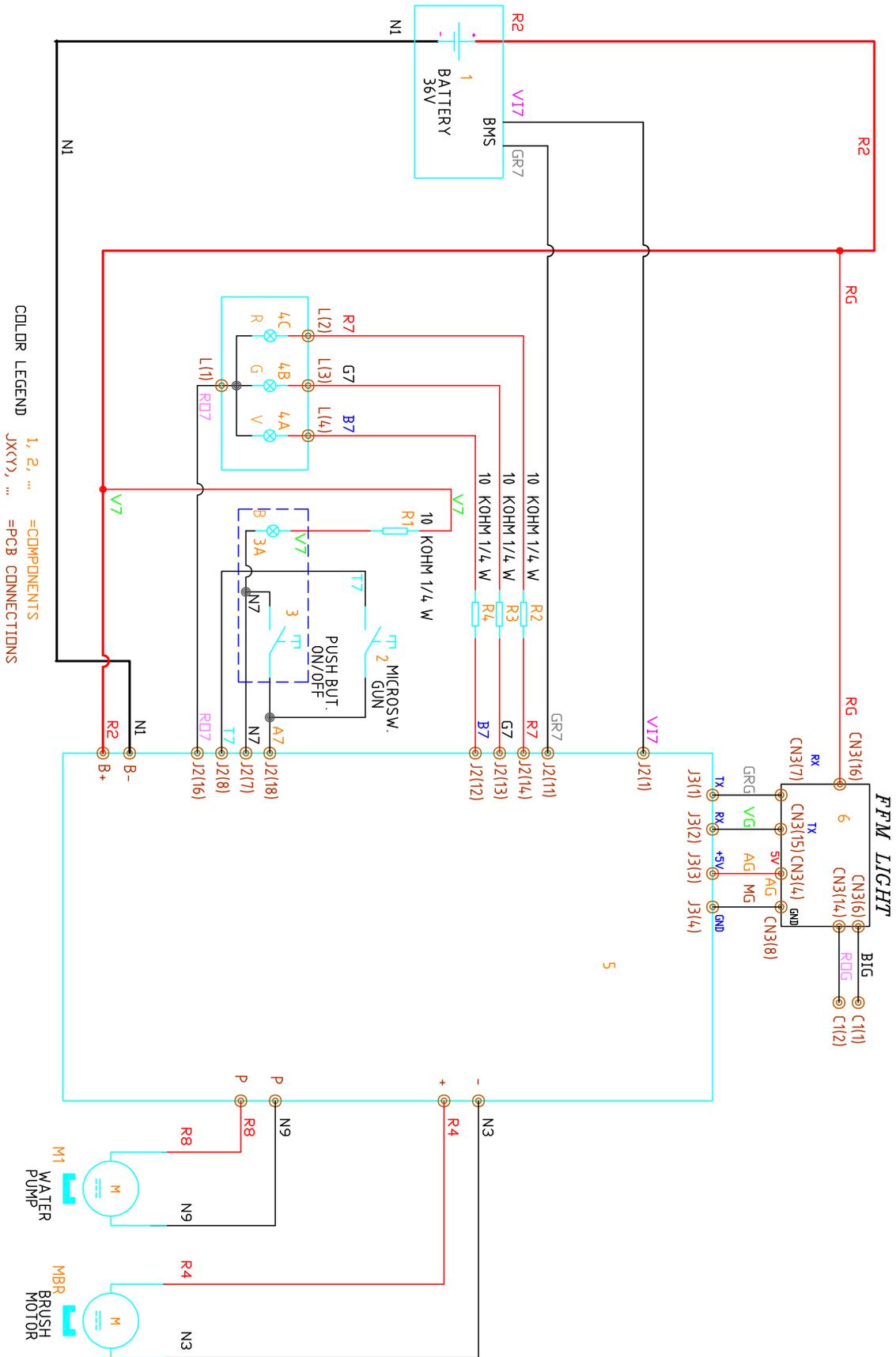
3.3.1 General Alarms

Id Alarm	Flashes	Solution
AL_1: General Memory error		When turned on, the parameter values are checked, if an alarm occurs while reading the memory, the alarm appears. Turn off the machine, wait 5 seconds and turn it back on If the problem persists, replace the Main board
AL_2: General Ignition fault		Bounce on ignition contact Turn off the machine, wait 5 seconds and turn it back on If the problem persists check the power button, replace the function board
AL_3: General Undervoltage		The anomaly occurs in the following two cases: If the battery level reaches protection level 0 If the battery voltage drops below 15V, even instantly Check the battery level and condition and replace it if necessary
AL_4: General Overvoltage		The anomaly intervenes instantly if the battery voltage exceeds 45V Check the battery level, make sure the connections are clean and replace it if necessary
AL_7: Function FFM Communication		Lack of communication with the FFM module Check the connection cables between the function board and the FFM module If the problem persists, replace the function board or FFM module

3.3.2 Function Alarms

Id Alarm	Flashes	Solution
AL_41: Function Overtemperature		It is activated when the temperature on the power mosfets of the functions exceeds 90 ° C Turn off the machine, wait for it to cool down and turn it back on If the problem persists, check the power and consumption connections.
AL_42: Function Power Damaged		Disconnect the motor and pump and check If the problem persists, replace the card
AL_44: Function General Contactor Fault		The general function relay does not close Check the power connections and consumption.
AL_45: Function General Contactor Fault- CC		The general function relay remains closed Check the power connections and consumption.
AL_46: Function Overcurrent Deck Exit		Short circuit on the motor output Check the base motor and its connections Replace the Main card.
AL_49: Function Amperometric Deck Output		Excessive consumption of the deck motor Check motor absorptions and methods of use.
AL_54: Function Deck not connected		Brush output current less than 3A for 15 seconds Check the Deck connection Try to power the deck motor, if it works replace the board otherwise check the wiring or the motor.

3.4 Electric Scheme



3.5 Component Description

Pos.	Description
1	Battery 36V
2	Water Button
3	On/Off Button
4	Battery Green LED
4A	Battery Yellow LED
4B	Battery Red LED
5	Main Card
6	FFM Light Card
M1	Water Pump
MBR	Deck Orbital Motor

Chapter 4

Washing Unit

4.1 Location on machine

The washing unit is located under the machine body.



4.2 Main Components

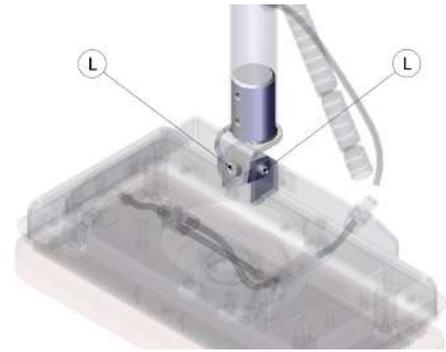
- 1 Deck Cover
- 2 Deck Plate
- 3 Deck Antivibrants
- 4 Bumping Rubber
- 5 Pad
- 6 Deck Joint
- 7 Motor
- 8 Eccentric Bell
- 9 Eccentric Pin
- 10 Eccentric group
- 11 Pad securing Plate



4.2.1 Lubrication Points

For lubrication use standard grease.

- Bushings



4.3 Work requirements

The washing unit only works if the following conditions are met:

1. The batteries are not discharged (1).
2. The machine is on (2).

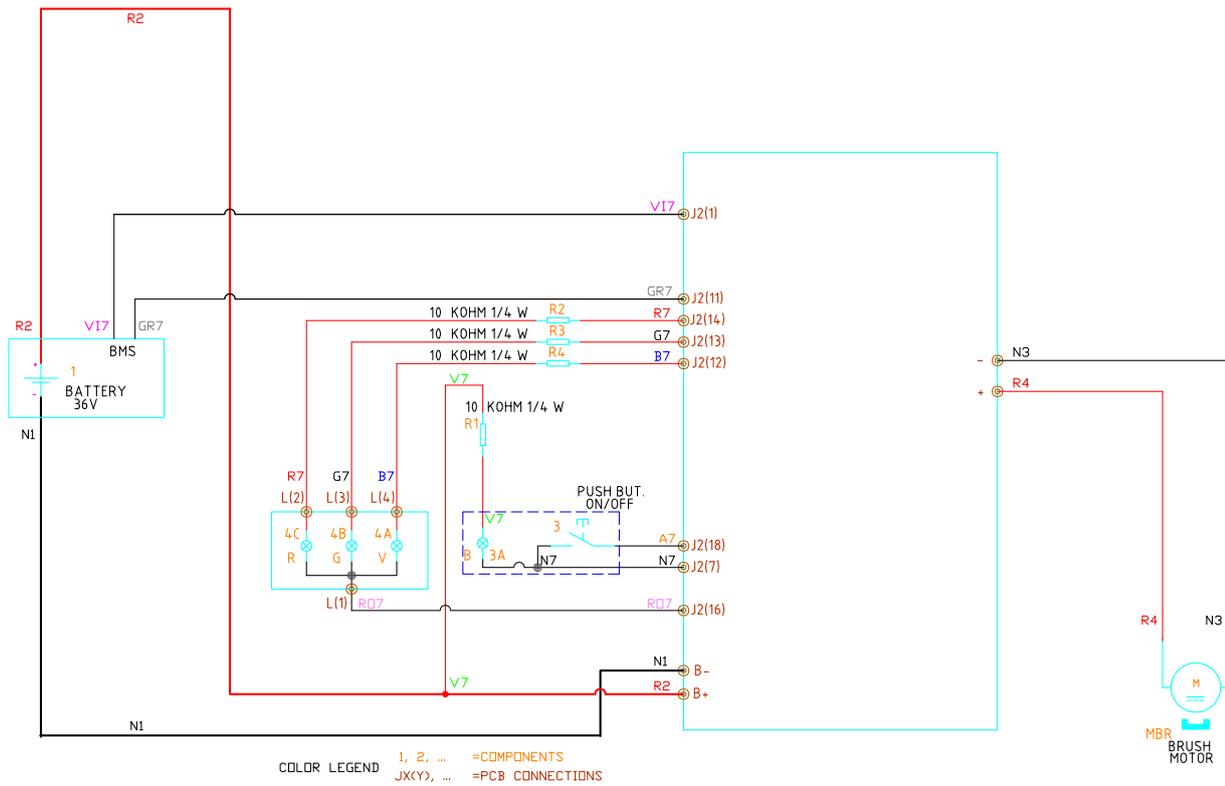


4.4 Operating mode

WASHING

Assumption	Action	Result
Switched On machine	On/Off Button Pressed	Motor ON (+24V to MBR)

4.5 Related electrical circuit



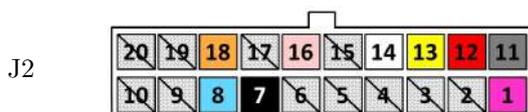
Deck Functionality Check

Conventions:

- **R2**: Positive voltage of the battery.
- **N1**: Negative voltage of the battery.

Input/output:

Satisfied condition	Note	Pin	V
On/Off Button Pressed	Motor	+R4 ref to -N3	$+V_b$
	On/Off Button	J2(7) ref to J2(18)	$+V_b$
	Battery BMS	J2(1) ref to J2(11)	$+V_b$
	Battery indication LED	J2(12) ref to J2(16)	$+V_b$
	Battery indication LED	J2(13) ref to J2(16)	$+V_b$
	Battery indication LED	J2(14) ref to J2(16)	$+V_b$



4.5.1 Relative electrical Components

Motor

The motor is a DC type, connected directly to the function board via a connector.

With full battery the single brush motor MBR from 3 to 5 Amps \pm 0.1, depending on the type of floor and pad used.

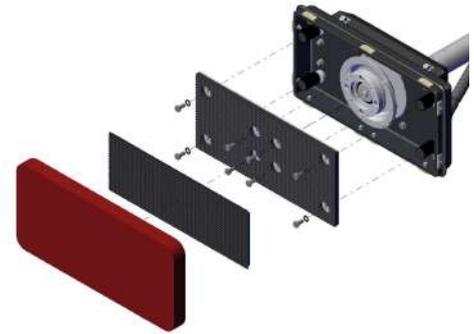
4.6 Disassembly

4.6.1 Deck Group

Turn the machine Off and remove the battery.

Remove the pad.

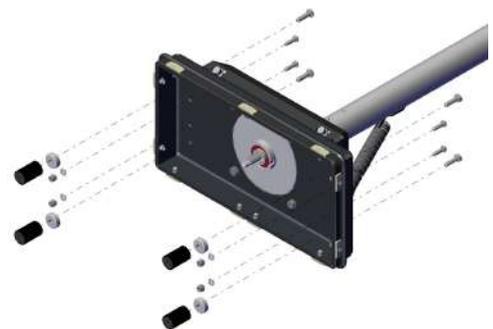
Remove the velcro and the fixing screws of the pad holder plate.



Remove the central nut and remove the orbiting mass.



Remove the antivibration mounts and the upper casing using the fixing screws.



Disconnect the motor electrical connector and the water system hose.

Unscrew the fixing screws and remove the motor.



Chapter 5

Water Unit

5.1 Location on machine

The Water unit is located inside the machine.

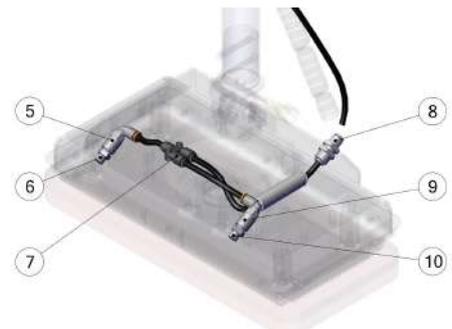


5.2 Main Components

- 1 Water Pump
- 2 Solution Hose
- 3 Solution Tank Hose
- 4 Solution Tank



- 5 Right Nozzle holder Insert
- 6 Right Nozzle
- 7 Distributor
- 8 Water coupling
- 9 Left Nozzle holder Insert
- 10 Left Nozzle



5.3 Work requirements

The Water unit only works if the following conditions are met:

1. The batteries are not discharged (1).
2. The tank is not empty (2).
3. The machine is on (3).
4. The Spray Trigger is pulled (4).

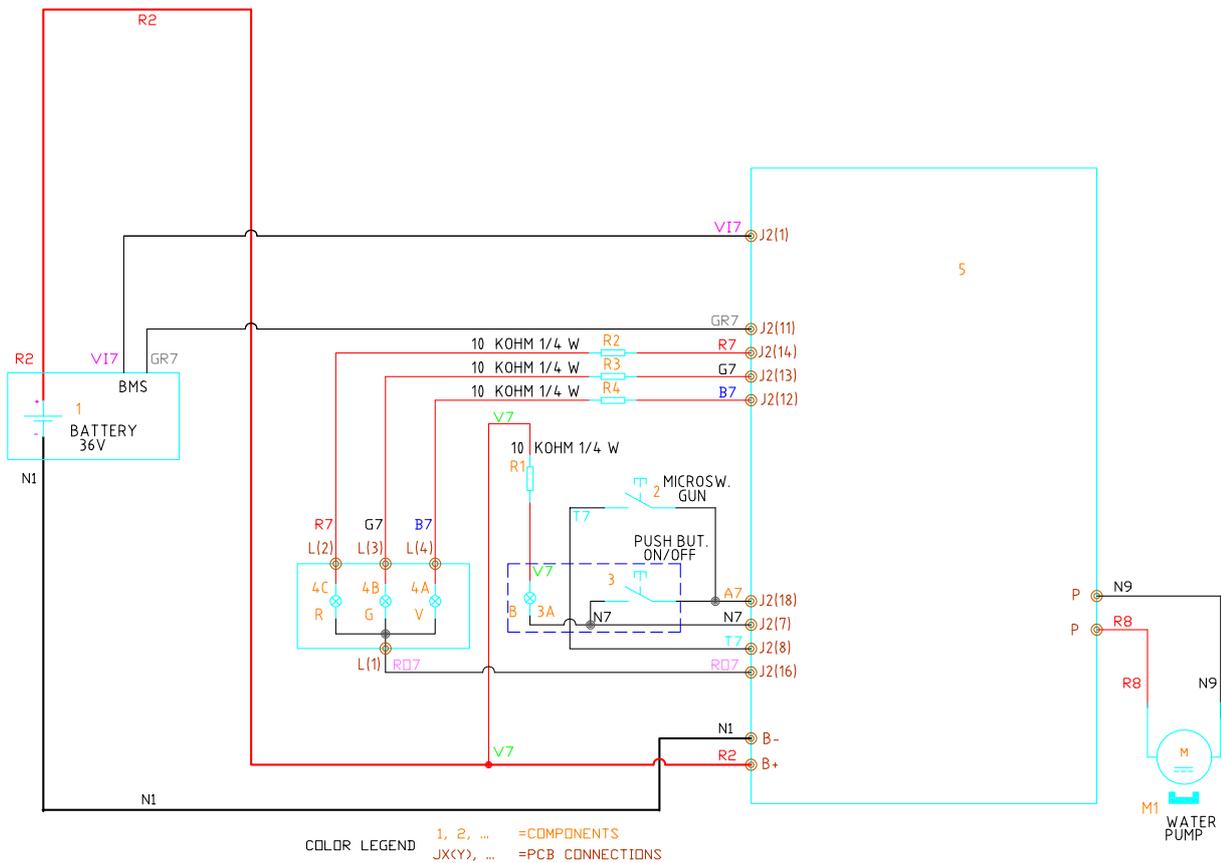


5.4 Operating mode

WATER SYSTEM

Assumption	Action	Result
Switched On machine	Pulled Trigger	Pump ON (+24V To R8 To N9)
	Trigger not Pulled	Pump OFF (0V To R8 To N9)

5.5 Related electrical circuit



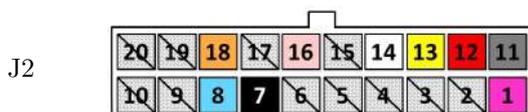
Functionality Check - Water Unit

Conventions:

- **R2**: Positive voltage of the battery.
- **N1**: Negative voltage of the battery.

Input/output:

Satisfied condition	Note	Pin	V
On/Off Button Pressed	Motor	+R4 ref to -N3	$+V_b$
	Battery BMS	J2(1) ref to J2(11)	$+V_b$
	On/Off Button	J2(7) ref to J2(18)	$+V_b$
	Battery indication LED	J2(12) ref to J2(16)	$+V_b$
	Battery indication LED	J2(13) ref to J2(16)	$+V_b$
Pulled Trigger	Water pump	R8 ref to N9	$+V_b$
	Trigger Microsw.	J2(8) ref to J2(18)	$+V_b$
Trigger not Pulled	Water pump	R8 ref to N9	0
	Trigger Microsw.	J2(8) ref to J2(18)	0



5.5.1 Relative electrical Components

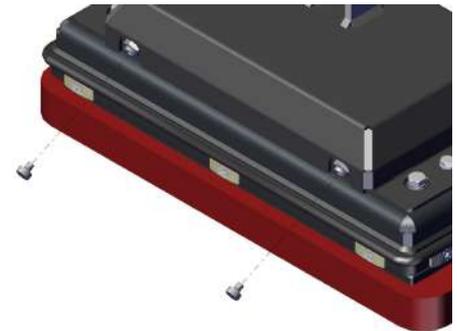
Pump

The pump is located inside the machine body, when the consent microswitch is activated the pump is powered supplying the solution to the nozzles.

5.6 Maintenance

Any single disc machine can work well and work profitably only if kept in full efficiency by carrying out the maintenance described below.

Unscrew the nozzles on the front part of the deck body.
Immerse the Nozzles in a descaling solution.



Fill the tank with water only and without nozzles, rinse the entire water system of the machine by spraying from the two nozzle holder supports until the tank is empty.



5.7 Disassembly

5.7.1 Pump

Remove the battery and tank.



Remove the support handle. Open the left carter of the machine by removing the fixing screws.



Remove the pump by removing the fixing screws.



Chapter 6

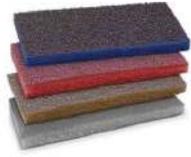
Consumable and Recommended Spare Parts

6.1 Consumable

6.1.1 Washing Unit

PN	Description	Dimensions	Color
453675	MICROFIBER PAD	340 x 160 x 25 mm 13.4 x 6.3 x 0.4 in	-
454290	VISCOSA MICROFIBER PAD	340 x 160 x 25 mm 13.4 x 6.3 x 1 in	White
453236	POLISHING MICROFIBER PAD	340 x 160 x 10 mm 13.4 x 6.3 x 0.4 in	-
453208	RED PAD	340 x 160 x 25 mm 13.4 x 6.3 x 1 in	Red
453411	WHITE PAD	340 x 160 x 25 mm 13.4 x 6.3 x 1 in	White
453410	BROWN PAD	340 x 160 x 25 mm 13.4 x 6.3 x 1 in	Brown
453671	BLUE DIAMOND PAD	340 x 160 x 25 mm 13.4 x 6.3 x 1 in	Blue
453672	RED DIAMOND PAD	340 x 160 x 25 mm 13.4 x 6.3 x 1 in	Red
453673	BEIGE DIAMOND PAD	340 x 160 x 25 mm 13.4 x 6.3 x 1 in	Beige
453674	WHITE DIAMOND PAD	340 x 160 x 25 mm 13.4 x 6.3 x 1 in	White
453670	DSWC PAD	340 x 160 x 10 mm 13.4 x 6.3 x 0.4 in	Brown
454291	MELAMINE PAD	340 x 160 x 25 mm 13.4 x 6.3 x 1 in	White
453676	VELCRO PAD	340 x 160 x 10 mm 13.4 x 6.3 x 0.4 in	-

6.1.2 Choice and use of the PAD

Image	PAD type	Suggested interventions	Flooring
	Microfiber [453675]	- Maintenance cleaning This type of PAD can be used as an alternative to flat Pad	- Ceramic - Carpet and fitted carpet - PVC - Wood - Natural stone - Stoneware Terracotta - Resin
	Microfiber viscosa [454290]	- Drying - Maintenance cleaning This type of PAD can be used as an alternative to Microfiber, as it collects more water but less dirt	- Ceramic - PVC - Wood - Natural stone - Stoneware Terracotta - Resin
	Microfiber to polish [453236]	- Polishing of treated floors	- Floors treated with wax
	Abrasives [453208] Red [453411] White [453410] Brown	- Maintenance cleaning - Deep cleaning - Polishing of treated floors	- Ceramic - PVC - Wood - Natural stone - Stoneware Terracotta - Resin
	Diamond pads [453671] gr.500 [453672] gr.1000 [453673] gr.2000 [453674] gr.3000	- Micro polishing	- gr from 500 to 5000 - Restoration - Marble and derivatives
	DSWC [453670]	- Wax removing - Sanding	- PVC - Wood
	Melamine [454291]	- Deep wash This type of PAD can be used for ordinary / periodic or deep cleaning. Furthermore, it can be used without detergents	- Hard floors - Microporous surfaces - Ceramic Gres - Concrete - Terracotta tiles - Marble
	Velcro pad [453676]	Used to install abrasive / diamond / DSWC PADS on the Orbitizer brushdeck	

6.2 Recommended Spare Parts

The following table refers to the Recommended Spare Parts, and reports the amount suggested by the number of purchased machines.

Machines		Parts
1	⇒	1
10	⇒	2
25	⇒	3
50	⇒	4

6.2.1 Electrical System

PN	Description
453219	MAIN CARD 7CFF0010
441676	ON/OFF/ BUTTON
409499	TRIGGER MICROSWITCH
453220	BATTERY INDICATOR LED CARD
440807	BATTERY CHARGER

6.2.2 Washing Unit

PN	Description
453201	ANTIVIBRANT SUPPORTS (4 UNIT)
230399	ORBITIZER DECK MOTOR
230382	ORBITIZER ECCENTRICO GROUP

6.2.3 Cleaning Solution Supply Unit

PN	Description
452729	CLEAN WATER COMPLETE FILTER
452730	DETERGENT PUMP
452698	NOZZLEHOLDER INSERT (2 UNIT)
452951	NOZZLE (2 UNIT)



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