



# SERVICE MANUAL

# FSR7

*sweepers*



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**EN** | *series*  
PERFORMANCE



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## PREMISE

### Purpose of the manual

Good customer service requires thorough training and well-structured training materials.

This service manual was created to assist certified service technicians with instructions and reference guide. It is recommended that you read this document completely before servicing the machine.

### Update record

VERSION	MODIFICATION	REFERENCES	
	Added update history	Sez.	Pag.

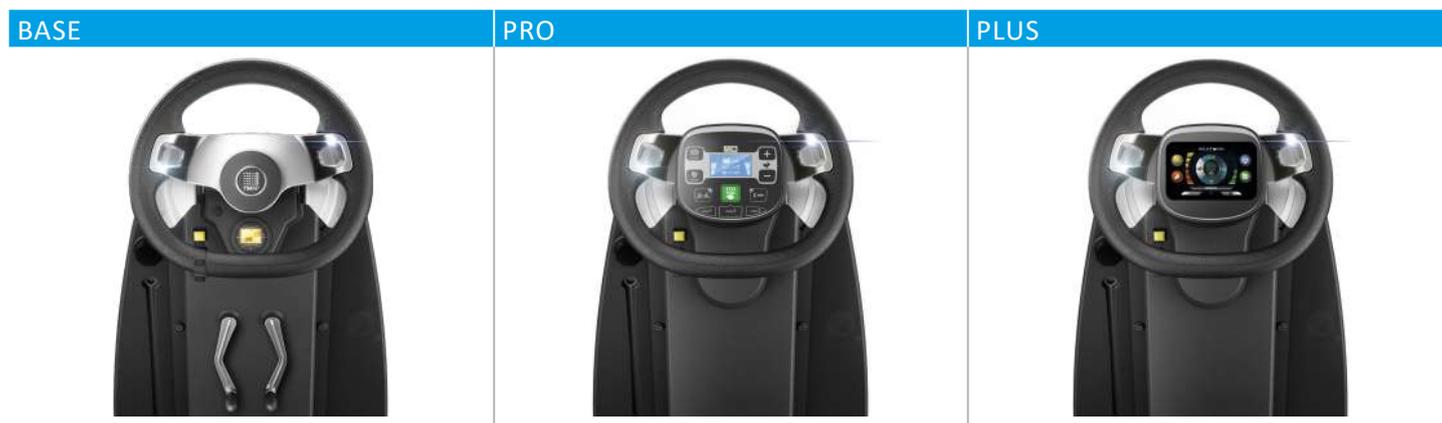
## SECTION 1 - GENERAL INFORMATIONS

### 1.1 Configurations

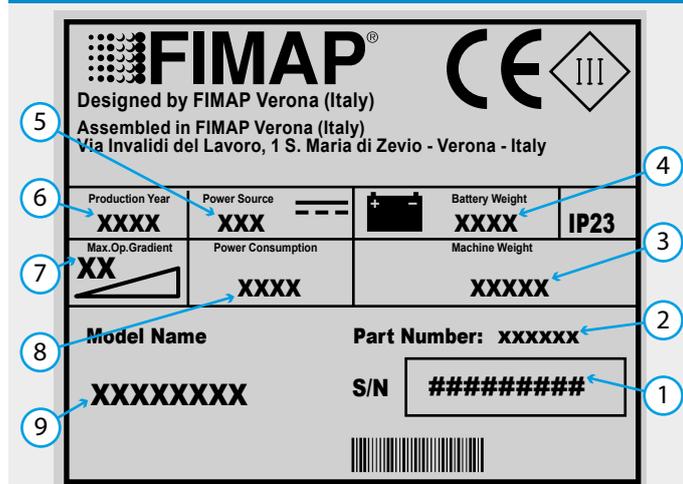
#### 1.1.1 Types

VERSION	DESCRIPTION	
FSR7 BASE	<p>Sweeper supplied with the following standard equipment:</p> <p><b>COMFORT</b> Hour counter, Suction ON/OFF (*), Basic seat, Manual brush lifting system;</p> <p><b>PRODUCTIVITY</b> Manual filter shaker, Front flap lift for easy collection of coarse dirt, Right side brush, Force technology (**);</p> <p><b>SAFETY</b> Ramp up, Stop&amp;Go, Descent control, ESC (***) , Emergency Stop, Mechanical drum brakes, Electrobrake, Side brushes retracting in the event of a collision; +</p> <p><b>ENVIRONMENT</b> Paper panel filter, FES (****), Start&amp;Stop</p>	
FSR7 PRO	<p>Sweeper supplied with the following standard equipment:</p> <p><b>USER EXPERIENCE</b> Zone programmes, Speed control, Eco mode, Maintenance warning, Control panel with soft touch controls;</p> <p><b>COMFORT</b> Hour counter, Suction ON/OFF (*), Basic seat, Automatic brush lifting system;</p> <p><b>PRODUCTIVITY</b> Extra pressure, Automatic filter shaker with timer, Manual filter shaker, Front flap lift for easy collection of coarse dirt, Right side brush, Force technology (**);</p> <p><b>SAFETY</b> Ramp up, Stop&amp;Go, Descent control, ESC (***) , Emergency Stop, Mechanical drum brakes, Electrobrake, Side brushes retracted in the event of a collision;</p> <p><b>ENVIRONMENT</b> Polyester panel filter, FES (****), Start&amp;Stop</p>	
FSR7 PLUS	<p>Sweeper supplied with the following standard equipment:</p> <p><b>USER EXPERIENCE</b> iD-Intelligent Drive, 5-inch high-resolution colour touch screen display, Password login, Zone programmes, Speed control, Eco Mode, Power Mode, Rear camera, Operator training video tutorial, Maintenance warning, Control panel with soft touch controls;</p> <p><b>COMFORT</b> Hour meter, Suction ON/OFF (*), Seat with armrests and safety belts, Automatic brush lifting system;</p> <p><b>PRODUCTIVITY</b> Pressure adjustment on three levels, Extra pressure, Suction adjustment, Automatic filter shaker with timer, Manual filter shaker, Front flap lift for easy collection of coarse dirt, Right side brush, Force technology (**);</p> <p><b>SAFETY</b> Beacon, LED driving lights (front- rear), LED service lights, Ramp up, Stop&amp;Go, Descent control, ESC (***) , Emergency Stop, Mechanical drum brakes, Electrobrake, Side brushes retracted in the event of a collision;</p> <p><b>ENVIRONMENT</b> Polyester panel filter, FES (****), Start&amp;Stop</p>	

\*) to protect the filter when cleaning on wet surfaces;  
 \*\*) always guarantees even cleaning even on uneven surfaces  
 \*\*\*) Electronic Stability Control  
 \*\*\*\*) Fimap Energy Saver



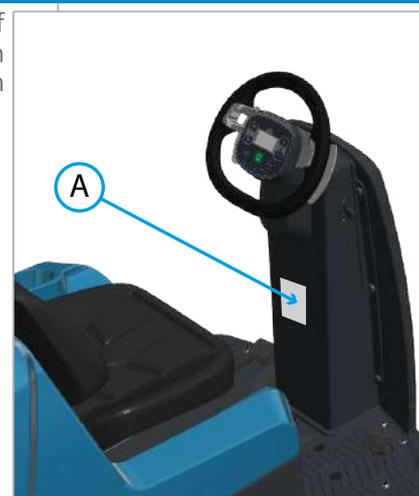
## 1.2 Serial number plate



The serial number plate of the machine is located in the steering column (A in side picture).

### Index:

1. Serial number
2. Part number
3. Machine weight
4. Battery weight
5. Power supply
6. Production year
7. Maximum slope
8. Energy consumption
9. Machine name



## 1.3 Conventions

By convention, all forward and backward, front and rear, left and right references in this manual refer to the operator in the driving position with his hands on the control handlebars



*senso di marcia*

## 1.4 General safety instructions

Always wear the appropriate personal protective equipment (PPE) whenever working.

When working near electrical components to avoid short circuits do not use:

- Non-insulated tools;
- Do not place or drop metal objects on electrically powered components;
- Remove rings, watches and clothing with metal parts that could come into contact with electrically powered components.
- Do not work under the raised machine without adequate fixed safety supports.
- Restore and recheck all electrical connections after any maintenance work.
- For any maintenance work, switch off the machine using the main switch (then remove the key from the lock) disconnect the battery connector from the electrical system connector.
- Avoid contact with moving parts. Do not wear loose clothing or jewellery and tie up long hair.
- Lock the wheels before lifting the machine.
- Lift the machine with equipment suitable for the weight to be lifted.
- Empty both tanks before transport.
- Bring both squeegees and brushes into working position before attaching the machine to the means of transport.
- The ramp for positioning the machine on top of the means of transport must be inclined so that the machine is not damaged.
- Check that the parking brake is properly applied after loading the machine onto the means of transport

## 1.5 How to move the machine

The traction motor also acts as an electro-brake, so the machine must be powered in order to be moved.

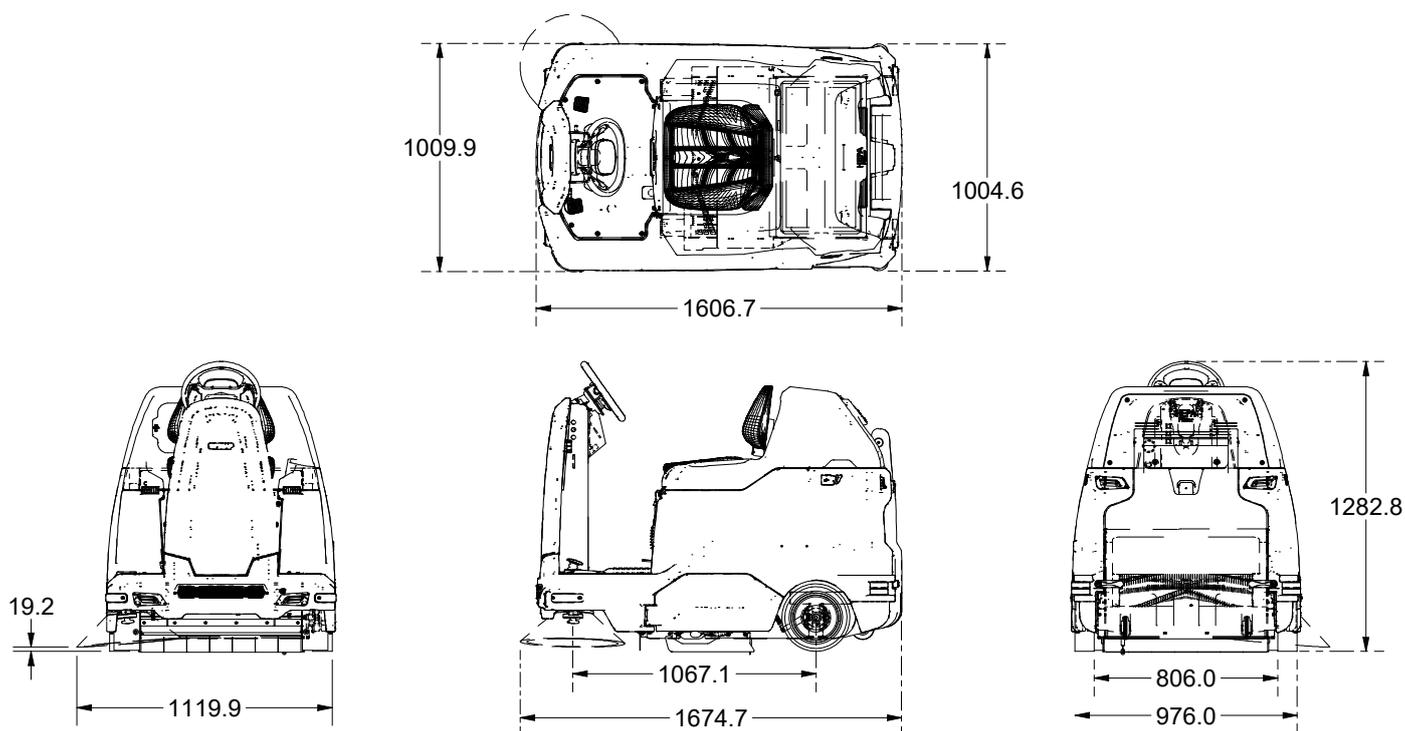
### ATTENTION

to release the electric brake, supply the GREY and BROWN cables of the wheel motor with direct battery power (24Vdc)



## 1.6 Technical data

### TECHNICAL DATA



TECHNICAL DATA	I.S.U.	FSR7
Nominal voltage <small>[IEC 60335-2-72; IEC 62885-9]</small>	V	24
Nominal input power <small>[IEC 60335-2-72; IEC 62885-9]</small>	kW	1,9
Maximum surmountable slope at work with GVW weight <small>[IEC 60335-2-72; IEC 62885-9]</small>	%	12,5
Machine weight at work (Gross weight GVW) <small>[IEC 60335-2-72; IEC 62885-9]</small>	Kg	685
	lb	1510,17
Transport weight <small>[IEC 60335-2-72; IEC 62885-9]</small>	Kg	420
	lb	926
Machine dimensions at work <small>(lunghezza; altezza; larghezza)</small>	mm	1610x1290x1020
	In	63,38x50,78x40,15
Operator Seat Sound Pressure Level (LpA) <small>[IEC 60335-2-72; IEC 62885-9; ISO 11201]</small>	dB (A)	69
Sound Power Level (LwA) <small>[IEC 60335-2-72; IEC 62885-9; ISO 3744]</small>	dB (A)	85,8
Uncertainty KpA	dB (A)	±1,5
Hand-arm vibrations <small>[IEC 60335-2-72; IEC 62885-9; ISO 5349-1]</small>	m/s <sup>2</sup>	1,34
Whole-body vibrations <small>[IEC 60335-2-72; IEC 62885-9; ISO 2631-1]</small>	m/s <sup>2</sup>	0,3
Vibration measurement uncertainty	%	±4

I.S.U.= International System of Units

## 1.7 Diagnostics and tools required

In addition to a complete set of metric spanners, the following items are required for correct and quick troubleshooting and repair.

- Digital multimeter
- DC Current Clamp with 40-200A Backscale
- Densimeter
- Hydraulic lift
- Serial data cable Battery charger, part number 435226

## 1.8 Clamping specifications

Ø Nominal	STANDARD SCREWS			INOx SCREWS		
	Nm	lb/in	lb/ft	Nm	lb/in	lb/ft
M4	3,1	27.4	2.3	2,1	18.6	1.5
M5	6,0	53.1	4.4	4,0	35.4	3.0
M6	10,4	92.0	7.7	7,0	62.0	5.2
M8	24,6	217.7	18.1	16,5	146.0	12.2
M10	50,1	443.4	37.0	33,5	296.5	24.7
M12	84,8	750.5	62.5	56,8	502.7	41.9

## 1.9 Scheduled maintenance



MAINTENANCE	DAILY	WEEKLY	MONTHLY	YEARLY
Check and charge battery if necessary				
Tank and pipe cleaning check				
Brush and pad cleaning				
Squeegee cleaning				
Clean Float				
Empty/Clean Debris Collection Cage				
Checking/Cleaning Suction Filter				
Check Liquid Level of EACH Battery Cell				
Check/Clean All Splash Guards				
Check/Clean Filter Solution				
Device lubrication				
* <sup>1</sup> ) Checking/Replacing Carbon Brushes				
** <sup>2</sup> ) Control/tightening Electrical contacts				

\*<sup>1</sup>) The brush motor and drive motor carbon brushes should be checked every 500 hours or once a year (to be assessed according to the working environment of the machine).

\*\*<sup>2</sup>) Carry out the operation after 100 operating hours, every replacement of an electrical component or once a year

### 1.9.1 Before handing over the machine, carry out all the following operations (POI)

- Install batteries and perform a complete charge cycle (check machine and charger settings);
- Check Traction (Forward, Reverse and Braking)
- Carry out on-site adjustments (base and squeegee adjustment)
- Check the operation of the optional extras if present:
  - Anti-collision sensors;
  - Headlights;
  - Service lights;
  - Lance Kit.
- When the demonstration is over, carry out daily maintenance immediately (see Operation and Maintenance Manual).

### 1.9.2 Demo tips

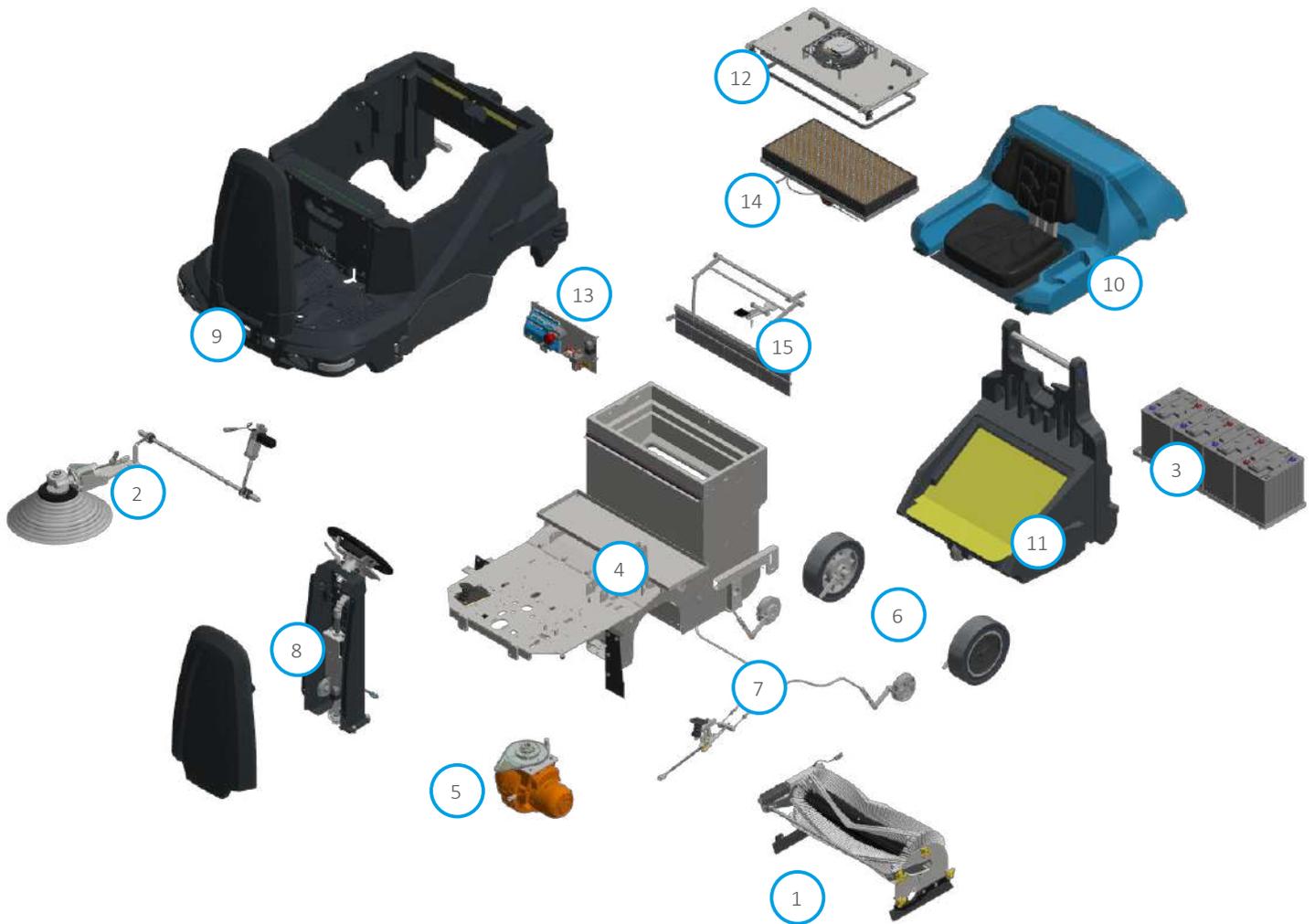
#### Brushes

Have centre brushes of different thicknesses available.  
Have available side brushes of different hardness.

#### Panel filters

Always have polyester, pocket or cloth filters available (remember the rods and vibro-quickener holder).

## 1.10 Main components



### Index

- |                        |                               |                                |
|------------------------|-------------------------------|--------------------------------|
| 1. Central brush group | 6. Rear brake assembly        | 11. Waste bin assembly         |
| 2. Side brush assembly | 7. Brake assembly             | 12. Suction unit               |
| 3. Battery assembly    | 8. Traction steering assembly | 13. Electrical system assembly |
| 4. Frame assembly      | 9. Lower body assembly        | 14. Panel filter assembly      |
| 5. Wheel motor unit    | 10. Suction hood assembly     | 15. Bottom flap assembly       |

## SECTION 2 - TROUBLESHOOTING GUIDE

### 2.1 Electrical system

#### MACHINE DOES NOT SWITCH ON

Key is in position 0	→ Turn key to position I
The emergency button is pressed	→ Disarm the emergency button
The key microswitch is not correctly connected	→ Restore correct connections
Batteries are charged	→ Check for correct voltage
The key microswitch does not work	→ Replace the key microswitch
Batteries do not work correctly	→ See relevant section
The machine is correctly powered	→ Check the charge level of the batteries and if necessary run a recharge cycle or replace them

#### BATTERIES DO NOT WORK CORRECTLY

Batteries are not connected correctly	→ Connect bridge cable and output cables correctly
Batteries are discharged	→ Carry out a complete battery charging cycle
Battery poles are oxidised	→ Disconnect batteries, clean battery poles and reconnect batteries
Connector contacts are worn from operation (blackened)	→ Replace connector
With the machine in working condition one battery has lower voltage (difference greater than 2V) than the others	→ Replace all batteries
The fuse on the jumper cable is defective	→ Check for short circuits and, if not present, replace jumper cable
Connection cables are damaged	→ Replace damaged cables
The charger is not adjusted correctly	→ Adjust the charger correctly
Charger does not work	→ See relevant section

#### THE CHARGER DOES NOT WORK

The charger is not connected to the mains	→ Connect the charger to a powered socket
The charger is not connected to the batteries	→ Connect the charger to the batteries
The charger has one or more lights flashing continuously	→ The charger is at fault, check the alarm table and solve the problem
Correctly connected charger does not switch on	→ Replace charger

#### AN ALARM MESSAGE APPEAR ON THE DISPLAY

There is an alarm message on the display	→ Check which alarm it is and rectify the problem
--	---

#### THE MACHINE HAS A VERY LOW WORKING AUTONOMY

The battery connections are oxidised	→ Disconnect the battery connection cables, clean the connectors and reconnect them to the batteries, protecting the connections with grease
--------------------------------------	--

Check all electrical contact connections for tightness

Check the input and output voltage of the key block

The batteries have already undergone many discharge and recharge cycles	→ Disconnect the battery connection cables, clean the connectors and reconnect them to the batteries, protecting the connections with grease; Check the type of battery used, set the charger; Check the type of battery used and adjust the battery charge control; Replace batteries
---	---

### 2.2 Main brush system

#### THE MACHINE DOES NOT SWEEP WELL

An alarm message appears on the display	→ Check which alarm it is and proceed to remedy the problem
The microswitch on the main brush down lever does not work	→ Replace microswitch
Main brush motor is not powered	→ Check motor connections
Motor brushes are worn	→ Replace motor brushes
Motor does not turn although powered	→ Replace motor
Brush rotates in opposite direction	→ Check motor connections
Brush is not engaged correctly	→ Engage brush correctly
Brush is dirty or worn	→ Clean or replace brush

## 2.3 Lateral brush system

### THE MACHINE DOES NOT SWEEP WELL

An alarm message appears on the display	→ Check which alarm it is and try to solve the problem
The microswitch on the side brush down lever does not work	→ Replace the microswitch
The side brush motor is not powered	→ Check the motor connections
Motor brushes are worn	→ Replace motor brushes
Motor does not turn although powered	→ Replace motor
Brush rotates in opposite direction	→ Check motor connections
Brush is not engaged correctly	→ Engage brush correctly
Brush is dirty or worn	→ Clean or replace brush

## 2.4 Suction system

### MACHINE DOES NOT SUCTION WELL

Suction motor is switched off	→ Switch on suction motor
Suction motor does not switch on	→ See relevant section
Centre tunnel tyres are worn or broken	→ Rotate or replace tyres
The suction filter is dirty or clogged	→ Disassemble and clean the suction filter
Gaskets in the intake filter chamber do not fit properly	→ Check and replace gaskets if necessary

### SUCTION MOTOR DOES NOT WORK WELL

The suction motor is not powered	→ Check the power connections of the suction motor
The microswitch on the suction motor does not work	→ Replace the microswitch
An alarm message appears on the display	→ Check which alarm it is and rectify the problem
The motor brushes are worn	→ Replace the motor brushes
Filter shaker does not work although powered	→ Replace motor

### THE FILTER SHAKER DOES NOT WORK WELL

Filter shaker is not powered	→ Check vibratory shaker power connections
Shaker switch does not operate	→ Replace switch
Shaker does not operate even though power is being supplied	→ Replace filter shaker

## 2.5 Chassis and traction system

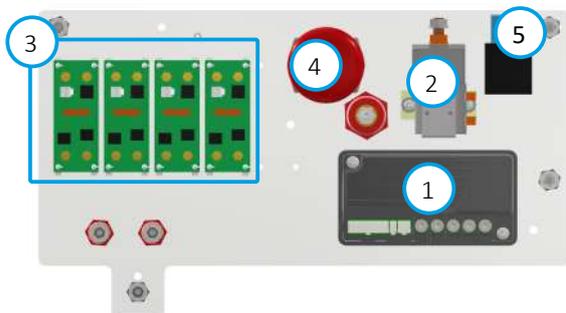
### THE TRACTION MOTOR DOES NOT WORK WELL

Batteries are discharged	→ Connect the charger and perform a full charge cycle
Operator is not sitting on the seat	→ Operator must sit on the seat
Operator is sitting on the seat	→ Check and/or replace man-presence microswitch
The pedal is not pressed	→ Press the pedal according to the speed you want to reach
The pedal is pressed	→ Check and/or replace the pedal potentiometer/microswitch
An alarm message appears on the display	→ Check which alarm it is and proceed to remedy the problem
The motor is not powered	→ Check the motor connections
The motor carbon brushes are worn out	→ Replace the motor carbon brushes
The motor does not turn although powered	→ Replace the motor
The electric brake does not release	→ Check the electric brake connections

## SECTION 3 - FUNCTIONAL GROUPS

### 3.1 Electrical system BASE

#### 3.1.1 Electrical panel

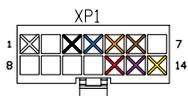
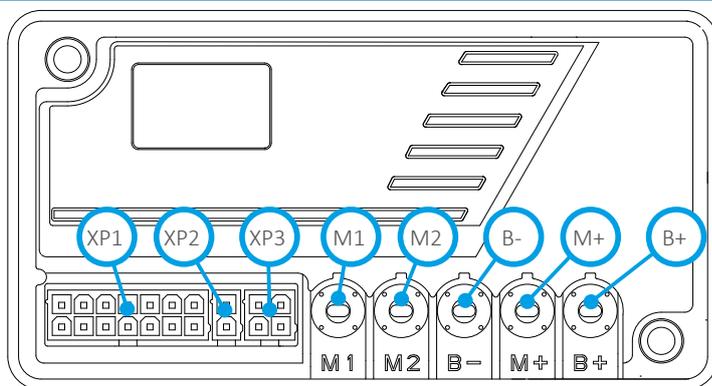


#### Index

- 1. Traction card
- 2. Contactor
- 3. Mosfet control units
- 4. Emergency button
- 5. 80A fuse

#### 3.1.2 Traction card Base version

The traction board handles all signals from the microswitches and the potentiometer in order to supply current to the traction motor.



1	POT IN	THROTTLE INPUT	WHITE
2	POT HIGH+	THROTTLE (+)	NOT USED
3	HORN OUTPUT	HORN OUTPUT	BLACK
4	DIGITAL INPUT (IN1)	FORWARD/BACKWARD SW	BLUE
5	DIGITAL INPUT	KEY IN	ORANGE
6	DIGITAL INPUT	SPEED LEVEL SW	BROWN
7	DIGITAL OUTPUT	KEY OUT	NOT USED
8	POT LOW-	THROTTLE (-)	NOT USED
9	SPEED LIMIT INPUT	THROTTLE (SPEED LIMIT SIGNAL)	NOT USED
10	STATUS LED OUTPUT	STATUS LED OUTPUT	NOT USED
11	BDI (0-5V)	BDI SIGNAL OUTPUT	NOT USED
12	DIGITAL INPUT	OPERATOR PRESENCE SW	RED
13	GND		PURPLE
14	DIGITAL INPUT	TRACTION INHIBIT SW	YELLOW



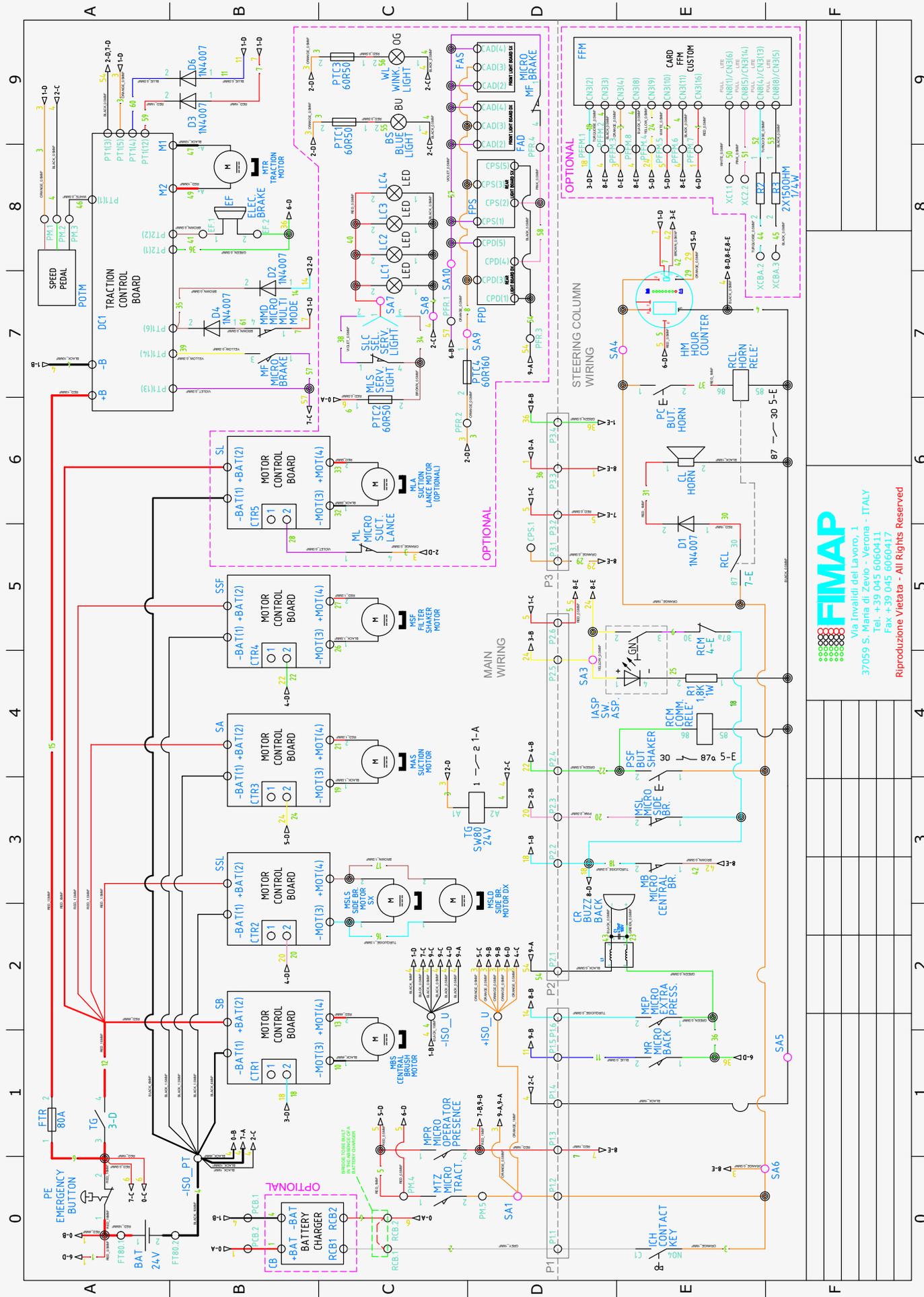
1	Vcc	PARKING BRAKE +	GREEN
2	DIGITAL OUTPUT	PARKING BRAKE -	BROWN



1	RX (USART)		NOT USED
2	GND		NOT USED
3	CHARGE INHIBIT / TX (USART)	RESERVED FOR PC DEBUG	NOT USED
4	VCC (+24VDC)		NOT USED

●	B+	POWER INPUT	POWER SUPPLY (+)	RED
	M+	POWER OUTPUT	+24V DC (RESERVED)	NOT USED
●	B-	POWER INPUT	POWER SUPPLY (-)	BLACK
●	M2	POWER OUTPUT	TRACTION MOTOR 1	RED
●	M1	POWER OUTPUT	Traction motor 2	BLACK

## 3.1.3 Functional diagram BASE version



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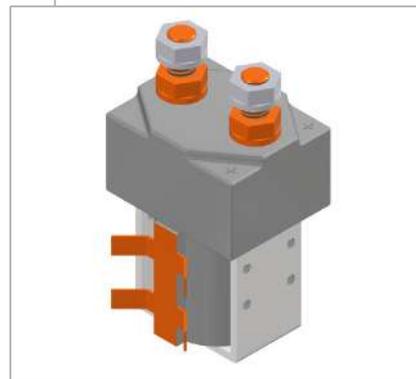
### 3.1.4 Contactor 24v sw80-65

The SW80 is designed for DC loads, including motors such as those used in electric vehicles such as industrial trucks, and for telecommunication and power distribution applications. Developed for both interrupted and uninterrupted loads, the SW80 is suitable for switching resistive, capacitive and inductive loads.

Interrupted current - opening and closing of the load with frequent switching (resulting in increased contact resistance).

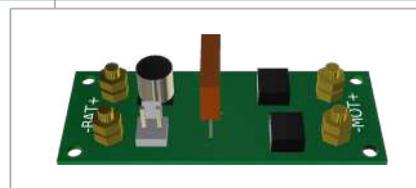
Uninterrupted current - no or infrequent load switching requirements (maintains lower contact resistance).

The SW80 has single-pole main contacts with double-break M8 pin with silver alloy tips, silver, solder-resistant, durable and with excellent conductivity.



### 3.1.5 MOSFET ON/OFF board with ramp

Thanks to a microcontroller, the motors are controlled by means of a 1.2s ramp (to avoid cues that could damage on-board components)



### 3.1.6 Man Presence Microswitch

All versions of the FSR7 are equipped with a man-presence micro switch, which is located inside the driver's seat and is actuated by the weight of the operator.

At rest contact is of the 'NO' (normally open) type.



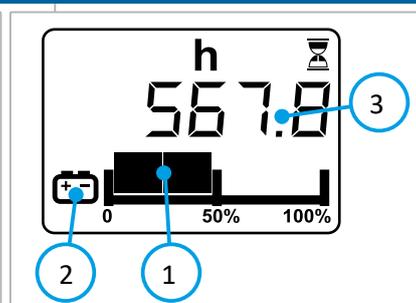
### 3.1.7 Throttle pedal

The pedal, located on the chassis support, allows the machine's forward speed to be adjusted.



### 3.1.8 Hour meter

The machine is equipped with an electronic hour meter installed on the control panel that allows the total working hours of the machine to be displayed, and in real time the battery charge level to be shown on the display. The device also allows the machine's work cycle to be interrupted if the battery discharge threshold is close to values that could compromise its operation.



**Index**

- 1. Battery charge level
- 2. Battery charge level
- 3. Hour meter

## 3.1.9 Alarm list

### Lithium alarms (special hour meter for lithium batteries)

ALARM ID	EXPLENATION	SOLUTION
ALL 01	Communication	No communication between battery and hour meter: check RS232 connection
ALL 02	Display	Internal fault; replace hour meter
ALL 05	Communication KO	Communication error; replace hour meter.

### Overcurrent and temperature alarms

ALARM ID	POSSIBLE CAUSE
PNPreChargeErr	EM break+ is short to B- Internal failure of controller
PVDD_VHighErr	PVDD voltage is higher than 34V ( <i>PVDD is the motor and EM break power</i> )
PVDD_VLowErr	PVDD voltage is lower than 12V ( <i>PVDD is the motor and EM break power</i> )
KeyIn_VHighErr	key in voltage is higher than 34V
KeyIn_VLowErr	key in voltage is lower than 12V
BatteryVoltageLowErr	Bat voltage is lower than 12V
BatteryVoltageHighErr	Bat voltage is higher than 34V
BatteryVoltageLimitLowErr	Bat voltage is lower than 10V
BatteryVoltageLimitHighErr	Bat voltage is higher than 36V
RelayConnect_Err	other failure cause the controller shut down the realy ( <i>voltage abnormal, motor short</i> ) Internal failure of controller
TractionM_TempNtcA_Err	Internal failure of controller, the traction motor ctrl mos ntc sensor abnormal
TractionM_TempNtcB_Err	Internal failure of controller, the traction motor ctrl mos ntc sensor abnormal
TractionM_TempHigh_Err	traction ctrl mos temprature is high, the controller will slow down traction current
TractionM_TempLimitHigh_Err	traction ctrl mos temprature is high, the controller will shut down traction motor ctrl
TractionMA_Mos_VHigh_Err	Internal failure of controller, the traction motor mos voltage is too high
TractionMA_Mos_VLow_Err	Internal failure of controller, the traction motor mos voltage is too low
TractionMB_Mos_VHigh_Err	Internal failure of controller, the traction motor mos voltage is too high
TractionMB_Mos_VLow_Err	Internal failure of controller, the traction motor mos voltage is too low
TractionM_Open_Err	traciton motor is not connected normally
TractionM_Short_Err	traciton motor is short
TractionM_OverLoad_Err	RESERVED
Output1_Open_Err	output1 config is ON,and output1 is not connected to controller
Output1_Short_Err	output1 config is ON,and output1 is short
Output2_Open_Err	output2 config is ON,and output1 is not connected to controller
Output2_Short_Err	output2 config is ON,and output1 is short
Output3_Open_Err	output3 config is ON,and output1 is not connected to controller
Output3_Short_Err	output3 config is ON,and output1 is short
Output4_Open_Err	output4 config is ON,and output1 is not connected to controller
Output4_Short_Err	output4 config is ON,and output1 is short
CAN_DisConnect_Err	RESERVED
UART_DisConnect_Err	if the controller is configed to be controled from usart, and the usart communication is not connect normally
PedalConnect_Err	throttle params ard inappropriate throttle is connected abnormally
PedalLimitConnect_Err	speed limit params ard inappropriate speed limit is connected abnormally
PedalHPD_Err	when power on, the throttle and dirction are all in valid state ( <i>the direction is not in P level, and the throttle is valid</i> )
eepromSysTime_Err	RESERVED
eepromParamList_Err	RESERVED
eepromSysInfo_Err	RESERVED
eepromPFC_Err	RESERVED
ProgramFile_Err	RESERVED
EmergencyStop Err	the bat is disconnected
ReverseLock Err	RESERVED
HPDLock Err	controller is locked beacuse of the HPD fault, and need restart the controller

### 3.1.10 Regulations

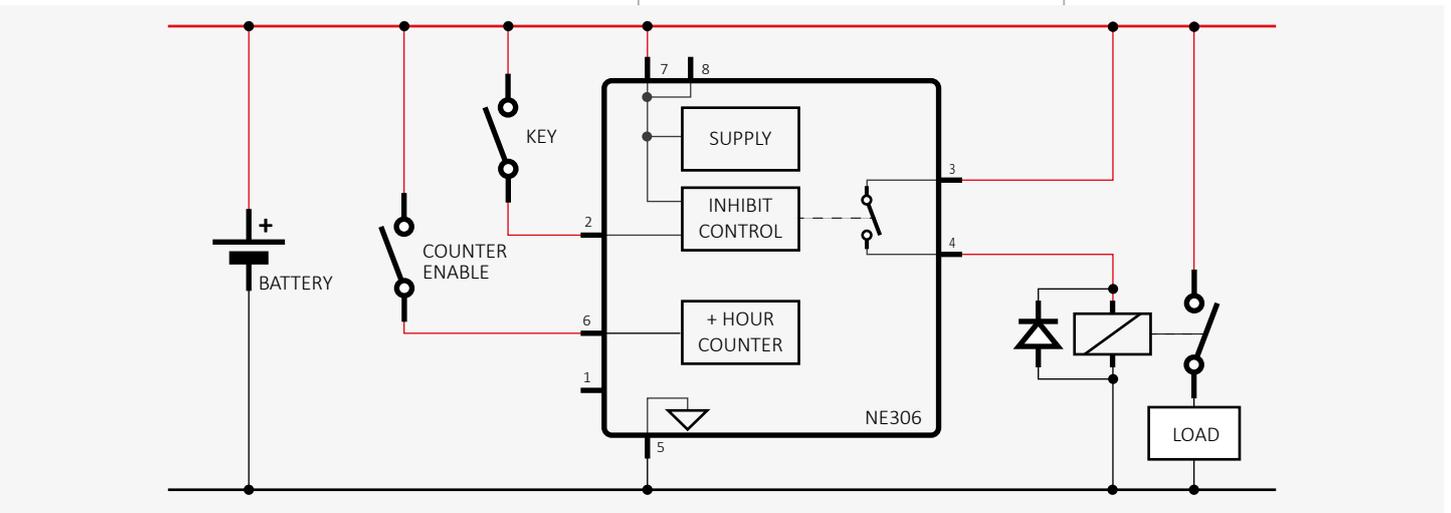
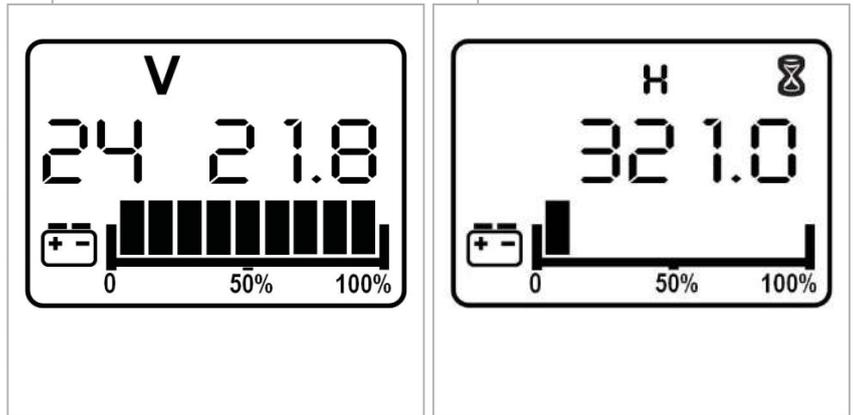
#### Battery control board (hour meter)

When switched on, for the first 2sec the hour counter displays information about itself:

- First the software version, then the value on the left, which indicates the nominal voltage set for the battery (24V), while the value on the right indicates the maximum discharge threshold (e.g. 21.8.1V).

When the machine is in working condition, the hourglass symbol flashes.

When the discharge threshold is reached, the first segment flashes for 20 seconds, then it goes out and the battery symbol starts flashing.



Check the correct setting of the hour counter in relation to the installed batteries.

To set the battery control board correctly, proceed as follows:

- Secure the machine.
- Remove the electrical system handle.
- On the back of the hour counter, set the dipswitches, following the instructions below (for dipswitch setting and consequent discharge threshold, see the battery manufacturer's instructions):

#### Battery type setting



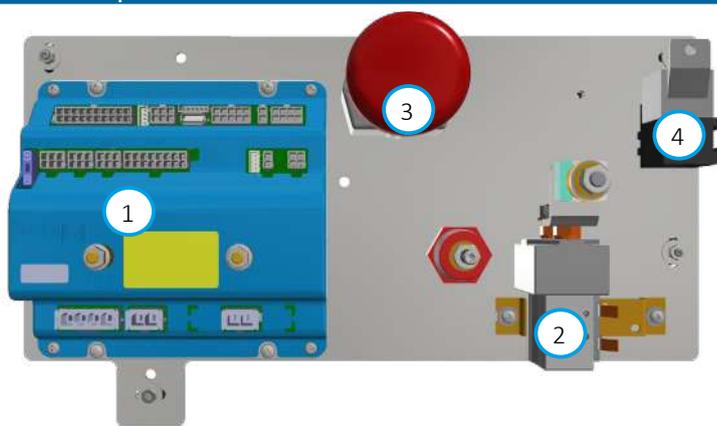
DP1	DP2	NOMINAL VOLTAGE	DP3	DP4	DP5	DP6	INHIBITION THRESHOLD	PIN	FUNCTION
<input type="checkbox"/>	<input type="checkbox"/>	12 V	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1,683 V/cell	1	DO NOT CONNECT
<input type="checkbox"/>	<input checked="" type="checkbox"/>	24 V	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1,700 V/cell	2	Key positive command
<input checked="" type="checkbox"/>	<input type="checkbox"/>	36 V	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1,717 V/cell	3	Common Relay
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	48 V	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1,733 V/cell	4	NO Contact Relay
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1,750 V/cell	5	Battery negative
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1,767 V/cell	6	Positive Hour Meter Command
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1,783 V/cell	7	Positive battery
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1,800 V/cell	8	Positive battery
<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1,817 V/cell		
<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1,833 V/cell		
<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1,850 V/cell		
<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1,867 V/cell		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1,883 V/cell		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1,900 V/cell		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1,917 V/cell		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1,933 V/cell		

Index  
 ON  
 OFF

- Refit the electrical system cover.

## 3.2 Electrical system PRO / PLUS

### 3.2.1 Electrical panel

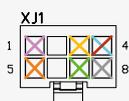
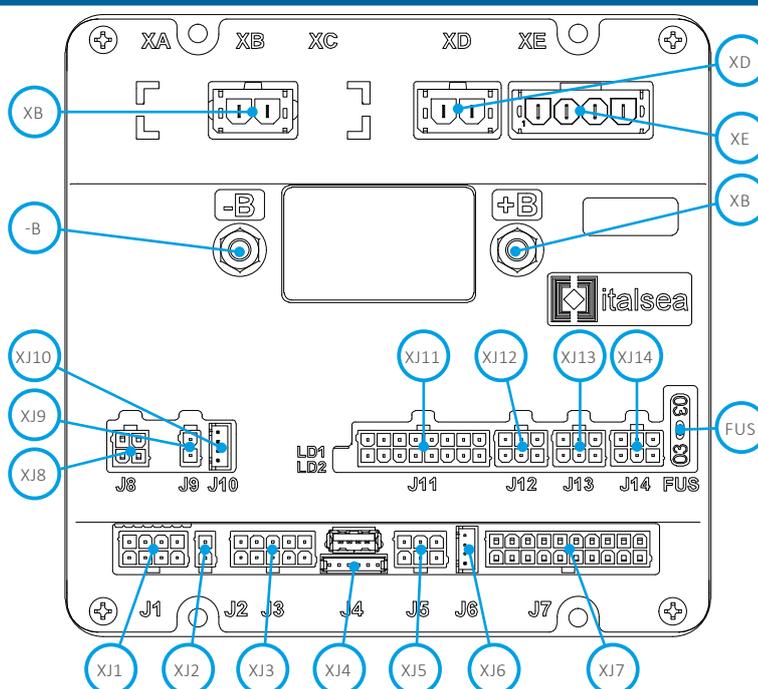


#### Index

1. Function card
2. Contactor
3. Emergency button
4. Relay R502/024Z3C9

### 3.2.2 Function card

The function control board is the heart of the machine and based on the information received from the field it regulates the behaviour of the machine under operating conditions. The tables show the cable legend for each individual connector and the contact legend.



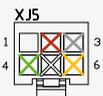
PIN	TYPE	FSR7 BS PRO	FSR7 BS PLUS	COLOUR
1	KEY OUT	KEY POWER OUTPUT (Fus. Auto 3A)		ROSA
2	KEY OUT	KEY POWER OUTPUT (Fus. Auto 3A)		(NOT USED)
3	RX KEYBOARD	RX DISPLAY	RX DISPLAY TOUCH	YELLOW
4	GND KEYBOARD	DISPLAY/ LAMP (Gnd)		BROWN/BLUE
5	KEY IN	RETURN FROM KEY (IN) / CB		ORANGE
6	KEY IN	RETURN FROM KEY (IN) / CB		(NOT USED)
7	TX KEYBOARD	TX DISPLAY	TX DISPLAY TOUCH	GREEN
8	Vcc KEYBOARD	DISPLAY (Vcc)		GREY



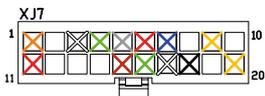
PIN	TYPE	FSR7 BS PRO	FSR7 BS PLUS	COLOUR
1	EF	ELECTROBRAKE (Gnd)		PURPLE
2	VBT	+VB (1A max)		ORANGE



PIN	TYPE	FSR7 BS PRO	FSR7 BS PLUS	COLOUR
1	GND	ENCODER (N)		BROWN
2	Vcc	LAMP. (Vcc)		RED
3	Vin			(NOT USED)
4	HALL U	ENCODER (Bi)		WHITE
5	HALL V	ENCODER (T)		YELLOW
6	5V	ENCODER (R)		GREEN



PIN	TYPE	FSR7 BS PRO	FSR7 BS PLUS	COLOUR
1	POT1 + (15V)			(NOT USED)
2	POT2 + (5V)		POT (Vcc)	BROWN
3	POT3 + (Vcc)		THROTTLE MICROSWITCH A	GREY
4	POT-		POT (Gnd)	GREEN
5	POT1 in		POT (SIGNAL)	WHITE
6	POT2 in		THROTTLE MICROSWITCH B	YELLOW



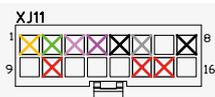
PIN	TYPE	FSR7 BS PRO	FSR7 BS PLUS	COLOUR
1	+24Vdc		COM J7(5), J7(6), J7(15), J7(18) (Vcc)	ORANGE
2	IN1			(NOT USED)
3	IN3			WHITE
4	IN5			GREEN
5	IN7		BRAKE MICROSWITCH	GREY
6	IN9		MULTIMODE	RED
7	IN11		PADDLE POWER	BLUE
8	IN13			(NOT USED)
9	IN15			YELLOW
10	GND			(NOT USED)
11	+24Vdc		COM J7(7), J7(16) (Vcc)	RED
12	IN2			(NOT USED)
13	IN4			(NOT USED)
14	IN6			(NOT USED)
15	IN8		SEAT MICROSWITCH	BROWN
16	IN10		REVERSE PADDLE	GREEN
17	IN12			WHITE
18	IN14		VACUUM CLEANER MICROSWITCH ON (Gnd) (Opt.)	BLACK
19	IN16			(NOT USED)
20	GND		HEADLIGHTS FRONT(Gnd)	YELLOW



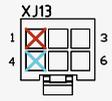
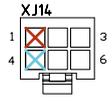
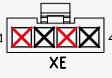
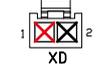
PIN	TYPE	FSR7 BS PRO	FSR7 BS PLUS	COLOUR
1	VBF			(NOT USED)
2	VBF		FILTER SHAKER (Vcc)	BLUE
3	PUMP1			(NOT USED)
4	PUMP2		FILTER SHAKER (Gnd)	ORANGE



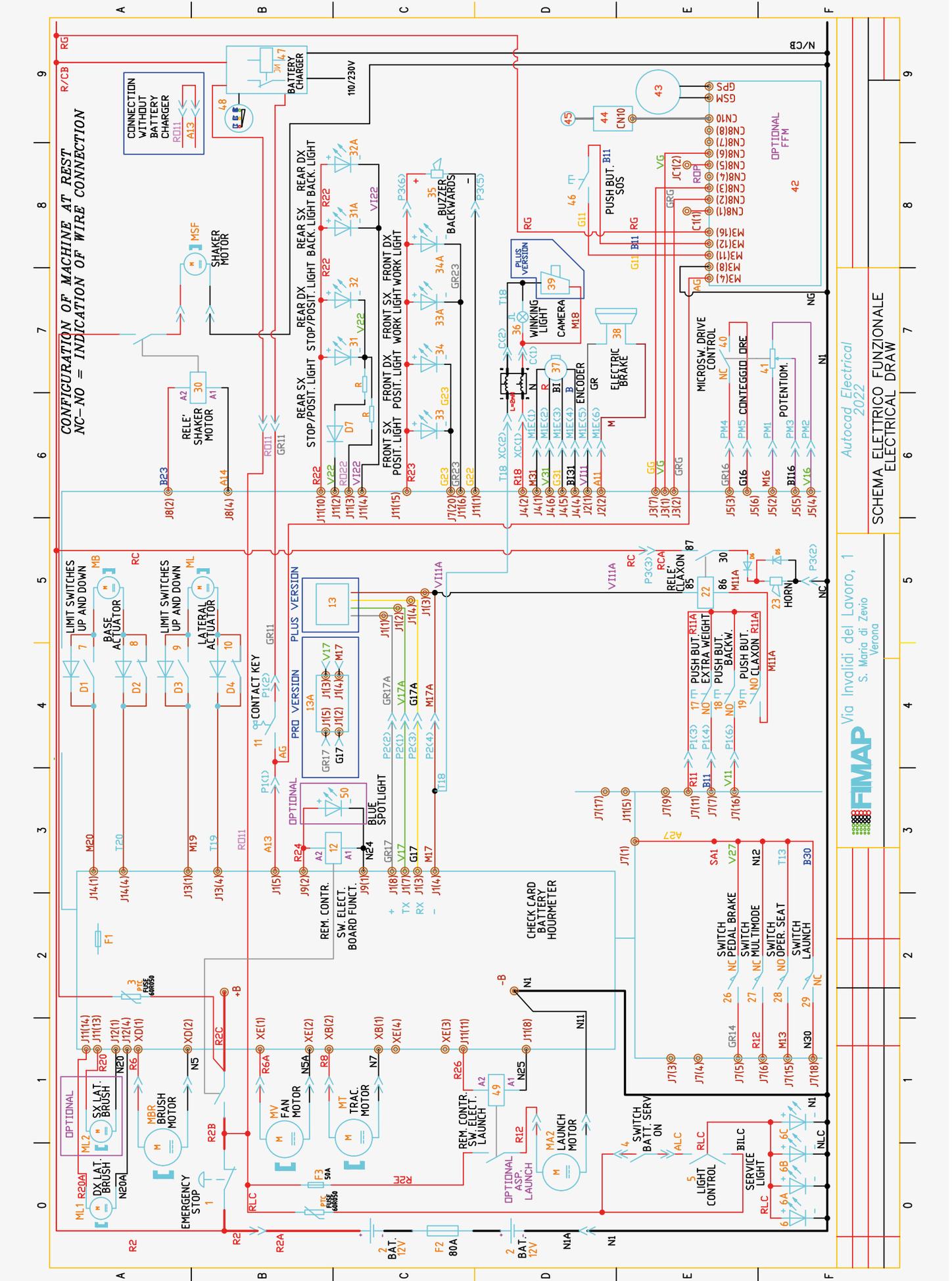
PIN	TYPE	FSR7 BS PRO	FSR7 BS PLUS	COLOUR
1	- CONTACTOR		- CONTACTOR EXT	BLACK
2	+V		+ CONTACTOR EXT	RED



PIN	TYPE	FSR7 BS PRO	FSR7 BS PLUS	COLOUR
1	OUT1		BUZZER EXT. (Gnd)	YELLOW
2	OUT2		REAR REVERSING HEADLIGHTS (Gnd)	GREEN
3	OUT3		STOP LIGHTS (Gnd)	PINK
4	OUT4		REAR LIGHTS (GND)	PURPLE
5	OUT5			BLACK
6	OUT6		WORK LIGHTS (GND)	GREY
7	OUT7			(NOT USED)
8	OUT8		VACUUM CLEANER RELAY ON (GND)	BLACK
9	VBF			(NOT USED)
10	VBF		COM J11(2), J11(3), J11(4) (Vcc)	RED
11	VBF		J11(8)	(NOT USED)
12	VBF			(NOT USED)
13	VBT			(NOT USED)
14	VBT			RED
15	VBT		COM J11(1), J11(3), J11(6), J7(20) (Vcc)	RED
16	VBT			(NOT USED)

	<b>PIN</b>	<b>TYPE</b>	<b>FSR7 BS PRO</b>	<b>FSR7 BS PLUS</b>	<b>COLOUR</b>
	1	M1ACT2	LATERAL BRUSHES ACTUATOR (M1)		BROWN
	2	FC1			(NOT USED)
	3	FC3			(NOT USED)
	4	M2ACT2	LATERAL BRUSHES ACTUATOR (M2)		BLUE
	5	FC2			(NOT USED)
	6	GND			(NOT USED)
	<b>PIN</b>	<b>TYPE</b>	<b>FSR7 BS PRO</b>	<b>FSR7 BS PLUS</b>	<b>COLOUR</b>
	1	M1ACT1	BRUSH DECK ACTUATOR (M1)		BROWN
	2	FC1			(NOT USED)
	3	FC3			(NOT USED)
	4	M2ACT1	BRUSH DECK ACTUATOR (M2)		BLUE
	5	FC2			(NOT USED)
	6	GND			(NOT USED)
	<b>PIN</b>	<b>TYPE</b>	<b>FSR7 BS PRO</b>	<b>FSR7 BS PLUS</b>	<b>COLOUR</b>
	1	M+	BRUSH MOTOR (Vcc)		RED
	2	M-	BRUSH MOTOR (Gnd)		BLACK
	3	M-	LATERAL BRUSH MOTOR 1-2 (Vcc)		RED
	4	M+	LATERAL BRUSH MOTOR 1-2 (Gnd)		BLACK
	<b>PIN</b>	<b>TYPE</b>	<b>FSR7 BS PRO</b>	<b>FSR7 BS PLUS</b>	<b>COLOUR</b>
	1	VCC	SUCTION MOTOR STANDARD (Vcc)		RED
	2	GND	SUCTION MOTOR STANDARD (GND)		BLACK
	<b>PIN</b>	<b>TYPE</b>	<b>FSR7 BS PRO</b>	<b>FSR7 BS PLUS</b>	<b>COLOUR</b>
	1	M1	TRACTION MOTOR (Vcc)		RED
	2	M2	TRACTION MOTOR (GND)		BLACK

## 3.2.3 Functional circuit diagram PRO / PLUS version



Autocad Electrical  
2022

Via Invalidi del Lavoro, 1  
S. Maria di Zevio  
Verona

**FIMAP**  
SCHEMA ELETTRICO FUNZIONALE  
ELECTRICAL DRAW

### 3.2.4 Function card parameters

ID	GROUP	CATEGOR	DESCRIPTION	RANGE	UDM	DEFAULT	INC
000	GENERAL	MAIN	RESET	0 ÷ 1		0	1
001	GENERAL	MAIN	LANGUAGE	0=ENG; 1=ITA; 2=FRA; 3=GER; 4=ESP;		0	1
002	GENERAL	MAIN	SCREENSAVER	0 ÷ 100	S	0	100
003	GENERAL	MAIN	DISPLAY TUNE (SOLO PRO)	0 ÷ 50		15	1
004	GENERAL	MAIN	DISPLAY BRIGHTNESS (SOLO PRO)	0 ÷ 10		0	1
010	GENERAL	BATTERY	BATTERY TYPE	0=PB60; 1=GEL60; 2=PURE LEAD; 3=PB80; 4=GEL80; 5=CUSTOM; 6=LITIO		1	1
011	GENERAL	BATTERY	DELAY TIME	5 ÷ 300	S	30	5
012	GENERAL	BATTERY	RESET LEVEL	10 ÷ 100	%	80	5
013	GENERAL	BATTERY	BRUSHES OFF LEVEL	0 ÷ 100	%	20	5
014	GENERAL	BATTERY	VACUUM OFF LEVEL	0 ÷ 100	%	10	5
015	GENERAL	BATTERY	TRACTION OFF LEVEL	0 ÷ 100	%	0	5
016	GENERAL	BATTERY	CUSTOM LEVEL 5/5	15.0 ÷ 40.0	V	23.5	0.1
017	GENERAL	BATTERY	CUSTOM LEVEL 4/5	15.0 ÷ 40.0	V	23.0	0.1
018	GENERAL	BATTERY	CUSTOM LEVEL 3/5	15.0 ÷ 40.0	V	22.5	0.1
019	GENERAL	BATTERY	CUSTOM LEVEL 2/5	15.0 ÷ 40.0	V	22.0	0.1
020	GENERAL	BATTERY	CUSTOM LEVEL 1/5	15.0 ÷ 40.0	V	21.5	0.1
021	GENERAL	BATTERY	CUSTOM LEVEL 0/5	15.0 ÷ 40.0	V	21.0	0.1
025	GENERAL	HOURMETER	PARTIAL HOURMETER DISPLAY	0=KEY; 1=TR; 2=BR; 3=VAC;		1	1
026	GENERAL	HOURMETER	RESET PARTIAL HOURMETER	0=NO; 1=KEY; 2=TR; 3=BR; 4=VAC; 5=ALL;		0	1
027	GENERAL	HOURMETER	RESET MAIN HOURMETER	0=NO; 1=KEY; 2=TR; 3=BR; 4=VAC; 5=ALL;		0	1
030	GENERAL	ACCESS MODE	PASSWORD 0 (FACTORY)	9000 ÷ 9999		****	1
031	GENERAL	ACCESS MODE	PASSWORD 1 (SERVICE)	4000 ÷ 4999		4304	1
032	GENERAL	ACCESS MODE	PASSWORD 2 (DEALER)	3000 ÷ 3999		3222	1
033	GENERAL	ACCESS MODE	PASSWORD 3 (CUSTOMER)	2000 ÷ 2999		2234	1
034	GENERAL	ACCESS MODE	PASSWORD 4 (USER)	1000 ÷ 1999		1000	1
035	GENERAL	ACCESS MODE	PASSWORD 5 (PIN)	100 ÷ 999		123	1
036	GENERAL	ACCESS MODE	PASSWORD ENABLE: USER	0 ÷ 1		1	1
037	GENERAL	ACCESS MODE	PASSWORD ENABLE: PIN	0 ÷ 1		0	1
040	GENERAL	SERVICE	SERVICE WARNING START	0 ÷ 1000	H	100	10
041	GENERAL	SERVICE	SERVICE WARNING END	0 ÷ 1000	H	10	10
042	GENERAL	SERVICE	SERVICE WARNING TIME	0 ÷ 1000	S	5	10
043	GENERAL	SERVICE	SERVICE WARNING COUNT	0=KEY; 1=TR; 2=WORK;		2	1
044	GENERAL	SERVICE	SERVICE WARNING RESET	0 ÷ 1000		0	10

ID	GROUP	CATEGOR	DESCRIPTION	RANGE	UDM	DEFAULT	INC
050	GENERAL	CONFIG	MODEL	0=BASE; 1=PRO; 2=PLUS		0	1
051	GENERAL	CONFIG	BASE VERSION	0=CYLIND		0	1
052	GENERAL	CONFIG	NO LOGO	0=NO; 1=YES		0	1
053	GENERAL	CONFIG	WORKLIGHT ENABLE	0 ÷ 1		1	1
054	GENERAL	CONFIG	SOLUTION MANAGEMENT	0,1=FSS; 2=FLR;		0	1
055	GENERAL	CONFIG	WAND (ASP. OPTIONAL)	0 ÷ 1		0	1
056	GENERAL	CONFIG	SPRAY GUN	0 ÷ 1		1	1
058	GENERAL	CONFIG	HAZARD LIGHTS	0 ÷ 1		0	1
059	GENERAL	CONFIG	MANUAL OP. ENABLE	0 ÷ 1		1	1
060	GENERAL	CONFIG	ZONE OP. ENABLE	0 ÷ 1		1	1
070	GENERAL	ZONE PROG.	ZONA 1 – LEVELS	0X0000÷0X3333			
071	GENERAL	ZONE PROG.	ZONA 1 – DOSAGE	0.5 ÷ 3.0	%	2.0	0.5
072	GENERAL	ZONE PROG.	ZONA 2 – LEVELS	0X0000÷0X3333			
073	GENERAL	ZONE PROG.	ZONA 2 – DOSAGE	0.5 ÷ 3.0	%	2.0	0.5
074	GENERAL	ZONE PROG.	ZONA 3 – LEVELS	0X0000÷0X3333			
075	GENERAL	ZONE PROG.	ZONA 3 – DOSAGE	0.5 ÷ 3.0	%	2.0	0.5
076	GENERAL	ZONE PROG.	ZONA 4 – LEVELS	0X0000÷0X3333			
077	GENERAL	ZONE PROG.	ZONA 4 – DOSAGE	0.5 ÷ 3.0	%	2.0	0.5
100	GENERAL	BRUSH MOTOR	MAXIMUM CURRENT (SINGLE)	30 ÷ 50	A	40	5
101	GENERAL	BRUSH MOTOR	NOMINAL CURRENT (SINGLE)	10 ÷ 40	A	16	1
102	GENERAL	BRUSH MOTOR	OVERLOAD TIME	5 ÷ 60	S	20	1
103	GENERAL	BRUSH MOTOR	SWITCH-ON DELAY	0.1 ÷ 10.0	S	0.1	0.1
104	GENERAL	BRUSH MOTOR	SWITCH-OFF1 DELAY (RELEASE)	0.1 ÷ 10.0	S	1.5	0.1
105	GENERAL	BRUSH MOTOR	SWITCH-OFF2 DELAY (FUNCTION)	0.1 ÷ 10.0	S	1	0.1
106	GENERAL	BRUSH MOTOR	RESET DELAY	1 ÷ 300	S	20	1
107	GENERAL	BRUSH MOTOR	SPEED REDUCTION	15 ÷ 24	V	24	1
108	GENERAL	BRUSH MOTOR	PRESSURE LEVEL #1 (SUM)	10 ÷ 40	A	11	1
109	GENERAL	BRUSH MOTOR	PRESSURE LEVEL #2 (SUM)	10 ÷ 40	A	13	1
110	GENERAL	BRUSH MOTOR	PRESSURE LEVEL #3 (SUM)	10 ÷ 40	A	15	1
111	GENERAL	BRUSH MOTOR	PRESSURE RANGE	1.0 ÷ 4.0	A	2.0	0.5
300	VACUUM	VAC. MOTOR	MAXIMUM CURRENT	10 ÷ 40	A	40	5
301	VACUUM	VAC. MOTOR	NOMINAL CURRENT	10 ÷ 40	A	10	1
302	VACUUM	VAC. MOTOR	OVERLOAD TIME	1 ÷ 60	S	20	1
303	VACUUM	VAC. MOTOR	SWITCH-ON DELAY	0.1 ÷ 5.0	S	0.1	0.1
304	VACUUM	VAC. MOTOR	SWITCH-OFF1 DELAY	0.1 ÷ 30	S	1.5	0.1
305	VACUUM	VAC. MOTOR	SWITCH-OFF2 DELAY	1 ÷ 300	S	30	1
306	VACUUM	VAC. MOTOR	RESET DELAY (ACT. AFTER STOP TRACTION)	1 ÷ 300	S	300	1
307	VACUUM	VAC. MOTOR	VACUUM NOISE LEVEL 1	12 ÷ 24	V	20	1
310	VACUUM	SHAKE MOTOR	SHAKE FREQUENCY #1	5 ÷ 60	MIN	15	1
311	VACUUM	SHAKE MOTOR	SHAKE FREQUENCY #2	5 ÷ 60	MIN	10	1
312	VACUUM	SHAKE MOTOR	SHAKE FREQUENCY #3	5 ÷ 60	MIN	5	1
400	OPTIONAL	BRUSH FUNC.	MAXIMUM CURRENT	10 ÷ 40	A	40	2
401	OPTIONAL	BRUSH FUNC.	NOMINAL CURRENT	5 ÷ 20	A	15	1
402	OPTIONAL	BRUSH FUNC.	OVERLOAD TIME (ONLY DC MOTORS)	0.1 ÷ 5	S	5	1
403	OPTIONAL	BRUSH FUNC.	SWITCH-ON DELAY	0.1 ÷ 10.0	S	0.1	0.1
404	OPTIONAL	BRUSH FUNC.	SWITCH-ON 2 DELAY (NOT USED)	0.1 ÷ 10.0	S	0.1	0.1
405	OPTIONAL	BRUSH FUNC.	SWITCH-OFF 1 DELAY (RELEASE)	0.1 ÷ 10.0	S	1.5	0.1
406	OPTIONAL	BRUSH FUNC.	SWITCH-OFF 2 DELAY (FUNCTION)	0.1 ÷ 10.0	S	2.5	0.1
407	OPTIONAL	BRUSH FUNC.	RESET DELAY (ACT. AFTER STOP TRACTION)	1 ÷ 300	S	20	1
410	OPTIONAL	VAC. MOTOR	MAXIMUM CURRENT	10 ÷ 40	A	30	2
411	OPTIONAL	VAC. MOTOR	NOMINAL CURRENT	5 ÷ 20	A	25	1
412	OPTIONAL	VAC. MOTOR	OVERLOAD TIME (ONLY DC MOTORS)	5 ÷ 60	S	30	1
413	OPTIONAL	VAC. MOTOR	SWITCH-ON DELAY	0.1 ÷ 10.0	S	0.1	0.1

ID	GROUP	CATEGOR	DESCRIPTION	RANGE	UDM	DEFAULT	INC
414	OPTIONAL	SWEEP FUNC.	SWITCH-ON 2 DELAY	0.1 ÷ 10.0	S	0.1	0.1
415	OPTIONAL	VAC. MOTOR	SWITCH-OFF 1 DELAY	0.1 ÷ 10.0	S	0.1	0.1
416	OPTIONAL	SWEEP FUNC.	SWITCH-OFF 2 DELAY	0.1 ÷ 10.0	S	0.1	0.1
417	OPTIONAL	SWEEP FUNC.	RESET DELAY (ACT. AFTER STOP TRACTION)	1 ÷ 300	S	20	1
500	ACTUATOR	BRUSHES	TIMEOUT	0 ÷ 30	S	8	1
501	ACTUATOR	BRUSHES	STOP POSITION	0=OVERI; 1=FC INT; 2=FC EXT;		1	1
502	ACTUATOR	BRUSHES	WORK POSITION	0=OVER I; 1=FC INT; 2=FC EXT;		1	1
503	ACTUATOR	BRUSHES	EXTRA POSITION	0=OVER I; 1=FC INT; 2=FC EXT;		1	1
504	ACTUATOR	BRUSHES	OVERLOAD LEVEL	2.0 ÷ 10.0	A	5.0	0.5
505	ACTUATOR	BRUSHES	OVERLOAD TIME	0.1 ÷ 5.0	S	2.0	0.2
507	ACTUATOR	OPT. BRUSHES	TIMEOUT	0 ÷ 30	S	6	1
508	ACTUATOR	OPT. BRUSHES	STOP POSITION	0=OVER I; 1=FC INT; 2=FC EXT;		1	1
509	ACTUATOR	OPT. BRUSHES	WORK POSITION	0=OVER I; 1=FC INT; 2=FC EXT;		1	1
510	ACTUATOR	OPT. BRUSHES	OVERLOAD LEVEL	2.0 ÷ 10.0	A	5.0	0.5
511	ACTUATOR	OPT. BRUSHES	OVERLOAD TIME	0.1 ÷ 5.0	S	2.0	0.2
600	TRACTION	SPEED SETS	ACCELERATION RAMP 1(TRANSFERT)	0.5 ÷ 5.0	S	3.0	0.1
601	TRACTION	SPEED SETS	ACCELERATION RAMP 2(WORK)	0.5 ÷ 5.0	S	4.0	0.1
602	TRACTION	SPEED SETS	DECELERATION RAMP 1 (REF. TRANSFERT)	0.3 ÷ 5.0	S	1.5	0.1
603	TRACTION	SPEED SETS	DECELERATION RAMP 2 (REF. WORK)	0.3 ÷ 5.0	S	2.0	0.1
604	TRACTION	SPEED SETS	DECELERATION RAMP 3 (RELEASE)	0.3 ÷ 5.0	S	2.0	0.1
605	TRACTION	SPEED SETS	REVERSE RAMP 1 (TRANSFERT)	0.3 ÷ 5.0	S	1.0	0.1
606	TRACTION	SPEED SETS	REVERSE RAMP 2 (WORK)	0.3 ÷ 5.0	S	2.0	0.1
607	TRACTION	SPEED SETS	FORWARD MAX SPEED	50 ÷ 100	%	100	2
608	TRACTION	SPEED SETS	BACKWARD MAX SPEED	10 ÷ 100	%	50	2
609	TRACTION	SPEED SETS	MINIMUM SPEED	0 ÷ 50	%	10	2
610	TRACTION	SPEED SETS	MODE1 SPEED (MULTIMODE)	10 ÷ 100	%	70	2
611	TRACTION	SPEED SETS	MODE1CURRENT (MULTIMODE)	10 ÷ 100	A	50	2
612	TRACTION	SPEED SETS	MODE2 SPEED (WORK SPEED)	10 ÷ 100	%	100	2
613	TRACTION	SPEED SETS	MODE3 SPEED (NOT USED)	10 ÷ 100	%	100	2
614	TRACTION	SPEED SETS	SPEED LEVEL #1	0 ÷ 100	%	40	2
615	TRACTION	SPEED SETS	SPEED LEVEL #2	0 ÷ 100	%	69	2
616	TRACTION	SPEED SETS	SPEED LEVEL #3	0 ÷ 100	%	100	2
620	TRACTION	SPEED REF	SIGNAL RANGE	0=0 ÷ 5; 1=0 ÷ 15;		0	1
621	TRACTION	SPEED REF	SIGNAL MIN POSITION	0.0 ÷ 10.0	V	0.7	0.1
622	TRACTION	SPEED REF	SIGNAL MAX POSITION	0.0 ÷ 15.0	V	3.3	0.1
623	TRACTION	SPEED REF	SIGNAL DEAD BAND	0 ÷ 500	MV	50	10
624	TRACTION	SPEED REF	SIGNAL MID POS	0.0 ÷ 10.0	V	2.0	0.1
625	TRACTION	MOTOR SETS	MAXIMUM CURRENT	40 ÷ 120	A	100	5
626	TRACTION	MOTOR SETS	BOOST CURRENT	40 ÷ 120	A	110	5
627	TRACTION	MOTOR SETS	BOOST TIME	0 ÷ 20	S	20	1
628	TRACTION	MOTOR SETS	NOMINAL CURRENT	10 ÷ 50	A	40	2
629	TRACTION	MOTOR SETS	OVERLOAD TIME	10 ÷ 60	S	60	2
630	TRACTION	E-BRAKE	SWITCH-OFF DELAY	0.0 ÷ 10.0	S	1.0	0.1
631	TRACTION	E-BRAKE	E-BRAKE CHECK	1=ENABLE		1	1
632	TRACTION	G-SENSOR L	ACTIVE AXE	0=X; 1=Y; 2=Z;		1	1

ID	GROUP	CATEGOR	DESCRIPTION	RANGE	UDM	DEFAULT	INC
633	TRACTION	G-SENSOR L	MIN G-VALUE	0 ÷ 1000	MG	100	10
634	TRACTION	G-SENSOR L	MAX G-VALUE	100 ÷ 2000	MG	200	10
635	TRACTION	G-SENSOR L	MAX SPEED	0 ÷ 100	%	40	5
636	TRACTION	G-SENSOR L	SIGNAL FILTER	0 ÷ 6	MS	4	1
637	TRACTION	G-SENSOR L	DECELERATION RAMP	0.2 ÷ 10.0	S	1.0	0.1
638	TRACTION	G-SENSOR L	ACCELERATION RAMP	0.2 ÷ 10.0	S	3.0	0.1
640	TRACTION	G-SENSOR DH	ACTIVE AXE	0=X; 1=Y; 2=Z;		2	1
641	TRACTION	G-SENSOR DH	START SLOPE	1 ÷ 50	%	10	1
642	TRACTION	G-SENSOR DH	RESET SLOPE	1 ÷ 50	%	5	1
643	TRACTION	G-SENSOR DH	MAX SPEED	20 ÷ 100	%	50	5
644	TRACTION	G-SENSOR DH	SIGNAL FILTER	0 ÷ 6	MS	4	1
645	TRACTION	G-SENSOR DH	DECELERATION RAMP	0.2 ÷ 0.5	S	0.5	0.1

## 3.2.5 Anomalies

ALARM ID	DESCRIPTION	BLOCK	MANUAL RST	AUTO RST
AL_1: GENERAL	MEMORY ERROR	•		
AL_2: GENERAL	KEY ANOMALY	•		
AL_3: GENERAL	UNDERTENSION	•		
AL_4: GENERAL	OVERTENSION	•		
AL_5: GENERAL	BATTERY CONNECTION	•		
AL_6: GENERAL	BRIDGE COMMUNICATION			•
AL_7: GENERAL	FFM COMMUNICATION			•
AL_8: GENERAL	INTERNAL COMMUNICATION 1	•		
AL_9: GENERAL	INTERNAL COMMUNICATION 2	•		
AL_10: GENERAL	ADD TAG	•		
AL_11: GENERAL	TAG NOT VALID	•		
AL_12: GENERAL	UPDATE IN PROGRESS			•
AL_13: GENERAL	TURN OFF	•		
AL_14: GENERAL	RECOVERY TANK COMPLETELY FULL (WARNING W_2)			•
AL_41: FUNCTION	OVERTEMPERATURE	•		
AL_42: FUNCTION	DAMAGED POWER	•		
AL_43: FUNCTION	DAMAGED POWER	•		
AL_44: FUNCTION	GENERAL FUSE DAMAGED	•		
AL_45: FUNCTION	GENERAL CONTACTOR FAULT	•		
AL_46: FUNCTION	GENERAL CONTACTOR FAULT - CC	•		
AL_47: FUNCTION	OVERCURRENT BRUSH OUTPUTS 1-2-3	•		
AL_48: FUNCTION	OVERCURRENT ASPIRATOR OUTPUTS 1-2	•		
AL_49: FUNCTION	OVERCURRENT WATER PUMP OUTPUTS		•	
AL_50: FUNCTION	AMPEROMETRIC BRUSH OUTPUT 1		•	
AL_51: FUNCTION	AMPEROMETRIC BRUSH OUTPUT 2		•	
AL_52: FUNCTION	AMPEROMETRIC BRUSH OUTPUT 3		•	
AL_53: FUNCTION	AMPEROMETRIC SUCTION UNIT OUTPUT 1		•	
AL_54: FUNCTION	AMPEROMETRIC SUCTION UNIT OUTPUT 2	•		
AL_55: FUNCTION	BRUSH 1 NOT CONNECTED	•		
AL_56: FUNCTION	BRUSH 2 NOT CONNECTED	•		
AL_57: FUNCTION	BRUSH 3 NOT CONNECTED	•		
AL_58: FUNCTION	ASPIRATOR 1 NOT CONNECTED	•		
AL_60: FUNCTION	ASPIRATOR 1 NOT CONNECTED	•		
AL_61: FUNCTION	TIMEOUT ACTUATOR 1		•	
AL_62: FUNCTION	AMPEROMETRIC ACTUATOR 1	•		
AL_63: FUNCTION	OVERCURRENT ACTUATOR 1	•		
AL_64: FUNCTION	INCORRECT LIMIT SWITCHES ACTUATOR 1	•		
AL_65: FUNCTION	TIMEOUT ACTUATOR 2		•	
AL_66: FUNCTION	AMPEROMETRIC ACTUATOR 2	•		
AL_67: FUNCTION	OVERCURRENT ACTUATOR 2	•		
AL_68: FUNCTION	INCORRECT LIMIT SWITCHES ACTUATOR 2	•		
AL_69: FUNCTION	TIMEOUT ACTUATOR 3		•	
AL_70: FUNCTION	AMPEROMETRIC ACTUATOR 3	•		
AL_71: FUNCTION	OVERCURRENT ACTUATOR 3	•		
AL_80: TRACTION	INCORRECT LIMIT SWITCHES ACTUATOR 3	•		
AL_81: TRACTION	OVER-TEMPERATURE	•		
AL_82: TRACTION	DAMAGED POWER	•		
AL_83: TRACTION	GENERAL FUSE DAMAGED	•		
AL_84: TRACTION	GENERAL CONTACTOR DAMAGED	•		
AL_85: TRACTION	GENERAL CONTACTOR DAMAGED - CC	•		
AL_86: TRACTION	OVERCURRENT TRACTION OUTPUT		•	
AL_87: TRACTION	AMPEROMETRIC OUTPUT TRACTION	•		
AL_88: TRACTION	MOTOR READING			•
AL_89: TRACTION	ELECTRO-BRAKE ANOMALY	•		
AL_90: TRACTION	PEDAL FAILURE			•
AL_91: TRACTION	PEDAL PRESSED			•

## Block type allarms

Errors that can only be reset by switching off the machine and result in the immediate stoppage of all or part of the machine. Below is a description of each error.

### AL\_1: General Memory Error

When switched on, the parameter values are checked and compared with their respective minima and maxima. If the value is outside the respective range, an alarm is generated.

### AL\_2: General Key Anomaly

If the input on the key contact experiences a bounce (in the millisecond range), the board generates this fault. The fault starts as soon as the key input goes to zero and is used to stop all functions and give the board time to save the status before the capacitors discharge. If it is switched on again before the capacitors discharge, it remains in fault.

### AL\_3: General Under-voltage

The fault is triggered in the following two cases:

- if the battery level reaches 0%, after filtering;
- if the battery voltage drops below 15V, instantaneously.

### AL\_4: General Over-voltage

The fault intervenes instantaneously if the battery voltage exceeds 35V.

### AL\_5: General Battery connection

If parameter P.010 Battery Type is set to 6 (Lithium), and the board does not receive the battery % value message on the ID600, the alarm is displayed for 10 seconds:

- In case of broken communication while the machine is switched on.
- In case of communication failure at power-up.

### AL\_8: General Internal Communication 1

Alarm displayed in the event that the main (traction) micro cannot communicate with the function module micro.

### AL\_9: General Internal Communication 2

Alarm displayed in the event that the main (traction) micro cannot communicate with the actuator module micro.

### AL\_10: General Insert Tag

Anomaly managed by the FFM module and communicated to the function card. Identifies the non-presence of a tag if tag verification via portal has been enabled.

### AL\_11: General Invalid Tag

Anomaly managed by the FFM module and communicated to the function card. Identifies the insertion of an invalid tag if tag verification via portal has been enabled.

### AL\_13: General Turn off

Fault handled by the FFM module and communicated to the function board. After parameter update, it indicates that the machine needs to be restarted.

### AL\_41: Function Over-temperature

It is activated when the temperature on the function power mosfets exceeds 90 C.

### AL\_42: Function Damaged power

During the switch-on sequence, a series of tests are carried out to check the correct functioning of the mosfets and their drivers. The sequence may also fail in the event of an incorrect brush deck configuration.

### AL\_43: Function General fuse damaged

Check when switching on that the potential difference at the ends of the traction fuse is zero.

### AL\_44: Function General contactor damaged

Alarm generated if after the switch-on sequence (check) the general function relay does not close.

### AL\_45: Function General contactor damaged CC

Alarm generated in the event that the general function relay is already closed when switched on.

### AL\_46: Function Overcurrent Brush Outputs 1-2-3

Hardware control that intervenes in the event of a short circuit on the output, at approximately 300A for 10us.

### AL\_47: Function Overcurrent Aspirator outputs 1-2

Hardware control that intervenes in the event of a short circuit on the output, at approximately 100A per 10us.

### AL\_54: Function Brush 1 not connected

If the current read at the output of Brush 1 remains below 3A for 15 seconds.

### AL\_62: Function Overcurrent Actuator 1

Hardware control that intervenes in the event of a short circuit on the output, at approximately 40A per 10us.

### AL\_66: Function Overcurrent Actuator 2

Hardware control that intervenes in the event of a short circuit on the output, at approximately 40A per 10us.

### AL\_80: Traction Overtemperature

It is activated when the temperature on the function power mosfets exceeds 90 C.

### AL\_81: Traction Damaged power

During the power-up sequence, a series of tests are carried out to verify the proper functioning of the mosfets and their drivers

### AL\_82: Traction General fuse damaged

Check when switching on that the potential difference at the ends of the traction fuse is zero

**AL\_83: Traction General contactor damaged**

Alarm generated in the event that after the switch-on sequence (check) the main drive relay does not close

**AL\_84: Traction General contactor damaged CC**

Alarm generated in the event that when switched on, the main traction relay is already closed

**AL\_85: Traction - Overcurrent Traction output**

Hardware control that intervenes in the event of a short circuit on the output, at approximately 300A for 10us

**AL\_87: Traction Motor reading**

If the current reading circuit is found to be providing incorrect values (outside certain thresholds considered unreliable)

**AL\_89: Traction Pedal damaged**

Alarm generated in the event that:

- the voltage of the running pedal signal is greater than the maximum reference voltage of the pedal;
- the run pedal signal voltage is greater than 2V and the run pedal micro does not close;

## Manual Reset Type Alarms

Errors that can be reset manually via user interface (in the basic version, without user interface, they are reset at key switch-off). They can lead to the immediate shutdown of the entire machine or part of it. Below is a description of each error.

**AL\_49: Function Amperometric Brush Output 1**

Software control of the output current according to the  $I_2t$  formula.

The card admits a current above the rated current ( $I_n$ ) for a time  $t$ , when the current  $I_{max}$  (Parameter P.100) is reached, the alarm intervenes even if the time  $t$  has not expired

**AL\_52: Function Amperometric Outlet Aspirator 1**

Software control of the output current according to the  $I_2t$  formula.

The card admits a current above the rated current ( $I_n$ ) for a time  $t$ , when the current  $I_{max}$  (Parameter P.300) is reached, the alarm intervenes even if the time  $t$  has not expired

**AL\_61: Function Amperometric Actuator 1**

Software control that intervenes if the current read at the output remains above the Nominal Current for the time set in the Nominal Time parameter. If the current falls below the threshold, the time is reset instantly

**AL\_65: Function Amperometric Actuator 2**

Software control that intervenes if the current read at the output remains above the Nominal Current for the time set in the Nominal Time parameter. If the current falls below the threshold, the time is reset instantly

**AL\_86: Traction Amperometric Traction Output**

Software control of the output current according to the  $I_2t$  formula.

The board admits a current above the rated current ( $I_n$ ) for a time  $t$

## Automatic Rest Type Alarms

Errors that reset automatically when the fault is resolved. They can lead to immediate shutdown of the entire machine or part of it. Below is a description of each error

**AL\_6: General Dashboard communication**

No communication with display or user interface

**AL\_7: General FFM communication**

After establishing communication with the FFM module at least once since power-up, an error is generated if communication is lost.

**AL\_12: General Update in progress**

Anomaly managed by the FFM module and communicated to the function board. Indicates the alignment phase of the card parameters with those of the portal

**AL\_88: Traction Electro-brake anomaly**

The fault occurs if the board does not sense any load on the electro-brake output

**AL\_90: Traction Pressed throttle**

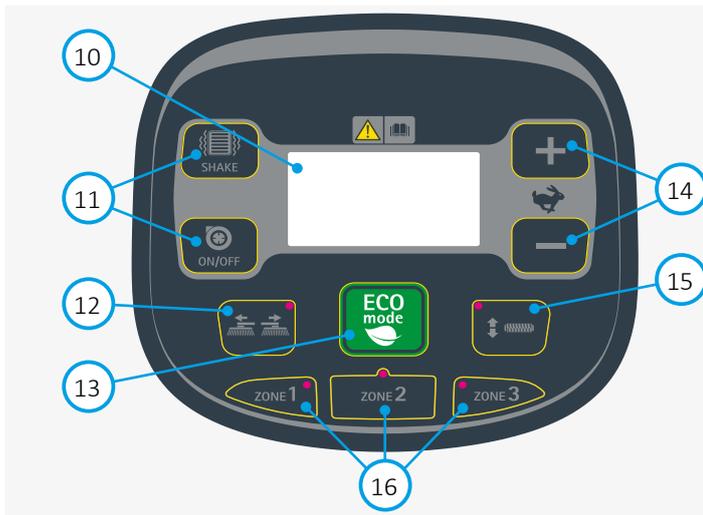
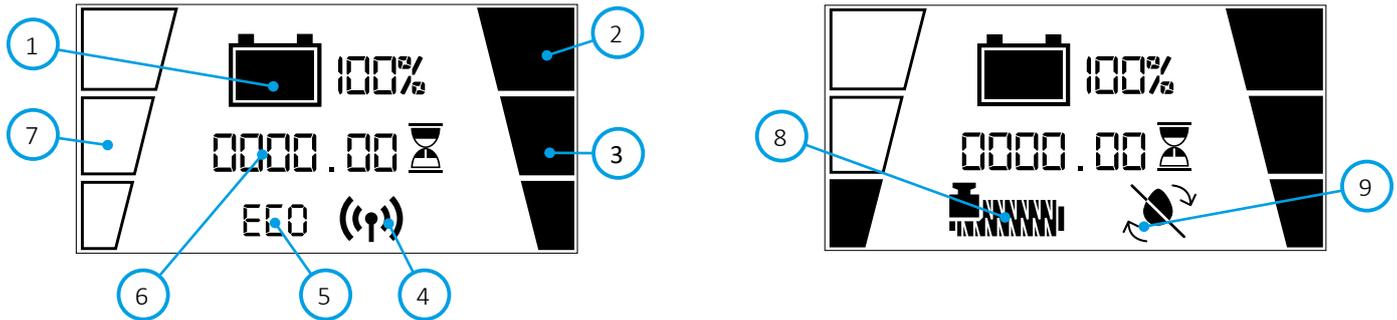
The fault occurs if the throttle pedal is depressed when the ignition is switched on

**AL\_91: Traction Encoder anomaly**

The anomaly occurs in the following cases:

- always, if within 20 edges of one channel at least 1 edge of the other channel does not occur;
- in the first 200ms after start-up, if 100 fronts occur in the opposite direction to the direction of travel (motor power supply reversed);

## 3.2.6 Display and dashboard PRO version



### Index

1. Remaining battery charge.
2. Percentage of remaining battery charge.
3. Forward speed performance level.
4. Automatic fleet management system
5. ECO work programme active.
6. Machine hour meter.
7. Detergent solution performance level.
8. POWER MODE work programme.
9. Automatic detergent dosing system.
10. Control display.
11. Detergent solution performance adjustment buttons .
12. Side brush function control
13. ECO-MODE work programme control button .
14. Feed speed performance adjustment buttons .
15. Brush release button.
16. Working zone control button

### Power-up page

The following information is displayed at start-up:



The battery type is the one selected in the function card parameter list.

The partial and total hour counters are related to the function selected in the parameter list as the hour counter to be displayed (function card parameter list). The software versions installed in the display and function cards are shown below.

### ONE-TOUCH start

When switched on, the working mode in transfer. For the first selection only, the default working mode or programme is loaded:

- selecting one of the programmes (Eco, Zone X or Power) activates the Sweep/Breathe with Side Sweep work mode;
- selecting the Sweep/Breathe with Side-Spray working mode will load the Eco programme.

### Work programmes

#### Eco programme

If you select the Eco programme, the predefined performance levels (speed, pressure, filter shaking) are loaded (if filter shaking is set to automatic, alternatively the Filter Shaking function is independent of programmes and zones). The symbol "ECO" lights up. The symbol is switched off by switching to Manual mode (changing one of the performance levels), switching to the Power programme or selecting a Zone.

#### Zone Selection

Selecting one of the Zones loads the performance levels (speed, pressure, filter shaking) relative to the selected Zone (if filter shaking is set to automatic, alternatively the Filter Shaking function is independent of programmes and zones). The LED is switched off when switching to Manual mode (by changing one of the performance levels), switching to the Power programme or selecting a Zone.

#### Extra Pressure Function

Pressing the extra pressure paddle changes the pressure level from 1 to 3. If ECO mode is set, pressing the paddle switches to manual mode.

The symbol is switched off by pressing the paddle when the function is active, switching to Eco mode or selecting a Zone.

## Programs

Below the list of predefined performance levels.

PROGRAM	SPEED PRESSURE	SUCTION	FILTER SHAKER
Eco	1	1	2
Zone 1	1	1	1
Zone 2	1	3	2
Zone 3	3	3	3

## Edit Zone Programmes

It is possible to save a programme by holding down the Zone button on which you want to save the programme for 3 seconds. To confirm saving, the LED of the relevant saved Zone Program flashes 3 times. Pressing one of the Zone Buttons recalls the saved working parameters. Saving remains even when the machine is switched off.

## Working Modes

### Transfer

The transfer mode is active if the Sweep/Vacuum with Side Brushes mode is switched off. speed levels can be changed via Button 14a and 14b. The symbols S0, S1, S2, S3, S4, S5, S6, S9 and S10 are switched off.

### Sweep/Vacuum with Side Brushes

The Sweep/Vacuum with Side Brushes mode is entered as follows:

- from transfer mode, by pressing Button 1

### Vacuum cleaner (Optional)

When the function is activated, the "Vacuum cleaner" icon is shown on the display flashing for 5 seconds.

### Filter Shake Function

If the function is in automatic mode, display the level set on the notches.

If the function is in manual mode, display level 0 on the level markings.

### Electro Brake Symbol

The following symbol is displayed when the electric brake is not electrically connected.

### FFM (Optional)

With FFM active and key control activated from the FFM portal, the following symbols will be displayed full screen in the event of an incorrect key code being entered or a key with no code entered.

### Remote Work Programme Command

A request to change the work programme may be received from the FFM portal. This request can be accepted or rejected. If the user accepts, the suggested work programme is loaded. Otherwise, the previous programme remains active. The name of the suggested programme appears on the display in full screen, flashing. In addition, in the case of a Zone 1, 2 or 3 programme, the corresponding LED also flashes.

This display remains for a maximum of 20 seconds or until a key is pressed:

- If the button of the suggested programme is confirmed, the same programme is loaded instead of the previous one.
- If the 20 seconds expire or if a key other than that of the suggested programme is pressed, the command is rejected and the previous programme remains active.

COMMAND	1	2	3	4	5	6
PROGRAM	ZONE	ZONE	ZONE	ECO	ECO	POWER

Values other than those in the table are not taken into account.

### Expired Maintenance Warning

The following symbol is used. The warning is generated by the functions tab.

### Access Levels

The Dashboard allows access to basic settings with free access and to the password-protected parameter list. To enter the password, follow the instructions in the diagram.

### Functions and Commands

In normal working condition the display shows the hour meter and the percentage residual battery charge status.

In critical residual charge conditions, the battery control board is programmed to successively disable the brush motor (the suction motor and traction motor still work) when the battery residual charge is 20% and the suction motor when the residual charge is 10%.

### Machine Control Panel Functions

- Manage and set the main functions and controls of the machine during the work cycle;
- Display alarm signals for correct and easy detection of any anomaly.
- Differentiated access to three menus:

#### Work Menu

shows the battery level and the hours worked by the machine (according to the Operator Menu setting).

In the event of a fault, the Work Menu also shows any alarm message.

#### Operator Menu

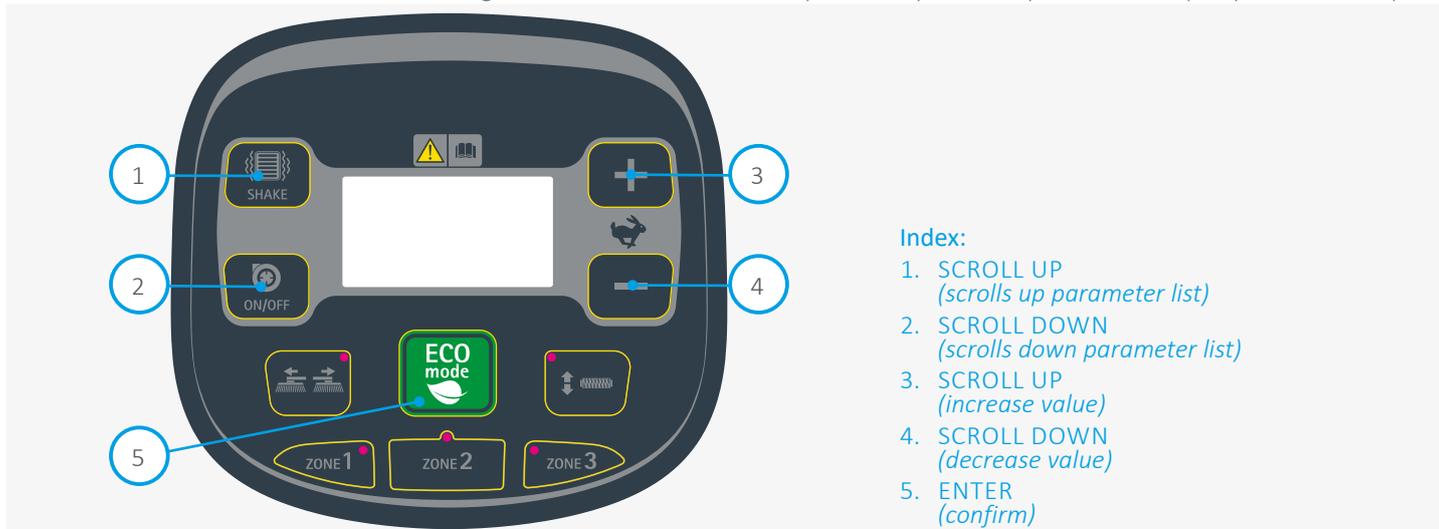
contains the basic settings that can be used by the machine operator.

#### Advanced Menu

it is possible to change advanced settings and, thanks to the Monitor Mode function, to check motor absorption.

## 3.3.7 Programming PRO version

The Dashboard allows access to basic settings with free access and to the password-protected parameter list (the password is 60)

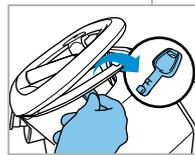


### How to access the Operator Menu

To access the Operator Menu proceed as follows:



With the machine switched off, press the **2** and **3** buttons simultaneously;



With both keys pressed, turn the ignition key to the ON position;



Wait for the Operator Menu text interface to load;



Release the keys **2** and **3**;



To navigate within the menu sections use the **1** and **2** keys;

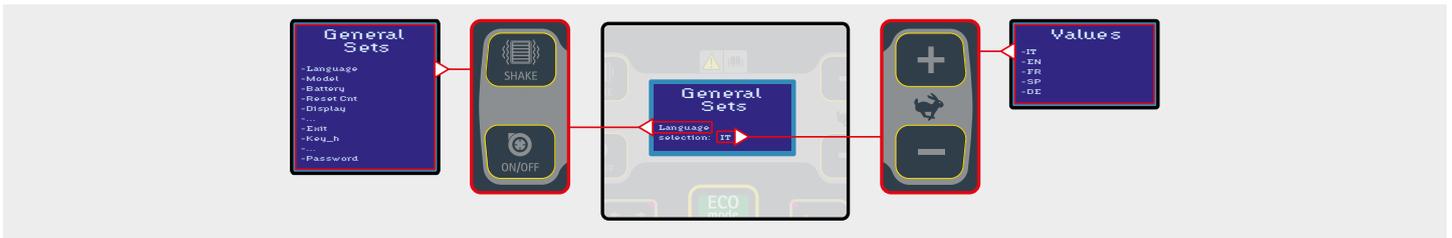


To change a setting use the **3** and **4** keys.

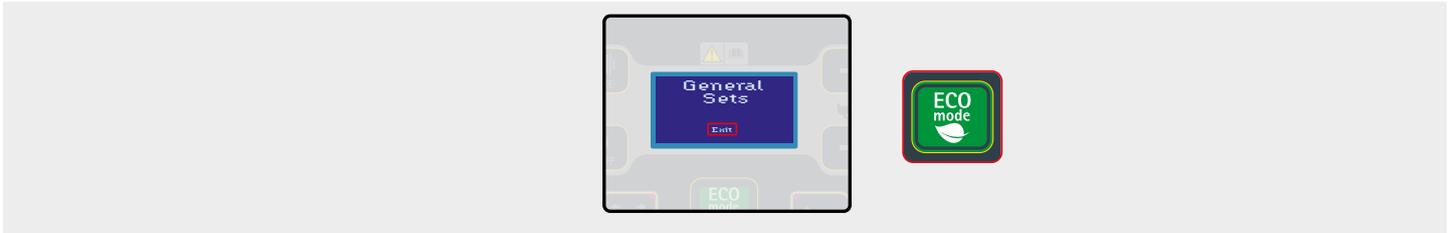
The changed setting remains automatically confirmed, both when leaving the menu (exit) and when switching off the machine.

## Navigating and Changing 'General Sets' Values

Scrolling through the "General Sets" menu is done using the + and- keys on the left (1 and 2), changing values (Values) is done using the + and- keys on the right (3 and 4).



To exit the "General Sets" menu, select the "EXIT" item and press the "ECO mode" button.



## Parameter Menu Access and Menu Tree

The menu structure can be schematically summarised in the following images. Switch on the machine and access the menus by following the icons in the diagram.

### Operator menù



Navigation MENÙ	OK	Navigation Sub - MENÙ	Navigation PARAMETERS
<ul style="list-style-type: none"> <li>SHAKE</li> <li>↑</li> <li>↓</li> <li>ON/OFF</li> </ul>	<ul style="list-style-type: none"> <li>ECO mode</li> <li>→</li> </ul>	<ul style="list-style-type: none"> <li>GENERAL                             <ul style="list-style-type: none"> <li>Main</li> <li>Battery</li> <li>Hourmeter</li> <li>Access Mode</li> <li>Service</li> <li>Config</li> <li>Zone Prog.</li> </ul> </li> <li>BRUSH                             <ul style="list-style-type: none"> <li>Brush Motor</li> </ul> </li> <li>VACUUM                             <ul style="list-style-type: none"> <li>Vacuum Motor</li> <li>Shake Motor</li> </ul> </li> <li>OPTIONAL                             <ul style="list-style-type: none"> <li>Brush Function</li> <li>Vacuum Motor</li> <li>Sweep Func.</li> <li>Vacuum Motor</li> <li>Sweep Func.</li> </ul> </li> <li>ACTUATOR                             <ul style="list-style-type: none"> <li>Brushes</li> <li>Opt. Brushes</li> </ul> </li> <li>TRACTION                             <ul style="list-style-type: none"> <li>Speed Sets</li> <li>Speed Ref</li> <li>Motor Sets</li> <li>E-Brake</li> <li>G-Sensor L</li> <li>G-Sensor H</li> <li>Zone Prog.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>SHAKE</li> <li>↑</li> <li>↓</li> <li>ON/OFF</li> </ul>
<ul style="list-style-type: none"> <li>GENERAL</li> <li>BRUSH</li> <li>VACUUM</li> <li>OPTIONAL</li> <li>ACTUATOR</li> <li>TRACTION</li> </ul>			<ul style="list-style-type: none"> <li>GENERAL</li> <li>SERVICE</li> <li>General Sets</li> <li>Brushes Set</li> <li>Water Pump Sets</li> <li>Chemical Sets</li> <li>Service</li> <li>Vacuum Sets</li> <li>Traction Sets</li> <li>Monitor Mode</li> <li>Engineer Pars</li> <li>... EXIT ..</li> </ul>

## Service Menù

Once in the service menu, we have the possibility to act in the following sub-menus:

GENERAL	SERVICE	General Sets	(Access to general parameters)
		Brushes Set	(Access to brush base function parameters)
		Water Pump Sets	((Access to water pump function parameters)
		Chemical Sets	(Access to parameters related to the detergent pump function)
		Service	
		Vacuum Sets	(Access to suction function parameters)
		Traction Sets	(Access to traction function parameters)
		Monitor Mode	(Access to working parameter display)
		Engineer Pars	NOT USED
		... EXIT ..	

To select the desired sub-menu, press the "ECO mode" button.

Once the parameter item to be changed has been selected with the left buttons 1 and 2, to change the parameter value press the right buttons 3 and 4; the value is saved automatically.

To re-emerge from the sub-menu, press the "ECO Mode" button and then select the Exit item.

### MENÙ "General Sets"

DESCRIZIONE	RANGE	DEFAULT
Language Selection	0=IT; 1=EN; 2=FR; 3=SP; 4=DE	1
Model Selection	0=BT; 1=BTS; 2=BTO; 3=NoLogo BT; 4=NoLogo BTS; 5=NoLogo BTO;	0
Battery Selection	0=Pb60; 1=Gel60; 2=PPb; 3=Pb80; 4=Gel80; 5=Litio	1
Reset count-meter	0 ÷ 1	0
Reset Main count-meter	0 ÷ 1	0
Display count-meter	0 ÷ 1	
Display Tune	5 ÷ 50	15
Display Brightness	0 ÷ 10	0
Solution Management	0=None; 1=FLR; 1=FSS	0
Wand/Spray	0=None; 1=Wand; 2=Spray	2

### MENÙ "Brushes Set"

DESCRIZIONE	RANGE	DEFAULT
Imax	20 ÷ 50	40
Inom	10 ÷ 40	25
Tnom	1 ÷ 60	30
Toff	0.0 ÷ 1.0	0.0
Treset	0 ÷ 100	30
Ton	0.0 ÷ 0.5	0.0
Speed Reduction	15 ÷ 24	24
Pressure level 1	0 ÷ 40	10
Pressure level 2	0 ÷ 40	20
Range	0 ÷ 10	2

### MENÙ "Water Pump Sets"

DESCRIZIONE	RANGE	DEFAULT
Flow Lvl 1	0 ÷ 100	25
Flow Lvl 2	0 ÷ 100	50
Flow Lvl 3	0 ÷ 100	90

### MENÙ "Chemical Sets"

DESCRIZIONE	RANGE	DEFAULT
Pulse Duration	1 ÷ 100	75
Percent. Chemical	0.0 ÷ 3.0	2.0

### MENÙ "Service"

DESCRIZIONE	RANGE	DEFAULT
Service Start	0 ÷ 1000	100
Service Time	5 ÷ 60	10
Service Reset	0 ÷ 1	0

### MENÙ "Vacuum Sets"

DESCRIZIONE	RANGE	DEFAULT
Imax	10 ÷ 40	30
Inom	5 ÷ 40	23
Tnom	1 ÷ 30	10
Toff	0 ÷ 30	5
Toff Stop	0 ÷ 100	15
Eco Speed	15 ÷ 20	17

## Monitor Mode

The Monitor Mode function allows you to check

- Battery status;
- The absorption of the motors.

Motor absorptions can be displayed while the machine is in working condition. To view the values follow the procedure outlined here:

Enter the "Monitor Mode" menu and confirm by pressing key 5 (ECO Mode).

Use buttons 1 and 2 until you find the parameter you wish to examine in working mode, and confirm by pressing button 5.

PARAMETER	DEFAULT	DESCRIPTION
No Monitor		Neutral situation, no entry required
Function Inputs:	Pedal= 0,5V	Gear pedal potentiometer voltage range
Keyboard		Testing of handlebar membrane buttons
Functions Temp.	## C°	Function card temperature
Traction Temp.	## C°	Traction motor temperature
Vacuum Current	## A	Current Suction Motor
Brushes Current	## A	Brusches Suction Motor
Traction Ammeter	## %	Maximum Traction Motor Current
Traction Current	## A	Traction Motor Current
Traction Voltage	## V	Traction Motor Voltage
Battery	## V	Battery voltage

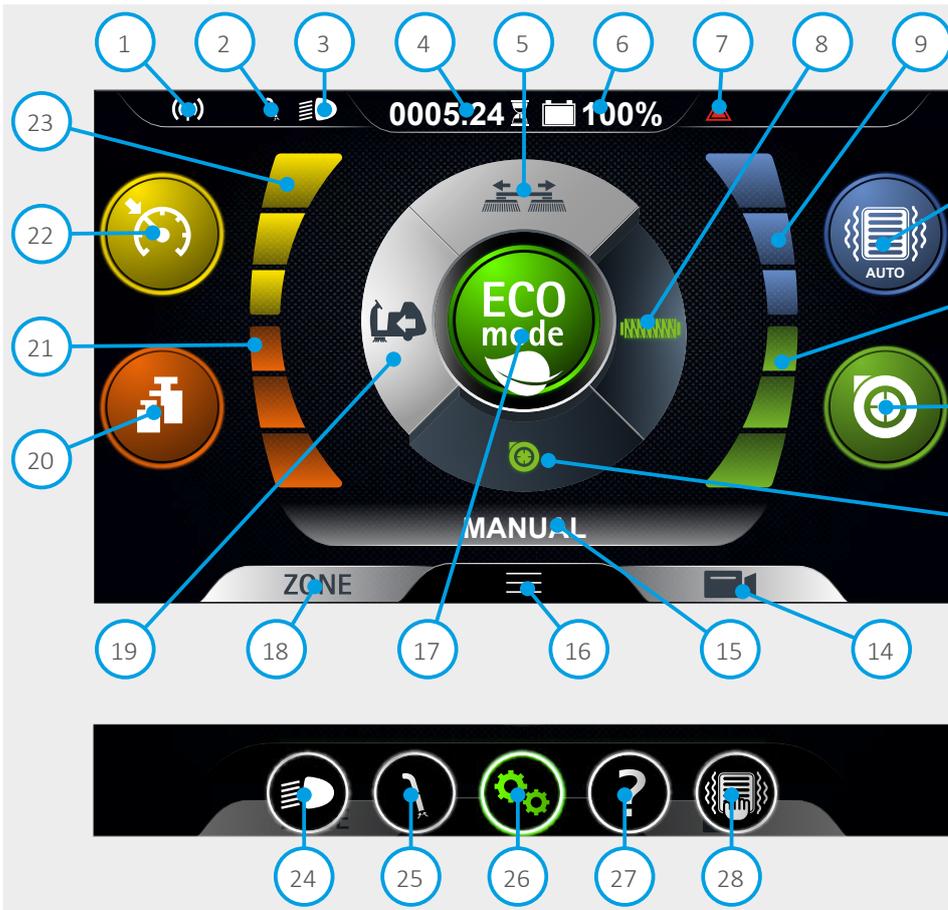
Once confirmed, scroll through the parameters with buttons 1 and 2 until exit is found and confirm with button 5.

The display will immediately return to working mode, but the relative measurement will be shown at the top.

To exit the Monitor Sets function, switch the machine off and on again

## 3.2.8 Display and dashboard PLUS version

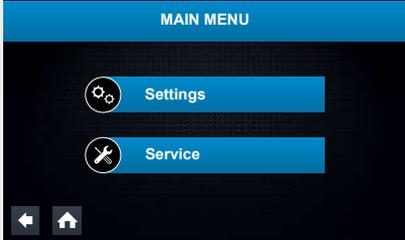
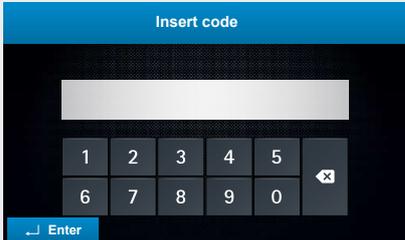
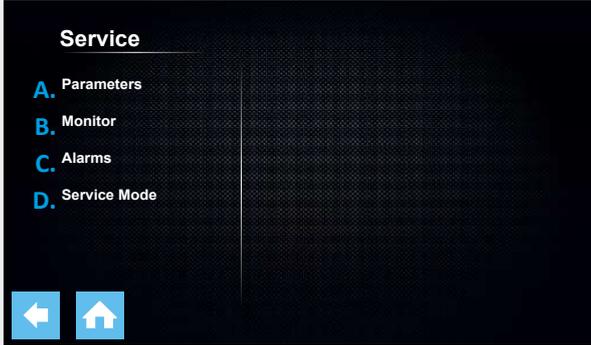
The 5in touch display allows access to all machine functions and settings.



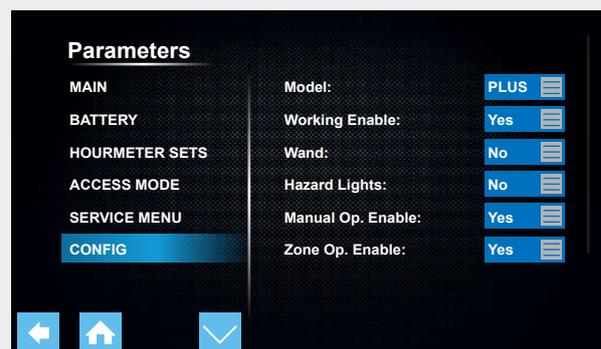
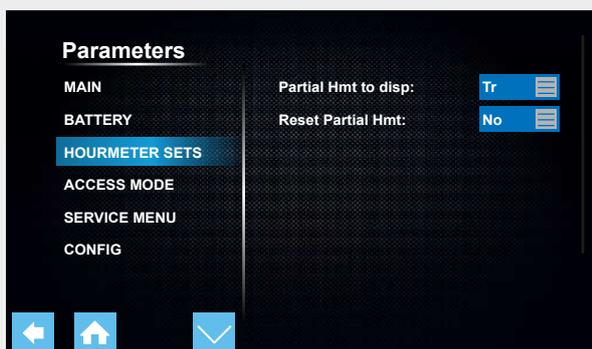
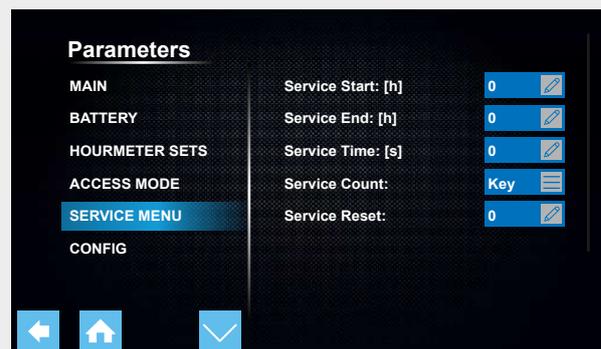
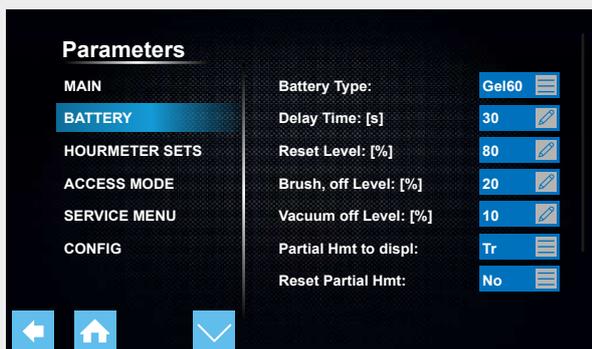
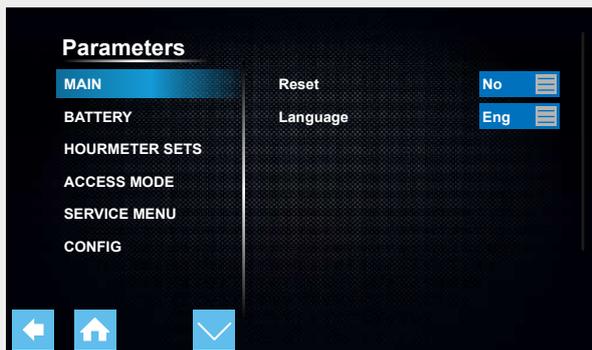
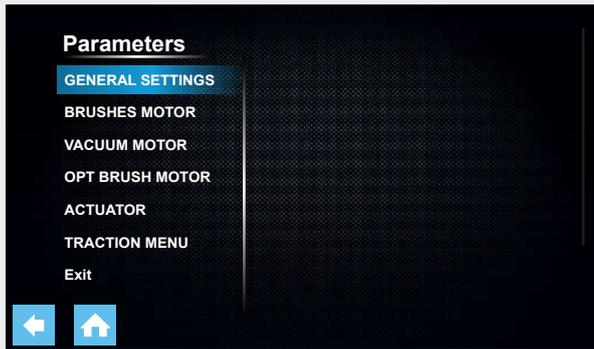
1. FFM system
2. Vacuum cleaner
3. Working lights
4. Hour counter
5. Side brush
6. Battery level indicator
7. General alarm
8. Working modes
9. Filter shaker activation frequency level
10. Filter shaker activation frequency level adjustment
11. Suction motor performance level
12. Suction motor performance level adjustment
13. Suction
14. Rear camera
15. Text indicator.
16. Pop-up menu screen.
17. Eco Mode
18. Work Zones
19. Transport mode
20. Centre brush pressure setting
21. Centre brush pressure level
22. Feed speed
23. Feed speed level
24. Headlight brightness
25. On-board Hoover kit
26. Menu access
27. Tutorial
28. Manual filter shaker

### How to access the Service Menu

To access the Operator Menu, proceed as follows:

1. 
  -  Select the pop-up menu
2. 
  -  Select access to menus
3. 
  -  Select the Service menu
4. 
  - To access enter the code "3222"
5. 
  - Service**
  - A. Parameters
  - B. Monitor
  - C. Alarms
  - D. Service Mode

## A. Sub-menu Parameters



## B. Sub-menu Monitor

**Monitor**

- GENERAL
- BRUSHES
- VACUUM
- TRACTION

Battery Voltage [V]	24.4
Seat safety seitch	OFF
Multimode	OFF
Backward paddle	OFF
Power paddle	OFF

**Monitor**

- GENERAL
- BRUSHES
- VACUUM
- TRACTION

Current [A]	0.0
Voltage [V]	0
Heatsink temp [C]	22

**Monitor**

- GENERAL
- BRUSHES
- VACUUM
- TRACTION

Current Brush 1 [A]	0.0
Actuator base	OFF
Heatsink temp [C]	30

**Monitor**

- GENERAL
- BRUSHES
- VACUUM
- TRACTION

Speed [km/h]	0.0
Voltage [V]	0.0
Current [A]	0
Overload level [%]	0
Heatsink temp [C]	20
Pedal Ref. [V]	0.0
Pedal En.	OFF

## C. Sub-menu Alarms

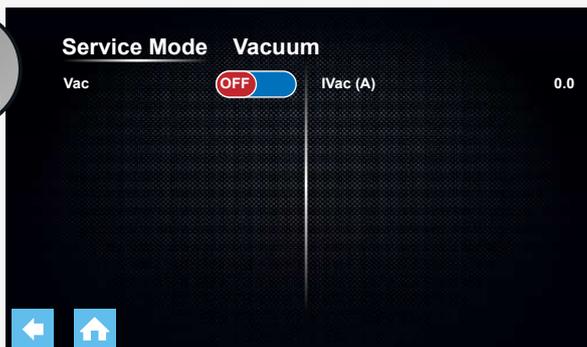
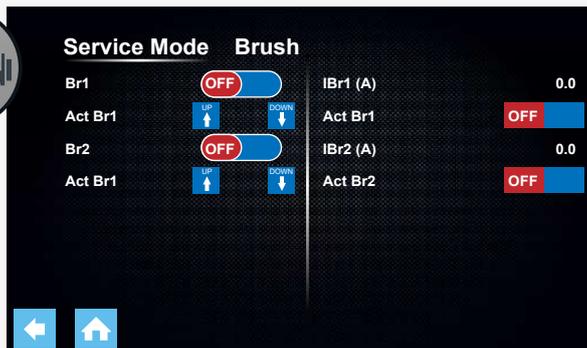
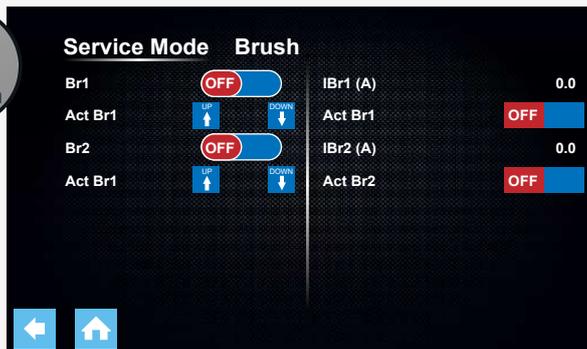
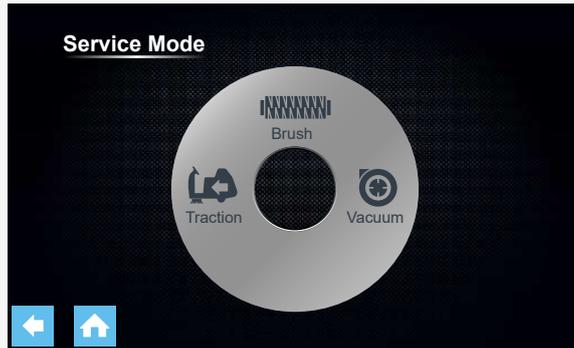
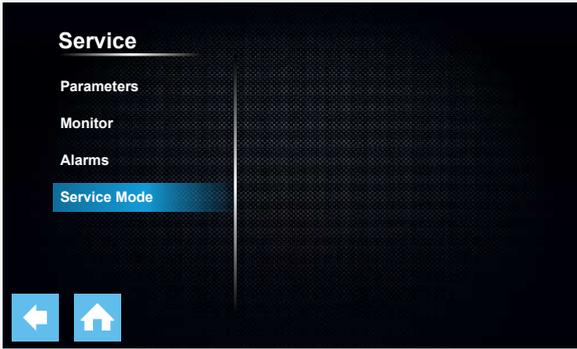
**Service**

HourMeter

Parameters	1 AL_03 Undervoltage	0000.04
Monitor	0	0000.00
Alarms	0	0000.00
Service Mode	0	0000.00
	0	0000.00

Reset

## D. Sub-menu Service Mode



## 3.4 BATTERY AND CHARGERS

### 3.4.1 Location on the machine

The machine is available with a battery charger option. The battery charger is positioned on the rear side of the machine, with immediate access by the operator so as to make the charging operation easy.

When the recharge cycle starts, the red LED flashes once, the yellow LED flashes once and then the green LED flashes to indicate which charging algorithm has been selected. A correct recharge cycle is carried out with the following series of phases.



### 3.4.2 Batteries

The power supply is 24V with one 24V battery in series or two 24V batteries in parallel. The function card converts the voltage value of the batteries into a percentage value. This value is then used for operation as a percentage of charge compared to the maximum capacity. The conversion depends on the battery type (settable by parameter). The following table shows the percentage values as a function of the battery voltage value where  $V_b$  is the voltage read on the battery.

DISPLAY	$V_b$	Pb60	Gel60	Pure Lead	Pb80	Gel80	LITHIUM (*)
100 %	$\geq$	24.3	24.3	24.5	24.3	24.3	25.3
90 %	$\leq$	24.3	24.3	24.5	24.3	24.3	25.3
80 %	$\leq$	24.1	24.0	24.3	24.0	24.0	25.2
70 %	$\leq$	23.5	23.7	24.2	23.5	23.6	25.1
60 %	$\leq$	23.0	23.4	24.1	22.9	23.2	25.0
50 %	$\leq$	22.5	23.1	23.9	22.3	22.8	24.9
40 %	$\leq$	22.1	22.8	23.8	21.7	22.4	24.7
30 %	$\leq$	21.7	22.5	23.6	21.1	22.0	24.5
20 %	$\leq$	21.2	22.2	23.4	20.5	21.6	21.5
10 %	$\leq$	20.8	21.9	23.2	20.1	21.2	21.0
0 %	$\leq$	20.4	21.6	23.0	19.8	20.9	20.6

Alert threshold 1: when the 20% battery level is reached, the brush function is disabled.

Alert threshold 2: when the 10% battery level is reached, the machine switches to transfer mode, regardless of the selected operating mode.

\*) If Lithium is selected, the remaining battery charge is determined directly by the SHUNT; in case of communication failure between SHUNT and Function Card, alarm 24 appears for 10 seconds, afterwards the battery charge calculation is determined with the voltages in the table, it is advisable to check and possibly reprogram the SHUNT.

### 3.4.3 Battery charger

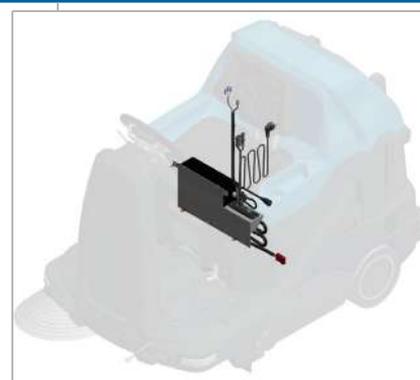
The battery charger is located on the rear side of the machine and is easily accessible to the operator. When the recharge cycle starts, the red LED flashes once, the yellow LED flashes once and then the green LED flashes to indicate which charging algorithm has been selected. A correct recharge cycle consists of the following series of phases.

#### Charging cycle

PHASE	LED	DESCRIPTION
A		Depending on the setting of the charging curve (*)
B	 RED	First charging phase
C	 YELLOW	Second charging phase
D	 GREEN	Charge

Check that the battery charger set-up corresponds to the type of battery actually installed on the machine.

(\*) See table of Dip Switch settings.



## Charger Adjustment

To adjust the battery charger, proceed as follows:

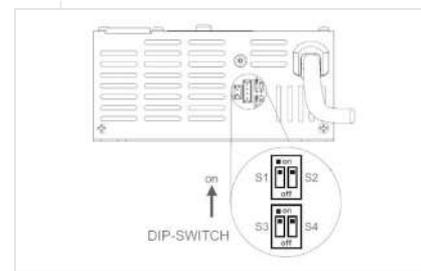
- Remove the battery charger from the machine.
- Set the dip switches inside according to the table below.

The dip switches are divided into pairs.

The top pair refers to DP1 and DP2.

The bottom pair consists of DP3 and DP4.

The table illustrates the setting of the dip switches.



## Dip Switch Setting

DP1	DP2	DP3	DP4	SETUP	STANDARD	LED		
						RED	YELLOW	GREEN
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	IUI0-Wet Generic		●	●	☀
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	IUI0-Wet TJ		●	●	☀☀
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	IUoU-Gel TJ		●	●	☀☀☀
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Iula-Gel ES	*	●	●	☀☀☀☀
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	IUI0-Gel SO		●	●	☀
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	IUI0-Gel Generic		●	●	☀☀
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	IUI0-AGM DI		●	●	☀☀☀
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	IUIa-AGM ES		●	●	☀☀☀☀
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	IUoU-AGM Generic		●	●	☀
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	IUa-Litio DI		●	●	☀☀
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	IUa-Litio ZH		●	●	☀☀☀
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	IUa-Litio Generic		●	●	☀☀☀☀
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	IUIa-Wet Generic		●	●	☀
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	IUIa-Gel Generic		●	●	☀☀
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	IUa-AGM Generic		●	●	☀☀☀
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	REMOTE		--	--	--

### Index

- OFF
- /● ON FIXED
- ☀ BLINKING
- ON
- OFF

## Charger Error Codes

The battery charger is equipped with an alarm signalling system by means of successive flashes of the Yellow LED.

LED FLASHES	DESCRIPTION	SOLUTION
☀	Battery disconnected or polarity reversed or short circuit in output	Check connection to battery
☀☀	Time-out Alarm: defective battery or battery capacity too high	The alarm resets by disconnecting the power supply. If it reappears, consult service
☀☀☀	Defective battery alarm	The alarm is reset by disconnecting the power supply. If it occurs again, consult service.
☀☀☀☀	Over-temperature alarm	The alarm resets itself when the battery charger cools down. Check ventilation.

## Battery charger connectors



1. Battery (-)
2. Battery (+)



1. COM Rel contact
2. NC Rel contact

## 3.4.4 Maintenance and checks

### Electrical system

Controllo (da eseguire dopo 10h di funzionamento dal primo avvio e ogni 150h successivamente)

Check (to be carried out after 10h of operation from initial start-up and every 150h thereafter)

Check the function and correct connection of switches, microswitches, motors, solenoid valves, contactors, relays, power fuses, thermal circuit breakers and battery bridge cables.

Periodically check the condition of electrical connections. To access the electrical system, remove the control panel and the rear protection cover.

### Batteries

Check (to be carried out every 150h)

Check the correct connection of the bridge cable and that the contacts of the battery connection cables are not oxidised.

## 3.5 Sweeping Group

### 3.5.1 Location on the machine

The sweeping unit is located under the machine body.

The sweeping unit consists of:

no. 1 central cylindrical brush();

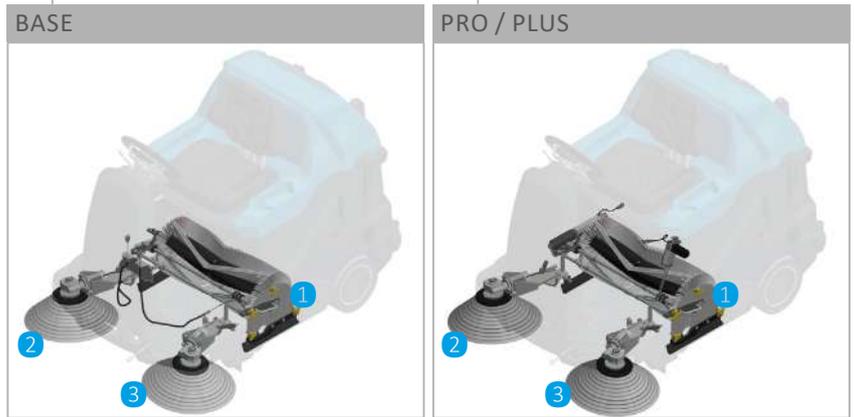
no. 1 right side front brush();

no. 1 left side front brush ( optional).

Brush control, depending on the machine model, is activated as follows:

BASIC version, via levers positioned on the steering column;

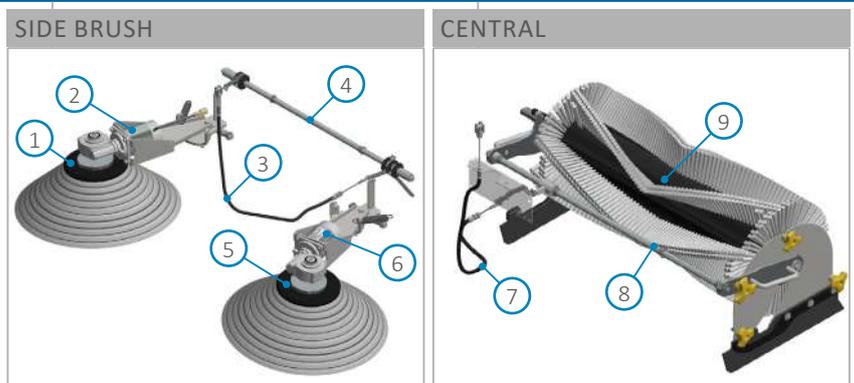
PRO and PLUS versions, by means of jacks operated by the controls on the board that equips the machine (membrane pressure for PRO models, function selection on touch display for PLUS models).



### 3.5.2 Principal components

#### Brush set BASE version

1. Right side disc brush
2. Right side brush pre-assembly
3. Lifting rope for side brushes
4. Lifting bar for side brushes
5. Side brush disc left (optional)
6. Pre-assembly left brush (optional)
7. Lifting strap centre brush
8. Lifting bar centre brush
9. Cylindrical



#### Brush unit PRO / PLUS version

1. Right side disc brush
2. Right side brush pre-assembly
3. Side brush lifting bar
4. Lifting bar for side brushes
5. Side brush disc left (optional)
6. Pre-assembly left brush (optional)
7. Central brush lifting jack
8. Centre brush lifting bar
9. Cylindrical



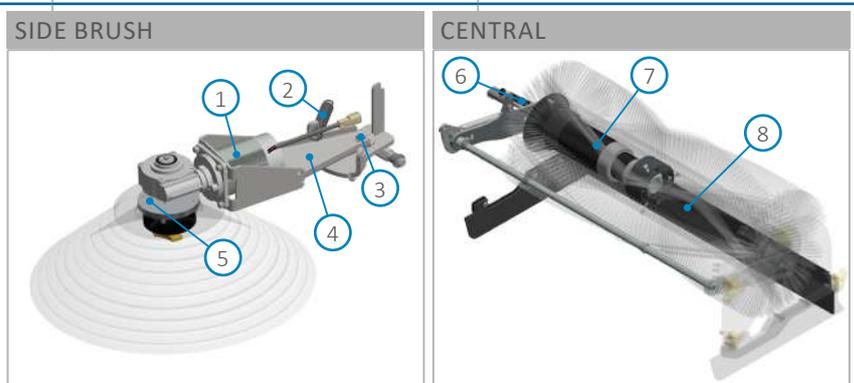
#### Brush assembly

Lateral:

1. Gear motor
2. Traction spring
3. Side brush fulcrum
4. Side brush holder
5. Side disc brush

Centrale:

6. Gas spring
7. Gear motor
8. Side brush



## Lubrication points

Use standard-use grease for lubrication:

- Movement fulcrums
- Bushings
- Sliding seat and drive chain rings
- Junction points

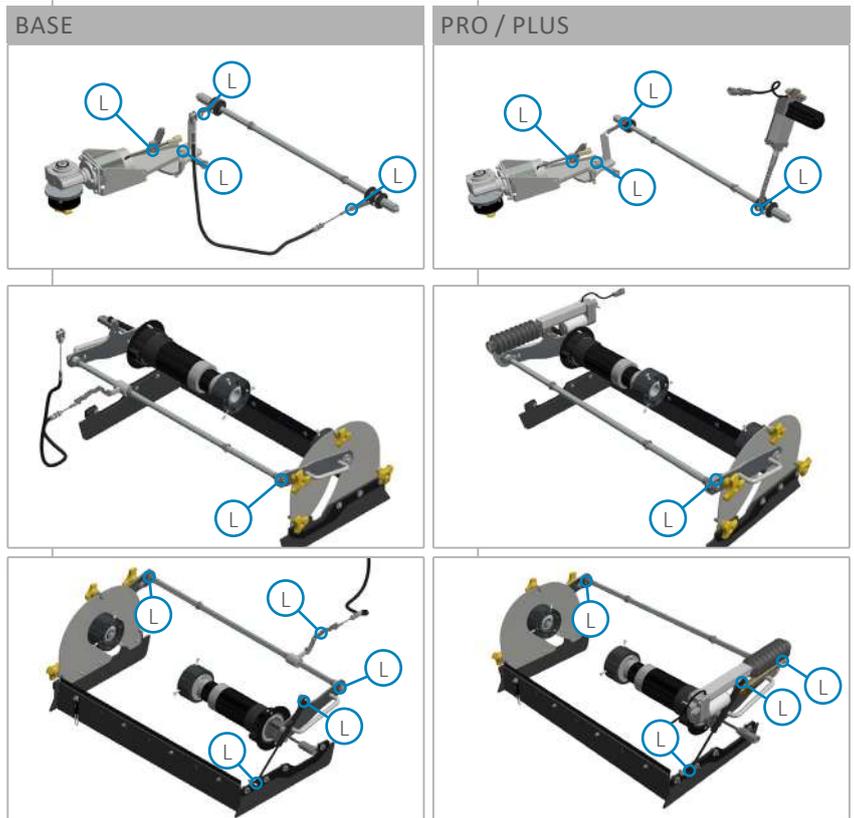
Recommended lubricant

### MINERAL GREASE

PROPERTIES	VALUES	METHOD
Active component	PTFE	
Consistency	NLGI 25°C 2	ASTM D-217
Density	g/cm <sup>3</sup> 25°C 0,899	
Kinematic viscosity	cSt. 100°C 12,1 40°C 154,3	

### SYNTHETIC GREASE

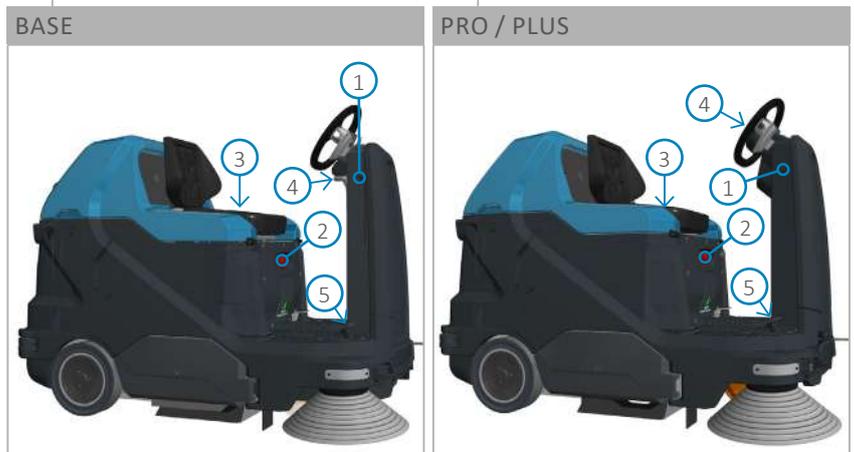
PROPERTIES	VALUES	METHOD
Type of lubricant	PAO	
Consistency	NLGI 25°C 2	ISO 2137
Density	g/cm <sup>3</sup> 20°C 0,9	IPPM-CS/03
Kinematic viscosity	cSt. 100°C 73 40°C 610	ISO 12058



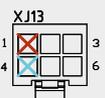
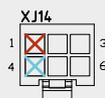
## 3.5.3 Work Requirements

The sweeping unit only works if the following conditions are fulfilled:

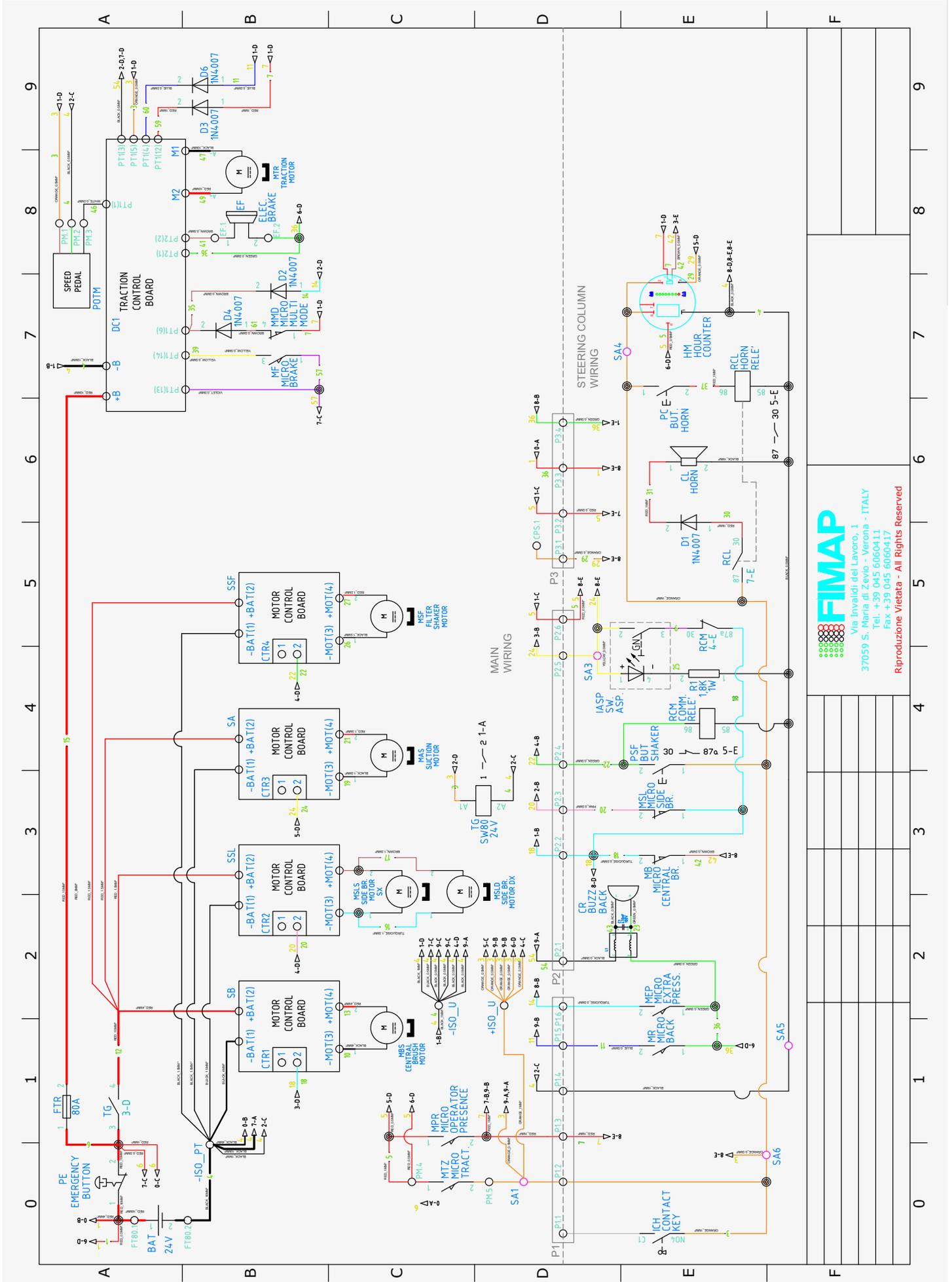
1. The machine is switched on (1).
2. The emergency button is not pressed (2).
3. The batteries are not discharged (3).
4. The seat man presence contact is in the working position (3).
5. The sweeper function controls are activated (4).
6. The drive pedal is depressed (5).
7. The centre stand is lowered.
8. The brake is not activated



FOREWORD	ACTION	RESULT BASIC VERSION	RESULT PRO/PLUS VERSION
Machine ON	CENTRAL ACTUATOR	NOT PRESEN	MOTOR ON [+24V to J14(1) - J14(4)]
Machine ON	CENTRAL BRUSH	MOTOR ON [+24V to MOSFET SB]	MOTOR ON [+24V to XD(1) - XD(2)]
Machine ON	LATERAL ACTUATOR	NOT PRESEN	MOTOR ON [+24V to J13(1) - J13(4)]
Machine ON	LATERAL BRUSH	MOTOR ON [+24V to MOSFET SSL]	MOTOR ON [+24V to J11(14) - J12(4)]
Machine ON	ASPIRATOR	MOTOR ON [+24V to MOSFET SA]	MOTOR ON [+24V to XE(1) - XE(2)]
Machine ON	FILTER SHAKER	MOTOR ON [+24V to MOSFET SSF]	MOTOR ON [+24V to J8(2) - J8(4)]

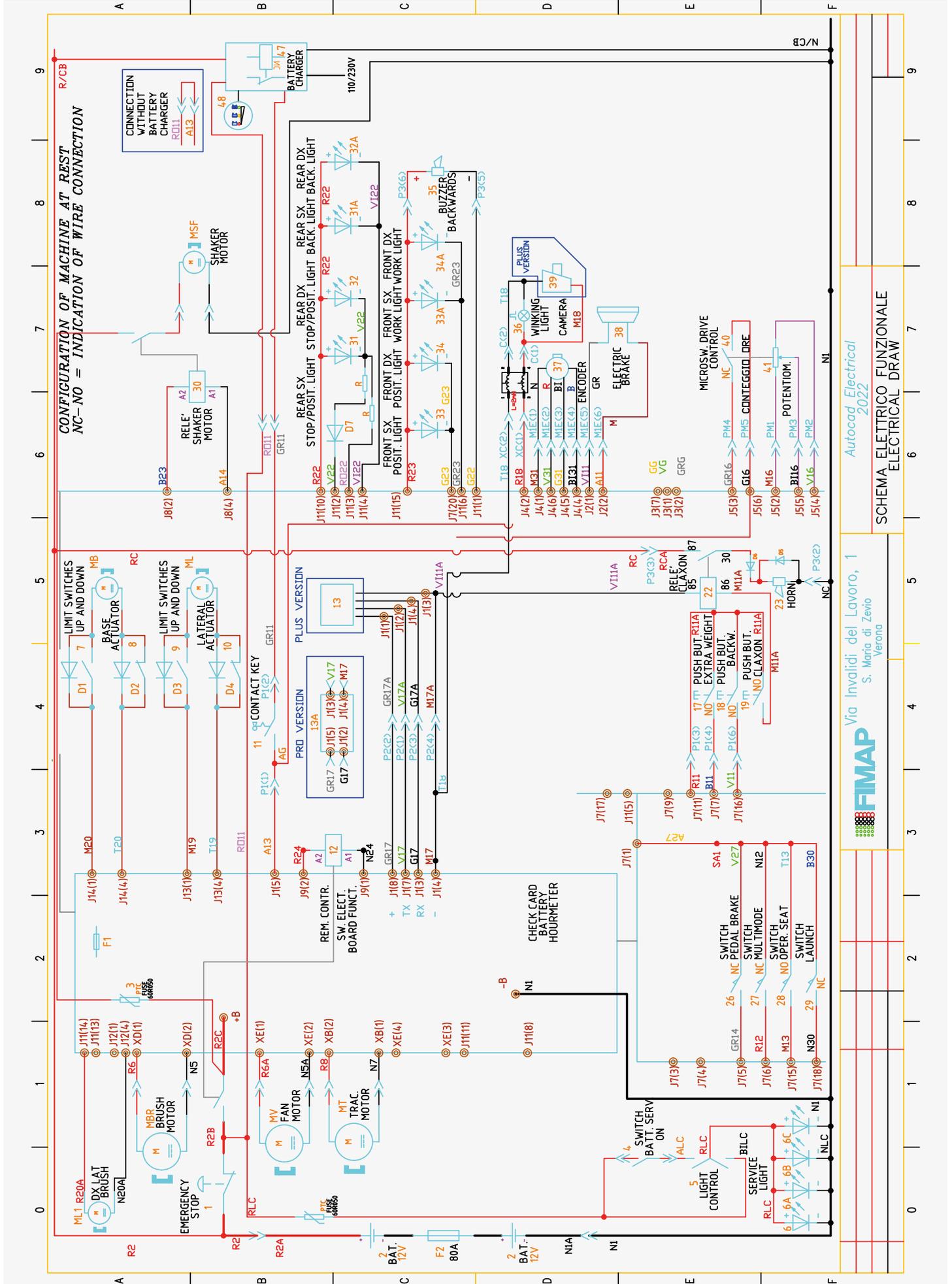


## BASE Functional Scheme



**FIMAP**  
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 Tel. +39 045 6060411  
 Fax +39 045 6060417  
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## PRO /PLUS Functional Scheme



Autocad Electrical  
 2022

Via Invalidi del Lavoro, 1  
 S. Maria di Zevio  
 Verona

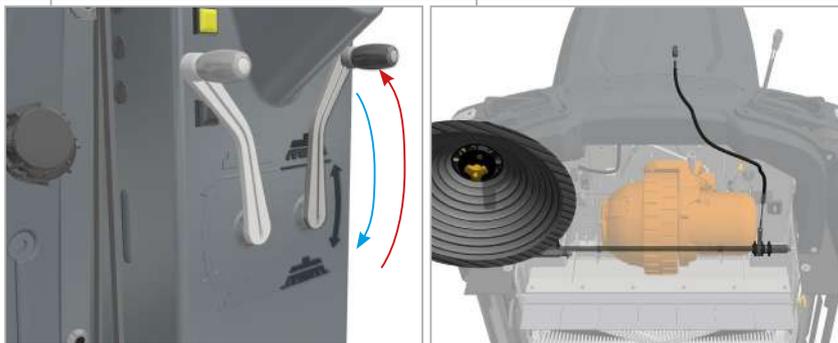


SCHEMA ELETRICO FUNZIONALE  
 ELECTRICAL DRAW

## 3.5.4 Regulations

### Side brush levers BASIC version

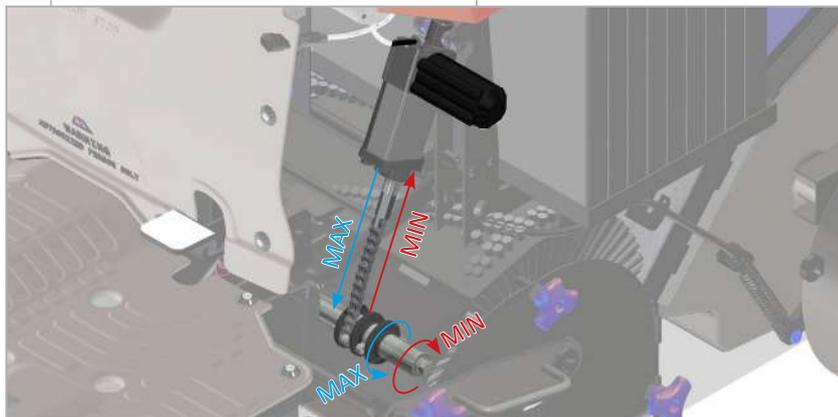
In the base version, a steel rod is used to position the side brush on the ground, operated by the special lever inserted in the steering column.



### Side brush actuator PRO/PLUS version

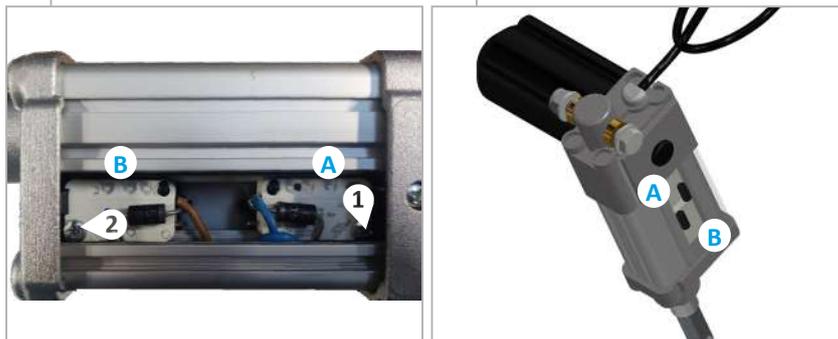
The jack for setting the side brush(s) has two adjustments which can be summarised as follows:

1. adjustment at end stop/rest (depicted as min. in red);
2. adjustment to maximum jack extension or working extension (depicted as max. in blue).



### ATTENTION

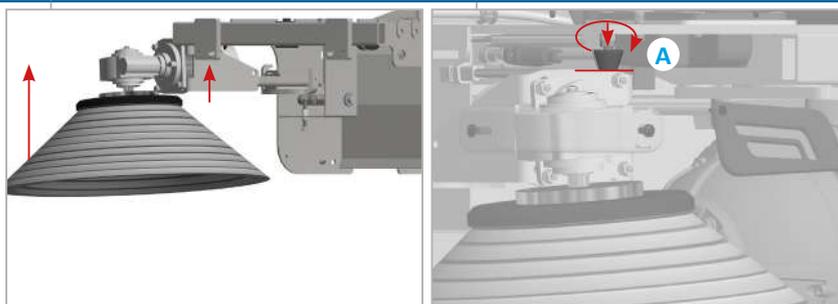
to change the setting or re-set the microswitches (A/B) act on screws 1 and 2, according to the limit switches defined below.



### Lateral brush stroke end

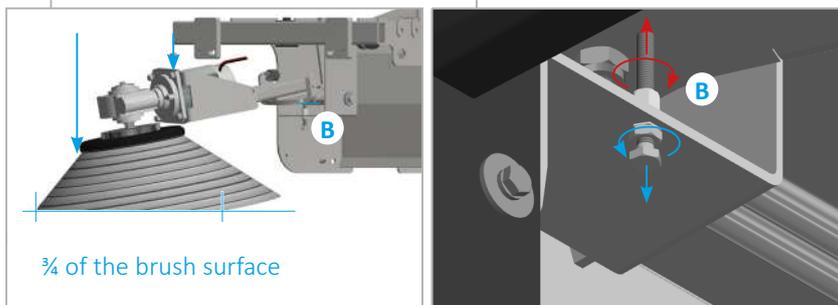
#### STROKE END / REST

Having brought the actuator to rest, with the sweeping unit raised and firmly adhered to the chassis we will tighten on the locking spacer inserted in the chassis (A).



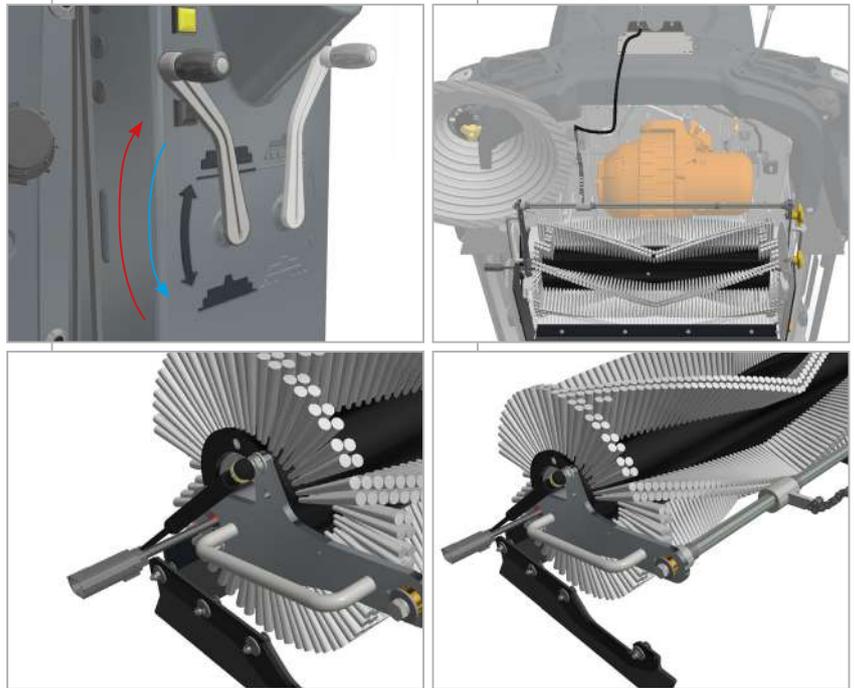
#### MAX EXTENTION/WORK

Once the brush has been placed on the ground so that  $\frac{3}{4}$  of the brush surface is adhered to the ground, we will adjust the brush position by adjusting the appropriate clamping screw (B).



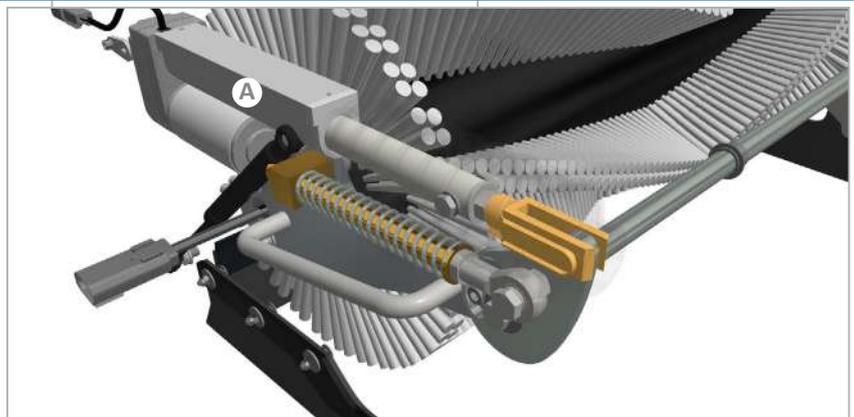
## Central brush lever BASE version

In the base version, a steel rod operated by the special lever inserted in the steering column is used to position the central brush on the ground.



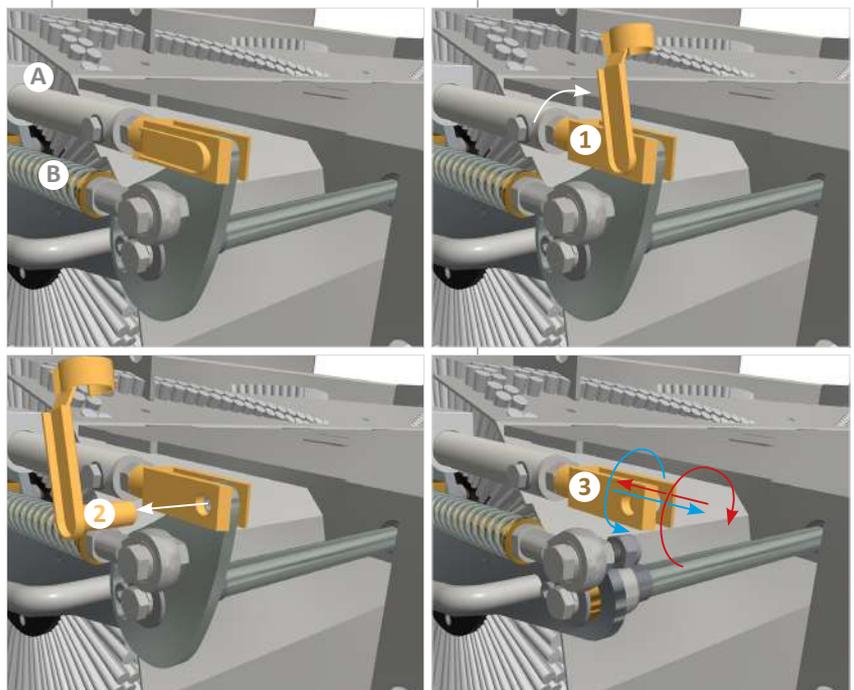
## Centre brush actuator PRO/PLUS version

The centre brush actuator is located on the right side of the machine under the operator seat shell.



After removing the rubber actuator cover, proceed as follows for adjustment:

1. tighten the anchor pin;
2. extract the pin;
3. act on the pin as required to move the action on the centre brush bar away or closer.

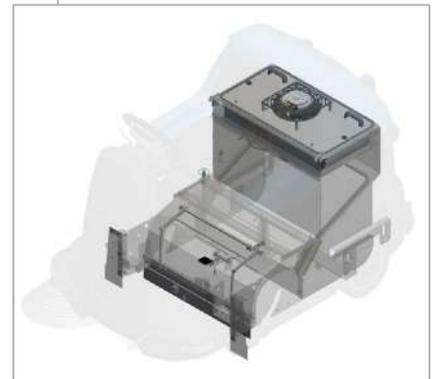


In versions with actuator (A), spring B can manage an automatic pressure controlled directly from the function board.

## 3.6 Suction Group

### 3.6.1 Location on the machine

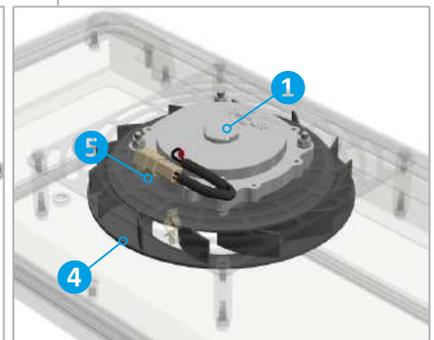
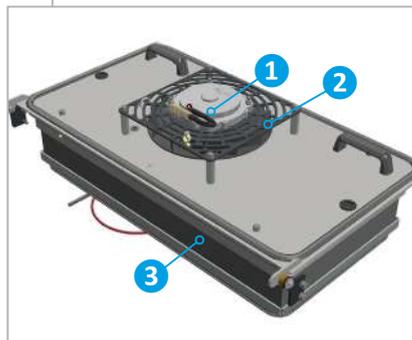
The suction unit is located behind the driver's seat.  
The suction unit control is activated by the operator when he activates one of the sweeping bodies.



### 3.6.2 Main components

#### Motor unit

1. Suction motor;
2. Motor mounting plate;
3. Filter press chassis;
4. Fan;
5. Connector.



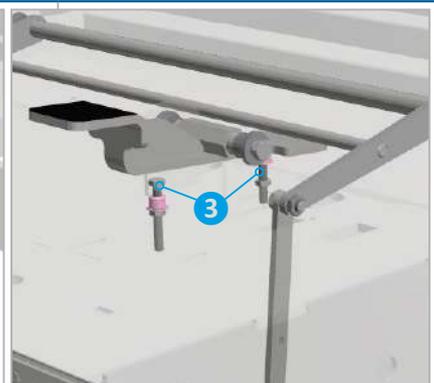
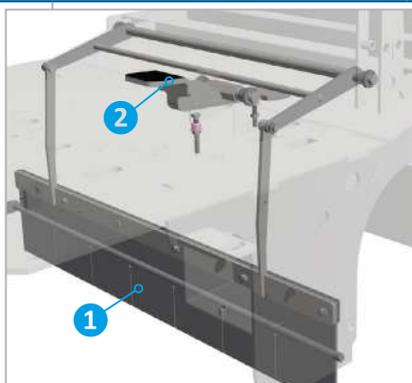
#### Filter shaker assembly

1. Vibro-shaker;
2. Filter shaker support;
3. Filter.



#### Front flap assembly

1. Flap
2. Flap lift pedal
3. Adjustment clamps



#### Hepa filter

1. Suction motor;
2. Hepa filter.



## Lubrication points

Use standard-use grease for lubrication.

- Movement fulcrums;
- junction points;
- bushings;
- slide seat and drive chain rings.



## Recommended lubricant

### MINERAL GREASE

PROPERTIES	VALUES	METHOD
Active component	PTFE	
Consistency	NLGI 25°C 2	ASTM D-217
Density	g/cm <sup>3</sup> 25°C 0,899	
Kinematic viscosity	cSt. 100°C 12,1 40°C 154,3	

### SYSNTHETIC GREASE

PROPERTIES	VALUES	METHOD
Type of lubricant	PAO	
Consistency	NLGI 25°C 2	ISO 2137
Density	g/cm <sup>3</sup> 20°C 0,9	IPPM-CS/03
Kinematic viscosity	cSt. 100°C 73 40°C 610	ISO 12058

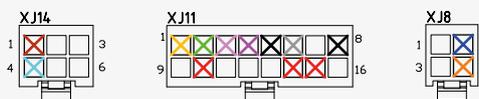
## 3.6.3 Work requirements

The suction unit only works if the following conditions are fulfilled:

1. The machine is switched on (1).
2. The emergency button is not pressed (2).
3. The batteries are not discharged (3).
4. The seat man presence contact is in the working position (3).
5. The sweeper function controls are activated (4).
6. The drive pedal is pressed (5).
7. The centre stand is down.
8. The brake is not activated

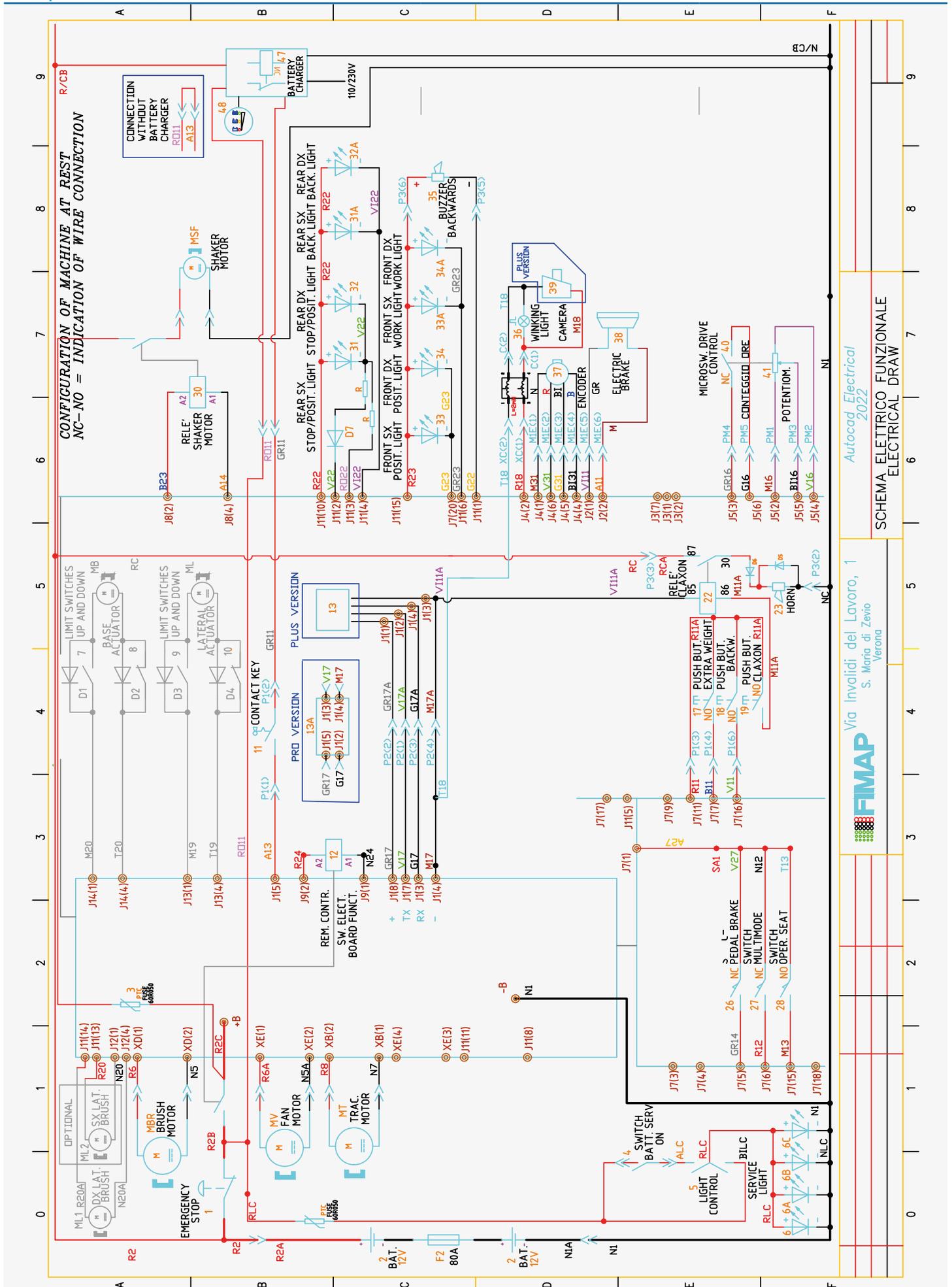


PREMISE	ACTION	BASE VERSION RESULT	PRO/PLUS VERSION RESULT
MACHINE ON	CENTRAL ACTUATOR	NOT PRESENT	MOTOR ON [+24V to J14(1) - J14(4)]
MACHINE ON	CENTRAL BRUSH	MOTOR ON [+24V to MOSFET SB]	MOTOR ON [+24V to XD(1) - XD(2)]
MACHINE ON	ASPIRATOR	MOTOR ON [+24V to MOSFET SA]	MOTOR ON [+24V to XE(1) - XE(2)]
MACHINE ON	FILTER SHAKER	MOTOR ON [+24V to MOSFET SSF]	MOTOR ON [+24V to J8(2) - J8(4)]





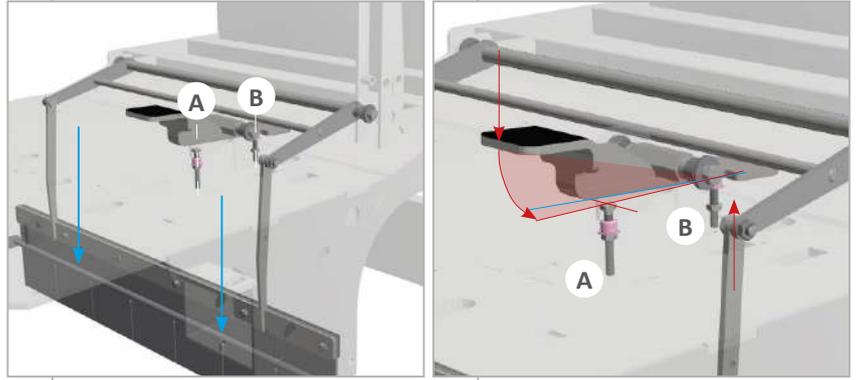
## PRO / PLUS Functional Scheme



### 3.6.4 Regulations

#### FLAP lifting pedal

The flap is normally in the working position (front tyre resting on the ground).  
The flap is adjusted using the two clamps A and B.



### 3.6.5 Vacuum cleaner kit

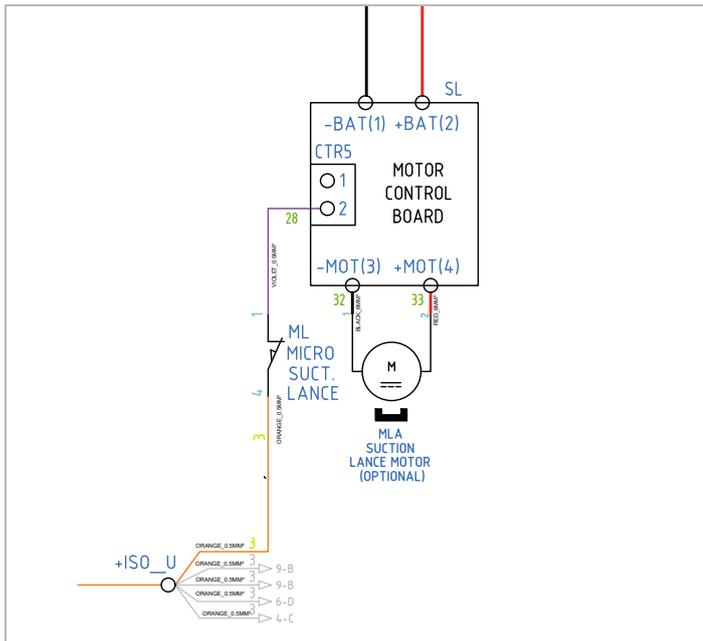
An on-board vacuum cleaner kit can be fitted to FSR7 sweepers.

There are two kits:

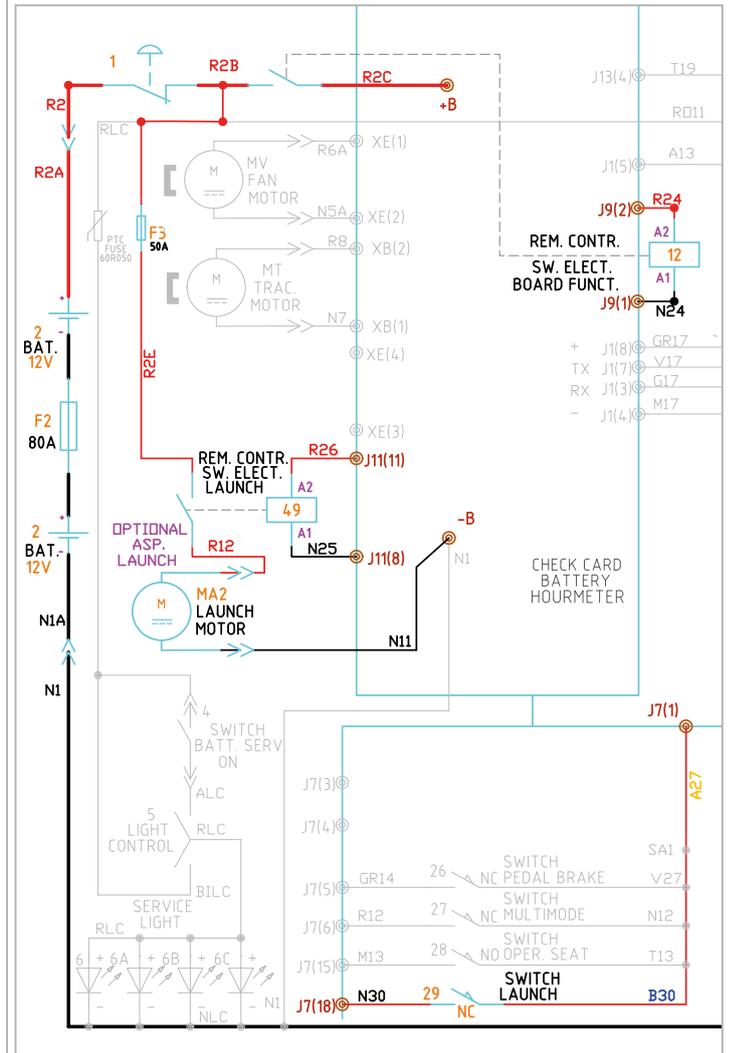
1. VACUUM CLEANER KIT model FSR7 BASIC (code 232912);
2. VACUUM CLEANER KIT model FSR7 PRO/PLUS (code 232182).



VACUUM CLEANER KIT model FSR7 BASIC (code 232912)



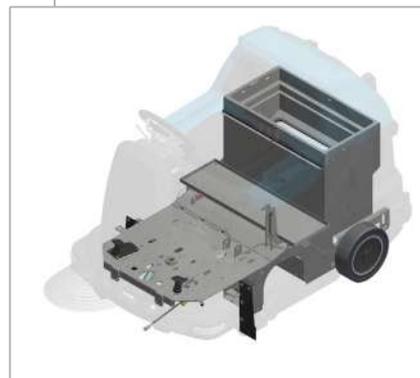
VACUUM CLEANER KIT model FSR7 PRO/PLUS (code 232182)



## 3.7 Traction and Chassis Group

### 3.7.1 Location on the machine

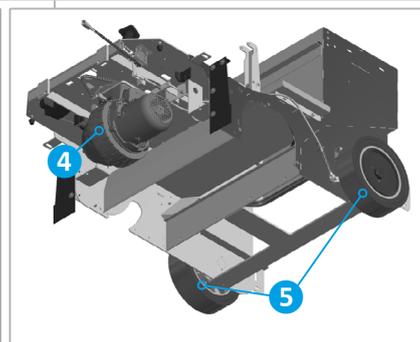
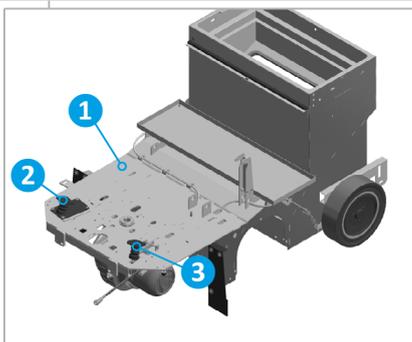
The chassis and traction unit is located at the bottom of the machine. The control is activated by the operator.



### 3.7.2 Principal components

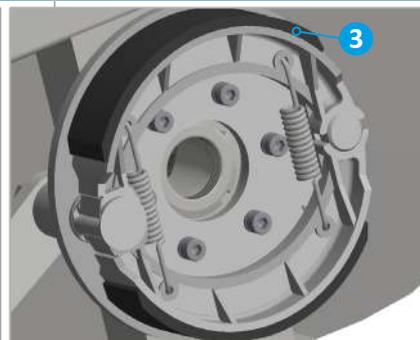
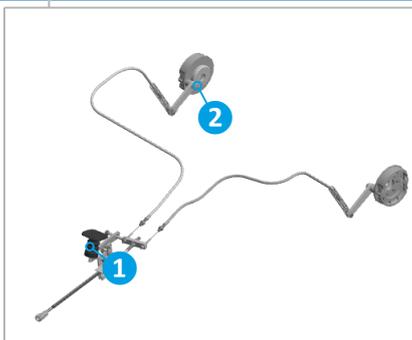
#### Chassis Group

1. Chassis;
2. Accelerator pedal;
3. Brake pedal;
4. Motor wheel;
5. Rear wheels.



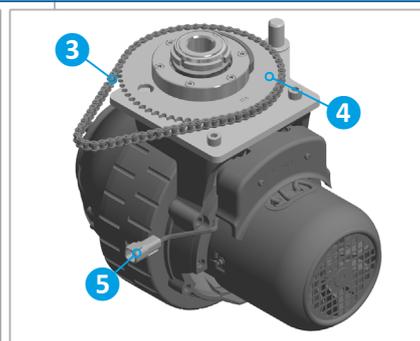
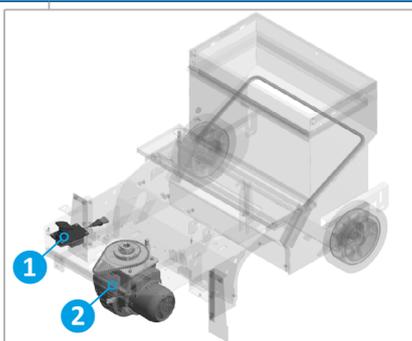
#### Brake System Assembly

1. Brake pedal;
2. Brake assembly;
3. Brake shoes;



#### Drive unit

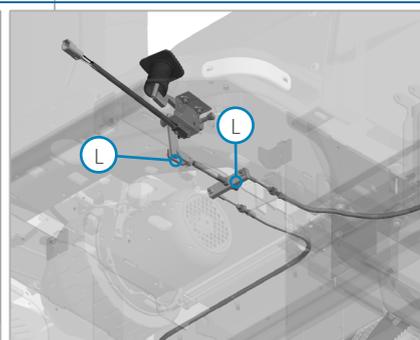
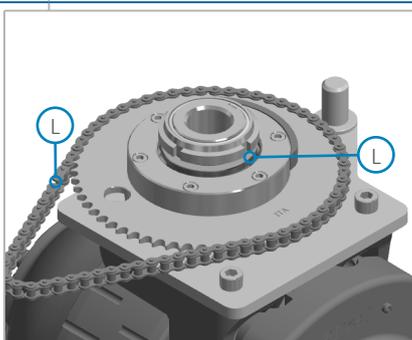
1. Accelerator pedal
2. Wheel motor
3. Roller chain
4. Bearing bracket + crown wheel
5. Connector



#### Lubrication points

Use standard-use grease for lubricatio.

- Movement fulcrums;
- junction points;
- bushings;
- slide seat and drive chain rings.



## Recommended lubricant

### MINERAL GREASE

PROPERTIES	VALUES	METHOD
Active component	PTFE	
Consistency	NLGI 25°C 2	ASTM D-217
Density	g/cm <sup>3</sup> 25°C 0,899	
Kinematic viscosity	cSt. 100°C 12,1 40°C 154,3	

### SYSNTHETIC GREASE

PROPERTIES	VALUES	METHOD
Type of lubricant	PAO	
Consistency	NLGI 25°C 2	ISO 2137
Density	g/cm <sup>3</sup> 20°C 0,9	IPPM-CS/03
Kinematic viscosity	cSt. 100°C 73 40°C 610	ISO 12058

## 3.7.3 Work requirements

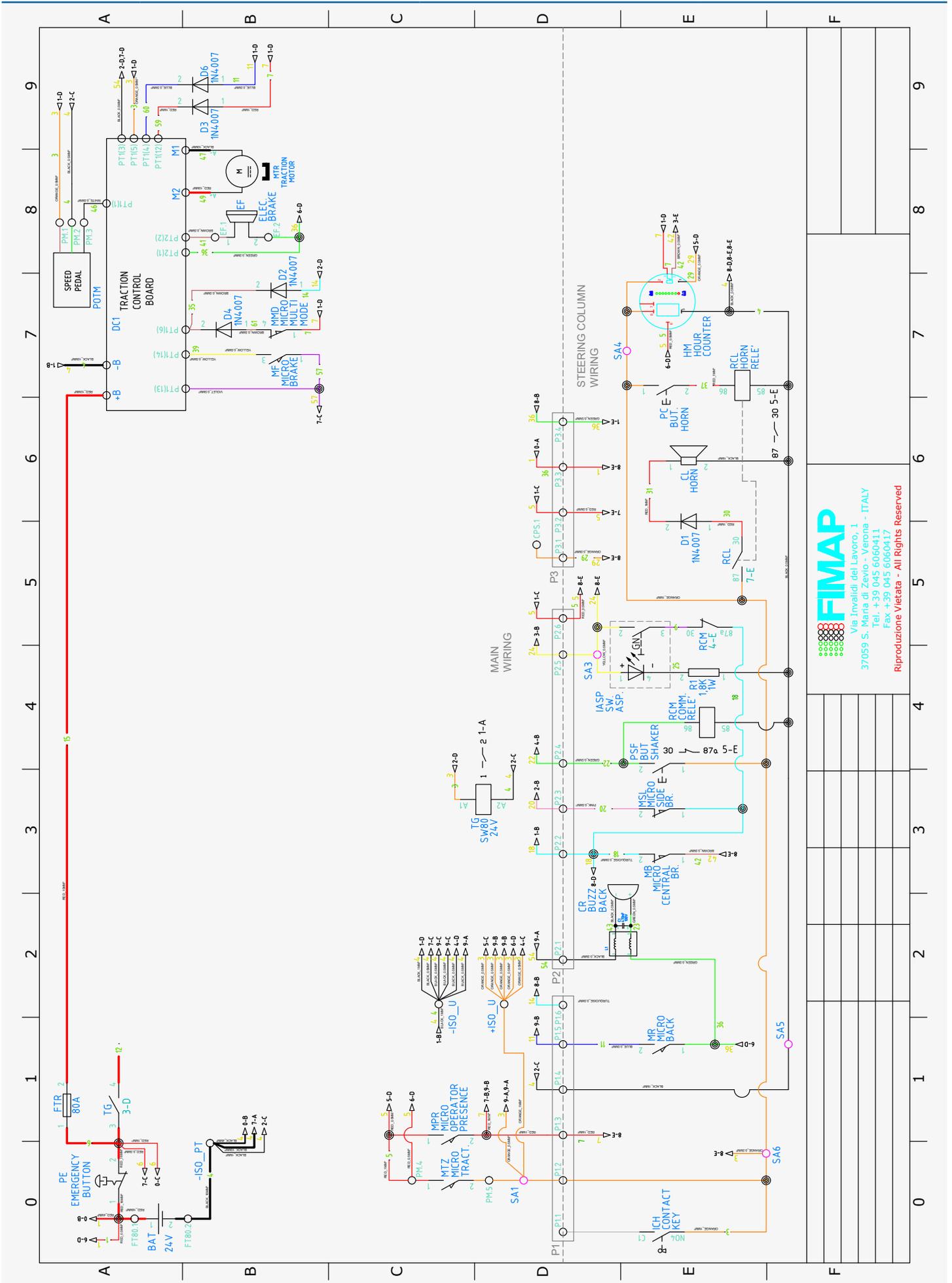
The traction unit only works if the following conditions are fulfilled:

1. The machine is switched on (1).
2. The emergency button is not pressed (2).
3. The batteries are not discharged (3).
4. The seat man presence contact is in the working position (3).
5. The drive pedal is depressed (4).
6. The brake is not activated.

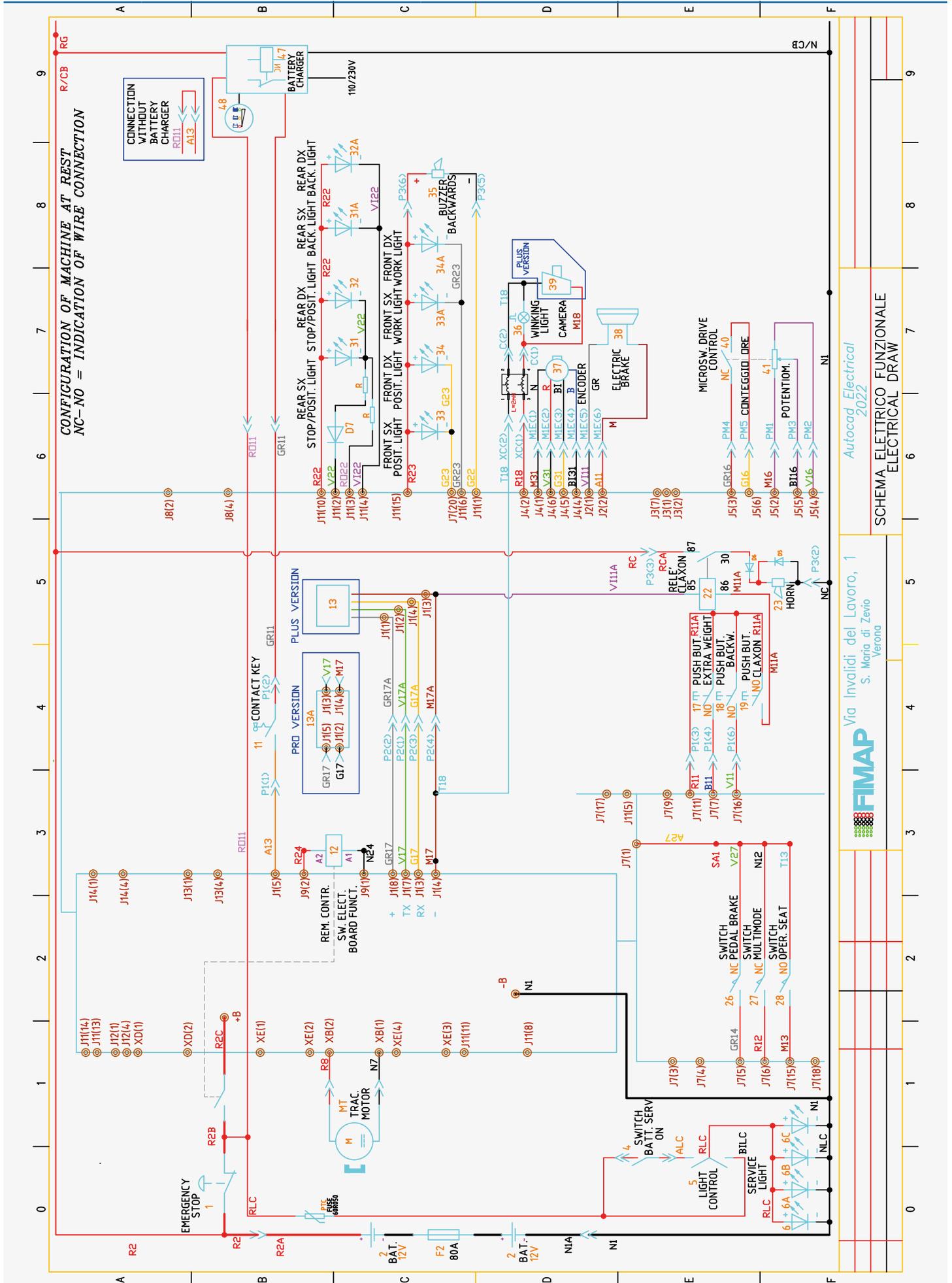


PREMISE	ACTION	BASE VERSION RESULT	PRO/PLUS VERSION RESULT
MACHINE ON	ACCELERATOR PEDAL PRESSED	MOTOR ON [24V to M1- M2]	MOTOR ON [24V to XB(1)- XB(2)]
MACHINE ON	ACCELERATOR PEDAL PRESSED	--	ENCODER [J4(1)- J4(4)- J4(5)- J4(6)]
MACHINE ON	ACCELERATOR PEDAL PRESSED	ELECTROBRAKE ON [24V to PT2(1)- PT2(2)]	ELECTROBRAKE ON [24V to J2(1) - J2(2)]

## Functional diagram BASE version



## Functional diagram PRO / PLUS version



Autocad Electrical  
 2022  
 SCHEMA ELETTRICO FUNZIONALE  
 ELECTRICAL DRAW

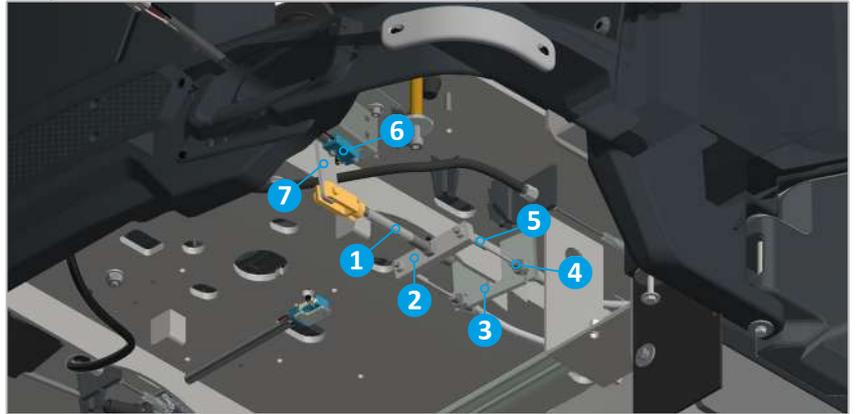
Via Invalidi del Lavoro, 1  
 S. Maria di Zevio  
 Verona



## 3.7.4 Regulations

### Brake system clamps

1. Tie rod for sway bar;
2. Foot brake sling bar;
3. Brake rod clamping bracket;
4. Brake Clamping
5. Brake terminal with threaded rod;
6. Foot brake microswitch;
7. Brake pedal return.

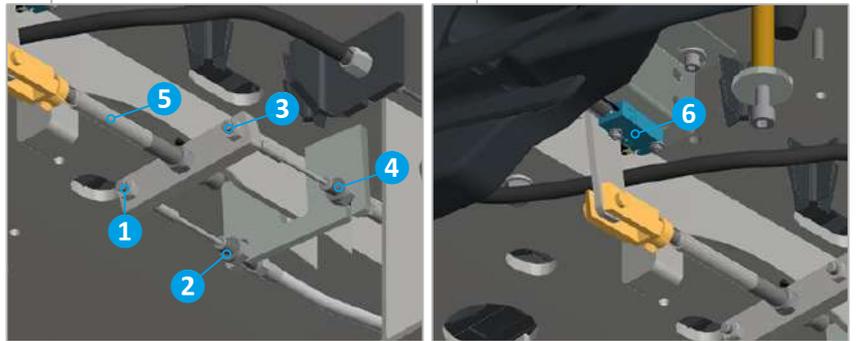


### Foot Brake Slingbar

Adjust the rocker arm by turning screws 2 and 4 so that the distance from the tie rod clamp bracket is equidistant over the entire length of the rocker arm.

### Adjusting the Braking

Act on nuts 1 and 3 and the rocker arm (5) so that there is no play on the brake pedal. Check that the brake micro (6) closes the contact as soon as the pedal is depressed.



## SECTION 4 - CONSUMABLES AND STOCK MATERIALS

### 4.1 CONSUMABLES

CODE	Q.TY	DESCRIPTION	BASE	PRO	PLUS
456985	1	CYLINDRICAL BRUSH Ø300X683 PPL 0,3/0,7	☐	☐	☐
459783	1	CYLINDRICAL BRUSH Ø300X683 PPL 0,7/1,1	☐	☐	☐
456984	1	CYLINDRICAL BRUSH Ø300X688 MISTO ACC.	☐	☐	☐
457570	1	CYLINDRICAL BRUSH Ø300x688 TAMPICO	☐	☐	☐
457641	1	LATERAL DISC BRUSH Ø460 (PPL 0,7)	☐	☐	☐
429206	1	LATERAL DISC BRUSH Ø460 (PPL 1)	☐	☐	☐
429205	1	LATERAL DISC BRUSH Ø460 (PPL 1,1 + ACC. 0,7)	☐	☐	☐
457571	1	LATERAL DISC BRUSH Ø460 (TAMPIC + BRONZE)	☐	☐	☐
456807	2	DUST PROTECTION RUBBER	☐	☐	☐
456828	1	FILTER PANEL L=635 P=320 H=80 (FILTER PAPER)	☐	☐	☐
457277	1	FILTER PANEL L=635 P=320 H=80 (POLYESTER)	☐	☐	☐
456923	1	FRONT FLAP RUBBER	☐	☐	☐
456865	1	CLOTH BAG FILTER	☐	☐	☐
457471	1	TETRATEX BAG FILTER	☐	☐	☐
457474	2	ALL. SPRAYEX FILTER 295X275X15 FSR7	☐	☐	☐
446376	1	FILTER BAG FV9+ (HEPA)	☐	☐	☐
442806	1	NANO INLET SPONGE FILTER	☐	☐	☐
456967	1	HEPA FILTER 474x145x32	☐	☐	☐

### 4.2 STOCK MATERIALS (RECOMMENDED)

The table below is intended as a suggestion on the minimum quantity of spare parts to be purchased and to be kept in stock. It is to be considered as entirely indicative and does not take into consideration the type of site where the machine usually works.

On the basis of the "Number of machines" followed, we will multiply the indicative Index to the quantity existing in the "Stock materials" table.

No. of machines	Indice In.
1	1
10	2
25	3
50	4

*Example of the use of the table for the calculation of Stock Materials:*

The number of machines maintained are 12, the Indicative Reference Index 2:

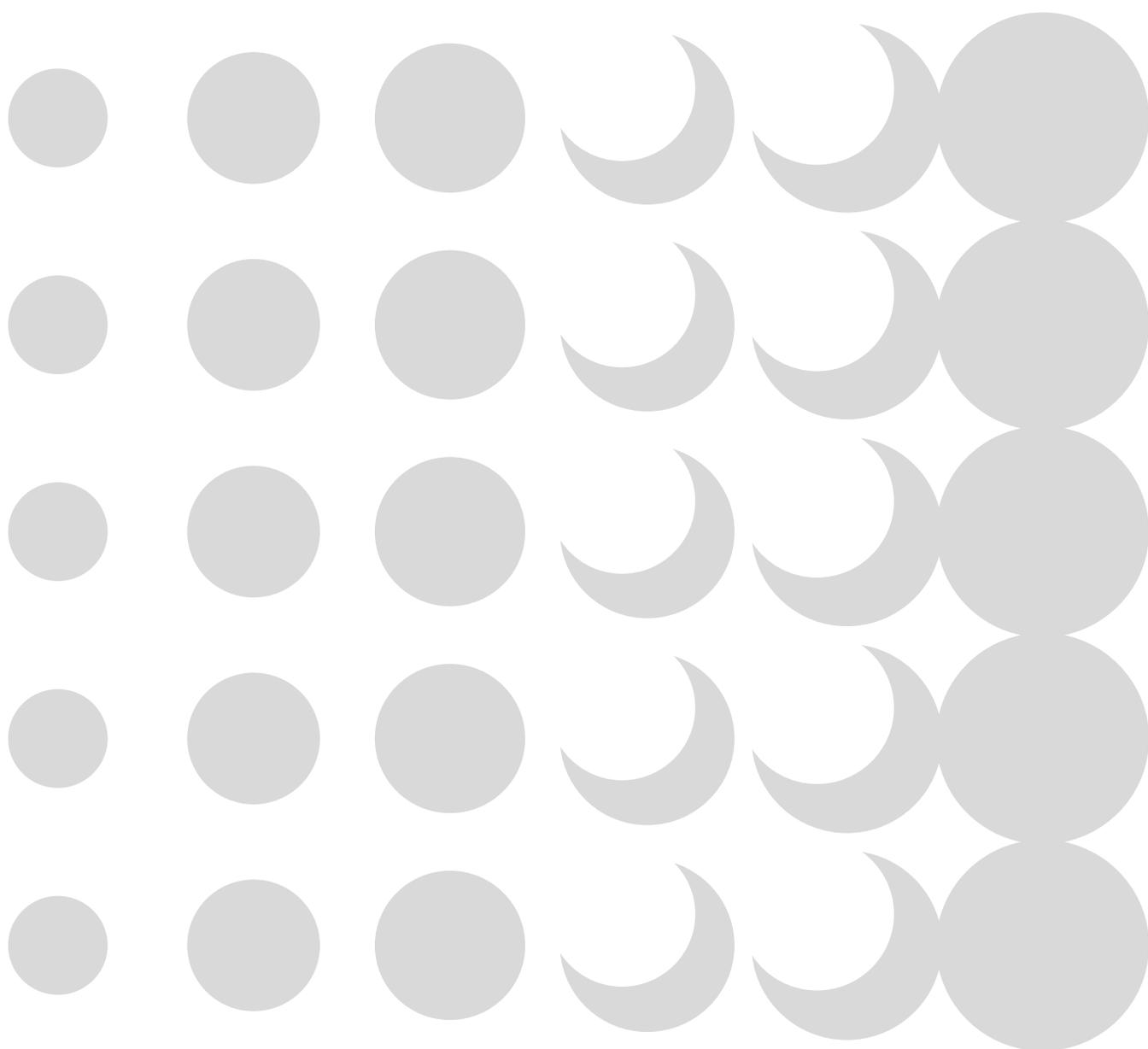
No. of machines	Indice In.
1	1
10	2
25	3
50	4

how many 'FRONT FLAP RUBBER' should the maintainer have in stock?

CODE	Q.TY	DESCRIPTION	BASE	PRO	PLUS
456807	2	DUST COVER RUBBER	☐	☐	☐
457277	1	PANEL FILTER L=635 P=320 H=80 (FILTERING PAPER)	☐	☐	☐
457277	1	PANEL FILTER L=635 P=320 H=80 (POLYESTER)	☐	☐	☐
456923	1	FRONT FLAP RUBBER	☐	☐	☐
456865	1	TETRATEX BAG FILTER	☐	☐	☐
457471	1	FILTRO A SACCHE IN TETRATEX	☐	☐	☐
457474	2	SPRAYEX FILTER 295X275X15	☐	☐	☐
446376	1	FILTER BAG FV9+ (HEPA)	☐	☐	☐
442806	1	NANO INLET SPONGE FILTER	☐	☐	☐

If you consult the "Stock materials" table, the quantities are 2, so the "FRONT FLAP RUBBER" that we recommend you have in stock are 2.





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Tel. +39 045 6060411 - Fax +39 045 6060417