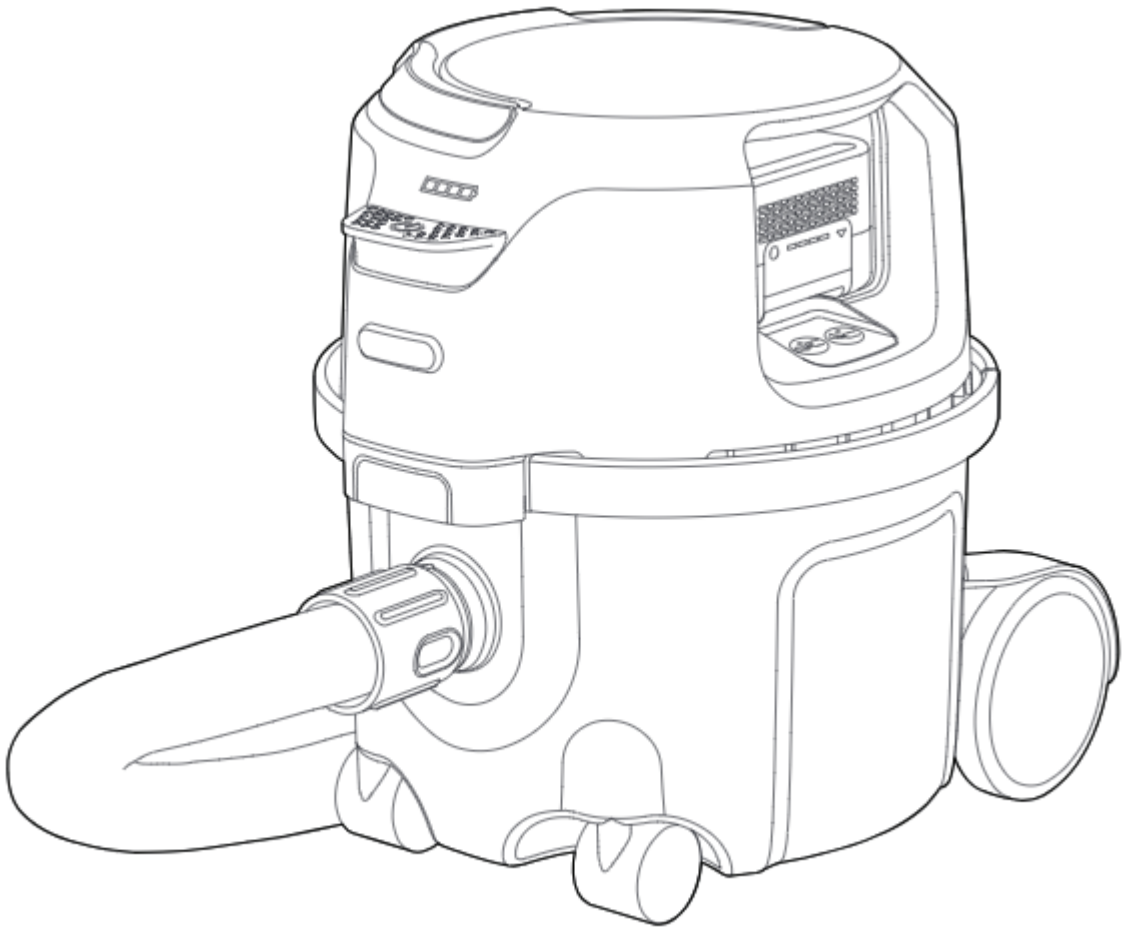
SERVICE MANUAL

VP 500



NILFISK

Preface

This service manual contains detailed description of the main repair work on the VP 500

Repair work requires a suitable testing workplace with the necessary power supply.

If operating errors are evident, refer the customer to the operating instructions.

A fault in the equipment can have several causes as described in the section on troubleshooting.

Refer to the illustrated spare parts lists during repairs. They show the assembly position and the sequence in which the individual components should be assembled.

See ”Technical Service Bulletin” (TSB) sheets. They include information on technical

modifications that have been made after this repair manual was printed.

”Technical Service Bulletin” sheets are also valid as a supplement to the spare parts list until publication of a new edition.

Repair manuals and ” Technical Service Bulletin” sheets should be available at the site

where repairs are carried out.

It is not permitted to give them to third parties.

Use original Nilfisk spare parts only.

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For your own safety!

Before using the cleaner, always read the operating instructions and keep them
readily available.

Only allow the vacuum cleaner to be used by persons who have been trained in its use and who have been explicitly authorized to use it.

Repairs should only be made by someone who has received proper instructions for the job or who is a qualified electrician.

After the repair or modification an electrical examination is to be performed according to EN 62638

Observe national safety directives and regulations for the electrical engineering trade, in particular:

EN 60335-2-69:2012

IEC 60335-1:2020 (Ed.6)

EN 60335-1:2012+A11:2014+A13:2017
+A1:2019+A14:2019+A2:2019+A15:2021

EMC Directive 2014/30/EU

EN 55014-1:2021

EN 55014-2:2021

EN 63000:2018

RoHS Directive 2011/65/EU

WEEE Directive 2012/19/EU

REACH Regulation 1907/2006/EC

Battery Directive 2006/66/EC

POP Regulation 2019/1021/EU

DIN VDE 105 Part 1:

Operation of power Installation.

EN 62638:

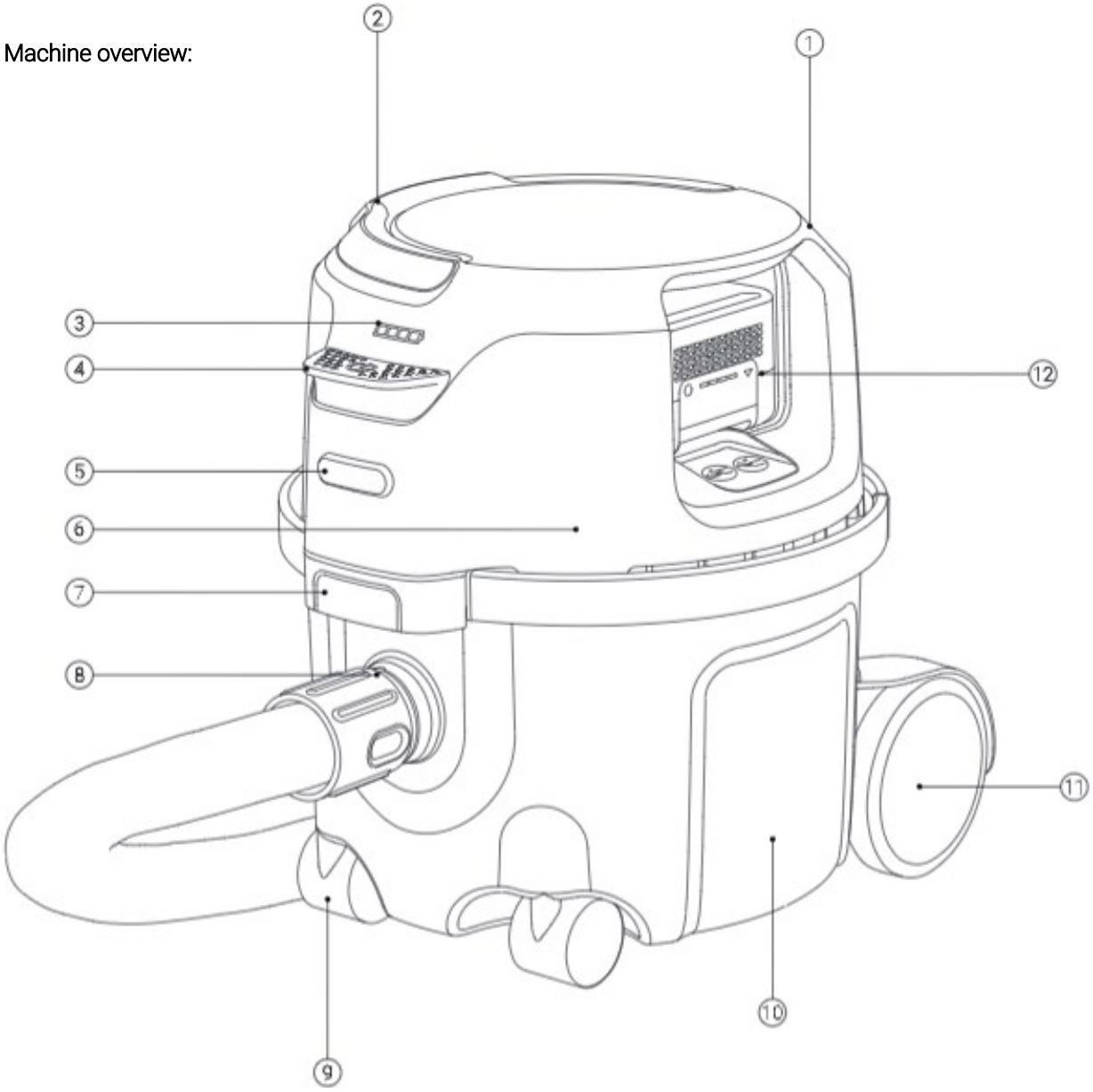
Repairing, modifying and testing electrical installations.

Technical data

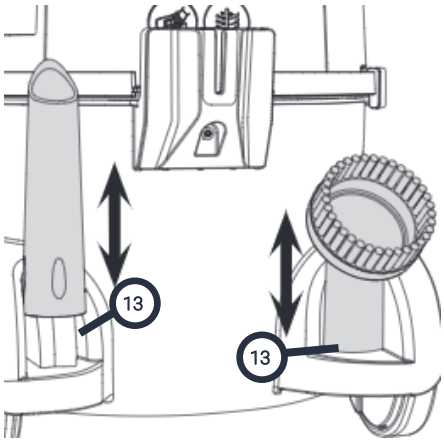
B

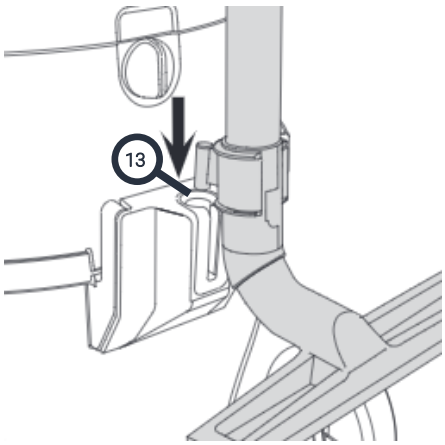
		VP500		
Basic specs:		36V		
Item number:				
Battery voltage	V	36		
Rated power	w/H.P.	500 / 0.67		
Protection grade (dust,moist)		IP20		
Protection class (electrical)				
Max. Airflow. End of tube	l/s/cmf	29 / 61.4		
Vacum at nozzle	kPa	21		
Suction power. End of tube	W / H.P.	190 / 0,255		
Sound level @2m	dB/A	52		
Sound Pressure Level L_{PA} (IEC 60335-2-69)	db(A)	57		
Sound Pover Level L_{wa} (IEC 60335-2-69)	db(A)	70		
Vibration	m/s^2	≤ 2,5		
Run time up to: NBP60 / NBP100*	min	30 (55) / 50 (90)		
Main filter type*	Class	HEPA / Standard filter		
HEPA filter surface area*	Cm² / inch²	2400 / 372		
Weight machine	Kg / lb	5 / 11.02		
Container volume	L / gal	10 / 2.64		
Dimensions (LxWxH)	mm / inch	398x340x395 / 15.66x13.38x15.55		
* Model dependent.				

Machine overview:

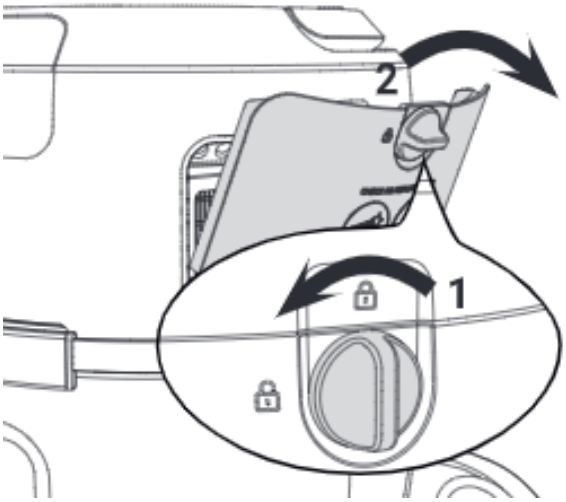


1. Main filter cover
2. Handle
3. Power indicator
4. Power switch on/off
5. Speed mode. Only selected models
6. Motorhead
7. Latch for lock of container.
8. Hose
9. Castor wheel
10. Container
11. Wheel
12. Battery storage
13. Accessory holder

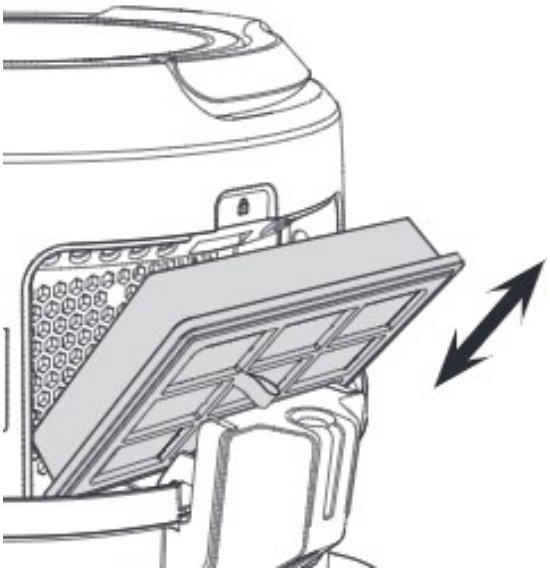




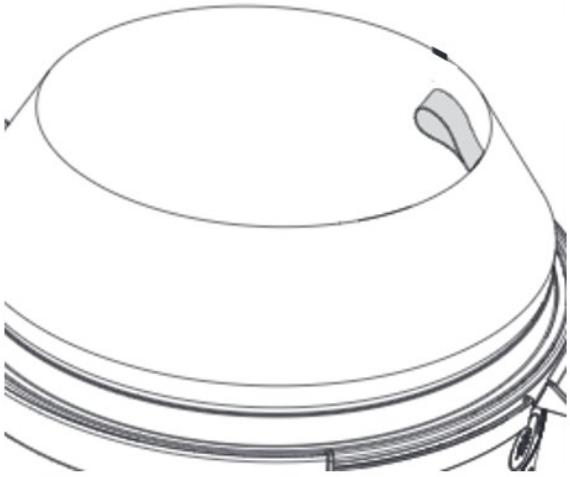
Machine overview:



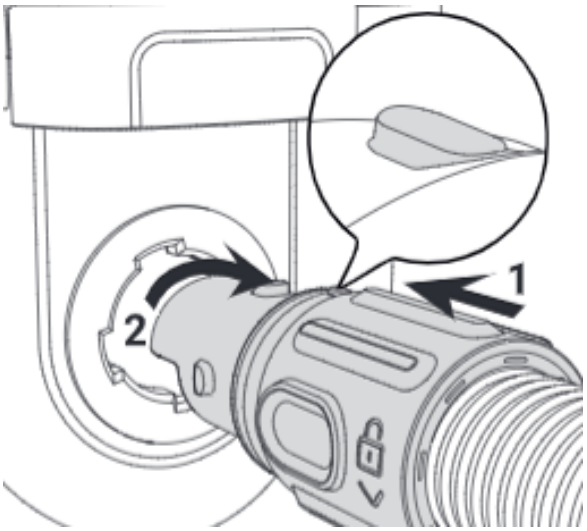
HEPA filter cover with lock



HEPA filter

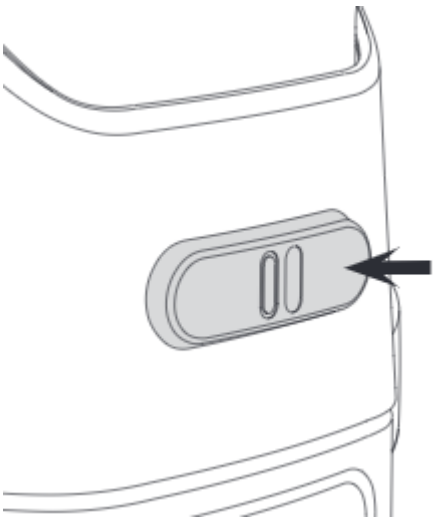


Main filter



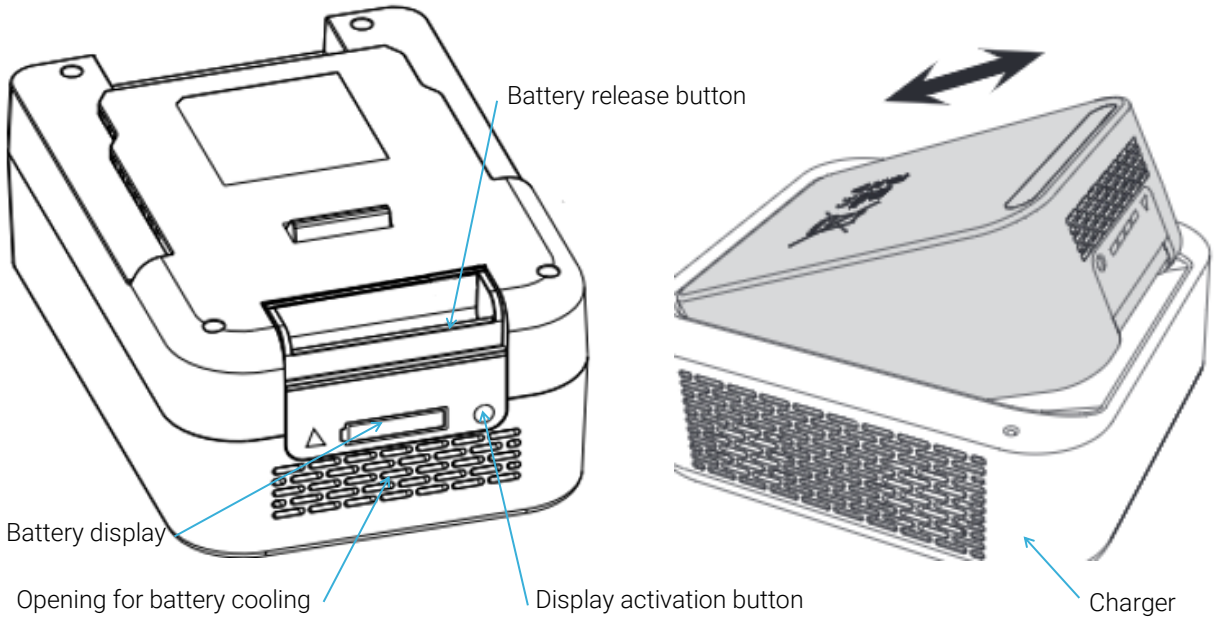
Hose connection

Power switch on/off



Speed mode. Machine will start in ECO mode.
Only on selected models.

Battery:/Charger:



Battery display:

Charging behaviour:

The battery pack contains the above "Display", which consists of a Button ⇩ to activate the display if not under charge or discharge, 4 green LED's to indicate the actual capacity, and a red LED to give warnings and show errors. The available battery capacity is indicated by the 4 green LED's as follows:

(1)

1st Green LED (Flashing): < 10 %, incl. empty
1st Green LED (Solid): ≥ 10 %
2nd Green LED (Solid): >30%
3rd Green LED (Solid): >60%
4th Green LED (Solid): >90% and fully charged.

(2)

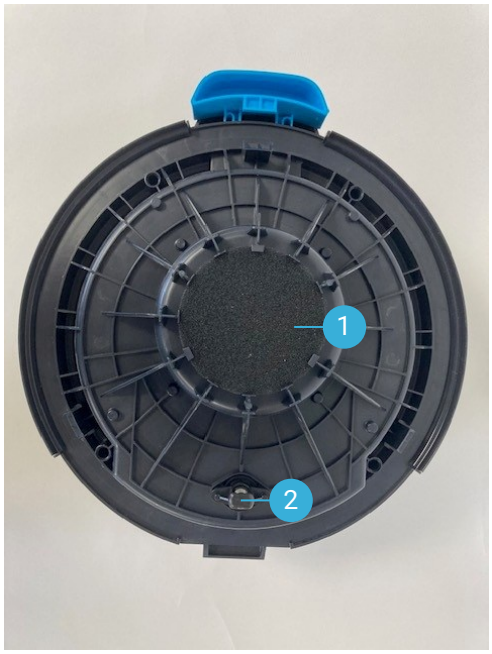
Red LED Solid: The battery is outside temperature boundary. Charging is resumed when the temperature is within boundary. Red LED (3 Fast flashes followed by pause): The battery is defect and must be replaced. The LED's automatically turns on when it is placed in an active charger. The LED's turns Off again approx. 5 seconds after the battery is fully charged or if the power to the charger is removed

Discharge behaviour: The behaviour of the green LED's for capacity is identical to the Charge behaviour. Red LED solid: Battery is shorted or outside temperature boundary. It's beneficial to move a hot battery to the charger because the charger has active cooling of the battery.

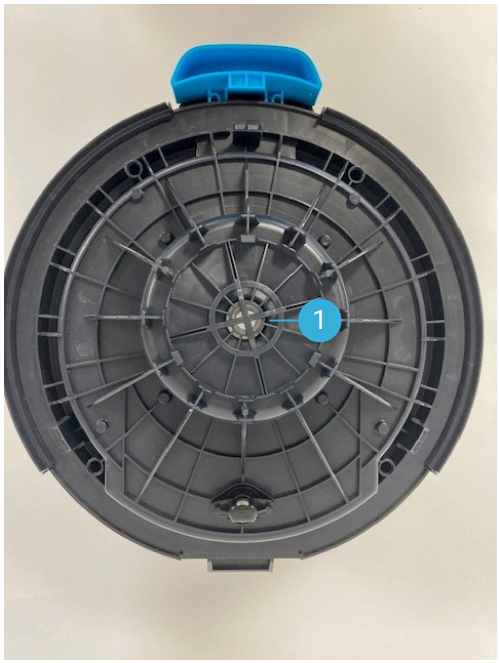
The battery can only be reactivated by a new On request if/when the error has disappeared. Red LED (3 Fast flashes followed by pause): The battery is defect and must be replaced. The green LED's are active as long as the battery is discharged. The Red LED turns Off after approx. 5 seconds. Button behaviour: When the button is activated, all LED's shows the capacity, warning, and fault status for approx. 5 seconds.

Construction —

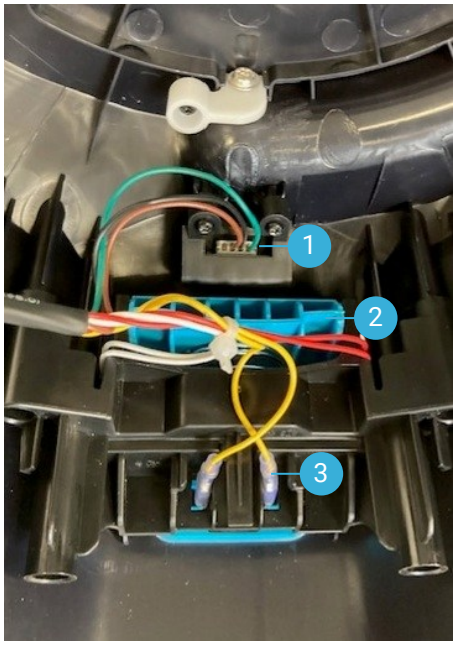
C



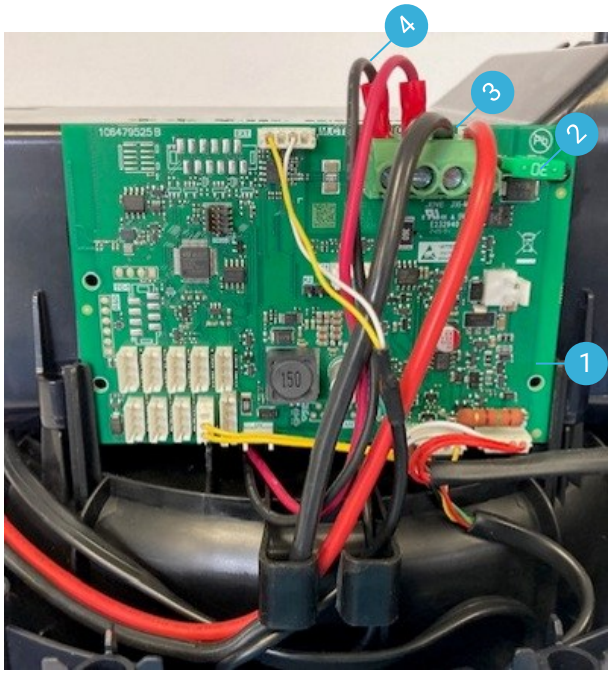
1 Filter
2 Vacum valve. Valve ensures cooling for the turbine if the bendend/hose/bag is blocked



1 Turbine BLDC



1. Power indicator
2. Power switch on/off
3. Speed mode. Only selected models



1. PCBA NEO P25
2. Fuse 30A
3. Connection battery
4. Connection to turbine

VP500

The 36V battery pack is supplying the motor voltage through the “+” and “—” connections on the PCBA.

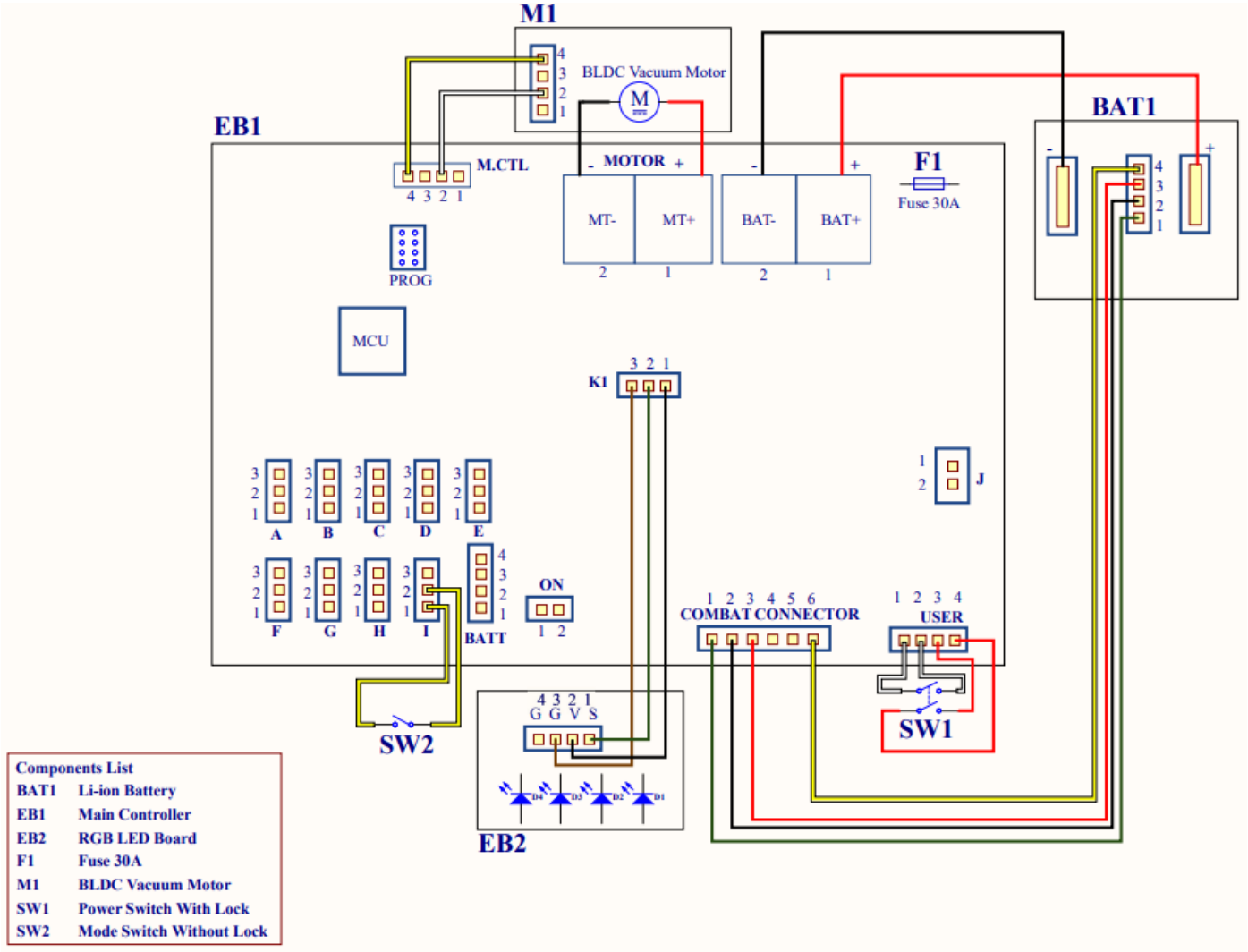
Motor wires are connected to the PCBA on the 2 terminals “motor”.

PCBA (NEO P25) connection “Combat connector” is for the communication between PCBA and battery. This communication will in case of low battery voltage, high battery temperature, high amp. consumption command the PCBA to shutdown the turbine and the rest of the electronics to protect the batteries.

Communication error between PCBA and battery can be checked by inserting the battery into the machine and start it. The battery indicator (on the machine) will not show the status of the battery. Machine will not start.

FUNCTION:

Machine is started by pressing the ON/OFF switch. Machine will start in low suction power (ECO). To get full suction power press speed mode button once. Press again to return to low suction power (ECO).
Machine is stopped by pressing the ON/OFF switch.



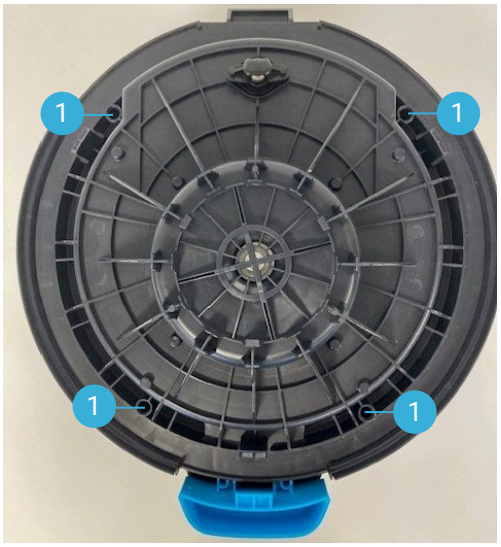
VP500

Failure symptom	Cause	Remedy
Machine do not start	No power to turbine when ON/OFF switch is turned on.	NO battery power - or too low battery power (below 29V) ON/OFF switch defect Turbine defect PCBA Defect. Communication error between PCBA and battery (Combat connector port). Blown fuse (30A). Replace PCBA. Components may be damaged if the fuse blows Electrical connection between PCBA (EXT port) and turbine disconnected
Machine can only run at low or high suction power.	No regulation signal to PCBA	Speed mode switch or wiring defect.
Low airflow	Restriction in the machine's suction system	Inspect hose, bag, and filter. Clean or replace if necessary.

Disassembly

Remove the head (1) from the container (2)

Remove the pre filter (1) from the head.

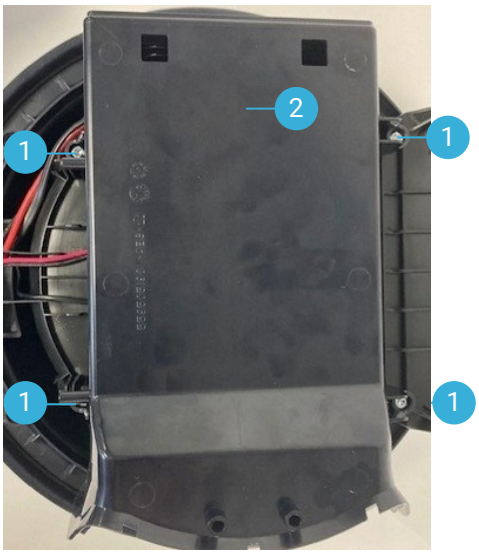


Remove the 4 screws **Torx 20** (1)

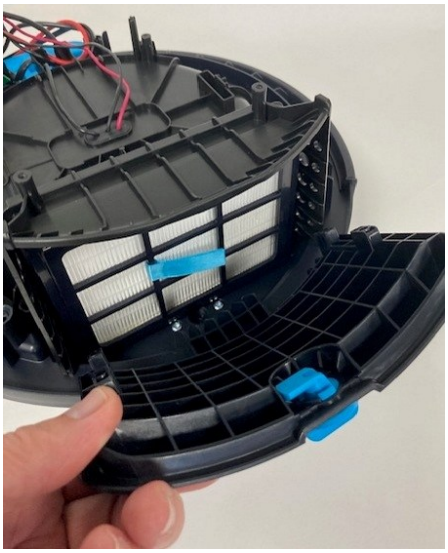
Remove topcover (1)

Disassembly

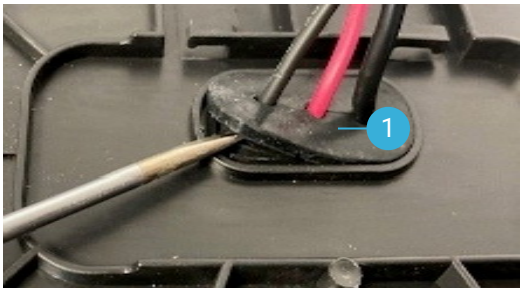
Remove the screw (1) holding the PCBA. Torx 10.
Remove the PCBA from the battery compartment (2).

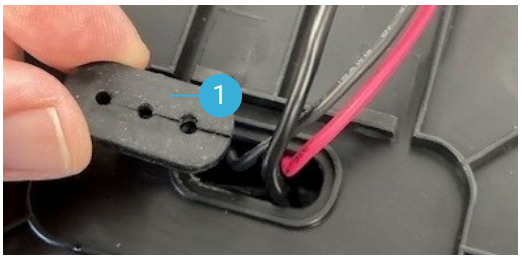


Remove the 4 screws (1). Torx 20 . Remove battery compartment (2).



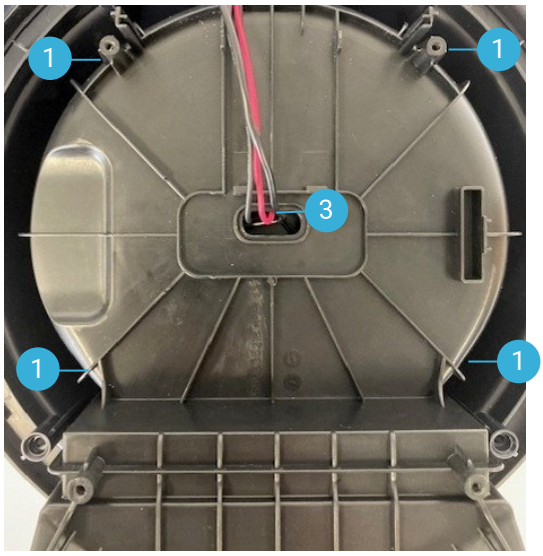
Remove filter cover and filter.



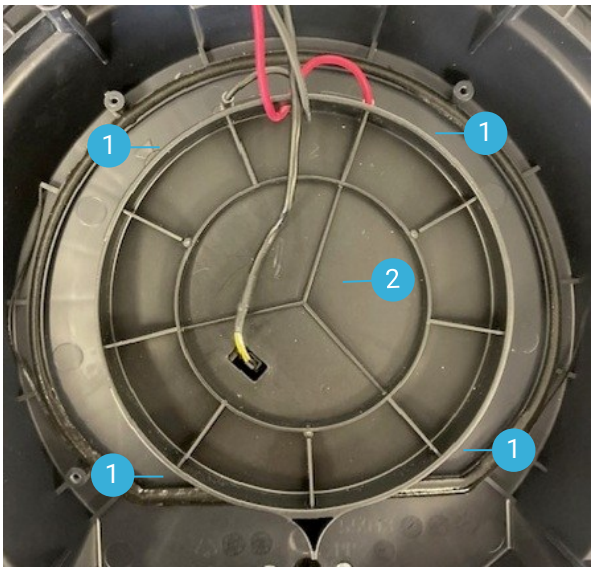


Carefully remove the rubber gasket (1) with a screwdriver.

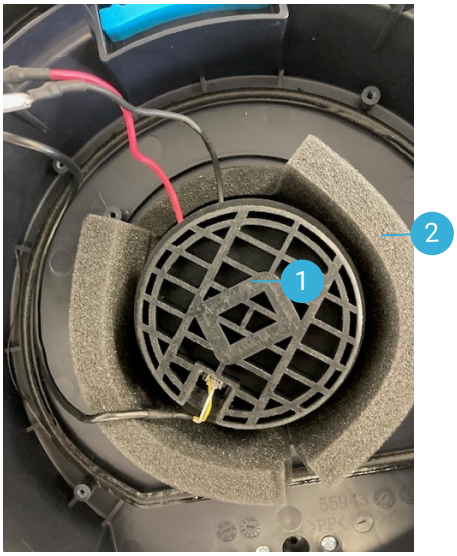
Disassembly



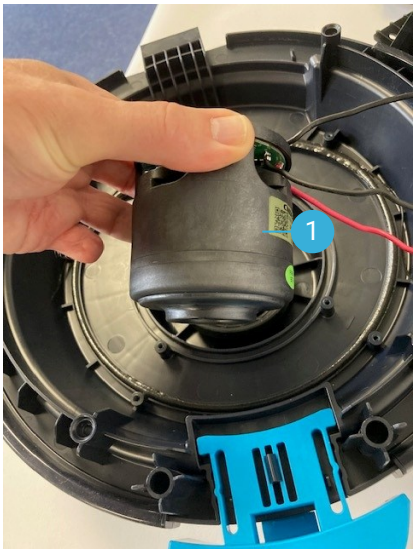
Remove the 4 screws (1) Torx 20
Remove cover (2) carefully. Be careful not to pull on the 3 wires to the turbine (3).



Remove the 4 screws (1) Torx 20
Remove the turbine cover (2)

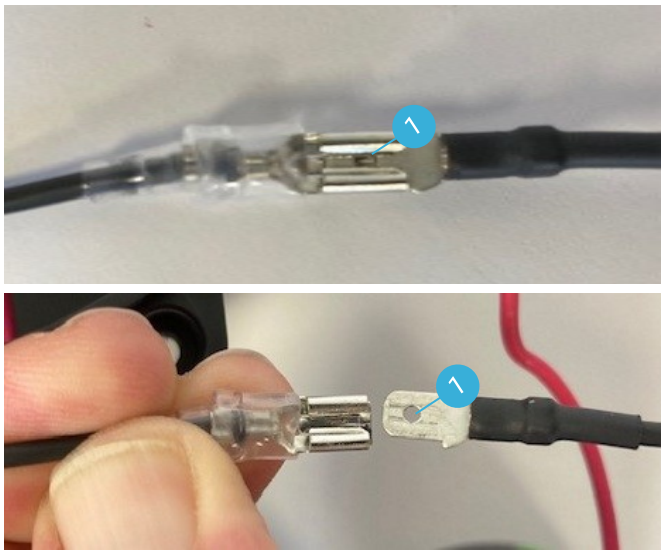


Remove rubber spacer (1) and foam insulation (2)

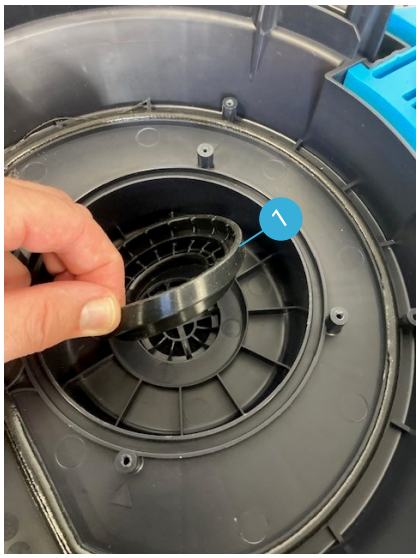


The turbine (1) can now be removed.

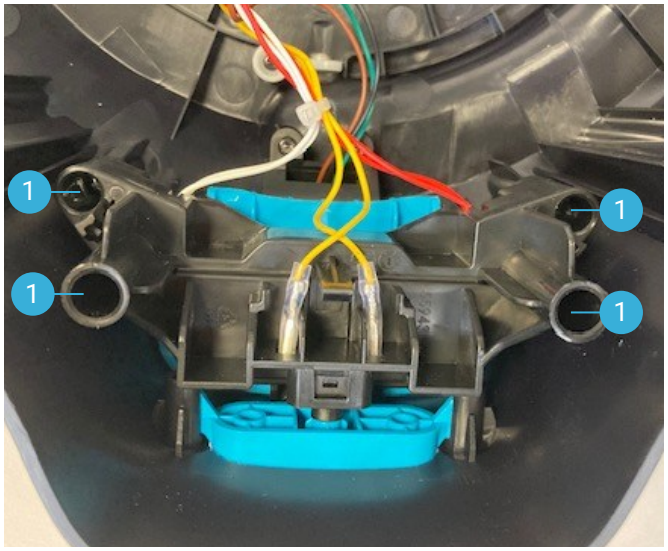
Disassembly



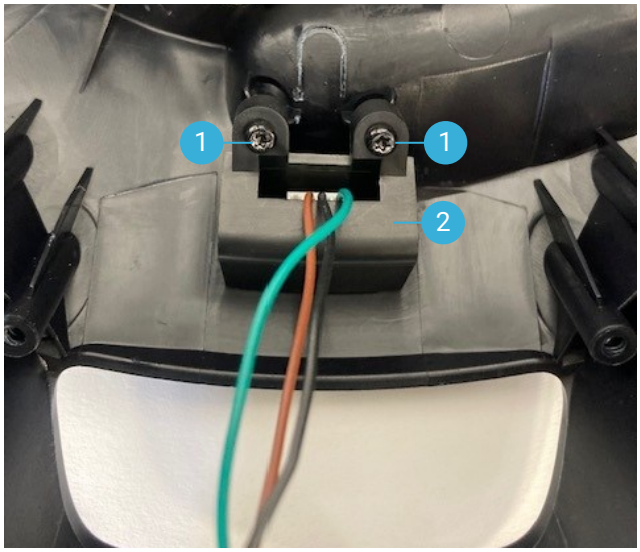
The power plug for the turbine can be separated by pressing the release button through the hole (1).



Motor gasket (1) on base plate can now be removed.

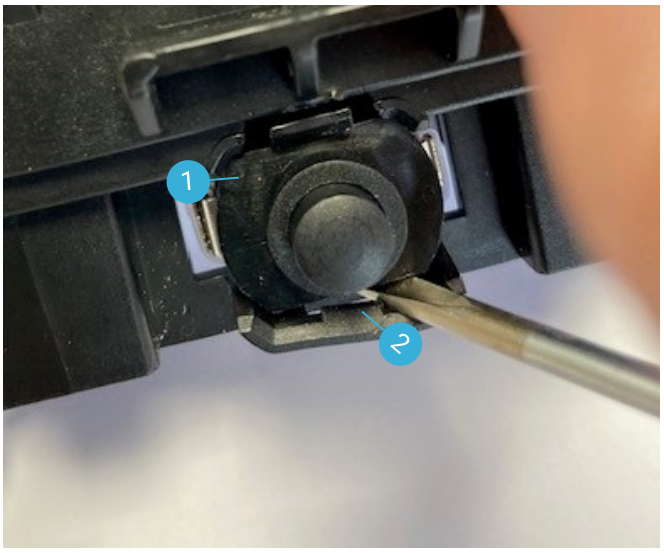


Remove the 4 screws (1) **Torx 20**. Remove control panel.

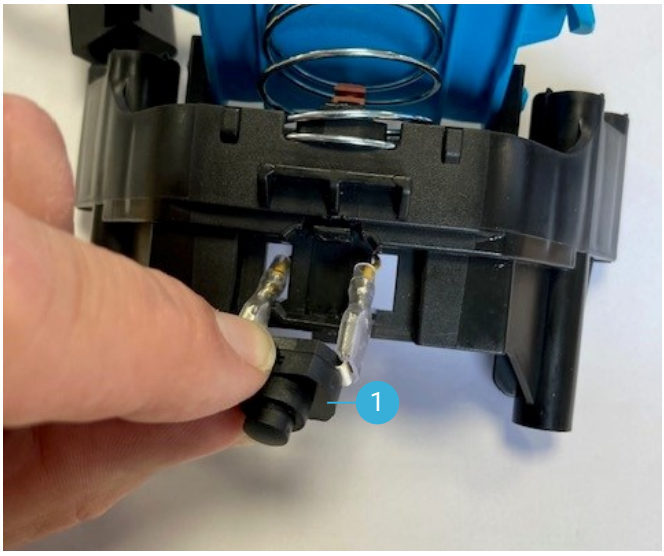


Remove the 2 screws (1)**Torx 10**. Remove control panel. Remove the battery indicator (2).

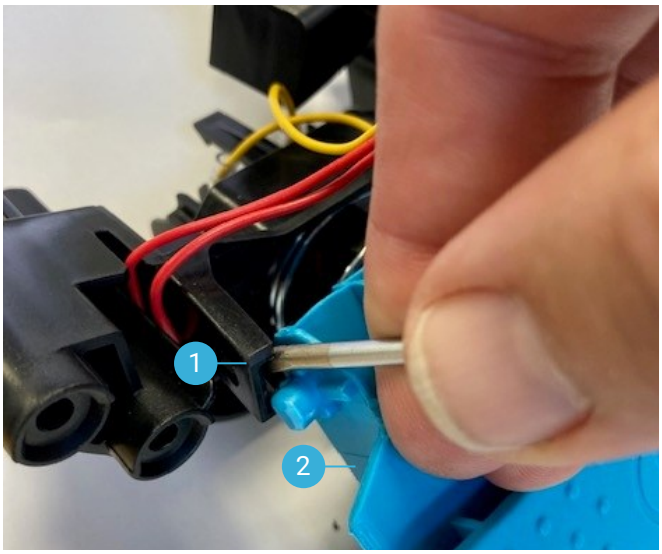
Disassembly



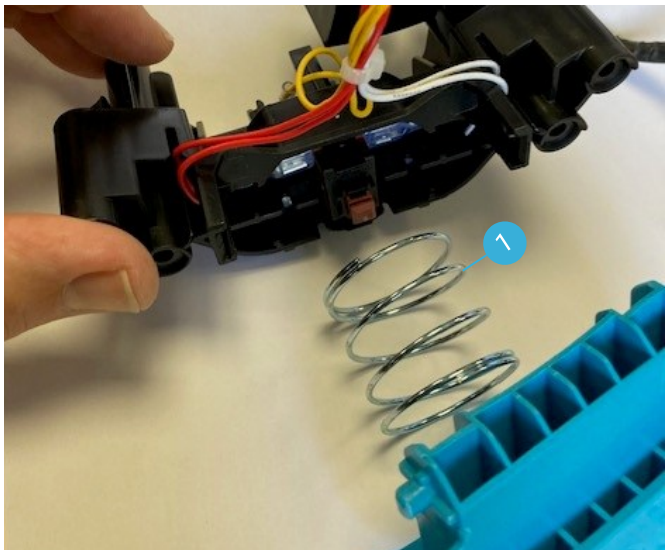
Place a screwdriver between the speed mode switch (1) and the control panel to release the snap (2).



Pull out the Speed mode switch (1).

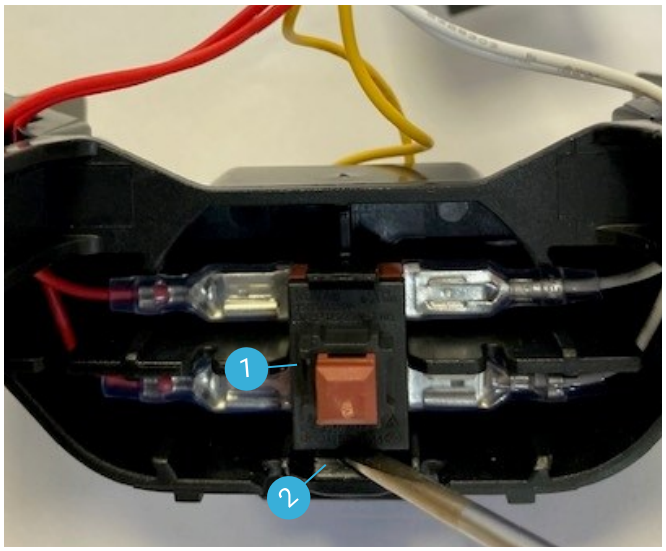


Trigger the snap function (1) in the control panel to remove the power switch on/off switch (2).

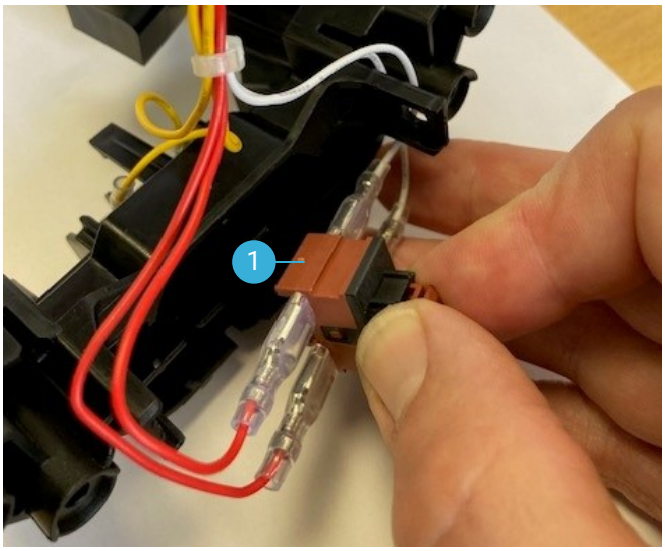


Remove the spring (1).

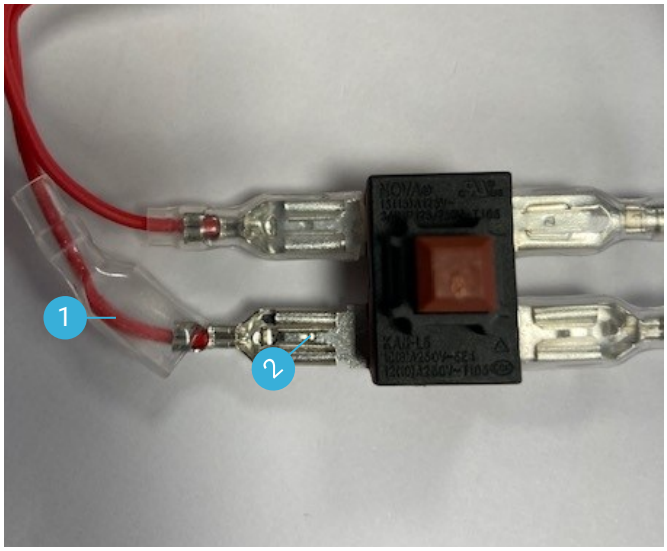
Disassembly



Place a screwdriver between the power switch on/off switch (1) and the control panel to release the snap (2).



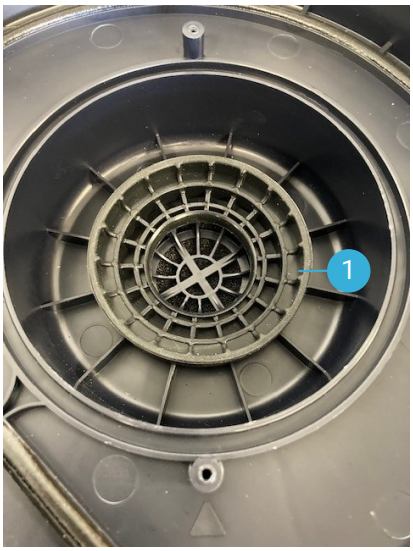
Pull out the power switch on/off switch (1).



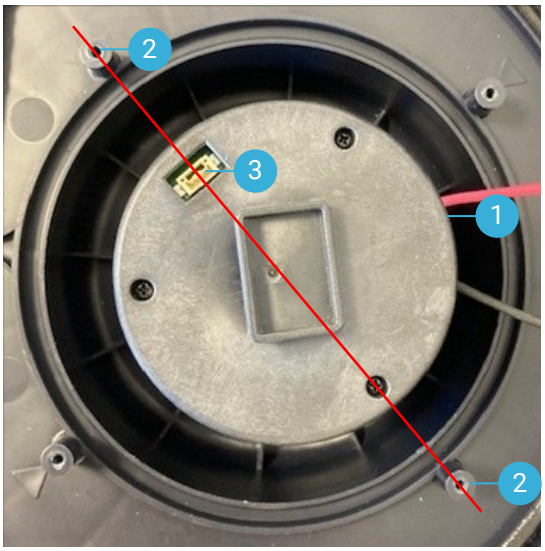
The plugs can be separated by removing insulation (1) around connector and then press the release button through the hole (2).

Container:
Release the four locks in the wheel and pull it out of the container.

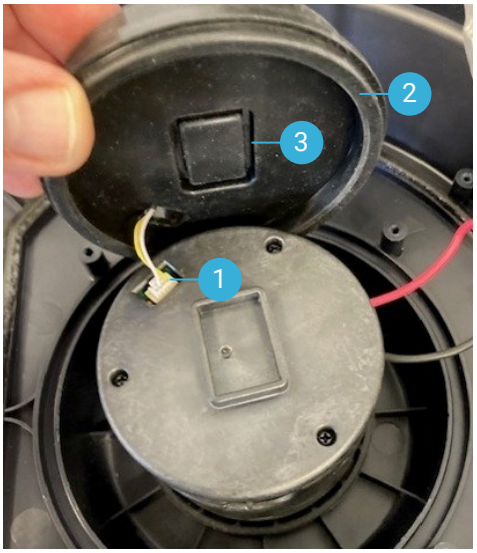
Assembly



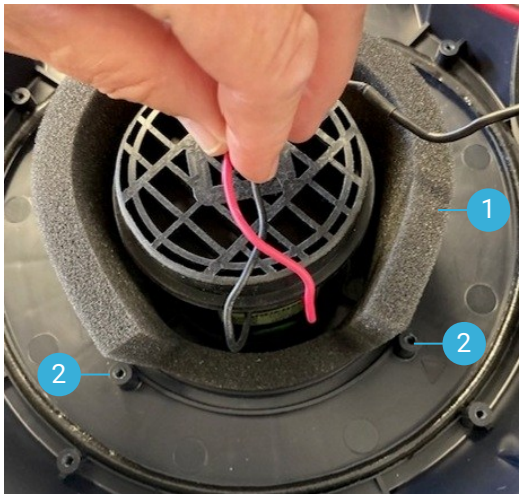
Mount the lower sealing for turbine (1)



Mount the turbine (1). Adjust the turbine rotationally so that the plug (3) is symmetrical about an axis between the two screw towers (2).

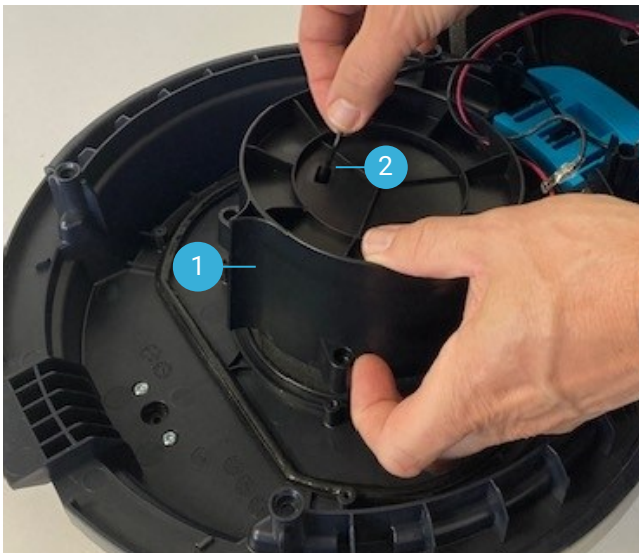


Mount the plug (1) in the turbine. Mount the rubber spacer (2) on the top of turbine. Make sure the rubber part is installed correctly in the recess (3).



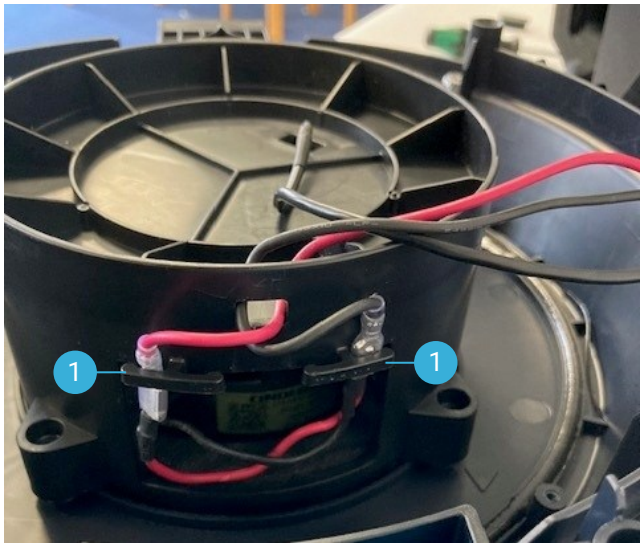
Mount the foam insulation (1). The opening must be centered between the 2 screw towers (2).

Assembly

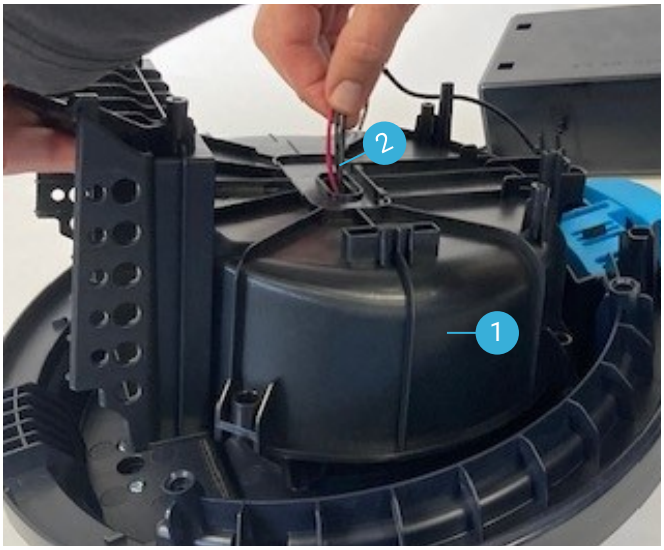


Mount the turbine cover (1). Pull wire (2) upwards **very** carefully. Pulling too hard can damage the connectors/wires.

Mount the 4 screws **Torx 20** and tighten with **1,2 Nm +/- 10 %**

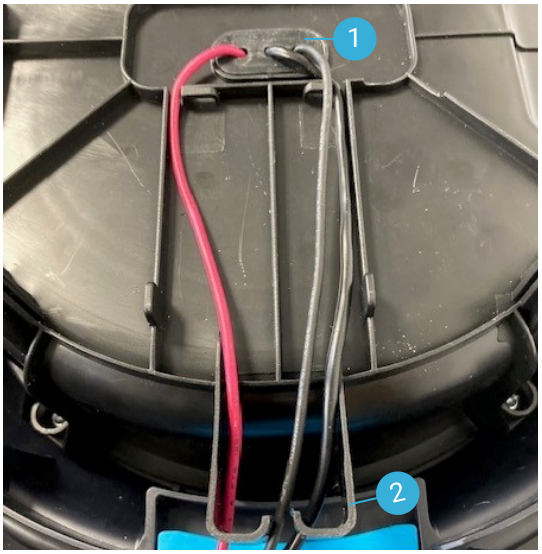


Place the 2 wires in the wire holders (1).



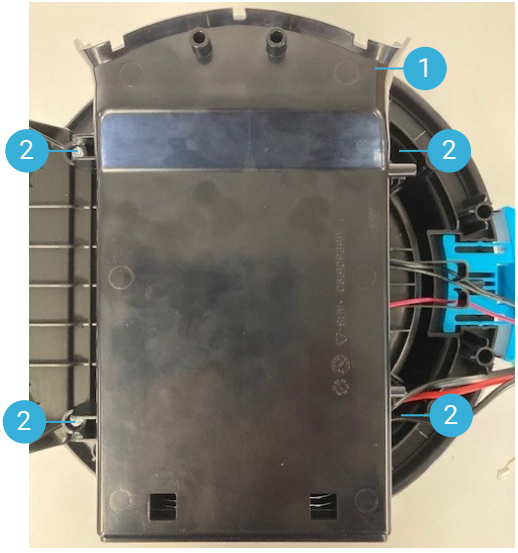
Mount cover (1) and check that the 3 motor wires (2) are not squeezed between cover (1) and turbine cover. Pull wires upwards **very** carefully when cover is mounted.

Mount the 4 screws **Torx 20** and tighten with **1,2 Nm +/- 10 %**

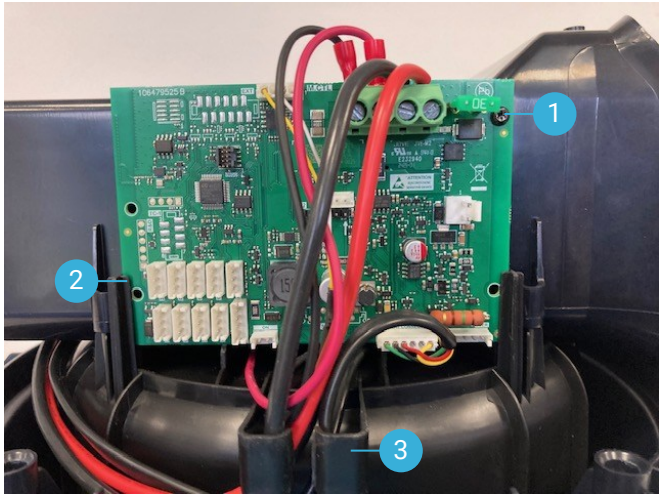


Mount rubber gasket (1). Place wires under the wire holder (2)

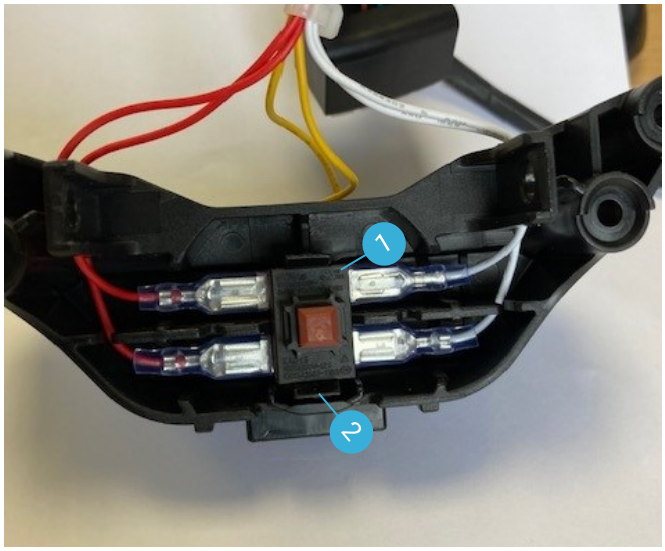
Assembly



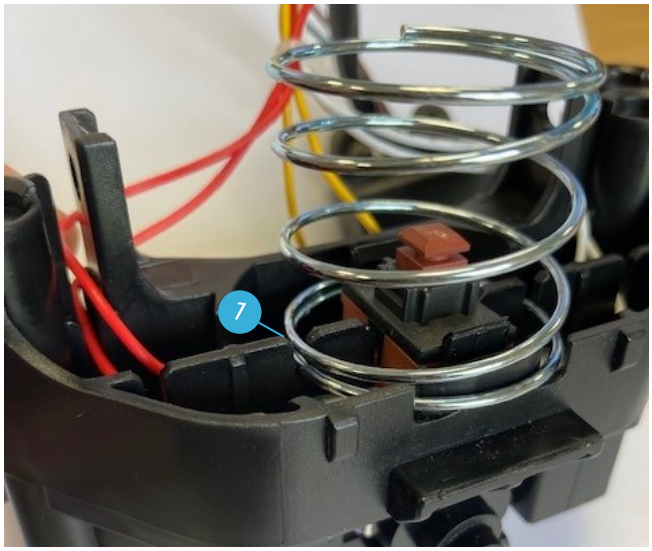
Mont the battery compartment (1) . Mount the 4 screws **Torx 20** (2) and tighten with **1,2 Nm +/- 10 %**



Place the PCBA in the recess (2). Mount the screws (1) **Torx 10** and tighten with **0,3 Nm +/- 10 %.**
Place all cables behind the cable holder (3).

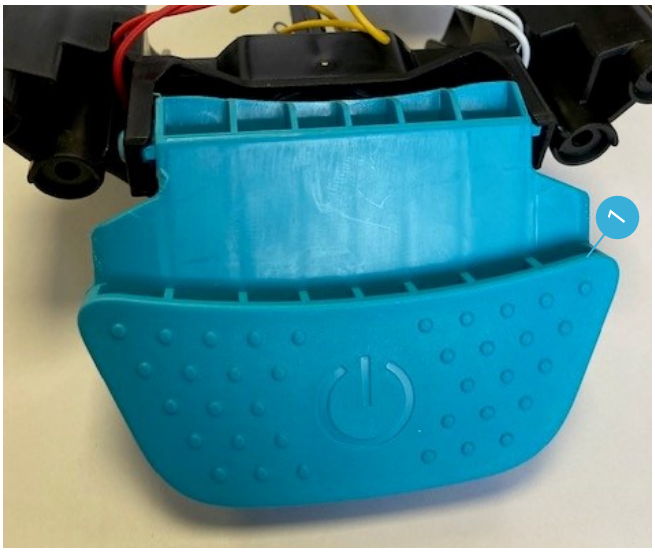


Mount the power switch on/off switch (1) by pressing it into the holder until the snap (2) holds it in place.

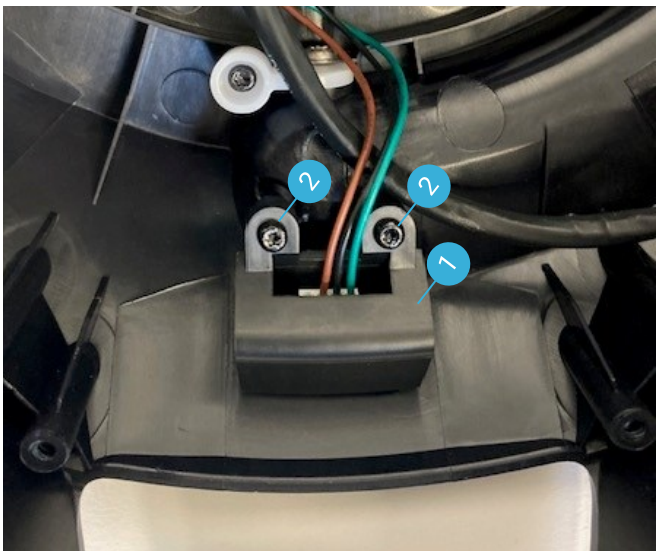


Mount the spring in the recess (1).

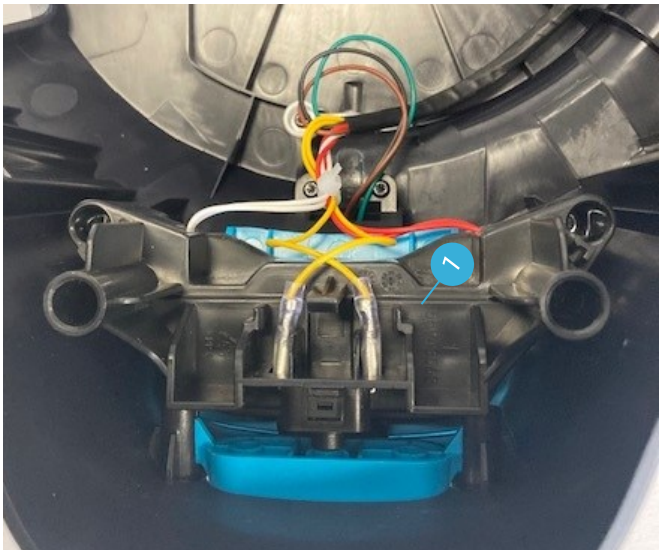
Assembly



Mount the power switch on/off switch (1) by attaching it to one side and then clicking it into the other side



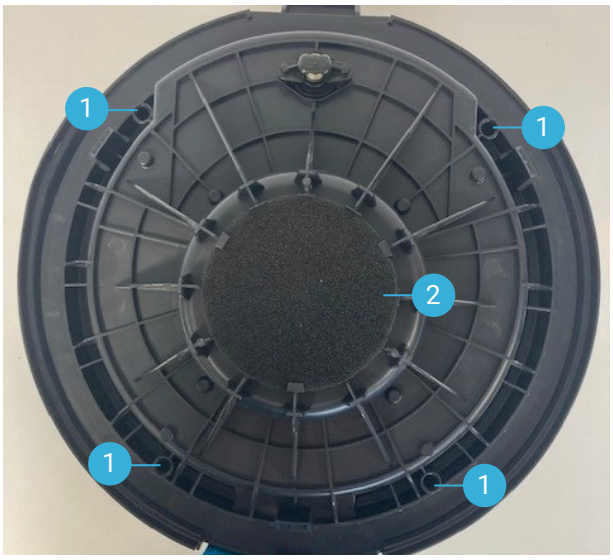
Mount the the battery indicator (1) and tighten the two screws (2) **Torx 10** with **0,3 Nm +/- 10 %.**



Mount the control panel (1) and tighten the four screws **Torx 20** with **1,2 Nm +/- 10 %.**

Mount the topcover (1) and turn the machine around 180°.

Assembly



Mount the 4 screws (1) **Torx 20** and tighten with **1,2 Nm +/- 10 %.** Mont the foam (2).

Mount filter (1).

Mount filter (1) and lid (2). Head is now complete.

Container:
Install the wheel (1) by pressing it into place until the four snap in the wheel are released.

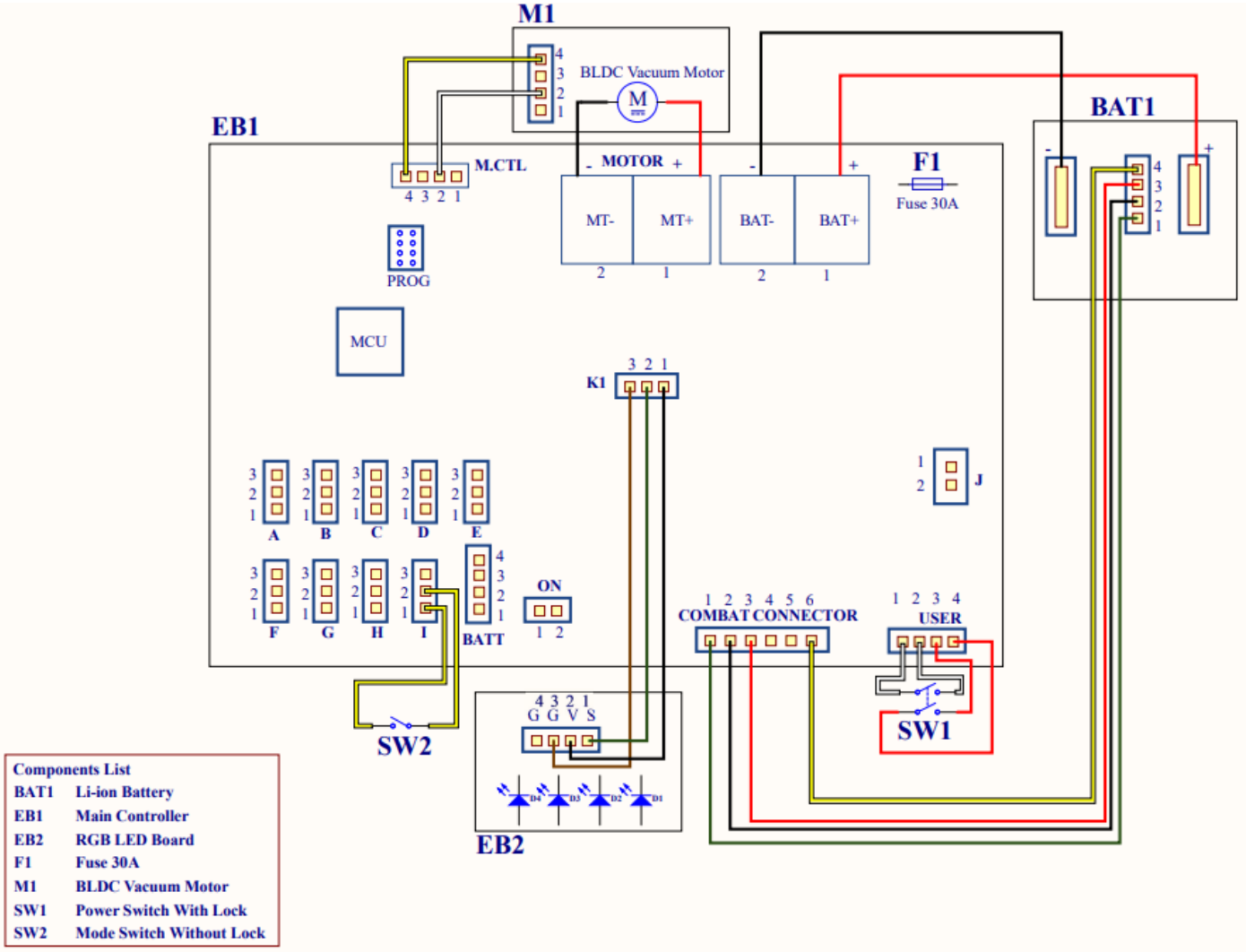
Assembly

Machine head and container can now be assembled

Wiring diagrams

H

VP500



Special tools / Spare parts

I

Part Number	Description	Remarks

Notes

Nilfisk A/S
Industrivej 1
9560 Hadsund
Denmark

www.nilfisk.com