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<th>Denomination</th>
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2 ACCESSIBILITY

The following chapter follows a disassembling process that step by step will allow the Technician to completely dismount the vacuum cleaner. Tags have been added to help finding the needed item to be removed quickly.

The following sections are outlined:
- Dust container
- Pedals, display cover and hose connection
- Upper cover
- Top cover
- Handle
- Motor housing
- Motor
- Cord winder
- HBTN

ATTENTION:
Boards and electronic devices could be damaged by electrostatic discharges.
Don't touch any components without any ESD protection.
You can change the gaskets, the door and the cyclone cone!
Pedals

You can remove the cord winder pedal and the on/off pedal with a normal screw driver. Push the screw driver next to the central side of the pedal, and stretch it out!

Do the same with both pedals!

Display cover

Stretch the cover with a normal screw driver at the middle of the front side!
**Connection for hose**

To remove the hose connector, you have to use a normal screw driver. Stretch the cover, start it at the top.

After you can reach the lower side, push your screw driver below the part, and stretch it out.
Upper cover

Take out the two screws, and remove the upper cover!
Top cover

Take out the 6 screws, you can find below the pedals, the hose connector and the upper cover!
After that, you can remove the top cover.

Inside the front side of the top cover, you can find two clips. Stretch that out, and take out the cover of the electrical connection of the hose.
Handle

Take out the two screws, and remove the handle.
Motor housing

Take out the screws from the middle…

…and the back side of the cleaner
After that you can lift out the cover of motor house, with the complete electrical equipment!
Remove the display PCB and take out the four screws from the front side of the cover.

Below the blower seal, you can find the motor!
Lift out the pushing arm of the cord winder.

After that, you can remove the cord winder!
Remove the screw using a torx screwdriver

Detach the top cover

Remove 3 screws using a fine-cross screwdriver

Detach the complete brush lever system

Telescope tube

Bent end

Nozzle

HBTN
Detach the wheel cover using a fine-tipped screwdriver

Remove the screw using a fine-cross screwdriver

Remove 2 screws using a fine-cross screwdriver

Detach the hose from the brush
Detach the cover using a fine-tipped screwdriver

Detach the remote control using a fine-tipped screwdriver

Detach the cover from the hose
3 Levels of Electronic Control

3.1 Display Layout for level 1 model, slider control:

3.1.1 Basic software functionality

- ON/OFF switch
- Soft-start, function according to chapter “Softstart and motor power change”.
- Automatic 50/60Hz detection.
- Motor power regulated by slider.

3.1.2 Motor power regulation and LED-functionality

1. Main plug connected:
   - Motor shall be off.

3.1.3 Software calibration process of the slider potentiometer

Calibration process of the potentiometer, to calibrate min power position:

Erase the micro controllers actual calibrated value:

- Disconnect the potentiometer from the control PCB.
- Connect the main plug while keeping the On/Off button pressed.
- Erase completed is indicated by oscillating the motor power.
- Disconnect the main plug.

Calibrate potentiometer to microcontroller:

- Make sure that the slider is adjusted to minimum power position.
- Connect the main plug.
- Calibrated value is now stored in the micro controllers memory and the cleaner can be operated as normal.
3.2 Display Layout for models with Aeropro passive remote system:

3.2.1 Basic Software functionality
- Double ON/OFF switches, remote and body
- Soft-start
- Automatic 50/60Hz detection.
- When started from unplugged, cleaner starts in power level 5, otherwise in last used mode.
- 5 manual power steps.
- (+) increases power level up to power level 5.
- (-) decreases power level down to power level 1.
- Power indication by segment LED, 1-5.
- Failure indication.

3.2.2 Motor power regulation and LED-functionality
1. Main plug connected:
   - Motor is off.
   - Segment LED:s indicates standby indicating “0”
2. First start by either of the two On/Off switches (after main plug is connected):
   - Motor power starts, power level “5”.
   - Segment LED indicates actual power.
3. (+) button is pressed:
   - Power steps up.
   - Segment LED indicates actual power.
4. (-) button is pressed:
   - Power steps down.
   - Segment LED indicates actual power.
5. Cleaner is turned off:
   - Actual power setting is remembered by that microcontroller.
   - Motor turns off.
   - Segment LED shows standby by indicating “0”
6. Cleaner is turned on after being in standby mode:
   - Cleaner turns on and goes into last power setting used.
3.3 Display Layout for models with Aeropro active remote system:

3.3.1 Basic Software functionality
- Double ON/OFF switches, remote and body
- Soft-start
- Automatic 50/60Hz detection.
- When started from unplugged, cleaner starts in power level 5, otherwise in last used mode.
- 5 manual power steps.
- (+) increases power level up to power level 5.
- (-) decreases power level down to power level 1.
- Power indication by segment LED, 1-5.
- Failure indication.

3.3.2 Motor power regulation and LED-functionality
1. Main plug connected:
   - Motor is off.
   - Segment LED:s indicates standby indicating “0”
2. First start by either of the two On/Off switches (after main plug is connected):
   - Motor power starts, power level “5”.
   - Segment LED indicates actual power.
3. (+) button is pressed:
   - Power steps up.
   - Segment LED indicates actual power.
4. (+) button is pressed, and kept pressed:
   - Power steps up automatically until power level 5 is reached.
   - Segment LED indicates actual power.
5. (-) button is pressed:
   - Power steps down.
   - Segment LED indicates actual power.
6. (-) button is pressed, and kept pressed:
   - Power steps down automatically until power level 1 is reached.
   - Segment LED indicates actual power.
7. Cleaner is turned off:
   - Actual power setting is remembered by that microcontroller.
   - Motor turns off.
   - Segment LED shows standby by indicating “0”
8. Cleaner is turned on after being in standby mode:
   - Cleaner turns on and goes into last power setting used.

3.3.3 Brush motor functionality
It is not possible to start the brush motor when the vacuum cleaner motor is turned off. If the cleaner is turned off by one of the On/Off switches, the brush motor also turns off.
If the cleaner turned off by one of the On/Off switches, the brush motor status is saved by the microcontroller, and when started again it reloads the status of the brush motor (on or off).
3.4 Nozzle power supply interface

For vacuum cleaners without AUTO mode function:

button 1 turns on or off the cleaner
button 2 turns on or off the nozzle motor (handled by the Aeropro PCB)
button 3 increases the cleaner power in up to 5 power steps
button 4 decreases the cleaner power in up to 5 power steps

3.5 Brush nozzle PCB 230V/110V active remote

The remote control for the Aeropro 230V/110V active system are a two wire connected PCB assembled in the cleaners bent end. From the remote control it is possible to control the cleaner functions.

Note: PCB working with live voltage – 230/110V.

3.6 Standby indication (for both RF and active versions)

When the main is connected, and the cleaner is in standby mode. This is indicated by “0” on the LED display.

3.7 Reprogramming RF remote controller

When changing to a new RF transmitter (or bent-end with new transmitter), the cleaner must learn the new identity of the new transmitter.

The learning process is done in following way:
- Press ON/OFF button on cleaner and keep it pressed while inserting the main plug.
- Keep the ON/OFF button pressed until the segment display LED indicates “C”, the cleaner is now in RF learning mode. Release the ON/OFF button.
- On the remote control press the ON/OFF button.
- If the cleaner have received the new RF remote address the segment LED will first indicate “L”, learning, and after that “F”, programming its memory. After successful learning process the display will show “0”
- Start the cleaner either with the remote control or on the cleaner.
3.8 PCB’s

3.8.1 View of Level 1 control PCB

ATTENTION:
Boards and electronic devices could be damaged by electrostatic discharges. Don’t touch any components without any ESD protection.
3.9 Display PCB (level 2 – 3, segment LED display)

1. (-) button, level 2 (Not assembled on UltraActive)
2. (+) button, level 2 (Not assembled on UltraActive)
3. Segment LED
4. Connector pressure switch PCB
5. Connector On/Off PCB
6. Connector Aeropro Active PCB, Level 3
7. Connector Power Module
8. Filter LED (Not assembled on UltraActive)
9. S-bag LED (Not assembled on UltraActive)

ATTENTION:
Boards and electronic devices could be damaged by electrostatic discharges. Don’t touch any components without any ESD protection.
3.10 Pressure switch PCB

The pressure switch PCB is only used on the RF controlled version. The 2 pressure switches are not assembled.
For level 2, RF version, the RF receiver PCB and the RF antenna is assembled on this PCB.

**ATTENTION:**
Boards and electronic devices could be damaged by electrostatic discharges.
Don't touch any components without any ESD protection.
4 PCB Power Module used for level 2-3 (position 014A)

4.1 Introduction

Power module is intended as a module PCB for mainly vacuum cleaners from Electrolux Floor Care & Small Appliances AB. The module is intended to consist of a Triac, triggering a motor, and a power supply for additional connected electronic.

The component layout for the power module should look like below sketch:

1. Power Module PCB.
2. Connector main voltage
3. Alternative main power connector / main power out
4. Motor connector
5. Connector to control PCB

All different kinds of Power modules have the same configuration of connector configuration, simplifying design, service and cross over.

4.2 Connection for control unit

To be able to control the power module a control unit is connected to the 5-pol connector, which also power supplies the control unit with 5VDC.

The configuration for the connector is following:
1. Ground.
2. 5VDC, maximum current according to level of power module.
3. Zero cross signal, square wave that follows the main frequency (5V amplitude).
4. Reserved for TCO signal (temperature control signal). Not implemented on the PCB, only reserved for the function.
5. Triac ignition signal from the control unit to the power module.

4.3 High Current Power Module

The high current power module consists of a switched power supply for providing the logical voltage with higher current output.
4.3.1 Electrical specification switched power supply

- Input voltage: 85-265V / 50-60Hz.
- Output voltage: 5V ±5%
- Max output current: 220mA.
5   RF transmitter

5.1   Introduction

The RF transmitter is used as remote control for a vacuum cleaner powered by a 3V changeable lithium cell. The transmitter uses the 433MHz band for transmitting data inside EU. With the transmitter it is possible to turn the appliance on and off, and regulate the motor power. Estimated lifetime for the battery in normal use is approximately 8-12 months.

5.2   Design

5.2.1 Mechanical design, PCB shape

SW1 – ON/OFF
SW2 – (-)
SW3 – (+)

5.3   LED indication

The assembled LED is intended to communicate the battery status to the user. When there is no LED indication it is time for the user to change the battery. In normal condition (standby) the LED are inactivated. If a button is pressed the LED activates for approximately 250 milliseconds.

5.4   Changing the battery

Change the battery when light indicator is not responding when pressing any button. Observe polarity of battery.
6 Aeropro PCB 230V/110V motor

6.1 Introduction
Aeropro PCB 230V is a new PCB to support the drive of a 230VAC motor mounted in the Aeropro nozzle. The motor’s continuous current consumption is maximum 1A. The PCB can also be used without nozzle motor, and then only support a wired remote control between the cleaners bent end and the cleaners control unit.

6.2 PCB variants
The 230V variant use single sided PCB. Low voltage variant (100V for USA, Japan) use double sided PCB together with UL approved coating.

6.3 Electrical overview
Sketch:
6.3.1 Functional description

The Aeropro PCB is supplied with main voltage, dimensioned to be used with both 230V and 100V main power. A capacitive power supply is used to supply the electronics with 5VDC. The motor speed and motor status in the nozzle are controlled by a triac. The triac are controlled by the cleaners control unit.

6.4 Description Remote control signal and handling

The remote control is connected to connector on the Aeropro PCB. The remote control uses a two wire connection to the Aeropro PCB, and is connected as following:
- KEY +5V analog signal.
- M2 GND. Note: live voltage potential.

The controller on the Aeropro PCB reads the analog signal level, and converts the signal to a frequency output signal, which is communicated to the Power Module PCB.

6.5 Motor output

The on/off of the motor nozzle is controlled by a Triac.

The motor is also connected as follows
- M1 motor phase
- M2 motor neutral (shared with the GND for the remote control)

Nozzle motor status is following:
- Plug in: OFF
- Switch cleaner on: OFF or last status.
- Switch cleaner off: OFF
- (+) or (-): No change
- Nozzle on/off: If nozzle motor is off and cleaner motor running – turn it on
- Nozzle on/off: If nozzle motor is on and cleaner motor running – turn it off
- Cleaner motor is off: Always off.
7 INDICATION & DIAGNOSTICS

7.1 Error indication

7.1.1 Level 1, potentiometer is not connected
If the potentiometer is not connected, the controller starts oscillating the motor power when the main plug is connected to the mains.

7.1.2 Level 2-3, error indication and function

7.1.2.1 Error (high prio)
The highest levels will shutdown the motor and error codes that will be displayed are;
“E” + “2” = Aeropro active failure, check aeropro connections.
“E” + “3” = Aeropro active failure, change aeropro control PCB.
“E” + “4” = Flash error RF selflearning (problem with erase or programming & enter self prog. Mode).
Problem with either RF communication or control unit. Investigate RF receiver PCB and control unit PCB.

7.1.2.2 Error (low prio)
Lowest error levels will indicate on display the error and the power could be reduced depending on type of application. Error codes that will be displayed are:
“E” + “5” = P1(pressure switch shorted during standby mode), power range 0-100%, no update of power level on display (Not used in UltraActive, but error might occur).
Check control unit PCB.
“E” + “6” = P2(pressure switch shorted during standby mode), power range 0-100%, no update of power level on display (Not used in UltraActive, but error might occur).
Check control unit PCB.
“E” + “7” = RF-receiver(not working/not on board: no white noise), power range 0-75%, no update of power level on display.
Check RF receiver PCB.

7.1.2.3 Error Summary

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<th>Peripheral status</th>
<th>Display</th>
<th>Main motor</th>
<th>LED Filter</th>
<th>LED Bag</th>
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</thead>
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<td>P1 Deactivated (Filter)</td>
<td>Start Up</td>
<td>“0”</td>
<td>0%</td>
<td>Not Lit</td>
</tr>
<tr>
<td></td>
<td>Standby</td>
<td>“0”</td>
<td>0%</td>
<td>Not Lit</td>
</tr>
<tr>
<td></td>
<td>Running</td>
<td>“1”-“5”</td>
<td>20%-100%</td>
<td>Not Lit</td>
</tr>
<tr>
<td>P1 Activated (Filter)</td>
<td>Start Up</td>
<td>“E”+“5”</td>
<td>0%</td>
<td>Lit</td>
</tr>
<tr>
<td></td>
<td>Standby</td>
<td>“0”</td>
<td>0%</td>
<td>Lit</td>
</tr>
<tr>
<td></td>
<td>Running</td>
<td>“1”-“5”</td>
<td>20%-100%</td>
<td>Lit(3s/60s)</td>
</tr>
<tr>
<td>P2 Deactivated (Bag)</td>
<td>Start Up</td>
<td>“0”</td>
<td>0%</td>
<td>Not Lit</td>
</tr>
<tr>
<td></td>
<td>Standby</td>
<td>“0”</td>
<td>0%</td>
<td>Not Lit</td>
</tr>
<tr>
<td></td>
<td>Running</td>
<td>“1”-“5”</td>
<td>20%-100%</td>
<td>Not Lit</td>
</tr>
<tr>
<td>P2 Activated (Bag)</td>
<td>Start Up</td>
<td>“E”+“6”</td>
<td>0%</td>
<td>Not Lit</td>
</tr>
<tr>
<td></td>
<td>Standby</td>
<td>“0”</td>
<td>0%</td>
<td>Not Lit</td>
</tr>
<tr>
<td></td>
<td>Running</td>
<td>“1”-“5”</td>
<td>20%-100%</td>
<td>Not Lit</td>
</tr>
<tr>
<td>Aeropro active disconnected</td>
<td>Start Up</td>
<td>“0”</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Standby</td>
<td>“0”</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Running</td>
<td>“E”+“2”</td>
<td>0% after&lt;1sec</td>
<td></td>
</tr>
<tr>
<td>Aeropro active No frequency</td>
<td>Start Up</td>
<td>“0”</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Standby</td>
<td>“0”</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Running</td>
<td>“E”+“3”</td>
<td>0% after 3sec</td>
<td></td>
</tr>
</tbody>
</table>
# 8 TROUBLE SHOOTING

<table>
<thead>
<tr>
<th>Problem</th>
<th>Checks</th>
</tr>
</thead>
</table>
| Cleaner without remote: | - Investigate if the plastic knob reaches the ON/OFF switch on the PCB.  
- Replace the control unit  
- Check connection to the ON/OFF switch board |
| Cleaner with radio remote: | - Investigate if both ON/OFF (cleaner and remote) are non-functional.  
If remote ON/OFF working, but not cleaner ON/OFF:  
- Investigate if the plastic knob reaches the ON/OFF switch on the PCB.  
- Replace the control unit (display PCB).  
If cleaner ON/OFF working, but not remote ON/OFF:  
- Investigate if the LED on the remote indicates transmission. If not, change battery and try again.  
- If still no LED indication on remote, change remote control and reprogram the cleaner according to above instruction.  
- If LED indicates transmission, try replacing the remote according to above instruction. If cleaner starts, replace the RF remote control.  
- If still no function, replace the control unit in the cleaner. Be aware of the position of the radio antenna. If replacing the control unit this has to learn the RF-remote address according to above description, chapter 3.7.  
If no reaction on any ON/OFF buttons: replace the control unit (display PCB). |
| Cleaner doesn't start; standby is indicated on display | |
| Cleaner with active motor nozzle: | - Investigate if both ON/OFF (cleaner and remote) are non-functional..  
If remote ON/OFF working, but not cleaner ON/OFF:  
- Investigate if the plastic knob reaches the ON/OFF switch on the PCB.  
- Replace the control unit (display PCB).  
If cleaner ON/OFF working, but not remote ON/OFF:  
- Check the bent end, test with another HBNT. If the cleaner starts, change.  
- Check wiring from hose connection to 2G active PCB.  
- Change 2G active PCB, test.  
- Check wiring between 2G active PCB and control unit for failure or bad connection.  
- Change the control unit.  
If no reaction on any ON/OFF buttons: replace the control unit (display PCB). |
| Cleaner doesn't start; no indication on display | - Check if the Power module PCB gets main voltage.  
- Check communication wire between Power module and control unit for failure or bad connection.  
- Change the control unit.  
- Change the Power module.  
- Check wire connection from CW. |
| Cleaner doesn't start; display shows normal running mode | - Check motor voltage, if no voltage, check the electronics as below, else check motor TCO and motor.  
- Check communication wire between Power module and control unit for failure or bad connection.  
- Change the control unit.  
- Change the Power module. |
| Not possible to change power level | Cleaner without remote:  
Investigate if the plastic knob reaches the slider on the potentiometer on the PCB.  
Replace the control unit (display PCB). |
**Cleaner with radio remote:**

- Investigate if the LED on the remote indicates transmission. If not, change battery and try again.
- If still no LED indication on remote, change remote control and reprogram the cleaner according to above instruction.
- If LED indicates transmission, try replacing the remote according to above instruction. If cleaner starts, replace the RF remote control.
- If still no function, replace the control unit in the cleaner. Be aware of the position of the radio antenna. If replacing the control unit this has to learn the RF-remote address according to above description, chapter 3.7.

**Cleaner with active motor nozzle:**

- Check the bent end, test with another HBTN. If possible to change power setting, change.
- Check wiring from hose connection to 2G active PCB.
- Change 2G active PCB, test.
- Check wiring between 2G active PCB and control unit for failure or bad connection.
- Change the control unit.

If the power regulation works for the first minutes after start, and then stops working. Motor seems to run only in maximum speed.

- Check the cooling system to the Power module (tube, cooling house, tube connection to dust compartment).
- Change the Power module PCB.

**Nozzle motor doesn’t start or stop on active system**

- Check the bent end, test with another HBTN. If possible to start nozzle motor, change.
- Check wiring from hose connection to 2G active PCB.
- Change 2G active PCB, test.
- Check wiring between 2G active PCB and control unit for failure or bad connection.
- Change the control unit.

**LED’s on nozzle doesn’t light, but nozzle motor is running**

- Change nozzle electronic