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8 Trouble Shooting
1. General Description

1 Display (see the specified versions later)
2 Exhaust filter lid
3 Exhaust filter
4 Parking slot
5 Power cord
6 Motor filter
7 Motor filter holder
8 S-bag®
9 S-bag® Holder
10 Dust compartment cover
11 Accessory clip
12 3in1 nozzle
13 Hose
14 Handle (see the specified versions later)
15 Telescopic tube
16 Parking clip
17 Display for models with manual control*
18 Display for models with + - control*
19 Display for models with remote control*
20 Classic handle*
21 Ergo handle*
22 Remote control handle*
23 Remote control handle for motorized nozzle*
24 Nozzle
25 Power brush motorized nozzle*
26 Turbo nozzle*
27 Parketto nozzle*

* Accessories may vary from model to model.
### 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 quickly the needed item to be removed quickly.

The following sections are outlined:
- Dust bag cover and compartment
- Display cover
- PCB Display/Switch
- Top cover
- Housing
- Cord winder
- Handle
- Wheels
- Power module and power supply unit
- Motor
- HBTN

**ATTENTION:** Boards and electronic devices could be damaged by electrostatic discharges. Don’t touch any components without any ESD protection.
2.1 Dust bag cover

Dust bag cover is easily removable. Open the cover, and press the locks on both sides with a screw driver. After that, pull the cover upwards.
2.2 Display cover

You can remove the display cover with a normal screw driver. Pry the cover at the middle of the front side, and you can take it out easily.
2.3 PCB Display/Switch

The display/switch PCB is fixed by clips on both sides.
2.4 Top cover

Take out the screws, which you can see on the pictures below! Remove the sealing of dust compartment too!

Remove the exhaust filter lid, and the filter! Open the lid, and bend it, while it's fall down!

After that, you can remove the top cover with a simple movement. Press the appliance down, take the top cover by the handle, and pull it down!
2.5 Housing

Take out the four screws from the dust compartment.

Remove the side frames from both sides, and take out the screws, you can find below the frames.

On the left side, you can find two screws on the top, behind the parking slot.
After you take out the screws, you can remove the side panels.

Remove the two screws, which takes place below the exhaust grill, and the other, you can find on the left side of the motor house.

Turn over the cleaner, and lift the lower part up.
2.6 Cord winder

After you removed the side panel from the right side, you can take out the cord winder easily. You have to disconnect the wires and the cooling hose, before you lift the cord winder out! After you lift up the cord winder you have to remove the cover from the back side, in order to the wall-plug can be removable.
2.7 Handle

To take out the handle, you have to remove the two screws from the lower side of the top cover!
2.8 Power module and power supply unit

You can find the power supply PCB below the left side panel. This PCB is fixed by clips, it is easily removable.

The power module PCB takes place on the top of the cleaner, below the top cover.

You can also find a pressure switch on the back side of the cleaner, left side of the exhaust filter.
2.9 Motor

Take out the four screws, you can find between the motor house and the body of the appliance!

After that, pull out the motor house from the body of the appliance!
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:

1. Disconnect the potentiometer from the control PCB.
2. Connect the main plug while keeping the On/Off button pressed.
3. 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 level 2 model, with LED display and step control:

![Image of display layout]

#### 3.2.1 Basic software functionality

- ON/OFF switch
- Soft-start
- Automatic 50/60Hz detection. When started from unplugged, cleaner starts in power level 3, 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.
- S-bag and Filter status are indicated by two LED:s.
- 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 the On/Off switch (after main plug is connected):
   - Motor power starts, power level “3”.
   - 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 Display Layout for models with passive remote system:

![Display Layout Image](image)

#### 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 3, 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.

- S-bag and Filter status are indicated by two LED’s.

- 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 “3”.

20
3. 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.

3.4 Display Layout for models with active remote system:

3.4.1 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 3, 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.

- S-bag and Filter status are indicated by two LED’s.

- Failure indication.
3.4.2 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 “3”.
   - 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.

3.4.3 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 are 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).
3.5 Nozzle power supply interface

For vacuum cleaners with 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 turns on the cleaner into AUTO mode
button 4 turns on the cleaner into manual mode and toggles the manual 5 power steps

For vacuum cleaners without AUTO mode function:

1 turns on or off the cleaner
2 turns on or off the nozzle motor (handled by the PCB)
3 increases the cleaner power in up to 5 power steps
4 decreases the cleaner power in up to 5 power steps
3.6 **Brush nozzle PCB 230V/110V active remote**

The remote control for the 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.

3.7 **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.

3.8 **Reprogramming RF remote controller**

- 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.

3.9 **PCB’s**

3.9.1 **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.
3.10 Display PCB (level 2 – 4, segment LED display)

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

The pressure switch PCB contains the 2 pressure switches detecting clogged filter or S-bag. For level 3, RF version, also 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 2-4 (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.

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 Low Current Power Module

The low current power module contains a capacitive power supply.

The low current power module can always be replaced by a high current power module, or International power module (see parts lists).

4.3.1 Power supply design low current power module

The 5V power supply is of the type capacitive supply.
4.3.2 Electrical specification
Input voltage: 230V / 50Hz. Output voltage: 5V Max output current: 35mA@4.8V.

NOTE: Output voltage is not insulated from main voltage

4.4 High Current Power Module
The high current power module consists of a switched power supply for providing the logical voltage with higher current output.

4.4.1 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

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.

6. PCB 230V/110V motor

6.1 Introduction
PCB 230V is a new PCB to support the drive of a 230VAC motor mounted in the nozzle. The motors continuously 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
6.3.1 Functional description
The 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 PCB. The remote control uses a two wire connection to the PCB, and is connected as following:
- KEY +5V analog signal.
- M2 GND. Note: live voltage potential.

The controller on the PCB reads the analog signal level, and converts the signal to a frequency output signal, which is communicated to the control 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 Filter and S-bag indicators

7.1.1 Activation
The indicators are operated by the controller. If the pressure switches activates, this is indicated by the indicator LED’s. After 2 seconds activation the corresponding LED will light up for 1 second, and after additional 57 seconds the corresponding LED will start to indicate continuously. During this time delay the pressure switch must not be deactivated. If it is deactivated, there will be a new 60 second delay when activated next time. The LED’s will continue to indicate after the cleaner is turned off and in standby mode.

At first start, after the main plug is connected, the S-BAG and FILTER indicator will turn on for one second, indicating that the LED is working.
7.1.2 Deactivation
To deactivate the LED indicator after activation this can be made in three ways. First is to disconnect and reconnect the main connector. Also this can be made by turning off the cleaner, turn it on again and keep the on/off button pressed for 5 seconds. At last when turned on after being activated, and running without the actual pressure switch is activated for 30 seconds.

7.2 Error indication

7.2.1 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.

7.2.2 Level 2-4, error indication and function

7.2.2.1 Error (high prio)
The highest levels will shutdown the motor and error codes that will be displayed are; “E” + “1” = motor error (disconnected/thermal) (Not in use)”E” + “2” = active failure ”E” + “3” = active failure “E” + “4” = Flash error RF self learning (problem with erase or programming & enter self program. Mode)

7.2.2.2 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. “E” + “6” = P2 (pressure switch shorted during standby mode), power range 0-100%, no update of power level on display. “E” + “7” = RF-receiver (not working/not on board: no white noise), power range 0-75%, no update of power level on display.

7.2.2.3 Error Summary

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

<table>
<thead>
<tr>
<th>Problem</th>
<th>Checks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaner without remote: Cleaner doesn’t start; if standby is indicated on display</td>
<td>- Investigate if the plastic knob reaches the ON/OFF switch on the PCB. - Replace the control unit (display PCB). - Replace the control unit (display PCB). - Check connection to the ON/OFF switch board.</td>
</tr>
<tr>
<td>Cleaner with radio remote: Cleaner doesn’t start; if standby is indicated on display</td>
<td>- Investigate if both ON/OFF (cleaner and remote) is not working. 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. If no reaction on any ON/OFF buttons: replace the control unit (display PCB).</td>
</tr>
<tr>
<td>Cleaner with active motor nozzle: Cleaner doesn’t start; no indication on display</td>
<td>- Investigate if both ON/OFF (cleaner and remote) are not working. 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 HBTN. 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).</td>
</tr>
<tr>
<td>Cleaner doesn’t start; no indication on display</td>
<td>- 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.</td>
</tr>
<tr>
<td>Cleaner doesn’t start; display shows normal running mode</td>
<td>- 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.</td>
</tr>
<tr>
<td>Not possible to change power level</td>
<td>Cleaner without remote: Investigate if the plastic knob reaches the +/- switches on the PCB. Replace the control unit (display PCB).</td>
</tr>
<tr>
<td>Troubleshooting</td>
<td>Cleaner with radio remote:</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Investigate if the LED on the remote indicates transmission. If not, change battery and try again.</td>
<td>-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.</td>
</tr>
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