

SB, SMART and SMART-E pokers overheating issue, All models, 2021-12

SYMPTOM/DESCRIPTION

Recently, many SMART and SMART-E units were reported to shut down after several minutes of work, indicating overheating. When the poker is allowed to cool for 15-20 minutes, it can be restarted.

AFFECTED UNITS

All units of SMART and SMART-E before SN 20212100026.

CORRECTIVE ACTION AND PROCEDURE

After an 8D investigation it was found that the main possible reasons for this failure are:

- bad crimping in wire harness
- incorrect oil quantity
- impurities in the oil
- failed component inside vibration head

Refer to Appendix A to identify which one of the above is the root cause of the failure or if it's something else.

Refer to Appendix B and C for details regarding repairing of the poker and vibrating head.

WARRANTY INFORMATION

The normal warranty policy applies.

ADDITIONAL INFORMATION

Appendix A – SMART pokers troubleshooting (2 pages).

Appendix B – Repairing SMART pokers (5 pages).

Appendix C – Repairing SMART pokers vibration head (7 pages).

Revision History

Rev.	Date	Order id.	Description
A	2021-12	00015945	Created

Appendix A

SMART pokers troubleshooting

Testing

1. Immerse the vibration head of the poker into a bucket full of water.
2. Power the poker and push the button to start it up.
3. Run the poker for 15 – 30 minutes and check the status of the LED.
4. Continue according to the table below.

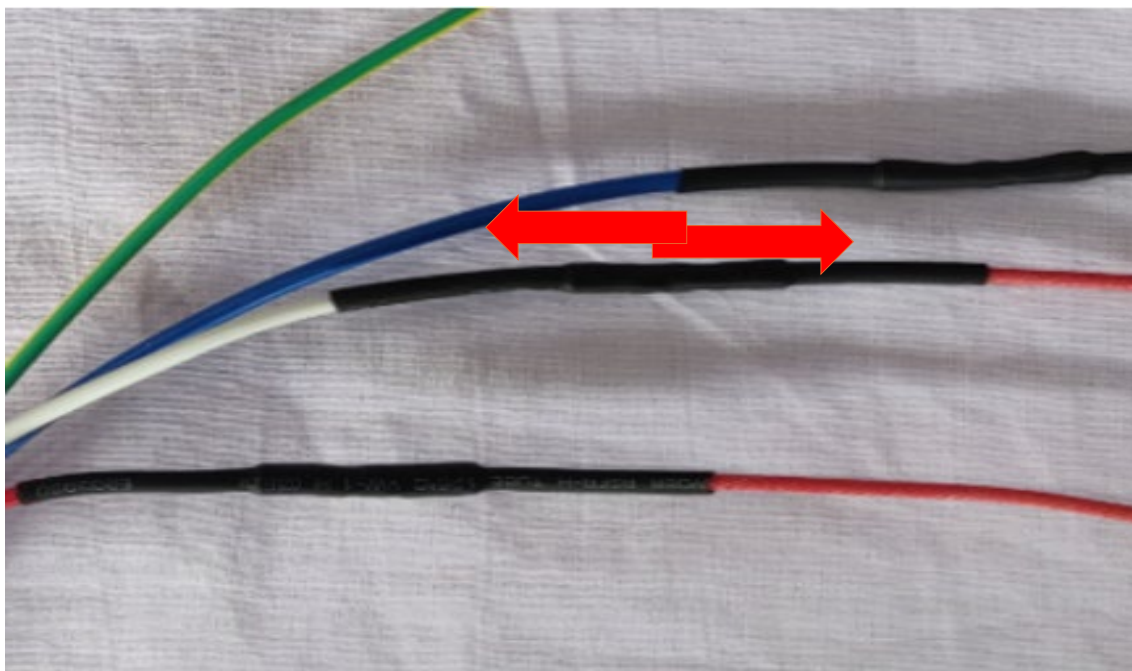
What you see	What's this	What's happening	What to do
	LED is not lit	Not powered – no power in the socket or damaged power cord.	Check the power source. Check the power cord.
	LED is steady green	Powered, normal operation.	Poker is OK.
	LED is flashing green	Work in progress. Limitation of current.	Check if the vibrating head is blocked or overloaded.
	LED is flashing green and red	Overvoltage or undervoltage.	Check the voltage of the power source.
	LED is flashing red	Converter box is overheating. Vibrating head is overheating.	Let the converter or vibrating head cool down then try to restart the poker.
	LED is steady red	Internal fault in the converter box or vibration head .	Examine the converter box and vibrator head for damage.

Troubleshooting

If the LED is steady or flashing red, identify which component causes the failure. Measure the temperature of the converter box and the vibrating head to see if one of them is overheating.

1. Hose wire harness – start with it since it's the cheapest and simplest to be checked.
 - Check for broken wire and for shortcut between the wires by measuring with multimeter.
 - Check the connections between the converter box and hose wire harness and between the hose wire harness and vibration head by pulling the wires apart from each other.

Refer to Appendix B for details.



2. Converter box – replace and run the test again. Refer to Appendix B for details.
3. Vibration head – disassemble it to identify which of its internal components is the root cause of the failure. Refer to Appendix C for details.

Appendix B

Repairing SMART pokers.

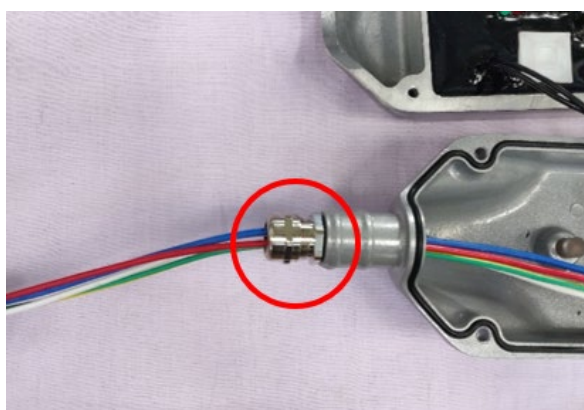
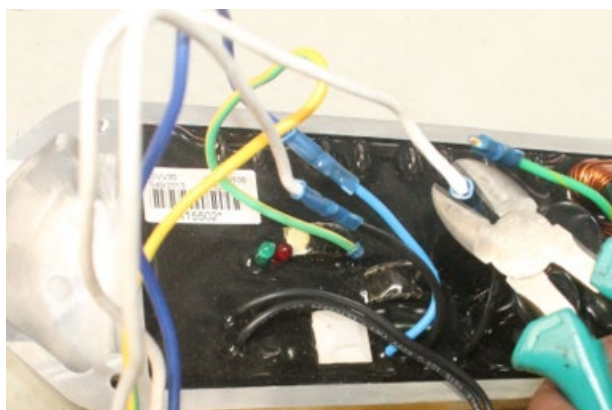
1. Cut the clamps from both ends of the hose.



2. Open electronic box cover by loosening and removing screws with the help of screw driver.



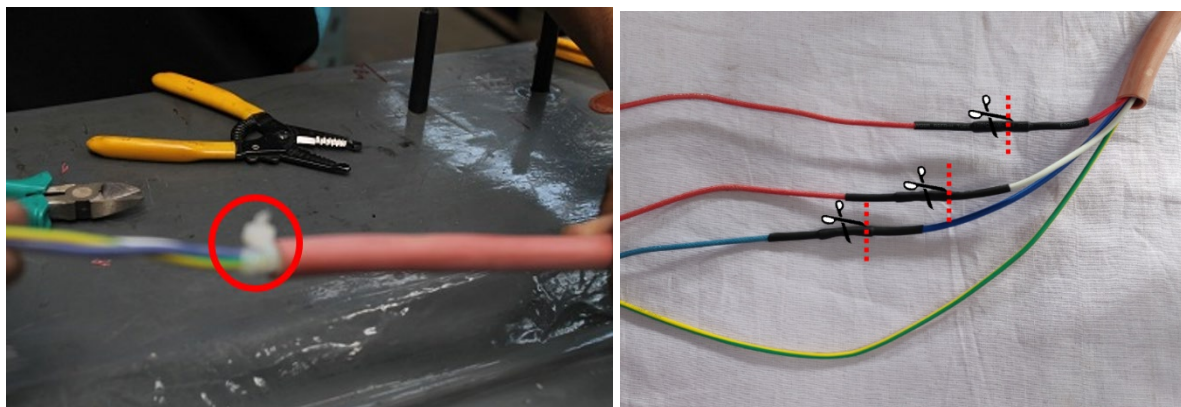
3. Cut the cable tie.
4. Cut the joints between converter box wires and hose wire harness. Cut exactly in the middle of the splicing sleeves.



5. Loosen cable gland and take the wires out.
6. Pull vibrating element with cables outside of the hose.



7. Remove screw of yellow-green earth cable from vibrating element.
8. Cut the cable tie at the end of the brown hose revealing cable joints.
9. Cut the joints maintaining earlier lengths to identify phases.



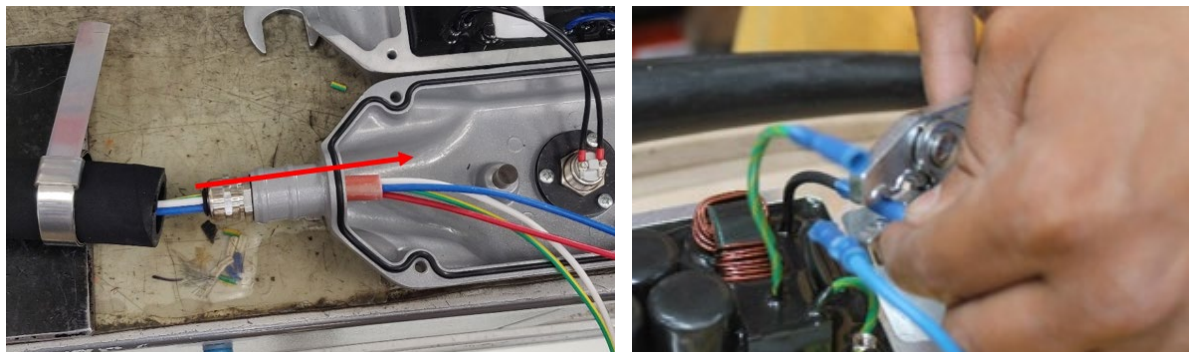
10. If you need to change the hose length, prepare hose and wires according to the table below, otherwise keep the original parts. Prepare 300 mm loop on the wires. Available lengths are 5m, 8m, 10m and 14m.

EU & UK	5m	8m	10m	14m
Hose	594388405	594388408	594388406	594388409
Red wire	598479102	529485902	529485903	529485904
Blue wire	594285903	594285904	594285905	594285907
White wire	594287702	594287704	594287705	594287706
Ground (green-yellow) wire	594527804	594527805	594527806	594527807

cETLus	5m	8m	10m	14m
Hose	594388405	594388408	594388406	594388409
Red wire	598479201	598479202	598479203	598479204
Blue wire	595196702	595196703	595196704	595196705
White wire	595196602	595196603	595196604	595196605
Ground (green-yellow) wire	594527804	594527805	594527806	594527807

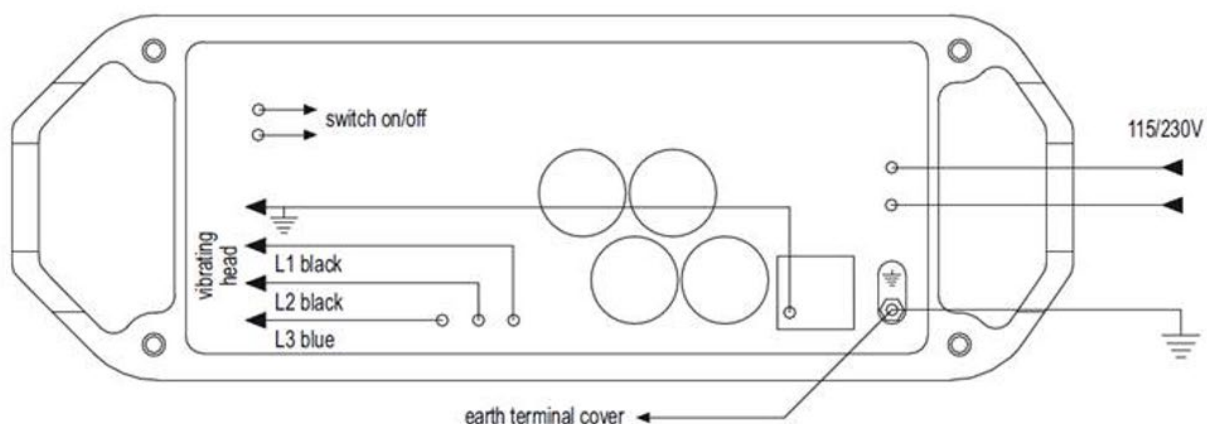
Note: If you need length different from those above, choose the closest longer one and cut the wires and hose by the difference between desired and the chosen length.

11. Put two clamps (594281701) on the new hose.
12. Insert wire rope in the new hose and engage cables in wire rope.
13. Pull the wire rope in from the other side of the new hose.
14. Pull cables through the gland inside the electronic box cover.



15. Connect wires from the hose to the electronic box wires according to the table below and crimp them with 3 pcs of splicing sleeve (595118501).

From hose	To electronic box
RED	L1 Black
WHITE	L2 Black
BLUE	L3 Blue



16. Form a loop and put a cable tie on the wires.



17. Tighten the clamp by using clamping tool (594832201) and adapter (594832301).

TOOLS FOR CLAMPS

- HVG P/N **594832201**
- BAND-IT P/N **C00169**
- HVG P/N **594832301**
- BAND-IT P/N **J00169**



Example of how to use these tools is in the link below:

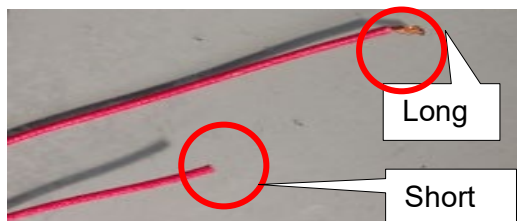
<https://www.youtube.com/watch?v=f8OIS3doF1I>

18. Put three pieces of heat shrink tubes (594257501) onto the red, white and blue wires from the hose, put brown hose (594254901) over all four of them, connect the wires from the hose to the wires from the vibration element according to the table below and crimp them with 3 pcs of splicing sleeve (595118501).

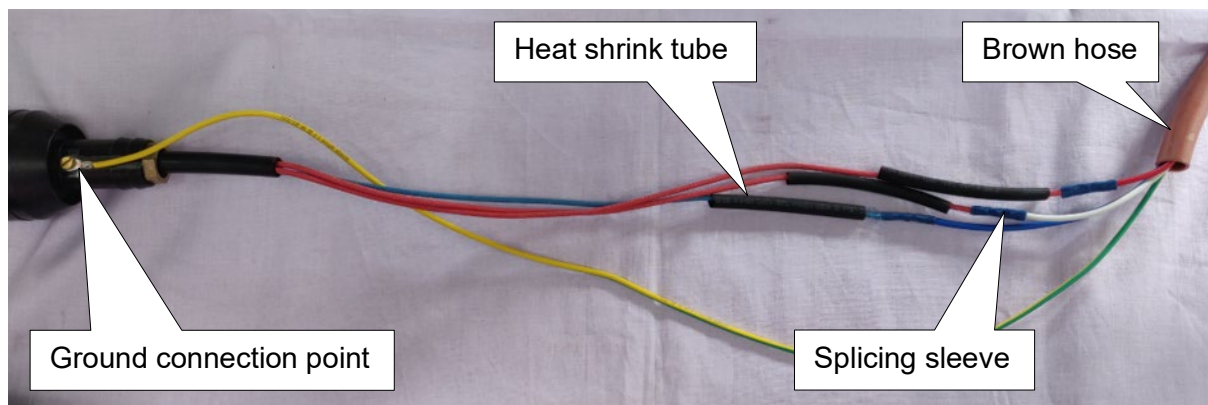
From vibration element 230V	To electronic box
RED (long)	RED
RED (short)	WHITE
BLUE	BLUE

From vibration element 115V	To electronic box
WHITE (long)	RED
WHITE (short)	WHITE
BLUE	BLUE

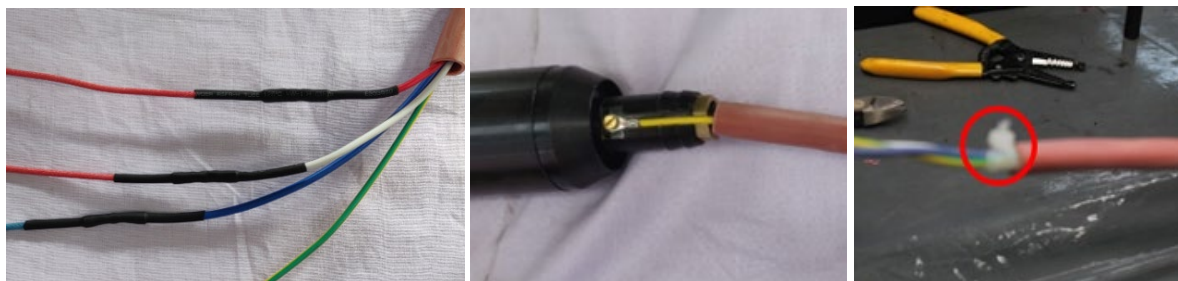
Note: Vibrating head ordered as a spare part will come with wires shaped as in the picture. If the vibrating head is kept unchanged, follow the sequence in #8.



19. Connect the ground green-yellow wire to the vibrating element.



20. Slide the heat shrink tubes onto the connections and heat them with hot air gun.



21. Slide brown hose over these connections and fix it in place at the opposite from the vibrating element end by cable tie.

22. Engage the hose onto the vibrator element and tighten the clamp (594281701) over the hose and element by using clamping tool (594832201) and adapter (594832301).



23. Test the poker.

Appendix C

Repairing SMART pokers vibration head

Measuring the vibration head

1. Measure the current consumption on each of the three phases before disconnecting the vibration head. Use TRMS current clamp meter.
2. If the above measurement is impossible due to the poker doesn't start, measure the resistance of the windings instead. Use milliohm meter.

Note: Measuring the resistance is more difficult and doesn't give the same preciseness as the current consumption measurement. It should be use as a last resort.

Note: A regular multimeter could be used instead of the milliohm meter, this will reduce the preciseness of the measurement.

3. Compare the readings with the table below.

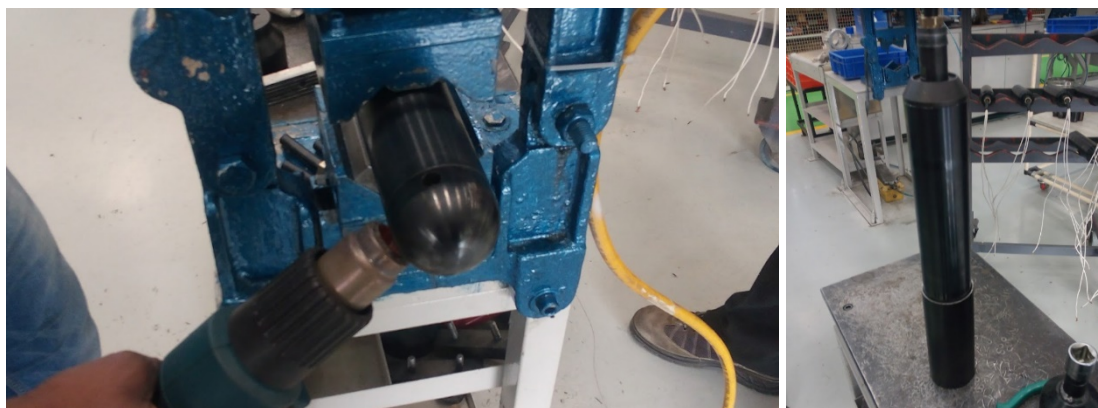
Resistance & Amps Value For SMART			Amperage (A)	
Model	Resistance for 230 Volts	Resistance for 115 Volts	230 Volts	115 Volts
Smart 40	26.5 ohm (+/- 5%)	6.6 ohm (+/- 5%)	2.5	5
Smart 48	9.3 ohm (+/- 5%)	2.4 ohm (+/- 5%)	4.5	9
Smart 56	5.6 ohm (+/- 5%)	1.5 ohm (+/- 5%)	6.4	12.8
Smart 65	2.6 ohm (+/- 5%)	N/A	10	N/A

Note: The stator is delta connected.

- 3.1. If the readings on the three phases are significantly non-equal to each other, most probably the stator is faulty.
- 3.2. If the readings on the three phases are equal but higher than the data in the table above, most probably there is a mechanical fault in the vibration head.

Disassembly of vibration head

1. Fix the vibrating element in a vice clamp firmly attached to a sturdy workbench.
2. Put a screw M8 with a proper length into the hole of the end cap and secure it with a nut.
3. Melt the Loctite by heating the end cap thread area. Use heat gun or gas torch.
4. By using the screw as a grip points loose the end cap from the vibrating element with a pipe wrench. The thread is a normal one, righthand thread.



5. Hold the vibrating element in vertical position with end cap side down for at least 10 minutes to collect all the oil into the end cap.
6. Remove the end cap (A) from the stator (B) until keeping the oil in the end cap.

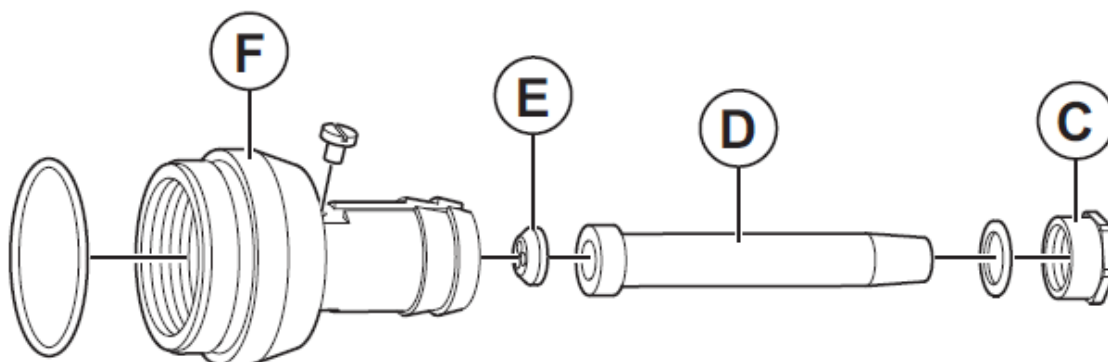


7. Measure the oil quantity precisely. It should be according the table below.

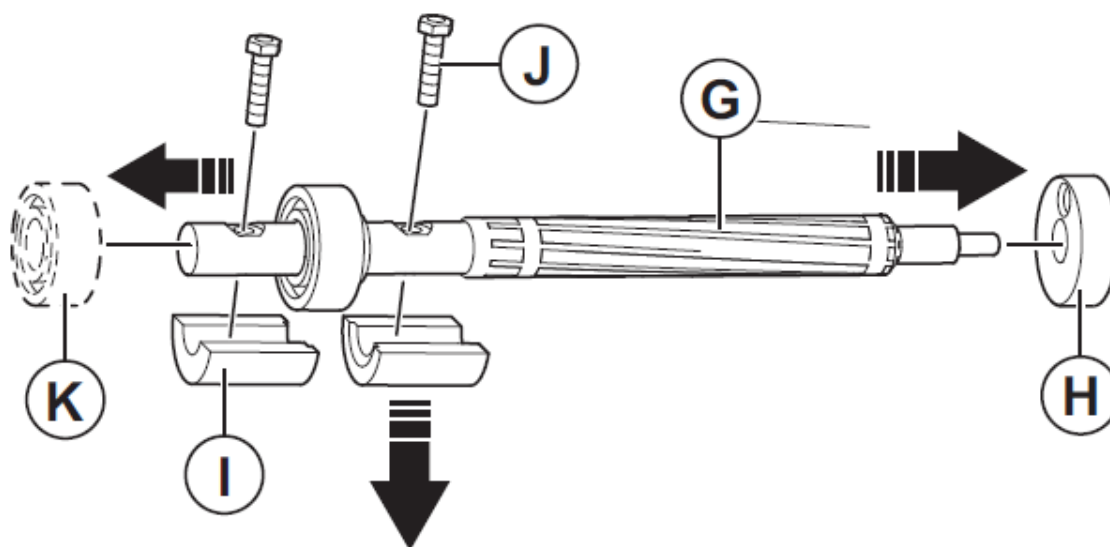
Model	SMART 40/40E	SMART 48/48E	SMART 56/56E	SMART 65
Oil quantity, ml	5	10	15	20

8. Inspect the oil for impurities and particles from wearing.
9. Check if rotor rotates smoothly without touching the stator. Check for any bearing jam or loose from seating.

10. Remove the nut (C), the flexible sheathing (D) and the rubber gasket (E). Keeping the gasket (E) in place will cause twisting and cutting of the wires. The nut (C) has a righthand thread.



11. Remove the hose nipple (F). It has righthand thread.
12. Use an applicable rod and hammer to carefully push the rotor (G) through the bearing holder (H).
13. Remove the bearing holder (H), the eccentric element (I) and the screws (J).



14. Remove the bearing (K).

Inspecting the parts

1. Rotor:

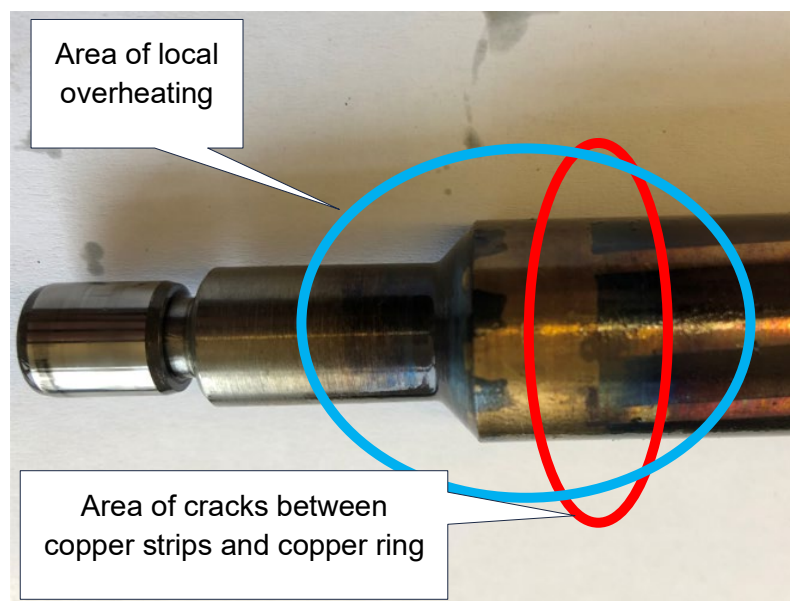
- Inspect the rotor for any marks indicating physical contact between rotor and stator.



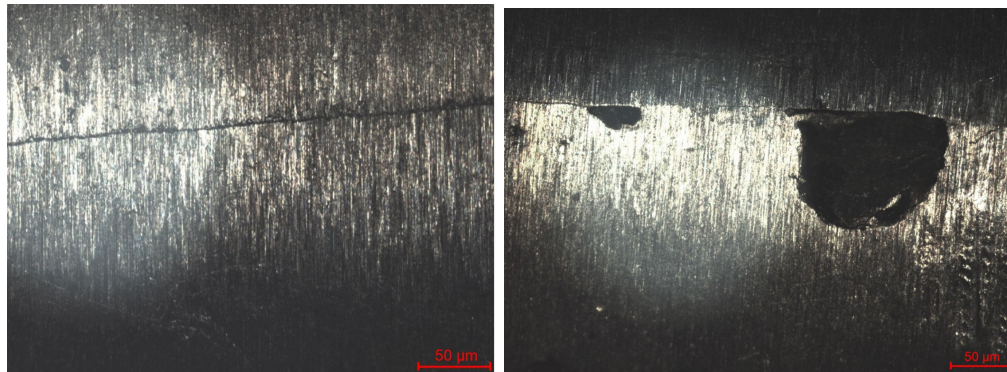
- Inspect the rotor for copper strips that are out of their grooves.



- Inspect the area between the copper strips and the copper rings for cracking. This is usually indicated with signs of local overheating.



Next pictures showing the cracks between the copper strips and the copper ring are taken with large magnification.



2. Stator:

- Check the resistance of the phases, it should be according to the table in the “Measuring the vibration head” subchapter.
- Check the insulation resistance. Use megohmmeter at 700V for no more than 3 seconds.

3. Bearings:

- Check if the bearings are jammed or seized.
- Check for the marks on the outer bearing surface indicating movement of the bearing inside its bed.

Assembly of vibration head

Assemble the vibrator head in the opposite to the disassembly sequence.

Change the O-rings.

Follow the below procedure to install the end cup.

1. Carefully clean the threads of the vibrator head and end cap. Make sure that the parts are dry with no oil, grease or dirt.
2. Apply 4 strings of threadlocker vertically on the end cap threads. Make sure that no threadlocker goes into the vibrator head.



3. Put oil into the end cap according to the table below. Keep the end cap vertical and make sure that no oil goes on the end cap threads. Use Shell Tellus T46 or equivalent.

Model	SMART 40/40E	SMART 48/48E	SMART 56/56E	SMART 65
Oil quantity, ml	5	10	15	20

4. Keep the end cap vertical and install the stator tube.
5. Install the screw on the ground connection point and seal it with Loctite 243 to prevent oil spillage.

6. Tighten the end cap to the specified torque according to the table below.

Tightening torque, Nm					Threadlocker type
Vibration head	40/40E	48/48E	56/56E	65	
End cap	170	350	520	750	Loctite 638
Hose nipple	120	200	250	250	Loctite 243
Eccentric screw	5	8	8	20	Loctite 243

Note: In order for Loctite to have time to polymerize, do not operate or test the poker for the next 6 hours, preferably leave it overnight and test it on the next day.