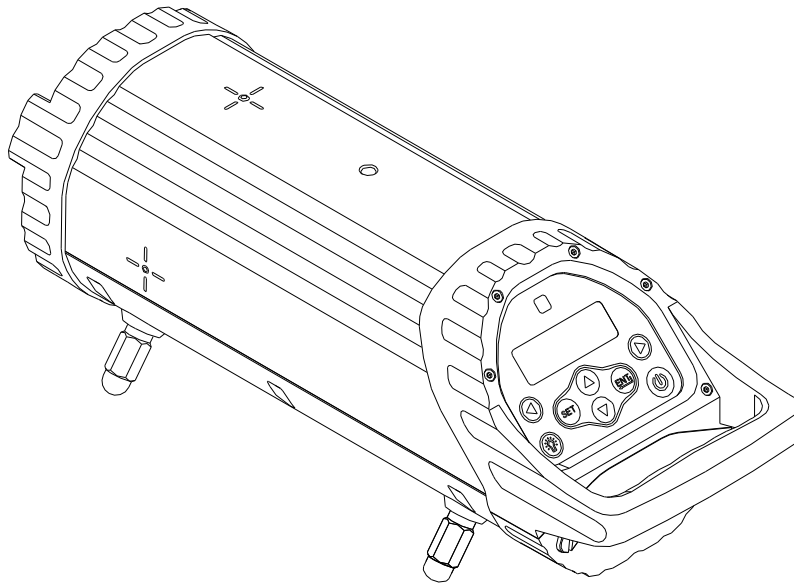


40-6690 Pipe Laser Service Manual



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1. Typical malfunction analysis and service method

No.	Malfunction Phenomenon	Possible cause	Service method
1	Visible Components are defective	Damage in handling	Replace components
2	Unable to power on	The battery is depleted	Replace battery or charge the rechargeable battery
		Button on the operation keypad is defective	Replace the operation keypad
3	No display when power on	LCD module is defective	Replace LCD module
4	Dark beam after power on	The laser source is defective	Replace laser source in pedestal
5	No laser after power on	The laser source is defective	Replace laser source in pedestal
		The power wire to laser source is not continuous	Reconnect the power wire
6	Could not level after power on	Inner mechanical setup malfunction	Replace Leveling module or re-calibrate
		Circuit malfunction	Replace mother board
7	Grade setting function is invalid	Button on the operation keypad is defective	Replace operation keypad
		Inner mechanical setup malfunction	Replace Leveling module or re-calibrate
		Circuit malfunction	Replace circuit
8	The function of laser scan left & right and on-level is invalid	Button on operation keypad is defective	Replace operation keypad
		Inner mechanical setup malfunction	Replace or adjust the relative position
		Circuit malfunction	Replace mother board
9	Level in left and right is invalid	Level sensor is defective	Replace sensor
10	The indicator lamp of laser center mark is not illuminated	Button on operation keypad is defective	Replace the operation keypad
		Indicator lamp is defective	Replace power LED
		The power to indicator lamp is cut off	Reconnect the power wire
11	Accuracy is out of tolerance	The sensor is not adjusted	Adjust the level sensor
		The sensor is defective	Replace level sensor
		The absolute code plate system is defective	Replace the defective component in the system
12	The sealing is invalid	The seal is defective	Replace seal
		The seal glue is invalid	Spread the seal glue again
	In above malfunctions, several malfunctions may occur simultaneously. Troubleshoot in this order: check the outer appearance, test the function and accuracy, perform a sealing test.		

2. Instrument disassembly and assembly

2.1 Instrument disassembly

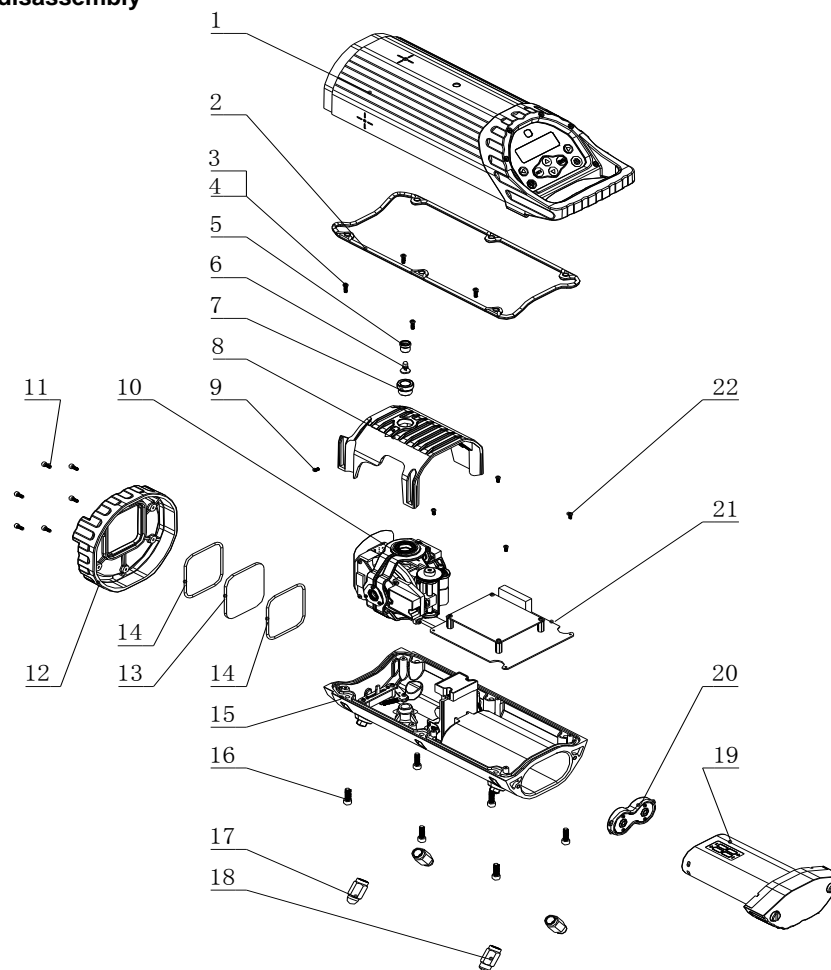


Figure 1 Disassembly of whole instrument

- | | |
|-----------------------------|--|
| 1. Upper cover | 13. Window glass |
| 2. Seal ring | 14. Seal ring |
| 3. Philips head screw M3x10 | 15. Bottom |
| 4. Lock washer | 16. SHCS M5X16 |
| 5. Press ring | 17. Support leg |
| 6. Power LED | 18. Support leg with rubber |
| 7. Bearing seat | 19. Alkaline battery box (19-1 rechargeable battery box) |
| 8. Exterior frame | 20. Alkaline battery cover |
| 9. M3X4 set screw | 21. Main circuit board |
| 10. Core | 22. Philips head screw M2.5X6 |
| 11. SHCS M3X8 | |
| 12. Front end cover | |

- 1) Remove the securing screw of the battery box to remove the battery box (19 or 19-1).
- 2) Remove 6 M3X8 SHCS (11), then remove front end cover (12), and window glass (13).
- 3) Remove 6 M5X16 SHCS (16), then remove the upper cover (1) and seal ring (2) using a 1/8" x 3" standard screw driver to break the seal.
- 4) Remove 4 2.5X6 Philips head screws (22), disconnect all electric connecting wires and remove the main circuit board (21).
- 5) Remove M3X4 set screw (9), press ring (5), power LED (6) and bearing seat (7).
- 6) Remove 4 M3X10 Philips head screw (3), 4 3mm lock washer (4), and exterior frame (8)
- 7) Vertically lift the core (10) out of the bottom bearing. Remove gimbal tensioning spring, from bottom (15) and remove core.

Figure 2 Disassembly of cover

- 1) Remove 6 SHCS M3X8, inner hexagon-head screw (1-1) and front end cover (1-2).
- 2) Remove operation keypad using a utility knife to separate (1-3)
- 3) Remove 4 M2.5X6 Phillips head screws (1-9) and 4 2.5mm lock washers (1-8), remove LCD module (1-7).
- 4) Remove screw (1-5) and seal ring (1-6)

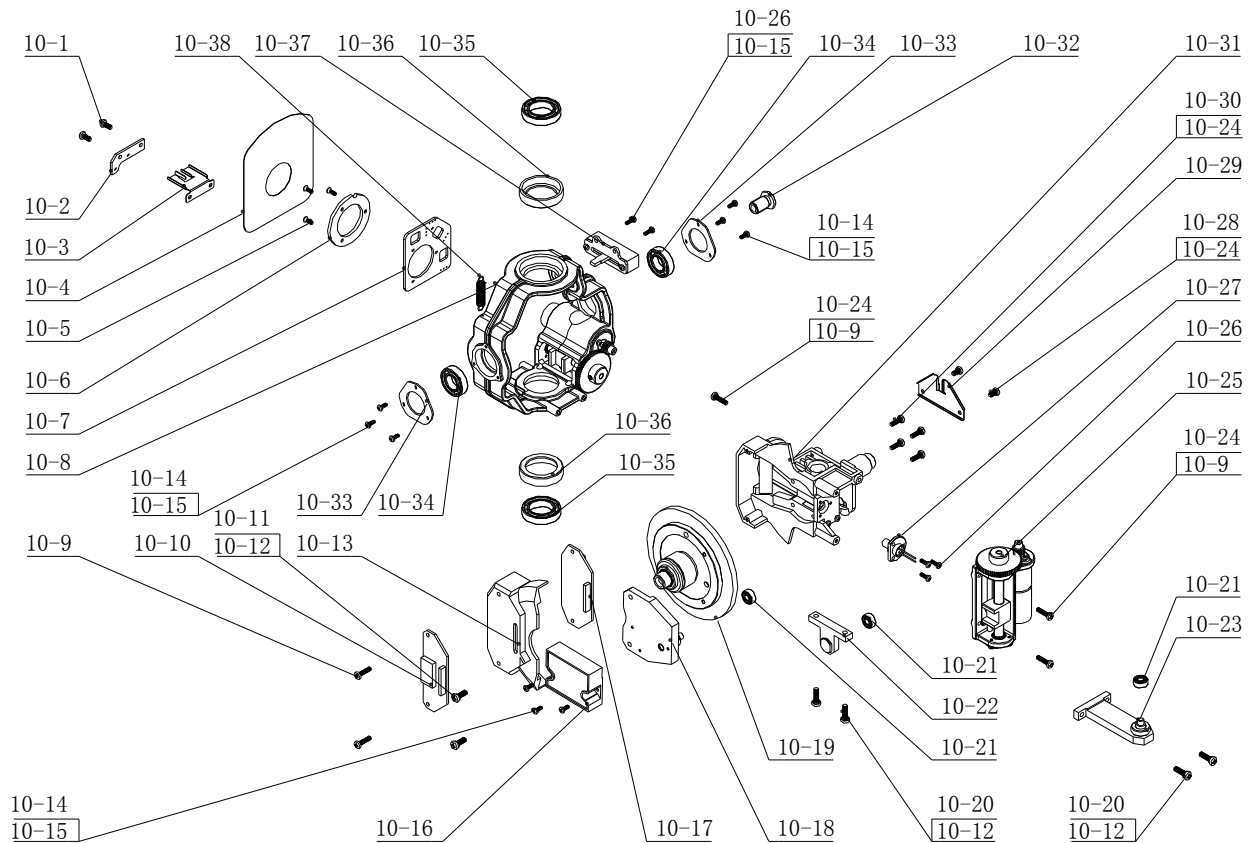


Figure 3 Disassembly of core

- | | |
|---|----------------------------------|
| 10-1. Philips head screw M2.5X6 | 10-20. Philips head screw M3X10 |
| 10-2. bracket | 10-21. 4mm bearing |
| 10-3. Leaf spring | 10-22. Mounting Bracket |
| 10-4. Membrane | 10-23. Mounting Bracket |
| 10-5. FHCS M2X6 | 10-24. 2.5mm elastic gasket |
| 10-6. Press board | 10-25. Leveling module |
| 10-7. #5 remote receiving circuit board | 10-26. Philips head screw M2X6 |
| 10-8. Pedestal | 10-27. Illuminator tube |
| 10-9. Philips head screw M2.5X10 | 10-28. Philips head screw M2.5X5 |
| 10-10. #13 connecting circuit board | 10-29. Bracket |
| 10-11. Philips head screw M3X8 | 10-30. Philips head screw M2.5X8 |
| 10-12. 3mm elastic gasket | 10-31. Base |
| 10-13. Cover | 10-32. Adjustment seat |
| 10-14. Philips head screw M2X5 | 10-33. Press board |
| 10-15. 2mm elastic gasket | 10-34. 10mm bearing |
| 10-16. Level sensor | 10-35. 15mm bearing |
| 10-17. #4 CCD circuit board | 10-36. Insulated seat |
| 10-18. Level sensor | 10-37. Encoder |
| 10-19. Code plate | 10-38. Tension spring |

- 1) Remove 2 M2.5X6 Philips head screws (10-1), and remove bracket (10-2) and leaf spring 2(10-3).
- 2) Strip off membrane (10-4).
- 3) Remove 3 M2X6 flat head screw (10-5), and remove press board (10-6) and #5 remote receiving circuit board (10-7).
- 4) Remove 2 M2X6 (10-26) and 2 2mm lock washers (10-15), and remove encoder (10-37).
- 5) Remove 6 M2X5 Philips head screw (10-14) and 6 2mm lock washers (10-15), remove adjustment seat (10-32), press board (10-33), 10mm bearing (10-34) and separate core main with pedestal (10-8).
- 6) Remove 2 M2.5X10 Philips head screw (10-9) and remove #13 connecting circuit board (10-10), cover (10-13) and #4 CCD circuit board (10-17) by removing soldier joint between the 2 circuit boards.
- 7) Remove 3 M2X5 Philips head screw (10-14) and 3 2mm lock washers (10-15), remove sensor (10-16) and tension spring (10-38).
- 8) Remove 2 M3X8 Philips head screw (10-11) and 2 3mm lock washer (10-12), and remove sensor seat (10-18) and 1pc 4mm bearing (10-21).
- 9) Remove 2 M2.5X5 Philips head screw (10-28) and 2 2.5mm lock washer (10-24) and remove leaf spring (10-29).
- 10) Remove 4 M2.5X8 Philips head screw (10-30), 4 2.5mm lock washer (10-24) and code plate (10-19). Manipulation of the base (10-31) may be needed to remove the screws and code plate.
- 11) Remove 2 M3X10 Philips head screw (10-20), 2 3mm lock washer (10-12), mounting bracket (10-22) and 1pc 4mm bearing (10-21).
- 12) Remove 2 M3X10 Philips head screw (10-20) and 2 3mm lock washer (10-12), mounting bracket (10-23) and 1pc 4mm bearing (10-21).
- 13) Remove 3 M2.5X10 Philips head screw (10-9) and 3 2.5mm lock washer (10-24), and frame (10-25).
- 14) Remove 3 M2X6 cross-head screw (10-26) and illuminator tube (10-27).

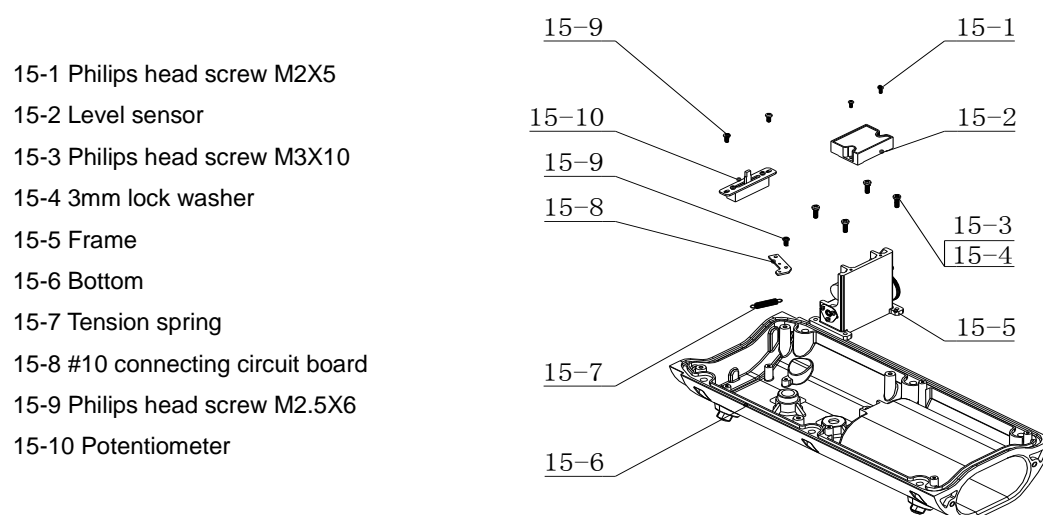


Figure 4. Disassembly of bottom

- 1) Remove 2 M2.5X6 Philips head screw (15-9), remove potentiometer (15-10).
- 2) Remove 1pcs M2.5X6 Philips head screw (15-9), remove #10 connection circuit board (15-8) and tension spring (15-7).
- 3) Remove 2 M2X5 Philips head screw (15-1) and level sensor (15-2).
- 4) Remove 4 M3X10 Philips head screw (15-3) and 4 3mm lock washer (15-4), remove frame (15-5)

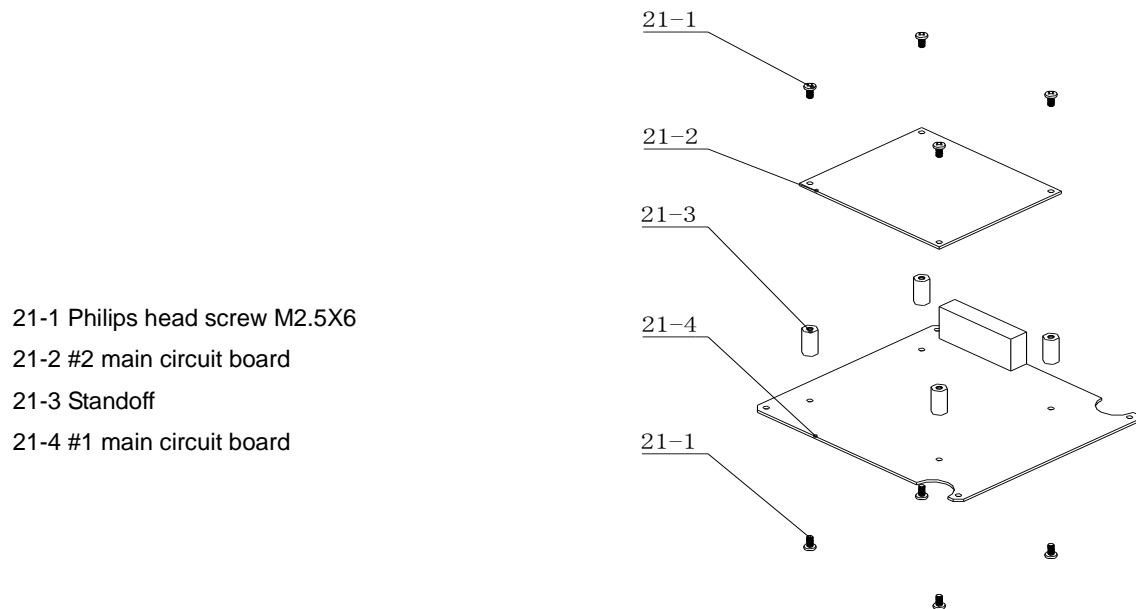
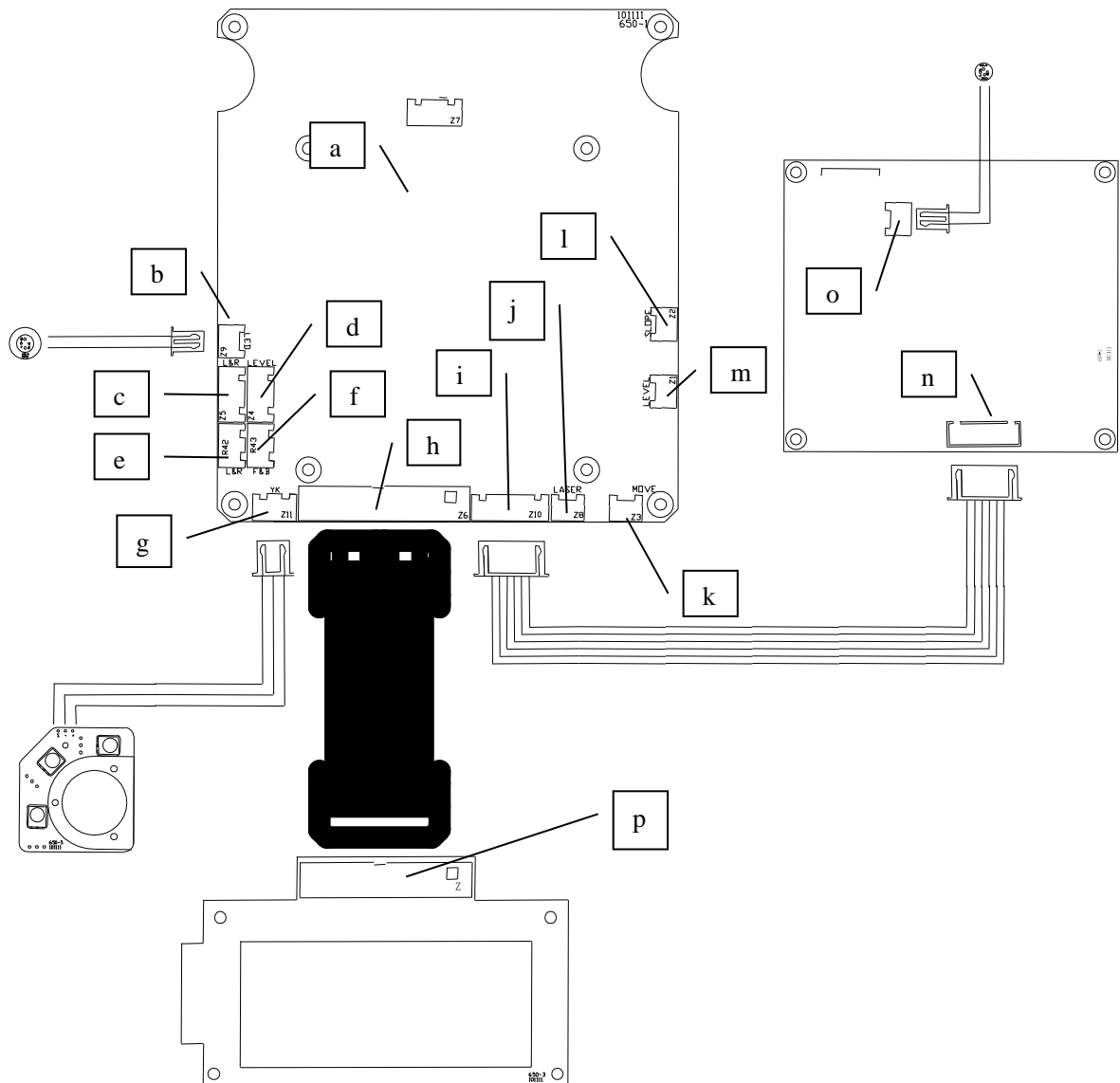


Figure 5. Disassembly of main circuit board

- 1) Remove 8 M2.5X6 Philips head screw (21-1), and separate #2 main circuit board (21-2) and standoff (21-3) with #1 main circuit board (21-4).

2.2 Circuit connecting wire figure



Connecting wire instruction:

- a Socket: Power wire plug
- b Socket: #9 board illuminator indicator lamp (fixed on the upper cover) two-core plug
- c Socket: Left and right sensor (15-2 level sensor in figure 4) plug
- d Socket: Front and back sensor (10-16 sensor in figure 3) plug
- e Socket: Left and right potentiometer (15-10 potentiometer in figure 4) plug
- f Socket: Front and back potentiometer (10-37 potentiometer in figure 3) plug

g Socket: #5 board remote receiving board three-core plug
h Socket: Connect with p socket by 26-core computer wire
i Socket: Connect with n socket by six-core wire
j Socket: Laser source wire plug
k Socket: motor (assembly on 15-5 frame in figure 4) plug
l Socket: motor (assembly on 10-25 frame in figure 3) plug
m Socket: motor (assembly on 10-8 pedestal in figure 3) plug
o Socket: #8 board CCD illuminator tube two-core plug

2.3 Important instruction on the instrument assembly

- 1) Please assemble the instrument as per the contrary order of 2.1 instrument disassembly
- 2) Use 706 glue (or like silica gel), on the seal as specified before assembly of the instrument.
- 3) Pay special attention to the insulation of core, and affix the front tension spring (15-7) with the fiber board to ensure insulation.
- 4) Fill the nitrogen in the top nitrogen hole, after filling up, plug up with sealing screw and seal it with 706 glue.