

TRACE 1300/1310: NPD Thermionic Source Replacement

This note provides instructions for replacing the thermionic source of the NPD detector.



CAUTION Thermionic sources are fragile. Handle them with care. Gently remove the plastic tube protecting the source ceramic during shipment. Especially avoid any excessive transverse force to the source ceramic. Before inserting the new source into the holder check that the PTFE insulator is properly interposed.

Source replacement operation must be carried out at low temperature to avoid burns. Therefore, before beginning the sequence, the detector must be cooled to room temperature.

NPD Thermionic Source Replacement

To replace the NPD thermionic source proceed as follows:

1. Put the GC in standby condition.
2. Switch off the thermionic source.
3. Turn off the make up gas flow.
4. Power off the GC.
5. Power off the thermoionic source power module.
6. Unplug the signal cable from the detector module.
7. Open the module flap cover.
8. Remove the thermionic source assembly cable.
9. Unscrew and pull out the straight jack connector of the collecting electrode cable from the collecting electrode bulkhead jack.
10. Remove the thermionic source.
 - a. Using a T6 torxhead key, loosen the dowel which fix the thermionic source connector to the thermionic source support.
 - b. Using the T10 torxhead screwdriver, remove the three T10 Torx screws from the thermionic source assembly.
 - c. Gently lift up the thermionic source connector guiding the flexible cable from the thermionic source support, then remove the thermionic source assembly from the NPD body. Avoid bumping the bead on the sides of the collector.
11. Replace the thermionic source.
 - a. Remove the protective cap covering the new thermionic source.
 - b. Mount and guide the new source assembly on the NPD body proceeding in the reverse order in which it was removed. Be careful not to bump the bead on the sides of the body and collecting electrode.
 - c. Rotate and align the thermionic source connector, then tighten the dowel to fix the connector to the support using the T6 Torxhead key.
 - d. Reconnect and screw the straight jack connector of the collecting electrode cable to the collecting electrode bulkhead jack.
12. Reconnect the source assembly cable to the NPD thermionic source, and twist the ring to lock the connection.
13. Close the module flap cover.
14. Plug in the signal cable into its contact on the detector module.

NPD Thermionic Source Turning On

15. Power on the GC.

To turn on the source **the first time**, follow the sequent steps:

1. Power on the thermoionic source power module.
2. Set the make-up gas on.
3. Switch on the thermionic source. Hydrogen and air are automatically opened.
4. Open the detector gases and set the gas flow rates as follows:
 - Hydrogen = 2.3 mL/min
 - Air = 60 mL/min
 - Make-Up (Nitrogen) = 15 mL/min
5. Increase the base temperature to 300 °C and wait the NPD cell reaches the correct set temperature.
6. Set the polarizer voltage to 4 V.
7. Be sure that the backoff signal is between 0 and 1.5 pA.
8. Switch on the source with an initial current of 2.50 A. The backoff signal can slightly increase, but should remain within 0 and 1.5 pA.
9. Monitor the signal through the keypad or through the data system, increase the current value by steps of 0.002 A, until an immediate and strong increase of the signal is observed.
10. Wait five minutes to let the source stabilizes.
11. Check that source is correctly switched on proceeding as follows:
 - a. Decrease hydrogen flow to 0.5 mL/min until signal decreases down to zero, then increase again to original value.
 - i. If the signal remains around zero, it means that the source is not switched on and it is necessary to increase further the current, accordingly to the procedure just described.
 - ii. If the signal rises back to original value, it means that source is correctly switched on.
 - b. Increase the current value of 2% of the actual ignition current. Let the signal stabilizes until its level drops below 20 pA



CAUTION Changes of gas flows and of detector base temperature affect the source current value required.