



TEST REPORT

Electrical verification of quench heaters after cold test of the cryo dipole HCLBALA-CR002002

Description

Some electrical problems affecting three quench heater circuits appeared during the cold test of the magnet. In order to localize the source of the problem(s) the IFS has been opened allowing the access to the instrumentation wires at the level of the cold mass output. During this operations some tests have been performed to verify if the problem(s) where located in the IFS or inside the cold mass.

Measurements

- 1 Electrical resistance, resistance to ground and resistance to coil of YT111, YT211, YT212 quench heaters before the opening of the IFS warm head.
- 2 Same measurements as in point 1 but after the opening of the IFS cold head.
- 3 Same measurements as in point 1 but accessing to the wires directly at the cold mass output level (excluding the IFS tube and external circuits).

Results

| | 1 Before IFS CH opening | | | 2 After IFS CH opening | | | 3 From cold mass output | | |
|-------|-------------------------|--------------|-------------|------------------------|--------------|-------------|-------------------------|--------------|-------------|
| | resistance | res. to coil | res. to gnd | resistance | res. to coil | res. to gnd | resistance | res. to coil | res. to gnd |
| | [Ohm] | [KOhm] | [KOhm] | [Ohm] | [KOhm] | [KOhm] | [Ohm] | [KOhm] | [KOhm] |
| YT111 | 23.2 | 26.7 | >20000 | 23.2 | 26.7 | >20000 | 21.5 | 26.7 | >20000 |
| YT211 | 146.2 | >20000 | 1.04 | 146.2 | >20000 | 1.03 | 144.5 | >20000 | 0.98 |
| YT212 | 21.4 | >20000 | 6.57 | 21.4 | >20000 | 6.56 | 19.6 | >20000 | 6.57 |

Conclusion

Tests 1 & 2 shows identical values before and after the opening of the IFS therefore we can conclude that there where no faulty contacts of IFS instrumentation wires to ground or to coil on the IFS cold head and inside the IFS tube. Following the results of tests 1 & 2, the 6 wires connected to the three quench heaters YT111, YT211, YT212 have been cut at the level of the cold mass output and the same verification has been performed excluding the IFS portion of each QH electrical circuit. The resistances of each quench heater to coil and to ground slightly changed within a range of 5%. The resistance of each quench heater decreased of 0.7 Ohms, this value correspond to the series resistance of the IFS QH circuit. **The source(s) of the electrical problems detected during the cold tests are located inside the cold mass.** The operation of opening the IFS cold head has been performed without problems using an orbital cutting machine, as foreseen in case of an in-situ IFS reparation.

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