



Contribution ID: 532 Contribution code: THPG52

Type: **Poster Presentation**

Design, manufacturing and validation of the new quench heater discharge power supplies for the protection of superconducting magnets for the High-Luminosity LHC Project at CERN

Thursday, 23 May 2024 16:00 (2 hours)

The Quench Heater Discharge Power Supplies (HDS) are magnet protection devices installed in the Large Hadron Collider (LHC) that, upon detection of a magnet quench, release energy into the copper-plated stainless-steel strip heaters, inducing a resistive transition all along the superconducting coils. Such a distributed internal heating ensures an even energy dissipation across the entire volume, preventing local overheating and magnet damage. Over 6000 HDS units have been operational in the LHC tunnel since 2007. The new HDS design for protection of the High Luminosity LHC (HL-LHC) Inner Triplet magnets, to be installed in the Long Shutdown starting in 2026, calls for a more advanced design with up-to-date components resulting in a higher reliability of the HDS units.

Several HDS prototypes were produced at CERN, eventually culminating in the development of the HL-LHC HDS version to be installed in the accelerator. This paper describes the design of the upgraded HDS units and the comprehensive safety and electromagnetic compatibility (EMC) tests, coupled with extensive operational tests, including irradiation tests, that have been conducted.

Footnotes

Funding Agency

Paper preparation format

Word

Region represented

Europe

Primary author: CARRILLO, David (European Organization for Nuclear Research)

Co-authors: BERBERAT, Raphael (European Organization for Nuclear Research); GEORGAKAKIS, Spyridon (European Organization for Nuclear Research); GUASCH-MARTINEZ, Josep (European Organization for Nuclear Research)

Research); LOPEZ CORDONCILLO, Denisse (European Organization for Nuclear Research); DE NICOLÁS LUMBRERAS, Enrique (European Organization for Nuclear Research); NOWAK, Edward (European Organization for Nuclear Research); PAPAMICHALI, Maria (European Organization for Nuclear Research); POJER, Mirko (European Organization for Nuclear Research); RODRIGUEZ MATEOS, Felix (European Organization for Nuclear Research); LEON LOPEZ, Miguel (Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas)

Presenter: CARRILLO, David (European Organization for Nuclear Research)

Session Classification: Thursday Poster Session

Track Classification: MC6: Beam Instrumentation, Controls, Feedback, and Operational Aspects: MC6.T23 Machine Protection