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Power Test of the First Two MQXFB Quadrupole Magnets Built at CERN for the HL-LHC Low-Beta Insertion

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The High-Luminosity project (HL-LHC) of the CERN Large Hadron Collider (LHC), requires low β* quadrupole magnets in Nb3Sn technology that will be installed on each side of the ATLAS and CMS experiments. After a successful short-model magnet manufacture and test campaign, the project has advanced with the production, assembly, and test of full-size magnets. In the last two years, two CERN-built prototypes (MQXFBP1 and MQXFBP2) have been tested and magnetically measured at the CERN SM18 test facility. These are the longest accelerator magnets based on Nb3Sn technology built and tested to date. In this paper, we present the test and analysis results of these two magnets, with emphasis on quenches and training, the quench localization with voltage taps and a new quench antenna, as well as voltage-current measurements.

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