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Current lead system of the SuperKEKB final focus SC magnet cryostats

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The SuperKEKB is being constructed at KEK, based on the nano-scheme. The final focus superconducting (SC) magnets to squeeze the beams, were designed with 8 quadrupoles, 4 compensation solenoids and 43 correctors, contained in two cryostats at the left and right sides of the interaction point (IP). The cooling power for each cryostat is supplied with an independent refrigerator and the dominant heat leak into the cryostat is from the current lead system. For the main quadrupoles and solenoids the current leads were rated at 2000 A, 1800 A, 1350 A, 1000 A and 450 A and were commercially supplied with the self vaporized helium gas cooled mode. The leads for the correctors with the maximum current of about 70 A were developed at KEK with the high temperature SC (HTS) tape at their cold ends. To qualify the current leads prior to installation into the service cryostat, a dedicated measurement cryostat was designed and fabricated. The cryostat consists of two liquid helium (LHe) vessels, which allow the leads to work under real operating conditions with the self cooling mode. This paper presents the electrical and thermal results of the full cryogenic tests on the leads. The current lead system will be analyzed for the coming commissioning and the future normal operation.

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