WORKABILITY OF THE Fast Discharge Unit components in scattered magnetic field of the ITER reactor hall [[1]](#footnote-1)\*)

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Switching devices of the power supply system for the TF superconducting magnet systems will be installed in the ITER reactor hall and should function in a scattered magnetic field (up to 30 mT) generated by the tokamak magnet systems. The preliminary tests have revealed that the normal operation of nearly all elements with magnet cores in the switching devices and their control systems was disrupted under the action of the dc magnetic field, including:

* power transformers;
* low-power transformers in control systems including transformers and chokes of power supply units;
* magnetic elements of transducers, including magnetic modulators of zero current transducers;
* electromagnets, including electromagnets of high-voltage safety contactors.

The disruption in operation of the elements with magnet cores is caused by the magnetic field concentration in ferromagnetic elements and a change in their magnetic state up to the level of magnetic saturation.

The paper considers the actions to be taken to eliminate the failure:

* magnetostatic shielding of elements with magnetic cores;
* selection and change of power supply units to units with components resistant to the magnetic field;
* change of the operation regimes so that magnetization in the external magnetic field does not disturb the workability of elements;
* use of fiber-optic transducers instead of transducers with magnetic elements.

Mathematical simulation and experimental research of magnetic field propagation in magnetic cores have made it possible to select and substantiate the configuration of the magnetostatic shields. The effectiveness of the action taken to clear the failure has been verified by the tests of the switching device elements and their control systems in dc magnetic fields with an induction up to 50 mT.

1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/E/ru/JA-Nechaev.docx) [↑](#footnote-ref-1)