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P4.063 Functional and load testing of stepping-motor hexapod for positioning of H-alpha optical components in the ITER port interspace

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For an ITER optical diagnostic, the components located within the port interspace area must be equipped with the proper remotely controlled positioning/alignment mechanisms meeting the variety of functional, environmental and load requirements. For the H-alpha diagnostics the major requirements are: 1) high structural stiffness and positioning stability under the ~100kg weight of Long Focus Spectral Telescope (LF-ST, metal-mirror optical unit of ~0.9m size); 2) high static and dynamic stability under the electromagnetic and vibrational interface loads; 3) low backstroke; 4) functionality in the magnetic field up to ~0.2T; 5) thermal and radiation resistance up to ~120°C and ~10 Mrad respectively, 6) Compact 6DoF design.

The modified stepping motors, implemented in the hexapod holding the LF-ST, have been designed to withstand the radiation and magnetic field loads. More details of hexapod design are described in a separate submission to the conference [1].

In this work, the test plans and preliminary results of major functional and load tests are reported, including the linear and angular stiffness, 6 DoF positioning precision and stability, resistance to vibrational, thermal and magnetic field loads.

[1] A.Yusov et al., "Prototyping of stepping-motor hexapod for 6 DoF positioning of optical components in the ITER port interspace", submitted to SOFT-2018

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