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Design and development of the mechanical support structure for ITER in-vessel magnetic sensors

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A mechanical support structure (a.k.a. “platform”) has been designed to provide mechanical support and thermal conductance for the inductive magnetic sensors installed on the inner shell of ITER vacuum vessel (VV) for equilibrium and high-frequency magnetic field measurement. The platform design is modular so as to simplify the on-site installation process. It consists of a permanent and a removable section. The permanent section is welded to the VV surface, forming the base of the whole assembly and allowing electrical connection with the in-vessel electrical service. The removable section houses the sensor head, which is engaged with the permanent base through a knife-switch type connector. Alignment of the two sections is realized via two alignment pins built into the permanent base. The removable section is designed to be compatible with remote handling operation in case of replacement. Real-scale prototypes of the platform components had been successfully manufactured and assembled together according to the design. Good alignment between the two sections has been achieved. Full electrical continuity from the sensor head down to the electrical service cabling has been demonstrated in the platform prototypes. Continued R&D efforts will focus on testing some installation and operation aspects, including mechanical vibration, thermal cycling, cable clamping, etc.

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