REMOTE HANDLING INSTALLATION OF DIAGNOSTICS IN THE JET TOKAMAK

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The requirement for the upgrade of the diagnostics for the JET ITER Like Wall (ILW) installation and application of ALARP, has necessitated the development of a bespoke set of diagnostic components. These components, by virtue of their design and location, require a versatile yet comprehensive suite of remote handling tools to undertake their in-vessel installation. The installation of the various diagnostic components is covered in multiple tasks. Each task requires careful assessment and design of tools that can successfully interface with the components and comply with the handling and installation requirements.
An example of one such task is the welding of a large number of support rails and supports to the torus wall to provide support for the extensive number of diagnostic conduits and trunking needed to convey sensor looms from various locations within the vessel to a common exit feed-through port. The welds for these support rails are specified as Autogenous TIG Welds. The methodology adopted and equipment developed will be discussed in the paper along with the solution to constraints imposed by RH tooling architecture.
With remote maintenance a requirement, the looms/conduits were designed to be modular with connections which are electrically connected when the module is fitted or conversely disconnected when removed. Installation of the trunking and looms will require the MASCOT to handle components varying in size and mass from small and light to others approximately two metres in length and 14 kg mass. Other components, like the TAE antennae, having a mass of approximately 130kg, also require specific consideration.
The design solutions for the varied and complex tooling necessary to carry out these tasks will be discussed along with the deployment strategy for the RH systems.
Finally, the shape of each complex and often bulky component is verified during the design phase, to ensure that it can be delivered and installed to its specified location in the torus. This is done by matching the kinematic capabilities of the remote handling system and the path of the component through the torus by using a state of the art virtual reality system.