

Radiation withstanding Remote-manipulated connectors

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1. Product overview

'Radiation withstanding Remote-manipulated connectors' are electrical connectors which are used in the Vitrification facility of Nuclear fuel reprocessing facility in Rokkashomura and are pursued Remote operationability for the power manipulator in the Hot Cell.

This Vitrification facility is designed so that all the process equipment are set-up in a big cell, and also maintained and remote-operated visually through ITV camera in the cell by using power manipulators and cranes installed under the ceiling. The new grip mechanism which was developed through several Mock-up tests in Japan is applied on this 'Radiation withstanding Remote-manipulated connectors'.

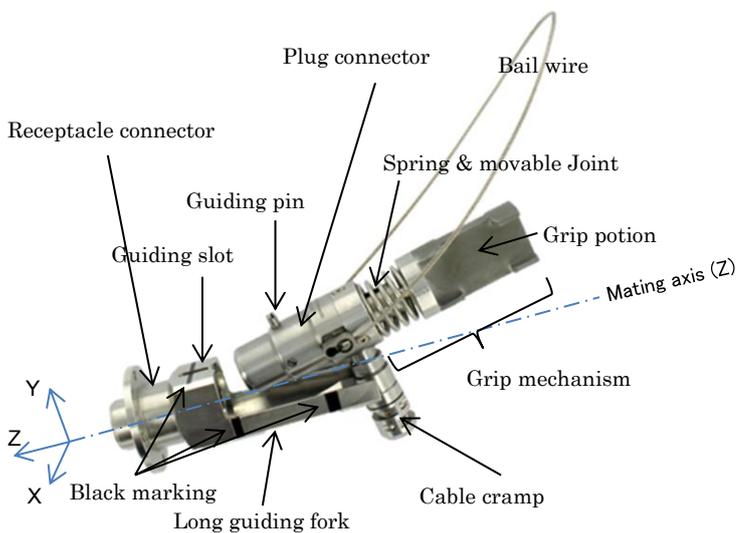


Fig 1. Remote manipulated connector overview

2. Major features of Product

- 1) 3 shell sizes, 10 pin-layouts can be applied for power supply and signal transmission
- 2) Receptacle with Ceramic insulator for connector boxes (40years use) and Plug & Receptacle with PEEK insulator
- 3) Horizontal and Vertical configuration of Plug & receptacle selected by Power manipulator movable range
- 4) Push-pull mating mechanism can realize the good operationability and space reduction
- 5) Optimized grip design for Power manipulator
- 6) Bail wire for the easy handling of the connector with cable and easy un-mating operation
- 7) Black marking for the visibility through ITV camera in the cell
- 8) During the mating operation of plug and receptacle, it is

possible to put plug connector on the long guiding fork of receptacle first, and then the mating alignment is automatically defined by pushing the plug along with mating axis (by guiding pin and guiding slot)

- 9) To avoid applying over load by power manipulator during mating operation, a coil spring with pre-loaded (20Kgf) equipped between grip portion and plug body is designed (Fig 2)

Thanks to contracting the coil spring when more than 20Kgf loaded, the operator can detect that the mating operation is completed in addition to check the marking indication visually through ITV camera

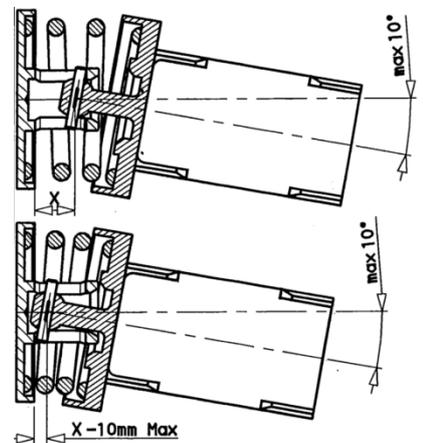


Fig 2. Grip mechanism behavior

- 10) In case of approaching plug connector by gripping the grip portion with power manipulator, plug connector can absorb the misalignment from the mating axis by $\pm 10^\circ$ acceptability in both X and Y direction (Fig 1, 2)

3. Sales record

From the beginning of the construction of Vitrification facility in year 2001, more than 1,950 connectors are delivered during over 15 years

'Radiation withstanding Remote-manipulated connectors' are dedicated (100%) connectors for the use of power manipulators in the Vitrification cell.

During the period, the connectors have been achieving good performance without any problems and are indispensable for the future commercial operation expected high reliability