

Traversing Incore Probe System (TIPS) Drive Control Unit (DCU)

Challenge

Existing Traversing Incore Probe System (TIPS) Drive Control Units (DCU) contain a large number of electromechanical components and arcane technologies. As the electromechanical components age, their reliability deteriorates due to age related degradation of materials, corrosion and wear. Many electromechanical components have become obsolete making it difficult or impossible to find direct replacement parts, which leads to expensive modifications and long lead times.

Components such as incandescent lamps have a finite life and must periodically be replaced. Many vintage semiconductor families have also become obsolete and difficult or impossible to source with no direct substitutes available. All of these factors lead to reliability problems with the system, increased maintenance burden and cost, and pose a risk to plant availability.

Solution

To address these issues, Framatome is providing the Framatome DCU and re-engineering expertise. Framatome's DCU uses commercial off-the-shelf (COTS) state-of-the-art components and current Programmable Logic Controller (PLC) technology as a direct-replacement to fit in the same footprint, utilizing the same field connections and positions. Customer training and maintenance resources are reduced due to unit simplicity, design drawing simplicity and ease of configuration.

Framatome is the proven leader in safety and non-safety retrofits and upgrades. Our lessons learned from past and ongoing projects help promote efficiency, reduce ambiguity, and minimize or eliminate rework, lowering costs and increasing quality. The Framatome team approach allows for desired system functionality and effective development efforts to be identified early in conceptual design phase. Framatome upgrade solutions are designed to utilize the right hardware and software for the job.

Delivery times of shorter than
six months available

Your performance
is **our** everyday **commitment**



DCU Front Panel



DCU Internals

Customer benefits

- A direct replacement to fit the same footprint, using the same field connections and positions as the existing DCU.
- Reduced training and maintenance
- Reliable and robust design for at least a 20-year service life.
- Framatome has been installing and upgrading TIP Systems since 1975.
- Spare storage solutions through the Nuclear Parts Center.

Technical Information

Framatome's DCU is offered as a direct replacement for the existing DCU:

- Same mounting, dimensions, and weight as the existing unit
- Field cable connections mate in the same positions and locations
- Commercial-off-the-shelf (COTS) state-of-the-art components
- Siemens PLC for future expansion or flexibility for plant changes
- EMC tested to EPRI TR-102323 for Emissions & Susceptibility
- Layout and configuration for maximum operations, maintenance access and flexibility
- Front Panel Status LED indicators for long life
- 16-segment LED alphanumeric displays for Core Limit & Detector Position
- PLC allows for several self-diagnostic features



DCU Automated Tester and Plant Simulator

DCU Automated Tester and Plant Simulator

Framatome's TIP Tester and Plant Simulator (TIP-TAPS) Unit is a portable test instrument that will simulate the operation of all plant equipment that connects to the DCU. All interface components, including the connectors for interfacing with the DCU interface cables, are located on the front panel of the TIP-TAPS.

Design

Framatome's direct-replacement DCU will be designed for maximum reliability, robustness and serviceability for at least a 20-year service life. The design and construction of the replacement DCU will employ modern technologies and components that have established track records for reliability and long-term availability, which minimize interface changes with operations and procedural processes. The Framatome solution is designed to take advantage of widely used and proven components that are readily available. Framatome builds and supports the DCUs in Lynchburg, Va. The Nuclear Parts Center in Lynchburg, Va., offers spare storage solutions for the life of the plant.

For future expansion, if it is desired to change encoder types or require tighter integration with other systems, the Framatome DCU makes these changes relatively easy. The ability to input a torque sensor would be an easy upgrade. This change would prove difficult in a non-digital implementation.

References

Since 1975, Framatome has installed and upgraded TIP Systems in the United States and in Europe. Of particular note, Framatome has upgraded five antiquated, obsolete TIP Systems, and installed a replacement system at a U.S. nuclear plant in New York. Framatome's TIPS support team leverages the knowledge base of worldwide users with Framatome TIPS experts located in Lynchburg, Va., as well as Karlstein and Erlangen, Germany.

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