

Global Instrumentation and Control

Nuclear Instrumentation System

Updated High Voltage Power Supplies

Background

The Westinghouse original ex-core Nuclear Instrumentation System (NIS) has been protecting nuclear plants for over 50 years. Industry experience has proven the design to be robust, reliable, and effective.

Westinghouse actively supports the original NIS by providing upgrades and replacement components such as the updated high voltage power supplies. These are direct replacements for the original high voltage power supplies. Westinghouse also continues to sell and repair the original models.

These modern design high voltage power supplies produce less heat and are designed for even higher reliability. They also provide several key technical and user advantages over the original models.

Description

The new power supplies mount in the same drawer location as the original supplies and use the existing signal interfaces. The high voltage power supplies provide filtered power to the ex-core neutron detectors, up to 10 mA with 15 mV_{PP} maximum ripple.

The new design improves on the original with reliability enhancements, normal and abnormal LED status indicators, a ripple test jack, and detector plateau curve testing support.

The updated power supplies are seismically and environmentally qualified as class 1E in accordance with the IEEE 323-1983 and 344-1987 requirements.

The power supplies are also qualified to the electromagnetic and radio frequency interference requirements of Regulatory Guide 1.180. The power supplies contain no microprocessors or firmware.



The updated high voltage power supplies are qualified replacements with important advantages over the original models.

Intermediate and Power Range Part Number 10356D59G01

- 0 - 1500 Vdc adjustable
- replaces UPMD-X54W / 2384A23H04

Source Range Part Number 10356D59G02

- 0 - 2500 Vdc adjustable
- replaces UPMD-X54W-M1 / 2384A23H01

Benefits

- **Status LEDs enable rapid troubleshooting**

The new status LEDs add a powerful troubleshooting tool. Analog diagnostic circuits monitor power supply voltage, current, and ripple. Problems are evident at a glance to simplify troubleshooting.

In addition to indicating power supply conditions, the status LEDs can warn of other problems such as excessive current draw and disruption of AC power.

- **Ripple test jack facilitates measurement**

A new test jack isolates high voltage for safe and easy ripple measurement in the drawer without disconnection of the triax cable.



The updated power supplies have the same connectors and mounting rails as the originals. A ripple test jack has been added for easy testing.



- *New status LEDs provide important information.*

Lower heat generation – longer life

The updated power supplies utilize modern design and components that allow the supplies to operate more efficiently and at a temperature cooler than the original models. Lower heat generation leads to less component stress, longer in-service life, and lower operating cost.

Easier detector plateau curve testing

The new power supplies are adjustable down to 0 volts to facilitate detector plateau curve testing. This eliminates the need for external test equipment. It also prevents problems associated with triax connector wear and tear since the detector field cables no longer need to be disconnected from the power supply.

Improved triax connector anti-rotation

The triax connector uses a D-hole mounting to provide greater resistance to rotation when the triax cable is attached or removed.

Deliverable

The updated NIS high voltage power supplies are fit and function compatible replacements that maintain the original system qualification. They can be ordered through Westinghouse Nuclear Parts Operations (NPO) or included in new NIS drawer builds.