

Global Instrumentation and Control

Nuclear Instrumentation System

Power Range Digital Meter 2.0

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 continues to support the NIS with obsolescence replacements and upgrades such as the Power Range Digital Meter 2.0. The original digital meter upgrades that Westinghouse supplied from 1985-2002 have become obsolete. To resolve this issue, Westinghouse developed the Digital Meter 2.0, which can be installed to replace obsolete digital meters or to upgrade from analog meters.

The digital meters increase measurement resolution and reduce the potential for human error when taking readings.

Description

The Digital Meter 2.0 is a class 1E qualified precision LED microampere current meter for the NIS power range A and B drawers.



The Digital Meter 2.0 fits the same cutouts as analog meters and original digital meters.

Installation Options

- Field kit to upgrade from analog meters
- Field kit to replace obsolete digital meters
- Installation by Westinghouse during new NIS drawer builds or refurbishment

Both power range A and B digital meters feature slow and fast averaging settings for steadier readings or faster response.

- Power range A digital meters display reactor power from 0.0 – 120.0 percent.



Power range A digital meter has 0.1 percent resolution, whereas the analog meter only has 1 percent resolution.

- Power range B digital meters display ex-core neutron detector current in 0.0 – 400.0 μA and 0 – 4000 μA ranges.



The power range B analog meter is challenging to read and provides only 5 μA resolution on the typical range setting.



Power range B digital meters are easy to read and provide 0.1 μA resolution.

Specialized bezels are provided to mount the digital meters in the original analog meter cutouts. New shunt/ filter circuit boards are mounted on the back of each meter to interface to the existing drawer electronics.

Meter range/rate switches are pre-wired to the shunt/filter boards for easy installation. New front panel nameplates, wires, labels and mounting hardware are provided.

The meters are seismically and environmentally qualified as class 1E components in accordance with the Institute of Electrical and Electronics Engineering 323-1983 and 344-1987 requirements. They are also qualified to Regulatory Guide 1.180 EMI/RFI susceptibility requirements when installed with the provided NIS power line filter kits.

Westinghouse can provide licensing support, field change notices, drawing updates, technical manual updates and installation services.

Benefits

Greater measurement resolution provides potential for more power capability and margin to trip.

- Easily readable display reduces potential for human error.
- Opening the power range drawers for digital measurements is no longer required.
- Westinghouse controls the design and manufacturing to mitigate obsolescence issues.
- Simple, reliable design contains no microprocessor or firmware.
- Test jacks are provided for easy calibration.
- Same meter is used for Power range A and B drawers with easily interchangeable lenses.
- Included Power Line Filter Kits remove noise from instrument power to source, intermediate, and power range A & B drawers.

Experience

The Digital Meter 2.0 has been installed in 6 reactor units.