Product Specifications

300i SR/IR NFMS

Source Range/Intermediate Range Neutron Flux Monitoring Systems for Nuclear Power Plants

Tired of replacing failure-prone BF_3 Source Range detectors which extend your outages and result in lost revenues and unplanned replacement and waste disposal costs? Do you need to modernize your aged or obsolete nuclear instrumentation systems to support life extension? The Thermo Scientific 300i Neutron Flux Monitoring System helps nuclear power plants solve these problems by replacing traditional Source and Intermediate (Wide) Range channels with a single, 40-year-life, fission-chamber-based system.

Features

- Eliminates failure-prone, short-lived BF_3 detectors
- Reduces personnel exposure associated with frequent detector replacements
- Replaces two channels with one, reducing maintenance and inventory
- 40 year life under normal, full-power operating conditions
- Qualified for Safety Grade Class 1E and US NRC RG 1.97 Post-Accident Monitoring applications
- Meets Appendix R Fire in the Control Room requirements
- Demonstrated high immunity to electromagnetic interference and noise
- Modern, proven electronics for reliability and low maintenance
- Modular design insures spare parts availability into the future

With minimal impact and cost, nuclear power plants can easily upgrade their Source and Intermediate (Wide) Range channels to the simpler and more reliable, fission-chamber-based Thermo Scientific 300i Neutron Flux Monitoring System. The 300i is the ideal solution for new plants to be constructed in the future.

Rugged, field-proven components and a streamlined design give the Thermo Scientific 300i superior reliability and qualify it to last the life of the reactor. No longer must nuclear power plants be forced to routinely replace short-lived detectors, or continually service obsolete electronics.

By using fewer components, the single-detector design of the 300i significantly reduces the cost of installation and increases reliability. A single detector replaces both the Source Range and Intermediate Range detectors. Yet, the 300i measures the full neutron flux range—more than 11 decades from cold reactor shutdown to 200 percent full power.

Plants began to replace aging, failure-prone systems to comply with new regulations in the early 1980s. Since then, more than 130 reactors worldwide have chosen our neutron flux monitoring systems because of their high reliability, high immunity to electromagnetic interference, ease of installation, and ease of testing.

Nuclear power plants already using the Thermo Scientific 100 Series System for compliance with Regulatory Guide (RG) 1.97 can easily upgrade to the 300i by changing only the electronics. The 300i System upgrade uses the presently installed detectors and cables of the 100 Series System, and can easily be performed at power or during a short outage since no in-containment work is required.

300i SR/IR NFMS — Source Range/Intermediate Range Neutron Flux Monitoring System

General Specifications	Source Range	Intermediate (Wide) Range
Sensitivity	20 cps/nv (thermal)	1 V/decade
Flux Range	10^{-2} nv to 10^{4} nv	1 nv to 10^{10} nv
Output Range	1.0 cps to 10^{6} cps (0.1 cps to 10^{5} cps optional)	10^{-8} to 200% (10^{-6} to 200% optional)
Linearity	±2% (percent of equivalent linear full scale)	±1% (percent of equivalent linear full scale)
Mechanical Specifications	**Dimensions**	**Weight**
Detector Housing	152 cm (60 in) x 14.3 cm (5.625 in) O.D.	36 kg (80 lb)
Amplifier	61 cm (24 in) x 51 cm (20 in) x 25 cm (10 in)	23 kg (50 lb)
Source/Intermediate Range Drawer	26 cm (10.25 in) x 48 cm (19 in) x 48 cm (19 in)	16 kg (35 lb)

Temperature Specifications

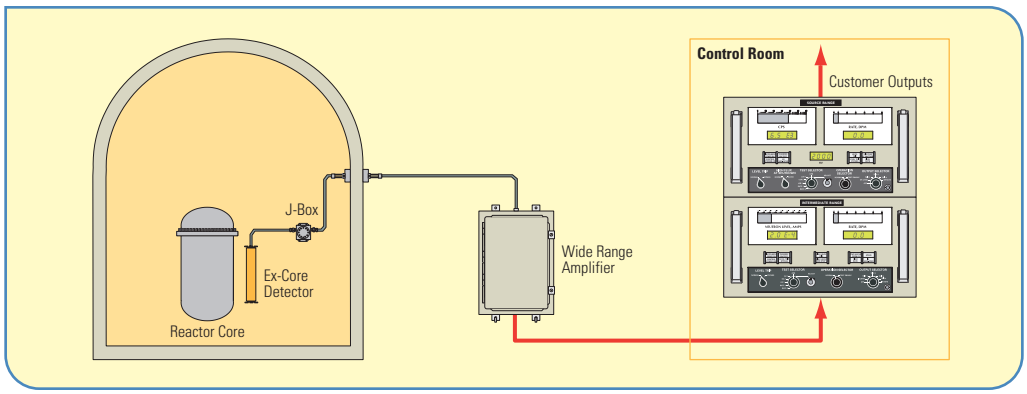
The 300i Neutron Flux Monitoring Channel is designed to operate under normal service conditions and to operate through a design basis event (DBE)

Detector	Normal:	0°C to +93°C (+32°F to +200°F); 10% to 100% RH
	DBE:	LOCA profile
Amplifier	Normal:	+5°C to +60°C (+41°F to +140°F); 10% to 95% RH
	DBE:	+5°C to +60°C (+41°F to +140°F); 10% to 100% RH
Signal Processor	Normal:	+8°C to +57°C (+46°F to +135°F); 10% to 95% RH
	DBE:	Normal

Electrical Specifications

Power Requirements	120 VAC ±10%, 60 Hz, 1.0 A/unit; 220 VAC ±10%, 50 Hz, 0.5 A/unit

Typical Ex-Core Neutron Flux Monitoring System Channel



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