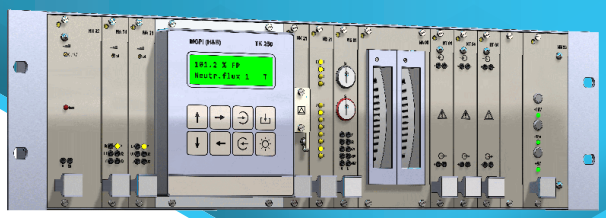
MIRION TECHNOLOGIES

PROTK

PRM 501™

Power Range Monitor



Power range monitor used with neutron ionization chamber for ex-core neutron flux monitoring.

FEATURES

- Qualified to perform category A functions, according to IEC 61226 and KTA 3505 (for safety related instrumentation)
- Seismic qualification (IEEE 344 and KTA 3505)
- Two signal paths for two neutron ionization chambers
- Short response time < 20 ms
- Calibration to neutron flux signal or reactor power (nv, P/Pn)
- Calculation of the top flux, bottom flux, flux average value and flux deviation
- Linear analog outputs
- Generation of analog and binary outputs for the reactor protection system
- Built in test signal generators (remote activation possible)

DESCRIPTION

The power range monitor PRM 501 forms part of the digital Neutron Flux Monitoring Systems (NFMS) product line proTK™. It is used, in combination with neutron ionization chambers (B-10 detectors) for ex-core neutron flux monitoring in the power range.

The associated processing unit DGK 250, has been designed and is qualified (in hardware and software) to meet category A requirements, applicable at the level of the reactor protection system.

Note: 1 nv = 1 neutron / (cm^2.s)

PRM 501 | POWER RANGE MONITOR

KNU 50 SAC NEUTRON IONIZATION CHAMBER

The neutron ionization chamber KNU 50 SAC (and its variants) has been designed for neutron flux monitoring in ex-core positions. The neutron sensitivity of this chamber is achieved by a B-10 layer within the sensitive volume of the detector. Thermal neutrons react with the B-10 nuclei and cause alpha particles or Li nuclei to be emitted into the gas. The resulting ionizations within the chamber are directed, due to the high voltage between the electrodes and generate a measurable DC current.

Type	Neutron Sensitivity (A/nv)	Operating Range (nv)	Nominal Diameter (mm)	Detector Length (mm)		Temperature	
				Nominal	Sensitive	Continuous	Accident
KNU 50 SAC	4.2E-14	1E+2 to 1E+10 *	50	665	521	0°C to +130°C (+32°F to +266°F)	72 hours 160°C (320°F)

* Detector only

OTHER DETECTOR CHARACTERISTICS

- Integrated mineral insulated cables
- Nominal operating voltage: 800 VDC
- Maximum pressure (short time): 500 kPa (5 bar)
- Gamma TID: 40 MGy
- Maximum fluence: 5E+18 nvt (neutrons/cm^2)

DIGITAL PROCESSING UNIT (DGK 250)

- Input range of preamplifiers adapted to application (0 to between 5 µA and 4 mA)
- Up to two current preamplifier modules in each measurement channel
- Modular, multi-processor system
- Program code & configuration parameters, fixed in EPROM
- Non-volatile parameter memory (CMOS-RAM with integrated Li-battery)
- Data interface: up to two RS 232 and/or RS 485 (with optional built in firewall)
- Alphanumeric LCD: 2 x 16 characters (measurement values, status, diagnostic, parameters, thresholds...)
- Alarm and status LEDs on the front panel
- HV detector supply: 0 to 1 kV / 2mA (option up to 30 mA)
- Dimensions: standard 19" x 3U rack (IEC60297)

ENVIRONMENTAL CHARACTERISTICS (For Electronics)

- Temperature: 0°C to +70°C (+32°F to +158°F)
- Relative humidity: max. 75% RH

ELECTRICAL CHARACTERISTICS

- Power supply: 24 VDC or 115/230 VAC (50/60 Hz)
- Isolated analog outputs: 0/4-20 mA, 0/2-10 V
- Binary outputs (isolated relays): 60 V/0.5 A or 125 V/1 A

REFERENCE STANDARDS

- Safety classification: Category A, acc. IEC61226
- Software: IEC60880, KTA3503/3505
- Qualification: IEEE323, KTA3505
- Seismic: IEC60980, IEEE344, KTA3503/3505
- EMC/RF: IEC61000-6-2, IEC61000-6-4

VERSIONS

- 24 VDC or 115/230 VAC (50/60 Hz)
- Other ionization chambers available on request
- Possibility to connect up to 4 ionization chambers
- Various lengths of integrated mineral cable up to 70 m (230 ft) and connectors (e.g. HN male/female), with or without PEEK coating
- Number and type of input and output modules adjustable

ACCESSORIES

- Seismic cabinet or wall-mounted cabinet
- Mineral extension cables up to 70 m (230 ft)
- Organic cables (length on customer's specification)

Featuring:

MGPi H&B

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