

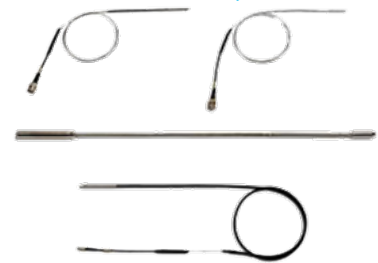


**PROTK**

# PRM 502™

*Local and Average Power Range Monitor (In-Core Neutron Flux Instrumentation for BWR Applications)*

Power range channel used with fission chambers for in-core neutron flux monitoring.



## FEATURES

- Qualified to perform category A functions
- Up to 4 in-core fission chambers per DSK 250
- Up to 64 LPRM signals (16 DSK 250) can be connected to the DMK 250 processing unit for average power range monitoring
- Compatible with in-core fission chambers of various sensitivities
- Fission chambers for extreme environmental conditions (temperature, pressure, radiation,...)
- Individual adjustable detector supply
- No preamplifier required between detector and DSK 250
- Signal filtering with adjustable time constant
- Neutron flux signal for each detector
- 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 502 forms part of the digital Neutron Flux Monitoring Systems (NFMS) product line proTK™.

It is used in BWR type reactors in combination with fission chambers for in-core neutron flux monitoring in the power range and the signal processing units DSK 250 and DMK 250.

The processing unit DSK 250 has been designed and is qualified (hardware and software) to provide the flux density for each detector position, i.e. perform the functions of a “Local Power Range Monitor” (LPRM).

The associated processing unit DMK 250

calculates the average and flow related flux signal, i.e. functions as an “Average Power Range Monitor” (APRM).

## IN-CORE FISSION CHAMBERS

For local and average power monitoring, miniature fission chambers are used in the current mode. They are designed to withstand the extreme in-core environmental conditions.

Depending on the type and use of the fission chambers suitable connectors (e.g. HN) can be mounted on the integral mineral insulated cable of the detector.

Also movable miniature fission chambers are available for in-core flux monitoring. They can be used in conjunction with the DSK 250 or - if required - with customized signal processing.

## TYPICAL CHARACTERISTICS OF THE DETECTORS

- Maximum operating temperature: 350°C (662°F)
- Nominal operating voltage: 150 VDC
- Maximum fluence: 3E+20 nvt (neutrons/cm<sup>2</sup>)
- Maximum gamma flux: 1E+7 Gy/h
- Diameter of the integrated mineral cable: 1 mm
- Different diameters and sensitivities of detection are available (1)

(1) Please consult Mirion Technologies for complementary information

## DIGITAL PROCESSING UNIT

- 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
- Dimensions: standard 19" x 3U rack (IEC60297)
- **DSK 250 processes four detector signals in four individual signal paths:**
  - Calibration of detector signal to power density
  - Alarm threshold for local density in relation to coolant flow
- **DMK 250 accumulates up to 64 detector lines (16 DSK 250):**
  - Calculation and calibration of average reactor power
  - Calculation of flow related flux and margin to scram
  - Flux oscillation monitoring combining transient suppression and fast response
  - Typically the full scope consists of the equipment for 3 redundancies (trains), i.e. 3 x 16 DSK 250 + 3 DMK 250 and a total of up to 192 detectors

## 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: suitable for RPS (acc. KTA3501/3505)
- Software: IEC60880, KTA3503/3505
- Qualification: IEC60780, 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)
- Various in-core fission chambers
- Various detector cable lengths
- Number and type of input and output modules adjustable

## ACCESSORIES

- Seismic cabinet or wall-mounted cabinet
- Field cables (length on customer's specification)

Featuring:

**MGP***i***H&B**

