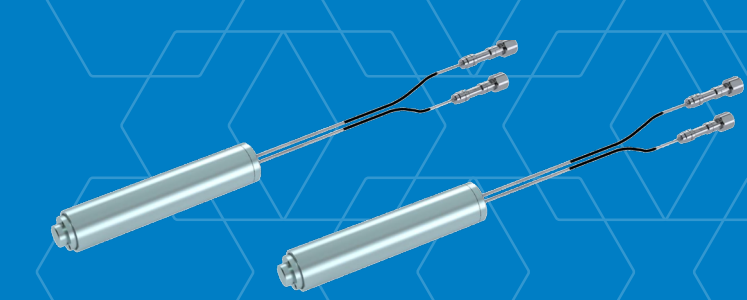
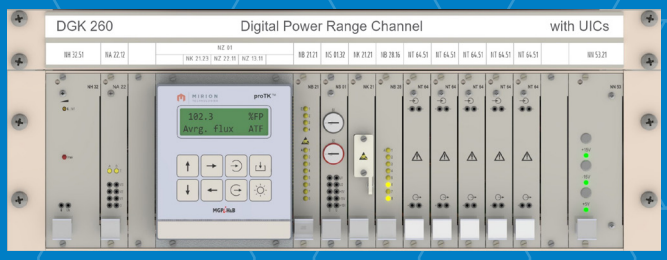
MIRION
TECHNOLOGIES

PROTK™ NEUTRON FLUX MONITORS

PRM 510™

Power Range Monitor





Neutron flux monitor for reactor power operation.

DESCRIPTION

At the heart of the PRM 510 power range monitor resides the DGK 260™ digital power range signal processing unit that belongs to the Mirion proTK™/260 series of signal processing units for safety critical applications.

The DGK 260 channel can be used with up to two neutron ionization chambers and provides fast linear signals proportional to the reactor power.

Hardware and software of the PRM 510 monitor are designed and qualified for use at the level of the reactor protection system.

With the PRM 510 monitor, Mirion provides the complete neutron monitoring system for the power range from the neutron detectors to the safety signals for reactor protection and control.

FEATURES

- Modular design, highly customizable
- Operated with up to two B-10 lined neutron ionization chambers
- Individual signal paths for the two ionization chambers
- Calculation of mean value, axial deviation and linear rate (of change)
- Independent calibration of output signals (nv, %FP)
- Optional signal filtering with fixed time constant
- Generation of analog signals with linear scaling, binary alarms, trip and status indication signals
- Fast response times (< 15 ms, without filtering)
- Integrated test signal generators and simulation capabilities
- Secured serial interface
- Qualified for Category A functions (Class 1 systems) acc. IEC 61226

PRM 510™ POWER RANGE MONITOR

DETECTORS						
Type	**Product Code**	**Sensitivity (A/nv) x 10^{-14}**	**Nominal Op. Voltage (VDC)**	**Neutron Flux Range (nv)**	**Dimensions (mm) ϕ, L (total)**	**Integral Cable, Connectors**
Compensated B-10 neutron ionization chamber (CIC)	KNK 50-1 ACH … KNK 50-6 ACH	0.7 … 4.4	800, -500 (comp. voltage)	1.0e+2 … 1.0e+10	50, 255 … 50, 705	3 x (MI-cable + HN)
Uncompensated B-10 neutron ionization chamber (UIC)	KNU 50-1 ACH … KNU 50-6 ACH	0.7 … 4.4	800	1.0e+2 … 1.0e+10	50, 255 … 50, 705	2 x (MI-cable + HN)

The KNK/KNU 50™ ACH are designed to withstand accident/LOCA conditions (max. 200 °C/390 °F, 800 kPa/116 psi, 100% saturated steam).
For the full range of available detectors, for specific applications and for receiving further technical data, please contact Mirion.

DIGITAL SIGNAL PROCESSING
Multi-processor system
Protected program memory
Non-volatile parameter memory
RS-232 and/or RS-485 serial interface for measurement data, status information and parameter settings
Internal LC-display: 2 x 16 characters

OUTPUT SIGNALS	
Top/bottom and average neutron flux or reactor power	Linear scaling: 0 … 1e+10 nv 0 … 125 %FP
Axial deviation (top/bottom)	−30 … +30 %FP
Linear rate signal	−10 ... 0 ... +10 %FP/s
Analog outputs	0/4 ... 20 mA/600 Ω, isolated
Binary outputs (isolated relay changeovers)	60 V/0.5 A or 125 V/1 A

The shown scaling of the output signals are examples and can be configured according to the application requirements.

ACCESSORIES	
Cabinet, incl. EMI/EMC and seismic testing	I&C cabinet or wall mounted housing (e.g. IEC 61000-6 2/4, IEEE 344)
Field cables (> 100 m)	Organic, low noise coaxial or triaxial field cables Halogen free, flame retardant (e.g. IEE 383, IEC 60754-1, IEC 60332-1-2)

ENVIRONMENTAL, ELECTRICAL, MECHANICAL CHARACTERISTICS (SIGNAL PROCESSING UNITS)	
AC/DC power supply **230 VAC or 115 VAC** **18 ... 33 VDC**	+10%/−15%, approx. 30 VA
High voltage supply **HV module(s) in DGK 260-g**	Adjustable within max. range: 0 ... 0.5/1/2/4 kV
Operating temperature **open rack** **recommended long-term op.**	 0 ... 70 °C (32 ... 158 °F) 10 ... 40 °C (50 ... 104 °F)
Mechanical vibrations	max. 5 g, 5 ... 100 Hz (or acc. custom requirements)
Dimensions (mm/inch) **Rack (W×H×D)** **Plug-in modules**	19” system acc. IEC 60297 483 × 133 × 280 / 19 x 5.2 x 11 100 × 160 / 3.9 x 6.3

QUALIFICATION / DESIGN STANDARDS (SELECTION)	
Design **Software** **Qualification**	IEC 61513 / IEEE 603 IEC 60880 / IEEE 7.4.3.2 IEC/IEEE 60780-323 IEC/IEEE 60980-344

RELATED PRODUCTS	
DGK 260	Digital signal processing unit for power range
SRM/IRM/WRM 510	Source/intermediate/wide range monitor

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