



PROTK™ NEUTRON FLUX MONITORS

IRM 510™

Intermediate Range Monitor

Neutron flux monitor for reactor start-up in the intermediate range.

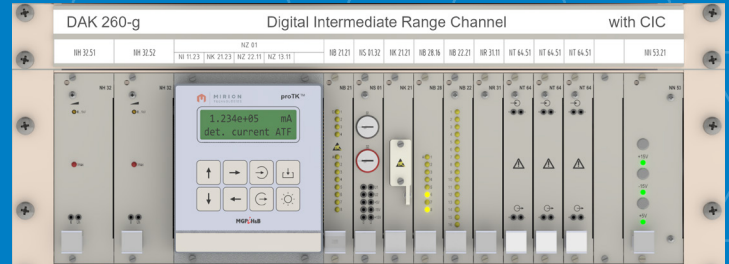
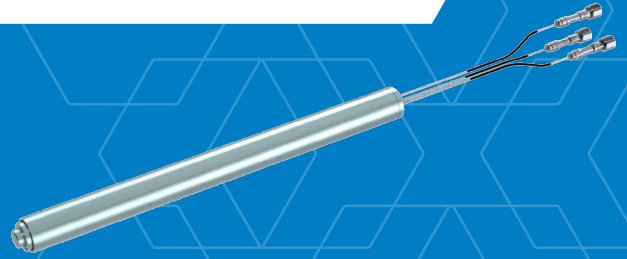
DESCRIPTION

At the heart of the IRM 510 intermediate range monitor resides the DAK 260-g digital startup signal processing unit that belongs to the Mirion proTK™/260 series of signal processing units for safety critical applications.

The DAK 260-g channel can be used with any type of neutron ionization chamber and a matching current-to-frequency converter to cover up to 10 decades of neutron flux during reactor start-up.

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

With the IRM 510 monitor, Mirion provides the complete neutron monitoring system for the intermediate range during reactor start-up from neutron detector to the safety signals for reactor protection and control.



FEATURES

- ✓ Modular design, highly customizable
- ✓ Operated with a B-10 lined, compensated or uncompensated neutron ionization chamber (CIC/UIC)
- ✓ Provides the calibrated neutron flux (nv) or reactor power (%FP, W, ...)
- ✓ Calculation of flux change rate (reciprocal of the reactor period)
- ✓ Signal filtering with adaptive filter parameters
- ✓ Generation of analog output signals with lin. or log. scaling
- ✓ Generation of binary alarm, trip and status indication signals
- ✓ Integrated test signal generators and simulation capabilities
- ✓ Secured serial interface
- ✓ Custom detector assemblies and mounting options, field cables and connectors available on request
- ✓ Qualified for Category A functions (Class 1 systems) acc. IEC 61226

IRM 510™ INTERMEDIATE 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	0.7	800, -500 (comp. voltage)	1.0e+2 ... 1.0e+10	50, 255 ... 50, 705	3 x (MI-cable + HN)
				
	KNK 50-6 ACH	4.4				
Uncompensated B-10 neutron ionization chamber (UIC)	KNU 50-1 ACH	0.7	800	1.0e+2 ... 1.0e+10	50, 255 ... 50, 705	2 x (MI-cable + HN)
				
	KNU 50-6 ACH	4.4				

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	
Log. neutron flux or reactor power	1E+2 ... 1e+10 nv 1.5E-6 ... 1.5e+2 %FP
Linear multirange power signal with range indication	Full scale: 125/40/12.5/ ... %FP (16 ranges/half-decades)
Relative flux change rate (log rate = 1/reactor period)	-3.33 ... 0 ... +33.3 %/s (equiv. period -30 ... ∞ ... +3 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)

PRE-AMPLIFIERS	
I/F converter (for ion. chambers) NV 102 NV 103	10 decades of meas. range: 1e-13 A ... 1e-3 A 1e-14 A ... 1e-4 A
Integrated test signal generators (pulses, AC and DC)	Activation via HMI or through serial interface.

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 DAK 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	
DAK 260	Digital signal processing unit for reactor start-up
SRM/PRM/WRM 510	Source/power/wide range monitor



Copyright © 2024 Mirion Technologies, Inc. or its affiliates. All rights reserved. Mirion, the Mirion logo, and other trade names of Mirion products listed herein are registered trademarks or trademarks of Mirion Technologies, Inc. or its affiliates in the United States and other countries. Third party trademarks mentioned are the property of their respective owners.