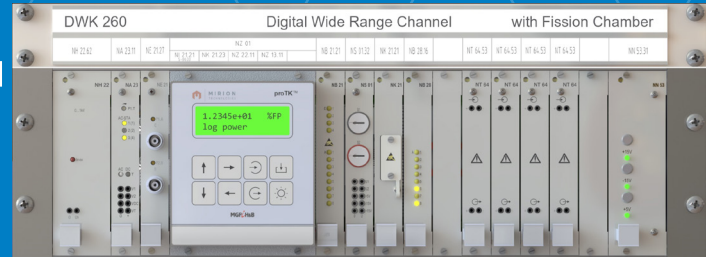


PROTK™ NEUTRON FLUX MONITORS

WRM 510™

Wide Range Monitor



Neutron flux monitor for reactor start-up and power operation.

DESCRIPTION

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

The DWK 260 channel can be used with any type of guarded or non-guarded wide range fission chamber to cover more than 10 decades of neutron flux during all modes of reactor operation.

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

With the WRM 510 monitor, Mirion provides the complete neutron monitoring system for the wide range from neutron detector to the safety signals for reactor protection and control.

FEATURES

- ✓ Modular design, highly customizable
- ✓ Operated with one wide range fission chamber (guarded or un-guarded)
- ✓ 10+ decades of neutron flux range coverage with one fission chamber
- ✓ Calibration of signal into units of neutron flux (nv) or reactor power (%FP, W, ...)
- ✓ Seamless calculation of the relative flux change rate (reciprocal of the reactor period) over the full neutron flux range
- ✓ Signal filtering with adaptive filter parameters
- ✓ Generation of analog output signals with linear or logarithmic scaling
- ✓ Generation of binary alarm, trip and status indication signals
- ✓ Integrated test-signal generators and simulation capabilities
- ✓ Secured serial interface
- ✓ Qualified for Category A functions (Class 1 system) acc. IEC 61226

WRM 510™ WIDE RANGE MONITOR

DETECTORS						
Type	Product Code	Sensitivity (pulse, DC)	Nominal Op. Voltage (VDC)	Neutron Flux Range (nv)	Dimensions (mm) ϕ , L (total)	Integral Cable, Connectors
Guarded Wide Range Fission Chamber	NY-11016	0.7 cps/nv 2e-13 A/nv	800	2.0e+0 ... 2.0e+10	76.2, 580	2 x (MI-cable + HN)
Wide Range Fission Chamber (unguarded)	WL-6376A	0.7 cps/nv 1.4e-13 A/nv	800	1.4e+0 ... 1.4e+10	50.8, 292	1 x HN

The wide range fission chambers are designed for min. operation of 150 °C/300 °F.
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	
Pulse count rate (logarithmic)	0.5 ... 5e+5 cps
Campbell (AC/MSV) signal	> 7 decades
Wide-range signal (logarithmic power)	1 ... 1e+10 nv, 1.5e-8 ... 150 %FP
Relative flux change rate (log rate = 1/reactor period)	-3.33 ... 0 ... +33.3 %/s (equiv. period -30 ... ∞ ... +3 s)
Linear DC signal (linear power)	0 to 150 %FP
Linear rate signal	-10 ... 0 ... +10 %FP/s
Analog outputs	0/4 ... 20 mA/600 Ω , isolated
Binary outputs (isolated relay change overs)	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	
Type NV 230 series	Compatible to all common wide range fission chambers
Processing	Pulses, AC (Campbell) and DC signals
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 in DWK 260	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	
DWK 260	Digital wide range processing unit for reactor start-up
IRM/PRM/SRM 510	Intermediate/power/source range monitor



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