

MIRA – GAMMA DOSE RATE MONITORING SYSTEM

MIRA is a highly versatile and very flexible gamma dose rate monitoring system that measures the ambient equivalent dose rate $\dot{H}^*(10)$. It facilitates both a gamma detector and a gamma monitoring station. MIRA can be used either for fixed or temporary installation as well as mobile applications. A particular feature besides its modular design is its autonomous operation capability due to extremely low power consumption. Thus, it can be operated for many weeks with its integrated battery or for unlimited operation time with the integrated solar panel. Utilizing the wireless data transmission technologies, data communication between MIRA and the Monitoring Centre (NMC) uses the GPRS/LTE service of cellular networks, a radio link (RF) or even Iridium satellite communication where redundant or extremely reliable transmission is required.

MIRA can be powered by 5 V DC, supplied for instance from a standard cell phone power unit or it can be operated autonomously with its integrated battery or solar power system. For stationary application, MIRA can be easily fixed on a pole or a wall. In combination with a tripod, MIRA works as a mobile monitoring station and can be quickly deployed in emergency situations. Consequently, MIRA is available with an integrated GPS receiver that enables the automatic recognition of a new location after deployment.

The manifold data communication capabilities permit numerous operation possibilities and uses. LAN is the standard interface, for configuration, periodic tests and data readout. For bi-directional wireless remote data access, a version with integrated LTE/3G/GPRS is available, Bluetooth is used for maintenance. Base units can be equipped with a radio modem and Iridium satellite communication.

To improve the data foundation, e.g., to differentiate of artificial from natural wash-out peaks, a maintenance-free rain sensor integrated on top of the detector housing is available. An even better foundation is provided by the full-featured weather station.

Two Geiger–Müller (GM) detectors provide a wide detection range from natural background up to >10 Sv/h. The high-volume low dose rate detector (LD) enables detection of minor changes in the radiation at background levels within short detection cycles. The second detector (HD) is used for measurement of higher dose rates (>100 μ Sv/h). The hermetically sealed detector housing protects the electronics and detectors from external conditions.

GENERAL TECHNICAL DATA

■ Detection range	10 nSv/h to 10 Sv/h
■ Accuracy	± 15 % (calibrated to Cs-137)
■ Operating temperature	-40°C to +60°C (-40°F to +140°F)
■ Power supply	5 V DC, through USB or solar with battery
■ Power consumption	<10 mW
■ Data communication	LAN, GPRS/LTE or/and radio
■ Radio frequency	868 MHz (up to 40 km*)
■ Electromagnetic	EN 55022 Class B
■ Interference protection	EN 55024
	EN 61326-1
■ Diameter	60 mm (2.36 in.)
■ Height	876 mm (34.49 in.)
■ Weight	2.3 kg (5.1 lb) (including battery)
■ Protection class	Detector unit IP68
	Battery compartment IP65

*Depend on local conditions

MIRA WITH SOLAR PANEL AND TRIPOD



FUNCTIONS

- Ambient Dose Equivalent Rate $\dot{H}^*(10)$ at three user configurable time intervals*
- Count rate detection at three user configurable time intervals*
- Battery state of charge detection
- Storage of all measured values for an unlimited time (>10 years)
- Data acquisition on real time
- Intrinsic background correction
- Temperature compensation of intrinsic background
- Temperature compensation of LD/HD characteristic
- Local background correction
- Automatic switch-over between LD and HD
- Overload detection of HD detector
- Secured VPN data transmission with external router (option)
- Status supervision of detectors, battery and electronic
- Alarm management with two thresholds
- Notification on threshold exceeding or status change (spontaneous call)

* must be a multiply of the time base interval. Shortest time base interval 1 minute.

GM DETECTOR TYPES

Part Number	Type
MIRA-100-x-x	70031A & 70018 ^a

TECHNICAL DATA – LOW DOSE RANGE (LD)

GM type 70031A

Range	10 nSv/h to 1 mSv/h
Sensitivity	823 counts min ⁻¹ / μ Sv/h
Detector background	47 nSv/h (38 counts min ⁻¹)
Energy range	38 keV -1.3 MeV (± 25 %) 35 keV -2.5 MeV (-29 % / +67 %)

TECHNICAL DATA – HIGH DOSE RANGE (HD)

GM type 70018A

Range	0.01 mSv/h to 10 Sv/h
Sensitivity	1.03 counts min ⁻¹ / μ Sv/h
Energy range	70 keV -1.3 MeV (+15 %) 70 keV - 4.5 MeV (-29 % / +67 %)

FEATURES

- Unlimited autonomous operation
- Lightweight and extremely mobile
- Easy to install or to deploy
- Rugged design (IP68 / IP65)
- Operation under harsh environmental conditions
- Bi-directional wireless data communication via LTE, Iridium satellite as unidirectional backup
- Redundant data communication
- Integrated accuracy test
- Power supply or battery charging with standard cellphone power supply unit or by USB
- Unlimited and nonvolatile storage of all readings
- Wireless service interface: Bluetooth
- Ethernet interface included

EXTENSION MODULES

Part Number	Type
MIRA-500-G	GPS
MIRA-500-R	Rain detector
MIRA-500-B	Battery
MIRA-500-S	Solar

INTERFACES

MIRA-400-4	LTE/3G/GPRS
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ACCESSORIES

MIRA-800-0011	Tripod (Metal)
MIRA-800-0020	Pole Brackets
MIRA-800-0033	Carrying Case for two MIRAs
MIRA-800-0034	Carrying Case 2 + Charger
MIRA-800-0035	Carrying Case for five MIRAs
MIRA-800-0040	Central Radio Com. Unit
MIRA-800-0051	Plug-In Power Supply Unit, USB
MIRA-800-0100	Test Set Cs-137 (~360 kBq)
MIRA-800-0102	Test Set Eu-152 (~500 kBq)
MIRA-80S-L-S	Base Unit S: Solar
MIRA-80S-L-P	Base Unit S: Mains
MIRA-80S-LI-SW	Base Unit S: Solar, weather, satellite
MIRA-80M-L-SW	Base Unit M: Solar, weather
MIRA-80M-LI-SW	Base Unit M: Solar, weather, satellite
MIRA-800-0500	External battery pack
MIRA-800-2500	Mounting pole set