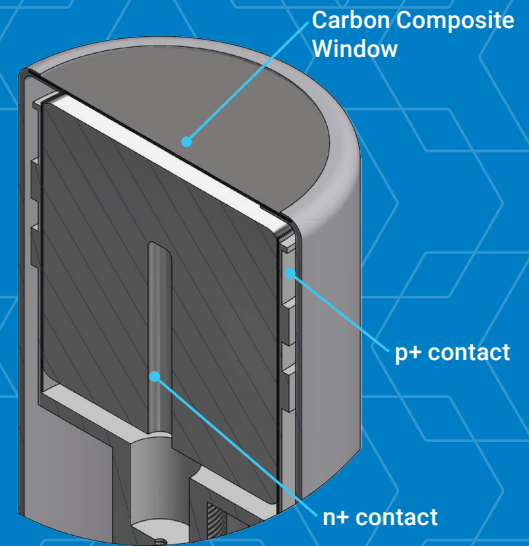




DETECTORS

REGe™

Reverse Electrode Coaxial Germanium Detectors



FEATURES

The reverse-electrode detector (REGe) is similar in geometry to other coaxial germanium detectors with one important difference. The electrodes of the REGe detector are opposite from the conventional coaxial detector in that the p-type electrode, (ion-implanted boron) is on the outside, and the n-type contact (diffused lithium) is on the inside. There are two advantages to this electrode arrangement – window thickness and radiation damage resistance.

The ion-implanted outside contact is extremely thin (0.3 μm) compared to a lithium-diffused contact, enabling the REGe detector to cover a broad energy range from 3 keV up to several MeV. REGe detectors are normally equipped with a carbon composite window which is robust and provides excellent transmission to below 10 keV. Aluminum windows are also available and are preferred when there is no interest in energies below 30 keV and when improved ruggedness is desired. If full advantage of the low energy capability (down to 3 keV) needs to be taken, non-ULB Beryllium windows may be chosen on special request after consulting the factory.

It has been found that radiation damage, principally due to neutrons or charged particles, causes hole trapping in germanium. Unlike the case of the conventional coaxial detector, holes are collected by the outside electrode of the REGe detector. Since a much greater amount of the active detector volume is situated within a given distance, ΔR , of the outside contact, than of the inside contact (Volume $\approx R^2$) it follows that, on average, holes have less distance to travel if they are attracted to the outside contact than if they are attracted to the inside contact. With less distance to travel, they are less likely to be trapped in radiation damaged material. The extent of the improved resistance to radiation damage depends on other facts, of course, but experimental evidence suggests that the REGe detector may be 10 times as resistant to damage as conventional coaxial germanium detectors.

- ✓ Spectroscopy from 3 keV to >10 MeV
- ✓ Ultra-thin ion implanted contacts
- ✓ Radiation damage resistant
- ✓ Excellent timing resolution
- ✓ High energy rate capability
- ✓ Equipped with Intelligent Preamplifier
- ✓ Diode FET protection
- ✓ Warm-up/HV shutdown
- ✓ USB 2.0 Serial Interface

REGe REVERSE ELECTRODE COAXIAL GE DETECTORS

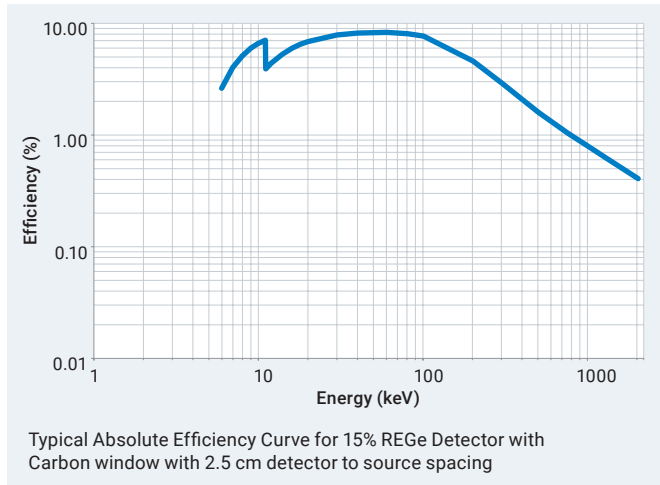
SPECIFICATIONS

REGe Germanium Detector:

- General Specifications and Information

Standard Configuration Includes:

- Vertical Slimline™ dipstick cryostat with Carbon Composite window and 30 liter Dewar.
- Model iPA™ Intelligent Preamplifier with 3 meter bias, high voltage inhibit, signal and power cables.



See the “Cryostats, coolers & options” section for all information on available options and configurations.

The iPA Intelligent Preamplifier included with this style of HPGe detector has an improved, low power analog front stage providing excellent resolution and count rate performance. An integrated digital back-end makes use of the detector sensors to continuously monitor and store all relevant parameters and status information. This data, which may be trended over time, allows the user to take preventative measures if a key parameter starts to shift and ultimately improves equipment availability and productivity.

It also enables setup and tuning of the preamplifier through digital controls rather than potentiometers.

The preamplifier status information, on board log file and digital controls are accessible through a USB 2.0 serial connection and software application which is provided with the iPA unit.

See the “Intelligent Preamplifier” specification sheet for more details. The REGe detector is guaranteed to give a 22 to 88 keV intensity ratio of greater than 18:1. This ratio is only achievable with the carbon composite and beryllium window.

Model Number	Typical Rel. Eff. (%) ≥	Full Width Half Max (FWHM) Resolution (keV)		Peak to Compton Ratio (P/C)	Peak Shape FWTM/FWHM	Endcap diameter mm (in.)
		At 122 keV energy	At 1.3 MeV energy			
GR1018 GR1020	10 10	0.825 1.00	1.8 2.00	38 34	1.90 2.00	76 (3.0) 76 (3.0)
GR1518 GR1520	15 15	0.825 1.00	1.8 2.0	44 40	1.90 2.00	76 (3.0) 76 (3.0)
GR2018 GR2020	20 20	0.850 1.10	1.8 2.0	50 46	1.90 2.00	76 (3.0) 76 (3.0)
GR2519 GR2521	25 25	0.850 1.10	1.9 2.1	54 50	1.90 2.00	76 (3.0) 76 (3.0)
GR3019 GR3021	30 30	0.875 1.20	1.9 2.1	56 52	1.90 2.00	76 (3.0) 76 (3.0)
GR3519 GR3521	35 35	0.925 1.20	1.9 2.1	56 52	1.90 2.00	76 (3.0) 76 (3.0)
GR4020 GR4022	40 40	0.925 1.20	2.0 2.2	56 52	1.90 2.00	76 (3.0)* 76 (3.0)*
GR4520 GR4522	45 45	0.950 1.20	2.0 2.2	58 54	1.90 2.00	83 (3.25) 83 (3.25)
GR5021 GR5023	50 50	1.00 1.20	2.1 2.3	58 54	1.90 2.00	83 (3.25)* 83 (3.25)*
GR5522 GR5524	55 55	1.10 1.25	2.1 2.3	60 54	2.00 2.10	89 (3.5) 89 (3.5)
GR6022 GR6024	60 60	1.10 1.25	2.2 2.4	60 54	2.00 2.10	89 (3.5) 89 (3.5)
GR6523 GR6525	65 65	1.20 1.30	2.3 2.5	60 54	2.00 2.10	89 (3.5) 89 (3.5)
GR7023 GR7025	70 70	1.20 1.30	2.3 2.5	60 54	2.00 2.10	89 (3.5)* 89 (3.5)*
GR8023 GR8025	80 80	1.20 1.30	2.3 2.5	60 56	2.00 2.10	95 (3.75) 95 (3.75)
GR9023 GR9025	90 90	1.20 1.30	2.3 2.5	60 56	2.00 2.10	95 (3.75) 95 (3.75)
GR10024 GR10026	100 100	1.30 1.40	2.4 2.6	60 56	2.00 2.10	95 (3.75)* 95 (3.75)*

For availability of detectors above 70% relative efficiency consult factory.

* Note: Due to variations in crystal size endcap diameter may be larger. For guaranteed endcap diameter or custom specifications and hardware customization consult factory.

Above specifications are in accordance with IEEE Std 325-1996. Resolution performance is tested with Lynx® digital MCA. For resolution performance guarantee using other Mirion digital MCAs consult factory.



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