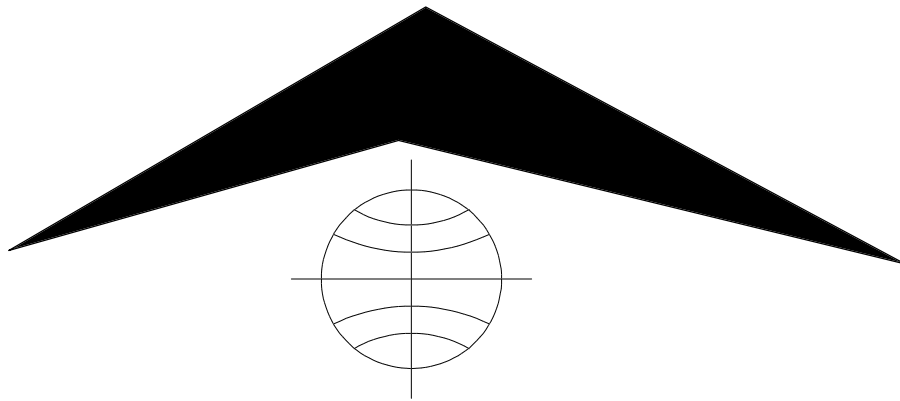


# 2SGA-1000 SLIM GAMMA PROBE

*Preliminary*



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# Table of Contents

General Information.....	3
Overview.....	3
Controls, Connectors, and Layout.....	3
Theory of Operation.....	3
Specifications .....	4
Installation .....	5
Installing the Slim - Gamma and support equipment .....	5
Operating Procedure .....	6
Operation.....	6
Performance Checks and Calibrations.....	6
Preventative Maintenance .....	6
Troubleshooting.....	7
Problems with the Tool.....	7
Disassembly Instructions.....	7
Schematics.....	8
Appendix.....	9
Suggested QA Procedure .....	9

**General Information**

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**Overview**

The 2SGA-1000 Slim Gamma is a logging probe providing natural gamma measurements. The Slim Gamma probe can be operated as a standalone probe on an MGX II or any other system capable of supplying the correct power and having borehole conditions within specifications.

**Controls, Connectors, and Layout**

Connectors for the tool are as follows. The probe top described below is specific to the Slim Gamma probe and is based on a single conductor style. Other variations of probe tops and wiring can be accommodated at the factory but will not be discussed in this document.

**PROBE TOP CONNECTOR:**

Pin	Signal	Origin
Probe top housing	Tool power ground	Armor
Center connection	Tool power and pulses	Center Conductor

Layout for the tool in general is as follows starting at the bottom of the tool. The bottom bull-nose is below the scintillation crystal and Photo multiplier. Next is the electronic section for the gamma measurements, followed by the probe top.

**Theory of Operation**

**GAMMA**

The natural gamma measurement is made by the use of a Sodium Iodide crystal, which when struck by a gamma ray emits a pulse of light. This pulse of light is then amplified by a Photo multiplier tube, which outputs a current pulse. These pulses are then detected, shaped and transmitted up the cable line. The center of the Sodium Iodide crystal is approximately 16.58 inches, or 419.1 mm below probe top. The approximate location of the gamma detector is referenced by a band of colored tape on the housing of the probe. This tape, marker must be maintained by you, the user, as it tends to rub off with use of the tool.

The Slim Gamma tool is capable of using a power source that is positive with respect to the armor. Worthy of note is the crystal detector and the Photo multiplier tube. Both of these devices are fragile at best and are quite costly to replace. The housing of the 2SGA is extremely thin and can be damaged quite easily. Great care must be taken when operating, shipping and handling the Slim Gamma probe. Mount Sopris has taken steps to afford these items as much protection as possible. These items are subject to be damaged by sudden shock so when shipping or transporting the tool ensure it has proper protection from vibration and shock to reduce the chances of damage.

## Specifications

### Power Requirements

DC voltage positive with respect to Armor at probe top. Min. 16 VDC, Max. 28 VDC  
@ 160mA nominal.

### Tool Output

Positive pulse, 1 to 2uS wide, approximately 8v peak.

### Gamma Detector

NaI (tl) .612" dia x 3.0" long 15.5mm dia. x 76.2mm long

### Gamma Detector location

Using the probe top as a reference measure towards the bottom of the tool 16.5", or  
419.1 mm.

### Operating temperature range

14 to 120 deg. F -10 to 50 deg. C

### Pressure rating

200 PSI 137931 PASCAL

### Dimensions

Length	20.6 inches	523 cm
Diameter	.72 inches	1.82 cm
Weight	10 oz	285 g

## **Installation**

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### **Installing the Slim - Gamma and support equipment**

*Read this section carefully before operating the Slim - Gamma probe.*

In order to operate the probe, remove the thread protector from the probe top. Now thread the probe onto the special cablehead, 2CHA-1000, mounted to the winch assembly. Inspect the O-ring on the cablehead for cuts or abrasions before each use to ensure an adequate seal. Follow the operating instructions in this manual or in the logging software before logging in regards to this probe.

## Operating Procedure

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### Operation

#### GAMMA MEASUREMENTS

**USE WITH AN MGX SYSTEM** **Note: Modifications may need to be made to MGX before using.**

The MGX must be 305 meters or less due to power consumption by the probe. Consult the factory on modifications to run this probe. Following the instructions for the logger, and choose the correct probe file, place the tool selection switch to the PULSE position and turn the TOOL POWER to the ON position. Follow the logging instructions for the MGX logger to begin the logging process. When the logging process has ended, ensure that the TOOL POWER switch is in the OFF or center position before removing the probe from the cablehead.

#### USE WITH AN MGX II SYSTEM

To use the Slim Gamma with the MGX II logging system, obtaining a log is the same as described above with the MGX logger. The main difference is the MGX II system has no switches for tool selection or PROBE POWER switches. These functions are electronically controlled on the MGX II logger by the logging software and setup instructions in tool drivers. Complete logging instructions for the MGX II are discussed in detail in the MGX II manual and should be referred to if there are any questions.

#### MSLog

1. Select the correct tool driver from the Tool panel selection box. If the correct one is not available run MSLConfig to install it.
2. In the Tool panel, click the Power On button.
3. Click the Depth panel upper right corner icon. Click Zero Tool.
4. If you wish to fill out the header, in the Acquisition panel click Header button.
5. In the Acquisition panel, click Record and select a file name.
6. Turn on the desired, Depth Sampling mode.
7. If you are printing, turn on the printer in MCHCurve.
8. Log to the desired interval as normal. Refer to the MSLog manual for additional information on logging.
9. When done, in the Acquisition panel, click Stop.
10. In the Tool panel, click the Power Off button before removing the probe.

### Performance Checks and Calibrations

Calibrations are performed at the factory and require a basic knowledge and understanding of the tool. In the event the user feels the tool needs to be calibrated it is advisable to speak with a representative of Mount Sopris. Performance checks for the gamma measurement can be made on the surface before logging. With the tool powered on and viewing data on the computer screen a small source of natural gamma radiation can be placed in close proximity to the detector area about 6 inches above the bottom of the probe. An increase in gamma counts will then be observed on the computer screen if the probe is working properly.

### Preventative Maintenance

The 2SGA-1000 Slim-Gamma requires little maintenance other than washing the probe off after each use. Inspecting o-rings occasionally and keeping the threads on the probe top clean, will minimize problems in the future. The heart of the gamma section is the Photo multiplier tube and the Sodium Iodide crystal. Both units are very fragile and can be damaged if the probe is dropped or sees very abrupt shock. Take great care while handling or packing the probe for transportation.

## Troubleshooting

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### Problems with the Tool

In the event the tool develops a problem, follow the troubleshooting procedure listed below.

#### **GAMMA PROBLEMS**

No counts from the probe.

1. Are the MGX switches set correctly? **PULSE** and **ON** positions.
2. Are the PROBE CURRENT and PROBE POWER LED's on?
3. Is the correct probe file being used? MGX and MGX II versions.
4. Check the cable for conductive leakage across the center conductor to ARMOR. (20 Meg MIN.)
5. Is the thread protector installed in the bottom of the probe in the stand alone mode?
6. Is the logger supplying the correct voltage as specified in this document?
7. If no result from the above , consult Mount Sopris.

### Disassembly Instructions

The 2SGA-1000 Slim Gamma probe should never be disassembled unless service is necessary. There are no user serviceable parts in the Slim Gamma probe. Most problems are usually cable related and can be avoided by routine maintenance of the cablehead. If there are problems with getting data do not assume that there is a problem with the probe. This is a very small and difficult probe to disassemble, and is highly recommended that any service be performed by Mount Sopris or a qualified technician.

**Schematics**

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2SGA-1000

Drawing Number      500S-2157 50002157A.S01      Title: Slim Gamma Electronics

## Appendix

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### Suggested QA Procedure

General notes for Quality Assurance are presented here for users who need to utilize these techniques when collecting data. These users will need to periodically calibrate their equipment using equipment whose calibration is traceable to an approved standard. Details of these calibrations must be recorded.

When an instrument is calibrated, records need to be kept regarding the calibration standard(s) used and what was changed on the instrument to calibrate it. Typically, the corrections made to the instrument involve changing constants that are used to scale the raw instrument reading so that the proper value is reported. The constants must be recorded during a calibration procedure. The Mt. Sopris family of Acquire programs records the calibration constants that were used to acquire the data. This aids the QA process, but does not replace the need for recording these constants at the time of calibration. The reason for this is that the length of time since the last calibration is unknown with only this information.

The device providing the standard must be traceable to an accepted standard. Examples of organizations providing standards for measuring instrumentation are: The U. S. National Bureau of Standards; The American Petroleum Institute; and the American Society for Testing Materials. For example, if the voltmeter or the density standard used for calibration is not traceable to an approved organization, such as those listed above, the calibration should not be considered valid. Records should be kept indicating the last time that standard being used for calibration was calibrated or checked against an approved standard. The QA procedure necessary for some programs mandate that the calibration standards be periodically checked against a standard approved by a proper agency.

A QA procedure may dictate that data taken from a given locale be associated with records indicating the exact time and location that the data was collected. The data itself may have to be collected in a certain format to meet requirements. Often, QA procedure specifies that surveys must be repeated and the data from the successive surveys compared. This technique is used to eliminate poor or invalid data.