



**GENERAL MONITORS**

## **Model S800**

### **Machine Mounted Methane Monitoring System**



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#### **Instruction Manual**

**1006**

General Monitors reserves the right to change published specifications and designs without prior notice.

Part No.  
Revision

MANS800  
MANS800  
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## Warranty Statement

United Central Industrial Supply, exclusive Mining distributor for General Monitors, Warrants the Model S800 to be free from defects in workmanship or material under normal use and service within one (1) year from the date of shipment. General Monitors will repair or replace without charge any such defective equipment to be found defective during the warranty period. Full determination of the nature of, and Responsibility for, defective or damaged equipment will be made by General Monitors personnel. Defective or damaged equipment must be shipped prepaid to General Monitors plant or the representative from which shipment was made. In all cases this warranty is limited to the cost of the equipment supplied by General Monitors. The customer will assume all liability for the misuse of this equipment by its employees or other Personnel. All warranties are contingent upon proper use in the application for which the product was intended and do not cover products which have been modified or repaired without General Monitors approval or which have been subjected to neglect, accident, improper installation or application, or on which the original identification marks have been removed or altered. Except for the express warranty stated above, General Monitors disclaims all warranties with regard to the products sold, including all implied warranties of merchantability and fitness and the express warranties stated herein are in lieu of all obligations or liabilities on the part of General Monitors for damages including, but not limited to, consequential damages arising out of/or in connection with use or performance of the product.

## Warnings

- Combustible & flammable gases and vapors are very dangerous.
- Extreme caution should be used when combustible & flammable gases and vapors are present.
- Where applicable, adhere to Mine Safety and Health Administration guidelines for service and installation.
- Only catalytic bead sensors designed by General Monitors will work with the Model S800. Any attempt to use a sensor that has not been designed by General Monitors will void the warranty.

## SAFETY WARNING:



**Installation and maintenance must be carried out by suitably skilled and competent personnel only.**

## **System Integrity Verification**

General Monitors' mission is to benefit society by providing solutions through industry-leading safety products, services and systems that save lives and protect capital resources from the dangers of hazardous flames, gases and vapors.

The safety products you have purchased should be handled carefully and installed, calibrated, and maintained in accordance with the respective product instruction manual. Remember, these products are for your safety.

To ensure operation at optimum performance, General Monitors recommends that certain maintenance items are performed.

## **Commissioning Safety Systems**

Before power up, verify wiring, terminal connections and stability of mounting for all integral safety equipment including, but not limited to:

- Power supplies
- Control modules
- Field detection devices
- Signaling / output devices
- Accessories connected to field and signaling devices

After the initial application of power (and any factory specified warm-up period) to the safety system, verify that all signal outputs, to and from devices and modules, are within the manufacturers' specifications. Initial calibration / calibration checking / testing should be performed per the manufacturers' recommendations and instructions.

Proper system operation should be verified by performing a full, functional test of all component devices of the safety system, ensuring that the proper levels of alarming occur.

Fault/Malfunction circuit operation should be verified.

## **Periodic Testing/Calibration of Field Devices**

Periodic testing/calibrating should be performed per the manufacturers' recommendations and instructions. Testing/Calibrating procedures should include, but not be limited to:

- Verify zero reading
- Apply a known concentration of gas, or a simulated test device provided by the manufacturer
- Verify integrity of all optical surfaces and devices

When testing produces results outside of the manufacturers' specifications, re-calibration or repair/replacement of the suspect device(s) should be performed as necessary. Calibration

intervals should be independently established through a documented procedure, including a calibration log maintained by plant personnel, or third party testing services.

## 1.0 Introduction

### 1.1 Notice

This Chapter provides a brief description of the Model S800 and its' features & benefits. More detailed information on the features and benefits listed in section 1.2 will be presented in later chapters.

The S800 is easy to install and operate; however, this manual should be read in full, and the information contained herein understood before attempting to install or operate the system.

### 1.2 General

The General Monitors Model S800 Smart Methane Monitoring System is a single channel monitoring system designed specifically for the mining industry for installation on longwalls, continuous miners and other face cutting equipment. It is supplied through our exclusive mining distributor, United Central Industrial Supply (UCISC). UCISC should be consulted if service beyond the scope of this manual becomes necessary.

The Model S800 is based upon General Monitors latest sensing technology and consist of an S800 Power Supply Module, a remote mounted catalytic bead sensor in its own explosive-proof housing, and a large LED display (approximately two inches high available in yellow or red) incorporated into an explosion proof (XP) housing.

The basic system is a single channel unit; however, two channel operation may be achieved by adding an additional display unit and an additional sensing unit.

### 1.3 Features and Benefits

**Single Point, Auto-Calibration:** the unit's display indicates simple automated calibration prompts to the operator with no adjustments of "zero" and "span" required.

**Microprocessor Based Electronics:** Monitors fault conditions and sensor inputs and provides outputs in the form of display codes and relay contacts.

**Power On Self Test (POST):** this is a test that is performed by the microprocessor each time power is applied to the S800.

**LED Test:** tests the integrity of each LED and each segment of the digital display.

**Ramp Test:** tests the functionality of the instrument through the microprocessor ramping up in the signal from the present gas level to full scale and back.

**The Model S800 Smart Methane Monitoring System is approved for use by The Mine Safety and Health Administration (MSHA).**

## 2.0 System Specifications

### 2.1 Notice

This Chapter provides detailed specifications for the model S800 Machine Mounted Methane Monitoring System. The system mechanical, electrical and environmental specifications present the Model S800 in Technical terms. The unit description is provided for insertion into other written specifications by architects and engineers.

### 2.2 System Specifications

**Application:** combustible & flammable gas and vapor detection.

**Sensor Type:** General Monitors low temperature, catalytic bead, limited diffusion sensor.

**Measuring Range:** 0 to 5% Methane gas by volume or 0 to 100%LEL.

**Accuracy:**  $\pm 3\%$  of full scale for gas concentrations up to and including 50% of full scale. For gas concentrations greater than 50%, the accuracy of the systems will be  $\pm 5\%$  of the full scale gas concentration.

**Zero Drift:** less than 5% of span per year.

**Response Time:** Time to 50% of full scale < 10 seconds with 100%LEL concentration of Methane applied. Time to 90% of full scale < 30 seconds with 100% LEL Concentration of Methane Applied.

**User Protection:** The Model S800 is MSHA certified (Cert# 32A-23/MS-0), Commonwealth of Pennsylvania approved (Cert# BFE 1275-96) and warranted for one year on parts and labor.

<b>AWG</b>	<b>Feet</b>	<b>Meters</b>
14	7600	2320
16	4800	1460

### 2.3 Mechanical Specifications

#### Power Supply:

**Weight:** 5 lbs 2 oz (2.3 Kg)  
**Length:** 8 inches (20.3 cm)  
**Height:** 3.5 inches (8.9 cm)  
**Width:** 5 inches (12.7 cm)



**Sensor Housing with Sensor:**

**Weight:** 6 lbs 7 oz (2.9 Kg)  
**Depth:** 8.5 inches (21.6 cm)  
**Height:** 2.2 inches (5.6 cm)  
**Width:** 3.2 inches (8.1 cm)

**Electronics with XP Housing:**

**Weight:** 8 lbs 10 oz (3.9 Kg)  
**Depth:** 5.6 inches (14.2 cm)  
**Height:** 4.6 inches (11.7 cm)  
**Width:** 8 inches (20.3 cm)

## 2.4 Electrical Specifications

**Input Power Requirements:** To Power Supply-120Vac  $\pm$ 25% @ 150mA.  
To Instrument-13 to 17 Vdc (15 Vdc @ 500mA nominal).

**Electrical Classifications:** the sensor is rated for use in Class I, Division 1, Groups B, C & D. The model S800 is designed for use in hazardous environments.

**Machine Cut-off Relay Output:** 10A @ 120Vac SPDT, 5A @ 600Vac SPDT.

**Remote Output:** 10A @ 12Vdc SPDT, 10A @ 120Vac SPDT.

**Cable Parameters:** Recommended 3 wire shielded, maximum cable lengths allowable between module and sensor with one way resistance of 10Ohms per sensor lead (20 Ohms Loop) @ 4.5Vdc nominal is 7600 feet (2320 Meters) using 14 AWG.

## 2.5 Environmental Specifications

**Operating Temperature Range:**

**Sensor:** -67F to +200F (-55C to +93C)

**S800:** -40F to +140F (-40C to +60C)

**Operating Humidity Range:** 0 – 95% relative humidity (non-condensing)

**Vibration Specifications:** as per Mine Safety and Health Administration (MSHA).

**Weather Proof Protection:** Conforming to weather proofing per NEMA 4X.

**Radio Frequency**

**Interference Susceptibility:** Conforms to levels defined by IEC 801-3 Severity Level 3.

## 2.6 System Description

The monitor and sensor shall be MSHA approved and be capable of monitoring 0 to 5% Methane gas by volume or 0 to 100% LEL concentration. The monitor shall have an interface panel, providing magnetic switches for the following indications: 2-discrete alarm threshold level indicators, a fault or malfunction indicator, a calibration mode indicator and a 2-digit display. All alarm parameters and user options shall be configurable by qualified personnel. A power on self-test (POST) shall automatically be performed each time the monitor powers up. A functional ramp test and LED test shall be switch capable without interrupting normal on-line services.

The monitor will generate display codes associated with fault conditions whenever a fault or malfunction occurs. A magnetic switch shall provide the operator front panel access to a calibration mode. The monitor, with sensor, shall be capable of calibration with the following display prompts during the calibration routine:

**AC** = Calibration routine Activated

**CP** = Calibration in Progress

**CC** = Calibration Complete

## 3.0 Installation

### 3.1 Notice

This Chapter outlines what steps to take when the Model S800 is received, the terminal connections & designations, sensor locations and what to be aware of when applying power.

### 3.2 Upon Receipt of Equipment

All equipment shipped by General Monitors is packaged in shock absorbing containers which Provide considerable protection against physical damage. The contents of the package should be carefully removed and checked. If any damage has occurred in shipping, or if there is a discrepancy in the order, notify United Central Industrial Supply immediately. Please specify the affected part and serial number if applicable. Each Model S800 is completely checked out at the factory; however, a complete check-out is necessary upon initial installation and start- up to ensure system integrity.

#### Power Supply Installation

The Model S800 Power Supply must be housed in an MSHA approved enclosure. The power Supply has been designed for 120Vac use only.

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**NOTE:** Location of the permissible box on a hydraulic reservoir tank or other heat producing surface must be avoided.

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### 3.3 S800 Installation

Access must be provided for the cable to enter the right, left or back side of the S800 housing. Adequate clearance should be left for removal access of the electronics module. The location of the Model S800 should be protected by an overhanging part of the machine or a canopy provided for that purpose.

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**NOTE:** All cable must be MSHA approved or encased in MSHA approved conduit.

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#### Special considerations for S800 Locations:

Mount the S800 where vibration and shock are minimized.

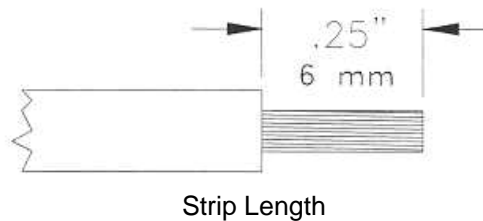
- Clearance must be provided for removal of the sensor as well as the S800 electronics module.
- Clearance must also be provided to the front display panel of the S800 for introduction of the magnet to the Calibration switch.
- Provisions must be made for access to the sensor for calibration of the S800.
- The sensor side of the S800 sensor housing should be angled downward to prevent accumulation of dust and water. A high percentage of sensor failures are directly related to poor selection in the location of the sensor.

- The sensor should be protected from coal, or rock damage, water spray, oil and grease. A splash guard, P/N 10395-1 (UCISC# 544535), is provided for protection against water, oil and grease.
- Weld the shock mounting plate furnished by UCISC in location selected prior to mounting the S800 Monitor.
- Mount the S800 in place on the shock mounting plate. Bolting will facilitate easy removal in the event of damage.

### 3.5 S800 Terminal Connections

All instrument wire connections to the Model S800 are made to the connector located in the base of the unit's explosion proof (XP) housing.

The connector accepts 14 or 16 AWG stranded wire. Recommended strip length of the wire inserted into the connector is shown in Figure 1.



**Figure 1: Wire strip Length**

Connections to the sensor and power supply are made via terminal blocks which are designed to accept spade lugged 14 or 16 AWG wire. Follow the color coded wiring connections in Figure 2.

### 3.6 Installation Check-Out

Installation of the Model S800 system is now complete.

Recheck all wiring installed in the permissible enclosure and/or the miner control box. Check to ensure compliance with Figure 2, and the mining machine manual. Ensure that it conforms to the wiring schematic applicable to the particular installation being made. Recheck S800 wiring for connection to proper terminals.

## **System power “ON” Test**

Ensure that all mining machine switches for main power, pumps, cutting heads, headlights, loading arms, etc. are “OFF”

Energize mining machine cable main power and note the following.

During a 20 second start-up, the digital display will show an increasing, then decreasing gas level as the sensor warms up and stabilizes. At the end of the 20 second start-up, the display may still indicate an elevated sensor level that will decrease to the present gas level. Additionally, the **READY** LED will light indicating system readiness.

If the indicated gas level exceeds the Alarm or Warn set-points during start-up, the relays will not activate and the LED’s will remain off. However, if the gas level is still elevated after the system has stabilized, the appropriate relay will be activated and the LED will light.

The level the sensor ramps to during stabilization is directly related to how cool the sensor has become. The length of time off power and ambient temperature are contributing factors.

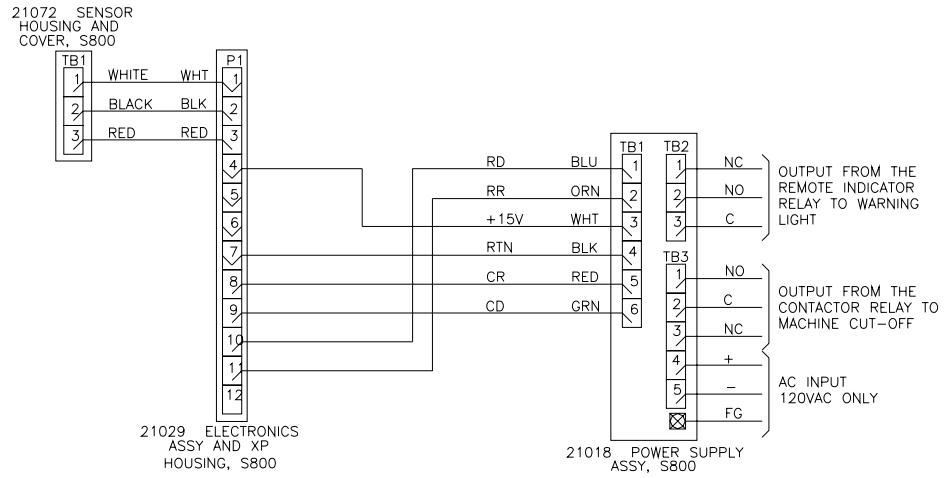
### **3.7 Sensor Locations**

The sensor should be mounted as close as practical to the miner cutting head. For longwall, one at the head gate and one at the tail gate. These are the recommended locations for Methane detection.

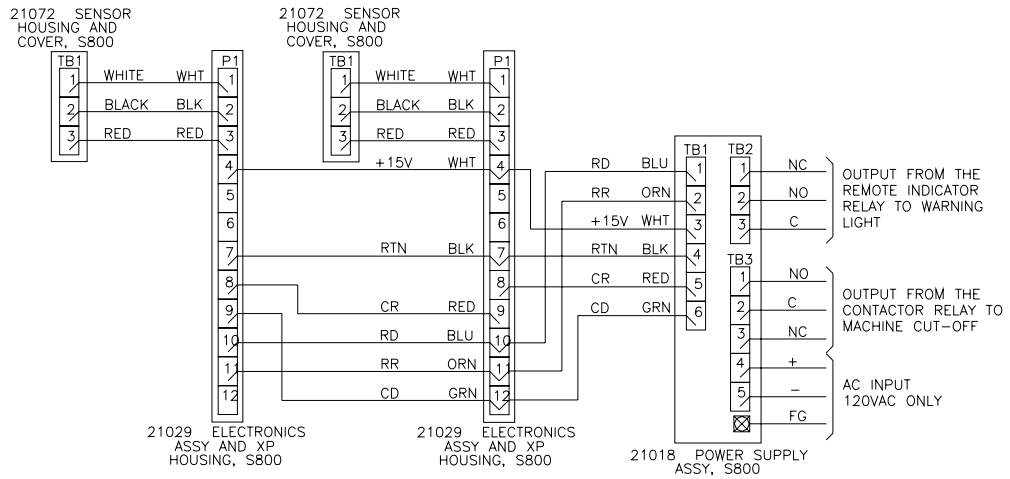
In addition, there are certain considerations to be taken into account when locating sensors. The optimum sensor location is different for each application; and, therefore, the customer must evaluate conditions at the sensor site in order to make the proper determination.

#### **Generally:**

- The sensor should be easily accessible for calibration checks. Ensure that sufficient clearance exists to allow the use of field calibration devices.
- The sensor head should always be pointing down and out of the direct blast of water spray to prevent water build up on the sensing element.
- The sensor should not be placed where it may be coated by contaminating substances.



SINGLE SENSOR



DUAL SENSOR

**Figure 2: Color Coded Wiring Connections**

### 3.8 Sensor Poisons

Sensors may be adversely affected by prolonged exposure to certain atmospheres. The important contaminants are:

- Silicones contained in greases or aerosols are the most common “coating” agents, which reduce sensor response.
- Prolonged exposure to Hydrogen Sulfide (H<sub>2</sub>S) gas.
- Halides – compounds containing Fluorine, Chlorine, Bromine and Iodine.
- Heavy Metals (e.g., Tetraethyl Lead).
- Other damaging materials which attack the sensor physically include mineral acids and caustic vapors.
- The presence of such poisons and vapors does not exclude the use of General Monitors catalytic bead sensors, however, a careful analysis of ambient conditions should be aware that sensor calibration may need to occur at more frequent intervals.

## 4.0 Operation

### 4.1 Notice

This chapter discusses what general maintenance to perform, electrical inputs/outputs, and re-setting alarm and fault.

### 4.2 General Maintenance

- Once the Model S800 has been installed, very little maintenance is required other than periodic checks to verify the integrity of the system.
- The minimum suggested calibration requirement is every 31 days.
- The power sensor and output wiring should be checked for tightness, verifying that all of the components and devices are connected correctly.

### SAFETY WARNING:



**Installation and maintenance must be carried out by suitably skilled and competent personnel only.**

### 4.3 Electrical Inputs/Outputs

The General Monitors catalytic bead sensor (field device) input is made to the terminal block at the base of the S800 XP housing (see chapter 3 for more detailed installation information).

- The sensor connections consists of the following three leads; Black = Reference Bead, White = Active Bead, Red = Sensor power.
- The Model S800 provides relay outputs for warn and alarm conditions.

### 4.4 Alarm Conditions

The **WARN** and **ALARM** levels are preset at the factory. If the alarm levels require fine tuning, an UCISC service representative must be contacted to make the adjustment.

At a factory preset of 1% gas by volume (20% LEL), the **WARN** LED will flash indicating the presence of the condition. In addition, the optional Remote Indicator Relay circuit will be activated. If **WARN** latching has been enabled, the **WARN** indication and relay circuit will not clear unless the Reset/Test Switch has been activated (Manual Reset). Otherwise, the **WARN** indication and relay circuit will clear as soon as the gas levels drop below the preset level (Auto Reset).

At a factory preset of 2% gas by volume (40% LEL), the **ALARM** LED will flash indicating the presence of the condition. In addition, the Machine Cut-off Relay circuit will be activated. If **ALARM** latching has enabled, the **ALARM** indication and relay circuit will not clear unless the Reset/Test Switch has been activated (Manual reset), otherwise, the **ALARM** indication and relay circuit will clear as soon as the gas levels drop below the preset level (Auto Reset).



## 4.5 Latch/Non-Latch Alarm

Re-setting Latched outputs is accomplished by applying the magnet to the Reset/Test switch (see Figure 10, sec. 7.2.1 for switch location). Activating the switch, as indicated by “- - “ on the display, will reset any latched conditions that are no longer valid.

**Example:** The sensor detects a gas concentration in excess of an alarm set point (trip Level). The associated alarm outputs will activate. After a few moments, the gas concentration drops below the alarm set point. If the alarm outputs are latched, the operator can activate the switch and the latched alarm outputs will return to their normal (safe) state.

## 4.6 LED Test Feature

To activate the LED Test, the operator applies the magnet to the Reset/Test switch for five seconds, and then removes. All of the LEDs and LED segments in the digital will illuminate for approximately eight seconds.

### Ramp Test Feature

To activate the Ramp Test simply apply the magnet to the Reset/Test switch longer than ten seconds. The digital display will begin ramping up at the start of the test and will continue to ramp up at a rate of 0.1/ second.

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**NOTE:** A faster ramp test (10 seconds total test time) may be set by an UCISC service representative.

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As each alarm set-point is exceeded, the ramp-up will pause 1 to 2 seconds then continue rising until the user deactivates the Reset/Test switch. The digital display will then begin ramping down, again pausing at each alarm activation set-point.

The ramp test ramps up from the current gas level, and returns to the current gas level. Each alarm LED will light when the alarm set-point is exceeded.

## 4.8 Fault Diagnostics

In addition to the Fault LED, the Model S800 provides a fault code on the digital display whenever a fault condition occurs.

- **F2** – Calibration failed, re-calibrate. If this fault occurs remove the gas, reset the fault code by actuating the reset/test switch and allow the gas to see clean or zero air for at least two minutes. Before attempting another calibration, ensure the following:
  - Proper calibration gas being used
  - Proper gas flow from the bottle
  - Sensor is not blinded
  - Splash guard is not fouled

If the second attempt fails, replace the sensor. If this fault continues to occur, consult United Central Industrial Supply.

**F3, F7 & F8** – Check module. This fault occurs during initial power-up of the unit. If this fault occurs, remove and reapply power to the unit. If the fault continues to occur, replace the electronics module.

- **F4** – Check sensor. Sensor connections open or short circuited. Make sure the sensor wires are not damaged and are connected properly. If this fault continues to occur, replace the sensor and re-calibrate.
- **F6** – Low supply voltage. Make sure the supply voltage level at the S800 is  $15\text{Vdc} \pm 2\text{Vdc}$ . An unlatched F6 indicates momentary brown out or drop out of AC voltage.
- **F9** - Communications Error. This error is displayed if the communications circuit of the S800 has been enabled and it does not receive a response from the external device. Check the wiring between the S800, pins 5 & 6 on the base connector and the external device.

## 5.0 User Interfaces

### 5.1 Notice

This chapter discusses the user interfaces along with the Auto-Calibration Mode.

#### Types of Interfaces

User interfaces are provided so that the operator may interpret and direct the Model S800 in the performance of its various functions. User interfaces consist of (Figure 3):

- The **digital display** provides the user with the gas concentration at the sensor site, fault diagnostic codes, and auto-calibration prompts.
- The **status indicators** provide the user with an indication of the current mode of operation (alarm, warn, fault, ready and calibration).
- The Rest/Test and Calibration switches provide the user access to the LED/Ramp test and auto-calibration functions.



Figure 3: User Interfaces/Displays

### 5.2 Auto-Calibration Mode

To perform an auto-calibration, follow the procedure listed below.

- Place the calibration cup from the calibration kit (Use United Central calibration kit #543568) over the sensor with splash guard in place and apply zero air.
- Enter the Auto-Calibration mode by applying a magnet to the magnetic Calibration switch (see Figure 10, sec. 7.2.1 for switch location) until the **CAL** LED lights (about five seconds) then remove the magnet. The unit is now in the Auto-Calibration Mode (Figure4).



**Figure 4: Entering Auto-Calibration Sequence**

When the magnet is removed from the Calibration switch, the digital display will indicate a flashing “AC” (Figure 5).



**Figure 5: “AC” Auto-Calibration Display**

The unit is now setting a zero value. When flashing “AC” becomes a steady “AC” (approximately 5 seconds), the zero value is now set.

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**NOTE:** zero-air must be used to establish a true zero value.

---

Apply 2.5% by volume calibration gas. The display will change to “CP”. The calibration is now proceeding (Figure 6).



**Figure 6: “CP” Auto-Calibration Display**

After approximately two minutes, the display will change to “CC”. The calibration is now complete. Remove the calibration gas (Figure 7). The unit will return to normal operation when the gas level drops below "0.8% (16% LEL)



**Figure 7: "CC" Auto-Calibration Display**

If the unit does not see gas or the unit cannot calibrate within six minutes, an "F2" fault condition will be displayed.

Activating the Reset/Test switch will reset the unit out of the "F2" fault. The unit will return to normal operation with the previous calibration levels restored.

Perform a Cal Check ("Bump" test) by re-applying the 2.5% mixture of Methane in Air and note the response of the Warning and Alarm relays as well as the sensor output. The relays should energize per the ventilation plan and the sensor should respond between 2.3% to 2.7%. If not, recalibrate the system.

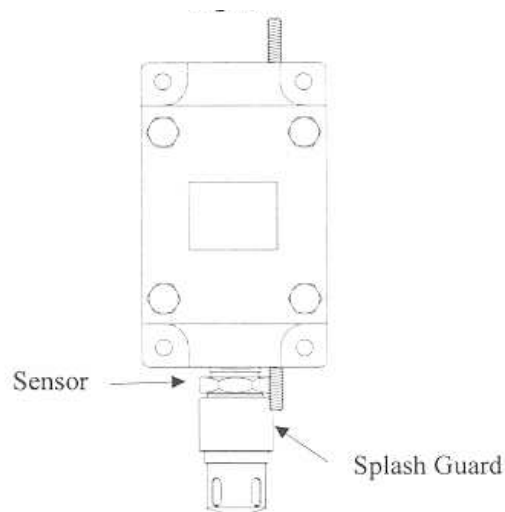
## 6.0 Sensor Assembly/Accessories

### 6.1 Notice

This chapter provides a description of the accessories that are used with the model S800.

### 6.2 Sensor Housing

General Monitors offers an MSHA approved explosion proof housing, UCISC #543308 that is rated for use in mines (Figure 8).



**Figure 8: Sensor Housing Drawing**

One end of the housing is tapped for use with a General Monitors sensor (3/4 NPT), while the other end is tapped for use with an MSHA approved packing gland. The set screws used to guard against vibration related loosening of both the sensor and packing gland nut must be in place during operation, otherwise the MSHA explosion proof approval is void. Once the sensor is installed/operating in the field, no attempt should be made to disconnect the sensor, the conduit or the housing lid without removing power from the Model S800 as such an act would compromise the explosion proof integrity of the field device.

### 6.3 Splash Guard

General Monitors produces a universal splash guard, UCISC #455535 that has been designed for use on all General Monitors combustible gas sensors (Figure 9).

The splash guard prevents water from sprays or equipment wash-downs from being forced into the sensor cavity and affecting the response of the sensing element. Constructed of rugged Valox plastic, it has a series of internal baffles to deflect water down and away from the sensor. This guard is also threaded for simple screw on installation.

The splash guard is recommended for reducing dust and rock damage to the sensor head. The S800 MUST be calibrated with the splash guard in place.

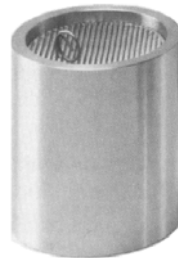


**Figure 9: Splash Guard, Picture**

#### **6.4 Dust Guard Assembly**

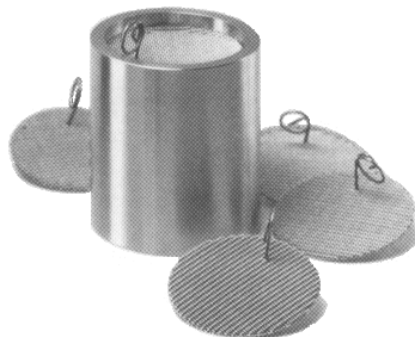
The Dust Guard Assembly (UCISC #452328) is a simple, threaded stainless steel cylinder with a wire screen at one end. It is easily removed for cleaning and/or replacement of the disposable screen.

This General Monitors accessory is specifically designed to prevent dust and particulate matter from reaching the sensor flame arrestor. Such debris can plug the screen and limit the amount of gas reaching the active surface of the sensor.



**Figure 10: Dust Guard**

The Dust Guard is also available in a kit (UCISC #543204) with twelve replaceable screens (Figure 11).



**Figure 11: Dust Guard Kit**

## **6.5 Calibration Equipment**

To calibrate the Model S800 use the Calibration Kit UCISC# 543568.

The calibration procedure and use of the Calibration Kits explained in section 5.3.



## 7.0 Technical Information

### 7.1 Spare Parts

<u>UCISC P/N</u>	<u>Description</u>
<b><i>Power Supply:</i></b>	
1. 543576	Power Supply, S800, 120VAC
2. 543604	Hold Down, Pwr Supply
3. 543380	Fuse, 3/4A 600V
<b><i>Sensor Housing:</i></b>	
4. 543720	Washer, Locking
5. 543680	Screw, Gland/Sensor Locking
6. 543684	Screw, Detector Hsg Cover
7. 543688	Screw, Mounting, Term Block
8. 417337	Sensor, Aluminum Hsg
9. 455535	Splash Guard, Molded Plastic
* 543100	Optional, Splash Guard, Aluminum
* 452328	Optional, Dust Cap, SS, w/screen"
10. 543584	Housing, Detector w/o Sensor
11. 543608	Cover, Sensor Housing
12. 543748	Block, Terminal 3 Pos
13. 543704	O-Ring, Sensor Housing
<b><i>Electronic Module:</i></b>	
14. 543692	Screws, 2.5 x 8mm, Connector
15. 543696	Screws, 6-32 x ¼, Wire Guard
16. 544156	Module, Electronic, Red
19. 543828	S800, Module w/Base, Red
20. 543600	Post, Module Guide
21. 543708	Wire Guard, Assy
22. 543712	Base Assy, Readout
23. 543448	Magnet, Calibration, S800
24. 543716	Conn, 12 Pos, Base Assy
25. 543700	O-Ring, Readout Housing

## 7.2 S800 Tool List

### Used On

### Tool

#### ***Power Supply:***

2. 543604                      3/8 slotted screw driver or 1/2 socket with 4 in .ext.

#### ***Sensor Housing:***

5. 543680                      1/8 hex handle or I-key

6. 543684                      7/16 open wrench

7. 543688                      #2 Phillips screw driver

8. 417337                      12 in crescent wrench

#### ***Electronic Module:***

14. 543692                      #1 Phillips screw driver

16. 544156                      3/16 Hex T-handle pr L-key with 2 in. long stem minimum.

21. 543600                      5/16 open wrench

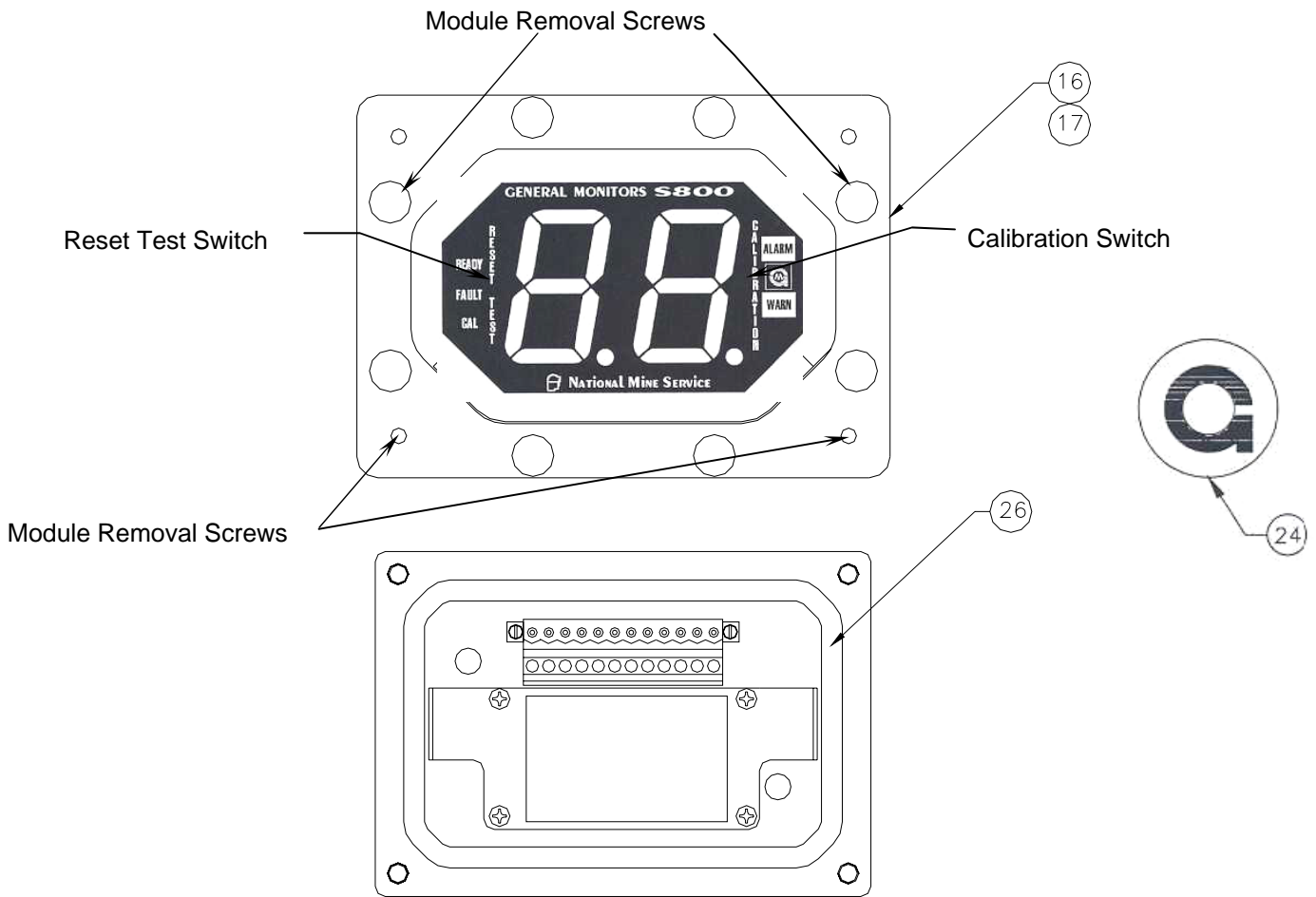
22. 543708                      #2 Phillips screw driver\*

25. 543716                      1/8 slotted screw driver\*

Terminal Blocks 1/4 slotted screw driver\*

\* Any of these tools may be used on the Terminal Block Screws.

### 7.3 Electronic Module



**Figure 12: Electronic Module**

### 7.4 Module Base Assembly

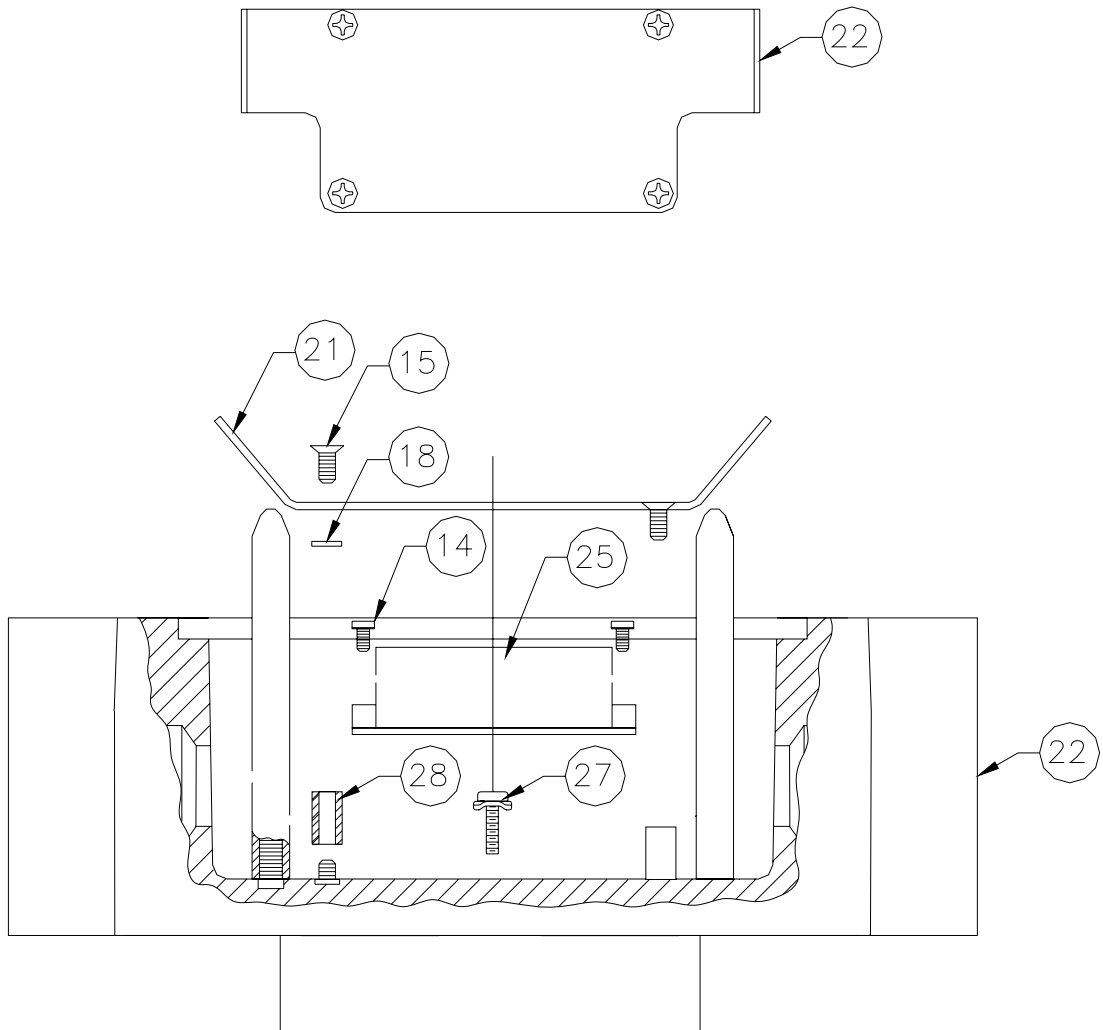


Figure 13: Module Base Assembly

### 7.5 Power Supply Assembly

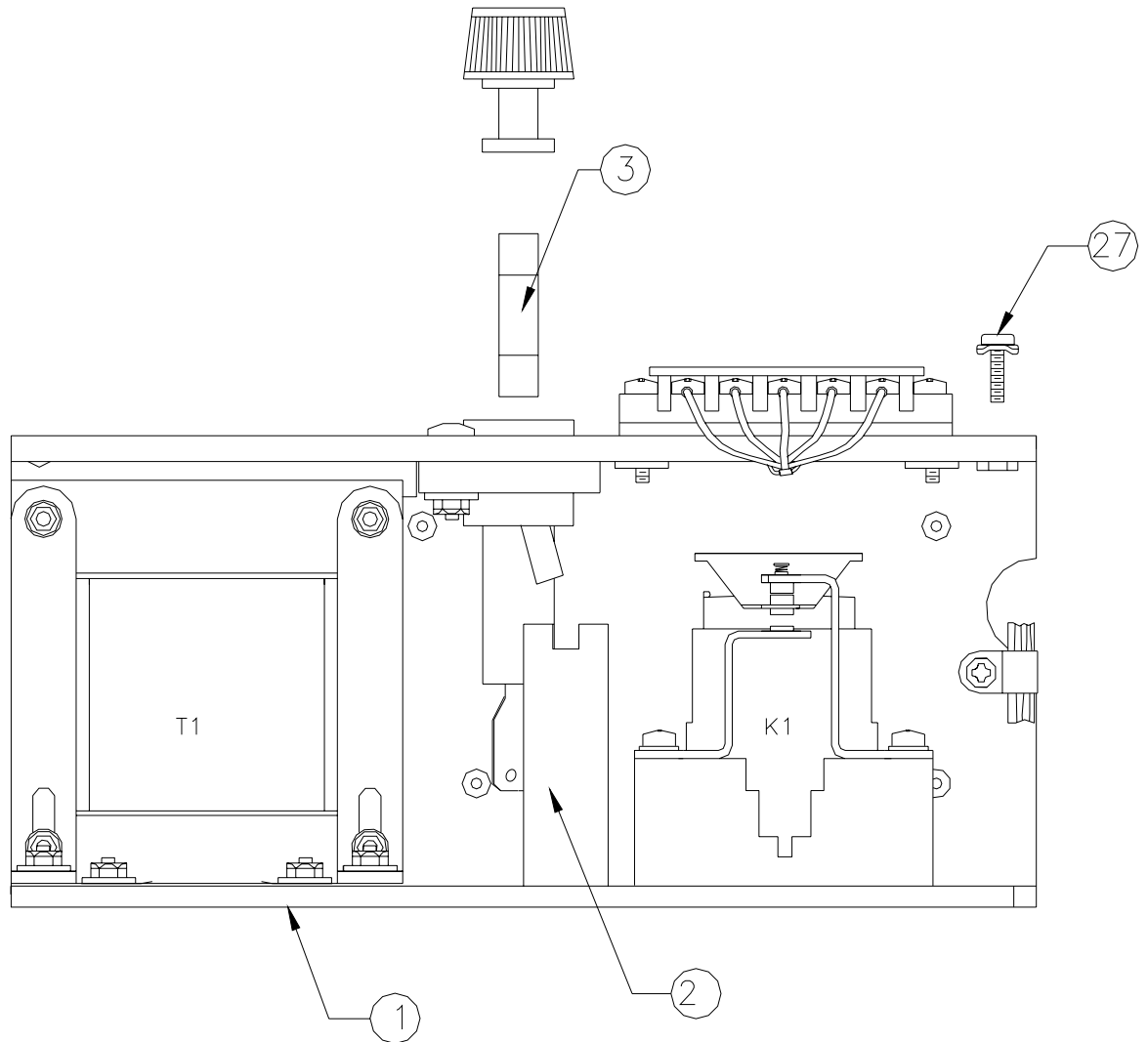
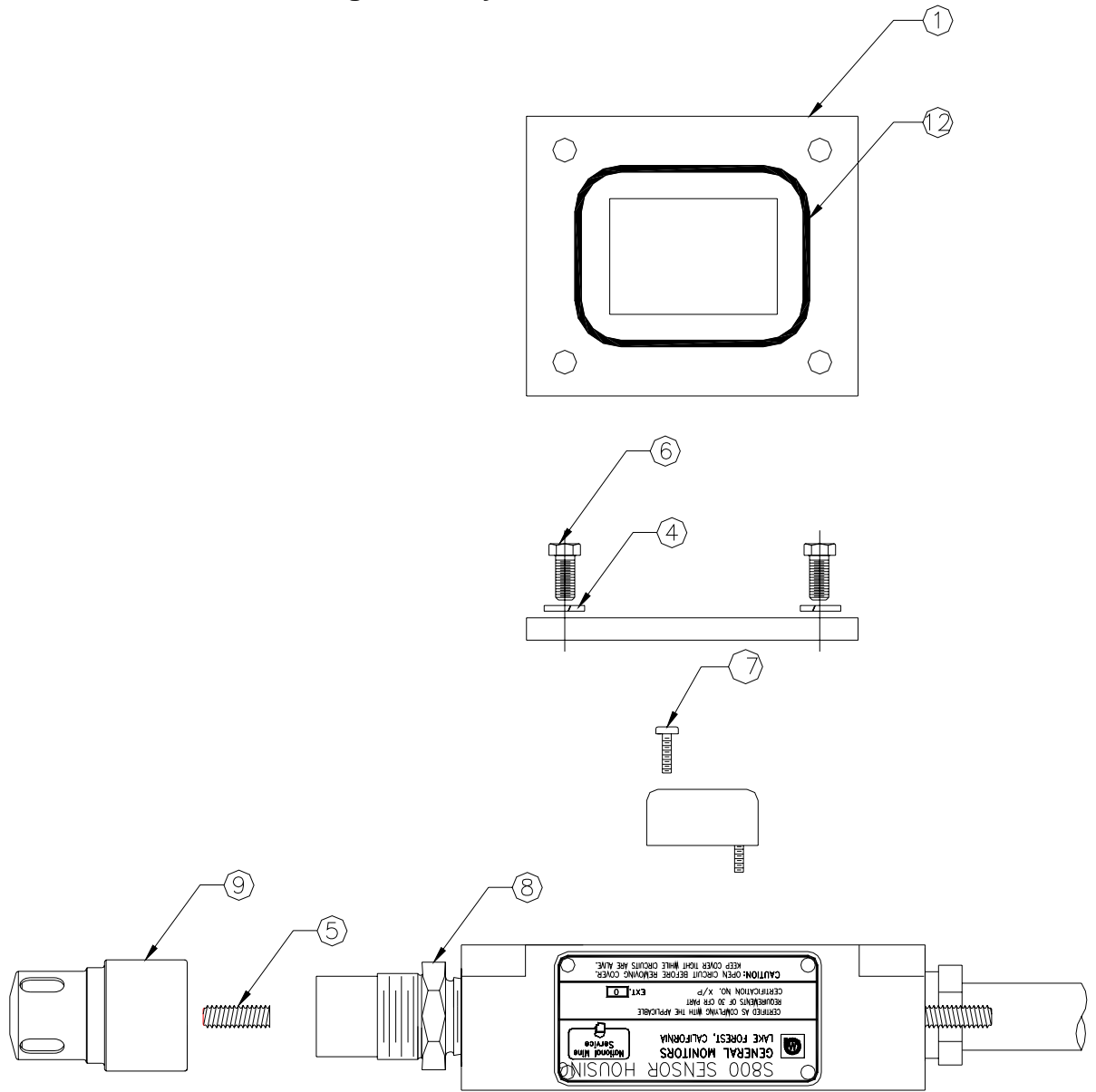


Figure 14: Power Supply Assembly

### 7.6 Detector Housing Assembly



**Figure 15: Detector Housing Assembly**

## 8.0 MSHA Installation Letter

Mine Safety and Health Administration  
 Approval and Certification Center  
 Box 20103 Route 1  
 Industrial Park Road  
 Triadelphia, West Virginia 26059

Company: \_\_\_\_\_  
 Mine: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 \_\_\_\_\_

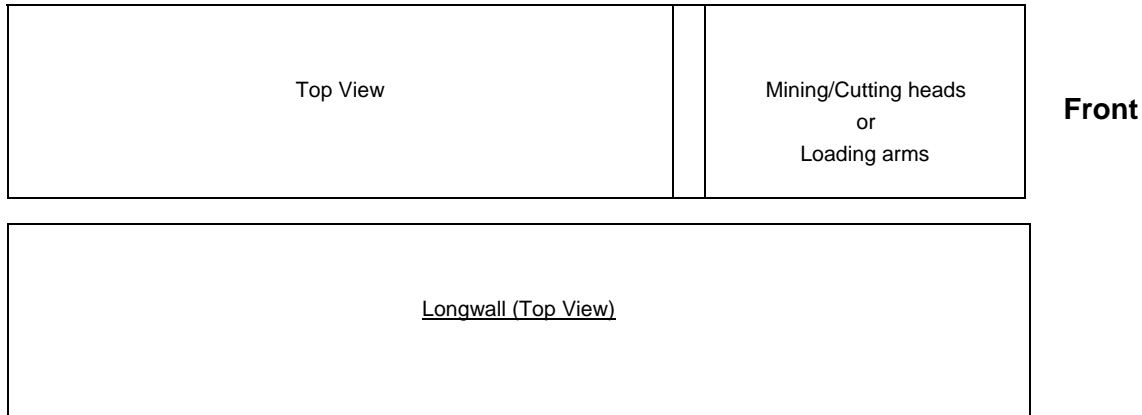
Attention: Health and Safety Technical  
 Approval and Testing

Gentlemen:

We have installed an S800 Methane Monitoring System, M.S.H.A. Cert. #32A-23/MS-0a  
 (manufacturer) \_\_\_\_\_, type (number) \_\_\_\_\_  
 serial number: \_\_\_\_\_

This machine is operated on (voltage) \_\_\_\_\_ and carries M.S.H.A. approval number \_\_\_\_\_

The installation was made in accordance with the manufacturer's instructions & safe practices.  
 The physical position of mounting is as shown on the following sketch.



**National Mine Service System Part No. is \_\_\_\_\_ Details of the monitor system are shown on the attached drawing.**

**Unit was installed by \_\_\_\_\_ Unit was calibrated by \_\_\_\_\_**

Please grant extension of approval for this machine.

Very truly yours,

Name: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

- Original copy for operator's records. Send two copies to local MSHA District Office.
- 1 copy for local district office records.
- 1 copy to be forwarded to A&CC.



**ADDENDUM**  
**Product Disposal Considerations**

This product may contain hazardous and/or toxic substances.

EU Member states shall dispose according to WEEE regulations. For further General Monitors' product WEEE disposal information please visit:  
**[www.generalmonitors.com/customer\\_support/faq\\_general.html](http://www.generalmonitors.com/customer_support/faq_general.html)**

All other countries or states: please dispose of in accordance with existing federal, state and local environmental control regulations.