

CGSM100/CGSM300

User's Manual



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WARNING!

THIS USER'S GUIDE MUST BE CAREFULLY READ BY ALL INDIVIDUALS WHO HAVE OR WILL HAVE THE RESPONSIBILITY FOR INSTALLING, USING OR SERVICING THIS PRODUCT. LIKE ANY PIECE OF COMPLEX EQUIPMENT, THIS PRODUCT WILL PERFORM AS DESIGNED ONLY IF INSTALLED, USED AND SERVICED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. OTHERWISE, IT COULD FAIL TO PERFORM AS DESIGNED AND PERSONS WHO RELY ON THIS PRODUCT FOR THEIR SAFETY COULD SUSTAIN SEVERE PERSONAL INJURY OR DEATH.

The warranties made by Quest Controls, Inc. with respect to these Products are voided if the products are not installed, used and serviced in accordance with the instructions in this user's guide. Please protect yourself and others by following them. We encourage our customers to write or call regarding this equipment prior to use or for any additional information relative to use or repair.

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GENERAL WARNINGS AND CAUTIONS!

1. The CGSM Gas Monitor described in this user's guide should be installed, operated, and maintained in strict accordance with their labels, cautions, warnings, instructions, and within the limitations stated.
2. This equipment must be isolated or disconnected before opening and more than one disconnect may be required. For MODEL CGSM300, the Amphenol connector is not suitable as a disconnecting means.
3. The CGSM Gas Monitor is a non-explosion proof design. It must not be installed in an open area or location where explosive concentrations of combustible gases or vapors might occur in the atmosphere in Class 1, Groups A, B, C, and D areas, as defined by the National Electrical Code (NEC). Since this monitor is not explosion proof, it must be located in a non-hazardous general-purpose area.
4. The CGSM Gas Monitor is designed to detect gases in air. It cannot measure the concentration of gases in steam or inert or oxygen deficient atmospheres.
5. As with all gas sensors high levels of, or long exposure to certain compounds in the tested atmosphere can contaminate sensors. In atmospheres where a gas sensor may be exposed to such materials, calibration should be performed frequently to ensure that the sensor operation is dependable and indications are accurate readings.
6. The CGSM Gas Monitor must not be painted. If painting is being done in an area where gas monitors and sensors are located, paint deposits will interfere with the diffusion process, whereby a sample of the atmosphere being monitored diffuses into the sensor head.
7. The only absolute method to ensure the proper overall operation of gas sensors is to check them with a known concentration of the gas for which they have been calibrated. Consequently, calibration checks should be included as part of the routine inspection of gas sensors.

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Section 1

Specifications

Power Requirements	21-61Vdc or 16-42Vac, 10VA.
Relays 1, 2 and 3	K1 -SPDT normally de-energized for CO Sensor Alarm. K2 -SPDT normally de-energized for HC Sensor Alarm. K3 -SPDT normally de-energized for optional H2 Sensor Alarm.
Relay Contact Rating	10A, 1/8 H.P., 125Vac; 6A, 1/8 H.P., 240Vac; 1A, 48Vdc (Resistive).
Relays 4 and 5	K4 -DPDT normally energized for Power/Sensor fault. K5 -DPDT normally de-energized for Ventilation Fan control common to all active sensors. One of the form 'C' contacts common legs is fused with a 4-amp socketed micro fuse.
Relay Contact Rating	5A, 1/8 H.P., 250Vac; 5A, 30Vdc (Resistive).
Alarm Trip-points	Factory set. May be field defined by a digital RS232 interface.
DC Power Output	+12Vdc and ground (maximum power 33mA) for remote Smoke Detector. Fused at 1A.
Calibration	Factory set. May be field defined using the RS232 interface.
Connections	On-board terminal blocks.

CARBON MONOXIDE SENSOR (CO)

Operating principal	(MOS) metal oxide semiconductor sensor
Operating range	25 to 500ppm
Alarm Threshold set point	Factory set at 35ppm or (Customer Specified)

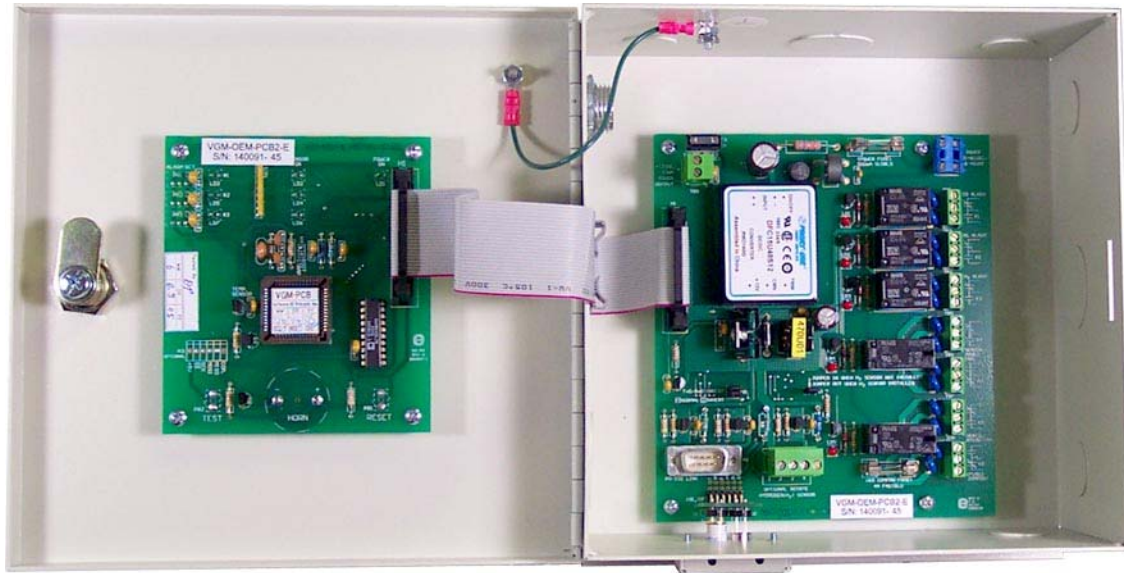
METHANE SENSOR (HC)

Operating principal	(MOS) metal oxide semiconductor sensor
Operating range	1,000-10,000ppm
Alarm Threshold set point	Factory set at 5,000ppm or (Customer Specified)

OPTIONAL REMOTE HYDROGEN SENSOR (H2)

Operating principal	(MOS) metal oxide semiconductor sensor
Operating range	1,000-10,000ppm
Alarm Threshold set point	Factory set at 5,000ppm or (Customer Specified)

Section 2 General Description

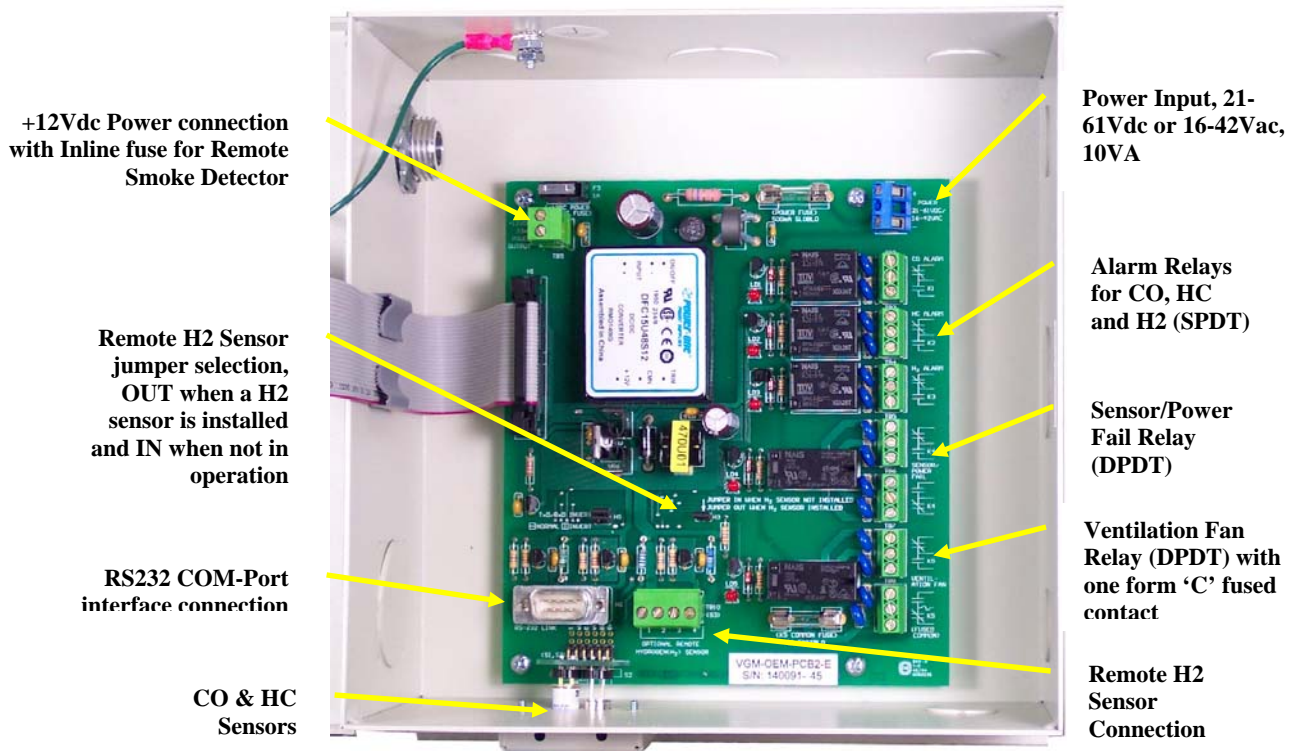


The CGSM Gas Monitor is designed to monitor potentially hazardous and toxic gas levels. The instrument employs integral Methane (HC) and Carbon Monoxide (CO) sensors with the option of adding a remote Hydrogen (H₂) detector. All of the sensing elements are Metal Oxide Semiconductor (MOS) solid-state technology. The CGSM consists of a main board for all input and output connections and a display board including all status indicators, alarm audible device and push buttons for test and reset. A status LED indication for each sensor, alarm and power is provided. A local audible device with reset and test buttons are also provided. The sensors are factory set with alarm thresholds: however, the set points can be adjusted to any value between 0 and 90% of the operating range. A discrete relay is assigned for each of the target gas.

FEATURES

- The front panel features discrete LED indication for sensor alarm, sensor OK (Fault) and a power LED. Push buttons to dynamically test the unit functionally and silence the on board audible device.
- The main board provides a +12Vdc – Ground output for a remote Smoke Detector.
- The CGSM sensor alarm thresholds are factory set. If the target gas level rises above the established value, a dedicated (SPDT) normally de-energized relay contacts will transfer state and the local audible device will sound. Pressing the reset push-button will silence the audible device. Additionally, the CGSM features a diagnostic LED indication for each active sensor which is also mapped to a common (DPDT) normally energized Fail relay that will transfer state if any of the sensors become inoperative or lose of power.
- A common (DPDT) normally de-energized Ventilation Fan relay will transfer state, if any of the sensors reach the pre-set Alarm threshold limit. One of the form 'C' contacts common legs is protected with a 4-Amp socketed micro fuse.
- The test button simulates an alarm condition. This action will momentarily activate the alarm and fault relays while illuminating the status LEDs and sounding an audible alarm. Any equipment connected to the monitor will also be activated.
- The monitor also allows serial data interrogation using RS232 interface for modifying the alarm set points, recording the operating parameters and calibration. Communication is established using an IBM compatible computer running MS HyperTerminal or ProComm applications.
- On board terminal blocks for convenient interface of power, alarm and fault relay contacts, remote Hydrogen and Smoke Detector.
- The CGSM is electrically isolated by a DC to DC Converter which is designed to provide positive and negative outputs if required.

Figure 1 Main Circuit Board



Alarm Scheme: LED indicators exhibit alarm and sensor status for each sensor. Dedicated alarm relay contacts will transfer state anytime a gas level exceeds the trip point. During an alarm event, the local audible device will alert personnel of the impending danger. Pressing the reset button will silence the audible alarm. The system features an automatic reset when gas levels fall below the alarm trip points. The alarm thresholds are factory set at 35ppm CO, 5000ppm Hydrogen and 5000ppm Methane. These settings can be adjusted in the field using the RS232 Communication port provided on the main circuit board.

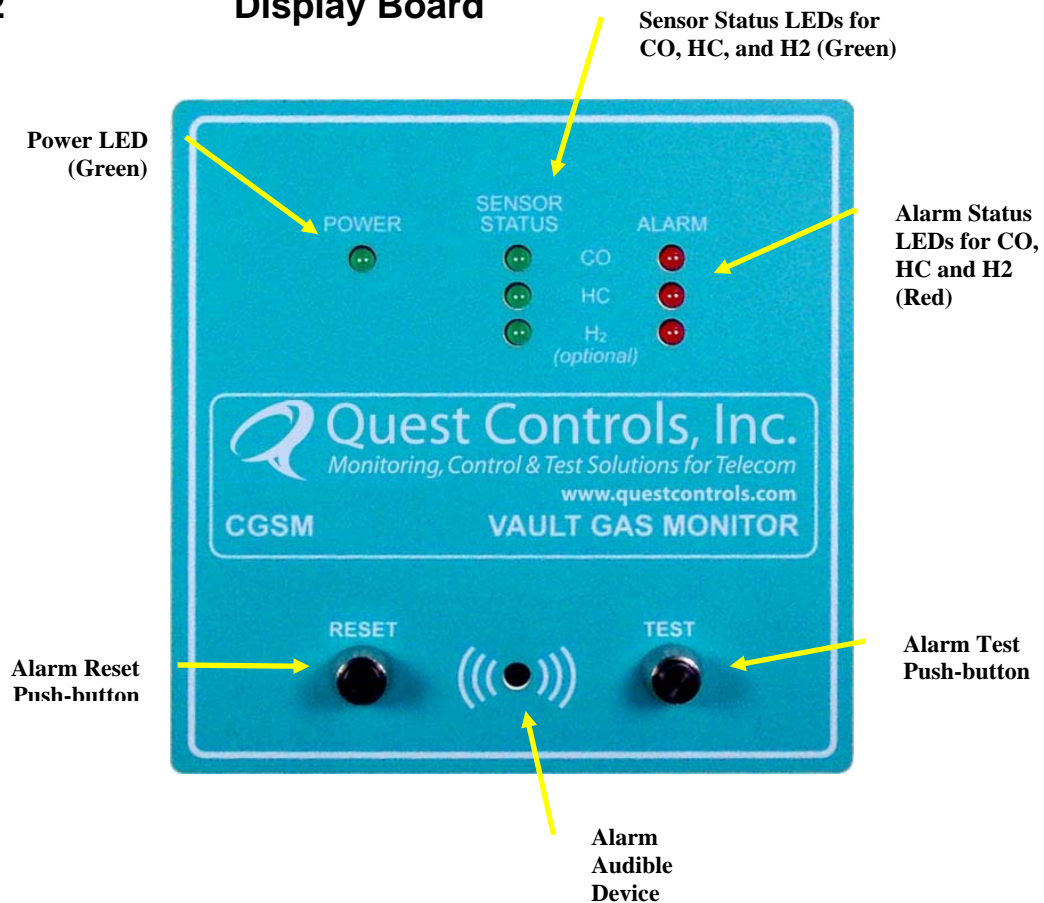
Test Button: When momentarily pressed, simulates an alarm condition and performs a dynamic check of the instrument. This action will momentarily activate all of the alarm and fault relays, illuminate the status LEDs and sounding an audible. **Note:** Any equipment connected to the monitor will also be activated.

Remote Interface Connections: On board terminal blocks for input power, sensor or power failure and alarm relay contacts.

RS232 Serial Communication Port: Conveniently located on the main circuit board. This feature provides access to the operating parameters. Once the connection is made, the current settings can be modified and recorded. Communication is established using an IBM compatible computer running MS HyperTerminal or ProComm applications.

Figure 2

Display Board



Alarm LEDs: Discrete status indication for Carbon Monoxide, Hydrocarbons and the Optional Hydrogen.

Fault LEDs: Discrete status indication for each sensor. A Sensor OK LED is ON under normal operating conditions. If a sensor is disconnected from the main circuit, the LED will turn OFF.

Test Button: To verify the operation of the monitor, press the test button on the front panel momentarily. The action will activate the alarm relays, turn on the alarm status LEDs and sound an alarm.

WARNING: Any equipment connected to the relay contacts will respond accordingly.

Sensor Fail: If any active sensor loses communication, the Sensor OK LED will turn off.

Section 3 Operation & Installation

Operation: When the CGSM is first powered up, it may go into alarm for a few minutes until the sensors have stabilized. This is normal whenever the sensors have been turned off for a while. It is also true when installing a new replacement sensor element.

Installation: The CGSM must be mounted on a wall or structure that is free from shock or vibration. It should be protected against physical damage, water, heat, and direct sunlight. Also consider the accessibility for servicing. Perform all wiring and conduit installation in accordance to the National Electrical Code (NEC).

External Connections: Connect a power supply to terminal block labeled + and -. Follow the applicable electrical code requirements when installing and wiring on the unit.

CAUTION: Do not exceed the contact ratings marked on the relays.

Section 4 Set-Up and Calibration

The monitor is factory configured. However, calibration or custom alarm trip points can be filed defined. Note that the CGSM must always be recalibrated after replacing any of the sensors or installing the optional remote Hydrogen sensor. Perform calibration checks regularly as part of a routine inspection and maintenance procedure. Use calibration gases of known and certified concentrations. Check the expiry date on the gas cylinders. The CGSM sensors are factory calibrated. However, if it is necessary to re-calibrate or re-configure the sensor alarm threshold set points then follow procedure below. **NOTE!** The sensors must always be re-calibrated after replacing any of the gas sensors.

IMPORTANT! The CGSM sensors must be calibrated with a humidified calibration gas. This can be accomplished by passing the calibration gas through the vapor space inside a bottle of distilled water at a flow rate of 0.25 L/M.

Calibration Equipment

Flow controller 0.25 litres/minute and tubing

Appropriate Calibration Gas

Electronic Multi-meter

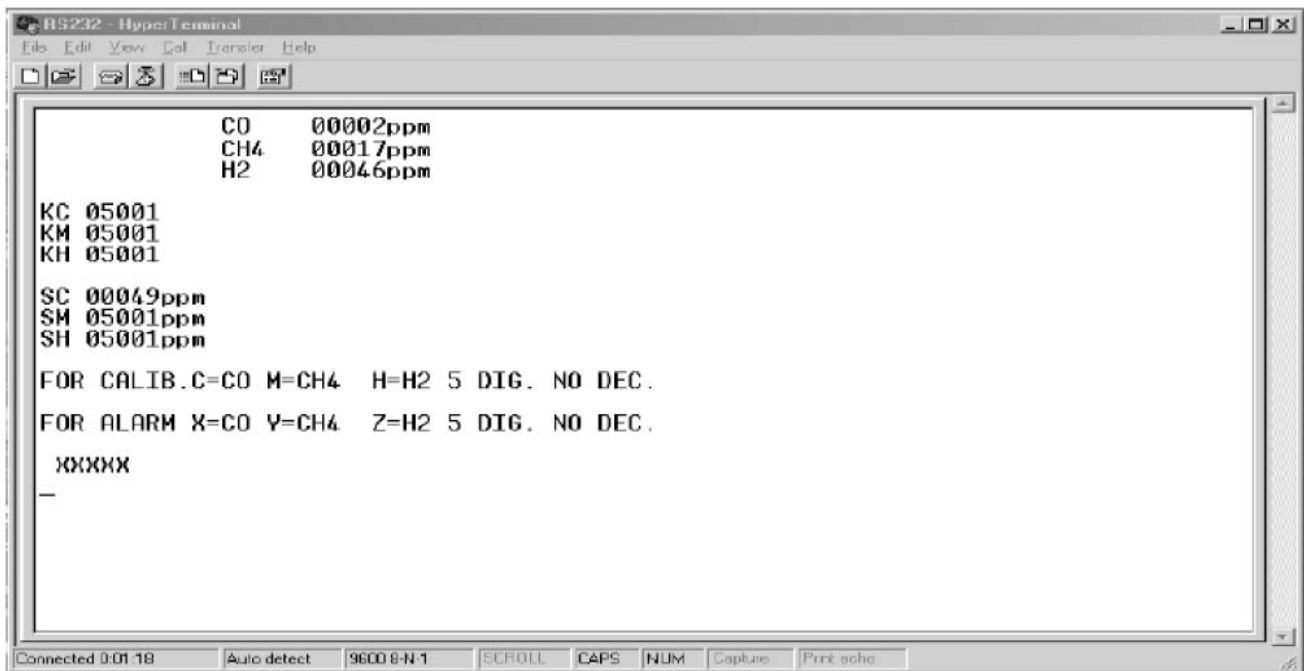
Container of Distilled water with inlet and outlet tubing, required for humidifying the calibration gas.

COMPUTERIZED SET-UP

1. **Before attempting to calibrate the CGSM, make sure that the unit has been operating for at least 24 hours.**
2. The calibration and set-up parameters of the CGSM sensor can be downloaded to an IBM compatible computer running MS Windows version 95, 98 or XP. The communication between the CGSM and a computer can be established by using MS HyperTerminal or ProComm applications. Connect a 9-pin serial communication cable between the CGSM, RS232 port provided and COM1 or COM2 port on the computer.
3. **Go to Section 5, and perform the COMPUTERIZED, ONE-STEP Calibration procedure.**

Refer to section 6, for the HyperTerminal set-up.

When connected to a serial port, the CGSM monitor sends out the information similar to the screen image below.



The screenshot shows a HyperTerminal window titled "RS232 - HyperTerminal" with a menu bar (File, Edit, View, Get, Transfer, Help) and a toolbar. The main display area contains the following text:

```
      CO   00002ppm
      CH4  00017ppm
      H2   00046ppm

KC 05001
KM 05001
KH 05001

SC 00049ppm
SM 05001ppm
SH 05001ppm

FOR CALIB.C=CO M=CH4 H=H2 5 DIG. NO DEC.
FOR ALARM X=CO Y=CH4 Z=H2 5 DIG. NO DEC.

XXXXXX
-
```

The status bar at the bottom of the window displays: "Connected 0:01:18", "Auto detect", "9600 8-N-1", "SCROLL", "CAPS", "NUM", "Capture", and "Print echo".

Section 5 Computerized Set-up Procedure

ONE-STEP CALIBRATION

The calibration procedure of the CGSM requires a PC or Laptop running a serial communications program in DOS or WINDOWS. The serial communication is conducted in ACSII at 9600 BAUD, 8 data bits, no parity, and 1 stop bit.

CALIBRATION PROCEDURE

1. Apply a known concentration of the appropriate calibration gas to the target gas sensor.

IMPORTANT! The (C) Carbon Monoxide, (M) Hydrocarbon and (H) Hydrogen gas sensors must be calibrated with a humidified calibration gas. This can be accomplished by passing the calibration gas through the vapor space, inside a bottle of distilled water a flow rate of 0.25 L/M.

2. Observe the gas value on the screen; wait for at least 10 minutes, until the reading has stabilized.
3. Toggle the computer's CAPS LOCK key to the ON position.
4. Press the appropriate gas calibration key (H for Hydrogen, M for Methane or C for CO).
5. Type in a 5-digit gas value equal to the calibration gas that is being introduced to the sensor. Use leading zeros to pad the value to five digits. Do not enter decimal points.
6. Wait for 30 seconds until the CGSM responds to the new settings and verify that the gas level is now the same as the applied calibration gas. If necessary, repeat this procedure.

Example: Gas Code 'M', enter 05000 for 5000ppm Methane.

ALARM THRESHOLD ADJUSTMENT PROCEDURE

1. Toggle computer's CAPS LOCK key to the ON position.
2. Press the appropriate ALARM CODE key (X for CO, Y for Methane or Z for Hydrogen).
3. Type in a 5-digit alarm set-point value. Use leading zeros to pad the value to five digits. Do not enter decimal points.
4. Wait until the monitor responds to the new settings.

Example: Alarm Code 'Y', enter 05000 for a 5000ppm trip point.

Section 6 MS Hyper-Terminal Set-Up Procedure

HyperTerminal COM set-up: In order to send and receive program files from the CGSM, the HyperTerminal application needs to be set up on the computer. Start HyperTerminal by clicking Start, pointing to Programs, then Accessories, then Communications and clicking on the HyperTerminal. For information about how to use HyperTerminal, click the Help icon in the HyperTerminal menu.

Set up the HyperTerminal with the following parameters.

- On the properties of your HyperTerminal type in the name CGSM COM.
- Set the operating properties of the CGSM HyperTerminal as follows;

Connect using: Direct to COM 1 or COM 2 (computer specific)

Port settings;

Bits per second: 9600
Data bits: 8
Parity: None
Stop bits: 1
Flow control: Xon/Xoff

ACSII set up;

Click on; Send line ends with Line feeds
Line delay: 0
Character delay: 0

Settings tab;

Terminal keys.
Ctrl + h.
Emulation: ANSI
Telnet Terminal: ANSI
Back scroll buffer lines: 220

Section 8 Replacement parts list

<u>Description</u>	<u>Quest Part Number</u>
CGSM100 Gas Monitor	300150
CGSM300 Stand Alone Gas Monitor	300152
Replacement PCBs for CGSM	300189
Replacement Methane sensor	510052
Replacement Carbon Monoxide sensor	510053
Smoke Detector	300136
Methane Calibration Kit	300655
Hydrogen Calibration Kit	300656
CO Calibration Kit	300657
Optional Hydrogen Sensor (see below)	300652

Optional Hydrogen Sensor



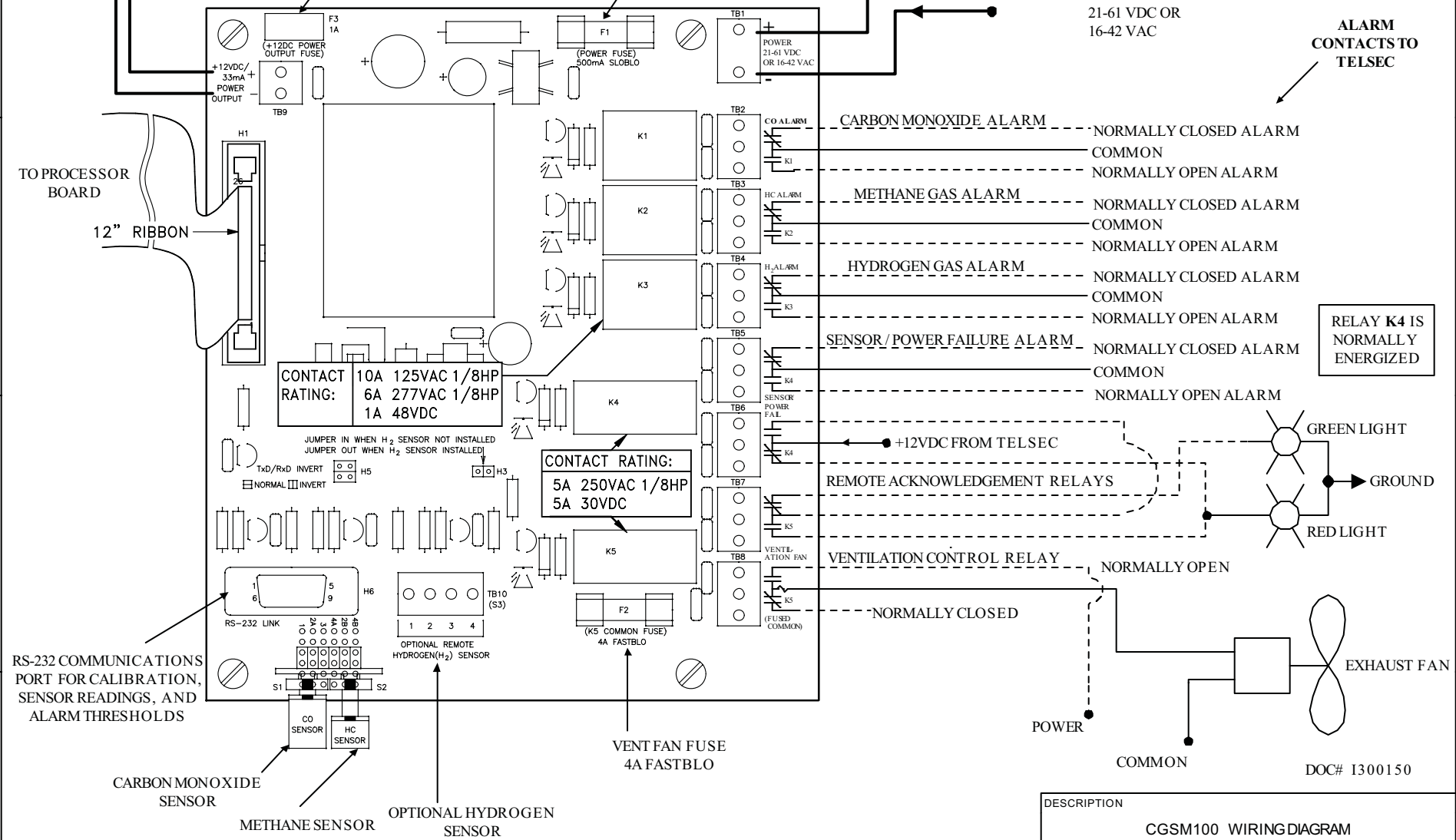
+5VDC FOR EXTERNAL SMOKE DETECTOR

SMOKE DETECTOR MICRO FUSE
1A FASTBLO

POWER FUSE
500mA SLOWBLO

INCOMING POWER
21-61 VDC OR
16-42 VAC

ALARM CONTACTS TO
TELSEC



CONTACT RATING:
10A 125VAC 1/8HP
6A 277VAC 1/8HP
1A 48VDC

CONTACT RATING:
5A 250VAC 1/8HP
5A 30VDC

RELAY K4 IS
NORMALLY
ENERGIZED

RS-232 COMMUNICATIONS
PORT FOR CALIBRATION,
SENSOR READINGS, AND
ALARM THRESHOLDS

CARBON MONOXIDE
SENSOR

METHANE SENSOR

OPTIONAL HYDROGEN
SENSOR

VENT FAN FUSE
4A FASTBLO

DOC# 1300150

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DESCRIPTION	
CGSM100 WIRING DIAGRAM	
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SCOTTHICKS/CTG	11/10/2005
FILENAME	PAGE
CGSM_100_WIRING_DIAGRAM	1 OF 1

