MODEL 5000

S E N T R Y

GAS MONITORING SYSTEM

Version 6

Sensors Service

APPLICABILITY & EFFECTIVITY

Effective for all Sentry systems manufactured after September 1, 1995.

Instruction Manual Part Number T12001-A1

Sierra Monitor Corporation
1991 Tarob Court, Milpitas, CA 95035
(408) 262-6611

7.5 COMBUSTIBLE GAS SENSOR MODULE (5100-02)

7.5.1 DESCRIPTION

The Combustible Gas Module includes the sensor and electronic assembly installed in an explosion proof housing. The sensor screws into one hub of the enclosure and plugs into the bottom electronics card via a six pin connector. Cabling to the controller connects to a three pin spring loaded terminal strip.

7.5.2 TROUBLE ANALYSIS

Electrical adjustment, or replacement of the sensor will be necessary under the following conditions:

- Controller displays the following error messages:

  CHK BRIDGE VOLT
  SENSOR FAILURE
  LOW SENSITIVITY

- False readings or alarms are received due to sensor inaccuracy.

Warning: : During sensor adjustments the concentration reading on the controller will be inaccurate and alarm level concentrations may be displayed. If false activation of the alarm relays will cause a problem disconnect the relay wiring prior to adjustment or turn the module off using the **CHANGE MODULE** mode.

> ***NOTE***
> ***Although all the necessary data can be collected with a voltmeter at the sensor module, some helpful information can be displayed or printed. See diagnostic codes 0004 and 0008 in Appendix C.***

7.5.3 ADJUSTMENT PROCEDURE

Prior to reading voltages and making adjustments perform a visual inspection to confirm that there are no physical problems such as water in the electronics enclosure, wiring damage or corrosion.

Use Figure 7-6 to locate test points during the following procedures:

Caution: The area must be free of flammable vapors or gases during any adjustments or maintenance procedures.

7.5.3.1 BRIDGE VOLTAGE ADJUSTMENT

Confirm that no combustible gas is present and remove sensor module cover.

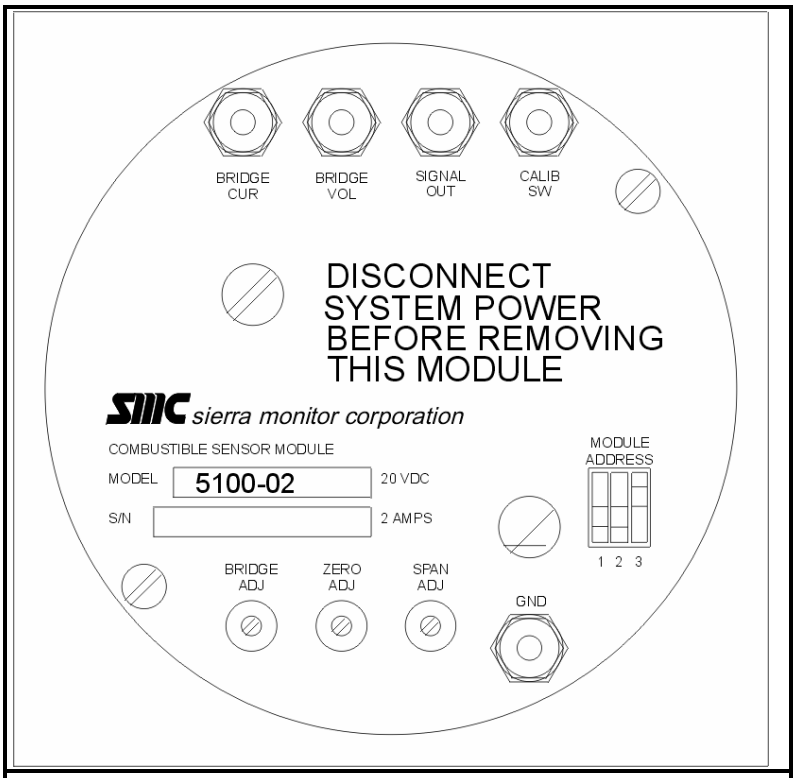

Figure 7-6
Cover Plate - Combustible Gas Module

Comparing to the "GND" (ground) test point measure "BRIDGE VOL" (bridge voltage) and adjust to 2.00 VDC using "BRIDGE ADJ" potentiometer. Turn counter-clockwise to increase.

7.5.3.2 ZERO ADJUSTMENT

Comparing to ground measure **SIGNAL OUT** and adjust to 0.18 VDC by turning **ZERO ADJ** potentiometer. Turn counter clock-wise to increase.

7.5.3.3 SPAN ADJUSTMENT

1. Determine the concentration of the calibration gas (CG) in % LEL.
2. Use the following formula to determine the response to the calibration gas at **SIGNAL OUT**.

   Voltage (Signal Out) = (CG+12)/60

   For Example:

   If CG = 50% L.E.L

   Signal Out = (50+12)/60

   = 1.03 volts

3. Using a Sierra Monitor Model 1200-26 Gas Calibrator with a Sierra Monitor Model 5358-00 calibration adapter, or Model 5360 Gas Delivery Fitting. Apply the calibration gas at a flow rate of 100 cc/min. until the signal out voltage stops changing (approx. 2 minutes). Then adjust span adj. potentiometer to the calculated value.
4. Remove the calibration gas and wait for the voltage to drop. If the voltage is below 0.30 VDC the procedure is complete. If the voltage is above 0.30 VDC repeat the zero and span adjustments.
5. Calibrate the sensor using the instruction manual procedure.

    - A **LOW SENSITIVITY** message during calibration indicates one of the two conditions for a combustible sensor:

        - The zero gas voltage must be less than .3 volts.
        - The new span change (span voltage less zero voltage) must exceed 30% of the calculated span change.

        For Example:

        Zero gas voltage= .20 VDC

        Span voltage = .43 VDC

        Span change is .43-.2 = .23 VDC

        As the calculated span value (from step 5 above) is 1.03, the calculated span change is: 1.03-.2 = .87

        By calculation: 30% of .87 = .26

        The new span change (.23) is less than 30% of the calculated span change so a **LOW SENSITIVITY** message will be displayed.

The **LOW SENSITIVITY** calculation is made to insure that the calibration does not adjust the electronics so that the "gain" is large enough to cause false alarms due to minor drift or due to minimal electronic noise.

7.5.4 SENSOR REPLACEMENT

If any of the above adjustments cannot be completed successfully the sensor and/or electronics will require replacement. To check the sensor unplug it from the electronics and remove from the housing so that continuity and resistance tests can be made. Table 7-4 provides the pin out for the sensor assembly.

PIN	FUNCTION	WIRE COLOR
1	DETECTOR	WHITE
2	COMPENSATOR	BROWN
3	CALIB. SW.	RED
4	DETECTOR	BLACK
5	DRAIN	BARE
6	CALIB. SW.	GREEN

Table 7-5
Combustible Gas Sensor
Wiring Pin Out

1. Detector element resistance should be between 1.5 to 2 ohms.
2. Compensator element resistance should be between 1.5 to 2 ohms.
3. Calibration switch should be open in normal operation and should close when the calibration magnet is applied.

If the sensor fails any of these tests it should be replaced. If the sensor passes these tests the electronics are suspect and BOTH the sensor and electronics should be replaced. (The electronics and sensor which are removed should be returned to the factory for evaluation).

When a new sensor is installed the following actions must be taken:

- Make the bridge voltage adjustment immediately to avoid over-voltage damage to the sensor.
- Use diagnostic code 0020 to establish nominal value calibration.
- Allow 24 hours for full stabilization of the sensor, recheck the zero and span adjustments and calibrate the sensor module.

7.5.5 COMBUSTIBLE GAS SCALING FACTORS

For combustible gas monitoring, a calibration standard of Methane or Propane my be used in conjunction with scaling factors to cause Sentry concentration display and alarm function in %LEL scale of another gas as follows:

GAS	METHANE FACTOR	PROPANE FACTOR
Acetaldehyde	60	109
Acetic Acid	54	98
Acetic Anhydride	46	83
Acetone	52	94
Acetylene	57	103
Alkyl Alcohol	51	92
Ammonia	126	229
n-Amyl Alcohol	33	59
Aniline	39	71
Benzene	41	74
Biphenyl	25	45
1,3-Butadiene	56	101
n-Butane	58	106
iso-Butane	52	94
Butene-1	45	82
cis-Butene-2	48	88
trans-Butene-2	51	92
n-Butyl Alcohol	34	62
iso-Butyl Alcohol	53	96
tert-Butyl-Alcohol	74	134
n-Butyl Benzene	31	57
iso-Butyl Benzene	32	58
n-Butyric Acid	38	69
Carbon Disulfide	18	32
Carbon Monoxide	75	137
Carbon Oxysulphide	93	169
Chlorobenzene	34	62
Cyanogen	89	162
Cyclohexane	41	74
Cyclopropane	62	113
n-Decane	33	59
Diethylamine	49	88
Dimethylamine	58	105
2,3-Dimethylpentane	40	72
2,3-Dimethylpropane	40	72
Dimethylsulphide	43	79
1,4-Dioxane	45	81
Epichlorohydrin	45	82
Ethane	68	123
Ethyl Acetate	51	93
Ethyl Alcohol	73	132
Ethylamine	53	95
Ethyl Benzene	36	65
Ethyl Bromide	91	165
Ethyl Chloride	57	103
Ethylcyclopentane	40	72
Ethylene	71	128
Ethylenedichloride	66	120
Ethyleneoxide	52	94

GAS	METHANE FACTOR	PROPANE FACTOR
Diethyl Ether	46	84
Dimethoxyethane	42	75
Dimethyl Ether	63	113
Dimethylformamide	46	83
Ethyl Formate	44	80
Ethylmercaptan	56	102
n-Heptane	39	70
n-Hexane	37	67
Hydrazine	45	82
Hydrogencyanide	48	86
Hydrogen	77	139
Hydrogen Sulfide	41	74
Methane	100	181
Methyl Actetate	50	90
Methyl Alcohol	86	156
Methylamine	77	140
Methyl Bromide	90	162
Methyl Chloride	102	186
Methylcyclohexane	44	80
Methylenedichloride	93	168
Methylethylether	44	80
Methylethylketone	41	75
Methyl Formate	67	121
Methylmercaptan	61	110
Methylpropionate	51	93
Methyl n-propylketone	40	73
Napthalene	34	62
Nitromethane	34	62
n-Nonane	31	57
n-Octane	37	68
n-Pentane	46	83
i-Pentane	46	84
Propane	55	100
n-Propyl Alcohol	47	85
n-Propylamine	48	88
n-Propylchloride	50	90
Propylene	52	93
Propyleneoxide	46	83
iso-Propylether	44	79
Propyne	42	75
Toluene	40	73
Triethylamine	40	72
Trimethylamine	48	88
Vinylethylether	42	76
o-Xylene	36	65
m-Xylene	39	71
p-Xylene	39	71
JP-4 (Jet Fuel)	41	73

NOTES:

1. Scaling factors are not FMRC approved.
2. Base data source: EEV sensor specification catalog. (EEV claims some data is the result of specific tests, other data is empirically derived.)

7.6 OXYGEN MODULE (5100-03)

7.6.1 DESCRIPTION

The Oxygen Module includes the electronic assembly installed in an explosion proof housing and the electrochemical sensor connected to one hub of the enclosure. Cabling from the controller connects to a three pin spring loaded terminal strip.

7.6.2 TROUBLE ANALYSIS

Electrical adjustment, or replacement of the sensor will be necessary under the following conditions:

- Controller displays the following error messages:

  CHANGE SENSOR
  SENSOR FAILURE
  REPLACE SENSOR

- False readings or alarms are received due to sensor inaccuracy.

Warning: During sensor adjustments the concentration reading on the controller will be inaccurate and alarm level concentrations may be displayed. If false activation of the alarm relays will cause a problem disconnect the relay wiring prior to adjustment or turn the module off using the "Change Module" mode.

> ***NOTE***
> ***Although all the necessary data can be collected with a voltmeter at the sensor module, some helpful information can be displayed on the controller or printed. See diagnostic codes 0004 and 0008 in Appendix C.***

7.6.3 ADJUSTMENT PROCEDURE

Prior to reading voltages and making adjustments perform a visual inspection to confirm that there are no physical problems such as water in the electronics enclosure, wiring damage or corrosion.

Use Figure 7-7 to locate test points during the following procedures.

7.6.3.1 SIGNAL ADJUSTMENT

It is unlikely that any electrical adjustment will be required except when a new sensor is installed.

To make the electrical adjustment connect a voltmeter to **SIGNAL OUT** (pos) and **GND** (ground) and use **SENSITIVITY ADJ** potentiometer to set the voltage equal to 1/10 of the actual oxygen concentration. In clean air the concentration is 20.9% so the voltage should be set at 2.09 VDC.

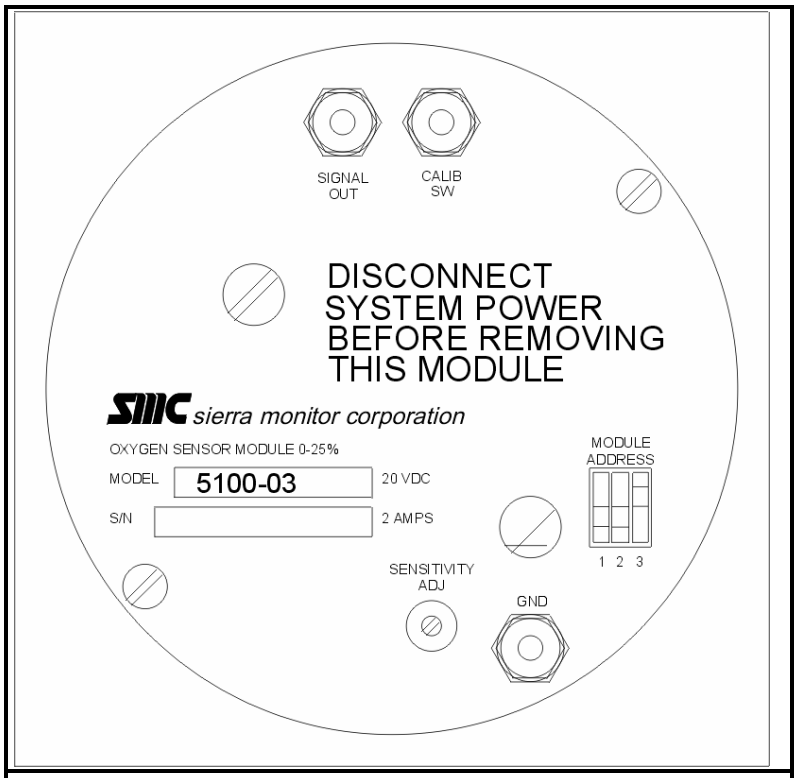

Figure 7-7
Cover Plate - Oxygen Module

7.6.4 SENSOR REPLACEMENT

The oxygen sensor should be replaced when it can no longer be calibrated correctly or when the signal output drops to zero. Generally this is every twelve to eighteen months. The Sentry clock keeps track of the age of the sensor if it is correctly initialized in the "change module" mode.

When a new sensor is installed use the **CHANGE MODULE** menu selection to answer yes to the "new sensor?" question. After nine months the **CHANGE SENSOR** message will be displayed to warn that a new sensor should be installed.

The **SENSOR FAILURE** message for Oxygen sensors does not indicate a specific failure of the sensor but indicates that the sensor is not correctly connected to the electronics. If this message appears check that the sensor harness is correctly installed to the connector on the bottom electronics board.

When sensor replacement is required, open the cover of the sensor module, remove the transmitter and disconnect the sensor wiring harness from the back of the transmitter.

Unscrew the old sensor from the conduit hub, screw in the new sensor and connect the wiring harness to the transmitter electronics. Replace the transmitter into the enclosure, make signal adjustments as described above, and replace the enclosure cover.

After the sensor is installed:

- Update "new sensor" status in the change module mode.
- Allow one hour of stabilization of the new sensor.
- Make the electrical sensitivity adjustment as described above.
- Calibrate the sensor module.

7.7 CARBON MONOXIDE MODULE (5100-04)

7.7.1 DESCRIPTION

The Carbon Monoxide Module includes the sensor and electronic assembly installed in an explosion proof housing.

The sensor screws into one hub of the enclosure and plugs into the bottom electronics card via a six pin connector. Cabling from the controller connects to a three pin spring loaded terminal strip.

7.7.2 TROUBLE ANALYSIS

Electrical adjustment, or replacement of the sensor will be necessary under the following conditions:

- Controller displays the following error messages

  SENSOR FAILURE
  LOW SENSITIVITY

- False readings or alarms are received due to sensor inaccuracy.

Warning: During sensor adjustments the concentration reading on the controller will be inaccurate and alarm level concentrations may be displayed. If false activation of the alarm relays will cause a problem disconnect the relay wiring prior to adjustment or turn the module off using the "Change Module" mode.

> ***Note***
> ***Although all the necessary data can be collected with a voltmeter at the sensor module, some helpful information can be displayed on the controller or printed. See diagnostic codes 0004 and 0008 in Appendix C.***

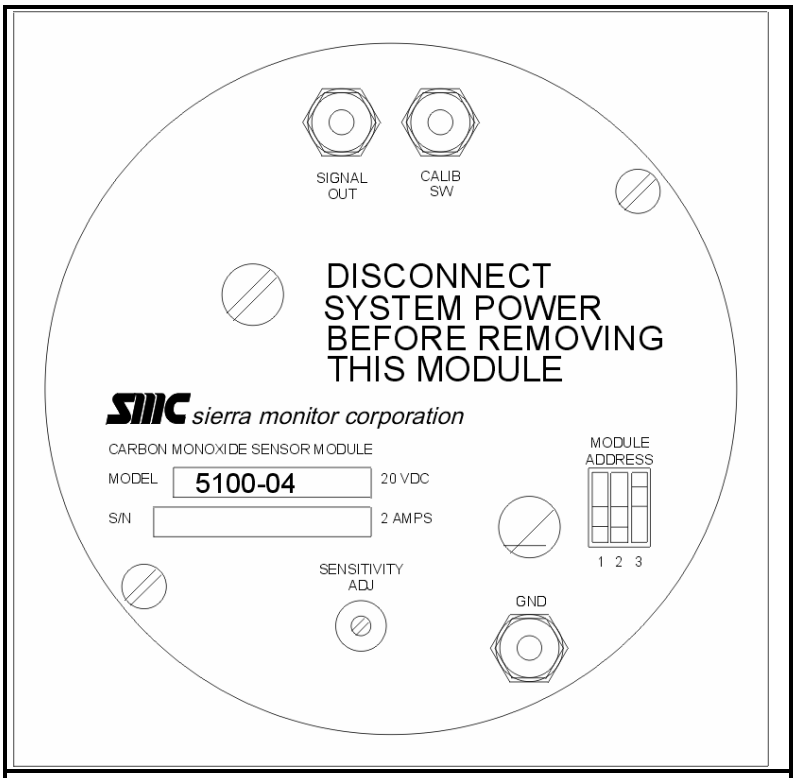

Figure 7-8
Cover Plate - Carbon Monoxide Module

7.7.3 ADJUSTMENT PROCEDURE

Prior to reading voltages and making adjustments perform a visual inspection to confirm that there are no physical problems such as water in the electronics enclosure, wiring damage or corrosion.

Use Figure 7-8 to locate test points during the following procedures.

7.7.3.1 SIGNAL ADJUSTMENT

It is unlikely that any electrical adjustment will be required except when a new sensor is installed.

To make the electrical adjustment connect a voltmeter to **SIGNAL OUT** (pos) and **GND** (ground) and use **SENSITIVITY ADJ** potentiometer to adjust the voltage based on the following:

- 1 ppm CO = 0.004 VDC.
- 100 ppm CO = 0.40 VDC.
- 250 ppm CO = 1.00 VDC.

7.7.3.2 SENSOR REPLACEMENT

The carbon monoxide sensor should be replaced when it can no longer be calibrated correctly. Generally this is every twenty four to thirty months.

The "SENSOR FAILURE" message for Carbon Monoxide sensors does not indicate a specific failure of the sensor but indicates that the sensor is not correctly connected to the electronics. If this message appears check that the sensor harness is correctly installed to the connector on the bottom electronics board.

If sensor replacement is necessary remove the electronics from the housing and unplug the old sensor from the bottom board, remove it from the enclosure hub and reverse the procedure to install the new sensor.

After the sensor is installed:

- Allow one hour of stabilization of the new sensor.
- Make the electrical sensitivity adjustment as described above.
- Calibrate the sensor using the instruction manual procedure.

7.8 HYDROGEN SULFIDE MODULE (5100-05)

7.8.1 DESCRIPTION

Model 5100-05 Hydrogen Sulfide Sensor Module includes a sensor assembly and electronic assembly installed in an explosion proof housing.

The sensor assembly includes a reuseable housing and disposable electrochemical sensor. The assembly screws into one hub of the sensor module enclosure and plugs into the bottom electronics card via a six pin connector.

Cabling from the controller connects to a three pin spring loaded terminal strip on the electronics assembly.

7.8.2 TROUBLE ANALYSIS

Electrical adjustment, or replacement of the sensor will be necessary under the following conditions:

- Controller displays the following error messages

  SENSOR FAILURE
  LOW SENSITIVITY

- False readings or alarms are received due to sensor inaccuracy.

Warning: During sensor adjustments the concentration reading on the controller will be inaccurate and alarm level concentrations may be displayed. If false activation of the alarm relays will cause a problem disconnect the relay wiring prior to adjustment or turn the module off using the "Change Module" mode.

> ***NOTE***
> ***Although all the necessary data can be collected with a voltmeter at the sensor module, some helpful information can be displayed on the controller or printed. See diagnostic codes 0004 and 0008 in Appendix C.***

7.8.3 ADJUSTMENT PROCEDURE

Prior to reading voltages and making adjustments perform a visual inspection to confirm that there are no physical problems such as water in the electronics enclosure, wiring damage or corrosion.

Use Figure 7-9 to locate test points during the following procedures.

7.8.3.1 SIGNAL ADJUSTMENT

It is unlikely that any electrical adjustment will be required except when a new sensor is installed.

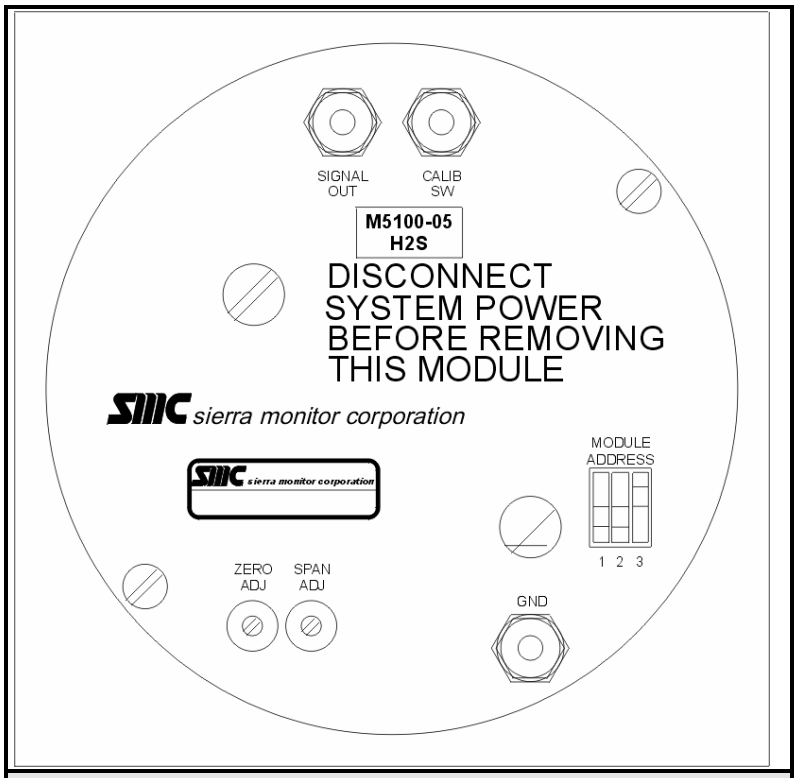

Figure 7-9
Cover Plate - Hydrogen Sulfide Module

To make the electrical adjustment connect a voltmeter to **SIGNAL OUT** (pos) and **GND** (ground) and use **SPAN ADJ** potentiometer to adjust the voltage based on the following:

- 1 ppm H_2S = 0.02 VDC.
- 100 ppm H_2S = 2.00 VDC.

7.8.3.2 SENSOR REPLACEMENT

The Hydrogen Sulfide sensor should be replaced when it can no longer be calibrated correctly. Generally this is every twenty four to thirty months.

The **SENSOR FAILURE** message for Hydrogen Sulfide sensors does not indicate a specific failure of the sensor but indicates that the sensor is not correctly connected to the electronics. If this message appears check that the sensor harness is correctly installed to the connector on the bottom electronics board.

The gas sensor which is located inside the sensor assembly housing can be replaced without replacement of the housing. To replace the sensor:

1. Confirm that system power has been removed.
2. Remove the transmitter electronics board from the main housing and unplug the sensor harness from the transmitter electronics.
3. Unscrew the sensor housing from the bottom of the enclosure
4. Hold the sensor assembly so that the harness faces down and the sensor faces up. Unscrew and remove the round section of the housing from the hex section. Be careful not to lose the spacer washer which will be sitting on top of the exposed sensor.
5. Carefully pull the old sensor straight up from the socket.
6. Orient the new sensor so that the sensor pin labeled "**C**" faces the socket labeled "**C**" which is on the far side of the board from the vertical reed switch. The reed switch will slide into a hole on the side of the new sensor. Press the new sensor's pins into the three sockets.
7. Carefully replace the cover on the sensor assembly including the spacer washer.
8. Install the sensor assembly into the enclosure and tighten firmly.
9. Reconnect the sensor harness to the transmitter, install the transmitter into the housing and restore power.
10. Allow one hour for the sensor to stabilize prior to recalibration.
11. Recalibrate the sensor module.

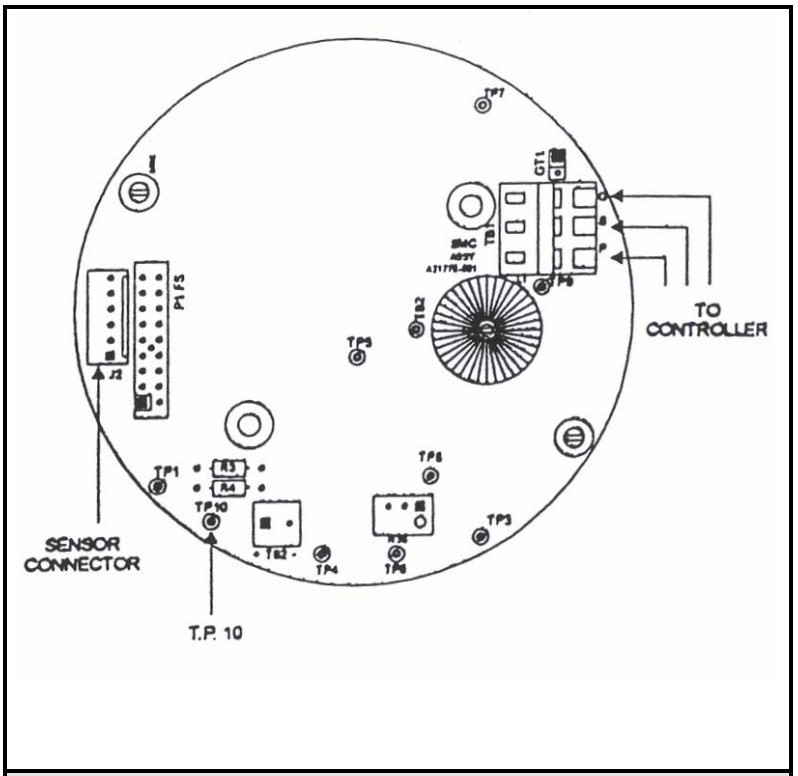

Figure 7-10
Hydrogen Sulfide Transmitter Component Locator

7.8.3.3 SENSOR OUTPUT ADJUSTMENT

The following procedure is to be used when, during normal calibration of a new sensor, the span voltage cannot be adjusted to a high enough level.

1. Adjust the span potentiometer so that it is approximately mid range. (Twenty turns clockwise and tens turns counter-clockwise).
2. Remove system power and remove both the transmitter and the sensor assembly from the enclosure. Remove the sensor assembly cover so that the sensor is visible.
3. Plug the sensor harness into the transmitter assembly and check that no components are touching the enclosure. Restore power and allow a minimum of 30 minutes for stabilization before adjustment.
4. Connect a DVM across TP10 and GT1 on the transmitter assembly. Figure 7-10
5. Locate the gain potentiometer which is on the sensor electronics directly behind one of the holes in the sensor body. The potentiometer is accessible by inserting a jewelers screwdriver through the hole in the sensor.
6. Determine the correct value to be read at TP10 based on the following formula:

$V_{TP10} = 2(C/R)$, where C = concentration of span gas, and R = range of detection (100 PPM).

7. Apply span gas. Adjust the gain potentiometer until TP10 = correct value as described above. To increase voltage at TP10 turn the gain potentiometer counter clockwise.
8. Remove system power and re-install the sensor and transmitter in the enclosure. Restore power and calibrate.

7.9 TOXIC GAS SENSOR MODULE

7.9.1 DESCRIPTION

Toxic Gas Sensor Modules include the following models and default ranges:

5100-06	Chlorine -10 PPM
5100-07	Hydrogen - 2000 PPM
5100-12	Nitrogen Dioxide - 20 PPM
5100-13	Carbon Monoxide, High Range - 1,000 PPM
5100-10	Sulfur Dioxide - 100 PPM
5100-16	Carbon Monoxide, H2 Tolerant - 2,000 PPM
5100-19	Nitric Oxide - 20 PPM
5100-21	Hydrogen Chloride - 20 PPM
5100-22	Hydrogen Cyanide - 20 PPM
5100-27	Ethylene Oxide - 20 PPM

The Toxic Sensor Module includes a sensor assembly and electronic assembly installed in an explosion proof housing.

The sensor assembly includes a reuseable housing and disposable electrochemical sensor. The assembly screws into one hub of the sensor module enclosure and plugs into the bottom electronics card via a six pin connector.

Cabling from the controller connects to a three pin spring loaded terminal strip on the electronics assembly.

7.9.2 TROUBLE ANALYSIS

Electrical adjustment, or replacement of the sensor will be necessary under the following conditions:

- Controller displays the following error messages

  SENSOR FAILURE
  LOW SENSITIVITY

- False readings or alarms are received due to sensor inaccuracy.

Warning: During sensor adjustments the concentration reading on the controller will be inaccurate and alarm level concentrations may be displayed. If false activation of the alarm relays will cause a problem disconnect the relay wiring prior to adjustment or turn the module off using the "Change Module" mode.

NOTE
Although all the necessary data can be collected with a voltmeter at the sensor module, some helpful information can be displayed on the controller or printed. See diagnostic codes 0004 and 0008 in Appendix C.

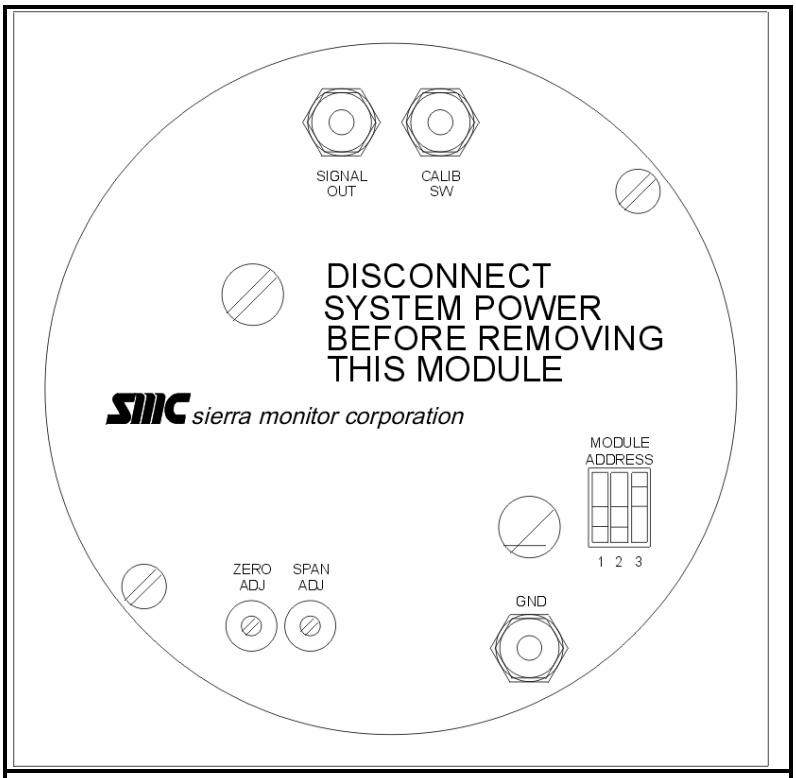

Figure 7-11
Cover Plate - Toxic Gas Module

7.9.3 ADJUSTMENT PROCEDURE

Prior to reading voltages and making adjustments perform a visual inspection to confirm that there are no physical problems such as water in the electronics enclosure, wiring damage or corrosion.

Use Figure 7-11 to locate test points during the following procedures.

7.9.3.1 SIGNAL ADJUSTMENT

It is unlikely that any electrical adjustment will be required except when a new sensor is installed.

To make the electrical adjustment connect a voltmeter to **SIGNAL OUT** (pos) and **GND** (ground) and use **SPAN ADJ** potentiometer to adjust the voltage based on the following:

- 1% of full scale = 0.02 VDC.
- 100% of full scale = 2.00 VDC.

7.9.3.2 SENSOR REPLACEMENT

The toxic gas sensor should be replaced when it can no longer be calibrated correctly. Generally this is every twenty four to thirty months.

The **SENSOR FAILURE** message for toxic gas sensors does not indicate a specific failure of the sensor but indicates that the sensor is not correctly connected to the electronics. If this message appears check that the sensor harness is correctly installed to the connector on the bottom electronics board.

The gas sensor which is located inside the sensor assembly housing can be replaced without replacement of the housing. To replace the sensor:

1. Confirm that system power has been removed.
2. Remove the transmitter electronics board from the main housing and unplug the sensor harness from the transmitter electronics.
3. Unscrew the sensor housing from the bottom of the enclosure
4. Hold the sensor assembly so that the harness faces down and the sensor faces up. Unscrew and remove the round section of the housing from the hex section. Be careful not to lose the spacer washer which will be sitting on top of the exposed sensor.
5. Carefully pull the old sensor straight up from the socket.
6. Orient the new sensor so that the sensor pin labeled "**C**" faces the socket labeled "**C**" which is on the far side of the board from the vertical reed switch. The reed switch will slide into a hole on the side of the new sensor. Press the new sensor's pins into the three sockets.
7. Carefully replace the cover on the sensor assembly including the spacer washer.
8. Install the sensor assembly into the enclosure and tighten firmly.
9. Reconnect the sensor harness to the transmitter, install the transmitter into the housing and restore power.
10. Allow one hour for the sensor to stabilize prior to recalibration.
11. Recalibrate the sensor module.

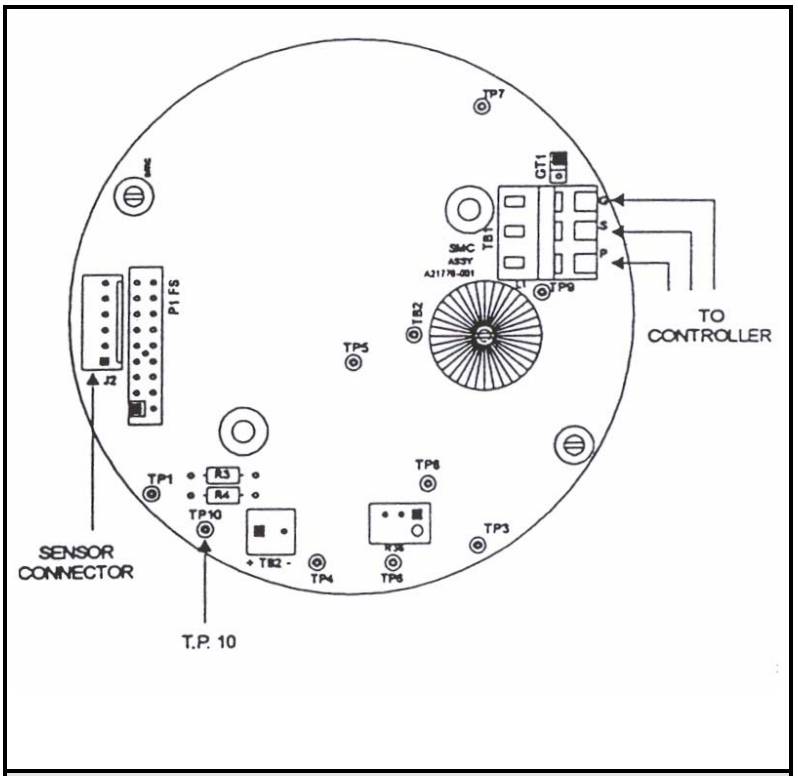

Figure 7-12
Toxic Gas Transmitter Component Locator

7.9.3.3 SENSOR OUTPUT ADJUSTMENT

The following procedure is to be used when, during normal calibration of a new sensor, the span voltage cannot be adjusted to a high enough level.

1. Adjust the span potentiometer so that it is approximately mid range. (Twenty turns clockwise and tens turns counter-clockwise).
2. Remove system power and remove both the transmitter and the sensor assembly from the enclosure. Remove the sensor assembly cover so that the sensor is visible.
3. Plug the sensor harness into the transmitter assembly and check that no components are touching the enclosure. Restore power and allow a minimum of 30 minutes for stabilization before adjustment.
4. Connect a DVM across TP10 and GT1 on the transmitter assembly. Figure 7-12
5. Locate the gain potentiometer which is on the sensor electronics directly behind one of the holes in the sensor body. The potentiometer is accessible by inserting a jewelers screwdriver through the hole in the sensor.
6. Determine the correct value to be read at TP10 based on the following formula:

$V_{TP10} = 2(C/R)$, where C = concentration of span gas, and R = range of detection (100 PPM). The value is negative for all models except 5100-06, and 5100-19.

7. Apply span gas. Adjust the gain potentiometer until TP10 = correct value as described above. To increase voltage at TP10 turn the gain potentiometer counter clockwise.
8. Remove system power and re-install the sensor and transmitter in the enclosure. Restore power and calibrate.

7.10 AMMONIA SENSOR MODULE (5100-25)

7.10.1 DESCRIPTION

The Ammonia Sensor Module includes a sensor assembly and electronic assembly installed in an explosion proof housing.

The sensor assembly includes a rechargeable electrochemical sensor. The assembly screws into one hub of the sensor module enclosure and plugs into the bottom electronics card via a six pin connector.

Cabling from the controller connects to a three pin spring loaded terminal strip on the electronics assembly.

7.10.2 TROUBLE ANALYSIS

Electrical adjustment, recharge, or replacement of the sensor will be necessary under the following conditions:

- Controller displays the following error messages

  SENSOR FAILURE
  LOW SENSITIVITY

- False readings or alarms are received due to sensor inaccuracy.

Warning: During sensor adjustments the concentration reading on the controller will be inaccurate and alarm level concentrations may be displayed. If false activation of the alarm relays will cause a problem disconnect the relay wiring prior to adjustment or turn the module off using the "Change Module" mode.

> ***NOTE***
> ***Although all the necessary data can be collected with a voltmeter at the sensor module, some helpful information can be displayed on the controller or printed. See diagnostic codes 0004 and 0008 in Appendix C.***

7.10.3 ADJUSTMENT PROCEDURE

Prior to reading voltages and making adjustments perform a visual inspection to confirm that there are no physical problems such as water in the electronics enclosure, wiring damage or corrosion.

Use Figure 7-13 to locate test points during the following procedures.

7.10.3.1 SIGNAL ADJUSTMENT

It is unlikely that any electrical adjustment will be required except when a new sensor is installed.

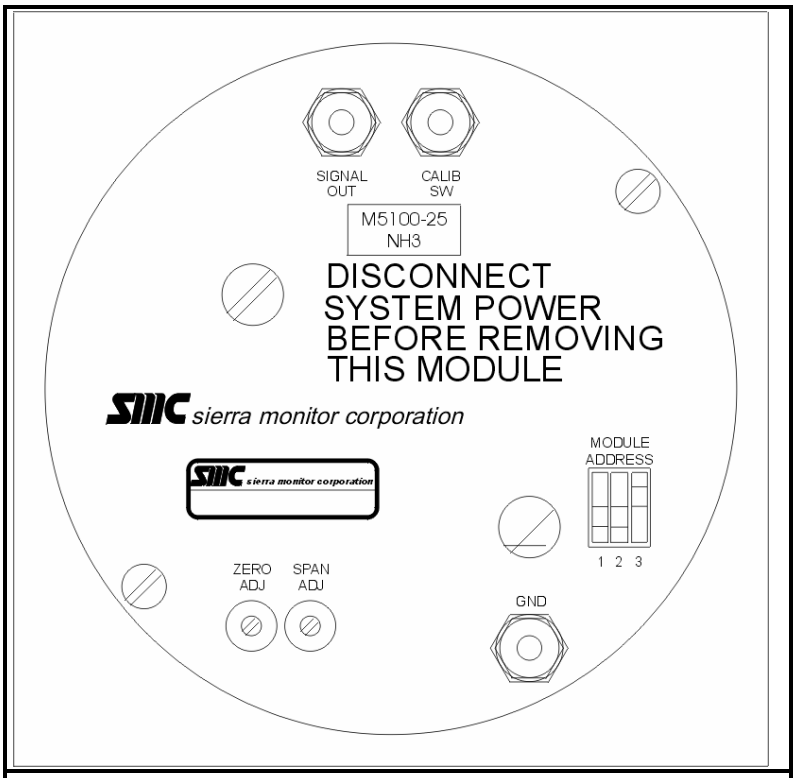

Figure 7-13
Cover Plate - Ammonia Module

To make the electrical adjustment connect a voltmeter to **SIGNAL OUT** (pos) and **GND** (ground) and use **SPAN ADJ** potentiometer to adjust the voltage based on the following:

- 1% of full scale = 0.02 VDC.
- 100% of full scale = 2.00 VDC.

7.10.3.2 SENSOR RECHARGE

The Ammonia sensor can be recharged by removing it from service, draining electrolyte, cleaning electrodes and replacing the electrolyte and membrane.

Step by step instructions for sensor recharge are supplied with the recharge kit.

7.10.3.3 SENSOR REPLACEMENT

The Ammonia sensor assembly should be replaced when it can no longer be recharged and calibrated correctly.

The **SENSOR FAILURE** message for ammonia sensors does not indicate a specific failure of the sensor but indicates that the sensor is not correctly connected to the electronics. If this message appears check that the sensor harness is correctly installed to the connector on the bottom electronics board.

To replace the sensor assembly:

1. Confirm that system power has been removed.
2. Remove the transmitter electronics board from the main housing and unplug the sensor harness from the transmitter electronics.
3. Unscrew the sensor housing from the bottom of the enclosure
4. Install the new sensor assembly into the enclosure and tighten firmly.
5. Reconnect the sensor harness to the transmitter, install the transmitter into the housing and restore power.
6. Allow one hour for the sensor to stabilize prior to recalibration.
7. Recalibrate the sensor module.