

Instruction Manual

SEC 4100 SYSTEM MONITOR

Manual Part Number 71-4100C Version 020796

I. SPECIFICATIONS

Model:

Sensor Electronics Corporation SEC 4100

Digital Inputs:

LAN Connection, Industry Standard RS-485
Up to 32 unit loads (Digital Remote Sensors) Max. Distance 4000 feet.

Power:

24V DC standard (AC voltage available)

Outputs:

Four form "C" contacts rated at 8 Amp, 120 VAC

K1 RELAY: SENSOR FAULT
K2 RELAY: REMOTE AUDIBLE
K3 RELAY: HIGH ALARM
K4 RELAY: LOW ALARM

LCD Display:

2 Line by 20 Character display as follows:
Point No, Zone No, Alarm Status, Gas Value

RS-232C Port:

Industry Standard RS-232C driver for use with modems or DOS compatible computers. Normally used with computer terminal software for data logging and monitoring.

Keypad:

A 16 position keypad. The keys are arranged with the numerals 0-9, and menu functions:
MENU, UP ARROW, DOWN ARROW, ENTER, SILENCE.

Time Delay:

Off Time Delays for Low, High and Audible are fully programmable from the operator keypad (Maximum 99 Minutes).

Parallel Port:

Industry Standard Centronics compatible printer port. This output is used when local hard copy reporting is required.

Optional Features:

Audible:

Sonalert audible device mounted on door and Factory preset to alarm on a High Alarm. Audible SILENCE pushbutton located on keypad.

Relay Modules:

The System Monitor can be expanded to have a total of 20 relay contact outputs. Each RC-8 relay module has 8 relays, rated 8A AC, Form "C" (SPDT). A total of 2 SEC-8 modules can be connected.

LED Indicators:

The System Monitor can be supplied with 8 or 16 multicolored LEDs. For higher density displays, other display interface units are available, depending upon the application.

LED Display: (Optional)

Each point or zone can have one multicolor LED as follows:

Sensor OK LED (Green)
LOW Alarm (Amber)
HIGH Alarm (Red)
Program Mode (Amber Flashing)

II. GENERAL DESCRIPTION

The SEC 4100 System Monitor is a multi-channel microprocessor based controller designed to monitor gas detectors located in environments where toxic or combustible gases are present or where an oxygen deficiency condition may occur. The SEC 4100 can monitor up to 400 gas detectors (digital, RS-485 transmitters), providing a digital display of the gas level present at each detector and alarm indications when any one detector senses a hazardous level.

The System Monitor control unit consists of a 19-inch instrument rack or wall/surface mount type enclosure.

Outputs

The standard System Monitor has four output contacts; Low Alarm, High Alarm, Sensor Fail, and Remote Audible Alarm.

The Low and High Alarm values are factory preset depending on the application. Typically, the Low Alarm is used to turn on the exhaust fans and warning alarms while the High Alarm is used to turn on other warning devices and shutdown alarms. The Sensor Fail contact, which turns on if any sensor is not operating, is used to alert operators of a system problem. The Audible Alarm contact is often configured to activate an audible alarm device when a High Alarm occurs. This can be canceled by pushing the S (SILENCE) push-button located on the keypad. Time delays for on and off of all output contacts are fully programmable from the operator keypad.

The System Monitor has optional inputs and outputs which can be added for different applications. These options include dry contact outputs, Serial RS-232C port and a Centronics compatible parallel interface for printers.

Controls and Indicators

All controls, indications and operations are made from the user interface on the System Monitor. This consists of a 16 position keypad, a 2 line by 20 character LCD display for calibration, setup, time delays, and other functions.

Optional display LEDs are available to show Power On status, Sensor OK status, the Low Alarm and the High Alarm status.

Data Highway

A shielded twisted pair cable connects the gas detectors to the "Data A" and "Data B" lines of the SEC 4100, forming a data highway. The System Monitor has two sets of "Data A" and "Data B" terminals, labeled X and Y. This allows the gas detectors to be connected in a complete loop. If a data highway fault is detected by the System Monitor the data highway will transfer to the X or Y highway.

The two wire data highway allows the connection of up to thirty-one (31) remote gas detectors and 4000 feet. A maximum of 400 digital sensors can be connected by using SEC RS-485 Repeaters for each 31 remote sensors. Each remote digital sensor transmits its I.D. Number, Alarm Status and Gas Value in % VOL, PPM or % LEL to the SEC 4100 on the data highway.

III. KEYPAD OPERATION

Keypad Layout

The keypad is set up as follows:

(DIGITS 0-9)

Numeric input. If a numeric input error is made, the buffer can be cleared by pressing the (MENU), (UP) or (DOWN) arrow keys.

(MENU)

Toggles between menu control mode and normal running mode. Press once to enter control menu mode and display menus. Press a second time to return to normal running.

(UP Arrow)

Selects the menu above the current one. Value in the input buffer is discarded.

(DOWN Arrow)

Selects the menu below the current one. Value in the input buffer is discarded.

(ENTER)

Accepts value in the input buffer and applies it to the current menu configuration option.

(SILENCE)

Turns off audible alarm. This button may be pressed at any point. There is no effect if the audible is not currently on.

Screen Displays

Upon first power up the following is displayed on the LCD:

SENSOR
Electronics Corp.

SENSOR
SEC-4100 Controller

SENSOR
System Initializing...

SENSOR
Locating Sensors...

At this point the System Monitor locates and displays all sensors connected to the gas detection network.

Display will be as follows:

Point No. Zone No. Alarm Status Value

To enter into the MENU structure, press the MENU key. Use the arrow keys to advance between MENU items. Use the MENU key to exit from the submenus.

IV. MAIN MENU

Press the MENU key to enter the MAIN MENU.

Pressing the arrow keys will advance the display through the Main Menu displaying all the options.

Main Menu

When the desired submenu is displayed press ENTER, and the System Monitor will enter that submenu. Following is a list of available submenus:

- LOW OFF DELAYS
- HIGH OFF DELAYS
- ADD/EDIT NETWORK DEVICE
- AUDIBLE DELAY
- ALARM TRIP LEVELS
- SET CURRENT TIME & DATE
- DISPLAY OPTIONS
- MANUAL RELAY CONTROL

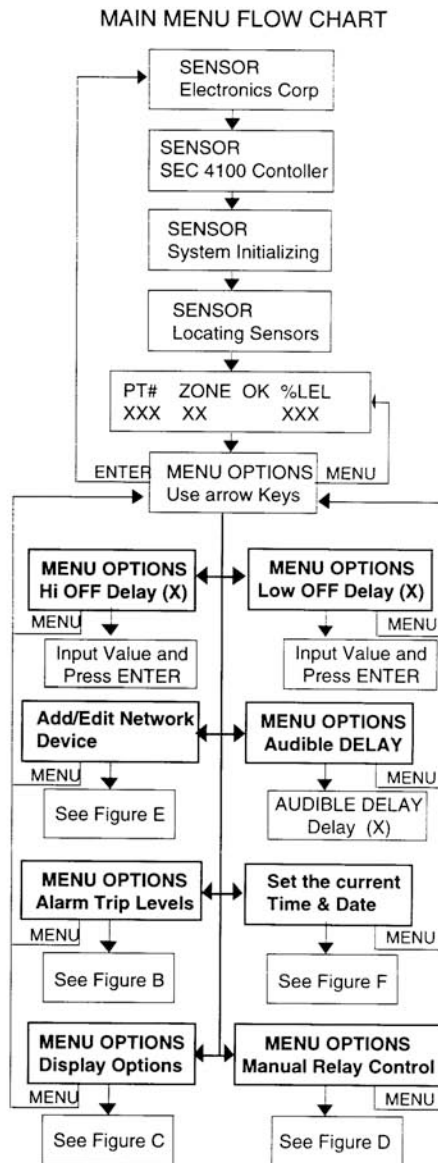


Figure A

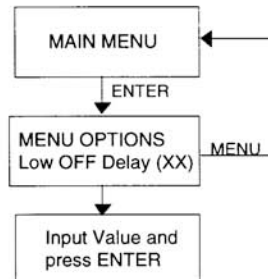
MAIN MENU: Low OFF Delay

This display indicates the length of time in minutes that the Low, High or Audible Relay will remain energized after the alarm condition has been cleared (Off Delay). This feature applies only if the relay is programmed to be non-latching (default value is zero).

Press ENTER to advance into this menu. Input desired value for Low Off Delay and press ENTER.

Legal Values = 0 - 99 minutes
Default Values = 0 minutes

To return to the main menu press MENU.

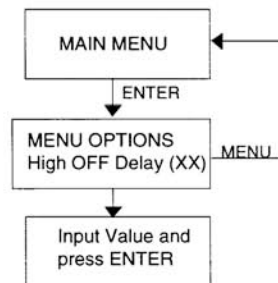


MAIN MENU: High OFF Delay

Press ENTER to advance into this menu. Input desired value for High Off Delay and press ENTER.

Legal Values = 0 - 99 minutes
Default Values = 0 minutes

To return to the main menu press MENU.

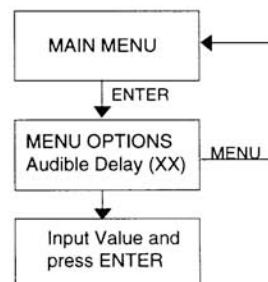


MAIN MENU: Audible Delay

Press ENTER to advance into this menu. Input desired value for Audible Delay and press ENTER.

Legal Values = 0 - 99 minutes
Default Values = 0 minutes

To return to the main menu press MENU.



MAIN MENU: ALARM TRIP LEVELS

SUB MENU: LOW SET

SUB MENU: HIGH SET

Press ENTER to advance into this menu.

Use the arrow keys to advance to different gas types if more than one type sensor is present.

When correct gas type is showing press ENTER.

The display will now read present gas type. Input desired value for Low set point and press ENTER.

Legal Values = 0 - Full scale (% , PPM etc.)
Default Values = Determined by transmitter during initialization and startup, and will vary with the different gases.

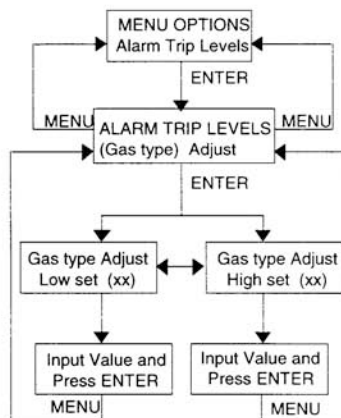
Use arrow keys to advance to High set and press ENTER.

Use the arrow keys to advance to different gas types if more than one type sensor is present.

When correct gas type is showing press ENTER.

The display will now present gas type. Input desired value for High set point and press ENTER.

Legal Values = 0 - Full scale (% , PPM etc.)
Default Values = Determined by transmitter during initialization and startup, and will vary with the different gases.



MAIN MENU: DISPLAY OPTIONS

SUB MENU: SCAN START

SUB MENU: SCAN STOP

SUB MENU: SCAN DELAY

Press ENTER to advance into this menu.

Use the arrow keys to advance to desired submenu. When desired submenu is showing press ENTER.

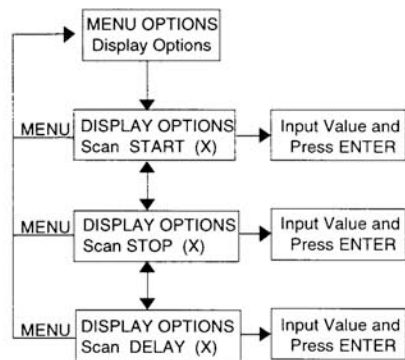
The Scan START submenu selects the first sensor which will be displayed in normal operation. Sensors with lower values than this are still scanned, but their values are not displayed.

Legal Values = 1 - Scan stop
Default Value = 0

The Scan STOP submenu selects the last sensor which will be displayed in normal operation. Sensors with values higher than this are still scanned, but not displayed.

Legal Values = Scan start - 9999
Default Value = Number of sensor found on initialization.

The Scan DELAY submenu selects the amount of time (in seconds) a sensor is displayed before moving to the next sensor.



MAIN MENU: MANUAL RELAY CONTROL

SUB MENU: LOW RELAY

SUB MENU: HIGH RELAY

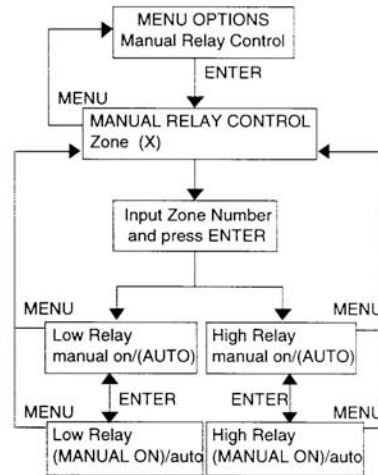
Press ENTER to advance into this menu.

The display will prompt for the number of the zone to be controlled. Input the desired zone number and press ENTER.

Use the arrow keys to display either the Low Relay or the High Relay. When the display indicates the relay to be controlled press ENTER.

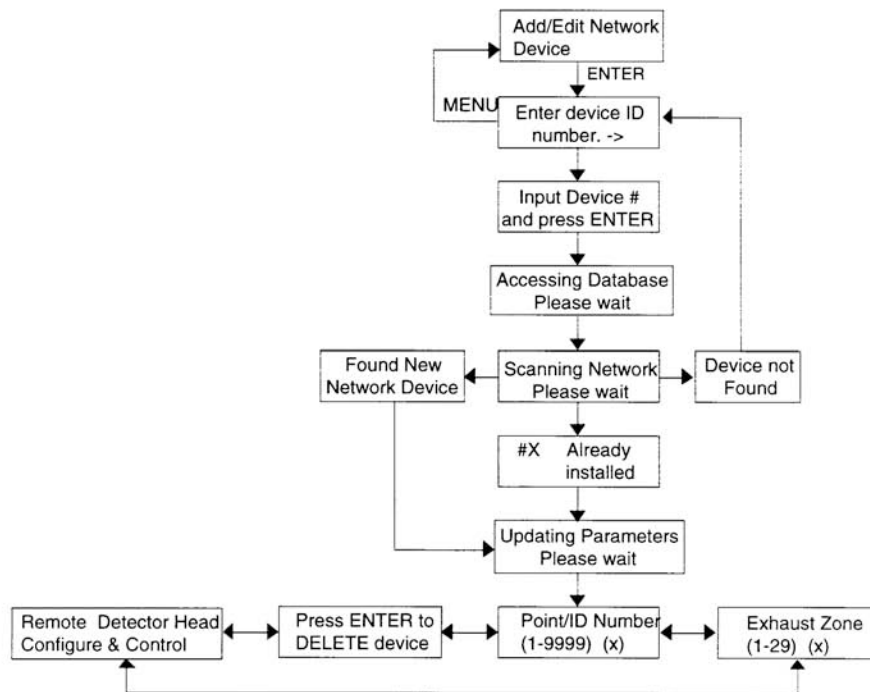
At this point the display for the relay chosen will change from "manual on/(AUTO)" to "(MANUAL ON)/auto", and the chosen relay will change states. Each time the ENTER key is pressed the relay will change states.

Press MENU to exit.



MAIN MENU: ADD/EDIT NETWORK DEVICE

Press ENTER to advance into this menu. The display will prompt you to enter the ID# of the desired device. When the device is located the SEC 4100 will retrieve the parameters for that device. When the updating is completed, the submenu routines will be accessible.



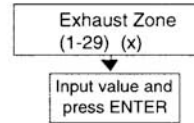
MAIN MENU: ADD EDIT NETWORK DEVICE

SUB MENU: EXHUAIST ZONE

Press ENTER to advance into this menu.
Input desired value of Exhuast Zone and press
ENTER.

Legal Values = 0 - 29
Default Values = 0

To return to the main menu press MENU. Use
the Arrow keys to display the other submenus.



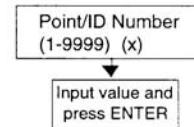
MAIN MENU: ADD EDIT NETWORK DEVICE

SUB MENU: POINT ID NUMBER

Press ENTER to advance into this menu.
Input new ID Number and press ENTER.

Legal Values = 0 - 9999
Default Values = Number when intialized

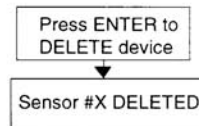
To return to the main menu press MENU. Use
the Arrow keys to display the other submenus.



MAIN MENU: ADD EDIT NETWORK DEVICE

SUB MENU: DELETE DEVICE

Press ENTER and the device selected will be
deleted from the data highway. The display
will show which sensor has been deleted and
will automatically return to the main menu.



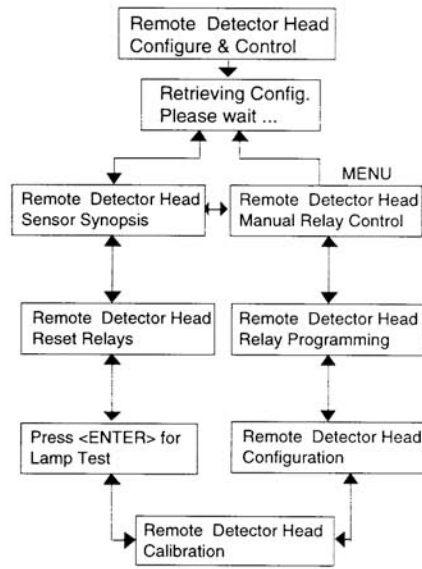
MAIN MENU: ADD EDIT NETWORK DEVICE

SUB MENU: REMOTE DETECTOR HEAD CONFIGURE & CONTROL

Remote Detector Head Configure and Control allows information to be sent to and from the gas detector and SEC 4100.

To enter this submenu press ENTER. The SEC 4100 will retrieve the programmed information from the gas detector (selected when the Add/Edit Network Device routine was entered).

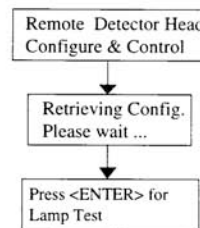
Once the Configuration Information from the gas detector has been retrieved, the Remote Detector Head Configure and Control Sub Menu can be viewed, by using the arrow keys.



MAIN MENU: ADD EDIT NETWORK DEVICE

SUB MENU: REMOTE DETECTOR HEAD CONFIGURE & CONTROL

Pressing ENTER will cause the gas detector to perform a Lamp Test. The Lamp Test can be performed as many times as desired. To return to the main menu press MENU.



MAIN MENU: ADD EDIT NETWORK DEVICE

SUB MENU: REMOTE DETECTOR HEAD CONFIGURE & CONTROL

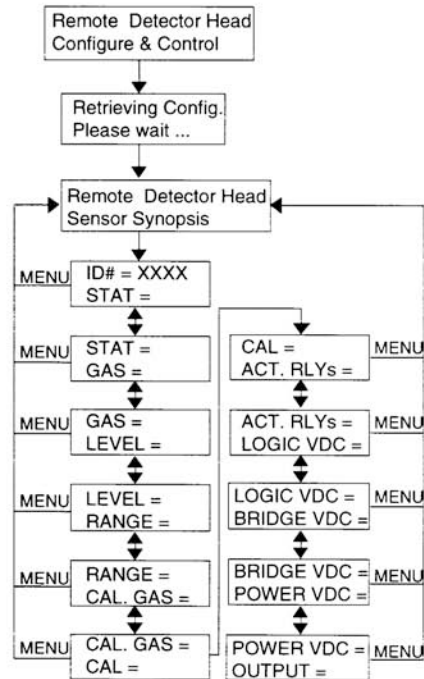
SUB ROUTINE: SENSOR SYNOPSIS

Several operating parameters and conditions of the gas detector head can be examined using the System Monitor Sensor Synopsis Menu. The Sensor Synopsis can be selected by pressing ENTER. The System Monitor will attempt to establish communication with the selected gas detector. After communication has been established and all the information has been successfully up loaded from the gas detector, the System Monitor will display the following Sensor Synopsis information:

ID#ID# of the selected detector
 STATStatus of detector
 GASType of gas being detected
 LEVEL.....Current level of gas being detected
 CAL. GASValue of calibration gas
 ACT. RYLSRelay status, L = Low, M=Mid, H=High, F=Fault
 LOGIC VDC.....Logic Voltage (typically 5VDC)
 BRIDGE VDC.....Bridge voltage, combustible detectors heads only
 POWER VDC.....Input voltage (18 to 30 VDC)
 OUTPUT4-20 mA output current level

This information is viewed two lines at a time. Use the arrow keys to scroll through the Sensor Synopsis Menu.

Press MENU to exit.

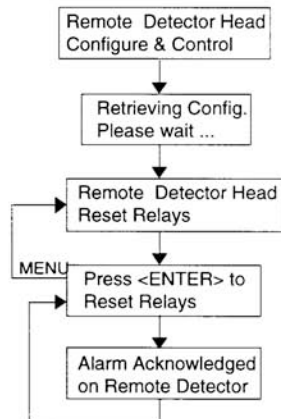


MAIN MENU: ADD EDIT NETWORK DEVICE

SUB MENU: REMOTE DETECTOR HEAD CONFIGURE & CONTROL

SUB ROUTINE: RESET RELAYS

This sub routine is used to reset the gas detector relays that have been set to latch upon alarm conditions. This routine will only reset the relays in the gas detector. The Reset Relay sub routine is selected by pressing ENTER.



MAIN MENU: ADD EDIT NETWORK DEVICE

SUB MENU: REMOTE DETECTOR HEAD CONFIGURE & CONTROL

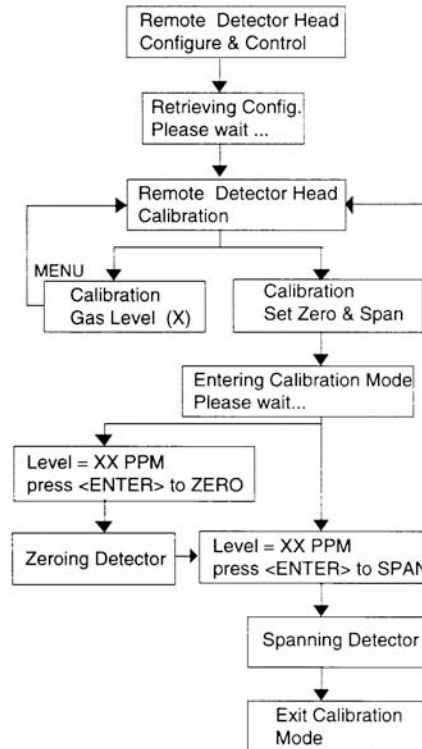
SUB ROUTINE: REMOTE DETECTOR HEAD CALIBRATION

This sub routine allows the user to calibrate the gas detector head using the System Monitor. To enter this sub routine press ENTER.

The display will indicate the value of calibration gas the detector expects to see during calibration. To change this value, input the desired number and press ENTER. This new value is programmed into both the gas detector and the System Monitor. The calibration gas value will also be changed in the System Monitor Configuration Menu. When the calibration gas value is correct, press one of the arrow keys and the System Monitor will enter the Calibration mode. If communication was successful, the gas detector will be in the calibration mode. On the gas detector, the message "CAL" will flash on the display. The System Monitor will display the present level of gas being detected by the gas detector, and will prompt to Zero the detector. Pressing ENTER will cause the System Monitor to display "Zeroing Detector". This step must be performed while a known gas free atmosphere exists at the gas detector sensor. In the case of an oxygen sensor, 100% nitrogen must be used.

The gas detector accepts the zero as a no gas condition presently at the sensor. The gas detector will display the message "ZERO". When this step has been successfully completed, the System Monitor will automatically advance to the "Set Span" Menu.

The user must first apply calibration gas to the sensor and wait for a stable reading on the System Monitor and gas detector. In the case of oxygen, the gas detector must be subject to a known oxygen concentration.



When the operator presses ENTER, communication between the System Monitor and the gas detector occurs and the gas detector accepts the gas condition at the sensor as being equal to the value of the calibration gas value programmed in the gas detector. The gas detector will display the message "SPAN". The System Monitor will display "Spanning Detector". After this step has been successfully completed, the gas detector will exit the calibration mode and the System Monitor will return the main menu.

MAIN MENU: ADD EDIT NETWORK DEVICE

SUB MENU: REMOTE DETECTOR HEAD CONFIGURE & CONTROL

SUB ROUTINE: REMOTE DETECTOR HEAD CONFIGURATION

The Configuration sub routine is selected by pressing ENTER. The System Monitor will display the gas sensor type.

At this level of the configuration sub routine, there are seven (7) choices. They can be viewed by using the arrow keys to scroll through.

Gas Sensor Type

This display indicates the type of gas the detector has been programmed to detect.

Gas Sensor Units

This display indicates the type of units the gas concentrations will be displayed in (LEL, PPM, PPB).

Detector Range

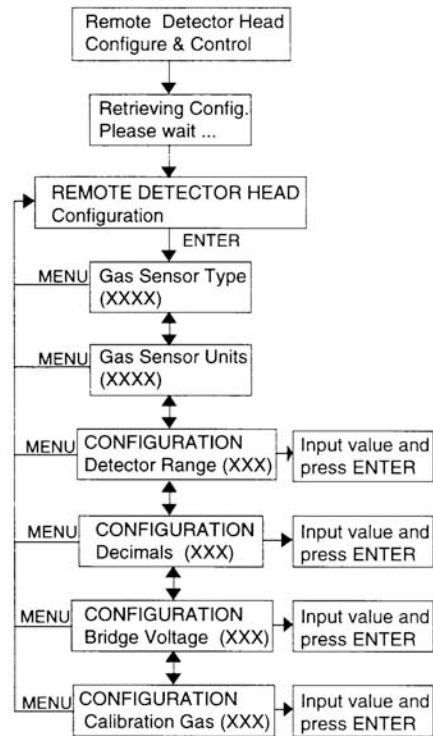
This display indicates the range currently entered into the gas detector memory. The default range is 0 - 0. To change the indicated range, input the full scale value using the 0 - 9 keys and then press ENTER.

Decimals

This display indicates the number of decimal places currently entered into the gas detector memory. The default value is 0. To change the number of decimal places, input the desired number and press ENTER. The new value is then programmed into the System Monitor memory. The maximum number of decimals will be limited by the Detector Range value.

Bridge Voltage

This display indicates the bridge voltage, (combustible sensor only) multiplied by a factor of ten (10).



Calibration Gas

This display indicates the concentration of Calibration gas (Cal. Gas) used for calibrating the gas detector.

The default value for Cal. Gas is zero (0). To change the calibration gas value, input the new calibration gas value and press ENTER.

MAIN MENU: ADD EDIT NETWORK DEVICE

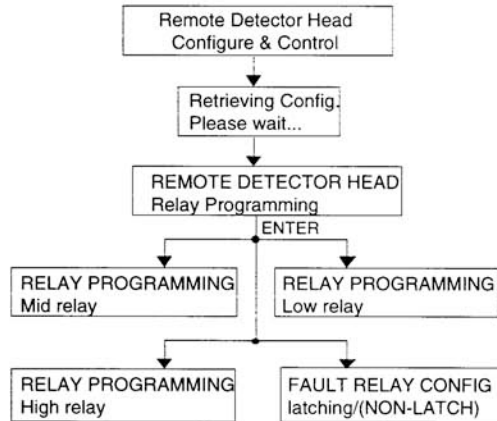
SUB MENU: REMOTE DETECTOR HEAD CONFIGURE & CONTROL

SUB ROUTINE: RELAY PROGRAMMING

In addition to the gas detector operating parameters that can be programmed using the Configuration Menu, the Relay Programming Menu allows the user to specify the operation of the gas detector alarm and fault relays.

The relay parameters apply to the gas detector relays located in the gas detector relay module and not in any other system relay.

Relay Programming sub routine is selected by pressing ENTER. At this level of the Relay Programming Menu, the operator can choose between Low, Mid, High and Fault relay alarms to program. They can be viewed by using the arrow keys. Any one of the sub routines can be entered by pressing ENTER. Pressing MENU will exit this sub routine.



MAIN MENU: ADD EDIT NETWORK DEVICE

SUB MENU: REMOTE DETECTOR HEAD CONFIGURE & CONTROL

SUB ROUTINE: RELAY PROGRAMMING

SUB ROUTINE: LOW RELAY

Select the Low Relay sub routine by pressing ENTER. This sub routine allows the user to program various operating characteristics of the Low Alarm Relay. At this level of the Low Alarm Relay programming menu, there are four (4) choices. They can be viewed by using the arrow keys.

Alarm Set

This display indicates the set point of the gas detector Low Alarm (default value is zero). To change the Low Alarm set point, input the desired number and press ENTER.

Maximum Low Alarm Set is 9999.

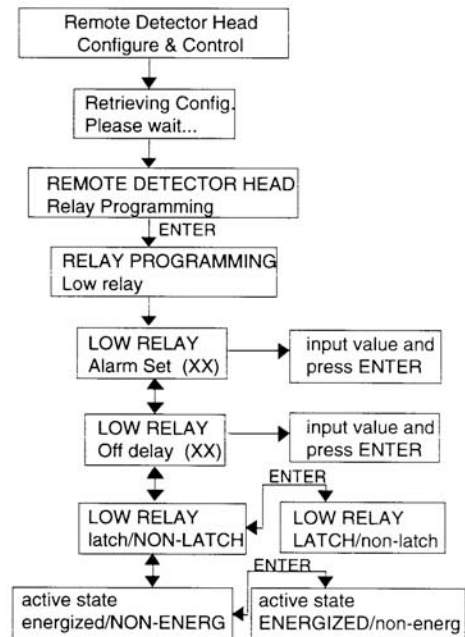
Off Delay

This display indicates the length of time in minutes that the Low Alarm Relay will remain energized after the alarm condition (Off Delay). This feature applies only if the relay is programmed to be non-latching (default value is zero). To change the Off Delay, input the desired number of minutes and press ENTER. Maximum Off Delay is 255 minutes.

Latch/Non-latch

This sub routine is used to set the Low Alarm Relay to be either Latching or Non-latching. To change the relay state, press ENTER, and the display will toggle between Latching and Non-latching.

If the relay is programmed to be Latching, the gas detector Low Alarm Relay will remain active even after the alarm condition is no longer present. The Low Alarm Relay can be reset, by resetting the gas detector with the System Monitor or the detector CRD switch.



Active State

There are two possible conditions of the relay; energized or non-energized. If the display indicates that the normal state of the Low Alarm Relay is non-energized, then during alarm conditions, the Low Alarm Relay is energized. In non-alarm conditions, the Low Alarm Relay is non-energized. To reverse the alarm logic, press ENTER, and the display will toggle between Norm = Energized and Norm = Non-energized.

MAIN MENU: ADD EDIT NETWORK DEVICE

SUB MENU: REMOTE DETECTOR HEAD CONFIGURE & CONTROL

SUB ROUTINE: RELAY PROGRAMMING

SUB ROUTINE: MID RELAY

Select the Mid Relay sub routine by pressing ENTER. This sub routine allows the user to program various operating characteristics of the Mid Alarm Relay. At this level of the Mid Alarm Relay programming menu, there are four (4) choices. They can be viewed by using the arrow keys.

Alarm Set

This display indicates the set point of the gas detector Mid Alarm (default value is zero). To change the Mid Alarm set point, input the desired number and press ENTER.

Maximum Mid Alarm Set is 9999

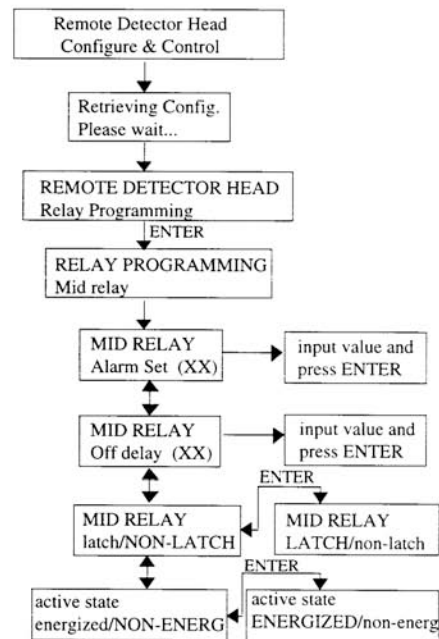
Off Delay

This display indicates the length of time in minutes that the Mid Alarm Relay will remain energized after the alarm condition (Off Delay). This feature applies only if the relay is programmed to be non-latching (default value is zero). To change the Off Delay, input the desired number of minutes and press ENTER. Maximum Off Delay is 255 minutes.

Latch/Non-latch

This sub routine is used to set the Mid Alarm Relay to be either Latching or Non-latching. To change the relay state, press ENTER, and the display will toggle between Latching and Non-latching.

If the relay is programmed to be Latching, the gas detector Mid Alarm Relay will remain active even after the alarm condition is no longer present. The Mid Alarm Relay can be reset, by resetting the gas detector with the System Monitor or the detector CRD switch.



Active State

There are two possible conditions of the relay; energized or non-energized. If the display indicates that the normal state of the Mid Alarm Relay is non-energized, then during alarm conditions, the Mid Alarm Relay is energized. In non-alarm conditions, the Mid Alarm Relay is non-energized. To reverse the alarm logic, press ENTER, and the display will toggle between Norm = Energized and Norm = Non-energized.

MAIN MENU: ADD EDIT NETWORK DEVICE

SUB MENU: REMOTE DETECTOR HEAD CONFIGURE & CONTROL

SUB ROUTINE: RELAY PROGRAMMING

SUB ROUTINE: HIGH RELAY

Select the High Relay sub routine by pressing ENTER. This sub routine allows the user to program various operating characteristics of the High Alarm Relay. At this level of the High Alarm Relay programming menu, there are four (4) choices. They can be viewed by using the arrow keys.

Alarm Set

This display indicates the set point of the gas detector High Alarm (default value is zero). To change the High Alarm set point, input the desired number and press ENTER.

Maximum High Alarm Set is 9999.

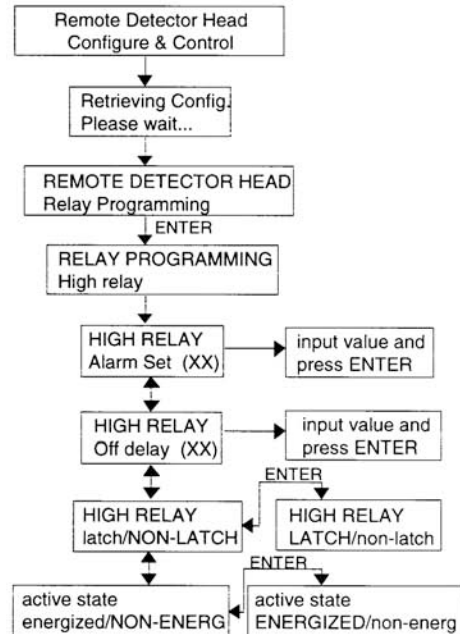
Off Delay

This display indicates the length of time in minutes that the High Alarm Relay will remain energized after the alarm condition (Off Delay). This feature applies only if the relay is programmed to be non-latching (default value is zero). To change the Off Delay, input the desired number of minutes and press ENTER. Maximum Off Delay is 255 minutes.

Latch/Non-latch

This sub routine is used to set the High Alarm Relay to be either Latching or Non-latching. To change the relay state, press ENTER, and the display will toggle between Latching and Non-latching.

If the relay is programmed to be Latching, the gas detector High Alarm Relay will remain active even after the alarm condition is no longer present. The High Alarm Relay can be reset, by resetting the gas detector with the System Monitor or the detectorCRD switch.



Active State

There are two possible conditions of the relay; energized or non-energized. If the display indicates that the normal state of the High Alarm Relay is non-energized, then during alarm conditions, the High Alarm Relay is energized. In non-alarm conditions, the High Alarm Relay is non-energized. To reverse the alarm logic, press ENTER, and the display will toggle between Norm = Energized and Norm = Non-energized.

MAIN MENU: ADD EDIT NETWORK DEVICE

SUB MENU: REMOTE DETECTOR HEAD CONFIGURE & CONTROL

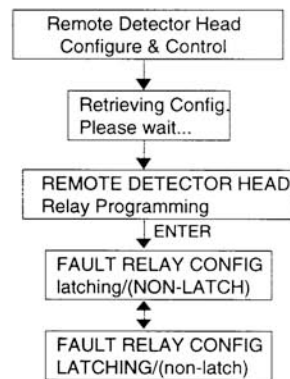
SUB ROUTINE: RELAY PROGRAMMING

SUB ROUTINE: FAULT RELAY

This sub routine is used to set the Fault Alarm Relay to be either Latching or Non-latching. To change the relay state, press ENTER, and the display will toggle between Latching and Non-latching.

If the relay is programmed to be Latching, the gas detector Fault Alarm Relay will remain active even after the fault condition is no longer present. The High Alarm Relay can then be returned to its normal state by resetting the gas detector with the System Monitor or the detector Reset/Calibration pushbutton .

The gas detector Fault Relay is always energized in non-fault conditions and non-energized during fault conditions.



MAIN MENU: ADD EDIT NETWORK DEVICE

SUB MENU: REMOTE DETECTOR HEAD CONFIGURE & CONTROL

SUB ROUTINE: MANUAL RELAY CONTROL

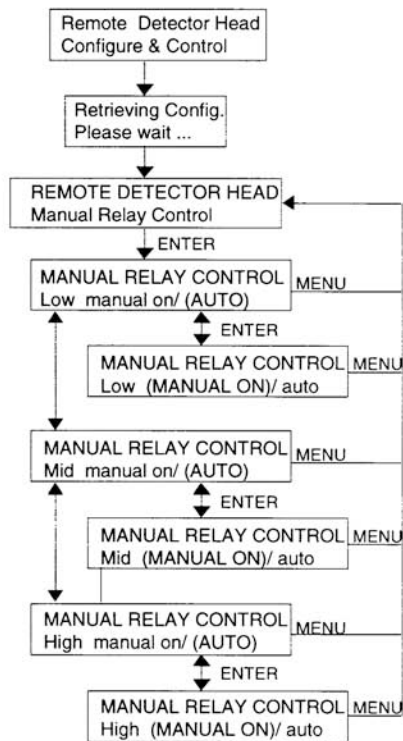
This Menu allows the user to manually toggle the gas detector's Low, Mid, High and Fault relays on and off. To enter this sub routine press ENTER.

In the Manual Relay Control Menu, the relays can be viewed by using the arrow keys. The relay to be manually controlled is selected by pressing ENTER while the relay is being displayed on the System Monitor.

The status of the relay will be displayed in capital letters. If the relay is in the auto mode display will read "manual on/AUTO".

To change this state of the relay press ENTER. Each time the ENTER key is pressed the relay will toggle between manual on and auto.

Pressing MENU twice at any point will return the System Monitor to the normal display of current gas detector status and gas concentration.



V. INSTALLATION PROCEDURE

1. Locate the SEC 4100 System Monitor in a suitable location, eg. the main electrical room, utility room, supervisors office, etc.
2. Prime power for the System Monitor is 24V DC, 120 VAC, 60 Hz., Single Phase is available.
3. Install the SEC 2000 gas detectors in the areas specified on the control drawings supplied by the engineer. Cover any openings (flame arrestor of sensor housing where gas sensor is located) with protective tape or material. This is to prevent any paint or construction material from damaging the sensor.
4. Gas detectors: Run twisted shielded cables from the controller data highway output to the first sensor location. Continue to run the data highway cable to the next sensor, etc. until all sensors are wired in the loop and terminated back at the System Monitor. The gas detectors power wiring should be 16 AWG, and the DATA HIGHWAY WIRING SHOULD 16 TO 22 AWG TWISTED PAIR.
5. Attach the output wiring to the field devices as specified in the control drawings supplied by the engineer and/or as shown in the shop drawings.
6. After all painting, spraying and cleaning has been done on the job site, remove the protective covering from the sensors.
7. NOTE: IT IS IMPORTANT TO CHECK THE POWER WIRING TO EACH SENSOR BEFORE POWER IS APPLIED. IF THE 24VDC IS IMPROPERLY WIRED AND IS CONNECTED TO THE A OR B DATA LINE OF THE LAN, DAMAGE TO THE RS-485 DRIVER INTEGRATED CIRCUITS WILL OCCUR.
8. After checking all wiring connections, apply prime power to the main control panel, and proceed to the Start-up procedure.

VI. STARTUP PROCEDURE

1. When power is first applied, the System Monitor goes through an initialization where the LCD displays the SEC logo (and optional multi-colored LED's go through a light test routine). To re-initiate this test, press the MENU key and press the ENTER key.
2. For gas detectors, refer to the MENU item ADD/EDIT SENSORS. Typically the sensors are programmed into memory at the factory, but may have to be changed in the field. If all the sensors are properly communicating, the LCD display will display the appropriate information for each point (Zone, Status and PPM). If a particular sensor has difficulty communicating, or has not responded, the display will indicate an OFFLINE ALARM. To rectify any of these problems, check the wiring to the suspect sensor.
3. To check the operation of the System Monitor, press one of the arrow keys on the keypad to check that all sensors are present and responding. Each sensor should be reading a Point Number, Zone Number, and Alarm Status PPM (LEL or % VOL) value.
4. The system and sensors are pretested and precalibrated and no field calibration should be required. If an operational test is required, only calibrated gas should be used to give meaningful results.
5. There are no calibration adjustments required for the System Monitor. The only adjustment that can be made is for the LCD contrast, which is located on the main CPU module.
6. Time delays, manual relay control, display options, setpoint and other functions are all programmed by using the operator interface. The MENU functions are described in this manual and in the appendix if special or custom features have been added, depending on the application.
7. To perform a field test, apply calibration gas to the SEC 2000 allowing the sensor to react. The LCD will display the Point Number and alarm level and concentration. If the alarm level is exceeded, the appropriate alarm relay will energize. When the gas concentration falls below the alarm level, the relay will de-energize.

VII. Warranty

Sensor Electronics Corporation (SEC) warrants products manufactured by SEC to be free from defects in workmanship and materials for a period of two (2) years from date of shipment from the factory. Any parts returned freight pre-paid to the factory and found defective within the warranty will be repaired or replaced, at SEC's option. SEC will return repaired or replaced equipment pre-paid lowest cost freight. This warranty does not apply to items which by their nature are subject to deterioration or consumption in normal service. Such items may include:

Fuses and Batteries.

Catalytic, Toxic and Oxygen sensors, that may be covered by a standard warranty based on the specific application. (Consult Factory)

Warranty is voided by abuse including rough handling, mechanical damage, alteration or repair. This warranty covers the full extent of SEC liability and SEC is not responsible for removal, replacement costs, local repair costs, transportation costs or contingent expenses incurred without prior written approval.

Sensor Electronics Corporation's obligation under this warranty shall be limited to repair or replacement of any product that has been returned to Sensor Electronics Corporation for warranty consideration.

This warranty is expressly in lieu of any and all other warranties expressed or implied, and all other obligations or liabilities on the part of Sensor Electronics Corporation including but not limited to, the fitness for a particular purpose. In no event shall Sensor Electronics Corporation be liable for direct, incidental, or consequential loss or damage of any kind connected with the use of its products or failure to function or operate properly.

January 1997

4100 Network Monitor RS232 Output Format

All sensors on the network are checked, one after the other, continuously. As these sensors are checked, their status is delivered to the RS232 output. The format of this output is as follows:

<A|B|C|D|E|F>

where:

A = sensor id
B = gas abbreviation
C = gas level
D = gas units
E = sensor status
F = system status

where:

sensor status (E) may be one of the following text strings:

OFL	offline
FLT	fault
L	low alarm
M	middle alarm
H	high alarm
HH	high-high alarm
CAL	calibration mode
OK	none of the above

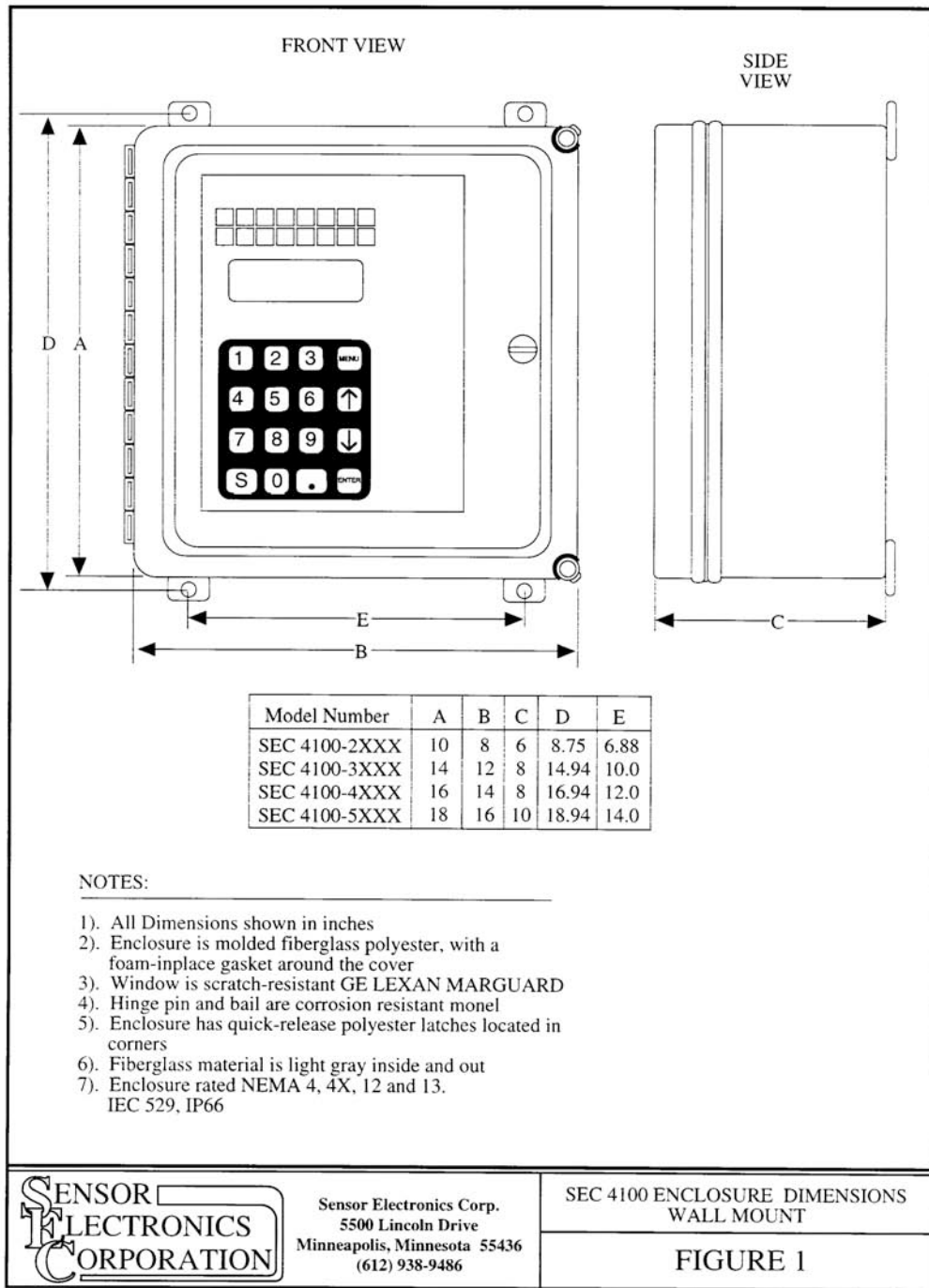
system status (F) may be one of the following text strings:

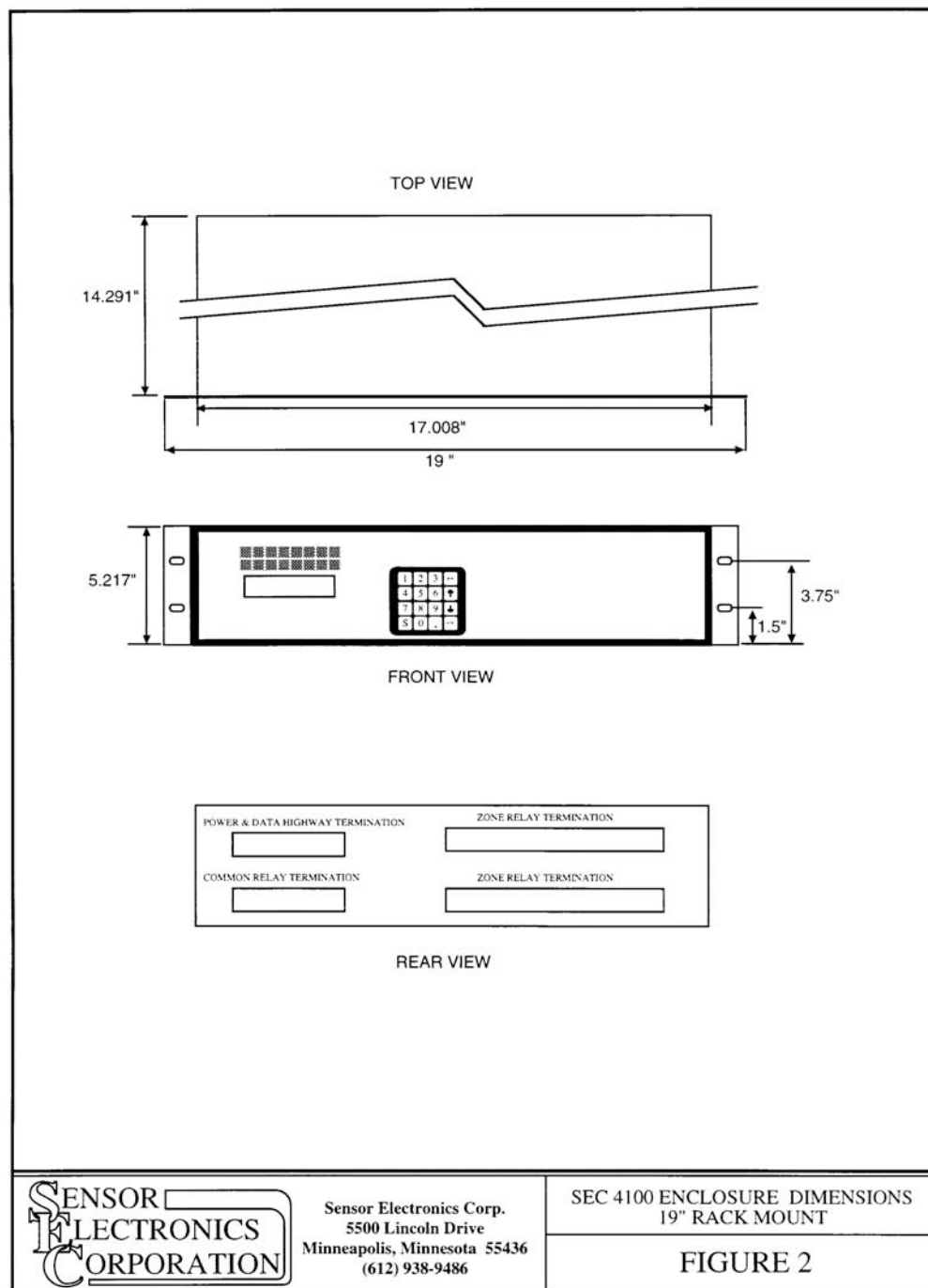
LB	line break
OK	none of the above

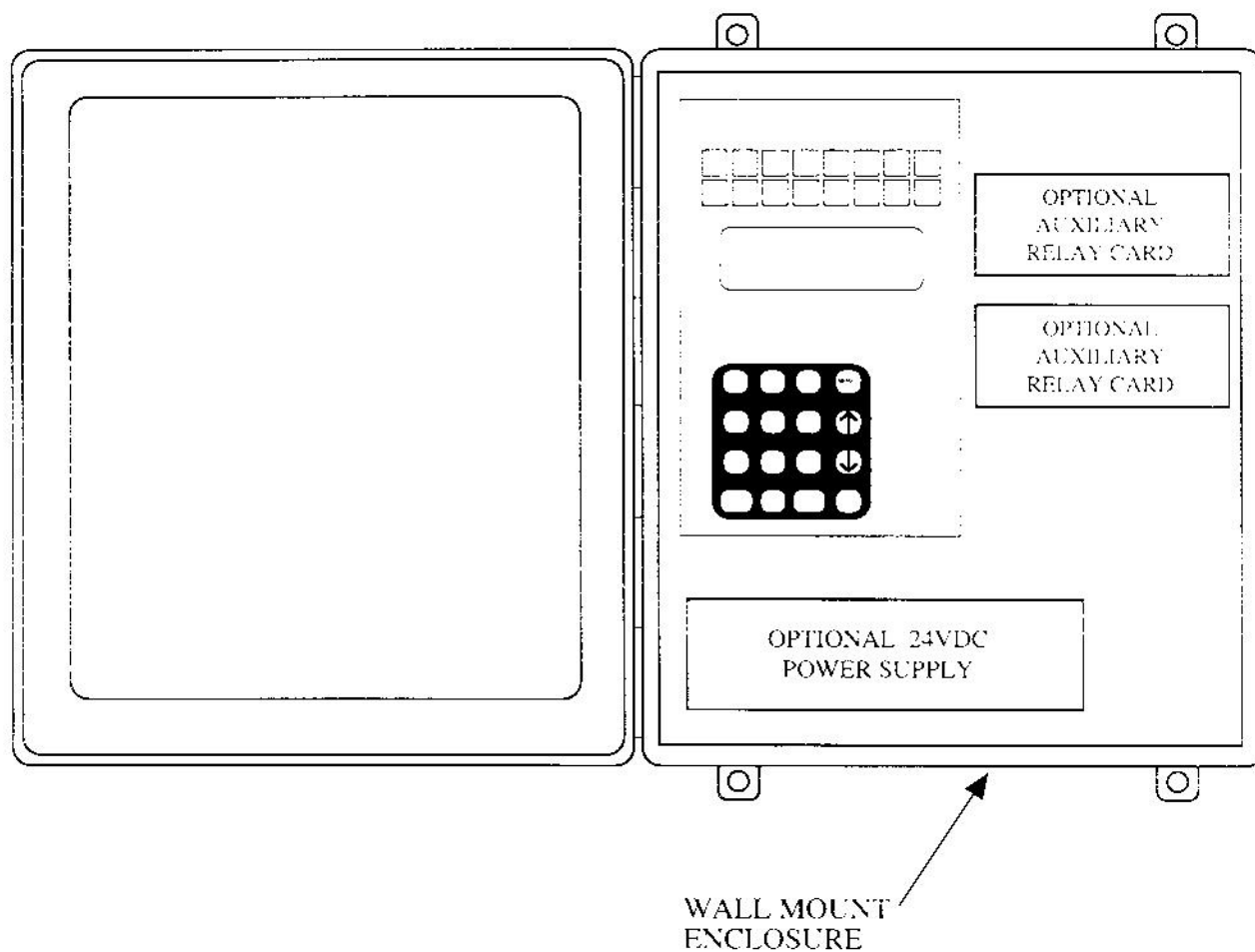
Each record is surrounded by the greater-than / less-than symbols (hex 3C and hex 3E) and followed by a return / linefeed combination (hex 0D and hex 0A). Each field is separated by a pipe symbol (hex 7C).

Example:

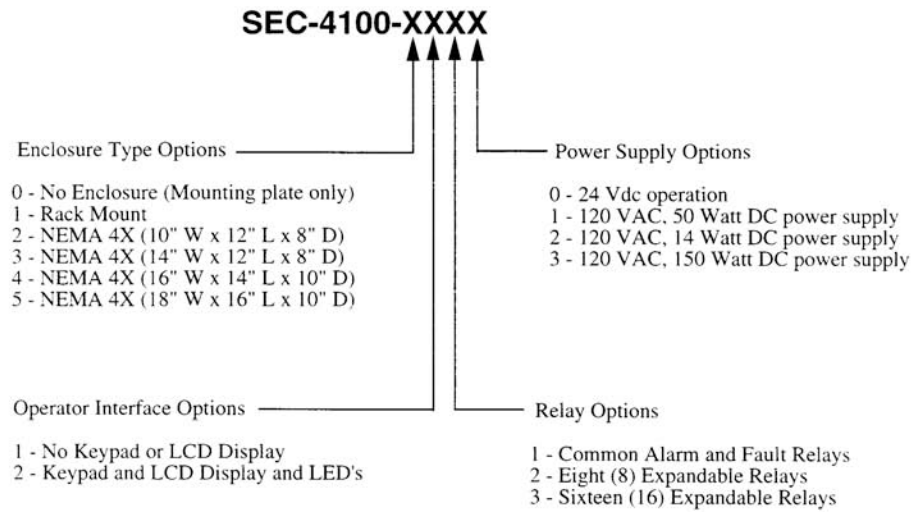
<1|COMB.|100|L|LEL|OK|OK>







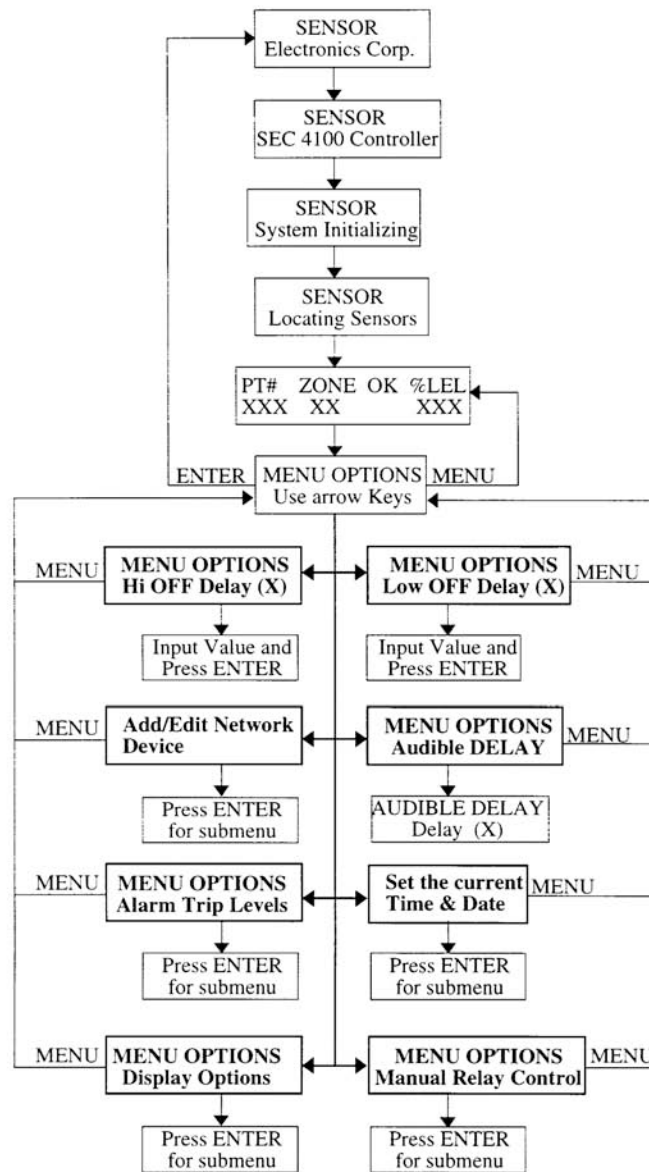
SEC 4100 System Monitor Part Numbers



Sensor Electronics Corp.
5500 Lincoln Drive
Minneapolis, Minnesota 55436
(612) 938-9486

PART NUMBERING SYSTEM

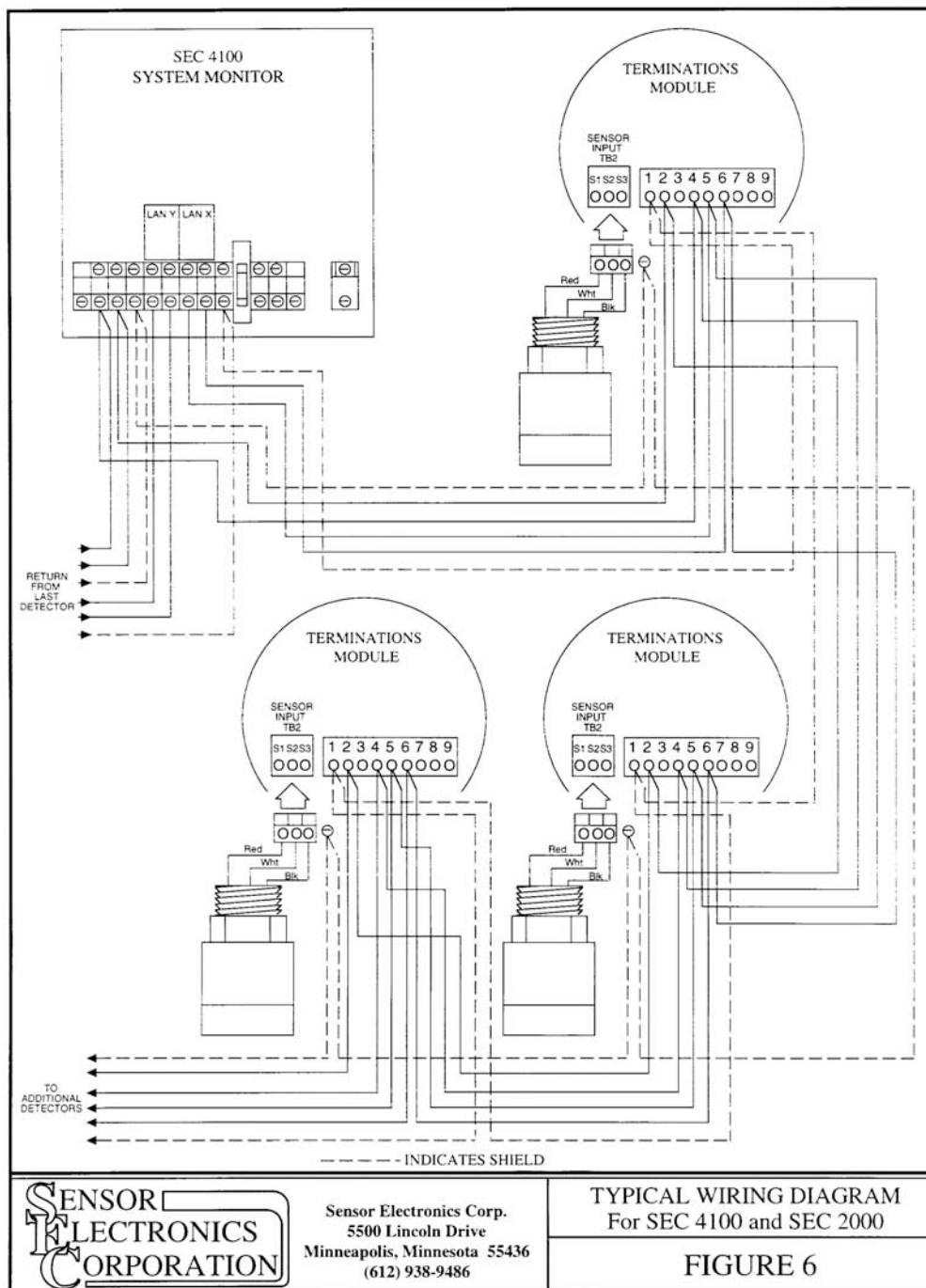
FIGURE 4

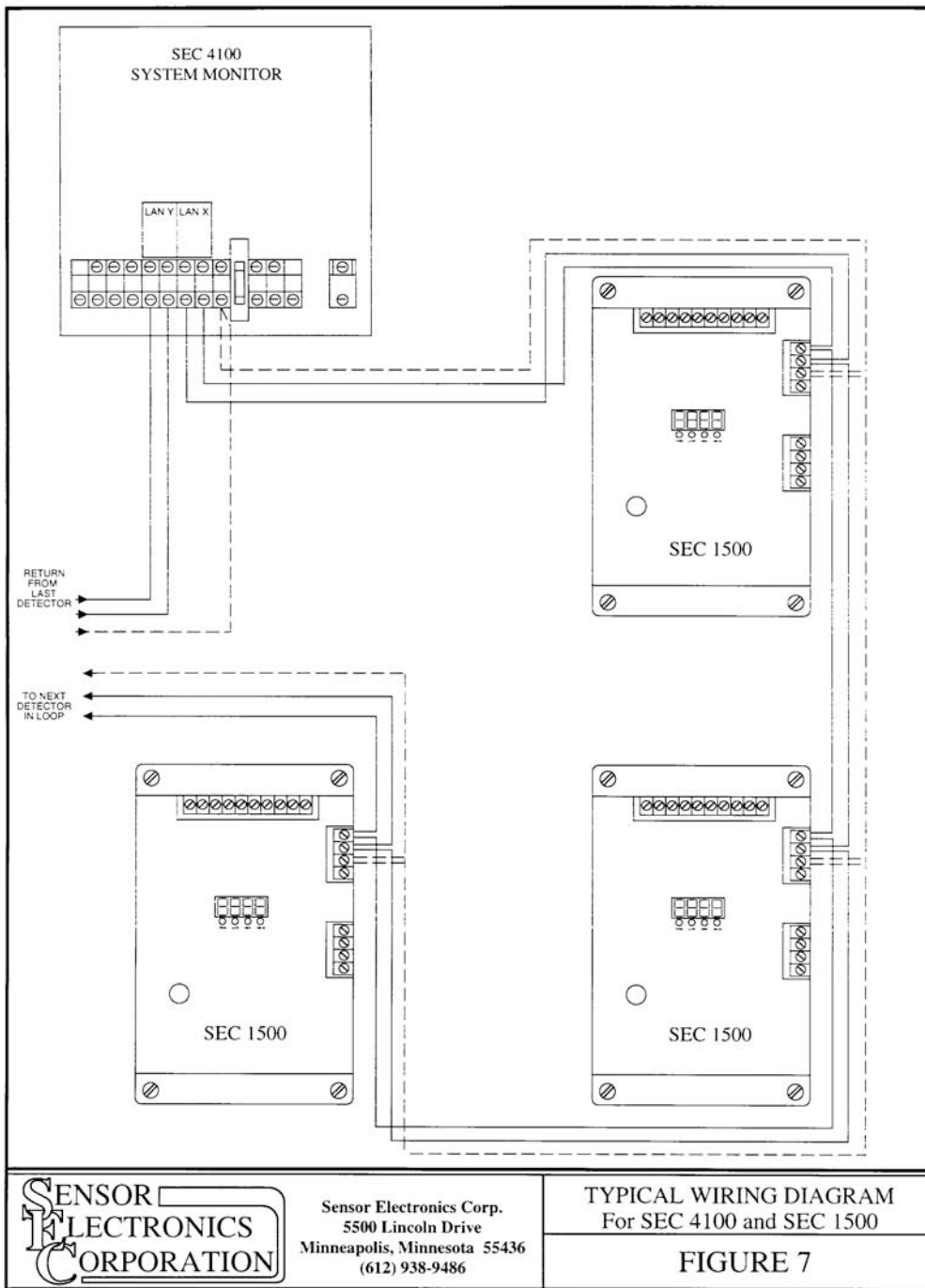


Sensor Electronics Corp.
5500 Lincoln Drive
Minneapolis, Minnesota 55436
(612) 938-9486

SEC 4100
MAIN MENU FLOW CHART

FIGURE 5





SENSOR ELECTRONICS CORPORATION

5500 Lincoln Drive

Minneapolis, Minnesota 55436 U.S.A.

Telephone: (952) 938-9486 or 800-285-3651

Fax: (952) 938-9617

Email: sensor@minn.net

www.sensorelectronic.com