



# **IG-2000**

## **Central Access Panel (CAP)**

### **User Manual**

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# Industrial Grade Gas Monitor

Flexible monitoring and control for toxic | combustible gas in arenas, chiller rooms, industrial facilities and wastewater plants.

The IG-2000 offers an intelligent solution to gas monitoring for control and ventilation. More than 30 years of gas detection experience has contributed to this highly functional monitor.

- central panel offers display and control functions
- toxic and combustible gas sensors inputs
- supports both Hazardous Location and General Purpose sensors



# IG-2000

The IG-2000 control panel offers a keypad and LCD user interface for easy set-up and operation. The Arjay microprocessor scans the field of sensors. Multiple relays are available for interface and control.

Various sensor technologies are available to address the application need. Electrochemical sensors for toxic gases and oxygen, pellister pair (Hot Wire) sensors for combustible gases, and infrared sensors for carbon dioxide and refrigerant gases are available. These can mix and match onto one control system for maximum efficiency and ease of use.

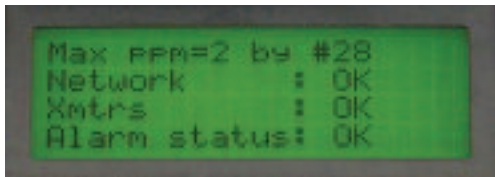
## ■ Features and Benefits

- bright backlit display and large keypad interface
- analog and relay outputs for control interface
- wall mount heavy duty metal or water tight fiberglass enclosure
- buzzer with silence button
- password protected calibration and control functions
- multiple sensor style inputs
- sensors available for Hazardous Locations use
- relay expansion boards provide unlimited relay and output functions

## ■ Technical Specifications - Control Unit

Operating Temperature	0°C to 40°C, indoor use
Power Input	24 vdc, 110 vac or 220 vac
Standards	UL, CSA
Enclosure	Nema Type 1 or Nema Type 4X

Sensor gases available: Carbon Monoxide, Hydrogen Sulfide, Oxygen, Chlorine, Ammonia, Nitrogen Dioxide, Methane, Hydrogen, Combustibles and Refrigerants. Ask about our specialty gases.



Backlit display offers detailed sensor information



Large keypad, 4-line display, and plug-in connectors are a few of the many features that make this instrument easy to use.

Arjay SS-06



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## 1.0 INSTRUMENT OVERVIEW

### 1.1 FEATURES

- Scans EC Gold transmitters as well as 4-20mA inputs
- Communicates with up to 2 Auxiliary Units each with 8 relays and 4 mA inputs.
- Auxiliary Units are networked and may be located where required
- Sensors may be assigned to any of 8 zones
- Each zone may be associated with a different and user selectable gas type
- Optional: 4-20mA output per zone to reflect the zone's max gas reading
- Differential (dual threshold), independent, High-High, High, and Low alarms per zone
- User selectable abundance or deficiency setting for High and Low alarms per zone
- Optional 4 integral SPDT 10A relays plus up to 2 Auxiliary Units with up to 8 relays each. Each relay is user selectable to be linked to any combination of 24 alarm sources: High-High, High and Low alarms for all 8 zones. Relay1 can be designated for System Fault Alarm.
- Buzzer output linked to common High-High alarm, with Acknowledge input. Each Auxiliary Unit also has a buzzer output and acknowledge input.
- Independent Delay to On and Off for all installed relays
- Delay to ON for buzzer alarm
- RS-485 Modbus protocol to communicate with EC Gold sensors and Auxiliary Units
- Optional 2<sup>nd</sup> RS-485 link to Building Monitoring & Control System (BMCS)
- Front panel LCD and membrane keypad user interface.

### 1.2 DESCRIPTION

The CAP unit is field configured for the number of zones (up to 8) and sensors per zone.

The CAP unit continuously scans gas concentrations from EC Gold transmitters as well as from mA inputs on Auxiliary Units. These sensor readings are user allocated to zones, each of which contain a group of sensors from 1 to the maximum sensors supported (80). Up to 8 zones are supported. Each zone is user linked to a single gas type. All sensors in the zone must be for this gas type. For example, a Scanner may be configured for 3 zones to monitor Carbon Monoxide, Nitrogen Dioxide, and Methane respectively. Zone 1 may have 5 CO EC Gold transmitters, Zone 2 may have 1 NO<sub>2</sub> EC Gold transmitter, Zone 3 may have 4 Methane 4-20mA transmitters connected to the mA inputs of an Auxiliary Unit.

The CAP supports 4 integral relays plus up to 2 Auxiliary Units each with 8 relays for a total of 20 relays. The Auxiliary boards are accessed via the Scanner network and may be located conveniently to where they are required to reduce electrical wiring.

All sensor values are scanned, and based on the gas concentrations, 3 level alarms are set per zone: low alarm, high alarm, and high high alarm. Low and high alarm conditions for each zone may be user selectable for abundance or deficiency. The High-high alarm is automatically linked with the abundance or deficiency setting of the high alarm. Any sensor in a zone triggers the zone alarms. There are a total of 24 possible alarms: up to 8 zones, 3 alarms per zone.

Each of the 20 relays may be independently mapped in the field to any of the 24 alarms (Low, High, High-High for up to 8 zones). For example, Relay1 may be mapped to zone 1 Low Alarm as well as the High Alarm for all other zones. Relay2 may be mapped to zone 2 Low Alarm as well as the High Alarm for all other zones. This scheme will turn on the individual relays 1 and 2 when their respective zones go into Low alarm, and both relays will turn on when any zone goes into High or High-High alarm. This flexibility ensures efficient use of the relays, which can be tailored to unique system requirements.

The common Trouble alarm is set if any EC Gold transmitter has a fault, or does not respond on the network. Relay1 can be designated the common Trouble alarm relay.

Independent Delay to On and Delay to Off can be set for each relay.

For each zone, the maximum ppm value is transmitted on an optional 4-20mA output.

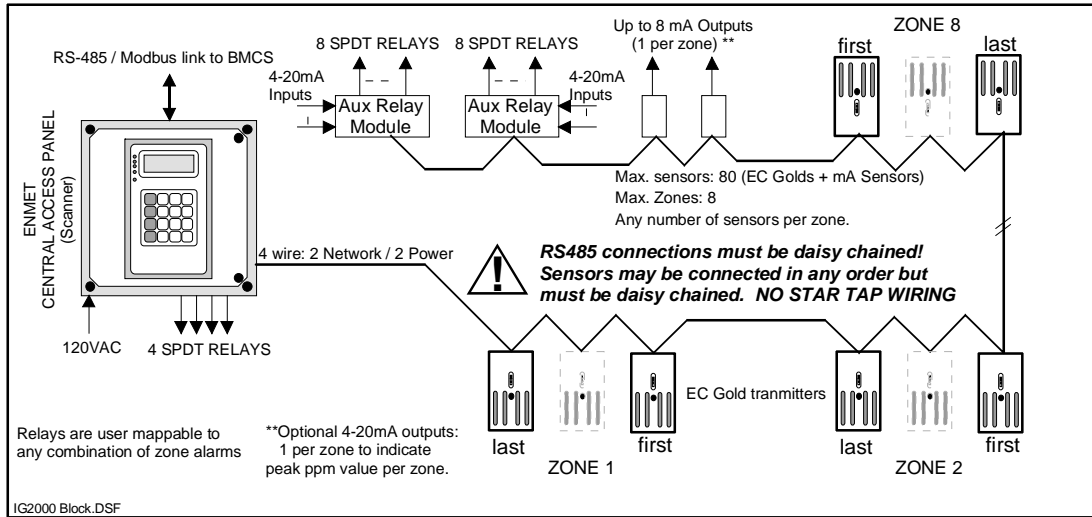


Figure 1.0

## 1.3 SPECIFICATIONS

### OPERATION

The CAP can access up to 80 sensors (either EC Gold units or via 4-20mA inputs on Auxiliary Units) assigned to up to 8 zones and set Sensor Fault, High-High, High, and Low alarms based on ppm values read from the sensors. In addition, the maximum gas reading value is reflected on an optional 4-20mA output per zone.

### USER INTERFACE

4 Line x 20 char LCD and 4X4 membrane keypad.

Network RS-485 Modbus protocol connection to EC Gold sensors. Optional additional serial port to link to a Building Automation System.

### SENSORS

The CAP communicates via RS-485 / Modbus protocol with ECGold transmitters as well as 4-20mA inputs on Auxiliary Units. The EC Golds support electrochemical sensors such as Carbon Monoxide, Nitrogen Dioxide, Ammonia etc. In addition 4-20mA transmitters may be accessed via Auxiliary Units which have up to four 4-20mA inputs each.

### OUTPUTS

Alarms Differential threshold Low, High, and High-High alarms per zone for up to 8 zones. Each zone is assigned a gas type selectable from a list of about 30 gases. Low and high alarms may be user selectable for abundance or deficiency. There is a Common Sensor Fault alarm triggered by any sensor in any zone.

Relay Contacts 4 integral relays and up to 16 external relays in banks of 8. Each bank of 8 is accessible via RS-485 and may be located where convenient to save on wiring. Each relay may be field linked to any combination of 24 alarm sources: High-High, High and Low alarms per zone for up to 8 zones. Relay1 may be designated as a System Fault alarm. Contacts are SPDT 10A/120VAC.

Alarm Delay Independent Delay to On and Delay for each relay. Delay range: 0-100 minutes field adjustable.

Buzzer Activated by any zone's High-High alarm with acknowledge input. Each bank of 8 relays also includes a buzzer and acknowledge input.

4-20mA Outputs Optional. Accessible via RS-485 and may be located where convenient. 2 mA outputs per zone indicating max. ppm and average ppm.

### ELECTRICAL SPECIFICATION

#### Base Scanner Unit

Power 120VAC / 230VAC / 24VDC  $\pm 10\%$  (specify at time of order), 15VA max.

Fuse T160mA, 250VAC. **Note: For 24VDC power input, the fuse is a 5mm x 20mm, 1/2A, Fast Blow type. This fuse is installed within the unit and must be installed by qualified personnel only.**

Sensor Power The equipment belongs to Pollution Degree2, Installation category II  
24VDC / current depends on number of transmitters.

### MECHANICAL SPECIFICATIONS

Enclosure Nema 1 or 4X (optional) wall mount with clear cover to protect keypad / LCD

Dimensions 305mm (12") H, x 305mm (12") W x 101.5mm (4") D or  
356mm (14") H, x 305mm (12") W x 203mm (8") D (Fiberglass)

Weight 0.3 kg

### ENVIRONMENTAL SPECIFICATIONS

Operating Temp. 0 - 55 Deg. C

Relative Humidity 90% max. with no condensation.

## **2.0 INSTALLATION**

See drawings at back of manual.

### 3.0 STARTUP AND CONFIGURATION

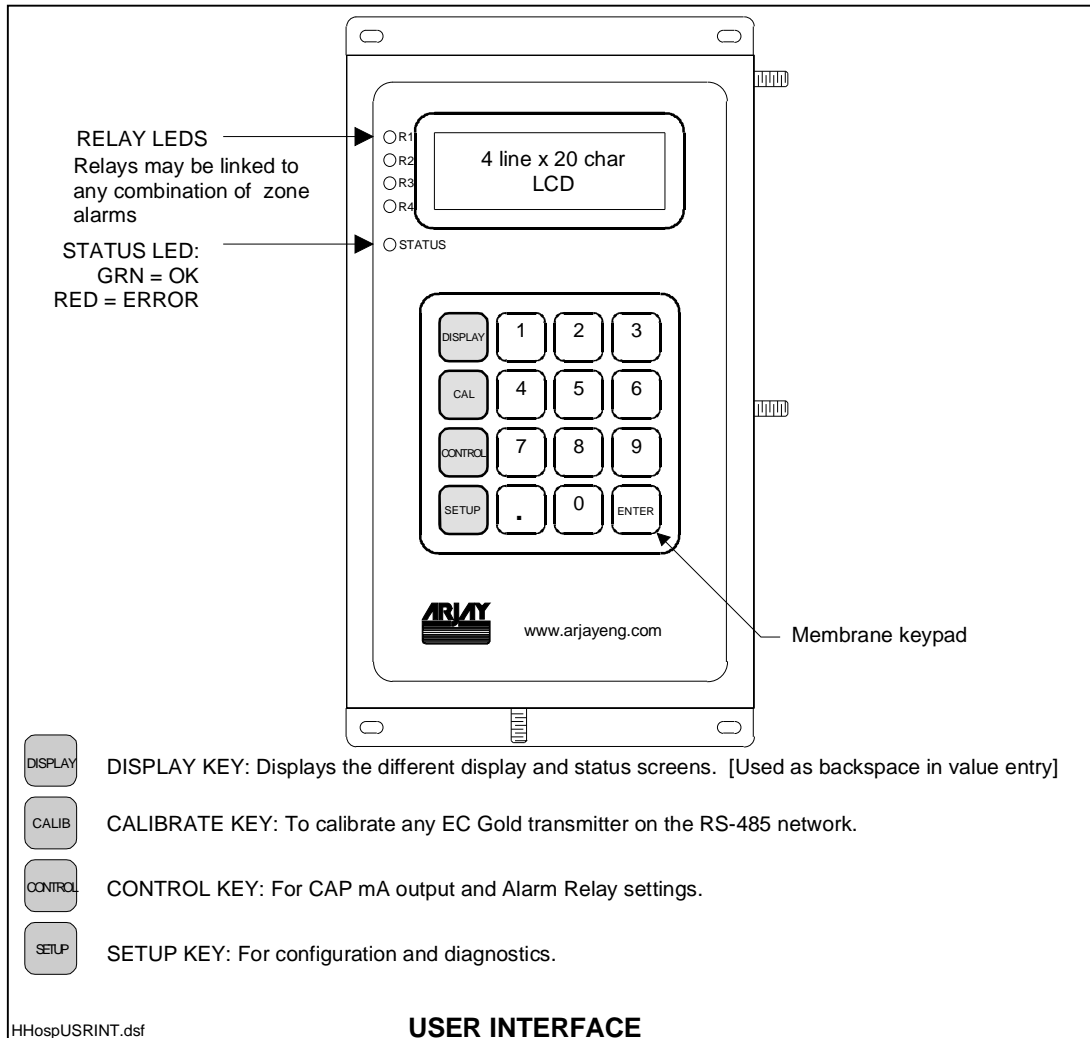


Figure 3.0

#### 3.1 STATUS INDICATIONS

One LED per Relay status. Each relay is triggered by any selectable combination of zone High and Low alarms. The LEDs indicate the condition of the 4 local relays only. Relays on Auxiliary Units have their own LEDs on the Auxiliary Unit.

#### 3.2 PASSWORD PROTECTION

A password must be entered to access any of the 3 value entry menus: CALIB, CONTROL, SETUP. The factory default password is 2000. The password may be changed from the setup menu as described later. The prompt for entering the password is always 9999 regardless of the actual password.

#### 3.3 DISPLAY SCREENS

After powerup, and the initial startup screen has been displayed for about 3 seconds, the CAP scans all active EC Gold transmitters and mA transmitter sensors on the network. This may take several seconds depending on the number. The following screen will now appear:

##### 3.3.1 ZONE ALARM STATUS SCREEN

The following is a typical display:

```

z1: 0 ppm CO
z2: 0 %LEL Meth
z3: 0 ppm NH3
z4: 0 ppm NO2

```

The above display is for example only. Actual values will vary.

The peak gas concentration is displayed for each zone. The zone display line will toggle between the zone status and the concentration every second if any of the zones are in alarm. **If there are more than 4 zones, then display will toggle between the 2 zone screens every 6 seconds.**

Alarm types:

Low Alarm	At least one sensor in this zone has a ppm level at or above the Low Alarm ppm level for at least the Low Alarm Delay On time.
High Alarm	At least one sensor in this zone has a ppm level at or above the High Alarm ppm level for at least the High Alarm Delay On time.
Hi Hi Alarm	At least one sensor in this zone has a ppm level at or above the High High Alarm ppm level for at least the High High Alarm Delay On time.
Xmtr error	At least one sensor in this zone has a sensor fault or instrument fault.
No response	At least one sensor in this zone is not responding on the network.

### 3.3.2 OVERALL ALARM STATUS SCREEN

To view this screen, press the DISP key from the Zone Alarm Status Screen (previous screen).

```

Max ppm=25 by #5
Network      : OK
Xmtrs       : OK
Alarm status: Low

```

The above display is for example only. Actual values will vary.

The top line displays the maximum ppm registered by any sensor in any zone, and also the sensor number, which caused it. Sensors are numbered as follows: EC Gold sensors are numbered first followed by 4 mA input type sensors for every Auxiliary Unit installed. For example, in a system with 10 EC Golds and 1 Auxiliary Unit, the EC Golds are numbered 1-10 and the 4-20mA inputs on the Auxiliary Unit are numbered 11-14. If there are 2 Auxiliary Units, then its mA inputs are numbered right after the first Auxiliary Unit numbers (15 – 18 in the above example).

The second line displays the network status: either “OK” if all active sensors and networked resources are responding, or “Net no response: x” and the number (quantity) of not responding transmitters or networked resources is displayed. For example if 1 EC Gold transmitter and 1 Aux relay board and 1 mA output module are not responding then "Net no response: 3" is displayed.

The third line displays the common sensor status. This includes sensors that have sensor faults or if they are not responding on the network. Sensors for mA inputs are considered in fault if the received mA value is less than 3.5 mA. If all sensors are OK, then “OK” is displayed, else “Xmtr trouble: x” is displayed where “x” is the number (quantity) of sensors with faults or not responding. Note: if an EC Gold transmitter is not responding then this will be indicated on line 2 and 3 i.e. you will get “Net no response” and “Xmtr trouble” errors.

The bottom line displays the common alarm status. Based on the current alarm state, “OK”, “Low Alarm”, “High Alarm”, or “High High Alarm” is displayed. The status reflects the alarm condition including user settable time delays.

### 3.3.3 AUXILIARY MODULE STATUS SCREEN

To view this screen, press the DISP key from the Overall Alarm Status Screen (previous).

```

Aux1:ok
Relays 1-8: 10000000

```

```
Aux2:ok  
ReLays 1-8: 00000001
```

The above display is for example only. Actual values will vary.

The status of the Auxiliary Relay module(s) is displayed. If only one Aux module is installed, then the bottom 2 lines are blank.

“ok” means the Aux module is responding on the network.

The next line for each Aux module displays the individual status of each relay 1-8 installed on the Aux module. From left to right for relays 1 to 8, a 1 indicates the relay is energized and a 0 indicates it is de-energized.

### 3.3.4 mA MODULE STATUS SCREEN

To view this screen, press the DISP key from the Auxiliary Status Screen (previous).

```
z1 mA:ok    z5 mA:ok  
z2 mA:ok    z6 mA:ok  
z3 mA:ok    z7 mA:ok  
z4 mA:ok    z8 mA:ok
```

The above display is for example only. Actual values will vary.

The status of the optional mA output units is displayed. **The mA outputs are accessed via the RS-485 / Modbus protocol and the status indicates if they are Ok or not responding. Uninstalled mA units are listed as N/A for Not Applicable.**

**The screen is skipped altogether if there are no mA output units installed.**

### 3.3.5 INDIVIDUAL SENSOR STATUS

The status of individual EC Gold transmitters or mA input sensors may be viewed by pressing the following keys on the keypad while in any of the screens described above in sections 3.3.1 – 3.3.4:

Press the zone number to get to the corresponding zone sensor status. For example for zone 1 press “1”. The ENTER key does not need to be pressed.

The status of individual EC Gold transmitters for the corresponding zone are displayed 15 at a time. If more than 15 transmitters are assigned to the zone, then press the DISP key repeatedly to view the status of remaining EC Gold transmitters, 15 at a time.

For each EC Gold transmitter, ppm value and its status is alternately displayed every second beside the sensor number.

The status is displayed followed by a 2 letter code:

NR = no response from

ER = Instrument error

HH = This EC Gold transmitter has caused a High High Alarm

Hi = This EC Gold transmitter has caused a High Alarm

Lo = This EC Gold transmitter has caused a Low Alarm

Pressing the DISPLAY key when the last transmitter is on screen cycles back to the Main Display.

## 3.4 NOTES ON THE USER INTERFACE

When entering in numeric values, the cursor can be backspaced to correct mistakes by pressing the DISPLAY key. This is only true if the cursor is not at the beginning of the displayed value, in which case the DISPLAY menu is entered.

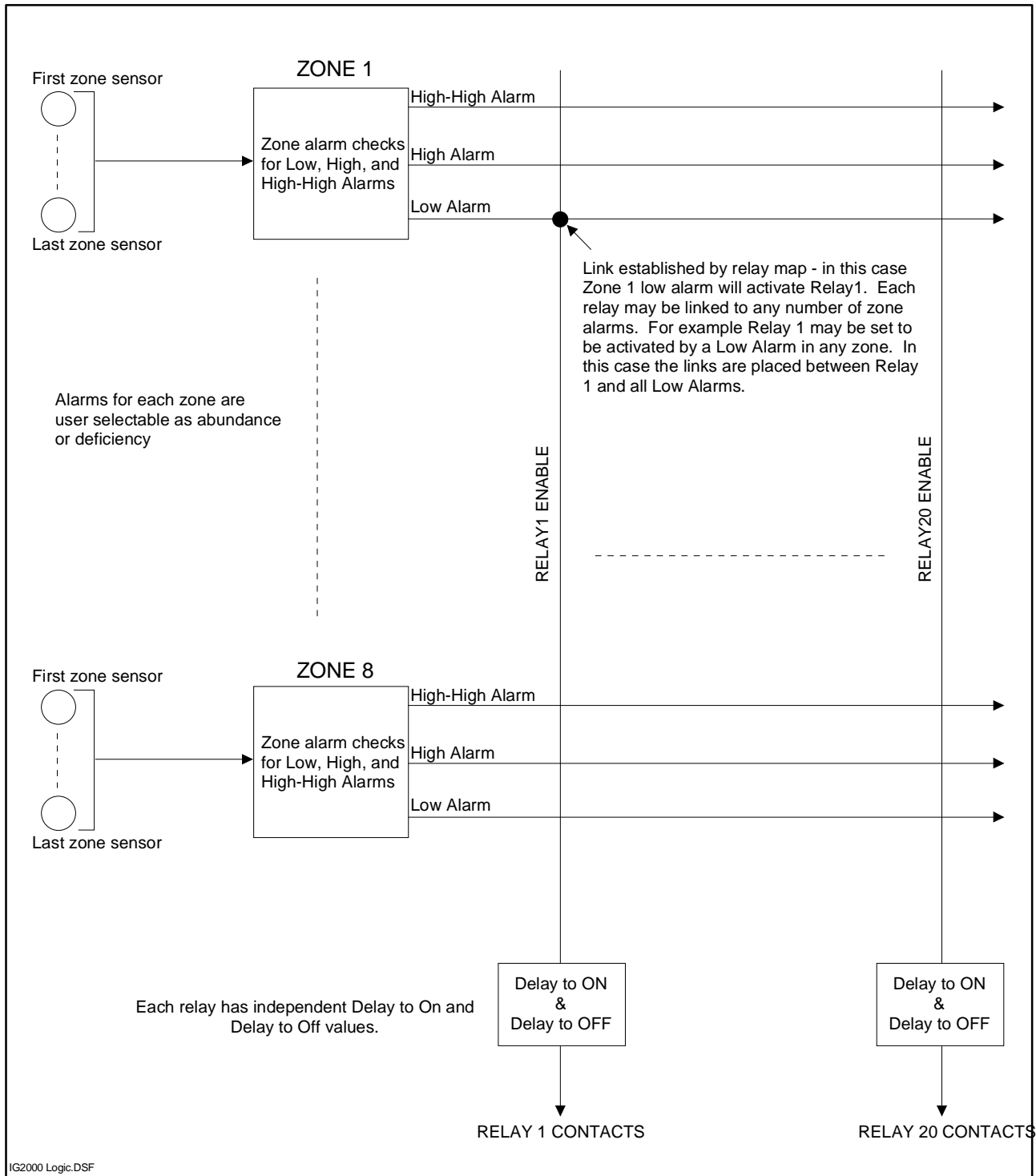
Values may be entered with any number of places of decimal.

If the entered value is out of the allowed limits, the system displays the limiting value for 2 seconds. For example if a gas concentration Calibration value is entered as 5000.0 then **MAX. 999** is displayed for 2 seconds then entry is allowed again. The current value is not changed unless the entered value is within limits.

**ALL PARAMETERS DESCRIBED BELOW ARE TYPICALLY SET AT THE FACTORY AS PER THE CUSTOMER ORDER REQUIREMENTS. HOWEVER, THEY MAY BE VIEWED OR MODIFIED IN THE FIELD.**

### 3.5 IG2000 CONTROL LOGIC DIAGRAM

The diagram below describes the concept of zones as well as the alarm logic of the IG2000. The system allows for maximum flexibility and utilization of relay resources.



### 3.6 SET NUMBER OF EC GOLD TRANSMITTERS ON NETWORK

1. Press the SETUP key, enter the password at the prompt, then 1 for Zone / EC Gold transmitter setup from the SETUP menu screen. The default factory set password is 2000.

2. Enter the total number of EC Gold transmitters on the network followed by the ENTER key. Note: this value includes transmitters in all zones. The CAP unit assumes sequential addresses starting from 1 to the number entered. i.e. if 14 is entered then addresses 1 to 14 are considered active. If there are no EC Golds in the system (only mA input sensors are being used) then enter 0. If there are no EC Golds, then the first mA input on the first Auxiliary Unit is numbered 1.
3. Next, at the prompt, enter the number of zones require (maximum is 8).
4. At the prompt for each zone, enter the start and end sensor network addresses for each zone. Any number of sensors may be selected for a zone as long as they have sequential network addresses. Also, the end address must always be greater than the start address. For example zone 1 addresses 1-5, zone 2 addresses 6-14 and so on. Auxiliary Units 4-20mA inputs can be included in zone sensors numbering. These mA inputs are automatically located at sensor numbers above the last assigned EC Gold sensor number. For example, if 10 EC Golds are installed, then the first Auxiliary Unit's 4 mA inputs are numbered 11 to 14, and the second Auxiliary Unit's mA inputs are numbered 15 to 18.
5. Next, at the prompt, enter the alarm type for the low and high alarms for this zone. Press 1 to toggle the high alarm type between abundance or deficiency. Press 2 to toggle the low alarm type between abundance or deficiency. An abundance setting triggers the corresponding alarm when the gas concentration exceeds the alarm value. A deficiency setting triggers the corresponding alarm when the gas concentration drops below the alarm value. Note: the high-high alarm type is automatically assigned the high alarm setting.
6. After entering the alarm type, select the gas name to associate with this zone. Follow the prompts to select a gas name. Selecting a name automatically selects appropriate units; for example, selecting CO will automatically select ppm as units. Gas names are selected by a numeric code. The code table showing gases and corresponding codes is shown below:
7. After pressing a Gas number, select the gas type by pressing a 2 digit gas code from 0 to 23 followed by the ENTER key. For each code entered, the corresponding gas is selected, with a prompt to press 1 to keep the selection or 2 to select another gas. The supported gases and their corresponding codes are shown below:

GAS NAME	CODE
Carbon Monoxide: CO (ppm)	00
Nitrogen Dioxide: NO <sub>2</sub> (ppm)	01
Methane: CH <sub>4</sub> (%LEL)	02
Propane: C <sub>2</sub> H <sub>5</sub> (%LEL)	03
Hydrogen Sulfide: H <sub>2</sub> S (ppm)	04
Ammonia: NH <sub>3</sub> (ppm)	05
Chlorine: Cl (ppm)	06
Oxygen: O <sub>2</sub> (%)	07
Gasoline (%)	08
Hydrogen: H <sub>2</sub> (ppm)	09
Toxic (ppm) – generic name	10
Combustible (%LEL) – generic name	11
BRH (Broad Range Hydro Carbon) (ppm)	12
Carbon Dioxide: CO <sub>2</sub> (ppm)	13
Acetylene (ppm)	14

Sulfur Dioxide: SO <sub>2</sub> (ppm)	15
ClO <sub>2</sub> (ppm)	16
Hydrogen Chloride: HCl (ppm)	17
Hydrogen Cyanide: HCN (ppm)	18
Ozone: O <sub>3</sub> (ppm)	19
Nitric Oxide: NO (ppm)	20
Temperature in deg. C	21
Temperature in deg. F	22
Refrigerant R134A	23
Refrigerant R123	24
Refrigerant R22	25

**Table 3.1**

### 3.7 SET ZONE ALARM AND SPAN VALUES

1. Press the CONT key then press 1 for Zone Alarms / mA Span. If coming from the normal display screens, enter the password at the prompt. The default factory set password is 2000.
2. Select a zone by pressing the desired zone number key (1 – 8).
3. Enter the Low Alarm differential values. For an abundance alarm type (see section 3.6 / step 5) the low alarm is activated when the peak gas concentration of the zone rises above the high threshold (Diff High), and remains active until the concentration drops below the low threshold (Diff Low). For a deficiency alarm type, the low alarm is activated when the lowest concentration of the zone drops below the low threshold (Diff Low) and remains active until the concentration rises above the high threshold (Diff High).
4. After entering the Low Alarm differential values, the user is prompted for the High, and then High-High differential values. See step 3 above for an explanation of how the abundance or deficiency alarm types affect the alarm condition.
5. Finally, the user is prompted for the mA span value. This is used to set the mA output reflecting the peak gas concentration for the zone. For example a Span of 200 for Carbon Monoxide sensing zone, will cause the mA output to be 20 mA (full scale) at gas concentrations of 200 ppm and higher.
6. After setting the Span as per above, the main control screen is again displayed. Select another zone to setup if desired by pressing the corresponding zone number key.

### 3.8 ALARM DELAYS

1. From the main Control menu, press 2 to set the Alarm Delays.
2. Press 1 for Buzzer delay. The Buzzer only has a On delay. Enter the Buzzer On delay in minutes followed by the Enter key. The Alarm delay menu is again displayed.
3. Select 2 to set delays for Relays 1-4. These are integral to the IG2000 scanner hardware. Select 3 for Auxiliary Unit 1 relays and 4 for Auxiliary Unit 2 relays (if it is present). Next select the relay number (1-4) for Integral relays or 1-8 for Aux relays. Enter the On and Off delays for each relay. The values are in minutes. Fractional minutes are allowed i.e. 1.5 minutes can be entered. Note: the relay number is automatically incremented after each relay delay has been set.

### 3.9 RELAY ALARM MAP

NOTE: The IG2000 Scanner supports up to 20 relays. There are 4 integral relays (contained within the IG2000 Scanner enclosure), as well as 8 relays per Auxiliary Unit. The internal relays (numbered 1-4) are typically not installed unless specifically ordered. The corresponding LEDs on the front panel of the IG2000

Scanner are, however, always installed and the relay map is set so these LEDs indicate common Sensor Fault (R1), Low alarm (R2), High alarm (R3) and High-High alarm (R4).

1. From the main Control menu, press 4 to set the Relay Map. Each of the installed relays (up to 20) may be linked to any combination of up to 24 alarm sources: High-High, High and Low alarms for 8 zones. In addition, Relay1 may be designated as a System Fault alarm.
2. The unit prompts if Relay1 is desired for System Fault alarm:

```

FAULT RELAY
Set Relay1=Sys Fault
Press 1 to toggle
Yes

```

3. The bottom line displays the current setting (Yes means Relay1 is set for System Fault alarm). If necessary, press 1 to change this value, then press the ENTER key.
4. Press the ENTER key after reading the description screen. A screen similar to the following is displayed. The map shown is an example only. The actual values will vary. This screen shows the map for Integral Relays 1 and 2 (R1 and R2). Note: the "Int" on top of the Relay column indicates that the relay is part of the Integral relay group. Aux1 and Aux2 are displayed when setting Aux relays. If the Integral Relay1 has been set for System Fault, then it is excluded from other alarms. The column headings are for the Low (L), High (h), and High-High (H) alarms for each zone (z1 to z4). Enter the mapping as follows:

```

          z1  z2  z3  z4
Int  LhH LhH LhH LhH
R1   YNY NNY NNY NNY (or "Fault Relay")
R2   NNY YNY NNY NNY

```

5. The cursor starts at the Low alarm column for zone 1. To establish a link: press 1, to clear the link: press 0. If there are more than 4 zones then complete the entries for the first 4 zones for each relay and the remaining zones are automatically displayed. Unused zones are not displayed. To advance the cursor to the next column with no change: press the ENTER key. To advance to the next screen: press any other numeric key. Note: changes are made as soon as the '1' or '0' key is pressed. If a mistake is made, you will need to exit the menu, then re-enter to change the value.
6. After completing the maps for relays 1 and 2, the system automatically prompts with the maps for all remaining relays.

**THIS CONCLUDES THE CAP SETUP. FOR SETTING UP / CALIBRATING INDIVIDUAL EC GOLD TRANSMITTERS, REFER TO THE NEXT SECTION.**

## 4.0 MISCELANEOUS SETUP

Each remote EC Gold transmitter may be individually setup and calibrated via the CAP unit. Setup from the CAP is more convenient than using the EC Gold integral switches. Calibration, on the other hand, is usually best done at each EC Gold since the sensor has to be gassed. A handheld calibrator may be purchased for easy calibration.

NOTE: The CAP acts as a user interface to the remote EC Gold transmitter being calibrated. The resulting setup and calibration values reside in EC Gold transmitter and not in the CAP.

### 4.1 CALIBRATION (See Sensor Manuals)

**The mA transmitters and EC Gold transmitter are pre-calibrated at the factory, but field verification with a known concentration of test gas should be performed to ensure proper operation of the system. Calibration is typically done at the transmitter itself and therefore the user should read the Sensors Manuals supplied with the equipment. Field calibrations should be scheduled every 3 or 4 months as part of a regular maintenance program.**

The EC Gold transmitters may be calibrated either using the CAP or at the EC Gold itself using the convenient single point pushbutton procedure. The latter method is quickest since calibration involves exposing the sensor of the EC Gold transmitter with a calibration gas i.e. the procedure requires someone to fit the calibration cup over the EC Gold's sensor housing.

Calibration via the CAP is practical if there are 2 people equipped with 2 way radios calibrating the EC Gold transmitters (one at the CAP and the other gassing the sensors).

### 4.2 CALIBRATION USING EC GOLD PUSHBUTTON

To calibrate the EC Gold transmitters using their integral calibration pushbutton, refer to the EC Gold manual for the latest calibration procedure information.

### 4.3 CALIBRATION FROM THE CAP

The following procedure describes how to individually calibrate any remote EC Gold transmitter from the CAP unit. As mentioned earlier, this method is most convenient if performed by 2 people communicating via radio transceivers. This method is also preferred if the calibration gas can be selectively applied to the EC Gold transmitters via tubing from a centrally located calibration gas canister. In this scenario, one person can conveniently perform calibration.

The following procedure is for calibrating from the CAP panel and applies to either of the 2 methods (2 people or a single person with control over calibration gas to remote transmitters).

1. If not at the main Remote Setup Menu, press the CAL key, then enter the password at the prompt. The factory set password is 2000.
2. Press 1 for Calibration from the Calibration menu
3. Select the Address of the desired EC Gold transmitter to be calibrated.
4. The calibration menu offers 3 types of calibration: auto cal, manual cal and direct entry of the slope and offset.

#### 4.3.1 AUTOCALIBRATION

Autocal is the most common form of calibration. In this procedure, the gas sensor is exposed to 2 different gas concentrations in turn – one of which can be clean air (0 ppm CO). The concentration value is entered for each. The EC Gold is then instructed to calculate the required calibration parameters.

1. Press the CAL key to enter the EC Gold Setup menu.
2. Press 1 for Sensor CAL.
3. At the prompt, enter the address number of the desired EC Gold transmitter to be calibrated.
4. From the Calibration menu press 1 for Autocal.
5. Gas the EC Gold sensor being calibrated with the first gas. Ambient air can be used as 0 ppm ONLY if it is certain that there is no CO in the air. Enter the concentration of the first gas in ppm

for this first point. The bottom line displays the raw sensor reading in mV and is displayed to give an indication when the reading has settled. This typically takes about 1 minute. Press Enter to confirm the first calibration point.

6. This display now prompts for the second calibration point. Remove the first calibration gas and let the sensor settle in air until the reading returns to clean air levels.
7. Repeat step 5 with the second gas concentration.
8. In case of calibration errors such as low sensor sensitivity, or user entry errors, an error message is flashed for about 2 seconds after the ENTER key has been pressed.

#### **4.3.2 OTHER CALIBRATION METHODS**

There are 2 other methods. Both require a prior successful autocal. The first method allows manual entry of 4 points: the concentration and raw sensor values for each of 2 cal points. The EC Gold is then instructed to calculate the required calibration parameters.

The final cal method is to directly enter the calibration values i.e. the SLOPE sensitivity) and the OFFSET (or raw value in 0 ppm CO).

#### **4.4 VIEWING EC GOLD TRANSMITTER INFORMATION**

1. Press the SETUP key then 2 for Xmtr Information.
2. Press 1 for the Sensor Values / Stat menu, then at the prompt, enter the address of the desired EC Gold transmitter.
3. The CO concentration in ppm, the sensor signal in mV and Status for the selected EC Gold transmitter is displayed.

#### **4.5 VIEWING EC GOLD REVISION/ SERIAL NUMBER INFORMATION**

1. Press the SETUP key then 2 for Xmtr Information.
2. Press 2 for the Revisions /ID, then at the prompt, enter the address of the desired EC Gold transmitter.
3. The Software rev., Hardware rev., and serial number of the selected EC Gold are displayed.

## 5.0 SETTINGS SHEET

Checked by			
Model Number		Serial Number	
Hardware Rev.		Software Rev.	

The factory settings column below lists the typical default settings. The user may change these values. If changed, please fill in the USER SETTING column for future reference.

PARAMETER	DESCRIPTION	FACTORY SETTING	USER SETTING
Numer of EC Golds	Total number of EC Golds in the system		
Numer of Zones	Total number of zones		
Number of Auxiliary Units	Total Auxiliary Units installed (max 2). Each Aux Unit adds 8 relays and 4 mA inputs. The mA inputs automatically increase the total number of sensors = number of EC Golds + 4 mA inputs per Aux Unit.		
ZONE 1	<b>Sensor Range</b> (sensor numbers in zone must be contiguous).		
	<b>Gas Code</b> (For example 0 = CO)		
	<b>Low Alarm type</b> (abundance or deficiency). Abundance: low alarm is triggered when the concentration of any sensor in the zone exceeds the low alarm high threshold (Diff High) and clears when the concentration drops below the low alarm low threshold (Diff Low). Deficiency: alarm is triggered when the concentration of any sensor in the zone falls below the low threshold (Diff Low) and clears when it exceeds the high threshold.		
	<b>Low Alarm high threshold</b> – is used with alarm type and low threshold to set alarm.		
	<b>Low Alarm low threshold</b> – threshold – is used with alarm type and high threshold to set alarm.		
	High (and High-high) Alarm type (abundance or deficiency). Abundance: high alarm is triggered when the concentration of any sensor in the zone exceeds the high alarm high threshold (Diff High) and clears when the concentration drops below the high alarm low threshold (Diff Low). Deficiency: alarm is triggered when the concentration of any sensor in the zone falls below the high alarm low threshold (Diff Low) and clears when it exceeds the high alarm high threshold.		
	<b>High Alarm high threshold.</b> As per Low Alarm thresholds description		
	<b>High Alarm low threshold.</b> As per Low Alarm thresholds description.		
	<b>High High Alarm high threshold.</b> As per Low Alarm thresholds description		

ZONE 1	<b>High High Alarm</b> low threshold. As per Low Alarm thresholds description		
	<b>SPAN:</b> This is used on the optional Auxillary Board. There are up to 2 per board to reflect the maximum gas concentration in the zone. The full Scale concentration in ppm.		
ZONE 2	<b>Sensor Range</b> (sensor numbers in zone must be contiguous).		
	<b>Gas Code</b> eg. 0=CO		
	<b>Low alarm alarm type</b> (abundance or deficiency) – as per zone 1 description.		
	<b>Low Alarm</b> high threshold – concentration of any sensor in the zone must exceed this value for at least the the Low Alarm delay to ON period to activate the Low Alarm.		
	<b>Low Alarm</b> low threshold – concentration of all sensors in the zone must fall below this value for at least the Low Alarm delay to OFF period to de-activate the Low Alarm		
	<b>High alarm alarm type</b> (abundance or deficiency) – as per zone 1 description.		
	<b>High Alarm</b> high threshold. As per Low Alarm thresholds description		
	<b>High Alarm</b> low threshold. As per Low Alarm thresholds description.		
	<b>High High Alarm</b> high threshold. As per Low Alarm thresholds description		
	<b>High High Alarm</b> low threshold. As per Low Alarm thresholds description		
	<b>SPAN</b> :This is used on the optional Auxillary Board. There are up to 2 per board to reflect the maximum gas concentration in the zone. The full Scale concentration in ppm.		
ZONE 3	<b>Sensor Range</b> (sensor numbers in zone must be contiguous).		
	<b>Gas Code</b> eg. 0=CO		
	<b>Low alarm alarm type</b> (abundance or deficiency) – as per zone 1 description.		
	<b>Low Alarm</b> high threshold – concentration of any sensor in the zone must exceed this value for at least the the Low Alarm delay to ON period to activate the Low Alarm.		
	<b>Low Alarm</b> low threshold – concentration of all sensors in the zone must fall below this value for at least the Low Alarm delay to OFF period to de-activate the Low Alarm		
	<b>High alarm alarm type</b> (abundance or deficiency) – as per zone 1 description.		
	<b>High Alarm</b> high threshold. As per Low Alarm thresholds description		
	<b>High Alarm</b> low threshold. As per Low Alarm thresholds description.		

ZONE 3	<b>High High Alarm</b> high threshold. As per Low Alarm thresholds description		
	<b>High High Alarm</b> low threshold. As per Low Alarm thresholds description		
	<b>SPAN:</b> This is used on the optional Auxillary Board. There are up to 2 per board to reflect the maximum gas concentration in the zone. The full Scale concentration in ppm.		
ZONE 4	<b>Sensor Range</b> (sensor numbers in zone must be contiguous).		
	<b>Gas Code eg.0=CO</b>		
	<b>Low alarm alarm type</b> (abundance or deficiency) – as per zone 1 description.		
	<b>Low Alarm</b> high threshold – concentration of any sensor in the zone must exceed this value for at least the the Low Alarm delay to ON period to activate the Low Alarm.		
	<b>Low Alarm</b> low threshold – concentration of all sensors in the zone must fall below this value for at least the Low Alarm delay to OFF period to de-activate the Low Alarm		
	<b>High alarm alarm type</b> (abundance or deficiency) – as per zone 1 description.		
	<b>High Alarm</b> high threshold. As per Low Alarm thresholds description		
	<b>High Alarm</b> low threshold. As per Low Alarm thresholds description.		
	<b>High High Alarm</b> high threshold. As per Low Alarm thresholds description		
	<b>High High Alarm</b> low threshold. As per Low Alarm thresholds description		
ZONE 5	<b>SPAN:</b> This is used on the optional Auxillary Board. There are up to 2 per board to reflect the maximum gas concentration in the zone. The full Scale concentration in ppm.		
	<b>Sensor Range</b> (sensor numbers in zone must be contiguous).		
	<b>Gas Code eg.0=CO</b>		
	<b>Low alarm alarm type</b> (abundance or deficiency) – as per zone 1 description.		
	<b>Low Alarm</b> high threshold – concentration of any sensor in the zone must exceed this value for at least the the Low Alarm delay to ON period to activate the Low Alarm.		
	<b>Low Alarm</b> low threshold – concentration of all sensors in the zone must fall below this value for at least the Low Alarm delay to OFF period to de-activate the Low Alarm		
	<b>High alarm alarm type</b> (abundance or deficiency) – as per zone 1 description.		
<b>High Alarm</b> high threshold. As per Low Alarm thresholds description			

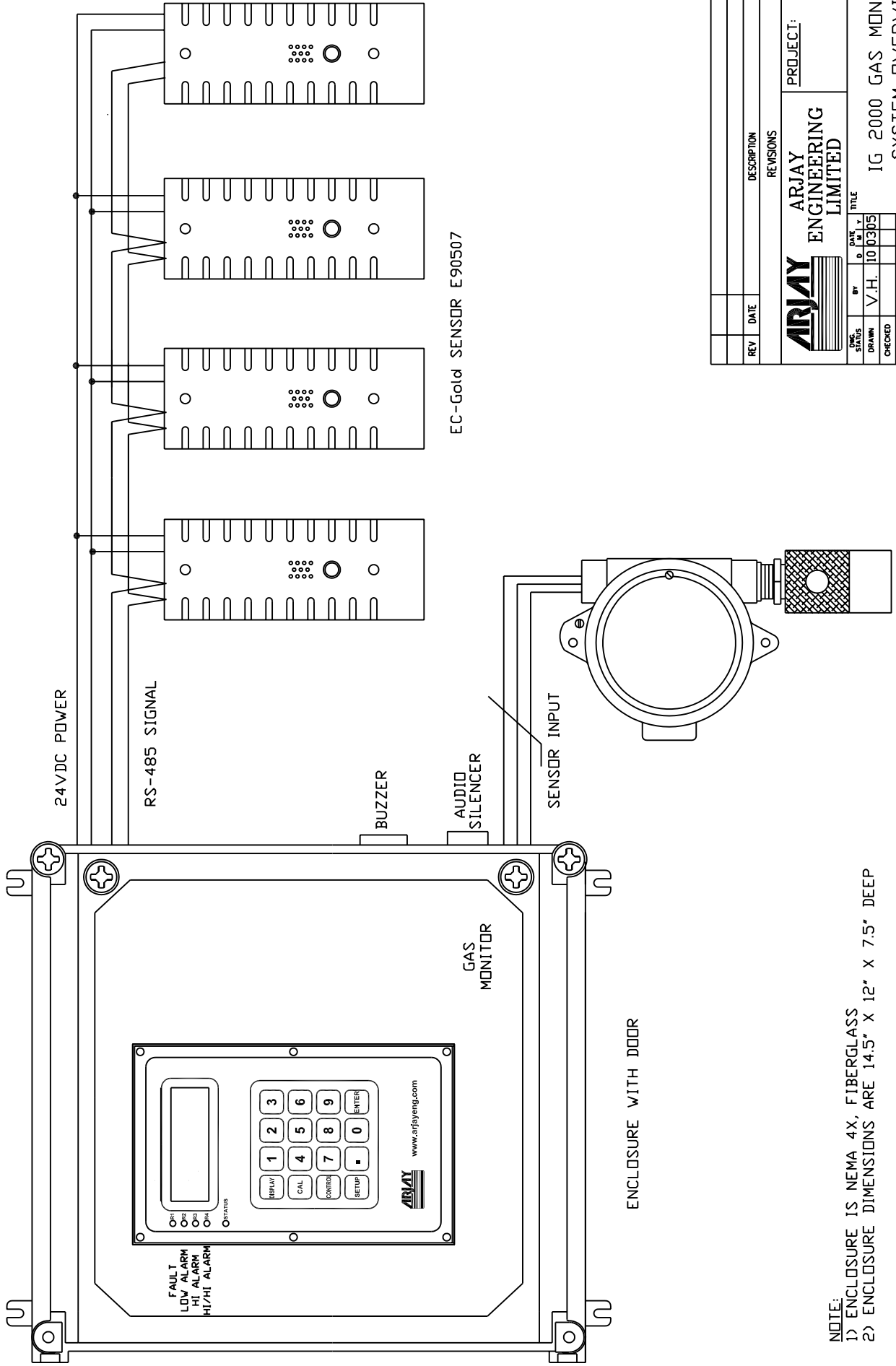
ZONE 5	<b>High Alarm</b> low threshold. As per Low Alarm thresholds description.		
	<b>High High Alarm</b> high threshold. As per Low Alarm thresholds description		
	<b>High High Alarm</b> low threshold. As per Low Alarm thresholds description		
	<b>SPAN:</b> This is used on the optional Auxillary Board. There are up to 2 per board to reflect the maximum gas concentration in the zone. The full Scale concentration in ppm.		
ZONE 6	<b>Sensor Range</b> (sensor numbers in zone must be contiguous).		
	<b>Gas Code</b> eg.0=CO		
	<b>Low alarm alarm type</b> (abundance or deficiency) – as per zone 1 description.		
	<b>Low Alarm</b> high threshold – concentration of any sensor in the zone must exceed this value for at least the the Low Alarm delay to ON period to activate the Low Alarm.		
	<b>Low Alarm</b> low threshold – concentration of all sensors in the zone must fall below this value for at least the Low Alarm delay to OFF period to de-activate the Low Alarm		
	<b>High alarm alarm type</b> (abundance or deficiency) – as per zone 1 description.		
	<b>High Alarm</b> high threshold. As per Low Alarm thresholds description		
	<b>High Alarm</b> low threshold. As per Low Alarm thresholds description.		
	<b>High High Alarm</b> high threshold. As per Low Alarm thresholds description		
	<b>High High Alarm</b> low threshold. As per Low Alarm thresholds description		
ZONE 7	<b>SPAN:</b> This is used on the optional Auxillary Board. There are up to 2 per board to reflect the maximum gas concentration in the zone. The full Scale concentration in ppm.		
	<b>Sensor Range</b> (sensor numbers in zone must be contiguous).		
	<b>Gas Code</b> eg. 0=CO		
	<b>Low alarm alarm type</b> (abundance or deficiency) – as per zone 1 description.		
	<b>Low Alarm</b> high threshold – concentration of any sensor in the zone must exceed this value for at least the the Low Alarm delay to ON period to activate the Low Alarm.		
	<b>Low Alarm</b> low threshold – concentration of all sensors in the zone must fall below this value for at least the Low Alarm delay to OFF period to de-activate the Low Alarm		
<b>High alarm alarm type</b> (abundance or deficiency) – as per zone 1 description.			

ZONE 7	<b>High Alarm</b> high threshold. As per Low Alarm thresholds description		
	<b>High Alarm</b> low threshold. As per Low Alarm thresholds description.		
	<b>High High Alarm</b> high threshold. As per Low Alarm thresholds description		
	<b>High High Alarm</b> low threshold. As per Low Alarm thresholds description		
	<b>SPAN:</b> This is used on the optional Auxillary Board. There are up to 2 per board to reflect the maximum gas concentration in the zone. The full Scale concentration in ppm.		
ZONE 8	<b>Sensor Range</b> (sensor numbers in zone must be contiguous).		
	<b>Gas Code</b> eg. 0=CO		
	<b>Low alarm alarm type</b> (abundance or deficiency) – as per zone 1 description.		
	<b>Low Alarm</b> high threshold – concentration of any sensor in the zone must exceed this value for at least the the Low Alarm delay to ON period to activate the Low Alarm.		
	<b>Low Alarm</b> low threshold – concentration of all sensors in the zone must fall below this value for at least the Low Alarm delay to OFF period to de-activate the Low Alarm		
	<b>High alarm alarm type</b> (abundance or deficiency) – as per zone 1 description.		
	<b>High Alarm</b> high threshold. As per Low Alarm thresholds description		
	<b>High Alarm</b> low threshold. As per Low Alarm thresholds description.		
	<b>High High Alarm</b> high threshold. As per Low Alarm thresholds description		
	<b>High High Alarm</b> low threshold. As per Low Alarm thresholds description		
	<b>SPAN:</b> This is used on the optional Auxillary Board. There are up to 2 per board to reflect the maximum gas concentration in the zone. The full Scale concentration in ppm.		
BUZZER ON TIME DELAY	<b>HI/ HI Alarm</b> Time Delay for Buzzer in minutes		
TIME DELAY NOTES	Time delay set to 0 at factory. To be set at proper values at START_UP.		
RELAY DELAYS	Each relay has independent Delay to ON and Delay to OFF values set in minutes. See the Relay Mapping settings sheet on the next page for details.		

Relay Mapping (Circles specifies the factory setting of "YES" as per job specification)

- Relay Mapping is set in #3 of Control Menu;
- Time Delay is set in #2 of Control Menu;
- Internal relays (Relays 1-4) are typically not installed unless specifically ordered. The corresponding LEDs on the front panel of the IG2000 Scanner are, however, always installed. If internal relays are not ordered then the map below is set so these LEDs indicate common Sensor Fault (R1), Low alarm (R2), High alarm (R3) and High-High alarm (R4).

Relay		Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Time Delay on (min)	Time Delay off (min)
INT R1 set for Fault YES / NO	R1	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R2	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R3	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R4	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
AUX1	R1	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R2	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R3	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R4	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R5	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R6	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R7	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R8	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
AUX2	R1	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R2	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R3	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R4	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R5	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R6	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R7	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		
	R8	NNN	NNN	NNN	NNN	NNN	NNN	NNN	NNN		



NOTE:  
 1) ENCLOSURE IS NEMA 4X, FIBERGLASS  
 2) ENCLOSURE DIMENSIONS ARE 14.5" X 12" X 7.5" DEEP

REV	DATE	DESCRIPTION	CHK'D/APPT'D

		<b>PROJECT:</b> ARJAY ENGINEERING LIMITED	
Dwg. No. V.H. 100305	Date 10/03/05	Title IG 2000 GAS MONITOR SYSTEM OVERVIEW	Date Iss. 20050130
Drawn V.H.	Checked [Signature]	Approved [Signature]	Scale N.T.S.
Ref. Dwg. [Blank]	Ref. Dwg. [Blank]	Scale N.T.S.	Rev. 1
Date [Blank]	Date [Blank]	Date [Blank]	Date [Blank]