EC-Gold Dual
Gas Concentration Transmitter
User Manual

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A Product of Arjay Engineering Ltd.
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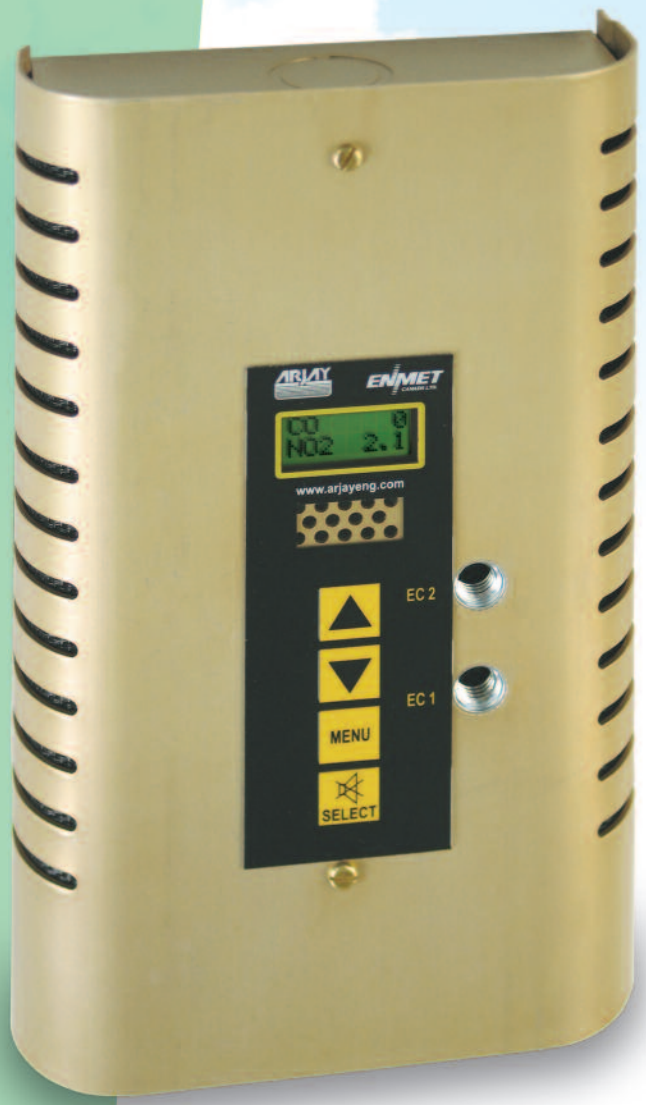
www.EnmetGasDetection.com

EC-Gold Dual

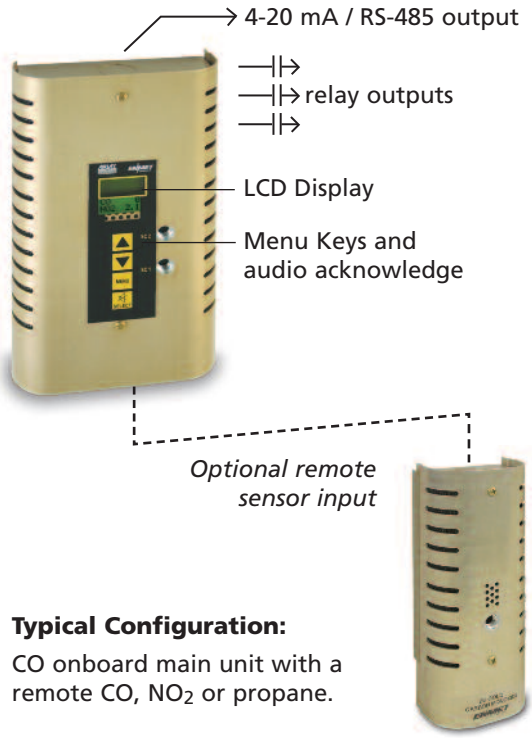
Multi-Sensor Gas Detector



Stand alone gas monitoring for commercial and light industrial applications

The EC-Gold Dual is ideal for any size facility where one or multiple gases need to be monitored. More than 30 years of gas detection experience has contributed to this highly functional detector.

- one or two onboard sensors (ie. CO and NO_2)
- two optional remote sensors (ie. toxic, combustible, or any analog device)
- LCD display, buzzer, 3 relays, RS-485 communication, 4-20 mA output and a keypad interface are standard
- ideal for maintenance garages, fire and ambulance stations, service, storage and repair bays, chiller rooms, factories and laboratories



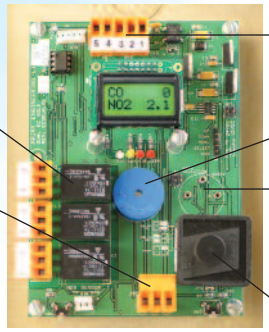
Typical Configuration:

CO onboard main unit with a remote CO, NO_2 or propane.

EC-GOLD DUAL

The EC-Gold Dual offers complete flexibility in meeting your gas detection needs. The standard unit includes 3 relays. They are factory set to High, Low and fault and activated by all of the sensors. The standard 4-20 mA output can be designated to one sensor or scan all sensor inputs simultaneously to represent the highest concentration. The RS-485 Modbus communication is always available.

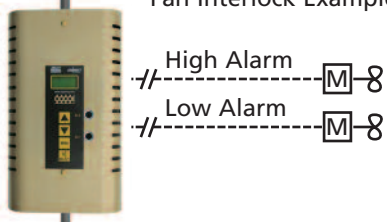
The Full Feature package includes a LCD display of the gas concentration, a buzzer with silence, and a keypad interface for user set-up and calibration.



Plug-in connectors and easy access sensors for fast maintenance.

Optional Power Transformer

Fan Interlock Example



Available with remote sensor capability

Features and Benefits

- analog and relay outputs for control interface
- metal sensor guard
- top, bottom and rear conduit entry
- 3 year sensor guarantee (CO sensor)
- on-board diagnostics
- up to four sensor inputs
- remote sensor input capability
- LCD display of concentration
- LED Alarm Status indication
- Buzzer with silence
- Keypad/menu driven set-up
- Single analog output representing highest sensor concentration for easy fan speed control or logging
- Push to Test button to confirm interlocks

Technical Specifications - Control Unit

Operating Temperature	-20˚C to 40˚C, indoor use
Approvals to	CSA, UL
Enclosure	Nema/Type 1 (IP40)
Mounting	Surface mount
Power Input	24 vac or 24 vdc, 0.2 amp (.325 with MOS)
Relays	3xSPDT, 10 amp @ 240 vac
Analog Output	4-20 mA, 700 ohms (24 vdc units only)
Communication	RS-485 Modbus

Typical Gases

CO	carbon monoxide 0-500 ppm (factory shipped 0-200 ppm)
NO_2	nitrogen dioxide 0-20 ppm
NH_3	ammonia 0-100 ppm
H_2S	hydrogen sulphide 0-100 ppm (factory shipped 0-10 ppm
Cl_2	chlorine 0-10 ppm
O_2	oxygen 0-30%
combustibles	
refrigerants	

ARJAY ENGINEERING

ISO 9001:2008 Quality Management Systems Système de Qualité www.ca.sgs.com

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TABLE OF CONTENTS

1.0 INSTRUMENT OVERVIEW

1.1 Features

- Gas monitor for a large variety of gas types.
- Can monitor up to 4 different sensor inputs at one time
  - Port 1: on board CO (Carbon Monoxide) Electrochemical
  - Port 2: on board electrochemical for NO2 (Nitrogen Dioxide), CL2 (Chlorine), H2S (Hydrogen Sulfide), NH3 (Ammonia) and others.
  - Port 3: integral or remote MOS broad range toxic and combustibles
  - Port 4: remote 4-20 mA input transmitters
- Carbon Monoxide sensor has expected life of 5 years min. (3 year guarantee)
- Other sensors have expected life of 2 years (1 year guarantee)
- Output may be user selectable for analog (4-20mA / 2-10V) or Arjay's Discrete Voltage Output (DVO).
- Convenient pushbutton calibration.
- User selectable for Single or Dual Point calibration
- High/High, High, Low, and optional System Fault Indication in place of High/High alarm
- User selectable High and Low Alarm levels
- Modbus protocol via RS-485 for access by Arjay/Enmet Central Access Panel or compatible system
- Can be used as a stand alone gas detector or can be used with other EC-Gold sensors for interfacing with an Arjay Central control panel or customer system
- User specified custom features might be added by contacting Arjay Engineering Ltd.

1.2 Description

The EC-Gold Dual can be used a Stand Alone gas detector with relays and outputs available to communicate with remote devices such as alarms, fans and building automation systems.

The standard model provides 3 relays, a 4-20 mA output and an RS-485 interface. The full feature model provides the addition of an LCD display of concentration, buzzer with silence, and keypad interface.

The 4-20 mA output will represent the peak value determined from all sensor inputs based on the percentage concentration of their range. For example, assume the detector has a CO sensor calibrated for 0-200 ppm and an NO2 sensor with a calibrated range of 0-20 ppm. If the CO sensor reads a 20ppm and the NO2 sensor reads 10ppm, the 4-20 mA output will be 12 mA. This will represent that the NO2 is at 50% of its range while the CO is only at 10% of its range. An analog output cannot be averaged among sensors. This would provide outputs not representative of actual conditions and could result in unsafe conditions.

The relays are common to all sensors and are set to ppm or % LEL values specific and proper for each sensor type.

The LCD display will provide a real time reading of the ppm or % LEL concentrations of all sensors.

The EC-Gold Dual can be used with multiple sensors connected to any Arjay/Enmet Control panel. The following are examples of typical methods of installing the EC-Gold Dual.

Figure 1.0: The EC-Gold Dual can be a Stand Alone detector to interface with fans or alarms using the relays or analog outputs.

Figure 1.1: EC-Gold Dual can be combined with other EC-Gold Dual or EC-Gold sensors to the ISA 66 RLU panel using the cost effective Arjay/Enment DVO signal. Ideal for multi-zone installations where a central control panel is desirable.

Figure 1.2: EC-Gold Dual can be combined with other EC-Gold Dual or EC-Gold sensors to the ISA Gas Alert Max panel using the cost effective Arjay/Enmet DVO signal. Ideal for single or multi-zone installations where a control panel is desirable at each fan location or in central location.

Figure 1.3: EC-Gold Dual can be combined with other EC-Gold Dual or EC-Gold sensors to the PG-2000 panel using the RS-485 communication to address each sensor. Ideal for applications that require more complex zone control or analog outputs for VFD fan control.

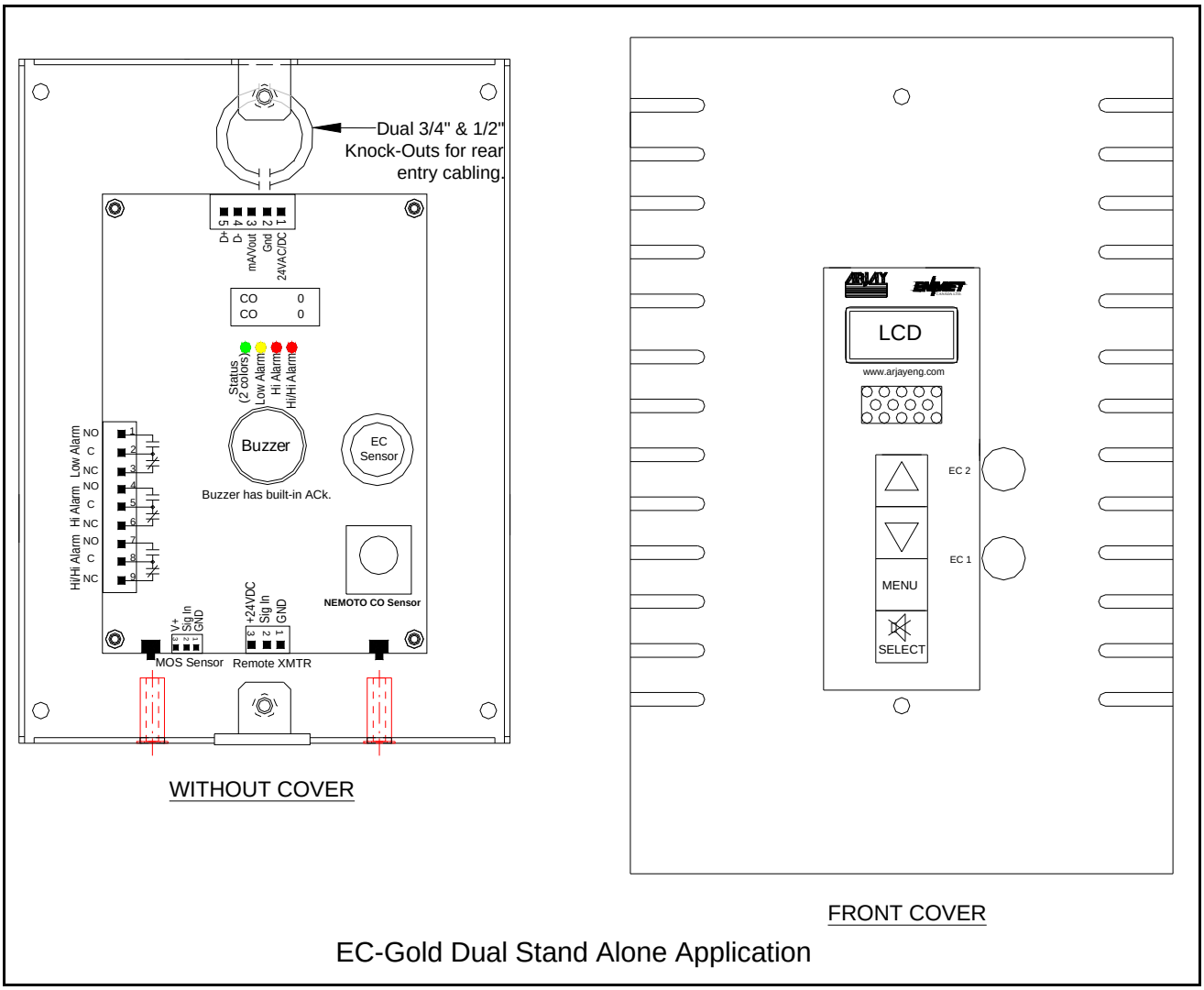


Figure 1.0

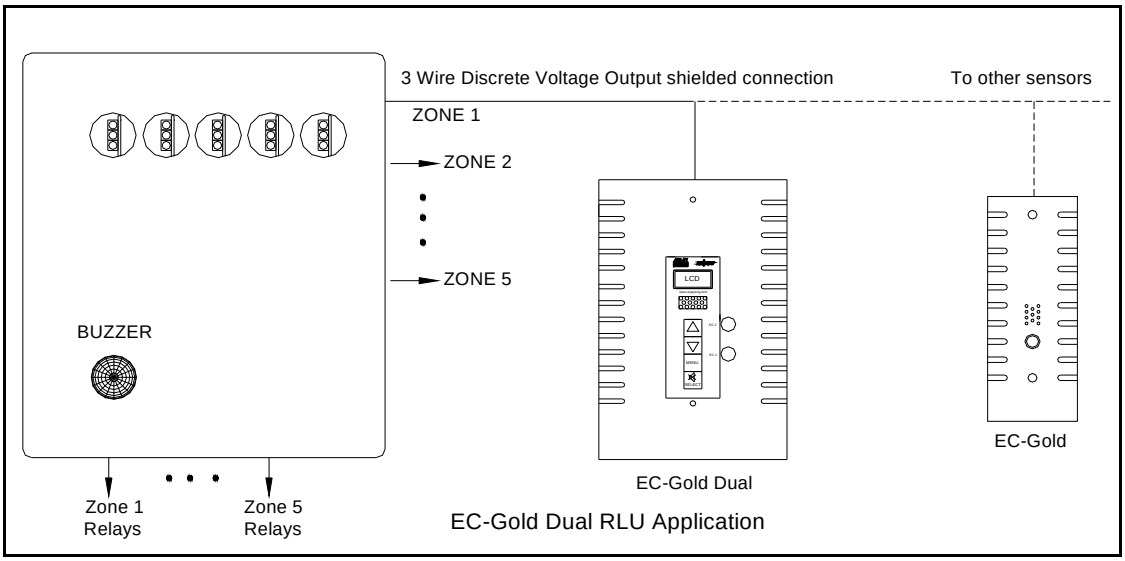


Figure 1.1

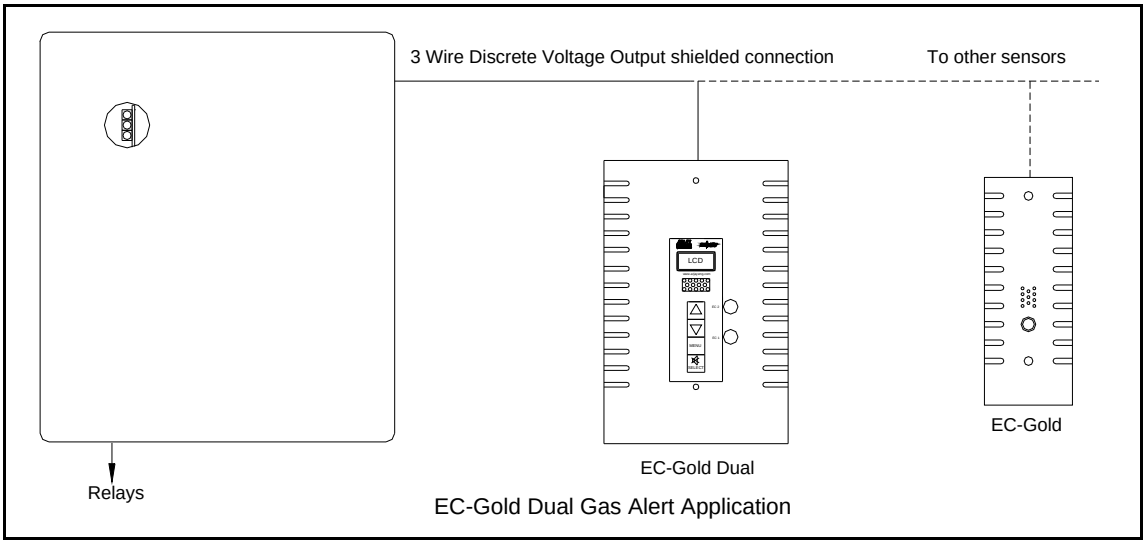


Figure 1.2

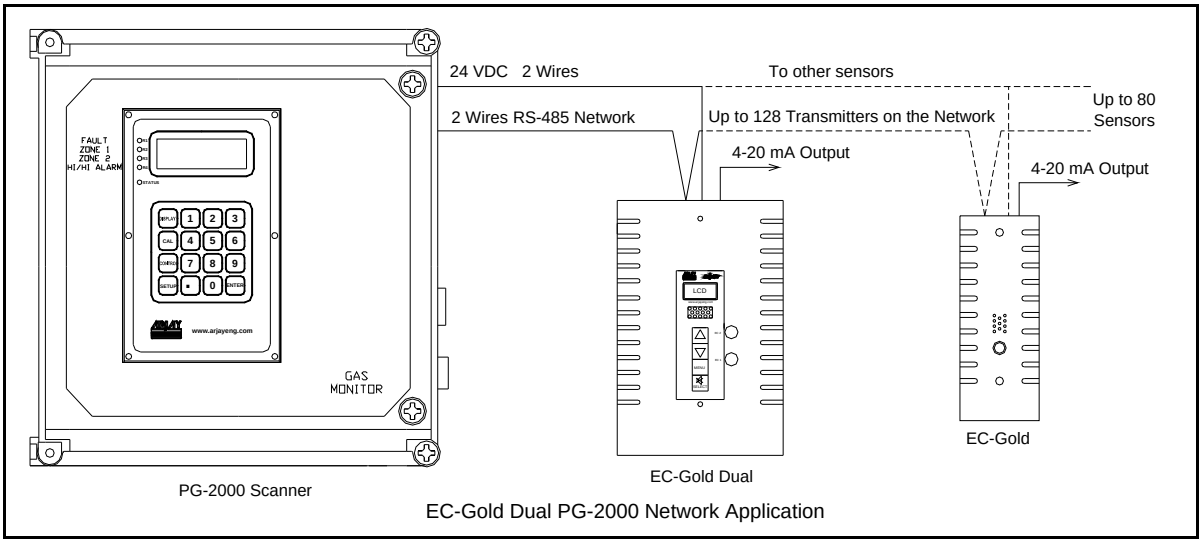


Figure 1.3

1.3 Specifications

OPERATION

The EC-Gold Dual is a multi-sensor gas detector. A variety of gases may be sensed when fitted with the appropriate sensors.

PUSH-TEST FEATURE On demand using the Push to Test pushbutton.

LCD DISPLAY/KEYPAD 2 x 8 LCD display showing ppm concentrations and calibration menus

USER INTERFACE

Calibration and setup	Keypad, LCD, pushbutton, and LED status lights.
Push-Test	Pushbutton.
Network	RS-485 modbus protocol. Used either with the ARJAY/ENMET CAP unit or via third party, modbus compatible systems.

INPUTS

Port 1 (EC1):	on board CO (Carbon Monoxide) Electrochemical
Port 2 (EC2):	on board electrochemical for NO2 (Nitrogen Dioxide), CL2 (Chlorine), H2S (Hydrogen Sulfide), NH3 (Ammonia) and others.
Port 3:	integral or remote MOS broad range toxic/combustibles and catalytic combustibles
Port 4:	remote 4-20 mA input transmitters

OUTPUTS

mA output	When configured for Analog output: 4-20mA into 700 ohms max.
DC Voltage output	When configured for Voltage output: 2-10V proportional to calibrated range.
mA / Voltage output	0.1% resolution – non-isolated.
RLU DV output	When configured for RLU Discrete Voltage Output mode: 0V = No Alarm, 1.8V = Low Alarm, 2.8V = High Alarm, 10V = Sensor Fault. (Sensor Fault only detected with CO sensor).
Alarms	3 alarms (High/High, High, Low) and Optional System Fault May be factory selected
Alarm Indication	High (Red), Low (Yellow), and a 2 color LED for Sensor Fault (Red) and No Alarms (Green). The 2 color LED is also used to flash calibration errors (Red for ~2 seconds after an unsuccessful calibration).

PERFORMANCE Accuracy ±2% of Full Scale Range (the accuracy is limited by the sensors – the electronic accuracy is better than 1%.

POWER

12VDC - 24VDC @ 200mA max OR 24VAC INPUT (See JP1 Jumper in Fig 2.1)
Requires extra current if wiring external transmitter

MECHANICAL SPECIFICATIONS

Enclosure	Nema 1 wall mount
Dimensions	9.61” [244mm] H x 6.25” [159mm] W x 2” [50mm] D
Weight	0.3 kg

ENVIRONMENTAL SPECIFICATIONS

Operating Temp.	-20°C to +55°C
Relative Humidity	90% max. with no condensation.

2.0 INSTALLATION

2.1 Mechanical Installation

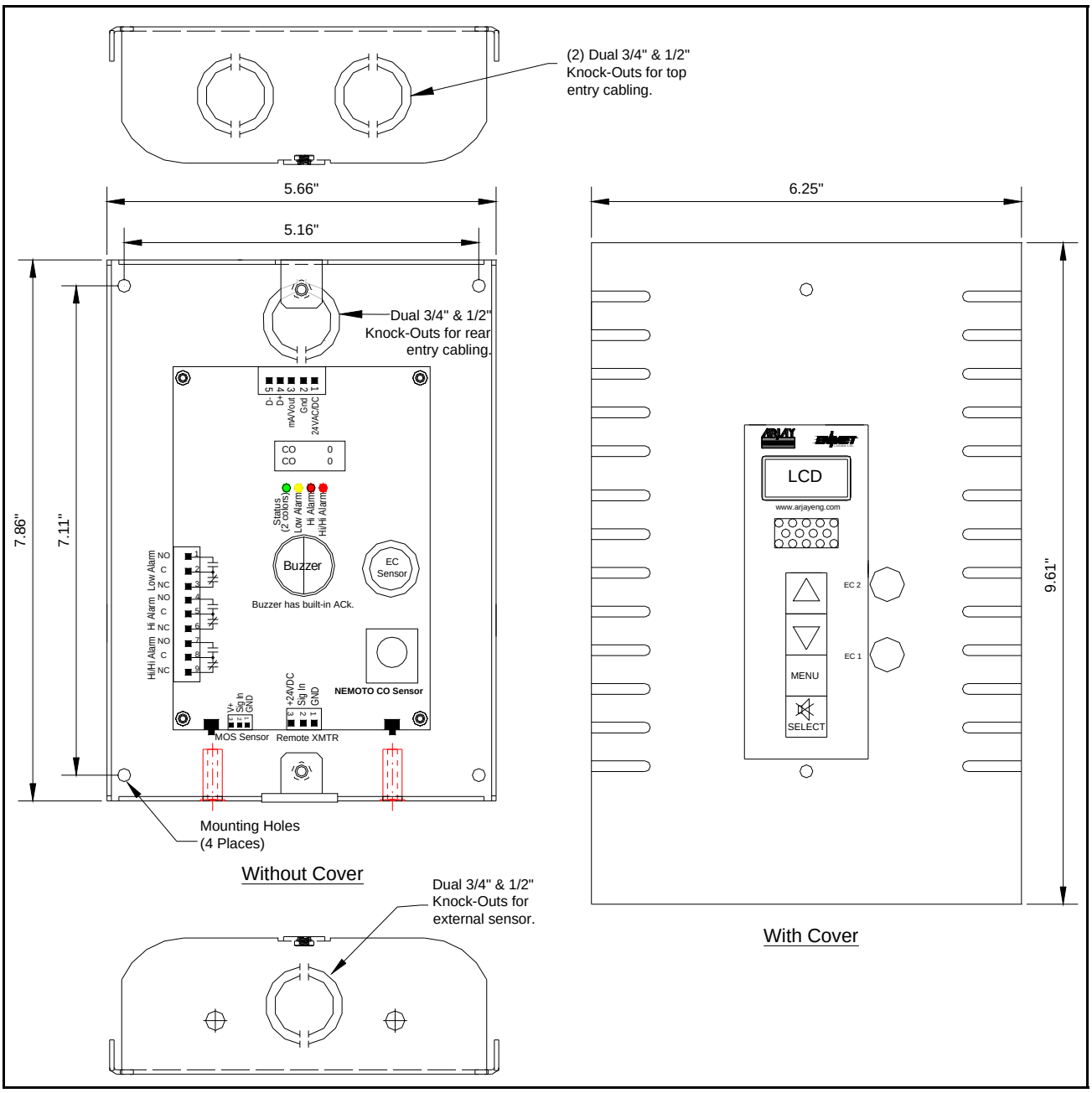


Figure 2.0

Locate the EC-Gold Dual on a vertical surface away from drafts, open doors or windows, condensation or dripping moisture.

The vertical placement (above the floor) depends on the gas being monitored. For CO, the unit should be located within the breathing zone: about 4 - 5 feet above the finished floor*. For other gases, refer to an Arjay Engineering representative.

* Check local building codes (i.e. Ontario Building code requires mounting 2'11" to 3'11").

2.2 Electrical Installation

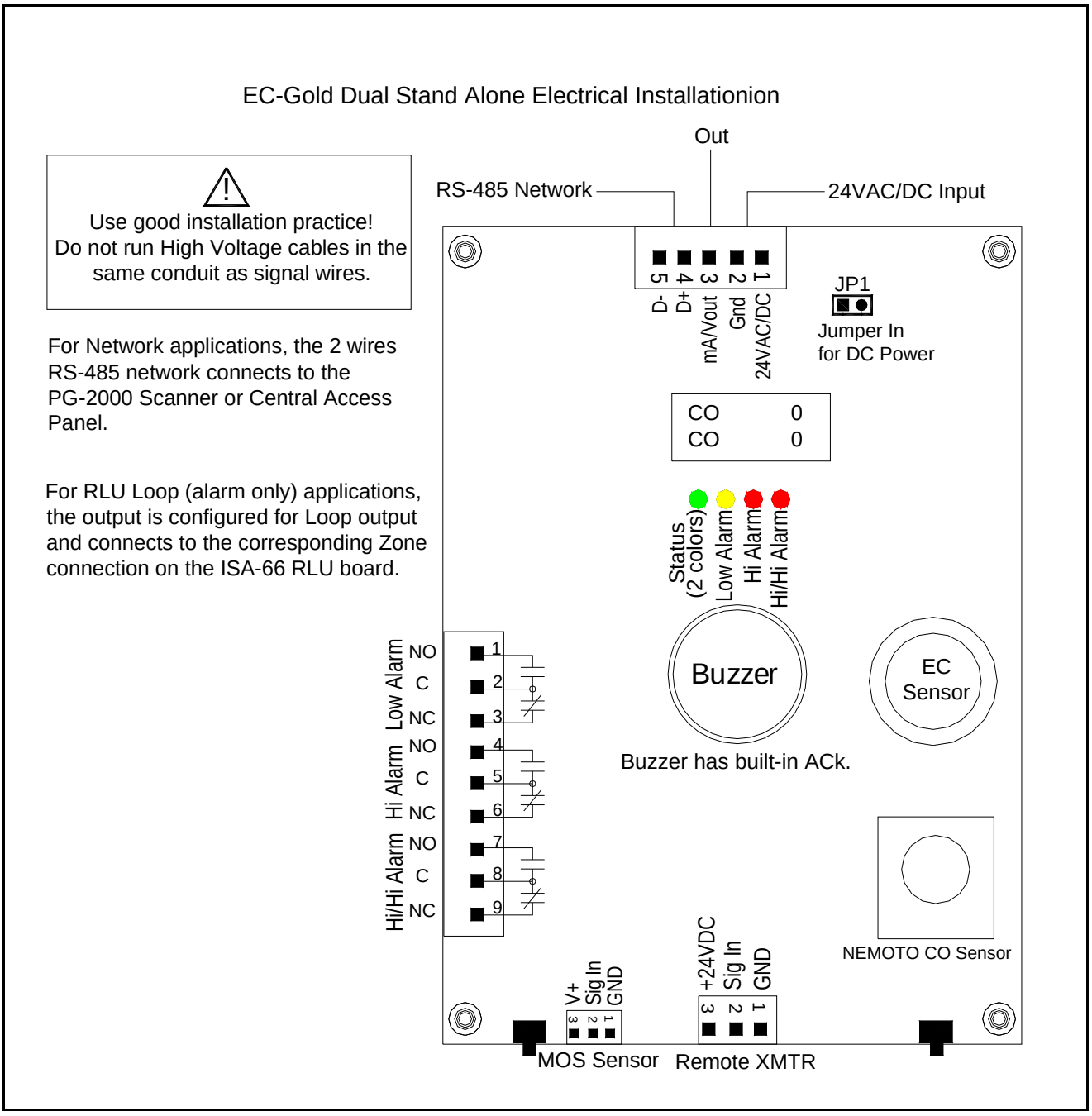
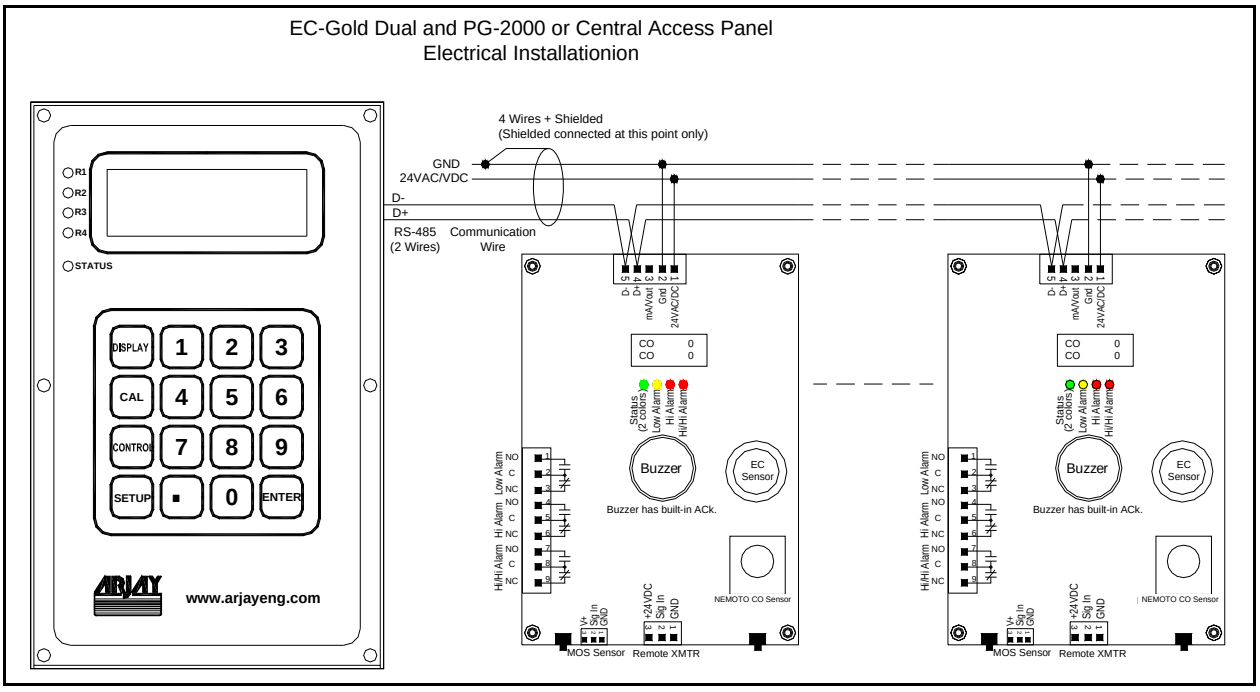


Figure 2.1



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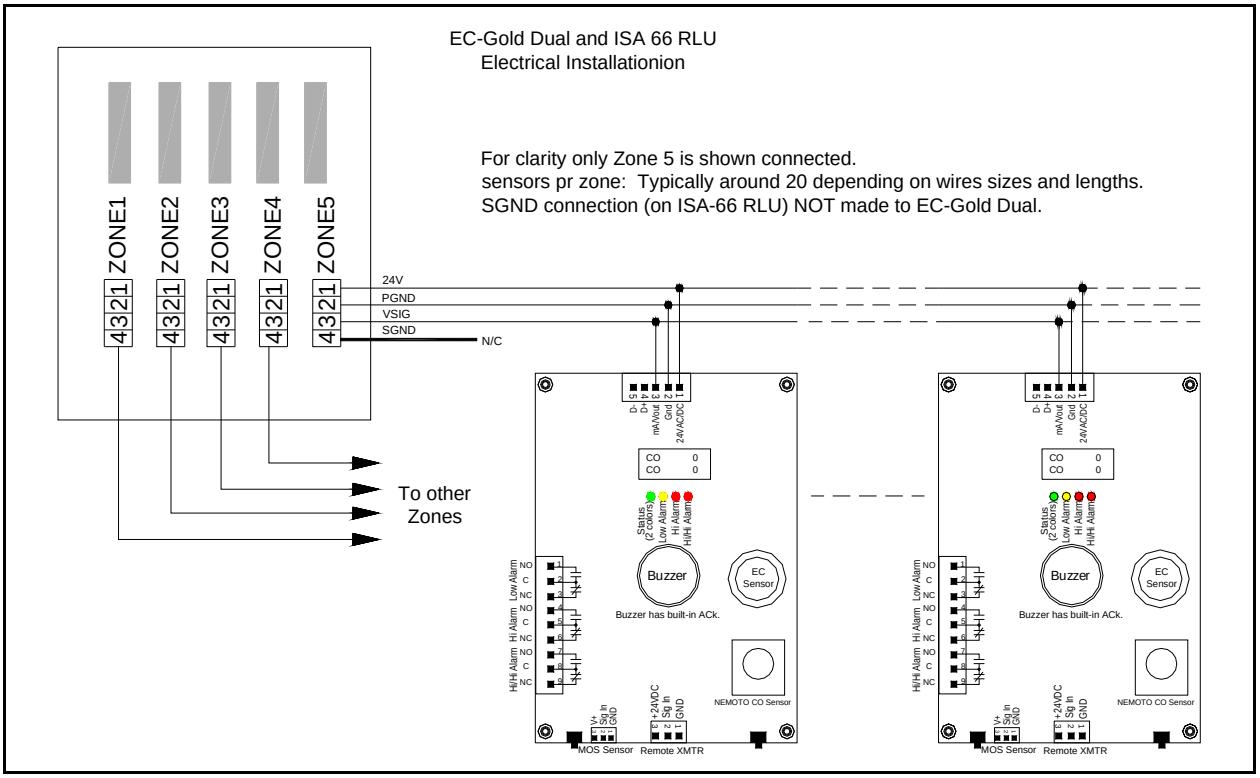


Figure 2.3

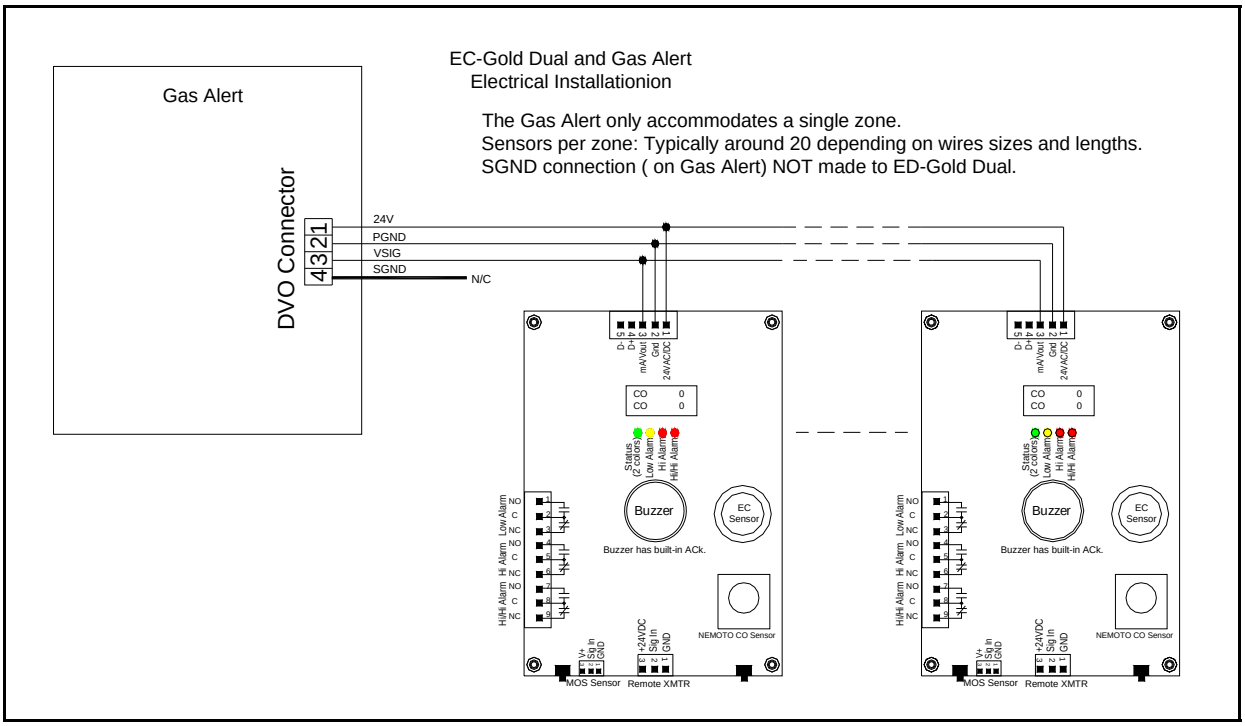


Figure 2.4

All user connections are via mating plug/receptacle connectors to make installation and service easier.

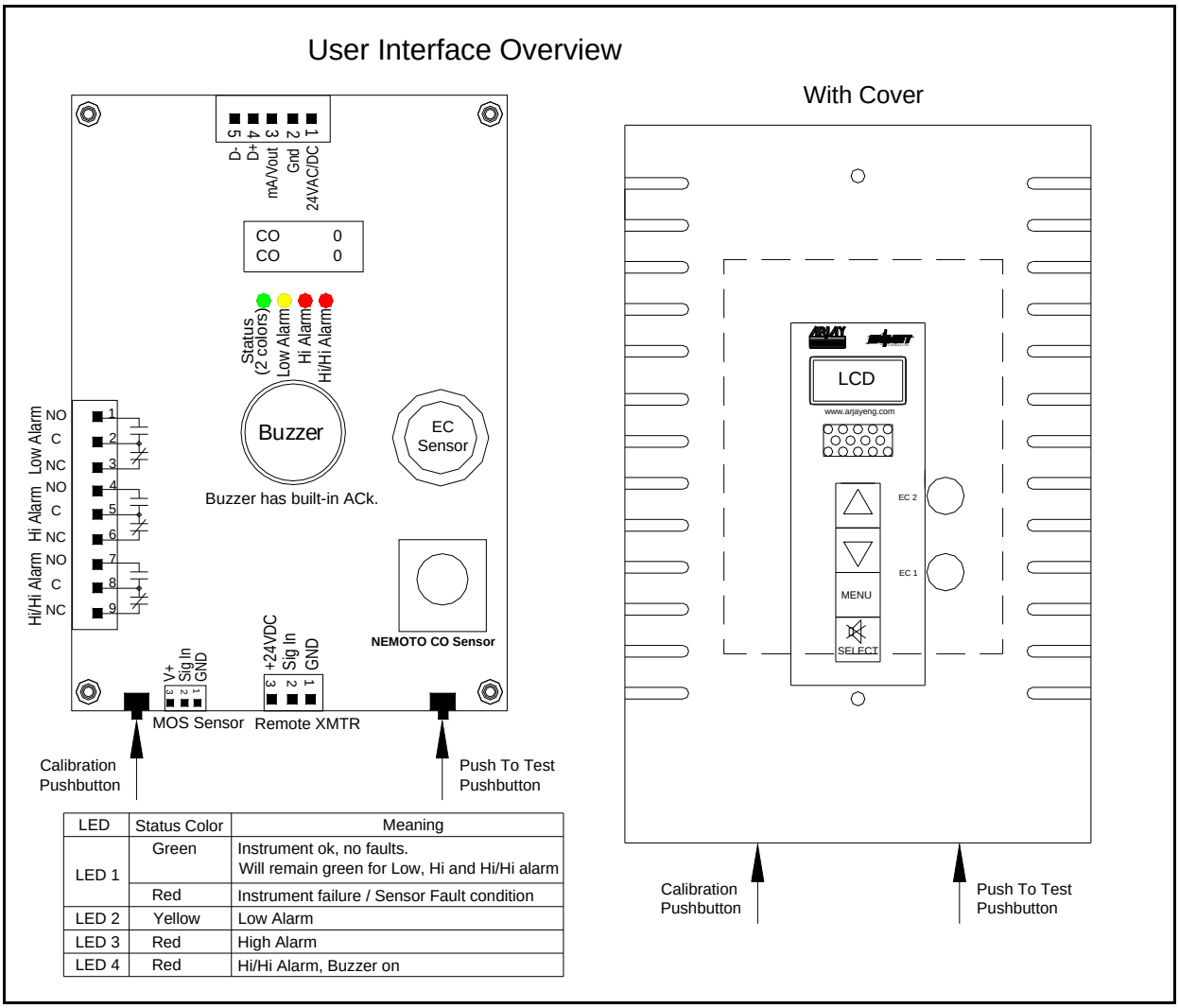
CAUTION:

THE UNIT HOUSES SENSITIVE ELECTRONIC COMPONENTS AND SHOULD BE HANDLED WITH CARE. IF PUNCHING OR DRILLING THROUGH THE ENCLOSURE WALLS IS NECESSARY MAKE SURE THAT THE INTERNAL ELECTRONIC MODULES ARE SHIELDED FROM DEBRIS ESPECIALLY METAL PARTICLES.

PLEASE MAKE SURE THAT THE CONNECTIONS HAVE THE POLARITY AS INDICATED OR THE CONTROLLER MAY BE DAMAGED.

USE GOOD INSTALLATION PRACTICE! DO NOT RUN HIGH VOLTAGE CABLE IN THE SAME CONDUIT AS SIGNAL WIRES.

3.0 STARTUP AND CONFIGURATION



LED	Status Color	Meaning
LED 1	Green	Instrument ok, no faults. Will remain green for Low, Hi and Hi/Hi alarm
	Red	Instrument failure / Sensor Fault condition
LED 2	Yellow	Low Alarm
LED 3	Red	High Alarm
LED 4	Red	Hi/Hi Alarm, Buzzer on

Figure 3.0

3.1 Notes On The User Interface

The EC-Gold Dual can monitor up to 4 different Sensor inputs at one time.

Port 1: on board CO (carbon monoxide) sensor
Port 2: on board electrochemical sensor
Port 3: remote MOS sensor
Port 4: remote 4-20 mA Input Transmitter

The standard model provides 3 relays, a 4-20mA output and an RS-485 interface. The full feature model provides the addition of an LCD display of concentration, buzzer with silence and keypad interface.

The EC-Gold Dual may be configured and calibrated using the following methods:

1. Using the calibration pushbutton (basic model without keypad). The pushbutton is accessible without removing the front cover.

2. Using the keypad and display (full feature model). The user follows the menus on the display.
3. Using Arjay's optional 2000-CAL hand held calibrator. The calibrator communicates with the EC-Gold Dual via the RS-485 connection using the modbus protocol. The calibrator's LCD and keypad offer a more convenient method of setting up and calibrating the EC-Gold Dual unit.

3.2 Startup

Power up the unit. The status LED should be green. The High and Low alarm LED's should go off in less than a minute.

The unit is normally pre-configured and calibrated at the factory so field setup is not required on startup.

To re-calibrate, see section 4.0 Calibration.

To re-enter or modify settings, follow the procedures described below. Only the full feature model interface procedure is described here.

3.3 Menu Configuration

After powering up the unit and under normal operating conditions, the LCD displays the Normal Operating Menu. See the next page for detail Menu configuration>

The Default Password: 2000

Alrm Del – Alarm and Buzzer Delay (Setup Alarm Delay On and Off Time in seconds; setup Buzzer Delay On time in seconds)

K1 – Relay 1 Alarm Delay On/Off time

K2 – Relay 2 Alarm Delay On/Off time

K3 – Relay 3 Alarm Delay On/Off time

Buzzer – Delay On time

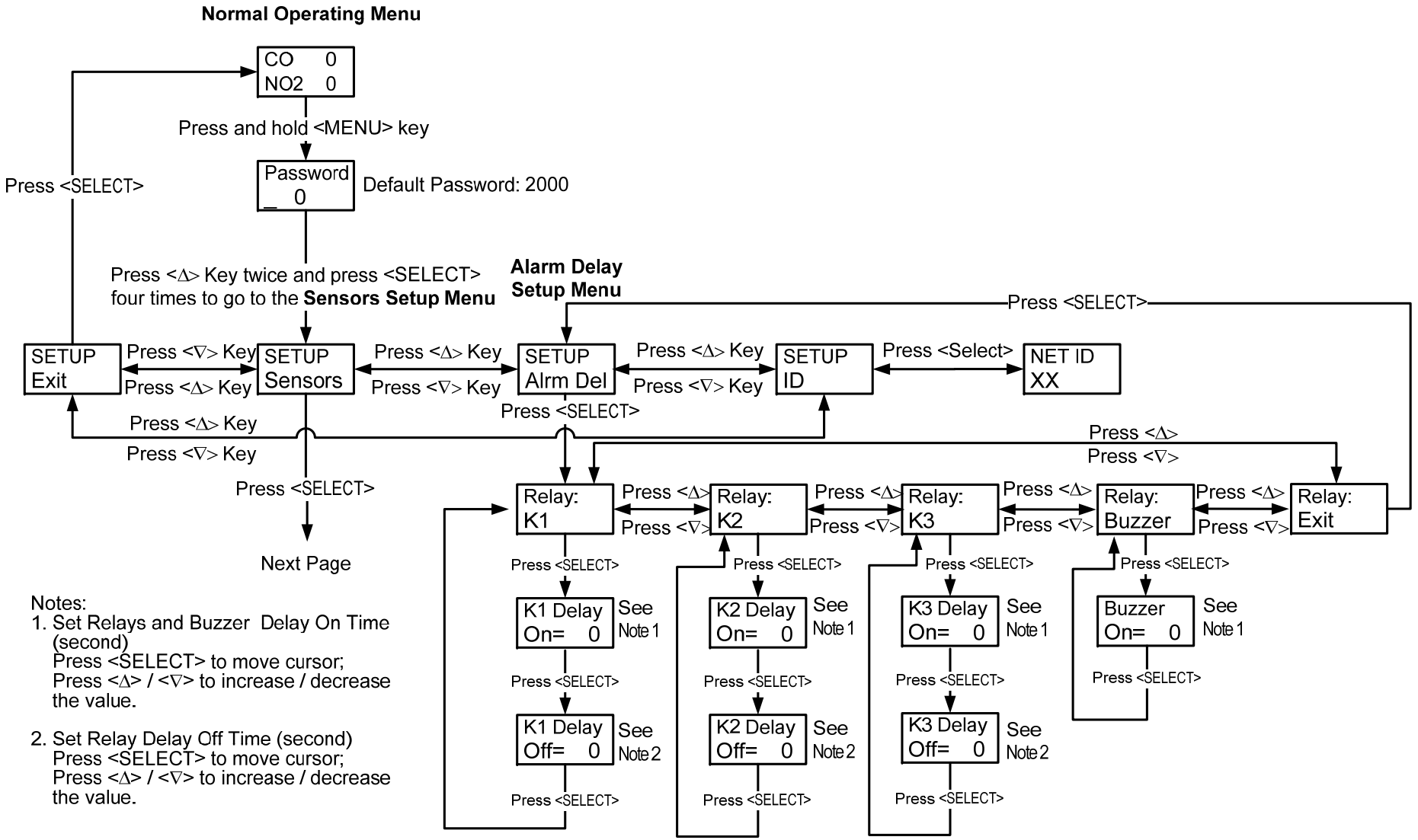
Sel Snsr – Select Sensor

A1 – Relay 1 Alarm Setting Value (normally, Low alarm value)

A2 – Relay 2 Alarm Setting Value (normally, High alarm value)

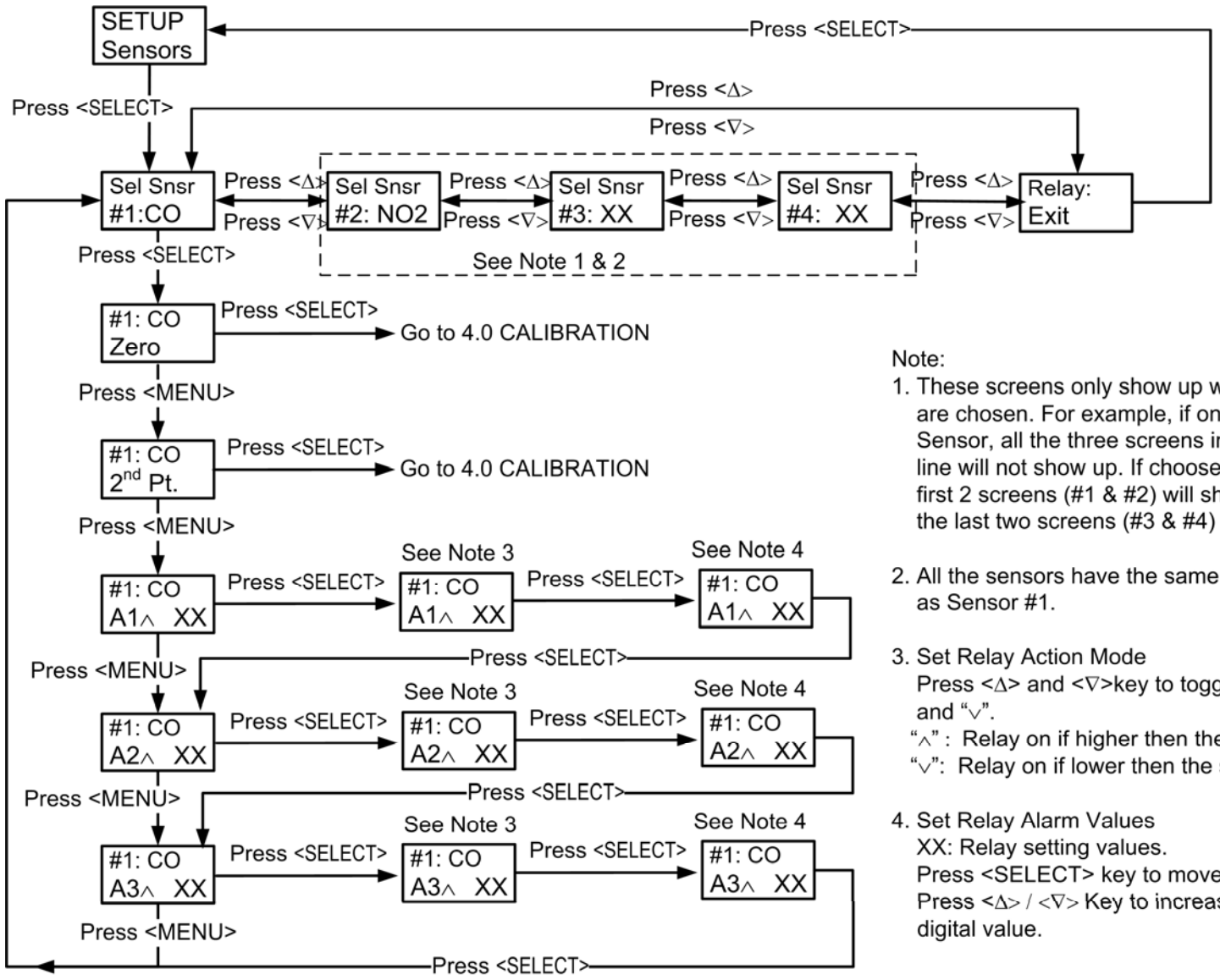
A3 – Relay 3 Alarm Setting Value (normally, Hi/Hi alarm value)

3.3.1 Normal Operating Menu Flow Chart



3.3.2 Sensors Setup Menu Flow Chart

Sensors Setup Menu



Note:

1. These screens only show up when sensors are chosen. For example, if only choose one Sensor, all the three screens inside the dot line will not show up. If choose 2 sensors, the first 2 screens (#1 & #2) will show up and the the last two screens (#3 & #4) will not show up.

2. All the sensors have the same menu flow chart as Sensor #1.

3. Set Relay Action Mode
   Press <Δ> and <∇>key to toggle between "∧" and "∨".
   "∧" : Relay on if higher then the setting value.
   "∨": Relay on if lower then the setting value.

4. Set Relay Alarm Values
   XX: Relay setting values.
   Press <SELECT> key to move the cursor.
   Press <Δ> / <∇> Key to increase / decrease the digital value.

4.0 CALIBRATION

4.1 Calibration Notes

The instrument was calibrated and tested prior to leaving the factory. Therefore, it is possible to use the instrument directly out of the box. Under normal conditions, recalibration is recommended once every 6 months. For a two point calibration, the first point is typically Zero (clear air); the second point (also called span) is a determined gas concentration value.

If the preset EC-Gold Dual calibration span value is known and you have the same calibration gas concentration, the entire calibration procedure can be completed without removing the front cover.

4.2 Calibration Procedures (Full Feature Mode with LCD / KEYPAD)

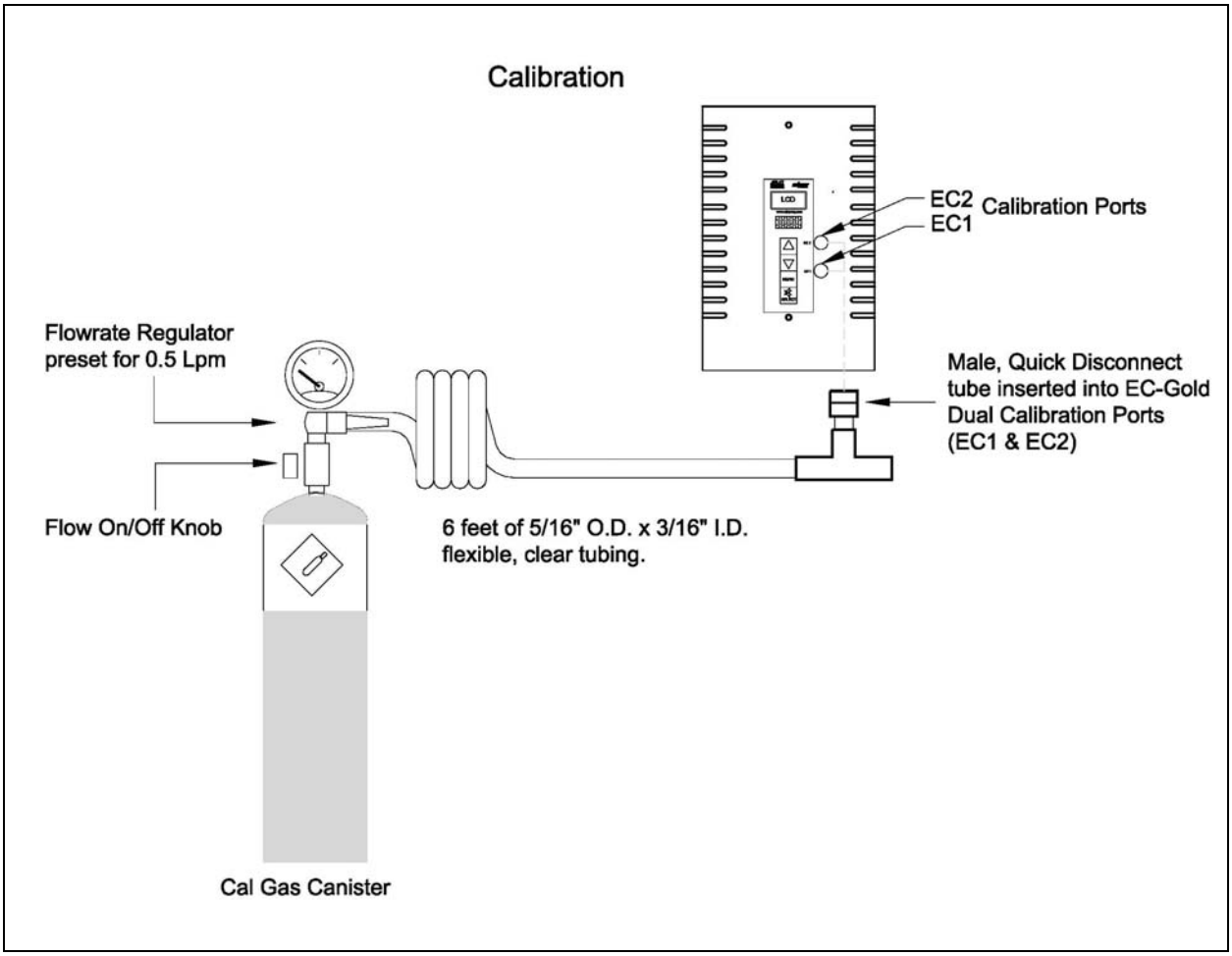


Figure 4.0

1. Under normal operating conditions, the LCD displays the following (depending on sensors order):

CO	0
NO2	0

2. Follow the Manu Flow Chart, until the following screen display:

#1: CO
Zero

3. Zero Calibration only needs to be done when installing a new sensor. Press <MENU> key to bypass Zero Calibration, and go to step 6 to start second point calibration. If a Zero Calibration is required, follow the steps 4-5.
4. Press <SELECT> key, the LCD display:

Z	xx
mv	xx

5. Make sure the ambient air around the sensor is clean ie. it has no traces of the gas being monitored. In applications where the ambient air is not guaranteed to be clean, use a compressed air calibration canister and apply the air to the sensor hole (EC1). For the Zero point, the mv values should be less then 100 mv. If the mv value is changing within 5 mv for a minimum of 10 seconds, the instrument will automatically accept the Zero calibration. Or press <SELECT> key and finish the first point (Zero) calibration.
6. The LCD now displays the following and the instrument is ready for the second point calibration.

#1: CO
2nd Pt.

7. Press <SELECT> key to start the second point calibration, and the LCD displays the following. Press <SELECT> key to move the cursor and accept the second point calibration. If want to change gas concentration value, press <SELECT> key to move the cursor to proper position and press <MENU> key to increase up to the right value. Press <SELECT> key to accept the gas concentration value.

#1: CO	
S	100

S stands for second point

8. After selecting gas concentration value, the LCD displays the following and the instrument is ready for the second calibration:

S	xxx
mv	xxx

9. Apply the Gas in the sensor hole (EC1). EC1 is for Carbon Monoxide; EC2 is for other types of gas, such as NO2. Start gassing the sensor by opening the valve on the canister. The flow rate is set to 0.5 Lpm (or ~1 SCFH (Standard Cubic Foot per Hour). Wait about 90 seconds. After this, if the mv value is changing within 5 mv for a minimum of 10 seconds, the instrument will automatically accept the second point. Or press <SELECT> key to manually accept the second point. If the calibration was successful, the LCD displays the following. Otherwise, the LCD displays the calibration error message.

#1: CO
Cal OK

10. The “Cal OK” or “Error Message” only displays a couple of seconds, then the LCD displays the following alarm 1 setting value:

#1: CO	
A1 ^	35

11. Press <MENU> key to bypass the Alarm value setting menu, until the following Sensor Selection Menu shows up:

Sel Snsr #1: CO

12. Press <Δ> or <∇> key to select the #2 Sensor or Exit. If choose the #2 Sensor, the LCD displays the following:

Sel Snsr #2: NO2

13. Press <SELECT> Key to the second sensor calibration menu. If the sensor is mA input sensor, then go to step 14

#2 NO2 Zero

The calibration procedure for second sensor is the same as the first sensor except for applying gas to sensor hole (EC2). Follow the steps 3-12, then press <MENU> key to go to the normal working display.

14. If the sensor is mA input sensor, the calibration of the sensor is done at the remote sensor (see Remote Sensor Manual). The mA scale is normally factory set, but may be changed if change needed. Press <SELECT> to change mA settings or press <MENU> key to bypass the calibration and go back to the Sensor Selection Menu.

#2 CO mA Scale

15. Press <SELECT> key to set 4 mA, and the LCD displays the following. Press <SELECT> key to move the cursor and accept the value. Normally, set 4 mA equals 0 ppm. To change the value, press <SELECT> key to move the cursor to proper position and press <MENU> key to increase up to the right value. Press <SELECT> key to accept the setting value.

#2 CO 4= 0

16. Press <SELECT> key to set 20 mA, and the LCD displays the following. Press <SELECT> key to move the cursor and accept the value. 20 mA is normally set for maximum range of remote XMTR. To change the value, press <SELECT> key to move the cursor to proper position and press <MENU> key to increase up to the right value. Press <SELECT> key to accept the setting value.

#2 CO 20= 200

17. Then the display goes to the Alarm setting Menu. Press <MENU> key to bypass the calibration and go back to the Sensor Selection Menu. Repeat Step 12 to Step 16 if calibrate more sensors.

18. Go back to the normal operating Menu by following the Normal Operating Menu Flow Chart

THIS COMPLETES THE CALIBRATION PROCEDURE FOR FULL FEATURE CONTROLLER

4.3 Calibration Procedures (Standard Feature Mode Without LCD / KEYPAD)

4.3.1 CALIBRATION NOTES

The EC-Gold Dual may be calibrated using a Single Point calibration procedure, by using calibration push button.

The Calibration pushbutton may be accessed using a screwdriver or other fine tool – See Figure 4.1 for the location of the access hole.

A full Dual Point calibration is always performed at the factory and involves zeroing the sensor in clean air, then calibrating at a preset gas concentration. The Single Point calibration is typically used in the field since it is more convenient. Also, it does not require clean air as one of the calibration points, since clean air cannot be guaranteed in all installations. **A Single Point calibration assumes the unit has already been zeroed.** This is always true for new units from the factory.

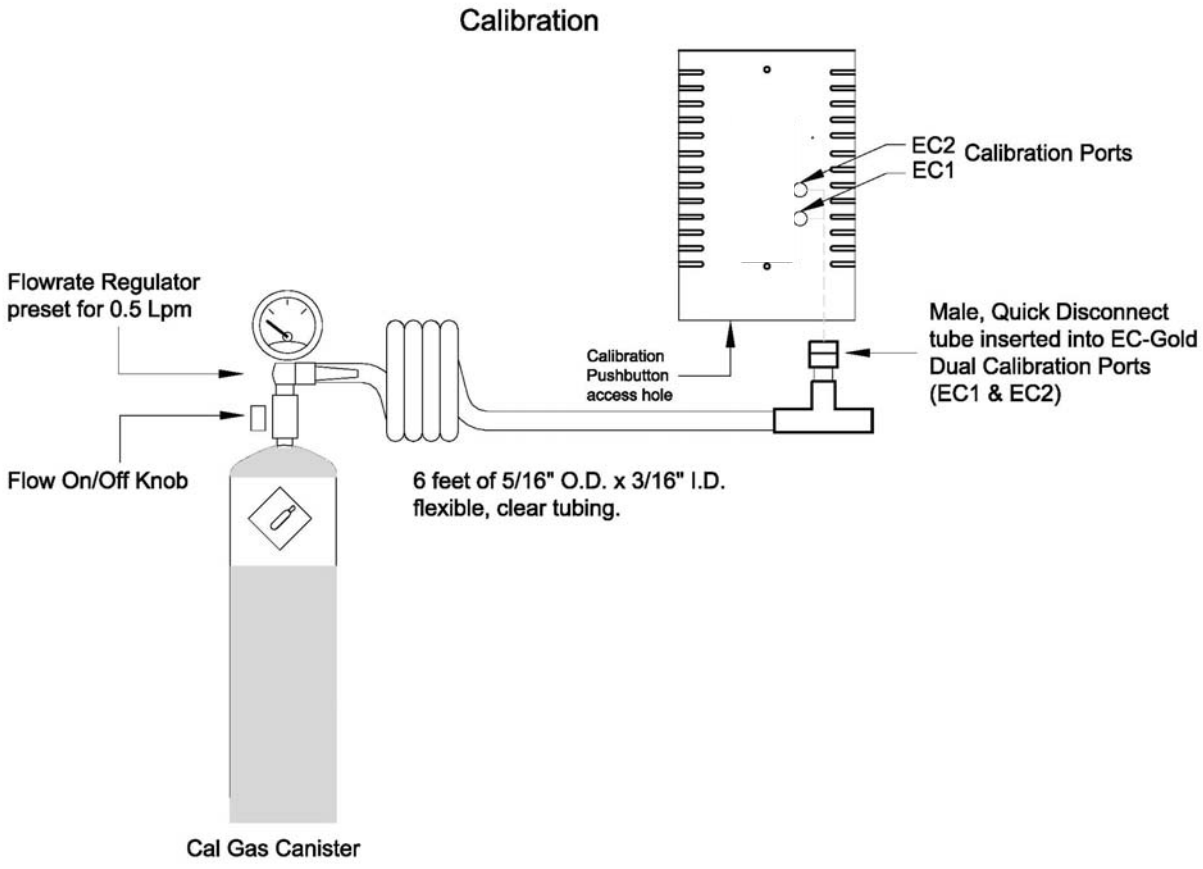


Figure 4.1

4.3.2 SINGLE POINT CALIBRATION

The calibration gas concentration value must be known. The unit comes factory set for Single Point Calibration and 100 ppm CO or 10 ppm NO2. If either setting is in doubt, then see section 7, controller setting sheet.

1. Determine what Calibration gas concentration the EC-Gold Dual is expecting. This value is listed on the packing slip and may be recorded in the back of the user manual in the CONTROLLER SETTINGS sheet for future reference.
2. The gas sensor is mounted directly behind the Calibration Port in the middle of the front plate of the EC-Gold Dual housing [See Fig. 4.1]. Insert the Quick Disconnect tube into the EC-Gold's Dual Calibration Port.
3. Start gassing the sensor by opening the valve on the canister. The flow rate is preset to 0.5 Lpm (or ~1 SCFH (Standard Cubic Foot per Hour). Wait about 90 seconds.
4. Press and hold the calibration pushbutton (via the access hole – see Fig. 4.1) until the Status LED glows orange acknowledging the calibration request. Release the pushbutton.
5. **If the Status LED remains green after the Calibration pushbutton is released, then the Calibration has been successfully completed**. If the calibration was successful, the Status LED remains green. If there was a calibration error such as not enough change for the gas concentration used, then the Status LED shows red for about 2-3 seconds before reverting back to green.

THIS COMPLETES THE CALIBRATION PROCEDURE

FOR STANDARD FEATURE CONTROLLER

5.0 PUSH TO TEST FEATURE

The Push to Test feature allows the customer to verifty if the controller is receiving a LOW, HIGH, HIGH HIGH and Total span alarm signals and that ventilation fans, audio alarms etc are working.

Press the Push to Test pushbutton to activate this feature. See Figure 3.0 for the pushbutton location.

When the button is pressed and released, the Status LED starts blinking green on and off every 2 seconds to indicate a test is underway. This feature forces the sensor to Low alarm plus 1ppm.

Press Button again to force High alarm plus 1ppm. Press Button again to force HIGH HIGH alarm (HIGH HIGH alarm plus 1ppm). Press Button again to force span value alarm. Press Button again to get out of Push to Test feature. If Push to Test feature is left ON, it will time out after 30 minutes.

6.0 EC-GOLD DUAL MODBUS SETTING

The EC-GOLD Dual may be monitored via RS-485 protocol compatible digital communications. Typical features are:

1. Ease of wiring in multiple level point monitoring:

Up to 254 may be connected together in a daisy chain (2 wire communication plus power wiring) connection to an Arjay Remote Access monitor or customer control system which allows viewing data and setup of any of the transmitters on the network. The relay and analog outputs may still be used if necessary.

2. Setup for the EC-Gold Dual for network operation:

Each EC-Gold Dual transmitter must have a unique ID number to connect in a network system.

6.1 Modbus Configuration

Parameter settings: 9600 Baud Rate; Even Parity, 8 Data Bits and 1 Stop Bit.
Wiring connection: RS485 (+) connect to D+; RS485 (-) connect to D-

6.2 Ec-Gold Dual Modbus Register Mapping

REG	DESCRIPTION	TYPE	No. of Reg	Read/write
40001	Serial Number	int	1	R/W
40002	Hardware Rev / Software Rev	byte	1	R/W
40003	Instrument status / Mode byte		1	R/W
40004	mA Output Link / Node Address		1	R/W
40005	Precison Ch2 / Precision Ch1		1	R/W
40006	Precison Ch4 / Precision Ch3		1	R/W
40007	Gas No Ch2 / Gas No Ch1		1	R/W
40008	Gas No Ch4 / Gas No Ch3		1	R/W
40009	Sensor Link Ch2 / Sensor Link Ch1		1	R/W
40010	Sensor Link Ch4 / Sensor Link Ch3		1	R/W
40011	Alarm Mode Ch2 / Alarm Mode Ch1		1	R/W
40012	Alarm Mode Ch4 / Alarm Mode Ch3		1	R/W
40013	Relay 1 Map		1	R/W
40014	Relay 2 Map		1	R/W
40015	Relay 3 Map		1	R/W
40016	Alarm Status bits		1	R/W
40017	Delay On Relay 1	int	1	R/W
40018	Delay On Relay 2		1	R/W
40019	Delay On Relay 3		1	R/W
40020	Delay Off Relay 1		1	R/W
40021	Delay Off Relay 2		1	R/W
40022	Delay Off Relay 3		1	R/W
40023	Slope for Monox Sensor	float	2	R/W
40025	Slope for Electrochemical Cell		2	R/W
40027	Slope for MOS sensor		2	R/W
40029	Slope for 4-20mA input sensor		2	R/W
40031	Offset for Monox Sensor		2	R/W
40033	Offset for Electrochemical Cell		2	R/W
40035	Offset for MOS sensor		2	R/W
40037	Offset for 4-20mA input sensor		2	R/W
40039	Cal1 PV Ch1		2	R/W
40041	Cal1 PV Ch2		2	R/W
40043	Cal1 PV Ch3		2	R/W
40045	Cal1 PV Ch4		2	R/W
40047	Cal2 PV Ch1		2	R/W
40049	Cal2 PV Ch2		2	R/W
40051	Cal2 PV Ch3		2	R/W
40053	Cal2 PV Ch4		2	R/W
40055	Cal1 Raw Ch1		2	R/W
40057	Cal1 Raw Ch2		2	R/W
40059	Cal1 Raw Ch3		2	R/W

40061	Cal1 Raw Ch4		2	R/W
40063	Cal2 Raw Ch1		2	R/W
40065	Cal2 Raw Ch2		2	R/W
40067	Cal2 Raw Ch3		2	R/W
40069	Cal2 Raw Ch4		2	R/W
40071	Output trim slope (Factory use only)		2	R/W
40073	Output trim offset (Factory use only)		2	R/W
40075	High High Alarm value Ch1		2	R/W
40077	High High Alarm value Ch2		2	R/W
40079	High High Alarm value Ch3		2	R/W
40081	High High Alarm value Ch4		2	R/W
40083	High Alarm Ch1		2	R/W
40085	High Alarm Ch2		2	R/W
40087	High Alarm Ch3		2	R/W
40089	High Alarm Ch4		2	R/W
40091	Low Alarm Ch1		2	R/W
40093	Low Alarm Ch2		2	R/W
40095	Low Alarm Ch3		2	R/W
40097	Low Alarm Ch4		2	R/W
40099	mA Span		2	R/W
40101	Output value		2	R/W
40103	mV for Monox Sensor		2	Read only
40105	mV for Electrochemical Sensor		2	Read only
40107	mV for MOS Sensor		2	Read only
40109	mV for 4-20mA Sensor		2	Read only
40111	PV for Monox Sensor		2	Read only
40113	PV for Electrochemical Sensor		2	Read only
40115	PV for MOS Sensor		2	Read only
40117	PV for 4-20mA Sensor		2	Read only
40119	PVMax Ch1	int	1	R/W
40120	PVMax Ch2		1	R/W
40121	PVMax Ch3		1	R/W
40122	PVMax Ch4		1	R/W
40123	Password		1	R/W

7.0 TROUBLESHOOTING

ERROR DESCRIPTION	WHAT TO DO
1. No Output and all lights off	• Check the power to the unit. The voltage should be 24VAC/DC at the power connector with the positive and negative connected as shown on the connector label. • Make sure JP1 is in place for DC voltage • If the Power checks out, call Arjay Service.
2. 4-20mA output does not track the gas concentration.	• Make sure that the EC-Gold Dual output mode is set to Analog mode and not to Discrete Voltage Output mode. See Controller Settings Sheet section for details. • Make sure the maximum range of the remote XMTR is the same as the 2nd calibration point. Ex. 20mA=200ppm CO • Calibration may be required. See the calibration section for details. • Call Arjay/Enmet Service for Help if none of the above fixes the problem.
3. In Discrete Voltage Output mode, the ISA-66RLU or Gas Alert connected to the EC-Gold always shows Sensor Fault	• Make sure that the EC-Gold DUAL output mode is set to Discrete Voltage Output mode and not to Analog.

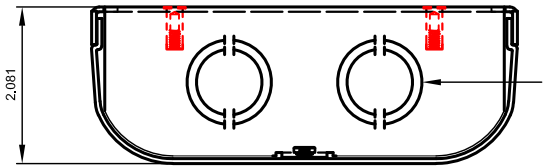
8.0 CONTROLLER SETTINGS SHEET

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 at any time. If changed, please fill in the USER SETTING column for future reference.

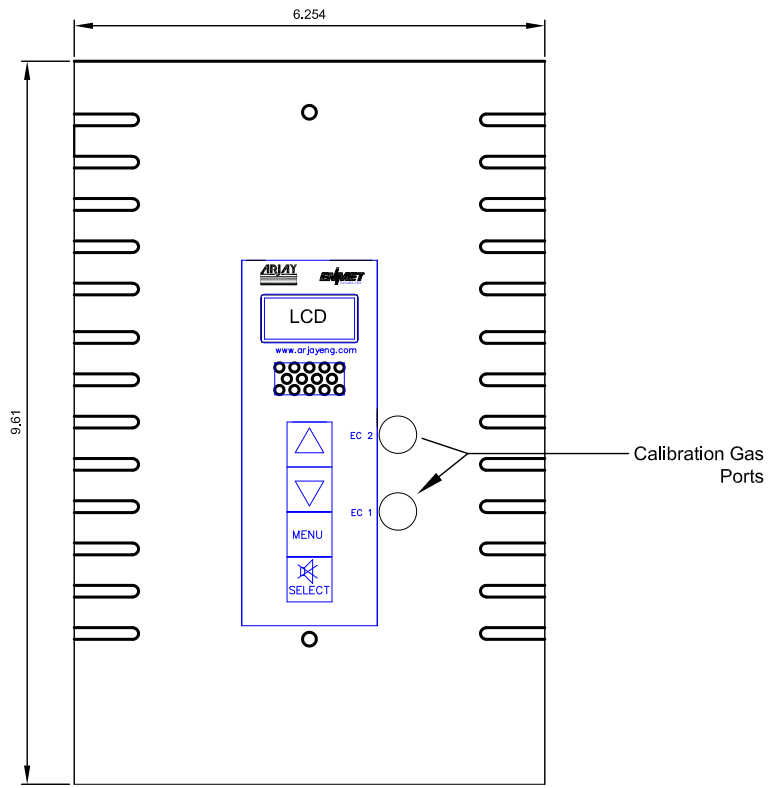
PARAMETER	DESCRIPTION	FACTORY SETTING	USER SETTING
OUTPUT MODE	There are2 main output modes : Analog(4-20 mA) and DVO (discrete Voltage Output)		
BUZZER TYPE	Enable or disable the buzzer		
LOW ALARM DELAY TO ON	The minimum time in seconds a Low Alarm must exist before the corresponding relay and indicator are activated.		
LOW ALARM DELAY TO OFF	The minimum time in seconds the Ec-Gold Dual must be out of Low Alarm before the Low Alarm relay and indicator are de-activated		
HIGH ALARM DELAY TO ON	The minimum time in seconds a High Alarm must exist before the High Alarm relay and indicator are activated.		
HIGH ALARM DELAY TO OFF	The minimum time in seconds the Ec-Gold Dual must be out of High Alarm before the High Alarm relay and indicator are de-activated.		
Hi/Hi ALARM DELAY To ON	The minimum time in seconds a Low Alarm must exist before the corresponding relay and indicator are activated.		
Hi/Hi ALARM DELAY To OFF	The minimum time in seconds the Ec-Gold Dual must be out of Low Alarm before the Low Alarm relay and indicator are de-activated		
SENSOR #1	**Type or Port**.		
	Sensor serial number		
	Gas name		
	Low alarm value		
	High alarm value		
	Hi/Hi alarm value		
	Span Value		

PARAMETER	DESCRIPTION	FACTORY SETTING	USER SETTING
SENSOR #1	**First Cal point** Enter ppm and corresponding mV e.g. 0ppm= 150mV		
	Second Cal point Enter ppm and corresponding mV e.g. 100ppm=400mV		
SENSOR #2	**Type or Port**.		
	Sensor serial number		
	Gas name		
	Low alarm value		
	High alarm value		
	Hi/Hi alarm value		
	Span Value		
	First Cal point Enter ppm and corresponding mV e.g. 0ppm= 150mV		
	Second Cal point Enter ppm and corresponding mV e.g. 100ppm=400mV		
SENSOR #3	**Type or Port**.		
	Sensor serial number		
	Gas name		
	Low alarm value		
	High alarm value		
	Hi/Hi alarm value		
	Span Value		
	First Cal point Enter ppm and corresponding mV e.g. 0ppm= 150mV		
	Second Cal point Enter ppm and corresponding mV e.g. 100ppm=400mV		
SENSOR #4	**Type or Port**.		
	Sensor serial number		
	Gas name		
	Low alarm value		
	High alarm value		
	Hi/Hi alarm value		
	Span Value		
	First Cal point Enter ppm and corresponding mV e.g. 0ppm= 150mV		
	Second Cal point Enter ppm and corresponding mV e.g. 100ppm=400mV		

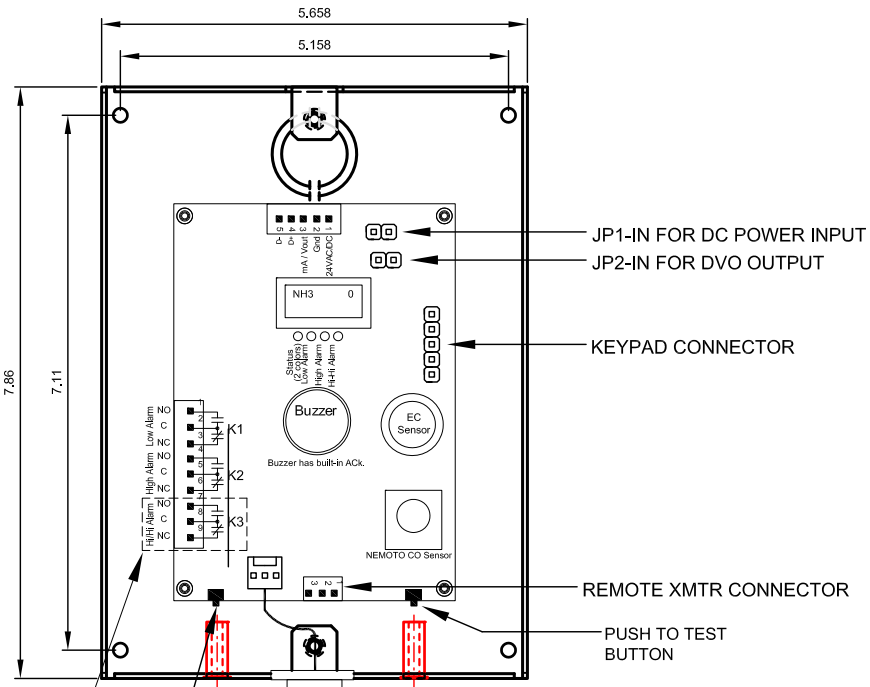


(4) 0.875 Ø x 1.0125 Ø
Double Knock-Outs for
conduit or cable

TOP VIEW

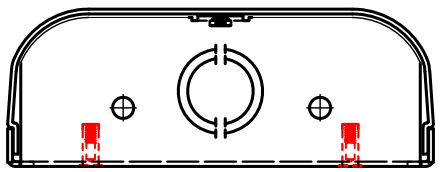


FRONT VIEW with
COVER



FRONT VIEW without
COVER

RELAY K3 IS FACTORY SET
AS FAULT RELAY WHEN
USING MOS SENSORS,
O2 SENSORS &
REMOTE TRANSMITTERS.



BOTTOM VIEW

REV	DATE	DESCRIPTION	CHK'D	APP'D
3	31/07/17	REVISED TITLE DESCRIPTION & DRAWING FRAME		
2	12/06/13	ADDED SPECIAL NOTE FOR RELAY HI/HI - K3		
1	24/06/10	CHANGED MONOX TO NEMOTO CO SENSOR & ADDED PUSH TO TEST BUTTONS		

REVISIONS

ARJAY ENGINEERING LIMITED

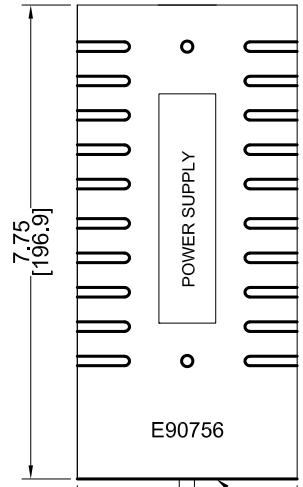
PROJECT

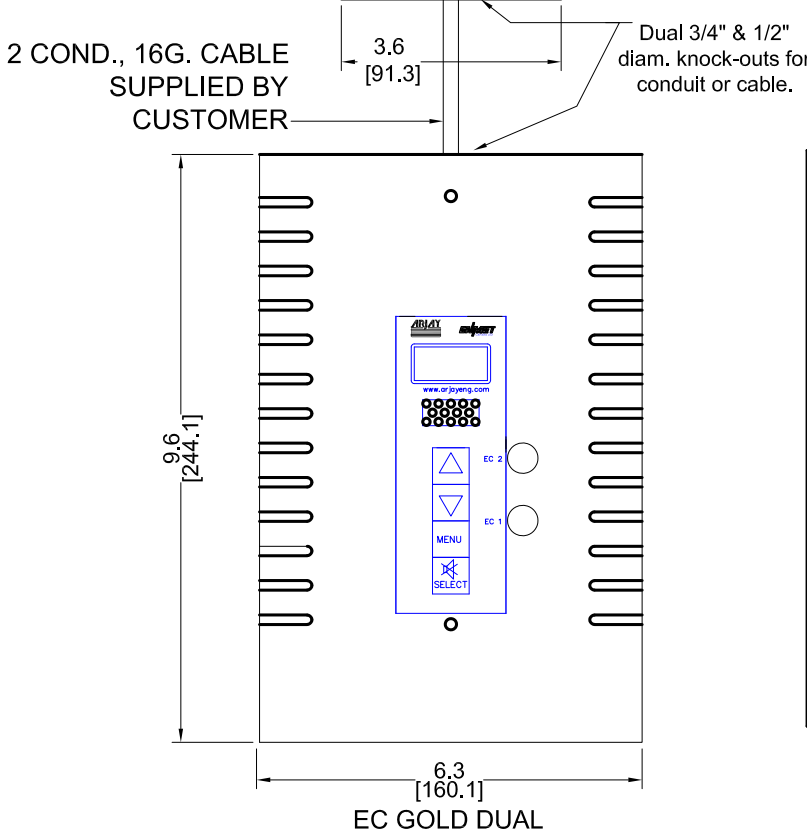
DWG. STATUS	BY	DATE D	M	Y
DRAWN	P.S.	01	03	07
CHECKED				
APPROVED				

TITLE: STANDARD DUAL EC GOLD CONTROLLER OVERVIEW DRAWING

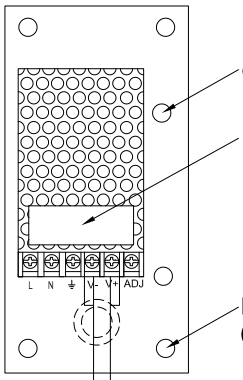
SCALE	REF. DWGS.	DWG. NO.	SHT.	REV.
N.T.S.		20060392	1	3

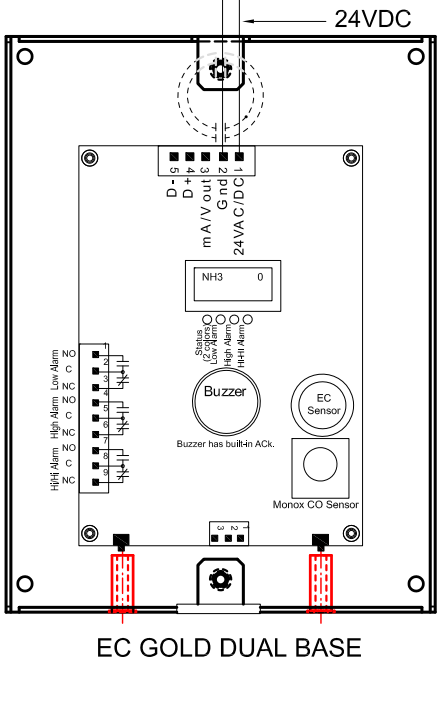
NOTES:
1. All dimensions are in inches [mm].
2. Dimensions of the Dual EC Gold are approx. 9.6 x 6.3 inches.
3. Dimensions of the Power Supply are approx. 7.75 x 3.6 inches.
4. Terminal marked (-) (+) are for DC power unit & (N) (L) are for AC power unit.





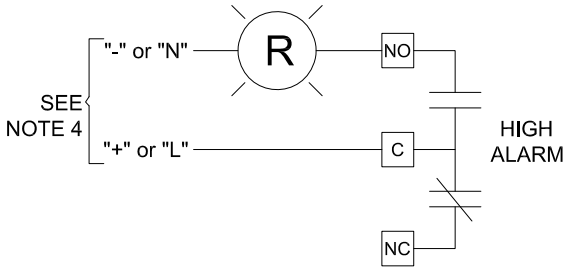
POWER SUPPLY BASE



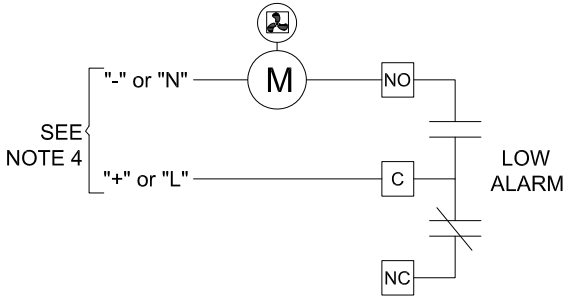


EC GOLD DUAL BASE

TYPICAL CONNECTION TO REMOTE ALARM LIGHT



TYPICAL CONNECTION TO EXHAUST FAN MOTOR STARTER



REV	DATE	DESCRIPTION	CHK'D	APP'D
2	25/07/17	REVISED.		
1	08/01/16	REVISED.		

REVISIONS

ARJAY ENGINEERING LIMITED

PROJECT

DWG. STATUS	BY	DATE D	DATE M	DATE Y
DRAWN	F.H.	16	01	09
CHECKED				
APPROVED				

TITLE: DUAL EC GOLD WITH E90756 POWER SUPPLY

SCALE	REF. DWGS.	DWG. NO.	SHT.	REV.
N.T.S.		20070126	1	2

WARRANTY STATEMENT

with options for: Extended Warranty by Purchase
Extended Warranty by Start-Up Service
New Home Warranty Act

Seller's Express Warranty. Seller warrants the Purchased Items to be free from defects in materials and workmanship under normal use and service for a period of one year from time of purchase. Seller further warrants that it will perform the Services in a professional and workmanlike manner. Buyer agrees that it has the sole responsibility for the proper selection, application, installation, and/or use of the Purchased Items and for instructions to ultimate users, if any, concerning use, application, periodic maintenance, and cautions regarding the Purchased Items. Buyer agrees that the warranties provided herein shall not apply to any Purchased Item which: (1) has been repaired or altered outside of Seller's factory in any way so as, in Seller's judgment, to affect such Purchased Item's reliability; (2) has been subject to misuse, negligence, or accident; (3) has been operated other than in accordance with the applicable printed instructions provided by Seller; or (4) has been subject to wear of wetted or reactive parts caused by Buyer's application of the Purchased Items.

Seller's Exclusive Obligations Under Warranty. Seller may, at its option, repair or replace, or refund the purchase price of Purchased Items which shall be returned to Seller, no later than one month after the expiration of the applicable warranty period in the manner set forth in this clause, and which Seller's examination shall disclose to Seller's satisfaction to be defective as specified in the warranty clause hereof.

All such Purchased Items shall be returned to Seller at Oakville, Canada; freight, duty and brokerage prepaid, accompanied, or preceded by a particularized statement of the claimed defect. Under such circumstances and if confirmed warranty applicable by Seller, Seller shall bear the cost of repair or replacement and the risk of loss while the Purchased Items are in Seller's possession at Seller's plant. Seller will return warranty product to Buyer prepaid by a freight method of Sellers discretion. SELLER'S OPTION TO REPAIR, REPLACE, OR REFUND THE PURCHASE PRICE FOR PURCHASED ITEMS IS BUYER'S EXCLUSIVE REMEDY AGAINST SELLER WITH RESPECT TO THE PURCHASED ITEMS. SELLER SHALL NOT BE LIABLE TO BUYER, ITS AGENTS, EMPLOYEES, OFFICERS, OR DIRECTORS, FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES, LOSS OF REVENUE OR PROFIT, OR ANY OTHER INDIRECT DAMAGES RELATED TO THE PURCHASED ITEMS OR SERVICES.

Fee based extension:
For an additional fee, the standard factory warranty can be extended. To initiate this process please contact an Arjay Representative to determine price and time allotment.

Start-up Services extension:
The basic factory warranty of one year will be extended if the Arjay Start-up services are purchased along with the instruments on the original order. An additional one year of warranty will apply in addition to the standard one year warranty supplied. Carbon Monoxide sensors cells are included in this extended warranty. All other consumable gas sensor cells are excluded from this additional warranty.

New Home Warranty Act extension:
If the Arjay Start-up services are purchased along with the instruments on the original order and the instrument is further maintained and calibrated a minimum of once per year during the warranty period by an Arjay Authorized Service company, an additional two years of warranty will apply in addition to the standard one year warranty supplied. This warranty extends to Arjay supplied equipment and includes carbon monoxide sensing cells. All other consumable gas sensor cells are excluded from this additional warranty.

Arjay Engineering Ltd.
arjayeng.com

Gas Detection Calibration Services

- single visit calibration and repair
- multi-visit contracts with discounts on multi-year
- on-site or in-shop (Oakville, Ontario) services

We provide:

- ☑ fully trained technicians
- ☑ WSIB Certificates
- ☑ full insurance (2 million liability)
- ☑ Calibration Certificates
- ☑ Stock parts in vehicles and Oakville facility
- ☑ Calibration gas certified to NIST Standards

Our Technicians have:

- ☑ Dangerous Goods Handling Certification
- ☑ St. Johns First Aid Training
- ☑ Fall Arrest Training
- ☑ Confined Space Training (special request)
- ☑ WHMIS Training

Call for a no obligation quote

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N. America 1-800-387-9487 ***www.arjaygasdetection.com***