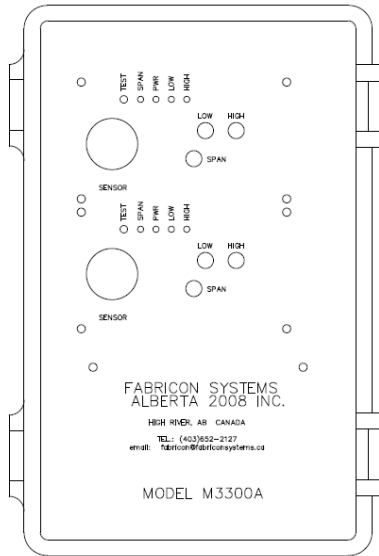


# FABRICON SYSTEMS

**ALBERTA 2008 INC.**

*Keeping you in Front*



## **M3300A Stand Alone Gas Detection System Operator's Manual**

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## **INTRODUCTION**

For situations that require dual level gas monitoring, the M3300A is ideal. The unit samples small amounts of air and measures the gas content against preset levels. A relay output is provided for when the ambient gas level exceeds the lower alarm threshold which may be used to activate exhaust fans via an electromagnetic contactor. A relay output is provided for when the upper alarm threshold is exceeded to sound audible & visual alarms, actuate automatic dialers, or provide an input signal to a central alarm system.

The Fabricon Systems Alberta 2008 Inc. M3300A combines our M1000A Low Voltage Power Supply and Output Control Unit with up to two of our M3050 Dual Level Electrochemical Gas Detectors in a standalone unit. In addition eight M3050 or three M2050 gas detectors may be added to the M3300A as remote detectors.

The internal M1000A Low Voltage Power Supply and Output Control Unit within the M3300A is designed to also provide a 10VAC supply for remote M2050 and M3050 gas detectors, while also providing two relays containing DPDT contacts, which are activated by the alarm output from the internal M3050 or remote M2050 or M3050 units. These relays are capable of switching up to 5A into a resistive load, or 2A into an inductive load (P.F.= 0.4) such as an electromagnetic contactor used in controlling ventilation fans, at voltages up to and including 250VAC.

The internal M1000A has selectable time delays built into the unit that provide Low Alarm "On Delays" of one or two minutes and "Off Delays" of five or ten minutes. The "On Delay" is used to prevent short term cycling of the exhaust fans in the event of a momentary low alarm. If the gas detectors do not stay in the alarm condition for a time greater than the "On Delay" the fans will not be activated. The "Off Delay" is used to ensure that once the exhaust fans are activated that they will continue to run for five or ten minutes after the gas detector recovers from the alarm condition. This ensures the area being monitored is completely evacuated of the target gas. The High Alarm output is instantaneous when the alarm threshold is reached. In addition, if the high alarm output is activated it will automatically override the low alarm "On Delay" in the event the output is still timing out. The M1000A is equipped with a High Alarm buzzer that can be disabled by the internal buzzer "on/off" switch.

Other features of the M1000A include; a manual "On/Off" switch to activate the low alarm relay and any external equipment attached thereto, and field selection of "Fail Safe or Non-Fail Safe" condition of the low alarm relay. Additionally, the M1000A may be used to provide a regulated 12VDC output at up to one ampere to run external equipment such as sirens or sonalerts. The M1000A input transformer is rated either 12VA or 20VA (optional) therefore total current draw (AC and DC combined) should not exceed 1.8 amperes total.

The internal M1000A Low Voltage Power Supply and Output Control Unit when equipped with the optional 20VA transformer is capable of powering up to seven Model M2050 or eighteen M3050 Gas Detectors and providing output control for two alarm levels.

An optional M1300 Alarm Status Display unit may be used to inform maintenance personnel or management of the status of the system. The M1300 has a LED display for power, low alarm and high alarm, plus an audible alarm for high alarm or fail condition. The M1000A power supply printed circuit board has a terminal block (TB-3) that interfaces with the M1300. The M1300 unit is fitted with its own housing for remote status display. This allows the system to be monitored from any location in the building.

## **GENERAL**

- Very low maintenance costs due to use of electrochemical sensors, with a long life expectancy.
- Periodic calibration to ensure reliable operation is all that is normally required. The recommended calibration interval is six months. Maximum calibration interval is twelve months.
- Typical life expectancy for carbon monoxide sensor exceeds five years and is approximately two years for nitrogen dioxide sensor. Unit is covered by manufacturers warranty for 12 months. See manufacturer's warranty for details.
- The sensor is mounted in a socket which allows for easy replacement. The calibration adjustments are located behind removable hole plug on the face of the unit. Span and alarm levels are easily adjusted in the field.
- The M3300A Standalone Unit gas detectors are capable of monitoring 7000 square feet (650 sq. meters). If centrally located the gas detector monitors approximately 45 -50 feet in all directions.
- Visual LED displays for Power, Low Alarm, High Alarm and Span are located on the front of the unit.
- The M3300A is designed 'Fail Safe' and will simulate an alarm condition in the event of a power failure.

## **FEATURES**

- Low maintenance, long life expectancy, fail safe design.
- Accurate monitoring of carbon monoxide and/or nitrogen dioxide gases.
- Low sensor drift over time and temperature variations.
- A fan switch has been provided so that maintenance personnel can activate the ventilation fans manually. (See #1 on page 6 drawing for switch location.) With the switch in the up position the fans will operate continuously. In the down position (Auto) the fans are controlled by the gas detector alarm outputs.
- An "On Delay" of zero, one or two minutes has been provided to prevent nuisance tripping of the fans. At the time of shipping the system was set for one minute delay. This delay prevents the fans from activating until an alarm condition has occurred for at least one minute. If a longer time delay is required, move the jumper indicated #2 on page 6 drawing so that it is over the two posts marked 2 on the circuit board. If zero "On Delay" is desired, move the jumper indicated #3 on page 6 drawing so it covers the two terminals marked "out" on the printed circuit board.

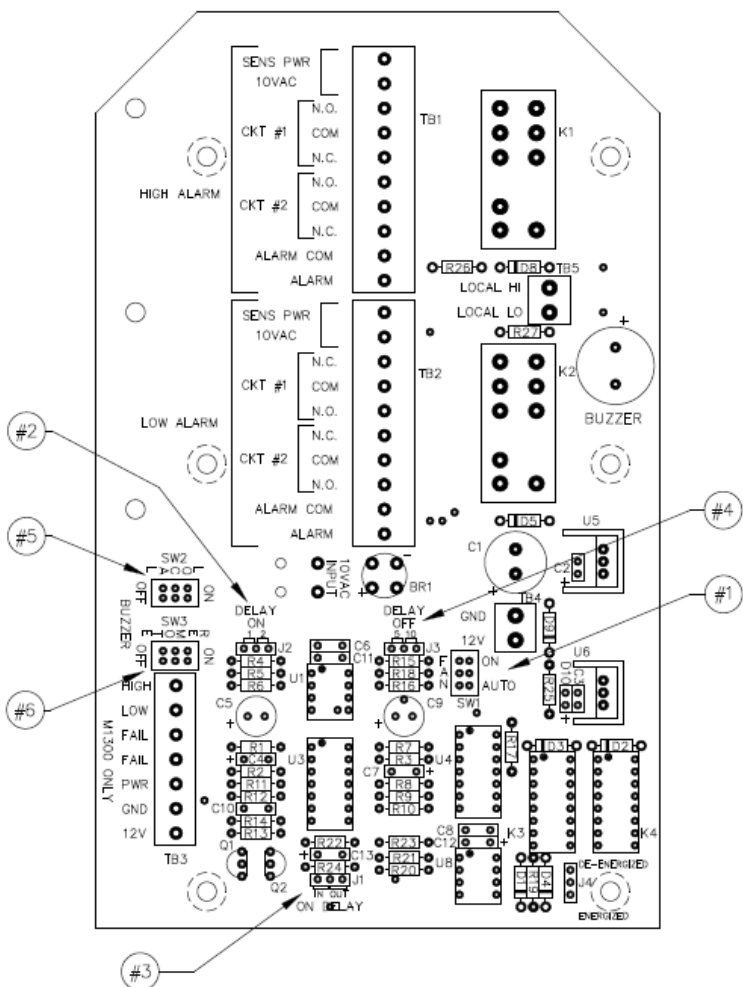
Note: For system testing purposes the "On Delay" is normally turned off by positioning the jumper indicated #3 to the "off" position. This allows the system to activate instantly when the test buttons on the front of the gas detectors are depressed.

Do not forget to put this jumper back in the "In" position after testing is complete.

- An "Off Delay" of five or ten minutes has been provided that allows the ventilation fans to continue to operate for a period of time after the alarm condition has cleared. This prevents short cycling of the fans by ensuring that the fumes in the area are sufficiently reduced to well below the gas sensors alarm threshold level. At the time of shipping, the system was set for a five minute delay. If a longer "Off Delay" is wanted, move the jumper indicated #4 on the page 6 drawing so it covers the terminals marked 10 on the printed circuit board.

Note: The "Off Delay" cannot be overridden.

- The Low Alarm output control relay is held normally energized. In the event of a power failure to the system the fans will activate automatically and continue to run until power is restored to the system.
- The occurrence of a high alarm state in the system will automatically override the low alarm delay mechanism and activate the fans immediately. At the end of the high alarm state the function of the equipment reverts to its normal delay settings.
- During the testing process it is possible to activate the "Off Delay" and the ventilation fans will continue to run after the test buttons are released. This is caused by the timer that activates the "On Delay". The timer is started by the first "Low Alarm" signal it receives. The timer continues to time out even though the alarm condition is removed. If a second test button is depressed and the low alarm condition coincides with the one minute time out of the "On Delay" timer, the system will activate the "Off Delay". To avoid this, wait two minutes between low alarm test button activations. This will ensure that the "On Delay" timer has reset itself. In the event that you inadvertently activate the "Off Delay" you will have to wait five minutes for the system to time out.
- The occurrence of a High Alarm state in the system activates an internal buzzer for the duration of the High Alarm condition. This buzzer can be disabled by switching the internal buzzer switch, indicated #5, to the "off" position.

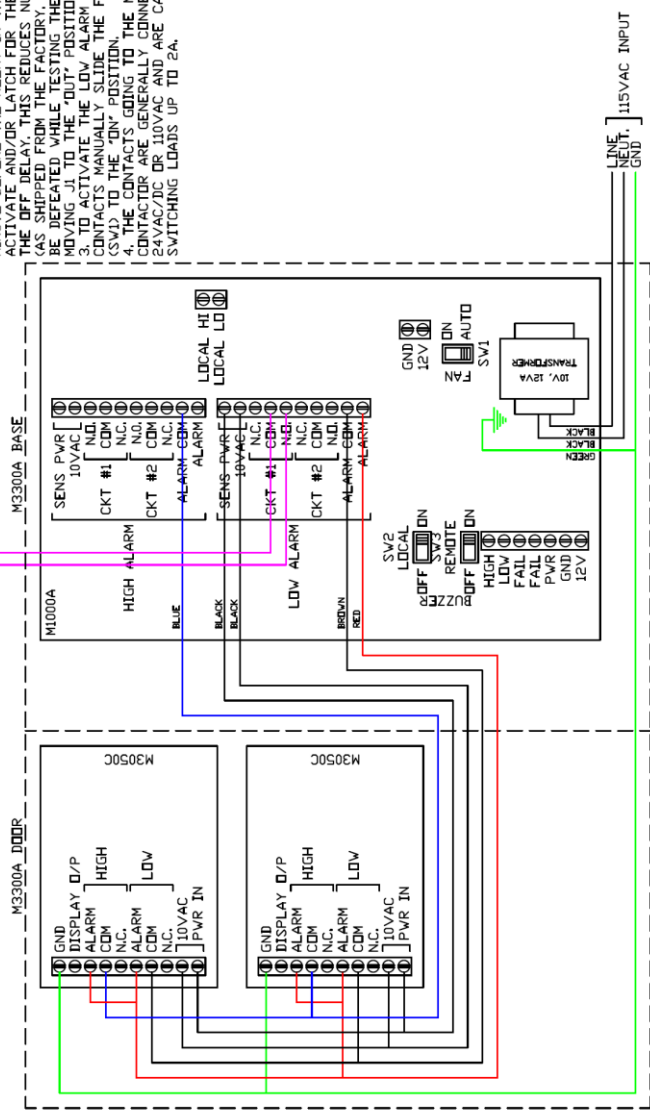


1. Fan Switch (SW1)  
ON – activates low alarm relay.  
AUTO – activates low alarm relay automatically when detectors reach low alarm threshold.
2. Low Alarm On Delay Jumper (J2)  
Selectable for one or two minute on delay.
3. Low Alarm On Delay Jumper (J1)  
Selectable for no delay (OUT) or delay (IN), duration set at J2.
4. Off Delay Jumper (J3)  
Selectable for five minute or ten minute off delay of low alarm relay.
5. Local Buzzer Switch (SW2)  
Silences local buzzer in OFF position, in ON position local buzzer will sound with high alarm.
6. Remote Buzzer Switch (SW3)  
Silences remote buzzer in OFF position, in ON position remote buzzer will sound with high alarm.

# M3300A WIRING DIAGRAM

- NOTES:
1. ALWAYS WIRE THE MAU AND EXHAUST FANS TO COME ON WITH LOW ALARM. THIS WILL BEGIN TO EXHAUST ANY GASSES BEFORE THEY BUILD UP TO A DANGEROUS LEVEL. IF USING TWO STAGE FANS WIRE THE SECOND STAGE TO HIGH ALARM.
  2. LOW ALARM MUST BE PRESENT FOR ONE MINUTE BEFORE THE RELAY IN THE M1000A WILL ACTIVATE AND/OR LATCH FOR THE DURATION OF THE OFF DELAY. THIS REDUCES NUISANCE ALARMS. (AS SHIPPED FROM THE FACTORY, ON DELAY MAY BE DEFEATED WHILE TESTING THE SYSTEM BY MOVING J1 TO THE "DUTY" POSITION.)
  3. TO ACTIVATE THE LOW ALARM RELAY (SW2) MANUALLY, SLIDE THE FAN SWITCH (SW1) TO THE "ON" POSITION IN THE MAU OR CONTACTOR ARE GENERALLY CONNECTED TO 24VAC/DC OR 110VAC AND ARE CAPABLE OF SWITCHING LOADS UP TO 2A.

TO MAU AND/OR EXHAUST CONTACTOR



115VAC INPUT  
LINE  
NEUT.  
GND



## **SPECIFICATIONS**

Housing Size		10.75”H X 7.25”W x 4.5”D
Power Output Standard Transformer		12VA
Power Output Optional Transformer		20VA
Power Requirements Input		120VAC
Operating Temperature		-20° to 40° C
Weight		
Recommended Calibration Interval		Every Six Months
Warranty		12 Months
Sensing Technology		Electrochemical sensor
Coverage		45’ to 50’ radius
Carbon Monoxide	Standard Calibration	25ppm Low Alarm 100ppm High Alarm
	Standard Span Setting	250ppm
	Repeatability	±2% of set value
Nitrogen Dioxide	Standard Calibration	1ppm Low Alarm 3ppm High Alarm
	Standard Span Setting	5ppm
	Repeatability	±5% of set value
Installation Height		The M3300A should be mounted 4 to 5 feet above the floor level.

## **REMOTE SENSOR WIRING**

Remote sensors are normally wired to the internal M1000A terminals (see the remote sensor simplified wiring diagram on page 11).

The internal M1000A provides the low voltage (10VAC) power required by the remote gas detectors. In order to ensure that sufficient voltage is available to power the sensors some consideration must be given to the gauge of wire to be used for power distribution. The M1000A is capable of providing sufficient power to operate up to seven M2050 or twenty M3050 gas detectors, including the ones mounted in the M3300A door (with 20VA input transformer). Assuming that the gas detectors are "daisy chained" together on a continuous power run, the most distant detector determines the gauge of wire that must be used. The following table provides the recommended wire gauge based on the number of gas detectors on the circuit and the distance from the M1000A to the most remote gas detector unit. The distance is based on the actual wire length, not on the linear distance between the M1000A and the gas detector unit. The wire gauge used to connect low alarm, high alarm and fail circuits is not critical and may be 18AWG.

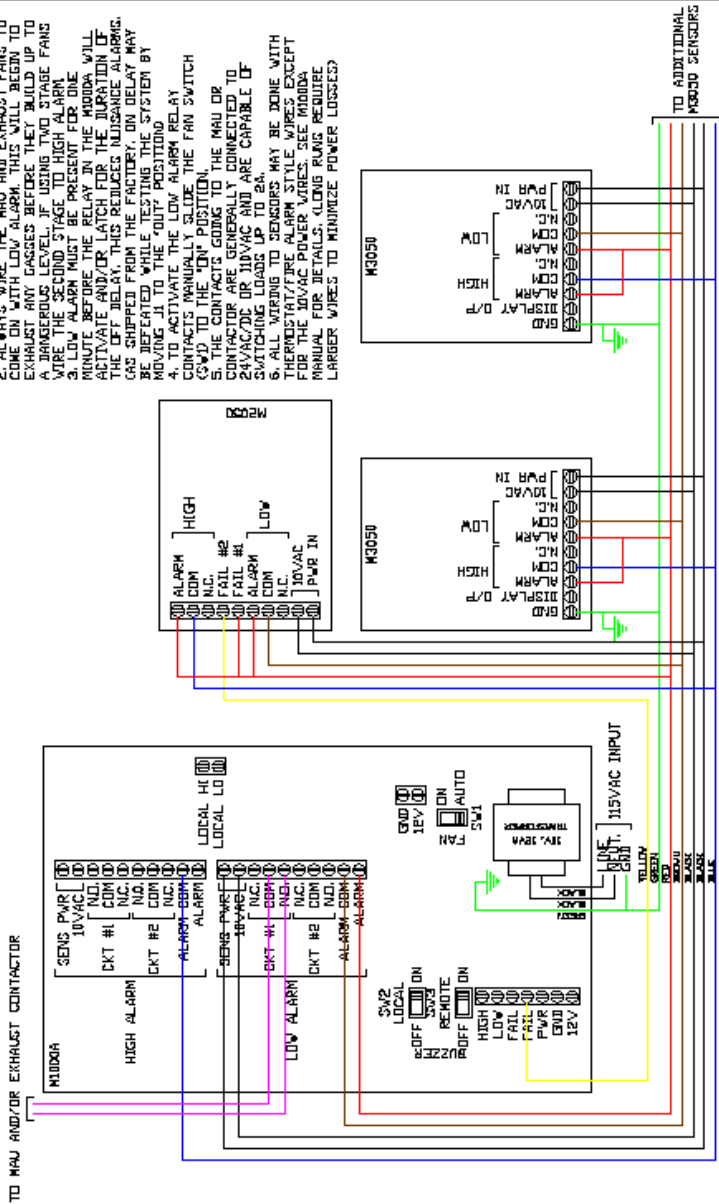
<b>10VAC Power Distribution</b>										
<b>Wire Gauge Recommendations</b>										
		Number of M2050 detectors equipped and wire gauge recommended								
Distance to most remote detector (feet)		1	2	3	4	5	6	7	8	
	25	18	18	18	18	18	18	18	16	16
	50	18	18	18	18	18	18	16	16	16
	75	18	18	18	18	18	18	16	16	16
	100	18	18	18	18	16	16	16	16	16
	150	18	18	18	16	16	16	16	16	16
	200	16	16	16	16	16	16	16	16	16
	300	16	16	16	16	16	16	16	14	14
	400	16	16	16	16	16	14	14	14	14
	500	16	16	14	14	14	14	14	14	14

Chart is for M2050 models. For M3050 models the number of detectors can be doubled.

# Remote Sensor Simplified Wiring Diagram

**NOTED:**

1. ALWAYS CONNECT BOTH HIGH ALARM AND LOW ALARM WIRING FROM THE SENSORS TO THE MUDDA. THE HIGH ALARM WIRING WILL ACTIVATE BOTH THE LOW ALARM AND HIGH ALARM CIRCUITS IN THE MUDDA WHILE OVERRIDING ANY DELAYS IN THE LOW ALARM CIRCUIT.
2. ALWAYS WIRE THE MAU AND EXHAUST FANS TO COME ON WITH LOW ALARM. THIS WILL BRING TO THE MUDDA THE NECESSARY SIGNALS TO START EXHAUST FANS AND STAGE FANS.
3. WIRE THE SECOND STAGE TO HIGH ALARM.
4. LOW ALARM MUST BE PRESENT FOR ONE MINUTE BEFORE THE RELAY IN THE MUDDA WILL ACTIVATE AND/OR LATCH FOR THE DURATION OF THE OFF DELAY. THIS REDUCES NUISANCE ALARMS. GAS SHIPPED FROM THE FACTORY. ON DELAY MAY BE DEFERRED WHILE TESTING THE SYSTEM BY MOVING IT TO THE 'OFF' POSITION.
5. CONTACTS MANUALLY CLOSE THE MAIN SWITCH (SW2) TO THE 'ON' POSITION.
6. THE CONTACTS GOING TO THE MAU OR CONTACTOR ARE GENERALLY CONNECTED TO 24VAC/DC OR 110VAC AND ARE CAPABLE OF SWITCHING LOADS UP TO 2A.
7. ALL WIRING TO SENSORS MAY BE DONE WITH THERMOTAT/TIRE ALARM STYLE WIRES EXCEPT FOR THE 110VAC POWER WIRES. SEE MUDDA WIRE DETAILS. USING LONGER WIRE REDUCES LARGER WIRES TO MINIMIZE POWER LOSSES.



## **CALIBRATION PROCEDURE**

This section describes the procedure for calibrating a Fabricon M3050 series dual level gas detector. The recommended calibration interval for the M3050 series sensors is six months.

### **Required Equipment**

- 0.5 slpm flow regulator for carbon monoxide, 1 slpm flow regulator for nitrogen dioxide
- Calibration cup
- Low alarm level calibration gas cylinder:
  - 25ppm carbon monoxide in air
  - 1ppm nitrogen dioxide in air
- High alarm level calibration gas cylinder:
  - 100ppm carbon monoxide in air
  - 3ppm nitrogen dioxide in air
- Small flat-blade screwdriver

### **Glossary of Terms and Abbreviations**

pot – variable resistor

ppm – parts per million

slpm – standard litres per minute

### **Calibration Procedure**

Note: If you are sure that both the low alarm level and high alarm level (pots) have not been tampered with since the detector was delivered from the factory, or that the alarm levels were set properly by a reputable technician at the last scheduled calibration interval, the M3050 gas detector may be calibrated using only the high alarm level calibration gas and the SPAN pot. If this is the desired method, follow Step 1 through Step 6, Step 12 and Step 13, substituting the high alarm calibration gas (100ppm for carbon monoxide sensors, and 3ppm for nitrogen dioxide sensors) for the low alarm calibration gas and adjust the SPAN pot for the HIGH LED just coming on instead of the LOW LED (the LOW LED should be lit the entire time that the high alarm calibration gas is applied to the sensor).

1. Connect the calibration cup to the appropriate flow regulator (0.5slpm for carbon monoxide, 1slpm for nitrogen dioxide) using a short length of flexible hose.
2. Install the appropriate flow regulator (0.5slpm for carbon monoxide, 1slpm for nitrogen dioxide) on the appropriate low alarm level calibration gas cylinder (25ppm for carbon monoxide sensors, 1ppm for nitrogen dioxide sensors).

3. Remove the black hole plugs from the SPAN and HIGH holes to expose the adjusting pots. Note: The LOW pot should only be adjusted by factory authorized technicians.
4. Insert the calibration cup into the nose piece (the large black ring) on the detector.
5. Flow the low alarm level gas over the sensor for two minutes before making adjustments.
6. Adjust the SPAN pot (screw seen through the SPAN hole) until the LOW LED just lights. If the LED is not lit, turning the pot clockwise will cause it to light. If already lit, turning the pot several turns counter-clockwise will extinguish it. There will be a difference between where the LED lights and extinguishes due to hysteresis built into the detector.
7. Remove the low alarm level gas.
8. Install the appropriate flow regulator (0.5slpm for carbon monoxide, 1slpm for nitrogen dioxide) on the appropriate high alarm level calibration gas cylinder (100ppm for carbon monoxide sensors, 3ppm for nitrogen dioxide sensors).
9. Insert the calibration cup into the nose piece on the detector.
10. Flow the high alarm level gas over the sensor for two minutes before making adjustments.
11. Adjust the HIGH pot (screw seen through the HIGH hole) until the HIGH LED just lights. If the LED is not lit, turning the pot clockwise will cause it to light. If already lit, turning the pot several turns counter-clockwise will extinguish it. There will be a difference between where the LED lights and extinguishes due to hysteresis built into the detector.
12. Remove the high alarm level gas and insert the black hole covers back into the SPAN and HIGH holes.
13. Wait until the HIGH and LOW LEDs extinguish. If the LEDs do not extinguish after several minutes, check the ambient gas levels near the detector with a hand held meter. The LOW LED will not extinguish until the ambient gas levels drop below approximately 15ppm for carbon monoxide detectors or approximately 0.7ppm for nitrogen dioxide detectors.

Contact the factory if any problems are encountered.

## **ORDERING PART NUMBERS**

- M3300A-2-C-NO2 Standalone Carbon Monoxide/Nitrogen Dioxide Gas Detection System
- M3300A-1-C Standalone Carbon Monoxide Gas Detection System
- M3300A-1-NO2 Standalone Nitrogen Dioxide Gas Detection System

## **GENERAL TERMS AND CONDITIONS OF SALE**

### **TERMS:**

Domestic payment terms are net thirty days, subject to Credit Department approval. Export Payment terms are subject to negotiation at time of order. All payments are to be in Canadian Dollars.

### **PRICES:**

Fabricon Systems Alberta 2008 Inc. quotations remain in force for 60 days from the date of issue unless stated otherwise. Prices are thereafter subject to change without notice. All applicable federal, provincial, or local sales, excise, use, or other taxes levied on the equipment subject to the agreement shall be paid by the purchaser.

### **ERRORS:**

We reserve the right to correct clerical or stenographic errors or omissions.

### **SHIPMENTS:**

Shipments and deliveries shall be subject to the approval of the Credit Department. Shipping shall be F.O.B. High River, Alberta, with freight charges collect. Title and risk of loss shall pass to the purchaser at the point of shipment. We are not responsible for any loss, damage, or delay that may occur after goods have been accepted for shipment by the transportation company. Claims for shipping damages should be made directly to the carriers.

Prices include products having standard domestic packing only. Where packing for overseas shipment is required, contact Fabricon Systems Inc. for additional costs.

### **PARTIAL SHIPMENTS:**

Partial shipments will be invoiced as shipped. Payments are due as invoiced.

### **DELIVERY:**

Delivery dates are given to the best of our knowledge based on conditions existing at the time of quotation. Fabricon will make every effort to ship within the time estimated but cannot guarantee to do so. Failure to make shipment as scheduled does not constitute cause for cancellation and/or damages of any nature. The execution of an order is contingent upon strikes, fires, shortage of raw material, government approvals, delays of carriers and other delays or causes either unavoidable or beyond our control.

### **CANCELLATION:**

Cancellation of orders will be accepted only on written notice to Fabricon Systems Alberta 2008 Inc. and upon payment of reasonable and proper cancellation charges. These charges are calculated to offset any expense incurred by Fabricon in the processing of the original Purchase Order and the

ordering of inventory from outside vendors to fulfil the said Purchase Order, but in no event shall it be less than 15% of the selling price.

**WARRANTY:**

Each new instrument manufactured and/or sold by Fabricon is warranted to be free of defects in material and workmanship. Fabricon's responsibility is limited to the repair or replacement of any instrument or part thereof for a period of one year from the date of shipment when, in our opinion, the repair or replacement is caused by an inherent flaw in the design, assembly, or components of the instrument. Field service is not included. This warranty does not cover components that are considered consumable in normal operation, nor does it apply to equipment that has been misused, abused, or tampered with by unqualified personnel.

FABRICON SHALL HAVE NO LIABILITY FOR ANY PERSONAL INJURY, PROPERTY DAMAGE, OR ANY SPECIAL, INCIDENTAL, CONTINGENT OR CONSEQUENTIAL DAMAGES OF ANY KIND RESULTING FROM A GAS LEAK OR THE PRESENCE OF TOXIC GASES. THE EXCLUSIVE REMEDY FOR BREACH OF THE LIMITED WARRANTY CONTAINED HEREIN IS THE REPAIR OR REPLACEMENT OF THE DEFECTIVE PRODUCT AT THE MANUFACTURERS OPTION. IN NO CASE SHALL FABRICON'S LIABILITY, UNDER ANY OTHER REMEDY PRESCRIBED BY LAW, EXCEED THE PURCHASE PRICE OF THE INSTRUMENT.

**RETURNS:**

All unserviceable equipment must be returned to Fabricon on a Return Material Authorisation (RMA) number provided by Fabricon's inside sales staff. This RMA number provides instrument tracking in Fabricon's facility to ensure that instruments are properly serviced and returned to their original owner. Any defective equipment must be returned to Fabricon's facility freight prepaid. After servicing, the instrument will be returned to the owner with the freight prepaid by Fabricon. Please provide telephone, email, and fax and the name of the contact person in your organization with all returned items so that Fabricon personnel have someone to contact in the event that is necessary.

**NON-WARRANTY RETURNS:**

Instruments that are returned to Fabricon for service or repair that are not covered by warranty will be inspected by the service department and an estimate of the repair costs will be produced. This estimate will be sent to the owner of the instrument for his/her approval prior to undertaking repair of the instrument. Final invoicing shall not vary more than 10% from the original estimate.