

CO, CO₂, NO₂, AND/OR VOC MONITOR VEHICLE EXHAUST GAS DETECTOR

MODEL GVU-3

GENERAL DESCRIPTION:

The GVU-3 ventilation control system combines toxic gas-based and time-based fan control modes in an all solid-state, low maintenance, cost effective product.

The GVU-3 series controller can monitor up to three (3) GVU-CO sensors; (3) GVU-CO₂ sensors, (3) GVU-NO₂ sensors, (3) GVU-VOC sensors; or any combination of sensors. The GVU-3 Controller consists of the power supply, solid state clocks, time delays, output relays, terminal strips, 3 sensor alarm LED's and a green LED to indicate power to remote sensors.

The GVU-CO sensor is microprocessor based and is temperature and humidity compensated for stability. The GVU-CO sensor range is 0 to 250 ppm. The transducer utilizes a tin oxide sensing element that is cleaned and sampled by the microprocessor. The GVU-CO indicates its status via a two color LED (light emitting diode). When the LED is flashing green, operation is normal and not in alarm. When the LED is flashing red, the unit is in alarm (high CO); a continuous red or green indicates sensor failure; and LED extinguished indicates power failure.

See separate specification data sheet for information regarding GVU-CO₂ carbon dioxide sensors, GVU-NO₂ nitrogen dioxide sensor and GVU-VOC smoke/air quality sensor.

TIME CONTROL:

The systems "hour" clock outputs to it's "fan-on" relay once per hour causing it to energize. The "on" time of the "fan-on" relay is user adjustable, in one minute settings from 1 to 8 minutes. The "hour" clock operates in this manner irrespective of gas concentration, and may be disabled, if desired. To disable "hour" clock operation, place switch S3 to RST (RESET) position.

DETECTION CONTROL:

Should a high gas concentration occur (above user-adjustable alarm level), an alarm signal from any sensor unit starts a 30 second delay. Should the concentration persist through the delay period, the "alarm" clock is activated. The "on" time of this clock, is user-adjustable in discrete settings from 1 to 8 minutes and its setting is independent of the "hour clock" setting. Upon activation of the "alarm" clock, the "fan-on" relay energizes and remains energized until the "alarm clock" times out. Should the high concentration still be above the alarm level, the "fan-on" relay will remain ON and the "warning" relay will energize. This condition is maintained until the high concentration drops.

In the event of a power failure, the control unit sets itself to an alarm condition upon power restoration. Thus, fan activation is assured, to clear possible accumulated toxic gases.



CONTROL PANEL

FEATURES

- Fully electronic for long life
- User adjustable alarm setting
- User adjustable minimum fan run time
- User adjustable 2nd stage activation
- One person field calibration
- UL listed components
- Key locking sensor
- Red LED to indicate high gas concentration for each sensor
- Visual indication of high gas concentration level and fan on
- Automatic fan start-up upon power restoration following power outage
- Operating range meets OSHA std. 1910.1000
- User adjustable clock-activation of fans, if desired
- NEMA 1 std., others available

OPTIONS

- Audible alarm with silence switch
- Power ON, Fan ON LED's on face of controller
- Sensor alarm LED's on face of controller
- Controller key lock

SPECIFICATIONS

- Input Power:** 120 VAC, 60 Hz, 1A (fused)
- Relay Contacts:** 24 VAC, 2A resistive, 1.5 inductive
- Discrete Clock Settings:** 1 minute intervals
- Automatic Ventilation Cycle Upon Power Restoration:** User adjustable 1 to 8 minutes
- Finish: Control Unit:** Gray enamel
- Enclosure:** Nema 1 standard, others available
- Dimensions:** 14" H x 12" W x 4" D.
(305mm x 102 mm)
- Weight:** 8 lbs. (3.6 kg)

INSTALLATION INSTRUCTIONS

1. INTRODUCTION

Your TOXALERT Ventilation Control System incorporates the latest in solid state technology to give you maximum reliability and performance. The system alarm set point can be adjusted to activate fans upon detection of an unsafe concentration of CO, CO₂, NO₂, VOC air quality. In addition, a user-definable hourly repeat cycle is provided, allowing time-based, as well as gas-based fan activation. In both modes of fan control, the "on" time is user-adjustable 1 to 8 minutes in one minute increments. For optimum performance, install, burn-in, calibrate and check out your TOXALERT exactly as instructed. If your TOXALERT can't be calibrated or fails checkout, please contact your local representative or TOXALERT International for servicing.

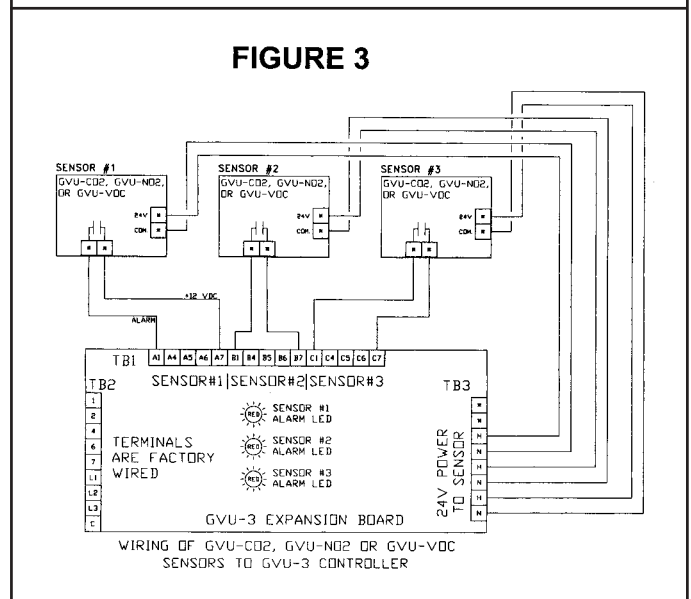
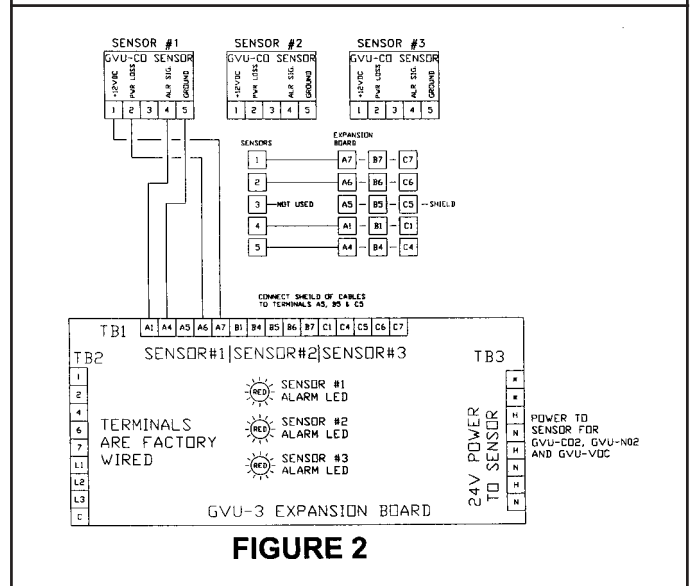
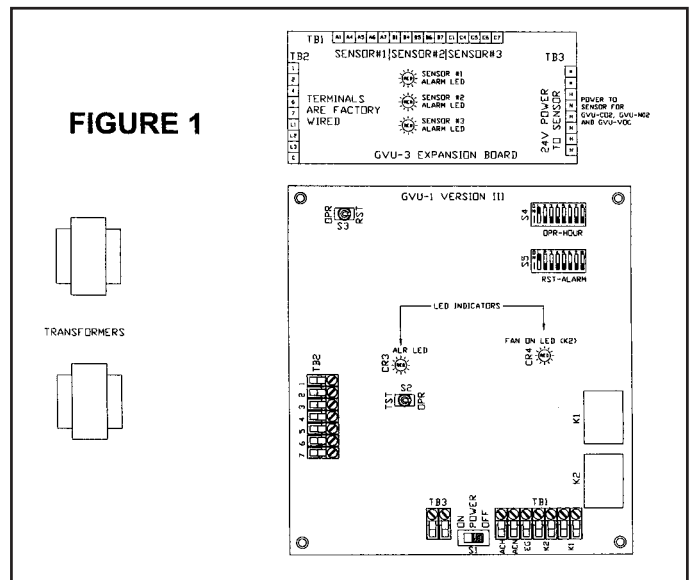
2. INSTALLATION

Refer to figures 1, 2 and 3, and install and connect the TOXALERT sensors and control units as follows:

GVU-CO SENSING UNITS

- 1) Open the door using the key provided. Next lift off the front door by sliding it up the pins of the hinges. Put it aside.
- 2) Locate a mounting location away from drafts, away from direct fresh air intakes, and mount vertically on wall or support column approximately 5 to 6 feet above floor.
- 3) Mount base with hinge pins along left side by using mounting holes (4 are available).
- 4) A wiring access hole must be added to the base anywhere around the bottom or right side. Do not place an access hole on the hinge side of the base, since, if conduit is used, this may restrict the opening of the door. If conduit is to be used, use a chassis punch to match the required fitting size.
- 5) Remove any metal chips and burrs from enclosure.
- 6) Place the cover onto the hinges of the base.

See separate data sheet for installation instructions of Gvu-CO2, Gvu-NO2 and Gvu-VOC.



CONTROL UNIT

- 1) Unlock and open enclosure cover.
- 2) If necessary, cut access holes for wiring in enclosure sides directly opposite terminal blocks to be wired. First disconnect fuse leads, remove the four screws that secure chassis plate to enclosure and then care fully remove plate and attached transformer and circuit boards; cut holes and remove metal chips and burrs from enclosure.
- 3) Mount enclosure with four screws.
- 4) Reinstall and secure chassis plate to enclosure with the four screws and reconnect fuse leads removed in step (2).
- 5) Connect to 120 VAC, 60 Hz power source.

SENSOR WIRING

NOTE: Refer to Figures 2 and 3 and Tables 1 and 2. Use shielded cable to interconnect sensors and control units if metal conduit is not used, or if conduit also contains AC wiring.

- 1) Measure distance between sensing unit and controller unit and select proper size wire or larger wire from Table 1.
- 2) Run wiring between controller and sensing units and into enclosure through access holes. Connect wires from terminal blocks in sensing unit to appropriate sensor # terminal (TB-1 of Gvu-3 expansion board) in control unit per Figure 2 and/or 3.

TABLE 1

AWG	DO NOT EXCEED
#20 Wire	800 Ft. Sensor to Controller
#18 Wire	1300 Ft. Sensor to Controller
#16 Wire	2000 Ft. Sensor to Controller

POWER AND RELAY WIRING

WARNING: To prevent fire or shock hazard turn off control unit and fan power sources before making connections to control unit. Comply with all local building codes and ordinances.

- 1) Connect power to TB1 of Gvu-1, version II board as follows:
 - AC hot to TB1-1 (ACM)
 - AC neutral to TB1-2 (ACN)
 - AC ground to TB1-3 (KG)

CAUTION: Relays K1 and K2 are rated for a 5.0 amps resistive load. If a higher rated alarm or pilot control is required, add a remote relay between the control relay and load.

- 2) Connect dry contacts of alarm KI (TB1-6 and TB1-7) to alarm device (optional).
- 3) Connect dry contacts of fan relay K2 (TB1-4 and TB1 5) to fan pilot control.
- 4) Set control unit power switch S1 to the off position, TST/OPR switch S2 to OPR and OPR/RST switch S3 to RST.
- 5) Turn on control unit AC power source, but do not apply power to fans at this time.

3. BURN-IN

Burn-in period allows sensor to stabilize before proceeding with alarm setting procedure.

- 1) Be sure fan power is off, power is applied to control unit and power switch S1 is set to PWR ON.
- 2) Allow system with CO/VOC sensors to burn-in at least 72 hours with power turned on to sensors. Allow CO₂ / NO₂ sensors 1 hour to burn-in.
- 3) When 72 hour burn-in is complete, proceed with alarm setting and checkout.

4. SETTING OF TIMING FUNCTIONS:

There are two (2) eight position dip switches in the upper right hand corner of the Gvu-1 controller board, labeled S4 and S5. These control the system's timing functions.

A) Hourly Operations (S4)

S4 and Toggle switch S3, in the upper left corner of the P.C. board control the hourly operation of K-2 relay. With number "1" switch of S4 in the up position, the fan will run one minute each hour; with the number "2" switch in the up position, system will run 2 minutes every hour: and so on, up to eight (8) minutes. The switches are not additive and if more than one switch of S4 is in the up position, the system operates the lowest number of minutes of the S4 switches in the up position. With S3 in RST (reset) position the hourly function is deactivated. If S3 is in the OPR position and all S4 switches are down (off), K2 will operate 8 minutes each hour.

B) Minimum Fan Run Time (S5)

Dip switch S5 controls the minimum time K2 relay is activated once an alarm condition has been acknowledged by the controller. With number "1" switch of S5 in the up position, the minimum run time (K2 relay closed) is one minute. With number "2" switch of S5 in the up position, the minimum run time is 2 minutes, and so on, up to 8 minutes. The switches are not additive, and if more than one switch is in the up position, K2 operates the number of minutes of the "lowest" numbered switch of S5 in the up position. If all are in the down position, the minimum run time defaults to 8 minutes.

TABLE 2 (Refers to Figures 2 and 3)

CO SENSOR TERMINALS	GVU-3 SENSOR EXPANSION BOARD TERMINALS				C02 / N02 SENSOR TERMINALS
	Sensor #1	Sensor #2	Sensor #3	Function	
1	A7	B7	C7	(+ 12 VDC Power)	Normally open relay terminal
2	A6	B6	C6	(Sensor Power Loss)	NA
4	A1	B1	C1	(Alarm Input)	Normally open relay terminal
5	A4	B4	C4	(Ground)	NA
No Connection*	A5	B5	C5	(Cable Shield)	No Connection*
NA	TB3-Hot			(24 VAC Power)	VAC (+)
NA	TB3-Neutral			(24 VAC Power)	VAC (-)

5. ALARM SETTING PROCEDURES

All sensors are factory calibrated for their specific setpoint. Periodic calibration is required and performed at the sensor. Please refer to the individual sensor instruction manual (supplied with each sensor) and calibration instruction sheet (supplied with calibration kits, available separately).

6. CHECKOUT

- 1) Turn off power.
- 2) Disconnect alarm input wires from sensors at terminals A1, B1 & C1 of GVVU-3 board.
- 3) Set alarm timer (S5) to 2 minutes and hour timer (S4) to 1 minute.
- 4) Set power switch S1 to PWR On. Set OPR/RST switch S3 to RST and back to OPR, note time.
- 5) Check that the LED indicators CR3 and CR4 on GVVU1 board are extinguished and that fans are off.
- 6) Set TST/OPR switch S2 to TST, check that the CR3 LED indicator is ON. After 30 seconds check that CR4 and the fans are on. Set S2 to OPR (CR3 off) and check that the fans stop after running 2 minutes (CR4 off).
- 7) Set TST/OPR switch S2 to TST, check that when 2 1/2 minutes have elapsed (this includes the delay), alarm device activates and fans continue to run. If optional alarm is not installed, connect an ohm-meter across TB1-6 and TB 1-7 and check that contacts of relay K1 are closed (continuity).
- 8) Set S2 to OPR. Check that fans stop and K1 de-energizers (CR3 and CR4 off).
- 9) Check that 1 hour after step (2) was performed, fans start (CR4 lights) run for 1 minute.
- 10) Check power switch S1 to off position, set alarm and hour timers to desired setting.
- 11) To disable hour clock operation, position switch S3 to RST position.
- 12) Reconnect sensor alarm input wires, to A1, B1 & C1.
- 13) Set power switch S1 to PWR ON, close and lock enclosure cover. This completes the checkout and installation.

GVU SERIES PRODUCTS:

CONTROLLERS –

GVU-1	Control unit for use with one sensor
GVU-3	Control unit for use with one to three remote sensors
GVU-6	Control unit for use with one to six remote sensors
GVU-12	Control unit for use with one to twelve remote sensors
GVU-18	Control unit for use with one to eighteen remote sensors

REMOTE SENSORS –

GVU-CO	Remote carbon monoxide sensor	GVU-NO ₂	Remote nitrogen dioxide sensor
GVU-CO ₂	Remote carbon dioxide sensor	GVU-VOC	Remote smoke/air quality sensor