

# Quickstart Guide

## Model M1/EC Toxic / O<sub>2</sub> Gas Detector

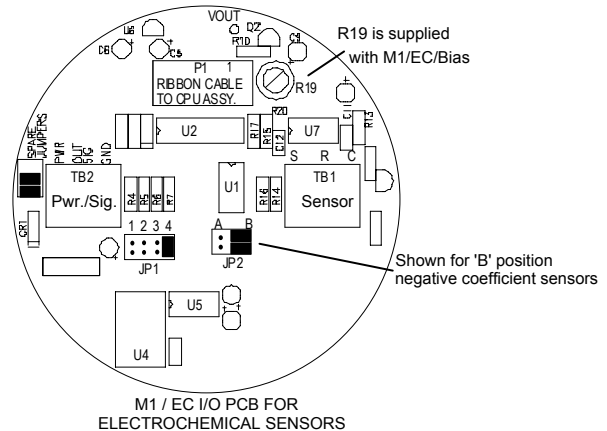


### INSTALLATION

Declassify the area to non-hazardous prior to installation by monitoring for hazardous gases. Orient the sensor housing so the sensor head is aimed down and mount securely. Use conduit and installation practices approved for the area's classification. When properly installed the M1 is rated for Class 1, DIV 1 & 2 Gr. B, C, D.

### M1 WIRING

M1 wiring terminates behind the front display assembly; removed by loosening 2 captive thumbscrews. The M1 is a 3-wire transmitter with +POWER, +4-20mA and GROUND terminals on TB2 of the I/O board (at right). M1 power may range between 19 – 30 volts. The 4-20mA signal sources output current into loads up to 750 ohms (at nominal 24 VDC power). Sensor wires attach to TB1 and are typically connected at the factory. See the manual for wiring to options such as ALARMS, RS-485 Modbus or ISOLATED 4-20mA.



### INITIAL INSTALLATION SETUP

The following procedure is performed at the factory but should be checked again at initial start-up. Uncontrolled variables such as “tinkering” with adjustments or jumper positions may require attention. After installation, this procedure should only need repeating upon replacement of the sensor.

NEW M1 USERS UNFAMILIAR WITH BASIC OPERATION SHOULD SEE **DELAY MODE - CAL MODE - UNITY GAIN MODE** SECTION BEFORE PROCEEDING! Apply M1 power and wait at least one hour for the M1 to stabilize. Place the M1 in CAL MODE, then UNITY MODE as described in the next section.

WITH ZERO GAS ON THE SENSOR the LCD readout (still attached by ribbon cable) should display a reading between -5 to +5 percent of full scale. Using the GDS Corp calibration cup with barbed hose fitting, apply approximately 0.5 liter per minute of 50% SPAN gas to the sensor and wait for the reading to stabilize. So, if full scale is 100 PPM, apply 50 PPM (other gases than 50% may be used but the LCD reading should be within 15-20% of the desired value in UNITY mode.). The horizontal shorting strip pair on JP2 allows use of positive or negative coefficient sensors. For example, H<sub>2</sub>S and CO sensors have a negative coefficient while oxygen is positive. The left “A” position is for positive output sensors and the right “B” position is for negative output sensors.

DO NOT ADJUST MAGNETIC CONTROLS YET! The M1 must be in UNITY mode to complete this step. Confirm the LCD reads from 35 – 65 then proceed to ROUTINE CALIBRATIONS. If outside this window, move JP1's vertical shorting strip left to increase and right to decrease the reading. Note: Shorting strips may also be combined on JP1 to provide additional GAIN combinations. For example, shorting strips in both positions 3 & 4 provide higher readings than 3 or 4 by themselves, but lower than one strip in position 2. JP1 shorting strips are correctly set when 50% SPAN gas applied to a NEW sensor, in UNITY mode, give a reading of 35-65 on the LCD. Proceed to ROUTINE CALIBRATIONS.

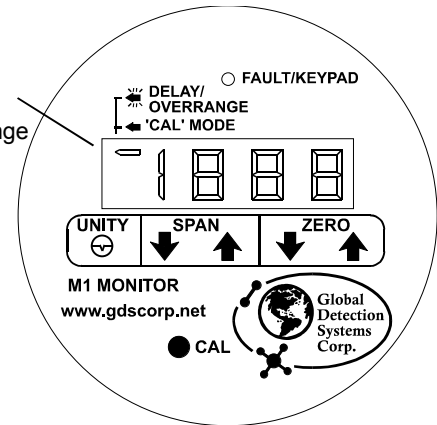
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## DELAY MODE - CAL MODE - UNITY GAIN MODE

One-minute delay modes, during which the 4-20mA signal is locked at 4mA to prevent erroneous alarm trips, are invoked after power-up and upon exiting the CAL MODE. Delay mode is indicated by a slow flashing of the left arrow. CAL Mode is invoked by briefly holding the magnet tool over the CAL key until CAL appears on the LCD. From CAL mode, UNITY GAIN mode is invoked by briefly holding the magnet over the UNITY key. UNITY simply means the magnetic controls are applying no gain and no offset (offset = 0, gain = 1). This allows viewing of the unconditioned signal from the I/O board's amplifier circuit on the LCD. However, remember negative readings may only be viewed in CAL mode. At all other times the M1 suppresses negative readings to 0 until -10% is exceeded causing a FAULT indication.

Left Arrow Indicator  
Steady = Cal Mode,  
Slow flash = Delay,  
Fast flash = Overrange



## ROUTINE CALIBRATIONS (After Initial Setup)

Hold the magnetic wand to the CAL key until CAL appears on the LCD. With ZERO gas applied to the sensor, use the UP/DOWN ZERO keys to zero the LCD reading. Apply a known SPAN gas (typically 50% of full scale) and use the UP/DOWN SPAN keys to obtain the correct gas value reading on the LCD. Hold the wand to the CAL key again to exit the CAL MODE.

## REASONS TO READ THE ENTIRE M1 MANUAL

- Learn to use the "4-20mA Source Mode" feature in section 3.8.
- Learn to use the "End of Sensor Life" (**ESL**) feature in section 3.9.
- Learn to replace sensors without throwing away the stainless steel sensor head in section 4.4.
- Learn to view new *offset* and *gain* settings after calibrations in section 3.3.1
- Learn to configure the LCD full scale reading for other ranges in section 3.7
- Learn about the flashing LCD over-range indication in section 3.2

## SPARE PARTS AND ACCESSORIES

10-0198	Sensor splash guard with remote calibration port
10-0203	Sensor calibration cup
10-0205	Sensor flow cell for process monitoring
10-0187	Sensor replacement tool kit
1000-0076	Small magnetic wand for NEMA enclosures

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