

Parking Garage Carbon Monoxide (CO) Sensor Calibration Procedure

1.0 Maintenance Objective & Frequency

The objective of this procedure is to calibrate carbon monoxide (CO) sensors installed in parking garage ventilation systems to ensure accurate detection of CO concentrations. Proper calibration prevents false alarms and ensures that exhaust fans activate at the correct setpoints (typically 25 ppm for Stage 1 and 50 ppm for Stage 2) to maintain air quality within safe limits. This PM is to be performed every 6 months (semi-annually) or per manufacturer specifications, whichever is more frequent.

2.0 Lockout/Tagout (LOTO) & Safety

- **Electrical Isolation:** Disconnect power to the CO sensor controller or panel at the main disconnect. Apply personal lock and tag.
- **Ventilation System:** Ensure the parking garage ventilation system is in manual mode or locked out to prevent unexpected fan starts during calibration.
- **Confined Space:** If accessing sensors in enclosed areas, follow confined space entry procedures as per local regulations.
- **PPE:** Wear safety glasses, cut-resistant gloves, and a respirator if working in dusty environments. Use a portable CO monitor to ensure ambient CO levels are safe (< 25 ppm) before beginning work.

3.0 Required Tools, Parts & Lubricants

- Calibration gas cylinder: 50 ppm CO in air (or per sensor manufacturer specification)
- Calibration gas regulator with flow control (0.5 L/min recommended)
- Calibration cup or adapter for the specific sensor model
- Digital multimeter (for verifying output signals if applicable)
- Small flathead screwdriver (for zero/span potentiometer adjustments)
- Lint-free wipes and isopropyl alcohol (for cleaning sensor face)
- Sensor data sheet or manufacturer calibration manual
- Personal lock and tag set

4.0 Step-by-Step Maintenance Procedure

1. Perform lockout/tagout on the CO sensor controller and associated ventilation system as per Section 2.0.
2. Visually inspect the sensor housing for physical damage, corrosion, or contamination. Clean the sensor face gently with a lint-free wipe and isopropyl alcohol if dirty. Allow to dry completely.
3. Remove the sensor cover or access cap to expose the calibration potentiometers (zero and span) and the sensor element. Refer to the manufacturer's diagram for exact locations.
4. Connect the calibration gas regulator to the CO calibration gas cylinder. Set the flow rate to 0.5 L/min (or as specified by the sensor manufacturer).

5. Attach the calibration cup or adapter securely over the sensor element. Ensure a tight seal to prevent ambient air dilution.
6. Apply zero gas (clean air or nitrogen) if available, or expose the sensor to ambient air for 2 minutes to establish a baseline. Adjust the zero potentiometer until the sensor output reads 0 ppm (or 4 mA for 4-20 mA output).
7. Turn off zero gas flow. Apply the calibration gas (50 ppm CO) at the specified flow rate. Allow the sensor to stabilize for 2-3 minutes.
8. Adjust the span potentiometer until the sensor output reads exactly 50 ppm (or the corresponding mA value, e.g., 12 mA for a 4-20 mA loop with 0-100 ppm range).
9. Turn off calibration gas flow and remove the calibration cup. Allow the sensor to return to ambient air and verify that the output returns to 0 ppm (or baseline).
10. Reinstall the sensor cover or access cap securely. Ensure all gaskets are properly seated to maintain environmental sealing.
11. Repeat steps 2-10 for each CO sensor in the parking garage. Document the pre- and post-calibration readings on the PM work order.

5.0 Verification & Return to Service

1. Remove all lockout/tagout devices and restore power to the CO sensor controller and ventilation system.
2. Perform a bump test: Apply a known concentration of CO gas (e.g., 25 ppm) to the sensor and verify that the controller triggers the appropriate alarm or fan activation within the specified response time (typically < 30 seconds).
3. Allow the sensor to clear and confirm that the output returns to baseline. Repeat the bump test for each calibrated sensor.
4. Verify that the ventilation system operates correctly by simulating a high CO condition (e.g., 50 ppm) and confirming that Stage 2 fans engage. Return the system to automatic mode.
5. Sign off on the PM work order in ServiceGrid, including calibration dates, results, and any corrective actions taken. Update the sensor calibration sticker with the next due date.

Regulatory Disclaimer: This document is a generic maintenance template provided for educational and informational purposes only. It does not constitute professional engineering or reliability advice. The end-user assumes all liability for validating all step sequences, torque specs, and LOTO protocols against specific machinery OEM manuals before deployment to a live production floor.