BRASCH
ENVIRONMENTAL TECHNOLOGIES

Gas Detector Operation and Maintenance

Rev 2.0
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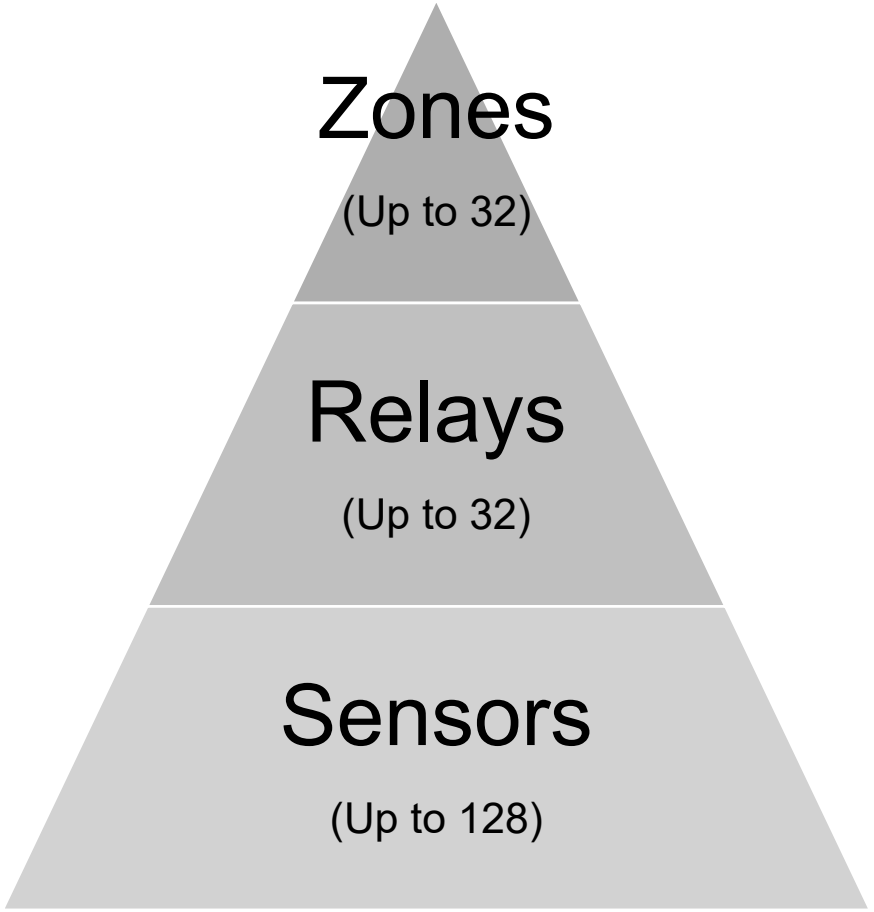
Components

- Sensors
  - Main Component
  - Detect the target gas
  - Require the most maintenance
- Relays
  - Use information provided by sensors
  - Control external equipment
- Zones
  - Logical organization of physical components
  - Management tool
  - Breaks down large areas



Standards

- Agencies
  - OSHA
  - NIOSH
  - ACGIH
- Limits
  - PEL: Permissible Exposure Limit
  - REL: Recommended Exposure Limit
  - TLV: Threshold Limit Value
- Categories
  - TWA: Time Weighted Average
  - STEL: Short-Term Exposure Limit
  - C: Ceiling Limit

OSHA	NIOSH	ACGIH
Carbon Monoxide	**Carbon Monoxide**	**Carbon Monoxide**
PEL – TWA: 50 PPM	REL – TWA: 35 PPM	TLV – TWA: 25 PPM TLV – STEL: 400 PPM
Nitrogen Dioxide	**Nitrogen Dioxide**	**Nitrogen Dioxide**
PEL – STEL: 1 PPM PEL – C: 5 PPM	REL – STEL: 1 PPM	TLV – TWA: 3 PPM TLV – STEL: 5 PPM

Theory of Operation

- Low Alert
  - Minimum threshold for ventilation to activate
  - Presents little danger to occupants
  - Most commonly used to open louvers and turn on low-speed fans
- Medium Alert
  - Gas beginning to rise to potentially dangerous levels
  - Usually increases fan speed or adds more fans
  - May be skipped for fewer alert levels
  - Not present on Brasch Standalone Detectors

Theory of Operation

- High Alert
  - Maximum allowable threshold
  - Occupants should have limited exposure
  - Ventilation equipment operates at maximum capacity
- Alarm
  - Ventilation attempts failed
  - Warning equipment activates
  - Occupants to evacuate the area

Operation Settings

- Setpoint
  - Threshold concentration of gas
    - Represented as PPM (Parts Per Million), % LEL (Lower Explosive Limit), or % V/V (Volume)
- Time Delay
  - Duration equipment waits before turning ON or OFF
  - Compensates for transient gas levels
  - Eliminates rapid cycling of fans
- Analog Outputs
  - Provides singular output for entire zone
  - Available in 4-20 mA, 0.2-1.0 VDC, 1-5 VDC, and 2-10 VDC with zero offset enable/disable
- BACnet IP
  - Communication with BAS/BMS for greater control integration

Other Considerations

- Warm-Up
  - Sensors need time to stabilize
  - Sensor modules prevent readings for 90 seconds
  - Ideal period for total stabilization varies by gas type (20 minutes to 12 hours)
- Overrides
  - Force ventilation/warning equipment ON or OFF
  - Manually activated or scheduled to run automatically
- Fail-Safe
  - Brasch Detectors attempt to run connected equipment during failure conditions
  - Can be avoided if desired

Maintenance

- Cleaning
  - Keep vents and holes clear of dust and debris
    - Brasch Detectors use louvered vents and slotted drainage holes for airflow
    - If airflow is restricted, proper operation will be compromised
  - Wipe filters clear of any contaminants
    - Each sensor has a filter on top that needs to be clear to function optimally
  - Remove any minor corrosion from circuit boards
    - High humidity environments are especially prone to damage from condensation
    - Use light chemicals
    - Dry completely
    - Never touch electronic components while power is applied
  - Detectors are NOT waterproof – do not perform wash-downs

Testing

- Types
  - Response
    - Ensures the sensor reacts well enough and quickly enough
    - Can be performed with improvised equipment
    - Often referred to as bump testing
  - Analytical
    - Determines the sensor's exact deviation from acceptable tolerance
    - Requires specialized equipment including NRTL certified gas
    - Usually only required for formal inspections
    - Often referred to as a calibration check
- Frequency
  - Depends on state/local codes
  - Brasch recommends testing response once or twice per year
  - Anticipated recalibration timeframe varies by gas type (6 months to 2 years)

Calibration

- Tolerances
  - Maintain within approximately 10-15%
  - May vary depending on state/local regulations
- Test Gas Kit
  - Perform your own calibration using a tank of calibration ga
  - Brasch offers a test gas kit that includes everything require
- Calibration Values
  - CO Sensors: 100 PPM CO
  - NO_2 Sensors: 5.0 PPM NO_2
  - CH_4 and C_3H_8 Sensors: 50% LEL CH_4
  - H_2 Sensors: 50% LEL H_2
  - O_2 Sensors: 0% O_2 (100% N_2), 20.9% O2 (Zero Air)

Sensor Replacement

- Sensor Modules
  - Pluggable (Hot Swappable)
  - Factory-Calibrated
- Calibration Expiration
  - Quicker and easier than full calibration
  - More cost effective in smaller quantities
- End-of-Life
  - Sensors are completely depleted
  - Module must be replaced

Resources

- Brasch
  - Website
    - White Paper
    - Recalibration
    - Downloads
  - Customer Service
    - customerservice@braschenvtech.com
    - 314-291-0440 Option 1
  - Technical Support
    - support@braschenvtech.com
    - 314-291-0440 Option 2