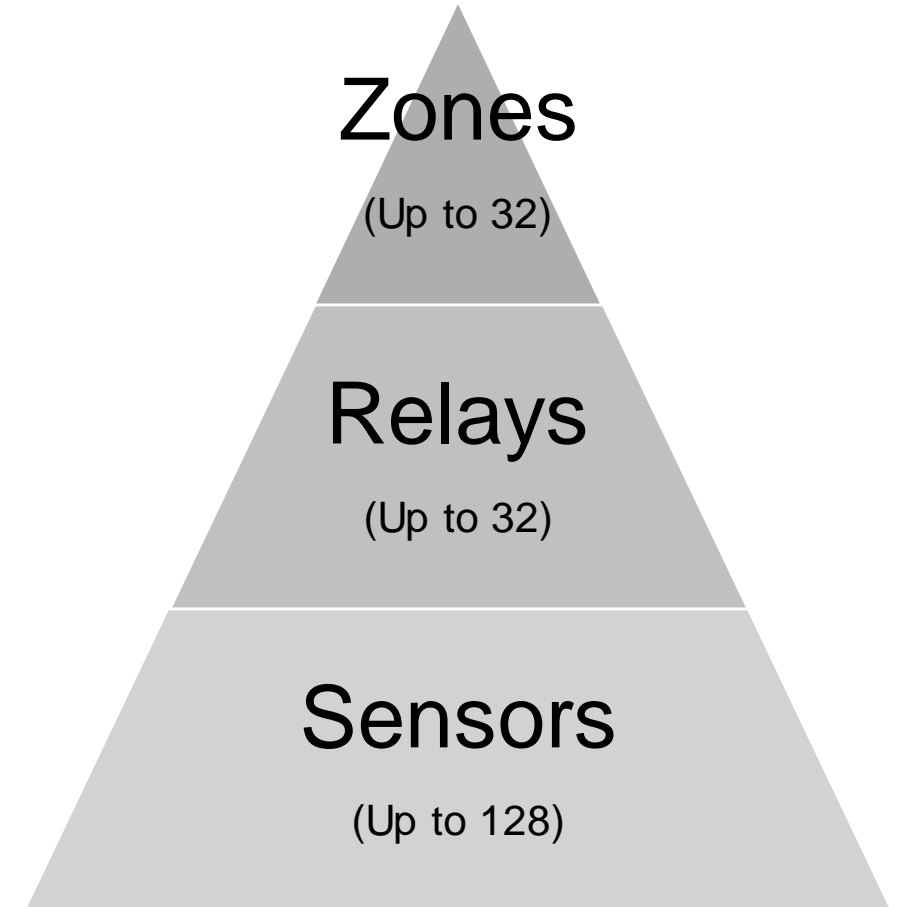# Gas Detector
Operation and Maintenance

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

Zones
(Up to 32)

Relays
(Up to 32)

Sensors
(Up to 128)

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

Carbon Monoxide
PEL – TWA: 50 PPM

Nitrogen Dioxide
PEL – STEL: 1 PPM
PEL – C: 5 PPM

NIOSH

Carbon Monoxide
REL – TWA: 35 PPM

Nitrogen Dioxide
REL – STEL: 1 PPM

ACGIH

Carbon Monoxide
TLV – TWA: 25 PPM
TLV – STEL: 400 PPM

Nitrogen Dioxide
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
- 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
- BACnet IP
  - Communication with BAS/BMS for greater control integration

Other Considerations

- Warm-Up
  - Sensors need time to stabilize
  - Brasch Detectors prevent readings for 150 seconds
  - Ideal period is 2 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 white 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 is approximately 2 years

Calibration

- Calibration Values
  - CO Sensors: 100 PPM
  - NO_2 Sensors: 5.0 PPM

- Tolerances
  - Maintain within approximately 10-15%
  - May vary depending on state/local regulations

- Options:
  - Field Calibration
    - Perform your own calibration using a tank of calibration gas
    - Brasch offers a test gas kit that includes everything required
  - Factory Calibration Kit
    - Receive a new, factory calibrated sensor board to replace the existing one
    - No calibration experience necessary

Resources

- Brasch
  - Website
    - White Paper
    - Recalibration
    - Downloads
  - Customer Service
    - customerservice@braschenvtech.com
    - 314-291-0440