DuoSense-M

Vehicle Emissions Gas Detection System

CTI GAS DETECTION SPECIALISTS

The most reliable and cost effective system for your distribution center and parking structure

- Continuously monitor CO and NO_2 levels and operate ventilation only when needed.
- Designed and manufactured in the USA.
- Backed by a national service team and an excellent two year warranty.

DuoSense-M

The most reliable and cost effective choice for vehicle emission detection

M255: The Controller

- 4-Channel Modbus Gas Detection Controller
- 255 device capacity
- 8 programmable relay outputs
- 10" color touchscreen for excellent at-a-glance information
- Intuitive menu navigation for easy setup and operation
- 2-year warranty

DuoSense-M: The Detector

- CO and NO2 sensors on board
- 7-year CO and 3-year NO2 typical cell life
- Gas specific electrochemical sensors = no false alarms.
- Onboard display screen for easy programming and calibration
- Safety cage kit protects detector from damage
- Detection range of 0-200 ppm CO, 0-10 ppm NO2
- 2-year warranty

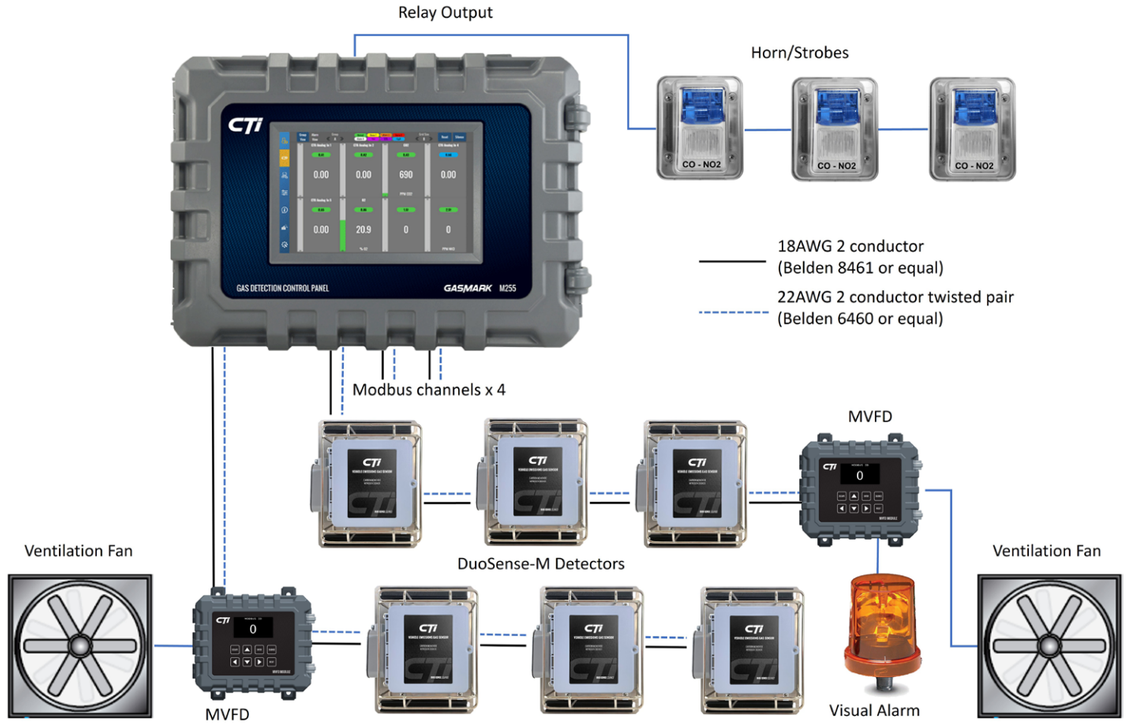
MVFD: The Fan Controller

- Up to three relay outputs for fan speed control
- Locate anywhere on the RS-485 Modbus channel
- Easy set up, 2-year warranty

SHA-24-Blue: The Audio Visual Alarm

- Horn/Strobe assembly, 24 VDC
- Gray body with blue, amber, red, green, or clear lens
- Weather proof mounting backbox
- Horn and strobe operate independently or simultaneously

CO/NO2 Monitoring System Example



CO Alarm Setpoints (Programmable)	
0-200 ppm	activate mechanical, non-latching ventilation
0-200 ppm	activate audio visual evacuation alarm

NO2 Alarm Setpoints (Programmable)	
0-10 ppm	activate mechanical, non-latching ventilation
0-10 ppm	activate audio visual evacuation alarm

Equipment List

Part Number	Description	Application
M255	Controller with Modbus	Monitor gas detection system
DuoSense-M	CO-NO2 Gas Detector	CO-NO2 gas detection
SHA-24-BLUE	Strobe/Horn assembly 24vdc	Audio/Visual
MVFD	VFD Device	Fan motor control

Typical Application

Detector **Range**

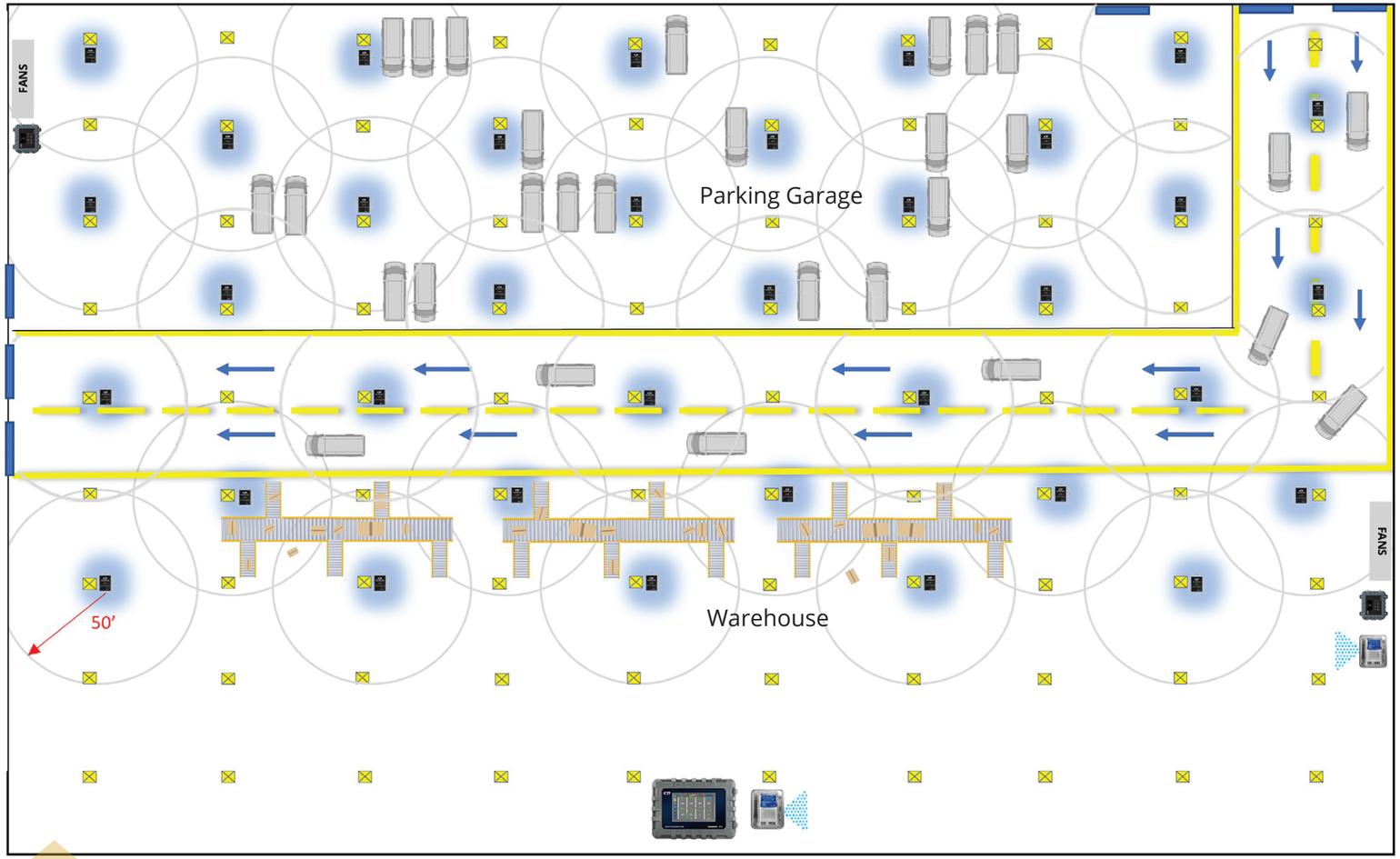
Each DuoSense-M has a detection radius of 50 feet. The sensor element uses the diffusion method to evaluate and monitor the surrounding air quality and measure NO2 and CO levels.

Detector **Placement**

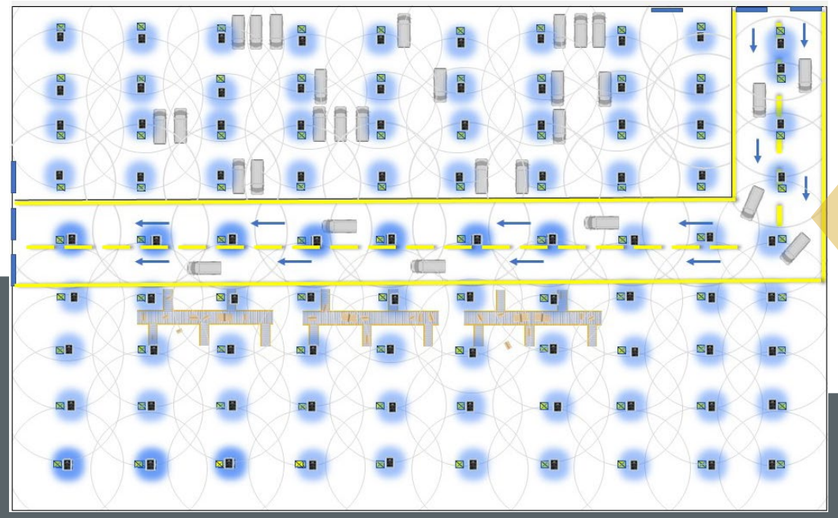
Detectors should be mounted approximately 3 - 5 feet above finished floor, in the typical human breathing zone.

Detector **Quantity**

Based on typical construction, a sensor should be placed on every other support column in an alternating pattern. This will ensure that no area is left unprotected. By only selling you the number of detectors you really need, CTI saves you money on both the initial installation and ongoing calibration and maintenance.



CTI’s System Layout
Sensors placed on every other support column and concentrated in areas containing vehicles and personnel.



Competitor’s System Layout
Sensors placed on every support column creating unnecessary overlap and inflated initial installation and ongoing maintenance costs.

Variable Frequency **Adaptation**

The MVFD facilitates direct communication between the detectors and the ventilation fans. It eliminates the need for an additional control wiring run.

Audio Visual **Requirements**

SHA-24 horn strobes provide immediate warning to alert personnel of dangerous gas levels. They should be installed at every exit.

Diagram Key

- Support column
- DuoSense-M
- M255 Controller
- SHA-24 Horn Strobe
- MVFD
- Detection Area Covered

866-394-5861
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Delivery Lead Time

All orders ship from our facility in Columbia, Missouri. We keep products in stock and ready to ship within one day after receipt of order. Our production facilities and shipping departments are fast, reliable, and dependable.
All shipments come with a tracking number so you can monitor the progress of your equipment as it is in route to your facility.

Lower Costs and Quick Quotes

Our application engineers help you design a system that meets safety requirements without unnecessary redundancy. By installing only the number of detectors you need, you will save money on both the initial install and long-term maintenance costs.

Working directly with the manufacturer helps you get the best price and quick responses to questions and quotes.

Unmatched Warranty

CTI stands by our equipment with excellent warranties. Our M255 controller is guaranteed for two years. The two year warranty on the DuoSense-M includes the sensor elements.

A quick call or email to CTI begins the no-hassle warranty process.

Post Installation Support

Our nation-wide, factory-certified field service team is ready to commission and maintain your gas detection equipment. The field service department is backed by our in-house support experts. When you call CTI, you will be greeted by a real person, not a recording. You will have direct access to experienced engineers who have the knowledge and authority to solve any problems you might be having.

Made in the USA

All CTI equipment is designed, manufactured and shipped from our headquarters in Columbia, Missouri. We are proud to be a privately held, family owned business in the heart of our country. We stand by our products and believe that customer service always wins.

Factory-Direct Support

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M255 Data Sheet

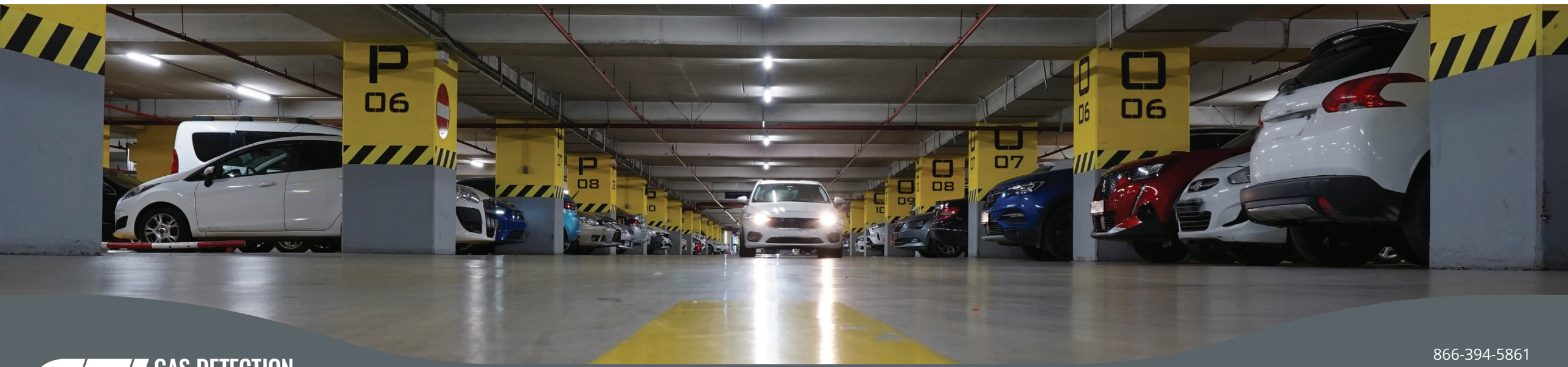
- **Input Power:** 120Vac, 3A / 240Vac, 2A, switch-selectable
- **DC Power Available For Sensors:** 24Vdc, 6.5A
- **Communications:** RS-485 Modbus RTU, 4-channels (sensors only)
- **BMS/BAS/PLC Comms:** ModBus, BACnet, and Ethernet
- **Maximum Device Capacity:** 255
- **Maximum Sensor Cable Length:** 4,000 feet per channel
- **Relays:** 8 Form C, 8A, programmable
- **Display:** 10” color touchscreen for operator interface
- **Operating Temperature:** +32 to +104°F (+0 to +40°C)
- **Operating Humidity:** 0-95% non-condensing
- **Enclosure:** NEMA 4X Polycarbonate with hinged lid
- **Warranty:** two years

DuoSense-M Data Sheet

- **Input Power:** 24Vdc, 20mA
- **Detection Principle:** Electrochemical
- **Detection Method:** Diffusion
- **Gases:** Carbon Monoxide (CO), Nitrogen Dioxide (NO2)
- **Range:** 0-200 ppm (CO), 0-10 ppm (NO2)
- **Display:** 1” LCD
- **Pushbuttons:** (4) for setup and maintenance
- **Communications:** RS-485 Modbus RTU
- **Temperature Range:** -4 to +122°F (-20 to +50°C)
- **Enclosure:** Polycarbonate, NEMA 3RX, hinged lid and captive screw
- **Warranty:** two years (including sensor elements)

MVFD Data Sheet

- **Input Power:** 24Vdc, 150mA
- **Relays:** (3) Programmable SPDT, Form C dry contacts, 8A @ 24Vdc or 10A @ 120-240Vac
- **Operator Interface:** 2.7” OLED display with (8) pushbuttons
- **Communications:** RS-485 Modbus RTU (M255 controller compatibility only)
- **Temperature Range:** -4 to +122°F (-20 to +50°C)
- **Enclosure:** Polycarbonate, NEMA 4X, hinged lid and captive screw
- **Warranty:** two years



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Vehicle Emissions

System Overview

Following is a discussion of Carbon Monoxide (CO) and Nitrogen Dioxide (NO2) detection for facilities such as parking structures, loading docks, and delivery facilities where gasoline and/or diesel exhaust is expected to accumulate. There are numerous institutions, societies, organizations and government agencies such as ASHRAE, IMC, UMC & UBC that have established codes and standards to address the limits of CO and NO2 for parking structures. Most building codes allow for demand-based ventilation in parking structures by monitoring CO & NO2 levels. This type of system can drastically reduce operating costs by limiting the time ventilation fans need to be running. The design of a garage exhaust system should be based upon the local codes for your jurisdiction.

Design Parameters

1. Purpose

The Purpose of this document is to provide guidance on placement of sensors and alarm settings where vehicle exhaust (carbon monoxide and nitrogen dioxide) monitoring equipment is required or recommended.

2. Responsibility

2.1.1 Building / Real Estate Design: design building and install equipment to meet parameters outlined below including activating ventilation systems.

2.1.2 Facilities Maintenance or Designee: Maintain and test sensors and functions.

2.1.3 Safety Team of Designee: train associates on emergency procedures in the event of an alarm.

3. Requirements

3.1 Sensing equipment

3.1.1 Sensor equipment to detect airborne concentrations of potential vehicle exhaust contaminants will be installed throughout each structure where vehicles routinely enter or exit the building and may run idle or park. Sensors for carbon monoxide (CO), and nitrogen dioxide (NO2) will be present.

3.2 Placement of sensors

3.2.1 Dual sensors (CO and NO2) or CO only will be placed at 3-5 feet from the floor unless noted otherwise from the sensor manufacturer;

3.2.2 Sensors measuring for NO2 only will be placed at 1-3 feet from the floor unless otherwise noted from the sensor manufacturer.

3.2.3 Sensors will be located in areas of the building where vehicles are present.

3.3 Quantity of Sensors

3.3.1 The quantity of sensors is dependent on the size and complexity of a building and should follow the recommendations of the manufacturer of the sensor equipment. Typically, area sensors cover an area of 7,000 square feet. In wide open spaces this coverage may expand to 9,000 square feet;

3.3.2 Total quantity of sensors may be increased based on local requirements or building configuration

3.4 Alarm Methods

3.4.1 Detection sensors will have a minimum of two alarm points. The first alarm point will activate mechanical ventilation and is not required to be an audible alarm. The 2nd alarm point will sound a horn strobe alerting occupants to evacuate the area.

3.5 Alarm Parameters

3.5.1 Recommended alarm parameters will be as follows unless otherwise specified by the local authority having jurisdiction (AHJ) for your area.

3.6 Alarm Response

3.6.1 Mechanical ventilation will remain active until airborne concentrations have dropped below the low alarm activation point

3.6.2 Audio/Visual horn strobes will remain active until airborne concentrations have dropped below the high alarm activation point. Ventilation will continue to until it drops below the low alarm activation point

3.7 Preventative Maintenance and Calibration

3.7.1 Equipment will be calibrated and maintained per manufacturer schedule. CTI recommends maintaining a 6 month calibration schedule.

3.7.2 Owner may consider using factory-authorized service representative to perform the 6 month calibration procedure.

Equipment

Equipment notes

- All controllers and sensors shall be manufactured by CTI - Phone number 866-394-5861.
- See Equipment table for part numbers and function descriptions.
- See Warning and Alarm setpoints table for recommended setpoints.

Controller

- Provide a M255 controller to monitor all fixed sensors. The controller shall be equipped with programmable alarm relays to activate external horn/strobes, exhaust fans, and monitoring systems.
- The controller shall provide two alarm setpoints per channel.
- The controller shall provide RS-485 Modbus RTU communications with detectors.
- The controller shall provide +24 Vdc to power all connected detectors.
- The controller shall provide an LCD operator interface for simple menu-driven programming.
- The controller shall provide a horn relay which is silenceable from the LCD operator interface.
- The controller shall provide an alarm log to record and store all events.
- The controller shall provide a calibration mode which locks relay outputs for detector maintenance and calibration.
- Controller shall supervise wire runs and indicate a fault if communication with detectors is lost.

Detectors

- Parking structure, or facility where CO & NO2 are expected to accumulate
  - Provide (1) DuoSense-M in all areas within 50’ of where CO and NO2 are expected to accumulate.
  - Locate detectors in the breathing zone at 3 - 5 feet above finished floor.
  - The detector’s circuit boards shall have a protective conformal coating.
  - The detector shall have a polycarbonate enclosure.
  - The detector shall have RS-485 Modbus RTU communications.

Variable Frequenty Device

- The MVFD has three relays to provide control of the ventilation fans and eliminates the need for an additional wire runs.
- The MVFD relays can also be used for remote control of horn/strobes.

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NO FALSE ALARMS. Our detectors thrive where others fail.

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