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## **TYPICAL SPECIFICATIONS FOR ACME MGMS SERIES MULTIPOINT, MULTIGAS DETECTION AND CONTROL SYSTEMS**

- 1.0** Supply and install as shown on drawings an ACME Multi Gas Multi Point (MGMS) Series Centralized Detection and Control System consisting of the following:

A quantity of XXX MGMS-CM Control Module and a quantity of XXX MGMS-SM CO/NO2 combo sensors and a quantity of 9 RA-1 strobe/horns.

Note: Panels and Remote Sensor/Transmitter stations shall be by the same manufacturer.

### **1.1 DESCRIPTION**

The system shall use an addressable RS485 communication protocol capable of handling each monitored area as a fully independent zone with its own alarm levels, and relay/analog outputs. Each sensor shall be sequentially polled by the Control Panel. Sensor data shall be acquired and stored in the Control Modules memory. This data will be exportable for analysis.

The modular gas detection network shall be capable of communicating, in real time, the readings from any of the sensors and operational status of all components on a display panel located on the MGMS-CM Control Module and through an internet-based interface. A push/pull notification app will warn custodians of any alarm conditions or maintenance issue. The modular architecture of the MGMS shall make it possible to add different types of modules such as relay output modules (MGMS-RM), analog out modules (MGMS-AOM) and power modules (MGMS-PM) to fully customize the network to the projects requirements.

- 1.2** The ACME MGMS Series Multipoint System shall use only a common 2 Conductor Multi-Conductor Cable Gray 14 AWG for power and 24 AWG stranded (7x32) TC conductors, polyethylene insulation, twisted pairs cable for the communication link between the Control Module and the local Sensing Modules. An ethernet connection shall be made available for the MGMS-CM so that an internet connection could be used to communicate with MGMS-APP application.
- 1.3** The Control Module shall have LEDs to provide full-time status of the entire gas detection network. The MGMS-CM shall have a LED indicating normal operation, low level, high level and alarm level. The MGMS-CM shall connect to a touch screen for programming and display purposes. The display shall be arranged so that each sensing node shall have its own icon on the networks display and on the MGMS-APP. The color of the channel indicator will be green for normal, yellow for LOW, orange for HIGH and red for ALARM gas levels. Each sensor will have its own icon on the screen providing the exact ppm reading on the part of each sensor. Each sensor/icon on the display will be customizable so that information concerning the exact physical location of the unit could be added. The touch screen display shall have fully customizable screens, so that sensors could be arranged in zones or by physical location.
- 1.4** The network activation sequence and all programmed customization shall be stored in the MGMS-CM Control Module. Loss of power to the MGMS-CM shall not require a reprogramming of the unit.



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- 1.5** The Control Module shall be capable of communicating readings to the internet for remote monitoring of the network. Although the gas detection network shall leave the factory fully programmed, the MGMS-CM will be capable of being programmed or updated via an internet-based app. All parameters of the activation sequence shall be capable of being monitored and adjusted directly at the panel or through an internet-based app.
- 1.6** The system shall have all its components, including the Control Module, Relay Module and Analog Output Module mountable on a din rail block or installed in a modular method with a central Control Module and remote Relay and Analog Output Modules. When in a modular configuration, the Relay Modules and Analog Output Modules could be mounted in any location within the network. The MGMS-CM shall be capable of a minimum quantity of 96 Relay Modules and 96 Analog Output Modules, each module having 8 outputs (relays or analog)
- 1.7** The equipment shall be CSA and/or ETL certified.



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## **2.0 OUTPUTS**

### **2.1 "ON - OFF"**

The MGMS-CM Control Panel shall incorporate the necessary logic circuits to operate the exhaust/supply fans and the motorized dampers for fresh air and/or exhaust according to the specified logic of ventilation. For example, if the ventilation system does not succeed in reducing the concentration rates below preset thresholds within specific time limits, the MGMS shall be capable of sending additional notifications. In those situations, the MGMS shall be capable of energizing strobe/horns, send notifications on the MGMS-APP internet based application

### **2.2 CONSTRUCTION**

The MGMS-CM Control Module shall be either surface mounted or dinrail mounted, within a noncorrosive plastic housing. All electronic components shall be behind a locked door. There shall be no accessible switches or knobs on front of panel (except for override if specified). All electrical connections should be made to clearly identified terminals.

### **2.3 SELF-CHECKING**

Integrity of the system shall be under constant checking. Should a remote station not confirm a response, a fault condition will be displayed at the Control Module, the touch screen display and the web based application. with indication of faulty station location. A common alarm shall be locked in.

### **2.4 TIME DELAY**

The Control Panel shall include a time delay of approximately 30 minutes scheduled between the time a High Level is detected and the time visual display on unit cover or panel, audible alarm and closure of alarm contacts. This time delay is introduced in order to avoid nuisance alarms produced by short temporary conditions. The time delay also allows the ventilation equipment, previously started at a lower gas level below alarm conditions, a reasonable length of time to reverse the gas trend.

### **2.5 TIME BASED ACTIVATION**

The MGMS-CM control panel shall be capable of activating peripheral devices , such as the ventilation, based upon a seven (7) day calendar.

### **2.6 ZONE BASED ANALOG OUTPUTS**

The command module shall be capable of creating zones based on location or gas type, so that an analog output (4-20mA, 0-5Vdc or 0-10 Vdc) can be generated for each zone.

### **2.7 INTERNET COMPATIBILITY**

The network shall have the ability to communicate operational status, alarm conditions and maintenance issues via an internet based app.

### **2.8 BACnet**

The MGMS network shall be equipped with a BACnet (IP an MSTP) interface. This interface shall permit the BMS to read all of the MGMS's points as well as permit the BMS to override relays and analog outputs through the write portion of the interface.

### **2.9 Modbus**

The MGMS shall be equipped with a Modbus interface that provides the same capabilities as the BACnet interface.



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### **3.0 SENSOR STATIONS**

**3.1** The wall or column mounted gasketed enclosures with vandal-proof cover screws or a lockable clasp and shall not have any parts accessible from outside.

### **3.2 RESPONSE**

The local reaction time of the ACME MGMS-SM Sensing Modules shall be in the order of a few seconds. The MGMS-SM shall employ gas detection sensing elements that are gas specific, relative humidity and temperature compensated, therefore avoiding unnecessary start-stops of ventilation equipment through false positive readings.

**3.3** The MGMS-SM response to ambient conditions shall be interpreted by the detection circuitry according to selected levels. Information is converted for transmittal to Control Panel at scanning time.

**3.4** The MGMS-SM Sensor/Transmitter stations shall have LED's for visual indication of "Power-On", and "Fault" conditions.

**3.5** Removing or disconnecting a local sensor station from the system shall not affect its operation as long as the "daisy-chain" connection to the other sensor stations is maintained.

**3.6** The sensors shall be equipped with clip in/clip out sensing nodes for ease of maintenance. These sensing nodes shall be precalibrated. The nodes shall be intelligent so that they automatically communicate the gas detected and the sensors range to the control panel, therefore eliminating the need for adjusting the control panel's activation sequence.

**3.6** CO electrochemical sensing cell shall have a normal life expectancy of 7 years. The NO<sub>2</sub> electrochemical sensing element shall have a life expectancy of two years. Both sensing elements shall be temperature and relative humidity compensated for greater accuracy.

**3.7** Communication between the MGMS-CM control panel and the MGMS-SM sensor modules shall be via daisy chain RS485 network. Each parking garage level shall have its own communication channel so that installation costs are kept to a minimum.

**3.8** The electrochemical CO/NO<sub>2</sub> MGMS-SM sensing elements shall be spring mounted for ease of sensor replacement. Sensors that are soldered to a PCP board that can NOT be replaced in the field are NOT acceptable.

**3.9** The sensors shall also be capable of reporting temperature and relative humidity levels back to the control panel. The control panel shall be capable of incorporating those parameters in the activation sequence.

**3.10** The MGMS-SM shall require no additional maintenance other than the replacement of sensing nodes (SN-XX) once the nodes have reached end-of-life.



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#### 4.0 INSTALLATION

**4.1 Wiring :** The interconnections between the Control Panel and Sensors shall be made via 5 communication busses.. Each bus shall support a total length of 3000 ft and a maximum of 50 sensors.

**For CO/NO2 (Diesel Fumes):** remote sensor stations must be mounted vertically at heights between 4 ft. (1.20 m) and 6 ft.(1.80 m) .

**4.2** The MGMS network should be energized at all times. Supply 24 Vdc 10A from dedicated circuit. It should be impossible to disconnect power to an MGMS system in order to service other equipment.

**4.3** All equipment shall be interconnected at the factory and shipped factory calibrated after a 7-day operational test. The logic of the system shall be factory tested by simulated field conditions as specified. A report shall be furnished with the equipment.

**4.4** All electrical connections shall be made by the electrical contractor according to diagrams shown on drawings furnished with the equipment by the manufacturer. Use 4-wire coded cable from station to station, maintaining color code. All wiring is low voltage (24V).

**4.5** Although the MGMS shall be field configurable, the network shall leave the factory fully programmed. The activation sequence shall be preprogrammed in to the MGMS-CM panel, and tested, at the time of manufacturing, for a period of five days.