



Trimex Ind. Bldg., PMB #10
2330 State Route 11
Mooers, NY 12958
Tel. : (518) 236-5659
Fax : (518) 236-6941
E-mail : info@acmeprod.com
Web site : www.acmeprod.com

TYPICAL SPECIFICATIONS FOR ACME CEL(LS) MegaSet MULTIPOINT, MULTIGAS DETECTION AND CONTROL SYSTEMS

1 Engineering Specifications For:

Large Parking Garages / Maintenance Garages

CATEGORY 1 -

Suitable for large-scale projects where the ventilation system will be controlled either directly by the Acme MegaSet system or indirectly via Bacnet interface or other BMS protocols. Up to 256 sensors addressable on a common RS485 network.

1.0 Supply and install as shown on drawings an ACME MegaSet Series Multipoint & Multigas Centralized Detection and Control System consisting of the following:

A quantity of ___ CEL-Series Control Panels and a quantity of ___ GasPost CO Sensor/Transmitters and a quantity of ___ GasPost NO₂ Sensor/Transmitters (maximum of 256 Sensor/Transmitters per panel).

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

DESCRIPTION

- 1.1** The system shall use an addressable RS485 communication protocol. Each sensor shall be sequentially polled by the Control Panel. Sensor data shall be acquired and stored in the Control Panel memory.
- 1.2** The ACME MegaSet CEL(LS) Series Multipoint System shall use only a common 4-wire 14 gauge communication link between the Control Panel and the local sensor stations.
- 1.3** The Control Panel shall have an LCD screen to display each sensor location and the corresponding gas reading. The color of the channel indicator will be green for normal, yellow for LOW, orange for HIGH and red for ALARM gas levels.
- 1.4** The Control Panel shall be provided with a USB keyboard and mouse to set up/modify system parameters and configuration.
- 1.5** The system shall have all of its components, including the controller, the LCD screen, RS-485 communication module, power transformer and relay outputs boards (unless remote relay modules are specified – see options) in a single enclosure. Multiple enclosures requiring inter-wiring are not acceptable.
- 1.6** The Control Panel shall be shipped already configured at the factory so that the gas detection network is “plug-and-play”. It shall be possible to revise the configuration of the controller in the field in the event of upgrades and other modifications.

1.7 Control Panel shall have up to eight RS-485 communication channels to avoid unnecessarily long wiring runs and overloading.

1.8 The equipment shall be CSA (Canada/USA) certified. Equipment shall be manufactured within ISO 9001 manufacturing environment.

2.0 OUTPUTS

2.1 "ON - OFF"

The 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. Should the equipment operated by the 100 PPM CO contacts not reduce the CO level below this value within 30 minutes (3 to 60 minutes adjustable), and/or should a 3PPM NO₂ concentration be reached at any NO₂ sensor, the Control Panel shall go on visual and audible alarm (rating of no less than 65 dB at a distance of 3 feet) and also provide a contact for remote alarm indication or supervision. Control Panel shall be capable of incorporating common alarm relays and relays dedicated to each sensor. Relay rating shall be no less than 3A at 120V.

2.2 CONSTRUCTION

The MegaSet CEL (LS) Control Panel shall be of solid ventilated 16 gauge steel construction. 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-DIAGNOSIS

The CEL (LS) system shall continuously interrogate/test itself for system integrity. Should a remote station fail to communicate with the Control Panel, the latter shall display fault for that station (channel). Additionally, if a central or network malfunction occur in the system, an error code shall will be displayed identifying the nature of the problem. In either case an common alarm sound at the Control Panel.

2.4 TIME DELAY (APPLICABLE TO CO SENSORS ONLY)

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.

3.0 SENSOR STATIONS

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

3.2 The local reaction time of the Acme GasPost sensors shall be in the order of a few seconds therefore avoiding all potential hazardous situations by immediately activating the ventilation equipment.

3.3 The sensor's 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.



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- 3.4.CO/NO2 Sensor/Transmitter stations shall have LED's for visual indication of "Power-On", and an LED bar graph indicating at-a-glance concentration levels.
- 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 There shall be no maintenance required except for yearly simple calibration checks performed by introducing a known gas mixture into the sensor and verifying or adjusting the electronic response at the sensor location.
- 3.7 CO and NO2 sensors shall be of electrochemical type and shall have a useful life of no less than 5 years for the CO and 2 years for the NO2 sensor. Sensing elements shall be gas specific, temperature and humidity and RFI compensated and with an accuracy of no less than 3% of the reading.
- 3.8 Sensing elements that are compound generic and lack temperature and humidity compensation that are prone to false positives creating false alarms and require more than a calibration a year are no acceptable.

4.0 INSTALLATION

4.1 Wiring : The interconnections between the Control Panel and Sensors shall be made by a required number of branches consisting of 4 conductor 14 gauge wires. Each branch shall support a total length of 800ft and a maximum of eight (8) sensors.

For CO (Standard Gasoline Fumes): remote sensor stations must be mounted vertically according to the arrow on the sensor. Heights between 4 ft. (1.20 m) and 6 ft.(1.80 m) are usual. Locations where a parked vehicle may exhaust directly into the sensor should be avoided. Where sensors are mounted on columns, the preferred side should be outside the usual lane of traffic.

For NO2 (Diesel Fumes), Methane, and Hydrogen: remote sensor stations must be mounted vertically according to the arrow on the sensor. Installation heights between 12 to 18 inches below the ceiling are typical.

Refer to table for the determination of quantities and alarm settings:

TOXIC GASES	FIRST ALARM SET POINT (TLV-TWA)	SECOND ALARM SET POINT (TLV-STEL)	RADIUS OF COVERAGE
Carbon Monoxide (CO)	25 PPM	100PPM	50 feet
Diesel (NO ₂)	1 PPM	3 PPM	50 feet

- 4.2** The MegaSet systems should be energized at all times. Supply 120/1/60 - 15A from dedicated circuit. It should be impossible to disconnect power to a MegaSet 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 field wiring to sensor stations shall be low voltage (24V).
- 4.5** Gas detection network shall be tested by a factory authorized representative. A minimum of 25% of the sensors shall be tested by injecting the target from certified gas cylinders. The Control Panel's sequence of operation shall be tested by simulating alarm levels with the use of gas cylinders.

5.0 OPTIONS

5.1 Fan Override Control:

Provide the Control Panel with auto-hand selector switches and pilot lights to manually override all of the fans controlled by the system. The switches shall be mounted on the Control Panel door and be accessible from outside.

It shall be possible to order key-operated override switches.

It shall be possible to order timers to work in conjunction with the override switches so that the fans run manually for a finite interval and then stop.

5.2 Battery Backup:

Provide the Control Panel with a built-in battery back-up to maintain the system in operation during a power failure. The battery used shall be compact and rechargeable and located inside the locked Control Panel.

5.3 Remote Relay Modules:

The MegaSet system shall be provided with a quantity of _ Remote Relay Modules (RRM) for the remote activation/deactivation of fans and dampers or other equipment controlled in the building. The RRM's will be fully addressable on the same RS485 network used for the sensors. The RRM's will be integrated into the system and configured via the control panel software. The maximum number of RRM's per panel shall be 94, each RRM will support up to 8 DPDT relays.

- 5.4** The Remote Relay Modules shall also be used to provide the Control Panel with Fan on/off status feedback signals. Current transformers, air switches or other devices used to confirm fan operation shall be provided and installed by _.

5.5 Remote Alarm Station:

Provide a Remote Alarm Station furnished with Audible/Visual alarm with silencing button.

5.6 BACnet:

The MegaSet shall be capable of communicating with the BMS via BACnet IP protocol in both READ and WRITE modes.

5.7 Start-up:



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Once the installation of the MegaSet is completed, a representative of ACME ENGINEERING shall check, test and start the system. A written report shall be submitted to the owner/engineers or contractor.