SECTION 28 42 00

GAS DETECTION AND ALARM

Display hidden notes to specifier. (Don't know how? [Click Here](https://www.arcat.com/sd/display_hidden_notes.shtml))

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\*\* NOTE TO SPECIFIER \*\* CONSPEC Controls Inc.; Gas Detection Instruments and Controls.  
This section is based on the products of CONSPEC Controls Inc., which is located at:6 Guttman Blvd.Charleroi, PA 15022Toll Free Tel: 800-487-8450Tel: 724-489-8450Email: [request info (null)](https://arcat.com/rfi?action=email&company=CONSPEC%252BControls%252BInc.&message=RE%253A%2520Spec%2520Question%2520(13850cop)%253A%2520&coid=54019&spec=13850cop&rep=&fax=)  
Web: [https://conspec-controls.com/?utm\_source=arcat&amp;utm\_medium=referral](https://conspec-controls.com/?utm_source=arcat&utm_medium=referral)   
 [ [Click Here](https://arcat.com/company/conspec-controls-inc-54019) ] for additional information.  
CONSPEC Controls is an internationally recognized gas detection system company and is a leader in the design, development, and manufacturing of gas detection instruments and control systems. Since 1968, Conspec has offered a complete array of products, ranging from fully integrated installations to stand-alone independent devices.  
Our user-friendly devices are engineered to coexist and interface with both new and existing control equipment. We combine state-of-the art manufacturing with cutting-edge research to create specialized instrumentation and equipment that meets individual customer applications and requirements.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Controllers.
    2. Gas monitors.
    3. Remote transmitters.
    4. Wireless monitors.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Division 26 - Electrical.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. CSA Group (CSA).
    2. California Title 24 - Building Standards Code.
    3. European Standards (EN):
       1. EN50014 - Electrical apparatus for potentially explosive atmospheres - General requirements.
       2. EN 50018 - Electrical apparatus for potentially explosive atmospheres - Flameproof enclosure 'd'.
    4. Federal Communications Commission (FCC).
    5. FM Global (FM).
    6. National Electrical Code (NEC).
    7. Underwriters Laboratories (UL):
       1. UL 61010-1 - Safety Requirements for Electrical Equipment For Measurement, Control, and Laboratory Use; Part 1: General Requirements.
       2. UL 2075 - Gas and Vapor Detectors and Sensors.
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00.
     2. Product Data:
        1. Manufacturer's data sheets on each product to be used.
        2. Preparation instructions and recommendations.
        3. Storage and handling requirements and recommendations.
        4. Typical installation methods.

\*\* NOTE TO SPECIFIER \*\* Delete if not applicable to product type.

* + 1. Verification Samples: Two representative units of each type, size, pattern, and color.
    2. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.
  1. QUALITY ASSURANCE
     1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum of five years documented experience.
     2. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
     3. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
  2. PRE-INSTALLATION CONFERENCE
     1. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.
  3. DELIVERY, STORAGE, AND HANDLING
     1. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
     2. Protect from damage due to weather, excessive temperature, and construction operations.
  4. PROJECT CONDITIONS
     1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
  5. WARRANTY
     1. Manufacturer's standard limited warranty unless indicated otherwise.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: CONSPEC Controls Inc., which is located at:6 Guttman Blvd.Charleroi, PA 15022Toll Free Tel: 800-487-8450Tel: 724-489-8450Email: [request info (null)](https://arcat.com/rfi?action=email&company=CONSPEC%252BControls%252BInc.&message=RE%253A%2520Spec%2520Question%2520(13850cop)%253A%2520&coid=54019&spec=13850cop&rep=&fax=);Web: [https://conspec-controls.com/?utm\_source=arcat&amp;utm\_medium=referral](https://conspec-controls.com/?utm_source=arcat&utm_medium=referral)
      2. Substitutions: Not permitted.

\*\* NOTE TO SPECIFIER \*\* Applications: Enclosed Parking Garages, Tunnels, Vehicle Maintenance Facilities, Car Dealerships, Factories/ Warehouses, Fire/ Police Stations, Bus Terminals & Depots, Service Bays.

* 1. CONTROLLERS

\*\* NOTE TO SPECIFIER \*\* Applications: Enclosed Parking Garages, Vehicle Maintenance Facilities, Factories and Warehouses, Bus Terminals and Depots, Tunnels, Car Dealerships, Fire and Police Stations, and Service Bays.

* + 1. Basis of Design: Ventilation Controller: Primus V as manufactured by Conspec Controls. Gathers and displays real time data from Optio V and Optio PGM units. Optional 24 Vac / 24 Vdc input power. Maximum power consumption of 2.5 A at maximum load. Six onboard relays that are programmable using Subcon logic. Four button keypad for menu navigation. Graphical LCD displays detailed monitor information. Two local 4 to 20 mA outputs, 12 remote Modbus 4-20 mA outputs, 1 local Strobe and Horn output port and three RS485 Modbus RTU Scan Ports that support up to 96 multi-gas monitors.
       1. Mechanical:
          1. Enclosure: NEMA 4X enclosure (IP66 and UL94 5 VA rated).
          2. Dimensions: 9.04 x 9.04 x 5.72 inches (230 x 230 x 145 mm).
          3. Weight: Approximately 5 lbs (2.2 kg).
          4. Conduit Entry: Space for installer to add custom routing on the back and all four sides of the device.
       2. Environmental:
          1. Operating Temperature Range: -4 to 122 degrees F (-20 to 50 degrees C).
          2. Operating Humidity: 0 o 95 percent RH non-condensing.
          3. Altitude: Less than 6500 ft (2 km).
          4. For use in indoor environments with a pollution degree of 2.
       3. Electrical:
          1. Power Consumption:

100 mA at 24 VDC typical, maximum of 2.5 A at 24 VDC.

100 mA at 24 VAC typical, maximum of 2.5 A at 24 VAC.

Accepts 12 to 24 VDC or 16 to 24 VAC 50/60Hz.

* + - * 1. Cable Distance: 6000 ft (1829 m).
        2. Can directly power up to 96 separate monitors.
        3. Automatic Reset After Power Loss.
      1. Network Capacity:
         1. Up to 96 multi-gas monitors.

Each Optio V multi-gas monitor can have up to 6 sensors, 6 relays, 6 0 to 5 V digital IO ports, and 2 local 4-20 outputs.

Each Optio PGM can have up to 2 sensors, 2 relays, and 2 local 4 to 20 mA outputs.

* + - 1. Communication Interfaces:
         1. Modbus RTU RS485 Scan Port. Quantity: 3.
         2. RS-232 Subcon Port. Quantity: 1.

\*\* NOTE TO SPECIFIER \*\* The following three items are optional. Delete options not required.

* + - * 1. Ethernet/POE COM Card. Quantity: 1.
        2. RS485 COM Card. Quantity: 1.
        3. BACnet COM card. Quantity: 1.
      1. Input/Output Capabilities:
         1. Local 4 - 20 mA Output. Quantity: 2.
         2. Remote Modbus 4 - 20 mA Output. Quantity: 12.
         3. Relay Ports with Normal and Failsafe Operation. Quantity: 6.
         4. Local Horn and Strobe Port. Quantity: 1.
      2. Alarms:
         1. Ability to configure relays and output controls via drop down selections of different alarm logics using simple IF/ELSE logic.
         2. Custom Alarm Levels with hysteresis and hold-to-alarm times. Quantity: 4.
         3. Sensor Fail Alarms: High and Low.
         4. Local 85 dB buzzer for alarming.
      3. Menu and Display:
         1. Password protected, User or Admin.
         2. Dimmable RGB backlight and contrast.
         3. Review screens show additional diagnosis and monitor settings.
         4. Intuitive menu navigation via LCD.
         5. Real-time gas readings.
      4. Configuration:
         1. Completely configurable on a PC/laptop via Subcon Software.
         2. Local Menu Display via 128 x 64 Graphical LCD and 4 push buttons for basic settings.
      5. Standards and Approvals:
         1. UL61010-1.
    1. Basis of Design: AUS1415 as manufactured by Conspec Controls. 15 channel gas detector controller panel can communicate with up to fifteen CN/CX Series gas detectors. It can serve as an independent controller or be fed into any digital communication system. The convenient 7 inch ( mm) touch screen continuously shows real time values of the measured parameters as well as provides navigation through the system's screens. Control options are nearly endless thanks to the Allen Bradley MicroLogix 1400 processing power.
       1. Mechanical:
          1. Enclosure: NEMA 4 Steel. UL and CSA Approved.
          2. Dimensions: 23.6 x 15 x 8.3 in (600 x 380 210 mm).
          3. Weight: Approximately 24 lbs (10.8 kg).
          4. Conduit Entries: Space for installer to add custom conduit entry along the bottom of the device.
       2. Environmental:
          1. Operating Temperature Range: 32 to 104 degrees F (0 to 40 degrees C).
          2. Operating Humidity: 0 percent to 99 percent RH Non-Condensing.
       3. Electrical:
          1. Power Consumption:

300 mA at 120 VAC typical, maximum of 716318926500 mA at 120 VAC716318926MAMarc Andreani7163189261204243050Measured 290mA with both trunks enabled, no alarms. Giving it a wide margin of error.

* + - 1. Network Capacity:
         1. Up to 15 CN/CX Series Gas Detectors.
      2. Input/Output Capabilities:
         1. Modbus RS485 Trunk Ports. Quantity: 2.
         2. Relay Controlled Outputs. Quantity: 6.
         3. Auxiliary 24 VDC Output. Quantity: 1.
      3. Alarms:
         1. Two Zones with Relay-Controlled Output for Trouble, Alarm 1, and Alarm 2.
         2. Local horn and strobe.
         3. Configurable remote 24 VDC alarm.
         4. Remote silencing for alarms.
      4. Menu and Display:
         1. PanelView 7 inch ( mm) LCD touchscreen display.
         2. Password protection.
         3. Review screens show additional diagnosis and monitor settings.
         4. Allows configuring and testing alarms directly from device.
         5. Real-time gas readings.
      5. Configuration:
         1. Locally via integrated touchscreen display.
  1. GAS MONITORS
     1. Basis of Design: Single/Multi Gas Monitors: OPTIO-XP as manufactured by Conspec Controls. Industrial gas detector featuring MIR infrared sensor technology. Incorporates moisture protection/compensation for harsh environments. Withstands impacts, vibration, and dramatic environmental changes. 2.6 inch (66 mm) graphical LCD, infrared remote, and on-board buttons. Monitors up to 6 toxic and combustible sensor inputs on one transmitter with a combination of IR, Catalytic Bead, and Electrochemical sensors.
        1. Mechanical:
           1. Enclosure: Explosion-proof housing (UL/cUL, FM, and AEx Certified).
           2. Dimensions: 5.44 x 8.22 x 5.66 inches (138 x 208 x 144 mm).
           3. Weight: Approximately 4.5 lbs (2.0 kg).
           4. Conduit Entry: 3/4 inch NPT holes for gas sensor or conduit. Quantity: 3.
        2. Environmental:
           1. Operating Temperature Range: -4 to 140 degrees F (-20 to 60 degrees C).
           2. Operating Humidity: 0 to 99 percent, non-condensing.

Condensation recovery algorithm for NDIR CH4 sensors.

* + - 1. Electrical:
         1. Power Consumption:

25 mA at 24 VDC typical, maximum of 200 mA at 24 VDC.

* + - * 1. Accepts 10 to 32 VDC
        2. Automatic Reset After Power Loss.
      1. Sensors:
         1. Factory preconfigured and calibrated gas sensors. Quantity: Up to 6

Sensors Available: CO, NO, H2, NO2, H2S, O2, SO2, Cl2, HCN, HCl, NH3, HF, CH4, C3H8, CO2, and VOC.

\*\* NOTE TO SPECIFIER \*\* Sensors using NDIR Technology are limited to three (3) per monitor

* + - * 1. Sensors be remotely located up to 100 ft (30 m) from the monitor.
      1. Input/Output Capabilities:
         1. RS485 Modbus RTU. Quantity: 4.
         2. 4 to 20 mA Output. Quantity: 2.
         3. SPDT Relays. Quantity: 4 .

Standard or Failsafe.

Can be linked to alarm states or controlled via Modbus.

2 A at 30 VDC.

0.5 A at 120 VAC.

* + - 1. Alarms:
         1. Custom Alarm Levels with hysteresis and hold-to-alarm times. Quantity: 4.
         2. Sensor Fail Alarms: High and Low.
         3. Ability to associate relay outputs with alarm levels from a single sensor, or multiple sensors using logical "AND/OR."
      2. Menu and Display:
         1. Local Tactile Buttons. Quantity: 4.
         2. Intuitive menu using graphical LCD.
         3. Password protected, user or admin.
         4. Quick info screen shows device settings.
         5. Real-time readings of multiple sensors.
         6. Dimmable RGB backlight.
         7. Backlight color indicates monitor status.
      3. Configuration:
         1. Using IR remote with local LCD menu.
         2. Via Modbus register map or wireless.
      4. Standards and Approvals:
         1. Class 1 Division 1 Groups ABCD, NEMA 4X.
         2. Class 1, Zone 1, AEx d IIC, IP66.
         3. FM Approved Enclosure.
    1. Basis of Design: Industrial Gas Monitors: Optio CPM as manufactured by Conspec Controls. For toxic, combustible and oxygen gas monitoring utilizing Plug and Play (PnP) Sensor technology. Users can hot-swap factory calibrated and configured sensors. Supports various industry standard interface protocols such as 4-20 mA, Modbus RTU, etc.
       1. Mechanical:
          1. Enclosure: NEMA 4X Polycarbonate.
          2. Dimensions: 8 x 6 x 3 inches (203 x 152 x 76 mm)
          3. Weight: Approximately 3.8 lbs (1.7 kg)
          4. Conduit Entry: 3/4 inch (19 mm) Cable Grip. Quantity: 2
       2. Environmental:
          1. Operating Temperature Range: 4 to 122 degrees F (-20 to 50 degrees C).
          2. Operating Humidity: 15 to 90 percent, non-condensing.

Condensation recovery algorithm for NDIR CH4 sensors.

* + - 1. Electrical:
         1. Power Consumption:

1)2 mA at 24 VDC typical, maximum of 125 mA at 24 VDC102050139MAMarc Andreani102050139-1480076461Max: 106mA = 1x Pellistor, 2x CO, 3x NDIR, 6x Relays, 2x 20mA Out

Avg: 1mA = 1x CO, 1x Modbus Card

2mA = 1x CO, Legacy Comms.

* + - * 1. Accepts 10 to 32 VDC.
        2. Automatic Reset After Power Loss.
      1. Sensors:
         1. Factory preconfigured and calibrated gas sensors. Quantity: Up to 6.

Sensors Available: CO, NO, H2, NO2, H2S, O2, SO2, Cl2, HCN, HCl, NH3, HF, CH4, C3H8, CO2, and VOC.

\*\* NOTE TO SPECIFIER \*\* Sensors using NDIR Technology are limited to three (3) per monitor

* + - * 1. Sensors can be remotely located up to 100ft (30m) from the monitor.
      1. Input/Output Capabilities:
         1. RS485 Modbus RTU. Quantity: 1.
         2. Conspec Trunk. Quantity: 1.
         3. 4 to 20 mA Output. Quantity: 2.
         4. SPDT Relays. Quantity: 4.

Standard or Failsafe.

Can be linked to alarm states or controlled via Modbus.

2 A at 30 VDC.

0.5 A at 120 VAC.

* + - 1. Alarms:
         1. Custom Alarm Levels with hysteresis and hold-to-alarm times. Quantity: 4.
         2. Sensor Fail Alarms: High and Low.
         3. Ability to associate relay outputs with alarm levels from a single sensor, or multiple sensors using logical "AND/OR."
      2. Menu and Display:
         1. Intuitive menu using graphical LCD.
         2. Password protected, user or admin.
         3. Quick info screen shows device settings.
         4. Real-time readings of multiple sensors.
         5. Dimmable RGB backlight.
         6. Backlight color indicates monitor status.
      3. Configuration:
         1. Using IR remote with local LCD menu.
         2. Via Modbus register map.

\*\* NOTE TO SPECIFIER \*\* Applications: Automotive Facilities, Factories/Warehouses, Boiler/Generating Rooms, Water Treatment Facilities, Wastewater Treatment Plants, Chemical Processing, Petrochemical Exploration, Pulp and Paper Mills, Pharmaceutical Labs, Telecommunication Facilities, Semiconductor Facilities, and Power/Cogeneration Plants.

* + 1. Basis of Design: OPTIO XP Solo as manufactured by Conspec Controls: a stand-alone microprocessor based single gas detector in an explosion proof enclosure. It can be equipped with an optional alarm relay board that features dry relay contacts as well as one (1) local onboard 4-20 mA output, one (1) local onboard 4-20 mA input and Modbus communications which can be used alone or in conjunction with the relay outputs.
       1. Mechanical:
          1. Enclosure: Explosion proof housing. FM, CSA, and IEC Approved.
          2. Dimensions: 7-3/4 x 5-3/4 x 5 inches (193 x 145 x 128 mm).
          3. Weight: Approximately 2.5 lbs (1.1 kg).
          4. Conduit Entry: 3/4 inch (19 mm) NPT threaded entry hole. Quantity: 2.
       2. Environmental:
          1. Operating Temperature Range: -4 to 140 degrees F (-20 to 60 degrees C).

Specific sensors extend this range up to -40 to 185 degrees F (-40 to 85 degrees C).

* + - * 1. Operating Humidity: 10 to 95 percent RH Non-Condensing.
      1. Electrical:
         1. Power Consumption:

Back Heater OFF: 50 mA at 24 VDC typical, maximum of 125 mA at 15858276724 V158582767MAMarc Andreani158582767174111632449.6mA w/ HP Dynament

87.3mA w/ HP Dynament and 4x relays

107mA w/ HP Dynament, 4x Relays, 20mA outDC.

Back Heater OFF: 10.0 mA at 12 VDC typical, maximum of 395454864200 mA at 12 VDC395454864MAMarc Andreani395454864174111632792.0mA w/ HP Dynament

172mA w/ HP Dynament and 4x relays

192mA w/ HP Dynament, 4x Relays, 20mA out.

Back Heater ON: 1813454822275 mA at 24 VDC, 500 mA at 12 VDC1813454822MAMarc Andreani18134548221741116331185mA w/ HP Dynamat, heater draws aprox 135mA.

Due to difficulties testing, I took the current at 24V and doubled it to get the draw at 12V.

* + - * 1. Automatic Reset After Power Loss.
      1. Sensors:
         1. Factory preconfigured and calibrated gas sensors. Quantity: 1.
         2. Sensors Available: CO, NO, H2, NO2, H2S, O2, SO2, Cl2, HCN, HCl, NH3, HF, CH4, C3H8, CO2, and VOC.
      2. Input/Output Capabilities:
         1. RS485 Modbus RTU. Quantity: 1.
         2. 4-20 mA Input. Quantity: 1.
         3. 4-20 mA Output. Quantity: 1.
         4. SPDT Relays. Quantity: 4.

2A at 30 VDC.

0.5A at 120 VAC

Can be linked to alarm states or controlled via Modbus.

* + - 1. Alarms:
         1. Custom Alarm Levels with hysteresis and hold-to-alarm times. Quantity: 4.
         2. Sensor Fail Alarms: High and Low.
         3. Ability to associate relay outputs with alarm levels from a single sensor, or multiple sensors using logical "AND/OR."
      2. Menu and Display:
         1. Intuitive menu using graphical LCD.
         2. Password protected, user or admin.
         3. Quick info screen shows device settings.
         4. Real-time readings of gas values.
         5. Dimmable RGB backlight.
         6. Backlight color indicates monitor status.
      3. Configuration:
         1. Using IR remote with local LCD menu.
         2. Via Modbus register map.
      4. Standards and Approvals:
         1. CSA (Pending).
         2. IEC 60079-29-1 (Pending).

\*\* NOTE TO SPECIFIER \*\* Applications: Enclosed parking garages, Vehicle maintenance facilities, Factories and warehouses, Bus terminals and depots, Tunnels, Car dealerships, Fire and police stations, Service bays.

* + 1. Basis of Design: Stand-Alone Microprocessor Based Multi-Gas Detector: OPTIO-V as manufactured by Conspec Controls. Dry contact relays with programmable alarm points provided for fan control. Can be used in conjunction with external relays for louver and damper control. Modbus Communications can be used for monitoring with a building automation system (BAS). Two outputs, 4-20 mA can be used to send a signal to variable frequency drive (VFD) controlled fans.
       1. Mechanical:
          1. Enclosure: NEMA 4X enclosure (IP67 and UL94 V-0 rated).
          2. Dimensions: 8.24 x 6.29 x 3.93 inches (209 x 160 x 100 mm).
          3. Weight: Approximately 1.9 lbs (0.86 kg).
          4. Mounting: Standard 4 x 4 inch (102 x 102 mm) junction box with room for wiring relays, outputs, and/or Modbus communications.
          5. Conduit Entry: 3/4 inch (19 mm) entry hole, rear mounted to junction box. Quantity: 1.
       2. Environmental:
          1. Operating Temperature Range: -4 to 122 degrees F (-20 to 50 degrees C).
          2. Operating Humidity: 15 to 95 percent, non-condensing.

Condensation recovery algorithm for NDIR CH4 sensors.

* + - 1. Electrical:
         1. Power Consumption:

1)15 mA at 24 VDC typical, maximum of 125 mA at 24 VDC462033186MAMarc Andreani462033186-148007646245mA base, 65mA with Piezo enabled, 105 w/ both 4-20mA signals.

With single CO Sensor and default Relays, draws ~15mA..

* + - * 1. Accepts 12 to 24 VDC, 120 VAC 50/60 Hz.
        2. Self-Diagnostic.
        3. Automatic Reset After Power Loss.
      1. Sensors:
         1. System CO. Quantity: 1.

Sensor Type: Electrochemical.

Sensor Range: Carbon Monoxide 500 ppm.

Sensor Life Expectancy: 7 Years.

Response Time: T90 less than 30 seconds.

Repeatability: +/- 2 percent at 250 ppm calibration point.

Linearity: Linear output in proportion to gas concentration.

Temperature Compensation: Across the entire range.

* + - * 1. System NO2. Quantity: 1

Sensor Type: Electrochemical.

Sensor Range: Nitrogen Dioxide 20 ppm.

Sensor Life Expectancy: 2 Years.

Response Time: T90 less than 25 seconds.

Repeatability: +/- 2 percent at 10 ppm calibration point.

Linearity: Linear output in proportion to gas concentration.

Temperature Compensation: Across the entire range.

* + - * 1. Sensors can be remotely located up to 100 ft (30 m) from the monitor.
      1. Input/Output Capabilities:
         1. RS485 Modbus RTU. Quantity: 1.
         2. Digital Input/Output (0 to 5.0 V). Quantity: 6.
         3. 4-20 mA Output. Quantity: 2.
         4. Configurable Relays. Quantity: 6.

Standard or Failsafe.

Can be linked to alarm states or controlled via Modbus.

2 A at 220 VDC.

2 A at 250 VAC.

* + - 1. Alarms:
         1. Custom Alarm Levels with hysteresis and hold-to-alarm times. Quantity: 4.
         2. Sensor Fail Alarms: High and Low.
         3. Ability to associate relay outputs with alarm levels from a single sensor, or multiple sensors using logical "AND/OR."
         4. Onboard 80 dB alarm.
      2. Menu and Display:
         1. Intuitive menu navigation via LCD.
         2. Password protected, User or Admin.
         3. Quick Review screens show additional diagnosis and Monitor Setting.
         4. Real-time gas readings on screen.
         5. Dimmable RGB backlight and contrast Backlight color indicates monitor status.
      3. Configuration:
         1. Using IR remote with local LCD menu.
         2. Via Modbus register map.
      4. Approvals:
         1. UL61010-1.
         2. Compliant With California Title 24; When combined with Primus V Controller.
    1. Basis of Design: Parking Garage Gas Monitors: Optio PGM as manufactured by Conspec Controls. For areas where toxic gases may accumulate and must be continually ventilated or have a gas monitoring device installed. Before an unsafe level of Carbon Monoxide or Nitrogen Dioxide is reached, the detector will signal ventilation fans to cycle and operate until the atmosphere in the area has returned to normal. Multiple PGMs can be connected with a PVC controller station with customizable user-defined logic, or as a standalone device without the need for a central controller. LED indicator lights show the status of the monitor, and a large LCD display continually shows the CO/NO2 levels being monitored. In the event of a power loss or malfunction, the controller activates the ventilation system as a failsafe mechanism.
       1. Mechanical:
          1. Enclosure: Polycase WH-02.
          2. Dimensions: 5.11 x 3.93 x 2.75 inches (130 x 100 x 70 mm).
          3. Weight: 0.60 lbs (0.27 kg).
          4. Conduit Entry: 3/4 inch (19 mm) conduit entry hole on top of device, and dimples on the back for easy connection via junction box.
       2. Environmental:
          1. Operating Temperature Range: -4 to 120 degrees F (-20 to 50 degrees C).
          2. Operating Relative Humidity: 10 to 90 percent non-condensing.
          3. Temperature Compensation: Full temperature range.
       3. Electrical:
          1. Power Consumption:

8 mA at 24 VDC typical, maximum of 75 mA at 24 VDC.

11 mA at 12 VDC typical, maximum of278381419100 mA at 12 VDC278381419MAMarc Andreani278381419-148009076959.6mA with 2x sensors, 2x relays, local horn+strobe. + 20mA = 79.6mA -> 100mA max.

* + - * 1. Automatic reset after power loss.
      1. Sensors:
         1. System CO. Quantity: 1

Sensor Type: Electrochemical.

Sensor Range: Carbon Monoxide 500 ppm.

Sensor Life Expectancy: 7 Years.

Response Time: T90 less than 30 seconds.

Repeatability: +/- 2 percent at 250 ppm calibration point.

Linearity: Linear output in proportion to gas concentration.

* + - * 1. System NO2. Quantity: 1.

Sensor Type: Electrochemical.

Sensor Range: Nitrogen Dioxide 20 ppm.

Sensor Life Expectancy: 2 Years.

Response Time: T90 less than 25 seconds.

Repeatability: +/- 2 percent at 10 ppm calibration point.

Linearity: Linear output in proportion to gas concentration.

* + - 1. Input/Output Capabilities:
         1. RS485 Modbus. Quantity: 1.
         2. 4-20 mA Output. Quantity: 2.
         3. DPDT Relays, configurable. Quantity: 2.

5 A at 12 VDC, 2 A at 30 Vdc, or 60 W.

* + - 1. Alarms:
         1. Local 80dB Horn.
         2. Relay 1; Factory Default, User Configurable:

ON When: CO Greater than 25 ppm or NO2 Greater than 1 ppm.

OFF When: CO Less than 15 ppm or NO2 Less than 0.7 ppm.

A 5 minute minimum ON duration.

* + - * 1. Relay 2; Factory Default, User Configurable:

ON When: CO Greater than 200 ppm or NO2 Greater than 3 ppm.

OFF When: CO Less than 150 ppm or NO2 Less than 2 ppm.

A 5 minute minimum ON duration.

* + - 1. Menu and Display:
         1. Intuitive menu using graphical LCD.
         2. Password protected, user or admin.
         3. Quick info screen shows device settings.
         4. Real-time readings of multiple sensors.
         5. Dimmable RGB backlight.
         6. Backlight color indicates monitor status.
      2. Configuration:
         1. Using IR remote with local LCD menu.
         2. Via Modbus register map.
      3. Standards and Approvals:
         1. Compliant With California Title 24 (When combined with Primus V Controller).
         2. UL 61010-1.
         3. UL 2075 (Pending).
    1. Basis of Design: Ventilation Fan Controller. 911154-1 CO/VC as manufactured by Conspec Controls. Before an unsafe level of Carbon Monoxide is reached, the detector will signal ventilation fans to cycle and operate until the atmosphere in the area has returned to normal. Multiple Controllers can be connected by a simple series connection without a central panel. LED indicator lights show monitor status. A large LCD display continually shows CO levels being monitored. Power Loss or Malfunction Event: Controller activates the ventilation system. Ventilation fans operate only when needed.
       1. Mechanical:
          1. Enclosure: NEMA 4X Non-Metallic. o UL and CSA Approved.
          2. Dimensions: 4.3 x 2.2 x 3 inches (109 x 56 x 76 mm).
          3. Weight: 1.2 lbs (0.54 kg).
          4. Mounting: 4 x 4 inch (102 x 102 mm) Electrical Junction Box Mounting Plate.
          5. Conduit Entry: 1/2 inch (13 mm) Cable Grip. Quantity: 1
       2. Environmental:
          1. Operating Temperature: -4 to 120 degrees F (-20 to 50 degrees C).
          2. Operating Relative Humidity, Non-Condensing: 10 to 90 percent.
          3. Temperature Compensation: Full temperature range.
       3. Electrical:
          1. Power Consumption:
          2. 60 mA at 24 VAC typical, maximum of 125 mA at 24 VAC.
          3. Automatic reset after power loss.
       4. Sensors:
          1. System CO. Quantity: 1.

Sensory Types: Electrochemical.

Sensor Range: Carbon Monoxide 500 ppm.

Sensor Life Expectancy: 7 Years.

Response Time: Less than 30 Seconds, 90 percent Final Level, Using 250 ppm gas.

Repeatability: +/- 2 percent at 250 ppm calibration point.

Linearity: +/- 5 percent over 0 to 500 ppm range.

* + - 1. Input/Output Capabilities:
         1. Connections: Single 8-pin screw terminal connector, or Eight No. 18 gauge PVC insulated stranded wire.
         2. SPDT Relays, configurable. Quantity: 2.
         3. 2 A at 30 VDC.
      2. Alarms:
         1. Local Horn: 80 dB.
         2. Relay 1; factory default, user configurable.

Fan relay.

ON When: CO Greater than 25 ppm.

OFF When: CO Less than 15 ppm.

A 5 minute minimum ON duration.

* + - * 1. Alarm 2; factory default, configurable.

ON When: CO Greater than 200 ppm.

OFF When: CO Less than 150 ppm.

A 5 minute minimum ON duration.

Alarm relay.

* + - 1. Menu and Display:
         1. Two-line alphanumeric LCD Display.
         2. Nine button infrared remote control.
         3. Password protected.
         4. Real-time readings of gas values.
      2. Standards and Approvals:
         1. Compliant With California Title 24.
  1. REMOTE TRANSMITTERS
     1. Basis of Design: Remote Transmitter. CN Series as manufactured by Conspec Controls. For toxic, hydrogen, and oxygen gas monitoring. A "smart" gas detector. Industry standard 4-20 mA Analog output signal can be connected to PLC, DCS, or EMS systems. Simplified calibration procedure. Transmitters ship factory preprogrammed, calibrated, and tested on day of shipment. Units can be connected on a single 4-conductor cable via RS-485 instead of having to route individual cables to each unit.
        1. Mechanical:
           1. Enclosure: NEMA 4X.
           2. Dimensions: 4.5 x 5 x 4 inches (114 x 127 x 102 mm).
           3. Weight: 3 lbs (1.4 kg) approximately.
           4. Conduit Entry: 3/4 inch (19 mm) Cable Grip. Quantity: 1.
        2. Environmental:
           1. Operating Temperature: -4 to 120 degrees F (-20 to 50 degrees C).
           2. Operating Relative Humidity: 10 to 95 percent non-condensing.
           3. Temperature Compensation: Full Temperature Range.
        3. Electrical:
           1. Power Consumption:

1)110 mA at 24 VDC typical, maximum of 150 mA at 24 VDC418463713MAMarc Andreani418463713-1480076453Tested with 1x Pellistor Sensor, 2x Relays, and 1x 20mA Out = 130mA

150 mA at 12 VDC typical, maximum of 200 mA at 12 VDC

* + - * 1. Cable Requirements: 3-Conductor 18 AWG.
        2. Automatic Reset After Power Loss
      1. Sensors:
         1. Factory preconfigured and calibrated gas sensors. Quantity: 1
         2. Sensors Available: CO, NO, H2, NO2, H2S, O2, SO2, Cl2, HCN, HCl, NH3, HF, CO2, and VOC.
      2. Input/Output Capabilities:
         1. RS485 Modbus RTU.
         2. 4 to 20 mA Output. Quantity: 1.
         3. Status LEDs:

Power: Green.

Alarm1: Yellow.

Alarm2: Red.

Sensor Fail: Red/Green.

\*\* NOTE TO SPECIFIER \*\* The following is optional. Delete if not required.

* + - * 1. Relay Card with three (3) configurable SPDT Relays. Quantity: 1.

0.5 A at 120 VAC, 60 W.

* + - 1. Alarms:
         1. Custom Alarm Levels with hysteresis and hold-to-alarm times. Quantity: 2.
         2. Sensor Fail Alarm: High and Low. Quantity: 1.

\*\* NOTE TO SPECIFIER \*\* The two following items are optional. Delete options not required.

* + - * 1. Enclosure Mounted Halogen Strobe. Quantity: 1.
        2. Enclosure Mounted Audible Horn. Quantity: 1.
      1. Menu and Display:
         1. Two-line alphanumeric LCD Display.
         2. Nine button infrared remote control.
         3. Password protected.
         4. Real-time readings of gas values.
      2. Configuration:
         1. Using IR remote with local LCD menu.
      3. Approvals:

\*\* NOTE TO SPECIFIER \*\* Applications: Automotive Facilities, Factories/Warehouses, Boiler/Generating Rooms, Water Treatment Facilities, Wastewater Treatment Plants, Chemical Processing, Petrochemical Exploration, Pulp and Paper Mills, Pharmaceutical Labs, Telecommunication Facilities, Semiconductor Facilities, and Power/Cogeneration Plants.

* + 1. Basis of Design: Explosion Proof Remote Transmitter: CX Series as manufactured by Conspec Controls. For toxic, combustible, and oxygen gas monitoring. A "smart" gas detector for use in hazardous or classified locations. Industry standard 4 to 20 mA analog output signal. Can be connected to PLC, DCS, or EMS systems. Simplified calibration procedure. Transmitters ship factory preprogrammed, calibrated, and tested on day of shipment. Units can be connected on a single 4 conductor cable via RS-485 instead of having to route individual cables to each unit.
       1. Mechanical:
          1. Enclosure: Explosion Proof (FM, CSA Certified).
          2. Dimensions: 7-3/4 x 5-3/4 x 5 inch (193 x 145 x 128 mm).
          3. Weight: 3 lbs (1.4 kg) approximately.
          4. Conduit Entry: 3/4 inch (19 mm) NPT threaded entry hole. Quantity: 2.
       2. Environmental:
          1. Operating Temperature: -4 to 140 degrees F (-20 to 60 degrees C).

Specific sensors extend this range up to -40 to 185 degrees F (-40 to 85 degrees C)

* + - * 1. Operating Relative Humidity: 10 to 95 percent non-condensing.
        2. Temperature Compensation: Full Temperature Range.
      1. Electrical:
         1. Power Consumption:

1)110 mA at 24 VDC typical, maximum of 150 mA at 24 VDC1289041837MAMarc Andreani1289041837-1480076453Tested with 1x Pellistor Sensor, 2x Relays, and 1x 20mA Out = 130mA.

150 mA at 12 VDC typical, maximum of 200 mA at 12 VDC.

* + - * 1. Cable Requirements: 3-Conductor 18 AWG.
        2. Automatic reset after power loss.
      1. Sensors:
         1. Factory preconfigured and calibrated gas sensors. Quantity: 1.
         2. Sensors Available: CO, NO, H2, NO2, H2S, O2, SO2, Cl2, HCN, HCl, NH3, HF, CH4, C3H8, CO2, and VOC.
      2. Input/Output Capabilities:
         1. RS485 Modbus RTU.
         2. 4-20 mA Output. Quantity: 1.
         3. Status LEDs:

Power: Green.

Alarm1: Yellow.

Alarm2: Red.

Sensor Fail: Red/Green.

\*\* NOTE TO SPECIFIER \*\* The following is optional. Delete if not required.

* + - * 1. Relay Card with three (3) configurable SPDT Relays. Quantity: 1.

0.5 A at 120 VAC, 60 W.

* + - 1. Alarms:
         1. Custom Alarm Levels with hysteresis and hold-to-alarm times. Quantity: 2.
         2. Sensor Fail Alarm: High and Low. Quantity: 1.

\*\* NOTE TO SPECIFIER \*\* The following item is optional. Delete if not required.

* + - * 1. Remote Alarm Unit. Quantity: 1.
      1. Menu and Display:
         1. Two-line alphanumeric LCD Display.
         2. Nine button infrared remote control.
         3. Password protected.
         4. Real-time readings of gas values.
      2. Configuration:
         1. Using IR remote with local LCD menu.
      3. Standards and Approvals:
         1. CL I Grps B, C, D Div 1, 2.
         2. CL II Grps E, F, G Div 1, 2.
         3. CL III NEMA 4X.
  1. WIRELESS MONITORS

\*\* NOTE TO SPECIFIER \*\* Applications: Gas Production Units (GPU) - Oil and Gas, Compressor Stations - Oil and Gas, Power Plants, Pulp and Paper, Coal Handling Facilities, Wastewater Treatment Plants, and Steel Production.

* + 1. Basis of Design: Optio XP Wireless Multigas Detector as manufactured by Conspec Controls: The OPTIO XP wireless multi gas detector (up to 6 gases) eliminates costly wire installation and provides a massive coverage area when used with remote sensors. Avoid the cost of purchasing and installing multiple detectors with Conseco's all-in-one solution. The OPTIO XP wireless multi gas detector provides detection coverage for up to 6 sensors and communicates wirelessly to an OPTIO XP configured gateway. The OPTIO XP gateway outputs consist of 4 dry relay contacts and Modbus RTU over RS-485 communications giving your wireless gas detection network the capability to control alarm or process systems. Optional remote sensors can be wired up to 100 ft. giving the detection system a huge coverage area when using multiple sensors.
       1. Mechanical:
          1. Enclosure: Explosion-proof housing. UL/cUL, FM, and AEx Certified.
          2. Dimensions: 5.44 x 8.22 x 5.66 inches (138 x 208 x 144 mm).
          3. Weight: Approximately 4.5 lbs (2.0 kg).
          4. Conduit Entry: 3/4 inch NPT holes for either local gas sensor, conduit, or antenna. Quantity: 3.
       2. Environmental:
          1. Operating Temperature Range: -4 to 104 degrees F (-20 to 40 degrees C).
          2. Operating Humidity: 10 to 95 percent, non-condensing.

Condensation recovery algorithm for NDIR CH4 sensors.

* + - 1. Electrical:
         1. Power Consumption:

25 mA at 24 VDC typical, maximum of 200 mA at 24 VDC.

* + - * 1. Accepts 10 to 32 VDC.
        2. Automatic reset after power loss.
        3. Optional Battery Operation for wireless systems.

Battery Life: Up to one year.

3.6V, 19 Ah non-rechargeable Lithium Thionyl Chloride Battery.

Monitor goes into various sleep modes when battery powered.

* + - 1. Sensors:
         1. Factory preconfigured and calibrated gas sensors. Quantity: Up to 6.

Sensors Available: CO, NO, H2, NO2, H2S, O2, SO2, Cl2, HCN, HCl, NH3, HF, CH4, C3H8, CO2, and VOC.

\*\* NOTE TO SPECIFIER \*\* Sensors using NDIR Technology are limited to three (3) per monitor.

* + - * 1. Sensors be remotely located up to 100 ft (30 m) from the monitor.
      1. Network Capacity and Configuration:
         1. Up to 32 wireless monitors per gateway.
         2. Up to 247 MODBUS wireless monitors.
         3. Seamless MODBUS RTU over wireless communication, up to 2 miles (3.2 km).
         4. License free 900 MHz (800 MHz pending) band.
         5. Five channel frequencies with 125 kHz, 250 kHz, or 500 kHz bandwidth.
         6. Self-healing and self-forming network.
         7. Multiple antenna options.
      2. SCADA:
         1. Gateway Communication Options to SCADA Systems: RS485 only.
         2. Gateway appears transparent to the SCADA System.
         3. Compatible with Conspec Senturion 950 (S950) and other MODBUS compatible SCADA systems.
      3. Alarms:
         1. Custom Alarm Levels with hysteresis and hold-to-alarm times. Quantity: 4.
         2. Sensor Fail Alarms: High and low.
      4. Menu and Display:
         1. Local Tactile Buttons. Quantity: 4.
         2. Intuitive menu using graphical LCD.
         3. Password protected, user or admin.
         4. Quick info screen shows device settings.
         5. Real-time readings of multiple sensors.
         6. Dimmable RGB backlight.
         7. Backlight color indicates monitor status.
      5. Configuration:
         1. Using IR remote with local LCD menu.
         2. Via Modbus register map or wireless.
      6. Standards and Approvals:
         1. Class 1 Division 1 Groups ABCD, NEMA 4X.
         2. Class 1, Zone 1, AEx d IIC, IP66.
         3. FCC Part 15 wireless operation approval.
         4. FM Approved Enclosure.
    1. Basis of Design: Optio G Wireless as manufactured by Conspec Controls: The OPTIO G wireless multi gas detector provides detection coverage for up to 6 sensors and communicates wirelessly to an OPTIO G configured gateway. The OPTIO G gateway outputs consist of 4 dry relay contacts and Modbus RTU over RS-485 communications giving your wireless gas detection network the capability to control alarm or process systems. Optional remote sensors can be wired up to 100 ft. giving the detection system a huge coverage area when using multiple sensors.
       1. Mechanical
          1. Enclosure: NEMA 4X Polycarbonate.
          2. Dimensions: 8 x 6 x 3 inches (203 x 152 x 76 mm).
          3. Weight: Approximately 3.8 lbs (1.7 kg).
          4. Conduit Entry: 3/4 inch (19 mm) Cable Grip. Quantity: 2.
       2. Environmental:
          1. Operating Temperature Range: 4 to 140 degrees F (-20 to 60 degrees C).
          2. Operating Humidity: 0 to 99 percent, non-condensing.

Condensation recovery algorithm for NDIR CH4 sensors.

* + - 1. Electrical:
         1. Power Consumption:

2 mA at 24 VDC typical, maximum of 125 mA at 24 VDC.

* + - * 1. Accepts 10 to 32 VDC.
        2. Automatic Reset After Power Loss.
        3. Optional Battery Operation for wireless systems.

Battery Life: Approximately 6 months.

3.6 V, 19 Ah non-rechargeable Lithium Thionyl Chloride Battery.

Monitor goes into various sleep modes when battery powered.

* + - 1. Sensors:
         1. Factory preconfigured and calibrated gas sensors. Quantity: Up to 6.

Sensors Available: CO, NO, H2, NO2, H2S, O2, SO2, Cl2, HCN, HCl, NH3, HF, CH4, C3H8, CO2, VOC

\*\* NOTE TO SPECIFIER \*\* Sensors using NDIR Technology are limited to three (3) per monitor.

* + - * 1. Sensors be remotely located up to 100 ft (30 m) from the monitor.
      1. Network Capacity and Configuration:
         1. Up to 32 wireless monitors per gateway.
         2. Up to 247 MODBUS wireless monitors.
         3. Seamless MODBUS RTU over wireless communication, up to 2 miles (3.2 km).
         4. License free 900 MHz (800 MHz pending) band.
         5. Five channel frequencies with 125 kHz, 250 kHz, or 500 kHz bandwidth.
         6. Self-healing and self-forming network.
         7. Multiple antenna options.
      2. SCADA:
         1. Gateway Communication Options to SCADA Systems: Conspec Trunk, RS-485, RS-232, Ethernet, POE, Wi-Fi, LTE.
         2. Gateway appears transparent to the SCADA system.
         3. Compatible with Conspec Senturion 950 (S950) and other MODBUS compatible SCADA systems.
      3. Alarms:
         1. Custom Alarm Levels with hysteresis and hold-to-alarm times. Quantity: 4.
         2. Sensor Fail Alarms: High and Low.
         3. Ability to associate relay outputs with alarm levels from a single sensor, or multiple sensors using logical "AND/OR."
      4. Wireless Features:
         1. Up to 1 year battery life.
         2. Up to 2 miles using external antenna.
         3. Up to 0.5 miles using low-cost internal antenna.
         4. License free 915 MHz band.
         5. Seamless Modbus RTU over Wireless.
         6. Self-healing and Self-forming Network.
         7. Up to 250 Modbus Gateway nodes with each Gateway supporting up to 32 wireless multi-gas monitors.
      5. Menu and Display:
         1. Intuitive menu using graphical LCD.
         2. Password protected, user or admin.
         3. Quick info screen shows device settings.
         4. Real-time readings of multiple sensors.
         5. Dimmable RGB backlight.
         6. Backlight color indicates monitor status.
      6. Configuration:
         1. Using IR remote with local LCD menu.
         2. Via Modbus register map or wireless.
      7. Standards and Approvals:
         1. FCC Part 15 wireless operation approval.
         2. Class 1 Division 1 Groups ABCD, NEMA 4X.
         3. Class 1, Zone 1, AEx d IIC, IP66.
         4. IECEx Ex d II C, IP68.
         5. ATEX 94/9/EC, EN50014, EN 50018.
         6. SIL-1 (pending).

1. EXECUTION
   1. EXAMINATION
      1. Do not begin installation until the substrates have been properly constructed and prepared.
      2. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.
   2. PREPARATION
      1. Clean surfaces thoroughly prior to installation.
      2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
   3. INSTALLATION
      1. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
   4. FIELD QUALITY CONTROL
      1. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

\*\* NOTE TO SPECIFIER \*\* Include if manufacturer provides field quality control with onsite personnel for instruction or supervision of product installation, application, erection, or construction. Delete if not required.

* + 1. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.
  1. CLEANING AND PROTECTION
     1. Clean products in accordance with the manufacturers recommendations.
     2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION