

## Guide Specification

*Specifier Notes: This guide specification is written in Construction Specifications Institute (CSI) 3-Part Format in accordance with the CSI Construction Specifications Practice Guide, MasterFormat, SectionFormat, and PageFormat.*

*Specifier Notes: This Section must be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the Project and local building code. Coordinate this Section with Division 01, other specification sections, and the Drawings. Delete all Specifier Notes after editing this Section.*

*Section numbers and titles are based on MasterFormat 2020 Update.*

## SECTION 28 42 15 GAS DETECTION AND ALARM

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

*Specifier Notes: Delete items below not required for this project. Brackets denote options.*

- A. Gas Detection and Alarm components of the following types:
  - 1. [Single Zone Control Hubs.]
  - 2. [Multi-Zone Control Hubs.]
  - 3. [Remote Detectors.]
- B. Accessories.
  - 1. [Streamline Modular Multifunctional LED Combination Audible / Visual Signals.]

#### 1.2 RELATED SECTIONS

*Specifier Notes: Delete any sections below not relevant to this project. Add other sections as required.*

- A. Division 16 - Electrical.

#### 1.3 REFERENCES

*Specifier Notes: List reference standards used elsewhere in this Section, complete with designations and titles. Delete reference standards from the following list not used in the edited Section. Add others as required.*

- A. American National Standards Institute (ANSI):
  - 1. ANSI/ISA 92.00.01-2010 (R2015) – Performance Requirements for Toxic Gas Detectors.
- B. European National Standards (EN):
  - 1. EN 50270 – Electromagnetic compatibility. Electrical apparatus for the detection and measurement of combustible gases, toxic gases, or oxygen.
  - 2. EN 60204-1 – Safety of machinery - Electrical equipment of machines - Part 1: General requirements.
  - 3. EN 60825-1, identical to IEC 825 and DIN-VDE 0837 – Safety of laser products - Part 1: Equipment classification and requirements.
- C. Federal Communications Commission (FCC):
  - 1. FCC Part 15 Subpart B – Electromagnetic compatibility. Electrical apparatus for the detection and measurement of combustible gases, toxic gases, or oxygen.

- D. German Institute for Standardization (DIN):
  - 1. DIN EN 54 – Fire detection and fire alarm systems.
  - 2. DIN EN 842 – Safety of machinery - Visual danger signals - General requirements, design and testing.
  - 3. DIN EN 981 – Safety of machinery - System of auditory and visual danger and information signals.
  - 4. DIN 54113-2 – Non-destructive testing - Radiation protection rules for the technical application of X-ray equipment up to 1 MV - Part 2: General technical safety requirements and testing for the manufacture, installation, and operation.
  - 5. DIN EN ISO 7731 – Ergonomics - Danger signals for public and work areas - Auditory danger signals.
- E. International Electrotechnical Commission (IEC):
  - 1. IEC 73 / DIN EN 60073 / VDE 0199 – Coding of indicating devices and actuators by colors and supplementary means.
- F. Intertek ETL (ETL).
- G. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA 1 – Enclosures constructed for indoor use.
  - 2. NEMA 3R – Rainproof enclosures constructed for indoor or outdoor use.
  - 3. NEMA 4X – Watertight and corrosion resistant enclosures constructed for indoor or outdoor use.
- H. Restriction of Hazardous Substances Directive (RoHS):
- I. Underwriters Laboratory (UL):
  - 1. UL 248 – Low Voltage Fuses.
  - 2. UL 2075 – Gas and Vapor Detectors and Sensors
  - 3. UL 5085-3 – Low Voltage Transformers.

#### 1.4 SUBMITTALS

*Specifier Notes: Edit the Submittals article as required for the Project. Delete sections not required. Add other sections as required.*

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. 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.
- C. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum of five years documented experience.
- B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
- C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

## 1.6 PRE-INSTALLATION CONFERENCE

*Specifier Notes: Edit the Preinstallation Conference article as required for the Project. Delete article if not required.*

- A. 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.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
- B. Protect from damage due to weather, excessive temperature, and construction operations.

## 1.8 PROJECT CONDITIONS

- A. 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.

## 1.9 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard limited warranty.

# PART 2 PRODUCTS

## 2.1 MANUFACTURERS

*Specifier Notes: Delete B. or C.; coordinate with requirements of Division 1 section on product options and substitutions.*

- A. Systemair MFG Inc. For more information: Tel: 800-263-7081; Email: sales@systemair.net; Web: <https://www.systemair.com/en-us>.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with the provisions of Section 01 60 00 - Product Requirements.

## 2.2 [SINGLE ZONE CONTROL HUBS (CH-S [Dual] [24] [120])]

*Specifier Notes: Specify if substitutions will be permitted. Delete power requirements option not required. Delete basis of design options not required. Delete sensor options not required. Brackets denote options. Delete article if not required.*

- A. Performance Requirements:
  - 1. Standards Compliance:
    - a. Performance: ANSI/ISA 92.00.01-2010 (R2015)
    - b. Electromagnetic Interference: EN 50270, FCC Part 15 Subpart B.
    - c. Environmental: RoHS compliant.
    - d. Safety: UL 2075 certified sensors (Only CO and NO2).
- B. General Features: Unless specified otherwise.
  - 1. User-Adjustable Setpoints, Delays, Outputs, and Relays.
  - 2. Preconfigured Wiring
  - 3. Factory Calibration
  - 4. Customized Programming
  - 5. Works with New and Existing Building Controls Systems
  - 6. [Power Requirements: 24 VAC, 1.0 A, 50/60 Hz.] [120 VAC via PP96, PowerPack]

7. [Power Requirements: 120 VAC, 0.2 A, 50/60 Hz.]
  8. Power Consumption: 24 VA.
  9. Control Relays: 6 relays, 5A at 125 VAC / 250 VA.
  10. Analog Outputs:
    - a. User-Selectable: 4 to 20 mA, 0.2 to 1 VDC, 1 to 5 VDC, or 2 to 10 VDC.
  11. Storage Temperature: Minus 58 to 248 degrees F (Minus 50 to 120 degrees C).
  12. Operating Temperature: Minus 4 to 122 degrees F (Minus 20 to 50 degrees C).
  13. Humidity: 10 to 90 percent, non-condensing.
  14. Display: 4 digits, numeric. Color: Red.
  15. Front Panel Indicators: 10 LEDs.
    - a. Power: Quantity: 1 Color: Green.
    - b. Sensors: Quantity: 4. Color: Yellow.
    - c. Zones: Quantity: 2. Color: Yellow.
    - d. Alert: Quantity: 2. Color: Red.
    - e. Alarm: Quantity: 1. Color: Red.
  16. Alarm: 106 dB at 100 mm, 3.8 kHz piezoelectric element.
  17. Sensor Lifespan: 2–10 years (varies by gas type).
  18. Sensor Capacity: A maximum of 2 local sensors. Maximum of 4 sensors with remote detectors.
    - a. Coverage: Up to 30,000 sq ft (2787 sq m)
  19. Dimensions (WxHxD): 8.72 x 10.50 x 2.90 inch (221 x 267 x 74 mm).
  20. Weight: 4.5 lbs (2.04 kg).
  21. Housing: Gray, NEMA 3R, polycarbonate plastic.
- C. [Basis of Design: Systemair; CH-S [24] [120]]
1. Sensors: No local sensors.
- D. [Basis of Design: Systemair, Combination Gas Detector, Nitrogen Dioxide and Carbon Monoxide; CH-S Dual [24] [120]]
1. Sensors: 2 local sensors.
- 2.3 [MULTI-ZONE CONTROL HUBS: CH-M]
- Specifier Notes: Specify if substitutions will be permitted. Delete remote detectors not required. Delete input power option not required. Brackets denote options. Delete article if not required.*
- A. Performance Requirements
1. Performance Requirements:
    - a. Performance: ANSI/ISA 92.00.0se1-2010 (R2015).
    - b. Electromagnetic Interference: EN 50270, FCC Part 15 Subpart B.
    - c. Environmental: RoHS compliant.
- B. General Features:
1. Fully configurable zones, relays, setpoints, delays, and outputs.
  2. On-demand ventilation control by gas concentration, timer schedule, or user input.
  3. Customized factory programming and configuration.
  4. Remote Detectors:
  5. [Model RD CO: Carbon Monoxide Detector.]
  6. [Model RD NO2: Nitrogen Dioxide Detector.]
  7. [Model RD H2: Hydrogen Detector]
  8. [Model RD Dual: Carbon Monoxide and Nitrogen Dioxide Detector.]
  9. [Input Power: 24 VAC, 50/60 Hz, 0.75 A.]
  10. [Input Power: 120 VAC, 50/60 Hz, 0.2 A via [PP96] [PP150] [PP300] PowerPack.]
  11. Power Consumption: 18 VA.
  12. Control Relays: 4 relays, 5A at 125 VAC / 250 VA.
  13. [Control Relays: Up to 32 relays via REP-M, Relay Expansion Pack.]
  14. Analog Outputs:
    - a. User-Selectable: 4 to 20 mA, 0.2 to 1 VDC, 1 to 5 VDC, or 2 to 10 VDC.

15. Digital Outputs: [BACnet IP], [Modbus RTU, two-wire RS-485 bus].
16. Storage Temperature: Minus 8 to 248 degrees F (Minus 50 to 120 degrees C).
17. Operating Temperature: Minus 4 to 158 degree F (Minus 20 to 70 degrees C).
18. Humidity: 10 to 90 percent non-condensing.
19. Display: 7.0 inch (178 mm) LCD, 1024 x 600, 5 point capacitive touch.
20. Alarm: 70 dB at 100 mm, 2.9 kHz piezoelectric element.
21. Sensor Capacity: Maximum of 128 remote detectors.
22. Dimensions (WxHxD): 8.15 x 9.93 x 2.70 inch (210 x 250 x 70 mm).
23. Weight: 5.0 lbs. (2.27 kg).
24. Housing: Gray, NEMA 4X, fiberglass/polycarbonate.
25. Fuse:
  - a. Compliance: UL 248.
  - b. Halogen free and lead-free.
  - c. Reduced PCB space requirements.
  - d. Low internal resistance.

#### 2.4 [REMOTE DETECTORS (RD [CO] [NO2] [H2] [Dual])]

*Specifier Notes: Specify if substitutions will be permitted. Delete basis of design options not required. Delete gases not used. Brackets denote options. Delete article if not required.*

- A. Performance Requirements:
  1. Performance: ANSI/ISA 92.00.01-2010 (R2015)
  2. Electromagnetic Interference: EN 50270, FCC Part 15 Subpart B
  3. Environmental: RoHS.
  4. Safety: UL 2075 certified sensors (Only CO and NO2).
- B. [Basis of Design: Systemair, Toxic Gases, Remote Detectors; model RD [CO] [NO2]]
  1. Gas Detection: [Carbon Monoxide] [Nitrogen Dioxide]
  2. Input Power: 24 VAC, 50/60 Hz, 0.2 A.
  3. Power Consumption: 4.8 VA.
  4. Analog Output:
    - a. User Selectable: 4 to 20 mA, 0.2 to 1 VDC, 1 to 5 VDC, or 2 to 10 VDC.
  5. Storage Temperature: Minus 58 to 248 degrees F (Minus 50 to 120 degrees C).
  6. Operating Temperature: Minus 4 to 122 degrees F (Minus 20 to 50 degrees C).
  7. Humidity: 10 to 90 percent; non-condensing.
  8. Front Panel Indicators; 2 LEDs: Power - Green. Fault - Yellow.
  9. Sensor Lifespan: Up to 10 years (varies by gas type).
  10. Sensor Coverage: 7,500 sq ft (696 sq m).
  11. Dimensions (WxHxD): 4.98 x 4.98 x 2.18 inch (126 x 126 x 55 mm)
  12. Weight: 1 lbs (0.5 kg).
  13. Housing: Gray, NEMA 3R, polycarbonate plastic.
- C. [Basis of Design: Systemair, Toxic Gases, Remote Detectors; model RD Dual]
  1. Gas Detection: Carbon Monoxide and Nitrogen Dioxide.
  2. Input Power: 24 VAC, 50/60 Hz, 0.35 A
  3. Power Consumption: 8.5 VA.
  4. Analog Output:
    - a. User Selectable: 4 to 20 mA, 0.2 to 1 VDC, 1 to 5 VDC, or 2 to 10 VDC.
  5. Storage Temperature: Minus 58 to 248 degrees F (Minus 50 to 120 degrees C).
  6. Operating Temperature: Minus 4 to 122 degrees F (Minus 20 to 50 degrees C).
  7. Humidity: 10 to 90 percent; non-condensing.
  8. Front Panel Indicators; 2 LEDs: Power - Green. Fault - Yellow.
  9. Sensor Lifespan: Up to 10 years.
  10. Sensor Coverage: Up to 7,500 sq ft (696 sq m).
  11. Dimensions (WxHxD): 4.98 x 4.98 x 2.18 inch (126 x 126 x 55 mm)
  12. Weight: 1 lbs (0.5 kg).

13. Housing: Gray, NEMA 3R, polycarbonate plastic.
- D. [Basis of Design: Systemair, Combustible Gases, Remote Detectors; model RD H2]
1. Gas Detection: Hydrogen
  2. Input Power: 24 VAC, 50/60 Hz, 0.28 A
  3. Power Consumption: 6.8 VA.
  4. Analog Output:
    - a. User Selectable: 4 to 20 mA, 0.2 to 1 VDC, 1 to 5 VDC, or 2 to 10 VDC.
  5. Storage Temperature: Minus 58 to 248 degrees F (Minus 50 to 120 degrees C).
  6. Operating Temperature: Minus 4 to 158 degrees F (Minus 20 to 70 degrees C).
  7. Humidity: 0 to 100 percent; non-condensing.
  8. Front Panel Indicators; 2 LEDs: Power - Green. Fault - Yellow.
  9. Sensor Lifespan: Maximum of 2 years
  10. Sensor Coverage: 5,000 sq ft (465 sq m).
  11. Dimensions (WxHxD): 4.98 x 4.98 x 2.18 inch (126 x 126 x 55 mm)
  12. Weight: 1 lbs. (0.5 kg).
  13. Housing: Gray, NEMA 3R, polycarbonate plastic.

## 2.5 ACCESSORIES

*Specifier Notes: Delete accessories not required. Delete power options not required. Delete channel options not required. Delete flash pattern options not required. Brackets denote options. Delete article if not required.*

- A. [Streamline Modular Multifunctional LED Combination Audible / Visual Signals.]
1. Basis of Design: Model SLM500 as manufactured by Federal Signal. Multifunctional LED beacon and sounder combination with multiple input technology.
    - a. Three Separate Alarm Levels: Controllable via wiring selection offering multiple combinations. Three Flash Patterns and the option of no visual effect.
    - b. Unique Tones: To select from across two switches (32 tones per switch).
      - 1) Tone Volume: Selected tone is adjustable between 86 to 105 dBA at 1m at three output levels (high, medium, low) through an integrated button.
  2. Standards Compliance:
    - a. CE Certified.
    - b. UL and cUL Listed.
  3. Enclosure: Self-extinguishing polycarbonate material with high impact and UV resistance. Type 3R, IP65.
  4. Operating Temperature: -40 to 131 degrees F (-40 to 55 degrees C).
  5. [Power: 12 VDC, 315 mA.]
  6. [Power: 24 VDC, 280 mA.]
  7. [Power: 12 VAC, 375 mA.]
  8. [Power: 24 VAC, 325 mA.]
  9. [Power: 120 VAC, 205 mA.]
  10. [Power: 240 VAC, 115 mA.]
  11. Mounting: Deep base.
  12. PLC Compatible with PNP or NPN connections (Except Dock Base, only NPN).
  13. Three Channels:
    - a. [Channel 1: Visual signal only.]
    - b. [Channel 2: Visual signal and Audio tone 1.]
    - c. [Channel 2: Audio tone 1.]
    - d. [Channel 3: Visual signal and Audio tone 2.]
    - e. [Channel 3: Audio tone 2.]
  14. LED Hours: 100,000.
  15. Five LED lamp/lens:
    - a. Color: Red.
  16. Flash Rate per Minute: 85 (+/- 10)
  17. [Flash Pattern: 3x Strobe (default).]

18. [Flash Pattern: Fade.]
19. [Flash Pattern: Steady.]
20. Tone Options: 64 at three adjustable levels.
  - a. Decibels at 10 ft; 76 to 95 (1 m; 86 to 105).

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Do not begin installation until the substrates have been properly constructed and prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

### 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### 3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.

### 3.4 CLEANING AND PROTECTION

- A. Clean products in accordance with the manufacturer's recommendations.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION