SECTION 28 42 00

GAS DETECTION AND ALARM

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\*\* NOTE TO SPECIFIER \*\* Armstrong Monitoring; Gas Detection and Hazardous Gas Monitoring Equipment.
This section is based on the products of Armstrong Monitoring, which is located at:215 Colonnade Rd. S.Ottawa, ON, Canada K2E 7K3Toll Free Tel: 800-465-5777Tel: 613-225-9531Fax: 613-225-6965Email: [request info (null)](https://arcat.com/rfi?action=email&company=Armstrong%252BMonitoring&message=RE%253A%2520Spec%2520Question%2520(13850amg)%253A%2520&coid=53096&spec=13850amg&rep=&fax=613-225-6965)
Web: <https://www.armstrongmonitoring.com>
 [ [Click Here](https://arcat.com/company/armstrong-monitoring-53096) ] for additional information.
As a pioneer in the industry, we have been developing, manufacturing, and servicing gas detection and monitoring equipment for over 40 years. Our commitment to ensuring safer environments, healthier air, and reduced environmental impact has helped forge our reputation as a trusted gas monitoring and detection solution provider with global reach.
Armstrong Monitoring designs and manufactures a highly versatile product line using the most reliable sensing technologies available. Intrinsic adaptability combined with a wide variety of gas sensor options means that Armstrong Monitoring systems can be tailored to meet the requirements of almost any application. Armstrong Monitoring's history and breadth and depth of product development enable it to support virtually every industry and site, including mines, refineries, hospital labs, pharmaceutical manufacturing, automotive, food, any type of manufacturing, naval vessels, schools, automotive dealerships and parking garages, municipal water/sewer facilities, skating rinks, pools, etc.

1. GENERAL
	1. SECTION INCLUDES

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

* + 1. Fixed gas detection. (AMC-1BXX Standalone Monitor) (AMC-UTx-M-400 Transmitter) (AMC-400 Transmitter) (AMC-1DBX Digital Monitor) (AMC-UTx-B Transmitter) (AMC-1BZ Series Multi-Sensor Monitoring System) (AMC-122X Multi Drop Sensor Modules)
		2. Modular boxes. (AMC-1DMB- RL 8CH Relay Module) (AMC-1DPS 24VDC, 7A, Power Supply) (AMC-1DMB- PS-R Power Supply w Repeater) (AMC-1DMB-AI 8CH 0-20mA Analog Input) (AMC-1DMB-RL-AO 8CH Relay and Analog Out Module)
		3. Remote alarm modules. (AMC-RAM-3 Remote Audio/Visual Alarm)
	1. RELATED SECTIONS

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

* + 1. Division 16 - 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):
			1. CAN/CSA C22.2 No. 205-17 - Signal Equipment - Second Edition.
		2. Underwriters Laboratories (UL):
			1. ANSI / UL 1635: 2018 - Digital Alarm Communicator System Units - Fourth Edition.
		3. National Electrical Manufacturers Association (NEMA):
			1. NEMA 4X - Watertight and corrosion resistant enclosures constructed for indoor or outdoor use.
			2. NEMA 4 - Water resistant and corrosion resistant enclosures constructed for indoor or outdoor use.
			3. NEMA 1 - Protection from solid objects and access to hazardous parts, constructed for indoor use.
		4. BACnet International:
			1. ISO 16484-5 - Building automation and control systems (BACS) Part 5: Data communication protocol.
			2. ISO 16484-6:2020 - Building automation and control systems (BACS) Part 6: Data communication conformance testing.
	1. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		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.
		3. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.
	2. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum 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.
	3. 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.
	4. 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.
	5. 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.
	6. WARRANTY
		1. Manufacturer's standard limited warranty unless indicated otherwise.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Armstrong Monitoring, which is located at:215 Colonnade Rd. S.Ottawa, ON, Canada K2E 7K3Toll Free Tel: 800-465-5777Tel: 613-225-9531Fax: 613-225-6965Email: [request info (null)](https://arcat.com/rfi?action=email&company=Armstrong%252BMonitoring&message=RE%253A%2520Spec%2520Question%2520(13850amg)%253A%2520&coid=53096&spec=13850amg&rep=&fax=613-225-6965);Web: <https://www.armstrongmonitoring.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete basis of design options not required.

* 1. FIXED GAS DETECTION
		1. Basis of Design: Model AMC-1BXX Standalone Monitors as manufactured by Armstrong Monitoring. Highly configurable fixed gas detector for single or dual sensor applications.
			1. Certifications: CSA Listed for Canada and USA.
			2. Coverage Area: Up to 7500 sq ft (700 sq. m.); 50 ft (15 m) radius.
			3. Recommended Mounting Height: 4 to 5 ft (1.2 to 1.5 m) A.F.F.
			4. Gas Options:

\*\* NOTE TO SPECIFIER \*\* Delete gas option and PPM options not required.

* + - * 1. Carbon Monoxide (CO):

AMC-1BCO CARBON MONOXIDE (CO) 0-100 PPM, EC.

AMC-1BCO-HC-LV CARBON MONOXIDE (CO) 0-300 PPM, EC,24VDC.

AMC-1BCO-LV CARBON MONOXIDE (CO) 0-100 PPM, EC,24VDC.

* + - * 1. Carbon Monoxide (CO) and Nitrogen Dioxide (NO2):

AMC-1BVC CARBON MONOXIDE (CO) 0-100 PPM, NITROGEN DIOXIDE (NO2) 0-10 PPM, EC.

AMC-1BVC-HC-LV CARBON MONOXIDE (CO) 0-300 PPM, NITROGEN DIOXIDE (NO2) 0-10 PPM, EC, 24VDC.

AMC-1BVC-LV CARBON MONOXIDE (CO) 0-100 PPM, NITROGEN DIOXIDE (NO2) 0-10 PPM, EC, 24VDC

* + - 1. Expected Sensor Life: Up to 6 years (CO). Up to 3 years (NO2).
				1. End-of-life notification.
			2. Sensor Calibration: Recalibration every 6 months, or more frequently as required
				1. Patent pending ADAPTiCal algorithm ensures safe, reliable, and rapid calibrations optimized for the unique operating conditions of each sensor.
				2. Integral Sensor Modules: Easily changed, and eligible for the EZ Cal service program.

EZ Cal Service Program: Allows sensor maintenance to be a simple swap-out.

* + - 1. Intelligent sensors transfer sensor information to transmitter including sensor type, measurement range, calibration span values, last calibration date, serial number, sensor life and manufacture date.
			2. Housing: UV Stabilized Polycarbonate (LxWxH): 11.75 x 9.98 x 5.46 inch (299 x 253 x 139 mm).
				1. Rating: UL 94 V-0.
				2. Lockable with hinged door.

\*\* NOTE TO SPECIFIER \*\* Delete power supply options not required.

* + - 1. Power Supply: AMC-1BCO: 120 VAC, 60 Hz. Rated 53VA.
			2. Power Supply: AMC-1BVC: 120 VAC, 60 Hz. Rated 53VA.
			3. Power Supply: AMC-1BCO-LV: 24VDC, Rated 2A
			4. Power Supply: AMC-1BCO-HC-LV: 24VDC, Rated 2A
			5. Power Supply: AMC-1BVC-LV: 24VDC, Rated 2A
			6. Power Supply: AMC-1BVC-HC-LV: 24VDC, Rated 2A
			7. Analog Outputs:
				1. Two independent outputs. Can be linked to either gas channel.
				2. User-Selectable: 4 to 20 mA, or 0 to 10 VDC.
			8. Relays: Two DPDT 10 A at 250 VAC Res.
			9. Display: OLED Display. Lines: 8. Characters: 20.
				1. Gas values, units of measurement, system configuration options, and alarm levels.
				2. User Interface: Three button. View or change system configuration parameters
			10. Front Panel Indicators: 3 LEDs.
				1. Sensor: Indicates status of Sensor Module or highest error level if multiple errors are reported.
				2. Network: Not applicable to the 1Bxx Series. LED will display flashing Green.
				3. Sensor Module: Indicates status of sensor element or module.
			11. Alarm: Buzzer, 95 dBa at (100 mm), 3.5 kHz piezoelectric element.
			12. Temperature Range: Minus 4 to 104 degrees F (Minus 20 to 40 degrees C).
			13. Humidity Range: 15 to 90 percent Relative Humidity Non-condensing.
			14. Atmospheric Pressure: 0.9 to 1.1 atm.
			15. Connecting Terminals:
				1. Wire Range, Power, and Signal: 22 AWG to 12 AWG (0.2 to 2.5 sq mm).
				2. Wire Range, Ground: 22 AWG to 10 AWG (0.2 to 4 sq mm).
				3. Strip Length: 0.3 inches (8 mm).
				4. Torque: 7 inch-lbs (0.4 Nm).
				5. Relay connections: Ring Terminal for No. 6 stud.
			16. Weight: 5.7 lbs (2.6 kg) max.
			17. Accessories:
				1. AMC-RAM-1B-WH-2 Wiring Interface for RAM-3 and 1B Monitor.

One for each RAM3 up to maximum of 2 per 1B Monitor.

* + - * 1. AMC-1B-SG Spashguard to achieve IP Rating of IPx5.
		1. Basis of Design: Model AMC-UTx-M Transmitter as manufactured by Armstrong Monitoring. Highly configurable fixed gas detector for single or dual sensor applications.
			1. Coverage Area: Up to 7500 sq ft (700 sq m); 50 ft (15 m) radius.
			2. Recommended Mounting Height: 4 to 5 ft (1.2 to 1.5 m) A.F.F.
			3. Gas Options:

\*\* NOTE TO SPECIFIER \*\* Delete gas options not required.

* + - * 1. Carbon Monoxide (CO).

AMC-UTx-M-91A01-N-R-0400 (CO) 0-100 PPM, EC.

AMC-UTx-M-91B01-N-R-0400 (CO) 0-300 PPM, EC.

* + - * 1. Carbon Monoxide (CO) and Nitrogen Dioxide (NO2).

AMC-UTx-M-VCA01-N-R-0400 (CO) 0-100 PPM, (NO2) 0-10 PPM, EC.

AMC-UTx-M-91B01-98A01-R-0400 (CO) 0-300 PPM, (NO2) 0-10 PPM, EC.

* + - * 1. Nitrogen Dioxide (NO2).

AMC-UTx-M-98A01-N-R-0400 (NO2) 0 to 10 ppm.

* + - 1. Expected Sensor Life: Up to 6 years (CO). Up to 3 years (NO2).
				1. End-of-life notification.
			2. Sensor Calibration: Recalibration every 6 months, or more frequently as required
				1. Patent pending ADAPTiCal algorithm ensures safe, reliable, and rapid calibrations optimized for the unique operating conditions of each sensor.
				2. Integral Sensor Modules: Easily changed, and eligible for the EZ Cal service program.

EZ Cal Service Program: Allows sensor maintenance to be a simple swap-out.

* + - 1. Intelligent sensors transfer sensor information to transmitter including sensor type, measurement range, calibration span values, last calibration date, serial number, sensor life and manufacture date.
			2. Housing: Grey Polycarbonate (LxWxH): 5.45 x 4.64 x 2.35 inch (138 x 118 x 60 mm).
			3. Power Supply: 12 to 24 VDC, 40 mA.
			4. Temperature Range: Minus 4 to 104 degrees F (Minus 20 to 40 degrees C).
			5. Humidity Range: 15 to 90 percent Relative Humidity Non-condensing.
			6. Atmospheric Pressure: 0.9 to 1.1 atm.
			7. Weight: 1.0 lbs (0.45 kg) max.
			8. Display: OLED Display. Lines: 8. Characters: 20.
				1. Gas values, units of measurement, system configurations, and alarm levels.
				2. User Interface: Three button. View or change system configuration parameters
			9. Front Panel Indicators: 3 LEDs.
				1. Sensor: Indicates status of Sensor Module or highest error level if multiple errors are reported.
				2. Network: Indicates status of Modbus interface.
				3. Sensor Module: Indicates status of sensor element or module.
			10. Relay: SPDT, 2 A at 30 VDC, resistive.
			11. Serial Interface: RS-485 RTU addressable interface MODBUS RTU over RS-485 9600 Baud, 8bit Even Parity.
			12. Connecting Terminals: Wire Range, Signal: 22 AWG to 20 AWG (0.33 to 0.5 sq mm).
				1. Cable Characteristics Required:

Impedance: 120 ohms.

Low Capacitance: 13 pf per ft conductor to conductor and 23 pf per ft conductor to shield.

* + - * 1. Wire Range, Power: 18 AWG to 16 AWG (0.82-1.3 sq mm).
				2. Strip Length: 0.35 inches (9 mm).

\*\* NOTE TO SPECIFIER \*\* Delete accessory options not required.

* + - 1. Accessories:
				1. Weathershield: AMC-WS00-SL.
				2. Vandal Guard Universal fit: AMC-VG-XL.
				3. Pole Mounting Bracket: 3473501-6. Included with each transmitter.
				4. Calibration Kit: AMC-C1-FM1.
				5. Calibration Adaptor: AMC-FM1. Included with Calibration Kit or ordered separately.
		1. Basis of Design: Model AMC-400 Transmitter as manufactured by Armstrong Monitoring. Fixed gas detector for single or dual sensor applications.
			1. Coverage Area: Up to 7500 sq ft (700 sq m); 50 ft (15 m) radius.
			2. Recommended Mounting Height: 4 to 5 ft (1.2 to 1.5 m) A.F.F
			3. Gas Options:

\*\* NOTE TO SPECIFIER \*\* Delete gas options not required.

* + - * 1. Carbon Monoxide (CO):

AMC-400-CO (CO) 0-100 PPM, EC.

AMC-400-CO-HC (CO) 0-200 PPM, EC.

* + - * 1. Nitrogen Dioxide (NO2):

AMC-400-NO2 (NO2) 0-10 PPM.

* + - * 1. Hydrogen (H2):

AMC-400-H2 (H2) 0-100 percent LEL.

* + - * 1. Methane (CH4):

AMC-400-CH4 (CH4) 0-100 percent LEL.

* + - * 1. Propane (C3H8):

AMC-400-C3H8 (C3H8) 0-100 percent LEL.

* + - 1. Expected Sensor Life: Up to 6 years (CO). Up to 3 years (NO2).
			2. Sensor Calibration: Recommended recalibration every 6 months.
			3. Housing: Grey Polycarbonate (LxWxH): 5.45 x 4.64 x 2.35 inch (138 x 118 x 60 mm).
			4. Power Supply: 12 to 24 VDC, 40 mA.
			5. Temperature Range: Minus 4 to 104 degrees F (Minus 20 to 40 degrees C).
			6. Humidity Range: 15 to 90 percent Relative Humidity Non-condensing.
			7. Atmospheric Pressure: 0.9 to 1.1 atm.
			8. Weight: 0.8 lbs (0.36 kg) max.
			9. Display: LCD Display (3 characters). Gas concentration and status information.
				1. User Interface: Momentary On/Off Pushbutton for Configuration.
			10. Front Panel Indicators: 3 LEDs. Indicates transmitter and sensor status.
			11. Serial Interface: RS-485 RTU addressable interface MODBUS RTU over RS-485 9600 Baud, 8bit Even Parity.
			12. Connecting Terminals: Wire Range, Signal: 22 AWG to 20 AWG (0.33 to 0.5 sq mm).
				1. Cable Characteristics Required:

Impedance: 120 ohms.

Low Capacitance: 13 pf per ft conductor to conductor and 23 pf per ft conductor to shield.

* + - * 1. Wire Range, Power: 18 AWG to 16 AWG (0.82-1.3 sq mm).
				2. Strip Length: 0.35 inches (9 mm).

\*\* NOTE TO SPECIFIER \*\* Delete accessories options not required.

* + - 1. Accessories:
				1. Weathershield: AMC-WS00-SL.
				2. Vandal Guard Universal fit: AMC-VG-XL.
				3. Pole Mounting Bracket: 3473501-6. Included with each transmitter.
				4. Calibration Kit: AMC-C1-FK1 CO. For non-reactive gases.
				5. Calibration Kit: AMC-C1-FK2 NO2. For reactive gases.
		1. Basis of Design: Model AMC-1DBX Digital Monitor as manufactured by Armstrong Monitoring. A versatile monitoring package systems using Armstrong's addressable AMC-UTx-M-400 and AMC-400 Series transmitters. Supports up to 988 sensors divided over up to 128 zones.

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: AMC-1DB1-30000B Gas Monitor, Nema 1, 120 VAC 4 Integral DPDT Relays.
			2. Model: AMC-1DB1-30000D Gas Monitor, Nema 1, 120 VAC 8 Integral DPDT Relays.
			3. Model: AMC-1DB1-30000F Gas Monitor, Nema 1, 120 VAC 12 Integral DPDT Relays.
			4. Model: AMC-1DB1-30000H Gas Monitor, Nema 1, 120 VAC 16 Integral DPDT Relays.
			5. Model: AMC-1DB1-40000B Gas Monitor, Nema 1, 24 VDC 4 Integral DPDT Relays.
			6. Model: AMC-1DB1-40000D Gas Monitor, Nema 1, 24 VDC 8 Integral DPDT Relays.
			7. Model: AMC-1DB1-40000F Gas Monitor, Nema 1, 24 VDC 12 Integral DPDT Relays.
			8. Model: AMC-1DB1-40000HGas Monitor, Nema 1, 24VDC 16 Integral DPDT Relays.
			9. Certifications: CSA Listed for Canada and USA.
			10. Housing: 16 gauge steel (LxWxH): 12 x 12.25 x 6.875 inch (305 x 311 x 175 mm).
				1. Powder Coating: Grey.
				2. Degree of Protection: NEMA 1.
				3. Latchable with hinged door.
				4. Knockouts: Three, 1.375 / 1.125 inch diameter and three, 1.125 / 0.875-inch diameter on bottom surface.
				5. Mounting Flanges: Extend 0.8 inches top and bottom.
			11. Power Supply, Input:

\*\* NOTE TO SPECIFIER \*\* Delete power supply options not required.

* + - * 1. AC Option: 120 VAC, 60 Hz, 100 VA.
				2. DC Option: 24 VDC, 2A.
			1. Power Output: 24 VDC, 1 A max for external devices on RS-485 network.
			2. Display: 3.5 inch (89 mm), 320x240 pixel. Gas values, units of measurement, system configuration options and alarm levels.
			3. User Interface. Eight pushbuttons.
				1. UP, DOWN and BACK: To navigate menu on display.
				2. ENTER: To select options on menu.
				3. RESET RELAY: Reset latching relays if associated alarm condition has passed.
				4. TEST: To activate relays and audio alarm for test purposes.
				5. SILENCE: Silences audible alarms. Configurable for resetting of relay outputs.
				6. HOLD: Freezes display content on currently displayed sensor reading.
			4. Front Panel Indicators: Nine LEDs.
				1. SYSTEM LED: Indicates power supply status.
				2. FAULT LED: Indicates system health.
				3. ALARM LEDs: Three LEDs to indicate if gas concentrations exceed alarm thresholds.
				4. MODBUS LEDs: Indicate MODBUS traffic; sending and receiving.
				5. ETHERNET LEDs: Indicate Link Activity and Speed.
			5. Alarm: 95 dBa at (100 mm), 2.9 kHz piezoelectric element.
			6. Temperature Range: Minus 4 to 122 degrees F (Minus 20 to 50 degrees C).
			7. Humidity Range: 0 to 90 percent Relative Humidity Non-condensing.
			8. Atmospheric Pressure: 0.9 to 1.1 atm.
			9. Connecting Terminals:
				1. Wire Range, Power, and Signal: 26 AWG to 14 AWG (0.13 to 2.08 sq mm).
				2. Wire Range, Chassis Ground: 14 AWG to 2 AWG (2.08 to 33.6 sq mm).
				3. Strip Length: 0.3 inch (7 mm).
				4. Torque: 2.6 inch-lbs (0.3 Nm).
			10. Weight: 15.8 lbs (7.2 kg) max.
			11. Serial Interface:
				1. Four RS-485 lanes providing MODBUS interface for transmitters.
				2. RS-485 9600 Baud, 8bit Even Parity interface to provide optional BACnet/MSTP uplink to BAS.
				3. Ethernet Interface. 10/100 UTP providing optional BACnet/IP uplink to BAS.
				4. USB 2.0 Interface for external flash drives used in firmware upgrades or downloading the units database.
			12. Analog Outputs: Four user selectable 0 to 20 mA or 0 to 10 V.
				1. Additional Outputs: Available using external Modular Boxes connected to the RS485 lanes.
			13. Analog Inputs: 0 to 20 mA inputs available using external Modular Boxes connected to the RS485 lanes.
			14. Relays:
				1. DPDT 10 A at 250 VAC Res.
				2. Up to 16 relays per Control Panel.
				3. Up to 255 relays with use of external Modular Boxes.
		1. Basis of Design: Model AMC-UTx-B Transmitter as manufactured by Armstrong Monitoring. Highly configurable fixed gas detector for single or dual sensor applications.
			1. Certifications
				1. BTL Listed.
			2. Coverage Area: Up to 7500 sq ft (700 sq m); 50 ft (15 m) radius.
			3. Recommended Mounting Height: 4 to 5 ft (1.2 to 1.5 m) A.F.F.
			4. Gas Options:

\*\* NOTE TO SPECIFIER \*\* Delete gas options not required.

* + - * 1. Carbon Monoxide (CO):

AMC-UTx-B-91A01-N-R-0400 (CO) 0-100 PPM, EC.

AMC-UTx-B-91B01-N-R-0400 (CO) 0-300 PPM, EC.

* + - * 1. Carbon Monoxide (CO) and Nitrogen Dioxide (NO2):

AMC-UTx-B-VCA01-N-R-0400 (CO) 0-100 PPM, (NO2) 0 to 10 PPM, EC.

AMC-UTx-B-91B01-98A01-R-0400 (CO) 0-300 PPM, (NO2) 0 to 10 PPM, EC.

* + - * 1. Nitrogen Dioxide (NO2):

AMC-UTx-B-98A01-N-R-0400 (NO2) 0 to 10 ppm.

* + - 1. Expected Sensor Life: Up to 6 years (CO). Up to 3 years (NO2).
				1. End-of-life notification.
			2. Sensor Calibration: Recalibration every 6 months, or more frequently as required.
				1. Patent pending ADAPTiCal algorithm ensures safe, reliable, and rapid calibrations optimized for the unique operating conditions of each sensor.
				2. Integral Sensor Modules: Easily changed, and eligible for the EZ Cal service program.

EZ Cal Service Program: Allows sensor maintenance to be a simple swap-out.

* + - 1. Intelligent sensors transfer sensor information to transmitter including sensor type, measurement range, calibration span values, last calibration date, serial number, sensor life and manufacture date.
			2. Housing: Grey Polycarbonate (LxWxH): 5.45 x 4.64 x 2.35 inch (138 x 118 x 60 mm).
			3. Power Supply: 12 to 24 VDC, 40 mA.
			4. Temperature Range: Minus 4 to 104 degrees F (Minus 20 to 40 degrees C).
			5. Humidity Range: 15 to 90 percent Relative Humidity Non-condensing.
			6. Atmospheric Pressure: 0.9 to 1.1 atm.
			7. Weight: 1.0 lbs (0.45 kg) max.
			8. Display: OLED Display. Lines: 8. Characters: 20.
				1. Gas values, units of measurement, system configurations, and alarm levels.
				2. User Interface: Three button. View or change system configuration parameters.
			9. Front Panel Indicators: 3 LEDs.
				1. Sensor: Indicates status of Sensor Module or highest error level if multiple errors are reported.
				2. Network: Indicates status of Modbus interface.
				3. Sensor Module: Indicates status of sensor element or module.
			10. Relay: SPDT, 2 A at 30 VDC, resistive.
			11. Serial Interface: RS-485 BACnet MSTP over RS-485.
				1. Baud Rate: 9600 (default), 19200, 38400, 57600, 76800,115200.
				2. Device ID: 677100.
				3. MAC Address: 100.
				4. Parity: No parity.
				5. Stop bits: 1.
				6. Data bits: 8.
			12. Connecting Terminals: Wire Range, Signal: 22 AWG to 20 AWG (0.33 to 0.5 sq mm).
				1. Cable Characteristics Required:

Impedance: 120 ohms.

Low Capacitance: 13 pf per ft conductor to conductor and 23 pf per ft conductor to shield.

* + - * 1. Wire Range, Power: 18 AWG to 16 AWG (0.82-1.3 sq mm).
				2. Strip Length: 0.35 inches (9 mm).

\*\* NOTE TO SPECIFIER \*\* Delete accessory options not required.

* + - 1. Accessories:
				1. Weathershield: AMC-WS00-SL.
				2. Vandal Guard Universal fit: AMC-VG-XL.
				3. Pole Mounting Bracket: 3473501-6. Included with each transmitter.
				4. Calibration Kit: AMC-C1-FM1.
				5. Calibration Adaptor: AMC-FM1. Included with Calibration Kit or ordered separately.
		1. Basis of Design: Model AMC-1BZ Series Multi-Sensor Monitoring System as manufactured by Armstrong Monitoring.
			1. Gas Monitor: For use with AMC-122X Multi Drop Sensor Modules, supports 1 or 2 zones of up to 10 Transmitters each.
				1. AMC-1BZ1-X 1 Input Channel of up to 10 AMC-122X Sensor Modules.
				2. AMC-1BZ2-X 2 Input Channels of up to 10 AMC-122X Sensor Modules each.
			2. Certifications: CSA Listed for Canada and USA.
			3. Recommended Mounting Height: 4 to 5 ft. (1.2 to 1.5 m) A.F.F
			4. Housing: UV Stabilized Polycarbonate (LxWxH): 11.75 x 9.98 x 5.46 inch (299 x 253 x 139 mm).
				1. Rating: UL 94 V-0.
				2. Lockable with hinged door.
			5. Power Supply:
				1. AMC-1BZ1, AMC-1BZ2: 120 VAC, 60 Hz. Rated 53 VA.
				2. AMC-1BZ1-LV, AMC-1BZ2-LV: 24 VDC, Rated 2 A.
			6. Analog Outputs:
				1. Two independent outputs, can be linked to either zone.
				2. User-Selectable: 4 to 20 mA, or 0 to 10 VDC.
			7. Relays:
				1. AMC-1BZ1: Two DPDT 10A at 250 VAC Res.
				2. AMC-1BZ2: Four DPDT 10A at 250 VAC Res.
			8. Display: OLED Display; 8 lines x 20 characters.
				1. Displays zone status, system configuration options and alarm levels.
				2. Three button user interfaces to view or change system configuration parameters.
			9. Front Panel Indicators: 3 LEDs:
				1. Sensor; indicates highest error level if multiple errors are reported.
				2. Network; Not applicable to the 1B Series. LED will display flashing Green.
			10. Alarm: Buzzer, 95 dBa at (100 mm), 3.5 kHz piezoelectric element.
			11. Temperature Range: -4 to 104 degrees F (-20 to 40 degrees C).
			12. Humidity Range: 15 to 90 percent RH Non-condensing.
			13. Atmospheric Pressure: 0.9 to 1.1 atm.
			14. Connecting Terminals:
				1. Wire Range, Power and Signal: 22 AWG to 12 AWG (0.2 to 2.5 sq mm);
				2. Wire Range, Ground: 22 AWG to 10 AWG (0.2 to 4 sq mm)
				3. Strip Length: 0.3 inches (8 mm).
				4. Torque: 7 lb-in. (0.4 Nm).
				5. Relay connections: Ring Terminal for No. 6 stud.
			15. Weight: 5.7 lbs (2.6 kg) max.
			16. Accessories:
				1. AMC-RAM-1B-WH-2 Wiring Harness for RAM-3 and AMC-1BZ1 Monitor.

Order one for each RAM3 up to maximum of 2 per Monitor.

* + - * 1. AMC-RAM-1B-WH Wiring Interface for RAM-3 and AMC-1BZ2 Monitor.

Order one for each RAM3 up to maximum of 2 per Monitor.

* + - * 1. AMC-1B-SG Spashguard to achieve IP Rating of IPx5.
		1. Basis of Design: Model AMC-122X Multi Drop Sensor Modules as manufactured by Armstrong Monitoring.
			1. Fixed Gas Detector for single or dual sensor applications compatible with AMC-1BZ Series Monitors.
			2. Recommended Mounting Height: 4 to 5 ft. (1.2 to 1.5m) A.F.F.
			3. Coverage Area:
				1. AMC-1222 and AMC-1228: Up to 7500 sq ft (700 sq m); 50 ft (15 m) radius.
				2. AMC-1225: Up to 2000 sq ft (175 sq m); 25 ft (7.5 m) radius.
			4. Gas Options:
				1. Carbon Monoxide (CO) and Nitrogen Dioxide (NO2):

AMC-1222-3; CO 0-100 ppm, NO2 0-3 ppm.

* + - * 1. Carbon Monoxide (CO):

AMC-1228-20s; 0-100 ppm.

* + - * 1. Nitrogen Dioxide (NO2):

AMC-1228-28s; 0-10 ppm.

* + - * 1. Combustible Gases:

AMC-1225 0-50 percent LEL.

* + - 1. Expected Sensor Life: Up to 6 years (CO), up to 3 years (NO2), up to 10 years (Combustible).
			2. Sensor Calibration: Recommended recalibration every 6 months.
			3. Housing: Grey Polycarbonate Enclosure (LxWxH): 5.45 x 4.64 x 2.35 inch (138 x 118 x 60 mm).
			4. Power Supply: 6-30 VDC.
			5. Temperature Range:
				1. AMC-1222-3/1228-20s/1228-28s: -4 to 104 degrees F (-20 to 40 degrees C).
				2. AMC-1225: 32 to 104 degrees F (0 to 40 degrees C).
			6. Humidity Range: 15 to 90 percent RH Non-condensing.
			7. Atmospheric Pressure: 0.9 to 1.1 atm.
			8. Weight: 0.8 lbs (0.36 kg) max.
			9. Front Panel Indicators: 3 LEDs.
				1. AMC-1222; CO, NO2, Comfort Zone, Power.
				2. AMC-1225; High, Low, Power/Fail.
				3. AMC-1228; High, Low, Power/Fail.
			10. Signal Interface:
				1. Multidrop Voltage Output:

Fail: 0 VDC.

Normal: 1 VDC.

Low Alarm: 2 VDC.

High Alarm: 3 VDC.

* + - 1. Connecting Terminals:
				1. Wire Range: 18 AWG (0.82 sq mm ).
				2. Strip Length: 0.35 inches (9 mm).
			2. Accessories:
				1. AMC-WS00-SL Weathershield.
				2. AMC-VG-XL Vandal Guard Universal fit.
				3. 3473501-6 Pole Mounting Bracket (included with each transmitter).
				4. AMC-C1-FE1 Cal Kit for AMC-1222 and AMC-1228 Series.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete basis of design options not required.

* 1. MODULAR BOXES
		1. Basis of Design: Model AMC-1DMB- RL 8CH Relay Module as manufactured by Armstrong Monitoring. Each box provides an additional eight DPDT relay interfaces that are controlled over the AMC-1DBX Control Panel Modbus interface.
			1. Certifications: CSA Listed for Canada and USA.
			2. Housing: 16-gauge steel (LxWxH): 12 x 12.25 x 6.875 inch (305 x 311 x 175 mm).
				1. Powder Coating: Grey.
				2. Degree of Protection: NEMA 1.
				3. Latchable with hinged door.
				4. Knockouts: Three, 1.375 / 1.125 inch diameter and three, 1.125 / 0.875-inch diameter on bottom surface.
				5. Mounting Flanges: Extend 0.8 inches top and bottom.
			3. Power Supply: 24 VDC, plus or minus 10 percent, 450 mA with all relays energized.
			4. Serial Interface: RS-485 RTU addressable interface MODBUS RTU over RS-485 9600 Baud, 8 bit Even Parity.
			5. Temperature Range: 14 to 122 degrees F (Minus 10 to 50 degrees C).
			6. Humidity Range: 0 to 95 percent Relative Humidity Non-condensing.
			7. Atmospheric Pressure: 0.9 to 1.1 atm.
			8. Connecting Terminals:
				1. Wire Range, Power, and Signal: 22 AWG to 12 AWG (0.2 to 2.5 sq.mm.).
				2. Wire Range, Ground: 22 AWG to 10 AWG (0.2 to 4 sq.mm.
				3. Strip Length: 0.3 in. (8 mm).
				4. Torque: 7 in-lbs (0.4 Nm).
			9. Weight: 11.6 lbs. (5.26 kg) max.
		2. Basis of Design: Model AMC-1DPS-7A Power Supply as manufactured by Armstrong Monitoring. Each box provides up to an additional 7 amps of 24 VDC power to provide power to devices within the network.
			1. Certifications: CSA Listed for Canada and USA.
			2. Housing: 16-gauge steel (LxWxH): 12 x 12.25 x 6.875 inch (305 x 311 x 175 mm).
				1. Powder Coating: Grey.
				2. Degree of Protection: NEMA 1.
				3. Latchable with hinged door.
				4. Knockouts: Three, 1.375 / 1.125 inch diameter and three, 1.125 / 0.875-inch diameter on bottom surface.
				5. Mounting Flanges: Extend 0.8 inches top and bottom.
			3. Power Supply:
				1. Input: 120 VAC, 60 Hz, 5.3 A.
				2. Output: 24 VDC, 10 A.
			4. Fuses:
				1. Input: 5x20 mm 4 A.
				2. Output: 5x20 mm 10 A.
			5. Temperature Range: 32 to 122 degrees F (0 to 50 degrees C).
			6. Humidity Range: 0 to 90 percent Relative Humidity Non-condensing.
			7. Atmospheric Pressure: 0.9 to 1.1 atm.
			8. Connecting Terminals:
				1. Wire Range, Power, and Signal: 22 AWG to 12 AWG (0.2 to 2.5 sq mm).
				2. Wire Range, Ground: 22 AWG to 10 AWG (0.2 to 4 sq.mm.
				3. Strip Length: 0.3 inch (8 mm).
				4. Torque: 7 inch-lbs (0.4 Nm).
			9. Weight: 11.6 lbs (5.26 kg) max.
		3. Basis of Design: Model AMC-1DMB- PS-R Modular Box as manufactured by Armstrong Monitoring. Each box can be used to expand RS-485 networks, while also offering up to 7 A of 24 VDC power for nodes on the RS-485 network. Designed to isolate the data coming from the AMC-1DBX Control Panel RS-485 input and transmit to a four loop, expanded, RS-485 network.
			1. Certifications: CSA Listed for Canada and USA.
			2. Housing: 16-gauge steel (LxWxH): 12 x 12.25 x 6.875 inch (305 x 311 x 175 mm).
				1. Powder Coating: Grey.
				2. Degree of Protection: NEMA 1.
				3. Latchable with hinged door.
				4. Knockouts: Three, 1.375 / 1.125 inch diameter and three, 1.125 / 0.875-inch diameter on bottom surface.
				5. Mounting Flanges: Extend 0.8 inches top and bottom.
			3. Power Supply:
				1. Input: 120 VAC, 60 Hz, 5.3 A.
				2. Output: 24 VDC, 10 A.
			4. Fuses:
				1. Input: 5x20 mm 4 A.
				2. Output: 5x20 mm 10 A.
			5. Serial Interface:
				1. Input: RS-485 RTU addressable interface MODBUS RTU over RS-485 9600 Baud, 8bit Even Parity.
				2. Output: Electrically isolated four loop RS-485 network.
			6. Temperature Range: 32 to 122 degrees F (0 to 50 degrees C).
			7. Humidity Range: 0 to 90 percent Relative Humidity Non-condensing.
			8. Atmospheric Pressure: 0.9 to 1.1 atm.
			9. Connecting Terminals:
				1. Wire Range, Power, and Signal: 22 AWG to 12 AWG (0.2 to 2.5 sq mm).
				2. Wire Range, Ground: 22 AWG to 10 AWG (0.2 to 4 sq.mm.
				3. Strip Length: 0.3 inch (8 mm).
				4. Torque: 7 inch-lbs (0.4 Nm).
			10. Weight: 11.6 lbs (5.26 kg) max.
		4. Basis of Design: Model AMC-1DMB-AI Modular Box as manufactured by Armstrong Monitoring.
			1. Each AMC-1DMB-AI provides eight channels of 0 to 20 mA Analog Inputs that can be communicated to the AMC-1DBX Control Panel over the RS-485 Modbus Interface.
			2. Certifications: CSA Listed for Canada and USA.
			3. Housing: 16-gauge steel (LxWxH): 12 x 12.25 x 6.875 inch (305 x 311 x 175 mm).
				1. Powder Coating: Grey.
				2. Degree of Protection: NEMA 1.
				3. Latchable with hinged door.
				4. Knockouts: Three, 1.375 / 1.125 inch diameter and three, 1.125 / 0.875-inch diameter on bottom surface.
				5. Mounting Flanges: Extend 0.8 inches top and bottom.
			4. Power Supply: 12 to 24 VDC, 250 mA.
			5. Serial Interface: RS-485 RTU addressable interface MODBUS RTU over RS-485 9600 Baud, 8 bit Even Parity.
			6. Analog Inputs (AMC-1DMB-AI only): Eight channels 0 to 20 mA.
			7. Temperature Range: 14 to 122 degrees F (Minus 10 to 50 degrees C).
			8. Humidity Range: 0 to 90 percent Relative Humidity Non-condensing.
			9. Atmospheric Pressure: 0.9 to 1.1 atm.
			10. Connecting Terminals:
				1. Wire Range, Power, and Signal: 22 AWG to 12 AWG (0.2 to 2.5 sq.mm.).
				2. Wire Range, Ground: 22 AWG to 10 AWG (0.2 to 4 sq.mm.
				3. Strip Length: 0.3 inch (8 mm).
				4. Torque: 7 inch-lbs (0.4 Nm).
			11. Weight: 11.6 lbs (5.26 kg) max.
		5. Basis of Design: Model AMC-1DMB-RL-AO Modular Box as manufactured by Armstrong Monitoring. Each box provides eight DPDT relay interfaces and eight channels of 0 to 20 mA Analog Outputs controlled by the AMC-1DBX Control Panel over the Modbus Interface.
			1. Certifications: CSA Listed for Canada and USA.
			2. Housing: 16-gauge steel (LxWxH): 12 x 12.25 x 6.875 inch (305 x 311 x 175 mm).
				1. Powder Coating: Grey.
				2. Degree of Protection: NEMA 1.
				3. Latchable with hinged door.
				4. Knockouts: Three, 1.375 / 1.125 inch diameter and three, 1.125 / 0.875-inch diameter on bottom surface.
				5. Mounting Flanges: Extend 0.8 inches top and bottom.
			3. Power Supply: 24 VDC, plus or minus 10 percent, 450 mA with all relays energized.
			4. Serial Interface: RS-485 RTU addressable interface MODBUS RTU over RS-485 9600 Baud, 8 bit Even Parity.
			5. Analog Outputs (AMC-1DBM-RL-AO only): Eight channels of 0 to 20 mA.
			6. Relays: Eight DPDT 10A at 240 VAC Res.
			7. Temperature Range: 14 to 122 degrees F (Minus 10 to 50 degrees C).
			8. Humidity Range: 0 to 90 percent Relative Humidity Non-condensing.
			9. Atmospheric Pressure: 0.9 to 1.1 atm.
			10. Connecting Terminals:
				1. Wire Range, Power, and Signal: 22 AWG to 12 AWG (0.2 to 2.5 sq.mm.).
				2. Wire Range, Ground: 22 AWG to 10 AWG (0.2 to 4 sq.mm.
				3. Strip Length: 0.3 inch (8 mm).
				4. Torque: 7 inch-lbs (0.4 Nm).
			11. Weight: 11.6 lbs (5.26 kg) max.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. REMOTE ALARM MODULES

\*\* NOTE TO SPECIFIER \*\* The AMC-RAM-3 is perfect for mechanical rooms, confined spaces, or general remote alarming requirements.

* + 1. Basis of Design: Model AMC-RAM-3 Remote Alarm Monitor as manufactured by Armstrong Monitoring. Offers remote audio/visual signaling of alarms, in conjunction with any of Armstrong Monitoring's monitor systems.
			1. Recommended Mounting Height: 4 to 5 ft (1.2 to 1.5 m) A.F.F.
			2. Housing: Polypropylene (LxWxH): 11.75 x 9.98 x 5.46 inch (299 x 253 x 139 mm).
				1. Degree of Protection: NEMA 4X.
			3. Power Supply: 12 to-24 VDC, 275 mA with strobe and buzzer operating.
			4. Indicators:
				1. Red Strobe Light, 90 strobes per minute.
				2. Buzzer 85 dBa at (610 mm), 2.9 kHz piezoelectric element.
			5. Audio Alarm Acknowledge Switch: Silences alarm. Visual alarm continues until gas clears.
			6. Temperature Range:
				1. Operating: Minus 40 to 140 degrees F (Minus 40 to 50 degrees C).
				2. Storage: Minus 40 to 167 degrees F (Minus 40 to 70 degrees C).
			7. Humidity Range: 0 to 99 percent Relative Humidity Non-condensing.
			8. Atmospheric Pressure: 0.9 to 1.1 atm.
			9. Connecting Terminals, Power:
				1. Wire Range: 22 AWG to 16 AWG (0.2-1.5 sq mm).
				2. Ring Terminal for No. 6 stud.
				3. Torque: 7 inch-lbs (0.4 Nm).
			10. Connecting Terminal, Ground:
				1. Wire Range, Ground: 14 AWG to 2 AWG (2.08-33.6 sq.mm).
				2. Strip Length: 0.47 inches (11.9 mm).
				3. Torque: 12 inch-lbs (1.3 Nm).
			11. Weight: 3.3 lbs (1.7 kg).
1. EXECUTION
	1. EXAMINATION
		1. Do not begin installation until 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.
		2. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.
	5. CLEANING AND PROTECTION
		1. Clean products in accordance with the manufacturer's recommendations.
		2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION