SECTION 13850

FIRE ALARM AND DETECTION SYSTEMS

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

\*\* NOTE TO SPECIFIER \*\* Bosch Security Systems; security and life safety systems.
 .
 This section is based on the products of Bosch Security Systems, which is located at:
130 Perinton Pkwy.
Fairport, NY 14450
Toll Free Tel: 800-289-0096
Tel: 585-223-4060
Email: [request info (presales.support@us.bosch.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=Bosch%20Security%20Systems&coid=44833&rep=&fax=&message=RE:%20Spec%20Question%20(13850bss):%20%20&mf=)
Web: [www.boschsecurity.us](http://www.boschsecurity.us)
[ [Click Here](http://www.arcat.com/arcatcos/cos44/arc44833.html) ] for additional information.

 Bosch Security Systems, Inc. works closely with an extensive network of certified dealers and integrators to design dependable security and life safety solutions for the market. Our broad portfolio of products and systems for video surveillance, access control, and intrusion and fire detection are used by major schools and universities, government agencies, correctional facilities, retail stores, casinos and in many other commercial environments throughout North America.

 Our significant investment in research and development is unsurpassed in the security industry and enables us to regularly update our existing products and introduce new technologies. These advancements are continually recognized by the market. For example, the products we manufacture for networked video systems have won 11 awards in the last three years. Our solution for integrating building security and management systems across an enterprise has been implemented by various Fortune 500 companies and can facilitate centralized management of an organization's assets. Testing by independent certified regulatory compliance organizations verifies updates to our intrusion and fire systems extend beyond minimum compliance requirements. And, while technological innovation is important, we ensure that new product development addresses all the concerns paramount in the world of security and life safety today, including performance, quality, and ease of installation, maintenance and use.

 For more than 100 years, the Bosch name has stood for quality and reliability. We are there for our customers during all crucial phases of a project: before, during and after the sale.
 .

1. GENERAL
	1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* FPD 7024 Product. Delete items below not required for project.

* + 1. The contractor shall furnish and install a complete 24 VDC, electrically supervised, conventional / addressable fire alarm system as specified herein and indicated on the drawings. The system shall include but not be limited to all control panels, power supplies, initiating devices, audible and visual notification appliances, alarm devices, and all accessories required to provide a complete operating fire alarm system.
			1. System cabinet.
			2. Power supply.
			3. Two optional multiplex buss.
			4. 32 character LCD annunciator.
			5. Programming keypad.
			6. Four to eight programmable conventional zones.
			7. Up to 247 addressable points in addition to 8 conventional zones.
			8. Built in dual line Digital Communicator.
			9. IP communications with a DX4020, B420 or B426 Network Interface Module installed with full single, double, and backup reporting.
			10. Cellular communications with an ITS-DX4020-G GPRS/GSM Integrated Communicator Module installed with full single, double, and backup reporting.
			11. Associated peripheral devices.
			12. Batteries.
			13. Wiring.
			14. Conduit.
	1. RELATED SECTIONS

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

* + 1. Section 05500 - Miscellaneous Metal Fabrications: Supporting structure.
		2. Division 16 - Electrical: Wiring, conduit, disconnects and connection to power supply and control devices.
	1. REFERENCES

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

* + 1. National Electric Code, Article 760.
		2. National Fire Protection Association Standards:
			1. NFPA 70 - National Electrical Code.
			2. NFPA 72 - National Fire Alarm Code.
			3. NFPA 101 - Life Safety Code.
		3. Local and State Building Codes:
			1. BOCA, National Building Code, Mechanical Code, Fire Prevention Code.
		4. Local Authorities Having Jurisdiction (AHJ).
		5. Underwriters Laboratories, Inc.:
			1. Equipment shall be approved by Underwriters Laboratories, Inc. for its intended purpose, listed as power limited by Underwriters Laboratories, Inc., for the following standards as applicable.
			2. UL 864 9th Editions UOJZ - Control units for Fire Protective Signaling Systems: Local Signaling Unit. Central Station Signaling Protected Premises Unit. Remote Signaling Protected Premises Unit. Auxiliary System Control Unit.
			3. UL 268 - Smoke Detectors for Fire Protective Signaling systems.
			4. UL 268A - Smoke Detectors for duct applications.
			5. UL 217 - Smoke Detectors for Single Stations.
			6. UL 521 - Heat Detectors for Fire Protective Signaling systems.
			7. UL 228 - Door Holders for Fire Protective Signaling systems.
			8. UL 464 - Audible Signaling appliances.
			9. UL 1638 - Visual Signaling appliances.
			10. UL 38 - Manually Activated Signaling Boxes.
			11. UL 346 - Water flow indicators for Fire Protective Signaling systems.
			12. UL 1481 - Power Supplies for Fire Protective Signaling systems.
		6. Americans with Disabilities Act (ADA):
			1. All visual notification appliances and manual pull stations shall comply with the requirements of the Americans with Disabilities Act.
		7. California State Fire Marshal (CSFM)
			1. 71650801:177.
		8. New York City's Materials and Equipment Acceptance system (NYC-MEA):
			1. MEA 12‑92‑E Vol. VII (Conventional version only, addressable pending).
	1. REGULATORY REQUIREMENTS
		1. Listings:
			1. All fire alarm system equipment shall be listed for its intended purpose and be compatibility listed to assure the integrity of the complete system.
	2. SUBMITTALS
		1. Submit under provisions of Section 01300.
		2. Product Data: Manufacturer's data sheets on each product to be used, including:
			1. Submit required documentation within thirty calendar days after award of the purchase order. Indicated in the document will be the type, size, rating, style, catalog number, manufacturers' names, photos, and /or catalog data sheets for all items proposed to meet these specifications. The proposed equipment shall be subject to the approval of the Architect/Engineer and no equipment shall be ordered or installed on the premises without that approval.
		3. Shop Drawings: Indicate dimensions and required tolerances, connection details, anchorage spacing, installation details, and special conditions.
			1. Submittal of shop drawings shall contain at least three copies of original manufacturer specification and installation instruction sheets. Subsequent information may be copies. All equipment and devices on the shop drawings to be furnished under this contract shall be clearly marked in the specification sheets.
		4. Qualification Submittals:
			1. Supplier's qualifications shall be submitted indicating years in business, service policies, warranty definitions, NICET certification, and completion of factory training program and a list of similar installations.
			2. Contractor qualifications shall be supplied indicating years in business and prior experience with installations that include the type of equipment that is to be supplied.
			3. The contractor shall provide hourly Service Rates, performed by a technician for this installed Life Safety System with the submittal. These hourly service rates shall be guaranteed for a 1-year period.
		5. Contract Close-out Submittals:
			1. Deliver two copies of the following to the owner's representative within thirty days of system acceptance. The closeout submittals shall include:
				1. Installation and Programming manuals for the installed Life Safety System.
				2. Point to point diagrams of the entire Life Safety System as installed. This shall include all connected smoke detectors and addressable field modules.
			2. All drawings shall reflect device address as verified in the presence of the engineer and/or end user.
	3. QUALITY ASSURANCE
		1. Manufacturers/Distributors Services:
			1. The following supervision shall be provided by an authorized factory trained service technician from the dealer of the fire alarm equipment. The technician shall have a minimum of two years of service experience in the fire alarm industry. The technician shall have the appropriate state licenses where applicable. The technician's name shall appear on equipment submittals. The technician shall be responsible for the following items:
				1. A pre installation visit to the job site to review equipment submittals and to verify the method by which the system is to be wired.
				2. During the installation the technician shall be on site or make periodic visits to verify installation and wiring of the system. He shall also supervise the completion of conduit rough, wires pulled into conduit and wiring rough, and ready for trim.
				3. Upon completion of wiring, final checkout and certification of the system shall be made under the supervision of this technician.
				4. At the time of the formal checkout, technician shall give operational instructions to the owner and/or his representative on the system.
		2. Installer Qualifications: Company experienced in manufacturer's products and certified by the manufacturer.
	4. DELIVERY, STORAGE, AND HANDLING
		1. Store products in manufacturer's unopened packaging until ready for installation.
		2. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
	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 absolute limits.
	6. WARRANTY
		1. Warrant all materials, installation and workmanship for a three year period, unless otherwise specified. A copy of the manufacturer's warranty shall be provided with the close out documentation.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Bosch Security Systems, which is located at: 130 Perinton Pkwy.; Fairport, NY 14450; Toll Free Tel: 800-289-0096; Tel: 585-223-4060; Email: [request info (presales.support@us.bosch.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=Bosch%20Security%20Systems&coid=44833&rep=&fax=&message=RE:%20Spec%20Question%20(13850bss):%20%20&mf=); Web: [www.boschsecurity.us](http://www.boschsecurity.us)

\*\* 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 01600.
		3. Products:
			1. The Life Safety System requirements shall be conformed to in their entirety to ensure that the installed and programmed Life Safety System will accommodate all of the requirements and operations required by the building owner. Any specified item or operational feature not specifically addressed prior to the bid date will be required to be met without exception.
			2. Submission of product purported to be equal to those specified herein will be considered as possible substitutes only when all of the following requirements have been met:
				1. Any deviation from the equipment, operations, methods, design or other criteria specified herein shall be submitted in detail to the specifying Architect or Engineer a minimum of ten working days prior to the scheduled submission of bids. Each deviation from the operation detailed in these specifications shall be documented in detail, including page number and section number, which lists the system function for which the substitution is being proposed.
				2. A complete list of such substituted products with three copies of working drawings thereof shall be submitted to the approved Architect and/or Consulting Engineer not less than ten working days prior to the scheduled submission of bids.
				3. The contractor or substitute bidder shall functionally demonstrate that the proposed substitute products are in fact equal in quality and performance to those specified herein.
		4. General Equipment and Materials Requirements:
			1. All equipment furnished for this project shall be new and unused. All components shall be designed for uninterrupted duty. All equipment, materials, accessories, devices and other facilities required or as noted on the contract drawings shall be best suited for the intended use and shall be provided by a single manufacturer. If any of the equipment provided is by different manufacturers, then that equipment shall be "Listed" as to its compatibility by Underwriters Laboratories (UL), if such compatibility is required by UL standards.
		5. Design Intent:
			1. It is the contractor's responsibility to meet the entire intent of these specifications.
			2. Deviations from the specified items shall be at the risk of the contractor until the date of final acceptance by the architect, engineer, and owner's representative.
			3. All costs for removal, relocation, or replacement of a substituted item shall be at the risk of the contractor.

\*\* NOTE TO SPECIFIER \*\* FPD-7024 Product. Delete if not required.

* 1. GENERAL DESCRIPTION
		1. Control Panel:
			1. The Fire Alarm Control Panel (FACP) shall be the Bosch FPD-7024 conventional /addressable control panel. The FACP shall have a 4 Amp power supply and be capable of expansion to a maximum of 32 total amps via bus connected expander modules that supervise low battery, loss of AC and loss of communication.
			2. The panel shall be IP (B426) and GPRS/GSM Cellular (ITS-DX4020-G) compatible.
			3. The FACP shall be capable of supporting up to eight (8) conventional fire zones and 247 addressable points combined in one system.
			4. The panel shall have a built in 32 character LCD annunciator/keypad with the capability of having an additional four supervised remote annunciators/keypads connected in the field.
			5. The FACP shall have a built in UL approved digital communicator. The communicator shall transmit in Modem IIIa2, SIA, CID, BFSK and 4/2, 3/1 Tone Burst. The communicator shall allow local and remote up/downloading of system operating options, event history, and detector sensitivity data for addressable detectors.
			6. Class A or B configuration on both IDC and NAC devices shall not require adaptors.
			7. The main communication bus (options bus) shall be capable of Class A or Class B configuration with a total bus length of 5900 feet (1798 m).
		2. System Wiring:
			1. The multiplex buss and Data Communication Bus (options bus) shall be wired with standard NEC 760 compliant wiring, no twisted, shielded or mid capacitance wiring is required for standard installations. All FACP screw terminals shall be capable of accepting 14 AWG (ISO 2.5 mm2) to 18 AWG (ISO 0.75 mm2) wire. All system wiring shall be in accordance with the requirements of NFPA 70, the National Electrical Code (NEC) and also comply with article 760 of the NEC.
			2. Power Limited Wiring: For Power Limited wiring, use FPL, FPLR or FPLP approved wiring.
		3. Multiplex Bus:
			1. Each multiplex bus shall be capable of a wiring distance of 5900 feet from the multiplex bus driver module (D7039) and be capable of supporting 128 devices. The communication protocol to multiplex bus devices shall be digital. Any multiplex bus loop device, which goes into alarm, shall interrupt the polling cycle for priority response from the FACP. The FACP shall respond consistently to a device that goes into alarm on a multiplex buss in less than 3 seconds. The multiplex buss shall be capable of functioning in a Class A or Class B configuration.
		4. Multiplex Bus Loop Devices:
			1. Devices supported shall include addressable photoelectric smoke detectors, addressable input modules, input/relay output modules, dual input modules, and addressable eight input modules. There shall be no device type limit.
		5. Detector Functions:
			1. The products of photoelectric detectors shall communicate values using a digital protocol to the FACP using the following values:
				1. Automatic compliance with NFPA 72 standards for detector sensitivity.
				2. Trouble alert when a detector is out of tolerance
				3. Alert control panel of values that indicate fire.
		6. Maintenance Function:
			1. The FACP shall have the ability to poll its multiplex smoke detectors for detectors that are getting close to their compliance limits. When a detector has reached near these limits it will send maintenance or "Chamber Check" alert to the control. The FACP will indicate the condition via the LCD display and record it to the buffer. The end user shall have the ability to access this information from the Annunciator and from the remote software.
		7. On board programmable conventional inputs:
			1. The FACP shall support four (4) on board conventional input circuits that are each capable of supporting up to 20 two‑wire conventional smoke detectors. A four (4) conventional input module (FPC-7034) expander can be added to give the FACP the ability to provide eight (8) conventional zones and a total of 160 conventional smoke detectors.
		8. Annunciators:
			1. The main control must have a built in annunciator with a 32-character LCD display and feature LED's for General Alarm, System Trouble, System Silence, Supervisory, Ground Fault and Power. All controls and programming keys are membrane style buttons. The annunciator must be able to silence and reset alarms through the use of a keypad-entered code, or by just pushing the desired function key, depending on how the system is configured. The annunciators must have four levels of user codes that will allow the limitation of operating system programming to authorized individuals.
		9. Remote Annunciators:
			1. The fire system shall be capable of supporting up to four remote annunciators. LCD Remote annunciator Model FPC-7033 shall have the same control and display layout so that they match identically the built in annunciator. Remote annunciators shall have the same functionality and operation as the built in annunciator. All annunciators shall have 32-character LCD displays and shall feature four LED's for general alarm, system trouble, system silence, and system power. All controls and programming keys are silicone mechanical type with tactical and audible feedback. Keys shall have a travel of 0.040 inches (0.01 cm). No membrane style buttons will be permitted.
			2. The annunciator shall be able to silence and reset alarms through the use of a code entered on the annunciator keypad. The annunciator shall have three levels of user codes that will limit the operating system programming to authorized individuals. The control panel shall allow all annunciators to accommodate multiple users input simultaneously. Remote annunciators shall be capable of operating at a distance of 2000 feet (610 m) from the main control panel on unshielded non-twisted cable.
			3. An annunciator with 2 line LCD display, silence and reset buttons protected by key switch shall be available.
		10. Annunciator Modules:
			1. The fire system shall be able to support up to eight LED annunciator modules (D7030X) that shall be used to drive eight LED's for zone annunciation. These annunciators will only follow the fifty programmable zones on the control. The D7030X shall reside on the option buss, and can be up to 1000 feet (305 m) from the control.
		11. Distributed Power Panel:
	2. The contractor shall supply a D7038 compatible with the FPD-7024 fire alarm control panel. The power module shall have 6 Amps of output power, four NAC circuits rated at 2.5 Amps each, and one trouble relay circuits. The fire system shall be capable of supporting up to two (2) D7038 modules. The four NAC circuits shall have similar functionality as the NAC circuits on the main panel. The Distributed Power Supply shall be capable of being connected via an option system buss.
		1. Digital Communicator:
			1. The digital communicator shall be an integral part of the control panel and be capable of reporting all points and all zones of alarm, supervisory, and trouble as well as all system status information such as loss of AC, low battery, ground fault, loss of supervision to any remote devices with individual and distinct messages to a central station or remote station. The communicator shall also be capable of up/downloading of all system programming options, Event history and Sensitivity compliance information to a PC on site or at a remote location.
			2. The communicator shall have an answering machine bypass feature that will allow the panel to respond to communication even on phone lines that have other communication equipment present. The communicator shall be capable of reporting via 4/2, BFSK, SIA, Contact ID, 3/1 formats and Modem IIIa2. The communicator shall have a delayed AC loss report function which will provide a programmable report delay to help ease traffic to the central station during a power outage. No controls that use External modems for diagnostics control shall be accepted.
		2. Dry Contacts:
			1. The FACP will have three (3) form "C" dry contacts that can be programmed for alarm, trouble notification, water flow, and supervisory.
		3. Ground Fault Detection:
			1. A ground fault detection circuit shall be provided to detect positive and negative grounds on all field wiring. The ground fault detector shall operate the general trouble devices as specified but shall not cause an alarm to be sounded. A single ground fault will not interfere with the normal operation, such as alarm, or other trouble conditions.
		4. Over current Detection:
			1. All low voltage circuits will be protected by microprocessor controlled circuit breakers or has a self restoring circuit breaker for the following: smoke detector power, main power supply, indicating appliance circuits, battery standby power and auxiliary output.
		5. Test Functions:
			1. A "Walk Test" mode shall be a standard feature of the fire alarm control panel. The walk test feature shall function so that each alarm input tested will operate the associated notification appliance for two seconds. The FACP will then automatically perform a reset and confirm normal device operation.
			2. A "Fire Drill" mode shall allow the manual testing of the fire alarm system notification circuits. The "Fire Drill" shall be capable of being controlled at the main annunciator, and remote annunciators.
			3. A "Disable Mode" shall allow for any point or NAC circuit to be disabled without affecting the operation of the total fire system.
		6. Remote Input Capabilities:
			1. The control panel shall have provisions for supervised switch inputs for the purpose of Alarm reset and silence operations.
		7. Notification Appliance Mapping Structure:
			1. All notification circuits and modules shall be programmable via a mapping structure that allows output activation to be flexibly associated with input activation or system conditions. Each of these shall have the ability to be triggered by any of the panel's 50 input Zones or 10 system zones. An input zone may trigger outputs individually, or zones may be triggered by global conditions such as fire alarms, water flow alarms, system trouble or other system zones. Additionally each output can be individually configured to control the cadence pattern of the output so that sounders can indicate a variety of conditions.
		8. On board programmer:
			1. The FACP shall have an on board programmer which will allow for all system functions and options to be programmed via the on board annunciator keypad. Any panel that does not have this capability will not be accepted.
		9. Downloading Software:
			1. The fire alarm control panel must support up/downloading of system programming from a PC with Remote Programming software using DX4010I, D4010V2, DX4020, B420, B426 or ITS-DX4020-G Network interface modules.
			2. The FACP shall also be able to download the detector "Chamber Check" state of the addressable detectors, and 500-event system buffer to the PC. Communication shall take place via the same telephone lines as the built in digital communicator and shall not require an external modem to be connected to the panel. The downloading software shall contain a code that will block unauthorized persons from accessing the panel via direct connection or over the phone lines.
		10. English language descriptions:
			1. The FACP shall provide the ability to have a text description of up to 16 characters for each input point, on the system. The use of individual lights to provide descriptions will not be acceptable.
	3. SYSTEM OPERATION
		1. Alarm:
			1. When a device indicates any alarm condition the control panel shall respond within three seconds. The General Alarm LED on the annunciator(s) should light and the LCD should prompt the user as to the current events. The alarm information shall be stored in event memory for later review. When the alarmed device is restored to normal, the control panel shall be required to be manually reset to clear the alarm condition, except that the alarms may be silenced as programmed.
			2. An alarm shall be silenced by the silenced button at the main or on the remote annunciators. When silenced, this shall not prevent the resounding of subsequent events if another event should occur (subsequent alarm feature). When alarms are silenced the silenced LED on the control panel, and on any remote annunciators shall remain lit, until the alarmed device is returned to normal.
		2. Troubles:
			1. When a device indicates a trouble condition, the control panel System Trouble LED should light and the LCD should prompt the user as to the current events. The trouble information shall be stored in event memory for later review.
			2. When the device in trouble is restored to normal, the control panel shall be automatically reset. The trouble restore information shall be stored in event memory for later review. Pushing the silence button at the main control or entering a code and pushing the silence button on the remote annunciators shall silence a trouble. When silenced, this shall not prevent the resounding of subsequent events if another event should occur.
		3. Supervision Methods:
			1. Each loop shall be electrically supervised for opens and ground faults in the circuit wiring, and shall be so arranged that a fault condition on any loop will not cause an alarm to sound. Additionally, every addressable device connected to the multiplex buss will be supervised and individually identified if in a fault condition. The occurrence of any fault will light a Supervisory LED and sound the system trouble sounder, but will not interfere with the proper operation of any circuit which does not have a fault condition.
			2. Each indicating appliance circuit shall be electrically supervised for opens, grounds and short circuit faults, on the circuit wiring, and shall be so arranged that a fault condition on any indicating appliance circuit or group of circuits will not cause an alarm to sound. The occurrence of any fault will light the trouble LED and sound the system trouble sounder, but will not interfere with the proper operation of any circuit which does not have a fault condition.

\* NOTE TO SPECIFIER \*\* FPD-7024 Product only. Delete if not required.

* + 1. Ground Faults:
			1. A yellow GND Fault LED lights whenever the system detects a ground fault condition. A single ground fault will not interfere with the normal operation, such as alarm, or other trouble conditions.
	1. CONTROL UNIT
		1. System Cabinet:
			1. Mounting: The system cabinet shall be red and can be surface or semi-flush mounted. The cabinet door shall be easily removable to facilitate installation and service.
			2. Key lock to prevent tampering: The cabinet shall have a physical key and lock system to prevent unauthorized tampering to the control panel, power supply and any wiring within the cabinet.

\* NOTE TO SPECIFIER \*\* FPD-7024 Product only. Delete if not required.

* + - 1. Audible System Trouble Sounder: An audible system trouble sounder shall be an integral part of the control unit. Provisions shall also be provided for an optional supervised remote trouble signal.
		1. Power Supply and Charger:
			1. The entire system shall operate on 24 VDC power supply with the rated current available of 4 Amps. The FACP shall have a battery charging circuit capable of complying with the following requirements:
				1. Sixty (60) hours of battery standby with five (5) minutes of alarm signaling at the end of this sixty (60) hour period (as required per NFPA 72 remote station signaling requirements) using rechargeable batteries with automatic charger to maintain standby sealed lead-acid batteries in a fully charged condition.

\* NOTE TO SPECIFIER \*\* Delete above or below option for battery standby power duration.

* + - * 1. Twenty-four (24) hours of battery standby with five (5) minutes of alarm signaling at the end of this twenty-four (24) hour period (as required per NFPA 72 central station signaling requirements) using rechargeable batteries with automatic charger to maintain sealed lead-acid batteries in a fully charged condition.
			1. The power supply shall comply with UL Standard 864 9th Edition for power limiting.
			2. The FACP will indicate a trouble condition if there is a loss of AC power or if the batteries are missing or of insufficient capacity to support proper system operation in the event of AC failure. A "Battery Test" will be performed automatically every three minutes to check the integrity of the batteries. The test shall disconnect the batteries from the charging circuit and place a load on the battery to verify the battery condition.

\* NOTE TO SPECIFIER \*\* FPD-7024 Product only. Delete if not required.

* + - 1. In the event that it is necessary to provide additional power one or more of the model D7038 Distributed Modules shall be used to accomplish this purpose.
		1. Connections and Circuits:
			1. Connections to the light and power service shall be on a dedicated branch circuit in accordance with the National Fire Alarm Code NFPA 72, National Electrical Code (NEC) NFPA 70, and the local authority having jurisdiction (AHJ).
			2. The circuit and connections shall be mechanically protected.
			3. A circuit disconnecting means shall be accessible only to authorized personnel and shall be clearly marked "FIRE ALARM CIRCUIT CONTROL".
	1. ACCESSORY COMPONENTS
		1. Control & Option Data Bus Device Support:
			1. The FACP shall support the following devices on the control and option data buss:
				1. D7030X: Eight-point LED Annunciator (eight red).
				2. D7030X-S2: Eight-point LED Annunciator (two yellow, six red).
				3. D7030X-S8: Eight-point LED Annunciator (eight yellow).
				4. D7032: Eight-point LED Annunciator Expander (eight red).

\* NOTE TO SPECIFIER \*\* FPD-7024 Product only. Delete 70 series components if not required.

* + - * 1. FMR-7033: LCD fire system keypad.
				2. FMR-7036: LCD Annunciator.
				3. FPC-7034: Four-Point Expander
				4. D7035/B: Octal relay module.
				5. D7039: Multiplex bus processor board.
				6. D7042/B: 8 Input module.
				7. D7048/B: Octal driver module.
				8. FPP-RNCA-8A-4C: Remote NAC Booster.

\* NOTE TO SPECIFIER \*\* FPD-7024 Product only. Delete if not required.

* + 1. Multiplex Buss Loop Device Support:
			1. The FACP shall support the operation of 128 total devices per multiplex buss loop without regard to device type. The following devices shall be supported:
				1. D7050: Addressable Photoelectric Smoke Detector Head.
				2. D7050TH: Addressable Photoelectric Smoke and Heat Detector Head.
				3. D7050-B6: Detector Base.
				4. D7042: Multiplex eight‑input remote module.
				5. D7042B: Multiplex eight‑input remote module with fire enclosure.
				6. D7044: Multiplex single‑input module.
				7. D7044M: Mini multiplex single‑input module.
				8. D7048: Multiplex octal driver.
				9. D7048B: Multiplex octal driver with fire enclosure.
				10. D7052: Multiplex dual‑input module.
				11. D7053: Multiplex input output module.
				12. FMM-7045: Single‑action manual station.
				13. FMM-7045-D: Double‑action manual station.
			2. The FACP shall support these other devices via addressable input, conventional inputs, Notification circuits, or FPP-RNAC-8A-4C NAC expanders:
				1. Single‑action manual station - Key Reset.
				2. Dual‑action manual station - Key Reset.
				3. Combination Horn Strobe or Strobe Only Devices.
				4. Up to 4 FPP-RNAC-8A-4C NAC supplies, for a total of 16 circuits can be synchronized on the options bus.
				5. NAC sync signal for Wheelock and Systems Sensor NAC appliances.
	1. NOTIFICATION DEVICES
		1. The visible signal of the notification device shall be approved Multi-candela signal devices with field selectable settings and be listed by Underwriters Laboratories Inc.
		2. The audible signal of the notification appliance (combination audible/visible units only) shall produce a peak sound output of 90 dBa or greater as measured in an anechoic chamber.
		3. The signaling appliance shall also have the capability to silence the audible signal while leaving the visible signal energized or silence and turn off the visual signals with a single pair of wires. Additionally, the user shall be able to select either continuous or temporal tone output with the temporal signal having the ability to be synchronized.
		4. The visible signaling appliance shall maintain a minimum flash rate of 1 Hz to 2 Hz regardless of power input voltage. The appliance shall also be capable of meeting the candela requirements of the specification presented by the Engineer and ADA.
		5. The appliance shall be polarized to allow for electrical supervision of the system wiring. The unit shall be provided with terminals with barriers for input/output wiring and be able to mount to a single gang or double gang box or double workbox with the use of an adapter plate. The unit shall have an input voltage range of 16 – 33 Volts with either direct current (DC) or full wave rectified (FWR) power.
	2. SMOKE DETECTORS

\*\* NOTE TO SPECIFIER \*\* The FCP-500 Series smoke detectors have the lowest mounting profile in the industry so it nearly disappears when installed in the ceiling. In addition, the FCP-500 comes in standard white and a clear plastic model with 16 color-matching rings so it virtually disappears while it works. Where appearance and interior design are important considerations, this smoke detector - a Bosch exclusive - is the hands down favorite. Delete if not required.

* + 1. Smoke detectors shall be Bosch model FCP‑500 series ceiling mounted addressable photoelectric smoke detectors.
			1. Conventional Flush-mount Detectors shall be UL Listed, open area photoelectric smoke detectors.

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

* + - 1. Model FCP-500: Conventional 4-wire flush mount smoke detector; white.
			2. Model FCP-500-C: Conventional 4-wire flush mount smoke detector with CO element; white.
			3. Model FCP-500-P: Conventional 4-wire flush mount smoke detector; transparent with color ring kit.
			4. Model FCP-500-C-P: Conventional 4-wire flush mount smoke detector with CO element; transparent with color ring kit.

\*\* NOTE TO SPECIFIER \*\* Intelligent automatic fire detector for smoke, optical component for flush fitting in steel-reinforced concrete ceilings or suspended ceilings with connection to a conventional line. Delete if not required.
 Planning:
 Monitoring range: max. 1290 sf (120 sq. m).
 Maximum installation height: 52.5 feet (16 m).
 Minimum installation height: 8 feet 10 inches (2.70 m).
 For flush fitting installation with ceiling mount back box:
 1) Thickness of false ceiling: up to 1-1/4 inches (32 mm).
 2) Required drill hole: 5 inches (130 mm) diameter.
 3) Installation Height: 4-3/8 inches (110 mm).
 Minimum distance from lights:1 feet 8 inches ( 0.5 m).

* + 1. Smoke detectors shall be Bosch FCP-500-xK series ceiling mounted photoelectric smoke detectors. Complete with ceiling mount back box, base and panel.

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

* + - 1. Model FCP-500-K/-EK:
				1. Detector Housing Color: Signal white, RAL 9003.
				2. Detector Front Plate Color: Signal white.
			2. Model FCP-500-PK/-EPK:
				1. Detector Housing Color: Signal white, RAL 9003.
				2. Detector Front Plate Color: Transparent/silver gray.
			3. Detection Principle: Two independent scattering light sensors with sensing volumes directly beneath the detector. Contamination detection by means of a third optical system.
			4. Detection Characteristics:
				1. Detection Principle: Scattered light measurement.
				2. Response Sensitivity: 1.4%/ft. – 3.2%/ft. (.201 - .465 dB/m).
				3. Drift compensation.
				4. Protection against insects by means of a redundant evaluation system.
				5. Protection against external light.
				6. Chamber contamination monitoring.
				7. Optical fault monitoring.
				8. Trouble relay for signaling faults.
				9. Can be removed from the base with an installation tool up to a ceiling height of 26 feet (8 m) without the need for access equipment.
				10. Activation of test mode on the detector itself by means of a reed switch.
				11. Windproof installation in suspended ceilings possible.
				12. Alarm indication identifiable from 360 degree.
				13. Connection for at least one remote alarm display.
				14. Does not protrude more than 3/8 inch (10 mm) from the ceiling.
				15. Blends into white ceilings.
			5. Electrical Data:
				1. Operating Voltage: 8.5 VDC to 33 VDC.
				2. Current Consumption: 3.5 mA.
				3. Alarm Output: Relay resistance is selectable for Short (0 Ohm) or 680 Ohms.
				4. Remote Indicator output is a current sinked (Grounded) through a built in 1.5 kOhm resistor at 20 mA max.
			6. Mechanical Data:
				1. Bi-color LED status Indicator: Red (alarm), Green (normal or test mode).
				2. Dimensions:

 Detector: 4-7/16 inch diameter by 2-5/32 inch (113 mm diameter by 55 mm).

 Detector with trim ring: 6 inches diameter by 2-3/8 inches (150 mm diameter by 55 mm).

 Detector with trim ring and base: 6 inches diameter by 2-3/4 inches (150 mm diameter by 70 mm).

* + - * 1. Housing Material: Polycarbonate.
			1. Environmental Conditions:
				1. Protection Category per EN 60529: IP 53.
				2. Operating Temperature: -4°F to 149°F (-20°C to +65°C) with a UL listed range of +32°F to +100°F (0°C to +38°C).
				3. Maximum Relative Humidity: 95% (non-condensing)
				4. Maximum Air Speed: 300 fpm (1.5 m/s).

\*\* NOTE TO SPECIFIER \*\* Intelligent automatic fire detector for smoke and carbon monoxide, optical component for flush fitting in steel-reinforced concrete ceilings or suspended ceilings with connection to a conventional line. Delete if not required.
 Planning:
 Monitoring range: max. 1290 sf (120 sq. m).
 Maximum installation height: 52.5 feet (16 m).
 Minimum installation height: 8 feet 10 inches (2.70 m).
 For flush fitting installation with ceiling mount back box:
 1) Thickness of false ceiling: up to 1-1/4 inches (32 mm).
 2) Required drill hole: 5 inches (130 mm) diameter.
 3) Installation Height: 4-3/8 inches (110 mm).
 Minimum distance from lights:1 feet 8 inches ( 0.5 m).

* + 1. Smoke detectors shall be Bosch FCP-500-CxK series ceiling mounted photoelectric smoke detector and chemical sensor (CO). Complete with ceiling mount back box, base and panel.

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

* + - 1. Model FCP-500-CK/-CEK:
				1. Detector Housing Color: Signal white, RAL 9003.
				2. Detector Front Plate Color: Signal white.
			2. Model FCP-500-PK/-CPEK:
				1. Detector Housing Color: Signal white, RAL 9003.
				2. Detector Front Plate Color: Transparent/silver gray.
			3. Detection Principle: Two independent scattering light sensors with sensing volumes directly beneath the detector in combination with independent chemical sensor system (CO) to detect combustion gases.
			4. Detection Characteristics:
				1. Detection Principle: Combination of scattered light measurement and CO measurement.
				2. Response Sensitivity: 1.4%/ft. – 3.2%/ft. (.201 - .465 dB/m).
				3. CO Gas sensor to enhance false alarm immunity.
				4. Drift compensation.
				5. Protection against insects by means of a dual chamber design and algorithm.
				6. Protection against external light.
				7. Chamber contamination monitoring.
				8. Optical fault display.
				9. Trouble relay for signaling faults.
				10. Can be removed from the base with an installation tool up to a ceiling height of 26 feet (8 m) without the need for access equipment.
				11. Activation of test mode on the detector itself by means of a reed switch.
				12. Windproof installation in suspended ceilings possible.
				13. Alarm indication identifiable from 360 degree.
				14. Connection for at least one remote alarm display.
				15. Does not protrude more than 3/8 inch (10 mm) from the ceiling.
				16. Blends into white ceilings.
			5. Electrical Data:
				1. Operating Voltage: 8.5 VDC to 33 VDC.
				2. Current Consumption: 3.5 mA.
				3. Alarm Output: Relay resistance is selectable for Short (0 Ohm) or 680 Ohms.
				4. Remote Indicator output is a current sinked (Grounded) through a built in 1.5 kOhm resistor at 20 mA max.
			6. Mechanical Data:
				1. Bi-color LED status Indicator: Red (alarm), Green (normal or test mode).
				2. Dimensions:

 Detector: 4-7/16 inch diameter by 2-5/32 inch (113 mm diameter by 55 mm).

 Detector with panel: 6 inches diameter by 2-3/8 inches (150 mm diameter by 55 mm).

 Detector with panel and base: 6 inches diameter by 2-3/4 inches (150 mm diameter by 70 mm).

* + - * 1. Housing Material: Polycarbonate.
			1. Environmental Conditions:
				1. Protection Category per EN 60529: IP 53.
				2. Operating Temperature: -4°F to 149°F (-20°C to +65°C) with a UL listed range of +32°F to 100°F (0°C to +38°C).
				3. Maximum Relative Humidity: 95% (non-condensing)
				4. Maximum Air Speed: 300 fpm (1.5 m/s).
		1. Smoke detectors shall be Bosch model D7050/D7050TH series ceiling mounted addressable photoelectric smoke detectors. The detector shall be UL listed compatible with the Bosch FPD-7024 fire alarm control panel.
			1. The smoke detector shall have a flashing status LED for visual supervision. When the detector is activated, the flashing LED shall flash at a 1/sec rate. If the chamber is out of calibration range the LED will double flash. The detector may be reset by pressing the control panel's reset button.
			2. The vandal security-locking feature shall be used in those areas as indicated on the drawing. The locking feature shall be field selectable when required.
			3. All detectors shall have the "Chamber Check" feature with the addressable detectors sending a contaminated chamber signal (Dirty) to the FACP.

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

* + 1. Conventional smoke detectors shall be the Bosch D256A/D257A, D263/D263TH, D263S/D263THS, D285/D285TH or F220 two wire smoke detectors with appropriate bases.
			1. The smoke detector shall have a flashing status LED for visual supervision. When the detector is actuated, the flashing LED will latch on solid. The LED shall flash at a 1/sec rate if the chamber is out of calibration range. The detector may be reset by actuating the control panel's reset switch.
			2. The vandal security-locking feature shall be used in those areas as indicated on the drawing. The locking feature shall be field selectable when required.
			3. All detectors shall have the "Chamber Check" feature with the addressable detectors sending a contaminated chamber signal to the FACP.
		2. Projected beam smoke detectors shall be Bosch model D296/D297 projected beam smoke detector. The detector shall be UL listed compatible with the Bosch FPD-7024 fire alarm control panel.
			1. The smoke detector shall have a flashing green status LED for visual supervision. When the detector is activated, the red LED shall be on steady. If there are any blockages or other detector troubles the yellow LED shall be on steady. The detector shall latch until reset by pressing the control panel's reset button.
			2. A trouble shall be created when the door/cover is removed, power is lost or the beam path is blocked by >90%. It must also supervise the signal strength and create a trouble if it is <50% or greater than 20%.
			3. All detectors shall have be self compensating for dust and dirt and produce a trouble when the limit is reached.
			4. Automatic signal synchronization eliminates the need for extra wires and ease of setup.
			5. The alarm threshold shall have 8 settings, selectable from 20% to 80% reduction in signal strength to account for installation distance and various applications. The response shall also have a selectable time of 5 or 30 seconds. This flexibility helps detect fast growing fires and/or false alarm sources.
			6. Installation and diagnostic features shall include an alignment sight, signal strength, and automatic gain control.
			7. The transmitter and receiver shall be able to be installed up to 350 ft (107 m) apart and have a spacing of 60 ft (18 m).
1. EXECUTION
	1. WIRING
		1. Installer's Responsibilities:
			1. The installer shall coordinate the installation of the fire alarm equipment.
			2. All conductors and wiring shall be installed according to the manufacturer's recommendations.
			3. It shall be the installer's responsibility to coordinate with the supplier, regarding the correct wiring procedures before installing any conduits or conductors.
		2. Installation of System Components:
			1. System components shall be installed in accordance with the latest revisions of the appropriate NFPA pamphlets, the requirements contained herein, National Electrical Code, local and state regulations, the requirements of the fire department and other applicable authorities having jurisdiction (AHJ).
			2. All wire used on the fire alarm system shall be UL Listed as fire alarm protection signaling circuit cable per National Electrical Code, Article 760. The use of FPL, FPLR or FPLP wiring for power limited applications.
	2. DEVICE INSTALLATION
		1. Furnish and install, all devices where shown on the drawings, the following applicable codes, standards and manufacturer recommendation to ensure proper operations and functions as intended.
	3. FINAL TEST
		1. Before the installation shall be considered completed and acceptable by the awarding authority, a test of the system shall be performed as follows:
			1. The contractor's job foreman, a representative of the owner, and the fire department shall operate every building fire alarm device to ensure proper operation and correct annunciation at the control panel.
			2. At least one half of all tests shall be performed on battery standby power.
			3. Where application of heat would destroy any detector, it may be manually activated.
		2. The communication loops and the indicating appliance circuits shall be opened in at least two locations per circuit to check for the presence of correct supervision circuitry.
		3. When the testing has been completed to the satisfaction of both the contractor's job foreman and owner, a notarized letter cosigned by each attesting to the satisfactory completion of said testing shall be forwarded to the owner and the fire department.
		4. The contractor shall leave the fire alarm system in proper working order, and, without additional expense to the owner, shall replace any defective materials or equipment provided by him under this contract within one year (365 days) from the date of final acceptance by the awarding authority.
		5. Prior to final test the fire department shall be notified in accordance with local requirements.
	4. AS BUILT DRAWINGS, TESTING, AND MAINTENANCE INSTRUCTIONS
		1. As Built Drawings:
			1. A complete set of reproducible "as-built" drawings showing installed wiring, color coding, and wire tag notations for exact locations of all installed equipment, specific interconnections between all equipment, and internal wiring of the equipment shall be delivered to the owner upon completion of system.
		2. Operating and Instruction Manuals:
			1. Operating and instruction manuals shall be submitted prior to testing of the system. Three complete sets of operating and instruction manuals shall be delivered to the owner upon completion. User operating instructions shall be provided prominently displayed on a separate sheet located next to the control unit in accordance with UL Standard 864.

END OF SECTION