

28 31 00 – Digital, Addressable Fire Alarm System

DIVISION 28 – Electronic Safety and Security



STATEMENT OF PURPOSE & BACKGROUND

- Scope:
 - Section includes District standard fire alarm system and components
- Statement of goals:
 - This section has been developed to provide a consistent framework for fire alarm systems throughout the District.
- Revision history of section:
 - 2021
 - 1/17/2023 (update products, revised format)
 - 12/26/2023 (*'Lockout' changed to 'Secure' where relevant*)
 - 04/12/2024 (Various updates)
 - 01/23/2026 (Blue Security Strobe)

OUTLINE SPECIFICATION

- The following pages contain the standard specification for Fire Alarm Systems for use throughout the school District.

SECTION 28 31 00 – DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section. (When applicable)
- B. Related Sections include the following: Division 28 Section "Conductors and Cables for Electronic Safety and Security." (When applicable)

SUMMARY

- A. Section Includes:
 - 1. Fire alarm control panel.
 - 2. Manual fire-alarm boxes.
 - 3. System smoke detectors.
 - 4. Duct smoke detectors.
 - 5. Photoelectric beam detectors.
 - 6. Heat detectors.
 - 7. Notification appliances.
 - 8. Magnetic door holders.
 - 9. Remote annunciator.
 - 10. Addressable interface device.
 - 11. Digital alarm communicator transmitter.
 - 12. Remote / Exterior Alarm.
 - 13. Lockdown push button.

1.02 DEFINITIONS

- A. LED: Light-emitting diode.
- B. NICET: National Institute for Certification in Engineering Technologies.
- C. DACT: Digital alarm communicator transmitter.
- D. FACP: Fire-alarm control panel
- E. FAAP: Fire alarm annunciator panel
- F. FAPS: Fire alarm power supply
- G. DVC: Digital voice command

1.03 SYSTEM DESCRIPTION

- A. Non-coded, UL-certified addressable system, with multiplexed signal transmission, dedicated to fire-alarm service only. All components and all wiring shall be new

1.04 SUBMITTALS

A. General Submittal Requirements:

1. Submittals shall be submitted concurrently to the Authorities Having Jurisdiction and to the Engineer.
2. Submittals shall be approved by authorities having jurisdiction before installation.
3. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by manufacturer in fire-alarm system design.
 - b. NICET-certified fire-alarm technician, Level III minimum.
 - c. Licensed or certified by authorities having jurisdiction.

B. Product Data: For each type of product indicated.

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
2. Include voltage drop calculations for notification appliance circuits.
3. Include battery-size calculations.
4. Include plans, sections and when applicable elevations of heating, ventilation and air-conditioning ducts drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
5. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.

D. Qualification Data: For qualified Installer.

E. Field quality-control reports.

F. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
2. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
3. Recorded on USB flash memory device - either the one built into the documentation enclosure or a separate one left in documentation enclosure - a copy of site-specific software and final database as programmed with any required passwords.
4. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:
 - a. Frequency of testing of installed components.
 - b. Frequency of inspection of installed components.
 - c. Requirements and recommendations related to results of maintenance.
 - d. Manufacturer's user training manuals.

5. Manufacturer's required maintenance related to system warranty requirements.
6. Abbreviated operating instructions for mounting at fire alarm control panel.
7. Copy of NFPA 25.

G. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On documentation enclosure USB or a separate one left in documentation enclosure complete with data files.
3. Device address list.
4. Any required passwords. Note: SPPS standard programming password shall be factory default at all locations.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Supervised installation shall be led by personnel certified by NICET as fire-alarm Level II technician and shall be trained by the manufacturer on the specific equipment to be installed. Contractor must be Honeywell Notifier certified or use a subcontractor that is Honeywell Notifier certified.
- B. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from a single manufacturer.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.

1.06 SOFTWARE SERVICE AGREEMENT

- A. Comply with UL 864.
- B. Technical Support: Beginning with Substantial Completion, provide software support for two years.

1.07 WARRANTY. See General and Supplementary Conditions in Division 01 for requirements when applicable or refer to 1.07 A.

- A. Provide a complete parts and labor warranty for the system, commencing on the date of final acceptance and continuing for a period of (1) year. Provide material and labor required to correct system malfunctions or failure (determined not to be result of negligence, abuse or misuse) at no charge to Owner during this period.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements provide fire alarm equipment from the following manufacturers.

1. Notifier by Honeywell - Onyx Series Panel with NFS2-3030D CPU/display and DVC Networkable Control Panel (District Standard – No Substitutions)
2. Wheelock by Eaton – Notification devices – No Substitutions
3. Potter - Strobe Power Supplies.

2.02 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:

1. Manual stations.
2. Heat detectors.
3. Smoke detectors.
4. Duct smoke detectors.
5. Automatic sprinkler systems to include wet, dry or pre-action
6. Heat detectors in elevator shaft and pit if applicable
7. Fire-extinguishing system operation.
8. Fire standpipe system.
9. Building Automation System (BAS) input

B. Fire-alarm signal shall initiate the following actions:

1. Continuously operate alarm notification appliances.
2. Identify alarm at fire alarm control panel and remote annunciators.
3. Transmit an alarm signal to the remote alarm receiving station.
4. Unlock electric door locks in designated egress paths.
5. Release fire and smoke doors held open by magnetic door holders.
6. Close smoke dampers in air ducts of designated air-conditioning duct systems.
7. Signal to HVAC equipment. All air handling units within the building covered by the fire alarm system shall be made to shut down.
8. Recall elevators to primary or alternate recall floors.
9. Record events in the system memory.
10. All fire & smoke dampers and duct detectors shall be reset via FACP reset.

C. Supervisory signal initiation shall be by one or more of the following devices and actions:

1. Valve supervisory switch.
2. High or low air pressure switch of dry pipe or pre-action sprinkler system
3. Smoke Duct Detector Activation
4. Elevator shunt-trip supervision.
5. Fire pump running.
6. Fire-pump loss of power.
7. Fire-pump power phase reversal.
8. Independent fire-detection and suppression systems.
9. Carbon monoxide detection at a toxic level.

D. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.
2. User disabling of zones or individual devices.
3. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.

4. Loss of communication with remote annunciator, addressable sensor, input module, relay module, control module
 5. Loss of primary power at fire alarm control panel.
 6. Ground or a single break in fire-alarm control unit internal circuits.
 7. Abnormal AC voltage at fire alarm control panel.
 8. Break in standby battery circuitry.
 9. Failure of battery charging.
 10. Abnormal position of any switch at fire alarm control panel or annunciator.
 11. Notification panel (FACP) failure
 12. Carbon monoxide detection at a maintenance level
- E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire alarm control panel and remote annunciators.
1. Identify trouble or supervisory at fire panel and remote annunciator.
 2. Transmit trouble or supervisory signal to the remote alarm receiving station.
- F. Building Automation System (BAS) Fire Alarm Interface. Include the following fire alarm output points to communicate to the District's BAS System, include two-pole relays within three feet of BAS interface cabinet to signal the following conditions to other systems:
1. Fire alarm signal (pole 1: security panel, pole 2: BAS panel)
 2. Supervisory Signal (BAS panel)
 3. Trouble Signal (BAS panel)
- G. Device Guards:
1. Description: Welded wire mesh or polycarbonate of size and shape for manual station, smoke detector and notification devices or other device requiring protection.
- H. Document Storage Box with USB storage:
1. Description: Enclosure to accommodate standard 8-1/2-by-11 inch manuals, document records, system required documentation and system information.
 2. Material and Finish: 18-gauge cold-rolled steel; four mounting holes. 3) Color: Black powder-coat epoxy finish.
 3. Labeling: Permanently screened with 1 inch high lettering "SYSTEM RECORD DOCUMENTS" with white indelible ink.

2.03 FIRE ALARM CONTROL PANEL

- A. General Requirements for Fire Alarm Control panel:
1. Notifier: NFS2-3030D with DVC (Digital voice command) – No Substitutions
 2. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864 and listed and labeled by an NRTL.
 - a. System software and programs shall be held in flash electrically erasable programmable read-only memory (EEPROM), retaining the information through failure of primary and secondary power supplies.
 - b. Include a real-time clock for time annotation of events on the event recorder.

3. Addressable initiation devices that communicate device identity and status.
 4. Addressable control circuits for operation of notification appliances, mechanical equipment and electrical interface.
- B. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire alarm control panel and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
1. Annunciator and Display: Liquid-crystal type, 640 character, minimum.
 2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.
 3. Custom DVC Programming Buttons: Control panel shall include 28 buttons for custom programming inputs with space for printed label next to each button and LED indicator light to latch on when activated. Program the following functions to the custom buttons, leave empty buttons between all programmed buttons:
 - a. Severe Weather (button press shall activate severe weather voice announcement)
 - b. Secure (button press shall activate Secure announcement)
 - c. Lockdown (button press shall activate Lockdown announcement)
 - d. All Clear (button press shall activate All Clear announcement)
 - e. Disable Fire Alarm outputs (button press shall disable all alarm outputs for testing)
 - f. Fire Alarm (fire evacuation button shall mimic outputs from pull station)
 - g. Hold (button press shall activate Hold announcement)
- C. Circuits:
1. Initiating Device, Notification Appliance, and Signaling Line Circuits: NFPA 72, Class B.
 - a. Initiating Device Circuits: Class B
 - b. Notification Appliance Circuits: Class B
 - c. Signaling Line Circuits: Class B
 - d. Circuits shall not be loaded beyond 90% of their capacity on each circuit, thus leaving at least 10% spare capacity on each circuit.
 2. Serial Interfaces: Two RS-232 ports for printers.
- D. Elevator Recall:
1. Smoke detectors at the following locations shall initiate automatic elevator recall.
 - a. Elevator lobby detectors except the lobby detector on the designated floor.
 - b. Smoke detector in elevator machine room.

- c. Smoke detectors in elevator hoistway.
- 2. Elevator lobby detectors located on the designated recall floors shall be programmed to move the cars to the alternate recall floor.
- 3. Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.
 - a. Water-flow switch associated with the sprinkler in the elevator pit may have a delay to allow elevators to move to the designated floor.
- E. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke barrier walls shall be connected to fire-alarm system.
- F. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station as well as Building Automation Panel.
- G. Primary Power: 24-V DC obtained from 120-V AC service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory and digital alarm communicator transmitters shall be powered by 24-V DC source. All initiating device power supplies shall be intelligent type.
 - 1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power supply module rating.
- H. Secondary Power: 24-V DC supply system with batteries, automatic battery charger, and automatic transfer switch.
 - 1. Permanently label batteries with date of installation
- I. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

2.04 MANUAL FIRE-ALARM BOXES – NBG-12LX

- A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box (box shall be red to match device).
 - 1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire alarm control panel.
 - 2. Station Reset: Key-operated switch.
 - 3. Indoor Protective Shield (as indicated in contract documents): Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm.

2.05 SYSTEM SMOKE DETECTORS – FSP-951 or equal for requirements of coverage

- A. General Requirements for System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.
2. Detectors shall be addressable two wire type.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire alarm control panel.
4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type indicating detector has operated and power on status.
7. Detector address shall be accessible from fire alarm control panel and shall be able to identify the detector's location within the system and its sensitivity setting.
8. An operator at fire alarm control panel, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).

B. Duct Smoke Detectors: Photoelectric type complying with UL 268A. DNR w/FSP-951R

1. Detector address shall be accessible from fire alarm control panel and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire alarm control panel, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).
3. Remote indication and test station. Operating initiates an alarm test.
 - a. Key switch type. (RTS151KEY)
 - b. Magnetic type. (RTS151)
4. Weatherproof Duct Housing Enclosure (if applicable): NEMA 250, Type 4X; NRTL listed for use with the supplied detector.
5. Each sensor shall have multiple levels of detection sensitivity.
6. Sampling Tubes: New tubes, design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.

7. Relay Fan Shutdown: FRM-1

- a. Provide relay rated to interrupt fan motor-control circuit. Provide cable interface between relay and motor controller for fan shutdown.

8. Fire/Smoke Damper Shutdown: FRM-1

- a. Provide relay rated to interrupt damper control circuit. Provide cable interface between relay and damper for damper closure.
- b. If damper is pneumatically actuated, provide an EP switch to perform damper closure actions.
- c. Provide smoke damper position monitoring.

2.06 PROJECTED BEAM SMOKE DETECTORS: FS-OSI-RIA

- A. Projected Beam Light Source and Receiver: Designed to accommodate small angular movements and continue to operate and not cause nuisance alarms.
- B. Detector Address: Accessible from fire alarm control panel and able to identify the detector's location within the system and its sensitivity setting.
- C. Remote indication and test station. Operating initiates an alarm test.
 1. Key switch type. (RTS151KEY)
 2. Magnetic type. (RTS151)
- D. An operator at fire alarm control panel, having the designated access level, shall be able to manually access the following for each detector:
 1. Primary status.
 2. Device type.
 3. Present average value.
 4. Present sensitivity selected.
 5. Sensor range (normal, dirty, etc.).

2.07 HEAT DETECTORS: FST-951

- A. General Requirements for Heat Detectors: Comply with UL 521.
- B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135° F (or a rate of rise that exceeds 15°F. per minute unless otherwise indicated).
 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire alarm control panel.
- C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg. F.
 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm,

or trouble) to fire alarm control panel.

2.08 NOTIFICATION APPLIANCES

- A. Manufacturer – Wheelock (No Substitutions)
- B. Description: strobe only, voice only and combination visual voice appliances.
- C. General Requirements for Notification Appliances: Connected to a signaling line circuit, equipped for mounting as indicated and with screw terminals for system connections.
 - 1. Combination Devices: Factory-integrated audible and visible devices in a single mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.
- D. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear polycarbonate lens mounted on a White faceplate. The word “ALERT” shall be engraved in minimum 1-inch-high letters.
 - 1. Rated Light Output: As required to meet NFPA candela ratings for space coverage.
 - 2. Mounting: Ceiling or wall mounted as indicated.
 - 3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
 - 4. Flashing shall be synchronized with other units.
 - 5. Strobe Leads: Factory connected to screw terminals.
 - 6. Mounting Faceplate: Factory finish, white in color.
- E. Voice/Tone Notification Appliances (speakers):
 - 1. Appliances shall comply with UL 1480 and shall be listed and labeled by an NRTL.
 - 2. Power rating taps: 1/8 W to 2 W.
 - 3. All speakers shall be high fidelity with a minimum frequency range of 300 Hz to 8,000 Hz.
 - 4. Mounting: Flush or surface.
 - 5. Matching Transformers: Tap range matched to acoustical environment of speaker location. Minimum tap range shall be used to improve intelligibility unless higher taps are required to achieve minimum sound pressure levels for space.
 - 6. Remote exterior notification devices shall be Wheelock Exterior Speakers, Model ET-1010-R. Coverage shall include designated entrances and areas. Devices shall be on a dedicated outdoor speaker amplifier circuit or circuits with properly sized amplification. A push button at the fire alarm panel Digital Voice Command (DVC) shall allow disabling of the outdoor speaker circuits without disabling any indoor speaker circuit.

2.09 SURFACE MOUNTED BACKBOXES

- A. All surface mounted devices shall be installed with matching surface mounted back boxes, trim rings, or back box skirts. Back boxes, trim rings, and skirts shall factory fabricated and furnished by manufacturer of the device. Color, size and outline shall match associated device. Standard junction boxes for surface mounting are not acceptable.

2.10 DIGITAL VOICE EVACUATION AND PAGING SYSTEM (DVC - Digital Voice Command)

A. The facility shall have an emergency voice alarm communication system. Digitally stored message sequences shall notify the building occupants that a fire or life safety condition has been reported. A Message generator shall be capable of automatically distributing up to five (5) simultaneous, unique messages to appropriate audio zones within the facility based on the type and location of the initiating event. The system shall also support Emergency manual voice announcement capability for both system wide or selected audio zones, and shall include provisions for the system operator to override automatic messages system wide or in selected zones.

1. The digital audio message generator shall be of reliable, non-moving parts, and support the digital storage of at least 16 minutes of tones and emergency messages, shall support programming options to string audio segments together, or to loop messages and parts of messages to repeat for pre-determined cycles or indefinitely.
2. The audio portion of the system shall sound the proper audio signal (consisting of tone, voice, or tone and voice) to the appropriate zones.
3. Notification Appliance Circuits (NAC) speaker circuits shall be arranged such that there is a minimum of one speaker circuit per floor of the building or smoke zone whichever is greater.
4. Audio amplifiers and tone generating equipment shall be electrically supervised for normal and abnormal conditions.
5. Speaker circuits shall be electrically supervised for open and short circuit conditions. If a short circuit exists on a speaker circuit, it shall not be possible to activate that circuit.
6. Speaker circuits shall have 20% spare capacity for future expansion or increased power output requirements.
7. The emergency voice alarm communication system shall be UL listed for non-emergency paging and background music. The following items shall be incorporated into the system:
 - a. Audio Zones, minimum one zone per floor.
 - b. Provide digital audio files for the following conditions that also incorporate warning tones prior to the digital voice announcement:
 - 1) Fire Alarm
 - 2) Severe weather warning
 - 3) Hold
 - 4) Secure
 - 5) Lockdown
 - 6) All Clear

B. General:

1. Upon receipt of an alarm signal from the building fire alarm system, the DVC shall automatically transmit a pre-recorded fire alarm message throughout the building.
2. A digitized voice module shall be used to store each prerecorded message.
3. The DVC shall supervise all speaker circuits, control equipment, remote audio control equipment, and amplifiers.

C. Speaker Circuit Control Unit:

1. The speaker circuit control unit shall include buttons to manually activate or deactivate speaker circuits grouped by floor in the system
2. Speaker circuit control buttons shall provide on, off, and automatic positions with indications.
3. The speaker circuit control unit shall include visual indication of active or trouble status for each group of speaker circuits in the system.
4. A trouble indication shall be provided if a speaker circuit group is disabled.
5. A lamp test switch shall be provided to test all indicator lamps.
6. A single "all call" switch shall be provided to activate all speaker circuit groups simultaneously.
7. A push-to-talk microphone shall be provided for manual voice messages.
8. A voice message disconnect switch shall be provided to disconnect automatic digitized voice messages from the system. The system shall be arranged to allow manual voice messages and indicate a system trouble condition when activated.

D. Speaker Circuit Arrangement:

1. Speaker circuits shall be arranged such that there is a minimum of one speaker circuit per zone.
2. Audio amplifiers and control equipment shall be electrically supervised for normal and abnormal conditions.
3. Speaker circuits shall be 70.7 VRMS with a minimum of 20% spare power available.
4. Speaker circuits and control equipment shall be arranged such that loss of any one speaker circuit will not cause the loss of any other speaker circuit in the system.

E. Audio Amplifiers (DAA2-50/70 - District Standard - no substitutions)

1. Digital Audio Amplifiers shall provide at least 50 Watts at 70.7 VRMS output voltage level per amplifier circuit.
2. Amplifiers shall be continuously supervised for operational status.
3. Amplifiers shall have the ability to be configured for either single or dual channel application.
4. Each audio output circuit connection shall be configurable for Class B.
5. A minimum of 20% spare output capacity shall be available for each amplifier.

2.11 PAGING INTERFACE

- A. Description: Contact SPPS Project Manager for decision on use of fire alarm system for paging and requirements therein.

2.12 MAGNETIC DOOR HOLDERS

- A. Description: All existing door holder hardware and wiring shall be replaced and shall be re-connected to the new fire alarm system. Provide high wall-mounted electromagnetic door holder, Notifier FM Series or prior approved equivalent.
- B. Door holders shall not be powered from the fire alarm control panel power supplies or batteries. The Contractor shall assume an 110V to 24VDC power supply is needed to provide a separate power source to the door holders. The power supply shall be located adjacent to the fire alarm control panel and new power wiring shall be routed to the door holders. Door holders shall not run on 110VAC. Door holders shall operate on 24VDC.

2.13 REMOTE ANNUNCIATOR

- A. Description: Annunciator functions shall match those of fire alarm control panel for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire alarm control panel, including acknowledging, silencing, resetting, and testing.
 - 1. Mounting: Flush cabinet, NEMA 250, Type 1.
 - 2. Annunciator and Display: Liquid-crystal type, 3 line(s) of 80 characters, minimum. Notifier LCD-160.
- B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire alarm control panel. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

2.14 ADDRESSABLE INTERFACE DEVICES

- A. Monitor Module: (FMM-1)
 - 1. Microelectronic monitor module, listed for use in providing a system address for alarm-initiating devices for wired applications with normally open contacts.
- B. Control Module: (FCM-1)
 - 1. Microelectronic module listed for use in providing a direct signal to a circuit-breaker shunt trip device for power shutdown.
- C. Control Relay Module: (FRM-1)
 - 1. Microelectronic control module, listed for use in operating programmable dry contacts. Module shall be controlled and powered through the SLC addressable loop.

2.15 DIGITAL ALARM COMMUNICATOR TRANSMITTER (DACT)

- A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632 and be listed and labeled by a testing facility recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL). Provide Notifier UDACT2 and Honeywell HWF2V-COM Universal Digital Alarm IP (and cellular) Communicator/Transmitter.
- B. HWF2V-COM shall be installed in accordance with NFPA 70 and 72. HWF2V-COM shall be located in the same room that houses the fire panel and shall be mounted within 20 feet of the fire panel. The telephone-type wiring from UDACT2 to HWF2V-COM and the power wiring from power transformer to HWF2V-COM shall be routed through conduit. Power supply transformer for HWF2V-COM shall be UL listed. HWF2V-COM shall be powered from an un-switched circuit.
- C. IP connection between HWF2V-COM and switch port shall be CAT6E type cable of a length no longer than 300 ft and having no splice. Contractor shall provide data cable between HWF2V-COM and switch port. All equipment used for the IP connection such as router, hub, modem, etc. shall be UL listed, powered from an un-switched circuit, and provided with standby power. Prior to completion, contact Owner's IT department with the switch port address. Owner's IT department will configure the switch port for fire alarm monitoring. Contractor shall terminate data cable at fire alarm panel IP communicator. Owner will terminate data cable at server in data closet. Owner will provide a permanent IP address. Contractor shall program the IP communicator and coordinate with Owner's alarm monitor

group to make IP communications active.

D. Digital data transmission shall include the following:

1. Address of the alarm-initiating device.
2. Address of the supervisory signal.
3. Address of the trouble-initiating device.
4. Loss of ac supply or loss of power.
5. Low battery.
6. Abnormal test signal.
7. Communication bus failure.

E. Secondary Power: Integral rechargeable battery and automatic charger. Provide 7AH minimum battery backup power for 24 hour minimum backup capability, (sealed lead acid type).

F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

2.16 REMOTE/EXTERIOR ALARM FOR PROPERTY NOTIFICATION

- A. Devices shall be installed on the exterior of the building for notification of designated entrances and areas. Devices shall be on dedicated amplifier circuits. These amplifier circuits shall be independently disabled via DVC-KD (Digital Voice Communicator – Kinetic Display) button. The remote exterior devices shall be Wheelock Exterior Speakers, Model ET-1010-R.

2.17 DEVICE GUARDS

- A. Description: Wire guards of size and shape for devices in gymnasiums, cafeterias, and similar areas where indicated on the drawings.

2.18 SECURITY PUSHBUTTONS

- A. Security pushbuttons shall be located in each building's main office area where shown on the drawings. The purpose of these pushbuttons is to initiate warnings for severe weather, for the presence of a possible intruder in the area of the school, and for the presence of an intruder within the school building. Coordinate final location with Owner prior to installation. Pushbuttons shall be manufactured by Safety Technology International. Hold pushbutton shall be STI part number (STI SS2129ZA-EN-Hold) green in color with protective cover, push/turn to reset, labeled: HOLD. If unable to flush mount include color match surface mount back box part # (KIT-71101A-G). Lockdown pushbutton shall be STI part number (STI SS2229ZA-EN-Lockdown) yellow in color with protective cover, push/turn to reset, labeled: LOCKDOWN. If unable to flush mount include color match surface mount back box part # (Kit-71101A-Y).

Secure pushbutton shall be STI part number (STI SS2429ZA-EN-Secure.) blue in color with protective covered, push/turn to reset, labeled: SECURE. If unable to flush mount include color match surface mount back box part # (Kit-71101A-B). Install fire alarm addressable monitor modules (FMM-1 or FDM-1) with pushbuttons for connection to fire alarm system. The fire alarm panel shall be programmed as follows: When the Hold pushbutton is activated an audible notification shall be broadcast in the building and no signal shall be sent to the Owner's alarm monitoring group. When the lockdown pushbutton is activated an audible notification shall be broadcast in the building and a signal shall be sent to the

Owner's alarm monitoring group. When the secure pushbutton is activated an audible notification shall be broadcast in the building and a signal shall be sent to the Owner's alarm monitoring group. Do not program any of these activations as 'Security Alarm' codes. These same actions shall be programmed on DVC-KD buttons at FACP. A fire alarm pull station (Notifier NBG-12LX) shall be installed in close proximity to these pushbuttons.

- B. Provide two (2) future outputs relay contact from, and controlled by, the fire alarm panel in vicinity of card access system for future use.

Provide exterior-mounted blue strobes (Eluxa outdoor colored lens 4X/3R strobes-model EL4XSTB-NW) on appropriate weatherproof back boxes at each card access entrance within close proximity to card reader. Strobes shall be readily visible to persons using card reader. Add power supply with appropriate battery backup commensurate to the FACP capabilities and addressable fire alarm control modules (FCM-1) to supervise each cabling circuit and activate strobes upon activation of LOCKDOWN PUSHBUTTON. Mount black and white LOCKDOWN signage (provided by District) near each strobe location.

PART 3 - EXECUTION

3.01 SYSTEM PROGRAMMING

- A. System programming shall be per School District's standard requirements.
- B. Prior to programming new system, this contractor shall meet with the School District's current designated fire alarm maintenance contractor and review all requirements. Sample programming will be provided for the successful contractor.

3.02 EQUIPMENT INSTALLATION

- A. Installation Phasing of Fire Alarm Equipment
 - 1. Demolition, installation and testing shall be done during unoccupied hours unless special arrangements are made with the individual school management staff. No Work shall disrupt the regular school day and normal activities.
 - 2. Installation of new fire alarm equipment shall be phased to avoid code required fire watches. The premises shall not be without fire alarm or fire suppression protection of more than 4 hours in a 24-hour period. The systems shall never be offline or nonoperational. Contact the remote monitoring station for notification when work is in process.
 - 3. Install new fire alarm control panel and backbone cabling to remote NAC and detection circuit panels while the existing system remains operational.
 - 4. Phase the installation of new notification and detection devices and circuits on a per area basis. New devices shall directly replace existing devices or existing devices shall remain in place until new devices are operational.
 - 5. Remove the existing backbone and control panels when new system is complete.
 - 6. Fire Alarm contractor shall submit complete installation phasing plan and schedule to District and Engineer for review prior to commencement of work.
 - 7. Comply with NFPA 72 for installation of fire-alarm equipment.
- B. Equipment Mounting: Install fire alarm control panel on wall with tops of cabinets not more than 72 inches above the finished floor.
- C. Smoke- or Heat-Detector Spacing:
 - 1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
 - 2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
 - 3. Smooth ceiling spacing shall not exceed allowed NFPA spacing.
 - 4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A in NFPA 72.
 - 5. HVAC: Locate detectors not closer than 3 feet from air-supply diffuser or return-air opening.
 - 6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.
- D. Duct Smoke Detectors:
 - 1. Comply with NFPA 72 and NFPA 90A.
 - 2. Provide cabling/termination from Unit Motor Starter/Controller Fan Shutdown Relay

- contacts.
 - 3. Provide cabling/termination from Fire/Smoke Damper relay contacts
 - 4. Install sampling tubes so they extend the full width of duct.
 - 5. Coordinate HVAC Zone Shut-down prior to rough-in.
- E. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location if shaft has existing sprinkler coverage.
- F. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water flow switch and valve-tamper switch that is not readily visible from normal viewing position. All duct smoke detectors shall be provided with remote status indicators. In mechanical rooms with multiple air-handling units, group indicators in a common area in that room.
- G. Audible Alarm-Indicating Devices (Wall Mounted Units): Install not less than 6 inches below the ceiling. Install horns on flush-mounted or surface mounted (surface mounted back boxes shall match device in color) back boxes with the device-operating mechanism concealed behind a grille.
- H. Visible Alarm-Indicating Devices (Wall Mounted Units): Install at least 6 inches below the ceiling.
- I. Device Location-Indicating Lights: Locate in public space near the device they monitor.
- J. Annunciator: Install with top of panel not more than 72 inches above the finished floor.
- K. Carbon Monoxide Detection: Where appropriate, as in partial or whole building renovation, install intelligent monitor modules to supervise existing Macurco Co. detectors in boiler rooms for maintenance and toxic levels. Install upon ceiling of any room containing a combustion appliance a combination (smoke and carbon monoxide) detector (Notifer FPC-951 and base B200SR-WH) which will activate a local alarm on detection of a toxic level of carbon monoxide. Programming shall be such that detection of carbon monoxide shall report as a supervisory signal (toxic level) or trouble signal (maintenance level) to the fire alarm control panel. The smoke detector component shall operate as per section 2.02.A.
- L. Digital Alarm Communicator Transmitter UDACT2 may be installed in a separate NEMA 1 enclosure, with hinged and lockable cover. The digital alarm communicator and the universal alarm IP communicator shall be installed in the same enclosure. Locate enclosure on wall next to FACP. Provide monitoring of fire alarm system via existing telephone lines and BAS system, similar to monitoring of existing system. Install relay modules as required.

3.03 CONNECTIONS

- A. Provide interface relays as required to release secured/locked interior and perimeter doors. Verify the operability of certain interior doors used for "intervention purposes" before providing interfaces. Coordinate with facility staff at each building location to identify doors that must be unlocked upon fire alarm and fire drill.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.

1. Smoke dampers in air ducts of designated duct systems.
2. Fire/smoke dampers in accordance with the drawings.
3. Alarm-initiating connection to elevator recall system and components.
4. Supervisory connections at valve supervisory switches.
5. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
6. Supervisory connections at elevator shunt trip breaker.
7. Supervisory connections at fire-pump power failure including a dead-phase or phase reversal condition. All connections to the Fire Pump Controller shall be NEMA 4 rated.

C. Door holder power wiring.

1. Door holders SHALL NOT be powered from the fire alarm system. Provide 120VAC and/or 24V DC/AC power for existing and/or new door holders as required.

3.04 IDENTIFICATION

- A. Identify system wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems" when applicable.
- B. Install framed instructions in a location visible from fire alarm control panel.
- C. Fire Alarm Device Identification: All fire alarm devices shall include an adhesive label, black letters on white background with the associated loop and address of device installed on the outside of the device. Devices that include an end-of-line resistor installed at device shall include an additional label, "E-O-L."
- D. Fire Alarm Device Programming Labels: All device labels in the fire alarm program must contain the Owner's room numbers in the label. For example, a smoke detector installed in the corridor near room #101 could have an address such as: "Loop#-Device#-Corridor Outside Room 101."
- E. Provide adhesive identification labels on ceiling grid members indicating concealed location of duct smoke detectors and fire/smoke dampers.

3.05 AS-BUILT DOCUMENTATION FOR FIRE/SMOKE DAMPER INSTALLATION

- A. In addition to the as-built documentation required elsewhere note on the as-built drawings the location of the fire/smoke damper and whether it is pneumatic or electric. If pneumatic indicate the source signal for that pneumatic signal and note same on the drawings.
- B. Show location(s) of the remote status/keyed-reset switch and an identifier that associates it with the specific fire/smoke damper.

3.06 GROUNDING

- A. Ground fire alarm control panel and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire alarm control panel.

3.07 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 1. Manufacturer's Field Service: Engage a factory-authorized service representative to

inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Visual Inspection: Conduct visual inspection prior to testing.
 - a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
 - b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
4. Test audible appliances according to manufacturer's written instructions.
5. Test visible appliances according to manufacturer's written instructions.
6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

C. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

D. Fire-alarm system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

F. Warranty Period Tests and Inspection: Within one year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.08 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

1. Allow one 2-hour training session per facility. Provide video recording of all training sessions.

END OF SECTION 28 31 00