

STANDARD SPECIFICATION
SECTION 13851
HONEYWELL FIRE ALARM SYSTEM

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STANDARD SPECIFICATION

SECTION 13851

HONEYWELL FIRE ALARM SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Standard Drawing No. FA6001STD "Honeywell Fire Alarm Equipment Schedule" for equipment specifications listed in Part 2 of this Section.
- B. The current editions of the following standards are part of this Section:
 - NFPA 70 National Electrical Code
 - NFPA 72 National Fire Alarm Code

For interpretation of the above NFPA standards, the "Authority Having Jurisdiction" referred to in the standards shall be the Sandia Delegated Representative (SDR).
- C. Standard symbols shown on Standard Drawings E-0006STD and FA7001STD are used on drawings.

1.02 SUMMARY

- A. This Section includes fire alarm panels, manual pullstations, detectors, signal equipment, controls and devices for installation of a complete and functional Honeywell proprietary fire alarm system, both for new installations and modifications to existing systems. This Section does not include the Honeywell proprietary supervising station fire alarm system at Building 829.
- B. Related Sections include the following:
 - 1. Division 9, Section "Painting".
 - 2. Division 16, Section "Electrical Work".

1.03 DEFINITIONS

- A. DGP: Data Gathering Panel
- B. NAC: Notification Appliance Circuit
- C. Fire Safety Functions: Building and fire control functions that are intended to increase the level of life safety of occupants or control the spread of the harmful effects of fire. Examples include elevator recall, door holders, smoke removal systems.

- D. Proprietary Supervising Station: The Honeywell Delta 1000 equipment located at Buildings 829, 802, 956, and the KAFB Fire Station #2.
- E. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.04 SYSTEM DESCRIPTION

- A. Honeywell Delta 1000 system at the proprietary supervising station at Building 829 monitors alarms reported from a Honeywell FS20A or FS90 Data Gathering Panel (DGP) located at each protected building or group of buildings.
- B. The DGP is a noncoded, zoned system with manual and automatic alarm initiation devices with separate individual circuits for each zone of fire alarm initiation and notification appliances.
- C. Initiation zones are 4-wire Class A supervised circuits that report alarm, trouble, and supervisory signals from initiation devices (such as pullstations, smoke detectors, flow switches, tamper switches) to the DGP.
- D. Notification appliances (bells, strobes) are 2-wire Class B supervised circuits that activate to evacuate building(s) upon receipt of an alarm signal.
- E. Miscellaneous control circuits may be activated (such as smoke removal fans, dampers, door holders, elevator recall) upon receipt of an alarm signal.
- F. DGP reports signal data to proprietary supervising station at Building 829 Telephone Switch Building over dedicated Fire Alarm Reporting System (FARS) phone lines to one of two Central Processing Units (CPUs)
 - 1. The CPUs are connected to two Honeywell Delta Net Professional Computers (DPCs) that relay alarm and system information to computer terminals at the KAFB Fire Station at Wyoming and "F" Streets and the Sandia Security Headquarters Communication Center (HCC) at Buildings 802 and 956.
 - 2. The alarm and action messages indicate the building number, tech area location, zone number, zone description (by floor, wing, etc.), hazard description, and fire department dispatch information.

1.05 SUBMITTALS

- A. Fire Alarm System Operational Test Checklist (included in Attachments to this Section).
- B. Honeywell representative shall provide a marked-up DGP Schedule showing the final as-built condition of the Data Gathering Panel to the SDR at the time of acceptance testing.
- C. Honeywell representative shall provide DGP Panel Schedule for mounting on door for FS90 DGP listing zone numbers and descriptors for all initiation and notification zones.
- D. NFPA 72 Certificate of Completion (included in Attachments to this Section).

- E. Provide set of “marked-up” drawings including all equipment relating to the fire alarm system installed as part of this work. Show junction boxes, conduit sizes, devices, and any other information relevant to the as-built condition. Show conduit and junction box locations on the as-builts if they were shown on the original plans. Provide as-built drawings to SDR at closeout of the contract.

1.06 QUALITY ASSURANCE

- A. The fire alarm system shall be supplied from a distributor normally engaged in installation and maintenance of fire alarm systems, with at least three years' history of providing factory service in Albuquerque, New Mexico.
- B. Comply with NFPA 72.

1.07 SEQUENCING AND SCHEDULING

- A. Complete work according to the sequence of work described below.
 - 1. For new installations, install enclosure for Data Gathering Panel. Install power and communication raceways and wiring. Contact the SDR to request a Fire Alarm Reporting System (FARS) dedicated phone line to Building 829 from the Sandia Fire Alarm Engineer.
 - 2. Install new conduit runs and other new equipment that will not disrupt existing equipment, as far as practical.
 - 3. When adding new initiation or notification appliance circuits, coil and tape new wires in DGP for termination by a Honeywell representative.
 - 4. When modifying existing initiation or notification appliance circuits, contact SDR to schedule blockout of the impacted circuits to minimize disruption of fire alarm system.
 - 5. Upon completion of work, contact Honeywell representative to install required DGP components, terminate wiring, and perform required DGP programming to communicate with the proprietary supervising station in Building 829.
 - 6. Upon completion of work, demonstrate in presence of Honeywell representative and SDR the proper operation of: DGP, each alarm initiating device, each notification appliance, each control function, each ancillary system actuation, ground fault condition, power failure, battery stand-by, and other appropriate tests to verify that fire alarm system performs in accordance with this Section and manufacturer's data. Document test results on the “Fire Alarm System Operational Test Checklist” included in Attachments of this Section, and provide copy to SDR.
 - 7. For new DGP installations, complete the “Fire Alarm System Record of Completion” included in Attachments of this Section. (Note: Form can also be found in NFPA 72). Provide the completed Record of Completion to SDR, who in turn will provide copies to Fire Protection Engineering and Fire Alarm Maintenance Supervisor.

8. Contact SDR to request acceptance testing by Sandia Fire Alarm Maintenance personnel. SDR will complete "Request for Fire Alarm System Acceptance Testing" form, included in the Attachments of this Section, and provide a copy of completed "Fire Alarm System Operational Test Checklist" to Planner for the Sandia Fire Alarm Maintenance organization.
 9. Sandia Fire Alarm Maintenance personnel will perform acceptance testing of fire alarm system in presence of Contractor, the Honeywell representative and Sandia Fire Protection Engineering.
- B. Interruption of Existing Fire Alarm System
1. Do not interrupt existing fire alarm system without first obtaining written permission from the Sandia Delegated Representative (SDR) not less than 24 hours prior to such interruptions. Contractor shall make every effort to keep existing fire alarm system on line until the new system is operational. This may be accomplished by requesting blockouts from Sandia Fire Alarm Maintenance to jumper out only those areas where Contractor is involved in his work.
 2. Proceed continuously and expeditiously with work to be performed during the interruption until the system is restored to service. When requesting permission to interrupt service, specifically state the work to be performed, with the exact time and length of service interruption. Request separate permission for each interruption.
 3. Post temporary sign ("ATTENTION – In Case of Fire Call 911") on each new or existing pullstation during such times that it is installed but not in service. Refer to Attachments of this Section for sample sign that can be photocopied to use as notification.
 4. Coordinate all work concerning active portions of fire protection systems with the SDR to prevent false alarms and avoid unnecessary loss of protection.
 5. Maintain existing fire alarms in service during non-standard working hours and over weekends. If unable to do so, notify SDR.
- C. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted and placed in-service.
- D. Remove existing disconnected fire alarm equipment and restore damaged surfaces. Package and deliver unused functional fire alarm equipment to the Fire Alarm Maintenance Supervisor.
- E. Coordination with Sprinkler System Installation
1. Do not install raceway and wiring to sprinkler system components until the sprinkler system submittals have been accepted by Sandia Fire Protection Engineering.
 2. Proceed to install raceways and wiring when the location for all sprinkler system devices requiring connection to the fire alarm system have been installed by the sprinkler contractor.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - 1. Honeywell, Inc.
 - 2. Wheelock, Inc.

2.02 FUNCTIONAL DESCRIPTION OF SYSTEM

- A. Control of System: By the DGP.
- B. System Supervision: Automatically detect and report open circuits, shorts, and grounds of wiring for initiating device, notification appliance circuits, and signal line to the proprietary supervising station at Building 829.
- C. Priority of Signals: Automatic alarm response functions resulting from an alarm signal from one zone or device are not altered by subsequent alarm, supervisory, or trouble signals. Annunciate and display all alarm, supervisory, and trouble signals regardless of priority or order received.
- D. Noninterference: A signal on one zone shall not prevent the receipt of signals from other zones.
- E. System Reset: All zones are manually resettable from the DGP after initiating devices are restored to normal.
- F. Transmission to Proprietary Supervising Station: Automatically route alarm, supervisory, and trouble signals to proprietary supervising station at Building 829 by means of a tone signal transmitted over telephone lines.
- G. System Alarm Capability during Circuit Fault Conditions: System wiring and circuit arrangement prevents alarm capability reduction when a single ground or open circuit occurs in an initiating device circuit.
- H. Loss of primary power at the DGP initiates a trouble signal at the DGP and transmits a trouble signal to the proprietary supervising station.
- I. Basis Alarm Performance Requirements: Unless otherwise indicated, operation of a manual pullstation, automatic alarm operation of a heat detector, operation of a sprinkler flow or pressure device, or alarm operation of a smoke detector initiates the following:
 - 1. Notification appliance operation.
 - 2. Identification at the DGP and proprietary supervising station of the zone originating the alarm.

3. Transmission of an alarm signal to the remote proprietary supervising station.
 4. Release of fire and smoke doors held open by magnetic door holders.
 5. Recall of elevators.
 6. Shutdown of fans and other air-handling equipment.
 7. Recording of the event by the proprietary supervising station system printer.
- J. Alarm Silencing, System Reset and Indication: Controlled by switches in the DGP.
1. Silencing-switch operation halts alarm operation of notification appliances and activates an “alarm trouble” light. Display of identity of the alarm zone or device is retained.
 2. When alarm-initiating devices return to normal and system reset switch is operated, the silencing-switch can be set to normal position without notification appliances operating.
- K. Operating a heat detector in the elevator shaft shuts down elevator power by operating a shunt trip in a circuit breaker feeding the elevator.
- L. Water-flow alarm for connection to sprinkler in an elevator shaft and elevator machine room shuts down elevators associated with the location without time delay.
- M. Sprinkler valve-tamper switch operation initiates the following:
1. A supervisory signal indication for the zone involved at the DGP and proprietary supervising station.
 2. Recording of the event by the proprietary supervising station system printer.
- N. Low air pressure switch operation on a dry-pipe or preaction sprinkler system initiates the following:
1. A supervisory signal indication for the zone involved at the DGP and proprietary supervising station.
 2. Recording of the event by the proprietary supervising station system printer.
- O. Removal of an alarm initiating device or a notification appliance initiates the following:
1. A “trouble” signal indication for the zone involved at the DGP and proprietary supervising station.
 2. Recording of the event by the proprietary supervising station system printer.

2.03 STANDARD FIRE ALARM EQUIPMENT

A General: Provide initiation, notification appliance, and accessory devices as shown in Table 1, “Standard Fire Alarm Equipment”, unless otherwise indicated on Contract Drawings.

Table 1 – Standard Fire Alarm Equipment

Device Type	Description	Standard Dwg. FA6001STD Equip. List Symbol Number
Panels	FS90 DGP Components	20
	FS90 1-Up Enclosure (for fire safety function controls and auxiliary power supplies)	53, 54
Initiation Devices	Manual Pull Station	8
	Photoelectric Smoke Detector, including base	39
	Smoke Detector base with relay for relay applications	40
	Heat Detector, combination rate-of-rise and fixed temperature (135° F)	41
	Heat Detector, combination rate-of-rise and fixed temperature (200° F)	42
	Duct Detector	43
Notification Appliances	Wheelock Power Supply	37
	Electronic Multitone Horn	45
	Electronic Multitone Horn/Strobe	46
	Electronic Strobe	47
	6" Vibrating Bell (outside use only)	9
	End-of-Line Resistor (EOLR), 1.91K ohm	36
Fire Safety Function Devices	Floor Mounted Door Holders	49
	Flush Mounted Door Holders	50
	24 VDC Power Supply	52

B. Fire alarm initiating, notification appliance, and accessory devices shall be tested and listed by UL and/or approved by FM as a component part of the Honeywell Delta 1000 system, unless specifically noted on the drawings.

C. Initiating Devices

1. Manual Pullstations: Gamewell, cottage style, weatherproof, Vitiguard, non-coded stations for outdoor installations.
2. Provide Honeywell duct detector sampling tubes as listed below to correspond with the specific duct size.

<u>Tube Part Number</u>	<u>Outside Duct Width</u>
ST-1.5	1 to 2 feet
ST-3	2 to 4 feet
ST-5	4 to 8 feet
ST-10	8 to 12 feet

3. Supervisory Devices: N.O. or N.C. switches as indicated on drawings.

- D. Remote Duct Detector Annunciators
 - 1. Remote LED Annunciator: Honeywell RA400Z single-gang box mounted unit with alarm-indicating LED.
 - 2. Remote Test Station: Honeywell RTS451KEY single-gang box mounted remote test station unit with test, reset, and LED alarm annunciation.
- E. Notification Appliances: Honeywell SC806C 6” Vibrating Bell for bells located outside.

2.04 PANELS

- A. Wheelock Power Supply: Notification appliance power supply, 24 VDC with 8-amp output, and two (2) each 12V, 12 AH sealed lead acid batteries.
- B. Fire Alarm Terminal Cabinet: NEMA 1 telephone-type enclosure with hinged door, latch handle, painted red, sized as indicated on Drawings.
- C. Provide nameplates on Fire Alarm Terminal Cabinets and Wheelock Power Supplies in accordance with Standard Drawing E-0006STD.
- D. DGP Control Panel: FS90 1-Up enclosure with door.

2.05 MAGNETIC DOOR HOLDERS

- A. Description: Floor-mounted or flush mounted, as indicated on Drawings.
- B. Rating: 120 VAC or 24 VDC, as specified on equipment list
- C. Make/Model: Honeywell S4003B series for floor-mounted units; S4003A series for flush-mounted units.

2.06 DATA GATHERING PANEL

- A. Fire Alarm Data Gathering Panel: Honeywell DeltaNet FS90 Fire & Security System compatible with the Honeywell Delta 1000 system.
- B. FS90 DGP components consists of the following devices in the quantities required to ensure a fully operable system:
 - 1. Honeywell 2-up enclosure (with knockouts), and enclosure door designed for use with the FS90 DGP components.
 - 2. Motherboard: Provides eight function-board slots, each with an associated terminal block for field wiring.
 - 3. Control Board “CA”: One “CA” function board required for every four (4) motherboards.

4. Initiating Board "AB": One "AB" function board required to monitor two (2) supervised circuits for N.O. alarm devices.
5. Indicating Board "BF": One "BF" function board required to activate two (2) supervised Class B notification circuits. "BF" boards include two relays with user-selectable N.O. or N.C. contacts for auxiliary control circuits.
6. Communication Board "LD": One "LD" function board required for every four (4) motherboards to interface over phone lines with other Honeywell Delta 1000 equipment in Building 829.
7. Static Modules: One Static Module required for each phone pair terminated at a Communication Board "LD" (total of 2 per board).
8. Power Supply: One 4A @ 28 VDC power supply required for each motherboard.
9. Battery Supervision Module: Each power supply/battery combination requires one Battery Supervision Module (1 per panel) for battery supervision.
10. Batteries: Two 12V, 26 Ah gel-type batteries connected in series to provide 24 VDC standby power.
11. Interconnect cables for strapping motherboards inside the enclosure and between different DGP enclosures.
12. Power supply cables and battery harnesses.
13. Other function boards as specified on the DGP schedule.
14. Card Retainers (1 per motherboard) and Legend Cards as required for installed function boards.

2.07 WIRE

- A. Non-Power Limited Circuits: Solid-copper conductors with 600V rated, 75°C, color-coded insulation. Wiring shall conform to NFPA 72 and NEC Article 760.
- B. Initiation Circuits: #16 TFN solid-copper, color-coded per Table 2 – "Fire Alarm Wiring Color Code". THWN #14 solid-copper wire permissible for circuits routed underground between buildings.
- C. Notification Appliance Circuits: #14 THHN solid-copper, color-coded per Table 2 – "Fire Alarm Wiring Color Code".
- D. DGP and Wheelock AC Power Circuits: #12 THHN, color-coded per Table 2 – "Fire Alarm Wiring Color Code".
- E. Telephone Transmission Circuit: 4-pair #22 telephone cable.
- F. Conduit, wiring, boxes, and cabinets shall conform to NEC requirements for branch circuit wiring.

PART 3 - EXECUTION

3.01 EQUIPMENT INSTALLATION

A. Requirements

1. Install fire alarm system equipment in accordance with this Section, the Contract Drawings, and the manufacturer's recommendations.
2. Each initiating device shall be installed where it is accessible for periodic maintenance and testing.
3. Mount initiation devices and notification appliances at the elevations and locations to comply with NFPA 72 requirements and the manufacturers' specifications.
4. Install all fire alarm devices per their UL listing or approval.

B. Data Gathering Panel

1. Provide 120 VAC source on dedicated branch circuit(s). Identify circuit-disconnecting means as "FIRE ALARM CIRCUIT CONTROL". Label branch circuit designation of the circuit powering inside the panel.
2. Install to allow accessibility from the finished floor with a minimum workspace of 3 feet in front of panel.
3. Termination of initiation, notification appliance, and control circuits to be done by:
 - a. A Honeywell representative for new DGP installations and whenever Honeywell equipment is installed in an existing DGP.
 - b. Sandia Fire Alarm Maintenance when no new Honeywell equipment is installed in an existing DGP.
4. Do not terminate 120 VAC control circuits inside DGP enclosure.
5. All parts of the fire alarm system shall be free of grounds.
6. Install ½" conduit with a 4-pair #22 telephone cable from the DGP to IDR, or main telephone entrance cabinet/backboard in the building.

C. Fire Alarm Terminal Cabinets

1. Install to allow accessibility from the finished floor with a minimum workspace of 3 feet in front of panel.
2. Label panel door with warning label "DANGER: 120 VAC INSIDE" if panel contains 120 VAC control circuits.
3. Terminate 120 VAC control wiring on separate terminal blocks from 24 VDC wires.

4. Paint enclosure red to identify panel as fire alarm equipment.
 5. Install DGP Control Panel dedicated for fire safety functions immediately below or adjacent to the FS90 DGP panel.
- D. Wheelock Power Supply
1. Provide 120 VAC source on dedicated branch circuit(s). Identify circuit-disconnecting means as "FIRE ALARM CIRCUIT CONTROL". Label branch circuit designation of the circuit powering inside the panel.
 2. Install to allow accessibility from the finished floor with a minimum workspace of 3 feet in front of panel.
- E. Manual Pullstations
1. Install manual pullstations semiflush in recessed back boxes unless indicated otherwise on Drawings.
 2. Mount manual pullstations 4'-0" above finished floor in highly visible locations on exit egress routes. When shown on Drawings near doorways, install pullstation on the latch side of door immediately adjacent to the door frame wherever possible.
- F. Smoke Detectors
1. Ceiling-Mounted Smoke Detectors: Install not less than 4 inches from a side wall to the near edge. For exposed solid-joist construction, mount detectors on the bottom of joists. On smooth ceilings, install not more than 30 feet in any direction.
 2. Wall-Mounted Smoke Detectors: Install at least 4 inches, but not more than 12 inches, below ceiling.
 3. Do not install smoke detectors until after cleanup of all construction trades is complete and final. Do not remove dust covers provided with detector until the time of the final acceptance testing of the fire alarm system.
 4. Install smoke detectors a minimum of 3 feet from air supply registers. Do not install in direct airflow of a register.
- G. Duct Detectors
1. Install duct detectors, its' housing and sampling tubes in strict conformance with the manufacturer's installation instruction and the guidance on Standard Drawing FA5002STD.
 2. Install duct detector housings in duct where it can be accessed for maintenance of smoke detector. When a ladder cannot be used to access duct detector from finished floor, provide access door or platform where a maintenance worker can reach the duct detector. The platform shall support a minimum of 300 pounds.

3. Install directional labels pointing toward duct detectors installed in locations not readily visible by personnel from the finished floor. Note the zone number for the duct detector on the labels.
4. Install sampling tubes so they extend the full length of the duct with the sampling holes facing into the airflow.
5. Power for duct detectors shall be provided by a 24 VDC power supply installed in a FS90 DGP Control Panel (1-Up enclosure), unless specified otherwise on Drawings.
6. When specified on Drawings, install Honeywell RTS451KEY Remote Test Station for each duct detector that is not powered from the DGP Control Panel auxiliary power supply. Install Remote Test Station at accessible location from the finished floor. Label the station to indicate which duct detector is connected.
7. When specified on Drawings, install Honeywell RA400Z Remote Annunciator for each duct detector installed above a drop in ceiling that is accessible for testing, but the alarm LED is not readily visible to responding personnel from the finished floor. Install Remote Annunciator on ceiling immediately below the duct detector, unless specified otherwise on Drawings. Label the annunciator to indicate which detector is connected.

H. Heat Detectors

1. Install not less than 4 inches from a side wall to the near edge. For exposed solid-joint construction, mount detectors on the bottom of joists. On smooth ceilings, install not more than 50 feet in any direction.
2. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.

I. Water-Flow Detectors: Connect for each sprinkler line required to be alarmed, as indicated on Contract Drawings.

J. Valve Supervisory Switches

1. Connect for each sprinkler valve station required to be supervised, as indicated on Contract Drawings.
2. Do not wire supervisory switches (such as valve tamper switches) which report to the Fire Station and Security as "SUPERVISORY" signal on same zone as device reporting as "ALARM" signal (such as flow switches, pressure switches).

K. Notification Appliances

1. Surface-mount notification appliances on the wall between 80 and 96 inches above finished floor, and minimum of 6 inches below the ceiling.
2. Configure settings of multitone electronic bells and bell/strobe combinations to operate as bell tone on HI setting. Refer to Standard Drawing FA5006STD for instructions on the proper set-up of device.

L. Accessory Devices

1. Do not terminate control circuits for accessory devices (such as door holders, smoke removal, fan shutdown, elevator recall, etc.) in the DGP or Wheelock power supply. Provide a separate FS90 1-Up enclosure for termination of control wiring and associated relays.
2. Do not power magnetic door holder circuits off the DGP power supply.

3.02 WIRING INSTALLATION

- A. Install conduit, wiring, boxes, cabinets, etc., in accordance with NEC, NFPA, and manufacturer's approved shop drawings.
- B. Conduits may or may not be shown on the Drawings depending on the complexity of the installation. Unless specified on Drawings, the exact routing of conduit is at the discretion of the Contractor.
 1. Refer to Division 16, Section "Electrical Work" for conduit installation requirements.
 2. Do not install 120 VAC circuits in same conduit with fire alarm 24 VDC circuits.
- C. Paint J-box and pull box covers red to readily identify devices as part of the fire alarm system.
- D. Wire devices shown on Drawings according to the Fire Alarm Riser diagram. All conductors installed shall be continuous from device to device, from device to terminal block, or from terminal block to terminal block. Wire splices of any kind are not allowed in junction boxes, wireways, raceways, or elsewhere.
- E. Label conductors as shown on Standard Drawing FA7001STD. Refer to Division 16, Section "Electrical Work" for the approved methods.
- F. Color-code wires in accordance with Table 2 - "Fire Alarm Wiring Color Code".
 1. Color-code initiating zone and notification appliance circuit zone wiring as shown on DGP schedule.
 2. Use red (+) and black (-) color-coded #14 THHN conductors for initiating devices, such as duct detectors, that require DC power.
 3. Install 2 #16 TFN solid black conductors from each duct detector to the DGP Control Panel for remote testing of the detector.
 4. Color-code single-phase 120 VAC power wiring per requirements on Standard Drawing E-0006STD.
- G. Do not terminate 12 AWG wire (with the exception of 120 VAC circuit wiring) on the terminal strips in FS20 and FS90 DGPs. Terminal strips in the FS90 DGP are not designed to accept 12-gauge wire.

- H. Honeywell representative performs all wire terminations in the DGP and the initial powering up of the DGP.

Table 2 - Fire Alarm Wiring Color Code

Circuit Type	Description	Color Code	Wire Type
AC Power	Hot	Phase A - Black Phase B - Red Phase C - Blue	#12 THHN
	Neutral Ground	White Green	
Battery	Positive (+)	Blue	#12 THHN
	Negative (-)	Brown	
Notification Appliances	Positive	Red	#14 THHN solid copper
	Negative	Black	
Initiation Devices	Zones 1, 5, 9, 13, 17,...	(+) Orange (-) Blue	#16 TFN solid copper (#14 THWN solid copper when installed in underground conduits between buildings or structures)
	Zones 2, 6, 10, 14, 18, ...	(+) Green (-) White	
	Zones 3, 7, 11, 15, 19, ...	(+) Yellow (-) Purple	
	Zones 4, 8, 12, 16, 20,...	(+) Pink (-) Gray	
Telephone Transmission	Transmit	White/Blue	4 pr. #22 telephone cable
	Receive	White/Orange	

3.03 IDENTIFICATION

- A. Install nameplates on outside door of fire alarm terminal cabinets and Wheelock power supplies in accordance with Standard Drawing E-0006STD.
- B. Label each initiation device and notification appliance with zone number for circuit it is connected to at DGP. Provide Brother P-Touch 3 labels with TC-10 tape cartridge, or equal.
- C. For smoke detector bases with relays that are used for shunt trip, fan shutdown, or elevator recall, label the base "SHUNT TRIP", "FAN SHUTDOWN" or "ELEVATOR RECALL" as appropriate for the relay application.
- D. Paint J-box and pull box covers red to identify as fire alarm equipment.
- E. Conduit Labeling
 1. Brown 3/4" tape (Scotch #351) at each joint and termination for conduits containing initiating and notification circuits.
 2. Install white 3/4" tape (Scotch #351) adjacent to brown tape to identify communication conduit from DGP to IDR.
 3. Install blue 3/4" tape (Scotch #351) adjacent to brown tape for conduits containing fire alarm control circuits

3.04 FIELD QUALITY CONTROL

A. Honeywell Field Service

1. Contractor shall secure the services of Honeywell Corporation to install new DGP components, perform wiring terminations and programming changes to the Honeywell Data Gathering Panel (DGP). Honeywell representative shall approve and supervise all connections inside the DGP, and his decisions will take precedence over any connections shown on the Contract Drawings.
2. Honeywell representative shall provide supervised by-pass switch(s) in DGP as required to permit testing of the fire alarm system without actuating ancillary equipment controls. By-pass switch(s) shall be wired to provide a supervisory alarm when ancillary circuits are placed in the "OFF" or by-pass position.
3. Honeywell representative shall provide a double-gang outlet box in the DGP to permit manual switching between AC and DC power sources.
4. Honeywell representative shall install switch in DGP to permit resetting duct detectors by the momentary removal of power to the detectors.
5. Honeywell representative shall assist the Contractor in performing the final fire alarm system operation verification tests prior to requesting the acceptance testing by Sandia fire alarm system maintenance personnel.
6. Honeywell representative shall verify that the configuration of the FS90 board modules and bell loading on the notification circuits does not exceed 4 amps per motherboard.

B. Pretesting: After completion of fire alarm system installation, complete "Fire Alarm System Operational Test Checklist" included in Attachments for this Section and submit copy to SDR.

C. Acceptance Test Notice: After completion of "Fire Alarm System Operational Test Checklist", request SDR to submit "Request For Fire Alarm System Acceptance Testing" form with date for final acceptance test by Sandia Fire Alarm Maintenance.

D. Acceptance Test: Correct all minor deficiencies noted by Fire Alarm Maintenance during the time of the acceptance test.

E. Record of Completion: Complete and submit the NFPA 72 "Fire Alarm System Record of Completion", included in Attachments of this Section, to SDR.

3.05 CLEANING

A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Touch up scratches and marred finishes to match original finish.

PART 4 - ATTACHMENTS

- 4.01 Signage for Fire Alarm Impairment
- 4.02 Fire Alarm System Acceptance Testing Process
- 4.03 Request for Fire Alarm System Acceptance Testing
- 4.04 Fire Alarm System Operational Test Checklist
- 4.05 Fire Alarm System Record of Completion

END OF SECTION 13851

ATTENTION

**IN CASE OF FIRE
CALL 911**

FIRE ALARM SYSTEM IS NOT OPERATIONAL AS OF:

DATE: _____

TIME: _____

FIRE ALARM SYSTEM ACCEPTANCE TESTING PROCESS

1. The Contractor performs preliminary tests on the fire alarm system to verify proper operation. Results of tests are documented by the Contractor on the “*Fire Alarm System Operational Test Checklist*” (attached).
2. The Contractor provides a copy of the completed “*Fire Alarm System Operational Test Checklist*” to the SDR and requests a date and time to have Sandia Fire Alarm Maintenance perform fire alarm system acceptance testing.
3. The SDR completes the “*Request for Fire Alarm System Acceptance Testing*” form (attached). The SDR obtains the signature of a Fire Protection Engineer to authorize proceeding with the acceptance test.
4. The SDR submits the completed “*Request for Fire Alarm Acceptance Testing*” form, with a copy of the “*Fire Alarm System Operational Test Checklist*” completed by the Contractor, to the fire alarm Planner for the Sandia Fire Alarm Maintenance Organization. Submit acceptance test request a minimum of 48 hours prior to the date requested by the Contractor.
5. Sandia Fire Alarm Maintenance performs acceptance tests in the presence of the Contractor, who will be responsible for correcting any minor deficiencies found while the tests are underway.
6. If major deficiencies are found during the acceptance tests that cannot be corrected while the tests are underway, the Contractor shall make the required corrections and repeat the acceptance test process, starting at Step 1.

REQUEST FOR FIRE ALARM SYSTEM ACCEPTANCE TESTING

TO: Fire Alarm Maintenance Planner

Mail Stop: 0934

FROM: Requestor: _____

Date: _____

Requested Acceptance Test Date: _____

Time: _____

CONDITIONS REQUIRED PRIOR TO REQUESTING ACCEPTANCE TESTING

- The Sandia Delegated Representative (SDR) obtains the approval of Fire Protection to proceed with acceptance testing by Sandia Fire Alarm Maintenance.
- The SDR provides a copy of the Contractors completed "Fire Alarm System Operational Test Checklist" to Sandia Fire Alarm Maintenance verifying that the system has been tested by the Contractor and is ready for final acceptance testing by Sandia Fire Alarm Maintenance.
- A Fire Alarm Reporting System (FARS) phone line is electrically continuous from the DGP to Building 829.
- Attach a set of the Fire Alarm System drawings that depict the system(s) to be acceptance tested.

I authorize, by my signature below, that the fire alarm system is ready to be acceptance tested by Sandia Fire Alarm Maintenance personnel.

Fire Protection Approval: _____
Fire Protection Engineer

Date: _____

TEST LOCATION

Building: _____

Area: _____

Room Number(s)
(if applicable): _____

Zone Numbers: _____

Description of System(s) to be Acceptance Tested: _____

CONTRACT INFORMATION

Contract Number: _____

Case Number: _____

Electrical Inspector: _____

Phone Number: _____

Mechanical Inspector: _____

Phone Number: _____

Mechanical Contractor: _____

Contact /
Phone Number: _____

Electrical Contractor: _____

Contact /
Phone Number: _____

FIRE ALARM SYSTEM

Operational Test Checklist

SPRINKLER SYSTEM DEVICES	Y	N/A	N
Flow switches indicator(s) are labeled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tamper switches are NOT connected to the same initiation zone as flow and pressure switches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catastrophic flow switches are NOT connected to the same initiation zone as flow and pressure switches reporting an "Alarm" signal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When the catastrophic dump flow switch is manually tripped, after an approximately 20 second time delay, an alarm appears at the proper zone in the DGP.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The 2" drain test has been performed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Test results for the backflow preventor on the sprinkler system has been provided to the Sandia sprinkler system inspector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TROUBLE TEST: When a wire is lifted (from all of the sprinkler system devices on each zone), a trouble signal is sent to the proper zone at the DGP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ALARM TEST: Each sprinkler indication device, when activated, sends an alarm signal to the proper zone at the DGP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The sprinkler water motor gong operates properly with water flow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On antifreeze systems, the concentration of glycerin is at the proper concentration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On dry-pipe systems, the low pressure alarm indicating device operates properly and sends an alarm signal to the DGP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On dry-pipe systems, the air compressor has been cycled to ensure that high and low pressure points are properly set	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

FIRE SAFETY FUNCTION CONTROLS	Y	N/A	N
Smoke removal system operates properly as designed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smoke removal system is supervised	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smoke removal system components are labeled correctly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Magnetic door holder system operates properly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Elevator recall system operates correctly as specified in the Sequence of Operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

All "NO" answers to be fully explained in the Comments section below:

COMMENTS

<u>Inspector Name(s)</u>	<u>Company / Organization</u>	Phone Number	Test Date

Fire Alarm System

Record of Completion

Name of protected property: _____

Address: _____

Representative of protected property (name/phone): _____

Authority having jurisdiction: _____

Address/telephone number: _____

1. Type(s) of System or Service

_____ NFPA 72, Chapter 3 – Local

If alarm is transmitted to location (s) off premises, list where received: _____

_____ NFPA 72, Chapter 3 – Emergency Voice/Alarm Service

Quantity of voice/alarm channels: _____ Single: _____ Multiple: _____

Quantity of speakers installed: _____ Quantity of speaker zones: _____

Quantity of telephones or telephone jacks included in system: _____

_____ NFPA 72, Chapter 5 – Auxillary

Indicate type of connection:

_____ Local energy _____ Shunt _____ Parallel telephone

Location of telephone number for receipt of signals: _____

_____ NFPA 72, Chapter 5 – Remote Station

Alarm: _____

Supervisory: _____

_____ NFPA 72, Chapter 5 – Proprietary

If alarms are retransmitted to public fire service communications centers or others, indicate location and telephone numbers of the organization receiving alarm:

Indicate how alarm is retransmitted: _____

_____ NFPA 72, Chapter 5 – Central Station

Prime contractor: _____

Central station location: _____

Means of transmission of signals from the protected premises to the central station:

_____ McCulloh _____ Multiplex _____ One-way radio

_____ Digital alarm communicator _____ Two-way radio _____ Others

Means of transmission of alarms to the public fire service communications center:

(a) _____

(b) _____

System location: _____

	Organization name/phone	Representative name/phone
Installer	_____	_____
Supplier	_____	_____
Service organization	_____	_____
Location of record (as-built) drawings: _____		
Location of owners manuals: _____		
Location of test reports: _____		
A contract, dated _____ for test and inspection in accordance with NFPA standard(s)		
No(s). _____ dated _____ is in effect.		

2. Record of System Installation

(Fill out after installation is complete and wiring checked for opens, shorts, ground faults, and improper branching, but prior to conducting operational acceptance tests.)

This system has been installed in accordance with the NFPA standards as shown below, was inspected by _____ on _____, includes the devices shown below, and has been in service since _____

- _____ NFPA 72, Chapters 1 2 3 4 5 6 7 (circle all that apply)
- _____ NFPA 70, *National Electrical Code*, Article 760
- _____ Manufacturer's instructions
- _____ Other (specify): _____

Signed: _____ Date: _____
 Organization: _____

3. Record of System Operation

All operational features and functions of this system were tested by _____ on _____, and found to be operating properly in accordance with the requirements of:

- _____ NFPA 72, Chapters 1 2 3 4 5 6 7 (circle all that apply)
- _____ NFPA 70, *National Electrical Code*, Article 760
- _____ Manufacturer's instructions
- _____ Other (specify): _____

Signed: _____ Date: _____
 Organization: _____

4. Alarm-initiating Devices and Circuits

Quantity and class of initiating device circuits (*see NFPA 72, Table 3-5*) Quantity: _____ Style: _____
 Class: _____

MANUAL

- (a) _____ Manual stations _____ Noncoded, activating _____ Transmitters _____ Coded
- (b) _____ Combination manual fire alarm and guard's tour coded stations

AUTOMATIC

Coverage: Complete: _____ Partial: _____

- (a) _____ Smoke detectors _____ Ion _____ Photo
- (b) _____ Duct detectors _____ Ion _____ Photo
- (c) _____ Heat detectors _____ FT _____ RR _____ FT/RR _____ RC
- (d) _____ Sprinkler waterflow switches: _____ Transmitters _____ Noncoded, activating _____ Coded
- (e) _____ Other (list): _____

5. Supervisory Signal-Initiating Devices and Circuits (use blanks to indicate quantity of devices)

GUARD'S TOUR

- (a) _____ Coded stations
- (b) _____ Noncoded stations, activating _____ transmitters
- (c) _____ Compulsory guard tour system comprised of _____ transmitter stations and _____ intermediate stations

Note: Combination devices are recorded under 4(b) and 5(a).

SPRINKLER SYSTEM

- (a) _____ Coded valve supervisory signaling attachments
Value supervisory switches, activating _____ transmitters
- (b) _____ Building temperature points
- (c) _____ Site water temperature points
- (d) _____ Site water supply level points

Electric fire pump:

- (e) _____ Fire pump power
- (f) _____ Fire pump running
- (g) _____ Phase reversal

Engine-driven fire pump:

- (h) _____ Selector in auto position
- (i) _____ Engine or control panel trouble
- (j) _____ Fire pump running

Engine-driven generator:

- (k) _____ Selector in auto position
- (l) _____ Control panel trouble
- (m) _____ Transfer switches
- (n) _____ Engine running

Other supervisory function(s) (specify): _____

6. Alarm Notification Appliances and Circuits

Quantity and class (*see NFPA 72, Table 3-7*) of notification appliance circuits connected to the system:

Types and quantities of notification appliances installed: Quantity: _____ Style: _____ Class: _____

- (a) _____ Bells _____ Inch
- (b) _____ Speakers
- (c) _____ Horns
- (d) _____ Chimes
- (e) _____ Other: _____
- (f) _____ Visual signals Type: _____
_____ with audible _____ w/o audible
- (g) _____ Local annunciator

7. Signaling Line Circuits

Quantity and class (*see NFPA 72, Table 3-6*) of signaling line circuits connected to system:

Quantity: _____ Style: _____ Class: _____

8. System Power Supplies

(a) Primary (main): _____ Nominal voltage: _____ Current rating: _____

Overcurrent protection: Type: _____ Current rating: _____

Location: _____

(b) Secondary (standby):

_____ Storage battery: Amp-hour rating: _____

_____ Calculated capacity to drive system, in hours: ____ 24 _____ 60

_____ Engine-driven generator dedicated to fire alarm system:

Location of fuel storage: _____

(c) Emergency or standby system used as backup to primary power supply, instead of using a secondary power supply:

_____ Emergency system described in NFPA 70, Article 700

_____ Legally required standby system described in NFPA 70, Article 701

_____ Optional standby system described in NFPA 70, Article 702, which also meets the performance requirements of Article 700 or 701

9. System Software

(a) Operating system software revision level(s): _____

(b) Application software revision level(s): _____

(c) Revision completed by: _____

(name)

(firm)

10. Comments:

(signed) for central station or alarm service company or installation contractor/supplier (title) (date)

Frequency of routine tests and inspections, if other than in accordance with the referenced NFPA standard(s):

System deviations from the referenced NFPA standard(s) are: _____

(signed) for central station or alarm service company or installation contractor/supplier (title) (date)

Upon completion of the system(s) satisfactory test(s) witnessed (if required by the authority having jurisdiction):

(signed) representative of the authority having jurisdiction (title) (date)