FC-73 Series Conventional Fire Alarm Control Panel **Version 1.1**
Architect / Engineer Specification Modified June 3, 2004
Part No. 9020-0535

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SECTION ONE: GENERAL

1.1 Scope of this Document

This specification document provides the requirements for the FC-73 Series microprocessor-based fire alarm control panel. This control panel shall include, but not be limited to, system cabinet, FC-73 Unit, associated peripheral devices, programming, wiring, and other relevant components.

1.2 Work Included

1.2.1 General Requirements

The contractor shall furnish and install a complete 24 VDC, FC-73 Series conventional-zoned, multiprocessor-based fire alarm system as specified herein.
The system shall include, but not be limited to, all control equipment, power supply, initiating devices, audible and visual notification appliances as appropriate, conduit, wiring, fittings, and all other accessories necessary to provide a complete and operable system.

1.2.2 Labeling

All FC-73 Series equipment shall be labeled with the manufacturer's name and logotype to assure the integrity of the complete system. "Hybridized" systems (containing equipment from several different manufacturers) shall not be considered acceptable.

1.2.3 Agency Approvals

All equipment shall be listed by Underwriters Laboratories, Inc., approved by Factory Mutual Research, or as accepted by the Authority Having Jurisdiction (AHJ). The catalog numbers specified are those of Fire Control Instruments, Inc., and are indicative of the quality and type of equipment to be furnished.
Accessory components as required shall be catalogued by the manufacturer and Listed to operate with the manufacturer's control panel.

1.2.4 **Wiring**

Wire and cable shall be U.L. Listed for fire alarm use and shall be a minimum of 18 AWG or as required by local codes and Authority Having Jurisdiction.
Raceways containing conductors identified as "Fire Protective Control Panel" conductors shall not contain any other conductors. No AC current carrying conductors shall be allowed in the same raceway with the DC fire alarm detection and signaling conductors.

1.3 **Submittals**

The owner or his designated representative shall approve all equipment submittals.

1.3.1 **General Requirements**

Manufacturers original catalog data and descriptive information shall be supplied for all major components of the equipment to be supplied. Suppliers qualifications shall indicate years in business, service policies, warranty definitions, and a list of similar installations. Contractor qualifications shall indicate years in business and prior experience with installations that include the type of equipment that is to be supplied. All pertinent information shall be furnished regarding the reliability and operation of the equipment to be supplied. Delivery dates of the equipment to be supplied shall be furnished.
Installation and final test/acceptance dates of the equipment shall be furnished.
Sufficient information shall be furnished so that the exact function of each installed device is known.

NOTE: DOCUMENTATION

Submittal of shop drawings shall contain at least one (1) booklet of original manufacturer specification and installation instruction sheets. Subsequent booklets 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.

1.3.2 **Other than Specified Equipment**

If equipment other than that specified is supplied, it shall be the contractors obligation to furnish appropriate documentation and submit the following in writing to the engineer ten (10) days before the bid date:

A. Complete lists, descriptions and drawings of materials to be used.
B. A complete list of current drain requirements during normal supervisory condition, trouble conditions, and alarm conditions.
C. Battery standby calculations showing total standby power needed to meet the system requirements as specified.

1.3.3 **Satisfying the intent of these specifications**

It is the contractor's responsibility to meet the entire intent of these specifications. Deviations from specified items shall be at the risk of the contractor until the date of final acceptance by the architect, engineer, and owners representative. All costs for removal, relocation, or replacement of a disapproved substituted item shall be borne by the electrical contractor.

1.4 **Codes and Standards**

1.4.1 **Codes**

The fire alarm system in its entirety shall be in compliance with all applicable fire and electrical codes and comply with the requirements of the local Authority Having Jurisdiction over said systems.

1.4.2 **U.L. Standards**

The system shall comply with the applicable provisions of the following U.L. Standards and Classifications:

- UL STD 864, Control Units, Fire Protective Signaling Systems
- UOJZ, Control Units, System
- UOXX, Control Unit Accessories, System

1.4.3 **NFPA Standards**

The FC-73 Series system shall comply with the applicable provisions of the following current National Fire Protection Association (NFPA) standards:

- NFPA 72, National Fire Alarm Code
- NFPA 90A, Installation of Air Conditioning and Ventilating Systems
- Life Safety Code NFPA 101, Safety to Life from Fire in Buildings and Structures

SECTION TWO: SYSTEM OPERATION

2.1 **Microprocessor-Based**

The system shall be of microprocessor design to allow the module to hold and execute its own software program.

2.2 **Field Programmable**

The system shall be capable of field programming in two modes:

1. Programmed through the use of the LCD keypad using a menu driven system.
2. Computer programmed through the use of an FCP (Field Configuration Program) dedicated software package. The system configuration shall be saved to diskette for easy access and field program modification without the addition of programming hardware. A "hard" copy of the final system configuration showing all inputs, outputs, descriptions, addresses, programming matrixes, etc. shall be furnished at no extra cost.

2.3 **RS-232C Serial Output**

A supervised RS-232C serial port shall be provided to allow programming of system via a laptop computer.

2.4 **Zone Program**

Operation of a manual station or automatic activation of any smoke detector, heat detector, or waterflow zone shall activate the system control-by-event program to cause:

1. All notification appliances to sound in a temporal pattern and strobes to flash.

   OR

   All notification appliances to sound in a march time code pattern and strobes to flash.

   OR

   All notification appliances to sound in a continuous pattern and strobes to flash.
2. Shut down all air handling units as specified herein.
3. The "SYSTEM ALARM" LED shall flash and the panel audible sounder shall pulse. The System Control Unit display shall be of the light emitting diode type (LED), clearly visible in poor light conditions and indicate the specific zone in alarm on the main control unit via separate LEDs.
4. Close all magnetically held doors automatically.
5. Perform any additional function as specified herein or as shown on the plans.
6. Notify the Fire Department.

2.5 **General System Operation**

When an alarm occurs on a zone, the control panel indicates the alarm condition until manually reset. An alarm may be acknowledged by operating the "ACKNOWLEDGE" switch. This shall silence the panel sounder, and change the "SYSTEM ALARM" LED and the individual zone LED from flashing to steadily lit.

All notification appliances may be silenced by operating the "SILENCE" switch. This shall steadily light the "SIGNAL SILENCE" LED. If a subsequent alarm is activated, the notification appliances shall "resound" until again silenced. Waterflow zones shall be non-silenceable.

2.6 **Green "POWER" LED**

A green "POWER" LED shall normally be lit, indicating that the system is receiving AC electrical power. A failure of control panel power shall cause this LED to blink.

2.7 **Yellow "TROUBLE" LED**

A yellow "TROUBLE" LED shall light and the system audible sounder shall sound when any trouble is detected in the system. Failure of normal power, opens or short circuits on the notification appliance or zone circuits, disarrangement in system wiring, failure of the microprocessor or any identification module, or system ground faults shall activate this trouble circuit.

A trouble signal may be acknowledged by operating the "SILENCE" switch. This shall silence the panel trouble sounder. If additional trouble conditions occur, the trouble circuitry

will resound. During an alarm condition, all trouble signals shall be suppressed with the exception of lighting the yellow "TROUBLE" LED.

2.8 **Alarm Verification**

Smoke detector alarm verification shall be a standard option on all zones while allowing any dry contact device (i.e.: manual stations, heat detectors, etc.) to create an immediate alarm. This feature shall allow those smoke detectors that are installed in environments prone to nuisance or unwanted alarms to operating with the following sequence:

- System Ready - prior to smoke detector alarm.
- Smoke Detector Alarm - @ time = 0.
- Pre-Alarm Window - 15 seconds; a distinctive pre-alarm indication shall be displayed.
- Zone Reset - 5 seconds (occurs at end of pre-alarm window).
- Alarm Verification Window - 90 seconds; the system shall respond to a second alarm from the same smoke detector zone as a system alarm.
- System Ready - no alarm verification.

NOTE: The verification sequence is suspended once a system alarm is activated.

2.9 **Alarm Signals**

All alarm signals shall be automatically latched or "locked in" at the control panel until the operated device is returned to its normal condition and the control panel is manually reset. When used for waterflow, the SILENCE switch shall be bypassed.

2.10 **Alarm or Trouble Activation of Initiating Zones**

Alarm or trouble activation of initiating zones shall be indicated by zone alarm and trouble LEDs.

2.11 **Electrically Supervised**

Each initiating and notification appliance circuit shall be electrically supervised for opens, shorts, and ground faults in the wiring.

The occurrence of any fault shall activate the system trouble circuitry but shall not interfere with the proper operation of any circuit that does not have a fault condition.

2.12 **Walk Test**

The control unit shall provide a Zoned Walk Test Program which shall enable an individual to test the alarm/supervision status of each initiating device connected to the system. During walk test, the control unit shall automatically reset after an alarm condition enabling the technician to continue testing the system without requiring a return to the control panel.

2.13 **Printed Circuit Boards, Control Panel Components**

All control units shall be contained in a 16-gauge steel cabinet.

All groups of circuits or common equipment shall be clearly marked and shall be expandable by inserting interchangeable units.

The control unit shall be red in color and shall include the following features:

A. Auxiliary SPDT alarm and trouble dry contacts.

B. A solid-state power transfer circuit that shall switch to standby power automatically and instantaneously if normal power fails or falls below 15% of normal ("brown out" conditions). This circuit shall allow the batteries to be effectively "floated" on the operating system to avoid upsetting normal microprocessor operation and minimize resultant nuisance troubles and/or alarms. This circuit shall be physically isolated from the power supply to facilitate service.
C. A ground fault detector to detect positive or negative grounds on the initiating circuits, notification appliance circuits, power circuits, and telephone line circuit. A ground fault indication shall be activated and the general trouble devices shall operate as specified herein but shall not cause an alarm sound.
D. Each circuit shall be monitored for short circuits and shall have a distinctive LED for visual indication of the circuit and operating trouble devices as specified herein but shall not cause an alarm to sound.
E. Surge protection shall be a standard feature of the fire alarm control panel and shall be incorporated in the power supply circuit, common control circuits, notification appliance circuits, and telephone line circuit. Systems that require an optional module to provide this protection shall not be considered equal.
F. A reset switch, labeled "RESET" shall be provided to reset the control panel.

2.14 **City Connection**

The fire alarm system shall be connected to a local energy city master box, or via leased telephone lines to a central station, or remote station.
A standard disconnect switch shall be provided to allow testing of the system without notifying the fire department.

2.14.1 **Central Station Option**

The fire department shall be consulted as to the authorized central station companies serving the municipality. The fire alarm system shall transmit both alarm and trouble signals with the alarm having priority over the trouble signal. The contractor shall be responsible for all installation charges while the customer will be responsible for the telephone company lease charges.

2.14.2 **Remote Station Option**

The fire department shall be consulted as to the authorized remote station serving the municipality. The fire alarm system shall transmit both alarm and trouble signals with the alarm having priority over the trouble signal.
The contractor shall be responsible for all installation charges while the customer will be responsible for the telephone company lease charges.

2.14.3 **Local Energy City Master Box Option**

The city master box must be coded and timed in accordance with local fire department requirements. The box shall be (surface/flush) mounted and located as specified by the building engineer and fire department.

SECTION THREE: SYSTEM COMPONENTS

The FC-73 Series conventional system shall consist of the following units, components, and peripheral devices, each of which is described in detail in this section:

- System Cabinet
- FC-73 System board
- Peripheral Devices (Manual Stations, Smoke Detectors, Heat Detectors, etc.).

OPTIONAL:

- LCD-FC73 LCD Remote Annunciator
- ZDM-FC73 Zone Disconnect Module
- FC-5280 Status Display Module

3.1 System Cabinet

The cabinet shall be of dead-front construction and 16 or 18 gauge cold-rolled steel. The system components shall be installed on a mounting plate which may be removed to facilitate easy installation and testing of field wiring or directly to the backbox.

3.2 Power Supply Unit

The main power shall be converted via the transformerless power supply to rectified and filtered 24 VDC (nominal) for system operation. Power supplies requiring a step-down power transformer shall not be acceptable.

The system shall contain an integral, filtered, nominal 24 VDC at 6 amps power supply, which shall comply with UL Standard 864 for power limited operation.

3.2.1 Primary Power LED Indicator and Outputs

Power supply outputs shall be as follows:

- 24 VDC Non-Resettable, 1 amp. max., power limited.
- 24 VDC Resettable, 1 amp. max., power limited.

NOTE: Maximum combined output for entire system shall be 6.0 amp.

3.2.2 Battery Charger

The power supply shall contain a battery charger with a maximum average charging current of 1.0 or 2 amps. (this current shall be sufficient to maintain the system batteries at full charge). If the system loses AC power, a System Trouble shall occur. The charger output shall be supervised and fused. The battery charger shall be capable of charging up to 33 ampere/hour capacity sealed lead-acid batteries.

3.2.3 Batteries

Batteries shall be of sufficient capacity to provide power for the entire system upon loss of normal AC power for a period of sixty (60) hours with five (5) minutes of alarm signaling at the end of this sixty-hour (60) period as required by NFPA 72, auxiliary or remote station systems.

OR

Batteries shall be of sufficient capacity to provide power for the entire system upon loss of normal AC power for a period of twenty-four (24) hours with five (5) minutes of alarm signaling at the end of this twenty four (24) hour period as required by NFPA 72, local or proprietary systems.

3.2.4 **Connections and Circuits**

Connections to the light and power service shall be on a dedicated branch circuit in accordance with the National Electrical Code (NEC). The circuit and connections shall be mechanically protected. The circuit disconnecting means shall be accessible only to authorized personnel and shall be clearly marked "FIRE ALARM CIRCUIT CONTROL."

3.3 **FC-73**

Enclosed within the system cabinet, the FC-73 shall contain the microprocessor, memory, system operating software stored on a non-volatile EPROM, system configuration memory stored on a non-volatile EEPROM, and the circuits necessary to support a fire alarm system.

3.3.1 **Visual Displays**

Individual status LEDs shall be provided for the following functions:

LED	**Function**
Red	System Alarm
Yellow	Supervisory
Yellow	System Trouble
Yellow	Trouble Notification Circuits
Yellow	Trouble Municipal
Yellow	Silenced
Green	Power
Yellow	Zone Troubles
Red	Zone Alarm

3.3.2 **Real-Time Clock**

The SCU module shall contain a real-time clock capable of monitoring all real-time programming and all time control functions.

3.3.3 **Notification Appliance Circuits**

Two (2) independent notification appliance circuits shall be provided on the unit, each polarized and rated at 3.0 amps DC, individually overload protected and supervised for opens, grounds, and short circuits. They shall be capable of being wired Class A, Style Z or Class B, Style Y.

Specifications are as follows:

Voltage	**Current**
24 VDC Non-regulated	3.0 amps: Maximum alarm

3.3.4 **Trouble Dry Contacts**

Trouble dry contacts (Form A or Form B; jumper selectable) shall be provided rated 2 amps @ 24 VDC (resistive) and shall transfer whenever a system trouble occurs.

3.3.5 **Alarm Dry Contacts**
Alarm dry contacts (Form C) shall be provided rated 2 amps @ 24 VDC (resistive) and shall transfer whenever a system alarm occurs.

SECTION FOUR: PERIPHERAL DEVICES: Specifier choose as required. See FCI Compatibility Addendum, P/N 9000-0427 for a list of approved compatible two-wire smoke detectors and notification appliances.

SECTION FIVE: VISUAL ANNUNCIATION

5.1 **LCD Annunciator**
Furnish and install a remote LCD annunciator as shown on plans. Furnish FCI Model LCD-FC73. This shall display all events occurring on the control panel. Up to 6 remote annunciators may be installed per system. All wiring shall be supervised.

SECTION SIX: AUXILIARY FUNCTIONS

6.1 **Electromagnetic Door Holders**
Electromagnetic door holders shall be provided to hold fire and smoke barrier doors open until released by an alarm condition. The door holders shall have approximately 35 lb. (15.9 kg) holding power and offer fail safe operation. Furnish and install FCI Model FM-900 Series where shown on plans.
All holders shall release through the contacts of the control panel after an alarm condition has been initiated from any zone on the plans. All circuits shall be separately fused.

SECTION SEVEN: WIRING

7.1 **Installers' Responsibilities**
The installer shall coordinate the installation of the fire alarm equipment with the manufacturer or his authorized distributor.
All conductors and wiring shall be installed according to the manufacturer's recommendations.
It shall be the installers responsibility to coordinate with the supplier, regarding the correct wiring procedures before installing any conduits or conductors.

7.2 **Installation of System Components**
System components shall be installed in accordance with the latest revisions of the appropriate NFPA Standards, the requirements contained herein, National Electrical Code, local and state regulations, the requirements of the fire department and other applicable authorities having jurisdiction (AHJ).

All wire used on the fire alarm system shall be U.L. Listed as fire alarm protection signaling circuit cable per the National Electrical Code, Article 760.

SECTION EIGHT: WARRANTY AND FINAL TEST

8.1 General

The contractor shall warrant all equipment and wiring free from inherent mechanical and electrical defects for one year (365 days) from the date of final acceptance.

8.2 Final Test

Before the installation shall be considered completed and acceptable by the awarding authority, a test of:

1. The contractor's job foreman, in the presence of a representative of the manufacturer, 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.
4. The signaling line circuits and loudspeaker appliance circuits shall be opened in at least two (2) locations to verify the presence of supervision.
5. When the testing has been completed to the satisfaction of both the contractor's job foreman and the representatives of the manufacturer and owner, a notarized letter co-signed by each attesting to the satisfactory completion of said testing shall be forwarded to the owner and the fire department.
6. 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.
7. Prior to final test, the fire department must be notified in accordance with local requirements.

8.3 Operating and Instruction Manuals

Operating and instruction manuals shall be submitted prior to testing of the system. Four (4) complete sets of operating and instruction manuals shall be delivered to the owner upon completion.

8.3.1 "As-Built" Drawings

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.

8.3.2 Testing Instructions

Complete, accurate, step-by-step testing instructions giving recommended and required testing frequency of all equipment, methods for testing each individual piece of equipment, and a complete trouble shooting manual explaining how to test the primary internal parts of each piece of equipment shall be delivered to the owner upon completion of the system.

8.3.3 **Maintenance Instructions**

Maintenance instructions shall be complete, easy to read, understandable, and shall provide the following information:

1. Instructions for replacing any components of the system, including internal parts.
2. Instructions for periodic cleaning and adjustment of equipment with a schedule of these functions.
3. A complete list of all equipment and components with information as to the address and telephone number of both the manufacturer and local supplier of each item.
4. User operating instructions shall be provided prominently displayed on a separate sheet located next to the control unit in accordance with UL Standard 864.