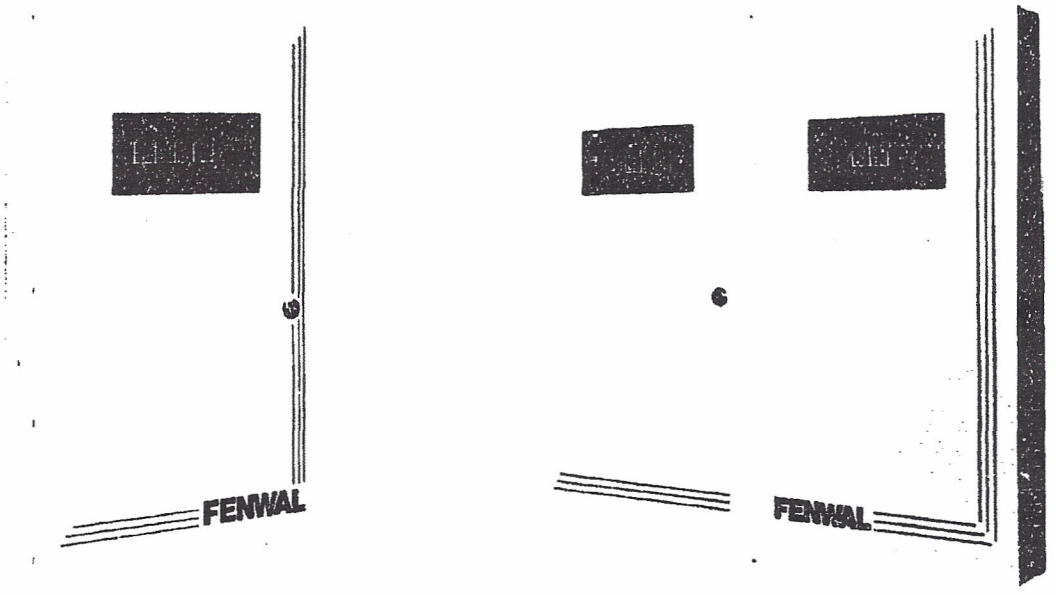
FENWAL®

PROTECTION SYSTEMS DIVISION

FIRE PROTECTION CONTROL UNITS
Model 2200
Model 2202
DS 30-2200.0

Effective: January, 1983



GENERAL FEATURES

- Fully Regulated Power Supply
- Built-In Battery Charger
- 6AH Sealed Lead Acid Battery Options
- Ground Fault Supervision
- Trouble Isolation Fault Indicators
- Solid State Circuitry
- UL Listed To Standard 864
- Listed For Proprietary Use
- Incorporates I.R.I. Feature
- Transient And Noise Isolation
- AC or DC Operation Options

ADDITIONAL FEATURES

- Field Selectable Class "A" or "B" Alarm Initiating Circuits
- Supervised Polarity Reversing Outputs For:
  - Pre-Alarm
  - Pre-Release
- Field Selectable Time Delays
- Supervised Abort Circuit
- Listed for Waterflow Service
- Differentiates Between Smoke Detectors and Contact Devices on

GENERAL

These low cost, versatile Control Units supervise one or two module Halon 1301 fire protection systems. They meet the requirements of NFPA Standards 72A and 72D, are UL Listed per Standard 864, and function to I.R.I. Standards. State of the art solid state circuitry provides immunity to transients and noise while increasing reliability. Many programmable options permit variations in system design without changing the basic circuitry of the unit or adding optional modules.

DETECTION

A special feature of these units is the ability to differentiate between two-wire smoke detectors and contact type alarm actuators on the same initiating circuit, simplifying installation and reducing wiring costs. Each suppression module has two independent alarm initiating circuits which may be wired for either Class "A" or Class "B" operation. Up to 30 Fenwal Series 7000 ionization or photoelectric smoke detectors may be connected to each circuit. Contact devices such as Fenwal's DETECT-A-FIRE® heat detectors or manual pull stations also may be connected in the same circuit. Total loop wire resistance of 50 ohms allows extended initiating circuit wire runs.

A single smoke detector in either of the suppression module's two input circuits, initiates a Pre-Alarm signal. When a smoke detector in both loops of one module is in alarm, a Pre-Release signal is generated and time delay circuits, if used, will activate. When the time delay is satisfied, agent is released and a Release signal is triggered unless the system abort feature has been enabled.

A contact device in either detection circuit will trigger both the Pre-Alarm and Pre-Release signals simultaneously; either releasing the extinguishant or starting the time delay sequence.

ALARMS

Three alarm output circuits for each suppression module are Class "B" supervised and operate polarized signalling devices. One independent dry Form C auxiliary relay contact is associated with each output circuit. Relay coils are supervised.

An Alarm Silence Switch located on the module board will silence each of the three signal outputs; however, a subsequent alarm will override the Alarm Silence Switch.

Another easily programmed feature is waterflow supervision which overrides the Alarm Silence Switch when a sprinkler system also is supervised by the Control Unit.

EXTINGUISHING AGENT RELEASE

The Control Units drive either initiator or solenoid actuated agent release valves so the units are compatible with either Fenwal Modular or Central Storage extinguishing systems.

ABORT SWITCH

Supervised Abort Switches may be connected to each module of the Control Unit to inhibit smoke detector initated suppression release. While the Abort Switch is held open, agent release is prevented, but alarms continue to sound. A programming procedure enables contact device actuation to override the Abort Switch if desired. See Programming Instructions.

In addition, the unit incorporates a field programmable **I.R.I. Feature** which allows the system to be aborted between Pre-Alarm and Pre-Release, but not after the Pre-Release stage.

SUPERVISION

Each suppression module is fully supervised. Supervision includes but is not limited to the following:

- AC Power
- battery voltage
- battery connections
- alarm initiating circuits
- alarm outputs
- abort switch circuit
- releasing outputs
- programming plug
- relay coils
- ground fault
- alarm silence
- pressure switch (NC/C)

Each suppression module includes an annunciator bank as depicted in Figure 3. The top row of indicators is visible with the enclosure door closed. Additional LED trouble indicators are located on the module printed circuit boards as shown in Figure 3.

TROUBLE INDICATION

Trouble conditions in one or both modules result in an audible signal and illumination of an LED annunciator on the affected module panel. The audible signal may be silenced by the Trouble-Silence Switch on the module panel. Additionally, fault isolation is facilitated by nine trouble indicators per module and a trouble ringback. A trouble condition activates a set of dry Form C contacts.

POWER SUPPLY

The power supply is conservatively rated at 3.0 amperes, 24 VDC and all outputs are regulated. Overload protection is provided by electronic current limiting. A fuse is utilized in the battery circuit only. A circuit breaker protects AC input.

Each control module contains a built-in battery charger and 1 or 2 optional sets of 6 ampere/hour sealed lead acid batteries housed within the control unit enclosure (see Battery Standby Chart). A Trouble signal is generated if battery voltage drops below acceptable levels.

ENCLOSURE

Panel enclosures are rugged 18 gauge steel. Doors are painted beige, back boxes are dark brown. Steel doors are secured to back boxes by full length piano-type hinges and held closed by a key lock. All switches and indicators, with the exception of Power, Trouble and Alarm indicators, are located behind the locked cover (see Annunciator Figure 3).

ORDERING INFORMATION

Description	Part Number
Model 2200 Single Module Control Unit w/enclosure and two battery brackets*	30-220000-000
Model 2200 Single Module Control w/o enclosure, w/two battery brackets*	30-220000-001
Model 2200 Enclosure Back Box	30-220070-009
Model 2200 Enclosure Cover	30-220070-008
Model 2200 Flush Mounting Adaptor Kit	30-220070-010
Model 202 Dual Module Control Unit w/enclosure and four battery brackets*	30-220000-200
Model 2202 Dual Module Control Unit w/enclosure and two battery brackets*	30-220000-201
Model 2202 Master Module Control w/o enclosure, w/two battery brackets*	30-220000-202
Model 2202 Slave Module Control w/o enclosure, w/two battery brackets*	30-220000-203
Model 2202 Slave Module Control w/o enclosure, w/o battery brackets*	30-220000-204
Model 2202 Enclosure Back Box	30-220070-013
Model 2202 Enclosure Cover (2 doors)	30-220070-014
Model 2202 Flush Mounting Adaptor Kit	30-220070-012

*Batteries and Harness not included

ACCESSORIES FOR BOTH MODELS

Description	Part Number
Two 12V, 6AH Sealed Lead Acid Batteries	30-220070-001
Battery Harness for above battery set	30-220070-002
Component Board (Module) Assembly	30-220070-003
Plug-in Ammeter	30-220070-050
Plug-in Voltmeter	30-220070-004
Transformer	30-220070-015
Battery Harness for external batteries (consult factory)	30-220070-016
Battery Simulator Resistor	30-220070-021
Battery Bracket (for two batteries)	06-233093-002

RECOMMENDED SPARE PARTS FOR BOTH MODELS

Description	Part Number
Spare E.O.L. Resistor Pack (5.6K ohms)	30-220070-005
Spare E.O.L. Resistor Pack (3.0K ohms)	30-220070-006
5 Amp Fuse	06-115917-071
Circuit Breaker	06-116679-001
Alarm Output Relay	06-115902-078

TECHNICAL SPECIFICATIONS

Power Supply:
Input: 120 VAC, 50/60 Hz., 1.5A max.
Output: 24 VDC, 3.0A max. regulated

Outputs per Suppression Module:
Polarity Reversing
Alarm (3): Form C rated 2A max. @ 24 VDC or 120 VAC
Trouble Relay Contact (1): Form C rated 2A max. @ 24 VDC or 120 VAC
Solenoid Output: 0.5A max. @ 24 VDC
Initiator Output
Total Loop Resistance: 10.0 ohms
Total Energy Available: 0.8J minimum
Supervisory Current: 2.5mA

Detection Circuits per Module:
Output Voltage: 24 to 27.5 VDC
Max. no two-wire smoke detectors per circuit: 30
Detector Types: Fenwal Series 7000
Max. no. Contact Devices: Up to 50 ohms wire resistance
Max. Contact Device Alarm Current: 100mA

End-of-Line Resistors:
Detection Circuits: 5.6K ohms 1/2W, 2 furnished
Alarm Output Circuits 3.0K ohms 1/2W, 3 furnished

Standby Batteries:
Sealed Lead Acid: 2-12V 6AH (std.)
Single set – 2200 and 2202
double set – 2202 options
Battery Recharge Time: 10 hours from deep discharge

Battery Standby Time:
See Battery Standby Chart.

Time Delays per Module:
0, 20, 40, 60, 80, 100 or 120 seconds, field selectable.
See Programming Instructions.

Dimensions (nominal)
Single Module: 26H x 14W x 4D
Dual Module: 26H x 29W x 4D

INSTALLATION INSTRUCTIONS

The 2200 and 2202 Fire Protection Control Units can be flush or surface mounted to any solid wall. For flush mounting, a special adaptor kit (part number 30-220070-010 for Model 2200, and part number 30-22070-012 for Model 2202) is required.

Instructions for Flush Mounting (reference Figure 1).

1. Remove control module(s) (a) from box (b) to facilitate flush mounting. The door(s) (c) of the box may also be removed if desired.
2. Remove knockouts (d) at top and bottom of box.
3. Frame wall opening between studs (e) (14¼" wide × 25¼" high for Model 2200, and 28¾" wide × 25¼" high for Model 2202).
4. Position long side trim piece (f) so the three smaller holes align with the three holes on back of box (as shown), and fasten trim to box with one bolt and nut in center hole. (Note: all bolt heads should be inside box unless wall opening depth prevents this).
5. Install second long side trim piece (f) as in Step (2).
6. Install short side trim pieces (g) (top and bottom) as shown, inserting and tightening all nuts and bolts.
7. Using the three larger holes in each long side trim piece as guides, drill three $\frac{3}{16}$" diameter holes through both long sides of box.
8. Insert box (b) into framed opening and fasten securely to studs with number 10 screws (not provided), inserted through holes drilled in side of box.
9. Reinstall control module(s) (a).
10. See Installation Wiring Diagram for further instructions.

Instructions for Surface Mounting (reference Figure 2).

1. Remove knockouts (d) at top and bottom of box.
2. Insert number 10 screws (not provided) into wall, spaced to match key holes on back of box.
3. Mount box onto the screws.
4. Insert number 10 screws in each remaining hole in back of box and tighten all screws.
5. See Installation Wiring Diagram for further instructions.

OPERATING INSTRUCTIONS

NORMAL STANDBY
Green — AC "On" Indicator shall illuminate on Master module. DC "On" Indicator shall illuminate on Slave module. All other indicators shall be extinguished.

ALARM — CIRCUIT 1
Red — ALARM CIRCUIT 1 Indicator shall illuminate, indicating activation of detection device or pull station connected to alarm initiating Circuit 1.

ALARM — CIRCUIT 2
Red — ALARM CIRCUIT 2 Indicator shall illuminate, indicating activation of detection device or pull station connected to alarm initiating Circuit 2.

PRE-ALARM SIGNAL — Audible or Visual Alarm
Activates when Alarm Circuit 1 or Alarm Circuit 2 activates.

PRE-RELEASE SIGNAL — Audible or Visual Alarm
Activates when Alarm Circuit 1 or Alarm Circuit 2 is activated by a manual pull station or a contact-type detection device connected to either alarm initiating circuit and delay mode of operation is selected.

Activates when Alarm Circuit 1 and Alarm Circuit 2 are activated by smoke detectors connected to both alarm initiating circuits.

RELEASE SIGNAL — Audible or Visual Alarm
Activates immediately upon activation of extinguishing agent release output, on EED operation and upon activation of last solenoid on solenoid operation.

AGENT RELEASE ANNUNCIATOR
Red indicator illuminates immediately upon activation of extinguishing agent release output. Remains latched until System Reset switch is activated.

SYSTEM TROUBLE ANNUNCIATOR
Amber indicator illuminates when a trouble condition exists in any of the system supervised circuits.

GROUND FAULT ANNUNCIATOR
Amber indicator on panel (Master Module Control on Dual Module Model Unit 2202) illuminates when a ground fault that could interfere with system operation exists. To determine which panel of a dual module system has the ground fault, disconnect interconnecting plug between Master and Slave modules (TB2), remove black lead from terminal 46 of the Slave Control Module, and operate the system reset switch. If the LED extinguishes, the ground fault is in the Slave unit.

If the LED remains illuminated, the fault is in the Master Module. The LED will remain latched "on" until the fault is cleared and the System Reset switch is operated.

RELEASE CIRCUIT TROUBLE ANNUNCIATOR
Amber indicator illuminates when a trouble condition exists in the supervised agent release output circuit and remains latched until trouble condition is cleared and System Reset switch is activated.

ALARM SILENCE ANNUNCIATOR
Amber indicator illuminates when alarm silence switch has been actuated and an alarm condition exists.

BATTERY TROUBLE ANNUNCIATOR
Amber indicator illuminates when a fault exists in the supervised battery circuit.

Also illuminates if battery voltage falls below acceptable limits either in normal operation or during battery test. Remains lit until fault condition or low voltage condition is corrected and system reset switch is operated.

BATTERY POLARITY ANNUNCIATOR

NOTES:

Alarm Outputs:
1. Use only polarized signalling devices.
2. Polarities shown are for normal standby.
3. Total System Current shall not exceed 3.0 A. at 24VDC.
4. Supervisory Current: 3.5 MA per circuit.

Relay Outputs:
5. All relay contacts shown with power applied in normal standby condition.

Time Delay:
6. This unit may be field programmed for release time delays of 0, 20, 40, 60, 80, 100 or 120 seconds. Underwriters Laboratories requires that max. release time delay shall not exceed 60 seconds.

Abort Switch:
7. To override Abort Switch when using contact type devices, do not cut violet jumper on printed circuit board. This jumper does not affect the Smoke Detector Abort Operation.
8. When Abort Switch is not used, jumper terminals No. 33 and No. 34.

Wiring:
9. All wiring to initiator output, manual pull and initiating circuits must be shielded or electrically isolated from all other wiring. Shielded conductors, MI cable, EMT, or rigid conduit may be used. Compliance with all national and local fire codes is required.

Power Options:
10. 120 VAC 50/60 Hz with Battery Standby:
    cut (white) AC Trouble Override Jumper.

    120 VAC 50/60 Hz only:
    cut (black) Battery Trouble Override Jumper, or install 2K Ohm Battery Simulator Resistor (Fenwal Cat. No. 30-220070-021) across terminals No. 47 and No. 48.

    240 VAC 50/60 Hz:
    use step down transformer (Fenwal Cat. No. 30-220070-015)

    Battery Standby only:
    Cut (black) Battery Trouble Override Jumper.

    Note: If AC with Battery Standby Option (above) used for future requirements, (black) Battery Trouble Override Jumper must be re-installed.

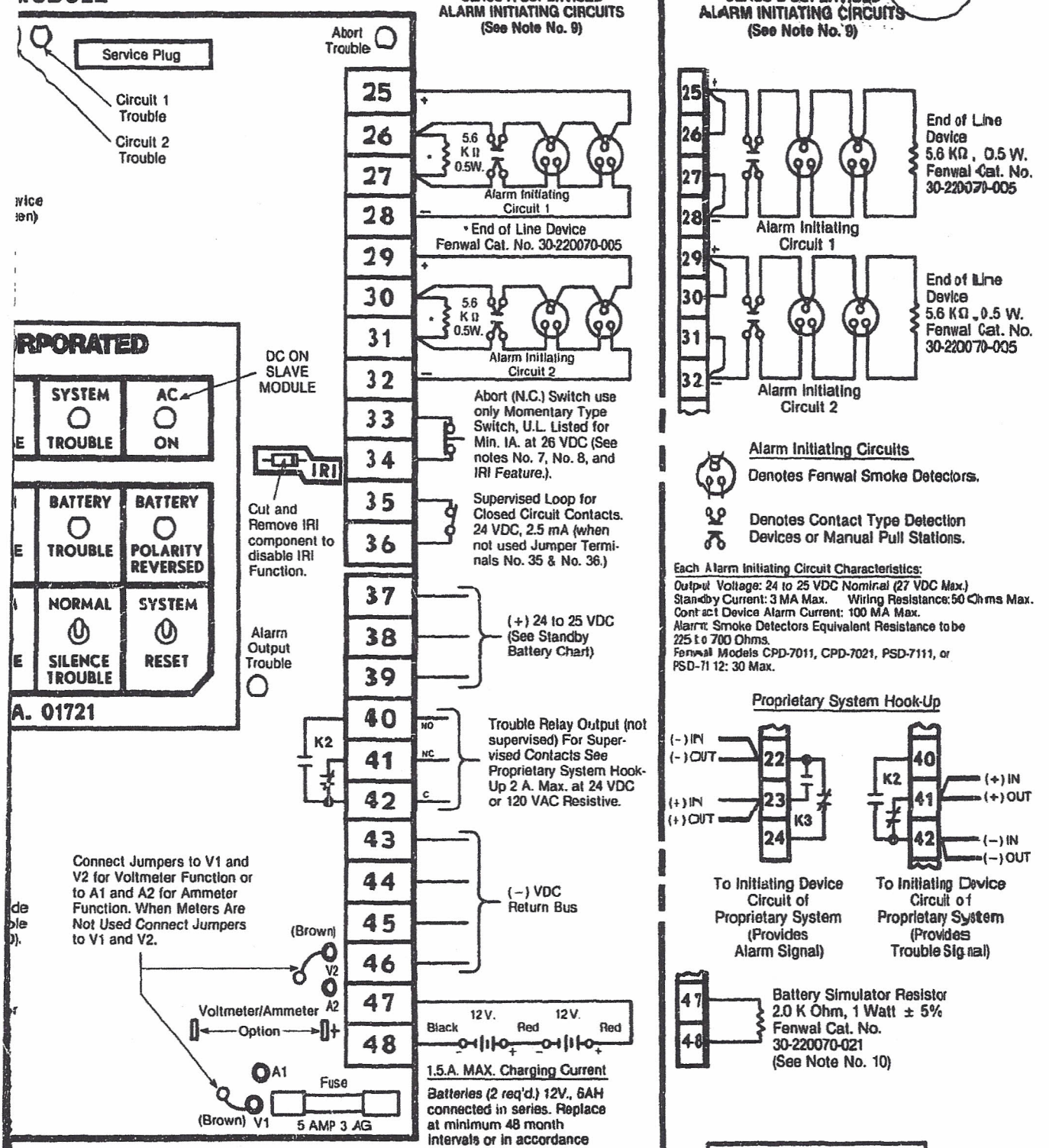
Module To Module Connections:
11. Connect 3 position plug from Master Module to connector (TB2) on Slave Module. Connect black lead wire from terminal No. 46 on Slave Module to terminal No. 46 on Master Module.

Initiator/Multiple Cascading Solenoid Release Circuit:
12. After firing, one solenoid in release circuit will remain energized and draw 0.5 A until system is cleared and reset.

Initiator/Single Solenoid Release Circuit:
13. After firing, solenoid in release circuit will remain energized and draw 0.5A until system is cleared and reset.
14. In this configuration, use solenoid without pressure switch.

Dual Initiator Release Circuit:
15. Total resistance of complete initiator release

RING DIAGRAM
MODULE



WER SUPPLY, DISCONNECT AC POWER
RY. OBSERVE PROPER BATTERY POLARITY
ES, AND OBSERVE BATTERY REVERSAL
AC POWER. IF INDICATOR IS ILLUMINATED,
BEFORE APPLYING AC POWER.

- Denotes Light Emitting Diode
- Denotes Toggle Switch (Normal Position up as Shown)

CLASS B SUPERVISED ALARM INITIATING CIRCUITS (See Note No. 9)

Alarm Initiating Circuits

Denotes Fenwal Smoke Detectors.

Denotes Contact Type Detection Devices or Manual Pull Stations.

Each Alarm Initiating Circuit Characteristics:
Output Voltage: 24 to 25 VDC Nominal (27 VDC Max.)
Standby Current: 3 MA Max. Wiring Resistance: 50 Ohms Max.
Contact Device Alarm Current: 100 MA Max.
Alarm: Smoke Detectors Equivalent Resistance to be 225 to 700 Ohms.
Fenwal Models CPD-7011, CPD-7021, PSD-7111, or PSD-7112: 30 Max.

Proprietary System Hook-Up

Battery Simulator Resistor 2.0 K Ohm, 1 Watt ± 5% Fenwal Cat. No. 30-220070-021 (See Note No. 10)

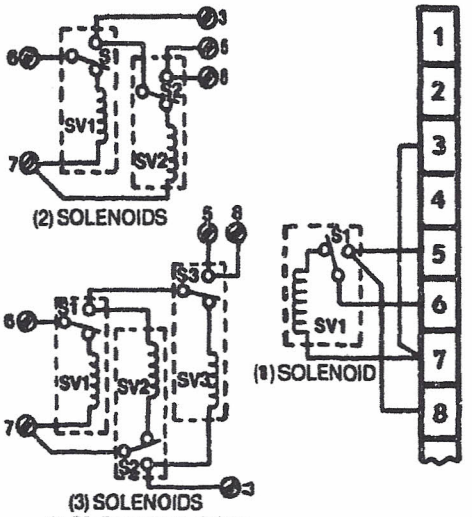
TIME (SECONDS)	
TIME	CUT JUMPERS
0	(NONE)
20	YELLOW
40	BLUE
60	RED
80	RED & YELLOW
100	RED & BLUE
120	RED, BLUE & YELLOW

FIGURE 3
30-173
REV. D

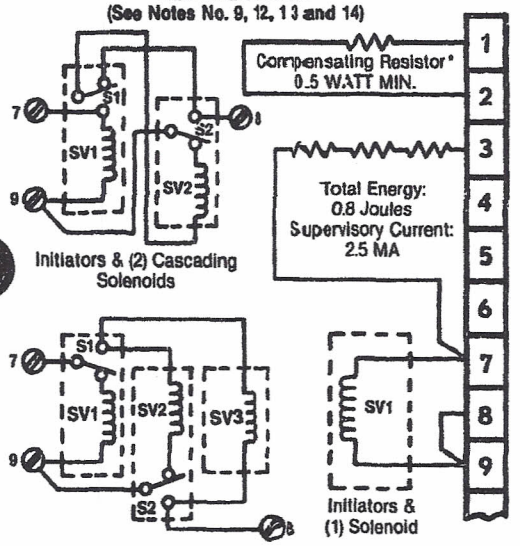
INSTALLATION WI

TYPICAL PER

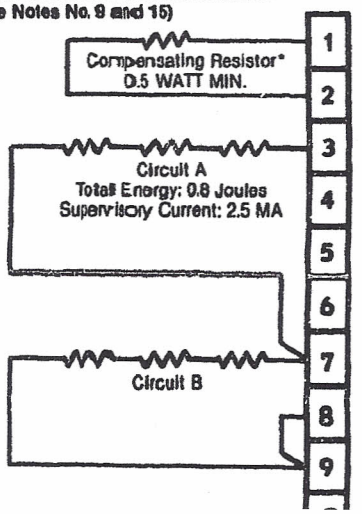
SUPERVISED SOLENOID ONLY RELEASE CIRCUIT (See Note No. 9)



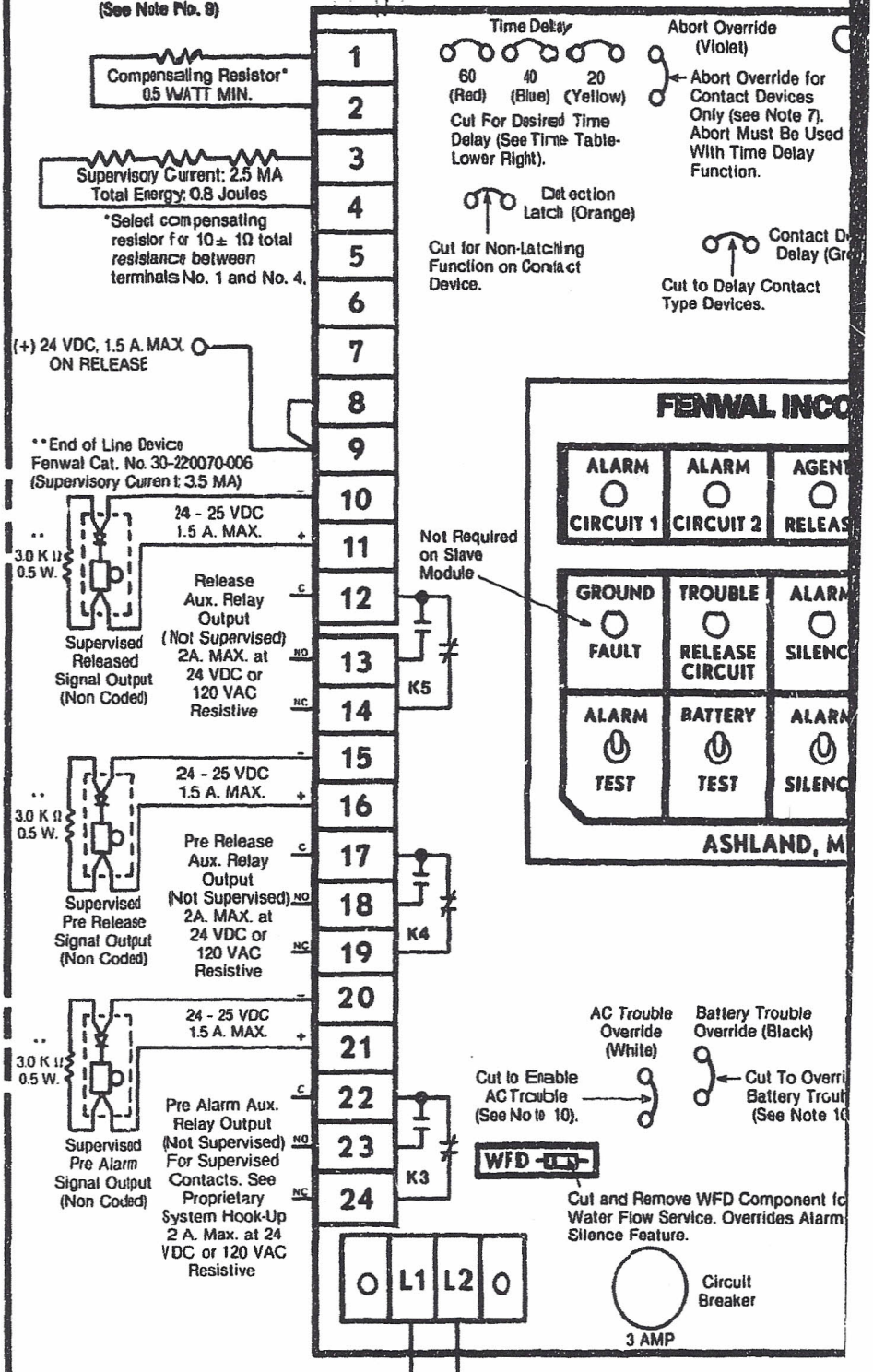
SUPERVISED INITIATOR AND SOLENOID RELEASE CIRCUIT (See Notes No. 9, 12, 13 and 14)



SUPERVISED DUAL INITIATOR RELEASE CIRCUIT (See Notes No. 9 and 15)



SUPERVISED INITIATOR ONLY RELEASE CIRCUIT (See Note No. 9)



OPERATING INSTRUCTIONS (CONT.)

ALARM TEST SWITCH
Activates Pre-alarm, Pre-release and Release audible or visual signaling circuits. Momentary action switch returns to Normal position when released.

BATTERY TEST SWITCH
Activates battery test function. Tests battery under load. Momentary action switch returns to Normal position when released. See Battery Maintenance Section for ammeter and voltmeter operation during test.

ALARM SILENCE SWITCH
Silences audible and visual alarm devices. Receipt of a subsequent alarm will reactivate the alarm outputs.

Momentary action switch returns to Normal position when released, but alarm outputs remain silenced until subsequent alarm is received and/or System Reset switch is activated.

Alarm Silence switch will not operate when system is programmed for waterflow service.

TESTING RECOMMENDATIONS
At least once a week or as required by local authorities having jurisdiction, the following testing program should be conducted.

1. Depress Alarm Test Switch to Test position and observe operation of Audible and Visual Alarm devices.
2. Perform Battery Maintenance procedure as outlined below.

FUSE REPLACEMENT
This control unit is equipped with a manual reset circuit breaker on AC input. To reset, simply depress the push button. The battery circuit is protected by a 5A Type 3 AG glass cartridge fuse. Replace only with a fuse of the same rating. Should service be required, contact your local service representative.

BATTERY MAINTENANCE
The following testing program should be conducted at least once a week, or as required by local inspection authorities having jurisdiction.

Actuate battery test switch to test position. Ammeter should momentarily deflect to full scale. Battery trouble indicator should not light. If voltmeter is used in lieu of ammeter, voltmeter should read 21.5 volts minimum and then return to 24 volts minimum.

Failure of the ammeter to deflect to full scale and/or failure of the voltmeter to register 21.5 volts minimum, or illumination of the Battery Trouble indicator indicates insufficient battery capacity.

NOTE: If prolonged AC power failure has occurred within 10 hours of battery test, allow at least 10 hours for the battery to recharge before taking further action.

If after 10 hours total recharge a failure indication occurs, replace the batteries with the same type and capacity. Batteries originally furnished by Fenwal are: 2 ea. YUASA Type NPG-12 or 1 ea. Fenwal Cat. 30-220070-001, rated 12V, 6AH. Replace in pairs only to assure maximum capacity. (Note Fenwal Cat. 30-220070-001 denotes a pair of batteries.)

CAUTION
To avoid damaging the power supply, disconnect AC power before connecting battery. Observe proper battery polarity after connecting batteries, and observe battery reversal warning before applying AC power. If indicator is illuminated, correct battery polarity before applying AC power.

Before servicing batteries, disconnect AC power. Batteries should be replaced at least once every 48 months, or as directed by the local authorities having jurisdiction.

BATTERY POWER TABLE
Batteries should provide 24 hours standby supervision plus 5 minute 3A alarm load at the end of that time complying with NFPA Standards 72A and 72D.

To determine battery operation time:

A. Determine load by adding control panel current (75mA per module) to load current of detectors (No. of detectors X 100uA for Fenwal PSD 711X photoelectric detectors or 60uA for Fenwal CPD 7021 ionization detectors).

B. Derate batteries by 12%: (6AH X .88) = 5,280mAH.

C. Divide 12% derated battery rating by total current load (see examples below).

EX 1 — 2200 Panel — 6AH batteries, PSD 711X Photoelectric Detector
75mA (module current) + (60 detectors X 100uA) = 81mA
5,280mAH ÷ 81mA = 65.2 hours battery operating time.

EX 2 — 2202 Panel — two 6AH batteries, CPD 7021 Ionization Detectors
150mA (module current) + (60 detectors × 60uA) = 154mA
5,280mAH ÷ 154mA = 34.3 hours battery operating time.

EX 3 — 2202 Panel — two 6AH batteries per module, PSD 711X Photoelectric Detectors
150mA (module current) + (120 detectors X 100uA) = 162mA
10,560mAH ÷ 162mA = 65.2 hours battery operating time.

SERVICE PLUG
The Service Plug also aides in trouble-shooting, by performing a trouble ring back function when a problem in the initiating circuit is located. To perform this function, the connector must be disconnected and pins one and two shorted.

PROGRAMMING INSTRUCTIONS

1. Connect brown jumpers to V1 and V2 for voltmeter option or to A1 and A2 for ammeter option.
2. For waterflow service, cut and remove diode WFD located on lower left corner of module printed circuit board. Removal of this diode prevents silencing of alarms.
3. For non-latching operation of contact-type devices, cut orange detection latch jumper on module printed circuit board. Cutting this jumper requires constant closure of contact-type devices to initiate alarm.
4. To delay agent release after actuation of contact-type devices, cut green jumper on module printed circuit board. Delay time is regulated by cutting red/blue/yellow jumper(s) as indicated on time delay table listed on schematic 30-173B.
5. To override abort switch when using contact-type devices, do not cut violet jumper on module printed circuit board. This jumper does not affect the smoke detector abort operation.
6. To delay agent release when using smoke detectors, cut red/blue/yellow jumper(s) as required to achieve desired delay time. Jumper cuts indicated in time delay table on schematic 30-173B.
7. For AC or Battery Trouble override, cut black or white jumpers per Note 10 on Schematic 30-173B.

ARCHITECTURAL AND ENGINEERING SPECIFICATIONS

The contractor shall furnish and install a Fenwal (Model 2200 Single Module) (Model 2202 Dual Module) (specify which one), Fire Protection Control Unit. The control unit shall be U.L. Listed per Standard 864.

Two Class A supervised alarm initiating circuits shall be provided per module. Circuits shall be compatible with contact type detection devices and any combination of up to 30 Fenwal Series 7000 ionization and photoelectric smoke detectors.

The first alarm initiation by a smoke detector connected to either alarm initiating circuit in a module zone shall cause a Pre-Alarm output.

A subsequent alarm initiation by a smoke detector connected to the second alarm initiating circuit in a module zone shall cause Pre-Release Alarm output.

An alarm initiation by a contact device connected to either alarm initiating circuit shall cause both a Pre-Alarm and Pre-Release output.

A time delay, field selectable for 0, 20, 40, 60, 80, 100 or 120 seconds, shall be initiated with the generation of the Pre-Release output. Upon expiration of the time delay, a Release output and a Release Alarm output shall occur.

An Abort Switch shall be provided to inhibit the Release output orginated by smoke detector alarm initiations. A field program feature shall insure that, where specified, Release outputs originated by contact devices shall override the Abort Switch function.

A programmable abort feature shall permit system abort after Pre-Alarm outputs have been actuated, but not after Pre-Release outputs.

The Pre-Alarm, Pre-Release and Release Alarm outputs shall be individually supervised, polarity reversal, signalling circuits, each rated at 28 VDC, 1.5 A. The Alarm outputs shall deactivate when the Alarm Silence Switch is activated and visual and audible trouble signals shall result except when the waterflow option is enabled. Alarm signals cannot be silenced when panel is used for water flow service.

Four individual dry, Form C, auxiliary relay contacts (one relay per function) shall transfer under Pre-Alarm, Pre-Release, Post-Release and Trouble conditions. Each of these contacts shall be rated 2A, 28 VDC and 120 VAC.

There shall be provisions for driving either initiator or solenoid actuated extinguishing agent release valves. The initiator output shall be supervised and be compatible with Fenwal Modular Suppression System release valves.

The solenoid output shall be supervised and shall be compatible with Fenwal Central Storage System electrically operated solenoid valves.

All connections to the detection, alarm and releasing circuits shall be supervised for open circuits and ground faults. All relay coils, battery connections and plugs shall be supervised for open circuits. Battery voltage, polarity and A.C. power input shall be supervised. Trouble conditions shall be indicated by a silenceable audible signal and illumination of an LED trouble annunciator. Alarm conditions shall override all trouble indications except Alarm Silence.

Fourteen (14) LED annunciators per module shall be provided as follows:

1. Power On (Green)
2. System Trouble (Amber)
3. Battery Trouble (Amber)
4. Circuit 1 Trouble (Amber)
5. Circuit 2 Trouble (Amber)
6. Ground Fault (Amber)
7. Release Trouble (Amber)
8. Alarm Circuit 1 (Red)
9. Alarm Circuit 2 (Red)
10. Agent Release (Red)
11. Alarm Silence (Amber)
12. Battery Polarity (Amber)
13. Abort Trouble (Amber)
14. Alarm Output Trouble (Amber)

The alarm and trouble indications shall be reset by a single System Reset Switch.

The control unit shall contain a single 3.0 ampere, 24 VDC regulated power supply incorporating electronic overload protection and a manually reset circuit breaker. No fuses shall be utilized except in the battery circuit. A self-contained battery charger shall be provided along with automatic transfer to battery standby in case of A.C. power loss. The control unit shall be equipped with optional per module 6 ampere hour sealed lead acid battery or shall be adaptable for connection of external standby batteries (specify which one). A battery test switch shall be provided and an optional ammeter or voltmeter, self-contained within the control unit shall be (available or furnished) (specify which one).

The control unit shall be housed in a painted steel enclosure equipped with a hinged cover held closed by a keylock. All control switches and indicators, with the exception of the Power On, Master Trouble, Loop 1 Alarm, Loop 2 Alarm and Release indicators shall be concealed and inaccessible behind the locked cover.

All circuitry shall be mounted to a removable subpanel.