PBCFR Minimum Plan Requirements for Clean Agent Fire Suppression Systems

The purpose of this document is to outline the minimum requirements for Clean Agent plan submissions. This will ensure that all required diagrams and documentation are included. By meeting the requirements, the time taken to review and return to the customer for system installation will be minimized.

Plans shall at a minimum include the following:

1. Statement of the applicable codes to which the system was designed
2. Scope of Work
3. A Gridded Key Plan with the layout of the floor indicating the room and room number of the installation and North point of reference
4. Contact/business/pages bottom right of each sheet
5. Equipment / system layout diagram
6. Overhead Room Diagram
7. Device Mounting Height Diagram
8. Clean Agent Installation Instruction
9. Sequence of Operations
10. Input / Output Matrix "Cause & Effect"
11. Below Ceiling Isometric
12. Subfloor Isometric
13. Ceiling Smoke Detector Mounting detail
14. Subfloor Smoke Detector Mounting Detail
15. Tank Manufacture & Cartridge Specifications
16. Tank Restraining Detail
17. Pipe Sizing & Hangar Details
18. Electrical Notes
19. Wiring Schedule
20. Electrical Riser Diagram and Battery Calculations
21. Picture/Photo ALL Caution/Warning Signage
22. Input Initiation Device Chart
23. Data Center List of Parts & Quantity
24. Nozzle specifications / chart
25. General notes as needed such as installation, fans and ventilation requirements
26. Individual Equipment Manufacture cut sheets

Upon completed installation of the System, prior to the system being activated, it must be tested with a Fire Rescue Fire Safety Specialist on site to witness all portions of the test. The following is needed in order for the test to commence:

1. Permit and plans on site
2. Leak Test Results Printed
3. Record of Completion / Test Certificate

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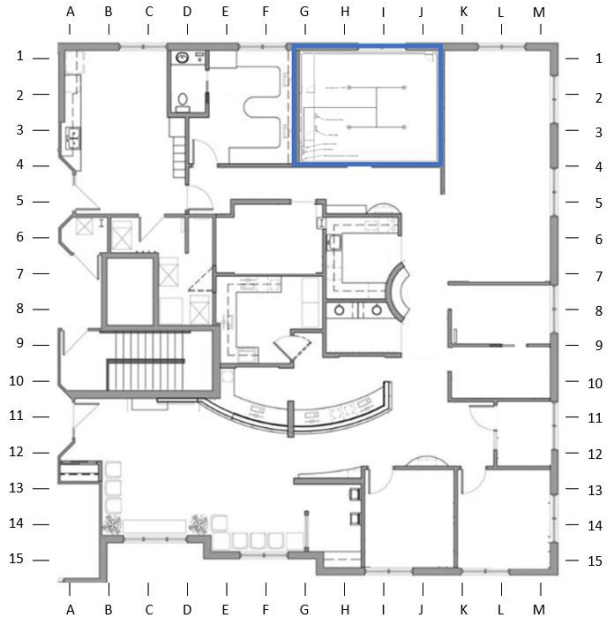
1. Applicable Standards and Publications - the design, installation, testing and maintenance of the Clean Agent Extinguishing System shall be in accordance with the applicable requirements set forth in the current Florida Building Code "FBC" and the Florida Fire Prevention Code "FFPC" to include the following codes, standards, and third party approval agencies:
   a. FFPC Current Edition
   b. Local Amendments to the FFPC
   c. NFPA 17, Current Edition
   d. NFPA 70, Current Edition
   e. NFPA 72, Current Edition
   f. NFPA 96, Current Edition

2. Scope of Work Designation

3. Gridded Key Plan with layout of floor indicating the room of installation and North point of reference

4. Contact/Business/Pages Bottom right of each sheet

Gridded Key Plan
Scale 1/8" = 1'



Engineers Stamp

Company Designing & Installing the System
Company Contact Information
Business name and address of Customer
Page # of # Pages

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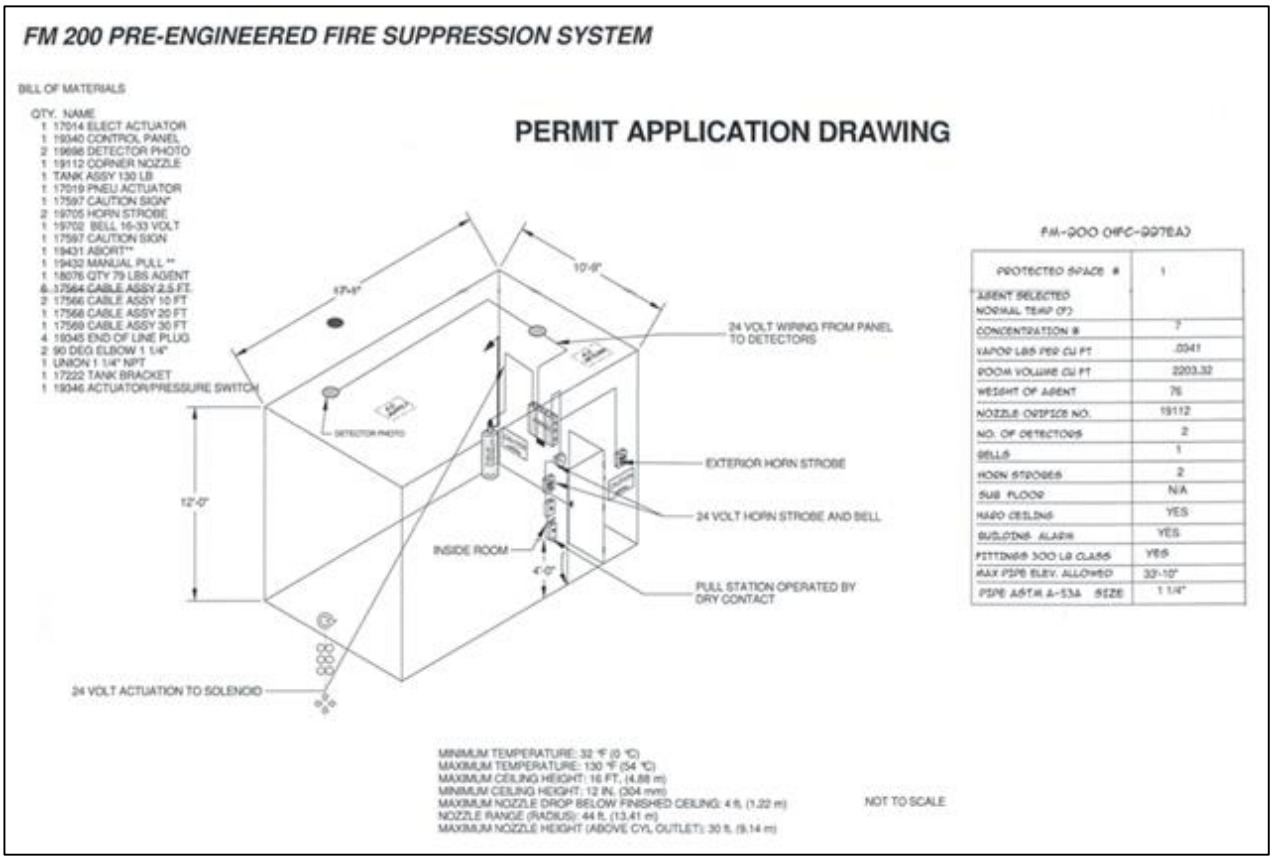
5. Three Dimensional Equipment / System Layout Diagram



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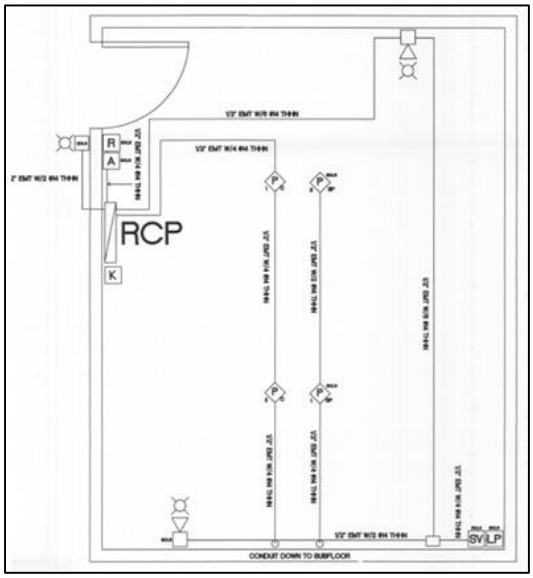
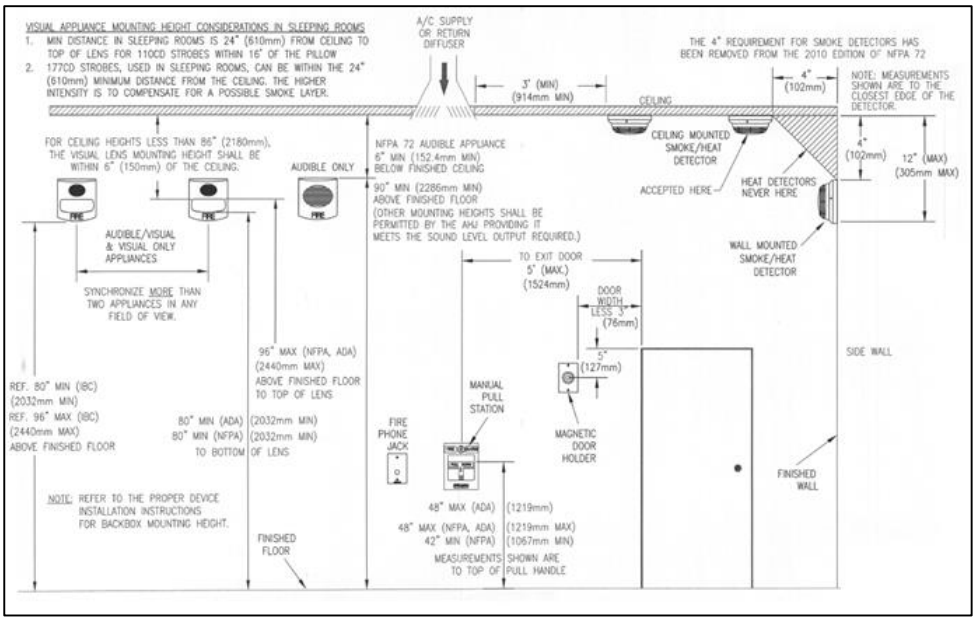
6. Overhead Room Diagram



7. Device Mounting Height per NFPA 72



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8. Clean Agent Installation Test Procedures

INSTALLATION TEST PROCEDURES FOR CLEAN AGENT

Disable each agent storage container release mechanism so that activation of the release circuit will not release the agent.

1. Disable each agent storage container release mechanism so that activation of the release circuit will not release the agent.
2. Piping shall be pneumatically tested in a closed circuit for a period of 10 minutes at 40psig. At the end of 10 minutes, the pressure drop shall not exceed 20 percent of the test pressure,
3. A flow test using nitrogen gas shall be performed on the piping network to verify that flow is continuous and that the piping and nozzles are unobstructed.
4. Verify the enclosure integrity per NFPA 2001 via of the door fan test.
5. Reconnect the release circuit with a functional device (24–volt lamp, flash bulbs, circuit breakers, etc.) or pneumatically activate release mechanism in lieu of agent storage container release mechanism.
6. Check all the supervised circuits for proper operation and confirm the supervisory signals are received at the control panel (audible and visual).
   - 6.1. Check lights, horn/lights, bells, supervised circuits for proper trouble response.
   - 6.2. Check manual release stations and abort switches (if provided), supervised circuits for proper trouble response.
   - 6.3. Check pull station, supervised circuits for proper trouble response.
7. Check all manual release switches to verify the agent release, check for two separate and distinct actions and that the switches are properly identified.
8. Check detection devices for a first alarm function.
9. Operate the necessary circuit to initiate a second alarm to actuate the agent release lamp.
10. Check that each forced air conditioning unit (if required by owner) shut off.
11. Check that all dampers required to seal the protected space functioned properly.
12. Check the power to the control panel, verify it is a dedicated circuit and properly labeled.
13. Remove detectors at random from the base to check the supervisory function.
14. Test abort switch (if provided) to verify the proper function.
15. Reconnect the agent release actuated release device.

9. Input / Output Matrix

Input Output Matrix

CAUSE		EFFECT: Suppression Control													Bldg F/A		
		Trouble	Supervisory	Alarm	1st Alarm Bell	Pre-Discharge Horn/Strobe	Input to Cross Zone	Start Timer - 30 Seconds	Start Timer - 30 Seconds	HVAC/Damper Control	Inhibit Automatic Release	Inhibit Agent Release	Discharge Agent	Discharge Strobes	Trouble	Alarm	Supervisory
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Panel Trouble	X													X		
2	Smoke Detector			X		X	X									X	
3	Manual Pull Station (Suppression)			X		X			X	X						X	
4	Abort Button	X									X				X		
5	Agent Disconnect Switch		X									X					X
6	Detection Cross Zoned							X									
7	Discharge Timer Start									X							
8	Discharge Timer Complete												X				
9	Agent Release													X			
10	Agent Pressure Switch		X														X

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10. Sequence of Operations

SEQUENCE OF OPERATIONS

ACTIVATION OF ANY SINGLE DETECTOR IN ANY DETECTION ZONE SHALL:

1. Cause a first-stage alarm horn/light (slow cadence) within protected space.
2. Energize an LED on the activated detector and control panel.
3. Latch LED on detector.
4. Notify building Fire Alarm panel of alarm signal.

ACTIVATION OF A SECOND DETECTOR ON THE ZONE SHALL:

1. Cause a second-stage pre-discharge horn (fast cadence) to be activated within protected space.
2. Energize an LED on the activated detector and control panel.
3. Latch LED on detector.
4. Initiate a 30 second time delay (clean agent release).
5. Operate auxiliary contacts for air conditioning shutdowns and automatic dampers.
6. Notify building Fire Alarm panel of alarm signal.

UPON COMPLETION OF THE TIME DELAY, THE CLEAN AGENT SYSTEM SHALL:

1. Cause a discharge alarm light to be activated at the entrance to the protected space.
2. Sound horn/light (in steady mode) within the protected space.
3. Energize a discharge LED at the control panel.
4. Energize an LED on the activated detector and control panel.
5. Latch LED on detector.
6. Energize control solenoid for clean agent cylinders releasing gaseous agent into the protected area.

ACTIVATION OF TROUBLE OR SUPERVISORY SIGNAL

1. Cause a trouble or supervisory signal to be activated at the control panel.
2. Notify building fire alarm system of trouble or supervisory signal.

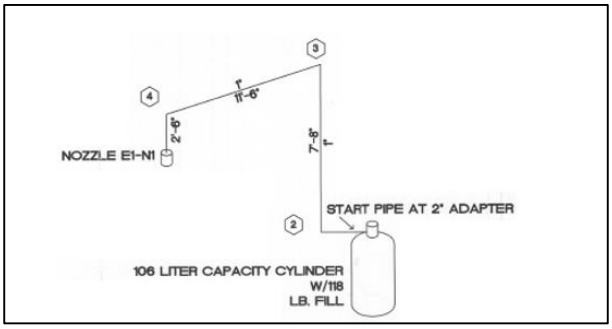
ACTIVATION OF ABORT SWITCH

1. Cause an abort trouble signal to be activated at the control panel.
2. Abort relay activated while abort is held.
3. Count down timer paused.

ACTIVATION OF MANUAL RELEASE

1. Cause a pre-discharge horn (fast cadence) to be activated within the protected space.
2. Cause a discharge light to be activated at the entrance to the protected space.
3. Energize an discharge LED at the control panel.
4. Notify building fire alarm system of alarm signal.
5. Operate auxiliary contacts for air conditioning shutdowns and automatic dampers.
6. Energize control solenoid for clean agent cylinders releasing gaseous agent into the protected area.

11. Below Ceiling Isometric



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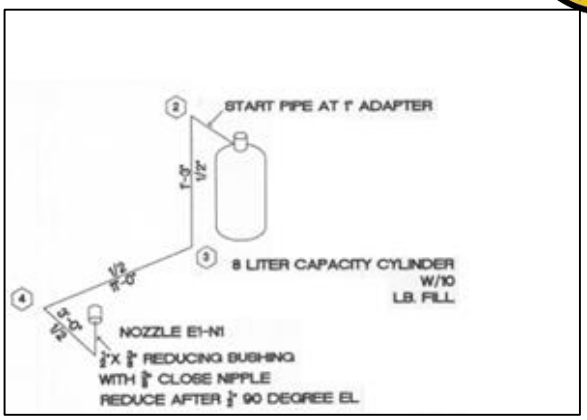
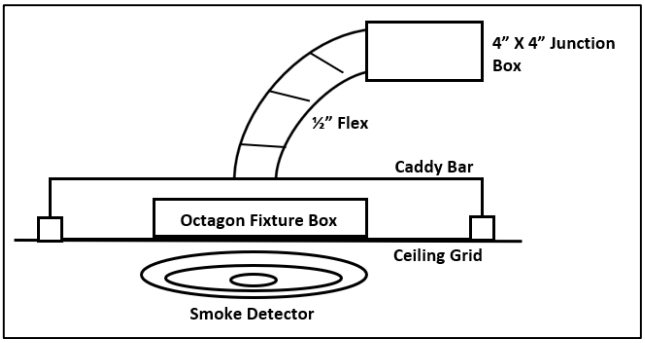
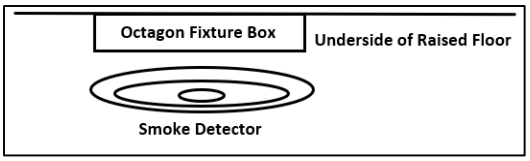
12. Subfloor Isometric



13. Ceiling Smoke Detector Mounting Detail



14. Subfloor Smoke Detector Mounting Detail



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15. Manufacture Tank & Cartridge Specifications / Requirements

TANK AND CARTRIDGE REQUIREMENTS

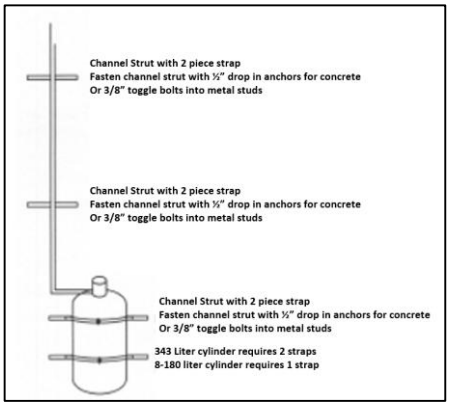
Once the hazard analysis is completed and the total nozzle flow numbers are established, the quantity and size of agent tanks and cartridges needed to supply the nozzles with the proper volumes of agent at the proper flow rates can be determined. For cartridges used in the regulated release mechanism, flow capacities, tank quantities and sizes, and regulated release cartridge options are given in the table below.

Total Flow Numbers*	Quantity and Size of Tank(s)	Regulated Release Cartridge Options	
		Nitrogen	Carbon Dioxide
1 – 5	(1) 1.5 Gallon	LT-20-R	101-10
6 – 11	(1) 3.0 Gallon	LT-30-R	101-20
11 – 16	(1) 1.5 Gallon (1) 3.0 Gallon	Double	101-30
16 – 22	(2) 3.0 Gallon	Double	101-30**

When one or more regulated actuators are used, the following tank and cartridge combinations apply for each regulated actuator:

Regulated Actuator Tank(s)	Regulated Actuator Cartridge
(1) 1.5 Gallon	LT-20-R or 101-10
(1) 3.0 Gallon	LT-30-R or 101-20
(1) 1.5 Gallon and (1) 3.0 Gallon	LT-A-101-30 or 101-30** or double tank
(2) 3.0 Gallon	LT-A-101-30 or 101-30** or double tank

16. Tank Restraining Detail



17. Pipe Sizing & Hangar Details

Maximum Spacing between pipe supports for screwed, welded or grooved	
Nominal Pipe Size	**Maximum Span**
1/4"	5'
1/2"	5'
3/4"	6'
1"	7'
1-1/4"	8'
1-1/2"	9'
2"	10'
2-1/2"	11'
3"	12'
4"	14'

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18. Electrical Notes

Electrical Notes:

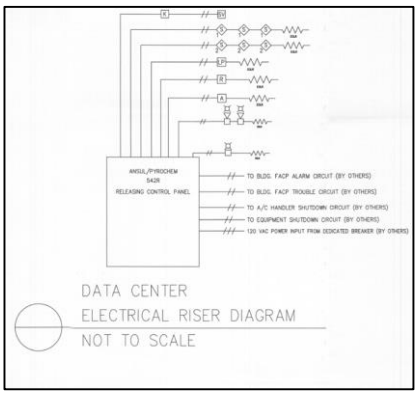
1. All Wiring shall conform to NFPA 72, National Fire Alarm Code and Article 760 of NFPA 70, the National Electrical Code
2. All Wiring shall be run in EMT conduit or flexible conduit
3. All Devices to be surface mounted if possible, to reduce agent leakage from enclosure
4. See submittal package for standby (Battery) power calculations
5. Control panel contacts provided for interface to the building fire alarm system and A/C handler)or dampers) are rated for 2.0 AMPS @ 30 VDC (Resistive and 0.5 AMPS @ 30 VAC (Resistive)
6. Control Panel enclosure dimensions are 16" high X 14.5" wide X 4.75" Deep
7. All devices to be installed in accordance with manufacturers specifications
8. Manual release stations and abort switches are to be mounted 46" above finished floor level
9. Alarm bell, Horn/Strobe, and strobes to be mounted 80-96" above finished floor
10. Smoke detectors shall not be installed closer the 36" to any air ducts, register grilles or returns

19. Wiring Schedule

WIRING SCHEDULE

INPUT CIRCUITS	
Detection Circuit A	14 THHN Stranded, Copper 7 Strands Black +
Detection Circuit A	14 THHN Stranded, Copper 7 Strands Blue -
Detection Circuit B	14 THHN Stranded, Copper 7 Strands Yellow +
Detection Circuit B	14 THHN Stranded, Copper 7 Strands Brown -
Manual Release Circuit	14 THHN Stranded, Copper 7 Strands Red +
Manual Release Circuit	14 THHN Stranded, Copper 7 Strands White -
Abort Circuit	14 THHN Stranded, Copper 7 Strands Orange +
Abort Circuit	14 THHN Stranded, Copper 7 Strands Violet -
OUTPUT CIRCUITS	
Horn/Strobe	14 THHN Stranded, Copper 7 Strands Red +
Horn/Strobe	14 THHN Stranded, Copper 7 Strands Black -
Bell Circuit	14 THHN Stranded, Copper 7 Strands Yellow +
Bell Circuit	14 THHN Stranded, Copper 7 Strands Violet -
Solenoid Circuit	14 THHN Stranded, Copper 7 Strands Orange +
Solenoid Circuit	14 THHN Stranded, Copper 7 Strands Brown -

20. Electrical Riser Diagram and Battery Calculations



21. Picture / Photo of All Caution Signage

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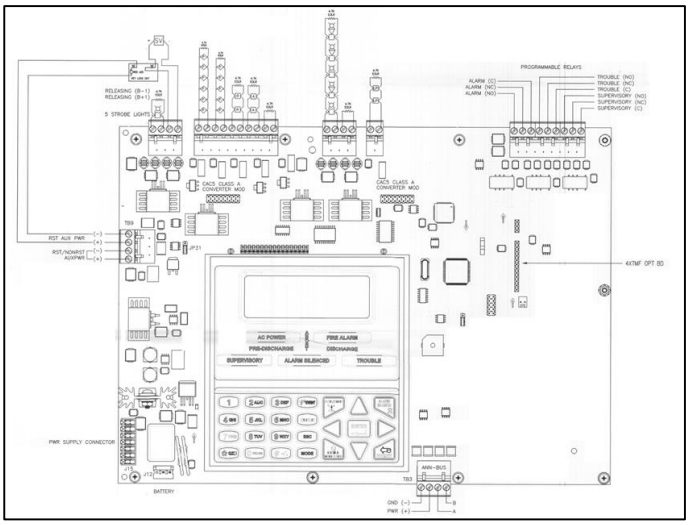
22. Input Initiation Device Chart



23. Data Center List of Parts & Quantity

DATA CENTER

SYMBOL	DESCRIPTION	PART NO.	QTY.
	106 LITER FM-200 CYLINDER W/ 18 LB. FILL W/ L.L. GAUGE	570007	1
	106 LITER FM-200 CYLINDER W/ 18 LB. FILL W/ L.L. GAUGE	570003	1
LP	LOW CYLINDER PRESSURE SWITCH	570585	2
	180 DEGREE ENGINEERED DISCHARGE NOZZLE CEILING	SEE CALCS	1
	360 DEGREE ENGINEERED DISCHARGE NOZZLE CEILING	SEE CALCS	1
S	PHOTOELECTRIC/IONIZATION SMOKE DETECTOR CEILING MOUNTED	HEAD - 430023 BASE - 430025	3
S	PHOTOELECTRIC/IONIZATION SMOKE DETECTOR SUBFLOOR	HEAD - 430023 BASE - 430025	3
R	DUAL ACTION MANUAL RELEASE STATION	56956	1
A	ABORT SWITCH	76494	1
SV	REMOVABLE ELECTRIC ACTUATOR	570537	1
	STROBE LIGHT	433552	1
	HORN/ STROBE	433557	2
	AUTOPULSE 542R FM-200 RELEASING CONTROL PANEL	570228	1
	HYDRAULIC NODE POINT	SEE CALCULATIONS	0
K	KEY MAINTENANCE SWITCH	76498	1
M/R	MAIN/RESERVE SWITCH	76497	0
	106 LITER CYLINDER STRAP	570092	1
	2" FLEXIBLE DISCHARGE HOSE	570536	0

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