

FM-200 PRESSURE VENTING CALCULATION:

EQUIPMENT ROOM:

FM-200 CONCENTRATION:	7.0 %
DISCHARGE TIME:	9.3 SECONDS
TOTAL VOLUME:	1,747.9 cu. Ft.
RELATIVE HUMIDITY:	36 %
WALL STRENGTH:	5.0 lbs. / sq. Ft.
SAFETY FACTOR:	1.2
OUTFLOW VENT REQUIRED:	27.0 sq. in.
INFLOW VENT REQUIRED:	53.0 sq. in.

NOTES:
1. THE ABOVE CALCULATION IS BASED ON THE FSSA GUIDE TO ESTIMATING ENCLOSURE PRESSURE AND PRESSURE RELIEF VENT AREA FOR APPLICATIONS USING CLEAN AGENT FIRE EXTINGUISHING SYSTEMS (FSSA PRG - 01, 1ST EDITION; AUGUST 2008) AND WAS PERFORMED USING THE FSSA PRV ESTIMATOR PROGRAM VERSION 1.0.1.

FM-200 PIPING INSTALLATION NOTES

- ALL DIMENSIONS ARE TO BE FIELD CHECKED. IF PIPING SHOWN INTERFERES WITH ANY OBJECT, APPROVAL FOR CHANGES SHALL BE SECURED PRIOR TO INSTALLATION. WITH HILLER NEW ENGLAND FIRE PROTECTION, INC.
- BEFORE ASSEMBLY, PIPE IS TO BE REAMED, BLOWN CLEAR AND SWABBED WITH APPROPRIATE SOLVENT TO REMOVE MILL VARNISH AND CUTTING OIL.
- TEFLON PIPE TAPE OR PIPE JOINT COMPOUND ARE ACCEPTABLE SEALANTS AND MUST BE APPLIED TO MALE THREADS ONLY.
- SIZE REDUCTIONS MAY BE ACCOMPLISHED WITH THE USE OF CONCENTRIC BELL REDUCING FITTINGS, STEEL OR STAINLESS STEEL CONCENTRIC SWAGE FITTINGS REDUCING BUSHINGS.
- ALL TEE OUTLETS MUST BE HORIZONTAL AND PARALLEL WITH THE FLOOR.
- THE DISTANCE FROM ANY TWO TEES OR A TEE AND AN ELBOW SHALL NOT BE LESS THAN 10 PIPE DIAMETERS.
- MATERIALS: ALL MATERIALS USED IN THE INSTALLATION OF THE FM-200 SYSTEM SHALL BE IN COMPLIANCE WITH ALL SECTIONS OF NFPA 2001, YEAR 2012 EDITION. THE FOLLOWING RESTRICTIONS APPLY:
 - PIPE AND FITTINGS:
 - THE DISTRIBUTION PIPING MUST BE CONSTRUCTED OF BLACK OR GALVANIZED STEEL SCHEDULE 40 SEAMLESS (GRADES A-106 A, B, OR C, A-53 A OR B), ELECTRIC RESISTANCE WELDED (GRADE A-53 A OR B) OR FURNACE BUTT WELDED (GRADE A-53F ONLY) PIPING WITH ANSI B16.3 FITTINGS HAVING A MINIMUM RATED WORKING PRESSURE OF 416 PSI. ALL UNIONS MUST BE CLASS 800.
 - UNACCEPTABLE MATERIALS ARE ASTM A-120 STEEL PIPE, ORDINARY CAST IRON, ALUMINUM OR NON-METALLIC PIPE, CLASS 150 LB. FITTINGS, MALLEABLE AND/OR CAST IRON BUSHINGS.
 - HANGERS:
 - THE MAXIMUM SPACING BETWEEN HANGERS SHALL NOT EXCEED THOSE LISTED IN THE HANGER SPACING BELOW.

PIPE SIZE IN NPT	MAXIMUM SPACING BETWEEN HANGERS	PIPE SIZE IN NPT	MAXIMUM SPACING BETWEEN HANGERS
1/2"	4'-0"	1 1/2"	12'-0"
3/4"	6'-0"	1 3/4"	12'-0"
1"	8'-0"	2"	15'-0"
- A HANGER SHOULD BE INSTALLED BETWEEN FITTINGS WHEN THE FITTINGS ARE MORE THAN 2'-0" APART.
- A HANGER SHOULD BE INSTALLED AT A MAXIMUM OF 1'-0" FROM ANY NOZZLE.
- THE HANGERS SHALL BE U.L. LISTED AND RIGIDLY SUPPORTED. NO CLEVIS HANGERS ARE ALLOWED.
- BRACING:
 - SEISMIC BRACING SHALL BE PROVIDED IN THE ACCORDANCE WITH ALL APPLICABLE STATE AND LOCAL CODE REQUIREMENTS.

FM-200 QUANTITY CALCULATIONS:

EQUIPMENT ROOM:

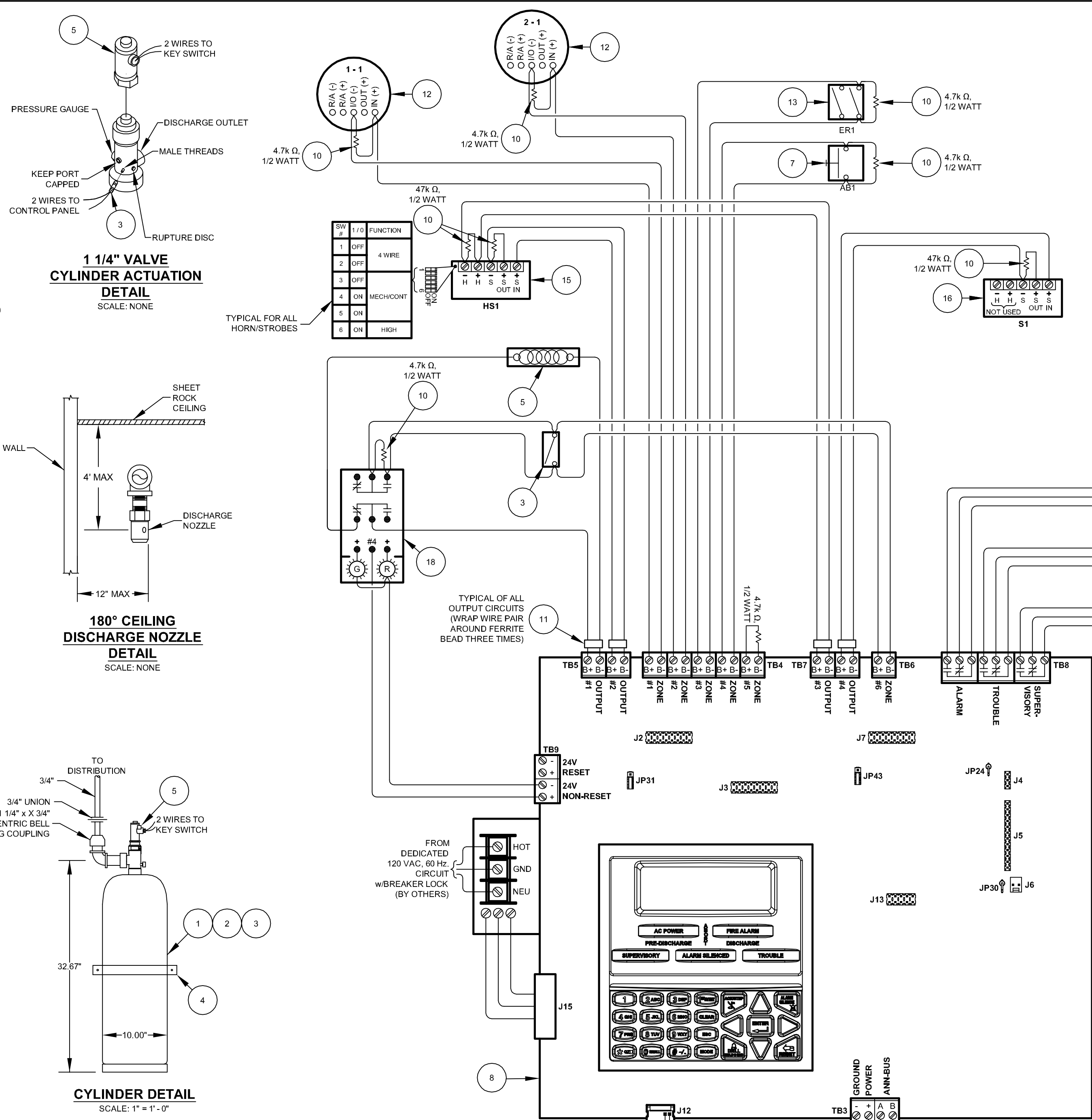
LENGTH:	15.3'	VOLUME:	1,794.7 cu. Ft.
WIDTH:	13.8'	VOLUME REDUCTIONS:	46.8 cu. Ft.
HEIGHT:	8.5'	TOTAL VOLUME:	1,747.9 cu. Ft.

61.0 lbs. OF FM-200 REQUIRED FOR A DESIGN CONCENTRATION OF 7.00% @ 65° F
64.0 lbs. PROVIDED

SEQUENCE OF OPERATIONS:

- ACTIVATION OF ANY DETECTOR WILL CAUSE THE FOLLOWING TO OCCUR:**
 - THE ALARMED DETECTORS RED STATUS LIGHT WILL FLASH.
 - AN ALARM CONDITION WILL BE ANNUNCIATED ON THE CONTROL PANEL.
 - THE HORN/STROBE FOR THE AFFECTED HAZARD WILL GENERATE A SLOW PULSING AUDIBLE TONE.
 - THE HVAC SYSTEM FOR THE AFFECTED HAZARD WILL BE SHUTDOWN.
 - AN ALARM SIGNAL WILL BE SENT TO THE BUILDING FIRE ALARM SYSTEM. AUDIBLE / VISUAL DEVICES THROUGHOUT THE FACILITY WILL OPERATE.
- ACTIVATION OF A SECOND DETECTOR, NOT ON THE SAME DETECTION ZONE AS THE INITIAL ALARMED DETECTOR, WILL CAUSE THE FOLLOWING TO OCCUR:**
 - THE ALARMED DETECTORS RED STATUS LIGHT WILL FLASH.
 - A PRE-DISCHARGE CONDITION WILL BE ANNUNCIATED ON THE CONTROL PANEL.
 - THE HORN/STROBE FOR THE AFFECTED HAZARD WILL GENERATE A FAST PULSING AUDIBLE TONE.
 - THE PROGRAMMED 20 SECOND CONTROL PANEL TIME DELAY WILL BEGIN.
- UPON EXPIRATION OF THE CONTROL PANEL'S PROGRAMMED 20 SECOND TIME DELAY, THE FOLLOWING WILL OCCUR:**
 - A DISCHARGE CONDITION WILL BE ANNUNCIATED ON THE CONTROL PANEL.
 - THE HORN/STROBE FOR THE AFFECTED HAZARD WILL GENERATE A STEADY SOUNDING AUDIBLE TONE AND ITS STROBE LIGHT WILL BEGIN TO OPERATE.
 - THE DISCHARGE STROBE LIGHT ABOVE THE ENTRANCE DOOR OF THE AFFECTED HAZARD WILL BEGIN TO OPERATE.
 - THE SUPPRESSION SYSTEM WILL BEGIN TO DISCHARGE.
- ACTIVATION OF A SUPPRESSION SYSTEM MANUAL ELECTRIC RELEASE STATION WILL CAUSE THE FOLLOWING TO OCCUR:**
 - THE HORN/STROBE FOR THE AFFECTED HAZARD WILL GENERATE A STEADY SOUNDING AUDIBLE TONE AND ITS STROBE LIGHT WILL BEGIN TO OPERATE.
 - THE PROGRAMMED 10 SECOND CONTROL PANEL TIME DELAY WILL BEGIN.
 - UPON EXPIRATION OF THE CONTROL PANEL'S PROGRAMMED 10 SECOND TIME DELAY, THE FOLLOWING WILL OCCUR:
 - A DISCHARGE CONDITION WILL BE ANNUNCIATED ON THE CONTROL PANEL.
 - THE DISCHARGE STROBE LIGHT ABOVE THE ENTRANCE DOOR OF THE AFFECTED HAZARD WILL BEGIN TO OPERATE.
 - THE SUPPRESSION SYSTEM ASSOCIATED WITH THE ACTIVATED SUPPRESSION SYSTEM MANUAL ELECTRIC RELEASE WILL BEGIN TO DISCHARGE.

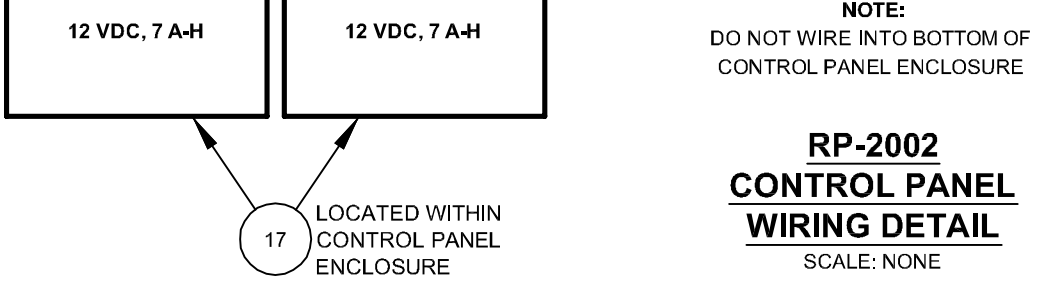
- NOTES:**
- THE ABORT STATION CAN BE PUSHED AND HELD TO PREVENT THE SUPPRESSION SYSTEM FROM DISCHARGING UNTIL THE CONTROL PANEL CAN BE RESET. IF THE ABORT STATION IS RELEASED PRIOR TO THE RESETTING OF THE CONTROL PANEL, THE SUPPRESSION SYSTEM WILL DISCHARGE AFTER A 10 SECOND TIME DELAY.
 - THE SUPPRESSION SYSTEM MANUAL ELECTRIC RELEASE STATION WILL OVERRIDE THE ABORT STATION.
 - SHOULD A TROUBLE CONDITION OCCUR ON THE CONTROL PANEL, THE TROUBLE CONDITION WILL BE ANNUNCIATED ON THE CONTROL PANEL AND A TROUBLE SIGNAL WILL BE SENT TO THE BUILDING FIRE ALARM SYSTEM.
 - ACTIVATION OF THE KEY SWITCH WILL DISABLE THE SUPPRESSION SYSTEM, CAUSING A TROUBLE CONDITION AND A SUPERVISORY CONDITION ON THE CONTROL PANEL BUT MAINTAINING FULL DETECTION AND REPORTING CAPABILITIES.
 - SHOULD A SUPERVISORY CONDITION OCCUR ON THE CONTROL PANEL, THE SUPERVISORY CONDITION WILL BE ANNUNCIATED ON THE CONTROL PANEL AND A SUPERVISORY SIGNAL WILL BE SENT TO THE BUILDING FIRE ALARM SYSTEM.
 - CYLINDER PRESSURE OF 280 PSI OR LESS WILL CAUSE THE CYLINDER SUPERVISORY PRESSURE SWITCH TO ACTIVATE, CAUSING A SUPERVISORY CONDITION ON THE CONTROL PANEL.



WIRING NOTES

- ALL WIRING SHALL BE IN ACCORDANCE WITH ARTICLE 760-16B OF THE NATIONAL ELECTRIC CODE (NFPA 70), UNLESS OTHERWISE SPECIFIED BY THE AUTHORITY HAVING JURISDICTION. ALL SUPERVISED CIRCUITS ARE CLASSIFIED AS POWER LIMITED.
- ALL EXPOSED WIRING SHALL BE RUN IN THIN WALL STEEL TUBING USING METALLIC CABLE ON FLEXIBLE RUNS.
- ALL WIRING, JUNCTION BOXES, CONDUIT, ETC. SHALL BE PROVIDED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
- THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR MOUNTING AND MAKING FINAL CONNECTIONS TO ALL SUPPLIED DETECTORS, CONTROL PANELS, SIGNALING DEVICES, MANUAL STATIONS, ETC.
- UNLESS OTHERWISE SPECIFIED, MINIMUM WIRE SIZES SHALL BE AS FOLLOWS:
 - NO. 18 GAUGE FOR DETECTION / INPUT CIRCUITS WITH A MAXIMUM LOOP RESISTANCE OF 100 Ω, 700 Ω.
 - IF THAT CIRCUIT IS EXCLUSIVE TO LINEAR HEAT DETECTION, DO NOT USE 2 WIRE DETECTORS IN CONJUNCTION WITH LINEAR HEAT DETECTION.
 - NO. 12 - 16 GAUGE FOR OUTPUT CIRCUITS
 - NO. 14 GAUGE FOR AC POWER AND GROUNDS
- NO PARALLEL BRANCHING OF WIRING ON SUPERVISED CIRCUITS IS PERMISSIBLE, UNLESS WHERE SHOWN, AND POLARITY MUST BE OBSERVED.
- ALL FIELD WIRING MUST BE CHECKED FOR SHORTS OR GROUNDS, BEFORE CONNECTIONS ARE MADE TO THE CONTROL PANEL. DO NOT CHECK THE WIRING.
- SMOKE AND HEAT DETECTOR MINIMUM DISTANCE FROM A WALL IS 4" AND 3" FROM ANY AIR REGISTER.
- BEFORE TERMINATING WIRING TO THE CONTROL PANEL, A VOLTAGE READING SHALL BE TAKEN WITH A HI-IMPEDANCE METER TO DETERMINE THAT NO AC INDUCTIVE VOLTAGE EXISTS ON THE FIELD WIRING.
- INPUT AND OUTPUT CIRCUIT WIRING SHALL NOT BE RUN IN THE SAME CONDUIT UNLESS SHIELDED FROM EACH OTHER. THE ONLY EXCEPTION IS THE MANUAL RELEASE INPUT CIRCUIT AND THE CYLINDER RELEASING DEVICE OUTPUT CIRCUIT WIRING CAN BE RUN TOGETHER IN THE SAME CONDUIT.
- AC POWER WIRING SHALL NOT BE RUN IN THE SAME CONDUIT AS DC WIRING UNLESS SHIELDED FROM EACH OTHER. THIS INCLUDES LOW VOLTAGE AC, I.E. HVAC CONTROLS AND SHUNT TRIP CIRCUITS.
- THE AC POWER CIRCUIT FOR THE FIRE SUPPRESSION SYSTEM CONTROL PANEL SHALL BE A SEPARATE, DEDICATED CIRCUIT WITH A BREAKER LOCK. DO NOT CONNECT THIS CIRCUIT TO A SHUNT TRIP OPERATED CIRCUIT BREAKER PANEL OR USE IT TO POWER OTHER EQUIPMENT.
- NO POWER, INCLUDING BATTERIES, SHALL BE APPLIED TO THE CONTROL PANEL UNTIL A HILLER NEW ENGLAND FIRE PROTECTION, INC. TECHNICIAN IS ON THE JOB SITE AND HAS CHECKED OUT THE WIRING TO THE CONTROL PANEL. IF UPON ARRIVAL TO THE JOB SITE, THE HILLER NEW ENGLAND FIRE PROTECTION INC. TECHNICIAN FINDS THAT POWER IS, OR HAS BEEN APPLIED, HILLER NEW ENGLAND FIRE PROTECTION INC. WILL ASSUME NO LIABILITY FOR THE MALFUNCTION OF, OR DAMAGE TO THE SYSTEM.
- RELEASING DEVICES ARE TO BE WIRED WITH LIQUID TIGHT CABLE FROM A JUNCTION BOX MOUNTED ON THE WALL DIRECTLY BEHIND THE CYLINDER WITH THE RELEASING DEVICE. DO NOT ATTACH THE RELEASING DEVICE TO THE SYSTEM AS A FALSE SYSTEM DISCHARGE COULD OCCUR.
- IF ANY CHANGES ARE TO BE MADE THAT DEVIATE FROM THE PLANS, PLEASE CONTACT HILLER NEW ENGLAND FIRE PROTECTION, INC. PRIOR TO MAKING THOSE CHANGES.

RP-2002 CONTROL PANEL WIRING DETAIL
SCALE: NONE

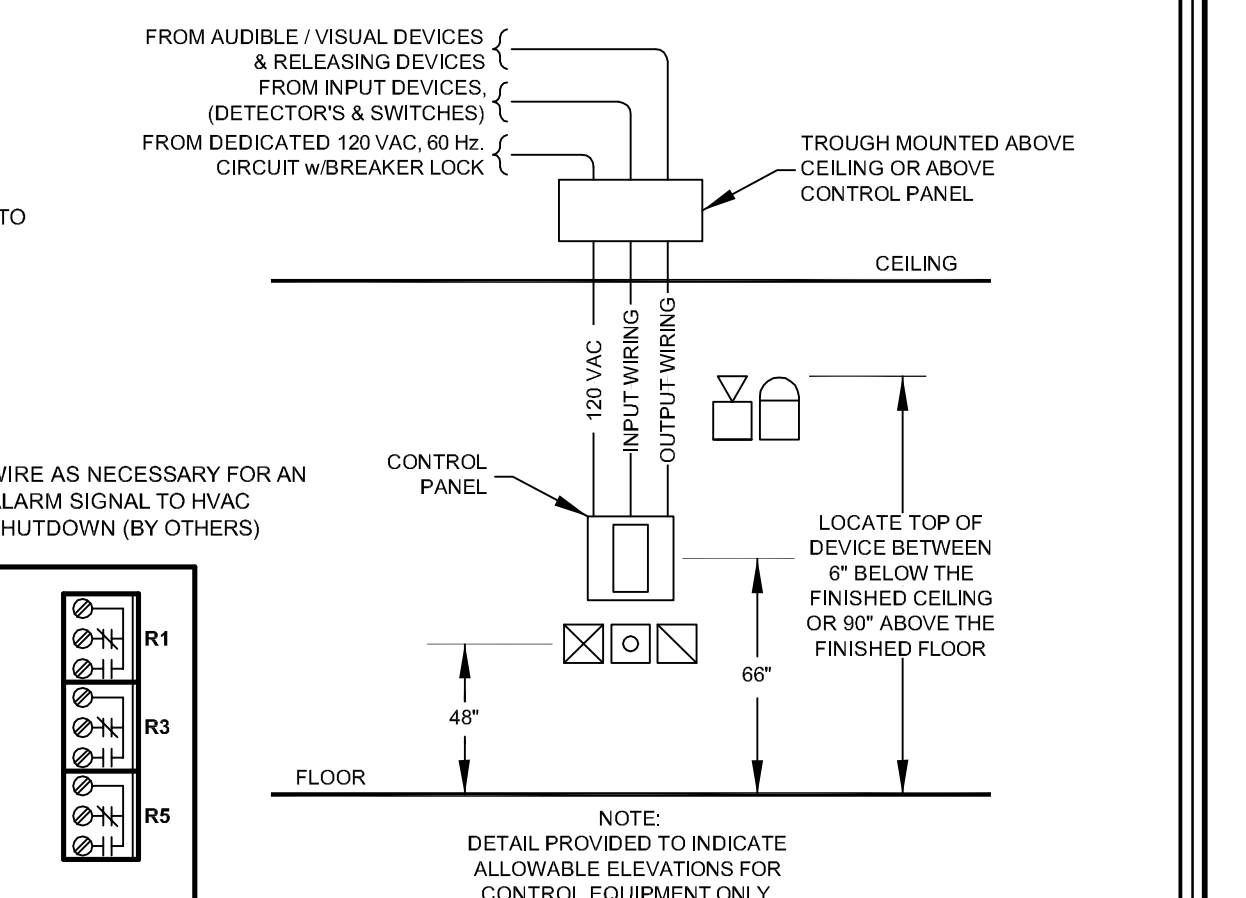


HVAC PURGE SWITCH WIRING DETAIL
SCALE: NONE



EQUIPMENT LIST

EQUIPMENT SUPPLIER	ITEM #	ITEM DESCRIPTION	# OF ITEMS	PART NUMBER
JANUS	1	80 lb. SV-SERIES FM-200 CYLINDER FILLED TO 64 lbs.	1	16584 - 064
	2	PRESSURE GAUGE	1	16772
	3	LOW-PRESSURE SUPERVISORY SWITCH: 1 1/4" SV VALVE	1	17032
	4	SV - SERIES CYLINDER BRACKET ASSEMBLY: 4080/130 LB. FM-200	1	18536
	5	ELECTRIC VALVE ACTUATOR	1	16481
	6	180° FM-200 DISCHARGE NOZZLE: 3/4", 0.4844 ORIFICE	1	18502 - 106
	7	MOMENTARY ABORT STATION	1	MAS - 1
NOTIFIER	8	AGENT RELEASE CONTROL PANEL	1	RP - 2002
	9	RELAY MODULE	1	N - ANN - RLY
	10	END OF LINE RESISTOR: 4.7k Ω, 1/2 WATT	9	71245
	11	FERRITE BEAD: RP - 2002 OUTPUT CIRCUITS	4	29150
	12	I SERIES PHOTOELECTRIC SMOKE DETECTOR: 2 WIRE	2	2W-B
	13	ELECTRIC AGENT RELEASE STATION	1	NBG - 12LR
	14	RELAY MODULE	1	N - ANN - RLY
GENTEX	15	COMMANDER HORN/STROBE: MULTI-CANDELA, RED LENS	1	904 - 1333 - 002
	16	COMMANDER STROBE: WALL MOUNT, RED BODY, RED LENS	1	904 - 1341 - 002
POWER SONIC	17	BATTERY: 12 VOLT, 7-AH	2	PS - 1270
HILLER	18	KEY MAINTENANCE SWITCH: GEMCON	1	HNE - 173
	19	PURGE SWITCH	1	HNE - 999
	20	NAMEPLATE: PURGE SWITCH	1	HNE - 998
	21	NAMEPLATE: CAUTION	1	HNE - 202
	22	NAMEPLATE: CYLINDER (S)	1	HNE - 204
	23	NAMEPLATE: MANUAL RELEASE	1	HNE - 200
	24	NAMEPLATE: ABORT SWITCH	1	HNE - 201
	25	NAMEPLATE: KEY SWITCH	1	HNE - 212
	26	NAMEPLATE: HORN/STROBE (SLOW, FAST, STEADY)	1	HNE - 206
	27	NAMEPLATE: DISCHARGE STROBE	1	HNE - 205



IMPORTANT NOTE:
HILLER NEW ENGLAND FIRE PROTECTION IS NOT RESPONSIBLE FOR THE LOSS OF FM-200 FIRE EXTINGUISHING AGENT DUE TO LEAKS IN THE PROTECTED AREA. PRIOR TO ACCEPTANCE, ALL HOLES AND CRACKS SHOULD BE CHECKED FOR TIGHTNESS. EMPTY CONDUITS MUST BE SEALED AND ALL DUCTS AND DAMPERS SHOULD BE TIGHT FITTING.

ASSOCIATED DRAWINGS/CALCULATIONS:
D-2636-10 SUPPRESSION EQUIPMENT LAYOUT & DETAILS
A-2636-10 HYDRAULIC CALCULATIONS
A-2636-20 BATTERY & POWER CALCULATIONS

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VERIZON WIRELESS
202 WOODFORD ST. PORTLAND, ME

FM-200 FIRE SUPPRESSION / DETECTION & CONTROL SYSTEM FOR THE EQUIPMENT ROOM EQUIPMENT LAYOUT & DETAILS

NO.		DATE	BY	DESCRIPTION
REVISIONS				
DRAWN BY: JAL				
DATE: 7/31/2013				
SIZE: D				
NICET CERT #: 099721				
LEVEL: IV				
APPROVED: _____				

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REV. # 0
1 OF 1