

Building Lee Summit Justice Center							
Panel # Main Fire Alarm Control Panel							
Panel Location: Lower Level, Fire Pr. 115							
BATTERY SIZING CALCULATION							
Device	Qty	Standby	Total Standby	Alarm	Total Alarm		
Panel Components							
FCM2018-U2 Operating Unit	1	0.1250	0.1250	0.1660	0.1660		
FC2018-U1 252pt Board	1	0.1050	0.1050	0.1360	0.1360		
FP201-U1 170W Power Supply	1	0.0000	0.0000	0.0000	0.0000		
FC201-U1 NAC Expander	1	0.0150	0.0150	0.0400	0.0400		
FOA2018-U1 RS-485 Module	1	0.0580	0.0580	0.0580	0.0580		
FT-2015-U2 Control Annunciator	3	0.0550	0.1650	0.0550	0.1650		
Addressable Devices							
FDBZ Series Duct Det w/ FDO421	32	0.0003	0.0090	0.0003	0.0106		
FDO0T441 Photo/Thermal Detector	54	0.0004	0.0194	0.0007	0.0351		
FDT421 Thermal Detector	5	0.0003	0.0013	0.0004	0.0021		
XMS-S/DW Manual Pull Station	18	0.0005	0.0090	0.0005	0.0090		
XTR-I-D Dual Input Module	12	0.0005	0.0060	0.0010	0.0114		
XTR-I-R Input/Relay Module	17	0.0005	0.0085	0.0008	0.0128		
Circuits							
P-1	2	-	-	-	0.012		
P-2	2	-	-	-	0.012		
P-3	2	-	-	-	0.012		
Standby Current: 0.521 Amps		Standby Current: 0.521		Alarm Current: 0.682			
Standby Time: 24 Hours		Total Standby Draw: 12.51 Amp-Hours		Batteries Provided: PS12330			
Alarm Current: 0.682 Amps		Total Standby + Alarm: 12.56 A.H. (-)		Battery Size: 33.00 A.H.			
Alarm Time: 5 Minutes		25% Cor. Factor per NFPA: 3.14 A.H. (-)		Total Standby + Alarm: 17.29 A.H. (+)			
Total Alarm Draw: 0.06 Amp-Hours		Spare Capacity: 17.29 A.H. (+)					
VOLTAGE DROP CALCULATION							
Model # (x=Red or White)	Device	Circuit P-1	Circuit P-2	Circuit P-3	Circuit P-4	Total Qty	
	Qty	Current	Qty	Current	Qty	Current	
Miscellaneous Devices							
PAD-3 Input (Sync/Turn-On)	0.006	2	0.012	2	0.012	6	
Total Current: 0.012 Amps		0.012 Amps		0.000 Amps			
Distance (Wire Length): 30 Feet		80 Feet		65 Feet			
Wire Size: 14 AWG		14 AWG		14 AWG			
Resistance (per 1000 ft): 3.14 Ohms		3.14 Ohms		3.14 Ohms			
Starting Circuit Voltage: 20.40 Volts		20.40 Volts		20.40 Volts			
Voltage Drop: 0.00 Volts		0.00 Volts		0.00 Volts			
Voltage @ End of Circuit: 20.40 Volts		20.40 Volts		20.40 Volts			
Calculation Method: VOLTAGE DROP = 2 x TOTAL CURRENT x DISTANCE x RESISTANCE / 1000							
VOLTAGE @ END OF CIRCUIT = STARTING CIRCUIT VOLTAGE - VOLTAGE DROP							
OPERATING VOLTAGE RANGE FOR 24V NOTIFICATION APPLIANCES TO BE 19V-25V							

1. CURRENT DRAW CALCULATION		OVER SUPPLY		EXTENDER	
Project Name: Lees Summit Justice Center		Project # 44op-302100		Project # 44op-302100	
DEVICE MODEL	DEVICE TYPE	STROBE CANDELA	CURRENT (AMPS)	APPLIANCE QUANTITIES PER CIRCUIT	
ST-AMC-RETRO-RAMNS-ALERT	15cd		0.064	0	0
ZH-HMC-CR	H.O. HornStrobe 115cd		0.371	0	0
ZH-HMC-R	H.O. HornStrobe 185cd		0.506	0	0
ZH-MC-CR	HornStrobe 15cd		0.087	0	0
ZH-MC-R	HornStrobe 30cd		0.131	0	0
ZH-MC-CR	HornStrobe 75cd		0.222	2	0
ZH-MC-R	HornStrobe 115cd		0.371	2	0
ZH-MC-R	HornStrobe 15cd		0.078	1	0
ZH-MC-R	HornStrobe 30cd		0.113	0	0
ZH-MC-R	HornStrobe 75cd		0.195	0	0
ZH-MC-R	HornStrobe 110cd		0.259	0	0
ZR-MC-R	Strobe 15cd		0.064	1	0
ZR-MC-R	Strobe 30cd		0.098	0	0
ZR-MC-R	Strobe 75cd		0.175	0	0
ZR-MC-R	Strobe 110cd		0.233	0	0
NOTE: All calculations utilize horn settings @ the highest setting. QTY Totals: 6 0 0 0					
AUXILIARY OUTPUT		Standby Alarm			
Flush 24vdc door holder (SDH-2D)		0.068	0.068		
Surface 24vdc door holder (SDH-3D)		0.068	0.068		
Flush 24vdc door holder (SDH-4D)		0.068	0.068		
Floor mount 24vdc door holder (SDH-5D)		0.068	0.068		
Double floor mount door holder (SDH-6D)		0.136	0.136		
HZM		0.001	0.000		
CURRENT DRAW PER CIRCUIT IN AMPERES:		1.328	0.000	0.000	0.000

2. CURRENT LOAD & VOLTAGE DROP CALCULATIONS		PROJECT THRESHOLDS - PAD-4 9AMP							
Project Name: Lees Summit Justice Center		Project # 44op-302100							
3.00 amps Maximum Circuit Current	2.40 amps	Max. Permitted Current Capacity							
9.00 amps Maximum Extender Capacity	7.20 amps	Max. Permitted Extender Current Capacity							
24.0 Vdc Nominal System Voltage Output	24.0 Vdc	Calculated Starting Voltage							
20% Voltage Drop Threshold %	16.0 Vdc	Minimum Voltage Threshold							
Standard Solid Copper Wire Resistance in Ohms per 1000 ft from NEC Chapter 9, Table 8 adjusted to: 167°F									
18AWG= 7.77	16AWG= 4.89	14AWG= 3.07	12AWG= 1.93						
CIRCUIT NUMBER		SOLID WIRE (AWG)	ESTD CKT LENGTH (FT)	NEC OHMS (KFT)	ALARM CURRENT (AMP)	CKT. OHMS	VOLTS @ EOL (min 16.0)	PERCENT DROP (max 20%)	
A21		66.00	3.07	1.328	PASS 2.347	PASS 21.0	PASS 12.4%	PASS	
A22		0.00	3.07	0.000	PASS 0.000	PASS 24.0	PASS 0.0%	PASS	
A23		0.00	3.07	0.000	PASS 0.000	PASS 24.0	PASS 0.0%	PASS	
A24		0.00	3.07	0.000	PASS 0.000	PASS 24.0	PASS 0.0%	PASS	
AUX				3.07	0.000	PASS 0.000	PASS 24.0	PASS 0.0%	PASS
TOTAL EXTENDER CURRENT (AMPS):		1.328 PASS							

3. BATTERY SIZE CALCULATION		PROJECT THRESHOLDS - PAD-4 9AMP	
Project Name: Lees Summit Justice Center		Project # 44op-302100	
Standby Period in Hours->	24 Hr	15 Min	<-Alarm Period in Minutes
Extender Internal Current->	0.068 amp	5.000 amp	<-Extender Internal Current
Extender circuit current->	0.001 amp	1.328 amp	<-Extender circuit current
Total Standby Current->	0.067 amp	6.328 amp	<-Total Alarm Current
Standby Amp-Hrs Required->	1.61 AH	1.58 AH	<-Alarm Amp-Hrs Required
Standby + Alarm Amp-Hrs->		3.19 AH	
Multiplied by the De-rating Factor->		25%	
Minimum Battery Amp-Hrs Required->		3.99 AH	
Actual Battery Size->		7.00 AH	PASS
Battery Safety Factor->		219%	
Maximum Battery Capacity: 18 AH (Maximum Inside Enclosure: 7 AH.)			



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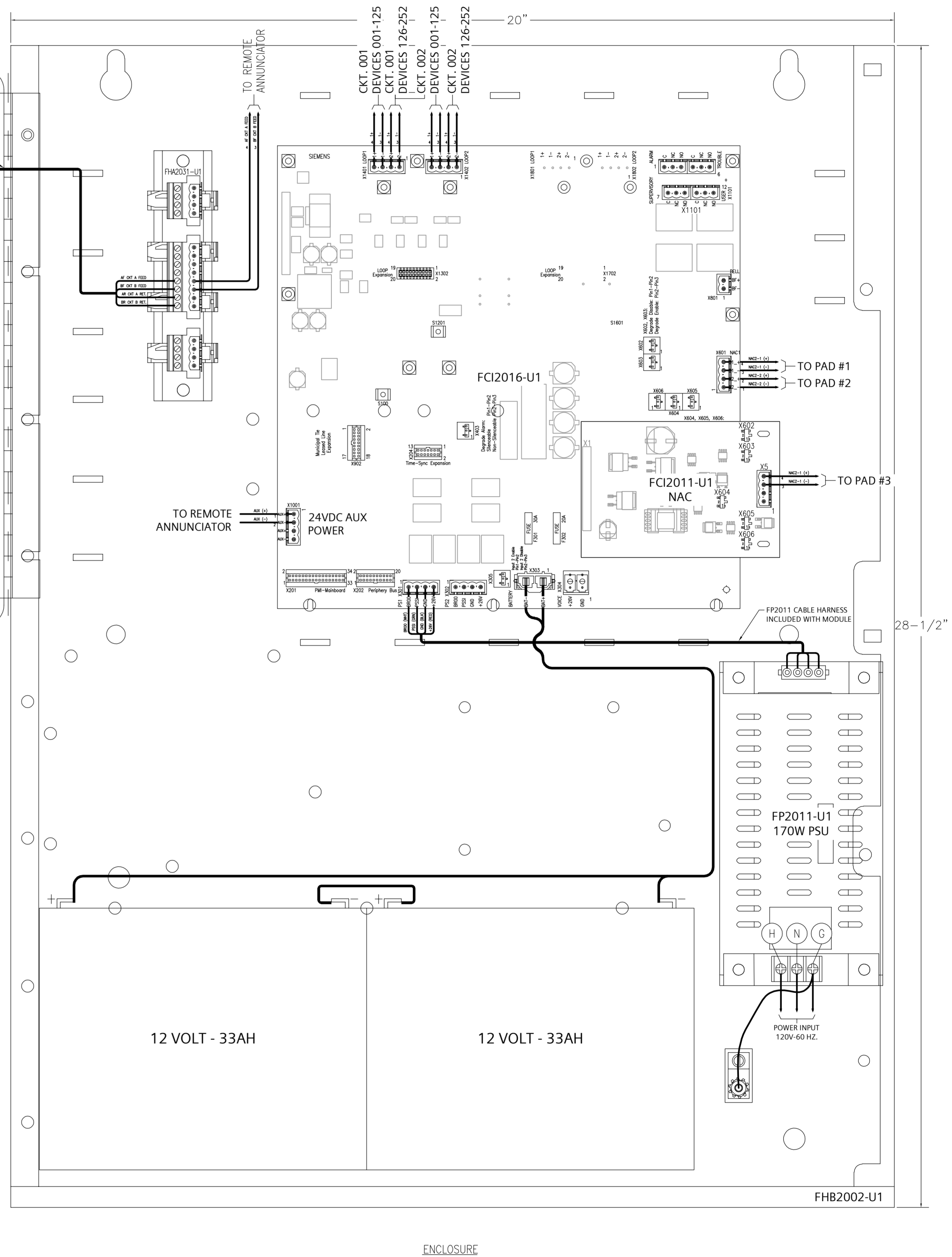
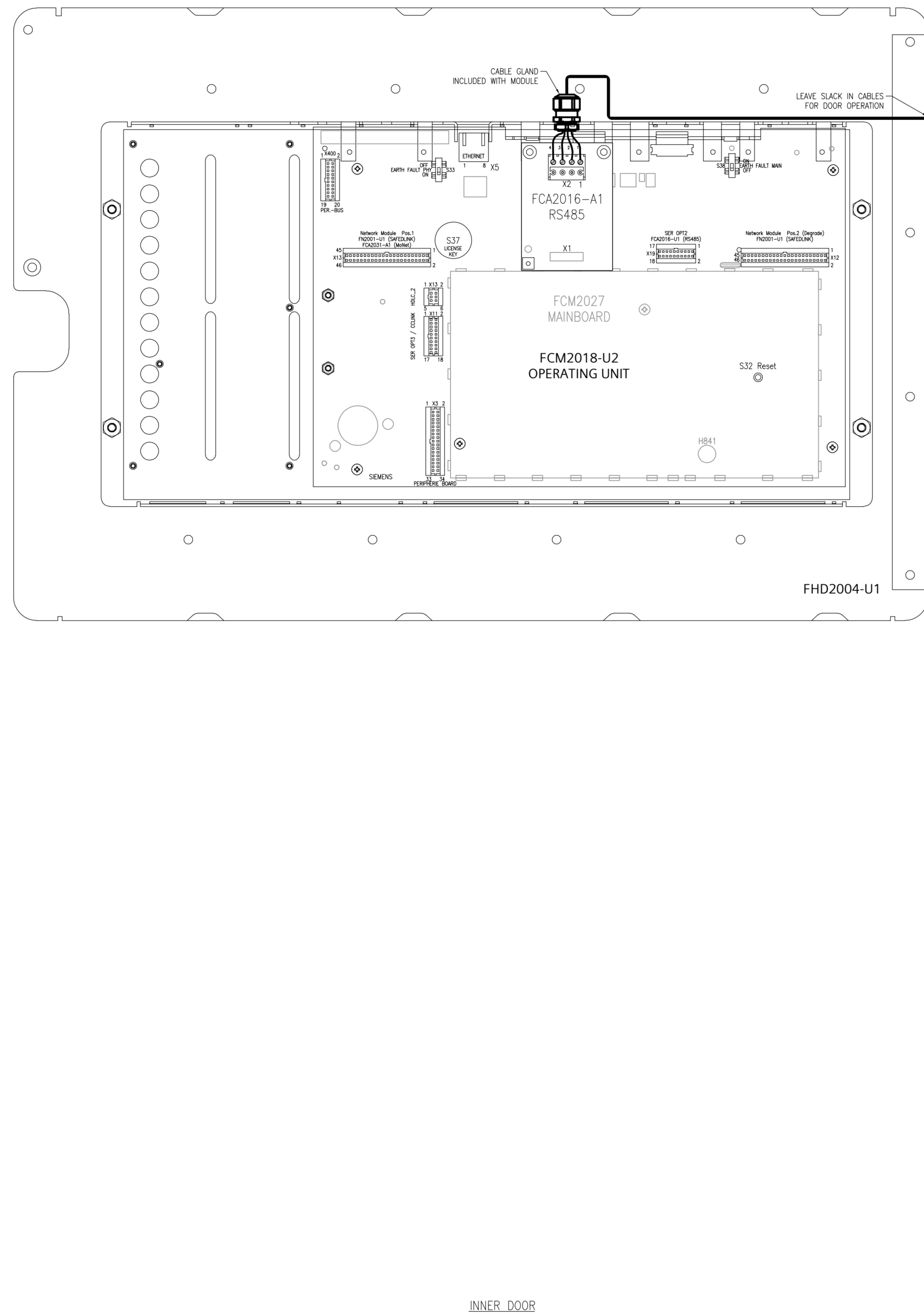
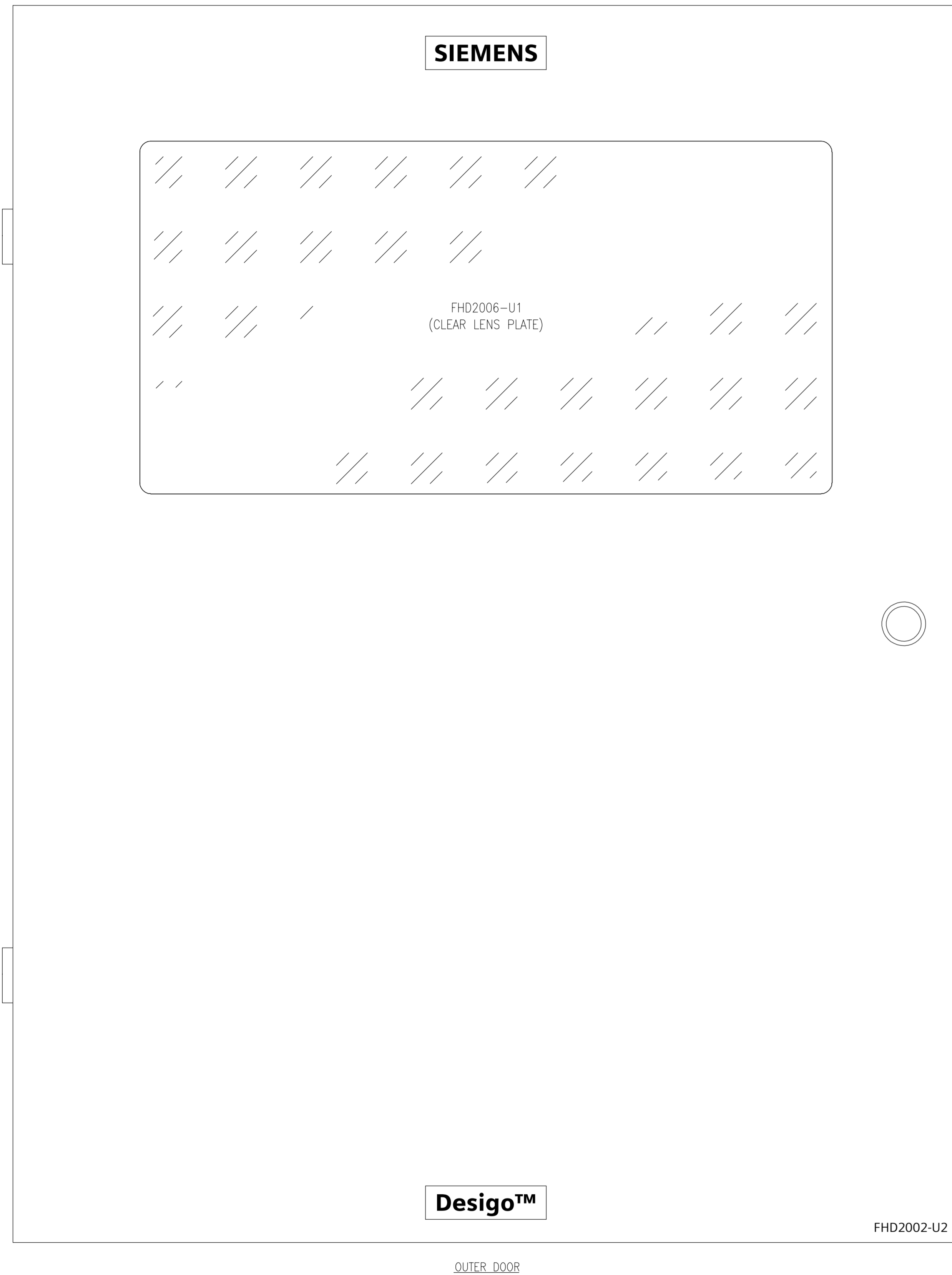
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0	9/11/97	ORIGINAL DESIGN DOCUMENTS
1	06/11/25	44OP-302100-01 DEVICE REPLACEMENT - AS-BUILT DRAWING
2	11/6/25	44OP-302100-02 CHARGE ADDITION
3	7/10/25	AS-BUILTS
4	7/10/25	AS-BUILTS
5	2/19/21	REVISIONS PER FSC MEP

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FA01.1



FIRE ALARM CONTROL PANEL WIRING
 NOT TO SCALE
 LOCATION: FIRE PR. 115

NO.	DATE	DESCRIPTION
0	9/11/97	ORIGINAL DESIGN DOCUMENTS
1	06/17/25	440P-3880K4C DEVICE REPLACEMENT - AS-BUILT DRAWING
2	11/6/25	440P-40825 - CHARGE ADDITION
3	7/10/25	AS-BUILTS
4	7/10/25	AS-BUILTS
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DRAWINGS PREPARED FOR:
 LEE'S SUMMIT JUSTICE CENTER
 10 NE TUDOR ROAD
 LEE'S SUMMIT, MO 64086
 FIRE ALARM PANEL LAYOUT

DRAWN BY:
 R. CALDWELL

SCALE:
 AS SHOWN

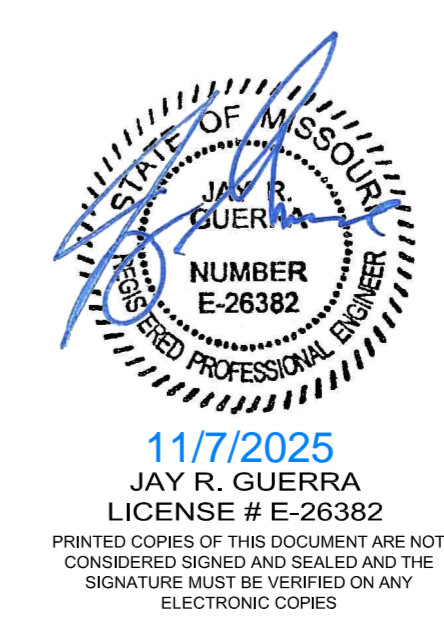
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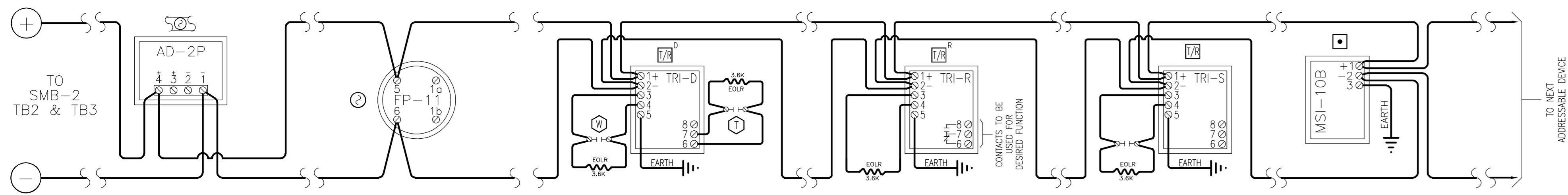


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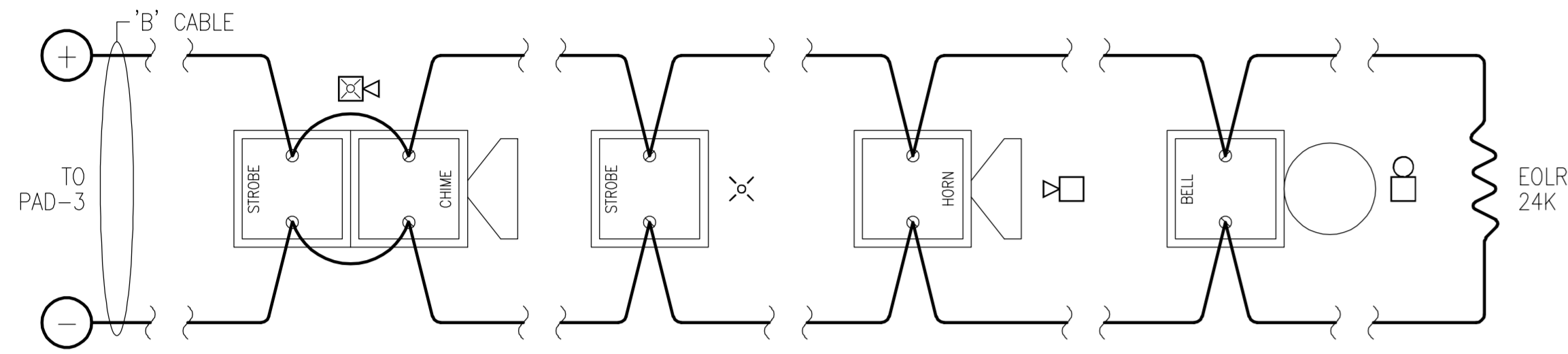
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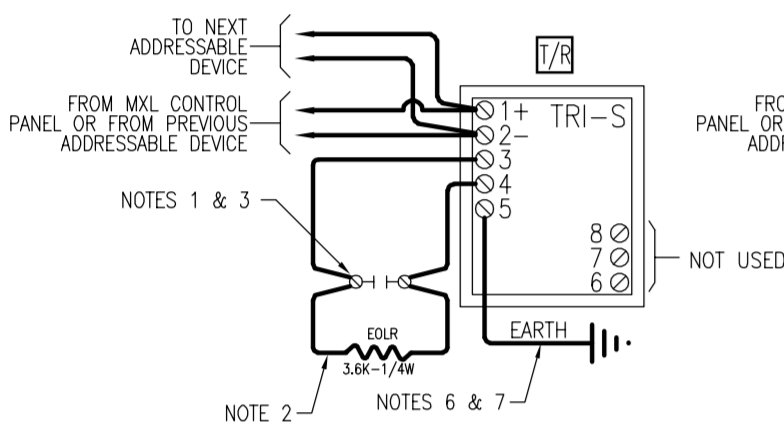
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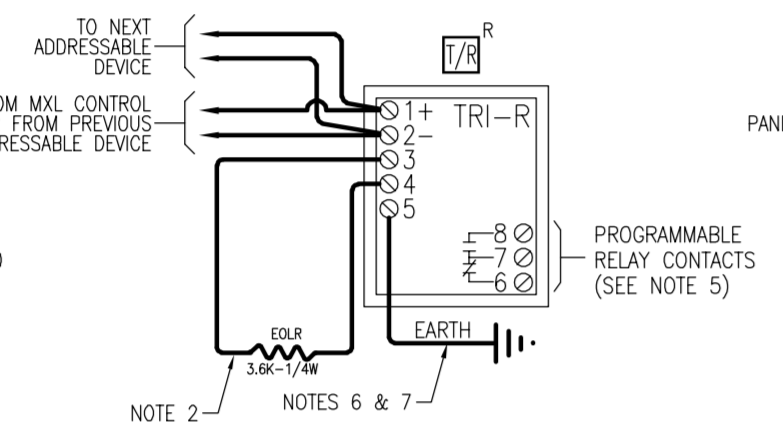
TYPICAL INITIATING DEVICE WIRING



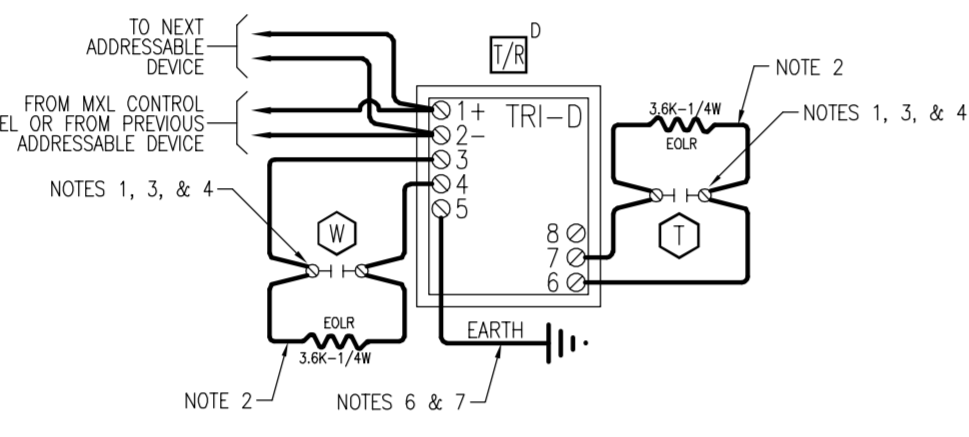
TYPICAL NOTIFICATION APPLIANCE CIRCUIT WIRING



TRI-S WIRING



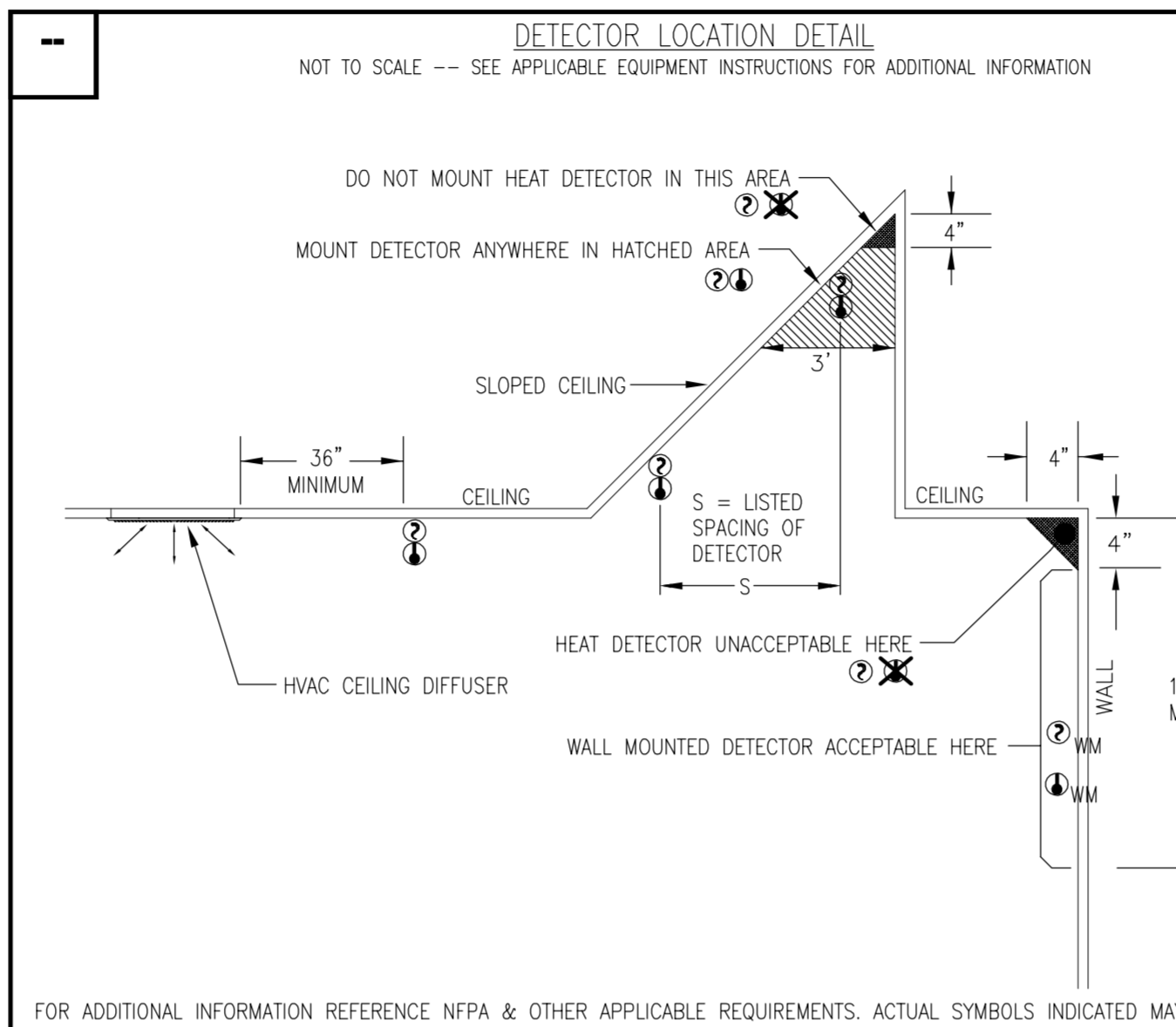
TRI-R WIRING



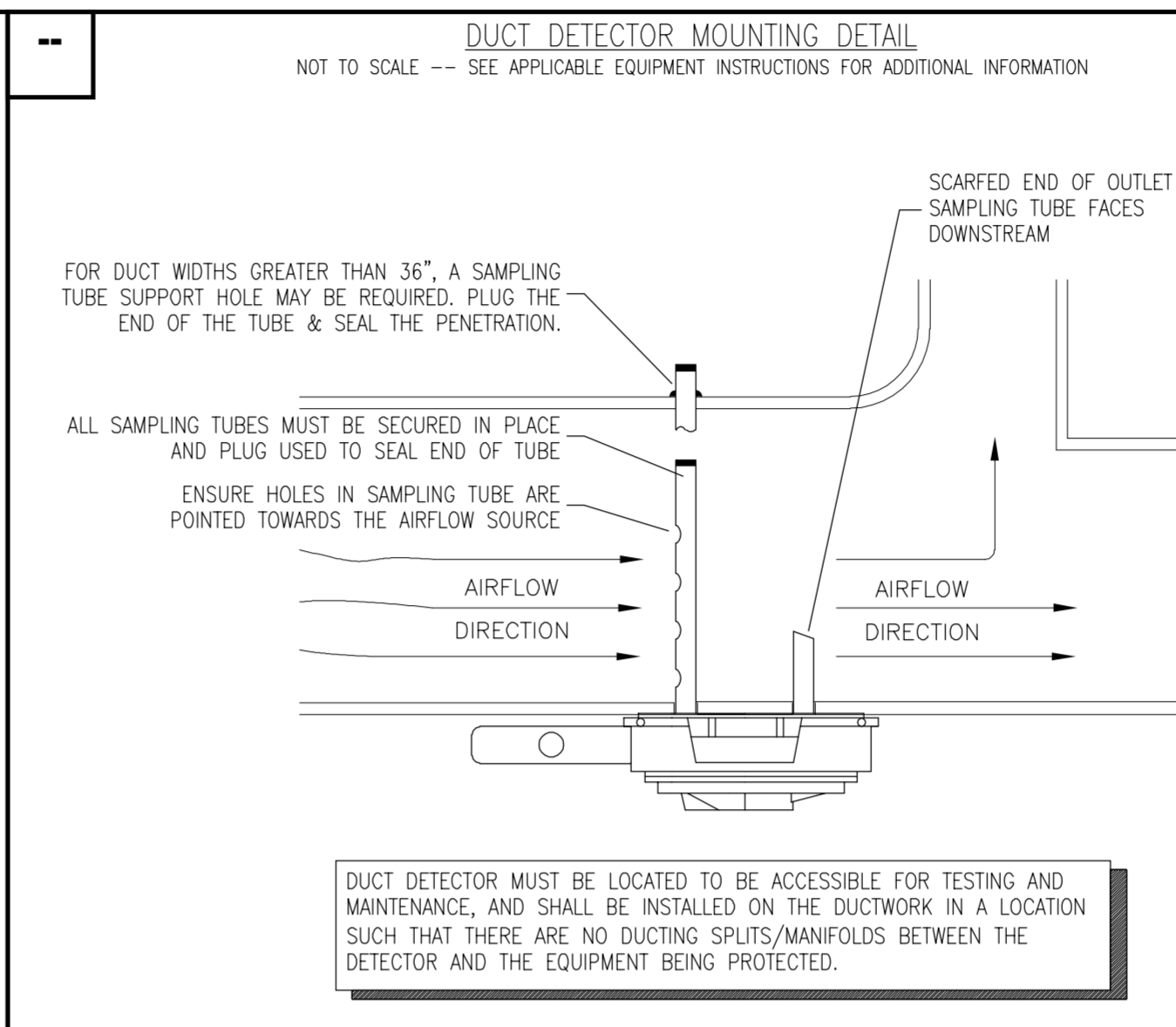
TRI-D WIRING

NOTES:

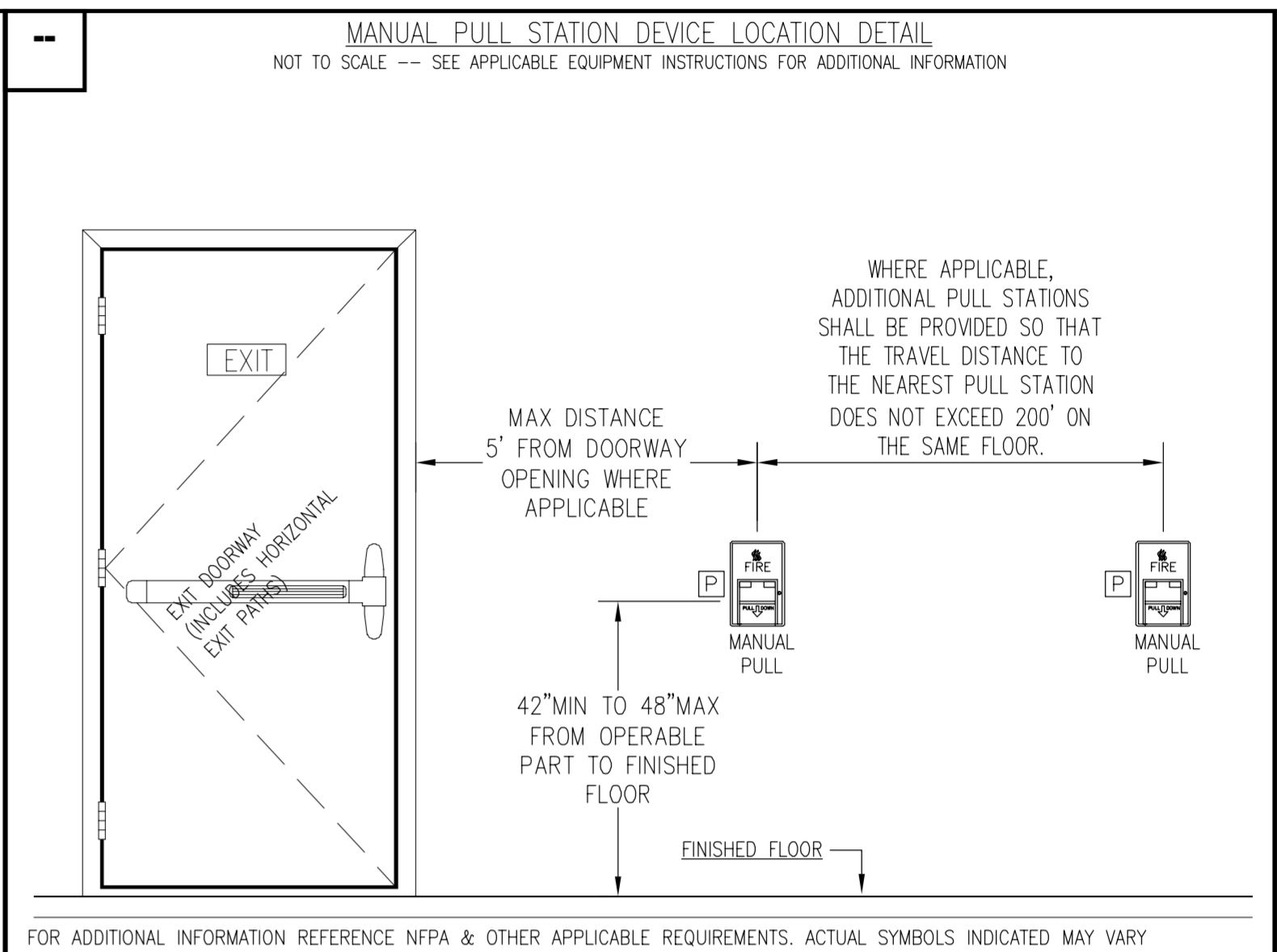
- All supervised switches must be held closed and/or open for at least a quarter of a second in order to guarantee detection.
- Use UL listed EOL Model EL-30/31 with 3.6K, 1/4W resistor, P/N 140-820185. Order Model EL-30/31 separately.
- The supervised switches have the following ratings:
Voltage maximum: 27VDC
Current maximum: 3.5mA during polling
Contact resistance maximum: 10 ohms
Maximum cable length: 200 feet (18 AWG)
Cable to line: 0.02uF
Cable to line: 0.04uF
Max line size: 14 AWG
Min line size: 18 AWG
- Supervised switch S1 is on the first programmed address, and supervised switch S2 is on the second programmed address.
- Relay contacts are rated: Resistive: 4A, 125 VAC
4A, 30 VDC
Inductive: 3.5A, 120 VAC (0.6P.F.)
3.0A, 30 VDC (0.6P.F.)
2.0A, 120 VAC (0.4P.F.)
2.0A, 120 VAC (0.35P.F.)
2.0A, 30 VDC (0.35P.F.)
- If a Good Local Earth Ground is NOT available: Connect shield to terminal 5. If ALD wiring is not shielded, the switch wiring must be in metal raceway.
- In supervisory: TRI-S/R draws 1.6mA
TRI-D draws 1.6mA
- If a Good Local Earth Ground is Available:
a. Terminal 5 must be connected to earth ground.
b. Use wire nuts to pass the shield wire through the electrical box with NO connection to the device terminal block or to local ground.
c. Use shielded wire to connect the switch wiring.
d. Tie the switch wiring shield to the ALD wiring shield. Do not connect shield to terminal 5 or the local earth ground.



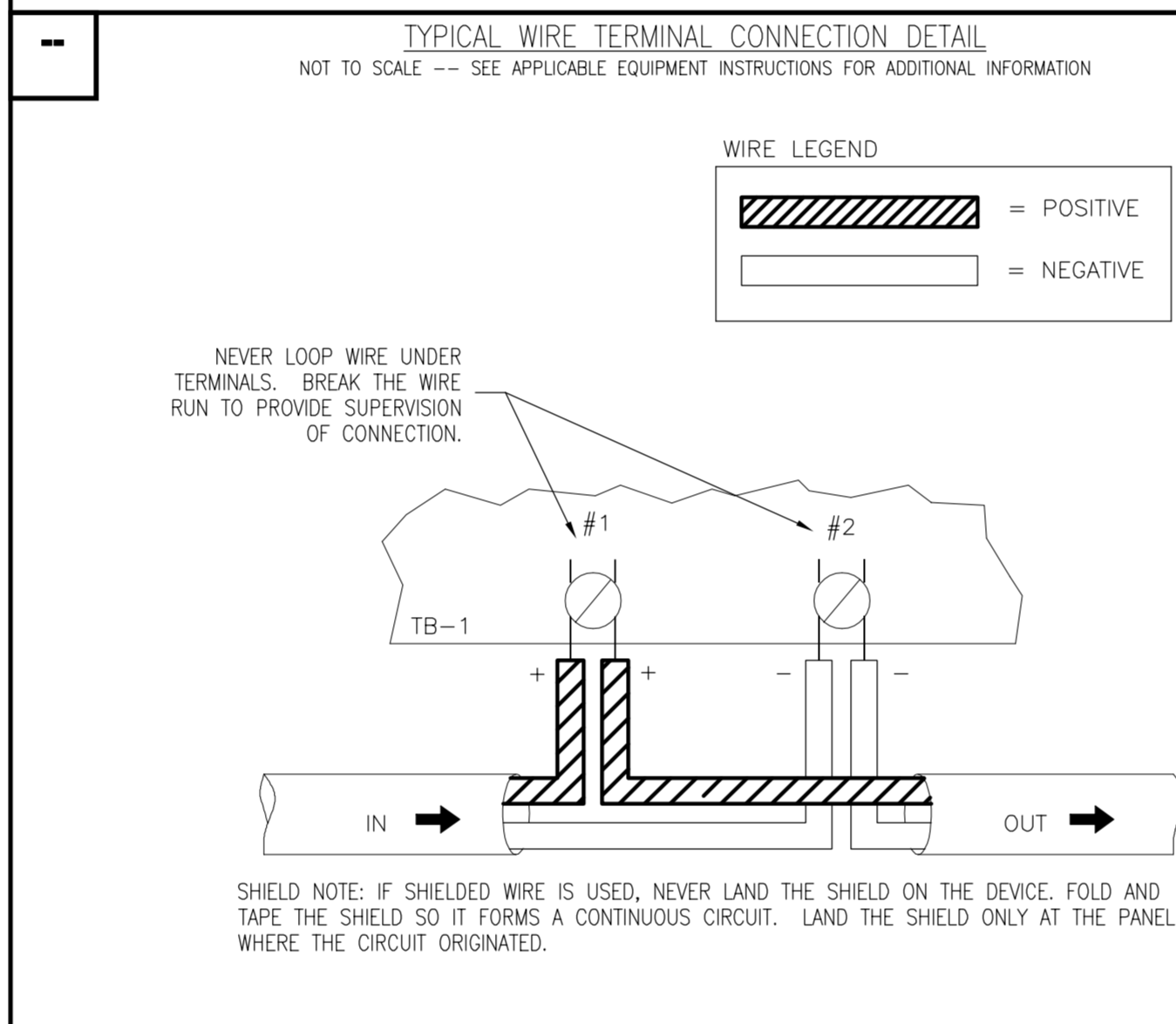
DETECTOR LOCATION DETAIL



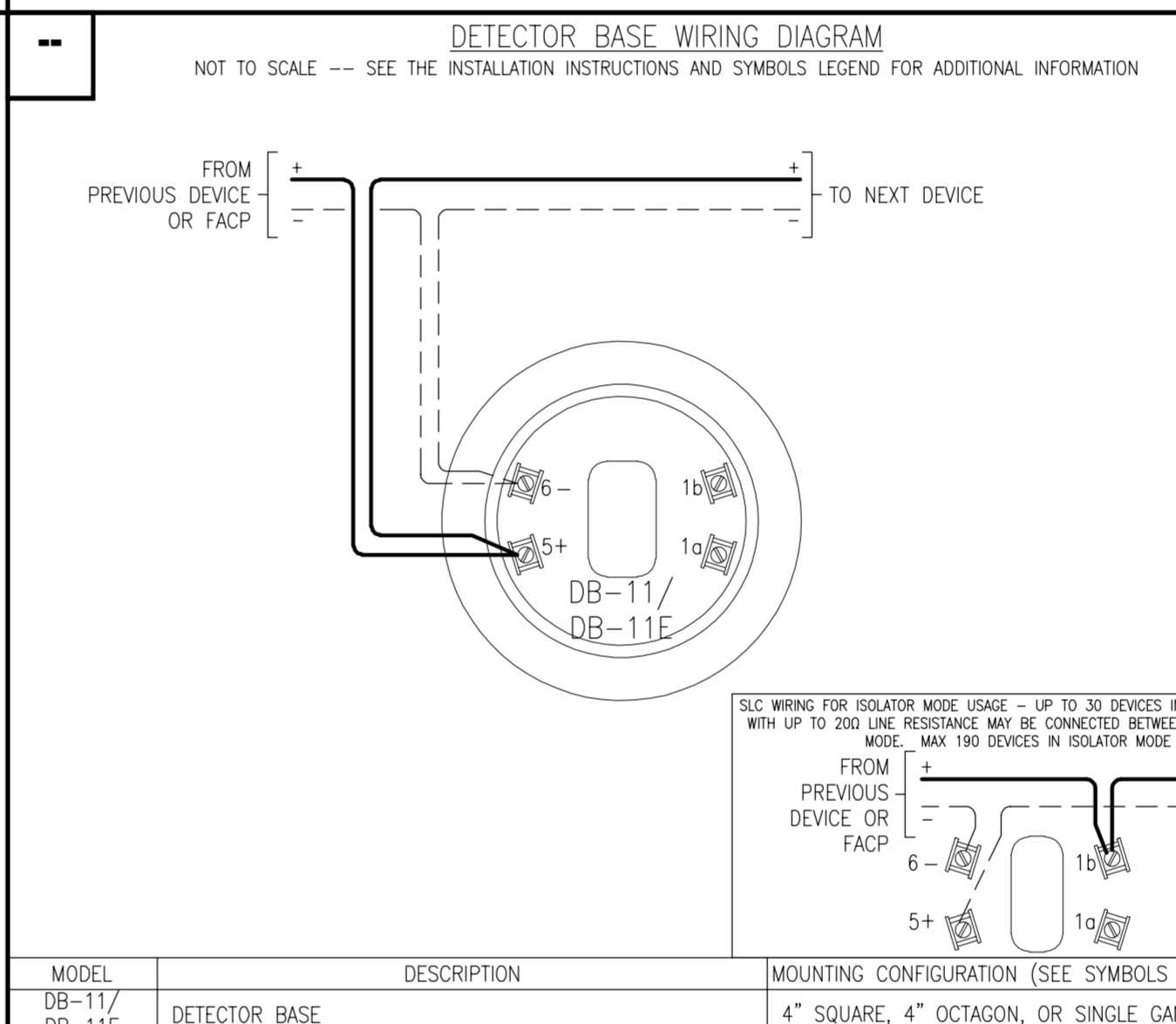
DUCT DETECTOR MOUNTING DETAIL



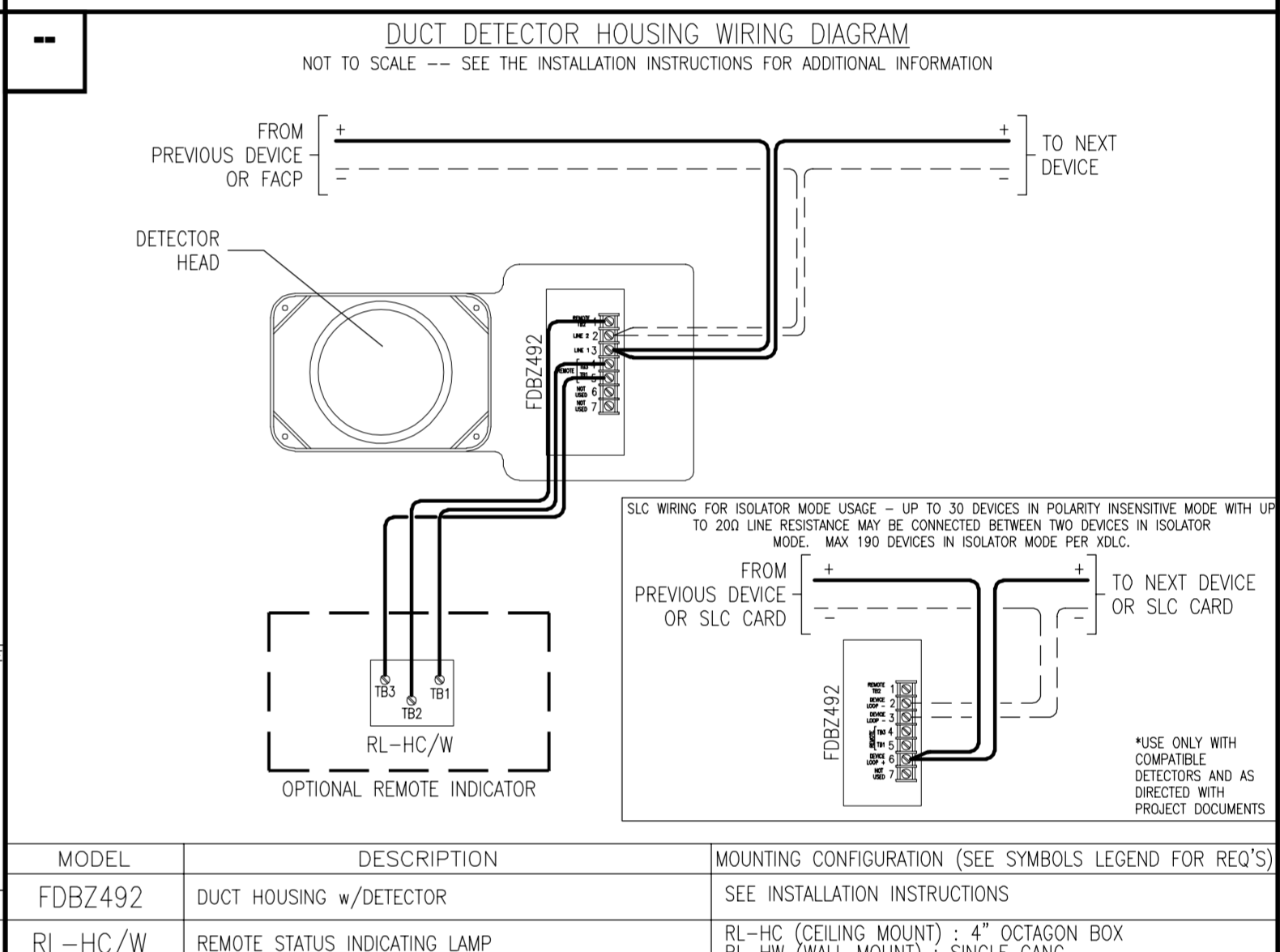
MANUAL PULL STATION DEVICE LOCATION DETAIL



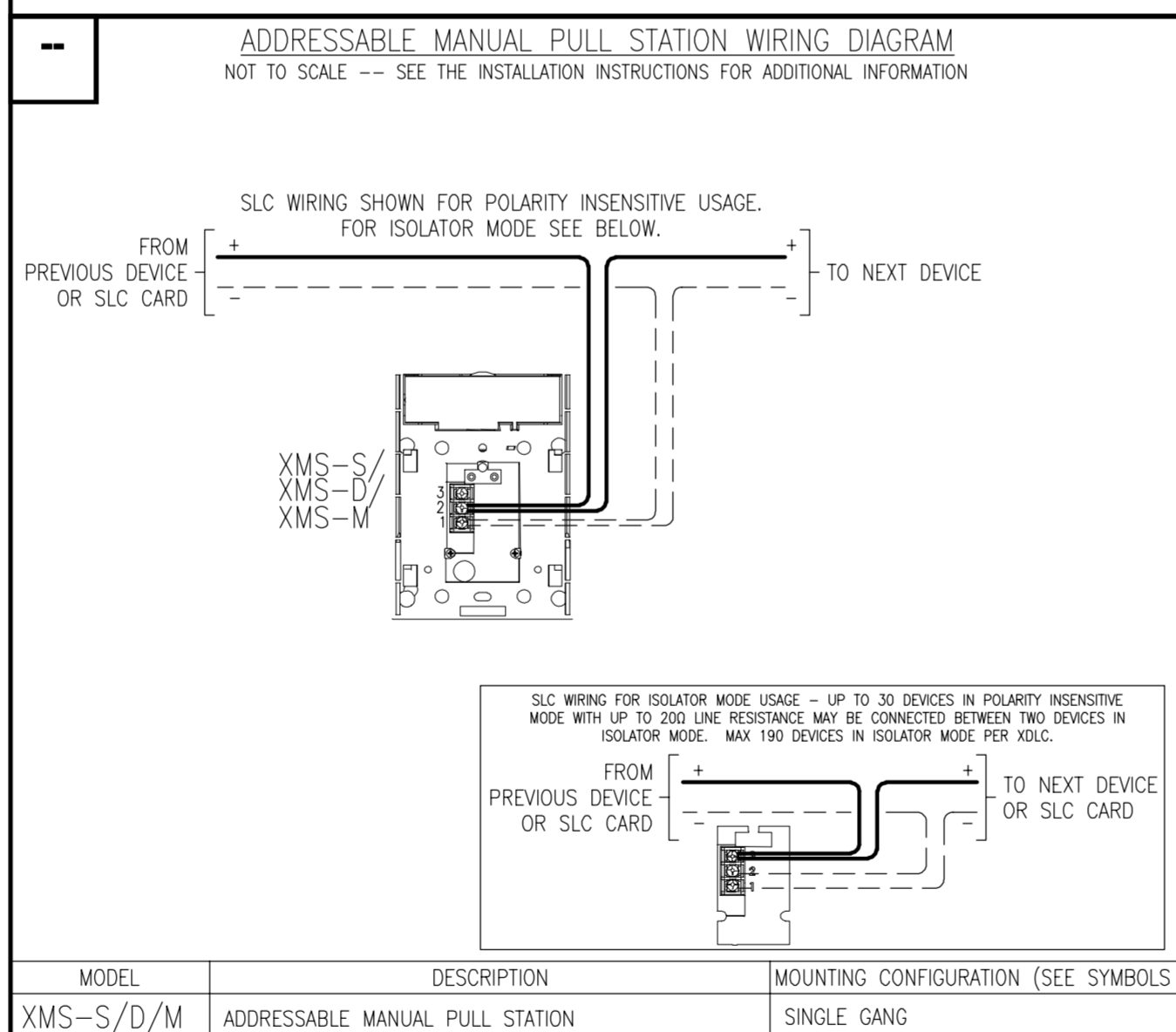
TYPICAL WIRE TERMINAL CONNECTION DETAIL



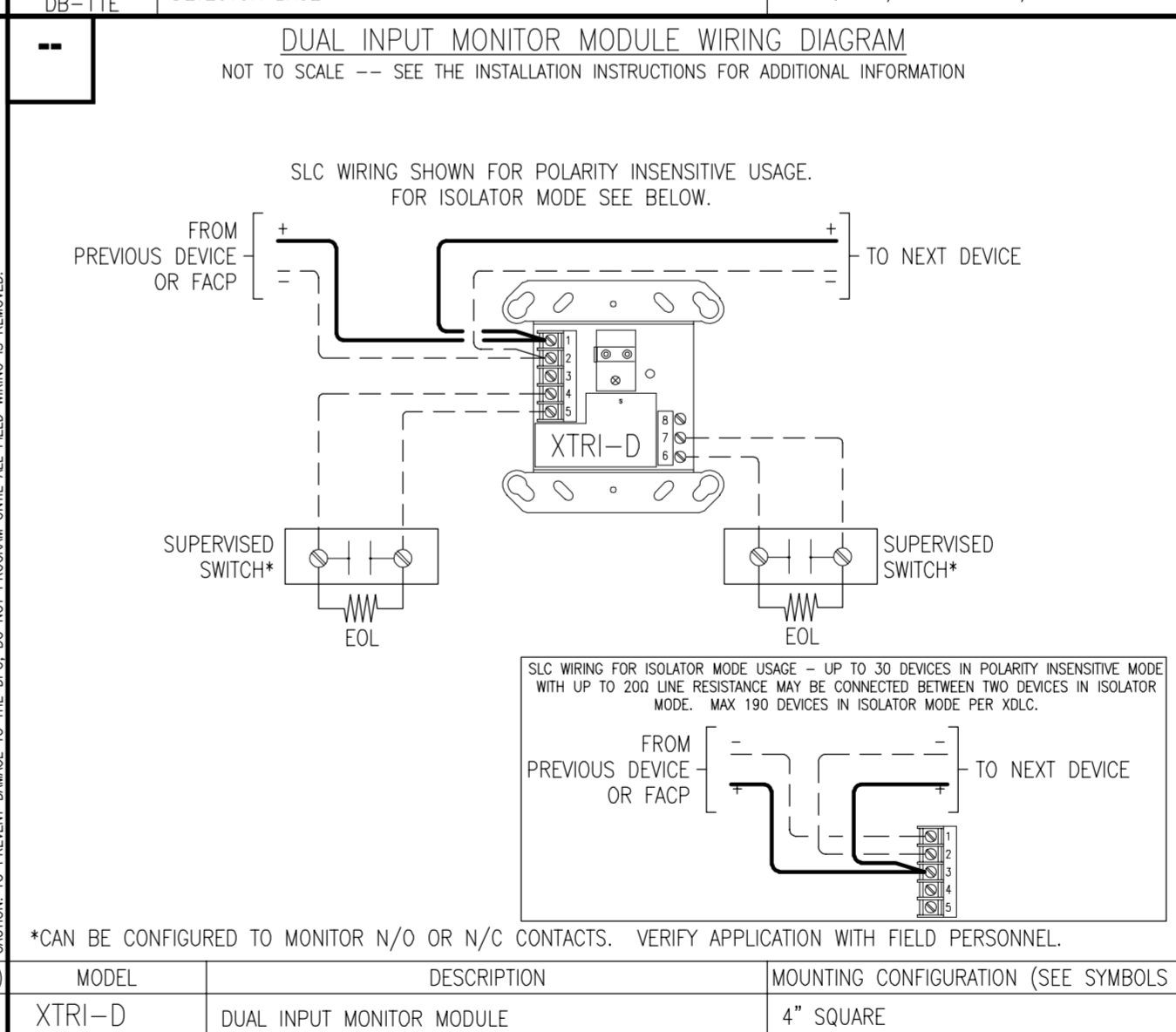
DETECTOR BASE WIRING DIAGRAM



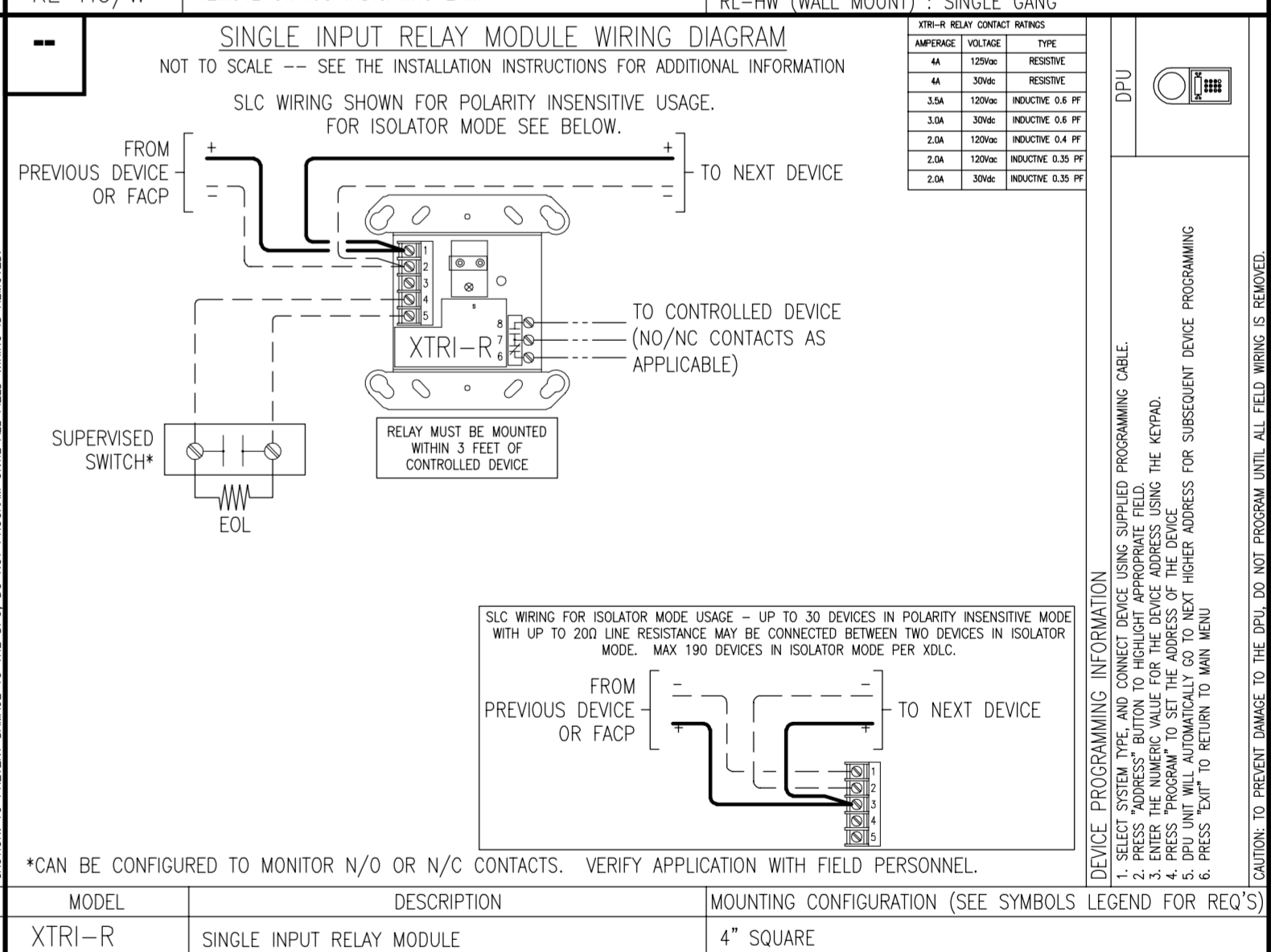
DETECTOR HOUSING WIRING DIAGRAM



ADDRESSABLE MANUAL PULL STATION WIRING DIAGRAM



DUAL INPUT MONITOR MODULE WIRING DIAGRAM



SINGLE INPUT RELAY MODULE WIRING DIAGRAM

MODEL	DESCRIPTION	MOUNTING CONFIGURATION (SEE SYMBOLS LEGEND FOR REQ'S)
XMS-S/D/M	ADDRESSABLE MANUAL PULL STATION	SINGLE GANG

MODEL	DESCRIPTION	MOUNTING CONFIGURATION (SEE SYMBOLS LEGEND FOR REQ'S)
XTRI-D	DUAL INPUT MONITOR MODULE	4" SQUARE

MODEL	DESCRIPTION	MOUNTING CONFIGURATION (SEE SYMBOLS LEGEND FOR REQ'S)
FDBZ492	DUCT HOUSING w/DETECTOR	SEE INSTALLATION INSTRUCTIONS
RL-HC/W	REMOTE STATUS INDICATING LAMP	RL-HC (CEILING MOUNT) : 4" OCTAGON BOX RL-W (WALL MOUNT) : SINGLE GANG
XTRI-R	SINGLE INPUT RELAY MODULE	4" SQUARE

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REVISION

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1	06/17/25	440P-388004: DEVICE REPLACEMENT - AS-BUILT DRAWING
2	11/6/25	440P-40825 - CHANGE ADDITION
3	7/10/25	AS-BUILT BUILDING TECHNOLOGIES, INC. ALL BUILDING REVISIONS
4	10/20/25	AS-BUILT BUILDING REVISIONS
5	2/19/21	REVISIONS PER FSC MEP

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JUSTICE CENTER
LEE'S SUMMIT
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LEE'S SUMMIT, MO 64086
FIELD DEVICE WIRING DETAILS

DRAWN BY: R. CALDWELL
SCALE: AS SHOWN
DATE: 9-11-97
JOB NO:
CHECKED BY: JEF
SHEET NO.

FA08

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11/7/2025
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