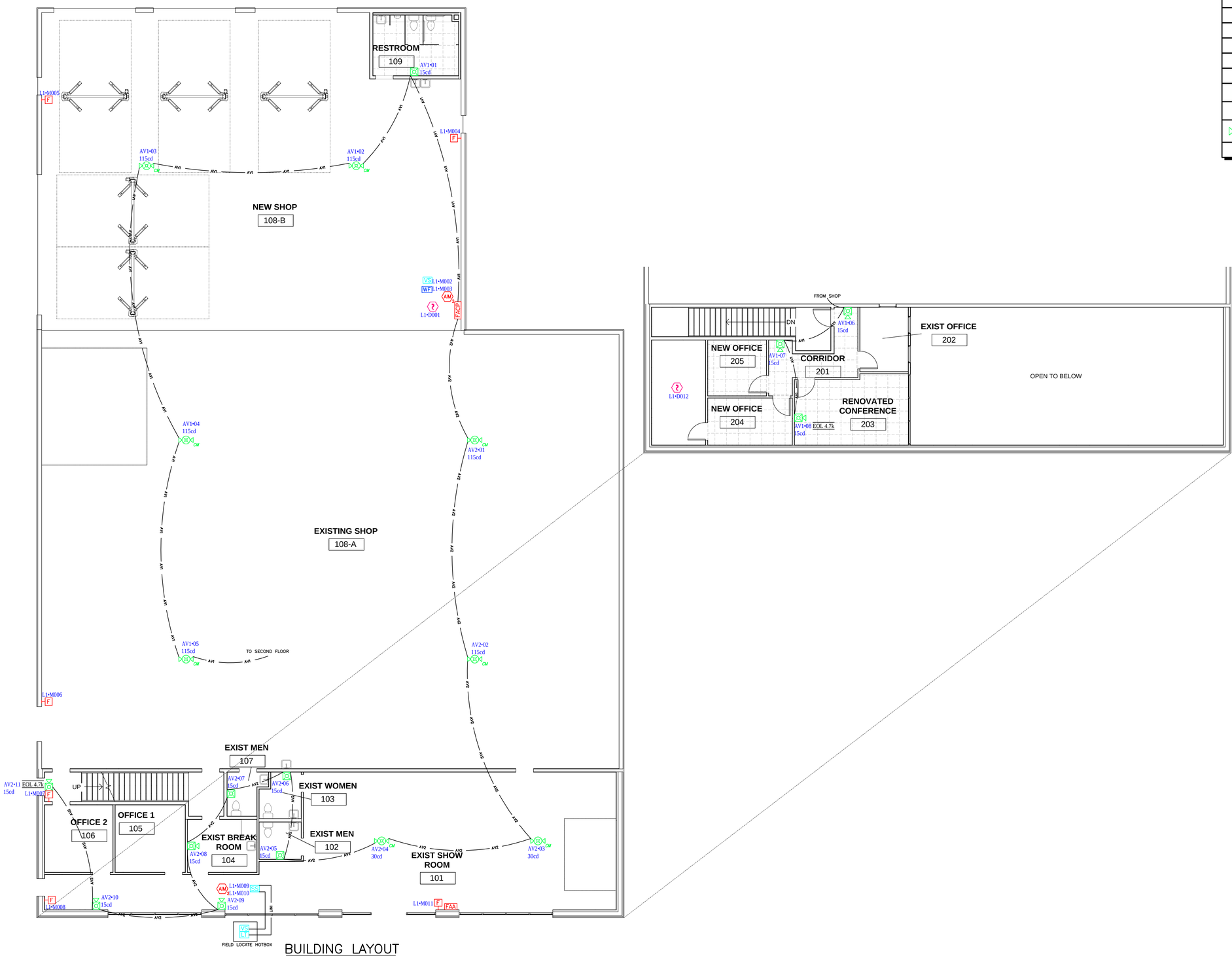

BUILDING LAYOUT
SCALE: 1/8" = 1'-0"

LEGEND

FACP	Fire Alarm Control Panel
F	Manual Fire Alarm Pull Station
	Photoelectric Smoke Detector
WF	Waterflow Switch (By Others)
VS	Valve Supervisory (Tamper) Switch (By Others)
LT	Low Temperature Switch
SS	24V Surge Suppressor
xx Cd	Alarm Strobe – Candela As Noted
xx Cd	Alarm Horn/Strobe – Candela As Noted
xx Cd CM	Horn/Strobe, Ceiling Mount – Cd as Noted
AV #-#	Notification Circuit Number – Device Number

5' 0' 5' 10'
GRAPHIC SCALE
SCALE: 1/8" = 1'-0"

MARK	REVISION	BY	DATE

REVISIONS:

Seal

SHOP DRAWINGS

Fire Alarm System Shop Drawings
Carolina Diesel Truck
62 Progress Drive
Fuquay Varina, North Carolina

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SCALE: As Noted
SHEET NO. 1 OF 3 SHEETS
DATE: 12/14/2022
PROJECT NO: RA-A6706-A-22

Sheet Contents:
Fire Alarm System
Building Layout

DRAWING NO.:
FA101

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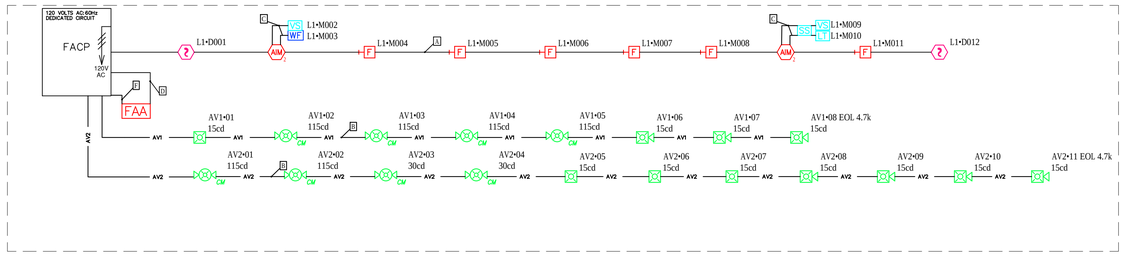
Carolina Diesel Truck
62 Progress Drive
Fuquay Varina, North Carolina

Fire Alarm System
Sequence of
Operation
Matrix

	MANUAL PULL STATION	SMOKE DETECTOR	WATERFLOW	TAMPER SWITCH, LOW TEMP, SENSOR, PIV	TROUBLE CONDITION ON FACP	AC POWER LOSS	GROUND FAULT	OPEN CIRCUIT		
ACTIVATE GENERAL ALARM HORN/STROBES.	X	X	X	X						
DISPLAY DEVICE ACTUATED ON FACP.	X	X	X	X	X					
DISPLAY DEVICE ACTUATED ON REMOTE ANNUNCIATOR.	X	X	X	X						
ACTIVATE SYSTEM ALARM LED ON FACP.	X	X	X							
ACTIVATE SYSTEM ALARM LED ON REMOTE ANNUNCIATOR.	X	X	X							
SEND ALARM SIGNAL TO DIGITAL COMMUNICATOR.	X	X	X							
ACTIVATE SYSTEM TROUBLE LED ON FACP.					X	X	X	X		
ACTIVATE SYSTEM TROUBLE LED ON REMOTE ANNUNCIATOR.					X	X	X	X		
SEND TROUBLE SIGNAL TO DIGITAL COMMUNICATOR.					X	X	X	X		
ACTIVATE SYSTEM SUPERVISORY LED ON FACP.				X						
ACTIVATE SYSTEM SUPERVISORY LED ON REMOTE ANNUNCIATOR.				X						
SEND SUPERVISORY SIGNAL TO DIGITAL COMMUNICATOR.				X						

FIRE ALARM SYSTEM RISER

CAROLINA DIESEL TRUCK



DETAILED ONE LINE RISER DIAGRAM

BILL OF MATERIAL REPORT

QTY	MANUFACTURER	PART NO	DESCRIPTION
1	NOTIFIER	NFW-50XGV	FIREWARDEN-50X (NFW-50X) INTELLIGENT ADDRESSABLE FACP WITH COMMUNICATOR
1	NOTIFIER	N-ANN-80	80-CHARACTER LCD ANNUNCIATOR
2	NOTIFIER	B300-6	DETECTOR BASE
6	NOTIFIER	NBG-12LX	DUAL-ACTION ADDRESSABLE PULL STATION. INCLUDES KEY LOCKING FEATURE.
2	NOTIFIER	FDM-1	ADDRESSABLE DUAL MONITOR MODULE W/ FLASHSCAN, 2 CLASS B
2	NOTIFIER	FSP-951	ADDRESSABLE LOW-PROFILE PHOTOELECTRIC SMOKE DETECTOR. FLASHSCAN ONLY.
7	SYSTEM SENSOR	P2RL	2-WIRE, HORN STROBE, RED
8	SYSTEM SENSOR	PC2RL	2-WIRE, HORN STROBE, RED
4	SYSTEM SENSOR	SRL	STROBE, RED
1	DITEK	DTK-2MHLP24BWB	SURGE SURPRESSOR
2	ADI	IM-12120	12V 12AMPHOUR BATTERY

BUILDING MATERIALS

SCALE: N.T.S.

WIRE SCHEDULE

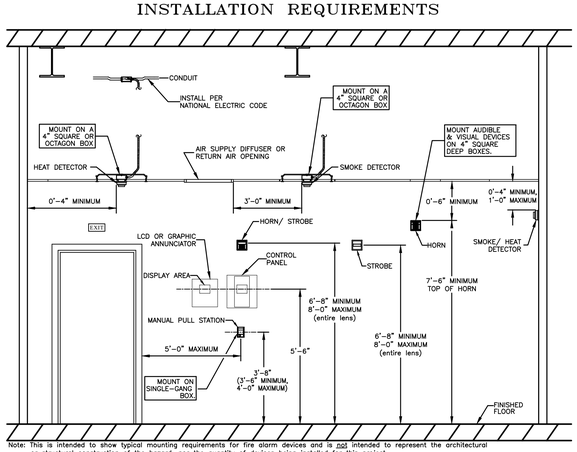
Conductor	Description	Wire Size	Wire Type	Wire Color	
				Positive(+)	Negative(−)
A	ADDRESSABLE LOOP	16 AWG	TWISTED, UNSHIELDED	RED	BLACK
B	NOTIFICATION APPLIANCE CIRCUITS	14 AWG	THHN SOLID	BLUE	BLACK
C	INITIATING DEVICE CIRCUIT	14/16 AWG	THHN SOLID	VIOLET	GRAY
D	24VOLTS	14 AWG	THHN SOLID	YELLOW	BROWN
F	E485	16 AWG	TWISTED SHIELDED	BLUE	BLACK
G	RTS151 KEY	16 AWG	TWISTED SHIELDED	BLUE	BLACK

NOTE: ABOVE WIRE TYPE IS FOR WIRE IN CONDUIT. PLENUM CABLE IS ACCEPTABLE; USE FPLP CABLE.

EACH LETTER REPRESENTS A PAIR OF CONDUCTORS, POSITIVE AND NEGATIVE, EVEN FOR A TWISTED PAIR.
THEREFORE, A TWISTED PAIR ADDRESSABLE LOOP IS 'A' AND THE POSITIVE CONDUCTOR OF A INITIATING CIRCUIT IS (1/2)'C'.

MAXIMUM CONDUIT FILL CANNOT EXCEED 80% CAPACITY.

NFPA 72 AND ADA DEVICE INSTALLATION REQUIREMENTS



Note: This is intended to show typical mounting requirements for fire alarm devices and is not intended to represent the architectural or structural construction of the hazard, nor the quantity of devices being installed for this project.

*2013 Edition, NFPA 72

MINIMUM NOTIFIER WIRE NOTES

Use Belden or equivalent.

THIS CHART IS TO PROVIDE GUIDANCE IN SIZING WIRE BASED ON THE ALLOWABLE LENGTH TO BE USED IF OTHERWISE NOT SPECIFIED.

CIRCUIT TYPE	CIRCUIT FUNCTION	DISTANCE FT.	TYPICAL WIRE TYPE
1. SLC LOOP (POWER LIMITED)	TWISTED UNSHIELDED PAIR 50 OHMS MAX PER LENGTH OF STYLE 6 AND 7 LOOPS. 50 OHMS PER BRANCH MAX FOR STYLE 4 LOOPS.	10,000 8,000 5,000	12 AWG BELDEN 5020UL, 6020UL 14 AWG BELDEN 5120UL, 6120UL 16 AWG BELDEN 5220UL, 6220UL
	UNTWISTED, UNSHIELDED WIRE, IN CONDUIT OR OUTSIDE CONDUIT.	3,700	12 TO 18 AWG
2. EIA−485 ACS, ANN	TWISTED SHIELDED PAIR WITH A CHARACTERISTIC IMPEDANCE OF 120 OHMS. 120 OHMS TOTAL.	5,000	16 AWG TWISTED SHIELDED PAIR
3. EIA−232	COMMUNICATION LOOP TWISTED SHIELDED PAIR	20	16 AWG TWISTED SHIELDED PAIR
4. IDC: INITIATING DEVICE CIRCUIT	FMM−1, FMM−101, XPM−10 (POWER LIMITED) MAXIMUM CIRCUIT RESISTANCE IS 20 OHMS.		12 AWG STRANDED/ SOLID THHN 14 AWG STRANDED/ SOLID THHN 16 AWG STRANDED/ SOLID THHN
5. NAC − NOTIFICATION APPLIANCE CIRCUIT	1.2 V DROP OR SIZED TO MEET MINIMUM RATING OF APPLIANCE	TO MEET 1.2V MAX LINE DROP	12 AWG STRANDED THHN 14 AWG STRANDED THHN
6. RELEASING MODULE	FCM−1−REL (POWER LIMITED) MAXIMUM CIRCUIT RESISTANCE IS 5 OHMS.		12 AWG STRANDED/ SOLID THHN 14 AWG STRANDED/ SOLID THHN 16 AWG STRANDED/ SOLID THHN
7. 24VDC POWER RUN (POWER LIMITED)	TO ANNUNCIATORS AND FCM−1 MODULES	TO MEET 1.2V MAX LINE DROP	12 AWG STRANDED/ SOLID THHN 14 AWG STRANDED/ SOLID THHN 16 AWG STRANDED/ SOLID THHN
8. CHG−120	EXTERNAL BATTERY CHARGER	20 MAX.	12 AWG STRANDED/ SOLID THHN

Reference wire schedule below.

CLASS 'B' (SLC) WIRING NOTES

1.) ALL WIRING SHALL BE IN ACCORDANCE WITH LOCAL AND NATIONAL CODES, INCLUDING NFPA 72 (2013 EDITION), NEC, AND ADA.

2.) ALL WIRING FROM CONTROL PANEL TO ANY DEVICE SHALL BE RUN IN MINIMUM 3/4" CONDUIT. SURFACE METAL RACEWAY IS ACCEPTABLE. FPLP CABLE IS ACCEPTABLE IN AREAS OTHER THAN WHERE WATERPROOF DEVICES ARE REQUIRED. CONDUIT SHALL BE USED TO DROP TO WALL MOUNTED DEVICES AND PENETRATIONS IN RATED WALLS SHALL BE MADE IN CONDUIT PER APPROPRIATE U.L. SYSTEM.

3.) DETECTORS ARE TO BE MOUNTED ON A STANDARD 4" OCTAGON BOX, SEE TYPICAL SUBFLOOR MOUNTING DETAILS IF APPLICABLE.

4.) NO PARALLEL BRANCHING OF WIRES ON SUPERVISED CIRCUITS IS PERMISSIBLE, AND POLARITY MUST BE OBSERVED. NO SPLICES SHALL BE MADE OTHER THAN AT TERMINAL BLOCKS. WIRE NUTS AND CRIMP SPLICES SHALL NOT BE PERMITTED.

5.) ALL FIELD WIRING SHALL BE CHECKED FOR SHORTS, OPENS, AND GROUNDS BEFORE CONNECTING TO THE CONTROL PANEL.

6.) A.C. WIRES SHALL BE RUN IN SEPARATE CONDUIT FROM D.C. WIRING, SUCH THAT A SYSTEM ALARM DOES NOT DE−ENERGIZE THE CONTROL PANEL, MINIMUM SIZE WIRE TO BE AWG 12 THHN. PROTECTION AGAINST VOLTAGE TRANSIENTS AND SURGES SHALL BE INSTALLED AT THE ELECTRICAL PANELBOARD AND INSTALLED BY THE ELECTRICAL CONTRACTOR. ALL AC POWER TO FIRE ALARM EQUIPMENT (i.e. CONTROL PANEL, REMOTE POWER SUPPLY, ETC.) SHALL BE A DEDICATED CIRCUIT.
CIRCUIT DISCONNNECTING MEANS SHALL BE PERMANENTLY IDENTIFIED BY THE SYSTEM TYPE:
i.e. 'FIRE ALARM', 'EMERGENCY COMMUNICATIONS', 'FIRE ALARM/ECS'.

7.) NO POWER, INCLUDING EMERGENCY BATTERY SUPPLY, SHALL BE CONNECTED TO THE CONTROL PANEL UNTIL BFPE INTERNATIONAL'S TECHNICIAN IS ON THE JOB SITE.

8.) SEE MANUFACTURER'S DATA SHEETS FOR MOUNTING DETAILS.

9.) ALL JUNCTION BOX COVERS SHALL BE RED IN COLOR. THOSE IN FINISHED AREAS ARE PERMITTED TO MATCH THE FINISH COLOR.

10.) ALL ADDRESSABLE LOOP WIRE SHALL BE AWG 16 MINIMUM, LOW CAPACITANCE, TWISTED UNSHIELDED COPPER PAIR. TYPE TO BE FPL, FPLR, OR FPLP SOLID OR STRANDED COPPER. CABLE JACKET COLOR SHALL BE RED (+) AND BLACK (−) CONDUCTOR INSULATION. REFER TO THE MINIMUM WIRE NOTES REQUIREMENTS NOTE TO DETERMINE MINIMUM REQUIREMENTS OF SIZE AND LENGTH.

11.) ALL NON−ADDRESSABLE WIRE SHALL BE AWG 14 MINIMUM SOLID OR STRANDED COPPER, TYPE THHN/THWN.

12.) ALL ADDRESSABLE SIGNALING LINE CIRCUITS SHALL BE A CLASS 'B' PATHWAY AS DEFINED IN TABLE A.12.3 (b) OF NFPA 72; WHERE A SINGLE GROUND SHALL NOT PREVENT THE RECEIPT OF AN ALARM AT THE FACP. THESE CONDITIONS AS WELL AS A SINGLE OPEN, AN OPEN AND GROUND, A SHORT, A SHORT AND OPEN, OR A SHORT AND GROUND SHALL SIGNAL A TROUBLE CONDITION AT THE FACP. NO "T" TAPS SHALL BE MADE.

13.) THE AUDIBLE EVACUATION SIGNAL SHALL BE THE ANSI S3.41 THREE−PULSE TEMPORAL PATTERN AS DESCRIBED IN NFPA 72.

14.) ALARM NOTIFICATION CIRCUITS SHALL BE A CLASS 'B' PATHWAY AS DEFINED IN TABLE A.12.3 (c) OF NFPA 72; WHERE A SINGLE GROUND SHALL NOT PREVENT THE RECEIPT OF AN ALARM AT THE FACP. A SINGLE OPEN, SINGLE GROUND, OR A WIRE TO WIRE SHORT SHALL SIGNAL A TROUBLE CONDITION AT THE FACP. EACH CIRCUIT SHALL NOT EXCEED ITS RATED OUTPUT. CIRCUITS SHALL NOT EXCEED 3 FLOORS OF COVERAGE.

15.) ALL WIRE COLORS SHALL BE MAINTAINED FROM DEVICE TO DEVICE AND SHALL NOT BE TRANSPOSED NOR CHANGED AT ANY DEVICE OR TERMINAL BLOCK. PERMANENT WIRE MARKERS SHALL BE USED TO IDENTIFY ALL CONNECTIONS AT THE FACP, OTHER CONTROL EQUIPMENT, POWER SUPPLIES, AND TERMINAL CABINETS.

16.) ALL RIGID OR IMC CONDUIT TERMINATING AT SHEET METAL BOXES OR CABINETS SHALL UTILIZE INSULATING BUSHINGS AND DOUBLE LOCK NUTS. EMT CONNECTORS MUST BE STEEL COMPRESSING TYPE WITH INSULATING THROATS.

17.) NOTIFICATION CIRCUIT BOOSTER POWER SUPPLIES OR 24 VDC POWER CIRCUITS SERVING ADDRESSABLE CONTROL RELAYS SHALL BE INDIVIDUALLY MONITORED FOR INTEGRITY.

18.) SPOT TYPE DETECTOR MUST HAVE THE DETECTOR ADDRESS LOOP AND DEVICE NUMBERS PERMANENTLY MOUNTED TO THEIR BASES, SO IT IS READABLE FROM THE FLOOR. THE ADDRESS MUST BE SHOWN ON THE AS−BUILT PLANS.

19.) DUCT DETECTOR SAMPLING TUBES SHALL EXTEND THE FULL WIDTH OF THE DUCT. ANY TUBES EXCEEDING 36 INCHES SHALL PROTRUDE THROUGH THE FAR END AND ANY TUBES EXCEEDING FIVE FEET SHALL BE SUPPORTED IN THE MIDDLE. INSTALL DETECTOR HOUSING AND SAMPLING TUBES PER MANUFACTURER'S RECOMMENDATIONS.

20.) SPOT TYPE SMOKE DETECTORS SHALL HAVE THEIR SENSITIVITIES SET TO NORMAL/MEDIUM UNLESS OTHERWISE DIRECTED BY THE AHJ OR ENGINEER'S SPECIFICATION.

21.) SMOKE DETECTORS SHALL BE A MINIMUM OF THREE FEET FROM ANY AIR SUPPLY DIFFUSER OR AIR RETURN OPENINGS.

22.) SURGE SUPPRESSORS SHALL BE USED ON A CIRCUIT ANYTIME IT EXITS (OR ENTERS) A BUILDING TO/ FROM THE OUTSIDE.

23.) ALL PENETRATIONS THROUGH RATED WALLS SHALL BE SEALED USING THE APPROPRIATE U.L. SYSTEM.

24.) PERMANENT WIRE MARKERS SHALL BE USED TO IDENTIFY ALL TERMINATIONS AND SPLICES FOR EVERY CIRCUIT.

25.) ALL ADDRESSABLE DEVICES SHALL BE LOCATED INSIDE THE BUILDING, NOT OUTSIDE WHERE THEY WOULD BE EXPOSED TO EXTREME TEMPERATURE AND HUMIDITY. (i.e. THOSE WHICH ARE TO MONITOR DEVICES OR PERFORM SHUTDOWNS.)

26.) DO NOT INSTALL CONDUIT INTO THE BOTTOM OF THE FIRE ALARM CONTROL PANEL(S).

27.) THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR METERING ALL WIRES TO ENSURE ALL OF THE CIRCUITS ARE CLEAR OF TROUBLES, i.e. GROUNDS, SHORTS, ETC, AND THAT THE PROPER END OF LINE RESISTANCE IS PRESENT. CHECK MANUFACTURER'S WIRE NOTES FOR OTHER CIRCUIT REQUIREMENTS. BFPE INTERNATIONAL WILL NOT CONNECT THE CIRCUIT TO THE FIRE PANELS UNTIL THE CIRCUITS(S) ARE CLEAR OF ALL TROUBLES.

28.) THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR LABELING ALL EOL'S AND ADDRESSABLE DEVICES WITH THEIR DEVICE ADDRESS. THE LABELS SHALL BE SELF−ADHEVISE TAPE, BLACK LETTERING ON WHITE OR CLEAR BACKGROUND AND LEGIBLE FROM THE FLOOR.

29.) ALL WIRE SHALL BE INSTALLED PER THE WIRE SCHEDULE IN THESE PLANS.

30.) PER 23.6 IN NFPA 72, SIGNALING LINE CIRCUITS SHALL BE CONFIGURED SO THAT A SINGLE FAULT ON THE PATHWAY SHALL NOT CAUSE THE LOSS OF MORE THAN 50 ADDRESSABLE DEVICES. REFER TO THE WIRING DIAGRAMS/RISER, PROJECT SPECIFIC NOTES, AND NOTES ON THE LAYOUT SHEETS IN THIS PLAN SET AS DESIGNED TO MAKE SLC INSTALLATION COMPLY WITH THIS NFPA 72 REQUIREMENT.

MARK	REVISION	BY	DATE

REVISIONS:

Seal

SHOP DRAWINGS

Fire Alarm System Shop Drawings
Carolina Diesel Truck
62 Progress Drive
Fuquay Varina, North Carolina

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SHEET NO. 2 OF 3 SHEETS
DATE: 12/14/2022
PROJECT NO: RA−A6706−A−22

Sheet Contents:
Fire Alarm System
Installation Notes
One Line Riser

DRAWING NO.:
FA201

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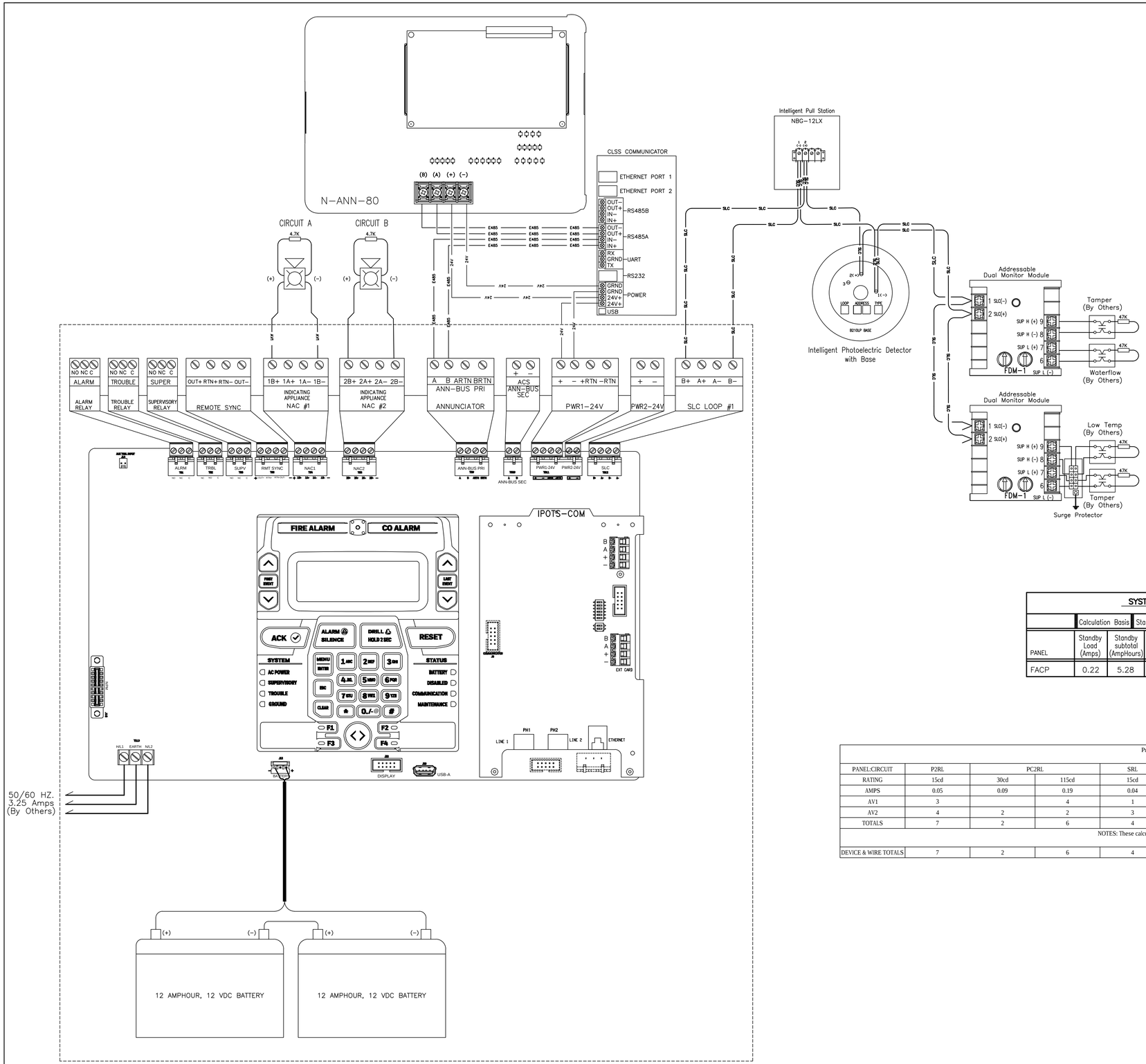

NFW-50X FIRE ALARM PANEL

SCALE: NONE

SYSTEM BATTERY CALCULATIONS

	Calculation Basis	Standby time	24 hours	Alarm time	0.084 hours			
PANEL	Standby Load (Amps)	Standby subtotal (AmpHours)	Alarm Load (Amps)	Alarm subtotal (AmpHours)	Secondary Load (AmpHours)	Safety derating factor	Required Battery (AmpHours)	Battery Size Supplied (AmpHours)
FACP	0.22	5.28	2.54	0.21	5.49	x1.2	6.59	12

Project: Carolina diesel Truck Date: 12/14/2022
Point-To-Point Voltage Drop Summary

PANEL:CIRCUIT	P2RL	PC2RL		SRL	AMPS	CIRCUIT LENGTH	START VOLTAGE	VOLTAGE DROP	EOL VOLTAGE	AWG
RATING	15cd	30cd	115cd	15cd						
AMPS	0.05	0.09	0.19	0.04						
AV1	3		4	1	0.95	452'	20.4v	1.13v	19.27v	14
AV2	4	2	2	3	0.895	288'	20.4v	0.72v	19.68v	14
TOTALS	7	2	6	4						
NOTES: These calculations double the wire length indicated to account for the total wire resistance of the circuit. DC resistance at 75° C/167° F per NFPA 70 ch. 9, table 8.										
DEVICE & WIRE TOTALS	7	2	6	4		740'				

MARK	REVISION	BY	DATE

REVISIONS:

Seal

SHOP DRAWINGS

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Installation Notes
One Line Riser

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FA202

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