Date: 11/03/15

Approved with Conditions

FACP Battery Calculation

10/12/2015

PROJECT NAME:	FIFTH AVENUE REGIMENT BUILDING	
Required Standby Time:	24	Hours
Required Alarm Time:	5	Minutes

Regulated Load in Standby

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
FACP – MS9050UD MAIN CIRCUIT BOARD	1	X	0.12000	=	0.12000
REMOTE ANNUNICATOR – ANN–80	1	X	0.01500	=	0.01500
SMOKE DETECTOR – SD355	1	X	0.00030	=	0.00030
HEAT DETECTOR – H355	25	X	0.00030	=	0.00750
PULL STATION – BG–12LX	8	X	0.00023	=	0.00184
TOTAL STANDBY LOAD					0.14464

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
FACP – MS9050UD MAIN CIRCUIT BOARD	1	X	0.20000	=	0.20000
REMOTE ANNUNICATOR – ANN–80	1	X	0.04000	=	0.04000
SMOKE DETECTOR – SD355	1	X	0.00000	=	0.00000
HEAT DETECTOR – H355	25	X	0.00000	=	0.00000
PULL STATION – BG–12LX	8	X	0.00000	=	0.00000
MAX ALARM DRAW – ALL ADDRESSABLE DEV.	1	X	0.40000	=	0.40000
NAC–1 (See Voltage Drop Calculations)	1	X	0.24200	=	0.24200
NAC–2 (See Voltage Drop Calculations)	1	X	0.60900	=	0.60900
TOTAL ALARM LOAD					1.49100

Battery Requirements

Standby Load			Required Standby Time in Hours		
Current (Amps)	0.14464	X	24.00000	=	3.47136
Alarm Load			Required Alarm Time in Hours		
Current (Amps)	1.49100	X	0.08333	=	0.12425
Total Ampere Hours (before derating factor)					3.59561
Derating Factor				X	1.2
TOTAL AMPERE HOURS REQUIRED				=	4.31473
BATTERIES TO BE PROVIDED (2 – 12v)					7 AH

Point to Point NAC Voltage Drop Calculation

10/6/2015

Project Name	FIFTH AVENUE REGIMENT BUILDING			
Circuit Number	NAC–1			
Nominal System Voltage	20.4	volts	Wire Gauge	Resistance Per 1000
Minimum Device Voltage	16.0	volts		
Distance from source to 1st device	30	feet	14	3.07
Wire Gauge for balance of circuit			14	3.07
Max Output Current	1.25	amps		
Total Circuit Current	0.242	amps		
End of Line Voltage	20.32	volts		

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.066	30	20.36	0.045	0.22%
Device 2	0.176	30	20.32	0.077	0.38%
Totals	0.242	60			

Notes:
Wire resistance is doubled in the calculations for two wires (Positive and Negative).
The voltage calculated to the last device must not be lower than the manufactures listed minimum operating voltage (IE: rated operating voltage 16–33 VDC (24 VDC nominal)).

Point to Point NAC Voltage Drop Calculation

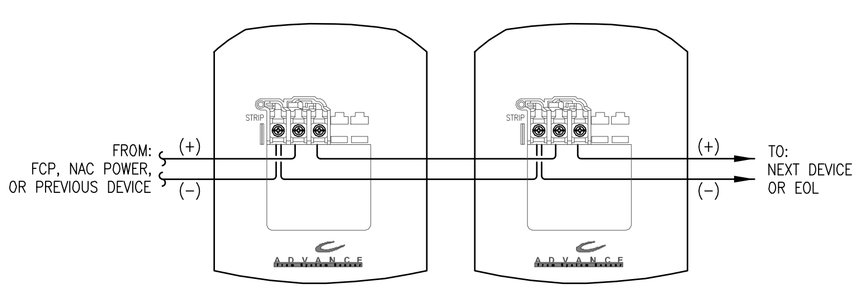
10/12/2015

Project Name	FIFTH AVENUE REGIMENT BUILDING			
Circuit Number	NAC–2			
Nominal System Voltage	20.4	volts	Wire Gauge	Resistance Per 1000
Minimum Device Voltage	16.0	volts		
Distance from source to 1st device	100	feet	14	3.07
Wire Gauge for balance of circuit			14	3.07
Max Output Current	1.25	amps		
Total Circuit Current	0.609	amps		
End of Line Voltage	19.73	volts		

Circuit is within limits

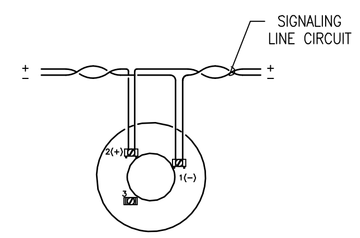
	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.079	100	20.03	0.374	1.83%
Device 2	0.066	15	19.98	0.423	2.07%
Device 3	0.066	10	19.95	0.451	2.21%
Device 4	0.212	60	19.80	0.598	2.93%
Device 5	0.107	20	19.78	0.621	3.04%
Device 6	0.079	100	19.73	0.669	3.28%
Totals	0.609	305			

Notes:
Wire resistance is doubled in the calculations for two wires (Positive and Negative).
The voltage calculated to the last device must not be lower than the manufactures listed minimum operating voltage (IE: rated operating voltage 16–33 VDC (24 VDC nominal)).



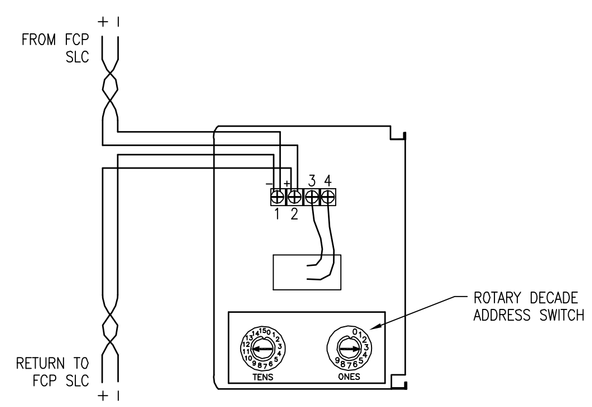
TYPICAL 2 WIRE STROBE WIRING DETAIL

SCHEMATIC: NO SCALE



ADDRESSABLE DETECTOR WIRING DETAIL

SCHEMATIC: NO SCALE



MANUAL PULL STATION WIRING DETAIL

SCHEMATIC: NO SCALE

GENERAL NOTES:

1. THESE DRAWINGS ARE DIAGRAMMATIC. REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT DIMENSIONS.
2. INSTALLATION SHALL COMPLY WITH NEC, NFPA 72 AND ALL OTHER APPLICABLE CODES AS REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION.
3. WIRING DEPICTED ON THESE PLANS IS SCHEMATIC – ACTUAL WIRE LOCATIONS MAY DIFFER FROM THESE PLANS. WIRING SHALL BE PERFORMED AS ACTUAL BUILDING CONSTRUCTION CONDITIONS ALLOW AND TO MINIMIZE PENETRATIONS THROUGH AREA SEPARATION WALLS AND FIRE WALLS. THE USE OF A RACEWAY IS PERMITTED AS LONG AS NO 110V OR HIGHER VOLTAGE CABLES ARE IN THE SAME RACEWAY.
4. FIRE RATINGS SHALL BE MAINTAINED FOR ALL PENETRATIONS THROUGH FIRE–RATED CONSTRUCTION.
5. POWER FOR ALL FIRE ALARM PANELS AND FIRE ALARM POWER SUPPLIES MUST BE PROVIDED BY A DEDICATED AC BRANCH CIRCUIT.
6. POWER–LIMITED AND NONPOWER–LIMITED CIRCUIT WIRING MUST REMAIN SEPARATED IN CABINET. ALL POWER–LIMITED CIRCUIT WIRING MUST REMAIN AT LEAST 0.25" AWAY FROM ANY NONPOWER–LIMITED CIRCUIT WIRING. FURTHERMORE, ALL POWER–LIMITED AND NONPOWER–LIMITED CIRCUIT WIRING MUST ENTER AND EXIT THE CABINET THROUGH DIFFERENT KNOCK OUTS AND/OR SEPARATE CONDUITS.
7. WHEN UTILIZING CLASS "A" CIRCUITS, SEPARATE OUTGOING AND RETURN CONDUCTORS OF CLASS "A" CIRCUITS BY A MINIMUM OF 12" WHERE RUN VERTICALLY AND 48" WHERE RUN HORIZONTALLY.
8. WHEN UTILIZING SHIELDED CABLE TIE SHIELDS THROUGH AND INSULATE AT EACH JUNCTION BOX. INSULATE AND TAPE BACK AT END.
9. ALL FIRE ALARM CABLING SHALL BE ACCEPTABLE TO THE FIRE ALARM EQUIPMENT MANUFACTURER FOR THE INTENDED PURPOSE.
10. SMOKE DETECTORS SHALL NOT BE INSTALLED UNTIL AFTER CONSTRUCTION CLEAN–UP IS COMPLETED AND FINAL.
11. LOCATE SMOKE DETECTORS A MINIMUM OF THREE (3) FEET FROM MECHANICAL DIFFUSERS. WALL–MOUNTED SMOKE DETECTORS SHALL BE LOCATED A MINIMUM OF 4" AND A MAXIMUM OF 12" FROM CEILING. CEILING–MOUNTED SMOKE DETECTORS SHALL BE MOUNTED ON CEILINGS AND NOT ON THE BOTTOMS OF BEAMS OR JOISTS.
12. PROVIDE SYNCHRONIZATION OF ALL VISUAL NOTIFICATION APPLIANCE CIRCUITS. PROVIDE ALL REQUIRED SYNC MODULES. PROVIDE A MULTI–SYNC MODE SLAVE CONNECTION BETWEEN ALL SYNC MODULES.
13. VERIFY ALL FIELD SELECTABLE AUDIBILITY SETTINGS OF NOTIFICATION APPLIANCES WITH FIRE ALARM CONTRACTOR.
14. UPON COMPLETION OF THE FIRE ALARM SYSTEM INSTALLATION AND PROGRAMMING, THE INSTALLING CONTRACTOR SHALL PERFORM FINAL TESTING OF THE ENTIRE SYSTEM, PER ALL APPLICABLE CODES, AND SHALL COORDINATE AND PERFORM A FINAL FIRE ALARM SYSTEM INSPECTION.
15. PROVIDE OFF–SITE MONITORING AS REQUIRED BY THE INTERNATIONAL FIRE CODE, SECTION 907.15 AND THE LOCAL AUTHORITY HAVING JURISDICTION.
16. INSTALLING CONTRACTOR SHALL, PHYSICALLY, LABEL ALL INITIATING DEVICES AND NOTIFICATION APPLIANCE CIRCUIT END OF LINE (WHEN WIRING CLASS "B"). THESE LABELS SHALL BE IN PLACE PRIOR TO START–UP AND TESTING.

FIRE ALARM SYMBOL LEGEND

NOTE: ALL SYMBOLS MAY NOT BE USED ON THIS PROJECT

SYMBOL	DESCRIPTION	MOUNTING
FACP	FIRE ALARM CONTROL PANEL	WALL–TOP @ 66"
FPS	FIRE ALARM POWER SUPPLY	FIELD VERIFY
FSA	FIRE SYSTEM ANNUNCIATOR	WALL–TOP @ 66"
FSD	FIRE/SMOKE DAMPER	BY OTHERS
	SMOKE DETECTOR	CEILING
	DUCT SMOKE DETECTOR	BY OTHERS
	HEAT DETECTOR	CEILING
CM	ADDRESSABLE CONTROL MODULE	FIELD VERIFY
MM	ADDRESSABLE MONITOR MODULE	FIELD VERIFY
P	MANUAL PULL STATION	WALL @ 48"
R	CONTROL RELAY (MULTI–VOLTAGE)	FIELD VERIFY
RM	ADDRESSABLE RELAY MODULE	FIELD VERIFY
KB	KNOX BOX	FIELD VERIFY
	WATER FLOW SWITCH	BY OTHERS
	VALVE TAMPER SWITCH	BY OTHERS
	BELL	BY OTHERS
	CEILING MOUNT STROBE	FIELD VERIFY
H	CEILING MOUNT HORN / STROBE	FIELD VERIFY
S	CEILING MOUNT SPEAKER / STROBE	FIELD VERIFY
	MINI HORN	WALL @ 10'–0
	HORN / STROBE	WALL 80"–96"
SS	SPEAKER / STROBE	WALL 80"–96"
SP	SPEAKER	WALL @ 90"
	STROBE	WALL 80"–96"

ABBREVIATION	DESCRIPTION
E	EXISTING
G	WITH GUARD
P	PENDENT MOUNT
R	RESIDENTIAL (110V)
S	SOUNDER BASE
WP	WEATHER PROOF
EOL	END OF LINE RESISTOR
EOLR	END OF LINE RELAY
AWG	AMERICAN WIRE GAUGE
TWP	TWISTED PAIR
TWSP	TWISTED SHIELDED PAIR
FPLP	FIRE POWER LIMITED PLENUM
FPLR	FIRE POWER LIMITED RISER

SPEAKER WATTAGE (3W) 75 STROBE CANDELA 30

DEVICE ADDRESS
L1D0001 OR D01
(L – DENOTES LOOP #)
(D or M – DENOTES DETECTOR OR MODULE #)

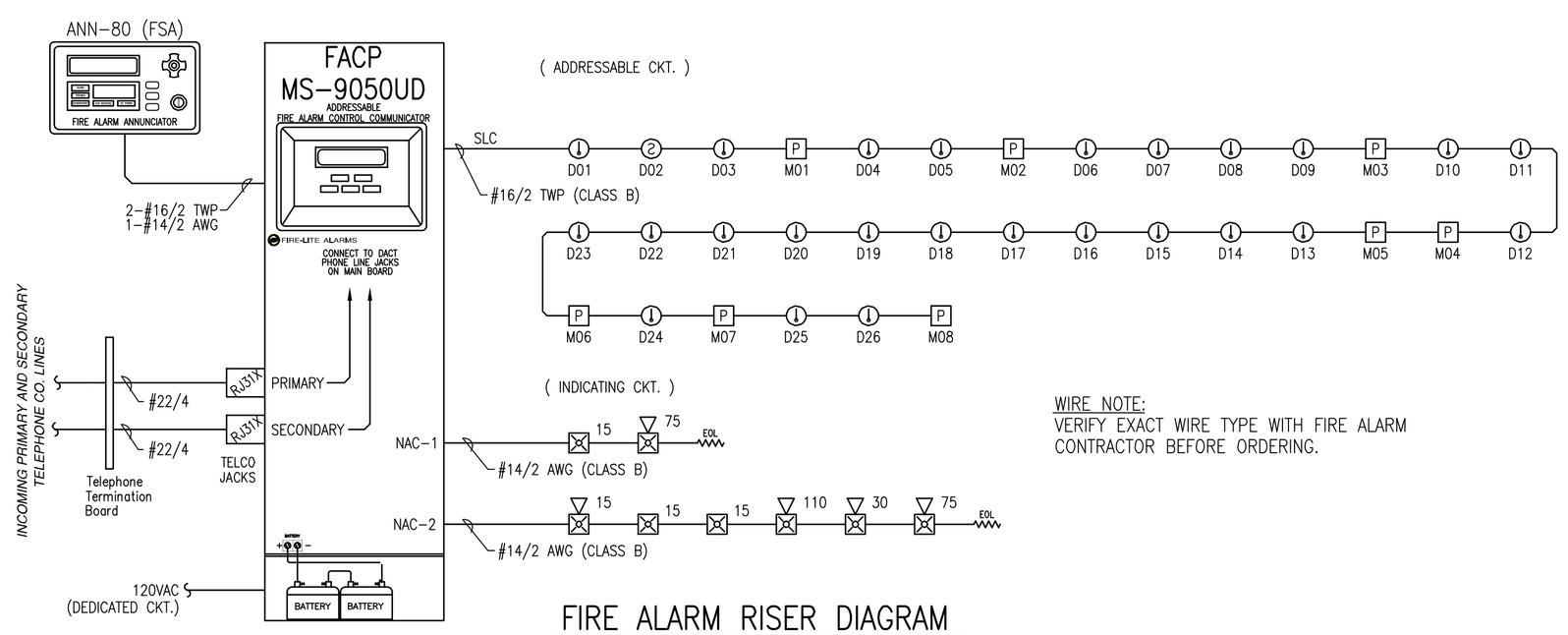
1–#16/2 TWP
WIRE TYPE ABBREVIATED
CONDUCTOR COUNT
WIRE SIZE
OF CABLES (IF OMITTED ONLY 1 CABLE NEEDED)

APPLICABLE CODES:

MAINE UNIFORM ENERGY & BUILDING CODE
PORTLAND CITY CODE, CHAPTER10, FIRE PREVENTION & PROTECTION
NFPA 1, FIRE CODE, & NFPA 101, LIFE SAFETY CODE

OPERATIONS MATRIX

FIRE ALARM INPUT	FIRE ALARM OUTPUT: ACTIVATE ALARM INDICATOR	ACTIVATE AUDIBLE ALARM	ACTIVATE TROUBLE INDICATOR	ACTIVATE AUDIBLE TROUBLE INDICATOR	TRANSMIT ALARM SIGNAL	TRANSMIT TROUBLE SIGNAL
SMOKE DETECTORS	●	●			●	
HEAT DETECTORS	●	●			●	
PULL STATIONS	●	●			●	
FIRE ALARM AC POWER FAIL			●	●		●
FIRE ALARM LOW BATTERY			●	●		●
OPEN CIRCUIT			●	●		●
GROUND FAULT			●	●		●
NAC SHORT CIRCUIT			●	●		●
LOSS OF AC TO BUILDING			●	●		●



WIRE NOTE:
VERIFY EXACT WIRE TYPE WITH FIRE ALARM CONTRACTOR BEFORE ORDERING.

FIRE ALARM RISER DIAGRAM

SCHEMATIC: NO SCALE

RESERVED FOR CITY STAMP

REVISION	DESCRIPTION	DATE
0	ISSUED FOR REVIEW & APPROVAL	10/12/2015

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FIFTH MAINE

PEAKS ISLAND, ME 04108

CALCS, DETAILS, LEGEND, MATRIX, NOTES, RISER

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