FCP Battery Calculation

9/13/2013

PROJECT NAME: 659 WARREN AVENUE 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)
MS-9200UDLS Main Circuit Board	1	X	0.14500	=	0.14500
XRM-24B	1	X	0.00000	=	0.00000
ANN-80 Annunciator	1	X	0.01500	=	0.01500
SD355 Smoke Detector	1	X	0.00030	=	0.00030
MMF-300 Monitor Modules	2	X	0.00040	=	0.00080
BG-12LX Pull Station	1	X	0.00030	=	0.00030
TOTAL STANDBY LOAD					0.16140

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
MS-9200UDLS Main Circuit Board	1	X	0.27500	=	0.27500
XRM-24B	1	X	0.00000	=	0.00000
ANN-80 Annunciator	1	X	0.04000	=	0.04000
Maximum Alarm Draw - All Addressable Devices	1	X	0.40000	=	0.40000
NAC-1 (See voltage drop calcs for device quantity)	1	X	0.77600	=	0.77600
NAC-2	1	X	1.47200	=	1.47200
NAC-3	1	X	1.39200	=	1.39200
NAC-4	1	X	0.99200	=	0.99200
TOTAL ALARM LOAD					5.34700

Battery Requirements

Standby Load			Required Standby Time in Hours		
Current (Amps)	0.16140	X	24.00000	=	3.87360
Alarm Load			Required Alarm Time in Hours		
Current (Amps)	5.34700	X	0.08333	=	0.44558
Total Ampere Hours (before derating factor)					4.31918
Derating Factor				X	1.2
TOTAL AMPERE HOURS REQUIRED				=	5.18302
BATTERIES TO BE PROVIDED (2 - 12v)					**7 AH**

NAC Circuit Voltage Drop Calculation 9/13/2013

Project Name: 659 WARREN AVENUE BUILDING
Circuit Number: NAC-1

Nominal System Voltage: 20.4 volts
Minimum Device Voltage: 16 volts
Distance from source to 1st device: 105
Wire Gauge for balance of circuit: 14 / 14

Wire Gauge	Resistance Per 1000
14	6.14
14	6.14

Max Output Current: 1.5 amps
Total Circuit Current: 0.776 amps

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.212		19.90	0.50	2%
Device 2	0.176	32	19.79	0.61	3%
Device 3	0.212	54	19.66	0.74	4%
Device 4	0.176	2	19.66	0.74	4%
Totals	0.776	193			

NAC Circuit Voltage Drop Calculation 9/13/2013

Project Name: 659 WARREN AVENUE BUILDING
Circuit Number: NAC-2

Nominal System Voltage: 20.4 volts
Minimum Device Voltage: 16 volts
Distance from source to 1st device: 30
Wire Gauge for balance of circuit: 14 / 14

Wire Gauge	Resistance Per 1000
14	6.14
14	6.14

Max Output Current: 1.7 amps
Total Circuit Current: 1.472 amps

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.212		20.13	0.27	1%
Device 2	0.212	2	20.11	0.29	1%
Device 3	0.212	61	19.72	0.68	3%
Device 4	0.107	8	19.68	0.72	4%
Device 5	0.107	2	19.67	0.73	4%
Device 6	0.066	29	19.56	0.84	4%
Device 7	0.066	27	19.47	0.93	5%
Device 8	0.066	9	19.44	0.96	5%
Device 9	0.212	41	19.33	1.07	5%
Device 10	0.212	2	19.33	1.07	5%
Totals	1.472	211			

NAC Circuit Voltage Drop Calculation 9/13/2013

Project Name: 659 WARREN AVENUE BUILDING
Circuit Number: NAC-3

Nominal System Voltage: 20.4 volts
Minimum Device Voltage: 16 volts
Distance from source to 1st device: 80
Wire Gauge for balance of circuit: 14 / 14

Wire Gauge	Resistance Per 1000
14	6.14
14	6.14

Max Output Current: 1.6 amps
Total Circuit Current: 1.392 amps

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.212		19.72	0.68	3%
Device 2	0.079	31	19.49	0.91	4%
Device 3	0.176	34	19.26	1.14	6%
Device 4	0.079	16	19.17	1.23	6%
Device 5	0.079	15	19.09	1.31	6%
Device 6	0.079	19	19.00	1.40	7%
Device 7	0.079	25	18.90	1.50	7%
Device 8	0.107	20	18.82	1.58	8%
Device 9	0.066	13	18.78	1.62	8%
Device 10	0.066	11	18.75	1.65	8%
Device 11	0.079	10	18.73	1.67	8%
Device 12	0.079	16	18.70	1.70	8%
Device 13	0.212	19	18.68	1.72	8%
Totals	1.392	309			

NAC Circuit Voltage Drop Calculation 9/13/2013

Project Name: 659 WARREN AVENUE BUILDING
Circuit Number: NAC-4

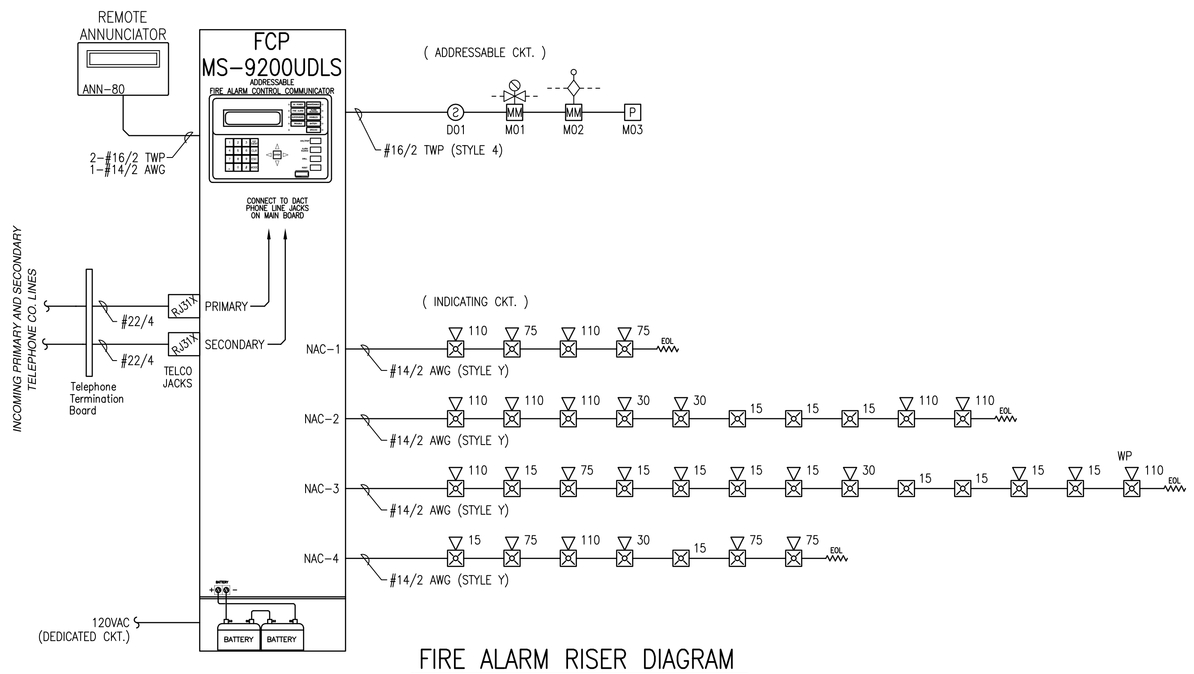
Nominal System Voltage: 20.4 volts
Minimum Device Voltage: 16 volts
Distance from source to 1st device: 100
Wire Gauge for balance of circuit: 14 / 14

Wire Gauge	Resistance Per 1000
14	6.14
14	6.14

Max Output Current: 1.2 amps
Total Circuit Current: 0.992 amps

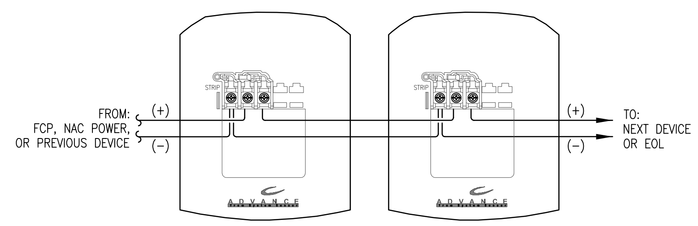
Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.079		19.79	0.61	3%
Device 2	0.176	44	19.54	0.86	4%
Device 3	0.212	56	19.29	1.11	5%
Device 4	0.107	50	19.13	1.27	6%
Device 5	0.066	15	19.09	1.31	6%
Device 6	0.176	23	19.04	1.36	7%
Device 7	0.176	38	19.00	1.40	7%
Totals	0.992	326			



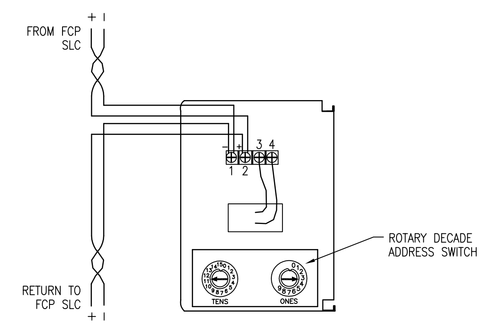
FIRE ALARM RISER DIAGRAM

SCHEMATIC: NO SCALE



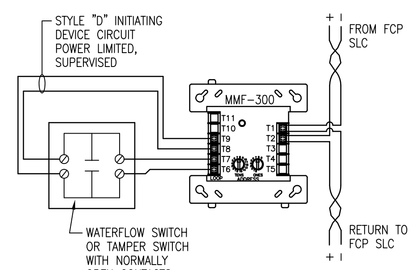
TYPICAL 2 WIRE STROBE WIRING DETAIL

SCHEMATIC: NO SCALE



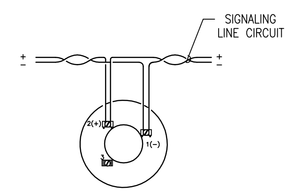
MANUAL PULL STATION WIRING DETAIL

SCHEMATIC: NO SCALE



WATERFLOW / TAMPER WIRING DETAIL

SCHEMATIC: NO SCALE



ADDRESSABLE SMOKE DETECTOR 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.

APPLICABLE CODES:

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

RESERVED FOR CITY STAMP

FIRE ALARM SYMBOL LEGEND

NOTE: ALL SYMBOLS MAY NOT BE USED ON THIS PROJECT

SYMBOL	DESCRIPTION	MOUNTING
FCP	FIRE ALARM CONTROL PANEL	WALL-TOP @ 66"
FPS	FIRE ALARM POWER SUPPLY	FIELD VERIFY
FSA	FIRE SYSTEM ANNUNCIATOR	WALL-TOP @ 66"
S	SMOKE DETECTOR	CEILING
S	DUCT SMOKE DETECTOR	BY OTHERS
H	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
	MAGNETIC DOOR HOLDER	FIELD VERIFY
	WATER FLOW SWITCH	BY OTHERS
	VALVE TAMPER SWITCH	BY OTHERS
	HORN / STROBE	WALL 80"-96"
	STROBE	WALL 80"-96"
KB	KNOX BOX	FIELD VERIFY

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

STROBE CANDELA: 75 / 30

DEVICE ADDRESS: 2 D01 1 (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)

OPERATIONS MATRIX

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

REVISION	DESCRIPTION	DATE
0	ISSUED FOR REVIEW & APPROVAL	8/8/2013
1	UPDATED FA SYSTEM PER NEW FLOOR PLAN	9/13/2013
2	D TO E SIZE DRAWING	9/16/2013

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649 WARREN AVENUE BUILDING
649 WARREN AVENUE
PORTLAND, MAINE 04103
CALCULATIONS, DETAILS, LEGEND, MATRIX, NOTES

DRAWN	JPB UNICAD JOB #13441
CHECKED	WAYNE B. HAWS NICET IV 90496
DATE	8/7/2013
REVISION	2
SCALE	NONE

FA-1

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