FCP Battery Calculation

4/4/2014

PROJECT NAME: ENDODONTIC ASSOCIATES
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-9050UD Main Circuit Board	1	X	0.12000	=	0.12000
ANN-80 Remote Annunciator	1	X	0.01500	=	0.01500
SD355 Smoke Detector	10	X	0.00030	=	0.00300
BG-12LX Pull Station	3	X	0.00023	=	0.00069
TOTAL STANDBY LOAD					0.13869

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
MS-9050UD Main Circuit Board	1	X	0.20000	=	0.20000
ANN-80 Remote Annunciator	1	X	0.04000	=	0.04000
All Addressable Devices – Maximum Draw	1	X	0.40000	=	0.40000
NAC-1	1	X	0.76800	=	0.76800
NAC-2	1	X	1.12100	=	1.12100
TOTAL ALARM LOAD					2.52900

Battery Requirements

Standby Load Current (Amps)	0.13869	X	Required Standby Time in Hours 24.00000	=	3.32856
Alarm Load Current (Amps)	2.52900	X	Required Alarm Time in Hours 0.08333	=	0.21075
Total Ampere Hours (before derating factor)					3.53931
Derating Factor				X	1.2
TOTAL AMPERE HOURS REQUIRED				=	4.24717
BATTERIES TO BE PROVIDED (2 – 12v)					7 AH

NAC Circuit Voltage Drop Calculation — 4/4/2014

Project Name: ENDODONTIC ASSOCIATES
Circuit Number: NAC-1

			Wire Gauge	Resistance Per 1000
Nominal System Voltage	20.4	volts		
Minimum Device Voltage	16	volts		
Distance from source to 1st device	15		14	6.14
Wire Gauge for balance of circuit			14	6.14
Max Output Current	1.0	amps		
Total Circuit Current	0.768	amps		

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.066		20.33	0.07	0%
Device 2	0.079	11	20.28	0.12	1%
Device 3	0.094	5	20.26	0.14	1%
Device 4	0.066	21	20.19	0.21	1%
Device 5	0.079	21	20.13	0.27	1%
Device 6	0.107	31	20.06	0.34	2%
Device 7	0.066	31	20.01	0.39	2%
Device 8	0.066	18	19.99	0.41	2%
Device 9	0.066	15	19.97	0.43	2%
Device 10	0.079	12	19.97	0.43	2%
Totals	0.768	180			

NAC Circuit Voltage Drop Calculation — 4/4/2014

Project Name: ENDODONTIC ASSOCIATES
Circuit Number: NAC-2

			Wire Gauge	Resistance Per 1000
Nominal System Voltage	20.4	volts		
Minimum Device Voltage	16	volts		
Distance from source to 1st device	70		14	6.14
Wire Gauge for balance of circuit			14	6.14
Max Output Current	1.5	amps		
Total Circuit Current	1.121	amps		

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.079		19.92	0.48	2%
Device 2	0.066	6	19.88	0.52	3%
Device 3	0.066	2	19.87	0.53	3%
Device 4	0.066	14	19.79	0.61	3%
Device 5	0.066	17	19.70	0.70	3%
Device 6	0.066	2	19.69	0.71	3%
Device 7	0.066	19	19.61	0.79	4%
Device 8	0.079	14	19.55	0.85	4%
Device 9	0.066	7	19.53	0.87	4%
Device 10	0.066	2	19.52	0.88	4%
Device 11	0.066	22	19.46	0.94	5%
Device 12	0.066	2	19.46	0.94	5%
Device 13	0.079	9	19.44	0.96	5%
Device 14	0.066	12	19.43	0.97	5%
Device 15	0.158	9	19.42	0.98	5%
Totals	1.121	207			

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

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"
RTS	REMOTE TEST STATION	FIELD VERIFY
S	SMOKE DETECTOR	CEILING
S	DUCT SMOKE DETECTOR	BY OTHERS
H	HEAT DETECTOR	CEILING
CO	CARBON MONOXIDE 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
	MAGNETIC DOOR HOLDER	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
	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 (W) 75 — STROBE CANDELA 30

L1D001 OR D01 (L = DENOTES LOOP #) (D or M = DENOTES DETECTOR OR MODULE #) — DEVICE ADDRESS

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

RESERVED FOR CITY STAMP

REVISION	DESCRIPTION	DATE
0	ISSUED FOR REVIEW & APPROVAL	4/4/2014

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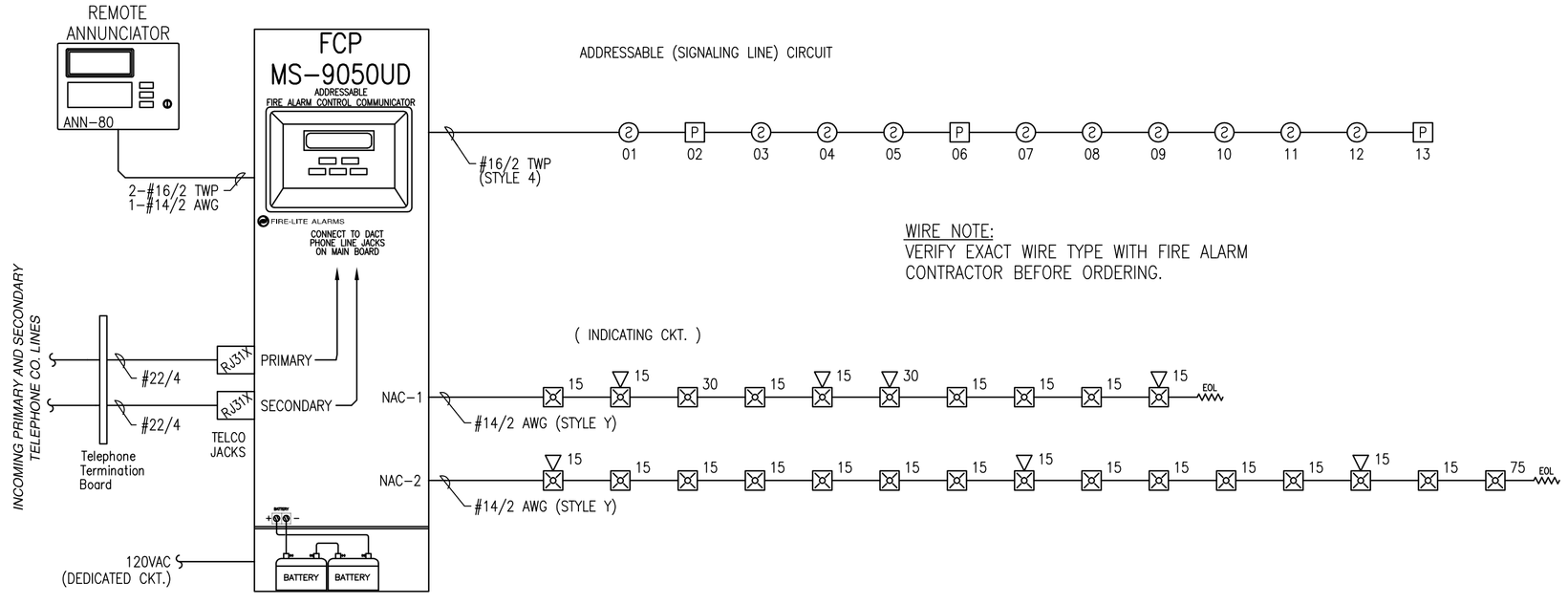
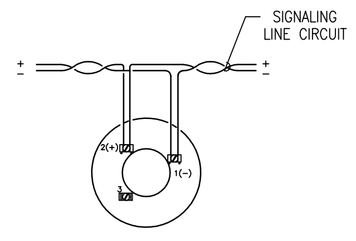
CALCS, DETAILS, LEGEND, MATRIX, NOTES



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

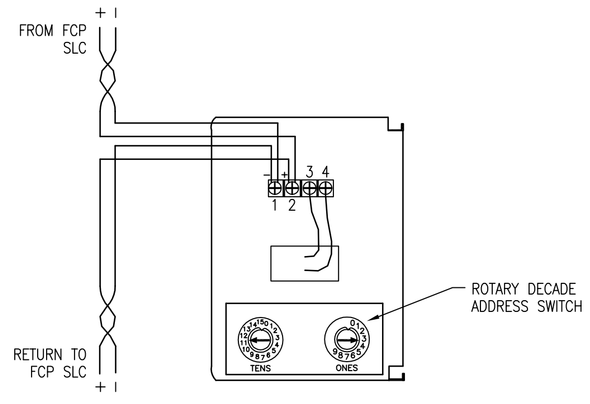
FIRE ALARM RISER DIAGRAM

SCHEMATIC: NO SCALE



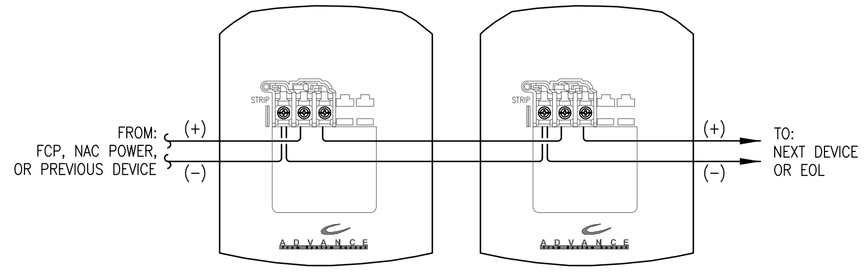
ADDRESSABLE SMOKE DETECTOR WIRING DETAIL

SCHEMATIC: NO SCALE



MANUAL PULL STATION WIRING DETAIL

SCHEMATIC: NO SCALE



TYPICAL 2 WIRE STROBE WIRING DETAIL

SCHEMATIC: NO SCALE

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		●	●			●	
PULL STATIONS		●	●			●	
FIRE ALARM AC POWER FAIL				●	●		●
FIRE ALARM LOW BATTERY				●	●		●
OPEN CIRCUIT				●	●		●
GROUND FAULT				●	●		●
NAC SHORT CIRCUIT				●	●		●
LOSS OF AC TO BUILDING				●	●		●

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SCALE	NONE

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