FCP Battery Calculation

8/7/2013

PROJECT NAME: HABITAT FOR HUMANITY
Required Standby Time: 24 Hours
Required Alarm Time: 5 Minutes

Regulated Load in Standby

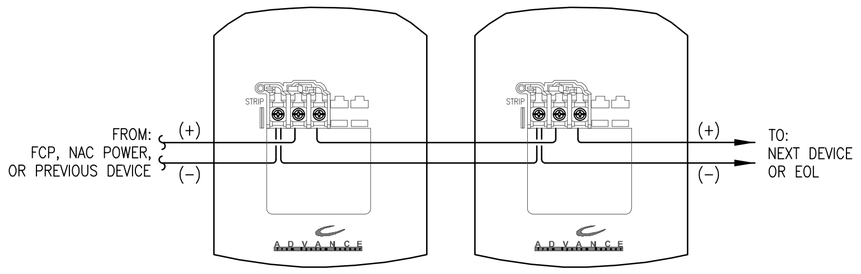
Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
MS-9200UDLS Main Circuit Board	1	X	0.14500	=	0.14500
XRM-24B	1	X	0.00000	=	0.00000
ANN-80 Annunciator	1	X	0.01500	=	0.01500
SD355 Smoke Detector	1	X	0.00030	=	0.00030
MMF-300 Monitor Modules	2	X	0.00040	=	0.00080
BG-12LX Pull Station	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	0.91600	=	0.91600
NAC-3	1	X	1.23400	=	1.23400
TOTAL ALARM LOAD					3.64100

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)	3.64100	X	0.08333	=	0.30342
Total Ampere Hours (before derating factor)					4.17702
Derating Factor				X	1.2
TOTAL AMPERE HOURS REQUIRED				=	5.01242
BATTERIES TO BE PROVIDED (2 - 12v)					7 AH



TYPICAL 2 WIRE STROBE WIRING DETAIL

SCHEMATIC: NO SCALE

NAC Circuit Voltage Drop Calculation — 8/7/2013

Project Name: HABITAT FOR HUMANITY
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

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 — 8/7/2013

Project Name: HABITAT FOR HUMANITY
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

Wire Gauge	Resistance Per 1000
14	6.14
14	6.14

Max Output Current: 1.5 amps
Total Circuit Current: 0.916 amps

Circuit is within limits	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.212		20.23	0.17	1%
Device 2	0.212	2	20.22	0.18	1%
Device 3	0.212	59	20.04	0.36	2%
Device 4	0.107	8	20.03	0.37	2%
Device 5	0.107	2	20.03	0.37	2%
Device 6	0.066	30	20.02	0.38	2%
Totals	0.916	131			

NAC Circuit Voltage Drop Calculation — 8/7/2013

Project Name: HABITAT FOR HUMANITY
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

Wire Gauge	Resistance Per 1000
14	6.14
14	6.14

Max Output Current: 1.5 amps
Total Circuit Current: 1.234 amps

Circuit is within limits	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.212		19.79	0.61	3%
Device 2	0.079	31	19.60	0.80	4%
Device 3	0.176	38	19.38	1.02	5%
Device 4	0.079	23	19.27	1.13	6%
Device 5	0.079	19	19.19	1.21	6%
Device 6	0.079	24	19.10	1.30	6%
Device 7	0.079	20	19.04	1.36	7%
Device 8	0.066	11	19.01	1.39	7%
Device 9	0.066	8	18.99	1.41	7%
Device 10	0.107	10	18.97	1.43	7%
Device 11	0.212	32	18.93	1.47	7%
Totals	1.234	296			

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

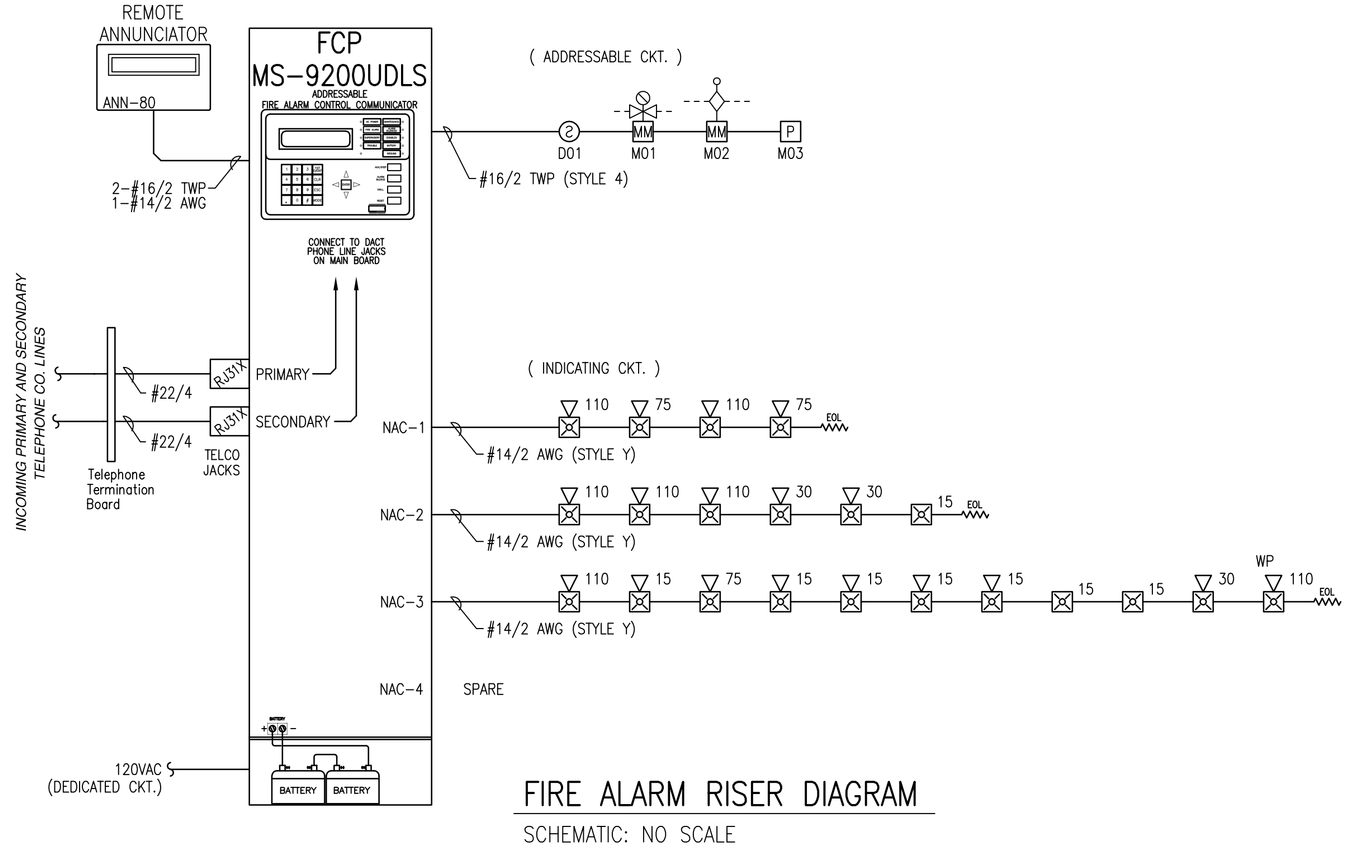
SYMBOL	DESCRIPTION	MOUNTING
FCP	FIRE ALARM CONTROL PANEL	WALL-TOP @ 66"
FPS	FIRE ALARM POWER SUPPLY	FIELD VERIFY
FSA	FIRE SYSTEM ANNUNCIATOR	WALL-TOP @ 66"
FSD	FIRE/SMOKE DAMPER	BY OTHERS
(2)	SMOKE DETECTOR	CEILING
(2)-	DUCT SMOKE DETECTOR	BY OTHERS
(1)	HEAT DETECTOR	CEILING
CM	ADDRESSABLE CONTROL MODULE	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
	BELL	BY OTHERS
	CEILING MOUNT STROBE	FIELD VERIFY
	CEILING MOUNT HORN / STROBE	FIELD VERIFY
	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 (2W) 75 — STROBE CANDELA 30

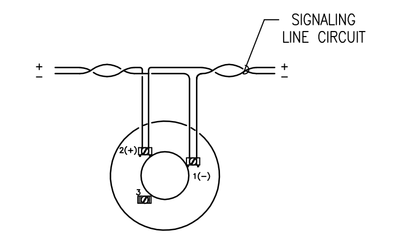
(2) DEVICE ADDRESS (1)
L1D001 OR D01
(L - DENOTES LOOP #)
(D or M - DENOTES DETECTOR OR MODULE #)

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



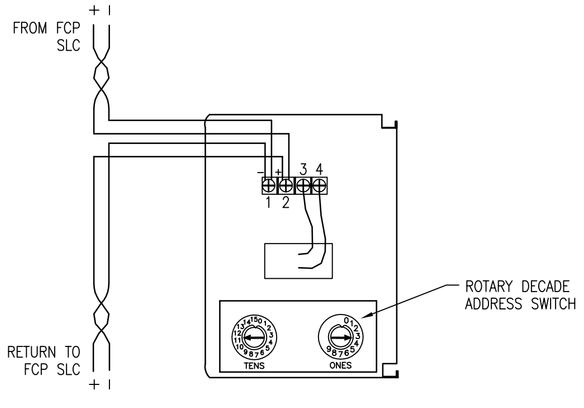
FIRE ALARM RISER DIAGRAM

SCHEMATIC: NO SCALE



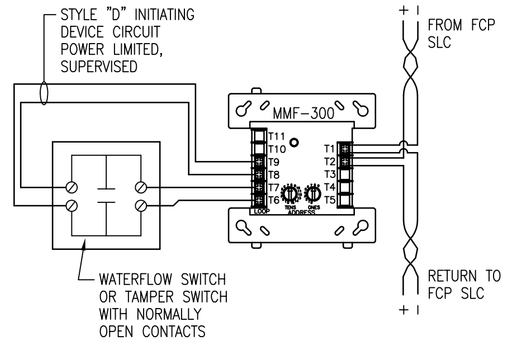
ADDRESSABLE SMOKE DETECTOR WIRING DETAIL

SCHEMATIC: NO SCALE



MANUAL PULL STATION WIRING DETAIL

SCHEMATIC: NO SCALE



WATERFLOW / TAMPER WIRING DETAIL

SCHEMATIC: NO SCALE

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

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CALCS, DETAILS, LEGEND, MATRIX, NOTES

DRAWN	JPB UNICAD JOB #13441
CHECKED	WAYNE B. HAWS NICET IV 90496
DATE	8/7/2013
REVISION	0
SCALE	NONE

FA-1

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