FACP Battery Calculation

3/20/2016

PROJECT NAME:	233 CUMBERLAND	
Required Standby Time:	24	Hours
Required Alarm Time:	5	Minutes

AC Branch Current

AC Branch Current: Amps @ 120V

Regulated Load in Standby

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
MS-9050 – FACP MAINBOARD	1	X	0.12000	=	0.12000
7788FULP – RADIO TRANSMITTER	1	X	0.04000	=	0.04000
SD355 – SMOKE DETECTOR	5	X	0.00003	=	0.00015
MMF301 – MONITOR MODULE	2	X	0.00038	=	0.00076
BG-12LX – PULL STATION	10	X	0.00038	=	0.00380
ANNN-80 – ANNUNCIATOR	1	X	0.00038	=	0.00038
TOTAL STANDBY LOAD					0.16509

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
MS-9050 – FACP MAINBOARD	1	X	0.12000	=	0.12000
7788FULP – RADIO TRANSMITTER	1	X	0.04000	=	0.04000
SD355 – SMOKE DETECTOR	5	X	0.00660	=	0.03300
MMF301 – MONITOR MODULE	2	X	0.00050	=	0.00100
BG-12LX – PULL STATION	10	X	0.00500	=	0.05000
ANNN-80 – ANNUNCIATOR	1	X	0.73600	=	0.73600
FACP-1 (See Voltage Drop Calculations)	1	X	0.81300	=	0.81300
FACP-2 (See Voltage Drop Calculations)	1	X	0.29400	=	0.29400
TOTAL ALARM LOAD					2.08700

Battery Requirements

Standby Load			Required Standby Time in Hours		
Current (Amps)	0.16509	X	24.00000	=	3.96216
Alarm Load			Required Alarm Time in Hours		
Current (Amps)	2.08700	X	0.08333	=	0.17392
Total Ampere Hours (before derating factor)					4.13608
Derating Factor				X	1.2
TOTAL AMPERE HOURS REQUIRED				=	4.96329
BATTERIES TO BE PROVIDED (2 – 12v)					7 AH

Point to Point NAC Voltage Drop Calculation

3/20/2016

Project Name	233 CUMBERLAND			
Circuit Number	FACP-1			
Nominal System Voltage	20.4	volts	Wire	Resistance
Minimum Device Voltage	16.0	volts	Gauge	Per 1000
Distance from source to 1st device	40	feet	14	3.07
Wire Gauge for balance of circuit			14	3.07
Max Output Current	3.00	amps		
Total Circuit Current	0.813	amps		
End of Line Voltage	19.46	volts		

Circuit is within limits

		Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	AV-110	0.066	40	20.20	0.200	0.98%
Device 2	AV-15	0.212	60	19.93	0.475	2.33%
Device 3	AV-15	0.066	10	19.89	0.508	2.49%
Device 4	VO-15	0.066	40	19.78	0.623	3.05%
Device 4	AV-15	0.079	60	19.63	0.771	3.78%
Device 6	AV-15	0.079	25	19.58	0.821	4.03%
Device 7	VO-15	0.066	30	19.53	0.866	4.25%
Device 8	MH	0.017	15	19.52	0.883	4.33%
Device 9	MH	0.017	25	19.49	0.908	4.45%
Device 10	VO-15	0.066	15	19.48	0.921	4.51%
Device 11	AV-15	0.079	35	19.46	0.938	4.60%
Totals		0.813	355			

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

3/20/2016

Project Name	233 CUMBERLAND			
Circuit Number	FACP-2			
Nominal System Voltage	20.4	volts	Wire	Resistance
Minimum Device Voltage	16.0	volts	Gauge	Per 1000
Distance from source to 1st device	100	feet	14	3.07
Wire Gauge for balance of circuit			14	3.07
Max Output Current	3.00	amps		
Total Circuit Current	0.294	amps		
End of Line Voltage	20.07	volts		

Circuit is within limits

		Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	AV-15	0.079	100	20.22	0.181	0.88%
Device 2	MH	0.017	15	20.20	0.200	0.98%
Device 3	MH	0.017	15	20.18	0.219	1.07%
Device 4	MH	0.017	30	20.15	0.252	1.23%
Device 5	MH	0.017	15	20.13	0.267	1.31%
Device 6	AV-15	0.079	15	20.12	0.281	1.38%
Device 7	MH	0.017	75	20.09	0.312	1.53%
Device 8	MH	0.017	15	20.08	0.317	1.55%
Device 9	MH	0.017	35	20.08	0.324	1.59%
Device 10	MH	0.017	15	20.07	0.325	1.60%
Totals		0.294	330			

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)).

FIRE ALARM RISER DIAGRAM

SCHEMATIC: NO SCALE

REVISION	DESCRIPTION	DATE
0	ISSUED FOR REVIEW & APPROVAL	3/20/2016

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FIRE ALARM PLAN - RISER

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CHECKED	WAYNE B. HAWS NICET IV 90496
DATE	3/18/2016
REVISION	
SCALE	

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Reviewed for Code Compliance
Inspections Division
Approved with Conditions

CITY OF PORTLAND, MAINE

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