FACP Battery Calculation

12/19/2017

PROJECT NAME:	608–610 CONGRESS STREET	
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 – MS–9200UDLS MAIN CIRCUIT BOARD	1	X	0.14500	=	0.14500
ANN–80W WITH FACP	1	X	0.01500	=	0.01500
XRM–24B	1	X	0.00000	=	0.00000
ANN–80 REMOTE ANNUNCIATOR	1	X	0.01500	=	0.01500
SD355 SMOKE DETECTOR	19	X	0.00030	=	0.00570
H355/H355R HEAT DETECTOR	30	X	0.00030	=	0.00900
MMF–301 MINI MONITOR MODULE	10	X	0.00038	=	0.00375
MAX ALARM DRAW – ALL ADDRESS DEVICES	1	X	0.00000	=	0.00000
TOTAL STANDBY LOAD					0.19345

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
FACP – MS–9200UDLS MAIN CIRCUIT BOARD	1	X	0.27500	=	0.27500
ANN–80W WITH FACP	1	X	0.04000	=	0.04000
XRM–24B	1	X	0.00000	=	0.00000
ANN–80 REMOTE ANNUNCIATOR	1	X	0.04000	=	0.04000
SD355 SMOKE DETECTOR	19	X	0.00000	=	0.00000
H355/H355R HEAT DETECTOR	30	X	0.00000	=	0.00000
MMF–301 MINI MONITOR MODULE	10	X	0.00000	=	0.00000
MAX ALARM DRAW – ALL ADDRESS DEVICES	1	X	0.40000	=	0.40000
NAC–1 (See Voltage Drop Calculations)	1	X	0.49500	=	0.49500
NAC–2 (See Voltage Drop Calculations)	1	X	0.90600	=	0.90600
NAC–3 (See Voltage Drop Calculations)	1	X	0.71400	=	0.71400
NAC–4 (See Voltage Drop Calculations)	1	X	0.71400	=	0.71400
TOTAL ALARM LOAD					3.58400

Battery Requirements

Standby Load			Required Standby Time in Hours		
Current (Amps)	0.19345	X	24.00000	=	4.64280
Alarm Load			Required Alarm Time in Hours		
Current (Amps)	3.58400	X	0.08333	=	0.29867
Total Ampere Hours (before derating factor)					4.94147
Derating Factor				X	1.2
TOTAL AMPERE HOURS REQUIRED				=	5.92976
BATTERIES TO BE PROVIDED (2 – 12v)					7 AH

Point to Point NAC Voltage Drop Calculation

12/19/2017

Project Name	608–610 CONGRESS STREET			
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	25	feet	16	4.89
Wire Gauge for balance of circuit			16	4.89
Max Output Current	1.50	amps		
Total Circuit Current	0.495	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	0.054	25	20.28	0.121	0.59%
Device 2	0.074	10	20.24	0.164	0.80%
Device 3	0.043	10	20.20	0.200	0.98%
Device 4	0.043	5	20.18	0.216	1.06%
Device 5	0.043	5	20.17	0.230	1.13%
Device 6	0.074	15	20.14	0.265	1.30%
Device 7	0.121	35	20.08	0.321	1.57%
Device 8	0.043	30	20.07	0.333	1.63%
Totals	0.495	135			

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

12/19/2017

Project Name	608–610 CONGRESS STREET			
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	40	feet	16	4.89
Wire Gauge for balance of circuit			16	4.89
Max Output Current	1.50	amps		
Total Circuit Current	0.906	amps		
End of Line Voltage	19.37	volts		

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.138	40	20.05	0.354	1.74%
Device 2	0.054	15	19.93	0.467	2.29%
Device 3	0.054	20	19.79	0.607	2.97%
Device 4	0.138	20	19.66	0.736	3.61%
Device 5	0.138	5	19.64	0.761	3.73%
Device 6	0.138	45	19.47	0.930	4.56%
Device 7	0.054	15	19.43	0.966	4.74%
Device 8	0.054	10	19.41	0.985	4.83%
Device 9	0.138	30	19.37	1.026	5.03%
Totals	0.906	200			

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)).

PLAN NORTH

GROUND FLOOR FIRE ALARM PLAN

SCALE: 1/4"=1'–0"

0 2' 4' 8'

RESERVED FOR CITY STAMP

Point to Point NAC Voltage Drop Calculation

12/19/2017

Project Name	608–610 CONGRESS STREET			
Circuit Number	NAC–3			
Nominal System Voltage	20.4	volts	Wire Gauge	Resistance Per 1000
Minimum Device Voltage	16.0	volts		
Distance from source to 1st device	60	feet	16	4.89
Wire Gauge for balance of circuit			16	4.89
Max Output Current	1.50	amps		
Total Circuit Current	0.714	amps		
End of Line Voltage	19.54	volts		

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.138	60	19.98	0.419	2.05%
Device 2	0.138	20	19.87	0.532	2.61%
Device 3	0.054	25	19.76	0.639	3.13%
Device 4	0.054	20	19.69	0.714	3.50%
Device 5	0.054	25	19.61	0.795	3.89%
Device 6	0.138	10	19.58	0.822	4.03%
Device 7	0.138	25	19.54	0.855	4.19%
Totals	0.714	185			

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

12/19/2017

Project Name	608–610 CONGRESS STREET			
Circuit Number	NAC–4			
Nominal System Voltage	20.4	volts	Wire Gauge	Resistance Per 1000
Minimum Device Voltage	16.0	volts		
Distance from source to 1st device	75	feet	16	4.89
Wire Gauge for balance of circuit			16	4.89
Max Output Current	1.50	amps		
Total Circuit Current	0.714	amps		
End of Line Voltage	19.42	volts		

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.138	75	19.88	0.524	2.57%
Device 2	0.138	20	19.76	0.636	3.12%
Device 3	0.054	30	19.64	0.765	3.75%
Device 4	0.054	20	19.56	0.840	4.12%
Device 5	0.054	20	19.50	0.905	4.43%
Device 6	0.138	15	19.45	0.945	4.63%
Device 7	0.138	25	19.42	0.979	4.80%
Totals	0.714	205			

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)).

REVISION	DESCRIPTION	DATE
0	ISSUED FOR REVIEW & APPROVAL	12/19/2017

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608 & 610 CONGRESS STREET
PORTLAND, MAINE 04101
CALCS & GROUND FLOOR FIRE ALARM PLAN

DRAWN	JPB UNICAD JOB #17820
CHECKED	BRADY B. HAWS NICET III 138751
DATE	12/19/2017
REVISION	0
SCALE	1/4"=1'–0"

FA-2

Date: 01/17/18

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