FCP Battery Calculation

6/4/2013

PROJECT NAME: RUNNING WITH SCISSORS
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	1	X	0.00030	=	0.00030
H355 Heat Detector	1	X	0.00030	=	0.00030
MMF-300 Monitor Module	2	X	0.00040	=	0.00080
BG-12LX Pull Station	2	X	0.00023	=	0.00046
TOTAL STANDBY LOAD					0.13686

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
TOTAL ALARM LOAD					0.64000

Battery Requirements

Standby Load			Required Standby Time in Hours		
Current (Amps)	0.13686	X	24.00000	=	3.28464
Alarm Load			Required Alarm Time in Hours		
Current (Amps)	0.64000	X	0.08333	=	0.05333
Total Ampere Hours (before derating factor)					3.33797
Derating Factor				X	1.2
TOTAL AMPERE HOURS REQUIRED				=	4.00557
BATTERIES TO BE PROVIDED (2 - 12v)					7 AH

FPS1 Battery Calculation

6/4/2013

PROJECT NAME: RUNNING WITH SCISSORS
Required Standby Time: 24 Hours
Required Alarm Time: 5 Minutes

AC Branch Current

AC Branch Current: 3.2 Amps @ 120V

Regulated Load in Standby

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
FCPS-24FS8 Main Circuit Board	1	X	0.06500	=	0.06500
TOTAL STANDBY LOAD					0.06500

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
FCPS-24FS8 Main Circuit Board	1	X	0.14500	=	0.14500
FPS1-1	1	X	1.71800	=	1.71800
FPS1-2	1	X	1.30300	=	1.30300
FPS1-3	1	X	1.31900	=	1.31900
FPS1-4	1	X	0.37000	=	0.37000
TOTAL ALARM LOAD					4.85500

Battery Requirements

Standby Load			Required Standby Time in Hours		
Current (Amps)	0.06500	X	24.00000	=	1.56000
Alarm Load			Required Alarm Time in Hours		
Current (Amps)	4.85500	X	0.08333	=	0.40458
Total Ampere Hours (before derating factor)					1.96458
Derating Factor				X	1.2
TOTAL AMPERE HOURS REQUIRED				=	2.35750
BATTERIES TO BE PROVIDED (2 - 12v)					7 AH

NAC Circuit Voltage Drop Calculation

6/4/2013

Project Name: RUNNING WITH SCISSORS
Circuit Number: FPS1-1

			Wire Gauge	Resistance Per 1000
Nominal System Voltage	20.4	volts		
Minimum Device Voltage	16	volts		
Distance from source to 1st device	20		14	6.14
Wire Gauge for balance of circuit			14	6.14
Max Output Current	2.0	amps		
Total Circuit Current	1.718	amps		

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.094		20.19	0.21	1%
Device 2	0.176	20	19.99	0.41	2%
Device 3	0.094	17	19.84	0.56	3%
Device 4	0.079	23	19.65	0.75	4%
Device 5	0.079	2	19.63	0.77	4%
Device 6	0.107	34	19.38	1.02	5%
Device 7	0.107	2	19.37	1.03	5%
Device 8	0.094	22	19.24	1.16	6%
Device 9	0.176	12	19.17	1.23	6%
Device 10	0.066	14	19.11	1.29	6%
Device 11	0.066	2	19.10	1.30	6%
Device 12	0.066	27	19.01	1.39	7%
Device 13	0.066	2	19.00	1.40	7%
Device 14	0.066	27	18.92	1.48	7%
Device 15	0.066	2	18.92	1.48	7%
Device 16	0.158	44	18.83	1.57	8%
Device 17	0.158	2	18.83	1.57	8%
Totals	1.718	272			

NAC Circuit Voltage Drop Calculation

6/4/2013

Project Name: RUNNING WITH SCISSORS
Circuit Number: FPS1-2

			Wire Gauge	Resistance Per 1000
Nominal System Voltage	20.4	volts		
Minimum Device Voltage	16	volts		
Distance from source to 1st device	10		14	6.14
Wire Gauge for balance of circuit			14	6.14
Max Output Current	2.0	amps		
Total Circuit Current	1.303	amps		

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.079		20.32	0.08	0%
Device 2	0.079	19	20.18	0.22	1%
Device 3	0.066	17	20.06	0.34	2%
Device 4	0.094	23	19.91	0.49	2%
Device 5	0.066	8	19.86	0.54	3%
Device 6	0.066	19	19.75	0.65	3%
Device 7	0.066	2	19.74	0.66	3%
Device 8	0.066	17	19.66	0.74	4%
Device 9	0.066	2	19.65	0.75	4%
Device 10	0.079	52	19.44	0.96	5%
Device 11	0.066	14	19.39	1.01	5%
Device 12	0.066	10	19.36	1.04	5%
Device 13	0.094	2	19.35	1.05	5%
Device 14	0.218	23	19.30	1.10	5%
Device 15	0.066	24	19.28	1.12	5%
Device 16	0.066	2	19.28	1.12	5%
Totals	1.303	244			

NAC Circuit Voltage Drop Calculation

6/4/2013

Project Name: RUNNING WITH SCISSORS
Circuit Number: FPS1-3

			Wire Gauge	Resistance Per 1000
Nominal System Voltage	20.4	volts		
Minimum Device Voltage	16	volts		
Distance from source to 1st device	35		14	6.14
Wire Gauge for balance of circuit			14	6.14
Max Output Current	2.0	amps		
Total Circuit Current	1.319	amps		

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.066		20.12	0.28	1%
Device 2	0.066	2	20.10	0.30	1%
Device 3	0.066	13	20.01	0.39	2%
Device 4	0.094	17	19.89	0.51	3%
Device 5	0.079	32	19.69	0.71	3%
Device 6	0.066	26	19.54	0.86	4%
Device 7	0.066	2	19.53	0.87	4%
Device 8	0.079	4	19.51	0.89	4%
Device 9	0.176	40	19.32	1.08	5%
Device 10	0.066	27	19.23	1.17	6%
Device 11	0.066	4	19.22	1.18	6%
Device 12	0.066	2	19.21	1.19	6%
Device 13	0.218	13	19.18	1.22	6%
Device 14	0.066	18	19.17	1.23	6%
Device 15	0.079	2	19.17	1.23	6%
Totals	1.319	237			

NAC Circuit Voltage Drop Calculation

6/4/2013

Project Name: RUNNING WITH SCISSORS
Circuit Number: FPS1-4

			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	2.0	amps		
Total Circuit Current	0.370	amps		

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.158		20.37	0.03	0%
Device 2	0.212	51	20.30	0.10	0%
Totals	0.370	66			

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 7/15/2013

RESERVED FOR CITY STAMP

REVISION	DESCRIPTION	DATE
0	ISSUED FOR REVIEW & APPROVAL	6/5/2013

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RUNNING WITH SCISSORS
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CALCULATIONS

DRAWN	JPB UNICAD JOB #13273
CHECKED	WAYNE B. HAWS NICET IV 90496
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REVISION	0
SCALE	NONE

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