

SAINT LOUIS
UNIVERSITY

Marguerite Hall

Fire Alarm, Voice Evacuation and Firefighter Telephone Systems Upgrade

Battery Calculations

Prepared by:

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Fire Alarm Systems Level IV
NICET Certification Number [121312](#)

July 3, 2014



MS-9600LS Battery Calculation

Secondary Power Source Requirements

Device Type	Standby Current (amps)				Secondary Alarm Current (amps)			
	Qty	x	Current Draw	= Total	Qty	x	Current Draw	= Total
Main Circuit Board	1	x	0.103000	= 0.10300	1	x	0.253000	= 0.25300
DACT-UD2	1	x	0.017000	= 0.01700	1	x	0.029000	= 0.02900
SLC-2LS Expander Module	1	x	0.019000	= 0.01900	1	x	0.026000	= 0.02600
4XTMF	0	x	0.005000	=	0	x	0.011000	=
IPDACT-2	0	x	0.093000	=	0	x	0.136000	=
IPDACT-2UD	0	x	0.098000	=	0	x	0.155000	=
ANN-BUS Devices								
ANN-80(-W)	1	x	0.015000	= 0.015000	1	x	0.040000	= 0.040000
ANN-LED	0	x	0.028000	=	0	x	0.068000	=
ANN-RLED	0	x	0.028000	=	0	x	0.068000	=
ANN-RLY	0	x	0.015000	=	0	x	0.075000	=
ANN-I/O	0	x	0.035000	=	0	x	0.200000	=
ANN-S/PG	0	x	0.045000	=	0	x	0.045000	=
ACS Annunciators								
ACM-8RF	0	x	0.030000	=	0	x	0.158000	=
ACM-16ATF	0	x	0.040000	=	0	x	0.056000	=
ACM-32AF	0	x	0.040000	=	0	x	0.056000	=
AEM-16ATF	0	x	0.002000	=	0	x	0.018000	=
AEM-32AF	0	x	0.002000	=	0	x	0.018000	=
AFM-16ATF	0	x	0.040000	=	0	x	0.056000	=
AFM-32AF	0	x	0.040000	=	0	x	0.056000	=
AFM-16AF	0	x	0.025000	=	0	x	0.065000	=
LDM-32F	0	x	0.040000	=	0	x	0.056000	=
LDM-E32F	0	x	0.002000	=	0	x	0.018000	=
LCD-80F	0	x	0.025000	=	0	x	0.064000	=
Resettable Power								
4-wire Detector Heads	0	x	0.000000	=	0	x	0.000000	=
Addressable Devices								
BEAM355	0	x	0.002000	=				
BEAM355S	0	x	0.002000	=				
BEAM1224	0	x	0.017000	=				
CP355	0	x	0.000300	=				
SD355	124	x	0.000300	= 0.037200				
SD355T	0	x	0.000300	=				
AD355	0	x	0.000300	=				
H355	5	x	0.000300	= 0.001500				
H355R	0	x	0.000300	=				
H355HT	0	x	0.000300	=				
D350P	0	x	0.000300	=				
D350RP	0	x	0.000300	=				
D350PL	0	x	0.000300	=				
D350RPL	0	x	0.000300	=				
D355PL	4	x	0.000300	= 0.001200				
MMF-300	25	x	0.000400	= 0.010000				
MMF-300-10	0	x	0.003500	=				
MDF-300	0	x	0.000750	=				
MMF-301	11	x	0.000375	= 0.004125				
MMF-302	0	x	0.000270	=				
MMF-302-6	0	x	0.002000	=				
BG-12LX	23	x	0.000300	= 0.006900				

CMF-300	5	x	0.000390	=	0.001950				
CMF-300-6	0	x	0.002250	=					
CRF-300	6	x	0.000270	=	0.001620				
CRF-300-6	0	x	0.001450	=					
I300	13	x	0.000400	=	0.005200				
B501BH-2	0	x	0.001000	=					
B501BHT-2	0	x	0.001000	=					
B224RB	0	x	0.000500	=					
B224BI	0	x	0.000450	=					
B200SR	0	x	0.000500	=					
CDRM-300	0	x	0.001300	=					
	Maximum alarm draw for Addressable devices (SLC 1)							0.40000	
	Maximum alarm draw for Addressable devices (SLC 2)							0.40000	
EOLR-1	0	x	0.020000	=		0	x	0.020000	=
Miscellaneous Device 1	0	x	0.000000	=		0	x	0.000000	=
Miscellaneous Device 2	0	x	0.000000	=		0	x	0.000000	=
Miscellaneous Device 3	0	x	0.000000	=		0	x	0.000000	=
Miscellaneous Device 4	0	x	0.000000	=		0	x	0.000000	=
Miscellaneous Device 5	0	x	0.000000	=		0	x	0.000000	=
NAC #1						0	x	0.000000	=
NAC #2						0	x	0.000000	=
NAC #3						0	x	0.000000	=
NAC #4						0	x	0.000000	=
Current Draw from TB3 (non-alarm)			0.000000	=				0.000000	=
Sum each column for totals	Total Standby Current			0.22370	Total Alarm Current			1.14800	

MS-9600LS Battery Calculation

Note: You can edit all current draws and are **fully responsible for verifying** these calculations. Only enter values in **yellow** cells.

		Required Standby Time in Hours			
		24 Hours			
Standby Load Current (Amps)	0.224 A	x	24	=	5.369 AH
		Required Alarm Time in Hours			
		15 Minutes			
Alarm Load Current (Amps)	1.148 A	x	0.25	=	0.287 AH
Standby and Alarm Load Subtotal				=	5.656 AH
Derating Factor				=	x 1.2
Total Ampere Hours Required				=	6.787 AH

Recommended Batteries:	BAT-1270 - 7AH Batteries
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Battery Check

The batteries can be charged by the MS-9600LS Charger.
 The batteries can be housed in the MS-9600LS Cabinet.

Current Draw Check

NAC#1 current is within the limitations of the circuit.
 NAC#2 current is within the limitations of the circuit.
 NAC#3 current is within the limitations of the circuit.
 NAC#4 current is within the limitations of the circuit.
 The standby current is within the limitations of the panel.
 The alarm current is within output limitations of the panel.

Jobsite Information: Marguerite Hall, FCPS 1 (First Floor)

FCPS-24FS6 / 8 Battery Calculation

Entries only to be made in the Yellow cell locations

Regulated Load in Standby

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
Main PC Board	1	X	0.065	=	0.065
Power Supervision Relays	0	X	0.025	=	0
Auxiliary Current Draw from TB4 Terminals 9 & 10	0	X	0	=	0
STANDBY LOAD					= 0.065

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
Main PC Board without AC	1	X	0.145	=	0.145
Power Supervision Relays	0	X	0.025	=	0
Auxiliary Current Draw from TB4 Terminals 9 & 10	0	X	0	=	0
NAC / Output # 1	6	X	0.158	=	0.948
NAC / Output # 2	6	X	0.158	=	0.948
NAC / Output # 3	9	X	0.158	=	1.422
NAC / Output # 4	9	X	0.158	=	1.422
ALARM LOAD					= 4.885

Battery Amp Hour Calculation

Standby Load Current (Amps)		Required Standby Time (Typically 24 or 60 Hours)
0.065	X	24 = 1.56 AH
Alarm Load Current (Amps)		Required Alarm Time (Typically 5 or 10 Minutes)
4.885	X	15 = 1.22 AH
Sub Total Standby / Alarm Amp Hours		2.78 AH
Multiply by the Derating Factor		X 1.2 *
Total Ampere Hours Required		= 4 AH

* Derating Factor required to compensate for the non-linear discharge characteristic of a battery.

Jobsite Information: Marguerite Hall, FCPS 2 (Second Floor)

FCPS-24FS6 / 8 Battery Calculation

Entries only to be made in the Yellow cell locations

Regulated Load in Standby

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
Main PC Board	1	X	0.065	=	0.065
Power Supervision Relays	0	X	0.025	=	0
Auxiliary Current Draw from TB4 Terminals 9 & 10	0	X	0	=	0
STANDBY LOAD					= 0.065

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
Main PC Board without AC	1	X	0.145	=	0.145
Power Supervision Relays	0	X	0.025	=	0
Auxiliary Current Draw from TB4 Terminals 9 & 10	0	X	0	=	0
NAC / Output # 1	5	X	0.158	=	0.79
NAC / Output # 2	4	X	0.158	=	0.632
NAC / Output # 3	5	X	0.158	=	0.79
NAC / Output # 4	4	X	0.158	=	0.632
ALARM LOAD					= 2.989

Battery Amp Hour Calculation

Standby Load Current (Amps)		Required Standby Time (Typically 24 or 60 Hours)
0.065	X	24 = 1.56 AH
Alarm Load Current (Amps)		Required Alarm Time (Typically 5 or 10 Minutes)
2.989	X	15 = 0.75 AH
Sub Total Standby / Alarm Amp Hours		2.31 AH
Multiply by the Derating Factor		X 1.2 *
Total Ampere Hours Required		= 3 AH

* Derating Factor required to compensate for the non-linear discharge characteristic of a battery.

Jobsite Information: Marguerite Hall, FCPS 3 (Fourth Floor)

FCPS-24FS6 / 8 Battery Calculation

Entries only to be made in the Yellow cell locations

Regulated Load in Standby

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
Main PC Board	1	X	0.065	=	0.065
Power Supervision Relays	0	X	0.025	=	0
Auxiliary Current Draw from TB4 Terminals 9 & 10	0	X	0	=	0
STANDBY LOAD =					0.065

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
Main PC Board without AC	1	X	0.145	=	0.145
Power Supervision Relays	0	X	0.025	=	0
Auxiliary Current Draw from TB4 Terminals 9 & 10	0	X	0	=	0
NAC / Output # 1	5	X	0.158	=	0.79
NAC / Output # 2	4	X	0.158	=	0.632
NAC / Output # 3	5	X	0.158	=	0.79
NAC / Output # 4	4	X	0.158	=	0.632
ALARM LOAD =					2.989

Battery Amp Hour Calculation

Standby Load Current (Amps)		Required Standby Time (Typically 24 or 60 Hours)	
0.065	X	24	= 1.56 AH
Alarm Load Current (Amps)		Required Alarm Time (Typically 5 or 10 Minutes)	
2.989	X	15	= 0.75 AH
Sub Total Standby / Alarm Amp Hours			2.31 AH
Multiply by the Derating Factor			X 1.2 *
Total Ampere Hours Required =			3 AH

* Derating Factor required to compensate for the non-linear discharge characteristic of a battery.

Jobsite Information: Marguerite Hall, FCPS 4 (Sixth Floor)

FCPS-24FS6 / 8 Battery Calculation

Entries only to be made in the Yellow cell locations

Regulated Load in Standby

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
Main PC Board	1	X	0.065	=	0.065
Power Supervision Relays	0	X	0.025	=	0
Auxiliary Current Draw from TB4 Terminals 9 & 10	0	X	0	=	0
STANDBY LOAD					= 0.065

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
Main PC Board without AC	1	X	0.145	=	0.145
Power Supervision Relays	0	X	0.025	=	0
Auxiliary Current Draw from TB4 Terminals 9 & 10	0	X	0	=	0
NAC / Output # 1	5	X	0.158	=	0.79
NAC / Output # 2	4	X	0.158	=	0.632
NAC / Output # 3	5	X	0.158	=	0.79
NAC / Output # 4	4	X	0.158	=	0.632
ALARM LOAD					= 2.989

Battery Amp Hour Calculation

Standby Load Current (Amps)		Required Standby Time (Typically 24 or 60 Hours)	
0.065	X	24	= 1.56 AH
Alarm Load Current (Amps)		Required Alarm Time (Typically 5 or 10 Minutes)	
2.989	X	15	= 0.75 AH
Sub Total Standby / Alarm Amp Hours			2.31 AH
Multiply by the Derating Factor			X 1.2 *
Total Ampere Hours Required			= 3 AH

* Derating Factor required to compensate for the non-linear discharge characteristic of a battery.

Jobsite Information: Marguerite Hall, FCPS 5 (Eighth Floor)

FCPS-24FS6 / 8 Battery Calculation

Entries only to be made in the Yellow cell locations

Regulated Load in Standby

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
Main PC Board	1	X	0.065	=	0.065
Power Supervision Relays	0	X	0.025	=	0
Auxiliary Current Draw from TB4 Terminals 9 & 10	0	X	0	=	0
STANDBY LOAD =					0.065

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
Main PC Board without AC	1	X	0.145	=	0.145
Power Supervision Relays	0	X	0.025	=	0
Auxiliary Current Draw from TB4 Terminals 9 & 10	0	X	0	=	0
NAC / Output # 1	7	X	0.158	=	1.106
NAC / Output # 2	1	X	0.158	=	0.158
NAC / Output # 3	1	X	0.158	=	0.158
NAC / Output # 4	0	X	0	=	0
ALARM LOAD =					1.567

Battery Amp Hour Calculation

Standby Load Current (Amps)		Required Standby Time (Typically 24 or 60 Hours)	
0.065	X	24	= 1.56 AH
Alarm Load Current (Amps)		Required Alarm Time (Typically 5 or 10 Minutes)	
1.567	X	15	= 0.39 AH
Sub Total Standby / Alarm Amp Hours			1.95 AH
Multiply by the Derating Factor			X 1.2 *
Total Ampere Hours Required =			3 AH

* Derating Factor required to compensate for the non-linear discharge characteristic of a battery.

ECC-50/100 Battery Calculation

Secondary Power Source Requirements


Device Type	Standby Current (amps)					Secondary Alarm Current (amps)					
	Qty		Current Draw	=	Total	Qty		Current Draw	=	Total	
1. System											
ECC-50/100 Primary Console	1	X	0.2720	=	0.2720	1	X	0.4460	=	0.4460	
ECC-50W-25V/70V*1	0	X	0.1000	=		0	X	0.2350	=		
ECC-50W-25V/70V (As Backup)*1	0	X	0.1000	=		0	X	0.0000	=		
ECC-CE6 Circuit Expander	1	X	0.0200	=	0.0200	1	X	0.1890	=	0.1890	
ECC-RTZM	0	X	0.0550	=		0	X	0.0600	=		
ECC-FFT Firefighter Telephone	1	X	0.1200	=	0.1200	1	X	0.2300	=	0.2300	
2. Operator Interface Devices (Maximum of 8 total)											
ECC-LOC Local Operator Console	0	X	0.0850	=		0	X	0.1000	=		
ECC-RM Remote Microphone	0	X	0.0500	=		0	X	0.0640	=		
ECC-RPU Remote Page Unit	0	X	0.0500	=		0	X	0.0680	=		
Total Devices:	0										
3. Additional Amplifiers (Maximum of 8 total)											
ECC-50DA	2	X	0.0120	=	0.0240	2	X	0.0120	=	0.0240	
ECC-125DA	0	X	0.0120	=		0	X	0.0120	=		
Total Amplifiers:	2										
4. Speakers (Maximum 50 Watts)											
1/4 Watt	91	X	0.0000	=	0.0000	91	X	0.0170	=	1.5470	
1/2 Watt	1	X	0.0000	=	0.0000	1	X	0.0330	=	0.0330	
3/4 Watt	0	X	0.0000	=		0	X	0.0500	=		
1 Watt	4	X	0.0000	=	0.0000	4	X	0.0680	=	0.2720	
2 Watt	0	X	0.0000	=		0	X	0.1320	=		
Custom Watt Tap Description	0	X	0.0000	=		0	X	0.0000	=		
Total Watts:	27.25										
5. Output Circuits											
NAC Output (2 amps maximum)			0.00000	=				0.00000	=		
Non-Resettable Output (0.5 amps max)			0.00000	=				0.00000	=		
6. Additional Devices											
Power Supervision Relays	0	X	0.0250	=		0	X	0.0250	=		
SP-SVC Volume Control	0	X	0.0100	=		0	X	0.0100	=		
Total Standby Load					0.4360	Total Alarm Load					2.7410

*1 Select only one Additional Amplifier based on whether or not it will be used for backup purposes.


ECC-50/100 Battery Calculation

Calculation in Total Sheet


		Required Standby Time in Hours				
		24 Hours				
Standby Load Current (Amps)	0.4360 Amps	X	24	=	10.464 AH	
		Required Alarm Time in Hours				
		15 Minutes				
Alarm Load Current (Amps)	2.7410 Amps	X	0.25	=	0.685 AH	
Total Current Load					11.15 AH	
		*Multiply by the Derating Factor		1.2	=	x 1.20
Total Ampere Hours Required					13.38 AH	

		ECC-50DA Battery Calculation								
Secondary Power Source Requirements										
Device Type	Standby Current (amps)					Secondary Alarm Current (amps)				
	Qty		Current Draw	=	Total	Qty		Current Draw	=	Total
1. System										
ECC-50DA (25V)*	1	X	0.0850	=	0.0850	1	X	0.5250	=	0.5250
ECC-50DA (70.7V)*	0	X	0.1000	=		0	X	0.5800	=	
ECC-CE4	0	X	0.0200	=		0	X	0.1800	=	
2. Speakers										
Enter Number of Watts @ 25Vrms	30	X	0.0000	=	0.0000	30	X	0.0400	=	1.2000
Enter Number of Watts @ 70.7Vrms	0	X	0.0000	=		0	X	0.0450	=	
Total Standby Load					0.0850	Total Alarm Load			1.7250	


* Select only ONE type of Amplifier

		ECC-50DA Battery Calculation								
Calculation in Total Sheet										
						Required Standby Time in Hours				
						24 Hours				
Standby Load Current (Amps)		0.0850 Amps				X	24	=	2.040 AH	
						Required Alarm Time in Hours				
						15 Minutes				
Alarm Load Current (Amps)		1.7250 Amps				X	0.25	=	0.431 AH	
						Total Current Load			2.47 AH	
*Multiply by the Derating Factor						1.2		=	x 1.20	
Total Ampere Hours Required								2.97 AH		
Recommended Batteries:						BAT-1270 - 7AH Batteries				

* Derating Factor required to compensate for the non-linear discharge characteristic of a battery.

		<h2 style="margin: 0;">ECC-50DA Battery Calculation</h2>								
<h3 style="margin: 0;">Secondary Power Source Requirements</h3>										
Device Type	Standby Current (amps)					Secondary Alarm Current (amps)				
	Qty	X	Current Draw	=	Total	Qty	X	Current Draw	=	Total
1. System										
ECC-50DA (25V)*	1	X	0.0850	=	0.0850	1	X	0.5250	=	0.5250
ECC-50DA (70.7V)*	0	X	0.1000	=		0	X	0.5800	=	
ECC-CE4	0	X	0.0200	=		0	X	0.1800	=	
2. Speakers										
Enter Number of Watts @ 25Vrms	5	X	0.0000	=	0.0000	5	X	0.0400	=	0.2000
Enter Number of Watts @ 70.7Vrms	0	X	0.0000	=		0	X	0.0450	=	
Total Standby Load					0.0850	Total Alarm Load			0.7250	

* Select only ONE type of Amplifier

		<h2 style="margin: 0;">ECC-50DA Battery Calculation</h2>								
<h3 style="margin: 0;">Calculation in Total Sheet</h3>										
						Required Standby Time in Hours				
						24 Hours				
Standby Load Current (Amps)		0.0850 Amps				X	24	=	2.040 AH	
						Required Alarm Time in Hours				
						15 Minutes				
Alarm Load Current (Amps)		0.7250 Amps				X	0.25	=	0.181 AH	
						Total Current Load			2.22 AH	
*Multiply by the Derating Factor						1.2		=	x 1.20	
Total Ampere Hours Required								2.67 AH		
Recommended Batteries:						BAT-1270 - 7AH Batteries				

* Derating Factor required to compensate for the non-linear discharge characteristic of a battery.