

BATTERY CALCULATIONS
FAP-001-47

ITEM	DESCRIPTION	QTY	STANDBY CURRENT PER ITEM (AMPS)	TOTAL STANDBY CURRENT PER ITEM	ALARM CURRENT PER ITEM (AMPS)	TOTAL ALARM CURRENT PER ITEM
CP-35	FACP w/22N'S + AUD	1	0.1750	0.1750	0.5010	0.5010
PS-35	POWER SUPPLY	1	0.0000	0.0000	0.0000	0.0000
BC-35	BATTERY CHARGER	1	0.0450	0.0450	0.0300	0.0300
PM-32	MATRIX MODULE	1	0.0000	0.0000	0.0000	0.0000
SM-30	SWITCH MODULE	1	0.0000	0.0000	0.0450	0.0450
SR-30	2 RELAY MODULE	1	0.0000	0.0000	0.0450	0.0450
SR-32	6 RELAY MODULE	-	0.0000	0.0000	0.0450	0.0000
SR-35	8 RELAY MODULE	1	0.0000	0.0000	0.0210	0.0210
TC-30U	BATTERY TRANSFER	-	0.0300	0.0000	0.0150	0.0000
ZN-34US	SUPERVISORY MODULE	1	0.0100	0.0100	0.1100	0.1100
ZU-35	ZONE MODULE	2	0.0090	0.0180	0.1100	0.2200
ZU-35DS	ZONE MODULE/SD's	-	0.0090	0.0000	0.1100	0.0000
SMOKE	SMOKE DETECTOR	28	0.0001	0.0028	0.0010	0.0280
MOI	TRANSMITTER	1	0.1200	0.1200	0.1750	0.1750
MID	INPUT BOARD	1	0.0020	0.0020	0.0000	0.0000
PS-5A	POWER SUPPLY	1	0.0380	0.0380	0.0000	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT						0.1000
TOTAL SYSTEM CURRENT			STANDBY	0.4108	ALARM	1.2750

MIN. BATTERY CAPACITY = {(TOT. STANDBY CURRENT X STANDBY TIME) + (TOT. ALARM CURRENT X ALARM TIME)} X 1.25
 MIN. BATTERY CAPACITY = {(0.4108A X 24 HR) + (1.2750 A X 0.083 HR)} X 1.25
 MIN. BATTERY CAPACITY = {9.8592 Ahr + 0.1058 Ahr} X 1.25 = 12.4563 Ahr

FIRE ALARM SYSTEM
FUNCTION CHART

SYSTEM EVENT	RESPONSE				
	ANNUNCIATE AT FACU	FIRE SIGNAL TO RECEIVER	TROUBLE SIGNAL TO LBNL RECEIVER	SUPERVISORY SIGNAL TO LBNL RECEIVER	OPERATE NOTIFICATION APPLIANCES
FIRE CALL BOX	●	●			●
SMOKE DETECTOR	●	●			●
HEAT DETECTOR	●	●			●
FIRE SPRINKLER WATERFLOW SWITCH	●	●			●
FIRE SPRINKLER VALVE SUPERVISORY SWITCH	●			●	
AC POWER FAILURE	●		●		
SYSTEM FAULT	●		●		

NOTIFICATION APPLIANCE CIRCUIT
VOLTAGE DROP & POWER REQUIREMENTS

CKT AV1 -- BLDG 47			
DESCRIPTION	QTY	CURRENT PER ITEM (AMPS)	TOTAL CURRENT PER ITEM
WHEELLOCK STROBE 15 cd	-	0.5010	0.0000
WHEELLOCK HORN/STROBE 15cd	-	0.0000	0.0000
WHEELLOCK STROBE 30 cd	-	0.0300	0.0000
WHEELLOCK HORN/STROBE 30 cd	-	0.0450	0.0000
WHEELLOCK STROBE 75 cd	-	0.0210	0.0000
WHEELLOCK HORN/STROBE 75 cd	-	0.1100	0.0000
WHEELLOCK STROBE 110 cd	-	0.1100	0.0000
WHEELLOCK HORN/STROBE 110 cd	-	0.1750	0.0000
WHEELLOCK HORN	-	0.0000	0.0000
AUTOCALL BELL	2	0.0500	0.1000
TOTAL NOTIFICATION APPLIANCES CURRENT			0.1000

VOLTAGE DROP (VD) CALCULATIONS
 $VD = \frac{I(D)(21.6)}{CM}$
 WHERE: I = CIRCUIT CURRENT
 D = CONDUCTOR LENGTH (FT) ONE WAY
 21.6 = CONSTANT
 CM = WIRE CROSS-SECTIONAL AREA (CIRCULAR MILS)
 $VD = \frac{(0.1A)(60FT)(21.6)}{4110} = 0.032V$
 $\%VD = \frac{0.032V}{24V} \times 100 = 0.131\%$
 REMAINING VOLTS = 23.968

WIRE SIZE	CIRCULAR MILS
12AWG	6530
14AWG	4110
16AWG	2580
18AWG	1620
20AWG	1020

AS BUILT - - 09/17/13	ISSUE	PROGRESS, ESTIMATE, BID, CONSTRUCTION, CONFORMED, REVISION, RECORD	REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS	BLDG 47 FIRE ALARM FUNCTION CHART & CALCULATIONS - UNIVERSITY OF CALIFORNIA LAWRENCE BERKELEY NATIONAL LABORATORY FACILITIES DIVISION	DRAWN BY LDD CHECKED BY LDD APPROVED BY MCD	DATE 09/17/2013 09/17/2013 09/17/2013
	ISSUE	PROGRESS, ESTIMATE, BID, CONSTRUCTION, CONFORMED, REVISION, RECORD	REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS		SCALE AS NOTED	
	ISSUE	PROGRESS, ESTIMATE, BID, CONSTRUCTION, CONFORMED, REVISION, RECORD	REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS		DRAWING NO. 4B47E011_	
	ISSUE	PROGRESS, ESTIMATE, BID, CONSTRUCTION, CONFORMED, REVISION, RECORD	REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS		SHEET 1 OF 1	
	ISSUE	PROGRESS, ESTIMATE, BID, CONSTRUCTION, CONFORMED, REVISION, RECORD	REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS		PROJECT NO. 000000	