NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV2: 50C DESCRIPTION	QTY	CURRENT PER ITEM (AMPS)	TOTAL CURRENT PER ITEM
WHEELOCK STROBE 15 cd			
WHEELOCK HORN/STROBE 15cd			
WHEELOCK STROBE 30 cd			
WHEELOCK HORN/STROBE 30 cd			
WHEELOCK STROBE 75 cd			
WHEELOCK HORN/STROBE 75 cd			
WHEELOCK STROBE 110 cd	2	0.2200	0.4400
WHEELOCK HORN/STROBE 110 cd			
WHEELOCK HORN			
AUTOCALL BELL	2	0.0500	0.1000
TOTAL NOTIFICATION APPLIANCES CURRENT			0.5400

VOLTAGE DROP (VD) CALCULATIONS

VD = {(I) (D) (21.6)}/CM

WHERE: I = CIRCUIT CURRENT

D = CONDUCTOR LENGTH (FT) ONE WAY

21.6 = CONSTANT

CM = CROSS-SECTIONAL AREA OF WIE (CIRCULAR MILS)

VD = {(0.54A) (220FT) (21.64)}/4110 = 0.624V

%VD = {0.624V / 24V} X 100 = 2.601%

REMAINING VOLTS = 23.376

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

BATTERY CALCULATIONS FAP-001, -001A & -001B-50

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/2ZN'S + AUD	1	0.1750	0.1750	0.5010	0.5010
PS-35	POWER SUPPLY	2	0.0000	0.0000	0.0000	0.0000
BC-35	BATTERY CHARGER	1	0.0450	0.0450	0.0300	0.0300
AA-30U	CLASS B BELL MODULE	1	0.0065	0.0065	0.0400	0.0400
AE-30U	CLASS B BELL MOULE	1	0.0065	0.0065	0.0040	0.0040
HC-35	HALON RELEASE MODULE	1	0.0120	0.0120	0.1800	0.1800
PM-32	MATRIX MODULE	1	0.0000	0.0000	0.0000	0.0000
SM-30	SWITCH MODULE	7	0.0000	0.0000	0.0450	0.3150
SR-32	6 RELAY MODULE	1	0.0000	0.0000	0.0450	0.0450
SR-35	8 RELAY MODULE	2	0.0000	0.0000	0.0210	0.0420
TC-30U	BATTERY TROUBLE	1	0.0300	0.0300	0.0500	0.0500
ZN-34US	SUPERVISORY MODULE	11	0.0100	0.1100	0.1100	1.2100
ZU-35	ZONE MODULE	14	0.0090	0.1260	0.1100	1.5400
ZU-35DS	ZONE MODULE/SD's	6	0.0090	0.0540	0.1100	0.6600
MOI	TRANSMITTER	1	0.1200	0.1200	0.1750	0.1750
MID	INPUT BOARD	2	0.0020	0.0040	0.0000	0.0000
PS-5A	POWER SUPPLY	1	0.0380	0.0380	0.0000	0.0000
	SMOKE DETECTORS	170	0.0001	0.0170	0.0010	0.1700
TOTAL NOTIFICATION APPLIANCES CURRENT						5.0100
TOTAL SYSTEM CURRENT			STANDBY	1.0100	ALARM	9.9730

MIN. BATTERY CAPACITY = {(TOT. STANDBY CURRENT X STANDBY TIME) + (TOT. ALARM CURRENT X ALARM TIME)} X 1.25

MIN. BATTERY CAPACITY = {(1.01 A X 24 HR) + (9.973 A X 0.083 HR)} X 1.25

MIN. BATTERY CAPACITY = {24.24 AHr + 0.8278 AHr} X 1.25 = 31.3347 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 50A NOTIFICATION APPLIANCES	OPERATE 50C NOTIFICATION DEVICES	OPERATE 50E NOTIFICATION DEVICES	50A ELEVATOR RECALL	ALARM LVL 1 (PULSATEING TONE, BLUE STROBE)	ALARM LVL 2 (YELLOW STROBE)	ALARM LVL 3 (CONT. HORN, RED STROBE, 30 SEC HALON DELAY)	SMOKE DAMPER RELEASE	50A,50E DOOR HOLDER RELEASE
50A FIRE CALL BOX	●	●			●			●				●	●
50A HEAT DETECTOR	●	●			●			●				●	●
50A SMOKE DETECTOR	●	●			●			●				●	●
50A FIRE SPRINKLER WATERFLOW SWITCH	●	●			●							●	●
50A FIRE SPRINKLER VALVE SUPERVISORY SWITCH	●			●									
50A-1156 MANUAL HALON RELEASE	●	●			●			●				●	●
50A-1156 VESDA ALARM LVL 1	●	●			●			●	●			●	●
50A-1156 VESDA ALARM LVL 2	●	●			●			●		●		●	●
50A-1156 VESDA ALARM LVL 3	●	●			●			●			●	●	●
50A-1156 VESADA PANEL TROUBLE	●		●										
RP1001 PANEL TROUBLE	●		●										
50C FIRE CALL BOX	●	●				●							
50C HEAT DETECTOR	●	●				●							
50C FIRE SPRINKLER WATERFLOW SWITCH	●	●				●							
50C FIRE SPRINKLER VALVE SUPERVISORY SWITCH	●			●									
50E FIRE CALL BOX	●	●					●						●
50E SMOKE DETECTOR	●	●					●						●
50E FIRE SPRINKLER WATERFLOW SWITCH	●	●					●						●
50E FIRE SPRINKLER VALVE SUPERVISORY SWITCH	●			●									
50E HEAT ACTIVATED DEVICE (HAD) LOW PRESSURE	●		●										
AC POWER FAILURE	●		●										
SYSTEM FAULT	●		●										

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV3: 50E DESCRIPTION	QTY	CURRENT PER ITEM (AMPS)	TOTAL CURRENT PER ITEM
WHEELOCK STROBE 15 cd			
WHEELOCK HORN/STROBE 15cd			
WHEELOCK STROBE 30 cd			
WHEELOCK HORN/STROBE 30 cd			
WHEELOCK STROBE 75 cd			
WHEELOCK HORN/STROBE 75 cd			
WHEELOCK STROBE 110 cd	7	0.2200	1.5400
WHEELOCK HORN/STROBE 110 cd			
WHEELOCK HORN			
AUTOCALL BELL	3	0.0500	0.1500
TOTAL NOTIFICATION APPLIANCES CURRENT			1.6900

VOLTAGE DROP (VD) CALCULATIONS

VD = {(I) (D) (21.6)}/CM

WHERE: I = CIRCUIT CURRENT

D = CONDUCTOR LENGTH (FT) ONE WAY

21.6 = CONSTANT

CM = CROSS-SECTIONAL AREA OF WIE (CIRCULAR MILS)

VD = {(1.69A) (250FT) (21.64)}/4110 = 2.22V

%VD = {2.22V / 24V} X 100 = 9.252%

REMAINING VOLTS = 21.78

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

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV1: 50A DESCRIPTION	QTY	CURRENT PER ITEM (AMPS)	TOTAL CURRENT PER ITEM
WHEELOCK STROBE 15 cd			
WHEELOCK HORN/STROBE 15cd			
WHEELOCK STROBE 30 cd			
WHEELOCK HORN/STROBE 30 cd			
WHEELOCK STROBE 75 cd			
WHEELOCK HORN/STROBE 75 cd			
WHEELOCK STROBE 110 cd	9	0.2200	1.9800
WHEELOCK HORN/STROBE 110 cd			
WHEELOCK HORN			
AUTOCALL BELL	16	0.0500	0.8000
TOTAL NOTIFICATION APPLIANCES CURRENT			2.7800

VOLTAGE DROP (VD) CALCULATIONS

VD = {(I) (D) (21.6)}/CM

WHERE: I = CIRCUIT CURRENT

D = CONDUCTOR LENGTH (FT) ONE WAY

21.6 = CONSTANT

CM = CROSS-SECTIONAL AREA OF WIE (CIRCULAR MILS)

VD = {(2.78A) (175FT) (21.64)}/4110 = 2.557V

%VD = {2.557V / 24V} X 100 = 10.653%

REMAINING VOLTS = 21.443

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

NOTIFICATION APPLIANCE CIRCUIT CURRENTS

CKT AV1	50A	2.780
CKT AV2	50C	0.540
CKT AV3	50E	1.690
CKT AV4	–	–
CKT AV5	–	–
CKT AV6	–	–
CKT AV7	–	–
CKT AV8	–	–
	TOTAL NOTIFICATION APPLIANCES CURRENT	5.010

PROFESSIONAL SEAL (IF REVISION, APPLIES ONLY TO REVISED WORK)

ISSUE (PROGRESS, ESTIMATE, BID, CONSTRUCTION, CONFORMED, REVISION, RECORD)

AS BUILT
–
–
09/18/13

REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS
–	LDD	LDD	MCD	09/18/13	AS BUILT

BLDG 50A,50C,50E FIRE ALARM FUNCTION CHART & CALCULATIONS
–

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY NATIONAL LABORATORY
FACILITIES DIVISION

DRAWN BY	LDD	DATE 09/18/2013
CHECKED BY	LDD	09/18/2013
APPROVED BY	MCD	09/18/2013
SCALE	AS NOTED	
DRAWING NO.	4B50AE218_	SHEET
PROJECT NO.	000000	1 OF 1