

UT. XFRM FAULT CALC		320488 LOAD.xlsm
SERVICE ENTRANCE		CALCULATION
VOLTAGE (L-L):	208V	I-FLA=[RATED KVA * 1000]/[V-LL*SQRT(PHASE)]
PHASE (PH):	3	
AMPS:	1000A	I-FLA= 1,388A
FULL LOAD KVA:	360KVA	
TRANSFORMER:	500KVA	M=100%/Z= 80.6
IMPEDANCE (%Z):	1.2%Z	I-SC=I-FLA*M= 10 KA
CALCULATION IS BASED ON ESTIMATED TRANSFORMER SIZE WITH %Z FROM BUSSMANN SPD. CONTRACTOR SHALL CONTACT UTILITY AND VERIFY I-SC AVAILABLE AT SECONDARY OF TRANSFORMER. CONTACT ENGINEER FOR RE-CALCULATION IF LARGER THAN CALCULATED.		

MOTOR LOAD FAULT CALC		320488 LOAD.xlsm
STARTING I-SC:		CALCULATION
MOTOR LOAD (KVA):	42KVA	I-SC(ML)=I-ML*6= 697A
MOTOR LOAD (A):	116A	I-SC=I-SC+I-SC(ML)= 11 KA

LL METER CENTER FEEDER FAULT CALC		320488 LOAD.xlsm
STARTING I-SC:		IMPEDANCE BASED ON 3 SINGLE CONDUCTORS IN NON-MAGNETIC CONDUIT (WORSE CASE)
VOLTAGE (L-L):	208V	
PHASE (PH):	3	
FEEDER SIZE:	400	CALCULATION
FEEDER MATERIAL:	CU	f=[SQRT(PHASE)*L*IS-C]/[Q*C*V-LL]
PARALLEL SETS (Q):	3 SETS	
FEEDER LENGTH (L):	65FT	f= 0.079
FEET PER OHMS (C):	24,297 FT/OHMS	M=1/((1+f)= 0.926
		I-SC=I-SC*M= 10 KA
NOTE: CALCULATION BASED ON BUSSMANN SPD		

SBA & SBB FEEDER FAULT CALC		320488 LOAD.xlsm
STARTING I-SC:		IMPEDANCE BASED ON 3 SINGLE CONDUCTORS IN NON-MAGNETIC CONDUIT (WORSE CASE)
VOLTAGE (L-L):	208V	
PHASE (PH):	3	
FEEDER SIZE:	3/0	CALCULATION
FEEDER MATERIAL:	CU	f=[SQRT(PHASE)*L*IS-C]/[Q*C*V-LL]
PARALLEL SETS (Q):	2 SETS	
FEEDER LENGTH (L):	60FT	f= 0.178
FEET PER OHMS (C):	13,923 FT/OHMS	M=1/((1+f)= 0.849
		I-SC=I-SC*M= 8 KA
NOTE: CALCULATION BASED ON BUSSMANN SPD		

FM FEEDER FAULT CALC		320488 LOAD.xlsm
STARTING I-SC:		IMPEDANCE BASED ON 3 SINGLE CONDUCTORS IN NON-MAGNETIC CONDUIT (WORSE CASE)
VOLTAGE (L-L):	208V	
PHASE (PH):	3	
FEEDER SIZE:	3/0	CALCULATION
FEEDER MATERIAL:	CU	f=[SQRT(PHASE)*L*IS-C]/[Q*C*V-LL]
PARALLEL SETS (Q):	2 SETS	
FEEDER LENGTH (L):	30FT	f= 0.089
FEET PER OHMS (C):	13,923 FT/OHMS	M=1/((1+f)= 0.918
		I-SC=I-SC*M= 9 KA
NOTE: CALCULATION BASED ON BUSSMANN SPD		

HP FEEDER FAULT CALC		320488 LOAD.xlsm
STARTING I-SC:		IMPEDANCE BASED ON 3 SINGLE CONDUCTORS IN NON-MAGNETIC CONDUIT (WORSE CASE)
VOLTAGE (L-L):	208V	
PHASE (PH):	3	
FEEDER SIZE:	3	CALCULATION
FEEDER MATERIAL:	CU	f=[SQRT(PHASE)*L*IS-C]/[Q*C*V-LL]
PARALLEL SETS (Q):	1 SETS	
FEEDER LENGTH (L):	30FT	f= 0.515
FEET PER OHMS (C):	4,811 FT/OHMS	M=1/((1+f)= 0.660
		I-SC=I-SC*M= 7 KA
NOTE: CALCULATION BASED ON BUSSMANN SPD		

VOLTAGE DROP CALCULATIONS										
PANEL/LOAD	FEEDER				LENGTH	Z	LOAD	V-DROP	V	%V-DROP
	AWG	SETS	CU/AL	PH						
LL METER CENTER	#400	3	CU	3	0.056 OHM/K-FT	65 FT	0.0012 OHM	113 A	0.14 V	208 V 0.07%
SBA	3/0	2	CU	1	0.094 OHM/K-FT	60 FT	0.0056 OHM	101 A	0.57 V	208 V 0.27%
FM	3/0	2	CU	1	0.094 OHM/K-FT	30 FT	0.0028 OHM	1 A	0.00 V	208 V 0.00%
HP	#3	1	CU	1	0.245 OHM/K-FT	30 FT	0.0147 OHM	12 A	0.17 V	208 V 0.08%
SBA-2,4,6	#6	1	CU	3	0.450 OHM/K-FT	60 FT	0.0270 OHM	54 A	1.46 V	208 V 0.70%
HP-3,5	#10	1	CU	1	1.210 OHM/K-FT	300 FT	0.7260 OHM	3 A	2.18 V	208 V 1.05%
NOTES:										
SBA-2,4,6 (RTU-2) REPRESENTS THE HEAVIEST LOAD AND HP-3,5 (SITE LIGHTING) REPRESENTS THE LONGEST LOAD. TOGETHER THESE ARE THE WORST CASE BRANCH CIRCUITS.										
1-PHASE V-DROP CALC IS BASED ON NEC TABLE 8, DC RESISTANCE, UNCOATED WIRES. IF #1/0 OR LARGER, USE TABLE 9 DUE TO SKIN AFFECT.										
3-PHASE V-DROP CALC IS BASED ON NEC TABLE 9, EFFECTIVE Z AT 0.85 PF, UNCOATED WIRES, STEEL CONDUIT (WORST CASE).										
EQUATIONS:										
Z (1-PH) = (TABLE 8 OHMS/K-FT) * (K-FT/1000') * (LENGTH) (*2) / (SETS) - NOTE: IF #1/0 OR LARGER, USE TABLE 9 DUE TO SKIN AFFECT										
Z (3-PH) = (TABLE 9 OHMS/K-FT) * (K-FT/1000') * (LENGTH) / (SETS)										
V-DROP = Z * LOAD										
320488 LOAD.xlsm										

NOTE	MOUNT: SURFACE				120/208	3-PHASE, 4W	PANEL		FM		CAPACITY: 400A				INT CAP: 200KA				
	LOCATION: FUTURE MEDICAL OFFICE						LUGS:		MLO		DEMAND LOAD: A				AV. FAULT: 9KA				
	CKT	LTG	REC	HVAC	MISC	NP	DESCRIPTION	AMP	POLE	Φ	AMP	POLE	DESCRIPTION	LTG	REC	HVAC	MISC	NP	CKT
	1						SPARE	20	1	A	20	1	SPARE						2
	3						SPARE	20	1	B	20	1	SPARE						4
	5						SPARE	20	1	C	20	1	SPARE						6
	7						SPARE	20	1	A	20	1	SPARE						8
	9						SPARE	20	1	B	20	1	SPARE						10
	11						SPARE	20	1	C	20	1	SPARE						12
	13						SPARE	20	1	A	20	1	SPARE						14
	15						SPARE	20	1	B	20	1	SPARE						16
	17						SPARE	20	1	C	20	1	SPARE						18
	19						SPARE	20	1	A	20	1	SPARE						20
	21						SPARE	20	1	B	20	1	SPARE						22
	23						SPARE	20	1	C	20	1	SPARE						24
	25						SPARE	20	1	A	20	1	SPARE						26
	27						SPARE	20	1	B	20	1	SPARE						28
	29						SPARE	20	1	C	20	1	SPARE						30
	31						SPARE	20	1	A	20	1	SPARE						32
	33						SPARE	20	1	B	20	1	SPARE						34
	35						SPARE	20	1	C	20	1	SPARE						36
	37						SPARE	20	1	A	20	1	SPARE						38
	39						SPARE	20	1	B	20	1	SPARE						40
	41						SPARE	20	1	C	20	1	SPARE						42
	43						SPARE	20	1	A	20	1	SPARE						44
	45						SPARE	20	1	B	20	1	SPARE						46
	47						SPARE	20	1	C	20	1	SPARE						48
	49						SPARE	20	1	A	20	1	SPARE						50
	51						SPARE	20	1	B	20	1	SPARE						52
	53						SPARE	20	1	C	20	1	SPARE						54
	55						SPARE	20	1	A	20	1	SPARE						56
	57						SPARE	20	1	B	20	1	SPARE						58
	59						SPARE	20	1	C	20	1	SPARE						60
	61						SPARE	20	1	A	20	1	SPARE						62
	63						SPARE	20	1	B	20	1	SPARE						64
	65						SPARE	20	1	C	20	1	SPARE						66
	67						SPARE	20	1	A	20	1	SPARE						68
	69						SPARE	20	1	B	20	1	SPARE						70
	71						SPARE	20	1	C	20	1	SPARE						72
	73						SPARE	20	1	A	20	1	SPARE						74
	75						SPARE	20	1	B	20	1	SPARE						76
	77						SPARE	20	1	C	20	1	SPARE						78
	79						SPARE	20	1	A	20	1	SPARE						80
	81						SPARE	20	1	B	20	1	SPARE						82
	83						SPARE	20	1	C	20	1	SPARE						84

PHASE BALANCE			LIGHTING	0.0 KVA	0.0 KVA	LOAD X 125% NEC 210.19 CONTINUOUS	CONNECTED	DEMAND
Φ	LOAD	%	RECEPTACLE	0.0 KVA	0.0 KVA	10KVA + 50% REMANDER NEC 220.44	0.0 KVA	0.0KVA
A	0.0 KVA	####	HVAC	0.0 KVA	0.0 KVA	LOAD X 80% (USED MCA IN CALCULATION)	0.0A	0.0A
B	0.0 KVA	####	MISC	0.0 KVA	0.0 KVA	LOAD X 100% NEC 210.19 NON-CONT.	FILENAME:	
C	0.0 KVA	####	NP	0.0 KVA	0.0 KVA	0 NONCOINCIDENTAL LOADS NEC 220.60	320488 LOAD.xlsm	
NOTES:								
A. AIC RATING: STANDARD 10,000 AIC CIRCUIT BREAKERS. SERIES RATED AT 200,000 AMPS WITH BUSSMANN JJJN-400 FUSES.								

					120/208	3-PHASE, 4W	LOAD				CAPACITY: 1,000A									
										DEMAND LOAD: 113A										
LTG	REC	HVAC	MISC	NP	DESCRIPTION	AMP	POLE	Φ	AMP	POLE	DESCRIPTION	LTG	REC	HVAC	MISC	NP				
0.5	0.4	11.6	0.0	0.0	PANEL SBA	400	3	A	PANEL											
0.0	0.1	15.1	1.0	0.0				B												
0.0	0.0	15.2	0.0	0.0				C												
0.0	0.0	0.0	0.0	0.0	PANEL FM	400	3	A												
0.0	0.0	0.0	0.0	0.0				B												
0.0	0.0	0.0	0.0	0.0				C												
0.4	0.0	0.0	0.2	0.0	PANEL HP	100	3	A												
1.8	0.4	0.0	0.0	0.0				B												
0.7	0.0	0.0	0.0	0.0				C												
LOAD TYPE					CONNECTED	DEMAND		DEMAND FORMULA					TOTAL LOAD							
LIGHTING					3.4 KVA	4.2 KVA		LOAD X 125% NEC 210.19 CONTINUOUS					CONNECTED		DEMAND					
RECEPTACLE					1.8 KVA	1.8 KVA		10KVA + 50% REMAINDER NEC 220.44					48.2 KVA		40.7KVA					
HVAC					41.8 KVA	33.5 KVA		LOAD X 80% (USED MCA IN CALCULATION)					133.8A		112.9A					
MISC.					1.2 KVA	1.2 KVA		LOAD X 100% NEC 210.19 NON-CONT.					FILENAME:							
NP					0.0 KVA	0.0 KVA		0 NONCOINCIDENTAL LOADS NEC 220.60					320488 LOAD.xlsx							