

LOAD CALCULATIONS FOR "PANEL SP2"

BASED ON THE 2008 NEC

NEC 220.61(A)

	L1	L2	L3	NEUTRAL
CALCULATED LOAD ( NEC 215.5 )	14,740 VA	14,540 VA	14,540 VA	12,937 VA
CALCULATED LOAD WITH DEMAND FACTORS ( NEC 215.5 )				
GENERAL LOAD	0 VA	0 VA	0 VA	0 VA
RECEPTACLE LOAD (NEC TABLE 220.44)				
1ST 10,000W	3,333 VA	3,333 VA	3,333 VA	3,333 VA
REMAINDER @ 50%	2,654 VA	2,654 VA	2,654 VA	2,654 VA
CONTINUOUS LOAD (NEC 215.2)	1,500 VA	1,000 VA	1,000 VA	1,500 VA
PLUS 25% (L1, L2, L3)	375 VA	250 VA	250 VA	
0% (NEUTRAL) NEC 215.2(A) EX NO 2				0 VA
MOTOR LOAD (NEC 430.24)	3,400 VA	3,400 VA	3,400 VA	3,400 VA
PLUS 25% OF LARGEST MOTOR	850 VA	850 VA	850 VA	850 VA
KITCHEN LOADS (NEC 220.56)				
L1 ( 1,200 X 1 ) =	1,200 VA			1,200 VA
L2 ( 1,500 X 1 ) =		1,500 VA		
L3 ( 1,500 X 1 ) =			1,500 VA	
TOTAL BALANCED LOAD (3-PHASE)	12,987 VA	12,987 VA	12,987 VA	
TOTAL BALANCED LOAD (1-PHASE)	0 VA	0 VA	0 VA	
TOTAL UNBALANCED LOAD (1-PHASE)	325 VA	0 VA	0 VA	
NEUTRAL LOAD				12,937 VA
LINE AMPS BALANCED (3-PHASE)	108.1 A	108.1 A	108.1 A	
LINE AMPS BALANCED (1-PHASE)	0.0 A	0.0 A	0.0 A	
LINE AMPS UNBALANCED (1-PHASE)	2.7 A	0.0 A	0.0 A	
TOTALS	110.8 A	108.1 A	108.1 A	107.8 A
ADJUSTMENT FACTOR	0.0 A	0.0 A	0.0 A	0.0 A
TOTAL DESIGN LOAD	110.8 A	108.1 A	108.1 A	107.8 A

VOLTAGE DROP CALCULATIONS

Three Phase Primary ( 2 X 20' L X 0.4910 R X 48.0 A ÷ 1,000 X 0.866 ) = 0.8 VD  
 Voltage Drop % Primary ( 0.8 VD ÷ 480 V X 100 ) = 0.2 % VD  
 Three Phase Secondary ( 2 X 30' L X 0.1540 R X 110.8 A ÷ 1,000 X 0.866 ) = 0.9 VD  
 Voltage Drop % Secondary ( 0.9 VD ÷ 208 V X 100 ) = 0.4 % VD

HARMONIC CURRENT CALCULATION ( NEC 310.15 (B) 4 (C) & NEC TABLE 310.15 B (2) A )

( Harmonic Load 0 VA ÷ Connected Load 43,820 VA ) X 100 = 0 %  
 Harmonic Load Does Not Exceed 50%

PRIMARY FAULT CURRENT CALCULATIONS

Available Fault Current at Starting Point (( 21,237 AFC X 1.00 UA ) + 48 MC ) = 21,285 AFC  
 Conductor Factor CF - Formula ( 1.732 X 20 L X 21,285 AFC ) ÷ ( 2,425 C X 1 N X 480 PV ) = 0.633 CF  
 Conductor Multiplier CM - Formula ( 1 ) ÷ ( 1 + 0.633 CF ) = 0.612 CM  
 Conductor Let-Through Current CLC - Formula ( 21,285 AFC X 0.612 CM ) = 13,026 CLC

TRANSFORMER LET THROUGH CURRENT CALCULATIONS

Calculate TF ( 13,026 AFC x 480 PV x 1.732 x 2.5 %Z ) ÷ ( 100,000 x 45.0 KVA ) = 6.016 TF  
 Calculate TM ( 1 ) / ( 1 + 6.016 TF ) = 0.143 TM  
 Calculate TLC ((( 480 PV ÷ 208 SV ) ÷ ( 0.143 TM x 13,026 AFC )) x 1.0 UA ) + 112 MC ) = 4,411 TLC

SECONDARY FAULT CURRENT CALCULATIONS

Conductor Factor CF - Formula ( 1.732 x 30 L x 4,411 TLC ) ÷ ( 7,293 C x 1 N x 208 SV ) = 0.151 CF  
 Conductor Multiplier CM - Formula ( 1 ) ÷ ( 1 + 0.151 CF ) = 0.869 CM  
 Conductor Let-Through Current CLC - Formula ( 4,411 TLC x 0.869 CM ) = 3,833 CLC

%Z - Transformer Impedance Nameplate %Z

L - Length of Conductor

TM - Transformer Multiplier

A - Amps

MC - Motor Contribution

UA - Utility Adjustment 1.1

AFC - Available Fault Current

N - Number of Conductors Per Phase

V - Voltage

C - Conductor Constant

PV - Primary Voltage

VA - Volt Amps

CF - Conductor Factor

R - Resistance

VD - Voltage Drop

CLC - Conductor Let-Through Current

SV - Secondary Voltage

CM - Conductor Multiplier

TF - Transformer Factor

KVA - Kilovolt Amps

TLC - Transformer Let-Through Current