

Project Summary

<b>Contact Information</b>		<b>Prepared By</b>	
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<b>Environment</b>		<b>Engine</b>	
Ambient Temp:	100 F / 38 C	Duty:	Standby
Elevation:	500 ft / 152 m	Fuel:	Diesel
<b>Electrical Configuration</b>		<b>Generator Configuration</b>	
Phase:	Three Phase	Application:	
Frequency (Hz):	60 Hz	Enclosure Type:	Weather
Voltage (Nominal):	208	Sound (desired):	70 dBA
Voltage (Specific):	208 volts	Fuel Tank:	Sub Base UL 142
<b>Electrical Performance</b>		<b>Load Sequence Configuration</b>	
Max Running Load:	75%	Cyclic #1:	75% After Largest
Maximum Allowable Transients		Cyclic #2:	50% After Largest
Voltage Dip:	15.00%		
Frequency Dip:	10 hertz		
Maximum Allowable Voltage Distortion (%THVD)			
Continuous:	10%		
Momentary:	13%		

Generator and Load Summary

<b>Selected Generator &amp; Alternator</b>		<b>150 kW Diesel Genset - Site rated 150 kW</b>	
Product Family Method:	Manual	6.7 L Engine with UpSized (200kW-G2020124Y21) Alternator	
Product Family:	SD Diesel (single)	Load Level:	Transients Harmonics
Module Size:	NA	Running:	52% Fdip (Hz): 3.4 THVD Cont: 3.6%
Sizing Method:	Manual	Peak:	50% Vdip (%): 14.0% THVD Peak: 3.6%
Generator:	150 kW, 6.7L Module	Project Limits:	Fdip (Hz): 10.0 THVD Cont: 10.0%
Alternator:	200 kW	Max Loading:	75% Vdip (%): 15.00% THVD Peak: 13.0%
<b>Load Summary - Connected Load of 79 kW</b>			
Running	Transients	Harmonics	
kW	kVA (Step): 91.1	kVA:	23.2
kVA:	82 kW (Peak): 91.1	THD Cont:	32.7%
PF:	0.95 kVA (Step): 111.0	THD Peak:	32.7%

Sequence	Description	Starting kW	Starting kVA	Running kW	Running kVA	Peak kW	Cont. kW	Peak kVA	Cont. kVA	Vdip	THD	Fdip
Step 1	Lighting, Lighting 1 x 1.9 kVA, @ 0.97 PF Harmonics: THD = 20.0%	8.7	9.0	8.7	9.0	20.0%	20.0%	9.0	25.0%	10.0	hertz	
Step 1	Resistive Heating 1 x 44 kW, @ 1.00 PF Harmonics: THD = 0.0%	44.0	44.0	44.0	44.0	0.0%	0.0%	0.0	35.0%	15.0	hertz	
Step 1	Medical Equipment, Medical Equipment #1 1 x 0.9 kVA, @ 0.80 PF Harmonics: THD = 0.0%	5.9	9.8	7.8	9.8	0.0%	0.0%	0.0	15.0%	3.0	hertz	
Step 1	Motor, Vacuum Pump 2 x 2 HP, Code K (8.5 kVA/HP) Across the line Rated torque at start running at 100%	18.7	34.0	4.3	5.4	0.0%	0.0%	0.0	35.0%	15.0	hertz	
Step 1	Office Equipment, Office Equipment #1 1 x 12 kW, @ 0.97 PF Harmonics: THD = 45.0%	12.0	12.4	12.0	12.4	45.0%	45.0%	12.4	20.0%	10.0	hertz	

Load List

Sequence	Description	Starting kW	Starting kVA	Running kW	Running kVA	Peak kW	Cont. kW	Peak kVA	Cont. kVA	Vdip	THD	Fdip
Step 1	Non-linear, Refrigerators 1 x 1.9 kVA, @ 0.97 PF Harmonics: THD = 30.0%	1.7	1.8	1.7	1.8	30.0%	30.0%	1.8	15.0%	5.0	hertz	
Step 1	All loads on (concurrent starting)											
Summary	#1 kW Sequence Peak #1 kW Application Peak	91.1	111.0	78.6	82.4	32.7%	32.7%	23.2	15.0%	31.0	hertz	3.0

Transient Analysis

<b>Most difficult alternator transient requirements (Vdip)</b>				<b>Most difficult engine transient requirements (Fdip)</b>			
Sequence:	Step 1	Sequence:	Step 1	Sequence:	Step 1	Sequence:	Step 1
Load:	Heating	Load:	Heating	Starting kW:	91.1	Fdip Tolerance:	3.0
Starting kVA:	111.0	Fdip Tolerance:	3.0	Fdip Expected:	3.4		
Vdip Tolerance:	15.0%						
Vdip Expected:	14.0%						

Alternator Transient Analysis (Vdip)				Engine Transient Analysis (Fdip)			
Sequence	Allowable Vdip	Expected Vdip	Largest Transient Load	Sequence	Allowable Fdip	Expected Fdip	Largest Transient Load
Step 1	15.0%	14.0%	Heating	Step 1	3.0	3.4	Heating

Note: UPS that revert to battery on system transients do not establish a sequence frequency dip limit though they may impact the sizing. The sizing algorithm verifies the engine can accept the UPS within its frequency tolerance.

EX PANEL MDP VOLTAGE 120/208V/3PH/4W ENCLOSURE NEMA 1  
ALUMINUM GROUND BUS SHORT CIRCUIT: 42K A/C  
SOLID ALUMINUM 100% NEUTRAL BUS BUS 600 AMPS MOUNTING SURFACE  
BOLT ON BREAKERS MLO 600 AMPS FEED-THRU LUGS: NO

VOLT	SERVING	BRKR	CCT	A	B	C	CCT BRKR	SERVING	VOLT
S 27982	EP#2	E	300	1	48666	2	225	E	20704 S
S 32362		E	3	3	53066	4	1	E	20704 S
S 28222		E	1	5		48726	6	1	20704 S
	Space	E	7	10480		8	150	E	10480 S
	Space	E	9		8360	10	1	E	8360 S
	Space	E	11		10344	12	1	E	10344 S

PHASE CONNECTED LOAD (VA) 59146 61426 59070  
PHASE DEMAND LOAD (VA) 63059 63380 60869

CONNECTED D.F. DEMAND TOTAL CONNECTED LOAD: 179.6 kVA  
A. APPLIANCES 0.0 1.00 0.0 498.6 AMPS  
E. EQUIPMENT 20.2 1.00 20.2 DESIGN LOAD 216.2 kVA  
H. HEATING 112.1 1.00 112.2 600.0 AMPS  
K. KITCHEN (220.56 #KIT. APPL.) 5 3.4 0.70 2.4 NEC DEMAND LOAD 118.7 kVA  
L. LIGHTING 10.0 1.25 12.5 490.6 AMPS  
M. MOTORS 6.5 1.00 6.5 SPARE CAPACITY: 39.4 kVA  
LARGEST MOTOR 5.6 1.25 7.0 109.4 AMPS  
O. OTHER 0.0 1.00 0.0  
R. RECEPTACLES (FIRST 10 KW) 0.0 1.00 0.0 PHASE BALANCE A TO B: 96.3%  
RECEPTACLES (REMANINDER) 11.8 0.50 5.9 PHASE BALANCE B TO C: 95.2%  
S. SUBFEED PANEL 238.8 1.00 238.1 PHASE BALANCE C TO A: 99.9%

NOTES:  
1. BRANCH CIRCUIT VOLTAGE DROP NOT TO EXCEED 3% AT FARTHEST OUTLET.  
TOTAL VOLTAGE DROP INCLUDING FEEDERS AND BRANCH CIRCUITS NOT TO EXCEED 5%.  
2. FIELD VERIFY EQUIPMENT LOADS.  
3. ALL CONDUCTORS SHALL BE COPPER.  
4. ALL EXISTING LOADS TAKEN FROM EXISTING STAMPED DRAWINGS.

CB NOTES: "N" - New, "E" - Existing, "R" - Revised Load "GFP" - GFCI Breaker, "GFP" - Equipment Rated GFCI Breaker "L" - Lockable

EX PANEL RP1 VOLTAGE 120/208V/3PH/4W ENCLOSURE NEMA 1  
ALUMINUM GROUND BUS SHORT CIRCUIT: 42K A/C  
SOLID ALUMINUM 100% NEUTRAL BUS BUS 225 AMPS MOUNTING SURFACE  
BOLT ON BREAKERS MLO 150 AMPS FEED-THRU LUGS: NO

VOLT	SERVING	BRKR	CCT	A	B	C	CCT BRKR	SERVING	VOLT
L 1500	Lighting - Cont. Office	E	20	1	2320	2	20	E	Recepts - Rofoto Service 720 R
H 800	Refrigerator - Conference	E	20	3	980	4	20	E	Recepts - Clean Supply 180 R
R 1080	Recepts - Cont. Mlnvork	E	20	7	2080	8	20	E	Copper 1000 R
R 360	Recepts - Conference RM	E	20	11	900	10	20	E	Recepts - Reception 540 R
R 1080	Recepts - Conference RM	E	20	11	900	12	20	E	Recepts - Reception 540 R
R 540	Recepts - Waiting	E	20	13	1080	14	20	E	Recepts - Reception 540 R
R 1080	Recepts - Nurse Consult	E	20	15	1450	16	20	E	Intercom/Door Bell 400 E
M 334	EP-1 EP-2	E	20	17	1534	18	20	E	Sign 1200 L
H 1000	HJH-1	E	20	19	1000	20	20	E	Spare 20 E
H 1000	HJH-1	E	21	1000	22	20	E	Spare 20 E	
H 1000	HJH-1	E	23	1000	24	20	E	Spare 20 E	
H 1000	HJH-1	E	25	1000	26	20	E	Spare 20 E	
H 1000	HJH-1	E	27	1000	28	20	E	Spare 20 E	
H 1000	HJH-1	E	29	1000	30	20	E	Spare 20 E	
H 1000	Spare	E	31		32	20	E	Spare 20 E	
H 1000	Spare	E	33		34	20	E	Spare 20 E	
M 300	Pump F-1	E	20	36	300	36	20	E	Spare 20 E
E 3000	EDW-1	E	35	37	3000	38	20	E	Spare 20 E
E 3000		E	39	3000	40	20	E	Spare 20 E	
E 3000		E	41	3000	42	20	E	Spare 20 E	

PHASE CONNECTED LOAD (VA) 10480 8360 10344  
PHASE DEMAND LOAD (VA) 10882 8362 10005

CONNECTED D.F. DEMAND TOTAL CONNECTED LOAD: 29.2 kVA  
A. APPLIANCES 0.0 1.00 0.0 81.0 AMPS  
E. EQUIPMENT 10.4 1.00 10.4 DESIGN LOAD 43.2 kVA  
H. HEATING 6.0 1.00 6.0 120.0 AMPS  
K. KITCHEN (220.56 #KIT. APPL.) 2 1.6 1.00 1.6 NEC DEMAND LOAD: 30.0 kVA  
L. LIGHTING 2.8 1.25 3.5 83.2 AMPS  
M. MOTORS 0.0 1.00 0.0 13.3 kVA  
LARGEST MOTOR 0.3 1.25 0.4 SPARE CAPACITY: 36.8 AMPS  
O. OTHER 0.0 1.00 0.0  
R. RECEPTACLES (FIRST 10 KW) 7.8 1.00 7.8 PHASE BALANCE A TO B: 79.8%  
RECEPTACLES (REMANINDER) 0.0 0.50 0.0 PHASE BALANCE B TO C: 80.8%  
S. SUBFEED PANEL 0.0 1.00 0.0 PHASE BALANCE C TO A: 98.7%

NOTES:  
1. BRANCH CIRCUIT VOLTAGE DROP NOT TO EXCEED 3% AT FARTHEST OUTLET.  
TOTAL VOLTAGE DROP INCLUDING FEEDERS AND BRANCH CIRCUITS NOT TO EXCEED 5%.  
2. FIELD VERIFY EQUIPMENT LOADS.  
3. ALL CONDUCTORS SHALL BE COPPER.  
4. ALL EXISTING LOADS TAKEN FROM EXISTING STAMPED DRAWINGS.

CB NOTES: "N" - New, "E" - Existing, "R" - Revised Load "GFP" - GFCI Breaker, "GFP" - Equipment Rated GFCI Breaker "L" - Lockable

EX PANEL EP2 VOLTAGE 120/208V/3PH/4W ENCLOSURE NEMA 1  
ALUMINUM GROUND BUS SHORT CIRCUIT: 42K A/C  
SOLID ALUMINUM 100% NEUTRAL BUS BUS 400 AMPS MOUNTING SURFACE  
BOLT ON BREAKERS MLO 300 AMPS FEED-THRU LUGS: NO

VOLT	SERVING	BRKR	CCT	A	B	C	CCT BRKR	SERVING	VOLT
E 200	Fire Alarm Control Panel	EL	1	2067	2	30	E	Vacuum Pump 1967 M	
E 800	Crash Cart	N	GR	3	2667	4	1	E	1967 M
R 190	Recept - Generator	N	5	5	2047	6	1	E	1967 M
H 4534	AHJ-1	E	45	7	9068	8	45	E	AHJ-2 4534 H
H 4534		E	9	9	9068	10	1	E	4534 H
H 4534		E	11	11	9068	12	1	E	4534 H
H 2800	HPU-1	E	40	13	5600	14	40	E	HPU-2 2800 H
H 2800		E	15	15	5600	16	1	E	2800 H
H 2800		E	17	17	5600	18	1	E	2800 H
E 800	Battery Charger - Gen.	N	20	19	2667	20	30	N	Vacuum Pump 1967 M
E 1000	Isolant Heater - Generat	N	20	21	2667	22	1	N	1967 M
E 1000		N	21	21	2667	22	1	N	1967 M
E 1000		N	23		2867	24	1	N	1967 M

PHASE CONNECTED LOAD (VA) 19402 20202 19582  
PHASE DEMAND LOAD (VA) 22217 22264 20530

CONNECTED D.F. DEMAND TOTAL CONNECTED LOAD: 59.2 kVA  
A. APPLIANCES 0.0 1.00 0.0 163.3 AMPS  
E. EQUIPMENT 3.8 1.00 3.8 DESIGN LOAD 86.5 kVA  
H. HEATING 44.0 1.00 44.0 240.0 AMPS  
K. KITCHEN (220.56 #KIT. APPL.) NONE 0.0 1.00 0.0 NEC DEMAND LOAD: 60.6 kVA  
L. LIGHTING 0.0 2.25 0.0 165.5 AMPS  
M. MOTORS 25.8 1.00 5.6 SPARE CAPACITY: 25.8 kVA  
LARGEST MOTOR 5.6 1.25 7.0 71.7 AMPS  
O. OTHER 0.0 1.00 0.0  
R. RECEPTACLES (FIRST 10 KW) 0.2 1.00 0.2 PHASE BALANCE A TO B: 96.0%  
RECEPTACLES (REMANINDER) 0.0 0.50 0.0 PHASE BALANCE B TO C: 96.9%  
S. SUBFEED PANEL 0.0 1.00 0.0 PHASE BALANCE C TO A: 99.1%

NOTES:  
1. BRANCH CIRCUIT VOLTAGE DROP NOT TO EXCEED 3% AT FARTHEST OUTLET.  
TOTAL VOLTAGE DROP INCLUDING FEEDERS AND BRANCH CIRCUITS NOT TO EXCEED 5%.  
2. FIELD VERIFY EQUIPMENT LOADS.  
3. ALL CONDUCTORS SHALL BE COPPER.  
4. ALL EXISTING LOADS TAKEN FROM EXISTING STAMPED DRAWINGS.

CB NOTES: "N" - New, "E" - Existing, "R" - Revised Load "GFP" - GFCI Breaker, "GFP" - Equipment Rated GFCI Breaker "L" - Lockable

EX PANEL MP VOLTAGE 120/208V/3PH/4W ENCLOSURE NEMA 1  
ALUMINUM GROUND BUS SHORT CIRCUIT: 35K A/C  
SOLID ALUMINUM 100% NEUTRAL BUS BUS 225 AMPS MOUNTING SURFACE  
BOLT ON BREAKERS MLO 225 AMPS FEED-THRU LUGS: NO

VOLT	SERVING	BRKR	CCT	A	B	C	CCT BRKR	SERVING	VOLT
H 4434	RTU-1	E	50	1	7434	2	35	E	RTU-2 3000 H
H 4434		E	3	3	7434	4	1	E	3000 H
H 4434		E	5	5	7434	6	1	E	3000 H
H 1000	H-1	E	7	5434	8	50	E	H-3 4434 H	
H 1000		E	9	5434	10	1	E	4434 H	
H 1000		E	11	5434	12	1	E	4434 H	
H 1000	H-2	E	15	13	2667	14	20	E	H-4 1667 H
H 1000		E	16	16	2667	16	1	E	1667 H
H 1000		E	17	17	2667	18	1	E	1667 H
H 2334	EDH-1, EDH-2	E	30	19	3001	20	15	E	EDH-5, EDH-6 667 H
H 2334		E	21	3001	22	1	E	667 H	
H 2334		E	23	3001	24	1	E	667 H	
H 834	EDH-3	E	15	25	2168	26	15	E	EDH-4 1334 H
H 834		E	27	2168	28	1	E	1334 H	
H 834		E	29	2168	30	1	E	1334 H	
	Space	E	31		32	20	E	Space	
	Space	E	33		34	20	E	Space	
	Space	E	35		36	20	E	Space	
	Space	E	37		38	20	E	Space	
	Space	E	39		40	20	E	Space	
	Space	E	41		42	20	E	Space	

PHASE CONNECTED LOAD (VA) 20704 20704 20704  
PHASE DEMAND LOAD (VA) 20725 20725 20725

CONNECTED D.F. DEMAND TOTAL CONNECTED LOAD: 62.1 kVA  
A. APPLIANCES 0.0 1.00 0.0 172.4 AMPS  
E. EQUIPMENT 0.0 1.00 0.0 DESIGN LOAD 81.1 kVA  
H. HEATING 62