

Generator Sizing Guide



IMPORTANT NOTICE:

This booklet is designed to familiarize estimators and installers with proper sizing guidelines for residential and commercial generators. The information is not comprehensive, nor does it replace or supercede any material contained in any of the written documents shipped with the equipment. This booklet should only be used in conjunction with the Owner's Manual, Installation Manual and other technical documents shipped with each product. Always read all accompanying documentation carefully before attempting to install any generator, transfer switch or related equipment.

HOW TO USE THIS BOOKLET:

Within this booklet, you will find electrical load information, plus an outline of generator surge capability, fuel pipe sizing, liquid propane tank sizing, and UPS / generator compatibility. The worksheet pages can be removed from the book and photocopied to create additional Onsite Estimating Sheets for use with individual jobs.

SAFETY INFORMATION:

Proper sizing of the generator is crucial to the success of any installation and requires a good working knowledge of electricity and its characteristics, as well as the varying requirements of the electrical equipment comprising the load. When analyzing the electrical load, consult the manufacturer's nameplate on each major appliance or piece of equipment to determine its starting and running requirements in terms of watts, amps and voltage. When choosing the generator output for commercial or industrial applications, select a rating that is approximately 20 to 25% higher than the peak load (for example, if the load is about 40 kilowatts, select a 50 kW genset). A higher rated generator will operate comfortably at approximately 80% of its full capacity and will provide a margin of flexibility if the load increases in the future.

For safety reasons, Generac recommends that the backup power system be installed, serviced and repaired by a Generac Authorized Service Dealer or a competent, qualified electrician or installation technician who is familiar with applicable codes, standards and regulations.

It is essential to comply with all regulations established by the Occupational Safety & Health Administration (OSHA) and strict adherence to all local, state and national codes is mandatory. Before selecting a generator, check for municipal ordinances that may dictate requirements regarding placement of the unit (setback from building and/or lot line), electrical wiring, gas piping, fuel storage (for liquid propane or diesel tanks), sound and exhaust emissions.



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GENERATOR SIZING GUIDE

NOTES	



Starting kW 2.5

5

7.5

10

12.5

17

12.5

20

17

30

20

40

50

30

60

40

80

50

100

MOTOR LOAD REFERENCE

Caution:

DO NOT size the generator based on starting kW alone.

YOU MUST compare LR Amps to generator surge capability (table #3). **SIZE** the generator by following the sizing instructions.

IC & Hea	at Pullip	15	Runn	ing Lo	ad			Start	ting Lo	ad
Description	Нр	Running kW	Amps @ 240V 1Ø	Amps @ 208V 3Ø	Amps @ 240V 3Ø	Amps @ 480V 3Ø	LR Amps @ 240V 1Ø	LR Amps @ 208V 3Ø	LR Amps @ 240V 3Ø	LR Amps @ 480V 3Ø
1 Ton 12,000 BTU)	1	1	5	3	3	1	33	22	19	10
2 Ton 24,000 BTU)	2	2	10	7	6	3	67	44	38	19
3 Ton 36,000 BTU)	3	3	15	10	8	4	100	67	58	29
1 Ton 48 000 BTU)	4	4	20	13	11	6	117	78	67	34

										- 1001 0.0
1 Ton (12,000 BTU)	1	1	5	3	3	1	33	22	19	10
2 Ton (24,000 BTU)	2	2	10	7	6	3	67	44	38	19
3 Ton (36,000 BTU)	3	3	15	10	8	4	100	67	58	29
4 Ton (48,000 BTU)	4	4	20	13	11	6	117	78	67	34
5 Ton (60,000 BTU)	5	5	25	16	14	7	145	97	84	42
7.5 Ton (85,000 BTU)	7.5	7.5	37	24	21	11	219	146	126	63
10 Ton* (120,000 BTU)	5 Hp (x2)	10	49	33	28	14	145	97	84	42
10 Ton (120,000 BTU)	10 Hp	10	49	33	28	14	250	167	144	72
15 Ton* (180,000 BTU)	7.5 Hp (x2)	15	74	49	42	21	219	146	126	63
15 Ton (180,000 BTU)	15 Hp	15	74	49	42	21	375	250	217	108
20 Ton* (240,000 BTU)	10 Hp (x2)	20	98	65	57	28	250	167	144	72
20 Ton (240,000 BTU)	20 Hp	20	n/a	65	57	28	500	333	289	144
25 Ton (300,000 BTU)	25	25	n/a	82	71	35	625	416	361	180
30 Ton* (360,000 BTU)	15 Hp (x2)	30	n/a	98	85	42	375	250	217	108
30 Ton (360,000 BTU)	30 Hp	30	n/a	98	85	42	750	500	433	217
40 Ton* (480,000 BTU)	20 Hp (x2)	40	n/a	131	113	57	500	333	289	144
40 Ton (480,000 BTU)	40 Hp	40	n/a	131	113	57	1000	666	577	289
50 Ton* (480,000 BTU)	25 Hp (x2)	50	n/a	163	142	71	625	416	361	180
50 Ton (480,000 BTU)	50 Hp	50	n/a	163	142	71	1250	833	722	361

^{*} For Multiple motor configurations, sequence starting is assumed.

Air Conditioning

1 hp per 1 ton

1 ton = 12,000 BTUs

General Residential Running Load

Starting Load

Description	Нр	Running kW	Amps @ 120V 1Ø	4.9Amps @ 240V 1Ø	Starting kW	LR Amps @ 120V 1Ø	LR Amps @ 240V 1Ø
Refrigerator pump, sump, furnace, garage opener	0.5	0.5	4.9	2.5	1.5	25	13
Freezer, washer, septic grinder	0.75	0.75	7.4	3.7	2.3	38	19
General 1 Hp	1	1	9.8	4.9	3	50	25
Well & septic lift pump	2	2	19.6	9.8	6	100	50



TABLE 2

NON-MOTOR LOAD REFERENCE

Residential

		Running Load*	
Description	kW	Amps at 120V 1ø	Amps at 240V 1ø
Electric heat per 1000 ft ²	12	n/a	50
Heat pump elements per 1000 ft ²	7	n/a	29
Dryer	5.5	n/a	23
Hot tub	10	n/a	50
Range oven/Stove top per burner	8	n/a	30
Hot water	4.5	n/a	19
General lighting and receptacles per 1000 ft ²	3	24.9	n/a
Blow dryer	1.25	10.4	n/a
Dishwasher	1.5	12.5	n/a
Microwave	1	8.3	n/a
Toasters	1	8.3	n/a
Home Entertainment Center	1	8.3	n/a
Computer	1	8.3	n/a
Kitchen	1.5	12.5	n/a
Laundry	1.5	12.5	n/a

^{*}Always check data plate for actual running amps.

Commercial

Please refer to equipment data plate and/or billing history for commercial details.



TABLE 3

SURGE CAPABILITY

Generac QT Series Generators (Operating at less than 3600 RPM)

	Rated Output (Running Amps)				Commercial Surge Capability (LR Amps @ 15% Voltage Dip)				Residential Surge Capability (LR Amps @ 30% Voltage Dip)			
Size (kW)	240V 1Ø	208V 3Ø	240V 3Ø	480V 3Ø	240V 1Ø	208V 3Ø	240V 3Ø	480V 3Ø	240V 1Ø	208V 3Ø	240V 3Ø	480V 3Ø
22	92	76	n/a	n/a	71	48	n/a	n/a	134	92	n/a	n/a
27	113	94	81	41	100	67	58	33	153	137	118	64
30	125	104	90	45	100	67	65	43	205	137	130	87
36	150	125	108	54	113	75	65	44	225	151	131	87
45	188	156	135	68	146	98	94	57	292	195	168	112
48	200	167	144	72	163	109	94	57	321	214	185	112
70	292	243	210	105	275	164	159	95	550	330	318	190
100	417	347	300	150	369	222	214	128	738	441	426	255
130	542	451	390	195	546	364	315	209	1088	724	628	419

Generac QT Series Generators (Operating at 3600 RPM)

	Rated Output (Running Amps)				Commercial Surge Capability (LR Amps @ 15% Voltage Dip)				Residential Surge Capability (LR Amps @ 30% Voltage Dip)			
Size (kW)	240V 1Ø	208V 3Ø	240V 3Ø	480V 3Ø	240V 1Ø	208V 3Ø	240V 3Ø	480V 3Ø	240V 1Ø	208V 3Ø	240V 3Ø	480V 3Ø
7	29	n/a	n/a	n/a	23	n/a	n/a	n/a	46	n/a	n/a	n/a
8	33	n/a	n/a	n/a	26	n/a	n/a	n/a	51	n/a	n/a	n/a
10	42	n/a	n/a	n/a	31	n/a	n/a	n/a	63	n/a	n/a	n/a
14	58	n/a	n/a	n/a	52	n/a	n/a	n/a	102	n/a	n/a	n/a
17	71	n/a	n/a	n/a	63	n/a	n/a	n/a	125	n/a	n/a	n/a
20	83	n/a	n/a	n/a	73	n/a	n/a	n/a	145	n/a	n/a	n/a
25	104	87	75	38	71	48	46	30	138	92	91	60
30	125	104	90	45	100	67	60	43	205	137	130	87
45	188	156	135	68	146	98	94	57	292	195	168	112
60	250	208	180	90	179	120	103	69	350	234	204	136
70	292	243	210	105	275	164	142	95	550	330	286	190
80	333	278	240	120	275	183	158	106	550	366	318	212
100	417	347	300	150	369	222	214	128	738	441	426	255
150	625	520	451	226	558	372	322	215	1121	747	647	431

Note: All nominal ratings based upon LP fuel. Refer to specification sheet for NG ratings and deration adjustments for ambient temperature and altitude.



TABLE 4

FUEL PIPE SIZING

Natural Gas (Table values are maximum pipe run in feet.)

				Pipe Size (in)			
kW	0.75"	1"	1.25"	1.5"	2"	2.5"	3"
7-8	55	200	820				
10	20	85	370	800			
13-14	10	50	245	545			
16-17		40	190	425			
20		20	130	305	945		
22		15	115	260	799		
25		10	95	220	739		
27			85	203	552		
30			60	147	565		
35-36			35	95	370	915	
40			25	75	315	790	
45			15	60	260	650	
48				50	230	585	
50				50	220	560	
60				25	145	390	1185
70				5	75	225	710
80					65	195	630
100					40	140	460
130						50	215
150						30	150

LΡ

LPG: $8.55\ ft^3/lb.$, $4.24\ lbs./gal.$, $2500\ btu/ft^3$

LPG: 36.3 ft³ = 1 gal.

Natural Gas

1 cubic foot = 1,000 BTU

1 therm = 100,000 BTU

Gas consumption = 13,000-16,000 BTU per kW/hr

Pressure

1 inch mercury = 13.61 inches water column

1 inch Water Column = 0.036 psi

5-14 inches water column = 0.18 psi to 0.50 psi

LP Vapor (LPV) (Table values are maximum pipe run in feet.)

				Pipe Size (in))		
kW	0.75"	1"	1.25"	1.5"	2"	2.5"	3"
7-8	165	570					
10	70	255	1000				
13-14	45	170	690				
16-17	25	130	540				
20	15	115	480				
22		85	365				
25		60	275	605			
27		55	260	575			
30		40	195	435			
35-36		20	125	290	1030		
40		15	107	250	890		
45			82	195	725		
48			70	165	620		
50			70	160	610		
60			45	115	445	1095	
70			20	60	260	660	
80			15	50	230	590	
100				30	165	430	1305
130					70	205	660
150					45	150	490

Note:

- Pipe sizing is based on 0.5" H₂O pressure drop.
- Sizing includes a nominal number of elbows and tees.
- Please verify adequate service and meter sizing.



TABLE 5 LP VAPOR (LPV) TANK SIZING

Vapor Withdrawal

Tank Capacity Total (Gal.)	Tank Capacity Useable (Gal.)	Minimum Temp (°F)	Tank Capacity (btu/hr.)	Length (Inches)	Diameter (Inches)	Overall Ht. (Inches)
120	72	40 20 0	246,240 164,160 82,080	57	24	33
150	90	40 20 0	293,760 195,840 97,920	68	24	33
250	150	40 20 0	507,600 338,400 169,200	94	30	39
325	195	40 20 0	642,600 428,400 214,200	119	30	39
500	300	40 20 0	792,540 528,360 264,180	119	37	46
850	510	40 20 0	1,217,700 811,800 405,900	165	41	50
1000	600	40 20 0	1,416,960 944,640 472,320	192	41	50

Load (kW)	BTU / Hr	LP Gal / Hr	NG Ft ³ / Hr	NG Therms/ HR
5	110,000	1.2	110	1.1
10	156,000	2	156	1.6
15	231,800	2.5	220	2.2
20	294,000	2.9	294	2.6
25	345,000	3.8	345	3.2
30	418,300	4.5	417	4.2
35	485,000	5.1	485	4.8
40	550,000	6.1	550	5.5
50	655,000	7.5	655	6.7
60	836,600	9	862	8.6
70	1,035,700	11	1,020	10.2
80	1,170,000	12.7	1,154	11.5
90	1,200,000	13	1,200	12
100	1,280,000	13.8	1,260	12.6
110	1,550,000	17.1	1,550	15.5
120	1,675,000	18.5	1,675	16.7
130	1,800,000	19.5	1,786	17.8
140	1,925,000	21.3	1,925	19.2
150	2,050,000	22.7	2,050	20.5
200	2,800,000	30.9	2,800	28.0
300	4,100,000	45.3	4,100	49.0

Gas Required For Common Appliances				
Appliance	Approximate Input BTU / Hr			
Warm Air Furnace Single Family Multifamily, per unit	100,000 60,000			
Hydronic Boiler, Space Heating Single Family Multifamily, per unit	100,000 60,000			
Hydronic Boiler, Space and Water Heating Single Family Multifamily, per unit	120,000 75,000			
Range, Free Standing, Domestic Built-In Oven or Broiler Unit, Domestic Built-In Top Unit, Domestic	65,000 25,000 40,000			
Water Heater, Automatic Storage, 30 to 40 gal. Tank Water Heater, Automatic Storage, 50 gal. Tank Water Healer, Automatic Storage, Instantaneous	35,000 50,000			
2 GPM 4 GPM 6 GPM	142,800 285,000 428,000			
Water Heater, Domestic, Circulating or Side-Arm	35,000			
Refrigerator Clothes Dryer, Type 1 (Domestic) Gas Fireplace Direct Vent	3,000 35,000 40,000			
Gas log	80,000			
Barbecue Gas light	40,000 2,500			
Incinerator, Domestic	35,000			
Table Reprinted From Table 5.4.2.1, NFPA 54, 2002 e	d.			

Operating Cost Per Hour

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NG Therms/HR x Cost of NG Therm

Note: Tank BTU capacity and generator run times based upon maintaining a minimum tank fuel level of 20%. Tanks are typically filled to 80% full.

Note: Typical fuel consumption based on a generator 100% loaded.



UPS - GENERATOR COMPATIBILITY

Passive (also referenced as standby or off-line) and Line-Interactive

These technologies are most common for personal workstations and point of sale applications. They are typically single phase equipment with size ranges of 350 VA - 2000 VA for passive and 500 VA to 5000 VA for line-interactive.

Passive UPS's are the simplest type. Under normal conditions AC power passes straight through to the UPS load. When the input power supply goes outside of specifications, the UPS transfers the load from input power to the internal DC to AC power inverter. Passive UPS's do not correct for voltage or frequency deviations under "normal" operation.

Line-interactive is similar to the passive technology except it has circuitry that attempts to correct for standard voltage deviations. Frequency deviations under "normal" power operation are not corrected.

Equipment Notes:

These devices tend to be electrically / harmonically very noisy. A single small UPS is not a significant concern, but applications with multiple UPS's can be problematic.

Passive UPS technology typically has normal tolerances of 10-25% on voltage and 3 hertz on frequency. Minuteman UPS input tolerance is closer to 10-36%. If the input source goes outside of these tolerances, the UPS will switch onto the UPS battery source. Some line-interactive units may have frequency tolerances factory set to 0.5 hertz. These units will need to have their frequency tolerance increased to a minimum of 2 hertz. Minuteman UPS products are close to 5 hertz and not 0.5 hertz.

Generator Sizing Recommendation:

Limit the total UPS loading to 15% - 20% of the generator capacity.

Double-Conversion

This technology is most common for critical load applications. Double-conversion UPS's constantly rectify AC to DC and then invert the DC back into AC. This configuration results in an output that corrects for voltage and frequency deviations.

There are single and three phase models covering small through large applications. Most UPS applications larger than 5000 VA use double conversion technology. This approach is also the preferred technology for generator applications.

Equipment Notes:

Double-conversion UPS's that are single phase or unfiltered three phase models tend to create a significant level of electrical/ harmonic noise. This is illustrated by harmonic current distortions that are greater than 35%. Minuteman UPS products could have current distortion of 8%. When three phase models are supplied with harmonic filters (current distortion less than 10%), this concern is no longer an issue.

Generator Sizing Recommendation:

Single phase models: limit the total UPS loading to 25% of the generator capacity.

Single phase Minuteman UPS models: limit the total UPS loading to 50% of the generator capacity.

Three phase models without filters (current distortion > 30%): limit the UPS loading to 35% of the generator capacity.

Three phase models with filters (current distortion < 10%): limit the UPS loading to 80% of the generator capacity.

Supplier(s)	Passive (Standby)	Line-Interactive	Double-Conversion
Minuteman UPS	Enspire	Enterprise Plus	Endeavor
APC	Back-UPS Series	Smart-UPS Series	Symmetra Series
Liebert	PowerSure PST & PSP	PowerSure PSA & PSI	UPStation & Nfinity
Powerware	3000 series	5000 series	9000 series

Note: Ferrups and Delta-Conversion UPS technologies not included in discussion

TYPICAL GENERATOR/TRANSFER SWITCH COMBINATIONS

Name			ent Switch nodel #	Description	Prior Models (5/08-5/09)	Prior Switch model # (*see note)
S882	ansfer swtiches ar	swtiches and	prior models / tr	ansfer swtiches listed CAN be used together. See notes below for deta	ils	,
S882 RTS106ZA1 10 Circuit Lade Dishbution Panel S518, 9528 RTS100A3 100 amp CSA Service Rated Switch RTSE100A3CSA 100 amp CSA Service Rated Switch RTSE3100A3CSA 200 amp CSA Service Rated Switch RTSE3100A3CSA 200 amp CSA Service Rated Switch RTSS10CA3CSA 100 circuit Lade Dishbution Panel RTS10CA3 10 Circuit Lade Dishbution Panel RTS10CA3 10 Circuit Lade Dishbution Panel RTS10CA3 100 amp Service Entrance Rated News Smart Switch RTS1010A3 100 amp Service Entrance Rated News Smart Switch RTS1010A3 150 amp Service Entrance Rated News Smart Switch RTS1010A3 150 amp Service Entrance Rated News Smart Switch RTS1010A3 150 amp Service Entrance Rated News Smart Switch RTS1010A3 150 amp Service Entrance Rated News Smart Switch RTS1010A3 150 amp Service Entrance Rated News Smart Switch RTS1010A3 150 amp Service Entrance Rated News Smart Switch RTS1010A3 150 amp Service Entrance Rated News Smart Switch RTS1010A3 150 amp Service Entrance Rated News Smart Switch RTS1010A3 150 amp Service Entrance Rated News Smart Switch RTS1010A3 150 amp Service Entrance Rated News Smart Switch RTS1010A3 150 amp Service Entrance Rated News Smart Switch RTS1010A3 150 amp Service Entrance Rated News Smart Switch RTS1010A3 150 amp Service Entrance Rated Switch RTS1010A3 150 amp Service Entrance Rated Switch RTS1010A3 150 amp CSA Service Rated Switch RTS1010A3 150 amp CSA Service Rated Switch RTS1010A3 150 amp Normal News Smart Switch RTS1010A3 150 amp Service Entrance Rated News Smart Switch RTS1010A3 150 amp Service Entrance Rated News Smart Switch RTS1010A3 150 amp Service Entrance Rated News Smart S						
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RTSF100ACCSA						RTSF100A1*
RTSE200A3CSA						RTSN100A3*
NA						
NA	1 101	101	-200/1000/1			
RTS100A3			Ν/Δ		_	RTSD100A1*
RTSX100A3	F	RT			-	RTSF100A1*
RTSX150A3						RTSN100A3*
RTSD150A3	F	RT	SD100A3	100 amp Service Entrance Rated Nexus Smart Switch		RTSE100A3*
R1SU100A3					5520 5528	
RTSD200A3					3320, 3320	
RTSJ200A3						RTSN200A3*
S449 GenReady Load Center NEMA 1 S454 GenReady Load Center NEMA 3R S448 Basic GenReady Load Center NEMA 3R S448 Basic GenReady Load Center RTSE 100A3CSA 100 amp CSA Service Rated Switch RTSE200A3CSA 100 amp CSA Service Rated Switch RTSE200A3CSA 100 amp CSA Service Rated Switch RTSE20A3CSA 100 care CSA Service Rated Switch RTS10EZA1 12 Circuit Load Distribution Panel RTS14EZA1 12 Circuit Load Distribution Panel RTS14EZA1 12 Circuit Load Distribution Panel RTSX100A3 100 amp Mormal Nexus Smart Switch RTSX10A3 100 amp Service Entrance Rated Nexus Smart Switch RTSX150A3 150 amp Normal						RTSE200A3*
S444		KI			-	RTSS200A3* 5449
S448					-	5454
RTSE100A3CSA						5448
	RT	RTSE				
RTS10EZA1				200 amp CSA Service Rated Switch		
RTS10EZA1	1		-	14 kW Air-Cooled Generator - Steel		
RTS12EZA1	F	RT	S10EZA1		1	RTSF100A1*
RTSX100A3	F	RT	S12EZA1	12 Circuit Load Distribution Panel		RTSH100A1*
RTSD100A3					\exists	RTSP100A1*
RTSX150A3						RTSN100A3*
TRIST 15043					5522, 5530	RTSE100A3*
RTSX200A3						
RTSD200A3						RTSN200A3*
RTSJ200A3						RTSR200A3*
S449 GenReady Load Center NEMA 1						RTSS200A3*
S454 GenReady Load Center NEMA 3R S4448 Basic GenReady Load Center STSE100A3CSA 100 amp CSA Service Rated Switch STSE200A3CSA 200 amp CSA Service Rated Switch STSE200A3CSA 200 amp CSA Service Rated Switch STSE200A3CSA 200 amp CSA Service Rated Switch STSE20A3CSA 200 amp CSA Service Rated Switch STSE20A3CSA 200 amp CSA Service Rated Switch STSE2A1 12 Circuit Load Distribution Panel RTS14EZA1 14 Circuit Load Distribution Panel RTS14EZA1 14 Circuit Load Distribution Panel RTS16EZA1 16 Circuit Load Distribution Panel RTSX100A3 100 amp Normal Nexus Smart Switch S523, 5531 RTSX100A3 100 amp Normal Nexus Smart Switch S524, 5532 RTSX150A3 150 amp Normal Nexus Smart Switch S524, 5532 RTSX150A3 150 amp Service Entrance Rated Nexus Smart Switch RTSX200A3 200 amp Normal Nexus Smart Switch RTSX200A3 200 amp Service Entrance Rated Nexus Smart Switch RTSX200A3 200 amp Normal Nexus Smart Switch RTSX200A3 200 amp Service Entrance Rated Nexus Smart Switch RTSX200A3 LTS Load Shedding 200 amp Nexus Smart Switch RTSX200A3 LTS Load Shedding 200 amp Nexus Smart Switch RTSX200A3 S6RReady Load Center NEMA 3R S4448 Basic GenReady Load Center NEMA 3R S4488 Basic GenReady Load Center NEMA RTSX100A3 100 amp CSA Service Rated Switch RTSX100A3 100 amp Normal Nexus Smart Switch RTSX100A3 100 amp Normal Nexus Smart Switch RTSX100A3 100 amp Normal Nexus Smart Switch RTSX100A3 150 amp Normal Nexus Smart Switch RTSX10A3 150 amp Normal Nexus Smart Switch RXSX10A3 150 amp Normal Nexus Smart Switch RXSX10A3 150 amp Normal Nexus Smart Switch RXSX10A3 150 amp Normal Nexus Smart Switch		111				5449
RTSE100A3CSA 100 amp CSA Service Rated Switch RTSE200A3CSA 200 amp CSA Service Rated Switch			5454			5454
RTSE200A3CSA 200 amp CSA Service Rated Switch						5448
17 kW Air-Cooled Generator - Steel 17 kW Air-Cooled Generator - Aluminum RTS12EZA1 12 Circuit Load Distribution Panel RTS14EZA1 14 Circuit Load Distribution Panel RTS16EZA1 16 Circuit Load Distribution Panel RTS110A3 100 amp Normal Nexus Smart Switch RTSD100A3 100 amp Normal Nexus Smart Switch RTSD100A3 100 amp Normal Nexus Smart Switch S523, 5531 R RTSX150A3 150 amp Normal Nexus Smart Switch RTSX200A3 200 amp Normal Nexus Smart Switch RTSX200A3 200 amp Normal Nexus Smart Switch RTSX200A3 200 amp Normal Nexus Smart Switch RRSD200A3 200 amp Service Entrance Rated Nexus Smart Switch RRSD200A3 200 amp Service Entrance Rated Nexus Smart Switch RRSD200A3 LTS Load Shedding 200 amp Nexus Smart Switch RRSD200A3 LTS Load Shedding 200 amp Nexus Smart Switch RRSD200A3 LTS Load Shedding 200 amp Nexus Smart Switch RRSD200A3 East CenReady Load Center NEMA 1 S454 GenReady Load Center NEMA 3R S448 Basic GenReady Load Center NEMA 3R S448 Basic GenReady Load Center NEMA 8 RTSE100A3CSA 200 amp CSA Service Rated Switch RTSE200A3CSA 200 amp CSA Service Rated Switch RTSE200A3CSA 200 amp Service Entrance Rated Switch RTSE100A3 100 amp Normal Nexus Smart Switch RTSE100A3 150 amp Normal Nexus Smart Switch RTSE200A3 200 amp Service Entrance Rated Nexus Smart Switch RTSE200A3 200 amp Service Entrance Rated Nexus Smart Switch RTSE200A3 200 amp Service Entrance Rated Nexus Smart Switch RTSE200A3 200 amp Service Entrance Rated Nexus Smart Switch RTSE200A3 200 amp Service Entrance Rated Nexus Smart Switch RTSE200A3 200 amp Service Entrance Rated Nexus Smart Switch RTSE200A3 200 amp Service Entrance Rated Nexus Smart Switch RTSE200A3 200 amp Service Entrance Rated Nexus Smart Switch RTSE200A3 200 amp Service Entrance Rated Nexus Smart Switch RTSE20A448 Basic GenReady Load Center NEMA 3R S448 Basic GenReady Load Center NEMA 3R S448 Basic GenReady Load Center NEMA 3R S448 Basic GenReady Load C						
17 kW Air-Cooled Generator - Aluminum	RI	RISE	=200A3CSA			
RTS12EZA1						
RTS14EZA1	-	DT	'S12Ε7Δ1		-	RTSH100A1*
RTS16EZA1					1	RTSP100A1*
RTSX100A3					-	RTSW100A1*
RTSX150A3					5523, 5531	RTSN100A3*
RTSD150A3					5524, 5532	RTSE100A3*
RTSD150A3 150 amp Service Entrance Rated Nexus Smart Switch RTSD200A3 200 amp Normal Nexus Smart Switch RTSD200A3 200 amp Service Entrance Rated Nexus Smart Switch RTSD200A3 LTS Load Shedding 200 amp Nexus Smart Switch RTSD200A3 LTS Load Shedding 200 amp Nexus Smart Switch RTSD449 GenReady Load Center NEMA 1						
RTSX200A3						DTONIOGGAGE
RTSJ200A3					-	RTSN200A3* RTSE200A3*
S449 GenReady Load Center NEMA 1					-	RTSS200A3*
5454 GenReady Load Center NEMA 3R		KI				5449
S448 Basic GenReady Load Center						5454
RTSE100A3CSA 100 amp CSA Service Rated Switch 200 amp CSA Service Rated Switch						5448
20 kW Air-Cooled Generator - Aluminum				100 amp CSA Service Rated Switch		
RTSX100A3	RT	RTSE	E200A3CSA	200 amp CSA Service Rated Switch		
RTSX100A3		T		20 kW Air-Cooled Generator - Aluminum		
RTSD100A3	F	RT	SX100A3			RTSN100A3*
RTSD150A3 150 amp Service Entrance Rated Nexus Smart Switch S887 RTSX200A3 200 amp Normal Nexus Smart Switch S525, 5533 R RTSD200A3 200 amp Service Entrance Rated Nexus Smart Switch R R 5449 GenReady Load Center NEMA 1 GenReady Load Center NEMA 3R S454 GenReady Load Center NEMA 3R S454 Basic GenReady Load Center S448 Basic GenReady Load Center S454 S454 <td>F</td> <td>RT</td> <td>SD100A3</td> <td></td> <td></td> <td>RTSE100A3*</td>	F	RT	SD100A3			RTSE100A3*
5887 RTSX200A3 200 amp Normal Nexus Smart Switch 5525, 5533 R RTSD200A3 200 amp Service Entrance Rated Nexus Smart Switch R 5449 GenReady Load Center NEMA 1 GenReady Load Center NEMA 3R 5454 GenReady Load Center NEMA 3R 5448 Basic GenReady Load Center						
RTSD200A3 200 amp Service Entrance Rated Nexus Smart Switch 5449 GenReady Load Center NEMA 1 5454 GenReady Load Center NEMA 3R 5448 Basic GenReady Load Center						P.TO. I CO. C.
5449 GenReady Load Center NEMA 1 5454 GenReady Load Center NEMA 3R 5448 Basic GenReady Load Center				5525, 5533	RTSN200A3	
5454 GenReady Load Center NEMA 3R 5448 Basic GenReady Load Center	F	L RT			-	RTSE200A3*
5448 Basic GenReady Load Center			,		-	5449 5454
in the state of th		<u> </u>			-	5454 5448
RTSJ200A3 LTS Load Shedding 200 amp Nexus Smart Switch R		RT		· · · · · · · · · · · · · · · · · · ·	-	RTSS200A3*
RTSE100A3CSA 100 amp CSA Service Rated Switch						

*NOTE 1: Combining a previous model transfer switch with a current Nexus model generator requires kit #0H93030SRV to be installed to complete the battery charging circuit.

NOTE 2: Installing a previous model series generator with any of the listed transfer swtich will require the installation of the battery charger included with the generator

TYPICAL GENERATOR/TRANSFER SWITCH COMBINATIONS

Current Model - NEXUS	Current Switch model #	Description	Prior Models (5/08-5/09)	Prior Switch model # (*see note)
exus models / transfer sw	tiches and prior models / t	ransfer swtiches listed CAN be used together. See notes below for detail	ls	
QT02224ANAX	·	22 kW Liquid-Cooled Generator, 1phase - Aluminum	QT02224ANAN	
QT02516ANSX		25 kW Liquid-Cooled Generator, 1phase - Steel	QT02516ANSN	
QT02724ANAX		27 kW Liquid-Cooled Generator, 1phase - Steel	QT02724ANAN	
QT03016ANSX		30 kW Liquid-Cooled Generator, 1phase - Steel	QT03016ANSN	
Q100010ANOX	RTSX100A3	100 amp Normal Nexus Smart Switch	Q100010AITOIT	RTSN100A3
ŀ	RTSD100A3	100 amp Service Entrance Rated Nexus Smart Switch		RTSE100A3
ŀ	RTSX150A3	150 amp Normal Nexus Smart Switch		11102100/10
	RTSD150A3	150 amp Service Entrance Rated Nexus Smart Switch		
	RTSX200A3	200 amp Normal Nexus Smart Switch		RTSN200A3
	RTSD200A3	200 amp Service Entrance Rated Nexus Smart Switch		RTSE200A3
	RTSJ200A3	LTS Load Shedding 200 amp switch		RTSS200A3
	5449	GenReady Load Center NEMA 1		5449
ŀ	5454	GenReady Load Center NEMA 3R		5454
ŀ	5448	Basic GenReady Load Center		5448
ŀ	RTSE100A3CSA	100 amp CSA Service Rated Switch		0110
	RTSE200A3CSA	200 amp CSA Service Rated Switch		
	TTTOLESONTOCOTT			
	DTCV400A2	36 kW Liquid-Cooled Generator - Aluminum 100 amp Normal Nexus Smart Switch	-	RTSN100A3
-	RTSX100A3		-	
-	RTSD100A3	100 amp Service Entrance Rated Nexus Smart Switch	07000443444	RTSE100A3
	RTSX150A3	150 amp Normal Nexus Smart Switch	QT03624ANAN	
QT03624ANAX	RTSD150A3	150 amp Service Entrance Rated Nexus Smart Switch		
Q103024ANAA	RTSX200A3	200 amp Normal Nexus Smart Switch		RTSN200A3
	RTSD200A3	200 amp Service Entrance Rated Nexus Smart Switch		RTSE200A3
	RTSJ200A3	LTS Load Shedding 200 amp switch		RTSS200A3
	RTSE100A3CSA	100 amp CSA Service Rated Switch		
	RTSE200A3CSA	200 amp CSA Service Rated Switch		
		45 kW Liquid-Cooled Generator - Steel		
	RTSX100A3	100 amp Normal Nexus Smart Switch		RTSN100A3
	RTSD100A3	100 amp Service Entrance Rated Nexus Smart Switch		RTSE100A3
OTO4504ANOV	RTSX200A3	200 amp Normal Nexus Smart Switch	OTO4504ANON	RTSN200A3
QT04524ANSX	RTSD200A3	200 amp Service Entrance Rated Nexus Smart Switch	QT04524ANSN	RTSE200A3
	RTSJ200A3	LTS Load Shedding 200 amp switch		RTSS200A3
	RTSE100A3CSA	100 amp CSA Service Rated Switch		
RTSE200A3C		200 amp CSA Service Rated Switch		
		48 kW Liquid-Cooled Generator - Aluminum		
	RTSX100A3	100 amp Normal Nexus Smart Switch		RTSN100A3
	RTSD100A3	100 amp Service Entrance Rated Nexus Smart Switch	Ī	RTSE100A3
	RTSX200A3	200 amp Normal Nexus Smart Switch	Ţ	RTSN200A3
QT04842ANAX	RTSD200A3	200 amp Service Entrance Rated Nexus Smart Switch	QT04842ANAN	RTSE200A3
Q I O TO TEATIVAL	RTSJ200A3	LTS Load Shedding 200 amp switch	Q104042ANAN	RTSS200A3
	RTSE100A3CSA	100 amp CSA Service Rated Switch		
	RTSE200A3CSA	200 amp CSA Service Rated Switch		
	RTSX400A3	400 amp Normal Nexus Smart Switch		RTSE200A3
		60 kW Liquid-Cooled Generator -		
ŀ	RTSX100A3	100 amp Normal Nexus Smart Switch	}	RTSN100A3
QT06024ANSX*	RTSX200A3	100 amp Service Entrance Rated Nexus Smart Switch	}	RTSN200A3
This model available	RTSD200A3	200 amp Normal Nexus Smart Switch		RTSE200A3
n Steel or Aluminum;	RTSX400A3	200 amp Service Entrance Rated Nexus Smart Switch	QT06024ANSN	RTSN400A3
Natural Gas or LP	RTSD400A3	400 amp Normal Nexus Smart Switch	<u> </u>	RTSE200A3
	RTSE100A3CSA	100 amp CSA Service Rated Switch	<u> </u>	52250710
	RTSE200A3CSA	200 amp CSA Service Rated Switch		
RTS 100 -		22-60 kW Liquid-Cooled Generator - 3 phase options	HTS 100 -	400 amp*

^{*(}all NON service entrance rated)

NOTE: Combining a previous model transfer switch with a current Nexus model generator requires a kit #0H93030SRV to be installed to complete the battery charging circuit.



NEC (700, 701, 702) Comparison

NEC Comparison Table to be used as a general guideline in determining the proper generator for specific applications. Refer to architectural documents for final selection.

		Article 700 - Emergency	Article 701 - Standby	Article 702 - Optional Standby
	Scope	Legally required life safety	Legally required critical support (fire fighting, health hazards, etc)	Protect property & facilities
	Equipment Approval	For Emergency / (UL2200)	For Intended Use / (UL2200)	For Intended Use / (UL2200) / Not in 2008
	Witness Testing (on-sight)	At install & periodically	At install	None
Ðι	Periodic Testing	Yes	Yes	None
Testing	Battery Maintenance	Yes	Yes	None
<u> </u>	Maintenance Records	Yes	Yes	None
	Load Testing	Yes	Yes	None
	Capacity	All Loads	All loads intended to operate at one time	All loads intended to operate at one time / Not in 2008
	Other Standby Loads Allowed	Yes with load shedding	Yes with load shedding	2008 – Yes with load shedding
	Peak Shaving Allowed	Yes ??	Yes	Yes
رج ج	Automatic	Yes	Yes	No
۸ ۲	Equipment Approval	For Emergency / (UL1008)	For Standby / (UL1008)	For Intended Use / (UL1008)
(5)	Means to Permitt Bypass	Yes	No	No
) fe	Elect. Operated - Mech. Held	Yes	No	No
Transfer Switch	Other loads	No	Yes with load shedding	N/A
Ĕ	Max. Fault Current Capable	Yes	Yes	Yes
ox	Derangement	Yes / Standard common alarm	Yes / Standard common alarm	Yes / Standard common alarm
Signals Audible (Visual)	Carrying Load	Yes / Displayed at ATS	Yes / Displayed at ATS	Yes / Displayed at ATS
gng dib sug	Battery Charger Failed	Yes	Yes	No
Signals (Audible & Visual)	Ground Fault Indication	Yes (480V & 1000A)	No	No
٠	NFPA 110 Signaling	Yes / Optional annunciator	Yes / Optional annunciator	No
Signs	At service	Yes / Type & location	Yes / Type & location	Yes / Type & location
Sić	At neutral to ground bonding	Yes (if remote)	Yes (if remote)	Yes (if remote)
	Wiring kept independent	Yes	No	No
	Fire protection (ref 700-9d)	Yes (1000 persons or 75' building)	No	No
	Maximum power outage	10 sec	60 sec	N/A
	Retransfer delay	15 min setting	15 min setting	No
	Automatic starting	Yes	Yes	No
	On-site fuel requirements	2 hours (see NFPA 110)	2 hours	None
	Battery charger	Yes	Yes	No
	Ground Fault	Indication Only	No	No

Electrical Formulas

TO FIND	KNOWN VALUES	1-PHASE	3-PHASE
KILOWATTS (kW)	Volts, Current, Power Factor	<u>E x l</u> 1000	<u>E x I x 1.73 x PF</u> 1000
KVA	Volts, Current	<u>E x l</u> 1000	Exlx1.73 1000
AMPERES	kW, Volts, Power Factor	<u>kW x 1000</u> E	<u>kW x 1000</u> E x 1.73 x PF
WATTS	Volts, Amps, Power Factor	Volts x Amps	E x l x 1.73 x PF
NO. OF ROTOR POLES	Frequency, RPM	2 x 60 x Frequency RPM	2 x 60 x frequency RPM
FREQUENCY	RPM, No. of Rotor Poles	RPM x Poles 2 x 60	RPM x Poles 2 x 60
RPM	Frequency, No. of Rotor Poles	2 x 60 x Frequency Rotor Poles	2 x 60 x Frequency Rotor Poles
kW (required for Motor)	Motor Horsepower, Efficiency	HP x 0.746 Efficiency	HP x 0.746 Efficiency
RESISTANCE	Volts, Amperes	<u>E</u>	<u>E</u>
VOLTS	Ohms, Amperes	I x R	l x R
AMPERES	Ohms, Volts	<u>E</u> R	<u>E</u> R



U.S. WEIGHTS AND MEASURES LINEAR MEASURE 1 INCH 2.540 CENTIMETERS = 3.048 DECIMETERS 12 INCHES **FOOT** = 9.144 DECIMETERS 3 FEET YARD = 5.5 YARDS ROD **5.029 METERS** = = FURLONG = 2.018 HECTOMETERS 40 RODS = FURLONGS = 1.609 KILOMETERS 1 MILE = **MILE MEASUREMENTS** STATUTE MILE 5,280 FEET SCOTS MILE 5,952 FEET IRISH MILE 6,720 FEET RUSSIAN VERST = 3,504 FEFT ITALIAN MILE 4,401 FEET 1 SPANISH MILE 15.084 FEET **OTHER LINEAR MEASUREMENTS** LINK = 7.92 INCHES FATHOM = 6 FEET FURLONG = 10 CHAINS 1 HAND = 4 INCHES 1 SPAN = 9 INCHES 1 LINK CHAIN = 22 YARDS = 608 1 CABLE **SQUARE MEASURE** 144 SQUARE INCHES SQUARE FOOT SQUARE FEET SQUARE YARD 301/4 SQUARE YARDS SQUARE ROD 40 RODS = ROOD ROODS **ACRE** = 640 **ACRES** SQUARE MILE = SQUARE MILE 1 SECTION =36 **SECTIONS** = 1 TOWNSHIP **CUBIC OR SOLID MEASURE** CU. FOOT 1728 CU. INCHES CU. YARD 27 CU. FEET 7.48 CU. FOOT **GALLONS** GALLON (WATER) 8.34 231 LBS. GALLON (U.S.) = GALLON (IMPERIAL) = CU. INCHES OF WATER 2771/4 CU. INCHES OF WATER

METRIC SYSTEM

CUBIC MEASURE:

(THE UNIT IS THE METER = 39.37 INCHES)

1 CU. CENTIMETER = 1000 CU. MILLIMETERS = 0.06102 CU. IN. 1 CU, DECIMETER = 1000 CU, CENTIMETERS = 61,02374 CU, IN. = 1000 CU. DECIMETERS = 35.31467 CU. FT. 1 CU. METER = 1 STERE 1.30795 CU. YDS. 1 CU. CENTIMETER (WATER) = 1 GRAM

1000 CU. CENTIMETERS (WATER) = 1 LITER = 1 KILOGRAM 1 CU. METER (1000 LITERS) = 1 METRIC TON

MEASURES OF WEIGHT:

(THE UNIT IS THE GRAM = 0.035274 OUNCES)

MILLIGRAM = = CENTIGRAM = 10 MILLIGRAMS = 0.015432 GRAINS 0.15432 GRAINS DECIGRAM = 10 CENTIGRAMS = GRAINS 1.5432 = 10 DECIGRAMS = GRAM 15.4323 **GRAINS** DEKAGRAM = 10 GRAMS 5.6438 DRAMS HECTOGRAM = 10 DEKAGRAMS = 3.5274 OUNCES KILOGRAM = 10 HECTOGRAMS = 2.2046223 POUNDS MYRIAGRAM = 10 KILOGRAMS = 22.046223 POUNDS = 10 MYRIAGRAMS = QUINTAL 1.986412 CWT. METRIC TON = 10 QUINTAL = 2,2045.622 POUNDS GRAM

= 0.56438 DRAMS 1 DRAM = 1.77186 GRAMS = 27.3438 GRAINS

1 METRIC TON = 2,204.6223 POUNDS

MEASURES OF CAPACITY:

(THE UNIT IS THE LITER = 1.0567 LIQUID QUARTS)

CENTILITER = 10 MILLILITERS = 0.338 FLUID OUNCES DECILITER = 10 CENTILITERS = 3.38 FLUID OUNCES LITER = 10 DECILITERS = 33.8 FLUID OUNCES DEKALITER = 10 LITERS = 0.284 BUSHEL HECTOLITER = 10 DEKALITERS = 2.84 BUSHELS 1 KILOLITER = 10 HECTOLITERS = 264.2 GALLONS

NOTE: KILOMETERS x 5 = MILES or MILES x 8 = KILOMETERS 5

METRIC SYSTEM

PREFIXES:

A. MEGA = 1,000,000 F. DECI 0.1 1,000 B. KILO F. CENTI 0.01 = = C. HECTO = 100 G. MILLI = 0.001 D. DEKA 10 H. MICRO 0.000001

LINEAR MEASURE:

(THE UNIT IS THE METER = 39.37 INCHES)
1 CENTIMETER = 10 MILLIMETERS = 0
1 DECIMETER = 10 CENTIMETERS = 3 0.3937011 IN. 3.9370113 INS. YDS. = 10 DECIMETERS 1.0936143 3.2808429 FT. DEKAMETER = 10 METERS HECTOMETER = 10 DEKAMETERS 10.936143 YDS = = 109.36143 YDS KILOMETER = 10 HECTOMETERS = 0.62137 MILE 1 MYRIAMETER = 10,000 METERS

SQUARE MEASURE:

(THE UNIT IS THE SQUARE METER = 1549.9969 SQ. INCHES)

SQ. CENTIMETER = 100 SQ. MILLIMETERS = 0.1550 SQ. IN.
SQ. DECIMETER = 100 SQ. CENTIMETERS = 15.550 SQ. INS. = 100 SQ. DECIMETERS = 10.7639 SQ. FT. SQ. METER SQ. DEKAMETER = 100 SQ. METERS = 119.60SQ, YDS, SQ. HECTOMETER = 100 SQ. DEKAMETERS SQ. KILOMETER = 100 SQ. HECTOMETERS

(THE UNIT IS THE "ARE" = 100 SQ. METERS)

= 10 MILLIARES CENTIARE 10.7643 SQ. FT. = DECIARE = 10 CENTIARES = 11.96033 SQ. YDS. SQ. YDS. ARE = 10 DECIARES = 119.6033 DEKARE = 10 ARES 0.247110 ACRES = **HEKTARE** = 10 DEKARES 2.471098 ACRES = 1 SQ. KILOMETER = 100 HEKTARES 0.38611 SQ. MILE

CUBIC MEASURE:

(THE UNIT IS THE "STERE" = 61,025.38659 CU. INS.)

DECISTERE = 10 CENTISTERES = 3.531562 CU. FT. STERE = 10 DECISTERES 1.307986 CU. YDS. = DEKASTERE = 13.07986 CU. YDS. = 10 STERES

METRIC DESIGNATOR AND TRADE SIZES

METRIC DESIGNATOR

16 21 27 35 41 53 63 78 91 103 129 155 12 1/2 3/4 1 11/4 11/2 2 21/2 3 31/2 4 $^{3}f_{8}$ 5 6 TRADE SIZE

U.S. WEIGHTS & MEASURES / METRIC EQUIVALENT CHART

	ln.	Ft.	Yd.	Mile	Mm	Cm	M	Km
1 Inch =	1	.0833	.0278	1.578x10 ⁻⁵	25.4	2.54	.0254	2.54x10 ⁻³
1 Foot =	12	1	.333	1.894x10 ⁻⁴	304.8	30.48	.3048	3.048x10 ⁻⁴
1 Yard =	36	3	1	5.6818 x10 ⁻¹	914.4	91.44	.9144	9.144x10 ⁻⁴
1 Mile =	63,360	5,280	1,760	1	1,609,344	160,934.4	1,609.344	1.609344
1 mm =	.03937	.0032808	1.0936x10 ⁻³	6.2137x10 ⁻⁷	1	0.1	0.001	0.000001
1 cm =	.3937	.0328084	.0109361	6.2137x10 ⁻⁶	10	1	0.01	0.00001
1 m =	39.37	3.28084	1.09361	6.2137x10 ⁻⁴	1000	100	1	0.001
1 km =	39,370	3,280.84	1,093.61	0.62137	1,000,000	100,000	1,000	1

In. = Inches FI. = Foot Yd. = Yard Mi. = Mile Mm = Millimeter Cm = Centimeter M = Meter Km = Kilometer

EXPLANATION OF SCIENTIFIC NOTATION:

Scientific Notation is simply a way of expressing very large or very small numbers in a more compact format. Any number can be expressed as a number between 1 & 10, multiplied by a power of 10 (which indicates the correct position of the decimal point in the original number). Numbers greater than 10 have positive powers of 10, and numbers less than 1 have negative powers of 10.

Example: $186,000 = 1.86 \times 10^{5}$ 0.000524 = 5.24 x 10⁻⁴

USEFUL CONVERSIONS / EQUIVALENTS

To determine circular mil of a conductor:

ROUND CONDUCTORCM = (Diameter in mils)²

MIL Equals 0.001 in.

BUS BARCM = Width (mils) x Thickness (mils)

0.7854

1 Millimeter = 39.37 Mils 1 Cir. Millimeter = 1550 Cir. Mils

1 Sq. Millimeter = 1974 Cir. Mils



Contractor			Ema	il				
Phone			Fax_				Application	ns
Job Name							The QT Series	does not meet the necessary
							requirements for NEC 695	or the following applications: Fire Pumps
VOLTAGE TYPE	☐ 120/240 1Ø☐ Natural Gas		208 3 ø Vapor (LF)/240 3 ø 🗌 277/4	80 3 ø	NEC 700 NFPA 20 NFPA 99 NFPA 110	Emergency Systems Fire Pumps Healthcare
ELEC. SERVICE	□ 100 Amp □	200 Amp	□ 400	Amp 🗆	☐ 600 Amp ☐ Othe	er	Reference	Codes
Before installation contact local jurisdiction to confirm all requirements are met. Jurisdictions may vary. Generac recommends contacting local authorities prior to installation. LOADS: Look for heavy building loads such as refrigeration, air conditioning, pumps or UPS systems. Use the following for sizing and determining generator kW.							and Standards: Branch Circuits and Feeders Overcurrent Protection Grounding Generators Emergency Systems	
TABLE 6 Motor Load Table (refer to Table 1)						NEC 701 NEC 702	Legally Required Standby Optional Standby	
Device		HP	RA	LRA	kW Running (= HP)	Starting kW ¹	NFPA 37	Installation & Use of Stationary Engines
							NFPA 54	National Fuel Gas Code

				NFPA 54		
				NFPA 58 LP Gas Code		
				To Calculate	kW	
				120 V 1ø	Amps x 120/1000 = kW	
				240 V 1ø	Amps x 240/1000 = kW	
				208 V 3ø	(Amps x 208 x 1.732 x PF) /1000 = I	
				240 V 3ø	(Amps x 240 x 1.732 x PF) /1000 =	
				480 V 3ø	(Amps x 480 x 1.732 x PF) /1000 =	
¹ Starting kW for HP < 7.5 starting	ng kW = HP x 3			PF is applicatio	n power factor (worst case 1.0)	

Starting kW for HP < 7.5 starting kW = HP x 3 Starting kW for HP > 7.5 starting kW = HP x 2

Starting kW for loading with no listed HP, calculate HP based on running amps in the chart on the right

TABLE 7	Non-Motor Load Table (refer to Table 2)				
Device		Amps	kW		

UPS Information

1.5 x kVA rating for a filtered system

3 – 5 x kVA rating for an unfiltered system

Generac recommends you refer to the Generac UPS Generator Compatibility sheet and contact the manufacturer of the UPS system to assist in your installation.

Typical application power factor is 0.95.

Transfer Switch Availability

- 100, 200 and 400 Amp service rated **RTSD** RTSN - 100-800 3ø and 600-800 1ø Amp RTSX - 100, 200, 400, 600, 800 Amp RTSJ200A3 - Service rated load shed switch

GenReady – 200 Amp service panel

RTS and GenReady switches only work with the R-controller.

Recommended Generator Size _____ Refer to Generator Sizing Instructions on other side of this sheet.

INSTALL NOTES:

- 1. Suggested concrete pad minimum thickness of 4" with 6" overhang on all sides. Composite pad included with air-cooled products.
- 2. Consult manual for installation recommendations.
- 3. Consult local authority having jurisdiction for local requirements.

PF) /1000 = kW PF) /1000 = kW PF) /1000 = kW

Generator Sizing Instructions:

There is not a single correct sizing solution. Following are several methods that, when mixed with good judgement, should result in an appropriately sized generator. Remember to consider load growth, seasonality, and effects of starting motors.

As municipalities and states adopt the new 2011 NEC Electrical Code, there may be new sizing requirements, spelled out in the code book, which the installation technician must follow. Always check with the local inspection department to confirm which code cycle will affect your install.

Never add Amps when sizing a generator. Convert Amps to kW and add kW to determine the required generator size. Power factors for various motor loads vary widely. Adding Amps without properly accounting for the power factor and/or mixing voltages will result in improperly sizing the generator.

When motors start, they create a current surge that step loads the generator and creates a voltage dip. After selecting a generator, reference the generator's surge capability using **table 3**. Verify that voltage dip is adequate for the application. Most commercial applications should be limited to about 15% voltage dip and residential applications should be limited to a 30% voltage dip.

Some applications utilize an uninterruptible power supply (UPS) to back up critical loads. Please read sizing guide for this load type.

Measurement Method

Use a clamp-on Amp meter or power analyzer to measure facility load levels. Clamp each leg separately and take the measurement during peak usage levels.

240V 1ø Applications: To determine peak usage in kW, add the highest Amp readings from the two legs, multiply by 120 and divide by 1,000.

(L1 + L2)120 / 1000

Size the generator 10 to 20% larger than the peak measured load.

3ø Applications: Add the peak Amp readings from all three legs and divide by 3 to determine peak Amps. Multiply peak Amps by volts, multiply the result by 1.732 (square root of 3), then divide by 1000 to convert Amps to kW.

Peak Amps = (L1 + L2 + L3) / 3

kW = [(Peak Amps x Volts) x 1.732] / 1000*

*Assumes power factor of 1.0

Size the generator 20 to 25% larger than the peak measured load.

Peak Amps -	 Peak kvv-	

GENERAC°

Determining Existing Loads/Billing History Method 220.87 NEC 2011

Many customers have a utility rate structure that has a peak demand charge. Using a year's worth of electric bills, size the generator 25% larger than the largest peak demand.

Verify motor and UPS load compatibility. Peak Demand = _____

Load Summation Method

- Enter running kW for all motor loads (except the largest) expected to run during peak load levels into table 6. Refer to table 1 for typical motor load sizes and electrical requirements.
- Enter kW for all non-motor loads expected to run during peak load levels into table 7. Refer to table 2 for typical residential loads and rules of thumb.
- Add the running motor load kW, non-motor load kW, and the starting kW of the largest motor load

Motor load running total (minus largest motor):	kW (ref. table 6)
Non-motor load total:	kW (ref. table 7)
Starting load from largest cycling motor:	kW (ref. table 6)
Total electrical loads:	=kW

Select generator: Commercial (add 20 to 25% to total kW)

Residential (add 10 to 20% to total kW)

- Confirm that voltage dip is within acceptable limits by comparing motor LRA to generator surge capability (see table #3).
- 5) Confirm UPS compatibility (see page 6).

System Capacity - Load Calculation

If the local municipality or state you are in has adopted the 2011 NEC Code, you may be required to use this step. Article 702 of the 2011 NEC includes a new requirement for sizing (702.5B). If no other method for sizing is acceptable, sizing of the generator shall be made in accordance with Article 220 of the NEC. The system capacity estimating sheet will guide you through this process.

DLM Load Control Module

702.4 (B) (2) (a) NEC 2011

The DLM Load Control Module is a 50 amp contact housed in a NEMA 3R enclosure for indoor and outdoor installation applications. Through the use of the DLM Modules in conjunction with any of the 100-400 amp Nexus Smart Switches, household or business loads can be intelligently managed enabling the use of a smaller, more efficient generator system. Up to four DLM Modules can be used with a single switch.

Project Layout

Ball Park Estimates (Do not use for final sizing)

Estimate based on 60% service size: (commercial)

240 Volts, 1 Ø:	Amps x .15 = .	kW
208 Volts, 3 Ø:	Amps x .22 =	kW
240 Volts, 3 Ø:	Amps x .25 =	kW
480 Volts 3 Ø:	Amps x 50 =	kW

Estimate based on 40% service size: (residential)

240 Volts, 1 Ø:	Amps x .10 =	kW
208 Volts, 3 Ø:	Amps x .15 =	kW
240 Volts, 3 Ø:	Amps x .17 =	kW
480 Volts, 3 Ø:	Amps x .34 =	kW

Estimate based on square footage

Fast food, convenience stores, restaurants, grocery stores

Other commercial applications

Square footage = ______

Estimated kW = _____

Amps to kW Rule of Thumb (assumes .8 pf)

For 480 volt systems Amps = $kW \times 1.5$ For 208 volt systems Amps = $kW \times 3.5$ For 240 volt 3 Ø systems Amps = $kW \times 3$ For 240 volt 1 Ø systems Amps = $kW \times 4$

System Capacity – Load Calculator



DIRECTIONS FOR NEC 2011, ARTICLE 220,	PART IV
220.80 Optional Feeder and Service Load Calculations (RESIDENTIAL)	NEC REFERENCE
SECTION CAN BE USED FOR DWELLING UNITS	220.82 (A
Served by a single feeder conductor (generator)	
• 120/240 volt or 208Y/120 volt service	
Ampacity of 100 amps or greater	
The calcultated load will be the result of adding	
• 220.82 (B) General Loads, and	220.82 (B
 220.82 (C) Heating and Air-Conditioning Load 	220.82 (C
 Calculated neutral load determined by 220.61. (Additional 70% demand factor can be 	
taken for cooking appliances and dryers when tables 220.54 and/or 220.55 are used)	
GENERAL LOADS	220.82 (B
General Lighting and General-Use Receptacles	
Calculate at 3 VA per square foot	220.82 (B) (1
 Use exterior dimensions of the home to calculate square footage – do not include ope 	1
porches, garages, or unused or unfinished spaces not adaptable for future use.	
 Add 20-amp small appliance & laundry circuits @ 1500 VA each 	220.82 (B) (2
Calculate the following loads at 100% of nameplate rating	220.82 (B) (3
 Appliances fastened in place, permanently connected or located on a specific circuit 	220.82 (B) (3)
 Ranges, wall-mounted ovens, counter-mounted cooking units (Tables 220.54 & 220.55) 	5) 220.82 (B) (3)
 Clothes dryers not connected to the laundry branch circuit 	220.82 (B) (3)
Water heaters	220.82 (B) (3)
 Permanently connected motors not included in Heat & Air-Conditioning Load section 	220.82 (B) (4
HEATING & AIR-CONDITIONING LOADS	220.82 (0
Include the largest of the following six selections (kVA load) in calculation	000 00 (0) (
Air Conditioning and Cooling	220.82 (C) (1
• 100% of nameplate rating	200 80 (0) (
Heat Pumps Without Supplemental Electric Heating	220.82 (C) (2
100% of nameplate rating Heat Pumps With Supplemental Electric Heating	220 82 (C) (2
• 100% of nameplate rating of the heat pump compressor*	220.82 (C) (C
65% of nameplate rating of the heat pump compressor 65% of nameplate rating of supplemental electric heating equipment	
If compressor & supplemental heat cannot run at the same time	
do not include the compressor	
Electric Space Heating	
Less than 4 separately controlled units @ 65% of nameplate rating	220.82 (C) (4
4 or more separately controlled units @ 40% of nameplate rating	220.82 (C) (5
40% of nameplate rating if 4 or more separately controlled units	220.02 (0) (0
Electric Thermal Storage (or system where the load is expected to be	220.82 (C) (6
continuous at nameplate rating	(*)
• 100% of nameplate rating	
• Systems of this type cannot be calculated under any other section of 220.82 (C).	
LOAD CALCULATIONS	
General Lighting Load	3 VA x ft ²
Small Appliance & Laundry Circuits	+ 1500 VA per circuit
General Appliances & Motors (100% rated load)	+ <u>Total general appliances</u>
Sum of all General Loads	= Total General Load (VA)
APPLY DEMAND FACTORS	
- First 10 kVA @ 100%	= 10,000 VA
- Remainder of General Loads @ 40%	(Total VA - 10.000) x .40
	= Calculated General Load (VA)
• HEAT / A-C LOAD @ 100%	Largest Heat or A-C Load (VA)
	= TOTAL CALCULATED LOAD

Converting VA TO kW (Single-phase applications with 1.0 power factor only) 1 kVA = 1 kW

220.54

Worksheet — NE	C 2011, 220 Pa	art IV			
Contractor		Email			
Phone		Fax			
Job Name					
Date	Location				
Voltage (Circle)	240V -1Ø				
Fuel		NG	LPV	ليسل	
Elec. Service	100 Amp	200 Amp	400 Amp	Ut Ot	her
NET SQUARE FOOTAGE					Loodo (IdA)
GENERAL LOADS	Qty	Rating (Load)	Factor	Loads (VA)	Loads (kW) (VA ÷ 1,000)
General Lighting and General Use Receptacles		3 VA/ft ²	100%		ļ
Branch Circuits (1500 VA/ft²)	ļ				
Small Appliance Circuits (20 Amp)		1500	100%		
Laundry Circuits		1500	100%		
Fixed Appliances		Full Curre	nt Rating		
Well			100%		
Sump Pump			100%		
Freezer			100%		
Microwave (Not counter-top model)	i		100%	1	
Disposal			100%		
Dishwasher			100%		
Range (See Table 220.55 for multiple cooking appliances)	<u> </u>		100%		
Wall-Mounted Oven	 	+	100%		
Counter-Mounted Cooking Surface	<u> </u>	1	100%		1
	-				
Water Heater	-	-	100%		-
Clothes Dryer	ļ	-	100%		-
Garage Door Opener			100%	ļ	
Septic Grinder			100%		
Other (list)			100%		
			100%		
			100%		
			100%		
			100%		
			100%		
	İ		100%		
			100%		
	<u> </u>		100%		
			100%		
Total General Loads		+	10070	VA	kW
HEAT / A-C LOAD	<u>. </u>				l KW
A-C / Cooling Equipment	Γ	T	100%	T	ı
Heat Pump	 	+	100/0	+	
Compressor (if not included as A-C)	 	+	1000/	+	
	 	 	100%	 	
Supplemental Electric Heat Floating Control Monthly	 	<u> </u>	65%		
Electric Space Heating	ļ		2=2/		
Less than 4 separately controlled units		ļ	65%	ļļ	ļ
4 or more separately controlled units	ļ	ļ	40%	ļļ	
System With Continuous Nameplate Load	ļ	ļ	100%	ļ	
Largest Heat / A-C Load (VA) VA kW	<u> </u>				
GENERAL LOADS					
• 1st 10 kW of General Loads 100% kW			100%	kW	
Remaining General Loads (kW) 40% kW			40%	kW	
CALCULATED GENERAL LOAD (kW) kW					kW
LARGEST HEAT / A-C LOAD 100% kW kW					kW
TOTAL CALCULATED LOAD (Net General Loads + Heat/A-C Load)					1
,					kW



Contractor			Ema	il							
Phone			Fax_				Application	ns			
Job Name							The QT Series	does not meet the necessary			
							requirements for NEC 695	or the following applications: Fire Pumps			
							NEC 700	Emergency Systems			
VOLTAGE	□ 120/240 1 ø	120/2	208 3 ø	\square 120)/240 3 ø 🗌 277/4	180 3 ø	NFPA 20	Fire Pumps			
TYPE	☐ Natural Gas	☐ LP	Vapor (LF	PV)			NFPA 99 NFPA 110	Healthcare Emergency Systems			
ELEC. SERVICE	□ 100 Amp □	200 Amp	□ 400	Amp [☐ 600 Amp ☐ Oth	er		3 3 1, 1, 1			
	,	·		·	•		Reference	and Standards:			
	ntact local jurisdiction t s contacting local autho		•		t. Jurisdictions may vary.		NEC 225	Branch Circuits and Feeders			
	y building loads such as r	•			or UPS systems.		NEC 240	Overcurrent Protection			
	for sizing and determ	•		0.,			NEC 250 NEC 445	Grounding Generators			
							NEC 700	Emergency Systems			
TABLE 6	Motor Loa	d Table	(refer to	Table 1)			NEC 701 NEC 702	Legally Required Standby Optional Standby			
Device		HP	RA	LRA	kW Running (= HP)	Starting kW ¹	NFPA 37	Installation & Use of			
							NFPA 54	Stationary Engines National Fuel Gas Code			
							NFPA 58	LP Gas Code			

Starting kW for loading with no listed HP, calculate HP based on running amps in the chart on the right

TABLE 7	Non-Motor Load Table (refer to Table 2)							
Device		Amps	kW					

UPS Information

1.5 x kVA rating for a filtered system

3 – 5 x kVA rating for an unfiltered system

Generac recommends you refer to the Generac UPS Generator Compatibility sheet and contact the manufacturer of the UPS system to assist in your installation.

To Calculate kW

Amps x 120/1000 = kW

Typical application power factor is 0.95.

Transfer Switch Availability

RTSD − 100, 200 and 400 Amp service rated **RTSN** − 100-800 3ø and 600-800 1ø Amp **RTSX** − 100, 200, 400, 600, 800 Amp **RTSJ200A3** − Service rated load shed switch

GenReady – 200 Amp service panel

RTS and GenReady switches only work with the R-controller.

Recommended Generator Size _____ Refer to Generator Sizing Instructions on other side of this sheet.

INSTALL NOTES:

- 1. Suggested concrete pad minimum thickness of 4" with 6" overhang on all sides. Composite pad included with air-cooled products.
- 2. Consult manual for installation recommendations.
- 3. Consult local authority having jurisdiction for local requirements.

²⁴⁰ V 1ø Amps x 240/1000 = kW

208 V 3ø (Amps x 208 x 1.732 x PF) /1000 = kW

240 V 3ø (Amps x 240 x 1.732 x PF) /1000 = kW

480 V 3ø (Amps x 480 x 1.732 x PF) /1000 = kW

PF is application power factor (worst case 1.0)

¹ Starting kW for HP < 7.5 starting kW = HP x 3 Starting kW for HP > 7.5 starting kW = HP x 2

Generator Sizing Instructions:

There is not a single correct sizing solution. Following are several methods that, when mixed with good judgement, should result in an appropriately sized generator. Remember to consider load growth, seasonality, and effects of starting motors.

As municipalities and states adopt the new 2008 NEC Electrical Code, there may be new sizing requirements, spelled out in the code book, which the installation technician must follow. Always check with the local inspection department to confirm which code cycle will affect your install.

Never add Amps when sizing a generator. Convert Amps to kW and add kW to determine the required generator size. Power factors for various motor loads vary widely. Adding Amps without properly accounting for the power factor and/or mixing voltages will result in improperly sizing the generator.

When motors start, they create a current surge that step loads the generator and creates a voltage dip. After selecting a generator, reference the generator's surge capability using **table 3**. Verify that voltage dip is adequate for the application. Most commercial applications should be limited to about 15% voltage dip and residential applications should be limited to a 30% voltage dip.

Some applications utilize an uninterruptible power supply (UPS) to back up critical loads. Please read sizing guide for this load type.

Measurement Method

Use a clamp-on Amp meter or power analyzer to measure facility load levels. Clamp each leg separately and take the measurement during peak usage levels.

240V 1ø Applications: To determine peak usage in kW, add the highest Amp readings from the two legs, multiply by 120 and divide by 1,000.

(L1 + L2)120 / 1000

Size the generator 10 to 20% larger than the peak measured load.

3ø Applications: Add the peak Amp readings from all three legs and divide by 3 to determine peak Amps. Multiply peak Amps by volts, multiply the result by 1.732 (square root of 3), then divide by 1000 to convert Amps to kW.

Peak Amps = (L1 + L2 + L3) / 3

kW = [(Peak Amps x Volts) x 1.732] / 1000*

*Assumes power factor of 1.0

Size the generator 20 to 25% larger than the peak measured load.

Peak Amps –	 Peak kvv-	

GENERAC

Determining Existing Loads/Billing History Method 220.87 NEC 2008

Many customers have a utility rate structure that has a peak demand charge. Using a year's worth of electric bills, size the generator 25% larger than the largest peak demand.

Verify motor and UPS load compatibility. Peak Demand = _____

Load Summation Method

- Enter running kW for all motor loads (except the largest) expected to run during peak load levels into table 6. Refer to table 1 for typical motor load sizes and electrical requirements.
- Enter kW for all non-motor loads expected to run during peak load levels into table 7. Refer to table 2 for typical residential loads and rules of thumb.
- Add the running motor load kW, non-motor load kW, and the starting kW of the largest motor load

Motor load running total (minus largest motor):	kW (ref. table 6)
Non-motor load total:	kW (ref. table 7)
Starting load from largest cycling motor:	kW (ref. table 6)
Total electrical loads:	=kW

Select generator: Commercial (add 20 to 25% to total kW)

Residential (add 10 to 20% to total kW)

- Confirm that voltage dip is within acceptable limits by comparing motor LRA to generator surge capability (see table #3).
- 5) Confirm UPS compatibility (see page 6).

System Capacity - Load Calculation

If the local municipality or state you are in has adopted the 2008 NEC Code, you may be required to use this step. Article 702 of the 2008 NEC includes a new requirement for sizing (702.5B). If no other method for sizing is acceptable, sizing of the generator shall be made in accordance with Article 220 of the NEC. The system capacity estimating sheet will guide you through this process.

DLM Load Control Module

702.5 (B) (2) (a) NEC 2008

The DLM Load Control Module is a 50 amp contact housed in a NEMA 3R enclosure for indoor and outdoor installation applications. Through the use of the DLM Modules in conjunction with any of the 100-400 amp Nexus Smart Switches, household or business loads can be intelligently managed enabling the use of a smaller, more efficient generator system. Up to four DLM Modules can be used with a single switch.

Project Layout

Ball Park Estimates (Do not use for final sizing)

Estimate based on 60% service size: (commercial)

240 Volts, 1 Ø:	Amps x .15 =	kW
208 Volts, 3 Ø:	Amps x .22 =	kW
240 Volts, 3 Ø:	Amps x .25 =	kW
480 Volts, 3 Ø:	Amps x .50 =	kW

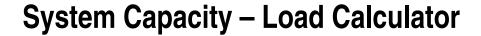
Estimate based on 40% service size: (residential)

240 Volts, 1 Ø:	Amps x .10 =	kW
208 Volts, 3 Ø:	Amps x .15 =	kW
240 Volts, 3 Ø:	Amps x .17 =	kW
480 Volts. 3 Ø:	Amps x .34 =	kW

Estimate based on square footage

Amps to kW Rule of Thumb (assumes .8 pf)

For 480 volt systems Amps = $kW \times 1.5$ For 208 volt systems Amps = $kW \times 3.5$ For 240 volt 3 Ø systems Amps = $kW \times 3$ For 240 volt 1 Ø systems Amps = $kW \times 4$





DIRECTIONS FOR NEC 2011, ARTICLE 220, P	ART IV
220.80 Optional Feeder and Service Load Calculations (RESIDENTIAL)	NEC REFERENCE
SECTION CAN BE USED FOR DWELLING UNITS	220.82 (A)
 Served by a single feeder conductor (generator) 	
• 120/240 volt or 208Y/120 volt service	
Ampacity of 100 amps or greater	
The calcultated load will be the result of adding	
• 220.82 (B) General Loads, and	220.82 (B)
• 220.82 (C) Heating and Air-Conditioning Load	220.82 (C)
 Calculated neutral load determined by 220.61. (Additional 70% demand factor can be taken for cooking appliances and dryers when tables 220.54 and/or 220.55 are used) 	
GENERAL LOADS	220.82 (B)
General Lighting and General-Use Receptacles	220 82 /B\ /1\
 Calculate at 3 VA per square foot Use exterior dimensions of the home to calculate square footage – do not include open 	220.82 (B) (1)
- Ose exterior dimensions of the nome to calculate square lootage – do not include open	
porches, garages, or unused or unfinished spaces not adaptable for future use.	
Add 20-amp small appliance & laundry circuits @ 1500 VA each	220.82 (B) (2)
Calculate the following loads at 100% of nameplate rating	220.82 (B) (3)
 Appliances fastened in place, permanently connected or located on a specific circuit 	220.82 (B) (3) a
 Ranges, wall-mounted ovens, counter-mounted cooking units (Tables 220.54 & 220.55) 	220.82 (B) (3) b
Clothes dryers not connected to the laundry branch circuit	220.82 (B) (3) c
• Water heaters	220.82 (B) (3) d
Permanently connected motors not included in Heat & Air-Conditioning Load section	220.82 (B) (4)
HEATING & AIR-CONDITIONING LOADS	220.82 (C)
Include the largest of the following six selections (kVA load) in calculation	220.82 (C) (1)
Air Conditioning and Cooling • 100% of nameplate rating	220.82 (C) (1)
Heat Pumps Without Supplemental Electric Heating	220.82 (C) (2)
• 100% of nameplate rating	220.02 (0) (2)
Heat Pumps With Supplemental Electric Heating	220.82 (C) (3)
• 100% of nameplate rating of the heat pump compressor*	====== (=) (=)
65% of nameplate rating of supplemental electric heating equipment	
- If compressor & supplemental heat cannot run at the same time	
do not include the compressor	
Electric Space Heating	
 Less than 4 separately controlled units @ 65% of nameplate rating 	220.82 (C) (4)
 4 or more separately controlled units @ 40% of nameplate rating 	220.82 (C) (5)
 40% of nameplate rating if 4 or more separately controlled units 	
Electric Thermal Storage (or system where the load is expected to be	220.82 (C) (6)
continuous at nameplate rating	
• 100% of nameplate rating	
Systems of this type cannot be calculated under any other section of 220.82 (C).	
LOAD CALCULATIONS	
General Lighting Load	3 VA x ft²
Small Appliance & Laundry Circuits	+ 1500 VA per circuit
General Appliances & Motors (100% rated load)	+ Total general appliances
Sum of all General Loads	Total General Load (VA)
APPLY DEMAND FACTORS	
- First 10 kVA @ 100%	= 10,000 VA
- Remainder of General Loads @ 40%	(Total VA - 10.000) x .40
	= Calculated General Load (VA)
• HEAT / A-C LOAD @ 100%	Largest Heat or A-C Load (VA)
	= TOTAL CALCULATED LOAD

Converting VA TO kW (Single-phase applications with 1.0 power factor only) 1 kVA = 1 kW

220.54

Worksheet — NE	C 2008, 220 P	art IV			
Contractor		Email			
Phone		Fax			
Job Name					
Date	Location				
Voltage (Circle)	240V -1Ø				
Fuel		NG	LPV	ليسل	
Elec. Service	100 Amp	200 Amp	400 Amp	Ut Ot	ner
NET SQUARE FOOTAGE					Loodo (IdA)
GENERAL LOADS	Qty	Rating (Load)	Factor	Loads (VA)	Loads (kW) (VA ÷ 1,000)
General Lighting and General Use Receptacles		3 VA/ft ²	100%		ļ
Branch Circuits (1500 VA/ft²)		ļ			
Small Appliance Circuits (20 Amp)		1500	100%		
Laundry Circuits		1500	100%		
Fixed Appliances		Full Curre	nt Rating		
Well			100%		
Sump Pump			100%		
Freezer			100%		
Microwave (Not counter-top model)			100%	1	
Disposal		†	100%		
Dishwasher			100%		
Range (See Table 220.55 for multiple cooking appliances)		<u> </u>	100%		
Wall-Mounted Oven		+	100%		
Counter-Mounted Cooking Surface		1	100%		
		+			-
Water Heater		+	100%		-
Clothes Dryer		1	100%		
Garage Door Opener			100%	ļ	
Septic Grinder		<u> </u>	100%		
Other (list)			100%		
			100%		
			100%		
			100%		
			100%		
			100%		
			100%		
			100%		
		1	100%		1
			100%		
Total General Loads		+	10070	VA	kW
HEAT / A-C LOAD	<u> </u>			VA]	I KW
A-C / Cooling Equipment	l	T	100%	T	1
Heat Pump		+	10070		1
		+	1000/	1	-
Compressor (if not included as A-C) Complemental Floatic Most		 	100%	 	-
Supplemental Electric Heat Floating Opening Months		 	65%		
Electric Space Heating		 	2=2/		<u> </u>
Less than 4 separately controlled units		ļ	65%	ļļ	ļ
4 or more separately controlled units	ļ	ļ	40%	ļļ	
System With Continuous Nameplate Load		ļ	100%	ļ	ļ
Largest Heat / A-C Load (VA) VA kW					
GENERAL LOADS					
• 1st 10 kW of General Loads 100% kW			100%	kW	
Remaining General Loads (kW) 40% kW			40%	kW	
CALCULATED GENERAL LOAD (kW) kW					kW
LARGEST HEAT / A-C LOAD 100% kW kW					kW
TOTAL CALCULATED LOAD (Net General Loads + Heat/A-C Load)					
,					kW



Contractor		Ema	nil				
Phone		Fax_				Application	ns
Job Name						The QT Series	does not meet the necessary
						requirements for NEC 695	or the following applications: Fire Pumps
VOLTAGE 120/240 1Ø TYPE Natural Gas	☐ 120/2 ☐ LP\	08 3 ø /apor (LF	□ 120 PV))/240 3Ø □ 277/4	80 3Ø	NEC 700 NFPA 20 NFPA 99 NFPA 110	Emergency Systems Fire Pumps Healthcare
ELEC. SERVICE 100 Amp	200 Amp	□ 400	Amp L	」600 Amp	er	Reference	Codes
Before installation contact local jurisdiction to confirm all requirements are met. Jurisdictions may vary. Generac recommends contacting local authorities prior to installation. LOADS: Look for heavy building loads such as refrigeration, air conditioning, pumps or UPS systems. Use the following for sizing and determining generator kW.						NEC 240 Overcurro NEC 250 Groundin NEC 445 Generato	and Standards: Branch Circuits and Feeders Overcurrent Protection Grounding Generators Emergency Systems
TABLE 6 Motor Loa	d Table	(refer to	Table 1)			NEC 701 NEC 702	Legally Required Standby Optional Standby
Device	HP	RA	LRA	kW Running (= HP)	Starting kW ¹	NFPA 37	Installation & Use of
						NFPA 54 NFPA 58	Stationary Engines National Fuel Gas Code LP Gas Code

To Calculate kW					
	120 V 1ø	Amps x 120/1000 = kW			
	240 V 1ø	Amps x 240/1000 = kW			
	208 V 3ø	(Amps x 208 x 1.732 x PF) /1000 = kW			
	240 V 3ø	(Amps x 240 x 1.732 x PF) /1000 = kW			
	480 V 3ø	(Amps x 480 x 1.732 x PF) /1000 = kW			

PF is application power factor (worst case 1.0) Typical application power factor is 0.95.

Starting kW for loading with no listed HP, calculate HP based on running amps in the chart on the right

TABLE 7	Non-Motor Load Table (refer to Table 2)							
Device		Amps	kW					
	_							

UPS Information

1.5 x kVA rating for a filtered system

3 – 5 x kVA rating for an unfiltered system

Generac recommends you refer to the Generac UPS Generator Compatibility sheet and contact the manufacturer of the UPS system to assist in your installation.

Transfer Switch Availability

RTSD − 100, 200 and 400 Amp service rated **RTSN** − 100-800 3ø and 600-800 1ø Amp **RTSX** − 100, 200, 400, 600, 800 Amp **RTSJ200A3** − Service rated load shed switch

GenReady – 200 Amp service panel

RTS and GenReady switches only work with the R-controller.

Recommended Generator Size _____ Refer to Generator Sizing Instructions on other side of this sheet.

INSTALL NOTES:

- 1. Suggested concrete pad minimum thickness of 4" with 6" overhang on all sides. Composite pad included with air-cooled products.
- 2. Consult manual for installation recommendations.
- 3. Consult local authority having jurisdiction for local requirements.

¹ Starting kW for HP < 7.5 starting kW = HP x 3 Starting kW for HP > 7.5 starting kW = HP x 2

Generator Sizing Instructions:

There is not a single correct sizing solution. Following are several methods that, when mixed with good judgement, should result in an appropriately sized generator. Remember to consider load growth, seasonality, and effects of starting motors.

As municipalities and states adopt the new 2008 NEC Electrical Code, there may be new sizing requirements, spelled out in the code book, which the installation technician must follow. Always check with the local inspection department to confirm which code cycle will affect your install.

Never add Amps when sizing a generator. Convert Amps to kW and add kW to determine the required generator size. Power factors for various motor loads vary widely. Adding Amps without properly accounting for the power factor and/or mixing voltages will result in improperly sizing the generator.

When motors start, they create a current surge that step loads the generator and creates a voltage dip. After selecting a generator, reference the generator's surge capability using **table 3**. Verify that voltage dip is adequate for the application. Most commercial applications should be limited to about 15% voltage dip and residential applications should be limited to a 30% voltage dip.

Some applications utilize an uninterruptible power supply (UPS) to back up critical loads. Please read sizing guide for this load type.

Measurement Method

Use a clamp-on Amp meter or power analyzer to measure facility load levels. Clamp each leg separately and take the measurement during peak usage levels.

240V 1ø Applications: To determine peak usage in kW, add the highest Amp readings from the two legs, multiply by 120 and divide by 1,000.

(L1 + L2)120 / 1000

Size the generator 10 to 20% larger than the peak measured load.

3ø Applications: Add the peak Amp readings from all three legs and divide by 3 to determine peak Amps. Multiply peak Amps by volts, multiply the result by 1.732 (square root of 3), then divide by 1000 to convert Amps to kW.

Peak Amps = (L1 + L2 + L3) / 3

kW = [(Peak Amps x Volts) x 1.732] / 1000*

*Assumes power factor of 1.0

Size the generator 20 to 25% larger than the peak measured load.

Peak Amps =	Peak kW=
-------------	----------

GENERAC°

Determining Existing Loads/Billing History Method 220.87 NEC 2008

Many customers have a utility rate structure that has a peak demand charge. Using a year's worth of electric bills, size the generator 25% larger than the largest peak demand.

Verify motor and UPS load compatibility. Peak Demand = _____

Load Summation Method

- Enter running kW for all motor loads (except the largest) expected to run during peak load levels into table 6. Refer to table 1 for typical motor load sizes and electrical requirements.
- Enter kW for all non-motor loads expected to run during peak load levels into table 7. Refer to table 2 for typical residential loads and rules of thumb.
- Add the running motor load kW, non-motor load kW, and the starting kW of the largest motor load

Motor load running total (minus largest motor):	kW (ref. table 6)
Non-motor load total:	kW (ref. table 7)
Starting load from largest cycling motor:	kW (ref. table 6)
Total electrical loads:	=kW

Select generator: Commercial (add 20 to 25% to total kW)

Residential (add 10 to 20% to total kW)

- Confirm that voltage dip is within acceptable limits by comparing motor LRA to generator surge capability (see table #3).
- 5) Confirm UPS compatibility (see page 6).

System Capacity - Load Calculation

If the local municipality or state you are in has adopted the 2008 NEC Code, you may be required to use this step. Article 702 of the 2008 NEC includes a new requirement for sizing (702.5B). If no other method for sizing is acceptable, sizing of the generator shall be made in accordance with Article 220 of the NEC. The system capacity estimating sheet will guide you through this process.

DLM Load Control Module

702.5 (B) (2) (a) NEC 2008

The DLM Load Control Module is a 50 amp contact housed in a NEMA 3R enclosure for indoor and outdoor installation applications. Through the use of the DLM Modules in conjunction with any of the 100-400 amp Nexus Smart Switches, household or business loads can be intelligently managed enabling the use of a smaller, more efficient generator system. Up to four DLM Modules can be used with a single switch.

Project Layout

Ball Park Estimates (Do not use for final sizing)

Estimate based on 60% service size: (commercial)

240 Volts, 1 Ø:	Amps x .15 =	kW
208 Volts, 3 Ø:	Amps x .22 =	kW
240 Volts, 3 Ø:	Amps x .25 =	kW
480 Volts, 3 Ø:	Amps x .50 =	kW

Estimate based on 40% service size: (residential)

240 Volts, 1 Ø:	Amps x .10 =	kW
208 Volts, 3 Ø:	Amps x .15 =	kW
240 Volts, 3 Ø:	Amps x .17 =	kW
480 Volts. 3 Ø:	Amps x .34 =	kW

Estimate based on square footage

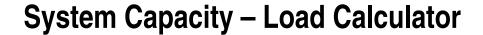
Fast food, convenience stores, restaurants, grocery stores

Other commercial applications

Square footage = ______

Estimated kW = _____

Amps to kW Rule of Thumb (assumes .8 pf)





DIRECTIONS FOR NEC 2011, ARTICLE 220,	PART IV
220.80 Optional Feeder and Service Load Calculations (RESIDENTIAL)	NEC REFERENCE
SECTION CAN BE USED FOR DWELLING UNITS	220.82 (A)
Served by a single feeder conductor (generator)	
• 120/240 volt or 208Y/120 volt service	
Ampacity of 100 amps or greater	
The calcultated load will be the result of adding	000 00 (5)
• 220.82 (B) General Loads, and	220.82 (B)
 220.82 (C) Heating and Air-Conditioning Load Calculated neutral load determined by 220.61. (Additional 70% demand factor can be 	220.82 (C)
taken for cooking appliances and dryers when tables 220.54 and/or 220.55 are used)	
GENERAL LOADS	220.82 (B)
General Lighting and General-Use Receptacles	
Calculate at 3 VA per square foot	220.82 (B) (1)
Use exterior dimensions of the home to calculate square footage – do not include open	1
porches, garages, or unused or unfinished spaces not adaptable for future use.	
Add 20-amp small appliance & laundry circuits @ 1500 VA each	220.82 (B) (2)
Calculate the following loads at 100% of nameplate rating	220.82 (B) (3)
Appliances fastened in place, permanently connected or located on a specific circuit	220.82 (B) (3) a
 Ranges, wall-mounted ovens, counter-mounted cooking units (Tables 220.54 & 220.55 	220.82 (B) (3) b
Clothes dryers not connected to the laundry branch circuit	220.82 (B) (3) c
Water heaters	220.82 (B) (3) d
Permanently connected motors not included in Heat & Air-Conditioning Load section	220.82 (B) (4)
HEATING & AIR-CONDITIONING LOADS	220.82 (C)
Include the largest of the following six selections (kVA load) in calculation Air Conditioning and Cooling	220.82 (C) (1)
Air Conditioning and Cooling • 100% of nameplate rating	220.82 (C) (1)
Heat Pumps Without Supplemental Electric Heating	220.82 (C) (2)
100% of nameplate rating	220.02 (0) (2)
Heat Pumps With Supplemental Electric Heating	220.82 (C) (3)
100% of nameplate rating of the heat pump compressor*	(-/(-/
65% of nameplate rating of supplemental electric heating equipment	
 If compressor & supplemental heat cannot run at the same time 	
do not include the compressor	
Electric Space Heating	
 Less than 4 separately controlled units @ 65% of nameplate rating 	220.82 (C) (4)
4 or more separately controlled units @ 40% of nameplate rating	220.82 (C) (5)
40% of nameplate rating if 4 or more separately controlled units Classic Theorem Change Ch	000 00 (0) (0)
Electric Thermal Storage (or system where the load is expected to be	220.82 (C) (6)
continuous at nameplate rating • 100% of nameplate rating	
Systems of this type cannot be calculated under any other section of 220.82 (C).	
LOAD CALCULATIONS	
General Lighting Load	3 VA x ft²
Small Appliance & Laundry Circuits	+ 1500 VA per circuit
General Appliances & Motors (100% rated load)	+ Total general appliances
Sum of all General Loads	= Total General Load (VA)
APPLY DEMAND FACTORS	
– First 10 kVA @ 100%	= 10,000 VA
- Remainder of General Loads @ 40%	(Total VA - 10.000) x .40
	= Calculated General Load (VA)
• HEAT / A-C LOAD @ 100%	Largest Heat or A-C Load (VA)
	= TOTAL CALCULATED LOAD

Converting VA TO kW (Single-phase applications with 1.0 power factor only) 1 kVA = 1 kW

220.54

Worksheet	— NEC 2008, 220 Pa	art IV			
Contractor		Email			
Phone		Fax			
Job Name					
Date	Location				
Voltage (Circle)	240V -1Ø				
Fuel		NG	LPV		<u>.l</u>
Elec. Service	100 Amp	200 Amp	400 Amp	Ot	her
NET SQUARE FOOTAGE					
GENERAL LOADS	Qty	Rating (Load)	Factor	Loads (VA)	Loads (kW) (VA ÷ 1,000)
General Lighting and General Use Receptacles		3 VA/ft ²	100%		
Branch Circuits (1500 VA/ft²)					
Small Appliance Circuits (20 Amp)		1500	100%		1
Laundry Circuits		1500	100%		
Fixed Appliances		Full Curre	nt Rating		ī
Well			100%		ī
Sump Pump			100%		1
Freezer			100%	†	1
Microwave (Not counter-top model)	<u> </u>		100%	 	1
Disposal			100%	 	
Dishwasher			100%	+	+
			100%	-	
Range (See Table 220.55 for multiple cooking appliances)		<u> </u>		-	+
Wall-Mounted Oven			100%		1
Counter-Mounted Cooking Surface			100%		_
Water Heater			100%		_
Clothes Dryer			100%		
Garage Door Opener			100%		
Septic Grinder			100%		1
Other (list)			100%		
			100%		
			100%		
			100%		i T
			100%		i T
			100%	 	1
			100%	1	i
			100%	 	+
			100%	+ -	1
				-	
T-1-10111-			100%	1/4	1.34
Total General Loads HEAT / A-C LOAD				VA	kW
A-C / Cooling Equipment			100%		1
Heat Pump					1
Compressor (if not included as A-C)			100%		i
Supplemental Electric Heat			65%	†	1
Electric Space Heating	<u> </u>		2370	†	it
Less than 4 separately controlled units		 	65%	+	
4 or more separately controlled units	+	+	40%	+	d
System With Continuous Nameplate Load		+	100%	+	1
		+	100%	+	
Largest Heat / A-C Load (VA) VA kW				1	, I
GENERAL LOADS					
• 1st 10 kW of General Loads 100% kW			100%	<u>kW</u>	
Remaining General Loads (kW) 40% kW			40%	kW	
CALCULATED GENERAL LOAD (kW) kW					kW
LARGEST HEAT / A-C LOAD 100% kW kW					kW
TOTAL CALCULATED LOAD (Net General Loads + Heat/A-C Load)					1347
					kW



_	Location		The QT Series does not meet the necess requirements for the following application				
TYPE	☐ LP Vapo	, ,	_		NFPA 110		
ELEC. SERVICE 100 Amp	200 Amp □	400 Amp	600 Amp U Othe	er	Reference Codes		
Before installation contact local jurisdiction to confirm all requirements are met. Jurisdictions may vary. Generac recommends contacting local authorities prior to installation. LOADS: Look for heavy building loads such as refrigeration, air conditioning, pumps or UPS systems. Use the following for sizing and determining generator kW.						and Standards: Branch Circuits and Feeders Overcurrent Protection Grounding Generators Emergency Systems	
TABLE 6 Motor Loa	NEC 700 NEC 701 NEC 702	Legally Required Standby Optional Standby					
Device	HP R	RA LRA	kW Running (= HP)	Starting kW ¹	NFPA 37	Installation & Use of Stationary Engines	
					NFPA 54 NFPA 58	National Fuel Gas Code LP Gas Code	

				To Calculat	e kW
				120 V 1ø	Amps x 120/1000 = kW
				240 V 1ø	Amps x 240/1000 = kW
				208 V 3ø	(Amps x 208 x 1.732 x PF) /1000 = kW
				240 V 3ø	(Amps x 240 x 1.732 x PF) /1000 = kW
				480 V 3ø	(Amps x 480 x 1.732 x PF) /1000 = kW
¹ Starting kW for HP < 7.5 starting kW =	HP x 3			PF is applicat	tion power factor (worst case 1.0)

¹ Starting kW for HP < 7.5 starting kW = HP x 3 Starting kW for HP > 7.5 starting kW = HP x 2

Starting kW for loading with no listed HP, calculate HP based on running amps in the chart on the right

TABLE 7	Non-Motor Load Table (refer to Table 2)						
Device		Amps	kW				

UPS Information

1.5 x kVA rating for a filtered system

3 – 5 x kVA rating for an unfiltered system

Generac recommends you refer to the Generac UPS Generator Compatibility sheet and contact the manufacturer of the UPS system to assist in your installation.

Typical application power factor is 0.95.

Transfer Switch Availability

RTSD − 100, 200 and 400 Amp service rated **RTSN** − 100-800 3ø and 600-800 1ø Amp **RTSX** − 100, 200, 400, 600, 800 Amp **RTSJ200A3** − Service rated load shed switch

GenReady – 200 Amp service panel

RTS and GenReady switches only work with the R-controller.

Recommended Generator Size _____ Refer to Generator Sizing Instructions on other side of this sheet.

INSTALL NOTES:

- 1. Suggested concrete pad minimum thickness of 4" with 6" overhang on all sides. Composite pad included with air-cooled products.
- 2. Consult manual for installation recommendations.
- 3. Consult local authority having jurisdiction for local requirements.

Generator Sizing Instructions:

There is not a single correct sizing solution. Following are several methods that, when mixed with good judgement, should result in an appropriately sized generator. Remember to consider load growth, seasonality, and effects of starting motors.

As municipalities and states adopt the new 2008 NEC Electrical Code, there may be new sizing requirements, spelled out in the code book, which the installation technician must follow. Always check with the local inspection department to confirm which code cycle will affect your install.

Never add Amps when sizing a generator. Convert Amps to kW and add kW to determine the required generator size. Power factors for various motor loads vary widely. Adding Amps without properly accounting for the power factor and/or mixing voltages will result in improperly sizing the generator.

When motors start, they create a current surge that step loads the generator and creates a voltage dip. After selecting a generator, reference the generator's surge capability using **table 3**. Verify that voltage dip is adequate for the application. Most commercial applications should be limited to about 15% voltage dip and residential applications should be limited to a 30% voltage dip.

Some applications utilize an uninterruptible power supply (UPS) to back up critical loads. Please read sizing guide for this load type.

Measurement Method

Use a clamp-on Amp meter or power analyzer to measure facility load levels. Clamp each leg separately and take the measurement during peak usage levels.

240V 1ø Applications: To determine peak usage in kW, add the highest Amp readings from the two legs, multiply by 120 and divide by 1,000.

(L1 + L2)120 / 1000

Size the generator 10 to 20% larger than the peak measured load.

3ø Applications: Add the peak Amp readings from all three legs and divide by 3 to determine peak Amps. Multiply peak Amps by volts, multiply the result by 1.732 (square root of 3), then divide by 1000 to convert Amps to kW.

Peak Amps = (L1 + L2 + L3)/3

kW = [(Peak Amps x Volts) x 1.732] / 1000*

*Assumes power factor of 1.0

Size the generator 20 to 25% larger than the peak measured load.

Peak Amps -	 Peak kvv-	

GENERAC

Determining Existing Loads/Billing History Method 220.87 NEC 2008

Many customers have a utility rate structure that has a peak demand charge. Using a year's worth of electric bills, size the generator 25% larger than the largest peak demand.

Verify motor and UPS load compatibility. Peak Demand = _____

Load Summation Method

- Enter running kW for all motor loads (except the largest) expected to run during peak load levels into table 6. Refer to table 1 for typical motor load sizes and electrical requirements.
- Enter kW for all non-motor loads expected to run during peak load levels into table 7. Refer to table 2 for typical residential loads and rules of thumb.
- Add the running motor load kW, non-motor load kW, and the starting kW of the largest motor load

Motor load running total (minus largest motor):	kW (ref. table 6)
Non-motor load total:	kW (ref. table 7)
Starting load from largest cycling motor:	kW (ref. table 6)
Total electrical loads:	=kW

Select generator: Commercial (add 20 to 25% to total kW)

Residential (add 10 to 20% to total kW)

- Confirm that voltage dip is within acceptable limits by comparing motor LRA to generator surge capability (see table #3).
- 5) Confirm UPS compatibility (see page 6).

System Capacity - Load Calculation

If the local municipality or state you are in has adopted the 2008 NEC Code, you may be required to use this step. Article 702 of the 2008 NEC includes a new requirement for sizing (702.5B). If no other method for sizing is acceptable, sizing of the generator shall be made in accordance with Article 220 of the NEC. The system capacity estimating sheet will guide you through this process.

DLM Load Control Module

702.5 (B) (2) (a) NEC 2008

The DLM Load Control Module is a 50 amp contact housed in a NEMA 3R enclosure for indoor and outdoor installation applications. Through the use of the DLM Modules in conjunction with any of the 100-400 amp Nexus Smart Switches, household or business loads can be intelligently managed enabling the use of a smaller, more efficient generator system. Up to four DLM Modules can be used with a single switch.

Project Layout

Ball Park Estimates (Do not use for final sizing)

Estimate based on 60% service size: (commercial)

240 Volts, 1 Ø:	Amps x .15 =	kW
208 Volts, 3 Ø:	Amps x .22 =	kW
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Estimate based on 40% service size: (residential)

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208 Volts, 3 Ø:	Amps x .15 =	kW
240 Volts, 3 Ø:	Amps x .17 =	kW
480 Volts. 3 Ø:	Amps x .34 =	kW

Estimate based on square footage

Fast food, convenience stores, restaurants, grocery stores

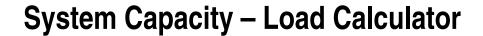
Other commercial applications

Square footage = ______

Estimated kW = _____

Amps to kW Rule of Thumb (assumes .8 pf)

For 480 volt systems Amps = $kW \times 1.5$ For 208 volt systems Amps = $kW \times 3.5$ For 240 volt 3 Ø systems Amps = $kW \times 3$ For 240 volt 1 Ø systems Amps = $kW \times 4$





DIRECTIONS FOR NEC 2011, ARTICLE 220,	PART IV
220.80 Optional Feeder and Service Load Calculations (RESIDENTIAL)	NEC REFERENCE
SECTION CAN BE USED FOR DWELLING UNITS	220.82 (A
Served by a single feeder conductor (generator)	
• 120/240 volt or 208Y/120 volt service	
Ampacity of 100 amps or greater	
The calcultated load will be the result of adding	
• 220.82 (B) General Loads, and	220.82 (B
 220.82 (C) Heating and Air-Conditioning Load 	220.82 (C
 Calculated neutral load determined by 220.61. (Additional 70% demand factor can be 	
taken for cooking appliances and dryers when tables 220.54 and/or 220.55 are used)	
GENERAL LOADS	220.82 (B
General Lighting and General-Use Receptacles	
Calculate at 3 VA per square foot	220.82 (B) (1
 Use exterior dimensions of the home to calculate square footage – do not include ope 	1
porches, garages, or unused or unfinished spaces not adaptable for future use.	
 Add 20-amp small appliance & laundry circuits @ 1500 VA each 	220.82 (B) (2
Calculate the following loads at 100% of nameplate rating	220.82 (B) (3
 Appliances fastened in place, permanently connected or located on a specific circuit 	220.82 (B) (3)
 Ranges, wall-mounted ovens, counter-mounted cooking units (Tables 220.54 & 220.55) 	5) 220.82 (B) (3)
 Clothes dryers not connected to the laundry branch circuit 	220.82 (B) (3)
Water heaters	220.82 (B) (3)
 Permanently connected motors not included in Heat & Air-Conditioning Load section 	220.82 (B) (4
HEATING & AIR-CONDITIONING LOADS	220.82 (0
Include the largest of the following six selections (kVA load) in calculation	000 00 (0) (
Air Conditioning and Cooling	220.82 (C) (1
• 100% of nameplate rating	200 80 (0) (
Heat Pumps Without Supplemental Electric Heating	220.82 (C) (2
100% of nameplate rating Heat Pumps With Supplemental Electric Heating	220 82 (C) (2
• 100% of nameplate rating of the heat pump compressor*	220.82 (C) (C
65% of nameplate rating of the heat pump compressor 65% of nameplate rating of supplemental electric heating equipment	
If compressor & supplemental heat cannot run at the same time	
do not include the compressor	
Electric Space Heating	
Less than 4 separately controlled units @ 65% of nameplate rating	220.82 (C) (4
4 or more separately controlled units @ 40% of nameplate rating	220.82 (C) (5
40% of nameplate rating if 4 or more separately controlled units	220.02 (0) (0
Electric Thermal Storage (or system where the load is expected to be	220.82 (C) (6
continuous at nameplate rating	(*)
• 100% of nameplate rating	
• Systems of this type cannot be calculated under any other section of 220.82 (C).	
LOAD CALCULATIONS	
General Lighting Load	3 VA x ft ²
Small Appliance & Laundry Circuits	+ 1500 VA per circuit
General Appliances & Motors (100% rated load)	+ <u>Total general appliances</u>
Sum of all General Loads	= Total General Load (VA)
APPLY DEMAND FACTORS	
- First 10 kVA @ 100%	= 10,000 VA
- Remainder of General Loads @ 40%	(Total VA - 10.000) x .40
	= Calculated General Load (VA)
• HEAT / A-C LOAD @ 100%	Largest Heat or A-C Load (VA)
	= TOTAL CALCULATED LOAD

Converting VA TO kW (Single-phase applications with 1.0 power factor only) 1 kVA = 1 kW

220.54

Worksheet — NE	C 2008, 220 P	art IV			
Contractor		Email			
Phone		Fax			
Job Name					
Date	Location				
Voltage (Circle)	240V -1Ø				
Fuel		NG	LPV	ليسل	
Elec. Service	100 Amp	200 Amp	400 Amp	Ut Ot	ner
NET SQUARE FOOTAGE					Loodo (IdA)
GENERAL LOADS	Qty	Rating (Load)	Factor	Loads (VA)	Loads (kW) (VA ÷ 1,000)
General Lighting and General Use Receptacles		3 VA/ft ²	100%		ļ
Branch Circuits (1500 VA/ft²)		ļ			
Small Appliance Circuits (20 Amp)		1500	100%		
Laundry Circuits		1500	100%		
Fixed Appliances		Full Curre	nt Rating		
Well			100%		
Sump Pump			100%		
Freezer			100%		
Microwave (Not counter-top model)			100%	1	
Disposal		†	100%		
Dishwasher			100%		
Range (See Table 220.55 for multiple cooking appliances)		<u> </u>	100%		
Wall-Mounted Oven		+	100%		
Counter-Mounted Cooking Surface		1	100%		
		+			-
Water Heater		+	100%		-
Clothes Dryer		1	100%		<u> </u>
Garage Door Opener			100%	ļ	
Septic Grinder		<u> </u>	100%		
Other (list)			100%		
			100%		
			100%		
			100%		
			100%		
			100%		
			100%		
			100%		
			100%		1
			100%		
Total General Loads		+	10070	VA	kW
HEAT / A-C LOAD	<u> </u>			VA]	I KW
A-C / Cooling Equipment	l	T	100%	T	1
Heat Pump		+	10070		1
		+	1000/	1	-
Compressor (if not included as A-C) Complemental Floatic Most		 	100%	 	-
Supplemental Electric Heat Floating Opening Months		 	65%		
Electric Space Heating		 	2=2/		<u> </u>
Less than 4 separately controlled units		ļ	65%	ļļ	ļ
4 or more separately controlled units	ļ	ļ	40%	ļļ	
System With Continuous Nameplate Load		ļ	100%	ļ	ļ
Largest Heat / A-C Load (VA) VA kW					
GENERAL LOADS					
• 1st 10 kW of General Loads 100% kW			100%	kW	
Remaining General Loads (kW) 40% kW			40%	kW	
CALCULATED GENERAL LOAD (kW) kW					kW
LARGEST HEAT / A-C LOAD 100% kW kW					kW
TOTAL CALCULATED LOAD (Net General Loads + Heat/A-C Load)					
,					kW

NOTES

