POWERSMITHS

Transformer Application Guide

Transformer Selection by Application

OPAL Transformer	Loading	Application
ESaver-33L	Typical light loading	Office, education, healthcare, commercial, most institutional, residential
ESaver-25H	Heavy loading	Dedicated equipment (fans, pumps, elevators), labs, broadcast, datacenter, industrial
T1000-30H	Harmonic rich loading	Medical, computer rooms, casinos. To prevent voltage distortion from becoming excessive

OPAL (Optimized Performance for the Application Load) Transformer Information

Transformer	Optimized Load Range	Savings Beyond US DOE 2016 (Reduction in Losses)	Temperature Rise	Winding Material	Continuous Overload Capacity	K-Rating
ESaver-33L	0-25%	33%	<130°C	CU	5%	K7
ESaver-25H	75-100%	25%	<105°C	CU/AL	20%	K13
T1000-30H	50-100%	30%	<105°C	CU	20%	K20

Information applies to product(s) manufactured at time of printing and therefore is for general reference. Call for current product information for specific models being considered.

Full-Load Current & Protection Ratings for 3-Phase Transformers

kVA	Primary: 480 V Delta			Secondary: 208Y/120 V		
	Full-Load Amps	125% of Full-Load	250% of Full-Load	Full-Load Amps	125% of Full-Load	250% of Full-Load
15	18	23	45	42	52	104
20	24	30	60	56	69	139
25	30	38	75	69	87	174
30	36	45	90	83	104	208
45	54	68	135	125	156	313
50	60	75	151	139	174	347
63	76	95	190	175	219	438
75	90	113	226	208	261	521
100	120	151	301	278	347	695
112.5	135	169	337	311	389	778
125	151	188	376	347	434	868
150	181	226	452	417	521	1,042
175	211	263	527	486	608	1,216
200	241	301	602	556	695	1,390
225	271	339	677	625	782	1,563
250	301	376	753	695	868	1,737
300	361	452	903	834	1,042	2,084
400	482	602	1,204	1,112	1,390	2,779
450	542	677	1,355	1,251	1,563	3,126
500	602	753	1,505	1,390	1,737	3,474
600	723	903	1,806	1,667	2,084	4,169
750	903	1,129	2,258	2,084	2,605	5,211

DIMENSIONS

For All Opal Transformers

kVA	W	D	H
15	18”	17”	27”
20	26”	18”	30”
25	26”	18”	30”
30	26”	18”	30”
45	26”	18”	30”
50	32”	22”	40”
63	32”	22”	40”
75	32”	22”	40”
100	32”	22”	40”
112.5	32”	22”	40”
125	38”	27”	48”
150	38”	27”	48”
175	38”	27”	48”
200	38”	27”	48”
225	38”	32”	52”
250	38”	32”	52”
300	38”	32”	52”
400	52”	32”	61”
450	52”	38”	61”
500	52”	38”	61”
600	52”	38”	61”
750	64”	45”	67”

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From *The ESP Calculator™* (Powersmiths' Energy Savings & Payback Calculation Worksheet)

Esaver-33L Light Loading (K-7)

Equipment operating hrs/day & days/yr	14 hrs & 260 days	Calc Load kW	Annual kWh
Load during operating hours	25%	84	307,125
Load outside operating hours	10%	34	172,800
		Total Annual kWh:	479,925

	Status Quo	Powersmiths	
Annual Cost of feeding Building Load	$ 58,118	$ 58,118	
Annual Cost of Transformer Losses	$ 1,650	$ 735	
Annual Cost of Associated A/C	$ 820	$ 366	Reduction
Annual estimated Electrical Bill	$ 60,587	$ 59,218	2%
Peak kW reduction (normal op hours)	1.7	kW	
Annual kWh reduction	11,647	kWh	
Reduction in Air Cond. Load (on peak)	0.32	Tons	

	Annual	20 years	32 years
Operating Costs			
Status Quo Transformers	$ 2,470	$ 85,742	$ 195,254
Powersmiths Transformers	$ 1,101	$ 38,215	$ 87,025
Savings with Powersmiths	**$ 1,369**	**$ 47,527**	**$ 108,230**

Cost of Powersmiths Transformers	$ 29,300	(Product costs are estimates that can vary
Cost of Status Quo Transformers	$ 16,900	significantly by manufacturer, project, model)
Payback on total cost	**9.06**	**Years @ $ 0.10/kWh and $ 10.00 Demand**
Cost of Energy Savings	$ 0.033	/kWh
Cost - Benefit Ratio	3.0	times less to save a kWh than to buy a kWh

ESaver-25H Heavy Loading (K-13)

Equipment operating hrs/day & days/yr	14 hrs & 260 days	Calc Load kW	Annual kWh
Load during operating hours	60%	203	737,100
Load outside operating hours	40%	135	691,200
		Total Annual kWh:	1,428,300

	Status Quo	Powersmiths	
Annual Cost of feeding Building Load	$ 167,130	$ 167,130	
Annual Cost of Transformer Losses	$ 4,227	$ 2,060	
Annual Cost of Associated A/C	$ 2,101	$ 1,024	Reduction
Annual estimated Electrical Bill	$ 173,458	$ 170,214	2%
Peak kW reduction (normal op hours)	5.4	kW	
Annual kWh reduction	25,982	kWh	
Reduction in Air Cond. Load (on peak)	1.02	tons	

	Annual	20 years	32 years
Operating Costs			
Status Quo Transformers	$ 6,328	$ 219,700	$ 500,307
Powersmiths Transformers	$ 3,084	$ 107,063	$ 243,807
Savings with Powersmiths	**$ 3,244**	**$ 112,637**	**$ 256,499**

Cost of Powersmiths Transformers	$ 29,300	(Product costs are estimates that can vary
Cost of Status Quo Transformers	$ 18,300	significantly by manufacturer, project, model)
Payback on total cost	**3.39**	**Years @ $ 0.10/kWh and $10.00 Demand**
Cost of Energy Savings	$ 0.013	/kWh
Cost - Benefit Ratio	7.6	times less to save a kWh than to buy a kWh

T1000-30H Harmonic Mitigation (K-20)

Equipment operating hrs/day & days/yr	14 hrs & 260 days	Calc Load kW	Annual kWh
Load during operating hours	60%	203	737,100
Load outside operating hours	25%	84	432,000
		Total Annual kWh:	1,169,100

	Status Quo	Powersmiths	
Annual Cost of feeding Building Load	$ 141,210	$ 141,210	
Annual Cost of Transformer Losses	$ 4,197	$ 1,916	
Annual Cost of Associated A/C	$ 2,086	$ 953	Reduction
Annual estimated Electrical Bill	$ 147,493	$ 144,079	2%
Peak kW reduction (normal op hours)	6.4	kW	
Annual kWh reduction	26,502	kWh	
Reduction in Air Cond. Load (on peak)	1.21	tons	

	Annual	20 years	32 years
Operating Costs			
Status Quo Transformers	$ 6,283	$ 218,147	$ 496,771
Powersmiths Transformers	$ 2,869	$ 99,611	$ 226,837
Savings with Powersmiths	**$ 3,414**	**$ 118,536**	**$ 269,934**

Cost of Powersmiths Transformers	$33,846	(Product costs are estimates that can vary
Cost of Status Quo Transformers	$26,900	significantly by manufacturer, project, model)
Payback on total cost	**2.03**	**Years @ $ 0.10/kWh and $10.00 Demand**
Cost of Energy Savings	$ 0.008	/kWh
Cost - Benefit Ratio	12.2	times less to save a kWh than to buy a kWh

kVA	BTUs-50%	BTUs-100%	Wt.
15	536	2,399	280
20	664	2,856	323
25	792	3,313	365
30	863	3,395	410
45	1,160	4,664	530
50	1,246	5,055	597
63	1,532	6,254	760
75	1,795	7,326	770
100	2,150	8,670	925
112.5	2,344	9,287	1,040
125	2,423	9,479	1,165
150	2,972	11,799	1,270
175	3,371	13,688	1,385
200	3,511	13,559	1,490
225	3,774	14,610	1,660
250	4,124	15,947	1,700
300	4,886	18,879	1,910
400	6,094	23,676	2,515
450	6,613	25,805	2,718
500	7,131	27,934	2,920
600	8,216	32,121	3,320
750	9,438	36,836	4,010
15	471	1,675	305
20	564	1,941	322
25	705	2,426	403
30	798	2,692	420
45	1,095	3,740	570
50	1,118	3,823	583
63	1,408	4,817	735
75	1,587	5,435	830
100	1,962	6,623	985
112.5	2,187	7,425	970
125	2,320	7,810	1,230
150	2,685	8,994	1,370
175	2,925	10,001	1,430
200	3,343	11,430	1,635
225	3,583	12,437	1,695
250	3,819	12,989	1,736
300	4,436	14,839	1,950
400	5,643	19,198	2,540
450	5,997	20,262	2,725
500	6,350	21,325	2,910
600	7,421	24,556	3,500
750	8,806	29,483	4,330
15	563	2,071	320
20	620	2,208	367
25	776	2,760	458
30	833	2,897	505
45	1,133	3,856	605
50	1,181	3,910	655
63	1,455	5,025	738
75	1,706	6,060	810
100	2,204	6,947	1,040
112.5	2,269	7,793	1,090
125	2,413	8,304	1,176
150	2,798	9,646	1,380
175	3,150	11,062	1,488
200	3,501	12,478	1,595
225	3,835	13,143	1,765
250	4,088	14,139	1,807
300	4,750	16,548	2,030
400	5,814	19,987	2,755
450	6,367	22,362	2,940
500	6,920	24,737	3,125
600	7,714	26,938	3,694
750	9,151	31,383	4,570

Sheet Note

ESaver-33L Light Loading

POWERSMITHS ESAVER-33L SERIES. UL 1561 LISTED. K-7 RATING. LOCKING HINGED DOORS. COPPER WINDINGS, 130° C RISE. IMPEDANCES 4.0%-5.8%. SIX 2 ½% VOLTAGE TAPS (2 ABOVE, 4 BELOW). SOUND LEVELS 3DB LESS THAN NEMA ST-20. 33% LESS LOSSES AT APPLICABLE LOADING. 5% CONTINUOUS OVERLOAD CAPABILITY. INSTALLATION TO WITHIN 2" OF REAR SURFACE. GUARANTEED COMPATIBILITY WITH 125% RATED UPSTREAM CIRCUIT BREAKER. PROVIDE ENERGY SAVINGS & PAYBACK CALCULATION AGAINST US DOE 2016 X-FMRS. PROVIDE A COPY OF ISO 17025 REGISTRATION. PROVIDE INTEGRAL LOAD POWER AND ENERGY DATA LOGGER WITH EXTERNAL USB ACCESS TO DATA. PROVIDE TEST REPORT, BY SERIAL NUMBER, OF EACH TRANSFORMER SUPPLIED WITH SOUND LEVEL AND NO LOAD LOSS PERFORMANCE. 32 YEAR WARRANTY.

ESaver-25H Heavy Loading

POWERSMITHS ESAVER-25H SERIES. UL 1561 LISTED. K-13 RATING. LOCKING HINGED DOORS. CU PRIMARY/AL SECONDARY, 105° C RISE. IMPEDANCES 4.0%-5.8%. SIX 2 ½% VOLTAGE TAPS (2 ABOVE, 4 BELOW). SOUND LEVELS 3DB LESS THAN NEMA ST-20. 25% LESS LOSSES AT APPLICABLE LOADING. 20% CONTINUOUS OVERLOAD CAPABILITY. INSTALLATION TO WITHIN 2" OF REAR SURFACE. GUARANTEED COMPATIBILITY WITH 125% RATED UPSTREAM CIRCUIT BREAKER. PROVIDE ENERGY SAVINGS & PAYBACK CALCULATION AGAINST US DOE 2016 X-FMRS. PROVIDE A COPY OF ISO 17025 REGISTRATION. PROVIDE INTEGRAL LOAD POWER AND ENERGY DATA LOGGER WITH EXTERNAL USB ACCESS TO DATA. PROVIDE TEST REPORT, BY SERIAL NUMBER, OF EACH TRANSFORMER SUPPLIED WITH SOUND LEVEL AND NO LOAD LOSS PERFORMANCE. 32 YEAR WARRANTY.

T1000-30H Harmonic Mitigation

POWERSMITHS T1000-30H HMT SERIES. UL 1561 LISTED. K-20 RATING. LOCKING HINGED DOORS. COPPER WINDINGS, 105° C RISE. IMPEDANCES 4.0%-5.8%. SIX 2 ½% VOLTAGE TAPS (2 ABOVE, 4 BELOW). SOUND LEVELS 3DB LESS THAN NEMA ST-20. 30% LESS LOSSES AT APPLICABLE LOADING. 20% CONTINUOUS OVERLOAD CAPABILITY. INSTALLATION TO WITHIN 2" OF REAR SURFACE. GUARANTEED COMPATIBILITY WITH 125% RATED UPSTREAM CIRCUIT BREAKER. PROVIDE ENERGY SAVINGS & PAYBACK CALCULATION AGAINST US DOE 2016 X-FMRS. PROVIDE A COPY OF ISO 17025 REGISTRATION. PROVIDE INTEGRAL LOAD POWER AND ENERGY DATA LOGGER WITH EXTERNAL USB ACCESS TO DATA. PROVIDE TEST REPORT, BY SERIAL NUMBER, OF EACH TRANSFORMER SUPPLIED WITH SOUND LEVEL AND NO LOAD LOSS PERFORMANCE. 32 YEAR WARRANTY.

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