

E-SAVER OPAL™ Series

**HIGH PERFORMANCE TRANSFORMERS OPTIMIZED TO DELIVER
25 - 50% LESS LOSSES THAN DOE 2016 MINIMUM
EFFICIENCY REQUIREMENT**

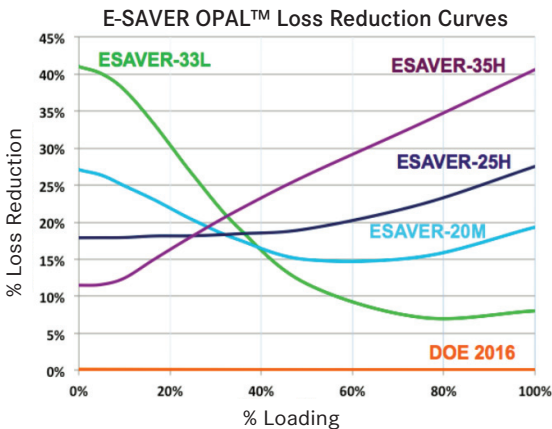
APPLICATION

The E-SAVER OPAL™ Series is a family of ultra-efficient dry-type isolation transformers that has been optimized for different application load profiles, to maximize energy savings and ensure electrical system compatibility. These energy optimized units are perfect for Net Zero, LEED® and High Performing Buildings.

OPAL™

OPTIMIZED PERFORMANCE FOR THE APPLICATION LOAD

To achieve 25-50% more savings than the DOE 2016 requirement, Powersmiths' developed and implemented a design best practice called OPAL™ - Optimized Performance for the Application Load. Recognizing that the transformer has much more impact in an electrical system than just efficiency, OPAL considers the system as a whole, including goals like managing impedance, arc flash, fault level, inrush, harmonics, and more. OPAL™ is possible thanks to the tight feedback loop between design, onsite manufacturing, and extensive ongoing real world operating performance verification. The result is more savings for the same dollar.



DOE 2016 IDENTIFIES BILLIONS IN SAVINGS BEYOND NEW LEGAL MINIMUM

Most manufacturers have designed their low-voltage transformers to just meet the new U.S. Dept. of Energy law (DOE 2016), setting minimum efficiency at a single required 35% load point, under an ideal sine wave factory test profile, sacrificing performance elsewhere. The DOE quantifies savings for going beyond DOE 2016 in billions of dollars. Furthermore, the DOE states that lifecycle savings can be maximized by optimizing for real-world loading. Powersmiths OPAL™ enables customers to access these savings – backed by real-world performance verification.

EXPANDED KVA SELECTION ENABLES RIGHT-SIZING

Powersmiths enables right-sizing of electrical infrastructure by offering a much broader selection of transformer kVA sizes. The capital cost, operating cost and footprint reductions can be dramatic – on the order of 30-50%, through smaller transformers, breakers, conductors, and distribution panels.

GUARANTEED PERFORMANCE FOR 32 YEARS

Powersmiths guarantees that every transformer we manufacture meets our published technical data, and furthermore, that this performance is met over the full term of the 32-year pro-rated warranty. Being able to trust that savings are both real and long-term is part of why organizations choose Powersmiths.



75kVA E-Saver OPAL™ Series shown with Cyberhawk TX™, hinged door and Rotatable IR Port™

K-RATING IS A MODERN REQUIREMENT

Many general purpose transformers are purchased and installed because they have the lowest first cost, however, they carry a UL label on the basis of feeding only linear loads. Since most connected loads today are electronic with nonlinear profiles, a low-voltage isolation transformer needs to be K-rated in order to have a valid UL listing for most applications today. E-Savers are appropriately K-rated.

ENVIRONMENTAL/GREEN BUILDING/LEED®/NET ZERO

By going meaningfully beyond the DOE 2016 baseline efficiency, the E-Saver™ contributes to green building, LEED®, Net Zero and carbon footprint reduction goals. Additional benefits of Powersmiths products include our ISO14001 certified manufacturing, integrated metering options and ability to integrate with the Powersmiths WOW™ Sustainability Management Platform.

CERTIFICATIONS & TESTING

Powersmiths certifications include ISO 9001 (Quality), ISO 14001 (Environment), ISO 17025 (Efficiency Test Lab), UL and CSA. Powersmiths has a production integrated nonlinear load test program that enables efficiency verification under real-world conditions, as well as IPMVP compliant field measurement of losses and efficiency, and Certified Test Lab Load Profile Test Reports.

METERING & ARC FLASH OPTIONS

Integrated metering can provide information about capacity utilization, load profiles, power quality and energy use. The lockable hinged door option, as well as our patented 360° Rotatable IR Port™ option enable quick and safe access to internal transformer connections, and reduces arc flash risk. Powersmiths also offers transformers with Integrated Power Distribution. For details see the Energy Station TX™ product information.

E-SAVER OPAL MODEL COMPARISON MATRIX²

Model	Optimized Load Range	Saving beyond DOE 2016*	Temp. Rise	Winding Material ***	Continuous Overload Capacity	K-Rating **/****	Applications
E-Saver-33L	0-25%	33%	<130°C	CU	5%	K7	Most Applications - office, education, healthcare, most other institutional, commercial (light load feeding electronic equipment).
E-Saver-20M	0-100%	20%	<115°C	CU	15%	K1, K9, K13	Where equipment or process loading varies widely, or where the load is expected to change significantly over time.
E-Saver-25H	75-100%	25%	<105°C	CU/AL CU opt.	20%	K13	Dedicated equipment (fans, pumps, elevators, etc.), labs, broadcast, datacenter, industrial where loading is significant.
T1000-30H	50-100%	30%	<105°C	CU	20%	K20	Harmonic Mitigation Transformer - for heavy, harmonic-rich loads, high densities of electronic equipment, where voltage distortion could become excessive.
E-Saver-35H	75-100%	35%	<80°C	CU/AL CU opt.	33%	K20	Heavy loading for extended hours, and need for lower losses & operating costs, overload capacity, faster payback if high energy rate.
E-Saver-50H	75-100%	50%	<65°C	CU	50%	K30	For Special Applications close to full continuous load, where full load losses & heat output must be minimized, significant overload capacity.
E-Saver-S0L	0-100%	30%	<105°C	CU/AL CU opt.	20%	K20 (but not required for app)	Solar Applications - to avoid solar production waste - minimize transformer idling and full load losses, continuous overload capacity for longer life.

*Estimated average savings vs. DOE 2016 reference for the application load profile

** K-Rating per IEEE-C57.110

*** CU - Copper, AL Aluminum, CU/AL Copper primary with Aluminum Secondary

**** The high K-factor rating is not the goal of the design, but a consequence of the low current densities used to achieve the high loading efficiency goals

¹ U.S. Department of Energy, 10 CFR Part 431, [Docket No. EERE-2010-BT-STD-0048] Energy Conservation Program: Energy Conservation Standards for Distribution Transformers; Final Rule, April 18, 2013

TECHNICAL SPECIFICATIONS

The E-Saver™ is an ultra-efficient low-voltage dry-type isolation transformer that meaningfully exceeds the U.S. Dept. of Energy's new minimum efficiency law, commonly referred to as DOE 2016. Each model is optimized to maximize energy savings and electrical system compatibility in each target application, and has a K-factor listing per UL 1561 and an application appropriate K-rating per C57.110 (see Comparison Matrix). For models with an 'H' designation, K-rating is reduced by one level for 400kVA and larger, reflecting lower harmonic content reality at heavy loading for large kVA transformers (ex.K30->K20, K20->K13, K13->K9) to avoid overbuilding and associated unnecessary cost. See table for individual model attributes.

E-Savers have a common-core (3-phase models), 10kV BIL, 200% rated neutral, are 60Hz rated (std), built to NEMA ST-20 and other applicable ANSI, IEEE standards and are UL listed and CSA approved. Both primary and secondary terminals and voltage taps (typically six 2.5%) are all front-accessible. E-Savers have a 220°C class insulation system that is NOMEX-based with an Epoxy Co-polymer impregnant with technical performance characteristics that embed lower environmental impact, long term reliability and long life expectancy. E-Savers carry OSHPD and IBC Seismic Certification. The seismic bracing option provides a higher 2.28g certification. All E-Saver models come standard in a Type 2 ventilated drip-proof indoor enclosure made of heavy gauge steel finished with epoxy powder coating for durability and low environmental impact, and are UL Listed for 2" rear clearance - a significant improvement over the typical industry 6" limit. A wide variety of enclosures and options are available.

Low Noise: Keeping audible noise at a minimum is key. While the NEMA ST-20 standard sets levels referenced by industry only a type test, not a production test, is required - so transformers on actual projects may be noisy. NEMA ST-20 also allows K13 transformers to be even noisier. Powersmiths builds 3dB quieter than NEMA standard values, and 6dB quieter than the K13+ allowance. Furthermore, every unit is tested to ensure quiet operation. For very sensitive environments, an additional 2dB lower noise option is available.

Management of Impedance, Inrush, Fault Level, Arc Flash: Powersmiths' OPAL™ design best practice includes addressing key transformer attributes like impedance, inrush, fault level, arc flash, to ensure smooth integration into an electrical system, avoiding the negative impacts often associated with high efficiency transformers. See individual technical data sheets for comprehensive values for all parameters.

Impedance: For 33L, 20M, 25H, 35H models, impedance is kept at or above 4.0% in order to manage downstream fault current and arc flash levels, and stay within interrupting capacity (kAIC) ratings. Higher impedance is available to meet specific project needs. 50H models are optimized to project specific requirements.

Inrush: Inrush currents are managed in order to avoid nuisance tripping of the primary breaker and to enable design engineers to use standard 125% rated primary protection, thereby avoiding expensive design changes that otherwise may be needed. Very low inrush designs are available as specific projects may require, for example some datacenter and medical applications.

ORDERING INFORMATION

OPAL PRODUCT FAMILY	MODEL	kVA	PV	SV	OPT
E-SAVER	33L 20M 25H 35H 50H	kVA Rating Unit (9-1000 kVA)	Primary Voltage Input (Up to 600V)	Secondary Voltage Input (Up to 600/347V)	Options if Applicable (See Available Options)

TECHNICAL DATA

kVA	Audible Noise	33L, 20M, 25H Model Weight Range (lbs)	Standard Case Size (in)	Alternate Smaller Case Size (in)*
15	42 dB	260-340	17.5W x 17D x 27.5H	17.5W x 14.5D x 25H
20	42 dB	300-380	25.5W x 18D x 30H	23W x 15.5D x 27.5H
25	42 dB	340-420	25.5W x 18D x 30H	23W x 15.5D x 27.5H
30	42 dB	380-470	25.5W x 18D x 30H	23W x 15.5D x 27.5H
45	42 dB	490-590	25.5W x 18D x 30H	No Alternate
50	42 dB	540-600	31.5W x 21.5D x 40H	No Alternate
63	47 dB	600-720	31.5W x 21.5D x 40H	26.5W x 20D x 33H
75	47 dB	650-800	31.5W x 21.5D x 40H	26.5W x 20D x 33H
100	47 dB	800-900	31.5W x 21.5D x 40H	No Alternate
112	47 dB	900-1000	31.5W x 21.5D x 40H	No Alternate
125	47 dB	1050-1150	37.5W x 26.5D x 48H	33W x 23D x 38H
150	47 dB	1170-1300	37.5W x 26.5D x 48H	33W x 23D x 38H
175	52 dB	1260-1450	37.5W x 26.5D x 48H	34.5W x 26.5D x 42H
200	52 dB	1375-1550	37.5W x 26.5D x 48H	34.5W x 26.5D x 42H
225	52 dB	1500-1700	37.5W x 31.5D x 52H	34.5W x 26.5D x 42H
250	52 dB	1650-1850	37.5W x 31.5D x 52H	37.5W x 26.5D x 48H
300	52 dB	1850-2000	37.5W x 31.5D x 52H	37.5W x 26.5D x 48H
400	57 dB	2150-2350	51.5W x 38D x 61H	43.5W x 33.5D x 55.5H
450	57 dB	2400-2650	51.5W x 38D x 61H	43.5W x 33.5D x 55.5H
500	59 dB	2800-3000	51.5W x 38D x 61H	43.5W x 33.5D x 55.5H
600	59 dB	3500-3800	64W x 47D x 67H	51.5W x 38D x 61H
750	61 dB	4000-4300	64W x 47D x 67H	Contact Factory
850	61 dB	4300-4850	64W x 47D x 67H	Contact Factory
1000	61 dB	4800-5500	64W x 53D x 67H	Contact Factory

* Typically the min cases are available for the standard models of 33L, 20M, 25H only.

AVAILABLE OPTIONS

Metering: Express Logger™, SMART™ or Cyberhawk TX™ (see product cut sheets for details)

CC: Core & Coils available for OEM Integration

3R: Type 3R, sprinkler proof/ outdoor ventilated enclosure

OSEC: Enclosure for outdoor public areas

SS: Painted stainless steel enclosure

NVI: Non-ventilated indoor enclosure

IRP: 360° Rotatable IR Port™

HD: Hinged Door

F50: 50 Hz design

1S: Single electrostatic shield

2S: Dual electrostatic shields

3S: Triple electrostatic shields

SPD: (120/208 V OR 277/480V)

PRO80: 80kA, 7 mode, Filter

PRO120: 120kA, 7 mode, Filter

PRO200: 200kA, 7 mode, Filter

PRO240: 240kA, 7 mode Filter

PROXX: Where XX is custom ID

LKS: Lug kit, screw-type

LKC: Lug kit, compression type

VLI: Very Low Inrush

IMP: Custom Impedance

COL: Custom color

TS: Thermal sensors at 170°C and 200°C

RTR: Routine Test Report

NLT: Nonlinear Load Test with Certificate

2016TR: DOE 2016 Test Report

CTL: ISO 17025 Certified Test Lab, load profile test

SE: Sensitive environment, extra low noise

SB: Certified Seismic Bracing for 2.28g

(for Certificate details contact Powersmiths)

WM: Wall-mount kit up to 75kVA is available (sold separately)

NOTE: The above data applies to the standard configuration of each kVA. Selection of some options may change enclosure size and/or transformer weight. Some options may be mutually exclusive. Consult factory for detailed product data sheet for these and other configurations. Efficiencies tested according to U.S. Dept. of Energy's 10 CFR Part 431, a linear load test at 35% of nameplate capacity. Refer to technical data sheet for comprehensive information for each specific model, kVA, and option selected.

As design optimization is continuous, technical data is updated over time. Please check with Powersmiths for latest revision.

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E-SAVER OPAL-R™ Series

OPAL-R TRANSFORMERS ARE OPTIMIZED FOR RETROFIT PROJECTS DELIVERING AN AVERAGE OF 80% LESS LOSSES WHEN REPLACING OLDER UNITS

APPLICATION

The OPAL-R Series (E-Saver-80R & E-Saver-81R) are ultra-efficient dry-type isolation transformers optimized to maximize energy savings and provide the fastest payback in retrofit applications.

Powersmiths has actively measured load profiles and losses for thousands of low-voltage transformers it has retrofitted for applications from K-12 schools to college and hospital campuses, from courthouses to military bases, from general commercial and office buildings to mission critical data centers.

Powersmiths has found that the most common profile is a lightly loaded transformer that feeds predominately electronic equipment.

OPAL-R's E-Saver-80R and -81R models have been optimized specifically for this profile delivering a per project average of an 80% reduction in losses when replacing existing older transformers.

For transformers optimized to feed dedicated equipment like fans, motors, elevators, or heavy harmonic rich loads, see the rest of the OPAL Series™ as well as OPAL T1000™.

OPAL™ - OPTIMIZED DESIGNS FOR RETROFITS

There is more to a transformer retrofit than simply matching the kVA and voltages with a typical transformer from the distributor's warehouse. A transformer has much more impact in an electrical system than just efficiency because of electrical characteristics that affect fault levels, arc flash levels and inrush. Other important considerations for a retrofit should also include site conditions, footprint and internal terminal layout.

Powersmiths has developed a transformer design best practice called OPAL - Optimized Performance for the Application Load to specifically address transformer retrofit considerations.

OPAL considers the system as a whole, including goals like managing impedance, arc flash, fault level, inrush, harmonics, and more. OPAL is possible thanks to the tight feedback loop between design, onsite manufacturing, and extensive real world performance verification.

Our flexible design and manufacturing process enables us to deliver solutions for the wide variety of site conditions and transformer manufacturers including footprint and internal terminal layouts, while the result is the most savings per dollar spent.

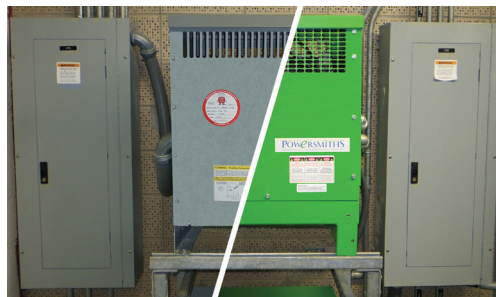
DOE IDENTIFIES BILLIONS IN SAVINGS BEYOND DOE 2016

Most manufacturers design low-voltage transformers to just meet the minimum requirement of U.S. Dept. of Energy law (DOE 2016). DOE 2016 has been set at a single 35% load point, under an ideal sine wave factory test profile, sacrificing performance elsewhere.

By exceeding the minimum efficiency, the DOE has quantified the savings potential to be in billions of dollars and that lifecycle savings can be maximized by optimizing for real-world loading. OPAL enables access to these savings – backed by real-world performance verification.

DEPARTMENT OF DEFENCE UFC COMPLIANCE

The OPAL-R with the T115 option complies with the US Department of Defense's Unified Facilities Criteria (UFC) - Interior Electrical Systems.



E-Saver OPAL-R™ Retrofits deliver maximum energy savings and follow best practices to measure & verify lifecycle savings, and ensure hassle-free transformer replacements.

RETROFITS REQUIRE A BEST PRACTICE

To replace existing transformers cost effectively, Powersmiths' professional engineers use a multi-step best practice for the entire project cycle including: vetted project savings calculations, comprehensive site audits and tagging, individualized product selection, baseline and post installation field measurements of load profiles, losses and efficiency, following IPMVP protocols, performance reports and more.

GUARANTEED PERFORMANCE FOR 32 YEARS

In a world filled with small print disclaimers and limited DOE compliance testing, you can count on Powersmiths performance. We guarantee that every transformer we manufacture meets our published technical data, and furthermore, that this performance is met over the full term of the 32-year pro-rated warranty. Trusting that savings are both real and long-term is part of why organizations choose Powersmiths.

K-RATING IS A MODERN REQUIREMENT

Typically, transformers are purchased and installed with lowest first cost in mind, however, these transformers' are UL listed on the basis of feeding only linear load. Today, most connected loads are electronic with nonlinear profiles, and in order to have a valid UL listing, a low-voltage isolation transformer needs to be appropriately K-rated for most applications

EXPANDED KVA SELECTION ENABLES RIGHT-SIZING

Powersmiths enables right-sizing of electrical infrastructure by offering a much broader selection of transformer kVA sizes. The capital cost, operating cost and footprint reductions can be dramatic – on the order of 30-50%, through smaller transformers, breakers, conductors, and distribution panels.

ENVIRONMENTAL/GREEN BUILDING/LEED®/NET ZERO

By going meaningfully beyond the DOE 2016 baseline efficiency, the E-Saver™ contributes to green building, LEED®, Net Zero and carbon footprint reduction. goals. Additional benefits include our ISO14001 certified manufacturing, integrated metering and ability to integrate with the Powersmiths WOW™ - Building Resource Management Platform.

CERTIFICATIONS & TESTING

Powersmiths certifications include ISO9001 (Quality), ISO14001 (Environment) ISO17025 (Efficiency Test Lab), UL and CSA. Powersmiths has a production-integrated nonlinear load test program that enables efficiency verification under real-world conditions, as well as Certified Test Lab Profile Test Reports.

METERING & ARC FLASH OPTIONS

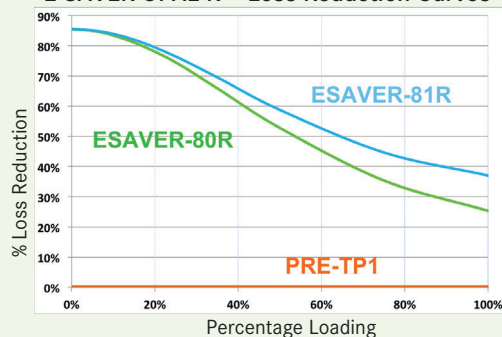
Integrated metering can provide information about capacity utilization, load profiles, power quality and energy use. The lockable hinged door option as well as our patented 360° Rotatable IR Port™ option enable quick and safe access to internal transformer connections, and reduces arc flash risk.

Powersmiths offers also transformers with Integrated Power Distribution, see the Energy Station TX™ brochure.

KEY FEATURES

- Optimized for light, nonlinear loads found in most applications K-rated as required by UL to feed modern electronic equipment
- Retrofit Best Practice ensures a smooth retrofit with verified savings
- Significant savings beyond DOE 2016 legislation
- Electrical system consideration: impedance, inrush, fault & arc flash levels
- Available with a wide range of safety & performance features like integrated hinged doors, 360° Rotatable IR Port™, and Cyberhawk™ Metering and Logging
- Manufactured in a certified ISO 9001, ISO 14001 and ISO 17025 facility for quality, low environmental impact, and transformer efficiency testing

E-SAVER OPAL-R™ Loss Reduction Curves



¹ U.S. Dept. of Energy 10 CFR Part 431, [Docket No. EERE-2010-BT-STD-0048] Energy Conservation Program: Energy Conservation Standards for Distribution Transformers, Final Rule April 18, 2013.

TECHNICAL SPECIFICATIONS

The E-Saver™-80R and 81R are ultra-efficient low-voltage dry-type isolation transformers that meaningfully exceed the U.S. Dept. of Energy's new minimum efficiency law, commonly referred to as DOE 2016. All E-Saver transformers carry a UL Listing and CSA Approval, with application appropriate K-factor. The aluminum wound E-Saver-80R and the copper wound E-Saver-81R are both K-factor listed per UL 1561 and are K-7 rated per C57.110. Both models are compatible with electronic equipment all the way up to full load. The standard temperature rise is 130°C with a 115°C option available. E-Savers have a common-core (3-phase models), 10kV BIL, 200% rated neutral, are 60Hz rated (std), built to NEMA ST-20, UL1561, IEEE C57.110 and other applicable ANSI and IEEE standards. Both primary and secondary terminals and voltage taps (typically six 2.5%) are all front-accessible. E-Savers have a 220°C class insulation system that is NOMEX-based with an Epoxy Co-polymer impregnant with technical performance characteristics that embed lower environmental impact, long term reliability and long life expectancy. E-Savers carry OSHPD and IBC Seismic Certification. The seismic bracing option provides a higher 2.28g certification. All E-Saver models come standard in a Type 2 ventilated drip-proof indoor enclosure made of heavy gauge steel finished with epoxy powder coating for durability and low environmental impact, and are UL Listed for 2" rear clearance – a significant improvement over the typical industry 6" limit. A wide variety of enclosures and options are available.

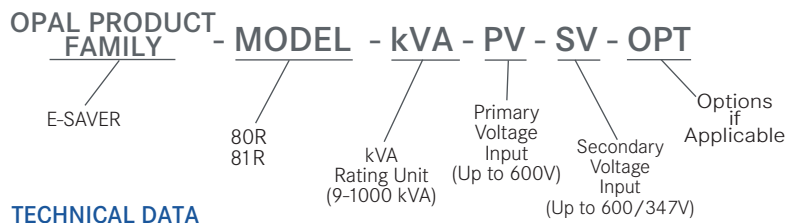
Low Noise: Keeping audible noise at a minimum is key. While the NEMA ST-20 standard sets levels referenced by industry only a type test, not a production test, is required – so transformers on actual projects may be noisy. Powersmiths builds 3dB quieter than NEMA standard values, and furthermore every unit is tested to ensure quiet operation. For very sensitive environments an additional 2dB lower noise option is available.

Management of Impedance, Inrush, Fault Level, Arc Flash: Powersmiths OPAL™ design best practice includes addressing key transformer attributes like impedance, inrush, fault level, arc flash, to ensure smooth integration into an electrical system, avoiding the negative impacts often associated with high efficiency transformers. See individual technical data sheets for comprehensive values for all parameters.

Impedance: For both the E-Saver-80R and E-Saver-81R, impedance is kept at or above 4.0% in order to manage downstream fault current and arc flash levels, and maintain compatibility with equipment interrupting capacity (kAIC) ratings. Higher impedance is available to meet specific project needs.

Inrush: Inrush currents are managed in order to avoid nuisance tripping of the primary breaker and to enable design engineers to use standard 125% rated primary protection, thereby avoiding expensive design changes that otherwise may be needed. Very low inrush designs are available as specific projects may require, for example some datacenter and medical applications.

ORDERING INFORMATION



TECHNICAL DATA

kVA	Audible Noise	80R, 81R Model Weight Range (lbs)	Standard Case Size (in)	Alternate Smaller Case Size (in)*
15	42 dB	230-300	17.5W x 17D x 27.5H	17.5W x 14.5D x 25H
20	42 dB	260-340	25.5W x 18D x 30H	23W x 15.5D x 27.5H
25	42 dB	300-380	25.5W x 18D x 30H	23W x 15.5D x 27.5H
30	42 dB	340-420	25.5W x 18D x 30H	23W x 15.5D x 27.5H
45	42 dB	400-540	25.5W x 18D x 30H	No Alternate
50	42 dB	450-600	31.5W x 21.5D x 40H	No Alternate
63	47 dB	500-650	31.5W x 21.5D x 40H	26.5W x 20D x 33H
75	47 dB	610-700	31.5W x 21.5D x 40H	26.5W x 20D x 33H
100	47 dB	675-900	31.5W x 21.5D x 40H	No Alternate
112.5	47 dB	770-990	31.5W x 21.5D x 40H	No Alternate
125	47 dB	875-1120	37.5W x 26.5D x 48H	33W x 23D x 38H
150	47 dB	1010-1230	37.5W x 26.5D x 48H	33W x 23D x 38H
175	52 dB	1100-1360	37.5W x 26.5D x 48H	34.5W x 26.5D x 42H
200	52 dB	1175-1450	37.5W x 26.5D x 48H	34.5W x 26.5D x 42H
225	52 dB	1295-1600	37.5W x 31.5D x 52H	34.5W x 26.5D x 42H
250	52 dB	1400-1800	37.5W x 31.5D x 52H	37.5W x 26.5D x 48H
300	52 dB	1575-1960	37.5W x 31.5D x 52H	37.5W x 26.5D x 48H
400	57 dB	2025-2450	51.5W x 38D x 61H	43.5W x 33.5D x 55.5H
450	57 dB	2200-2600	51.5W x 38D x 61H	43.5W x 33.5D x 55.5H
500	57 dB	2475-2900	51.5W x 38D x 61H	43.5W x 33.5D x 55.5H
600	59 dB	2725-3600	64W x 47D x 67H	51.5W x 38D x 61H
750	61 dB	3200-4300	64W x 47D x 67H	Contact Factory
850	61 dB	3600-5000	64W x 47D x 67H	Contact Factory
1000	61 dB	4200-6000	64W x 53D x 67H	Contact Factory

NOTE: The above data applies to the standard configuration of each kVA. Selection of some options may change enclosure size and/or transformer weight. Some options may be mutually exclusive. Consult factory for detailed product data sheet for these and other configurations. Efficiencies tested according to U.S. Dept. of Energy's 10 CFR Part 431, a linear load test at 35% of nameplate capacity. Refer to technical data sheet for comprehensive information for each specific model, kVA, and option selected.

As design optimization is continuous, technical data is updated over time. Please check with Powersmiths for latest revision.

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AVAILABLE OPTIONS

Metering: Express Logger™, SMART™ or Cyberhawk TX™
(see product cut sheets for details)

CC: Core & Coils available for OEM Integration

3R: Type 3R, sprinkler proof/outdoor ventilated enclosure

OSEC: Enclosure for outdoor public areas

SS: Painted stainless steel enclosure

NVI: Non-ventilated indoor enclosure

IRP: 360° Rotatable IR Port™

HD: Hinged Door

F50: 50 Hz design

1S: Single electrostatic shield

2S: Dual electrostatic shields

3S: Triple electrostatic shields

SPD: (120/208 V OR 277/480V)

PRO80: 80kA, 7 mode, Filter

PRO120: 120kA, 7 mode, Filter

PRO160: 160kA, 7 mode, Filter

PROXX: Where XX is custom ID

VLI: Very Low Inrush

IMP: Custom Impedance

COL: Custom color

TS: Thermal sensors at 170°C and 200°C

RTR: Routine Test Report

NLT: Nonlinear Load Test with Certificate

2016TR: DOE 2016 Test Report

CTL: ISO 17025 Certified Test Lab, load profile test

SE: Sensitive environment, extra low noise

SB: Certified Seismic bracing for 2.28g

(for Certificate details contact Powersmiths)

WM: Wall-mount kit up to 75kVA is available (sold separately)

T115: 115°C Temperature Rise

OPAL SOL™ Series

HIGH PERFORMANCE TRANSFORMERS OPTIMIZED FOR SOLAR PV TO DELIVER 25-35% LESS LOSSES THAN TYPICAL DOE 2016 COMPLIANT TRANSFORMERS

APPLICATION

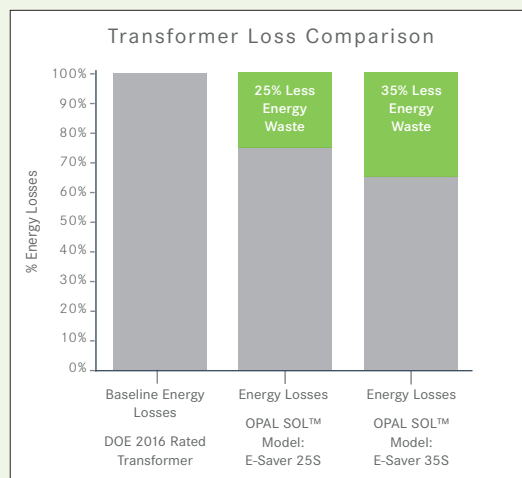
The E-Saver-SOL - OPAL Series (OPAL SOL) is an ultra-efficient low-voltage dry-type isolation transformer optimized specifically for solar PV applications. The OPAL SOL operates to maximize utilization of energy generated by solar PV. This is achieved by reducing typical energy waste that occurs when solar energy flows from the inverter to the building's electrical system – an even more compelling benefit for Net Zero, LEED® & High Performing Buildings.

KEY PERFORMANCE CHARACTERISTICS

The OPAL SOL models are designed to deliver top performance for solar applications: lowest idling losses during off hours and highest efficiency at 100% load, as well as the rapidly fluctuating loads in between. The two models are designed to maximize the price/performance which will vary by region, system design, and site conditions. The OPAL SOL is available in step-up or step-down voltages, and a variety of winding configurations as required by the application. Delta-Wye and Wye-Wye windings are the most common, but other configurations are available. The OPAL SOL Wye-Wye configuration is built on a 5-leg core, which conforms with IEEE Std 241 para. 4.5 for fault conditions, and also ensures correct inverter sensing of a lost phase, overcoming the weaknesses associated with wye-wye configurations on a 3-leg core. Additionally, impedances are managed by design to mitigate arc flash, inrush current and fault current levels (typically 4% or higher, per application requirement). Quiet operation is assured by delivering 3dB lower than NEMA Standard Noise levels. Performance characteristics of every unit are guaranteed.

SIZE OPAL SOL™ WITH SAME kW AS THE INVERTER

OPAL SOL designs are designed to handle the daily cyclical full load mode of operation without requiring derating or oversizing. This means that the OPAL SOL model is sized to match the inverter's power rating – it's that simple. This saves capital cost by enabling a right-sized electrical infrastructure including breakers, conductors, conduits, space, installation, and minimizes end-to-end carbon footprint. This also improves breaker trip coordination and reduces arc flash energy.



Savings estimate calculated in spring and autumn equinox in the L.A. California area compared with a basic DOE compliant transformer



OPAL SOL™ Transformer with 360° Rotatable IR Port™ and Hinged Door Options

NET ZERO & LEED® CONTRIBUTIONS

The OPAL SOL contributes to Net Zero and LEED® buildings through substantial reduction in energy losses, which means that more of the solar energy produced by the PV system is delivered to the building – losses which are typically not accounted for in the solar energy production models. Additional sustainable benefits include our ISO 14001 certified manufacturing, reduced waste packaging, integrated metering and ability to integrate with the Powersmiths WOW™ Sustainability Management Platform. The WOW platform is a natural fit with the OPAL SOL combining live building resource data with an education and outreach component. Show animations and other customized visuals with real-time data, highlighting solar energy contribution to organizational sustainability objectives.

SUSTAINABILITY, CERTIFICATIONS & TESTING

Sustainable design is evident in the substantial reduction in energy losses compared to legislation¹, backed by our manufacturing facility's ISO 14001 certified environmental management system, as well as lower emission superior epoxy co-polymer impregnant used during manufacturing and our innovative recyclable product packaging. With the continued "pursuit of excellence", our high-quality ISO 9001 manufacturing certification, and ISO 17025 Efficiency Test Lab certification, we deliver a product with a longer life and significant sustained benefits to our customers.

32-YEAR PERFORMANCE GUARANTEE & PRODUCT WARRANTY

The OPAL SOL has an industry leading 32-year pro-rated warranty.

EFFICIENCY & LOSSES: Powersmiths guarantees that ALL units meet or exceed the performance levels set out in their technical data sheets, for the full duration of the 32-year warranty period.

SEISMIC: Powersmiths warrants the unit will remain functional after a seismic event up to rated severity.

INTEGRATED OPTIONS

Powersmiths offers many integrated options, all with Arc Flash safety in mind, such as lockable hinged doors, integrated metering and meter ports to provide information about capacity utilization, load profiles, power and energy use, and a patented Rotatable IR Port™ to enable safe, quick, cost-effective and non-invasive thermal imaging of the live transformer. The integrated breaker option (input/output) is valuable where space is constrained, and may eliminate the need for outdoor-rated switchgear.

KEY FEATURES

- Maximize utilization of solar energy production
- Optimized for demanding solar applications: from no load to 100% load
- Match inverter kW; no oversizing required
- Fast payback and low lifecycle cost
- Performance guarantee – 32 Years

¹ U.S. Department of Energy, 10 CFR Part 431, [Docket No. EERE-2010-BT-STD-0048] Energy Conservation Program: Energy Conservation Standards for Distribution Transformers; Final Rule, April 18, 2013

TECHNICAL SPECIFICATIONS

OPAL SOL is an ultra-efficient low-voltage dry-type isolation transformer with a common-core, 10kV BIL, 200% rated neutral, built to NEMA ST-20, UL1561 and other applicable ANSI and IEEE standards, and is cULus Listed and CSA Efficiency Verified. All OPAL SOL models come standard in a TYPE 2 ventilated drip-proof indoor enclosure made of heavy gauge steel finished with epoxy powder coating for durability and low environmental impact. Outdoor TYPE 3 enclosures are also available. Both primary and secondary terminals and voltage taps (typically six 2.5%) are readily accessible by removing the front enclosure panel. The OPAL SOL is UL Listed for 2" clearance for ventilated openings - a significant improvement over the typical industry 6" limit. The 220°C class insulation system is NOMEX-based with an Epoxy Co-polymer impregnant with technical performance characteristics that embed lower environmental impact, long term reliability and long-life expectancy.

OPAL SOL MODELS

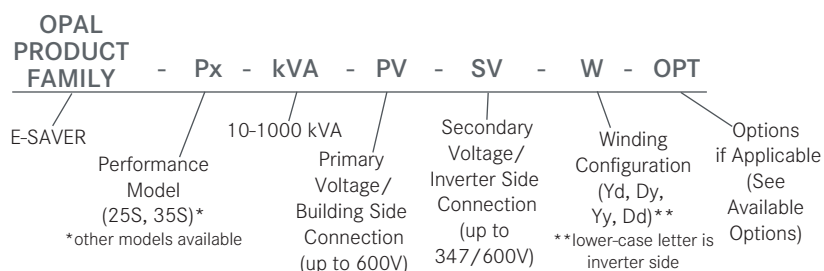
Model*	Winding Material	Temperature Rise	Estimated Savings vs. DOE2016
25S	Aluminum	115°C	25%
35S	Copper	80°C	35%

*The number designation represents the average savings compared to a DOE 2016 transformer. The 'S' designates solar optimization. The savings estimate is based on Southern California latitude and 10-15% solar array oversizing for extended peak power delivery.

WINDING CONFIGURATIONS

E-Saver-SOL is available in a variety of winding configurations: building side delta to inverter-side 4-wire grounded wye (Dy), building-side 3-wire wye to inverter-side 4-wire grounded wye (Yy) in configurations.

ORDERING INFORMATION



TECHNICAL DATA

kVA	Impedance (%Z)	CU Model Weight (lbs)	Standard Case Size (in)
15	3.2-4.5	250-325	A (18W x 17D x 27H)
20	3.2-4.5	275-375	B (26W x 18D x 30H)
25	3.2-4.5	300-400	B (26W x 18D x 30H)
30	3.2-4.5	350-425	B (26W x 18D x 30H)
45	3.2-4.5	450-550	B (26W x 18D x 30H)
50	3.2-4.5	500-600	C (32W x 22D x 40H)
63	3.2-4.5	550-650	C (32W x 22D x 40H)
75	3.2-4.5	675-800	C (32W x 22D x 40H)
100	3.2-4.5	775-975	C (32W x 22D x 40H)
112.5	3.2-4.5	875-1100	C (32W x 22D x 40H)
125	3.2-4.5	1000-1250	D (38W x 27D x 48H)
150	3.2-4.5	1150-1400	D (38W x 27D x 48H)
175	3.2-4.5	1250-1500	D (38W x 27D x 48H)
200	3.2-4.5	1325-1600	D (38W x 27D x 48H)
225	3.2-4.5	1400-1750	D+ (38W x 32D x 52H)
250	3.2-4.5	1550-1850	D+ (38W x 32D x 52H)
300	3.2-4.5	1700-2150	D+ (38W x 32D x 52H)
400	3.2-4.5	2200-2650	E+ (52W x 38D x 61H)
450	3.2-4.5	2500-2900	E+ (52W x 38D x 61H)
500	3.2-4.5	2750-3350	E+ (52W x 38D x 61H)
600	3.2-4.5	3000-3800	F (64W x 47D x 67H)
750	3.2-4.5	3550-4350	F (64W x 47D x 67H)
850	3.2-4.5	4100-4800	F+ (64W x 53D x 67H)
1000	3.2-4.5	4700-5700	F+ (64W x 53D x 67H)

AVAILABLE OPTIONS

Metering: Express Logger™, SMART™ or Cyberhawk TX™ (See product cut sheets for more info)

N3R: NEMA 3R, ventilated enclosure

N2S: Indoor sprinkler proof enclosure

OSEC: Enclosure for outdoor public areas

OV: Enclosure for outdoor secure areas

IRP: Rotatable IR Port™

IRG: Fixed IR Grill

HD: Hinged Door

1S: Single electrostatic shield

2S: Dual electrostatic shields

3S: Triple electrostatic shields

SPD: (120/208 V OR 277/480V)

PRO80: 80kA, 7 mode, Filter

PRO120: 120kA, 7 mode, Filter

PRO200: 200kA, 7 mode, Filter

PRO240: 240kA, 7 mode Filter

PROXX: Where XX is custom ID

LKS: Lug kit, screw-type

LKC: Lug kit, compression type

LI: Low inrush

COL: Custom color

TS: Thermal sensors at 170°C and 200°C

SE: Sensitive environment, extra low noise

SB: Seismic bracing

(Contact Powersmiths for seismic certification details)

IMP: Custom Impedance

RTR: Routine Test Report

2016TR: DOE 2016 Test Report

NOTE: The above data applies to the standard configuration of each kVA. Selection of some options may change enclosure size and/or transformer weight. Consult factory for detailed product data sheet for these and other configurations.

Technical specifications subject to change without notice.

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T1000 OPAL™ Series

HARMONIC MITIGATING TRANSFORMER OPTIMIZED FOR 30% LESS LOSSES THAN DOE2016 WHILE DELIVERING IMPROVED POWER QUALITY IN HARMONIC-RICH ENVIRONMENTS

APPLICATION

The OPAL™ Series T1000-30H™ model is an ultra-efficient dry-type low-voltage harmonic mitigating isolation transformer that delivers an average of 30% less losses than a comparable U.S. DOE 2016 transformer, under a heavy harmonic-rich load. T1000-30H is optimized to reduce voltage distortion in harmonic-rich environments.

KEY PERFORMANCE CHARACTERISTICS

OPAL-T1000™ transformers treat the 3rd harmonic through secondary flux cancellation and reduce fundamental current imbalance. Unlike delta-wye transformers, OPAL-T1000 windings are configured such that 3rd and other zero sequence currents in the transformer do not couple into the primary winding. 5th and 7th harmonics are treated on a system basis at the common point upstream, by alternating phase-shifted models.

DOE 2016 IDENTIFIES BILLIONS IN SAVINGS BEYOND NEW LEGAL MINIMUM & POWERSMITHS OPAL™ DELIVERS

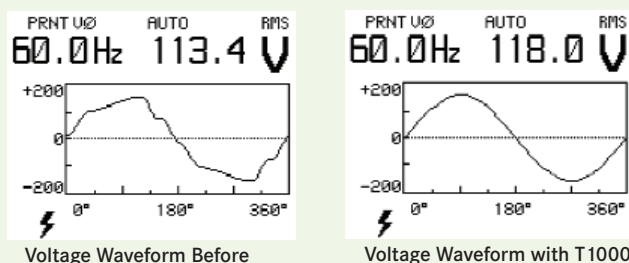
Most manufacturers have designed their low-voltage transformers to just meet the new U.S. Dept. of Energy law (DOE 2016), setting minimum efficiency at a single required 35% load point, under an ideal sine wave factory test profile, sacrificing performance elsewhere. The DOE quantifies savings for going beyond DOE 2016 in billions of dollars. Furthermore, the DOE states that lifecycle savings can be maximized by optimizing for real-world loading. Powersmiths OPAL™ - Optimized Performance of the Application Load enables customers to access these savings – backed by real-world performance verification.

OPAL™ - OPTIMIZED PERFORMANCE FOR THE APPLICATION LOAD

To achieve these savings, Powersmiths developed and implemented a design best practice called OPAL™ - Optimized Performance for the Application Load. Recognizing that the transformer has much more impact in an electrical system than just efficiency, OPAL considers the system as a whole, including goals like managing impedance, arc flash, fault level, inrush, harmonics, and more. OPAL is possible thanks to the tight feedback loop between design, onsite manufacturing, and extensive ongoing real world operating performance verification.

EXPANDED KVA SELECTION ENABLES RIGHT-SIZING

Powersmiths enables right-sizing of electrical infrastructure by offering a much broader selection of transformer kVA sizes. The capital cost, operating cost and footprint reductions can be dramatic – on the order of 30-50%, through smaller transformers, breakers, conductors, and distribution panels.



75kVA T1000-30H™ shown with Cyberhawk TX™, hinged door and Rotatable IR Port™

RETROFIT CONSIDERATIONS

Powersmiths' flexible design and manufacturing process removes the many barriers associated with replacing an existing transformer, including footprint, impedance, internal terminal layout, inrush, fault and arc flash levels.

GUARANTEED PERFORMANCE FOR 32 YEARS

In a world filled with small print disclaimers and limited DOE compliance testing, you can count on Powersmiths performance because we guarantee that every transformer we manufacture meets our published technical data, and furthermore that this performance is met over the full term of our 32-year pro-rated warranty. Being able to trust that savings are both real and long-term is part of why organizations choose Powersmiths.

ENVIRONMENTAL/GREEN BUILDING/LEED®/NET ZERO

By going meaningfully beyond the DOE 2016 baseline efficiency, the T1000 contributes to green building, LEED®, Net Zero and carbon footprint reduction goals. Additional benefits include our ISO14001 certified manufacturing, integrated metering and ability to integrate with the Powersmiths WOW™ Sustainability Management Platform.

CERTIFICATIONS & TESTING

Powersmiths certifications include ISO 9001 (Quality), ISO 14001 (Environment), ISO 17025 (Efficiency Test Lab), UL and CSA. In addition to standard industry tests, Powersmiths has a production-integrated nonlinear load test program that enables efficiency verification comparable to real-world conditions, as well as IPMVP compliant field measurement of losses and efficiency.

METERING & ARC FLASH OPTIONS

Integrated metering can provide information about capacity utilization, load profiles, power quality and energy use. The lockable hinged door option as well as our patented Rotatable IR Port™ option enable quick, safe access to internal transformer connections, which reduces arc flash risk. Powersmiths also offers transformers with Integrated Breakers, for details refer to Energy Station TX™ product information.

KEY FEATURES

- Powersmiths OPAL™ - Optimized Performance for the Application Load
- Significant energy savings beyond U.S. DOE 2016
- Harmonic mitigation with proven power quality and efficiency improvement in harmonic-rich, heavy load environments
- Avoids expensive changes to the electrical system from traditional high efficiency issues like high inrush, low impedance, increased fault and arc flash levels
- Available with wide range of safety & performance features like integrated hinged door, 360° Rotatable IR Port™, Metering & Logging
- Manufactured in a certified ISO 9001, ISO 14001 and ISO 17025 facility for quality, low environmental impact, and transformer efficiency testing

¹ U.S. Department of Energy, 10 CFR Part 431, [Docket No. EERE-2010-BT-STD-0048] Energy Conservation Program: Energy Conservation Standards for Distribution Transformers; Final Rule, April 18, 2013.

TECHNICAL SPECIFICATIONS

The T1000-30H™ is an ultra efficient harmonic mitigating dry-type low-voltage isolation transformer that meaningfully exceeds the U.S. Dept. of Energy's new minimum efficiency law, commonly referred to as DOE 2016. It is optimized to maximize energy savings and electrical system compatibility in heavily loaded harmonic-rich applications, where it delivers an average of 30% savings compared to a comparable DOE 2016 transformer.

T1000-30H is copper-wound, has a 105°C operating temperature rise, a 120% continuous duty overload capacity, is K-20 rated per C57.110 (K-13 for 400kVA and larger), has a common-core, 10kV BIL, 200% rated neutral, is 60Hz rated (std), built to NEMA ST-20 and other applicable ANSI and IEEE standards, and is UL Listed, CSA Approved. Both primary and secondary terminals and voltage taps (typically six 2.5%) are all front-accessible. The T1000-30H has a 220°C class insulation system that is NOMEX-based with an Epoxy Co-polymer impregnant with technical performance characteristics that embed lower environmental impact, long term reliability and long life expectancy. The T1000-30H carries OSHPD and IBC Seismic Certification. The seismic bracing option provides a higher 2.28g certification. The T1000-30H comes standard in a Type 2 ventilated drip-proof indoor enclosure made of heavy gauge steel finished with epoxy powder coating for durability and low environmental impact, which is UL Listed for 2" rear clearance - a significant improvement over the typical industry 6" limit. A wide variety of enclosures and options are available.

Low Noise: Keeping audible noise at a minimum is key. While the NEMA ST-20 standard sets levels referenced by industry, only a type test is required - so transformers on actual projects may be noisy. NEMA ST-20 also allows K-13 transformers to be even noisier. Powersmiths builds 3dB quieter than NEMA standard values, and 6dB quieter than the K-13 allowance. Furthermore, every unit is tested to ensure quiet operation. For very sensitive environments an additional 2dB lower noise option is available.

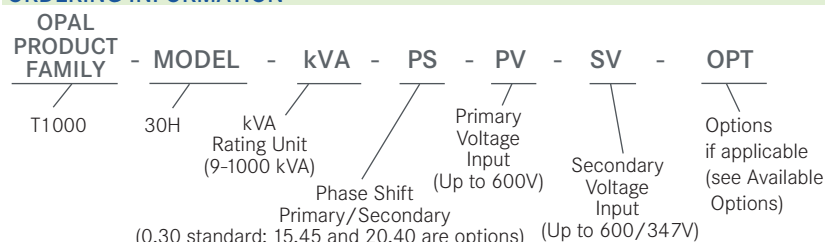
Electrostatic Shield Comes Standard: The T1000-30H comes standard with a single full-length copper electrostatic shield for high frequency noise attenuation. Dual and triple shields are available options. See technical data sheets and app note for comprehensive information.

Management of Impedance, Inrush, Fault Level, Arc Flash: Powersmiths OPAL™ design best practice includes addressing key transformer attributes like impedance, inrush, fault level, arc flash, to ensure smooth integration into an electrical system, avoiding the negative impacts often associated with higher efficiency. See individual technical data sheets for comprehensive values for all parameters.

Impedance: Impedance for the T1000-30H is kept at or above 3.8% in order to manage downstream fault current and arc flash levels, and stay within capacity (kAIC) ratings. Higher impedance is available to meet specific project needs.

Inrush: Inrush currents are managed in order to avoid nuisance tripping of the primary breaker and to enable design engineers to use standard 125% rated primary protection, thereby avoiding expensive design changes that otherwise may be needed. Very low inrush designs are available as specific projects may require, for example some datacenter and medical applications.

ORDERING INFORMATION



TECHNICAL DATA

kVA	Audible Noise	Model Weight Range (lbs)	Standard Case Size (in)
15	42 dB	275-325	17.5W x 17D x 27.5H
20	42 dB	325-375	25.5W x 18D x 30H
25	42 dB	350-400	25.5W x 18D x 30H
30	42 dB	375-420	25.5W x 18D x 30H
45	42 dB	500-550	25.5W x 18D x 30H
50	42 dB	550-600	31.5W x 21.5D x 40H
63	47 dB	600-650	31.5W x 21.5D x 40H
75	47 dB	725-800	31.5W x 21.5D x 40H
100	47 dB	875-975	31.5W x 21.5D x 40H
112	47 dB	1000-1100	31.5W x 21.5D x 40H
125	47 dB	1150-1250	37.5W x 26.5D x 48H
150	47 dB	1300-1400	37.5W x 26.5D x 48H
175	52 dB	1400-1500	37.5W x 26.5D x 48H
200	52 dB	1500-1600	37.5W x 26.5D x 48H
225	52 dB	1600-1750	37.5W x 31.5D x 52H
250	52 dB	1750-1850	37.5W x 31.5D x 52H
300	52 dB	2000-2150	37.5W x 31.5D x 52H
400	57 dB	2500-2650	51.5W x 38D x 61H
450	57 dB	2750-2900	51.5W x 38D x 61H
500	57 dB	3150-3350	51.5W x 38D x 61H
600	59 dB	3650-3800	64W x 47D x 67H
750	61 dB	4150-4350	64W x 47D x 67H
850	61 dB	4400-4800	contact factory
1000	61 dB	4900-5300	contact factory

NOTE: The above data applies to the standard configuration of each kVA. Selection of some options may change enclosure size and/or transformer weight. Some options may be mutually exclusive. Consult factory for detailed product data sheet for these and other configurations. Efficiencies tested according to U.S. Dept. of Energy's 10 CFR Part 431, a linear load test at 35% of nameplate capacity. Refer to technical data sheet for comprehensive information for each specific model, kVA, and option selected.

As design optimization is continuous, technical data is updated over time. Please check with Powersmiths for latest revision.

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POWERSMITHS

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AVAILABLE OPTIONS

Metering: Express Logger™, SMART™ or Cyberhawk TX™ (see product cut sheets for details)

CC: Core & Coils available for OEM Integration

3R: Type 3R, sprinkler proof/ outdoor ventilated enclosure

OSEC: Enclosure for outdoor public areas

SS: Painted stainless steel enclosure

NVI: Non-ventilated indoor enclosure

IRP: 360° Rotatable IR Port™

HD: Hinged Door

F50: 50 Hz design

2S: Dual electrostatic shields

3S: Triple electrostatic shields

SPD: (120/208 V OR 277/480V)

PRO80: 80kA, 7 mode, Filter

PRO120: 120kA, 7 mode, Filter

PRO200: 200kA, 7 mode, Filter

PRO240: 240kA, 7 mode Filter

PROXX: Where XX is custom ID

LKS: Lug kit, screw-type

LKC: Lug kit, compression type

LI: Custom Inrush

IMP: Custom Impedance

COL: Custom color

TS: Thermal sensors at 170°C and 200°C

RTR: Routine Test Report

NLT: Nonlinear Load Test with Certificate

2016TR: DOE 2016 Test Report

CTL: ISO 17025 Certified Test Lab, load profile test

SE: Sensitive environment, extra low noise

SB: Certified Seismic Bracing for 2.28g

(for Certificate details contact Powersmiths)

WM: Wall-mount kit up to 75kVA is available (sold separately)

OPAL™ – EV Series

HIGH PERFORMANCE TRANSFORMERS OPTIMIZED FOR ELECTRIC VEHICLE CHARGING APPLICATIONS, WITH A POTENTIAL TO FACILITATE 15% FASTER CHARGING

APPLICATION

The OPAL™ – EV Series (Models 240V & 208V) are ultra-efficient low-voltage dry-type isolation transformers optimized specifically for feeding Level 2 Electric Vehicle (EV) Charger applications, where loading varies from many hours of idling, to periods of heavy demand.

KEY PERFORMANCE CHARACTERISTICS

The OPAL-EV design delivers top performance for EV Charger applications. Features include from minimizing idling losses when there are no cars charging, to leading efficiency under heavy charging load, as well as the rapidly fluctuating loads in between. Powersmiths leverages its design best practice called OPAL – Optimized Performance for the Application Load, which in addition to efficiency optimization, considers the system as a whole, including load profile, impedance, arc flash, fault level, inrush, harmonics, and more. One of the achievements is very quiet operation – which can be an important consideration. Verified Performance is achieved by tight feedback loop between design, onsite manufacturing, and extensive real-world testing.

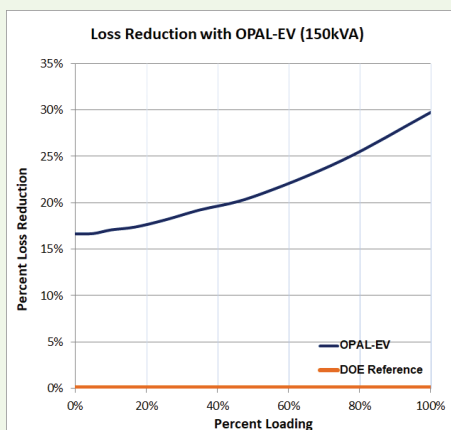
NET ZERO & LEED® CONTRIBUTIONS

OPAL-EV Series transformers makes several meaningful contributions to both Net Zero Energy and LEED objectives. These buildings benefit from choosing OPAL-EV transformers that deliver:

- **Significantly lower operating losses.** Compared to industry standard transformers, OPAL-EV reduces losses 15-30% (depending on operating conditions), helping to drive down building energy consumption, resulting in reduced renewable energy offset requirements.
- **Integrated energy metering/logging options.** Since the EV energy is used offsite, this option enables EV Charger energy use to be subtracted from the overall NET ZERO energy building calculation. Tracking this translates into a smaller required capacity and lower cost of renewables to meet Net Zero.

POWERSMITHS WOW™ Sustainability Management Platform

The WOW platform is a natural fit with the OPAL-EV as WOW's education and outreach component combines animations and other visuals with real-time data showing the contribution of the Electric Vehicles to the sustainability objectives of the organization. For more information see Powersmiths WOW™ product information or contact us.



OPAL-EV model with Input Breaker Option

MODEL ADVANTAGES

OPAL-EV 240V

Dedicated transformer for feeding charging stations, with potential for 15% faster charging. The OPAL-EV 240V model is optimized for applications where there is a dedicated transformer feeding multiple EV Charging Stations. The 15% faster charging time is a result of feeding the many current-limited (30A) 'Level 2' chargers at 240V instead of 208V.

This opportunity exists because charging station manufacturers build a single product to be compatible with both residential (240V) and non-residential (typically 208V) installations. For non-residential applications, the traditional distribution transformer is 3-phase 480V input, 208/120V output throughout the building, so using the same 208/120V model for the charging station is the typical design approach.

With the OPAL-EV 240V model, the charging stations are fed at 240V instead of the typical 208V. Since the same amps at higher voltage delivers proportionally more power, this secures a faster charging time for current limited chargers.

Even if none of the 'Level 2' charging stations are current limited, the load compatibility and the ongoing OPAL-EV energy savings are always there.

OPAL-EV 208V

Transformer for feeding mixed load applications (feeding EV charging stations + other loads). In some applications, typically those with fewer charging stations, the transformer that feeds the charging stations also feeds other loads. Since these other loads will typically be a combination of 120V and 208V equipment, the OPAL-EV 208V model matches this application requirement by providing a 208/120V output, while significantly reducing losses associated with feeding the fluctuating mixed load profile

INTEGRATED OPTIONS

Powersmiths offers many integrated options, all with Arc Flash safety in mind, such as lockable hinged doors, integrated metering and meter ports to provide information about capacity utilization, load profiles, power and energy use, and a patented Rotatable IR Port™ to enable safe, quick, cost-effective and non-invasive thermal imaging of the live transformer.

KEY FEATURES

- Minimizes building energy waste
- Reduces renewable energy requirement in Net Zero projects
- Optional EV charger energy tracking
- Potential for 15% faster charging with OPAL – EV 240V*
- Low lifecycle cost
- Performance guarantee – 32 Years

*See 'Model Advantages - OPAL-EV 240V'

TECHNICAL SPECIFICATIONS

OPAL-EV is a dry-type isolation transformer with a common-core, 10kV BIL, 200% rated neutral, built to NEMA ST-20, UL 1561 and other applicable ANSI and IEEE standards, and is cULus Listed and CSA Efficiency Verified. OPAL-EV models come standard in a NEMA 1 ventilated, drip-proof, indoor, steel enclosure finished with polyester powder coating for durability and low environmental impact. Other enclosures options are available. Both primary and secondary terminals and voltage taps (typically six 2.5%) are readily accessible by removing the front enclosure panel. OPAL-EV is UL Listed for 2" clearance for ventilated openings - a significant improvement over the typical industry 6" limit. OPAL-EV's 220°C class insulation system is NOMEX-based with an Epoxy Co-polymer impregnate with technical performance characteristics that embed lower environmental impact, long-term reliability and long-life expectancy.

Low Noise: Keeping audible noise at a minimum is key, yet NEMA ST20 only calls for a type test, not a production test, so transformers on your project may be noisy. NEMA ST-20 also allows K13 transformers to be even noisier. Powersmiths builds 3dB quieter than NEMA standard values, and 6dB quieter than the K13+ allowance. Furthermore, every unit is tested to ensure quiet operation. For very sensitive environments, an additional 2dB lower noise option is available.

The OPAL-EV delivers typically operational savings of 25% compared to a DOE 2016 transformer.

OPAL-EV has a delta-wye configuration, copper primary-aluminum secondary windings and comes with a K13 rating and low 105°C temperature rise.

SUSTAINABILITY, CERTIFICATIONS & TESTING

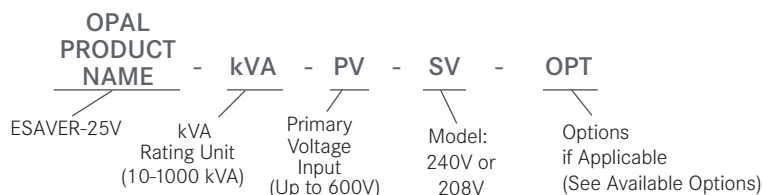
Sustainable design is evident in the substantial reduction in energy losses compared to legislation, backed by our ISO 14001 certified Environmental Management System superior epoxy co-polymer impregnate with lower emissions during manufacturing and longer life, and innovative recyclable product packaging. Our pursuit of excellence is shown in our manufacturing quality (ISO 9001), and ISO 17025 Efficiency Test Lab Certification.

32-YEAR PERFORMANCE GUARANTEE

EFFICIENCY & LOSSES: Powersmiths guarantees that ALL units meet or exceed the performance levels listed in their technical data sheets for 32-years.

SEISMIC: Powersmiths warrants the unit will remain functional after a seismic event up to rated severity.

ORDERING INFORMATION



TECHNICAL DATA

kVA	Audible Noise	33L, 20M, 25H Model Weight Range (lbs)	Standard Case Size (in)
15	42 dB	260-340	17.5W x 17D x 27.5H
20	42 dB	300-380	25.5W x 18D x 30H
25	42 dB	340-420	25.5W x 18D x 30H
30	42 dB	380-470	25.5W x 18D x 30H
45	42 dB	490-590	25.5W x 18D x 30H
50	42 dB	540-600	31.5W x 21.5D x 40H
63	47 dB	600-720	31.5W x 21.5D x 40H
75	47 dB	650-800	31.5W x 21.5D x 40H
100	47 dB	800-900	31.5W x 21.5D x 40H
112	47 dB	900-1000	31.5W x 21.5D x 40H
125	47 dB	1050-1150	37.5W x 26.5D x 48H
150	47 dB	1170-1300	37.5W x 26.5D x 48H
175	52 dB	1260-1450	37.5W x 26.5D x 48H
200	52 dB	1375-1550	37.5W x 26.5D x 48H
225	52 dB	1500-1700	37.5W x 31.5D x 52H
250	52 dB	1650-1850	37.5W x 31.5D x 52H
300	52 dB	1850-2000	37.5W x 31.5D x 52H
400	57 dB	2150-2350	51.5W x 38D x 61H
450	57 dB	2400-2650	51.5W x 38D x 61H
500	59 dB	2800-3000	51.5W x 38D x 61H
600	59 dB	3500-3800	64W x 47D x 67H
750	61 dB	4000-4300	64W x 47D x 67H
850	61 dB	4300-4850	64W x 47D x 67H
1000	61 dB	4800-5500	64W x 53D x 67H

AVAILABLE OPTIONS

Metering: Express Logger™, SMART™ or Cyberhawk TX™ (See product cut sheets for more info)

N3R: NEMA 3R, ventilated enclosure

N2S: Indoor sprinkler proof enclosure

OSEC: Enclosure for outdoor public areas

OV: Enclosure for outdoor secure areas

IRP: Rotatable IR Port™

HD: Hinged Door

1S: Single electrostatic shield

2S: Dual electrostatic shields

3S: Triple electrostatic shields

SPD: (120/208 V OR 277/480V)

PRO80: 80kA, 7 mode, Filter

PRO120: 120kA, 7 mode, Filter

PRO200: 200kA, 7 mode, Filter

PRO240: 240kA, 7 mode Filter

PROXX: Where XX is custom ID

LKS: Lug kit, screw-type

LKC: Lug kit, compression type

LI: Low inrush

COL: Custom color

TS: Thermal sensors at 170°C and 200°C

SE: Sensitive environment, extra low noise

SB: Seismic bracing

(Contact Powersmiths for seismic certification details)

IMP: Custom Impedance

RTR: Routine Test Report

2016TR: DOE 2016 Test Report

CU: Copper windings



Charge EVs using 'Level 2' chargers up to 15% faster with OPAL-EV 240V

NOTE: The above data applies to the standard configuration of each kVA. Selection of some options may change enclosure size and/or transformer weight. Consult factory for detailed product data sheet for these and other configurations. Efficiencies tested according to U.S. Dept. of Energy's 10 CFR Part 431, a linear load test at 35% of nameplate capacity.

Technical specifications subject to change without notice.

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