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.

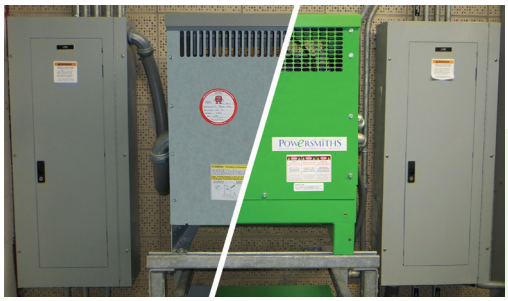
DOE IDENTIFIES BILLIONS IN SAVINGS BEYOND DOE 2016

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.

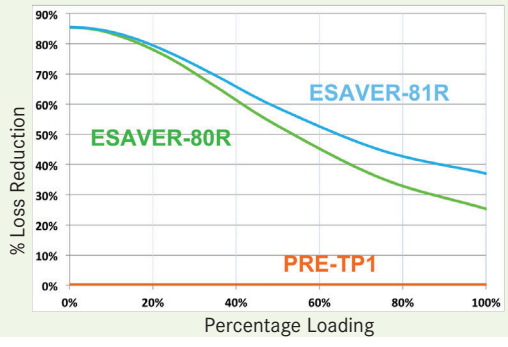
CERTIFICATIONS & TESTING

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

[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.

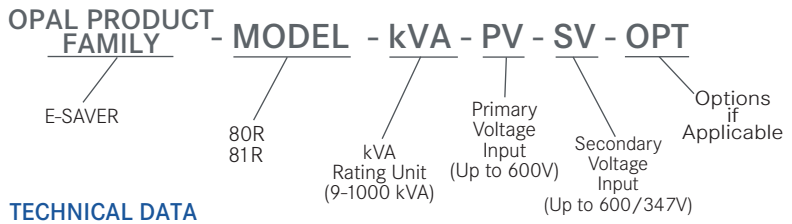
Low Noise: Keeping audible noise at a minimum is key. While the NEMA ST-20 standard sets levels referenced by industry only a type test, not a production test, is required – so transformers on actual projects may be noisy. Powersmiths builds 3dB quieter than NEMA standard values, and furthermore every 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

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

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.

POWERSMITHS

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