

Sound Source #	Noise Level at 3 meters
(4) SMA PEAK3 125 kW String Inverters	55.5
(3) 167 kVA Eaton Pole Mounted Transformers	55.0

*SMA specifies the units peak noise level as <65 dBa measured at 1 meter.*

*Eaton documents that the 167 kVA pole-mounted transformer produces a sound level of 55 dBa or less at 3 meters. (per NEMA-ST-20)*

**Formulas used for Calculations**

**Adding of Noise Levels**

$$L_T = 10 \times \log_{10} (10^{L_1/10} + 10^{L_2/10} + \dots + 10^{L_n/10})$$

Where:

L<sub>T</sub> = Total noise level of all equipment

L<sub>n</sub> = Noise level for each piece of equipment

**Noise Level Changes with Distance**

$$L_b = L_a - 20 \times \log_{10} (D_b/D_a)$$

Where:

L<sub>b</sub> = Noise level at new distance

L<sub>a</sub> = Noise level at original distance

D<sub>b</sub> = New distance from source of noise

D<sub>a</sub> = Original distance from source of noise

Receptor	Estimated Noise Level Based on Project Components (Sound Pressure, dBa)
Closest residence to project	39.1

	<p align="center"><b>DAYTIME FULL OPERATION SOUND LEVEL PLAN</b></p>	Project: Warren Switch (Labas)	<p>Plan ID:  DayTime</p>
		Location: Richville Road	
	<p align="center"><b>Basic Sound Level Estimates for Noise Produced by Transformers and Inverters</b></p>	Manchester VT 05255	Scale: N/A
			Date: 4/20/2020

**Richville Road - Manchester, Vermont - Nighttime**

Sound Source #	Noise Level at 3 meters
(3) 167 kVA Eaton Pole Mounted Transformer	55.0

*Eaton documents that the 167 k VA pole-mounted transformer produces a sound level of 55 dBa or less at 3 meters. (per NEMA-ST-20)*

**Formulas used for Calculations**

**Adding of Noise Levels**

$$L_T = 10 \times \text{Log}_{10} (10^{L_1/10} + 10^{L_2/10} + \dots + 10^{L_n/10})$$

Where:

L<sub>T</sub> = Total noise level of all equipment

L<sub>n</sub> = Noise level for each piece of equipment

**Noise Level Changes with Distance**

$$L_b = L_a - 20 \times \text{Log}_{10} (D_b/D_a)$$

Where:

L<sub>b</sub> = Noise level at new distance

L<sub>a</sub> = Noise level at original distance

D<sub>b</sub> = New distance from source of noise

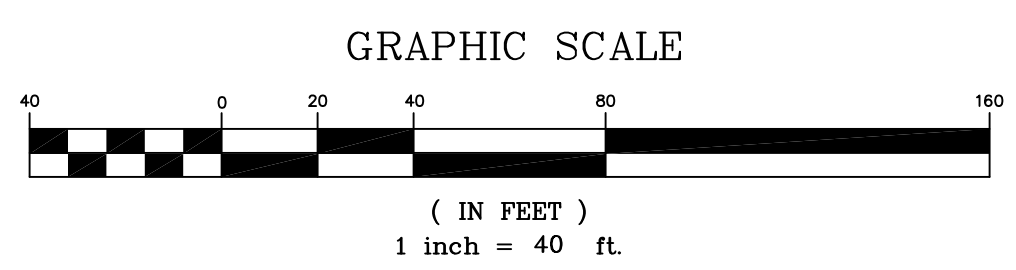
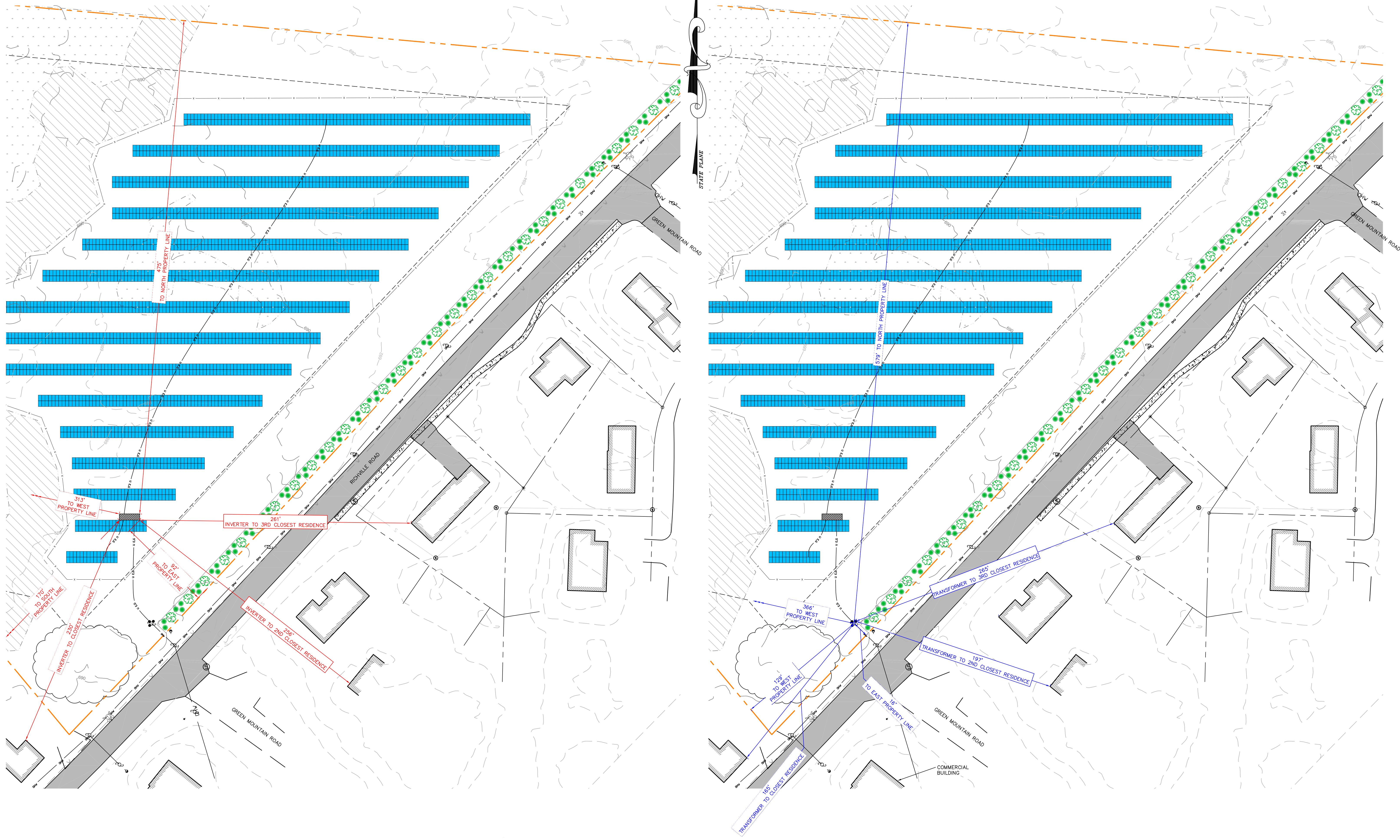
D<sub>a</sub> = Original distance from source of noise

Receptor	Estimated Noise Level Based on Project Components (Sound Pressure, dBa)
Closest residence to project	37.4

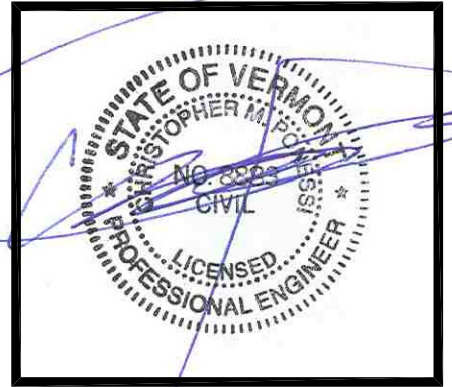
**NOTE:**

Site inverters do not operate at night. For this calculation we assume they will make no noise.

	<b>NIGHTTIME OPERATION SOUND LEVEL PLAN</b>	Project: Warren Switch (Labas)	<b>Plan ID: NightTime</b>
		Location: Richville Road, Manchester VT 05255	
	<b>Basic Sound Level Estimates for Noise Produced by Transformers</b>		Scale: N/A
			Date: 4/27/2020



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rev.	date	description

**MHG SOLAR LLC**  
**PROPOSED 500 KW SOLAR PROJECT**  
**RICHVILLE ROAD SOLAR PROJECT**  
**SOUND ASSESSMENT SITE PLAN**  
 TOWN OF MANCHESTER, BENNINGTON COUNTY, VERMONT

drawn CMP	checked JSW
date 5/15/20	scale 1"=40'
project no. 19-103VT	sheet no. SP-4

## Daytime

### 2nd Nearest House

Noise Level Change with Distance

	Tranformers			Inverters										
	A	B	C	1	2	3	4	5	6	7	8	9	10	
La (Db	55	55	55	55.5	55.5	55.5	55.5							
Db (feet)	197	197	197	256	261	266	271							
Da (feet)	3.28	3.28	3.28	3.28	3.28	3.28	3.28							
LB	19.4	19.4	19.4	17.7	17.5	17.3	17.2							

Adding of Noise Levels

LN	19.4	19.4	19.4	17.7	17.5	17.3	17.2							
$10^{(L1.../10)}$	87.71	87.71	87.71	58.28	56.06	53.98	52.00							
<b>LT (dB)</b>	<b>26.8</b>													

### Nearest House

Noise Level Change with Distance

	Tranformers			Inverters										
	A	B	C	1	2	3	4	5	6	7	8	9	10	
La (Db	55	55	55	55.5	55.5	55.5	55.5							
Db (feet)	129	129	129	230	231	232	233							
Da (feet)	9.84	9.84	9.84	9.84	9.84	9.84	9.84							
LB	32.7	32.7	32.7	28.1	28.1	28.1	28.0							

Adding of Noise Levels

LN	32.7	32.7	32.7	28.1	28.1	28.1	28.0							
$10^{(L1.../10)}$	1840.91	1840.91	1840.91	649.77	644.15	638.61	633.14							
<b>LT (dB)</b>	<b>39.1</b>													

## Nighttime

### 2nd Nearest House

Noise Level Change with Distance

	Tranformers			Inverters										
	A	B	C	1	2	3	4	5	6	7	8	9	10	
La (Db)	55	55	55											
Db (feet)	197	197	197	256	261	266	271							
Da (feet)	9.84	9.84	9.84	3.28	3.28	3.28	3.28							
LB	29.0	29.0	29.0	-37.8	-38.0	-38.2	-38.3							

Adding of Noise Levels

LN	29.0	29.0	29.0	-37.8	-38.0	-38.2	-38.3							
10 <sup>^(L1/10)</sup>	789.37	789.37	789.37	0.00	0.00	0.00	0.00							
<b>LT (dB)</b>	<b>33.7</b>													

### Nearest House

Noise Level Change with Distance

	Tranformers			Inverters										
	A	B	C	1	2	3	4							
La (Db)	55	55	55											
Db (feet)	129	129	129	230	231	232	233							
Da (feet)	9.84	9.84	9.84	3.28	3.28	3.28	3.28							
LB	32.7	32.7	32.7	-36.9	-37.0	-37.0	-37.0							

Adding of Noise Levels

LN	32.7	32.7	32.7	-36.9	-37.0	-37.0	-37.0							
10 <sup>^(L1/10)</sup>	1840.91	1840.91	1840.91	0.00	0.00	0.00	0.00							
<b>LT (dB)</b>	<b>37.4</b>													



# SUNNY HIGHPOWER PEAK3 125-US / 150-US

SHP 125-US-20 / SHP 150-US-20



## Cost effective

- Modular architecture reduces BOS and maximizes system uptime
- Compact design and high power density maximize transportation and logistical efficiency

## Maximum flexibility

- Scalable 1,500 VDC building block with best-in-class performance
- Flexible architecture creates scalability while maximizing land usage

## Simple install, commissioning

- Ergonomic handling and simple connections enable quick installation
- Centralized commissioning and control with SMA Data Manager

## Highly innovative

- SMA Smart Connected reduces O&M costs and simplifies field-service
- Powered by award winning ennexOS cross sector energy management platform

## SUNNY HIGHPOWER PEAK3 125-US / 150-US

A superior modular solution for utility power plants

The new Sunny Highpower PEAK3 is SMA's latest addition to a comprehensive portfolio of utility solutions. This 1,500 VDC inverter offers high power density in a modular architecture that achieves a cost-optimized solution for utility-scale PV integrators. With fast, simple installation and commissioning, the Sunny Highpower PEAK3 is accelerating the path to energization. SMA has also brought its field-proven Smart Connected technology to the PEAK3, which simplifies O&M and contributes to lower lifetime service costs. The PEAK3 utility system solution is powered by the ennexOS cross sector energy management platform, 2018 winner of the Intersolar smarter E AWARD.

Technical Data *	Sunny Highpower PEAK3 125-US	Sunny Highpower PEAK3 150-US
<b>Input (DC)</b>		
Maximum array power	187500 Wp STC	225000 Wp STC
Maximum system voltage	1500 VDC	
MPP voltage range	710 V ... 1425 V	855 V ... 1425 V
MPP trackers	1	
Maximum operating input current	180 A	
Maximum input short-circuit current	325 A	
<b>Output (AC)</b>		
Nominal AC power	125000 W	150000 W
Maximum apparent power	125000 VA	150000 VA
Output phases / line connections	3 / 3-PE	
Nominal AC voltage	480 V	600 V
Compatible transformer winding configuration	Wye-grounded	
Maximum output current	151 A	
Rated grid frequency	60 Hz	
Grid frequency / range	50 Hz, 60 Hz / -6 Hz ... +6 Hz	
Power factor at rated power / adjustable displacement	1 / 0.0 leading ... 0.0 lagging	
Harmonics (THD)	<3%	
<b>Efficiency</b>		
CEC efficiency (preliminary)	98.5 %	98.5 %
<b>Protection and safety features</b>		
Ground fault monitoring: Riso / Differential current	● / ●	
DC reverse polarity protection	●	
AC short circuit protection	●	
Monitored surge protection (Type 2): DC / AC	● / ●	
Protection class / overvoltage category (as per UL 840)	I / IV	
<b>General data</b>		
Device dimensions (W / H / D)	770 / 830 / 444 mm (30.3 / 32.7 / 17.5 in.)	
Device weight	85 kg (185 lbs)	
Operating temperature range	-25°C ... +60°C (-13°F ... +140°F)	
Storage temperature range	-40°C ... +70°C (-40°F ... +158°F)	
Audible noise emission (full power @ 1m and 25°C)	< 65 dB(A)	
Internal consumption at night	< 5 W	
Topology	Transformerless	
Cooling concept	OptiCool (forced convection, variable speed fans)	
Enclosure protection rating	Type 4X (as per UL 50E)	
Maximum permissible relative humidity (non-condensing)	100%	
<b>Additional information</b>		
Mounting	Rack mount	
DC connection	Terminal lugs - up to 600 kcmil CU/AL	
AC connection	Screw terminals - up to 300 kcmil CU/AL	
LED indicators (Status/Fault/Communication)	●	
SMA Speedwire (Ethernet network interface)	● (2 x RJ45 ports)	
Data protocols: SMA Modbus / SunSpec Modbus / Webconnect	● / ● / ●	
OptiTrac Global Peak (shade tolerant MPP tracking)	●	
PID Mitigation Solution	○	
Integrated Plant Control / Q on Demand 24/7	● / ●	
Off-grid capable / SMA Fuel Save Controller compatible	● / ●	
SMA Smart Connected (proactive monitoring and service)	●	
<b>Certifications</b> (pending as of June 2018)		
Certifications and approvals	UL 1741, UL 1998, IEEE 1547, CAN/CSA-C22.2 No.62109	
FCC compliance	FCC Part 15, Class A	
Grid interconnection standards	UL 1741 SA - CA Rule 21, HECO Rule 14H, PRC-024-02	
Advanced grid support capabilities	L/HFRT, L/HVRT, Volt-VAr, Volt-Watt, Frequency-Watt, Ramp Rate Control, Fixed Power Factor	
<b>Warranty</b>		
Standard	5 years	
Optional extensions	10 / 15 / 20 years	
Type designation	SHP 125-US-20	SHP 150-US-20

\* Preliminary data as of June 2018 ● Standard features ○ Optional features

SHP PEAK3 (US) 125/150 12 - Changes to product and services, including those resulting from country-specific requirements, as well as deviations from technical data are subject to change at any time without notice. SMA assumes no liability for typographical or other errors. Please visit www.sma-america.com for the latest information.

**Technical Data**

**Table 19.1-15. Typical Data for 480 V Class DOE 2016 Efficient Dry-Type Transformers, Aluminum Wound** ①

kVA	Frame	Weight	Losses in Watts		Efficiency (T Rise +20 °C)				% Regulation		% Imp. T Rise +20 °C	X T Rise +20 °C	R T Rise +20 °C	Sound Level dB (per NEMA ST-20)	Efficiency at 35% Load 75 °C	Inrush Practical Max.
			No Load	Total at Rise +20 °C	25%	50%	75%	Full Load	100% PF	80% PF						
<b>Type DS-3 150 °C Rise DOE 2016 Efficient Single-Phase</b>																
15	816	246	80	549	97.6	97.6	97.2	96.6	2.0	2.9	4.3	3.0	3.1	45	97.70	245
25	818	359	300	848	97.7	98.1	97.9	97.5	1.4	2.7	3.5	2.8	2.2	45	98.00	379
37.5	818	374	125	1314	98.1	97.8	97.2	96.6	2.2	4.6	5.8	4.8	3.2	45	98.20	355
50	819	555	300	1668	98.2	98.1	97.6	97.0	1.9	4.0	5.1	4.3	2.7	45	98.30	528
75	820	740	170	2266	98.4	98.2	97.6	97.0	2.3	5.3	6.9	6.3	2.8	50	98.50	701
100	821	841	260	2543	98.5	98.4	98.0	97.6	1.9	4.7	6.1	5.6	2.3	50	98.60	944
167	814	1610	900	3987	68.7	98.7	98.4	98.0	1.4	6.8	9.7	9.5	1.8	55	98.70	416
<b>Type DS-3 115 °C Rise DOE 2016 Efficient Single-Phase</b>																
15	816	246	80	519	97.8	97.8	97.3	96.8	2.1	3.1	3.9	2.6	2.9	45	97.70	244
25	818	373	300	766	97.7	98.1	98.0	97.7	1.4	2.8	3.3	2.8	1.9	45	98.00	367
37.5	818	380	125	1182	98.2	98.4	98.1	97.8	2.0	3.1	4.1	2.9	2.8	45	98.20	205
50	819	590	300	417	98.4	98.3	97.9	97.4	1.8	4.1	5.2	5.2	0.2	45	98.30	511
75	820	689	170	2356	98.5	98.2	97.6	97.0	2.7	5.6	6.9	6.3	2.9	50	98.50	572
<b>Type DS-3 80 °C Rise DOE 2016 Efficient Single-Phase</b>																
15	818	360	115	269	97.4	98.3	98.4	98.4	0.8	1.7	2.0	1.8	1.0	45	97.70	460
25	818	370	120	580	97.8	98.2	98.0	97.8	1.5	3.2	3.9	3.4	1.8	45	98.00	348
37.5	819	565	150	834	98.1	98.4	98.1	97.8	1.5	3.3	4.1	3.6	1.8	45	98.20	490
50	820	680	175	1014	98.4	98.5	98.4	98.1	1.5	3.4	4.2	3.9	1.7	45	98.30	577
75	821	900	260	1387	98.3	98.6	98.5	98.2	1.4	3.5	4.3	4.0	1.5	50	98.50	807
<b>Type DT-3 150 °C Rise DOE 2016 Efficient</b>																
15	939	225	64	517	97.5	97.5	96.9	96.3	3.41	4.04	3.74	2.08	3.46	45	97.89	70
30	940	409	121	689	97.9	98.1	97.8	97.4	2.25	2.49	2.74	1.13	2.25	45	98.23	218
45	940	416	125	1220	98.2	98.1	97.7	97.1	2.64	3.74	3.51	2.64	2.67	45	98.40	165
75	942	570	193	1761	98.4	98.3	97.9	97.5	2.26	3.86	3.61	3.34	2.29	50	98.60	270
112.5	943	976	256	2306	98.6	98.6	98.2	97.8	1.94	4.14	4.37	4.22	1.99	50	98.74	302
150	943	1239	350	2560	98.7	98.7	98.4	98.1	1.60	3.16	3.46	3.09	1.61	50	98.83	516
225	944	1571	489	3289	98.8	98.9	98.6	98.4	1.36	3.51	4.29	3.96	1.39	55	98.94	721
300	945	2157	592	4178	98.9	98.9	98.7	98.4	1.29	3.63	4.45	4.26	1.32	55	99.02	731
<b>Type DT-3 115 °C Rise DOE 2016 Efficient</b>																
15	939	231	64	472	97.6	97.6	97.2	96.6	3.10	3.78	3.54	2.08	3.14	45	97.89	70
30	940	399	121	586	97.9	98.3	98.0	97.7	1.91	2.35	2.21	1.37	1.90	45	98.23	196
45	940	429	125	1156	98.3	98.2	97.8	97.2	2.49	4.10	3.81	3.44	2.52	45	98.40	146
75	942	605	193	1655	98.4	98.4	98.0	97.6	2.11	4.07	3.82	3.90	2.14	50	98.60	244
112.5	943	982	256	2236	98.6	98.6	98.2	97.8	1.86	4.43	4.53	4.81	1.89	50	98.74	265
150	943	1253	350	2400	98.7	98.8	98.5	98.2	1.48	3.37	3.97	3.59	1.49	50	98.83	447
225	944	1607	489	3092	98.8	98.9	98.7	98.4	1.26	3.89	5.30	4.73	1.28	55	98.94	610
300	945	2193	592	3874	98.9	99.0	98.8	98.5	1.18	3.77	4.52	4.65	1.21	55	99.02	675
<b>Type DT-3 80 °C Rise DOE 2016 Efficient</b>																
15	939	237	65	508	98.0	97.9	97.4	96.8	3.63	3.81	3.81	2.40	2.96	45	97.89	70
30	940	436	125	452	98.0	98.4	98.3	98.1	1.45	2.49	2.50	1.76	1.78	45	98.23	165
45	942	570	193	531	98.0	98.6	98.6	98.4	1.12	2.31	3.61	2.01	1.37	50	98.40	270
75	943	970	256	865	98.4	98.8	98.7	98.5	1.06	2.76	3.11	2.81	1.32	50	98.60	302
112.5	943	1274	350	1220	98.5	98.9	98.8	98.6	0.99	2.37	2.62	2.31	1.21	50	98.74	516
150	944	1628	489	1244	98.5	98.9	99.0	98.9	0.74	2.34	2.90	2.64	0.93	55	98.83	721
225	945	2157	592	1999	98.7	99.0	99.0	98.9	0.80	2.73	3.35	3.20	0.99	55	98.94	731

① Typical values for aluminum windings. Refer to Page 19.1-23 for typical data for copper windings. Up-to-date design data is available at [www.eaton.com](http://www.eaton.com).

**Note:** Performance data is based upon 480 V delta primary and a 208Y/120 V secondary for three-phase transformers; 240 x 480 V primary and a 120/240 V secondary for single-phase transformers. Refer to Eaton for 5 kV class information. All data is subject to future revision.