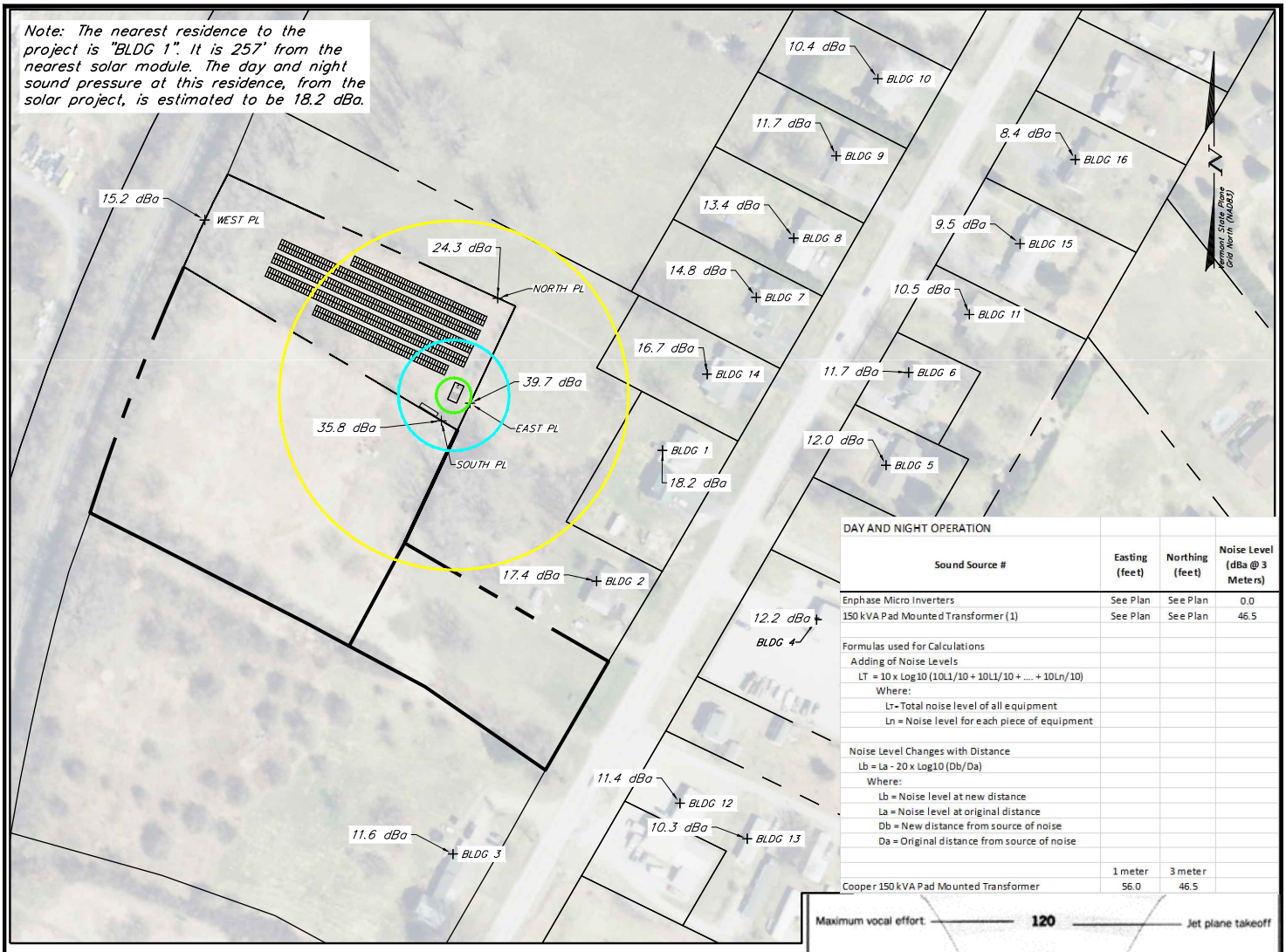


DAY AND NIGHT OPERATION

Sound Source #	Easting (feet)	Northing (feet)	Noise Level (dBa @ 3 Meters)
Enphase Micro Inverters	See Plan	See Plan	0.0
150 kVA Pad Mounted Transformer (1)	See Plan	See Plan	46.5
Formulas used for Calculations			
Adding of Noise Levels			
LT = 10 x Log10 (10L1/10 + 10L1/10 + ... + 10Ln/10)			
Where:			
Lt - Total noise level of all equipment			
Ln = Noise level for each piece of equipment			
Noise Level Changes with Distance			
Lb = La - 20 x Log10 (Db/Da)			
Where:			
Lb = Noise level at new distance			
La = Noise level at original distance			
Db = New distance from source of noise			
Da = Original distance from source of noise			
	1 meter	3 meter	
Cooper 150 kVA Pad Mounted Transformer	56.0	46.5	

Notes:

1. This project is using Enphase 107 microinverters. There is one inverter per solar module. The microinverters do not require fans for cooling. Alison Wilson of Enphase Energy has informed us that the microinverters are "designed to be quiet and do not emit sound". Therefore, no noise generation was modeled for the microinverters.
2. The project transformer is a pad mounted 150 kVA Cooper Power Systems. The manufacturer specifies a audible sound level of 56 dBa. No distance is reported in the specifications and therefore we have conservatively assumed the sound levels were recorded at 1 meter. Sound levels for pole mounted transformers are a maximum of 55 dBa [measured at 0.3 meter, as per NEMA TR1 (ANSI/IEEE Std. C57.12-90-1993, sec. 13.3.4)]. To be conservative we assumed the 56 dBA was measured at 1 meter from the unit, the calculated sound level at 3 meters is 46.5 dBa.
3. Other decibel ranges were derived using the following distance damping equation [L2 = L1 -20 Log(d1/d2)]. This damping equation was the only factor considered in decibel range attenuation estimates. Elevation, ambient noise, vegetation, proposed solar array and other structures which would further effect the attenuation of sound levels were not considered in this study. Sound levels depicted are the 150kVA Transformer operating simultaneously at maximum noise level, day and night.
4. Sound levels reported do not account for any background noise. Local background noise may exceed sound created by project equipment.

Legend:

BLDG 2 — 19 dBa — Study Point with Calculated Sound Pressure

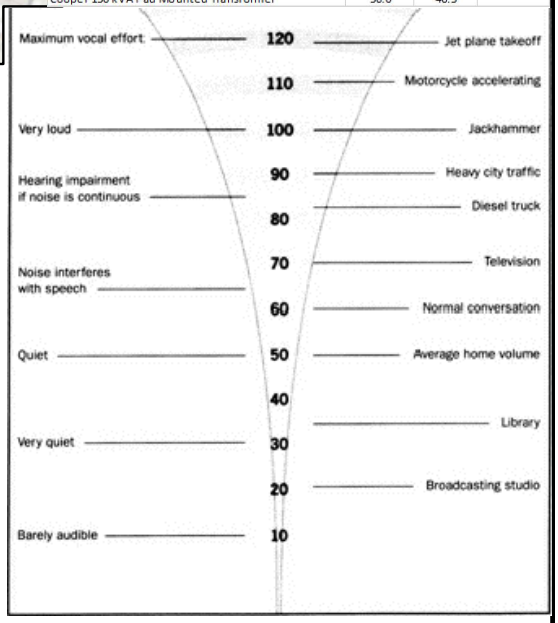
40 dBa range

30 dBa range "Very Quiet"

20 dBa range "Broadcast Studio"

0' 100' 200' 300' 400'

GRAPHIC SCALE 1" = 200'



Decibel Breakdown Compared to Everyday Noises

Krebs & Lansing Consulting Engineers, Inc.
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FULL OPERATION - DAY & NIGHT SOUND LEVEL PLAN

Basic Sound Level Estimates for Noise Produced by Transformer and Inverters

DRAWN BY: EJM

CHECKED BY: IAJ

Project: SMS SOLAR ARRAY LLC

Location: 428 S Main St, Saint Albans, VT

Source Data: *Chart found at www.soundinstitute.com/article_detail.cfm/ID/95*

Revision Date:

Plan ID: Sound 1

Scale: 1" = 200'

Date: 08/13/21

Three-phase pad-mounted compartmental type transformer

General

At Eaton, we are constantly striving to introduce new innovations to the transformer industry, bringing you the highest quality, most reliable transformers. Eaton's Cooper Power series Transformer Products are ISO 9001 compliant, emphasizing process improvement in all phases of design, manufacture, and testing. In order to drive this innovation, we have invested both time and money in the Thomas A. Edison Technical Center, our premier research facility in Franksville, Wisconsin. Such revolutionary products as distribution-class UltraSIL™ Polymer-Housed Evolution™ surge arresters and Envirotemp™ FR3™ fluid have been developed at our Franksville lab.

With transformer sizes ranging from 45 kVA to 12 MVA and high voltages ranging from 2400 V to 46 kV, Eaton has you covered. From fabrication of the tanks and cabinets to winding of the cores and coils, to production of arresters, switches, tap changers, expulsion fuses, current limit fuses, bushings (live and dead) and molded rubber goods, Eaton does it all. Eaton's Cooper Power series transformers are available with electrical grade mineral oil or Envirotemp™ FR3™ fluid, a less-flammable and bio-degradable fluid. Electrical codes recognize the advantages of using Envirotemp™ FR3™ fluid both indoors and outdoors for fire sensitive applications. The bio-based fluid meets Occupational Safety and Health Administration (OSHA) and Section 450.23 NEC Requirements.

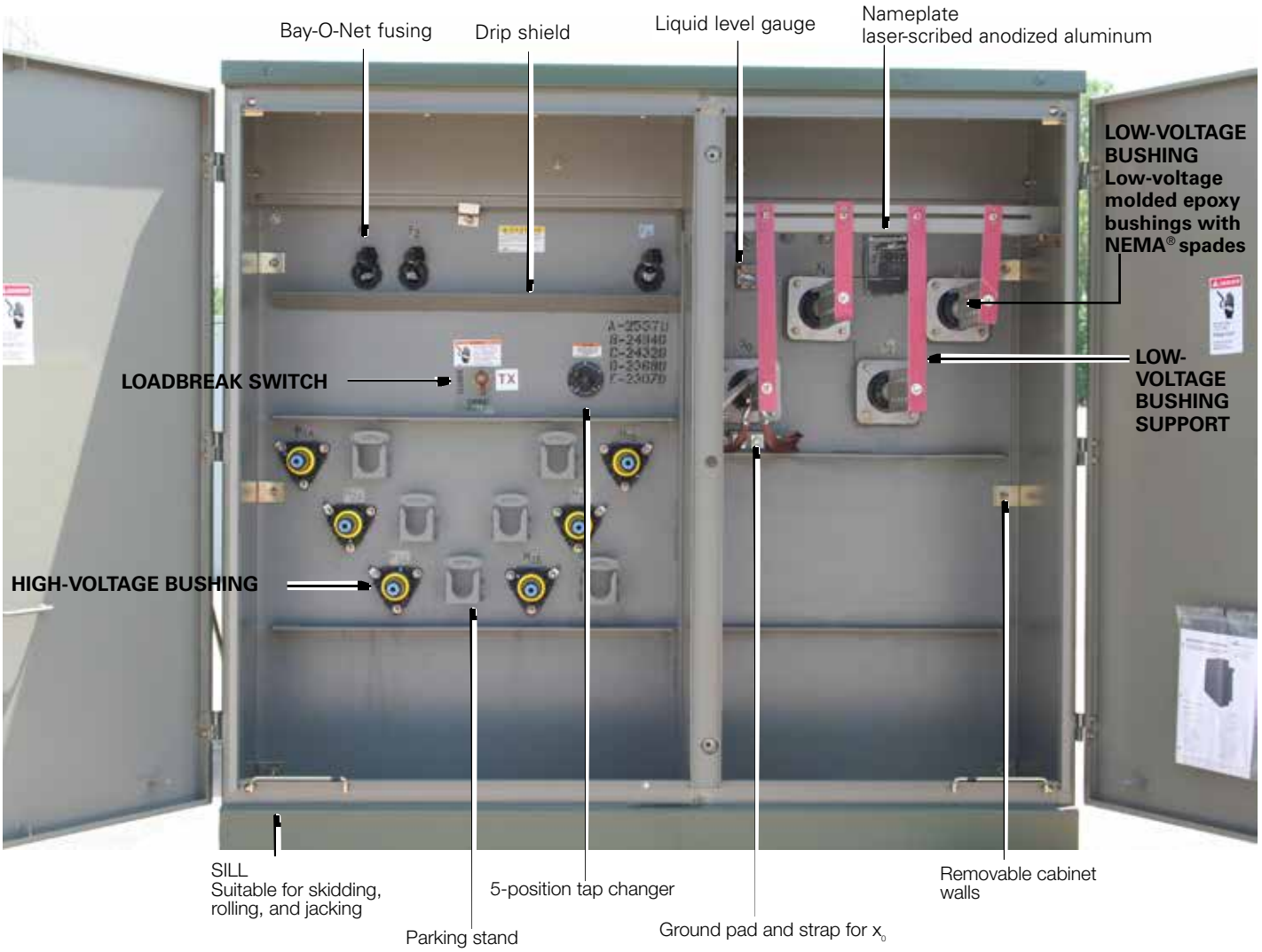

Figure 1. Three-phase pad-mounted compartmental type transformer.

Table 1. Product Scope

Type	Three Phase, 50 or 60 Hz, 65 °C Rise (55 °C, 55/65 °C), 65/75 °C, 75 °C
Fluid Type	Mineral oil or Envirotemp™ FR3™ fluid
Coil Configuration	2-winding or 4-winding or 3-winding (Low-High-Low), 3-winding (Low-Low-High)
Size	45 – 10,000 kVA
Primary Voltage	2,400 – 46,000 V
Secondary Voltage	208Y/120 V to 14,400 V
Specialty Designs	Inverter/Rectifier Bridge
	K-Factor (up to K-19)
	Vacuum Fault Interrupter (VFI)
	UL® Listed & Labeled and Classified
	Factory Mutual (FM) Approved®
	Solar/Wind Designs
	Differential Protection
	Seismic Applications (including OSHPD)
	Hardened Data Center

Table 2. Three-Phase Ratings

Three-Phase 50 or 60 Hz
kVA Available[1]: 45, 75, 112.5, 150, 225, 300, 500, 750, 1000, 1500, 2000, 2500, 3000, 3750, 5000, 7500, 10000

[1]Transformers are available in the standard ratings and configurations shown or can be customized to meet specific needs.

Table 3. Impedance Voltage

	Low-voltage rating		
Rating (kVA)	**≤ 600 V**	**2400 Δ through 4800 Δ**	**6900 Δ through 13800GY/7970 or 13800 Δ**
45-75	2.70-5.75	2.70-5.75	2.70-5.75
112.5-300	3.10-5.75	3.10-5.75	3.10-5.75
500	4.35-5.75	4.35-5.75	4.35-5.75
750-2500	5.75	5.75	5.75
3750	5.75	5.75	6.00
5000		6.00	6.50

Note: The standard tolerance is ± 7.5%

Table 4. Audible Sound Levels

	NEMA® TR-1 Average
Self-Cooled, Two Winding kVA Rating	**Decibels (dB)**
45-500	56
501-700	57
701-1000	58
1001-1500	60
1501-2000	61
2001-2500	62
2501-3000	63
3001-4000	64
4001-5000	65
5001-6000	66
6001-7500	67
7501-10000	68

Table 5. Insulation Test Levels

KV Class	Induced Test 180 or 400 Hz 7200 Cycle	kV BIL Distribution	Applied Test 60 Hz (kV)
1.2	Twice Rated Voltage	30	10
2.5		45	15
5		60	19
8.7		75	26
15		95	34
25		125	40
34.5		150	50

Table 6. Temperature Rise Ratings 0-3300 Feet (0-1000 meters)

	Standard	Optional
Unit Rating (Temperature Rise Winding)	65 °C	55 °C, 55/65 °C, 75 °C
Ambient Temperature Max	40 °C	50 °C
Ambient Temperature 24 Hour Average	30 °C	40 °C
Temperature Rise Hotspot	80 °C	65 °C

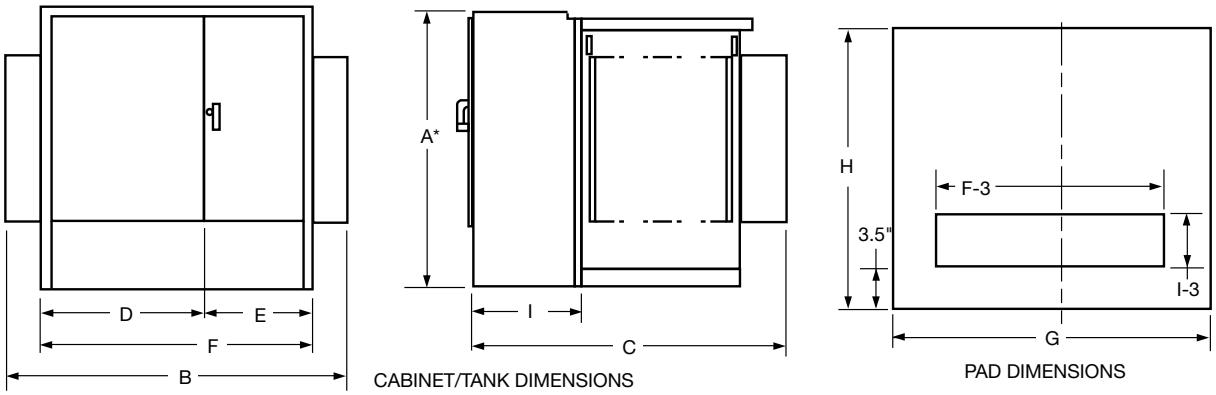

Figure 2. Transformer and pad dimensions.

* Add 9" for Bay-O-Net fusing.

Table 7. Fluid-filled—aluminum windings 55/65 °C Rise[1]

65° Rise	DEAD-FRONT—LOOP OR RADIAL FEED—BAY-O-NET FUSING OIL FILLED—ALUMINUM WINDINGS										
	OUTLINE DIMENSIONS (in.)									Gallons of	Approx. Total
kVA Rating	A*	B	C	D	E	F	G	H	I	Fluid	Weight (lbs.)
45	50	68	39	42	26	68	72	43	20	110	2,100
75	50	68	39	42	26	68	72	43	20	115	2,250
112.5	50	68	49	42	26	68	72	53	20	120	2,350
150	50	68	49	42	26	68	72	53	20	125	2,700
225	50	72	51	42	30	72	76	55	20	140	3,150
300	50	72	51	42	30	72	76	55	20	160	3,650
500	50	89	53	42	30	72	93	57	20	190	4,650
750	64	89	57	42	30	72	93	61	20	270	6,500
1000	64	89	59	42	30	72	93	63	20	350	8,200
1500	73	89	86	42	30	72	93	90	24	410	10,300
2000	73	72	87	42	30	72	76	91	24	490	12,500
2500	73	72	99	42	30	72	76	103	24	530	14,500
3000	73	84	99	46	37	84	88	103	24	620	16,700
3750	84	85	108	47	38	85	88	112	24	660	19,300
5000	84	96	108	48	48	96	100	112	24	930	25,000
7500	94	102	122	54	48	102	100	126	24	1,580	41,900

1 Weights, gallons of fluid, and dimensions are for reference only and not for construction. Please contact Eaton for exact dimensions.

* Add 9" for Bay-O-Net fusing.

Table 8. Fluid-Filled—Copper Windings 55/65 °C Rise[1]

65° Rise	DEAD-FRONT—LOOP OR RADIAL FEED—BAY-O-NET FUSING OIL FILLED—COPPER WINDINGS										
	OUTLINE DIMENSIONS (in.)									Gallons of	Approx. Total
kVA Rating	A*	B	C	D	E	F	G	H	I	Fluid	Weight (lbs.)
45	50	64	39	34	30	64	69	43	20	110	2,100
75	50	64	39	34	30	64	69	43	20	115	2,350
112.5	50	64	49	34	30	64	69	53	20	115	2,500
150	50	64	49	34	30	64	69	53	20	120	2,700
225	50	64	51	34	30	64	73	55	20	140	3,250
300	50	64	51	34	30	64	75	55	20	160	3,800
500	50	81	53	34	30	64	85	57	20	200	4,800
750	64	89	57	42	30	72	93	61	20	255	6,500
1000	64	89	59	42	30	72	93	63	20	300	7,800
1500	73	89	86	42	30	72	93	90	24	410	10,300
2000	73	72	87	42	30	72	76	91	24	420	11,600
2500	73	72	99	42	30	72	76	103	24	500	14,000
3000	73	84	99	46	37	84	88	103	24	720	18,700
3750	84	85	108	47	38	85	88	112	24	800	20,500
5000	84	96	108	48	48	96	100	112	24	850	25,000
7500	94	102	122	54	48	102	100	126	24	1,620	46,900

[1] Weights, gallons of fluid, and dimensions are for reference only and not for construction. Please contact Eaton for exact dimensions.

* Add 9" for Bay-O-Net fusing.

Gmail **Krebs and Lansing <email@krebsandlansing.com>**

FW: DBA rating

1 message

Will <will@vwdev.com> Fri, Aug 13, 2021 at 10:49 AM
To: Ian Jewkes <ian.jewkes@krebsandlansing.com>, "Joshua D. Leckey" <JLeckey@drm.com>

Does this work?

From: Allison Wilson <awilson@enphaseenergy.com>
Date: Friday, August 13, 2021 at 10:48 AM
To: Will <will@vwdev.com>
Subject: DBA rating

Hi Will,

Currently Enphase does not have a DBA rating on our IQ7 microinverters. Our data sheet does list that they are compliant with UL testing. Our microinverters are designed to be quiet and not emit sound. Please give us a call if you have any more questions!

Allison WIlson

Enphase Energy

Customer Service Technician

Enphase Energy Services

US: 1-877-797-4743

AU 1-800-006-374

NZ 09-887-0421