

PRODUCT SHEET

Type DD e-Rated® Drive TransFilter™ Ultra-Efficient, Low Voltage, Dry-Type Isolation Transformer for Medium K-Factor, Nonlinear Type 1 Motor Drives with an integrated Type TPM Transformer Performance Meter™



Ultra-High Efficiency

Drive Isolation Transformers supplied to the US market have not been required to meet NEMA TP 1 energy efficiency standards. Neither are they now required to meet the U.S. DOE 2016 efficiency standards. Unless otherwise specified by the purchaser, the energy efficiency of Drive Isolation Transformers in the US is typically lower than NEMA TP1 and probably far lower than DOE 2016 requirements.

Drive Isolation Transformers supplied to the Canadian market must meet the Canadian Standards Association (CSA) C802.2-12 standard, which is virtually identical to the NEMA TP 1 energy efficiency requirements.

In industrial applications, it has been estimated that motors account for more than 60% of all loads. To save energy and more accurately match motors to their load requirements, many are controlled by motor drives. To mitigate their harmonic related power quality issues, drive isolation transformers are often applied. If energy efficiency is the overall objective, the efficiency of drive transformers is critically important.

- Standard Type DD Drive TransFilters™ exceed NEMA TP 1-2002 and CSA C802.2-12 efficiency requirements
- Optional e-Rated® Drive TransFilters exceed NEMA Premium® Efficiency Transformer Program qualification requirements
- Optional e-Rated® Drive TransFilters exceed pre-2016 [10 CFR §431.196 (a)(1)] and post- Jan 1, 2016 [10 CFR §431.196 (a)(2)] U.S. DOE efficiency legislation
- Optional e-Rated® Drive TransFilters meet or exceed previously proposed U.S. DOE efficiency legislation including Candidate Standard Level / Trial Standard Level (CSL/TSL) 3 and 4 efficiencies
- Ultra-low Excitation (no-load) Losses provide high efficiency during periods of light-loading (<15% FL)
- Significantly lower Impedance (load) Losses, under nonlinear loading, provide high efficiency, and reduce temperature rise and A/C loading during periods of heavier loading (>15% FL)
- Peak efficiency can be matched to anticipated or measured average loading above 35% full load
- Provides the most attractive payback & ROI in the industry
- Reduces energy & lifecycle costs
- Financial benefits increase with rising energy costs

Additional Benefits

- Provides isolation from upstream transients
- Eliminates phase-to-ground voltage excursions at the motor drive
- Reduces voltage distortion to less than 5% THD_v
- Reduces harmonic current injection into the PCC per IEEE Std 519 recommendation

- Reduces environmental impact consistent with Green Building™ initiatives
- Enclosure size can be altered to match available space
- Optional sound level is 3dB (50%) below NEMA ST 20 requirements
- Ultra-Quiet Transformers are available at 6dB (75%) below NEMA ST 20 requirements

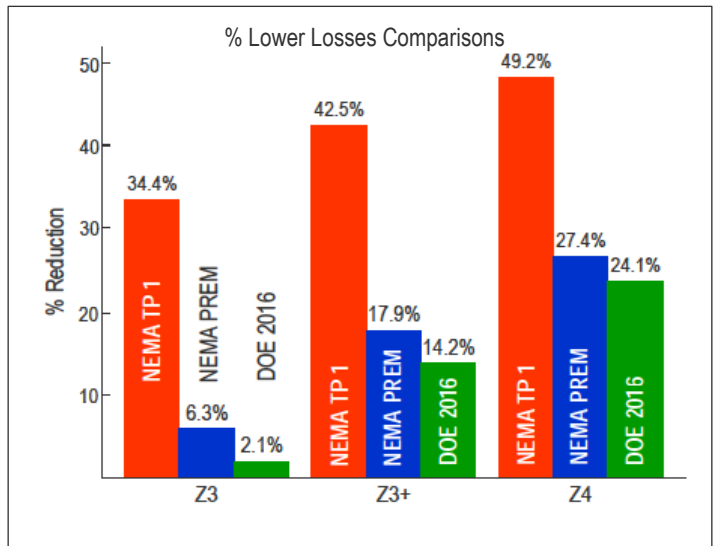
Product Description

Type DD harmonic mitigating Drive TransFilters™ exceed all existing and pending energy efficiency requirements under nonlinear loading.

Type DD transformers' ultra-low Excitation (no-load) Losses provide high efficiency during periods of light-loading (<15% FL). This benefit is achieved by using higher quality, grain oriented silicon core steel in the Unicore™ cores of lower kVA ratings and in the full and step-lap miter-cut cores, with reduced laminations per group, in higher kVA ratings.

Unlike Excitation Losses, which are constant from no-load to full-load, Impedance (load) Losses increase rapidly above 15% FL; particularly when the transformer's loads are nonlinear. To maintain energy efficiency, Type DD Drive TransFilters™ maintain published efficiencies at 35% FL. Type DD transformers' published efficiencies can be matched to anticipated or measured average loading above 35% FL, when required.

Ultra-Low Losses



Type DD Transformers with Z3 and Optional Z3+ & Z4 Efficiencies,
vs.

NEMA TP 1, NEMA Premium™ & US DOE 2016 Efficiencies

Type DD e-Rated® Ultra-Efficient, Low Voltage, Dry-Type Isolation Transformer

kVA	Enclosure Size (Inches)	Weight (lbs.) *
8	20.25W x 13.50D x 18.25H	160
11	20.25W x 18.25D x 26.50H	225
14	20.25W x 18.25D x 26.50H	240
20	20.25W x 18.25D x 26.50H	330
27	20.25W x 18.25D x 26.50H	350
34	20.25W x 18.25D x 26.50H	370
40	24.50W x 21.50D x 31.50H	445
51	24.50W x 21.50D x 31.50H	510
63	24.50W x 21.50D x 31.50H	790
75	30.75W x 27.75D x 30.75H	850
93	30.75W x 27.75D x 30.75H	970
118	30.75W x 27.75D x 30.75H	1150
145	40.00W x 31.00D x 44.00H	1430
175	40.00W x 31.00D x 44.00H	1510
220	40.00W x 31.00D x 44.00H	1690
275	40.00W x 31.00D x 44.00H	1980
330	40.00W x 31.00D x 44.00H	2450
440	46.00W x 40.00D x 62.00H	2620
550	46.00W x 40.00D x 62.00H	2850
660	60.00W x 45.00D x 67.00H	3650
775	60.00W x 45.00D x 67.00H	4150
880	73.00W x 45.00D x 78.00H	4750
990	73.00W x 45.00D x 78.00H	6150
1100	73.00W x 45.00D x 78.00H	6450
Other up to 3500kVA		* = Approx.

Notes: The weights & dimensions shown apply to three-phase, single output transformers. Options, such as higher K-Ratings, aluminum windings, lower temperature rise, lower frequency, nonstandard impedance and special terminal arrangements may change these weights & dimensions. Enclosure size can be altered to match available space. Contact PQI for detailed product information for other than standard configurations.

Transformer Application

Type DD Drive TransFilters mitigate the power quality problems associated with three-phase, six- and twelve-pulse drives. Unlike conventional drive isolation transformers, which are only intended to provide positive- and negative-sequence impedance, and isolation, Type 'DD' transformers will cancel the 5th, 7th, 11th, 13th, 17th, 19th, --- positive- and negative-sequence harmonic currents on their common primary bus or within their multi-output secondary windings. They are available in a number of standard primary-to-secondary phase-shifts so that they may be used to create twelve-, eighteen- or twenty-four-pulse systems.

Efficiency Confirmation

The efficiencies of Type DD transformers are confirmed using NEMA TP 2-2005 (*Standard Test Method for Measuring the Energy Consumption of Distribution Transformers*). These results can then be subjected to CSA C802.5 (*Guide for Selection of Efficient Dry-Type Transformers for Nonlinear Loading*) calculations to determine their *nonlinear* efficiencies at any load level, with any defined or measured harmonic current profile.

The PQI Solution™

Power Quality International's Application Engineers use IEEE Std. C57.110 and CSA C802.5 compliant engineering software (*The PQI Calculator™*) to quickly and accurately determine and compare the losses and efficiencies of any two transformers under any anticipated or measured load profile. The software can also be used to compare an existing and proposed transformer in a replacement scenario.

Given the cost of each transformer or a single transformer in a replacement scenario and the utility rates, the software calculates the annual energy savings, including A/C costs, payback on incremental or replacement costs, return-on-investment and EPA environmental benefits. PQI offers these analytical services, with recommendations, on a 'no charge' basis.

Technical Specifications

Type:

DD – Delta:Wye Equivalent

Primary-Secondary Phase-Shift:

0°, -15°, -20°, -30°, -40°, -45° Std.
(-7.5° & -10° increments also available at no additional cost)

Voltage Class:

1.2kV^[1], Other

Insulation Class:

R (220°C) Nomex

BIL Rating:

10kV (Std. for Class)^[1], Other

Cooling:

ANN (Air, Internal/External Circ., Natural)

Seismic Withstand:

Per IBC & CBC requirements with OSHPD Seismic Certification (S_{DS} = 2.1g)

Certifications:

Manufactured in an ISO 9001 facility, qualified by CSA International as a Testing Facility based on ISO/IEC 17025-2005.

Related Standards:

ANSI/UL 1561, ANSI/NFPA 70, ANSI/IEEE C57.110, NEMA ST 20, NEMA TP 1-2002, NEMA TP 2, NEMA TP 3, CSA C9-M1981, CSA C9-02, CSA No. 47-M90, CSA C802.2-12, IBC, CBC & OSHPD

Listings:

UL Listed and CSA Approved

Warranty:

10 Years Pro-rated

Product Selection

Frequency:

60Hz, 50Hz, 400Hz, Other

Rating:

009 – 1000kVA

Primary Voltage:

600, 480, 240, 208, Other

Secondary Voltage:

600/346, 480/277, 208/120, Other

Temperature Rise:

130 C°^[1], 115°C, 105°C, 80°C, Other

K-Factor:

K9

Taps:

4 Taps, ±2.5%, ±5%^[1]
6 Taps, ±2.5%, ±5%, +7.5%, +10% (6T)

Low Sound:

3dB below NEMA ST 20 (LS3)
6dB below NEMA ST 20 (LS6)
9dB below NEMA ST 20 (LS9)

Enclosure:

NEMA 3R^[1]
NEMA 3R w/ Weather Shield (N3R),
NEMA 4 (N4), 4X (N4X)

Enclosure Color:

PQI White^[1]
ANSI 61 Gray (61), Other

Winding Material:

Copper^[1], Aluminum (AL)

Efficiency:

All exceed NEMA TP 1^[1],
Exceeds DOE CSL 3 (Z3)
Exceeds Z3 (Z3+)
Exceeds DOE CSL 4 (Z4)

Options

1. Electrostatic Shield:

Single (ES), Dual (2ES), Triple (3ES)

2. Low Inrush:

Four times Full Load Current (4xI_R)

3. Thermal Sensors (TS)

4. Transformer Power Meter (TM)

5. TVSS:

50kA Mode (TVSS50),
100kA Mode (TVSS100), Other

Model Number Sequencing

Type-Hz-kVA-PV:SV-Temp. Rise-Taps-Low Sound-Enclosure-Enclosure Color-Winding Material^[1]-Options (1 – 4)-Efficiency-Option 5

Sample Model Number

DD0-60-075-480/480/277-115-6T-AL-ES-Z3

Product Selection Note^[1]

Selections that are identified as 'standard' are not required when creating a Model Number.

All Specifications are subject to change without notice

e-Rated®



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