

ULLTRA™ High Performance Transformers



Applications

A perfect solution for any application where energy efficiency and lower life cycle costs are critical – K-12 and Higher Education, Government, Healthcare, Commercial, Industrial and LEED buildings.

Applications that expect heavier loads such as Data Centers, Solar and other Alternative Energy projects, will benefit from ULLTRA Series Transformers ability to maximize savings under ANY load and for ANY load profile.



Not all Energy Efficient Transformers are created equal

ULLTRA High Performance transformers are designed to deliver more energy savings than any other transformer on the market. The result is a high performing transformer that offers the highest efficiency in the industry under either linear or non-linear loading and maintains these high efficiency levels at not only 35% loading but over a wide load range.

Although other energy efficient transformers on the market may meet new, more demanding standards such as defined by the Department of Energy (DOE) in the Code of Federal Regulations (CFR) 431 and NEMA Premium, these standards only restrict losses under linear loading and at 35% load levels. When it comes to higher load levels and non-linear loading, other transformers on the market can't offer the same high efficiencies under these conditions. ULLTRA High Performance transformers actually exceed DOE 2016 and NEMA Premium efficiency levels at their peak performance loading of 50% thereby assuring the most energy savings under any loading.

Quicker PAYBACK PERIOD

Mirus offers eVALUATOR™, a proprietary and complimentary payback analysis tool for transformers. By entering some simple data into the program it calculates accurate payback and energy savings and takes into account the effects of harmonics created by non-linear loading.

ULLTRA improves paybacks by allowing for 'Right Sizing'. Right Sizing takes into account that a transformer designed to maintain high efficiencies under heavy and non-linear loading can be significantly smaller than one optimized for light loading. The transformer can be sized to operate at heavier load levels, where it is better utilized, without sacrificing energy efficiency. This not only saves energy and the associated operating costs, but also saves on initial costs. In addition, smaller transformers require less materials, such as steel and copper, providing further environmental benefit.

Paybacks are particularly good in applications where both light and heavy loading can be expected. For example, transformers used for alternative energy sources, such as Solar Power, will be nearly fully loaded during peak daylight hours but very lightly loaded at night. Often incentives associated with Utility purchase agreements include much higher rates for the electricity they buy, further justifying ULLTRA's use.

Real-world Tested. REAL-WORLD PERFORMANCE

Like all of Mirus' products, ULLTRA High Performance Transformers undergo rigorous real-world tests in Mirus' own Harmonics & Energy Lab. Load profiles are matched to real-world conditions. With the largest non-linear load bank in the industry, Mirus can test transformers up to 225 kVA under full non-linear load conditions to ensure the promised energy savings are realized.



SCIGATE AUTOMATION (S) PTE LTD

No.1 Bukit Batok Street 22 #01-01 Singapore 659592

Tel: (65) 6561 0488

Fax: (65) 6562 0588

Email: sales@scigate.com.sg

Web: www.scigate.com.sg

Business Hours: Monday - Friday 8.30am - 6.15pm



Features

- Highest efficiencies in the industry at any load profile and at all load levels
- Lowest Life Cycle Costs for best paybacks and improved bottom line
- H1E improves reliability by reducing voltage distortion
- Exceeds DOE energy conservation standards for distribution transformers and NEMA Premium requirements in a wider load range
- Meets NEMA TP-1 efficiencies under non-linear loading
- Lower losses minimize energy waste and protect the environment by reducing greenhouse gas emissions
- Energy savings are realized even during peak load conditions when environmental impact is greatest
- Contributes to LEED (Leadership in Energy Efficient Design) in Energy & Atmosphere and Innovation & Design categories
- Performance validated through linear and non-linear load testing in Mirus' Harmonics & Energy Lab
- Inrush magnetization currents are the lowest in the industry
- Lower audible noise levels: 3dB to 5dB below NEMA ST-20 requirements

Mirus-engineered GREEN DESIGN

To maximize efficiencies at any load level or load profile, Mirus' ULLTRA High Performance Transformers feature a unique core configuration that substantially reduces the core losses without having to lower flux density and provides both low core losses and copper losses.

Other design features include: lower audible noise well below standard limits and much lower inrush currents. Since ULLTRA Series do not need to be oversized to reach high K-Ratings, its unique core design allows for smaller cores with even lower inrush currents than standard transformers.

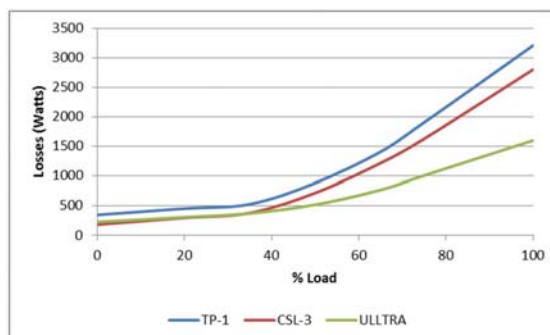
ULLTRA™ – Ultra Low Loss TRAnsformer

- Optimized for any load level making ULLTRA the only transformer ideally suited for both light or heavy loading conditions
- Linear load losses are a full 30% lower than the already low levels defined by NEMA TP-1
- Efficiencies meet NEMA Premium and DOE 2016 regulations at the mandated 35% loading and even exceed these levels at the transformer's peak design loading of 50%
- Harmonic losses are also reduced to ensure efficiencies meet NEMA TP-1 requirements even under 'real world' non-linear loading
- Inrush currents (< 8x rated) and audible noise (3dB lower than standard) are extremely low
- Ideal for Solar Power or other applications where transformer loading varies widely and electricity rates are high

ULLTRA-H1E™ – Harmonic Mitigating Transformer

In applications where non-linear loading is expected to be severe, the ULLTRA-H1E combines the proven harmonic mitigating properties of Mirus' Harmony™ HMT line with superior energy efficiency, low inrush and low audible noise found in the ULLTRA design.

- Voltage distortion (flat-topping) is minimized by cancelling zero sequence fluxes within the secondary windings and eliminating circulating currents in the primary windings
- Treats triplen harmonics (3rd and 9th) within the transformer and 5th and 7th upstream
- The highest efficiency harmonic mitigating transformer from the company that first introduced HMT's to the market in the early 1990's



75kVA Transformer Comparison under Linear Load

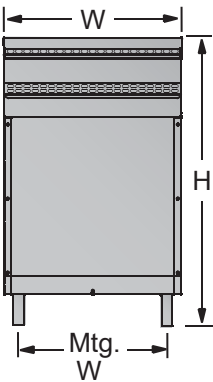
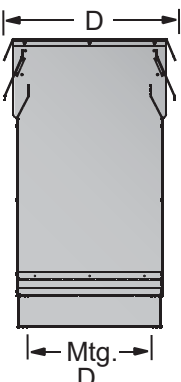
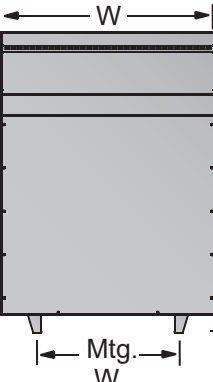
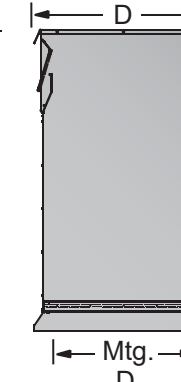
ULLTRA™ Series

Sizes			Efficiency		Impedance				
kVA	Case Style	Weight † lbs [kg]	Linear 35% Load*	50% Load	K-13 Non-Linear 50% Load**	No-Load Losses (W)	ULLTRA H1E Zero Sequence		3 Phase Short Circuit
15	MT2	250 [115]	97.90%	97.96%	97.0%	75	<0.95%	<0.3%	2.0-3.5%
30	MT2	375 [170]	98.25%	98.35%	97.5%	115	<0.95%	<0.3%	2.0-3.5%
45	MT3	500 [227]	98.40%	98.45%	97.7%	150	<0.95%	<0.3%	2.0-3.5%
75	MT3	850 [386]	98.60%	98.65%	98.0%	225	<0.95%	<0.3%	2.0-3.5%
112.5	MT4	1000 [454]	98.74%	98.82%	98.2%	320	<0.95%	<0.3%	2.5-5.0%
150	MT4	1200 [544]	98.83%	98.85%	98.3%	400	<0.95%	<0.3%	2.5-5.0%
225	LT1	1800 [820]	98.95%	99.00%	98.5%	560	<1.0%	<0.5%	3.0-6.0%
300	LT2	2500 [1135]	99.02%	99.07%	98.6%	710	<1.0%	<0.5%	3.0-6.0%
500	LT3	3175 [1440]	99.14%	99.20%	98.7%	1100	<1.5%	<0.5%	4.5-7.0%
750	LT3	4250 [1928]	99.23%	99.28%	98.8%	1550	<2.0%	<1.0%	5.0-8.0%

† Approximate Values

* DOE 2016, NEMA Premium & CSL3 specs

** Equivalent to NEMA TP-1

'MT' Style Enclosure			'LT' Style Enclosure		
					
Front View	Side View		Front View	Side View	

Dimensions					
Case Style	H (Height) inches [mm]	W (Width) inches [mm]	D (Depth) inches [mm]	Mtg. Center W inches [mm]	Mtg. Center D inches [mm]
MT1	29.00 [737]	16.75 [425]	15.00 [381]	13.75 [349]	13.00 [330]
MT2	38.00 [965]	21.50 [546]	19.50 [495]	17.00 [432]	17.50 [445]
MT3	45.00 [1143]	26.00 [661]	21.00 [534]	21.50 [546]	19.00 [483]
MT4	51.50 [1308]	32.00 [813]	25.50 [648]	23.50 [597]	23.50 [597]
LT1	59.00 [1499]	39.50 [1003]	30.00 [762]	24.00 [610]	32.00 [813]
LT2	66.00 [1677]	44.00 [1118]	34.00 [864]	26.00 [660]	36.00 [915]
LT3	75.00 [1905]	48.50 [1232]	39.00 [991]	27.50 [699]	41.00 [1041]

Product Code:

Transformer Type		Secondary	Electrostatic Shield		Options	
Ultra Low Loss Transformer		L-L Voltage 208, 480, 600	S = Single shield (Std. for ULL)	SS = Double shield		
Angular Displacement		Primary L-L Voltage	Primary kVA	Temperature Rise	Type	
30 (Std. for ULL)		208, 480, 600	15, 30, 45, 75, 112.5, 150, 225, 300, 500, 750	TRB = 115°C (Std.)	H1E = Harmonic Mitigating	
00 (Std. for Type H1E)					[Leave blank for Std. ULL]	

ULL - dd - hhh - xxx - kVA - S - TRB - t - (o)

General Specifications:

Primary

3-Phase, 3 wire, 60Hz

Secondary

3-Phase, 4-wire, 60Hz

Operating Temp. Rise

115°C

Insulation Class

220°C

Primary Taps

15kVA (and all 208V): $\pm 1 \times 5\%$
30kVA - 300kVA: $+2 \times 2.5\%$, $-4 \times 2.5\%$
500kVA - 750kVA: $\pm 2 \times 2.5\%$

K-Factor Rating (at 150°C rise)

13

Neutral Bus Ampacity

200% of phase current

Energy Efficiency († see table)

Linear Load: Meets and/or exceeds the US Department of Energy DOE 2016 efficiency requirements by ensuring losses are 30% lower than NEMA TP-1.

Non-Linear Load: Exceeds NEMA TP-1 efficiency requirements.

Magnetizing Inrush

< 8 times FL RMS

Winding Material

Copper

Insulating Varnish Impregnation

Polyester Resin

Audible Sound Level

3dB to 5dB below NEMA ST-20

Enclosure

Type: Nema-3R, ventilated
Paint: Polyester powder coated
Colour: ANSI 61 Grey

Electrostatic Shield

Single, [double]

Applicable Standards

NEMA Premium, NEMA ST20, NEMA TP1, NEMA TP2, CSA C9, CAN/CSA-C802.2, DOE 2016

Options:

Over-Temp. Sensors

[170°C], [200°C]

Solid Bottom Plate

Available for 'MT' case only

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MIRUS International Inc.

31 Sun Pac Blvd., Brampton, ON, Canada L6S 5P6

Tel: 905.494.1120 Fax: 905.494.1140

Toll Free: 1-888 TO MIRUS (888.866.4787)

www.mirusinternational.com



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