Amveco Toroidal Solutions

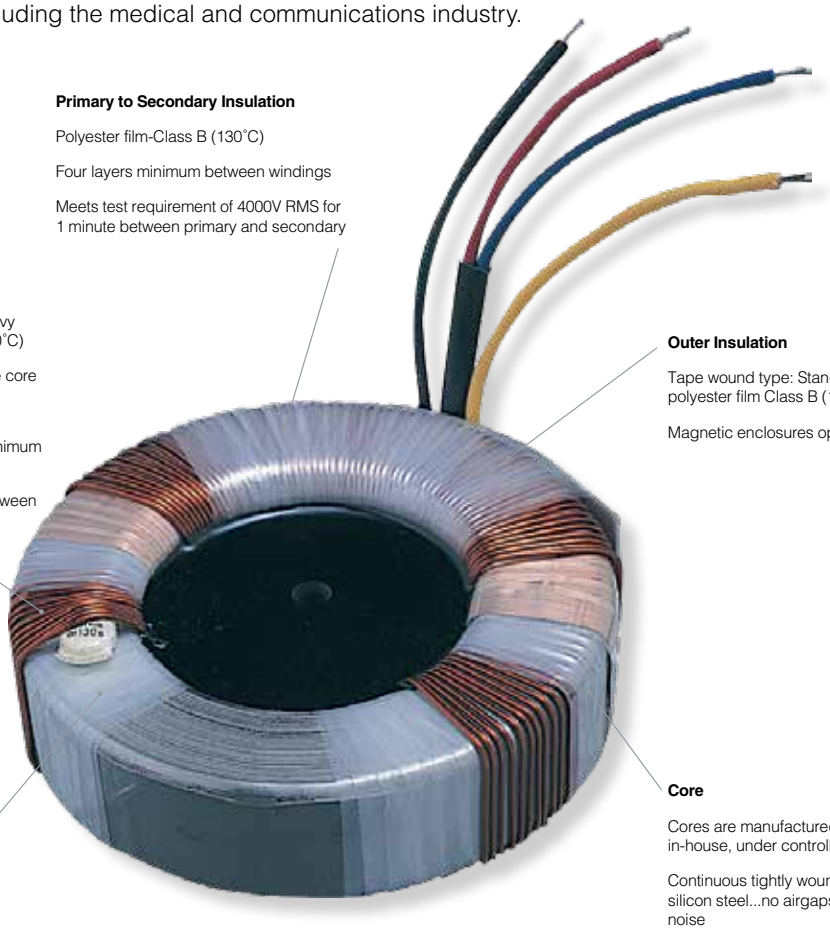
Acme Electric's class leading toroidal magnetics is the perfect solution for the most challenging applications.

HUBBELL®

Acme Electric®

AMVECO TOROIDAL SOLUTIONS

Acme Electric's Amveco brand specializes in the design and construction of class-leading toroid magnetics, for the most challenging applications, including the medical and communications industry.



Primary to Secondary Insulation

Polyester film-Class B (130˚C)

Four layers minimum between windings

Meets test requirement of 4000V RMS for 1 minute between primary and secondary

Windings

Base coat of Polyester. Heavy topcoat of amide imide (200˚C)

Wound uniformly over entire core

Better heat dissipation

Windings configured for minimum flux leakage

Low voltage maintained between adjacent turns

Outer Insulation

Tape wound type: Standard two layers polyester film Class B (130˚C)

Magnetic enclosures optional

Core Insulation

All cores: 100% surface coverage of four layers of 2 mil polyester film Class B (130˚C)

Protects, insulates and cushions the core from windings and reduces vibration

Core

Cores are manufactured and annealed in-house, under controlled conditions

Continuous tightly wound grain oriented silicon steel...no airgaps, no mechanical noise

Lathed radial corners... compact design, most efficient use of materials

No core caps necessary

Small Size

Most toroids are smaller than their E-I transformer counter- parts. They are particularly well suited where low height is a consideration.

Low Stray Magnetic Field

Toroids have no air gaps since the primaries and secondaries are wound uniformly around the entire core. As a result, toroids emit very low radiated magnetic fields. This makes the toroid ideal for applications involving high sensitivity circuitry.

Low Mechanical Hum

The core of a toroid is formed from a single strip of grain- oriented electrical grade silicon steel tightly wound in the form of a clock spring with the ends spot-welded in place. The copper wire is wound over polyester film, forming a silent, stable unit without the use of environmentally unfriendly glues or varnishes.

Low Weight

Toroids weigh up to 50% less, than conventional laminated transformers thanks to their higher efficiency levels. Low weight simplifies end product design by reducing mounting hardware and supporting enclosure requirements.

Low No-Load Losses

Compared to conventional E-I transformers, toroids exhibit extremely low no-load losses. In applications where a circuit is in a "stand-by" mode for long periods, the potential cost reduction for power can be significant, sometimes 80-90%.

High Efficiency

Due to its unique construction, toroids are typically between 15 and 30% more efficient than the conventional type.

Low Operating Temperature

Since most of the losses in a toroid are copper wire, the toroid cools off quicker than the conventional E-I type with more iron. At half the load, the toroid's temperature rise is only about 30% of what it is at full load.

Easy To Mount

A single-center screw easily and quickly mounts the toroid, avoiding costly mechanical design and practical problems associated with conventional E-I-laminated transformers.

OVERALL COMPARISON OF 250VA E-I CORE ISOLATION TRANSFORMER VS. 250 VA TOROIDAL ISOLATION TRANSFORMER

Feature	250VA E-I Core Transformer	250VA Toroid Transformer
Height	4.7" (119mm)	2.2" (56mm)
Width	3.9" (99mm)	4.5" (114mm)
Depth	4.3" (109mm)	4.5" (114mm)
Volume	78.8 sqs.in. (508.4cm2)	35.0 sq.in. (225.8cm2)
Weight	10 lbs. (4.5 kg)	5 lbs. (2.3 kg)
Mounting Requirements	Four corner bolts	Sinle bolt through center
No Load Losses	10.0 W	1.5 W
Continuity of Magnetic Path	50% of grain perpendicular	100% parallel grain orientation
Air Gaps	Approximately 180 (60 laminations x 3)	None
Magnetic Properties of Core	Affected by clamping, welding, banding, etc.	Optimized prior to winding and remains stable
Coupling Factor	Limited by bobbin width and layers of windings	Maximized by even winding distribution and close proximity to core

Safety Standards

Acme Electric proudly holds Certificates from both North American and International Safety Standard Testing Laboratories.

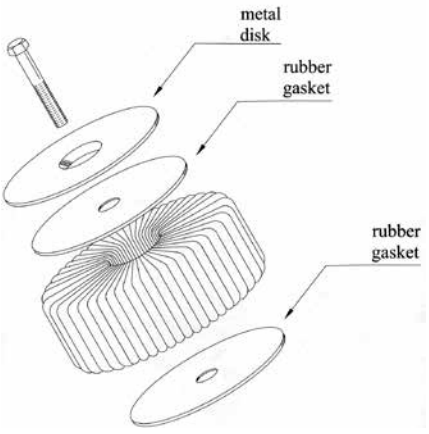
- UL 506 General Purpose Transformers (File # E 122978)
- UL 1950 Information Technology Equipment, Electrical Business Equipment (File # E 138299)
- UL60601-1 Medical and Dental Equipment (File # E 138299)
- UL 1446, Class B, Class F and Class H Insulation Systems (File # E 123069)
- CSA 22.2 No. 66-1988 Specialty Transformers (File # LR 86989)
- CSA 22.2 No. 601.1 M90 Medical Standard for Canada (File # E 138299)
- IEC 601.1 (Medical Standard for International Installations) (File # E 152649)

DIMENSIONS OF METAL MOUNTING DISK AND INSULATION PAD

Power Rage (VA)	OD inch (mm)	Hole inch (mm)	Thickness inch (mm)	Recommended Hardware
20	1.7 (45)	0.18 (4.5)	.04 (1)	#8
40-60	2.4 (60)	0.20 (5.2)	.04 (1)	#10
100-150	2.8 (70)	0.26 (6.6)	.04 (1)	1/4"
200-350	3.5 (90)	0.26 (6.6)	0.05 (1.3)	1/4"
425-800	4.4 (110)	0.26 (6.6)	0.06 (1.5)	1/4"
800-120	5.2 (130)	0.33 (8.4)	0.07 (1.7)	5/16"
1200-1500	5.6 (145)	0.41 (10.3)	0.07 (1.7)	3/8"

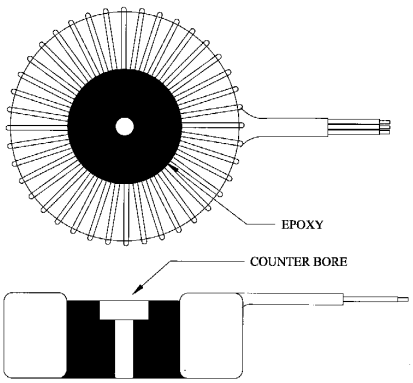
Metal disk with Insulating Pads

Up to 1500VA



Potted Centerhole

All sizes

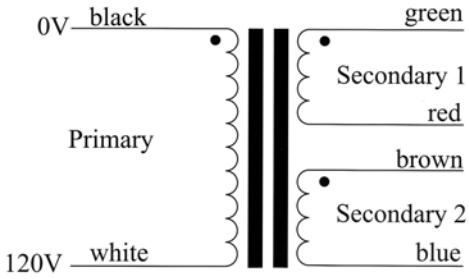


TOROIDAL TRANSFORMERS – North American Voltage 120V/60Hz

Our standard lines of toroidal transformers are designed for step up or step down general purpose applications in North American and international markets.

Features

- 120V, 60Hz
- Many, popular secondary voltage options
- 18 to 1000VA ratings available
- Listed as recognized/certified components (UL and CSA)
- Class A (105°C)
- Disk mounting hardware included
- 10" color-coded self leads
- Wiring configurations with color codes



Winding Configurations With Color Codes

Figure 1
Single 120V/60Hz Primary w/ Dual Secondaries

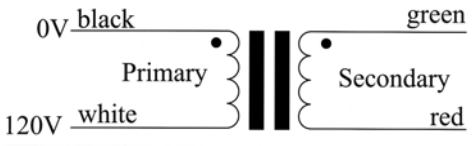


Figure 2
Single 120V/60Hz Primary w/ Single Secondary

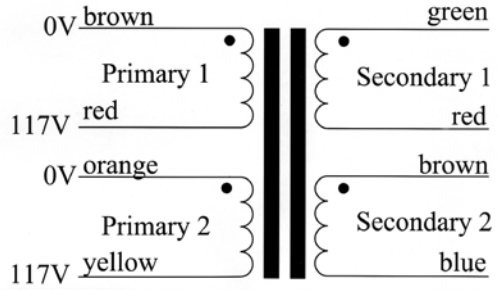
TOROIDAL TRANSFORMER – INTERNATIONAL VOLTAGE 2x117V, 50/60Hz

Features

- 2 x 117V/50-60Hz primaries
- Many popular secondary voltage options
- 15 to 990VA ratings available
- Listed as recognized/certified components (UL and CSA)
- Class A (105°C)
- Disk mounting hardware included
- 10" color coded self leads
- Wiring configurations with color codes

Winding Configurations With Color Codes

Dual 117V 50/60Hz Primaries w/ Dual Secondaries
Multiple primaries must be connected in series or parallel.



TOROIDAL POWER INDUCTORS

Many of the same features offered by our toroidal transformers are also true for our tor DC filtering and AC circuits. A toroidal DC filter choke for line frequency operation used in conjunction with a toroidal power transformer allows our engineering to design a small size transformer. Using toroidal DC filter chokes also reduces the size of the required filter capacitors.

Features

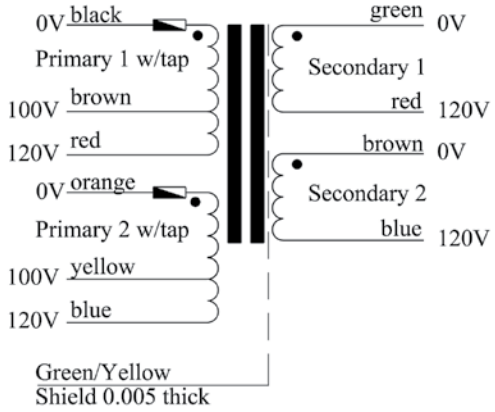
- Available from 5 to 60 Amps DC with various inductances
- Smaller size compared to traditional inductors
- Lower total losses compared to traditional inductors
- Near complete magnetic field cancellation

MEDICAL GRADE HIGH ISOLATION TOROIDAL TRANSFORMERS

Medical grade isolation transformers are installed in numerous medical power applications due to the advantages toroids have compared to other transformer constructions. The designs and constructions of medical transformers are greatly impacted by rigorous rules, guidelines, and laws that dictate specific requirements such as spacing, creepage distances, and leakage current maximums.

Features

- Quad Primaries – 100V,120V,220V,240V – 50/60Hz
- Available with single or dual 120V Secondary
- 100 to 10000VA ratings available
- Listed as recognized/certified components (UL and CSA)
- 100 to 5000VA carry full TUV Bauart Mark
- Meets stringent Medical Standard requirements
- Wiring configuration with color codes



ENCLOSED MEDICAL ISOLATION TRANSFORMERS

Acme Electric now offers a line of fully enclosed medical isolation transformers, featuring Amveco Toroidal Power technology. For medical grade applications, these units provide additional safety and protection. When using electronic devices in a medical, these medical grade transformers will bring the equipment into compliance with the UL 60601 medical safety standard. The transformers operate at 120V 60Hz input with 120V output. They have built in RFI filtering and in-rush current limiting. The transformer design utilizes toroidal transformer which offers light weight, high efficiency, quiet operation, cool overall temperature, and low stray magnetic field.

Features

- Fully enclosed medical isolation transformers housed in white aluminum enclosure
- Designed for North American 120V 60Hz input operation
- UL listed to UL 60601-1 and c-UL listed to CSA C22.2 No.601.1.
- High efficiency toroidal transformer design yielding overall compact size and low weight.
- Low leakage design. Less than 100 µA leakage current.
- Built in filtering with RFI interference and inrush protection.
- Surge suppression
- 10 ft hospital grade power cord
- Duplex 'green-dot' hospital grade outlets
- On/Off circuit breaker
- Floor standing or wall mount

LOW PROFILE PC MOUNT TRANSFORMERS

Our 70000-series PC Mount toroidal step-down transformers offer the same features as our non-encapsulated toroidal power transformers, namely, very low EMR (magnetic stray fields), quiet operation, low temperature rise, low profile, low no-load current and very low no-load losses.

The cores are produced from a continuous strip of high grade silicon steel, and the windings are placed concentrically around the core. This is the ideal magnetic path, lacking air gaps or discontinuities thereby optimizing the use of magnetic flux for power transformation and significantly reducing idling currents when the load is removed.

Additionally, the transformers are designed for PCB mounting and can be secured prior to the soldering process through the use of a central screw receptacle that will accommodate either M4/M5 metric machine screws, or self-tapping types.

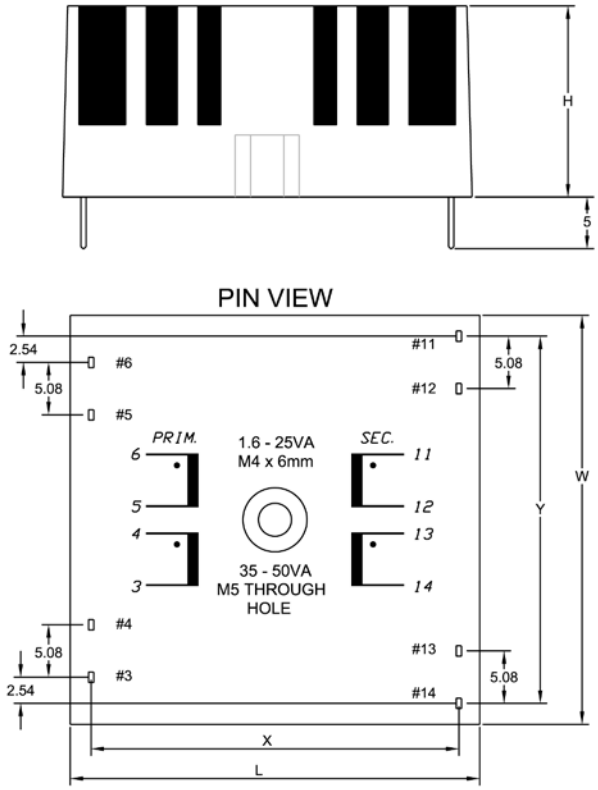
Benefits

- Low profile
- Low magnetic field radiation
- Acoustic noise virtually eliminated
- Small size
- High efficiency
- Low leakage losses
- High isolation (4000VAC primary to secondary)

Features

- Safety standard certifications (UL 506, UL 1950, UL File E122978, E138299)
- VDE 0805, IEC 950, EN 60950
- UL recognized for insulation Class A (105C). Meets all requirements of Class E(125°C)
- UL and VDE certifications to +40°C (1.6VA - 25VA)
- Hipot testing at 4000V between primary and secondary. (VDE0550)
- Maximum ambient temperature of +60°C for 1.6VA-25VA, +40°C for 35VA and 50VA models

Wire Diagram and Pin Layout



LOW PROFILE MINIATURE TRANSFORMERS

The 62000-series Miniature toroidal step-down transformers offers the design engineer the same features as our larger toroidal power transformers, namely, very low EMR (magnetic stray fields), quiet operation, low temperature rise, low profile, low no-load current and very low no-load losses.

The cores are produced from a continuous strip of high grade silicon steel, and the windings are placed concentrically around the core. This is the ideal magnetic path, lacking air gaps or discontinuities thereby optimizing the use of magnetic flux for power transformation and significantly reducing idling currents when the load is removed.

Benefits

- Lower Stray field
- Higher Efficiency
- Reduced “Standby” Current
- Reduced Weight

Features

- Safety standard certifications (UL 506, UL File E122978)
- UL recognized for insulation Class A (105°C). Meets all requirements of Class E(125°C)
- UL certifications to +40°C (1.6VA - 25VA)
- Hipot testing at 4000V between primary and secondary.
- Maximum ambient temperature of +60°C
- Epoxy potted center with through hole for M4 bolt

AC SERIES PC MOUNT CURRENT TRANSFORMERS

Current transformers (CTs) are used for measurement of electric currents and can be known as instrument transformers. When current in a circuit is too high to directly apply to measuring instruments, a current transformer produces a reduced current accurately proportional to the current in the circuit, which can be conveniently connected to measuring and recording instruments. A current transformer also isolates the measuring instruments from what may be very high voltage in the monitored circuit.

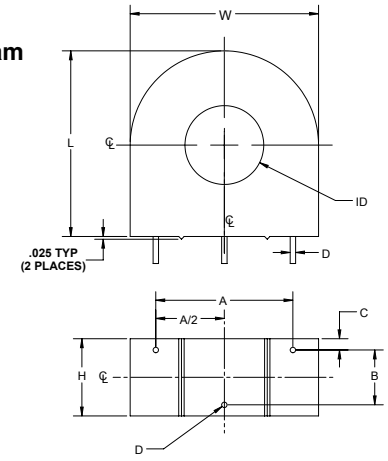
Applications

- Sensing Overload Current
- Ground Fault Detection
- Metering
- Coupling Analog to Digital Circuits

Features

- Current range from 5 - 200 A
- Frequency 50/60 Hz
- Fully encapsulated
- Primary to secondary insulation 4 kV AC
- Operating temperature range: -40° C to + 120° C

AC Series Diagram



Size Code	W	L	H	A	B	C	D	ID
A	0.938	0.938	0.438	0.6	0.3	0.069	0.032	0.375
B	1.188	1.188	0.563	0.8	0.4	0.082	0.04	0.45
C	1.375	1.375	0.563	1	0.4	0.082	0.04	0.575
D	1.5	1.5	0.625	1.2	0.4	0.112	0.04	0.575
E	1.75	1.75	0.563	1.4	0.4	0.082	0.04	0.75
F	2.188	2.188	0.813	1.8	0.5	0.156	0.04	0.94

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