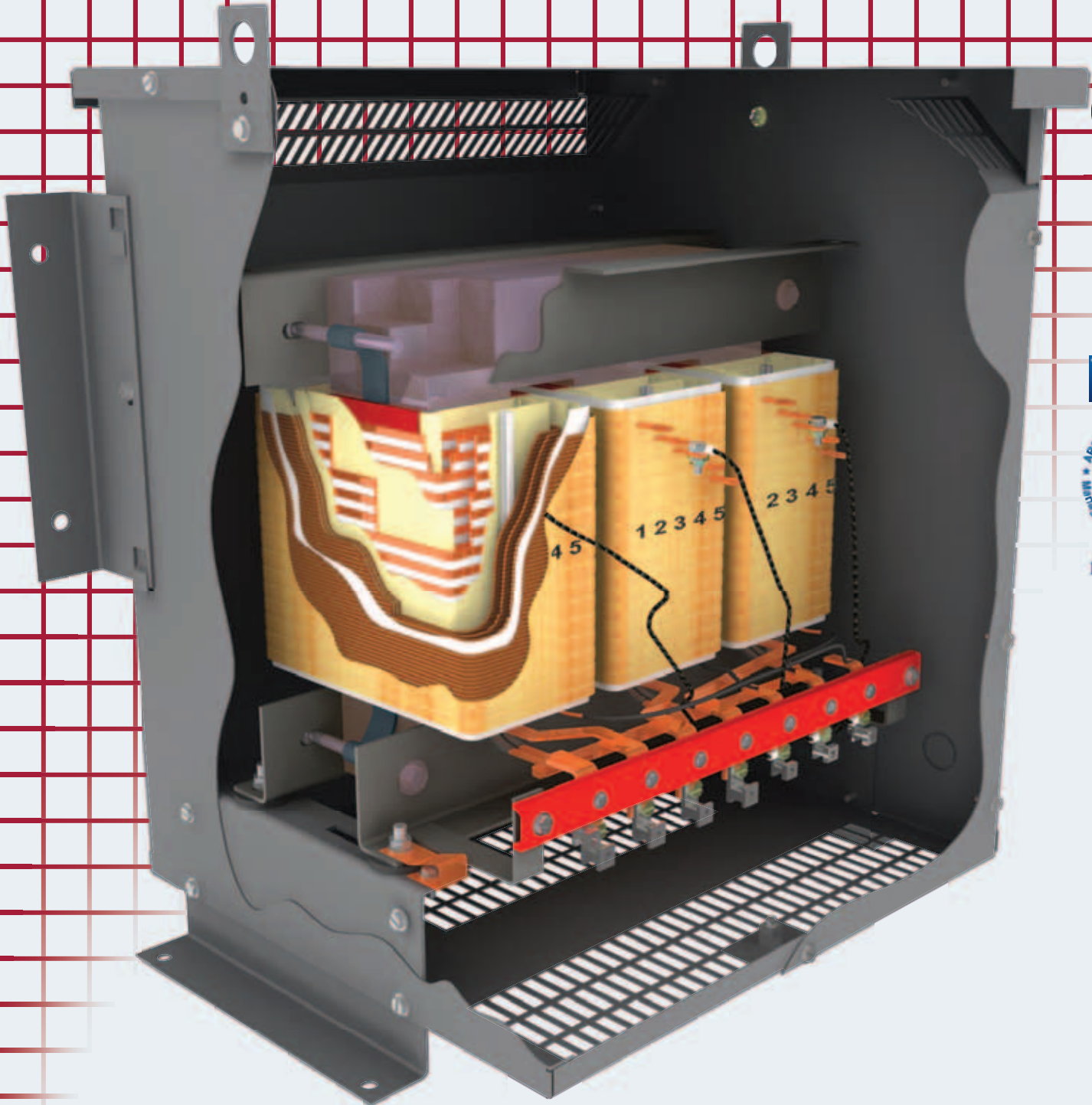


# DRY TYPE TRANSFORMERS

DISTRIBUTION  
K-FACTOR RATED  
ENERGY EFFICIENT

AUTO  
SHIELDED  
ENCAPSULATED



ISO 9001:2008



A Division of Transfactor Industries Inc.  
Concord, Ontario, Canada

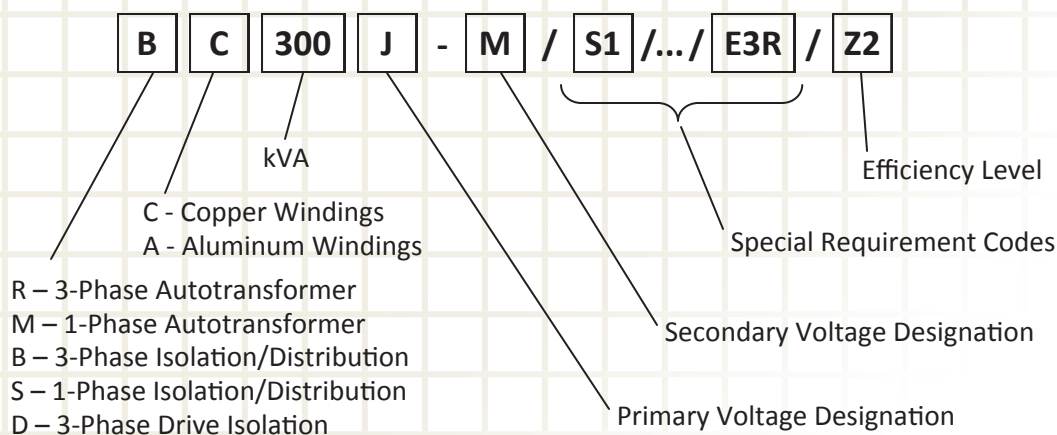
**REX POWER MAGNETICS**

# REX POWER MAGNETICS DISTRIBUTION TRANSFORMERS

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## CATALOG NUMBERING SYSTEM



## STEPS FOR SELECTING TRANSFORMERS

### SINGLE PHASE TRANSFORMER

1. Determine primary or supply voltage
2. Select secondary or load voltage
3. Verify single phase operation
4. Standard transformers are suitable for operation on a 60 Hz (hertz, or cycle) system. Refer to our engineering department for other frequencies.
5. Determine kVA rating of load. Select a transformer having a standard kVA rating equal to or greater than that required by the load.
6. Select autotransformer or double-wound isolation type. Formula for calculating single phase kVA:

$$kVA_{1\phi} = \frac{(Volts \times Amps)}{1000}$$

#### Line currents (in Amperes) at rated single phase voltage

kVA	120 V	240 V	480 V	600 V
1	8.3	4.2	2.1	1.7
2	16.7	8.3	4.2	3.3
3	25.0	12.5	6.3	5.0
5	41.7	20.8	10.4	8.3
7.5	62.5	31.3	15.6	12.5
10	83.3	41.7	20.8	16.7
15	125.0	62.5	31.3	25.0
25	208.0	104.0	52.1	41.7
37.5	313.0	156.0	78.0	62.5
50	417.0	208.0	104.0	83.3
75	625.0	313.0	156.0	125.0
100	833.0	417.0	208.0	167.0
150	1250.0	625.0	313.0	250.0

#### Transformer rating for motor H.P.

Motor H.P. up to	0.5	1	1.5	2	3	5	7.5	10
Actual KVA Required	1.16	1.9	2.30	2.76	3.92	6.45	9.23	11.5
Closest Standard KVA	2.0	3.0	3.0	3.0	5.0	7.5	10.0	15.0

### THREE PHASE TRANSFORMER

1. Determine primary or supply voltage
2. Select secondary or load voltage
3. Verify three phase operation
4. Standard transformers are suitable for operation on a 60 Hz (hertz, or cycle) system. Refer to our engineering department for other frequencies.
5. Determine kVA rating of load. Select a transformer having a standard kVA rating equal to or greater than that required by the load.
6. Select autotransformer or double-wound isolation type. Formula for calculating single phase kVA:

$$kVA_{3\phi} = \frac{(Volts \times Amps \times 1.73)}{1000}$$

#### Line currents (in Amperes) at rated three phase voltage

KVA	208V	240V	480V	600V
3	8.3	7.2	3.6	2.9
6	16.6	14.4	7.2	5.8
9	25.0	21.7	10.7	8.7
15	41.7	36.1	18.1	14.5
30	83.4	72.3	36.1	28.9
45	125	108	54.2	43.4
75	208	181	90.3	72.3
112.5	313	271	135	108
150	417	361	181	145
225	625	542	271	217
300	834	723	361	289

#### Transformer rating for motor H.P.

Motor H.P. up to	2	3	5	7.5	10	15	20	25
Actual KVA Required	2.4	3.42	5.73	8.4	10.3	15	19.8	24.4
Closest Standard KVA	3.0	6.0	6.0	9.0	15	15	30	30

## CONSTRUCTION, APPROVALS, TESTING, AND OPTIONS

### CORE

- All Rex three-phase transformers utilize three-legged cores.
- Only high quality grain oriented silicon steel is used.
- Core steel is precision cut and stacked for reduced noise and losses.
- Cores are clamped with heavy steel brackets.

### COILS

- All coil windings are of high quality magnet wire (copper or aluminum are available).
- Class 220°C insulation is utilized throughout the coil winding process.
- All Rex transformers are designed with substantial cooling ducts for effective cooling.
- Every coil is impregnated and baked in polyester resin varnish.
- Standard  $\pm 5\%$  or  $\pm 2 \times 2.5\%$  taps are provided on all isolation type transformers.

### ENCLOSURES

- Standard enclosures are constructed of heavy gauge steel.
- Ventilation openings are arranged so that each standard enclosure is suitable for either **NEMA** or **CSA Type 1, Type 2, or Type 3R** applications.
- All enclosures are designed to minimize the possibility of accidental contact with live parts and to restrict the access of falling particles into the transformer.
- All Rex standard enclosures are finished in ASA 61 grey powder coating.

### UL APPROVAL

Rex transformers are UL Listed File No. E108255.

### CSA APPROVAL

Rex transformers are manufactured in accordance with the requirements of CSA Standard C22.2 No.47 and certified under File No. LR34493.

### OPTIONAL TESTS AVAILABLE

- Temperature Rise test
- Partial Discharge (Corona) test
- Basic Insulation Impulse (BIL) test
- Sound Level test

### INSULATION SYSTEM

Rex transformers are manufactured with insulating materials complying with CSA Winding Insulation System Class 220 as follows:

Maximum acceptable temperature rise based on an average ambient of 30°C during any 24 h period and a maximum ambient of 40°C at any time.	Average windings temperature (Measured by rise of resistance)	<b>150°C</b>
Altitude not to exceed 1000 m (3000 ft).	Hottest spot temperature rise winding	<b>180°C</b>
	Maximum acceptable windings temperature	<b>220°C</b>

*Class 220 is the highest insulation level recognized by the transformer industry.*

### QUALITY ASSURANCE AND TESTING

Rex Power Magnetix produces and tests all products in full compliance with the requirements of CSA Z299.3 and ISO 9001 quality assurance programs. All Rex Power Magnetix transformers are tested as per the requirements of CSA standard C9 M1981.

### AVAILABLE OPTIONS

Enclosures: **NEMA** and **CSA**

Type 2: Ventilated, indoor, drip proof (Rex standard)

Type 3R: Ventilated, indoor or outdoor, weather resistant, sprinkler proof when the angle between sprinkler heads and opening does not exceed 45 degrees from vertical

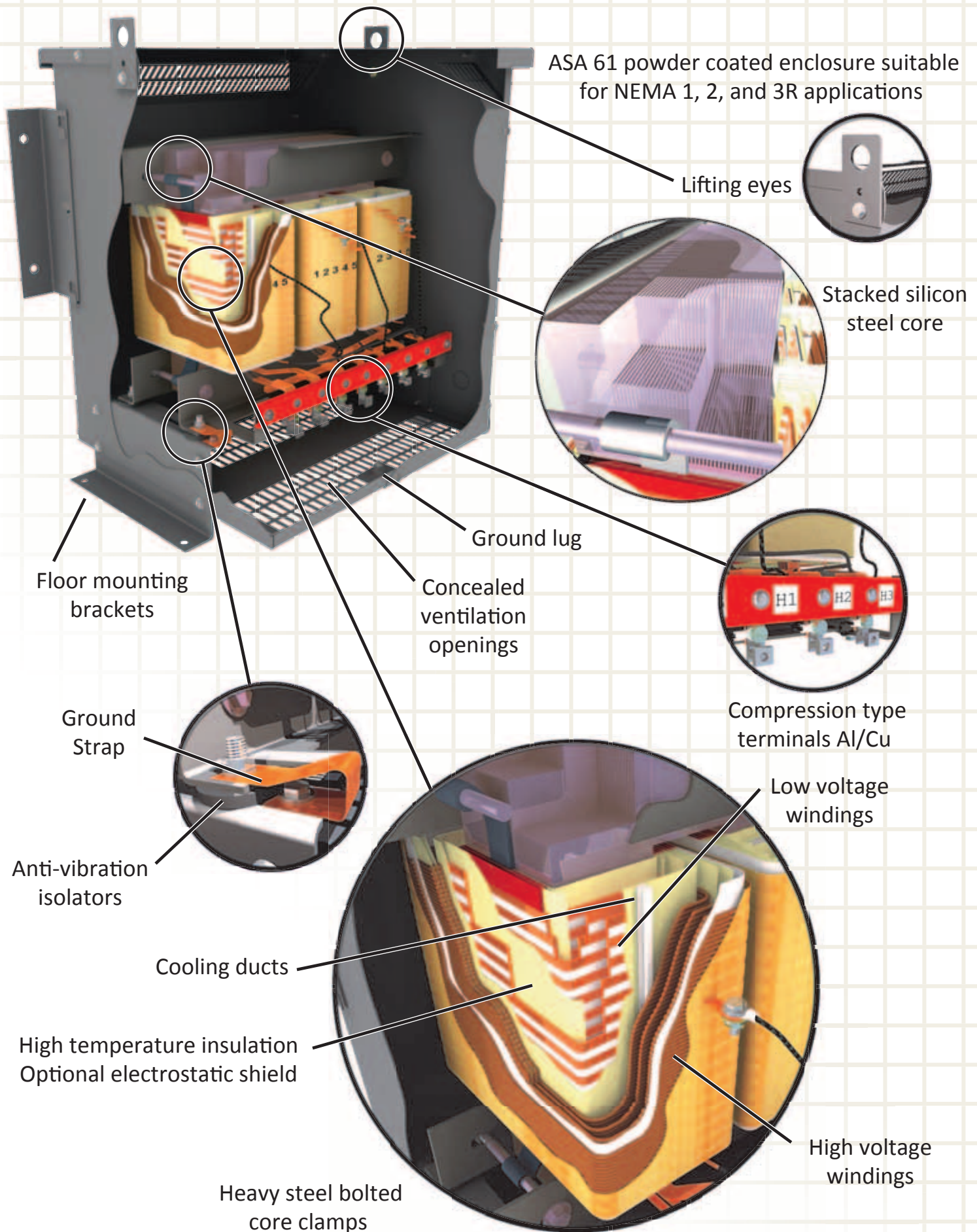
Type 4: Non ventilated, indoor or outdoor, watertight (protection against splashing and hose directed water)

Type 12: Non ventilated indoor industrial dust-tight and drip proof

- Epoxy impregnated windings
- Epoxy cast coil designs
- 50 Hz designs (or other frequencies when specified)
- Any non standard voltage
- Special configurations: delta-delta, zig-zag, others
- Special impedance designs
- Temperature sensing devices
- Multiple windings
- Special tap arrangements
- Low-audible-noise designs
- Tropicalization
- Special paint available upon request
- Anti-vibration pads (all transformers have standard internal vibration isolators, external pads are available)
- Lightning and surge arrestors
- Non-sinusoidal load designs



## STANDARD SPECIFICATION, 600 V CLASS, SINGLE AND THREE PHASE



## TRANSFORMER TERMS AND DEFINITIONS

**Ambient Temperature:** The temperature of the atmosphere surrounding a transformer installation.

**Autotransformer:** A transformer which has only one winding per phase, part of which is common to both the primary and secondary circuits.

**Control Transformer:** Often referred to as an Industrial Control Transformer. A transformer which is designed for good voltage regulation characteristics when large inrush currents are drawn (5 to 15 times normal) and low power factor loads are connected.

**Delta ( $\Delta$ ):** A standard three-phase connection in which each phase winding is connected in series to form a closed loop.

**Dielectric Test:** A series of tests conducted at voltages that are much higher than the nameplate rating, to determine the effectiveness of the insulating materials and electrical clearances.

**Electrostatic Shield:** A grounded conductive sheet (usually copper) placed between primary and secondary windings, which prevents electrical interference and provides additional protection.

**Excitation Current (No-Load Current):** The current which flows in any winding used to excite the transformer when all other windings are open-circuited.

**Frequency:** On AC circuits, designates number of times that polarity alternates from positive to negative. Eg. 60 Hz (cycles per second).

**Hertz (Hz):** A term for AC frequency in cycles per second. Transformers rated for 60 hertz service should not be applied to 50 hertz, as overheating will occur. Certain transformers are rated 50/60 hertz and therefore suitable for either frequency.

**Hi Pot:** A standard dielectric test to check insulating materials and clearances between windings and ground.

**Impulse Tests:** The test employed to determine Basic Insulation Level (BIL).

**Impedance:** The vector sum of resistance and reactance which limits the current flow in an AC circuit. Impedance is identified as a percentage and used to determine the interrupting capacity of circuit breakers that protect the primary circuit.

**Induced Potential Test:** A standard dielectric test which verifies the integrity of insulating materials and electrical clearances between turns and layers of a transformer winding.

**Isolating Transformer:** A transformer which insulates the primary circuit from secondary circuit.

**kVA:** Kilo Volt Ampere rating designates the power output which a transformer can deliver at rated voltage and frequency without exceeding a specified temperature rise.

**Load Losses:** The losses in a transformer incident to load carrying. Load losses include " $I^2R$  loss" in the windings due

to load current, stray loss due to stray fluxes in the windings, core clamps, general construction, and finally to circulating currents in parallel windings.

**No-Load Losses:** The losses incurred when a transformer is excited without a load connected to the secondary. These include core loss, dielectric loss, and exciting current  $I^2R$  loss.

**Polarity:** A designation of the relative instantaneous direction of the current in a secondary lead as compared with a primary lead.

**Power Factor:** The relationship of watts to volt amps in a circuit.

**Ratio:** A reference to either the primary to secondary windings turns-ratio or to the voltage ratio of the transformer.

**Reactor:** A device for introducing inductive reactance into a circuit.

**Rectifier Transformer:** A transformer designed to supply AC input to a rectifier to obtain the desired DC output and have the ability to withstand the heating effects caused by rectifier commutation or ripple.

**Scott Connection:** A transformer connection usually used to obtain a two-phase output from secondary of a transformer with a three-phase input to the primary, or vice versa.

**Step-Down Transformer:** One in which the high voltage winding is connected to the input or power source and the low voltage winding to the output or load.

**Step-Up Transformer:** A transformer in which the low voltage winding is connected to the power source or input and the high voltage winding is connected to the output load.

**Tap:** A connection provided in a transformer winding used to change the normal voltage ratio of the transformer. Taps are usually placed on the high voltage winding to correct for high or low voltage conditions found on the low voltage output side. Taps are expressed as either full capacity above normal (FCAN) or full capacity below normal (FCBN).

**T-Connection:** A Scott-connected three phase transformer utilizing two primary and two secondary coils called the main and teaser coils.

**Temperature Rise:** The temperature increase over ambient due to load. This is measured as either average rise by resistance or as hot-spot.

**Thermals:** Over-temperature protection devices.

**Volt-Amperes:** An expression of the power output rating of a transformer. The current flowing in a circuit multiplied by the voltage of that circuit.

**Wye (Y) Connection:** A three-phase connection in which similar ends of each phase winding are connected together at a common point which forms the electrical neutral and is often grounded.



# SINGLE-PHASE ISOLATION (DOUBLE-WOUND) TRANSFORMERS

## APPLICATION

Isolation transformers should be used on all systems that require grounding on the load.

Rex single-phase distribution transformers are ideal for supplying auxiliary lighting circuits from 600 V and lower supplies, and electric heating equipment.

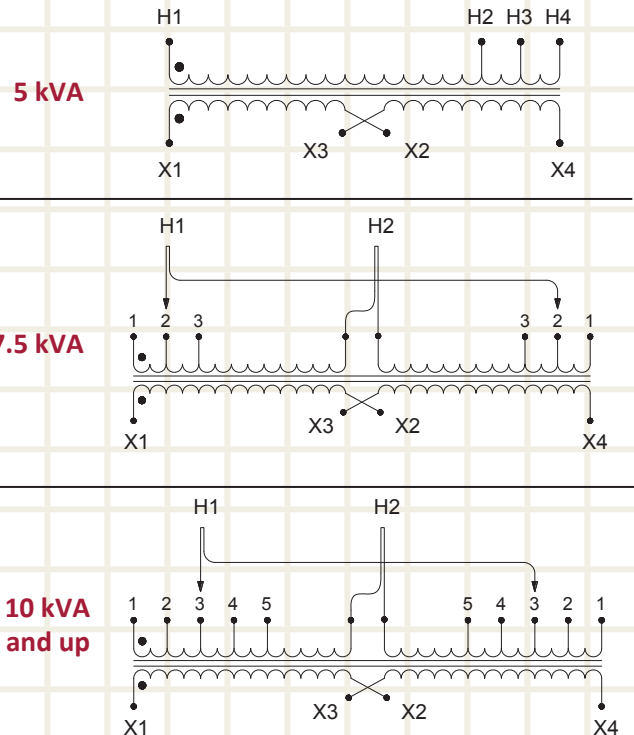
## FEATURES

- General purpose ventilated steel enclosure suitable for indoor, dry locations. After fabrication, all metal is finished in ASA 61 grey power coating suitable for most industrial and commercial installations.
- Transformers up to 75 KVA capacity may be readily hung on H-columns, walls, shelves or floor mounted to suit each installation. Most units have lifting lugs, conduit Knock-Outs (Kos) and a removable front cover for convenient access to terminals.
- Transformers rated above 75 KVA are suitable for floor or platform mounting and complete with integral lifting lugs and removable front panels for convenient access to terminals.
- Transformers terminations rated below 330 Amps are supplied with suitable hardware and lugs for cable connection. Terminations above 330 Amps are supplied with terminal pads only.

SC - Copper windings or  
SA - Aluminum windings  
See Catalogue Numbering System on page 1

- Primary windings have full capacity taps for supply voltage compensations and split secondaries for flexibility.
- Class 220 insulation used throughout.
- **CSA certified, File No. LR 34493**
- **UL listed, File No. E108255**

## TYPICAL CONFIGURATIONS



VOLTAGE	600 - 120/240	480 - 120/240			
kVA	Cat. No.	Cat. No	Taps	Encl. Size *	WT. (lb.)
5	SC5J-K	SC5H-K	±1x5%	2	80
7.5	SC7J-K	SC7H-K	±1x5%	4	120
10	SC10J-K	SC10H-K	±2x2.5%	4	140
15	SC15J-K/Z	SC15H-K/Z	±2x2.5%	4	160
25	SC25J-K/Z	SC25H-K/Z	±2x2.5%	6	220
37.5	SC37.5J-K/Z	SC37.5H-K/Z	±2x2.5%	6	325
50	SC50J-K/Z	SC50H-K/Z	±2x2.5%	6	370
75	SC75J-K/Z	SC75H-K/Z	±2x2.5%	7	540
100	SC100J-K/Z	SC100H-K/Z	±2x2.5%	8	720
150	SC150J-K/Z	SC150H-K/Z	±2x2.5%	9	1050
167	SC167J-K/Z	SC167H-K/Z	±2x2.5%	9	1180
250	SC250J-K/Z	SC250H-K/Z	±2x2.5%	9	1370

\* For enclosure dimensions refer to table on following page.

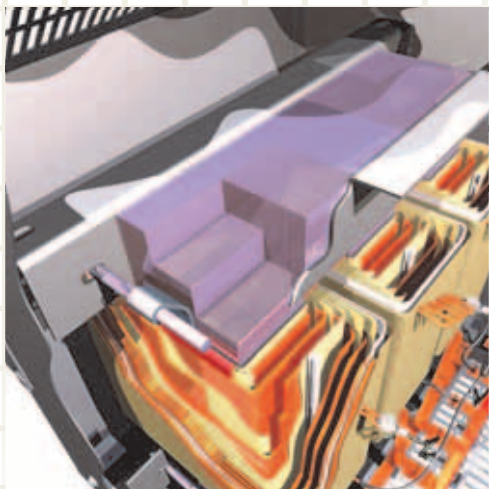
# THREE-PHASE ISOLATION (DOUBLE-WOUND) TRANSFORMERS

## APPLICATION

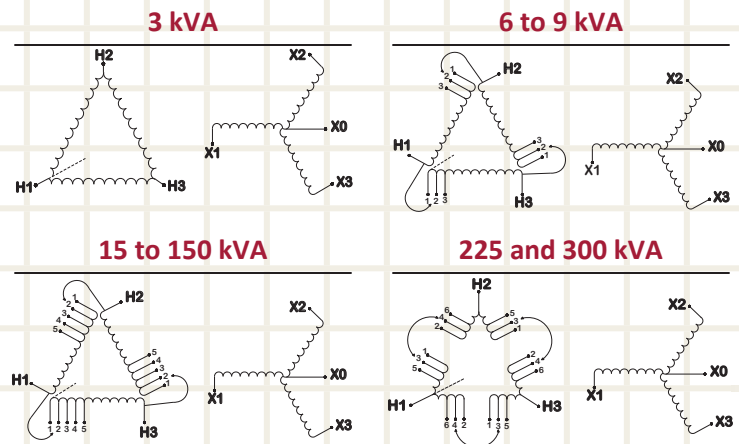
Designed for installation in hotels, schools, factories, as well as industrial and commercial buildings where a reliable power source is required for lighting and other low voltage equipment and machinery. Indoor and outdoor installation is possible depending on the enclosure.

## FEATURES

- Using Computer Aided Design (CAD) techniques and modern materials, Rex engineers have created a range of highly efficient transformers having long trouble-free life with reduced weight, size, and cost.
- Ventilation openings in the enclosure are coordinated with the cooling ducts in the coils to ensure proper natural circulation of the cooling air for long life and minimum losses.
- General-purpose ventilated steel enclosure, suitable for indoor locations. After fabrication, they are finished in ASA 61 grey powder coating, suitable for most industrial and commercial installations.
- **CSA certified, File No. LR34493.**
- **UL listed, File No. E108255.**
- Transformers up to 75 kVA capacity may be readily hung on H-columns, walls, shelves or floor mounted to suit each installation. All units have lifting lugs, conduit KOs and a removable front cover for convenient access to terminals.
- Transformers rated 112.5–300 kVA capacity are suitable for floor or platform mounting and complete with integral lifting lugs, a removable top, as well as front and rear panels for convenient access to the terminals.
- Class 220 insulation used throughout range
- Transformer terminations rated below 330 Amps are supplied with suitable hardware and lugs for cable connection. Terminations above 330 Amps are supplied with terminal pads only.



## TYPICAL CONFIGURATIONS



The configurations above are the most common, however the coils can be wound with a wide variety of connections, tap arrangements, phase shifts, and multiple windings.



## ENCLOSURE DIMENSIONS

Size No.	Length	Depth	Height
0	9.50	7.00	8.00
1	12.00	9.00	9.50
2	11.00	11.00	14.00
3	15.50	11.00	14.00
4	15.75	16.00	21.00
5	20.50	16.00	21.00
6	20.50	20.75	26.50
7	24.50	21.75	31.50
8	30.75	29.75	31.75
9	40.00	38.00	45.75
10	46.00	50.00	64.50



## THREE-PHASE ISOLATION (DOUBLE-WOUND) TRANSFORMERS

Taps

0 - No taps

1 -  $\pm 5\%$  FC

2 -  $\pm 2.5\%$  FC  
 $\pm 5\%$  FC

PRI	SEC	KVA	CAT. NO.	TAPS	HZ	SIZE	lb.	kg.
600	208 <sub>y</sub> 120	3	BC3J-M	0	60	3	85	39
		6	BC6J-M	1		4	130	59
		9	BC9J-M	1		4	143	65
		15	BC15J-M/Z	2		5	188	85
		30	BC30J-M/Z	2		6	290	132
		45	BC45J-M/Z	2		6	360	163
		75	BC75J-M/Z	2		7	540	245
		112.5	BC112J-M/Z	2		8	780	354
		150	BC150J-M/Z	2		8	970	437
		225	BC225J-M/Z	2		9	1380	626
		300	BC300J-M/Z	2		9	1750	794
480	208 <sub>y</sub> 120	3	BC3H-M	0	60	3	85	39
		6	BC6H-M	1		4	130	59
		9	BC9H-M	1		4	143	65
		15	BC15H-M/Z	2		5	188	85
		30	BC30H-M/Z	2		6	290	132
		45	BC45H-M/Z	2		6	360	163
		75	BC75H-M/Z	2		7	540	245
		112.5	BC112H-M/Z	2		8	740	333
		150	BC150H-M/Z	2		8	970	437
		225	BC225H-M/Z	2		9	1380	626
		300	BC300H-M/Z	2		9	1750	794
416	208 <sub>y</sub> 120	3	BC3G-M	0	60	3	85	39
		6	BC6G-M	1		4	130	59
		9	BC9G-M	1		4	143	65
		15	BC15G-M/Z	2		5	188	85
		30	BC30G-M/Z	2		6	290	132
		45	BC45G-M/Z	2		6	360	163
		75	BC75G-M/Z	2		7	540	245
		112.5	BC112G-M/Z	2		8	740	333
		150	BC150G-M/Z	2		8	970	437
		225	BC225G-M/Z	2		9	1380	626
		300	BC300G-M/Z	2		9	1750	794
600	240 <sub>y</sub> 139	3	BC3Q-S	0	60	3	85	39
		6	BC6Q-S	1		4	130	59
		9	BC9Q-S	1		4	143	65
		15	BC15Q-S/Z	2		5	188	85
		30	BC30Q-S/Z	2		6	290	132
		45	BC45Q-S/Z	2		6	360	163
		75	BC75Q-S/Z	2		7	515	234
		112.5	BC112Q-S/Z	2		8	816	370
		150	BC150Q-S/Z	2		8	936	425
		225	BC225Q-S/Z	2		9	1380	626
		300	BC300Q-S/Z	2		9	1740	790

BC - Copper windings

BA - Aluminum windings

See Catalog Numbering System on page 1



Optional ventilation covers for additional weather protection are shown above.

**Note:** All Rex enclosures larger than #3 are standard NEMA 3R and sprinkler proof. For outdoor installations where the transformer may be subject to severe weather conditions (such as wind blown snow and rain), Rex optional hoods are recommended. Enclosures #2 through to #7 can be wall mounted in addition to floor mounting. Consult the website or our engineering department for the most up-to-date information on enclosures.

For non standard configurations, or sizes larger than 300 kVA (up to 15 MVA), or medium and high voltage class products, please consult the head office.

### Notes:

- Other primary and secondary voltages available
- Refer to factory for other frequencies
- Outdoor enclosures available, refer to factory.
- All dimensions are subject to change and should not be used for construction purposes. Certified drawings supplied upon request.
- Shipping weights are approximate. Actual weights may be higher due to packing and crating.
- Open type, core and coil transformers available, refer to factory.

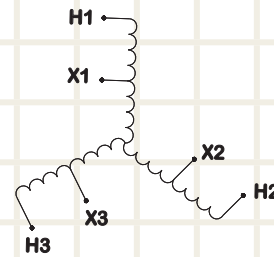
# THREE-PHASE AUTOTRANSFORMERS

## APPLICATION

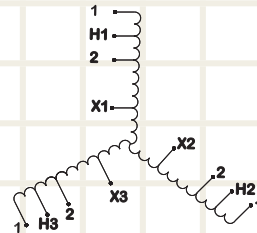
Autotransformers are an economical and compact means of connecting electrical equipment to a power supply of a different voltage. Part of the winding is common to both primary and secondary circuits so there is no isolation between the two. This may not be acceptable on some power systems that do not have a grounded neutral on the secondary side of the main power transformer. Typical applications include motor loads of industrial machinery, electric heating, air conditioners, etc.

## FEATURES

- Performs same function as an isolation transformer of same KVA and voltage rating without the isolation feature.
- Generally radiates less noise than equivalent isolation transformer.
- All terminals are clearly identified and easy to connect.
- May be used in either step-up or step down configuration.
- Low regulation; less than three percent.
- Class 220 insulation used throughout range.
- **CSA certified, File No. LR 34493.**
- **UL listed, File No. E108255.**
- General-purpose ventilated steel enclosure suitable for indoor location. After fabrication all metal is finished in ASA 61 grey power coating suitable for most industrial and commercial installations.
- Transformers in enclosures up to #7 may be readily hung on H-columns, walls, shelves or floor mounted to suit each installation. All units have lifting lugs, and removable top, front and rear panels for convenient access to the terminals.
- Transformers in enclosure #8 or larger are suitable for floor or platform mounting and complete with integral lifting lugs, and removable top, front, and rear panels for convenient access to the terminals.
- Transformer terminations rated below 330 Amps are supplied with suitable hardware and lugs for cable connection. Terminations above 330 Amps are supplied with terminal pads only.



Typical configuration



Optional configuration with  $\pm 1 \times 5\%$  taps



## Notes:

- Other primary and secondary voltages available.
- Standard units do not have primary taps.
- Taps available on special order - refer to factory.
- Refer to factory for other frequencies.
- All enclosures listed are indoor type.
- Outdoor enclosures available - refer to factory.
- All dimensions are subject to change and should not be used for construction purposes. Certified drawings supplied upon request.
- Shipping weights are approximate. Actual weights may be higher due to packing and crating.
- Open type, core and coil transformers available, refer to factory.
- Neutral terminal is available as an optional feature.

# THREE-PHASE AUTOTRANSFORMERS

PRI	SEC	KVA	CAT. NO.	TAPS	HZ	SIZE	Lb.	Kg.	PRI	SEC	KVA	CAT. NO.	TAPS	HZ	SIZE	Lb.	Kg.
600Y	480Y	3	RC3J-H	0	60	0	21	10	600Y	208Y	3	RC3J-B	0	60	1	45	21
		6	RC6J-H			1	34	16			6	RC6J-B			1	70	32
		9	RC9J-H			1	45	21			9	RC9J-B			3	130	59
		15	RC15J-H			1	65	29			15	RC15J-B			3	130	59
		30	RC30J-H			3	115	52			30	RC30J-B			5	210	95
		45	RC45J-H			3	135	61			45	RC45J-B			6	250	113
		75	RC75J-H			5	200	90			75	RC75J-B			6	360	163
		112.5	RC122J-H			6	225	102			112.5	RC122J-B			7	555	250
		150	RC150J-H			6	265	120			150	RC150J-B			8	650	293
		225	RC225J-H			7	450	175			225	RC225J-B			8	920	414
		300	RC300J-H			7	525	237			300	RC300J-B			9	1330	599
600Y	416Y	3	RC3J-G	0	60	0	32	15	480Y	240Y	3	RC3H-C	0	60	1	65	30
		6	RC6J-G			1	70	32			6	RC6H-C			1	85	39
		9	RC9J-G			1	85	39			9	RC9H-C			3	110	50
		15	RC15J-G			3	120	54			15	RC15H-C			3	125	57
		30	RC30J-G			3	135	61			30	RC30H-C			5	200	90
		45	RC45J-G			5	180	81			45	RC45H-C			5	225	102
		75	RC75J-G			6	225	102			75	RC75H-C			6	325	147
		112.5	RC122J-G			7	300	135			112.5	RC122H-C			7	450	203
		150	RC150J-G			8	400	180			150	RC150H-C			7	550	248
		225	RC225J-G			8	540	243			225	RC225H-C			8	675	304
		300	RC300J-G			9	615	277			300	RC300H-C			8	900	405
600Y	380Y	3	RC3J-F	0	60	1	38	18	480Y	208Y	3	RC3H-B	0	60	1	65	30
		6	RC6J-F			1	75	34			6	RC6H-B			1	85	39
		9	RC9J-F			3	110	50			9	RC9H-B			3	110	50
		15	RC15J-F			3	140	63			15	RC15H-B			3	130	59
		30	RC30J-F			5	170	77			30	RC30H-B			5	200	90
		45	RC45J-F			5	210	95			45	RC45H-B			5	225	102
		75	RC75J-F			6	285	129			75	RC75H-B			6	325	147
		112.5	RC122J-F			7	425	192			112.5	RC122H-B			7	450	203
		150	RC150J-F			8	525	237			150	RC150H-B			7	550	248
		225	RC225J-F			8	635	286			225	RC225H-B			8	675	304
		300	RC300J-F			9	900	405			300	RC300H-B			8	900	405
600Y	240Y	3	RC3J-C	0	60	1	40	18	240Y	208Y	3	RC3C-B	0	60	0	18	8
		6	RC6J-C			1	75	34			6	RC6C-B			0	21	10
		9	RC9J-C			3	120	54			9	RC9C-B			1	30	14
		15	RC15J-C			3	155	70			15	RC15C-B			1	52	24
		30	RC30J-C			5	225	99			30	RC30C-B			3	70	32
		45	RC45J-C			6	265	120			45	RC45C-B			3	125	57
		75	RC75J-C			6	400	181			75	RC75C-B			5	135	61
		112.5	RC122J-C			7	550	248			112.5	RC122C-B			5	180	81
		150	RC150J-C			7	610	277			150	RC150C-B			6	200	90
		225	RC225J-C			8	970	437			225	RC225C-B			6	240	108
		300	RC300J-C			9	1300	585			300	RC300C-B			7	300	135



# ENCAPSULATED TRANSFORMERS

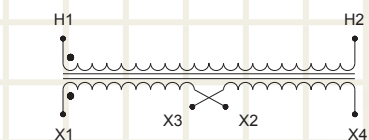
## APPLICATION

Standard dry-type ventilated transformers are cooled by circulating the surrounding air through its windings. For trouble free operation and long life expectancy this ventilating air must be reasonably free of dust, moisture or other damaging corrosive fumes. For this reason, standard dry-type ventilated transformers are normally installed in suitable indoor locations where they are protected from damaging elements. Some specifications require installation of transformers in hazardous surroundings where the above mentioned conditions can not be met. Resin encapsulated transformers are designed for such surroundings.

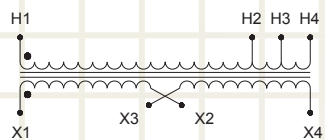
### 1-Phase Type EP

High Voltage	Low Voltage	KVA	Cat.#	Const. Type	Encl. Size	Weight (lb.)
600 V	120/240 V	1/4	SC0.25J-K/EP	1	A1E	17
		1/2	SC0.5J-K/EP	1	A1E	20
		3/4	SC0.75J-K/EP	1	B1E	23
		1.0	SC1J-K/EP	1	B1E	27
		1.5	SC1.5J-K/EP	1	C1E	40
		2.0	SC2J-K/EP	1	C1E	45
		3.0	SC3J-K/EP	1	C1E	55
		5.0	SC5J-K/EP	2	D1E	100
		7	SC7J-K/EP	2	D1E	163
		10	SC10J-K/EP	2	E1E	230
		15	SC15J-K/EP	2	E1E	262
		25	SC25J-K/EP	2	F1E	484
		37.5	SC37J-K/EP	2	F1E	650
		50	SC50J-K/EP	2	G1E	789

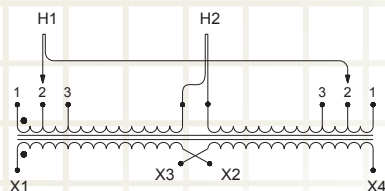
For 480 V to 120/240 V, use 'H-K' instead of 'J-K'. See page 1 for a complete listing of voltage letter codes, or use 'X' to denote a special voltage.



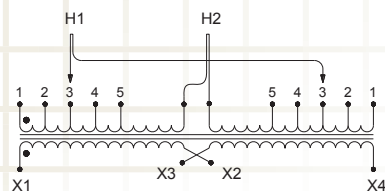
Up to 3 kVA



5 kVA



7 kVA



10 kVA and above

## CONSTRUCTION

- A mixture of silica sand and resin forms a solid mass, completely enclosing and protecting the core and coil, while also significantly reducing audible noise.
- Windings utilize class 200° C insulation, and are rated for 130° C rise. They can be designed to operate at other temperature rise levels.
- Core is solidly grounded.
- Enclosure constructed of heavy gauge steel, power coated, suitable for Type 3R and Type 4 applications, indoor or outdoor. Optional stainless steel enclosures are recommended where the enclosure is exposed to severe corrosive environments.
- Wiring compartment is spacious, cool, and easily accessible (bottom access for smaller units, front access for large units).

### Typical Applications

Abnormally corrosive, damp or dusty, indoor or outdoor, industrial, commercial and residential, harsh environments, such as:

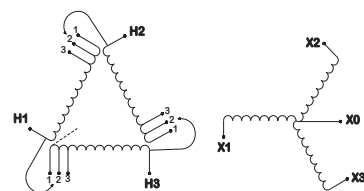
- Corrosive environments: Petro-chemical, steel, pulp and paper industries.
- Damp locations: Mines, pump houses, underground or rooftop service areas.
- Airborne dust, conductive particles: Textile, wood-working industries.

### 3-Phase Type EP

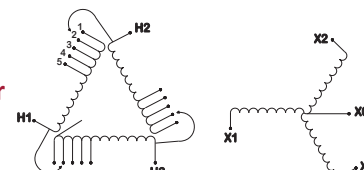
High Voltage	Low Voltage	KVA	Cat.#	Const. Type	Encl. Size	Weight (lb.)
600 Δ	208Y/120	1.5	BC1.5J-M/EP	2	A3E	145
		2	BC2J-M/EP	2	A3E	148
		3	BC3J-M/EP	2	B3E	153
		6	BC6J-M/EP	2	B3E	177
		9	BC9-M/EP	2	C3E	246
		15	BC15J-M/EP	2	D3E	330
		30	BC30J-M/EP	2	E3E	500
		45	BC45J-M/EP	2	F3E	790
		75	BC75J-M/EP	2	G3E	1500
		112.5	BC112J-M/EP	2	H3E	2400

For 480 Δ to 208Y/120, use 'H-M' instead of 'J-M'. See page 1 for a complete listing of voltage letter codes, or use 'X' to denote a special voltage.

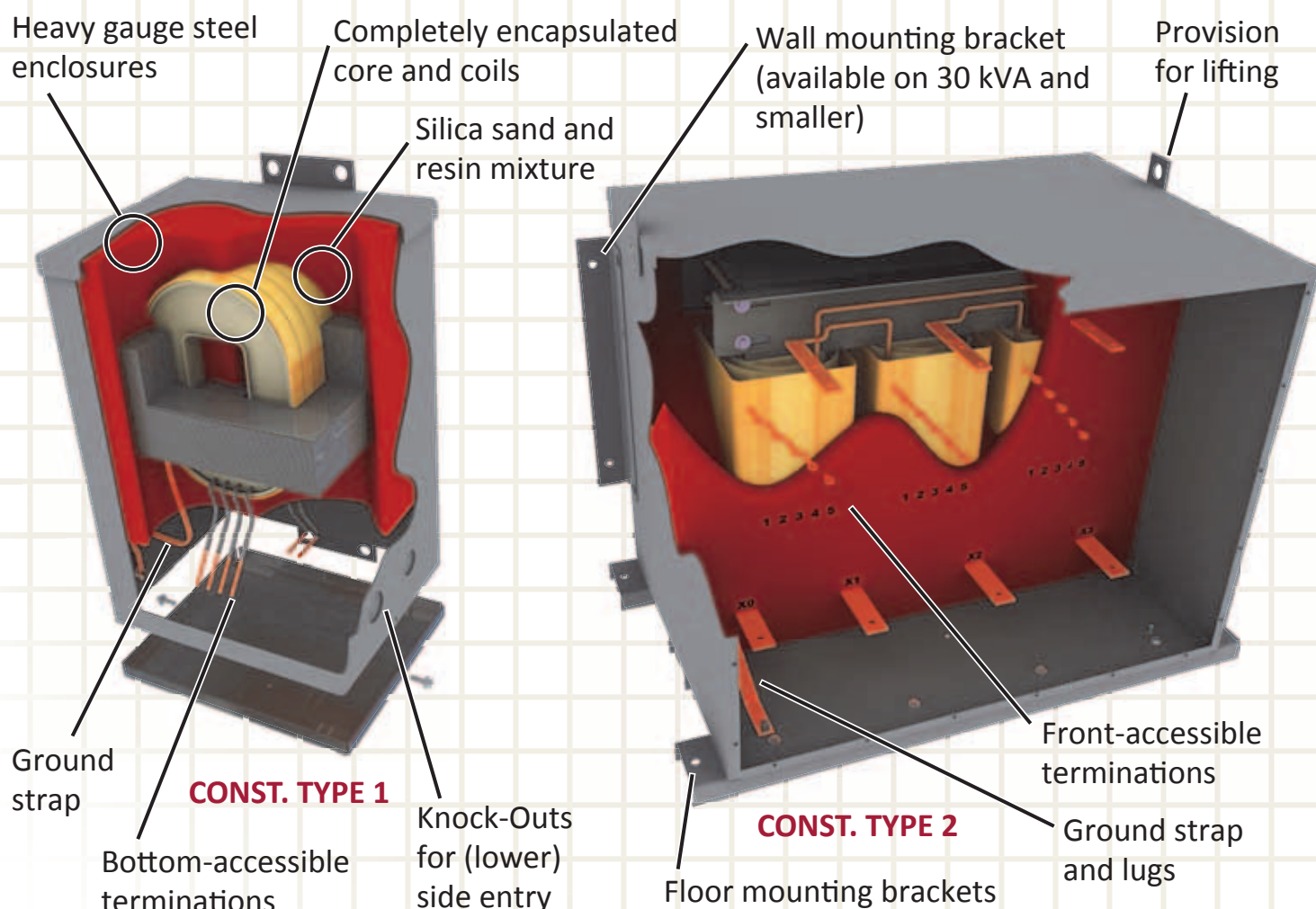
9 kVA and below



15 kVA and higher



## ENCAPSULATED TRANSFORMERS



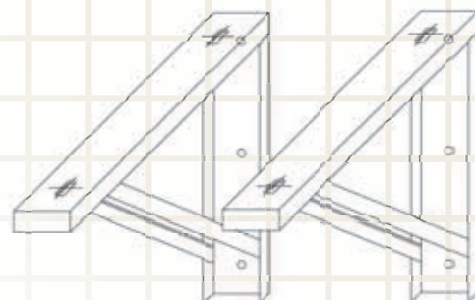
**Note:** Lugs are provided on all encapsulated transformers up to 75 kVA.

### EPOXY-ENCLOSURE DIMENSIONS

Dimensions are in inches

Size No.	Total Width including channels	Width box only	Depth	Height	Const. Type
A1E	5.25	5.25	4.50	9.00	1
B1E	6.00	6.00	5.00	10.00	1
C1E	7.625	7.625	6.50	11.25	1
D1E	12.50	12.50	12.50	15.00	1
E1E	15.00	15.00	14.75	18.00	1
F1E	18.00	18.00	14.00	24.75	1
G1E	19.00	19.00	16.00	28.25	1
A3E	14.00	11.00	10.00	15.00	2
B3E	18.00	15.00	11.00	15.25	2
C3E	21.00	18.00	12.50	17.00	2
D3E	24.00	21.00	14.00	17.50	2
E3E	24.00	21.00	18.00	20.00	2
F3E	30.00	26.00	18.00	25.00	2
G3E	36.00	32.00	18.00	25.00	2
H3E	36.00	32.00	21.00	25.00	2

For wall mounting of Const. Type 2 units that are 45 kVA and larger, wall mounting hardware is available. Consult our office for details.



Units designed for operation in **Hazardous Locations** Type A and B (HLA, HLB) are epoxy encapsulated, with additional provisions and components. For our complete HLA, HLB, and HLC offering, please see our special catalogue *Transformers for Hazardous Locations*, available at [www.rexpowermagnetics.com](http://www.rexpowermagnetics.com)

# GREEN STAR, PREMIUM AND ULTRA PREMIUM TRANSFORMERS

## APPLICATION

As energy prices rise, it is imperative to reduce the operating costs of electrical systems. All transformers have losses that appear in the form of heat. Transformers designed for temperature rises 80°C or 115°C will operate cooler, leading to lower losses, longer life expectancy, lower operating costs and significantly enhanced overload capabilities.



Consult the Rex Power Magnetics **Guide on How to Compare Transformers for Maximum Value** brochure for more information. This guide helps understand the payback offered by high efficiency transformers, and assists in selecting the appropriate efficiency level for minimization of total cost of transformer ownership.

Available online at:

**[www.rexpowermagnetics.com](http://www.rexpowermagnetics.com)**

## CORE LOSSES

Core losses are mainly caused by the resistance of the iron core to the magnetic flux magnetizing it. These losses can be reduced by lowering the flux density, using higher grade steel, special construction and exacting assembly techniques.

## LOAD LOSSES

Load losses are caused primarily by the resistance of the winding conductors to the current which flows through them. These losses can be reduced by lowering the resistance of the windings and by lowering the temperature rise of the unit.

In most cases, the core loss has the greater effect on total losses. Since core losses are present at all times the transformer is energized while winding losses are proportional to transformer load.

## CORE STACKING METHODS

**Butt-Lap Cut Core:** Rectangular strips of high grade grain oriented silicon steel arranged to minimize core reluctance to flux.

**Mitre or Step-Lap Mitre Cut Core:** Mitre cuts at corners reduces flux crowding aiding in efficiency. Step overlapping further reduces losses at transition spots.

**Unicore™ Distributed Gap Core:** A highly specialized machine precisely bends core steel to a shape that gives the flux a continuous path, maximizing the grain orientation of the steel.



**Green Star Energy Efficient Transformer**  
*Meets or exceeds NEMA TP-1 & CSA C802.2 (CSL-1) efficiency requirements*

To meet NEMA TP-1 & CSA C802.2 transformer efficiency standards, transformer cores are made with higher grade silicon steel, constructed with special miter arrangements, and winding resistance is reduced to minimize losses. **This is the currently legislated efficiency standard.**



**Green Star Premium Energy Efficient Transformer**  
*Meets or exceeds CSL-2 efficiency guidelines*

Green Star *Premium* transformers are one step ahead of the currently legislated NEMA TP-1 and CSA C802 levels. For many customers, these very efficient units are a smart choice which offer payback in electricity savings, while keeping one step ahead of the standard for efficiency.



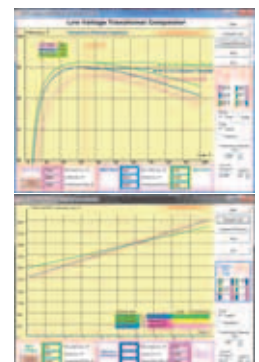
**Green Star Ultra Premium Energy Efficient Transformer**  
*Meets or exceeds CSL-3 efficiency guidelines*

Green Star *Ultra-Premium* transformers are the cutting edge in design and materials, which result in extremely low core and load losses.

## GREEN STAR TRANSFORMER BENEFITS

Rex Green Star transformers that are built to a specified 80°C or 115°C rise have enhanced overload capability. They can be operated at 150°C (30% and 15% overloaded, respectively, without reducing life expectancy or service reliability).

The Rex Power Magnetics website features a free efficiency calculation tool, which helps analyze the economic payback for your specific application, taking into account the cost of electricity and the percentage-loading. Also, it can help you fine tune the no-load and load losses you would like to specify to our engineering department.



Download and use our free calculation tool:

**[www.rexpowermagnetics.com](http://www.rexpowermagnetics.com)**



# ELECTROSTATICALLY SHIELDED TRANSFORMERS

## APPLICATION

Electrostatically (Faraday) shielded transformer are designed to protect sensitive electrical and electronic devices and systems from high frequency voltages (electrical noise) or transients that occur due to switching and loading on distribution lines. Electrical noise and transients are classified two ways.

**Normal mode:** Noise which appears between the hot and neutral current carrying conductors.

**Common mode:** Noise which appears between the ground wire and hot and neutral current carrying conductors.

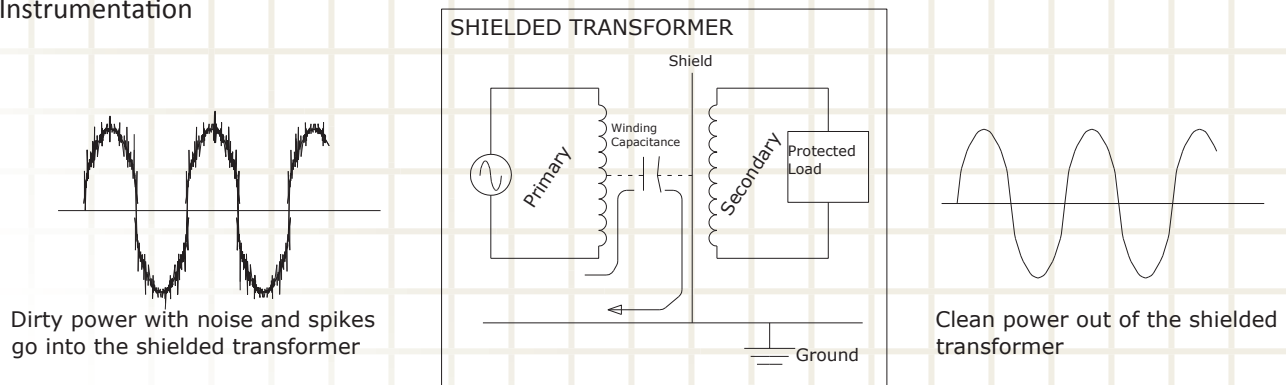
Common mode noise is more prevalent and should be the key criterion for any noise suppression device.

## TYPICAL APPLICATIONS

- Hospital operating rooms and X-ray equipment
- Computer installations and data processing
- Programmable controllers
- Instrumentation

## FEATURES

- Shielded transformers are available with copper or aluminum windings.
- Knock Outs (KOs) provided for simplified wiring.
- Class 220 insulation is used throughout entire range.
- General purpose ventilated steel enclosure, suitable for indoor locations finished in ASA 61 grey powder coating paint.
- Transformers rated up to 75 kVA may be readily hung on H columns, walls, shelves or floor mounted to suit each installation. All units come complete with provisions for lifting.
- Transformers rated 112.5 kVA and larger are suitable for floor or platform mounting and come complete with provisions for lifting.
- Internal ground lugs
- **CSA certified, File No. LR 34493**
- **UL listed, File No. E108255**



The shielded transformer suppresses common mode noise by introducing a grounded shield (copper or aluminum) between its primary and secondary windings. The grounded shield provides a low resistance path to ground by the effect of capacitive coupling which prevents high frequency signals present in the source voltage from reaching signals present in the source voltage from reaching the secondary of the transformer and subsequently the connected load. The electrostatic shield will not perform any function with regard to harmonic current or voltage distortion of waveforms. By redirecting unwanted common mode electrical noise and transients generated on the source side of the transformer to ground the shield is extremely valuable in protecting sensitive equipment connected to the transformer output.

3 Phase Isolation Transformer Common Mode Noise Attenuation		Attenuation Ratio Range
Transformer with no shield:	Minimum attenuation 12 dB Range: 12 dB - 20 dB	10:1
Single Shield:	Minimum attenuation 50 dB Range: 50 dB - 65 dB	1,000:1
Double Shield:	Minimum attenuation 65 dB Range: 65 dB - 90 dB	10,000:1
Triple Shield:	Minimum attenuation 90 dB Range: 90 dB - 120 dB	100,000:1
Ultra Isolating:	Minimum attenuation 120 dB Range: 120 dB - 150dB	1,000,000:1

Several types of electrostatically shielded transformers are available providing the option of various degrees of common-mode noise attenuation.

The ratio of the common mode noise attenuation on the input to that of output is expressed in decibels (dB).

Isolation transformers with electrostatic shields installed can have input noise to output noise ratios within the range of 10:1 to 1,000,000:1, or higher.

# K-FACTOR RATED TRANSFORMERS FOR NON-LINEAR LOADS

## APPLICATION

Today's modern electronic, electrical components and circuitry such as computers, copiers, printers, fax machines and display terminals utilize switching-mode power supplies for their operation. These switching-mode power supplies are non-linear in nature and cause significant power system problems.

- Circuit breakers and fuses blowing far below their current ratings.
- Neutrals in transformers and panel boards are much hotter than their ratings.
- Distribution transformers overheat, even when operating well within their specified name-plate ratings.

These problems are the result of harmonics. Solid-state switching elements such as SCR'S, transistors, and capacitors which are found in computers, fax machines, solid state drives, and energy efficient ballasts continuously switch on and off, producing non-linear or non-sinusoidal wave shapes in the current supplied from the power source.

A linear load uses current from the power source continuously over the sinusoidal cycle. A non-linear load uses current in large pulses from the power source which creates harmonic distortion.

Harmonic components are represented by periodic waves that has a frequency that is a multiple of the fundamental frequency.

### Example:

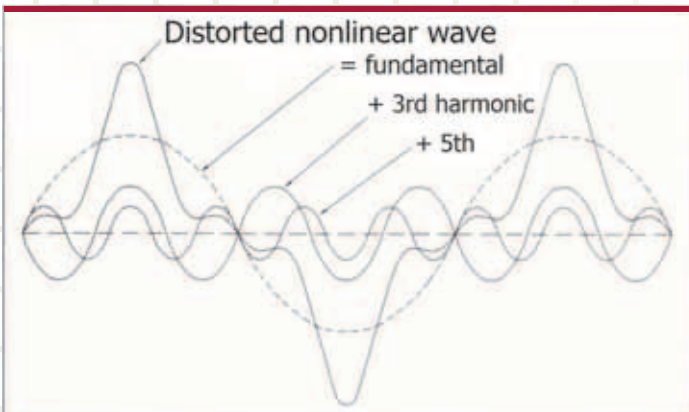
Fundamental frequency = 60 Hz.

3rd harmonic frequency  $3 \times 60 = 180$  Hz.

5th harmonic frequency  $5 \times 60 = 300$  Hz.

Harmonic frequencies superimpose themselves upon the fundamental waveform distorting it and changing its magnitude.

## Effects of Harmonic Components on the Sinusoidal Cycle



## EFFECTS ON TRANSFORMERS

The major components in the harmonic currents of switching mode power supplies are the third and the fifth harmonics. Harmonics which are even multiples of 3, such as the 3rd, 6th, 9th, etc. are called triplen harmonics. When triplen harmonics are present in a 3 phase system, they add together in the neutral conductor. Third harmonics result in a large current flowing through the transformer neutral terminal. Furthermore, the harmonics amplify the eddy and stray losses in the transformer's core and coils. These effects cause the transformer to operate at significantly higher temperatures, at a lower efficiency.

## K RATINGS

A K-factor rating applied to a transformer is an index of the transformers ability to supply harmonic content in its load current while operating within its temperature limits.

For dry type transformers a "K-factor" calculation is made to determine the amount of harmonic content present in a power system. K-rated transformers are sized to handle 100% of the fundamental 60 Hz load plus the non-linear load specified. The neutral of the transformer is sized at 200% of the current rating of the phase connections.

### Selecting transformer K-rating by load type

- |              |  |
|--------------|--|
| K-Factor 1:  | Motors<br>Incandescent Lighting<br>Resistance heating<br>Motor Generators (w/o solid state drives)   |
| K-Factor 4:  | HID Lighting<br>Induction Heaters<br>Welders<br>UPS with optional input filtering<br>PLCs and solid state controls   |
| K-Factor 13: | Multiple receptacle circuits in health care facilities<br>UPS without input filtering<br>Production or assembly line equipment<br>Facilities and classrooms of schools |
| K-Factor 20: | SCR variable speed drives<br>Circuits with exclusively data processing equipment.<br>Mainframe computers<br>Critical care areas and operating rooms of hospitals.      |

Given the harmonic data, our engineering department can calculate the K-factor rating of your application, in even the most extreme cases, and supply the suitable K-factor rated transformer.

## DRIVE ISOLATION TRANSFORMERS (DITs)

### APPLICATION

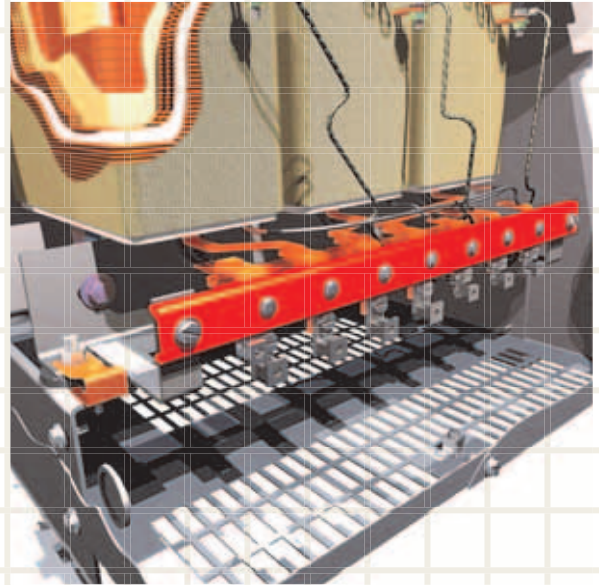
Rex Power Magnetics Drive Isolation Transformers are specifically designed to meet the requirements of AC and DC variable speed drives or rectifier outputs. Rex DIT type transformers are manufactured and rated to match standard motor horsepower and voltage ratings.

### FEATURES

- Anticipating that harmonics generated by the rectifiers will be present the steel core is increased to operate the transformer at a lower flux density to prevent saturation.
- Standard K-factor 4 rating. All K-factor ratings are available.
- Available in either high quality copper or aluminum windings.
- Braced to withstand the mechanical stresses of the current reversals and short circuits associated with SCR drives.
- Isolates the power source from low frequency noise generated by SCR voltage spikes and transient feedback.
- Reduces short-circuit currents.
- Lower than normal losses and temperature rise for greater life expectancy and overload capability.
- Full current neutral.
- Standard taps supplied,  $\pm 5\%$  FCAN & FCBN or  $\pm 2 \times 2.5\%$  FCAN & FCBN.

Drive H.P.	KVA Rating	Encl. Size	WT. (lb.)
5	8	4	135
8	11	4	150
10	14	5	182
15	20	6	247
20	27	6	275
25	34	6	310
30	40	6	336
40	51	7	455
50	63	7	485
60	75	7	565
75	93	8	755
100	118	8	820
125	145	8	890
150	175	9	1250
200	220	9	1470
250	275	9	1750
300	330	9	1990
400	440	10	2700
500	550	10	3100

- Class 220 insulation is used throughout entire range
- Thermal protectors (thermostats) for over temperature tripping are supplied standard.
- **CSA certified, File No. LR 34493**
- **UL listed, File No. E108255**



**Note:** All Rex enclosures larger than #3 are standard NEMA 3R and sprinkler proof. For outdoor installations where the transformer may be subject to severe weather conditions (such as wind blown snow and rain), Rex optional hoods are recommended. Enclosures #2 through to #7 can be wall mounted in addition to floor mounting. Consult the website or our engineering department for the most up-to-date information on enclosures.

### ENCLOSURE DIMENSIONS

Size No.	Length	Depth	Height
0	9.50	7.00	8.00
1	12.00	9.00	9.50
2	11.00	11.00	14.00
3	15.50	11.00	14.00
4	15.75	16.00	21.00
5	20.50	16.00	21.00
6	20.50	20.75	26.50
7	24.50	21.75	31.50
8	30.75	29.75	31.75
9	40.00	38.00	45.75
10	46.00	50.00	64.50

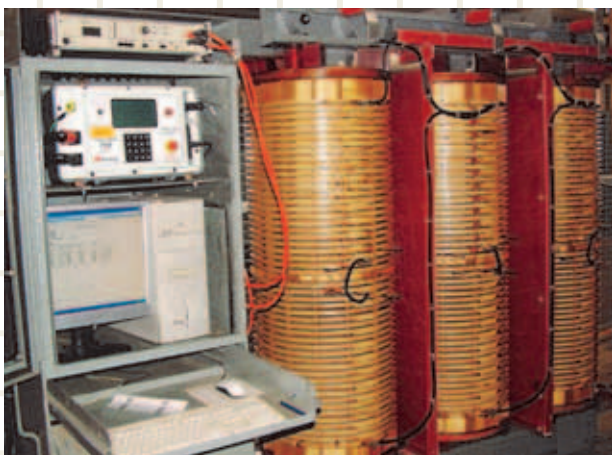




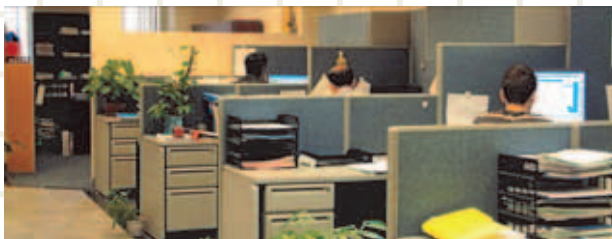
**REX POWER MAGNETICS**



***Advanced manufacturing techniques and central integrated facility***



***Broad testing and repair capabilities, and flexible, responsive engineering department***



***Sustained Research & Development for technology leadership and improvement***

## GENERAL TERMS

**For the most up-to-date and complete terms, policies, and conditions, please consult our website.**

All orders are subject to approval by the Head Office Sales Department. Written quotations are subject to change at any time and are void after 30 days.

Rex Power Magnetics reserves the rights to change the design and/or construction of any transformer in any manner in keeping with its efforts constant product improvement. Terms are net 30 days, subject to credit approval.

## SHIPPING METHOD

Shipping may be made by any method and routing specified by the customer, but any additional cost over our standard method must be paid by the customer.

## SHIPPING DAMAGE

Responsibility for the product is transferred to the customer when it leaves the factory. The customer is responsible for damage or loss in transit. Therefore it is recommended that the customer carefully examine the shipment before accepting delivery from the carrier. In the event of shortage or damage, the customer must note loss or damage on the transportation receipt and immediately file a claim with the carrier and at the same time send a copy to Rex.

## WARRANTY

Rex Power Magnetics warrants to its customers that the products delivered conform to the specifications and are free from defects in material and workmanship for a period of one year. For additional detail, consult factory or visit website.

## DEFECTS

If any defect in material or workmanship develops within one year from the date of shipment, Rex will replace or repair the defective part (at its discretion), F.O.B. factory, if (a) Rex has been notified in writing immediately upon the defect coming to light, (b) it has been shipped prepaid to Rex without delay, and (c) the product has not been misused, abused, altered, neglected, improperly installed or damaged.

## LIMITATIONS

No other warranty is intended or is to be implied. Rex shall not be liable for any indirect damages or damages in excess of the price of the product.

## CANCELLATION

No order accepted by Rex may be altered or modified by the purchaser unless agreed to in writing signed by an authorized official of Rex and no such order may be cancelled or terminated except upon payment of Rex's loss and expense arising from such cancellation.



REX POWER MAGNETICS

**RAPID RESPONSE QUOTATION REQUEST**

Complete the online quote request at **Contact Us** tab on our website  
or fax a completed photocopy of this page to 905.695.8855

Date: \_\_\_\_\_

Company/Location: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Your Tel/Fax/e-mail: \_\_\_\_\_

Reference: \_\_\_\_\_

1. Quantity and kVA size: \_\_\_\_\_ kVA (1 kVA = 1000 VA)

2. Primary Voltage: \_\_\_\_\_ ☐ Delta or ☐ Wye connected?3. Secondary Voltage: \_\_\_\_\_ ☐ Delta or ☐ Wye connected?4. Number of Phases: ☐ 1-Phase ☐ 3-Phase5. Type: ☐ Auto ☐ Distribution/Isolation ☐ Drive Isolation (K-rated)

\* Note other specialty types at #11

6. Efficiency compliance: ☐ CSL - 1, TP-1/C802.2 (Green Star High Efficiency)☐ CSL - 2 (Green Star Premium)☐ CSL - 3 (Green Star Ultra Premium)7. Windings: ☐ Copper ☐ Aluminum (NOTE: Aluminum windings may not be available for all items)8. Temperature Rise: ☐ 150°C ☐ 115°C ☐ 80°C Other \_\_\_\_\_9. Enclosure: ☐ Nema-1 ☐ Nema-2 ☐ Nema-3R Other \_\_\_\_\_10. Frequency: ☐ 60 Hz ☐ 50 Hz Other \_\_\_\_\_

11. Other information/specifications (K-Factor, encapsulation, etc.): \_\_\_\_\_

**QUICK REFERENCE GUIDE:****TO CALCULATE 1-PHASE KVA:** (VOLTS X AMPS)/1000

EXAMPLE: 31 A x 240 V = 7,440 VA (7½ KVA 1-PHASE)

**TO CALCULATE 3-PHASE KVA:** (VOLTS X AMPS X 1.732)/1000

EXAMPLE: 25 A x 208 V x 1.732 = 9,007 VA (9KVA 3-PHASE)

**AUTO TRANSFORMERS** — AN ECONOMICAL AND COMPACT MEANS OF CONNECTING ELECTRICAL EQUIPMENT TO A POWER SUPPLY OF A DIFFERENT VOLTAGE. APPLICATIONS INCLUDE MOTOR LOADS, ELECTRICAL HEATING, AIR CONDITIONERS, ETC.

**ISOLATION TRANSFORMERS** — FOR INSTALLATION IN HOTELS, SCHOOLS, ETC. WHERE A RELIABLE POWER SOURCE IS REQUIRED FOR LIGHTING AND OTHER LOW VOLTAGE EQUIPMENT AND MACHINERY IN COMMERCIAL OR INDUSTRIAL AREAS.

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