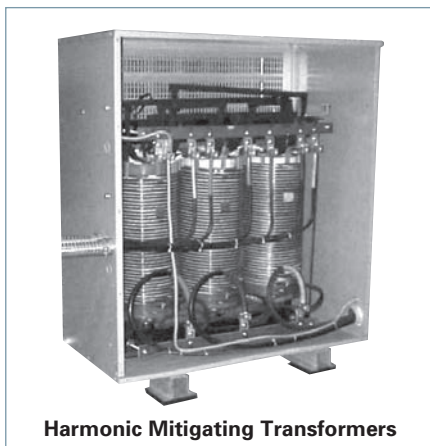




**Sentron Power Centers**

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**Harmonic Mitigating Transformers**



**Buck-Boost Transformers**

Scan to connect online to the most up-to-date version of this Section of SPEEDFAX.



# Transformers

## Dry Type Distribution 600 Volt Class<sup>①</sup>

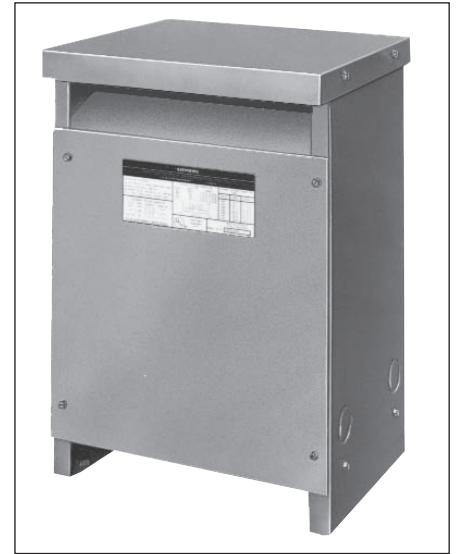
General

Siemens dry type distribution transformers are rated 600 volt class and are available in a wide variety of ratings to provide versatile electrical distribution for general purpose, lighting and power loads in commercial and industrial applications.

Ratings are available from 0.25 through 167 kVA single phase, and 3 through 1000 kVA 3-phase. A variety of primary and secondary voltage ratings are available to match the load requirements to the distribution system. All units meet applicable ANSI and NEMA standards. Standard designs are UL Listed. Transformers are designed, manufactured, and tested in accordance with ANSI, NEMA and IEEE Standards and are UL Listed. All units are fungus resistant. Fungus proof is not an option.



Encapsulated Transformer



Ventilated Transformer

### Encapsulated

- The self-cooled kVA rating shall be suitable for 30°C average, 40°C maximum ambient temperature.
- Ratings from 0.25 kVA through 25 kVA, 1-phase, and from 3 kVA through 15 kVA 3-phase are available.
- Feature indoor/outdoor enclosures with integral wall mounting brackets, and either a 135°C rise, 180°C insulation system or a 95°C rise, 130°C insulation system.

### Ventilated

- Ratings from 15 kVA through 167 kVA 1-phase, and from 15 kVA through 1000 kVA 3-phase are available.
- Indoor NEMA 1/3R enclosures with 150oC rise and 220oC insulation systems are standard. Many options are available.⓪
- Most three phase designs (15 kVA through 75kVA) and single phase designs (15 kVA through 50kVA)

- include primary and secondary terminal lugs. For more information, refer to lug table on page 8-8. Call customer support for confirmation if needed.
- 1-phase up to 167 kVA and 3-phase up to 750kVA are Seismic certified for floor mounting. Call customer support for larger kVA certification or wall mounting applications.

## DOE 2016 Efficiency Standards

- Department of Energy (DOE) 10 CFR 431 released efficiency standards which will take effect January 1, 2016.
- New efficiency standards apply to dry-type three-phase ventilated transformers, including Harmonic Mitigating Transformers from 15 kVA to 1000kVA
- New standards will surpass and supersede NEMA TP1 standards and will make NEMA Premium obsolete.

- DOE 2016 designs have grain-oriented, non-aging silicon steel.
- Dry type, three phase ventilated transformers must be manufactured to DOE 2016 standards after January 1, 2016
- NEMA TP1 rated transformers will still be available for single phase transformers after January 1, 2016
- See accompanying chart for efficiency increases for DOE 2016 standards.

### Comparison of 3-Phase LV Transformer Efficiency

kVA	TP1	NEMA Premium <sup>①</sup>	DOE 2016
15	97.00%	97.90%	97.89%
30	97.50%	98.25%	98.23%
45	97.70%	98.39%	98.40%
75	98.00%	98.60%	98.60%
112.5	98.20%	98.74%	98.74%
150	98.30%	98.81%	98.83%
225	98.50%	98.95%	98.94%
300	98.60%	99.02%	99.02%
500	98.70%	99.09%	99.14%
750	98.80%	99.16%	99.23%
1000	98.90%	99.23%	99.28%

⓪NEMA Premium will no longer be available after January 1, 2016 due to DOE 2016 requirements.

# Distribution Dry Type Transformers

600 Volts Class — Single and Three Phase

Selection

## 600 Volts Class

**Single Phase 0.25-167 kVA**

**Three Phase 3-1000 kVA**

### Features

- Standard units are UL listed and are designed in accordance with ANSI, NEMA (ST20) and IEEE standards

### Encapsulated

- UL listed designs (UL 506)
- Totally enclosed, non-ventilated, heavy gauge steel enclosure
- Core and coil completely embedded within a resin compound for quiet, low temperature operation
- Encapsulation seals out moisture and air
- UL listed indoor/outdoor enclosure features integral wall mounting brackets
- Rugged design resists weather, dust, and corrosion
- Efficient, compact, lightweight, easy to install
- Flexible wiring leads that terminate within the bottom wiring compartment
- Large wiring compartment on the bottom with convenient knockouts
- High quality non-aging electrical grade core steel
- Precision wound coils

### Ventilated

- UL listed designs (UL 1561)
- Designed for indoor NEMA 2 installations. NEMA 3R enclosures suitable for outdoor locations available as an option
- All D16 catalog numbers include NEMA 3R enclosures as standard unless other options chosen change or remove the enclosure
- Core and coils are designed with UL listed high-temperature materials rated for 220°C; standard units feature 150°C winding temperature rise
- Optional low temperature rise of 115° C or 80° C winding temperature rise for increased efficiency and additional overload capability
- Rugged sheet steel enclosure per UL1561, UL506 standards with removable panels for access to the internal wiring area
- Neoprene noise dampening pads isolate the core and coil from the enclosure
- Optional drip shields/weathershield and wall brackets available
- High quality grain-oriented, non-aging silicon steel core for 3 Phase units

## Single Phase Transformer Ampere Ratings

Single Phase Full Load Amperes (FLC)						
kVA	120V	208V	240V	277V	480V	600V
0.25	2.0	1.2	1.0	0.9	0.5	0.4
0.50	4.2	2.4	2.1	1.8	1.0	0.8
0.75	6.3	3.6	3.1	2.7	1.6	1.3
1	8.3	4.8	4.2	3.6	2.1	1.7
1.5	12.5	7.2	6.2	5.4	3.1	2.5
2	16.7	9.6	8.3	7.2	4.2	3.3
3	25	14.4	12.5	10.8	6.2	5
5	41	24	20.8	18.0	10.4	8.3
7.5	62	36	31	27	15.3	12.5
10	83	48	41	36	20.8	16.7
15	125	72	62	54	31	25
25	206	120	104	90	52	41
37.5	312	180	156	135	76	62
50	416	240	208	180	104	83
75	625	340	312	270	156	125
100	833	480	416	361	208	166
167	1391	803	695	603	347	278

## Three Phase Transformer Ampere Ratings

Three Phase Full Load Amperes (FLC)				
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	21.6	10.8	8.6
15	41.7	36.1	18.0	14.4
30	83.4	72.3	36.1	28.9
45	124	108	54.2	43.4
75	208	180	90	72
112.5	312	270	135	108
150	416	360	180	144
225	624	541	270	216
300	832	721	360	288
500	1387	1202	601	481
750	2084	1806	903	723
1000	2779	2408	1204	963

## Insulation Class and Temperature Rise<sup>ⓐ</sup>

kVA		Insulation	
1-Phase	3-Phase	Temperature Class	Temperature Rise
0.25-1	N/A	130° C	95° C
1.5-25	3-15	180° C	135° C
15-167	15-1000	220° C	150° C

## Sound Level in Decibels – 600V Class

kVA	Self Cooled Ventilated			kVA	Self Cooled Ventilated		Self Cooled Sealed
	K Factor: 1, 4, 9	K Factor: 13, 20	Self Cooled Sealed		K Factor: 1, 4, 9	K Factor: 13, 20	
NEMA Average DB				NEMA Average DB			
0-3.00	40	40	45	112.51-150.00	50	53	55
3.01-9.00	40	40	45	150.01-225.00	55	58	57
9.01-15.00	45	45	50	225.01-300.00	55	58	57
15.01-30.00	45	45	50	300.01-500.00	60	63	59
30.01-50.00	45	48	50	500.01-700.00	62	65	61
50.01-75.00	50	53	55	700.01-1000.00	64	67	63
75.01-112.50	50	53	55				

<sup>ⓐ</sup> Temp rise and insulation system values shown are typical. Variation in these values may exist depending on size, design and series, but will comply with the requirements of UL506 and UL1561

# Transformers

## Dry Type Distribution 600 Volt Class<sup>①</sup>

## Specifications

### Standard Construction Features

Transformers rated 15 kVA and larger shall be a ventilated dry type with a UL Listed 220°C insulation system. Units shall be designed to operate with a rated maximum temperature rise of 150°C (Optional 115°C or 80°C rise can be specified).

Construction shall consist of aluminum windings and arranged to brace coil layers and provide maximum ventilation. (Optional copper windings can be specified). 3-Phase cores shall be constructed of grain-oriented, non-aging silicon steel with high magnetic permeability and low loss characteristics.

Core laminations shall be tightly assembled. The complete core and coil assembly shall be impregnated with non-hydroscopic thermo-setting varnish to provide a high dielectric, moisture resistant, flame retardant seal that is inherently fungus-resistant.

Core and coil assemblies shall be constructed to provide short circuit withstand capability as defined by ANSI and NEMA standards. The complete assembly shall be installed on vibration dampening pads to reduce noise and will be securely bolted to the enclosure base. A flexible grounding conductor shall be installed between the core and coil assembly and the transformer enclosure.

Enclosures shall be ventilated, heavy gauge steel construction finished with light gray paint. Front and rear covers shall be removable to provide access to the terminal compartment. Terminals shall be fully sized to carry the transformer full load current and shall be arranged to accept required UL-Listed cable connectors. Units installed outdoors shall have a UL-Listed type 3R outdoor enclosure, or shall be UL Listed with optional weathershields installed. Standard voltage ratings shall be supplied with NEMA standard taps for the high-voltage windings. Unless specified otherwise, average sound levels (150°C rise) shall meet the NEMA ST20 standards.

Each transformer shall have a securely attached nameplate providing complete electrical ratings, wiring diagram, tap connections, and catalog number, as applicable.

### K-Factor Rated for Non-Linear Loads

Siemens offers transformer designs which meet K-Factor ratings. K-Factor is a ratio between the additional losses due to harmonics and the eddy losses at 60Hz. It is used to specify transformers for non-linear loads. Note that K-Factor transformers do not eliminate harmonic distortion; they withstand the non-linear load condition without overheating.

### K-Factor Features

- Designed to ANSI and NEMA Standards
- UL K-Factor Listed per UL 1561
- K-Factor Rating Designed to IEEE c57.110
- Aluminum Wound Coils
- Core, Conductors designed for Harmonics and Eddy Currents 150°C
- Rise, 220°C Insulation
- Electrostatic Shield to Attenuate Line Transients
- 200% Neutral Bar (2X Phase current)
- NEMA 3R Enclosure standard for D16 catalog numbers

Transformers shall be designed, manufactured, and tested in accordance with ANSI, NEMA and IEEE Standards and shall be UL Listed. The self-cooled kVA rating shall be suitable for 30°C average, 40°C maximum ambient temperature. Non-Linear rated transformers shall be suitable for nonsinusoidal loads and harmonic distortion as indicated in IEEE C57.110, and shall be designed with the following K-Factor rating (choose one):

- K4 for 50% Non-Linear load
- K13 for 100% Non-Linear load
- K20 for 150% Non-Linear load
- K30 for 200% Non-Linear load

Non-Linear rated transformers shall be UL Listed and shall bear the UL marking on the nameplate along with the specified K-Factor rating. Non-Linear rated transformers shall include the following design features:

- a) Core designed to withstand voltage distortion and high frequency harmonic currents. Magnetic flux density designed to reduce eddy currents and prevent saturation or overheating of the core
- b) Primary and secondary coils designed to minimize stray losses, skin effect losses, and excessive heating from harmonic currents. Coils shall not exceed the specified winding temperature rise, the corresponding hot spot temperature rating, or the 220°C insulation rating while carrying the specified Non-Linear load.
- c) Neutral bus sized for 200% of rated current to withstand circulating currents and triplen harmonics.
- d) An Electrostatic Shield between the primary and secondary winding and grounded to a common point within the transformer enclosure. When properly grounded, the shield shall provide noise isolation and attenuate common mode and transverse mode noise transients under normal loading conditions.
- e) The design and materials used shall enable the transformers to comply with NEMA TP1 efficiency standards.

### Options

- Special K-Factor ratings
- Special voltage ratings
- NEMA 3R provided for Series J Single-Phase with Drip Shield (DS)
- 80° or 115°C temperature rise
- Low noise designs
- Copper windings
- Drip Shields (when not provided as standard – see chart on page 8-8)
- Wall mounting brackets (15–75 kVA) (standard in most cases)
- NEMA Premium<sup>®</sup> Efficiencies available only until January 1st, 2016 on 3-Phase but will continue to be available on Single-Phase

<sup>①</sup>Temp rise and insulation system values shown are typical. Variation in these values may exist depending on size, design and series, but all will comply with the requirements of UL506 and UL1561.

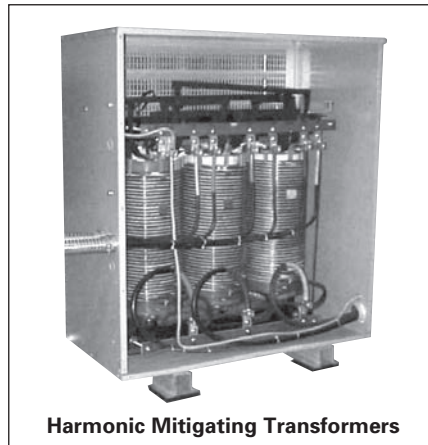
# Distribution Dry Type Transformers

Overview of Transformer Offerings

Selection



Sentron Power Centers



Harmonic Mitigating Transformers



Buck-Boost Transformers

## Single Phase Transformers

Siemens offers single phase transformers from 0.25 kVA to 167 kVA with aluminum windings. Common optional modifiers include Low Temperature Rise, Electrostatic Shield, Copper Windings, Wall Mounting Brackets and Drip Shields. See Page 8-10 for common single-phase transformer offerings.

## Three Phase Transformers

Siemens offers three phase transformers from 3 kVA through 1000kVA with aluminum windings. Common optional modifiers include K factor, Low Temperature Rise, Electrostatic Shield, Copper Windings, Low Noise, Wall Mounting Brackets, and Drip Shields. All three phase dry-type ventilated transformers will be manufactured to DOE 2016 efficiency standards after January 1, 2016. See page 8-12 for common three-phase transformer offerings.

## Motor Drive Isolation Transformers

Siemens Drive Isolation Transformers are designed to meet the rugged demands of AC and DC variable speed drives and to provide circuit isolation from SCR's. The separate primary and secondary windings provide isolation between the incoming line and the load, minimizing line disturbances, feedback and transients caused by SCR firing. Common optional modifiers include low temperature rise, electrostatic shields, copper windings, thermal switches, wall mounting brackets and drip shields. See page 8-15 for more details.

## Sentron Power Centers

Siemens Sentron Power Center is a pre-wired combination of a primary breaker disconnect, dry type shielded transformer, secondary breaker disconnect and a secondary power panel all in one convenient package. You save time, space and money by not having to individually assemble, mount and wire these components. Simply add the branch breakers and you're ready to go. Both plug-on and bolt-on breaker panels are available. All Sentron Power Centers are UL-3R listed for indoor and outdoor use. See page 8-17 for more details.

## Harmonic Mitigating Transformers

The Sentron Harmonic Mitigating Transformers (HMTs) are designed to meet the needs of modern power distribution systems that contain a large percentage of non-linear equipment that produces harmonics. The Sentron HMTs are specially designed to operate under high non-linear load conditions and have the additional benefit of improving the overall power system reliability. Siemens Sentron Harmonic Mitigating Transformers are only available in three-phase with either one or two secondaries (outputs). See page 8-20 for more details. DOE 2016 efficiency standards apply after January 1, 2016.

## Buck-Boost Transformers

The Buck-Boost Transformer has four separate windings; two windings in the primary and two windings in the secondary. It can be used as either an insulating transformer or autotransformer. As an autotransformer, the unit can be corrected to Buck (decrease) or Boost (increase) a supply voltage. Since autotransformers may transmit line disturbances directly, they may be prohibited in some areas by local building codes. As insulating transformers, these units can accommodate a high voltage of 120, 240, or 480 volts. For units with two 12 volt secondaries, two 16 volt secondaries, or two 24 volt secondaries, the output can be wired for either secondary voltage, or for 3-wire secondary. The unit is rated (kVA) as any conventional unit. See Page 8-23 for more details.

# Distribution Dry Type Transformers

## Basic Rating Information

(The first five options are dedicated to Basic Rating Information and are the beginning of all Transformer part numbers)

Primary and Secondary terminal lugs are included on certain ventilated transformers. See chart on page 8-8 for lug information

Phase	Suffix
1-Phase	1
3-Phase	3

Primary Voltage Configuration	Suffix
240x120 V 1Ph	A
208 V 1Ph or 3Ph Delta	B
240 V 1Ph or 3Ph Delta	C
480x240 V 1Ph	D
277 V 1Ph	E
480 V 1Ph or 3Ph Delta	F
600 V 1Ph or 3Ph Delta	G
190/200/208/220x380 400/416/440	H
190/208/220/240x380 416/440/480	X

Secondary Voltage <sup>①</sup>	Suffix
240/1Ph 120V <sup>②</sup>	1
240	2
208Y/120	3
480	4
480Y/277	5
380Y/219	6
230Y/133	7
220/1Ph 110V <sup>②</sup>	8
400Y/231	9
416Y/240	0

Taps <sup>③</sup>	Suffix
None	N
2-5% FCBN	R
2-5% (1 FCAN, 1 FCBN)	S
4-2.5% (2 FCAN, 2 FCBN)	T
2-2.5% FCBN	U
4-2.5% FCBN	X
6-2.5% (2 FCAN, 4 FCBN)	Y
4-3.1% (2 FCAN, 2 FCBN)	J
2-3.5% (1 FCAN, 1 FCBN)	K
3-5% (1 FCAN, 2 FCBN)	M

① 380V Delta secondary is available by special quote.  
 ② Includes center tap on one phase often referred to as a lighting tap.

③ Taps are determined by transformer design and are not selectable on standard catalog units.

Optional Modifiers (If applicable, add suffix to part number in this order, from left to right)



Basic Rating Information

kVA	Suffix
0.25	205
0.5	505
0.75	705
1	001
1.5	105
2	002
3	003
5	005
6	006
7.5	007
9	009
10	010
15	015
25	025
30	030
37.5	037
45	045
50	050
75	075
100	100
112.5	112
150	150
167	167
225	225
300	300
500	500
750	750
1000	000

Optional Modifiers		
Modifier	Suffix	Description
K-Factor	K4	K-Factor of 1 is standard for all and is not shown as part of part number. Addition of K-Factor options 4-through 30 include Electrostatic Shield (ES) option and 200% neutral
	K13	
	K20	
	K30	
Low Temperature Rise	150C temperature rise with 220 insulation class is standard, no suffix code is needed	
	B	B=80C (80° C temp rise, can tolerate 30% continuous overload) <sup>②</sup>
	F	F=115C (115° C temp rise, can tolerate 15% continuous overload) <sup>②</sup>
Electrostatic Shield	G	G=130C
	ES	Electrostatic shield (full width copper foil) for added noise attenuation and reduction of high frequency disturbances.
Copper Wound	ES2	ES2=dual (only applicable to HD1). Series H only.
	C	C=Copper Windings. Aluminum windings are standard, no suffix code needed.
Low Noise	LN3	LN3=3dB below NEMA ST20
	LN()	( )=dB below NEMA ST20. Contact sales office for levels other than LN3 & LN5.
Seismic rated	Z4	See chart on page 8-8 for available seismic ratings, not part of catalog number when standard. Not used after DOE 2016 is introduced. Shown for legacy products only.
Totally Enclosed (Non-Ventilated)	TE	TE for Series H is NEMA 4 as a standard. TE for Series J is NEMA 3R as a standard. Other NEMA types available. TE option not available with D16 and TP1.
Totally Enclosed Encapsulated	TEE	Same as TE except encapsulated. TEE not available with D16 and TP1.
Energy Efficient <sup>③</sup>	D16	D16=DOE 2016 standards. DOE 2016 standards will replace TP1 For 3 Phase Ventilated Dry Type Transformers for 15 kVA-1000kVA starting Jan. 1, 2016
	TP1	Still valid for single phase and all non ventilated transformers after Jan. 1, 2016
Frequency	LZ	Standard is 60 Hertz. LZ option is 50/60 Hz. Not available with TP1 and D16.

Note 1: If the catalog number will not completely describe the product, it will be identified as SPC-- -kVA-XFMR.  
 Note 2: "JST" suffix has been removed. Standard units are in stock for immediate shipment in many cases. Contact customer support.

② With continuous overloads these units will be operating at 150 C rise designs.  
 ③ All D16 catalog numbers include NEMA 3R enclosures as standard unless other options chosen change or remove the enclosure.

# Distribution Dry Type Transformers

## Optional Modifiers (continued)

Modifier	Suffix	Description
Harmonic Mitigation		HD1 for DOE 2016 standard 3 phase dry type ventilated transformers only. Series H only.
	HD1	HD1=1 secondary/single output
"NEMA Premium"	NP	Surpasses NEMA-TP1 (Combine NP with available combined options as shown: "TP1...NP", "HM1...NP", "HM2...NP"). DOE 2016 standards surpass NP. NP not available after January 1, 2016 for DOE 2016 3 phase ventilated dry type transformers (15kVA-1000kVA). NP 1-phase will continue to be available after this date.
		Only to be used with suffix code HD1
Phase Shift for HD1	0	0 degree lagging
	30	30 degree lagging

## Optional Product Offerings

1. For non-standard or non-cataloged voltages or non-cataloged primary taps refer to sales office.
2. Non-standard application, 50/60 Hz, special impedance, voltage, etc.- consult sales office.
3. Auto transformers (A)- see page 8-11.
4. Non-standard paint color-contact sales office.
5. Harmonic mitigating transformers-see page 8-15.
6. Transformer and panel combinations- see page 8-13 & 8-14.

Optional Modifiers—continued (If applicable, add suffix to part number in this order, from left to right)

HD1	NP	30	TS7	TV	TB	SS	SSN4X	I3	CC	W	VG	DS
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## Optional Modifiers (continued)

Modifier	Suffix	Description
Thermal Switches		Typical Thermal Switch is 2.5 A and 250V max, typical installation is one TS per coil with wires brought to a modular screw terminal block on top of the transformer. Customer must specify NO or NC contacts. Contact customer support for special requirements.
	TS7 ( )	170C ( ) =no value: 1 switch
	TS8 ( )	180C ( ) = 2: 2 switches
	TS0 ( )	200C ( ) = 6: 6 switches
TVSS/SPD	TV	Filter Capacitors Secondary Side with Surge Suppression. Available for Series H only. Must specify 100kA or 200kA surge rating.
Terminal Block	TB	Contact customer support for standard terminal block availability. If special terminating requirements please advise
Stainless Steel Enclosure	SS	304 stainless (NEMA 3R if no NEMA type qualifier is specified)
	SS316	316 stainless (NEMA 3R if no NEMA type qualifier is specified)
Enclosure Types		304 stainless is standard. Stainless steel 316 available with a special quote.
	SSN4X	Non-Metallic NEMA 4X option not available.⑤
	N12	NEMA 12 (SSN12 with 304 stainless) 316 available with special quote⑤
	N4	NEMA 4 (SSN4 with 304 stainless) 316 available with special quote⑤
Special Impedance		The impedance tolerance per ANSI is +/- 7.5% nominal which is the "I" value shown on Impedance charts. (see SpeedFax Supplement - Addendums H and J) Contact customer support for special requirements (if max or min or min/max range is required.) (If no Min or Max is specified - catalog number will NOT include an "I" value)
	Ix.x or Ix	I2.5 = 2.5% max. or I3 = 3% max. for example. I2.5 to I6.5 are typical values.
	IMx.x	IM2.5 = 2.5% min. or IM3 = 3% min. for example.
	IMx.xIx.x	IM2.5I5.5 = 2.5% min. and 5.5% max. impedance range or IM2I15 = 2% min. and 5% max. range are examples.
Core and Coil Assembly	CC	Name plate is displayed on frame bracket. Product may be shipped with or without enclosure.
Wall Mounting Brackets	W④	Some DOE 2016 3 Phase Dry Type Ventiladed Transformers include Wall Brackets. See chart on next page for non-DOE availability and DOE 2016 details.
Vent Guard	VG	Vent Guard is a Mesh screen to prevent vent opening access.
Drip Shields (weathershields)	DS④	Most DOE 2016 Dry Type Ventiladed Transformers include Drip Shields from 15kVA to 1000kVA. See chart on next page for availability. Also see non-DOE availability.

④ The W and DS codes are not always part of the catalog number. Only shown as reference when it is not a standard feature of the device.  
 ⑤ Not available with D16 or TP1.

# Distribution Dry Type Transformers

Catalog Number Coding System for Transformers

Selection

## Seismic Rated:

All others not listed below are not seismic rated (contact customer support for Wall Mounting Ratings if needed)

Phase	Encapsulated	Ventilated		Non Ventilated
	Series J <sup>②</sup>	Series J <sup>②</sup>	Series H <sup>③</sup>	Series J <sup>②</sup>
1	1-25kVA (Wall Mounted) S <sub>DS</sub> =2.00g ; z/h = 1.00 ; I <sub>p</sub> = 1.5	1-250 kVA (Floor Mounted) S <sub>DS</sub> =2.00g ; z/h = 1.00 ; I <sub>p</sub> = 1.5	15-167kVA (Floor Mounted Only) S <sub>DS</sub> =2.00g ; z/h = 1.00 ; I <sub>p</sub> = 1.5	1-250kVA (Floor Mounted Only) S <sub>DS</sub> =2.00g ; z/h = 1.00 ; I <sub>p</sub> = 1.5
3	3-75kVA (Floor Mounted) S <sub>DS</sub> =2.00g ; z/h = 1.00 ; I <sub>p</sub> = 1.5	1-1000kVA (Floor Mounted) S <sub>DS</sub> =2.00g ; z/h = 1.00 ; I <sub>p</sub> = 1.5	15-750kVA (Floor Mounted Only) <sup>①</sup> S <sub>DS</sub> =2.00g ; z/h = 1.00 ; I <sub>p</sub> = 1.5	1-500kVA (Floor Mounted Only) S <sub>DS</sub> =2.00g ; z/h = 1.00 ; I <sub>p</sub> = 1.5
<b>DOE 2016 3 Phase Ventilated</b>				
3	NA	1-1000kVA (Floor Mounted)	15-750kVA (Floor Mounted Only)	NA

① Seismic labels are standard up to 750kVA with 150C temperature rise.  
 ② Series J Results are filed with OSHPD per OSP-0109-10.  
 ③ Series H results are filed with OSHPD per OSP-0136-10.

Seismic Qualified according to:  
 • International Building Code (IBC) 2012  
 • American Society of Civil Engineers (ASCE) 7-10

## Wall Mounting Brackets and Drip Shields

1 Phase Dry Type Wall Brackets/Drip Shields				
kVA	Wall Mounting Brackets (W)		Drip Shields (DS)	
	Series J	Series H	Series J	Series H
0.25-25 Encapsulated	Wall Mount only	NA	NA	NA
<b>All items below are Ventilated</b>				
15, 25	Optional**	Standard	Standard	Standard
37.5	Optional**	See Note 1	Standard	Standard
50	Optional**	See Note 1	Standard	Standard
75	NA	See Note 1	Standard	Standard
100-500	NA		Standard	Standard
3 Phase Dry Type Ventilated DOE 2016 Wall Brackets/Drip Shields				
kVA	Wall Mounting Brackets (W)		Drip Shields (DS)	
	Series J	Series H	Series J	Series H
15, 30	Optional**	Standard	Standard	Standard
45	Optional**	See Note 1	Standard	Standard
75	See Note 2	See Note 1	Standard	Standard
112.5-1000	N/A	See Note 1	Standard	Standard
3 Phase Dry Type Encapsulated				
kVA	Wall Mounting Brackets (W)		Drip Shields (DS)	
	Series J	Series H	Series J	Series H
3-15	Standard	Standard	N/A	N/A

- Standard with DH1 and DH2 enclosures. For DH3 enclosure, Series H transformers 1000 lbs or less can be wall mounted with kit p/n TWB75H. The DH3 designation is found on the lower left corner of the Front View Outline on the transformer drawing.
- Optional except with copper windings or options B, K13, K20. See table page 8-27.

\*\*For DOE 2016 and 1-Phase ventilated, cost of transformer will not include wall brackets. Wall brackets will be an additional charge.

## Standard Terminal Lug Offerings<sup>①②</sup>

(Primary and Secondary) for Ventilated Transformers (150 Degree Rise - Series J only - Without a K rating)

1-Phase					3-Phase				
kVA	120/240V	208V	480V	600V	kVA	120/240V	208V	480V	600V
0-15	Contact customer support				0-15	Contact customer support			
15	#2/0-6	#14-2	#14-2	#14-2	15	#14-2	#14-2	#14-2	#14-2
25	250MCM-6	250MCM-6	#14-2	#14-2	30	#2/0-6	#2/0-6	#14-2	#14-2
37.5	350MCM-6	350MCM-6	#14-2	#14-2	45	250MCM-6	250MCM-6	#14-2	#14-2
50	600MCM-2	600MCM-2	#2/0-6	#2/0-6	75	600MCM-2	350MCM-6	#2/0-6	#2/0-6
>50	Contact customer support				>75	Contact customer support			

① Values listed above are for standard configurations. There may be slight variations depending on requirements. Contact Customer Support for special requirements.  
 ② For Series H, see chart in Series H Addendum - Page H-16. Lug sizes are not available except on cutsheets. Contact Customer Support for special requirements.



# Distribution Dry Type Transformers

Single Phase

Selection

kVA	Catalog Number	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>②③④</sup>	Drip Shield Provided <sup>③</sup>	Enclosure Style – Type <sup>④</sup>	Optional Modifications
<b>208 Volts Primary, 120/240 Volts Secondary</b>								
1	1B1N001	N	95° C	130° C	Wall	No	Encapsulated – NEMA 3R	1, 2, 4
2	1B1N002	N	135° C	180° C	Wall	No		1, 2, 4
3	1B1N003	N	135° C	180° C	Wall	No		1, 2, 4
5	1B1N005	N	135° C	180° C	Wall	No		1, 2, 4
7.5	1B1N007	N	135° C	180° C	Wall	No		1, 2, 4
10	1B1N010	N	135° C	180° C	Wall	No		1, 2, 4
15	1B1N015	N	135° C	180° C	Wall	No	1, 2, 4	
15	1B1Y015TP1	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 2, 3
25	1B1Y025TP1	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3
37.5	1B1Y037TP1	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3
50	1B1S050TP1	Y <sup>⑤</sup> S <sup>⑥</sup>	150° C	220° C	Floor & Wall	Yes		1, 2, 3
75	1B1S075TP1	Y <sup>⑤</sup> S <sup>⑥</sup>	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 2, 3
100	1B1S100TP1	Y <sup>⑤</sup> S <sup>⑥</sup>	150° C	220° C	Floor	Yes		1, 2, 3
167	1B1S167TP1	Y <sup>⑤</sup> S <sup>⑥</sup>	150° C	220° C	Floor	Yes		1, 2, 3

## 240 × 480 Volts Primary, 120/240 Volts Secondary

.25	1D1N205	N	95° C	130° C	Wall	No	Encapsulated – NEMA 3R	1, 2, 4
.50	1D1N505	N	95° C	130° C	Wall	No		1, 2, 4
.75	1D1N705	N	95° C	130° C	Wall	No		1, 2, 4
1.0	1D1N001	N	95° C	130° C	Wall	No		1, 2, 4
1.5	1D1N105	N	135° C	180° C	Wall	No	Encapsulated – NEMA 3R	1, 2, 4
2.0	1D1N002	N	135° C	180° C	Wall	No		1, 2, 4
3.0	1D1N003	N	135° C	180° C	Wall	No		1, 2, 4
5.0	1D1N005	N	135° C	180° C	Wall	No		1, 2, 4
7.5	1D1N007	N	135° C	180° C	Wall	No		1, 2, 4
10.0	1D1N010	N	135° C	180° C	Wall	No		1, 2, 4
15	1D1N015	N	135° C	180° C	Wall	No	1, 2, 4	
15	1D1Y015TP1	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 2, 3
25	1D1Y025TP1	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3
37.5	1D1Y037TP1	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3
50	1D1Y050TP1	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3
75	1D1Y075TP1	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 2, 3
100	1D1Y100TP1	Y	150° C	220° C	Floor	Yes		1, 2, 3
167	1D1Y167TP1	Y	150° C	220° C	Floor	Yes		1, 2, 3

## 277 Volts Primary, 120/240 Volts Secondary

3	1E1U003	U	135° C	180° C	Wall	No	Encapsulated – NEMA 3R	1, 2, 4
5	1E1U005	U	135° C	180° C	Wall	No		1, 2, 4
7.5	1E1U007	U	135° C	180° C	Wall	No		1, 2, 4
10	1E1U010	U	135° C	180° C	Wall	No		1, 2, 4
15	1E1U015	U	135° C	180° C	Wall	No		1, 2, 4
25	1E1U025	U	135° C	180° C	Wall	No		1, 2, 4

## 480 Volts Primary, 120/240 Volts Secondary

3	1F1R003	R	135° C	180° C	Wall	No	Encapsulated – NEMA 3R	1, 2, 4
5	1F1R005	R	135° C	180° C	Wall	No		1, 2, 4
7.5	1F1R007	R	135° C	180° C	Wall	No		1, 2, 4
10	1F1R010	R	135° C	180° C	Wall	No		1, 2, 4
15	1F1R015	R	135° C	180° C	Wall	No		1, 2, 4
25	1F1R025	R	135° C	180° C	Wall	No		1, 2, 4

### Optional Modifications Table (Contact Sales office for List Price)

Optional (commonly used) Modifications	Catalog Suffix Code
1a. 115° C Rise	F
1b. 80° C Rise	B
2. Electrostatic Shield	ES
3. Copper Windings	C
4. Wall Mounting Brackets	W
5. Drip Shields	DS

### Taps

Description	Designation
None	N
2–5% FCBN	R
2–5% (1 FCAN, 1 FCBN)	S
2–2.5% FCBN	U
6–2.5% (2 FCAN, 4 FCBN)	Y

① Actual taps may vary based on volts/turn ratio.  
 ② Wall designations for units having standard features.  
 ③ For outdoor application. Ventilated transformers requiring drip shields/weathershields are UL listed for outdoor use. All are NEMA 3R rated.

④ Encapsulated transformers are UL listed for indoor/outdoor use. NEMA 3R rated.  
 ⑤ Items marked floor and wall can be wall mounted with optional wall bracket.

⑥ See table on page 8-8 for available kits.  
 ⑦ Series H Tap Standard.  
 ⑧ Series J Tap Standard.

# Distribution Dry Type Transformers

Single Phase

Selection

kVA	Catalog Number	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>②③④</sup>	Drip Shield Provided <sup>③</sup>	Enclosure Style <sup>④</sup>	Optional Modifications
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### 600 Volts Primary, 120/240 Volts Secondary

3	1G1R003	R	135° C	180° C	Wall	No	Encapsulated – NEMA 3R	1, 2, 4
5	1G1R005	R	135° C	180° C	Wall	No		1, 2, 4
7.5	1G1R007	R	135° C	180° C	Wall	No		1, 2, 4
10	1G1R010	R	135° C	180° C	Wall	No		1, 2, 4
15	1G1R015	R	135° C	180° C	Wall	No		1, 2, 4
25	1G1R025	R	135° C	180° C	Wall	No		1, 2, 4
25	1G1T025TP1	Y <sup>⑤</sup> T <sup>⑥</sup>	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 2, 3
37.5	1G1T037TP1	Y <sup>⑤</sup> T <sup>⑥</sup>	150° C	220° C	Floor & Wall	Yes		1, 2, 3
50	1G1T050TP1	Y <sup>⑤</sup> T <sup>⑥</sup>	150° C	220° C	Floor & Wall	Yes		1, 2, 3
75	1G1T075TP1	Y <sup>⑤</sup> T <sup>⑥</sup>	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 2, 3
100	1G1T100TP1	Y <sup>⑤</sup> T <sup>⑥</sup>	150° C	220° C	Floor	Yes		1, 2, 3
167	1G1T167TP1	Y <sup>⑤</sup> T <sup>⑥</sup>	150° C	220° C	Floor	Yes		1, 2, 3

### Overseas Model 190/200/208/220 x 380/400/416/440 Volts Primary, 120/240 Volts Secondary—1Ø, 50/60 Hz

1	1H1N001	N	95° C	130° C	Wall	No	Encapsulated – NEMA 3R	2, 3
2	1H1N002	N	135° C	180° C	Wall	No		2, 3
3	1H1N003	N	135° C	180° C	Wall	No		2, 3
5	1H1N005	N	135° C	180° C	Wall	No		2, 3
7.5	1H1N007	N	135° C	180° C	Wall	No		2, 3
10	1H1N010	N	135° C	180° C	Wall	No		2, 3
15	1H1N015	N	135° C	180° C	Wall	No		2, 3
25	1H1N025	N	135° C	180° C	Wall	No		2, 3

### Overseas Model 190/208/220/240 x 380/416/440/480 Volts Primary, 120/240 Volts Secondary—1Ø, 50/60 Hz

1	1X1N001	N	95° C	130° C	Wall	No	Encapsulated – NEMA 3R	2, 3
2	1X1N002	N	135° C	180° C	Wall	No		2, 3
3	1X1N003	N	135° C	180° C	Wall	No		2, 3
5	1X1N005	N	135° C	180° C	Wall	No		2, 3
7.5	1X1N007	N	135° C	180° C	Wall	No		2, 3
10	1X1N010	N	135° C	180° C	Wall	No		2, 3
15	1X1N015	N	135° C	180° C	Wall	No		2, 3
25	1X1N025	N	135° C	180° C	Wall	No		2, 3

### Overseas Model 190/200/208/220 x 380/400/416/440 Volts Primary, 110/220 Volts Secondary—1Ø, 50/60 Hz

1	1H8N001	N	95° C	130° C	Wall	No	Encapsulated – NEMA 3R	2, 3
2	1H8N002	N	135° C	180° C	Wall	No		2, 3
3	1H8N003	N	135° C	180° C	Wall	No		2, 3
5	1H8N005	N	135° C	180° C	Wall	No		2, 3
7.5	1H8N007	N	135° C	180° C	Wall	No		2, 3

Notice: CE mark is included on all overseas models.



### Optional Modifications Table (Contact Sales office for List Price)

Optional (commonly used) Modifications	Catalog Suffix Code
1a. 115° C Rise	F
1b. 80° C Rise	B
2. Electrostatic Shield	ES
3. Copper Windings	C
4. Wall Mounting Brackets	W
5. Drip Shields	DS

### Taps

Description	Designation
None	N
2-5% FCBN	R
2-5% (1 FCAN, 1 FCBN)	S
2-2.5% FCBN	U
6-2.5% (2 FCAN, 4 FCBN)	Y

① Actual taps may vary based on volts/turn ratio.  
 ② Wall designations for units having standard features.  
 ③ For outdoor application. Ventilated transformers requiring drip shields/weathershields are UL listed for outdoor use. All are NEMA 3R rated.

④ Encapsulated transformers are UL listed for indoor/outdoor use. NEMA 3R rated.  
 ⑤ Items marked floor and wall can be wall mounted with optional wall bracket.

⑥ See table on page 8-8 for available kits.  
 ⑦ Series H Tap Standard.  
 ⑧ Series J Tap Standard.

# Distribution Dry Type Transformers

Three Phase

Selection

kVA	Catalog Number	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>②③</sup>	Drip Shield Provided <sup>③</sup>	Enclosure Style <sup>④</sup>	Optional Modifications
<b>480 Volts Δ Primary, 240 Volts Δ Secondary With 120 Volt Tap On B Phase<sup>⑤</sup></b>								
15	3F1Y015D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 2, 3, 4
30	3F1Y030D16	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4
45	3F1Y045D16	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4
75	3F1Y075D16	Y	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 2, 3, 4
112.5	3F1Y112D16	Y	150° C	220° C	Floor	Yes		1, 2, 3, 4
150	3F1Y150D16	Y	150° C	220° C	Floor	Yes		1, 2, 3
225	3F1Y225D16	Y	150° C	220° C	Floor	Yes		1, 2, 3
300	3F1Y300D16	Y	150° C	220° C	Floor	Yes		1, 2, 3
500	3F1T500D16	Y <sup>Ⓞ</sup> , T <sup>Ⓞ</sup>	150° C	220° C	Floor	Yes		1, 2, 3
750	3F1T750D16	Y <sup>Ⓞ</sup> , T <sup>Ⓞ</sup>	150° C	220° C	Floor	Yes		1, 2, 3

<b>480 Volts Δ Primary, 240 Volts Δ Secondary</b>								
3	3F2R003 <sup>Ⓞ</sup>	R	135° C	180° C	Wall	No	Encapsulated – NEMA 3R	1, 2, 3
6	3F2R006 <sup>Ⓞ</sup>	R	135° C	180° C	Wall	No		1, 2, 3
9	3F2R009 <sup>Ⓞ</sup>	R	135° C	180° C	Wall	No		1, 2, 3
15	3F2R015 <sup>Ⓞ</sup>	R	135° C	180° C	Wall	No		1, 2, 3

<b>480 Volts Δ Primary, 208Y/120 Volts Secondary</b>								
3	3F3R003	R	135° C	180° C	Wall	No	Encapsulated – NEMA 3R	1, 2, 3
6	3F3R006	R	135° C	180° C	Wall	No		1, 2, 3
9	3F3R009	R	135° C	180° C	Wall	No		1, 2, 3
15	3F3R015	R	135° C	180° C	Wall	No		1, 2, 3
15	3F3Y015D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 2, 3, 4, 6
30	3F3Y030D16	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
45	3F3Y045D16	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
75	3F3Y075D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 2, 3, 4, 6
112.5	3F3Y112D16	Y	150° C	220° C	Floor	Yes		1, 2, 3, 6
150	3F3Y150D16	Y	150° C	220° C	Floor	Yes		1, 2, 3, 6
225	3F3Y225D16	Y	150° C	220° C	Floor	Yes		1, 2, 3, 6
300	3F3Y300D16	Y	150° C	220° C	Floor	Yes		1, 2, 3, 6
500	3F3T500D16	Y <sup>Ⓞ</sup> , T <sup>Ⓞ</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
750	3F3T750D16	Y <sup>Ⓞ</sup> , T <sup>Ⓞ</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
1000	3F3T000D16	T	150° C	220° C	Floor	Yes		1, 2, 3, 6

kVA	Catalog Number	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type	Drip Shield Required	Optional Modifications	Avg. Sound Level
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<b>Totally Enclosed Transformers, Indoor/Outdoor Use 480 Volts Δ Primary, 208Y/120 Volts Secondary<sup>⑦</sup></b>								
15	3F3Y015TE	Y	150° C	220° C	Floor	No	1, 2, 3	50dB
30	3F3Y030TE	Y	150° C	220° C	Floor	No	1, 2, 3	50dB
45	3F3Y045TE	Y	150° C	220° C	Floor	No	1, 2, 3	50dB
75	3F3Y075TE	Y	150° C	220° C	Floor	No	1, 2, 3	55dB
112.5	3F3Y112TE	Y	150° C	220° C	Floor	No	1, 2, 3	55dB
150	3F3Y150TE	Y	150° C	220° C	Floor	No	1, 2, 3	55dB
225	3F3Y225TE	Y	150° C	220° C	Floor	No	1, 2, 3	57dB
300	3F3Y300TE	Y	150° C	220° C	Floor	No	1a, 2, 3	57dB

<b>480 Volts Δ Primary, 240 Volts Δ Secondary with 120V Lighting Tap on B Phase<sup>⑦</sup></b>								
15	3F1Y015TE	Y	150° C	220° C	Floor	No	1, 2, 3	50dB
30	3F1Y030TE	Y	150° C	220° C	Floor	No	1, 2, 3	50dB
45	3F1Y045TE	Y	150° C	220° C	Floor	No	1, 2, 3	50dB
75	3F1Y075TE	Y	150° C	220° C	Floor	No	1, 2, 3	55dB
112.5	3F1Y112TE	Y	150° C	220° C	Floor	No	1, 2, 3	55dB
150	3F1Y150TE	Y	150° C	220° C	Floor	No	1, 2, 3	55dB
225	3F1Y225TE	Y	150° C	220° C	Floor	No	1, 2, 3	57dB
300	3F1Y300TE	Y	150° C	220° C	Floor	No	1a, 2, 3	57dB

**Optional Modifications Table** (Contact Sales office for List Price)

Optional (commonly used) Modifications	Catalog Suffix Code
1a. 115°C Rise	F
1b. 80°C Rise	B
2. Electrostatic Shield	ES
3. Copper Windings	C
4. Wall Mounting Brackets	W
6. Low noise—XdB below std.	LNx

**Taps**

Description	Designation
None	N
2–5% FCBN	R
2–5% (1 FCAN, 1 FCBN)	S
2–2.5% FCBN	U
6–2.5% (2 FCAN, 4 FCBN)	Y

①Actual taps may vary based on volts/turn ratio.  
 ②Wall designations for units having standard features.  
 ③Ventilated transformers with drip shields are UL listed for outdoor use. NEMA 3R rated.  
 ④Encapsulated transformers are UL listed for indoor/outdoor use. NEMA 3R rated.

⑤See table on page 8-8 for available kits.  
 ⑥240 volt secondary (3F2) is available in 3-phase 3 to 15kVA only.  
 ⑦TE units will have inrush equal to 2 sizes larger than rated kVA.

⑧Items marked floor and wall can be wall mounted with optional wall bracket that may be identified with "W" suffix on catalog number.  
 ⑨Wall mounting for 150°C temperature rise.  
 ⑩Series H Tap Standard.  
 ⑪Series J Tap Standard.

# Distribution Dry Type Transformers

Three Phase

Selection

kVA	Catalog Number	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>②⑥⑦</sup>	Drip Shield Provided <sup>③</sup>	Enclosed Type <sup>④</sup>	Optional Modifications
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### 480 Volts Δ Primary, 480Y/277 Volts Secondary

15	3F5R015	R	135° C	180° C	Wall	No	Encapsulated – NEMA 3R	1, 2, 3
15	3F5Y015D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 2, 3, 4, 6
30	3F5Y030D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 6
45	3F5Y045D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 2, 3, 4, 6
75	3F5Y075D16	Y	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 2, 3, 6
112.5	3F5Y112D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 6
150	3F5Y150D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 6
225	3F5Y225D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 6
300	3F5Y300D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 6
500	3F5T500D16	Y <sup>⑧</sup> , T <sup>⑨</sup>	150° C	220° C	Floor	Yes	Ventilated	1, 2, 3, 6

### 3-Phase 480 Δ — 208Y/120 K-4 (50% Non-Linear Load)<sup>⑤</sup>

15	3F3Y015K4D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 3, 4, 6
30	3F3Y030K4D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 6
45	3F3Y045K4D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 6
75	3F3Y075K4D16	Y	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 3, 6
112.5	3F3Y112K4D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
150	3F3Y150K4D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
225	3F3Y225K4D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
300	3F3Y300K4D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
500	3F3T500K4D16	Y <sup>⑧</sup> , T <sup>⑨</sup>	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6

### 3-Phase 480 Δ — 208Y/120 K-13 (100% Non-Linear Load)<sup>⑤</sup>

15	3F3Y015K13D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 3, 4, 6
30	3F3Y030K13D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 6
45	3F3Y045K13D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 6
75	3F3Y075K13D16	Y	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 3, 6
112.5	3F3Y112K13D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
150	3F3Y150K13D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
225	3F3Y225K13D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
300	3F3Y300K13D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
500	3F3T500K13D16	Y <sup>⑧</sup> , T <sup>⑨</sup>	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6

### 3-Phase 480 Δ — 208Y/120 K-20 (125% Non-Linear Load)<sup>⑤</sup>

15	3F3Y015K20D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 3, 4, 6
30	3F3Y030K20D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 6
45	3F3Y045K20D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 6
75	3F3Y075K20D16	Y	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 3, 6
112.5	3F3Y112K20D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
150	3F3Y150K20D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
225	3F3Y225K20D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
300	3F3Y300K20D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
500	3F3T500K20D16	Y <sup>⑧</sup> , T <sup>⑨</sup>	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6

### 3-Phase 480 Δ — 208Y/120 K-30 (150% Non-Linear Load)<sup>⑤</sup>

15	3F3Y015K30D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 3, 4, 6
30	3F3Y030K30D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 6
45	3F3Y045K30D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated	1, 3, 4, 6
75	3F3Y075K30D16	Y	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 3, 6
112.5	3F3Y112K30D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
150	3F3Y150K30D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
225	3F3Y225K30D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
300	3F3Y300K30D16	Y	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6
500	3F3T500K30D16	Y <sup>⑧</sup> , T <sup>⑨</sup>	150° C	220° C	Floor	Yes	Ventilated	1, 3, 6

### Optional Modifications Table (Contact Sales office for List Price)

Optional (commonly used) Modifications	Catalog Suffix Code
1a. 115°C Rise	F
1b. 80°C Rise	B
2. Electrostatic Shield	ES
3. Copper Windings	C
4. Wall Mounting Brackets	W
6. Low noise—XdB below std.	LNX

### Taps

Description	Designation
None	N
2–5% FCBN	R
2–5% (1 FCAN, 1 FCBN)	S
2–2.5% FCBN	U
6–2.5% (2 FCAN, 4 FCBN)	Y

①Actual taps may vary based on volts/turn ratio.

②Wall designations for units having standard features.

③Ventilated transformers drip shields are UL listed for outdoor use.

④Encapsulated transformers are UL listed for indoor/outdoor use. 15kVA with R taps also available in ventilated enclosure.

⑤K-Factor transformers equipped with electrostatic shield and 200% neutral as standard features.

⑥See table on page 8-8 for available kits.

⑦Items marked floor and wall can be wall mounted with optional wall bracket that may be identified with

“W” suffix on catalog number. Wall mounting brackets will not be available for Series J 75kVA with copper winding options.

⑧Series H Tap Standard.

⑨Series J Tap Standard.

# Distribution Dry Type Transformers

Three Phase

Selection

kVA	Catalog Number	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>②③④</sup>	Drip Shield Provided <sup>③</sup>	Enclosure Style – Type <sup>④</sup>	Optional Modifications
<b>208 Volts Δ Primary, 208Y/120 Volts Secondary</b>								
3	3B3R003	R	135° C	180° C	Wall	No	Encapsulated – NEMA 3R	1, 2, 3
6	3B3R006	R	135° C	180° C	Wall	No		1, 2, 3
9	3B3R009	R	135° C	180° C	Wall	No		1, 2, 3
15	3B3R015	R	135° C	180° C	Wall	No		1, 2, 3
15	3B3Y015D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 2, 3, 4, 6
30	3B3Y030D16	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
45	3B3Y045D16	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
75	3B3Y075D16	Y	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 2, 3, 6
112.5	3B3Y112D16	Y	150° C	220° C	Floor	Yes		1, 2, 3, 6
150	3B3M150D16	Y <sup>⑤</sup> , M <sup>⑥</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
225	3B3M225D16	S <sup>⑦</sup> , M <sup>⑧</sup>	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 2, 3, 6
300	3B3M300D16	S <sup>⑦</sup> , M <sup>⑧</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
500	3B3M500D16	S <sup>⑦</sup> , M <sup>⑧</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
<b>208 Volt Δ Primary, 240 Δ Secondary with 120 Volt TAP on B Phase<sup>②</sup></b>								
15	3B1Y015D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 2, 3, 4, 6
30	3B1Y030D16	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
45	3B1Y045D16	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
75	3B1Y075D16	Y	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 2, 3, 6
112.5	3B1Y112D16	Y	150° C	220° C	Floor	Yes		1, 2, 3, 6
150	3B1M150D16	Y <sup>⑤</sup> , M <sup>⑥</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
225	3B1M225D16	Y <sup>⑤</sup> , M <sup>⑥</sup>	150° C	220° C	Floor	Yes	1, 2, 3, 6	
<b>208 Volts Δ Primary, 480Y/277 Volts Secondary</b>								
9	3B5R009	R	135° C	180° C	Wall	No	Encapsulated – NEMA 3R	1, 2, 3
15	3B5R015	R	135° C	180° C	Wall	No		1, 2, 3
15	3B5Y015D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 2, 3, 4, 6
30	3B5Y030D16	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
45	3B5Y045D16	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
75	3B5Y075D16	Y	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 2, 3, 6
112.5	3B5Y112D16	Y	150° C	220° C	Floor	Yes		1, 2, 3, 6
150	3B5M150D16	Y <sup>⑤</sup> , M <sup>⑥</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
225	3B5M225D16	S <sup>⑦</sup> , M <sup>⑧</sup>	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 2, 3, 6
300	3B5M300D16	S <sup>⑦</sup> , M <sup>⑧</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
500	3B5M500D16	S <sup>⑦</sup> , M <sup>⑧</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
<b>240 Volts Δ Primary, 208Y/120 Volts Secondary</b>								
15	3C3Y015D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 2, 3, 4, 6
30	3C3Y030D16	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
45	3C3Y045D16	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
75	3C3Y075D16	Y	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 2, 3, 6
112.5	3C3Y112D16	Y	150° C	220° C	Floor	Yes		1, 2, 3, 6
150	3C3Y150D16	Y	150° C	220° C	Floor	Yes		1, 2, 3, 6
225	3C3M225D16	S <sup>⑦</sup> , M <sup>⑧</sup>	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 2, 3, 6
300	3C3M300D16	S <sup>⑦</sup> , M <sup>⑧</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
500	3C3M500D16	S <sup>⑦</sup> , M <sup>⑧</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
<b>240 Volts Δ Primary, 480Y/277 Volts Secondary</b>								
15	3C5Y015D16	Y	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 2, 3, 4, 6
30	3C5Y030D16	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
45	3C5Y045D16	Y	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
75	3C5Y075D16	Y	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 2, 3, 6
112.5	3C5Y112D16	Y	150° C	220° C	Floor	Yes		1, 2, 3, 6
150	3C5Y150D16	Y	150° C	220° C	Floor	Yes		1, 2, 3, 6
225	3C5M225D16	S <sup>⑦</sup> , M <sup>⑧</sup>	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 2, 3, 6
300	3C5M300D16	S <sup>⑦</sup> , M <sup>⑧</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
500	3C5M500D16	S <sup>⑦</sup> , M <sup>⑧</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6

### Optional Modifications Table

Optional (commonly used) Modifications	Catalog Suffix Code
1a. 115° C Rise	F
1b. 80° C Rise	B
2. Electrostatic Shield	ES
3. Copper Windings	C
4. Wall Mounting Brackets <sup>1</sup>	W
6. Low noise—XdB below std.	LNx

### Taps

Description	Designation
None	N
2–5% FCBN	R
2–5% (1 FCAN, 1 FCBN)	S
2–2.5% FCBN	U
6–2.5% (2 FCAN, 4 FCBN)	Y

### Seismic Ratings

Series J <sup>®</sup> Rating Information (see page 8-8)	
Phase 1	1kVA-500kVA (Floor Mounted) S <sub>DS</sub> =2.00g ; z/h = 1.00 ; I <sub>p</sub> = 1.5
Phase 3	

① Actual taps may vary based on volts/turn ratio.  
 ② Wall designations for units having standard features.  
 ③ Ventilated transformers drip shields are UL listed for outdoor use.  
 ④ Encapsulated transformers are UL listed for indoor/outdoor use. 15kVA with R taps also available in ventilated enclosure.

⑤ See table on page 8-8 for available kits.  
 ⑥ Items marked floor and wall can be wall mounted with optional wall bracket that may be identified with "W" suffix on catalog number. Wall mounting brackets will not be available for Series J 75kVA with copper winding options.

⑦ Reduced capacity 1-phase tap— When utilizing 1-phase tap at 5%, the 3-phase load is reduced to 85% max. (5% reduction on 3 coils). 10% of rated kVA absolute maximum (evenly balanced on each side of lighting tap). When utilizing 1-phase tap at 10%, the 3-phase load is reduced to 70% max. (10% reduction on 3 coils).  
 ⑧ Results are filed with OSHDP per OSP-0109-10.  
 ⑨ Series H Tap Standard.  
 ⑩ Series J Tap Standard.

# Distribution Dry Type Transformers

Three Phase

Selection

kVA	Catalog Number	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>②③④</sup>	Drip Shield Provided <sup>⑤</sup>	Enclosure Style <sup>④</sup>	Optional Modifications
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### 600 Volts Δ Primary, 208Y/120 Volts Secondary

3	3G3R003	R	135° C	180° C	Wall	No	Encapsulated – NEMA 3R	1, 2, 3
6	3G3R006	R	135° C	180° C	Wall	No		1, 2, 3
9	3G3R009	R	135° C	180° C	Wall	No		1, 2, 3
15	3G3R015	R	135° C	180° C	Wall	No		1, 2, 3
15	3G3T015D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 2, 3, 4, 6
30	3G3T030D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
45	3G3T045D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
75	3G3T075D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 2, 3, 6
112.5	3G3T112D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
150	3G3T150D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
225	3G3T225D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
300	3G3T300D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
500	3G3T500D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6

### 600 Volts Δ Primary, 480Y/277 Volts Secondary

3	3G5R003	R	135° C	180° C	Wall	No	Encapsulated – NEMA 3R	1, 2, 3
6	3G5R006	R	135° C	180° C	Wall	No		1, 2, 3
9	3G5R009	R	135° C	180° C	Wall	No		1, 2, 3
15	3G5R015	R	135° C	180° C	Wall	No		1, 2, 3
15	3G5T015D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	1, 2, 3, 4, 6
30	3G5T030D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
45	3G5T045D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor & Wall	Yes		1, 2, 3, 4, 6
75	3G5T075D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor	Yes	Ventilated – NEMA 3R	1, 2, 3, 6
112.5	3G5T112D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
150	3G5T150D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
225	3G5T225D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
300	3G5T300D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6
500	3G5T500D16	Y <sup>∅</sup> , T <sup>⊗</sup>	150° C	220° C	Floor	Yes		1, 2, 3, 6

## Dual Purpose Auto Transformers<sup>®</sup>

kVA		Catalog Number	Taps <sup>①</sup>	Temperature Rise	Insulation	Mounting Type <sup>②</sup>	Drip Shield Required <sup>③</sup>	Enclosure Style <sup>④</sup>	Optional Modifications
600V Pri 480V Sec	480V Pri 380V Sec								

### 600 Volts Primary, 480 Volts Secondary 3Ø 60 Hz OR—480 Volts Primary 380 Volts Secondary 3Ø 50/60 Hz Alternate Rating

15	12	3G4N015A	N	80° C	130° C	Wall	No	Encapsulated – NEMA 3R	—
30	24	3G4N030A	N	115° C	180° C	Wall	No		—
45	36	3G4N045A	N	150° C	220° C	Floor & Wall	Yes	Ventilated – NEMA 3R	4, 5
75	60	3G4N075A	N	150° C	220° C	Floor & Wall	Yes		4, 5
112.5	90	3G4N112A	N	150° C	220° C	Floor & Wall	Yes		4, 5
150	120	3G4N150A	N	150° C	220° C	Floor & Wall	Yes		4, 5
225	180	3G4N225A	N	150° C	220° C	Floor & Wall	Yes		4, 5
300	240	3G4N300A	N	150° C	220° C	Floor	Yes		5
500	400	3G4N500A	N	150° C	220° C	Floor	Yes		5

### Optional Modifications Table (Contact Sales office for List Price)

Optional (commonly used) Modifications	Catalog Suffix Code
1a. 115° C Rise	F
1b. 80° C Rise	B
2. Electrostatic Shield	ES
3. Copper Windings	C
4. Wall Mounting Brackets	W
6. Low noise - XdB below std.	LNX

### Taps

Description	Designation
None	N
2-5% FCBN	R
2-5% (1 FCAN, 1 FCBN)	S
2-2.5% FCBN	U
6-2.5% (2 FCAN, 4 FCBN)	Y

① Actual taps may vary based on volts/turn ratio.  
 ② Wall designations for units having standard features.  
 ③ Ventilated transformers drip shields are UL listed for outdoor use.  
 ④ Encapsulated transformers are UL listed for indoor/outdoor use.

⑤ If used on unbalanced loads, these auto transformers will need to be used on a 4-wire system with the supply neutral connected to the transformer. If used on motor loads, then they may be used on a 3-wire system without a neutral or fourth wire. Review in NEC 450-4 and 450-5.  
 ⑥ Items marked floor and wall can be wall mounted with optional wall bracket that may be identified

with "W" suffix on catalog number. Wall mounting brackets will not be available for Series J 75kVA with copper winding options. See pages 8-8 and 8-27 for details.  
 ⑦ Series H Tap Standard.  
 ⑧ Series J Tap Standard.  
 ⑨ See table on page 8-8 for available kits.

# Distribution Dry Type Transformers

## Motor Drive Isolation

For industrial and commercial applications with SCR-controlled adjustable speed motor drives, and AC adjustable frequency or DC drives.

Designed for use with motor drives, the drive isolation transformer must isolate the motor from the line and handle the added loads of the drive-created harmonics.

Drive isolation transformers are engineered for both AC adjustable frequency and DC motor drives.

They are specifically designed to accommodate the electrical and mechanical stresses, regenerative current reversals and frequent short circuits, inherent in severe drive duty cycles.

### Three Phase 60HZ Motor Drive Isolation Transformers

Motor kVA	Catalog H.P. ④	Standard Number	Taps ①	Rise	Insulation	Mounting Type ③	Drip Shield Required ②	Optional Modifications
7.5	3 & 5	DT ( ) 007	S	135° C	180° C	Floor & Wall	No	1, 2, 3
11	7.5	DT ( ) 011	S	135° C	180° C	Floor & Wall	No	1, 2, 3
14	10	DT ( ) 014	S	150° C	220° C	Floor & Wall	Yes	1, 2, 3, 4, 5, 6
20	15	DT ( ) 020	S	150° C	220° C	Floor & Wall	Yes	1, 2, 3, 4, 5, 6
27	20	DT ( ) 027	S	150° C	220° C	Floor & Wall	Yes	1, 2, 3, 4, 5, 6
34	25	DT ( ) 034	S	150° C	220° C	Floor & Wall	Yes	1, 2, 3, 4, 5, 6
40	30	DT ( ) 040	S	150° C	220° C	Floor & Wall	Yes	1, 2, 3, 4, 5, 6
51	40	DT ( ) 051	S	150° C	220° C	Floor & Wall	Yes	1, 2, 3, 4, 5, 6
63	50	DT ( ) 063	S	150° C	220° C	Floor & Wall	Yes	1, 2, 3, 4, 5, 6
75	60	DT ( ) 075	S	150° C	220° C	Floor	Yes	1, 2, 3, 5, 6
93	75	DT ( ) 093	S	150° C	220° C	Floor	Yes	1, 2, 3, 5, 6
118	100	DT ( ) 118	S	150° C	220° C	Floor	Yes	1, 2, 3, 5, 6
145	125	DT ( ) 145	S	150° C	220° C	Floor	Yes	1, 2, 3, 5, 6
175	150	DT ( ) 175	S	150° C	220° C	Floor	Yes	1, 2, 3, 5, 6
220	200	DT ( ) 220	S	150° C	220° C	Floor	Yes	1, 2, 3, 5, 6
275	250	DT ( ) 275	S	150° C	220° C	Floor	Yes	1, 2, 3, 5, 6
330	300	DT ( ) 330	S	150° C	220° C	Floor	Yes	1, 2, 3, 5, 6
440	400	DT ( ) 440	S	150° C	220° C	Floor	Yes	1, 2, 3, 5, 6
550	500	DT ( ) 550	S	150° C	220° C	Floor	Yes	1, 2, 3, 5, 6
660	600	DT ( ) 660	S	150° C	220° C	Floor	Yes	1, 2, 3, 5, 6

DT ( ) Code	Primary Volts	Secondary Volts
18	208 Delta	208Y/120
20	208 Delta	230Y/133
21	208 Delta	460Y/266
22	230 Delta	230Y/133
24	230 Delta	460Y/266
30	380 Delta	460Y/266
42	460 Delta	230Y/133
44	460 Delta	460Y/266
45	460 Delta	380Y/220
52	575 Delta	230Y/133
54	575 Delta	460Y/266

Motor Drive Isolation Optional Modifications	Catalog Suffix Code
1a. 115° C Rise	F
1b. 80° C Rise	B
2. Electrostatic Shield	ES
3. Copper Windings	C
4. Wall Mounting Brackets	W
5. Drip Shields/Weather Shields	DS
6. Thermal Switches	TS

(Contact Sales office for List Price)

① Actual taps may vary based on volts/turn ratio.  
 ② For outdoor application. Ventilated transformers requiring drip shields are UL listed for outdoor use. No charge when requested at time of initial project order.

③ Items marked floor and wall can be wall mounted with optional wall bracket identified with "W" suffix on catalog number. See pages 8-8 and 8-27 for details.

④ Refer selection and application guide for additional information on horsepower, Ampere, kVA ratings and applications. Standard taps varies with design volts/turn ratio.

# Distribution Dry Type Transformers

Sentron Power Centers – Plug-In Series

Selection

## Economical Space Saving Package

Siemens Sentron Power Center is a pre-wired combination of a primary breaker disconnect, dry type shielded transformer, secondary breaker disconnect and a secondary power panel all in one convenient package.

You save time, space and money by not having to individually assemble, mount and wire these components. Simply add the branch and you're ready to go.

## UL-3R Enclosures

All Sentron Power Center enclosures are UL-3R listed for indoor and outdoor use.

## Transformer Assembly

Siemens totally encapsulated distribution transformers are designed for general purpose indoor/outdoor operation.

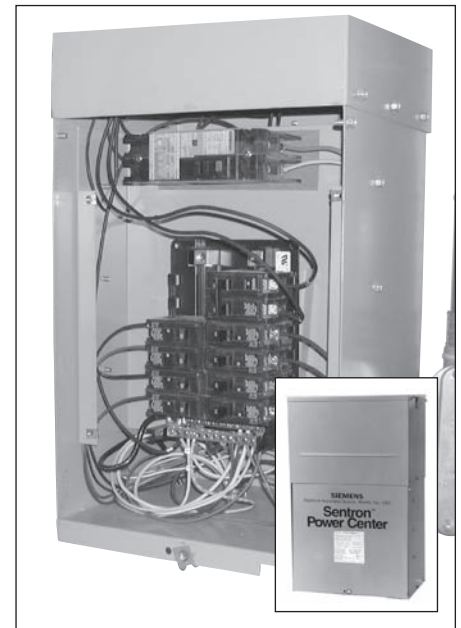
Sentron Power Centers can be installed in a wide variety of atmospheric and environmental conditions. A 180°C, UL recognized insulation system is used with a 115°C temperature rise.

Sentron Power Center units are electrostatically shielded to provide transient voltage protection at no extra cost. All units have 2-5% FCBN taps.

## Panel Assembly

The power panel assembly will accommodate one-inch, 1, 2 or 3-pole, common trip, duplex secondary branch circuit breakers, Type Q and QT as well as ground fault circuit breakers. Per UL and NEC requirements, the Sentron Power Center assembly comes fully equipped with primary and secondary main circuit breakers. Branch circuit breakers can be obtained from our local distributor once you have established your branch circuit requirements. All Sentron Power Centers are UL listed for service entrance.

- \* Not Seismic rated
- \*\* Not available for Buy America



kVA	Catalog Number <sup>③⑦</sup>	Maximum Secondary Circuits <sup>①</sup>			Interior Number Reference <sup>⑤</sup>	Approximate Dimensions (in inches)			Approximate Net Weight (lbs.)
		1" Wide	1/2" Wide	2" Wide		Height	Width	Depth	
		120V (1-Pole)	120V (1-Pole)	240V (2-pole)					

### 480 Volts Primary, 240/120 Volts Secondary — Single Phase<sup>②</sup> — Sentron Power Centers<sup>④</sup>

5.0	1LPC005	8	16	4	I1224ML1100	32.13	13.25	7.63	120
7.5	1LPC007	8	16	4	I1224ML1100	32.13	15.88	11.00	160
10.0	1LPC010	8	16	4	I1224ML1100	34.38	15.88	11.00	185
15.0	1LPC015	12	24	6	I1224L1125CU	34.38	17.13	12.38	240
25.0	1LPC025	20	40	10	I2440L1200CU	41.88	17.88	13.50	330

kVA	Catalog Number <sup>③⑦⑧</sup>	Maximum Secondary Circuits <sup>①</sup>			Interior Number Reference <sup>⑤</sup>	Approximate Dimensions (in inches)			Approximate Net Weight (lbs.)
		1" Wide	1/2" Wide	3" Wide		Height	Width	Depth	
		120V (1-Pole)	120V (1-Pole)	208V (3-pole)					

### 480 Volts Δ Primary, 208Y/120 Volts Secondary — Three Phase — Sentron Power Centers<sup>④</sup>

9.0	3LPC009	12	24	4	PI1836L3200CUB	33.75	22.13	7.63	255
15.0	3LPC015	12	24	4	PI1836L3200CUB	35.13	22.13	12.38	385
22.5	3LPC022	18	36	6	PI2442L3200CUB	38.25	30.25	13.38	535
30.0	3LPC030	24	42	8	PI3054L3200CUB	43.75	33.00	13.75	680

## Circuit Breaker Data for Plug-In Sentron Power Centers

### 480 Volts to 240/120 Volts — Single Phase

kVA	480 Volts Primary Breaker <sup>①③④</sup>	240/120 Volts Secondary Main	Maximum Rating of Secondary Breakers
5.0	ED42B025L (25A)	Q225 (25A)	20 Amps
7.5	ED42B025L (25A)	Q240 (40A)	30 Amps
10.0	ED42B035L (35A)	Q250 (50A)	40 Amps
15.0	ED42B050L (50A)	Q270 (70A)	60 Amps
25.0	ED42B090L (90A)	Q2125 (125A)	100 Amps

### 480 Volts Δ to 208Y/120 Volts — Three Phase

kVA	480 Volts Primary Breaker <sup>①③④</sup>	208Y/120 Volts Secondary Main	Maximum Rating of Secondary Breakers
9.0	ED43B025L (25A)	Q330 (30A)	25 Amps
15.0	ED43B040L (40A)	Q350 (50A)	40 Amps
22.5	ED43B070L (70A)	Q370 (70A)	60 Amps
30.0	ED43B090L (90A)	Q3100 (100A)	80 Amps

① Primary breaker has lineside lug for customer connection.  
 ② 18,000 Amps RMS Symmetrical Interrupting Capacity.  
 ③ Sentron Power Centers are NEMA 3R for outdoor application and may be ordered with "SS" suffix for 304 stainless steel enclosure. For 316 stainless steel add suffix SS316.

④ Secondary branch breakers are not included and must be ordered separately.  
 ⑤ Primary and secondary main breakers are included and are factory installed.  
 ⑥ ED frame breakers furnished are rated 18000 AIC and are sufficient for fault current of transformer. No other breakers are currently approved for use.

⑦ Copper windings are standard on 1LPC005 and 3LPC009. Add CU to other partnumber to get copper windings.  
 ⑧ CU and CUB interiors have tin plated copper bus. 1-Phase 5 thru 10kVA have aluminum bus. CUB refers to OEM interior versus CU un-assembled interior.



# Distribution Dry Type Transformers

Sentron Power Centers – Bolt-on Series

Selection

## Bolt-on Breaker Option

The same economical space saving package, NEMA 3R rated enclosure, and UL listed transformer of the original Sentron Power Center but now available with more robust BOLT-ON BREAKERS.

## Panel Assembly

This version of the Sentron Power Center uses our UL Recognized P1 Lighting Panel interior with the following ratings & features:

- 200 kA Short Circuit rating
- 240 Volts maximum (when using type BL branch devices)
- 250 Amps maximum
- Copper bus
- 18 circuit panel for 15kVA and below
- 30 circuit panel for designs above 15kVA

The power panel assembly will accommodate one-inch, 1, 2, or 3-pole type BL, BLH, HBL branch Breakers, to include the BL family of AFCI, GFCI, Ground Fault, Switching Neutrals, HID Lighting, Tungsten Lighting, and Molded Case Switches.

The Sentron Power Center assembly comes fully equipped with transformer primary and secondary main circuit breakers. Branch circuit breakers can be obtained from our local distributor once you have established your branch circuit requirements. All Sentron Power Centers are UL listed for service entrance applications.

\* Not Seismic rated

\*\* Buy America may be available on some models. Catalog numbers will end in "BA." Lead times will be affected. Please contact Customer Support for more information.



## Voltage rating: 480 - 240/120, Single Phase<sup>②</sup>, Sentron Power Center<sup>⑤</sup>

kVA	Catalog Number <sup>③</sup>	Maximum Secondary Circuits <sup>④</sup>		Interior Part Number	Approximate Dimensions (inches)			Approximate Weight (lbs.)
		1" Wide	2" Wide		Height	Width	Depth	
5	1LPC005JA <sup>④</sup>	16	8	K11D255001	38.00	15.88	11.00	165
7.5	1LPC007JA <sup>④</sup>	16	8	K11D255001	38.00	15.88	11.00	165
10	1LPC010JA <sup>④</sup>	16	8	K11D255001	38.00	17.13	12.38	240
15	1LPC015JA <sup>④</sup>	16	8	K11D255001	38.00	17.13	12.38	240
25	1LPC025JA <sup>④</sup>	28	14	K11D255002	45.19	17.88	13.50	330

## Voltage rating: 480 Delta - 208Y/120, Three Phase, Sentron Power Center<sup>④</sup>

kVA	Catalog Number <sup>③</sup>	Maximum Secondary Circuits <sup>①②</sup>		Interior Part Number	Approximate Dimensions (inches)			Approximate Weight (pounds)
		1" Wide	2" Wide		Height	Width	Depth	
9	3LPC009JA <sup>⑦</sup>	15	7	K11D255201	33.75	22.13	7.63	255
15	3LPC015JA <sup>⑦</sup>	15	7	K11D255201	35.13	22.13	12.38	385
22.5	3LPC022JA <sup>⑦</sup>	27	13	K11D255202	43.75	33.00	13.75	680
30	3LPC030JA <sup>⑦</sup>	27	13	K11D255202	43.75	33.00	13.75	680

## Circuit Breaker Data for Bolt-on Sentron Power Centers

### For Single Phase Sentron Power Centers

kVA	Transformer Primary Breaker <sup>①③④</sup>	Panel Secondary Main Breaker	Maximum rating of Branch Breakers (Amps)
5	ED42B025L (25A)	B230H (30A)	20
7.5	ED42B025L (25A)	B240H (40A)	30
10	ED42B035L (35A)	B250H (50A)	40
15	ED42B050L (50A)	B270 (70A)	60
25	ED42B090L (90A)	B2125 (125A)	100

### For Three Phase Sentron Power Centers

kVA	Transformer Primary Breaker <sup>①③④</sup>	Panel Secondary Main Breaker	Maximum rating of Branch Breakers (Amps)
9	ED43B025L (25A)	B330H (30A)	25
15	ED43B040L (40A)	B350H (50A)	40
22.5	ED43B070L (70A)	B370 (70A)	60
30	ED43B090L (90A)	B3100 (100A)	80

① Primary breaker has lineside lug for customer connection.

② 18,000 Amps RMS Symmetrical Interrupting Capacity.

③ Sentron Power Centers are NEMA 3R for outdoor application and may be ordered with "SS" suffix for 304 stainless steel enclosure. For 316 stainless steel add suffix SS316.

④ Secondary branch breakers are not included and must be ordered separately.

⑤ Primary and secondary main breakers are included and are factory installed.

⑥ ED frame breakers furnished are rated 18000 AIC and are sufficient for fault current of transformer. No other breakers are currently approved for use.

⑦ Standard windings are aluminum. Add "CU" at end for copper windings. Contact customer support for assistance.

⑧ Excluding Secondary Main Breaker that takes up 2 poles.

⑨ Excluding Secondary Main Breaker that takes up 3 poles.

# Transformers

## DOE 2016 Efficiency Standards

The Department of Energy (DOE) 10 CFR 431 has released new efficiency standards which will be put into effect January 1, 2016. These standards surpass and supersede NEMA TP1 efficiency standards. All low-voltage dry-type three-phase ventilated transformers from 15 kVA through 1000kVA must be manufactured to these standards after January 1, 2016. DOE 2016 standards also apply to Harmonic Mitigating Transformers (See pages 8-19 – 8-20).

Transformers manufactured to DOE 2016 efficiencies must meet efficiency levels with a 35% load and temperature of 75°C. Transformers with DOE 2016 standards have grain-oriented, non-aging silicon steel cores. DOE 2016 standards do not apply to single phase, encapsulated, motor drive isolation, and auto transformers.

## High Efficiency Transformers

Single Phase		Three Phase	
kVA	TP1 Efficiency	kVA	DOE 2016 Efficiency
15	97.70%	15	97.89%
25	98.00%	30	98.23%
37.5	98.20%	45	98.40%
50	98.30%	75	98.60%
75	98.50%	112.5	98.74%
100	98.60%	150	98.83%
167	98.70%	225	98.94%
250	98.80%	300	99.02%
333	98.90%	500	99.14%
		750	99.23%
		1000	99.28%

## NEMA TP1 Efficiency Standards

NEMA TP1 will still be a valid efficiency standard for single phase transformers after January 1, 2016. The TP1 designs use high grade electrical steel and other features to lower flux density and reduce losses especially at average 35% loading where the TP1 measurements apply. The core construction employs the use

of high quality grain-oriented, non-aging silicon steel with high permeability, low hysteresis, and low eddy current losses. These characteristics are required to achieve the TP1 efficiency levels. Core laminations must be tightly assembled enabling magnetic flux densities to be kept well below the saturation point.

### Description

The Sentron Harmonic Mitigating Transformers (HMTs) are designed to meet the needs of modern power distribution systems that contain a large percentage of non-linear equipment that produces harmonics. Some examples of this type of equipment are computers, printers, fax machines, scanners, copiers, uninterruptible power supplies, ballast and variable frequency drives (VFD). This type of equipment generates harmonic voltages and currents because they contain AC to DC power conversion rectifiers. Harmonic voltages and currents can cause a variety of problems ranging from poor power factor, voltage distortion, capacitor resonance and motor failures to overloaded transformers and conductors.

The Sentron HMTs are specially designed to operate under high non-linear load conditions and have the additional benefit of improving the overall power system reliability.

### Application

One of the most effective ways to eliminate power system harmonics is to use a technique known as "phase shifting." In this method power system harmonics are eliminated by pairing together harmonics that have 180° relative angular displacement, which causes them to cancel one another out. This can be accomplished by a variety of means:

#### Single Output Harmonic Mitigating Transformer (0° or -30° primary-secondary angular displacement)

■ The primary of this transformer has a delta connection and its secondary has a special double winding connection. Although there is only one secondary three phase output, the 3<sup>rd</sup>, 9<sup>th</sup> and 15<sup>th</sup> harmonic currents are prevented from circulating in the primary windings by canceling their magnetic fluxes at low impedance with the double winding secondary, reducing voltage distortions to the loads.

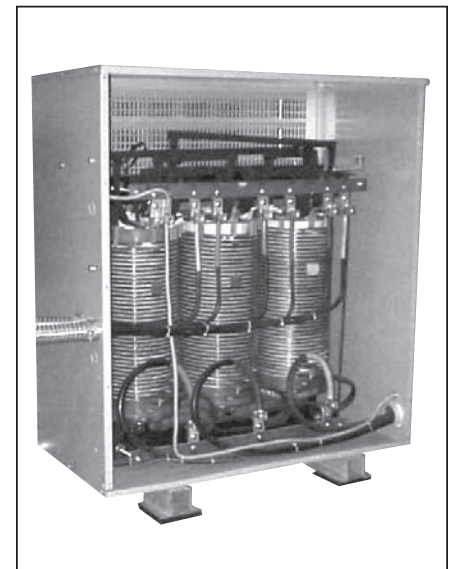
- When two transformers with this type of connection, 0° and -30° displacement, are used in parallel, the 3<sup>rd</sup>, 9<sup>th</sup> and 15<sup>th</sup> harmonic currents are canceled as previously described, and additionally the 5<sup>th</sup> and 7<sup>th</sup> harmonic currents are cancelled in the electrical supply common to both transformers due to their relative 30° phase shift.
- If a single harmonic mitigating transformer (0°) is used in an existing or new system utilizing standard delta-wye transformers (-30°), the 5<sup>th</sup> and 7<sup>th</sup> harmonic currents originating from the HMT transformer (0°) will attempt to cancel the 5<sup>th</sup> and 7<sup>th</sup> harmonic currents originating from the standard delta-wye transformer (-30°). This reduces the overall 5<sup>th</sup> and 7<sup>th</sup> harmonics present in the system, with the actual reduction dependent on the magnitudes of the secondary loads.

### Benefits

Elimination of undesirable harmonics by using the Siemens Sentron HMTs is an effective solution to the power quality problems encountered by today's power system professionals. By treating the harmonics at their source, using advanced technology, installation problems can be avoided and overall system reliability improved. The Sentron HMT product line provides many far reaching benefits such as lower operating cost, improved operating efficiency, reduced down-time due to outages caused by nuisance tripping, and increased equipment life due to low-voltage distortions.

### Design and Construction Features

The Sentron Harmonic Mitigating Transformers comply with all applicable ANSI/IEEE standards including C57.12.91, C57.96, C57.110, CSA # C22.2 No. 47 (CUL), UL506, UL1561 as well as NEMA ST-20. The design life is 25 years at 150 degree C rise, 30 years at 115C rise and 40 years for 80C rise models. Approvals and listings include UL, CSA. with CE approval available when requested. The Sentron HMTs have capability of K-factor up to K-13, which is achieved by harmonic cancellations in the secondary and low flux density design for protection against heat in place of design enlargement protection only. Both copper and aluminum coil windings are available and full width copper foil electrostatic shield is standard. Additional shield options are available for higher noise attenuation requirements. All HMTs have 150C rise with optional 130C, 115C and 80C winding rise designs available. All designs include vacuum impregnated polyester resin encapsulation of windings and NEMA 3R enclosures. A neutral sized at 200% of the ampacity of the secondary phase conductors for extra protection against triplens and unbalanced single phase loads. The Sentron HMT designs have DOE 2016 energy efficient rating equal to that of a non K-Factor rated transformer. Siemens HMT designs have DOE 2016 efficiency levels at 35% load @ ref temp. 75 degree C.



# Transformers

## Sentron Harmonic Mitigating Transformers (HD1)

Selection

### Catalog Number Coding:

Single output (1 secondary) = HD1,  
Phase Shift Options: HD1 followed by > (00) or (30) degree.  
HMT, 480 Volt Primary 208Y/120 Volt Secondary (3F3)–150C  
(standard), 115C and 80C Winding Rise displayed on this page.  
HMTs are also available with 480–480Y/277 (3F5), 208–  
208Y/120 (3B3), 208–480Y/277 (3B5).

### Standard Features Include:

- K-13 Load profile rating.
- DOE 2016 Efficiencies at 35% load.
- (C) Copper windings or Aluminum windings (no suffix code).
- (ES) Electrostatic shield.
- 150 C Winding rise.

Changes after January 1, 2016: 2 output, 15 & 45 deg Lag & 130 deg C temp rise will no longer be standard. They can be provided with a special quote from MAP.

kVA	150C (Std) Rise HMT Catalog Number <sup>①</sup>	115C Rise HMT Catalog Number <sup>①</sup>	80C Rise HMT Catalog Number <sup>①</sup>	Secondary Configuration		Enclosure Style	Optional HMT Modifications
				Outputs	Phase Shift		
15	3F3Y015CHD100	3F3Y015FCHD100	3F3Y015BCHD100	1	Zero Degree	Vented	A,B,C,D,E,F,G
15	3F3Y015CHD130	3F3Y015FCHD130	3F3Y015BCHD130	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G
30	3F3Y030CHD100	3F3Y030FCHD100	3F3Y030BCHD100	1	Zero Degree	Vented	A,B,C,D,E,F,G
30	3F3Y030CHD130	3F3Y030FCHD130	3F3Y030BCHD130	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G
45	3F3Y045CHD100	3F3Y045FCHD100	3F3Y045BCHD100	1	Zero Degree	Vented	A,B,C,D,E,F,G
45	3F3Y045CHD130	3F3Y045FCHD130	3F3Y045BCHD130	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G
75	3F3Y075CHD100	3F3Y075FCHD100	3F3Y075BCHD100	1	Zero Degree	Vented	A,B,C,D,E,F,G
75	3F3Y075CHD130	3F3Y075FCHD130	3F3Y075BCHD130	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G
112.5	3F3Y112CHD100	3F3Y112FCHD100	3F3Y112BCHD100	1	Zero Degree	Vented	A,B,C,D,E,F,G
112.5	3F3Y112CHD130	3F3Y112FCHD130	3F3Y112BCHD130	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G
150	3F3Y150CHD100	3F3Y150FCHD100	3F3Y150BCHD100	1	Zero Degree	Vented	A,B,C,D,E,F,G
150	3F3Y150CHD130	3F3Y150FCHD130	3F3Y150BCHD130	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G
225	3F3Y225CHD100	3F3Y225FCHD100	3F3Y225BCHD100	1	Zero Degree	Vented	A,B,C,D,E,F,G
225	3F3Y225CHD130	3F3Y225FCHD130	3F3Y225BCHD130	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G
300	3F3Y300CHD100	3F3Y300FCHD100	3F3Y300BCHD100	1	Zero Degree	Vented	A,B,C,D,E,F,G
300	3F3Y300CHD130	3F3Y300FCHD130	3F3Y300BCHD130	1	30 Deg Lagging	Vented	A,B,C,D,E,F,G
500	3F3Y500CHD100	3F3Y500FCHD100	3F3Y500BCHD100	1	Zero Degree	Vented	C,D,E,F,G
500	3F3Y500CHD130	3F3Y500FCHD130	3F3Y500BCHD130	1	30 Deg Lagging	Vented	C,D,E,F,G

### Optional Modifications Table for HMTs

<p><b>Sound Level</b></p> <p><b>A</b> LN3= (3dB below NEMA standard)</p> <p><b>B</b> LN5= (5dB below NEMA standard)</p> <p><b>Attenuation—Single shield—60dB Common Mode Std.</b></p> <p><b>C</b> ES2= Double shield—80dB Common Mode &gt; <sup>②</sup></p> <p><b>Filtering &amp; Attenuation</b></p> <p><b>E</b> TV= Secondary side TVSS (100kA &amp; 200kA available) with common mode noise attenuation</p> <p><b>F</b> TB= Terminal Block</p>	<p><b>Thermal Sensors 170° C= (TS7), 185° C= (TS8) or 200° C= (TS0)</b></p> <p><b>G</b> TS7 = 1 sensor center coil</p> <p><b>G</b> TS72 = 2 sensors center coil</p> <p><b>G</b> TS76 = 6 sensors, (2) on each coil</p> <p><b>G</b> TS8 = 1 sensor center coil</p> <p><b>G</b> TS82 = 2 sensors center coil</p> <p><b>G</b> TS86 = 6 sensors, (2) on each coil</p> <p><b>G</b> TS0 = 1 sensor center coil</p> <p><b>G</b> TS02 = 2 sensors center coil</p> <p><b>G</b> TS06 = 6 sensors, (2) on each coil</p>
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① Contact Sales Office for pricing.

② ES2  
Common Mode:  
100dB: Between 60 Hz – 1 kHz  
90 dB: Between 1 kHz – 10 kHz  
80dB: Between 10 kHz – 1000 kHz

Transverse Mode:  
10dB: @ 10kHz  
20dB: @ 100 kHz  
40dB: @ 1000 kHz

# Warehouse Stock Transformers

Warehouse Stock

Selection



## Buck-Boost Application Description and Selection

The Buck-Boost Transformer has four separate windings, two-windings in the primary and two-windings in the secondary. The unit is designed for use as an isolation (or insulating) transformer or as an autotransformer. As an autotransformer the unit can be connected to Buck (decrease) or Boost (increase) a supply voltage. When connected in either the Buck or Boost mode, the unit is no longer an isolation (or insulating) transformer but is an autotransformer. Units are designed for 60Hz applications (50Hz units available upon request).

Autotransformers are more economical and physically smaller than equivalent two-winding transformers and are designed to carry the same function as two-winding transformers, with the exception of isolating two circuits. Since autotransformers may transmit line disturbances directly, they may be prohibited in some areas by local building codes. Before applying them, care should be taken to assure that they are acceptable according to local code.

**NOTE:** Autotransformers are not used in closed delta connections as they introduce into the circuit a phase shift which makes them uneconomical.

As isolation (or insulating) transformers these units can accommodate a high voltage of 120, 240 or 480 volts. For units with two 12 volt secondaries, two 16 volt secondaries, or two 24 volt secondaries, the output can be wired for either secondary voltage, or for 3-wire secondary. The unit is rated (kVA) as any conventional transformer.

## Operation

Electrical and electronic equipment is designed to operate on a standard supply voltage. When the supply voltage is constantly too high or too low, (usually greater than  $\pm 5\%$ ), the equipment fails to operate at maximum efficiency. A Buck-Boost transformer is a simple and economical

means of correcting this off-standard voltage up to  $\pm 20\%$ . A Buck-Boost transformer will NOT, however, stabilize a fluctuating voltage. Buck-Boost transformers are suitable for use in a three phase autotransformer bank in either direction to supply 3-wire loads. They are also suitable for use in a three phase autotransformer bank which provides a neutral return for unbalanced current. They are NOT suitable for use in a three phase autotransformer bank to supply a 4-wire unbalanced load when the source is a 3-wire circuit.

## Construction

Buck-Boost Transformers are contained within a NEMA 3R, non-ventilated weather-proof enclosure. Wiring compartments are located at the bottom. Core and coil assemblies are encapsulated. Isolation (or insulating) system temperature is  $130^{\circ}\text{C}$  and the winding temperature rise is  $95^{\circ}\text{C}$  for units up through 1 kVA. Isolation (or insulating) system temperature is  $180^{\circ}\text{C}$  and the winding temperature rise is  $135^{\circ}\text{C}$  for units 1.5 kVA and above.

## How To Select The Proper Transformer

To select the proper Transformer for Buck-Boost applications, determine:

1. Input line voltage — The voltage that you want to buck (decrease) or boost (increase). This can be found by measuring the supply line voltage with a voltmeter.
2. Load voltage — The voltage at which your equipment is designed to operate. This is listed on the nameplate of the load equipment.
3. Load kVA or Load Amps — You do not need to know both — one or the other is sufficient for selection purposes. This information usually can be found on the nameplate of the equipment that you want to operate.

4. Number of phases — Single or three phase line and load should match because a transformer is not capable of converting single to three phase. It is however a common application to make a single phase transformer connection from a three phase supply by use of two legs of the three phase supply circuit. Care must always be taken not to overload the leg of the three phase supply. This is particularly true in a Buck-Boost application because the supply must provide for the load kVA, not just the nameplate rating of the Buck-Boost transformer.
5. Frequency — The supply line frequency must be the same as the frequency of the equipment to be operated — either 50 or 60 cycles.

## How To Use Selection Charts

1. Choose the selection table with the correct number of phases for single or three phase applications.
2. Line/Load voltage combinations are listed across the top of the selection table. Select a line/load voltage combination which comes closest to matching your applications.
3. Follow the selected column down until you find either the kVA or load amps of your application. If you do not find the exact value, go on the next highest rating.
4. Now follow across the table to the far left-hand side to find the catalog number and the kVA of the transformer you need.
5. Follow the column of your line/load voltage to the bottom to find the connection diagram for this application.  
**NOTE:** Connection diagrams show low-voltage and high-voltage connection terminals. Either can be input or output depending on Buck or Boost application.
6. In the case of three phase loads either two or three single phase transformers are required as indicated in the "quantity required" line at the bottom of the table. The selection is dependent on whether a Wye connected bank of three transformers with a neutral is required or whether an open Delta connected bank of two transformers for a Delta connected load will be suitable.
7. For line/load voltage not listed on the selection tables, use the pair listed on the table that is slightly above your application for reference. Then apply the first formula at the bottom of the table to determine "new" output voltage. The new kVA rating can be found using the second formula.

8

TRANSFORMERS

# Warehouse Stock Transformers

Buck-Boost

Selection

## 120 × 240 Volts Primary — 12/24 Volts Secondary, 60 Hz, No Taps, Wall Mounted

Single Phase — Table 1		Boosting								Bucking					
Catalog Number*	Line Voltage (Available)	96	100	105	109	189	208	215	220	125	132	229	245	250	252
Insulating Transformer Rating	Load Voltage (Output)	115	120	115	120	208	229	237	242	114	120	208	222	227	240
050BB1224J .050 kVA	kVA	.24	.25	.50	.50	.43	.48	.49	.50	.52	.55	.48	.51	.52	1.05
	Load Amps	2.08	2.08	4.17	4.17	2.08	2.08	2.08	2.08	4.59	4.59	2.29	2.29	2.29	4.38
100BB1224J .100 kVA	kVA	.48	.50	.96	1.00	.87	.95	.99	1.01	1.04	1.10	.95	1.02	1.04	2.10
	Load Amps	4.17	4.17	8.33	8.33	4.17	4.17	4.17	4.17	9.16	9.16	4.58	4.58	4.58	8.75
150BB1224J .150 kVA	kVA	.72	.75	1.44	1.50	1.30	1.43	1.48	1.51	1.55	1.65	1.43	1.53	1.56	3.15
	Load Amps	6.25	6.25	12.50	12.50	6.25	6.25	6.25	6.25	13.75	13.75	6.88	6.88	6.88	13.13
205BB1224J .250 kVA	kVA	1.19	1.25	2.40	2.50	2.17	2.38	2.47	2.52	2.60	2.75	2.38	2.54	2.60	5.25
	Load Amps	10.42	10.42	20.83	20.83	10.42	10.42	10.42	10.42	22.92	22.92	11.46	11.46	11.46	21.88
505BB1224J .500 kVA	kVA	2.37	2.50	4.80	5.00	4.33	4.77	4.94	5.04	5.18	5.50	4.77	5.09	5.20	10.50
	Load Amps	20.83	20.83	41.67	41.67	20.83	20.83	20.83	20.83	45.83	45.83	22.92	22.92	22.92	43.75
705BB1224J .750 kVA	kVA	3.56	3.75	7.19	7.50	6.50	7.15	7.41	7.56	7.77	8.25	7.15	7.63	7.80	15.75
	Load Amps	31.25	31.25	62.50	62.50	31.25	31.25	31.25	31.25	68.75	68.75	34.38	34.38	34.38	65.63
1BB1224J 1.00 kVA	kVA	4.75	5.00	9.58	10.00	8.67	9.53	9.88	10.08	10.36	11.00	9.53	10.17	10.40	21.00
	Load Amps	41.67	41.67	83.33	83.33	41.67	41.67	41.67	41.67	91.66	91.66	45.83	45.83	45.83	87.50
105BB1224J 1.50 kVA	kVA	7.13	7.50	14.38	15.00	13.00	14.30	14.81	15.13	15.54	16.50	14.30	15.26	15.61	31.50
	Load Amps	62.50	62.50	125.00	125.00	62.50	62.50	62.50	62.50	137.50	137.50	68.75	68.75	68.75	131.25
2BB1224J 2.00 kVA	kVA	9.50	10.00	19.17	20.00	17.33	19.07	19.75	20.17	20.72	22.00	19.07	20.35	20.81	42.00
	Load Amps	83.33	83.33	166.66	166.66	83.33	83.33	83.33	83.33	183.33	183.33	91.66	91.66	91.66	175.00
3BB1224J 3.00 kVA	kVA	14.25	15.00	28.75	30.00	26.00	28.60	29.63	30.25	31.08	33.00	28.60	30.53	31.21	63.00
	Load Amps	125.00	125.00	250.00	250.00	125.00	125.00	125.00	125.00	275.00	275.00	137.50	137.50	137.50	262.50
5BB1224J 5.00 kVA	kVA	23.75	25.00	47.92	50.00	43.33	47.67	49.37	50.42	51.79	55.00	47.67	50.88	52.02	105.00
	Load Amps	208.33	208.33	416.66	416.66	208.33	208.33	208.33	208.33	458.33	458.33	229.17	229.17	229.17	437.50
Connection Diagram (pg. 8-25)		2	2	1	1	4	4	4	4	4	1	4	4	4	3

Three Phase — Table 2		Boosting								Bucking					
Catalog Number*	Line Voltage (Available)	189Y/ 109	195Y/ 113	200Y/ 115	208Y/ 120	416Y/ 240	416Y/ 240	189	208	220	218	229	250	255	264
Insulating Transformer Rating	Load Voltage (Output)	208Y/ 120	234Y/ 135	240Y/ 139	229Y/ 132	458Y/ 264	437Y/ 252	208	229	242	208	208	227	232	240
050BB1224J .050 kVA	kVA	1.50	.84	.86	1.65	1.65	3.15	.75	.83	.87	1.58	.83	.90	.92	.95
	Load Amps	4.17	2.08	2.08	4.17	2.08	4.17	2.08	2.08	2.08	4.39	2.29	2.29	2.29	2.29
100BB1224J .100 kVA	kVA	3.00	1.69	1.73	3.30	3.30	6.29	1.50	1.65	1.75	3.15	1.65	1.80	1.84	1.90
	Load Amps	8.33	4.17	4.17	8.33	4.17	8.33	4.17	4.17	4.17	8.75	4.58	4.58	4.58	4.58
150BB1224J .150 kVA	kVA	4.50	2.54	2.60	4.96	4.96	9.44	2.26	2.48	2.62	4.73	2.48	2.71	2.76	2.86
	Load Amps	12.50	6.25	6.25	12.50	6.25	12.50	6.25	6.25	6.25	13.13	6.88	6.88	6.88	6.88
205BB1224J .250 kVA	kVA	7.50	4.22	4.33	8.30	8.25	15.75	3.75	4.13	4.37	7.88	4.13	4.50	4.61	4.76
	Load Amps	20.83	10.42	10.42	20.83	10.42	20.83	10.42	10.42	10.42	21.88	11.46	11.46	11.46	11.46
505BB1224J .500 kVA	kVA	15.01	8.44	8.66	16.60	16.50	31.50	7.50	8.26	8.73	15.76	8.26	9.01	9.21	9.53
	Load Amps	41.67	20.83	20.83	41.67	20.83	41.67	20.83	20.83	20.83	43.75	22.92	22.92	22.92	22.92
705BB1224J .750 kVA	kVA	22.52	12.67	12.99	24.90	24.75	47.25	11.26	12.39	13.10	23.64	12.39	13.52	13.82	14.29
	Load Amps	62.50	31.25	31.25	62.50	31.25	62.50	31.25	31.25	31.25	65.63	34.38	34.38	34.38	34.38
1BB1224J 1.00 kVA	kVA	30.02	16.89	17.32	33.20	33.00	63.00	15.01	16.51	17.47	31.52	16.51	18.02	18.42	19.05
	Load Amps	83.33	41.67	41.67	83.33	41.67	83.33	41.67	41.67	41.67	87.50	45.83	45.83	45.83	45.53
105BB1224J 1.50 kVA	kVA	45.03	25.33	25.98	49.80	49.50	94.50	22.52	24.77	26.20	47.28	24.77	27.03	27.63	28.53
	Load Amps	125.00	62.50	62.50	125.00	62.50	125.00	62.50	62.50	62.50	131.25	68.75	68.75	68.75	68.75
2BB1224J 2.00 kVA	kVA	60.06	33.77	34.64	66.40	66.00	126.00	30.02	33.03	34.93	63.05	33.03	36.04	36.84	38.11
	Load Amps	166.67	83.33	83.33	166.67	83.33	166.66	83.33	83.33	83.33	175.00	91.67	91.67	91.67	91.67
3BB1224J 3.00 kVA	kVA	90.07	50.66	51.96	99.59	99.00	189.00	45.03	49.54	52.39	94.57	49.54	54.06	55.25	57.16
	Load Amps	250.00	125.00	125.00	250.00	125.00	250.00	125.00	125.00	125.00	262.50	137.50	137.50	137.50	137.50
5BB1224J 5.00 kVA	kVA	150.11	84.44	86.60	165.99	165.00	318.00	75.05	82.56	87.32	157.62	82.56	90.10	92.09	95.26
	Load Amps	416.67	208.33	208.33	416.67	208.33	416.66	208.33	208.33	208.33	437.50	229.17	229.17	229.17	229.17
Quantity Required		3	3	3	3	3	3	2	2	2	2	2	2	2	2
Connection Diagram (pg. 8-25)		5	6	6	5	8	7	12	12	12	11	12	12	12	12

\* All Buck-Boost transformers listed are available for immediate shipment.

• Output voltage for lower input voltage can be found by:  
 $\frac{\text{Rated Output Voltage}}{\text{Rated Input Voltage}} \times \text{Input Actual Voltage} = \text{Output New Voltage.}$

• Output kVA available at reduced input voltage can be found by:  
 $\frac{\text{Actual Input Voltage}}{\text{Rated Input Voltage}} \times \text{Output kVA} = \text{New kVA Rating.}$

• Inputs and outputs may be reversed without affecting kVA capacity. See note on page 8-25

# Warehouse Stock Transformers

Buck-Boost

Selection

## 120 × 240 Volts Primary — 16/32 Volts Secondary, 60 Hz, No Taps, Wall Mounted

Single Phase — Table 3			Boosting							Bucking						
Catalog Number*	Line Voltage (Available)		95	100	105	208	215	215	220	225	135	240	240	245	250	255
Insulating Transformer Rating	Load Voltage (Output)		120	113	119	236	244	229	235	240	120	212	225	230	234	239
050BB1632J .050 kVA	kVA		.19	.36	.37	.37	.38	.72	.73	.73	.42	.37	.75	.77	.78	.80
	Load Amps		1.56	3.12	3.12	1.56	1.56	3.12	3.12	3.12	3.54	1.77	3.33	3.33	3.33	3.33
100BB1632J .100 kVA	kVA		.38	.72	.74	.74	.76	1.44	1.46	1.50	.84	.74	1.50	1.54	1.56	1.60
	Load Amps		3.13	6.25	6.25	3.13	3.13	6.25	6.25	6.25	7.09	3.54	6.66	6.66	6.66	6.66
150BB1632J .150 kVA	kVA		.56	1.06	1.12	1.12	1.14	2.16	2.20	2.26	1.26	1.10	2.26	2.30	2.34	2.40
	Load Amps		4.69	9.38	9.38	4.69	4.69	9.38	9.38	9.38	10.64	5.30	10.02	10.02	10.02	10.02
205BB1632J .250 kVA	kVA		.94	1.78	1.86	1.88	1.91	3.59	3.67	3.75	2.11	1.84	3.75	3.83	3.90	3.98
	Load Amps		7.81	15.63	15.63	7.81	7.81	15.63	15.63	15.63	17.71	8.85	16.67	16.67	16.67	16.67
505BB1632J .500 kVA	kVA		1.88	3.56	3.72	3.75	3.81	7.19	7.34	7.50	4.21	3.68	7.50	7.67	7.80	7.97
	Load Amps		15.63	31.25	31.25	15.63	15.63	31.25	31.25	31.25	35.42	17.71	33.33	33.33	33.33	33.33
705BB1632J .750 kVA	kVA		2.81	5.34	5.58	5.63	5.72	10.78	11.02	11.25	6.32	5.53	11.25	11.50	11.70	11.95
	Load Amps		23.44	46.88	46.88	23.44	23.44	46.88	46.88	46.88	53.13	26.56	50.00	50.00	50.00	50.00
1BB1632J 1.00 kVA	kVA		3.75	7.13	7.44	7.50	7.63	14.38	14.69	15.00	8.43	7.37	15.00	15.33	15.60	15.93
	Load Amps		31.25	62.50	62.50	31.25	31.25	62.50	62.50	62.50	70.83	35.42	66.67	66.67	66.67	66.67
105BB1632J 1.50 kVA	kVA		5.63	10.69	11.16	11.25	11.44	21.56	22.03	22.50	12.64	11.05	22.50	23.00	23.40	23.90
	Load Amps		43.90	93.80	93.80	46.90	46.90	93.80	93.80	93.80	106.30	53.10	100.00	100.00	100.00	100.00
2BB1632J 2.00 kVA	kVA		7.50	14.25	14.88	15.00	15.25	28.75	29.38	30.00	16.86	14.73	30.00	30.67	31.20	31.87
	Load Amps		62.50	125.00	125.00	62.50	62.50	125.00	125.00	125.00	141.70	70.80	133.30	133.30	133.30	133.30
3BB1632J 3.00 kVA	kVA		11.25	21.38	22.31	22.50	22.88	43.13	44.06	45.00	25.29	22.10	45.00	46.00	46.80	47.80
	Load Amps		93.80	187.50	187.50	93.80	93.80	187.50	187.50	187.50	212.50	106.30	200.00	200.00	200.00	200.00
5BB1632J 5.00 kVA	kVA		18.75	35.63	37.19	37.50	38.13	71.88	73.44	75.00	42.15	36.83	75.00	76.67	78.00	79.67
	Load Amps		156.30	312.50	312.50	156.30	156.30	312.50	312.50	312.50	354.20	177.10	333.30	333.30	333.30	333.30
Connection Diagram (pg. 8-25)			2	1	1	4	4	3	3	3	1	4	3	3	3	3

Three Phase — Table 4			Boosting					Bucking					
Catalog Number*	Line Voltage (Available)		183Y/ 106	208Y/ 120	195	208	225	240	245	250	256	265	272
Insulating Transformer Rating	Load Voltage (Output)		208Y/ 120	236Y/ 136	208	236	240	208	230	234	240	234	240
050BB1632J .050 kVA	kVA		1.13	1.28	1.13	.62	1.30	.56	1.33	1.35	1.39	.72	.74
	Load Amps		3.13	3.13	3.13	1.56	3.13	1.56	3.34	3.34	3.34	1.77	1.77
100BB1632J .100 kVA	kVA		2.25	2.55	2.25	1.30	2.60	1.13	2.66	2.70	2.77	1.44	1.48
	Load Amps		6.25	6.25	6.25	3.13	6.25	3.13	6.67	6.67	6.67	3.55	3.55
150BB1632J .150 kVA	kVA		3.38	3.83	3.38	1.95	3.90	1.69	3.98	4.05	4.16	2.15	2.21
	Load Amps		9.38	9.38	9.38	4.69	9.38	4.69	10.00	10.00	10.00	5.31	5.31
205BB1632J .250 kVA	kVA		5.63	6.39	5.63	3.17	6.50	2.81	6.64	6.76	6.93	3.59	3.68
	Load Amps		15.63	15.63	15.63	7.81	15.63	7.81	16.67	16.67	16.67	8.85	8.85
505BB1632J .500 kVA	kVA		11.26	12.77	11.26	6.33	12.99	5.63	13.28	13.50	13.86	7.17	7.36
	Load Amps		31.25	31.26	31.25	15.63	31.25	15.63	33.33	33.33	33.33	17.69	17.71
705BB1632J .750 kVA	kVA		16.89	19.16	16.89	9.50	19.49	8.44	19.92	20.26	20.78	10.76	11.04
	Load Amps		46.88	46.88	46.88	23.44	46.88	23.44	50.00	50.00	50.00	26.54	26.56
1BB1632J 1.00 kVA	kVA		22.52	25.55	22.52	12.67	25.98	11.26	26.56	27.02	27.71	14.34	14.72
	Load Amps		62.50	62.50	62.50	31.25	62.50	31.25	66.67	66.67	66.67	35.39	35.42
105BB1632J 1.50 kVA	kVA		33.77	38.32	33.77	19.00	38.97	16.89	39.84	40.53	41.57	21.52	22.08
	Load Amps		93.75	93.75	93.75	46.88	93.75	46.88	100.00	100.00	100.00	53.08	53.13
2BB1632J 2.00 kVA	kVA		45.03	51.10	46.03	25.33	51.96	22.52	53.11	54.04	55.43	28.69	29.44
	Load Amps		125.00	125.00	125.00	62.50	125.00	62.50	133.33	133.33	133.33	70.78	70.83
3BB1632J 3.00 kVA	kVA		67.55	76.64	67.55	38.00	77.94	33.77	79.67	81.06	83.14	43.03	44.17
	Load Amps		187.50	187.50	187.50	93.75	187.50	93.75	200.00	200.00	200.00	106.17	106.25
5BB1632J 5.00 kVA	kVA		112.58	127.74	112.58	63.33	129.90	56.29	132.79	135.09	138.56	71.72	73.61
	Load Amps		312.50	312.50	312.50	156.25	312.50	156.25	333.33	333.33	333.33	176.95	177.08
Quantity Required			3	3	2	2	2	2	2	2	2	2	2
Connection Diagram (pg. 8-25)			5	5	11	12	11	12	11	11	11	12	12

\* All Buck-Boost transformers listed are available for immediate shipment.

• Output voltage for lower input voltage can be found by:  
 $\frac{\text{Rated Output Voltage}}{\text{Rated Input Voltage}} \times \text{Input Actual Voltage} = \text{Output New Voltage}$

• Output kVA available at reduced input voltage can be found by:  
 $\frac{\text{Actual Input Voltage}}{\text{Rated Input Voltage}} \times \text{Output kVA} = \text{New kVA Rating}$

• Inputs and outputs may be reversed without affecting kVA capacity. See note on page 8-25.

# Warehouse Stock Transformers

Buck-Boost

Selection

## 240 × 480 Volts Primary — 24/48 Volts Secondary, 60 Hz, No Taps, Wall Mounted

Single Phase — Table 5		Boosting										Bucking			
Catalog Number*	Line Voltage (Available)	230	380	416	425	430	435	440	450	450	460	277	480	480	504
Insulating Transformer Rating	Load Voltage (Output)	276	418	458	468	473	457	462	495	472	483	231	436	457	480
050BB2448J .050 kVA	kVA	.29	.44	.48	.49	.49	.95	.96	.52	.98	1.01	.29	.50	1.00	1.05
	Load Amps	1.04	1.04	1.04	1.04	1.04	2.08	2.08	1.04	2.08	2.08	1.25	1.15	2.19	2.19
100BB2448J .100 kVA	kVA	.58	.87	.95	.97	.99	1.90	1.93	1.03	1.97	2.01	.58	1.00	2.00	2.10
	Load Amps	2.08	2.08	2.08	2.08	2.08	4.17	4.17	2.08	4.17	4.17	2.50	2.29	4.38	4.38
150BB2448J .150 kVA	kVA	.86	1.31	1.43	1.46	1.48	2.86	2.89	1.55	2.95	3.02	.86	1.50	3.00	3.15
	Load Amps	3.13	3.13	3.13	3.13	3.13	6.25	6.25	3.13	6.25	6.25	3.75	3.44	6.56	6.56
205BB2448J .250 kVA	kVA	1.44	2.18	2.38	2.43	2.46	4.76	4.81	2.58	4.92	5.03	1.44	2.50	5.00	5.25
	Load Amps	5.21	5.21	5.21	5.21	5.21	10.42	10.42	5.21	10.42	10.42	6.25	5.73	10.94	10.94
505BB2448J .500 kVA	kVA	2.88	4.35	4.77	4.87	4.93	9.52	9.62	5.16	9.83	10.06	2.88	5.00	10.00	10.50
	Load Amps	10.42	10.42	10.42	10.42	10.42	20.83	20.83	10.42	20.83	20.83	12.50	11.46	21.88	21.88
705BB2448J .750 kVA	kVA	4.31	6.53	7.15	7.30	7.39	14.28	14.44	7.73	14.75	15.09	4.31	7.49	15.00	15.75
	Load Amps	15.63	15.63	15.63	15.63	15.63	31.25	31.25	15.63	31.25	31.25	18.75	17.19	32.81	32.81
1BB2448J 1.00 kVA	kVA	5.75	8.71	9.53	9.74	9.85	19.04	19.25	10.31	19.67	20.13	5.75	9.99	20.00	21.00
	Load Amps	20.83	20.83	20.83	20.83	20.83	41.67	41.67	20.83	41.67	41.67	25.00	22.92	43.75	43.75
105BB2448J 1.50 kVA	kVA	8.63	13.06	14.30	14.61	14.78	28.56	28.88	15.47	29.50	30.19	8.63	14.99	30.00	31.50
	Load Amps	31.25	31.25	31.25	31.25	31.25	62.50	62.50	31.25	62.50	62.50	37.50	34.38	65.63	65.63
2BB2448J 2.00 kVA	kVA	11.50	17.42	19.07	19.48	19.71	38.08	38.50	20.63	39.33	40.25	11.50	19.98	40.00	42.00
	Load Amps	41.67	41.67	41.67	41.67	41.67	83.33	83.33	41.67	83.33	83.33	50.00	45.83	87.50	87.50
3BB2448J 3.00 kVA	kVA	17.25	26.13	28.60	29.22	29.56	57.13	57.75	30.94	59.00	60.38	17.25	29.98	60.00	63.00
	Load Amps	62.50	62.50	62.50	62.50	62.50	125.00	125.00	62.50	125.00	125.00	75.00	68.80	131.25	131.25
5BB2448J 5.00 kVA	kVA	28.75	43.54	47.67	48.70	49.30	95.20	96.20	51.56	98.30	100.60	28.80	50.00	100.00	105.00
	Load Amps	104.17	104.17	104.17	104.17	104.20	208.30	208.30	104.17	208.30	208.30	125.00	114.60	218.75	218.75
Connection Diagram (pg. 8-25)		2	4	4	4	4	3	3	4	3	3	2	4	3	3

Three Phase — Table 6		Boosting								Bucking							
Catalog Number*	Line Voltage (Available)	399Y/ 230	380	430	440	460	460	480	480	440	440	460	460	480	480	500	500
Insulating Transformer Rating	Load Voltage (Output)	480Y/ 277	418	473	462	506	483	528	504	400	419	438	418	457	436	455	476
050BB2448J .050 kVA	kVA	.86	.75	.85	1.66	.91	1.74	.95	1.82	.79	1.58	1.66	.83	1.73	.86	.90	1.80
	Load Amps	1.04	1.04	1.04	2.08	1.04	2.08	1.04	2.08	1.14	2.18	2.18	1.14	2.18	1.14	1.14	2.19
100BB2448J .100 kVA	kVA	1.73	1.51	1.70	3.33	1.82	3.48	1.90	3.63	1.59	3.17	3.31	1.66	3.46	1.73	1.80	3.61
	Load Amps	2.08	2.08	2.08	4.16	2.08	4.16	2.08	4.16	2.29	4.37	4.37	2.29	4.37	2.29	2.29	4.38
150BB2448J .150 kVA	kVA	2.60	2.26	2.56	4.99	2.73	5.22	2.85	5.45	2.38	4.75	4.97	2.48	5.19	2.59	2.70	5.41
	Load Amps	3.12	3.13	3.12	6.24	3.12	6.25	3.12	6.24	3.43	6.55	6.55	3.43	6.55	3.43	3.43	6.56
205BB2448J .250 kVA	kVA	4.33	3.77	4.26	8.32	4.56	8.70	4.76	9.08	3.96	7.92	8.28	4.14	8.64	4.32	4.51	9.02
	Load Amps	5.20	5.21	5.20	10.40	5.20	10.40	5.20	10.40	5.72	10.92	10.92	5.72	10.92	5.72	5.72	10.94
505BB2448J .500 kVA	kVA	8.60	7.54	8.52	16.64	9.11	17.40	9.51	18.16	7.93	15.85	16.57	8.28	17.29	8.64	9.02	18.04
	Load Amps	10.40	10.42	10.40	20.80	10.40	20.80	10.40	20.80	11.44	21.84	21.84	11.44	21.84	11.44	11.44	21.88
705BB2448J .750 kVA	kVA	12.90	11.31	12.77	24.97	13.67	26.10	14.27	27.24	11.89	23.77	24.85	12.42	25.93	12.96	13.52	27.06
	Load Amps	15.60	15.63	15.60	31.20	15.60	31.20	15.60	31.20	17.16	32.76	32.76	17.16	32.76	17.16	17.16	32.81
1BB2448J 1.00 kVA	kVA	17.30	15.08	17.03	33.29	18.23	34.80	19.02	36.31	15.85	31.70	33.14	16.57	34.57	17.28	18.03	36.08
	Load Amps	20.80	20.83	20.80	41.60	20.80	41.60	20.80	41.60	22.88	43.68	43.68	22.88	43.68	22.88	22.88	43.75
105BB2448J 1.50 kVA	kVA	25.90	22.62	25.55	49.93	27.34	52.50	28.53	54.47	23.78	47.55	49.71	24.85	51.86	25.92	27.05	54.13
	Load Amps	31.20	31.25	31.20	62.40	31.20	62.40	31.20	62.40	34.32	65.52	65.52	34.32	65.62	34.32	34.32	65.63
2BB2448J 2.00 kVA	kVA	34.60	30.17	34.07	66.58	36.46	69.60	38.04	72.63	31.70	63.40	66.27	33.13	69.15	34.56	36.06	72.17
	Load Amps	41.60	41.67	41.60	83.20	41.60	83.20	41.60	83.20	45.76	87.36	87.36	45.76	87.36	45.76	45.76	87.50
3BB2448J 3.00 kVA	kVA	52.00	45.25	51.18	100.03	54.69	104.57	57.07	109.12	47.63	95.25	99.57	49.77	103.89	51.92	54.18	108.25
	Load Amps	62.50	62.50	62.50	125.00	62.50	125.00	62.50	125.00	68.75	131.25	131.25	68.75	131.25	68.75	68.75	131.25
5BB2448J 5.00 kVA	kVA	86.10	75.42	85.17	166.44	91.15	174.01	95.11	181.57	79.26	158.50	165.69	82.83	172.87	86.39	90.16	180.42
	Load Amps	104.00	104.17	104.00	208.00	104.00	208.00	104.00	208.00	114.40	218.40	218.40	114.40	218.40	114.40	114.40	218.75
Quantity Required		3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Connection Diagram (pg. 8-25)		6	12	12	11	12	11	12	11	12	11	11	12	11	12	12	11

\* All Buck-Boost transformers listed are available for immediate shipment.

• Output voltage for lower input can be found by:  
 $\frac{\text{Rated Output Voltage}}{\text{Rated Input Voltage}} \times \text{Input Actual Voltage} = \text{Output New Voltage.}$

• Output kVA available at reduced input voltage can be found by:  
 $\frac{\text{Actual Input Voltage}}{\text{Rated Input Voltage}} \times \text{Output kVA} = \text{New kVA Rating.}$

• Inputs and outputs may be reversed without affecting kVA capacity. See note on page 8-25.



# Buck-Boost Transformers

If you are using this unit as an **auto transformer** to buck (lower) or boost (raise) the voltage by a 12 to 48 volts use the information on pages 8-22 to 8-24 to select the proper wiring diagram.

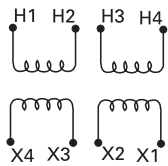
**Note: HV= Higher Voltage, LV= Lower Voltage when bucking and boosting.**

If you are using this unit as an isolation transformer with a primary of 120 or 240 or 480 volts and the secondary of 12/24, 16/32, or 24/48 (depending on the model) use the wiring diagram located on the inside of the cover to the wiring compartment.

Low-voltage Applications:

By using the "Standard Step-down Application" diagram at left, buck boost transformers will convert 120V or 240V to 12, 24, 16 or 32 volts and 240V or 480V to 24 or 48 volts without affecting the nameplate kVA rating of the transformer. Buck boost transformers used in this type of application will become isolation or insulating type transformers.

(Standard Step-down Application)\*



## Single Phase

Diagram 1

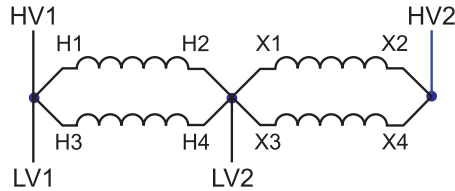


Diagram 2

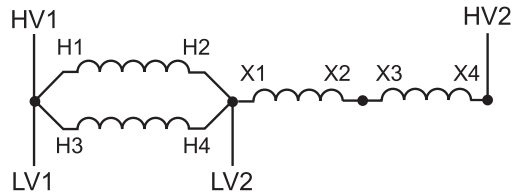


Diagram 3

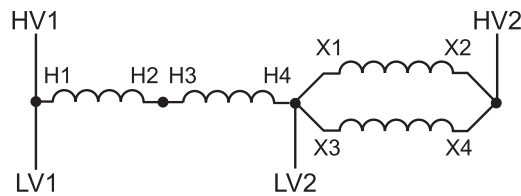
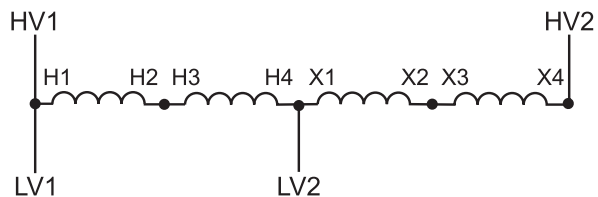


Diagram 4



Note:

- Inputs and Outputs may be reversed; kVA capacity remains constant. Exception: Cannot use 3-wire input with 4-wire output to form a neutral and does not apply to standard step-down applications.

- Refer to NEC 450-4 for overcurrent protection of an autotransformer.
- All applications are suitable for 60Hz only, contact factory for 50Hz information.

# Buck-Boost Transformers

Single Phase, Three Phase

Typical Connection Diagrams

## Three Phase

Note: Contact sales office for diagrams applicable to "J" suffix.

Diagram 5<sup>①</sup>

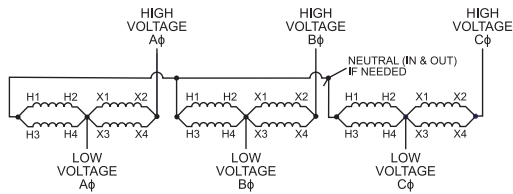


Diagram 6<sup>①</sup>

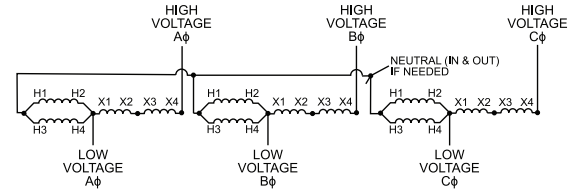


Diagram 7<sup>①</sup>

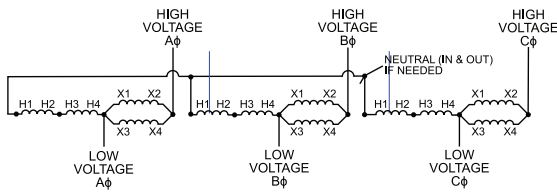


Diagram 8<sup>①</sup>

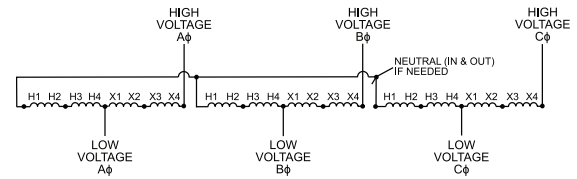


Diagram 9

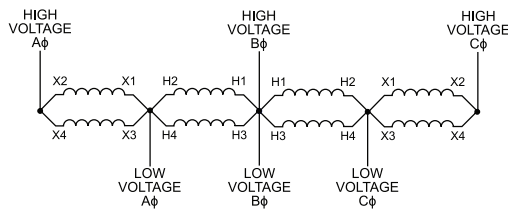


Diagram 11<sup>②</sup>

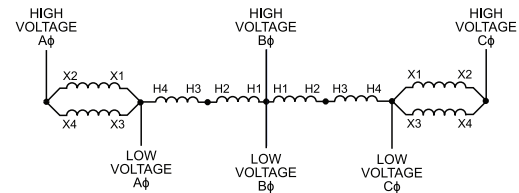
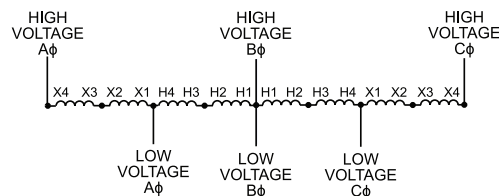


Diagram 12<sup>②</sup>



① These diagrams can only be used when the source is a 4-wire supply.  
 ② The neutral XO should not be used when the source is a three wire supply.

Note:  
 • Inputs and Outputs may be reversed; kVA capacity remains constant. Exception: Cannot use 3-wire input with 4-wire output to form a neutral and does not apply to standard step-down applications.

• Refer to NEC 450-4 for overcurrent protection of an autotransformer.  
 • All applications are suitable for 60Hz only, contact factory for 50Hz information.

# Warehouse Stock Transformers

## Accessories and Details

## Selection

### Drip Shield/Weather Shield Kits for Ventilated Transformers<sup>②</sup>

Drip shields are integral to enclosure for Series H transformers and all DOE 2016 Series J transformers. Include DS option code to catalog number to include with single phase Series J transformers. Drip shield kits are available for field installation for Series J and other previously sold series transformers. Call factory for price and availability. See page 8-8 for additional information.

### Wall Mounting Brackets for Ventilated Transformers

For Series H transformers, wall brackets are integral to the enclosure up to 30kVA and most 45kVA. A Wall Bracket Kit is available for 45kVA transformers that do not include wall brackets and for most 75kVA transformers. They should be ordered separately for field installation rather than including the W option in the catalog number. Series H wall brackets are not seismic certified. For Series J, include W option code for wall brackets to come with Series J transformers up to 75kVA or order separately for field installation. Call factory for price and availability.

### Terminal Lug Kits For Ventilated Transformers<sup>⑤</sup>

Catalog Number	Single Phase kVA Sizes	Three Phase kVA Sizes	Primary Terminal Lug <sup>③</sup> Qty. <sup>④</sup>	Range	Secondary Terminal Lug <sup>③</sup> Qty. <sup>④</sup>	Cable Range	Primary Hardware Included		Secondary Hardware Included	
							Qty.	Bolt Size	Qty.	Bolt Size
TLK14Q	75, 100	—	4	#6-350 kcmil	8	#6-350 kcmil	4	3/8 x 1 1/2	8	3/8 x 1 1/2
TLK15Q	167.5	—	8	#6-350 kcmil	12	1/0-750 kcmil	8	3/8 x 1 1/2	12	1/2 x 1 1/2
TLK34Q	—	112.5	3	#6-350 kcmil	8	#6-350 kcmil	3	3/8 x 1 1/2	8	3/8 x 1 1/2
TLK35Q	—	150	3	#6-350 kcmil	8	1/0-750 kcmil	3	3/8 x 1 1/2	8	3/8 x 1 1/2
TLK36Q	—	225	6	#6-350 kcmil	16	#6-350 kcmil	6	3/8 x 1 1/2	16	3/8 x 1 1/2
TLK37Q	—	300	6	#6-350 kcmil	16	1/0-750 kcmil	6	3/8 x 1 1/2	16	1/2 x 1 1/2
TLK38Q	—	500	9	#6-350 kcmil	24	1/0-750 kcmil	9	3/8 x 1 1/2	24	1/2 x 1 1/2
TLK39Q	—	750	12	#6-350 kcmil	28	1/0-750 kcmil	12	3/8 x 1 1/2	28	1/2 x 1 1/2

⑤ May be used on "JST" suffix and "non JST" suffix transformers. Terminal lugs are screw type, lug connectors suitable for both copper and aluminum cable. All lugs are single barrel and suitable for cable ranges shown. 750kcmil lugs are capable of holding (2) 250kcmil cables in lieu of (1) 750kcmil cable. All lugs are rated 90°C.

④ Lug kits contain quantity required for each kVA based NEC ampacities for cable range indicated. For cable sizes outside the range, hole size of terminal may not be the correct size to mount other lugs. Bolt size in Hardware included column provides indication of hole size.

③ Primary and secondary terminal lugs are included on most ventilated transformers. (15kVA - 75kVA 3PH & 15kVA - 50kVA 1PH). Some 45 or 75kVA may not have secondary lugs depending on number and type of additional options. Call factory for confirmation.

### Standard Terminal Lug Offerings<sup>⑦</sup>

(Primary and Secondary) for Ventilated Transformers (150 Degree Rise - Series J only - Without a K rating)									
1-Phase					3-Phase				
kVA	120/240V	208V	480V	600V	kVA	120/240V	208V	480V	600V
0-15	Contact customer support <sup>⑥</sup>								
15	#2/0-6	#14-2	#14-2	#14-2	15	#14-2	#14-2	#14-2	#14-2
25	250MCM-6	250MCM-6	#14-2	#14-2	30	#2/0-6	#2/0-6	#14-2	#14-2
37.5	350MCM-6	350MCM-6	#14-2	#14-2	45	250MCM-6	250MCM-6	#14-2	#14-2
50	600MCM-2	600MCM-2	#2/0-6	#2/0-6	75	600MCM-2	350MCM-6	#2/0-6	#2/0-6
>50	Contact customer support								

⑦ Values listed above are for standard configurations. There may be slight variations depending on requirements. Contact Customer Support for special requirements. Encapsulated units less than or equal to 15kVA do not have lugs. Lead wires are provided.

⑥ For Series H, see chart in Series H Addendum - Page H-17 Lug Pad sizes are not available except on cutsheets. Contact Customer Support for special requirements.

### Wall Bracket Kits for Series J DOE 2016 3 Phase Transformers

kVA	Temp Rise			K Factor			
	150C	115C	80C	K1	K4	K13	K20
15	TWB15J	TWB15J	TWB75J	TWB15J	TWB15J	TWB75J	TWB75J
30	TWB75J	TWB75J	TWB75J	TWB75J	TWB75J	TWB75J	TWB75J
45	TWB75J	TWB75J	NA	TWB75J	TWB75J	NA	NA
75 <sup>⑧</sup>	TWB75J	TWB75J	NA	TWB75J	TWB75J	NA	NA

⑧ Wall Bracket Kit not available for 75kVA with Copper Windings.

⑦ See Wall Bracket/Drip Shield Table on Page 8-8 for availability information.

### Wall Bracket for Series J Single Phase Transformers

kVA	Temp Rise		
	150C	115C	80C
15	TWB15J	TWB15J	TWB75J
25	TWB75J	TWB75J	TWB75J
37.5	TWB75J	TWB75J	TWB75J
50	TWB75J	TWB75J	TWB75J
75	NA	NA	NA
100	NA	NA	NA

⑧ Series J Drip Shield Kits are available as a special order. Add "XD" to the catalog number.

⑦ UL Listed for indoor and outdoor use with dripshield installed.

# Transformers

Notes

8

TRANSFORMERS