

Warehouse Stock Transformers

SELECTION

Type ST Buck-Boost Transformers

Encapsulated, Indoor / Outdoor Enclosure, 115° C Rise

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

Catalog Number	KVA	List Price \$
050BB1224	.050	118.
100BB1224	.100	141.
150BB1224	.150	152.
205BB1224	.250	190.
505BB1224	.500	244.
705BB1224	.750	328.
1BB1224	1.00	410.
105BB1224	1.50	495.
2BB1224	2.00	650.
3BB1224	3.00	904.
5BB1224	5.00	1170.

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

Catalog Number	KVA	List Price \$
050BB1632	.050	124.
100BB1632	.100	148.
150BB1632	.150	163.
205BB1632	.250	202.
505BB1632	.500	255.
705BB1632	.750	348.
1BB1632	1.00	435.
105BB1632	1.50	529.
2BB1632	2.00	690.
3BB1632	3.00	956.
5BB1632	5.00	1243.

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

Catalog Number	KVA	List Price \$
050BB2448	.050	129.
100BB2448	.100	158.
150BB2448	.150	175.
205BB2448	.250	214.
505BB2448	.500	271.
705BB2448	.750	365.
1BB2448	1.00	458.
105BB2448	1.50	552.
2BB2448	2.00	729.
3BB2448	3.00	1009.
5BB2448	5.00	1311.

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Accessories^①

Wall Mounting Brackets For Type ST Ventilated Transformers Single Phase And Three Phase 15 KVA-112 KVA, [150°C Rise Only] Floor/Wall Mounted

Catalog Number	Phase	KVA	List Price \$
WMB15	3	15-45	170.
WMB15	1	15-50	170.
WMB17	3	75-112	250.
WMB17	1	75-100	250.

Dripshield/Weathershield Kits For Type ST Indoor Ventilated Transformers^②

Catalog Number	Phase	KVA	List Price \$
DSK15	3	15	319.
DSK16	3	30-45	394.
DSK1718	3	75-112	567.
DSK19	3	150	680.
DSK20	3	225	815.
DSK30	3	300	920.
DSK50	3	500	1086.
DSK21	1	25	319.
DSK22	1	37.5	394.
DSK22	1	50	394.
DSK23	1	75	475.
DSK24	1	100	567.
DSK25	1	167	680.

Terminal Lug Kits For Ventilated Transformers

Catalog Number	KVA Sizes	List Price \$	Terminal Lug ^③		Cable Range	Hardware	
			Quantity ^④	Lug Number		Quantity ^④	Bolt Size
TLK1	15-25 1 Phase 15-30 3 Phase	67.	7	TA-0	14-1/0	7	¼ × 1½
TLK2	37½-50 1 Phase 45-75 3 Phase	164.	7	TA-250	6-250 kcmil	7	¾ × 1½
			6	TA-350	6-350 kcmil	3	¾ × 1
			3	TA-0	14-1/0		
TLK3	75-100 1 Phase 100-112½-150 3 Phase	253.	6	AU-350	4-350 kcmil	6	½ × 2
			6	TA-350	6-350 kcmil	7	¾ × 1½
TLK4	225 3 Phase	267.	3	TA-500	4/0-500 kcmil	7	½ × 2
			4	AU-600	2-600 kcmil		
TLK5	167 1 Phase 300 3 Phase	394.	3	AU-350	4-350 kcmil	7	½ × 2
			12	TA-500	4/0-500 kcmil	4	¾ × 2½
TLK6	500 3 Phase	603.	16	TA-800	350-800 kcmil	11	½ × 2½
			3	AU-600	2-600 kcmil		

①These accessories fit only warehouse stock transformers with ST Catalog Suffix.

②UL Listed for indoor and outdoor use with dripshield installed. Kit contains quantity required for each transformer.

③Terminal lugs are screw type, lug connectors suitable for both copper and aluminum cable.

TA lugs are single barrel, AU lugs are double barrel. Each barrel is suitable for cable range shown. May be used on "ST" suffix units and "non ST" suffix transformers.

④Contains quantity required for each transformer.

☐ = Warehouse Stock

Warehouse Stock

Buck-Boost Transformers



Application

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 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 insulating transformer but is an autotransformer.

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 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.

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 one leg 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.

Warehouse Stock Transformers

SELECTION

Buck-Boost

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	440	450	460	277	480	480	504
Insulating Transformer Rating	Load Voltage (Output)	277	420	457	467	473	457	462	484	472	483	230	436	456	480
050BB2448 .050 KVA	KVA	.29	.44	.48	.49	.49	.95	.96	.50	.98	1.01	.29	.50	1.05	1.10
	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	2.29	2.29
100BB2448 .100 KVA	KVA	.58	.87	.95	.97	.99	1.90	1.93	1.01	1.97	2.01	.58	1.00	2.09	2.29
	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	4.58	4.58
150BB2448 .150 KVA	KVA	.87	1.31	1.43	1.46	1.48	2.86	2.89	1.51	2.95	3.02	.86	1.50	3.14	3.00
	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	6.88	6.88
205BB2448 .250 KVA	KVA	1.44	2.19	2.38	2.43	2.46	4.76	4.81	2.52	4.92	5.03	1.44	2.50	5.23	5.50
	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	11.46	11.46
505BB2448 .500 KVA	KVA	2.89	4.38	4.76	4.86	4.93	9.52	9.62	5.04	9.83	10.06	2.88	5.00	10.45	11.00
	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	22.92	22.92
705BB2448 .750 KVA	KVA	4.33	6.56	7.14	7.30	7.39	14.28	14.44	7.56	14.75	15.09	4.31	7.49	15.68	16.50
	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	34.38	34.38
1BB2448 1.00 KVA	KVA	5.77	8.57	9.52	9.73	9.85	19.04	19.25	10.08	19.67	20.13	5.75	9.99	20.90	22.00
	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	45.83	45.83
105BB2448 1.50 KVA	KVA	8.66	13.13	14.28	14.59	14.78	28.56	28.88	15.13	29.50	30.19	8.63	14.99	31.35	33.00
	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	68.75	68.75
2BB2448 2.00 KVA	KVA	11.54	17.50	19.04	19.46	19.71	38.08	38.50	20.17	39.33	40.25	11.50	19.98	41.80	44.00
	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	91.67	91.67
3BB2448 3.00 KVA	KVA	17.31	26.25	28.56	29.19	29.56	57.13	57.75	30.25	59.00	60.38	17.25	29.98	62.70	66.00
	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	137.50	137.50
5BB2448 5.00 KVA	KVA	28.90	43.80	47.60	48.60	49.30	95.20	96.20	50.40	98.30	100.60	28.80	50.00	104.50	110.00
	Load Amps	104.20	104.20	104.20	104.20	104.20	208.30	208.30	104.20	208.30	208.30	125.00	114.60	229.20	229.20
Connection Diagram		B	D	D	D	D	C	C	D	C	C	B	D	C	C

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	420	473	462	506	483	528	504	400	419	438	418	457	436	455	477
050BB2448 .050 KVA	KVA	.86	.76	.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	2.18
100BB2448 .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	4.37
150BB2448 .150 KVA	KVA	2.60	2.27	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	3.12	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	6.55
205BB2448 .250 KVA	KVA	4.33	3.78	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	5.20	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	10.92
505BB2448 .500 KVA	KVA	8.60	7.56	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	10.40	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	21.84
705BB2448 .750 KVA	KVA	12.90	11.34	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	27.07
	Load Amps	15.60	15.60	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	32.76
1BB2448 1.00 KVA	KVA	17.30	15.12	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	36.09
	Load Amps	20.80	20.80	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	43.68
105BB2448 1.50 KVA	KVA	25.90	22.69	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	31.20	31.20	62.40	31.20	62.40	31.20	62.40	34.32	65.52	65.52	34.32	65.52	34.32	34.32	65.52
2BB2448 2.00 KVA	KVA	34.60	30.25	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	72.18
	Load Amps	41.60	41.60	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	87.36
3BB2448 3.00 KVA	KVA	52.00	45.45	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	108.44
	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
5BB2448 5.00 KVA	KVA	86.10	75.62	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	180.44
	Load Amps	104.00	104.00	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	218.40
Quantity Required		3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Connection Diagram		E	G	G	H	G	H	G	H	G	H	H	G	H	G	G	H

• 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:
 $\frac{\text{Actual Input Voltage}}{\text{Rated Input Voltage}} \times \text{Output KVA} = \text{New KVA Rating.}$

☐ = Warehouse Stock

TRANSFORMERS