

SECTION 2

HPS UNIVERSAL™ BUCK-BOOST TRANSFORMERS

How to use the Selection Chart

1. From the top row of the “**Selection Chart**” locate the high and low voltage combination that is closest to the one you require.
2. Move down that column to the kVA or Ampere rating equal to or greater than the rating required by the load.
3. From the far left column, obtain the transformer catalog number.
4. For dimensional information refer to the specifications table (Group A) on page 78.
5. The corresponding connection diagram is indicated at the bottom of the Voltage / kVA column. See page 81 for the connection diagrams.

Single Phase - Group A Selection Chart

Catalog Number	Low Voltage High Voltage	96 115	100 110	100 120	105 115	110 121	110 132	115 126	115 138	120 132	120 144	200 220	208 229	220 231	220 242	240 252	240 264
QC05ERCB	HV Amps	2.08	4.17	2.08	4.17	4.17	2.08	4.17	2.08	4.17	2.08	2.08	2.08	4.17	2.08	4.17	2.08
	KVA	.240	.458	.250	.480	.504	.275	.526	.288	.550	.300	.458	.477	.963	.504	1.05	.550
	LV Amps	2.50	4.58	2.50	4.58	4.58	2.50	4.58	2.50	4.58	2.50	2.29	2.29	4.38	2.29	4.38	2.29
QC10ERCB	HV Amps	4.17	8.33	4.17	8.33	8.33	4.17	8.33	4.17	8.33	4.17	4.17	4.17	8.33	4.17	8.33	4.17
	KVA	.480	.917	.500	.961	1.01	.550	1.05	.575	1.10	.600	.917	.953	1.92	1.01	2.10	1.10
	LV Amps	5.00	9.17	5.00	9.17	9.17	5.00	9.17	5.00	9.17	5.00	4.58	4.58	8.75	4.58	8.75	4.58
QC15ERCB	HV Amps	6.25	12.5	6.25	12.5	12.5	6.25	12.5	6.25	12.5	6.25	6.25	6.25	12.5	6.25	12.5	6.25
	KVA	.720	1.38	.750	1.44	1.51	.825	1.58	.863	1.65	.900	1.38	1.43	2.88	1.51	3.15	1.65
	LV Amps	7.50	13.8	7.50	13.8	13.8	7.50	13.8	7.50	13.8	7.50	6.88	6.88	13.1	6.88	13.1	6.88
QC20ERCB	HV Amps	8.33	16.7	8.33	16.7	16.7	8.33	16.7	8.33	16.7	8.33	8.33	8.33	16.7	8.33	16.7	8.33
	KVA	.960	1.83	1.00	1.92	2.02	1.10	2.11	1.15	2.20	1.20	1.83	1.91	3.85	2.02	4.20	2.20
	LV Amps	10.0	18.3	10.0	18.3	18.3	10.0	18.3	10.0	18.3	10.0	9.17	9.17	17.5	9.17	17.5	9.17
QC25ERCB	HV Amps	10.4	20.8	10.4	20.8	20.8	10.4	20.8	10.4	20.8	10.4	10.4	10.4	20.8	10.4	20.8	10.4
	KVA	1.20	2.29	1.25	2.40	2.52	1.37	2.63	1.44	2.75	1.5	2.29	2.38	4.81	2.52	5.25	2.75
	LV Amps	12.5	22.9	12.5	22.9	22.9	12.5	22.9	12.5	22.9	12.5	11.4	11.4	21.8	11.4	21.8	11.4
QC35ERCB	HV Amps	14.6	29.2	14.6	29.2	29.2	14.6	29.2	14.6	29.2	14.6	14.6	14.6	29.2	14.6	29.2	14.6
	KVA	1.68	3.21	1.75	3.36	3.53	1.92	3.68	2.01	3.85	2.10	3.21	3.34	6.74	3.53	7.35	3.85
	LV Amps	17.5	32.1	17.5	32.1	32.1	17.5	32.1	17.5	32.1	17.5	16.0	16.0	30.6	16.0	30.6	16.0
QC50ERCB	HV Amps	20.8	41.6	20.8	41.7	41.7	20.8	41.7	20.8	41.7	20.8	20.8	20.8	41.7	20.8	41.7	20.8
	KVA	2.39	4.58	2.50	4.80	5.04	2.75	5.26	2.87	5.50	3.00	4.58	4.77	9.62	5.04	10.5	5.50
	LV Amps	24.9	45.8	25.0	45.8	45.8	25.0	45.8	25.0	45.8	25.0	22.9	22.9	43.7	22.9	43.7	22.9
QC75ERCB	HV Amps	31.2	62.5	31.2	62.5	62.5	31.2	62.5	31.2	62.5	31.2	31.2	31.2	62.5	31.2	62.5	31.2
	KVA	3.60	6.87	3.75	7.20	7.56	4.12	7.89	4.31	8.25	4.50	6.87	7.15	14.4	7.56	15.7	8.25
	LV Amps	37.50	68.7	37.5	68.7	68.7	37.5	68.7	37.5	68.7	37.5	34.4	34.4	65.6	34.4	65.6	34.4
Q1C0ERCB	HV Amps	41.7	83.3	41.7	83.3	83.3	41.7	83.3	41.7	83.3	41.7	41.7	41.7	83.3	41.7	83.3	41.7
	KVA	4.80	9.17	5.00	9.60	10.1	5.50	10.5	5.75	11.00	6.00	9.17	9.53	19.2	10.1	21.0	11.0
	LV Amps	50.0	91.7	50.0	91.7	91.7	50.0	91.7	50.0	91.7	50.0	45.8	45.8	87.5	45.8	87.5	45.8
Q1C5ERCF	HV Amps	62.5	125	62.5	125	125	62.5	125	62.5	125	62.5	62.5	62.5	125	62.5	125	62.5
	KVA	7.20	13.7	7.50	14.4	15.1	8.25	15.8	8.62	16.5	9.00	13.7	14.3	28.9	15.1	31.5	16.5
	LV Amps	75.0	137	75.0	137	137	75.0	137	75.0	137	75.0	68.7	68.8	131	68.7	131	68.7
Q002ERCF	HV Amps	83.3	166	83.3	166	166	83.3	166	83.3	166	83.3	83.3	83.3	166	83.3	166	83.3
	KVA	9.58	18.3	10.0	19.2	20.1	11.0	21.0	11.5	22.0	12.0	18.3	19.0	38.5	20.1	42.0	22.0
	LV Amps	99.8	183	100	183	183	100	183	100	183	100	91.7	91.7	175	91.6	175	91.6
Q003ERCF	HV Amps	125	250	125	250	250	125	250	125	250	125	125	125	250	125	250	125
	KVA	14.4	27.5	15.0	28.8	30.2	16.5	31.5	17.2	33.0	18.0	27.5	28.6	57.7	30.2	63.0	33.0
	LV Amps	150	275	150	275	275	150	275	150	275	150	137	137	262	137	262	137
Q005ERCF	HV Amps	208	417	208	417	417	208	417	208	417	208	208	208	417	208	417	208
	KVA	24.0	45.8	25.0	48.0	50.4	27.5	52.7	28.7	55.0	30.0	45.8	47.7	96.3	50.4	105	55.0
	LV Amps	250	458	250	458	458	250	458	250	458	250	229	229	438	229	438	229
CONNECTION DIAGRAM		2	1	2	1	1	2	1	2	1	2	4	4	3	4	3	4

SECTION 2



Why Use Buck-Boost Transformers?

The advantages of using a buck-boost transformer over an equivalent standard isolation transformer are as follows:

Advantages

- 1) Used in a variety of applications
- 2) Inexpensive
- 3) Smaller and lighter
- 4) More efficient
- 5) 5-10 times increase in kVA

Disadvantages

- 1) No circuit isolation
- 2) Cannot create a neutral
- 3) KVA and voltages do not match what's on the nameplate kVA and voltages.



Buck-Boost Application

Buck-boost transformers offer an economical solution to the adjustment of line voltages that are slightly above or below normal. When a buck-boost transformer is connected as an autotransformer, only a portion of the load kVA is actually transformed. The majority of the load kVA is passed directly through to the source. For this reason a buck-boost transformer may be used to supply a much larger load kVA than is indicated on the nameplate.

Buck-boost transformers can be used to adjust **stable** voltages only.

BUCK-BOOST STANDARD SPECIFICATIONS

	50 to 1000 VA	1500 to 5000 VA
UL Listed	File: E50394	File: E50394
CSA Certified	File: LR3902	File: LR3902
Frequency	50/60 Hz	50/60 Hz
Insulation System	130°C (80°C rise)	180°C (115°C rise)
Standard Design	Single Phase, welded core construction made with high quality, high permeability silicon steel laminations. Computer designed coils, accurately wound from high quality magnetic wire.	Single Phase, welded core construction made with high quality, high permeability silicon steel laminations. Computer designed coils, accurately wound from high quality copper magnetic wire.
Encapsulation	All units from 50VA to 5kVA are encapsulated with electrical grade silica sand and resin compounds.	All units from 50VA to 5kVA are encapsulated with electrical grade silica sand and resin compounds.
Enclosure Type	Heavy Duty Encapsulated NEMA Type 3R (optional NEMA 4, 4X and 12 available)	Heavy Duty Encapsulated NEMA Type 3R (optional NEMA 4, 4X and 12 available)
Enclosure Finish	ANSI 61 Grey, UL50	ANSI 61 Grey, UL50
Termination	Front accessible separate high and low voltage lead wires or copper tabs.	Front accessible separate high and low voltage lead wires or copper tabs.
Conduit Knock-Outs	Side and rear standard on all units.	Side and rear standard on all units.
Mounting	Standard Wall Mounting.	Standard Wall Mounting.

Voltage Is the Key

Buck-boost transformers represent an economical way to both raise supply voltage caused by line drop or equipment demand on the distribution system, or lower voltage caused by increased system voltages due to supply line adjustments. Some loads including lighting and resistive loads require a stable supply to maintain performance. The detrimental effects of incorrect supply line voltage can cause equipment failure. Buck-boost transformers can correct line voltage within 5 to 25% of nominal.

Steps for Selecting Buck-Boost Transformers

The following information is required before selecting a buck-boost transformer:

- (1) Line Voltage - The voltage that you want to buck (decrease) or boost (increase). This can be determined 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. This information usually can be found on the nameplate of the equipment that you want to operate. It is the sum of all the equipment that represents the load.
- (4) Frequency - The supply line frequency must be the same as the equipment to be operated - either 50 or 60 Hertz.
- (5) Phase - The supply line should be the same as the load - either single or three phase.

Four Steps to Select the Correct Buck-Boost Transformer

1. From the top row of each "Selection Chart", select a 'high voltage' and 'low voltage' combination that is the closest to matching the high voltage and low voltage correction that is required for your application.
2. Move down that column to the kVA or current rating equal to, or greater than, the rating required by the total load. It is not likely that the exact value of the load will be found, so go to the next higher rating.
3. From the far left column, select the corresponding catalog number of the exact buck-boost transformer required. Refer to specification tables for dimensional information.
4. Connect the transformer in accordance with the connection diagram referenced at the bottom of the same column where you selected your high voltage and low voltage combination. Connection diagrams are on pages 81 and 82 in this catalog section. They are also packaged with each transformer.

