

Quick Reference Chart - 208, 230, 240 Volts Single & Three Phase Buck - Boost

The most common buck - boost transformer uses are those involving line / load combinations of 208, 230 and 240 volts, in both single and three phase installations. These applications include air conditioning loads, motor loads, and machinery loads of all kinds.

The charts below provide simple solutions to these common applications with easy access data for kVA, line, and load amps information.

Three phase installations are easily accomplished with the use of Series ODY factory preconnected three phase buck boost transformers. The ODY Series allows you to *install and connect one preconnected transformer* for your three phase applications.

Other voltage combinations may be found on the following pages.

Single Phase			Single Phase		
Type M - 1 Unit			Type Y - 1 Unit		
Catalog Number	230 208		Catalog Number	240 208	
35-M005	Max Amps at 230 V.	1.9	35-Y005	Max Amps at 240 V.	1.5
.45 kVA	Max Amps at 208 V.	2.1	.37 kVA	Max Amps at 208 V.	1.8
	208V Fuse	5		208V Fuse	5
35-M010	Max Amps at 230 V.	3.9	35-Y010	Max Amps at 240 V.	3.1
.90 kVA	Max Amps at 208 V.	4.3	.75 kVA	Max Amps at 208 V.	3.6
	208V Fuse	8		208V Fuse	5
35-M015	Max Amps at 230 V.	5.9	35-Y015	Max Amps at 240 V.	4.6
1.36kVA	Max Amps at 208 V.	6.5	1.12 kVA	Max Amps at 208 V.	5.4
	208V Fuse	12		208V Fuse	8
85-M020	Max Amps at 230 V.	9.8	85-Y020	Max Amps at 240 V.	7.5
2.2 kVA	Max Amps at 208 V.	10.8	1.8 kVA	Max Amps at 208 V.	9.0
	208V Fuse	15		208V Fuse	15
85-M025	Max Amps at 230 V.	19.7	85-Y025	Max Amps at 240 V.	15.4
4.5 kVA	Max Amps at 208 V.	21.7	3.7 kVA	Max Amps at 208 V.	18.0
	208V Fuse	30		208V Fuse	25
85-M030	Max Amps at 230 V.	29.5	85-Y030	Max Amps at 240 V.	23.3
6.7 kVA	Max Amps at 208 V.	32.6	5.6 kVA	Max Amps at 208 V.	27.0
	208V Fuse	45		208V Fuse	30
85-M035	Max Amps at 230 V.	39.4	85-Y035	Max Amps at 240 V.	31.2
9.0 kVA	Max Amps at 208 V.	43.5	7.5 kVA	Max Amps at 208 V.	36.0
	208V Fuse	60		208V Fuse	40
85-M040	Max Amps at 230 V.	59.1	85-Y040	Max Amps at 240 V.	46.6
13.5 kVA	Max Amps at 208 V.	64.9	11.2 kVA	Max Amps at 208 V.	54.0
	208V Fuse	90		208V Fuse	60
85-M045	Max Amps at 230 V.	78.8	85-Y045	Max Amps at 240 V.	62.5
18.1 kVA	Max Amps at 208 V.	87.0	15.0 kVA	Max Amps at 208 V.	72.1
	208V Fuse	125		208V Fuse	80
85-M050	Max Amps at 230 V.	118.2	85-Y050	Max Amps at 240 V.	93.7
27.1 kVA	Max Amps at 208 V.	130.2	22.5 kVA	Max Amps at 208 V.	108.0
	208V Fuse	175		208V Fuse	125
85-M055	Max Amps at 230 V.	197.0	85-Y055	Max Amps at 240 V.	156.2
45.3 kVA	Max Amps at 208 V.	217.7	37.5 kVA	Max Amps at 208 V.	180.2
	208V Fuse	300		208V Fuse	200
Qty. Required	Connection Dia.	Page	Qty. Required	Connection Dia.	Page
1	SP- 14	60	1	SP- 15	60

Three Phase			Three Phase		
Type ODY - 1 Unit			Type Y - 2 Units		
Catalog Number	240 208	Max Amps	Catalog Number	240 208	Max Amps
Series ODY Autotransformers provide an economical, factory preconnected installation for transforming three phase lines from 208 to 240, or 240 to 208. Simply bring in three wires on the line side and take out three wires on the load side.			35-Y005	Max Amps at 240 V.	1.3
			.56 kVA	Max Amps at 208 V.	1.5
				Fuse Size	4.5
			35-Y010	Max Amps at 240 V.	2.7
			1.12 kVA	Max Amps at 208 V.	3.1
				Fuse Size	5
			35-Y015	Max Amps at 240 V.	4.0
			1.68 kVA	Max Amps at 208 V.	4.6
				Fuse Size	8
34-280-ODY	Max Amps at 240 V.	6.7	85-Y020	Max Amps at 240 V.	6.7
2.8 kVA	Max Amps at 208 V.	7.8	2.8 kVA	Max Amps at 208 V.	7.8
	Fuse Size	15		Fuse Size	15
34-560-ODY	Max Amps at 240 V.	13.5	85-Y025	Max Amps at 240 V.	13.5
5.6 kVA	Max Amps at 208 V.	15.6	5.6 kVA	Max Amps at 208 V.	15.6
	Fuse Size	25		Fuse Size	25
34-840-ODY	Max Amps at 240 V.	20.2	85-Y030	Max Amps at 240 V.	20.2
8.4 kVA	Max Amps at 208 V.	23.4	8.4 kVA	Max Amps at 208 V.	23.4
	Fuse Size	30		Fuse Size	30
84-1120-ODY	Max Amps at 240 V.	27.0	85-Y035	Max Amps at 240 V.	27.0
11.2 kVA	Max Amps at 208 V.	31.2	11.2 kVA	Max Amps at 208 V.	31.2
	Fuse Size	45		Fuse Size	45
84-1690-ODY	Max Amps at 240 V.	40.5	85-Y040	Max Amps at 240 V.	40.5
16.9 kVA	Max Amps at 208 V.	46.8	16.9 kVA	Max Amps at 208 V.	46.8
	Fuse Size	60		Fuse Size	60
84-2250-ODY	Max Amps at 240 V.	54.1	85-Y045	Max Amps at 240 V.	54.1
22.5 kVA	Max Amps at 208 V.	62.4	22.5 kVA	Max Amps at 208 V.	62.4
	Fuse Size	80		Fuse Size	80
84-3300-ODY	Max Amps at 240 V.	81.1	85-Y050	Max Amps at 240 V.	81.1
33.7 kVA	Max Amps at 208 V.	93.6	33.7 kVA	Max Amps at 208 V.	93.6
	Fuse Size	125		Fuse Size	125
84-5600-ODY	Max Amps at 240 V.	135.3	85-Y055	Max Amps at 240 V.	135.3
56.2 kVA	Max Amps at 208 V.	156.1	56.2 kVA	Max Amps at 208 V.	156.1
	Fuse Size	200		Fuse Size	200
Qty. Required	Connection Dia.	Page	Qty. Required	Connection Dia.	Page
1	TP-25	63	2	TP-26	63

Single Phase Buck - Boost Sizing Tables

SINGLE PHASE BUCK - BOOST TABLE, TYPE M

Type M		Single Phase / Single Unit - Type M												
Catalog Number	Load Line	Boost - Increase Voltage								Buck - Decrease Voltage				
		120	120	120	120	240	240	240	230	120	120	208	240	240
		96	100	108	109	216	218	228	208	132	144	230	252	264
35-M005	Load Amps	2.0	2.0	3.7	4.1	2.0	2.0	4.1	1.9	4.5	2.5	2.1	4.3	2.2
	kVA	0.25	0.25	0.45	0.49	0.50	0.49	1.00	0.45	0.55	0.30	0.45	1.05	0.55
	Line Fuse	5	5	8	8	5	5	7	5	7	5	5	7	5
35-M010	Load Amps	4.1	4.1	7.5	8.2	4.1	4.1	8.3	3.9	9.1	5.0	4.3	8.7	4.5
	kVA	0.50	0.50	0.90	0.99	1.00	0.99	2.00	0.90	1.10	0.60	0.91	2.10	1.10
	Line Fuse	10	10	15	15	8	8	15	8	15	7	7	15	7
35-M015	Load Amps	6.2	6.2	11.2	12.3	6.2	6.1	12.5	5.9	13.7	7.5	6.5	13.1	6.8
	kVA	0.75	0.75	1.35	1.48	1.50	1.48	3.00	1.36	1.65	0.90	1.36	3.15	1.65
	Line Fuse	15	15	20	20	12	12	20	12	20	12	10	20	12
85-M020	Load Amps	10.4	10.4	18.7	20.6	10.4	10.3	20.8	9.8	22.9	12.5	10.9	21.8	11.4
	kVA	1.25	1.25	2.25	2.47	2.50	2.47	5.00	2.26	2.75	1.50	2.27	5.25	2.75
	Line Fuse	20	20	30	30	15	15	30	15	30	15	15	30	15
85-M025	Load Amps	20.8	20.8	37.5	41.2	20.8	20.6	41.6	19.7	45.8	25.0	21.8	43.7	22.9
	kVA	2.50	2.50	4.50	4.95	5.00	4.95	10.00	4.53	5.50	3.00	4.55	10.50	5.50
	Line Fuse	35	35	60	60	30	30	60	30	60	30	30	60	30
85-M030	Load Amps	31.2	31.2	56.2	61.9	31.2	30.9	62.5	29.5	68.7	37.5	32.8	65.6	34.3
	kVA	3.75	3.75	6.75	7.43	7.50	7.43	15.00	6.79	8.25	4.50	6.83	15.75	8.25
	Line Fuse	50	50	80	90	45	45	80	45	80	40	40	80	40
85-M035	Load Amps	41.6	41.6	75.0	82.5	41.6	41.2	83.3	39.4	91.6	50.0	43.7	87.5	45.8
	kVA	5.00	5.00	9.00	9.90	10.00	9.90	20.00	9.06	11.00	6.00	9.10	21.00	11.00
	Line Fuse	70	70	125	125	60	60	110	60	110	60	60	110	60
85-M040	Load Amps	62.5	62.5	112.5	123.8	62.5	61.9	125.0	59.1	137.5	75.0	65.6	131.2	68.7
	kVA	7.5	7.5	13.5	14.8	15.0	14.8	30.0	13.5	16.5	9.0	13.6	31.5	16.5
	Line Fuse	100	100	175	175	80	80	175	90	175	80	80	175	80
85-M045	Load Amps	83.3	83.3	150.0	165.1	83.3	82.5	166.6	78.8	183.3	100.0	87.5	175.0	91.6
	kVA	10.0	10.0	18.0	19.8	20.0	19.8	40.0	18.1	22.0	12.0	18.2	42.0	22.0
	Line Fuse	150	150	250	250	125	125	225	125	225	110	110	225	110
85-M050	Load Amps	125.0	125.0	225.0	247.7	125.0	123.8	250.0	118.2	275.0	150.0	131.3	262.5	137.5
	kVA	15.0	15.0	27.0	29.7	30.0	29.7	60.0	27.1	33.0	18.0	27.3	63.0	33.0
	Line Fuse	200	200	350	350	175	175	350	175	350	175	150	350	175
85-M055	Load Amps	208.3	208.3	375.0	412.8	208.3	206.4	416.6	197.0	458.3	250.0	218.9	437.5	229.1
	kVA	25.0	25.0	45.0	49.5	50.0	49.5	100.0	45.3	55.0	30.0	45.5	105.0	55.0
	Line Fuse	350	350	600	600	300	300	600	300	600	300	250	600	300
Qty. Required Connection Dia. Page		1 SP - 8 59	1 SP - 12 60	1 SP - 7 59	1 SP - 11 60	1 SP - 6 59	1 SP - 10 60	1 SP - 5 59	1 SP - 10 60	1 SP - 3 59	1 SP - 4 59	1 SP - 2 59	1 SP - 1 59	1 SP - 2 59

Connection diagrams may be found on Pgs. 59 - 60.

Connections found on this Page require ordering
1 Buck - Boost Transformer

The appropriate size 35 or 80 Series Transformer may be substituted for the 85 Series where desired.



Single Phase Buck - Boost Sizing Tables

SINGLE PHASE BUCK - BOOST TABLE, TYPE Y

Type Y		Single Phase / Single Unit - Type Y												
Catalog Number	Load Line	Boost - Increase Voltage								Buck - Decrease Voltage				
		120	120	120	120	240	240	240	240	120	120	240	240	208
		88	95	104	106	212	224	225	208	136	152	256	272	240
35-Y005	Load Amps	1.5	1.9	3.1	3.1	1.5	3.1	3.1	1.5	3.5	1.9	3.3	1.7	1.8
	kVA	0.18	0.23	0.37	0.37	0.37	0.75	0.75	0.37	0.42	0.23	0.80	0.42	0.37
	Line Fuse	5	5	5	5	5	5	5	5	5	5	5	5	5
35-Y010	Load Amps	3.1	3.9	6.2	6.3	3.1	6.2	6.2	3.1	7.0	3.9	6.6	3.5	3.6
	kVA	0.37	0.47	0.75	0.75	0.75	1.50	1.50	0.75	0.85	0.47	1.60	0.85	0.75
	Line Fuse	7	8	12	12	6	10	10	6	10	5	10	5	5
35-Y015	Load Amps	4.6	5.9	9.3	9.4	4.7	9.3	9.3	4.6	10.6	5.9	10.0	5.3	5.4
	kVA	0.56	0.71	1.12	1.13	1.13	2.25	2.25	1.12	1.27	0.71	2.40	1.27	1.12
	Line Fuse	10	15	15	15	9	15	15	9	15	8	15	8	8
85-Y020	Load Amps	7.8	9.8	15.6	15.7	7.8	15.6	15.6	7.8	17.7	9.8	16.6	8.8	9.0
	kVA	0.93	1.18	1.87	1.89	1.89	3.75	3.75	1.87	2.12	1.18	4.00	2.12	1.87
	Line Fuse	15	25	25	25	15	25	25	15	20	15	20	15	15
85-Y025	Load Amps	15.6	19.7	31.2	31.5	15.7	31.2	31.2	15.6	35.4	19.7	33.3	17.7	18.0
	kVA	1.87	2.37	3.75	3.78	3.78	7.50	7.50	3.75	4.25	2.37	8.00	4.25	3.75
	Line Fuse	30	35	45	45	25	45	45	25	40	25	40	25	25
85-Y030	Load Amps	23.4	29.6	46.8	47.3	23.6	46.8	46.8	23.4	53.1	29.6	50.0	26.5	27.0
	kVA	2.81	3.56	5.62	5.67	5.67	11.25	11.25	5.62	6.37	3.56	12.00	6.37	5.62
	Line Fuse	40	50	70	70	35	70	70	35	60	30	60	35	30
85-Y035	Load Amps	31.2	39.5	62.5	63.0	31.5	62.5	62.5	31.2	70.8	39.5	66.6	35.4	36.0
	kVA	3.75	4.75	7.50	7.57	7.57	15.00	15.00	7.50	8.50	4.75	16.00	8.50	7.50
	Line Fuse	60	70	90	90	45	90	90	50	80	40	80	45	40
85-Y040	Load Amps	46.8	59.3	93.7	94.6	47.3	93.7	93.7	46.8	106.2	59.3	100.0	53.1	54.0
	kVA	5.6	7.1	11.2	11.3	11.3	22.5	22.5	11.2	12.7	7.1	24.0	12.7	11.2
	Line Fuse	80	100	150	150	70	125	125	70	125	60	125	70	60
85-Y045	Load Amps	62.5	79.1	125.0	126.1	63.0	125.0	125.0	62.5	141.6	79.1	133.3	70.8	72.1
	kVA	7.5	9.5	15.0	15.1	15.1	30.0	30.0	15.0	17.0	9.5	32.0	17.0	15.0
	Line Fuse	110	125	200	200	90	175	175	100	175	80	150	90	80
85-Y050	Load Amps	93.7	118.7	187.5	189.2	94.6	187.5	187.5	93.7	212.5	118.7	200.0	106.2	108.1
	kVA	11.2	14.2	22.5	22.7	22.7	45.0	45.0	22.5	25.5	14.2	48.0	25.5	22.5
	Line Fuse	175	200	300	300	150	300	300	150	250	125	225	150	125
85-Y055	Load Amps	156.2	197.9	312.5	315.4	157.7	312.5	312.5	156.2	354.1	197.9	333.3	177.0	180.2
	kVA	18.7	23.7	37.5	37.8	37.8	75.0	75.0	37.5	42.5	23.7	80.0	42.5	37.5
	Line Fuse	300	350	500	450	250	450	450	250	400	200	400	250	200
Qty. Required		1	1	1	1	1	1	1	1	1	1	1	1	1
Connection Dia.		SP - 8	SP - 12	SP - 7	SP - 11	SP - 10	SP - 5	SP - 9	SP - 6	SP - 3	SP - 4	SP - 1	SP - 2	SP - 13
Page		59	60	59	60	60	59	60	59	59	59	59	59	60

Connection diagrams may be found on Pgs. 59 - 60.

Connections found on this Page require ordering
1 Buck - Boost Transformer

The appropriate size 35 or 80 Series Transformer may be
substituted for the 85 Series where desired.

Single Phase Buck - Boost Sizing Tables

SINGLE PHASE BUCK - BOOST TABLE, TYPE LM

Type LM		Single Phase / Single Unit - Type LM													
Catalog Number	Load	Boost - Increase Voltage								Buck - Decrease Voltage					
		240	240	240	240	480	480	480	480	230	230	240	240	480	480
	Line	192	200	216	218	432	437	456	457	253	277	264	288	504	528
35-LM010	Load Amps	2.0	2.0	4.1	4.1	2.0	2.1	4.1	4.1	4.5	2.4	4.5	2.5	4.3	2.2
	kVA	0.50	0.50	1.00	1.00	1.00	1.01	2.00	1.98	1.05	0.56	1.10	0.60	2.10	1.10
	Line Fuse	5	5	8	7	5	5	7	7	7	5	7	7	5	7
35-LM015	Load Amps	3.1	3.1	6.2	6.2	3.1	3.1	6.2	6.2	6.8	3.6	6.8	3.7	6.5	3.4
	kVA	0.75	0.75	1.50	1.50	1.50	1.52	3.00	2.98	1.58	0.84	1.65	0.90	3.15	1.65
	Line Fuse	7	7	10	12	6	6	10	10	10	5	10	5	10	5
85-LM020	Load Amps	5.2	5.2	10.4	10.4	5.2	5.2	10.4	10.3	11.4	6.1	11.4	6.2	10.9	5.7
	kVA	1.25	1.25	2.50	2.50	2.50	2.54	5.00	4.96	2.63	1.41	2.75	1.50	5.25	2.75
	Line Fuse	10	10	15	15	10	10	15	15	15	9	15	9	15	9
85-LM025	Load Amps	10.4	10.4	20.8	20.8	10.4	10.5	20.8	20.6	22.9	12.2	22.9	12.5	21.8	11.4
	kVA	2.50	2.50	5.00	5.00	5.00	5.08	10.00	9.93	5.27	2.82	5.50	3.00	10.50	5.50
	Line Fuse	20	20	30	30	15	15	30	30	30	15	30	15	30	15
85-LM030	Load Amps	15.6	15.6	31.2	31.2	15.6	15.8	31.2	31.0	34.3	18.4	34.3	18.7	32.8	17.1
	kVA	3.75	3.75	7.50	7.50	7.50	7.62	15.00	14.90	7.90	4.23	8.25	4.50	15.75	8.25
	Line Fuse	25	25	45	45	25	25	45	45	40	20	20	20	40	20
85-LM035	Load Amps	20.8	20.8	41.6	41.6	20.8	21.1	41.6	41.3	45.8	24.5	45.8	25.0	43.7	22.9
	kVA	5.00	5.00	10.00	10.00	10.00	10.16	20.00	19.87	10.54	5.64	11.00	6.00	21.00	11.00
	Line Fuse	35	35	60	60	30	30	60	60	60	30	60	30	60	30
85-LM040	Load Amps	31.2	31.2	62.5	62.5	31.2	31.7	62.5	62.0	68.7	36.8	68.7	37.5	65.6	34.3
	kVA	7.50	7.50	15.00	15.00	15.00	15.24	30.00	29.80	15.81	8.47	16.50	9.00	31.50	16.50
	Line Fuse	50	50	90	90	45	45	90	90	80	40	80	40	80	40
85-LM045	Load Amps	41.6	41.6	83.3	83.3	41.6	42.3	83.3	82.7	91.6	49.1	91.6	50.0	87.5	45.8
	kVA	10.0	10.0	20.0	20.0	20.0	20.3	40.0	39.7	21.0	11.2	22.0	12.0	42.0	22.0
	Line Fuse	70	70	125	125	60	60	110	110	110	60	110	60	110	60
85-LM050	Load Amps	62.5	62.5	125.0	124.9	62.5	63.5	125.0	124.1	137.5	73.6	137.5	75.0	131.2	68.7
	kVA	15.0	15.0	30.0	30.0	30.0	30.4	60.0	59.6	31.6	16.9	33.0	18.0	63.0	33.0
	Line Fuse	100	100	175	175	90	90	175	175	175	80	175	80	175	80
85-LM055	Load Amps	104.1	104.1	208.3	208.3	104.1	105.8	208.3	206.9	229.1	122.7	229.1	125.0	218.7	114.5
	kVA	25.0	25.0	50.0	50.0	50.0	50.8	100.0	99.3	52.7	28.2	55.0	30.0	105.0	55.0
	Line Fuse	175	175	300	300	150	150	300	300	300	150	300	150	300	150
Qty. Required		1	1	1	1	1	1	1	1	1	1	1	1	1	1
Connection Dia.		SP - 8	SP - 12	SP - 7	SP - 11	SP - 6	SP - 10	SP - 5	SP - 9	SP - 3	SP - 4	SP - 3	SP - 4	SP - 1	SP - 2
Page		59	60	59	60	59	60	59	60	59	59	59	59	59	59

$$\text{Single Phase kVA} = \frac{\text{Load Voltage} \times \text{Load Amps}}{1000}$$

$$\text{kVA} = \frac{\text{Volt Amperes}}{1000}$$

$$\text{Three Phase kVA} = \frac{\text{Load Voltage} \times \text{Load Amps} \times 1.73}{1000}$$

$$\text{VA} = \text{kVA} \times 1000$$

Connection diagrams may be found on Pgs. 59 - 60.

**Connections found on this Page require ordering
1 Buck - Boost Transformer**

The appropriate size 35 or 80 Series Transformer may be substituted for the 85 Series where desired.



Three Phase Buck - Boost Sizing Tables

THREE PHASE BUCK - BOOST TABLE, TYPE M

Type M		Three Phase / Two or Three Units - Type M															
		Boost - Increase Voltage										Buck - Decrease Voltage					
Catalog Number	Load	208	208	208	230	240	240	416	416	416	416	208	208	240	240	416	416
	Line	166	173	187	208	216	228	374	377	395	397	230	249	252	264	437	457
35-M005	Load Amps	1.6	2.0	3.6	4.1	1.8	3.9	1.8	2.0	3.9	4.1	4.5	2.4	4.3	2.2	4.3	2.2
	kVA	0.60	0.75	1.30	1.64	0.77	1.64	1.34	1.50	2.85	3.95	1.64	0.90	1.82	0.95	3.12	1.65
	Line Fuse	5	5	7	8	5	7	5	5	7	7	7	5	7	5	7	5
35-M010	Load Amps	3.3	4.1	7.2	8.2	3.7	7.8	3.7	4.1	7.9	8.3	9.1	4.9	8.7	4.5	8.6	4.5
	kVA	1.20	1.49	2.60	3.29	1.55	3.28	2.69	3.00	5.70	5.99	3.29	1.80	3.64	1.90	6.24	3.30
	Line Fuse	7	8	15	12	7	15	7	7.5	15	15	15	7	15		15	7
35-M015	Load Amps	4.9	6.2	10.8	12.4	5.5	11.8	5.6	6.2	11.8	12.4	13.7	7.4	13.1	6.8	12.9	6.8
	kVA	1.80	2.24	3.90	4.94	2.32	4.92	4.04	4.50	8.55	8.99	4.94	2.70	5.46	2.86	9.36	4.95
	Line Fuse	10	12	20	20	10	20	12	10	20	20	20	10	20	10	20	10
85-M020	Load Amps	8.3	10.4	18.0	20.6	9.3	19.7	9.3	10.4	19.7	20.8	22.8	12.4	21.9	11.4	21.6	11.4
	kVA	3.00	3.74	6.50	8.23	3.87	8.20	6.74	7.50	14.26	14.99	8.23	4.50	9.10	4.76	15.60	8.25
	Line Fuse	15	20	30	30	15	30	15	15	30	30	30	15	30	15	30	15
85-M025	Load Amps	16.6	20.8	36.0	41.3	18.6	39.4	18.7	20.8	39.5	41.6	45.7	24.9	43.8	22.9	43.3	22.9
	kVA	6.00	7.49	13.00	16.46	7.75	16.40	13.49	15.00	28.52	29.98	16.46	9.00	18.20	9.53	31.21	16.50
	Line Fuse	30	35	60	60	30	60	30	30	60	60	60	30	60	30	60	30
85-M030	Load Amps	24.9	31.2	54.1	62.0	27.9	59.1	28.0	31.2	59.3	62.42	68.5	37.4	65.7	34.4	64.9	34.3
	kVA	9.00	11.24	19.50	24.69	11.62	24.60	20.23	22.50	42.78	44.97	24.69	13.50	27.31	14.30	46.82	24.75
	Line Fuse	45	50	80	90	45	80	45	45	80	90	80	45	80	45	80	45
85-M035	Load Amps	33.3	41.6	72.1	82.6	37.2	78.9	37.4	41.6	79.1	83.2	91.4	49.9	87.6	45.8	86.6	45.8
	kVA	12.00	14.99	26.00	32.93	15.50	32.80	26.98	30.00	57.05	59.97	32.93	18.00	36.41	19.07	62.49	33.00
	Line Fuse	60	70	110	125	60	110	60	60	110	110	110	60	110	60	110	60
85-M040	Load Amps	49.9	62.4	108.2	124.0	55.9	118.3	56.17	62.45	118.7	124.8	137.1	74.9	131.4	68.8	129.9	68.7
	kVA	18.00	22.49	39.00	49.39	23.25	49.20	40.47	45.00	85.57	89.95	49.39	27.00	54.62	28.61	93.64	49.50
	Line Fuse	80	100	175	175	80	175	80	90	175	175	175	80	175	80	175	80
85-M045	Load Amps	66.6	83.2	144.3	165.3	74.5	157.8	74.8	83.2	158.3	166.4	182.8	99.9	175.2	91.7	173.2	91.6
	kVA	24.0	29.9	52.0	65.8	31.1	65.6	53.9	60.0	114.1	119.9	65.8	36.0	72.8	38.1	124.8	66.0
	Line Fuse	110	150	225	250	110	250	110	125	250	250	225	110	225	110	225	110
85-M050	Load Amps	99.9	124.8	216.5	248.0	111.8	236.7	112.3	124.9	237.5	249.6	274.2	149.9	262.8	137.6	259.9	137.4
	kVA	36.0	44.9	78.8	98.7	46.5	98.4	80.9	90.00	171.1	179.9	98.7	54.0	109.2	57.2	187.2	99.0
	Line Fuse	175	200	350	400	175	250	175	175	350	350	350	175	350	175	350	175
85-M055	Load Amps	166.6	208.1	360.8	413.3	186.4	394.5	187.2	208.1	395.9	416.1	457.0	249.8	438.0	229.4	433.2	229.0
	kVA	60.0	74.9	130.0	164.6	77.5	164.0	134.9	150.0	285.2	299.8	164.6	90.0	182.0	95.3	312.1	165.0
	Line Fuse	300	350	600	600	300	600	200	300	600	600	600	300	600	300	600	300
Qty. Required		3	3	3	3	2	2	3	3	3	3	3	3	2	2	3	3
Connection Dia.		TP-18	TP-22	TP-17	TP-21	TP-5	TP-6	TP-20	TP-24	TP-19	TP-23	TP-13	TP-14	TP-10	TP-9	TP-15	TP-16
Page		62	63	62	63	61	61	63	63	63	63	62	62	62	61	62	62

$$\text{Single Phase kVA} = \frac{\text{Load Voltage} \times \text{Load Amps}}{1000}$$

$$\text{kVA} = \frac{\text{Volt Amperes}}{1000}$$

$$\text{Three Phase kVA} = \frac{\text{Load Voltage} \times \text{Load Amps} \times 1.73}{1000}$$

$$\text{VA} = \text{kVA} \times 1000$$

Connection diagrams may be found on Pgs. 61 - 63.

Connections found on this Page require ordering
2 or 3 Buck - Boost Transformers

The appropriate size 35 or 80 Series Transformer may be
substituted for the 85 Series where desired.

Three Phase Buck - Boost Sizing Tables

THREE PHASE BUCK - BOOST TABLE, TYPE Y

Type Y		Three Phase / Two and Three Units - Type Y															
		Boost - Increase Voltage										Buck - Decrease Voltage					
Catalog Number	Load	208	208	208	235	240	240	240	416	416	471	208	208	208	240	240	416
	Line	152	164	180	208	208	212	224	360	388	416	263	235	240	256	272	390
35-Y005	Load Amps	1.5	1.5	2.6	3.1	1.3	1.5	2.9	1.3	2.9	1.5	1.9	3.5	1.5	3.3	1.77	3.1
	kVA	0.55	0.55	0.96	1.27	0.56	0.64	1.21	0.96	2.09	1.25	0.69	1.27	0.56	1.38	.73	2.25
	Line Fuse	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5.6
35-Y010	Load Amps	3.0	3.1	5.3	6.2	2.7	3.0	5.8	2.6	5.8	3.0	3.8	7.0	3.1	6.6	3.5	6.2
	kVA	1.11	1.11	1.93	2.54	1.12	1.28	2.42	1.93	4.19	2.50	1.39	2.54	1.12	2.77	1.47	4.50
	Line Fuse	5	7	10	12	5	5	10	5	12	6	5	10	5	10	5	7
35-Y015	Load Amps	4.6	4.6	8.0	9.3	4.0	4.6	8.7	4.0	8.7	4.6	5.8	10.6	4.6	10.0	5.3	9.3
	kVA	1.67	1.67	2.89	3.81	1.68	1.92	3.63	2.89	6.28	3.75	2.09	3.81	1.68	4.16	2.21	6.75
	Line Fuse	8	10	12	15	8	9	15	7.5	15	9	8	15	7	15	9	15
85-Y020	Load Amps	7.7	7.7	13.4	15.6	6.7	7.7	14.5	6.7	14.5	7.6	9.7	17.6	7.8	16.6	8.8	15.6
	kVA	2.78	2.79	4.83	6.36	2.81	3.21	6.05	4.83	10.47	6.26	3.49	6.36	2.81	6.93	3.68	11.25
	Line Fuse	12	15	25	30	15	15	25	15	25	15	15	25	10	25	15	25
85-Y025	Load Amps	15.4	15.5	26.8	31.2	13.5	15.4	29.1	13.4	29.0	15.3	19.4	35.3	15.6	33.3	17.7	31.2
	kVA	5.57	5.58	9.66	12.72	5.62	6.42	12.10	9.66	20.94	12.52	6.99	12.72	5.62	13.87	7.37	22.51
	Line Fuse	25	25	45	45	25	25	45	25	45	25	25	45	25	45	25	45
85-Y030	Load Amps	23.1	23.2	40.2	46.9	20.2	23.1	43.6	20.1	43.6	23.0	29.1	53.0	23.4	50.0	26.5	46.8
	kVA	8.35	8.38	14.49	19.09	8.43	9.64	18.15	14.49	31.42	18.78	10.49	19.09	8.43	20.80	11.05	33.76
	Line Fuse	35	45	60	70	35	35	60	35	60	35	30	60	30	60	30	70
85-Y035	Load Amps	30.9	31.0	53.6	62.5	27.0	30.9	58.2	26.8	58.1	30.7	38.8	70.6	31.2	66.7	35.4	62.4
	kVA	11.14	11.17	19.32	25.45	11.25	12.85	24.21	19.32	41.89	25.04	13.98	25.45	11.25	27.74	14.73	45.02
	Line Fuse	45	50	80	90	45	45	80	45	80	45	45	80	40	80	40	90
85-Y040	Load Amps	46.3	46.5	80.4	93.8	40.5	46.3	87.3	40.2	87.2	46.0	58.2	106.0	46.8	100.1	53.1	93.7
	kVA	16.7	16.7	28.9	38.1	16.8	19.2	36.3	28.9	62.8	37.5	20.9	38.1	16.8	41.6	22.1	67.5
	Line Fuse	60	80	125	150	60	70	125	60	125	70	60	125	60	125	70	125
85-Y045	Load Amps	61.8	62.0	107.2	125.0	54.1	61.8	116.4	53.6	116.2	61.4	77.6	141.3	62.4	133.4	70.9	124.9
	kVA	22.2	22.3	38.6	50.9	22.5	25.7	48.4	38.6	83.7	50.0	27.9	50.9	22.5	55.4	29.4	90.0
	Line Fuse	80	100	175	200	80	90	175	80	175	125	80	175	70	175	80	175
85-Y050	Load Amps	92.7	93.0	160.9	187.6	81.1	92.7	174.7	80.4	174.4	92.1	116.4	212.0	93.6	200.2	106.3	187.4
	kVA	33.4	33.5	57.9	76.3	33.7	38.5	72.6	57.9	125.6	75.1	41.9	76.3	33.7	83.2	44.2	135.0
	Line Fuse	125	175	250	300	125	150	250	150	250	150	125	250	125	250	150	250
85-Y055	Load Amps	154.6	155.1	268.1	312.7	135.3	154.6	291.2	134.0	290.7	153.5	194.1	353.3	156.1	333.7	177.2	312.4
	kVA	55.7	55.8	96.6	127.2	56.2	64.2	121.0	96.6	209.4	125.2	69.9	127.2	56.2	138.7	73.6	225.1
	Line Fuse	200	250	400	450	200	225	400	200	400	250	250	400	175	400	200	450
Qty. Required		3	3	3	3	2	2	2	3	3	3	3	3	2	2	2	3
Connection Dia.		TP-18	TP-22	TP-17	TP-21	TP-5	TP-1	TP-6	TP-20	TP-19	TP-24	TP-14	TP-13	TP-2	TP-10	TP-9	TP-23
Page		62	63	62	63	61	61	61	63	63	63	62	62	61	62	61	63

$$\text{Single Phase kVA} = \frac{\text{Load Voltage} \times \text{Load Amps}}{1000}$$

$$\text{kVA} = \frac{\text{Volt Amperes}}{1000}$$

$$\text{Three Phase kVA} = \frac{\text{Load Voltage} \times \text{Load Amps} \times 1.73}{1000}$$

$$\text{VA} = \text{kVA} \times 1000$$

Connection diagrams may be found on Pgs. 61 - 63.

Connections found on this Page require ordering 2 or 3 Buck - Boost Transformers

The appropriate size 35 or 80 Series Transformer may be substituted for the 85 Series where desired.

Three Phase Buck - Boost Sizing Tables

THREE PHASE BUCK - BOOST TABLE, TYPE LM

Type LM		Three Phase / Two or Three Units - Type LM																	
Catalog Number	Load	Boost - Increase Voltage									Buck - Decrease Voltage								
		240	240	240	416	416	440	480	480	480	200	216	230	230	240	240	416	480	480
	Line	192	200	216	332	346	400	400	432	456	240	240	253	276	264	288	500	504	528
35-LM010	Load Amps	1.6	2.0	3.7	1.6	2.0	4.1	2.1	1.8	3.9	2.4	4.1	4.5	2.4	4.5	2.5	2.5	4.3	2.2
	kVA	0.68	0.86	1.54	1.20	1.50	3.13	1.80	1.54	3.28	0.86	1.54	1.80	0.98	1.90	1.04	1.80	3.64	1.90
	Line Fuse	5	5	7	5	5	7	5	5	7	5	6	7	5	7	5	5	7	5
35-LM015	Load Amps	2.4	3.1	5.5	2.5	3.1	6.1	3.2	2.7	5.9	3.7	6.1	6.7	3.7	6.8	3.7	3.7	6.5	3.4
	kVA	1.02	1.29	2.31	1.80	2.26	4.70	2.70	2.31	4.92	1.29	2.31	2.70	1.47	2.86	1.56	2.70	5.46	2.86
	Line Fuse	5	6	10	5	6	10	6	5	10	5	9	10	5	10	5	5	10	5
85-LM020	Load Amps	4.0	5.1	9.2	4.1	5.2	10.2	5.4	4.6	9.8	6.2	10.2	11.3	6.1	11.4	6.2	6.2	10.9	5.7
	kVA	1.70	2.15	3.85	3.00	3.76	7.83	4.50	3.85	8.20	2.15	3.85	4.51	2.46	4.76	2.60	4.50	9.10	4.76
	Line Fuse	8	10	15	9	10	15	10	8	15	8	15	15	8	15	9	9	15	9
85-LM025	Load Amps	8.1	10.3	18.5	8.3	10.4	20.5	10.8	9.2	19.7	12.4	20.8	22.6	12.3	22.9	12.5	12.5	21.9	11.4
	kVA	3.40	4.30	7.70	6.01	7.53	15.67	9.00	7.70	16.40	4.30	7.70	9.02	4.92	9.53	5.20	9.01	18.20	9.53
	Line Fuse	15	20	30	15	20	30	20	15	30	15	25	30	15	30	15	15	30	15
85-LM030	Load Amps	12.2	15.5	27.7	12.5	15.6	30.8	16.2	13.8	29.5	18.6	30.8	33.9	18.5	34.4	18.7	18.7	32.8	17.2
	kVA	5.10	6.46	11.55	9.02	11.29	23.51	13.50	11.55	24.60	6.46	11.55	13.5	7.38	14.30	7.80	13.52	27.31	14.30
	Line Fuse	25	25	45	25	25	45	25	25	45	25	45	45	25	45	25	25	45	25
85-LM035	Load Amps	16.3	20.7	37.0	16.7	20.9	41.1	21.6	18.5	39.4	24.8	41.1	45.2	24.7	45.8	25.0	25.0	43.8	22.9
	kVA	6.80	8.61	15.40	12.03	15.06	31.35	18.00	15.40	32.80	8.61	15.40	18.04	9.84	19.07	10.40	18.03	36.41	19.07
	Line Fuse	30	35	60	30	35	60	35	30	60	30	50	60	30	60	30	30	60	30
85-LM040	Load Amps	24.5	31.0	55.5	25.0	31.3	61.7	32.4	27.7	59.1	37.3	61.7	67.9	37.0	68.8	37.5	37.5	65.7	34.4
	kVA	10.2	12.9	23.1	18.0	22.5	47.0	27.0	23.1	49.2	12.9	23.1	27.0	14.7	28.6	15.6	27.0	54.6	28.6
	Line Fuse	45	50	80	45	50	90	50	45	80	45	80	80	45	80	45	45	80	45
85-LM045	Load Amps	32.7	41.4	74.0	33.4	41.8	82.2	43.3	37.0	78.9	49.7	82.3	90.5	49.4	91.7	50.0	50.0	87.6	45.8
	kVA	13.6	17.2	30.8	24.0	30.1	62.7	36.0	30.8	65.6	17.2	30.8	36.0	19.6	38.1	20.8	36.0	72.8	38.1
	Line Fuse	60	60	110	60	70	125	70	60	110	60	100	110	60	110	60	60	110	60
85-LM050	Load Amps	49.0	62.1	111.1	50.1	62.7	123.4	64.9	55.5	118.3	74.6	123.4	135.8	74.1	137.6	75.0	75.0	131.4	68.8
	kVA	20.4	25.8	46.2	36.1	45.1	94.0	54.0	46.2	98.4	25.8	46.2	54.1	29.5	57.2	31.2	54.1	109.2	57.2
	Line Fuse	80	100	175	80	100	175	100	80	175	80	150	175	80	175	80	80	175	80
85-LM055	Load Amps	81.7	103.6	185.2	83.5	104.5	205.6	108.2	92.6	197.2	124.3	205.8	226.4	123.5	229.4	125.1	125.1	219.0	114.7
	kVA	34.0	43.0	77.0	60.1	75.3	156.7	90.0	77.6	164.0	43.0	77.0	90.2	49.2	95.3	52.0	90.1	182.0	95.3
	Line Fuse	150	175	300	150	175	300	175	150	300	150	250	300	150	300	150	150	300	150
Qty. Required		2	2	2	3	3	3	3	2	2	2	2	2	2	2	2	3	2	2
Connection Dia.		TP-7	TP-3	TP-4	TP-18	TP-22	TP-21	TP-22	TP-5	TP-6	TP-11	TP-8	TP-12	TP-12	TP-12	TP-11	TP-14	TP-10	TP-9
Page		61	61	61	62	63	63	63	61	61	62	61	62	62	62	62	62	62	61

$$\text{Single Phase kVA} = \frac{\text{Load Voltage} \times \text{Load Amps}}{1000}$$

$$\text{kVA} = \frac{\text{Volt Amperes}}{1000}$$

$$\text{Three Phase kVA} = \frac{\text{Load Voltage} \times \text{Load Amps} \times 1.73}{1000}$$

$$\text{VA} = \text{kVA} \times 1000$$

Connection diagrams may be found on Pgs. 61 - 63.

Connections found on this Page require ordering 2 or 3 Buck - Boost Transformers

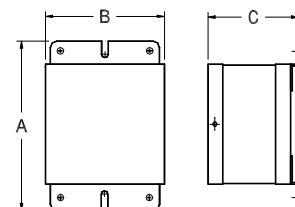
The appropriate size 35 or 80 Series Transformer may be substituted for the 85 Series where desired.

Encapsulated Buck - Boost Transformers

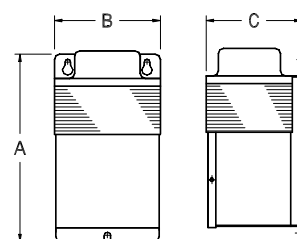
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PRIMARY VOLTS 120 X 240, SECONDARY VOLTS 12 / 24

General Information				Winding Specifications				Dimensions			
kVA Cap.	Catalog Number	Hz.	Wgt. Lbs	Taps	Maximum Amps		Conn Dia. Pg. 66	Height A	Width B	Depth C	Outline Dwg.
					Pri.	Sec.					
.050	35-M005*	50/60	4	0	.4 / .2	4.1 / 2.0	18	6.37	3.75	3.37	1
.100	35-M010*	50/60	5	0	.8 / .4	8.3 / 4.1	18	6.37	3.75	3.37	1
.150	35-M015*	50/60	7	0	1.2 / .6	12.5 / 6.2	18	7.00	3.87	3.37	2
.250	85-M020	50/60	15	0	2.0 / 1.0	20.8 / 10.4	18	12.00	4.87	5.25	3
.500	85-M025	50/60	19	0	4.1 / 2.0	41.6 / 20.8	18	12.00	4.87	5.25	3
.750	85-M030	50/60	23	0	6.2 / 3.1	62.5 / 31.2	18	12.00	4.87	5.25	3
1.0	85-M035	60	28	0	8 / 4	83 / 41	18	15.25	5.75	5.87	3
1.5	85-M040	60	39	0	12 / 6	125 / 62	18	15.25	5.75	5.87	3
2.0	85-M045	60	43	0	16 / 8	166 / 83	18	15.25	5.75	5.87	3
3.0	85-M050	60	69	0	25 / 12	250 / 125	18	15.25	8.25	7.87	3
5.0	85-M055	60	89	0	41 / 20	416 / 208	18	15.25	8.25	7.87	3



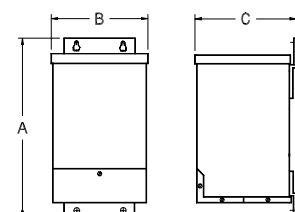
Outline Drawing 1
Wall Mount - Ventilated - NEMA 1



Outline Drawing 2
Wall Mount - Ventilated - NEMA 3R

PRIMARY VOLTS 120 X 240, SECONDARY VOLTS 16 / 32

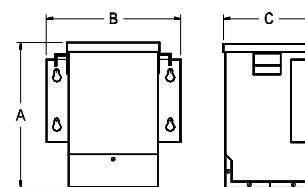
General Information				Winding Specifications				Dimensions			
kVA Cap.	Catalog Number	Hz.	Wgt. Lbs	Taps	Maximum Amps		Conn Dia. Pg. 66	Height A	Width B	Depth C	Outline Dwg.
					Pri.	Sec.					
.050	35-Y005*	50/60	4	0	.4 / .2	3.1 / 1.5	19	6.37	3.75	3.37	1
.100	35-Y010*	50/60	5	0	.8 / .4	6.2 / 3.1	19	6.37	3.75	3.37	1
.150	35-Y015*	50/60	7	0	1.2 / .6	9.3 / 4.6	19	7.00	4.00	3.63	2
.250	85-Y020	50/60	15	0	2.0 / 1.0	15.6 / 7.8	19	12.00	4.87	5.25	3
.500	85-Y025	50/60	19	0	4.1 / 2.0	31.2 / 15.6	19	12.00	4.87	5.25	3
.750	85-Y030	50/60	23	0	6.2 / 3.1	46.8 / 23.4	19	12.00	4.87	5.25	3
1.0	85-Y035	60	28	0	8 / 4	62 / 31	19	15.25	5.75	5.87	3
1.5	85-Y040	60	39	0	12 / 6	93 / 46	19	15.25	5.75	5.87	3
2.0	85-Y045	60	43	0	16 / 8	125 / 62	19	15.25	5.75	5.87	3
3.0	85-Y050	60	69	0	25 / 12	187 / 93	19	15.25	8.25	7.87	3
5.0	85-Y055	60	89	0	41 / 20	312 / 156	19	15.25	8.25	7.87	3



Outline Drawing 3
Wall Mount - Encapsulated - NEMA 3R
Note: 3 kVA & 5kVA 85 Series are also available in Outline Drawing 4 Configuration

PRIMARY VOLTS 240 X 480, SECONDARY VOLTS 24 / 48

General Information				Winding Specifications				Dimensions			
kVA Cap.	Catalog Number	Hz.	Wgt. Lbs	Taps	Maximum Amps		Conn Dia. Pg. 66	Height A	Width B	Depth C	Outline Dwg.
					Pri.	Sec.					
.100	35-LM010*	50/60	5	0	.4 / .2	4.1 / 2.0	20	6.37	3.75	3.37	1
.150	35-LM015*	50/60	7	0	.6 / .3	6.2 / 3.1	20	7.00	4.00	3.63	2
.250	85-LM020	50/60	15	0	1.0 / .52	10.4 / 5.2	20	12.00	4.87	5.25	3
.500	85-LM025	50/60	19	0	2.0 / 1.0	20.8 / 10.4	20	12.00	4.87	5.25	3
.750	85-LM030	50/60	23	0	3.1 / 1.6	31.2 / 15.6	20	12.00	4.87	5.25	3
1.0	85-LM035	60	28	0	4 / 2	41 / 20	20	15.25	5.75	5.87	3
1.5	85-LM040	60	39	0	6 / 3	62 / 31	20	15.25	5.75	5.87	3
2.0	85-LM045	60	43	0	8 / 4	83 / 41	20	15.25	5.75	5.87	3
3.0	85-LM050	60	69	0	12 / 6	125 / 62	20	15.25	8.25	7.87	3
5.0	85-LM055	60	89	0	20 / 10	208 / 104	20	15.25	8.25	7.87	3



Outline Drawing 4
Wall Mount - Encapsulated - NEMA 3R

Dimensions & weights may change. Consult factory for certified drawings.

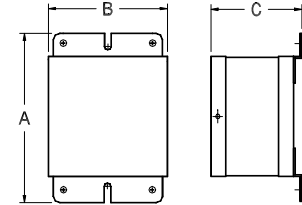
kVA capacity, primary amps, and secondary amps are shown with values when used as a low voltage, isolation transformer. Buck - Boost capacities are found on the charts on pages 52 - 58.

*Series 35 are ventilated units.

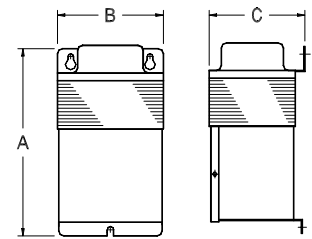
Ventilated Buck - Boost Transformers

PRIMARY VOLTS 120 X 240, SECONDARY VOLTS 12 / 24

General Information				Winding Specifications			Dimensions				
kVA Cap.	Catalog Number	Hz.	Wgt. Lbs.	Taps	Maximum Amps		Conn Dia. Pg. 66	Height A	Width B	Depth C	Outline Dwg.
					Pri.	Sec.					
.050	35-M005	50/60	5	0	.4 / .2	4.1 / 2.0	18	6.37	3.75	3.37	1
.100	35-M010	50/60	8	0	.8 / .4	8.3 / 4.1	18	6.37	3.75	3.37	1
.150	35-M015	50/60	8	0	1.2 / .6	12.5 / 6.2	18	7.00	4.00	3.63	2
.250	35-M020	50/60	11	0	2.0 / 1.0	20.8 / 10.4	18	7.50	4.63	4.00	2
.500	35-M025	50/60	20	0	4.1 / 2.0	41.6 / 20.8	18	9.28	5.50	4.75	2
.750	35-M030	50/60	28	0	6.2 / 3.1	62.5 / 31.2	18	10.88	5.50	4.75	2
1.0	80-M035	50/60	29	0	8 / 4	83 / 41	18	10.88	5.50	4.75	2
1.5	80-M040	50/60	37	0	12 / 6	125 / 62	18	10.63	6.63	5.88	2
2.0	80-M045	60	42	0	16 / 8	166 / 83	18	11.00	6.63	5.88	2
3.0	80-M050	60	58	0	25 / 12	250 / 125	18	16.38	7.69	6.88	2
5.0	80-M055	60	82	0	41 / 20	416 / 208	18	18.50	7.69	6.88	2



Outline Drawing 1
Wall Mount - Ventilated - NEMA 1



Outline Drawing 2
Wall Mount - Ventilated - NEMA 3R

PRIMARY VOLTS 120 X 240, SECONDARY VOLTS 16 / 32

General Information				Winding Specifications			Dimensions				
kVA Cap.	Catalog Number	Hz.	Wgt. Lbs.	Taps	Maximum Amps		Conn Dia. Pg. 66	Height A	Width B	Depth C	Outline Dwg.
					Pri.	Sec.					
.050	35-Y005	50/60	5	0	.4 / .2	3.1 / 1.5	19	6.37	3.75	3.37	1
.100	35-Y010	50/60	8	0	.8 / .4	6.2 / 3.1	19	6.37	3.75	3.37	1
.150	35-Y015	50/60	8	0	1.2 / .6	9.3 / 4.6	19	7.00	4.00	3.63	2
.250	35-Y020	50/60	11	0	2.0 / 1.0	15.6 / 7.8	19	7.50	4.63	4.00	2
.500	35-Y025	50/60	20	0	4.1 / 2.0	31.2 / 15.6	19	9.25	5.50	4.75	2
.750	35-Y030	50/60	28	0	6.2 / 3.1	46.8 / 23.4	19	10.88	5.50	4.75	2
1.0	80-Y035	50/60	29	0	8 / 4	62 / 31	19	10.88	5.50	4.75	2
1.5	80-Y040	50/60	37	0	12 / 6	93 / 46	19	10.63	6.63	5.88	2
2.0	80-Y045	60	42	0	16 / 8	125 / 62	19	11.00	6.63	5.88	2
3.0	80-Y050	60	58	0	25 / 12	187 / 93	19	16.38	7.69	6.88	2
5.0	80-Y055	60	82	0	41 / 20	312 / 156	19	18.50	7.69	6.88	2

PRIMARY VOLTS 240 X 480, SECONDARY VOLTS 24 / 48

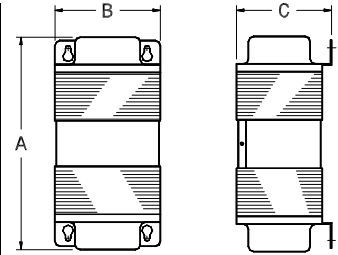
General Information				Windings Specifications			Dimensions				
kVA Cap.	Catalog Number	Hz.	Wgt. Lbs.	Taps	Maximum Amps		Conn Dia. Pg. 66	Height A	Width B	Depth C	Outline Dwg.
					Pri.	Sec.					
.100	35-LM010	50/60	8	0	.4 / .2	4.1 / 2.0	20	6.37	3.75	3.37	1
.150	35-LM015	50/60	8	0	.6 / .3	6.2 / 3.1	20	7.00	4.00	3.63	2
.250	35-LM020	50/60	11	0	1.0 / .52	10.4 / 5.2	20	7.50	4.63	4.00	2
.500	35-LM025	50/60	20	0	2.0 / 1.0	20.8 / 10.4	20	9.25	5.50	4.75	2
.750	35-LM030	50/60	28	0	3.1 / 1.6	31.2 / 15.6	20	10.88	5.50	4.75	2
1.0	80-LM035	50/60	29	0	4 / 2	41 / 20	20	10.88	5.50	4.75	2
1.5	80-LM040	50/60	37	0	6 / 3	62 / 31	20	10.63	6.63	5.88	2
2.0	80-LM045	60	42	0	8 / 4	83 / 41	20	11.00	6.63	5.88	2
3.0	80-LM050	60	58	0	12 / 6	125 / 62	20	16.38	7.69	6.88	2
5.0	80-LM055	60	82	0	20 / 10	208 / 104	20	18.50	7.69	6.88	2

Dimensions & weights may change. Consult factory for certified drawings.

kVA capacity, primary amps, and secondary amps are shown with values when used as a low voltage, isolation transformer. Buck - Boost capacities are found on the charts on pages 52 - 58.

SERIES ODY DIMENSIONS

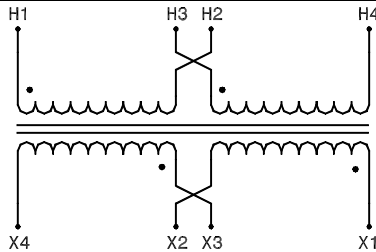
General Information				Winding Specifications			Dimensions			
kVA Cap.	Catalog Number	Hz.	Wgt. Lbs	Taps	Maximum Amps		Conn Dia.	Height A	Width B	Depth C
					208	240				
2.8	34-280-ODY	60	21	0	7.8	6.7	ODY	10.75	4.50	4.06
5.6	34-560-ODY	60	37	0	15.6	13.5	ODY	12.25	5.31	4.75
8.4	34-840-ODY	60	54	0	23.4	20.2	ODY	15.50	5.31	4.75
11.2	84-1120-ODY	60	55	0	31.2	27.0	ODY	15.50	5.31	4.75
16.9	84-1690-ODY	60	65	0	46.8	40.5	ODY	16.13	7.19	5.81
22.5	84-2250-ODY	60	74	0	62.4	54.1	ODY	17.13	7.19	5.81
33.0	84-3300-ODY	60	127	0	93.6	81.1	ODY	20.50	7.69	6.75
56.0	84-5600-ODY	60	158	0	156.1	135.3	ODY	24.88	7.69	6.75



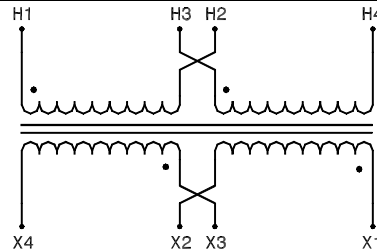
Series ODY
Wall Mount - Ventilated - NEMA 3R

LOW VOLTAGE CONNECTION DIAGRAMS

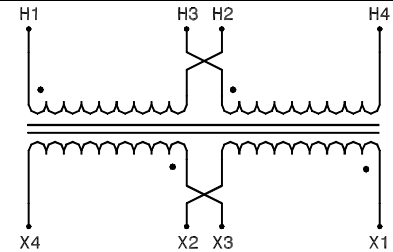
Dia. 18	Catalog Series 35-MOXX & 80-MOXX 85-MOXX		
Tap Arrangement	No Taps		
% High Voltage	High Voltage 120 X 240	Inter-Connect	Connect High Voltage Lines To
100	120	H1 To H3 H2 To H4	H1H3 & H2H4
100	240	H2 To H3	H1 & H4
% Low Voltage	Low Voltage 12 / 24	Inter-Connect	Connect Low Voltage Lines To
100	12	X1 To X3 X2 To X4	X1X3 & X2X4
100	12 / 24	X2 To X3	X1 & X2X3 & X4
100	24	X2 To X3	X1 & X4



Dia. 19		Catalog Series 35-YOXX & 80-YOXX 85-YOXX		
Tap Arrangement	No Taps			
% High Voltage	High Voltage 120 X 240	Inter-Connect	Connect High Voltage Lines To	
100	120	H1 To H3 H2 To H4	H1H3 & H2H4	
100	240	H2 To H3	H1 & H4	
% Low Voltage	Low Voltage 16 / 32	Inter-Connect	Connect Low Voltage Lines To	
100	16	X1 To X3 X2 To X4	X1X3 & X2X4	
100	16 / 32	X2 To X3	X1 & X2X3 & X4	
100	32	X2 To X3	X1 & X4	



Dia. 20		Catalog Series 35-LM0XX & 80-LM0XX 85-LM0XX		
Tap Arrangement	No Taps			
% High Voltage	High Voltage 240 X 480	Inter-Connect	Connect High Voltage Lines To	
100	240	H1 To H3 H2 To H4	H1H3 & H2H4	
100	480	H2 To H3	H1 & H4	
% Low Voltage	Low Voltage 24 / 48	Inter-Connect	Connect Low Voltage Lines To	
100	24	X1 To X3 X2 To X4	X1X3 & X2X4	
100	24 / 48	X2 To X3	X1 & X2X3 & X4	
100	48	X2 To X3	X1 & X4	



Buck - Boost Connection Diagrams

Single Phase Connection Diagrams

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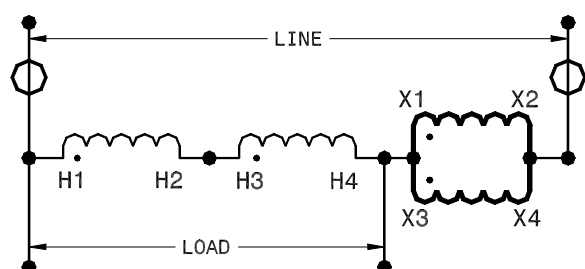


Diagram SP - 1

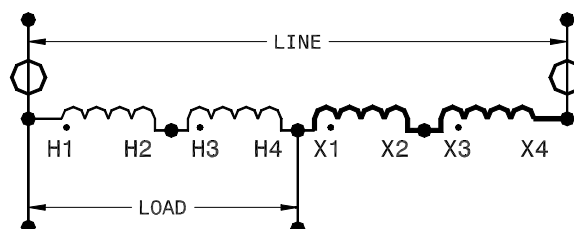


Diagram SP - 2

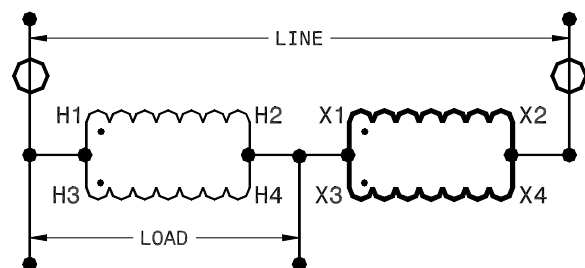


Diagram SP - 3

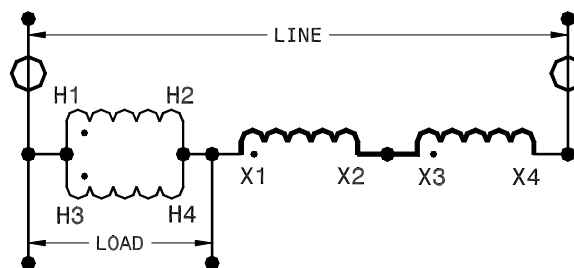


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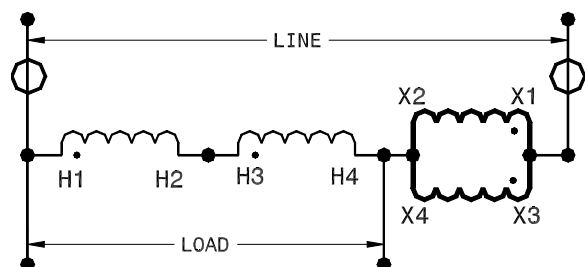


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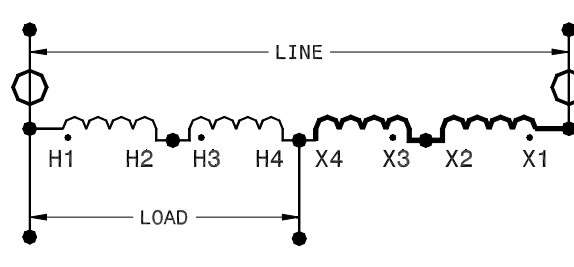


Diagram SP - 6

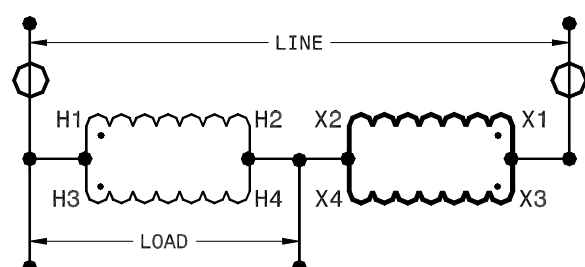


Diagram SP - 7

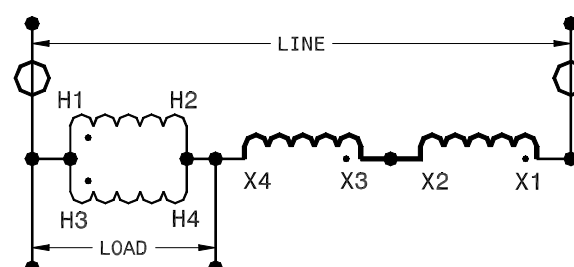
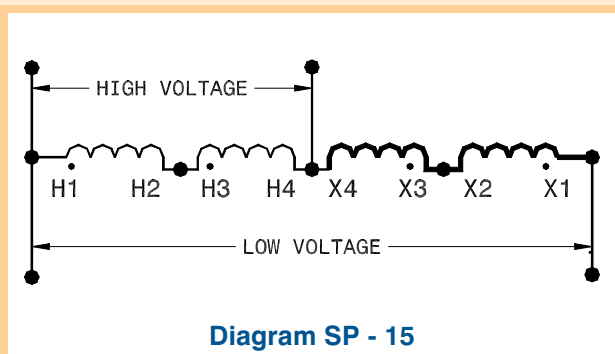
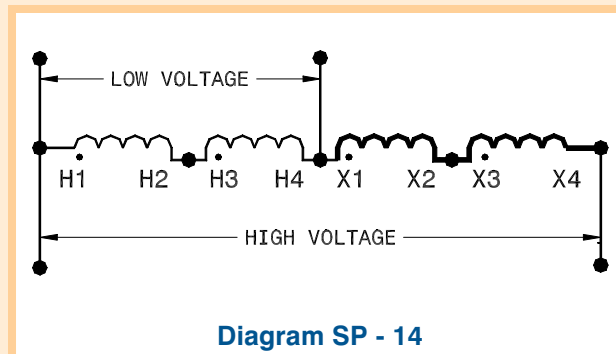
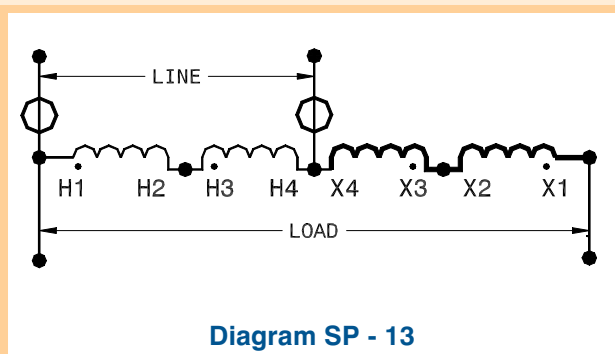
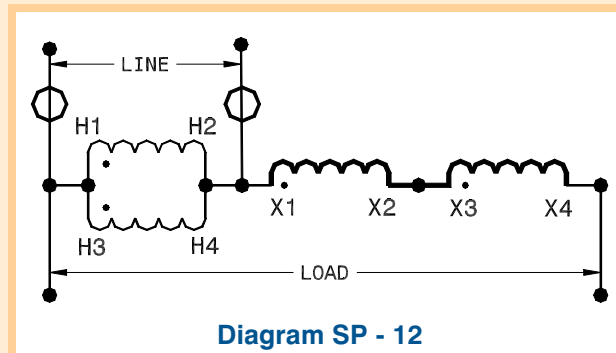
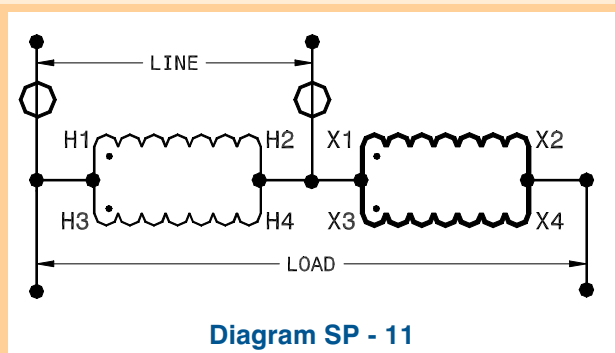
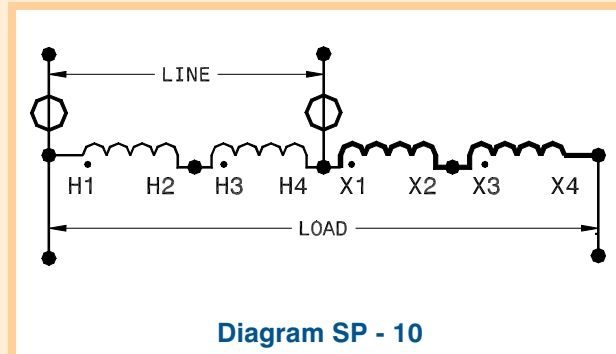
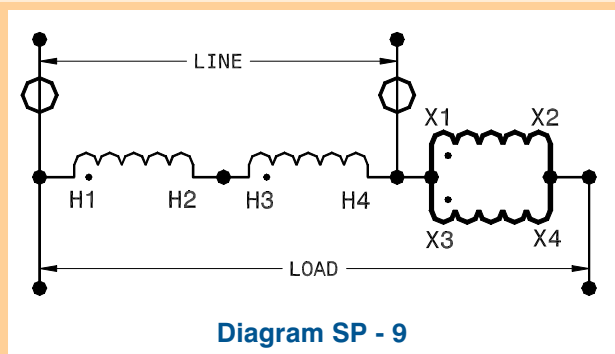


Diagram SP - 8

Buck - Boost Connection Diagrams

Single Phase Connection Diagrams



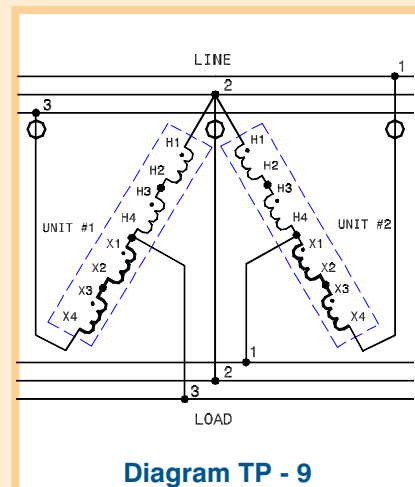
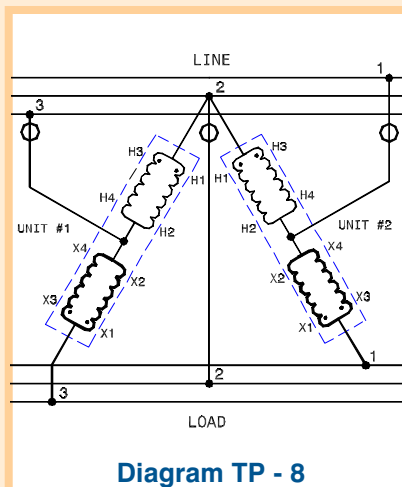
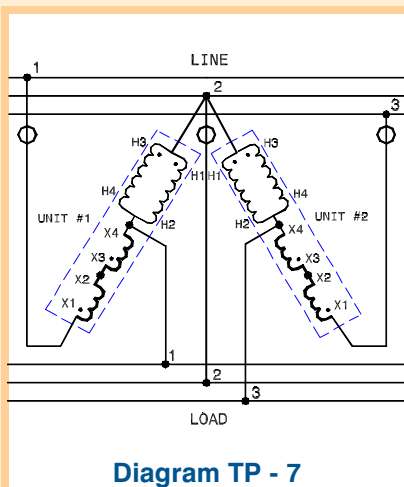
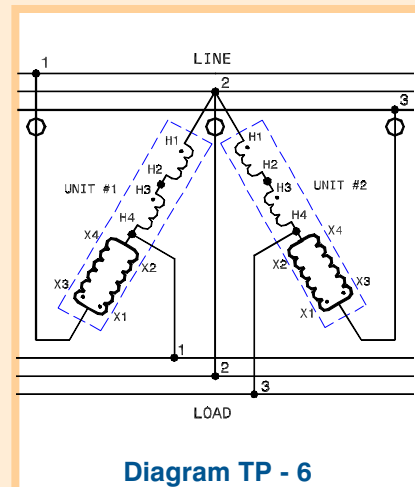
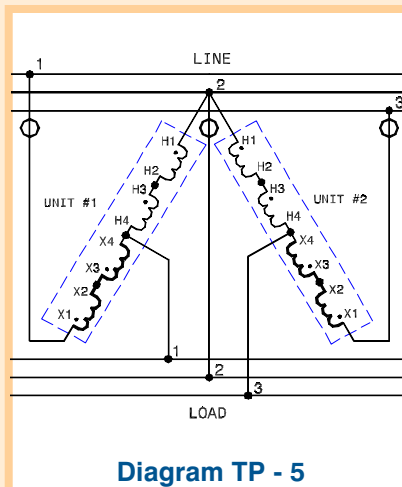
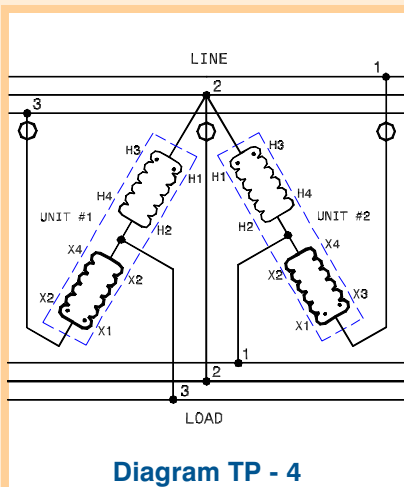
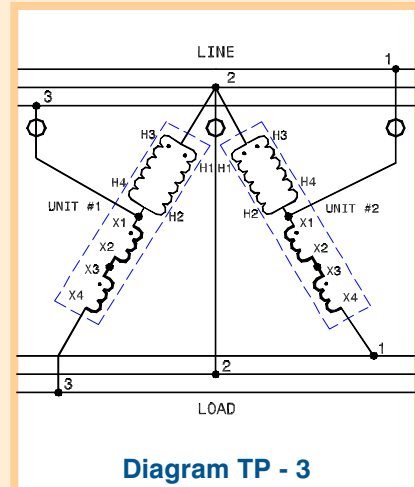
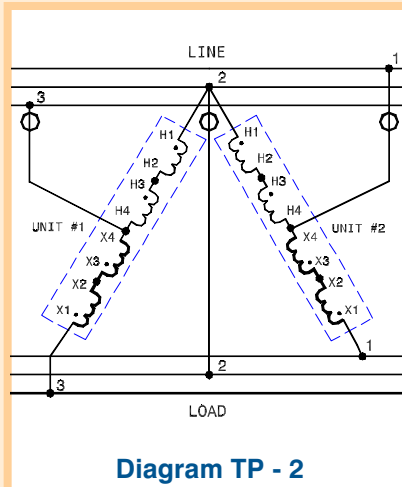
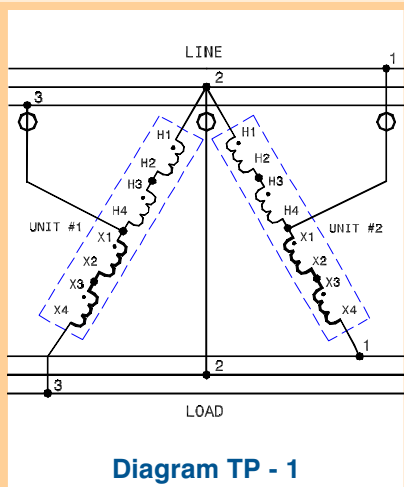
Symbol Key

O - Indicates Overcurrent Protection

Note: If present, do not fuse grounded conductor

Buck - Boost Connection Diagrams

Three Phase Connection Diagrams



Three Phase Connection Diagrams

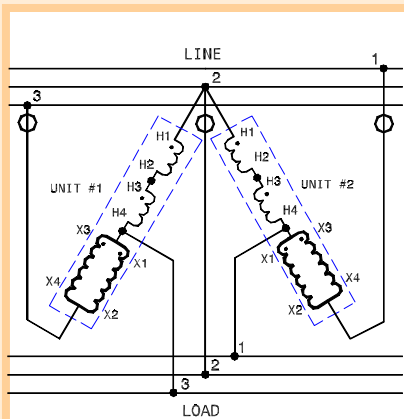


Diagram TP - 10

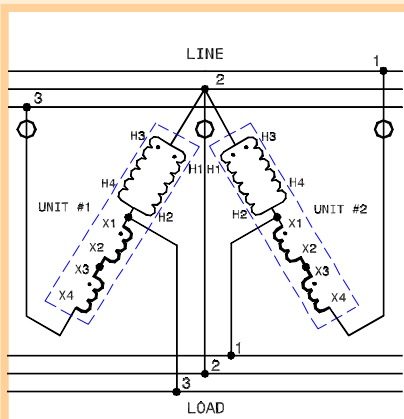


Diagram TP - 11

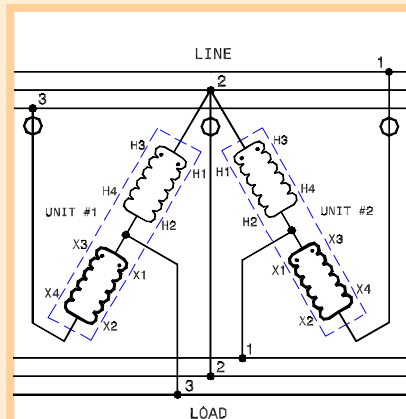


Diagram TP - 12

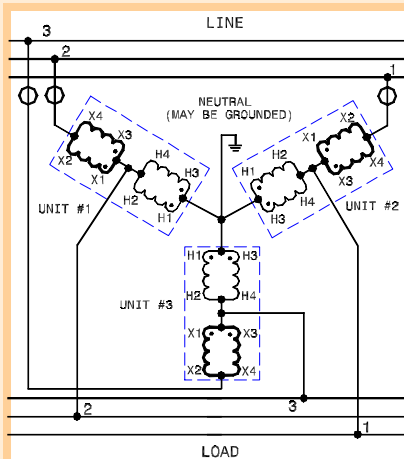


Diagram TP - 13

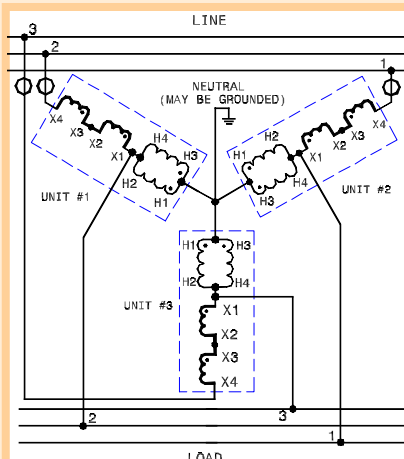


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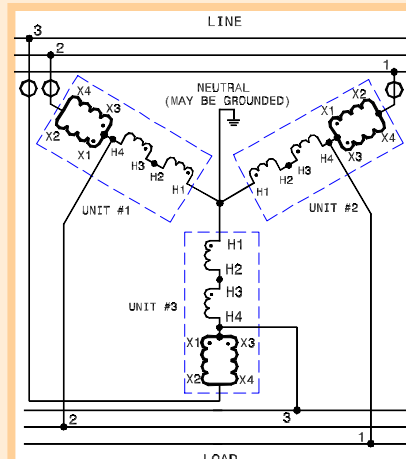


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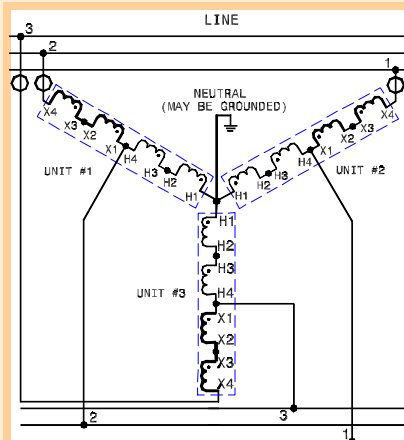


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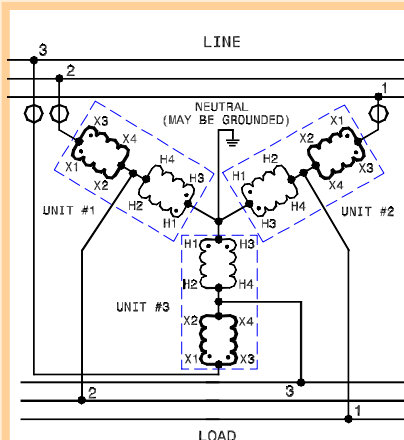


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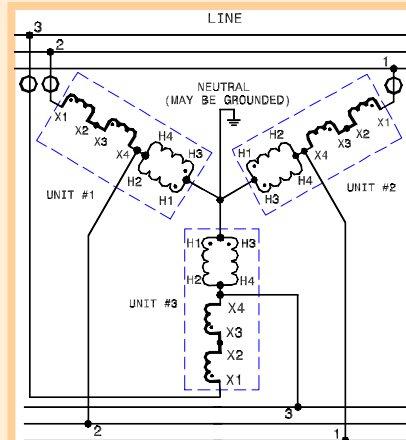
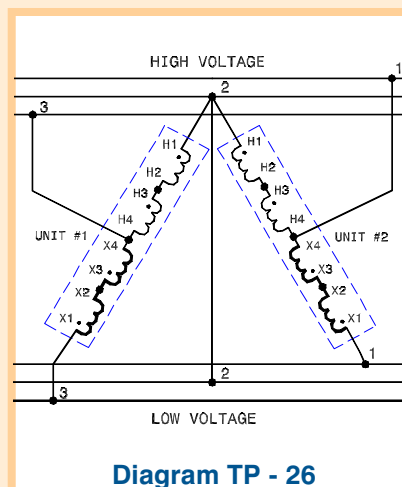
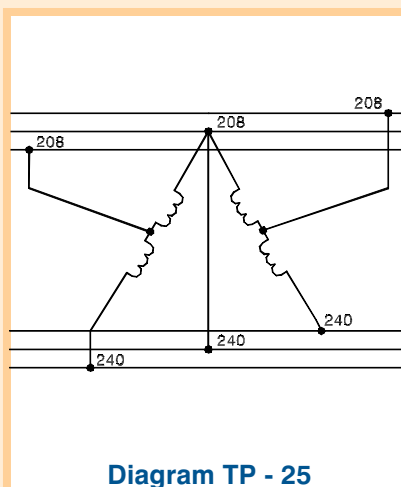
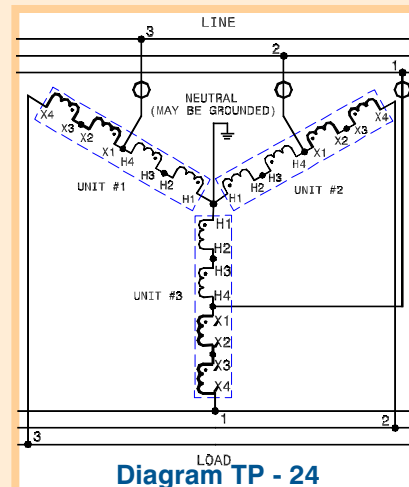
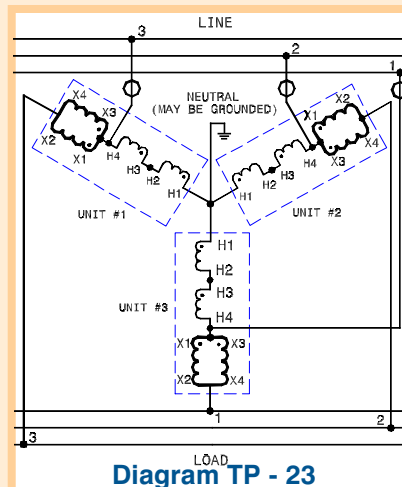
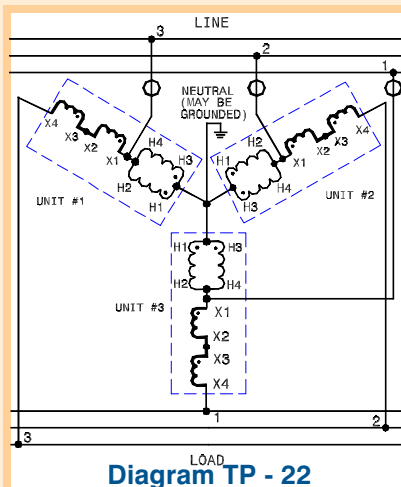
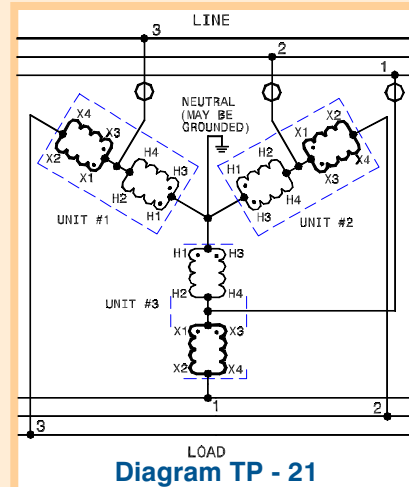
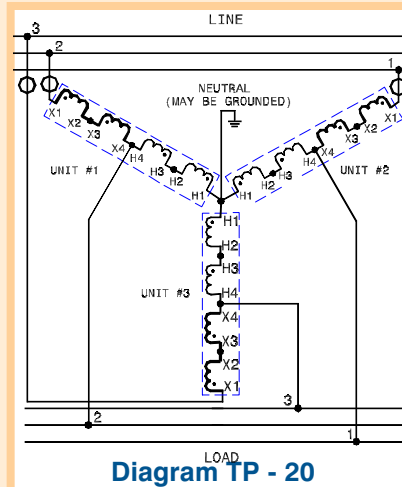
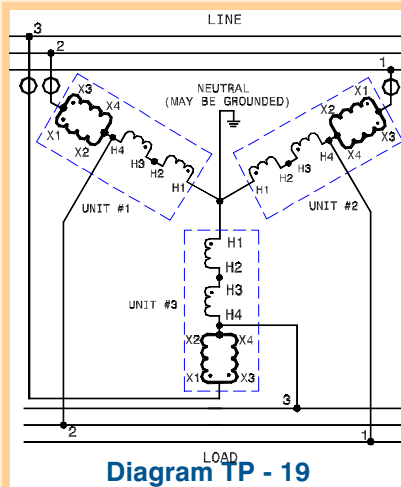


Diagram TP - 18

Buck - Boost Connection Diagrams

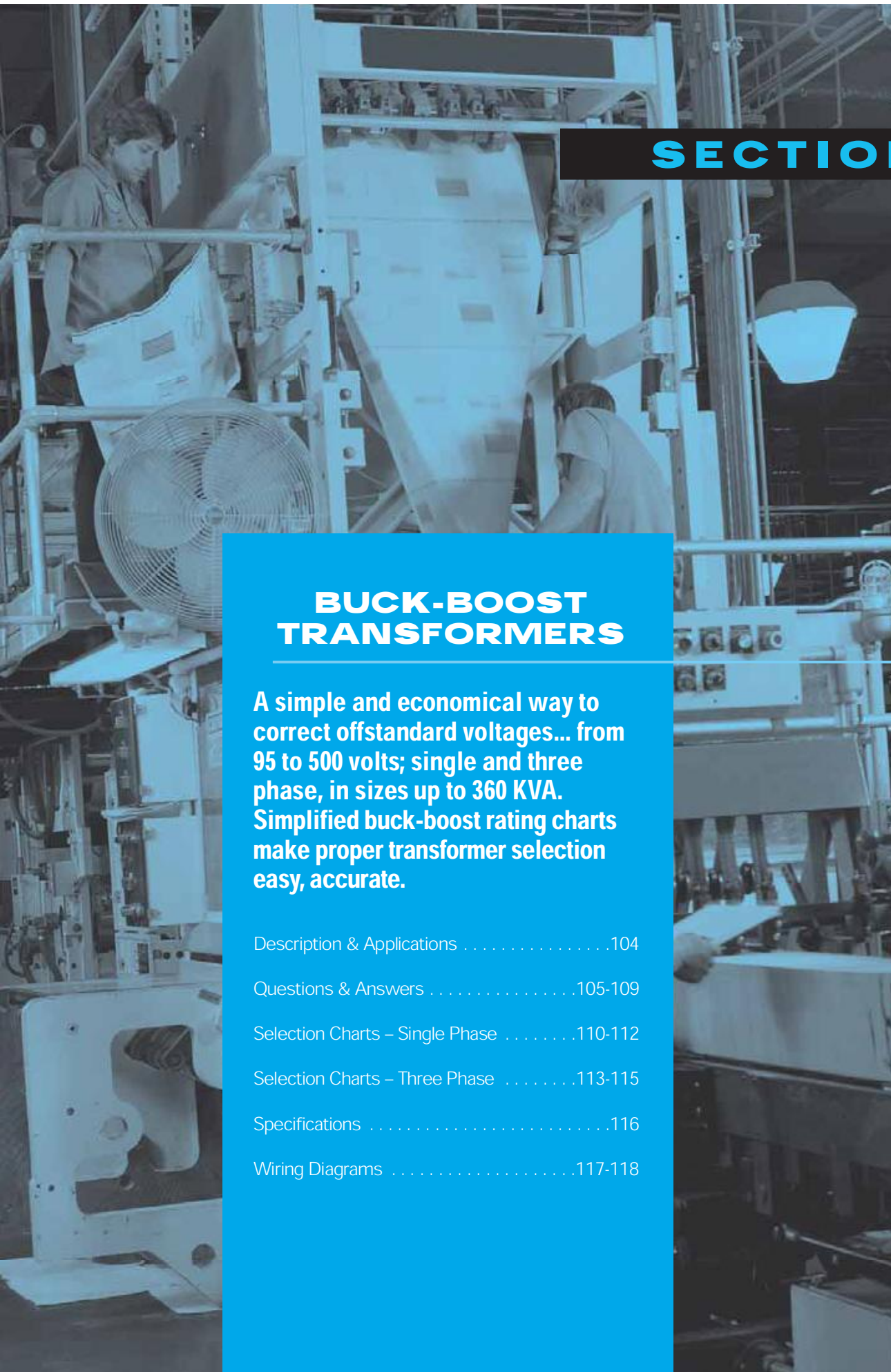
Three Phase Connection Diagrams



Symbol Key

O - Indicates Overcurrent Protection

Note: If present, do not fuse grounded conductor



SECTION 7

BUCK-BOOST TRANSFORMERS

A simple and economical way to correct offstandard voltages... from 95 to 500 volts; single and three phase, in sizes up to 360 KVA. Simplified buck-boost rating charts make proper transformer selection easy, accurate.

Description & Applications	104
Questions & Answers	105-109
Selection Charts – Single Phase	110-112
Selection Charts – Three Phase	113-115
Specifications	116
Wiring Diagrams	117-118

Where Are Buck-Boost Transformers Used?

A typical buck-boost application is 120 volts in, 12 volts out for low voltage lighting or control circuitry. In most applications, this low voltage transformer is field connected as an autotransformer. (See question 2 for the definition of an autotransformer). Buck-boost transformers provide tremendous capabilities and flexibility in KVA sizes and input/output voltage combinations. **Basically you get 75 different transformers... all in one convenient package.**

Other buck-boost applications are, where (A) low supply voltage exists because equipment is installed at the end of a bus system; (B) the supply system is operating at or over its design capacity; and (C) where overall consumer demands may be so high the utility cuts back the supply voltage to the consumer causing a "brownout."

Why Use Buck-Boost Instead of Another Type Transformer?

Take a look at the advantages and disadvantages of using a buck-boost transformer (autotransformer) compared to a standard isolation transformer of the proper size and voltage combination.

As you can see, the advantages are many, the economies great. Buck-boost transformers are readily available from the stock of your nearest Power Distribution Products Distributor.

ADVANTAGES	DISADVANTAGES
More efficient	No circuit isolation
Smaller & lighter	Cannot create a neutral
5-10 times increase in KVA	Application voltages and KVA don't match the nameplate voltages and KVA
Versatile, many applications	
Lower cost	



Proper Voltage Is Critical

With nearly two-thirds of all electrical loads being A.C. motor loads, maintenance of the proper voltage to that motor is very important. If the supply line voltage is not maintained, motor winding current is increased causing reduced motor torque and escalating motor temperature, all of which results in the rapid loss of insulation life expectancy.

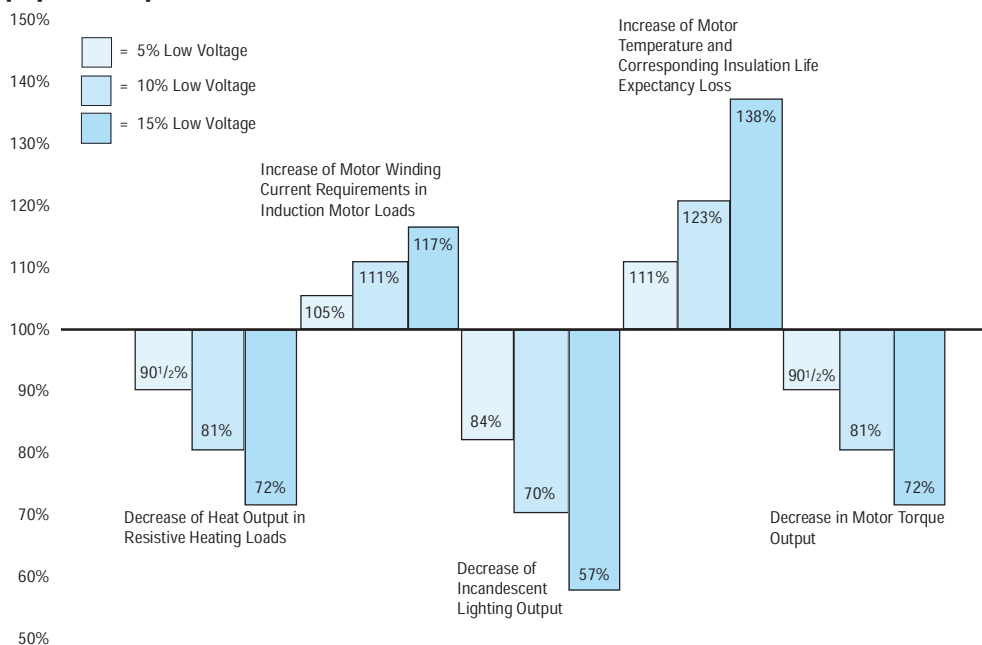
In addition to motor loads, the detrimental effects of low voltage on both resistive heating loads and incandescent lighting output is illustrated in the chart.

Anytime you have a lower than standard voltage, equipment damage and failure can result.

Buck-boost transformers are an economical way to correct this potentially very serious problem. **Anytime** a line voltage change in the 5-20% range is required, a buck-boost transformer should be considered as your first line of defense.



How Low Voltage Affects Various Equipment Operations and Functions



Questions & Answers About Buck-Boost Transformers

1. What is a buck-boost transformer?

Buck-boost transformers are small single phase transformers designed to reduce (buck) or raise (boost) line voltage from 5 - 20%. The most common example is boosting 208 volts to 230 volts, usually to operate a 230 volt motor such as an air-conditioner compressor, from a 208 volt supply line.

Buck-boosts are a standard type of single phase distribution transformers, with primary voltages of 120, 240 or 480 volts and secondaries typically of 12, 16, 24, 32 or 48 volts. They are available in sizes ranging from 50 volt amperes to 10 kilo-volt amperes.

Buck-boost transformers are shipped ready to be connected for a number of possible voltage combinations.

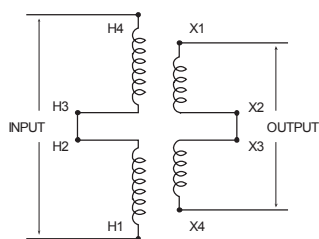


Figure 1. Buck-boost transformer connected as a low voltage insulating transformer (primary and secondary windings shown series connected).

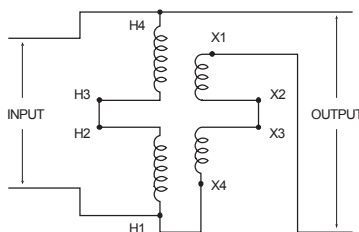


Figure 2. Same buck-boost transformer connected as a boosting autotransformer. The connection from H1 to X4 "converted" the unit to an autotransformer.

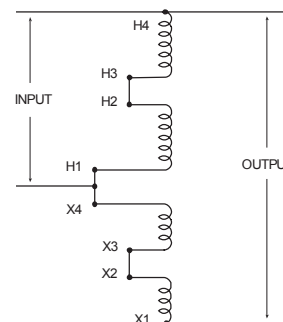


Figure 3. Illustration No. 2 shown with the primary and secondary windings "straightened".

3. What is the difference between a buck-boost transformer and an autotransformer?

When a primary lead wire and secondary lead wire of a buck-boost transformer are connected together electrically, in a recommended voltage bucking or boosting connection, the transformer is in all respects, an autotransformer. However, if the interconnection between the primary and secondary winding is not made, then the unit is an insulating type transformer.

Applications

4. Why are they used?

Electrical and electronic equipment is designed to operate on standard supply voltage. When the supply voltage is constantly too high or too low, (usually more than 55%), the equipment fails to operate at maximum efficiency. A buck and boost transformer is a simple and ECONOMICAL means of correcting this off-standard voltage.

5. What are the most common applications for buck-boost transformers?

Boosting 208V to 230V or 240V and vice versa for commercial and industrial air conditioning systems; boosting 110V to 120V and 240V to 277V for lighting systems; voltage correction for heating systems and induction motors of all types. Many applications exist where supply voltages are constantly above or below normal.

6. Can buck-boost transformers be used to power low voltage circuits?

Yes, low voltage control, lighting circuits, or other low voltage applications requiring either 12V, 16V, 24V, 32V or 48V. The unit is connected as an insulating transformer and the nameplate KVA rating is the transformer's capacity.

Operation and Construction

7. Why do buck-boost transformers have 4 windings?

To make them versatile! A four winding buck-boost transformer (2 primary and 2 secondary windings) can be connected eight different ways to provide a multitude of voltage and KVA outputs. A two winding (1 primary & 1 secondary) buck-boost transformer can be connected only one way.

8. Will a buck-boost transformer stabilize voltage?

No. The output voltage is a function of the input voltage. If the input voltage varies, then the output voltage will also vary by the same percentage.

Load Data

9. Are there any restrictions on the type of load that can be operated from a buck-boost transformer?

No, there are no restrictions.

10. Why can a buck-boost transformer operate a KVA load many times larger than the KVA rating on its nameplate?

Since the transformer has been auto-connected in such a fashion that the 22V secondary voltage is added to the 208V primary voltage, it produces 230V output.

The autotransformer KVA is calculated:

$$\text{KVA} = \frac{\text{Output Volts} \times \text{Secondary Amps}}{1000}$$

$$\text{KVA} = \frac{230 \text{ V} \times 41.67 \text{ Amps}}{1000} = 9.58 \text{ KVA}$$

The picture to the left illustrates the difference in physical size between the autotransformer of 1 KVA, capable of handling a 9.58 KVA load, and an isolation transformer capable of handling a 7.5 KVA load.

To cite an example . . . a model T-1-11683 buck-boost transformer has a nameplate KVA rating of 1 KVA, but when it's connected as an autotransformer boosting 208V to 230V, its KVA capacity increases to 9.58 KVA. The key to understanding the operation of buck-boost transformers lies in the fact that the secondary windings are the only parts of the transformer that do the work of transforming voltage and current. In the example above, only 22 volts are being transformed (boosted) — i.e. 208V + 22V = 230V. This 22V transformation is carried out by the secondary windings which are designed to operate at a maximum current of 41.67 amps (determined by wire size of windings).



(1 KVA) T-1-11683

(7.5 KVA) T-2-53515-3S

$$\text{Maximum Secondary Amps} = \frac{\text{nameplate KVA} \times 1000}{\text{secondary volts}}$$

$$\begin{aligned} \text{Maximum Secondary Amps} &= \frac{1.0 \text{ KVA} \times 1000}{24 \text{ V}} \\ &= \frac{1000 \text{ VA}}{24 \text{ V}} = 41.67 \text{ amps} \end{aligned}$$

11. Can buck-boost transformers be used on motor loads?

Yes, either single or three phase. Refer to the motor data charts in Section I for determining KVA and Amps required by NEMA standard motors.

12. How are single phase and three phase load Amps and load KVA calculated?

$$\text{Single phase Amps} = \frac{\text{KVA} \times 1000}{\text{Volts}}$$

$$\text{Three phase Amps} = \frac{\text{KVA} \times 1000}{\text{Volts} \times 1.73}$$

$$\text{Single phase KVA} = \frac{\text{Volts} \times \text{Amps}}{1000}$$

$$\text{Three phase KVA} = \frac{\text{Volts} \times \text{Amps} \times 1.73}{1000}$$

Three-Phase**13. Can buck-boost transformers be used on three-phase systems as well as single phase systems?**

Yes. A single unit is used to buck or boost single phase voltage — two or three units are used to buck or boost three phase voltage. The number of units to be used in a three-phase installation depends on the number of wires in the supply line. If the three-phase supply is 4 wire Y, use three buck-boost transformers. If the 3-phase supply is 3 wire Y (neutral not available), use two buck-boost transformers. Refer to three-phase selection charts.

14. Should buck-boost transformers be used to develop a three-phase 4 wire Y circuit from a three-phase 3 wire delta circuit?

No. A three phase "wye" buck-boost transformer connection should be used only on a 4 wire source of supply. A delta to wye connection does not provide adequate current capacity to accommodate unbalanced currents flowing in the neutral wire of the 4 wire circuit.

3 PHASE CONNECTIONS

INPUT (SUPPLY SYSTEM)	DESIRED OUTPUT CONNECTION	
DELTA 3 wire	WYE 3 or 4 wire	DO NOT USE
OPEN DELTA 3 wire	WYE 3 or 4 wire	DO NOT USE
WYE 3 or 4 wire	CLOSED DELTA 3 wire	DO NOT USE
WYE 4 wire	WYE 3 or 4 wire	OK
WYE 3 or 4 wire	OPEN DELTA 3 wire	OK
CLOSED DELTA 3 wire	OPEN DELTA 3 wire	OK

15. Why isn't a closed delta buck-boost connection recommended?

A closed delta buck-boost auto transformer connection requires more transformer KVA than a "wye" or open delta connection and phase shifting occurs on the output. Consequently the closed delta connection is more expensive and electrically inferior to other three-phase connections.

Connection and Frequency**16. How does the installer or user know how to connect a buck-boost transformer?**

The connection chart packed with each unit shows how to make the appropriate connections. These same connection charts are also shown in this section (page 118).

17. Can 60 Hertz buck-boost transformers be used on a 50 Hertz service?

No. Acme buck-boost transformers should be operated only at the frequencies recommended. However, units recommended for 50 cycle operation are suitable for 60 cycle operation but not vice versa.

Selection**18. How do you select a buck-boost transformer?**

Refer to the selection steps on page 109 for easy 4-step selection, then go to the charts. Also, pages 12 and 13 are helpful for determining buck-boost KVA when only the H.P. rating of a motor is available.

Nameplate Data**19. Why are buck-boost transformers shipped from the factory as insulating transformers and not preconnected at the factory as autotransformers?**

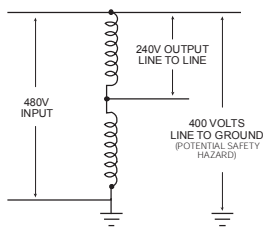
A four winding buck-boost transformer can be auto connected eight different ways to provide a multitude of voltage and KVA output combinations. The proper transformer connection depends on the user's supply voltage, load voltage and load KVA. Consequently, it is more feasible for the manufacturer to ship the unit as an insulating transformer and allow the user to connect it on the job site in accordance with the available supply voltage and requirements of his load.

20. Why is the isolation transformer KVA rating shown on the nameplate instead of the autotransformer KVA rating?

The KVA rating of a buck-boost transformer when auto connected depends on the amount of voltage buck or boost. Since the amount of voltage buck or boost is different for each connection, it is physically impossible to show all of the various voltage combinations and attainable KVA ratings on the nameplate. A connection chart showing the various attainable single phase and three-phase connections is packed with each unit.

Safety**21. Do buck-boost transformers present a safety hazard usually associated with auto-transformers?**

No. Most autotransformers, if they are not of the buck-boost variety, change voltage from one voltage class to another. (Example 480V to 240V) In a system where one line is grounded, the user thinks he has 240V; yet due to the primary and secondary being tied together, it is possible to have 480V to ground from the 240V output. A buck-boost transformer only changes the voltage a small amount, such as 208V to 240V. This small increase does not represent a safety hazard, as compared to a buck of 480V to 240V. Refer to Figure on the following page.



Sound Levels

22. Are buck-boost transformers as quiet as standard isolation transformers?

Yes. However, an auto-connected buck-boost transformer will be quieter than an isolation transformer capable of handling the same load. The isolation transformer would have to be physically larger than the buck-boost transformer, and small transformers are quieter than larger ones. (Example) 1 KVA — 40 db; 75 KVA — 50 db. (db is a unit of sound measure).

Cost and Life Expectancy

23. How does the cost of a buck-boost transformer compare to that of an insulating transformer — both capable of handling the same load?

For the most common buck-boost applications, the dollar savings are generally greater than 75% compared to the use of an insulating type distribution transformer for the same application.

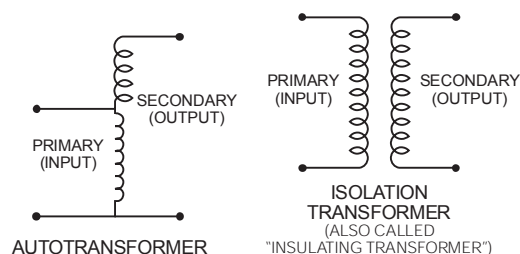
24. What is the life expectancy of a buck boost transformer?

The life expectancy of a buck-boost transformer is the same as the life expectancy of other dry type transformers.

National Electrical Code

25. Your catalog indicates that a buck-boost transformer is suitable for connecting as an AUTOTRANSFORMER. What is the definition of an autotransformer and how does it differ from an isolation transformer?

An autotransformer is a transformer in which the primary (input) and the secondary (output) are electrically connected to each other. An isolation transformer, also known as an insulating transformer, has complete electrical separation between the primary (input) and the secondary (output). This is illustrated in the drawing below



An autotransformer changes or transforms only a portion of the electrical energy it transmits. The rest of the electrical energy flows directly through the electrical connections between the primary and secondary. An isolation transformer (insulating transformer) changes or transforms all of the electrical energy it transmits.

Consequently, an autotransformer is smaller, lighter in weight, and less costly than a comparable KVA size insulating transformer.

Please refer to Question 27 for additional information on autotransformers.

Buck-boost transformers are frequently field-connected as autotransformers.

26. Buck-boost transformers are almost always installed as auto-transformers. Does the N.E.C. (National Electrical Code) permit the use of autotransformers?

Yes. Please refer to N.E.C. Article 450-4, "Autotransformers 600 Volts, Nominal, or Less." Item (a) explains how to over-current protect an autotransformer; item (b) explains that an insulating transformer such as a buck-boost transformer may be field connected as an autotransformer.

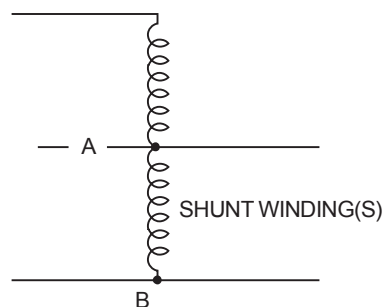
27. When a buck-boost transformer is connected as an autotransformer such as boosting 208V to 230V, the KVA is greatly increased. What is the procedure for determining the size (ampere rating) of the over-current protective device such as a fuse or circuit breaker?

The National Electrical Code Article 450-4 addresses over-current protection of autotransformers. A copy is reproduced below for easy reference.

450-4. Autotransformers 600 Volts, Nominal, or Less.

(a) Overcurrent Protection. Each autotransformer 600 volts, nominal, or less shall be protected by an individual overcurrent device installed in series with each ungrounded input conductor. Such overcurrent device shall be rated or set at not more than 125 percent of the rated full-load input current of the autotransformer. An overcurrent device shall not be installed in series with the shunt winding (the winding common to both the input and the output circuits) of the autotransformer between Points A and B as shown in Diagram 450-4.

Diagram 450-4



Exception: Where the rated input current of an autotransformer is 9 amperes or more and 125 percent of this current does not correspond to a standard rating of a fuse or non-adjustable circuit breaker, the next higher standard rating described in Section 240-6 shall be permitted. When the rated input current is less than 9 amperes, an overcurrent device rated or set at not more than 167 percent of the input current shall be permitted.

(b) Transformer Field-Connected as an Autotransformer.

A transformer field-connected as an autotransformer shall be identified for use at elevated voltage.

28. I have noted the reprint of the N.E.C. (National Electrical Code), Article 450-4 shown in the previous question covering autotransformer overcurrent protection. Could you explain this article in detail by citing an example?

An example of an everyday application is always a good way to explain the intent of the "Code." **Example:** A 1 KVA transformer Catalog No. T-1-11683 has a primary of 120 x 240V and a secondary of 12 x 24V. It is to be connected as an autotransformer at the time of installation to raise 208V to 230V single phase.

When this 1 KVA unit is connected as an autotransformer for this voltage combination, its KVA rating is increased to 9.58 KVA (may also be expressed as 9,580 VA). This is the rating to be used for determining the full load input amps and the sizing of the overcurrent protect device (fuse or breaker) on the input.

Full Load Input Amps =

$$\frac{9,580 \text{ Volt Amps}}{208 \text{ Volts}} = 46 \text{ Amps}$$

When the full load current is greater than 9 amps, the overcurrent protective device (usually a fuse or non-adjustable breaker) amp rating can be up to 125 percent of the full load rating of the autotransformer input amps.

Max. amp rating of the
overcurrent device

$$= 46 \text{ amps} \times 125\% = 57.5 \text{ amps}$$

The National Electrical Code, Article 450-4 (a) Exception, permits the use of the next higher standard ampere rating of the overcurrent device. This is shown in Article 240-6 of the N.E.C.

Max. size of the fuse or circuit breaker
= 60 amps

Steps for Selecting the Proper Buck-Boost Transformer

You should have the following information before selecting a buck-boost transformer.

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.

Load Voltage — The voltage at which your equipment is designed to operate. This is listed on the nameplate of the load equipment.

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.

Frequency — The supply line frequency must be the same as the frequency of the equipment to be operated — either 50 or 60 cycles.

Phase — The supply line should be the same as the equipment to be operated — either single or three phase.

Four Step Selection

1. A series of LINE VOLTAGE and LOAD VOLTAGE combinations are listed across the top of each selection chart. Select a LINE VOLTAGE and LOAD VOLTAGE combination from ANY of the charts that comes closest to matching the LINE VOLTAGE and LOAD VOLTAGE of your application.
2. Read down the column you have selected until you reach either the LOAD KVA or LOAD AMPS of the equipment you want to operate. You probably will not find the exact value of LOAD KVA or LOAD AMPS so go to the next higher rating.
3. From this point, read across the column to the far left-hand side and you have found the catalog number of the exact buck-boost transformer you need. Refer to the catalog number listing on page 116 for dimensions.
4. CONNECT the transformer according to the connection diagram specified at the bottom of the column where you selected YOUR LINE VOLTAGE and LOAD VOLTAGE combination. Connection diagrams are found at the end of this section.

This same connection information is packed with each buck-boost transformer.

SELECTION CHARTS

SINGLE PHASE



GROUP I

SINGLE PHASE		BOOSTING								BUCKING					
Line Voltage (Available)		95	100	105	110	189	208	215	220	125	132	230	245	250	252
Load Voltage (Output)		114	120	115	120	208	230	237	242	113	120	208	222	227	240
CAT. NO.															
T-1-81047	Load KVA	0.24	0.25	0.48	0.50	0.43	0.48	0.49	0.50	0.52	0.54	0.47	0.50	0.52	1.02
	Amps	2.08	2.08	4.17	4.17	2.08	2.08	2.08	2.08	4.60	4.60	2.28	2.28	2.28	4.37
T-1-81048	Max. Size of Fuse or Breaker	6	6	10	10	6	6	6	6	10	10	6	6	6	10
T-1-81048	Load KVA	0.47	0.50	0.96	1.01	0.87	0.96	0.99	1.01	1.04	1.08	0.95	1.00	1.04	2.04
	Amps	4.17	4.17	8.33	8.33	4.17	4.17	4.17	4.17	9.20	9.20	4.56	4.56	4.58	8.75
T-1-81049	Max. Size of Fuse or Breaker	10	10	15	15	10	10	10	10	15	15	10	10	10	15
T-1-81049	Load KVA	0.71	0.75	1.43	1.51	1.30	1.43	1.48	1.51	1.56	1.62	1.42	1.50	1.56	3.00
	Amps	6.25	6.25	12.50	12.50	6.25	6.25	6.25	6.25	13.80	13.80	6.86	6.86	6.86	13.10
T-1-81050	Max. Size of Fuse or Breaker	15	15	20	20	15	15	15	15	20	20	15	15	15	15
T-1-81050	Load KVA	1.19	1.25	2.40	2.50	2.16	2.39	2.46	2.52	2.60	2.75	2.37	2.50	2.60	5.10
	Amps	10.42	10.40	20.80	20.80	10.40	10.40	10.40	10.40	22.80	22.80	11.40	11.40	11.40	21.80
T-1-81051	Max. Size of Fuse or Breaker	25	25	40	30	15	15	15	15	30	30	15	15	15	30
T-1-81051	Load KVA	2.37	2.50	4.80	5.00	4.33	4.79	4.93	5.04	5.20	5.40	4.47	5.00	5.20	10.20
	Amps	20.83	20.83	41.67	41.67	20.83	20.83	20.83	20.83	46.80	46.80	22.80	22.80	22.80	43.70
T-1-81052	Max. Size of Fuse or Breaker	35	35	60	60	30	30	30	30	60	60	30	30	30	60
T-1-81052	Load KVA	3.56	3.75	7.17	7.56	6.50	7.19	7.41	7.56	7.80	8.15	7.10	7.50	7.80	15.30
	Amps	31.25	31.25	62.50	62.50	31.25	31.25	31.25	31.25	68.50	69.50	34.40	34.40	34.40	65.50
T-1-11683	Max. Size of Fuse or Breaker	50	50	90	90	45	45	45	45	80	80	40	40	40	80
T-1-11683	Load KVA	4.75	5.00	9.58	10.00	8.66	9.58	9.87	10.00	10.40	10.80	9.50	10.00	10.00	20.40
	Amps	41.67	41.67	83.31	83.31	41.67	41.67	41.67	41.67	91.50	91.50	45.80	45.80	45.80	87.50
T-1-11684	Max. Size of Fuse or Breaker	70	70	125	125	60	60	60	60	110	110	60	60	50	110
T-1-11684	Load KVA	7.12	7.50	14.40	15.10	13.00	14.30	14.80	15.10	15.00	16.20	14.24	15.00	15.60	30.60
	Amps	62.50	62.50	125.00	125.00	62.50	62.50	62.50	62.50	138.00	138.00	68.60	68.60	68.60	132.00
T-1-11685	Max. Size of Fuse or Breaker	100	100	175	175	90	90	90	90	150	175	80	80	80	175
T-1-11685	Load KVA	9.50	10.00	19.20	20.20	17.30	19.16	19.70	20.10	20.80	21.60	19.00	20.00	20.30	40.80
	Amps	83.30	83.30	166.60	166.60	83.30	83.30	83.30	83.30	183.00	183.00	91.60	91.60	91.20	175.00
T-1-11686	Max. Size of Fuse or Breaker	125	125	250	250	125	125	125	125	225	225	110	110	110	225
T-1-11686	Load KVA	14.20	15.00	28.80	30.00	26.00	28.70	29.60	30.30	31.20	32.50	28.50	30.00	31.20	61.00
	Amps	125.00	125.00	250.00	250.00	125.00	125.00	125.00	125.00	275.00	275.00	136.80	136.80	136.80	263.00
T-1-11687	Max. Size of Fuse or Breaker	200	200	350	350	175	175	175	175	350	350	175	175	175	350
T-1-11687	Load KVA	23.70	25.00	47.90	50.00	43.30	47.80	49.30	50.30	52.00	54.00	47.40	50.00	52.00	102.00
	Amps	208.00	208.00	416.60	416.60	208.00	208.00	208.00	208.00	457.00	457.00	228.00	228.00	228.00	437.00
T-2-11688 ①	Max. Size of Fuse or Breaker	350	350	600	600	300	300	300	300	600	600	300	300	300	600
T-2-11688 ①	Load KVA	35.60	37.50	71.90	75.60	65.00	71.80	74.00	75.60	78.00	81.00	71.00	76.00	78.00	153.00
	Amps	312.50	312.50	625.00	625.00	312.50	312.50	312.50	312.50	688.00	688.00	344.00	344.00	344.00	655.00
T-2-11689 ①	Max. Size of Fuse or Breaker	500	500	1000	1000	450	450	450	450	800	800	400	400	400	800
T-2-11689 ①	Load KVA	47.50	50.00	95.80	100.00	86.60	95.80	98.70	101.00	104.00	108.00	95.00	100.00	104.00	204.00
	Amps	416.60	416.60	833.30	833.30	416.60	416.60	416.60	416.60	915.00	915.00	458.00	458.00	458.00	875.00
T-2-11689 ①	Max. Size of Fuse or Breaker	700	700	1200	1200	600	600	600	600	1200	1200	600	600	600	1200
See Page 118 For Connection Diagrams		D	D	C	C	H	H	H	H	F	F	I	I	I	E

① See chart on page 117, for number of leads per termination.

NOTE: Inputs and Outputs may be reversed; KVA capacity remains constant. All applications above bold face line are suitable for 50/60 Hz. All applications below bold face line are suitable for 60 Hz only.

With larger KVA buck-boost units, it is necessary to utilize multiple conductors on the secondary (X) terminals as shown in the chart on page 117.

GROUP II



SINGLE PHASE		BOOSTING								BUCKING					
Line Voltage (Available)		95	100	105	208	215	215	220	225	135	240	240	245	250	255
Load Voltage (Output)		120	114	119	240	244	230	235	240	119	208	225	230	234	239
CAT. NO.															
T-1-81054	Load KVA	0.19	0.36	0.37	0.38	0.38	0.72	0.73	0.75	0.42	0.37	0.75	0.77	0.78	0.80
	Amps	1.56	3.13	3.13	1.56	1.56	3.13	3.13	3.13	3.54	1.77	3.33	3.33	3.33	3.33
T-1-81055	Max. Size of Fuse or Breaker	6	6	6	6	6	6	6	6	6	3	6	6	6	6
	Load KVA	0.38	0.71	0.74	0.75	0.76	1.44	1.47	1.50	0.84	0.74	1.50	1.53	1.56	1.59
T-1-81056	Amps	3.13	6.25	6.25	3.13	3.13	6.25	6.25	6.25	7.08	3.54	6.67	6.67	6.67	6.67
	Max. Size of Fuse or Breaker	10	15	6	6	15	15	15	15	15	6	15	15	15	15
T-1-81057	Load KVA	0.56	1.07	1.12	1.13	1.14	2.16	2.20	2.25	1.26	1.11	2.25	2.30	2.34	2.39
	Amps	4.69	9.38	9.38	4.69	4.69	9.38	9.38	9.38	10.63	5.31	10.00	10.00	10.00	10.00
T-1-81058	Max. Size of Fuse or Breaker	10	15	15	10	10	15	15	15	15	6	15	15	15	15
	Load KVA	0.94	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
T-1-81059	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
	Max. Size of Fuse or Breaker	15	25	25	15	15	25	25	25	20	15	20	20	20	20
T-1-13073	Load 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
	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
T-1-13074	Max. Size of Fuse or Breaker	25	45	45	25	25	45	45	45	40	20	40	40	40	40
	Load 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
T-1-13075	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
	Max. Size of Fuse or Breaker	40	70	70	40	40	70	70	70	60	30	60	60	60	60
T-1-13076	Load 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
	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
T-1-13077	Max. Size of Fuse or Breaker	50	90	90	50	50	90	90	90	80	40	80	80	80	80
	Load 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
T-1-13078	Amps	46.90	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
	Max. Size of Fuse or Breaker	80	150	150	70	70	125	125	125	125	60	125	125	125	125
T-1-13079	Load 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
	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
T-1-13080	Max. Size of Fuse or Breaker	100	200	200	90	90	175	175	175	175	80	175	175	175	175
	Load 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
T-1-13081	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
	Max. Size of Fuse or Breaker	150	300	300	150	150	250	250	250	250	125	250	250	250	250
T-1-13082	Load 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
	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
T-1-13083	Max. Size of Fuse or Breaker	250	450	450	225	225	450	450	450	400	200	400	400	400	400
	Load KVA	28.10	53.40	55.80	56.30	57.20	107.80	110.20	112.50	63.20	55.30	112.50	115.00	117.00	119.50
T-2-13084	Amps	234.40	468.80	468.80	234.40	234.40	468.80	468.80	468.80	531.30	265.60	500.00	500.00	500.00	500.00
	Max. Size of Fuse or Breaker	400	700	700	350	350	700	700	700	600	300	600	600	600	600
T-2-13085	Load KVA	37.50	71.30	74.40	75.00	76.30	143.80	146.90	150.00	84.30	73.70	150.00	153.30	156.00	159.30
	Amps	312.50	625.00	625.00	312.50	312.50	625.00	625.00	625.00	708.30	354.20	666.70	666.70	666.70	666.70
T-2-13086	Max. Size of Fuse or Breaker	500	1000	1000	450	450	1000	1000	1000	800	400	800	800	800	800
	Max. Size of Fuse or Breaker	500	1000	1000	450	450	1000	1000	1000	800	400	800	800	800	800
See Page 118 For Connection Diagrams		D	C	C	H	H	G	G	G	F	I	E	E	E	E

① See chart on page 117.

NOTE: Inputs and Outputs may be reversed; KVA capacity remains constant. All applications above bold face line are suitable for 50/60 Hz. All applications below bold face line are suitable for 60 Hz only.

With larger KVA buck-boost units, it is necessary to utilize multiple conductors on the secondary (X) terminals as shown in the chart on page 117.

GROUP III



SINGLE PHASE		BOOSTING									
Line Voltage (Available)		230	380	416	425	430	435	440	440	450	460
Load Voltage (Output)		277	420	457	467	473	457	462	484	472	483
CAT. NO.											
T-1-81061	Load KVA	0.29	0.44	0.48	0.49	0.49	0.95	0.96	0.50	0.98	1.01
	Amps	1.04	1.04	1.04	1.04	1.04	2.08	2.08	1.04	2.08	2.08
Max. Size of Fuse or Breaker		3	3	3	3	3	6	6	3	6	6
T-1-81062	Load KVA	0.58	0.87	0.95	0.97	0.99	1.90	1.93	1.01	1.97	2.01
	Amps	2.08	2.08	2.08	2.08	2.08	4.17	4.17	2.08	4.17	4.17
Max. Size of Fuse or Breaker		6	6	6	6	6	10	10	6	10	10
T-1-81063	Load KVA	0.87	1.31	1.43	1.46	1.48	2.86	2.89	1.51	2.95	3.02
	Amps	3.13	3.13	3.13	3.13	3.13	6.25	6.25	3.13	6.25	6.25
Max. Size of Fuse or Breaker		10	6	6	6	6	15	15	6	15	15
T-1-81064	Load KVA	1.44	2.19	2.38	2.43	2.46	4.76	4.81	2.52	4.92	5.03
	Amps	5.21	5.21	5.21	5.21	5.21	5.21	10.42	5.21	10.42	10.42
Max. Size of Fuse or Breaker		15	10	10	10	10	15	15	10	15	15
T-1-81065	Load KVA	2.89	4.38	4.76	4.86	4.93	9.52	9.62	5.04	9.83	10.06
	Amps	10.42	10.42	10.42	10.42	10.42	20.83	20.83	10.42	20.83	20.83
Max. Size of Fuse or Breaker		20	15	15	15	15	30	30	15	30	30
T-1-81066	Load KVA	4.33	6.56	7.14	7.30	7.39	14.28	14.44	7.56	14.75	15.09
	Amps	15.63	15.63	15.63	15.63	15.63	31.25	31.25	15.63	31.25	31.25
Max. Size of Fuse or Breaker		25	25	25	25	25	45	45	25	45	45
T-1-37920	Load KVA	5.77	8.57	9.52	9.73	9.85	19.04	19.25	10.08	19.67	20.13
	Amps	20.83	20.83	20.83	20.83	20.83	41.67	41.67	20.83	41.67	41.67
Max. Size of Fuse or Breaker		35	30	30	30	30	60	60	30	60	60
T-1-37921	Load KVA	8.66	13.13	14.28	14.59	14.78	28.56	28.88	15.13	29.50	30.19
	Amps	31.25	31.25	31.25	31.25	31.25	62.50	62.50	31.25	62.50	62.50
Max. Size of Fuse or Breaker		50	50	45	45	45	90	90	45	90	90
T-1-37922	Load KVA	11.54	17.50	19.04	19.46	19.71	38.08	38.50	20.17	39.33	40.25
	Amps	41.67	41.67	41.67	41.67	41.67	83.33	83.33	41.67	83.33	83.33
Max. Size of Fuse or Breaker		70	60	60	60	60	110	110	60	110	110
T-1-37923	Load KVA	17.31	26.25	28.56	29.19	29.56	57.13	57.75	30.25	59.00	60.38
	Amps	62.50	62.50	62.50	62.50	62.50	125.00	125.00	62.50	125.00	125.00
Max. Size of Fuse or Breaker		100	90	90	90	90	175	175	90	175	175
T-1-37924	Load KVA	28.90	43.80	47.60	48.60	49.30	95.20	96.20	50.40	98.30	100.60
	Amps	104.20	104.20	104.20	104.20	104.20	208.30	208.30	104.20	208.30	208.30
Max. Size of Fuse or Breaker		175	150	150	150	150	300	300	150	300	300
T-2-43570	Load KVA	43.30	65.60	71.40	73.00	73.90	142.80	144.40	75.60	147.50	150.90
	Amps	156.30	156.30	156.30	156.30	156.30	312.50	312.50	156.30	312.50	312.50
Max. Size of Fuse or Breaker		250	225	225	225	225	450	450	225	450	450
T-2-43571 ①	Load KVA	57.70	87.50	95.20	97.30	98.50	190.40	192.50	100.80	196.70	201.30
	Amps	208.30	208.30	208.30	208.30	208.30	416.70	416.70	208.30	416.70	416.70
Max. Size of Fuse or Breaker		350	300	300	300	300	600	600	300	600	600
See Page 118 For Connection Diagrams		D	H	H	H	H	G	G	H	G	G

BUCKING			
277	480	480	504
230	436	456	480
0.29	0.50	1.05	1.10
1.25	1.15	2.29	2.29
3	3	6	6
0.58	1.00	2.09	2.20
2.50	2.29	4.58	4.58
6	6	10	10
0.86	1.50	3.14	3.30
3.75	3.44	6.88	6.88
6	6	15	15
1.44	2.50	5.23	5.50
6.25	5.73	11.46	11.46
10	10	15	15
2.88	5.00	10.45	11.00
12.50	11.46	22.92	22.92
15	15	30	30
4.31	7.49	15.68	16.50
18.75	17.19	34.38	34.38
20	20	45	45
5.75	9.99	20.90	22.00
25.00	22.92	45.83	45.83
30	30	60	60
8.63	14.99	31.35	33.00
37.50	34.38	68.75	68.75
40	40	90	90
11.50	19.98	41.80	44.00
50.00	45.83	91.67	91.67
60	60	110	110
17.25	29.98	62.70	66.00
75.00	68.80	137.50	137.50
80	80	175	175
28.80	50.00	104.50	110.00
125.00	114.60	229.20	229.20
150	150	300	300
43.10	74.90	156.80	165.00
187.50	171.90	343.80	343.80
200	200	450	450
57.50	99.90	209.00	220.00
250.00	229.20	458.30	458.30
300	300	600	600
J	I	E	E

① See chart on page 117.

NOTE: Inputs and Outputs may be reversed; KVA capacity remains constant. All applications above bold face line are suitable for 50/60 Hz. All applications below bold face line are suitable for 60 Hz only.

SELECTION CHARTS

THREE PHASE

GROUP I



THREE PHASE		BOOSTING						
Line Voltage (Available)		189Y 109	196Y 113	201Y 116	208Y 120	189	208	220
Load Voltage (Output)		208	234	240	230	208	230	242
CAT. NO.								
T-1-81047	Load KVA Amps	1.50 4.17	0.84 2.08	0.87 2.08	1.66 4.17	0.75 2.08	0.83 2.08	0.87 2.08
	Max. Size of Fuse or Breaker	10	6	6	10	6	6	6
T-1-81048	Load KVA Amps	3.00 8.33	1.69 4.17	1.73 4.17	3.32 8.33	1.50 4.17	1.66 4.17	1.75 4.17
	Max. Size of Fuse or Breaker	15	10	10	15	10	10	10
T-1-81049	Load KVA Amps	4.50 12.50	2.53 6.25	2.60 6.25	4.98 12.50	2.25 6.25	2.49 6.25	2.62 6.25
	Max. Size of Fuse or Breaker	20	15	15	20	15	15	15
T-1-81050	Load KVA Amps	7.51 20.83	4.22 10.42	4.33 10.42	8.30 20.83	3.75 10.42	4.15 10.42	4.37 10.42
	Max. Size of Fuse or Breaker	30	20	20	30	15	15	15
T-1-81051	Load KVA Amps	15.01 41.67	8.44 20.83	8.66 20.83	16.60 41.67	7.51 20.83	8.30 20.83	8.73 20.83
	Max. Size of Fuse or Breaker	60	35	35	60	30	30	30
T-1-81052	Load KVA Amps	22.52 62.50	12.67 31.25	12.99 31.25	24.90 62.50	11.26 31.25	12.45 31.25	13.10 31.25
	Max. Size of Fuse or Breaker	90	50	50	90	45	45	45
T-1-11683	Load KVA Amps	30.02 83.33	16.89 41.67	17.32 41.67	33.20 83.33	15.01 41.67	16.60 41.67	17.46 41.67
	Max. Size of Fuse or Breaker	125	70	70	125	60	60	60
T-1-11684	Load KVA Amps	45.03 125.00	25.33 62.50	25.98 62.50	49.80 125.00	22.52 62.50	24.90 62.50	26.20 62.50
	Max. Size of Fuse or Breaker	175	100	100	175	90	90	90
T-1-11685	Load KVA Amps	60.04 166.67	33.77 83.33	34.64 83.33	66.40 167.67	30.02 83.33	33.20 83.33	34.93 83.33
	Max. Size of Fuse or Breaker	250	125	125	250	125	125	125
T-1-11686	Load KVA Amps	90.07 250.00	50.66 125.00	51.96 125.00	99.59 250.00	45.03 125.00	49.80 125.00	52.39 125.00
	Max. Size of Fuse or Breaker	350	200	200	350	175	175	175
T-1-11687	Load KVA Amps	150.11 416.67	84.44 208.33	86.60 208.33	165.99 416.67	75.06 208.33	82.99 208.33	87.32 208.33
	Max. Size of Fuse or Breaker	600	350	350	600	300	300	300
T-2-11688 ①	Load KVA Amps	225.17 625.00	126.66 312.50	129.90 312.50	248.98 625.00	112.58 312.50	124.49 312.50	130.99 312.50
	Max. Size of Fuse or Breaker	1000	500	500	1000	450	450	450
T-2-11689 ①	Load KVA Amps	300.22 833.33	168.87 416.67	173.21 416.67	331.98 833.33	150.11 416.67	165.99 416.67	174.65 416.67
	Max. Size of Fuse or Breaker	1200	700	700	1200	600	600	600
Quantity Required		3	3	3	3	2	2	2
See Page 118 For Connection Diagrams		A-A	F-F	F-F	A-A	B-B	B-B	B-B

BUCKING				
219	230	250	255	264
208	208	227	232	240
1.58 4.39	0.83 2.30	0.90 2.29	0.92 2.29	0.95 2.29
10	6	6	6	6
3.16 8.77	1.66 4.61	1.80 4.59	1.84 4.58	1.91 4.58
15	10	10	10	10
4.74 13.16	2.49 6.91	2.71 6.88	2.76 6.87	2.86 6.88
20	15	15	15	15
7.90 21.94	4.15 11.52	4.51 11.47	4.60 11.45	4.76 11.46
30	15	15	15	15
15.80 43.87	8.30 23.04	9.02 22.94	9.20 22.90	9.53 22.92
60	30	30	30	30
23.71 65.81	12.45 34.56	13.53 34.42	13.80 34.35	14.29 34.38
80	40	40	40	40
31.61 87.74	16.60 46.07	18.04 45.89	18.40 45.80	19.05 45.83
110	60	60	60	60
47.41 131.61	24.90 69.11	27.06 68.83	27.60 68.70	28.58 68.75
175	80	80	80	80
63.22 175.48	33.20 92.15	36.08 91.78	36.81 91.59	38.11 91.67
225	110	110	110	110
94.83 263.22	49.80 138.22	54.13 137.67	55.21 137.39	57.16 137.50
350	175	175	175	175
158.05 438.70	82.99 230.37	90.21 229.44	92.02 228.99	95.26 229.17
600	300	300	300	300
237.07 658.05	124.49 345.55	135.32 344.16	138.02 343.48	142.89 343.75
800	400	400	400	400
316.10 877.40	165.99 460.74	180.42 458.88	184.03 457.97	190.53 458.33
1200	600	600	600	600
2	2	2	2	2
C-C	E-E	E-E	E-E	E-E

① See chart on page 117.

NOTE: (1) Inputs and Outputs may be reversed; KVA capacity remains constant. All applications above bold face line are suitable for 50/60 Hz. All applications below bold face line are suitable for 60 Hz only. (2) Connection Diagrams A-A and F-F cannot be reverse connected.

GROUP II



THREE PHASE		BOOSTING				
Line Voltage (Available)		183Y 106	208Y 120	195	208	225
Load Voltage (Output)		208	236	208	240	240
CAT. NO.						
T-1-81054	Load KVA	1.13	1.28	1.13	0.63	1.30
	Amps	3.13	3.13	3.13	1.56	3.13
	Max. Size of Fuse or Breaker	6	6	6	3	6
T-1-81055	Load KVA	2.25	2.55	2.25	1.27	2.60
	Amps	6.25	6.25	6.25	3.13	6.25
	Max. Size of Fuse or Breaker	15	15	15	6	15
T-1-81056	Load KVA	3.38	3.83	3.38	1.90	3.90
	Amps	9.38	9.38	9.38	4.69	9.38
	Max. Size of Fuse or Breaker	15	15	15	10	15
T-1-81057	Load KVA	5.63	6.39	5.63	3.17	6.50
	Amps	15.63	15.63	15.63	7.81	15.63
	Max. Size of Fuse or Breaker	25	25	25	15	25
T-1-81058	Load KVA	11.26	12.77	11.26	6.33	12.99
	Amps	31.25	31.25	31.25	15.63	31.25
	Max. Size of Fuse or Breaker	45	45	45	25	45
T-1-81059	Load KVA	16.89	19.16	16.89	9.50	19.49
	Amps	46.88	46.88	46.88	23.44	46.88
	Max. Size of Fuse or Breaker	70	70	70	35	70
T-1-13073	Load KVA	22.52	25.55	22.52	12.67	25.98
	Amps	62.50	62.50	62.50	31.25	62.50
	Max. Size of Fuse or Breaker	90	90	90	45	90
T-1-13074	Load KVA	33.77	38.32	33.77	19.00	38.97
	Amps	93.75	93.75	93.75	46.88	93.75
	Max. Size of Fuse or Breaker	150	150	125	70	125
T-1-13075	Load KVA	45.03	51.10	45.03	25.33	51.96
	Amps	125.00	125.00	125.00	62.50	125.00
	Max. Size of Fuse or Breaker	200	200	175	90	175
T-1-13076	Load KVA	67.55	76.64	67.55	38.00	77.94
	Amps	187.50	187.50	187.50	93.75	187.50
	Max. Size of Fuse or Breaker	300	300	250	150	250
T-1-13077	Load KVA	112.58	127.74	112.58	63.33	129.90
	Amps	312.50	312.50	312.50	156.25	312.50
	Max. Size of Fuse or Breaker	450	450	450	225	450
T-2-13078 ^①	Load KVA	166.87	191.61	166.87	94.99	194.86
	Amps	468.75	468.75	468.75	234.38	468.75
	Max. Size of Fuse or Breaker	700	700	700	350	700
T-2-13079 ^①	Load KVA	225.17	255.48	225.17	126.66	259.81
	Amps	625.00	625.00	625.00	312.50	625.00
	Max. Size of Fuse or Breaker	1000	1000	1000	450	1000
Quantity Required		3	3	2	2	2
See Page 118 For Connection Diagrams		A-A	A-A	G-G	B-B	G-G

BUCKING					
240	245	250	256	265	272
208	230	234	240	234	240
0.56	1.33	1.35	1.39	0.72	0.74
1.56	3.33	3.34	3.33	1.77	1.77
3	6	6	6	3	3
1.13	2.65	2.71	2.77	1.43	1.47
3.13	6.66	6.68	6.67	3.54	3.54
6	15	15	15	6	6
1.69	3.98	4.06	4.16	2.15	2.21
4.69	9.99	10.02	10.00	5.31	5.31
10	15	15	15	10	10
2.81	6.63	6.77	6.93	3.59	3.68
7.81	16.64	16.69	16.67	8.85	8.85
15	20	20	20	15	15
5.63	13.26	13.53	13.86	7.17	7.36
15.63	33.29	33.39	33.33	17.69	17.71
20	40	40	40	20	20
8.44	19.89	20.30	20.78	10.76	11.04
23.44	49.93	50.08	50.00	26.54	26.56
30	60	60	60	30	30
11.26	26.52	27.06	27.71	14.34	14.72
31.25	66.58	66.67	66.67	35.39	35.42
35	80	80	80	40	40
16.89	39.87	40.59	41.57	21.52	22.08
46.88	99.86	100.16	100.00	53.08	53.13
60	125	125	125	60	60
22.52	53.04	54.13	55.43	28.69	29.44
62.50	133.15	133.55	133.33	70.78	70.83
70	175	175	175	80	80
33.77	79.57	81.19	83.14	43.03	44.17
93.75	199.73	200.32	200.00	106.17	106.25
110	250	250	250	125	125
56.29	132.61	135.32	138.56	71.72	73.50
156.25	332.88	333.87	333.33	176.95	176.80
175	400	400	400	200	200
84.44	198.92	202.97	207.85	107.58	110.42
234.38	499.32	500.80	500.00	265.42	265.63
300	600	600	600	300	300
112.58	265.22	270.63	277.13	143.44	147.22
312.50	665.76	667.74	666.67	353.90	354.17
350	800	800	800	400	400
2	2	2	2	2	2
D-D	C-C	C-C	C-C	E-E	E-E

① See chart on page 115.

NOTE: (1) Inputs and Outputs may be reversed; KVA capacity remains constant. All applications above bold face line are suitable for 50/60 Hz. All applications below bold face line are suitable for 60 Hz only. (2) Connection Diagrams A-A and F-F cannot be reverse connected.

GROUP III



THREE PHASE		BOOSTING							
	Line Voltage (Available)	399Y 230	380	430	440	460	460	480	480
	Load Voltage (Output)	480Y 277	420	473	462	506	483	528	504
CAT. NO.									
T-1-81061	Load KVA Amps	0.86 1.04	0.76 1.04	0.85 1.04	1.66 2.08	0.91 1.04	1.74 2.08	0.95 1.04	1.82 2.08
	Max. Size of Fuse or Breaker	3	3	3	6	3	6	3	6
T-1-81062	Load KVA Amps	1.73 2.08	1.51 2.08	1.70 2.08	3.33 4.16	1.82 2.08	3.48 4.16	1.90 2.08	3.63 4.16
	Max. Size of Fuse or Breaker	6	6	6	10	6	10	6	10
T-1-81063	Load KVA Amps	2.60 3.12	2.27 3.12	2.56 3.12	4.99 6.24	2.73 3.12	5.22 6.25	2.85 3.12	5.45 6.24
	Max. Size of Fuse or Breaker	10	6	6	15	6	15	6	15
T-1-81064	Load KVA Amps	4.33 5.20	3.78 5.20	4.26 5.20	8.32 10.40	4.56 5.20	8.70 10.40	4.76 5.20	9.08 10.40
	Max. Size of Fuse or Breaker	15	10	10	15	10	15	10	15
T-1-81065	Load KVA Amps	8.60 10.40	7.56 10.40	8.52 10.40	16.64 20.80	9.11 10.40	17.40 20.80	9.51 10.40	18.16 20.80
	Max. Size of Fuse or Breaker	20	15	15	30	15	30	15	30
T-1-81066	Load KVA Amps	12.90 15.60	11.34 15.60	12.77 15.60	24.97 31.20	13.67 15.60	26.10 31.20	14.27 15.60	27.24 31.20
	Max. Size of Fuse or Breaker	25	25	25	45	25	45	25	45
T-1-37920	Load KVA Amps	17.30 20.80	15.12 20.80	17.03 20.80	33.29 41.60	18.23 20.80	34.80 41.60	19.02 20.80	36.31 41.60
	Max. Size of Fuse or Breaker	35	30	30	60	30	60	30	60
T-1-37921	Load KVA Amps	25.90 31.20	22.69 31.20	25.55 31.20	49.93 62.40	27.34 31.20	52.20 62.40	28.53 31.20	54.47 62.40
	Max. Size of Fuse or Breaker	50	45	45	90	45	90	45	90
T-1-37922	Load KVA Amps	34.60 41.60	30.25 41.60	34.07 41.60	66.58 83.20	36.46 41.60	69.60 83.20	38.04 41.60	72.63 83.20
	Max. Size of Fuse or Breaker	70	60	60	110	60	110	60	110
T-1-37923	Load KVA Amps	52.00 62.50	45.45 62.50	51.18 62.50	100.03 125.00	54.69 62.50	104.57 125.00	57.07 62.50	109.12 125.00
	Max. Size of Fuse or Breaker	100	90	90	175	90	175	90	175
T-1-37924	Load KVA Amps	86.10 104.00	75.62 104.00	85.17 104.00	166.44 208.00	91.15 104.00	174.01 208.00	95.11 104.00	181.57 208.00
	Max. Size of Fuse or Breaker	175	150	150	300	150	300	150	300
T-2-43570	Load KVA Amps	129.30 156.00	113.43 156.00	127.75 156.00	249.66 312.00	136.72 156.00	261.01 312.00	142.67 156.00	272.36 312.00
	Max. Size of Fuse or Breaker	250	225	225	450	225	450	225	450
T-2-43571 ^①	Load KVA Amps	173.10 208.00	151.25 208.00	170.33 208.00	332.89 416.00	182.29 208.00	348.02 416.00	190.22 208.00	363.15 416.00
	Max. Size of Fuse or Breaker	350	300	300	600	300	600	300	600
Quantity Required		3	2	2	2	2	2	2	2
See Page 118 For Connection Diagrams		F-F	B-B	B-B	G-G	B-B	G-G	B-B	G-G

BUCKING							
440	440	460	460	480	480	500	500
400	419	438	418	457	436	455	477
0.79 1.14	1.58 2.18	1.66 2.18	0.83 1.14	1.73 2.18	0.86 1.14	0.90 1.14	1.80 2.18
3	6	6	3	6	3	3	6
1.59 2.29	3.17 4.37	3.31 4.37	1.66 2.29	3.46 4.37	1.73 2.29	1.80 2.29	3.61 4.37
6	10	10	6	10	6	6	10
2.38 3.43	4.75 6.55	4.97 6.55	2.48 3.43	5.19 6.55	2.59 3.43	2.70 3.43	5.41 6.55
6	15	15	6	15	6	6	15
3.96 5.72	7.92 10.92	8.28 10.92	4.14 5.72	8.64 10.92	4.32 5.72	4.51 5.72	9.02 10.92
10	15	15	10	15	10	10	15
7.93 11.44	15.85 21.84	16.57 21.84	8.28 11.44	17.29 21.84	8.64 11.44	9.02 11.44	18.04 21.84
15	30	30	15	30	15	15	30
11.89 17.16	23.77 32.76	24.85 32.76	12.42 17.16	25.93 32.76	12.96 17.16	13.52 17.16	27.07 32.76
20	40	40	20	40	20	20	40
15.85 22.88	31.70 43.68	33.14 43.68	16.57 22.88	34.57 43.68	17.28 22.88	18.03 22.88	36.09 43.68
30	60	60	30	60	30	30	60
23.78 34.32	47.55 65.52	49.71 65.52	24.85 34.32	51.86 65.52	25.92 34.32	27.05 34.32	54.13 65.52
40	80	80	40	80	40	40	80
31.70 45.76	63.40 87.36	66.27 87.36	33.13 45.76	69.15 87.36	34.56 45.76	36.06 45.76	72.18 87.36
60	110	110	60	110	60	60	110
47.63 68.75	95.25 131.25	99.57 131.25	49.77 68.75	103.89 131.25	51.92 68.75	54.18 68.75	108.44 131.25
80	175	175	80	175	80	80	175
79.26 114.40	158.50 218.40	165.69 218.40	82.83 114.40	172.87 218.40	86.39 114.40	90.16 114.40	180.44 218.40
150	300	300	150	300	150	150	300
118.89 171.60	237.75 327.60	248.53 327.60	124.24 171.60	259.31 327.60	129.59 171.60	135.23 171.60	270.66 327.60
200	400	400	200	400	200	200	400
158.52 228.80	317.00 436.80	331.37 436.80	165.65 228.80	345.75 436.80	172.78 228.80	180.31 228.80	360.88 436.80
300	600	600	300	600	300	300	600
2	2	2	2	2	2	2	2
E-E	C-C	C-C	E-E	C-C	E-E	E-E	C-C

① See chart on page 115.

NOTE: (1) Inputs and Outputs may be reversed; KVA capacity remains constant. All applications above bold face line are suitable for 50/60 Hz. All applications below bold face line are suitable for 60 Hz only. (2) Connection Diagrams A-A and F-F cannot be reverse connected.

SPECIFICATIONS ①

GROUP I



120 X 240 PRIMARY VOLTS — 12/24 SECONDARY VOLTS — 60 Hz

CATALOG NUMBER	INSULATING TRANSFORMER RATING	SECONDARY MAXIMUM CURRENT OUTPUT		APPROX. DIMENSIONS INCHES (CM.)			APPROX. NET WEIGHT LBS. (KG.)	DIMENSIONAL DRAWINGS
		12 V	24 V	HEIGHT	WIDTH	DEPTH		
T-1-81047	0.05 KVA	4.16	2.08	6.41 (16.3)	3.14 (8.0)	3.05 (7.7)	4 (1.8)	A
T-1-81048	0.10 KVA	8.32	4.16	7.16 (18.2)	3.89 (9.9)	3.67 (9.3)	5 (2.3)	A
T-1-81049	0.15 KVA	12.52	6.25	7.16 (18.2)	3.89 (9.9)	3.67 (9.3)	7 (3.2)	A
T-1-81050	0.25 KVA	20.80	10.40	8.68 (22.0)	4.08 (10.4)	3.88 (9.9)	10 (4.5)	B
T-1-81051	0.50 KVA	41.60	20.80	9.06 (23.0)	4.37 (11.1)	4.20 (10.7)	15 (6.8)	B
T-1-81052	0.75 KVA	62.50	31.25	9.68 (24.6)	4.75 (12.1)	4.51 (11.5)	19 (8.6)	B
T-1-11683	1.00 KVA	83.20	41.60	10.50 (26.7)	5.50 (14.0)	5.13 (13.0)	24 (10.9)	B
T-1-11684	1.50 KVA	125.00	62.50	11.62 (29.5)	5.50 (14.0)	5.13 (13.0)	30 (13.6)	B
T-1-11685	2.00 KVA	166.00	83.20	13.00 (33.0)	5.50 (14.0)	5.13 (13.0)	38 (17.2)	B
T-1-11686	3.00 KVA	250.00	125.00	11.50 (29.2)	10.31 (26.2)	7.13 (18.1)	55 (24.9)	C
T-1-11687	5.00 KVA	416.60	208.00	14.38 (36.5)	10.31 (26.2)	7.13 (18.1)	75 (34.0)	C
T-2-11688	7.50 KVA	625.00	312.50	20.81 (52.9)	11.12 (28.2)	10.84 (27.5)	125 (56.7)	D
T-2-11689	10.00 KVA	833.00	416.60	20.81 (52.9)	11.75 (29.8)	11.59 (29.4)	160 (72.6)	D

GROUP II

120 X 240 PRIMARY VOLTS — 16/32 SECONDARY VOLTS — 60 Hz

CATALOG NUMBER	INSULATING TRANSFORMER RATING	SECONDARY MAXIMUM CURRENT OUTPUT		APPROX. DIMENSIONS INCHES (CM.)			APPROX. NET WEIGHT LBS. (KG.)	DIMENSIONAL DRAWINGS
		16 V	32 V	HEIGHT	WIDTH	DEPTH		
T-1-81054	0.05 KVA	3.12	1.56	6.41 (16.3)	3.14 (8.0)	3.05 (7.7)	4 (1.8)	A
T-1-81055	0.10 KVA	6.25	3.12	7.16 (18.2)	3.89 (9.9)	3.67 (9.3)	5 (2.3)	A
T-1-81056	0.15 KVA	9.38	4.69	7.16 (18.2)	3.89 (9.9)	3.67 (9.3)	7 (3.2)	A
T-1-81057	0.25 KVA	15.60	7.80	8.68 (22.0)	4.08 (10.4)	3.88 (9.9)	10 (4.5)	B
T-1-81058	0.50 KVA	31.20	15.60	9.06 (23.0)	4.37 (11.1)	4.20 (10.7)	15 (6.8)	B
T-1-81059	0.75 KVA	46.90	23.40	9.68 (24.6)	4.75 (12.1)	4.51 (11.5)	19 (8.6)	B
T-1-13073	1.00 KVA	62.50	31.20	10.50 (26.7)	5.50 (14.0)	5.13 (13.0)	24 (10.9)	B
T-1-13074	1.50 KVA	93.70	46.90	11.62 (29.5)	5.50 (14.0)	5.13 (13.0)	30 (13.6)	B
T-1-13075	2.00 KVA	125.00	62.50	13.00 (33.0)	5.50 (14.0)	5.13 (13.0)	38 (17.2)	B
T-1-13076	3.00 KVA	187.50	93.80	11.50 (29.2)	10.31 (26.2)	7.13 (18.1)	55 (24.9)	C
T-1-13077	5.00 KVA	312.00	156.00	14.38 (36.5)	10.31 (26.2)	7.13 (18.1)	75 (34.0)	C
T-2-13078	7.50 KVA	468.00	234.00	20.81 (52.9)	11.12 (28.2)	10.84 (27.5)	125 (56.7)	D
T-2-13079	10.00 KVA	625.00	312.00	20.81 (52.9)	11.75 (29.8)	10.84 (27.5)	160 (72.6)	D

GROUP III

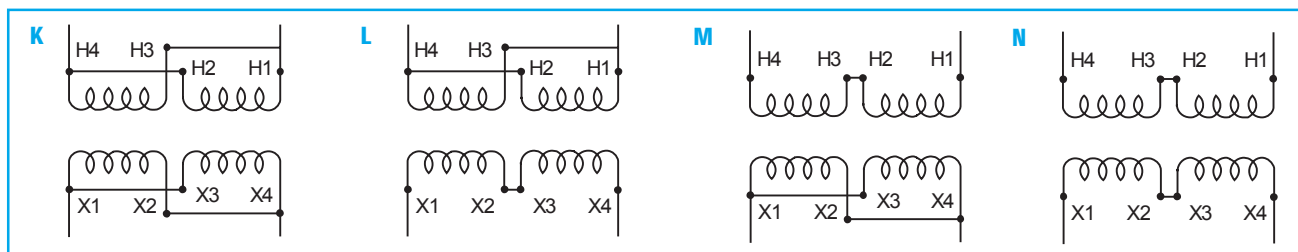
240 X 480 PRIMARY VOLTS — 24/48 SECONDARY VOLTS — 60 Hz

CATALOG NUMBER	INSULATING TRANSFORMER RATING	SECONDARY MAXIMUM CURRENT OUTPUT		APPROX. DIMENSIONS INCHES (CM.)			APPROX. NET WEIGHT LBS. (KG.)	DIMENSIONAL DRAWINGS
		24 V	48 V	HEIGHT	WIDTH	DEPTH		
T-1-81061	0.05 KVA	2.08	1.04	6.41 (16.3)	3.14 (8.0)	3.05 (7.7)	4 (1.8)	A
T-1-81062	0.10 KVA	4.16	2.08	7.16 (18.2)	3.89 (9.9)	3.67 (9.3)	5 (2.3)	A
T-1-81063	0.15 KVA	6.24	3.12	7.16 (18.2)	3.89 (9.9)	3.67 (9.3)	7 (3.2)	A
T-1-81064	0.25 KVA	10.40	5.20	8.68 (22.0)	4.08 (10.4)	3.88 (9.9)	10 (4.5)	B
T-1-81065	0.50 KVA	20.80	10.40	9.06 (23.0)	4.37 (11.1)	4.20 (10.7)	15 (6.8)	B
T-1-81066	0.75 KVA	31.20	15.60	9.68 (24.6)	4.75 (12.1)	4.51 (11.5)	19 (8.6)	B
T-1-37920	1.00 KVA	41.60	20.80	10.50 (26.7)	5.50 (14.0)	5.13 (13.0)	24 (10.9)	B
T-1-37921	1.50 KVA	62.40	31.20	11.62 (29.5)	5.50 (14.0)	5.13 (13.0)	30 (13.6)	B
T-1-37922	2.00 KVA	83.20	41.60	13.00 (33.0)	5.50 (14.0)	5.13 (13.0)	38 (17.2)	B
T-1-37923	3.00 KVA	125.00	62.50	11.50 (29.2)	10.31 (26.2)	7.13 (18.1)	55 (24.9)	C
T-1-37924	5.00 KVA	208.00	104.00	14.38 (36.5)	10.31 (26.2)	7.13 (18.1)	75 (34.0)	C
T-2-43570	7.50 KVA	312.00	156.00	20.81 (52.9)	11.12 (28.2)	10.84 (27.5)	135 (61.2)	D
T-2-43571	10.00 KVA	416.00	208.00	20.81 (52.9)	11.75 (29.8)	11.59 (29.4)	160 (72.6)	D

① All units have ground studs for use with non-metallic conduit. All sizes of 0.75 KVA and less are suitable for 50/60 Hertz. Additional field wiring box may be required when using units as autotransformers.

LOW VOLTAGE LIGHTING WIRING DIAGRAMS

SINGLE PHASE



GROUP I

Units Rated 120 x 240 V Input: 12/24 V Output		
INPUT	OUTPUT	CONNECTION DIAGRAM
120	12	K
120	24	L
240	12	M
240	24	N

GROUP II

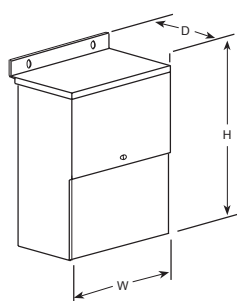
Units Rated 120 x 240 V Input: 16/32 V Output		
INPUT	OUTPUT	CONNECTION DIAGRAM
120	16	K
120	32	L
240	16	M
240	32	N

GROUP III

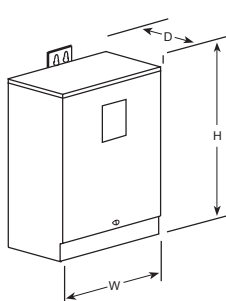
Units Rated 240 x 480 V Input: 24/48 V Output		
INPUT	OUTPUT	CONNECTION DIAGRAM
240	24	K
240	48	L
480	24	M
480	48	N

Number of Leads per Termination								
	H1	H2	H3	H4	X1	X2	X3	X4
T-2-13078	1	1	1	1	2	2	2	2
T-2-13079	1	1	1	1	2	2	2	2
T-2-43571	1	1	1	1	2	2	2	2
T-2-11688	1	1	1	1	2	2	2	2
T-2-11689	1	1	1	1	2	2	2	2
All leads with same designation (ex. X1, X1) MUST be joined together for proper operation.								

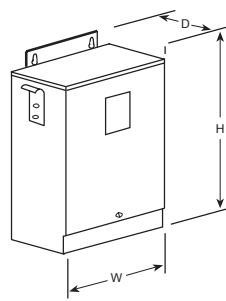
BUCK-BOOST DIMENSIONAL DRAWINGS



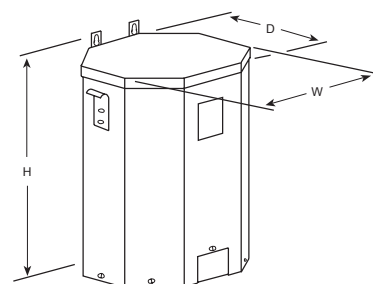
DESIGN A



DESIGN B



DESIGN C

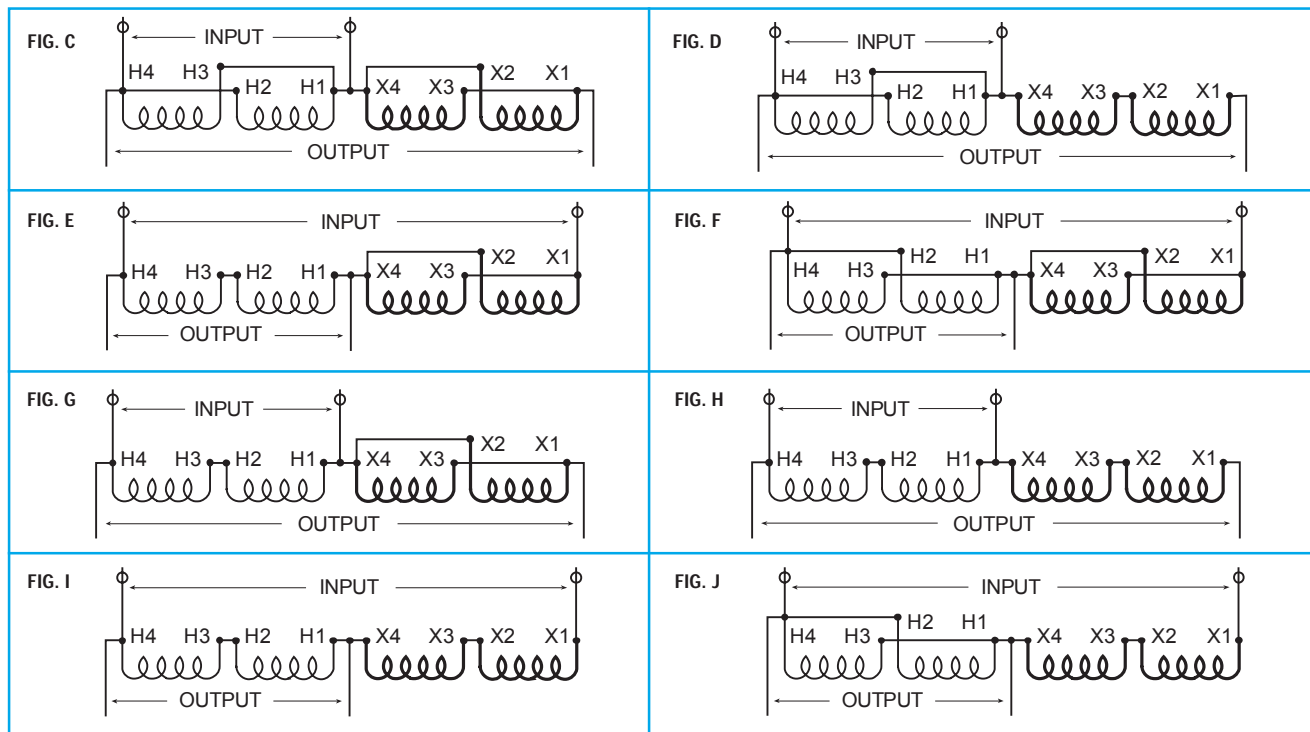


DESIGN D

NOTE: All designs listed above are totally enclosed and suitable for UL 3R outdoor service.

BUCK-BOOST WIRING DIAGRAMS ①

SINGLE PHASE



BUCK-BOOST WIRING DIAGRAMS ①

THREE PHASE

