SELECTION CHARTS

THREE PHASE

GROUP I

THREE PHASE		BOOSTING							BUCKING				
Line Voltage (Available)		189Y 109	196Y 113	201Y 116	208Y 120	189	208	220	219	230	250	255	264
Load Voltage (Output)		208	234	240	230	208	230	242	208	208	227	232	240
CAT. NO.													
T-1-81047	Load KVA	1.50	0.84	0.87	1.66	0.75	0.83	0.87	1.58	0.83	0.90	0.92	0.95
	Load Amps	4.17	2.08	2.08	4.17	2.08	2.08	2.08	4.39	2.30	2.29	2.29	2.29
	Max. Size of Fuse or Breaker	10	6	6	10	6	6	6	10	6	6	6	6
T-1-81048	Load KVA	3.00	1.69	1.73	3.32	1.50	1.66	1.75	3.16	1.66	1.80	1.84	1.91
	Load Amps	8.33	4.17	4.17	8.33	4.17	4.17	4.17	8.77	4.61	4.59	4.58	4.58
	Max. Size of Fuse or Breaker	15	10	10	15	10	10	10	15	10	10	10	10
T-1-81049	Load KVA	4.50	2.53	2.60	4.98	2.25	2.49	2.62	4.74	2.49	2.71	2.76	2.86
	Load Amps	12.50	6.25	6.25	12.50	6.25	6.25	6.25	13.16	6.91	6.88	6.87	6.88
	Max. Size of Fuse or Breaker	20	15	15	20	15	15	15	20	15	15	15	15
T-1-81050	Load KVA	7.51	4.22	4.33	8.30	3.75	4.15	4.37	7.90	4.15	4.51	4.60	4.76
	Load Amps	20.83	10.42	10.42	20.83	10.42	10.42	10.42	21.94	11.52	11.47	11.45	11.46
	Max. Size of Fuse or Breaker	30	20	20	30	15	15	15	30	15	15	15	15
T-1-81051	Load KVA	15.01	8.44	8.66	16.60	7.51	8.30	8.73	15.80	8.30	9.02	9.20	9.53
	Load Amps	41.67	20.83	20.83	41.67	20.83	20.83	20.83	43.87	23.04	22.94	22.90	22.92
	Max. Size of Fuse or Breaker	60	35	35	60	30	30	30	60	30	30	30	30
T-1-81052	Load KVA	22.52	12.67	12.99	24.90	11.26	12.45	13.10	23.71	12.45	13.53	13.80	14.29
	Load Amps	62.50	31.25	31.25	62.50	31.25	31.25	31.25	65.81	34.56	34.42	34.35	34.38
	Max. Size of Fuse or Breaker	90	50	50	90	45	45	45	80	40	40	40	40
T-1-11683	Load KVA	30.02	16.89	17.32	33.20	15.01	16.60	17.46	31.61	16.60	18.04	18.40	19.05
	Load Amps	83.33	41.67	41.67	83.33	41.67	41.67	41.67	87.74	46.07	45.89	45.80	45.83
	Max. Size of Fuse or Breaker	125	70	70	125	60	60	60	110	60	60	60	60
T-1-11684	Load KVA	45.03	25.33	25.98	49.80	22.52	24.90	26.20	47.41	24.90	27.06	27.60	28.58
	Load Amps	125.00	62.50	62.50	125.00	62.50	62.50	62.50	131.61	69.11	68.83	68.70	68.75
	Max. Size of Fuse or Breaker	175	100	100	175	90	90	90	175	80	80	80	80
T-1-11685	Load KVA	60.04	33.77	34.64	66.40	30.02	33.20	34.93	63.22	33.20	36.08	36.81	38.11
	Load Amps	166.67	83.33	83.33	167.67	83.33	83.33	83.33	175.48	92.15	91.78	91.59	91.67
	Max. Size of Fuse or Breaker	250	125	125	250	125	125	125	225	110	110	110	110
T-1-11686	Load KVA	90.07	50.66	51.96	99.59	45.03	49.80	52.39	94.83	49.80	54.13	55.21	57.16
	Load Amps	250.00	125.00	125.00	250.00	125.00	125.00	125.00	263.22	138.22	137.67	137.39	137.50
	Max. Size of Fuse or Breaker	350	200	200	350	175	175	175	350	175	175	175	175
T-1-11687	Load KVA	150.11	84.44	86.60	165.99	75.06	82.99	87.32	158.05	82.99	90.21	92.02	95.26
	Load Amps	416.67	208.33	208.33	416.67	208.33	208.33	208.33	438.70	230.37	229.44	228.99	229.17
	Max. Size of Fuse or Breaker	600	350	350	600	300	300	300	600	300	300	300	300
T-2-11688 ①	Load KVA	225.17	126.66	129.90	248.98	112.58	124.49	130.99	237.07	124.49	135.32	138.02	142.89
	Load Amps	625.00	312.50	312.50	625.00	312.50	312.50	312.50	658.05	345.55	344.16	343.48	343.75
	Max. Size of Fuse or Breaker	1000	500	500	1000	450	450	450	800	400	400	400	400
T-2-11689 ①	Load KVA	300.22	168.87	173.21	331.98	150.11	165.99	174.65	316.10	165.99	180.42	184.03	190.53
	Load Amps	833.33	416.67	416.67	833.33	416.67	416.67	416.67	877.40	460.74	458.88	457.97	458.33
	Max. Size of Fuse or Breaker	1200	700	700	1200	600	600	600	1200	600	600	600	600
Quantity Required		3	3	3	3	2	2	2	2	2	2	2	2
See Page 118 For Connection Diagrams		A-A	F-F	F-F	A-A	B-B	B-B	B-B	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					BUCKING					
Line Voltage (Available)		183Y 106	208Y 120	195	208	225	240	245	250	256	265	272
Load Voltage (Output)		208	236	208	240	240	208	230	234	240	234	240
CAT. NO.												
T-1-81054	Load KVA	1.13	1.28	1.13	0.63	1.30	0.56	1.33	1.35	1.39	0.72	0.74
	Load Amps	3.13	3.13	3.13	1.56	3.13	1.56	3.33	3.34	3.33	1.77	1.77
	Max. Size of Fuse or Breaker	6	6	6	3	6	3	6	6	6	3	3
T-1-81055	Load KVA	2.25	2.55	2.25	1.27	2.60	1.13	2.65	2.71	2.77	1.43	1.47
	Load Amps	6.25	6.25	6.25	3.13	6.25	3.13	6.66	6.68	6.67	3.54	3.54
	Max. Size of Fuse or Breaker	15	15	15	6	15	6	15	15	15	6	6
T-1-81056	Load KVA	3.38	3.83	3.38	1.90	3.90	1.69	3.98	4.06	4.16	2.15	2.21
	Load Amps	9.38	9.38	9.38	4.69	9.38	4.69	9.99	10.02	10.00	5.31	5.31
	Max. Size of Fuse or Breaker	15	15	15	10	15	10	15	15	15	10	10
T-1-81057	Load KVA	5.63	6.39	5.63	3.17	6.50	2.81	6.63	6.77	6.93	3.59	3.68
	Load Amps	15.63	15.63	15.63	7.81	15.63	7.81	16.64	16.69	16.67	8.85	8.85
	Max. Size of Fuse or Breaker	25	25	25	15	25	15	20	20	20	15	15
T-1-81058	Load KVA	11.26	12.77	11.26	6.33	12.99	5.63	13.26	13.53	13.86	7.17	7.36
	Load Amps	31.25	31.25	31.25	15.63	31.25	15.63	33.29	33.39	33.33	17.69	17.71
	Max. Size of Fuse or Breaker	45	45	45	25	45	20	40	40	40	20	20
T-1-81059	Load KVA	16.89	19.16	16.89	9.50	19.49	8.44	19.89	20.30	20.78	10.76	11.04
	Load Amps	46.88	46.88	46.88	23.44	46.88	23.44	49.93	50.08	50.00	26.54	26.56
	Max. Size of Fuse or Breaker	70	70	70	35	70	30	60	60	60	30	30
T-1-13073	Load KVA	22.52	25.55	22.52	12.67	25.98	11.26	26.52	27.06	27.71	14.34	14.72
	Load Amps	62.50	62.50	62.50	31.25	62.50	31.25	66.58	66.67	66.67	35.39	35.42
	Max. Size of Fuse or Breaker	90	90	90	45	90	35	80	80	80	40	40
T-1-13074	Load KVA	33.77	38.32	33.77	19.00	38.97	16.89	39.87	40.59	41.57	21.52	22.08
	Load Amps	93.75	93.75	93.75	46.88	93.75	46.88	99.86	100.16	100.00	53.08	53.13
	Max. Size of Fuse or Breaker	150	150	125	70	125	60	125	125	125	60	60
T-1-13075	Load KVA	45.03	51.10	45.03	25.33	51.96	22.52	53.04	54.13	55.43	28.69	29.44
	Load Amps	125.00	125.00	125.00	62.50	125.00	62.50	133.15	133.55	133.33	70.78	70.83
	Max. Size of Fuse or Breaker	200	200	175	90	175	70	175	175	175	80	80
T-1-13076	Load KVA	67.55	76.64	67.55	38.00	77.94	33.77	79.57	81.19	83.14	43.03	44.17
	Load Amps	187.50	187.50	187.50	93.75	187.50	93.75	199.73	200.32	200.00	106.17	106.25
	Max. Size of Fuse or Breaker	300	300	250	150	250	110	250	250	250	125	125
T-1-13077	Load KVA	112.58	127.74	112.58	63.33	129.90	56.29	132.61	135.32	138.56	71.72	73.50
	Load Amps	312.50	312.50	312.50	156.25	312.50	156.25	332.88	333.87	333.33	176.95	176.80
	Max. Size of Fuse or Breaker	450	450	450	225	450	175	400	400	400	200	200
T-2-13078①	Load KVA	166.87	191.61	168.87	94.99	194.86	84.44	198.92	202.97	207.85	107.58	110.42
	Load Amps	468.75	468.75	468.75	234.38	468.75	234.38	499.32	500.80	500.00	265.42	265.63
	Max. Size of Fuse or Breaker	700	700	700	350	700	300	600	600	600	300	300
T-2-13079①	Load KVA	225.17	255.48	225.17	126.66	259.81	112.58	265.22	270.63	277.13	143.44	147.22
	Load Amps	625.00	625.00	625.00	312.50	625.00	312.50	665.76	667.74	666.67	353.90	354.17
	Max. Size of Fuse or Breaker	1000	1000	1000	450	1000	350	800	800	800	400	400
Quantity Required		3	3	2	2	2	2	2	2	2	2	2
See Page 118 For Connection Diagrams		A-A	A-A	G-G	B-B	G-G	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.

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

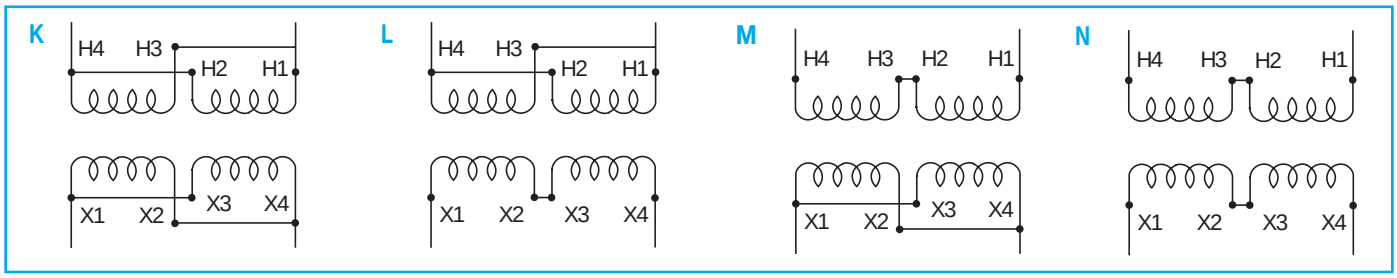
240 X 480 PRIMARY VOLTS — 24/48 SECONDARY VOLTS — 60 Hz

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

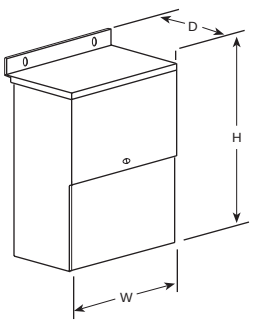
Units Rated 120 x 240 V Input: 16/32 V Output		
INPUT	OUTPUT	CONNECTION DIAGRAM
120	16	K
120	32	L
240	16	M
240	32	N

GROUP III

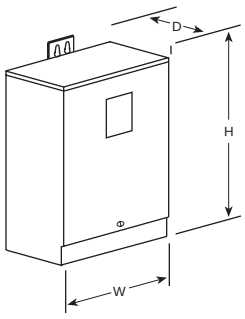
Units Rated 240 x 480 V Input: 24/48 V Output		
INPUT	OUTPUT	CONNECTION DIAGRAM
240	24	K
240	48	L
480	24	M
480	48	N

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



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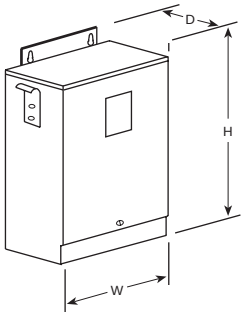

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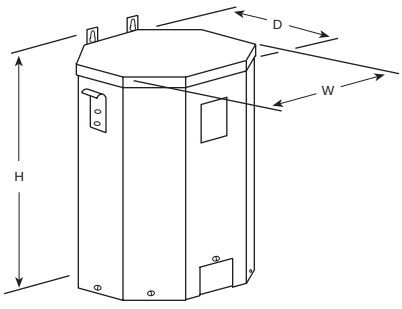

DESIGN D

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

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	

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Proper Voltage Is Critical

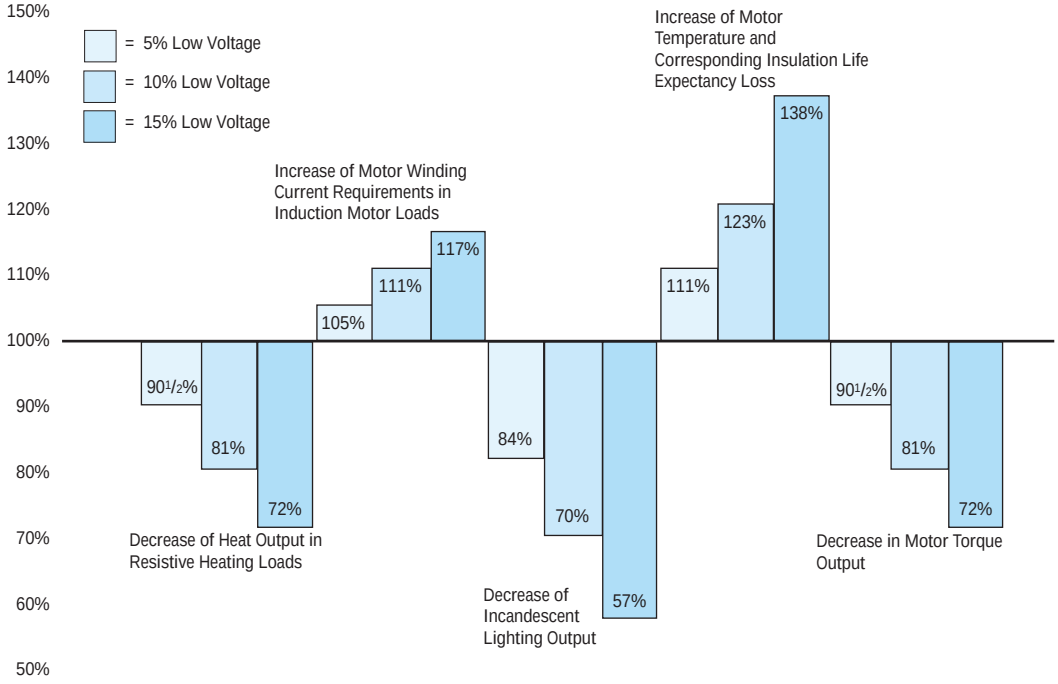
With nearly two-thirds of all electrical loads being A.C. motor loads, maintenance of the proper voltage to that motor is very important. If the supply line voltage is not maintained, motor winding current is increased causing reduced motor torque and escalating motor temperature, all of which results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

2. How does a buck-boost transformer differ from an insulating transformer?

A buck-boost transformer **IS** an insulating type transformer when it is shipped from the factory. When it is connected at the job site, a lead wire on the primary is connected to a lead wire on the secondary – thereby changing the transformer's electrical characteristics to those of an autotransformer. The primary and secondary windings are no longer "insulated" and secondary windings are no longer "insulated" and its KVA capacity is greatly increased. Refer to figures 1, 2 and 3.

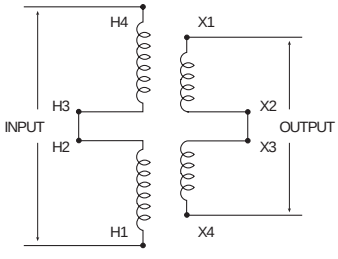


Figure 1. Buck-boost transformer connected as a low voltage insulating transformer (primary and secondary windings shown series connected).

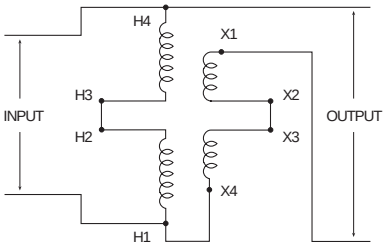


Figure 2. Same buck-boost transformer connected as a boosting autotransformer. The connection from H1 to X4 "converted" the unit to an autotransformer.

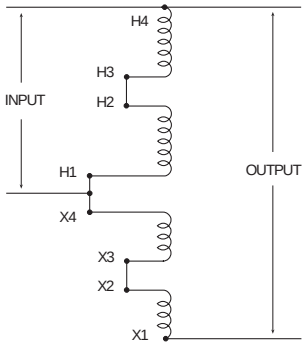


Figure 3. Illustration No. 2 shown with the primary and secondary windings "straightened".