



Buck Boost Transformers

Secondary Voltage 12/24



Steps for selecting the proper buck-boost transformer

You should have this 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.

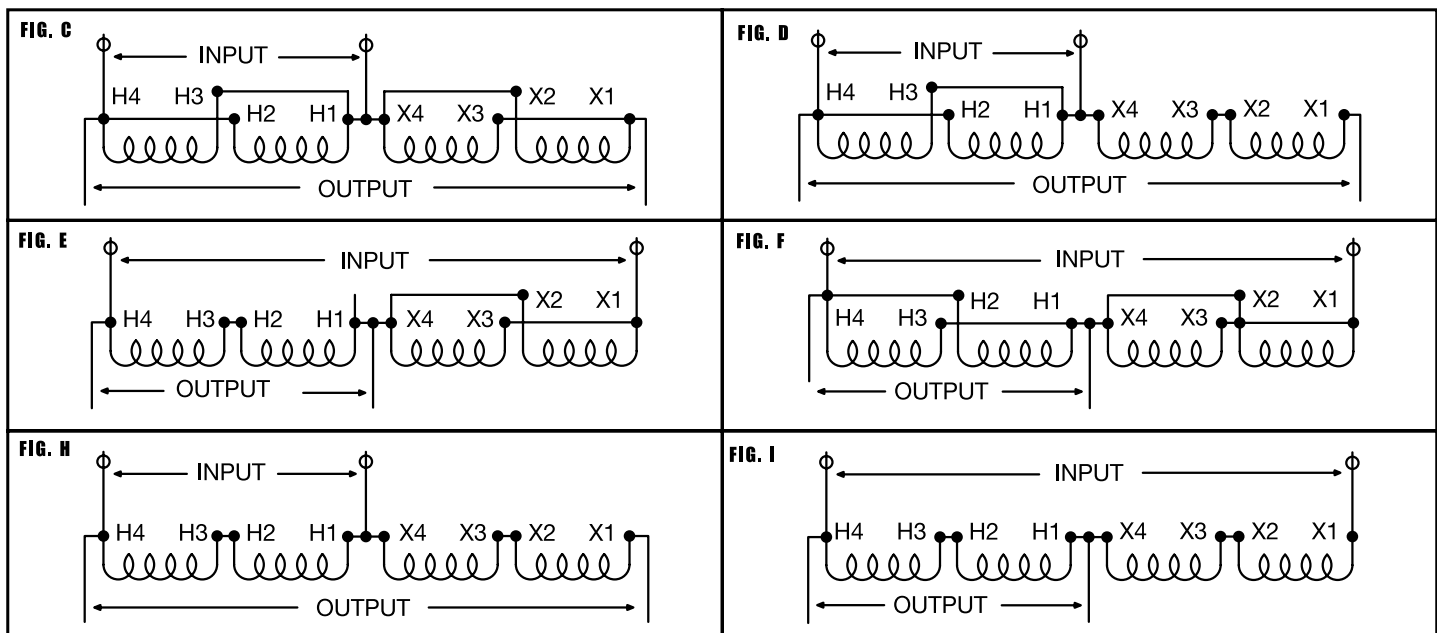
4 Step Selection

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 highest 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.
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 – Single Phase: Autotransformer Overcurrent Protection

- The symbol “O” used in these single phase connection diagrams illustrates where to field install an overcurrent protective device (typically a fuse or circuit breaker) when one input conductor is grounded and the other input conductor is ungrounded.
- When both input conductors are ungrounded, an overcurrent protection device is required to be installed in a series with each input conductor.
- When the input and output are reversed, always install the overcurrent protection device in series with the input conductor(s), as noted above.
- For additional information, refer to the National Electrical Code, Article 450-4.

Only one (1) transformer is required in the figure shown below.



CAUTION: DO NOT USE CONNECTIONS OTHER THAN THOSE SHOWN OR PROVIDED BY FACTORY

Single Phase Autotransformer Connections

Group 1

Single Phase	Boosting							
Line Voltage (Available)	95	100	105	110	189	208	215	220
Line Voltage (Output)	114	120	115	120	208	230	237	242

Δ Catalog No. (See footnote)

T-1-81047	Load	KVA Amps	0.24 2.08	0.25 2.08	0.48 4.17	0.50 4.17	0.43 2.08	0.48 2.08	0.49 2.08	0.50 2.08
	Fuse or Breaker Maximum Size		6	6	10	10	6	6	6	6
T-1-81048	Load	KVA Amps	0.47 4.17	0.50 4.17	0.96 8.33	1.01 8.33	0.87 4.17	0.96 4.17	0.99 4.17	1.01 4.17
	Fuse or Breaker Maximum Size		10	10	15	15	10	10	10	10
T-1-81049	Load	KVA Amps	0.71 6.25	0.75 6.25	1.43 12.50	1.51 12.50	1.30 6.25	1.43 6.25	1.48 6.25	1.51 6.25
	Fuse or Breaker Maximum Size		15	15	20	20	15	15	15	15
T-1-81050	Load	KVA Amps	1.19 10.42	1.25 10.40	2.40 20.80	2.50 20.80	2.16 10.40	2.39 10.40	2.46 10.40	2.52 10.40
	Fuse or Breaker Maximum Size		25	25	40	30	15	15	15	15
T-1-81051	Load	KVA Amps	2.37 20.83	2.50 20.83	4.80 41.67	5.00 41.67	4.33 20.83	4.79 20.83	4.93 20.83	5.04 20.83
	Fuse or Breaker Maximum Size		35	35	60	60	30	30	30	30
T-1-81052	Load	KVA Amps	3.56 31.25	3.75 31.25	7.17 62.50	7.56 62.50	6.50 31.25	7.19 31.25	7.41 31.25	7.56 31.25
	Fuse or Breaker Maximum Size		50	50	90	90	45	45	45	45
T-1-11683	Load	KVA Amps	4.75 41.67	5.00 41.67	9.58 83.31	10.00 83.31	8.66 41.67	9.58 41.67	9.87 41.67	10.00 41.67
	Fuse or Breaker Maximum Size		70	70	125	125	60	60	60	60
T-1-11684	Load	KVA Amps	7.12 62.50	7.50 62.50	14.40 125.00	15.10 125.00	13.00 62.50	14.30 62.50	14.80 62.50	15.10 62.50
	Fuse or Breaker Maximum Size		100	100	175	175	90	90	90	90
T-1-11685	Load	KVA Amps	9.50 83.30	10.00 83.30	19.20 166.60	20.20 166.60	17.30 83.30	19.16 83.30	19.70 83.30	20.10 83.30
	Fuse or Breaker Maximum Size		125	125	250	250	125	125	125	125
T-1-11686	Load	KVA Amps	14.20 125.00	15.00 125.00	28.80 250.00	30.00 250.00	26.00 125.00	28.70 125.00	29.60 125.00	30.30 125.00
	Fuse or Breaker Maximum Size		200	200	350	350	175	175	175	175
T-1-11687	Load	KVA Amps	23.70 208.00	25.00 208.00	47.90 416.60	50.00 416.60	43.30 208.00	47.80 208.00	49.30 208.00	50.30 208.00
	Fuse or Breaker Maximum Size		350	350	600	600	300	300	300	300
T-2-11688*	Load	KVA Amps	35.60 312.50	37.50 312.50	71.90 625.00	75.60 625.00	65.00 312.50	71.80 312.50	74.00 312.50	75.60 312.50
	Fuse or Breaker Maximum Size		500	500	1000	1000	450	450	450	450
T-2-11689*	Load	KVA Amps	47.50 416.60	50.00 416.60	95.80 833.30	100.00 833.30	86.60 416.60	95.80 416.60	98.70 416.60	101.00 416.60
	Fuse or Breaker Maximum Size		700	700	1200	1200	600	600	600	600
Connection Diagram			D	D	C	C	H	H	H	H

Single Phase

Bucking					
125	132	230	245	250	252
113	120	208	222	227	240

Bucking

0.52 4.60	0.54 4.60	0.47 2.28	0.50 2.28	0.52 2.28	1.02 4.37
10	10	6	6	6	10
1.04 9.20	1.08 9.20	0.95 4.56	1.00 4.56	1.04 4.58	2.04 8.75
15	15	10	10	10	15
1.56 13.80	1.62 13.80	1.42 6.86	1.50 6.86	1.56 6.86	3.00 13.10
20	20	15	15	15	15
2.60 22.80	2.75 22.80	2.37 11.40	2.50 11.40	2.60 11.40	5.10 21.80
30	30	15	15	15	30
5.20 46.80	5.40 46.80	4.74 22.80	5.00 22.80	5.20 22.80	10.20 43.70
60	60	30	30	30	60
7.80 68.50	8.15 69.50	7.10 34.40	7.50 34.40	7.80 34.40	15.30 65.50
80	80	40	40	40	80
10.40 91.50	10.80 91.50	9.50 45.80	10.00 45.80	10.00 45.80	20.40 87.50
110	110	60	60	50	110
15.00 138.00	16.20 138.00	14.24 68.60	15.00 68.60	15.60 68.60	30.60 132.00
150	175	80	80	80	175
20.80 183.00	21.60 183.00	19.00 91.60	20.00 91.60	20.30 91.20	40.80 175.00
225	225	110	110	110	225
31.20 275.00	32.50 275.00	28.50 136.80	30.00 136.80	31.20 136.80	61.00 263.00
350	350	175	175	175	350
52.00 457.00	54.00 457.00	47.40 228.00	50.00 228.00	52.00 228.00	102.00 437.00
600	600	300	300	300	600
78.00 688.00	81.00 688.00	71.00 344.00	76.00 344.00	78.00 344.00	153.00 655.00
800	800	400	400	400	800
104.00 915.00	108.00 915.00	95.00 458.00	100.00 458.00	104.00 458.00	204.00 875.00
1200	1200	600	600	600	1200
F	F	I	I	I	E

Δ The first digit of the catalog number appearing on the transformer name plate may be different than what is shown on this instruction sheet; example: T-1, T-2, T-3, etc.

Note: Inputs and outputs may be reversed; KVA capacity remains constant. All applications above the bold line are suitable for 50/60 Hz. All applications below the bold line (highlighted in gray) are suitable for 60 Hz only.

Important: Refer to the National Electrical Code Article 450-4 for Overcurrent Protection of an Autotransformer.

* Larger KVA buck-boost transformers utilize multiple conductors on the secondary (X) terminals as shown below:

Number of Leads per Termination								
	H1	H2	H3	H4	X1	X2	X3	X4
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.

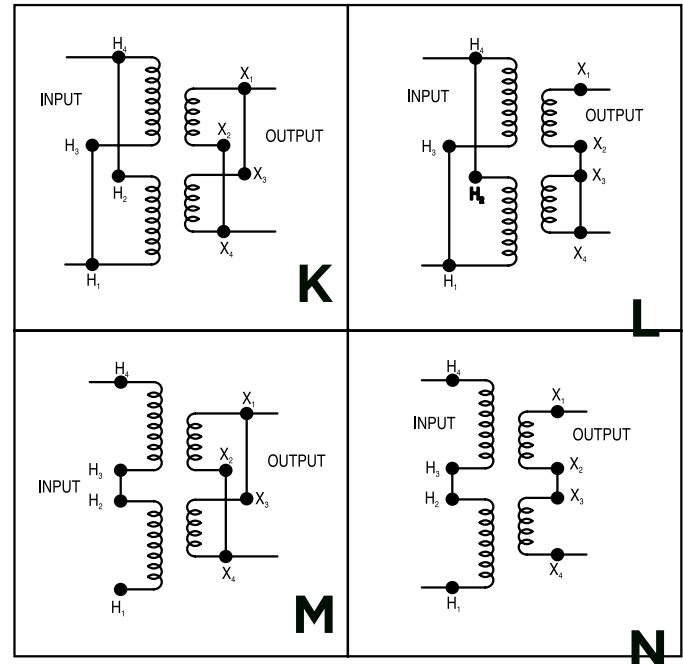


Input Voltage 120 x 240, Output Voltage 12 x 24: 60 Hz

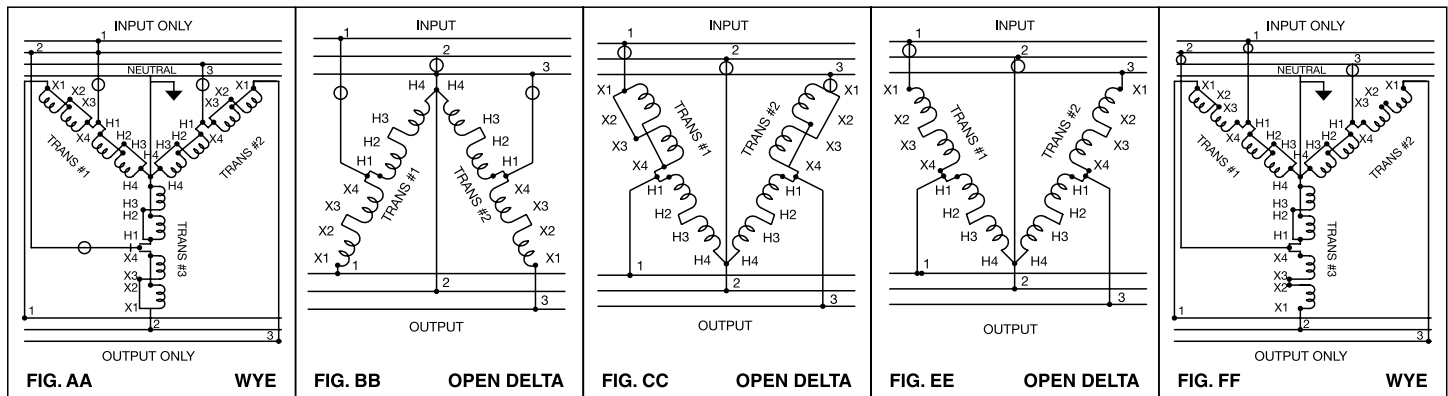
Units rated 120 x 240V Input: 12 x 24V Output

Input	Output	Connection Diagram
120	12	K
120	24	L
240	12	M
240	24	N

Catalog Number	Insulating Transformer Rating	Maximum Current Output	
		12V	24V
T-1-81047	*50 VA	4.16	2.08
T-1-81048	*100 VA	8.32	4.16
T-1-81049	*150 VA	12.52	6.25
T-1-81050	0.25 KVA	20.80	10.40
T-1-81051	0.50 KVA	41.60	20.80
T-1-81052	0.75 KVA	62.50	31.25
T-1-11683	1.00 KVA	83.20	41.60
T-1-11684	1.50 KVA	125.00	62.50
T-1-11685	2.00 KVA	166.00	83.20
T-1-11686	3.00 KVA	250.00	125.00
T-1-11687	5.00 KVA	416.00	208.00
T-2-11688	7.50 KVA	625.00	312.00
T-2-11689	10.00 KVA	832.00	416.00

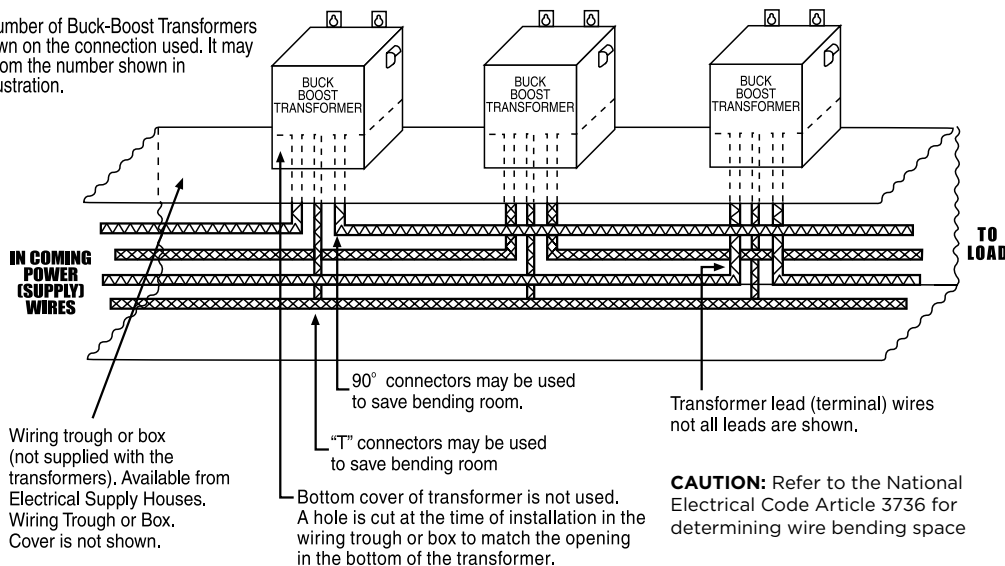


Connection Diagrams - Three Phase



Typical Buck Boost Autotransformer Installation

The number of Buck-Boost Transformers is shown on the connection used. It may vary from the number shown in this illustration.



Autotransformer Overcurrent Protection

The symbol "O" used in these single phase connection diagrams illustrates where to field install an overcurrent protective device (typically a fuse or circuit breaker)

- When the input and output are reversed, always install the overcurrent protection device in series with the input conductor(s)
- For additional information, refer to the National Electrical Code, Article 450-4 with the input conductor(s)
- For additional information, refer to the National Electrical Code, Article 450-4

CAUTION: DO NOT USE CONNECTIONS OTHER THAN THOSE SHOWN OR PROVIDED BY FACTORY

Three Phase Autotransformer Connections

Group 1

Single Phase		Boosting							
Line Voltage (Available)	95	100	105	110	189	208	215	220	
Line Voltage (Output)	114	120	115	120	208	230	237	242	

Δ Catalog No. (See footnote)

T-1-81047	Load	KVA Amps	0.24 2.08	0.25 2.08	0.48 4.17	0.50 4.17	0.43 2.08	0.48 2.08	0.49 2.08	0.50 2.08
	Fuse or Breaker Maximum Size		6	6	10	10	6	6	6	6
T-1-81048	Load	KVA Amps	0.47 4.17	0.50 4.17	0.96 8.33	1.01 8.33	0.87 4.17	0.96 4.17	0.99 4.17	1.01 4.17
	Fuse or Breaker Maximum Size		10	10	15	15	10	10	10	10
T-1-81049	Load	KVA Amps	0.71 6.25	0.75 6.25	1.43 12.50	1.51 12.50	1.30 6.25	1.43 6.25	1.48 6.25	1.51 6.25
	Fuse or Breaker Maximum Size		15	15	20	20	15	15	15	15
T-1-81050	Load	KVA Amps	1.19 10.42	1.25 10.40	2.40 20.80	2.50 20.80	2.16 10.40	2.39 10.40	2.46 10.40	2.52 10.40
	Fuse or Breaker Maximum Size		25	25	40	30	15	15	15	15
T-1-81051	Load	KVA Amps	2.37 20.83	2.50 20.83	4.80 41.67	5.00 41.67	4.33 20.83	4.79 20.83	4.93 20.83	5.04 20.83
	Fuse or Breaker Maximum Size		35	35	60	60	30	30	30	30
T-1-81052	Load	KVA Amps	3.56 31.25	3.75 31.25	7.17 62.50	7.56 62.50	6.50 31.25	7.19 31.25	7.41 31.25	7.56 31.25
	Fuse or Breaker Maximum Size		50	50	90	90	45	45	45	45
T-1-11683	Load	KVA Amps	4.75 41.67	5.00 41.67	9.58 83.31	10.00 83.31	8.66 41.67	9.58 41.67	9.87 41.67	10.00 41.67
	Fuse or Breaker Maximum Size		70	70	125	125	60	60	60	60
T-1-11684	Load	KVA Amps	7.12 62.50	7.50 62.50	14.40 125.00	15.10 125.00	13.00 62.50	14.30 62.50	14.80 62.50	15.10 62.50
	Fuse or Breaker Maximum Size		100	100	175	175	90	90	90	90
T-1-11685	Load	KVA Amps	9.50 83.30	10.00 83.30	19.20 166.60	20.20 166.60	17.30 83.30	19.16 83.30	19.70 83.30	20.10 83.30
	Fuse or Breaker Maximum Size		125	125	250	250	125	125	125	125
T-1-11686	Load	KVA Amps	14.20 125.00	15.00 125.00	28.80 250.00	30.00 250.00	26.00 125.00	28.70 125.00	29.60 125.00	30.30 125.00
	Fuse or Breaker Maximum Size		200	200	350	350	175	175	175	175
T-1-11687	Load	KVA Amps	23.70 208.00	25.00 208.00	47.90 416.60	50.00 416.60	43.30 208.00	47.80 208.00	49.30 208.00	50.30 208.00
	Fuse or Breaker Maximum Size		350	350	600	600	300	300	300	300
T-2-11688*	Load	KVA Amps	35.60 312.50	37.50 312.50	71.90 625.00	75.60 625.00	65.00 312.50	71.80 312.50	74.00 312.50	75.60 312.50
	Fuse or Breaker Maximum Size		500	500	1000	1000	450	450	450	450
T-2-11689*	Load	KVA Amps	47.50 416.60	50.00 416.60	95.80 833.30	100.00 833.30	86.60 416.60	95.80 416.60	98.70 416.60	101.00 416.60
	Fuse or Breaker Maximum Size		700	700	1200	1200	600	600	600	600
Connection Diagram			D	D	C	C	H	H	H	H

Single Phase

Bucking					
125	132	230	245	250	252
113	120	208	222	227	240

Bucking

0.52 4.60	0.54 4.60	0.47 2.28	0.50 2.28	0.52 2.28	1.02 4.37
10	10	6	6	6	10
1.04 9.20	1.08 9.20	0.95 4.56	1.00 4.56	1.04 4.58	2.04 8.75
15	15	10	10	10	15
1.56 13.80	1.62 13.80	1.42 6.86	1.50 6.86	1.56 6.86	3.00 13.10
20	20	15	15	15	15
2.60 22.80	2.75 22.80	2.37 11.40	2.50 11.40	2.60 11.40	5.10 21.80
30	30	15	15	15	30
5.20 46.80	5.40 46.80	4.74 22.80	5.00 22.80	5.20 22.80	10.20 43.70
60	60	30	30	30	60
7.80 68.50	8.15 69.50	7.10 34.40	7.50 34.40	7.80 34.40	15.30 65.50
80	80	40	40	40	80
10.40 91.50	10.80 91.50	9.50 45.80	10.00 45.80	10.00 45.80	20.40 87.50
110	110	60	60	50	110
15.00 138.00	16.20 138.00	14.24 68.60	15.00 68.60	15.60 68.60	30.60 132.00
150	175	80	80	80	175
20.80 183.00	21.60 183.00	19.00 91.60	20.00 91.60	20.30 91.20	40.80 175.00
225	225	110	110	110	225
31.20 275.00	32.50 275.00	28.50 136.80	30.00 136.80	31.20 136.80	61.00 263.00
350	350	175	175	175	350
52.00 457.00	54.00 457.00	47.40 228.00	50.00 228.00	52.00 228.00	102.00 437.00
600	600	300	300	300	600
78.00 688.00	81.00 688.00	71.00 344.00	76.00 344.00	78.00 344.00	153.00 655.00
800	800	400	400	400	800
104.00 915.00	108.00 915.00	95.00 458.00	100.00 458.00	104.00 458.00	204.00 875.00
1200	1200	600	600	600	1200
F	F	I	I	I	E

Note: 1) Inputs and outputs may be reversed; KVA capacity remains constant. All applications above the bold line are suitable for 50/60 Hz. All applications below the bold line (highlighted in gray) are suitable for 60 Hz only.

2) Connection diagrams A-A and F-F cannot be reverse connected.

Important: Refer to the National Electrical Code Article 450-4 for Overcurrent Protection of an Autotransformer.

* Larger KVA buck-boost transformers utilize multiple conductors on the secondary (X) terminals as shown below:

Number of Leads per Termination

	H1	H2	H3	H4	X1	X2	X3	X4
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.





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HHI-ACME-IOM-EN-03230 | 03/2025