MGM TRANSFORMER COMPANY

BULLETIN 5

BUCK-BOOST TRANSFORMERS

ISO 9001:2015

Other Products

Dry Substation *(Bulletin 30)*

Liquid Substation *(Bulletin 40)*

Custom 600V Dry Type *(Bulletin 15)*

BUCK BOOST OVERVIEW

MGM provides buck-boost transformers as a simple and economical way to correct off-standard voltages from 95 to 500 volts, single and three-phase, in sizes up to 25 kVA. When the supply voltage is constantly too high or too low, (usually more than 55%), the equipment fails to operate at maximum efficiency. Buck Boosts are most commonly used for 240V equipment in a facility with 208V service or vice versa.

WHEN IS CORRECT VOLTAGE 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. 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.

CAUSES OF VOLTAGE MISMATCH

- Service voltage changes after equipment is installed
- Voltage drop in power line
- Error in equipment ordering
- Utility cutback in source voltage

SIGNS OF VOLTAGE MISMATCHES

- Overheating motors
- Premature motor failures
- Equipment not working due to low torque of motors
- Nuisance tripping breakers
- Long distance service runs
- Improper, erratic, or no operation of equipment
- Increase in energy costs

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. 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.”

CAN BUCK BOOST TRANSFORMERS BE USED ON THREE-PHASE 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.

ADVANTAGES OF PURCHASING FROM MGM

With over forty-five years of transformer experience and our long-standing commitment to quality and customer service, MGM Transformer will find the transformer that is right for your specific application.

- ✓ Ratings from 50VA to 10,000VA
- ✓ Three standard voltage groups:
  - 120/240-12/24
  - 120/240-16/32
  - 240/480-24/48
- ✓ 50/60 Hz frequency
- ✓ Encapsulated core & coils in a combination silica sand and resin compound
- ✓ Insulation system: 115°C rise
- ✓ Single & three phase configurations available
- ✓ UL listed & CSA certified

TESTING AND QUALITY CONTROL

MGM Transformer tests every transformer to satisfy the standards required by IEEE Standard C57.12.01 for Dry-Type Transformers and IEEE Standard C57.12.00 for liquid filled transformers. Our testing equipment ensures the highest quality transformers that meet all IEEE, and NEMA standards. We also offer customer witness testing on individual transformers. We also have the capability of providing a range of design tests and optional tests such as impulse, partial discharge, temperature rise, sound level, and others.

THE BETTER CHOICE!

MGM is a leader in the transformer industry, and a premiere manufacturer capable of fulfilling the most demanding applications. **No one can provide a wider range of products and solutions than MGM!**

SPECIFICATIONS – SINGLE PHASE BUCK BOOST TRANSFORMERS – 60HZ

120 X 240 PRIMARY VOLTS – 12/24 SECONDARY VOLTS – 60 HZ

Catalog Number	Insulating Transformer Rating	Secondary Maximum Current Output		Height Inches (Cm)	Width Inches (Cm)	Depth Inches (Cm)	Weight Lbs (Kg)	Dimensional Drawing
		12V	24 V					
M181047	0.05 KVA	4.16	2.08	6.41 (16.3)	3.14 (8.0)	3.05 (7.7)	4 (1.8)	A
M181048	0.1 KVA	8.32	4.16	7.16 (18.2)	3.89 (9.9)	3.67 (9.3)	5 (2.3)	A
M181049	0.15 KVA	15.52	6.25	7.16 (18.2)	3.89 (9.9)	3.67 (9.3)	7 (3.2)	A
M181050	0.25 KVA	20.8	10.4	8.68 (22.0)	4.08 (10.4)	3.88 (9.9)	10 (4.5)	B
M181051	0.5 KVA	41.6	20.8	9.06 (23.0)	4.37 (11.1)	4.20 (10.7)	15 (6.8)	B
M181052	0.75 KVA	62.5	31.25	9.68 (24.6)	4.75 (12.1)	4.51 (11.5)	19 (8.6)	B
M111683	1 KVA	83.2	41.6	10.50 (26.7)	5.50 (14.0)	5.13 (13.0)	24 (10.9)	B
M111684	1.5 KVA	125	62.5	11.62 (29.5)	5.50 (14.0)	5.13 (13.0)	30 (13.6)	B
M111685	2 KVA	166	83.2	13.00 (33.0)	5.50 (14.0)	5.13 (13.0)	38 (17.2)	B
M111686	3 KVA	250	125	11.50 (29.2)	10.31 (26.2)	7.13 (18.1)	55 (24.9)	C
M111687	5 KVA	416.6	208	14.38 (36.5)	10.31 (26.2)	7.13 (18.1)	75 (34.0)	C
M211688	7.5 KVA	625	312.5	20.81 (52.9)	11.12 (28.2)	10.84 (27.5)	125 (56.7)	D
M211689	10 KVA	833	416.6	20.81 (52.9)	11.75 (29.8)	11.59 (29.4)	160 (72.6)	D

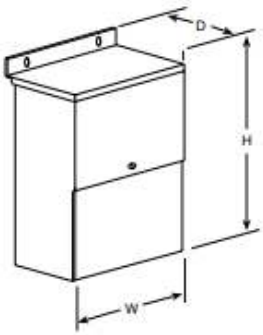
120 X 240 PRIMARY VOLTS – 16/32 SECONDARY VOLTS – 60 HZ

Catalog Number	Insulating Transformer Rating	Secondary Maximum Current Output		Height Inches (Cm)	Width Inches (Cm)	Depth Inches (Cm)	Weight Lbs (Kg)	Dimensional Drawing
		16V	32 V					
M181054	0.05 KVA	3.12	1.56	6.41 (16.3)	3.14 (8.0)	3.05 (7.7)	4 (1.8)	A
M181055	0.1 KVA	6.25	3.12	7.16 (18.2)	3.89 (9.9)	3.67 (9.3)	5 (2.3)	A
M181056	0.15 KVA	9.38	4.69	7.16 (18.2)	3.89 (9.9)	3.67 (9.3)	7 (3.2)	A
M181057	0.25 KVA	15.60	7.80	8.68 (22.0)	4.08 (10.4)	3.88 (9.9)	10 (4.5)	B
M181058	0.5 KVA	31.20	15.60	9.06 (23.0)	4.37 (11.1)	4.20 (10.7)	15 (6.8)	B
M181059	0.75 KVA	46.90	23.40	9.68 (24.6)	4.75 (12.1)	4.51 (11.5)	19 (8.6)	B
M113073	1 KVA	62.50	31.20	10.50 (26.7)	5.50 (14.0)	5.13 (13.0)	24 (10.9)	B
M113074	1.5 KVA	93.70	46.90	11.62 (29.5)	5.50 (14.0)	5.13 (13.0)	30 (13.6)	B
M113075	2 KVA	125.00	62.50	13.00 (33.0)	5.50 (14.0)	5.13 (13.0)	38 (17.2)	B
M113076	3 KVA	187.50	93.80	11.50 (29.2)	10.31 (26.2)	7.13 (18.1)	55 (24.9)	C
M113077	5 KVA	312.00	156.00	14.38 (36.5)	10.31 (26.2)	7.13 (18.1)	75 (34.0)	C
M213078	7.5 KVA	468.00	234.00	20.81 (52.9)	11.12 (28.2)	10.84 (27.5)	125 (56.7)	D
M213079	10 KVA	625.00	312.00	20.81 (52.9)	11.75 (29.8)	10.84 (27.5)	160 (72.6)	D

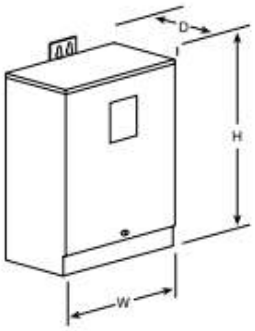
240 X 480 PRIMARY VOLTS – 24/48 SECONDARY VOLTS – 60 HZ

Catalog Number	Insulating Transformer Rating	Secondary Maximum Current Output		Height Inches (Cm)	Width Inches (Cm)	Depth Inches (Cm)	Weight Lbs (Kg)	Dimensional Drawing
		24 V	48 V					
M181061	0.05 KVA	2.08	1.04	6.41 (16.3)	3.14 (8.0)	3.05 (7.7)	4 (1.8)	A
M181062	0.1 KVA	4.16	2.08	7.16 (18.2)	3.89 (9.9)	3.67 (9.3)	5 (2.3)	A
M181063	0.15 KVA	6.24	3.12	7.16 (18.2)	3.89 (9.9)	3.67 (9.3)	7 (3.2)	A
M181064	0.25 KVA	10.40	5.20	8.68 (22.0)	4.08 (10.4)	3.88 (9.9)	10 (4.5)	B
M181065	0.5 KVA	20.80	10.40	9.06 (23.0)	4.37 (11.1)	4.20 (10.7)	15 (6.8)	B
M181066	0.75 KVA	31.20	15.60	9.68 (24.6)	4.75 (12.1)	4.51 (11.5)	19 (8.6)	B
M137920	1 KVA	41.60	20.80	10.50 (26.7)	5.50 (14.0)	5.13 (13.0)	24 (10.9)	B
M137921	1.5 KVA	62.40	31.20	11.62 (29.5)	5.50 (14.0)	5.13 (13.0)	30 (13.6)	B
M137922	2 KVA	83.20	41.60	13.00 (33.0)	5.50 (14.0)	5.13 (13.0)	38 (17.2)	B
M137923	3 KVA	125.00	62.50	11.50 (29.2)	10.31 (26.2)	7.13 (18.1)	55 (24.9)	C
M137924	5 KVA	208.00	104.00	14.38 (36.5)	10.31 (26.2)	7.13 (18.1)	75 (34.0)	C
M243570	7.5 KVA	312.00	156.00	20.81 (52.9)	11.12 (28.2)	10.84 (27.5)	135 (61.2)	D
M243571	10 KVA	416.00	208.00	20.81 (52.9)	11.75 (29.8)	11.59 (29.4)	160 (72.6)	D

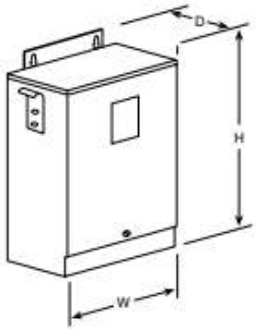
BUCK BOOST DIMENSIONAL DRAWINGS



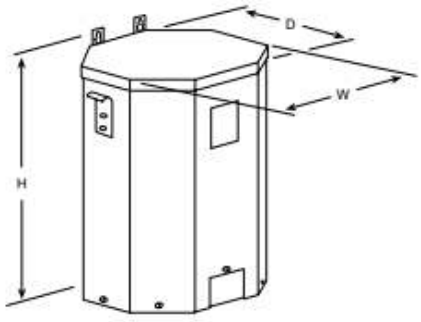
Design A



Design B



Design C



Design D

BUCK BOOST WIRING DIAGRAMS

UNITS RATED 120 X 240 V INPUT: 12/24 V OUTPUT

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

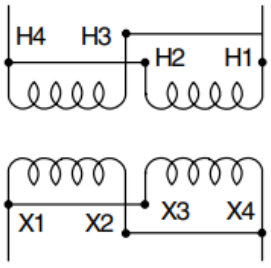
UNITS RATED 120 X 240 V INPUT: 16/32 V OUTPUT

Input	Output	Connection Diagram
120 V	16 V	K
120 V	32 V	L
240 V	16 V	M
240 V	32 V	N

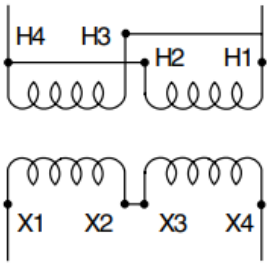
UNITS RATED 240 X 480 V INPUT: 24/48 V OUTPUT

Input	Output	Connection Diagram
240 V	24 V	K
240 V	48 V	L
480 V	24 V	M
480 V	48 V	N

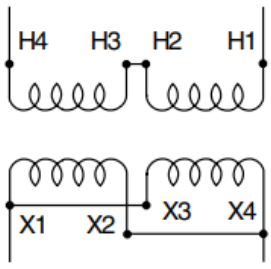
K



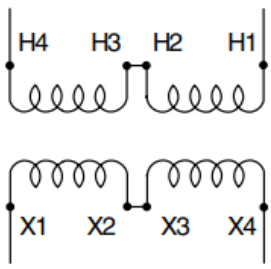
L



M



N



BUCK BOOST WIRING DIAGRAMS – SINGLE PHASE FOR THREE PHASE APPLICATIONS

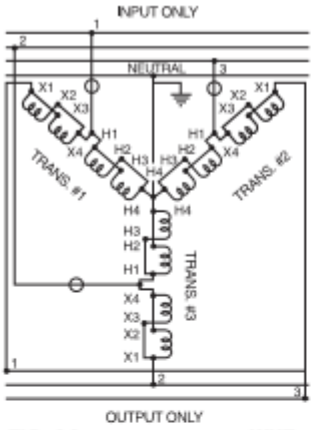


FIG. AA WYE

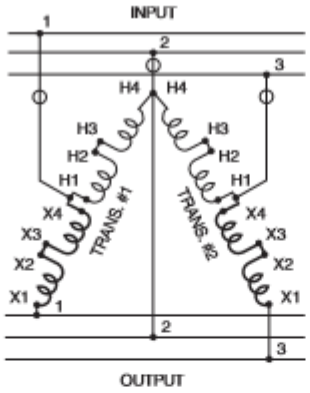


FIG. BB OPEN DELTA

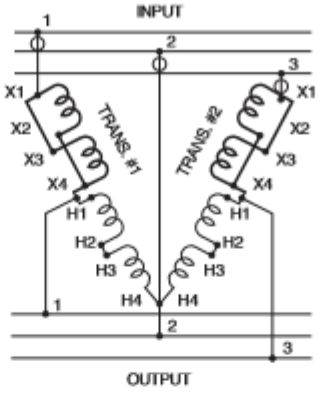


FIG. CC OPEN DELTA

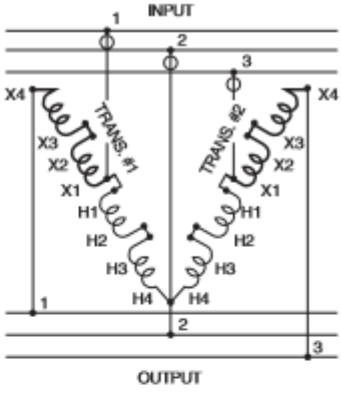


FIG. DD OPEN DELTA

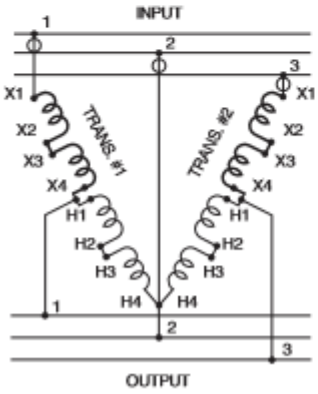


FIG. EE OPEN DELTA

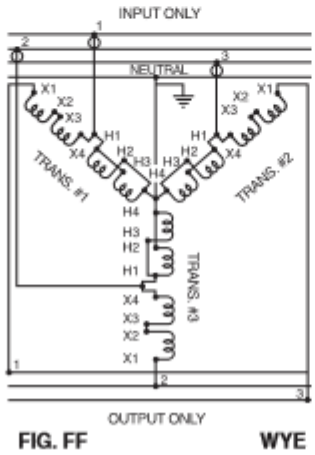


FIG. FF WYE

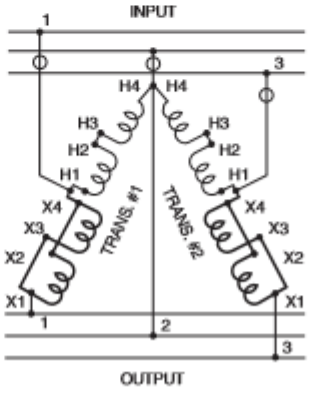


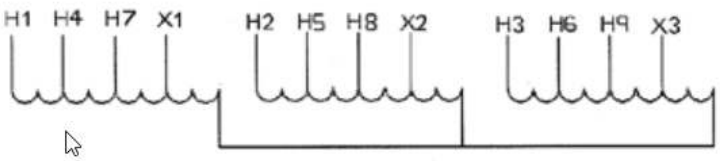
FIG. GG OPEN DELTA

① The symbol O used in these connection diagrams indicates where to field install the over-current protective device, typically a fuse or circuit breaker.

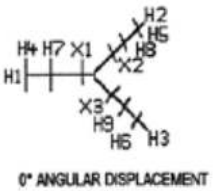
② Cannot be reverse connected.

IMPORTANT: Refer to the N.E.C. (National Electrical Code) Article 450-4 for overcurrent protection of an autotransformer. These connection diagrams are packed with each buck-boost transformer. Do not use connections other than those shown above.

BUCK BOOST CONNECTION DIAGRAM



PRIMARY VOLTS	%	CONNECT LEADS TO TAP NO.
252	105	H1-H2-H3
240	100	H4-H5-H6
228	95	H7-H8-H9
SECONDARY LINES TO X1-X2-X3		



0° ANGULAR DISPLACEMENT

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