



**Owner's Manual
T-220 Universal Transformer**

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Trace Engineering
5916 - 195th Street N.E.
Arlington, WA 98223
Phone: (360) 435-8826
Fax: (360) 435-2229

P/N 824

visit our website at: www.traceengineering.com

Model T-220

DESCRIPTION

The Model T-220 uses high efficiency transformer technology and is constructed with high temperature rated materials and M-6 grade steel laminations. This provides an unusually high efficiency device for voltage conversion from an inverter, generator or conventional AC source. The T-220 has four identical windings which can be connected in series or parallel depending upon the application. The result is a universal transformer design that can be used for line isolation, voltage step-up and step-down or generator balancing. The T-220 is sized to take advantage of the Trace Engineering inverter product line. For installations calling for increased power capability, transformers may be operated in parallel. The Model T-220 is configured from the factory as a 120 VAC to 240 VAC autoformer.

APPLICATIONS

Step Up/Step Down Autoformer

Typical installations include 120 VAC to 240 VAC step-up and 240 VAC to 120 VAC step down. In this configuration, the T-220 will allow the use of a 220/240 VAC deep well pump from a 110/120 VAC circuit. Or, conversely, it can allow the use of 110/120 VAC appliances from a 220/240 VAC circuit.

Generator Balancing

The T-220 can be used to sum both legs of a 240 VAC two phase circuit to produce more power than is available at either of the 120 VAC legs. This is useful with a generator that has sufficient total power, but insufficient power on a single leg for a particular load.

Transmission Lines

Long distance energy transmission can be made more efficient by using two T-220's. The first transformer increases the voltage to 240 VAC to reduce current flow and, hence, transmission losses. The second unit steps the voltage back down to 120 VAC to operate the 120 VAC connected load.

Isolation

Marine installations require isolation to prevent stray current electrolysis while connected to shore power. This can be accomplished using one (or more) T-220's configured in isolation mode to provide a 1:1 voltage transfer (eg. 120 VAC to 120 VAC) without a direct hardwire connection.

INSTALLATION

The Model T-220 is installed by first configuring the transformer's four windings for the desired application, and then connecting the external AC input and AC output wiring. The eight station terminal strip and the two 15 Amp circuit breakers allow the unit to be used for differing applications (see above.) The terminal strip is numbered 1 through 8 and represents each of the winding terminations as shown in the configuration diagrams. Transformer windings are placed in parallel or series by installing jumper wires at the terminal strip. Crimp type push-on connectors are provided for connection to the circuit breakers.

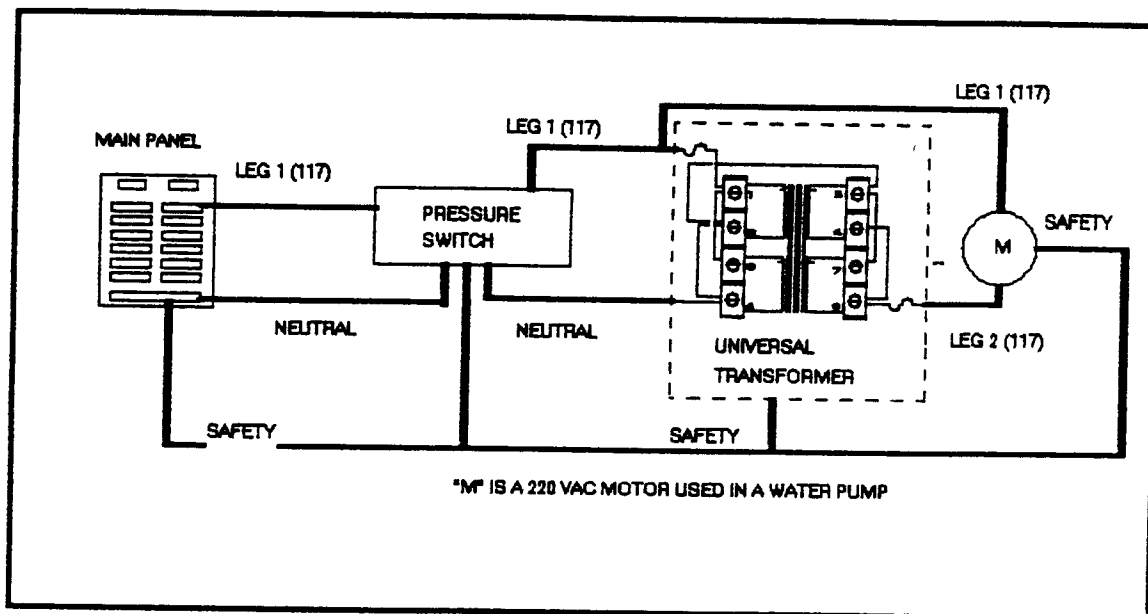
Step up/Step down Autoformer Configuration (See Diagram p. 3)

The Model T-220 is configured at the factory for use as an autoformer. This is the most efficient format for either stepping 120 VAC up to 240 VAC or stepping 240 VAC down to 120 VAC. To install the unit as a step-up autoformer complete the following steps:

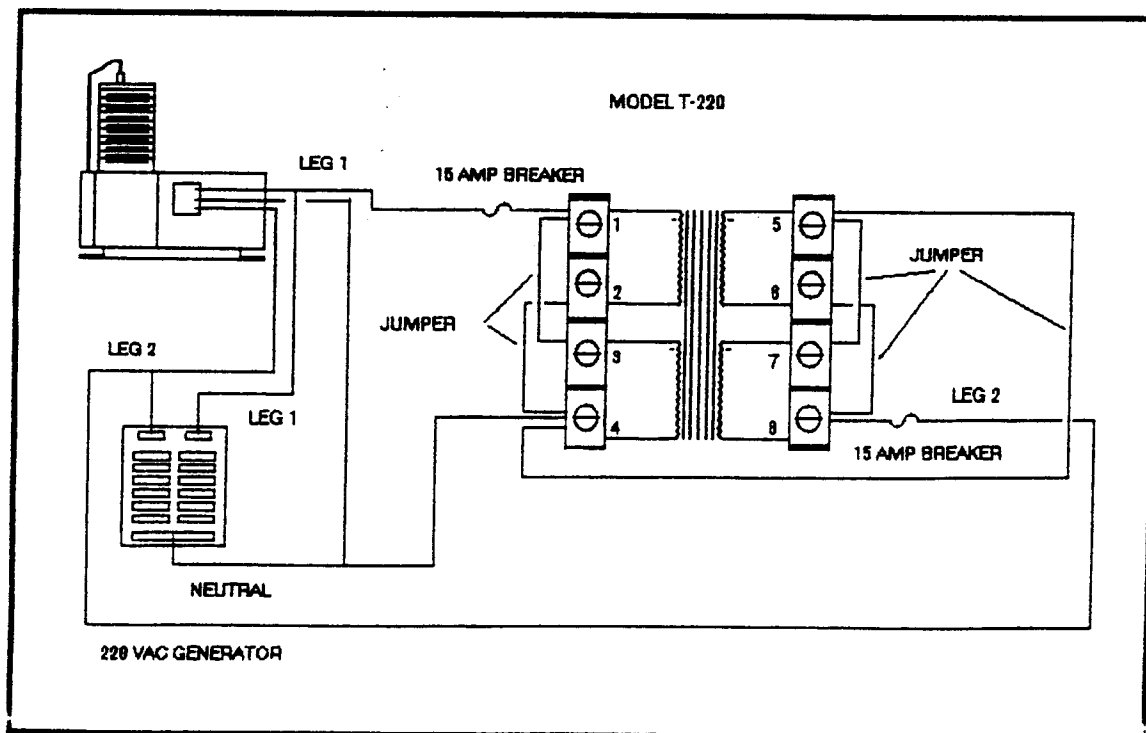
- 1) Lead the input and output neutral wires through a romex connector. Secure these wires to terminal position 4 of the T-220.
- 2) Lead the 120 VAC hot wire (from the power source) through a romex connector and terminate it with a push-on connector. The push-on connector is then attached to the upper of the two circuit breakers on the T-220. This 120 VAC input wire also act as Leg 1 of the 240 VAC output. Therefore, at a point before the circuit breaker, the 120 VAC output (Leg 1) is made by wire nutting to the 120 VAC input lead.
- 3) The 120 VAC leg 2 of the 240 VAC circuit is available at the unused connector of the lower of the two circuit breakers. Lead

Installation Diagrams

Autoformer with Deep Well Pump

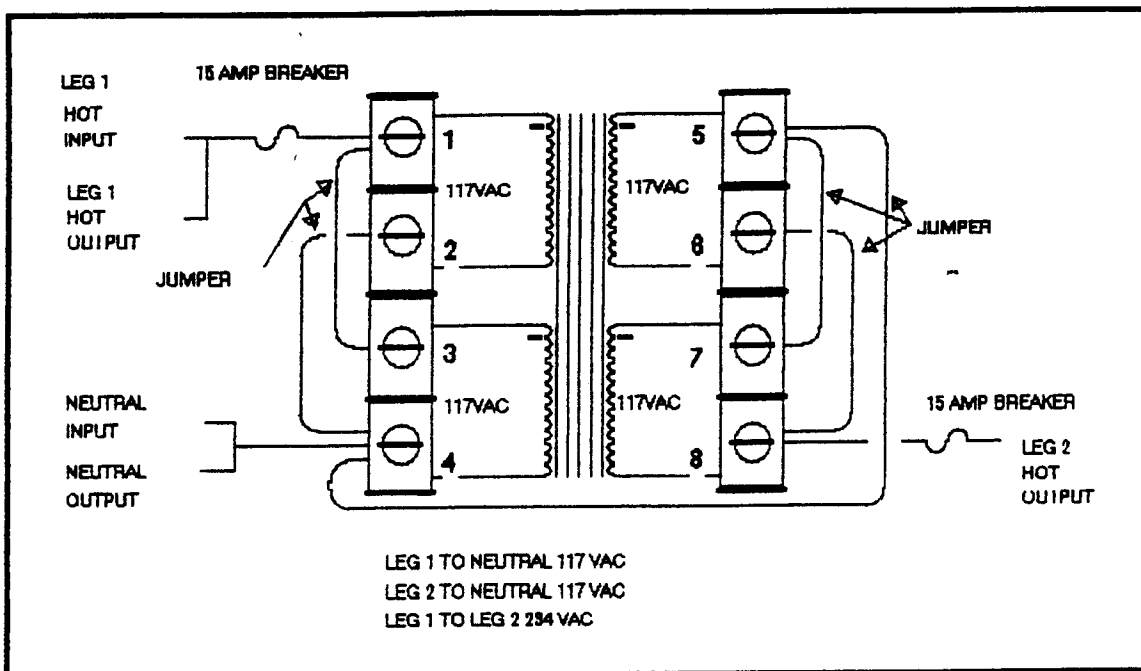


Generator Output Balancing

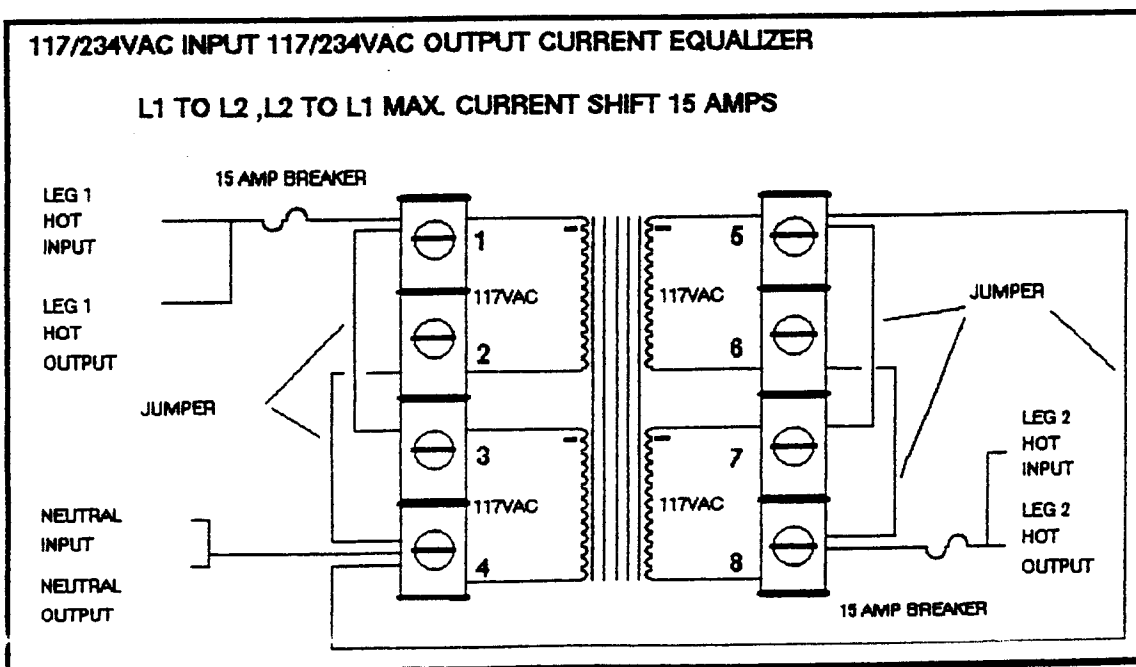


Configuration Diagrams

Autoformer - 120 VAC to 240 VAC



Generator Balancing Output Transformer



the wire for Leg 2 through the romex connector and attach the supplied push-on connector to it. Attach the push-on connector to the lower of the two circuit breakers on the T-220.

Generator Balancing Configuration (See Diagram p. 3)

This configuration is nearly identical to that of the autoformer described above. The only difference is that the Leg 2 from the output of the generator is attached to Leg 2 output on the T-220.

CONFIGURATION DIAGRAMS

Autoformer - 120 VAC to 240 VAC

Generator Balancing Output Transformer

Installation Diagrams

Autoformer with Deep Well Pump

Generator Output Balancing

SPECIFICATIONS

Operating:

Power rating as isolation transformer	*1800 watts for one hour
Power rating as autoformer or balancing transformer	*3600 watts for one hour
Surge power rating	*5000 watts
Input voltage (parallel mode)	120 VAC RMS +/- 15 VAC
Input voltage (series mode)	240 VAC RMS +/- 30 VAC
Output voltage (parallel mode)	120 VAC No load
Output voltage (series mode)	240 VAC No load
Accepted input frequency	60 Hz nominal +/- 10%
Input breaker rating	15 amps
Input breaker operating	19 amps
Motor operation rating	1.5 Hp capacitor start 1 Hp Deep Well 1 Hp Compressor
Efficiency	95.4% @ 10 amps 91.0% @ 20 amps 87.2% @ 30 amps
Insertion loss	.53 Ohms @ 117 VAC
AC Safety	1500 VAC Primaries

Environmental:

Operating temperature	+90C to -30C
Storage temperature	+90C to -30C
Humidity Non-condensing Rh	max 95%
Altitude operation	4,500 meters
Altitude storage	15,000 meters

Physical:

Weight Net	26 lbs.
Size	7.75 W, 11.375L, 7.0 H
Finish	Black anodize
Material	.08 inch folded aluminum
Max Hookup wire size	8 AWG Screw lug
Hookup access	Two (2) romex 3/4" clamps

* Note: All power ratings are based on resistive loads at 60°F. Inductive loads and higher ambient temperatures will reduce capacity.



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