Power Climber® INNOVATING SINCE 1972

Topic of Interest

Which Transformer?

There are three basic styles of transformers used in the suspended scaffold industry; buck/boost, step-up, and step-down.

Buck/Boost transformers are the most common transformers used in suspended scaffolding. As the name implies these transformers can have two different uses. “Bucking” power is done to decrease voltage by a certain amount. If you had voltage that was too high for normal operation, you would use a buck transformer to lower the voltage. If your voltage were 277 Volts, a 15% buck booster would lower the voltage to about 235 Volts, which is within the standard operating range of most electric traction hoists.

“Booster” transformers are the most common use of buck/boost transformers. Booster transformers raise voltage by a certain amount to correct poor voltage conditions. If your power cord voltage drop was too much or your initial line voltage was too low, a booster transformer would be necessary. If your line voltage was 200 volts and you boosted the power by 10%, you would have 220 volts to work with.

Typically the only difference between whether the transformer is considered a buck or boost transformer, is by which end you place the plug on.

“Step-Up” transformers are generally the type that increase voltage from 110 volts to 220 volts. They are used when 110 volts is the only available power and you need to use a 220-volt hoist.

“Step-down” transformers are generally used as a platform power supply for power tools and radios. These transformers usually have two 110-volt GFCI outlets with U-ground connectors. It is very important that these transformers are sized according to the largest power tool that is likely to be used on board a suspended platform. Grinders and polishers require a lot of power and can burn out an improperly sized transformer.

Sizing a Transformer

In order to properly size a transformer you must first decide what needs you have for a transformer. If you need a buck/boost transformer, will you be using it for one or two hoists? If you need a step-down transformer, what tools will be used?

After deciding what type of transformer you need, you must find out some information about the tools or hoists that you will use with the transformer. When you buy a transformer you must know how much energy it can produce. It must be able to produce at least as much energy as your equipment requires or your transformer will be undersized. Undersized transformers will burn out prematurely.

To help you determine the correct size of transformer you must know the following information for the equipment that you are using: Full Load Amps, Load Voltage, and Load kVA. Full Load Amps and Load Voltage information for any piece of equipment is found on the nameplate of the equipment. For an example we will use the information from a 99411 PC1-1000E Pocket Hoist nameplate. The full load amps are 9 amps and the load voltage is 220 volts. This information is necessary to calculate the Load kVA.

Power Climber®
365 Upland Drive
Seattle, WA 98188 USA

Phone: 1-800-560-2546
E-mail: CustomerService@SafeWorks.com
Internet: www.PowerClimber.com

SafeWorks®, LLC

Power Climber® INNOVATING SINCE 1972

Topic of Interest

Which Transformer?

For single-phase equipment, using a buck/boost transformer, Load kVA is calculated from the following formula.

$$\text{Load kVA (output)} = \frac{\text{Load Voltage X Full Load Amps}}{1000}$$

e.g. 99411 hoist

$$1.98 \text{ kVA} = \frac{220 \text{ volts X } 9 \text{ amps}}{1000}$$

The load kVA must be doubled if two hoists are being used.

When you use a Step-Up or a Step-Down transformer you must increase the full load amperage by 20%. For this application use the following formula.

$$\text{Load kVA (output)} = \frac{\text{Load Voltage X Full Load Amps X } 1.2}{1000}$$

With the Load kVA information, you can purchase the correct size buck/boost transformer for your application. Match this Load kVA that you calculated with the “output kVA” rating of the transformer, not the unit kVA rating.

Therefore from the example above, you would need 1.98kVA for each hoist, of the particular model cited in the example, on a platform. For two hoists, the Load kVA rating needed will be 3.96 kVA. Buck/Boost transformers with a unit kVA rating of 1.0-2.0 kVA will have an output rating of 6.23-12.5 kVA. This would be the correct size transformer to purchase for this application. A basic recommendation would be to use a transformer with a unit rating of at least 1.5kVA with most platforms.

What Transformers Do

Transformers change voltage by magnetic induction. They do not stabilize voltage fluctuations. If the input voltage of the transformer varies, the output voltage will vary by the same amount.

Transformers are only used to correct or change voltage. If the line voltage on a jobsite is outside of the normal operating range of the equipment you intend to use, it must be changed. If you intend to use long lengths of power cord on a job, a booster transformer can increase your available voltage. You must always calculate what your voltage drop will be in a given length of power cord to help decide if a transformer is needed. Voltage drop through power cords always occurs and can be predicted and planned for.
(SEE: http://www.powerclimber.com/newsletters/aug01.html and http://www.powerclimber.com/newsletters/sep98.html for more information about voltage)

Power Climber®
365 Upland Drive
Seattle, WA 98188 USA

Phone: 1-800-560-2546
E-mail: CustomerService@SafeWorks.com
Internet: www.PowerClimber.com

SafeWorks®, LLC

Power Climber® INNOVATING SINCE 1972

Topic of Interest

Which Transformer?

Did You Know?

- PC1 Pocket Hoists built after January 2000 have a low voltage indicator light and can help you decide when a transformer is needed.
- When using a “Step-Up” transformer, the amperage load from the input side is doubled. Generally this means that only one hoist can be attached to a “Step-Up” transformer. Never yoke two hoists to a step-up transformer.

Tips and Tricks

- Create a color code for all of your transformers to make identification of each type and size quick and easy. Then paint each transformer according to your color code. DO NOT PAINT OVER THE NAMEPLATE.

For questions or comments, contact Customer Service at 1-800-560-CLIMB (2546) or customerservice@safeworks.com.

Power Climber®
365 Upland Drive
Seattle, WA 98188 USA

Phone: 1-800-560-2546
E-mail: CustomerService@SafeWorks.com
Internet: www.PowerClimber.com