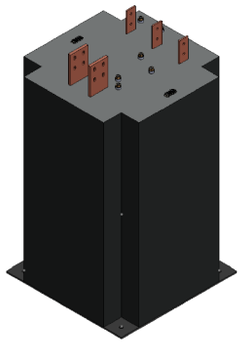
JACKSON® TRANSFORMER CO.

Quality Magnetic Products

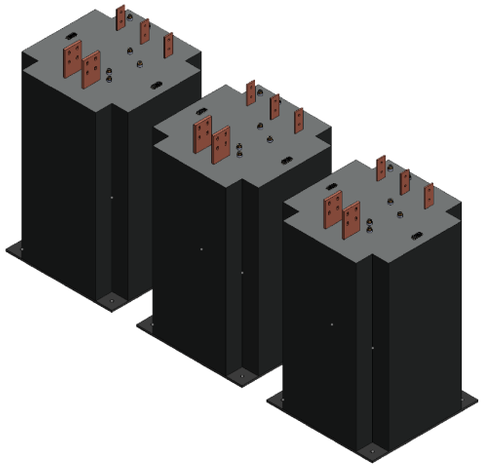
the Variable Impedance Transformer

Withstands Dead Shorts

1 Phase VIT®



3 Phase VIT®



* 3/2 Phase option designs available

U.S. Patent No. 5,789,907
U.S. Patent No. 5,163,173
Canadian Patent No. 2064446

Note: DC-control available upon request for pricing with system

The JACKSON® VIT® is a patented* method of controlling power to a load.

JACKSON® Variable Impedance Transformers are customized to meet customer requirements, and are available in various ratings. All designs are optimized utilizing our exclusive computer programs to ensure the highest quality product.

Utilizing integrated magnetics to provide stepless power to electric furnaces, load banks, plating power supplies, etc.

The **JACKSON® VIT®** is a current controlled device that requires DC signal to control large amounts of power for variable output.

Unlike SCR controlled power supplies, it can operate with large unbalanced loads or with an open circuit phase.

The **JACKSON® VIT®** can withstand short circuits for prolonged periods of time without incurring any component failure.

JACKSON® VIT's® are available in dry type and water-cooled construction. Water-cooled units are encapsulated for added reliability and dependability. Dry type units are available in open construction or housed in a ventilated enclosure.

Primary taps are provided for line correction when required.

Available in single or three phase. Three phase units available with different phase shifting for mulitpulse applications.

For a high quality customized **VIT®** - Specify a **JACKSON®**.

WORLD CLASS TRANSFORMERS FOR WORLD CLASS CUSTOMERS

Reliable | Efficient | Economical | Compact

JACKSON® Magnetic Products are made to order and made to last! At **JACKSON®** we work together with you, as a team, to design a product that meets ***your specific*** requirements. **JACKSON®** Transformer Co. – Quality magnetic products you deserve!

JACKSON® Transformer Company provides our customers with a complete ***Specification Sheet*** upon request.

JACKSON® Quality Products are not only a wise choice, but the right choice.

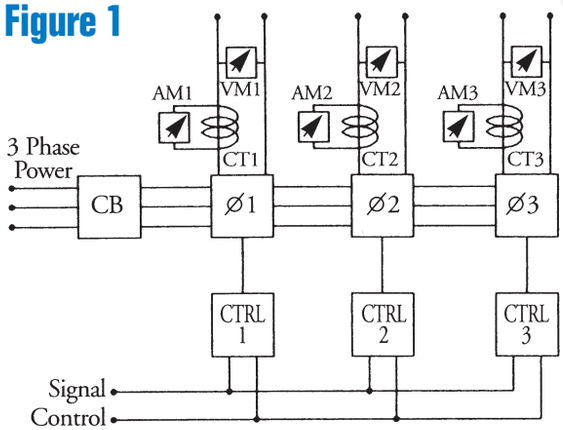
WE MANUFACTURE SOLUTIONS

ALL OF OUR MAGNETIC PRODUCTS ARE DESIGNED TO MEET YOUR SPECIFIC REQUIREMENTS.

For further information, contact our Engineering Department.

Operation of the VIT®
(Variable Impedance Transformer)

Figure 1



*The above chart depicts a block diagram consisting of three single phase **VIT's®** showing a method of controlling the **VIT's®** and their relative metering. They are available with many options, such as one control for three **VIT's®**, or with no control package, with or without metering, etc.*

Graph 1

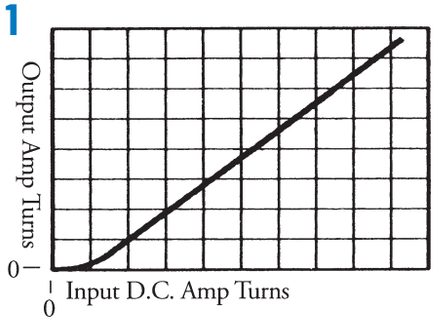
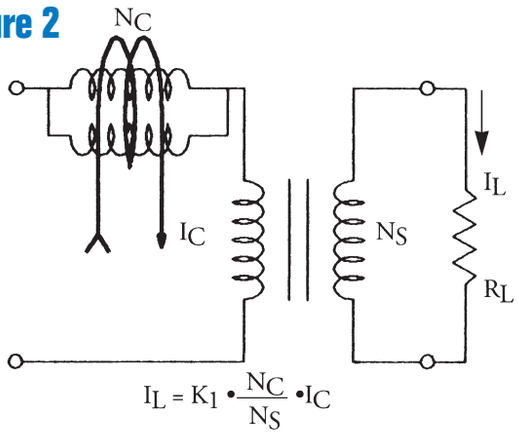
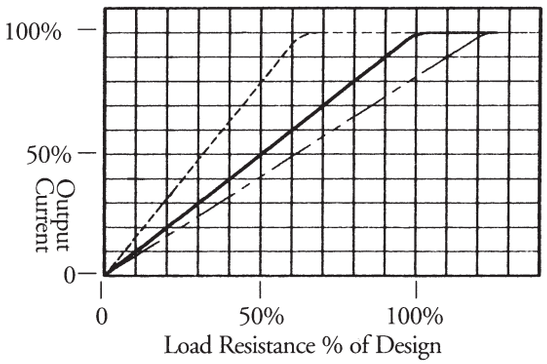


Figure 2



Graph 2



What does the term 'current driven device' mean? With the **VIT®** as long as it is operated in a non-saturated condition, that is, the flux in the cores of the magnetic amplifier does not exceed the saturated level, the **VIT®** is said to be working in a balance condition. The **VIT®**, then, follows the law of equal ampere turns. Therefore, the load current is determined by the following expression:

From Figure 2: $I_L = K_1 \cdot \frac{N_C}{N_S} \cdot I_C$

Where: I_L is the load current flowing through load R_L
N_C are the number of turns in the control winding
I_C is the DC current of the control winding
N_S is the secondary turns
K_1 is a constant
R_L is the load resistance

It can be observed that for a specific design where the control windings and the secondary windings have been determined, the load current is directly dependent on the DC control current.

From equation above, the load current is independent of the load resistance and a constant current will be supplied even if the secondary has a bolted short. This relationship holds true as long as the law of equal ampere turns is applied, meaning that the design of the **VIT®** must be consistent with the load parameters. The **VIT®** must be designed to match the load for this law to apply, (i.e. the **VIT®** cannot supply a constant current if the secondary is open circuited or if the resistance value of the load falls outside the range of the design). The relationship of DC amp turns is shown on Graph 1. The knee at the beginning of the curve reflects the DC ampere turns required to overcome the exciting current of the transformer.

Graph 2 shows the relationships of the output current versus load resistance. The slope of the current curve changes with load resistance. The current slope is given by the following relationship.

$$\tan^{-1}\left(\frac{1}{\frac{R \bullet K_2}{100}}\right)$$

Where R is the load resistance at 100% design, K_2 is the constant by which the resistance is deviated from R in % of R.

Example: R @ 100% is 1Ω if it increased to 1.2Ω then K = 120%
$\tan^{-1}$ 0.89 = 39.8 degrees slope

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