DC VOLTAGE TRANSFORMERS

2.4 CHOICE OF PROGRAMMING RESISTOR

If the absolute maximum voltage is above 25V, then a series programming (or input) resistor is required which protects the winding and serves to calibrate the transformer. The following procedure should be followed for selection of an appropriate value:

Resistor value

Two load constants (C and K) are required for the calculation, which are a function of secondary external load. These constants are plotted on the axes shown. See figure 4. Calculation of the programming resistor is then carried out using the equation:

$$\text{Value of programming resistor} = K \left\{ \frac{Vin \times C}{Vout} - 2.5 \right\} \text{ohm}$$

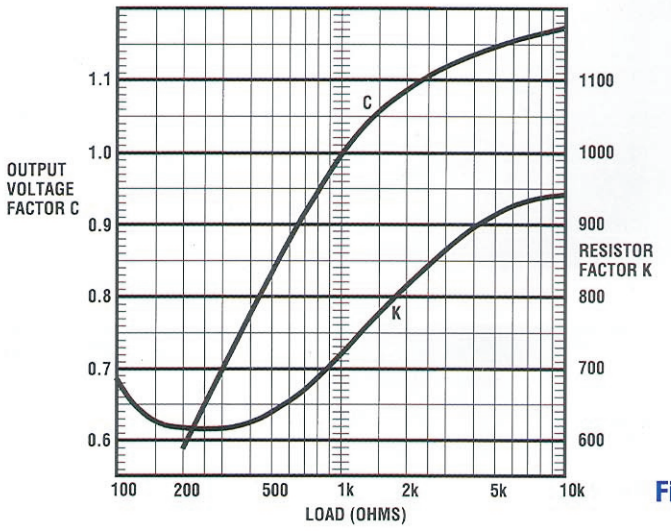

Figure 4

Example:
DCVT 5U (applies also to DCVT 5S, 8 and MDVT 5)
Requirement is 250V peak input, 8V output into 1kΩ
For 1kΩ load C =1.0, K = 720

$$\text{Value of programme resistor} = 720 \left\{ \frac{250 \times 1}{8} - 2.5 \right\}$$

$$= 20.7\text{k}\Omega$$

Dissipation

Select suitable resistor for required dissipation, which is given by the equation:

$$\text{Dissipation} = (Vin)^2/Rp \text{ Watts}$$

Voltage rating

Select resistor suitable for use at required voltage. Use two or more in series if the dissipation or voltage are not achievable with a single resistor.

One main resistor plus a trim resistor (5-10%), which may be fixed or variable, is recommended where accuracy of setting is required. However, this is often unnecessary.

The use of types DCVT 6U/MDVT 6 with an input resistor is not recommended due to the higher dissipation in the input resistor than for the corresponding DCVT 5/MDVT 5 units.

The curve for C also approximates to the change in output of the DCVT 6U/MDVT 6 with a change of load.