



# Featured Products Bulletin

## CHIP RESISTORS

Riverside, California -  
February 21, 2008



### Bourns® Fixed Resistors Product Line Releases New Application Note - Use of the Low Ohmic Resistor CRA2512 in Inverter Drives

**APPLICATION NOTE**  
CRA2512 Industrial Controls Use of the Low Ohmic Resistor CRA2512 in Inverter Drives

**For Use In:**  
 • Motor Drives  
 • Power Supplies  
 • Industrial Controls  
 • Automotive Applications  
 • High Power Applications

The 3 phase inverter are used in variable speed control applications. They can be found in a wide spectrum of automated controls including paper machines, presses, fans in cooling towers, pumps for water supplies, of steel, transversal and looting instruments in cranes and many more.

Inverters provide accurate and efficient control of variable speed motors providing cost effective solutions. AC motors are less expensive than DC motors which would otherwise be used.

Low ohmic resistors are an economical way to monitor and regulate the current used in the 3 phases by connecting them between a transistor, such leg and ground. An ACI current and temperature sensor facilitates the current and establish what actions are needed by the PWM controller. The accuracy of the control relies upon the correct measurement of resistors remaining within the budgeted tolerance.

R is the Resistance measured at Temperature T. Data sheets specify the RCR under conditions where the part is not placed under power. The T is constant at the time is measured at ambient temperature (+25 °C) and then again at the temperature extremes (-55 °C) or +125 °C. However the surface temperature of the chip will increase when placed under power and this in turn will affect the resistance. Furthermore, the actual ambient temperature can be quite high under normal operating conditions. This is because the circuit board will be combined in an enclosure with other heat generating components with little or no air movement.

The Temperature Coefficient (TCR) of a resistor is used with the following formula:

$$TCR = \frac{R_0(T_2 - T_1)}{R_0 \times (T_2 - T_1) \times 10^6}$$

TCR = Temperature coefficient (PPM/°C), R<sub>0</sub> = R at ambient temperature T<sub>0</sub>, T<sub>2</sub> = T at ambient temperature T<sub>2</sub>, T<sub>1</sub> = T<sub>0</sub> (temperature at R<sub>0</sub>)