

Bees Industrial Services

Experience Versatility Solutions

Heating Elements - Sensors - Controls - Auxiliary Equipment - Process Heating Systems



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Phase Circuit Explanation and Calculator

*Bees Industrial assumes no responsibility for the accuracy of this information
A qualified electrician should be referred to for all work.*

Enter your values into the cells below

Please click the Calculate button.

Heater Wattage Watts
Heater Voltage Volts

*** Please note: Due to various resistance factors the Ohm value on a properly functioning heater will not be the exact value based on the computations below. A variation of plus or minus 8% is not uncommon and is NOT an indication of a faulty heater. (Age of a heater is primary factor - a "used" heater may have higher than expected values due to oxidation of wire) (Multiple-Core heaters - *large diameter heaters* - also may have single core failures which will effect readings)
*** Resistant readings should be the same for all legs (A to B, B to C & A to C). If not, may be a sign of a bad core

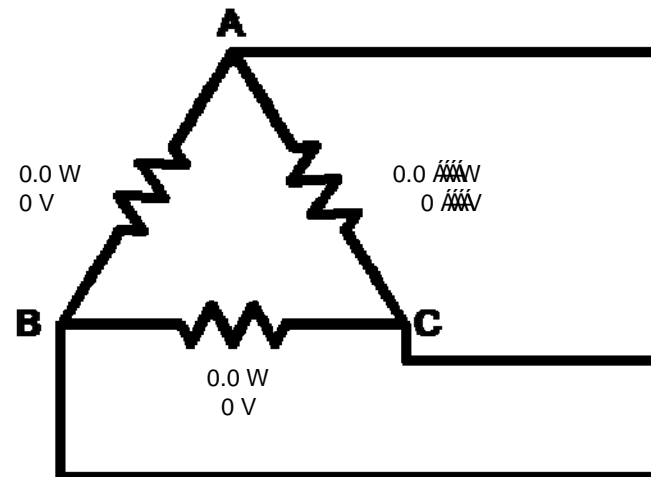
*** Be sure heater is completely disconnected from all connections before taking readings.

The heater needs to produce watts,
meaning that each leg of the 3-phase circuit
must produce watts
(as shown in the diagram).

Formula:

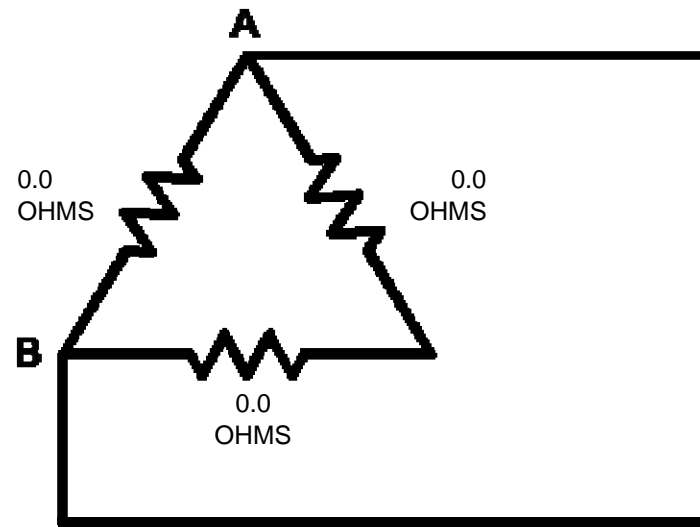
Wattage per Leg = Total Wattage / 3 = 0.00 W

Voltage per leg is equal to the total line voltage, so
Voltage per Leg = 0 V



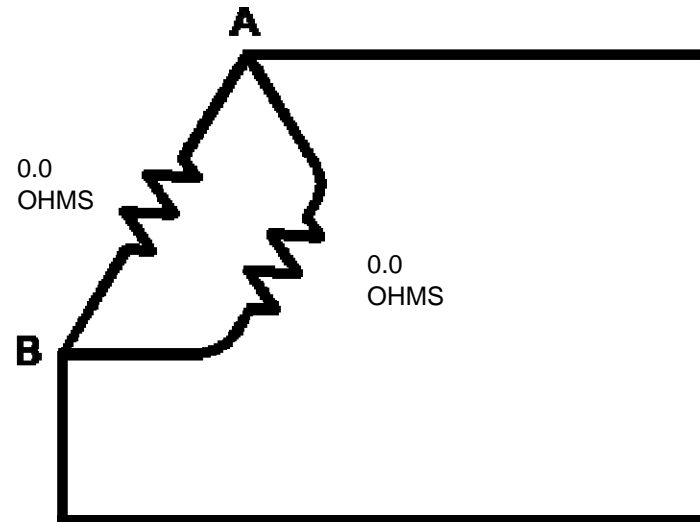
Knowing the wattage and voltage over each leg,
the resistance for each leg can be calculated using ohms law.
Resistance = V^2 / W , so now we know
Resistance per Leg = ohms

At the same time, we are going to consider measuring the
resistance from connection A to B. That means that connection C
'goes away', and the two legs that were connected to C are
in series with each other when making our measurement from A to B.



The resistance of those two legs in series = Ohms
so now our simplified circuit looks like this.

Formula:
 $R(\text{Series}) = R1 + R2$



Apply the formula to combine those two parallel resistors together,
and you get the resistance between A & B: Ohms

Formula:
 $R(\text{total}) = 1 / (1 / R1 + 1 / R2)$

which is what you should measure between any two connections.

