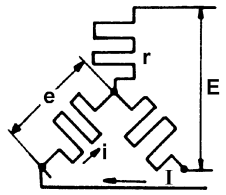
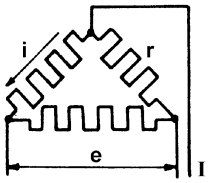
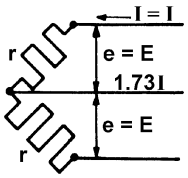
Electrical Data



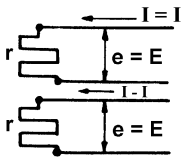
WYE OR STAR CONNECTION



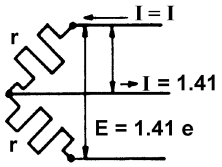
DELTA CONNECTION



3-PHASE OPEN DELTA



2-PHASE 4 WIRE



2-PHASE 3 WIRE

The energy output by a heating unit is measured in watts.

The power factor is always unity.

Single Phase, $W = 1^2R = E\ I$
Three Phase Delta, $W = 3Ei = 1.73\ E\ I$
Three Phase Wye, $W = 3eI = 1.73\ E\ I$
Two Phase 4 Wire, $W = 2I^2R = 2\ E\text{-}I$
Two Phase 3 Wire, $W = 2I^2R = 2\ E\ I$

(Voltage between outside wires = 1.41e)

$$\text{Amps} = I = \frac{W}{E} = \frac{E}{R}$$

$$\text{1 Phase Amps} = I = \frac{W}{E \times PF}$$

$$\text{A.C., 3 Phase Amps} = I = \frac{W}{1.73\ E \times PF}$$

A.C., 2 Phase 3 Wire: Middle Wire Amps = Amps in outside Wires x 1.41

W = Power, Watts

E = E.M.F. Volts

I = Current, Amperes

R = Resistance, Ohms

PF = Power Factor

Wattage Output at Other Voltages

When heaters are used at voltages other than the rated voltage the actual power can be calculated as follows:

$$\text{Actual Wattage} = \text{Rated Wattage} \times \frac{(\text{Actual Voltage})^2}{(\text{Rated Voltage})^2}$$

For instance, if a heater is rated 1000 W at 220 V, but the actual operating voltage is 240 V, the actual wattage of the heater will be:

$$\text{Actual Wattage} = 1000 \times \frac{(240)^2}{(220)^2} = 1190\text{W}$$

Care must be taken that the actual power does not exceed the rated current carrying capacity of the lead wires and of the resistance wire.

The following table will help on the computation of actual operating wattage.

APPLIED VOLTAGE	RATED VOLTAGE	TO OBTAIN OPERATING WATTAGE MULTIPLY RATED WATTAGE BY
110	115	.92
110	120	.82
115	110	1.09
115	120	.92
120	110	1.19
120	115	1.09
220	230	.92
220	240	.84
230	220	1.09
230	240	.92
240	220	1.19
240	230	1.09
440	480	.84
480	440	1.19

Ohm's Law

E = VOLTS
I = AMPS
R = OHMS
W = WATTS