Equations

Typical 3-Phase Wiring Diagrams and Equations for Resistive Heaters

Definitions

For Both Wye and Delta (Balanced Loads)

V_P = Phase voltage

V_L = Line voltage

I_P = Phase current

I_L = Line current

R = R_1 = R_2 = R_3 = Resistance of each branch
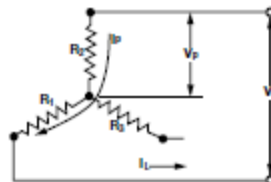
W = Wattage

Wye and Delta Equivalents

$W_{DELTA} = 3\,W_{WYE}$

$W_{ODELTA} = {}^2/_3\,W_{DELTA}$

$W_{OWYE} = {}^1/_2\,W_{WYE}$
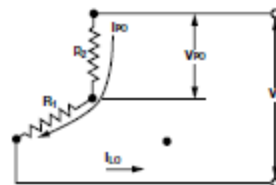
3-Phase Wye (Balanced Load)

Equations For Wye Only

$I_P = I_L$

$V_P = V_L/1.73$

$W_{WYE} = V_L^2/R = 3\,(V_P^2)/R$

$W_{WYE} = 1.73\,V_L I_L$

3-Phase Open Wye (No Neutral)
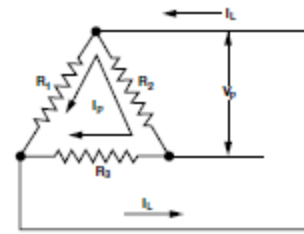

Equations For Open Wye Only

$I_{PO} = I_{LO}$

$V_{PO} = V_L/2$

$W_{OWYE} = {}^1/_2\,(V_L^2/R)$

$W_{OWYE} = 2\,(V_{PO}^2/R)$

$W_{OWYE} = V_L I_{LO}$
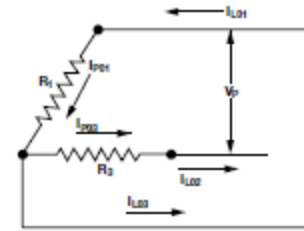
3-Phase Delta (Balanced Load)

Equations For Delta Only

$I_P = I_L/1.73$

$V_P = V_L$

$W_{DELTA} = 3\,(V_L^2)/R$

$W_{DELTA} = 1.73\,V_L I_L$

3-Phase Open Delta

Equations For Open Delta Only

$V_P = V_L$

$I_{PO1} = I_{PO3} = I_{LO2}$

$I_{LO3} = 1.73\,I_{PO1}$

$W_{ODELTA} = 2\,(V_L^2/R)$