PART A – DELTA/DELTA TRANSFORMERS

12–2 DELTA TRANSFORMER VOLTAGE

In a delta configured transformer, the line voltage equals the phase voltage ($E_{Line} = E_{Phase}$). Figure 12–11.

Primary Delta Voltage

LINE Voltage	PHASE Voltage
L_1 to L_2 = 480V	Phase A winding = 480V
L_2 to L_3 = 480V	Phase B winding = 480V
L_3 to L_1 = 480V	Phase C winding = 480V

Secondary Delta Voltage

LINE Voltage	PHASE Voltage	NEUTRAL Voltage
L_1 to L_2 = 240V	Phase A winding = 240V	Neutral to L_1 = 120V
L_2 to L_3 = 240V	Phase B winding = 240V	Neutral to L_2 = 208V
L_3 to L_1 = 240V	Phase C winding = 240V	Neutral to L_3 = 120V

12–3 DELTA HIGH-LEG

The term high-leg, wild leg or bastard leg is used to identify the conductor of a delta configured system that has a voltage rating of 208V to ground. The high-leg voltage is the vector sum of the voltage of transformers A and C_1, or transformers B and C_2, which equal 120V × 1.732 = 208V for a 120/240V secondary.

Note: The actual voltage is often less than the nominal system voltage because of voltage drop. Figure 12–12.

❑ High-leg Voltage

What is the actual high-leg voltage if the delta configured secondary is 115/230V, 3Ø?

(a) 115V (b) 230V (c) 199V (d) 240V

• Answer: (c) 199V

115V × 1.732 = 199.18 V

12–4 DELTA LINE CURRENTS

In a delta configured transformer, the line current does not equal the phase current.

The line current of a 3Ø transformer can be calculated by the formula:

$$I_{Line} = \frac{VA_{Line}}{E_{Line} \times \sqrt{3}}$$

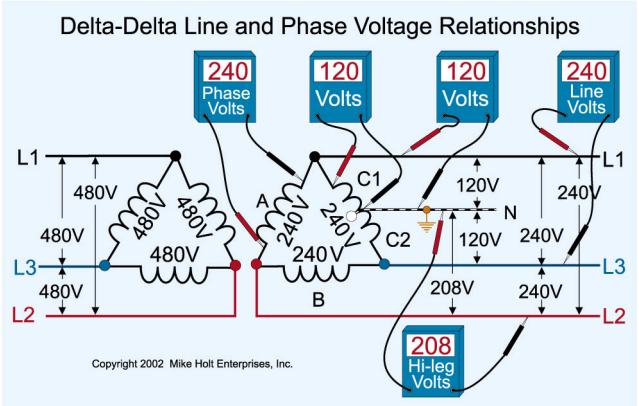

Figure 12-11
Delta-Delta Line and Phase Voltage Relationships

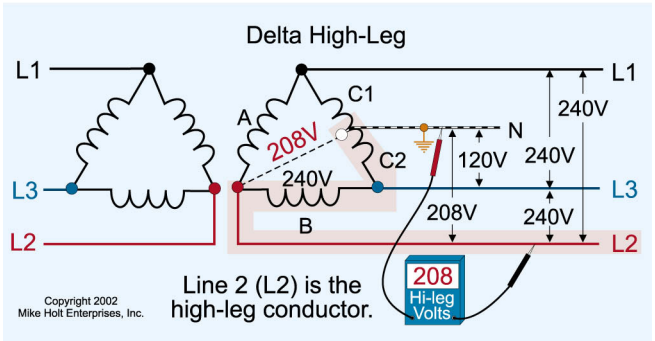

Figure 12-12
Delta High-Leg