469 Va / Vc Angle Difference

GE Power Management No. GET-8414A

DESCRIPTION

For the 469 Motor Management Relay, the Va and Vc angle difference is 60°, not 120°, because of the open delta connection and the way the 469 measures voltage. The angle is also affected by the system rotation.

The open delta PT connection provides the Va (Terminal G2–G1) and Vc (Terminal H2–G1) inputs with Vab and Vcb respectively.

ABC ROTATION

For ABC rotation, we have: Vab = V∠0°, Vbc = V∠–120°, and Vca = V∠120°

This gives: Va = Vab = V∠0°
Vb = 0 (short between Terminals H1 and G1)
Vc = Vcb = –Vcb = V∠–120°–180° = V∠–300°

Thus, Vc lags Va by 300° or leads Va by 60°.

ACB ROTATION

For ACB rotation, we have: Vab = V∠0°, Vbc = V∠120°, Vca = V∠–120°

This gives: Va = Vab = V∠0°
Vb = 0 (short between Terminals H1 and G1)
Vc = Vcb = –Vcb = V∠120°–180° = V∠–60°

Thus, Vc lags Va by 60°.