AC VOLTAGE PHASORS

Aφ   Cφ

20A FUSE   10A FUSE

IANh   ICNh

H1 100kVA H2   H1 50kVA H2
    XFMR.   XFMR.

X1   X2   X3   X1   X2   X3

Iac   Icb   Iba

12" OF
ORANGE TAPE

Aφ   N   Cφ   Bφ

BL   W   B
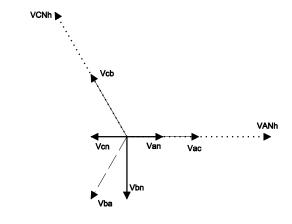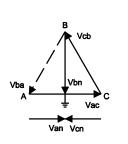
+ Vac -   + Vcb -
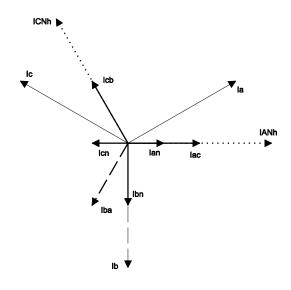
Ia   Ic   Ib

- Vba +

OPEN WYE-OPEN DELTA
STATION SERVICE

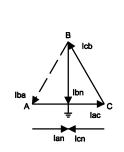3 PHASE, 4 WIRE, 240/120V SOLID NEUTRAL
WITH LIGHTING TRANSFORMER CONNECTED TO LEADING PHASE;
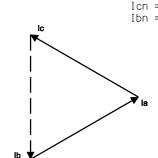LOW SIDE CURRENT LEADS HIGH SIDE CURRENT BY 30^

Vac DEVELOPED BY (IS IN PHASE WITH) VANh
Vcb DEVELOPED BY (IS IN PHASE WITH) VCNh
Vba DEVELOPED BY (IS IN PHASE WITH) -[VCNh+VANh]

LET Vac = 2∠0
THEN Vcb = 2∠120
AND Vba = -[2∠0+2∠120] = 2∠-120 = 2∠240

ALSO Van = $^1/_2$ Vac = 1∠0
     Vcn = $-^1/_2$ Vac = -1∠0 = 1∠180
     Vbn = Vba+$^1/_2$ Vac = 2∠240+1∠0 = 1.73∠-90 = 1.73∠270

AC CURRENT PHASORS

Iac DEVELOPED BY (IS IN PHASE WITH) IAh
Icb DEVELOPED BY (IS IN PHASE WITH) ICh
Iba DEVELOPED BY (IS IN PHASE WITH) -[ICh+IAh]

LET Iac = 1∠0
THEN Icb = 1∠120
AND Iba = -[1∠0+1∠120] = 1∠-120 = 1∠240

ALSO Ia = Iac-Iba = 1∠0-1∠240 = 1.73∠30
     Ic = Icb-Iac = 1∠120-1∠0 = 1.73∠150
     Ib = Iba-Icb = 1∠240-1∠120 = 1.73∠-90 = 1.73∠270

ALSO Ian = $^1/_2$ Iac = $^1/_2$ ∠0
     Icn = -Iac = $-^1/_2$ ∠0 = $^1/_2$ ∠180
     Ibn = Iba+$^1/_2$ Iac = 1∠240+$^1/_2$ ∠0 = .866∠-90 = .866∠270