AC CIRCUIT PHASE SEQUENCE

**Phase sequence** is the order in which the generated voltages in the phase winding of an alternator reach or attain their peak or maximum values. It is represented by the letters a, b, and c or the numbers 1, 2, 3 or by using double letter as ab, bc and ca or an, bn and cn.

For instance, The three phase balanced voltages with their common magnitudes as K have sequence of a b c , then in complex form,

**Positive Phase Sequence**

ABC sequence - $V_a = Ka0^\circ$, $V_b = a-120^\circ$ and $V_c = Ka-240^\circ$

In this sequence $V_b$ lags $V_a$ by $120^\circ$ and $V_c$ lags $V_b$ by $120$ or $V_c$ lags $V_a$ by $240$. The maximum value of $V_a$ comes first in the positive direction, next $V_b$ and then $V_c$.

ABC →BCA →CAB
AB - BC - CA → BC - CA - AB → CA - AB - BC
AN - BN - CN → BN - CN - AN → CN - AN - BN

Vector Representation

![Sequence ABC](image)
Negative Phase sequence

ACB sequence- $V_a = \text{ka} 0^\circ$, $V_b = \text{ka} -120^\circ$ and $V_c = \text{ka} -240^\circ$

Voltage $V_c$ lags $V_a$ by $120^\circ$ and voltage $V_b$ lags $V_c$ by $120^\circ$.

ACB → CBA → BAC

AB - CA - BC → CA - BC - AB → BC - AB - BA
AN - CN - BN → CN - BN - AN → BN - AN - CN

Vector representation
Assume a positive phase sequence if the phase sequence is not given. The three-phase alternators are designed to operate with positive phase sequence voltages.

Source: http://www.engineermaths.com/2012/02/ac-circuit-phase-sequence.html