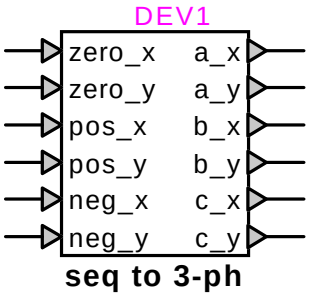
Transformation : sequences to 3-phase (xy)



1 Description

This device converts the zero-, positive-, and negative-sequence phasor transformation of a 3-phase quantity to the (x,y) coordinates of the phasor representation of each phase in a reference frame rotating at the fundamental frequency. By definition, only the first harmonic of the 3 phase quantities are considered.

1.1 Pins

This meter has twelve pins:

pin	*type*	*description*	*units*
zero_x	input pin	x-coordinate of zero-sequence phasor	any
zero_y	input pin	y-coordinate of zero-sequence phasor	same as zero_x
pos_x	input pin	x-coordinate of pos-sequence phasor	same as zero_x
pos_y	input pin	y-coordinate of pos-sequence phasor	same as zero_x
neg_x	input pin	x-coordinate of neg-sequence phasor	same as zero_x
neg_y	input pin	y-coordinate of neg-sequence phasor	same as zero_x
a_x	output pin	x-coordinate of phase-a phasor	same as zero_x
a_y	output pin	y-coordinate of phase-a phasor	same as zero_x
b_x	output pin	x-coordinate of phase-b phasor	same as zero_x
b_y	output pin	y-coordinate of phase-b phasor	same as zero_x
c_x	output pin	x-coordinate of phase-c phasor	same as zero_x
c_y	output pin	y-coordinate of phase-c phasor	same as zero_x

1.2 Parameters

No parameters are required for this device.

1.3 Input

The input pins may be connected to any control signals.
The 3 signals are the instantaneous values of a 3-phase quantity.

1.4 Output

The outputs are the (x,y) phasor representation of the zero-, positive-, and negative-sequence transformations of the instantaneous values of the 3-phase input signals. The (x,y) coordinates are the *x*-axis and *y*-axis projections of the phasors on a reference frame rotating at the fundamental frequency.

The transformation from sequence to phase is calculated as follows.

$$\begin{bmatrix} S_a \\ S_b \\ S_c \end{bmatrix} = \begin{bmatrix} 1 & 1 & 1 \\ 1 & a^2 & a \\ 1 & a & a^2 \end{bmatrix} \begin{bmatrix} S_0 \\ S_1 \\ S_2 \end{bmatrix} \quad (1)$$

This is equivalent to the matrix notations:

$$\mathbf{S_{abc}} = \mathbf{A}\mathbf{S_{012}} \quad (2)$$

Where $\mathbf{S_{abc}}$ is in phase domain and $\mathbf{S_{012}}$ is in sequence domain and a is a phasor rotation of $2\pi/3$. The real and imaginary parts of each signal S represent the x and y outputs respectively.