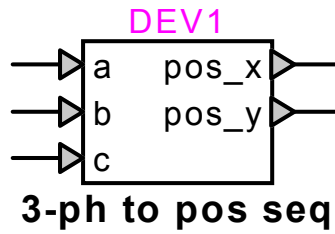


# Meter : 3-phase to positive sequence x,y



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## 1 Description

This device converts the first harmonic of the instantaneous value of 3 phase signals to the (x,y) coordinates of the corresponding positive-sequence phasor in a reference frame rotating at the fundamental frequency.

### 1.1 Pins

This meter has five pins:

<i>pin</i>	<i>type</i>	<i>description</i>	<i>units</i>
a	input pin	phase-a input signal	any
b	input pin	phase-b input signal	same as a
c	input pin	phase-c input signal	same as a
x	output pin	x-coordinate of pos-sequence phasor	same as a
y	output pin	y-coordinate of pos-sequence phasor	same as a

### 1.2 Parameters

The following parameter must be defined:

<i>parameter</i>	<i>description</i>	<i>units</i>
freq	fundamental frequency of the input signal	Hz

### 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 output is the (x,y) phasor representation of the positive-sequence transformation of the instantaneous values of the 3-phase input signals. The (x,y) coordinates are the x-axis and y-axis projections of that phasor on a reference frame rotating at the fundamental frequency.

The (x,y) coordinates of the phasor in that reference frame are calculated over a sliding time window of period equal to  $1/freq$ , as follows.

The (x,y) coordinates of the first harmonic of each input signal  $k$  are calculated as

$$\begin{aligned} x_k &= \frac{2}{\text{period}} \cdot \int_{t-\text{period}}^t i_{n_k}(t) \cdot \cos(2\pi \cdot \text{freq} \cdot t) \cdot dt \\ y_k &= \frac{2}{\text{period}} \cdot \int_{t-\text{period}}^t -i_{n_k}(t) \cdot \sin(2\pi \cdot \text{freq} \cdot t) \cdot dt \end{aligned} \quad (1)$$

where the negative sign for  $y$  follows the engineering convention for an inductive (lagging) current to have a negative angle when phasor rotation is counterclockwise.

The (x,y) coordinates of the positive-sequence transformation are calculated as

$$\begin{aligned} \text{seq1}_x &= \frac{1}{3} \cdot (x_a + rx_b + r^2x_c) \\ \text{seq1}_y &= \frac{1}{3} \cdot (y_a + ry_b + r^2y_c) \end{aligned} \quad (2)$$

where  $r$  represents a phasor rotation of  $2\pi/3$ , and  $r^2$  a rotation of  $4\pi/3$ .