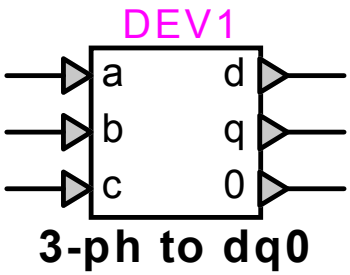
Meter : 3-phase to dq0



1 Description

This device converts the instantaneous value of 3 phase signals to their dq0 equivalent in a rotating reference frame.

1.1 Pins

This meter has six pins:

pin	*type*	*description*	*units*
a	input pin	phase-a	any
b	input pin	phase-b	same as a
c	input pin	phase-c	same as a
d	output pin	d-component	same as a
q	output pin	q-component	same as a
0	output pin	0-component	same as a

1.2 Parameters

The following parameter must be defined:

parameter	*description*	*units*
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 outputs are the coordinates of the dq0 transformation applied to the instantaneous values of the 3-phase input signals. The dq0 equivalent is defined in a reference frame rotating at the fundamental frequency.

The conversion is immediate and is calculated as follows:

$$\begin{pmatrix} d(t) \\ q(t) \\ 0(t) \end{pmatrix} = \frac{2}{3} \begin{pmatrix} \cos(\omega t) & \cos(\omega t - \frac{2\pi}{3}) & \cos(\omega t + \frac{2\pi}{3}) \\ -\sin(\omega t) & -\sin(\omega t - \frac{2\pi}{3}) & -\sin(\omega t + \frac{2\pi}{3}) \\ \frac{1}{2} & \frac{1}{2} & \frac{1}{2} \end{pmatrix} \begin{pmatrix} a(t) \\ b(t) \\ c(t) \end{pmatrix} \qquad (1)$$

where $\omega = 2\pi \cdot \text{freq}$, the angular velocity of the rotating reference frame.