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APPLICATION GUIDE

PPA Phase Conventions

Phase Conventions, Signs, and Orientation

Measurements of phase can be expressed in one of three conventional formats:

- 180° to + 180° (commonly used in circuit analysis)
  0° to - 360° (The default setting, commonly used in power applications)
  0° to + 360°

The measurement displayed on the PPA is the same whichever option has been selected, it is only the way that it is presenter to the user that changes.

The option to select the convention is found in the SYS menu on all the PPA ranges, labelled as Phase convention. Additionally, in the Power Analyzer menu, there are parameters to choose between negative leading and lagging for both the power factor sign and the VAr sign.

In the table below the same sinusoidal signal is applied and the phase convention switched between the three options, the resultant display is depicted from left to right in each row.

Note that the phase of the impedance is the opposite to the phase of the current in POWER mode. This is because the impedance is defined as voltage/current which, considering the magnitude and phase of Z (impedance), V (voltage) and A (current), gives:

Zmagnitude = Vmagnitude / Amagnitude
Zphase = Vphase – Aphase

As the phase is referred to the voltage:

Zphase = - Aphase

Therefore, using the phase convention from -180° to +180°, an inductive load which has an impedance with positive phase would cause a current with negative phase.

The table shows for the three convention options how the same sinusoidal signal is represented in each of the quadrants. This is displayed in columns two, three and four.

The fifth column shows the polarity of the resistance when the PPA is set in Impedance mode compared to Power Analysis mode.
In each convention 0° is taken to be at the 3 O'clock position.

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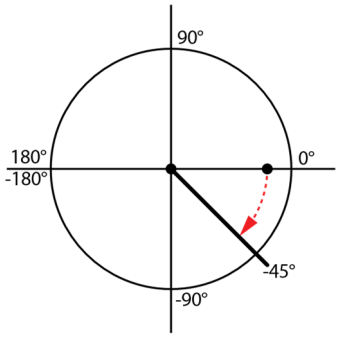
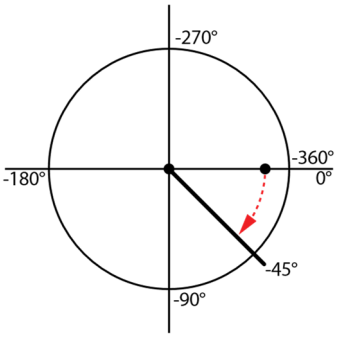
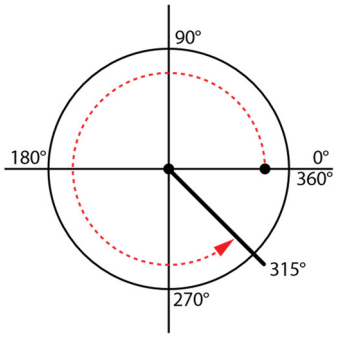
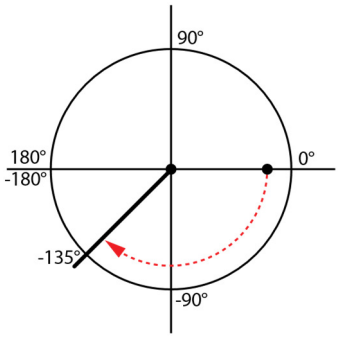
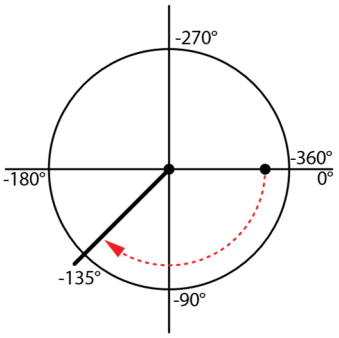
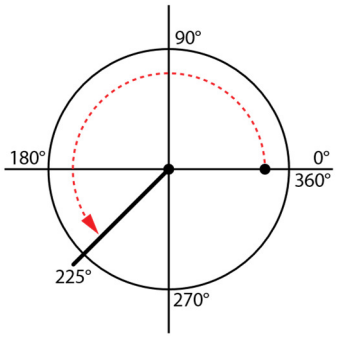
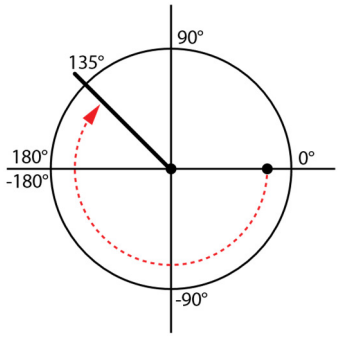
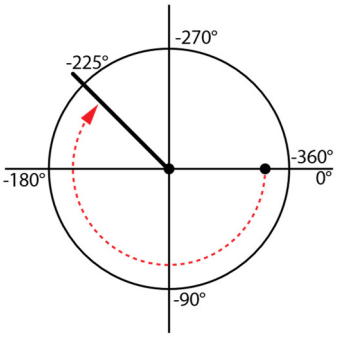
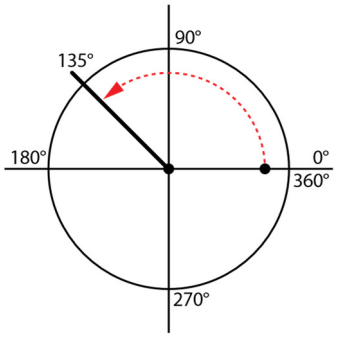
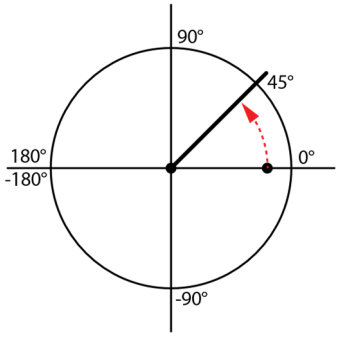
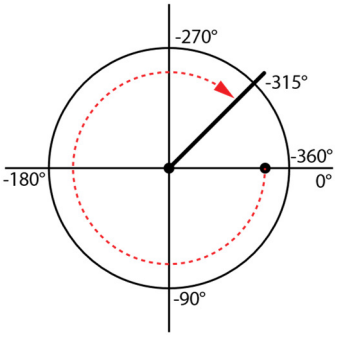
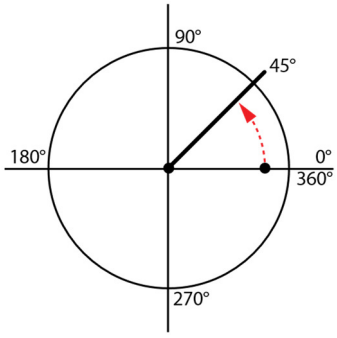
Reactance Capacitive or Inductive	0° to ± 180° Power analyzer mode	Default 0° to -360° Power analyzer mode	0° to +360° Power analyzer mode	Resistance polarity Impedance mode
Inductive				Positive +
Inductive				Negative -
Capacitive				Negative -
Capacitive				Positive +