PHASE ANGLE METER   MODEL PAM-4970

Product Description

The Phase Angle Meter is a purpose-built device that measures the Phase Angle, AC Voltage, frequency and AC Current in an electricity supply network such as at electrical sub-stations and metering installations. It is used to identify costly reactive losses in power distribution.

The User Interface consists of a keypad and 2 x 16 character LCD display. The meter's ease of use and accuracy makes it suitable for any application where Voltage and Current levels do not exceed 500V and 10A respectively.

Voltage and Current overload warnings are provided, and the Voltage and Current inputs are fully isolated from each other as well as the user.

The PAM meter is self-contained, battery powered and highly portable - designed with handheld operation in mind.

On Power up, the PAM meter samples the Voltage and Current terminals. If both waveforms are present and the Current range has been selected, the PAM meter automatically measures the TRUE RMS AC values and phase angle between them. All three values are then displayed simultaneously. If there is only a Voltage or Current waveform in normal mode, the meter will display its true RMS value and frequency, and indicate that the other waveform is missing.

If there is no valid reading for more than 10 minutes, the PAM meter turns itself off to conserve the battery. Low battery warning is also provided.

The User has the following options selectable by push buttons:
1) RANGE: Choose Low (< 1000 milliAmps) or High (0.1-10 Amps) current input range.
2) BACK LIGHT: Turn the back light On/Off
3) MODE: Display V, A and phase angle OR power in VAs, Watts and Power Factor.
4) DISPLAY: Display phase angle as either 0-360° OR +/- 180° (the negative (-) indicating that the Current is leading the Voltage).

Features & Comments

Point	Industry Requirements	PAM-4970 Compliance
1	500 Volts AC with 1 Volt resolution to 500 Volts, TRMS reading. Accuracy better than 1.00 % of reading ± 2 digits	Approx. 1 in 500 resolution. 12 Bit A/D provides 1 in 4096. Accuracy within 1% ± 2 digits
2	AC Current input must not be fused, it must be able to take 20 Amps. Resolve down to 0.01 Amps. TRMS Reading. Accuracy better than 1.0 % of reading ±2 digits	Of the evaluated technologies, Current transformer provides best accuracy and is non-fused. PAM-4970 within 1% ± 2 digits or ± 1mA
3	Phase Angle displayed either as ±180 degrees, or 0-360 degrees. Accuracy better than 1.00 degree	Yes. Timing accuracy will provide approx 0.15%, better than 1° at mid-range
4	Can measure Phase angle difference between a Voltage & Current waveform	Yes
5	Can measure V, A, & Phase Angle over frequency range 45-65 Hz.	Yes. Even wider range if of commercial interest
6	Auto switch-off after no inputs for 10 minutes	Yes F/W programmable period
7	Only needs to measure Phase Angle on sinusoidal signals	Complies
8	Designed & tested to IEC 61010 Cat III 600V	Complies
Point	**Industry Non-mandatory features**	**PAM-4970 Compliance**
1	Can display Volts, Amps, & Phase Angle simultaneously	Yes. On 2 x 16 character LCD
2	Back Lighting button on LCD display	Yes. User selectable
3	Able to display kW and Power Factor	Yes
4	Able to measure Phase Angle on non-sinusoidal waveforms that may have more than one zero crossing within one period (20 milliseconds for 50Hz). The Current waveform is much more likely to be this badly distorted.	Not implemented or tested at this stage, but subject to discussion

Other General Features and Notes:

- Low battery warning.
- Measurements are referenced to the Voltage input.
- Phase angles are generally lagging ie. Current is lagging the Voltage. This is read as a positive (+) phase angle. It is the Metering convention.
- As well as calculations for Volts, Amps, Angle, & frequency, the PAM does Power Factor = cos(Phase Angle), and is capable of displaying Volt Amps (VAs) and Watts (W).

Please Note: Specifications are subject to change

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