Model 6620A - 10Hz to 10MHz

Precision (GPIB) Programmable Phasemeter - 0.05º Accuracy

10Hz to 10MHz
0.05º Accuracy

Precision Phasemeter

GPIB/Manual Control
Automatic Voltage Ranging
Automatic Ranging Display
Deviation Measurements

Related Models
- Model 6200B - 0.5º Acc.; 1Hz to 1MHz; 0.1º Resolution
- Model 6600 - 0.5º Acc.; 10Hz to 10MHz; 0.1º Resolution
- Model 6610 - 0.05º Acc.; 10Hz to 10MHz; 0.01º Resolution
- > Model 6620A - 0.05º Acc.; GPIB; 10Hz to 10MHz; 0.01º Resolution

Features
Accuracy: Typically 0.02°
Resolution: 0.01°
GPIB Programmable
Automatic Ranging Display
Automatic Voltage Ranging
Input Voltage Range:
10mV rms to 320V rms
Deviation Measurements
Accepts Any Waveform
Analog Output
Automatic Meter Correct (AMC)

Options
Rack Mount Kit: Part No. RK-316 permits the installation of the Model 6620A into a standard 19" rack spacing.
002: 1Hz operation.
003: Rear panel BNC connectors for REFERENCE and SIGNAL inputs.
Extended 1 Year Warranty: Part No. EW6620A.

PERFORMANCE

The Model 6620A provides precision phase measurements with a typical accuracy of 0.02° and a resolution of 0.01° over most of the frequency range. It will accept a wide range of input signal levels from 10mVrms to 320V rms and input waveforms including sine, triangle, square and pulses. A 5 digit LED display provides continuous direct readout of phase angles between 0.00° and 360.00° or ±180°. These two ranges can be manually or automatically selected.

UNIQUE DESIGN

Two common factors that will affect the accuracy of a phasemeter are distortion and/or broadband noise present on either or both of the input signals. A unique circuit design used in the 6620A significantly reduces any effects that may be caused by these two factors.

Another problem found in most phasemeters is the inability to respond to very small phase angles, resulting in fluctuations or inconsistencies in the meter reading (sometimes referred to as ambiguity). To overcome this problem, the 6620A uses a design that eliminates any ambiguities that may occur at readings near 0°, 180° and 360°, and allows measurements as small as 0.01° to be made.

AMC FEATURE

The 6620A employs a technique that eliminates phase reading errors usually associated with component drift called Automatic Meter Correct (AMC). AMC provides instant correction of phase readings for zero and full scale errors, making phase measurements more accurate and reliable.

STANDARD FEATURES

The Model 6620A provides a RELATIVE phase measurement mode which allows the monitoring of phase deviations without having to make unwanted calculations. Also provided are an automatic selection of input voltage range, front panel indicators to indicate a too low/high input voltage range, and an analog output for use with an external meter or strip chart recorder.

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APPLICATIONS

The 6620A is the ideal instrument for precision phase angle measurements and provides more performance/dollar than any other phasemeter in its class. A broad range of applications include monitoring servo control systems, low impedance measurements, adjustment of crystal resonance, testing and adjustment of filter networks, controlling laser trimming of resistor networks, measurements in ac power systems, secondary standard and general testing and measurement.

SPECIFICATIONS

FREQUENCY RANGE: 10Hz to 10MHz (1Hz Optional)

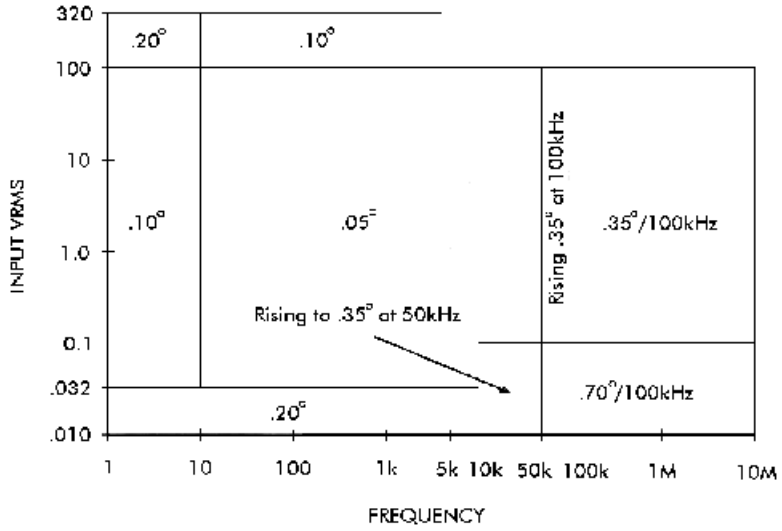
PHASE MODE: Absolute or Relative.

ACCURACY

Sinewave:

Input Volts (rms)	Frequency Range	Accuracy
10mV to 32mV	1Hz to 10kHz	0.2º
10mV to 100mV	10kHz to 50kHz 50kHz to 10MHz	0.35º 0.7º/100kHz
32mV to 100V	1Hz to 10Hz 10Hz to 10kHz	0.1º 0.05º
100mV to 100V	10kHz to 50kHz 50kHz to 100kHz 100kHz to 10MHz	0.05º 0.35º 0.35º/100kHz
100V to 320V	1Hz to 10Hz 10Hz to 5kHz	0.2º 0.1º

Squarewave: Double the specification.



INPUT

Signal Amplitude: Auto ranging from 0.01V to 320V rms.
Waveforms: Sine, triangle, square and >50ns pulse. (The phasemeter is triggered on the positive going transition of the input waveform. A sinewave on the reference input and a square wave on the signal input is allowed).
Impedance: 1 Megohm in parallel with a 50pF.
Maximum DC Component: ±200 volts.

RESPONSE

Time Constant: >10Hz, less than 500msec; <10Hz, less than 5sec.
Settling Time: To within specified accuracy, within 1 to 8 seconds, dependent on input amplitude and frequency (>10Hz).

DRIFT

Vs. Time (30 days without CALIBRATE reset):
Sinewave:
±0.025° from 20Hz to 100kHz
±0.1° at 10Hz

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±0.1° per 100kHz above 100kHz.
Squarewave:
±0.025° from 10Hz to 5kHz
±0.05° to 100kHz
±0.1° per 100kHz above 100kHz.

Vs. Temperature (without AMC or CALIBRATE reset):
±0.01°/°C, 10Hz to 100kHz
±0.05°/°C to 1MHz
±0.05°/°C per MHz above 1MHz.

GENERAL

Analog Output: (for use with an external meter or recorder) 0-3.6 or ±1.8 volts dc, 10mV dc/degree phase; Impedance 50 ohms.
Display: 0.5", 7 segment, green LED.
Display Ranges: Automatic, 0.00° to 360.00° or ±180.00°.
Resolution: 0.01°.
Repeatability: Better than 0.01°.
Ambient Temperature Range: 0°C to 50°C.
Front Panel Controls: POWER, METER RANGE Reference Waveform, Signal Waveform, REL PHASE, CALIBRATE (AMC and MAN), phase adjust (0°, 180° and 360°), LOCAL.
Remote Programming: IEEE-488.1 interface.
Subsets: SH1, AH1, T6, L4, SR1, RL1, PP1, DC1, DT0, C0, E1.
Terminals (BNC):
Front Panel: REFERENCE and SIGNAL inputs.
Rear Panel: Analog Output, optional REFERENCE and SIGNAL inputs.
Power Requirements: 90-132V or 198-264V, single phase, 50-400Hz, 40W.
Dimensions and Weights: 3.5" (8.9cm) high, 16.5" (41.9cm) wide, 16" (40.6cm) deep; 15 lbs (6.8kg) net, 18 lbs (8.1kg) shipping.
Accessories: 3-terminal line cord; operating manual.

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Figure 1 shows the maximum phase error introduced versus the percentage of harmonic distortion present on each input channel.

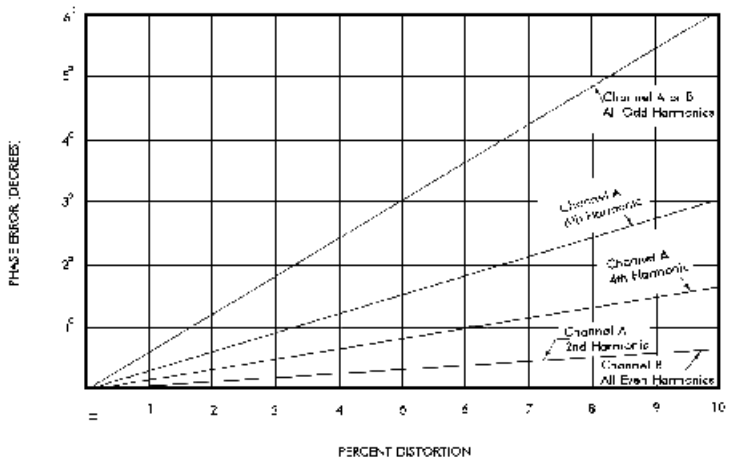

Figure 1 - Maximum Phase Error * vs. % Harmonic Distortion

* (Worst case would occur when the maximum amount of harmonic coincides with the positive zero crossing the fundamental.)

Figure 2 gives a typical curve for phase error vs. input frequency, for a signal-to-noise ratio of 10:1 on both inputs.

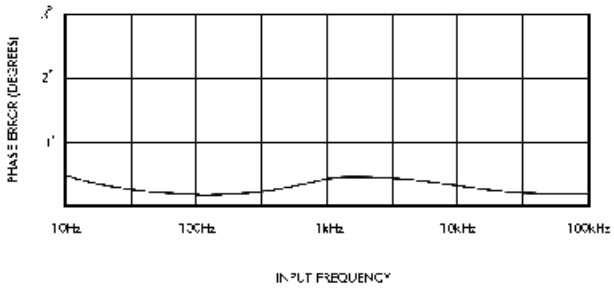

Figure 2 - Phase Error vs. Random Noise

OPTIONS

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OPTIONAL ACCESSORIES

CAB-010: GPIB Cable with Connectors, 2-Meters
CAB-011: GPIB Cable with Connectors, 1-Meters
CAB-025: Cable, BNC, 3ft, Low Noise

Specifications are subject to change without notice.

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