Specifications

1616 PRECISION CAPACITANCE BRIDGE

Capacitance measurement, 3-terminal: DECADES: 12. RANGE: 0.1 aF to 1 μF (10^{-18} to 10^{-6} F). ACCURACY:* ±10 ppm, when most-significant decade is 1, 10, or 100 pF per step; otherwise, and at other frequencies, accuracy is ±[50 ppm + (0.5 − 20 C_{pF}) (f_{kHz})² ppm − (f_{kHz}) aF].

Capacitance, 2-terminal: Same as above, except as follows. RANGE: One additional decade, to 10 μF (10^{-18} to 10^{-5} F).

Conductance measurement, 3-terminal: DECADES: 5 (virtually extended to 11 by G multiplier). RANGE: 100 aS to 100 μS (10^{-18} to 10^{-4} ℧). ACCURACY:* ±(0.1% − 1 step in least significant decade). There is a small reduction in conductance accuracy at frequencies other than 1 kHz. RESIDUAL C (across conductance standards): ±(< 0.03 pF).

Conductance, 2-terminal: Same as above, except as follows. RANGE: One additional decade, to 1000 μS (10^{-18} to 10^{-3} S).

Multipliers: FOR 3-TERM: X1, X10; FOR 2-TERM: X1, X10, X100; affect both C and G. FOR CONDUCTANCE ONLY: X1, X10⁻¹, . . . X10⁻⁶ (7 positions). Effects of these multipliers are included in the specified ranges.

Frequency: 10 Hz to 100 kHz.

Standards: CAPACITANCE: Air dielectric with TC < +40 ppm/°C and D <10 ppm for 7 lowest decades; invar†, air dielectric with TC of +3 ±1 ppm/°C and D <10 ppm for 3 middle decades, mica dielectric with TC of 20 ±10 ppm/°C and D <200 ppm for 2 highest decades. ADJUSTMENTS for all capacitance standards available through key-locked door on panel. THERMAL LAG: C standards for first 8 decades mounted in an insulated compartment with a thermal time constant of 6 h (time required for compartment interior to reach 63% of ambient change). CONDUCTANCE: Metal film resistors in T networks with small phase angles.

Comparison: Terminals provided to connect external standard for comparison measurements; 13-position panel switch multiplies standard by ±0.1, 0 . . . +1.

Input: The smaller of 160 f_{kHz} or 350 V rms can be applied to the bridge transformer at the GENERATOR terminals without waveform distortion; 500 V rms max, depending on conductance range, when GENERATOR and DETECTOR connections are interchanged.

Interface: G900 locking coaxial connector on panel to connect 2-terminal unknowns, G874 locking coaxial connectors on panel to connect 3-terminal unknowns and 2 to connect external standard. DATA OUTPUT: 50-pin and 36-pin type 57 connectors on rear provide connection to 8-4-2-1 weighted BCD contacts (rated at 28 V, 1 A) on each switch for capacitance and conductance values respectively.

OSCILLATOR and DETECTOR: Connect to rear BNC connectors.

Required: OSCILLATOR: GR 1316 recommended. DETECTOR: GR 1238 recommended. The 1616 Bridge is available with this oscillator and detector as the 1621 Capacitance-Measuring Assembly.

Available: 1316 OSCILLATOR, 1238 DETECTOR and a broad line of capacitance standards.

Mechanical: Bench or rack model. DIMENSIONS (wxhxd): Bench, 19.75x13.81x12.88 in. (502x351x327 mm); rack, 19x12.22x10.56 in. (483x310x268 mm). WEIGHT: Bench, 57 lb (26 kg) net, 69 lb (32 kg) shipping; rack, 49 lb (23 kg) net, 61 lb (28 kg) shipping.

*Accuracy for these conditions: Frequency 1 kHz, expect as noted, temperature, 23° ± 1° C, humidity, <50% RH. See manual for detailed accuracy analysis.

† Registered trademark of the Carpenter Steel Co.

G900 and G874 – G-ben, Engineering, Glendale, Arizona 85301

Description	Catalog Number
1616 Precision Capacitance Bridge	
Bench Model	**1616-9700**
Rack Model	**1616-9701**

1621 PRECISION CAPACITANCE-MEASUREMENT SYSTEM

Internal Temperature: C standards in bridge, about 1°C above ambient; for ultimate accuracy, allow 24 hrs to stabilize with ac power on.

Frequency: 10 Hz to 100 kHz.

Supplied: 1616 Precision Capacitance Bridge, 1316 Oscillator, 1238 Detector, all necessary interconnection cables, and power cord.

Available: 1404 REFERENCE STANDARD CAPACITORS (10 pF, 100 pF, and 1000 pF) for calibration.

Power: 100 to 125 and 200 to 250 V, 50 to 60 Hz, 51 W.

Mechanical: Bench or rack models. DIMENSIONS (wxhxd): Bench, 19.75x24.25x15 in. (502x616x381 mm); rack, 19x20.91x11.44 in. (483x531x291 mm). WEIGHT: Bench, 105 lb (48 kg) net, 140 lb (64 kg) shipping; rack, 90 lb (41 kg) net, 125 lb (57 kg) shipping.

Description	Catalog Number
1621 Precision Capacitance-Measurement System	
Bench Model, 60-Hz	**1621-9701**
Rack Model, 60-Hz	**1621-9702**
Bench Model, 50-Hz	**1621-9703**
Rack Model, 50-Hz	**1621-9704**