

Precision Decade Capacitor

1413 Series p. 1 of 2

1413 Precision Decade Capacitor is a high-quality, high-accuracy, high-stability, wide-range standard. It is ideal for verification and calibration of LCR meters and multimeters.

- Capacitance Range: 1 pF to 1.111 11 μ F
- Base Accuracy: 0.05%
- Resolution: 6 digits
- Zero-Capacitance: <0.1 pF
- Stability: 100 ppm/year
- TC: <20 ppm/°C
- Rack mounting available
- Front and rear outputs available



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For greater range and flexibility see the [HACS-Z Series](#)

SPECIFICATIONS

Capacitance per step	Total decade capacitance	Max voltage	Accuracy*	Dissipation factor*	Stability	Capacitor type
1 pF	10 pF	500 V peak max up to 10 kHz	$\pm (0.05\% + 0.5 \text{ pF})$	<0.002	$\pm(100 \text{ ppm} + 0.1 \text{ pF})$ per year	Air capacitors
10 pF	100 pF			Position 1: <0.002 All others: <0.001		
100 pF	1 nF			Position 1: <0.001 Position 2: <0.0005 All others: <0.0003		Silvered mica Mechanically stabilized Hermetically sealed
1,000 pF	10 nF			<0.0003		
0.01 μ F	100 nF			<0.0003		
0.1 μ F	1 μ F			<0.0004		

*1 kHz, 3-terminal measurement; series model; 1 Vrms, 23°C; traceable to SI
No zero-subtraction required

Zero Capacitance:

≤ 0.1 pF maximum capacitance obtained with all dials set to zero;

Temperature Coefficient:

<20 ppm/°C

Insulation Resistance:

>50,000 M Ω

Operating Temperature Range:

10°C to 40°C

Shielding:

Double-shielded construction; see below.

Connection to Capacitor:

Two bnc connectors labeled **HI** and **LO** are located on front panel.

Dimensions:

Bench: 43.2 cm W x 13.3 cm H x 27.7 cm D (17" x 5.2" x 10.9")

Rack: 48.3 cm W x 13.3 cm H x 27.7 cm D (19" x 5.2" x 10.9")

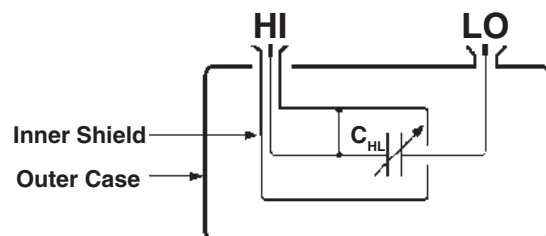
Weight:

8.6 kg (19 lb) for bench version

DOUBLE SHIELDED CONSTRUCTION

The shielding is divided into two different parts: an inner shield that minimizes the low terminal-to-guard capacitance, and an outer shield (the case) that minimizes the detector input capacitance and noise.

The outer shell of the **HI** connector is connected to the switch shaft. The outer shell of the **LO** connector is connected to the outer case. When these two shields are connected together, the 1413 becomes an excellent 3-terminal capacitance substituter with low zero capacitance.



Double Shielded Construction

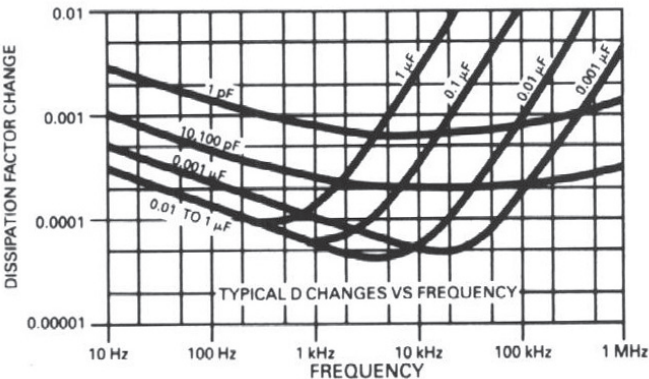
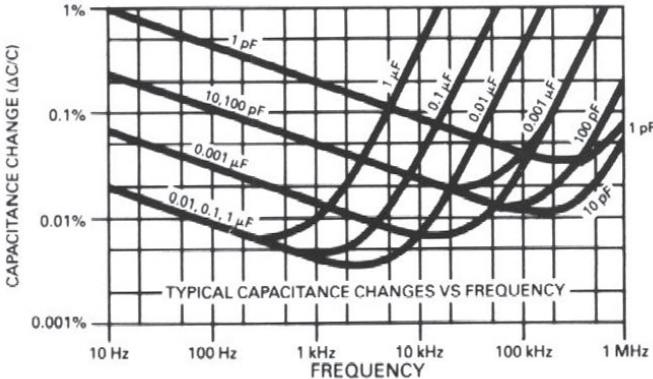


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FREQUENCY CHARACTERISTICS



MAX TERMINAL CAPACITANCE

Capacitance values	1 pF - 100 pF	101 pF - 1000 pF	1001 pF - 2000 pF	2001 pF - 0.1 μF	>0.1 μF
Max Terminal Capacitance	HIGH to Case: 4 pF HIGH to GUARD: 85 pF LOW to GUARD: 45 p	HIGH to Case: 8 pF HIGH to GUARD: 110 pF LOW to GUARD: 70 pF	HIGH to Case: 10 pF HIGH to GUARD: 125 pF LOW to GUARD: 80 pF	HIGH to Case: 30 pF HIGH to GUARD: 165 pF LOW to GUARD: 110 pF	HIGH to Case: 60 pF HIGH to GUARD: 200 pF LOW to GUARD: 120 pF

ORDERING INFORMATION

Precision Decade Capacitor - Benchtop Model: **1413-9700**
 Precision Decade Capacitor - Rack Mount Model: **1413-9701**

Optional

For rear output option, add **-RO** at the end of the part number.

