# Precision Decade Capacitor

# 1413 Series

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

Manufactured using the same design as the original GenRad 1413 Precision Decade Capacitor.

### Features

- Capacitance Range: 1 pF to 1.111 11  $\mu$ F
- Base Accuracy: 0.05%
- Resolution: 6 digits
- Zero-Capacitance: <0.1 pF</li>
- Stability: 100 ppm/year
- TC: <20 ppm/°C</li>
- Rack mounting available

SPECIFICATIONS:

Front and rear outputs available



1413 Precision Decade Capacitor

For greater range and flexibility see the HACS-Z Series

Capacitance per step	Total decade capacitance	Accuracy*	Stability	Max Voltage	Dissipation factor*	Capacitor type
HACS-Z-1pF Variable Decade	1 pF+	±0.1 pF	±(100 ppm + 0.1 pF) per year	500 V peak max up to 10 kHz	<0.003 typical	Air Capacitors
1 pF	10 pF	±(0.05%+0.5 pF)			<0.002	
10 pF	100 pF				<0.002	
100 pF	1 nF				Position 1: <0.002 All others: <0.001	Silvered mica Mechanically stabilized Hermetically sealed
1,000 pF	10 nF				Position 1: <0.001 Position 2: <0.0005 All others: <0.0003	
0.01 μF	100 nF				<0.0003	
0.1 μF	1 µF				<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:  $>50,000 \text{ M}\Omega$ 

#### Environmental conditions:

Operating conditions: 10°C to 40°C Storage conditions: -40°C to 70°C

#### Shielding:

Double-shielded construction; see below.

#### **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

### Connection to capacitor:

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



### Page 1 of 2

# Precision Decade Capacitor

С

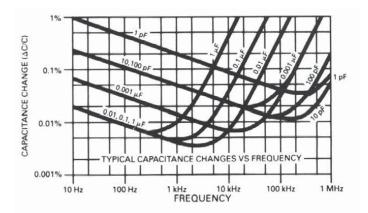
# 1413 Series

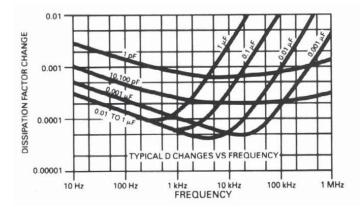
## **DOUBLE SHIELDED CONSTRUCTION**

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.

## FREQUENCY CHARACTERISTICS





HI

Double Shielded Construction

**Inner Shield** 

**Outer Case** 

## 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 Case: 8 pF	HIGH to Case: 10 pF	HIGH to Case: 30 pF	HIGH to Case: 60 pF
	HIGH to GUARD: 85 pF	HIGH to GUARD: 110 pF	HIGH to GUARD: 125 pF	HIGH to GUARD: 165 pF	HIGH to GUARD: 200 pF
	LOW to GUARD: 45 pF	LOW to GUARD: 70 pF	LOW to GUARD: 80 pF	LOW to GUARD: 110 pF	LOW to GUARD: 120 pF

## **ORDERING INFORMATION**

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

### Optional

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



## Page 2 of 2

LO