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.

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

**Features**
- Capacitance Range: 1 pF to 1.111 11 μF
- 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

**SPECIFICATIONS:**

<table>
<thead>
<tr>
<th>Capacitance per step</th>
<th>Total decade capacitance</th>
<th>Accuracy*</th>
<th>Stability</th>
<th>Max Voltage</th>
<th>Dissipation factor*</th>
<th>Capacitor type</th>
</tr>
</thead>
<tbody>
<tr>
<td>HACS-Z-1pF Variable Decade</td>
<td>1 pF+</td>
<td>±0.1 pF</td>
<td>(100 ppm + 0.1 pF) per year</td>
<td>500 V peak max up to 10 kHz</td>
<td>&lt;0.003 typical</td>
<td>Air Capacitors</td>
</tr>
<tr>
<td>1 pF</td>
<td>10 pF</td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.002</td>
<td></td>
</tr>
<tr>
<td>10 pF</td>
<td>100 pF</td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.002</td>
<td></td>
</tr>
<tr>
<td>100 pF</td>
<td>1 nF</td>
<td>±(0.05%+0.5 pF)</td>
<td></td>
<td></td>
<td>Position 1: &lt;0.002</td>
<td>Silvered mica</td>
</tr>
<tr>
<td>1,000 pF</td>
<td>10 nF</td>
<td></td>
<td></td>
<td></td>
<td>Position 1: &lt;0.001</td>
<td>Mechanically stabilized</td>
</tr>
<tr>
<td>0.01 µF</td>
<td>100 nF</td>
<td></td>
<td></td>
<td></td>
<td>Position 2: &lt;0.0005</td>
<td>Hermetically sealed</td>
</tr>
<tr>
<td>0.1 µF</td>
<td>1 µF</td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.0003</td>
<td></td>
</tr>
</tbody>
</table>

*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 MΩ

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.
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

![Frequency Characteristics Graph]

MAX TERMINAL CAPACITANCE

<table>
<thead>
<tr>
<th>Capacitance values</th>
<th>1 pF - 100 pF</th>
<th>101 pF - 1000 pF</th>
<th>1001 pF - 2000 pF</th>
<th>2001 pF - 0.1 µF</th>
<th>&gt;0.1 µF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max terminal capacitance</td>
<td>HIGH to Case: 4 pF HIGH to GUARD: 85 pF LOW to GUARD: 45 pF</td>
<td>HIGH to Case: 8 pF HIGH to GUARD: 110 pF LOW to GUARD: 70 pF</td>
<td>HIGH to Case: 10 pF HIGH to GUARD: 125 pF LOW to GUARD: 80 pF</td>
<td>HIGH to Case: 30 pF HIGH to GUARD: 165 pF LOW to GUARD: 110 pF</td>
<td>HIGH to Case: 60 pF HIGH to GUARD: 200 pF LOW to GUARD: 120 pF</td>
</tr>
</tbody>
</table>

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 part number.