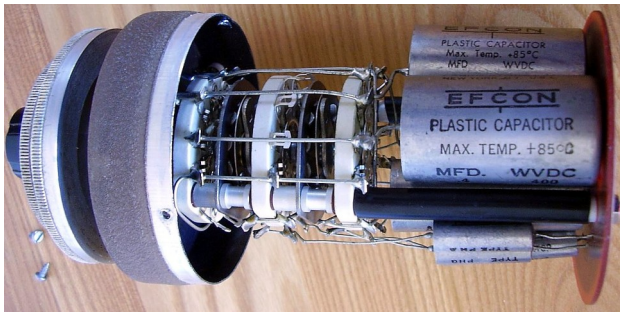
ESI Dekacap - Precision Step-Variable Capacitor





ESI Dekacap, decadic variable capacitor, is a true engineering masterpiece, covering three full decades in 1.000 steps in our three-knob sample. It relies upon a 1-2-2-5 parallel switching matrix and the well known ESI coaxial rotary-switch assembly to squeeze three full decade capacitors with numeric indication in a compact component measuring about 77 x 170 mm, 150 mm for the metal can plus the knobs coming out of the panel.

Technical Data Sheet: ESI DK30 (Dekapacitor)

Manufacturer: Electro Scientific Industries (ESI) – Portland, Oregon, USA
Component Type: 3-Decade Coaxial-Dial Precision Decade Capacitor (OEM Panel Mount)

Mechanical Specifications & Configuration

- **Physical Dimensions:** Outer cylinder body diameter of approximately **77 mm**; total length of the shielded enclosure of approximately **150 mm**.
- **Measurement Configuration:** True **3-terminal shielded network** (HIGH, LOW, and GUARD connected directly to the aluminum case). Internal capacitor banks are fully isolated from the outer housing to eliminate stray leakage currents to ground.
- **Switching Mechanism:** Proprietary ESI concentric coaxial drive utilizing a **1-2-2-5 switching schema**, minimizing the total number of internal master capacitors to optimize stability and balance.

• Initial Accuracy (at 23°C)	**± 0.2% of the selected setting for the standard series (DK30); ± 0.1% for the laboratory high-precision series (DK30A).**
• Long-Term Stability	**± 0.05% (or better) per year under controlled laboratory conditions**
• Temperature Coefficient	**Typically ± 50 ppm/°C due to high-stability internal polystyrene film and silver mica elements.**
• Maximum Operating Voltage	**300 V DC continuous (derated to a maximum peak of 200 V AC for low-frequency sinusoidal signals).**
• Dissipation Factor (D)	**Less than 0.0005 (corresponding to a quality factor Q > 2000) measured at the standard reference frequency of 1 kHz.**
• Residual Zero Capacitance	**Approximately 25 pF to 30 pF (caused by internal radial wiring; constant and negligible when using the guard configuration).**
• Terminal Insulation	**Side-mounted turret terminals insulated with pure Teflon, featuring an insulation resistance to the chassis exceeding 10^{11} Ω (100 Gigaohms).**

Decade Step Allocation (Full Scale: 1.110 µF)

Decade	Value per Step	Maximum Decade Value	Internal Dielectric Type
Decade 1 (High)	0.1 µF (100 nF)	1.0 µF	High-Stability Polystyrene Film
Decade 2 (Medium)	0.01 µF (10 nF)	0.10 µF	High-Stability Polystyrene Film
Decade 3 (Low)	0.001 µF (1 nF)	0.010 µF	Selected Silver Mica / HT Polystyrene

ESI also listed different models for capacitance range, precision and resolution, up to four coaxial dials.