

Decade Ratio Transformer



- Resolution 0.1 ppm
- Terminal linearity 0.9 ppm
- Bandwidth 50 Hz to 20 kHz
- Parallel switches reduce contact resistance
- Switch Resistors virtually eliminate switch transients
- Ratio range from -0.0111111 to +1.1111110

Model DT72B is an inductive voltage divider that meets or exceeds all of the requirements for a calibration standard in precision measurement applications. It is easy to integrate into systems for calibration of voltage dividers, transformer standards, synchro/resolver standards, transformers, calibrators, ammeters, and voltmeters. It can also be used to make impedance or capacitance comparisons. The ratio accuracy is traceable to the National Institute of Standards and Technology.

This variable AC voltage divider demonstrates extreme precision for measuring and generating voltage ratios. Seven decades of tapped transformer windings are selected using special low resistance switches providing 0.1 ppm resolution and 0.9 ppm terminal linearity. The key to these standards is extremely stable toroidal transformers, resulting in precision and outstanding long-

term stability over a wide range of environmental conditions. The seven in-line control knobs permit quick, easy setting of the required ratios. The first dial has end stops to prevent accidental switching from zero to full output. The other dials rotate independently through 360° of rotation to simplify the settings. The switch settings are easily read from the large-numeral in-line presentation above the knobs.

Switching transients are virtually eliminated due to a special circuit which couples the adjacent voltage steps through a resistor while the switching is taking place. The range overlap between decades is $\pm 10\%$, permitting accurate voltage ratios from 1.1 to -0.1.

The high input impedance of the DT72B makes it well suited for use in high impedance circuits without causing excessive loading.

Specifications

Frequency Range	50 to 20,000 Hz
Maximum rms Input Voltage	0.35f (.35 V/Hz) or 350 volts, whichever is less
Ratio Range	Maximum 1.111111 Minimum -0.0111111
Maximum Phase Shift	Approx. 0.05 mrad/kHz for settings above 0.1
Resolution	0.00001 % (0.1 ppm)
Maximum Input Current	For best performance, no DC current should be permitted. DC input of 20 μ A will decrease AC input voltage rating about 10 % and increase distortion slightly; 200 μ A will cause near saturation of core and serious errors.
Terminal Linearity	50 Hz to 1 kHz: ± 0.9 ppm (referenced to input) for settings 0.1 to 1.0 $(0.9 \sqrt{10} * \text{setting} + 0.01)$ ppm for settings 0 to 0.1 Above 1 kHz: multiply by f2 in kHz Below 50 Hz: Multiply by 50/f(Hz)
Maximum Effective Series Output Impedance	R: approximately 5 ohms maximum L: 30 μ H
Input Impedance at 20 V and 400 Hz	Approximately 500 K ohms minimum
Input Inductance	Approximately 100 to 400 H depending on excitation
Output Current	1 A maximum
Dimensions	Width 148.3 cm (9 in) Height 13.3 cm (5.25 in) Depth 18 cm (7.1 in)
Weight	8.1 kg (18 lb)

Included Accessories

Manual-CD

P/N 7203-CD

Optional Accessories

ANSI/NCSL Z540-1-1994 Compliant Calibration with Certificate and Data P/N OPT-Z540

