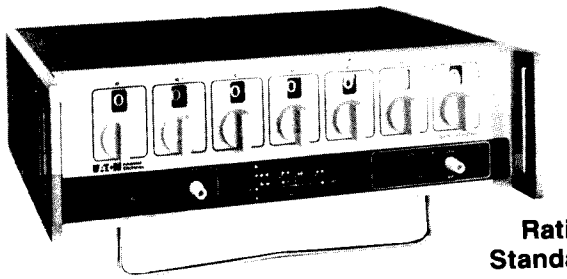
Ratio Transformers



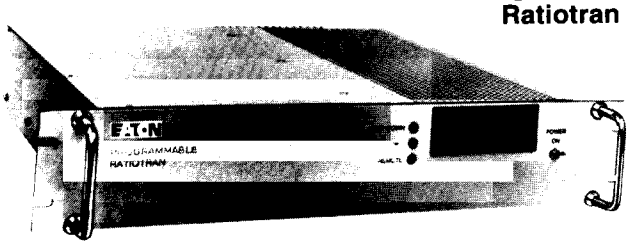
Ratio Standards

The RatioTrans precision voltage dividers were designed for instrument standards and calibration laboratories, or any applications where maximum accuracy is required. Instruments feature maximum ratios up to 1.111111 and minimum ratios down to -.0111111. All units provide transient suppression, 7-place resolution, and terminal linearity that is .0001% or better below 1 kHz. Adapter brackets are available for rack mounting.

All models (except 1011A) are equipped with extra-heavy duty instrument-type switches and are available in case or rack mount. Two basic ratio sections are available: high frequency and low frequency. (See specifications.) No special input voltage settings are required for specified accuracy—input voltage variations have no appreciable effect on linearity. Instrument is extremely stable and operates without recalibration throughout a wide range of environments.

Seven in-line control knobs permit quick, easy settings of required values. Unique circuitry keeps the output connected while settings are being changed, virtually eliminating switching transients. Range overlap between decades is ± 10%, permitting accurate voltage ratios from 1.1 to -.1. Certification and data are provided upon request on all Eaton Ratio Standards in terms of a standard which has been certified by the National Bureau of Standards.

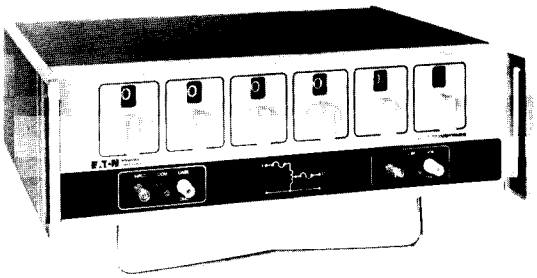
Programmable Ratiotran



The Eaton PRT-10 is the industry's first IEEE-488-1975 GPIB compatible ratio transformer. This feature permits remote control by external calculator or computer for fully automatic ratio measurements.

RT Series Standard Ratio Transformers

All "RT" series RatioTrans (except Model RT-2) incorporate switching transient suppression. This feature is of great importance when using the RatioTrans in a bridge circuit with a sensitive null indicator, when operating near null. These instruments are supplied with certificates of accuracy showing traceability to N.B.S.



RT-20A

Applications

The RatioTrans precision variable AC voltage divider provides extreme accuracy and high resolution in the measurement and generation of voltage ratios. Instruments are available in a variety of functional types and form factors for use in such applications as checking resolvers and servos, voltmeter calibration, computer testing, transformer turns ratio measurements, and ratio arms of bridges. All units illustrated are standard models. Special "RT" Ratio Trans voltage dividers can be designed to meet specific requirements, and/or for incorporation into customer systems.

Accuracies Under Load Conditions

While the RatioTrans is designed basically for use in an unloaded condition for maximum accuracy, because of design parameters, reasonable loads may be applied. The resulting accuracy is a function of this load. With reference to the equivalent circuit, assuming an ideal transformer, looking into the arm, we see impedance (Ls and Rs) in series with the arm, which is due to leakage inductance, wiring resistance, switch resistance, potentiometer resistance and other stray circuit parameters. From these series impedances, the effect of loading upon the transformer, and overall accuracy can be calculated. Typical values of Rs and Ls are 3 ohms and 75 μH. In the assumption of the ideal transformer, the indicated unloaded accuracies apply at the arm of the assumed ideal transformer.

Specifications

Model	Frequency Range	Switch Type	Resolution	Input Voltage	Maximum Effective Series Output Impedance	Dimensions and Weight	Remarks
RT-18A	50—10,000 Hz	Rotary Normal duty	.0001% steps	.35 f 170V max	Depends Upon Ratio	Rack: 19"L x 5¼"H x 15⅛"D 13.5 lbs. Case: 17"W x 5⅞"H x 16⅞"D Weight: 16 lbs.	Optimized for step up ratios to 3.111110
RT-20A	50-10,000 Hz	Rotary Normal duty	Continuous	.35 f 350V max	Rs-3.5 ohms Ls-75 μH	Same as Rt-18A Weight: 16 lbs.	Five decades of transformer switching, and 1-turn interpolating pot. Connectors on both front and rear. Ratios between 1.11111 and —.11111.
RT-23A	5 kHz to 20 kHz	Rotary Normal duty	0.0001%	.05 f 350V max	Rs-2.0 ohms Ls-16 μH	Same as RT-18A Weight: 14 lbs.	
RT-30A	50-10,000 Hz	Rotary Normal duty	Continuous	.35f 350V max	Direct: Rs-4 ohms Ls-200 μH Isolated: Rs-12 ohms Ls-1.5 mH	Same as RT-18A Weight: 14 lbs.	Multipurpose isolated or direct phase inversion ratio to 2.111110.
RT-60	50-10,000 Hz	Rotary Normal duty	.001% steps	.35 f 350V max	Rs-2.5 ohms Ls-75 μH	Case: 7.5"W x 3.5"H x 7"D Weight: Approx. 8 lbs.	Low cost 5-Decade

All "RT" instruments can be rack mounted and the RT-60 is half-rack adaptable.

Model	Frequency Range	Resolution	Terminal Linearity	Maximum RMS Input Voltage	Maximum Effective Series Output Impedance	Minimum Input Impedance 20V & 400 Hz	Dimensions and Weight
1011A	50—10,000 Hz	.00001%	.0001% below 1 kHz	.35 f in Hz 350V max.	R: 3.5 ohms L: 75 μH	(400 Hz) 200K ohms	Case: 17"W x 5⅞"H x 16⅞"D 18 lbs.
1012A	30—1000 Hz	.00001%	.0001%	2.5 f in Hz 350V max.	R: 5 ohms L: 350 μH	(60 Hz) 200K ohms	Case: 17"W x 5⅞"H x 16⅞"D 26 lbs.

Model	Frequency Range	Resolution	Terminal Linearity	Input Voltage	Input Inductance	Max. Effect Series Output Impedance	Weight	Notes
CRT-3F	50—10,000 Hz	Continuous	.001%	.35 f 350V max	150 henries	R-14 ohms L-75 μH	2	5-place readout with 3-decade transformer and 1-turn potentiometer with dial lock.

*Information for CRT-5, CRT-6 and CRT-6A is available from the factory.

Model	Frequency Range	Max RMS Voltage	Terminal Linearity	Ratio Range	Maximum Effective Series Output Impedance	Input Impedance at 20V, 400 Hz	Switching Time	Power Input	
PRT-10	50 Hz—10 kHz	.35 f 350V max.	±2 ppm of input	0—.999999	Direct: 4 Ω + 75 μH Isolated: 40 + 3.5 μH	150K	30 milliseconds	115V/230V AC	

PRT-10C/D/E have direct input, isolated input, phase inversion and voltage step-down of 100:100, 100:10; 115:115, 115:28; 115:115, 115:100, respectively.