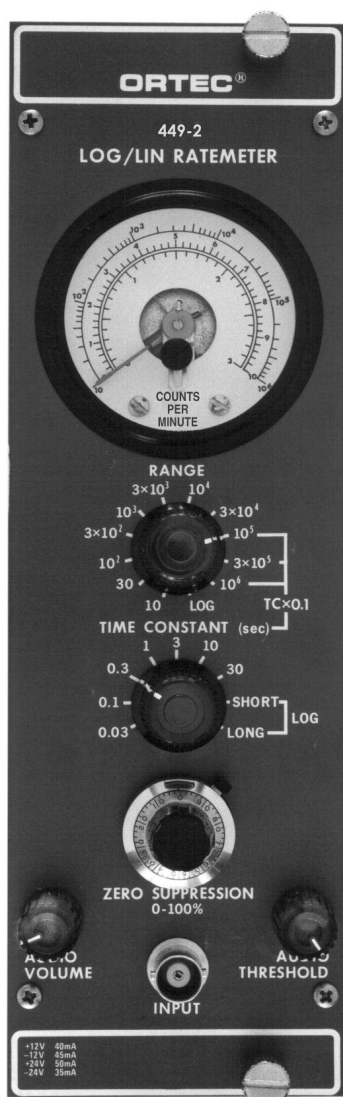


- Linear and logarithmic modes
- 10 to 10<sup>6</sup> counts/sec ranges
- 5-decade log range
- 0 to 100% zero suppression
- Positive or negative inputs (50 ns minimum width)
- Wide choice of time constants
- Optional audible output
- Low-rate counting from <10 counts per second to 10 million counts per second



The ORTEC Model 449 Log/Lin Ratemeter provides two modes of operation: linear and logarithmic. The linear mode has 11 full-scale ranges from 10 to 10<sup>6</sup> counts/sec in 1-3-10 steps. The 5-decade log mode covers the range from 10 to 10<sup>6</sup> counts/sec in a single span. These selections permit logical operation of the instrument when measuring low, medium, or high steady pulse rates or when monitoring rates that vary through a wide range.

The unique, circular front-panel meter provides excellent readability for both modes because of the longer effective scale inherent in its 240° movement and because of the 2% accuracy of its indications.

Zero suppression is provided for up to 100% of any linear range. Any relatively constant background in the counting rate can be subtracted from the data by adjusting this control. Also, a suppressed zero will permit observation of rates that are beyond the nominal full-scale limit with greater accuracy than could be obtained by switching to a higher range. The choices between 7 linear and 2 log time constants is a further aid in accurately reading the rate of incoming signals.

The Model 449 measures the rate of either positive or negative input signals with a wide variety of pulse shapes. This provides the user with maximum flexibility in the selection of sources for input signals.

In addition to the front-panel meter indications, outputs are provided for both current and voltage recorders, as well as a high-level voltage output for control or monitor applications.

The Model 449 is available with an optional built-in audible output (Model 449-2), which has a sound frequency that is variable as a function of count rate. The range of sound frequencies is effectively 0 to 500 Hz and corresponds directly to the full-scale range of the front-panel meter. The audible output includes a threshold control to totally suppress all sound until the input rate exceeds the preselected audio threshold and a separate audio volume control to allow either local or relatively remote audible monitoring of observed rates.

For control and/or alarm applications, the Model 449 can operate an accessory device through its analog input.

## Specifications

### PERFORMANCE

**LINEAR RANGES** 11 ranges from 10 to 10<sup>6</sup> counts/sec full scale in 1-3-10 steps.

**Dead Time** <100 ns on the 10<sup>6</sup> range; <0.3% of average pulse spacing up to the 3 X 10<sup>4</sup> range; ≤1% on the 10<sup>5</sup> and 3 X 10<sup>5</sup> ranges.

**Rated Overload** Maintains full-scale output for X300 overload or 10<sup>7</sup> counts/sec, whichever is smaller.

**Temperature Instability** <±0.05%/°C.

**Nonlinearity** ≤±0.15% from 10 to 3 X 10<sup>4</sup> counts/sec range; ≤±1.5% from 10<sup>5</sup> to 10<sup>6</sup> counts/sec.

**Time Constants** 7 selectable time constants, 0.03 to 30 s in 1-3-10 steps.

**Zero Suppression** 0 to 100% of full scale; nonlinearity of ≤±0.25%.

**LOGARITHMIC RANGE** One 5-decade range for 10 to 10<sup>6</sup> counts/sec.

**Temperature Instability** ≤±0.25% of full scale per °C.

**Analog Output Error** ≤±2.5% of full scale.

**Standard Deviation** ~15% with Log Short time constant; ~5% with Log Long time constant.

**Slewing Rate** Dependent on input rate; for any rate change. Log Short-time constant provides 10 times faster response than Log Long-time constant.

### CONTROLS

**RANGE** 12-position switch selects the full-scale range and either linear or logarithmic mode; linear ranges are 0 to 10 counts/sec through 0 to 10<sup>6</sup> counts/sec in 1-3-10 steps; log range is 10 to 10<sup>6</sup> counts/sec.

**TIME CONSTANT** 9-position switch selects an integrating time constant of 0.03, 0.1, 0.3, 1, 3, 10, or 30 s for linear ranges from 10 to 3 X 10<sup>4</sup> counts/sec or for any of these values divided by 10 for 10<sup>5</sup>, 3 X 10<sup>5</sup>, and 10<sup>6</sup> ranges; Short and Long for the log range.

**ZERO SUPPRESSION** 10-turn precision potentiometer to suppress the zero-reference level for any linear range from 0 to 100%; the same full-scale span is effective above the preselected zero-reference level.

### INPUTS

Accepts either positive or negative input signals with amplitude ≥±3 V and width ≥50 ns; ±30 V maximum; UG-1094/U BNC connectors on both front and rear panels.

### OUTPUTS

**PANEL METER** 240° circular movement with 8.9 cm (3.5 in.) deflection; accuracy 2% of full scale; three scale markings, 0-1 and 0-3 for linear ranges and 10-10<sup>6</sup> in five decades for log range.

# 449/449-2 Log/Lin Ratemeter

**ANALOG OUTPUT** 0 to +10 V full scale, dc-coupled with 100- $\Omega$  output impedance; UG-1094/U BNC connector on rear panel.

**RECORDER OUTPUT (A)** Voltage output with 100-mV full scale; dc-coupled with 100- $\Omega$  output impedance; binding post connectors on rear panel.

**RECORDER OUTPUT (B)** Current output with 1-mA full scale; dc-coupled with 10-k $\Omega$  output impedance; binding post connectors on rear panel.

## OPTION

**449-2 AUDIBLE OUTPUT OPTION** This option is in addition to the regular specifications of Model 449.

**AUDIO OUTPUT** A tone of variable frequency is furnished through a chassis-mounted speaker; the frequency increases from essentially 0 to 500 Hz, corresponding to the proportional meter deflection.

**AUDIO THRESHOLD** A 1-turn control mutes the audible output until the input rate exceeds the setting of the control and permits the output to be heard for all higher rates; range is 0 to 100% of selected full scale, linear, and log.

**AUDIO VOLUME** A 1-turn control adjusts the amplitude of the audible output from a near-inaudible level to a level that can be heard above normal laboratory ambient noise.

## ELECTRICAL AND MECHANICAL

**POWER REQUIRED** +24 V, 50 mA; -24 V, 35 mA; +12 V, 30 mA; -12 V, 45 mA.

### WEIGHT

**Net** 1.5 kg (3.5 lb).

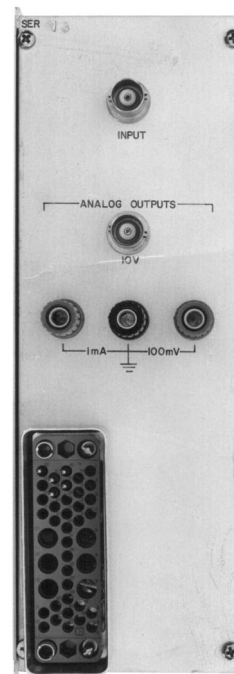
**Shipping** 2.5 kg (5.5 lb).

**DIMENSIONS** NIM-standard double-width module  
6.90 X 22.13 cm (2.70 X 8.714 in.) per DOE/ER-0457T.

## Ordering Information

To order, specify:

Model	Description
449	Log/Lin Ratemeter
449-2	Log/Lin Ratemeter with audible output



Specifications subject to change  
072320

**ORTEC**<sup>®</sup>

[www.ortec-online.com](http://www.ortec-online.com)

Tel. (865) 482-4411 • Fax (865) 483-0396 • [ortec.info@ametek.com](mailto:ortec.info@ametek.com)  
801 South Illinois Ave., Oak Ridge, TN 37830 U.S.A.  
For International Office Locations, Visit Our Website

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