

- General-purpose amplifier for energy spectroscopy with all types of detectors
- Unipolar output
- Low noise, wide-gain range and front-panel selectable time constants
- Gated BLR with automatic threshold control for excellent counting rate performance



The ORTEC Model 570 Amplifier is a general-purpose spectroscopy amplifier that offers excellent performance for varying counting rates at an economical price.

The low noise, wide-gain range and selectable shaping networks make this instrument ideally suited for operation with semiconductor detectors, proportional counters, and scintillation detectors in a wide variety of high-resolution spectroscopy applications.

The Model 570 incorporates an automatic gated baseline restorer, which causes the system resolution to be nearly independent of input counting rates. Figure 1 illustrates the peak shift and resolution for a typical gamma spectroscopy system.

The gated baseline restorer (BLR) includes a discriminator that operates the sensing circuits that normally establish the baseline reference for the MCA. Performance of the spectrometer often depends on the precision of the setting of the BLR threshold. The Model 570 offers the convenience of an automatic threshold control, which typically gives as good or better results than those the most experienced operator could achieve manually.

The active filter networks of the Model 570 generate a very symmetrical unipolar output with optimal signal-to-noise ratio over a wide range of time constants.

The excellent DC stability of the Model 570 output eliminates spectrum broadening caused by DC drift and ensures that the high-resolution capability of germanium detectors is realized.

Specifications

PERFORMANCE

GAIN RANGE Continuously adjustable from 1 to 1500.

PULSE SHAPE Semi-Gaussian on all ranges with peaking time equal to 2.2τ and pulse width at 0.1% level equal to 2.9 times the peaking time.

INTEGRAL NONLINEARITY For 2- μ s shaping time, $< \pm 0.05\%$.

NOISE Typically $< 5 \mu\text{V}$ for unipolar output referred to the input, using 2- μ s shaping and Coarse Gain ≥ 100 .

TEMPERATURE INSTABILITY

Gain $\leq \pm 0.0075\%/^{\circ}\text{C}$, 0 to 50°C .

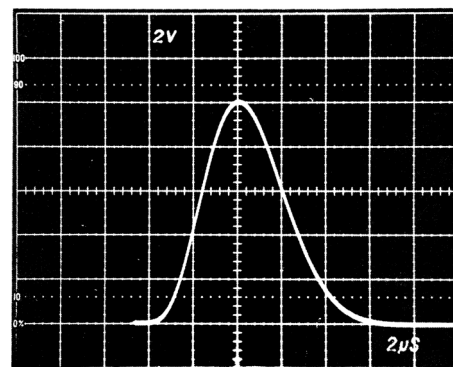
DC Level $\leq \pm 50 \mu\text{V}/^{\circ}\text{C}$, 0 to 50°C .

BIPOLAR CROSSOVER WALK $\leq \pm 3$ ns at 0.5 μs for 50:1 dynamic range, including contribution of an ORTEC Model 552 Single-Channel Analyzer.

OVERLOAD RECOVERY Recovers to within 2% of rated output from X300 overload in 2.5 nonoverloaded pulse widths using maximum gain for Unipolar Output.

SPECTRUM BROADENING Typically $< 16\%$ FWHM for a ^{60}Co 1.33 MeV gamma line at 85% of full scale for an incoming count rate of 1 to 75,000 counts/s (Unipolar Output, 2- μ s shaping).

SPECTRUM SHIFT Peak position shifts typically $< 0.024\%$ for a ^{60}Co 1.33-MeV gamma line at 85% of full scale measured from 1 to 75,000 counts/s (Unipolar Output, 2- μ s shaping).



2 V/cm, 2 μs /cm
UNIPOLAR OUTPUT

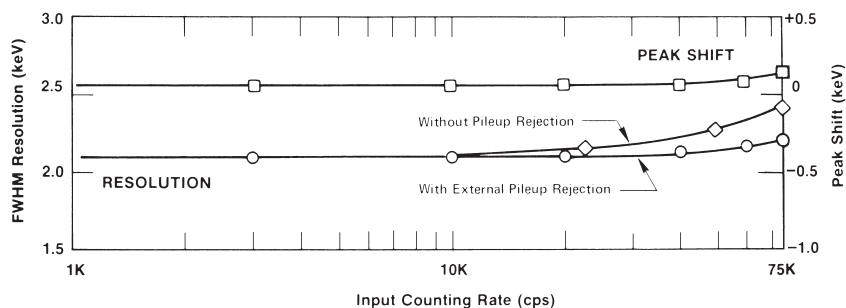


Fig. 1. Typical Resolution and Baseline Stability vs. Counting Rate for the Model 570 in a Gamma Spectroscopy System.

570 Amplifier

CONTROLS

FINE GAIN 10-turn precision potentiometer with graduated dial for continuously variable direct-reading gain factor of X0.5 to X1.5.

COARSE GAIN 6-position switch selects feedback resistors for gain factors of 20, 50, 100, 200, 500, and 1k. Jumper on the printed wiring board (PWB) selects X0.1 attenuation.

INPUT POLARITY Locking toggle switch selects either Pos or Neg input pulse polarity.

SHAPING TIME 6-position switch selects time constants for active pulse-shaping filter network from 0.5, 1, 2, 3, 6, and 10 μ s.

PZ ADJ Screwdriver adjustable potentiometer to set the pole-zero cancellation to compensate input decay times from 40 μ s to ∞ .

BLR 3-position locking toggle switch selects the source of control for the gated baseline restorer discriminator threshold from:

Auto The BLR threshold is automatically set to an optimum level, as a function of the signal noise, by an internal circuit.

PZ Adj The BLR threshold is determined by the threshold potentiometer. The BLR time constant is also greatly increased to facilitate PZ adjustment; this position may give the lowest noise for count rates under 5000 counts/s and/or longer shaping times.

Threshold The BLR threshold is manually set by the threshold potentiometer.

DC Screwdriver adjustable potentiometer to set the Unipolar Output DC level; range ± 100 mV.

INPUT

INPUT Front-panel BNC connector accepts either positive or negative pulses with rise times of 10 to 650 ns and decay times of 40 μ s to ∞ , $Z_{in} \cong 1000 \Omega$ DC-coupled; linear maximum 10 V; absolute maximum 20 V.

OUTPUTS

UNIPOLAR Front-panel BNC connector with $Z_o < 1 \Omega$, short-circuit proof; prompt with full-scale linear range of 0 to +10 V; active filter shaped; DC-restored; DC-level adjustable to ± 100 mV.

PREAMP POWER Rear-panel standard ORTEC power connector. Amphenol 17-10090, mates with captive and noncaptive power cords on all ORTEC preamplifiers.

BUSY OUTPUT Rear-panel BNC connector with $Z_o < 10 \Omega$ provides a +5 V logic pulse for the duration that the input pulse exceeds the baseline restorer discriminator.

ELECTRICAL AND MECHANICAL

POWER REQUIRED +12 V, 60 mA; -12 V, 30 mA; +24 V, 80 mA; -24 V, 85 mA.

WEIGHT

Net 1.5 kg (3.3 lb).

Shipping 3.1 kg (7.0 lb).

DIMENSIONS Standard single-width NIM module 3.43 X 22.13 cm (1.35 X 8.714 in.) per DOE/ER-0457T.

Ordering Information

Model	Description
570	Amplifier

