

# E-470 - E-471 - E-472 - E-420

## High-Power, Modular HVPZT Piezo Amplifiers / Controllers

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E-471.00 Configuration example: E-471.00 HVPZT amplifier, with optional E-509.S1 PZT servo-controller (strain gauges) and E-516 20-bit DAC interface/display.

- 550 W Peak Power
- Output Voltage -3 to -1100 V & Bipolar
- 1- and 2-Channel Versions
- Optional Position Servo-Control Modules
- Optional RS-232 & IEEE 488 Interface Module & Display

The E-470 series high-power amplifier/controllers are specifically designed to drive high-capacitance PZT actuators. They are based on the E-420 4-quadrant amplifier module, which can output and sink a peak current of 500 mA and an average current of 100 mA in a voltage range of -3 to -1100 V (positive or bipolar range, jumper selectable). OEM, 19" rackmount, bench-top, and two-channel versions are available, some with servo-control module and display (see Ordering Information for standard combinations).

Standard versions can be operated in two ways:

### I. Manual Control:

The output voltage can be set by a 10-turn, DC-offset potentiometer in the range of -3 to -1000 Volts

### II. External Control:

Output voltage is controlled by an analog signal applied to the BNC input, ranging from 0 to 11 Volts. Multiplying by the gain factor of -100, an output voltage range of -3 to -1100 Volts results. The DC-offset potentiometer adds a DC bias to the

input, allowing continuous shifting of the input range between 0 V to +10 V and -10 V to 0 V (see page 6-52).

See graph for frequency response with selected HVPZTs.

### Upgrades

The E-471.00 version allows installation several upgrade options for enhanced versatility (see Ordering Information).

Two additional modes are possible with versions having the E-509 Sensor & Servo-Controller Module upgrade:

### I. Manual Closed-Loop Operation

Displacement of the PZTs can be set by a 10-turn DC-offset potentiometer in the range of zero to nominal displacement.

### II. External Closed-Loop Operation

Displacement of the PZT is controlled by an analog signal in the range of 0 to +10 V, applied to the BNC input. The controller is calibrated in such a way that 10 V corresponds to maximum nominal displacement and 0 V corresponds to 0 displacement. The DC-offset potentiometer can be used to add an offset voltage of 0 to 10 V to the input signal.

### Notes

Important Calibration Information: Please read details see page 6-53.



E-420.00 HVPZT amplifier module

**Ordering Information**

**E-470.00**  
HVPZT Amplifier, 550 W, -3 to -1100 V, Bench-Top

**E-471.00**  
HVPZT Amplifier, Controller & Interface / Display Upgrade Possible, 550 W, -3 to -1100 V, 19"

**E-472.00**  
HVPZT Amplifier, 2 Channels, 550 W, -3 to -1100 V, Bench-Top, 19"

**E-420.00**  
HVPZT Amplifier Module, 550 W, -3 to -1100 V, Integrated P/S

**Upgrades for E-471**

**E-509.C1A**  
PZT Sensor-Controller Module (Capacitive Sensor)

**E-509.L1**  
PZT Sensor / Controller Module (LVDT Sensor)

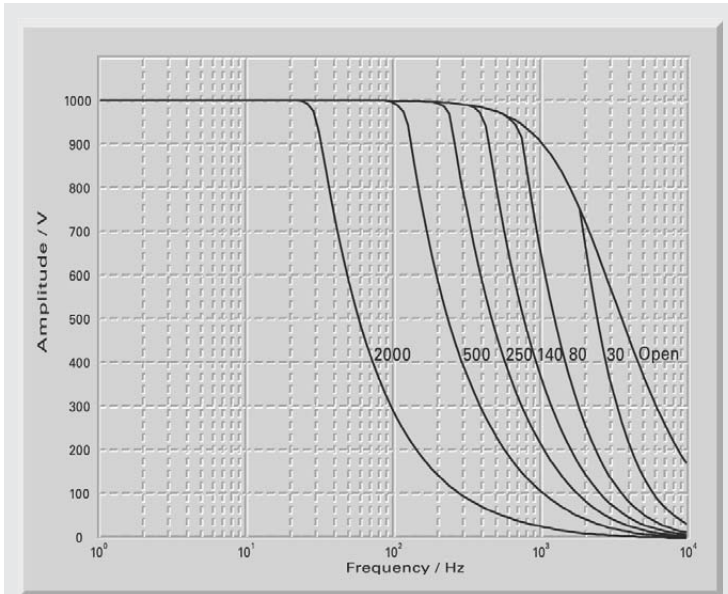
**E-509.S1**  
PZT Sensor / Controller Module (Strain Gauge Sensor)

**Computer Interface and Display Module (see page 6-26)**

**E-516.i31**  
20-bit DAC Interface/Display Module, IEEE 488 / RS-232 Voltage & Position Display Module (see page 6-26)

**E-515.01**  
Display Module for PZT Voltage and Displacement Sensor & Servo-Controller Modules for Closed-Loop PZT Operation (see page 6-28)

**Ask about custom designs!**



E-420, E-470, E-471, E-472, frequency response with various PZT loads. Values shown are capacitance in nF, measured in actual PZT.



E-472.00 HVPZT amplifier

### Technical Data

<b>Models</b>	<b>E-470.00, E-471.00, E-472.00, E-420.00</b>
Function	power amplifier (servo-controller option for E-471)
Channels	1 (E-472: 2)
Maximum output power	550 W / channel (see page 6-52)
Average output power	110 W / channel
Peak output current <50 ms:	500 mA / channel
Average output current >50 ms	100 mA / channel
Current limitation	short-circuit proof
Voltage gain	-100 ±1, +100 ±1 (selectable)
Polarity	Negative/positive/bipolar (jumper selectable)
Control input voltage	0 to +11 V, 0 to -11 V (jumper selectable)
Output voltage	-3 to -1100 V (-780 to +260, -550 to +550, -260 to +780, +3 to +1100 V, jumper selectable)
DC-offset setting	-3 to -1100 V at output with 10-turn pot.
Input impedance	100 kΩ / 1 nF
Control input sockets	BNC
PZT voltage output sockets	LEMO ERA.0A.250.CTL
Dimensions	236 x 132 x 296 mm + handles (E-470); 450 x 132 x 296 mm + handles (E-471, E-472); 215 x 123 x 185 mm (E-420) (see page 6-10)
Weight	5.2 kg (E-470); 7.6 kg (E-471); 10.1 kg (E-472); 2.5 kg (E-420)
Operating voltage	90-120 / 220-264 VAC, 50-60 Hz

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Capacitive Position Sensors

**Piezo Drivers & Nanopositioning Controllers**

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