

# E-664 NanoCube® Piezo Controller

## For XYZ-Nanopositioning System P-611.3S



E-664 Controller for NanoCube®  
XYZ nanopositioning systems

- **Integrated Amplifier with 3 x 14 W Peak Power**
- **Position Servo-Control with Notch Filter for Higher Bandwidth and Stability**
- **3 Displays for Voltage / Position**
- **Cost-Effective Controller for P-611.3S NanoCube® Nanopositioning Systems**
- **Manual and External Control**

The E-664 is a bench-top amplifier & position servo-controller that is especially designed for the P-611.3S NanoCube® XYZ nanopositioning system (see p. 2-52). Three integrated low-noise amplifiers and control circuitry for strain gauge position sensors allow closed-loop position resolution down to 2 nm and dynamic operation.

The combination of the E-664 servo-controller and P-611.3S NanoCube® piezo stage makes for a very cost-effective precision 3D nanopositioning system.

### Closed-Loop and Open-Loop Piezo Positioning

The E-664 servo controller can be operated both in closed-loop (position-control) and in open-loop (voltage-control) mode. In closed-loop mode, piezo displacement is propor-

tional to the analog signal applied to the BNC control-input socket. The integrated notch filters (adjustable for each axis) improve the stability and allow high-bandwidth operation closer to the piezo-mechanics resonant frequency. In open-loop operation the output voltage is determined by the analog control signal at the BNC Control Input socket, optionally combined with the DC-offset potentiometer. Voltage controlled operation (in contrast to position-controlled operation) is used in applications where the fastest possible response and very high resolution with maximum bandwidth are essential, and/or when commanding and reading the target position in absolute values is either not important or accomplished with an external feedback loop (see p. 2-104). The precision

10-turn potentiometers can also be used alone to set the output voltages manually.

### Versatile I/O Supports Automation

On-target and overflow status information is displayed separately for every channel. This information is also present on a 14-pin I/O connector on the rear panel that also carries the analog control input and sensor monitor lines.

### Remote Control via Computer Interface

Optionally, digital control via an external D/A converter is

### Ordering Information

**E-664.S3**  
NanoCube® Piezo Controller,  
3 Channels, SGS-Sensors,  
-20 to 120 V

possible. For several D/A boards from National Instruments, PI offers a corresponding LabVIEW driver set which is compatible with the PI General Command Set (GCS), the command set used by all PI controllers. A further option includes the patented HyperBit™ technology providing enhanced system resolution.

### Technical Data

Model	E-664.S3
Function	Power amplifier & position servo controller for P-611.3S NanoCube® nanopositioning system
Axes	3
<b>Sensor</b>	
Servo characteristics	P-I (analog), notch filter
Sensor type	SGS
<b>Amplifier</b>	
Input voltage	-2 to +12 V
Output voltage	-20 to 120 V
Peak output power per channel <5 ms	14 W
Average output power per channel >5 ms	6 W
Peak current per channel <5 ms	140 mA
Average current per channel >5 ms	60 mA
Current limitation	Short-circuit-proof
Voltage gain	10 ±0.1
Ripple, noise, 0 to 100 kHz	<1 mVrms
<b>Interfaces and operation</b>	
Piezo connector	25-pin sub-D connector
Sensor connector	25-pin sub-D connector
Control Input sockets	3 x BNC (rear), I/O connector
I/O ports	14-pin connector for on-target and overflow status, Control In and sensor monitor outputs
Display	3 x 3½-digits, LED
<b>Miscellaneous</b>	
Operating temperature range	5 to 50°C
Overtmp protection	Deactivation at 75°C
Dimensions	236 x 88 x 273 mm + handles
Mass	3 kg
Operating voltage	90–120 / 220–240 VAC, 50–60 Hz (linear power supply)
Max. power consumption	60 W