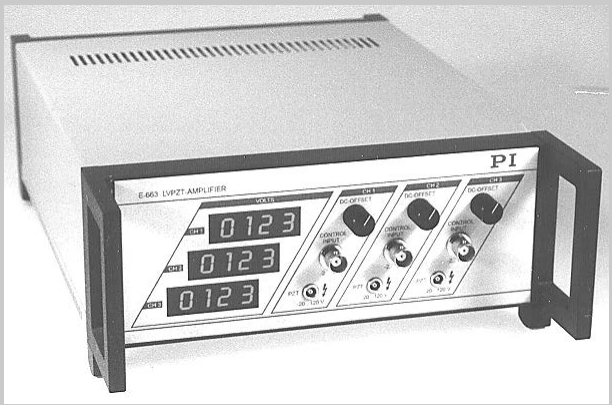
PZ 69E Operating Manual

E-663 LVPZT Amplifier

Release: 2.2.0 Date: 2019-08-29



This document describes the following product(s):

- E-663.00
  Three-Channel Amplifier for Low Voltage PZTs

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File:E-663_User_PZ69E211.doc, 1988608 Bytes

1. Safety

1.1. Intended Use

The E-663 is a laboratory device as defined by DIN EN 61010-1. It is intended for indoor use and use in an environment that is free of dirt, oil, and lubricants.

In accordance with its design, the E-663 is intended for driving capacitive loads (piezoceramic actuators) designed for an operating voltage ranging from -20 to 120 V.

The E-663 may not be used for purposes other than those stated in this user manual. In particular, the E-663 may not be used to drive ohmic or inductive loads.

The E-663 can be used both for static and dynamic applications.

1.2. General Safety Instructions

The E-663 is built according to state-of-the-art technology and recognized safety standards. Improper use can result in personal injury and/or damage to the E-663.

- Use the E-663 for its intended purpose only, and only when it is in perfect technical condition.
- Read the user manual.
- Eliminate any malfunctions that may affect safety immediately.

The E-663 is a power amplifier that outputs high voltages which can generate lethal currents. The operator is responsible for the correct installation and operation of the E-663.

- Install the E-663 near the power supply so that the power plug can be quickly and easily disconnected from the line voltage.
- Use the power cord supplied to connect the E-663 to the line voltage.
- If the power cord supplied has to be replaced, use a sufficiently rated power cord.
- Do not open the housing when line voltage is connected.
- When using PZT translators with bare contacts, never touch the conductors. Even if the PZT is not connected to the driver, the ceramic may be charged up to high voltage!

1.3. Organizational Measures

1.3.1. User manual

- Keep this user manual with the E-663 always.
  The latest versions of the user manuals are available for download on our website.
- Add all information from the manufacturer to the user manual, for example supplements or technical notes.
- If you give the E-663 to other users, include this manual as well as all other relevant information provided by the manufacturer.
- Always work according to the complete user manual. If your user manual is incomplete and is therefore missing important information, serious or fatal injury as well as damage to the equipment can result.
- Install and operate the E-663 only after you have read and understood this user manual.

1.3.2. Personnel qualification

The E-663 may only be installed, started up, operated, maintained, and cleaned by authorized and appropriately qualified personnel.

2. Product Description

E-663 is a bench-top amplifier for driving three low-voltage piezoelectric translators (LVPZTs). It offers three independent output channels capable of outputting and sinking a peak current of 140 mA and an average current of 60 mA each.

The output voltage range covers -20 to +120 V that can be controlled manually via front panel potentiometers or by analog control signals.

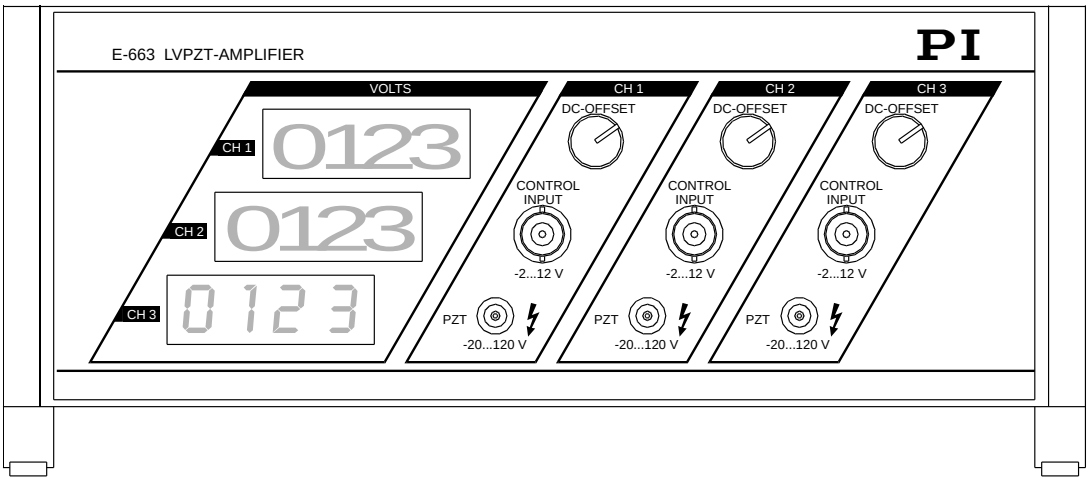
Three 3½-digit LEDs display the output voltage.

E-663 LVPZT amplifiers can be used for static and dynamic applications. The excellent output stability and linearity allow the device to be used with high-resolution positioning systems.

2.1. Operating and Display Elements

The following elements are available per channel on the E-663 front panel:

Name	Function
VOLTS	3½ -digit LED display of the current output voltage
PZT -20 … 120 V ⚠	LEMO output socket for the piezo voltage
CONTROL INPUT -2 …12 V	BNC input socket for analog control signal
DC-OFFSET	10-turn potentiometer for manual control of the output voltage (DC-offset setting)



2.2. Line Power and Fuses

The power connection, input voltage selection and line fuses are located on the rear panel. Unless you request a specific setting, the unit will be set up for the line voltage we believe predominant in your country.

New Fuses Required when Changing Supply Voltage

To connect the product to a different supply voltage, it is necessary not only to reorient the fuse carrier so that the desired voltage is visible in the window, but also to replace **both** the line fuses with the value appropriate for the new voltage. Lower supply voltage requires higher current.

To access the fuse carrier, remove the power cord. Wait a minute to be sure that any residual voltage has dissipated, and then pry open the door that covers the carrier. The carrier can then be pried out, exposing the two line fuses (see illustration at right).

After replacing the fuses, reinstall the carrier in the new orientation; check that the correct voltage setting is visible through the window in the door when it is reclosed.

Voltage Setting & Fuse Values:

115 V: 2 x 1.6A HT; 250V AC

230 V: 2 x 0.8A HT; 250V AC

Fuse location (1 of 2 fuses visible) and line voltage setting

2.3. Scope of Delivery

Unpack the E-663 with care. Compare the contents against the items covered by the contract and against the packing list.

The following components are included with an E-663:

PZ69E	User manual for E-663 (this document)
E500T0011	Technical Note for Analog Driver Set for use with NI LabVIEW software
3763	Line cord

Inspect the contents for signs of damage. If parts are missing or you notice signs of damage, contact PI immediately.

Save all packing materials in case the product needs be shipped again.

3. Operation

3.1. Analog Control Signal

The three channels of the E-663 are each controlled by an analog control signal. The output voltage is directly proportional to this analog control signal. The analog control signal consists of two components:

Analog control signal = CONTROL INPUT + DC OFFSET

where

CONTROL INPUT is the voltage connected to the corresponding BNC connector on the front panel

DC OFFSET is the DC offset voltage set via the corresponding potentiometer on the front panel (0 to 10 V)

The signal applied to the CONTROL INPUT BNC connector can be generated using a DAC-board in a PC. PI offers a driver set for NI LabVIEW software which can be used with certain D/A boards (see Technical note E500T0011, included in the scope of delivery).

3.2. Starting Operation

Before you power up the E-663, check whether the AC operating voltage is set to the right value (verify the specified line voltage at the rear panel).

Check basic operation of the E-663 functions without any PZT translators connected. Select any of the channels and set the corresponding DC offset potentiometer. The value read from the display represents the actual output voltage. Turning the potentiometer from one end to the other should cause the voltage reading to range from 0 to +100 V.

Turn the DC-OFFSET potentiometers counterclockwise (CCW) to zero the output before you connect PZT translators to the LEMO output sockets. Otherwise the translator may expand abruptly and connected parts could be damaged.

After the device is powered on, the displacements of the PZTs can be controlled by using the DC OFFSET potentiometers, either exclusively or in conjunction with the control input signals.

4. Cleaning

The E-663 contains electrostatic sensitive devices that can be damaged by short circuits or flashovers when cleaning fluids penetrate the housing.

Before cleaning, remove the E-663 from the power source by pulling the power plug.

Prevent cleaning fluid from penetrating the housing.

The housing surfaces of the E-663 can be cleaned using mild detergents or disinfectant solutions. Organic solvents must not be used.

5. Technical Data

5.1. Specifications

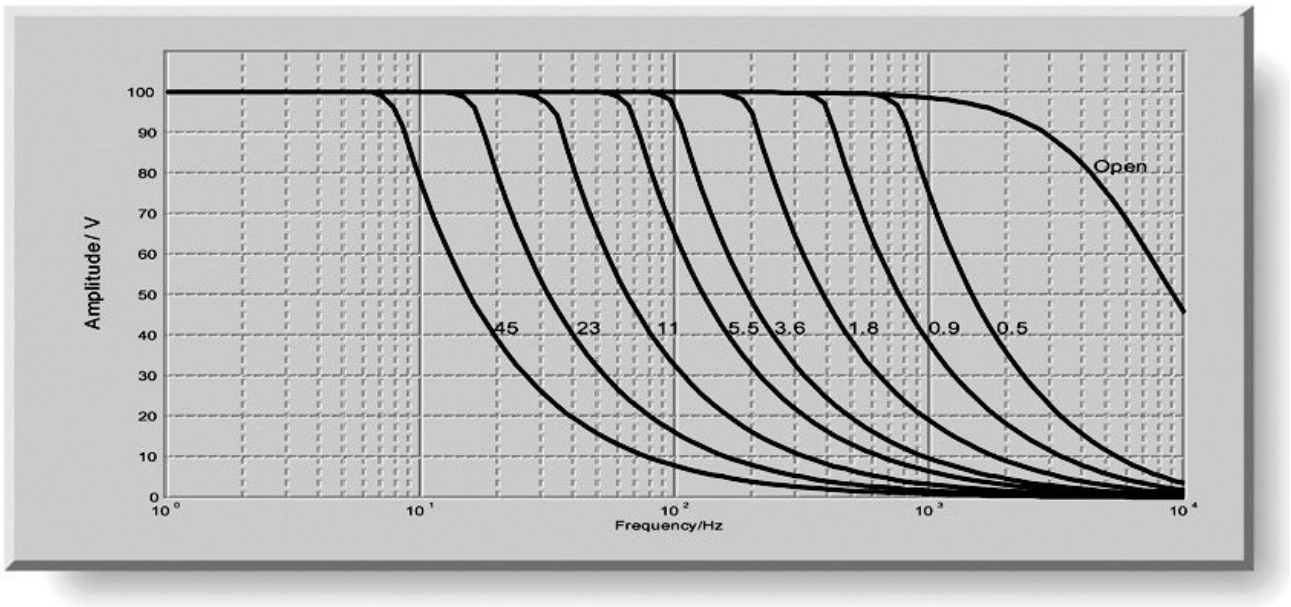
Function:	Amplifier for low-voltage PZTs
Channels:	3
Output voltage range	-20 to +120 V
Control signal input range:	-2 to +12 V
Peak output current (< 5 ms):	140 mA / channel
Average output current (> 5 ms):	60 mA / channel
Current limitation:	short-circuit-proof
Max output power:	14 W / channel
Average output power:	6 W / channel
Voltage Gain:	10 (+/- 0.1)
Noise, 0 to 100 kHz	<1 mV_{rms} <10 mV_{pp}
DC offset setting:	10-turn potentiometer; adds 0 to 10 V to the control input
Input impedance	100 kOhm
Display:	3 x 3½-digit LED
Control input sockets:	3 x BNC
PZT voltage output sockets:	3 x LEMO ERA.00.250.CTL
Mass	4.6 kg
Dimensions:	236 mm × 88 mm × 273 mm (320 mm with handles)
Operating voltage:	selectable: 90 to 120 or 220-240 VAC, 50-60 Hz (linear P/S)
Max. power consumption	60 W

5.2. Ambient Conditions and Classifications

The following ambient conditions and classifications for the E-663 must be observed:

Area of application	For indoor use only
Maximum altitude	2000 m
Air pressure	1100 hPa to 0.1 hPa
Relative humidity	Highest relative humidity 80 % for temperatures up to 31 °C Decreasing linearly to 50 % relative air humidity at 40 °C
Operating temperature	5 °C to 50 °C
Storage temperature	0 °C to 70 °C
Transport temperature	–25 °C to +85 °C
Overvoltage category	II
Protection class	I
Degree of pollution	2
Degree of protection according to IEC 60529	IP20

5.3. Operating Limits



E-663.00: Operating limits with various capacitive loads, capacitance values in µF

6. Customer Service

For inquiries and orders, contact your PI sales engineer or send us an email (mailto:service@pi.de).

If you have any questions concerning your system, provide the following information:

- Product and serial numbers of all products in the system
- Firmware version of the controller (if applicable)
- Version of the driver or the software (if applicable)
- Operating system on the PC (if applicable)
- If possible: Take photographs or make videos of your system that can be sent to our customer service department if requested.

The latest versions of the user manuals are available for download on our website.

7. Old Equipment Disposal

In accordance with EU law, electrical and electronic equipment may not be disposed of in EU member states via the municipal residual waste.

Dispose of your old equipment according to international, national, and local rules and regulations.

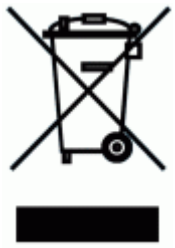
In order to fulfil its responsibility as the product manufacturer, Physik Instrumente (PI) GmbH & Co. KG undertakes environmentally correct disposal of all old PI equipment made available on the market after 13 August 2005 without charge.

Any old PI equipment can be sent free of charge to the following address:

Physik Instrumente (PI) GmbH & Co. KG

Auf der Roemerstr. 1

D-76228 Karlsruhe, Germany



8. EU Declaration of Conformity

For the E-663, an EU Declaration of Conformity has been issued in accordance with the following European directives:

Low Voltage Directive

EMC Directive

RoHS Directive

The applied standards certifying the conformity are listed below.

Safety (Low Voltage Directive): EN 61010-1

EMC: EN 61326-1

RoHS: EN 50581