

E-665 Piezo Amplifier / Servo Controller

Display, Analog & Digital Interface



Control of the E-665.SR piezo servo-controller is realized either via the digital high-speed interface or directly via the analog input

- Integrated 24-Bit USB Interface
- Network Capability with up to 12 Channels
- 360 mA Peak Current
- Notch Filter for Higher Bandwidth
- Position Control with Strain Gauge or Capacitive Sensor
- Table for User-Defined Curves
- Additional Analog Interface

The E-665 is a bench-top piezo linear amplifier and position servo-controller with integrated high-speed 24-bit computer interface and a high-bandwidth analog interface. It integrates a low-noise piezo amplifier which can output and sink peak currents of 360 mA for low-voltage piezoelectric actuators (-30 to 130 V). Servo-controller versions for position sensing with capacitive or SGS sensors are available.

Closed-Loop Piezo Positioning

PI employs proprietary position sensors for fast response and optimum positioning resolution and stability in the nanometer range and below. For high-end applications, capacitance sensors provide direct and non-contact position feedback (direct metrology). Strain gauge sensors (SGS) are available for cost-effective applications.

The piezo controllers comprise additional circuitry for position sensing and servo-control. In closed-loop position control mode, displacement of the piezo is highly linear and proportional to the analog signal. The servo modifies the amplifier output voltage based on the position sensor signal. Thus, positioning accuracy and repeatability down to the sub-nanometer range is possible, depending on the piezo mechanics and on the sensor type.

High-Resolution Digital Interface

The digital interface includes high-precision 24-bit A/D converters for optimum position stability and resolution and supports fast communication with the host-computer.

Waveform Memory

The built-in wave table can store user-defined datapoints

internally. These values can then be output automatically (or under the control of an external signal). Thus, trajectory profiles can be repeated reliably and commanded easily.

Multi-Axis Network for up to 12 Channels

Up to twelve E-665s for capacitive or SGS sensors can be networked and controlled over a single PC interface. The different modules are connected in parallel (not daisy-chained) over the link providing higher data rates than possible with serial links.

Extensive Software Support

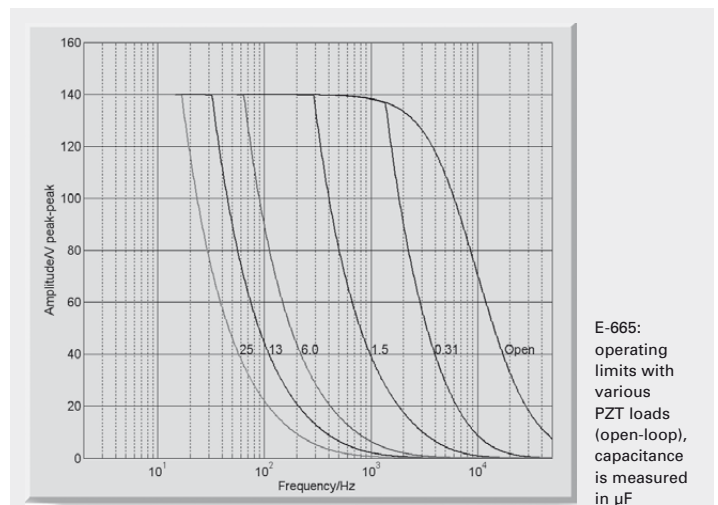
The controllers are delivered with Windows operating software.

The extensive command set is based on the hardware-independent General Command Set (GCS), which is common to all current PI controllers for both nano- and micropositioning systems. GCS reduces the programming effort in the face of complex multi-axis positioning tasks or when upgrading a system with a different PI controller.

Ordering Information

- E-665.CR**
Piezo Amplifier / Servo-Controller, 1 Channel, -30 to 130 V, Capacitive Sensor, USB, RS-232
- E-665.SR**
Piezo Amplifier / Servo-Controller, 1 Channel, -30 to 130 V, SGS-Sensor, USB, RS-232
- E-665.CO**
PIFOC® Piezo Amplifier / Servo-Controller, 1 Channel, -30 to 130 V, Capacitive Sensor
- E-665.SO**
PIFOC® Piezo Amplifier / Servo-Controller, 1 Channel, -30 to 130 V, SGS Sensor
- E-625.CN**
Network Cable for Networking of Two E-625

The GCS commands are available at the controller terminal, in macros and in the form of a universal driver set for LabVIEW (VIs) or Windows dynamic link libraries (DLL).



E-665: operating limits with various PZT loads (open-loop), capacitance is measured in µF

Technical Data

Model	E-665.SR, E-665.CR
Function	Piezo amplifier & position servo-controller with digital interface
Axes	1
Sensor	
Servo characteristics	P-I (analog), notch filter
Sensor type	SGS (.SR) / capacitive (CR)
Amplifier	
Control input voltage range	-2 to +12 V
Min. output voltage	-30 to 130 V
Peak current, < 20 ms	360 mA
Average current	120 mA
Current limitation	Short-circuit-proof
Noise, 0 to 100 kHz	0.5 (.SR) / 4.0 (.CR) mV _{rms}
Voltage gain	10 ±0.1
Input impedance	100 kΩ
Interfaces and operation	
Interface / communication	USB and RS-232 (9-pin Sub-D connector, 9.6–115.2 kBaud), 24-bit A/D, 20-bit D/A
Piezo connector	LEMO ERA.00.250.CTL (.SR) / Sub-D special (.CR)
Sensor connection	LEMO EPL.0S.304.HLN (.SR) / Sub-D special (.CR)
Analog input	BNC
Sensor monitor socket	BNC
Controller network	up to 12 channels, parallel
Command set*	PI General Command Set (GCS)
User software*	PIMikroMove
Software drivers*	LabVIEW drivers, DLLs
Supported functionality	Wave table, 256 data points, external trigger, 16 macros
Display	2 x 4½-digits, LED
DC Offset	10-turn pot., adds 0 to 10 V to Control In
Miscellaneous	
Operating temperature range	5 to 50 °C (10 % derated over 40 °C)
Overheat protection	Deactivation at 85 °C
Dimensions	236 x 88 x 273 mm + handles
Mass	2.5 kg
Operating voltage	100–120 / 220–240 VAC, 50–60 Hz (linear power supply)
Max. power consumption	< 70 W

* E-625.S0 and E-625.C0 without interface

Linear Actuators & Motors

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