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 20-Bit High-Speed RS-232 Interface**
- **Network Capability with up to 12 Channels**
- **36 W Peak Power**
- **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 20-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 (-20 to 120 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 RS-232 digital interface includes high-precision 20-bit D/A and A/D converters for optimum position stability and resolution and supports fast communication with the host computer, with up to 300 bidirectional read/write operations per second.

Waveform Memory

The built-in wave generator can store user-defined data points internally. These values can then be output automatically (or under the control of an external signal) and programmed for point-by-point or full-scan triggering. 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 RS-232 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. Comprehensive DLLs and LabVIEW drivers are available for automated control.

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.

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

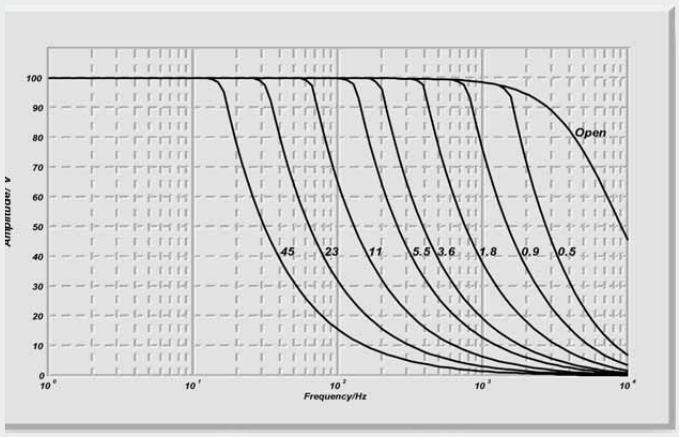
Ordering Information

E-665.CR
Piezo Amplifier / Servo-Controller, 1 Channel, RS-232, -20 to 120 V, Capacitive Sensor

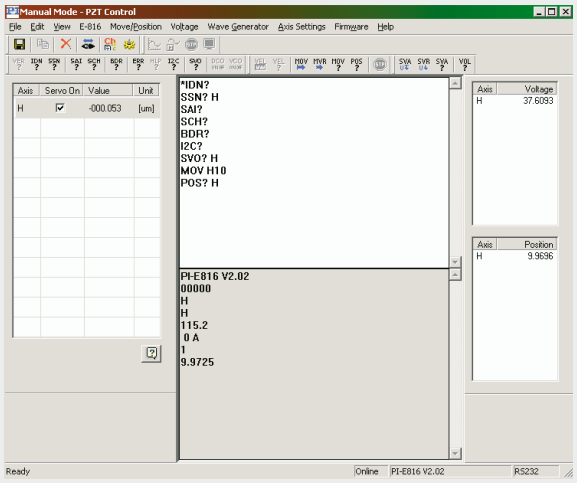
E-665.SR
Piezo Amplifier / Servo-Controller, 1 Channel, RS-232, -20 to 120 V, SGS-Sensor

E-665.C0
PIFOC® Piezo Amplifier / Servo-Controller, 1 Channel, Capacitive Sensor

E-665.S0
PIFOC® Piezo Amplifier / Servo-Controller, 1 Channel, SGS Sensor



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



Screenshot of the included PZT-Control software for E-665. The commands in the editor are compatible to the PI General Command Set

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	-20 to 120 V
Peak output power, < 20 ms	36 W
Average output power	12 W
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	RS-232 (9-pin Sub-D connector), 20 bit ADC/DAC, 9.6 - 115.2 kBaud
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
Supported functionality	Wave table, 64 data points, 100 Hz, external trigger
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
Overheat protection	Deactivation at 85 °C
Dimensions	236 x 88 x 273 mm + handles
Mass	2.5 kg
Operating voltage	90-120 / 220-240 VAC, 50-60 Hz (linear power supply)
Max. power consumption	50 W