

Compact and Cost-Optimized Digital Piezo Controller

FOR SGS, PIEZORESISTIVE AND CAPACITIVE SENSORS



E-709

- Linearity to 0.02 %
- Fast 25 Mbit/s serial interface
- Comprehensive I/O functions
- Low-cost OEM versions available
- Extensive software support

Fast digital controller

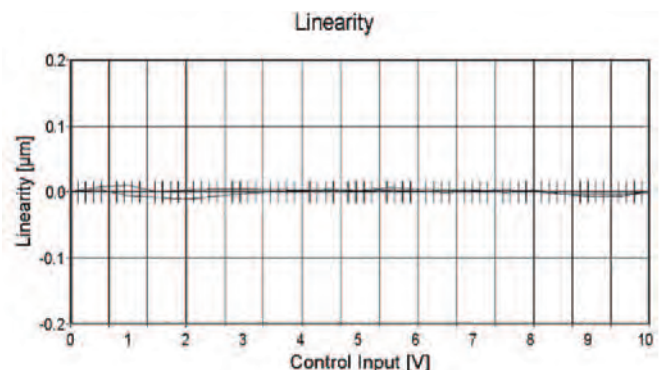
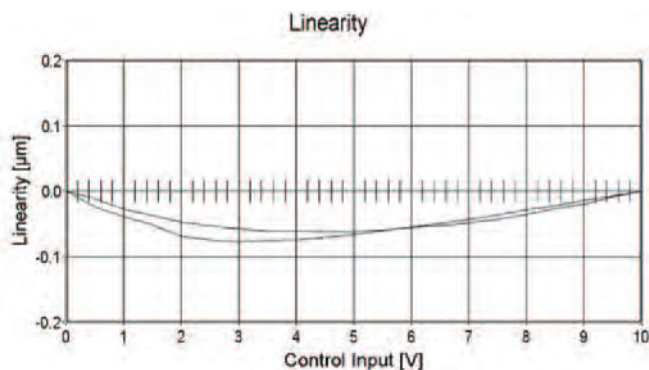
As bench-top (.xRG) or as OEM board (.xR).
Voltage range -30 to 130 V

Interfaces

USB, digital RS-232, fast serial interface with up to 25 MBit/s. Additional high-bandwidth analog control input/sensor input. Analog output, e.g. for external amplifiers

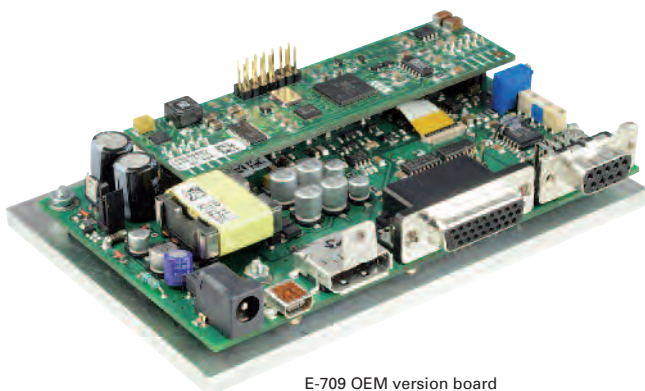
User software and functions

PIMikroMove, PI General Command Set (GCS). Drivers for LabVIEW, shared libraries for Windows and Linux. Compatible with μ Manager, MetaMorph, MATLAB. Wave Generator. Linearization. Data recorder. Auto zero. Trigger I/O. Software configurable servo parameters

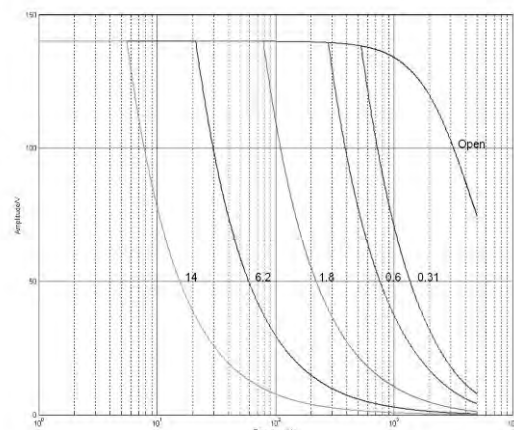


Comparison of the linearity of a strain gauge sensor with analog controller (top) and the E-709 digital controller (bottom), which improves the linearity by up to one order of magnitude

	E-709.SR/E-709.SRG	E-709.PR/E-709.PRG	E-709.CR/E-709.CRG
Sensor type	SGS	Piezoresistive	Capacitive
Function	Digital controller for single-axis piezo nanopositioning systems (.SR: OEM board)	Digital controller for single-axis piezo nanopositioning systems (.PR: OEM board)	Digital controller for single-axis piezo nanopositioning systems (.CR: OEM board)
Channels	1	1	1
Processor	DSP 32 bit floating point, 150 MHz	DSP 32 bit floating point, 150 MHz	DSP 32 bit floating point, 150 MHz
Servo characteristics	P-I, 2 notch filter, sensor linearization	P-I, 2 notch filter, sensor linearization	P-I, 2 notch filter, sensor linearization
Sampling rate, servo-control	10 kHz	10 kHz	10 kHz
Sampling rate, sensor	10 kHz	10 kHz	10 kHz
Sensor			
Linearization	5th order polynomials	5th order polynomials	5th order polynomials
Sensor bandwidth	5 kHz	5 kHz	5 kHz
Sensor resolution	16 bit	16 bit	16 bit
Ext. synchronization	No	No	No
Amplifier			
Output voltage	-30 V to +130 V	-30 V to +130 V	-30 V to +130 V
Peak output power	10 W (<5 ms)	10 W (<5 ms)	10 W (<5 ms)
Average output power	5 W (>5 ms)	5 W (>5 ms)	5 W (>5 ms)
Peak current	100 mA (<5 ms)	100 mA (<5 ms)	100 mA (<5 ms)
Average current	50 mA (>5 ms)	50 mA (>5 ms)	50 mA (>5 ms)
Current limitation	Short-circuit-proof	Short-circuit-proof	Short-circuit-proof
Resolution DAC	17 bit	17 bit	17 bit
Interface and operation			
Communication interfaces	USB, RS-232, SPI	USB, RS-232, SPI	USB, RS-232, SPI
Piezo / sensor connection	Sub-D, 9-pin	Sub-D, 9-pin	Sub-D-Special connector
I/O Connector	HD-Sub-D 26-pin, 1 analog input 0 to 10 V, 1 sensor monitor 0 to 10 V, 1 digital input (LVTTTL, programmable), 1 analog output, 5 digital outputs (LVTTTL, 3x predefined, 2x programmable)		
Command set	PI General Command Set (GCS)		
User software	PIMikroMove		
Software drivers	LabVIEW drivers, shared libraries for Windows and Linux		
Supported functionality	Wave generator, data recorder, auto zero, trigger I/O, MATLAB, MetaMorph, µManager		
Display	Status LED, overflow LED		
Miscellaneous			
Operating temperature range	8 to 50 °C (above 40 °C, power derated)	8 to 50 °C (above 40 °C, power derated)	12 to 50 °C (above 40 °C, power derated)
Dimensions	160 x 96 x 33 mm	160 x 96 x 33 mm	160 x 96 x 33 mm
Mass	260 g / 470 g	260 g / 470 g	260 g / 470 g
Operating voltage	24 VDC	24 VDC	24 VDC
Max. power consumptions	24 W	24 W	24 W



E-709 OEM version board



E-709: Operating limits with various PZT loads (open-loop), capacitance is measured in µF

Digital Single Channel Piezo Controller

HIGH OUTPUT POWER FOR DYNAMIC OPERATION, CAPACITIVE SENSORS



E-709.CHG

- Output power up to 50 W
- Linearity error up to 0.02%
- Fast 25 Mbit/s serial interface
- Comprehensive I/O functions
- Extensive software support

Fast piezo controller

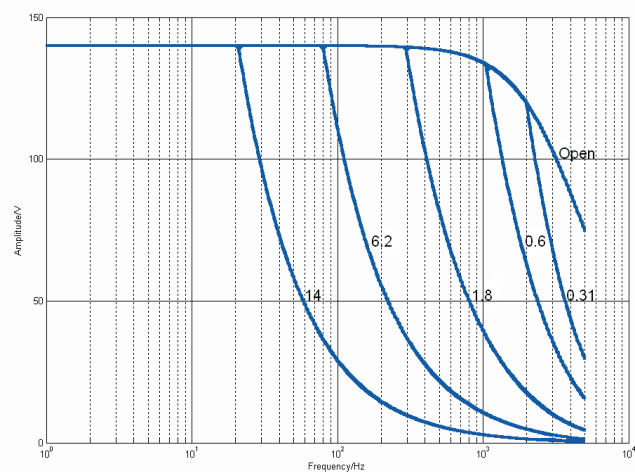
1 channel. For piezo-based nanopositioning systems with capacitive sensors. High output current for dynamic applications. Digital controller. Voltage range -30 to 130 V

Interfaces

USB, digital RS-232, fast serial interface with up to 25 MBit/s. Additional, high-bandwidth analog control input / sensor input. Analog output, e.g. for external amplifiers

User software and functions

PIMikroMove, PI General Command Set (GCS). Drivers for LabVIEW, shared libraries for Windows and Linux. Compatible with μ Manager, MetaMorph, MATLAB. Wave Generator. Linearization. Data recorder. Auto Zero. Trigger I/O. Software-configurable parameters



E-709.CHG: Operating limits (open-loop) with different PZT loads, capacity is measured in μ F

E-709.CHG	
Function	Digital highly dynamic controller for single-axis piezo nanopositioning systems
Channels	1
Processor	DSP 32-bit floating point, 150 MHz
Servo characteristics	P-I, 2 notch filter, sensor linearization
Sampling rate, servo-control	10 kHz
Sampling rate, sensor	10 kHz
Sensor	
Sensor type	Capacitive
Linearization	5th order polynomials
Sensor bandwidth	5 kHz
Sensor resolution	16 bit
Ext. synchronization	Yes
Amplifier	
Output voltage	-30 to 130 V
Peak output power, < 2 ms	50 W
Average output power (>5 ms)	15 W
Peak current, < 2 ms	500 mA
Average output current (>5 ms)	160 mA
Current limitation	Short-circuit-proof
Resolution DAC	17 bit
Interface and operation	
Communication interfaces	USB, RS-232, SPI
Piezo / sensor connection	Sub-D-Special connector
I/O connector	HD-Sub-D, 26-pin, 1 analog input 0 to 10 V, 1 sensor monitor 0 to 10 V, 1 digital input (LVTTTL, programmable), 1 analog output, 5 digital outputs (LVTTTL, 3 × predefined, 2 × programmable)
Command set	PI General Command Set (GCS)
User software	PIMikroMove, NanoCapture
Software drivers	LabVIEW driver, shared libraries for Windows and Linux. Supported by MATLAB, MetaMorph, µManager, Andor iQ
Supported functionality	Wave generator data recorder, auto zero, trigger I/O
Display	Status LED, overflow LED
Miscellaneous	
Operating temperature range	5 to 50°C
Dimensions	320 mm × 150 mm × 80 mm
Weight	2.5 kg
Operating voltage	24 VDC, in the scope of delivery: external power supply
Max. power consumption	45 W



The E-709.CRG controller is a more compact version of the E-709.CHG with lower electrical output power