

E-727

Digital Multi-Channel Piezo Controller

For Nanopositioning Systems with Capacitive, Piezoresistive or Strain Gauge Sensors



- 20 kHz control bandwidth
- Interfaces: Ethernet, USB, and RS-232
- Digital inputs and outputs
- Optional analog inputs and outputs
- Auto-loading of calibration data from stage ID chip for interchangeability of controller and mechanics
- 4th order polynomial linearization for mechanics and electronics

Digital motion controller for piezo-based nanopositioning systems

Integrated low-noise power amplifiers for PICMA® piezo actuators. Output voltage -30 to +130 V. Supports nanopositioning systems with strain gauge sensors, capacitive sensors or piezoresistive sensors. P-I controller with 2 notch filters. Linearization based on 4th order polynomials. Optional Dynamic Digital Linearization (DDL). Scope of delivery includes wide-range-input power supply, USB and RS-232 cable.

Extensive functionality

Data recorder. ID chip for fast start-up and quick exchange of system components. Extensive software support, e.g., for LabVIEW, dynamic libraries for Windows and Linux.

Interfaces

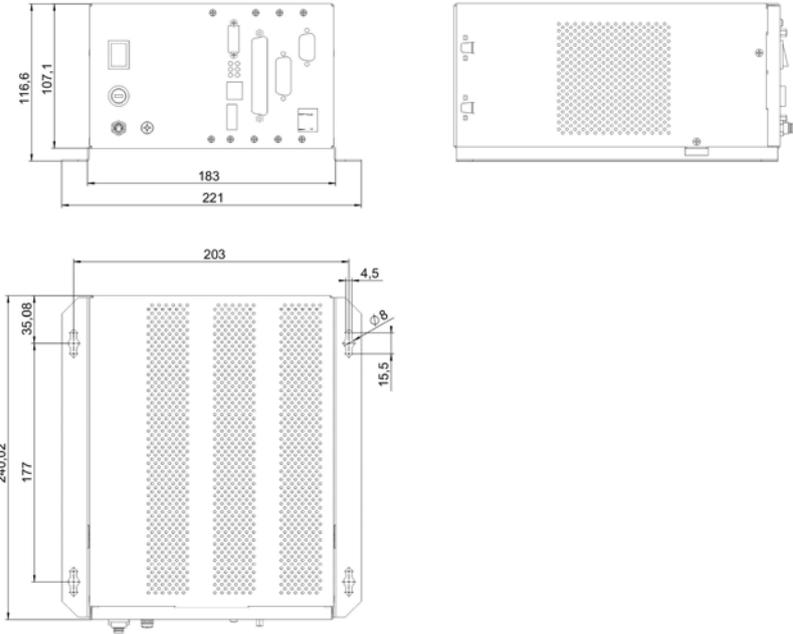
Ethernet. USB. RS-232. SPI. 4 analog inputs and outputs each (optional) for external sensors, target values or external amplifiers. 4 digital inputs and outputs each.

Specifications

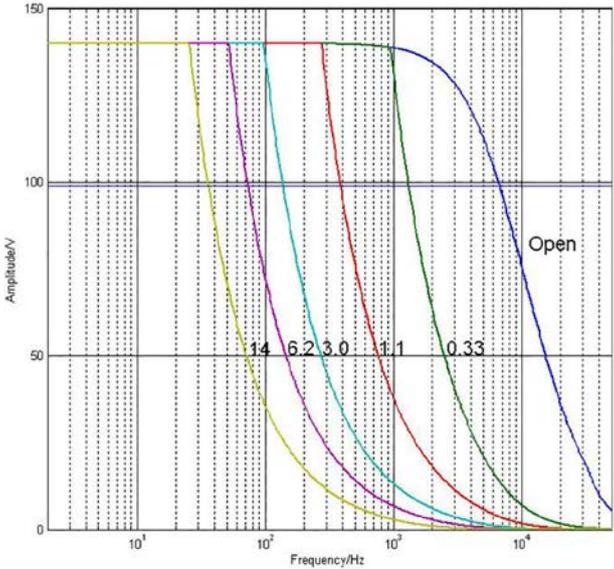
	E-727.3CD E-727.3CDA	E-727.3SD E-727.3SDA E-727.4SD	E-727.3RD E-727.3RDA E-727.4RD	Unit	Tolerance
Function	Digital controller for multi-axis piezo nanopositioning systems with capacitive sensors .3CDA: Additional analog interfaces	Digital controller for multi-axis piezo nanopositioning systems with strain gauge sensors .3SDA: Additional analog interfaces	Digital controller for multi-axis piezo nanopositioning systems with piezoresistive sensors .3RDA: Additional analog interfaces		
Axes	3	E-727.3x: 3 E-727.4x: 4	E-727.3x: 3 E-727.4x: 4		
Processor	DSP 32/64-bit, floating point, 375 MHz	DSP 32/64-bit, floating point, 375 MHz	DSP 32/64-bit, floating point, 375 MHz		
Sampling rate, servo control	20	20	20	kHz	
Sampling rate, sensor	100	100	100	kHz	
Sensor					
Servo characteristics	P-I, two notch filters Optional: Advanced piezo control	P-I, two notch filters Optional: Advanced piezo control	P-I, two notch filters Optional: Advanced piezo control		
Sensor type	Capacitive	Strain gauge sensors	Piezoresistive		
Sensor channels	3	4	4		
Sensor bandwidth (-3 dB)	10	10	10	kHz	max.
Sensor resolution (at 1 kHz over-sampling)	20	20	20	Bit	
Amplifier					
Output voltage	-30 to 130	-30 to 130	-30 to 130	V	±3 V
Amplifier channels	4	4	4		
Peak output power per channel, max. 30 ms	28	28	28	W	max.
Average output power per channel	14	14	14	W	max.
Peak current per channel, max. 30 ms	180	180	180	mA	max.
Average output current per channel	75	75	75	mA	max.
Current limitation	Short-circuit proof	Short-circuit proof	Short-circuit proof		
Resolution DAC	20	20	20	Bit	
Amplifier bandwidth	6.5	6.5	6.5	kHz	

	E-727.3CD E-727.3CDA	E-727.3SD E-727.3SDA E-727.4SD	E-727.3RD E-727.3RDA E-727.4RD	Unit	Tolerance
Interfaces and operation					
Interface / communication	Ethernet, USB, RS-232, serial SPI high-speed interface	Ethernet, USB, RS-232, serial SPI high-speed interface	Ethernet, USB, RS-232, serial SPI high-speed interface		
Piezo / sensor connection	Sub-D 25W3 (f)	Sub-D 37 (f)	Sub-D 37 (f)		
Analog inputs (only .3xDA)	Sub-D 15 (f) 4 inputs ±5 V or ±10 V 18-bit A/D converter	Sub-D 15 (f) 4 inputs ±5 V or ±10 V 18-bit A/D converter	Sub-D 15 (f) 4 inputs ±5 V or ±10 V 18-bit A/D converter		
Analog output (only .3xDA)	Sub-D 15 (f) ±10 V 20-bit D/A converter	Sub-D 15 (f) ±10 V 20-bit D/A converter	Sub-D 15 (f) ±10 V 20-bit D/A converter		
Sensor monitor (only .3xDA)	Sub-D 15 (f) Sensor channels 1 to 3	Sub-D 15 (f) Sensor channels 1 to 3	Sub-D 15 (f) Sensor channels 1 to 3		
Digital input/output	MDR14; 4 inputs, 4 outputs	MDR14; 4 inputs, 4 outputs	MDR14; 4 inputs, 4 outputs		
Command set	PI General Command Set (GCS)	PI General Command Set (GCS)	PI General Command Set (GCS)		
User software	PIMikroMove	PIMikroMove	PIMikroMove		
Software drivers	LabVIEW driver, shared libraries for Windows, and Linux	LabVIEW driver, shared libraries for Windows, and Linux	LabVIEW driver, shared libraries for Windows, and Linux		
Supported functions	Wave generator, data recorder, macros	Wave generator, data recorder, macros	Wave generator, data recorder, macros		
Display and indicators	LEDs for Power, Servo, Error, Overflow	LEDs for Power, Servo, Error, Overflow	LEDs for Power, Servo, Error, Overflow		
Linearization	4th order polynomials, DDL (Dynamic Digital Linearization)	4th order polynomials, DDL (Dynamic Digital Linearization)	4th order polynomials, DDL (Dynamic Digital Linearization)		
Separate protective earth connection	Yes	Yes	Yes		
Miscellaneous					
Operating temperature range	5 to 40	5 to 40	5 to 40	°C	
Overheat protection	Max. 72 °C, deactivation of the voltage output	Max. 72 °C, deactivation of the voltage output	Max. 72 °C, deactivation of the voltage output		
Mass	2.4 to 2.6	2.4 to 2.6	2.4 to 2.6	kg	approx.
Power consumption	80	80	80	W	max.
Power consumption without load	24	24	24	W	max.
Operating voltage	24 V DC (external power supply in the scope of delivery)	24 V DC (external power supply in the scope of delivery)	24 V DC (external power supply in the scope of delivery)		

Drawings and images



E-727, dimensions in mm



E-727: Operating limits (open-loop) with various capacitive loads, capacitance values in μF

Ordering information

E-727.3CD

Digital Multi-Channel Piezo Controller, 3 Axes, -30 to 130 V, Sub-D 25W3 Socket, Capacitive Sensors

E-727.3CDA

Digital Multi-Channel Piezo Controller, 3 Axes, -30 to 130 V, Sub-D 25W3 Socket, Capacitive Sensors, Analog Inputs

E-727.3SD

Digital Multi-Channel Piezo Controller, 3 Axes, -30 to 130 V, Sub-D 37 Socket, Strain Gauge Sensors

E-727.3SDA

Digital Multi-Channel Piezo Controller, 3 Axes, -30 to 130 V, Sub-D 37 Socket, Strain Gauge Sensors, Analog Inputs

E-727.3RD

Digital Multi-Channel Piezo Controller, 3 Axes, -30 to 130 V, Sub-D 37 Socket, Piezoresistive Sensors

E-727.3RDA

Digital Multi-Channel Piezo Controller, 3 Axes, -30 to 130 V, Sub-D 37 Socket, Piezoresistive Sensors, Analog Inputs

E-727.4SD

Digital Multi-Channel Piezo Controller, 4 Axes, -30 to 130 V, Sub-D 37 Socket, Strain Gauge Sensors

E-727.4RD

Digital Multi-Channel Piezo Controller, 4 Axes, -30 to 130 V, Sub-D 37 Socket, Piezoresistive Sensors

Possible Accessories

E-710.SCN

DDL (Dynamic Digital Linearization) Firmware Upgrade

Ask about custom designs!