E-754
Digital Piezo Controller

High-Speed, Single-Axis Controller

- Next generation digital controller provides higher flexibility, accuracy and speed
- Auto-loading of calibration data from stage ID chip for interchangeability of controller and mechanics
- Analog inputs and outputs
- Digital I/O lines for task triggering
- Extensive software package
- For nanopositioning systems with capacitive sensors

The E-754 digital controller from PI is the result of more than 30 years of experience with piezo positioning systems. It provides ideal control for the highest demands on positioning accuracy and dynamic performance of high-class precision nanopositioning systems. The E-754 replaces the E-753 controller and exceeds its performance by a factor of three.

Digital linearization for the highest accuracy
Linearization algorithms based on higher-order polynomials reduce the linearity error to less than 0.01 % with capacitive sensors. That is typically 10 times better than conventional controllers.
During fast periodic motion, such as that typical for scanning applications, it is possible to increase the tracking accuracy by up to a factor of three using Dynamic Digital Linearization (DDL, E-710.SCN).

High velocity and bandwidth for dynamic applications
The controller is perfectly suited for high-dynamics operation thanks to its high-resolution D/A converter and high-performance voltage amplifier. The high-speed processor with a sensor sampling rate of 50 kHz ensures settling times in the millisecond range and below.

Flexible customization for a variety of applications
The ID chip contains the calibration and servo-control parameters of the mechanics for PI nanopositioning systems that are equipped with an ID chip and were calibrated with digital electronics. The controller reads the data "intelligently" to adapt itself automatically to the mechanics connected and therefore renewed calibration is unnecessary after changing system components.

The integrated wave generator can save and output periodic motion profiles. Preconfigured sine and triangle wave profiles are provided to support the user when defining the curve, but any user-defined waveforms are possible.

Easy system connection
All parameters can be set and checked via software. Easy start-up and system configuration takes place via the PIMikroMove utility program included in the scope of delivery. Connection to the customer's software is possible via LabView drivers and shared libraries. System programming is identical for all PI controllers – combined control of a variety of different controllers is therefore possible without any problems.

Related and Compatible products

Compatible Mechanics
P-630 high-dynamics piezo nanopositioning system
P-518 • P-528 • P-558 piezo Z/tip/tilt stage
P-541.Z vertical nanopositioner
S-303 piezo phase shifter
P-620 – P-629 PIHera linear precision positioner

Related Controllers / Drivers / Amplifiers
E-727 digital multi-channel piezo controller
E-712 Digital Piezo Controller

Ordering Information

E-754.1CD
High-Speed Single-Channel Digital Piezo Controller for Capacitive Sensors

E-753.IO
Cable for Digital I/O Lines, 1.5 m, Open End

Ask about custom designs!

Specifications

	E-754.1CD
Function	Digital controller for single-axis piezo nanopositioning systems with capacitive sensors
Axes	1
Processor	375 MHz, 64-bit floating point, DSP/ARM
Sampling rate, servo-control	50 kHz
Sampling rate, sensor	50 kHz
Sensor	
Servo characteristics	P-I, two notch filters, optional APC
Sensor type	Capacitive
Sensor channels	1
Sensor bandwidth	8 kHz
Sensor resolution	19 bit
External synchronization	100 kHz and 4.8 MHz (LVDS)

Amplifier	
Output voltage	-30 to 135 V
Amplifier channels	1
Peak output power, <2 ms	45 W
Average output power	15 W
Peak output current, <2 ms	500 mA
Average output current	120 mA at 20 °C
Current limitation	Short-circuit proof
Resolution DAC	22 bit effective
Interfaces and operation	
Interface / communication	Ethernet (TCP/IP), SPI, USB, RS-232
Piezo / sensor connection	Sub-D 7W2 (f)
Analog input	LEMO, 1 channel, ±10 V, 20-bit ADC
Analog output	LEMO, 1 channel, ±10 V, 16-bit DAC
Digital input	LEMO, 2 lines, TTL
Digital output	LEMO, 2 lines, TTL
Command set	PI General Command Set (GCS)
User software	PITerminal, PIMikroMove
Software drivers	LabVIEW driver, dynamic libraries for Windows and Linux
Supported functions	Wave generator, trigger I/O, AutoZero, data recorder, macros
Display and indicators	Status LEDs
Linearization	4th order polynomials; optional DDL
Separate protective earth connection	Yes
Miscellaneous	
Operating temperature range	5 to 40 °C
Overheat protection	Automatic deactivation of the piezo output at temperatures higher than 70 °C
Mass	1.6 kg
Power consumption, full load	35 W (max.)
Power consumption, no load	13 W
Operating voltage	24 V DC from external power supply (included)