

Digital Piezo Controller

High-Speed, Single-Axis Controller



E-754

- Next generation digital controller provides higher flexibility, accuracy, and speed
- Autoloading 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

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.

High velocity and bandwidth for dynamic applications

The controller is perfectly suited to 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.

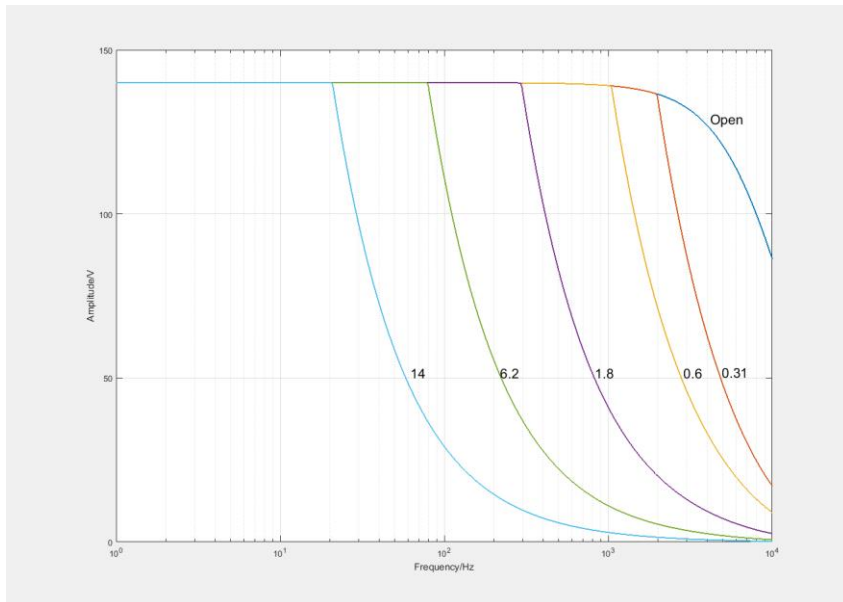
Extensive functions, software support

Powerful macro command language. Nonvolatile macro storage, e.g., for stand-alone operation with autostart macro. Data recorder. P-I controller, parameter changing during operation. Extensive software support, e.g., for NI LabVIEW, C, C++, MATLAB, Python. PIMikroMove user software.

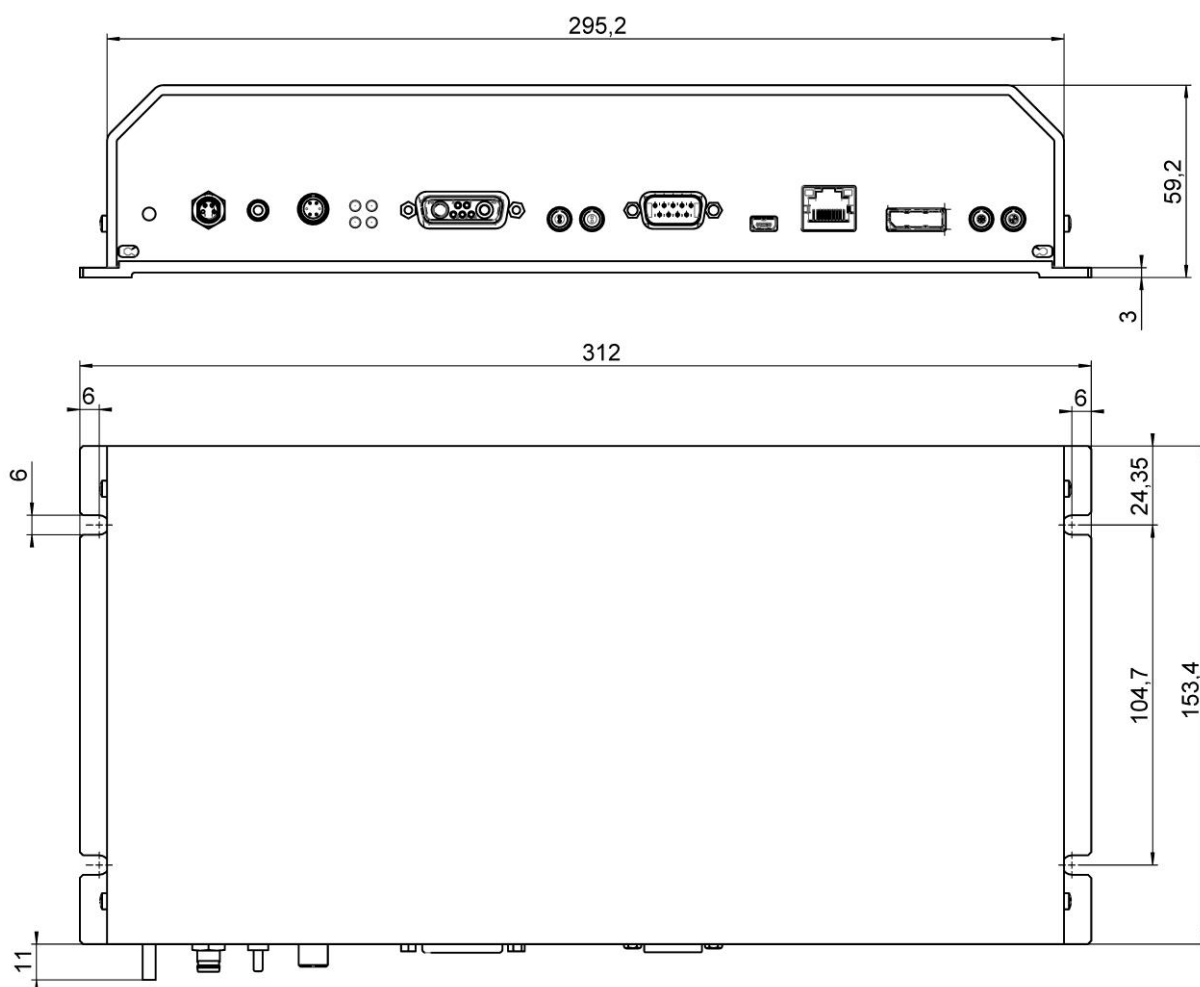
Specifications

	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
Supported functions	Wave generator, trigger I/O, autozero, data recorder, macros
Sampling rate, servo control	50 kHz
Sampling rate, sensor	50 kHz
Sensor	E-754.1CD
Controller type	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	E-754.1CD
Output voltage	-30 to 135 V
Amplifier channels	1
Peak power, <2 ms	45 W
Average output power	15 W
Peak 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	E-754.1CD
Communication interfaces	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, 20-bit DAC
Digital input	LEMO, 2 lines, TTL
Digital output	LEMO, 2 lines, TTL
Command set	PI General Command Set (GCS)
User software	PIMikroMove
Software drivers	NI LabVIEW driver, dynamic libraries for Windows and Linux
Display and indicators	Status LEDs
Linearization	4th-order polynomials; optional DDL
Separate protective earth connection	Yes
Miscellaneous	E-754.1CD
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 without load	13 W
Operating voltage	24 V DC from external power adapter (in the scope of delivery)

Drawings / Images



E-754: Operating limits (open loop) with various capacitive loads, capacitance values in μF



E-754, dimensions in mm

Ordering Information

E-754.1CD

Single-channel, digital high-speed piezo controller for capacitive sensors, with TCP/IP, USB, and RS-232 interface

Accessories

E-753.IO

Cable for digital I/O lines, 1.5 m, open end