C-867 Controller for PILine® Piezo Linear Drives

Servo-Controller with Integrated Driver for High-Speed Ultrasonic Piezo Motors

C-867 piezomotor controller together with an extremely low-profile M-692 positioner with integrated piezoceramic PILine® linear drive

- **Optimized for PILine® Ultrasonic Piezo Linear Motors**
- **High-Bandwidth Encoder Inputs Allow High Speed and Resolution**
- **PID Servo-Control with Dynamic Parameter Switching**
- **Integrated Piezo Motor Power Driver**
- **USB, RS-232 and Analog Interfaces (e. g. for Joystick)**
- **4 + 4 Programmable TTL-I/Os for Flexible Automation**
- **Data Recorder**
- **Daisy-Chain Networking for up to 16 Axes**
- **Powerful Macro Programming Language, e. g. for Stand-Alone Operation**
- **Extensive Software Support, LabVIEW, DLL ...**

The C-867 controller is especially designed for closed-loop positioning systems equipped with PILine® piezo linear motor drives. A compact case contains both drive electronics for the piezo ceramic motors and components for controlling and communication.

Application Examples

- Biotechnology
- Microscopy
- Fiber positioning
- Automation
- Photonics / integrated optics
- Quality assurance testing
- Testing equipment

The controller can be operated from a host PC either via a USB port or an RS-232 interface. Alternatively, a stand-alone operation is possible. Here, stored macro commands can be executed, or manual control by joystick or pushbutton box is possible.

Two models are available: C-867.160 is used to operate single-axis positioning systems, the two-channel C-867.260 is used with XY scanning stages.

Highly Specialized PID Servo-Controller

The C-867 is based on a highly specialized DSP (Digital Signal Processor) that handles the PID servo-control algorithm as well as other system functions. Because of the motion properties typical for ultrasonic piezomotors, the controller has a number of advanced features, including dynamic control parameter adaption. By automatically switching between gainsets for dynamic and static operation an optimized settling behavior within a couple of 10 milliseconds is achieved. The broadband encoder input (50 MHz) allows high resolution encoders to be used with the outstandingly high accelerations and velocities that PILine® drives deliver.

Highest Stability by Frequency Control

The integrated piezomotor drive electronics support all PILine® ultrasonic piezomotors used for the M-66x to M-69x positioning stage series.

Drift in the mechanical frequency of the motor caused by temperature or load changes is automatically compensated by a frequency-control loop which adjusts the operating frequency of the driving voltage. This leads to the highest stability in pushing force, velocity and closed-loop control.

Software / Programming

In addition to the user software for setup, system optimization and operation, comprehensive LabVIEW and DLL libraries are provided.

The PIMikroMove™ user software provides the PITuningTool for optimizing system performance. Graphic displays show the system's behaviour and facilitate parameter setting.

Advantages of PILine® Micropositioning Systems

Positioning systems equipped with ceramic ultrasonic drives of the PILine® series provide several advantages over positioners that apply classic drive technology:

- Smaller dimensions
- Higher holding force when powered down; no holding current
- Increased acceleration of up to 5 g
- Increased velocity of up to 500 mm/s or 720°/s
- No leadscrews, gears or other mechanical components, no wear or maintenance
- No lubricants
- Non-magnetic and vacuum-compatible operating principle

Ordering Information

C-867.160
Piezomotor Controller with Drive Electronics, Networkable, for PILine® Systems

C-867.260
Piezomotor Controller with Drive Electronics, 2 Channels, for PILine® Systems

Accessories:
C-819.20
Analog Joystick for 2 axes

C-819.20Y
Y-Cable for Connecting 2 Controllers to C-819.20

C-170.PB
Pushbutton Box, 4 Buttons and 4 LEDs

Ask about custom designs!

The two-channel C-867.260 controller operates XY scanning stages, here: a customized M-686 stage for microscopy

Technical Data

Model	C-867.160	C-867.260
Function	Controller and drive electronics for PILine® piezomotors / systems	
Drive type	PILine® motors, single and dual drives with P-661, P-664, U-161 or U-164	
Channels	1	2
Motion and control		
Servo characteristics	Programmable PID V-ff filter, parameter changes on the fly	
Trajectory profile modes	Trapezoidal	
Encoder input	A/B differential signals, 50 x 10^6 impulses/s	
Stall detection	Servo off, triggered by programmable position error	
Limit switch	2 x TTL per channel (programmable)	
Reference switch	1 x TTL per channel (active high / low, programmable)	
Electrical properties		
Max. output power / channel	15 W	
Max. output voltage / channel	200 V_{pp}	
Interfaces and operation		
Communication interfaces	USB, RS-232	
Motor connector	MDR14	2 x MDR14
Controller network	Up to 16 units on single interface	
I/O ports	4 analog/digital in, 4 digital out (Mini-DIN, 9-pin) digital: TTL analog: 0 to 5 V	
Command set	PI General Command Set (GCS)	
User software	PIMikroMove	
Software drivers	GCS-DLL, LabVIEW drivers	
Supported functionality	Start-up macro; macro; data recorder for recording parameters as motor input voltage, velocity, position or position error	
Manual control	Pushbutton box, joystick, Y-cable for control of 2 axes with joystick	Pushbutton box, joystick
Miscellaneous		
Operating voltage	24 VDC from external power supply (included)	
Current consumption	300 mA + motor current (2 A max.)	600 mA + motor current (4 A max.)
Operating temperature range	+5 °C to +40 °C	
Mass	1.0 kg	2.4 kg
Dimensions	206 x 130 x 66 mm (including mounting rails)	320 x 150 x 80.5 mm (including mounting rails)