

C-865

High-Speed, Closed-Loop Controller/Driver for PLine® Ultrasonic Piezo Linear Motors



C-865 with a PLine® M-663 miniature translation stage.

- **Optimized for PLine® Piezo Linear Motors**
- **High-Speed Encoder Input: 35 MHz**
- **PID Servo Algorithm with Dynamic Parameter Switching**
- **Integrated Piezomotor Drive Electronics**
- **S-Curve Profile Generator**
- **Limit Switch Control**
- **3 TTL Inputs, 3 TTL Outputs**
- **Analog Input**
- **Comprehensive High-Level Language Command Set**
- **Extensive Software Support, GCS Compatible (see p. 9-28)**
- **1 Mbit RAM for Real-Time Tracing**

The C-865 controller was specially designed for the newest generation of PLine® piezo linear motors and stages. This compact unit contains not only servo-control and communications circuitry, but also the drive electronics for the piezoceramic motors.

Application Examples

- Flexible automation
- Quality control
- Test equipment
- Biotechnology
- Photonics
- Fiber alignment

Specialized PID Servo-Controller

The C-865 uses a highly specialized DSP (Digital Signal Processor) to handle the PID servo-control algorithm, which has a wide range of options for controlling and programming acceleration, velocity or settling as well as other system functions.

Because of the static friction which is typical for piezomotors, the controller has a number of special features, including dynamic parameter switching for an optimized high-speed motion and settling behavior. The high-bandwidth encoder input with a limit fre-

quency of 35 MHz has ample reserves for the high speeds characteristic of piezo linear motors.

Integrated Drive Electronics, Optimized for PLine® Stages and Motors

To assure the best possible system performance, the integrated drive electronics is fine-tuned to the connected stage at the factory. M-663 miniature-stages can then, for example, achieve speeds up to 500 mm/s and more with a resolution of 0.1 µm and settling times of less than 10 ms.

Easy-to-Use Software / General Command Set (GCS)

For ease of operation, the C-865 is compatible with the PI General Command Set, designed to allow flexible combinations with other PI motion controllers (fiber aligners, stepper-motor controllers and piezo controllers for ultra-fast, sub-nanometer motion control). For more information on GCS, see p. 9-28.

Communication/Programming

Programming the C-865 is simplified by comprehensive software support, including LabView™ drivers and DLLs. All units are equipped with both USB and RS-232 Interfaces for communication with the host PC. In addition to the easy programming with GCS commands, direct DSP register access with low-level commands is also possible.

Advantages of PLine® Micropositioning Systems

The piezoceramic drives used in PLine® devices have a number of advantages over classical drives:

- Higher accelerations, up to 20 g

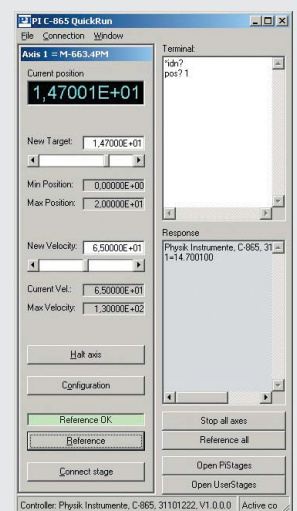
Ordering Information

- C-865.161**
Piezomotor Controller with Drive Electronics, 1 Channel, for PLine® Systems with P-661 Motors
- C-865.165**
Piezomotor Controller with Drive Electronics, 1 Channel, for PLine® M-665 Translation Stages

- Speeds to 500 mm/s and more
- Small form factor
- Self-locking at rest
- No shafts, gears or other rotating parts

Notes

To reduce the number of components in the system, the piezomotor drive electronics has been integrated in the C-865 controller. Models C-865.161 and C-865.165 are optimized for positioners with P-661 motors and M-665 stages, respectively.



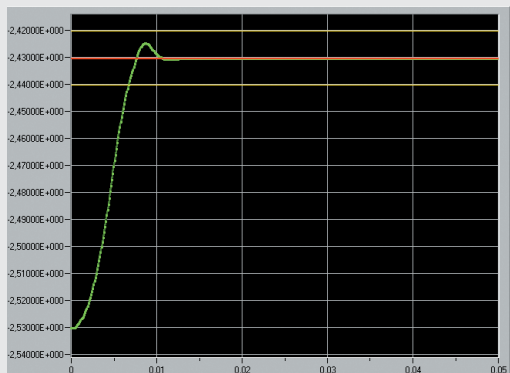
The C-865 operating software facilitates optimization and convenient operation of PLine® positioning systems. The results of the parameter setting can immediately be seen in the display as shown in the next graphics.

This product family has been replaced by the following new product:

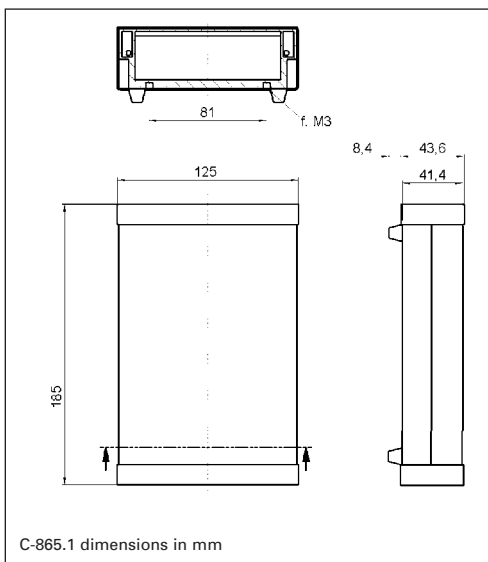
>> C-866 High-Speed, Closed-Loop Controller

Piezo • Nano • Positioning

PI



Settling behavior of a PILINE® M-663 linear stage with 100 g load after a 0.1 mm step. With dynamic parameter switching and the high servo rate, the C-865 can reach a stable position to within 0.1 μm (1 encoder count) in only 10 ms. Vertical axis displays motion in mm, horizontal axis time in seconds.



Technical Data

Models	C-865.1xx
Function	Controller / Driver for PILINE® Piezomotor Systems
Axes	1
Controller characteristics	Programmable PID, V-ff filter, on-the-fly parameter change
Trajectory profile	S-Curve
Resolution / output voltage	16-bit DAC, 0 to 60 Vrms (C-865.x61) or 0 to 170 Vrms (C-865.x65), at piezomotor MDR14 connector
Encoder input	A/B differential signal, 35 x 10 ⁶ Impulse/s, 4 x interpolated
Stall detection	Stop motor, deactivate servo, when position error exceeds programmable threshold.
Limit switch control	2 programmable TTL lines (active high/low)
Reference switch	1 programmable TTL line (active high/low)
Operating voltage	12 V DC, external power supply (included)
Operating current	190 mA (w/o piezomotor), current limit 1 A
Interfaces / communication	USB 1.1; RS-232, max. 115,200 Baud
Analog and digital I/O connections	DB9 Connector
Command set	PI General Command Set (GCS), see p. 9-28
Weight	565 g
Dimensions	185 x 125 x 44 mm

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