

# C-180 · C-181 · C-184 · C-185

## Analog and Pulsed Drivers for PLine® Ultrasonic Piezo Linear Motors



C-181.161 drive electronics with M-662.470 PLine® stage (20 mm, open-loop)

- For PLine® Ultrasonic OEM Motors and Stages
- Pulsed or Analog Drive
- OEM Board or Interface Box
- Ideal also with Third Party Controllers

C-180 to C-185 are single-channel drive electronics for PLine® ultrasonic piezomotors and stages. They were developed for customers who do not want to use the fully integrated C-170 and C-865 PLine® controllers/drivers. Drive electronics for piezomotors convert an analog or PWM input signal into a high-frequency drive signal which excites the required oscillations in the piezomotor and cause it to move.

### OEM or Packaged Electronics

The philosophy behind the design of PLine® ultrasonic drives dictates that they be easily adaptable to customer requirements. This includes making the drive electronics, independent of control signal type, available either as an OEM board or as a stand-alone unit in its own case. While the OEM boards are the most economic solution for large quantities, the stand-alone units make it possible to plug a system with PLine® stages together

and put it into operation quickly and easily, for example for system evaluation purposes.

### C-180, C-181 – Pulsed-Mode Operation

Pulsed operation with C-180 (OEM-Board) or C-181 (box with interface connectors) is especially suited for applications requiring small steps or rapid end-to-end motion, as in microscopy, automation or similar applications. The motor can be controlled with 5 V TTL pulses connected to the signal input on the driver electronics. The width of the pulses will determine the approximate length of the steps the motor makes. The smallest possible step is about 50 nm, requiring a pulse of about 10 µs in duration. The pulse rate and width can be used to influence the step size and rate, thus determining the velocity.

In addition to the single-step and step-sequence operating

modes, PLine® motors and stages can be operated in a high-speed CW mode with acceleration up to 20 g and velocities up to 500 mm/s and more. The CW mode is practical for applications where fast end-to-end motion is required, such as shutter or switching applications.

A flexible, programmable pulse generator with integrated C-180 driver is available as C-170.161.

### C-184, C-185 Analog Driver

The C-185 analog driver controls the motor speed as a function of a 10 V differential analog input. With an external position sensor and a controller, it is thus possible to set up a very fast, closed-loop system. The M-663 stage (see p. 10-18) with integrated linear encoder can also be run with this driver.

For closed-loop systems, PI also provides the C-865 controller (see p. 9-12), which already contains the analog drive electronics.

### Ordering Information

**C-180.161**  
Pulse-Mode OEM Drive Electronics for PLine® P-661 Piezo Linear Motors

**C-181.161**  
Pulse-Mode Drive Electronics for PLine® P-661 Piezo Linear Motors or Translation Stages with P-661 Motors; with Power Supply

**C-184.161**  
Analog OEM Drive Electronics for PLine® P-661 Piezo Linear Motors

**C-184.165**  
Analog OEM Drive Electronics for PLine® M-665 Translation Stages

**C-185.161**  
Analog Drive Electronics for PLine® P-661 Piezo Linear Motors or Translation Stages with P-661 Motors; with Power Supply

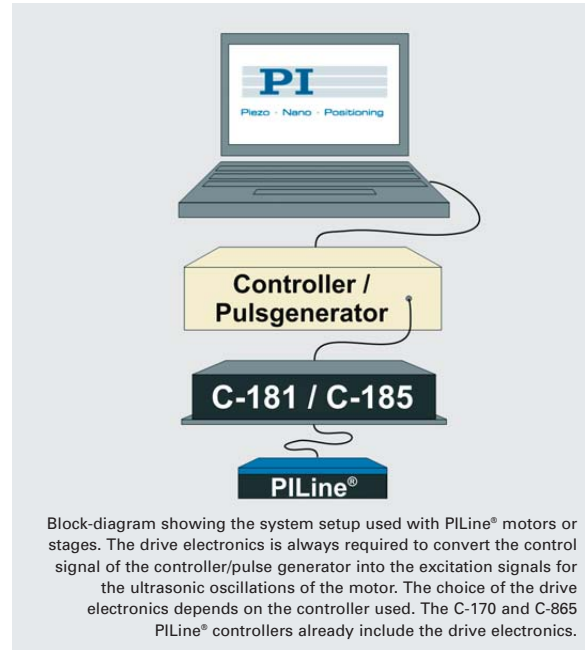
**C-185.165**  
Analog Drive Electronics for PLine® M-665 Translation Stages; with Power Supply

### Notes

The products described in this document are in part protected by the following patents: US-Patent No. 6,765,335.



C-180 OEM driver board with P-661 PLine® OEM piezomotor.



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Nanopositioning &amp; Scanning Systems

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Tutorial: Piezo-electrics in Positioning

Capacitive Position Sensors

Piezo Drivers &amp; Nanopositioning Controllers

Hexapods / Micropositioning

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**Motion Controllers**

Ceramic Linear Motors &amp; Stages

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## Technical Data

Models	C-180.161	C-181.161	C-184.161	C-185.161	C-184.165	C-185.165
Function	Single-channel OEM drive electronics board, pulsed mode	Single-channel driver box, pulsed mode	Single-channel OEM drive electronics board, analog mode	Single-channel driver box, analog mode	Single-channel OEM drive electronics board, analog mode	Single-channel driver box, analog mode
Motor / stage type	P-661 PLine® OEM piezo linear motor	P-661 piezo linear motors	P-661 piezo linear motors	P-661 piezo linear motors	M-665 translation stages	M-665 translation stages
Channels	1	1	1	1	1	1
Power supply	12 V ±10%, typ. 0.5 A	12 V, 15 W (included)	12 V, ±10%, typ. 0.5 A	12 V, 15 W (included)	12 V, ±10%, typ. 1 A	12 V, 15 W (included)
Control signal (input)	ENA (enable) and DIR (direction), TTL (but high up to 12 V allowed), Active high	ENA (enable) and DIR (direction), TTL (but high up to 12 V allowed), Active high	Differential, magnitude (max. 10 V) controls speed, polarity controls direction*	Differential, magnitude (max. 10 V) controls speed, polarity controls direction*	Differential, magnitude (max. 10 V) controls speed, polarity controls direction*	Differential, magnitude (max. 10 V) controls speed, polarity controls direction*
Output voltage to motor	3 x 60 V, 210 kHz	3 x 60 V, 210 kHz	3 x 60 V, 210 kHz	3 x 60 V, 210 kHz	3 x 170 V, 43 kHz	3 x 170 V, 43 kHz
Output power to motor	3 W	3 W	3 W	3 W	5 W	5 W
Controller connector	Soldering points	Sub-D 9	Soldering points	Sub-D 15	Soldering points	Sub-D 15
Stage/motor connector	Soldering points	LEMO EPL.0S.303.HLN	Soldering points	MDR 14 and LEMO EPL.0S.303.HLN	Soldering points	MDR 14 and LEMO EPL.0S.303.HLN
Operating temperature	+10 °C to +50 °C	+10 °C to +50 °C	+10 °C to +50 °C	+10 °C to +50 °C	+10 °C to +50 °C	+10 °C to +50 °C
Dimensions	35 x 18 mm <sup>2</sup>	108 x 34 x 56 mm <sup>3</sup>	65 x 38 mm <sup>2</sup>	108 x 34 x 76 mm <sup>3</sup>	65 x 38 mm <sup>2</sup>	108 x 34 x 76 mm <sup>3</sup>

\*Neither side of differential input may be more than 10 V from GND