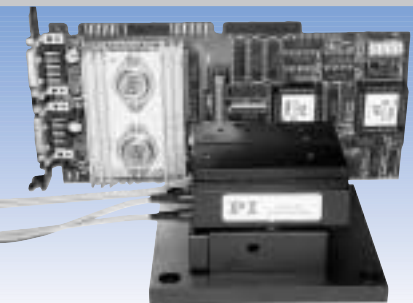


Ordering Information: Driver Options

- C-842.20**
DC-Motor Controller Upgrade, 2 Axes
- C-842.40**
DC-Motor Controller Upgrade, 4 Axes
- V-820.20**
QuickScan™ Voice Coil Scanning Controller Upgrade, 2 Axes
- E-760.3S0**
Low-Voltage Piezo Actuator Controller Upgrade, 3 Axes, for NanoCube™



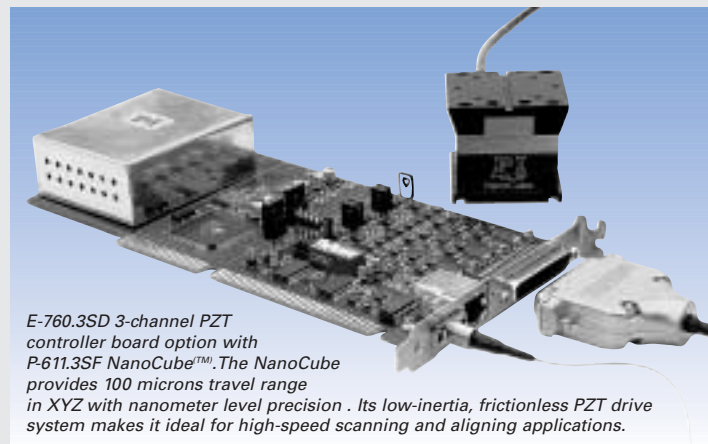
V-820 Voice-Coil scanner card option shown with XY scanning stage.
C-842. C-842 Servo Motion Controller Card controls 2 or 4 servo-motor channels.

Seamless Operation of Various NanoPositioning and MicroPositioning Drive Systems

The C-880 seamlessly operates the following drive systems. With controllers and drivers on-board, setup is further simplified, and complicated cabling issues are eliminated.

NanoPositioning Stages: Low-Inertia Piezosystems

Frictionless closed-loop piezo (PZT) driven flexure NanoPositioning stages can achieve sub-nanometer resolution and accuracy. One of their main advantages lies in the extremely low inertia and the high accelerations that solid-state piezo actuators are capable of generating. That's why PZT NanoPositioning stages are used in high-speed, high-resolution scanning applications, such as near-field scanning microscopy, atomic force microscopy, etc. Classical micropositioning stages cannot achieve the precision and scanning rates of NanoPositioning stages.



E-760.3SD 3-channel PZT controller board option with P-611.3SF NanoCube™. The NanoCube provides 100 microns travel range in XYZ with nanometer level precision. Its low-inertia, frictionless PZT drive system makes it ideal for high-speed scanning and aligning applications.

Currently, the C-880 can operate up to two P-611 NanoCube™ XYZ PZT NanoPositioning systems, providing 100 µm travel range in any axis.

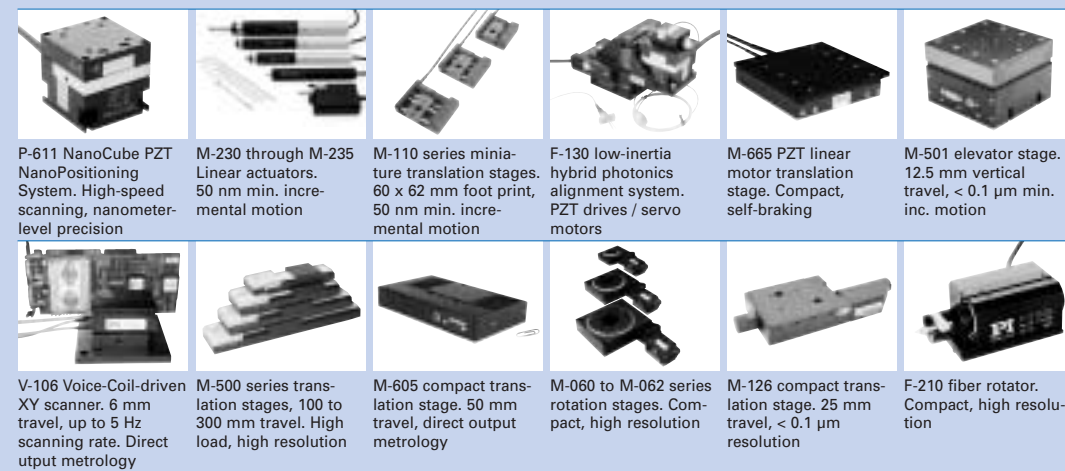
MicroPositioning Stages and Actuators: Smooth Motion over Longer Ranges

The C-880 can drive any translation stages, rotation stages, tilt stages and linear actuators in PI's product line. All of PI's high-speed positioning stages are equipped with the unique ActiveDrive™ integrated servo amplifier. The

low-speed stages and the ultra-compact stages are driven by the C-880's on-board servo-amplifiers. Stages range from the M-110 compact translation stage (5 mm travel, 62 x 60 mm footprint, 50 nm min. incremental motion) to the M-235 ballscrew high-resolution linear actuators and the M-531.DD translation stages with direct output metrology.

The enormous flexibility of the C-880 and the ongoing development of further hardware and software options allows the user to operate an almost unlimited number of positioning combinations. Since we can only show a few examples here, we encourage you to talk to your PI sales engineer about your application. He or she will be happy to assist you in selecting the C-880 configuration that fits your needs.

C-880 Drive Examples



- P-611 NanoCube PZT NanoPositioning System.** High-speed scanning, nanometer-level precision
- M-230 through M-235 Linear actuators.** 50 nm min. incremental motion
- M-110 series miniature translation stages.** 60 x 62 mm footprint, 50 nm min. incremental motion
- F-130 low-inertia hybrid photonics alignment system.** PZT drives / servo motors
- M-665 PZT linear motor translation stage.** Compact, self-braking
- M-501 elevator stage.** 12.5 mm vertical travel, < 0.1 µm min. inc. motion
- V-106 Voice-Coil-driven XY scanner.** 6 mm travel, up to 5 Hz scanning rate. Direct output metrology
- M-500 series translation stages.** 100 to 300 mm travel. High load, high resolution
- M-605 compact translation stage.** 50 mm travel, direct output metrology
- M-060 to M-062 series rotation stages.** Compact, high resolution
- M-126 compact translation stage.** 25 mm travel, < 0.1 µm resolution
- F-210 fiber rotator.** Compact, high resolution

Configuration Example for Fiber Alignment

Left Side:

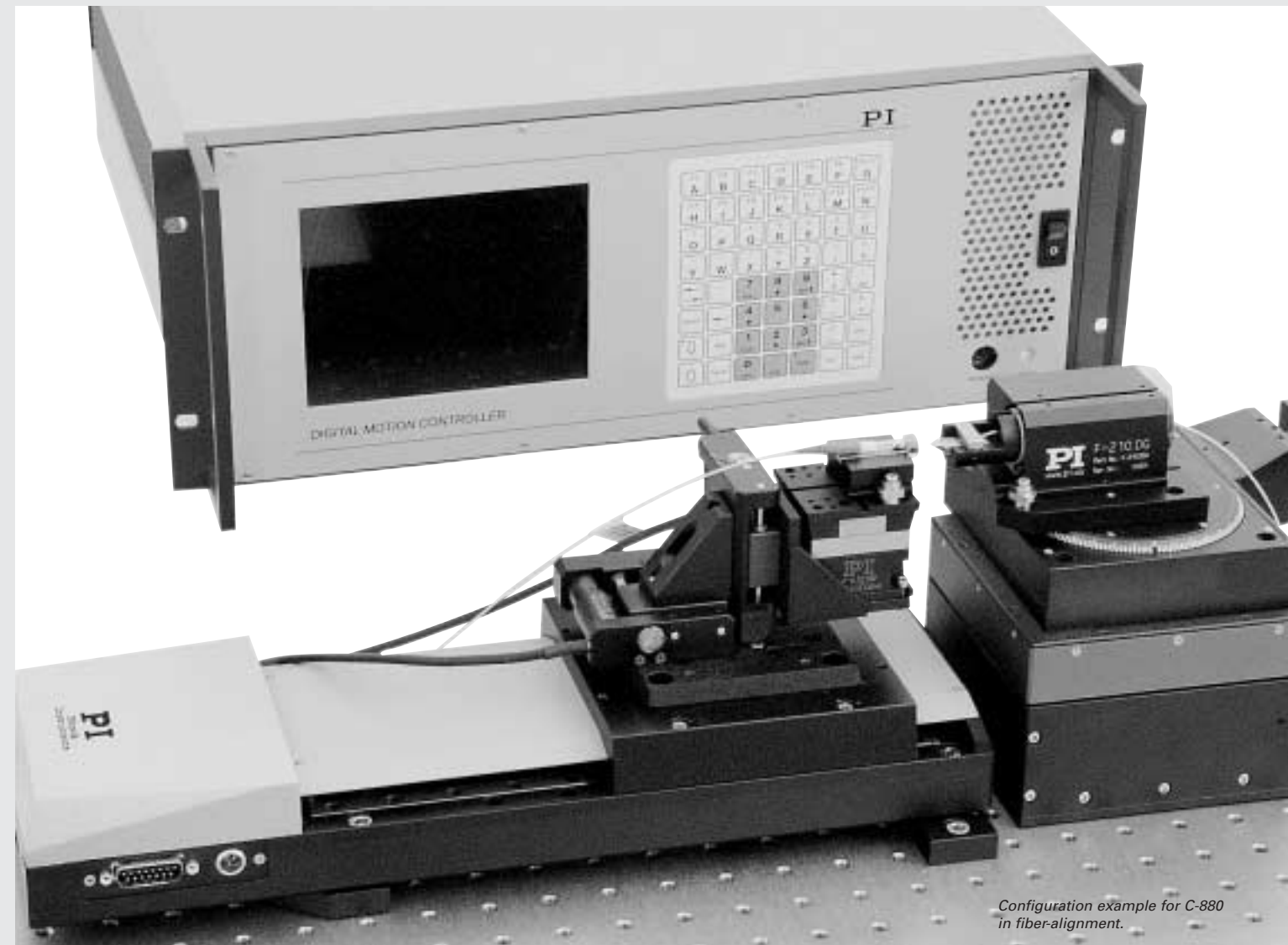
- **M-511.DD**
Linear Translator with Linear Scale Encoder for Fast, Long-Range Travel (Loading/Unloading) 100 mm Travel, 0.1 µm Resolution. Driven by C-842.40
- **F-131.3SD**
Consists of 3x M-111.1DG and Nanocube™ P-611.3SF for Fine Alignment Tasks. Travel in XYZ: 15 mm with a Resolution of 1 nm. Driven by C-842.40 and E-760.3S0

Right Side:

- **M-501.1PD**
Vertical Stage for Coarse Alignment. Travel: 12.5 mm, Resolution 0.008 µm. Driven by C-842.40
- **M-061.PD**
Rotary Stage for Angular Alignment. >360° Travel, Resolution 17.5 µrad. Driven by C-842.40
- **F-210.DG1**
Motorized Fiber Rotator Around the Optical Axis. Driven by C-842.40
- **Fiber Holder Accessories**

Background:

- **C-880.00D** equipped with
- **F-206.IRU**
Optical Photometer Board for Automated Alignment Detection
- **C-842.40 DC-Motor Controller Cards**
- **E-760.3S0 Piezo-Actuator Controller Card**



Configuration example for C-880 in fiber-alignment.



Micromanipulation with the PI line™ M-661 stage. This ultra-compact stage provides 20 mm of high-resolution motion in a package smaller than a match box.

VoiceCoil Drives: Magnetic Linear Motors for Rapid Scanning and Positioning

Voice coil systems offer very high-accuracy positioning and scanning in the smallest package and can reach speeds of up to 50 mm/s over travel ranges up to 6 mm. They are more rapid than classical lead-screw micropositioners, cover longer travel ranges than piezo actuators, and are also

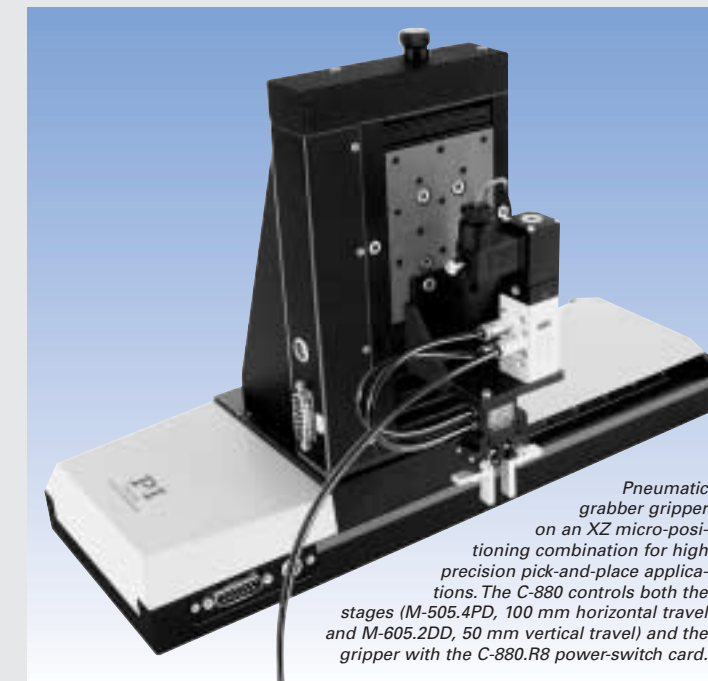
available in two-dimensional X-Y versions.

PiezoMotor Stages PI line™: Piezoelectric Linear Motors for Limited-Space Applications

Piezo-linear-motor-driven translation stages provide high resolution and velocity and a long travel range in an extremely small package. The M-661 stage, for example, provides 20 mm of high-resolution travel in a package the size of a coin. In contrast to magnetic linear

Ordering Information Accessories

- **F-206-IRU**
Photometer Card (IR Range)
- **F-206-00U**
Photometer Card (Visible Range)
- **F-206-I3E**
GPIB/IEEE 488 Interface Board
- **F-206.MC6**
Manual Control Pad
- **C-880.R8**
Switching Board with 8 Relays



Pneumatic grabber gripper on an XZ micro-positioning combination for high precision pick-and-place applications. The C-880 controls both the stages (M-505.4PD, 100 mm horizontal travel and M-605.2DD, 50 mm vertical travel) and the gripper with the C-880.R8 power-switch card.

Accessories for Flexible Automation

To live up to its name of "Automation Controller", a variety of options and high-level drivers are available for the C-880.

- High-speed GPIB/IEEE 488 interface card allows easy operation of one or more C-880s and other devices from one controlling PC.
- Optional C-880.R8 output card switches power on up to 8 channels. The high-power outputs (24 V, 1 A) can directly drive solenoids, relays or other loads for control of pneumatic grippers, vacuum chucks, brakes, valves, lasers, etc.
- F-206.MC6 Manual Control Pad option. This option allows easy manual control of any 6 motorized axes in the system, a valuable feature when it comes to testing or setting up a system.

■ F-206.iRU/00U Photometer and A/D cards. The C-880 high-level firmware structure supports a number of automated photonic search and alignment routines based on the input from these IR- or visible-range cards. Both cards come with a 12-bit A/D converter that can also be used for other automation applications.

Call your PI sales engineer for details and assistance with your application

C-880.R8 Switching Functions For:

- **Solenoids**
- **Valves**
- **Grippers**
- **Vacuum Chucks**
- **Sensor-Triggered Events**

C-880

Software Tools for Superior Solutions

PI General Command Set

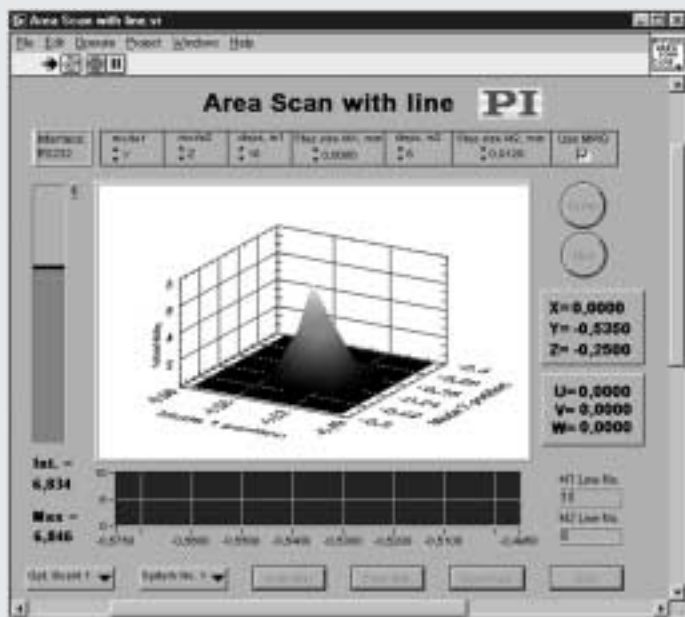
To reduce your programming effort in the face of complex multi-axis positioning tasks, PI has introduced the PI General Command Set.

All new controllers for motors and actuators will understand the commands of this set, either directly or through the use of command libraries which translate the standardized commands to low-level instructions as necessary to save communications time and/or bandwidth.

The PI General Command Set is valid for different devices, and multiple devices can be controlled from one host PC with one or more interfaces.

The C-880 automation system supports the PI General Command Set.

The C-880 automation system supports the PI General Command Set.



High-level scan and alignment routines make the C-880 an ideal tool for photonics automation applications.



C-880 Configuration Engine makes changing the configuration as easy as drag-and-drop.



The C-880 comes with a number of standard configurations to choose from.

<http://www.pi.ws>
info@pi.ws

C-880

Multi-Axis Automation-Platform



Application Examples

- Photonics Packaging
- Fiber Alignment
- Micro-Handling
- Flexible Automation
- Quality Control
- Semiconductor Test Equipment
- Biotechnology

PI General Command Set
Compatible

Technical Data C-880

Model	C-880.00, C-880.00D
Axes	Up to 16 DC-motor, (piezo-motor or voice-coil) channels Up to 6 piezo actuator axes
Processor	32-bit AMD K6-II 500 MHz CPU
Communication Interface	RS-232, IEEE 488/GPIB, optional
Command Set	PI General Command Set, ASCII Communication
Dimensions	19" rackmount, 450 mm x 460 mm x 180 mm
Operating Voltage	100 to 250 VAC, 50, 60, 440 Hz

Technical Data E-760 Piezo-Controller Card

Model	E-760
Function	Power amplifier & sensor / position servo-control of P-611 NanoCube™ systems
Channels	3 LVPZT
Max. output power	9 W
Average output power	3 W
Peak output current	90 mA
Average output current	30 mA
Output voltage	-20 to +120 V
Sensor type	Strain gauge
Servo characteristics	P-I (analog), notch filter
Connector	25-pin sub-D
Dimensions	PC card (ISA)

Technical Data C-842 Servo Motion Controller Card

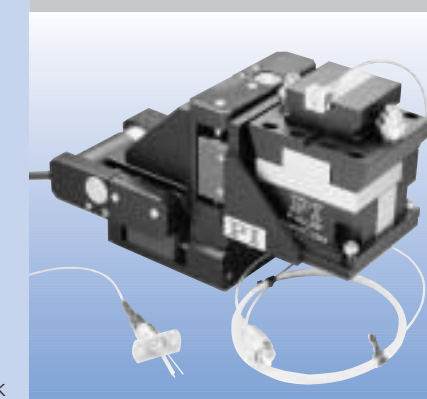
Model	C-842.20 / C-842.40
Function	DC servo-motor controller
Channels	2 / 4
Output power	Analog H-bridge +/-12 V, 5 W per channel, 12-bit PWM output, 10 bit, 24.5 kHz for external amplifiers (ActiveDrive™)
Encoder input	Quadrature encoder signals (single-ended or differential mode), max. 10 ⁶ cts/s
I/O Ports	Limit and origin switches
Servo Characteristics	32-bit programmable PID-f filter
Connectors	2 x 15-pin D-sub on board 2 x 15-pin D-sub on bracket holder (C-842.40)
Dimensions	PC card (ISA)

Technical Data C-880.R8 Power-Switch Card

Model	C-880.R8
Function	Power-switch card
Channels	8
Output power	60 W
Voltage per channel	24 V
Current per channel	1 A

Ordering Information

- C-880.00**
Multi-Axis Automation-Platform, Basic Unit, RS-232 Interface
 - C-880.00D**
Multi-Axis Automation-Platform, Basic Unit, RS-232 Interface, Front-Panel Display and Keyboard
- For Upgrades and Options, See the Following Pages!**



F-130.3SD Ultra-low inertia, hybrid XYZ photonics alignment system provides nano-meter-level precision and superior alignment speed in a small package at low cost. Two F-130 systems (plus other equipment) can be operated by a single C-880 controller.

- Scalable for Rapidly Changing Requirements
- Seamless Control of up to 18 Axes (PZT NanoPositioners, Servo-Motor Stages, Voice-Coil Drives, Piezo Linear Motors)
- Integrated High-Level Command Set Performs Scans, Alignments, etc.
- Convenient System Configuration Allows for Plug-and-Play Operation
- All Required Controllers and Drivers Built into One Rack-Mountable 19" Chassis
- Wide Range of Add-On Accessories (I/O Cards, Optical Metrology Cards, Manual Control...)
- Optional IEEE 488 Interface for Easy Networking
- Software Libraries and High-Level Drivers
- Powerful Macro Command Language

Flexibility from the Ground up

The new C-880 is a versatile, multi-axis control platform for complex automation tasks ranging from photonics alignment and packaging to biotech applications. Based on a rugged, high-performance industrial PC, it offers the flexibility required

in today's demanding and rapidly changing prototyping and production processes. Several basic versions and upgrades are available to coordinate combinations of up to 18 channels of servo motorized, voice-coil, piezo motor or piezo flexure Micro- and NanoPositioning stages. Other options include optical power meter cards for fully automated fiber alignment, a front panel display and keyboard for easy stand-alone operation and a manual control pad for convenient repositioning.

Convenient Interfacing

Control of the C-880 is facilitated by the controller's software architecture, which provides a variety of high-level commands for minimized communications bandwidth overhead. Other C-880 features include:

- Integrated Scan & Automatic Alignment Functions

- Powerful Macro Command Language
- LabView™ Drivers and DLL Libraries
- Terminal Software
- Configuration Software

Easy Operation, Configuration and Upgrade

All C-880s are delivered fully configured to your requirements and are ready to run your positioning equipment. The sophisticated firmware allows seamless operation of different kinds of positioners. With the newly developed configuration engine, changing the setup is as easy as drag-and-drop. It allows you to upgrade the system at any time, change the assignment of the individual axes and replace or add controller cards. Firmware upgrades can also be carried out on-site without any hardware changes.

Technical Data

Model	C-880.00, C-880.00D
Axes	Up to 16 DC-motor, (piezo-motor or voice-coil) channels Up to 6 piezo actuator axes
Processor	32-bit AMD K6-II 500 MHz CPU
Communication Interface	RS-232, IEEE 488/GPIB, optional
Command Set	PI General Command Set, ASCII Communication
Dimensions	19" rackmount, 450 mm x 460 mm x 180 mm
Operating Voltage	100 to 250 VAC, 50, 60, 440 Hz

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