

M-511.5i
M-521.5i
M-531.5i

IntelliStages™



M-511.5i IntelliStage™
with integrated motion controller

- **Precision Translation Stage and Motor Controller in a Single Package**
- **Daisy-Chain Network Capability**
- **Fewer Components—Higher Reliability**
- **Plug & Play Operation Through RS-232 Interface from Any PC or PLC**
- **Travel Ranges up to 306 mm (12")**
- **0.1 μm Resolution**
- **Stress-Relieved Aluminum Stage Base for Highest Stability**
- **Zero-Backlash Recirculating Ballscrews**
- **Hall-Effect Origin and Limit Switches**
- **>20,000 Hours MTBF**

M-500 Series IntelliStages™ are designed to meet demanding positioning requirements at minimum expense.

High Level of Integration

Because of the high level of integration, IntelliStages™ contain less than 50% of the components of a classical controller/stage setup (electronics, mechanics and cables!). This fact automatically increases the reliability and eliminates the potential of incompatibility.

Application Examples

- Quality control
- Semiconductor test equipment
- Metrology
- Disk drive test setups
- R&D

Ordering Information

M-511.5iM
IntelliStage™ Translation Stage, 102 mm (4"), Master Set, Including 24 V P/S

M-521.5iM
IntelliStage™ Translation Stage, 204 mm (8"), Master Set, Including 24 V P/S

M-531.5iM
IntelliStage™ Translation Stage, 306 mm (12"), Master Set, Including 24 V P/S

M-511.5iS
IntelliStage™ Translation Stage, 102 mm (4"), Slave Set

M-521.5iS
IntelliStage™ Translation Stage, 204 mm (8"), Slave Set

M-531.5iS
IntelliStage™ Translation Stage, 306 mm (12"), Slave Set

Custom Designs for Volume Buyers

Mechanically, the stages feature an ultra-stable, lightweight base precision machined from high-density, stress-relieved aluminum. The functional flat design allows multi-axis combinations.

Precision-ground recirculating ballscrews (higher precision than rolled ballscrews) with preloaded nuts provide low-friction, backlash-free positioning. High-precision linear guiding rails with recirculating ball bearings (no cage migration!) guarantee 1 μm/100 mm straightness and flatness. A high-resolution, 5-phase stepper motor with 20,000 steps/revolution provides minimum incremental motion of 0.1 μm.

Non-Contact Limit and Origin Switches

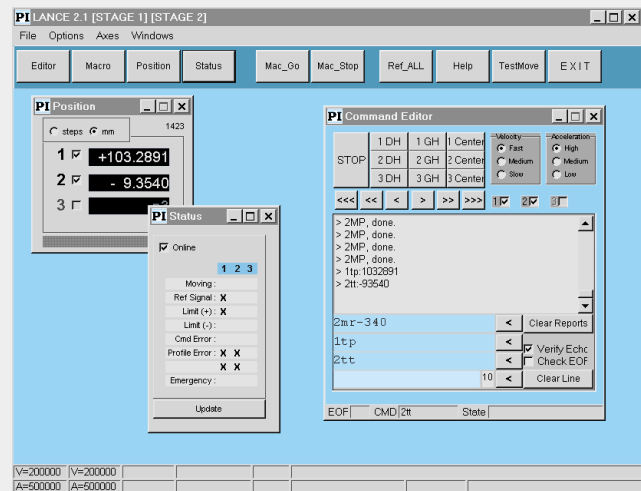
Integrated, high-precision, non-contact Hall-effect origin and limit switches with direction sensing on the origin switch protect your equipment and increase versatility in automation applications.

Setup and Daisy-Chain Feature

Setting up the IntelliStage™ is very easy. Connect one end of the cable (included) to the RS-232 interface of the PC and to the power supply (included), the other end to the stage and start the software (included). IntelliStages™ can be easily daisy-chain networked to form multi-axis motion-control systems—no extra parts are required. Whenever an additional stage is needed, it can be added and controlled from the same PC off the same interface (see drawing). Up to 27 IntelliStages™ can be daisy-chain networked (more with minor modifications).

Notes

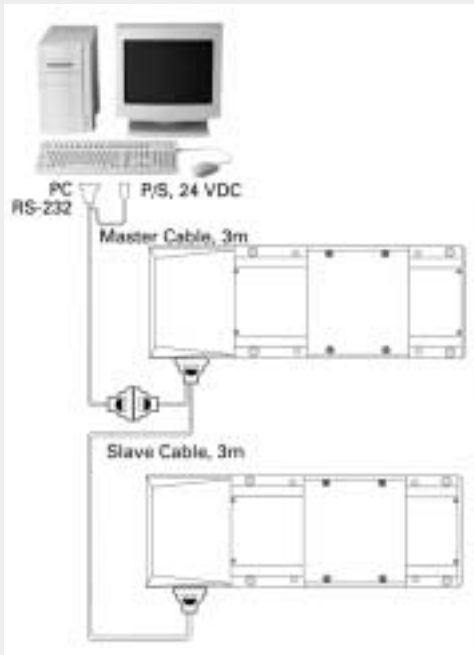
See "Accessories," page 7-82 ff. for adapters, brackets, etc.
See p. 7-43 for dimensional drawing.



Command editor for controlling multiple IntelliStages™ from one computer

PZT Actuators
PZT Flexure NanoPositioners
PZT Active Optics / Steering Mirrors
Tutorial: Piezoelectrics...
Capacitive Position Sensors
PZT Control Electronics
MicroPositioners / Hexapod Systems
Photonics Alignment & Packaging Systems
Motor Controllers
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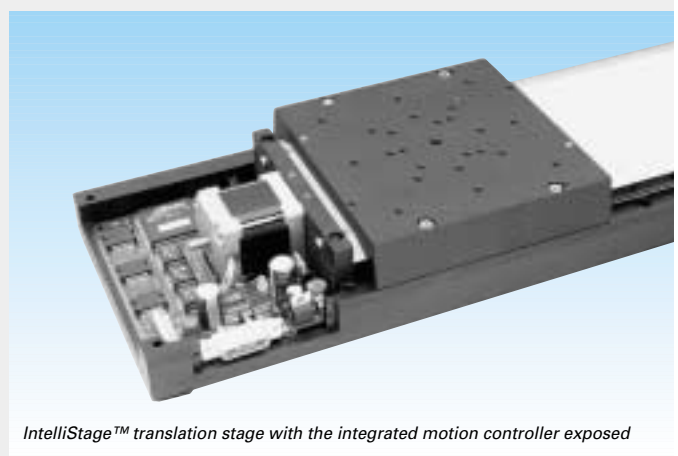
<http://www.pi.ws>
info@pi.ws



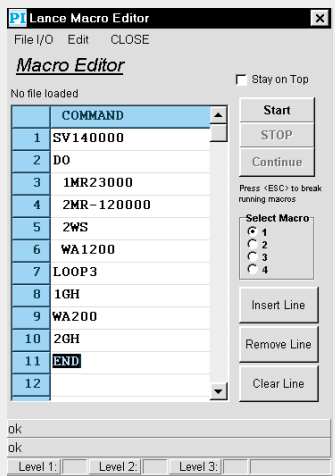
IntelliStage™, master/slave configuration. Up to 27 stages can be networked in a chain (custom designs with more than 27 are feasible).



Combination of two M-511.5i IntelliStages and an M-060 rotation stage. The special controller in the foreground allows operation of IntelliStages™ and other PI motorized stages from one computer interface.



IntelliStage™ translation stage with the integrated motion controller exposed



Macro editor software for M-511.5i IntelliStages™

Technical Data

Models	M-511.5i	M-521.5i	M-531.5i	Units	Notes see p. 7-96
Travel range	102	204	306	mm	
Design resolution	0.1	0.1	0.1	µm	A3
Min. incremental motion	0.1	0.1	0.1	µm	A4
Unidirectional repeatability	0.2	0.2	0.2	µm	
Bidirectional repeatability	1	1	1	µm	
Origin repeatability	1	1	1	µm	
Accuracy per 50 mm	2	2	2	µm	
Straightness / flatness per 100 mm	1	1	1	µm	
Max. velocity	20	20	20	mm/sec	
Max. normal load capacity	100	100	100	kg	B1
Max. push/pull force	80 / 80	80 / 80	80 / 80	N	B2
Max. lateral force	200	200	200	N	
Motor resolution	20000	20000	20000	steps/rev.	
Ballscrew pitch	2	2	2	mm/rev.	
Motor type	5-phase stepper	5-phase stepper	5-phase stepper		
Operating voltage *	24	24	24	V	
Weight	5.1	6.2	7.3	kg	
Body material	Al	Al	Al		L
Motor controller *	Integrated	Integrated	Integrated		

* Motor controller integrated in stage, cable for RS-232 interface and power included, 24 V power supply included in M-5x1.5iM Master Sets