



## Micromanipulators

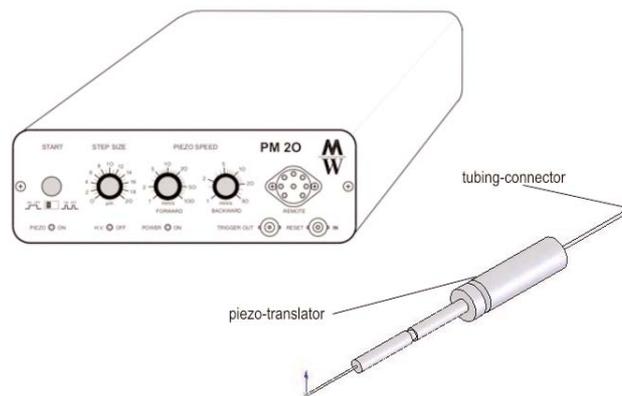
Microinjection of cells, with a hard or elastic cell membrane that resists, or gives to the injection capillary tip, is scarcely possible using conventional micromanipulators. Because of its very high penetration velocity and precise axial forward movement the PM 20 is a very efficient tool for this type of applications.

Any dodging of cells is virtually eliminated and even very resistant structures can be penetrated. An independent setting for retraction speed, separate from the forward speed, allows for very quick withdrawal of the capillary, without the penetrated cell sticking to the capillary tip.

The piezo manipulator PM 20 was primarily designed for use with our micromanipulators DC-3K and MMJ. It easily mounts directly to their standard tool holders. On request we can provide special mounting kits for other brands and types of micromanipulators (e.g. manual Leica manipulator, or Eppendorf InjectMan). The PM 20 may be used in combination with any common injector (e.g. Eppendorf, or WPI PV 820/830), provided that they feature the corresponding 5-volt TTL input / output.

Any such PM 20 configuration represents a high-performance unit for intracellular injection, and it is a great value for the money. The capillary is merely positioned at the cell; penetration, injection, and retraction of the capillary is fully automated and implemented at the push of a button (or optional foot switch).

## PM 20 piezo micromanipulator



## Specifications

### Order information

PM 20 with controller  
Part No.: 00-79-220-6820

The special design of this piezo element lets it achieve almost axial motion, which is crucial to a vibration free injection at high penetration speeds. Even at the maximum step size of 20  $\mu\text{m}$ , the sideways deviation from the ideal axis measures a mere 1  $\mu\text{m}$  (at the tip of the capillary).

<b>Step size:</b>	0 - 20 $\mu\text{m}$ adjustable
<b>Vmax forward:</b>	100 mm/s
<b>Vmax reverse:</b>	50 mm/s
<b>Input / output:</b>	one each 5 volt TTL in and out
<b>Fastest possible step sequence:</b>	1 step forward / backwards per second
<b>Weight:</b>	PM 10     200 g controller   2000 g

For more detailed information, please visit our web-site at: [www.marzhäuser.com](http://www.marzhäuser.com)

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