



Leica Mechanical Micromanipulator

Superior precision engineering
for exact movement

Leica
MICROSYSTEMS

Leica Mechanical Micromanipulator – the original

Leica Mechanical Micromanipulators have proved extremely successful in all branches of medicine and biology where surgical, physiological or chemical operations have to be performed on living animal and vegetable organisms. They are also useful for technical assembly and machining processes that can only be observed through the microscope.

In a continuously selectable gear reduction, Leica Micromanipulators translate, directly and without any backlash, the hand movements of the operator evenly and in the right direction to the tools. The chosen gear reduction can be matched to the microscope magnification.



Mechanical micromanipulator



Biology, medicine, biotechnology and genetic engineering

- c Microsurgery
- c Transgenic applications
- c Microinjections of nucleic acids, proteins, dyes, cell organelles or pharmaceutical substances
- c artificial insemination
- c production of unicellular cultures
- c isolation of viruses, bacteria, organs, parts of organs or cells
- c electrophysiological measurements

Precision engineering and electronics

- c assembly of minute mechanical parts
- c assembly in transistor and semiconductor production
- c elasticity testing of ultra thin fibres
- c manufacture of extremely small scales, drill holes and soldering joints

Technical research

- c mechanical structure tests on industrial materials
- c analysis of metallic deposits
- c orientation or isolation of minute particles

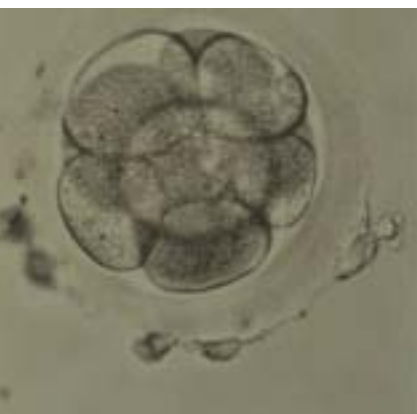
Leica Mechanical Micromanipulator – Superior precision engineering



All movement mechanisms of Leica Micromanipulators are completely free of backlash and are not affected by hysteresis or inertia phenomena unlike systems with pneumatic, hydraulic or electromechanic control. Thousands of our satisfied customers have been benefitting for decades from the following key advantages:

- c no movements of inertia to overcome when moving to specimen details
- c precise and straight movements of the microinstruments give optimum results
- c maximum tool positioning accuracy even at top magnifications

Smallest travel range approx. 0.25 mm



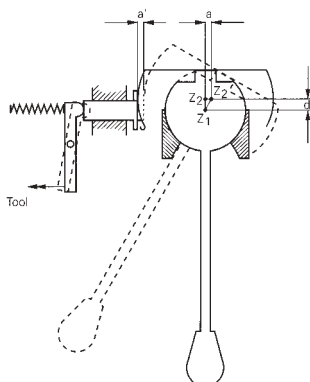
Embryo in the first stages of division
8-cell stage

- c reliable functioning
- c rapid prealignment of the micro tools with the individually adjustable instrument holders, saving valuable time
- c excellent user convenience – hands rest in a comfortable position on the base plate while using the tools
- c maximum accuracy for solving even extremely difficult problems

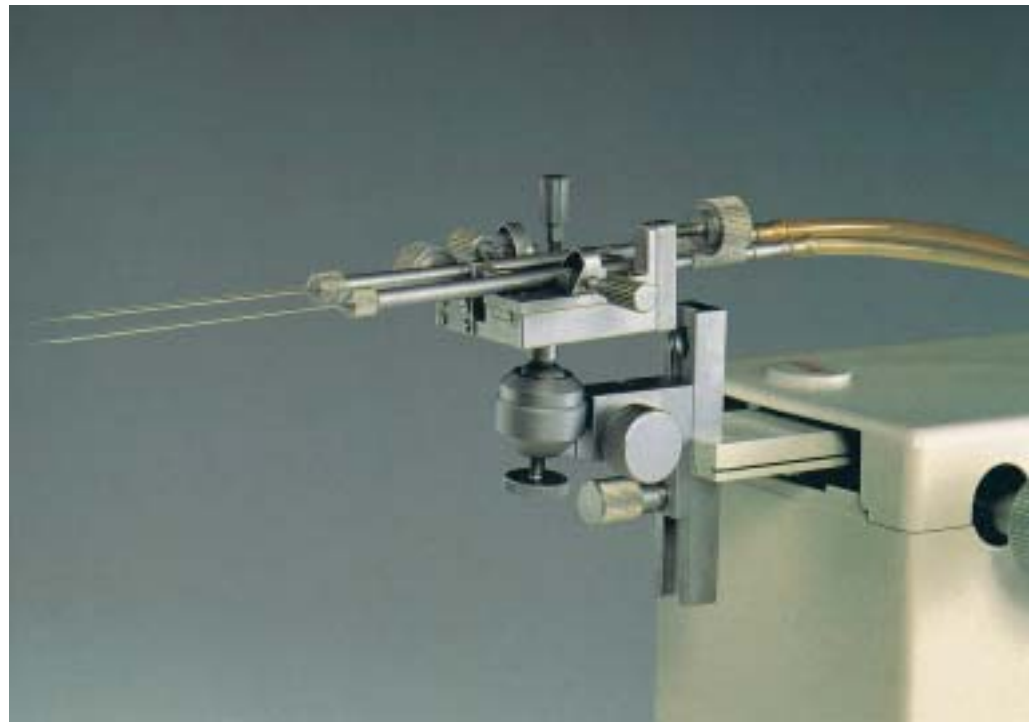
The proven lever and slide rail design of Leica Micromanipulators for moving the microinstruments works as follows:

When the position of the center points Z_2 of the outer ball socket is changed, a shorter lever arm is formed. Consequently, when the control lever is moved by the angle shown by the unbroken and dotted lines ($= Z_2 - Z_1 - Z_2'$) the slide rail moves by the distance $a' = a$. Using a further lever the movement of the instrument is made to move in the same direction as the control. This principle allows the continuous setting of transmission ratios between 1:1/16 and 1:1/800.

Additional controls for x and y movement are provided for pre-alignment of the instruments in the field of operation.



Leica Mechanical Micromanipulator – a sound basis for future-oriented techniques in biotechnology



The vertical movement control has been located separately from the x/y joystick to avoid them being mixed up.

Coaxial coarse and fine drives, like those on microscopes, are used to adjust the height of the instruments. There is a left- and a right-hand version of the Leica Micromanipulator. When the Micromanipulators are mounted symmetrically the height control knobs are therefore turned in the same direction on each side.

The drive knobs for the z movement of the instruments are within reach of the x and y controls, enabling simultaneous operation of all instrument movement controls.

Manipulation on objects in large containers is made easier by the inclination device that can be continuously adjusted between 0 and 15° with a rotary knob.

Flexibly adjustable instrument holders allow optimum alignment of the microtools.



Transgenic application
Photo: IGBMC, Strasbourg (F)

The single or double instrument holder can be inserted in the dovetail mounts of the micromanipulators. Both holders have arrestable ball joints which complement the inclination device in allowing movement of the tools at any spatial angle to the object.

The **single instrument holder** allows the attachment of one instrument sleeve.

The **double instrument holder** can take two instrument sleeves and permits a number of mechanically controllable movements of the two micro tools in relationship to each other:

forwards and backwards movement and inclination of one instrument plus scissor or tweezer movements with both instruments. This gives the additional possibility of making specific alterations to the relative positions of the two tools separate from the main movements of the Leica Micromanipulators.

For medical or biological specimens, the micro tools are mainly micropipettes drawn from glass capillaries with a diameter of 1 mm. These are inserted into the **instrument sleeves**, whose firm grip ensures smooth performance of microinjections or extractions.

Both the instrument holders and the sleeves are also useful for applications in precision engineering, electronics or in technical research.

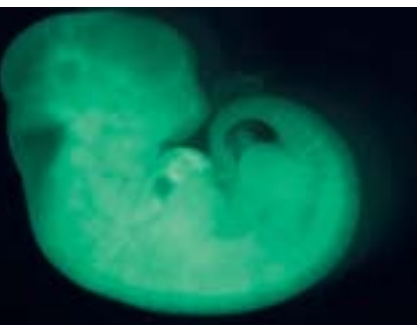
Vario joystick for enhanced precision

c Due to a continuously settable translation ratio, which can be adapted to the microscope magnification, the scope of the user's hand movement remains unchanged. So even at high magnifications, exact movements of the micromanipulators are no problem.

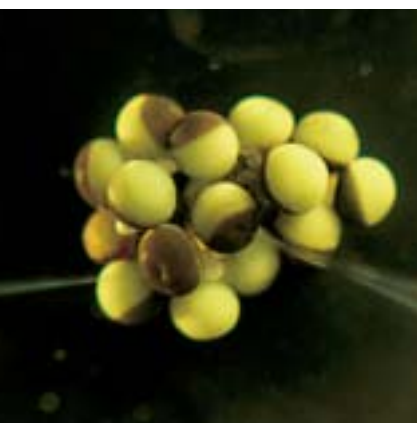
The force required to move the joystick can be individually set and it is also possible to lock the joystick in position.



Transgenic Mouse Embryo
(Transmitted light)
Photo: IGBMC, Strasbourg (F)



Transgenic Mouse Embryo
(GFP, fluorescence light)
Photo: IGBMC, Strasbourg (F)



RNA microinjection of frog oocytes
(Xenopus)

Leica
Micromanipulators with the
Leica DM IL
microscope for
examination of cell and tissue
cultures





The DM IRB HC –
ergonomically
designed for
optimal connection
of micromanipulators
and microtools

Leica Microsystems – the brand for outstanding products

Leica Microsystems' mission is to be the world's first-choice provider of innovative solutions to our customers' needs for vision, measurement, lithography and analysis of microstructures.

Leica Microsystems, the leading brand for microscopes and scientific instruments, developed from five brand names, all with a long tradition: Wild, Leitz, Reichert, Jung and Cambridge Instruments. Yet Leica symbolizes innovation as well as tradition.

Leica Microsystems – an international company with a strong network of customer services

Australia:	Gladesville	Tel. +61 2 9879 9700	Fax +61 2 9817 8358
Austria:	Vienna	Tel. +43 1 486 80 50 0	Fax +43 1 486 80 50 30
Canada:	Richmond Hill/Ontario	Tel. +1 905 762 2000	Fax +1 905 762 8937
Denmark:	Herlev	Tel. +45 4454 0101	Fax +45 4454 0111
France:	Rueil-Malmaison Cedex	Tel. +33 1 473 285 85	Fax +33 1 473 285 86
Germany:	Bensheim	Tel. +49 6251 136 0	Fax +49 6251 136 155
Italy:	Milan	Tel. +39 0257 486.1	Fax +39 0257 40 3273
Japan:	Tokyo	Tel. +81 3 5435 9600	Fax +81 3 5435 9618
Korea:	Seoul	Tel. +82 2 514 65 43	Fax +82 2 514 65 48
Netherlands:	Rijswijk	Tel. +31 70 4132 100	Fax +31 70 4132 109
Portugal:	Lisbon	Tel. +351 21 388 9112	Fax +351 21 385 4668
Republic of China:	Hong Kong	Tel. +852 2564 6699	Fax +852 2564 4163
Singapore:		Tel. +65 779 7823	Fax +65 773 0628
Spain:	Barcelona	Tel. +34 93 494 95 30	Fax +34 93 494 95 32
Sweden:	Sollentuna	Tel. +46 8 625 45 45	Fax +46 8 625 45 10
Switzerland:	Glattbrugg	Tel. +41 1 809 34 34	Fax +41 1 809 34 44
United Kingdom:	Milton Keynes	Tel. +44 1908 246 246	Fax +44 1908 609 992
USA:	Bannockburn/Illinois	Tel. +1 847 405 0123	Fax +1 847 405 0164

and representatives of Leica Microsystems in more than 100 countries.

The companies of the Leica Microsystems Group operate internationally in five business segments, where we rank with the market leaders.

Microscopy

Our expertise in microscopy is the basis for all our solutions for visualization, measurement and analysis of microstructures in life sciences and industry.

Specimen Preparation

We specialize in supplying complete solutions for histology and cytopathology.

Imaging Systems

With confocal laser technology and image analysis systems, we provide three-dimensional viewing facilities and offer new solutions for cytogenetics, pathology and material sciences.

Medical Equipment

Innovative technologies in our surgical microscopes offer new therapeutic approaches in microsurgery. With automated instruments for ophthalmology, we enable new diagnostic methods to be applied.

Semiconductor Equipment

Our automated, leading-edge measurement and inspection systems and our E-beam lithography systems make us the first choice supplier for semiconductor manufacturers all over the world.