



# Smooth Operator

Eppendorf micromanipulators TransferMan® 4r and InjectMan® 4  
with unprecedented movement control



Covering a broad range of applications, Eppendorf micromanipulation systems provide a high level of flexibility.

# »The Eppendorf micromanipulators combine an intuitive user interface with an unprecedented movement control.«

Everyone who performs microinjection knows what's most important to guarantee best results: precision, fast processing and ease of use. With this in mind, we developed the TransferMan® 4r and InjectMan® 4 to make your work as easy as possible.

## Microinjection into suspension cells

- > Production of genetically modified animals using pronuclear and cytoplasmic injection (e.g. CRISPR)
- > Applications in animal reproductive medicine (e.g. mouse ICSI)
- > Serial injection into fish embryos (e.g. Zebrafish, Medaka)
- > Injection into *C. elegans*, other worms, insects, etc.



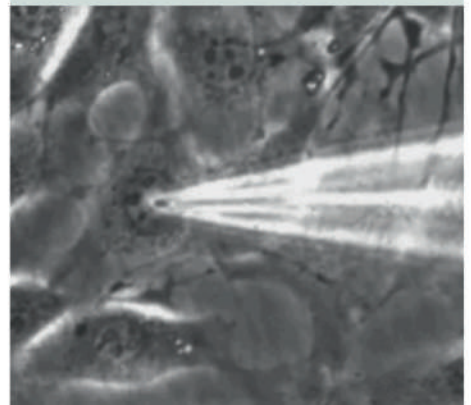
## Manipulation of suspension cells

- > Stem cell transfer
- > Nuclear transfer
- > Transplantation of cells into small organisms or 3D cell culture
- > Selection and isolation of individual cells (e.g. biopsies)



## Other application examples

- > Semi-automatic microinjection into adherent cells
- > Positioning and selection of microparticles
- > Microdissection of chromosomes, etc.
- > Automatic dispensing of cell suspensions or solutions



# TransferMan® 4r

The user-friendly TransferMan 4r combines an ergonomic and innovative operation concept that is ideal for manipulation of suspension cells such as oocytes and blastocysts. Application-specific user profiles simplify the individual workflow process with four predefined application masks to choose from (e.g. for cell transfer, DNA injection, etc.). The freely programmable »My application« mask can be optimized for specific individual needs.

## Features/advantages

- > Maximum stability ensures vibration-free work
- > One Joystick for precise movement control in 4 axes: X, Y, Z and X/Z (axial)
- > Programmable Z-axis limit for preventing capillary breakage
- > Connection with Eppendorf PiezoXpert® and Eppendorf electronic microinjectors

- 1 Unique DualSpeed™ joystick for precise, instantaneous control and positioning using two different speed modes
- 2 Ergonomically shaped control panel for fatigue-free work
- 3 Optimized user interface for various applications simplifies work procedures
- 4 Simple and quick capillary and sample change using automated home function
- 5 Selection and programming of additional functions (e.g. storage of up to 5 positions, limit, Y-off)
- 6 Comfortable, individual speed adjustment



The unique DualSpeed™ joystick combines precise and intuitive, direct movement with dynamic movement control for covering longer distances or speeding up sample processing. Furthermore, the dynamic movement mode can easily be switched off depending on the application need and personal preference.

# InjectMan® 4

The InjectMan 4 is ideal for microinjection into adherent cells, smaller organisms, and embryos in the early stages of development. The combination of InjectMan 4, FemtoJet® 4i or FemtoJet® 4x even enables a fast, semi-automatic injection. Furthermore, the InjectMan 4 is the ideal micromanipulator for all complex applications that require a dynamic movement mode and direct control of the injection process via the joystick button. The axial movement ensures the optimal protection of sensitive cells and the lowest possible mortality rate.

## Features/advantages

- > Maximum stability ensures drift-free work
- > Selection and programming of additional functions (e.g. axial movement, step injection)
- > Connection with Eppendorf PiezoXpert for piezo-assisted penetration over a pre-defined distance
- > PC interface for remote control



1 Dynamic movement control via joystick

2 Define injection levels and prevention of capillary breakage by programming the Z-axis limit

3 Connection with FemtoJet 4i, FemtoJet 4x for semi-automated axial injection

4 Simple and quick capillary and sample exchange using automated home function

5 Optimized user interface for various applications

The easily adjustable angle of the holding and injection capillaries can be set from 0° to 90°.



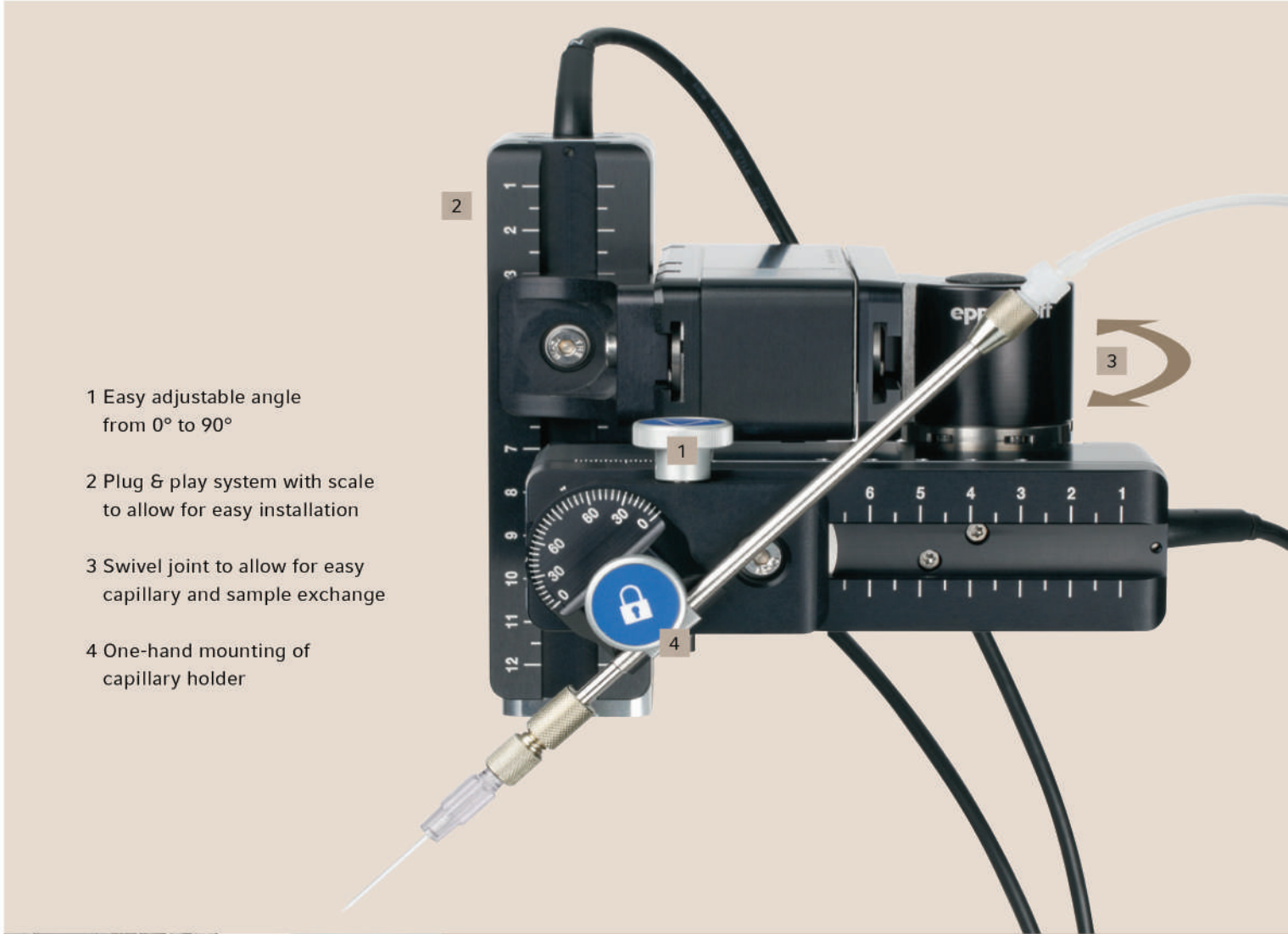
# Plug & Play Motor Modules

True to its roots, the Eppendorf electronic micromanipulators convince with outstanding technical performance and an overall ergonomic concept. The robust and reliable devices are ergonomically correct and function with maximum stability.

The exceptional directness and smoothness of the movement in all directions make these manipulators ideal platforms for use in a broad range of applications.

Easily adaptable to all major microscope models, both TransferMan 4r and InjectMan 4 can be coupled with the electronic microinjectors FemtoJet 4i, FemtoJet 4x, and the Eppendorf PiezoXpert. This allows for integration of the operating functions into the manipulator control.

In combination, a micromanipulation system like this provides best performance and easiest operation.



- 1 Easy adjustable angle from 0° to 90°
- 2 Plug & play system with scale to allow for easy installation
- 3 Swivel joint to allow for easy capillary and sample exchange
- 4 One-hand mounting of capillary holder



Swivel out function for easy capillary exchange.

# Examples of Micromanipulation Workstations



## Workstation for embryo manipulation techniques:

### *Recommended setup*

- > 2× TransferMan 4r
- > 1× Microscope adapter (to be specified at time of order)
- > 1× CellTram® 4r Air for holding
- > 1× CellTram 4r Oil or CellTram 4r Air for injection
- > 1× set of 25 VacuTip™
- > 1× set of 25 TransferTip® (to be specified at time of order)

### **Optional**

- > 1× Eppendorf PiezoXpert®
- > 1× set of 25 Piezo Drill Tips (to be specified at time of order)

## Workstation for generation of transgenic animals via pronuclear/cytoplasmic injection:

### *Recommended setup*

- > 2× TransferMan 4r
- > 1× Microscope adapter (to be specified at time of order)
- > 1× CellTram 4r Air
- > 1× FemtoJet 4i or FemtoJet 4x
- > 1× set of 25 VacuTips
- > 2× racks of 96 Microloader

### **Optional**

- > 1× Eppendorf PiezoXpert

## Workstation for injection into fish embryos:

### *Recommended setup*

- > 1× InjectMan 4
- > 1× Universal stand
- > 1× FemtoJet 4x
- > 2× racks of 96 Microloader

### **Optional**

- > 1× Eppendorf PiezoXpert

## Workstation for adherent cell injection and for injection into *Drosophila*, *C. elegans* etc.:

### *Recommended setup*

- > 1× InjectMan 4
- > 1× Microscope adapter (to be specified at time of order)
- > 1× FemtoJet 4i
- > 2× racks of 96 Microloader

Compatible to all major  
microscope brands



# Eppendorf Micromanipulation Systems

## Eppendorf PiezoXpert®

Our device for piezo-assisted micromanipulation facilitates easy perforation of cells for subsequent microinjection or manipulation. The piezo impulses are transmitted onto the attached microcapillary directly and without loss. Intuitive operation and a wide adjustment range ensure best performance and reproducible work. The electronic coupling with the TransferMan 4r and InjectMan 4 enables semi-automatic piezo-supported cell penetration.

## FemtoJet® 4i / FemtoJet® 4x

Eppendorf FemtoJet 4i and 4x are perfectly suited for injecting small to intermediate volumes (up to 1  $\mu\text{L}$ ) featuring a wide range of functionality, simple operation and electronic coupling to both, TransferMan 4r and InjectMan 4, allowing for easy controlling of the injection process. The FemtoJet 4i features a built-in compressor to independently deliver the required pressure. Both units convince with highest precision that allows for reproducible injections.

## CellTram® 4r Air/Oil

CellTram 4r Air and CellTram 4r Oil—manual microinjectors for pressure control, manual microinjection, and liquid dispensing—are designed with special emphasis on optimal ergonomics, operational comfort, and high precision. The CellTram 4r Air is a pneumatic microinjector for a broad range of microtransfer techniques. It is ideal for holding of cells or embryos in suspension or for dispensing

the smallest volumes of liquid. The CellTram 4r Oil is the tool of choice for sophisticated applications that demand high resolution and sensitivity (e.g. embryo biopsies or injecting into plant cells). All models offer simple and reliable performance suiting all applications and personal working techniques, satisfying even the most demanding requirements.



# Eppendorf Micromanipulation Accessories

## Eppendorf Antivibration Pads



The antivibration pads are specifically designed to effectively protect your micromanipulation system against extreme vibrations. The pads are simply directly positioned under the base points of your microscope. Five different sizes are available, from XS to XL. The various pads are optimized for specific load ranges to guarantee perfect results.

## Eppendorf Cell Imaging Dishes



The Eppendorf 35 mm Cell Imaging Dish supports a premium performance in microinjection

- > Low rim side walls allow for easier access for microinjection
- > The polygonal gripping zone improves handling of dishes supported by comprehensive marks for facilitated orientation
- > A TC treated glass surface enables attachment of most adherent cells
- > A central cavity for concentrated growth and staining of cells reduces costs of antibodies and dyes

## Eppendorf Microcapillaries

Eppendorf offers a wide range of excellent microcapillaries, designed to give you fast, efficient, and reproducible results for the most common applications.

All microcapillaries offer you reproducible quality through narrowly defined specifications and intensive quality control, as well as the greatest security through effective sterilization methods.

- > VacuTips for holding of suspension cells
- > TransferTips for stem cell transfer etc.
- > Femtotips and Femtotips II for microinjection of minimal volumes
- > Piezo Drill Tips for piezo-assisted micromanipulation

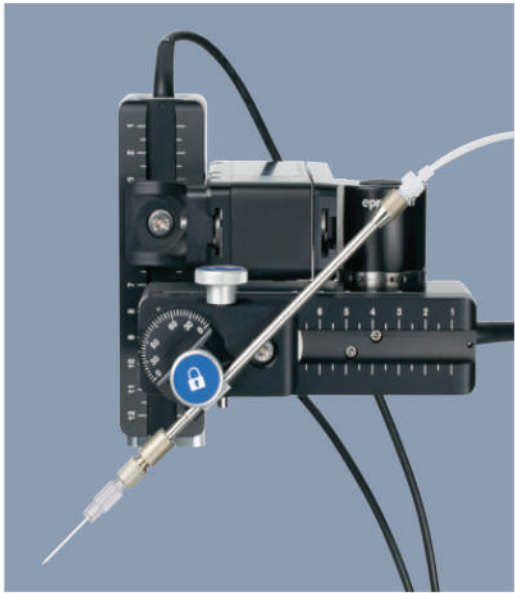


# Technical Specifications



| Control board      | TransferMan® 4r                                                   | InjectMan® 4     |
|--------------------|-------------------------------------------------------------------|------------------|
| Control            | One joystick for movement control in X-, Y-, Z- and X/Z-dimension |                  |
| Speed control      | Proportional and dynamic kinetics                                 | Dynamic kinetics |
| Working mode       | Coarse, fine, x-fine                                              |                  |
| Dimensions (W×H×D) | 205 mm × 288 mm × 152 mm                                          |                  |
| Weight             | 1.8 kg                                                            |                  |
| External device/PC | Serial interface SubD9, male                                      |                  |

| Motor module set                     | TransferMan® 4r/InjectMan® 4                |
|--------------------------------------|---------------------------------------------|
| Travelling distance                  | ≥20 mm                                      |
| Weight (complete)                    | 2.15 kg                                     |
| Stepper motor                        | X-,Y-,Z-module                              |
| Single module (X,Y,Z)                |                                             |
| Step size (computational resolution) | <20 nm                                      |
| Speed                                | 0–10,000 µm/s                               |
| Mechanical adjustability             | >80 mm                                      |
| Dimensions                           | 129 mm × 51 mm × 36 mm                      |
| Direction of rotation                | -45°– +90°                                  |
| Capillary exchange                   | Direction of rotation: forward (swivel out) |
| Sample replacement                   | Direction of rotation: backward (swivel in) |
| Operating angle of angle head        | 0°– 90°                                     |



**Eppendorf PiezoXpert®**

|                               |                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applications</b>           | <ul style="list-style-type: none"> <li>&gt; Transfer of embryonic or induced pluripotent stem cells into blastocysts</li> <li>&gt; Mouse ICSI (Intracytoplasmic Sperm Injection)</li> <li>&gt; Enucleation/nuclear transfer</li> <li>&gt; Blastomere biopsy from mouse embryos</li> <li>&gt; Biopsy of equine embryos for PGD (Preimplantation Genetic Diagnosis)</li> </ul> |
| <b>Input voltage</b>          | 100 V–240 V, 50–60 Hz                                                                                                                                                                                                                                                                                                                                                        |
| <b>Power input</b>            | 18 W                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Max. power input</b>       | <0.18 A                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Interface</b>              | USB 2.0 (for technical service)                                                                                                                                                                                                                                                                                                                                              |
| <b>Dimensions (W x H x L)</b> | 17 cm x 11.5 cm x 23 cm                                                                                                                                                                                                                                                                                                                                                      |
| <b>Weight</b>                 | 2.8 kg                                                                                                                                                                                                                                                                                                                                                                       |

**CellTram® 4r Air**

|                                     |                                                                                                                                                                                                                                                                          |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applications</b>                 | <ul style="list-style-type: none"> <li>&gt; Gentle holding of cells in suspension (e.g., oocytes or blastocysts)</li> <li>&gt; Aspiration and dispensing of small cells (e.g., sperm)</li> <li>&gt; Manual microinjection and dispensing of aqueous solutions</li> </ul> |
| <b>Generation of pressure</b>       | Cylinder/piston system, air-filled                                                                                                                                                                                                                                       |
| <b>Volume change per revolution</b> | 60 µL / 600 µL                                                                                                                                                                                                                                                           |
| <b>Cylinder volume</b>              | 10 mL                                                                                                                                                                                                                                                                    |
| <b>Minimum adjustable volume</b>    | <100 nL                                                                                                                                                                                                                                                                  |
| <b>Maximum pressure</b>             | 3,000 hPa                                                                                                                                                                                                                                                                |
| <b>Injection tube</b>               | Fluorinated ethylene propylene (FEP), 1.3 m length, inner diameter 0.5 mm, outer diameter 2 mm                                                                                                                                                                           |

**CellTram® 4r Oil**

|                                     |                                                                                                                                                                                                                                                           |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applications</b>                 | <ul style="list-style-type: none"> <li>&gt; Aspiration and dispensing of small cells (e.g., sperm)</li> <li>&gt; Manual microinjection under high pressure (e.g., into plant cells)</li> <li>&gt; Removal of cells (e.g., for embryo biopsies)</li> </ul> |
| <b>Generation of pressure</b>       | Cylinder/piston system, oil-filled                                                                                                                                                                                                                        |
| <b>Volume change per revolution</b> | 1 µL / 10 µL                                                                                                                                                                                                                                              |
| <b>Cylinder volume</b>              | 1,000 µL                                                                                                                                                                                                                                                  |
| <b>Minimum adjustable volume</b>    | <1.5 nL                                                                                                                                                                                                                                                   |
| <b>Maximum pressure</b>             | 20,000 hPa                                                                                                                                                                                                                                                |
| <b>Injection tube</b>               | Fluorinated ethylene propylene (FEP), 1.3 m length, inner diameter 1 mm, outer diameter 2 mm                                                                                                                                                              |



**FemtoJet® 4i**

- > Microinjection into suspension or adherent cells
- > Semi-automatic, serial injection in combination with InjectMan 4
- > Ideal for serial injection volumes from femtoliter up to 100 pL

**FemtoJet® 4x**

- > Microinjection into *C. elegans*, early fish embryos, *Xenopus* oocytes
- > Semi-automatic, serial injection in combination with InjectMan 4
- > Preferably used for injecting higher volumes (up to 1 µL) and/or longer injection series

|                         |                                                           |                                   |
|-------------------------|-----------------------------------------------------------|-----------------------------------|
| Applications            | Integrated compressor                                     | External pressure source required |
| Pressure supply         | Can be set to hPa or psi                                  |                                   |
| Pressure display        | Injection time, injection pressure, compensation pressure |                                   |
| Programmable parameters | 0; 10–99; 99 s; can be set in increments of 0.01 s        |                                   |
| Injection time          | 0; 5–6,000 hPa (87 psi)                                   |                                   |
| Injection pressure      | 0; 5–6,000 hPa (87 psi)                                   |                                   |
| Compensation pressure   | Maximum rinsing pressure 6,000 hPa (87 psi)               |                                   |
| Clean function          | 21,3 cm x 25 cm x 20,7 cm                                 |                                   |
| Dimensions (W x H x D)  | 5 kg                                                      | 3.5 kg                            |
| Weight                  | RS-232, USB (for service only)                            |                                   |
| Serial interface        |                                                           |                                   |

**Antivibration Pads**

| Size | Weight range |
|------|--------------|
| XS   | 4.5–6.0 kg   |
| S    | 6.0–8.0 kg   |
| M    | 8.0–10.0 kg  |
| L    | 10.0–12.5 kg |
| XL   | 12.5–16.5 kg |

no7, parvaneh st. jalal-e-al-e ahmad av  
Tehran, Iran



021- 8 8 3 3 2 1 2 3

021- 8 9 7 7 6 7 2 7

info@LianAzma.com

www.LianAzma.com

Barkhausenweg 1 22339  
Hamburg, Germany

+ 49 40 53 801-0

+ 49 40 53 801-556

eppendorf@eppendorf.de

www.eppendorf.com

**eppendorf**

**Ordering information**

| Description                                                                                                                                    | International Order no. | North America Order no. |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|
| TransferMan® 4r, micromanipulator with DualSpeed™ joystick for direct and dynamic movement control (for research use only)                     | 5193 000.012            | 5193000020              |
| InjectMan® 4, micromanipulator with dynamic movement control (for research use only)                                                           | 5192 000.019            | 5192000027              |
| <b>Microscope adapter, for TransferMan® 4r and InjectMan® 4</b>                                                                                |                         |                         |
| Leica® 1, for Leica® DMI3000 B, 3000 M, 4000 B, 5000 B, 5000 M, 6000 B, DM IRB E, HC, DMi8 and DM IRE 2 microscopes                            | 5192 301.000            | 5192301000              |
| Leica® 2, for Leica® DM IL LED and HC microscopes                                                                                              | 5192 302.007            | 5192302007              |
| Nikon® 1, for Nikon Eclipse® Diaphot 200, 300 and Eclipse® Ti-E, Ti-U, Ti-S, TE200, TE300, TE2000 microscopes                                  | 5192 316.008            | 5192316008              |
| Nikon® 2, for Nikon® Eclipse® Ts2R microscope                                                                                                  | 5192 317.004            | 5192 317.004            |
| Nikon® 3, for Nikon® Eclipse® Ti2-E/-A/-U microscopes                                                                                          | 5192 318.000            | 5192 318.000            |
| Olympus® 1, for Olympus® IX50, IX51, IX70, IX80, and IX81 microscopes                                                                          | 5192 306.002            | 5192306002              |
| Olympus® 2, for Olympus® IX53, IX73, IX83 microscopes                                                                                          | 5192 307.009            | 5192307009              |
| Olympus® 3, for Olympus® IX53 with illumination IX2-ILL30                                                                                      | 5192 308.005            | 5192308005              |
| Zeiss® 1, for Zeiss® Axiovert® 200, Axio Observer A1, D1, Z1 and Axio Observer 3, 5, 7 microscopes                                             | 5192 311.006            | 5192311006              |
| Zeiss® 2, for Zeiss® Axio Vert.A1 microscope                                                                                                   | 5192 312.002            | 5192312002              |
| Universal stand, for mounting TransferMan® 4r and InjectMan® 4 on upright microscopes and stereo microscopes                                   | 5192 325.007            | 5192325007              |
| Adapter bridge, for mounting TransferMan® 4r and InjectMan® 4 on microscope adapters for TransferMan® NK 2, InjectMan® NI 2 and PatchMan™ NP 2 | 5192 321.001            | 5192321001              |
| <b>Accessories for TransferMan® 4r and InjectMan® 4</b>                                                                                        |                         |                         |
| Positioning aid, pack of 2, for mounting universal capillary holder and capillary holder 4 on TransferMan® 4r and InjectMan® 4                 | 5192 072.001            | 5192072001              |
| Spare parts kit                                                                                                                                | 5192 071.005            | 5192071005              |
| Connecting cable TransferMan® 4r/InjectMan® 4 to FemtoJet® 4i/x                                                                                | 5192 082.007            | 5192082007              |
| Connecting cable, for connecting Eppendorf micromanipulators with FemtoJet® and FemtoJet® express                                              | 5181 070.015            | 920005845               |
| Y-cable FJ4, for connecting FemtoJet 4i/4x with a PC and TransferMan® 4r or InjectMan® 4                                                       | 5192 080.004            | 5192080004              |
| Connecting cable, for connecting Eppendorf micromanipulators with PC or Eppendorf PiezoXpert® and FemtoJet®                                    | 5181 150.094            | 920005837               |
| Y-cable PX, for connecting Eppendorf PiezoXpert or a PC with TransferMan® 4r or InjectMan® 4                                                   | 5192 081.000            | 5192081000              |
| Headstage holder, for pre-amplifier, for InjectMan® 4                                                                                          | 5192 073.008            | 5192073008              |
| Foot control, for Eppendorf micromanipulators                                                                                                  | 5252 070.020            | 5252070020              |
| Tube adapter, 2 pcs, for connecting injection tubes with an outer diameter of 2 mm or 3 mm                                                     | 5194 075.407            | 5194075407              |
| <b>Microinjectors &amp; Eppendorf PiezoXpert®</b>                                                                                              |                         |                         |
| FemtoJet® 4i, programmable microinjector with integrated compressor                                                                            | 5252 000.013            | 5252000021              |
| FemtoJet® 4x, programmable microinjector with external pressure supply                                                                         | 5253 000.017            | 5253000025              |
| CellTram® 4r Air, pneumatic, manual microinjector with gears 1:1 and 1:10                                                                      | 5196 000.013            | 5196000013              |
| CellTram® 4r Oil, hydraulic, manual microinjector with gears 1.1 and 1:10                                                                      | 5196 000.030            | 5196000030              |
| Capillary holder 4 (slim shape), for flat angle injections, for microcapillaries with outer diameter 1.0 mm                                    | 5196 062.000            | 5196062000              |
| Eppendorf PiezoXpert®, for piezo-assisted micromanipulation, incl. actuator 2, foot control, spacer plate and grip head 4 size 0               | 5194 000.016            | 5194000024              |

## Ordering information

| Description                                                                                                                   | International Order no. | North America Order no. |
|-------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|
| <b>Antivibration Pads</b>                                                                                                     |                         |                         |
| Antivibration Pad XS, weight range 4.5–6.0 kg                                                                                 | 5181 301.009            | 920007945               |
| Antivibration Pad S, weight range 6.0–8.0 kg                                                                                  | 5181 303.001            | 920007953               |
| Antivibration Pad M, weight range 8.0–10.0 kg                                                                                 | 5181 305.004            | 920007961               |
| Antivibration Pad L, weight range 10.0–12.5 kg                                                                                | 5181 307.007            | 920007970               |
| Antivibration Pad XL, weight range 12.5–16.5 kg                                                                               | 5181 309.000            | 920007988               |
| <b>Consumables</b>                                                                                                            |                         |                         |
| TransferTip® RP (ICSI), for sperm injection using the ICSI technique, set of 25                                               | 5195 000.010            | 5195000010              |
| TransferTip® F (ICSI), for sperm injection using the ICSI technique, set of 25                                                | 5195 000.001            | 5195000001              |
| TransferTip® R (ICSI), for sperm injection using the ICSI technique, set of 25                                                | 5195 000.028            | 5195000028              |
| TransferTip® (ES), for ES cell transfer, set of 25                                                                            | 5195 000.079            | 5195000079              |
| VacuTip I, holding capillary, set of 25                                                                                       | 5195 000.036            | 5195000036              |
| VacuTip II, holding capillary, set of 25                                                                                      | 5195 000.044            | 5195000044              |
| Piezo Drill Tip Mouse ICSI, for piezo-assisted mouse ICSI, set of 25                                                          | 5195 000.087            | 5195000087              |
| Piezo Drill Tip ES, for piezo-assisted mouse ES cell transfer, set of 25                                                      | 5195 000.095            | 5195000095              |
| Femtotips®, injection capillary, set of 20                                                                                    | 5242 952.008            | 5242952008              |
| Femtotip II, injection capillary, set of 20                                                                                   | 5242 957.000            | 5242957000              |
| Biopsy Tip I, capillary for laser-assisted biopsy of cells and organelles, set of 25                                          | 5195 000.052            | 5195000052              |
| Biopsy Tip II, capillary for laser-assisted biopsy of cells and organelles, set of 25                                         | 5195 000.060            | 5195000060              |
| Microloader™, tip for filling Femtotips® and other glass microcapillaries, 192 pcs. (2 racks x 96 pcs.)                       | 5242 956.003            | 5242956003              |
| <b>Eppendorf Cell Imaging Dishes , TC treated, sterile, free of detectable pyrogens, DNA, RNase and DNase. Non-cytotoxic.</b> |                         |                         |
| Eppendorf Cell Imaging Dish 145 µm, 35 x 10 mm                                                                                | 0030 740.009            | 0030740009              |
| Eppendorf Cell Imaging Dish 170 µm, 35 x 10 mm                                                                                | 0030 740.017            | 0030740017              |