

# Cell Manipulation Instrumentation

Intuitive. Precise. Reliable.



TransferMan® 4r, InjectMan® 4, CellTram® 4, FemtoJet® 4, PiezoXpert®

Tailored to a myriad of life science applications, our Cell Manipulation Instruments allow intuitive, reliable and precise physical manipulation of cells and embryos minimizing damage and maximizing reproducibility.

Build your unbeatable solution for your unique application from our comprehensive product line including the *TransferMan*® 4r, *InjectMan*® 4, *FemtoJet*® 4i/x, and *CellTram*® 4r. All paired with the right accessories to support your cell manipulation research.

#### Microinjection into oocytes and early embryonic stages

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



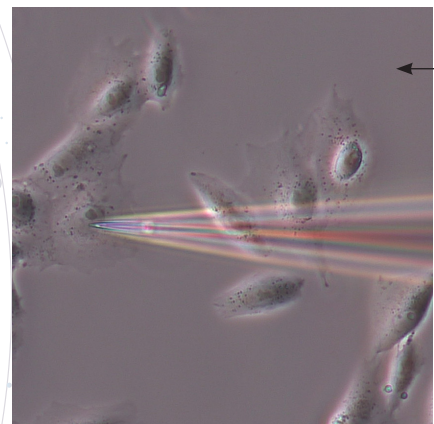
#### Manipulation of single cells, early embryonic stages and organoids

- 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



# Plug & Play Motor Modules

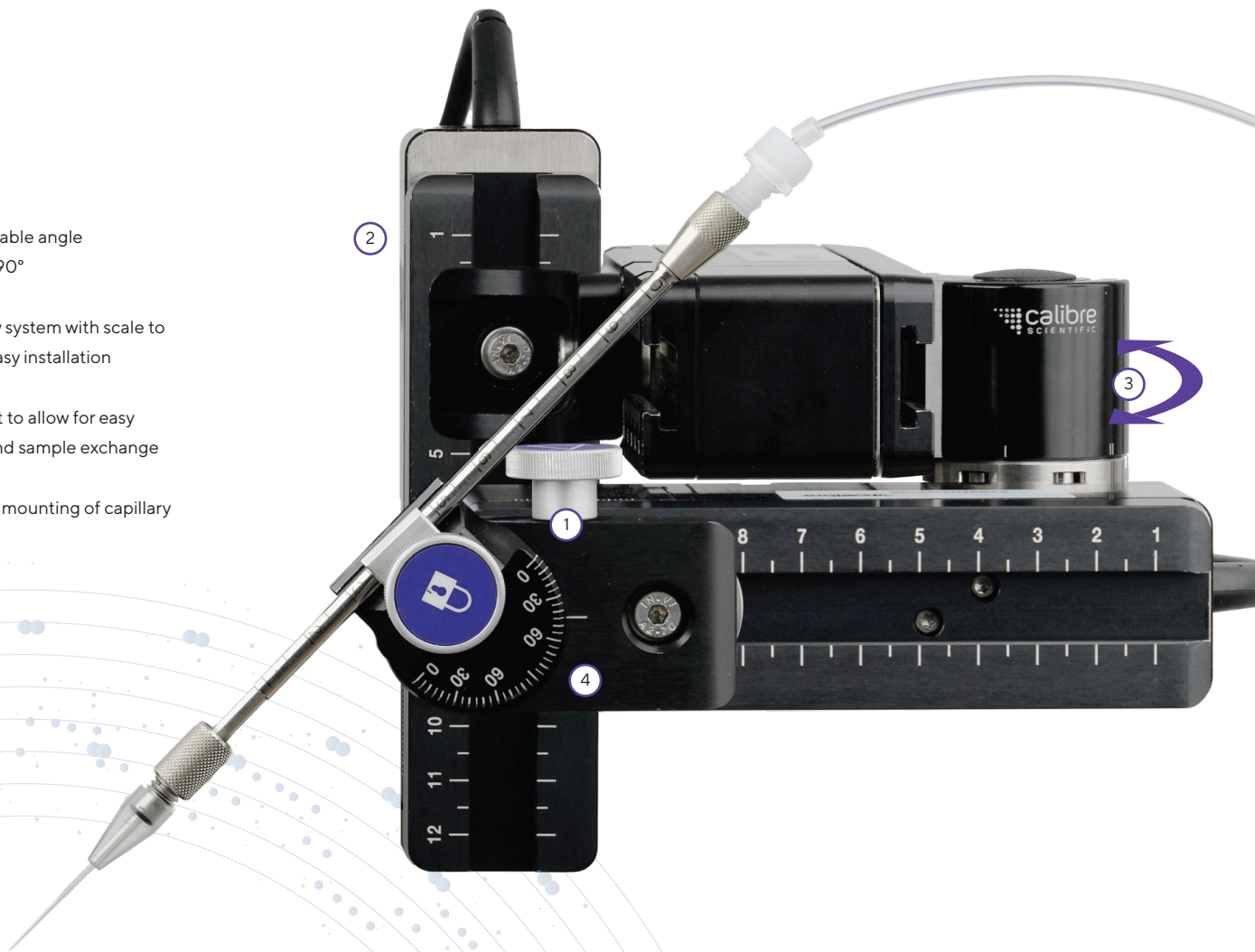
True to their roots, Calibre Scientific electronic micromanipulators provide outstanding technical performance and an overall ergonomic concept. The robust and reliable devices are ergonomically correct and function with maximum stability.

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 PiezoXpert®; this allows for integration of the operating functions into the manipulator control.

In combination, a micromanipulation system like this provides optimal performance and easy 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. No need to remove the capillary holder from the manipulator for this purpose.**

# TransferMan® 4r

The user-friendly TransferMan® 4r combines ergonomic and innovative operation making it ideal for manipulation of sensitive 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).

The freely programmable »My application« mask can be optimized for specific individual needs.

1. Unique DualSpeed™ joystick for precise, instantaneous control and positioning using three different speed modes
2. Comfortable, individual speed adjustment
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, Z-axis limit, Y-off)

## Features/advantages

- Maximum stability ensures vibration-free work
- One joystick for precise movement control in 4 axes: X, Y, Z and X/Z (axial)
- Ergonomically shaped control unit for a relaxed hand resting and therefore fatigue-free working
- Various easy-to-use smart functions for a smooth workflow under the microscope, such as:
  - Home function for quick capillary change
  - Z-axis limit to prevent capillary breakage
  - Position storage for quick changes between different working positions
  - Y-off function for particularly straight injection movements



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

- Connection with the FemtoJet 4 electronic microinjectors for pre-programmable semi-automatic injections to enable high-throughput injections
- Selection and programming of additional functions (e.g. axial movement, step injection)
- Connection with PiezoXpert® for piezo-assisted penetration over a pre-defined distance
- PC interface for remote control



1. Dynamic movement control via joystick for fast straight movements from one cell to the next
2. Define injection levels and prevention of capillary breakage by programming the Z-axis limit
3. Optimized user interface for various applications
4. Simple and quick capillary and sample exchange using automated home function

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



# Calibre Scientific Micromanipulation Systems

## 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 storage and rapid retrieval of two different pulse parameter sets allows the precisely optimized penetration of the piezo forces through the different cell layers (e.g. for the piezo-ICSI-related penetration of zona (strong pulse) and oolemma (soft pulse)).

## FemtoJet® 4i / FemtoJet® 4x

FemtoJet® 4i and 4x are perfectly suited for injecting smallest volumes from fL up to 1 µL and are distinguished by a wide range of functionality, simple operation and electronic coupling to both, TransferMan® 4r and InjectMan® 4, allowing for easy control of the injection process. The FemtoJet® 4i includes a built-in compressor to deliver the required pressure independently as a stand-alone device. Both microinjectors provide the highest precision that allows for reproducible injections.

## CellTram® 4r Air/Oil

CellTram® 4r Air and CellTram® 4r Oil – manual microinjectors for pressure control, aspiration and release of cells, 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 oocytes or embryos and transferring sperm cells. The CellTram® 4r Oil is the tool of choice for sophisticated applications requiring high resolution and pressure (e.g. cell transfer, embryo biopsies or

injecting into plant cells). All models offer simple and reliable performance suiting all applications and individual working techniques, satisfying even the most demanding requirements.



# 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

### Optional

- 1× set of 25 VacuTip™
- 1× set of 25 TransferTip® (to be specified at time of order)
- 1× PiezoXpert®
- 1× set of 25 Piezo Drill Tips (to be specified at time of order)
- 1× set Antivibration Pad (to be specified at time of order)

## Workstation for injection into early embryos:

### Recommended setup

- 1× InjectMan® 4
- 1× Universal stand
- 1× FemtoJet® 4i or FemtoJet® 4x

### Optional

- 1× PiezoXpert®
- 1× CellTram® 4r Oil (for xenotransplantation)
- 1× Femtotip II
- 2× racks of 96 Microloader



## 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

### Optional

- 1× CellTram 4r® Oil (for ES cell transfer in blastocysts)
- 1× Femtotip II
- 2× racks of 96 Microloader
- 1× set of 25 VacuTips™
- 1× set Antivibration Pad (to be specified at time of order)

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

### Recommended setup

- 1× InjectMan® 4 for single adherent cell injection
- 1× TransferMan® 4r for injection into Drosophila, C.elegans etc.
- 1× Microscope adapter (to be specified at time of order\*)
- 1× FemtoJet® 4i

### Optional

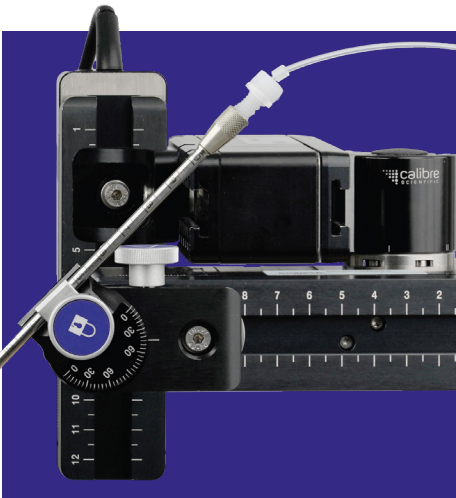
- 1× set Antivibration Pad (to be specified at time of order)
- 2× racks of 96 Microloader
- 1× racks of Femtotip I & II for single cell injection

Technical Specifications



Control board	TransferMan® 4r	InjectMan® 4
Control	One joystick for movement control in X-, Y-, Z- and X/Z-dimension	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	Coarse, fine, x-fine
Dimensions (W × H × D)	205 mm × 288 mm × 152 mm	205 mm × 288 mm × 152 mm
Weight	1.8 kg	1.8 kg
External device/PC	Serial interface SubD9, male	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	(TransferMan® 4r) 0–12,500 µm/s (InjectMan® 4) 0–10,000 µm/s
Mechanical adjustability	>80 mm
Dimensions	129 mm × 51 mm × 36 mm
Direction of rotation	-45° to +90°
Capillary exchange	Direction of rotation: forward (swivel out)
Sample replacement	Direction of rotation: backward (swivel in)
Operating angle of angle head	0° – 90°





PiezoXpert®

Applications	<div><div>&gt; Transfer of embryonic or induced pluripotent stem cells into blastocysts</div><div>&gt; Mammalian ICSI (Intracytoplasmic Sperm Injection)</div><div>&gt; Enucleation/nuclear transfer</div><div>&gt; Blastomere biopsy from mouse embryos</div><div>&gt; Biopsy of equine embryos for PGD (Preimplantation Genetic Diagnosis)</div></div>
Input voltage	100 V – 240 V, 50 – 60 Hz
Power input	18 W
Max. power input	< 0.18 A
Dimensions (W × H × D)	170 mm × 115 mm × 230 mm
Weight	2.8 kg



Applications	<div><div>&gt; Gentle holding of cells in suspension (e.g. oocytes or blastocysts)</div><div>&gt; Aspiration and dispensing of small cells (e.g. sperm)</div><div>&gt; Manual microinjection and dispensing of aqueous solutions</div></div>
Generation of pressure	Cylinder/piston system, air-filled
Volume change per revolution	60 µL / 600 µL
Cylinder volume	10 mL
Minimum adjustable volume	<100 nL
Maximum pressure	3,000 hPa
Injection tube	Fluorinated ethylene propylene (FEP), 1.3 m length, inner diameter 0.5 mm, outer diameter 2 mm

CellTram® 4r Air

Applications	<div><div>&gt; Aspiration and dispensing of small cells (e.g. sperm)</div><div>&gt; Manual microinjection under high pressure (e.g. into plant cells)</div><div>&gt; Removal of cells (e.g. for embryo biopsies)</div></div>
Generation of pressure	Cylinder/piston system, oil-filled
Volume change per revolution	1 µL / 10 µL
Cylinder volume	1,000 µL
Minimum adjustable volume	<1.5 nL
Maximum pressure	20,000 hPa
Injection tube	Fluorinated ethylene propylene (FEP), 1.3 m length, inner diameter 1 mm, outer diameter 2 mm

CellTram® 4r Oil





	FemtoJet® 4i	FemtoJet® 4x
Applications	<ul style="list-style-type: none"><li>&gt; Microinjection into suspension or adherent cells</li><li>&gt; Semi-automatic, serial injection in combination with InjectMan® 4</li><li>&gt; Ideal for serial injection volumes from femtoliter up to 100 pL</li></ul>	<ul style="list-style-type: none"><li>&gt; Microinjection into <i>C. elegans</i>, early fish embryos, <i>Xenopus</i> oocytes</li><li>&gt; Semi-automatic, serial injection in combination with InjectMan® 4</li><li>&gt; Preferably used for injecting higher volumes (up to 1 µL) and/or longer injection series</li></ul>
Pressure supply	Integrated compressor	External pressure source required
Pressure display	Can be set to hPa or psi	Can be set to hPa or psi
Programmable parameters	Injection time, injection pressure, compensation pressure	Injection time, injection pressure, compensation pressure
Injection time	0; 10–99; 99 s; can be set in increments of 0.01 s	0; 10–99; 99 s; can be set in increments of 0.01 s
Injection pressure	0; 5–6,000 hPa (87 psi)	0; 5–6,000 hPa (87 psi)
Compensation pressure	0; 5–6,000 hPa (87 psi)	0; 5–6,000 hPa (87 psi)
Clean function	Maximum rinsing pressure 6,000 hPa (87 psi)	Maximum rinsing pressure 6,000 hPa (87 psi)
Dimensions (W × H × D)	213 mm x 250 mm x 207 mm	213 mm x 250 mm x 207 mm
Weight	5 kg	3.5 kg
Serial interface	RS-232, USB (for service only)	RS-232, USB (for service only)



Antivibration Pads	
Applications	To protect your workstation from external oscillations and vibrations, place AV pads under the microscope feet. For optimum performance, the weight under each microscope foot should be measured.
Model	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

## Ordering information

Description	International Order no.	UK/IE Order no.	North America Order no.
TransferMan® 4r, micromanipulator with DualSpeed™ joystick for direct and dynamic movement control (for research use only)	EPE-5193000012	EPE-5193000030	EPE-5193000020
InjectMan® 4, micromanipulator with dynamic movement control (for research use only)	EPE-5192000019	EPE-5192000035	EPE-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	EPE-5192301000	EPE-5192301000	EPE-5192301000
Leica® 2, for Leica® DM IL LED and HC microscopes	EPE-5192302007	EPE-5192302007	EPE-5192302007
Nikon® 1, for Nikon® Eclipse® Diaphot 200, 300 and Eclipse® Ti-E, Ti-U, Ti-S, TE200, TE300, TE2000 microscopes	EPE-5192316008	EPE-5192316008	EPE-5192316008
Nikon® 2, for Nikon® Eclipse® Ts2R microscope	EPE-5192317004	EPE-5192317004	EPE-5192317004
Nikon® 3, for Nikon® Eclipse® Ti2-I/-A/-U microscopes	EPE-5192318000	EPE-5192318000	EPE-5192318000
Olympus® 1, for Olympus® IX50, IX51, IX70, IX71, IX80, and IX81 microscopes	EPE-5192306002	EPE-5192306002	EPE-5192306002
Olympus® 2, for Olympus® IX53, IX73, IX83 microscopes	EPE-5192307009	EPE-5192307009	EPE-5192307009
Zeiss® 1, for Zeiss® Axiovert® 200, Axio Observer A1, D1, Z1 and Axio Observer 3, 5, 7 microscopes	EPE-5192311006	EPE-5192311006	EPE-5192311006
Zeiss® 2, for Zeiss® Axio Vert.A1 microscope	EPE-5192312002	EPE-5192312002	EPE-5192312002
Zeiss® 3, for Zeiss® Axiovert 5 microscope	EPE-5192313000	EPE-5192313000	EPE-5192313000
Universal stand, for mounting TransferMan® 4r and InjectMan® 4 on upright microscopes and stereo microscopes	EPE-5192325007	EPE-5192325007	EPE-5192325007
Adapter bridge, for mounting TransferMan® 4r and InjectMan® 4 on microscope adapters for TransferMan® NK 2, InjectMan® NI 2 and PatchMan™ NP 2	EPE-5192321001	EPE-5192321001	EPE-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	EPE-5192072001	EPE-5192072001	EPE-5192072001
Spare parts kit	EPE-5192071005	EPE-5192071005	EPE-5192071005
Connecting cable TransferMan® 4r/InjectMan® 4 to FemtoJet® 4i/x	EPE-5192082007	EPE-5192082007	EPE-5192082007
Connecting cable, for connecting micromanipulators with FemtoJet® and FemtoJet® express	EPE-5181070015	EPE-5181070015	EPE-920005845
Y-cable FJ4, for connecting FemtoJet® 4i/4x with a PC and TransferMan® 4r or InjectMan® 4	EPE-5192080004	EPE-5192080004	EPE-5192080004
Connecting cable, for connecting micromanipulators with PC or PiezoXpert® and FemtoJet®	EPE-5181150094	EPE-5181150094	EPE-920005837
Y-cable PX, for connecting PiezoXpert® or a PC with TransferMan® 4r or InjectMan® 4	EPE-5192081000	EPE-5192081000	EPE-5192081000
Headstage holder, for pre-amplifier, for InjectMan® 4	EPE-5192073008	EPE-5192073008	EPE-5192073008
Foot control, for micromanipulators	EPE-5252070020	EPE-5252070020	EPE-5252070020
Tube adapter, 2 pcs, for connecting injection tubes with an outer diameter of 2 mm or 3 mm	EPE-5194075407	EPE-5194075407	EPE-5194075407
<b>Microinjectors &amp; PiezoXpert®</b>			
FemtoJet® 4i, programmable microinjector with integrated compressor	EPE-5252000013	EPE-5252000030	EPE-5252000021
FemtoJet® 4x, programmable microinjector with connection for external pressure supply	EPE-5253000017	EPE-5253000033	EPE-5253000025
CellTram® 4r Air, pneumatic, manual microinjector with gears 1:1 and 1:10	EPE-5196000013	EPE-5196000013	EPE-5196000013
CellTram® 4r Oil, hydraulic, manual microinjector with gears 1:1 and 1:10	EPE-5196000030	EPE-5196000030	EPE-5196000030
Capillary holder 4 (slim shape), for flat angle injections, for microcapillaries with outer diameter 1.0 mm	EPE-5196062000	EPE-5196062000	EPE-5196062000
PiezoXpert®, for piezo-assisted micromanipulation, incl. actuator 2, foot control, spacer plate and grip head 4 size 0	EPE-5194000016	EPE-5194000032	EPE-5194000024

## Ordering information

Description	International Order No.	UK/IE Order No.	North America Order No.
<b>Accessories for Micoinjectors and PiezoXpert</b>			
Capillary holder 4, for mounting microcapillaries, incl. 1 Grip head 4 size 0	EPE-5196081005	EPE-5196081005	EPE-5196081005
Grip head set 4 size 0, for capillary outer diameters from 1.0 to 1.1	EPE-5196082001	EPE-5196082001	EPE-5196082001
Grip head set 4 size 1, for capillary outer diameters from 1.2 to 1.3	EPE-5196083008	EPE-5196083008	EPE-5196083008
Grip head set 4 size 2, for capillary outer diameters from 1.4 to 1.5	EPE-5196084004	EPE-5196084004	EPE-5196084004
Grip head set 4 size 3, for capillary outer diameters from 0.7 to 0.9	EPE-5196085000	EPE-5196085000	EPE-5196085000
Capillary holder 4 (slim shape), for flat angle injections, for microcapillaries with outer diameter 1.0 mm	EPE-5196062000	EPE-5196062000	EPE-5196062000
O-ring set 4, incl 10 o-rings large, 10 o-rings small. 2 distance sleeves, o-ring removal tool	EPE-5196086007	EPE-5196086007	EPE-5196086007
Injection tube Air, for CellTram 4 Air, I.D. 0.5 mm, length 1,3 m	EPE-5196061004	EPE-5196061004	EPE-5196061004
Injection tube Oil, for CellTram 4 Oil, I.D. 1.0 mm, length 1,3 m	EPE-5196089006	EPE-5196089006	EPE-5196089006
Handcontrol, for remote-controlling, for FemtoJet 4i/4x	EPE-5252070011	EPE-5252070011	EPE-5252070011
Injection tube, for FemtoJet 4i/4x, length 2 m	EPE-5252070054	EPE-5252070054	EPE-5252070054
Y-cable FJ4, for connecting FemtoJet® 4i/4x with a PC and TransferMan® 4r or InjectMan® 4	EPE-5192080004	EPE-5192080004	EPE-5192080004
Tube adapter, 2 pcs, for connecting injection tubes with an outer diameter of 2 mm or 3 mm	EPE-5194075407	EPE-5194075407	EPE-5194075407
Actuator, capillary holder with Piezo element, for PiezoXpert	EPE-5194075156	EPE-5194075156	EPE-5194075156
<b>Antivibration Pads</b>			
Antivibration Pad XS, weight range 4.5–6.0 kg	EPE-5181301009	EPE-5181301009	EPE-920007945
Antivibration Pad S, weight range 6.0–8.0 kg	EPE-5181303001	EPE-5181303001	EPE-920007953
Antivibration Pad M, weight range 8.0–10.0 kg	EPE-5181305004	EPE-5181305004	EPE-920007961
Antivibration Pad L, weight range 10.0–12.5 kg	EPE-5181307007	EPE-5181307007	EPE-920007970
Antivibration Pad XL, weight range 12.5–16.5 kg	EPE-5181309000	EPE-5181309000	EPE-920007988
<b>Consumables</b>			
TransferTip® RP (ICSI), for sperm injection using the ICSI technique, set of 25	EPE-5195000010	EPE-5195000010	EPE-5195000010
TransferTip® F (ICSI), for sperm injection using the ICSI technique, set of 25	EPE-5195000001	EPE-5195000001	EPE-5195000001
TransferTip® R (ICSI), for sperm injection using the ICSI technique, set of 25	EPE-5195000028	EPE-5195000028	EPE-5195000028
TransferTip® (ES), for ES cell transfer, set of 25	EPE-5195000079	EPE-5195000079	EPE-5195000079
Piezo Drill Tip Mouse ICSI, for piezo-assisted mouse ICSI, set of 25	EPE-5195000087	EPE-5195000087	EPE-5195000087
Piezo Drill Tip ES, for piezo-assisted mouse ES cell transfer, set of 25	EPE-5195000095	EPE-5195000095	EPE-5195000095
VacuTip I, holding capillary, set of 25	EPE-5195000036	EPE-5195000036	EPE-5195000036
VacuTip II, holding capillary, set of 25	EPE-5195000044	EPE-5195000044	EPE-5195000044
Femtotips, for injection of aqueous solutions, set of 20	EPE-5242952008	EPE-5242952008	EPE-930000035
FemtoTip II for injections of aqueous solutions, set of 20	EPE-5242957000	EPE-5242957000	EPE-930000043
Microloader, for loading of microcapillaries, 0.5-20 µL, light grey, length: 100 mm, 2 racks of 96	EPE-5242956003	EPE-5242956003	EPE-930001007

## Your local distributor: [cmi.calibrescientific.com/contact](http://cmi.calibrescientific.com/contact)

Biozol Diagnostica Vertrieb GmbH · Oehleckerring 11-13 · 22419 · Hamburg · Germany  
[cmi.calibrescientific.com](http://cmi.calibrescientific.com)



[cmi.calibrescientific.com](http://cmi.calibrescientific.com)

Nikon® and Eclipse® are registered trademarks of Nikon Corp., Japan. Zeiss® is a registered trademark of Carl Zeiss AG, Germany. Olympus® is a registered trademark of Olympus Corporation, Japan.  
 Leica® is a registered trademark of Leica Microsystems IR GmbH, Germany.  
 TransferMan®, InjectMan®, FemtoJet®, CellTram®, Femtotips®, PiezoXpert® and TransferTip® are registered trademarks of Biozol Diagnostica Vertrieb GmbH, Germany.  
 Copyright © 2023 Biozol Diagnostica Vertrieb GmbH, Germany. All rights reserved, including graphics and images. No part of this publication may be reproduced without the prior permission of the copyright owner.