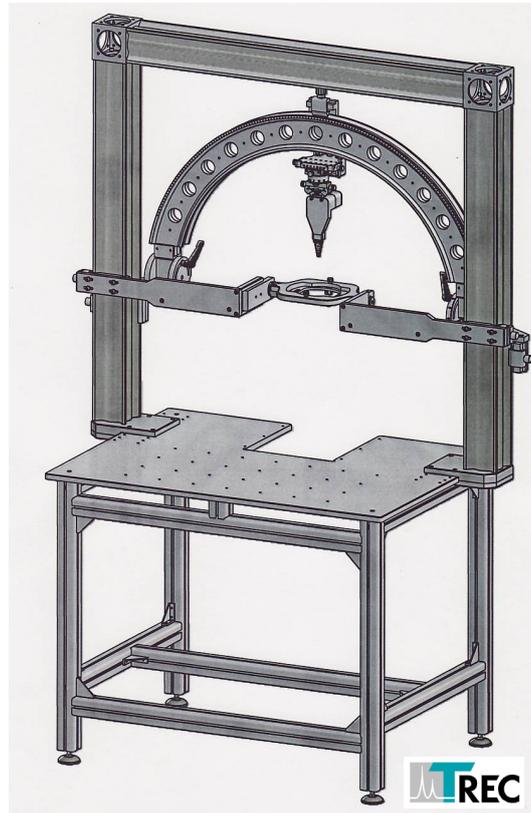




Thomas RECORDING GmbH

- The Microdrive Company -

Precision Positioning System (PPS)



Key Features:

- **Complete Monkey stereotaxic instrument**
- High precision & quality “**Made in GERMANY**” by Thomas RECORDING
- Available for all **Thomas RECORDING microdrives** (Micro-, Mini- and Eckhorn Matrix Systems)
- Available with Thomas RECORDING **low cost manual electrode drives**
- **Unique and very stable three point Thomas head holder**
- **Custom-made adaptations** for a wide range of applications on request
- **Modular accessories** allow for expansion of instrument capabilities

Precision Positioning System (PPS) for monkeys

The precision positioning system (PPS), originally designed by Thomas RECORDING in the 1980s presents an exiting stereotactic system for precise stereotactic procedures on monkeys. The PPS is a versatile, easy-to-use system that facilitates proper alignment of monkeys for the stereotaxic

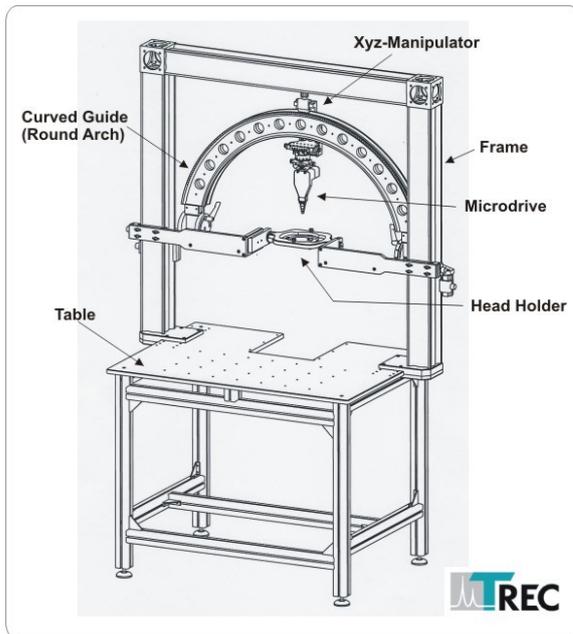


Fig. 1: Components of the PPS

placement of multielectrode microdrive systems or other devices.

The major kinematic difference of the PPS in contrast to other stereotaxic instruments presently available on the market is, that in the PPS system all translational joints kinematically follow the rotational joints. This is realized by a curved guide (round arch) first introduced in animal stereotaxic instruments by Thomas RECORDING.

Based on the fact that this instrument is Made in Germany guarantees high quality. The PPS system is designed to guarantee a

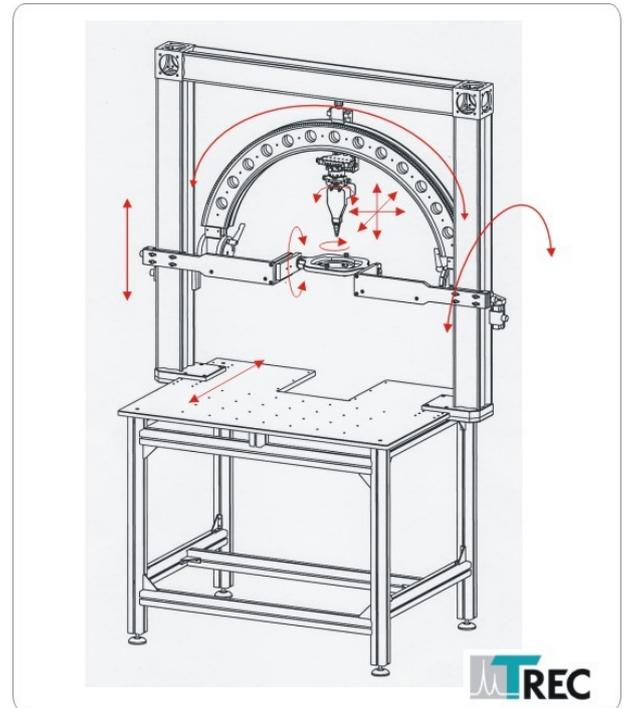


Fig. 2: The PPS offers different degrees of freedom

very stable and robust mounting of recording electrode and/or microinjection systems. Figure 2 shows the kinematic structure of the PPS setup.

As shown in **figure 1** the PPS consists of the following components:

Table, frame, curved guide (round arch), xyz-manipulator, three point head holder. Furthermore there is a monkey chair and a reward unit available (not shown in figure 1).

Precision Positioning System (PPS)

1. Table with frame

With the **Precision Positioning System (PPS)** Thomas RECORDING offers a special table and support system to fit any performance in primate training and recording experiments. Our extensive capabilities to manufacture custom tables and frame systems provides exceptional stability for our precision positioning system platform. The main part of the **Precision Positioning System (PPS)** is a heavy metal table and a frame of strong aluminum profiles. On the rear side, the table is equipped with an u-shaped opening for the primate chair. The table has four height adjustable legs.

The Thomas RECORDING PPS table with the rigid aluminum profile frame represents the state of the art in primate stereotaxic systems. The PPS table offers Thomas RECORDING performance and quality "Made in Germany" at an affordable price. The aluminum frame rail and carrier system is a rigid and lightweight support for primate stereotaxic instrumentation setups. The frame profiles are cylindrical aluminum extrusions with four longitudinal reinforcing ribs. The 10 mm thick ribs provide four symmetrical dovetail clamping surfaces for carriers and significantly increase the longitudinal and torsional rigidity of the aluminum profile.

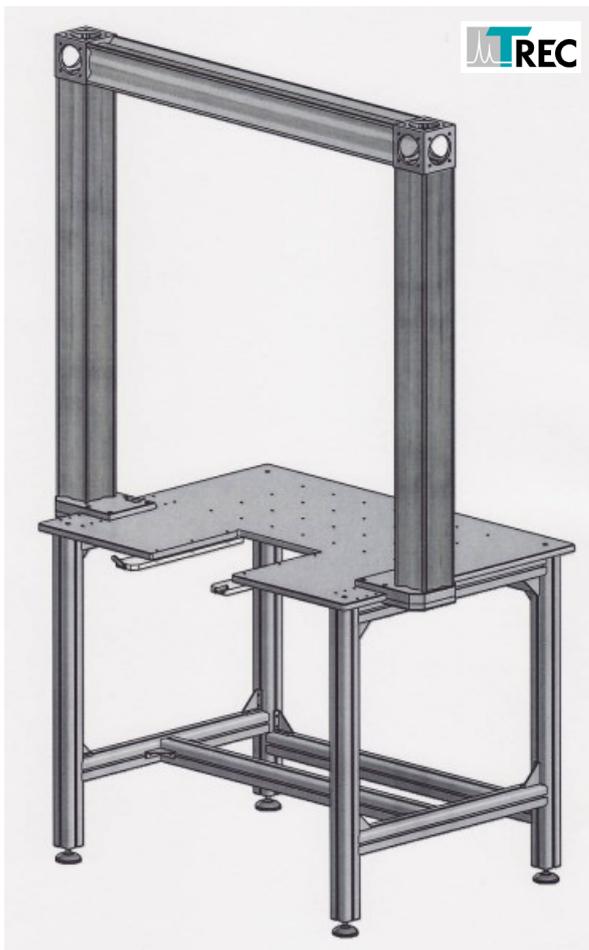


Fig. 3: PPS Table with frame (rear view)

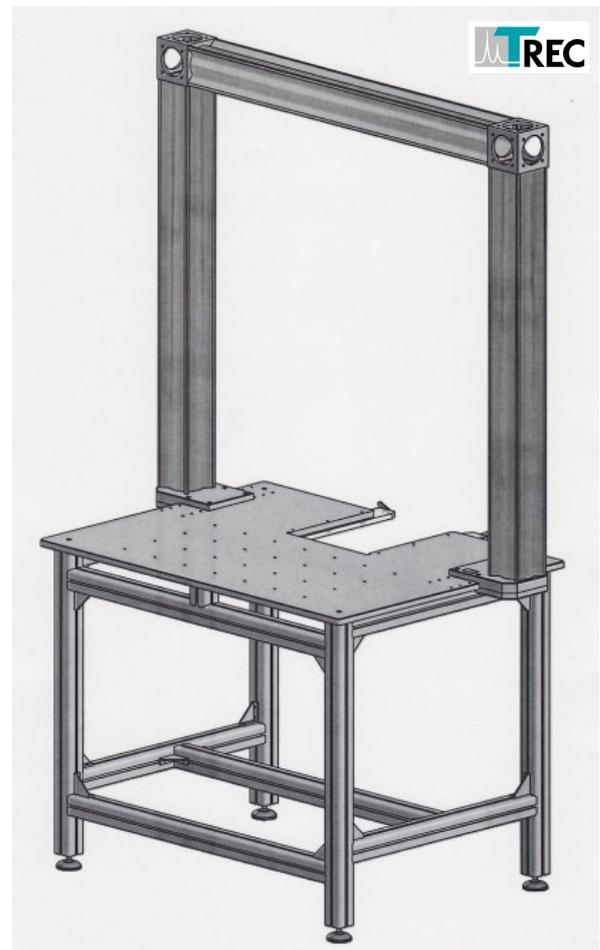


Fig. 4: PPS Table with frame (frontal view)

Precision Positioning System (PPS)

2. Curved Guide (round arch)

Thomas RECORDING's unique **round arch technology** used in PPS Series is also a leading development in primate stereotaxic systems for neurophysiological research.

By using this round arch technology one has access to the complete primate skull surface. The primate head is fixed with the Thomas RECORDING three point head holder. Recording instruments are mounted to the arch like shown in figure 6.

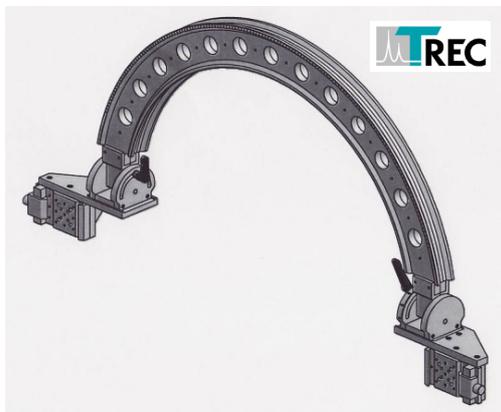


Fig. 5: Round arch of the PPS

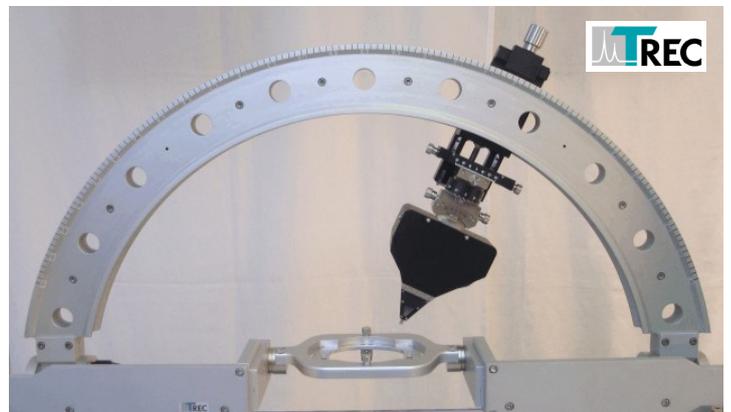
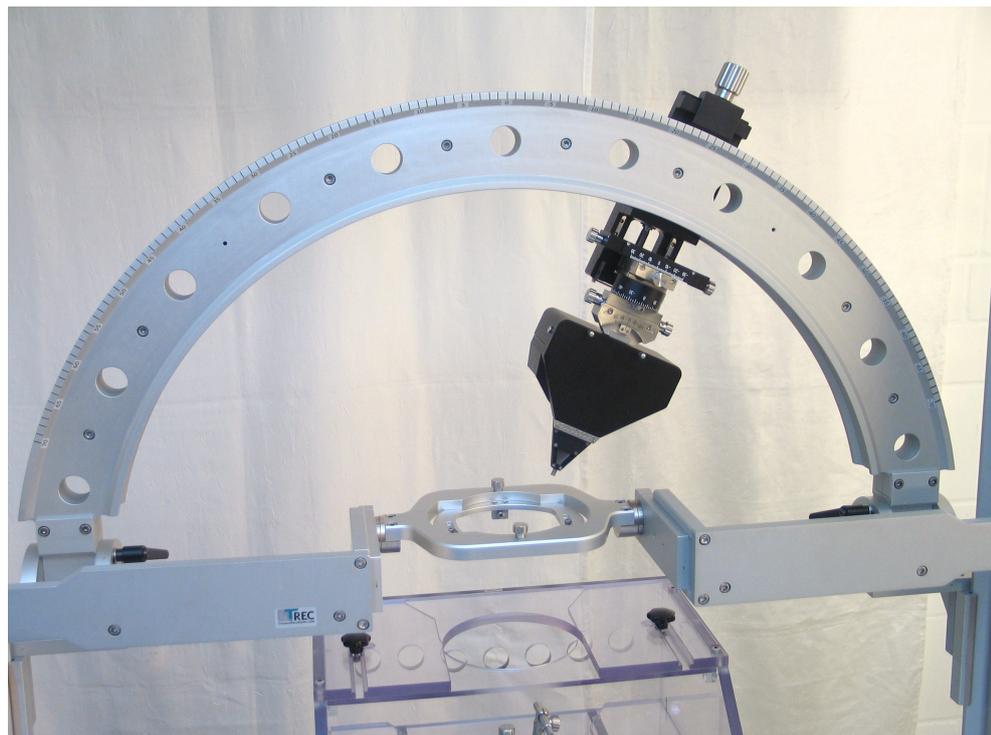


Fig. 6: 16 channel multielectrode microdrive type TREC Eckhorn Matrix mounted to the round arch



Precision Positioning System (PPS)

3. Xyz-Manipulator

Devices that precisely move samples in three orthogonal axis are called XYZ manipulators. Additional rotational movements around these axis are achieved using add-on rotary devices. While there are six degrees of freedom (XYZ and 3 rotations) for these motions. Thomas RECORDING XYZ manipulators benefit from a kinematic motion design, providing smooth and reliable motion. The XYZ mechanism incorporates a high precision drive and guidance system. The xyz-manipulator housing is made of a very rigid and also relatively lightweight aluminum construction.

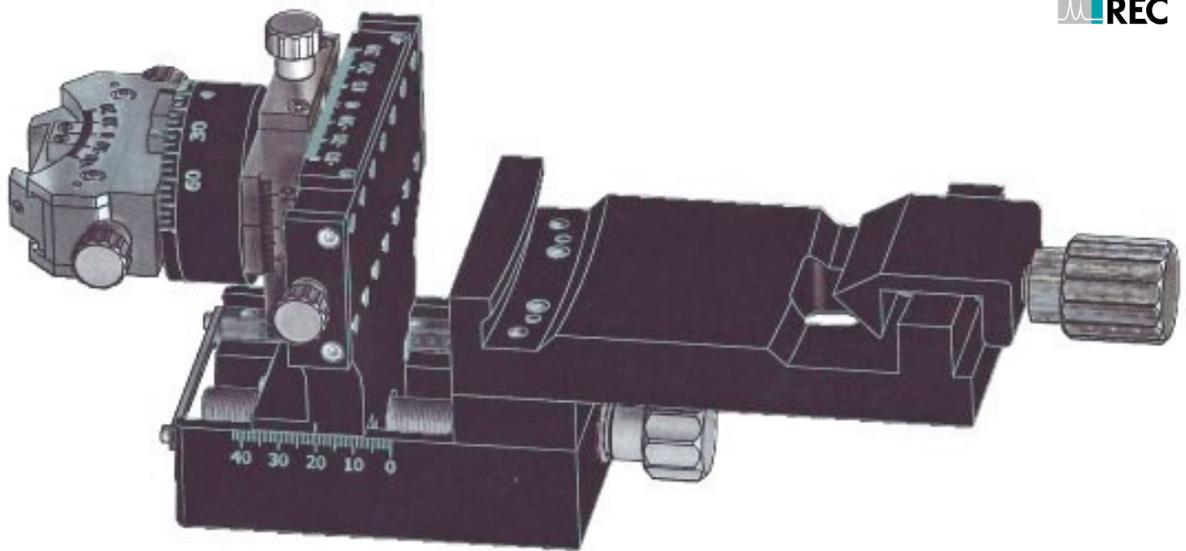


Fig. 7: Thomas RECORDING XYZ-Manipulator with PPS curved guide (round arch) adaptor

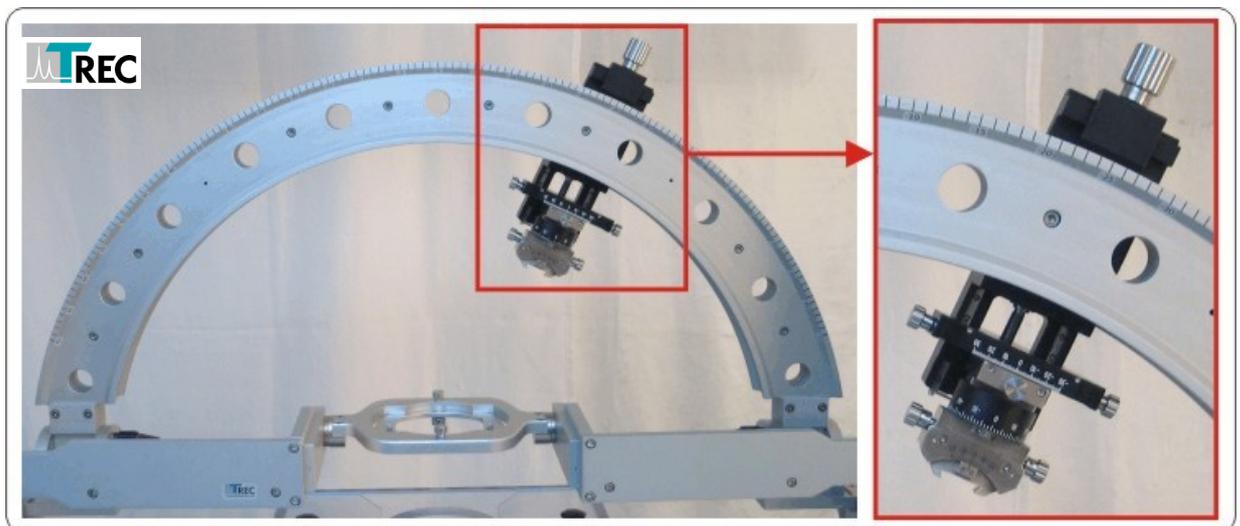


Fig. 8: Thomas RECORDING XYZ-Manipulator mounted to the PPS curved guide (round arch)

Precision Positioning System (PPS)

3. Xyz-Manipulator

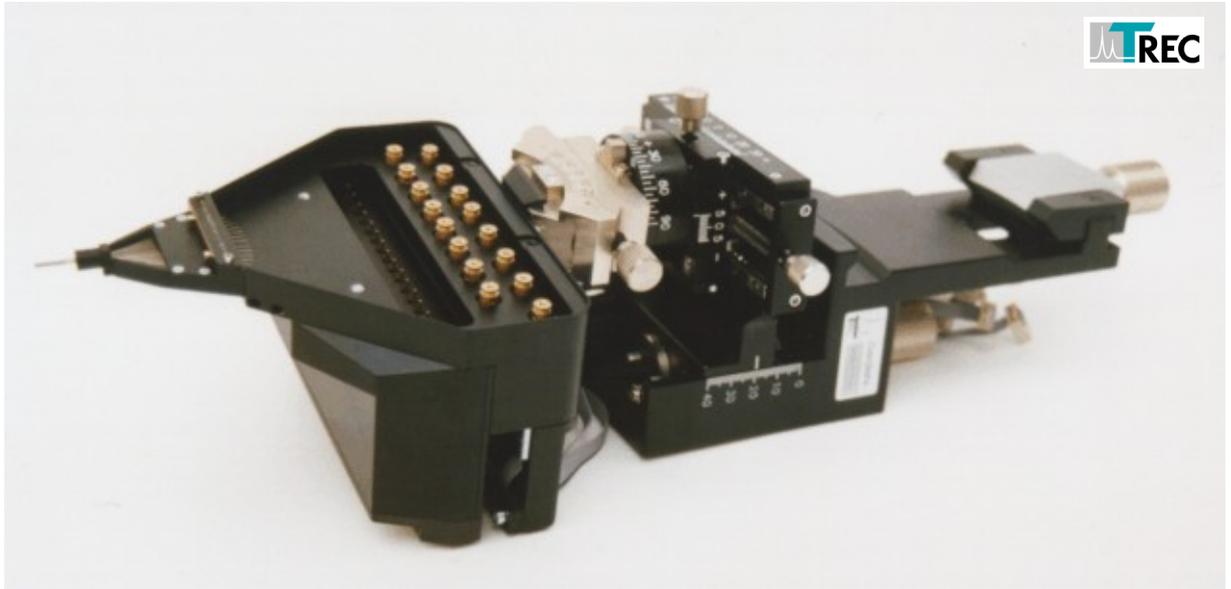


Fig. 9: 16 channel Eckhorn Matrix with Xyz-coarse manipulator

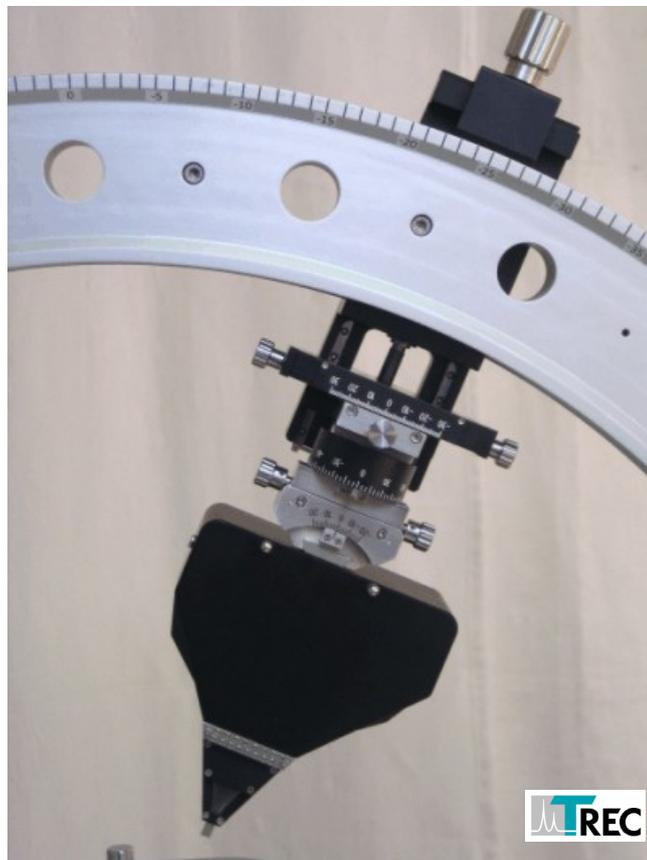


Fig. 10: 16 channel Eckhorn Matrix mounted to the arch

Precision Positioning System (PPS)

4. Head Holder (Thomas „Three Point“-System)

4.1 Frame-mounted head holder components

The PPS Head holder consists of a very rigid unit that is mounted to the PPS frame (see figure N). The main component of this head holder is the ring in the middle. This ring consists of two parts, one outer ring part that is fixed to the holder and a second inner ring that is mounted to the monkey's skull. The second inner ring can be fixed with two screws to the outer ring, so that finally the monkey skull is fixed by the head holder.

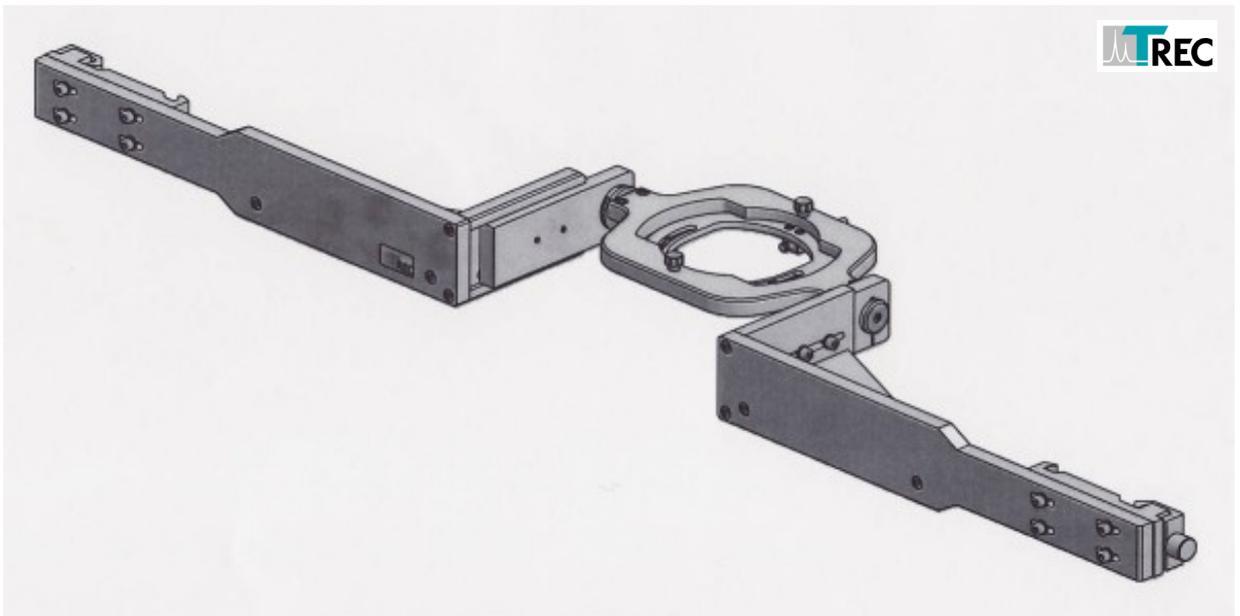


Fig. 11: The complete head holder unit ready to be mounted to the PPS frame

4.2 Head holder components mounted to the Monkey skull

For a fixation of the head holder inner ring to the monkey's skull it is required to implant three titanium base plates on the monkey's skull. Each base plate is fixed to the skull with small titanium screws (see figure 12).

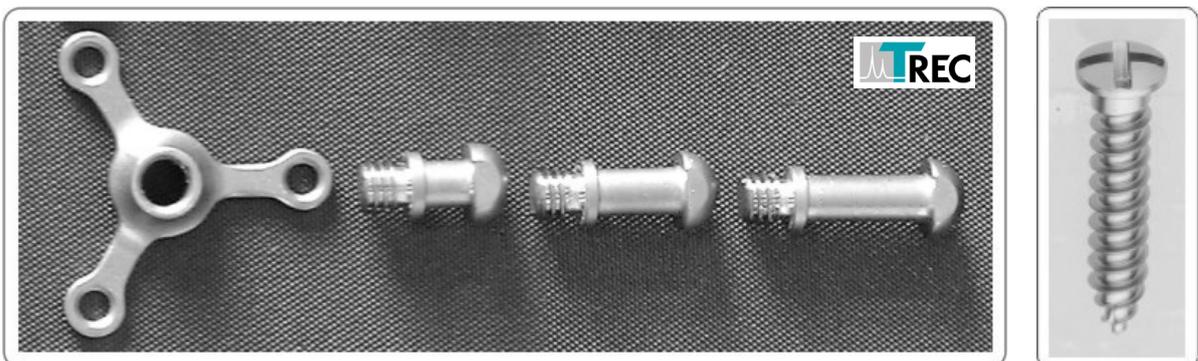


Fig. 12: Titanium base plate (legs each 120°), titanium pins (Length 7mm, 9mm, 13mm) and titanium screw

Precision Positioning System (PPS)

4. Head Holder (Thomas „Three Point“-System)

The positions of the implanted base plates are shown in figure 13. One base plate is implanted in the occipital position and two plates are implanted in the lateral position.

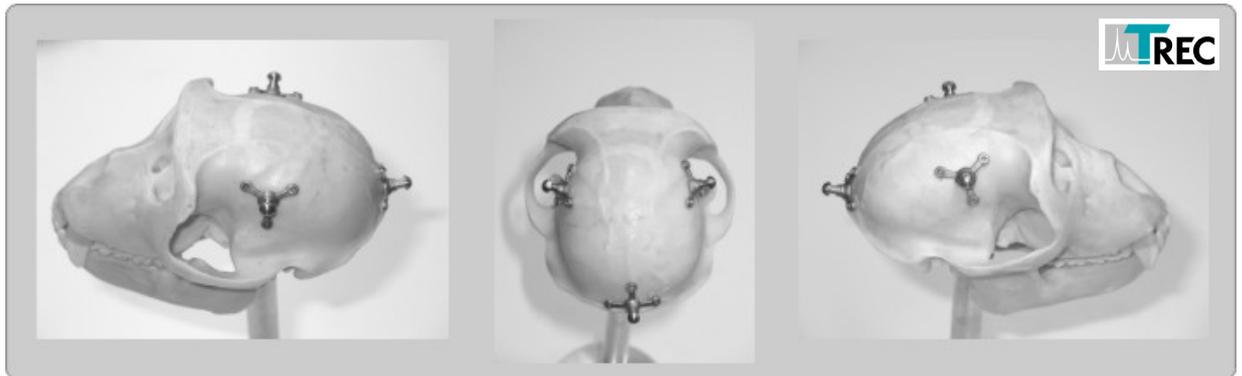


Fig. 13: The complete head holder unit ready to be mounted to the PPS frame

Figure 14 shows how the inner ring is mounted to the implanted base plates. The connection between the base plate pins and the inner ring is shown in figure 15.

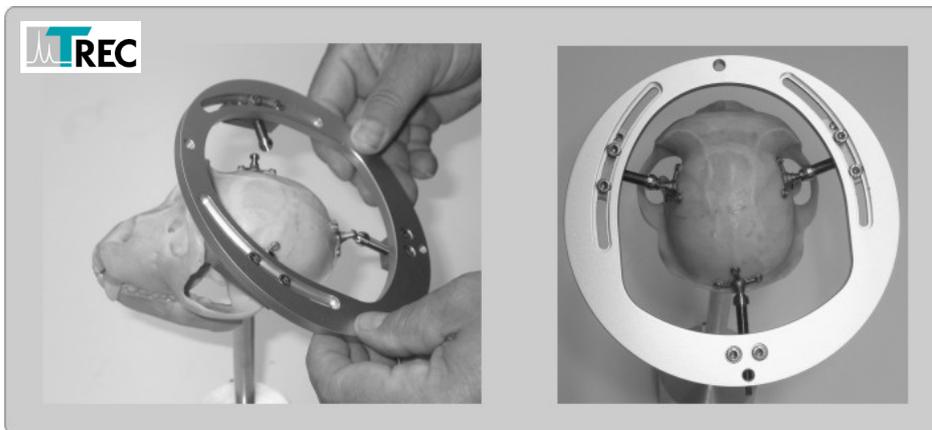


Fig. 14: There are three titanium base plates implanted on the animal's skull.

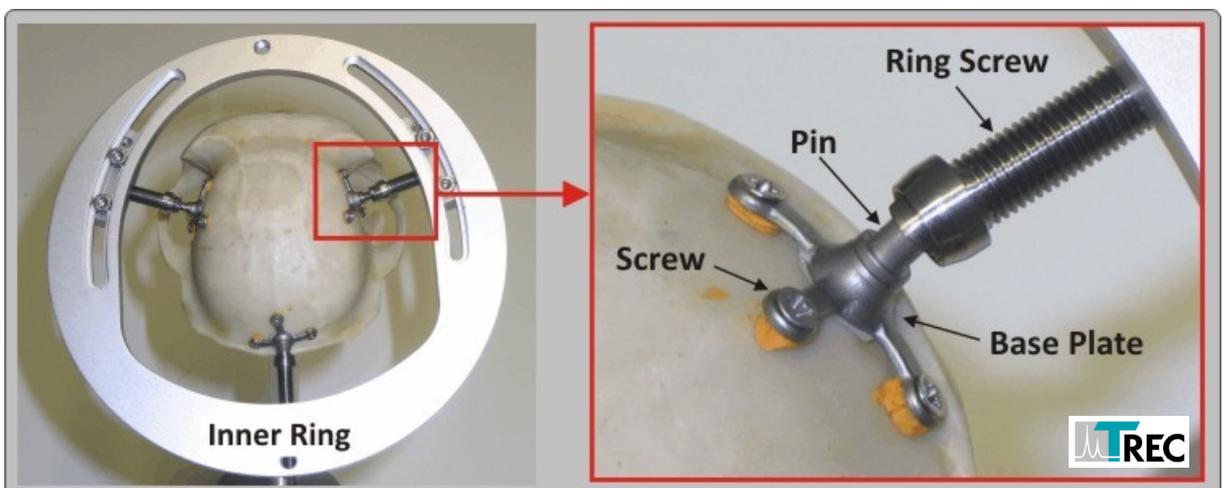


Fig. 15: There are three titanium base plates implanted on the animal's skull.

Precision Positioning System (PPS)

5. Monkey Chair

Primate chairs from Thomas RECORDING are designed to enable researchers to restrain primates effectively in a wide variety of research scenarios. Thomas primate chairs may be used in different protocols ranging from standard vision studies to complex behavioral experiments. Our standard models come equipped with a variety of features. Our chairs are made from polycarbonate (see figure 16), a plastic that is stronger than acrylic yet transparent to permit easy viewing of the subject in the chair. The main body of the chair, which holds the subject, is ventilated and permits movement of arms and legs, reducing muscle atrophy and discomfort.



Fig. 16: TREC primate chair

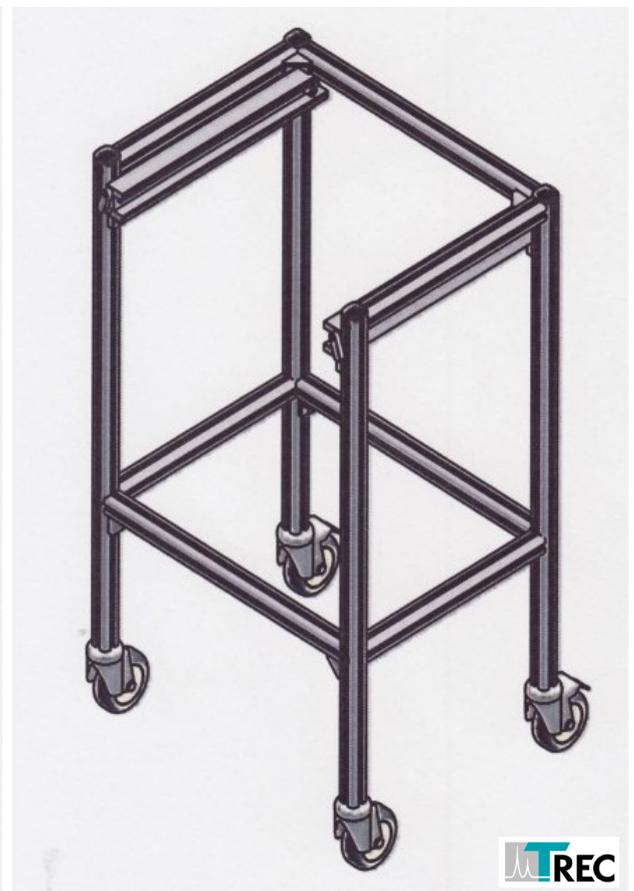


Fig. 17: TREC primate chair trolley

Figure 17 shows a trolley for the Thomas PPS primate chair. The trolley is equipped with rubber-covered wheels.

Upon special request, all of our chair designs can be modified to meet your specific protocol. If you require specifications that are not listed, please call Thomas RECORDING sales representative, and they will be happy to assist you.

Precision Positioning System (PPS)

5. Reward Unit

The Thomas RECORDING monkey reward system consists of the following components:

- Electronic control device with TTL compatible control input for controlling the valve that switches a valve ON and OFF. If the valve is switched ON the monkey gets juice or saline for reward or punishment during a training or recording session. The electronic control device is equipped with a handheld remote switch that allows to switch the valve manually. It is possible to select via front panel toggle switch between PC or manual valve control. The electronic control device has an integrated power supply.
- Fluid container for juice or saline
- Special mouth piece for the monkey with holder to mount it to the stereotaxic frame of the Precision Positioning System (PPS), incl. flexible tubing.

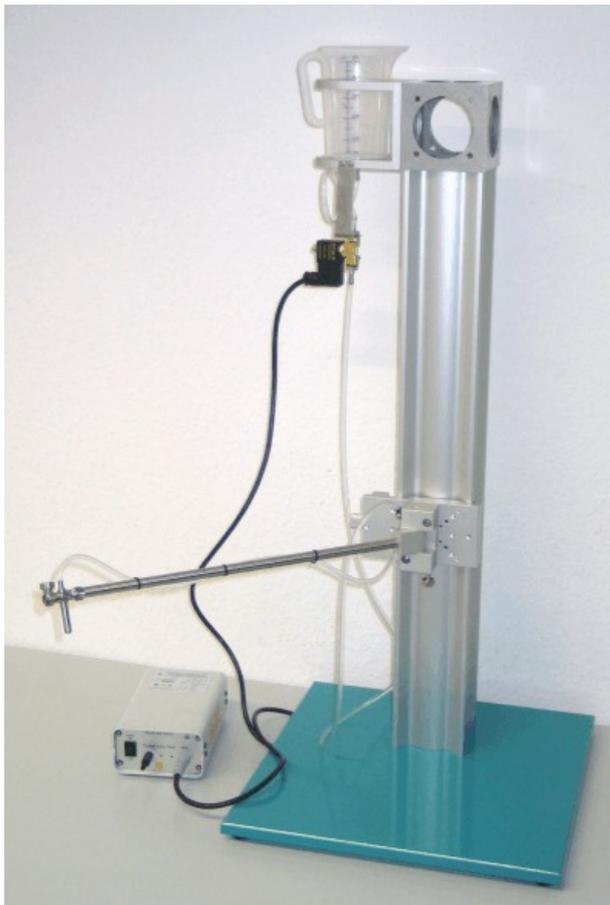


Fig. 18: All components of the reward unit

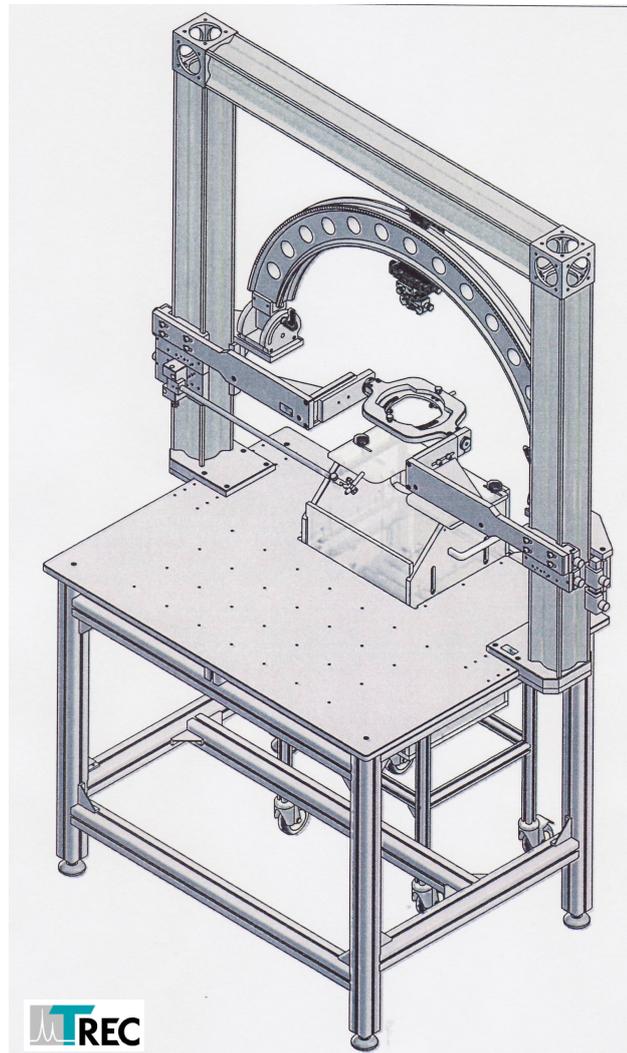


Fig. 19: Mouthpiece of the reward unit



Fig. 20: Control device of the reward unit

Precision Positioning System (PPS)



Ordering Information:

Article number	Article description	Price
AN000112	PPS frame	On request
AN000113	PPS table	On request
AN000114	PPS curved guide	On request
AN000115	PPS head holder	On request
AN000116	PPS monkey chair	On request
AN000117	PPS reward unit	On request
AN000120	PPS xyz manipulator	On request

Contact Information:

Email: info@ThomasRECORDING.com