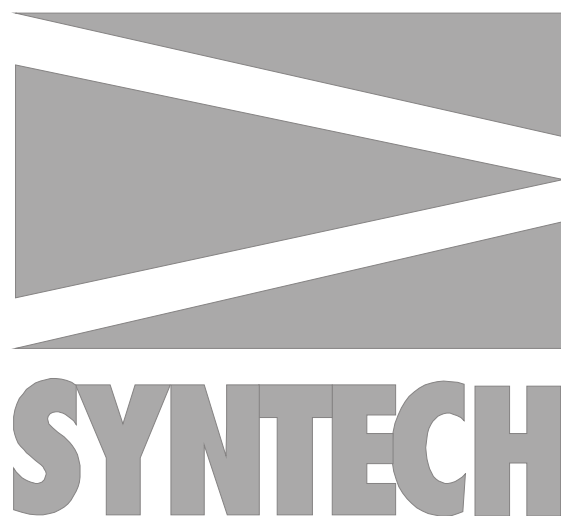


# MICROMANIPULATOR ASSEMBLY INR-5

INSTRUCTIONS





© SYNTECH 2002

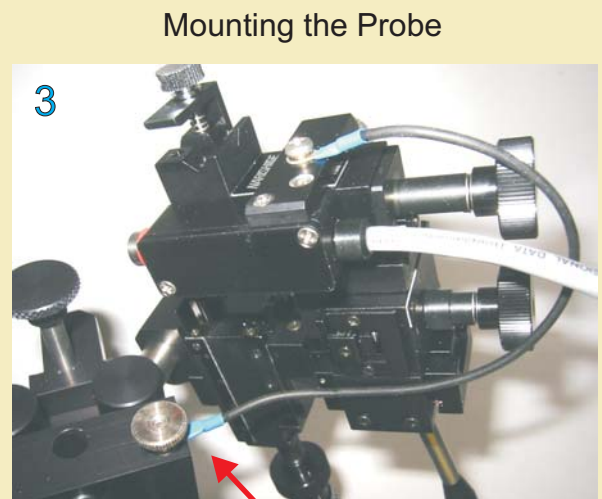
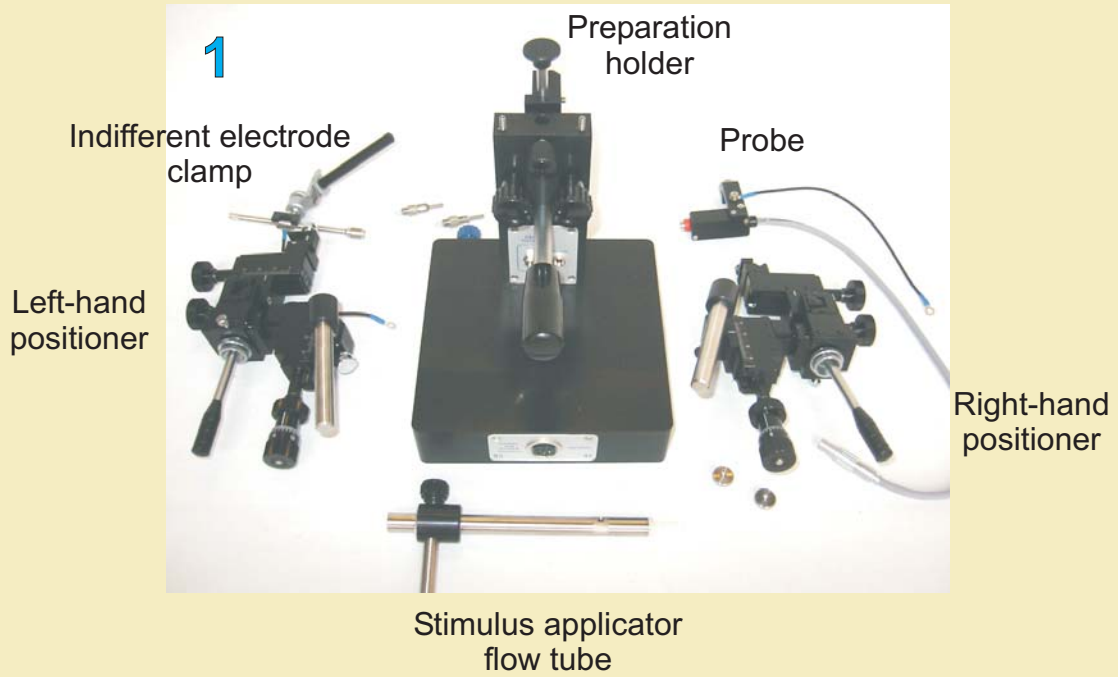
Hilversum, The Netherlands

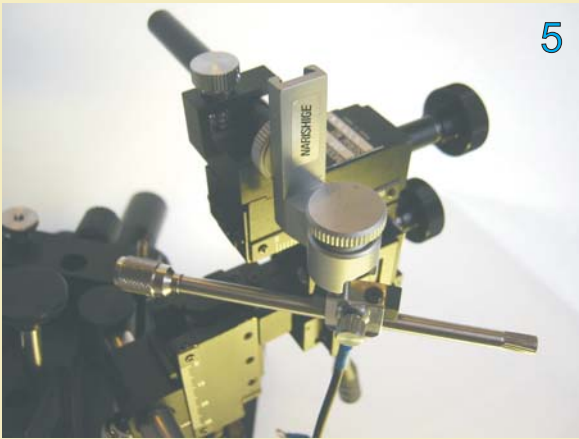
Reproduction of text and/or drawings is permitted for personal use. The use of reproductions in publications is only allowed if correct reference is made to SYNTECH



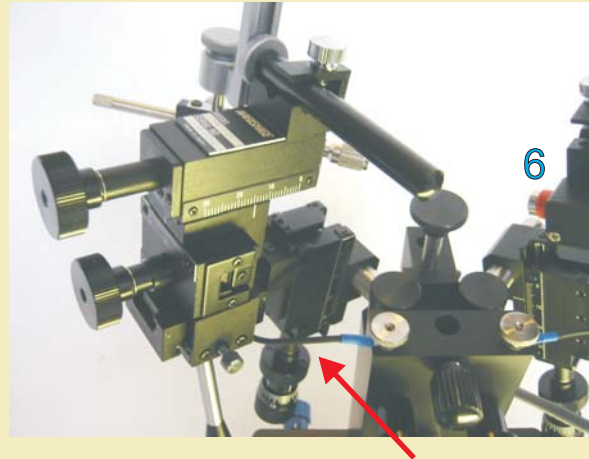
**MICROMANIPULATOR ASSEMBLY  
for SSR, EAG and GC-EAG/SSR,  
Type IRN-5**

# MICROMANIPULATOR INR-5 ASSEMBLY - 1 -

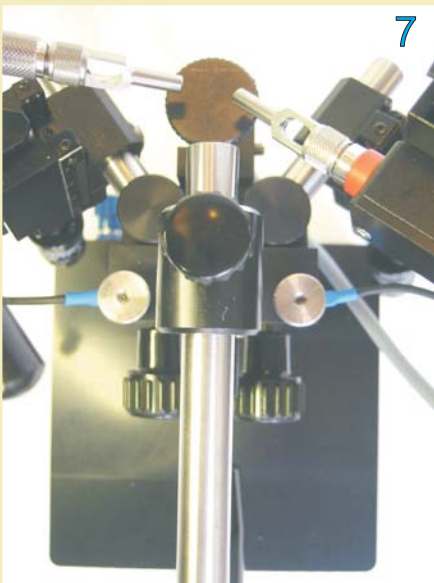




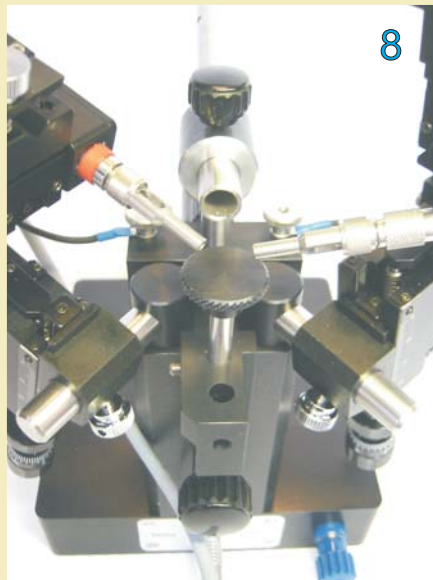
Mounting the indifferent electrode holder



*Connect grounding wire!*



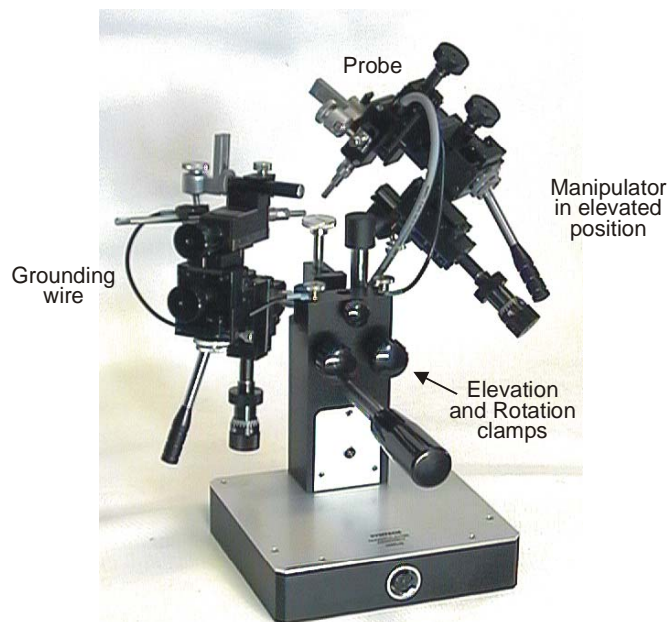
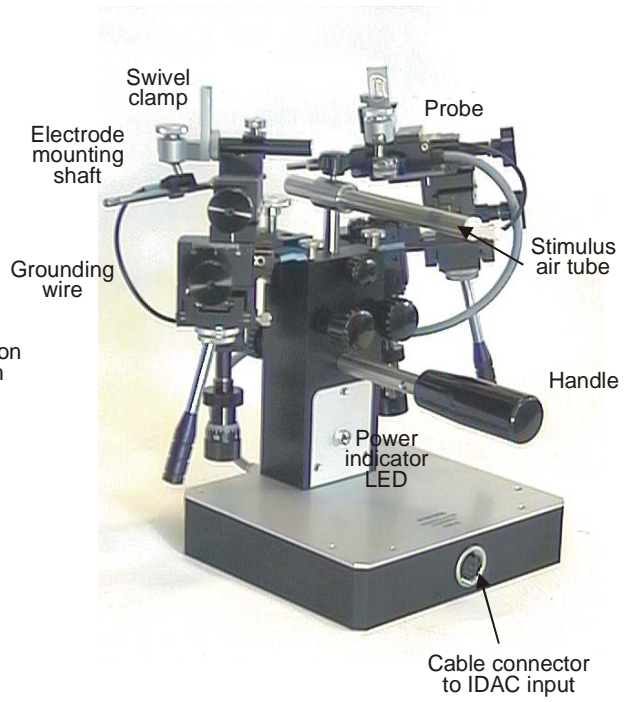
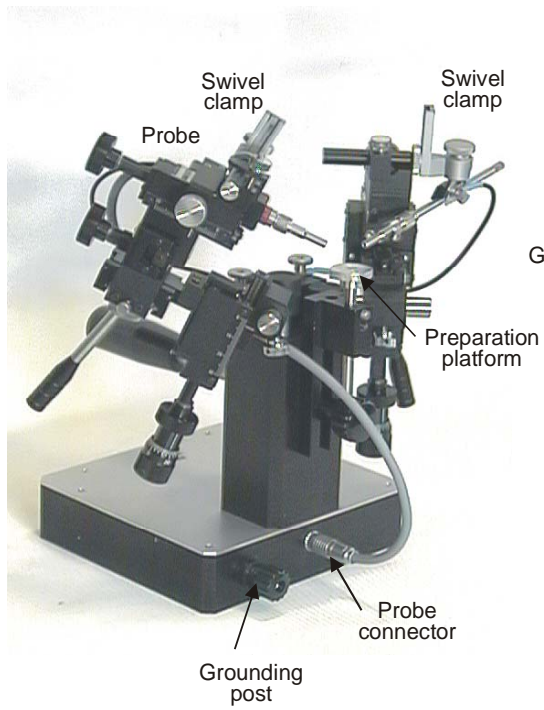
Mounting the flow tube



Adjustment of preparation holders, flow tube and electrode holders

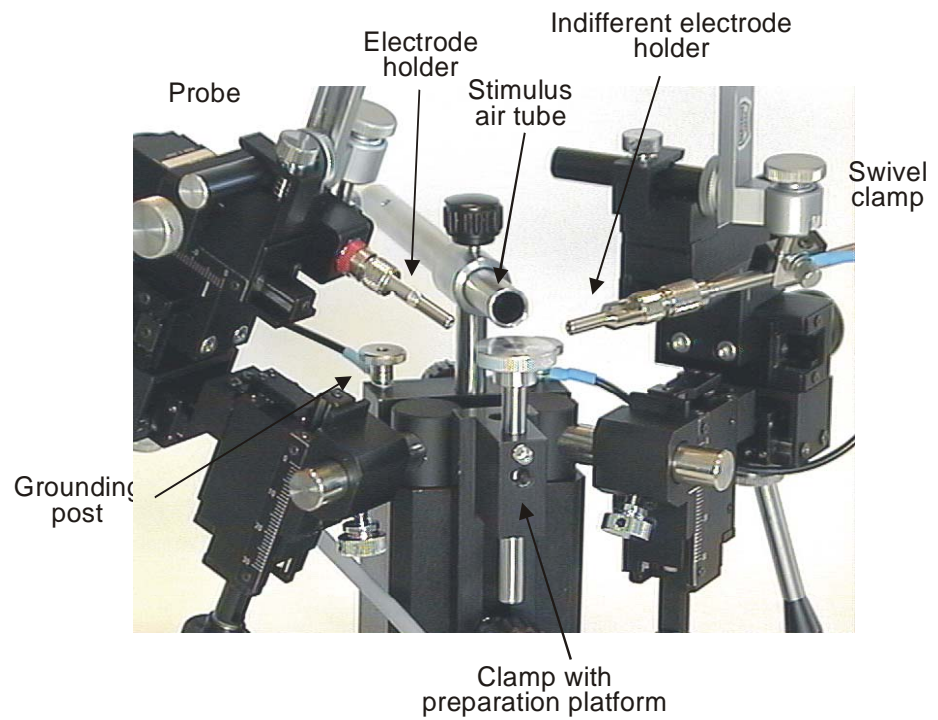
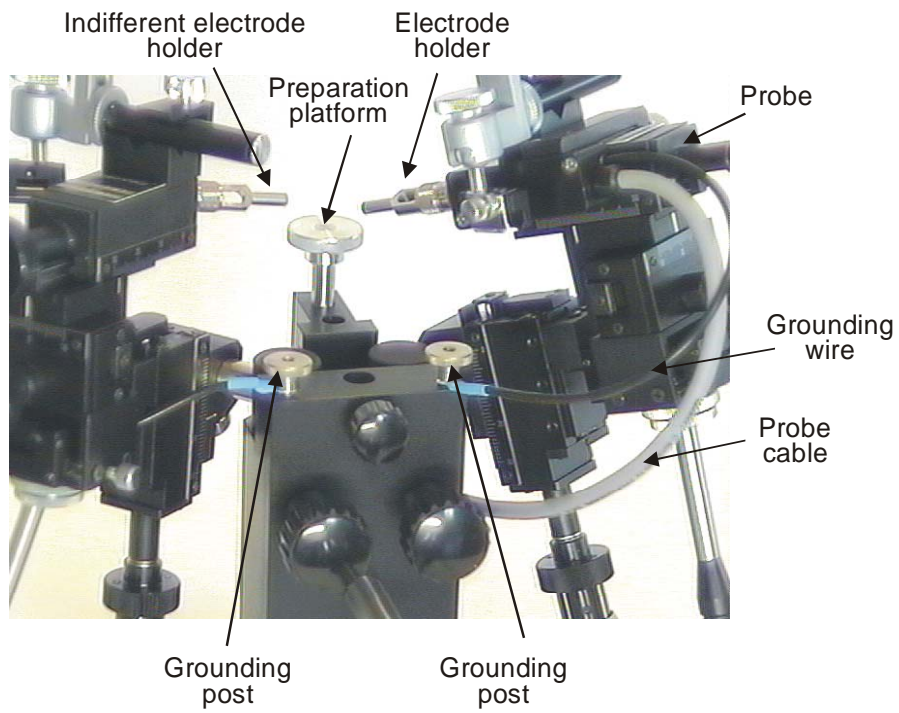
Signal/Power interface cable connection





MANIPULATOR ASSEMBLY, INR-5





MANIPULATOR ASSEMBLY, INR-5 - DETAILS

## DESCRIPTION

The SYNTECH Micromanipulator Assembly, Type INR-5, has been developed to enable convenient registration of Single-Sensillum Recordings (SSR) and Electroantennogram (EAG) measurements in the laboratory. The system combines an interchangeable preparation platform with micro-manipulators, input probe, electrode holders and stimulus flow tube in a single compact unit.

The instrument is suitable for standard laboratory experiments as well as for combined gas chromatography -electroantennographic or Single Sensillum detection (GC/EAD and GC/SSD).

Recordings can be made using glass micro capillary electrodes or tungsten electrodes. The recording electrode is directly coupled to the input receptacle of a high input impedance miniature head stage (probe). Vertical and horizontal tool holders are available for the support of micro-knives as used for the tip recording method. Preparation holders can be made according to the size and shape of the insect under study.

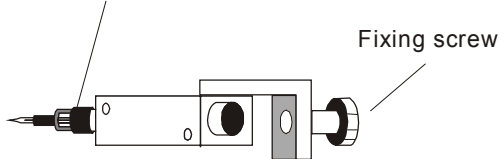
Optionally a micro thermistor air flow sensor can be installed; this air-sensor can be positioned close to the antennal preparation allowing simultaneous registration of the antennal signal and the air velocity over the preparation.

Recently, a special high pass filter has been built-in in the central column. This filter effectively suppresses 50 -60 Hz interference, and thus makes the use of a Faraday shield unnecessary for EAG and GC-EAD recording.

The base is provided with a receptacle for connection to an amplifier or main signal processing system. This interface is compatible with all Syntech amplifiers and data processing systems (IDAC-2, USB-IDAC, SERIAL IDAC and IDAC2000). The INR-2 does not need a battery or power supply, because power for the probe is provided via the interface cable.



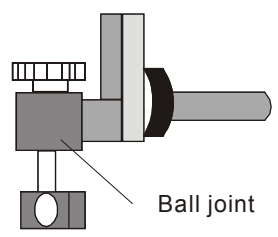
Different electrode holder



Fixing screw

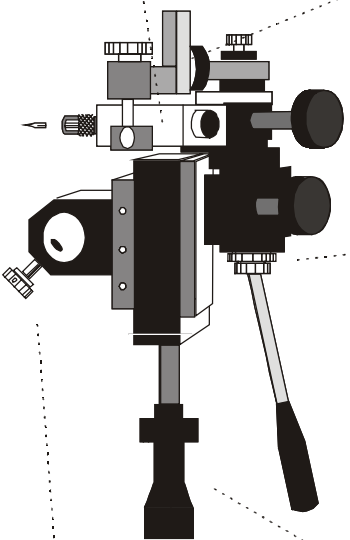
PROBE

Adjustable clamp



Ball joint

clamp



RIGHT-HAND MICROMANIPULATOR

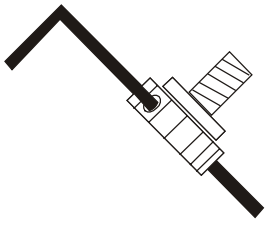
Joystick



Ratio adjustment Ring

Tension Adjustment Ring

Use small wrench to fix screw



Fixing screw



Coarse Z-movement

Fine Z-movement

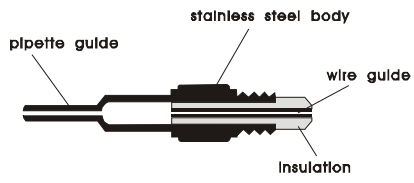
Z-Axis control

## OPERATION

The figures show the overall construction and the various mechanical components of the instrument.

To prepare the device for operation the following points should be carefully checked:

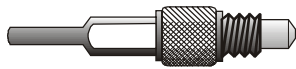
1. Mount the Probe and connect the cable to receptacle at the base of the unit.  
**NB. Never connect any other device to this receptacle!**
2. Check the grounding wire connections from the indifferent electrode holder clamp and from the probe to the central support of the device. The wires should make good contact with the grounding posts on the central support..
3. Set the filter switch to EAG on or off depending of the recording mode.  
Make sure the switch is in its off position when making single sensillum recordings (SSR).
4. Adjust the position of the micromanipulators. The mounting screws should be well secured using a small hexagon wrench.  
Adapt the ratio and tension adjustment rings of the joystick lever of the manipulators to the operator's requirements and feeling.
5. Arrange the neutral position of the electrode holders and the preparation holder in such a way that the preparation is within the working range of the manipulator X-Y-Z movements .
6. Mount the air flow tube and fix its position with respect to the preparation site.



CROSS SECTION of ELECTRODE HOLDER



SILVER WIRE 0.3 - 0.5 mm



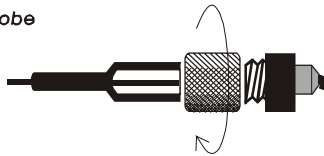
*make tiny bend at end of wire*



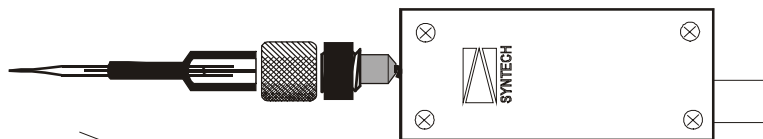
*Insert wire into holder*



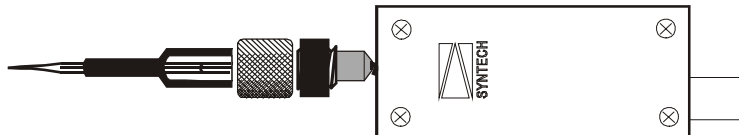
*screw holder onto probe*



GLASS PIPETTE ELECTRODE diam. 1.5 mm



*Insert pipette into electrode holder*



## Electrode preparation

## ELECTRODE PREPARATION

The use of SYNTECH electrode holders and the insertion of electrode wire and glass pipette is illustrated in the figure.

Note that the body of the *different* ('recording') electrode, which is mounted onto the PROBE, is ***not*** on ground potential. It is connected to the output of the first operational amplifier inside the PROBE, thus forming a so called 'guard'. Such a guard circuit constitutes an effective shield against noise interference and eliminates the effect of leakage currents across the input. Therefore, do not connect the body of this electrode to ground, and prevent it from making direct contact with the indifferent electrode or any grounded part of the instrument or set up.

Practice has thought that in most applications *AgCl coating of the silver wires is not necessary*, because the input 'window' of the PROBE allows offset voltages of up to 400 mV.

### Preparing the micropipettes

For single sensillum recording the tip size of the recording glass pipette electrode should be adjusted to the proper size depending on the recording method.

For EAG recording purposes the tips of most glass micropipettes are too fine. Therefore, carefully break off the tips with the help of fine forceps to an inner diameter wide enough to enable insertion of an excised antenna.

A good stereo dissecting microscope is indispensable for this work.

### Preparing the Ringer/PVP solution

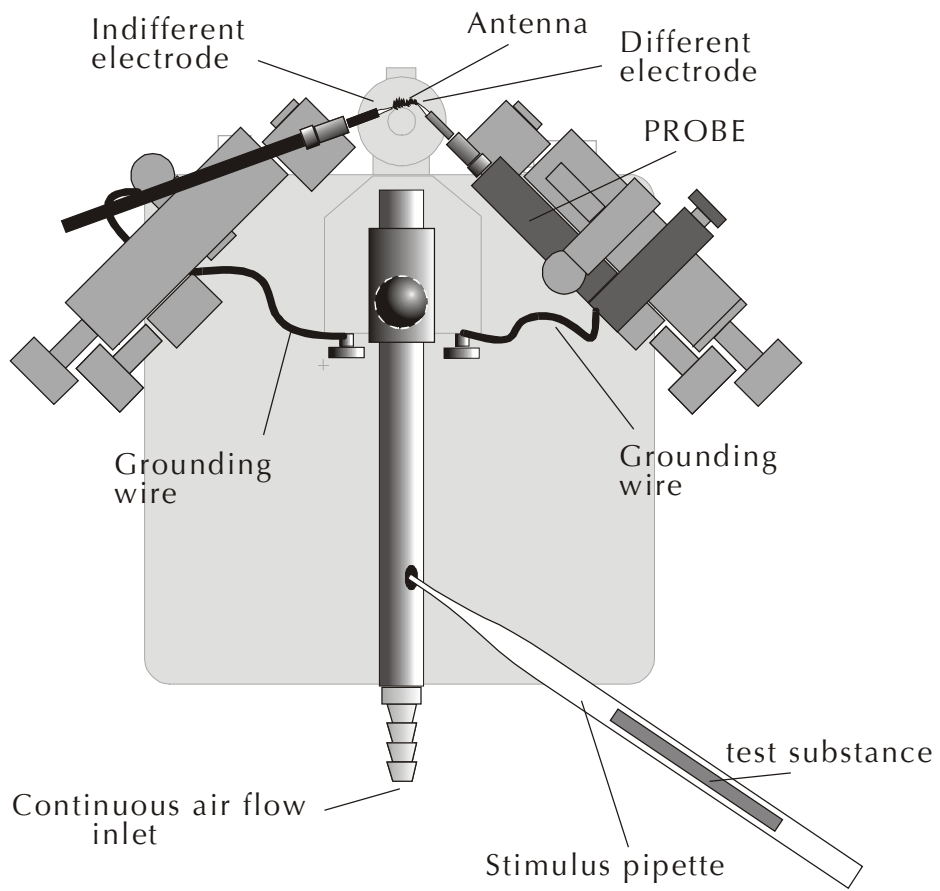
Add an amount of about 10% by volume of polyvinylpyrrolidone (PVP) to an aqueous solution of 0.1 N KCl or other suitable insect Ringer solution. Shake well and let it stand for a while until the solution becomes clear. Do not prepare more than 100 ml at a time, and store the solution in a refrigerator between experiments.

### Filling the micropipettes

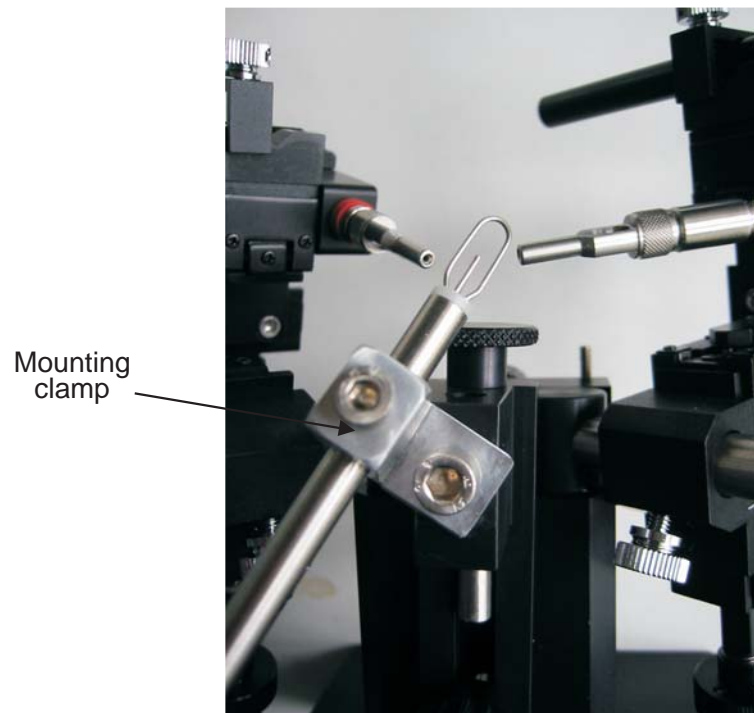
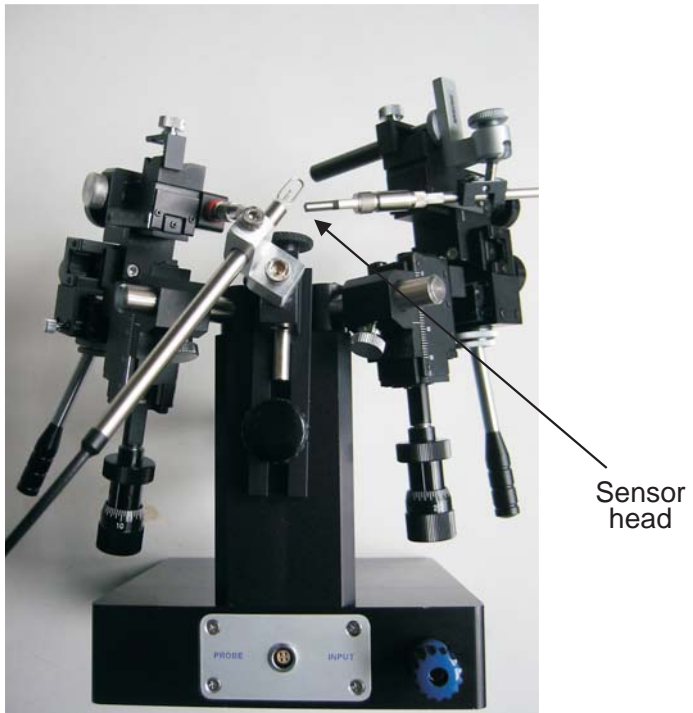
Pipettes with a relative wide tip fill spontaneously due to capillary action when the tip is dipped into the Ringer/PVP solution. Fine tipped pipettes are easily filled by dipping and simultaneous sucking from the wide end through a well fitting tube.

Take care to fill only the first 10 - 15 mm from the tip.

Fill the micropipettes shortly before making the antennal preparation.



Stimulus Application



AIR SPEED SENSOR ATTACHMENT



