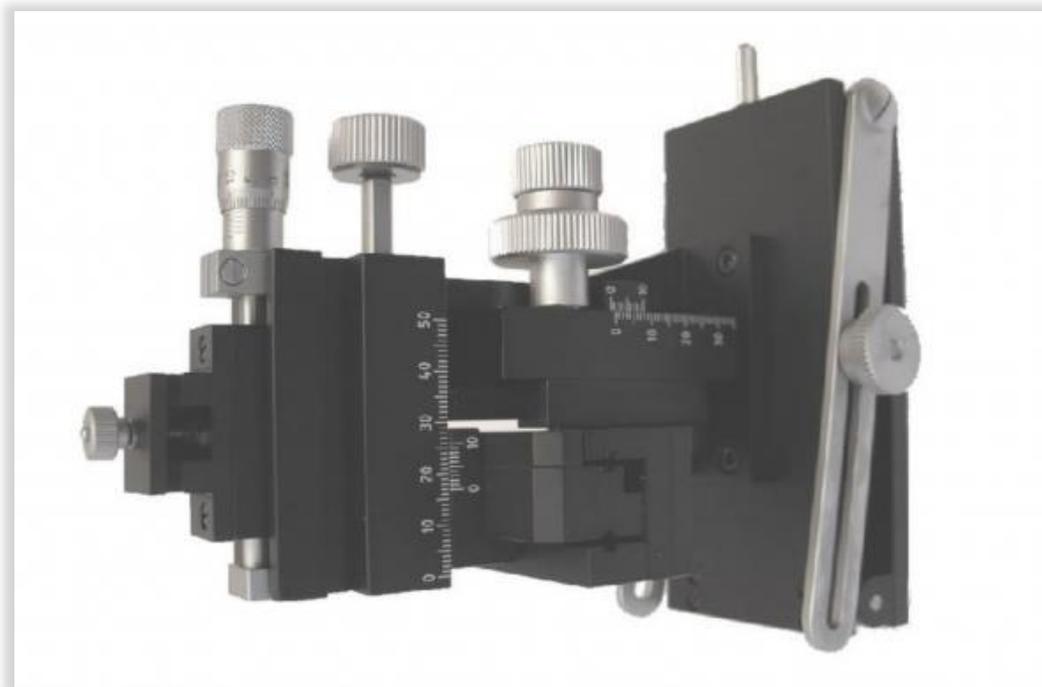


Micromanipulator MM33

Manual Micromanipulator

USER MANUAL



Micromanipulator MM33

Manual Micromanipulator

Document Version 1.11

The MM33 is provided by:

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1 INTRODUCTION

With the manual micromanipulator **MM33** it is possible to measure oxygen microprofiles in semi-solid samples by moving a micrometer screw stepwise manually. Due to its precise and smooth operation, the micromanipulator **MM33** is a standard tool for microsensor studies. For best operation conditions, the micromanipulator MM33 should be mounted on the heavy stand **HS1** from **PyroScience**.

The three control knobs for the three axes are positioned very compact and user-friendly. An additional micrometer screw for the z-axis allows positioning down to 10 μm resolution.

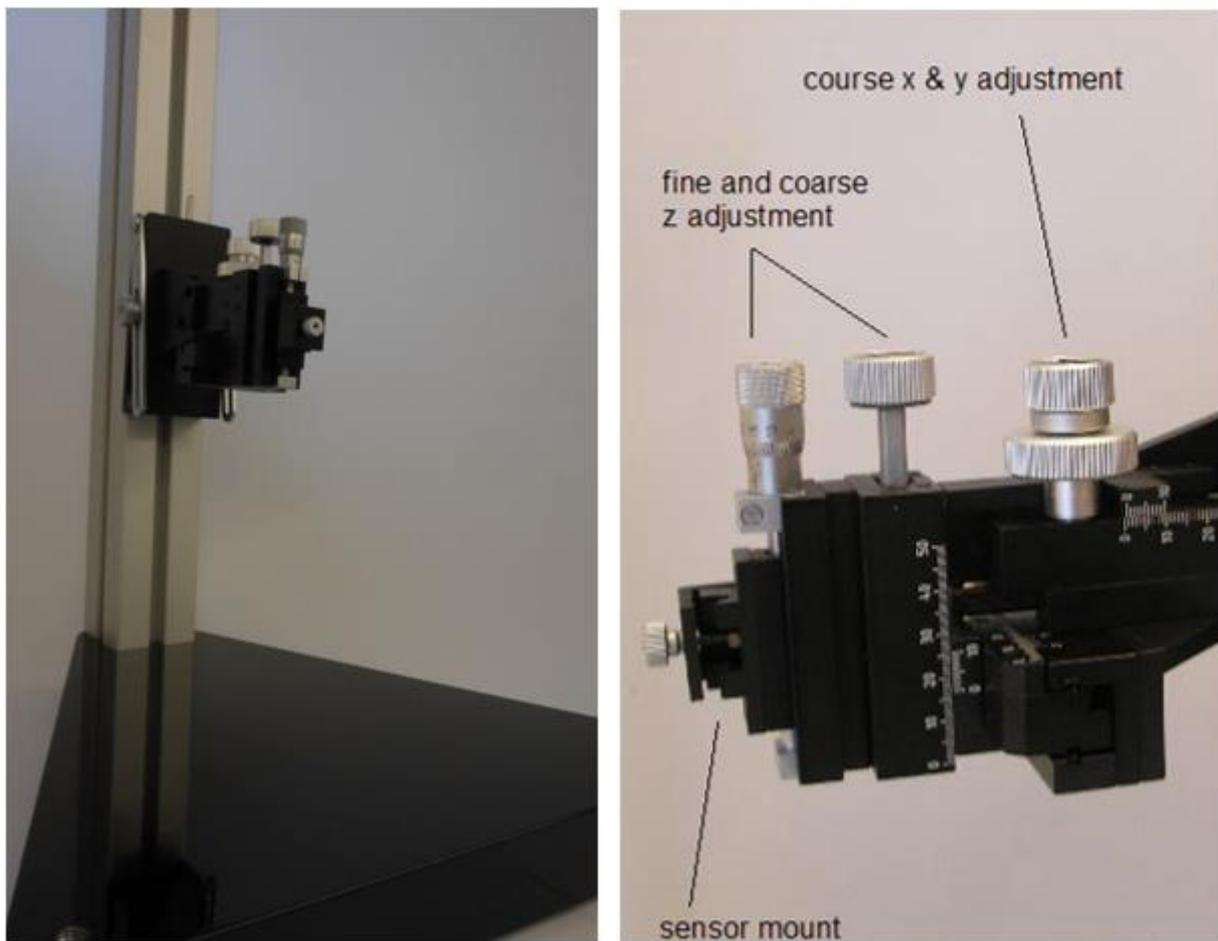


Fig 1: Manual micromanipulator MM33 mounted on heavy stand HS1 (left) with overview of MM33 (right)

2 SAFETY GUIDELINES

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE STARTING TO WORK WITH THIS DEVICE

- Ensure that the device is only operated under the climatic conditions specified in the chapter “Technical Specifications” in this instruction manual.
- Maintenance, modifications and repair work must only be carried out by a suitable, qualified technician, trained by **PyroScience**.
- If there is any reason to assume that the instrument can no longer be employed without a risk, it must be set aside and appropriately marked to prevent any further use, e.g. if the instrument a) is visibly damaged, b) no longer operates as specified, c) has been stored under adverse conditions for a longer period.
- If there is any problem, contact **PyroScience** and send the micromanipulator back for repair.
- The user has to ensure the following laws and guidelines:
 - EEC directives for protective labor legislation
 - National protective labor legislation
 - Safety regulations for accident prevention
- **This device is not protected against water spray**
- **This device is not water-proof**
- **This device must not be used under environmental conditions which cause water condensation**
- **This device must not be opened**

This device is only intended for use in the laboratory by qualified personal according to this instruction manual and these safety guidelines!

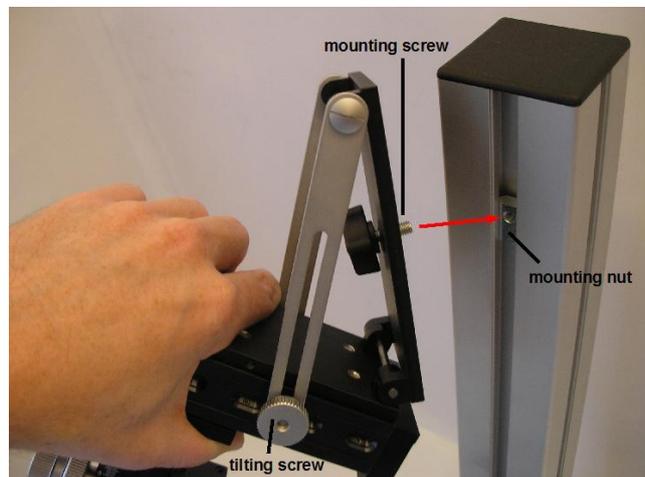
This device is not intended for medical or military purposes! Keep away from moving parts of the device! Keep this device out of the reach of children!

3 Installation and Operation

PRECAUTION: The Micromanipulator **MM33** comprises high-precision mechanics which can easily be damaged by improper or harsh treatment. **Handle with care!**

Please follow these steps for mounting the Micromanipulator **MM33**:

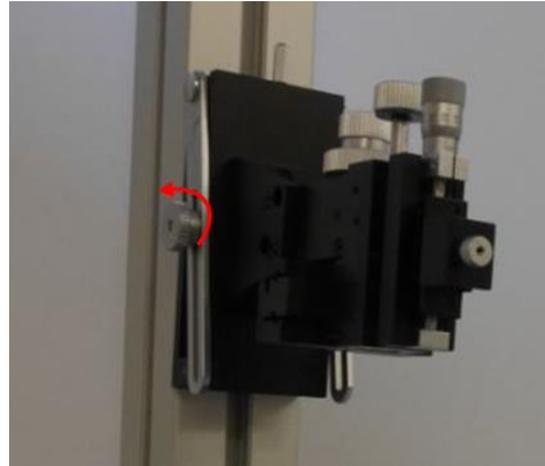
1. Release the tilting screws and open the tilting mechanism. Screw the mounting screw carefully into the mounting nut of the Heavy Stand **HS1** (if the spring-loaded mounting nut is not exactly centred within the groove, move it back into position with your fingers).



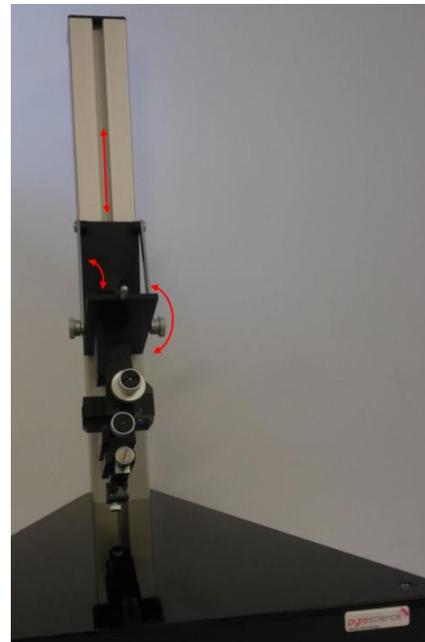
2. Fasten the mounting screw.



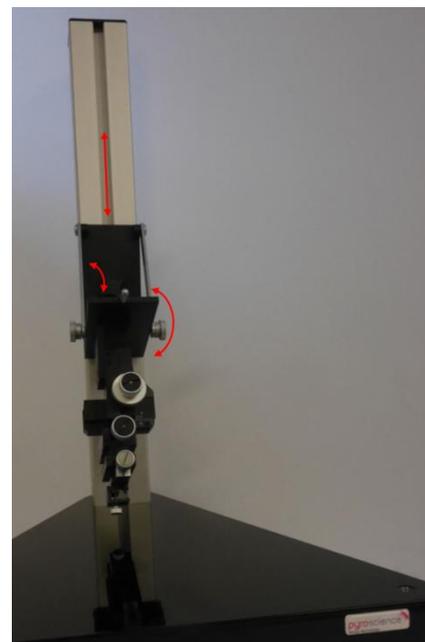
3. Fasten the tilting screws.



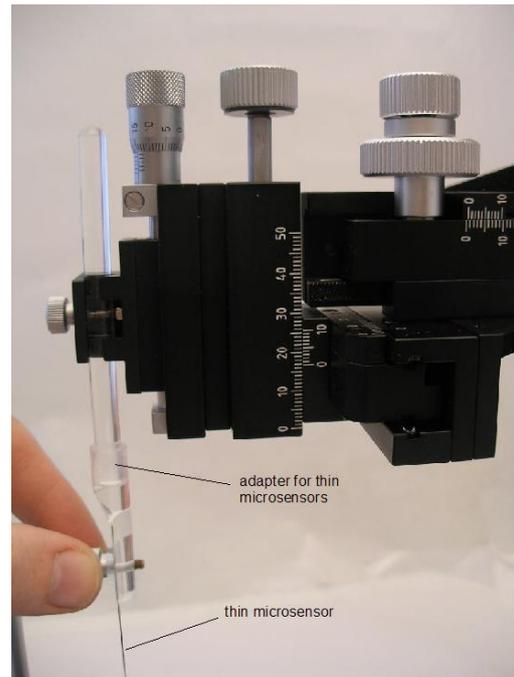
4. By releasing the tilting screws and the mounting screw, the mounting angle and the position of the micromanipulator can be adjusted. Ensure to fasten the screws carefully, if the desired position is reached.



5. Microsensors with diameters from 6.5 mm to 12 mm can be mounted directly to the sensor mount.



6. For mounting microsensors with diameters from 0.5 mm up to 3 mm use the included adapter for thin microsensors. The adapter can hold two thin microsensors simultaneously.



PRECAUTION: Keep any parts of your body (especially fingers and hairs!) out of the mechanics!

4 MAINTENANCE

PRECAUTION

The performance of the **MM33** depends strongly on the conditions of its precision mechanics. Ensure that its parts are kept free from dirt, dust, liquids and other contaminants!

Be aware, that aerated aquariums will deposit a fine spray of water drops in the surrounding. Ensure that the Micromanipulator **MM33** is shielded from this spray! Especially seawater is very aggressive, causing rapid corrosion of metallic parts!

The mechanical performance of the Micromanipulator **MM33** depends strongly on the condition of its precision mechanics. Periodically you might carefully clean the gear wheels and gear racks. For cleaning, first remove contaminants and old grease with ethanol. Then apply a small amount of silicone-based grease to the gear wheels, gear racks, and the lead screw. In order to protect all other parts of the **MM33** against contaminants, you might coat them thinly with a Teflon spray.

5 SPECIFICATIONS

Feature	Specification
Dimensions	65 mm x 200 mm x 160 mm
Weight	0.65 kg
Travel range y-axis (manual)	20 mm
Travel range z-axis (manual)	25 mm
Operating temperature	37 mm + 10 mm fine adjustment
Max. relative humidity	0 to +50°C
Mounting adapter	up to 95% (non-condensing conditions)
Sensor mount	M6 screw, 10 mm length
Adapter for thin sensors	Clamp for microsensors from 6.5 mm to 12 mm

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