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NOTICE TO PURCHASER
This product is for research use only. Not for use in human diagnostic or therapeutic procedures.

WARNING
Microsensors have very pointed tips and must be handled with care to avoid personal injury and only by trained personnel. Unisense A/S recommends users to attend instruction courses to ensure proper use of the products.

WARRANTY AND LIABILITY
The MicroProfiling System is covered by a one year limited warranty.

The warranty does not include repair or replacement necessitated by accident, neglect, misuse, unauthorized repair, or modification of the product. In no event will Unisense A/S be liable for any direct, indirect, consequential or incidental damages, including lost profits, or for any claim by any third party, arising out of the use, the results of use, or the inability to use this product.

Unisense mechanical and electronic laboratory instruments must only be used under normal laboratory conditions in a dry and clean and environment. Unisense assumes no liability for damages on laboratory instruments due to unintended field use or exposure to dust, humidity or corrosive environments.

REPAIR OR ADJUSTMENT
Sensors and electrodes cannot be repaired. Equipment that is not covered by the warranty will, if possible, be repaired by Unisense A/S with appropriate charges paid by the customer. In case of return of equipment please contact us for return authorization.
For further information please see the documents Conditions for Sale and Delivery for Unisense and Warranty and Shipping Information as well as the manuals for the respective products.
CONGRATULATIONS WITH YOUR NEW PRODUCT!

SUPPORT, ORDERING, AND CONTACT INFORMATION

If you wish to order additional products or if you encounter any problems and need scientific/technical assistance, please do not hesitate to contact our sales and support team. We will respond to your inquiry within one working day.

E-mail: sales@unisense.com

Unisense A/S
Tueager 1
DK-8200 Aarhus N, Denmark
Tel: +45 8944 9500
Fax: +45 8944 9549

Further documentation and support is available at our website www.unisense.com.

REPLACEMENT OF SENSORS

Unisense will replace sensors that have been damaged during shipment provided that:

- The sensors were tested immediately upon receipt in accordance with the delivery note and the manual
- The seal is still intact.
- The sensors are returned to Unisense for inspection within two weeks.
- The sensors are correctly packed for return to Unisense, in accordance with the note included in the sensor box.
OVERVIEW

With its stability, precision, and eminent spatial resolution, the MicroProfiling System is an outstanding tool for microscale measurements for a variety of applications.

The optimal choice of sensors and equipment depends on what kind of experiment you want to perform.

You can perform manual or automated profiles. In manual profiles, the micromanipulator is operated by hand. For increased accuracy and automatic profiles, a motorized stage and motor controller can be used. This will increase microsensor positioning precision, extend the travelling distance, facilitate multiple automated profiles and free the scientist from the tedious manual micromanipulator operation.

This manual gives an overview of the components of a Unisense profiling measurement set-up and how to connect them. For details on each component, please consult the individual manuals.
MICROSENSOR AMPLIFIERS

It takes a specialized high-quality amplifier to amplify the signal from a microsensor.

Amperometric microsensors (e.g. O₂, H₂S, H₂) require either a versatile amplifier with adjustable polarization like the MultiChannel UniAmp fx-6 or fx-3 or a picoammeter with preset polarization like the O₂ UniAmp.

Potentiometric microsensors (e.g. pH and Redox) require a high-impedance millivoltmeter like the pH/Redox UniAmp or a MultiChannel UniAmp.

All Unisense amplifiers have an integrated A/D-converter unit, so they are connected to the computer directly.

Please see separate manuals for more detailed instruction and specifications.
MANUAL MICROMANIPULATORS

A microsensor must be positioned in the measuring environment with much more precision than is possible to achieve with an ordinary laboratory stand. Therefore Unisense supplies manual micromanipulators with holders for one (MM33) or two sensors (MM33-2), which facilitate reliable measurements and minimize the risk of breaking the microsensor.

Mounted on a suitable laboratory stand (e.g. the Unisense LS), the micromanipulator provides a robust and precise tool for positioning microsensors with a x-axis precision of 10 microns. The y- and z-axis can be manipulated with a precision of 100 microns.

The MM33-2 offers the possibility for simultaneous positioning of two sensors. It allows for extremely fine adjustment of the two microsensor tips relative to each other so that the two sensors measure practically at the same point.

**Specifications (MM33 and MM33-2)**

- Weight: 1100 g (MM33), 1240 g (MM33-2)
- x-axis: 37 mm (1.5”) – additionally 100 mm (4”) with motor resolution 10 microns
- y-axis: 20 mm (0.8”), resolution 100 microns
- z-axis: 25 mm (1”), resolution 100 microns
For precision below 10 micron in the x-axis and for automated measurements, the MM33 (or MM33-2) can be mounted on a motor-driven micromanipulator stage (MMS), which is positioned via the PC data acquisition and motor control software (SensorTrace Suite) and a motor controller (MC-232). With multiple motors and motor controllers automated measurements can be performed in 2D or 3D with extreme precision in all directions.

Motorized sensor positioning is superior to manual positioning due to a higher level of precision, a longer operating distance, and ease of operation. A motorized unit consists of a micromanipulator (MM33/MM33-2) mounted on a motorized mechanical stage (MMS) via a small adapter. The stage is controlled by PC software (SensorTrace Suite) via a motor controller (MC-232). The function of the motor controller is to send power to the motor and to receive position signals, which are used to control the movement.

If you already have a manual positioning system it is easy to acquire the motor system as an add-on.
**SPECIFICATIONS FOR CONTROLLER MC-232**

- AC power supply adaptor: In: 100-240 VAC, 60-50 Hz Out: 24VDC 50W
- Interface: RS232 (adapter cable for USB port provided)
- Configured for: Unisense MMS
- Operating temperature: 0-70°C (32 to 158°F)
- <90% RH non-condensing

**SPECIFICATIONS FOR STAGE MMS (WITH MC-232)**

- Movement in x-axis: 100 mm (4”), optionally up to 300 mm (12”)
- Resolution of motorized micromanipulator stage: 0.5 µm
- Accuracy: 0.2%
- Maximum linear speed: 10 mm/sec
- Minimum linear speed: 0.1 microns/sec
- Maximum axial load: 5 kg (11 lbs)
- Motor type: DC-brush

*Manipulator mounted on a stage*
MICROMANIPULATOR STANDS

The LS is a highly stable, corrosion-protected laboratory stand, which makes it possible to maintain the precision of the MM33, MM33-2 and the motorized micromanipulator stage.

The in situ stand IS19 is a light-weight micromanipulator stand for field use in soft substrates such as mud or sediments. It consists of a pointed angular aluminum pole, and its tip is pushed into the substrate to provide a robust support for micromanipulators and sensors during in situ experiments. It can be used under water as well as in air. The in situ stand can be used alone or attached to the arm of the laboratory stand LS to increase the working height.

**Specifications Laboratory stand LS:**

- Weight: 12 kg (26.5 lbs)
- Dimensions: 40 cm x 30 cm x 54 cm (15.7" x 11.8" x 21.3") assembled.
- Surface treatment: chemically and physically resistant epoxy paint

**Specifications In situ stand IS19**

- Weight: 1.9 kg (4.4 lbs)
- Height: 50 cm (20")
- Fixation holes: thread M6, spacing between holes 5 cm (2")
- Surface treatment: chemically and physically resistant epoxy paint
SETTING UP

The following section will describe a typical profiling set-up. Please consult separate manuals for the individual components for further details.

1. Install the Unisense SensorTrace Suite software.

2. Place the laboratory stand LS on a smooth surface. Adjust the feet to prevent the stand from rocking. If the sample is not to be placed on the stand plate, the stand should be placed at an appropriate distance from the sample to allow space for the micromanipulator.

3. Mount the micromanipulator or assembled motorized system (see below for instructions) on the stand with the fixation screw at a suitable height so that the lower side of the sensor fixation is positioned about 12.5 cm/5” above the top of the sample, when the microsensor x-axis is completely retracted.

4. If motorized, connect the motor port of the motor controller(s) to the motor stage(s) using the motor cable(s).

5. Connect the the motor controllers to the PC using the RS-232 serial adapter cable. If you have several motor controllers, you can use either multiple adapters or one multi-adapter that split into 4 serial connections. If you do not have an RC-232 port on your computer, use the provided adapter cable for the USB port. The adapter may need to be installed. Drivers can be found on the SensorTrace Suite CD or latest version downloaded from http://www.easysync-ltd.com

6. RC-232 port on your computer, use the provided adapter cable

7. for the USB port. The adapter may need to be installed. Drivers

8. can be found pm upir SemsprTrace PRO CD or latest verion

10. Place the microsensor amplifier(s) near the stand (0.5m/1.5ft) and connect it to a power source if not battery or USB powered.

11. Connect the amplifiers to the PC using the USB cable.

12. Place the sample to be investigated under the micromanipulator, using the extra vertical arm of the LS18 and a fixation clamp (not provided) if necessary.

13. Place a microsensor in the holder of the micromanipulator with the tip a few centimetres above the sample. Move the sensor horizontally to the desired location with the y- and z-controls. Be careful not to break the microsensor tip!

14. Make measurements with the sensors according to the manuals for the sensors and software.
ASSEMBLY PROCEDURE 1D MOTORIZED SYSTEM

1. Take the MM33 or MM33-2 and use the hexagonal (Allen) key to unmount the front part from the tilting base. Save the screws.

2. With 2 of the provided large screws, mount the U-profile on the tilting base.

3. Mount the motorized stage MMS onto the U-profile: First, make sure that the tilt of the micromanipulator base will go out in the opposite end of the motor (see picture right) – this will decrease the risk of accidents with sensor damage. Move the stage plate completely down by turning the spindle joint with a finger and mount two of the provided large screws in the two upper of the four central holes in the back of the stage as shown below. Then turn the spindle to move the stage plate completely in the opposite direction to mount two of the provided large screws in the bottom holes.
4. The provided square plate (MMS-A) has four holes: two center holes near the middle and two corner holes near the corners. With the MMS neck (controller connection) pointing **upwards**, mount the plate with the two center holes located just right of the middle. Use the last two large screws.

5. Mount the front part of the MM33 or MM33-2 on the plate to finish using the two screws from point 1.

6. Mount the stage and micromanipulator on the Laboratory stand with the large screw.
ASSEMBLY PROCEDURE 2D MOTORIZED SYSTEM

1. Follow step 1 and 2 from the 1D assembly procedure.

2. Mount the 2D MMS horizontally on the U-profile. Move the stage plate completely down by turning the spindle joint with a finger and mount two of the provided large screws in the two upper of the four central holes in the back of the stage as shown below. Then turn the spindle to move the stage plate completely in the opposite direction and mount two of the provided large screws in the bottom holes.

3. Add the 1D MMS vertically on the 2D MMS as described in step 3 of the 1D assembly procedure. Here it is important to use the short screws provided. Remember that the tilt of the micromanipulator base should go out in the opposite end of the 1D motor. Move the stage plate completely down by turning the spindle joint with a finger and mount two of the provided screws in the two upper of the four central holes in the back of the stage as shown below. Then turn the spindle to move the stage plate completely in the opposite direction to mount two of the provided screws in the bottom holes.
4. The provided square plate has four holes: two center holes near the middle and two corner holes near the corners. With the 1D MMS neck (controller connection) pointing upwards, mount the plate with the two center holes located just right of the middle. Use the large screws (see picture under 1D motor mounting)

5. Mount the front part of the MM33 or MM33-2 on the plate to finish using the two screws from point 1 in the 1D assembly procedure.
ASSEMBLY PROCEDURE 3D MOTORIZED SYSTEM

1. Follow step 1 and 2 from the 1D assembly procedure.

2. Mount the 3D stage **horizontally** on the U-profile. Move the stage plate completely down by turning the spindle joint with a finger and mount two of the provided large screws in the two upper of the four central holes in the back of the stage as shown below. Then turn the spindle to move the stage plate completely in the opposite direction and mount two of the provided large screws in the bottom holes.

3. Add the adapter angle with the short side against the mounted 3D stage. Use the two largest screws (5 mm diameter) and the allen key no. 5. The screws go into the two largest corner holes on the stage.

4. Now mount the 2D stage horizontally on the adapter angle in the two innermost holes of the adapter. Use the small screws, only two are needed.

5. Mount the micro-manipulator on the 1D stage: The provided square plate has four holes: two center holes near the middle and two corner holes near the corners. With the 1D stage neck (controller connection) pointing **upwards**, mount the plate with the two center holes located just right of the middle. Use the large screws (see picture under 1D motor mounting).
6. Mount the front part of the MM33 or MM33-2 on the plate to finish using the two screws from point 1 in the 1D assembly procedure.

7. Lastly mount the 1D stage **vertically** on the 2D stage using the last four small screws. Remember that the **tilt of the micromanipulator base should go out in the opposite end of the 1D motor**.

Move the stage plate completely down by turning the spindle joint with a finger and mount two of the provided screws in the two upper of the four central holes in the back of the stage as shown below. Then turn the spindle to move the stage plate completely in the opposite direction to mount two of the provided screws in the bottom holes.
Unisense recommends that the micromanipulator, lab stand, and in situ stand are protected with silicone spray before use. This will help to keep the surfaces clean and will prolong the lifetime of the unit.

Rinse the micromanipulator and stands with distilled water if salt or other corrosive material have been deposited on them.

Keep the micromanipulator and motor free of sand and dust.

**WARNING**
Do not spray the MMS with silicone.

**IMPORTANT**
If you encounter problems that cannot be solved from the troubleshooting sections of the individual manuals, please contact sales@unisense.com for support (we will try to answer you within one workday)