

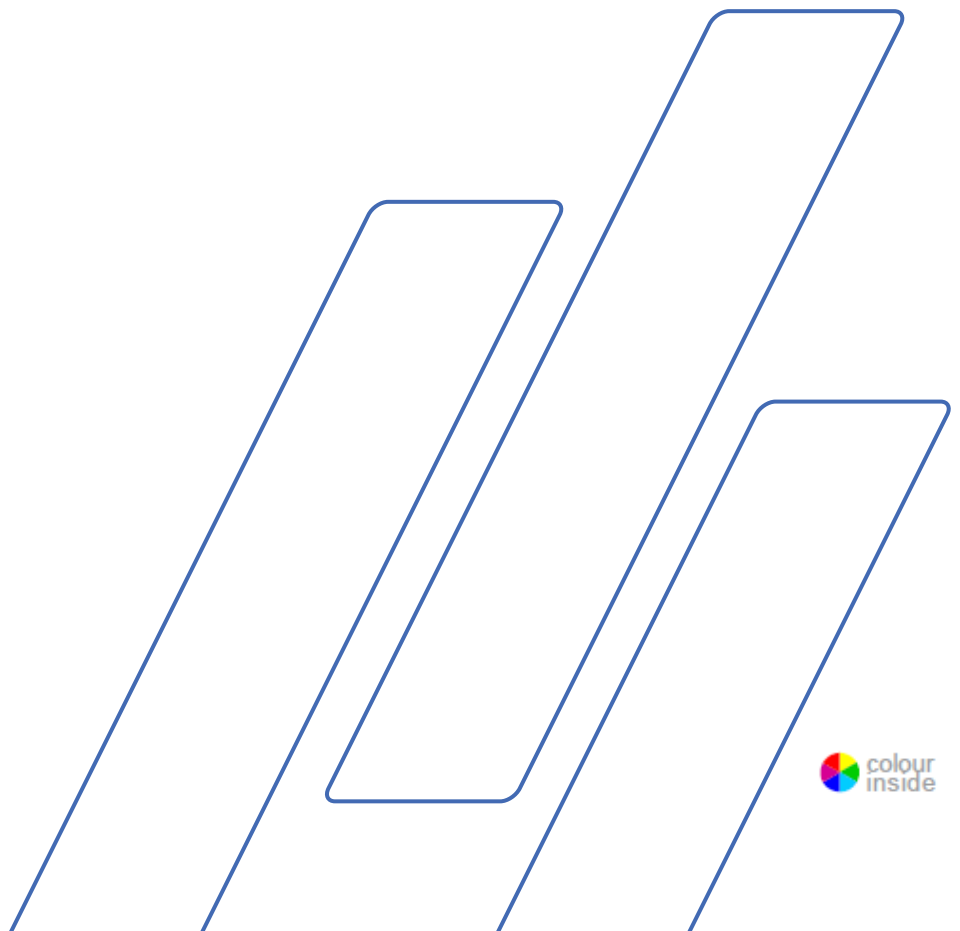
PSM-5/-10



Manual No.: 16077025
Revision A

Date of Release 2018.06.14

Portable Microscope Instruction Manual



Important

READ the instruction manual carefully before use.
Keep a copy of the manual in an easy-to-access place for future reference.

Always state *Serial No* and *Voltage/frequency* if you have technical questions or when ordering spare parts. You will find the Serial No. and Voltage on the type plate of the machine itself. We may also need the *Date* and *Article No* of the manual. This information is found on the front cover.

The following restrictions should be observed, as violation of the restrictions may cause cancellation of Struers legal obligations:

Instruction Manuals: Struers Instruction Manual may only be used in connection with Struers equipment covered by the Instruction Manual.

Service Manuals: Struers Service Manual may only be used by a trained technician authorised by Struers. The Service Manual may only be used in connection with Struers equipment covered by the Service Manual.

Struers assumes no responsibility for errors in the manual text/illustrations. The information in this manual is subject to changes without notice. The manual may mention accessories or parts not included in the present version of the equipment.

Original instructions. The contents of this manual is the property of Struers. Reproduction of any part of this manual without the written permission of Struers is not allowed.

All rights reserved. © Struers 2018.

If subjected to misuse, improper installation, alteration, neglect, accident or improper repair, Struers will accept no responsibility for damage(s) to the user or the equipment. Dismantling of any part of the equipment, during service or repair, should always be performed by a qualified technician (electromechanical, electronic, mechanical, pneumatic, etc.).

Struers
Pederstrupvej 84
DK-2750 Ballerup
Denmark
Telephone +45 44 600 800
Fax +45 44 600 801

Icons and typography

The following icons and typographic conventions are used in this instruction manual:

General Messages



Important or Note

indicates a risk of damage to property, or the need to proceed with special care.



Information or Tip

indicates additional information and tips.

Colour Inside Logo



The 'colour inside' logo on the cover page of this Instruction Manual indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

Typographic conventions

Bold type	indicates button labels or menu options in software programs
<i>Italic type</i>	indicates product names, items in software programs or figure titles
■ Bullets	indicates a necessary work step

Table of Contents	Page
1. Getting Started	
Checking the Contents of Packing	6
Placing PSM-5 and PSM-10	6
Transportation	6
Getting Acquainted with PSM-5 and PSM-10	7
PSM-10 Mounting the Tripod Base	9
Mounting the Objective	9
Mounting the Eyepiece	9
2. Operation	
Using the Magnetic Cross Table	10
Examining Replicas	11
3. Measuring with PSM-5/-10	
Using the Measuring eyepiece	12
4. Taking Photographs	
Mounting a Digital Camera with C-mount	13
Camera Settings	13
Adjusting the Colour Balance	15
Calculating the Magnification of the Camera Adapter	16
5. Maintenance	17
6. Technical Data	18
7. Accessories	18
8. Spare Parts	19

1. Getting Started

Checking the Contents of Packing

PSM-5

- 1 PSM-5 (Portable microscope)
- 1 Eyepiece 10x
- 1 Objective lens 10x
- 1 Allen key
- 1 LED light bulbs
- 1 Key (for removal of spacing ring)
- 2 Batteries (3V CR2025) (mounted)
- 1 Set of Instruction Manuals

PSM-10

- 1 PSM-10 (Portable microscope)
- 1 Eyepiece 10x
- 1 Objective lens 10x
- 2 Allen keys
- 1 LED light bulbs
- 1 Key (for removal of spacing ring)
- 2 Batteries (3V CR2025) (mounted)
- 1 Set of Instruction Manuals

Placing PSM-5 and PSM-10

PSM-5 and PSM-10 are designed for use in the field and are suited for on the spot examination of large objects during both the building and the operation processes. It can be used both on external surfaces and in corners, cavities and tubes.

PSM-5 and PSM-10 can also be used to control structural impressions, carried out with Transcopy or RepliSet.

Transportation

The microscopes are supplied with a sturdy aluminium transport case.

- Keep the parts safe in the case when not in use.
- Keep the delicate objective lenses in their special carrying case when not in use.
- Use the protective caps supplied with the microscope when not in use.

Getting Acquainted with PSM-5 and PSM-10

PSM-5

Take a moment to familiarise yourself with the location and names of the components.



- ① Eyepiece 10x in the eyepiece port
- ② Focus locking ring
- ③ Focussing knob
- ④ On/ Off switch for lamp
- ⑤ Lamp housing (LED light bulb and battery)
- ⑥ Objective lens 10x

PSM-10



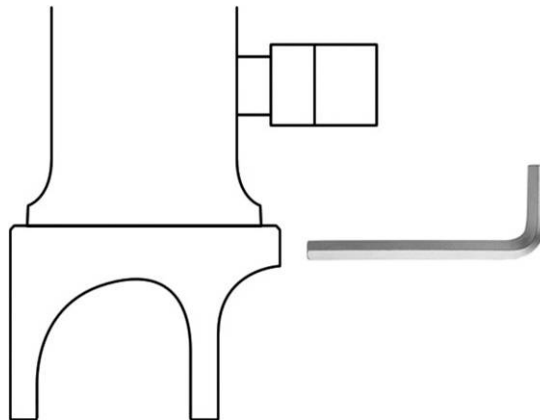
- ① Eyepiece 10x in the eyepiece port
- ② Focussing ring
- ③ On/ Off switch for lamp
- ④ Lamp housing (LED light bulb and battery)
- ⑤ Tripod base – Low (standard)
- ⑥ Objective lens 10x

PSM-10 Mounting the Tripod Base

PSM-10 is supplied with a tripod base mounted. A Tripod base for curved surfaces, a round base for use on flat surfaces and a magnetic cross table with magnetic clamps are available as accessories.

To replace the base:

- Loosen the 3 Allen screws securing the base and remove the base.
- Fix the new base in position using the Allen screws.



Note

When holding the microscope, take care that the eyepiece doesn't fall out if the microscope is tipped.

Mounting the Objective

- Remove the protective cap from the objective port.
- Insert the objective lens and screw firmly into place. Take care not to touch the lens with your fingers.

Mounting the Eyepiece

- Remove the protective cap from the eyepiece port.
- Insert the eyepiece into the eyepiece port.
- Take care not to touch the lens with your fingers.
- Secure the eyepiece by tightening the eyepiece locking screw (PSM-10).

2. Operation

- Place the microscope over the point of interest.
- Switch on the lamp.
- Move the microscope until the spot of light illuminates where required.
- Use the focusing ring to focus on the point of interest.
(PSM-5 - use the screw to lock the focusing ring so as not to damage the objective or prevent the position slipping).



Note

Take care that the objective is not damaged by touching the sample.



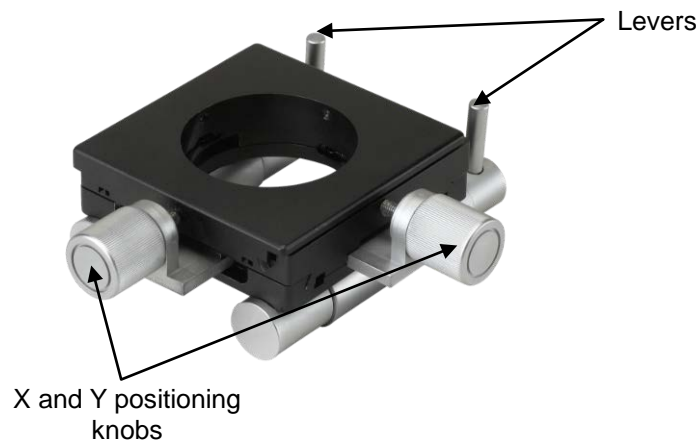
Tip

Remember to switch the lamp off after use.

Using the Magnetic Cross Table (Accessory)

With the magnetic cross table secured on the PSM-10:

- Place the table in position on the surface.
- Flip the levers on the magnetic cross table down; this will engage the magnetism.



- Use the X and Y positioning knobs to position the field of view directly over the point of interest.

To release the X/Y table:

- Flip the levers on the magnetic cross table up; this will release the magnetism.

Examining Replicas

If the microscope is to be used for examination of structural impressions (e.g. Replicas made using Struers' Transcopy or RepliSet), these must be glued onto a slide and then placed on a table with the structural surface uppermost. The microscope is positioned above the replica, which can be moved for viewing.

3. Measuring with PSM-5/-10

Using the Measuring eyepiece (Accessory)

The graduations on the measuring eyepiece should be calibrated for each objective lens using a Plate micrometer (accessory).

Calibration

- Remove the eyepiece and replace with the measuring eyepiece.
- Place the Plate micrometer under the microscope and position so that the text on the plate is directly under the spot of light.
- Use the focusing ring to focus on the text.
- Move the Plate micrometer so that the graduation scale is centred in the field of view.
- Turn the measuring eyepiece until the graduations are lined up with those on the plate.
- Measure the distance between the graduations on the eyepiece (the distance between the graduations on the Plate micrometer is 0.01mm).

Measuring

- Remove the Plate micrometer and position the microscope over the point of interest.
- Measure the distance of interest using the graduations on the measuring eyepiece.

The distance between the measuring eyepiece graduations should be re-measured whenever the objective lens is exchanged.

4. Taking Photographs

Mounting a Digital Camera with C-mount (Accessory)

Please refer to the [LCD Digital Microscope Camera](#) Instruction Manual to familiarise yourself with the camera and its operation.

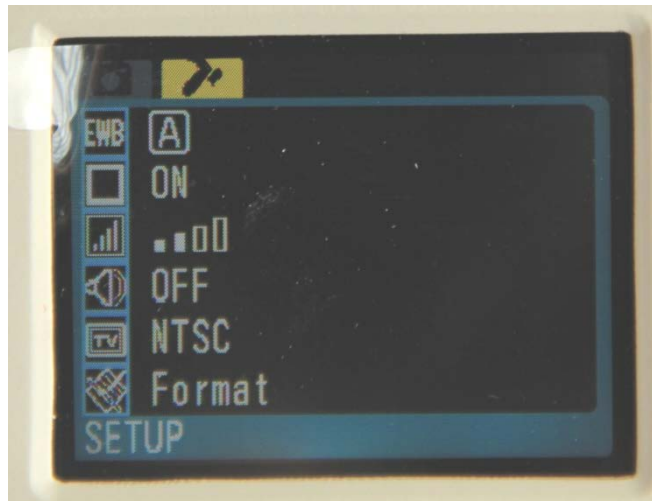
Camera Settings

- In the *SETUP* menu, set the *Exposure and White Balance [EWB]* to Auto [A].

Photo menu



Setup menu



- Fit the adaptor onto the camera.
- Remove the eyepiece from the microscope and slot the adaptor into the eyepiece port.
- Secure the adaptor to the microscope with the locking screw.



Tip

The microscope will be top-heavy with a camera mounted.
Take care that it doesn't tip or fall over.



- Connect the power supply (AC power adapter or Movipol-5/Transpol-5 battery pack) to DC IN on the right side of the camera.
- Insert an SD card.
- Press the POWER button.
- Press the On/ Off switch on PSM to turn on the lamp.
- Focus on the point of interest using the focussing ring.
- Press the SNAP button to capture an image.



Tip

Use the USB Shutter Cable and the remote controller supplied with the camera to eliminate vibration of the camera/ PSM whilst capturing images.

Adjusting the Colour Balance



Tip

In some cases, the image will appear bluish. To avoid this problem:

- Press the MENU button to enter the *SETUP* menu, then select *Exposure and White Balance [EWB]*.
- Press the RIGHT button to enter the submenu.
- Select *Manual white balance* and press the *Confirm* button.
- Press the MENU button again to exit.
4 sliders (green, blue, red and white) will be displayed.
- Select the blue slider. Use the LEFT or RIGHT buttons to manually adjust the blue colour balance.
- When the desired setting is achieved, return to the *SETUP* menu and set the *Exposure and White Balance* to *AUTO*.

Calculating the Magnification of the Camera Adapter

To ensure correct measurements using the Struers camera option, the magnification of the camera adapter must be known. It can be calculated with the use of a plate micrometer and a reference microscope.

- Capture an image of a plate micrometer using the 10x objective lens.
- Import the photo using Spatial Calibration in the Scentis software (or equivalent calibration software).
- Measure the pixel equivalent of one millimeter to obtain value "A".
- Use a reference microscope with known magnification e.g. 100x to capture an image of the plate micrometer.
- Import the second photo to the calibration software.
- Measure pixel equivalent of one millimeter to obtain value "B".
- Use the reference microscope with a 50x magnification¹, to obtain the pixel equivalent of one millimeter at 50x magnification, value "C".
- Insert "A", "B" and "C" in the following formulae:
$$A \times 100 / B = D1,$$
$$A \times 50 / C = D2$$
- The average of D1 and D2 is the magnification of the camera adapter² (this value will be approx. 6.5).

¹ Going from 100x to 50x magnification does not exactly halve the number of pixels. Thus, to balance the deviation, a calibration is performed at both magnifications on the reference microscope.

² Multiply this by 10 (10x objective lens on the portable microscope) to calculate the total magnification of microscope + adapter.

5. Maintenance

Daily

- Clean the body of the microscope with a soft, dry cloth.
- Should the body of the microscope become dirty, clean with a soft cloth moistened with mild soap solution.
- Do not touch the lenses with your fingers. Should the lenses become dusty or dirty, clean with lens tissue paper and a small amount of Ethanol or Propanol.

Replacing the bulb/ batteries

- Remove the lamp housing.
- Carefully remove the battery, unscrew the spacing ring (insert the special key to fit onto the slots of the spacing ring, and turn) and remove the bulb.
- Insert a new bulb, holding the bulb with a piece of lens tissue paper.
- Replace the spacing ring and the battery (with the text on the battery facing outwards).
- Finally replace the lamp housing and screw securely into place.

Storage

- Store the microscope in the transportation case and keep in a cool and dry place.



Important

DO NOT disassemble the microscope or the lenses.
Service and repair of the microscope should always be performed by a qualified technician.

6. Technical Data

Please see the brochure for [Non-destructive Preparation](#) for details.

7. Accessories

Please see the brochure for [Non-destructive Preparation](#) for details of the range available.

8. Spare Parts

Description	Spare Parts No.
Eyepiece, 10x.....	14282910
Adaptor - Eyepiece port (PSM-5)	14282916
Adaptor - Eyepiece port (PSM-10)	14282918
Objective lens, 10x.....	14282911
LED lamp housing.....	14282912
LED lamp	14282913
Locking knob (for locking ring on PSM-5).....	14282914
Friction ring (rubber ring on base of PSM-5)	14282915

