OPTIKA
MICROSCOPES
ITALY

Ver. 3.0.0

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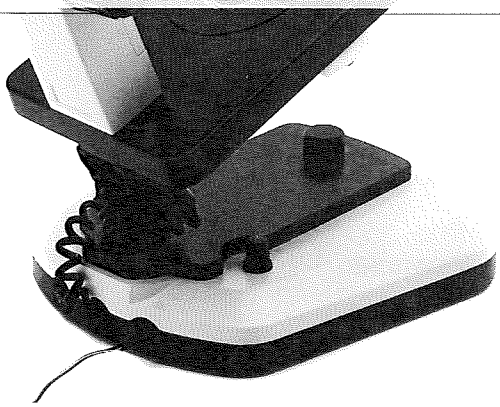
OPTIGEM



OPERATION MANUAL

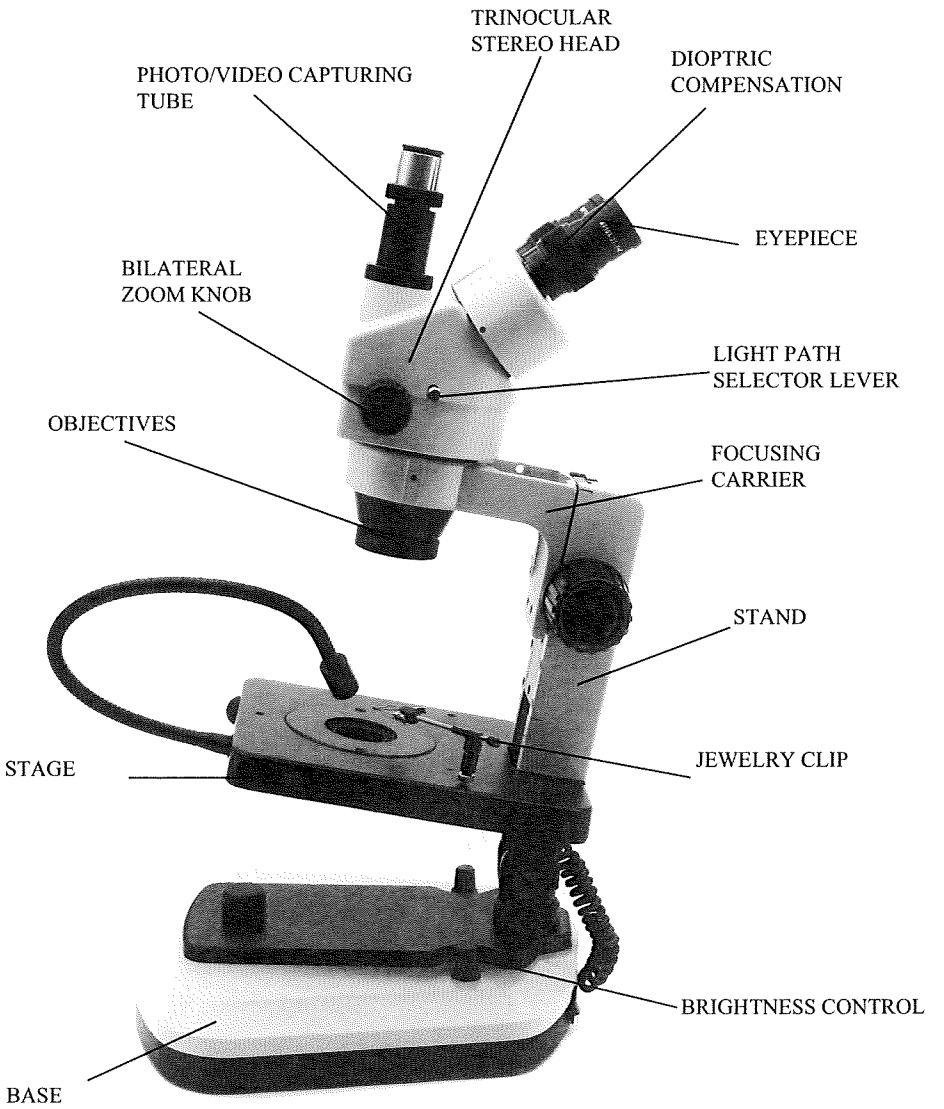


FIG. 1: OPTIGEM: RIGHT SIDE VIEW

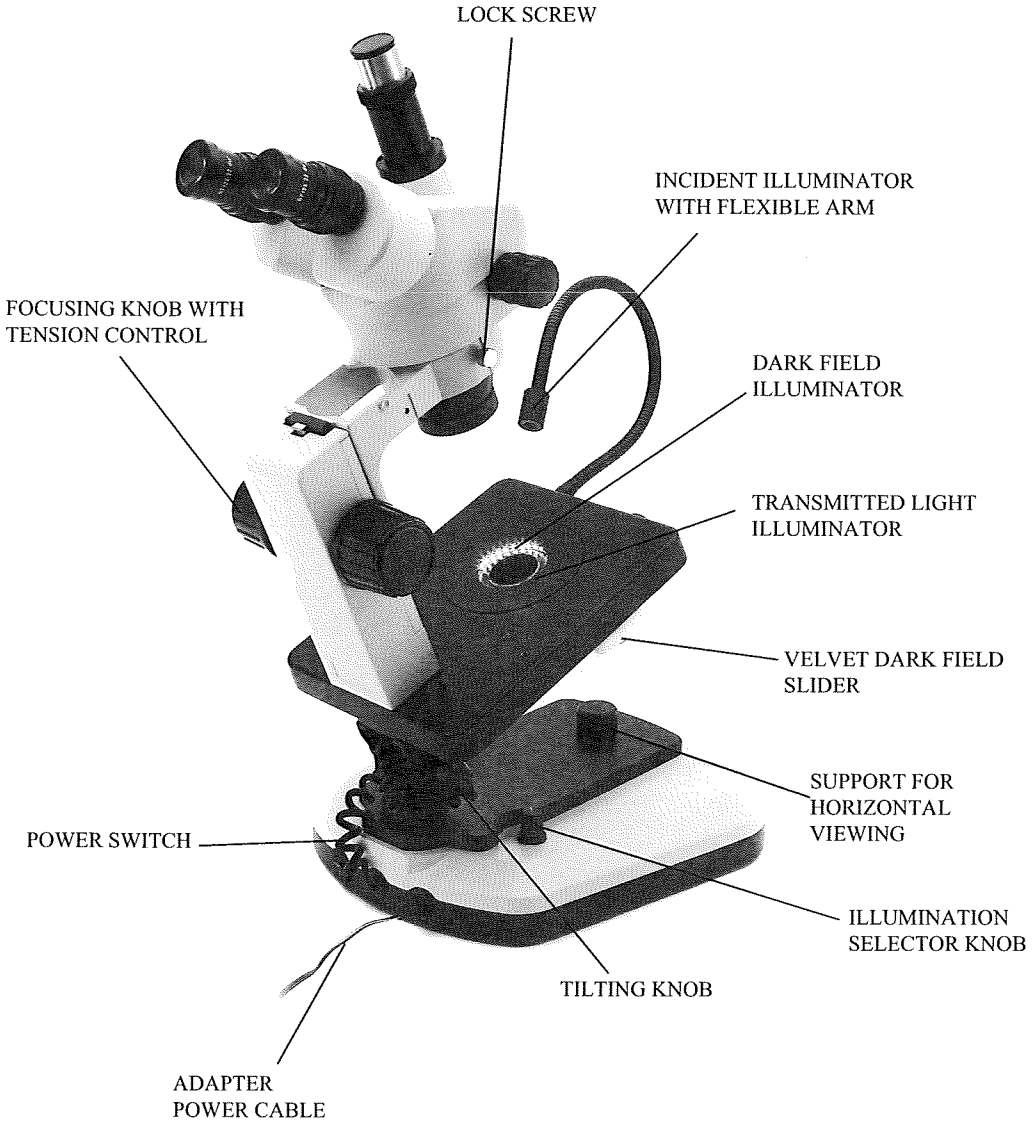


FIG. 2: OPTIGEM: LEFT SIDE/BACK VIEW

2.0 INTRODUCTION

The microscope OPTIGEM is a scientific precision instrument that has been developed especially for professional gemmological use. It has been built to high optical and mechanical standards to withstand many years of daily laboratory use.

The advanced illumination system, using combinations of transmitted, incident and dark field LED illumination, allows a thorough and complete analysis of the surface of the object. The microscope body and head can be rotated 360° and the stand can be inclined 90° to switch between vertical and horizontal position which gives a large flexibility observation.

The stereoscopic head of the microscope is equipped with two separate optical systems that give an excellent field depth to the image and is also fitted with a continuous zoom system with a span from 0.7x to 4.5x. The trinocular port of the head offers the possibility to attach a photo or video camera in order to view and elaborate the microscope image on a TV or computer monitor.

Optika reminds you that this manual contains important information on safety and maintenance, and that it must therefore be made accessible to the instrument users.

Optika declines any responsibility deriving from instrument uses that do not comply with this manual.

3.0 UNPACKING AND ASSEMBLY

The microscope is delivered assembled and ready for use. Remove it from the wooden case, and place it on a solid table.

4.0 USING THE MICROSCOPE

4.1 Illumination system

The OPTIGEM microscope comes with an integrated LED illumination system that consists of three separate light sources:

- Incident illumination: through a flexible arm attached to the microscope stage.
- Transmitted illumination: from the hole of the microscope stage.
- Dark field illumination: a LED ring on the inside of the hole of the stage.

Before starting, read the section 6.3 about electrical safety precautions. Then, insert the power cord into the microscope, the power adapter to the electrical net and switch on the instrument on the back of the microscope.

Use the illumination selector knob to change between different illumination combinations and use the brightness control to modify the light intensity.
The velvet dark field slider can be inserted, if needed, to increase the contrast of the dark field.

4.2 Adjust interpupillary distance

Hold the right and left parts of the observation head by both hands and adjust the interpupillary distance by moving the two parts until one circle of light can be seen. If two circles appear, the interpupillary distance is too big, and if two overlapped circles appear, the interpupillary distance is too small.

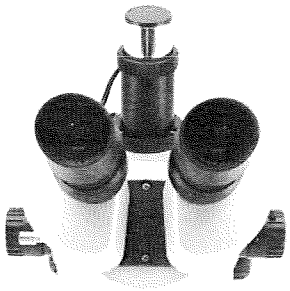
4.3 Mounting the jewellery clip

The jewellery clip can be mounted in one of three different holes on the stage plate: one in the front and one on each side. Once attached, the object to examine can be placed in the jewellery clip.

4.2 Focus and regulation of the focusing tension

Turn the zoom to the highest magnification using the bilateral zoom knob. Try to focus the sample using the focusing knobs.

The tension of the focusing knob can be adjusted by rotating the right focusing knob keeping still the left focusing knob.



4.3 Dioptric compensation

This compensation makes it possible for people with glasses to adjust the microscope to their eyes and use the microscope without glasses. Turn the zoom down to the lowest magnification.

Adjust the dioptre compensation ring of the right eyepiece tube until the image of the right eyepiece is clear and sharp. Repeat the procedure for the left eyepiece. Then, check the focus of the image for the whole zoom range. It should now be perfectly parfocal (focus is always maintained during the change of magnification).

4.6 Magnification and working distance

The jewellery clip can be mounted in one of three different holes on the stage plate: one in the front and one on each side. Once attached, the object to examine can be placed in the jewellery clip.

Select the desired magnification by adjusting the bilateral zoom knob. Change the eyepieces and/or add an appropriate magnifying objective lens if necessary. The total magnification used can be calculated by the following equation:

Total magnification = Eyepiece magnification x Zoom magnification x Objective lens magnification

Normal working distance for the standard configuration (1x objective lens) is 95 mm.

4.7 Observing objects in horizontal position

The OPTIGEM microscope stand can easily be tilted in order to observe objects in a horizontal position (see fig. 4).
To do this: Loosen the lock screw of the head and rotate the head 180°. Fix the screw again. Loosen the tilting knob (counter clockwise) and rotate the stand 180° (make sure that the power cable has not been winded too many turns around the base) lean it backwards until it gets stopped by the support and the microscope is in the position of figure 4.

Fig. 4: Horizontal position

5.0 OPTIONAL ACCESSORIES

5.1 Available accessories

A wide range of accessories are available for the OPTIGEM microscope: gemmology clips, an iris aperture diaphragm, a polarization analysis kit, an optical unit to switch the dark field from a "sharp" (gem exhibition) to a "soft" (diamond analysis) mode and a translating cell holder with vacuum pick-up and quartz immersion cells complete and enhance the instrument usability.

Please contact Optika Microscopes for more information and a complete list of accessories.

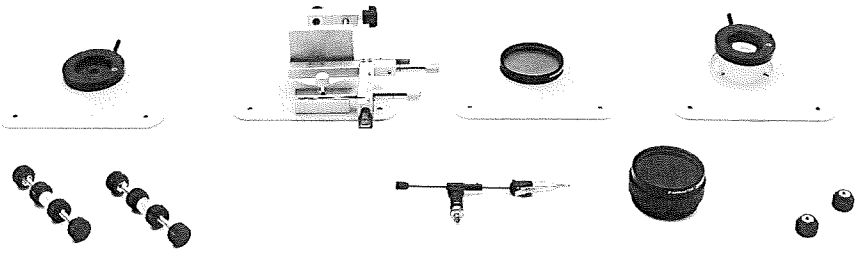


Fig. 5: Accessories

5.2 Video capturing (optional)

The OPTIGEM is fitted with a trinocular stereo head. The third port can be connected to cameras (in some cases via an adaptor) for digital and analogical photo and video capturing.

Before taking a picture or filming video, pull out the light path selector lever so the light will be deflected into the photo tube. At the same time, no light will enter into the left eyepiece tube for observation. Please refer to the adaptor and camera manuals for further details.

5.3 Assembling the accessories plates (optional)

All the accessories can be assembled one and one or combined in a stack, in any order, both when the microscope is being used as a horizontal unit and when it is in its vertical configuration (see fig. 6-9).

This is made by attaching the plate/s to the two holes in the stage plate and fixing them with the included screws and spacers.
The polarizing analysis kit comes with a polarizer and an analyser. The polarizer should be mounted on the stage as explained above and the analyser should be screwed onto the objective holder of the stereo head, first removing the ring that is already attached.

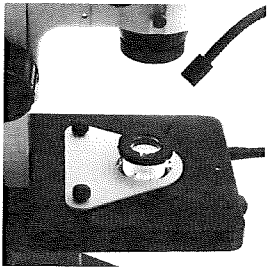


FIG. 6: IRIS APERTURE DIAPHRAGM FOR DARK FIELD USE

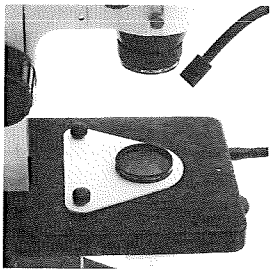


FIG. 7: POLARIZING ANALYSIS KIT

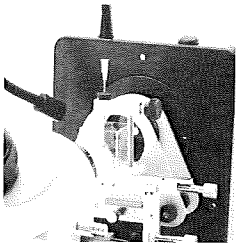


FIG. 8: TRANSLATING CELL HOLDER WITH VACUUM PICK-UP AND QUARTZ IMMERSION CELL

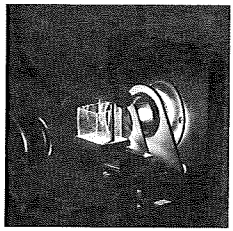


FIG. 9: TRANSLATING CELL HOLDER IN USE WITH DARK FIELD ILLUMINATION

For more information about using the optional accessories, please see **Appendix 1.**

6.0 MAINTENANCE

6.1 Microscopy environment

This microscope is recommended to be used in a clean, dry and shock free environment with a temperature of 0-40°C and a maximum relative humidity of 85 % (non condensing). Use a dehumidifier if needed.

6.2 To think about when and after using the microscope

- The microscope should always be held formly when moving it. Take care that no moving parts, such as the eyepieces, fall out.
- Never mishandle or impose unnecessary force on the microscope.
- Never attempt to service the microscope yourself.
- After use, turn off the light immediately, cover the microscope with the included dust-cover, and keep it in a dry and clean place.

6.3 Electrical safety precautions

- Before plugging in the power cord with the supply, make sure that the supplying voltage of your region matches with the operation voltage of the equipment and that the lamp switch is in off-position.
- Users should observe all safety regulations of the region. The equipment has acquired the CE safety label. However, users do have full responsibility to use this equipment safely.

6.4 Cleaning the optics

- If the optical parts need to be cleaned try first to: use compressed air.
- If that is not sufficient: use a soft lint-free piece of cloth with water and a mild detergent.
- And as a final option: use the piece of cloth moistened with a 3:7 mixture of ethanol and ether.

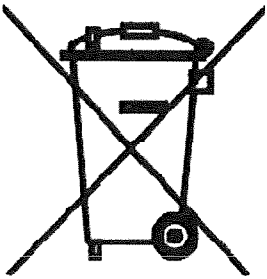
Note: ethanol and ether are highly flammable liquids. Do not use them near a heat source, near sparks or near electric equipment. Use these chemicals in a well ventilated room.

- Remember never to wipe the surface of any optical items with your hands. Fingerprints can damage the optics.
- Do not disassemble objectives or eyepieces in attempt to clean them.

7.0 TECHNICAL SPECIFICATIONS

Universal Power Transformer:	Input: 230 V, 50 Hz
	Output: 12V DC, 1000 mA
Bulbs:	High power LEDs

The appliance reports the symbol:



This symbol means that the appliance can be a precious source of raw materials. Therefore, it must not be disposed of as waste, but separately collected for the recycling and the recovery of the materials it contained in it. Such materials, if improperly dispersed into the environment, can be harmful to the environment and to human health.

The producer of the equipment, Optika Microscopes, recovers, re-uses and recycles the raw materials contained in the equipment. Such recovery, however, needs your help.

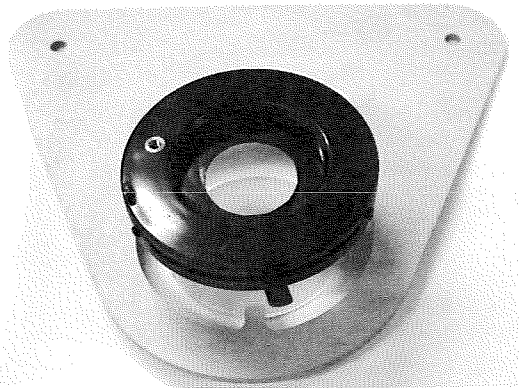
When, at the end of its operating life, you shall decide to dispose of the apparatus, do not try to open it, nor to use parts of it in ways other than reported in this Manual, but bring it back to the Distributor you bought it from, or to other Optika Microscopes distributors. The Distributor shall collect the apparatus free of charge.

The recovery of the raw materials shall then take place in accordance with the European Directive 2002 / 96 / EC and all other relevant Directives. Never disassemble, nor dispose of as waste, apparatus reporting the "crossed bin" symbol indicated above.

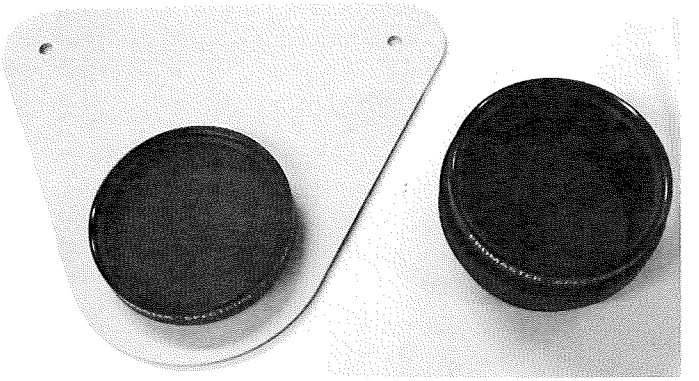
9.0 APPENDIX 1 – USING THE OPTIONAL ACCESSORIES

All the accessories can be assembled one and one or combined in a stack, in any order, both when the microscope is being used as a horizontal unit and when it is in its vertical configuration.
We describe here some possible configurations for common uses.

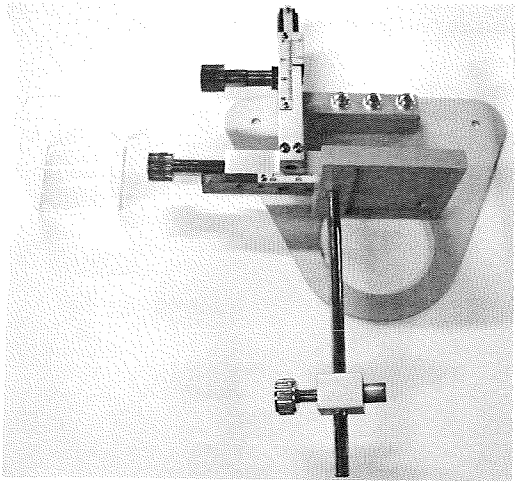
ST-201 Iris aperture diaphragm for darkfield



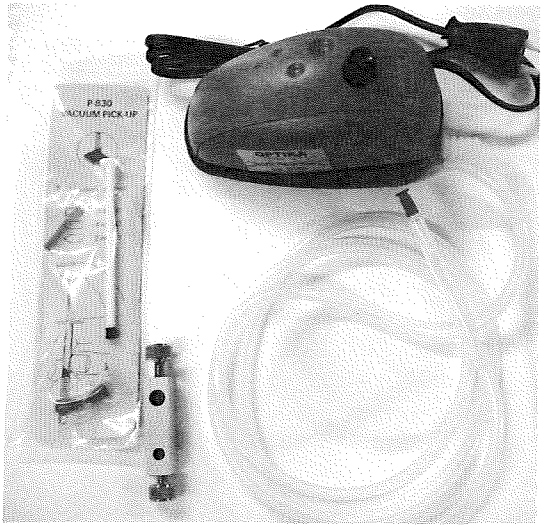
ST-202 Polarizing analysis kit



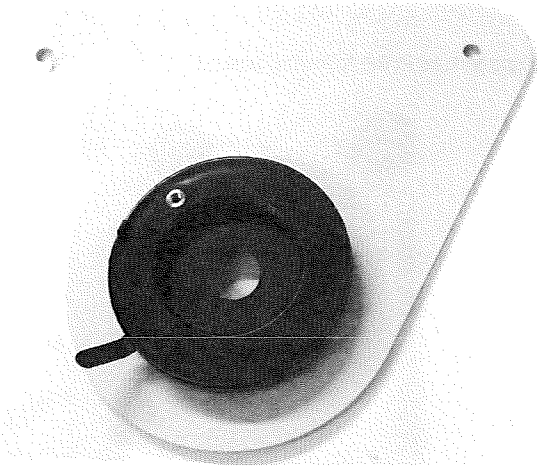
ST-203 Quartz immersion cell and ST-204 Translating cell holder



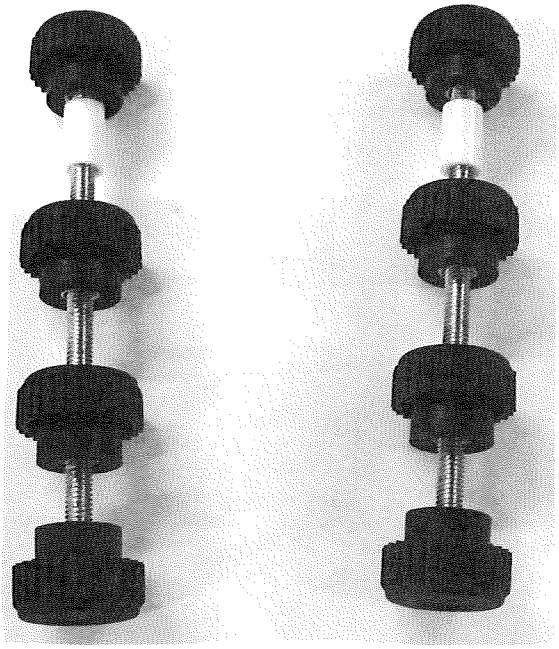
ST-205 Vacuum pick-up (with electric vacuum pump)



ST-207 Iris aperture diaphragm for standard illuminator



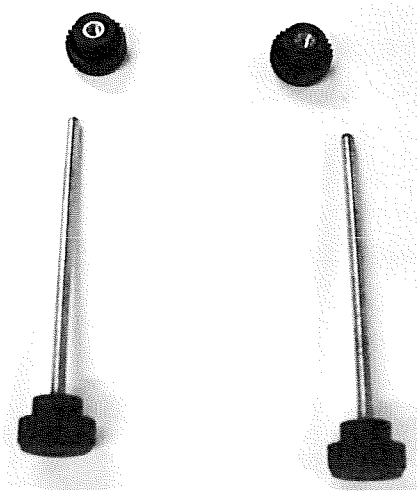
Rods and spacers for assembling



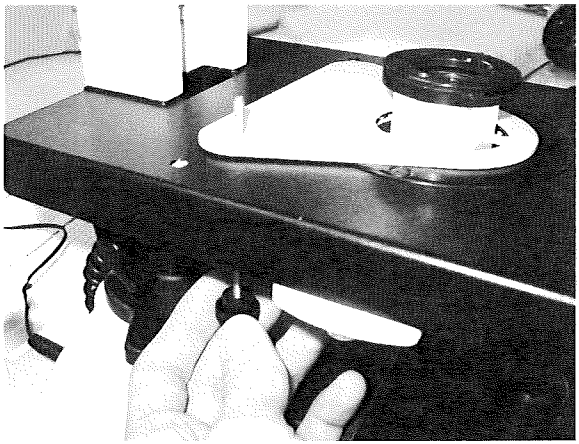
SET 1: Darkfield illumination

- **you need: ST-201**

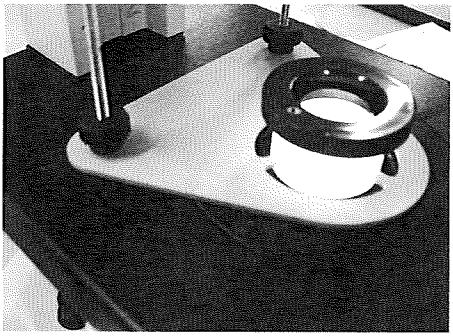
Prepare the rods and spacers as in the following picture:



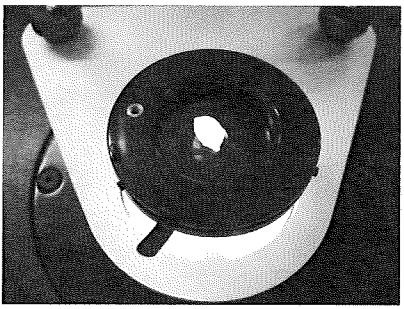
Put the ST-201 on the microscope stage, in correspondence with the two holes near the stand. Put one rod from the bottom of the stage, as showed:



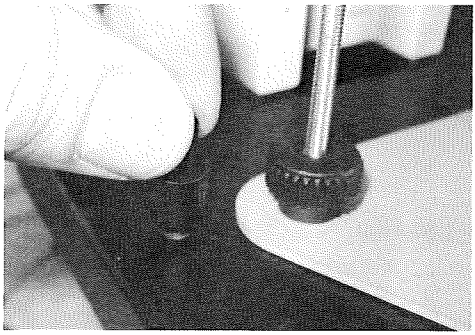
Screw one spacer on the rod, from the top. Repeat the same steps for the other rod:



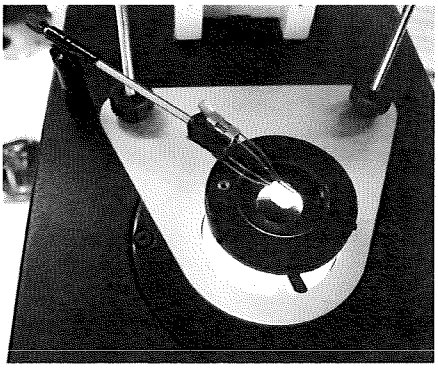
Switch on the LED ring illuminator. If you want it is possible to put your gem directly on the diaphragm, after closing it to a proper diameter:



Or, you can use the side clip to hold your object. In order to use the clip, first screw the black plastic adaptor into the microscope stage (there is a threaded hole on both sides of the stage):



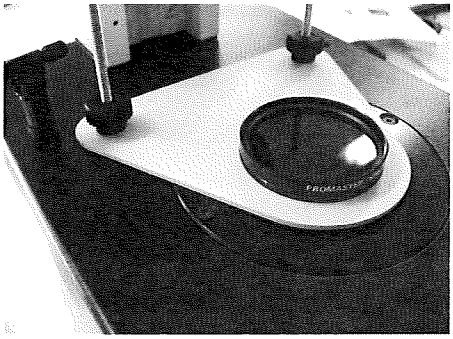
Then, push the clip onto the adaptor, in order to fix it in position:



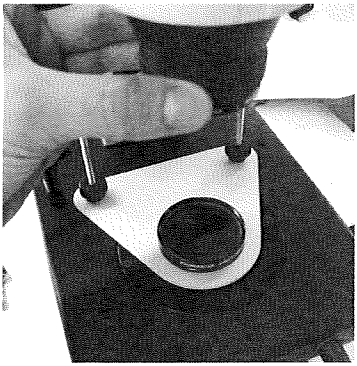
SET 2: Polarization analysis

•you need: ST-202

Mount the polarizer of the ST-202 in the microscope stage, as described above in SET 1:



Screw the analyzer on the bottom of the head, as shown:

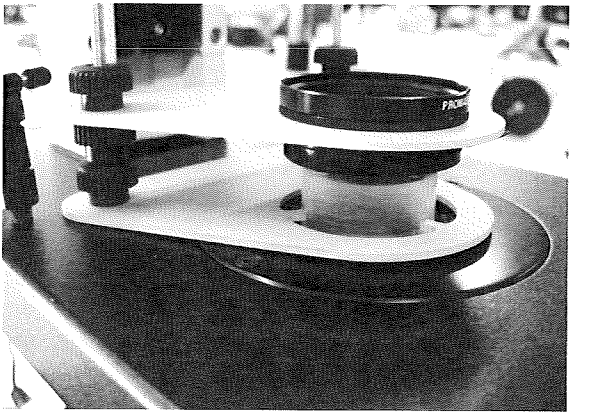


Holding your sample with the side clip, you can rotate both the polarizer and analyzer to perform polarization analysis.

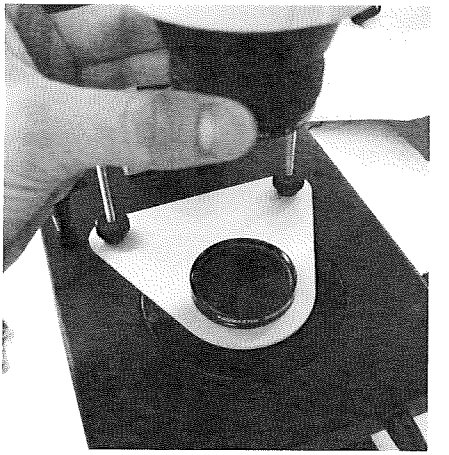
SET 3: Polarization and darkfield analysis
you need: ST-201 and ST-202

Mount the ST-201 darkfield diaphragm on the stage, as described in SET 1.

Then screw another spacer on both rods. Place the polarizer of ST-202 on the stack, and fix it with two spacers, as in the following picture:



Screw the analyzer on the bottom of the head, as shown:



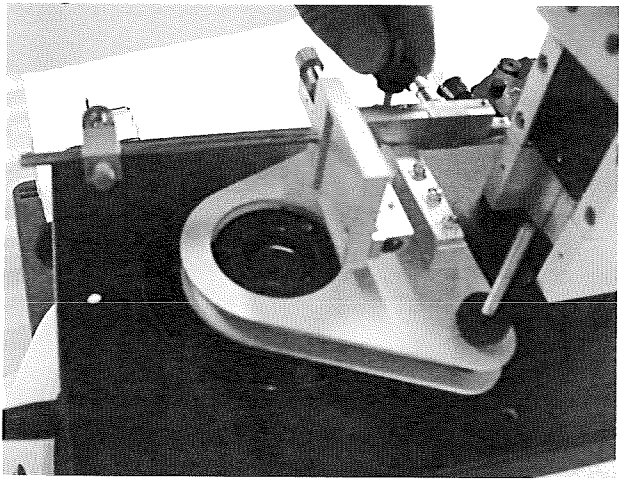
Switch on the LED ring illumination.

Holding your sample with the side clip, you can rotate both the polarizer and analyzer to perform polarization analysis. You can also open/close the diaphragm to adjust darkfield illumination:

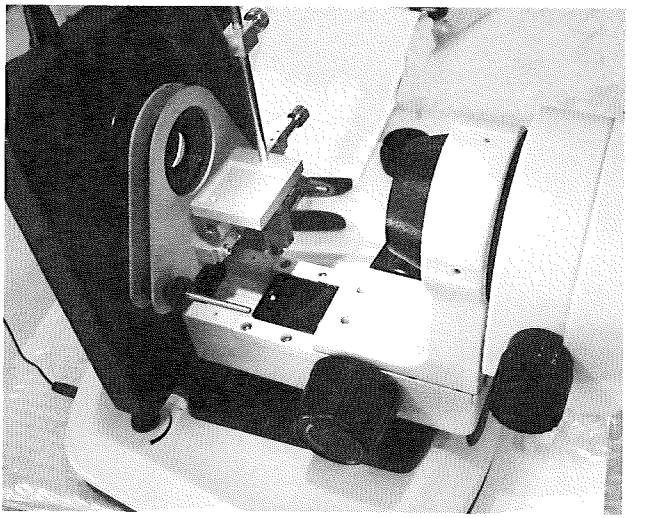
SET 4: Immersion analysis with translating holder
• you need: ST-203 ST-204 and ST-207

Mount the iris diaphragm ST-207 on the stage, as described in SET 1:

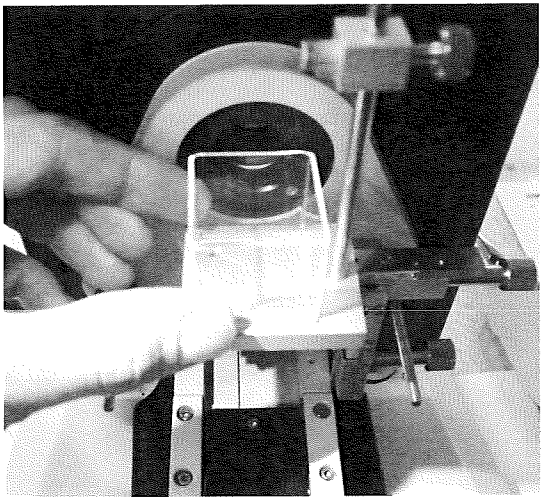
Put the translating holder ST-204 on the stack and fix it with a couple of spacers:



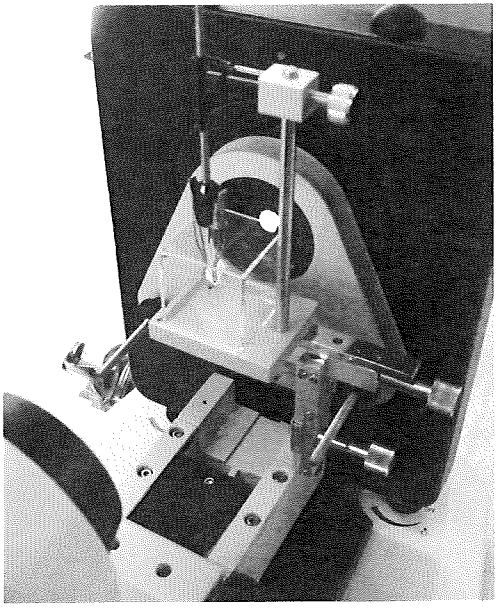
low rotate the microscope into its horizontal position:



Put the immersion cell ST-203 on the holder's plate:



Mount the clip on the vertical rod, in order to hold your object inside the cell:



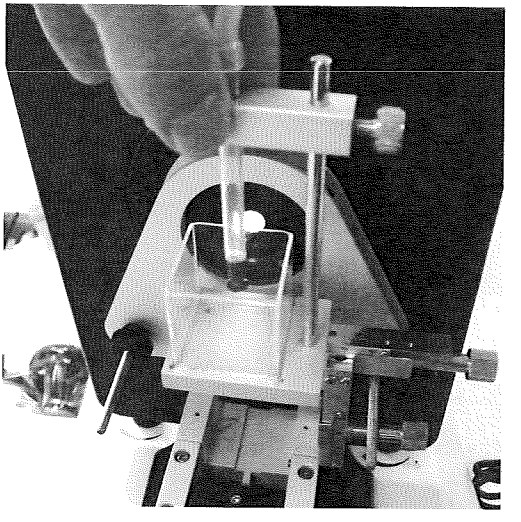
Switch on the transmitted light illuminator, and adjust the diaphragm (ST-207) in order to have the proper illumination.

SET 5: Immersion analysis with translating holder and vacuum pick-up

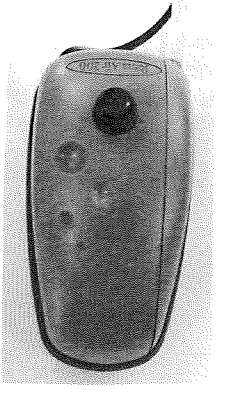
you need: ST-203 ST-204 ST-207 and ST-205

Prepare the stack of accessories exactly as described in SET 4.

nstead of the clip, mount on the vertical rod of the translating holder the adaptor for the pick-up pen:



witch on the pump, by pressing the black button:

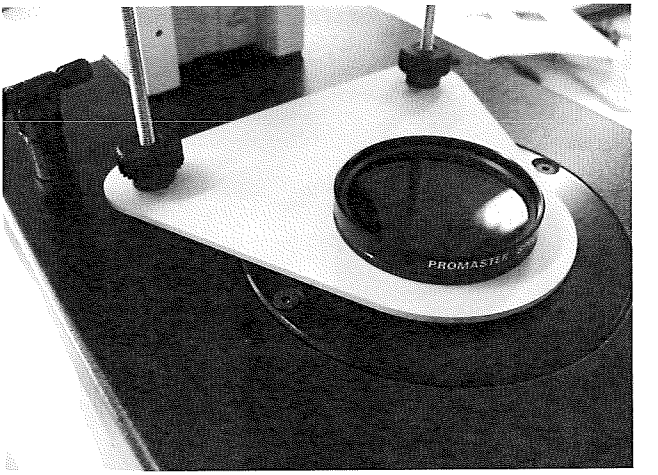


Pick up your gem with vacuum by placing it in contact with the rubber point of the pick-up pen.

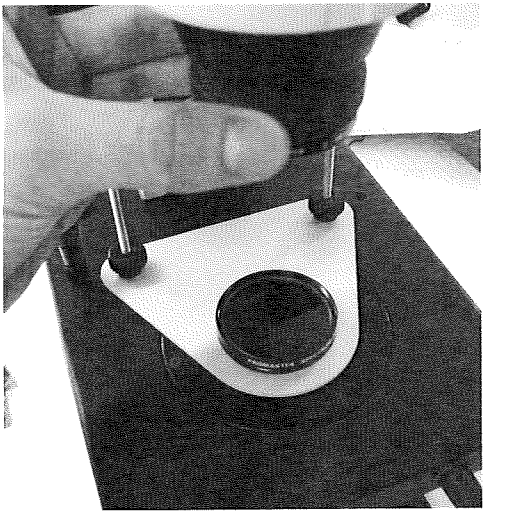
SET 6: Immersion and polarization analysis with translating holder

- **you need: ST-202 ST-203 ST-204**

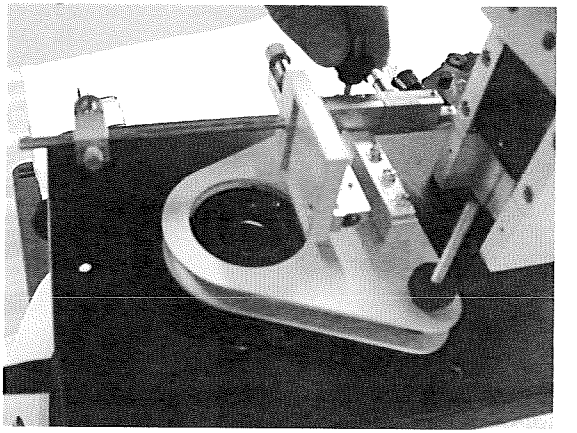
Mount the polarizer of the ST-202 in the microscope stage, as describe above in SET 1:



Screw the analyzer on the bottom of the head, as shown:



Put the translating holder ST-204 on the stack and fix it with a couple of spacers:



low rotate the microscope into its horizontal position and put the immersion cell ST-203 on the older's plate: