Gem-A
INSTRUMENTS

Gem-A Portable Microscope

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Introduction

The Gem-A Travel Microscope is a compact instrument that is fully rechargeable and comes already assembled with a travel case.
The travel case interior also contains spaces for a Gem-A refractometer, LED lamp and the Gem-A Portable Instrument Kit, allowing for easy transportation of the gemmologist's essential tools.

This microscope uses LED lighting, the benefits of which include:
- No heat generation
- Whiter light (instead of tungsten, meaning photographs of inclusions will require less colour adjustment).
- Longer bulblife (20,000 of hours of use).

Please note: Microscopes are a precision instrument, so always handle with care and avoid impact or abrupt movement during transportation.
The Gem-A Travel Microscope belongs to the ST-40 series.

Before use

Before setting up the Gem-A Travel Microscope please ensure that the area you intend to use is clean and dry and that the environment is between 0-40 °C, with a maximum relative humidity of 85%. Never expose the microscope to direct sunlight, high temperatures or strong vibrations. Check to ensure the power supply voltage is consistent with your microscope's voltage rating before use (see page 10).

Please note: The microscope may require a partial recharge before its first use.

Set-up

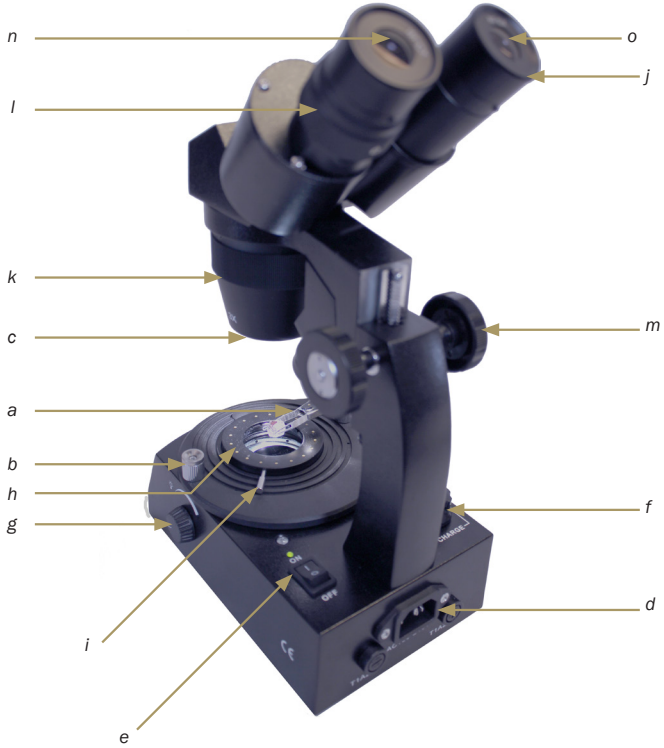
Place the case on a flat, level surface and open it, taking care to ensure any pieces that may have come loose do not slip out. Check that the microscope and its accessories are all present and undamaged.

The Gem-A Travel Microscope kit includes:
- 1 plastic cover
- 1 travel case with keys
- 2 rubber eye-guards
- 2 10× eye-pieces
- 2 20× eye-pieces
- 1 gemstone holder
- 1 UK transformer plug and lead

Remove the microscope from its case and position it in the space you intend to use it. Please make sure the surface you place it on is flat and level. It may be helpful to have a power source nearby for the first use.

Avoid touching the lenses; this will help to keep the image clear and reduces the risk of scratching.

Operating the microscope



LABELS:

a - Stone holders
b - Stone holder post
c - Objective lens
d - Outlet
e - On/off switch knob
f - Light control knob
g - Rheostat knob
h - Iris diaphragm
i - Lever for iris diaphragm aperture
j - Movable eyepiece holder
k - Zoom turret
l - Eye piece focus knob
m - Dioptre adjustment
n - Left eyepiece
o - Right eyepiece

i. SETTING THE SPECIMEN

- Place the specimen down on a flat surface
- Using the stone holder, clasp the specimen on either side, making sure it is held securely between the stone holder clips (a).
- Slot the stone holder into one of the stone holder posts (b). Try both sides to see which you feel most comfortable with.

ii. ILLUMINATION

- Remove the white cap from the turret section that holds the objective lenses of the microscope (c).
  Tip: Use the white cap to produce a diffused white light by placing it over the iris diaphragm.
- If necessary, plug the microscope into a power source (d), then turn the microscope on by pressing the ON/OFF switch on the left-hand side (e).
  N.B.: When the microscope is recharging the 'ON' button appears red; when it is no longer connected to a power supply it will turn green.
- The right hand dial (f) controls the two light sources in the following way:
  I - controls the main light only
  II - controls the overhead light only
  III - controls the main light and the overhead light simultaneously.

Operating the microscope (cont.)

- The rheostat control on the left-hand side of the base unit controls the light intensity (g).
- The dark-field unit is supplied with an iris diaphragm (h); it can be widened or narrowed to adjust the amount of light coming through by moving the handle (i) around the iris.

iii. ADJUSTING THE INTER-PUPILLARY DISTANCE

- The microscope head has movable eyepiece holders (binoculars) that move from side to side, allowing you to alter the width of the eyepieces to your ideal position (j).

iv. ADJUSTING THE MAGNIFICATION

- The Gem-A Travel Gem Microscope uses a turret system which houses two objectives of 1× and 3× magnification. When combined with the eye-pieces, the following magnifications can be attained: 10×, 20×, 30× and 60×.
- To alter the magnification turn the black turret (k) until you feel it click into place.
- The extra 20× eyepieces will allow higher magnifications of 20× and 60×. To change the eyepieces unscrew the small holding screws (l) and pull the 10× eyepieces out. Replace them with the 20× eyepieces. You do not need to re-tighten the screws unless the microscope is going to be moved.

v. ADJUSTING THE FOCUS

- Push the stone holder on to the fitting on the base of the microscope and look through the microscope at the tips of the stone holder clips.
- Close the right eye and rotate the focus knob (l) until the image is sharp and clear.
- For fine focus adjustment, close the left eye and look at the tips of the stone holder clips, twisting the dioptre adjustment on the left-hand eyepiece (m) until the tips are focused.
- Open both eyes and check: the microscope is now set up for your personal use.

vi. CHANGING THE SLIDE-IN OBJECTIVE LENSES

- Loosen the lock-screw on the objective mount and pull out the objective vertically.
- Insert an alternative objective into the correct position.
- Re-tighten the lock screw.

Please note:

- The microscope requires 8–10 hours for a full recharge
- The actual operation time after a full recharge depends on the settings used.
- It will last 6–8 hours at full capacity when used normally, and approximately 4 hours if all the LED lights are turned on and set to maximum intensity.
- Always turn the lights off after use. When the microscope has finished charging unplug the mains lead from the wall socket.
  N.B.: The microscope has rechargeable batteries inside, it is therefore extremely important to unplug the mains once the microscope has recharged.

Troubleshooting

Optical		
Problem	Possible Cause	Solution
Dirt obscuring the field of view	Dirt on the specimen	Clean the specimen
	Dirt on the surface of the lenses	Clean the lenses
	Dirt on the surface of the objective lens	Clean the objective lens
Doubling of images	Wrong interpupillary distance	Readjust the eyepieces
	Wrong dioptre adjustment	Readjust the dioptre
	Different magnification	Mount the same size eyepieces
Blurry image	Dirt on the surface of the objective lens	Clean objective lens
Incision image	The objective and light source are not fully aligned	Adjust the objective to the correct position

Electrical		
Problem	Possible Cause	Solution
LED not working	No power	Connect to mains to recharge the battery. If there is no power after charging then replace the batteries in the battery compartment inside the base. Open the bottom plate by unscrewing 4 locking screws at the rubber feet.
	The LED has reached the end of its life	Replace it
	The fuse has burned out	Replace it
Fuse burning out very quickly	The voltage is too high	Use a transformer to lower the voltage

If you have any problems with your microscope please contact us at instruments@gem-a.com or via telephone on +44 (0)20 7404 3334 before returning the microscope, as we may be able to rectify or advise on the problem.

Care and maintenance

Always cover the microscope with the plastic cover provided after use and store it in a clean and dry place, free from moisture to prevent rust.

Lenses:

- All lenses must be kept clean to avoid damage to the glass surfaces.
- Fine dust on the surface of the lens should be blown off with hand blower or wiped off gently with a soft lens tissue.
- Fingerprints or oil marks should be wiped off with a lens wipe.

Surfaces:

- Never use an organic solution to clean the surface of the microscope, especially the plastic surfaces.
- If it is absolutely necessary to clean them, please use a neutral detergent.

Technical specifications

Rated Voltage	100V-240V
Rated Power	4W
Rated Frequency	Auto adapts both 50Hz/60Hz
Protection	Class 1
Operating Temperature	0-40 C
Relative humidity	10-85%
User replaceable fuses	Double fuse design used. Each fuse has 1A rating.
Rechargeable batteries	Standard AA size Ni-Mh type with modern LSD (Low Self-Discharge) technology by which 80% of the power could be retained even after 1 year. Industry highest capacity 2700mAh each. Total 4 pcs in a gemscope, making it a massive 10,800mAh total. Easily replaceable in a battery compartment inside the base. Just open the bottom plate by unscrewing 4 locking screws at the rubber feet.

WARNING

This microscope is not designed for use with immersion liquids.
Using an immersion cell with this microscope is done at your own risk.

Please do not take the microscope apart if you fear it is damaged. Servicing of the unit should be done only by a qualified person or returned to the supplier.

The supplier does not accept any responsibility for damage or harm caused by not strictly observing the safety requirements and instructions in this manual and any other supplied documentation, or by negligence during installation, use, maintenance or repair of the units.

The Gem-A Travel Gem Microscope comes with a 1 year warranty. If you need to contact Gem-A regarding your microscope please make sure you have either a copy of your invoice or your student number and year of enrolment to hand.

For more information please contact instruments@gem-a.com.

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