

RI Saturn™ 5 Laser Systems

Installation Manual

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R_X Only

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SECTION 1 - PREFACE

This manual provides all necessary information to install the Research Instruments Saturn 5™ Laser System and perform specific service tasks. The system should be installed, serviced and operated by trained personnel only, after reading and understanding all sections of this manual. Please see the Intended Use for more information.

If the installer or operator is unsure of any of the information contained in this manual, they should contact Research Instruments or an appointed representative before attempting to use this equipment.

In no event does CooperSurgical assume liability for any technical or editorial errors of commission or omission; nor is Research Instruments liable for direct, indirect, incidental, or consequential damages arising out of the use or inability to use this manual.

CooperSurgical is constantly updating its products, and therefore, reserves the right to introduce changes in design, equipment and technical features at any time. The information in this manual is current at the time of publication. The latest version of the Installation Manual as well as RI Viewer™ software can be downloaded from the Marketing Zone.

The Saturn 5 Laser System Installation and Service manual should be retained by the installer/service engineer for future reference.

The use of in this manual indicates a trademark of Research Instruments Ltd. Any other brand names, referred to in this manual are trademarks of their respective owners.

Note: Assisted Hatching is not recommended for routine use in all ART patients.



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SECTION 2 - INTRODUCTION TO THE SATURN 5 LASER SYSTEM

Intended Use

The Saturn Laser System is intended to ablate a User defined section of a gamete or embryo within ART.



Indication for Use - USA Customers Only

For use in assisted reproduction procedures to ablate or thin the zona pellucida of an embryo to facilitate assisted hatching or recovery of cells for pre-implantation genetic diagnosis (blastomeres). The device can also be used on blastocyst stage embryos for biopsy of trophectoderm cells for pre-implantation diagnosis procedures, and blastocyst collapse prior to vitrification procedures.



Caution: Federal law restricts this device to sale by or on the order of a physician or a practitioner trained and certified in its use

Applicable indications for use are subject to the regulations of the country into which the device is sold.

Intended User

Trained clinical professional with locally relevant qualifications

Intended Patient Population

Patients seeking treatment for reproductive medicine

Clinical Benefits

To facilitate treatment of a patient by manipulation or modification of the patients' reproductive cells and/or tissue *in vitro*

Applicable Part Numbers

6-47-500 Saturn 5 Active Laser System
6-47-501 Saturn 5 Fixed Laser System

Microscope Compatibility

Zeiss Axiovert 40/100/200/Observer
Nikon TMD, Diaphot 200/300, TE200/300, TE2000, Ti, Ti2
Leica DMIRB, DMI3000B/4000B/6000B, DMIL, DMi8
Olympus IMT2, IX50/70, IX51/71/81, IX53/73/83

Installation

Installation of the Saturn 5 Laser System should be carried out by a CooperSurgical technician or other CooperSurgical authorised personnel. Incorrect installation could result in reduced power output, laser misalignment or laser malfunction.

All relevant sections of this manual should be read and understood fully before any operation of the Saturn 5 Laser System takes place. If the operator is unsure of any of the information contained in this manual, they should contact CooperSurgical or an appointed representative before attempting to use this equipment.

No user serviceable parts.

A Patients' Guide to Laser Assisted Hatching (LAH) is provided in the RI Viewer installation folder (LAH Patients Guide.pdf). This can be opened using Adobe Reader or other PDF viewers. We recommend that copies are printed and made available to patients.

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SECTION 3 - SATURN 5 LASER SYSTEMS SAFETY WARNINGS

Cautions and Warnings

Laser radiation is present within the Control Unit, the fibre optic patch lead and through the microscope to output at the objective. The Saturn 5 Laser System has been designed to ensure that emission of laser radiation at any point is within the limits stipulated by international safety standards, IEC 60825-1:2014, and US 21CFR1040.10 for unprotected viewing (Class 1). As an extra precaution, an infrared blocking filter has been incorporated into the optical path leading to the eyepieces to reduce laser emission by a further 99%.

For a description of controls and for the location of laser aperture on Control Unit, “Section 4 - Saturn 5 Laser Systems Product Overview” on page 8

Cautions



CAUTION DO NOT operate the laser unless it is properly mounted to a microscope.



CAUTION The system should be operated by qualified and trained personnel only.



CAUTION Where an ITO glass heated stage is fitted, do not fire the laser with the microscope focussed into the ITO glass surface as this may damage the ITO coating.



CAUTION Hazardous radiation exposure may occur through the use of controls, executing adjustments or the performance of procedures other than those specified herein. Servicing and adjustment other than that specified in this manual should only be carried out by CooperSurgical or CooperSurgical authorised agents.



CAUTION ONLY use the power cable and power supply adaptor supplied with the system.

The cable to the power supply is the Disconnect Device for this equipment. To remove all electrical power from this product, disconnect the power cable from the electrical outlet. Equipment should be positioned so as to allow easy access to the power cable. The appliance coupler or mains plug is used as the disconnect and must remain readily operable.

Warnings



WARNING The microscope itself must be maintained to a high standard. Problems such as worn focus mechanisms or an insecure video camera may lead to unreliable focus and image stability, and could lead to embryo damage.



WARNING DO NOT disassemble or modify any part of the Saturn 5 Laser System, or substitute any component for any other. Doing so may result in exposure to dangerous levels of laser radiation. This voids the warranty and/or service contract.



WARNING The embryo may be damaged if objectives other than the red Saturn 5 Laser System objective are used.



WARNING Do not operate the pilot laser with an embryo in the field of view. Exposure to the pilot laser may damage the embryo.



WARNING Not to be used in a patient environment.



WARNING Before performing any procedure, the pilot laser must be used to check the alignment of the Active positioning system. The system must be re-aligned when necessary. See Section 8 How to Check Laser Target Alignment.



WARNING Thermal lensing is a defocusing of the laser beam caused by changes to the refractive index of the medium as it is heated. The degree of defocus depends on the total beam energy deposited in the medium. While slight defocus has no effect on the drilling properties, this effect may become a problem for higher beam energies. To eliminate any significant effects from thermal lensing, we recommend that the pulse width be kept below 1000 μ s for clinical Laser Assisted Hatching (LAH) zona drilling.



WARNING Only a single opening should be made in the zona pellucida. Multiple openings or those that are too small may prevent embryo hatching or lead to abnormal development.



WARNING In the event of a cyber security incident, shut down the computer, then contact the manufacturer.

Cautions and Warnings also appear in this format throughout this manual.

Section 3

Electromagnetic Compatibility (EMC)

NOTE: The EMISSIONS characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential ENVIRONMENT (for which CISPR 11 class B is normally required) this equipment might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.

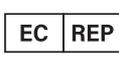
The Saturn 5 Laser System may be used alongside RFID readers operating at 13.56MHz. Where alternative frequencies are used, confirm correct operation of the Saturn 5 Laser System prior to use.

USA Only

Compliance with the emissions requirements of CISPR 22 Class A requires the following warning: "This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures."

Glossary of Safety and Information Symbols

Source: ISO 15223-1 and ISO 60601-1+A12

Symbol	Meaning	Symbol	Meaning
	In accordance with Annex II of the European Medical Device Directive 93/42/EEC, as amended by Directive 2007/47/EC		Serial Number
	Caution: US Federal law restricts this device for sale to or on the order of a licensed healthcare practitioner		Unique Device Identifier
	Authorized representative in the European Community		Do not dispose of product with normal waste. Dispose of in accordance with the EU WEEE Directive. (See Care and Maintenance section.)
	Consult instructions for use		Direct current (DC)
	Consult instructions for use		Class 1 laser product (IEC60825-1:2014)
	WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.		This way up
	CAUTION: Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.		Fragile, handle with care
	Manufacturer		Stacking limited to 3 units
	Date of Manufacture		Keep dry
	Catalogue or Part number		

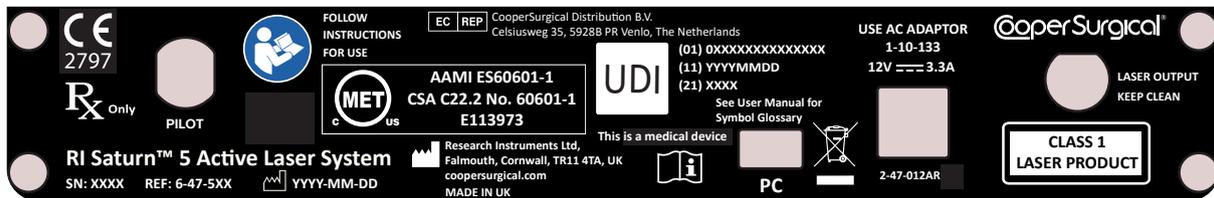


Section 4

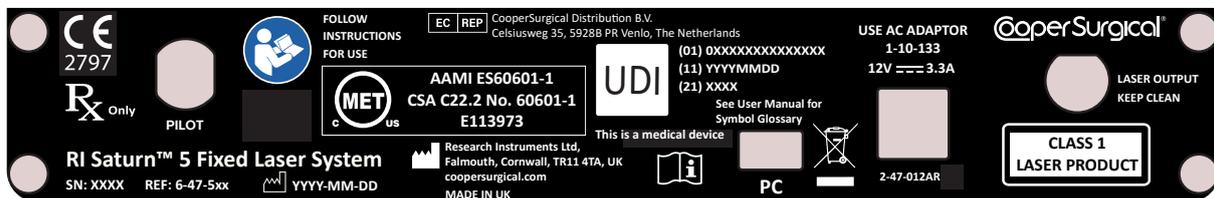
SECTION 4 - SATURN 5 LASER SYSTEMS PRODUCT OVERVIEW

Hardware Overview

Device Label - Saturn 5 Active Laser System



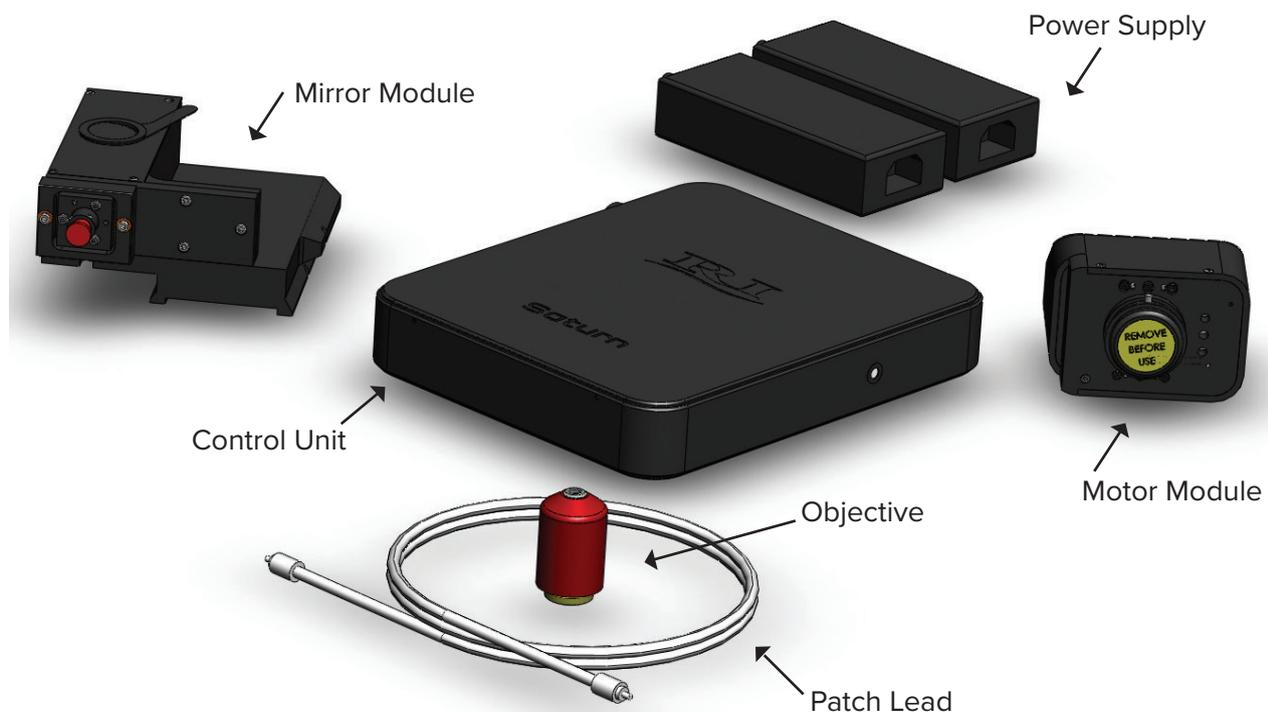
Device Label - Saturn 5 Fixed Laser System



Pilot laser brightness: The brightness of the pilot laser can be adjusted by turning the control to obtain the clearest image in the target alignment procedure.

The light on the front of the Control Unit indicates that the Control Unit is operational. If the unit is plugged in and the light is not on, contact CooperSurgical for assistance.

System Components



Note: Actual components may differ from those shown.

The Saturn 5 Laser System is supplied with a Control Unit containing the laser, a Mirror Module, an armoured patch lead and a special objective. If you have a Saturn 5 Active System then an

additional Motor Module is supplied. The laser beams are delivered to the specimen through a fibre optic patch lead, Collimator Module (that is part of the Mirror Module for a Fixed System or the Motor Module for an Active System) and the special objective.

A foot pedal for firing the laser is available as an optional extra. This is attached to the PC by a USB cable.

The Motor Module receives coordinates via USB which moves the motors to those coordinates. The Control Unit then receives commands via USB to fire for a specified length of time.

Packaging and Handling Requirements

No special packaging or handling requirements

Saturn 5 Laser System Component Part Numbers

Part Number	Description
5-47-010	Control Unit with 1.5m Patch Lead
5-47-100	Motor Module (Saturn 5 Active Laser System)
1-10-133	12V 3.3A Medical PSU (x2 for Saturn 5 Active Laser System)
5-45-500	Laser Objective (red) 40x
5-45-507	Laser Objective (red) 20x*

Saturn 5 Active Laser System Mirror Module Part Numbers

Part Number	Description
5-46-163	Mirror Module for Olympus IX53/73/83 left
5-46-150	Mirror Module for Olympus IX50/70 left
5-46-160	Mirror Module for Olympus IX50/70 right
5-46-151	Mirror Module for Olympus IX51/71/81 left
5-46-152	Mirror Module for Olympus IX51/71/81 right
5-46-159	Mirror Module for Olympus IMT2
5-46-135	Mirror Module for Nikon TMD
5-46-132	Mirror Module for Nikon Diaphot 200/300
5-46-130	Mirror Module for Nikon TE 200/300
5-46-140	Mirror Module for Nikon TE2000 with Integra Ti
5-46-141	Mirror Module for Nikon TE2000 without Integra Ti
5-46-142	Mirror Module for Nikon Ti with Integra Ti
5-46-144	Mirror Module for Nikon Ti with X-Y
5-46-146	Mirror Module for Nikon Ti2 with Integra
5-46-148	Mirror Module for Nikon Ti2 with XY stage
5-46-110	Mirror Module for Zeiss Axiovert 200/Observer
5-46-120	Mirror Module for Leica DMIRB
5-46-123	Mirror Module for Leica DMI3000B non-fluorescence
5-46-122	Mirror Module for Leica DMI3000B fluorescence
5-46-121	Mirror Module for Leica DMI4000B/6000B
5-46-124	Mirror Module for Leica DMi8

*Not cleared for use in USA market.

Section 4

Saturn 5 Laser System Collimator Module Part Numbers

5-45-163	Collimator Module for Olympus IX53/73/83
5-45-387	Collimator Module for Olympus IX71
5-45-301	Collimator Module for Nikon Diaphot 300/TE300
5-45-545	Collimator Module for Nikon TE2000/Ti/Ti-E
5-45-547	Collimator Module for Nikon Ti2
5-45-011	Collimator Module for Zeiss Ax200/Observer
5-45-470	Collimator Module for Leica DMIL
5-45-463	Collimator Module for Leica DMi8

Specifications

Laser Specifications	Ablation Laser	Pilot Laser
Output wavelength	1480nm	650nm
Power output from patch lead	400mW	180µW (max)
Maximum pulse width	2.0ms	None
Laser Safety Classification*	Class 1	Class 1

* IEC 60825-1:2014, US 21CFR 1040.10

Objective Specifications

Magnification	40x	20x*
N.A.	0.49	0.25
Working distance	2.5mm	2.5mm
Parfocal distance	45mm (adaptor supplied for Nikon CFI60 systems)	

*Not cleared for use in USA market.

40x or 20x is a nominal figure. Actual magnification will vary slightly when fitted to different microscopes.

Manufacturer	Actual Magnification
Olympus	40x, 20x
Nikon (CFI60)	36x, 18x
Leica	36x, 18x
Zeiss	44x, 22x

Saturn Active Specifications

Range of Movement	Approx. 370µm (40x), 740µm (20x)
Accuracy	1µm within calibration area, 3µm outside (40x) 2µm within calibration area, 6µm outside (20x)

Electrical Specifications

Mains Adaptor for Control Unit and Motor Module

Input	100-240VAC, 50-60Hz, 1.0-0.5A
Output Power (maximum)	40W
Voltage	12VDC
Current (maximum)	3.3A

Dimensions

Control Unit	220mmx180mmx34mm (8.6"x7.1"x1.3")
Weight	1.2Kg

Operating Conditions

Temperature	10°C (50°F) to 42°C (108°F)
Humidity	15% to 85% RH (Non-condensing)
Pressure	Pressure Range: 70kPa. to 108kPa.

Storage/Transport Conditions

Temperature	-40°C (40°F) to 60°C (140°F)
Humidity	15% to 85% RH (Non-condensing)
Pressure	Pressure Range: 70kPa. to 108kPa.

User Interface Icons

Icon	Meaning	Icon	Meaning
	Take Picture		Increase/Decrease Zoom Level
	Take Video		Laser Control
	Stop Video Recording		General Settings
	Open RI Viewer Gallery		Additional Camera Settings
	Device not connected		Take Measurements
	Device requires attention		Display Rulers Tool
	Device OK		Instructions For Use
	Choose Objective Magnification		

SECTION 5 - INSTALLATION

Unpacking

We recommend that the original packaging is kept for use in the event that the system is moved. Plastic covers for fibre optic connectors must be kept and replaced during transit to keep the connectors clean.

Tools Required

M1.6 1.3mm hex driver - 'orange'

M2 1.5mm hex driver - 'yellow'

M2.5 2.0mm hex driver - 'green'

M3 2.5mm hex driver - 'blue'

M4 3.0mm hex key

Adjustable lens removal tool - not included, contact CooperSurgical for details.

The toolkit should be kept safe for future maintenance.

Layout

The Control Unit should be placed in a convenient position. Avoid placing the Control Unit in contact with sources of heat. The Control Unit may be stacked with other equipment provided that there is no interference with any cables and that equipment is stacked in a stable manner.

The patch lead must be laid carefully between the Control Unit and the microscope, avoiding kinks, sharp corners or anything that might damage the outer sheath.

Objective

This should be screwed into a spare position on the nosepiece. We suggest placing the Saturn objective next to the highest magnification objective (usually 40x or 20x). Some microscopes require adaptors to fit the objective. Where appropriate these are normally supplied prefitted to the objective.

Mirror Module

First remove any covers from the fluorescence cassette mount. Remove any protective tape from the top of the Mirror Module. Slide the Mirror Module into the fluorescence cassette mount. Tighten the locking screw if fitted. See following pages for details.

Motor Module

Fit to the Mirror Module (see page 34) and tighten the locking screw.



The microscope itself must be maintained to a high standard. Problems such as worn focus mechanisms or an insecure video camera may lead to unreliable focus and image stability, and could lead to embryo damage.

If necessary (for example, if the Motor Module is faulty and cannot be repaired or replaced quickly) the Motor Module can be removed and the system used as a Saturn Fixed. Users must be instructed how to use the system in Fixed configuration. The Mirror Module will need to be replaced with the appropriate Collimator Module to fit the microscope.

How to Remove a Motor Module

If a Motor Module is being removed from a Saturn Laser System, it will need to be removed from the software.

1. Unplug and disconnect the Motor Module.
2. Start RI Viewer.
3. Connected devices panel will show that a Saturn Control Unit is connected and a Motor Module is not connected.
4. Open the General Settings panel.
5. Click System Information.
6. Click Remove under Motor Module.

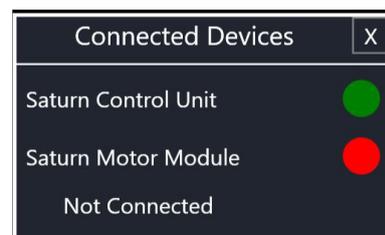


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Connecting a Motor Module to a Saturn Laser System

If you want to connect a Motor Module to a Saturn Laser System

1. Plug in and power up the Motor Module.
2. Start RI Viewer.



General

The following steps must be completed in order before the system is used.

1. Unpack laser components and fit to microscope.
2. Fit video camera to microscope. Refer to microscope instruction manual for further details.
3. Unpack and set up PC
 - i. Install RI Viewer software
 - ii. Connect USB video capture device if using analogue camera
 - iii. Connect camera
4. Connect the Saturn 5 Laser System to the PC with the USB cable provided.
5. If the system is a Saturn Active then attach the Motor Module to the PC using the USB cable provided.
6. Attach the patch lead between the Saturn 5 Laser System and the Collimator Module if it is a Fixed System or the Motor Module if it is an Active System. Note – Saturn 5 Laser System Patch Leads and connectors are delicate fibre optic components and need to be handled with extreme care.
7. Carry out the laser alignment procedure - See Section 13, “Laser Alignment (Fixed)” on page 64 and “Laser Alignment (Active)” on page 66.
8. In RI Viewer perform Laser Target Alignment - See Section 13, “How to Check Laser Target Alignment” on page 69.
9. In RI Viewer calibrate video system for correct measurement - see User Manual.

SECTION 6 - INSTALLATION GUIDE FOR FIXED SYSTEM

Zeiss Axiovert 100/200, Axio Observer

Nikon TMD, Diaphot 200/300, TE200/300, TE2000, Ti, Ti-E

Leica DMIRB, DMI3000B/4000B/6000B, DMIL, DMi8

Olympus IMT2, IX50/70, IX51/71/81, IX53/73/83

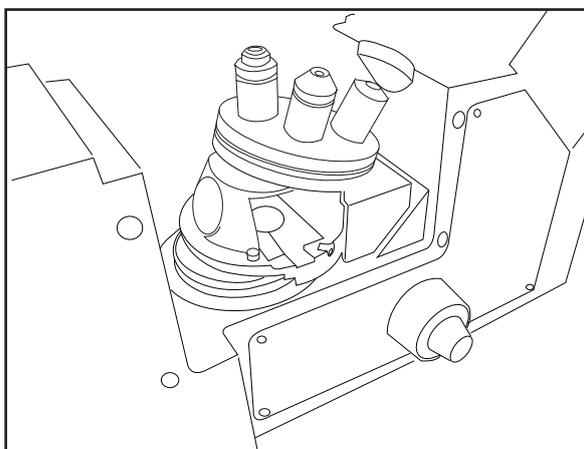
Motorised Microscopes (eg Nikon Ti-E)

After fitting the objective and Mirror Module, the microscope needs to be programmed to associate the laser objective with the port on the nosepiece where it has been fitted. A name should be chosen for the objective which clearly identifies it, for example, "40xLaser". Also, the laser objective needs to be associated with a brightfield position on the condenser turret. The objective may also need to be manually focussed to the correct position then recorded. See the microscope manual for instructions.

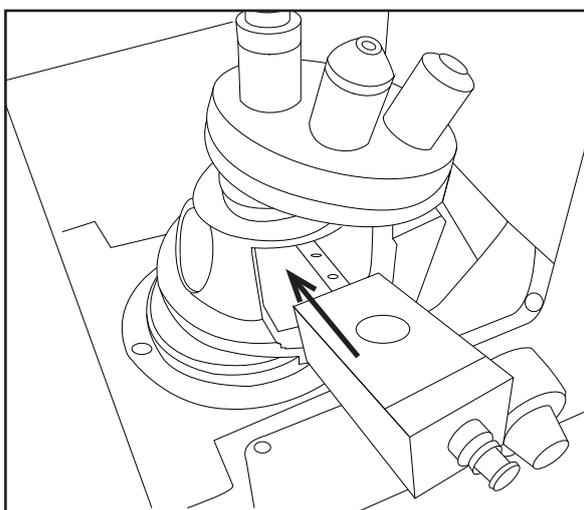
Zeiss Axiovert 100 (Fixed)

Objective

No adaptor required.



Remove the plastic cover from underneath the nosepiece (Axiovert 100 shown).



Insert the Collimator Module into the opening from the left hand side.

Push the module in until it clicks into position.

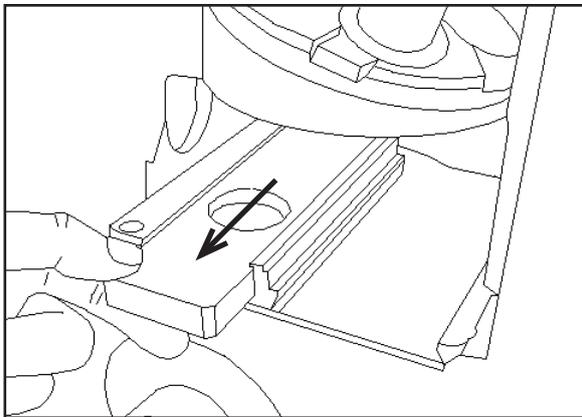
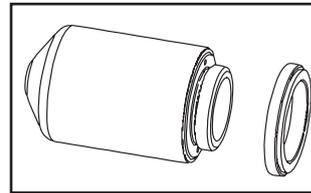
Section 6

Axiovert 200/ Axio Observer (Fixed)

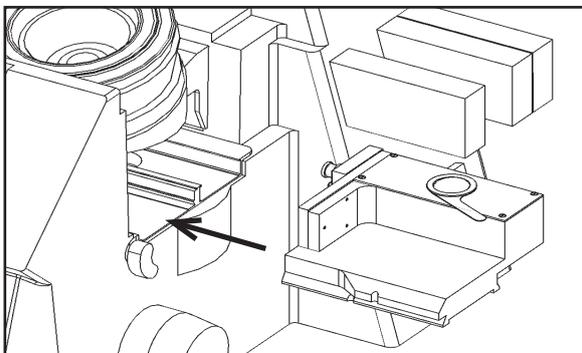
Objective

No adaptor required on most Axiovert 200s. Axio Observer and some late model Axiovert 200s require a M27 adaptor (supplied).

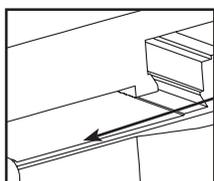
Note: The orientation of the adaptor. The step should face away from the objective.



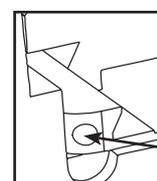
Remove any plastic covers from under the nosepiece.



Slide Collimator Module into position until it clicks into place, then lock.



Axio Observer locking lever



Axiovert 200 locking screw

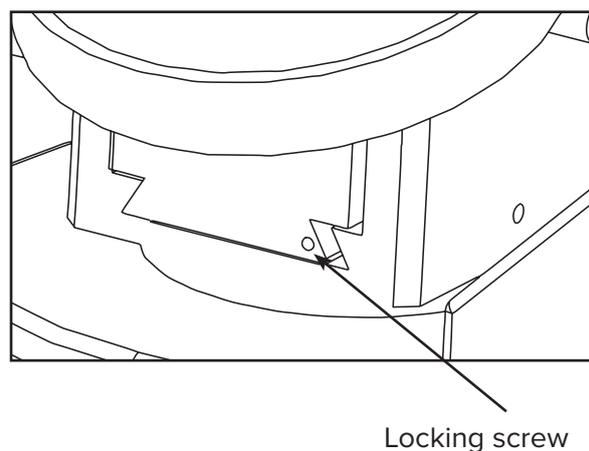
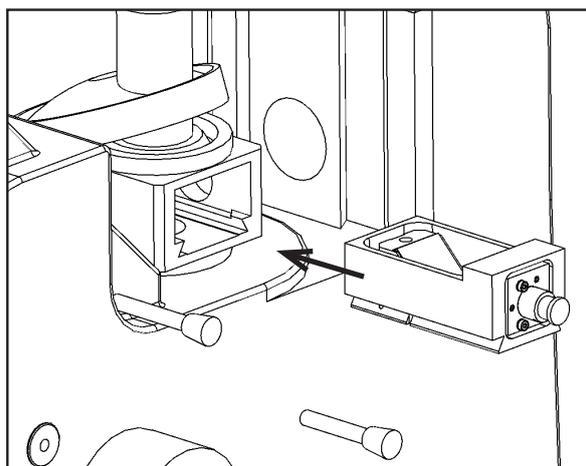


Nikon TMD (Fixed)

Objective

No adaptor required.

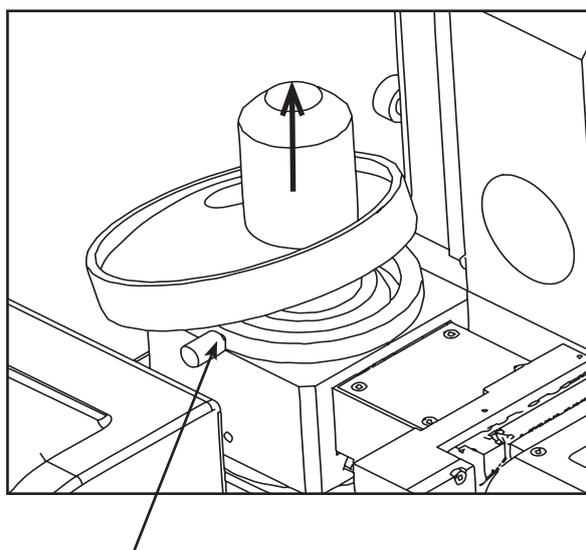
Remove the plastic cover from the fluorescence cassette mount on the right hand side of the microscope. Slide the Collimator Module into the fluorescence cassette mount until it clicks into position. Tighten the locking screw from the right hand side.



6

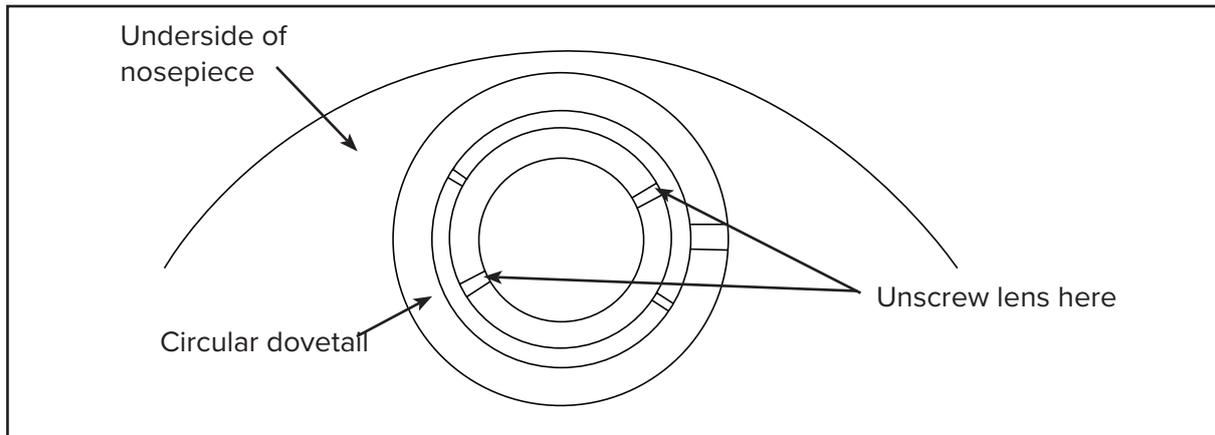
Modification to Microscope (optional)

For optimum focus and laser power transmission a lens should be removed from the microscope before installation. Removing the lens will cause a reduction in image size of approximately 10%, but otherwise the microscope will work as normal. If the lens is left in place, the system will work but longer pulse lengths may be required to achieve a given size of hole.



Undo the retaining screw and lift off the nosepiece.

Section 6



Fitting Objectives

Now replace the nosepiece and tighten the locking screw. Fit the red Saturn objective into the nosepiece.

Focus on the surface of a Petri dish using the Saturn objective. Now refit the 40x Hoffman objective (if used). Refit the 20x, 10x and 4x objectives with the spacers provided. The 4x objective should be brought into focus by rotating the whole objective within the spacer. When it is in focus tighten the grub screw in the spacer to secure in position.

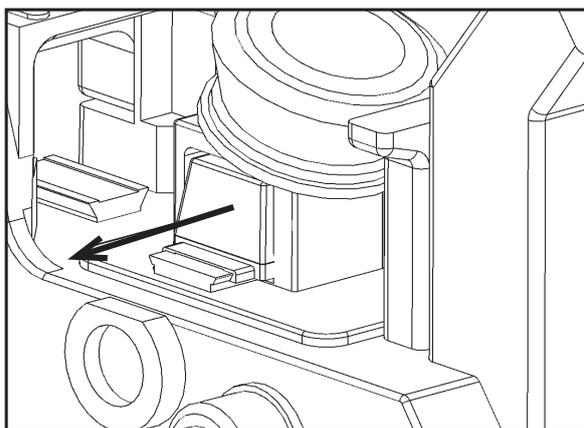
For the 20x and 10x objectives a selection of spacers is provided with slightly different thicknesses. Try each spacer in turn, as necessary, to find which one makes the objective parfocal with the Saturn objective.

6

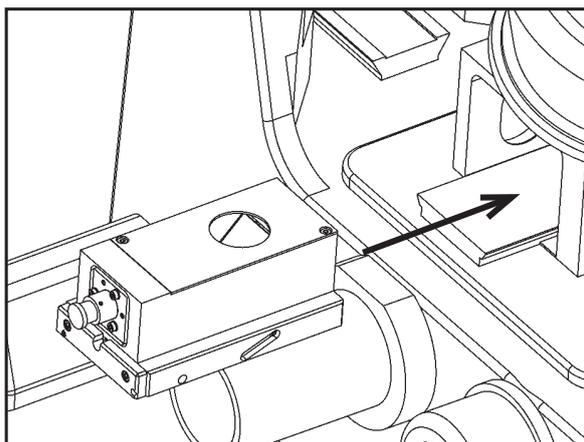
Nikon Diaphot 200/300 (Fixed)

Objective

No adaptor required.

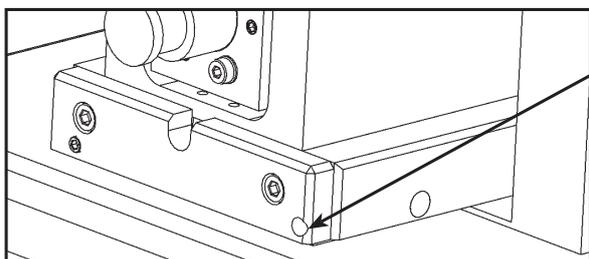


Remove the plastic cover from the fluorescence cassette mount on the left hand side of the microscope.



Slide the Collimator Module into the fluorescence cassette mount until it clicks into position. Tighten the locking screw from the left hand side.

6

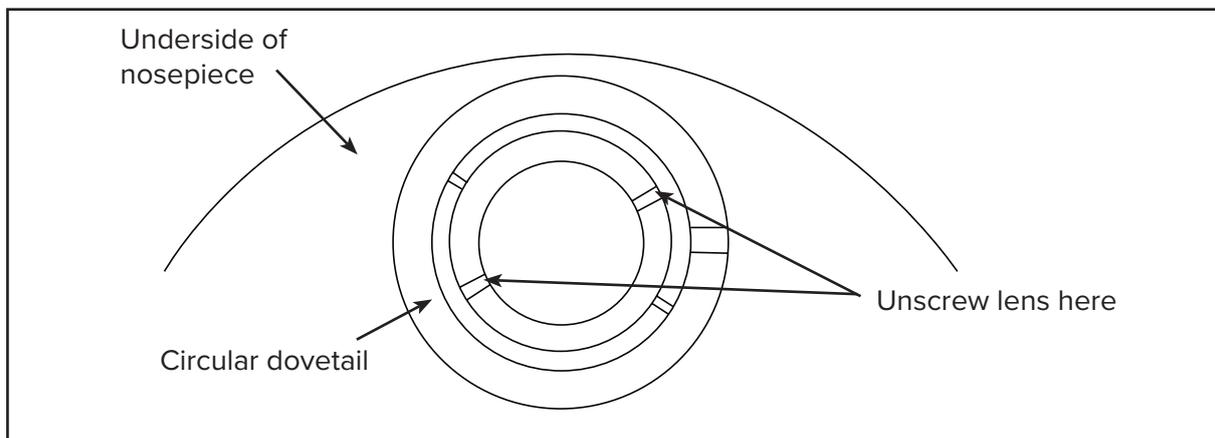
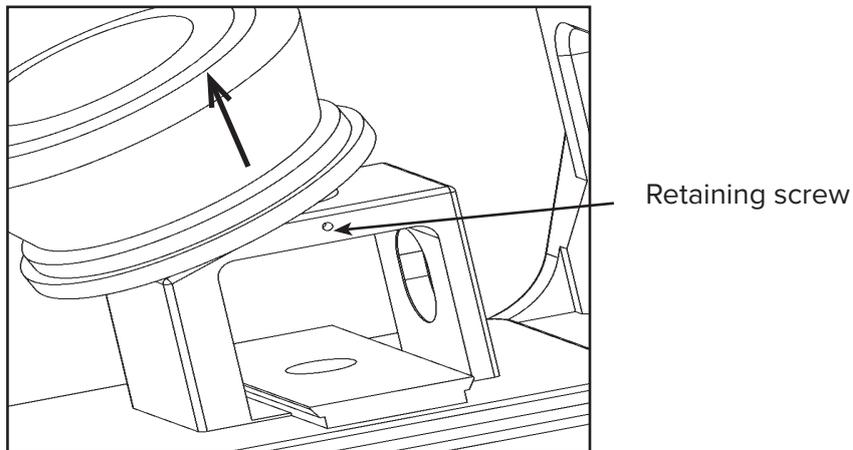


Locking screw

Modification to Microscope (optional)

For optimum focus and laser power transmission, a lens should be removed from the microscope before installation. Removing the lens will cause a reduction in image size of approximately 10%, but otherwise the microscope will work as normal. If the lens is left in place the system will work but longer pulse lengths may be required to achieve a given size of hole.

Section 6



Fitting Objectives

Now replace the nosepiece and tighten the locking screw. Fit the red Saturn objective into the nosepiece.

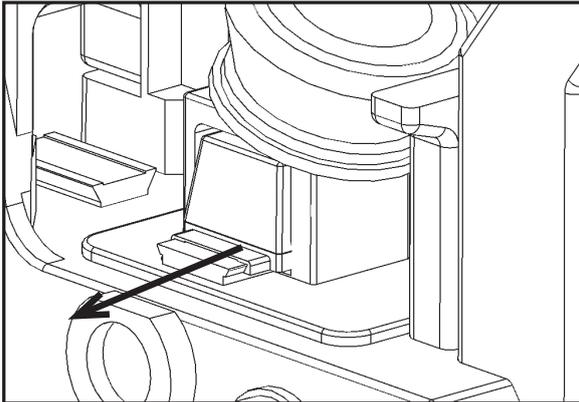
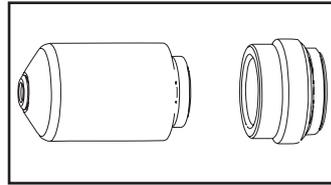
Focus on the surface of a Petri dish using the Saturn objective. Now refit the 40x Hoffman objective (if used). Refit the 20x, 10x and 4x objectives with the spacers provided. The 4x objective should be brought into focus by rotating the whole objective within the spacer. When it is in focus tighten the grub screw in the spacer to secure in position.

For the 20x and 10x objectives a selection of spacers is provided with slightly different thicknesses. Try each spacer in turn as necessary to find which one makes the objective parfocal with the Saturn objective.

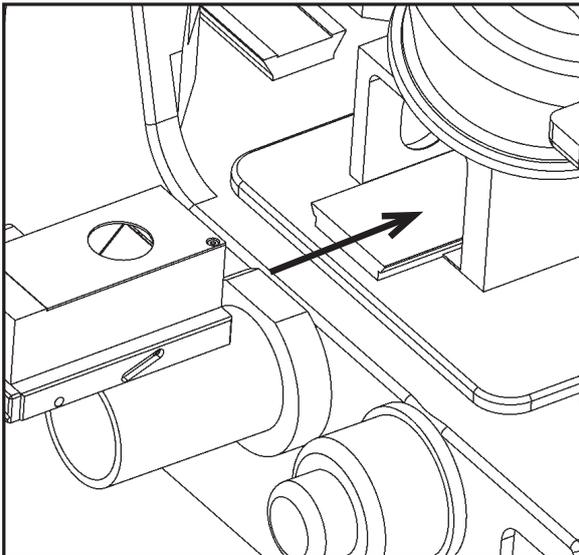
Nikon TE200/300 (Fixed)

Objective

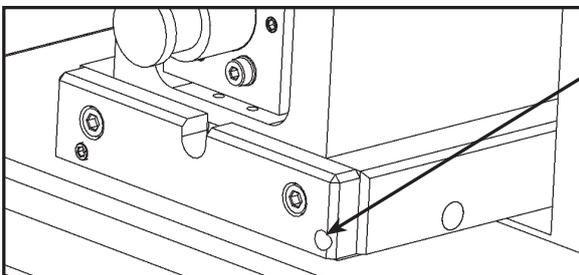
An adaptor is required as shown.



Remove the plastic cover from the fluorescence cassette mount on the left hand side of the microscope.



Slide the Collimator Module into the fluorescence cassette mount until it clicks into position. Tighten the locking screw from the left hand side.



Locking screw

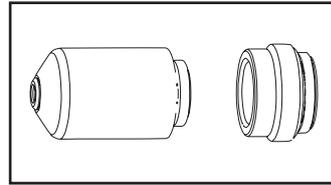


Section 6

Nikon TE2000/Ti/Ti-E (Fixed)

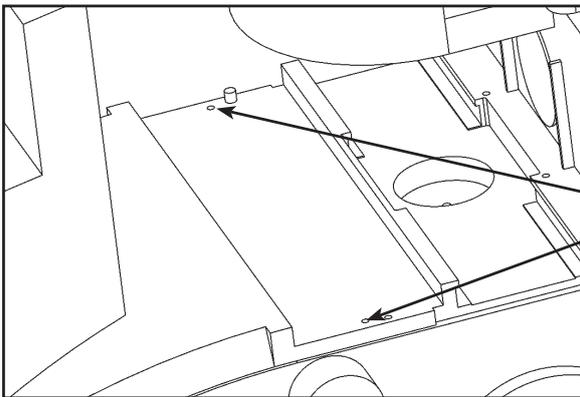
Objective

An adaptor is required as shown.

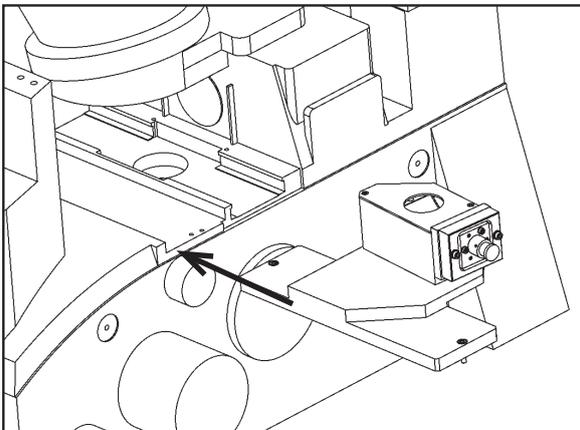


Collimator Module

First remove the plastic cover (if fitted) from the fluorescence cassette mount underneath the nosepiece, and remove the metal cover from the fluorescence cassette mount.



Undo these two screws to remove the metal cover.



Fit the Mirror Module into position as shown and secure by fitting the screw at each end.

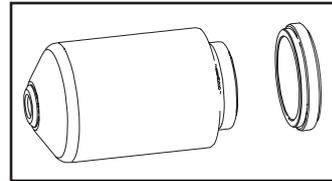
Note: There are two versions of the Mirror Module to suit different XY stages, so the module may look different to the one shown.

6

Leica DMIRB (Fixed)

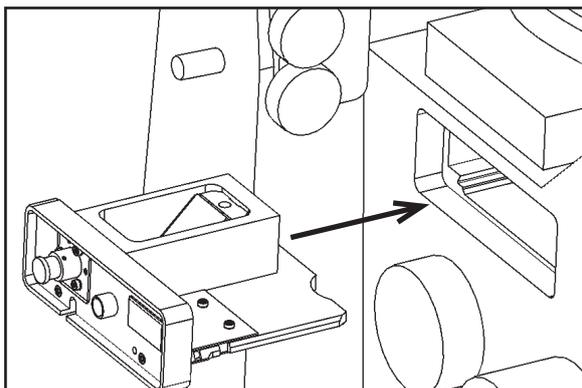
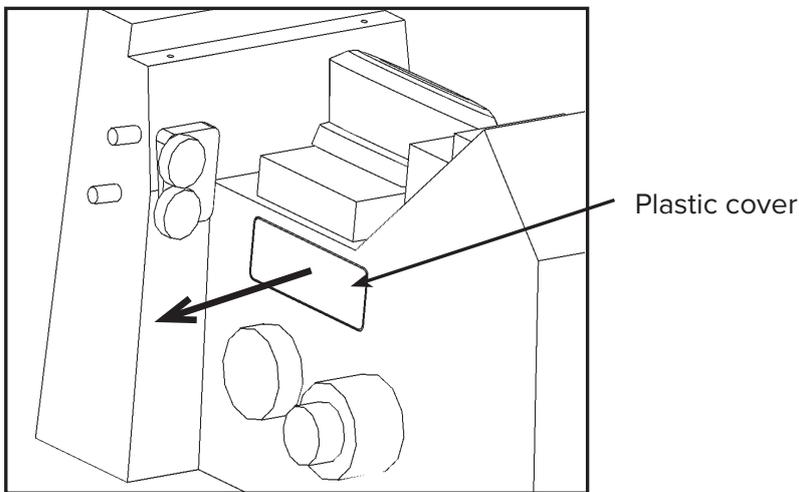
Objective

An adaptor is required as shown.



Collimator module

Remove the plastic cover from the fluorescence cassette mount on the left hand side of the microscope. Slide the Collimator Module into the fluorescence cassette mount. Make sure that the red panel of the Collimator Module is flush with the side of the microscope.



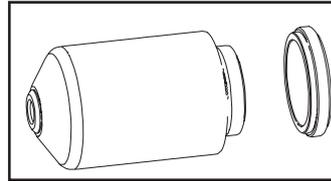
Section 6

Leica DMI3000B (Fixed)

Note: The Saturn 5 Laser System can only be fitted to fluorescence capable DMI3000Bs supplied after December 2007, and to non-fluorescence DMI3000Bs only if they have a removable cover on the right hand side. It cannot be fitted to earlier models.

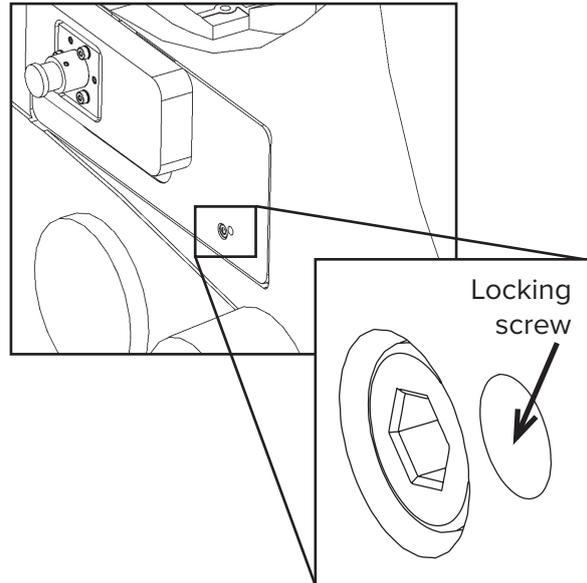
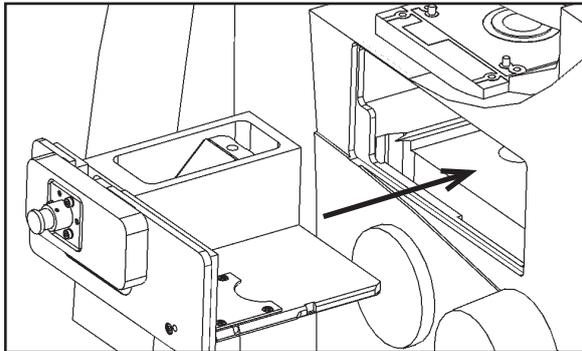
Objective

An adaptor is required as shown.



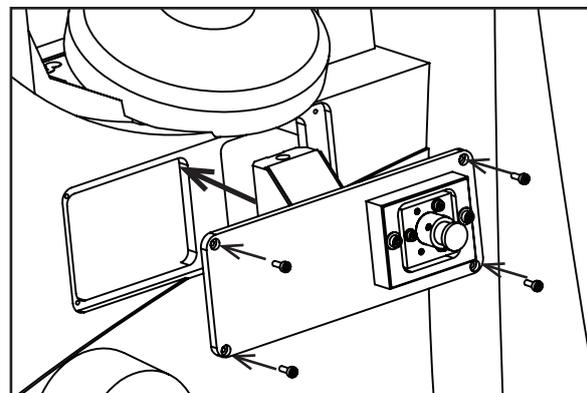
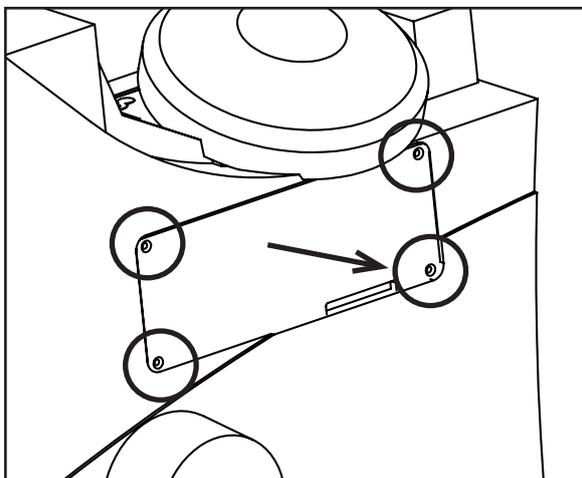
Mirror Module (fluorescence type)

Remove the plastic cover from the fluorescence cassette mount on the left hand side of the microscope. Slide the module into the fluorescence cassette mount until it clicks into position. Then gently tighten the locking screw.



Mirror Module (non-fluorescence type)

Undo the four screws and remove the cover from the right hand side of the microscope.



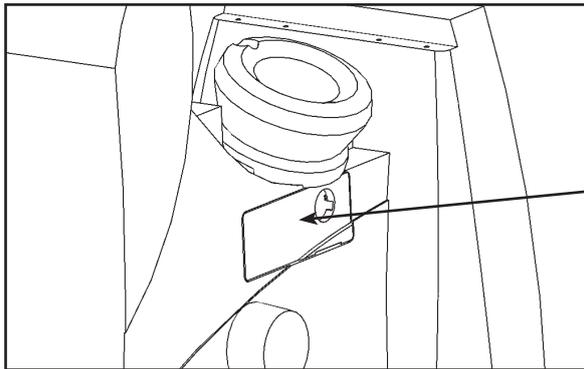
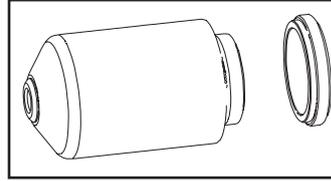
Fit the Collimator Module into the same position, and secure using the four screws provided.

Leica DMI4000B/6000B (Fixed)

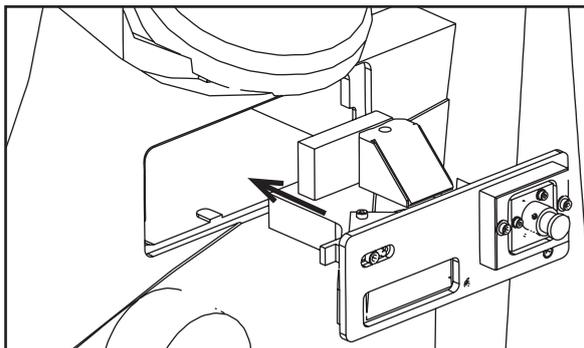
Objective

An adaptor is required as shown.

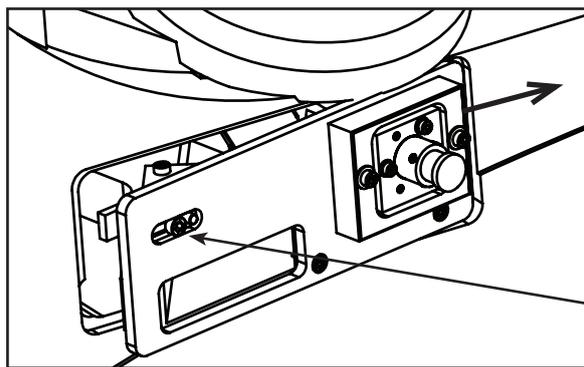
Collimator Module



Remove this panel from the microscope. There may be a weak glue holding it in place. Insert a small flat screwdriver in different places in the gap around the panel, and gently lever the panel. Consult your Leica distributor if you have any difficulty.

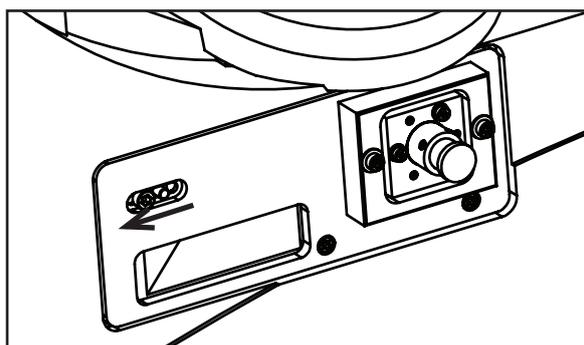


Insert the Collimator Module.



Make sure the lock is moved to the right. Angle the module slightly as shown, hold the right hand side against the microscope and slide the module to the right. Then move the left hand side of the module into place.

Lock



Use the blue ended driver to slide the lock to the left. Push the driver firmly to the left whilst tightening the screw.

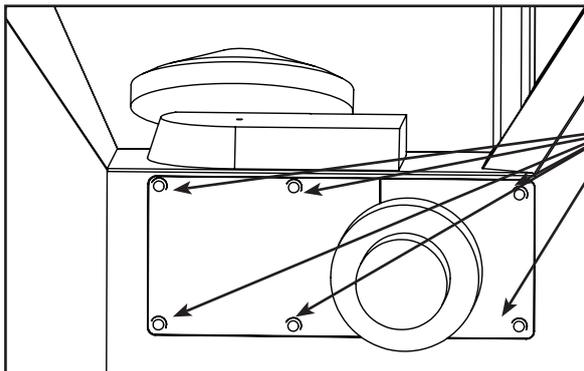
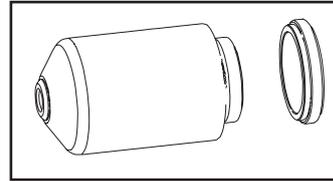
Section 6

Leica DMIL (Fixed)

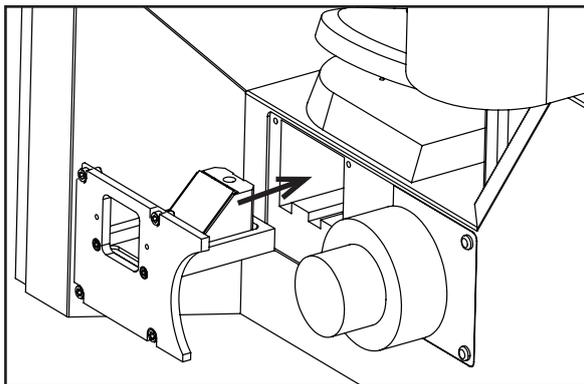
Objective

An adaptor is required as shown.

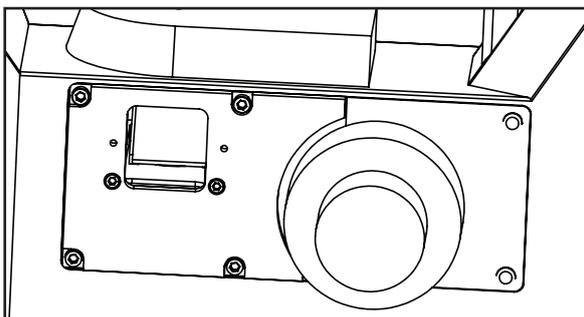
Collimator module



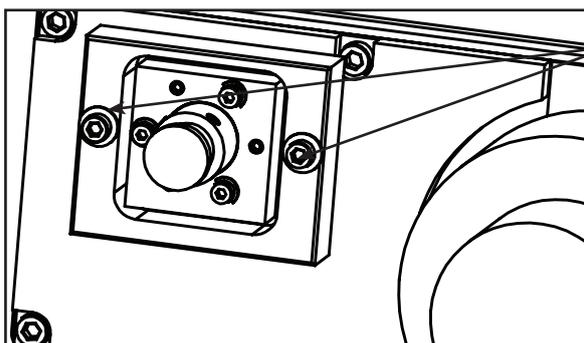
Undo the six screws shown and remove the cover. Keep the screws for the next step.



Insert the Mirror Module and use the original screws to secure it in position.



The Mirror Module in position.

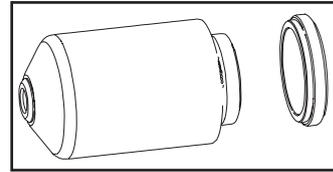


Fit the collimator using the two screws supplied. The fit is intentionally adjustable (see "Lateral Adjustment (Fixed)" on page 33). To start with, try to position the collimator approximately at the centre of the range of movement.

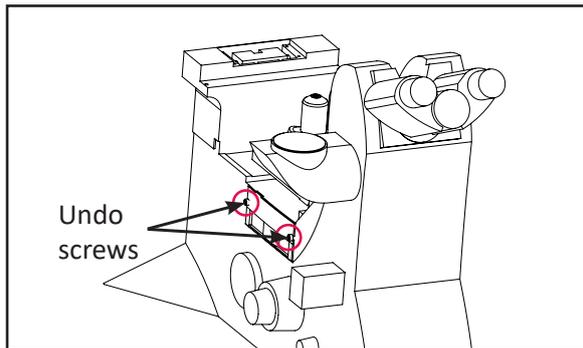
Leica DMI8 (Fixed)

Objective

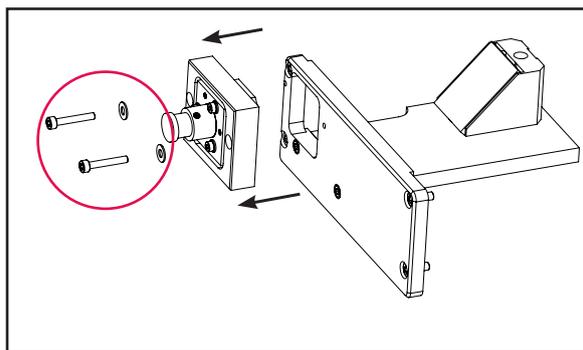
An adaptor is required as shown.



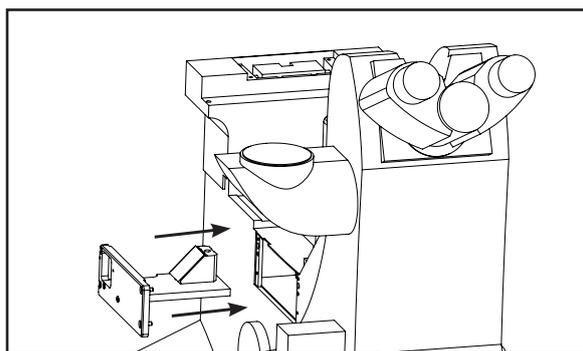
Collimator Module



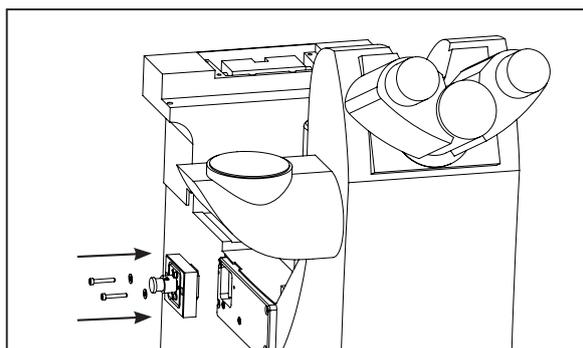
Remove the fluorescence port cover from the left-hand side by undoing and removing the screws. Keep the parts safe in case they need to be refitted in future.



Separate the collimator from the base by removing the two screws shown.



Slide the base into the opening in the microscope and secure using the four screws provided.



Fit the collimator back onto the base. The fit is intentionally adjustable (see “Lateral Adjustment (Fixed)” page 37). To start with, try to position the collimator approximately at the centre of the range of movement.

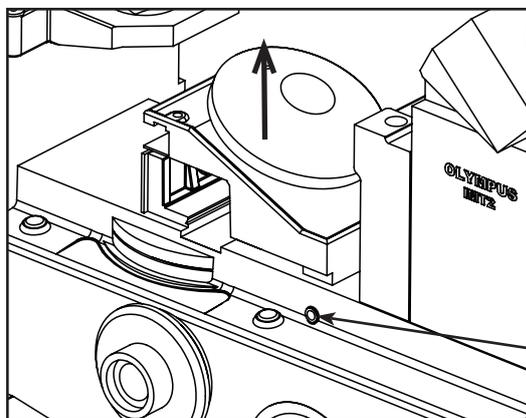
Olympus IMT2 (Fixed)

Objective

No adaptor required.

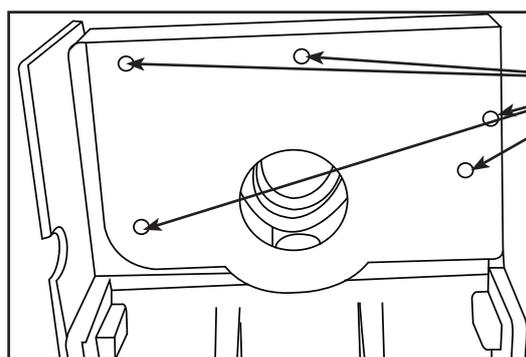
Modification to Microscope (optional)

For optimum focus and laser power transmission a lens should be removed from the microscope before installation. Removing the lens will cause a reduction in image size of approximately 10%, but otherwise the microscope will work as normal. If the lens is left in place the system will work but longer pulse lengths may be required to achieve a given size of hole.

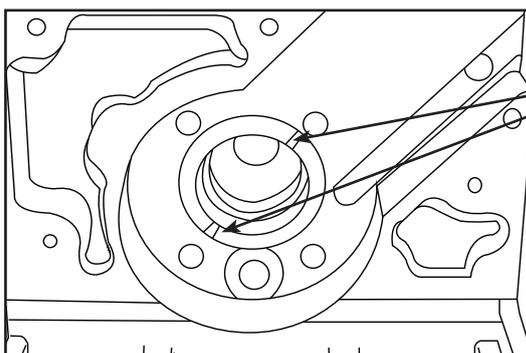


Remove the stage and turn the focus control down as far as it will go. Insert a 3mm hex driver into the hole shown and loosen the locking screw. Slide the nosepiece upwards and out of the microscope.

Locking screw



Undo the five small screws shown and remove the plate.



Unscrew the lens using the two slots and store safely for future refitting.

Fitting Objectives

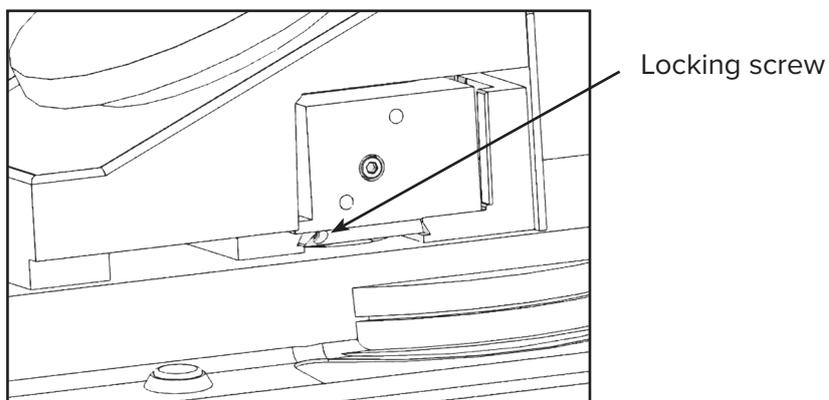
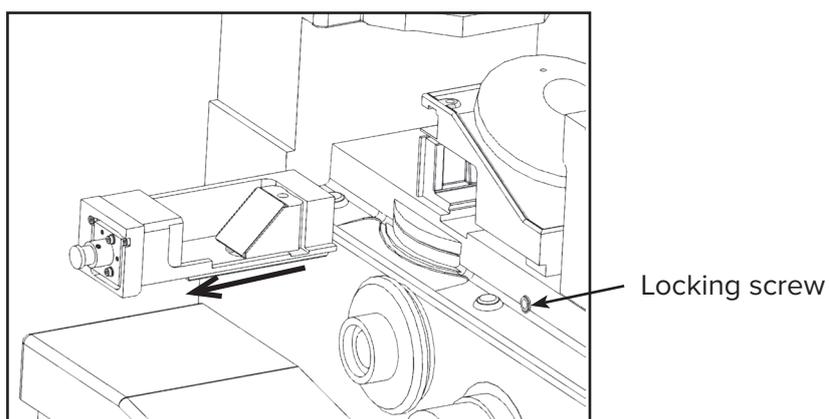
Replace the black cover on the nosepiece, then fit the nosepiece to the microscope and tighten the locking screw. Fit the red Saturn objective into the nosepiece.

Focus on the surface of a Petri dish using the Saturn objective. Now refit the 40x Hoffman objective (if used). Refit the 20x, 10x and 4x objectives with the spacers provided. The 4x objective should be brought into focus by rotating the whole objective within the spacer. When it is in focus tighten the grub screw in the spacer to secure in position.

For the 20x and 10x objectives a selection of spacers is provided with slightly different thicknesses. Try each spacer in turn as necessary to find which one makes the objective parfocal with the Saturn objective.

Collimator Module

Remove the plastic cover (if fitted) from the fluorescence mount underneath the nosepiece. Remove the protective tape from the top of the Collimator Module. Slide the Collimator Module into the fluorescence mount from the left hand side. The module will click into position. Now tighten the locking screw from the right hand side.



Section 6

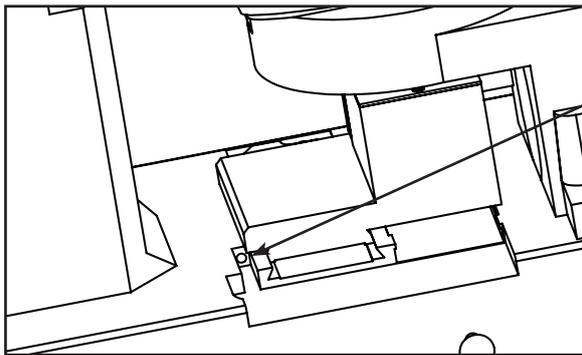
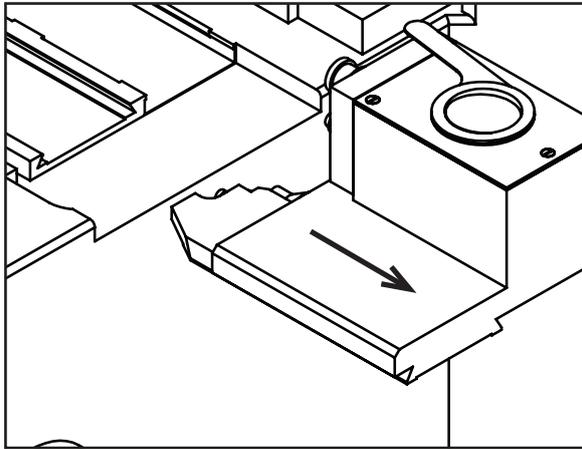
Olympus IX50/70 (Fixed)

Objective

No adaptor required.

Collimator Module

Remove the plastic cover (if fitted) from the fluorescence cassette mount underneath the objective. Remove the protective tape from the top of the Collimator Module. Slide the Collimator Module into the fluorescence cassette mount from the right hand side. Hold the Collimator Module against the stop and tighten the two locking screws.



Locking screw

6

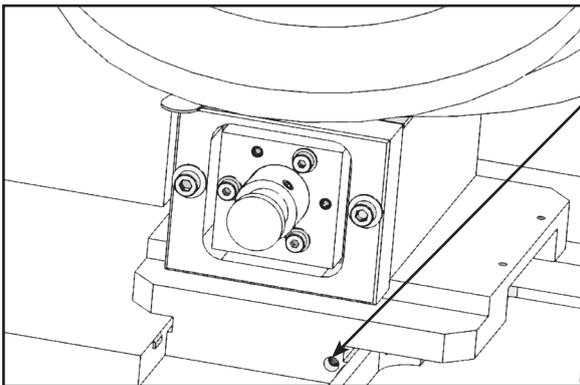
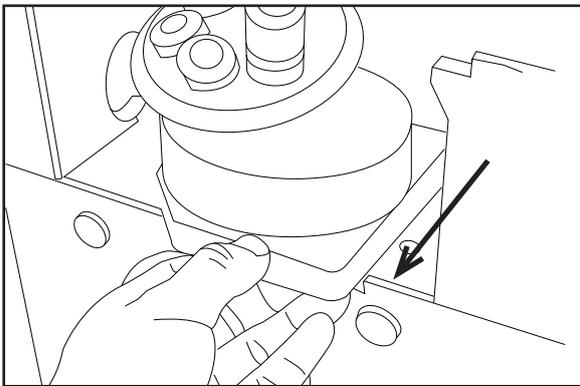
Olympus IX71 (Fixed)

Objective

No adaptor required.

Collimator Module

Remove the plastic cover from the fluorescence cassette mount underneath the objective. Remove the protective tape from the top of the Collimator Module. Slide the Collimator Module into the fluorescence cassette mount. Hold the Collimator Module against the stop and tighten the locking screw.



Locking screw



Section 6

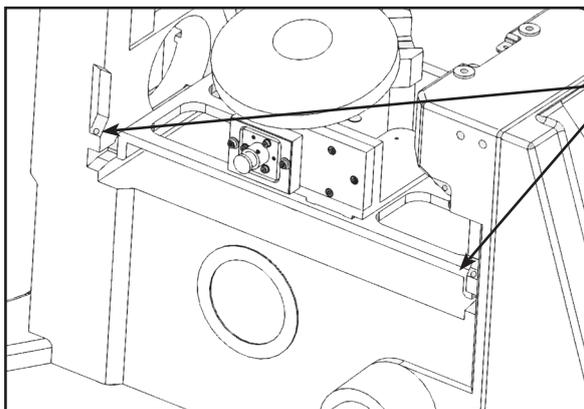
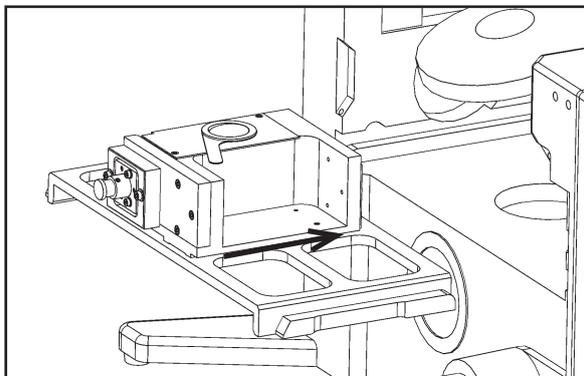
Olympus IX53/73/83 (Fixed)

Objective

No adaptor required.

Collimator Module

Remove the plastic cover (if fitted) from the fluorescence cassette mount underneath the objective. Remove the protective tape from the top of the Collimator Module. Slide the Collimator Module into the fluorescence cassette mount from the left hand side. Hold the Collimator Module against the stop and tighten the two locking screws.



Locking screws

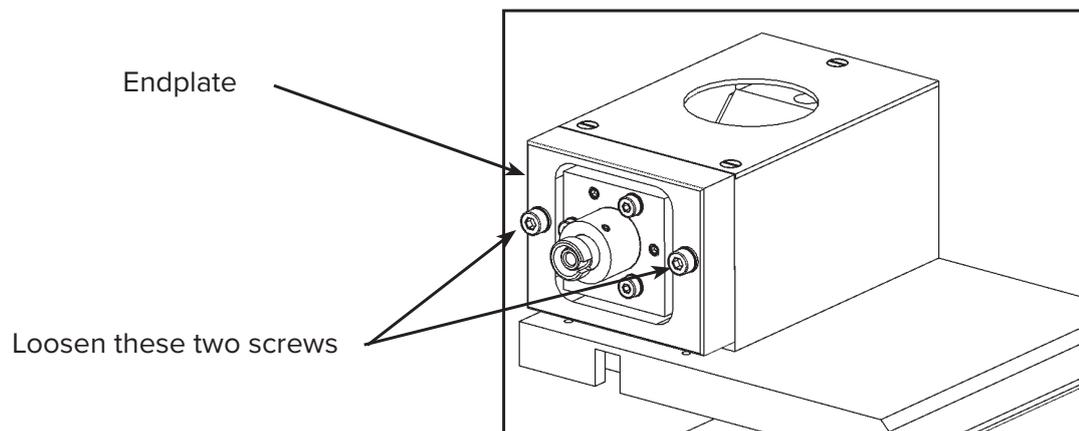
6

Lateral Adjustment (Fixed)

For Olympus IX50/70/51/71/81, IX53/73/83
 Nikon TE2000, Ti, Ti-E
 Leica DMIL, DMI3000B, DMI4000B, DMI6000B, DMI8
 Zeiss Axiovert 200, Axio Observer

Lateral Adjustment

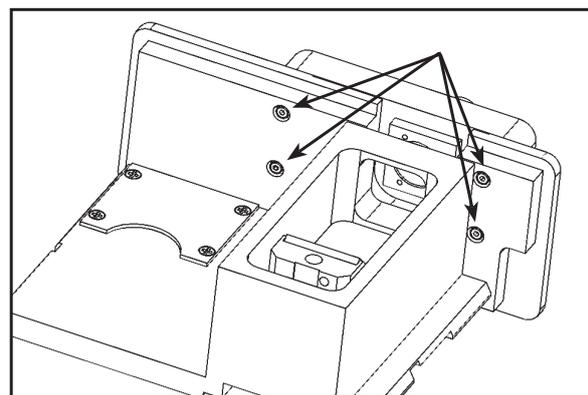
If, after adjustment (see “Laser Alignment (Fixed)” on page 64), the ring pattern is not at the centre of the field of view then the lateral adjustment can be used to move the pattern closer to the centre. Loosen the two screws shown below and slide the end plate sideways or vertically as required to move the pattern. Then tighten the two screws. Now readjust the concentric ring pattern. Repeat as required.



Leica DMI3000B

Slide the module out and loosen the four screws shown to adjust the position of the endplate.

Tighten the screws and readjust the ring pattern. Repeat as required.



SECTION 7 - INSTALLATION GUIDE FOR ACTIVE SYSTEM

Zeiss Axiovert 100/200

Nikon TMD, Diaphot 200/300, TE200/300, TE2000, Ti, Ti-E, Ti2

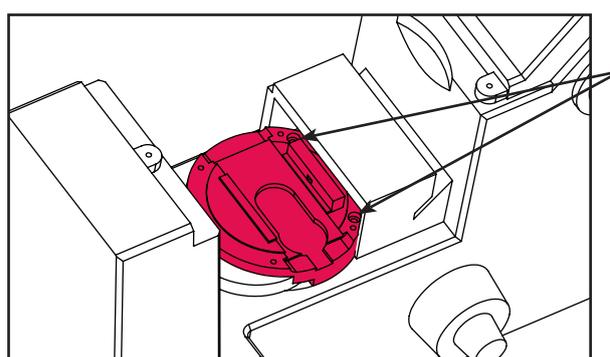
Leica DMIRB, DMI3000B/4000B/6000B, DMIL

Olympus IMT2, IX50/70, IX51/71/81, IX53/73/83

Motorised Microscopes (eg Nikon Ti-E)

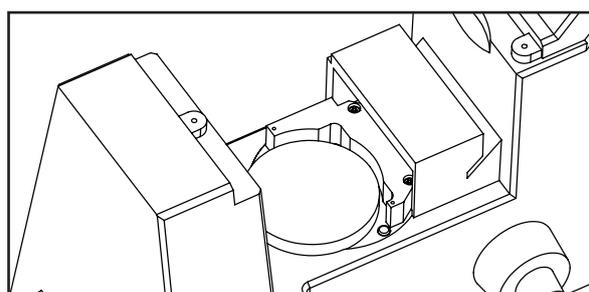
After fitting the objective and Mirror Module, the microscope needs to be programmed to associate the laser objective with the port on the nosepiece where it has been fitted. A name should be chosen for the objective which clearly identifies it, for example, "40xLaser". Also, the laser objective needs to be associated with a brightfield position on the condenser turret. The objective may also need to be manually focussed to the correct position then recorded. See the microscope manual for instructions.

Zeiss Axiovert S100/135 (Active)



Undo the two screws shown and remove the shaded part. Keep this part safe in case it needs to be refitted in future.

Note: For clarity, the microscope nosepiece is not shown.

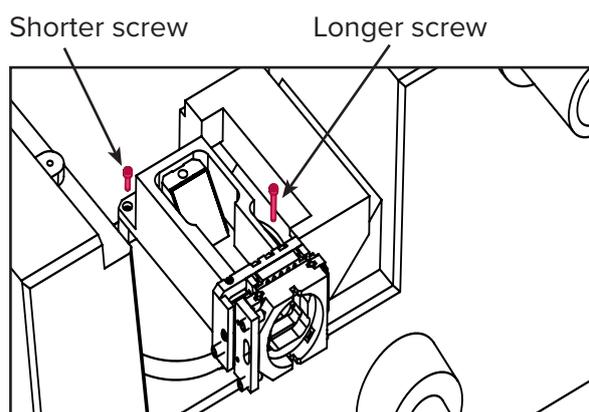


Fit the base component of the Saturn module.

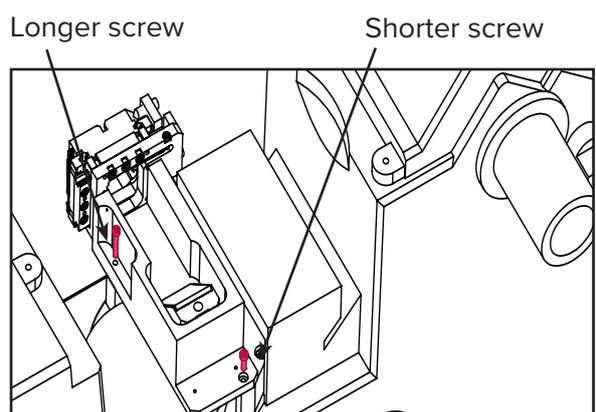
Fit the rest of the module using the screws provided. **Note:** The screws are different lengths, and must be fitted in the correct positions.

The module may be fitted such that the Motor Module is on the left or right side of the microscope.

Left-hand fitting:



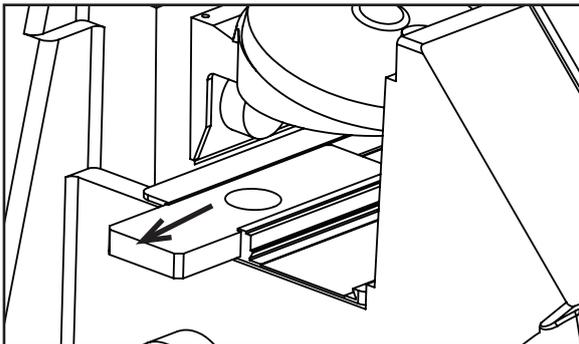
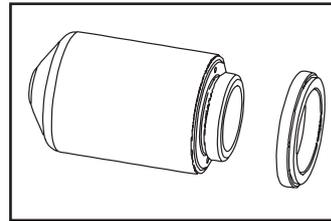
Right-hand fitting:



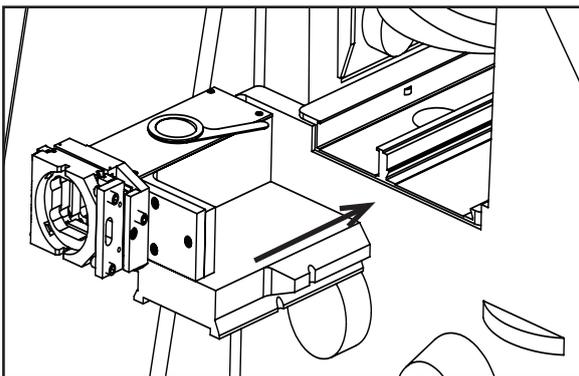
Zeiss Axiovert 200 (Active)

Objective

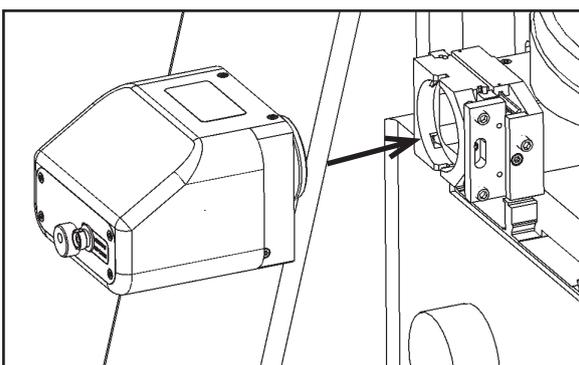
No adaptor required on most microscopes. Later models may require an M27 adaptor (supplied). **Note:** The orientation of the adaptor. The step should face away from the objective.



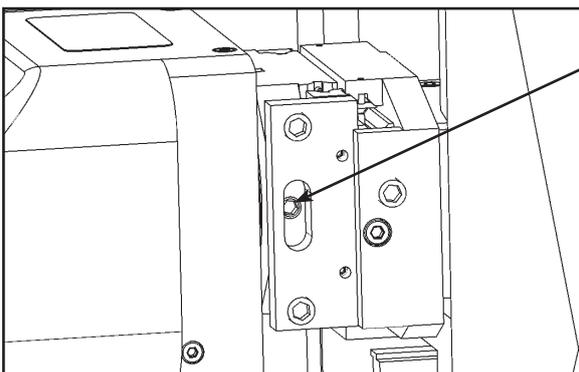
Remove the plastic cover (if fitted).



Slide the Mirror Module into position until it clicks into place.



The Motor Module fits with a circular dovetail. Insert the Motor Module in the orientation shown



Hold the Motor Module in position and tighten the screw shown, until the Motor Module is held securely.

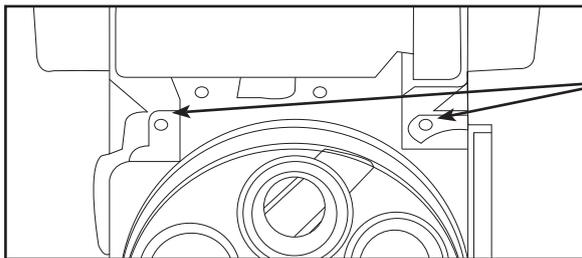
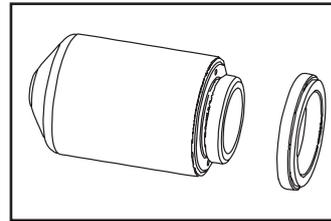


Section 7

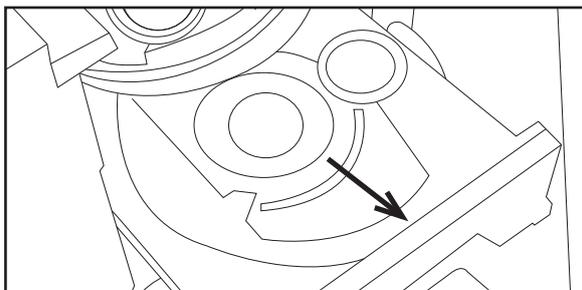
Zeiss Axio Observer (Active)

Objective

M27 adaptor supplied. **Note:** The orientation of the adaptor. The step should face away from the objective.

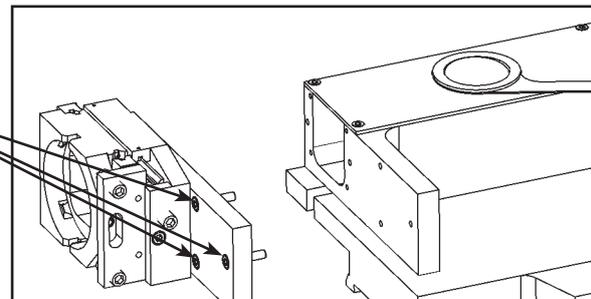


Undo the two screws from the rear corners of the plastic cover.



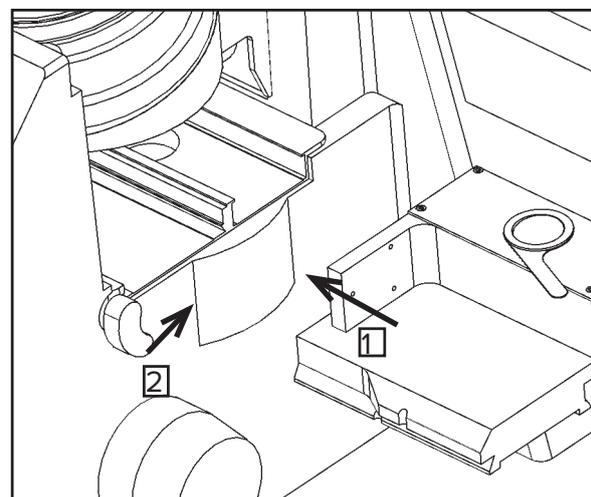
Slide out the cover from the right hand side.

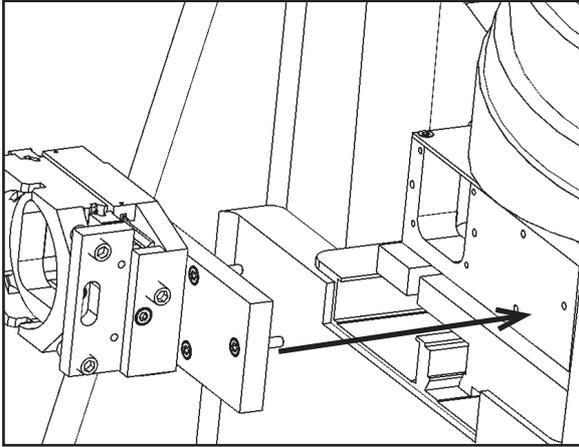
Remove the adjustment assembly by undoing the three screws shown.



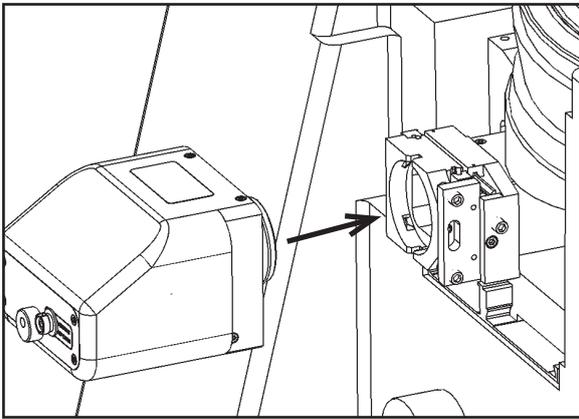
Slide the Mirror Module into position until it clicks into place.

Turn the locking lever upwards.

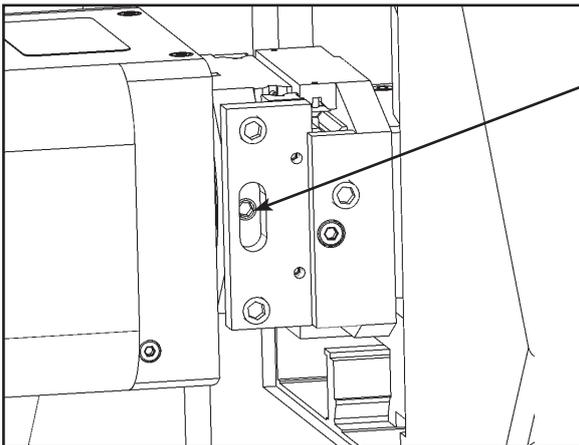




Fit the adjustment assembly back onto the Mirror Module.



The Motor Module fits with a circular dovetail. Insert the Motor Module in the orientation shown



Hold the Motor Module in position and tighten the screw shown, until the Motor Module is held securely.

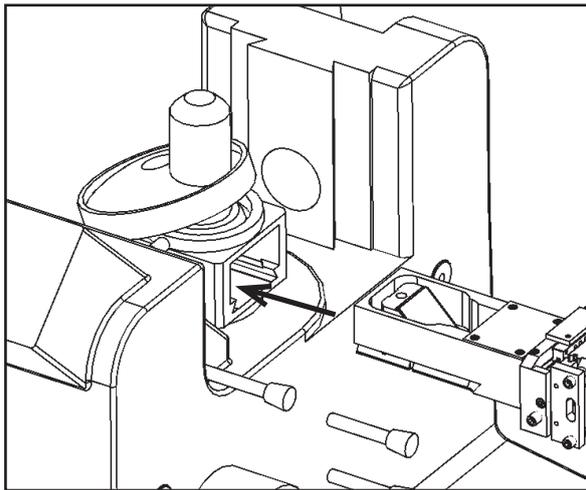


Section 7

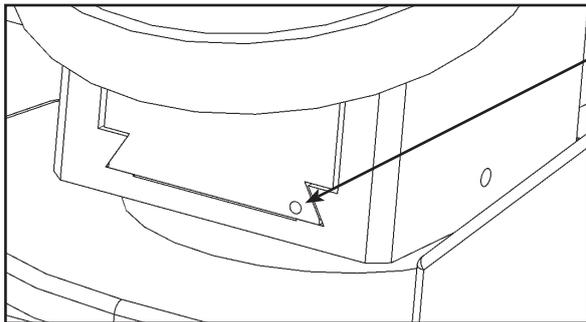
Nikon TMD (Active)

Objective

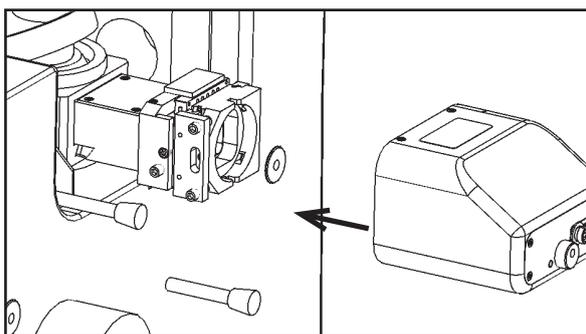
No adaptor required.



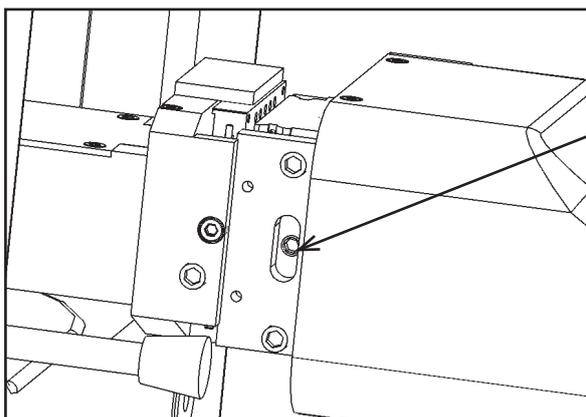
Remove the plastic cover from the fluorescence cassette mount on the right hand side of the microscope. Slide the Mirror Module into the fluorescence cassette mount until it clicks into position. Tighten the locking screw from the right hand side.



Locking screw



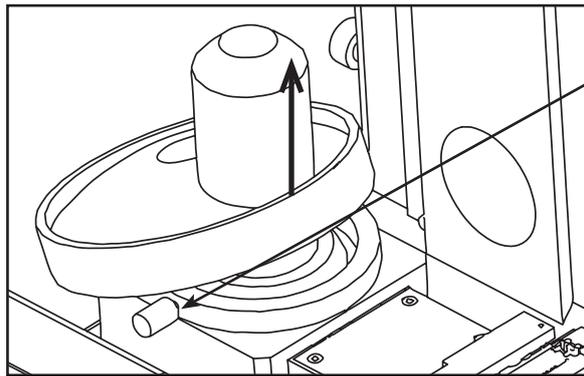
The Motor Module fits with a circular dovetail. Insert the Motor Module in the orientation shown



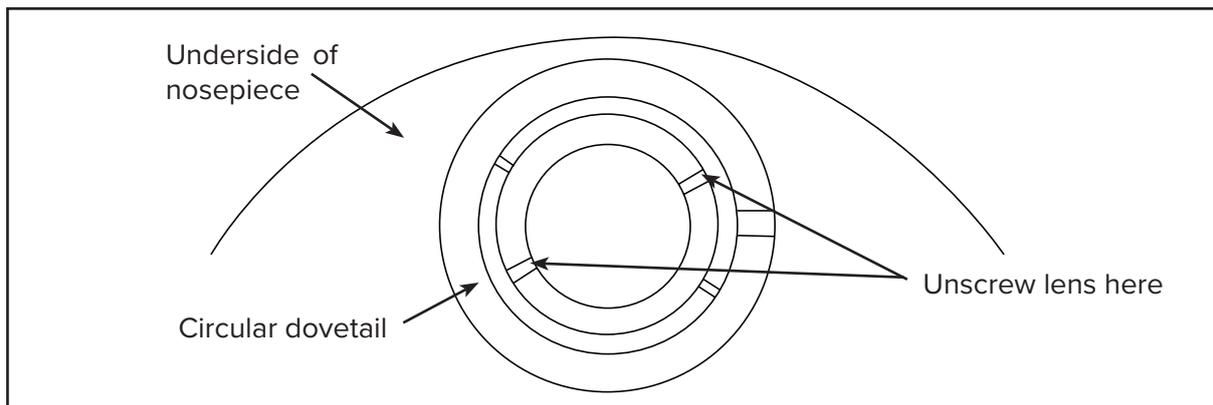
Hold the Motor Module in position and tighten the screw shown, until the Motor Module is held securely.

Modification to Microscope (optional)

For optimum focus and laser power transmission a lens should be removed from the microscope before installation. Removing the lens will cause a reduction in image size of approximately 10%, but otherwise the microscope will work as normal. If the lens is left in place the system will work but longer pulse lengths may be required to achieve a given size of hole.



Undo the retaining screw and lift off the nosepiece.



Fitting Objectives

Now replace the nosepiece and tighten the locking screw. Fit the red Saturn objective into the nosepiece.

Focus on the surface of a Petri dish using the Saturn objective. Now refit the 40x Hoffman objective (if used). Refit the 20x, 10x and 4x objectives with the spacers provided. The 4x objective should be brought into focus by rotating the whole objective within the spacer. When it is in focus tighten the grub screw in the spacer to secure in position.

For the 20x and 10x objectives a selection of spacers is provided with slightly different thicknesses. Try each spacer in turn, as necessary, to find which one makes the objective parfocal with the Saturn objective.

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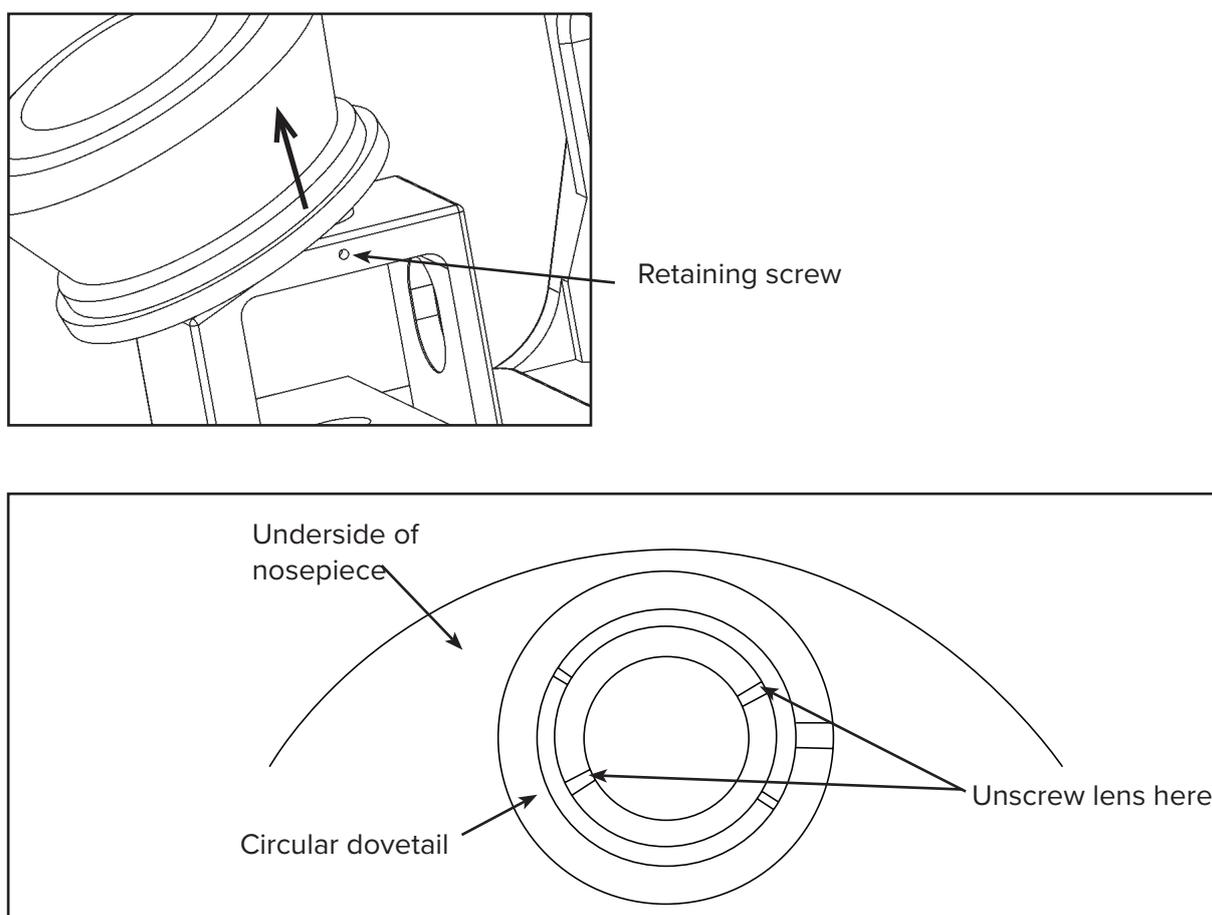
Nikon Diaphot 200/300 (Active)

Objective

No adaptor required.

Modification to Microscope (optional)

For optimum focus and laser power transmission a lens should be removed from the microscope before installation. Removing the lens will cause a reduction in image size of approximately 10%, but otherwise the microscope will work as normal. If the lens is left in place the system will work but longer pulse lengths may be required to achieve a given size of hole.



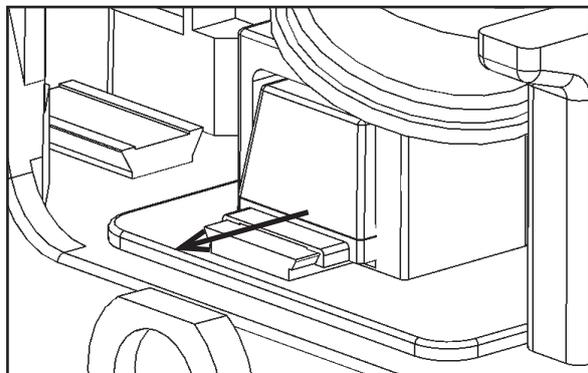
Fitting Objectives

Now replace the nosepiece and tighten the locking screw. Fit the red Saturn objective into the nosepiece.

Focus on the surface of a Petri dish using the Saturn objective. Now refit the 40x Hoffman objective (if used). Refit the 20x, 10x and 4x objectives with the spacers provided. The 4x objective should be brought into focus by rotating the whole objective within the spacer. When it is in focus tighten the grub screw in the spacer to secure in position.

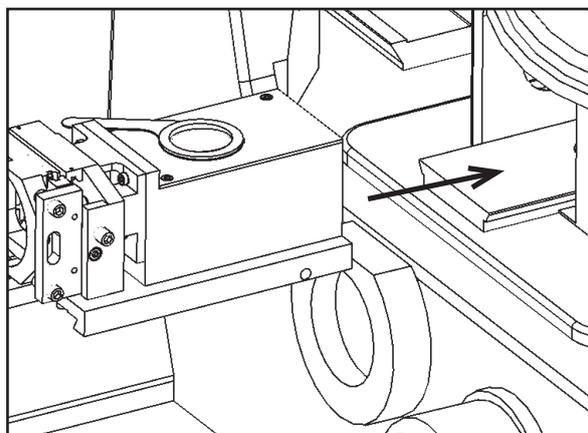
For the 20x and 10x objectives a selection of spacers is provided with slightly different thicknesses. Try each spacer in turn, as necessary, to find which one makes the objective parfocal with the Saturn objective.

Mirror Module

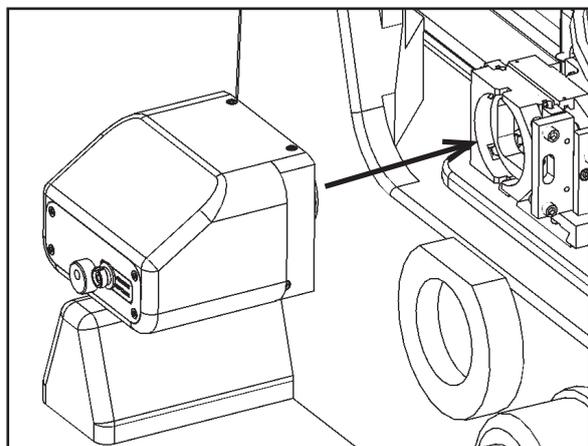
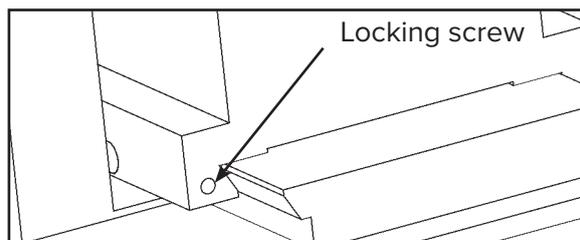


Left hand mounting (for stages with right hand X-Y control) is shown. Right hand installation (for stages with left hand X-Y control) is the same, except the components are fitted on the right hand side.

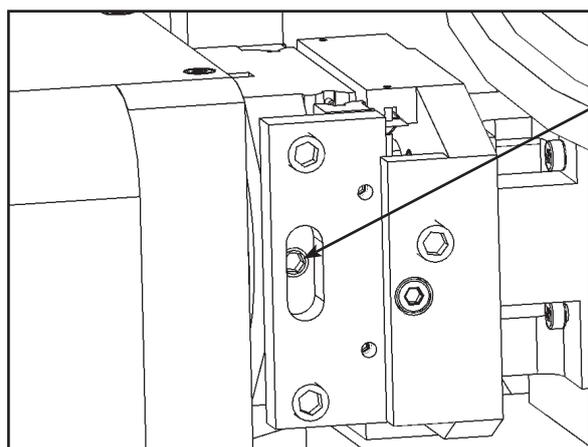
Remove the plastic cover from the fluorescence cassette mount.



Slide the Mirror Module into the fluorescence cassette mount until it stops. Tighten the locking screw from the right hand side.



The Motor Module fits with a circular dovetail. Insert the Motor Module in the orientation shown.



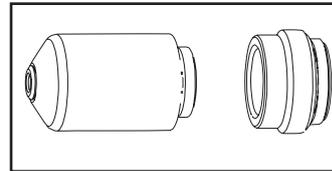
Hold the Motor Module in position and tighten the screw shown, until the Motor Module is held securely.

Section 7

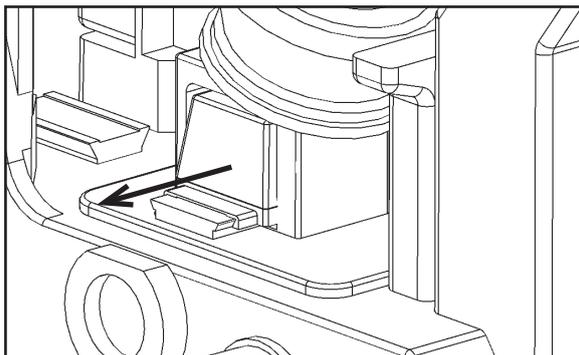
Nikon TE200/300 (Active)

Objective

An adaptor is required as shown.

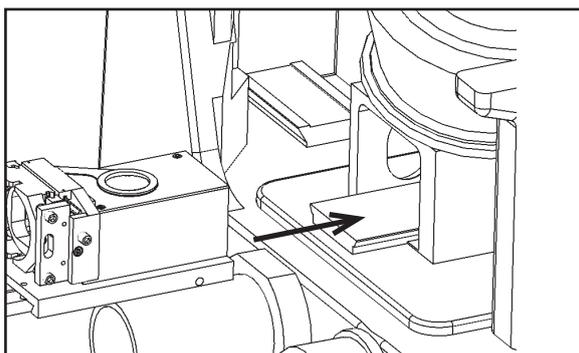


Mirror Module



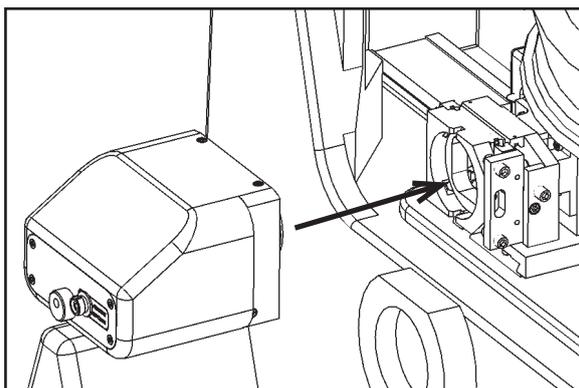
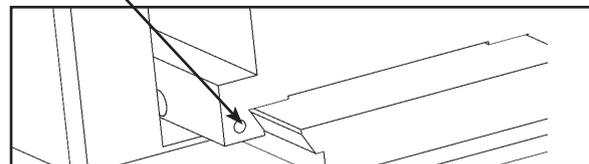
Left hand mounting (for stages with right hand X-Y control) is shown. Right hand installation (for stages with left hand X-Y control) is the same, except the components are fitted on the right hand side.

Remove the plastic cover from the fluorescence cassette mount.

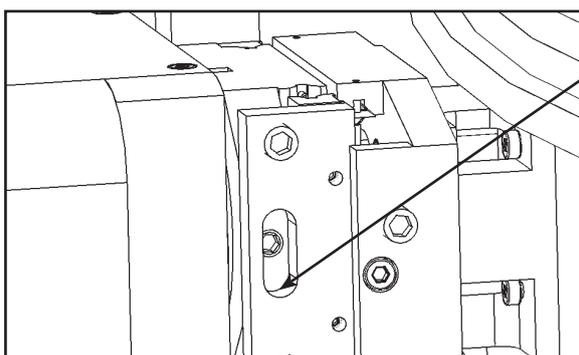


Slide the Mirror Module into the fluorescence cassette mount until it stops.

Tighten the locking screw from the right hand side.



The Motor Module fits with a circular dovetail. Insert the Motor Module in the orientation shown.

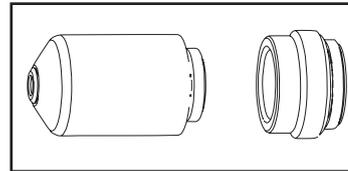


Hold the Motor Module in position and tighten the screw shown, until the Motor Module is held securely.

Nikon TE2000/Ti/Ti-E/Ti2 (Active)

Objective

An adaptor is required as shown.

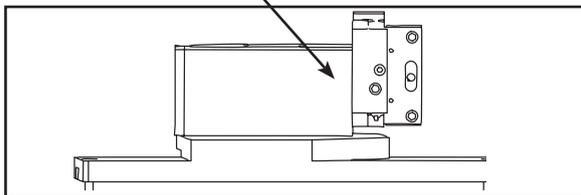


Mirror Module

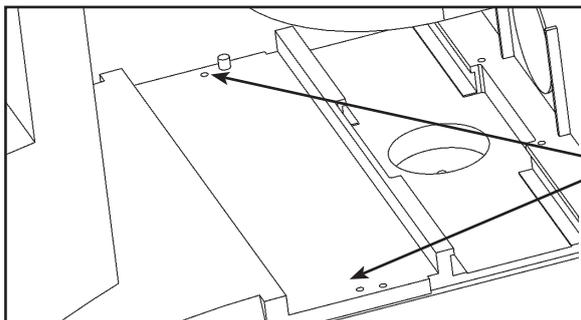
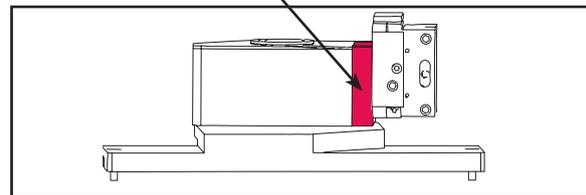
First remove the plastic cover (if fitted) from the fluorescence cassette mount underneath the nosepiece, and remove the metal cover (if fitted) from the fluorescence cassette mount.

Take care to use the correct module for each microscope, as they are similar but not identical.

Modules for Ti do not have a spacer



Modules for TE2000 have a spacer as shown

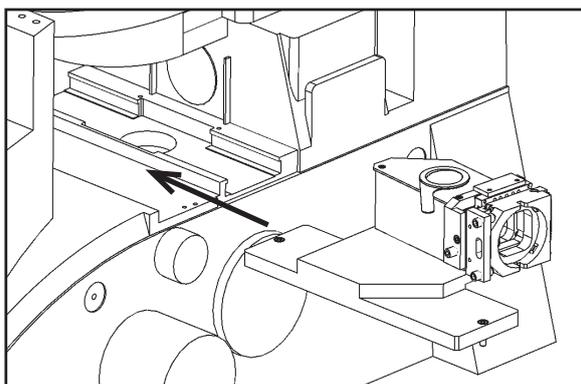


Undo these two screws to remove the metal cover

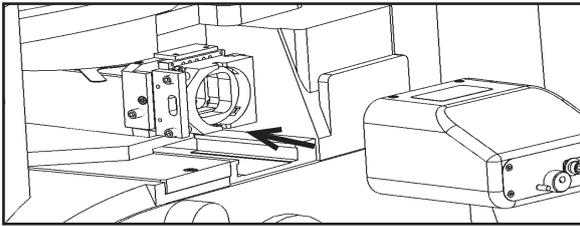


Microscopes with Integra Ti (straight Mirror Module)

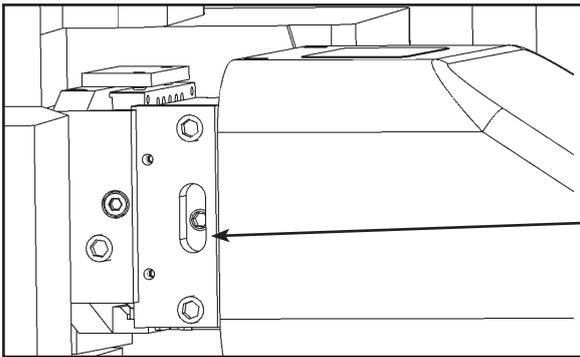
Fit the Mirror Module into position as shown and secure by fitting the screw at each end. **Note:** The module is angled slightly forwards. This is intentional allowing clearance between the Motor Module and the microscope.



Section 7



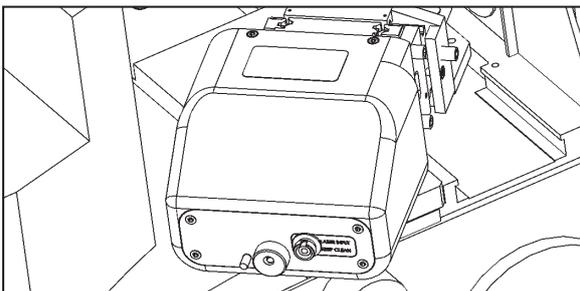
The Motor Module fits with a circular dovetail. Insert the Motor Module in the orientation shown.



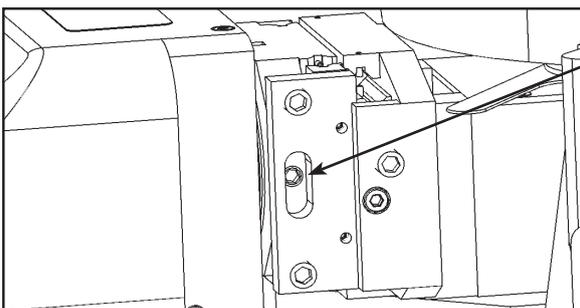
Hold the Motor Module in position and tighten the locking screw shown, until the Motor Module is held securely.

Locking screw

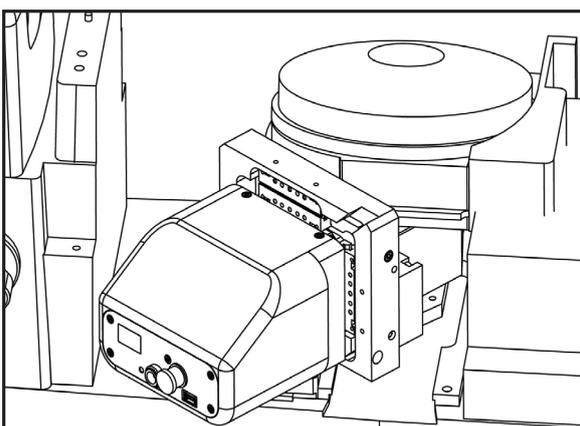
Microscopes with X-Y Stage (angled Mirror Module)



The Mirror Module and Motor Module fit in the same way as for the straight module, with the exception that the module is angled at 45° towards the front, and that the locking screw is on the rear side of the Motor Module.



Locking screw

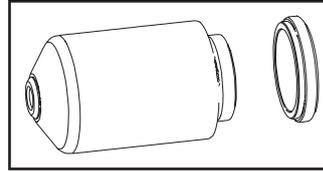


Mirror Modules for Nikon Ti2 use a different adjustment assembly. See Leica DMIRB/DM13000B Module on page 71 for adjustment instructions

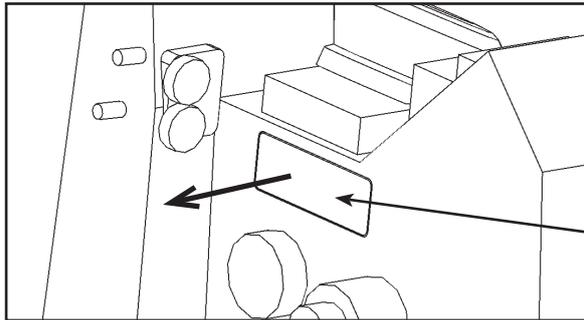
Leica DMIRB (Active)

Objective

An adaptor is required as shown.

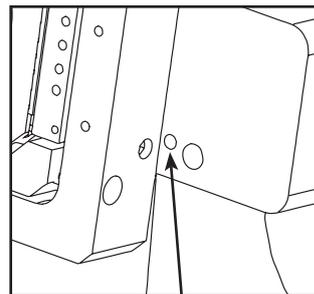
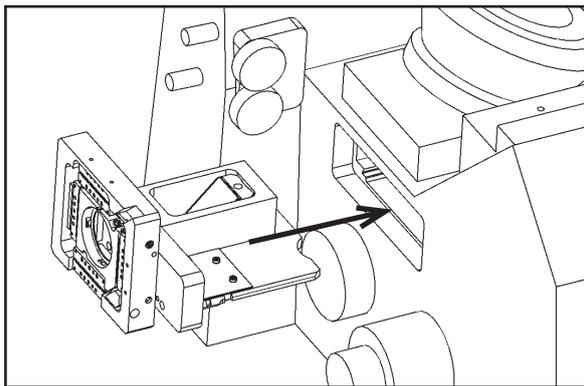


Mirror Module

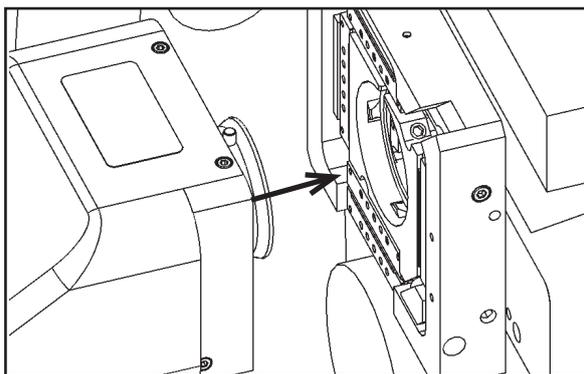


Remove the plastic cover from the fluorescence cassette mount on the left hand side of the microscope. Slide the Mirror Module into the fluorescence cassette mount and tighten the locking screw.

Plastic cover

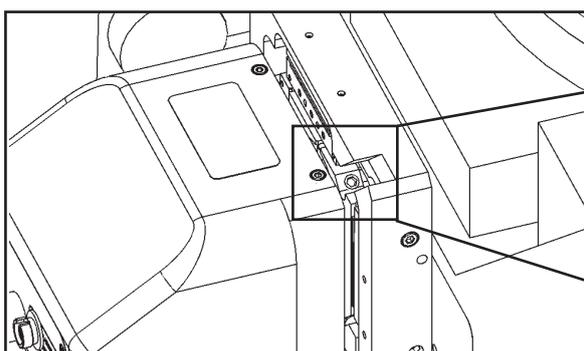


Locking screw



The Motor Module fits with a circular dovetail. Insert the Motor Module in the orientation shown.

Hold the Motor Module in position and tighten the locking screw shown, until the Motor Module is held securely.



Locking screw



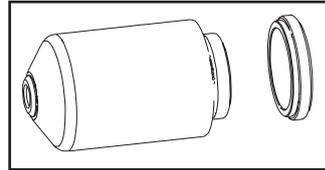
Section 7

Leica DMI3000B (Active)

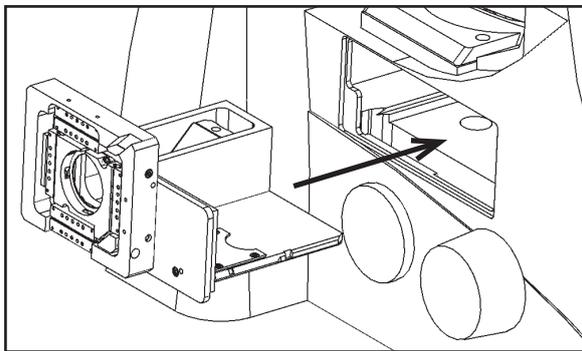
Note: The Saturn 5 Laser System can only be fitted to fluorescence capable DMI3000Bs supplied after December 2007, and to non-fluorescence DMI3000Bs only if they have a removable cover on the right hand side. It cannot be fitted to earlier models.

Objective

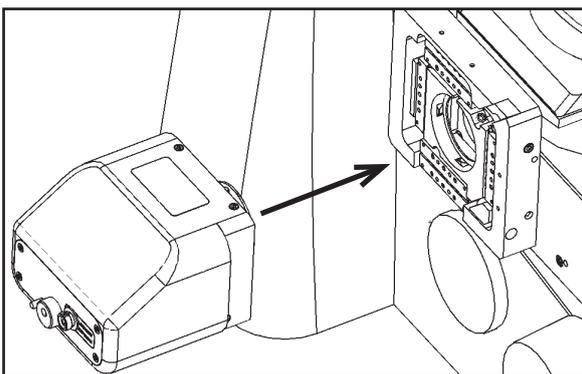
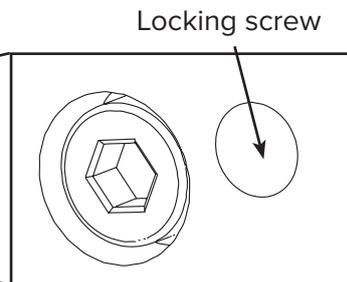
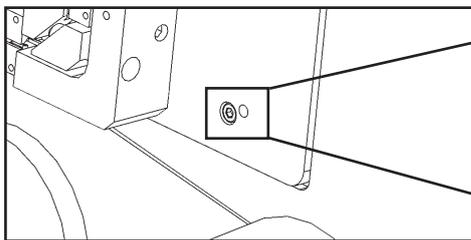
An adaptor is required as shown.



Mirror Module (Fluorescence Stand)

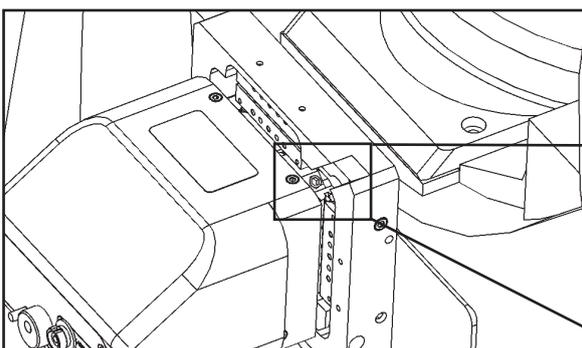


Remove the plastic cover from the fluorescence cassette mount on the left hand side of the microscope. Slide the Mirror Module into the fluorescence cassette mount until it clicks into position. Then gently tighten the locking screw.

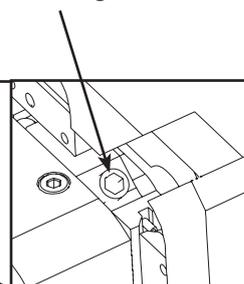


The Motor Module fits with a circular dovetail. Insert the Motor Module in the orientation shown.

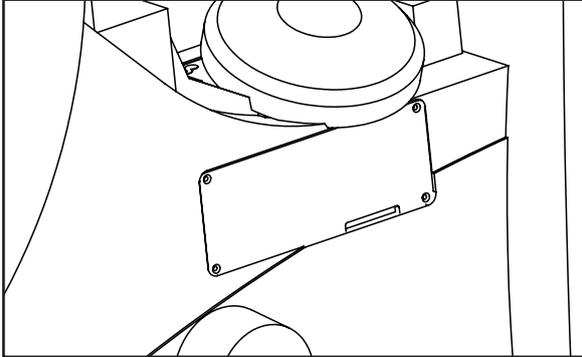
Hold the Motor Module in position and tighten the locking screw shown, until the Motor Module is held securely.



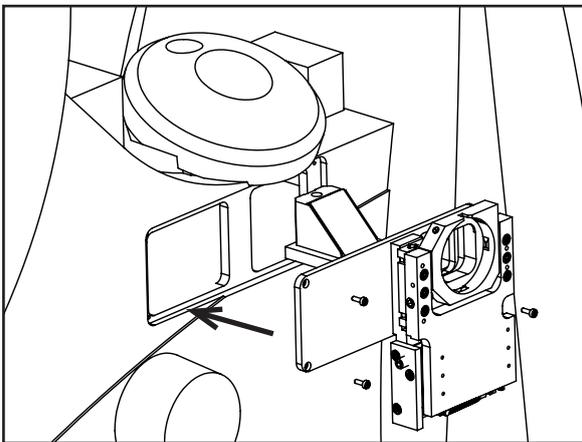
Locking screw



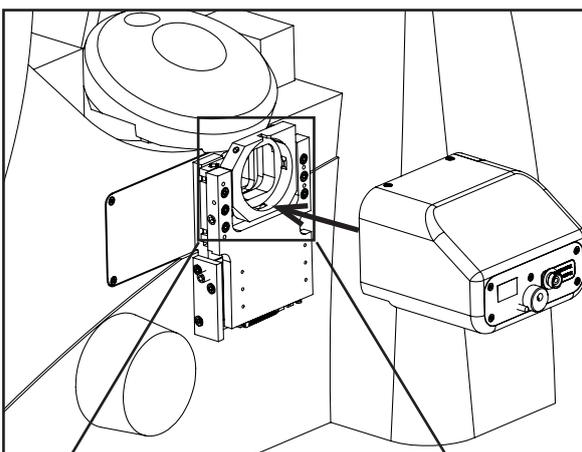
Mirror Module (Non-fluorescence Stand)



Undo the four screws and remove the cover from the right hand side of the microscope. Keep the screws and cover safe in case they need to be refitted in the future.

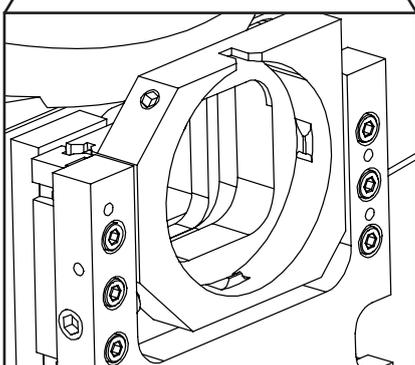


Insert the Mirror Module and secure with the three screws provided.



The Motor Module fits with a circular dovetail. Insert the Motor Module in the orientation shown.

Hold the Motor Module in position and tighten the locking screw shown until the Motor Module is held securely.



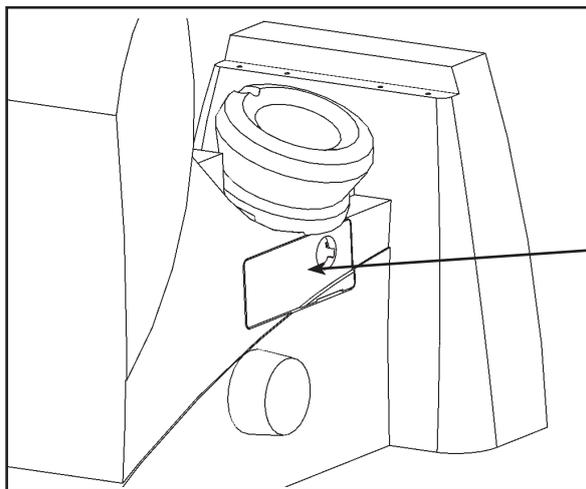
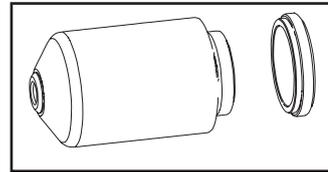
Section 7

Leica DMI4000B/6000B (Active)

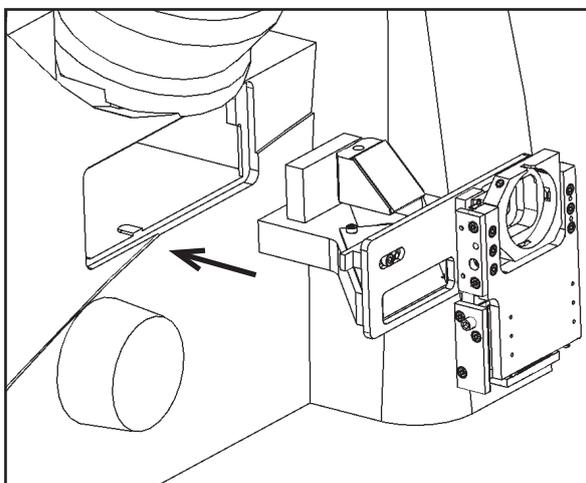
Objective

An adaptor is required as shown.

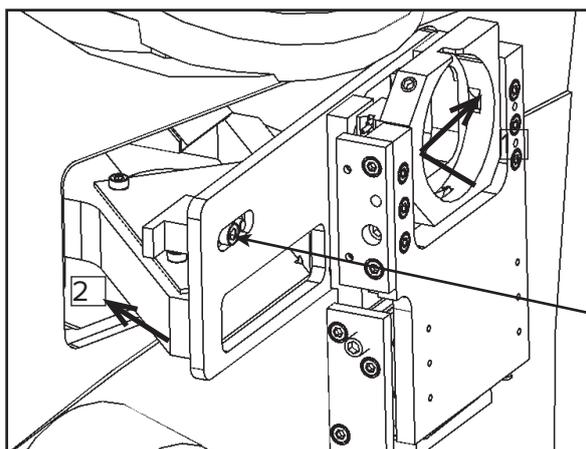
Mirror Module



Remove this panel from the microscope. There may be a weak glue holding it in place. Insert a small flat screwdriver in different places in the gap around the panel, and gently lever the panel. Consult your Leica distributor if you have any difficulty.

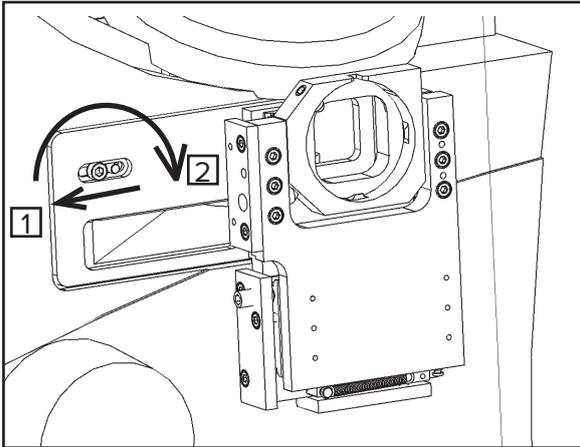


Insert the Mirror Module.



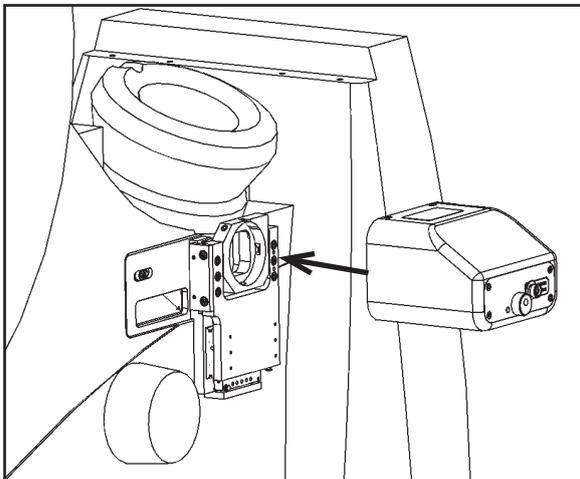
Move the lock to the right. Angle the module slightly as shown, hold the right hand side against the microscope and slide the module to the right. Then move the left hand side of the module into place.

Lock



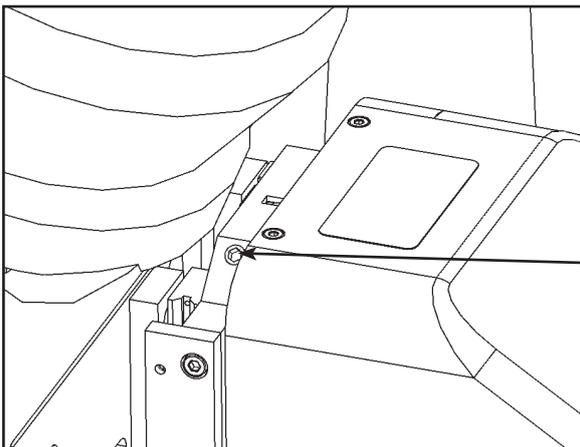
Use the blue-ended driver to slide the lock **1** to the left.

Push the driver firmly to the left **2** whilst tightening the screw .



The Motor Module fits with a circular dovetail. Insert the Motor Module in the orientation shown.

Hold the Motor Module in position and tighten the locking screw shown, until the Motor Module is held securely.



Locking screw

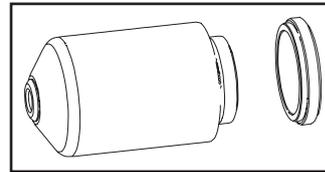


Section 7

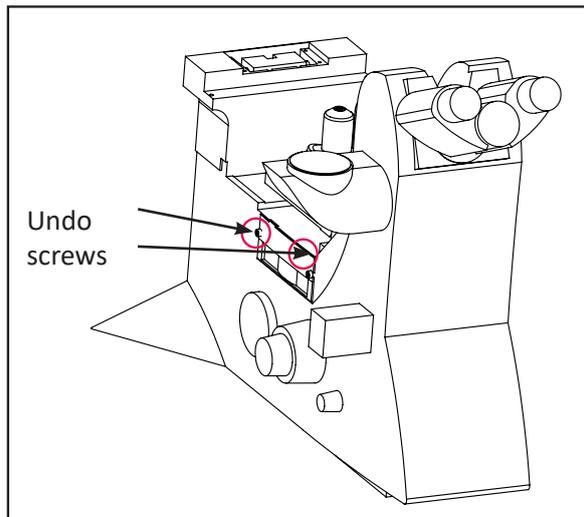
Leica DMI8 (Active)

Objective

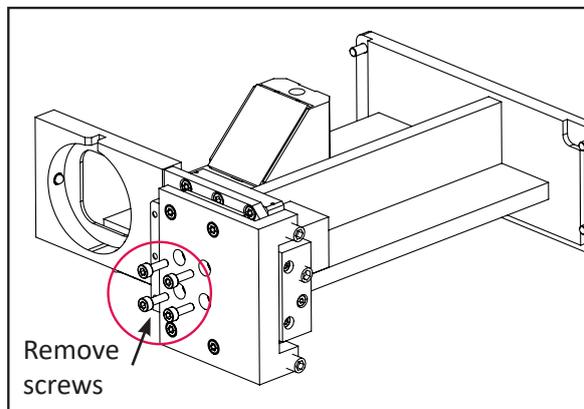
An adaptor is required as shown.



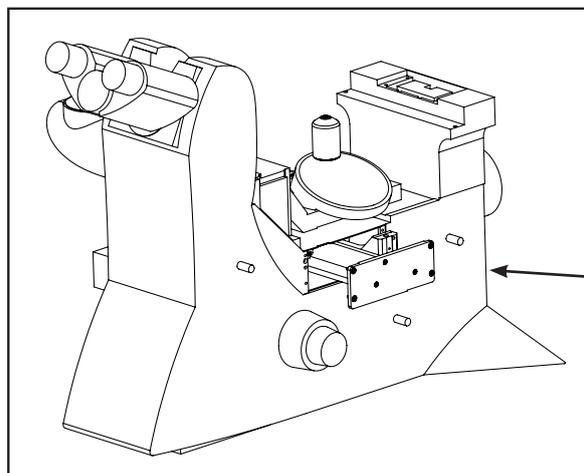
Mirror Module



Remove the fluorescence port covers (one on each side) by undoing and removing the screws. Keep the parts safe in case they need to be refitted in future.

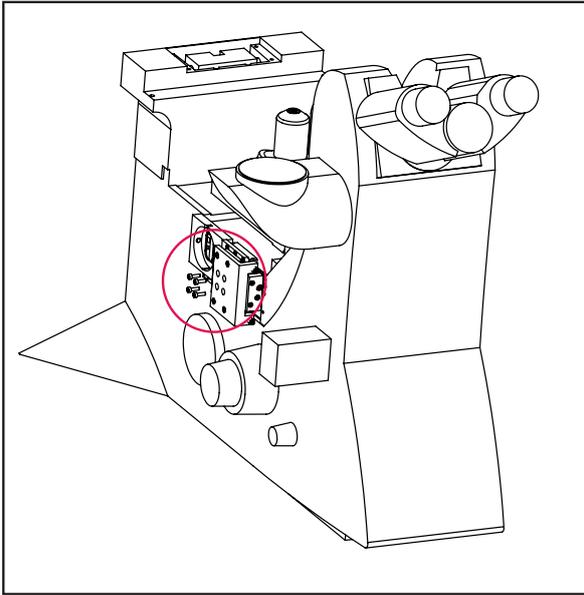


Separate the two halves of the Mirror Module by removing the four screws shown.

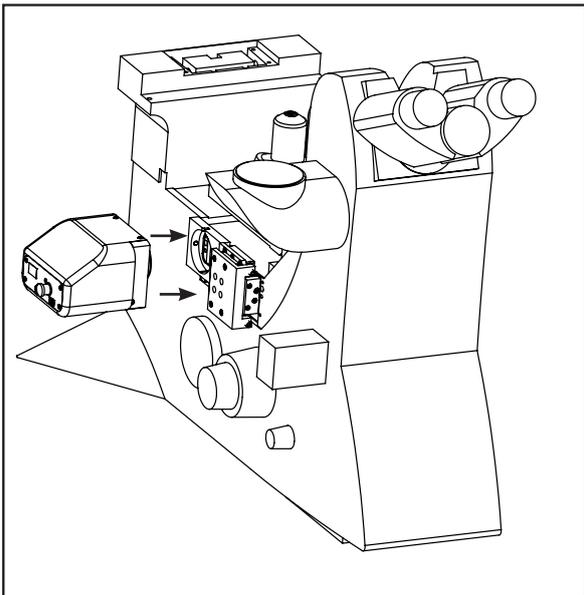


Slide the right-hand half of the Mirror Module into the opening in the microscope and secure using the four screws provided.

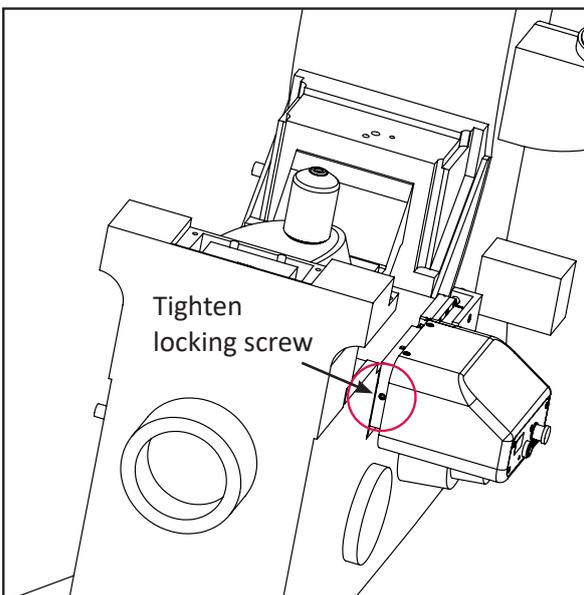
Slide and secure



Fit the left-hand half of the Mirror Module back onto its right-hand half.



The Motor Module fits with a circular dovetail. Insert the Motor Module in the orientation shown.



Hold the Motor Module in position and tighten the locking screw, as shown, until the Motor Module is held securely.



Section 7

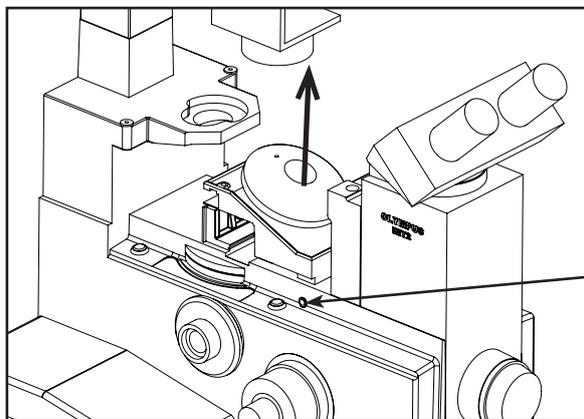
Olympus IMT2 (Active)

Objective

No adaptor required.

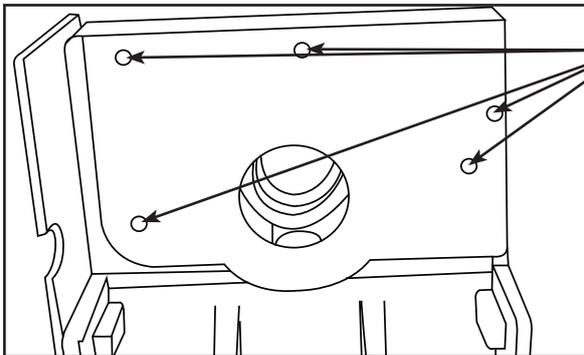
Modification to Microscope (optional)

For optimum focus and laser power transmission, a lens should be removed from the microscope before installation. Removing the lens will cause a reduction in image size of approximately 10%, but otherwise the microscope will work as normal. If the lens is left in place the system will work but longer pulse lengths may be required to achieve a given size of hole.

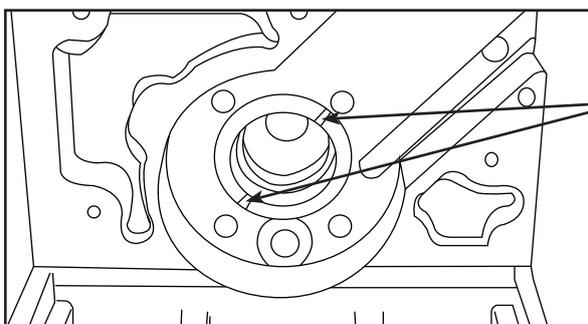


Remove the stage and turn the focus control down as far as it will go. Insert a 3mm hex driver into the hole shown and loosen the locking screw. Slide the nosepiece upwards and out of the microscope.

Locking screw



Undo the five small screws shown and remove the plate.



Unscrew the lens using the two slots and store safely for future refitting.

7

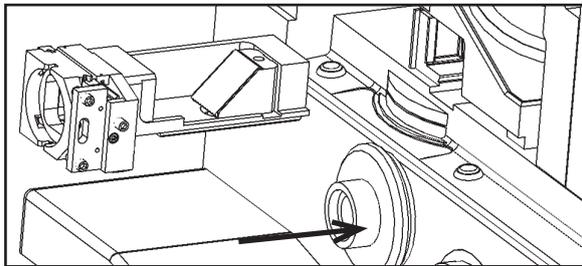
Fitting Objectives

Replace the black cover on the nosepiece, then fit the nosepiece to the microscope and tighten the locking screw. Fit the red Saturn objective into the nosepiece.

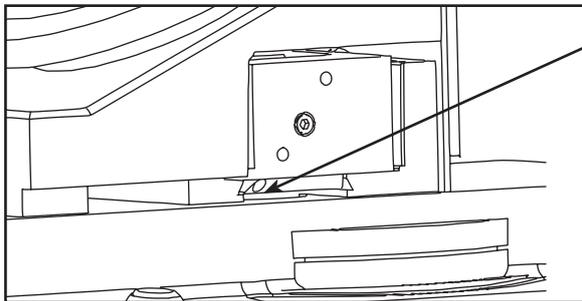
Focus on the surface of a Petri dish using the Saturn objective. Now refit the 40x Hoffman objective (if used). Refit the 20x, 10x and 4x objectives with the spacers provided. The 4x objective should be brought into focus by rotating the whole objective within the spacer. When it is in focus tighten the grub screw in the spacer to secure in position.

For the 20x and 10x objectives a selection of spacers is provided with slightly different thicknesses. Try each spacer in turn as necessary to find which one makes the objective parfocal with the Saturn objective.

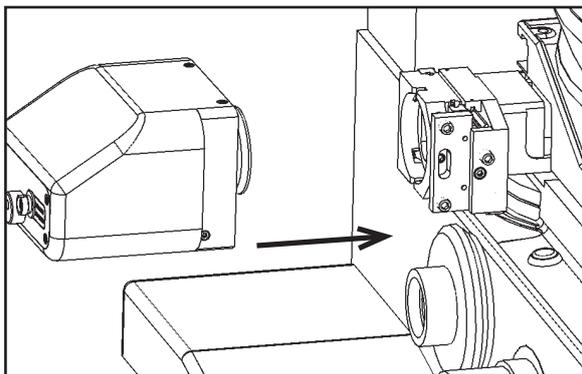
Mirror Module



Remove the plastic cover (if fitted) from the fluorescence mount underneath the nosepiece. Slide the Mirror Module into the fluorescence mount from the left hand side. The module will click into position. Now tighten the locking screw from the right hand side.

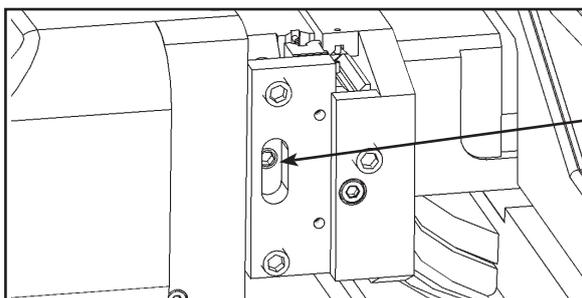


Locking screw



The Motor Module fits with a circular dovetail. Insert the Motor Module in the orientation shown.

Hold the Motor Module in position and tighten the locking screw shown, until the Motor Module is held securely.



Locking screw



Section 7

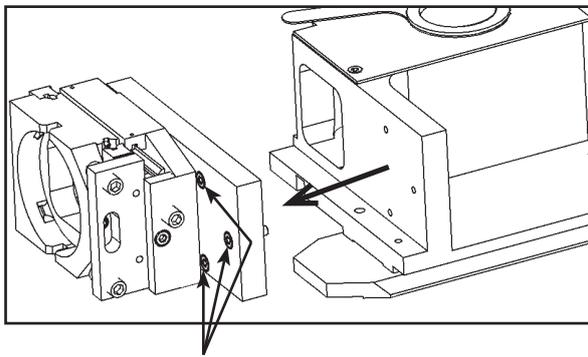
Olympus IX50/70 (Active)

Objective

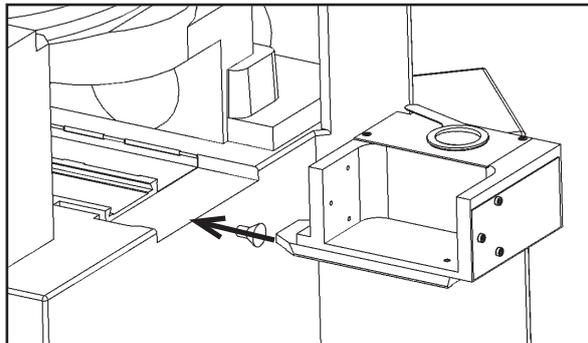
No adaptor required.

Mirror Module Left hand mounting (for stages with right hand X-Y control)

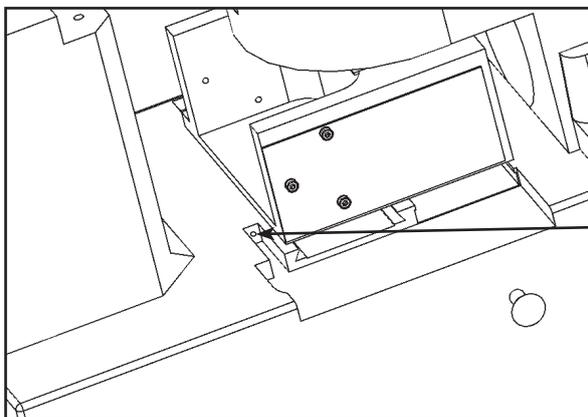
Remove the plastic cover from the fluorescence cassette mount underneath the objective. Remove the protective tape from the top of the Mirror Module.



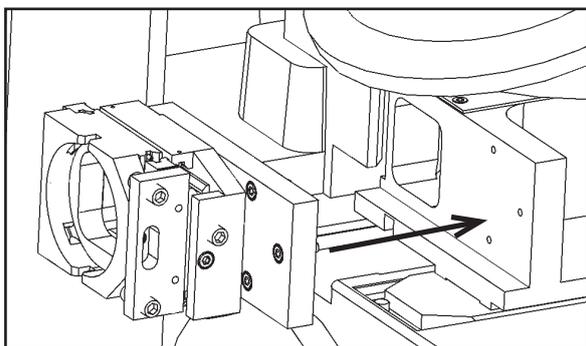
Remove the adjustment assembly from the Mirror Module by undoing the three screws shown above.



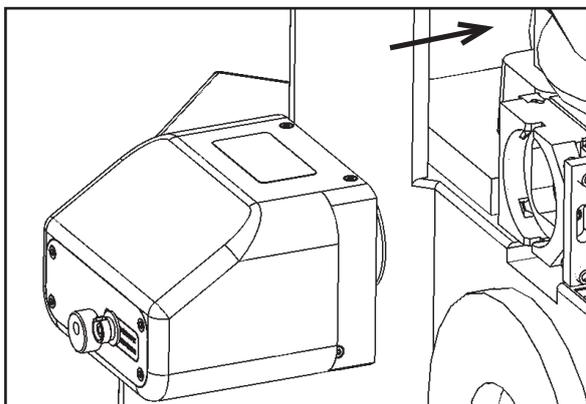
Slide the Mirror Module into the fluorescence cassette mount from the right hand side. Hold the Mirror Module against the stop and tighten the locking screw.



Locking screw

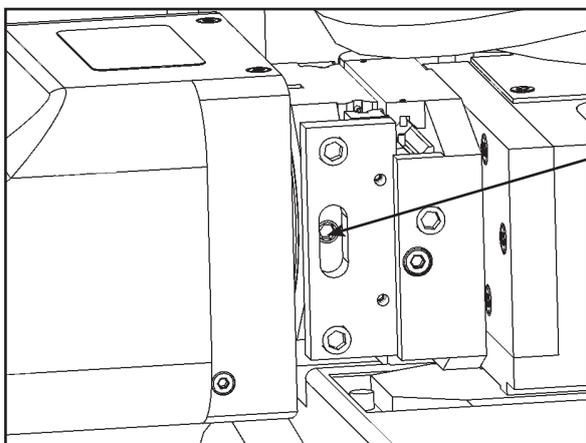


Fit the adjustment assembly back onto the Mirror Module.



The Motor Module fits with a circular dovetail. Insert the Motor Module in the orientation shown.

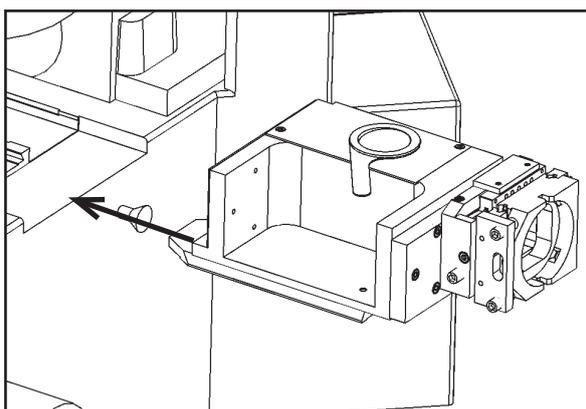
Hold the Motor Module in position and tighten the locking screw shown, until the Motor Module is held securely.



Locking screw

7

Right hand installation (for stages with left hand X-Y control or Integra Ti)



Remove the plastic cover from the fluorescence cassette mount underneath the objective. Remove the protective tape from the top of the Mirror Module.

Fit the Mirror Module from the right hand side and tighten the locking screw. Insert and lock the Motor Module in the same way as for left hand mounting.

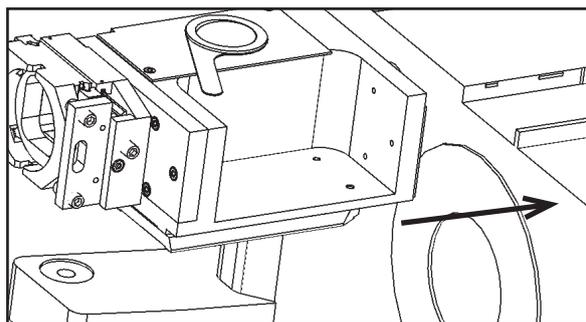
Section 7

Olympus IX51 / 71 / 81 (Active)

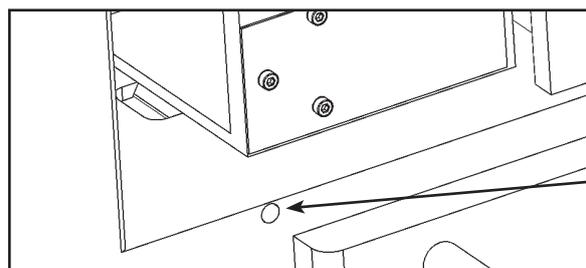
Objective

No adaptor required.

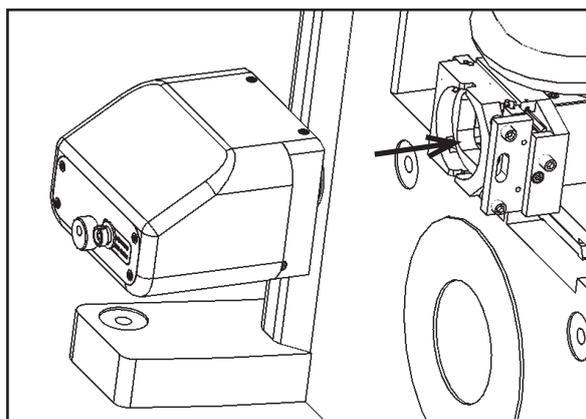
Mirror Module Left hand mounting (for stages with right hand X-Y control)



Remove the plastic cover from the fluorescence cassette mount. Remove the protective tape from the top of the Collimator Module. Slide the Mirror Module into the fluorescence cassette mount. Hold the Mirror Module against the stop and tighten the locking screw on the right hand side.

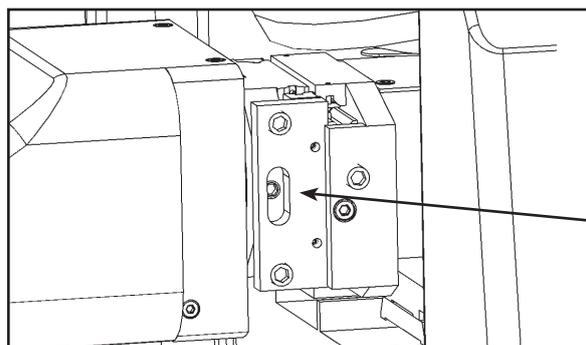


Locking screw



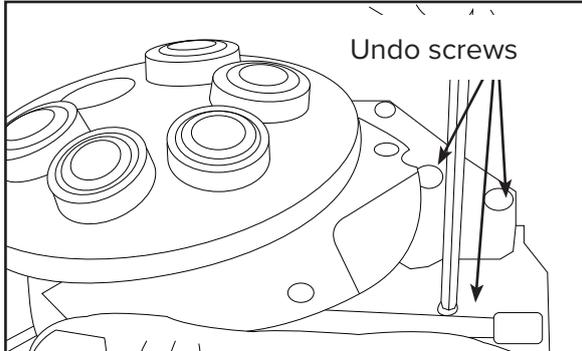
The Motor Module fits with a circular dovetail. Insert the Motor Module in the orientation shown.

Hold the Motor Module in position and tighten the locking screw shown, until the Motor Module is held securely.



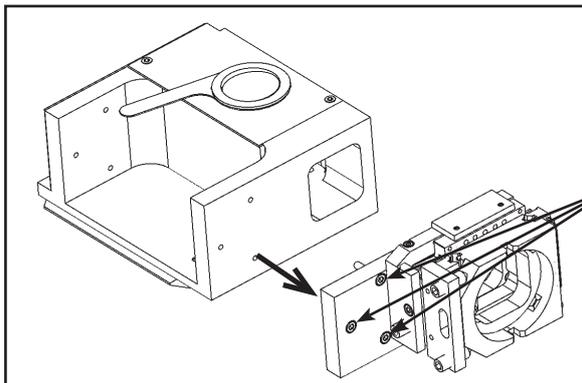
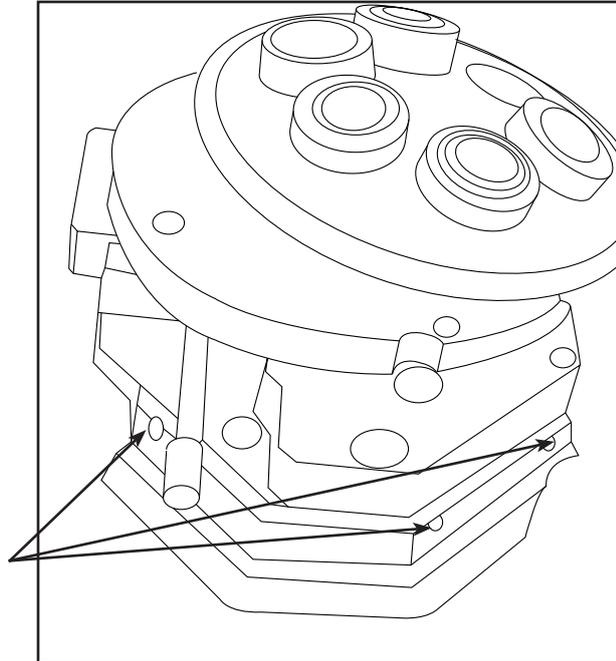
Locking screw

Right Hand Fitting

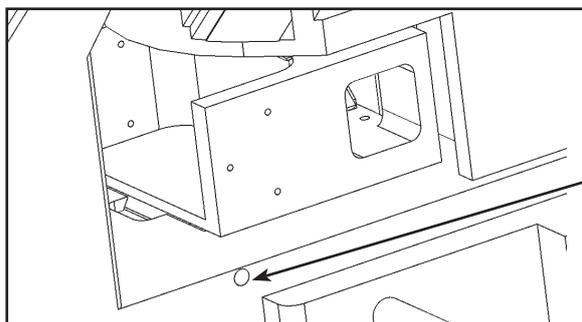


The spill deflector on the nosepiece must be removed to allow the Mirror Module to fit. Undo the three screws shown above and lift off the nosepiece.

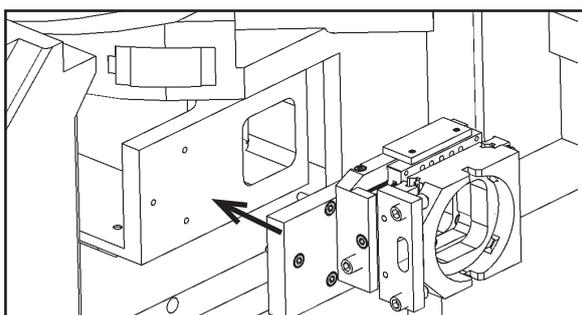
Undo the three small screws shown. The deflector is attached with sealant but a firm pull will remove it without damage. Keep the parts safe so they can be refitted in future.



Remove the adjustment assembly from the Mirror Module by undoing the three screws shown.



Slide the Mirror Module into the fluorescence cassette mount from the right hand side. Hold the Mirror Module against the stop and tighten the locking screw.



Fit the adjustment assembly back onto the Mirror Module.

Insert and lock the Motor Module in the same way as for left hand mounting.



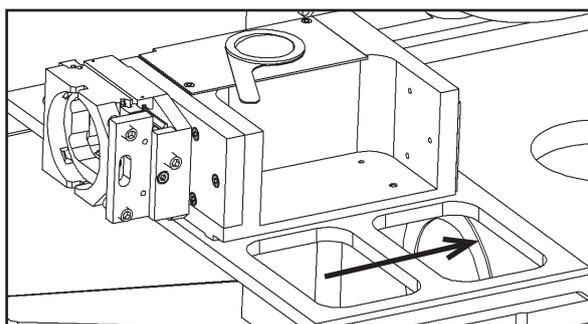
Section 7

Olympus IX53/73/83 (Active)

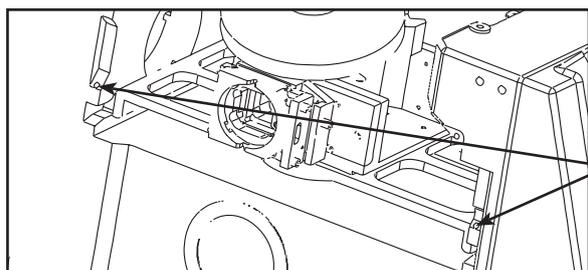
Objective

No adaptor required.

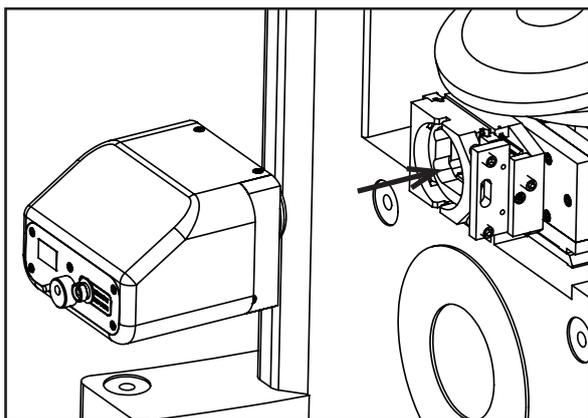
Mirror Module



Remove the plastic cover from the fluorescence cassette mount. Remove the protective tape from the top of the Collimator Module. Slide the Mirror Module into the fluorescence cassette mount. Hold the Mirror Module against the stop and tighten the locking screws on the left hand side.

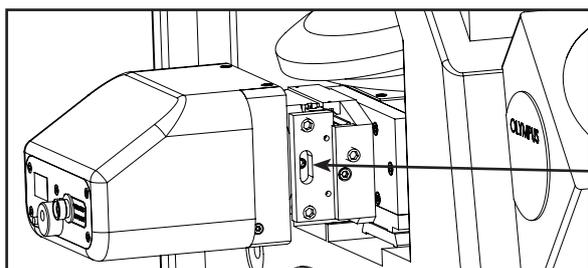


Locking screw



The Motor Module fits with a circular dovetail. Insert the Motor Module in the orientation shown.

Hold the Motor Module in position and tighten the locking screw shown, until the Motor Module is held securely.



Locking screw



SECTION 8 - PATCH LEAD

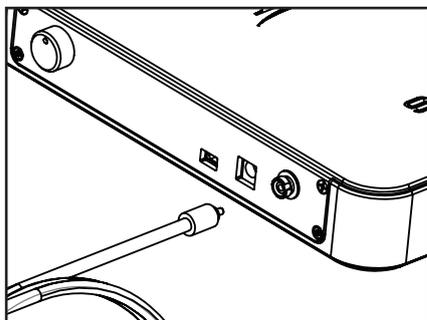


The fibre optic connectors must be kept absolutely clean. Do not touch the white tip of the connector. Any dirt, oils from the skin, etc can severely reduce the power transmitted through the fibre.

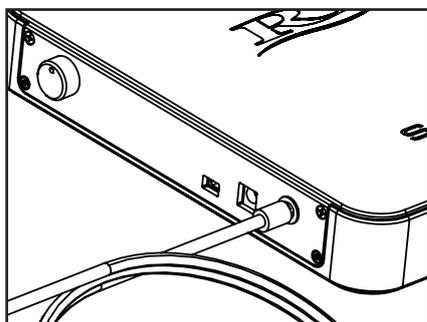


The patch lead must be laid carefully between the Control Unit and the microscope, avoiding kinks, sharp corners or anything that might damage the outer sheath.

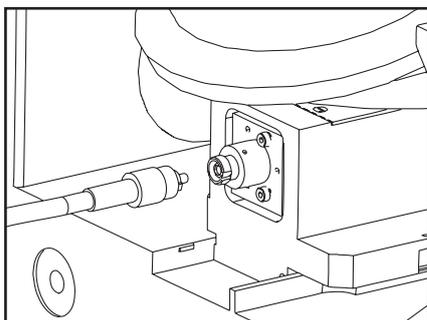
A fibre optic cleaning kit is available from RI. Please contact the sales team for details.



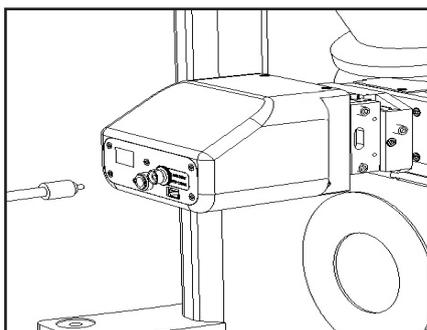
Remove the red plastic cap from the Control Unit laser output. Keep this cap safe for future use. The end of the patch lead that is matched to the Control Unit is identified by the serial number label. Pull the black plastic cap from this end of the patch lead. Align the square key with the slot in the connector.



Push the patch lead connector into place and tighten the collar. The collar will move freely at first then slight resistance will be felt. Continue turning gently for half to one turn until there is greater resistance. Stop turning at this point. Do not try to tighten further.



Now remove the red plastic cap from the Mirror Module or the Motor Module (Active only) and fit the other end of the patch lead in the same way.



SECTION 9 - SOFTWARE INSTALLATION

Installing RI Viewer

It is recommended that all other applications are closed before installing RI Viewer. Download a copy of the RI Viewer Installation folder before attempting the installation. The installation folder can be downloaded from,

<http://software.research-instruments.com/>

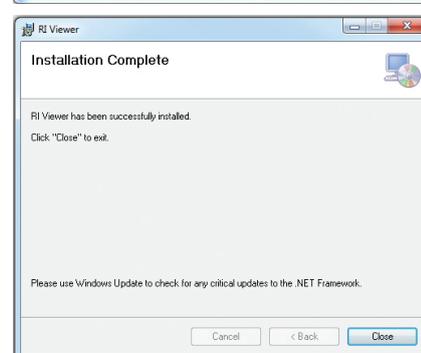
Extract the contents of the ZIP to a folder and copy onto a suitable medium, for example a USB memory drive. Insert the drive into the PC and allow it to run. After a moment or two the setup screen is displayed.

Click **Install RI Viewer**.

The Research Instruments end user licensing agreement is displayed. Please read all the text before clicking the **I agree** box and click **Next** to continue.

You may see a Windows message asking you to confirm that you want to install this software. Accept the installation: RI software is safe to install.

The progress of the installation will be displayed, followed by the completion screen.



USB Dongle

(Install RI Viewer BEFORE inserting the dongle)

RI Viewer software is protected by a hardware dongle. The dongle should be plugged into a USB socket on your computer, and must be left in place in order to use RI Viewer.

If the dongle is not present the application will not start.

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Note: Please look after the dongle. If lost or damaged, replacements may be charged at the full price of the software.

The software driver for the dongle is installed on the PC as part of the installation of RI Viewer.

Digital Cameras

Drivers for RI digital cameras are installed as part of the RI Viewer installation process. Connect the camera to a USB port on the computer. RI digital cameras are powered from the USB port, so no external power supply is required.

Saturn Control Unit

Drivers for the Saturn Control Unit are also installed as part of the installation of RI Viewer. Connect the Control Unit to the PC with the supplied USB cable.

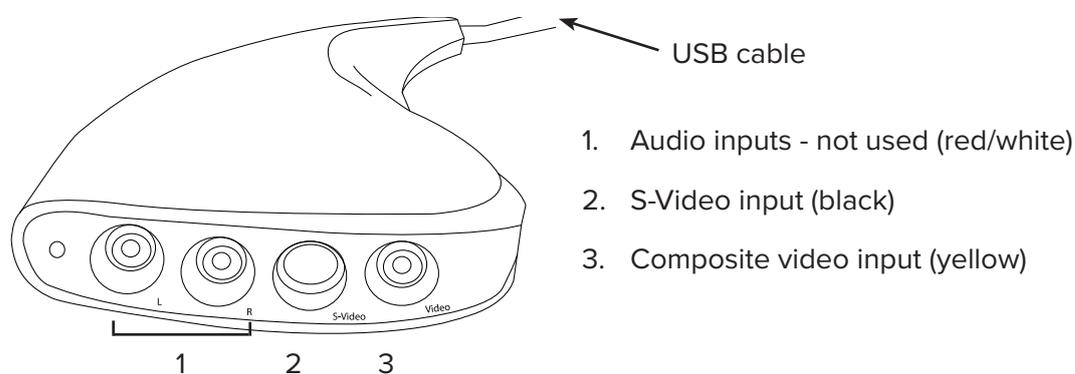
SECTION 10 - VIDEO CONVERTOR INSTALLATION

USB Video Convertor (for analogue cameras)

An analogue to USB video convertor can be supplied by CooperSurgical to enable an analogue camera to connect to a PC.

Installing USB Video Convertor

The convertor may look different to this, but the connections will be the same.



Connect the camera to its power supply, and connect the output to an S-Video or composite video port on the video convertor.

The driver is installed separately to RI Viewer.



Click **Install Dazzle Camera Drivers** from the installer.

Connect the USB cable to a USB2 port on the computer.

Windows will recognize the USB Video Convertor and will configure the driver for the device.

Section 11

SECTION 11 - INSTALLATION - STARTING RI VIEWER

RI Viewer Software

The RI Viewer application is started by clicking the icon on the desktop.



Alignment

The laser positioning system must be calibrated before the laser can be fired. Using the red Saturn objective, focus on the top surface of a clean Petri dish.

1. Click on Laser Control  on the toolbar. If the laser has not been aligned the Laser Target Alignment will start automatically.
2. Follow the on screen instructions.

Once Target Alignment has been completed, it can be accessed again by clicking **Laser Settings**, then **Align Laser** and finally clicking the **Target Alignment** button. This process is the same as the initial Target Alignment.

SECTION 12 - PARFOCAL LENSES

When a specimen is viewed through a microscope, it is easier to begin viewing under a lower magnification to get a broad view. This will help the operator determine where to centre the dish is in order to select a higher magnification. For this reason, it is ideal for the objectives to be set up in such a way that the specimen remains in focus when switching to a higher or lower magnification level.

Parfocaling your Saturn Laser Objective

1. If you are using a Hoffman system ensure that it is set up correctly on the microscope. Please refer to manufacturers guidance.
2. Place the stage micrometer onto the stage of the microscope.
3. Starting with a high magnification lens, use the coarse focus control on the side of the microscope to bring the stage micrometer into focus.
4. Turn the nosepiece to select the Saturn Laser objective.
5. Make a note of the fine adjustment measurement.
6. Use the fine adjustment knob to bring the stage micrometer into focus with the Saturn Laser objective.
7. Make a note of the amount the objective has been raised or lowered by reading the measurements on the fine adjustment knob.
8. If the objective has had to be raised, add shims to the value of the reading on the fine adjustment knob. See step 10.
9. If the objective has had to be lowered, remove shims to the value of the reading of the fine adjustment knob. See step 10.
10. To add or remove shims, remove the Saturn objective from the nosepiece. Unscrew the housing with the tool provided taking care not to drop any of the internal parts. Place or remove shims equal to the measurement on the fine adjustment. Replace the housing and tighten with the tool provided.
11. If shims have had to be added or removed from the Saturn laser objective, ensure that the thread on the housing is sitting correctly and the objective can be tightened fully without force using the tool provided.
12. Replace the Saturn laser objective back into the nosepiece and tighten.
13. Turn the nosepiece and select the same high magnification lens as in the beginning of the process.
14. Bring the stage micrometer into focus through the eyepiece. This should only require slight movement of the fine adjustment knob.
15. Turn the nosepiece to bring the Saturn laser objective under the stage hole. To focus on the stage micrometer should take only slight movement of the fine adjustment knob.

SECTION 13 - LASER ALIGNMENT

Laser Alignment (Fixed)

This ensures that the laser beam operates along the centre of the objective to give optimum power transmission and beam shape. **Note:** This optimum position may not be at the exact centre of the field of view due to normal tolerances in the microscope components.

This procedure is normally performed once on installation and should require no further adjustment. The collimator should only be readjusted if the pilot laser spot appears to have moved from the position of the target.

Before adjusting the collimator ensure that the red Saturn objective is in position. Any magnification changer on the microscope must be in the 1x position and all port selectors must be in the required position for use.

Place a clean Petri dish on the microscope stage. Switch on the microscope light source, then focus on the bottom of the dish. It may help to make a light scratch on the bottom of the dish to find the correct side.

Adjust the pilot laser knob to 3/4 of a turn. The pilot laser knob is located on the rear of the Control Unit "Hardware Overview" on page 8 Do not go over the 3/4 of a turn unless the unit has been switched on for at least 20 minutes.

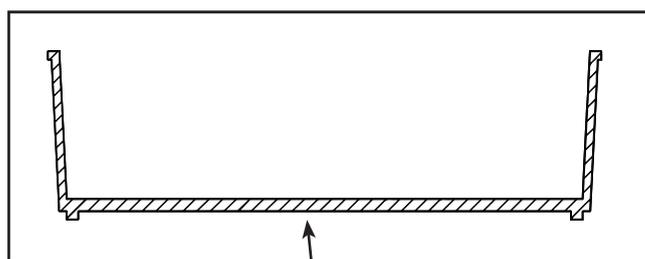


In RI Viewer, click **Laser Control**  on the toolbar.

Click Next, then the pilot laser will be switched on and will appear as a spot of red light on the screen. At this point do not click anything else in RI Viewer.

 Do not use the pilot laser with an embryo in the field of view.

 Before proceeding, check that the camera image is precisely in focus with the image in the eyepieces. Adjust the camera or camera mount if necessary. A misaligned camera may cause the centre of the drilled hole to be above or below the focal plane.



Focus on this side

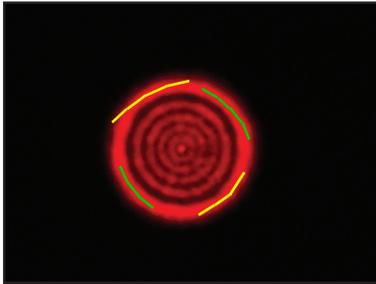
If the spot is not visible remove one eyepiece. Look down the eyepiece tube taking care to align your eye to the optical centre line (see next page). Adjust the Collimator Module as described below to move the red beam close to the centre. Now replace the eyepiece.

Reduce (or switch off) the microscope illumination to enable the pilot laser to be seen more clearly, adjust the pilot laser brightness if required.

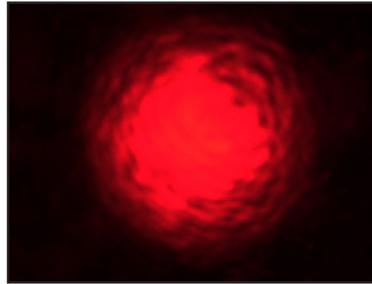
Use the fine focus control to move the focus upwards slightly. The red spot will spread into a series of concentric rings (this is the Alignment Pattern).

The following sections show correct appearance of the Alignment Pattern, and How to Adjust this if required.

Alignment Pattern



40 x Objective

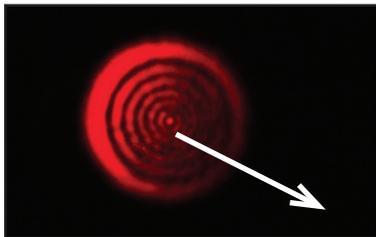


20 x Objective

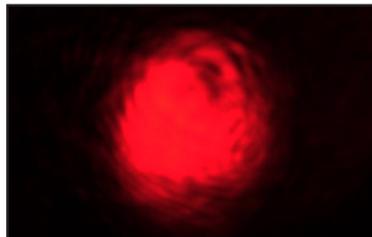
Good alignment - pattern has symmetrical brightness. Areas highlighted in yellow are slightly brighter than the areas highlighted in green. This is a normal effect. The important point is that the pattern is symmetrical.



The ring pattern must be adjusted correctly before attempting to ablate a specimen. If the ring pattern does not appear as above then the laser beam will not be correctly focussed. This may lead to embryo damage.

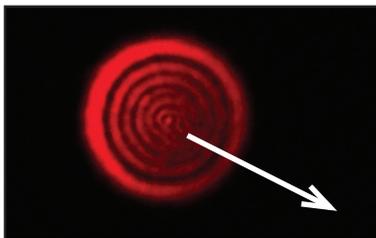


40 x Objective

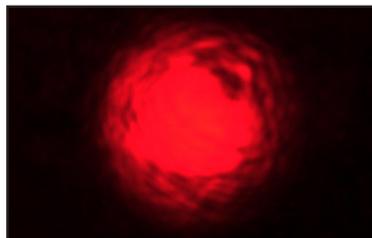


20 x Objective

Poor alignment - pattern is much brighter on one side. Use the adjustment screws to move in the direction shown. It may be necessary to loosen the locking screws further if the adjustment screws become tight. See “How to Adjust (Fixed)” below.



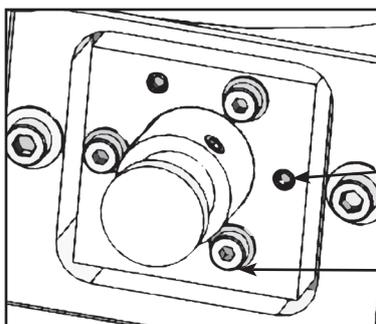
40 x Objective



20 x Objective

Nearly aligned - the pattern is still a little brighter on one side. Use the adjustment screws to move the pattern a little further. It may be necessary to loosen the locking screws further if the adjustment screws become tight.

How to Adjust (Fixed)



When the pattern is correctly aligned tighten the three locking screws gently and equally to prevent movement of the collimator. Check that the ring pattern is still correctly aligned.

Locking screw (orange driver)

Adjustment screw (yellow driver)

If, once adjusted, the pattern is not at the centre of the field of view, and the Collimator Module has a lateral adjustment, then it can be adjusted to move the pattern closer to the centre. Then repeat the adjustment above.

Laser Alignment (Active)

This ensures that the laser beam operates along the centre of the objective to give optimum power transmission and beam shape. **Note:** This optimum position may not be at the exact centre of the field of view due to normal tolerances in the microscope components.

This procedure is normally performed once on installation and should require no further adjustment. The collimator should only be readjusted if the pilot laser spot appears to have moved from the position of the target.

Before adjusting the collimator ensure that the red Saturn objective is in position. Any magnification changer on the microscope must be in the 1x position and all port selectors must be in the required position for use.

Place a clean Petri dish on the microscope stage. Switch on the microscope light source, then focus on the bottom of the dish. It may help to make a light scratch on the bottom of the dish to find the correct side.

Adjust the pilot laser knob to 3/4 of a turn. The pilot laser knob is located on the rear of the Control Unit (See “Hardware Overview” on page 8). Do not go over the 3/4 of a turn unless the unit has been switched on for at least 20 minutes.

In RI Viewer, click **Laser Control**  on the toolbar.

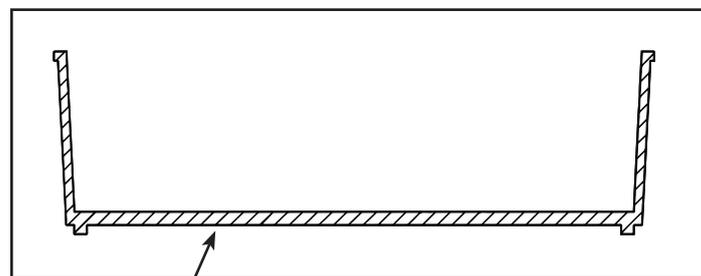
If the system has been started for the first time, click Next and the Saturn Motor Module Self Test will continue automatically.

Click Next, then the pilot laser will be switched on and will appear as a spot of red light on the screen. At this point do not click anything else in RI Viewer.



 Do not use the pilot laser with an embryo in the field of view.

 Before proceeding, check that the camera image is precisely in focus with the image in the eyepieces. Adjust the camera mount if necessary. A misaligned camera may cause the centre of the drilled hole to be above or below the focal plane.



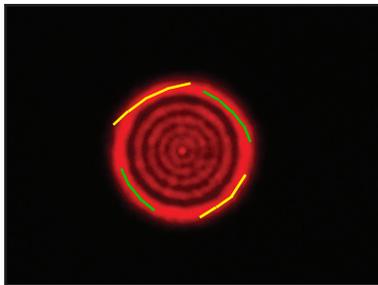
Focus on this side

Reduce (or switch off) the microscope illumination to enable the pilot laser to be seen more clearly, adjust the pilot laser brightness if required.

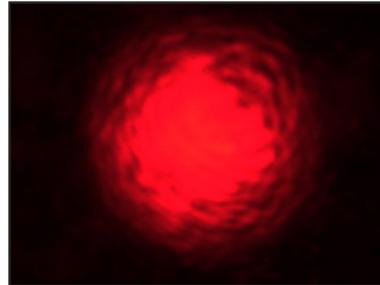
Use the fine focus control to move the focus upwards slightly. The red spot will spread into a series of concentric rings (this is the Alignment Pattern).

The following sections show correct appearance of the Alignment Pattern, and How To Adjust this if required. If adjustment is not required proceed to “How to Check Laser Target Alignment” on page 69.

Alignment Pattern



40 x Objective

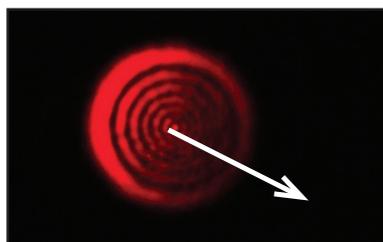


20 x Objective

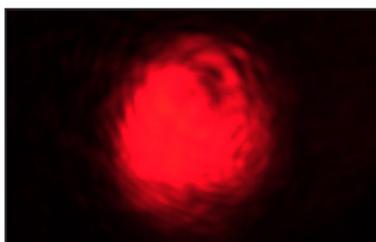
Good alignment - pattern has symmetrical brightness. Areas highlighted in yellow are slightly brighter than the areas highlighted in green. This is a normal effect. The important point is that the pattern is symmetrical.



The ring pattern must be adjusted correctly before attempting to ablate a specimen. If the ring pattern does not appear as above then the laser beam will not be correctly focussed. This may lead to embryo damage.

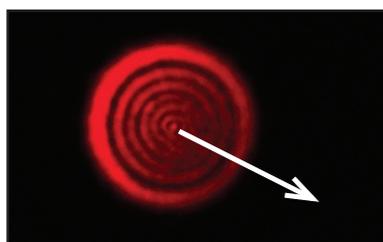


40 x Objective

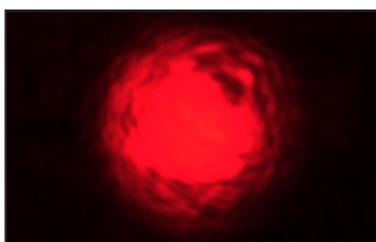


20 x Objective

Poor alignment - pattern is much brighter on one side. Use the adjustment to move in the direction shown (see "How to Adjust (Active)" below).



40 x Objective



20 x Objective

Nearly aligned - the pattern is still a little brighter on one side. Use the adjustment to move the pattern a little further.

How to Adjust (Active)

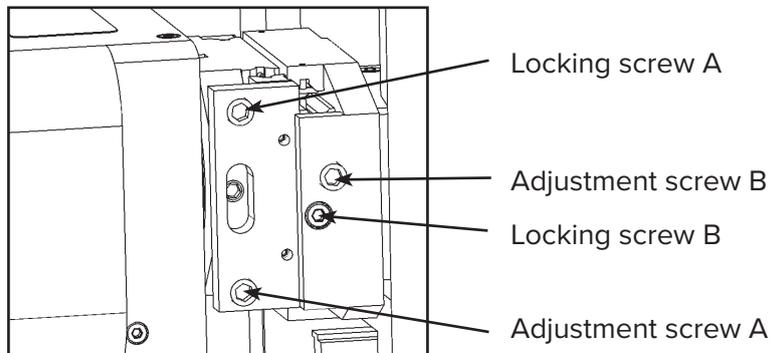
The adjustment mechanism has an adjustment screw and a locking screw for each direction of movement.

Loosen both locking screws by several turns, but do not remove them completely. Turn each adjustment screw as necessary to adjust the ring pattern. Gently tighten both the locking screws, checking that the ring pattern has not moved.

Section 13

Standard Left Hand Module

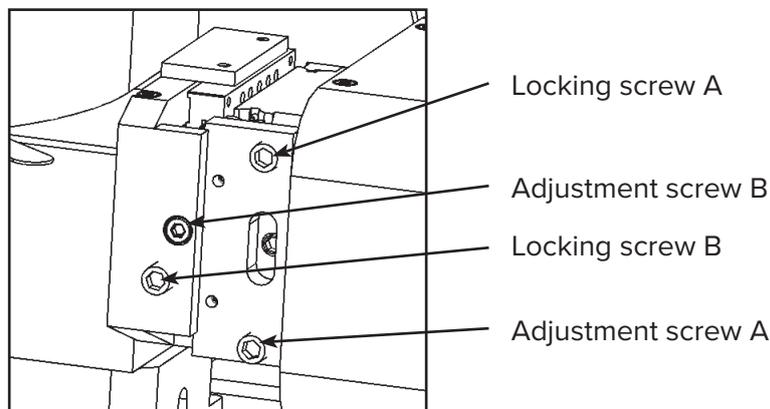
Zeiss Axiovert 100/200, Axio Observer, Nikon TMD, Diaphot 200/300, TE200/300, Ti2, Olympus IMT2, IX50/70, IX51/71/81, IX53/73/83



Standard Right Hand Module

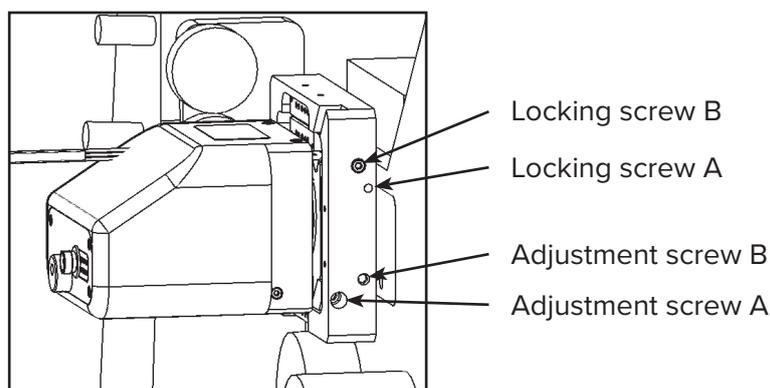
Zeiss Axiovert 100, Nikon TMD, Diaphot 200/300, TE200/300, TE2000/Ti*, Olympus IX50/70, IX51/71/81

*The angled TE2000/Ti module has the adjustment screws facing towards the back.

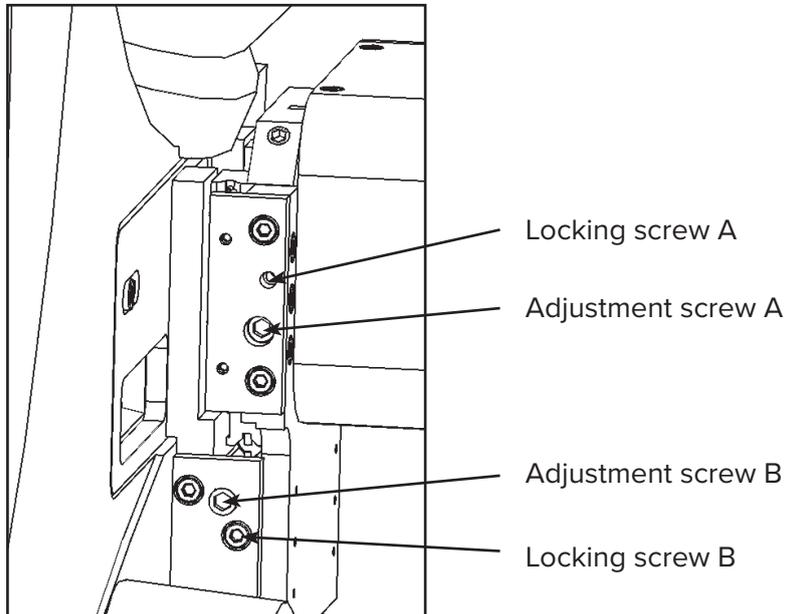


Leica DMIRB/DMI3000B Module

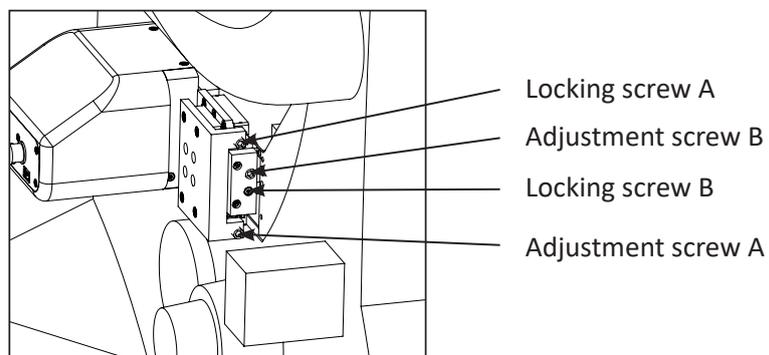
Also Nikon Ti2



Leica DMI4000B/6000B Module



Leica DMi8 Module



How to Check Laser Target Alignment

1. If not already in the Laser Target Alignment dialogue: Click the Laser Control icon  on the toolbar. If the system has been started for the first time, click Next and the Saturn Motor Module Self Test will continue automatically.
2. Follow the on screen instructions.
3. Once Target Alignment has been completed, it can be accessed again by clicking Laser Control, then Align Laser and finally clicking the Target Alignment button. This process is the same as the initial Target Alignment.

SECTION 14 - WARRANTY INFORMATION AND LIMITS ON LIABILITY

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CooperSurgical warrants that this item will be free from defects in materials and workmanship for one year from the date of installation. If CooperSurgical determines that the product fails to conform to that warranty during the one-year period, CooperSurgical will repair or replace the product, at CooperSurgical's discretion, free of charge.

To return the product to CooperSurgical, a customer must comply with CooperSurgical's Returned Goods Policy described in this manual and the warranty requires the customer to return the product to CooperSurgical in accordance with the CooperSurgical Returns Instruction. CooperSurgical will return products (that it repaired or replaced under warranty) to the same customer who returned those products, at CooperSurgical's expense F.O.B. the customer's facility. Under all other circumstances, CooperSurgical will return products to the same customer who returned those products at the customer's expense.

CooperSurgical's warranties do not cover damage caused by misuse, improper care, improper use of chemicals or cleaning methods, loss, theft, use of non-authorized parts, servicing by non-authorized personnel or negligent or intentional conduct on the part of the owner or user of the product, nor do they cover normal wear and tear or general maintenance. Any modifications or changes to a product will void that product's warranty. CooperSurgical's warranties do not apply to any single- or limited-use, disposable or consumable components or items.

CooperSurgical is not responsible for, and the owner and operator of the product shall defend, indemnify and hold harmless CooperSurgical from and against, all claims, damages, and other losses resulting from the improper servicing, maintenance, repair, use or operation of the product or the owner or operator's negligence or willful misconduct, and use of inadequate packing and packaging when returning product for repair.

The above warranties are in lieu of, and CooperSurgical hereby disclaims, all other warranties, express or implied, written or oral, with respect to CooperSurgical products, including the warranties of merchantability and fitness for a particular purpose. No terms, conditions, understandings or agreements that purport to modify the above warranties or that make any additional warranties for any CooperSurgical product shall have any legal effect unless made in writing and signed by an authorized CooperSurgical corporate officer.

CooperSurgical shall not under any circumstances be liable for lost profits, damages from loss of use or lost data, or indirect, special, incidental or consequential damages under its warranties or otherwise for any claim related to CooperSurgical products, even if CooperSurgical has been advised, knew or should have known of the possibility of such damages. CooperSurgical's liability with respect to a product covered by a warranty or otherwise shall be limited in all circumstances to the purchase price of that product.

SECTION 15 - RETURNING PRODUCT FOR REPAIR

Please refer to the 'Troubleshooting' section in this manual before returning product to CooperSurgical. If problems continue with the device, please follow these instructions:

Returned Goods Policy

Goods will be accepted for return for the following reasons:

- If shipment was made without the customer's authorization or order
- If incorrect items were shipped
- If defective items were shipped
- If defective goods are covered by the standard warranty

To return product, you must contact Customer Service for a Returned Merchandise Authorization (RMA) number. Items will not be accepted without an RMA number. Please have the following information:

- Reason you wish to return the goods
- Quantity, description, part number, serial number of the goods
- Date of receipt of order
- Customer's purchase order and the CooperSurgical or Origio invoice number

All used products must be cleaned and sterilized prior to shipment. A signed decontamination declaration may be required.

All products should be carefully and adequately packed, preferably in original packaging. Replacement items or additional repairs will be invoiced.

All packaging should be clearly labeled with the RMA number and statement "Urgent – Returned Items for Repair". If authorisation to return a product is granted you will be provided with a return address label.

Shipments must be sent prepaid by the customer and insured for their full value during shipping. Freight collect shipments will not be accepted, and goods will be returned to the sender.

If the customer intends to return equipment ordered in error, the following restocking charges and terms will apply:

- 25 percent within 60 days from date of shipment
- Goods must be returned unused, in the original carton, and in marketable condition
- Refurbishing and replacement charges will be added to the restocking charges for damaged or missing items
- No return after 60 days
- No refund on sterile, single-use disposable products

Customer Service Contact Details:

Tel: +45 46 79 02 02

Fax: +45 46 79 03 02

E-mail: sales@coopersurgical.com

fertility.coopersurgical.com

US only Customers Contact Details:

Tel: 800-243-2974

Fax: 800-262-0105

fertility.coopersurgical.com

Obligation to Inform

Any serious incident that has occurred in relation to this device should be reported to customer service and the competent authority of the Member State in which the user and/or patient is established. Please provide Customer Service with full details of the incident including any applicable serial numbers. In some instances, it may be necessary to return the device to the manufacturer to assist in their investigation of the incident.

Feedback

Thank you for purchasing an CooperSurgical product. To help CooperSurgical develop the best tools for ART, we rely on customer feedback. If you have any suggestions for how we can improve our products or the information we provide with them, please send them to Customer Service. Your feedback will help us develop the product and supporting materials to meet your future needs.

Thank you.

Disposal of Electrical and Electronic Equipment

CooperSurgical have taken the necessary steps to comply with the EC directive 2012/19/EU on waste electrical and electronic equipment (WEEE).



Environmental implications: WEEE contains materials that are potentially hazardous to the environment and to human health. Therefore, when this instrument has reached its end of life it must be collected and recycled separately from other waste according to national requirements. Please contact a local CooperSurgical distributor for instructions. Do not dispose of with 'normal' waste.

