

S0-5800

Ophthalmic Microscope



USER MANUAL

SCAN OPTICS

**SO-5800
MICROSCOPE**

**ASSEMBLY
AND OPERATOR'S
MANUAL**



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INTRODUCTION

Please read this manual carefully before installing and using the Scan Optics SO-5800 Ophthalmic microscope. Scan Optics is responsible for the safety, reliability and performance of the equipment only if it is used in accordance with these instructions.

This microscope is designed for use by a certified practitioner, for magnified observation of patients, and for use in an operating theatre as an observation aid during surgery.

Environmental storage and packing conditions of 60-95% relative humidity and 10-40 °C, are recommended for this product.

No parts or accessories supplied with this microscope are supplied in a sterile condition.

The only user-serviceable parts in this device are identified in this manual. Contact Scan Optics if any other parts fail.

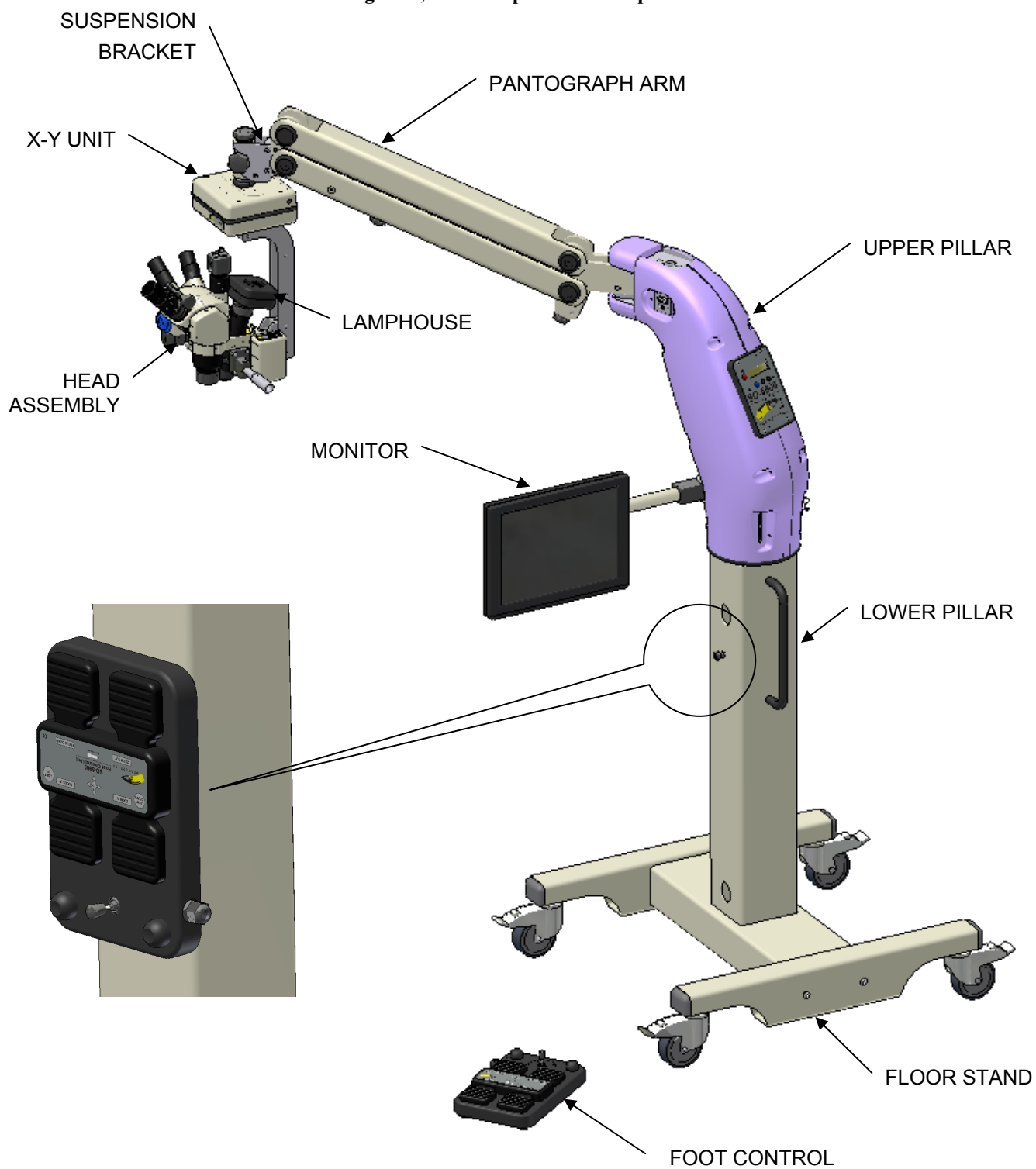
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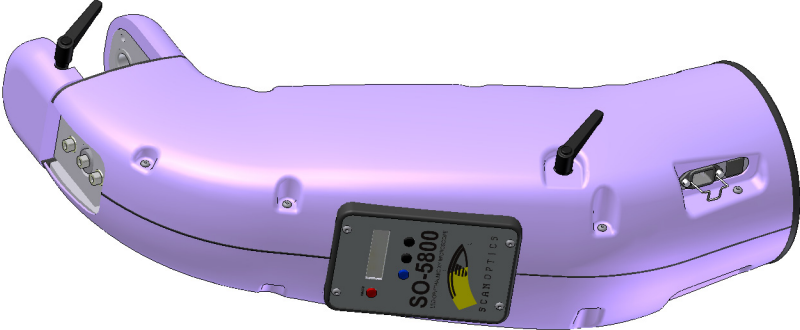
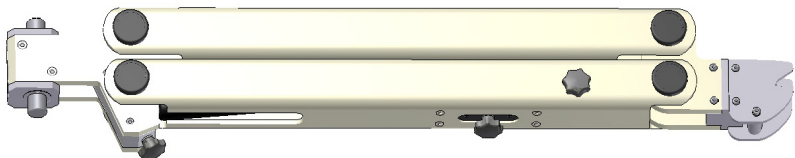
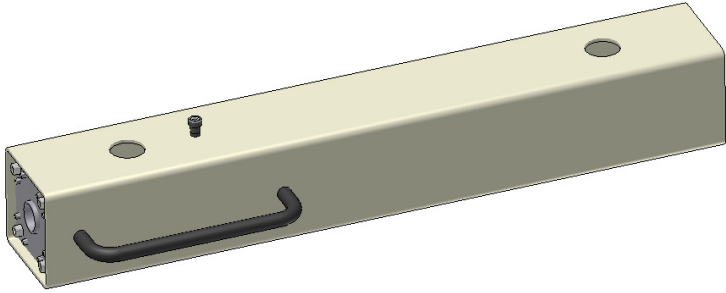
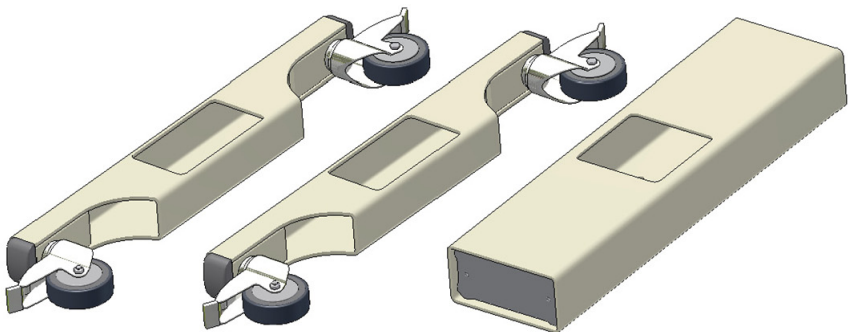
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Milton Keynes
MK13 0ZG
UNITED KINGDOM

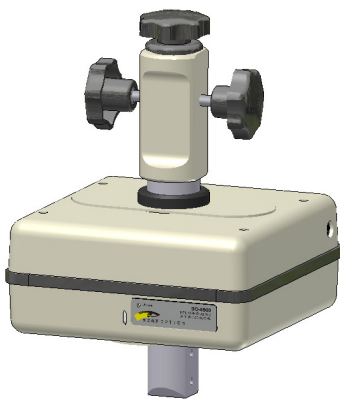
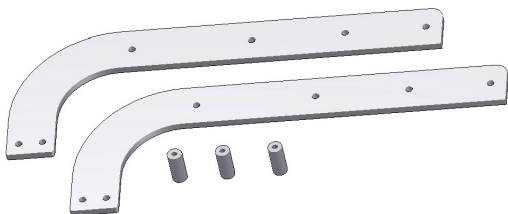

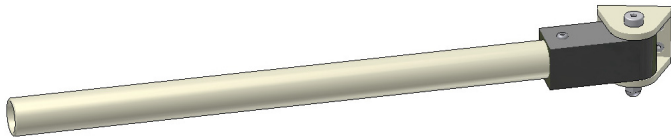

Figure 1, Microscope - main components



PACKING LIST

MAIN ASSEMBLIES



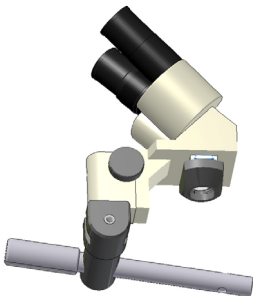

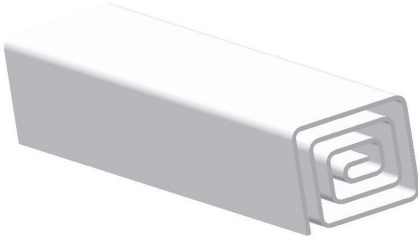

Upper pillar assembly	 A purple, L-shaped upper pillar assembly. It features a black control panel with a digital display and buttons, and a black handle on the side.
Pantograph arm assembly	 A yellow, horizontal pantograph arm assembly with multiple joints and a black handle at the end.
Lower pillar assembly	 A yellow, rectangular lower pillar assembly with a black handle on the side.
Floor stand components	 Three yellow floor stand components, each with a black handle and a black wheel at the end.

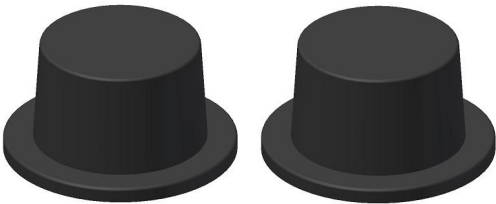
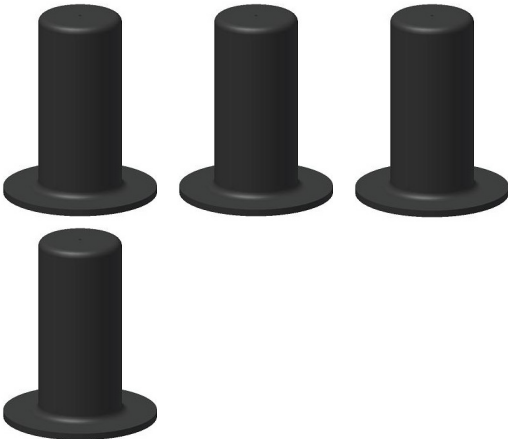

XY unit (packed in box)	
Suspension bracket and spacers	
Head assembly (packed in box)	
Monitor arm assembly	
Foot control (packed in box)	

CABLES

CABLE TYPE	APPLICATION	PACKED LOCATION
Microscope power cable	Connects between horizontal arm socket and XY unit	Pantograph arm
Mains cable	Connects mains power supply to IEC socket at pillar base	Accessories box
Video cable	Connects between video camera and monitor	Pantograph arm
Camera power cable	Connects between XY unit and camera power input	Monitor box
Monitor power cable	Connects between pillar and monitor power input	Monitor box
Foot control cable	Connects foot control to connector at pillar base	Hard-wired to foot control
Head power cable	Connects head assembly to head power socket on XY unit	Hard-wired to head assembly

ACCESSORIES

ITEM	DEPICTION	PACKED LOCATION
Monitor (with attached adapter)		Monitor box
Video camera (Watec 221S)		Monitor box
Binocular assistant microscope		microscope box
Assembly and Operator's manual	This manual	microscope box
Side handles x 2		microscope box
Microscope cover		microscope box
Zoom sterilisable covers (2)		microscope box

Focus sterilisable covers (2)		microscope box
Handle sterilisable covers (6)		microscope box
Allen key set	N/A	Tool box
Adjustable eyepieces X 2		Tool box
Cleaning cloth	N/A	Tool box

SCREWS

SIZE/NUMBER	APPLICATION	PACKED LOCATION
M8 x 70 socket head cap screw x 4	Attach top and bottom joiners over legs to make floor stand base assembly	Accessories box
M10 x 25 socket head cap screw x 4	Attach pillar and horizontal arm assembly to floor stand base	Pillar and horizontal arm assembly
M6 x 20 countersunk socket screws x 8	Attach arm bearing mounts to horizontal arm	With arm bearing mounts (accessories box)
M6 x 30 socket head cap screws x 8	Attach suspension bracket assembly to head assembly and XY unit	With suspension bracket assembly
M5 x 12 countersunk socket screw x 4	Attach monitor arm assembly to pillar	With monitor arm assembly
M5 x 8 socket head cap screw x 1	Attach guide handle to head assembly	With guide handle (accessories box)

ASSEMBLY INSTRUCTIONS

Note: To ensure all functions work correctly it is important that all cables are connected before switching the power onto the unit.

FLOOR STAND

The Floor Stand will need to be assembled in two parts.

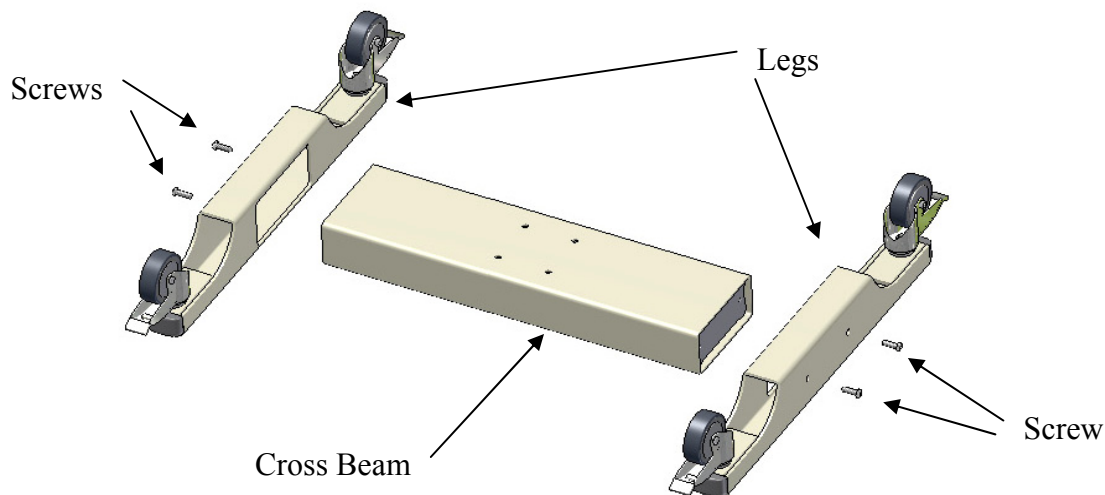


Figure 2, Floor stand components

1. Lay the Floor Stand legs upside down on a flat surface.
2. Place the Cross Beam face down into the cut-outs on the legs.
3. Use the provided M10 screws to lock the legs and Cross Beams together.

LOWER PILLAR

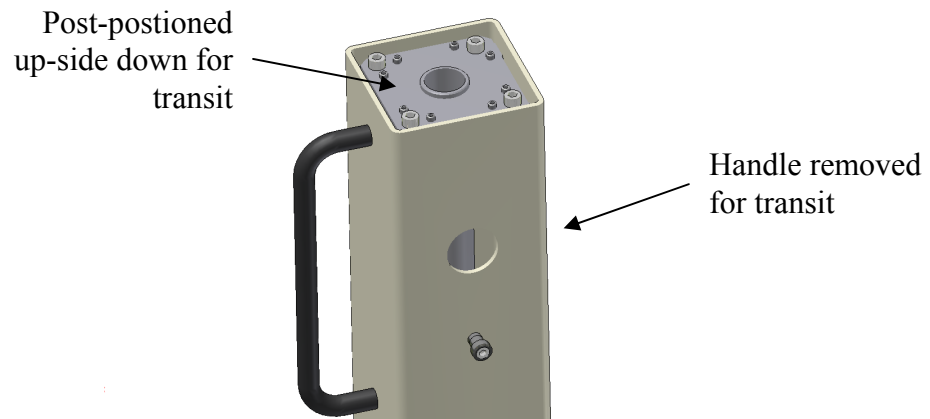


Figure 3, Lower pillar, removed from packaging

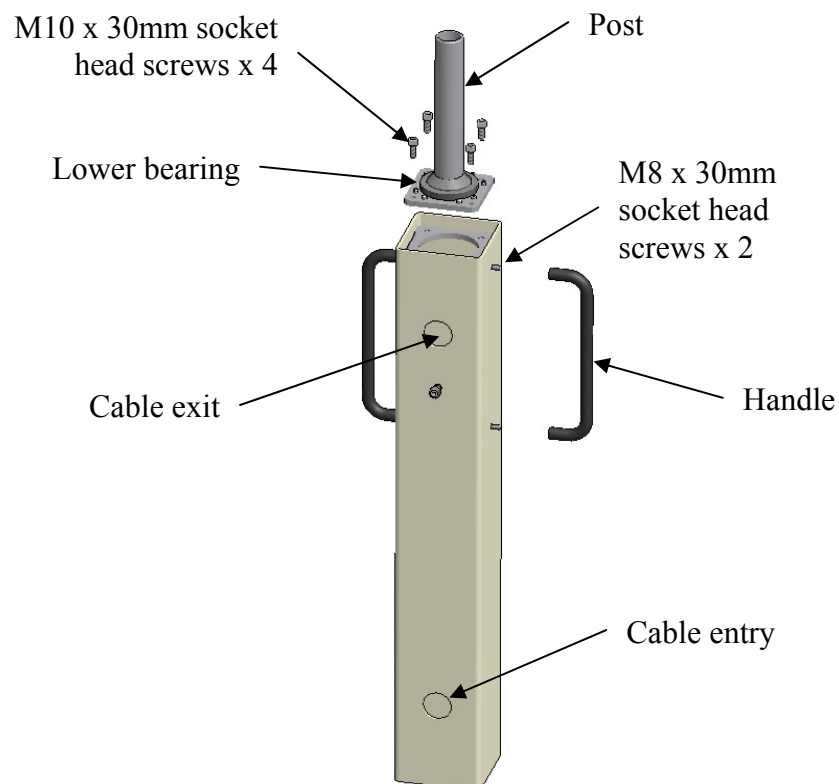


Figure 4, Lower pillar assembly and cable routing.

1. 2 holes are provided in the Lower Pillar for cable routing.
2. Feed the Mains and Foot control cable through the holes , this is best done before attaching the Post onto the Lower Pillar.

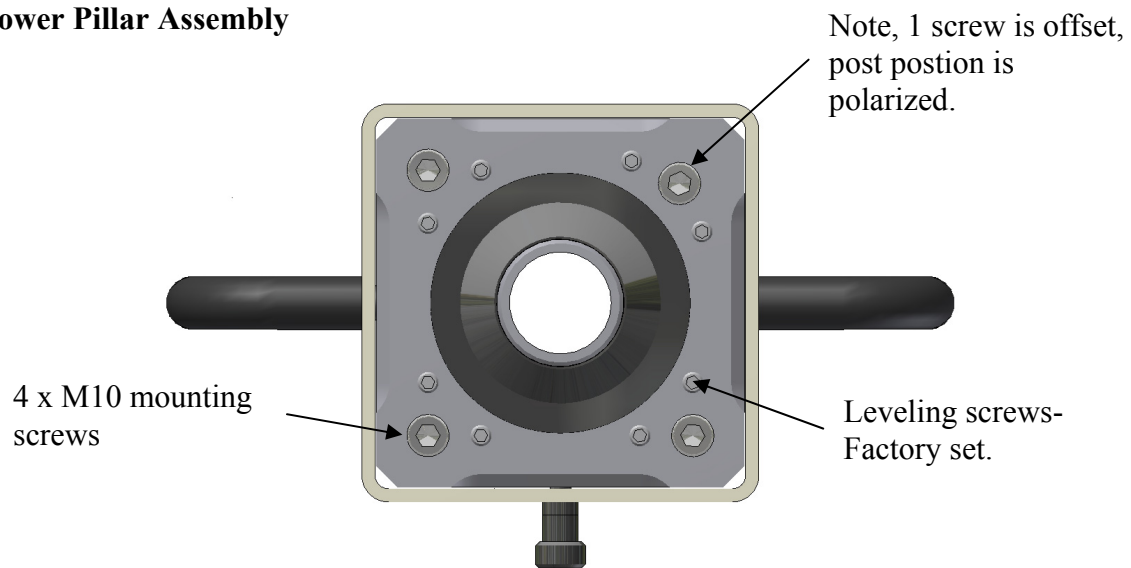
Lower Pillar Assembly

Figure 5, Detail showing screw arrangement on Post

1. Remove the 4 x M10 mounting screws Pillar.
2. Place Post in the correct position and replace the mounting screw.
3. Tighten the screws using the supplied hex driver.
4. Place the Lower Pillar into the Floorstand.
5. Insert 4 x M10 screw into the underside of the Floorstand and fully tighten.

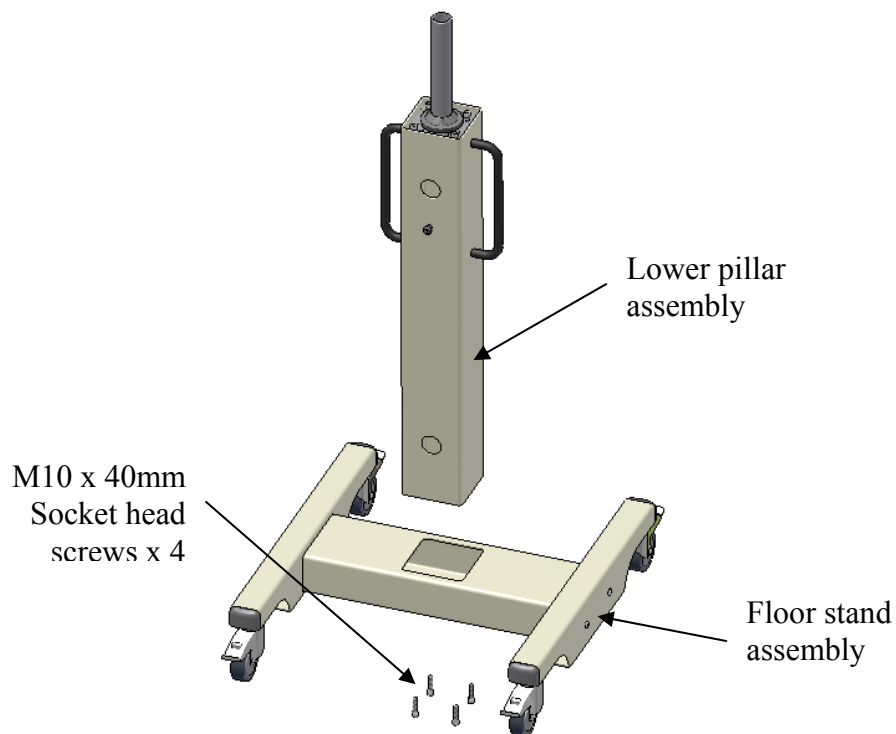


Figure 6, Assembling Lower pillar onto Floorstand

UPPER PILLAR

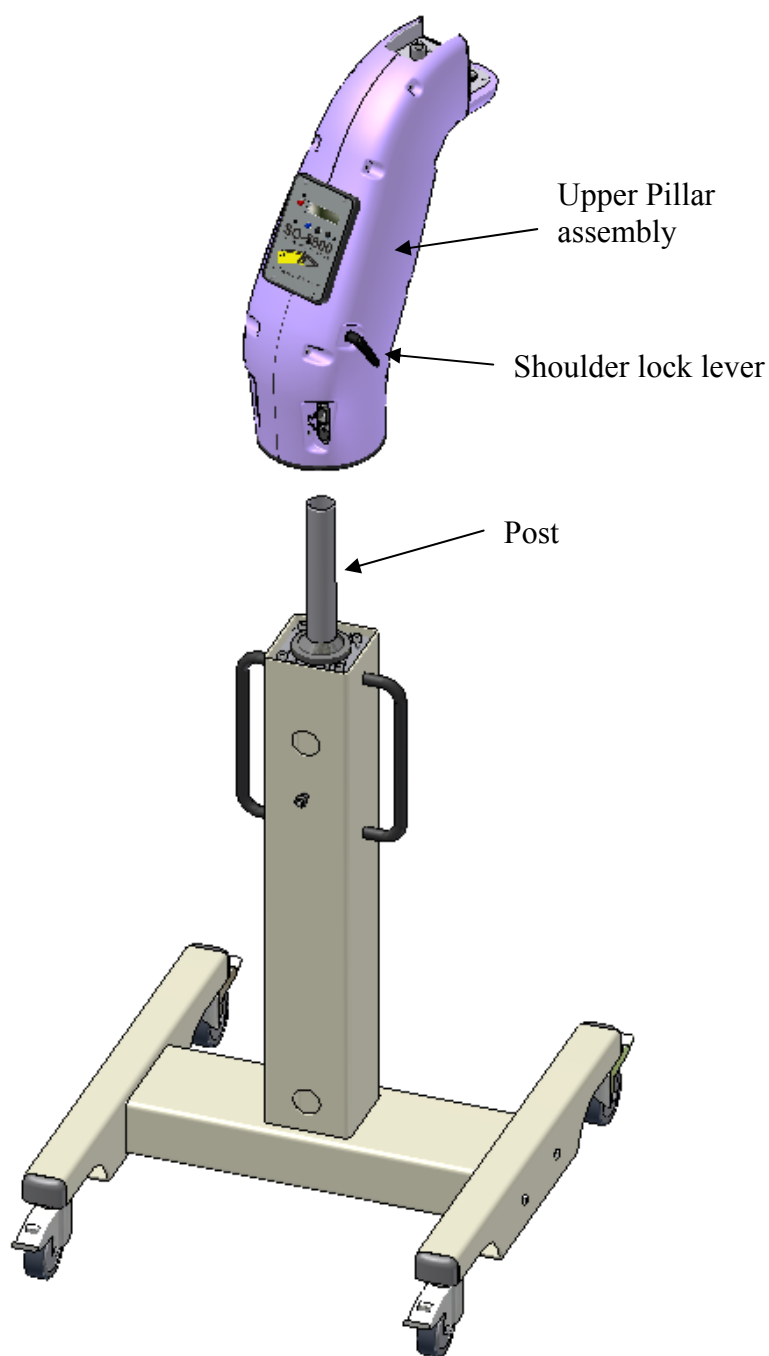


Figure 7, Fitting Upper Pillar to Post

1. Loosen the shoulder lock lever.
2. Lower the Upper Pillar onto the the Post and slide all the way down on to the Lower bearing.
3. Note, keep your fingers away from underside of Upper Pillar(to avoid pinching risk) while postioning on the Post

PANTOGRAPH ARM

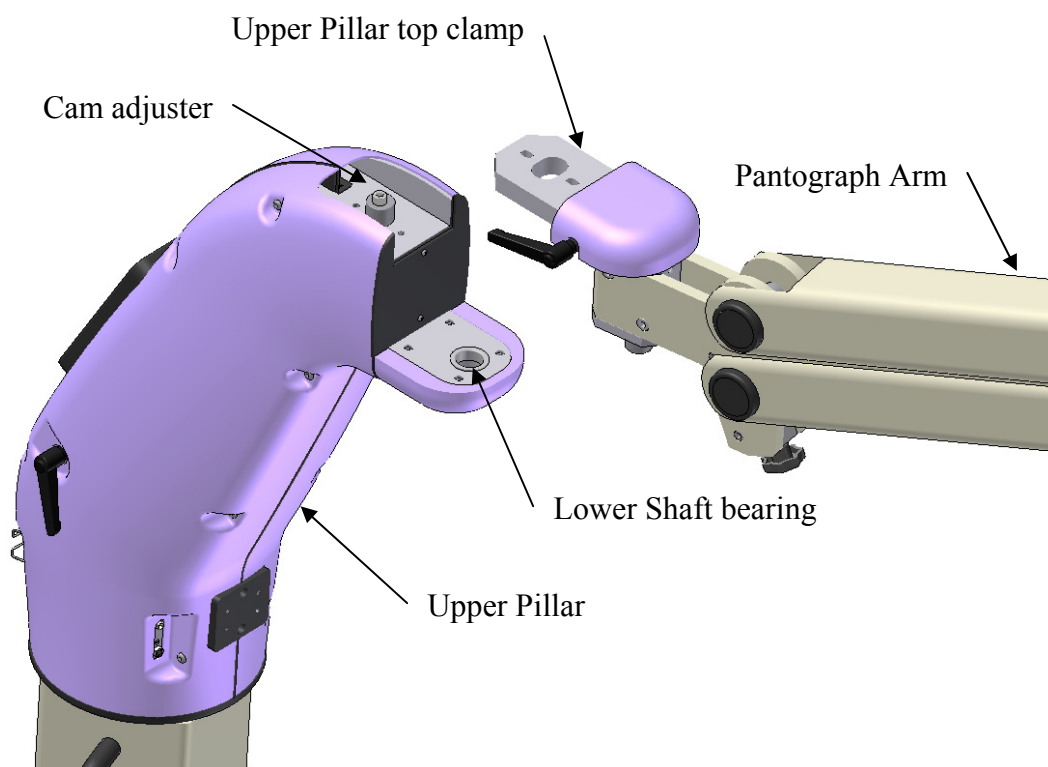


Figure 8, Positioning Pantograph Arm onto Upper Pillar

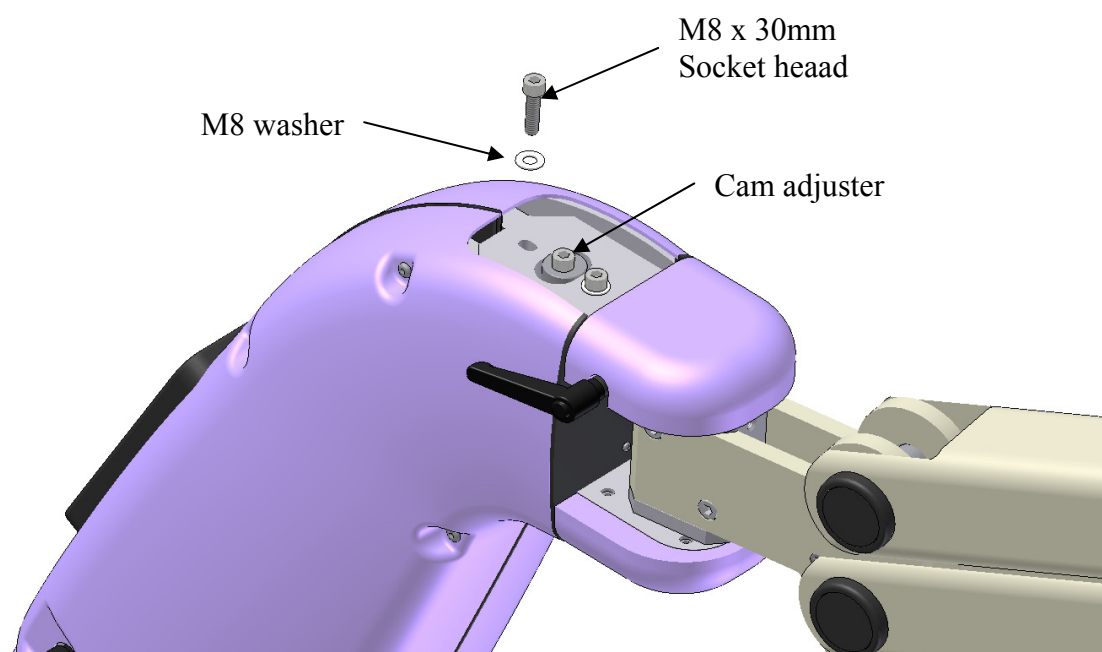


Figure 9, Attaching Pantograph arm

1. Position the Upper Pillar top clamp onto the Pantograph arm shaft. Lock the top clamp in line with the Pantograph arm.
2. Align the Pantograph arm shaft over the lower shaft bearing and Cam adjuster and gently lower into position.
3. Lock the top clamp in position and check Pantograph arm for smooth rotation adjust cam if necessary and re lock screws.

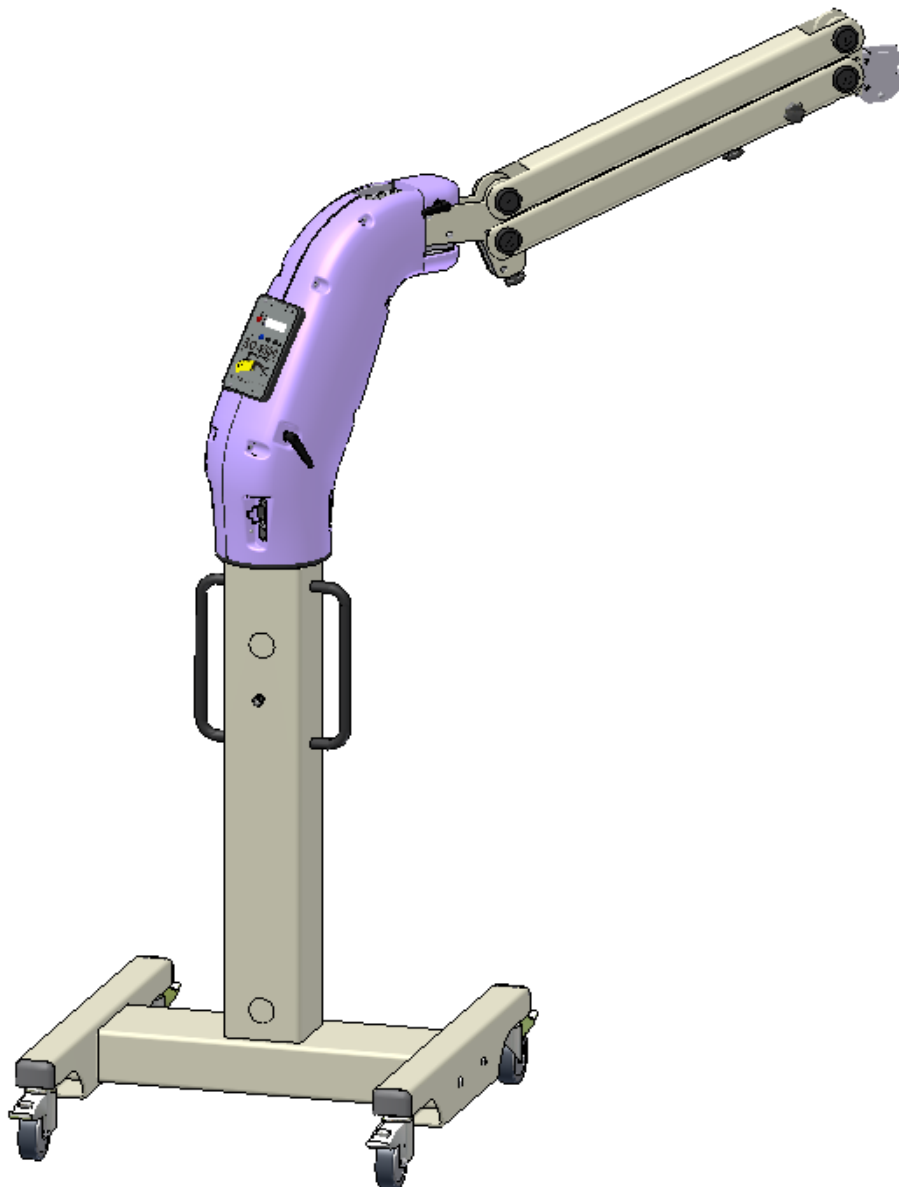


Figure 10, Pantograph assembled onto Upper Pillar

HEAD AND XY ASSEMBLY

1. Place the Head Assembly on a clean flat table.
2. Attach the Suspension Brackets to Tilt Adapter (as shown in the picture below) with the 4 x M6x16 Button Head. Tighten, then loosen the screw by 1 turn.
3. Locate the XY Unit to the top of the Suspension Bracket and also lock it with the supplied 4 x M6x16 Button Head. Do not tighten fully (loosen the screw by 1 turn)
4. Place the Spacer part between the Suspension Brackets and secure with the supplied 2 x M6x16 Button Head from both sides and tighten the screw.
5. Now tighten all 8 Button Head screws securely.

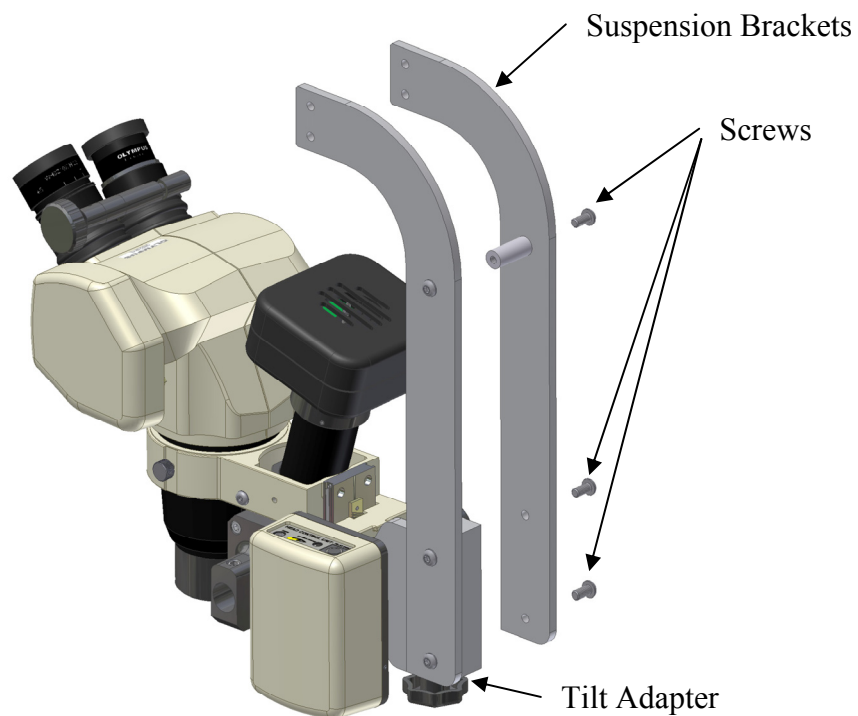


Figure 11: Suspension Bracket Assembly

Attaching the XY Unit to the Head Assembly

1. Loosen the Locking Knob on either side of the XY Upper Swivel Block.
2. Lift the Head and XY Assembly (two people may be required) up to the XY Mounting Plates and let it sit securely in the slots.
3. Tighten the Locking Knob.
4. Tighten the XY Rotation Locking Knob.

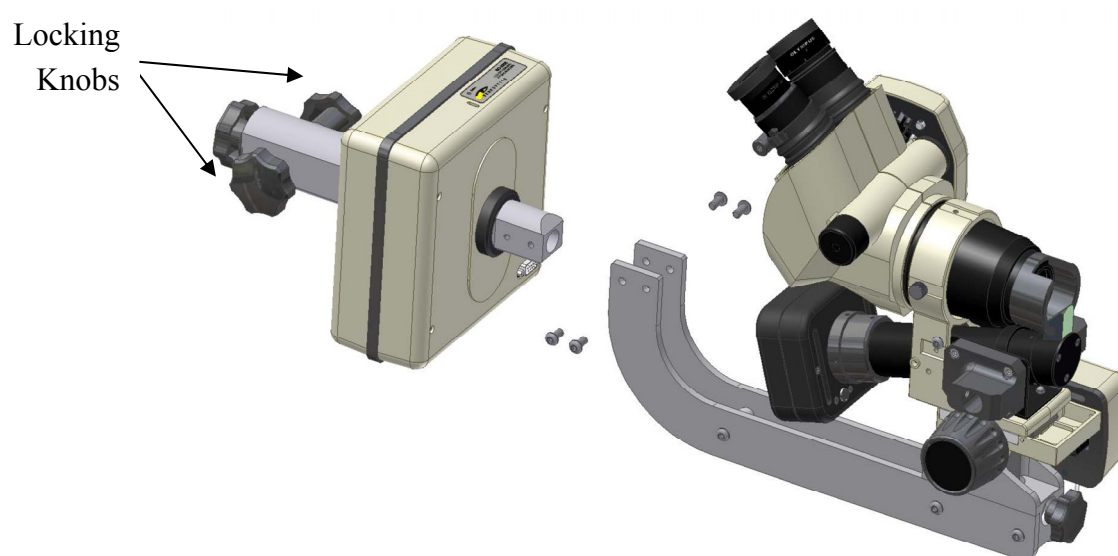


Figure 12, attaching head to XY unit

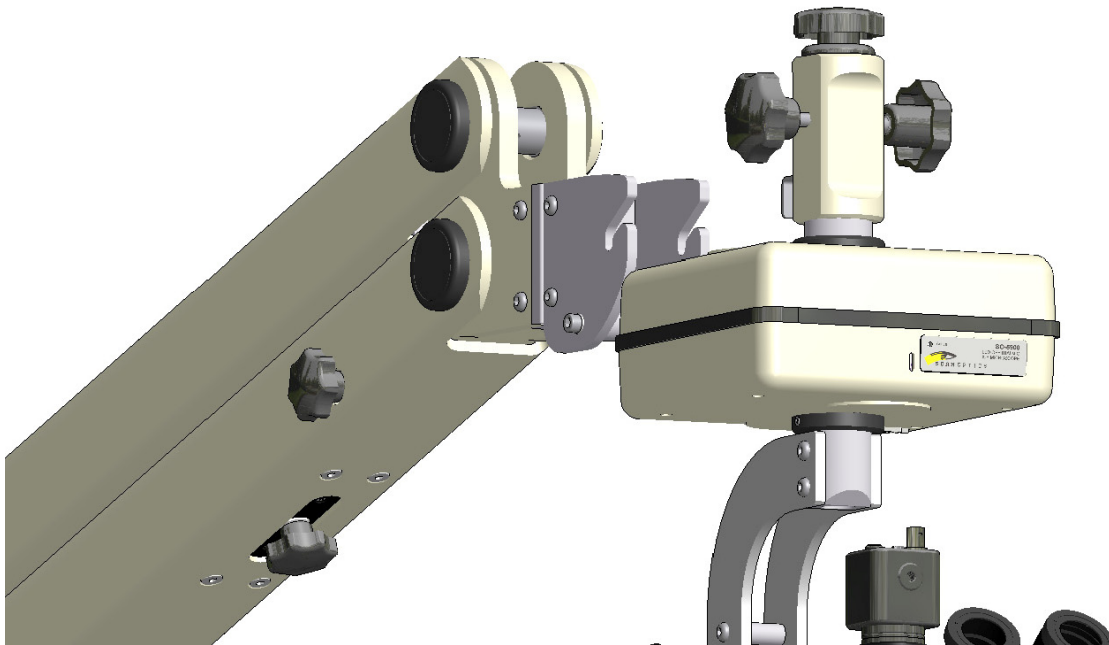


Figure 13, aligning XY unit onto Pantograph arm.

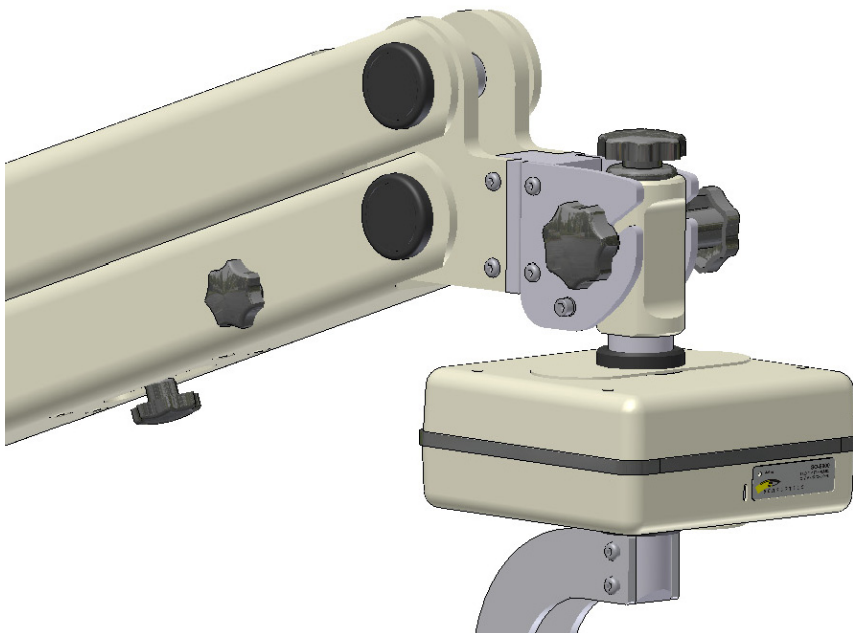


Figure 14, XY unit located on Pantograph arm.

Remove the eyepiece blanks and insert the eyepieces. Insert the focusing eyepiece in the LHS eyepiece tube from the observer's perspective and secure in place so that the scale marker is easily visible. Place the fixed eyepiece in the RHS eyepiece tube and secure using the screw. Retain the eyepiece caps in a safe place for when storing the microscope.

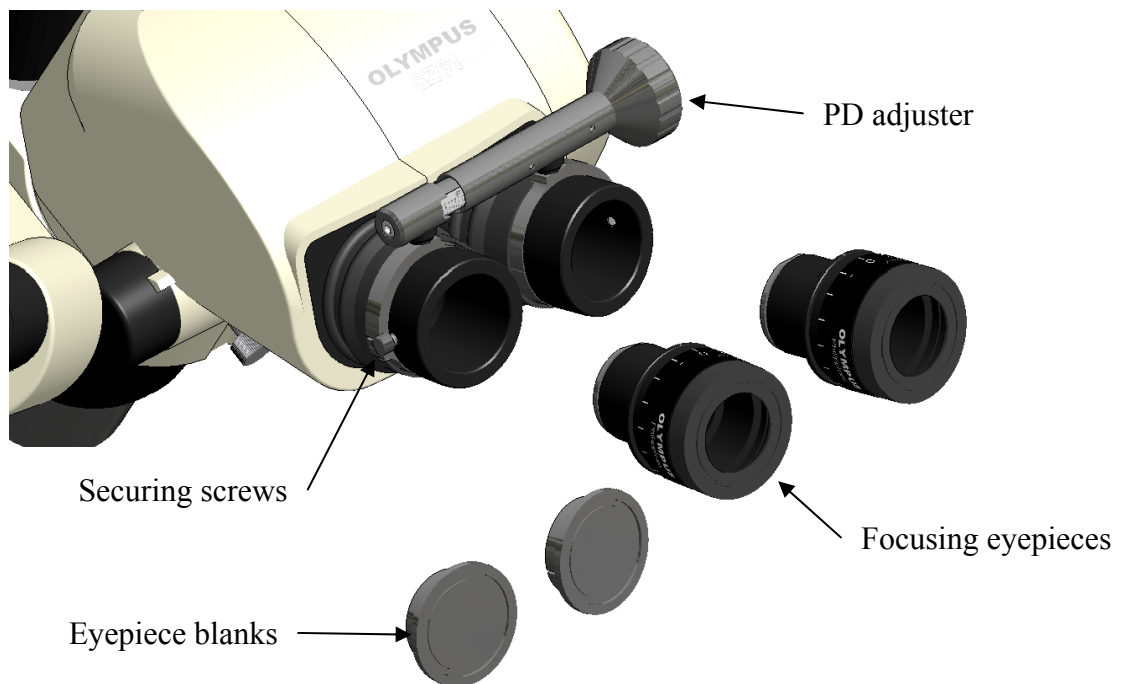


Figure 15, fitting eyepieces

ATTACHING THE GUIDE HANDLES

Insert the guide handles into the side of the microscope.

Note that the Groove and the Grub Screw Dimple on the handle needs to face upwards.

Lock down the handle by tightening the Grub Screw with the 4mm Hex Driver.

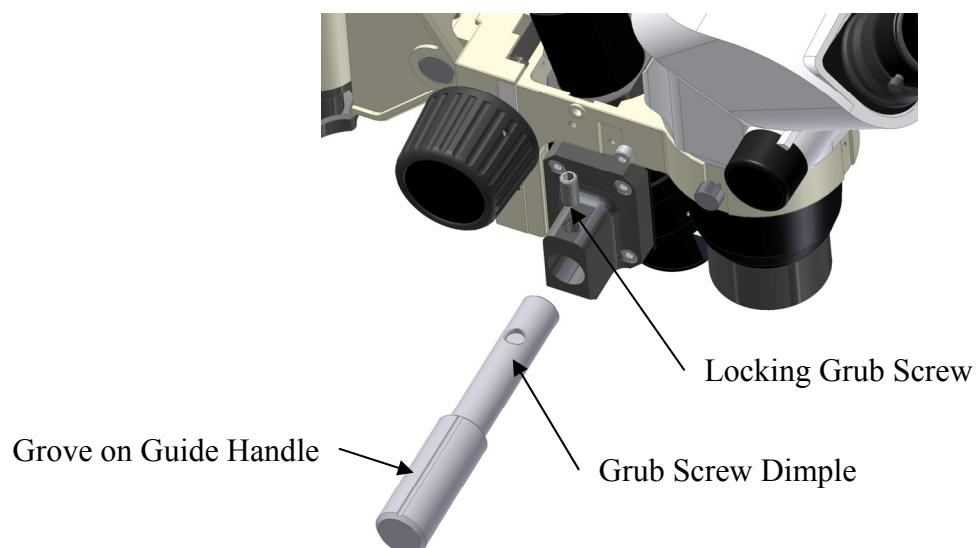


Figure 16, fitting Guide handle.

ASSISTANT MICROSCOPE ASSEMBLY

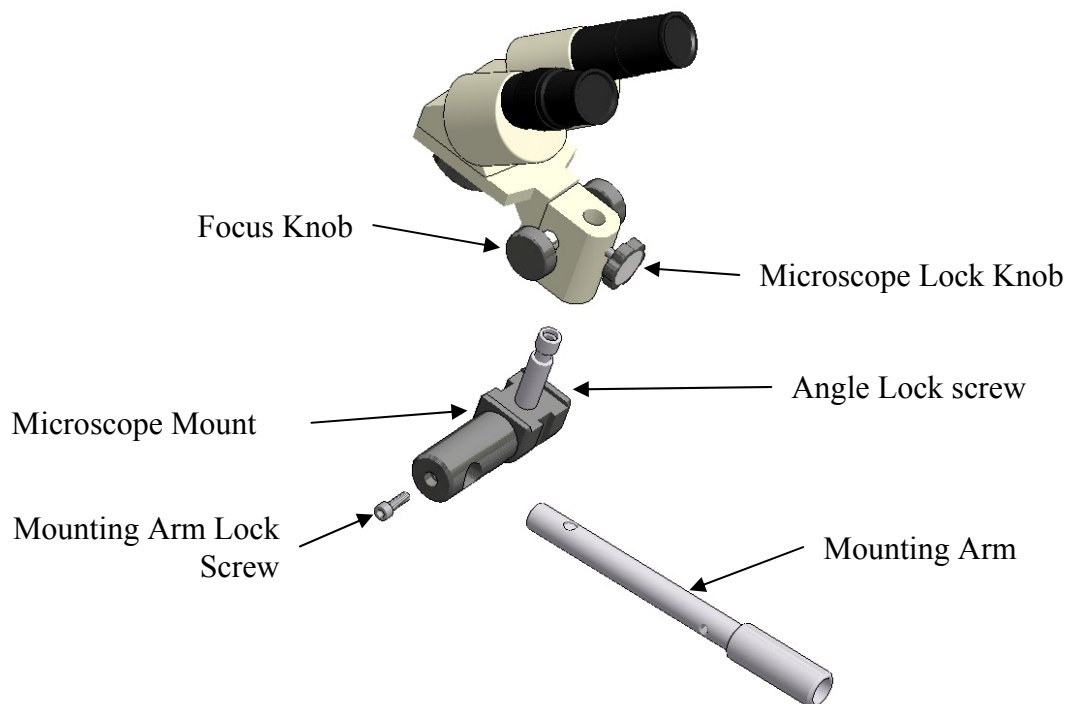


Figure 17, Assistant microscope components.

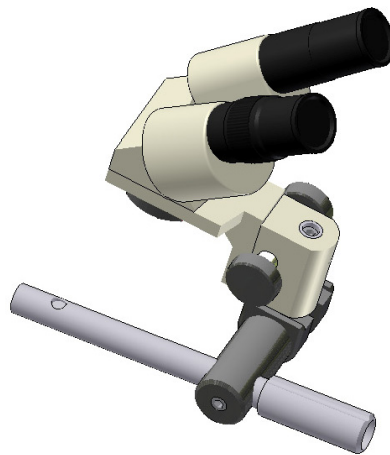


Figure 18, Assistant microscope assembled.

1. Remove the Mounting Arm Lock Screw from the Microscope Mount.
2. Slide the Microscope Mount onto the Mounting Arm.
3. Lock the Mounting Arm Lock Screw tightly with the 5mm Hex Driver.
4. Position the Assistant Microscope to the Microscope Mount, then secure by locking the Microscope Lock Knob into the Threaded Hole.

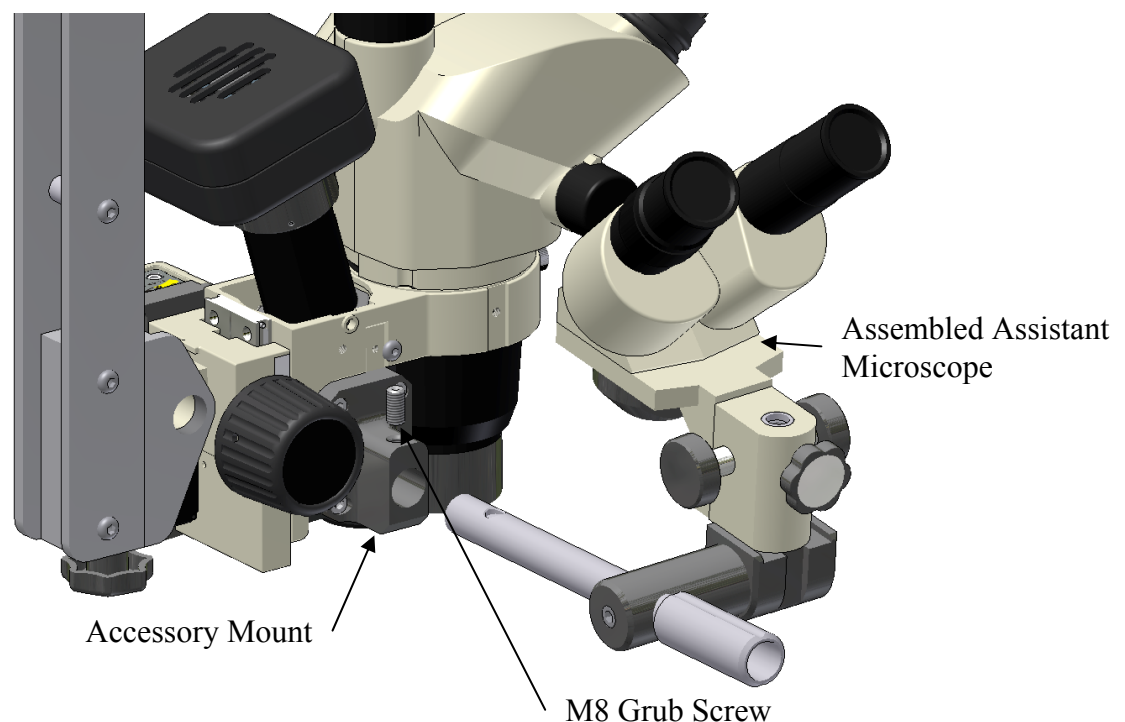


Figure 19: Attaching Assistant Microscope to Main Assembly

5. Insert the Assembled Assistant Microscope Mounting Arm into the Accessory Mount.
6. In order to set the Assistant Microscope Mount in a horizontal position; support the weight of the Assistant Microscope Head in one hand while you tighten the M8 Grub Screw using the 4m Hex Driver.

Swapping from R/H to L/H configuration

The previous procedure shows the assistant microscope being attached to the R/H side of the main microscope. However the assistant microscope can also be configured so it can be attached to the L/H side if required.

1. Remove the Assistant Microscope Assembly from the Accessory Mount, by loosening the M8 Grubscrew
2. Remove the Assistant Microscope from the Microscope Mount, by undoing the Microscope Lock Knob.
3. Insert the arm into the Accessory Mount on the L/H side.
4. The mount has to be rotated 180, simply undo the Angle Lock Knob about 5mm (this will disengage the limit travel pins) rotate the mount and re tighten the Angle Lock Knob.
5. Re-attach the Assistant Microscope to the mount and adjust the angle for optimum position.
6. Re-attach the short guide handle to the R/H Accessory Mount Block.

USING THE ASSISTANT MICROSCOPES

Focussing the Assistant Microscope

To focus the Assistant Microscope, first focus the main microscope according to the instructions on page 49. It may be helpful to focus on a target such as the one printed on this page.

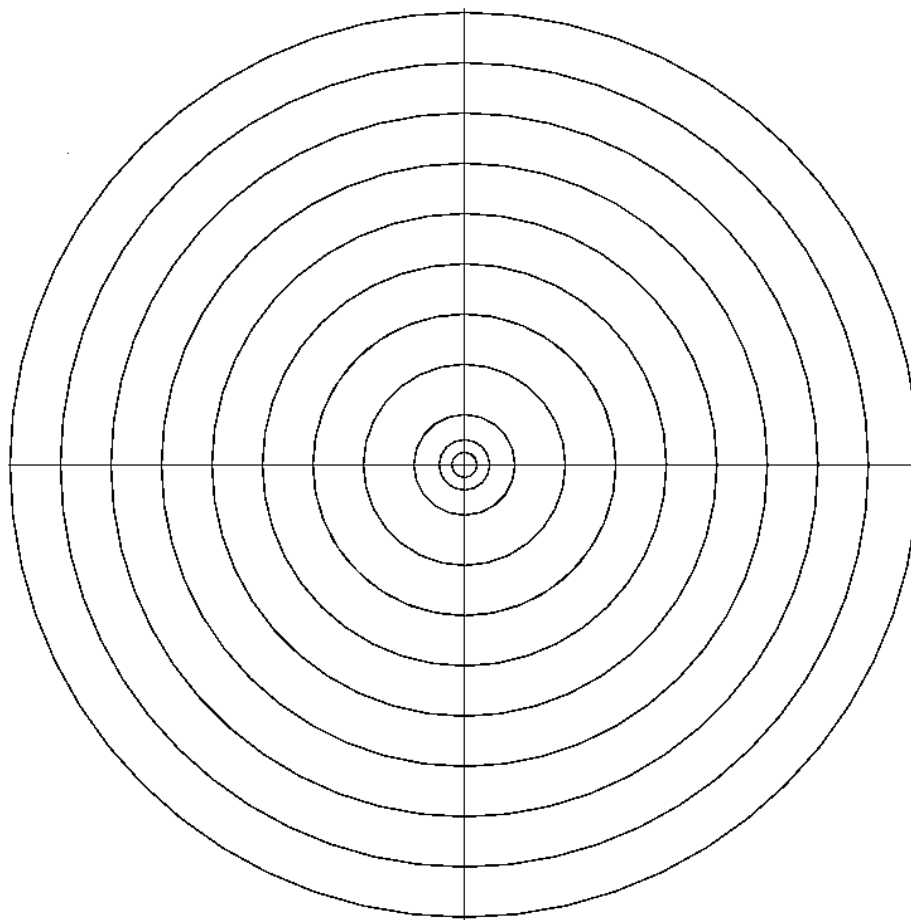


Figure 20, Test Target.

Hold the Assistant Microscope head assembly with one hand and loosen the Angle Lock Knob slightly. Look through the eyepieces of the Binocular Assistant Microscope and manoeuvre the microscope until the target is centred in the vertical plane.

Tighten the Angle Lock Knob and focus the assistant microscope using its own focus knob(s) while looking through the RHS eyepiece only with the right eye.

Re-check the vertical alignment and adjust the position of the Assistant Microscope head if necessary after loosening the angle lock knob. Re-tighten the Angle Lock Knob when vertical alignment is achieved.

Look through the LHS (adjustable) eyepiece with the left eye and rotate the collar until the left eye is in focus. Housings are not geared together and need to be adjusted to a symmetrical position manually.

When this procedure is complete the microscope should be centred on the vertical plane of the target and focussed on the centre of the target, although there may be some left-right displacement.

To correct for left-right displacement, loosen the microscope lock knob and swivel the microscope head assembly left or right slightly until the centre of the target is in the centre of the view. Tighten the microscope lock knob to secure the assembly.

The assistant microscope should stay focussed so long as the image through the main microscope is focussed.

Adjust the pupillary distance (PD) of the assistant microscope to a comfortable setting by rotating the prism housings apart or together as required.

MONITOR, CABLE, CAMERA AND POWER ASSEMBLY

Attach the monitor arm to the back of the pillar using the four M5 x 12 countersunk screws, and tighten using the 3 mm socket key provided.

Slide the monitor over the arm in the desired orientation. Tighten the adjustment knob on the Monitor mount to set the friction and adjust the monitor angle and position as appropriate. To swap the monitor to the other side, simply rotate the mounting arm. Slide the monitor off and replace it the other way around if necessary.

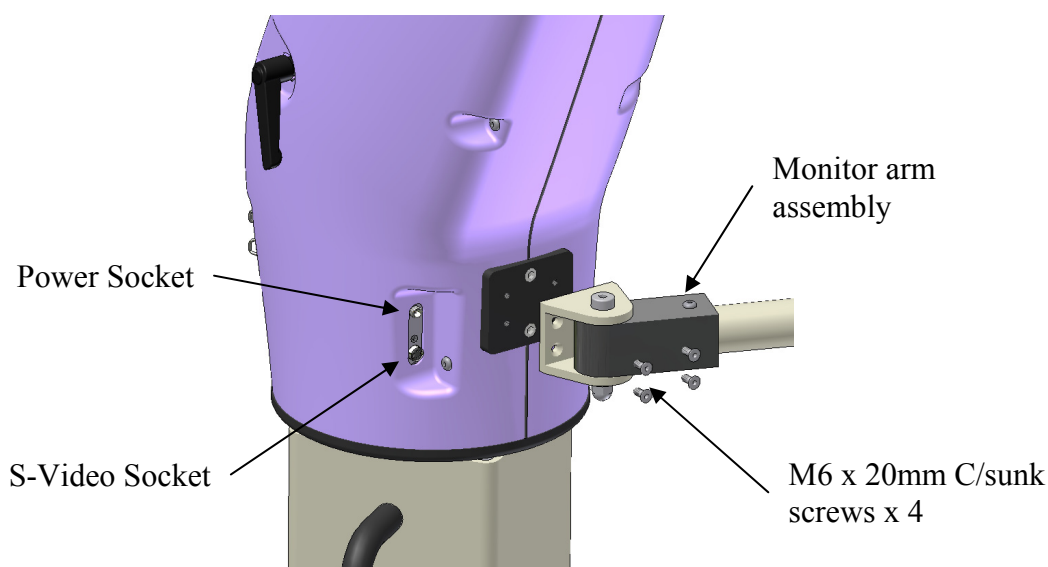


Figure 21, attaching the Monitor bracket onto Upper Pillar.

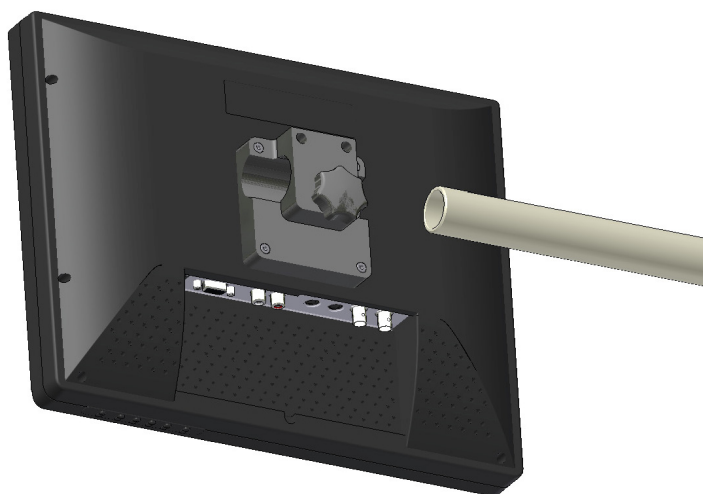


Figure 22, Sliding the Monitor onto Mounting Arm.

ATTACHING THE VIDEO SYSTEM

1. Lower the Monitor Mounting Arm onto the Pillar.
2. Tighten the Locking Knob so that it is stable.
3. Thread the video cable through the Pillar Mounting Block, up the arm and exit at the Monitor Mounting Adapter.
4. Rotate the LCD Monitor so it is flat for easy access to the connection panel.
5. Plug the LCD Monitor Power Cable into the LCD Power Socket. Plug the other end of the power cable to the top of the Pillar.
6. Plug the S-Video Cable into the S-Video Input socket. **DO NOT FORCE CONNECTOR.**

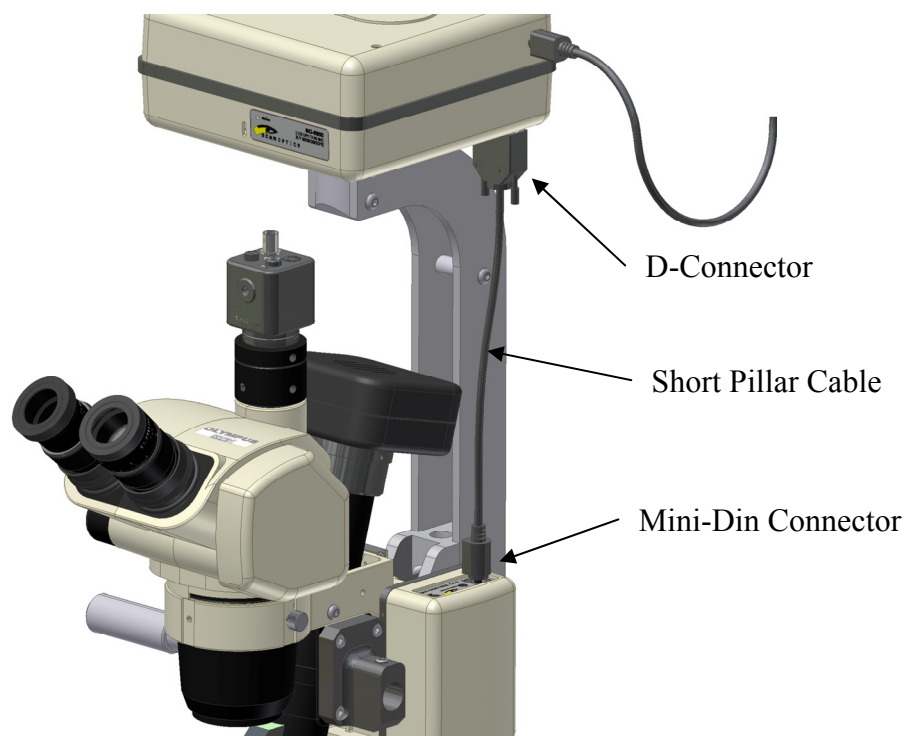


Figure 23, Monitor Connection Panel.

Microscope Head Cable

This cable connects between the XY Unit and the Microscope Connector Block. This cable provides power and data to the Microscope's Focus, Zoom, Lighting, Cooling and power to the CCD camera.

1. Connect the Short Pillar Cable between the XY Unit and Connector Block. The 9 Way D Connector should be locked with the terminal screws.
2. Connect the 8 Way Mini Din Connector to the top of the Connector Block. The flat side of the connector should face inwards.



Zoom Cable

The Zoom Cable connects between the Zoom Drive and Connector Block. In most cases, this cable should be already connected, however, in some setups, this cable may be supplied loose and should be connected before use.

Connect the zoom cable from the Zoom Drive Control to the Connector Block.

Note that this plug needs to be FULLY inserted to function correctly. Push the connector down until a solid click is heard.

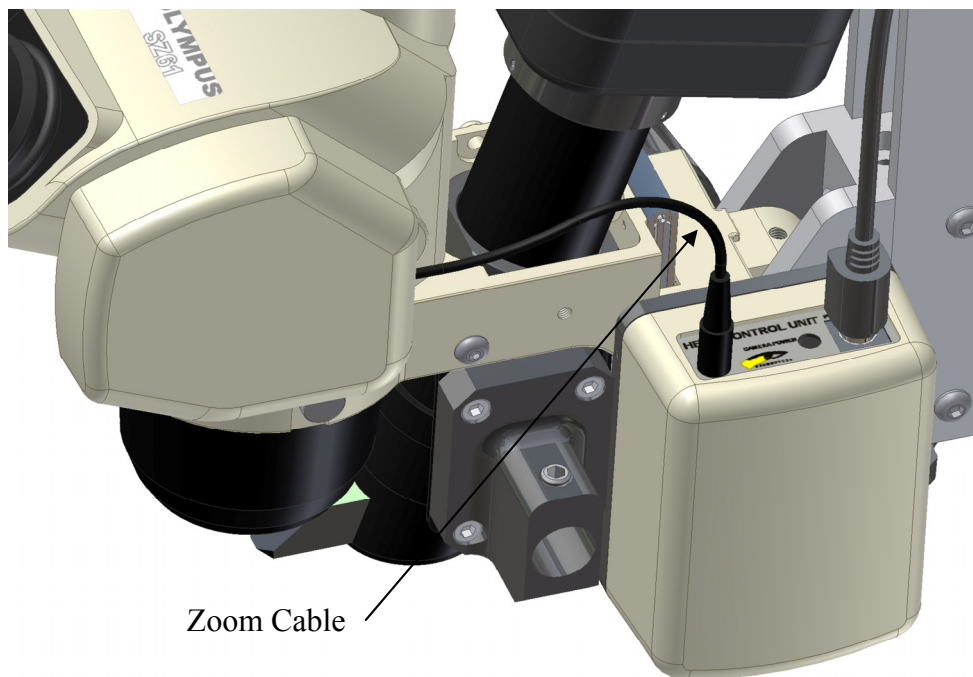


Figure 24, Zoom cable connection.

CCD Camera Power Cable

1. The camera requires a power connection from the Head Control Unit. The connector is NOT similar on both ends although they look very similar. One end only will fit into the camera, whilst the other only into the Connector Block.
2. Plug the power cable into the Connector Block first.
3. Plug the other end of the power cable to the CCD Camera.

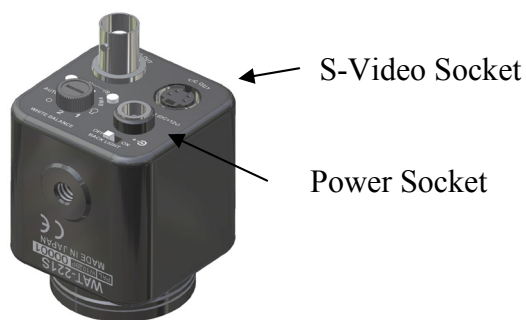


Figure 25, Watec Camera

Attaching the Camera

4. Remove the dust cover from the camera adapter part on the microscope.
5. Remove the dust cover from the camera.
6. Keep the dust covers in a safe place if you need to remove the camera for storage in the future.
7. Screw the camera into the camera adapter. Be careful that you do not cross thread the camera. The camera should be square once it's fully tightened. See figure below



Figure 26, Mounting Camera.

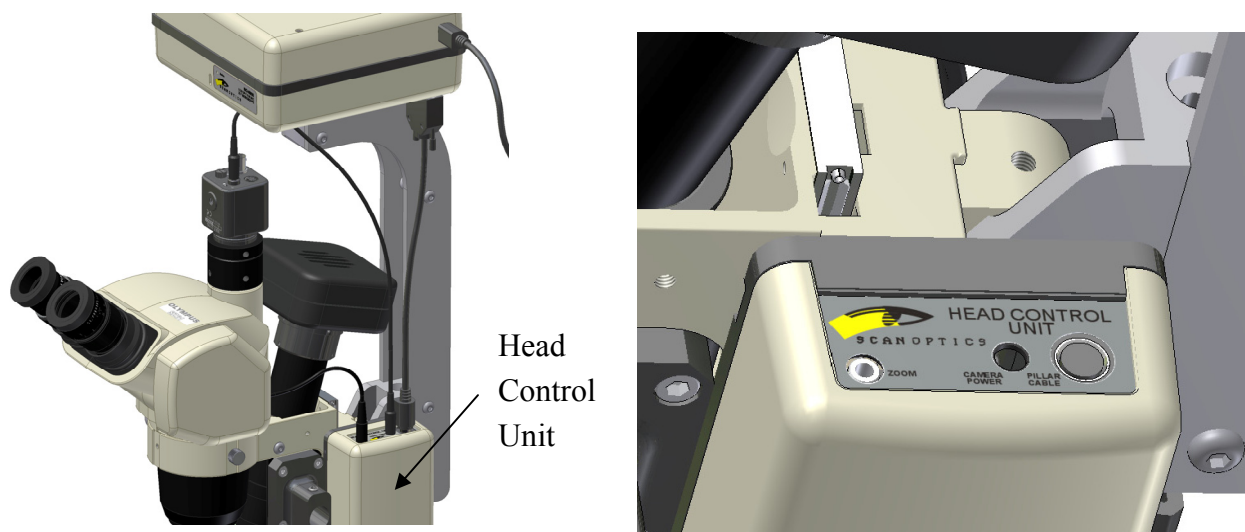


Figure 27, Head Control Unit, connections

Video Signal Cable

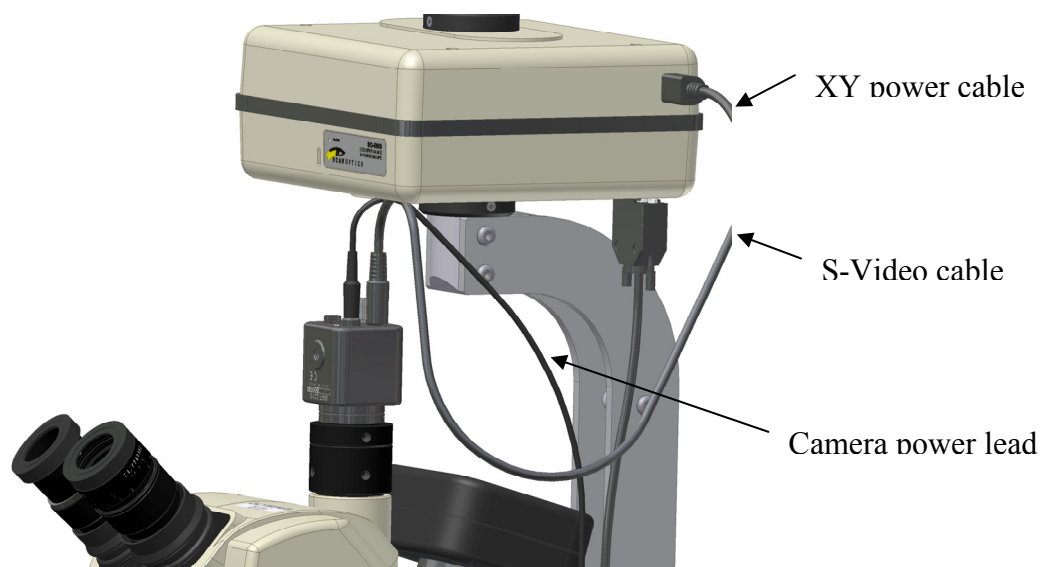


Figure 28, Camera cabling

The video signal out of the CCD camera is transmitted via S-VIDEO – a more superior video transmission than Composite video. The Video Cable carries the signal from the CCD Camera to the LCD monitor.

The Video Cable should be routed through the Pantograph Arms.

Connect one end of the Video Cable to the CCD Camera. Note that it has a polarity pin, so do not force the connection if it does not connect properly.

Route the other end of the Video Cable through the Pantograph Arm and to the S-Video socket in the connection panel on top of the Horizontal arm

Setting the position for the Video Camera

Focus the main microscope at the preferred magnification. If the microscope is typically used with a range of magnifications, focus the microscope at the highest magnification (smallest field).

Loosen the two lower grub screws below the camera. Observe the image on the monitor, and focus the camera by rotating the lower ring. Re-tighten the lower grub screws when the camera is focussed.

Check the orientation of the image by moving an object across the field, to see if left/right and up/down on the monitor correspond with left/right and up/down as observed through the main microscope. If it does not, loosen the upper grub screw and rotate the upper ring until the orientation is correct. This should correspond with the upside-down 'CE' mark on the camera facing the observer using the main microscope. When the orientation is correct, re-tighten the upper grub screw.

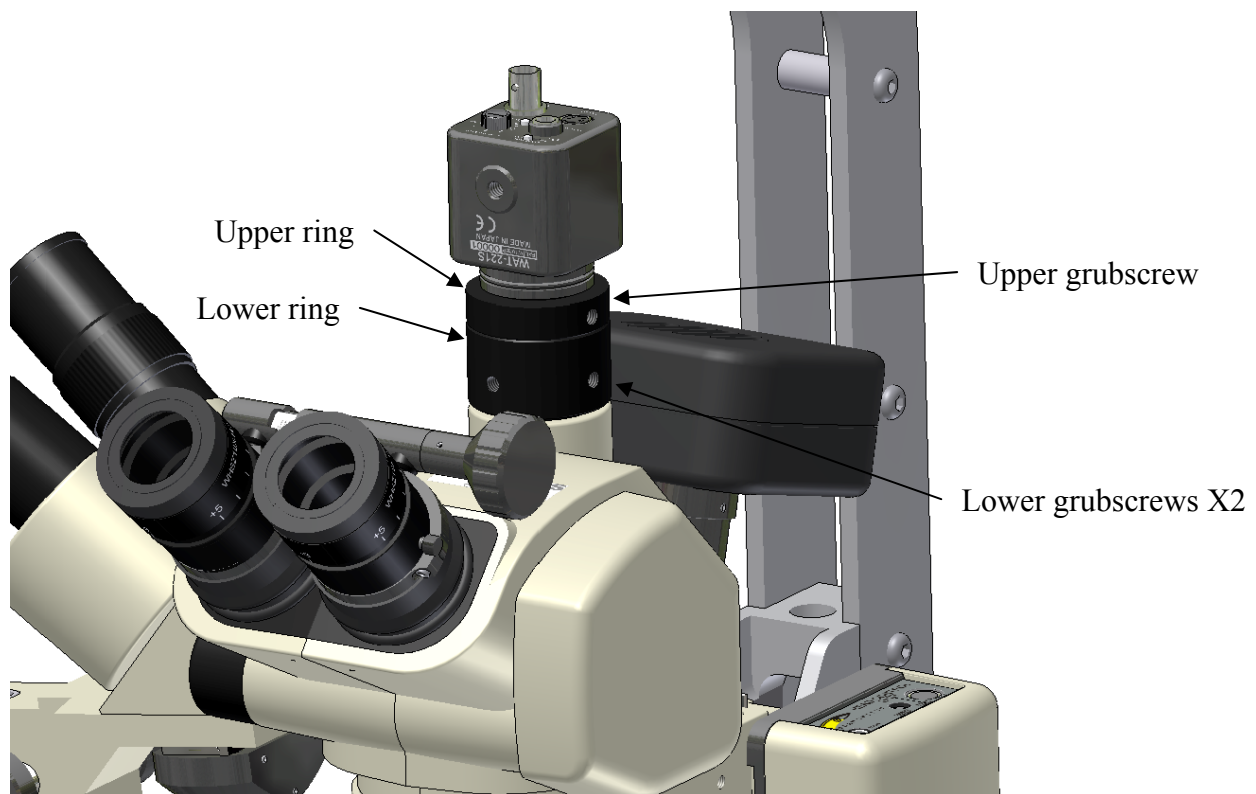


Figure 29, setting Camera focus

The video system should now be ready for use. Scan Optics recommend that the original (default) settings on the Watec camera be used.

These are as follows:

SHUTTER SPEED	POSITION 8 (EI OFF)
AGC	ON
AGC	HI
VIDEO LEVEL	100
GAMMA	ON
WHITE BALANCE	AUTO
BACK LIGHT	OFF

Refer to the Watec leaflet enclosed with the camera for further information regarding shutter speeds and white balance.

FOOT CONTROL UNIT

The Foot Control Unit controls some of the settings on the Microscope that the operator may wish to change during surgery.

It primarily controls the Focus, Zoom, Light intensity and XY movement.

To activate any of the functions, the operator should depress the pedals firmly.

The XY Translation Control Stick controls the XY movement of the head. Push the stick in the direction you want the FIELD OF VIEW to move.

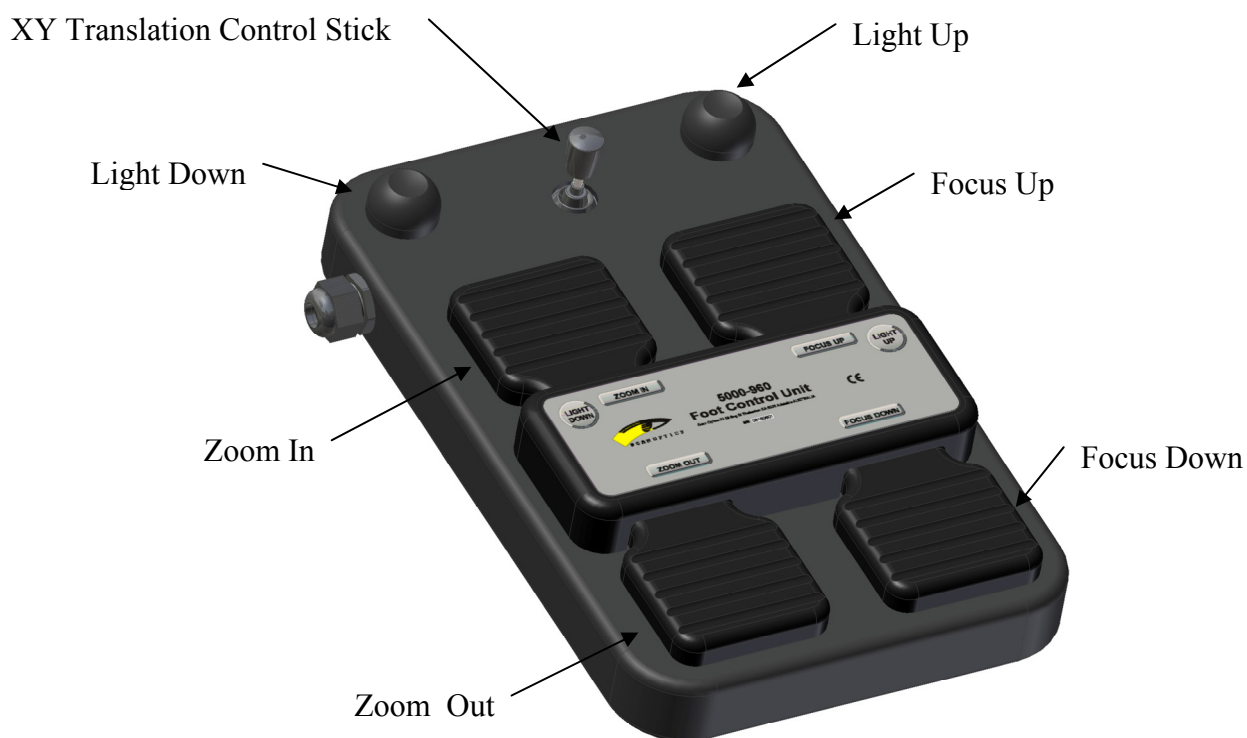


Figure 30, Foot Control Unit layout.

ATTACHING THE BATTERY CABLE

If you will be using the equipment where the power supply is unreliable and you are not connected to an Uninterrupted Power Supply (UPS), it's advisable that you connect a battery backup to the microscope in the event that mains power is unavailable.

The Battery Cable is a 9 Way D Socket that plugs into the Power Supply and is recommended that you connect it to a 12V Car Battery.

ATTACHING HE POWER CABLE

The Mains Cable provides mains power to the Microscope. This cable is orange and requires to be plugged into a source where an active Earth is available.

Note: The equipment is a Class II – Double Insulated Device, with NO ACTIVE EARTH POINT. For the internal switching power supply to comply with EMF/RFI requirements, it requires an Earth Point on the mains power to function correctly.

Attach the mains cable to the IEC socket on the lower panel and plug into the mains supply. Use the wire plug retainer to avoid accidental plug removal.

Switch the microscope on from the main panel by pressing the RED button, and set the light intensity as desired. Switch the monitor on.

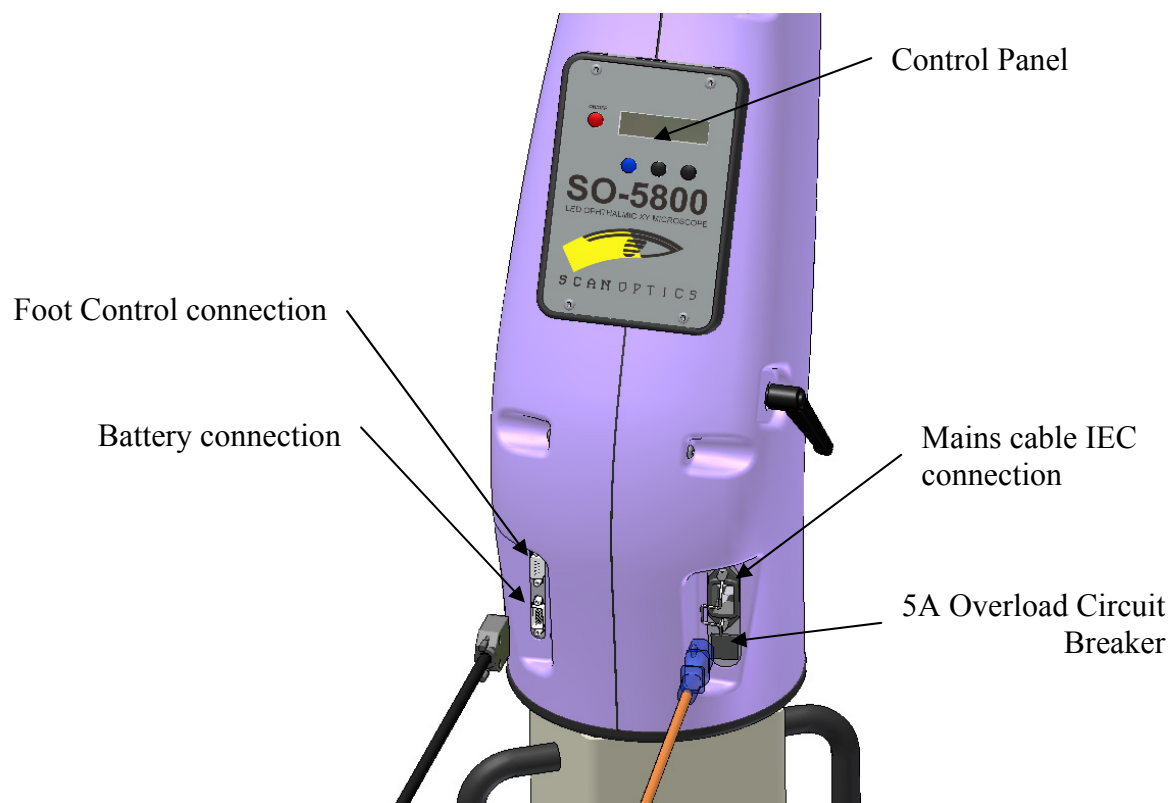


Figure 31, Control Panel and connection panels.

MICROSCOPE OPERATION AND FEATURES

TURNING THE MICROSCOPE ON AND OFF

Hold the red ON/OFF button for 1 second to turn it on. The microscope will go through it's start up and power up normally within 2 seconds.

To turn off, hold the red ON/OFF button for 1 second. The microscope will turn off automatically.

THE LCD SCREEN



Figure 32, LCD screen, close-up

CHANGING THE MICROSCOPE SETTINGS

Settings on the microscope can be changed by pressing the “FUNCTION SELECT” button to toggle to the settings you want to adjust.

Increase the setting by pressing the “UP” button and decrease by pressing the “DOWN” button.

When the LCD displays “LIGHT”, you are adjusting the LED intensity.

When the LCD displays “FOCUS SPEED”, you are adjusting the focus motor speed.

When the LCD displays “ZOOM SPEED”, you are adjusting the zoom motor speed.

When the LCD displays “XY SPEED”, you are adjusting the XY motor speed.

XY RETURN TO CENTRE (RTC)

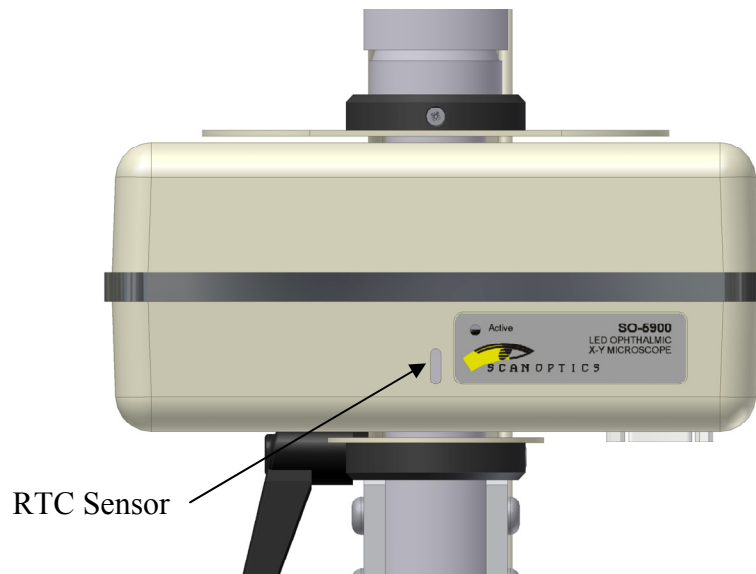


Figure 33, XY Control Unit

To activate the XY Return to Centre, there are two ways to do this.

Through the Power Supply:

Press the “FUNCTION SELECT” button until the text “XY RTC?” is displayed. To activate, press the “OK” to return the XY back to the centre.

Through the XY Unit:

Hold your hand/finger approximately 25mm (1 inch) in front of the XY Unit Label for 1 second.

Once detected, you will hear a short beep and the XY will automatically return to the centre.

UPPER PILLAR

The upper Pillar rotates around the top of the Lower Pillar and provides a connection interface for the main microscope power cable and s-video cable.

There are two sockets located at the top of the Upper Pillar. The top one provides low voltage power for XY unit and focus motors, as well as the lamp and its fan. The lower mini din socket connects video signal to the camera

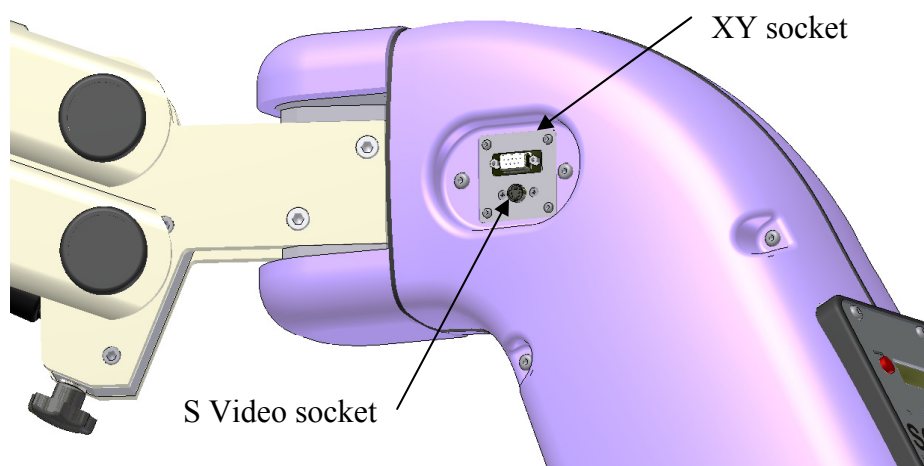


Figure 34, Connection panel

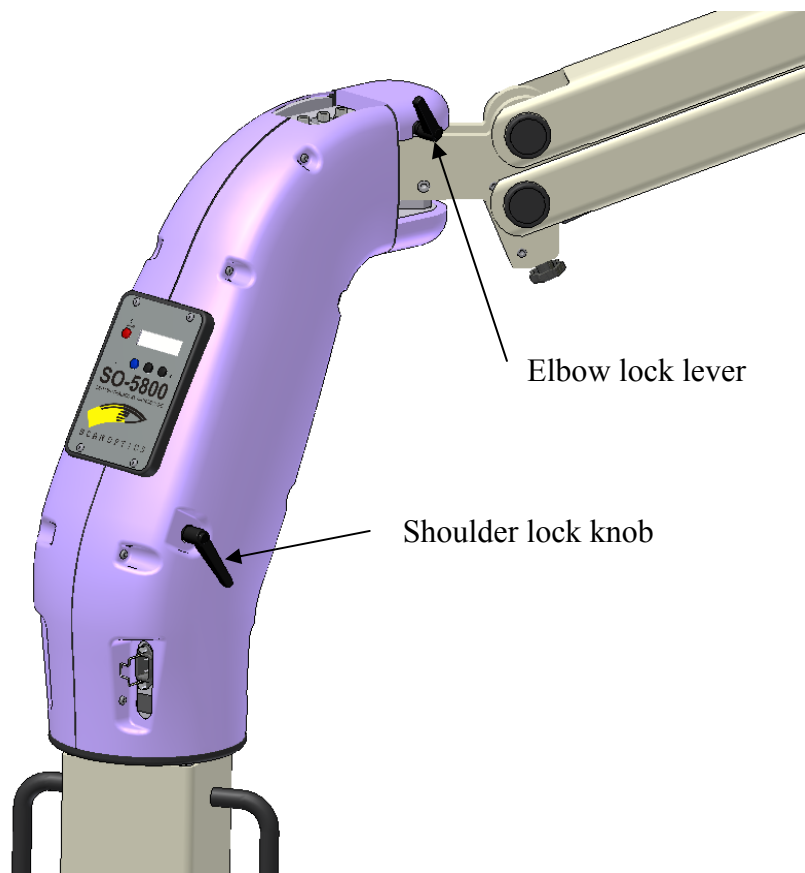


Figure 35, Upper Pillar features.

The lever on the side of the Upper Pillar assembly labelled 'SHOULDER LOCK' enables the horizontal arm to be fixed in position. To lock the arm, rotate the lever in clock-wise fashion.

The lever marked 'ELBOW FRICTION' located at the top of the Upper Pillar assembly allows friction to be applied to the swivel joint between the pantograph arm and the horizontal arm. To increase friction, rotate the knob in clock-wise fashion when viewed from beneath the horizontal arm.

PANTOGRAPH ARM

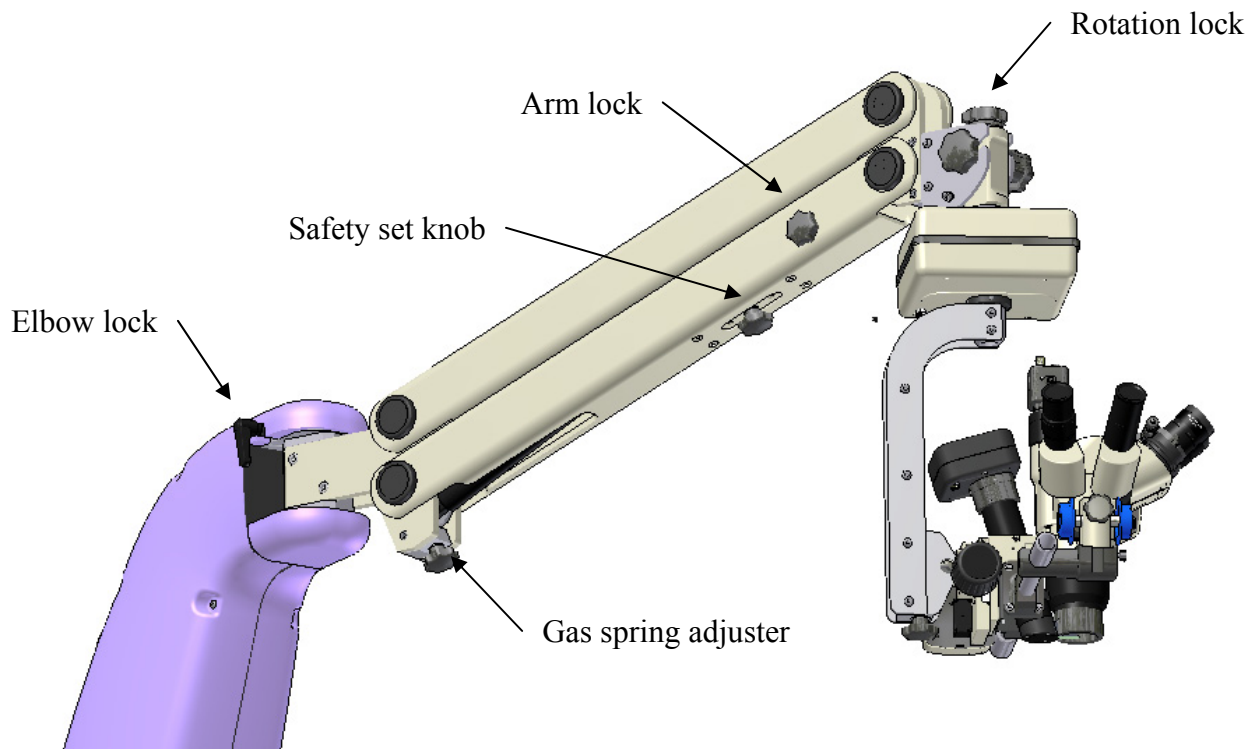


Figure 36, Pantograph Arm features.

The pantograph can rotate some 270° relative to the horizontal arm and is locked using the Lever located on the side of the horizontal arm (Elbow lock). Note that if both elbow friction and shoulder locks are applied and a side force is applied to the end of the pantograph arm, the elbow lock will give way if sufficient force is applied. If a fixed angle between the horizontal and pantograph arm is required, the elbow friction will work best if the shoulder lock is not applied. To lock the arm in a particular vertical position, simply rotate the 'ARM LOCK' knob clock-wise. To lock the rotational movement of the XY unit and microscope head below the end of the pantograph arm, rotate the 'ROTATION LOCK' knob clock-wise.

LEVEL ADJUSTMENTS

Under some setups, the microscope may not be level when used in certain positions. The SO-5800 is designed to be used level and hence there are some level compensations adjustments that can be made to correct for any tilt in the microscope.

You will need two 5mm socket key.

XY TILT ADJUSTMENT

There are two screws that will need adjusting above the XY unit.

The recessed socket head (Cam Adjust Screw) will rotate a cam that adjusts the tilt of the Horizontal Arm.

The protruding socket head (Cam Lock Screw) will loosen or lock the Cam.

- To adjust for the tilt you will need to insert both socket keys into the socket heads.
- To loosen the cam, hold the Cam Adjust Screw stationary whilst you loosen the Cam Lock Screw (about $\frac{1}{4}$ turn only)
- To adjust for the tilt, hold the Cam Lock Screw stationary whilst you rotate the Cam Adjust Screw. This will cause the Horizontal Arm to tilt up and down.
- Once your Horizontal Arm is level, hold the Cam Adjust Screw stationary then tighten the Cam Lock Screw until it's tight.

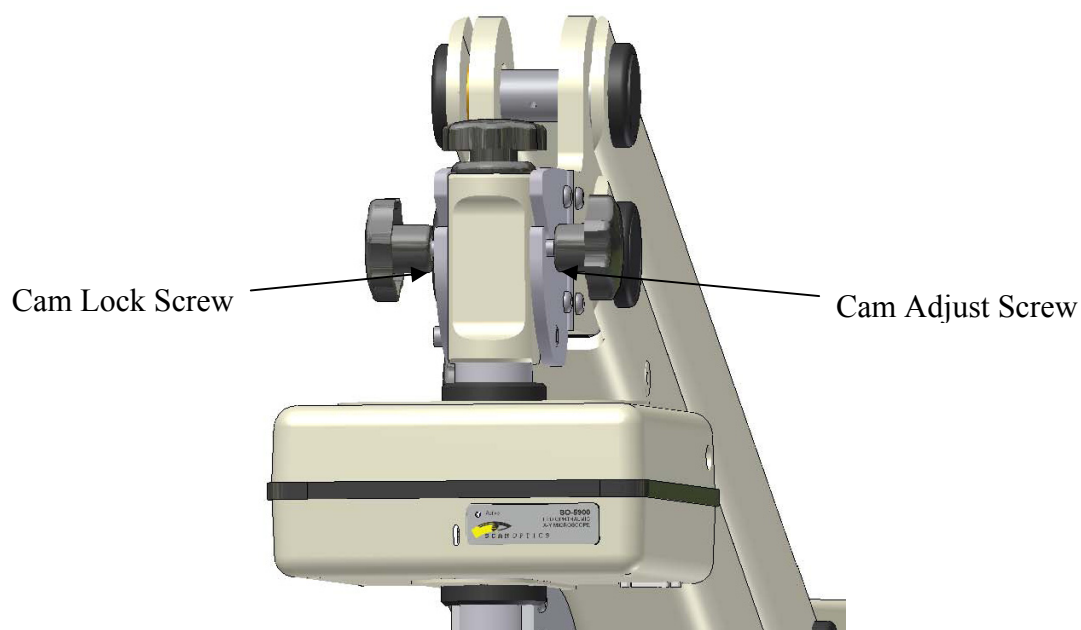


Figure 37, XY level adjustment.

GAS SPRING ADJUSTMENT

A gas spring inside the pantograph arm provides lifting force, which is able to support the weight of the XY unit and microscope head at the end of the arm.

By moving the end position of the gas spring, the amount of lifting force can be varied depending on the preference of the user or to suit the weight of additional accessories which may be placed on the microscope head assembly.

By rotating the knob clockwise, the end of the gas spring is lowered which increases the amount of vertical force. Similarly, anticlockwise movement will increase the end position height and reduce the amount of vertical force. The factory setting should mean the arm is almost perfectly balanced in any position when the standard accessories are placed on the microscope head. By variation of the gas spring position, the pantograph arm may also be set to always rise upwards, or to fall when released depending on individual preference.

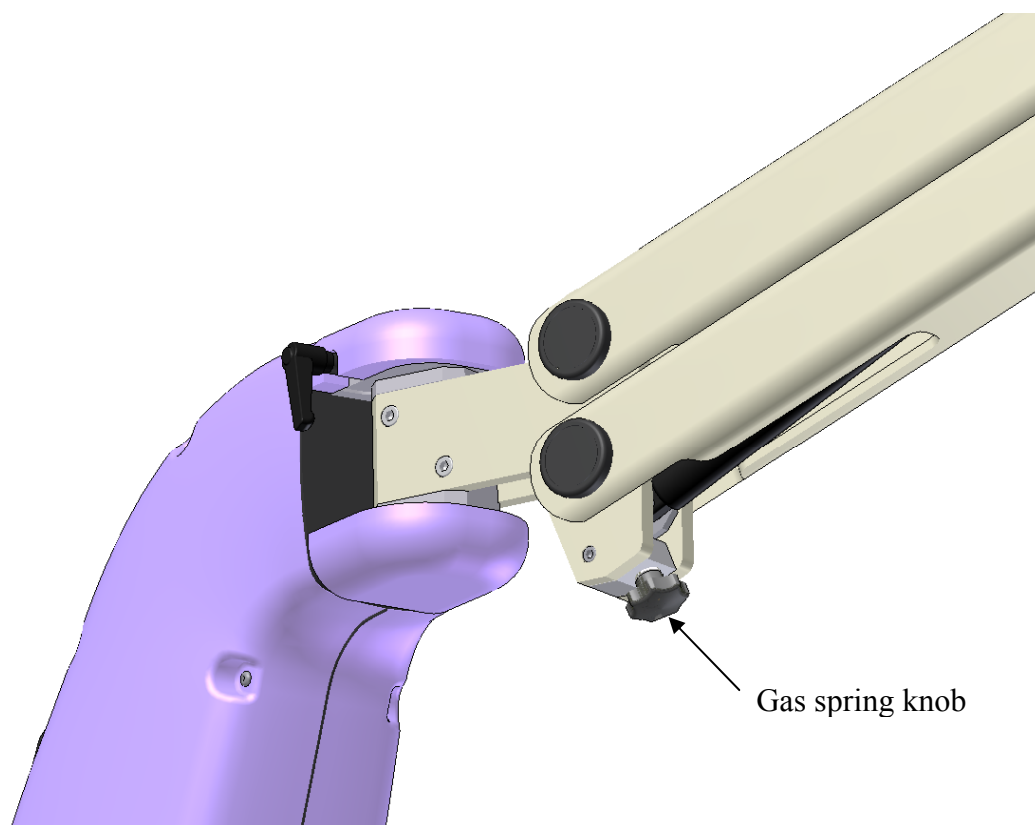


Figure 38, Gas Spring.

SAFETY STOP

The SO-5800 is fitted with a safety stop mechanism that enables the user to pre-set a particular height below which the pantograph arm will not move. Where the knob position is set closest to the horizontal arm end, there is no impediment to movement. When the knob is locked closest to the microscope head end, there will be almost no movement allowed in the pantograph arm below its rest (UP) position. Locations in between will allow a limited range of movement. Note that the knob **MUST** be locked in position for the safety mechanism to take effect. To use, unscrew the knob, then press the shaft in and move the slider to the desired position. To lock, screw the knob tight again.

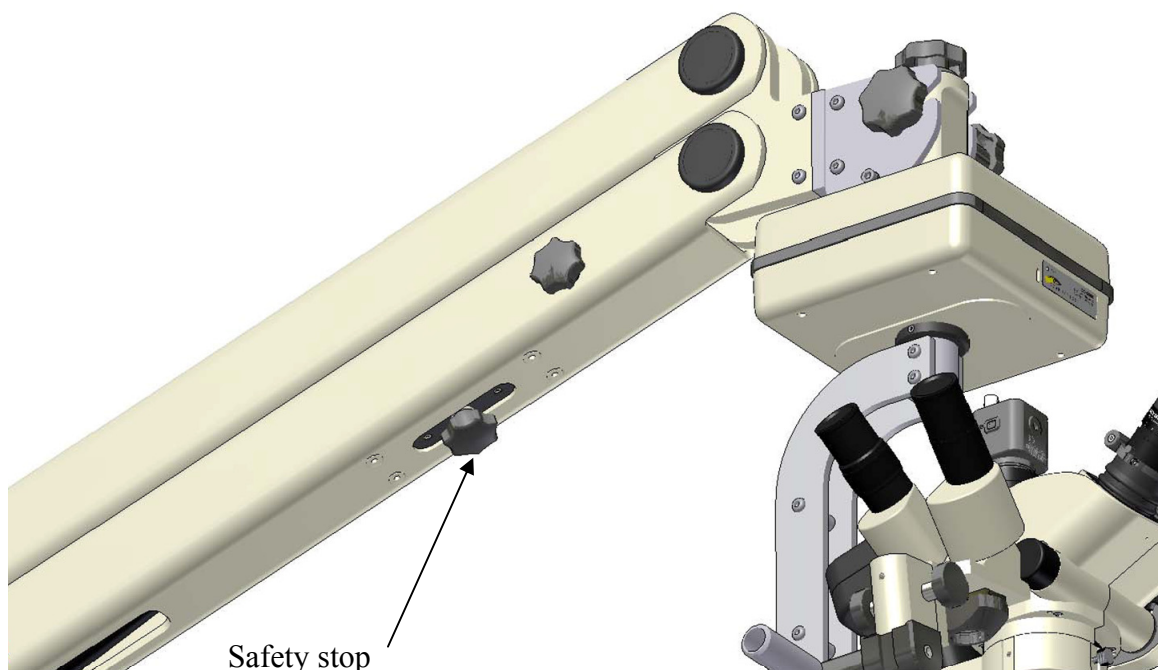


Figure 39, Safety Stop.

POWER SYSTEM

Power to the head is delivered from the XY unit to the connector block, which distributes power to the various systems. All power in this region is < 15Vdc.

The lamp power cable connects the lamp housing to the connector block and provides voltage for the LED lamp and its cooling fan. Power is also provided to the zoom drive motor and internally to the focus drive motor.

LIGHTING SYSTEM

The lamphouse provides the means for mounting a 20W LED lamp, which delivers light to the viewing field through a series of lenses, filters and a prism. The cooling fan enables the lamp to be run at maximum intensity if desired without heating the housing to extreme levels. The prism is positioned to optimise red reflex – this means that the prism tip may be visible when the viewing field is maximised, that is at the lowest magnification settings. Light intensity may be adjusted from the main control panel on the power supply.

FOCUS MECHANISM

A geared DC motor provides the means for driving the head assembly up and down for focussing via foot control. The motor is located inside the focus drive cover. Focus speed may be adjusted by using the intensity buttons on the LCD control panel on the main power supply. The manual knob located on the left side may be used instead of the foot control, if this is a preference of the user or in the event of a power failure. In this case the manual knob will simply drive the motor.

Do not attempt to drive the focus simultaneously using the foot control and the manual knob. This will damage the drive gears.

The range of focus movement is approximately 50 millimetres.

ZOOM MECHANISM

The zoom mechanism can also be driven by foot control or by using the manual zoom knob on the left side of the microscope head. A geared DC motor located inside the zoom cover provides the means for foot controlled zooming. When using the manual zoom, the manual knob will simply drive the motor.

Do not attempt to drive the zoom simultaneously using the foot control and the manual knob. This will damage the drive gears.

When the standard 0.62x objective lens is used with this microscope, the range of magnification controlled by the zoom mechanism is between 4x and 25x

VIEWING SYSTEM

The optical head provides the means for viewing the subject matter under magnification. There are adjustments available to suit the user in order to achieve the clearest image in the most comfortable circumstances. The pupillary distance (PD) may be adjusted manually by sliding one eyepiece sideways – the other eyepiece will move simultaneously in the opposite direction. On microscopes fitted with the optional PD adjuster, this is achieved by rotating the knob that protrudes to the side of the eyepieces. Eyepiece caps are provided to protect from dust entering the eyepiece tubes when the microscope is not in use. Simply remove the eyepieces and replace them in their protective wrapping, and insert the eyepiece caps in their place.

STERILISATION

Scan Optics microscopes are supplied with two sets of sterilisable covers – one set may be used while the other set is undergoing sterilisation. Additional sterilisable covers may be purchased from Scan Optics in the event of loss or damage. Simply slip the covers on to the zoom or focus knobs when required.

The covers may be sterilised by:

- boiling
- autoclaving
- chemical sterilisation
- gas sterilisation

Note that national authorities may require the use of specific sterilisation or disinfection methods.

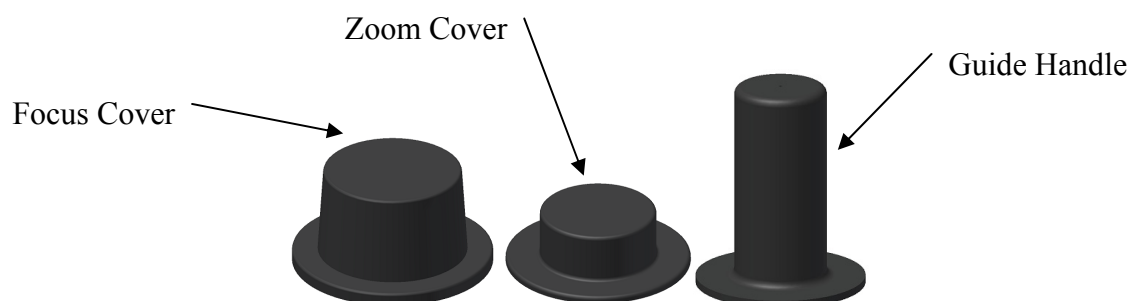


Figure 40, Sterile Covers

NOTE: The Sterile covers are not supplied in a sterile state.

MOVING THE HEAD INTO POSITION

Note that sterilised covers should be applied to the manual focus and zoom knobs and the side and guide handles before these parts of the microscope are touched by a sterile operator.

Move the head into approximate position using the arm assembly articulations.

Use the foot control to move the microscope focus up to the half-way position.

Use the manual focus knob or optional side handle to move the head up or down while looking through the eyepieces to roughly focus the microscope.

If the microscope eyepieces are higher than the most comfortable position for the operator and it is not possible or practical to adjust the operator's seat, rotate the tilt knob clockwise to tilt the head of the microscope down. To ease this operation, support the weight of the microscope head with one hand while using the other hand to rotate the knob. The range of tilt adjustment is from 45° downward to 5° above the horizontal.

FOCUSSING THE MICROSCOPE

Focussing the microscope in the correct sequence is an important step in setting up for use.

Set the pupillary distance of the microscope by moving the eyepieces apart or together as required. The eyepieces are geared together and will move equal distances on either side of the optical centre of the microscope.

Set the refractive error scale to zero on the LHS eyepiece.

Choose a high magnification zoom setting or one which is typically used in surgery.

Close the left eye and look through the right eyepiece of the microscope with the right eye only.

Focus the microscope slowly until the image is sharply in focus.

Close the right eye and look through the left eyepiece of the microscope with the left eye only.

Rotate the refractive error adjustment ring on the left eyepiece until the left eye is in focus. The reading on the ring will give an approximate measure of the relative refractive error between the left and right eyes.

Look through both eyepieces normally and check that the image is focussed and that stereopsis is achieved.

MONITOR AND CAMERA SYSTEM

Refer to the MONITOR, CABLE, CAMERA AND POWER ASSEMBLY assembly instructions found earlier in this manual, as well as the camera and monitor manufacturer's instructions.

ASSISTANT MICROSCOPE

Refer to SO-1450 manual included with this manual

FOOT CONTROL

The SO-5800 foot control allows the user to focus and zoom the main microscope by depressing foot switches and to move the microscope laterally (XY) by foot movement of a joystick, it also allows light intensity adjustment. If the XY function is not required, and if the user's preference is not to use the motorised focus and zoom, disconnect the foot control.

Do not attempt to drive the focus or zoom simultaneously using the foot control and the manual knob. This will damage the drive gears.

ROUTINE CARE AND MAINTENANCE

Optical Head

Cleaning the optical components

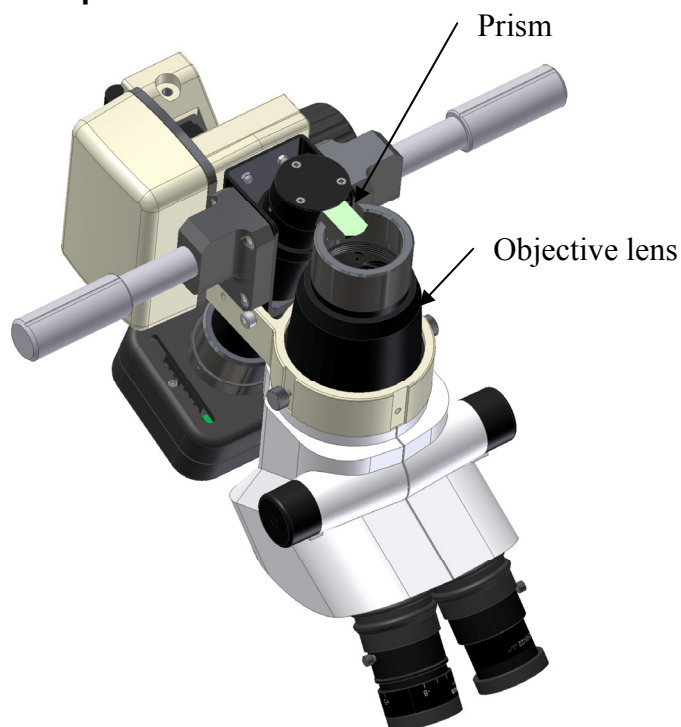


Figure 41, Microscope Head -Underside view

The eyepieces, objective lens and lamphouse prism should be checked for cleanliness each time the instrument is used. Surface dust should be removed with a clean, soft brush. Fingerprints, irrigation solution residue and grease may be removed by lightly wiping with a cotton cloth or lens tissue moistened with a mixture of 70% ether and 30% absolute alcohol (either ethanol or methanol). Use pure alcohol if no ether is available.

Do not use acetone as it may damage the surface coatings of the lenses.

Cleaning the plastic parts and paintwork

Use water based cleaners only. Do not use any organic solvent such as alcohol, ether or xylene.

Do not dismantle.

Apart from instructions specifically mentioned within this manual, no parts inside the optical head of the instrument can be serviced by the user. Attempts to dismantle the optical head or prism cover will make any warranty void.

Protection against mould

In hot and humid climates it is common for mould to grow on optical surfaces. Cleaning and repairing the damage can be expensive and inconvenient. To minimise the risk of mould forming, do not leave the instrument without either eyepieces or eyepiece blanks inserted and always store the optical head in a sealed bag containing silica gel desiccant. Scan Optics microscopes are fitted with anti-mould protection. In tropical climates, routine checking for the presence of mould is essential.

Replacing mould protection

The microscope is fitted with anti-mould protection which is effective for approximately three years. However, the effective life of this protection will depend on environmental factors such as the temperature and humidity of the place where the microscope is stored. Regular inspection of the microscope will help early identification of mould and alert the user of the need to replace the anti-mould protection.

To replace the anti-mould pellet:

1. Zoom the microscope to the lowest magnification setting
2. Loosen the retaining screw on the front of the microscope head.
3. Lift the microscope out of the mounting ring
4. Remove the prism protector from the auxiliary objective assembly by prying it apart
5. Unscrew the cover from the bottom of the microscope head. The location of the existing anti-mould pellet will be revealed from the front of the microscope head.
6. Remove the old anti-mould pellet.
7. Peel the adhesive backing from the new anti-mould pellet and place it in the same location.
8. Zoom the microscope in and out all the way to make sure the zoom optics do not dislodge the pellet.
9. Screw the cover back on.
10. Replace the prism protector on the auxiliary objective assembly, making sure that the slot lines up with the location of the lamphouse prism.
11. Replace the microscope head back in the mounting ring and re-tighten the retaining screw.
12. Update the anti-mould label on the microscope head, or replace it with a new label.



Figure 42, Fitting the Anti-mould pellet.

TROUBLESHOOTING

SYMPTOM		FIRST STEP	REMEDY
VIEWING SYSTEM	The image is blurry	If the microscope or object has moved it may no longer be in focus.	Refocus the microscope
		A different user may require adjustment for their refractive error.	Adjust the eyepieces for refractive error – refer Focussing the microscope.
		Check the eyepieces for cleanliness.	Carefully remove and clean the eyepieces if they are dirty, then replace them.
		Check the objective lens for cleanliness.	Carefully clean the objective lens, taking care not to damage the lamphouse prism.
	No image is seen	Check that the eyepieces have been inserted.	Insert the eyepieces.
		Check for obstructions in the viewing path	Remove the obstruction.
MOUNTING SYSTEM	The microscope is falling under its own weight	Loosen the arm friction handle and observe if the pantograph arm offers any significant resistance to downward pressure	If it does not then the gas spring may have failed. Contact your distributor, local service agent or Scan Optics.
		Locate the gas spring adjustment near the elbow joint between the arms.	Adjust the gas spring to compensate for additional load on the end of the microscope arm - refer Gas spring adjustment
	The microscope is not stable	Check that the microscope' wheel lock is securely locked and used on a level surface.	Lock the wheel lock.
			Place the microscope on level surface.
		Check that the appropriate friction knobs have been set correctly	Refer Arm assembly adjustments
		Check if the microscope head is seated correctly in the wrist joint	Refer Assembling the arm and head
FOCUS SYSTEM	The Focus is very hard to adjust	Loosen the focus friction lock.	

SPECIFICATIONS

OPTICAL HEAD	
VIEWING SYSTEM	Binocular, stereoscopic (convergence angle 10°)
	Eyepiece tube inclination 45°
MAGNIFICATION	Zoom magnification, range 4.2 x - 25x
WORKING DISTANCE	Auxiliary objective to object distance 180 mm
FIELD OF VIEW	15 - 65mm, depending on magnification
REFRACTIVE ERROR	+/- 5D left eyepiece
FOCUSING	Range ± 25mm
INTERPUPILLARY DISTANCE	Adjustable for Distance PD range approximately 50 to 80mm
LIGHTING SYSTEM	
LIGHT ALIGNMENT	Direct, Coaxial with viewing system,
TYPE	Typical 20.8V 27W Ostar LED (@ 25 ° C)
FILTERS	Internal ultraviolet and infrared filters
LIFE	Minimum 10 years
ILLUMINATION	50,000 Lux minimum at maximum setting
POWER SUPPLY	
MAINS POWER	100-110V, 220-240V AC, 47-440Hz universal input
OUTPUT	Regulated output
INTENSITY CONTROL	9 Levels
EARTHING	Via earth lead of power cable (green/yellow)
DIRECT CURRENT	15 V DC source optional
CIRCUIT BREAKERS	3A Overload protection
MAINS CABLE	Length 5 metres
MOUNTING SYSTEM	
HEIGHT	1750mm
HEAD TILT	+5° to -45°
XY RANGE	50 x 50mm
VERTICAL TENSION	Adjustable gas spring to set lifting force
DIMENSIONS	Shoulder to elbow 365mm Elbow to wrist 1020mm Wrist to optical axis 105mm Pantograph arm vertical range 460 mm (36 degrees)
FOOT CONTROLS	
FUNCTIONS	Zoom, Focus, XY positioning, Light intensity