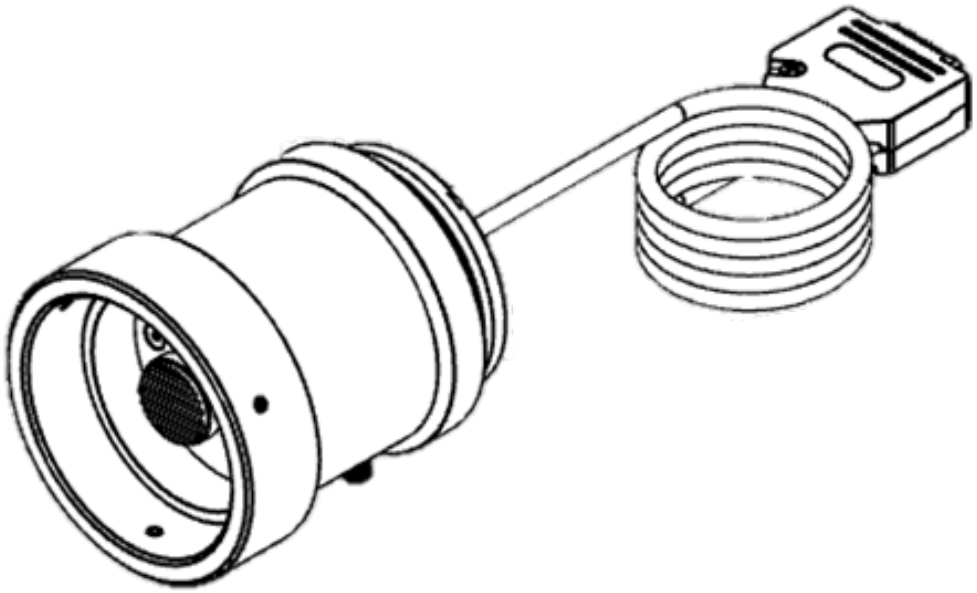
PS3H122R Focus Motor and Direct Couplings Installation Guide



Contents

The following instructions refer to the standard split-sleeve mounting for the focus motor. Instructions for direct couplings are included later in this guide.

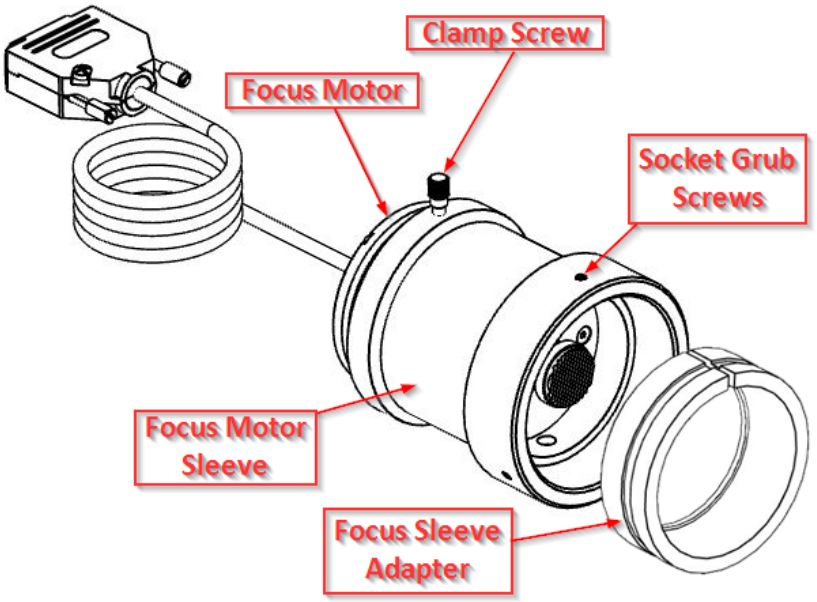
If you have any queries or concerns regarding your specific installation please reach out to Prior Scientific Technical Support at Techsupportuk@prior.com for advice and support.

Standard Parts

1. The following parts are required to connect a purchased PS3H122R to a compatible microscope:

PS3H122R

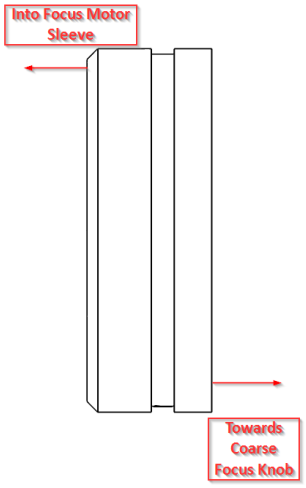
Description	Quantity
Focus Motor	1
Focus Motor Sleeve	1
Focus Sleeve Adapter	1
Clamp Screw	1
Socket Grub Screws	3



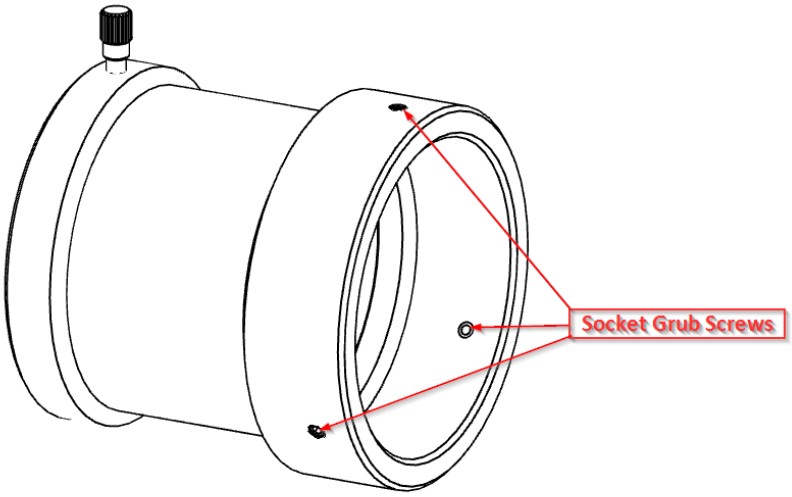
Standard Instructions

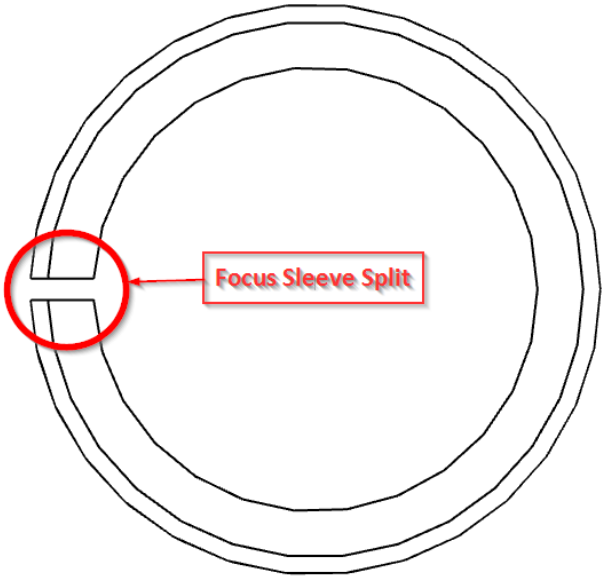
1. Loosen the clamp screw on the focus motor assembly and remove the focus motor from the sleeve.

2. Loosen the 3 socket grub screws around the outside of the focus motor sleeve with a 2mm Allen wrench until the focus sleeve adapter is able to fit inside the focus motor sleeve. **Note: It is important to insert the focus sleeve adapter in the correct orientation. There is an angled, chamfered, edge of the focus sleeve adapter that must be inserted first**. Please also note that there is a recess running around the circumference of the focus sleeve adapter. This recess must line up with the tips of the socket grub screws.



3. With the focus sleeve adapter in place, tighten the socket grub screws in sequence until they are flush with the outside of the sleeve. Ensure that the split in the focus sleeve adapter does not line up with any of the grub screw positions. **It is important to <u>not</u> fully tighten up any grub screws at this stage.**

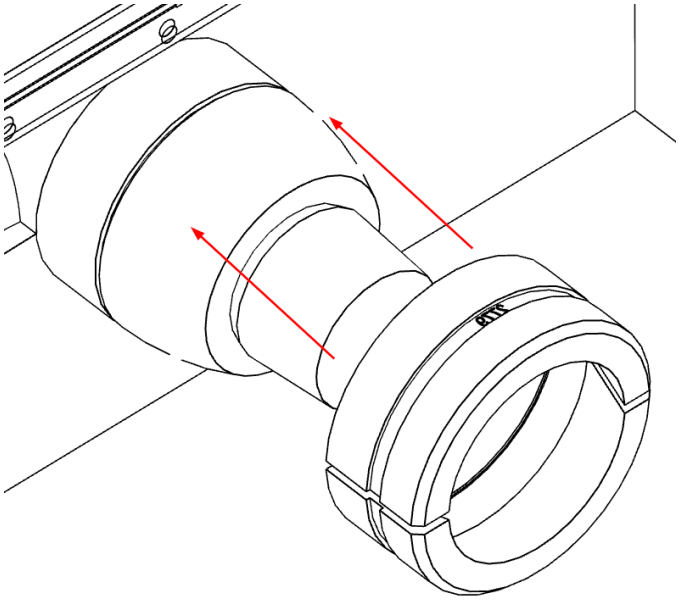


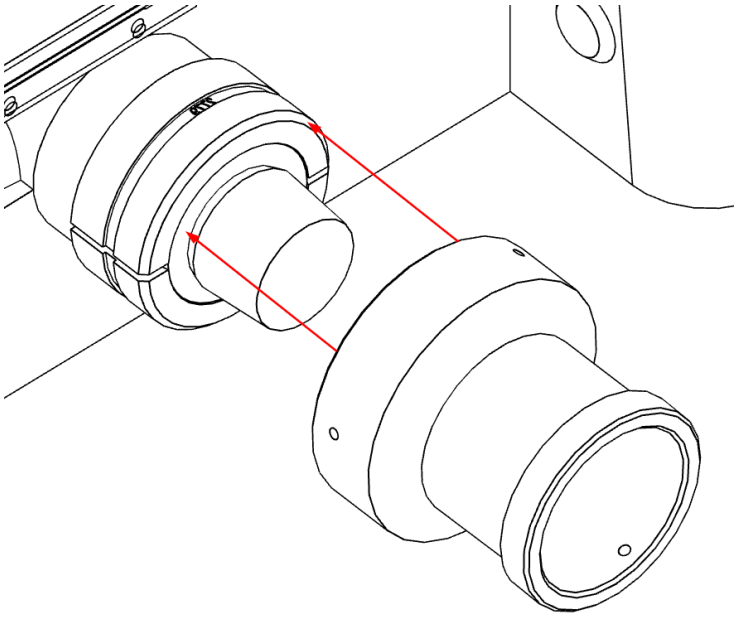


4. Push the complete focus adapter firmly onto the preferred right hand coarse knob of the microscope as far as it will go, as shown in the images below.

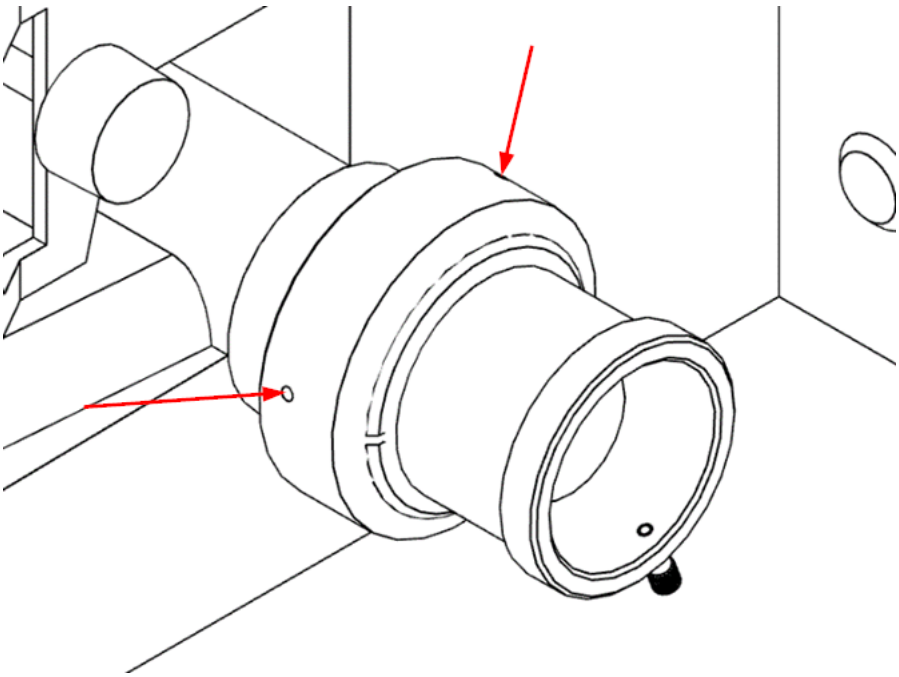
   The controller is factory configured to drive the focus motor in the correct direction when mounted to the right-hand side of an upright microscope.

   If the right-hand coarse knob is unsuitable, or cannot be accessed, the left knob can be used. Refer to "*Alternate Focus Motor Orientations*" section for further instructions.





5. While holding the focus adapter in place, firmly tighten the grub screws in sequence to secure the unit onto the coarse focus knob. The focus knob will have to be rotated to gain access to all of the screws.

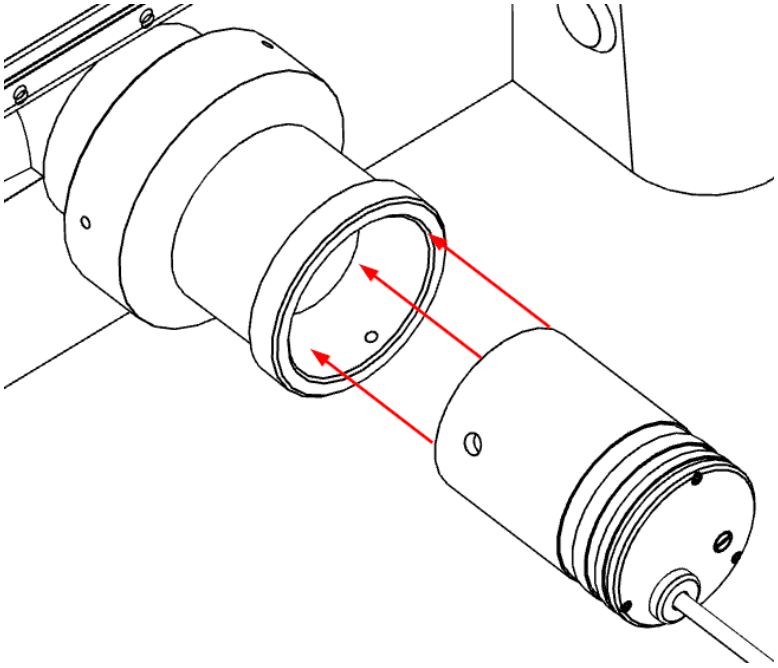


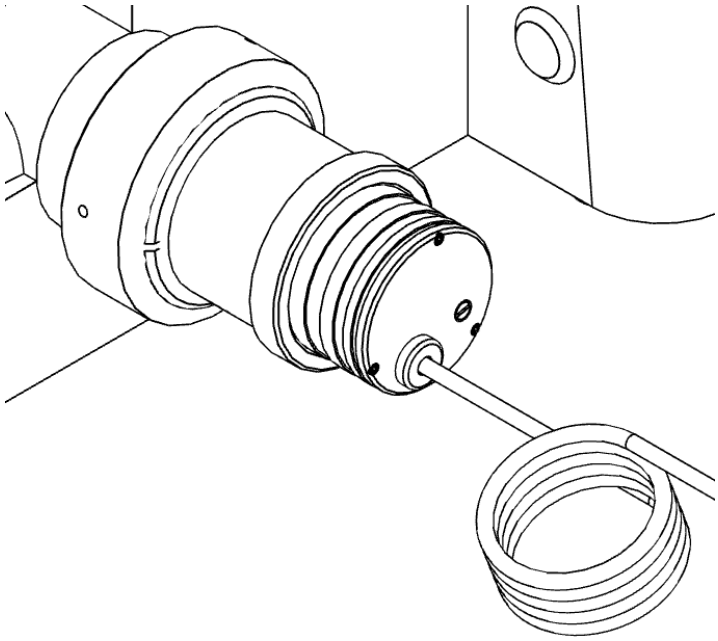
6. Check that the unit has been tightened sufficiently by taking hold of it and turning it. If the adapter is correctly fitted, it will stay attached to the coarse knob.

7. Slide the focus motor into the adapter as far as it will go as shown in the images below and, while applying gentle pressure to the motor, tighten the clamp screw. This will hold the motor in place.

   The rubber drive bush on the end of the motor spindle should now be pressing against the end surface of the fine focus control knob.

   This can be confirmed by manually rotating the exposed fine focus knob on the opposite side of the microscope and feeling for the resistance caused by the detent positions of the stepper motor as it rotates. This will not cause any damage to the focus motor.





8. Confirm that the controller is switched off before connecting the D-type plug on the focus motor lead to the socket on the rear of the controller.

   If attempting to use a new focus motor with an old controller or a new controller with an old focus motor, you may find the plugs do not match. Please contact your distributor or Prior Scientific for further support if this occurs.

Direct Coupling Installations

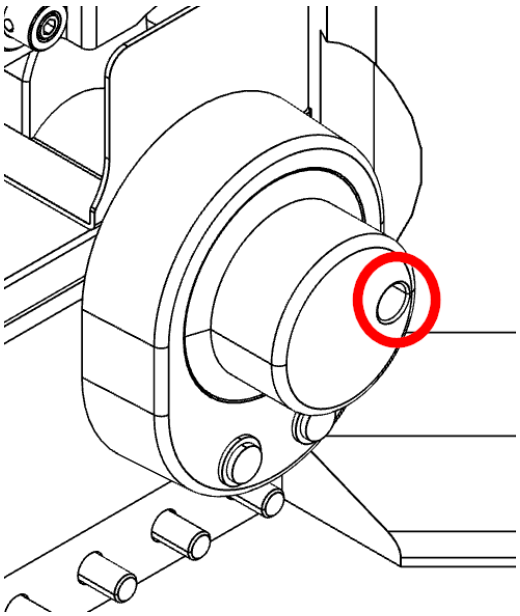
The installation of direct coupling focus drives requires a degree of disassembly of critical components. These installations should only be undertaken by an experienced technician familiar with the microscope and this type of assembly.

If unsure, do not complete these installations before consulting your microscope dealer or Prior Scientific.

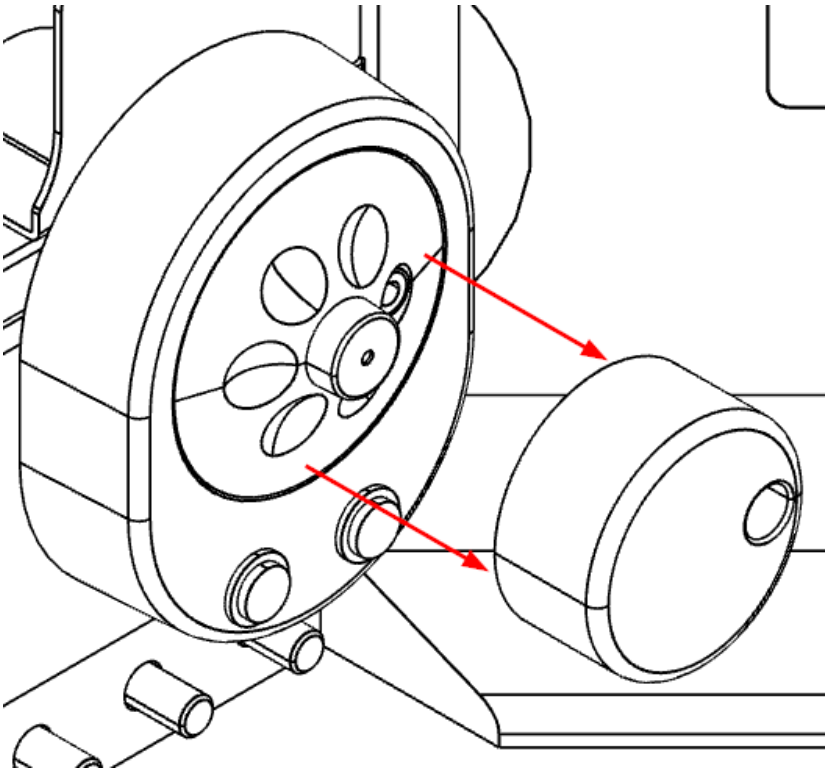
H122KBIX – Installation for Evident/Olympus IX and BX Microscopes

Description	Quantity
Coupler Adapter	1
Coupling Huco Hub, M4	1
Torque Disc, Black	1
Oldham Hub, 5 mm	1

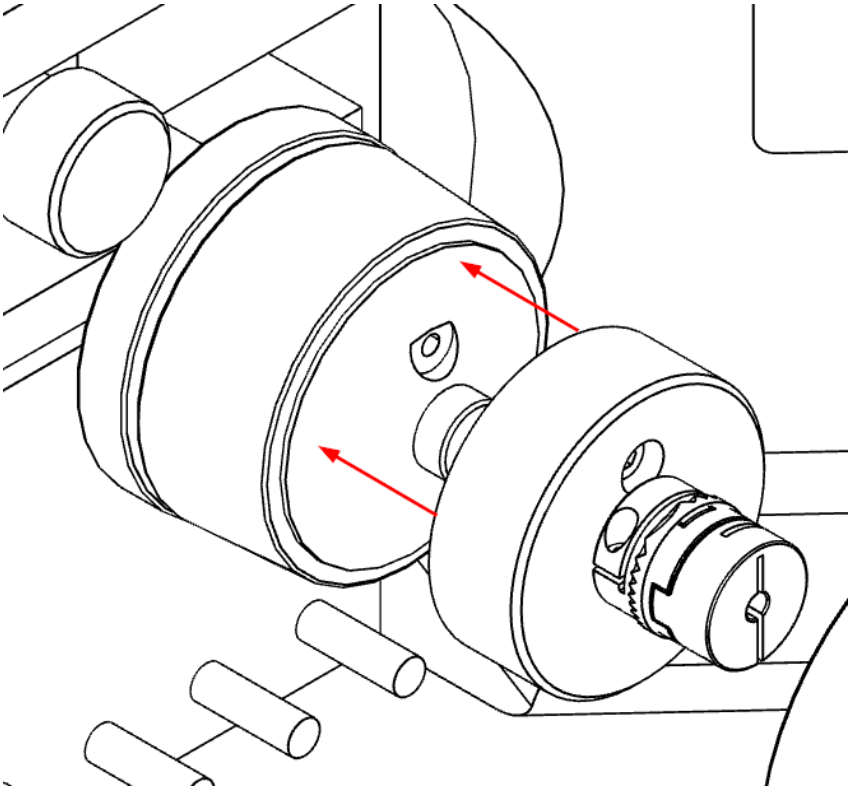
1) Remove the silver socket screw holding the outer fine focus knob to the coarse focus.

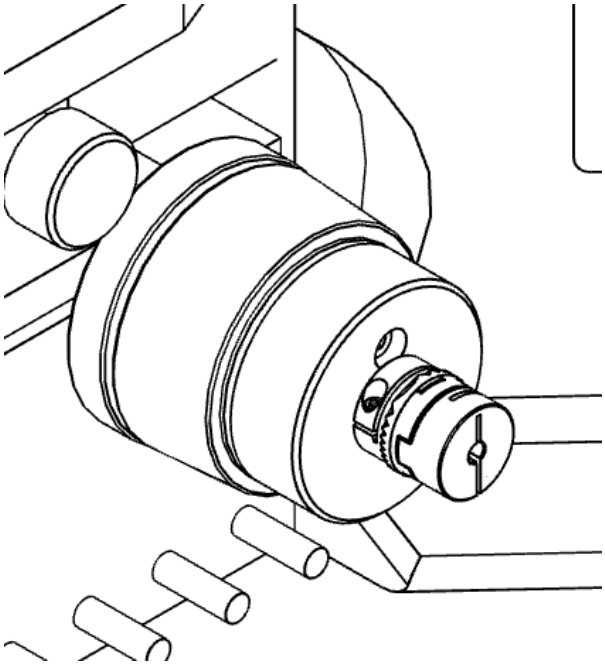


2) Remove the outer fine focus knob as shown below.

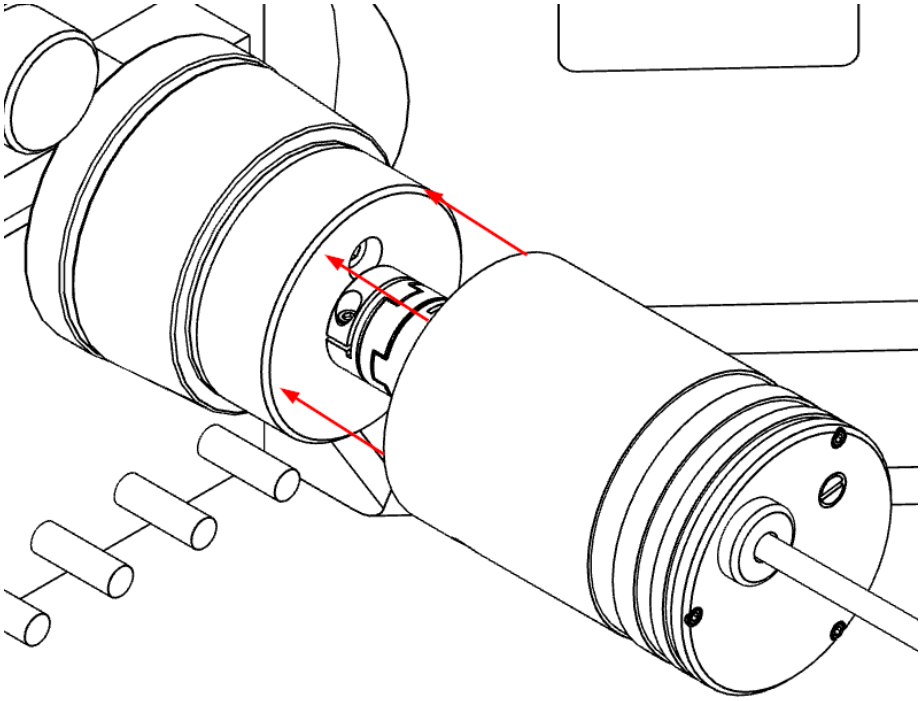


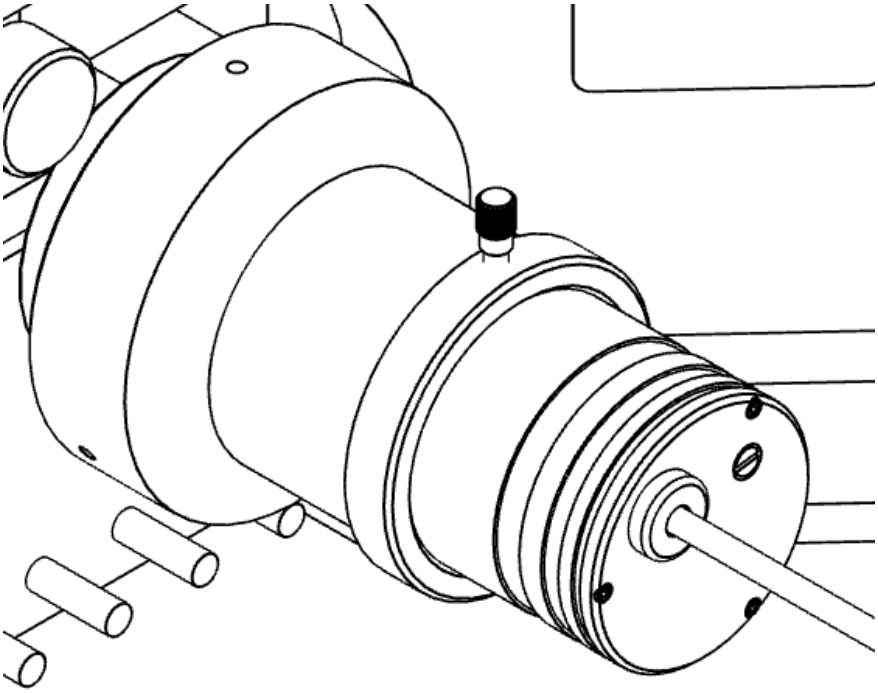
3) Attach the large plastic circular adapter with shaft extension to the inner fine focus knob using the original socket screw and then tighten securely.





4) Attach the inner hub and black anti-backlash coupler to the shaft extension as shown above. The outer hub will attach to the actual focus motor shaft of the PS3H122R and mates with the anti-backlash coupler as shown below. The motor cover sleeve can then be slid over and secured in place to complete the installation.



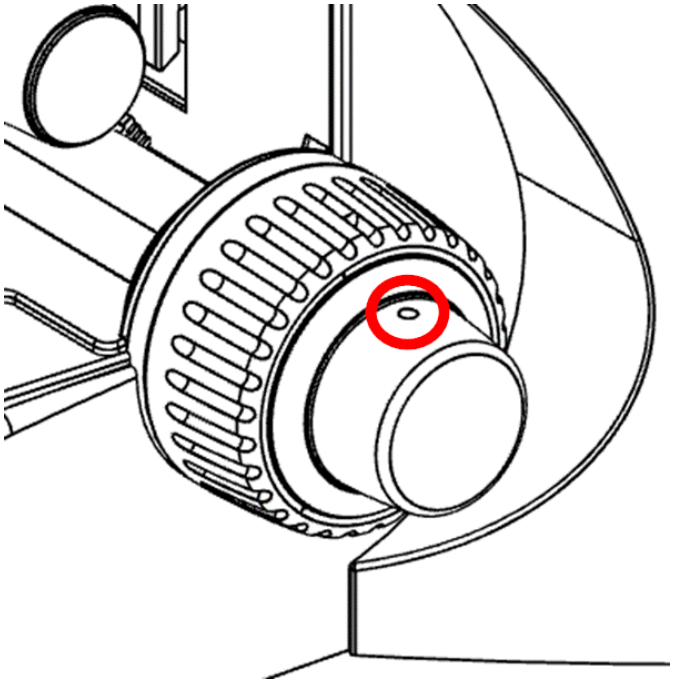


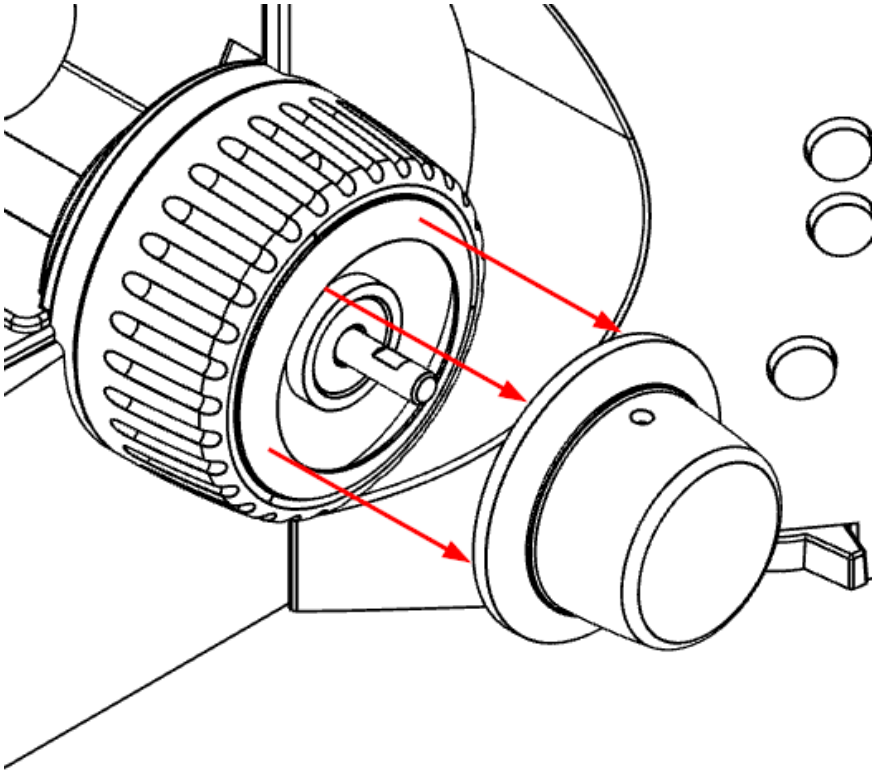
H122KLC – Installation for Leica DML and DMR Microscopes

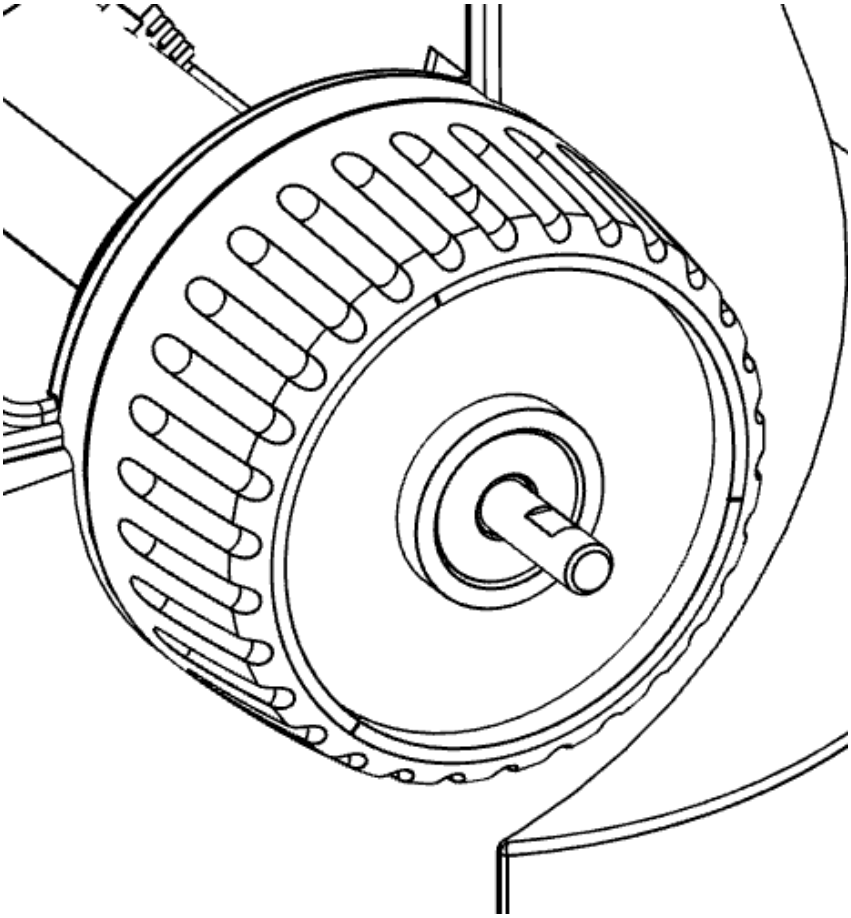
Description	Quantity
Compression Spring	1
Coupling Huco Hub, M4	2
Torque Disc, Black	1
Oldham Hub, 5 mm	1

1) Use a 1.27 mm hex key to undo the fine focus screw set, which will allow the knob to be pulled off. The below images display the sequence for removal.

   For the DML Microscope, place the focus sleeve adapter included with the PS3H122R over the coarse focus knob and secure the brass shaft using the hex key on the set screw.

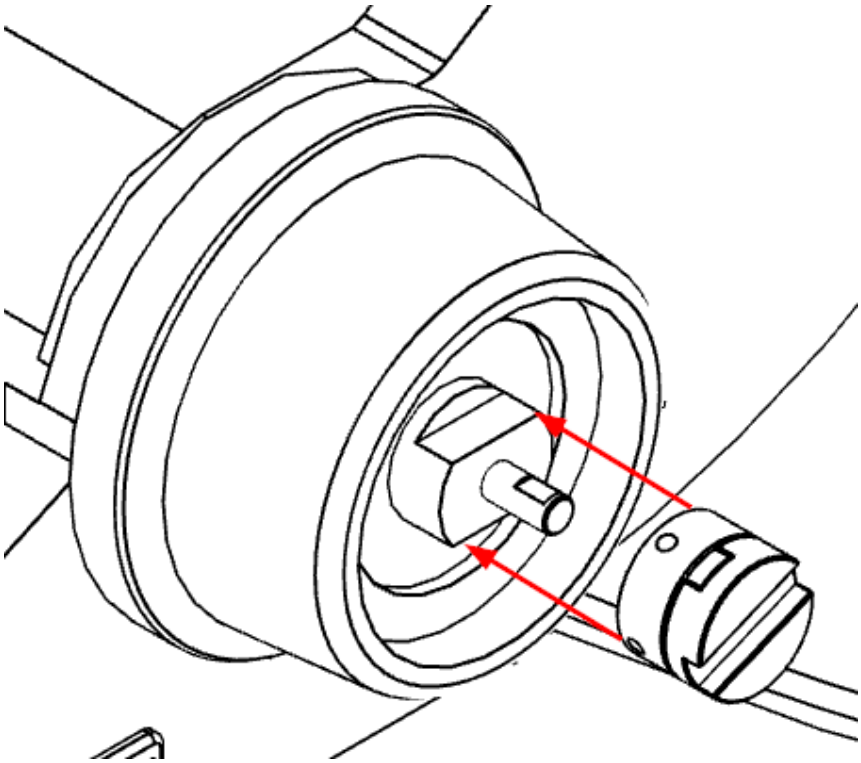


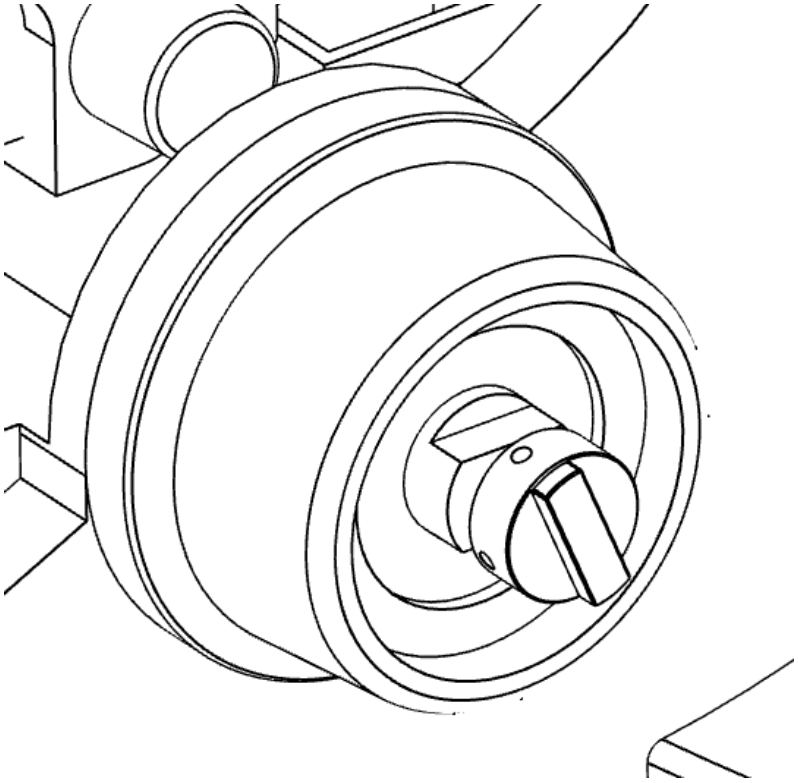




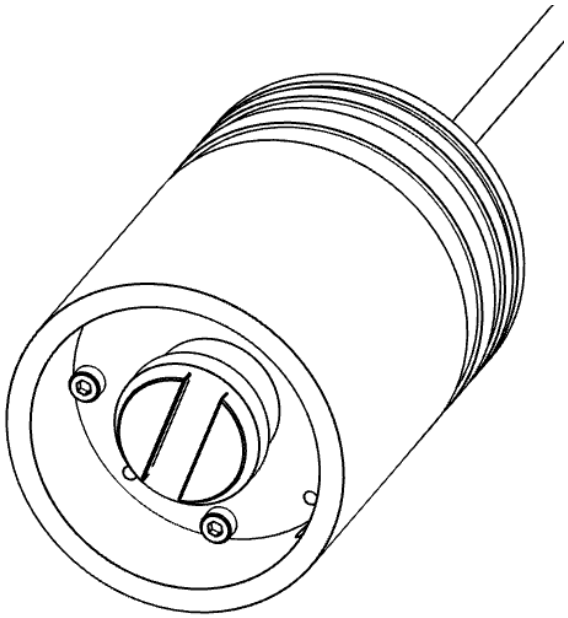
2) Place the compression spring over the fine focus shaft and place a coupling hub on the shaft whilst holding the opposite focus knob in position (otherwise it may disengage from the gears).

   Compress the spring by 3-6 mm and clamp the hub using the included hex key.

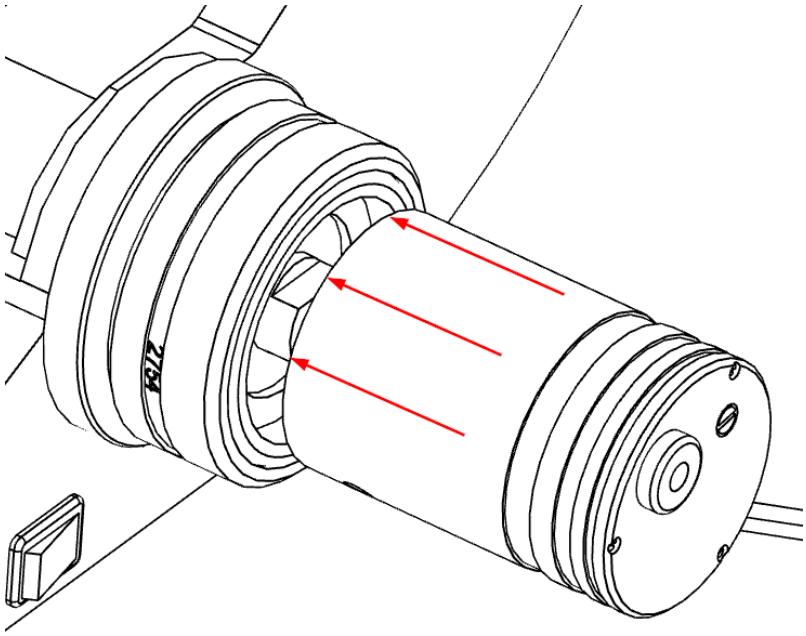


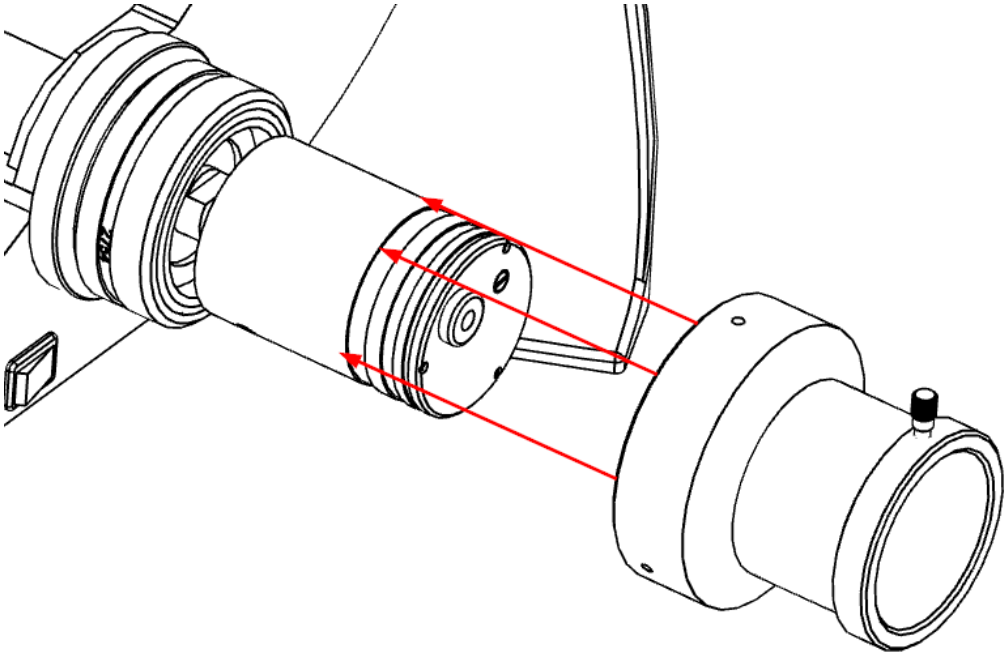


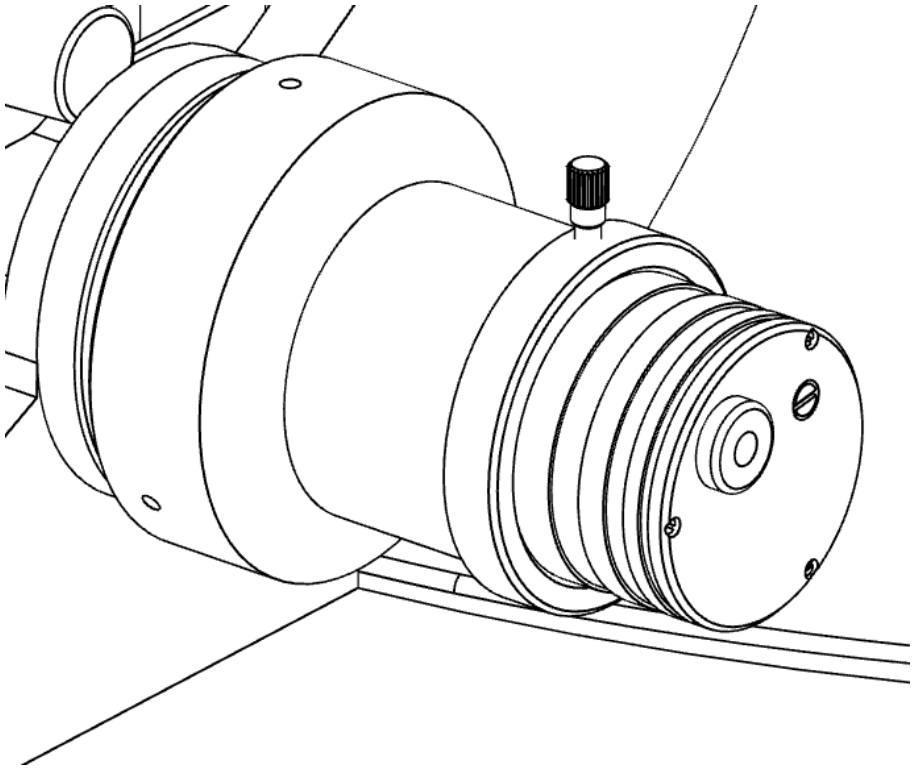
3) Push the remaining coupling hub on the focus motor shaft. Tighten using the hex key.



4) Place the adapter ring over the coarse focus knob. Align and push the couplings together and slide the motor focus sleeve over the focus motor and onto the adapter ring using the hex key to tighten the three set screws, again whilst holding the opposite focus knob. The below images show the attachment sequence.





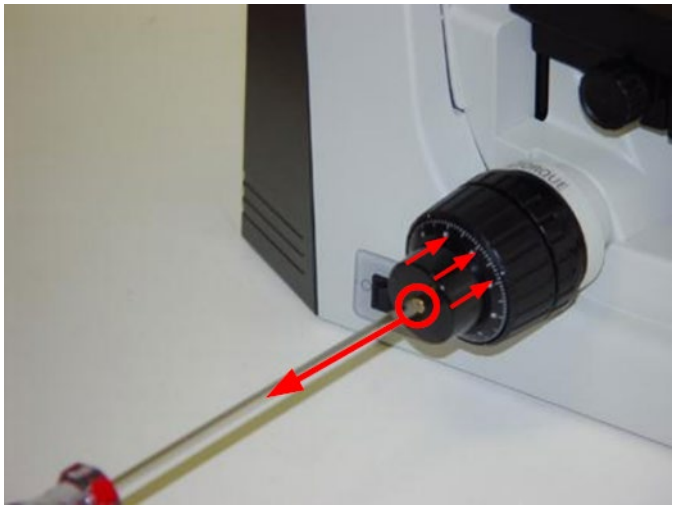


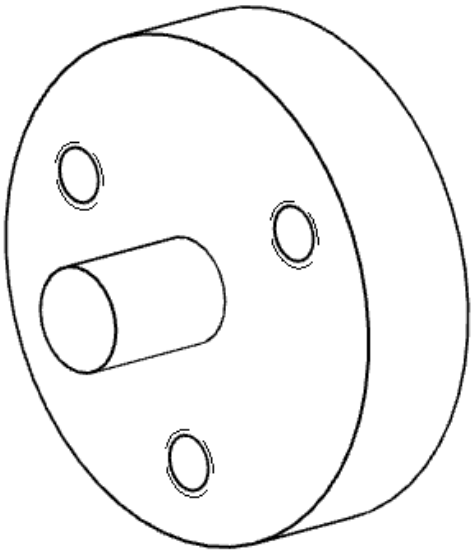
H122KNI – Installation for Nikon 50/80i Microscopes

Description	Quantity
Coupler Adapter	1
Coupling Huco Hub, M4	2
Torque Disc, Black	1
Shaft Extender	1

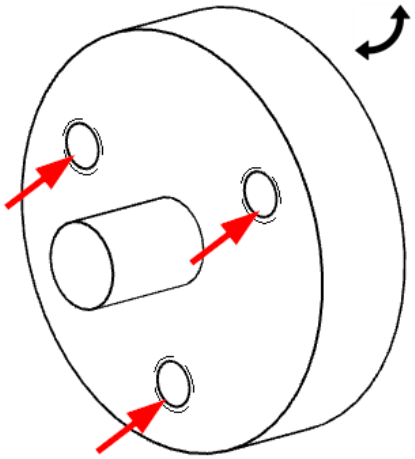
1) Remove the outer rubber cap from the left-hand side fine focus knob, exposing the slotted brass nuts.

2) Remove the slotted brass nut using a flat-head screwdriver. This will expose a threaded shaft. **Do not remove the fine focus knob.** Thread the shaft extender onto the fine focus shaft and tighten firmly with your fingers. The **longer** shaft should face **away** from the microscope. The below images show the removal sequence.

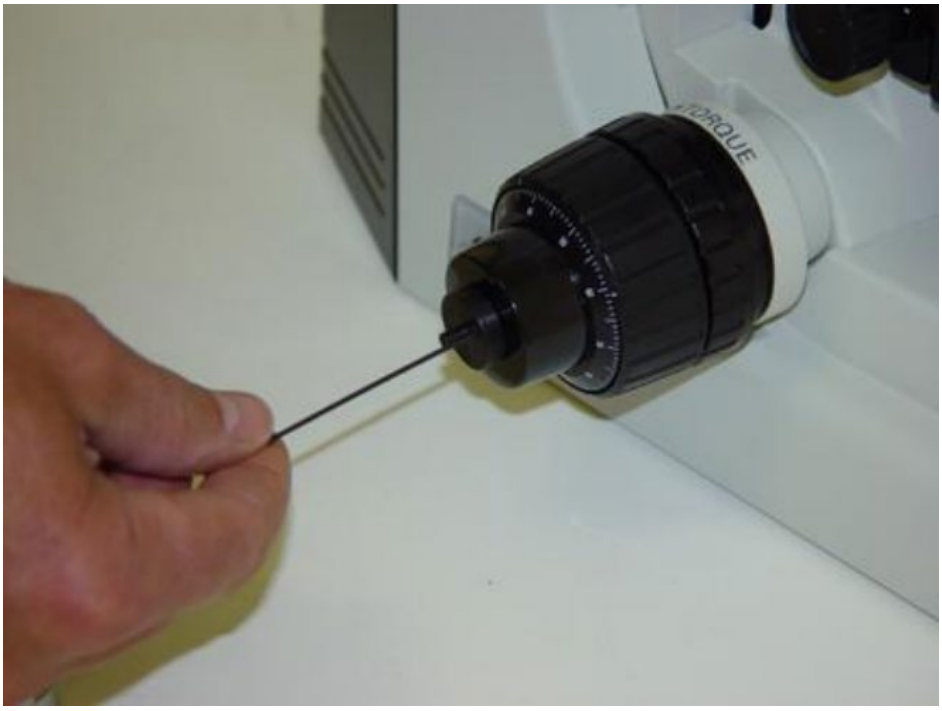




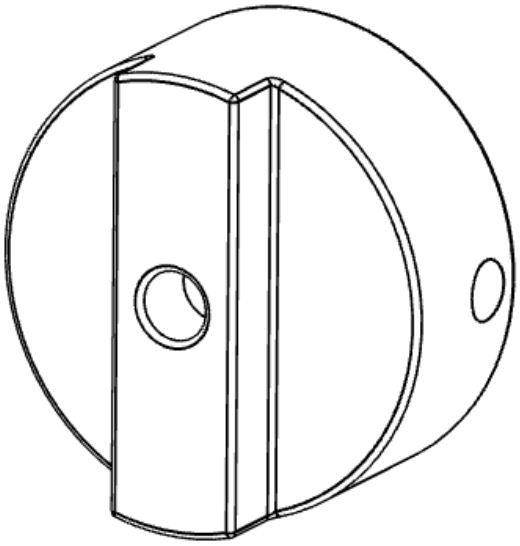
3) Tighten the three set screws on the shaft extender into the fine focus knob, quarter-turn at a time. Tightening the set screws quarter-turn at a time will ensure that the shaft extender stays aligned with the fine focus shaft.



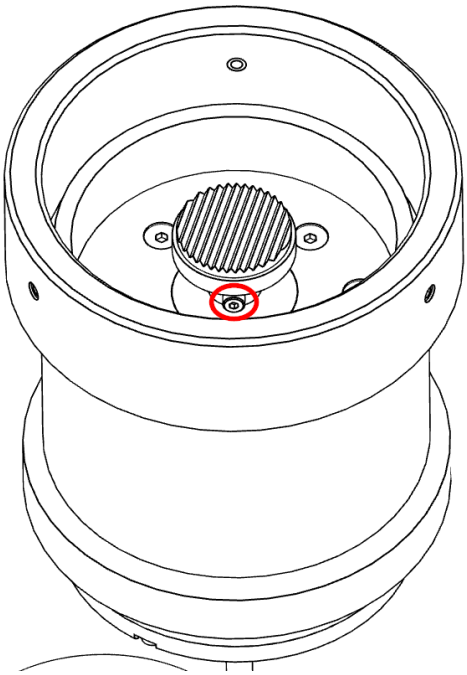
You can determine if the shaft extender is off-axis by looking down from above and rotating the fine focus knob. The shaft extender should spin true with no wobbling or distortions as it rotates.

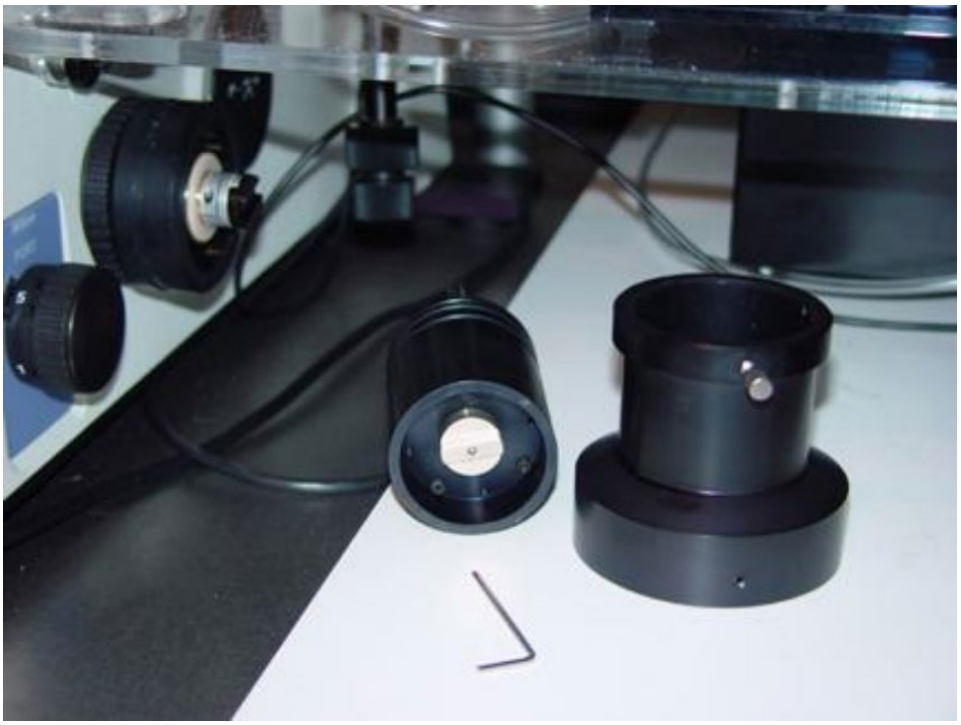


4) Mount a hub onto the shaft extender.

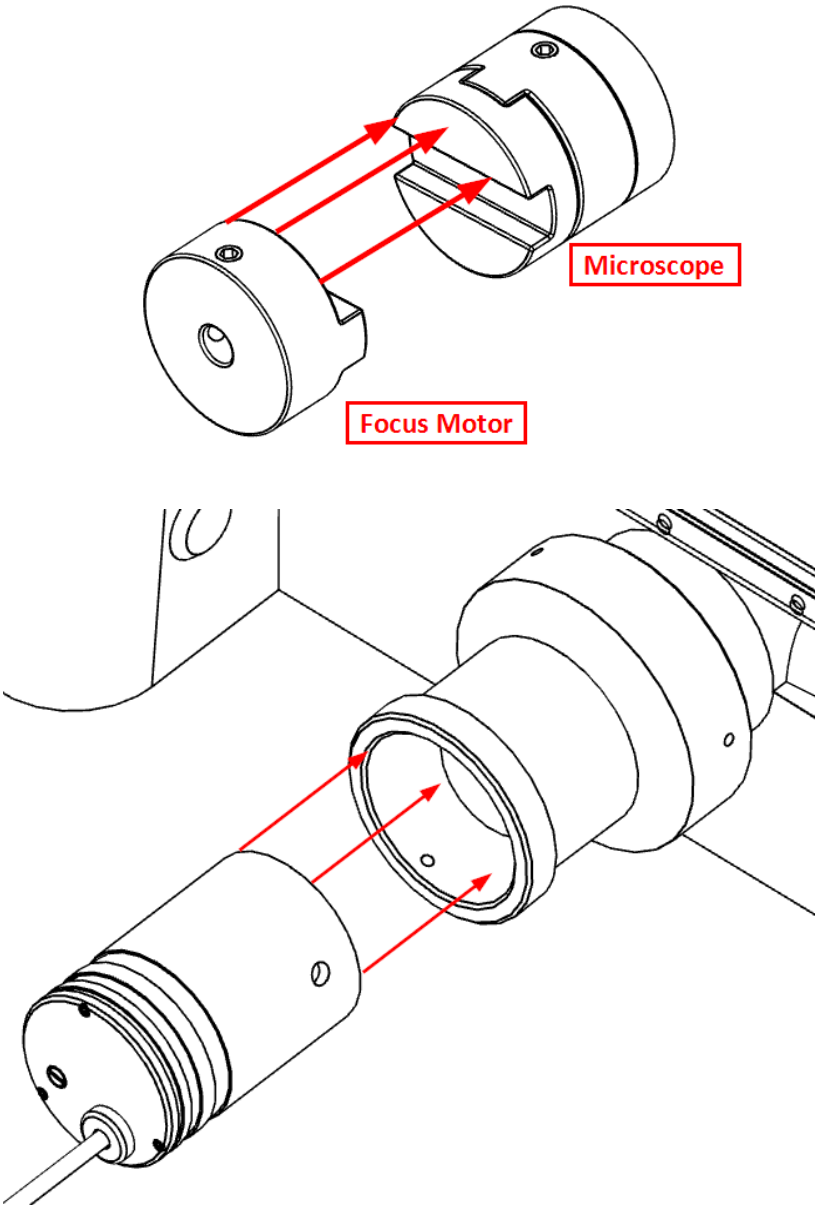


5) Remove the existing rubber coupler from the focus motor shaft by unscrewing the small grub screw on the axis behind the rubber pad and replace it with the remaining hub. The grub screw is circled below, and the following image shows the focus motor with hub replacing the rubber coupler.





6) Place the black plastic anti-backlash coupler into the hub attached to the fine focus shaft. Clamp the focus motor bell shaped housing onto the coarse focus knob using the three set screws located around the outside diameter of the focus motor sleeve.

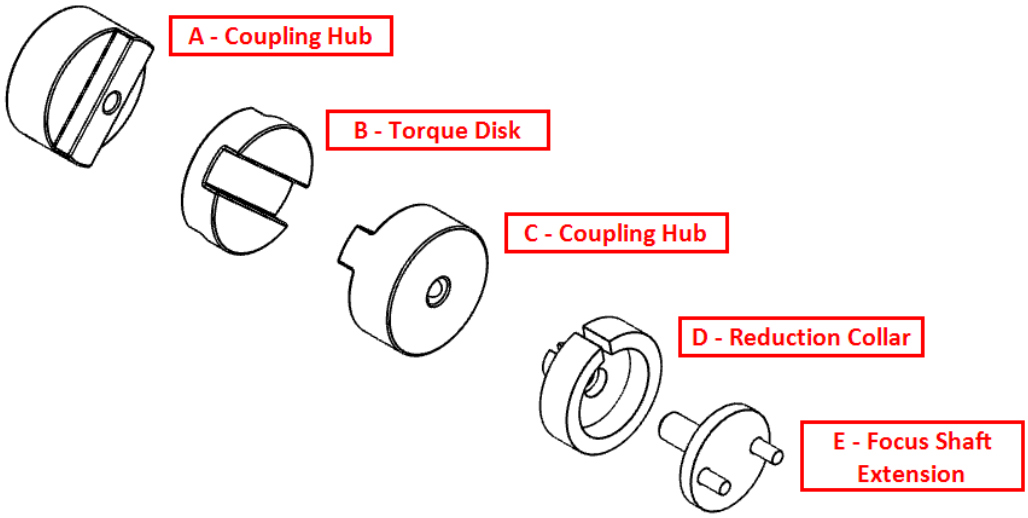


7) Slide the focus motor into the focus motor sleeve, taking care to align the raised section of the hub with the slot in the black plastic anti-backlash coupler. You may need to rotate the motor slightly to ensure proper engagement between the hub and anti-backlash coupler.

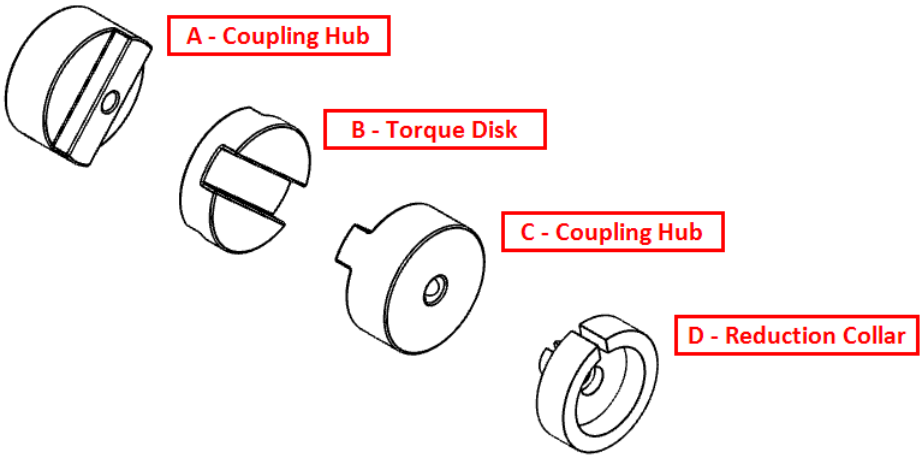
H122KON – Installation for Evident/Olympus and Nikon Microscopes

Description	Quantity
Coupling Hub, 1/4 inch bore	1
Coupling Huco Hub, M4	2
Torque Disc, Black	1
Oldham Hub, 5 mm	1
Reduction Collar, H122BXE	1
Reduction Collar	1
Focus Shaft Extension	1

1) Follow your microscope's instructions to remove the fine focus knob. The coarse focus knob should be left in position. To prevent the sudden dropping of a stage as the tension of the focus mechanism is released, move the stage to its lowest possible position before removing the fine focusing knob.

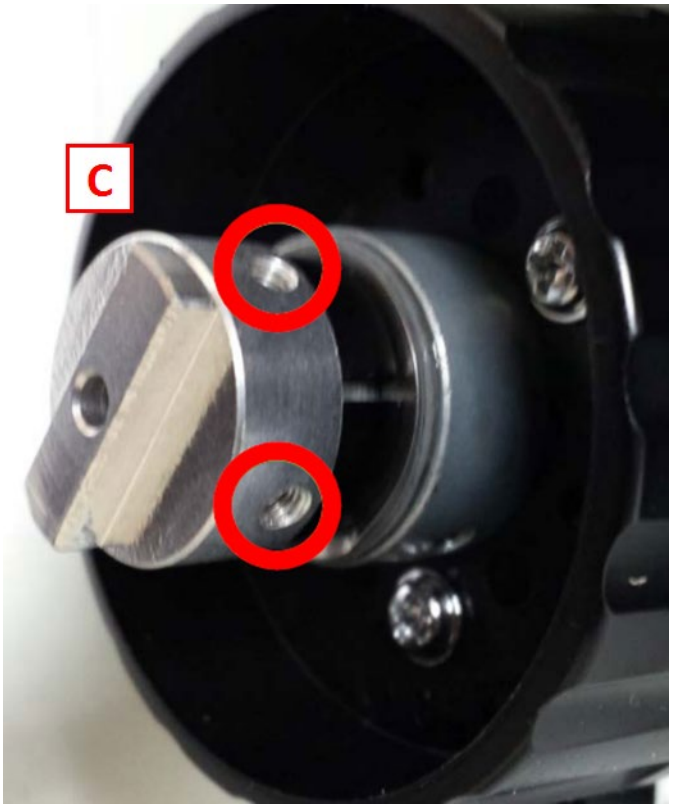


2) For **Evident/Olympus** microscopes, you will require 2x Coupling Huco Hub, 1x Torque Disc, and 1x Reduction Collar.

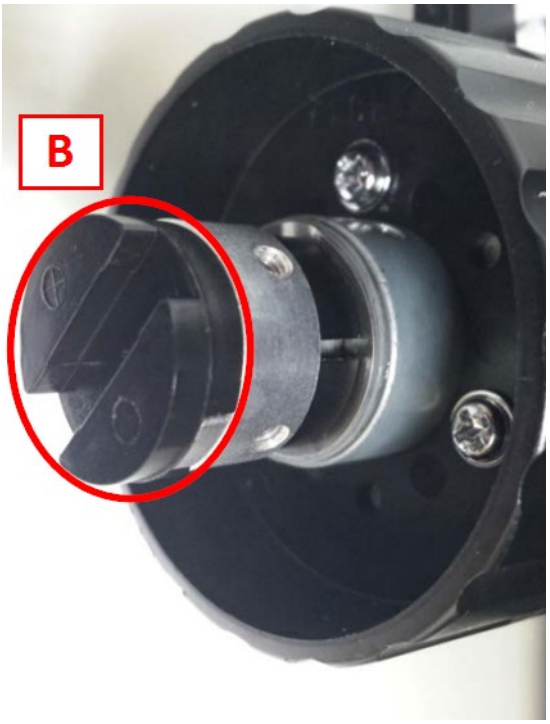


3) Secure the reduction collar (D) to the fine focus.

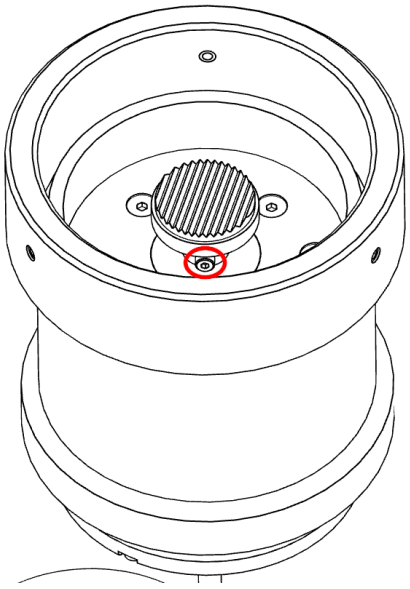
4) Attach one coupling hub to the reduction collar. Secure this coupling by tightening the set screws of the coupling hub.



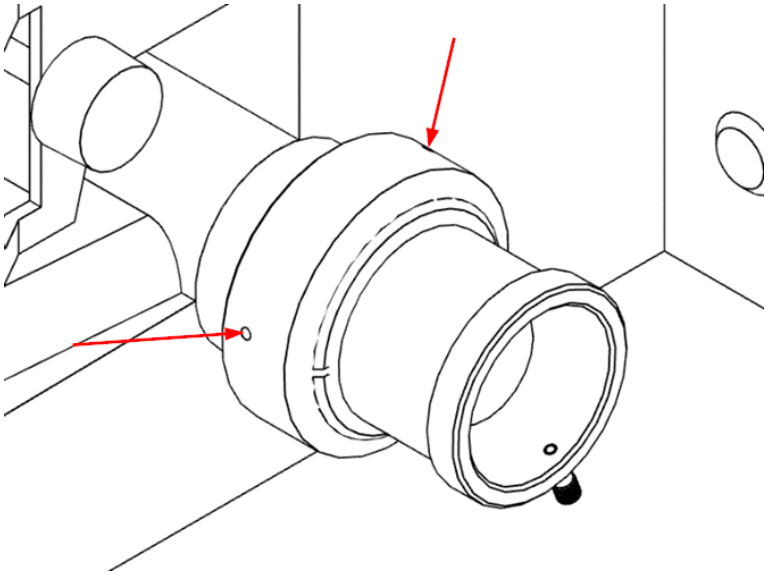
5) Add the torque disc, interlocking the hub and disc.



6) Remove the rubber coupler from the focus motor by unscrewing the connection on the axis behind the pad. Attach the second coupling hub and secure it with the set screws.

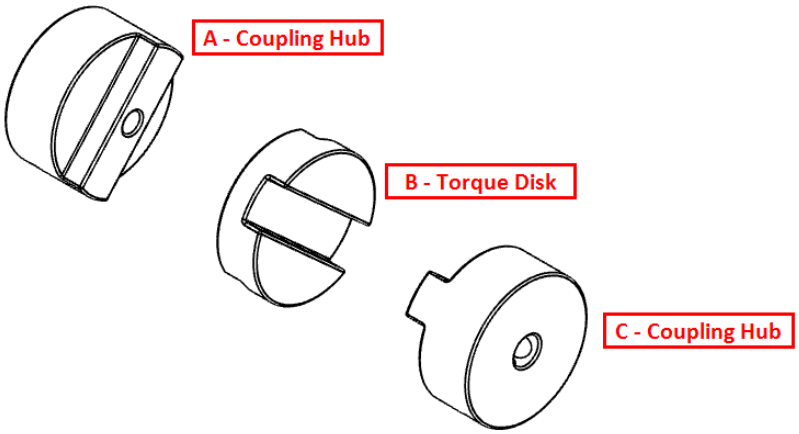


7) Mount the focus sleeve adapter over the coarse focus knob, as pictured below, and then mount the focus motor sleeve, tightening the three set screws to join the two together as in the image.



8) Ensure that the motor is in the correct position that the coupling hub connects to the torque disc tightly. Once the motor is in the correct position, secure it to the sleeve with the thumb screw.

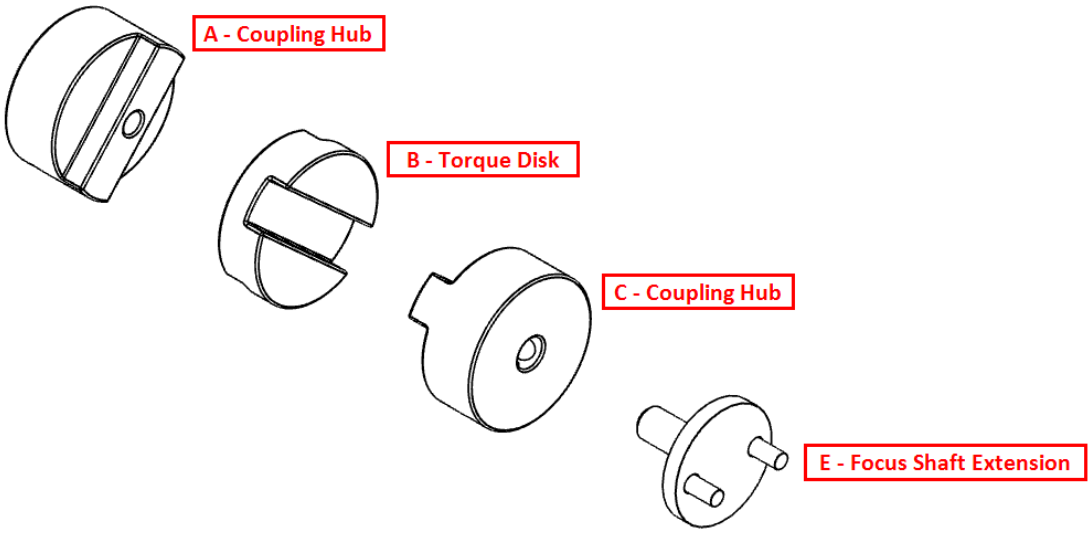
For **Nikon** microscopes, you will require 2x coupling hubs and 1x torque disc. The procedure is similar to the above but there is no need for the reduction collar or the focus shaft extension.



Mount the appropriate coupling hub with the correct diameter to match the Nikon fine focus shaft, ensuring the shaft goes through the coupling hub.

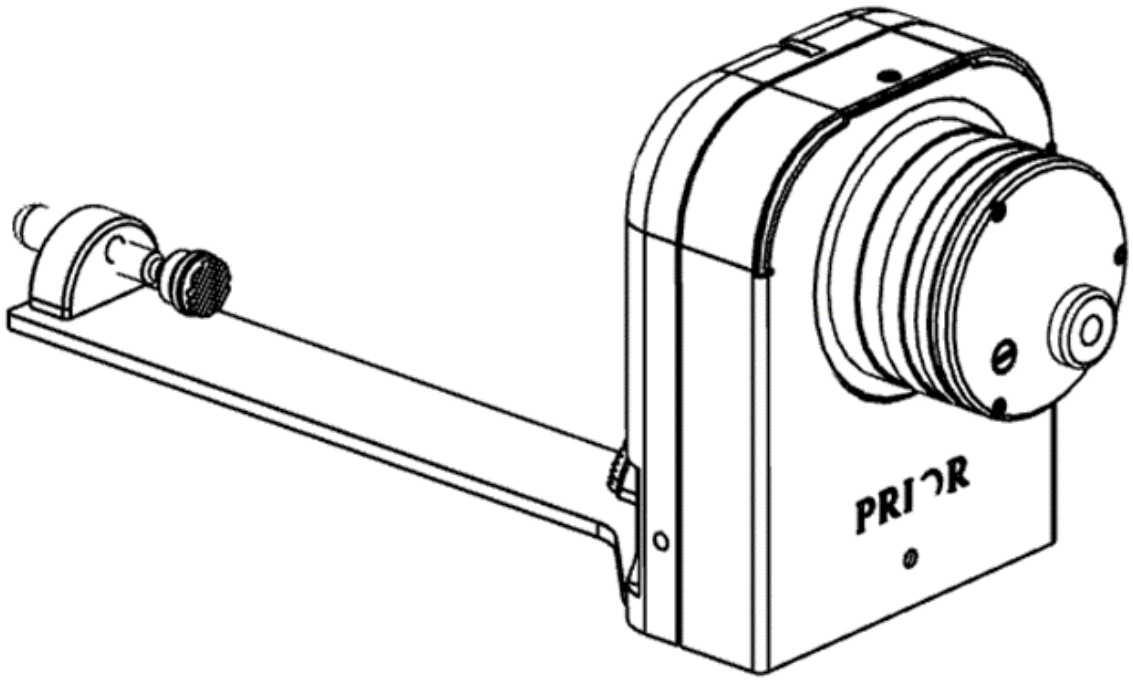
Proceed with the rest of the installation as outlined above in steps 4 to 8.

For **Nikon TE2000** microscopes, the procedure is almost exactly the same as above. The difference is that a focus shaft extension links the focusing mechanism to the Nikon-sized coupling hub.

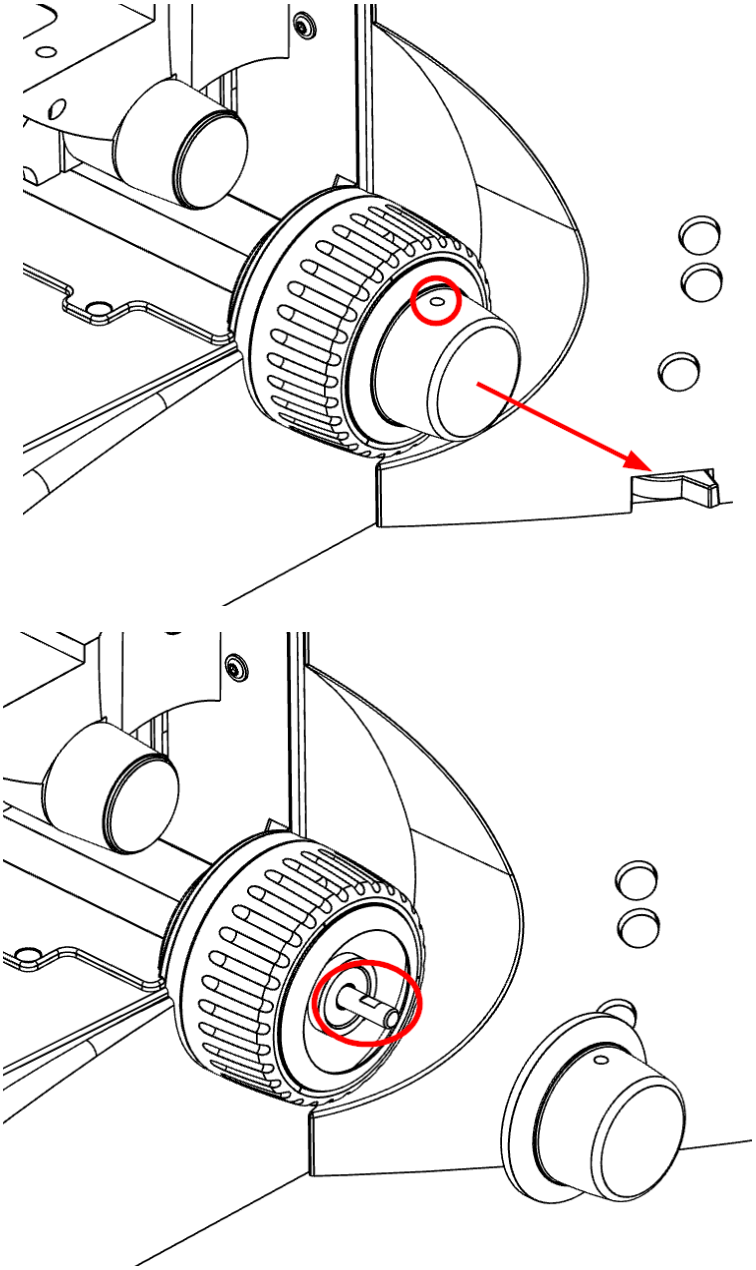


PS3H122DM4 – Installation for the Leica DM4000, DM5000, and DM6000

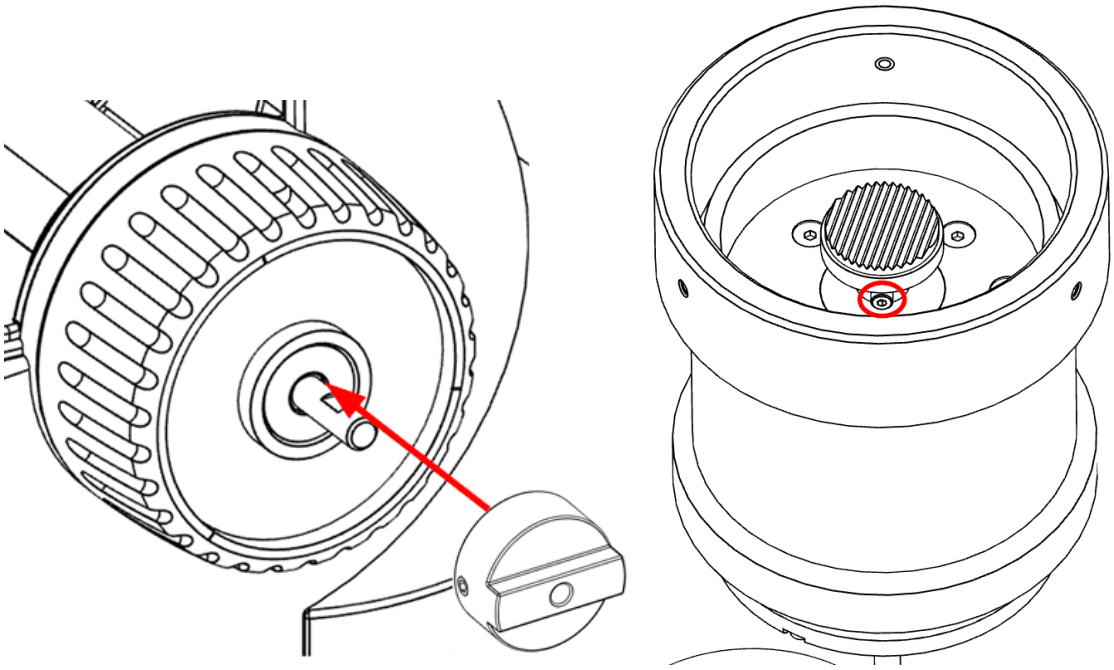
Description	Quantity
Coupling Huco Hub, M4	2
Torque Disc, Black	1
Coupling Cover	1
Motor Holder	1
Focus Motor	1
Cover	1



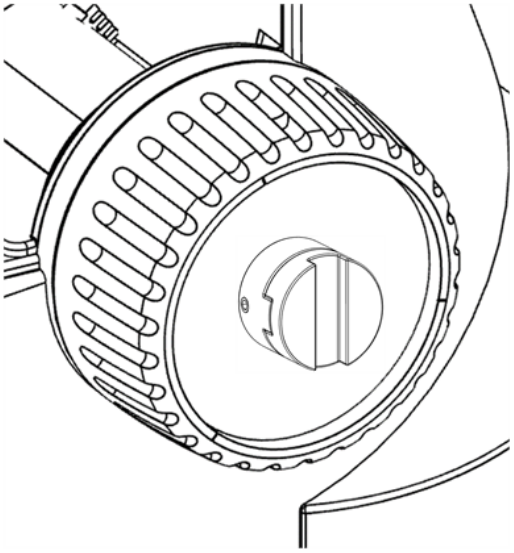
1) Loosen the grub screw in the right-hand side fine focus knob of the microscope, then remove the knob to expose the fine focus spindle.



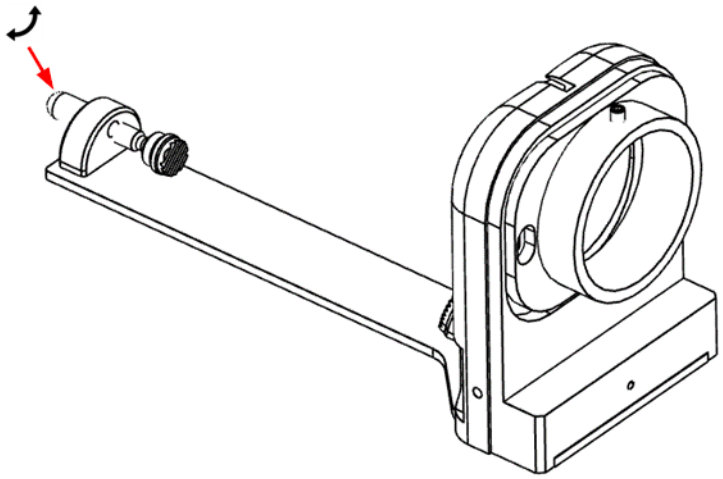
2) Attach a coupling hub to the fine focus spindle and the other coupling hub to the focus motor spindle after removing the rubber pad.



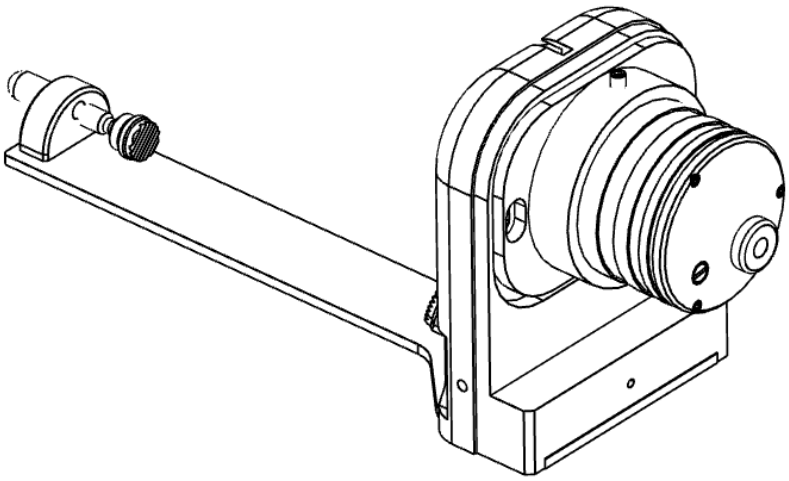
3) Insert the torque disk into the fine focus coupling hub.



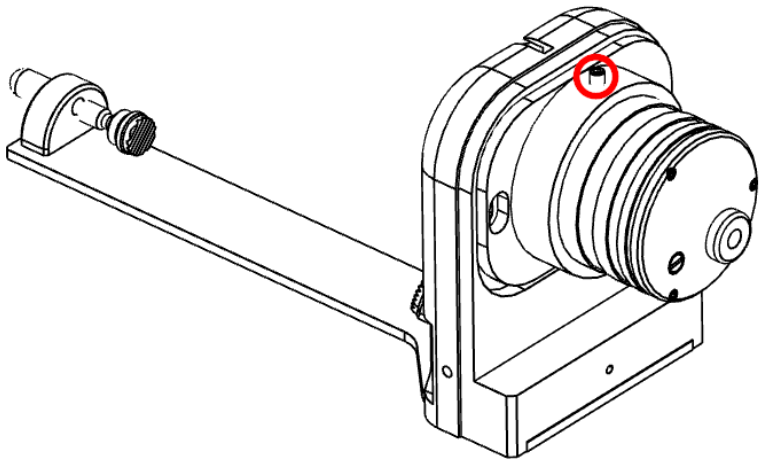
4) Place the motor holder assembly under the microscope and position so that it is opposite to the fine focus. Use the provided positioning block to centralize the motor holder and then lock the motor holder into position.



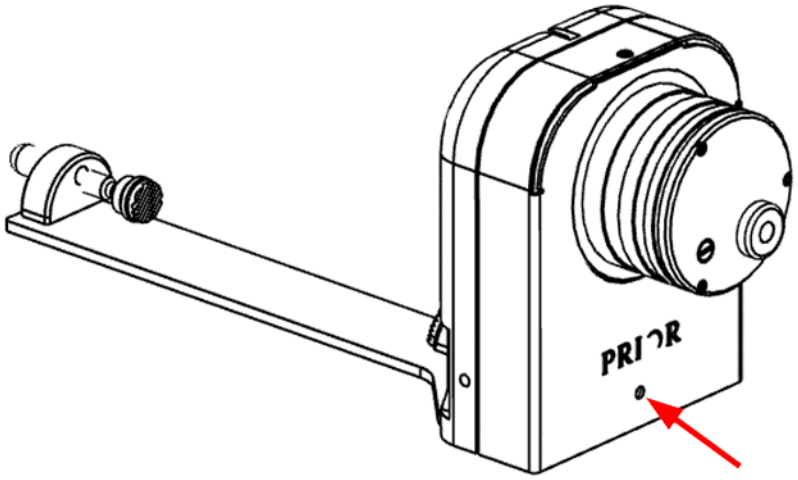
5) Push the focus motor through the motor holder and the coupling cover then connect the two coupling hubs and torque disc. You may need to adjust the position of the torque disc until they connect cleanly.



6) Fix the motor in place with the hex key and the set screw on the top surface of the motor holder.



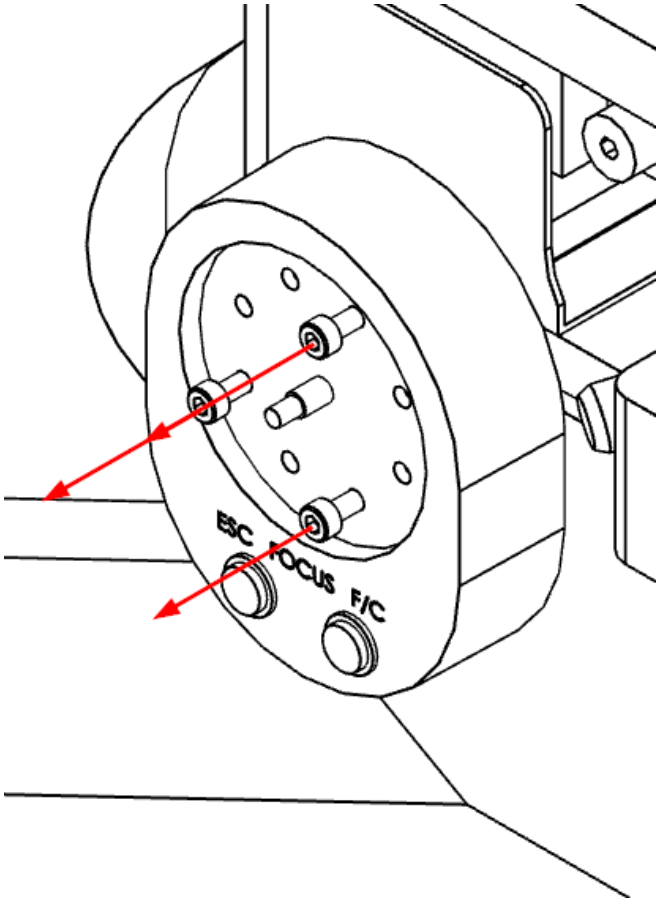
7) Finally, fix the cover and screw the lock on with the screw provided.



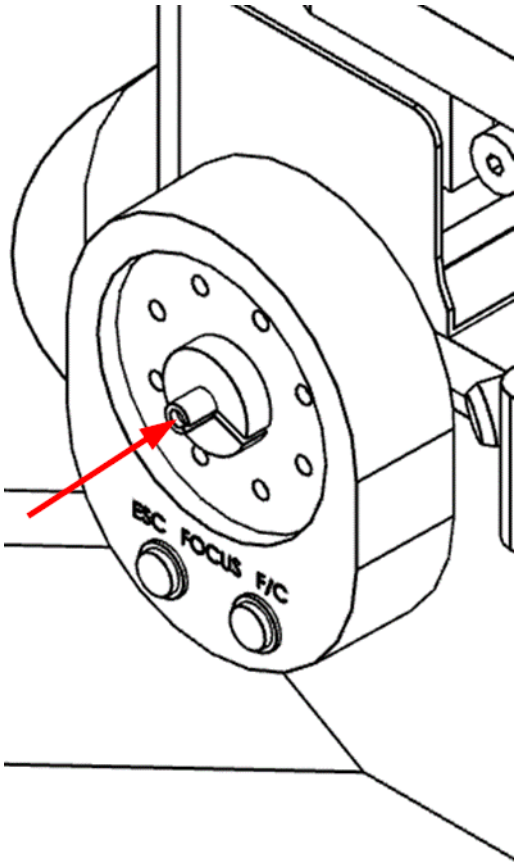
PS3H122OLM – Installation for the Evident/Olympus BX61

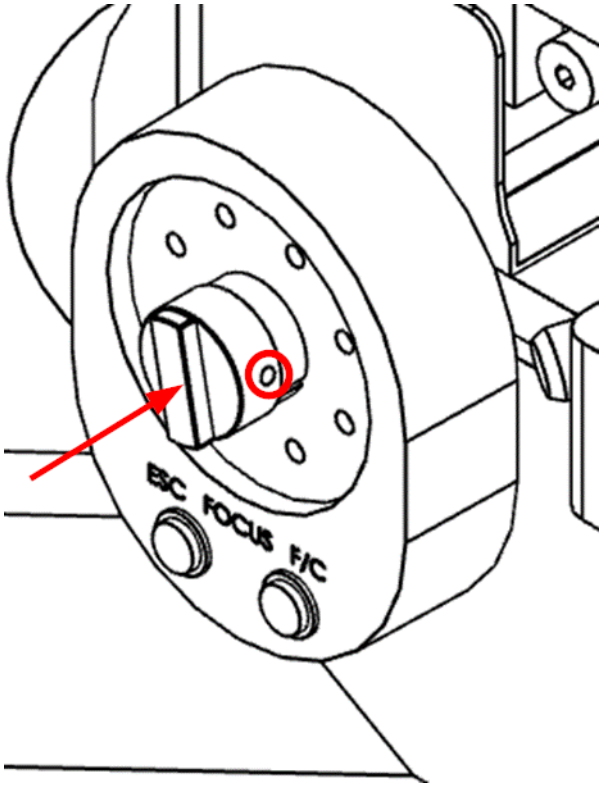
Description	Quantity
Coupling Huco Hub, M4	2
Torque Disc, Black	1
Mounting Flange	1
Focus Motor	1
Focus Motor Sleeve	1
Focus Extension Adapter	1
Reduction Collar	1

1) Remove the left-hand focus knob from the Evident/Olympus microscope and remove the three chrome screws, noting which positions they were removed from.

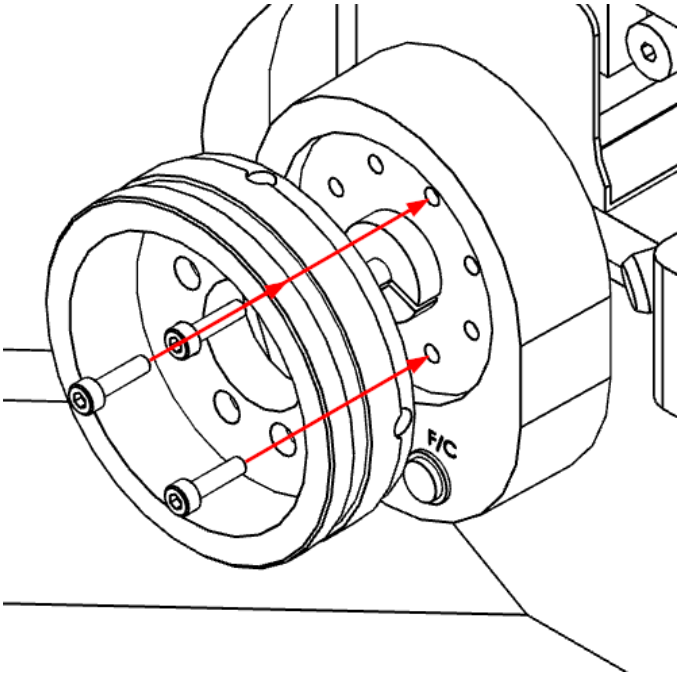


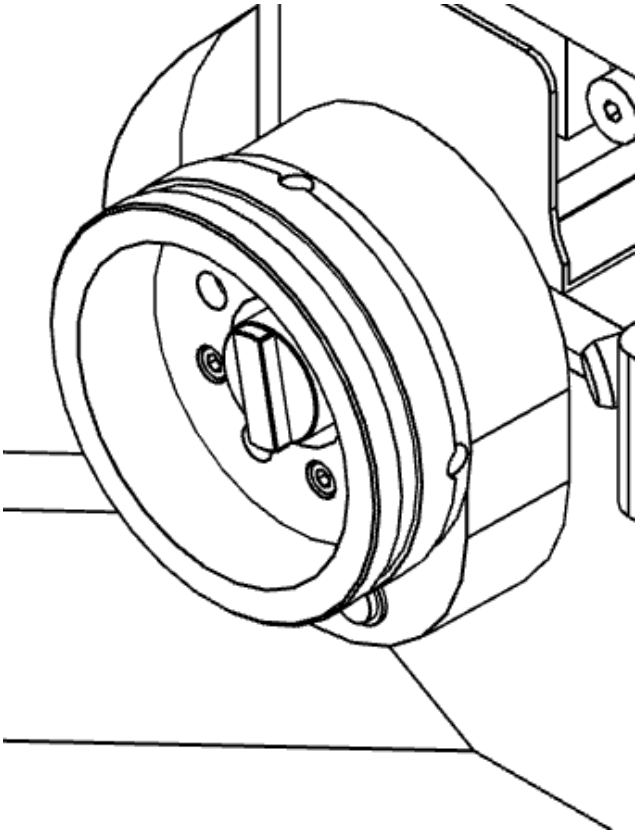
2) Place the appropriate collar over the microscope spindle and fasten with the metal hub grub screws. Attach a coupling hub to the reduction collar with the grub screws.



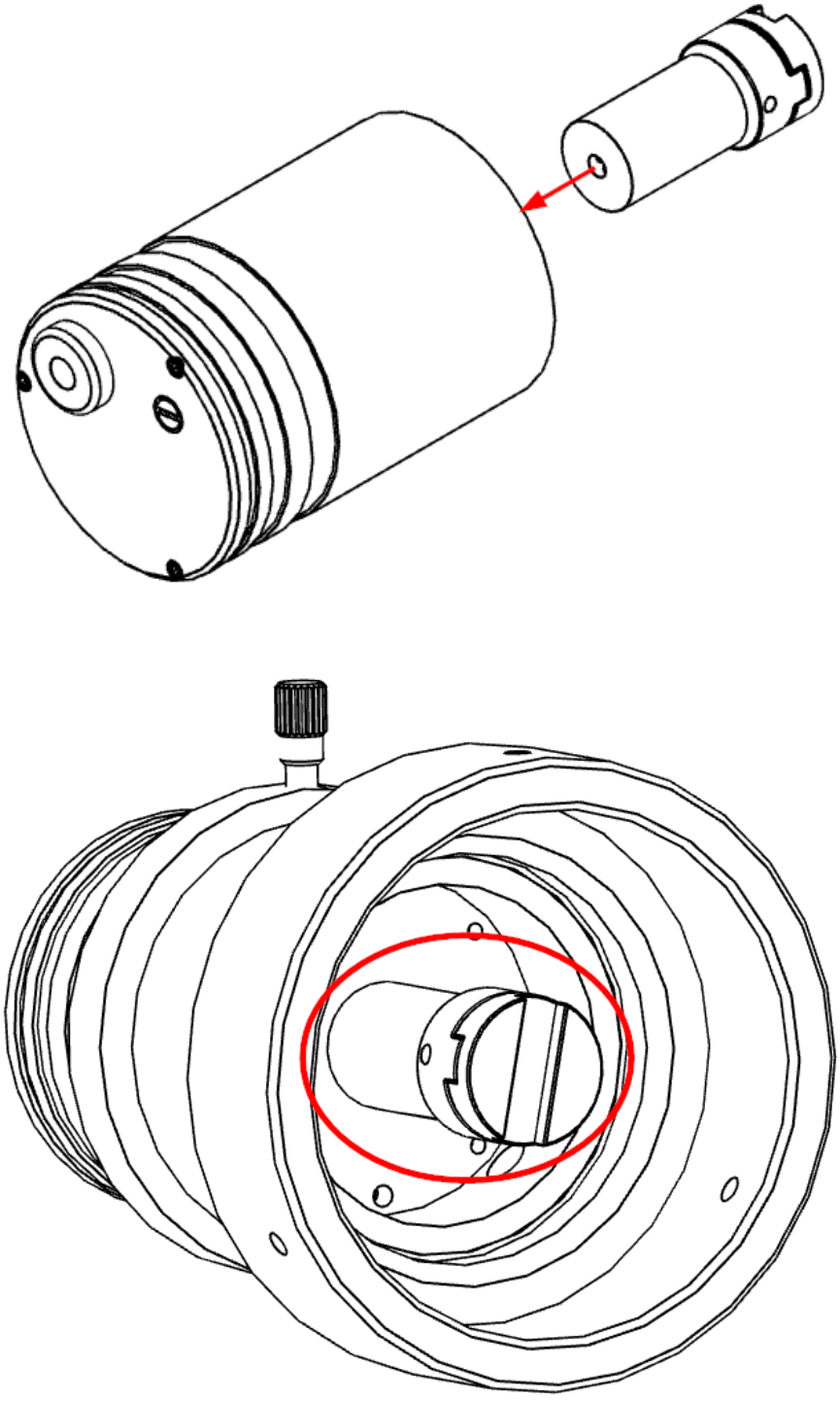


3) Affix the mounting flange to the microscope using the provided black screws and the same screw holes that the chrome screws were removed from. Attach the focus motor sleeve to the mounting flange using the grub screws as if it were a typical focus sleeve adapter.

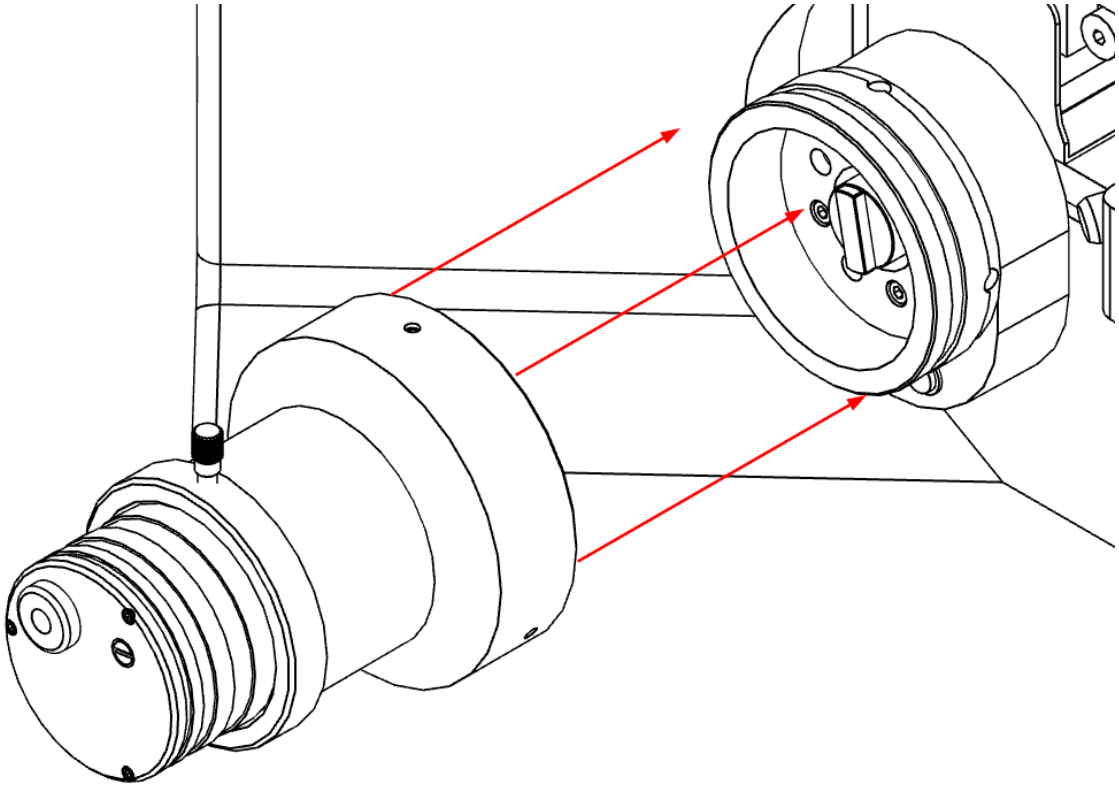




4) Remove the rubber coupler from the focus motor and replace it with the focus extension adapter. Secure a coupling hub to the spindle end of the focus extension adapter and then connect the torque disc to the coupling hub.



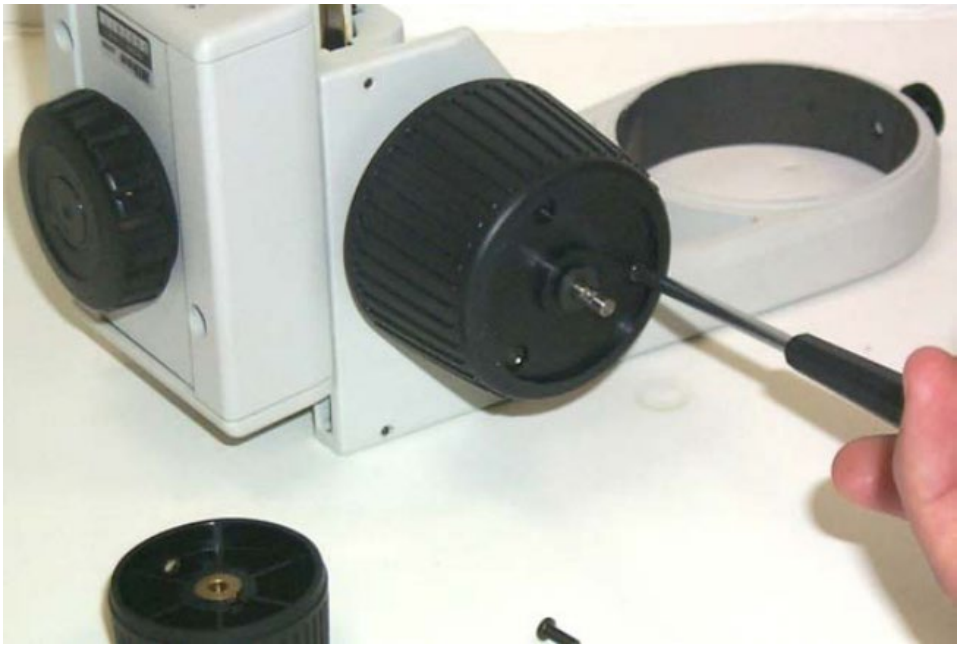
5) Slide the focus motor into the attached focus motor sleeve, ensuring the torque disc is positioned to connect with the coupling hub attached to the microscope. When the two are connected tightly, secure the focus motor with the screw on top of the motor sleeve.



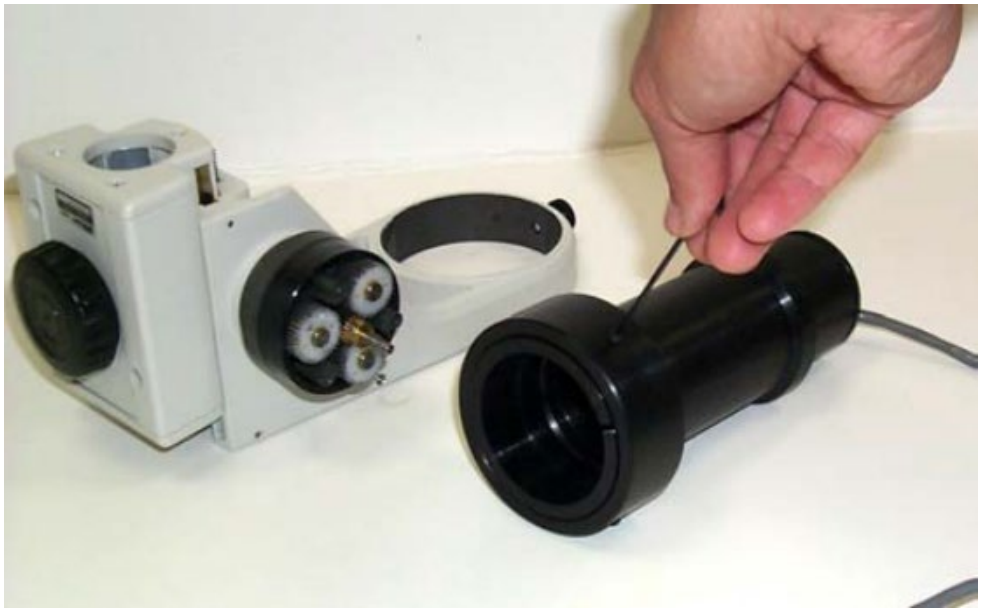
PS3H122S15 – Installation for the Nikon SMZ1500

Description	Quantity
Coupling Huco Hub, M4	2
Torque Disc, Black	1

1) Remove the fine focus knob from the right-hand side of the focus block with a 1.5 mm hex key, then use a Philips screwdriver to remove the coarse knob also.



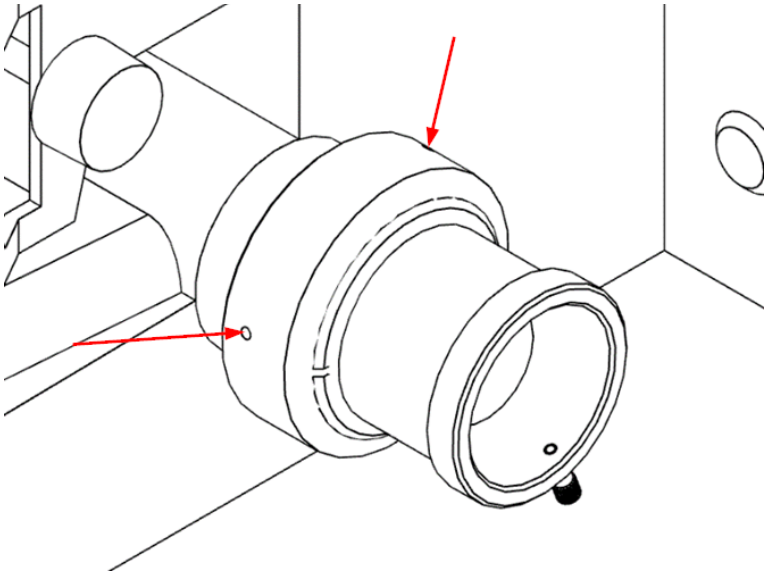
2) Remove the focus sleeve from the focus adapter by loosening the three grub screws with a 2 mm hex key.



3) Place the focus sleeve onto the focus knob and make sure it is pushed all the way onto the focus knob, chamfered edge pointed **outwards**.

4) Secure a coupling hub onto the focus shaft, making sure the shaft does not extend past the hole in the coupler. The coupler may be loose in the bag, or connected loosely to the focus motor spindle with the black torque disc and the paired coupling hub. **Do not remove the paired coupling hub**. Tighten the coupler onto the fine focus knob shaft using a 2mm hex key.

5) Remove the focus motor from the focus motor sleeve by loosening the single set screw at the narrow end. Place the focus motor sleeve over the focus sleeve adapter and tighten the three set screws with a 2 mm hex key.



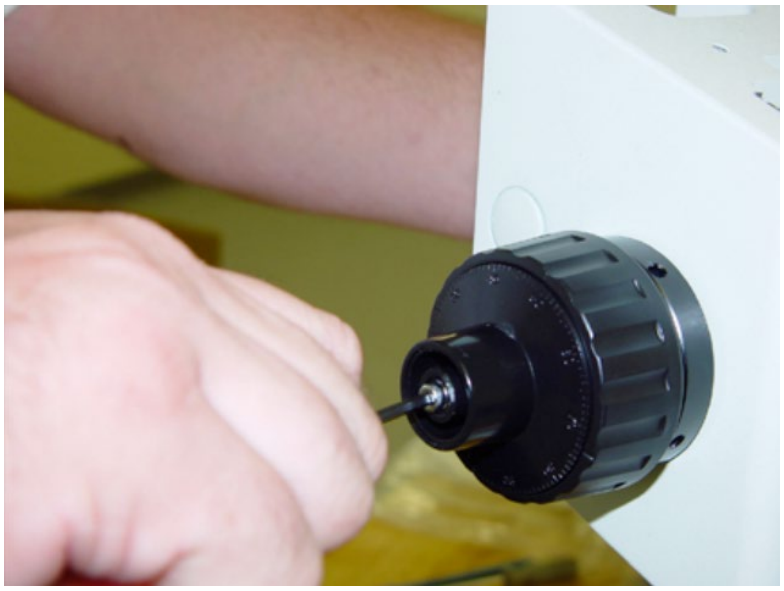
6) Slide the motor in and rotate it slowly until the coupling hub and torque disc connect. Lock the motor in position by tightening the single set screw.

Note: The speed limitation of the PS3H122S15 is dependent on the amount of weight carried by the focus block. The speed settings, either on the joystick, digipot, or computer, may need to be decreased if the focus motor is determined to be stalling. Methods for decreasing these speeds are outlined in the manual.

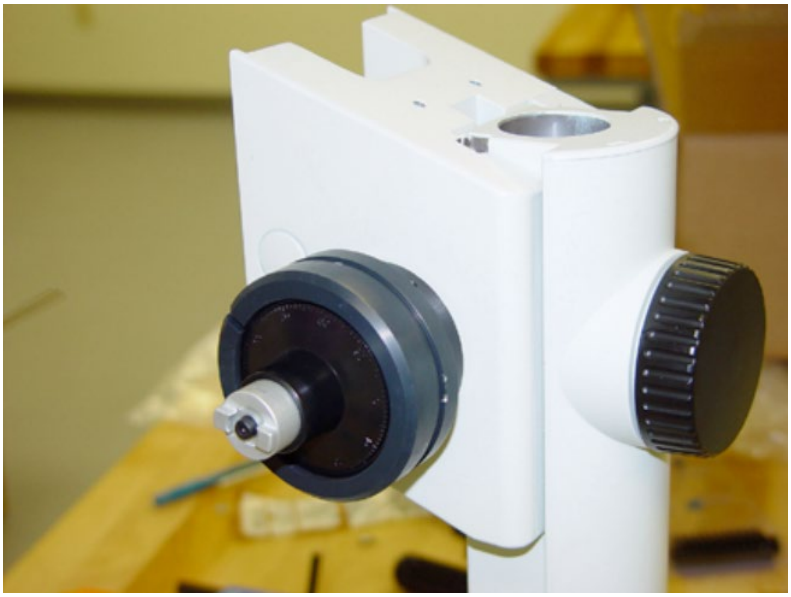
PS3H122SZX – Installation for Evident/Olympus SZX Stereomicroscopes

Description	Quantity
Coupling Huco Hub, M4	2
Torque Disc, Black	1

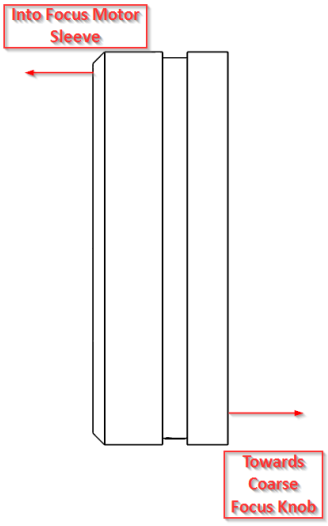
1) Remove the screw holding the focus knob assembly.

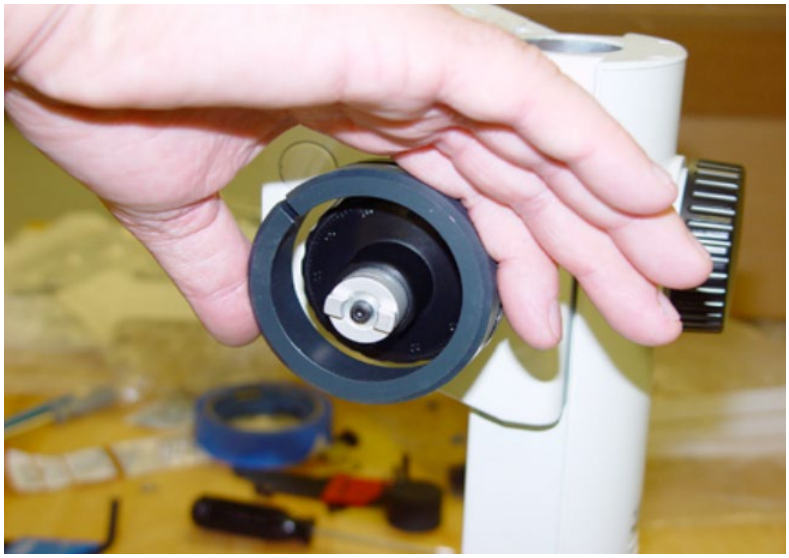


2) Attach a coupling hub to the stereomicroscope assembly using socket screws and washers provided with the focus motor assembly. Take care to make sure the bulb and fine focus knob are concentric.

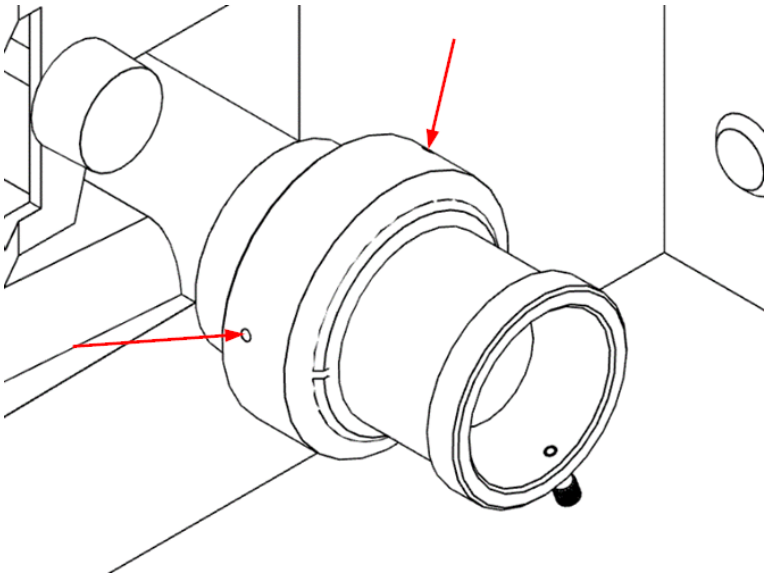


3) Slide the focus sleeve adapter over the coarse knob, chamfered end of the sleeve facing **outwards**.

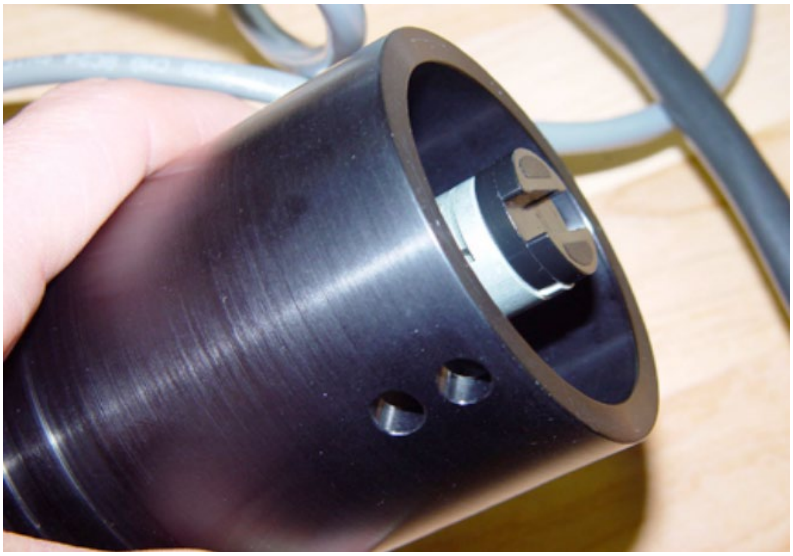




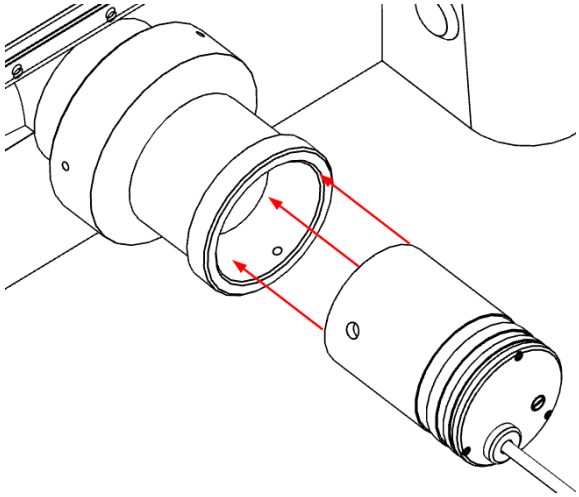
4) Slide the focus motor sleeve over the focus sleeve adapter. Tighten the three set screws on the outer diameter of the motor sleeve. This will clamp the housing to the coarse knob's outer diameter.

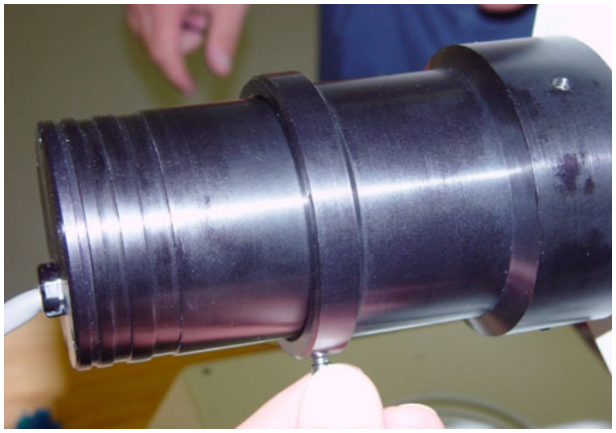


5) Mount the remaining coupling hub and torque disc to the end of the focus motor. The hub will tighten to the motor shaft via the set screw on its side.



6) Slide the focus motor into the focus motor sleeve, ensuring the coupling hub on the microscope assembly couples with the torque disc tightly. Once satisfied, tighten the thumb screw on the focus motor sleeve to secure the assembly in place.





Alternate Focus Motor Orientations

If the left hand coarse control knob is preferred by the user, or the focus drive is to be mounted on an inverted microscope, the motor direction can be reversed by using a PC with a terminal emulation program, e.g. Prior Terminal, and changing the settings using the ZD command via USB or RS232 communication. The command ZD -1 will reverse the default directions of the focus motor, allowing for left-handed or right-hand inverted usage.

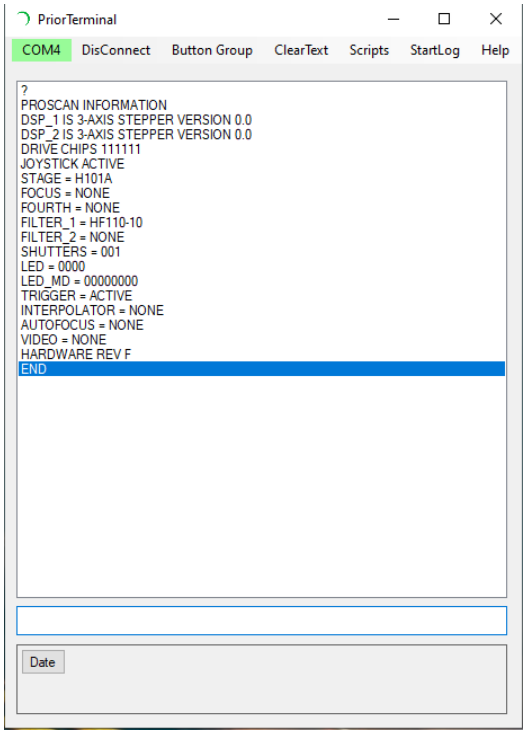
Prior Terminal software is available here (https://www.prior.com/download-category/software) as “64/32 Bit Prior Scientific Software”. Please select the download that fits your operating system’s bit and install the software.

Ensure your controller is connected to your PC and turned on for this step. Open Device Manager and expand ‘Ports’ to verify the COM Port number of the USB Serial Port or Prior Communication Port associated with your controller. Once this number is identified, note it down and start Prior Terminal.

When Prior Terminal opens, select the correct COM port and click connect. The COM number should in green in the top left corner.

Enter ? , then hit return/enter, to present a series of information about your controller and its connected equipment. If this information does not appear, please try another COM port.

If the correct COM port is selected, the controller is turned on, and the information does not appear, please contact Prior Scientific Technical Support for assistance.



If the information does appear, your controller is connected and you can proceed to change the direction of your focus motor.

Enter the command ZD –1 into the box near the bottom of the window and press Enter/Return. It will return with 0 if the command is accepted.

Z-axis joystick and PC commands will now be inverted until returned to default with the ZD 1 command.

Troubleshooting

My focus sleeve adapter will not fit into the focus motor sleeve properly.

- Please ensure you are putting the focus sleeve adapter in the correct way. The angular, chamfered edge should go into the focus motor sleeve while the flat edge should face the coarse focus knob of the microscope.

- Please ensure that the grub screws around the circumference of the focus motor sleeve are withdrawn fully to allow the focus sleeve adapter to be inserted.

My focus motor plug does not match my controller's focus plug.

- When Prior Scientific's focus motor, H122, was replaced by the PS3H122R, the plug changed from a 9-pin D-connector to a 15-pin D-connector. This means that newer focus motors are not compatible with older controllers that have the 9-pin D-connector.

- The inverse is also true. When ProScan III replaced ProScan II, the focus port was changed to a 15-pin D-connector and is no longer compatible with the H122 focus motor. **Please contact your distributor or Prior Scientific for further support.**

The focus sleeve is not right for my microscope/application.

- For some microscopes, we offer a direct coupling and instructions for the installation that differ significantly from these generic instructions. **Please contact Prior Scientific or your distributor with your microscope model for support if direct coupling is available.**

My focus motor goes down when I tell it to go up, or vice versa.

- By default, our focus motor is designed to be positioned on the right hand coarse knob of an upright microscope. If using the focus motor with a right handed inverted microscope, or a left handed upright microscope, then opening Prior Terminal and using the ZD -1 command will invert the direction to work properly. The direction can be returned to default with the command ZD 1.

The adapter sleeve is not tight against the coarse focus knob.

- Ensure that a grub screw is not in line with the gap in the focus adapter sleeve. This will cause uneven pressure and the sleeve will not be tight against the focus knob.

- Please ensure that all three grub screws are tightened securely against the focus adapter sleeve.

- The focus adapter sleeve may be oriented the wrong way so the grub screws are not resting in the recess. Please ensure the angled, chamfered, side is facing inwards while the flat side is facing the coarse focus knob.

About Prior Scientific

Prior Scientific has manufactured precision optical and electromechanical equipment and instrumentation for over 100 years.

As the leader in the development of systems for precision motion control and microscope automation, we work closely with our partners and customers to develop customized optical and automation systems as well as providing a wide range of standard microscopy components.

We partner with system integrators and OEMs to develop prototypes, custom-built products, and complete imaging system solutions according to individual customer requirements for a variety of applications. Our integrated design and manufacturing facilities enable us to seamlessly transition from concepts to production systems. Typical applications for our products are found in photonics, life science research, material science, nanotechnology, medical devices, metrology, and semiconductor manufacturing.

Our mission

We understand that every problem requires a unique approach. Our team works closely with customers and partners to identify their specific needs and design a cost-effective and tailored solution that meets their unique requirements. We continue to push scientific boundaries and constantly build on and improve our expertise in automated precision optical and mechanical systems.

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