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Focus Drive Installation for Zeiss Axio 99A402

NOTICE:

This installation should only be attempted by a qualified technician. It involves some minor disassembly of critical mechanical components. If you are not familiar with this type mechanical assembly do not attempt this installation, consult your local microscope representative.

Introduction:

The focus drive is compatible with all of the Zeiss Axio type microscopes. The focus drive must be attached to the side of the microscope that has the fine focus ball reduction mechanism. This varies from different versions of the microscope:

AXIOPLAN: Left side
AXIOSKOP: Left side
AXIOTRON: Right side
AXIOVERT: Right side

Specification:

The focus drive will drive the fine focus of the microscope. The encoder is driven from the coarse focus, which is driven by the fine focus at a ratio of 1:20. Each turn of the coarse focus will move the focus by 2mm (2000 μ m). The motorized attachment has a resolution of 20,000 encoder pulses per revolution, which results in a final drive resolution of 0.10 μ m.

Components:

The focus drive assembly is comprised of the following components:

- Drive motor, Encoder, Limit switch bracket, and End plate assembly (with common wiring harness)
- Base plate and Mounting flange assembly
- Encoder shaft/Limit switch leadscrew w/ actuator
- Drive shaft
- Cover
- Flex coupling
- (3) M3x22 mm socket head screws
- 2" piece of silicon tubing

Tools needed:

In order to install the focus drive, the following tools will be needed:

- 14mm socket wrench or 14 mm extended nut driver
- 1.27 mm hex wrench
- 1.5 mm hex wrench
- 2.0 mm hex wrench
- 2.5 mm hex wrench

NOTE DO NOT APPLY POWER TO THE DRIVE UNTIL ALL COMPONENTS ARE PROPERLY ASSEMBLED AND FASTENED. COMPONENT DAMAGE COULD RESULT!

Prepare the microscope:

1. Turn the coarse focus of the microscope so it is $\frac{1}{4}$ - $\frac{1}{2}$ turn from the lower end of travel.
2. Both coarse and fine focus knobs must be removed from the microscope in order to mount the focus drive. This is accomplished by loosening the setscrew on the fine focus knob with a 1.27-mm hex wrench and sliding the knob off the shaft. The coarse focus knob is held in place with a hex nut, which is removed with a SW14 wrench. The coarse knob is then removed by turning it counterclockwise to unthread it from the shaft. Removal of the knobs should expose a round plastic cover held in place with five screws.
3. Using a 2.5 mm hex wrench, remove the three screws, which are located 120° apart from each other, leaving the remaining two screws in place.

Prepare the focus drive unit.

1. Using a 2.0 mm hex wrench remove the cover by removing the two M3 button head screws from the top and then loosening the four M3 button head screws on the bottom edge.
2. The shipping bracket that holds the encoder in place must be removed next. Using a 2.0 mm hex wrench, loosen the encoder clamp screw. Next, using a 2.5 mm hex wrench remove the two M4x14 mm socket head screws that hold the shipping bracket to the mounting flange and remove the shipping bracket.
3. Unpack the bag of parts that is included with the unit. Inside the bag you will find one encoder shaft/limit switch leadscrew, one drive shaft, one flex coupling, one actuator, and three M3x22 mm socket head screws. Refer to drawing 1 for identification of the various parts. If it is not already done, thread the actuator onto the limit switch leadscrew so that it is flush with the front (microscope) side.
4. Using a 2.5-mm hex wrench remove the motor/endplate assembly from the baseplate assembly. This is done by removing the two M3x6 mm socket head screws from the back of the end plate on either side of the DB15 connector. *Save these screws!*

Install the drive:

1. Using the three provided M3x22 mm socket head screws and a 2.5-mm hex wrench, mount the baseplate assembly to the microscope. Align the mounting flange with the three holes in the plate from which the longer screws were removed during the microscope focus knob disassembly and insert the three screws into these holes. When aligned properly the unit should be upright. To seat the mounting flange properly, alternately tighten the screws a few turns until all three screws are tight.
2. Check the action of the fine and coarse focus knobs of the microscope. If the wrong holes were used or if the mounting flange was not alternately tightened, the focus may be stiff, may not turn at all, the coarse knob may slip or the whole unit may rotate. If this happens remove all of the screws and start from step 1 again.
3. Make sure there is a setscrew in the threaded hole of the drive shaft. Align the fine focus shaft so that the flat on the shaft is facing up. Slide the drive shaft over the fine focus shaft so that the setscrew is over the flat and as close to the microscope as possible. Check to make sure that the fine focus shaft does not slide out the other side of the microscope. Tighten the setscrew with a 1.27-mm hex wrench.
4. Insert the encoder shaft/limit switch leadscrew through the opening in the encoder such that the clamp faces the mounting flange. Thread the encoder shaft on to the microscope coarse focus shaft ensuring alignment between the pin of the mounting flange and the slot of the encoder. To tighten, hold the coarse focus knob on the other

side of the microscope with one hand, and insert a 2 mm hex wrench (using the tubing as a sheath) into the outside hole of the leadscrew and tighten. Space the encoder onto the shaft until it is approximately 1.0mm from the threaded portion of the encoder and then tighten the clamp screw with a 2.0-mm hex wrench.

5. Slide the flex coupling over the drive shaft so that the hex screw is visible through the second hole in the encoder shaft. Tighten this screw with a 1.5-mm hex wrench through the hole.
6. The actuator should be about 1 turn from the end of the thread on the shaft. For installation on the right side of the microscope the actuator should be about 1 turn from the end of the thread toward the encoder end of the shaft. For microscopes where the drive is attached to the left side the microscope, the actuator should be about 5 turns from the free end of the shaft.
7. Slide the motor shaft into the flex coupling so that the motor/endplate assembly rests against the baseplate. Secure the endplate to the baseplate with the two M3x6 mm screws and a 2.5-mm hex wrench. Be careful to align the limit actuator with the guide on the motor plate.
8. Tighten the other screw on the flex coupling using a 1.5-mm hex wrench.
9. Check the operation of the microscope focus knobs and the focus drive knob.

Setting and verifying the limits:

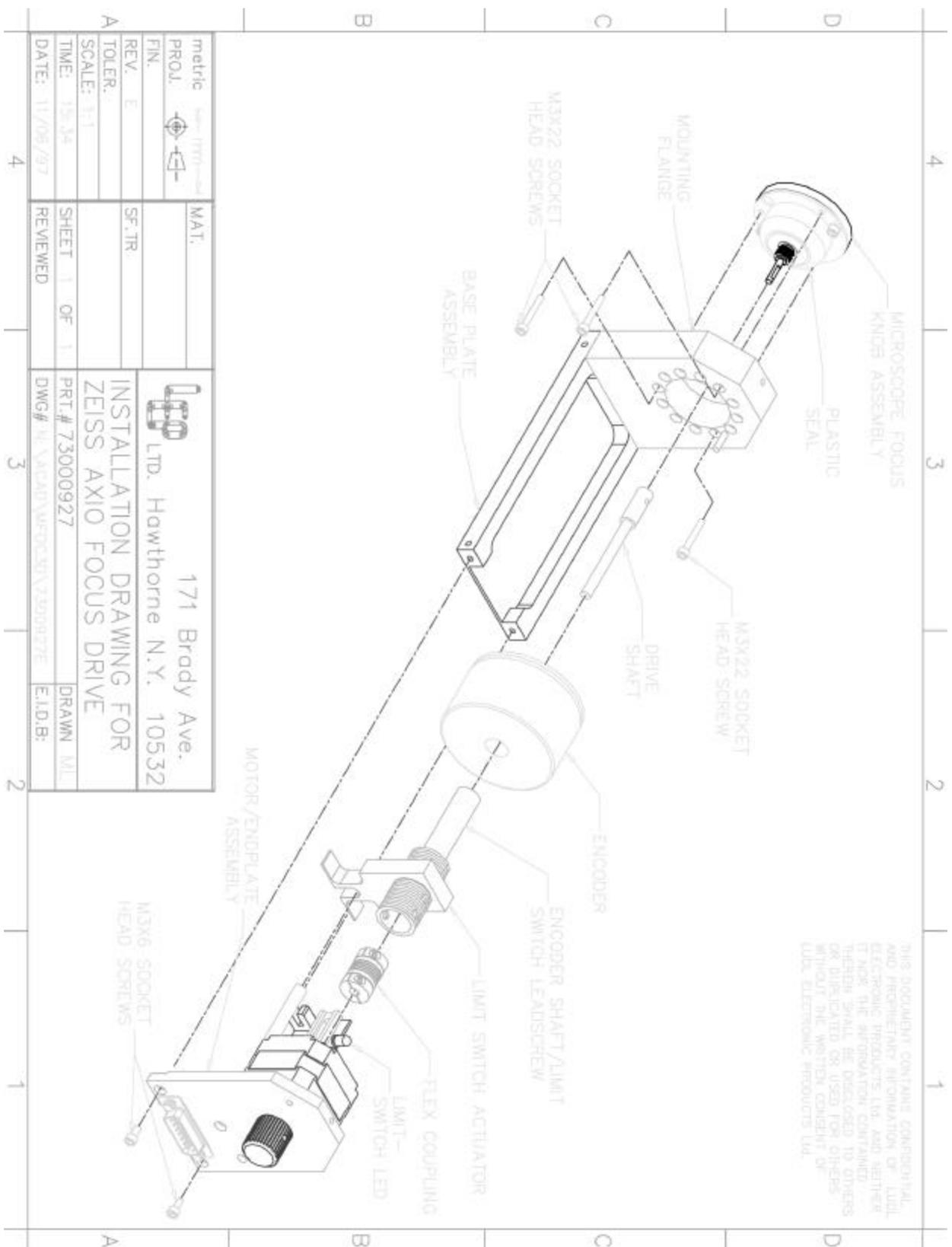
After connecting the cable to your controller and to the focus drive, turn on the power. Notice on the controller front panel the status of the limit switch LEDs for the Z axis drive (refer to the MAC2000 configuration manual) as well as the LEDs above each limit switch circuit board in the focus drive assembly. LEDs are illuminated as the optical path of the limit switch is interrupted. Specifically, the limit switch closest to mounting flange should illuminate the LED on the associated circuit board and CW LED on the controller. Conversely, the limit switch closest to the endplate should illuminate the CCW LED on the controller and the LED on the associated circuit board.

The limit switches are adjusted by loosening the two screws with a 2.0-mm hex wrench and sliding it along the bracket. With the focus at the lower end of travel, adjust the limit switch so that the corresponding LED illuminates. Once the lower limit is adjusted use the drive to focus the microscope with a 10X objective. Turn the fine focus one turn (approximately 110um) above the focus plane. Adjust the limit switch so that the corresponding LED goes out.

Check the drive for proper range, smoothness, and repeatability. Replace the cover with the six original screws.

Final note:

The coarse and fine focus knobs on the microscope may be used at any time, either when the focus drive is under power or when it is not. The encoder installed in the unit will accurately measure position regardless of how the focus is adjusted.



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**INSTALLATION DRAWING FOR
 ZEISS AXIO FOCUS DRIVE**
 PRT.# 73000927
 DWG# 81\vacad\usfoc30\7300927E
 DRAWN ML
 E.I.D.B.