LEP Focus Drive Installation Manual



This manual covers the following focus drive:

- 99A400, 96A400
- 99A401, 96A401
- 99A404, 96A404
- 99A405, 96A405
- 99A406, 96A406
- 99A407, 96A407
- 99A410, 96A410



Revision D 2/4/2010

Contents

Content	ts	. 1
1.0	LEP Focus Drive Installation	. 2
1.1	Introduction:	. 2
1.2	Specification:	. 2
1.3	Components:	. 2
1.4	Tools Needed:	3
1.5	Before Installing the Focus Drive:	3
2.0	Installing the Focus Motor	. 4
2.1	9xA400/9xA401 Generic Focus Drive Coupling:	. 5
2.2.	9xA400/9xA401 Olympus Generic Focus Drive Coupling:	. 6
2.3	9xA404 Olympus BX41, BX51 & IX71 Focus Drive Coupling:	. 7
2.4	9xA405 Nikon E400/E600 Focus Drive Coupling:	. 8
2.5	9xA406 Leica DMLB Focus Drive Coupling:	. 9
2.6	9xA407 Nikon E50i/E80i Focus Drive Coupling:	10
2.7	9xA410 Zeiss AxioImager/AxioObserver Focus Drive Coupling:	11
3.0	Focus Motor Functionality	12
4.0	Connections	12
5.0	Linear Encoder Optional Upgrade	13

1.0 LEP Focus Drive Installation



NOTICE:

Only a qualified technician should attempt this installation. 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.

1.1 Introduction:

The LEP focus drives have been designed to easily integrate with various microscopes make and model using a universal mounting adapter and a microscope specific focus collar. Using a optional linear encoder, this focus drive provides a resolution/repeatability of .05 microns and an overall accuracy of .2 microns over a 12 mm range. The linear encoder's are upgraded option and are easily mounted to the microscope body.

1.2 Specification:

The focus motor couples directly to the fine focus of the microscope. The stepper motor employed may be microstepped at a maximum resolution of 40000 steps/rev, however, the default setting is 10000 steps/rev. (see Configuration Manual for details) which corresponds with the encoder resolution. The final drive resolution is determined by using the following formulas:

For 9xA4xx:	Focus drive resolution = $\underline{Z \text{ dist. for 1 rev. of the fine focus}}$ Microstepping resolution
For 9xA401:	Focus drive resolution = $\underline{Z \text{ dist. for 1 rev. of the fine focus}}$ Encoder resolution (10,000 CPR)

For 9xA4xx w/ linear encoder: Focus drive resolution = Encoder resolution (.05um/step)

1.3 Components:

The LEP focus drive assembly (P/N: 9xA4xx) is comprised of the following components:

- Focus Motor Assembly
 - o (73-SA00400) MAC5000 Controller and Legacy
 - o (73-SA00401) MAC6000 Controller
- Microscope Specific Collar (74-F0013xx)
- Coupling and Mounting Hardware Package (See specific assembly drawings)

Note: The focus motor and adapter ring is usually shipped within the focus housing and should be separated before installation begins.

1.4 Tools Needed:

In order to install LEP P/N: 9xA4xx focus drives, the following tools are required:

- 1.5mm, 2.0mm and 2.5mm hex wrenches
- 1/16" hex wrench
- #1 Philips head screwdriver

1.5 Before Installing the Focus Drive:

Prepare the Microscope:

- 1. For generic 9xA400/9xA401 installation, clean the flat area of the fine focus knob with the provided chemical wipe (61-ME00177) to remove any contaminants that may impede adhesion of the adhesive-backed coupling flange.
- 2. For specific microscopes, follow the drawings in Section 2 with the supplied hardware kits.

Prepare the Focus Drive Unit:

- 1. Using a 2.0 mm hex wrench remove the focus motor from the focus housing by loosening the two motor clamping setscrews.
- 2. Loosen the three coarse knob clamping setscrews with a 2.0mm hex wrench. This will allow the focus housing to easily slide onto the coarse focus knob. Remove the inner adapter ring mounted inside the focus housing.
- 3. Unpack the bag of parts that is included with the unit. Inside the bag you will find the necessary items to couple the motor to the microscope.

2.0 Installing the Focus Motor

- 1. Generic Coupling
 - a. Remove the protective cover from the rear of the adhesive-backed coupling flange and firmly press the coupling flange against the **center** of the flat surface of the fine focus knob. Rotate the fine focus knob and visually check for proper centration before continuing. (See Section 2.1)
- 2. Generic Olympus Coupling
 - a. Pry the adhesive cover from the fine focus knob and remove the M3 screw which secures the fine focus knob to the microscope.
 - b. Use the supplied M3x20mm Philips head screw to tighten the mounting stud (74-F001059) in place. (See Section 2.2)
- 3. All other Couplings
 - a. See the following drawings for coupler specifics. (See Section 2.3 2.7)
- 4. Mate the nylon coupling spacer to the coupling flange/mounting shaft.
- 5. Slide the inner adapter ring around the coarse focus knob taking care to ensure that the **lip is positioned toward the microscope**.
- 6. Slide the focus housing onto the coarse focus knob until it is fully seated. Using the 2.0mm hex wrench, alternately tighten the three coarse knob clamping set screws of the focus housing. The screws should be snug; over tightening may damage or distort the inner adapter ring.
- 7. Adjust the fine focus knob on the opposite side of the microscope such that the intermediate coupling will align properly with the drive coupling as it is slid into the focus housing. To verify alignment, turn the fine focus knob and ensure the knob on the end of the motor shaft rotates accordingly. Tighten the two motor clamping setscrews.



2.1 9xA400/9xA401 Generic Focus Drive Coupling:



2.3 9xA404 Olympus BX41, BX51 & IX71 Focus Drive Coupling:

9xA404	4 FOCU	S MOTOR INSTA	LLATION FOR OLYMPUS BX41, BX51, & IX71
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	73-SA0040x	SUB-ASSEMBLY, FOCUS MOTOR
2	1	74-T301-5MM	COUPLING, 5MM
3	1	74-F001201	HOUSING, OUTER FOCUS MOTOR
4	1	74-A201-1	NYLON COUPLING SPACER
5	1	74-T301-5	COUPLING, 1/4"
7	1	74-F001300	ADAPTER RING, FOCUS MOTOR
10	1	74-F001058	FINE FOCUS ADAPTER FOR OLYMPUS
11	1	78-D912-M4X6	FINE FOCUS ADAPTER HARDWARE

Microscope Mounting: Either Side (left side recommended for manual stage)



2.4 9xA405 Nikon E400/E600 Focus Drive Coupling:

	9x	A405 FOCUS MOTOR INS	STALLATION FOR NIKON E400/E600
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	73-SA0040x	SUB-ASSEMBLY, FOCUS MOTOR
2	1	74-T301-5MM	COUPLING, 5MM
4	1	74-A201-1	NYLON COUPLING SPACER
5	1	74-T301-5	COUPLING, 1/4"
6	1	74-F001004	COUPLING, STANDARD FOCUS DRIVE
16	1	74-F001210	HOUSING, OUTER FOCUS MOTOR
19	1	74-F001301	ADAPTER RING, NIKON E400/E600

Microscope Mounting: Right Side *



2.5 9xA406 Leica DMLB Focus Drive Coupling:

	9x	A406 FOCUS MOT	OR INSTALLATION FOR LEICA DMLB
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	73-SA0040x	SUB-ASSEMBLY, FOCUS MOTOR
2	2	74-T301-5MM	COUPLING, 5MM
4	1	74-A201-1	NYLON COUPLING SPACER
16	1	74-F001210	HOUSING, OUTER FOCUS MOTOR
17	1	61-ME00173	SHAFT COLLAR, 5MM
18	1	74-F001323	ADAPTER RING, LEICA DMLB

Microscope Mounting: Right Side



2.6 9xA407 Nikon E50i/E80i Focus Drive Coupling:

9xA407 FOCUS MOTOR INSTALLATION FOR NIKON E50/E80			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	73-SA0040x	SUB-ASSEMBLY, FOCUS MOTOR
2	1	74-T301-5MM	COUPLING, 5MM
3	1	74-F001201	HOUSING, OUTER FOCUS MOTOR
4	1	74-A201-4	NYLON COUPLING SPACER
5	1	74-T301-5	COUPLING, 1/4"
7	1	74-F001300	ADPATER RING, FOCUS MOTOR
12	1	74-F001059	FINE FOCUS STUD FOR NIKON E50/E80

Microscope Mounting: Left Side



2.7 9xA410 Zeiss AxioImager/AxioObserver Focus Drive Coupling:

	9xA410 FOCUS MOTOR INSTALLATION FOR ZEISS AXIOIMAGER/OBSERVER			
	ITEM	QTY	PART NUMBER	DESCRIPTION
	1	1	73-SA0040x	SUB-ASSEMBLY, FOCUS MOTOR
	2	1	74-T301-5MM	COUPING, 5MM
	3	1	74-F001201	HOUSING, OUTER FOCUS MOTOR
	4	1	74-A201-1	NYLON COUPLING SPACER
	7	1	76-NS6R.125	SPACER NYLON ROUND #6 0.125
	13	1	74-T301-3MM	COUPLING, 3MM
	15	1	74-F001324	ADAPTER RING, FOCUS MOTOR

Microscope Mounting: Left Side



* Requires linear encoder (9xA420) with linear encoder bracket.

3.0 Focus Motor Functionality

The focus motor can be controlled in three manners:

- Joystick/Digipot via a connection at the back of the controller.
- Software via communication ports at the back of the controller.
- Manual focusing via the red button on the focus motor. To disable motor power at the microscope for manual movement, press the red button on the focus motor. To activate power, simply press the red button or continue to use the joystick/software control.



Note: While the use of manual focus can be used as an option, it is still recommended for optimum performance and position accuracy to use the joystick and/or software control. Without the use of an encoder, manual movement will result in a lost position.

4.0 Connections

- 4.1 Connect the focus motor DB 15 pin connector from the focus motor to the rear of the controller labeled FOCUS MOTOR on the 7300x056 module.
- 4.2 If being used, connect the 15 pin linear encoder cable (with gender changer) to the 15-pin male connector at the rear of the controller labeled ENCODER on the same focus motor drive module.

5.0 Linear Encoder Optional Upgrade



It is imperative the linear encoder is attached to the LEP controller using the supplied gender changer - failure to do so may result in significant damage to the linear encoder. Also, ensure you follow proper ESD precautions:



- 5.1 The encoder mounting brackets are designed to mount to the microscope frame. Install the MT-1271 encoder into the clamping bracket; tighten the clamping screw with a 2.5 mm hex wrench.
- 5.2 Mount the encoder/encoder bracket assembly to the microscope using the provided hardware. (See the Limit Switch/Linear Encoder Installation Manual 90M032 for more reference)
- 5.3 When installed properly, the actuator block will contact the encoder plunger as the stage travels in the Z direction.

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