

ESI0ZE

Focus Controller
Manual Version 2.3



Worldwide distribution



FM 61600

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Many thanks for purchasing a ESI0ZE focus controller – we hope and expect that it will prove to be useful, reliable and a valuable addition to your microscopy system. Please do take the time to read this manually thoroughly before attempting installation and use. This document contains both important safety information as well as advice on how to install and operate the product successfully to avoid damage. If you have any problems with this product, please do not hesitate to contact Prior.

SAFETY INFORMATION

SECTION I

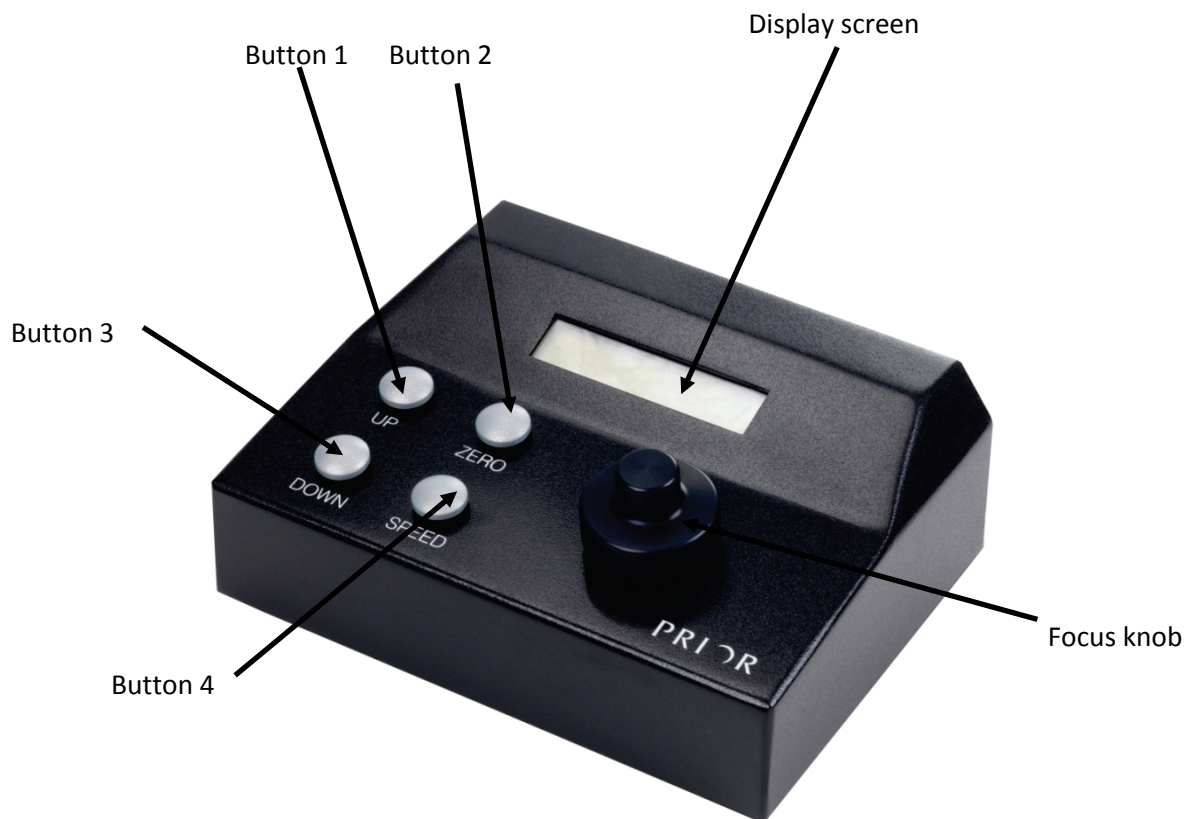
Important Safety Information

- **Keep this manual in a safe place as it contains important safety information and operating instructions.**
- **Before using the focus system, please follow and adhere to all warnings, safety and operating instructions located either on the product or in this User's Manual.**
- **Do not** expose the product to water or moisture, extreme hot or cold temperatures, or open flames. Do not allow objects to fall on, or liquids to spill on the product.
- Connect the AC power cord only to designated power sources as marked on the product
- Make sure the electrical cord is located so that it will not be subject to damage.
- Always disconnect power from product before connecting the components together.
- Only use the supplied AC/DC adapter with this product. **Never substitute another adapter.** Should the adapter be in any way faulty or damaged **contact your supplier**
- **DANGER – Never alter the AC cord or plug. The power cord set must be an appropriately rated and approved cord set in accordance in the regulations of the country it is used in. If the supplied plug adapter is not the correct fitting for your geographic area or if you are unsure about the relevant regulations, please contact your supplier for advice**
- **Do not in any way attempt to tamper with the product, doing so will void the warranty, and may damage the system. This product does not contain consumer serviceable components, all repairs or services should be performed by Authorised Service Centres, contact your local dealer for details.**

GETTING STARTED

SECTION 2

2.1 Basic controls



Button Functionality:

The Focus Knob controls Z axis, rotate to move focus.

Button 1 is the fast up button, hold down to move up at fast speed.

Button 2 is the zero relative position. Press once to set Relative 0, Relative mode shown by * on display. While in Relative mode press to zero counter. When in Relative mode if display at 0 press to return to absolute mode. e.g., press once to 0 and a second time to return to absolute position.

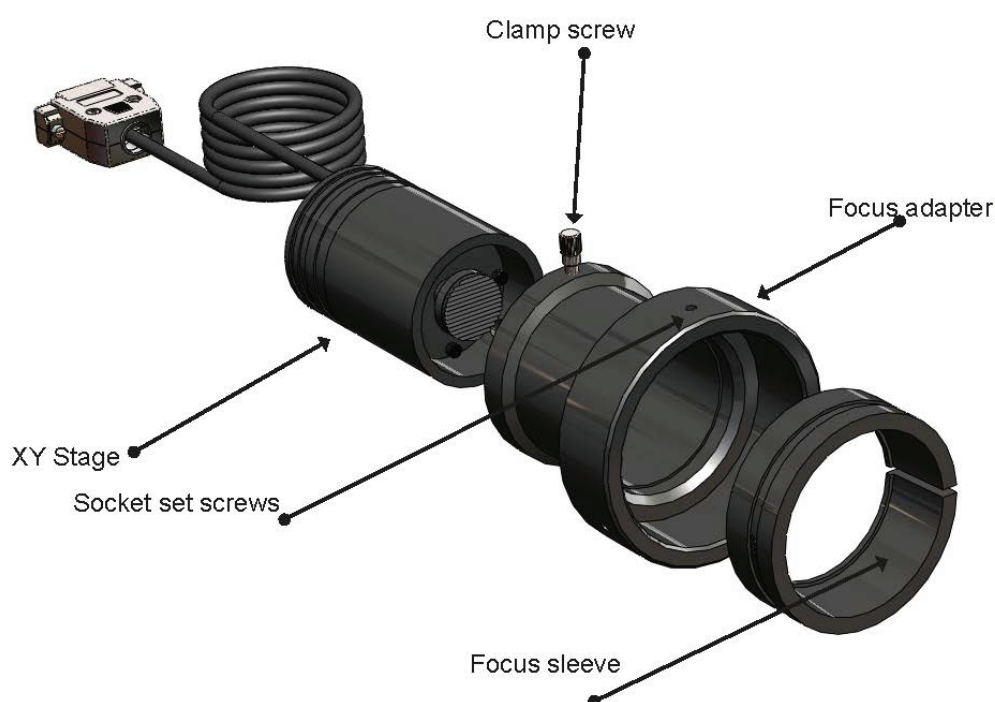
Button 3 is the fast down button, hold down to move down as fast speed.

Button 4 is the toggle speed button, press to toggle Focus Knob speed through 25-50-100% speed.

2.2 Connecting to the PS3HI22R to the microscope

For installation procedure for Zeiss Axio range (HI22AXIO and HI22AXIE), Leica DML range (HI22LB), and direct coupling models, see Appendix A. The following instructions refer to the standard split sleeve mounting.

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



2. Loosen the 3 socket set screws around the periphery of the focus adapter using a 2mm Allen wrench until the focus sleeve is able to fit inside the adapter. Note that it is important to insert the sleeve in the correct orientation with the lip furthest inside the adapter (the chamfered edge of the sleeve will be inserted first). Note the orientation of the sleeve as it has a recess around its outer surface, which will hold the sleeve in when the setscrews are tightened. This recess must line up with the tips of the socket set screws.

3. With the sleeve in place, tighten the 3 socket set screws in sequence until they all just touch the sleeve, ensuring that the split in the sleeve does not line up with any of

the set screw positions. **DO NOT TIGHTEN UP ANY OF THE SPACE SCREWS AT THIS STAGE.**

4. Push the adapter onto the preferred coarse knob of the microscope as far as it will go. The controller is factory configured to drive the focus motor in the correct direction when mounted to the left hand side of an upright microscope. If the right 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 programme e.g. Prior Terminal and changing the settings of the ZD command via RS232 communication. The inside fitting diameter of the sleeve is designed to be slightly larger than the coarse knob, provided the setscrews have not been tightened and are compressing the sleeve.

5. While holding the adapter in place, tighten the set screws in sequence only enough 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.

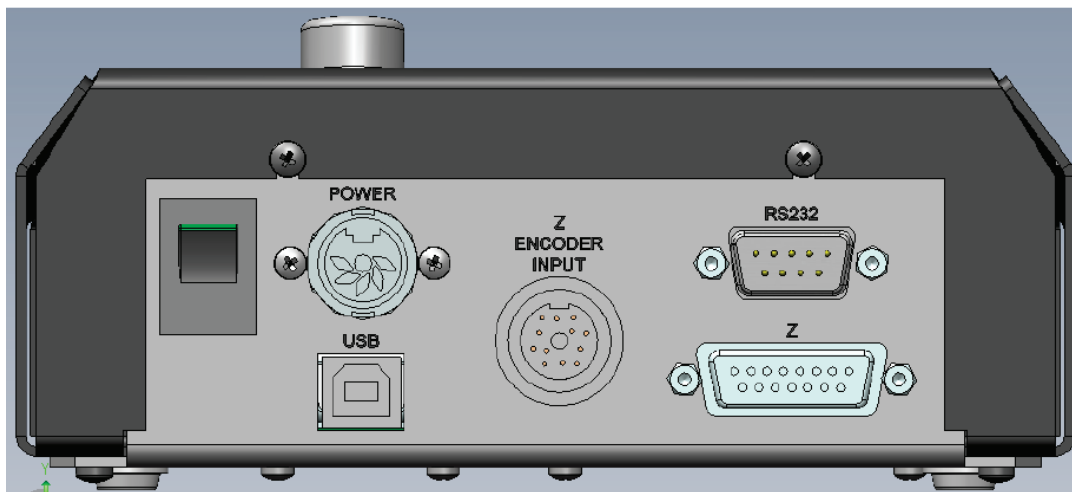
6. Check that the unit has been tightened sufficiently by taking hold of it and turning it. If the adapter is correctly fitted it will stay attached to the coarse knob.

7. Slide the focus motor into the adapter as far as it will go 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 9 way D type plug on the focus motor lead to the socket on the rear of the controller as shown below.

2.3 Connecting to the ESI0ZE

Switch off the ESI0ZE unit. Connect the Z motor into the connector labelled z, ensure the connector is firmly screwed in. If supplied, connect the focus encoder into the connection labelled Z encoder input, ensure the connector is firmly screwed in. If required, connect the communications cable via RS232 or USB (Requires drivers, see www.prior.com) Connect the power (H407, external 24v power supply) to the connector labelled Power. Switch on the EZI0ZE unit. Un-encoded: The unit will power up and display “PRIOR Z v1.0” while starting up. Encoded: The unit will power up and display “PRIOR v1.0” while starting up. The position will then be displayed in microns.



2.4 Display features.

The display is in absolute microns, this will be remembered by the controller if switched off. Display modes: Absolute Mode () The default mode, position is displayed in microns (um). Relative mode: (*) When the Zero button is pressed the display is in relative mode, and the counter is set to zero. If the counter is at zero and in relative mode when the “zero” button is depressed again the display will toggle back to absolute mode. If the counter is not at zero and in either absolute or relative mode the counter will be set to zero and the system will be in relative mode. Encoder mode: (E) If encoders are fitted and activated an E is displayed in the display screen.

ADVANCED OPERATIONS

SECTION 3

3.1 RS232 Command Set

The ESI0ZE controller can accept commands from either serial port, or USB port (with appropriate divers installed on PC). The ports (RS232-1 & RS232-2) default to a baud rate of 9600, this can be increased to 38400 if desired (see BAUD below). The ports can have different BAUD speeds, the system functions in Compatibility mode 0. Commands are terminated with a Carriage Return code <CR> (the 'ENTER key of the pc keyboard'). One or more of the following delimiters separates commands from arguments.

COMMA

SPACE

TAB

EQUALS

SEMICOLON

COLON

To set focus speed to 100 the user could enter any of the following SMZ,100<CR> SMZ 100<CR> SMZ, 100<CR> SMZ,, 100<CR> The controller immediately returns R after any movement command (the user has to query the controller with the \$ command to determine if the stage has stopped moving). commands can be stacked. All communication is none blocking so commands can always be sent although some will not be performed immediately or indeed at all.

The FOCUS, command response is terminated with the word END. This will enable extra information about the ESI0ZE to be added in the future and still be readable by the Application Software.

3.2 General Commands

		Response (all end with <CR>)	Description
\$	[a]	Decimal Report	Reports status as a decimal number and gives motion status of any axis of the controller. After binary conversion convention is as follows:- <pre>Z 0 0 D02 0 0</pre> If Z only moving 4 would be returned. Optional Parameters “\$.z) The command would return 0 or 1 depending on if the axis is in use.
?	None	Test string	Reports information about the peripherals currently connected to the controller. E.g. DRIVE CHPS 0001000 means a Z chip is fitted. END indicates end of readout. Users should always read lines in until END is seen. A typical response is shown below. <pre>OPTISCAN INFORMATION DRIVE CHOPS 0001000 JOYSTICK ACTIVE STAGE = NONE FOCUS = NORMAL FILTER_1 = NONE FILTER_2 = NONE SHUTTERS = 000 END</pre>
BAUD	b	0	Sets the baud rate of the port issuing the command to the value specified by b. Allowable values for baud are 96, 9600, 19, 19200, 38, and 38400 WARNING If Baud rate of ES10ZE is changed it is important for Application software to check communication with ES10ZE by scanning Baud Rate on initialisation. This will avoid a permanent communication failure should the ports be set at different Bauds.
DATE	None	Test String	Reports Instrument name, version number and compile time. Note that the system description refers to the presence or absence of internal drivers NOT

			which peripherals are connected.
I	None	R	Stops movement in a controlled manner and returns to the position the interrupt was entered at. This command is acted on immediately in compatibility mode there is no need for a <CR>. The command Queue is also emptied.
K	None	R	Stops movement with no regard for position (Not recommended). This command is acted on immediately in compatibility mode there is no need for a <CR>. The command Queue is also emptied.
LMT	None	Nm	Reports whether any limit switch is currently active. A limit switch is active if the switch is in contact with the axis hardware. Nm is a two digit Hex number (one Byte) which when converted to binary is as follows:- to binary is as follows:- D05 D04 -Z +Z eg 16 means stage is in contact with +Z limit switch, and 32 indicates contact with -Z limit switch. 00 means all axes are not in contact with any limit switch. Note that the controller knows whether the limit switch is normally low or normally high and corrects accordingly. This does not return the hardware signal level of the limit switch.
Serial	None	Nnnnn	Reports the units serial number nnnnn, if the serial number has not been set "00000" is returned.
VERSION	None	Ddd	Reports the units software version number as a 3 figure number eg 041 is Version 0.41

3.3 Z Axis commands

Command	Argument	Response (all end with <cr>)	Description
BLZH	s,b	0	Sets the Z backlash value for host moves to b in microsteps. s = 1 enables backlash s=0 disables backlash
BLZH	s	0	Enables / Disables the Z backlash s = 1 enables backlash s=0 disables backlash.
BLZH	None	s,b	Reports back the Z backlash value for Host moves.
BLZJ	s, b	0	Sets the Z backlash value for Joystick/Digipot to b in microsteps s = 1 enables backlash s=0 disables backlash
BLZJ	s	0	Enables / Disables the Z backlash s = 1 enables backlash s=0 disables backlash
BLZJ	None	s,b	Reports back s and b for Z axis (see above)
C	None	w	Reports the current step size for the focus motor.
C	w	0	Sets the current step size for the focus motor w
D	z	R	Moves Down by z steps
D	None	R	Moves Down one step as defined by the 'C' Command
FOCUS	None	Test string	Prints information about focus unit.. There are 250 microsteps per full step. The information end is always a line saying END This allows for the addition of extra fields of information without effecting application software. Users should always read lines in until the END is seen to keep in sync. Example FOCUS = NORMAL TYPE = 0 MICRONS/REV = 100 END

H	None	0	Turns OFF the joystick (Stage and Z axes) after completion of any current joystick move. Joystick is re-enabled using 'J' Command below. The joystick is re-enabled each time the controller is powered up.
I	None	R	Gracefully stops movement and returns to the position the interrupt was entered at.
J	None	0	Turns ON the joystick. (Stage and Z axes) This command is acted upon immediately.
JZD	d	0	Sets the direction of Z axis under digipot control, d=1 or d=-1.
JZD	None	d	Reads d.
K	None	R	Stops movement with no regard for position (Not recommended). The command Queue is also emptied.
M	None	R	Moves stage and focus to zero (0,0,0)
OF	s	0	Sets the speed of the focus motor under joystick/digipot control. s is percentage in range 4 to 100.
OF	None	s	Reports value of OF allowing for joystick speed buttons effect (if the button speed is ½ and OF is set to 50 the returned value will be 25)

PZ	None	z	Reports position of z only.
PZ	z	0	Sets Absolute position of z axis, No axis can be moving for this command to work. If encoder on Z the position is only set when the current position is in the encoder range (it must have been further down than it is currently).
SAZ	a	0	Sets the current Z acceleration to a. Range is 4 to 100
SAZ	None	a	Report the current Z acceleration setting.
SMZ	None	m	Report the current Z maximum speed setting m
SMZ	m	0	Sets the current Z maximum speed to m. Range is 1 to 100
U	z	R	Moves Up by z steps.
U	None	R	Moves Up by one step as defined by the 'C' Command.
V	z	R	Go to the absolute position z, in steps.
VZ	z	R	Sets the focus motor into constant speed, z (range -30000 to +30000). VZ, 1000 give velocity of 30000 microsteps per second. To stop the focus motor use VZ, 0, i.e., set the speed to 0.
Z	None	0	Sets the stage and focus to absolute position to ZERO (0, 0, 0).
ZD	d	0	d=1 Sets direction of rotation of focus motor. Defaults to 1 and is correct for motor fitted on right hand side of microscope. d=-1 Direction of rotation of focus motor opposite to above.
ZD	None	d	Returns d

UPR	a	0	Sets the um's per Revolution of the focus. This allows you to setup the screen output to match the actual movement of the focus. The RES,Z command must be resent after setting the UPR.
SSZ	s	0	Sets the value for Z user units to s. Entering negative number reverses direction of motor
ENCW	None	A, B, C, D	Returns a string of 4 values. The third value (c) is the encoder window for Z.
ENCW,Z	n	0	Sets the encoder window n. This can prevent excessive hunting as controller tries to close the position loop.
RES,Z	None		Returns resolution for axis
RES,Z	r		Sets the desired resolution for the stage, r can be a non integer number setting the resolution for the axis in units of microns. e.g. RES,s,1.0 Resolution set to 1.0 micron
SWZ	n	0	Sets a window of n encoder counts about the current Z position to prevent excessive hunting when servo enabled.
ZCORRECT	a	0	A= linear scaling of z axis. Default = 1.0

3.4 USB operation.

The instructions below are for Windows 7. If you are using an older version of Windows please contact Prior for advice.

Plug in the USB cable to the ESI0ZE and computer, power on the ESI0ZE. The software should install automatically. Afterwards, open Prior Terminal to check that it is in communication with the computer by giving the command '?'.

If nothing happens then try changing the coms port (using the box in the left hand corner of Prior Terminal' and again type '?'. If there are a large number of coms ports, or for any other reason you don't wish to use this method, open the control panel from the start menu, open "system" or Right-click on **My Computer** and select **Properties**. Click on the **Hardware** tab. Click **Device Manager**. Expand **Ports (COM & LPT)**. You should see **Prior Communication Port -> COM device (COMn)** listed, where *n* is the COM number assigned to the port.

3.5 Z Axis Encoder.

Prior stages can be equipped with either linear or rotary encoders for higher positioning repeatability and accuracy, EZI0ZE supports a Z axis encoder only. A Z-probe or Z-encoder is an optical system that reflects light off a graduated scale through a grating and onto photo sensors. These sensors generate electrical currents. The electrical currents generated are used to determine distance and direction the stage has travelled.

Unlike rotary encoders which imply a distance travelled by measuring the rotation of the motor, z-probes are actually mounted to the moving plates of a stage and therefore directly measure stage movement. Z-probe Encoders benefit the focus user by providing:

- The ability to use a Digital Read Out (DRO), screen of ESI0ZE
- The ability to provide closed loop "servo" control
- Superior precision and finer resolution.

Z-probe mounted on Prior focus now provide repeatability to +/- 0.3 microns and resolution (step size) as small as 0.05 microns. This superior performance is extremely critical in many Industrial and Bio-Science applications such as the performance of time-lapse imaging studies.

The ESI0ZE Controller with the 'E' option enables encoder with RS485 differential quadrature square wave outputs to be inputted to the Z axis. The controller will

have a round 12 pin connector on the back of the control box labelled, “Z encoder input”. Turn the controller off and plug in the encoder or scale. When an encoder is fitted and enabled (the default condition) the controller uses the position measured by the encoder as the true position and not the number of pulses sent to the stepper motor.

When the controller identifies an encoder fitted to the Z axis for the first power-up this prompts a small motion to be initiated (two full steps of the motor). The controller will use the number and sign of the counts from the encoder to establish the correct ratio between encoder pulses and motor pulses. Stepper moves will be faster than moves under encoder control due to the feedback, checking, and adjusting required for the closed loop system.

The SERVO,b command gives the option for the controller to constantly read the encoder position (when stationary) and correct for any position drift. b=4 SERVO on b=0 SERVO off. With SERVO off, the axis still moves to its destination positions measured by the encoder but will not correct for any drift once the destination has been reached.

Command	Arguments	Response	Description
ENCODER	None	n	Reports back as a decimal number (4) if the axis is operating using the encoder, or (0) if not.
ENCODER	b	0	b=0 Disables encoder b=4 Enables encoder.
ENCODER	Z	0,4	Returns whether the Z axis has encoder enabled or disabled.
SERVO	None	n	Reports back as a decimal number the axes that have servo operation enabled. For example, 4 means Z axis servo enabled.
SERVO	b	0	b = 0 stage moves to destination position (as read from encoders) and stops. There is no servo action therefore the focus can drift from destination position due to external mechanical and thermal forces. b = 4 focus continuously reads position from encoders (even when stationary) and corrects for any drift.
SERVO	Z	0,4	Returns whether the Z axis has servo enabled or disabled.
SERVO	Z,b	0	b=0 Disables servo specified by Z Axis b=4 Enables servo specified by Z Axis.
SWZ	e	o	Sets a window of n encoder counts about the current Z position to prevent excessive hunting when servo enabled
P	e	x,y,z	Argument 'e' indicates encoder position. If ENCODER,0 returns encoder position at present stepper position (Use P Command) If ENCODER,4 Returns encoder position. This is the same as 'P' Command

3.6 Error Codes

If a command is not valid a response of “E,n” is returned the n specifying an error type as listed below. Machine or human readable messages are chosen using the ERROR Command.

1	NO STAGE
2	NOT IDLE
3	NO DRIVE
4	STRING PARSE
5	COMMAND NOT FOUND
6	INVALID SHUTTER
7	NO FOCUS
8	VALUE OUT OF RANGE
9	INVALID WHEEL
10	ARG1 OUT OF RANGE
11	ARG2 OUT OF RANGE
12	ARG3 OUT OF RANGE
13	ARG4 OUT OF RANGE
14	ARG4 OUT OF RANGE
15	ARG 5 OUT OF RANGE
16	ARG 6 OUT OF RANGE
17	INCORRECT STATE
18	WHEEL NOT FITTED
19	QUEUE FULL
20	COMPATIBILITY MODE SET
21	SHUTTER NOT FITTED
60	ENCODER ERROR
61	ENCODER RUN OFF

TROUBLESHOOTING

SECTION 4

The ESI0ZE contains NO user servable parts and must be returned to Prior or an authorised service provider for repair. Do not modify or repair without first consulting Prior as this may damage the unit and void the warranty.

Please feel free to contact Prior if there are any problems with your ESI0ZE.

Below are some potential solutions for various problems.

Problem: Focus motor will not respond to Focus Knob or RS232 commands

Suggestions: Check that the system is properly installed and that there is a proper power connection to the controller. Check that the controller is switched on, and a position is displayed on the screen. Set up and run Prior Terminal (Windows Users) and send the '?' command via RS232-I. The controller should report with information about the peripherals currently connected, as shown in section 6 of this manual. If the controller does not acknowledge the presence of any of the connected peripherals contact your local Prior dealer.

Problem: The focus will not respond to my Image Analysis Software.

Suggestions: Check that the Image Analysis Software Program has drivers for Prior systems. If not, consult the software dealer. Close down the Image Analysis Software. Set up and run Prior Terminal (Windows Users) and try several basic commands while in Prior Terminal to determine if the focus responds correctly; if so the controller and connections are functioning properly. At this point consult the supplier of the Image Analysis Software. If the stage does not respond to the commands, contact your local Prior dealer for further advice. **Note:** Before running commands using Prior Terminal make sure that your microscope objectives and any other objects that may impede the motion of the stage are moved out of the way, to avoid damage.

Problem: The focus motor turns but the microscope fine focus knob does not.

Suggestions: The focus drive may not be properly positioned against the fine focus knob. Loosen the knurled screw that holds the focus motor and press it gently against the fine focus knob. While pressing, re-tighten the knurled screw.

REPLACEMENT PARTS

SECTION 5

Description	Part Number
Focus Drive and Adapter	PS3HI22R
Focus Drive and Adapter for Zeiss	HI22AXIO
RS232 cable for PC (9 or 25 pin)	H276K
RS232 cable for Macintosh	H277
Direct fine focus coupling for Olympus/Nikon	HI22KON
Direct fine focus coupling for Olympus IX/BX microscopes	HI22KBIX
Direct fine focus coupling for Focus Drive on Leica	HI22KLC

SPECIFICATIONS

SECTION 6

Dimensions: 165x126x60mm

Power: Universal external power supply

Input: 110 – 240V, 50/60Hz 60W

Output: 24VDC 2.5A

Specifications subject to change without notice.

RETURNS AND REPAIRS

SECTION 7

Should you experience problems with your ProScan System and want to send it back for service, warranty or otherwise, a Return Material Authorisation (RMA) number must be obtained from the appropriate Prior Scientific office before returning any equipment.

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APPENDICES

SECTION 8

Appendix A.

8.1 Non-Standard Focus Drive Installations

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 of 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 listed below. However, it is not compatible with the Zeiss Axioskop 2 and Axioplan 2. The focus drive must be attached to the fine focus ball reduction mechanism as follows:

Axioplan..... Left Side	Axiotron 10 Right side	Axiolab Right side
Axioskop Left Side	Axiovert 35 Right side	Standard..... Right side
Axiovert 25 ... Left Side	Axiovert 100 Right side	Axiovert 135.... Right side

Components

The focus drive assembly is comprised of the following:

- Drive motor, motor bracket and switch assembly
- Mounting block
- Anti backlash gear and locknut
- Cover and lead

Also included are screws and hexagon keys needed to install the focus drive unit.

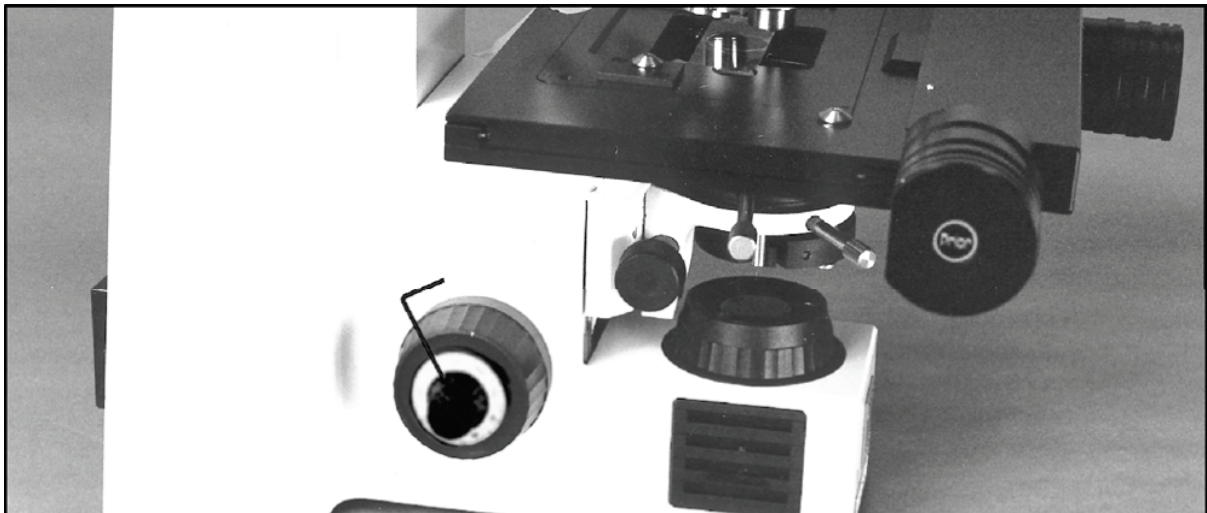
Tools Required:

14mm AF spanner or socket, 1pt Philips screw driver, 1.27mm hexagon key (supplied) 2.5mm hexagon key (supplied) 3.0mm hexagon key (supplied).

Prepare the focus drive:

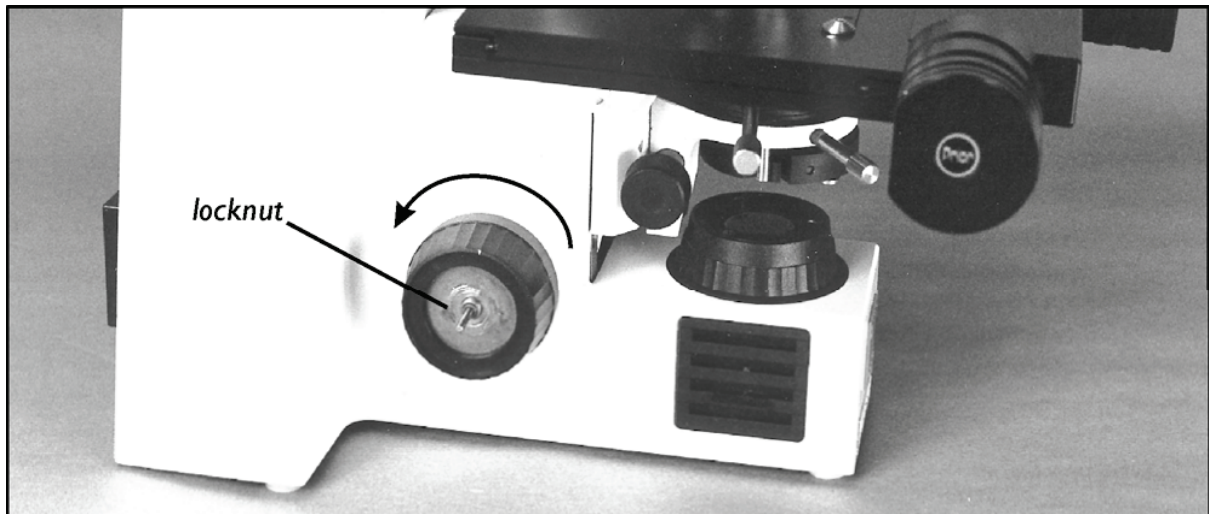
- Remove the cover.
- Remove bag containing anti-backlash gear, locknut and hexagon keys.
- Using 3.0 hexagon key remove the two 4mm cap head screws that hold the mounting block to the motor bracket assembly.

Installation of the focus drive



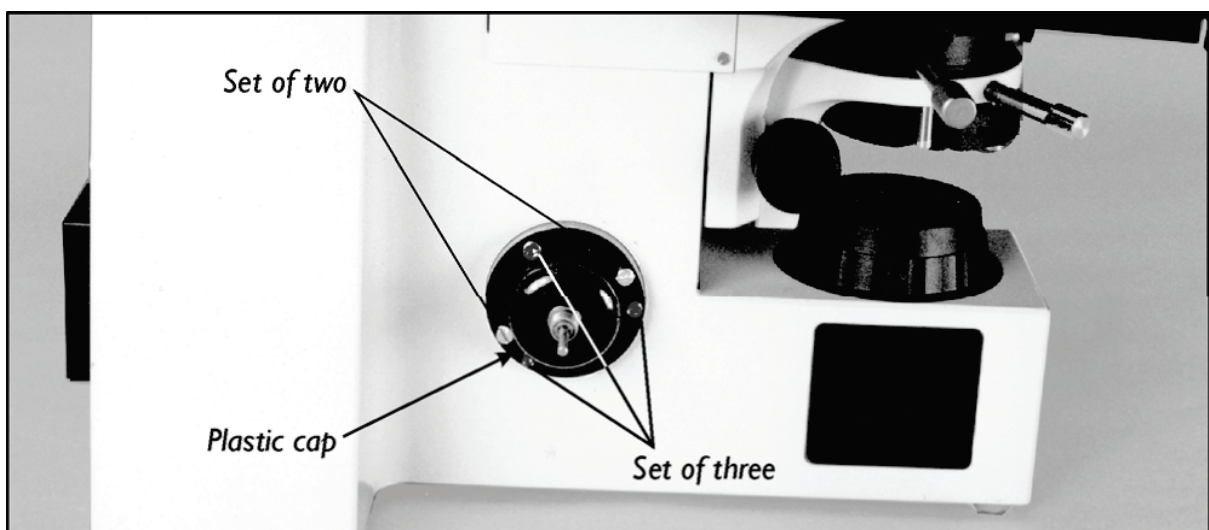
Determine which side the focus drive must go (see introduction).

Remove the fine focus knob by using the 1.27mm hexagon key to unscrew the set screw. The knob can then be pulled off.

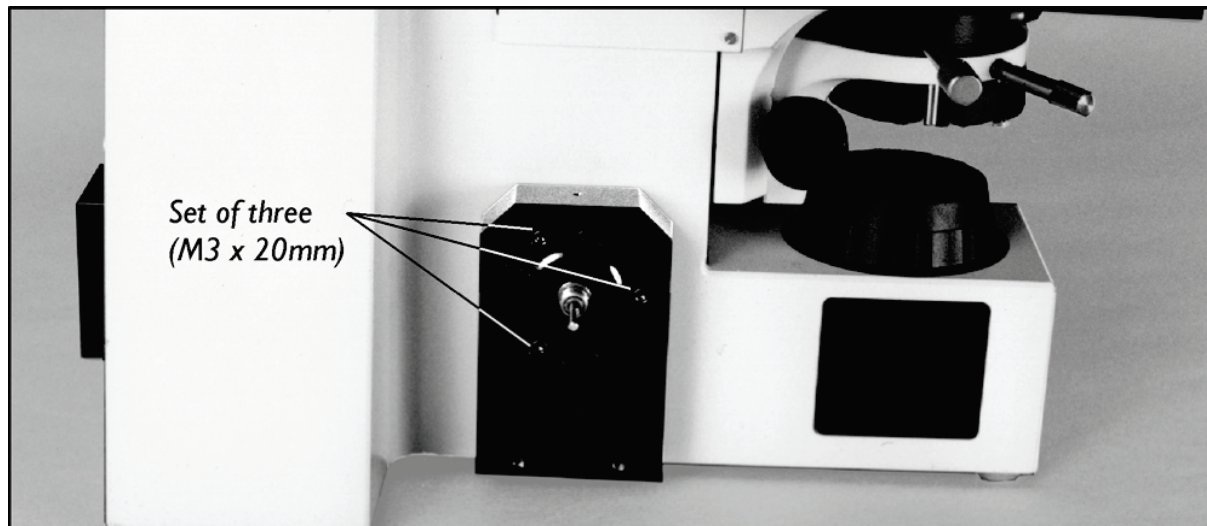


Using the 14mm spanner or socket to remove the lock nut. The coarse knob can now be removed by turning anti-clockwise and unscrewing from the coarse focus shaft.

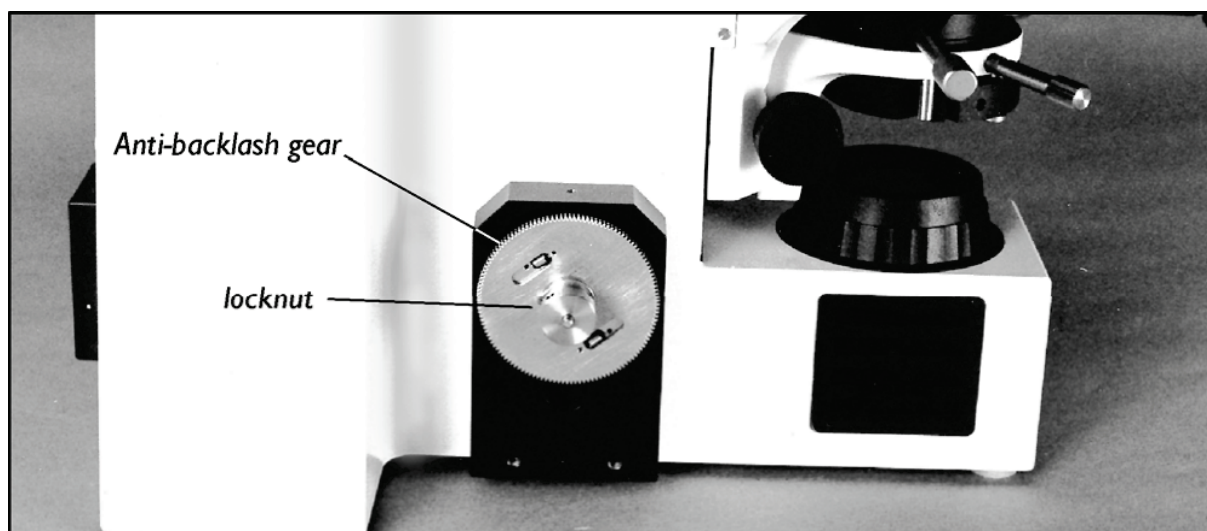
A black plastic cover should now be visible. If this is not the case, check the introduction to ensure you removed the knobs from the correct side. **It is very important that you replace both coarse and fine knobs before removing the knobs on the opposite side.**



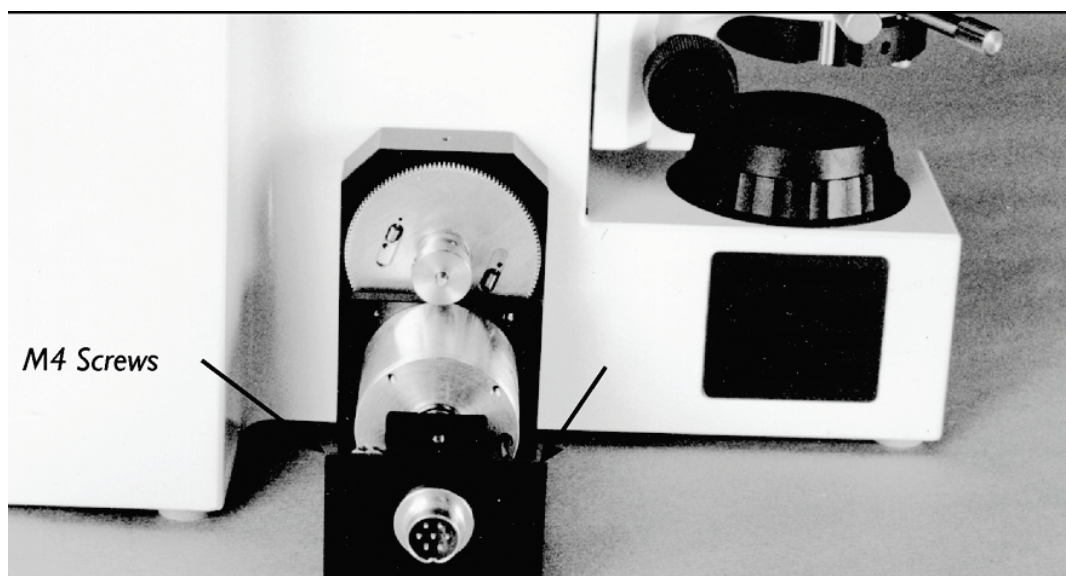
The plastic cap is held on with five screws, one set of two screws and one set of three. If the set of two screws are missing then install the two M3 x 6mm cap head screws supplied. Remove the set of 3 screws using the 2.5mm hexagon key.



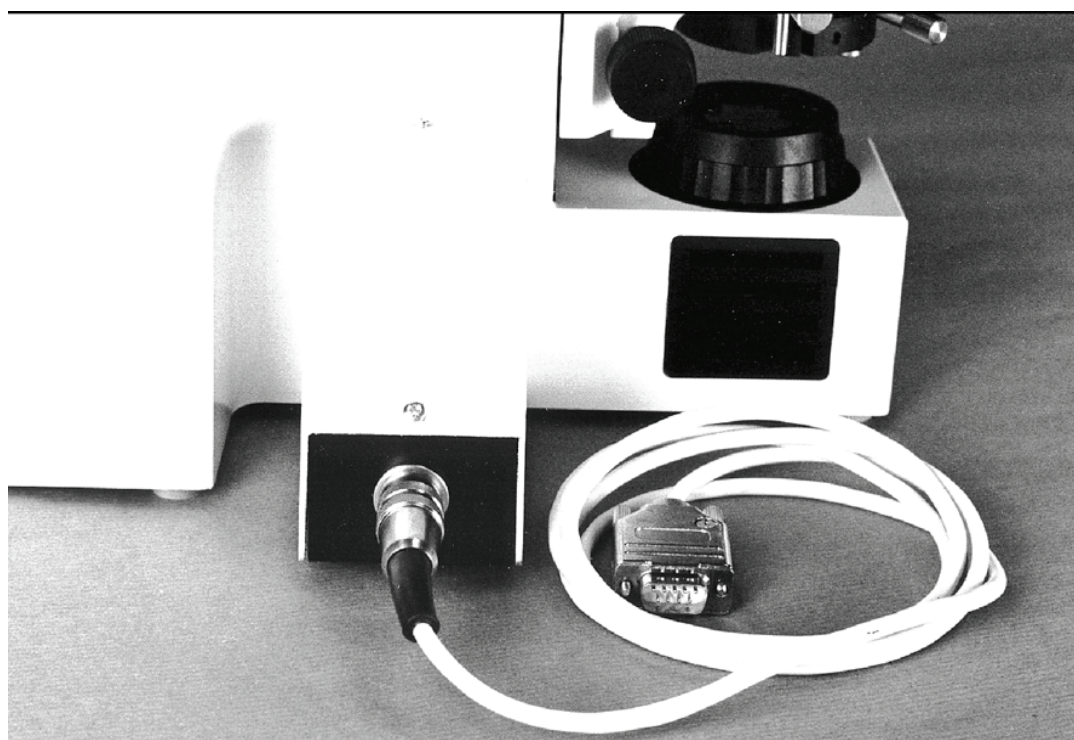
Place the mounting block over the plastic cap and hold in place using the 3 M3 x 20mm cap head screws supplied.



Screw the anti-backlash gear onto the coarse drive shaft, making sure the gear's boss is facing outwards. Screw the locknut into the boss and tighten.



Attach the motor, bracket and switch assembly to the mounting block using the two M4 cap head screws. The anti-backlash gear has two gears, one fixed, the other spring loaded and free to rotate. Rotate this gear approximately 6 teeth before aligning with the motor gear.

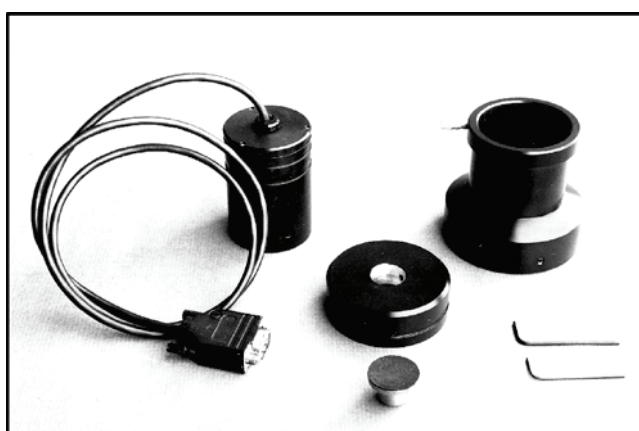


Replace the cover and attach the lead.

If the focus drive unit appears to drive in the wrong direction, i.e. you ask the controller to move up and the stage moves down, then the switch is set to the wrong position. Disconnect the power supply to the focus drive, remove the cover, move the switch and then replace the cover.

The unit will now move in the correct direction.

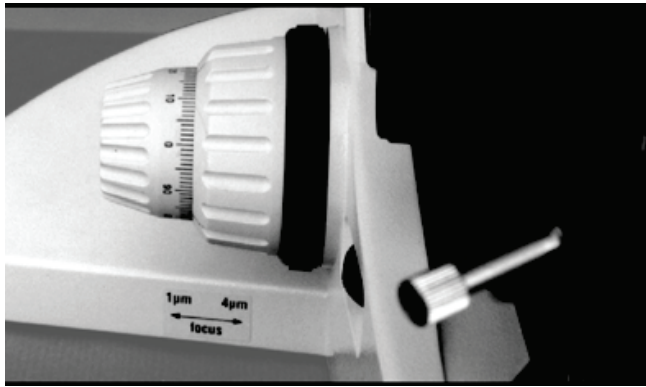
11.2 FOCUS DRIVE INSTALLATION FOR THE LEICA DML RANGE HI22LB MOTORISED FOCUS KIT PARTS LIST



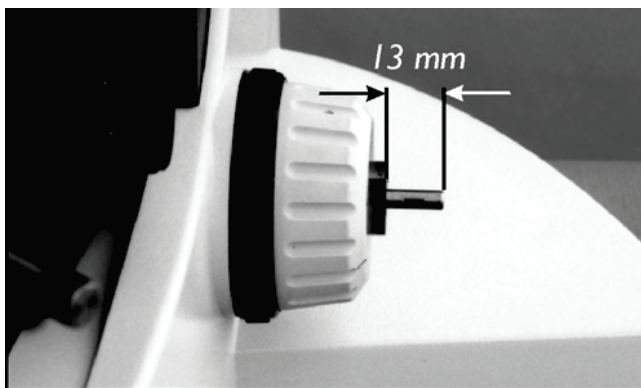
- a. H249 Microstep Focus Motor
- b. HI073 Adapter ring (for Leica DMLB)
- c. HI166 Drive coupling (For Leica DMLB)
- d. H569 Focus motor sleeve
- e. S690 Thumb locking screw
- f. WI401 2mm hexagonal wrench
- g. W347 1.5mm hexagonal wrench

Fitting the HI22LB to the Leica DMLB involves removing the right hand fine focus knob. Note that this has two sensitivity settings depending on whether the fine focus mechanism is pushed to the right (4 microns) or pushed to the left (1 micron). This option is indicated by the label on the front surface of the left hand stabiliser.

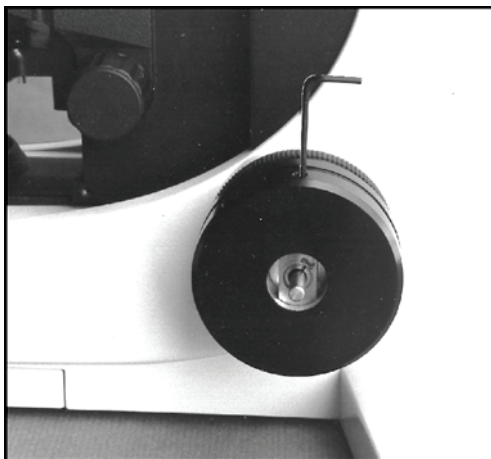
The fine focus must be set at the 1 micron position.



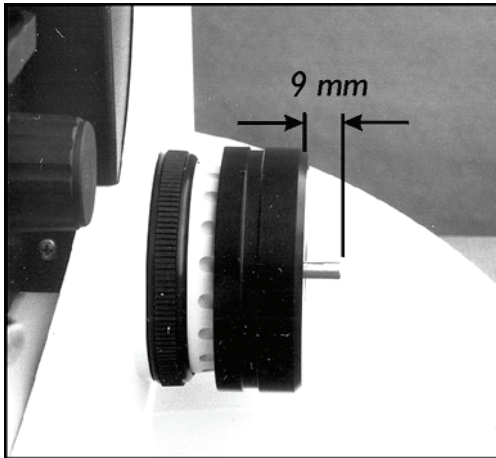
Push the fine focus fully to the left. Note the amount of the vernier scale showing on the left hand knob. Fitting the HI22LB is done with the fine focus in this 1 micron position.



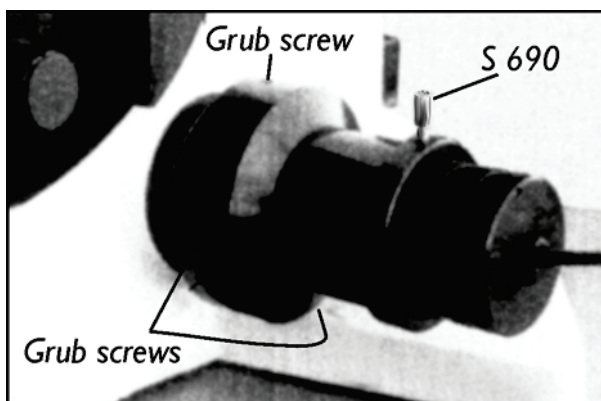
Remove the right hand focus knob using the 1.5 mm hexagonal wrench key inserted down the small hole in the right hand fine focus. Hold the left hand fine focus knob when pulling off the right hand fine focus knob ensuring that there is no lateral movement of the shaft. There should be approximately 13mm shaft length protruding from the brass boss. Ensure that the small spring washer is still on the shaft.



Fit the large adapter ring over the brass boss. Note that the orientation of the adapter ring should be such that the grub screw in the adapter ring screws down onto the centre of the radius (curved part of the brass boss).



Push this fully towards the body of the microscope leaving approximately 9mm of shaft protruding from the adapter ring whilst tightening up the adapter ring using the 2mm hexagonal wrench key.



Fit the drive coupling on the fine focus shaft using the 1.5mm hexagonal wrench key. Orient the shaft so that the grub screw will locate on the flat of the shaft. Push the drive coupling gently towards the adapter ring whilst tightening the grub screw.

Check that the fine focus rotates freely and is still set at 1 micron.

Fit H569 motor sleeve on the adapter ring. Tighten up 3 grub screws in sequence using the 2mm Hexagonal wrench key . It may be necessary to rotate the motor sleeve to gain access to each grub screw. The motor sleeve and adapter ring are now attached to the coarse focus.

Slide the H249 Microstep Focus motor assembly into the motor sleeve and tighten the S690 thumb screw whilst gently pushing the focus motor assembly towards the microscope such that there is a good contact between the rubber surfaces of the drive of the motor and the drive coupling. The fitting is now complete.

The motor is now able to drive the fine focus mechanism of the microscope.

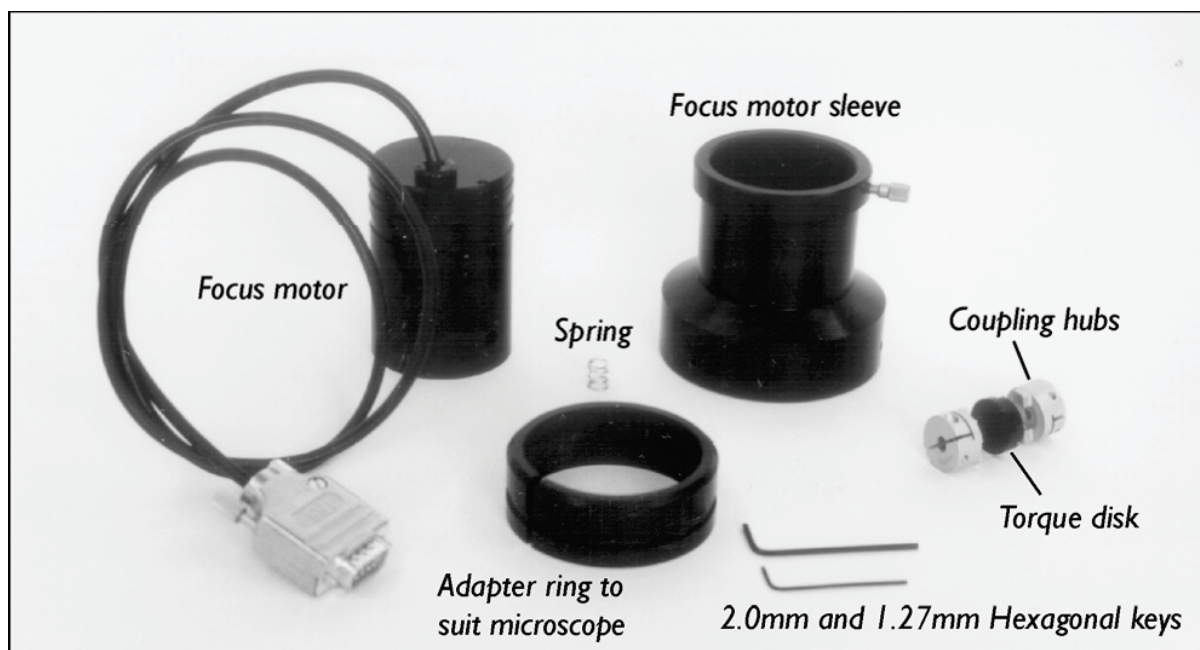
Appendix B

8.2 Direct Coupling Focus Installation for Leica and DML and DMR Range

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 of mechanical assembly do not attempt this installation, consult your local microscope representative.

Components



Installation on 'DMR'

STEP 1) Using a 1.27mm Hexagonal key, undo the fine focus set screw. The knob can then be pulled off.



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

Compress the spring by 3-6mm and clamp the hub using the 2mm hexagon key.

Note: Only one of the coupling hubs will fit the fine focus shaft

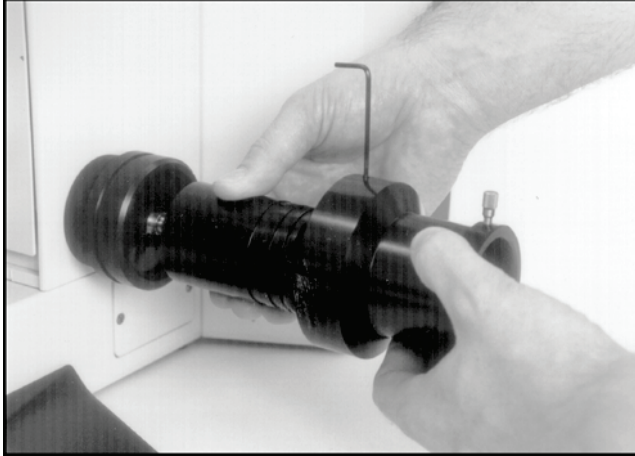


STEP 3) Push the remaining coupling hub and plastic torque disc together and place on the focus motor shaft.

Tighten using the 2mm hexagon key making sure it does not bind on the motor casing.



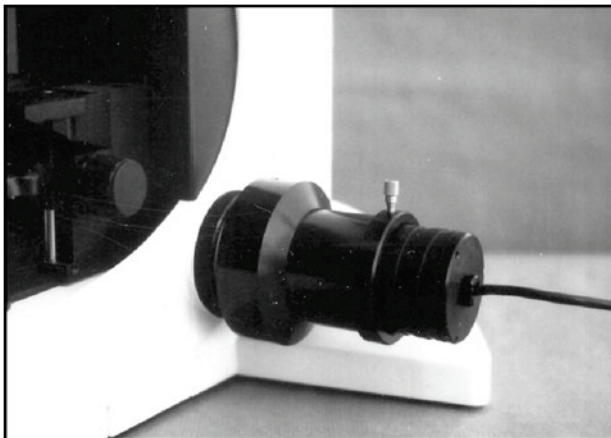
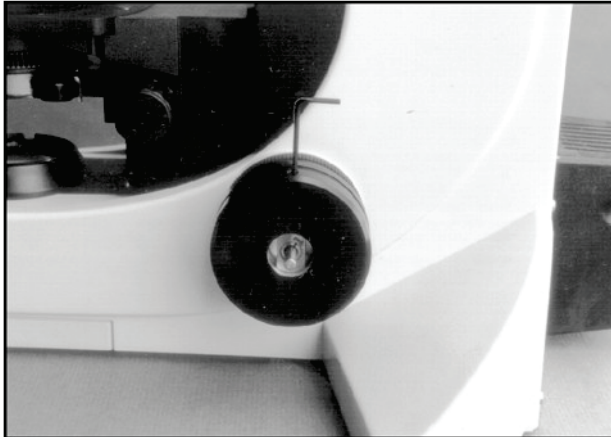
STEP 4) Place the adaptor ring over the coarse focus knob. Align and push the couplings together and slide the focus sleeve over the focus motor and onto the adaptor ring, using the 2mm hexagon key to tighten the three set screws. Again whilst holding the opposite focus knob.



Installation on the 'DML'

Step 1 as for 'DMR' series- then place the adaptor ring over the coarse focus knob and secure the brass shaft using the 2mm hexagon key on the set screw.

Continue with steps 2, 3 and 4 as for 'DMR' series.



All specifications in this manual are subject to change without specification.

Please feel free to contact us regarding any questions, comments or suggestions.

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