FocusLynx DirectSync ES25 Installation

Step-by-Step Instructions for Installing the DirectSync ES25 Motor Assembly to your Explore Scientific 2-1/2" hex focuser.

Optec's #19782 DirectSync ES25 motor assembly works with the **FocusLynx** dual focuser control system to provide a complete digital focusing solution for Explore Scientific's 2.5" Hex focuser. The 2-1/2-inch Hex focuser is included as standard on many of Explore Scientific premium imaging telescopes. DirectSync ES25 motors can be ordered separately or in kit format. The motor assembly replaces the coarse focus knob of the focuser pinion block for Sky-Watcher refractor telescopes.

When properly mounted, the DirectSync ES25 motor provides approximately 1.1 micron per step resolution, superior repeatability and load carrying capacity. A precision digital temperature sensor and electronic noise suppression circuitry are integrated into the DirectSync motor assembly. Connection to the FocusLynx control hub can be made using the included flat 8P8C or any other Cat-5e or Cat-6 network cable.

For addition information regarding the FocusLynx dual-focuser control system, please visit:

http://www.optecinc.com/astronomy/catalog/focuslynx/index.htm.

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DirectSync ES25 Package Contents

Confirm the contents of your DirectSync ES25 motor package. The package should contain the following:

- DirectSync ES25 motor assembly,
- 60-tooth drive shaft gear with brass hub,
- 1/16" Allen hex key,
- 2mm hex key,
- 2.5mm hex key,
- Two flat-point M5x 4mm setscrews (pre-installed),
- Cat-5e or Cat-6 Ethernet cable.

FocusLynx with DirectSync ES25 Package Contents

The DirectSync ES25 motor can be purchased as part of a complete kit including the FocusLynx controller hub. See http://optecinc.com/astronomy/downloads/focuslynx.htm for the latest FocusLynx Quick Start Guide available in pdf format.

If you purchased the full FocusLynx DirectSync ES25 package you will also have the following items:

- FocusLynx control hub
- 12VDC power supply with cord
- USB/Serial cable
- Cat-5e or Cat-6 Ethernet cable

The second Cat-5e Ethernet cable is for a network connection using the Network port on the bottom of the hub. This cable and the Ethernet cable included with the DirectSync SW are interchangeable with any Cat-5e or Cat-6 cable.

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Installation Procedure: Step-by-Step

Step 1 – Remove Course Focus Knob

To install the DirectSync ES25 motor, you will first remove the existing coarse focus knob on the left side of the focuser.   The coarse knob is fixed to the shaft with a metric hex set screw (also known as a grub screw). Use the 2mm hex key to loosen the coarse knob and slide it off the end of the pinion shaft.

Step 2 – Install Gear

Slide the 60-tooth gear hub-end first onto the pinion shaft. Rotate the gear so that the setscrew falls upon the flat section of the pinion shaft.

Adjust the gear position so the hub setscrew can be tightened. Use the 1/16" hex key to tighten the gear to the pinion shaft. Be sure it is fully secured before continuing.

IMPORTANT: Tighten this setscrew securely to avoid backlash introduced by a loose fitting gear.

Test the focuser function by moving the coarse and fine focus knobs on the right side of the focuser up and down ensuring smooth free movement. You can loosen the tension knob in the middle of the pinion block if necessary.

You will be removing this tension knob and screw to attach the motor assembly.

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Step 3 – Remove Tension Knob

The tension knob in the middle of the pinion block will help hold the clamp in place for the motor assembly. Unscrew it until it is removed completely.

Step 4 – Attach Focus Motor

The DirectSync ES25 motor is secured to the pinion block using the focuser tension knob.

Look carefully at the clamp and clutch mechanism inside the motor assembly. You will notice two flat point setscrews on opposite sides of the motor clamp. These are included to allow some top-to-bottom (front-to-back in relation to the telescope tube) adjustment of the motor assembly.

Disengage the motor by rolling the motor cap counter clockwise (as viewed from the connector end). Note the small motor gear will disengage from the idler cluster gear. Slide the DirectSync ES25 motor onto the focuser pinion block. Wiggle the motor body until the clamp is tight against the pinion block. You may need to loosen the one or both of the centering screws using the 2.5mm hex key. Insert the tension knob in the large hole on the motor clamp body and thread it back into the original threaded hole in the pinion block.

Adjust the centering setscrews before tightening down the tension knob. Now test the mesh of the gears by re-engaging the motor (turn the cap clockwise). Be sure the gears do not rub when the motor is disengaged. Use the right-side coarse knob to test the fit. With the motor adjusted for good gear mesh when engaged, and clearance when the motor is disengaged, tighten down the tension knob and setscrews.

Your DirectSync ES25 is now ready for FocusLynx Software Setup. Contact Optec Support if you have any questions or concerns when installing your DirectSync SW.

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Download FocusLynx Commander Software

Visit Optec's download page to obtain the latest version of the FocusLynx Commander ASCOM driver and software package. FocusLynx Commander runs on any Windows 7 or higher operating system.

http://www.optecinc.com/astronomy/downloads/focuslynx.htm

FocusLynx Commander functions as an ASCOM local server so the full ASCOM platform is also required. Visit the ASCOM webpages for the latest version.

https://ascom-standards.org/

FocusLynx Software Setup

Consult the *FocusLynx Quick Start Guide* to install the FocusLynx Commander.   Once installed, you will need to configure the FocusLynx Commander for your new DirectSync ES25 motor. Configuration within FocusLynx Commander will also configure the ASCOM driver so that the same settings will apply when using auto-focusing software such as Maxim D/L, FocusMax or Sequence Generator Pro.
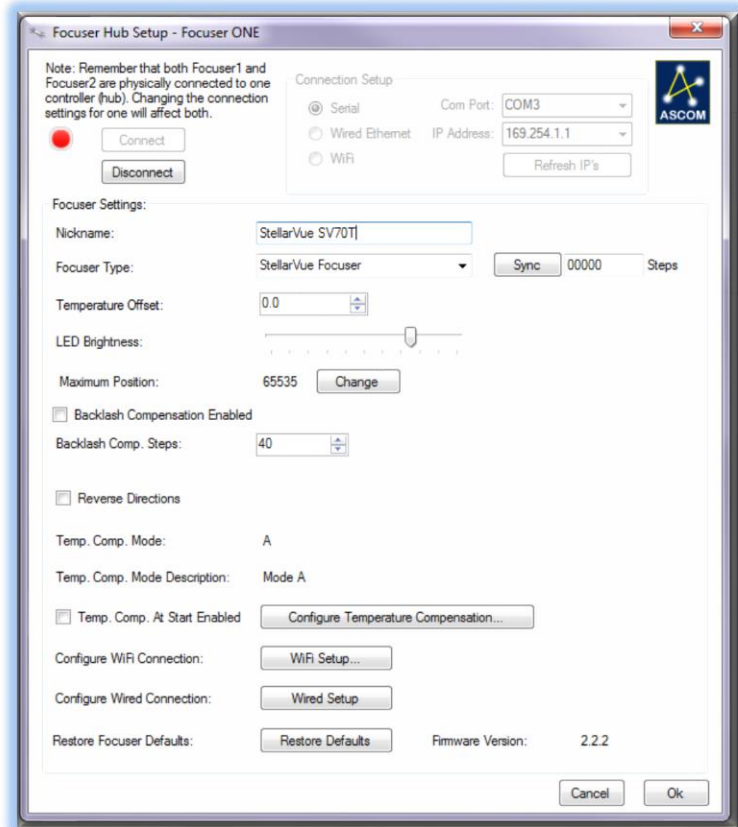
Control of the FocusLynx focusers within TheSky X can be accomplished through either the ASCOM chooser or with the native X2 drivers for FocusLynx.

Focuser Type Selection

Open the Focuser Hub Setup dialog for Focuser 1 or Focuser 2 and choose either the **QuickSync Hi-Torque** (recommended) or the **Quicksync Hi-Speed** Focuser Type option. With stepper motors speed and torque typically work inversely. That is, higher speeds will usually result in lower torque. The

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QuickSync Hi-Torque Focuser Type option coupled with the **DirectSync ES25** motor assembly can reliably handle payloads of 5 kg (11 lbs.) or more.

Contact Optec support (support@optecinc.com) if your focus motor cannot be adjusted without slippage or stalling.
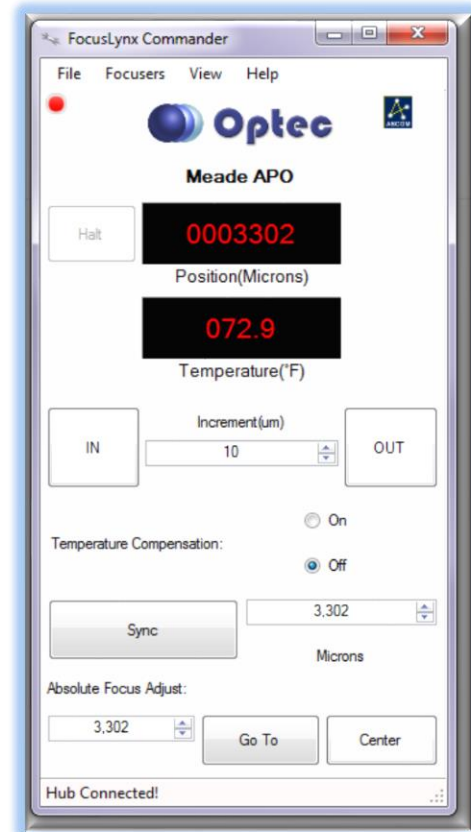
Set the Position Units

In the main form of the FocusLynx Commander window, you may left-click directly on the Position digital read-out to toggle units between Steps, Microns, and Millimeters. Note that only the step count is passed through to the ASCOM driver. The iFocuserV2 standard for ASCOM absolute focusers relates all focuser movements to actual step counts with the higher level client responsible for making the conversions to real-world measurements. The FocusLynx Commander client extends the property to easily convert the units to mm and microns.

Step Size and Focuser Range

The Sky-Watcher 3-inch focuser drawtube has a travel range of approximately 45 mm. The DirectSync ES25 stepper motor has a step-size of approximately 1.1 microns so the default maximum position of 65,535 steps will have no trouble reaching the end of travel for the drawtube. However, some focusers may have a smaller step size and greater travel. To take advantage of the full focuser travel, you may wish to change the Maximum Position value in setup to allow more steps for full travel. Click File- Step Size Wizard in FocusLynx Commander to determine the exact step size and MaxStep values for your focuser and motor.

Recommended Sync Procedure

For most auto-focus routines, the required range of movement for the focuser is quite small compared to the total range of travel. The default 16-bit digital range of 65,535 steps is always more than adequate to allow successful auto-focusing. For best results, we recommend the focuser be manually moved to a rough focus and the position be synced to the center position of 32,767. The FocusLynx Hand Control offers an easy push-button method of accomplishing this "sync to center" operation. To

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"sync to center" with FocusLynx Commander, enter 32,767 (or simply round to 33,000) in the box immediately right of the Sync button. Press **Sync** and wait a few seconds. Test the IN and OUT button movements to ensure proper operation and function.

Alternatively, you can manually move the focuser drawtube all the way IN and Sync to 0. Then, use the hand control or FocusLynx Commander interface to move the drawtube outward to the end of travel. Note the step position and enter this value in the Maximum Position within setup. Subsequent connection to the focuser will automatically calculate the new center position (half of MaxPos) and display it as the new default Sync position on the main form and in the hand control "sync to center" feature.

Temperature Compensation

The DirectSync SW motor includes a built-in temperature sensor for temperature compensation. Within FocusLynx Commander click File – Temp Comp Wizard to let the software step you through the process and automatically calculate the "TC" or Temperature Coefficient for your particular telescope configuration. After completing the wizard, save the new TC value in any of the five available TC modes. Click the adjacent radio button next to Mode A through E to select that TempComp Mode for the current session.

Turn on temperature compensation by selecting "On" just above the Sync button on the main FocusLynx Commander form. The FocusLynx controller will automatically adjust the focus for changing temperatures.
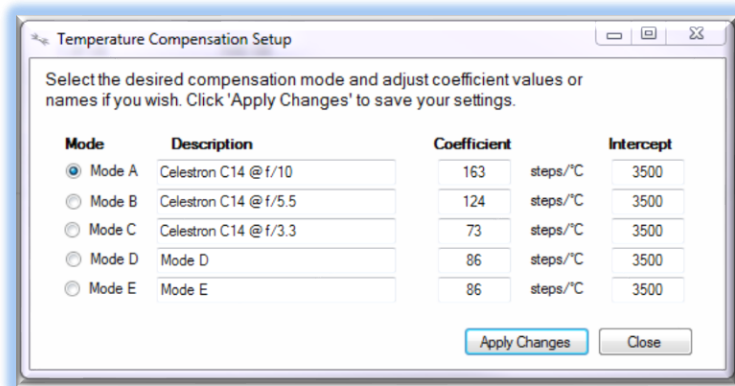
Third-Party Software

Visit the Optec website for the additional information describing FocusLynx configurations for ASCOM clients such as **FocusMax** and **Maxim D/L**, as well as non-ASCOM software such as Software Bisque's **TheSky X** native X2 drivers for FocusLynx. Our FocusLynx Resource page is currently under development: http://www.optecinc.com/astronomy/catalog/focuslynx/resources.htm.

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YouTube Channel

Optec is developing videos for installation and configuration of our many products for various software packages. Visit our YouTube channel by searching "Optec Inc" or clicking the link below.

https://www.youtube.com/channel/UCLOJ43G-q2SQfZfqeoaLiLA

Optec User Group

The Optec User Group is now located at Groups.io which provides a forum to communicate with other users of Optec instruments.   Other end-users can often provide answers to specific configuration questions and Optec staff routinely follow and answer many questions as well. Click the banner below to subscribe.

Or visit the Groups.io Optec User Group here: https://groups.io/g/Optec.

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