FocusLynx DirectSync SW25 Installation

Step-by-Step Instructions for Installing the DirectSync SW Motor Assembly to your Sky-Watcher® dual-speed focuser.

Optec's #19787 DirectSync SW motor assembly works with the **FocusLynx** dual focuser control system to provide a complete digital focusing solution for Sky-Watcher80 telescopes equipped with the Sky-Watcher brand 2-1/2-inch focuser. DirectSync SW25 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 SW25 motor provides approximately 2.3 micron per step resolution and 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 higher 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 SW Package Contents

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

- DirectSync SW motor assembly,
- 60-tooth drive shaft gear with brass hub,
- 1/16" Allen hex key,
- 2mm hex key,
- 3mm hex key,
- Two M3 X 37mm length socket head cap screws,
- Cat-5e or Cat-6 Ethernet cable.

FocusLynx with DirectSync SW25 Package Contents

The DirectSync SW25 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 SW 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 better cable.

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Installation Procedure: Step-by-Step

Step 1 – Remove Access Screw

To install the DirectSync SW25 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) that can only be accessed through a small port on the main pinion block. You will use the 2mm hex head L-key to loosen the setscrews.

To access the knob setscrew, rotate the coarse knob until the setscrew can be seen through the access port. Insert the 2mm hex key into the set screw hex head. Loosen only, do not remove.
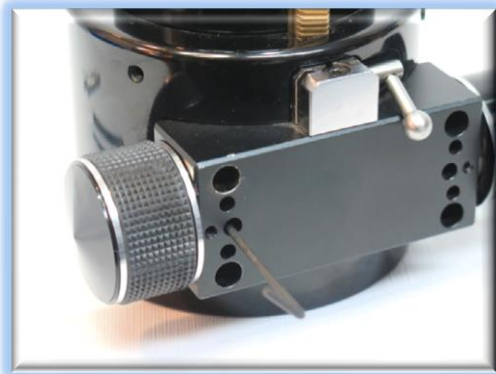
Step 2 – Remove Knob

Pull the coarse knob straight off the pinion shaft. Set aside in case you later wish to remove the motor and re-install.
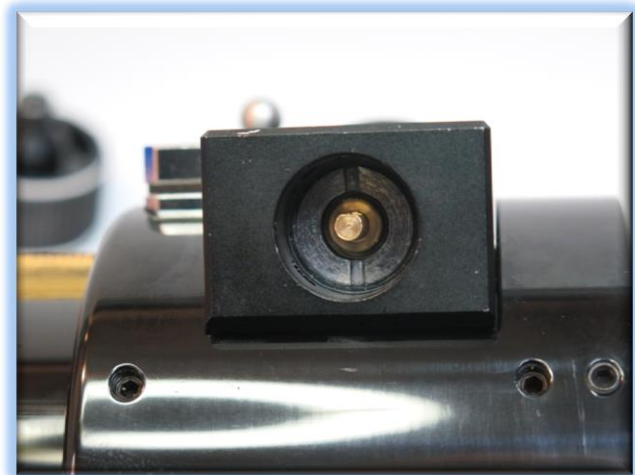
Step 3 – Install Gear

Examine the pinion shaft inside the pinion housing. Notice the flat on the shaft where the coarse knob setscrew made contact. When installing the drive gear, be sure to line up the gear hub setscrew with this same flat spot.

Slide the 60-tooth gear brass hub-end first onto the pinion shaft. Rotate the gear so that the

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setscrew falls upon the flat section of the pinion shaft. Rotate the pinion shaft so the gear-hub setscrew can be seen through the access hole.

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

IMPORTANT: Tighten this setscrew securely to avoid introducing backlash from a loose fitting.

Step 4 – Remove Socket Cap Screws

Examine the pinion block on the coarse side. Note the two largest holes (indicated in red below) have black socket cap screws holding the pinion block in place. We will remove these socket cap screws and replace with the stainless M4x0.6mm socket cap screws.

Use the 3mm hex key to remove the black alloy socket cap screws. Do not adjust the screws on the fine focus side.

Step 5 - Attach Focus Motor

Look at the DirectSync SW25 motor housing. Disengage the focus motor by rolling the motor cap counter clockwise (looking from the connector end.)

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Slide the DirectSync SW25 motor onto the focuser pinion block. You may need to wiggle the motor housing slightly to allow the gears to mesh properly. This is easiest with the motor disengaged. The two holes on the motor housing tab should line up with the two socket cap holes (indicated with the red arrows above).

Use two M4x0.6 stainless socket cap screws to hold the motor in place. Test the fit and the gear mesh with the motor engaged and disengaged. There should be no friction when the motor is disengaged and minimal backlash when the motor is engaged.

Now tighten the two M4 socket cap screws securely. Confirm the mesh of the gears by re-engaging the motor (turn the cap clockwise). Be certain the gears do not rub when the motor is disengaged.

Your DirectSync SW25 motor 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 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.
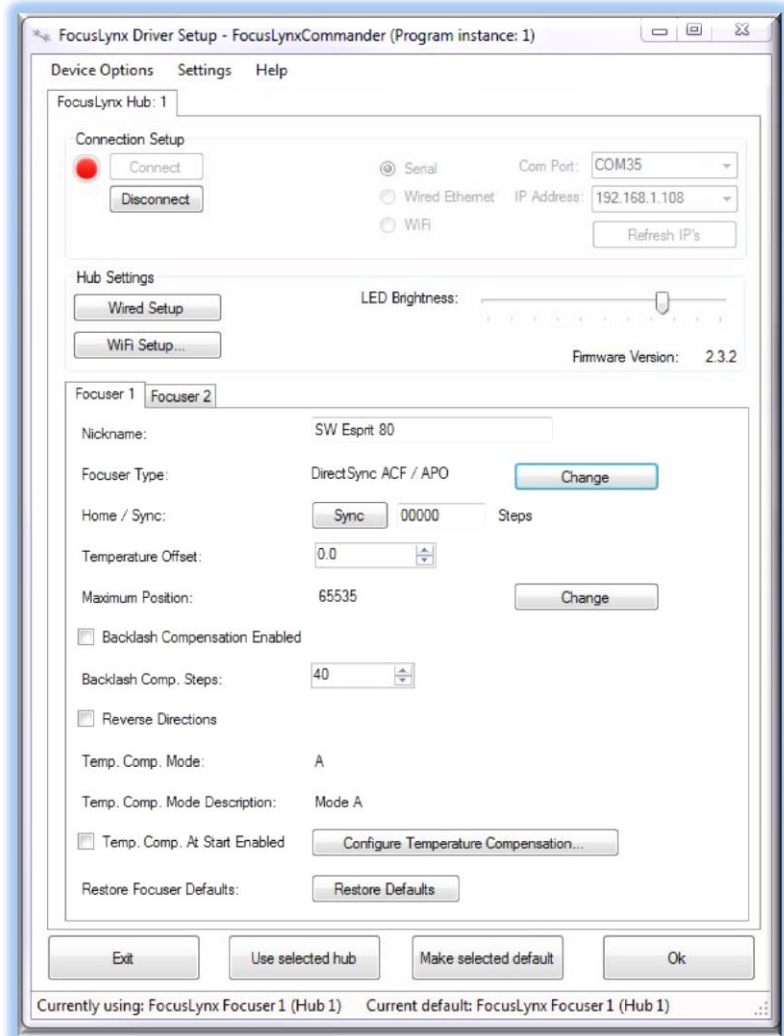
Focuser Type Selection

Open the Focuser Hub Setup dialog for Focuser 1 or Focuser 2 and choose the **DirectSync** Focuser Type option. Your FocusLynx Hub firmware should be v2.2.0 or higher for these options to be present. For

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the best repeatability, you may wish to turn on backlash compensation and set the number of steps somewhere around 40 to 60.

With stepper motors, speed and torque typically work inversely. That is, higher speeds will usually result in lower torque and vice-versa. The DirectSync Hi-Speed Focuser Type option coupled with the **DirectSync SW25** motor assembly can reliably handle payloads up to about 5 kg (11 lbs.).

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 2.5-inch focuser drawtube has a travel range of approximately 58 mm. The DirectSync SW25 stepper motor has a step-size of approximately 1.4 microns so the default maximum position of 65,535 steps should reach the end of travel for the drawtube. However, the Meade focuser 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.

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
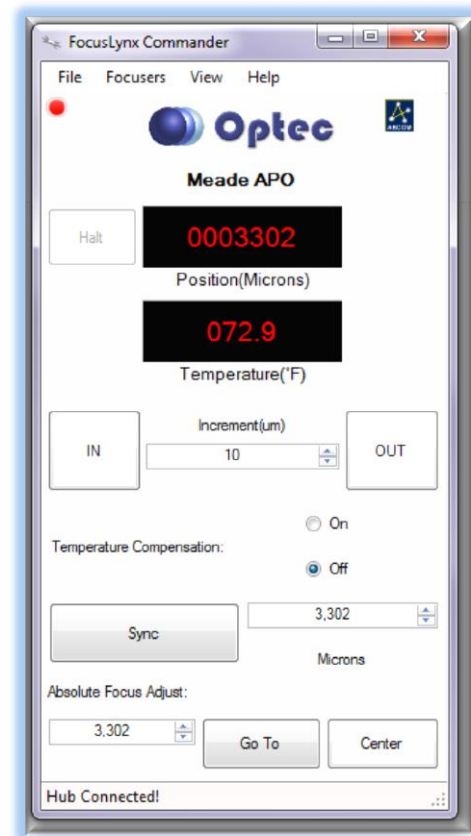
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adequate to allow successful auto-focusing. For best results, we recommend the focuser be manually moved to a rough focus and the position be synced to the center position of 32,767. The FocusLynx Hand Control offers an easy push-button method of accomplishing this "sync to center" operation. To "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 SW focus for changing temperatures.
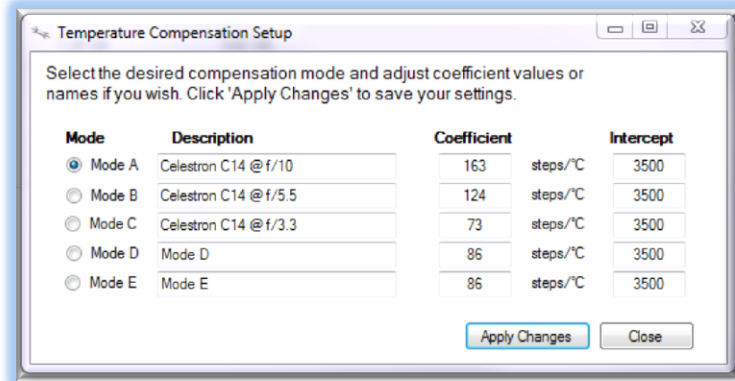
Third-Party Software

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.

Optec User Group

The Optec User Group on Yahoo! can also provide answers to specific configuration questions and provides a forum to communicate with other users. Click the banner below to subscribe.
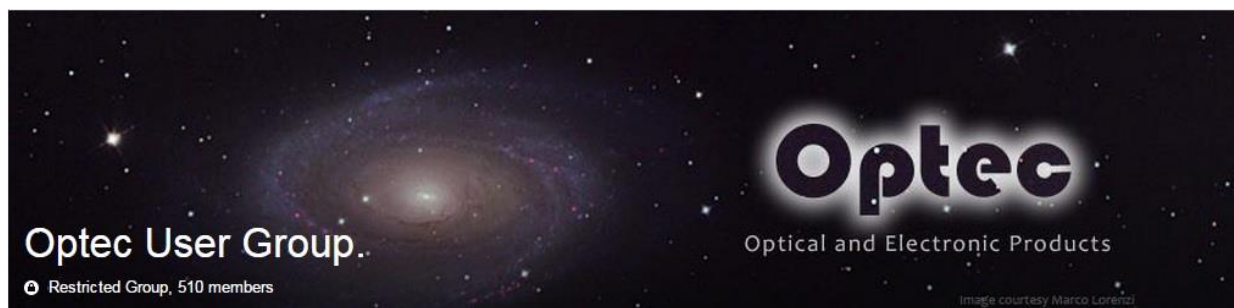
Or visit the Yahoo! site here: https://groups.yahoo.com/neo/groups/Optec/info.

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