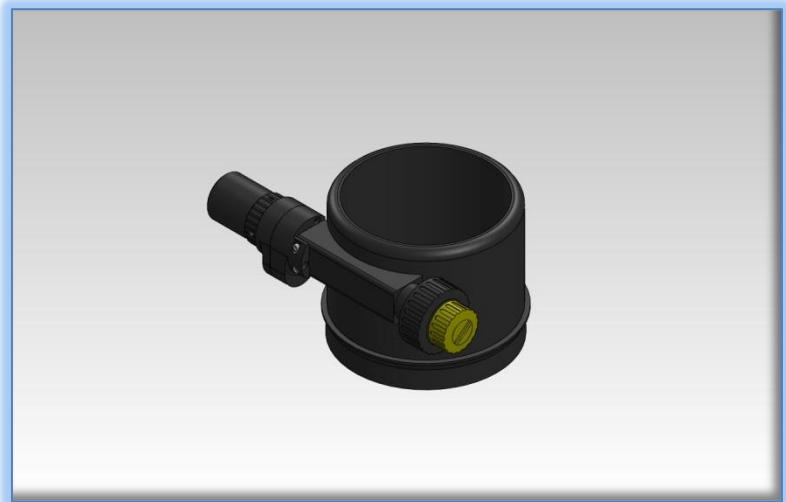




FocusLynx DirectSync TEC Installation

Step-by-Step Instructions for Installing the DirectSync TEC Motor Assembly to your TEC Focuser.

The DirectSync TEC motor assembly fits directly in place of the coarse focus knob on the left side of the TEC Large Focuser. The right-side coarse and fine focus gold knobs are left intact on the focuser while the DirectSync clutch mechanism offers easy engagement / disengagement of the stepper motor. When properly mounted, the DirectSync TEC provides a 1.25 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 allowing any Cat-5e cable to connect FocusLynx hub and motor.



TEC Focuser Model

The TEC Large Focuser is supplied with new APO140 and larger telescopes manufactured by **Telescope Engineering Company.**

See www.telescopengineering.com for the latest telescope models supplied with the TEC Large Focuser.

Developed as an improvement over the original QuickSync TEC motor, DirectSync provides a direct geared connection to the focuser rack and pinion assembly. The system will not slip and can carry loads in excess of 12 kg (27 lb.) with excellent repeatability – easily matching the exceptional performance of the QuickSync FT40 for the FeatherTouch focusers. The QuickSync style clutch mechanism is retained in the DirectSync design. A simple twist of the motor housing disengages and re-engages the motor.

Installation Video

For an overview of the installation procedure, review the installation video for the DirectSync TEC available online: http://www.optecinc.com/astromy/catalog/focuslynx/directsync_tec.htm.



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FocusLynx TEC with DirectSync

Contact Optec Support if you have any questions or concerns when installing the DirectSync TEC.

DirectSync TEC Package Contents

Confirm the contents of your FocusLynx DirectSync TEC package. The package should contain the following:

- DirectSync TEC motor assembly
- Cat-5e or Cat-6 Ethernet cable
- Precision machined brass spacer
- 60-tooth gear for coarse shaft
- Tool kit including long 1/16" and 3/32" Allen hex keys



FocusLynx TEC Contents

If you've purchased the full FocusLynx TEC with DirectSync 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
- Software CD

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 are interchangeable with any Cat-5e or better cable.



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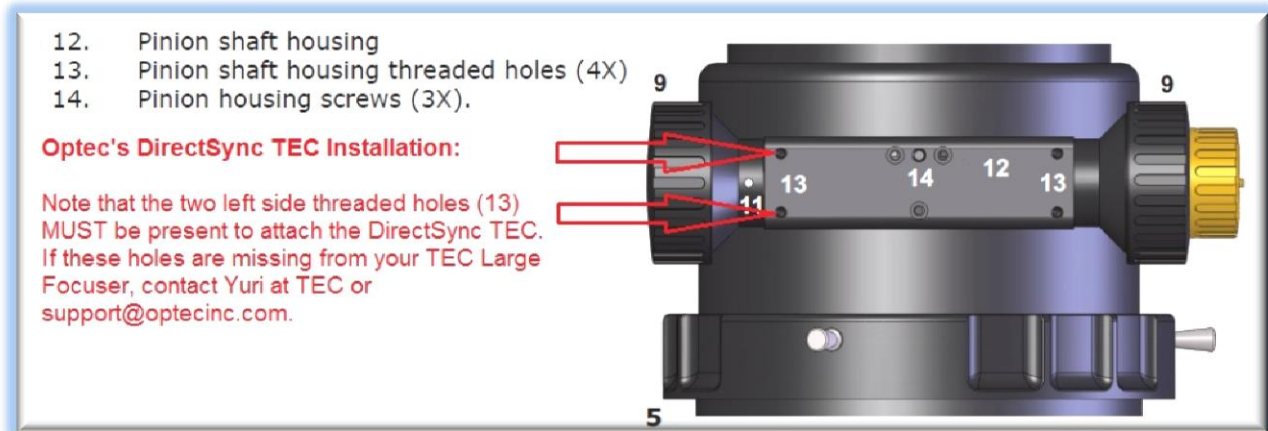
FocusLynx TEC with DirectSync



Installation Procedure: Step-by-Step

Step 1

Be certain the required mounting holes exist on your focuser. The majority of the TEC Large Focusers supplied with the TEC140 and larger scopes included two sets of mounting holes as shown below. The DirectSync motor will attach to the two holes on the left side of the pinion block.



If these mounting holes are missing from your TEC Large Focuser, contact Yuri at TEC to have the holes added or for guidance. Alternatively, contact Optec Support (support@optecinc.com) for a detailed drawing to add these holes using a local machinist.

Step 2

To install the DirectSync motor, first remove the large coarse focus knob on the left side of the TEC Large Focuser. No need to adjust or remove the fine focus knob on the right side.

Notice the flat machined into the shaft. A setscrew holding the knob in place should make contact against this flat.



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Step 3

Slide the machined brass spacer over the pinion shaft. This spacer is designed to ensure a good engagement between the 60-tooth pinion shaft gear and the internal gear on the DirectSync TEC motor.



Step 4

With the brass spacer in place, slide the 60-tooth gear hub-end first onto the pinion shaft.



Rotate the gear so that one of the two setscrews falls upon the flat and tighten each setscrew securely. Be sure these setscrews are 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 free movement.

Step 5

First set the DirectSync TEC motor to the engaged position by rolling the motor clockwise (toward you). Next slide the DirectSync TEC motor assembly over the pinion shaft keeping the 60-tooth gear and internal gear from engaging. Loosely thread the two socket cap screws into the pinion block and leave them loose for now. You should notice there is some up and down play with the DirectSync motor allowing adjustment.



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Step 6

With the socket cap screws still loose, apply enough upward pressure on the DirectSync motor to engage the internal motor gear and the 60-tooth gear mounted to the pinion shaft. Tighten down the socket cap screws and disengage the motor assembly by rolling the motor away from you or counter-clockwise. The manual focus knobs should now move freely. Re-engage the motor assembly and test for best fit.



When satisfied with the function and fit, tighten down both socket cap screws securely with the 3/32" Allen hex key.

Step 7

Connect the Cat-5e Ethernet cable into the RJ45 socket on the end of the motor housing and connect the other end to the FocusLynx control hub using either the Focuser 1 or Focuser 2 port if you own the second stepper board option.



Your DirectSync TEC should now be ready to connect to a PC.



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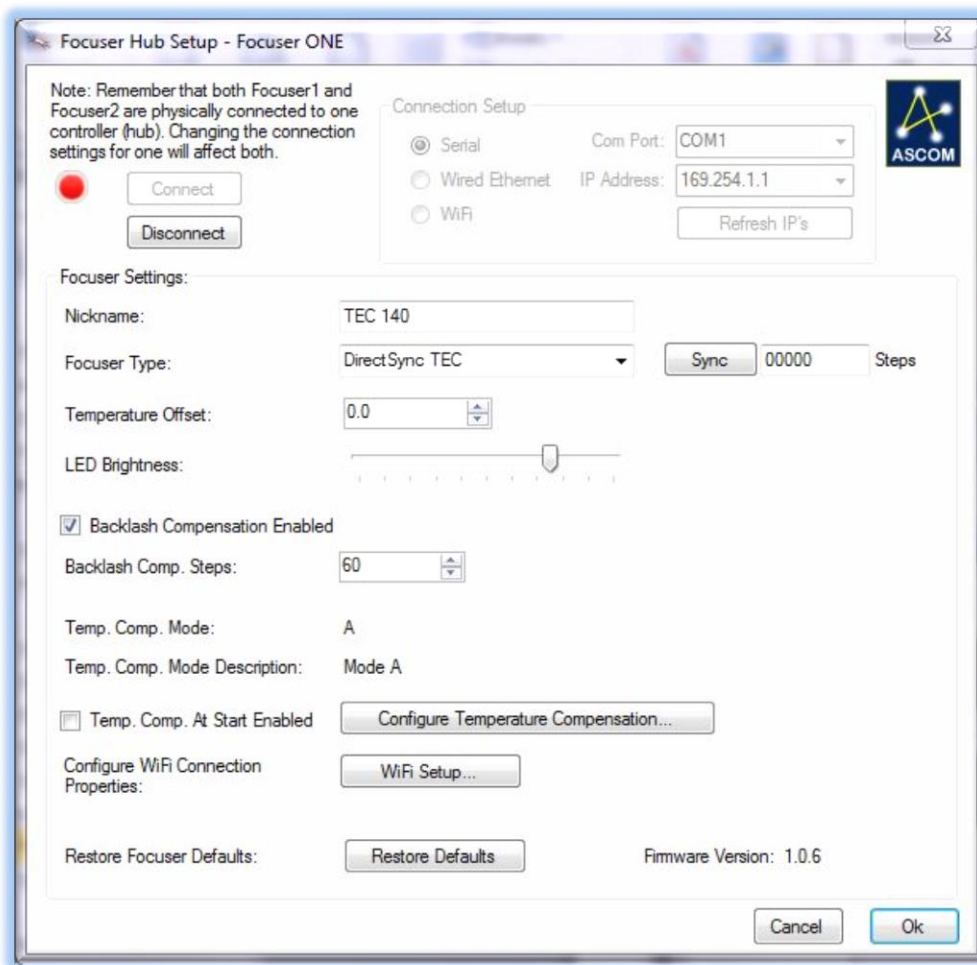


FocusLynx Software Setup

Your DirectSync TEC motor is now installed. Consult the **FocusLynx Quick Start Guide** to install the FocusLynx Commander software. Once installed, you will need to configure the FocusLynx Commander for your new DirectSync TEC 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 or FocusMax.

FocusLynx Commander Focuser Type selection

Open the Focuser Hub Setup dialog for Focuser 1 or Focuser 2 and choose the **DirectSync TEC** Focuser Type option. Your FocusLynx Hub firmware must be v1.0.6 or higher for this option to function properly.



We recommend you turn on anti-backlash compensation and set the number of steps to 60.

With stepper motors, speed and torque typically work inversely. That is, higher speeds will usually result in lower torque. The DirectSync TEC Focuser Type option coupled with the **DirectSync TEC** motor assembly can reliably handle payloads in excess of 12kg.



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FocusLynx TEC with DirectSync



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 TEC Large Focuser has a total travel range of approximately 105mm. The DirectSync TEC stepper motor has a step-size of approximately 1.25 microns and 16-bit resolution. With 65,535 total steps available a range of approximately 81.9mm can be accommodated by the FocusLynx Commander software. To take advantage of the full range of the TEC focuser travel, the DirectSync motor can be disengaged for manual focuser movement, re-engaged, and synced at any time.

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 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 “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.

Temperature Compensation

The DirectSync TEC motor includes a built-in temperature probe for temperature compensation. Within FocusLynx Commander click File – Temp Comp Wizard to automatically determine the “TC” or Temperature Coefficient for your particular telescope configuration. After completing the wizard, turn on temperature compensation by selecting “On” just above the Sync button. The FocusLynx controller will automatically adjust the TEC telescope focus for changing temperatures.



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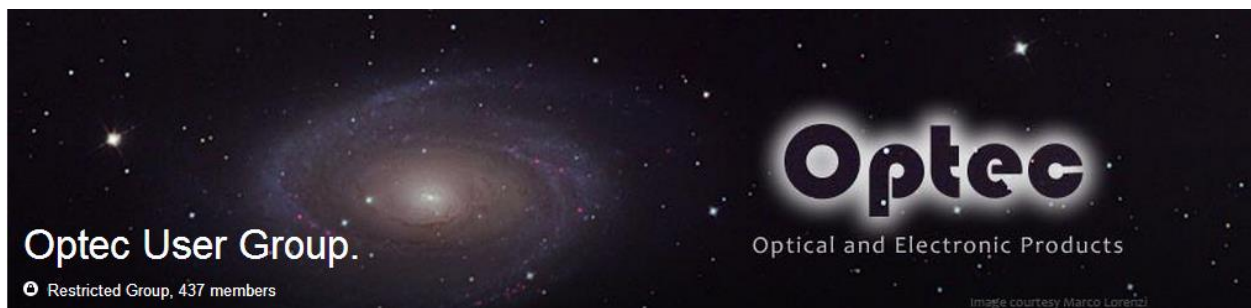


Third-Party Software

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/astromy/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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