Meade® DirectSync ACF Installation

Step-by-Step Instructions for Installing the DirectSync ACF Motor Assembly to your Meade ACF native dual-speed focuser.

The Meade DirectSync motor assembly works with the FocusLynx dual focuser control system and can be ordered separately or in kit form with the control hub.   The DirectSync motor assembly replaces the coarse focus knob of the Meade f/8 Dual-Speed native focuser. Note that this system was designed exclusively for use with the dual-speed "reverse Crayford" focuser systems currently offered with the Meade ACF f/8 optical tube assembly .

When properly mounted, the Meade DirectSync ACF provides a 1.1 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.

Meade f/8 ACF Focuser

Meade LX850 optical tube assemblies (OTA) with f/8 Advanced Coma-Free (ACF) optics include a unique focusing mechanism described as an *internal Crayford-style, zero image-shift, dual speed 5:1 focuser.*

See www.meade.com for additional details on the full Meade ACF product line. Optec engineers sought to provide a motorized add-on for the internal dual-speed focusers that is easily installed, quick to engage and disengage, and left the 5:1 reduction knobs in place. Our solution is called the DirectSync ACF and works elegantly with the FocusLynx focuser control hub. A full description of the FocusLynx system is available online at http://www.optecinc.com/astronomy/catalog/focuslynx/.

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#19775 - DirectSync ACF Motor for FocusLynx

Shown at left is the Meade internal Crayford dual speed manual focuser. Optec's DirectSync ACF motor was designed exclusively for this focuser and will NOT work on any other native focusers. The DirectSync ACF motor works with the 5:1 reduction system to allow motorized control of the primary ACF mirror.

The DirectSync SV uses a geared clutch mechanism with bevel gears to engage and dis-engage the motor. A simple twist of the motor housing cap disengages and re-engages the motor.

Please review these instructions carefully for proper installation procedures. Contact Optec Support if you have any questions or difficulty when installing the DirectSync ACF motor.

Meade DirectSync ACF Package Contents

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

- DirectSync ACF motor assembly,
- Cat-5e or Cat-6 Ethernet cable,
- Replacement geared coarse focus knob,
- Replacement flat-head screws (four M2 x 8mm, black alloy),
- Tool kit including .0.50" and 1/16" Allen hex keys,
- 9/64" ball driver hex tool.

FocusLynx DirectSync ACF Package Contents

The DirectSync ACF motor can be purchased as 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.

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If you purchased the full FocusLynx DirectSync ACF 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 ACF are interchangeable with any Cat-5e or better cable.

Installation Procedure: Step-by-Step

Step 1

To install the DirectSync ACF motor, you will first remove the existing focus knobs. Start by using the 1/16" Allen hex key to remove the smaller fine focus knob.   Save for Step 5 below.

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

Step 2

Next remove the coarse focus knob. There are four flat-head hex screws holding the coarse focus knob in place. Use the 0.050" hex key to remove each screw. Store the coarse knob and screws in a safe location in case you expect to replace them onto your Meade ACF telescope at some point in the future. They are not needed with the DirectSync ACF motor.

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199 Smith Street · Lowell, Michigan 49331 · U.S.A.
Telephone: 616-897-9351 · Fax: (616) 897-8229 · Toll Free: 888-488-0381
sales@optecinc.com · http://www.optecinc.com · www.optec.us

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Step 3

Slide the DirectSync ACF motor assembly onto the large focuser cylinder. Attach with the clamp closest to the primary mirror as shown. No need to tighten the clamp at this time.

Step 4

Slide the new geared coarse focus knob into the DirectSync ACF motor assembly. Rotate the coarse focus knob to line up the four holes. Use the 0.050" hex key to install and tighten four alloy screws included with the package. Tighten each screw securely.

Step 5

Now replace the original fine focus knob by lining up the flat with the setscrew. Use the 1/16" hex key to tighten securely.

Step 6

Finally, orient the DirectSynx ACF motor position to allow the Cat-5e cable to pass easily to the FocusLynx Hub. Use the 9/64" ball driver to tighten the clamp socket cap screw to fasten the motor assembly snugly to the focuser cylinder. Do not overtighten.

With the motor still disengaged move the coarse and fine focuser knobs to test the feel. The focuser may feel slightly less smooth but should function perfectly. Engage the motor by rotating the cap on the DirectSync ACF motor housing where the Cat-5e connects.

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

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## FocusLynx Software Setup

Your DirectSync ACF 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 ACF 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 ACF** Focuser
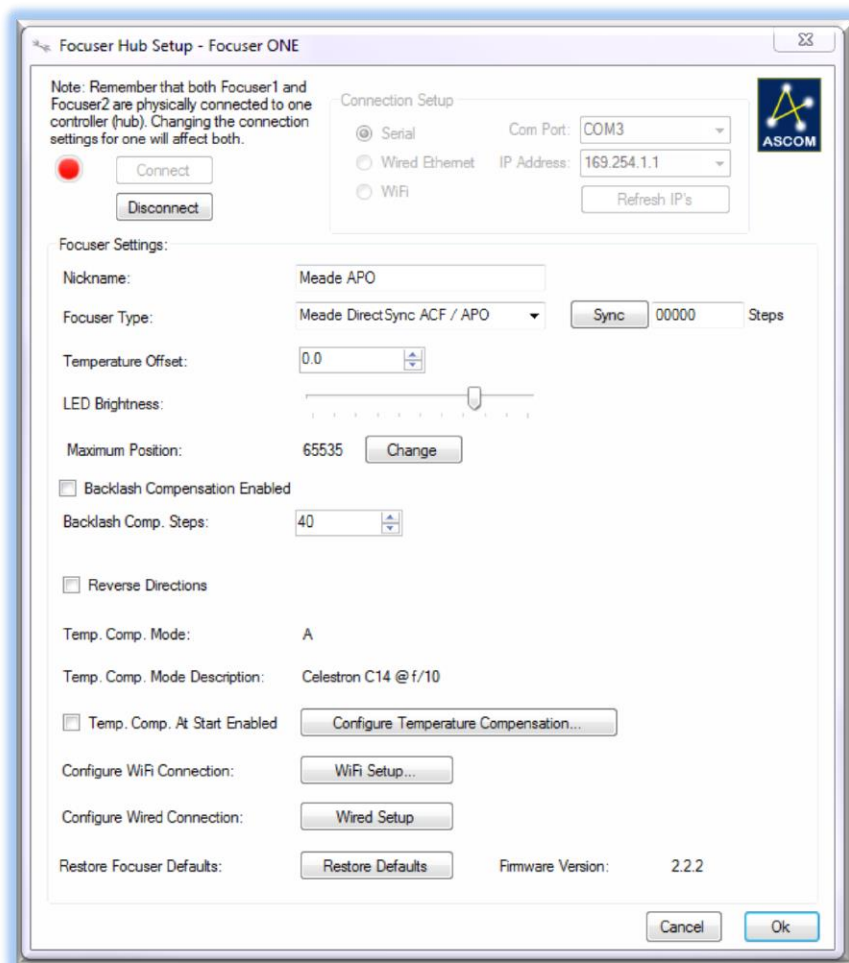
Type option. Your FocusLynx Hub firmware must be v1.0.6 or higher for this option to function properly. We recommend you turn on backlash compensation and set the number of steps to 60.

With stepper motors, speed and torque typically work inversely. That is, higher speeds will usually result in lower torque. The DirectSync ACF Focuser Type option coupled with the **DirectSync ACF** motor assembly can reliably handle payloads in excess of 5 kg (11 lbs.).

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

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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 and V3 standards 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 Meade ACF focuser has a very large travel range with the primary mirror capable of moving about 23.3mm. A 28tpi leadscrew and 5:1 reduction assembly work together to yield a total step travel of about 238,000 steps for the DirectSync ACF stepper motor. The step size works out to only about 0.1 micron of actual focal travel for each step of the motor. To take advantage of the full range of the Meade ACF focuser travel you should set the Maximum Position in setup to 238,000. If desired, enter 0.1 micron per step under File-Step Size Wizard or work through the wizard to measure the actual step size for your telescope focuser setup.

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 "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.
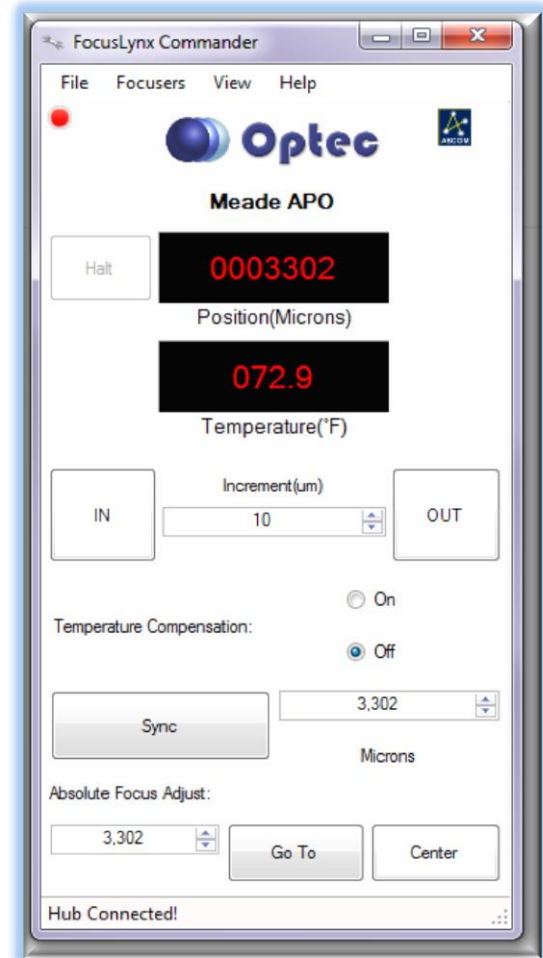
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Alternatively, you can manually move the focuser drawtube all the way IN and Sync to 0. Then, use the hand control or FocusLynx Commander interface to move the drawtube outward to the end of travel. Note the step position and enter this value in the 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 ACF 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 ACF 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/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.
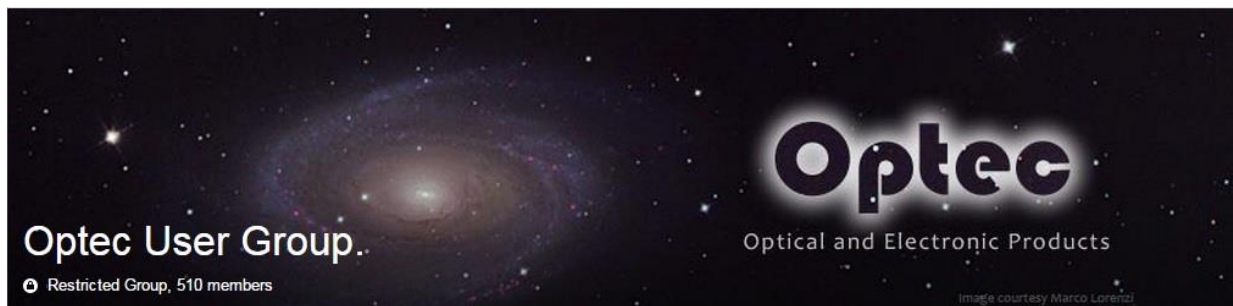
Or visit the Yahoo! site here: https://groups.yahoo.com/neo/groups/Optec/info.

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