



DirectSync FSQ130 Installation

Step-by-Step Instructions for Installing the DirectSync FSQ130 Motor Assembly to your Takahashi FSQ-130ED native focuser.

Optec's DirectSync FSQ130 motor assembly works with the FocusLynx dual focuser control system and can be ordered separately or in kit form with the FocusLynx control hub. The DirectSync motor assembly replaces the coarse focus knob of the Takahashi FSQ-130ED native focuser.

When properly installed, the DirectSync FSQ130 provides approximately 2 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 to the FocusLynx or FocusBoss II control hub.

Takahashi FSQ-130ED Quad-Element Apochromat Refractor

Takahashi's premier FSQ-130ED offers a large 130mm optical tube assembly (OTA). Featuring a four-element lens system made with superb ED glass, the FSQ-130ED produces a virtually flat field across a large image circle.

Visit www.takahashiamerica.com for full details, optical performance data, imaging options, and system charts.

The FSQ-130ED includes a large, heavy-duty 4-inch rack and pinion focuser. A dual-speed MEF (Micro-Edge Focuser) on the right side of the focuser pinion block provides smooth manual focusing while the single coarse focus knob on the left



side can be removed without altering the MEF. The DirectSync FSQ130 clutch mechanism allows motor control while maintaining the excellent manual dual-speed focusing capability of the MEF.



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



#19767 – DirectSync FSQ130 Motor for FocusLynx



FSQ-130ED Native 4-inch Focuser

Optec's DirectSync FSQ130 motor and housing were designed specifically to replace the coarse focus knob and take advantage of the locating holes on the bottom of the FSQ-130ED pinion block. Like all our



DirectSync and QuickSync motors, the FSQ130 motor includes a smooth clutch mechanism allowing the motor to be easily disengaged for manual focusing through the MEF. Re-engage for fully motorized focusing using [FocusLock](#), @Focus3, FocusMax, SGP or your favorite auto-focus software.

DirectSync FSQ130 is fully geared without belts or pulleys and provides the most elegant motorized focusing solution available for the Takahashi FSQ-130ED telescope. Coupled with Optec's FocusLynx dual focuser control system, the DirectSync FSQ130 kit makes fully automated, remote focusing possible.

DirectSync FSQ130 Motor Available with FocusLynx

Order the #19767 DirectSync FSQ130 motor separately or in kit form with the FocusLynx Control Hub. Specify FocusLynx kit #48000. FocusLynx kits are also available including the optional Hand Control and WiFi modules at discounted pricing.

A complete description of the FocusLynx system is available online at <http://www.optecinc.com/astromy/catalog/focuslynx/>

Contact [Optec Sales](#) with any pre-sales questions or to place your order.



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



#19767 – DirectSync FSQ130 Motor for FocusLynx



DirectSync FSQ130 Package Contents

Confirm the contents of your DirectSync FSQ130 motor package. The package should contain the following:

- DirectSync FSQ130 motor assembly,
- Cat-5e or Cat-6 Ethernet cable,
- Gear assembly for pinion shaft,
- Two M4 x 0.6mm socket-cap screws , 37mm length long stainless steel,
- Tool kit including 1/16" Allen hex key, 1/16" ball driver and 3mm (to fit M4 socket head) hex key.



FocusLynx DirectSync FSQ130 Package Contents

The DirectSync FSQ130 motor can be purchased as a complete kit including the FocusLynx controller hub. See <http://optecinc.com/astrometry/downloads/focuslynx.htm> for the latest FocusLynx Quick Start Guide available in pdf format.

If you purchased the full FocusLynx DirectSync FSQ130 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 FSQ130 are interchangeable with any Cat-5e or better cable.



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



#19767 – DirectSync FSQ130 Motor for FocusLynx



Installation Procedure: Step-by-Step

Please review these instructions carefully for proper installation procedures. Contact [Optec Support](#) if you have any questions or difficulty when installing the DirectSync FSQ130 motor.

Step 1 – Remove Knob

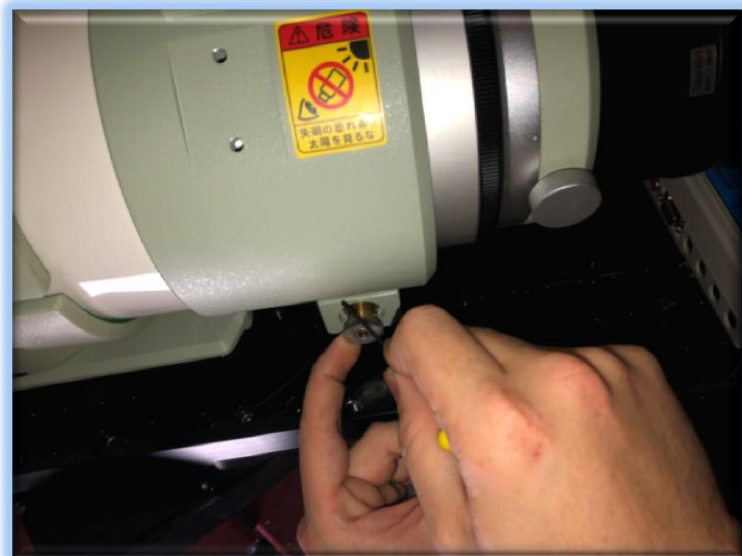
To install the DirectSync FSQ130 motor, you will first remove the existing coarse focus knob. Use the 1/16" hex key or ball driver to remove two setscrews at the base of the coarse focus knob.

Notice there are two flats machined into the pinion shaft. Each setscrew holding the knob in place will make contact against these flats.



Step 2 – Install Gear

Now install the gear assembly onto the pinion shaft. Note the brass hub will slide on first and is held in place with two setscrews. Like the focus knob, each setscrew should land upon the two machined flats on the pinion shaft.



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



#19767 – DirectSync FSQ130 Motor for FocusLynx



Step 3 – Remove Two Bolts

You will need to remove two M4 socket cap bolts that hold the pinion block against the focuser body. Use the 3mm hex key to carefully remove each. You will replace these bolts with the longer 37mm stainless steel M4 bolts included with the package.

Step 4 – Attach Motor

Slide the new FSQ130 motor onto the pinion gear and line up the two holes on the tab with the threaded pinion block holes. Insert the two 37mm long M4 bolts into each hole until finger tight.



Step 5 – Adjust Motor Fit

Now adjust the position of the FSQ130 motor for best fit. You should be able to slide the motor forward and backward and side-to-side enough to achieve a good engagement with the focuser shaft gear. The focuser shaft gear will mesh with the smaller gear inside the FSQ130 motor when the motor is fully engaged.



Test the gear mesh by engaging and disengaging the DirectSync motor (by turning the endcap where the cable enters the motor housing). When disengaged, you should be able to freely move the focuser using the MEF knobs. When engaged, there will be a small amount of backlash detectable with the MEF but you should feel the resistance of the motor. Finally, use the 3mm hex key to tighten the FSQ130 motor securely against the pinion block.



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



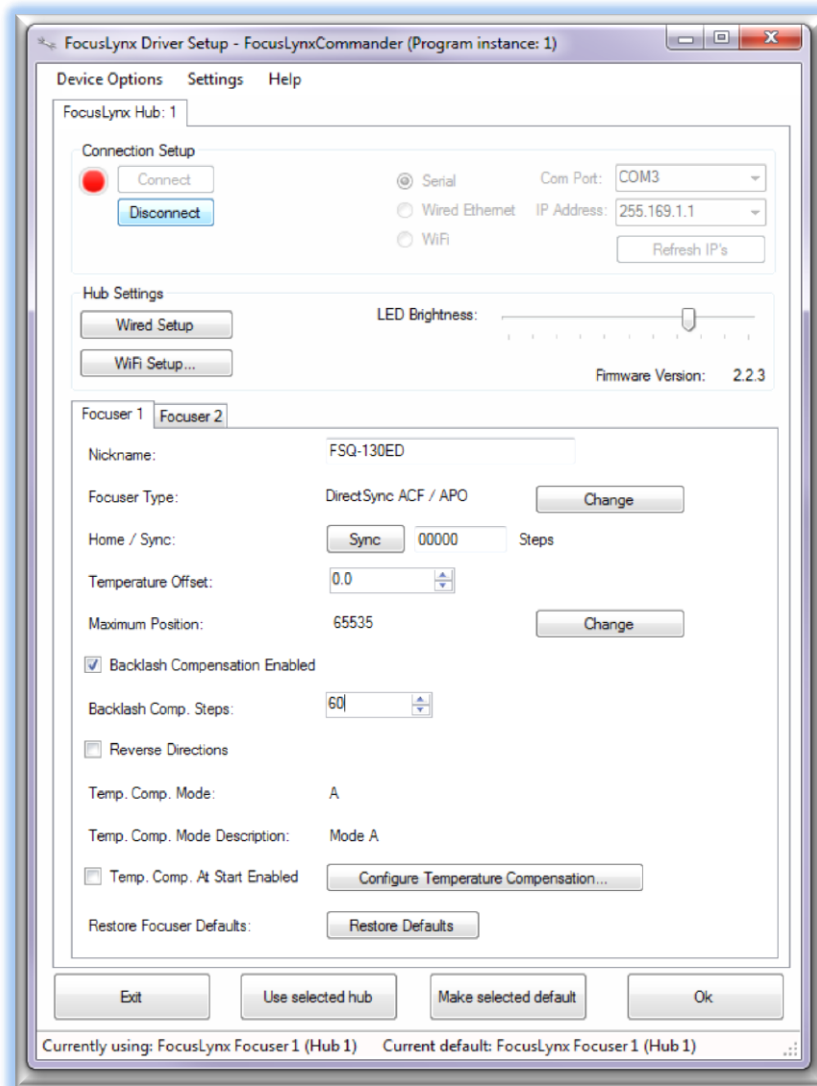
#19767 – DirectSync FSQ130 Motor for FocusLynx



FocusLynx Software Setup

Your DirectSync FSQ130 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 FSQ130 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** 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 Focuser Type option coupled with the DirectSync FSQ130 motor assembly can reliably handle payloads in excess of 10 kg (22 lbs.).

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



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



#19767 – DirectSync FSQ130 Motor for FocusLynx



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.

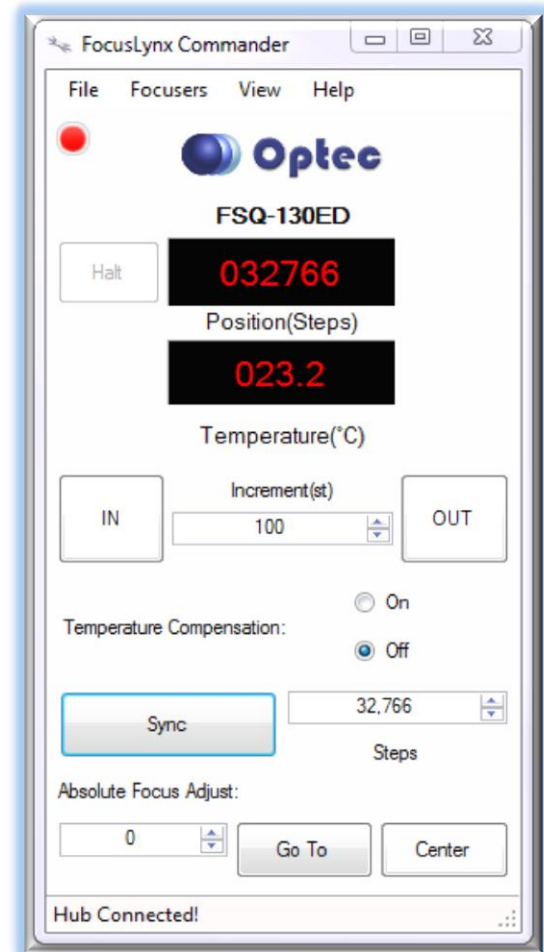
Step Size and Focuser Range

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.

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.



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



#19767 – DirectSync FSQ130 Motor for FocusLynx



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.

Mode	Description	Coefficient	units	Intercept
<input checked="" type="radio"/> Mode A	Celestron C14 @ f/10	163	steps/°C	3500
<input type="radio"/> Mode B	Celestron C14 @ f/5.5	124	steps/°C	3500
<input type="radio"/> Mode C	Celestron C14 @ f/3.3	73	steps/°C	3500
<input type="radio"/> Mode D	Mode D	86	steps/°C	3500
<input type="radio"/> Mode E	Mode E	86	steps/°C	3500



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



#19767 – DirectSync FSQ130 Motor for FocusLynx

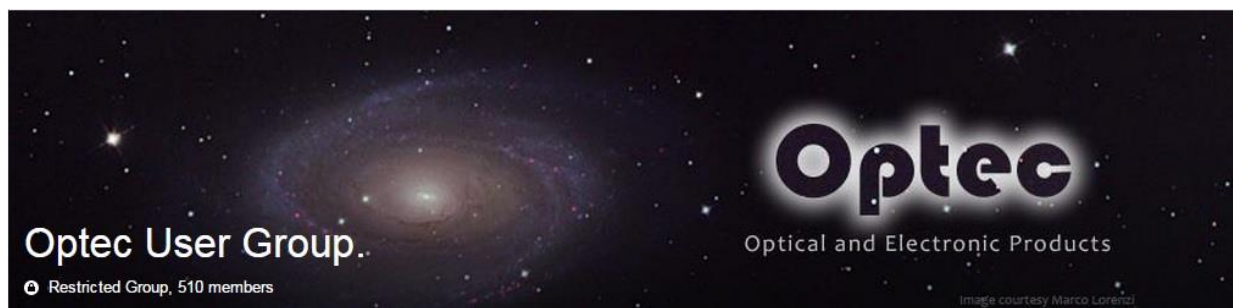


Third-Party Software

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>.



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