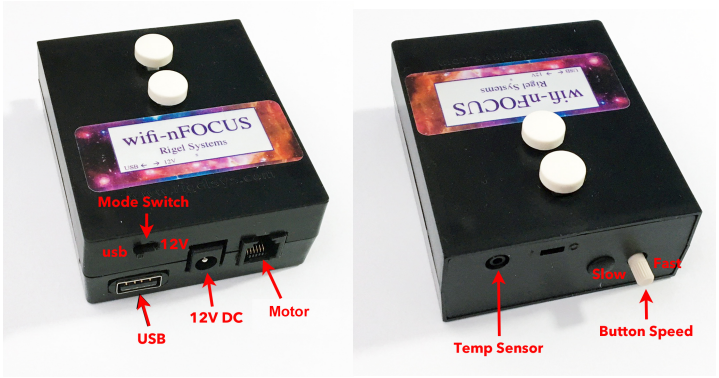
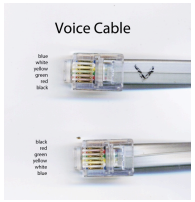
## Hardware Connection




1) Connect focus motor to wifi-nFOCUS using supplied **VOICE** cable. Do **not** use DATA cables. **VOICE** cables can be identified by looking at the ends of the cable. Color of wires are reversed comparing one end to the other.




2) Connect wifi-nFOCUS to external 12V DC using supplied power cable -- steppers will not work without 12V DC connected

Do **NOT** connect **STEPPER** to **wifi-nFOCUS**
As **may** result in **damage** to electronics

3) Connect wifi-nFOCUS to PC usb port using supplied USB cable

4) **MANUAL OPERATION**: For **ALL** modes of operation, **12V must be supplied.** usb-nSTEP can be operated from PC and manually.

- **For pc + manual operation** slide **mode switch** to **usb**
- **For standalone manual operation unplug usb cable before sliding mode switch to 12V**.

Press button to move focus in a direction. Rotate **button speed knob** to vary speed from slow to fast.

**High Speed mode.** While holding the first button down press the second button to switch to high speed in that direction.

**5)** Optional temperature probe plugs into 2.5mm jack.



## Before Installing Software

Make sure that your windows account has ADMIN privilege as ADMIN privilege is required to install drivers in Windows

Driver signature enforcement should only be disabled if you are positive that you need it to be disabled. Driver signature enforcement can be re-enabled by simply rebooting.

### Preparing To Disable Driver Signature Enforcement In Windows 8/8.1

- Press **Win + C** on your keyboard to open the Windows Charm bar.
- Select the **gear icon** in the charm bar. Selecting this icon will bring you to the **modern ui** control panel.

### WINDOWS 8

- Select '**General**', scroll all the way to the bottom of the page and click on the restart button located under the '**Advanced Startup**' section.
- After restarting in the advanced mode, a screen will come up with two options. Select the '**Troubleshoot**' option.
- When the '**Troubleshoot**' option is selected, another window will appear. Find and click the option that says 'Advanced options'.
- In the advanced options window, select the '**Startup settings**' option.
- Inside the '**Startup settings**' window, a list of selectable boot options will appear. Press the **F7** key to disable driver signature enforcement.
- Once you've selected the option to disable driver signature enforcement reboot back into windows.

### WINDOWS 8.1 or 10

- In the **Modern UI** control panel find '**Update & recovery**' on the left hand side of the menu.
- Once in 'Update & recovery,' select '**Recovery**' in the list of options on the left hand side of the **modern ui** menu.
- After restarting in the advanced mode, a screen will come up with two options. Select the '**Troubleshoot**' option.
- When the '**Troubleshoot**' option is selected, another window will appear. Find and click the option that says 'Advanced options'.
- In the advanced options window, select the '**Startup settings**' option.
- Inside the '**Startup settings**' window, a list of selectable boot options will appear. Press the **F7** key to disable driver signature enforcement.
- Once you've selected the option to disable driver signature enforcement reboot back into windows.

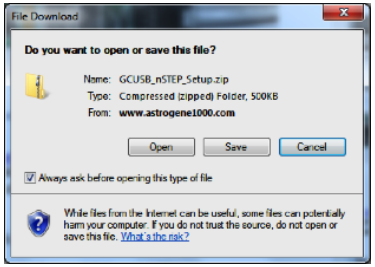
Copyright Rigel Systems 2020

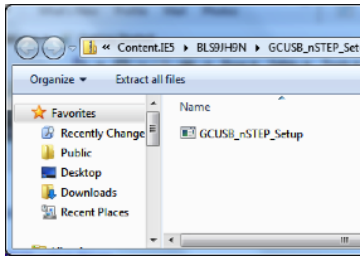
# Software Installation

1) Download and install the ASCOM platform from
http://ascom-standards.org/index.htm

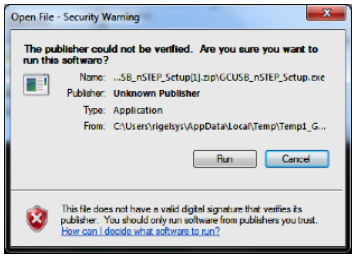
2) Go to rigelsystems.com web page, click on wifi-nFOCUS and at bottom of wifi-nFOCUS page there is a link to download the wifi-nFOCUS software.
http://rigelsys.com/00%20downloads/wifi-nFOCUS_Setup_6.0.8.PIC.ESP32.999.exe

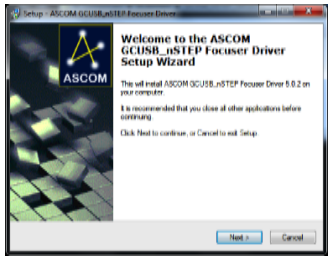
3) Click on "**INNO based installer wifi-nFOCUS ASCOM software.**" and **OPEN**



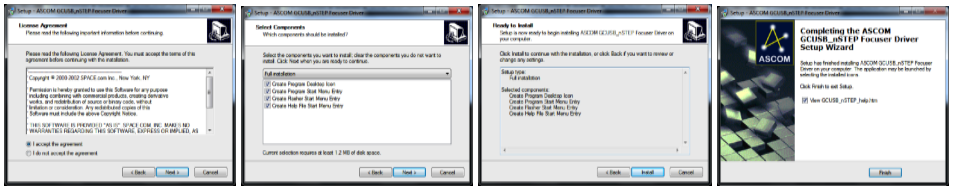




4) Double click on the "**wifi-nFOCUS Setup.exe**" and run the exe




5) Accept license agreement and proceed

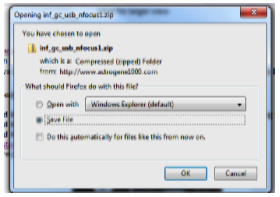


6) For Windows 10, skip ahead to **step 13**. Windows 10 now has usb drivers. To see which COM port the usb-nSTEP is on, use the windows device driver and look for a new usb device. COM port assignments can be changed to match in the SETUP window in the ASCOM driver.

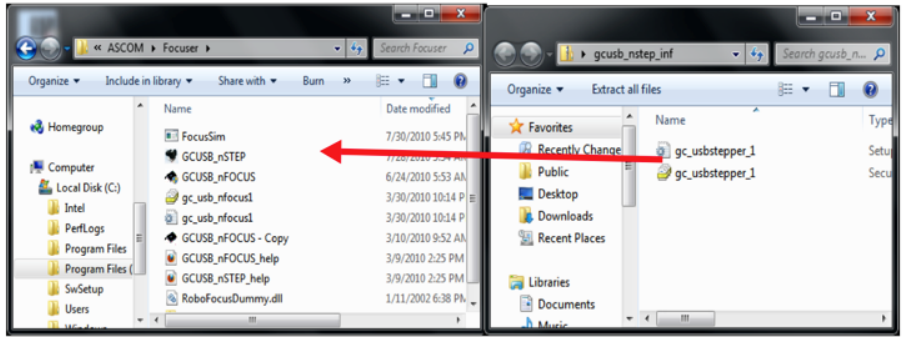
For Windows 7, go to http://www.astrogene1000.com/products/gcusb_nstep/gcusb_nstep.htm




7) Download and save the "**INF file, no code added**" zip file, then double click the zip file to unzip.



8) Open the folder where the **wifi-nFOCUS** executable is installed (left side of image below), and drag the "**wifi-nFOCUS**" setup information and security catalog files into it. . REMEMBER the directory for step 10 in case you need to explicitly point the Device Manager to the directory.

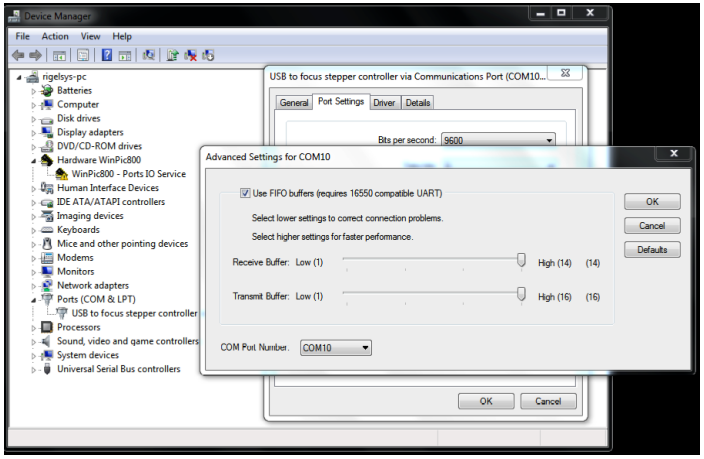


9) Plug the **wifi-nFOCUS** hardware into a USB port and device drive should install. If it doesn' then follow step 10.

10) Open **Device Manager**, click on **Other Devices**, click on **wifi-nFOCUS** device, pick **Driver** tab and select **Update Driver**. On next screen, select "browse local disk" and let it go to town!

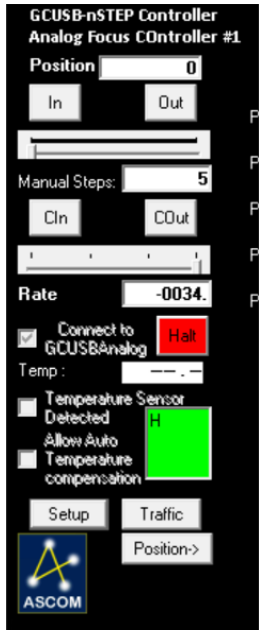
11) Driver is installed ☺ so select **Close**.

12) Select **PORTS (COM & LPT)** in the **Device Manager**. **USB to focus motor controller (COM#)** is displayed, with COM port assigned. You will need to know this COM port to setup the **wifi-nFOCUS** application. You **must** change the COM port assignment by clicking on the USB to focus controller, select the **Port Settings** tab, select **Advanced** and selecting a "**virgin**" **COM Port Number (one that doesn't say "in use") to avoid problems with settings from other applications.** For backwards compatibility, values are 1-16.




13) Ready to go ☺ Use the shortcut on your desktop to activate the **wifi-nFOCUS** application.

# Control Window




## Position:

Where the driver thinks the focuser is. For nSTEP this is truly always relative to a point you set in the SETUP screen.

## In/Out:

Press to move in or out the number of “steps” indicated by the 'sliders' setting.

## Slider

Select number of steps to do for each press of an In/Out or C

## CIn/COut

Equivalent to repeatedly pressing the In/Out buttons. nSTEP will continue to move until you release the button.

## Manual Steps

Displays the value selected on 'slider', or you can manually enter the number of steps

## Connect to nSTEP:

Check box to connect control software to usb-nSTEP hardware via the COM port selected in the setup screen (below).

**Note**: Once connected to the nSTEP you cannot disconnect without quitting program.

**Note**: An ASCOM application opening the driver will force this connection when “Linked”

**Halt:** Press to stop if motor runs away.

## Temp:

Displays the current temperature in degC or degF for the temperature probe is attached to the usb-nSTEP

## Temperature Sensor Detected

The software will “check” this box if it detects that a temperature probe is connected to the usb-nSTEP. If temp probe detected then you can choose to allow automatic temperature compensation.

## Temperature Compensation

Check box to enable temperature compensation but note that manual focusing is disabled while in temperature compensation mode.

**Green Square**: Park mouse pointer here to operate focus remotely from a Bluetooth/wireless presentation pointer connected to your PC.

## Setup

Select to display usb-nSTEP setup window.

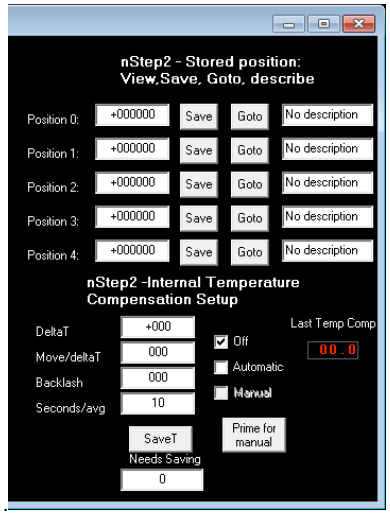
## Traffic

Select to display ASCOM usb-nSTEP command traffic with usb-nSTEP hardware.

## Position Button

Select to expand window to display the Stored Position / Internal Temperature Compensation features.

# Stored Position




Lets user make change major elements with large differences in focal plane easily by focusing once and then saving the position with annotation for later 'GoTo' when this element is used (camera1 to camera2 to eyepiece type '1' to eyepiece type '2').

## Save

Saves the current position

## Goto

Moves the focuser to the saved position

## Description

Lets the user label the position for ease of operation.

# Internal Temp Comp

This function runs the temperature internally to the nSTEP so a user can actually configure it and then exit the ASCOM driver, the nSTEP will keep on 'auto' compensating.

This internal temperature compensation is -not- controlled by the higher level ASCOM API for temperature compensation, the higher level API uses the temp comp of the ASCOM driver. The internal compensation should not be used if the higher level API's are used.

## DeltaT

**T**his is the temperature change x10 to trigger a compensation. The nSTEP uses a fixed point value here which is 10X the real temperature change desired. Examples: -005 = move in "-" direction when temp changes by 0.5C, +015 = +1.5C change must be detected before triggering a compensation. The values can range from -100 (-10.0C) to +100(+10.0C) in increments of 5(0.5C). The sign signifies whether to move + or - steps on a change.

## Move/DeltaT

Move this many steps for each Delta Temp change. Direction of movement controlled by sign of DeltaTemp

## Backlash

Apply this number of steps in last move direction before reversing direction. Range 0 through 100 with 0 = no backlash takeup

## Second/Avg

Temperature will be averaged over this number of seconds. Range 1 to 75 seconds. Set to a lower value for more immediate changes. A lower value may cause 'hunting' if the sensor is detecting a value that is just toggling slightly (e.g. from 17.5C to 18.0C to 17.5C).

## Off

Internal compensation turned off.

## Auto

Internal compensation runs all the time. Mutually exclusive with the ASCOM drivers temperature compensation.

## Manual

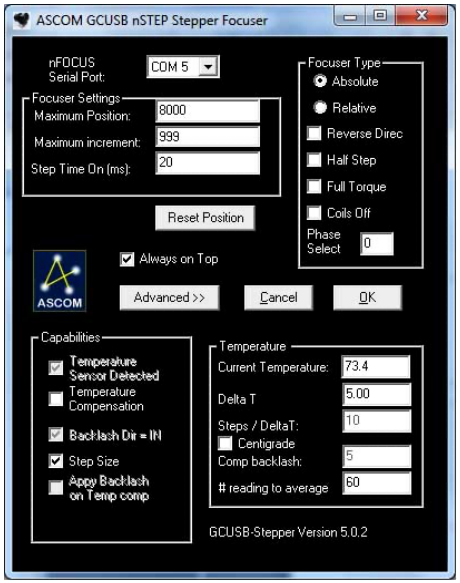
Temperature compensation done once on demand. Mutually exclusive with the ASCOM drivers temperature compensation.

## Prime for manual

Must press **'Prime for Manual'** then **'SaveT'** to set the device's current temperature and position so it knows where to start from. After that, press SaveT while **'Manual'** is set to force a compensation at the current temperature. Useful for focusers with backlash when you do not want compensation running in the middle of an exposure as taking up the backlash will throw image out of focus even more if direction of motion reverses.

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# Setup Window




## nSTEP Serial Port:

Set to the COM port number assigned to the usb-nSTEP hardware when first plugging it into a usb port on your computer. You can confirm/change the usb-nSTEP hardware COM port number using the WINDOWS DEVICE MANAGER. For backwards compatibility, valid values are 1-16.

## Focuser Settings

**Maximum Position:** Value is used by the **Absolute Focuser Type** (see below).

**Maximum Increment:** Maximum number of “steps” to send to the nSTEP at one time. Generally used to limits the number of “moves” an ASCOM autofocus application can execute during each call to the usb-nSTEP ASCOM driver.

**Step Time On (ms):** Sets the duration of a “step”. Valid range is 1-250 ms.

## Focuser Type

**Absolute:** Select **Relative Focuser Type**, rack focuser all the way in (to 'Home') and then press **Reset Position**. The gcusb-nSTEP software will will set the racked-all-the-way-in position to 00000. **Now Select Absolute Focuser Type** which limits focuser position to between 00000 and **Maximum Position** in ASCOM applications. **Relative: D**oes not enforce limits on focuser position. Uses **Maximum Position** value to set the current position to half the max position value, when you press **Reset Position**.

**Reverse Direc:** OBSELETE, see PHASE SELECT for reversing stepper direction.

**Half Step**: Energizes 1 or two coils at a time, doubling step resolution.

**Full Torque:** Highest power mode, two coils always energized.

**Coils Off:** Turn coils off after stepping to save power and reduce heating of the stepper motor. Only use with a gear-head stepper a non-gearhead stepper may slip lifting heavy loads

**Phase Select**: **set in factory to 0. If you desire reverse direction, set to 1**.

## Reset Position

Press to set the current focuser position to zero.

## Basic/Advanced

Toggles between displaying the **Advanced** (full screen as shown at left) or **Basic** setup (only upper half of screen)

## Cancel

Cancel setup changes and, return to the control window.

## OK

Apply all changes to setup and return to control window.

## Capabilities

**Temperature Sensor Detected:** If temperature probe is attached this box will be 'checked' and enable other menu items.

**Temperature Compensation:** Enable automatic temperature compensation. Manual movement is disabled If "Apply Backlash on Temp Comp" is chekced then apply backlash if moving "IN", else if moving "OUT"

## Temperature

**Current Temperature:** As read from temperature probe (if attached).

**Delta T:** For a change of Delta T, move "Steps/DeltaT"

**Steps/DeltaT:** Number of “steps” to move if "Delta T" temperature change is detected

**Centigrade:** Check box to report temperature in Centigrade, otherwise temperature will be displayed in Farenheit.

**Comp Backlash:** Move this number of steps to compensate for backlash in DC motor gears.

**# readings to average:** Read the temperature probe this number of times, average the readings, and display the result as the temperature and use when applying temperature compensation.

**1 Year limited warranty: Rigel Systems, 26850 Basswood Ave, Rancho Palos Verdes CA, 90275** warrants to the original consumer purchaser of its product that the product will be free of defects in material or workmanship 1 year from the date of purchase under normal use. During this warranty period, **Rigel Systems** will, at its option, repair or replace the product without charge for parts or labor when delivered to **Rigel Systems** with proof of the date of purchase and a statement of the problem with the product. Shipping and handling charges to **Rigel Systems** are your responsibility. This warranty does not apply if the product has been altered or repaired by anyone other than **Rigel Systems** or has been subjected to purchaser abuse, accident, negligence or damage subsequent to purchase including battery damage to product. This warranty excludes incidental or consequential damages resulting from the product or use of the product. The product is not a toy. Keep away from children.

For more information visit
http://www.rigelsys.com

# wifi-nFOCUS Instructions

## Web Browser on PC, phone or tablet

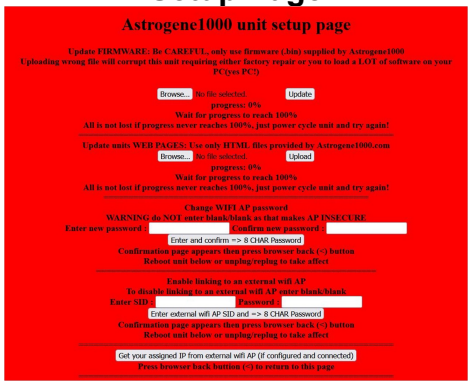
Safari, Firefox, Chrome and other

**FIRST TIME SETUP**

1) In your pc/tablet/phone wifi menu, connect to the **astrogene1000-XXXX access point** using default password **1234567890**
2) Go to **LOGIN** page **192.168.200.1:8888** and log in with default username/password **admin/admin**




## Setup Page




## Installing Firmware Update

1) Press **Browse**
2) Select **.bin** file
3) Press **Update**
4) Scroll down and press **Reboot Unit**

## Installing Web Page Update

1) Press **Browse**
2) Select **html** file
3) Press **Update**
4) Scroll down and press **Reboot Unit**

## Changing WIFI AP password

1) Scroll down to "Change wifi AP password"
2) Enter an => 8 Character password in both places

**WARNING do not enter blank/blank as that will turn OFF wifi security**

3) Press the gray button labeled "Enter and confirm => 8 Char Password".
4) Confirmation page appears, then press your browers's back (<) button to get back to setup page
5) Press gray "**Reboot Unit**" button at bottom of page or unplug/replug to cause wifi-nFOCUS to reboot.
6) Go to your PC network/wifi settings and have it "**forget**" your **astrogene1000-XXXX** before loging in with the new password.

## Enabling connection to an external wifi AP

1) On your pc/tablet/phone note your existing external wifi **access point SID** and **password**.
2) Scroll down to "**Enable linking to an external wifi AP"**
3) Type the **SID** and **Password** of the existing externa wifi network you wish the wifi-nFOCUS or wifi-nSTEP to attach to.
4) Press the gray button labeled "**Enter external wifi AP SID and => 8 Char Password**".
5) Confirmation page appears, then press your browers's back (<) button to get back to setup page
6) Press gray "**Reboot Unit**" button at bottom of page or **unplug/replug** to cause wifi-nFOCUS or to reboot.

## Confirming IP address assigned by external wifi AP

1) In your pc/tablet/phone wifi setup screen, connect directly to the wifi-nFOCUS **access point**
2) In your web browser, navigate to **ASTROGENE 1000 LOGIN page** 192.168.200.1:8888
3) log in with default username/password of **admin/admin**
4) **Setup Page** appears
5) Scroll down and press gray button labeled "**Get your assigned IP from external wifi AO (if configured and connected)".**
6) Confirmation page appears with **IP address** your **external wifi AP has assigned** to your wifi-nFOCUS **Note that address**.

**If it is 0.0.0.0 it is NOT connected.**

7) Enter that IP address in your browser on a pc connected to your external wifi AP adding :**80** for operating screen or **:8888** for admin Login Page.

**NOTE**: The wifi-nFOCUS native 192.168.200.1:80 (for operation) and 192.168.200.1:8888 (for Setup Login Page) are **simultaneously** available to use at the same time as the IP address your external wifi AP has assigned to them.

**DO NOT use both at the same time.**

## Removing connection to an external wifi AP

1) In your pc/tablet/phone wifi setup screen, connect directly to the wifi-nFOCUS or wifi-nSTEP **access point**
2) In your web browser, navigate to **ASTROGENE 1000 LOGIN page** 192.168.200.1:8888
3) log in with default username/password of **admin/admin Setup Page** appears
4) Scroll down to "**Enable linking to an external wifi AP"**
5) Blank out both SID and Password
6) Press the gray button labeled "**Enter external wifi AP SID and => 8 Char Password**".
7) Confirmation page appears, then press your browers's back (<) button to get back to setup page
8) Press gray "**Reboot Unit**" button at bottom of page or unplug/replug to cause wifi-nFOCUS or wifi-nSTEP to reboot.

## Confirming IP address assigned by external wifi AP is removed

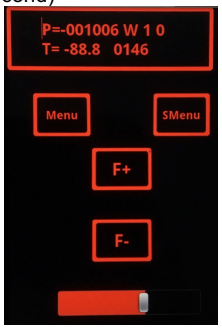
1) In your pc/tablet/phone wifi setup screen, connect directly to the or wifi-nFOCUS **access point**
2) In your web browser, navigate to **ASTROGENE 1000 LOGIN page** **192.168.200.1:8888**
3) log in with default username/password of **admin/admin**
4) **Setup Page** appears
5) Scroll down and press gray button labeled "**Get your assigned IP from external wifi AO (if configured and connected)".**
6) Confirmation page appears with **IP address** of **0.0.0.0**

## Operating from Web Browser

1) In your pc/tablet/phone wifi menu, connect to the **astrogene1000-XXXX** access point or through your external wifi AP.
2) Start your web browser
3) Goto CONTROL page **192.168.200.1:80.** if connecting using IP assigned by an external wifi AP, use that IP with **:80** appended

## TOP LEVEL DISPLAY

1) Shows current position (P=)
2) Stepping type (Half, Wave, Full), Wave shown
3) Coils On, Off after move (0 or 1) 1 = Coils Off shown
4) Stepping phase selected (0, 1 or 2) to match motor wiring, 0 = phase select shown
5) Current Temperature reading
6) Current Speed selected on slider (=0146 steps/second)




## Motor Controls

1) **Menu button**: press to cycle through the top level menus
2) **SMenu button**: Press to cycle through sub-menus for current top menu's
3) **F+ button:** Use for Focus on top level menu,
4) selections on sub menu's
5) **F- button**: used for focus on top level menu,
   selections on sub menu's
6) **Slider** – move left to go slower, right to go fast, will only go as fast as Max Speed allows (see below under Motor Setup)

### NOTE

There is a "deadman" timer of 10 seconds on F+ and F- presses, so if wifi connection is lost, motor does not continue to move after 10 seconds.

From TOP LEVEL DISPLAY, press Menu ONCE for

## DISPLAY SETUP




While in DISPLAY SETUP press S-Menu ONCE for

### BRIGHTNESS

use F+ and F- to change screen brightness




While in DISPLAY SETUP press S-Menu TWICE for

### BACKLIGHT ALWAYS ON

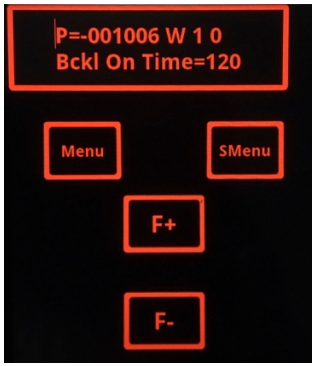
Press F+/F- to toggle backlight always on




While in DISPLAY SETUP press S-Menu THRICE times for

### BACKLIGHT ON TIME

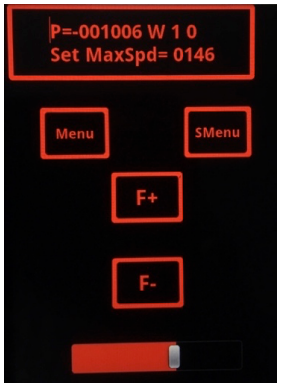
If Backlight Always On (=1) display will confirm, otherwise
If Backlight Always On = 0 (No)
Press F+/F- to change, value is in seconds




While in DISPLAY SETUP press S-Menu FOUR times to

### SET SLIDER MAX SPEED

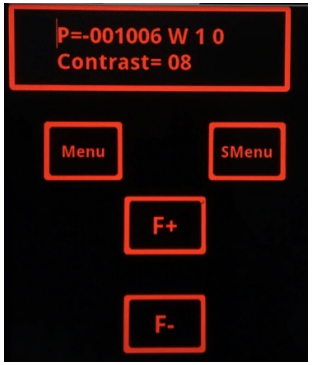
Use F+/F- keys to change the maximum allowed speed choice on the slider




While in DISPLAY SETUP press S-Menu FIVE times for

### CONTRAST

not used in Android system, no affect if F+ or F- pressed

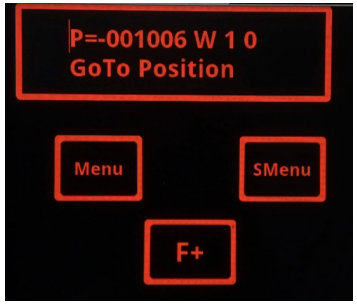



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**From TOP LEVEL DISPLAY, press Menu TWICE for**

## GOTO POSITION

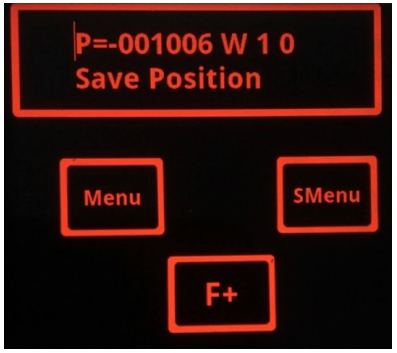
Press **S-Menu** multiple times to select one of 5 stored positions to Goto then press F+ to force GoTo the position shown




**From TOP LEVEL DISPLAY, press Menu THRICE for**

## SAVE POSITION

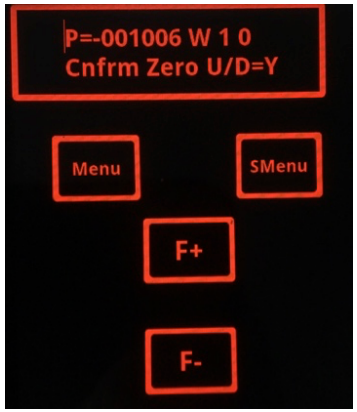
Press **S-Menu** multiple times to select slot 0 through 4 then press F+ to save current position in the selected slot.




**While in SAVE POSITION press S-Menu ONCE to**

## CONFIRM ZERO

Confirm Zero U/D=Y
Press F+ to zero position
Any other Button will not force zero

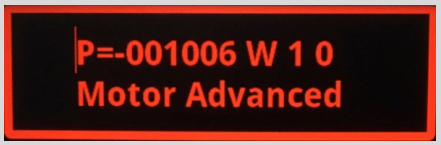



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**THESE STEPPER FUNCTIONS are NOT APPLICABLE TO wifi-nFOCUS motor – SETUP for wifi-nFOCUS best done from PC USB connection.**

**From TOP LEVEL DISPLAY, press Menu FOUR times for**

## MOTOR ADVANCED




**While in MOTOR ADVANCED press S-Menu ONCE to**

## SET STEPPING

Use F+/F- keys to change the stepping type
See 'W' in display, W=Wave, H=Half, F=Full




**While in MOTOR ADVANCED press S-Menu TWICE to**

## SET COILS ON/OFF

Use F+/F- keys to change the Coils On/Off
This is indicated by 0 (On) or 1 (Off) to the right of the stepping type (to right of H below)




**While in MOTOR SETUP press S-Menu THRICE to**

## SET PHASE

Use F+/F- keys to change the phase select
This is indicated by 0,1,2,3,4,5 to the right of the stepping type (to right of H below). Factory setting is 0 for our steppers and most others.
To reverse direction set to 3.




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**From TOP LEVEL DISPLAY press Menu FOUR times to enter**

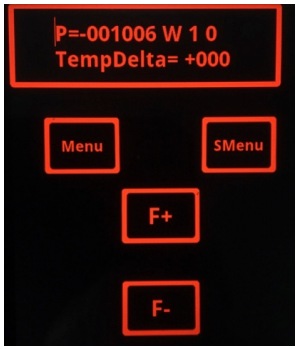



# TEMP SETUP

**While in TEMP SETUP press S-Menu ONCE for**

## DeltaTemp

**T**his is the temperature change x10 to trigger a compensation.
Use F+/F- keys to change the Delta Temp value

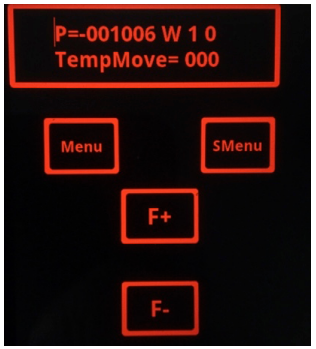



**While in TEMP SETUP press S-Menu TWICE for**

## TempMove

Move this many steps for each Delta Temp change. Direction of movement controlled by sign of DeltaTemp.

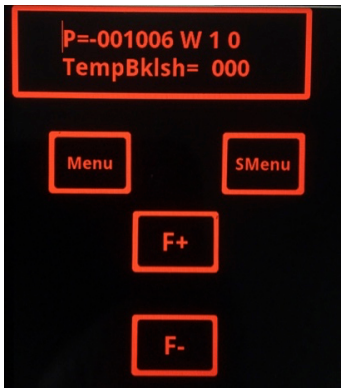
Use F+/F- keys to change the TempMove value
Range is 0 to 75




**While in TEMP SETUP press S-Menu THRICE for**

## TempBklash

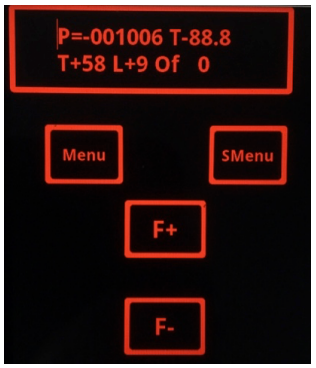
Apply this number of steps in last move direction before reversing direction.
Use F+/F- keys to change the Delta Temperature value
Usually not needed for Crayford focusers




**While in TEMP SETUP press S-Menu FOUR times for**

## Temperature Compensation Mode

Use F+/F- keys to change the internal temperature compensation mode between **Of** (off), **Ma** (Manual), **Au S** (Auto). Au(to) mode - must stay on this screen while auto temp compensating, leaving the screen turns off Au(to). Watch the position display or the 'S' or 'M' next to the Au to see movement. Entering MA or Au mode, the current temperature is used as the baseline. if in Au(to) mode, changing from this temp will force an Au(to) move.




**While in TEMP SETUP press S-Menu FIVE times for**

## DoTempComp

If Temperature Compensation Mode is **Ma** (Manual) then press F+ to set the "**Prime for Manual**" compensation using the current temperature and position as the starting point.
If Temperature Compensation Mode is **Of** (off) or **Au S** (Aut) displays **Frce Comp Disabld**. Do Temp Comp= S. Pressing either F+ or F- will take the base temperature versus currently display temp and move Delta steps base on Temp delta.




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