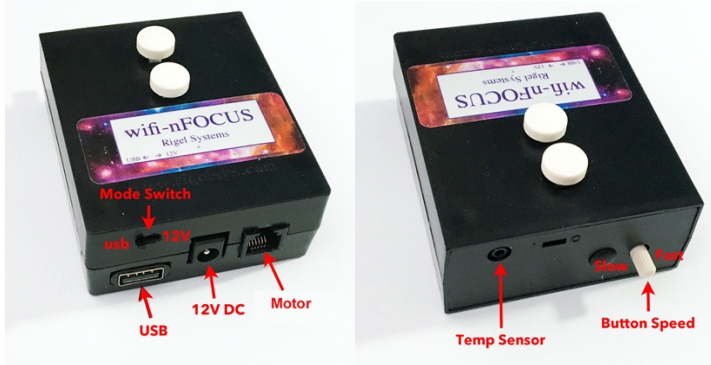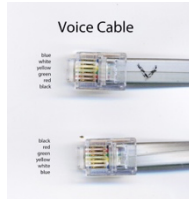# wifi-nFOCUS Instructions

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

<div align="center">

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

</div>

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 RIGHT 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

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 link and at bottom of wifi-nFOCUS page there is a link to download the wifi-nFOCUS software, **or** go directly to http://www.astrogene1000.com/products/Firmware/wifinfocus/GCUSB_WIFINFOCUS/GCUSB_nSTEP_ANALOG_Setup.exe

3) Double click on the "**GCUSB_nSTEP_ANALOG_Setup.exe**" and run the exe. Note depending upon your version of Windows and AntiVirus you may have to go through the steps to approve running this exe.


4) Accept license agreement and proceed
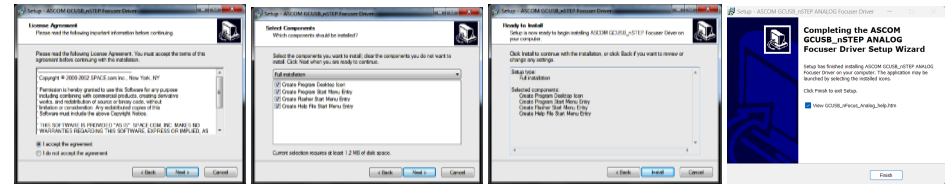
5) Plug the **wifi-nFOCUS** hardware into a USB port and device drive should install. If it doesn' then you may have to manually download and install. Go to here: https://www.silabs.com/developers/usb-to-uart-bridge-vcp-drivers Download: https://www.silabs.com/documents/public/software/CP210x_Universal_Windows_Driver.zip Extract to someplace and execute the given EXE for X86 or X64

6) 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.
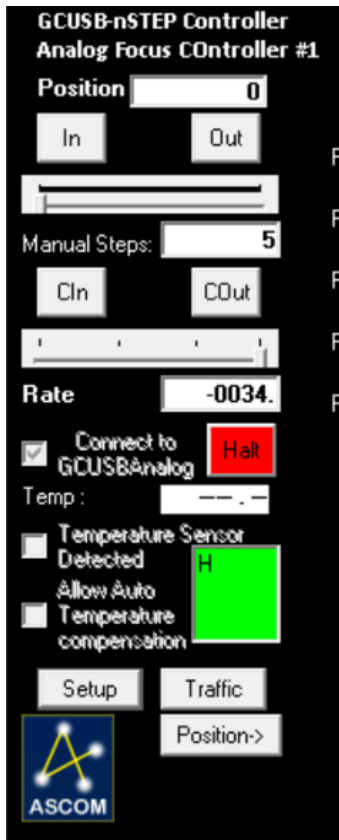If desired, you **may** change the COM port assignment by clicking on the USB to focus controller, select the **Port Settings** tab, select **Advanced** and selecting a "**virgin**" COM Port Number (one that doesn't say "in use") to avoid problems with settings from other applications.
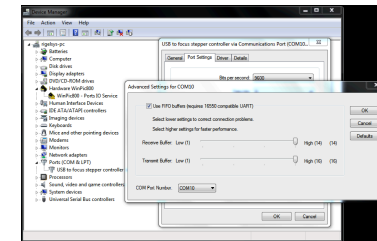
7) Ready to go ☺ Use the shortcut on your desktop to activate the **wifi-nFOCUS** application.

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

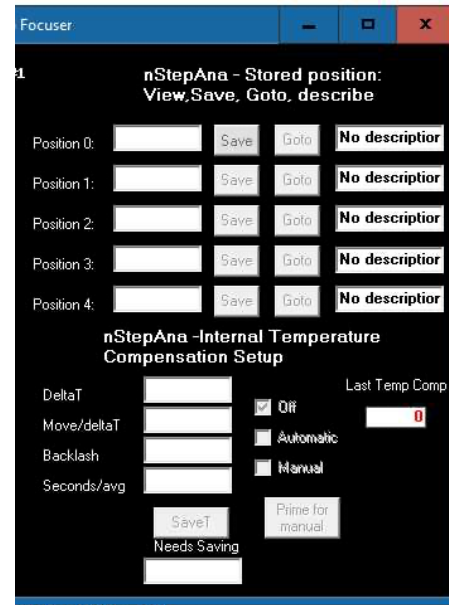Select to display usb-nSTEP setup window.

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

This 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.

Setup Window
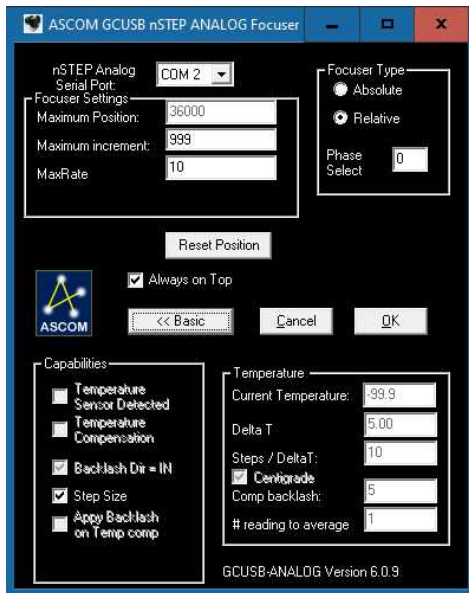
nSTEP Serial Port:

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**.

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.

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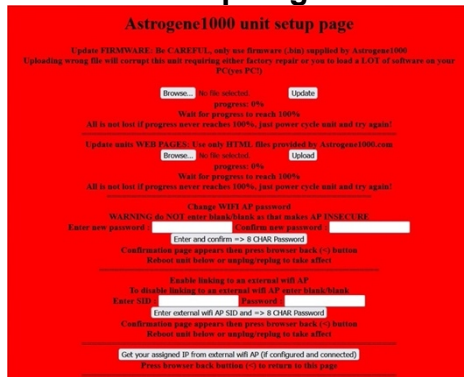http://www.rigelsys.com

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**

Astrogene1000
Login Page

Username
Password
Login

Setup Page

Astrogene1000 unit setup page

Update FIRMWARE: Be CAREFUL, only use firmware (.bin) supplied by Astrogene1000
Uploading wrong file will corrupt this unit requiring either factory repair or you to load a LOT of software on your PC(yes PC!)

Browse... No file selected. Update
progress: 0%
Wait for progress to reach 100%
All is not lost if progress never reaches 100%, just power cycle unit and try again!

Update units WEB PAGES. Use only HTML files provided by Astrogene1000.com

Browse... No file selected. Upload
progress: 0%
Wait for progress to reach 100%
All is not lost if progress never reaches 100%, just power cycle unit and try again!

Change WIFI AP password
WARNING do NOT enter blank/blank as that makes AP INSECURE
Enter new password: _____
Confirm new password: _____
Enter and confirm => 8 CHAR Password
Confirmation page appears then press browser back (<) button
Reboot unit below or unplug/replug to take affect

Enable linking to an external wifi AP
To disable linking to an external wifi AP enter blank/blank
Enter SID: _____ Password _____
Enter external wifi AP SID and => 8 CHAR Password
Confirmation page appears then press browser back (<) button
Reboot unit below or unplug/replug to take affect

Get your assigned IP from external wifi AP (if configured and connected)
Press browser back button (<) to return to this 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)

P=-001006 W 1 0
T= -88.8 0146

Menu   SMenu

F+

F-

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.

wifi-nFOCUS Instructions

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

DISPLAY SETUP

`P=-001006 W 1 0`
Display Setup

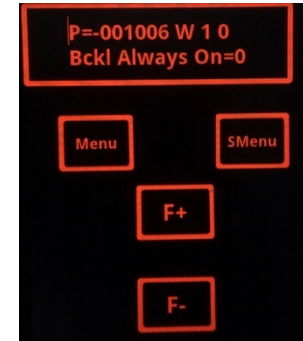While in **DISPLAY SETUP** press **S-Menu** ONCE for

BRIGHTNESS

use F+ and F- to change screen brightness

`P=-001006 W 1 0`
Brightness=16

Menu   SMenu

F+

F-

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

BACKLIGHT ALWAYS ON

Press F+/F- to toggle backlight always on

`P=-001006 W 1 0`
Bckl Always On=0

Menu   SMenu

F+

F-

While in **DISPLAY SETUP** press **S-Menu** THRICE times for

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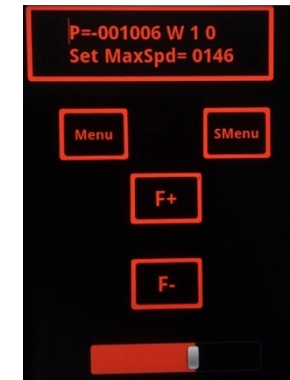
If Backlight Always On (=1) display will confirm, otherwise
If Backlight Always On = 0 (No)
Press F+/F- to change, value is in seconds

`P=-001006 W 1 0`
Bckl On Time=120

Menu   SMenu

F+

F-

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

`P=-001006 W 1 0`
Set MaxSpd= 0146

Menu   SMenu

F+

F-

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

CONTRAST

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

`P=-001006 W 1 0`
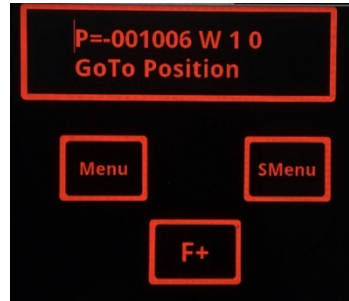**Contrast= 08**

Menu   SMenu

F+

F-

wifi-nFOCUS Instructions

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

P=-001006 W 1 0
GoTo Position

Menu   SMenu

F+

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.

P=-001006 W 1 0
Save Position

Menu   SMenu

F+
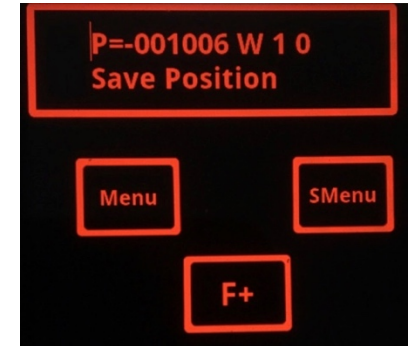
While in SAVE POSITION press S-Menu ONCE to

CONFIRM ZERO

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

P=-001006 W 1 0
Cnfrm Zero U/D=Y

Menu   SMenu

F+

F-

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

P=-001006 W 1 0
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

P=-001006 W 1 0
Set stepping

Menu   SMenu
      F+
      F-

While in MOTOR ADVANCED press S-Menu TWICE to

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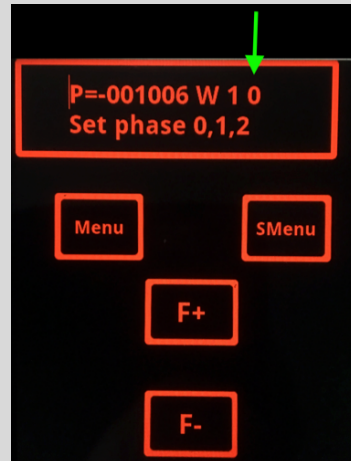
Use F+/F- keys to change the Coils On/Off
This is indicated by 0 (On) or 1 (Off) to the right of the stepping type (to right of H below)

P=-001006 W 1 0
Set coils on/off

Menu   SMenu
      F+
      F-

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.

P=-001006 W 1 0
Set phase 0,1,2

Menu   SMenu
      F+
      F-

---

wifi-nFOCUS Instructions

P=-001006 W 1 0
Temp Setup

TEMP SETUP

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

DeltaTemp

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

P=-001006 W 1 0
TempDelta= +000

Menu | SMenu
F+
F-

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

P=-001006 W 1 0
TempMove= 000

Menu | SMenu
F+
F-
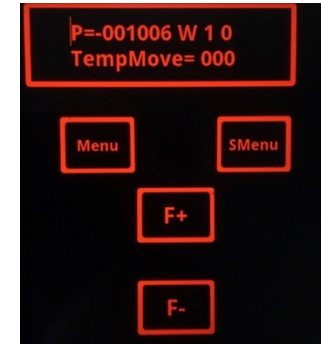
While in TEMP SETUP press **S-Menu** THRICE for

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

P=-001006 W 1 0
TempBklsh= 000

Menu | SMenu
F+
F-
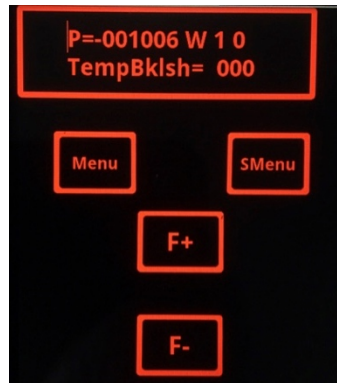
While in TEMP SETUP press **S-Menu** FOUR times for

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.

P=-001006 T-88.8
T+58 L+9 Of 0

Menu | SMenu
F+
F-

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.

P=-001006 T-88.8
Frce Comp Dsabld

Menu | SMenu
F+
F-