ECCO2 environmental computerized controller

USER MANUAL

VERSION 1.2

Update 15-12-2022



ECCO2 is made by PrimaLuceLab SpA (Italy). For any matters relating to the use, service and warranty, please refer to the addresses given in the relevant documents.

English

WARNING

If improperly handled, ECCO2 may become damaged, so please follow the instructions below:

- Do not disassemble
- Do not open, damage or subject to electric shock or excessive impact any part of ECCO2. Do not drop.
- Do not short the electronic elements
- Do not expose to temperatures below -20°C and above +60°C
- Do not burn or incinerate any component.
- Do not expose to rain or other atmospheric effect related to water
- Do not bend, modify or force any part of ECCO2

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QUALITY CONTROL

Each ECCO2 unit, after created in our laboratories, it's tested by PrimaLuceLab technical experts to check all components. We verify mechanics and electronics. In case you check any malfunction, please contact us immediately (+ 39-0434-1696106 or support@primalucelab.com). Do not try to disassemble, repair or modify yourself ECCO 2, without our written approval, in order not to loose the Producer Warrantee.

Contents of the package

- ECCO2 environmental computerized controller
- Adapter for Vixen-style finder shoe
- 2 temperature probes
- USB Type C cable - length 120cm
- Quick guide



NOTE

You can download the ECCO2 drivers and softwares package from DOWNLOAD section of our website:

www.primalucelab.com

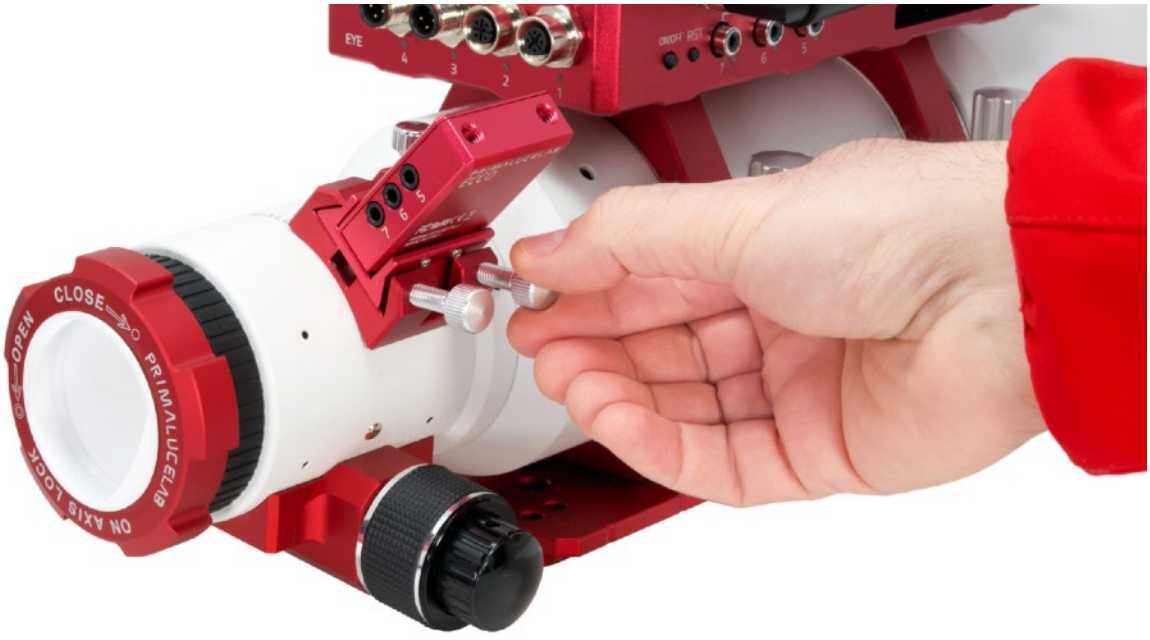
Save the package (in zip format) onto the EAGLE or computer you want to use to control the ECCO2 and unzip it with the proper unzip software (right click, and select “expand”). If an unzip utility is needed, you can use WinZip, available at https://www.winzip.com

First use: install ECCO2 on your telescope

ECCO2 comes with an adapter that allows you to connect it to Vixen-style finder shoe. Insert the ECCO2 to the adapter and lock it by using the 2 grub screws provided in the box.



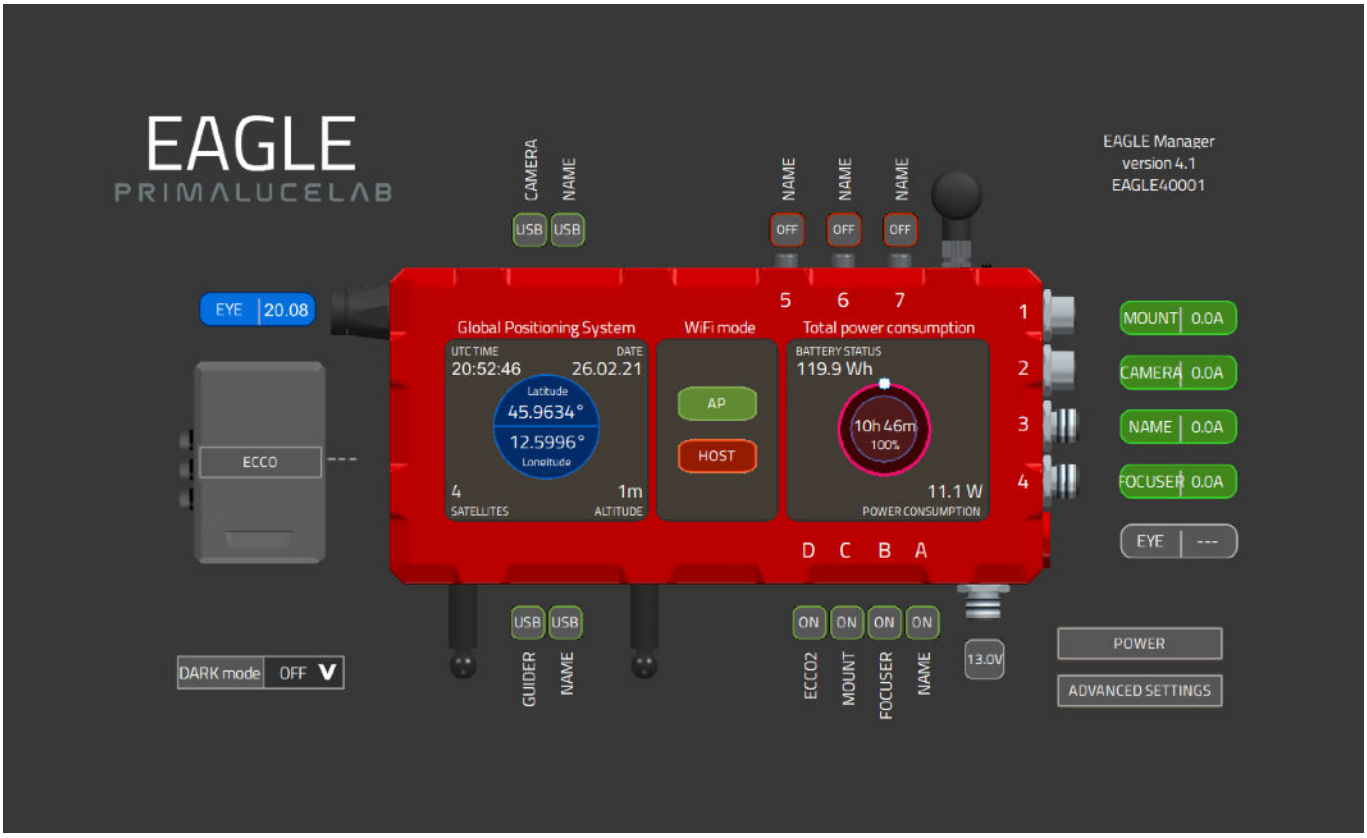
Now you can insert the ECCO2 in the Vixen-style finder shoe of your telescope. If you do not have a finder base, you can use our optional “DX finder base” and then connect the ECCO2. Now connect the USB cable (you find in the box) in the USB-C port of the ECCO2 and in USB port of the EAGLE or your standard Windows computer.



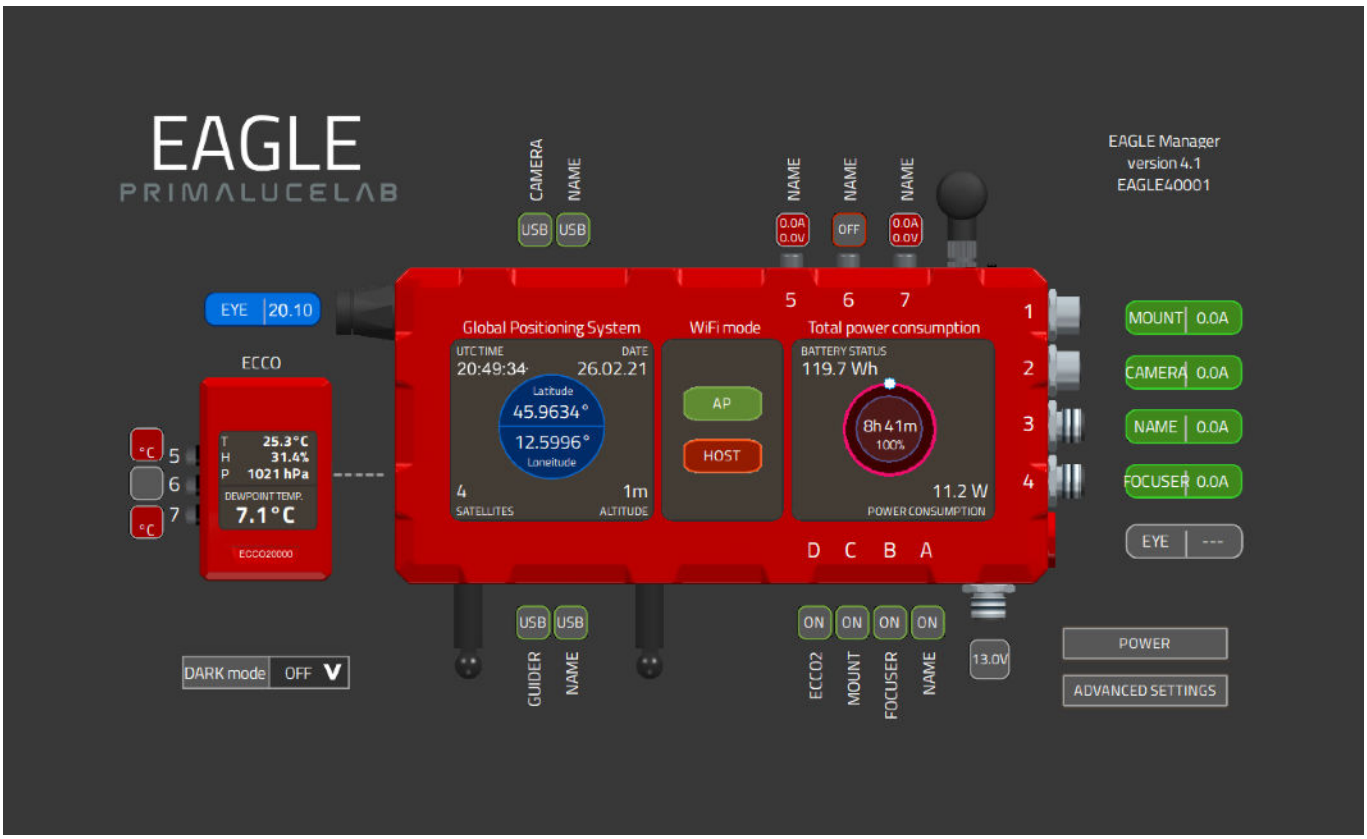
First use: use ECCO2 with EAGLE Manager

ECCO2 is designed to work with the EAGLE (compatible with EAGLE4, EAGLE LE, EAGLE3 and EAGLE2 - in order to work with EAGLE2 it requires update of OS and EAGLE Manager to v3) and, in order to automatically control dew heater power it doesn't need any external software. In order to use the ECCO2 with EAGLE, please follow these steps:

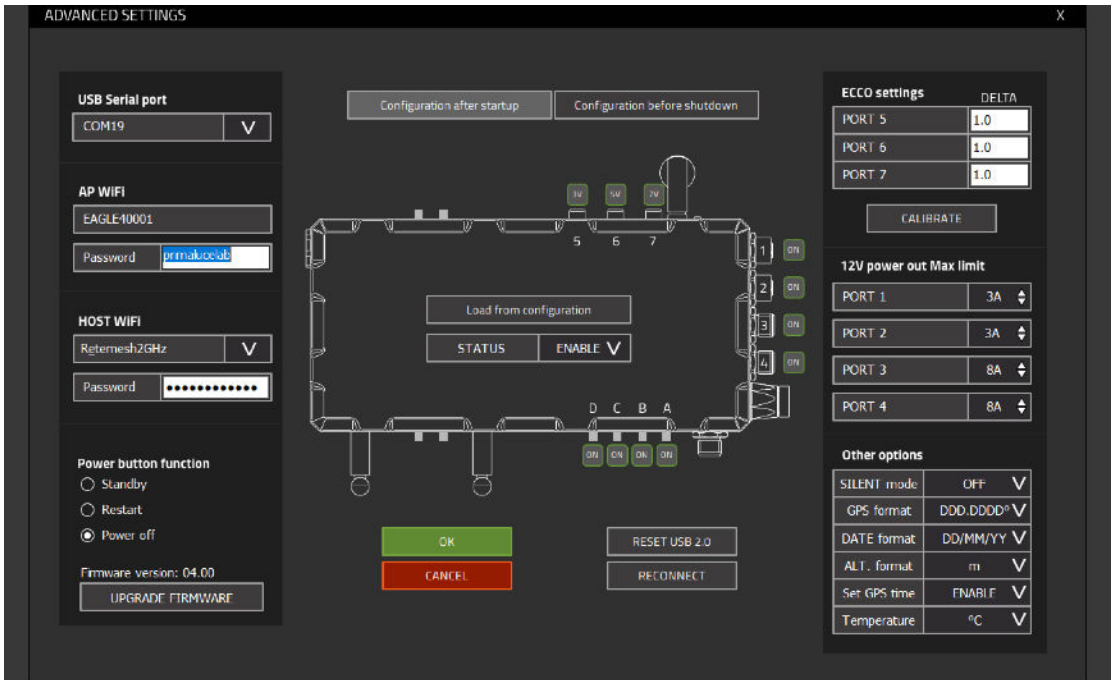
- Connect temperature sensors to the ECCO2; temperature sensor ports in the ECCO2 are numbered in the same order as the dew heater ports on the EAGLE. Connect temperature sensor to the ECCO2 port number corresponding to the port number on the EAGLE where you connected the dew heater. For example, if your telescope dew heater is connected to port 5 of your EAGLE, connect the temperature sensor to the port 5 of the ECCO2. Please do not connect the other side (the probe) to your telescope since, before start using the ECCO2, temperature probes will have to be calibrated. Please have the temperature probes free and not connected to different objects: for example you can leave them on the table or hanging freely.



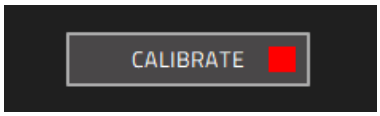
- Click on the ECCO button in the EAGLE Manager interface and, after a few seconds, ECCO2 will activate.



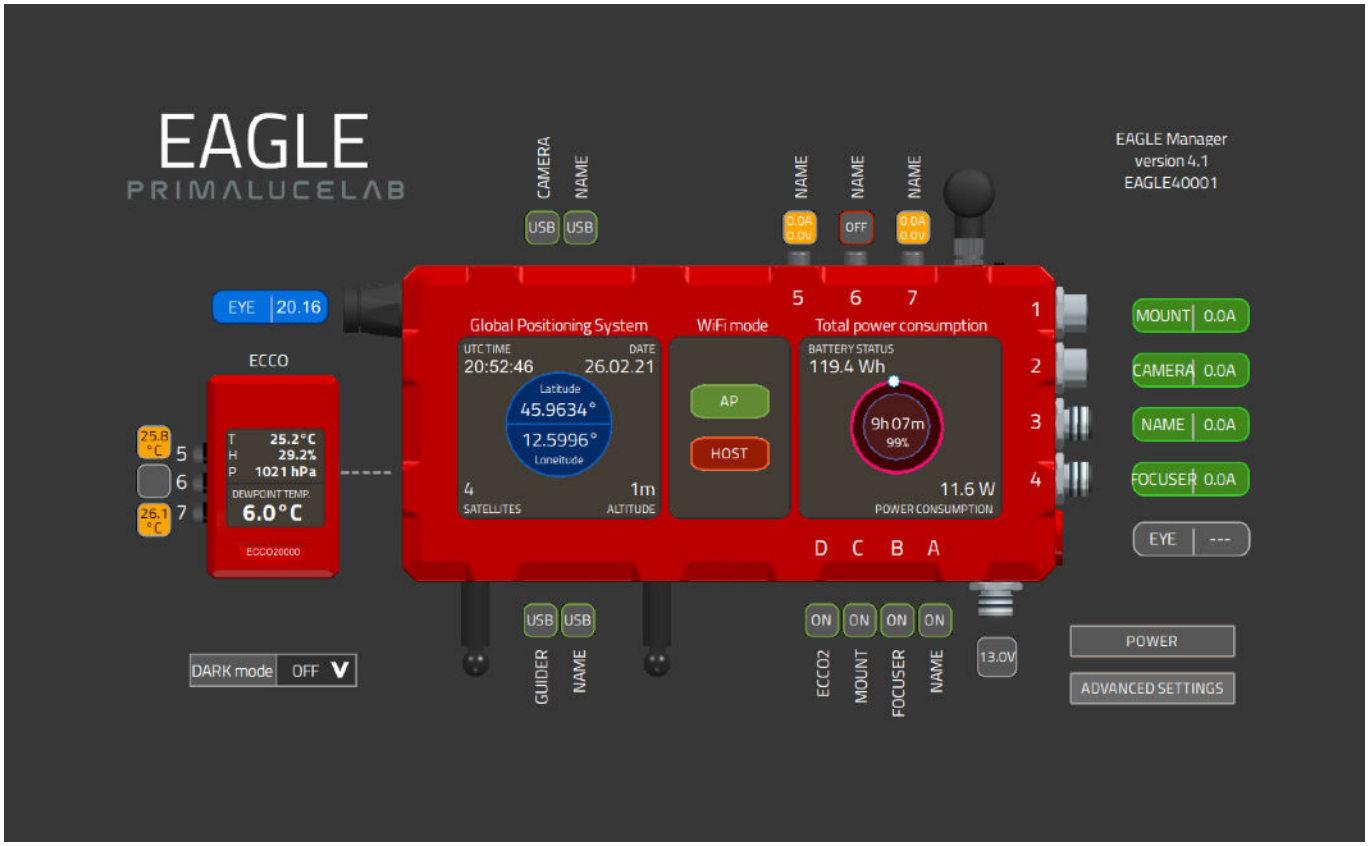
- The ports of the ECCO2 where you connected the temperature sensors, will become red. This means that the temperature sensors have to be calibrated. When the temperature sensors are not calibrated, ECCO2 LED light is flashing.
- In the EAGLE Manager, please click the ADVANCED SETTINGS button, this will open a new window. In the top right part of the new window, you will see the CALIBRATE button.



- Click on the CALIBRATE button and you will see a red icon that will appear during calibration. When the calibration is complete you will see a “Calibration OK” notification, click OK to confirm and then click OK in the ADVANCED SETTINGS window to close.



- The port (you connected both the dew heater and the temperature sensor) will become orange and this means ECCO2 is automatically controlling the dew power based on the dew point that will be displayed on the EAGLE Manager interface. From this moment ECCO2 takes control of the dew heater power based on the dew point and you can’t manually control power of the dew heater port in the EAGLE until you disconnect the temperature probe from the ECCO2.



- Insert the temperature probe head between the dew heater you want to automatically control with the ECCO2 and the telescope optical tube.

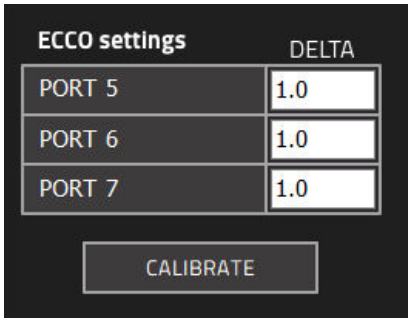


- Temperature readings in the ECCO2 are displayed in Celsius (°C). If you want to see temperatures in Fahrenheit (°F), please go to ADVANCED SETTINGS and select “°F” in Temperature option.



ECCO2 settings in EAGLE Manager

In the upper part of the ADVANCED SETTINGS window of EAGLE MANAGER you can find the “Delta-T” value: this is the temperature that ECCO2 adds to the dew point temperature relative the numbered dew heater.



The larger your optics, the higher we suggest to set this value in order to keep your optic uniformly heated.

How to use ECCO2 environmental module with ASCOM and third party softwares

ECCO2 is provided also with the “PLL Observing Conditions” ASCOM driver that allows you to connect it to third party astrophotography softwares. This way you will be able not only to see temperature, humidity and pressure data in the EAGLE Manager but also to import environmental data in your preferred astrophotography software that supports ASCOM Observing Conditions. More, ECCO2 ASCOM driver allows you to use the ECCO2 environmental computerized controller also with a standard Windows 10/11 computer, without the EAGLE. ECCO2's ASCOM driver requires at least ASCOM platform 6.5 that can be found here https://ascom-standards.org. In order to install the ASCOM driver (on your EAGLE or on your standard Windows 10/11 computer), please double click to the “PLL ASCOM ObservingConditions.exe” that you can find in the "ECCO2 software package” you can download from DOWNLOAD section of our website and follow the instructions. This will install the “PLL Observing Conditions” ASCOM driver. Now you can start your astrophotography software and connect to the ECCO2 ASCOM driver by following the instructions provided with the third party software.

Please note that:

- *if you use the ECCO2 with a standard Windows 10/11 computer*, you can use the ECCO2 to monitor air temperature, humidity and pressure but you can’t control dew heaters power in the same way you can do with the EAGLE.
- *if you use ECCO2 with the EAGLE*, in order to use third party softwares you always have to connect the ECCO2 to the EAGLE Manager before starting the ECCO2 ASCOM driver.



When you use the ASCOM driver, in the first tab you will see the connection status:

- *If you connected ECCO2 to the EAGLE*, you will see the “Connected” status close to EAGLE and ECCO, here you don’t have to select a connection COM port since it’s automatically managed by the EAGLE Manager.
- *If you connected ECCO2 to a standard Windows 10/11 computer*, here you will have to select the COM port created by your computer when you connect ECCO2 to its USB port (you can check it in your Windows Device Manager).



If you click on the second tab icon, you will see all the environmental data as recorded by the ECCO2 sensors. If one of the T5, T6 or T7 shows no data and the circle is orange, you have to calibrate it:

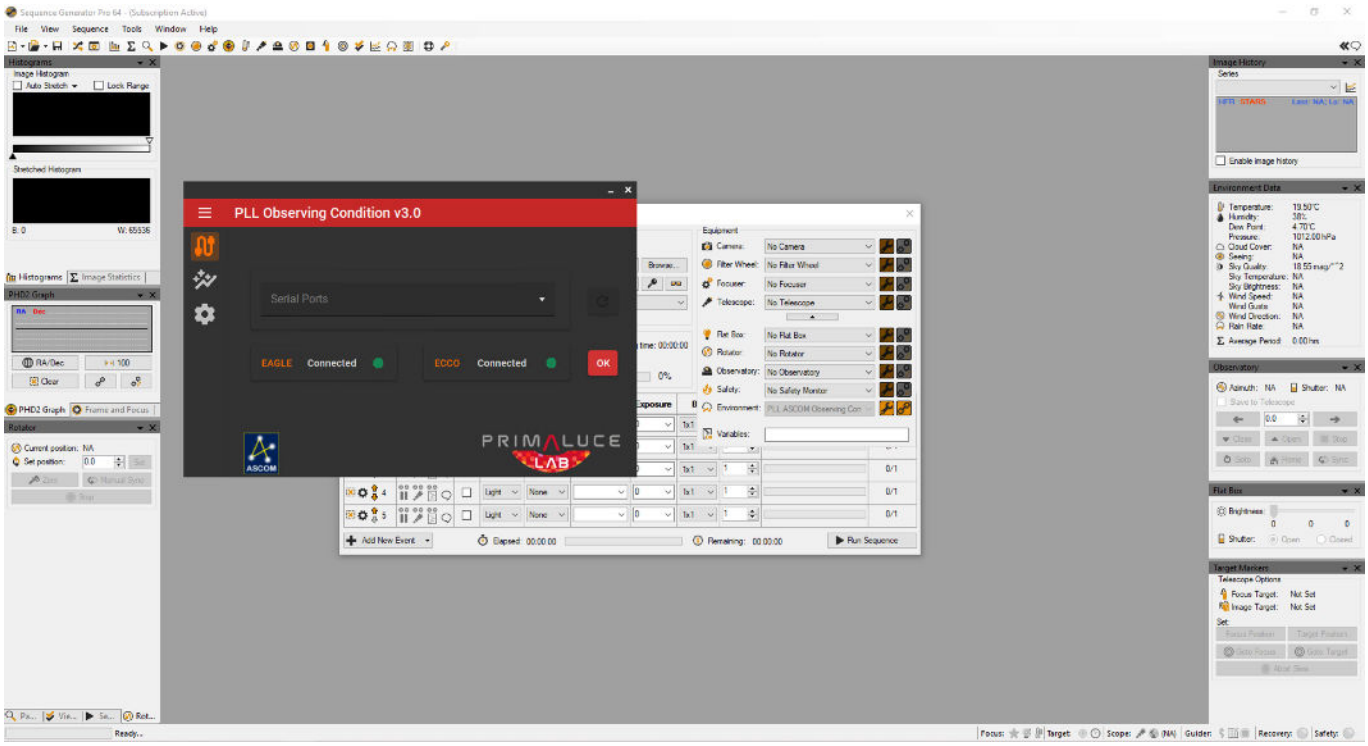
- *If you connected ECCO2 to the EAGLE*, the CALIBRATE button is greyed and you can make the calibration in the ADVANCED SETTINGS of EAGLE Manager.
- *If you connected ECCO2 to a standard Windows 10/11 computer*, you can make the calibration by pressing the CALIBRATE button in this window.



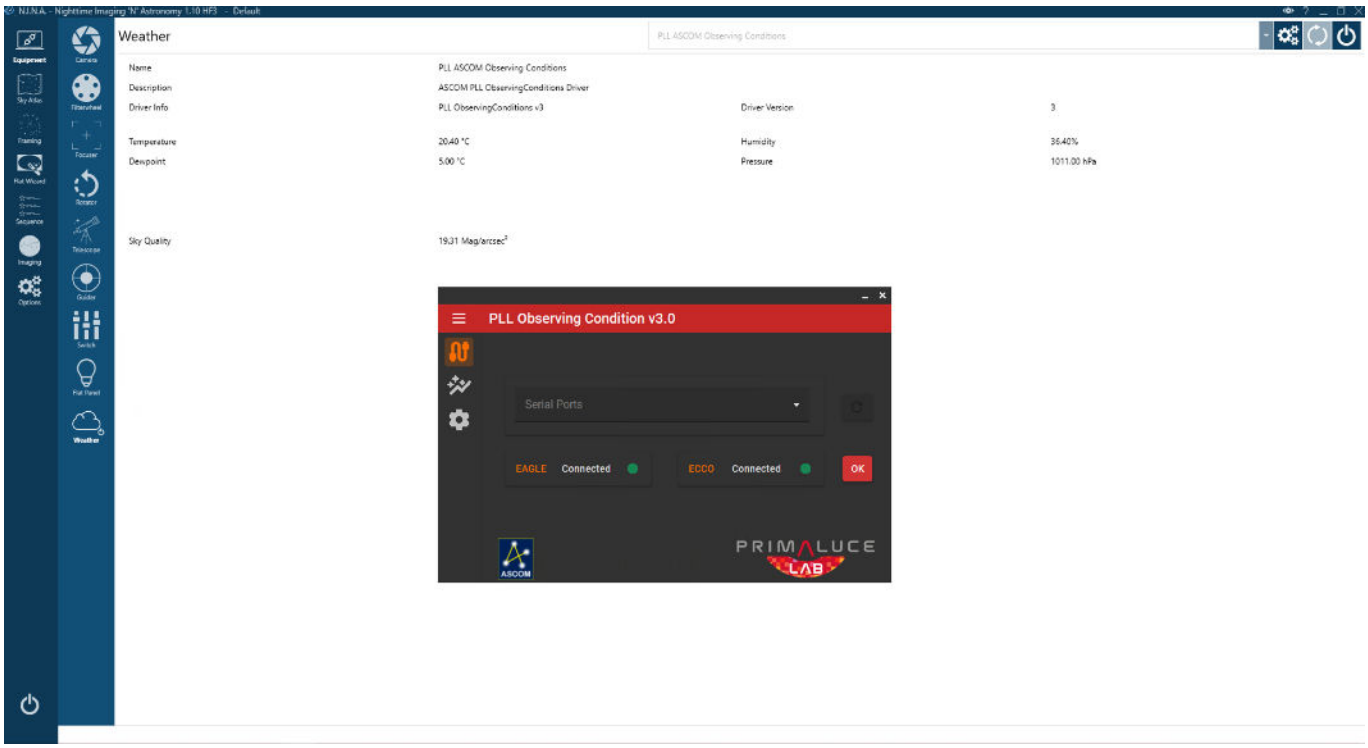
If you click on the third tab icon, you will see the Dark Mode option and the selector to save the log file (that can be useful to check functioning of ECCO2 ASCOM driver together with other softwares). About Dark Mode:

- *If you connected ECCO2 to the EAGLE*, the “Dark Mode” option is greyed and you can activate it in the EAGLE Manager.
- *If you connected ECCO2 to a standard Windows 10/11 computer*, you can turn ON or OFF Dark Mode with this switcher.

Let’s see now a few examples. If you want to connect ECCO2 to Sequence Generator Pro software, you can select “PLL ASCOM Observing Condition” driver in the Environment option of the “Sequencer” window. Press the Settings icon to view “PLL ASCOM Observing Condition” window and press the OK button to confirm. You can now press the Connect icon to start connection to ECCO2, you will see data in the “Environment Data” window of Sequence Generator Pro.



If you want to connect ECCO2 to N.I.N.A. software, you can select “PLL ASCOM Observing Condition” driver in the Weather tab. Press the Settings icon to view “PLL ASCOM Observing Condition” window and press the OK button to confirm. You can now press the Connect icon to start connection to ECCO2, you will see data in the Weather tab of N.I.N.A.



Troubleshooting

Q: When I click the ECCO button in the EAGLE Manager, the temperature probes readings are red and ECCO2 is flashing.
A: This means that the temperature probes are not calibrated. Please click on ADVANCED SETTINGS in the EAGLE Manager and click on CALIBRATE button.

Q: Temperature probes readings are red also if I previously calibrated.
A: It means that you connected the temperature probes to the wrong port number of the ECCO2. Please check numbers of the dew heater ports in the EAGLE and have them matched with the ones in the ECCO2.

Q: When I click on ECCO button in the EAGLE Manager, it doesn't connect.
A: If you see the "No ECCO found" after you press ECCO button, this may be related to 3 causes:

- *EAGLE Manager*: please make sure you are using the latest version of EAGLE Manager you can download from DOWNLOAD section of our website www.primalucelab.com

- *Driver not automatically loaded by Windows*: Windows may not properly load the driver when you connected ECCO's USB cable to your EAGLE. With the ECCO2 disconnected from the USB port, please go to Control Panel, then select Device Manager. Here you see the list of all the devices. Please connect ECCO's USB cable and you will see the list updating. If the new found device has a yellow mark, it means that the driver has not automatically loaded. Make a mouse right-click on it and select "Update Driver". In the new window select "Browse my computer for driver software", click on Browse button and select the folder where you previously unzipped the "ECCO2 software package" zip file, that includes also the system driver. This will manually install the ECCO2 driver, reboot your EAGLE and connect again to the ECCO2 in the EAGLE Manager.

- *Wrong driver loaded by Windows*: if in the Control Panel the COM device hasn't any yellow mark and it seems to be correctly loaded, the error may be related to a wrongly loaded driver. In this case please download the latest ECCO2 software package from our website https://www.primalucelab.com/astronomy/downloads and unzip the file in your EAGLE. Then connect the ECCO2 to the EAGLE, and enter Control Panel -> Device Manager. Select the device with COM port associated to the ECCO2 (if you're not sure what is the one associated to your ECCO2, just disconnect and reconnect the ECCO2 USB cable, you will see the list updating), make a right mouse click on it and select "Uninstall device". In the new window that opens, select the option "Delete the driver software for this device" and click "Uninstall" button to proceed. This will uninstall the COM device and the related driver. Disconnect ECCO2's USB cable from your EAGLE and connect again. Windows should automatically detect ECCO2 and install the new driver. You can now manually specify the folder address where you previously uncompressed the "ECCO2 software package" and, in particular, the "ECCO2 system driver" included in it.

Q: My telescope has dew on optics also if I use the ECCO2.
A: First of all please check that, when the dew point is higher than the tube temperature (and EAGLE Manager applies power to dew heaters) they warm up. If dew point temperature as calculated by EAGLE Manager by using ECCO2 sensors is lower than the temperature of your telescope as measured by the temperature probe, EAGLE won't provide power to dew heaters and that won't warm up your telescope.
In order to check that the automatic dew heater power works as expected, you can make a simple test. You can blow directly to the sensors of the ECCO2 (where you can see small holes on the side) and this will progressively increase the dew point temperature as shown in the EAGLE Manager. When dew point temperature will become higher than tube temperature measured by the probe, EAGLE Manager will start powering the dew heater. Temperature increase will be low but, if you can feel the temperature increase with your hand, this means the entire heating system works as expected.

If the dew heaters are fine and you still have dew on optics, we suggest you to increase (for example to 2-3 degrees) the DELTA value in the EAGLE Manager ADVANCED SETTINGS. DELTA is a temperature value in degrees that is added to the dew point temperature. The larger it is, the sooner the dew heater is powered.

INFORMATION TO USERS



According to art. 26 of Decreto Legislativo 14 marzo 2014, n. 49 "Attuazione della Direttiva 2012/19/UE sui rifiuti di apparecchiature elettriche ed elettroniche", the symbol of the barrel placed on the equipment or its packaging indicates that the product at the end of its useful life must be collected separately from other waste.

The user will therefore have to give the end-of-life equipment to the appropriate separate collection centers for electronic and electrotechnical waste or to return it to the reseller upon the purchase of a new type of equivalent equipment, one by one.

Properly differentiated collection for the subsequent start of dismantled equipment for recycling, treatment and environmentally compatible disposal helps to avoid possible adverse effects on the environment and health and favors the reuse and / or recycling of the materials contained in the equipment.

The abusive disposal of the product by the user implies the application of the administrative sanctions as per D.Lgs. 152/2006.

Compliance with the RAEE legislation (D.Lgs. 49/2014)
PrimaLuceLab is registered to AEE Register with number IT17030000009790
PrimaLuceLab adheres to Sistema Collettivo ERP Italia for the compliance to RAEE legislation.

European Recycling Platform

WARRANTY

1) The PrimaLuceLab product warranty is effective from the date of purchase and is valid only if it is with the invoice (or receipt) of purchase.

2) The warranty covers the product against defects in workmanship and includes the cost of the replaced material and labor.

3) The warranty does not cover any damage caused to the product or defects or failures that occur due to improper installation , improper use and/or deterioration due to normal wear.

4) THE GUARANTEE DOES NOT APPLY IN THE FOLLOWING CASES:
   - Repair by anyone not authorized by PrimaLuceLab .
   - Invasive interventions or tampering with internal and/or external parts.
   - Missing of the invoice (or receipt) of purchase.

TERMS OF SERVICE
Technical assistance is performed exclusively by PrimaLuceLab or its authorized resellers. All returns must be received with our permission (to be asked writing an email to support@primalucelab.com) . YOU HAVE TO add to the shipping the invoice (or receipt) of purchase and the detailed description of the defect. For products without the invoice (or receipt) of purchase, repair and shipping costs are always paid by the customer.