

Version 1.3

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PRODUCT MANUAL
BY PEGASUS ASTRO

Intro

Thank you for purchasing our products! **Prodigy Microfocuser** is a robust 3-inch robotic focuser which allows you to precisely and remotely control the focus of your telescope setup. Its sturdy mechanical design ensures that Prodigy Microfocuser can lift up to 10Kg of equipment, dead accurate and flexure free. Focuser has a 25mm of draw tube travel and a clear aperture of 76mm / 3-inch.

Focuser's drawtube accepts different types of optional telescope adapters such as Celestron SCT Edge, RC telescopes and refractors.

Prodigy houses 2 x USB2 switchable ports and 2 x 12V switchable power outputs that provide electric "juice" to your equipment close to the focuser (e.g Filter Wheel, Guiding camera etc).

CONTROLLER CARE

- Controller is protected from moisture but it is not waterproof and it should be kept clean and dry.
- Excessive moisture for long periods of time can damage electronics and connectors.
- Do not allow solvents or chemicals to come into contact with the device.
- Store controller indoor in a dry room when not in use for long time.
- Do not touch the internal components as they may get hot when in use.

DESIGN OVERVIEW

The images below show side views of the Prodigy Microfocuser.



What is in the box



Prodigy Microfocuser



2 x USB 2.0 Type-A male > USB 2.0 Type-B male (0.5 m)



2 x Power Cables (0.5 meter)



1 x USB 2.0 Type-A male > USB 2.0 Type-B male (1.8m)



1 x Temperature Sensor with stereo jack



M54 Male to M48 Male



M54 Male to M54 Male

OPERATING INSTRUCTIONS

- Plug the temperature sensor to the “**Sensor**” socket.
- Plug the USB cable to the “**PC**” socket.
- Plug any USB2 device to the dual stacked USB2 Ports. Same applies for the 2 x 12V Outputs.
- Plug the power cable into the “**12V DC IN**” socket.
- Device will boot and after three seconds is going to be fully operational.
- Download USB drivers, standalone software or ASCOM drivers from pegasusastro.com/support in order to connect to the device.

FOCUSER’S DRAWTUBE

Drawtube has a clear aperture of 3 inches or 76mm. It can travel up to 25mm.

Prodigy Microfocuser isn’t a Crayford neither a Rack & Pinion type. Its innovative mechanical focus design provides very high load support and accuracy with zero maintenance.

The focuser can easily lift up to 10Kg (22lb) of imaging equipment with zero flexure.

A limit sensor is engaged when the drawtube is fully inside the Prodigy’s body. Limit sensor allows the user to recalibrate focuser’s position to zero.

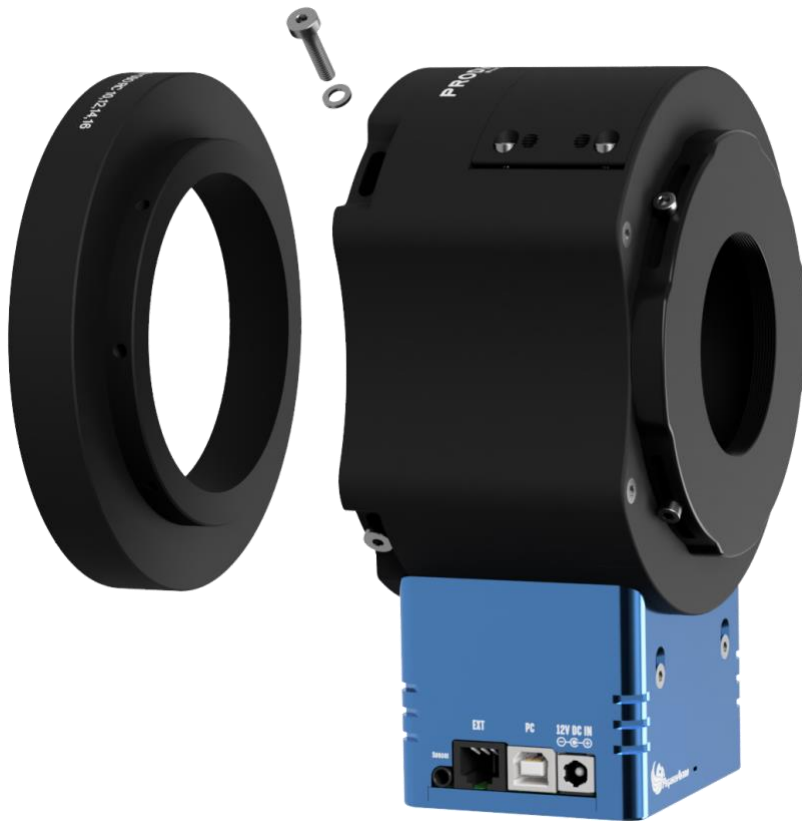
ADJUSTABLE ROTATION

Focuser allows adjustable rotation / precise orientation on both sides. This helps you to easily fit the microfocuser to your telescope and also place your camera with the desired orientation.



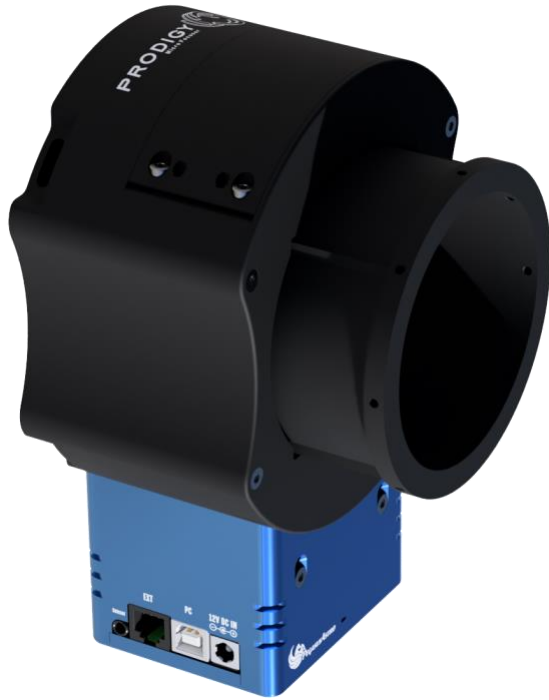
TELESCOPE ADAPTERS

Prodigy Microfocuser can accept different types of telescope adapters. The adapter can be securely mounted and aligned on user's preference.



- Celestron SCT Edge C11, C14 (SKU: PEG-PRDG-C11)
- GSO, Astrotech, Omegon, Altair, TS or similar **RC 10"**, **12"**, **14"**, **16"** (SKU: PEG-PRDG-GSO117)
- GSO, Astrotech, Omegon, Altair, TS or similar **RC 8"** (SKU: PEG-PRDG-GSO90)
- Takahashi ED-FSQ 85 – Coming soon
- Skywatcher ESPRIT 100 – Coming soon

CAMERA ADAPTER



Camera adapter (stock) is a M54 adapter. It can be easily replaced with a larger aperture adapter.

POWER INPUT

Controller accepts a voltage range from DC 11.0V – 15.0V *

We strongly recommend you use our certified “Pegasus Astro 12V/10A power supply”

- A 13.8V lead (or calcium/lead) battery is also recommended.
- Please use a power supply that can provide at least 2 Amps of current. If you utilize the USB and Power ports on the side of the focuser you might need up to 8 Amps of current.

Under no circumstance exceed DC 15.0V input as you might cause a severe damage to the electronic board

Controller has been designed with reverse polarity protection. If you accidentally reverse the power source polarity, the unit will instantly cut the power. The controller is fitted with a 2.1mm DC power connection (centre positive pin) which powers on the unit.

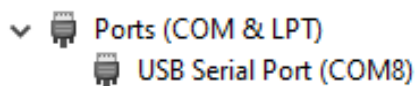
Insert the 2.1mm plug on the DC power cable. Controller will initialize and get fully operational after 3 seconds. *(The 3 seconds wait time duration is on purpose for a new firmware upload process).*



DATA CONNECTIVITY

A USB2 Type B port at the side of the unit accepts the USB cable for PC connection. It is strongly advised using a branded and shielded USB cable that does not exceed 5 meters /16ft. Plug one end into a spare USB 2.0 port on the computer or USB Hub, the other end into the USB type B receptacle on the controller labelled USB-PC.

Controller will be identified as “*Prodigy MF revX*” and a “USB Serial Port COMx” will be appeared to the device manager of Windows, under Ports (COM & LPT).



Each device gets a unique serialized COM number (e.g: COM8) so you can simultaneously plug to your PC as many focusers as you need.

EXTERNAL PORT (EXT)

The controller is fitted with a RJ45 Female Jack for auxiliary usage. In this socket you can **ONLY** plug the optional EZY Focus Hand Controller.

IMPORTANT NOTICE:

DO NOT CONECT ANY MOTOR OUTPUT OF AN EXTERNAL CONTROLLER SUCH AS ULTIMATE POWERBOX OR DUAL MOTOR FOCUS INTO THE RJ45 PORT. THIS WILL CAUSE SEVERE DAMAGE TO THE DEVICE.

TEMPERATURE SENSOR

The external probe is temperature measurement device which is attached to the controller. It comes with length of 0.6m cable with a mini stereo jack. Probe measures temperatures from -55°C to +125°C.

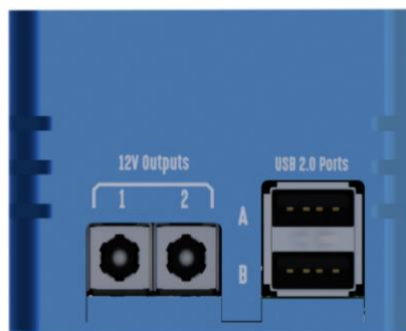
Accuracy of the probe is $\pm 0.5^{\circ}\text{C}$ from -10°C to $+85^{\circ}\text{C}$. The controller instantly detects during startup the presence of the probe and requests temperature readings every 30 seconds.

When using multiple controllers and probes, the reported temperature may differ slightly between units due to small differences between individual sensor readouts. This does not affect the operation of the units, as they respond to measured temperature change, not to the actual temperature.

Please notice that you have to connect the sensor before you power on the controller. You can also connect it later but you will need to wait for 15-30 seconds for sensor auto-detection and calibration

12V POWER OUTPUTS

On the right side of the Prodigy Microfocuser there are two (2) 12V DC unregulated outputs. These power outputs are driven by a dual channel smart mosfet, capable to deliver up to 8 Amps of current (in total). This mosfet incorporates a broad range of smart features like diagnose and protection. The 12V Channel can be switched ON/OFF via software. Each 12V power output has the following specification:



Voltage type	Current	Output Port
12V-13.8V DC unregulated	4 Amps max (each)	2.1mm DC Power Jack / Center Positive

DUAL PORT USB2 HUB

Prodigy Microfocuser includes an industrial grade USB hub IC capable to deliver 2 x USB2 High Speed ports. These dual stacked ports exist on the side of the Prodigy. Both USB ports are controllable and can be switched ON/OFF via supplied software.

These USB ports allow the connectivity of equipment close to the Prodigy focuser such as a Filter Wheel, a guiding camera, a motorized OAG etc.

MOTOR OPERATION

Prodigy Microfocuser has an embedded stepper motor. Its rotation is driven via a belt and pulley system to the focuser's drawtube. Stepper motor design ensures a smooth, low noise and **backlash free** operation. V-Curve points during automatic focus procedure are dead accurate.

- Focuser has been (factory) configured to perform position steps from 0 -> 11000
- Each step movement is 0,0227 mm / 2.27 micron

RESET WATCHDOG

A hardware watchdog resets the device if for any reason there is no response from the controller after two (2) seconds. A neat feature in the unlikely event of a microcontroller freeze – when have a remote observatory and you need to be sure that everything works as expected.

OPERATION LED

A red colored LED is fitted on the centre of the Prodigy enclosure. Every time the motor is moving the LED lights on to indicate that Focuser is sliding in or out. When motor is idle, led turns off to avoid any light reflection inside the focuser.

RECOMMENDATION

- It is advised to select and use good quality and short-length USB cables.
- Do the same for power cables. Long and thin power cables will have an effect of voltage drops. This can cause issues to your camera (CCD or CMOS) image quality or mount tracking.

- Make sure you use a good quality DC input socket with a thick power cable (1.5mm each pole). Verify there are no gaps that can cause power disconnect
- Do not loop USB or power cables. This might cause issues in communication.
- Pay extra attention if you are using a “step up voltage converter” in the DC input. You need at least 6 Amps to power all of your devices. (We don’t recommend step up converters – buy a good battery or a check our certified 12V/10A power supply).

WARRANTY

We provide 2-years warranty for this product. We will offer the repair service for free or replace the item for free if the unit does not work properly within the warranty period. After the warranty period, we will continue to provide repair support and service on a charged basis. This warranty does not apply to damage that occurred because of abuse or misuse, or damage caused by a fall, or any other accidental failures after purchase. The customer must pay for shipping when shipping the unit back for repair or replacement. If you get a faulty unit, please contact us as soon as possible through email: support@pegasusastro.com

Please describe the problem in detail, and we will do our best to solve the problem. Most instances are perceived problems which are caused by a bad driver install or software configuration.

TECHNICAL SPECIFICATIONS

Supply Voltage	DC 11-14V / 1.5 Amps minimum current
Motor Compatibility	Stepper Motor is inside the enclosure
Motor Output	None (Stepper Motor is in the enclosure)
Motor Specification	Bipolar stepper motor with internal pulleys / belt reduction system
Motor Backlash	Zero (0) *Belt/pulley system ensures zero backlash
Drawtube retraction	25mm / 11000 steps
USB Connectivity	USB 2.0 Type B plug
Power Outputs	2 x 2.1mm DC Outputs / 4 Amps each / Switchable ON or OFF
USB2 Outputs	2 x USB2 Type B Outputs / 1Amps each / Switchable ON or OFF
Thermal Sensor Resolution	9-bit Celsius temperature measurements – External Sensor with stereo plug
Power Input Connector	2.1mm Centre Positive Socket / 10 Amps maximum current
Dimensions	115 mm x 176 mm x 80mm
Weight	1470 grams

MAINTENANCE

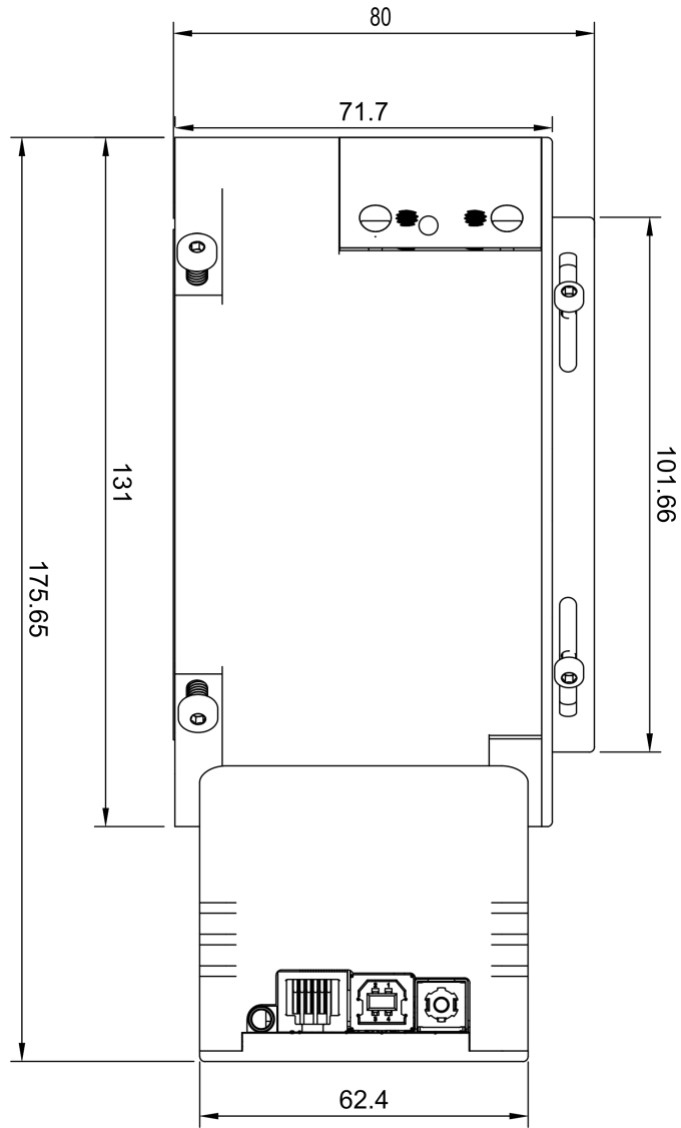
Prodigy focusers require very little maintenance. The focusers should be kept clean to prevent dust and dirt to accumulate on the tracks. If the tracks are found to be dirty, clean with a soft cloth. The focuser should not be subjected to temperatures $> 80^{\circ}\text{C}$ (176°F). This is the max temperature for the grease specification used.

The focuser is greased for lifetime. After years of intensive use, the lubricating grease may solidify. However, even solidified grease will not have any significant affect on the function of the system. Re-greasing is recommended to the lead screw and the roller tracks on the pressure plate. You can fully retract the focuser's drawtube and access / re-lubricate the lead screw. Move the focuser in and out a couple of times after relubrication to apply grease to the full moving path of the lead screw.

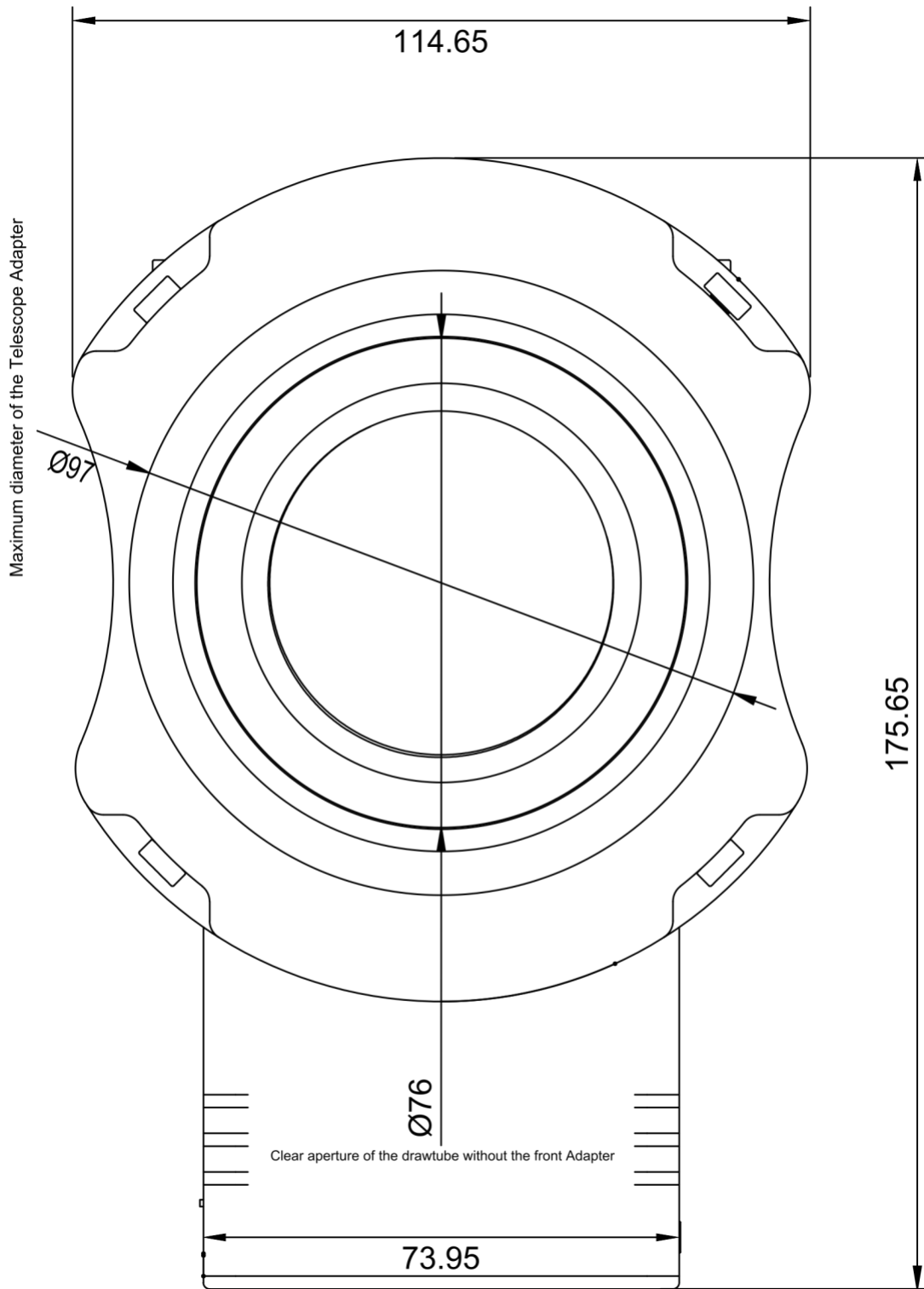
The color anodizing of the focuser is as resistant to aging as possible using state-of-the-art methods of electro-plating. The color, nevertheless, may change slightly if it is exposed to UV-radiation for years.



DIMENSIONS DRAWING



Please note that backfocus is 80mm (when drawtube is fully inside) without any telescope adapters. When you place a telescope adapter the total backfocus increases.



Designed and Assembled in Greece