

VERSION 1.1

JULY 1, 2020



## FALCON ROTATOR

PRODUCT MANUAL

BY PEGASUS ASTRO

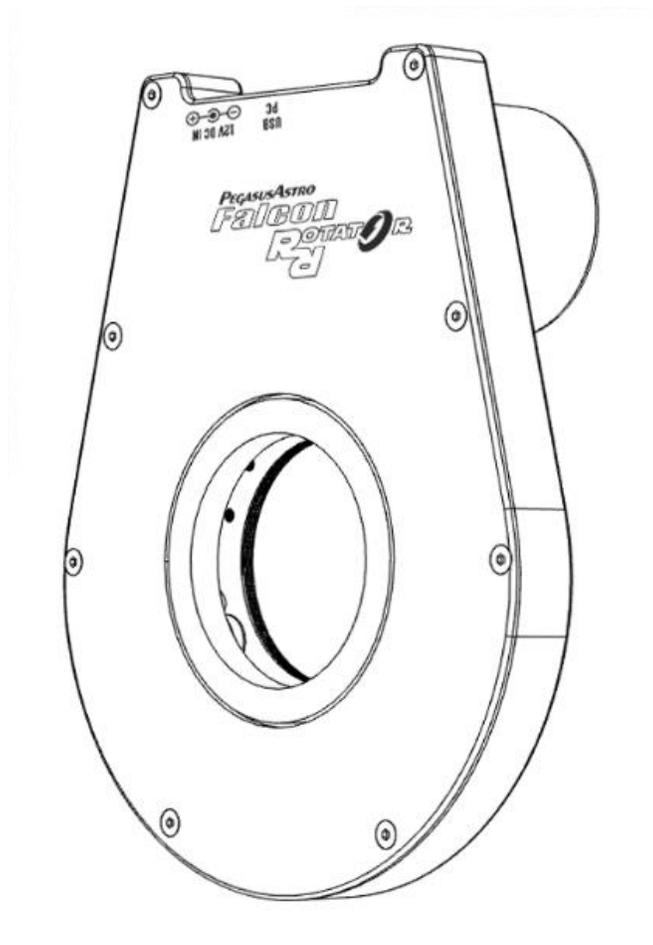
## INTRO

Thank you for purchasing Pegasus Astro – Falcon Rotator. Falcon Rotator is a light-weighted, low profile camera field rotator. Do not be fooled by its thin size! It can lift and handle heavy image trains – dead accurate! Very easy to operate via ASCOM drivers or standalone software will make your life easier to automatically adjust with precision your camera field.

## DEVICE CARE

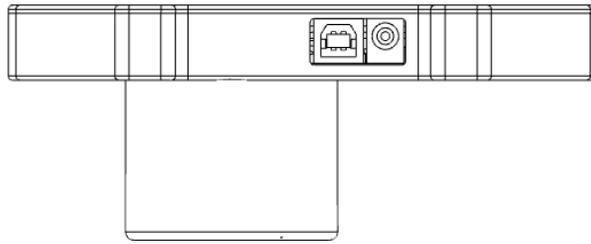
- Rotator electronics are protected from moisture but it is not waterproof and it should be kept clean and dry.
- Excessive moisture for long periods of time can damage electronics and connectors
- Do not allow solvents or chemicals to come into contact with the device
- Store rotator indoor in a dry room when not in use for long time
- Do not open the rotator lid.

## DESIGN OVERVIEW

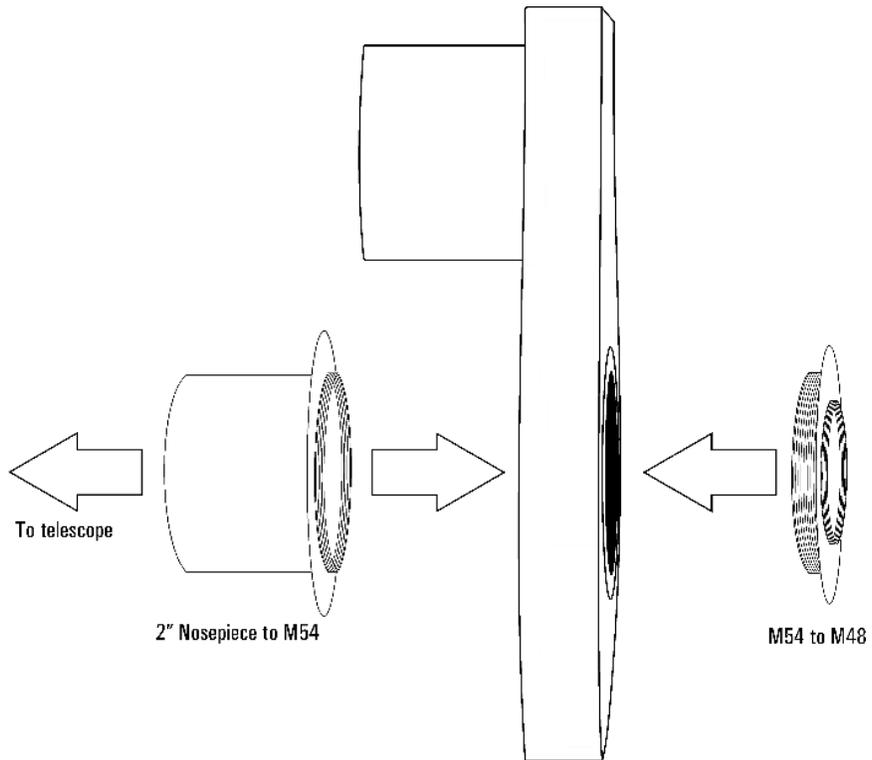


**Bottom View**

From left to right: USB2 TypeB Socket, 12V DC Input Socket (center pin positive)



**Adaptation to telescope**



<p style="text-align: center;"><b>What is inside the box</b></p>	<p style="text-align: center;">1 x Falcon Rotator</p> 	<p style="text-align: center;">1 x M54 male to 2" Nosepiece</p> 
<p style="text-align: center;">1 x M54 Male to M48 Male Adapter</p> 	<p style="text-align: center;">1 x USB2 Type B cable (1.8m)</p> 	<p style="text-align: center;">1 x Cigarette lighter adapter to DC 2.1mm plug</p> 

## OPERATING INSTRUCTIONS

- ⇒ Please check orientation of rotator displayed at the above image (USB and Power Cable on top).
- ⇒ Attach both M54 adapters to rotator body (one adapter on each side).
- ⇒ Attach the rotator to your telescope and to your imaging setup (camera / fitter wheel / OAG etc).
- ⇒ Plug the USB2 cable to the rotator and to your computer.
- ⇒ Plug the power supply (battery or power pack) into the "12V DC IN" socket.
- ⇒ Download USB drivers, standalone software or ASCOM drivers from [pegasusastro.com/support](http://pegasusastro.com/support) in order to connect to the device.

**Important Note:** Please make sure that all of your cables are loose enough to allow a half rotation.

## POWER INPUT

Rotator requires DC 12V – 13.8V in order to drive with precision its stepper motor. We strongly recommend to use our branded low ripple power supply unit of **12V DC**. A 13.8V lead (or calcium/lead) battery is also recommended. Please use a power supply that can provide at least 1 Amp of current.

**Under no circumstance exceed DC 18V input as you will cause a severe damage to the internal controller**

Unit has been designed with reverse polarity protection. If you accidentally reverse the power source polarity, the unit will cut the power. The rotator is fitted with a DC 2.1/5.5mm (centre positive) power connector.

## DATA CONNECTIVITY

A USB2 Type B port at the top of the unit accepts the USB cable for PC connection. A 1.8m USB2 type B cable is supplied in the package

## BACKFOCUS DISTANCE / CLEAN APPERTURE

BackFocus distance / Thickness of the Falcon Rotator is 18mm / 0.7". Both openings of the rotator are M54 threaded.

## RATED LOAD

Falcon Rotator has been tested with 6Kg / 13.2lbs of imaging setup. The 6 stainless steel branded bearings can easily handle higher payloads with zero flexure.

## BUILT IN LIMITS

Rotator has two limit sensors. One at 0 degree and another one placed at 200 degrees. Currently, rotator firmware does not enforce the 2<sup>nd</sup> limit position and it can move a 200 degrees limit. User can initiate rotator to find the zero limit and set the zero position by the supplied software. (please check software section of manual)

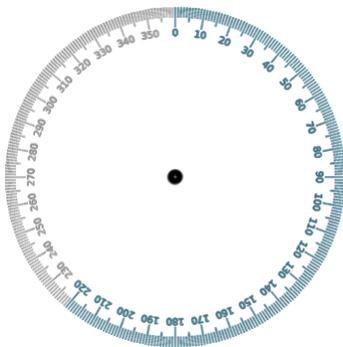
## ROTATOR MOVEMENT

(Requires firmware version >= 1.2)

Rotator can perform two movements:

- ⇒ From 0 -> 220 degrees (clockwise)
- ⇒ From 0 -> 220.1 degrees (anticlockwise)

Please check the image below for available movements (Blue degree index is the clockwise / **Black Index** is the Anticlockwise)



This firmware setup prevents cable stretch / loop which can damage plugged imaging cords (USB / Power).

Rotator can move to any degree (with **at least 1 decimal point accuracy** – current firmware) and automatically decide in which direction motor should be driven to precisely rotate your camera to designated degrees.

**Important note:** Rotator current position is automatically stored into memory after 10 seconds of each movement inactivity. This allows the rotator to remember the last position during startup / power reset.

## DE-ROTATION SUPPORT FOR ALT/AZ MOUNTS

Rotator has the step precision to support rotation compensation on an ALT-AZ mount. It requires firmware version  $\geq 1.2$ .

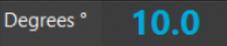
Software which calculates the Rate of Rotation (RoR) of a sky object will be available soon. (under heavy testing).

## RESET WATCHDOG

A 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.

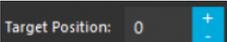
## SOFTWARE

### CONNECT TO ROTATOR

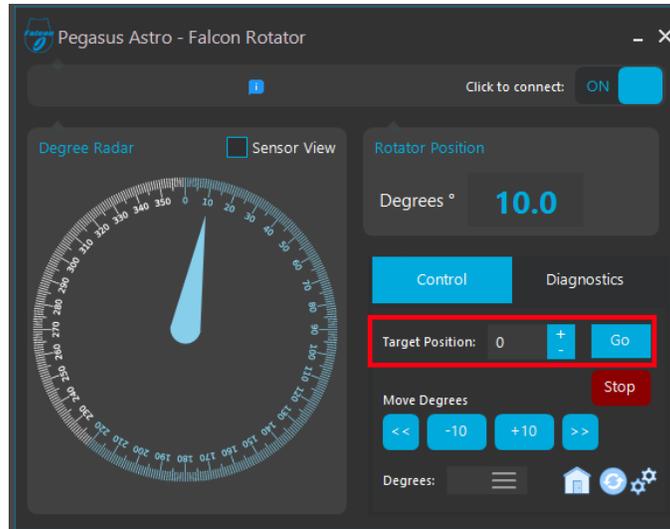
- ⇒ Open Falcon Rotator Software and Click button  on the top right corner to connect with Falcon Rotator
- ⇒ You can observe degree position of the rotator 



### MOVE TO A NEW TARGET POSITION

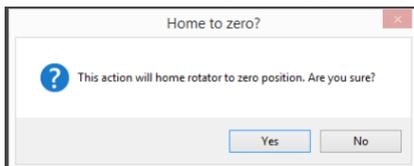
- ⇒ Type the degree number  and click "Go"  button.

⇒ Rotator will start moving towards that position.



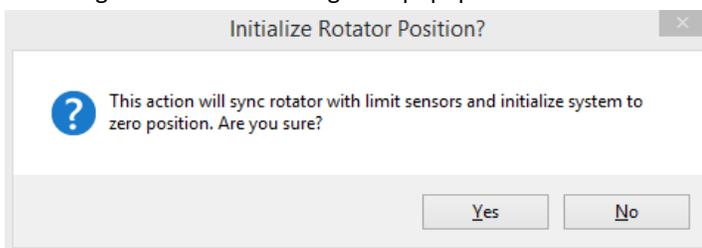
## MOVE TO ZERO POSITION

- ⇒ Click “Home”  button at the bottom of the software to move rotator to zero position.
- ⇒ Confirmation message will appear. On Yes, rotator will be moved to zero position.



## INITIALIZE ROTATOR TO ZERO LIMIT

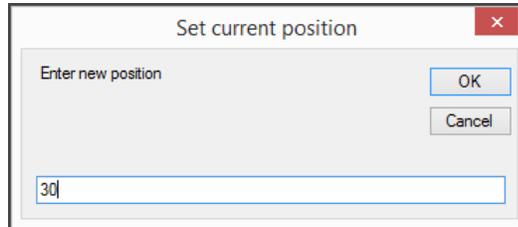
- ⇒ This action is required **only** if rotator has lost the zero limit point.
- ⇒ Click “Sync”  button.
- ⇒ Following confirmation message will popup



- ⇒ On yes, the rotator will start moving anticlockwise (reverse) until it senses / reaches the zero limit. When the limit is found, **rotator will mark this position as the zero degree point.**

### MANUAL SYNC ROTATOR TO A PREDEFINED DEGREE

- ⇒ This action enforces rotator to synced manually to a predefined degree number.
- ⇒ Click Gear  icon
- ⇒ Following message will appear asking for the new degree position. (in our example we set 30 degrees)



- ⇒ On OK rotator will sync its position to 30 degrees. (Please note: **Rotator will only sync – it will not move the motor**)

### ASCOM DRIVER

- ⇒ Please download available ASCOM driver from our support website.
- ⇒ Software should remain open as it communicates with ASCOM driver and translates all ASCOM commands to the rotator commands.
- ⇒ ASCOM supports multiple clients connected to the rotator

### DIMENSIONS



Size (Width, Depth, Height)	180mm x 140mm x 56mm
Weight	700gr / 1.54 lbs

Backfocus	18mm
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## FREQUENTLY ASKED QUESTIONS

Question	Answer
How many Kg can the Falcon Rotator lift	Falcon Rotator has been tested with 6Kg / 13.2lbs of imaging setup
I would like to use the Falcon Rotator to my remote observatory. What if the device freezes for some reason?	Device has a hardware watchdog and resets itself if the microcontroller is not responsive after 2 seconds
My observatory is in a very cold place. Is there any issue with the electronics of the device?	All electronic components were selected to support temperature ranges from -40 to +80 °C.
What if I accidentally reverse polarity?	Falcon Rotator has a reverse polarity protection input.
Can I upgrade the firmware?	Of course, device has been designed to support firmware upgrade for future features or bug fixes.

**Device is covered by two (2) years warranty**

**Designed and Assembled in Greece**