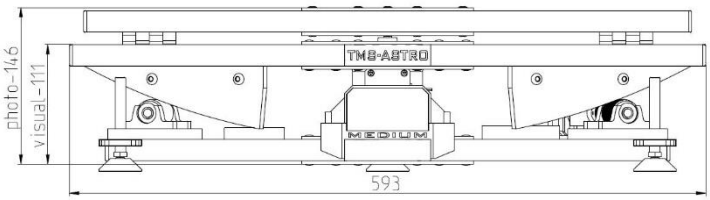
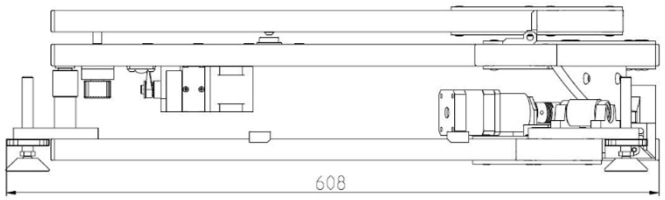
TMS-ASTRO

Aluminium EQ-PLATFORM

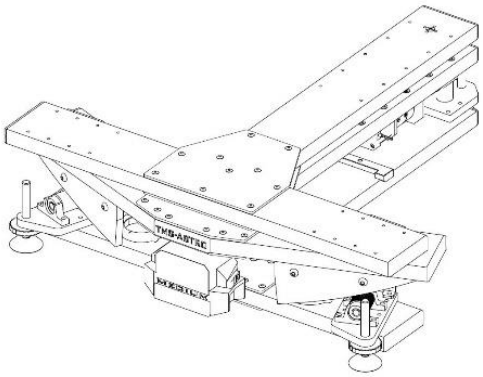
user manual V4.1.1





Technical data:

	visual	photographic
dimensions	593x608x111 mm	593x608x146 mm
weight	6,2 kg	9 kg
operating voltage	12-17 Vdc	
power consumption	250 mA	500 mA
load capacity	75 kg	70 kg
tracking time	60+ min.	



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What an equatorial platform is

An equatorial platform is a sophisticated device designed to enhance the functionality of Dobsonian telescopes by compensating for the Earth´s rotation. By precisely tracking celestial objects as they move across the night sky, equatorial platforms enable prolonged observation sessions without the need for constant manual adjustment. This revolutionary technology aligns the telescope´s axis with the Earth´s rotational axis, allowing amateur and professional astronomers to observe objects with unparalleled ease and accuracy.

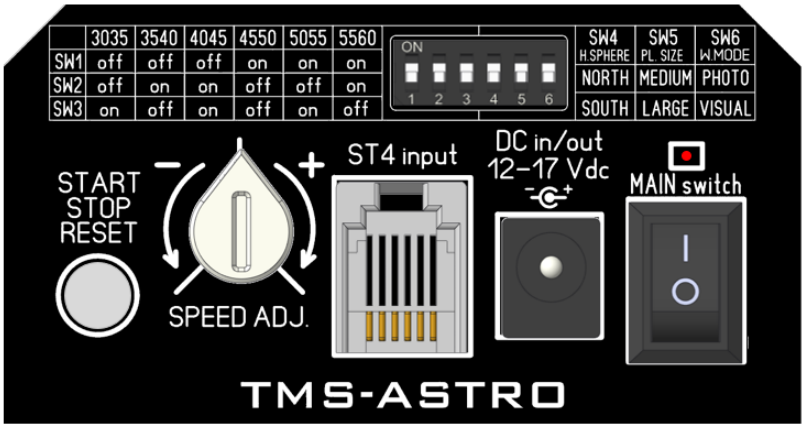
Main features

- lightweight construction; the platform is made from aluminium and plastic
- compact size which fits to the most popular telescopes
- ultra silent operation
- electrical and mechanical overrun protection to ensure the telescope to not fall off the platform
- programmed tracking speed which can be modified by ±3% with a potentiometer
- automatical reset function which provides a very comfortable usage
- built in compass and spirit level for coarse polar alignment
- polar alignment assitant routine makes easier to check alignment
- beep- and light feedback from any movement
- DIP switches to configure the platform
- wide range of power supply (12-17 Vdc)
- ST4 autoguider input for astrophotography
- low power consumption
- high load capacity
- 60+ min. tracking time

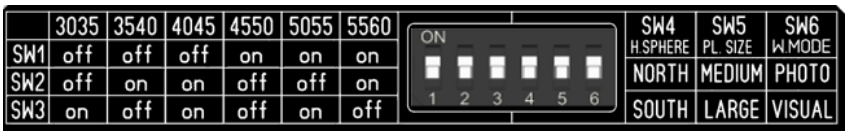
What's in the package

- one eq-platform with one pair of segments
- 3 ajustable feet
- 3 plastic fixtures
- 6 screws

The controller



DIP switches



The DIP switches on the top of the controller's front plate allow you to configure all necessary settings.

- Switches #1–3 are responsible for setting the tracking speed for the specific segment.
- Switch #4 selects the hemisphere based on the location.
- Switch #5 determines the size of the platform.
- Switch #6 selects the operating mode

Note: The photographic mode is only active if the declination axis is connected.

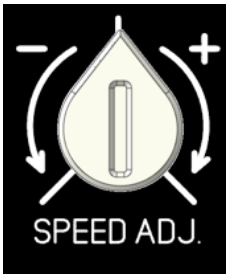
Multifunctional pushbutton

The multifunctional pushbutton allows you to interrupt all movements with a short press. When the button is pressed, the controller enters standby mode. In this mode, there are two options:

- A short press starts the tracking routine.
- A long press starts the homing routine.

To activate the polar alignment assistant routine, follow these steps: press and hold the pushbutton, then switch on the controller. The controller will begin homing the RA axis. Once homing is complete, a short press of the pushbutton will move the top plate to the opposite position.

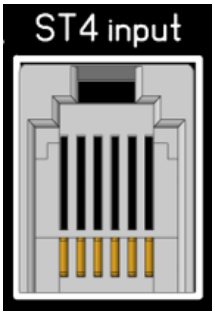
Speed adjust knob



This knob allows you to adjust the tracking speed by ±3%.

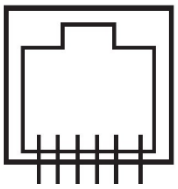
Note: speed adjustments cannot compensate for insufficient polar alignment.

Autoguider port



Autoguider port allows you to connect your guider to the controller. Autoguider speed is 1x starspeed.

Note: pay close attention to the pinout!



1 – NC
2 – GND
3 – RA+
4 – DEC+
5 – DEC-
6 – RA-

DC in/output

There are two DC input/output ports: one located on the front side of the controller and another on the back side.

Note: pay close attention to the pinout!

Main switch and LED

The main switch allows you to turn the controller on and off. The LED above the main switch indicates the current status of the controller.

- The LED is on continuously → Tracking routine.
- The LED is blinking evenly → Homing routine.
- The LED flashes briefly and stays off for a longer duration → Tracking time is over. The controller is waiting for a button press or will start the homing routine after 12 seconds.
- The LED stays on for a longer duration and turns off briefly → Movement interrupted by the pushbutton. Waiting for action.
- The LED is blinking rapidly → An incorrect segment has been set.

Beside the LED there is a buzzer too to inform you about the operation.

- 2 short beeps → controller started succesfully.
- 1 short beep → homing/tracking routine is started / pushbutton pressed / end position detected
- 3 short beeps → tracking time is over
- 5 short beeps → an incorrect segment has been set

How the platform works

- In visual mode, after the controller is turned on, the top plate moves to the start position, and the tracking routine starts automatically.

  If the tracking time is over, a beep signals this, and the controller waits for 12 seconds. If no button activity occurs during these 12 seconds, the top plate moves back to the start position, and the tracking routine restarts.

- In photo mode, after the controller is turned on, the declination axis moves to the home position and, once it reaches it, moves back to the middle position. At the same time, the RA axis begins its homing routine. If both axes reach the start position, the tracking routine starts.
  If the tracking time is over the process is the same as in visual mode.

Polar alignment

The built-in compass and spirit level help to roughly align the platform.

Note: You need to account for your location's declination.

You can check this here: https://www.ngdc.noaa.gov/geomag/calculators/magcalc.shtml?#declination

The platform is designed to the middle of the range of the segment. For example, the model 4045 was designed to 42.5°. If the bubble of the spirirt level is in the middle, then the platform is aligned to the middle of the segments range.

Precise polar alignment

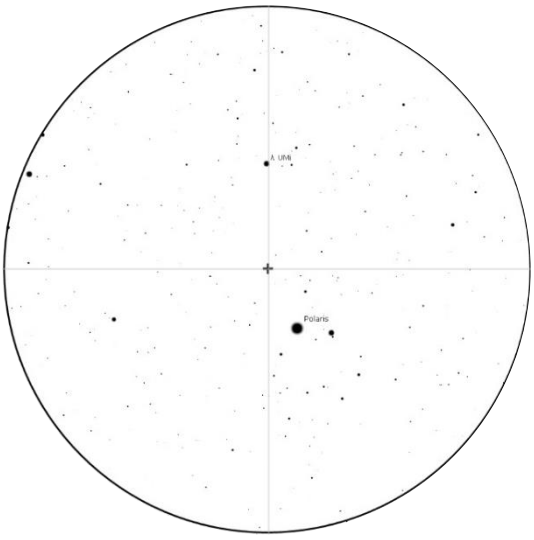
To achieve precise polar alignment, follow these steps:

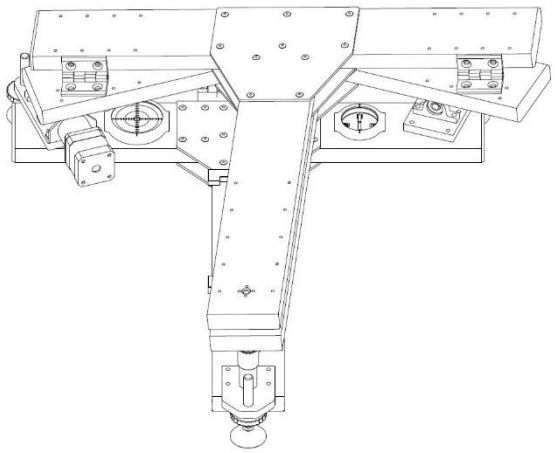
1. Place and align the platform using the compass and spirit level.
2. Mount the telescope onto the platform.
3. Start the alignment assistant routine. Refer to the multifunctional pushbutton section for detailed instructions.
4. Wait until the top plate reaches its end position.
5. Aim the finder scope's crosshair at the pole (not Polaris) and press the pushbutton.

6. The top plate will then move to the opposite end position. Observe the motion in the finder scope during this process. If the crosshair remains on the pole, no further adjustments are needed, and the alignment is complete.

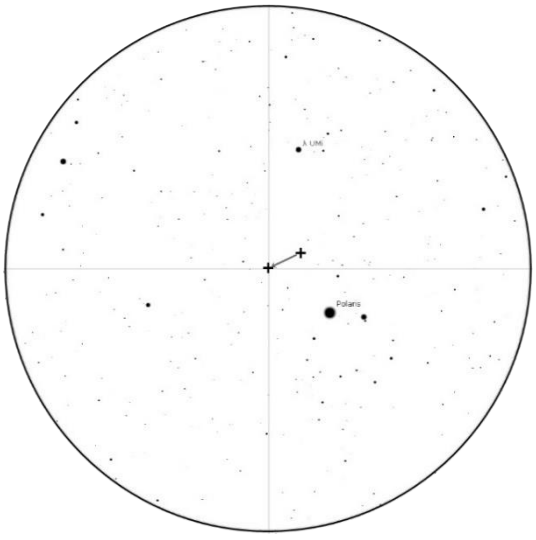
In case the movement is too large:

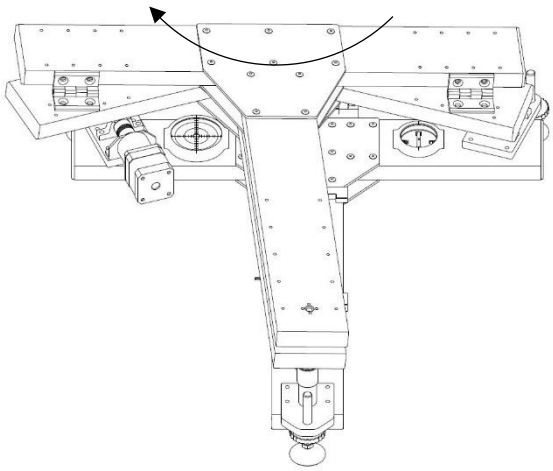
The top plate is at the end position (in this case, on the east side), and the finder scope's crosshair is pointed at the pole.



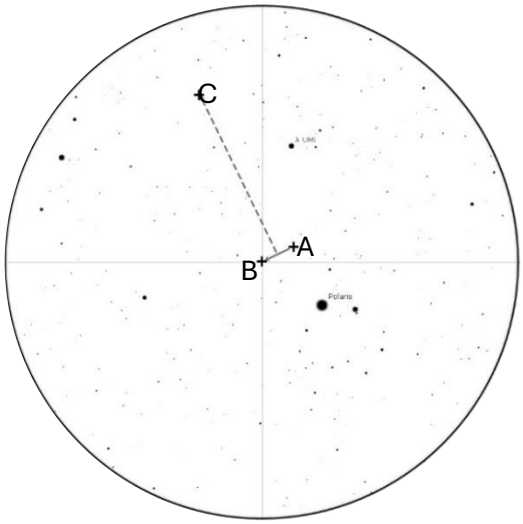


For example, the finder scope's crosshair moved as shown in the picture below. (Left and down)





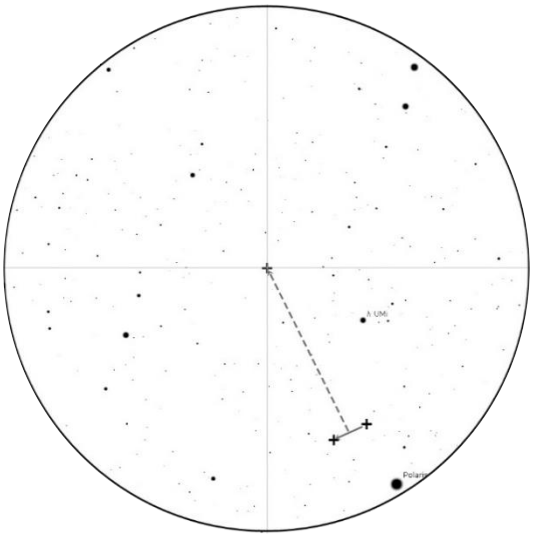
The top plate moved from east to west, causing the rotation in the finder scope's field of view to be clockwise (CW). In this case, it means the platform is rotating around a point located somewhere above and to the left of the pole. Below you can find the method to calculate the exact position of it.

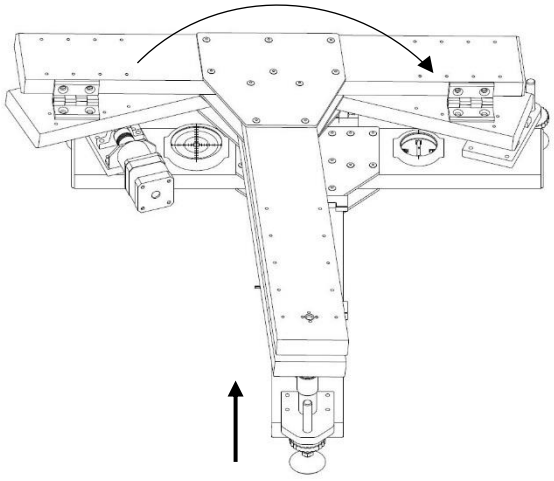


We have two points: the pole (A) and the point where the crosshair moved (B). Both points lie on the same arc. The center of this arc is the true rotational center of the platform (C). Our goal is to move that center precisely to the pole.

The midpoint between points A and B, along with point A and point C, forms a right triangle. The ratio between the two legs of this triangle is approximately 4:1. This gives us the true center of the platform's rotation.

Next, aim the finder scope's crosshair at this point. Keep the telescope stationary and adjust the entire platform with the telescope until the finder scope's crosshair aligns with the pole. Then, lift the back side (or lower the front side) of the platform and rotate it as needed.

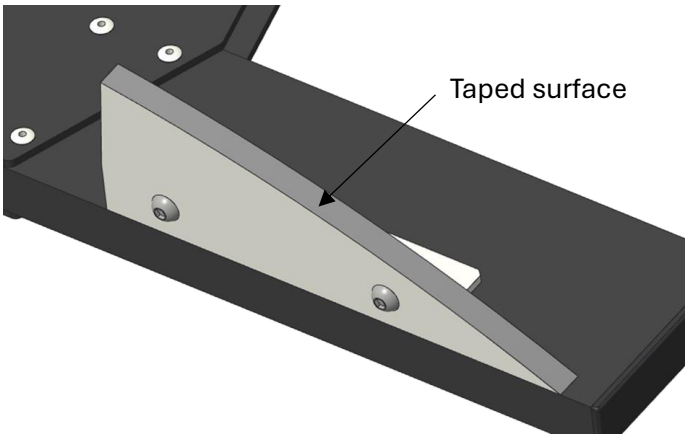




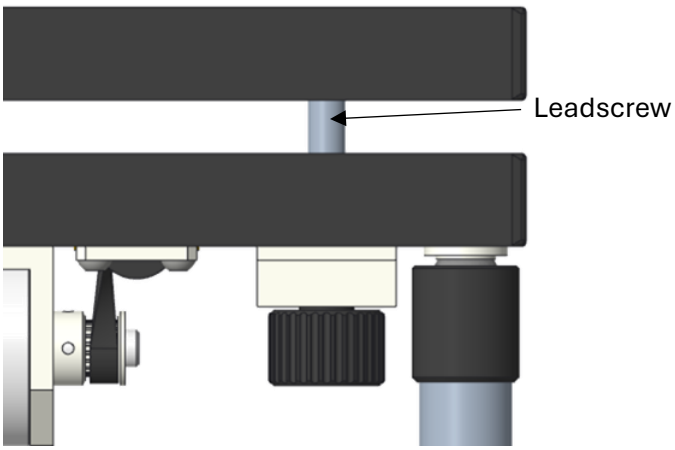
Re-check the alignment and repeat the procedure if further correction is needed.

Maintenance

For better grip, a piece of duct tape is applied to the segment on the side of the drive wheel. Check it frequently and replace it if it becomes worn. Duct tape can be used for this purpose.

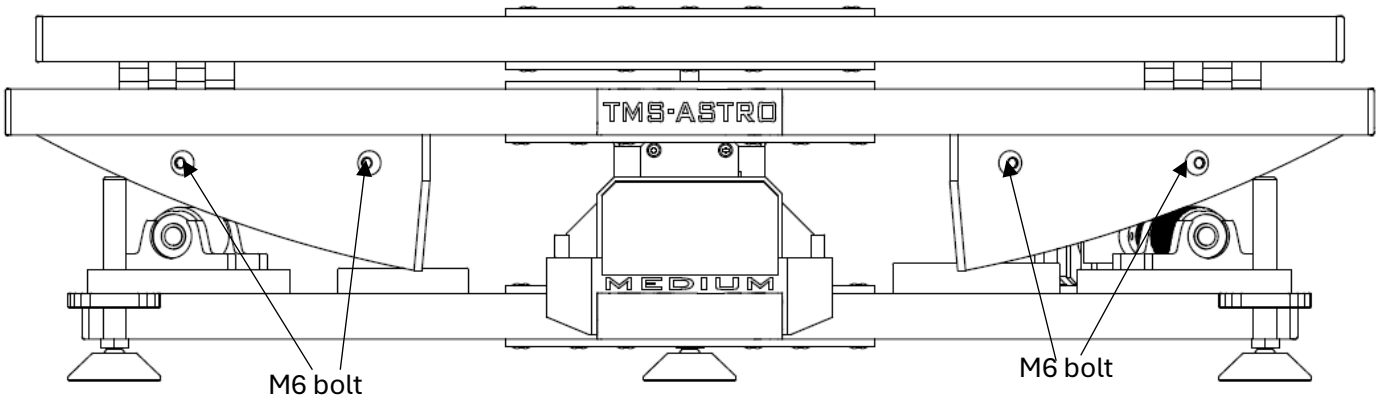


The leadscrew on the declination axis of the photographic platform should be greased. Check it regularly and apply new grease if needed.



Segment change

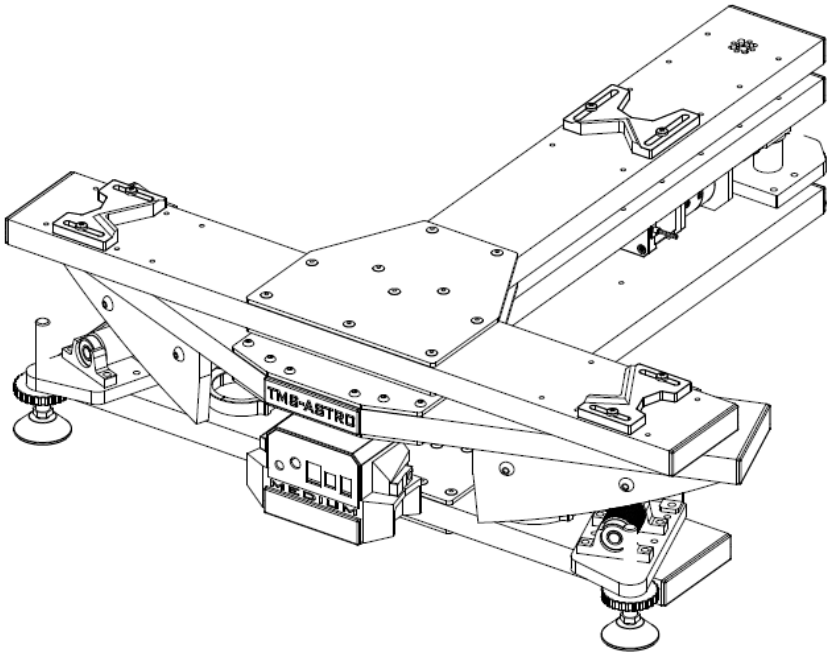
To replace the segments, unscrew the 2x2 bolts and remove the segment. Place the new segment in its position and screw the bolts back in. Make sure to tighten them securely!



Fixation of the telescope

Use the 3 plastic fixtures and screws to attach them to the top side of the platform. They help prevent the telescope from sliding sideways.

If your telescope has rubber feet, these fixtures may not be necessary.



Attention!

On the rear side of the platform, there is a spherical joint.

The shaft on the top plate must fit perfectly into it.

Make sure to check it before each observation!