

Paramount OTA Ring and Paramount Taurus OTA Installation Instructions

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Introduction

This document describes how to attach a variety of optical tube assemblies (OTAs) to the Paramount Taurus equatorial fork model mounts.

Software Bisque also manufactures precision OTA mounting rings for:

- 14-inch Celestron C14 Schmidt-Cassegrain (SCT) OTAs
- 14-inch Rowe-Ackerman Schmidt-Astrograph (RASA) OTAs
- Meade 16-inch SCT OTAs

The rings are compatible with:

- Paramount Taurus 400 equatorial fork mounts
- Paramount ME II German equatorial mounts (GEMs)
- Paramount MX/MX+ GEMs

Please review Table 1 and the steps to determine which sections apply to your setup.

Getting Started

Table 1 lists the apertures of many common commercial telescopes, and the accessories or bracketing hardware that is required to attach an OTA of this size to the Paramount.

An optional *Paramount Taurus Dovetail Plate* can be used to mount optics or other instruments to the OTA itself.

OTA Aperture (in/cm)	Paramount ME II	Taurus 400	Taurus 500	Taurus 600	Taurus Accessory Dovetail Plate Compatible?
24/61	Large Dovetail Accessory	n/a	n/a	Taurus 600 Brackets	Yes
20/51	Large Dovetail Accessory	n/a	Taurus 500 Brackets	n/a	Yes
17/43	Standard Versa-Plate Dovetail	Taurus 400 Brackets	n/a	n/a	Yes
14/36 SCT	Standard Versa-Plate Dovetail	Celestron 14-inch Rings	14-inch Cage Array (up to 6 total)	14-inch Cage Array (up to 9 total)	Rings Only
16/41 SCT	Standard Versa-Plate Dovetail	Meade 16-inch Rings	n/a	n/a	Rings Only
11/28	Standard Versa-Plate Dovetail	n/a	11-inch Cage Array (up to 6 total)	11-inch Cage Array (up to 9 total)	No

Table 1: Paramount OTA mounting options.

Type of OTA Mounting

There are five types of OTA mounting mentioned in Table 1 for the listed telescope apertures and systems:

1. Standard Versa-Plate Dovetail
 - a. All Paramount ME II mounts include the standard Versa-Plate with a dovetail that requires no extra mounting hardware. See the [Paramount User Guide \(GEM Models\)](#) for a description of this component.
2. Large Dovetail Accessory
 - a. The Paramount ME II can be fitted with an optional [Large Dovetail Accessory](#). Click on this link to read the referenced PDF document for instructions on how to install the mounting hardware, and the telescope.
3. Mounting Brackets
 - a. Mounting brackets have a unique set of instructions and packing list for each Taurus model (400, 500, or 600).
4. OTA Mounting Rings
 - a. OTA mounting rings can be used to attach an OTA to the Paramount ME II or Paramount Taurus 400. For Meade 16-inch and Celestron 14-inch OTA mounting rings, see the section “Mounting Rings and Scope Rail Installation” on page 15 for installation instructions.
 - i. For Paramount ME II mounting instructions, see “German Equatorial” on page 15 under “Mounting Rings and Scope Rail Installation”.
 - ii. For the Paramount Taurus 400, see “Equatorial Fork Mount” on page 15 under “Mounting Rings and Scope Rail Installation”.
5. Cage Arrays
 - a. Cage arrays are shipped mostly assembled, but the scope rails must be mounted. Additional documentation coming soon.


For the optional Taurus Accessory Dovetail Plate, see the “Bracket Dovetail Accessory Plate Installation” for OTAs using brackets, or “Ring Dovetail Accessory Plate Installation” for OTAs using mounting rings.



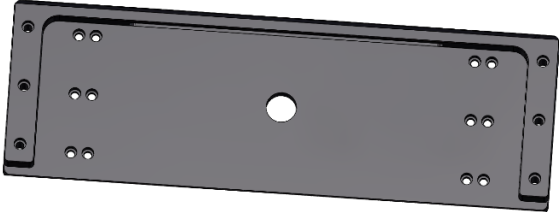
Scope Mounting Brackets and Scope Rail Instructions

Scope mounting brackets are used to mount the scope rail component to Officina Stellare or Planewave model OTAs. The scope rail component is used to mount the OTA to the Paramount Taurus fork arms.

These mounting brackets are easily installed on an existing scope as described below.

Packing List Scope Brackets

Picture	Part Description
	Front mounting bracket (has channel*, 2 pieces).

Picture	Part Description
<p>(side view)</p> 	
 <p>(side view)</p>	<p>Rear mounting bracket (has no channel*, 2 pieces)</p> <p>* The Paramount Taurus 400 brackets are the same for the front and back rings.</p>
	<p>Scope rail plate.</p>
<p>Socket Head Cap Screws (SHCS)</p>	<p>(40) 5/16-18 x 1-1/8-inch SHCS (8) for Stainless Steel Rail/Mounting</p>
<p>Thinner plate mounting component</p>	<p>¼-20 x 5/8-inch SHCS (6 pieces)</p>
<p>Thicker plate mounting component</p>	<p>¼-20 x 1-1/8-inch Array Assembly Instructions SHCS (6 pieces)</p>

Bracket Installation

These brackets get mounted 90 degrees from each other on the OTA. Typically, they are attached on the two sides that do not already have Losmandy dovetail installed (Figure 1).

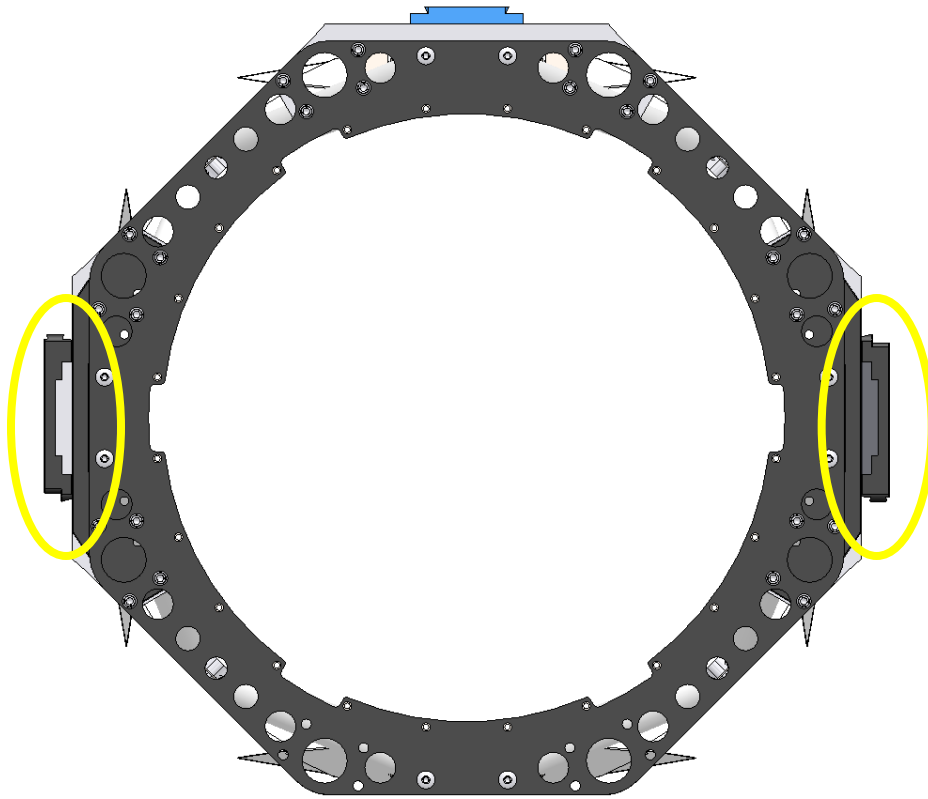


Figure 1: Mounting brackets (circled in yellow) to be installed on sides 90 degrees of Losmandy dovetail plate (the blue component is the Officina Stellare dovetail).

The brackets for the scope rail are the same brackets used for the scope accessory plate. This means the instructions described in under “Bracket Installation” on page 6 apply to both components.

If more than one accessory plate will be installed, other mounting plates such as the Losmandy dovetail shown in Figure 1 must be removed before installing Software Bisque’s brackets.

Front Bracket Installation

The front bracket has a channel as shown in Figure 2. This bracket gets mounted toward the front of the scope on the center ring of the OTA assembly (shown in Figure 3).

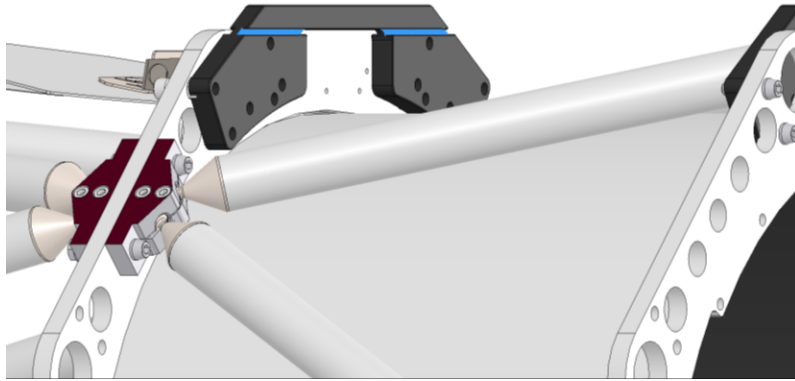


Figure 2: Front bracket mounted with channel highlighted in blue.

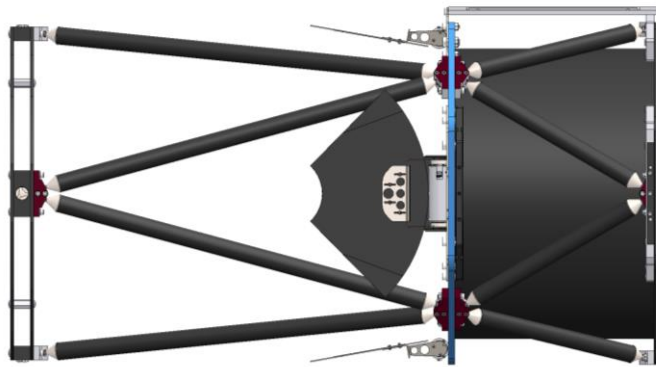


Figure 3: Center ring of the OTA assembly highlighted in blue.

There are four or eight 5/16-18 x 1-1/8-inch SHCSs depending on the OTA for each of the brackets. The threaded holes used for the 20-inch Officina Stellare 500 model OTA are shown in Figure 8, and for the 20-inch Planewave CDK20 OTA in Figure 5. The threaded holes for 24-inch Officina Stellare 600 model OTA are shown in Figure 6. The threaded holes for an Officina Stellare model 400 OTA are shown in Figure 7.

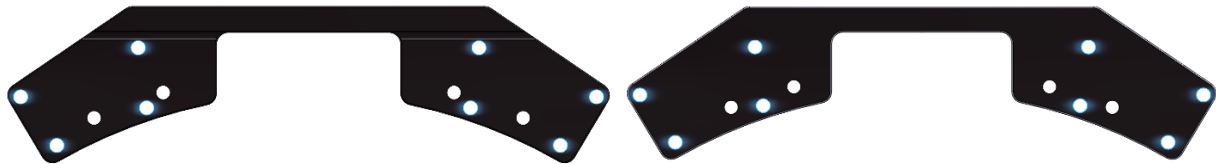


Figure 4: Eight 5/16-18 threaded holes for Officina Stellare 500 OTA bracket (front on the left, rear on the right).

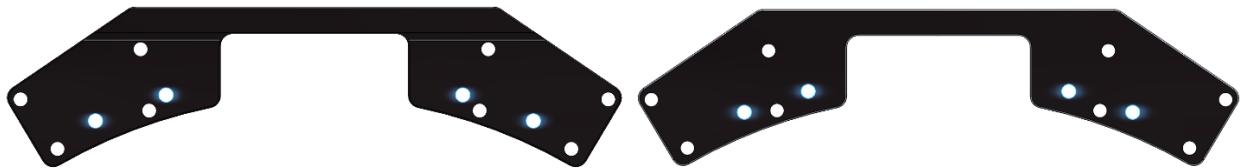


Figure 5: Four 5/16-18 threaded holes for Planewave 500 OTA bracket (front on the left, rear on the right).

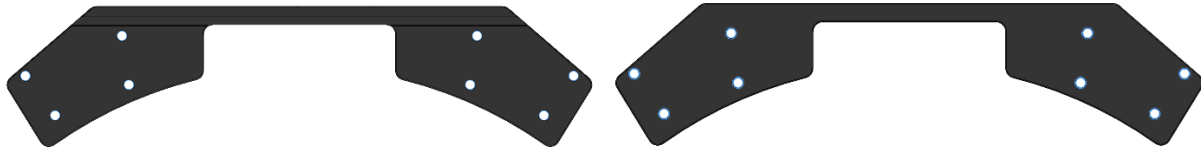


Figure 6: Eight 5/16-18 threaded holes for Officina Stellare 600 OTA bracket (front on the left, rear on the right)

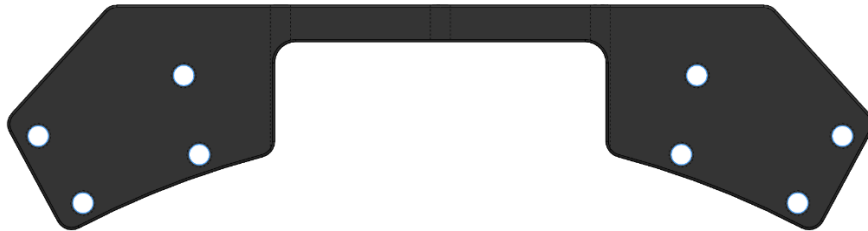


Figure 7: Eight 5/16-18 threaded holes for Officina Stellare 400 OTA bracket (front and rear are the same)

The plates are mounted in the orientation shown in Figure 8.

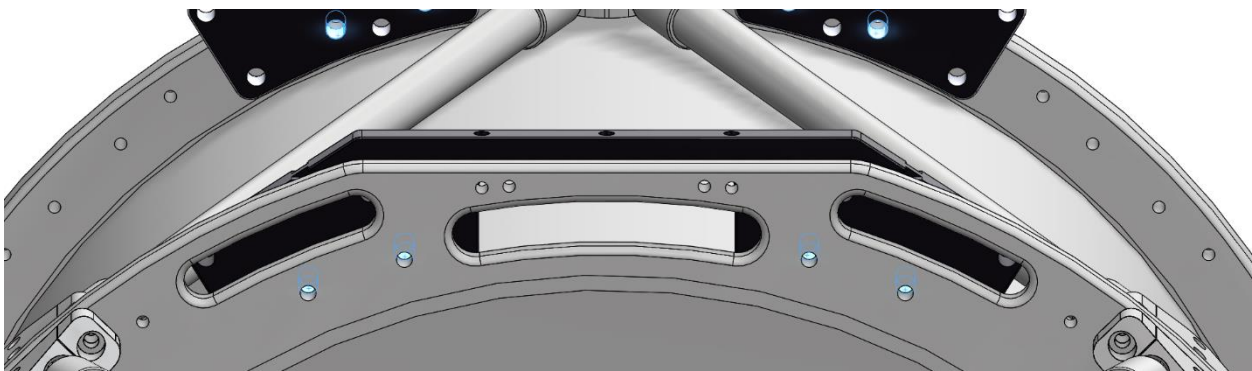


Figure 8: Front bracket installed (Officina Stellare top, Planewave bottom)

Install the second front plate on the opposite side of the scope (90 degrees from the first) as shown in Figure 1.

Rear Bracket Installation

The rear bracket which has no channel is mounted on the back ring of the telescope opposing the front bracket, see Figure 9 and Figure 10.

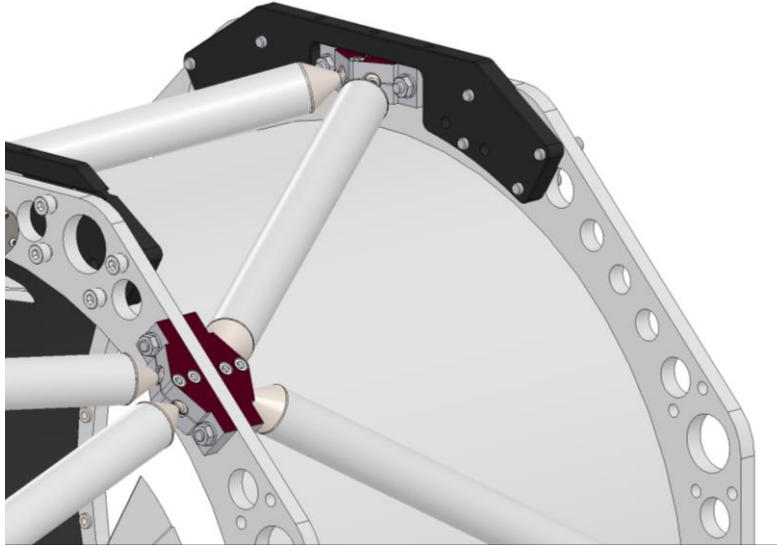


Figure 9: Rear bracket mounted.



Figure 10: Rear ring of OTA (highlighted in blue).

The other four or eight 5/16-18 x 1-1/8-inch SHCSs for the rear bracket are the same as the front bracket as shown in Figure 4 and Figure 5. Again, the orientation the plates are installed in is shown in Figure 11.

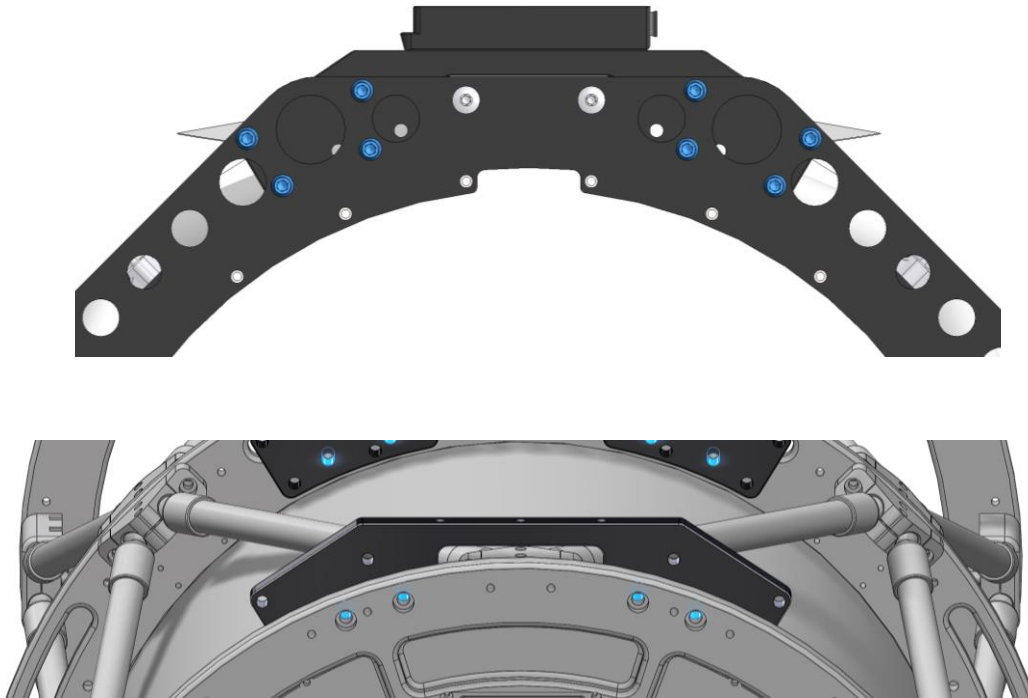


Figure 11: Rear bracket installed (*Officina Stellare top, Planewave bottom*).

Scope Rail Installation

There are two scope rails, and the orientation of the rail is critical for easy installation into the forks. As shown below in Figure 13, the U-Shape section of the scope rail needs to be installed facing toward the ground when the scope is in the position of 0 degrees altitude. Each of the plates are identical, so both need to be mounted on the front and rear brackets described in the instructions above.

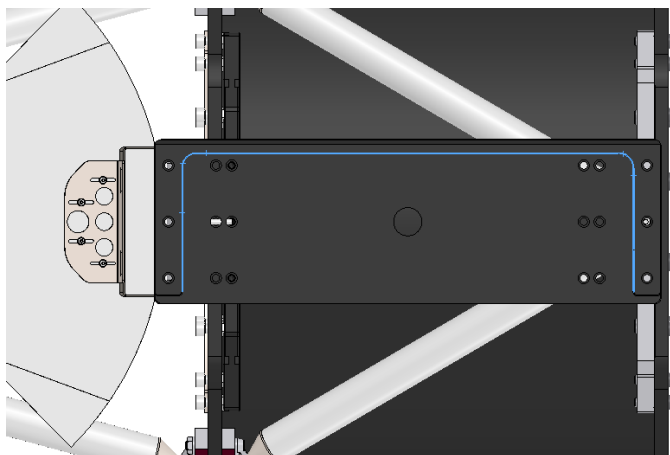


Figure 12: Scope rail installation orientation.

The scope rails can be attached in two different positions to allow OTA balancing. In Figure 13 the rail is mounted in the further-back position for back-heavy OTAs. The plates have slotted holes to

accommodate the dimensions between the front and rear rings of the telescope (see Figure 15 and Figure 17).

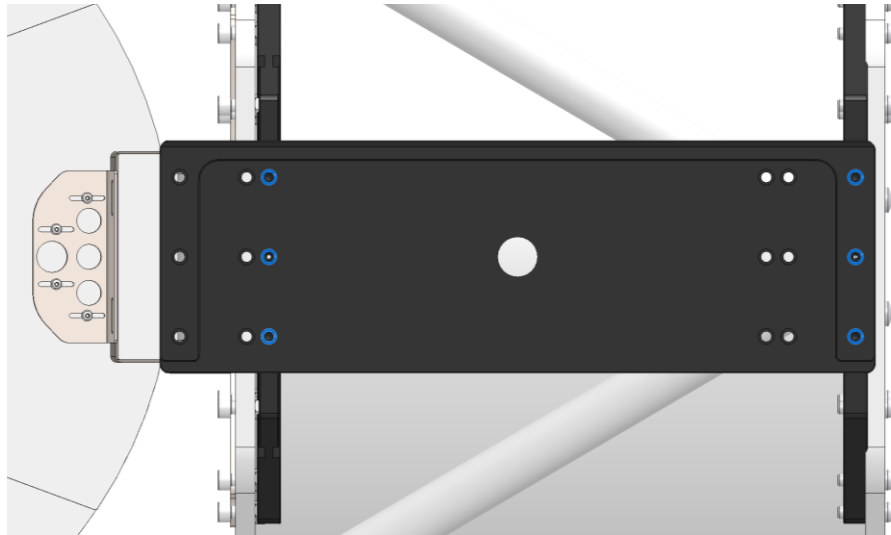


Figure 13: Scope rail 500 installed in further-back position (earlier model with circular holes shown).

The three screws shown on the left of Figure 13 are installed in the thinner part of the plate and therefore require $\frac{1}{4}$ -20 x 5/8-inch SHCSs; the three screws shown on the right in Figure 13 are installed in the thicker part of the plate required $\frac{1}{4}$ -20 x 1-1/8-inch SHCSs.

If the center of mass of the OTA plus instruments is going to be heavier toward the front, shift the plate the other way, and attach the longer screws in the front bracket and the shorter screws in the rear bracket as shown in Figure 14.

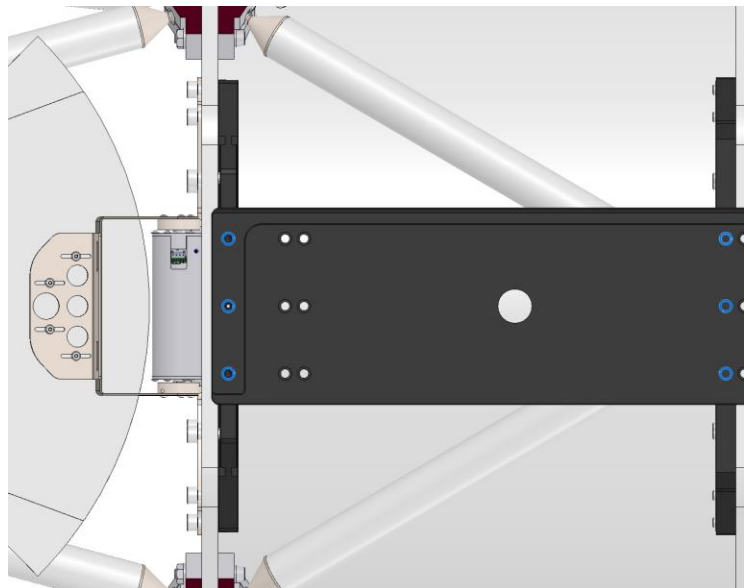


Figure 14: Scope rail 500 installed in further-forward position

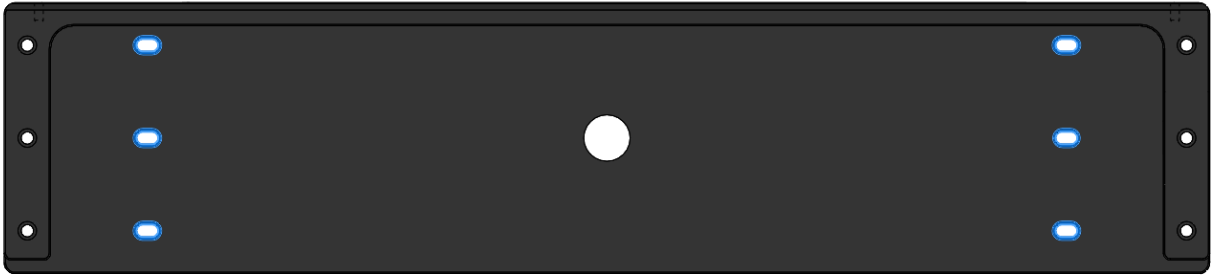


Figure 15: Scope rail 600 (with slotted holes).

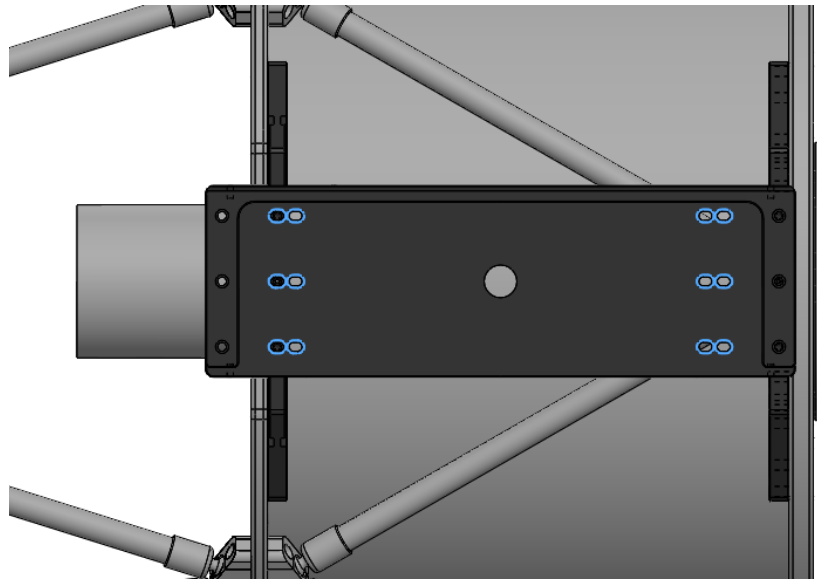


Figure 16: Scope rail 500 (with slotted holes).

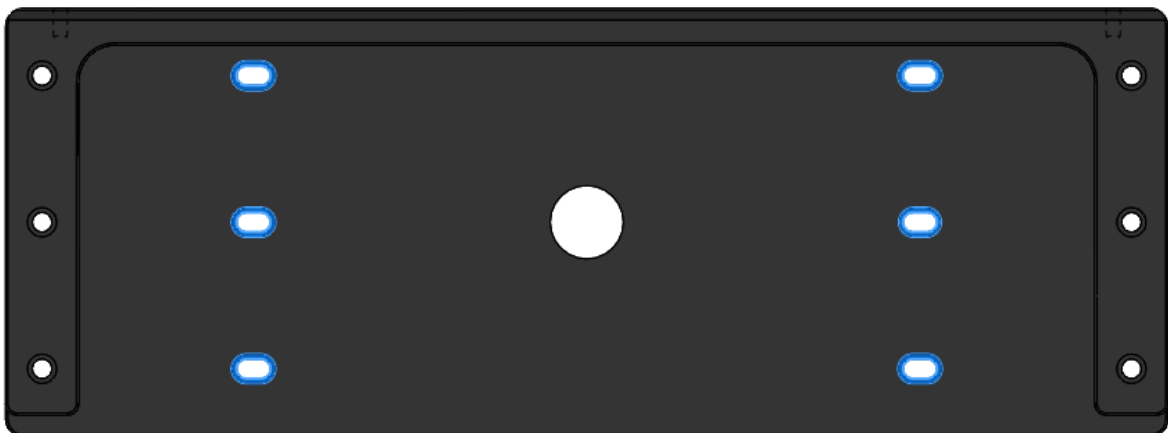


Figure 17: Scope rail 400 (with slotted holes).

Bracket Dovetail Accessory Plate Installation

The optional scope rail dovetail accessory plate has a smaller dovetail to mount additional telescopes, or other accessories. Since the length between the front and rear rings of OTAs is different for each scope, adapter plates are needed to mount the accessory plate. The adaptor plate is attached the same way as the scope plate, but has no specific orientation. There are six holes for ¼-20 x 5/8-inch SHCS (three of which are slotted) to attach the adaptor plate to the brackets.

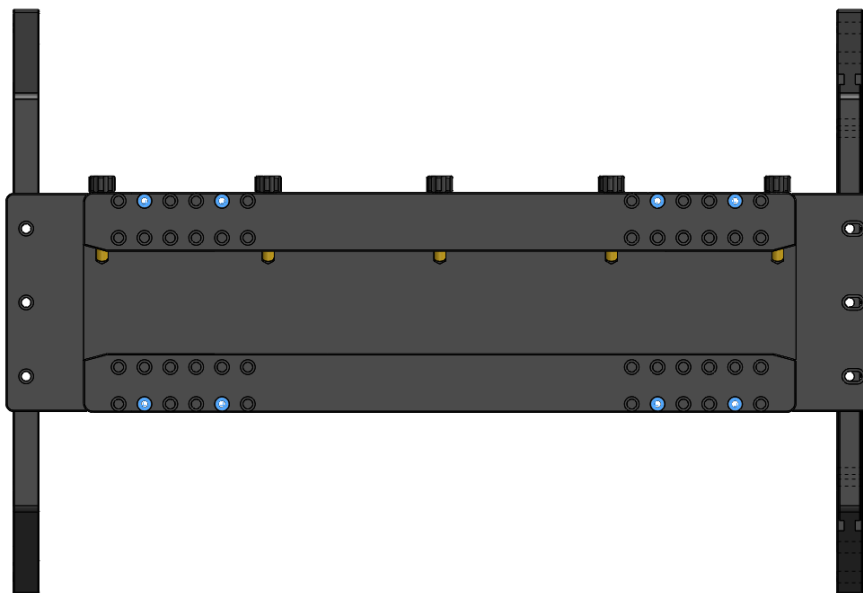


Figure 18: Paramount Taurus 600 accessory plate and adapter on front and rear brackets.

The dovetail accessory plate comes attached to the adapter plate with eight ¼-20 x 5/8-inch SHCSs. Each adapter plate has eight ¼-20 threaded holes that can be employed to customize where the dovetail accessory plate is mounted. For the 400 and 500 models, the dovetail accessory plate must be removed from the adapter plate before installing the adapter on the brackets. From there, the dovetail accessory plate can be placed where it fits best for the system.

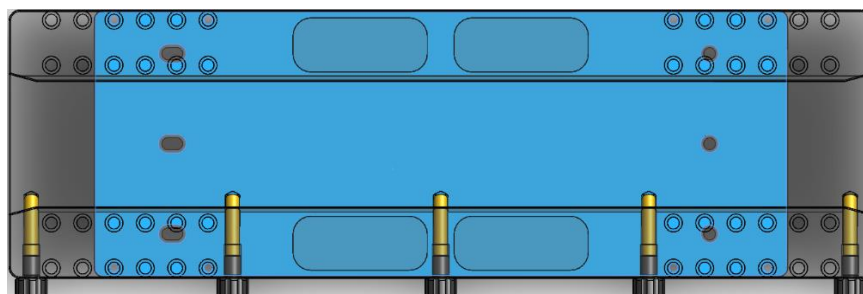
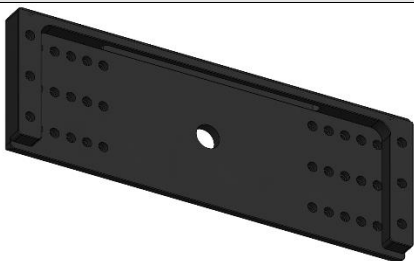



Figure 19: Model 400 accessory plate and adapter (adapter shown in blue).

Mounting Rings and Scope Rail Installation

The Software Bisque Ring Accessory attach mounting rings to 14-inch and 16-inch tube type telescopes. These rings can then be used to mount the telescope to a Paramount ME II Versa-Plate. When paired with scope rails the rings are also used to mount 14-inch and 16-inch telescopes on the Paramount Taurus 400 model.

Packing List Rings

Picture	Part Description
	(2) Scope rail plate
	(8) Ring Segments
	(16) ¼-20 x 1/2 SHCS for ring assembly
Thinner part of plate mounting	¼-20 x 5/8-inch SHCS (12 pcs)
Thicker part of plate mounting	¼-20 x 1-1/8-inch SHCS (12 pcs)

Ring Installation

The following section describes how to attach the Software Bisque OTA mounting rings for use with a Paramount German equatorial mount, and a Paramount Taurus equatorial fork mount.

German Equatorial Mounts

Before mounting the rings, evaluate to make sure there is enough room for the telescope to travel forward or backward to achieve balance when all the instruments are installed. Balance needs to be achieved both within the rings and when the rings are installed on the mount in the declination axis. Once you have an idea of the location of the balance point, install the two ring segments in the position you want on the Versa-Plate or top plate of the mount by using at sixteen of the ¼-20x 1-inch SHCS from the bottom of the Versa-Plate as shown in Figure 20. There are many different positions and spacing that can be used. Keep in mind, this may take a few tries, and installing the furthest back ring segment may require removing the Versa-Plate (for further instructions please see section Removing/Re-Attaching the Versa-Plate below).

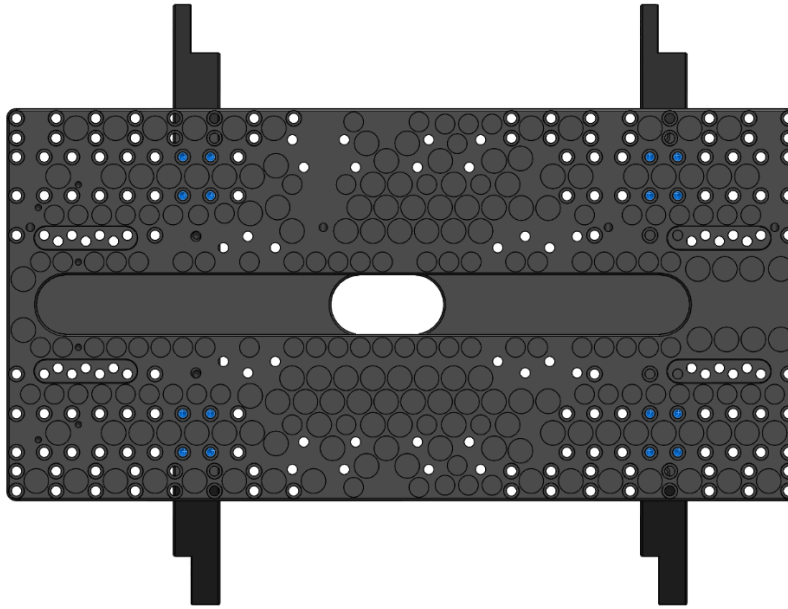


Figure 20: Ring installation holes on bottom of Versa-Plate.

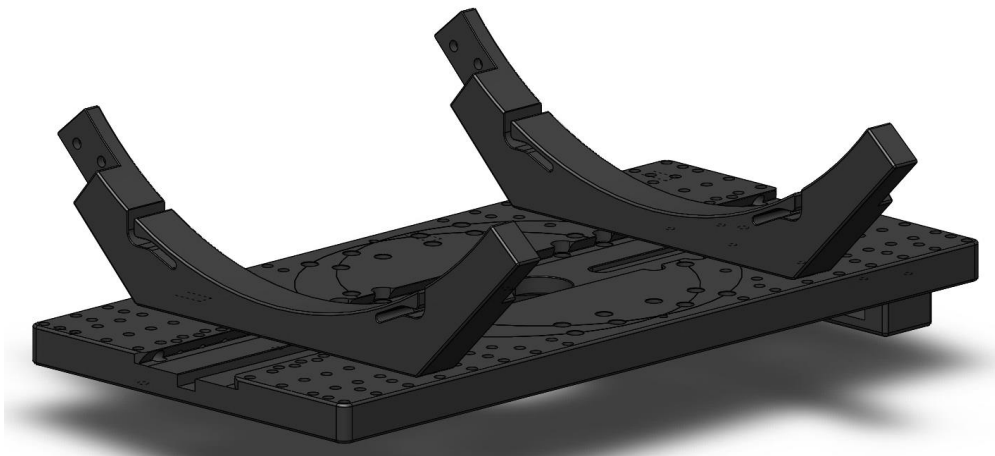


Figure 21: Versa-Plate with first two ring segments installed.

Place the scope inside the mounted rings (see Figure 22) and assemble the rest of the three ring segments around the telescope using eight ¼-20 x ½-inch SHCS (Figure 23) without tightening them down all the way. This allows for ring adjustment so the telescope is in the desired orientation, as well as the long flats being parallel. The rings may not fit snug against the telescope body yet, once you're satisfied with where the rings are install, move on to "Set Screw Adjustment" section.



Be careful, the telescope is not all the way secured! Do not let go of the telescope until the "Set Screw Adjustment" has been made.

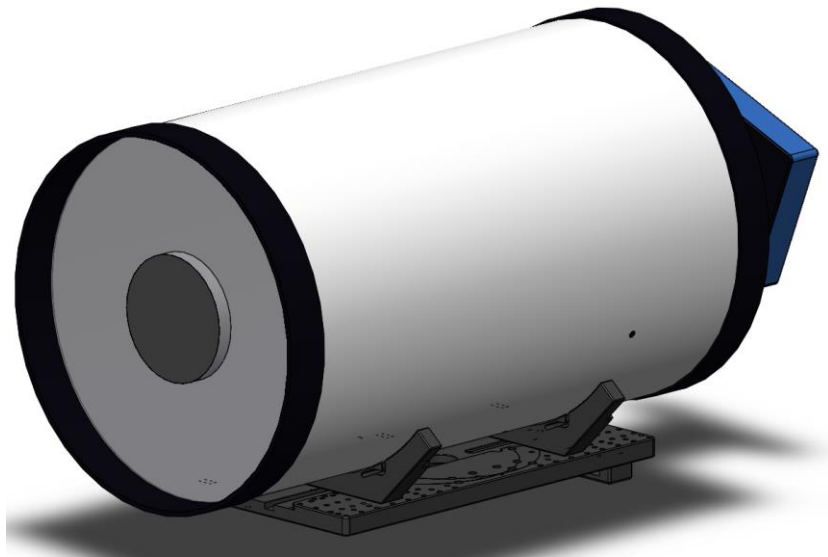


Figure 22: Meade 16-inch with two OTA mounting rings segments attached.

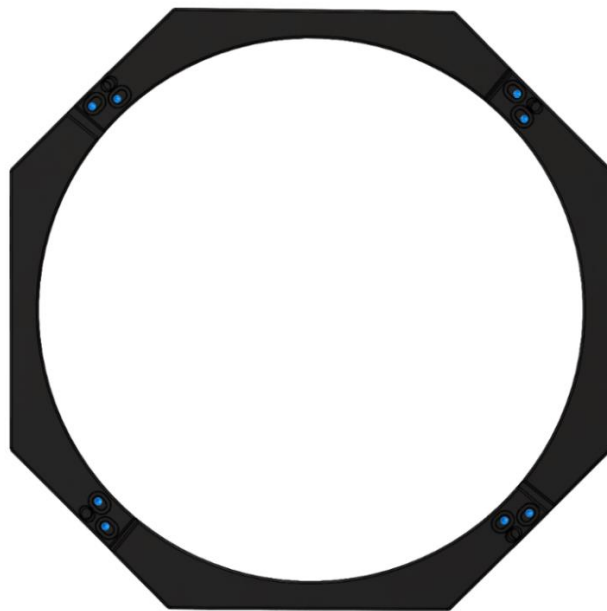


Figure 23: Ring Segment assembled and 1/4-20 holes.

Removing/Re-Attaching the Versa-Plate

As described in the Paramount User Guide, there are two positions that the Versa-Plate can be mounted in depending on your system's setup. The standard mounting position is shown in Figure 24 and Figure 25. If the payload is "camera-end heavy," mount the Versa-Plate at the forward most position so that

the payload can be more easily balanced. The “balance” mounting position depends on your equipment, so there may be a bit of trial and error to find the optimal spot.

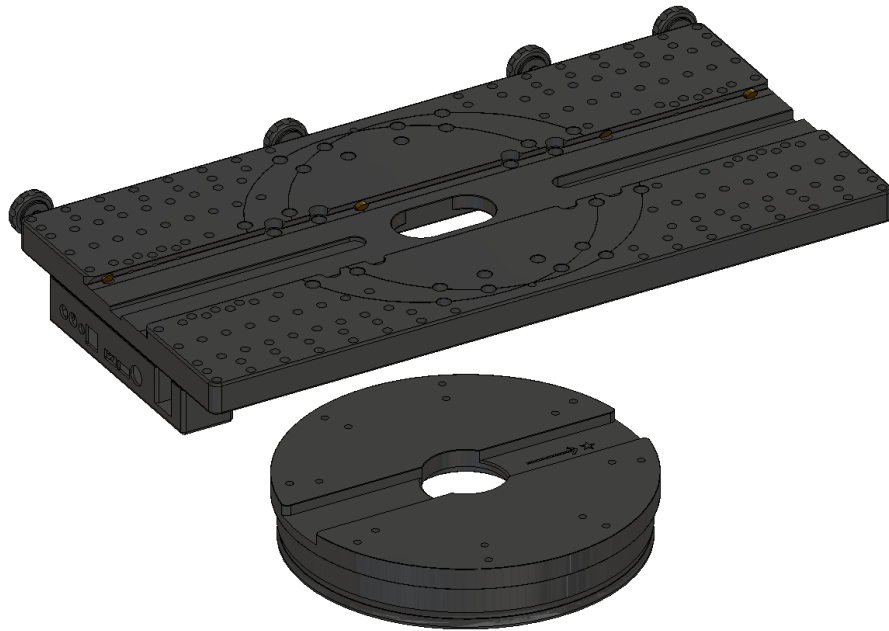


Figure 24: Standard Versa-Plate orientation.

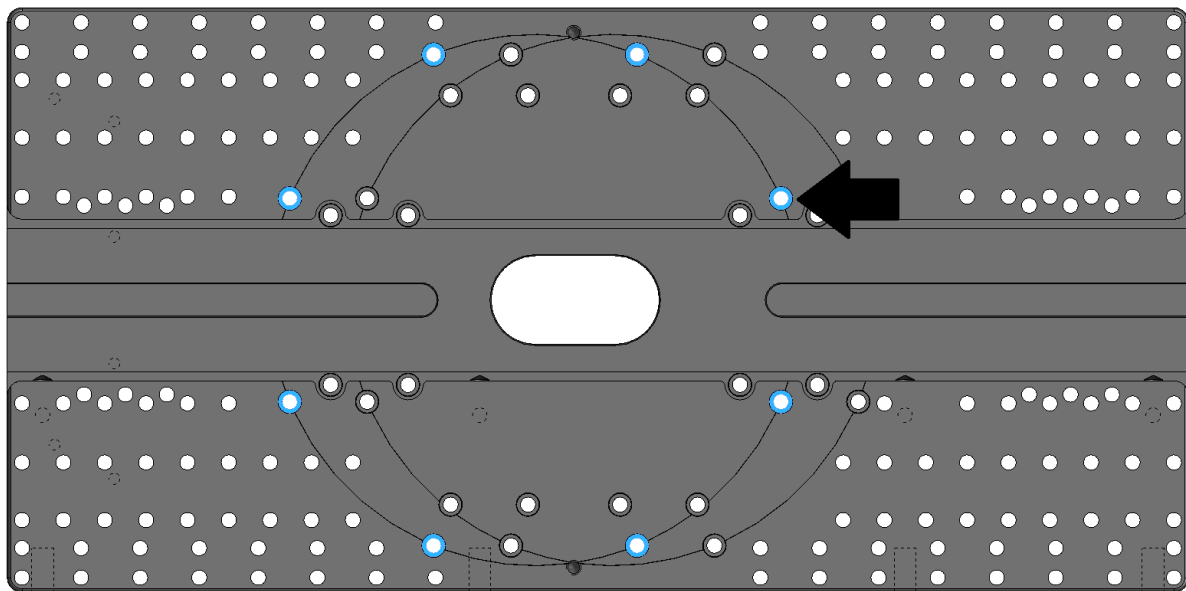


Figure 25: Standard Versa-Plate mounting holes (top view).

Lock the declination axis (see Figure 26) using one or two bolts found in a red velvet bag in the accessory kit.

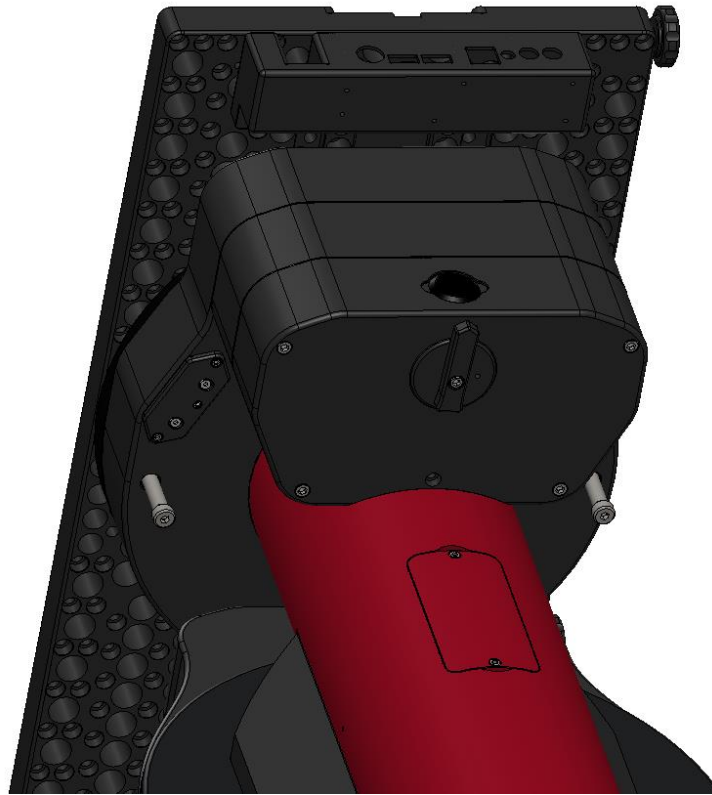


Figure 26: Dec axis locking (with already mounted Versa-Plate).

Snake the cables that are coming out of the declination tube through the hole in the Versa-Plate, and orient them so that they run along the channel cutout shown in Figure 27 and Figure 28 below.

See Figure 24 to be sure the Instrument Panel (10-32 tapped holes for the Instrument Panel are circled in yellow in Figure 27) is in the correct position with respect to the direction of light “star and arrow” image machined on the declination gear. Next, choose which set of holes to mount the Versa-Plate (again see Figure 25) and screw all eight of the ¼-20 x 1-inch SHCSs in about halfway.



Figure 27: Versa-plate cable channel and instrument panel holes (bottom view).

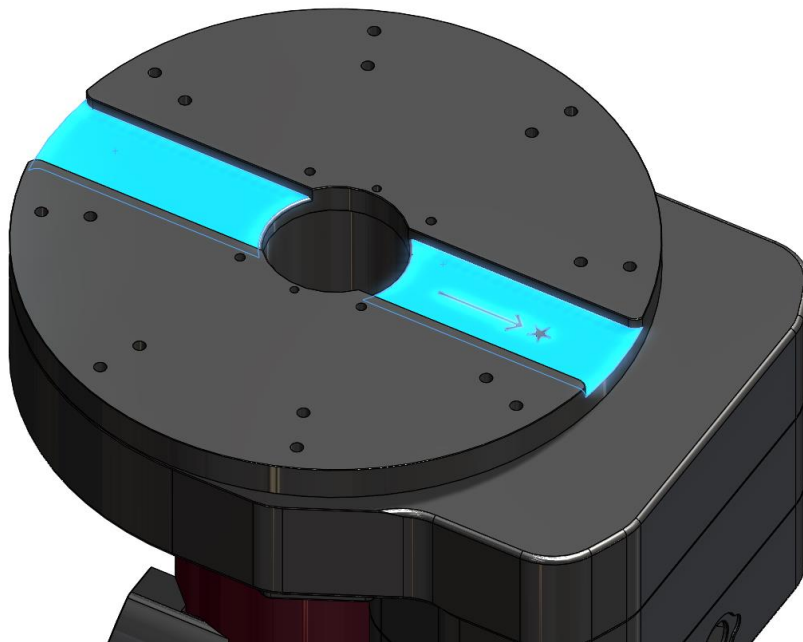


Figure 28: Declination gear cable channel.

Ensure the cables run along the channel underneath the Versa-Plate, as well as in the cutout of the Instrument Panel shown in Figure 29. Install the four 10-32x1/2 in. SHCSs and screw them in most of the way. To prevent cables from becoming crushed or pinched, double check that all run through this cutout *before* fully tightening any of these twelve screws.

Once cables are in the clear, tighten down the four Instrument Panel screws followed by the eight Versa-Plate mounting screws.

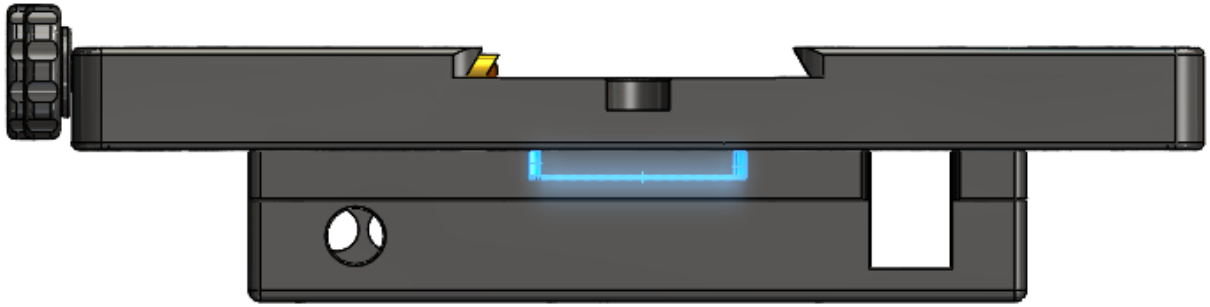


Figure 29: Instrument panel cable cutout.

Equatorial Fork Mounts

Attach the first two rings on the scope rail plate as shown in Figure 30 and Figure 31 using the $\frac{1}{4}$ -20 x 1- $\frac{1}{8}$ -inch SHCS and $\frac{1}{4}$ -20 x $\frac{1}{2}$ -inch SHCS. The holes in Figure 30 highlighted in blue use the 1- $\frac{1}{8}$ -inch length and the holes in white use the $\frac{1}{2}$ -inch length. The distance between these two rings depend on the telescope being used and the weight of the instruments being installed on the back. There must be sufficient space so that when the telescope is slid back or forward within the rings, balance can be achieved relative to the center of the plate (Figure 30).

Each segment is held together by eight $\frac{1}{4}$ -20 x $\frac{1}{2}$ -inch SHCS, shown in Figure 23. The rings will not fit all the way snug against the telescope body yet (see “Ring Installation” on page 15). Install the rest of the three ring segments around the telescope as shown on the front cover image of this document.

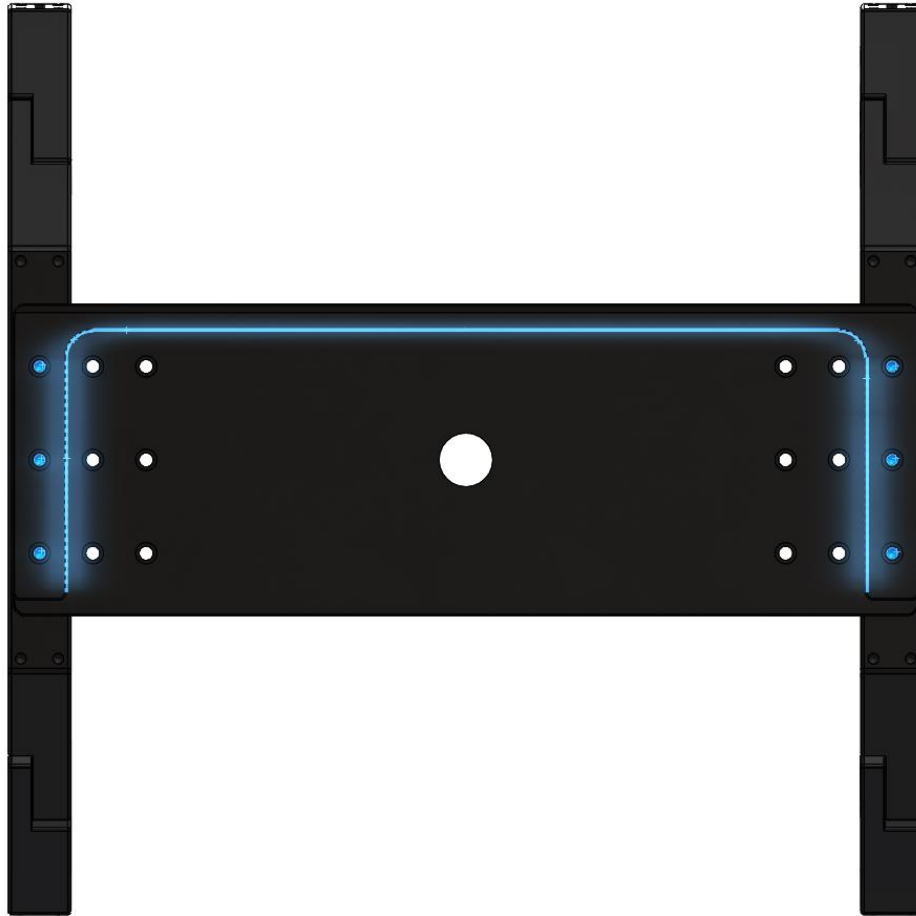


Figure 30: Scope Rail and rings (U shape highlighted in blue)

The second scope rail needs to be installed on the opposite side as the first rail as shown in Figure 31.



Both scope rails must have the U shape (shown in blue in Figure 30) oriented in the same direction as shown in Figure 30 and Figure 32.

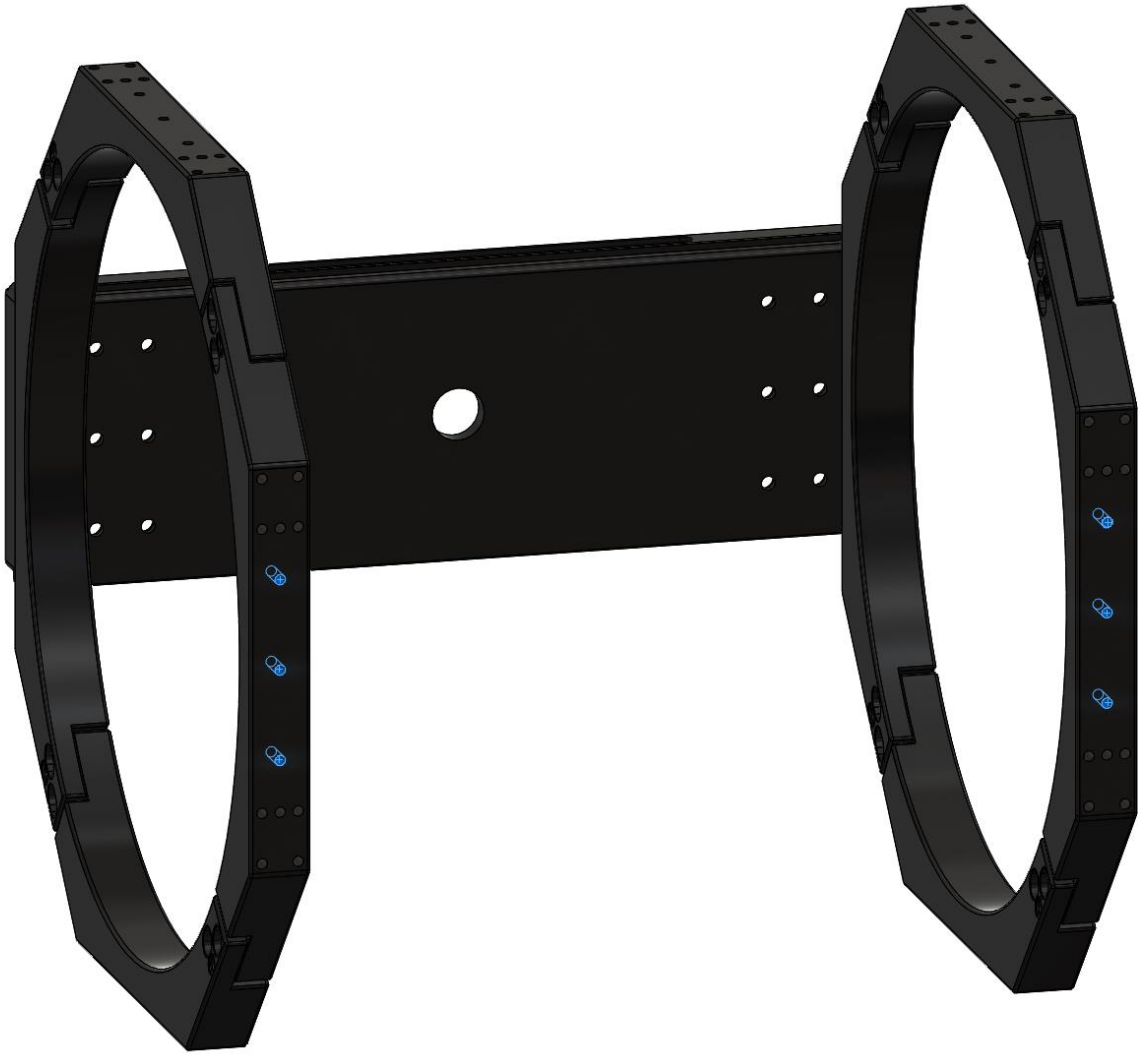


Figure 31: Scope rail and rings (installation screw holes highlighted in blue).

Ring Use

Once the rings are installed around the OTA with the two scope rails attached, each segment has two set screws located underneath each of the cutouts. These set screws ensure the fit around the tube is snug, and should be adjusted as equally to ensure the tension between the two is even. Once these have been adjusted so the telescope can no longer move, the telescope can be installed on the mount. See the document “Paramount Taurus Scope Installation and Scope Rail Use” for the instructions to installing the telescope in the Paramount Taurus.

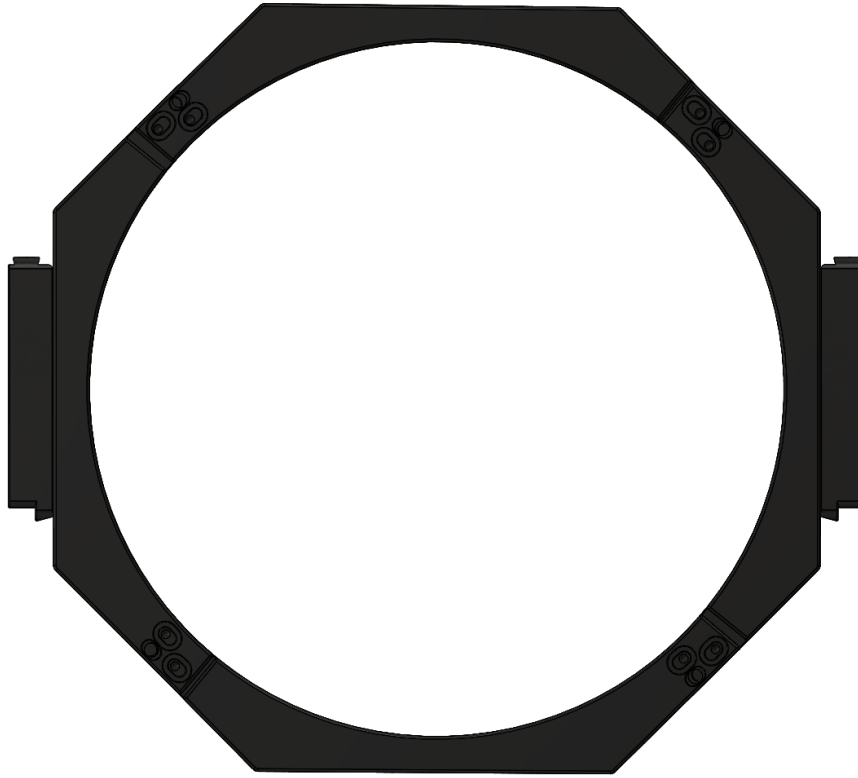


Figure 32: Scope rails installed.



Figure 33: Meade 16-inch with two OTA mounting rings attached.

There are two ¼-20 x 1/2-inch SHCS for each connection between ring segments. Install both screws but do not tighten them completely. This allows ring adjustment so that the telescope can be oriented properly, and the flats on the rings can be aligned as shown in Figure 33.

Scope Rail Installation

There are two scope rails, and the orientation of the rail is critical for installation into the forks. Each of the plates is identical, so both need to be mounted on the opposing flat surface containing the threaded holes as shown in Figure 34 and Figure 35. Figure 36 shows the U-shaped section of the scope rail that must be installed facing toward the ground on both sides of the telescope when the scope is pointing at 0 degrees altitude.

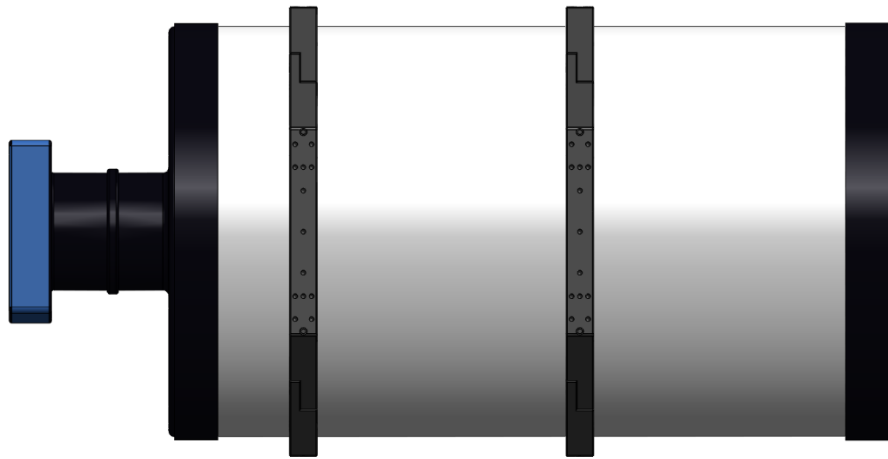


Figure 34: Rings installed with threaded holes' parallel.

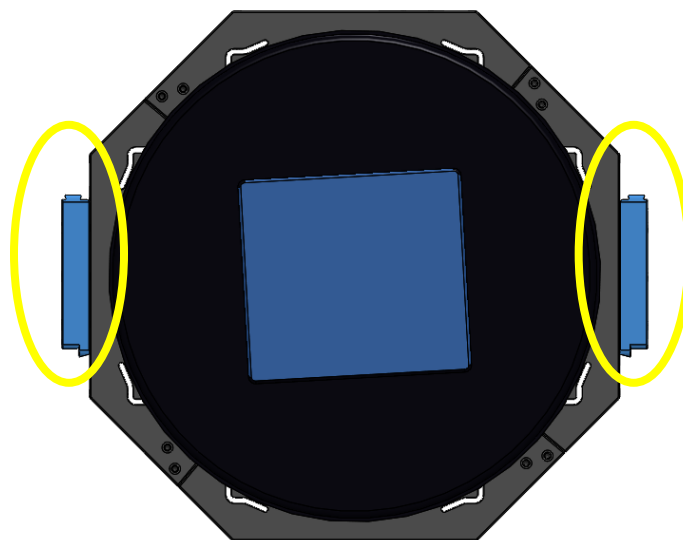


Figure 35: Scope Rails mounted on opposite sides

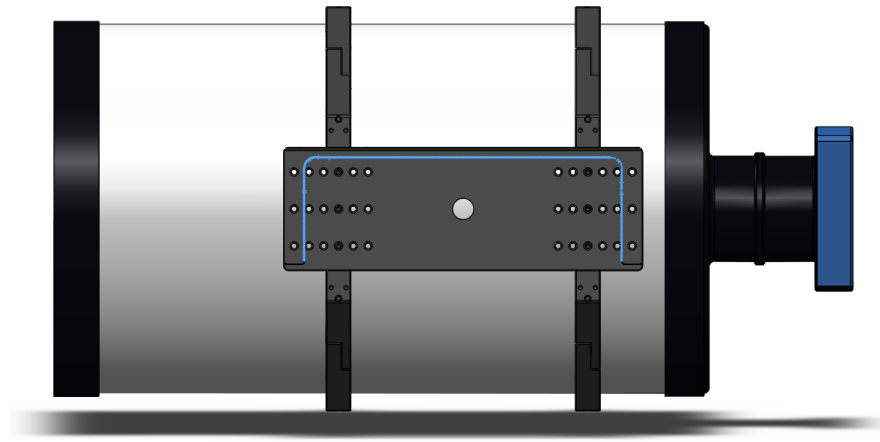


Figure 36: U-Shape section highlighted in blue

Place the rings on a flat surface to help level and orient both. Once the ring flats are aligned, attach the scope rails to the rings. There are six ¼-20 screws required to attach the plates to the rings on each side.

The thick part of the plate (through holes on the outside of the U-shape shown in Figure 36) will use ¼-20 x 1-1/8-inch SHCS, while the through holes inside of the U-shape will accept ¼-20 x 5/8-inch SHCS. Three combinations of the ¼-20 screw sizes are supplied to accommodate various rings positions:

- All ¼-20 x 5/8-inch SHCS
- All ¼-20 x 1-1/8-inch SHCS
- Three of each on each side

Choose the option that works for your setup, remembering you need to have the scope balanced at the center of the scope rail (the circle in the center of the plate). Once the rails are mounted, the ¼-20 x 1/2-inch SHCS holding the ring segments together can be securely tightened.

Set Screw Adjustment

Each ring segment has a special coating that increases the contact friction to better secure the OTA, as well as two set screws near each slotted portion, as shown in Figure 37. These set screws are the final adjustment to prevent the OTA from moving laterally, inside the rings. By tightening the set screw with a 1/8-inch hex key a few turns, the “free” section of the slot bends outward and secures each section the OTA.



To prevent OTA tube deformation, do not overly tighten the set screws!

The friction-increasing coating on each segment can rub off on to the telescope if the rings are overly tight and the telescope is forced to move laterally in the rings. This coating can be removed using a light cleaning solution, but lateral motion of the OTA when the rings are tight should be avoided.

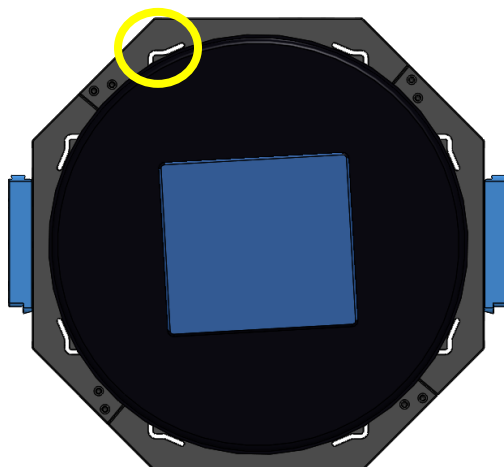


Figure 37: One of the OTA captivation slots is highlighted in yellow above.

Ring Dovetail Accessory Plate Installation

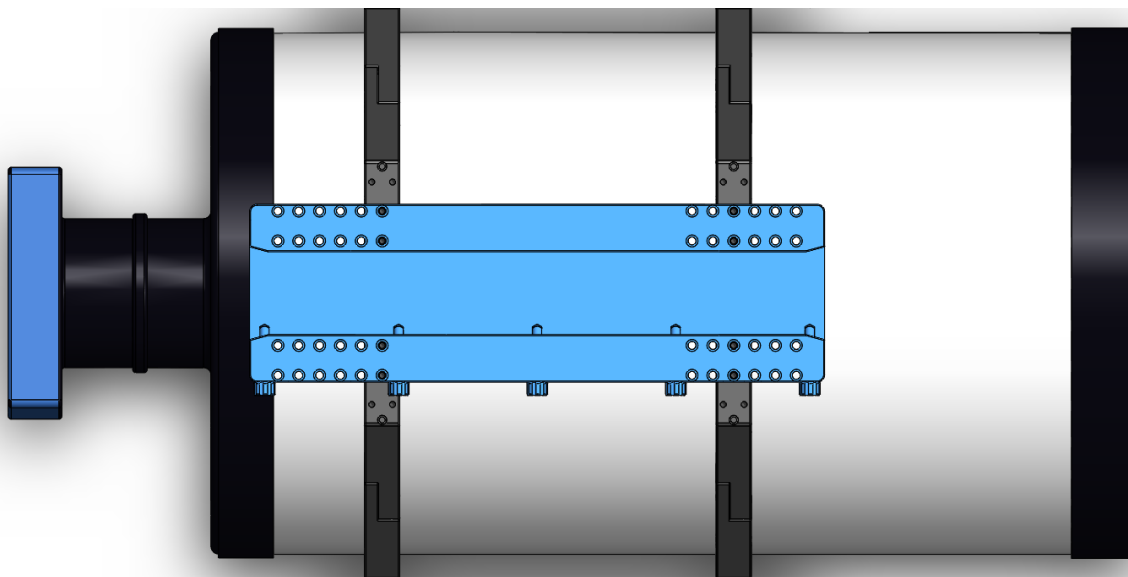


Figure 38: Accessory Plate installed

The optional scope rail accessory plate can be installed on the other three sides of the scope rings if needed, to mount additional imaging and viewing accessories. The plate includes eight additional ¼-20 x ½-inch SHCSs for mounting to the same holes as the scope rails in multiple positions.

Cage Array Installation

The Software Bisque-designed cage array assembly can be used to attach an array of two, three, four, six or nine 11-inch or 14-inch OTAs to the Paramount Taurus. The OTAs can be adjusted to point all at one object or a wide-field “mosaic” formation.

The instructions below describe how to install and align the telescopes in the array and then how to install them in to a Paramount Taurus.

[Array Assembly Instructions](#)

To be completed.

[Scope Installation Instructions](#)

To be completed.

[Scope Adjustments](#)

To be completed.

[Scope Rail Installation](#)

To be completed.

Scope Assembly Installation for a Paramount Taurus

Scope Rail Installation

The scope rail installation hardware is unique to each telescope that is attached to Taurus Equatorial Fork Mount, but the rail's mechanics work identically for all telescopes.

Before trying to install the telescope, confirm the pier and Taurus mount are bolted securely to the ground and pier respectively. Also, ensure the RA locking bolt is in place and both the RA and Dec axes are in *Balance Mode*. This ensures the precision worm gear is separated from main gear so that the two cannot be damaged during installation.

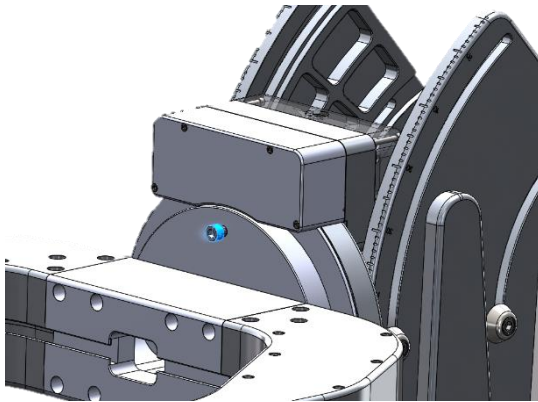


Figure 39: Taurus 500/600 RA locking bolt.



Figure 40: Worm block switch in the balance position.

Figure 39 shows the location of the RA locking bolt that must be in place while performing the first steps of the telescope install. Note that the RA can also be locked with the fork arms rotated 90 degrees in either direction (Taurus 500/600 only).

Figure 40 shows the worm block switch in the balance position. After the telescope is mounted and balanced, engage the worm and the gear by rotating this switch 90 degrees counterclockwise.

Fork Mounting Plates

The fork mounting plates are attached to each arm with the different hole patterns. For the fork arm without gear, there are six holes for $\frac{1}{4}$ -20 x $\frac{3}{4}$ -inch SHCSs as shown in Figure 41. In Figure 42 it shows the fork arm with gear holes, and there are eight holes for $\frac{1}{4}$ -20 x $\frac{3}{4}$ -inch SHCSs and four holes for 10-32 x $\frac{5}{8}$ -inch SHCSs (circled in yellow). The declination gear has an arrow pointing towards a star indicating the direction of the stars in the sky. This helps with the correct orientation of the plate in terms of how the declination gear moves.



The fork mounting plate that is installed on the gear must be oriented in the position shown in Figure 42.

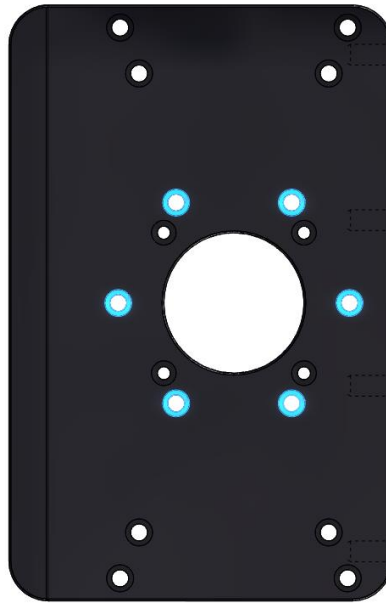


Figure 41: Fork arm without gear mounting plate

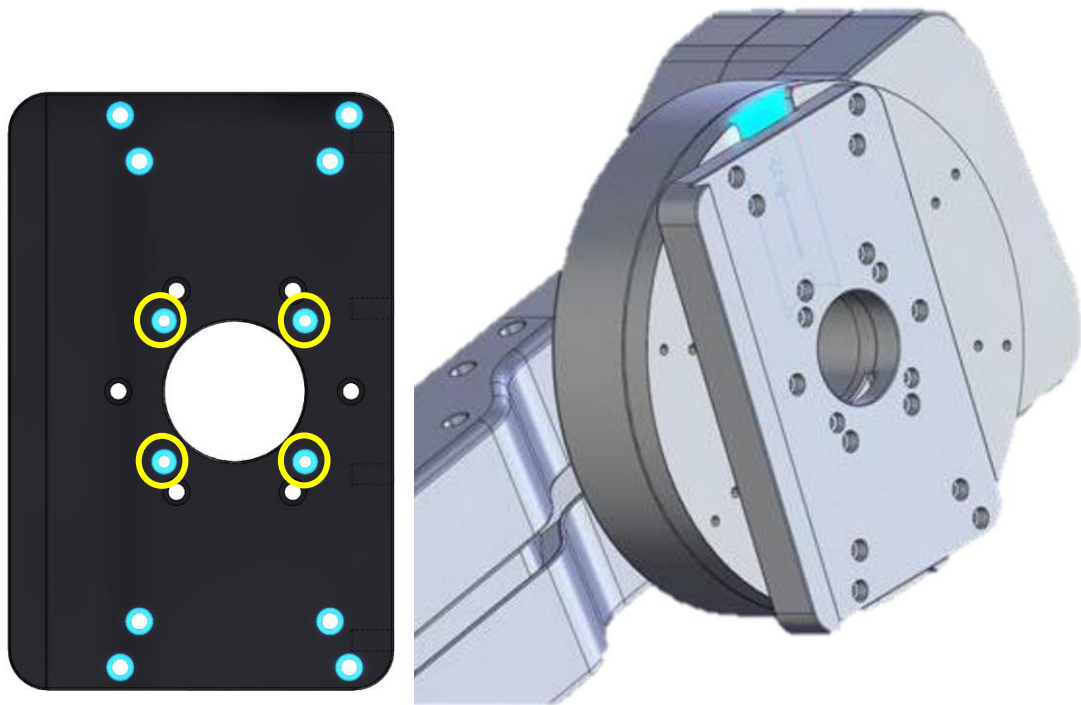


Figure 42: Fork arm with gear and mounting plate (the yellow circles show the location of the 10-32 screws).

Telescope Scope Rails

The Software Bisque telescope scope rails have eight 5/16-18 x 1-1/8-inch SHCS that must be inserted into the rails (Figure 43) to hold the telescope in place. Each scope rail needs to be mounted on to the telescope (see the specific section above for your system). The telescope trusses do need to be oriented

in a specific way for maximum amount of travel (that is, to achieve lowest altitude to the south) as shown in Figure 44.



Figure 43: Scope rail, top rail for 5/16-18 x 1-1/8-inch SHCS.

Telescope Installation

After the Taurus is assembled, and the scope rails are attached to the telescope, the telescope can be mounted to the fork arms. From here, please ***carefully read through the remainder of this document before attempting to mount the OTA.***

Adjust the altitude of the Taurus to close to zero degrees as shown in Figure 44.

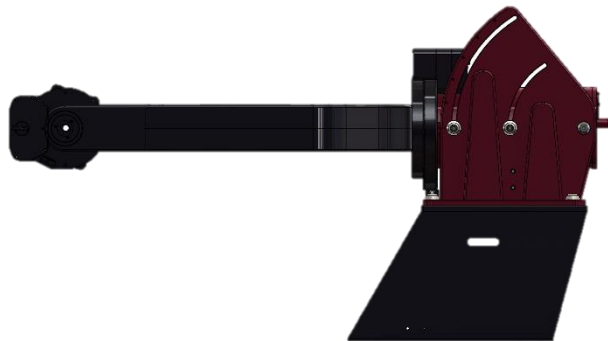


Figure 44: Taurus at lowest altitude.

For optimal motion the telescope should be installed with the open truss towards the body of the mount as shown in Figure 45.

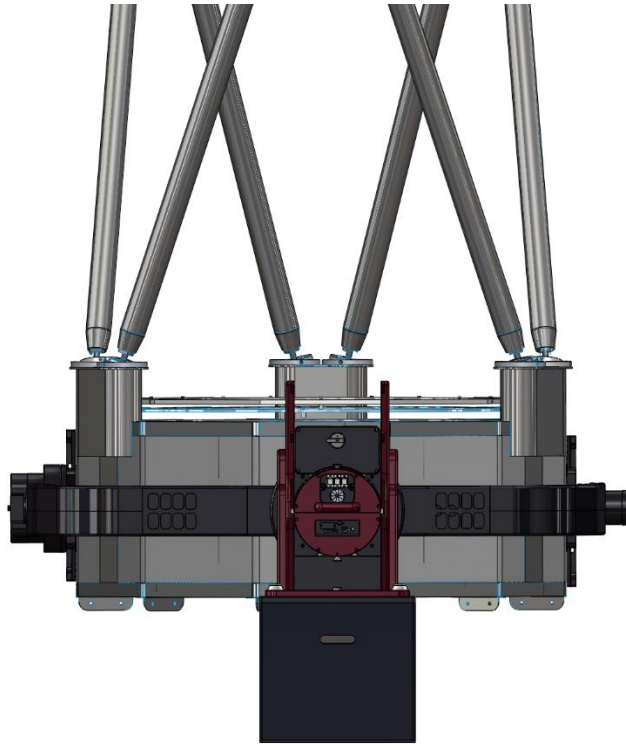


Figure 45: Truss OTA orientation.

Adjusting the Cylinder Assembly During Telescope Installation

The side of the fork opposite the declination gear incorporates a sliding cylindrical assembly that can be adjusted to match the width of the telescope. Ideally, the distance between the two mounting plates attached to the fork is identical to the distance between the two scope plates that are mounted on the telescope. The adjustable cylinder assembly provides ample adjustment if the distances between the two are not exact.

The ½-13 setscrew clamp located on the bottom half of the fork (with the arms orientation from Figure 45) can be loosened (see Figure 46) to permit lateral motion of the cylinder assembly as shown in Figure 47.

1. Loosen the setscrew clamp so that cylinder assembly can be adjusted freely.
2. Orient the fork mounting plates with the dovetail facing into the arms and the holes facing to the outside as shown in Figure 46, Figure 47 and Figure 48.



Figure 46: Location of the clamp setscrew on the bottom of the fork arm.

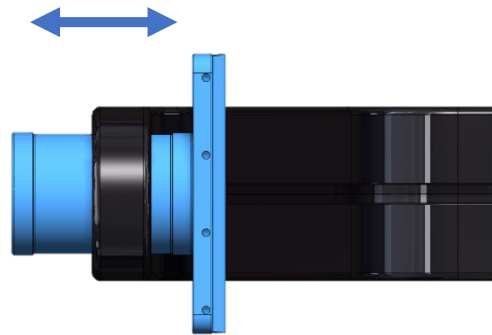


Figure 47: Lateral cylinder assembly adjustment when the setscrew is loose.

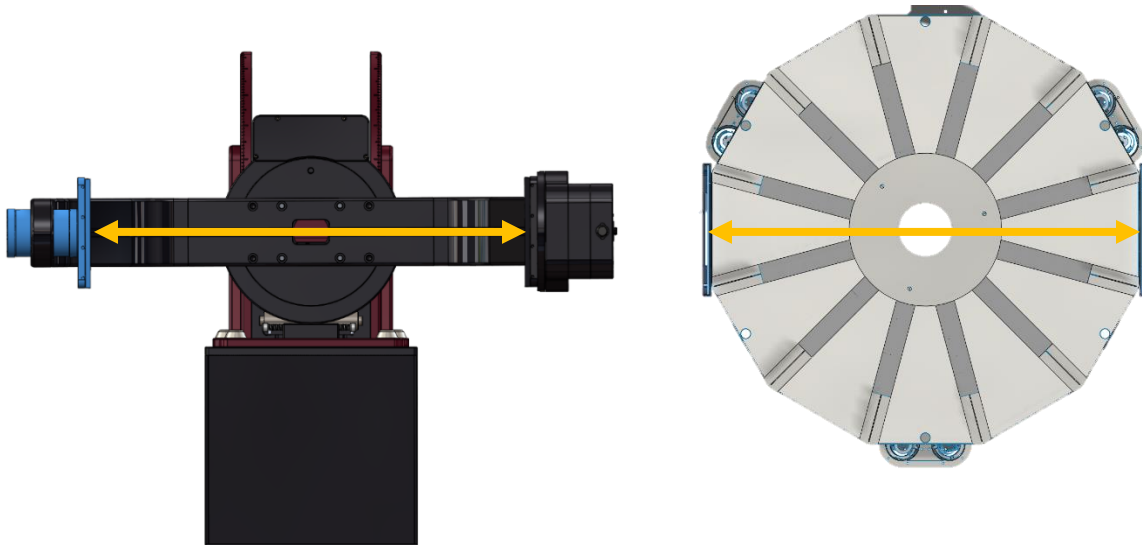


Figure 48: The distances shown with yellow arrows need to match from flat surface to flat surface.

The most effective way to measure this distance is to orient the telescope (ideally, by placing it on a roller cart or small table) to the correct height shown in Figure 49. The telescope needs to be flush against the gear-side fork first (shown on the right in Figure 48) then the cylinder assembly can be adjusted so both plates are flush on either side, effectively “pinching” the telescope between the forks.

On each side, have the dovetails match up (see Figure 50) before they are all the way flush. Once the plates are flush, the eight 5/16-18 x 1-1/8-inch SHCS should be screwed in and tightened through the stainless-steel “washer”. These screws clamp the open dovetails together and allow the telescope to slide along the optical axis when balancing the payload. When the scope is secured by tightening the four screws in each side, the telescope will be firmly mounted and still able to rotate about the declination axis.

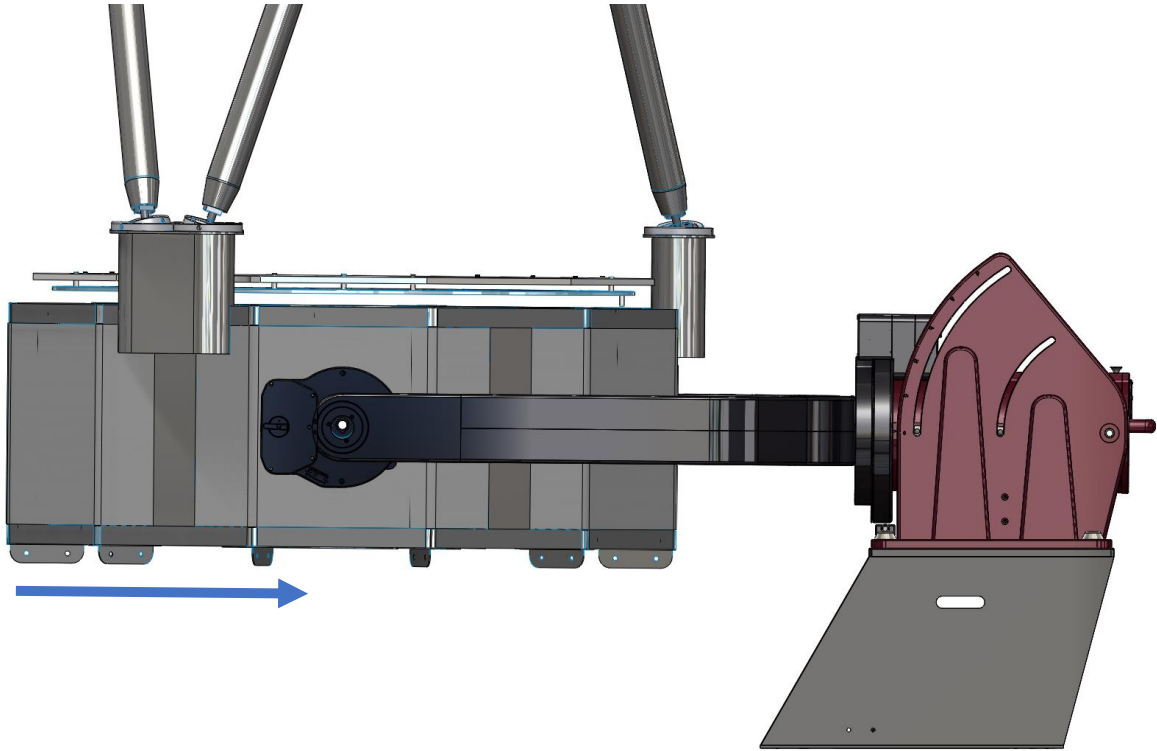


Figure 49: Scope installation position.



Figure 50: Dovetail mating (top view).

Telescope Balancing

To balance the telescope, the “pinching” on the scope needs checked, before the balance of the telescope can be adjusted.

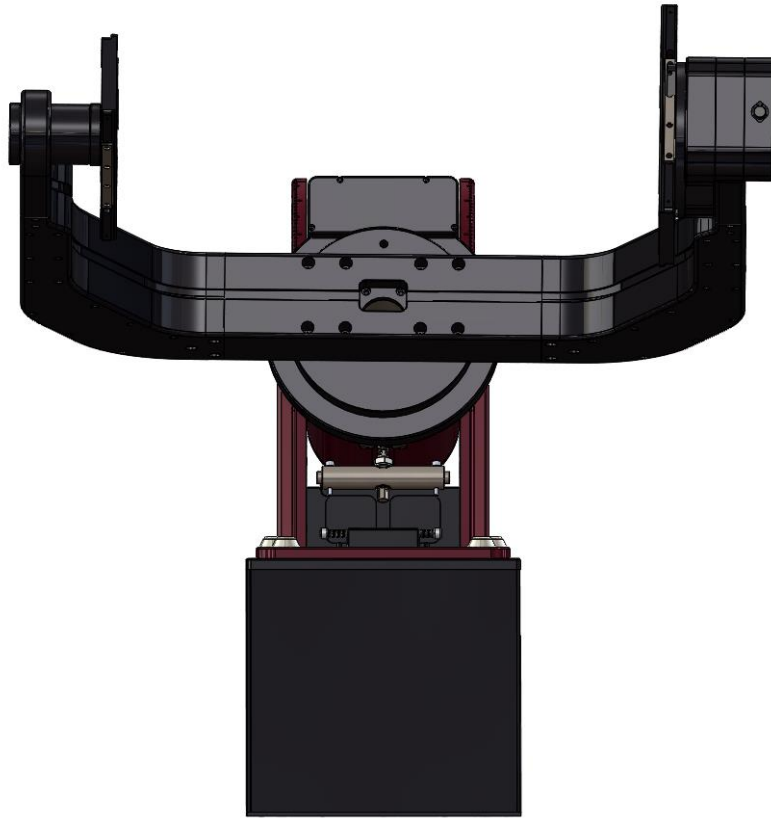


Figure 51: Elevated altitude adjuster.

Balancing in Right Ascension

Carefully and cautiously remove the RA locking bolt. The forks arms may need to be rotated slightly back and forth to free the bolt, as the RA axis will not be in balance at this point. The fork arm with the Dec gear is usually the heavier side, so be prepared to stop the natural rotation of the RA axis in the heavy direction.



With the locking bolt removed, the forks are free to rotate, and the telescope is out of unbalanced in both RA and Dec. Make sure the installation area is clear of all potential obstructions.

Allow the fork with the Dec gear to rotate downward so the arms are as close perpendicular to the floor as shown in Figure 52. Next, loosen the clamp setscrew (Figure 46) and make sure the mounting plates are still flush. Typically, the weight of the telescope in this direction causes the cylinder clamp to move slightly downward. Re-tighten the clamp screw while the fork is in this position.

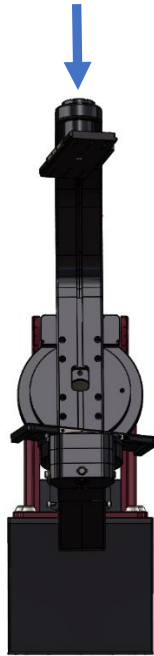


Figure 52: Fork arms oriented vertically, Dec gear side down.

Attach the counterweight shaft by screwing it in to the end of the cylinder assembly adjustment (also shown by the arrow in Figure 52). This counterweight shaft can be screwed in and out as far as needed to balance the RA axis while also keep a low profile. Two possible options are shown in Figure 53.

There are two different counterweights included in the accessory kit, a 3-pound counterweight (a little under 0.5-inches thick) and 6-pound counterweight (a little under 1 inch thick). There are also white Delrin™ washers and low profile hex nuts. The washers are for protecting, as well as keeping the counterweights from getting stuck together. The hex nut prevents the counterweight from being accidentally removed completely. The second counterweight has been included to use at the other end of the shaft if the entire length of the threaded shaft is needed to achieve balance.



The white Delrin washers must be placed between each counterweight before tightening. If a washer is not present, extreme force is required to separate them.

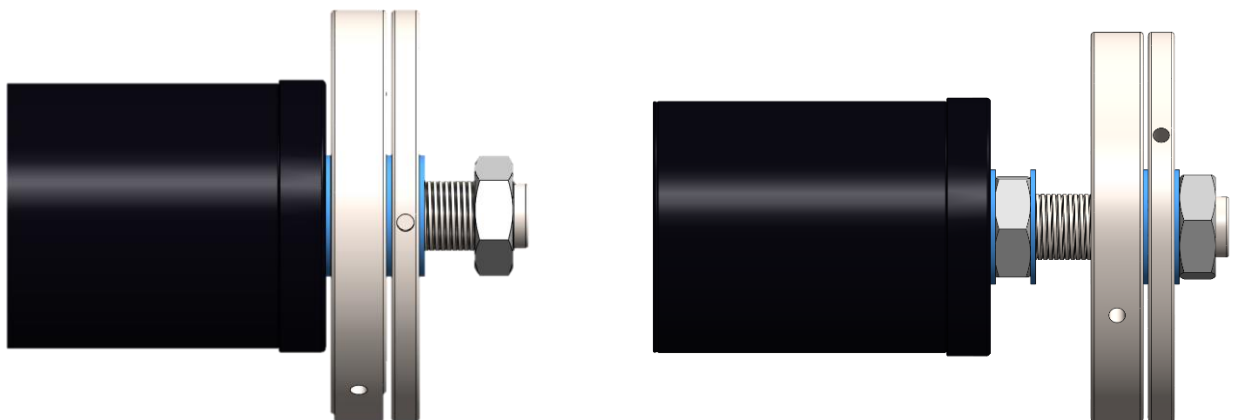


Figure 53: Counterweight and white Delrin washers highlighted in blue.

Balancing in Declination

With the scope balanced in RA, re-install the locking bolt so RA axis cannot rotate. The declination axis should be balanced only after all other instruments are attached to the back of the telescope (camera, focuser, etc.). When balancing the declination axis, the scope rails should be as close to horizontal as possible so that when the rails are freed there is not tendency for the telescope to slide in either direction.

To free the telescope so that it can be balanced in Dec, loosen the eight 5/16-inch x 1 1/8-inch SHCS (four on each side) which allows the telescope to slide along those two rails. While the scope cannot slide off the rails, adjust its position until the telescope is balanced in Dec. If extra travel is needed to achieve balance, make sure at least three screws, minimum, are engaged on each side to captivate the scope.

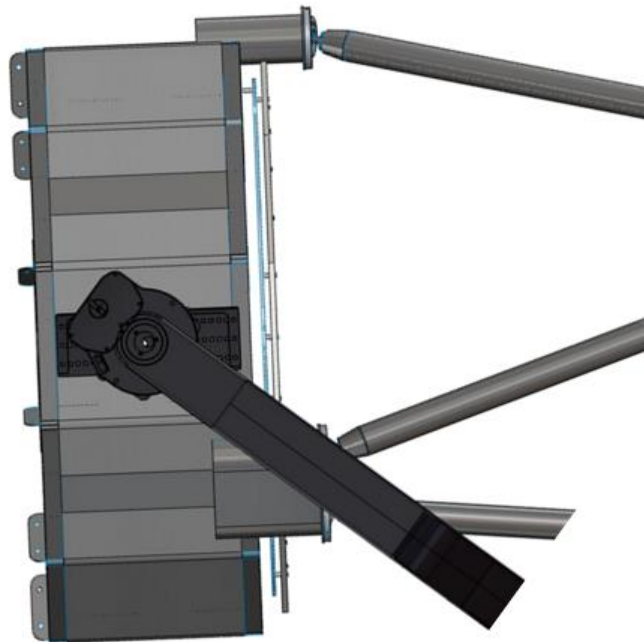


Figure 54: OTA and scope rail near horizontal.

Once the balance is adjusted in the Dec axis, rotate the switch as shown in Figure 55 to engage the worm and the gear. While rotating the switch, place one hand on the telescope to very slowly rotate the axis while gently turning the knob.



Figure 55: Balance knob in Run position.

Relieving Fork Stress

During the process of bolting the OTA to the forks, and balancing the payload, small misalignments between the OTA and the forks could introduce unwanted stresses. These stresses may adversely affect the behavior of the declination axis as the mount slews to different parts of the sky. The following procedure can help relieve them to achieve optimal mount performance.

1. Rotate the fork arms vertically, with the gear as close to the floor as possible, as shown in Figure 52.
 - a. Figure 52 does not show the OTA for clarity, but the OTA should be attached at this point.
2. Slowly loosen the clamp setscrew (Figure 46) enough so that the entire weight of the OTA is supported by the lower fork arm against its mounting plate.
 - a. The OTA is still captivated, but free to settle against the fork with the gear, so that potential play is removed by the other fork's clamp/sliding cylinder mechanism.
 - b. The mounting plate on the fork arm *with the gear* is fixed, and the OTA must be mounted 'hard' against it. (The force of gravity helps accomplish this when the fork arms are rotated vertically). In contrast, the mounting plate on the opposite fork arm is attached to a sliding cylinder that is designed to take up or account for any slack between the OTA and the fork arms.
3. Tighten the clamp setscrew (Figure 46).
4. Rotate the fork arms so that they are equidistant from the ground.
5. Loosen the clamp setscrew (Figure 46) to release any bending of the fork arm with the gear in Step 2 above.
6. Tighten the clamp setscrew.

The OTA is now mounted optimally, with no undue stresses between the two fork arms.