SOFTWARE BISQUE

Paramount Taurus Equatorial Fork Mount Specifications

Model 400 $20,000
Model 500 $45,000
Model 600 $55,000

The Software Bisque Paramount Taurus™ equatorial fork mount is available in three models*:

- Taurus Model 400 carries 17 inch (0.4 m) optical tube assemblies (OTAs) weighing up to 150 pounds (70 kg)†
- Taurus Model 500 carries 20 inch (0.5 m) OTAs weighing up to 400 pounds (180 kg)
- Taurus Model 600 carries 24 inch (0.6 m) OTAs weighing up to 400 pounds (180 kg)

**OTA and mounting pedestal pictured above are not included; optional accessories are described below.*

† The Taurus Model 400 retail price listed above does not include optional on-axis encoders.

The Taurus' transportable design consists of five separate components, each weighing less than 100 pounds (45 kg), making it the most easily deployable mount in its class. A two-person team can fully assemble the Taurus in about one hour. The fork arms are precision machined from solid aluminum to provide exceptional accuracy and rigidity.

Critical Features and Performance Specifications

Category	Feature/Specification	Details
Control software	Software Suite Includes: • TheSky Professional Edition • Camera Add On • TPoint Add On • Dome Add On 	The Paramount Taurus includes the world's most advanced observatory control software, for Mac, Windows, Linux and Raspbian. You'll enjoy the benefits of increased productivity and ease of use, on the OS of your choice, out of the box.
All-sky pointing accuracy	• 10 arcseconds or less with optional on-axis encoders • 20 arcseconds or less without on-axis encoders	In theory, the Paramount can point your telescope under one arcsecond (the limit of the control system's encoders). In *practice*, you should expect to achieve repeatable, quantifiable pointing accuracies at or below 20 arcseconds RMS by employing the TPoint Telescope Pointing Analysis software. The bottom line is that a Paramount with *TheSkyX Professional Edition*, the *TPoint Add On*, when used in conjunction with a well-mounted payload with a fixed mirror optical tube delivers exceptional pointing accuracy.
Backlash	Negligible	The spring-loaded worm-to-gear interface has virtually zero backlash in both the right ascension and declination axis.
Nightly startup	• Optional on-axis encoders ensure the mount is always ready to use. • Home, calibrate and start imaging without on-axis encoders	The Paramount with TPoint and ProTrack can be restarted (powered off then on) with virtually identical pointing and tracking accuracy from session to session.
Tracking performance	• With the optional on-axis encoders, periodic error is automatically removed and is negligible.	

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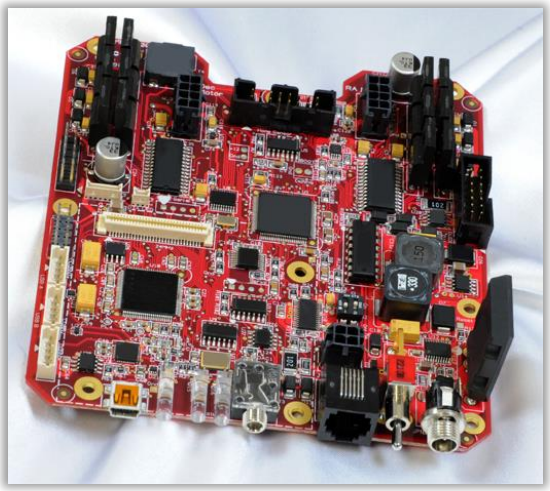
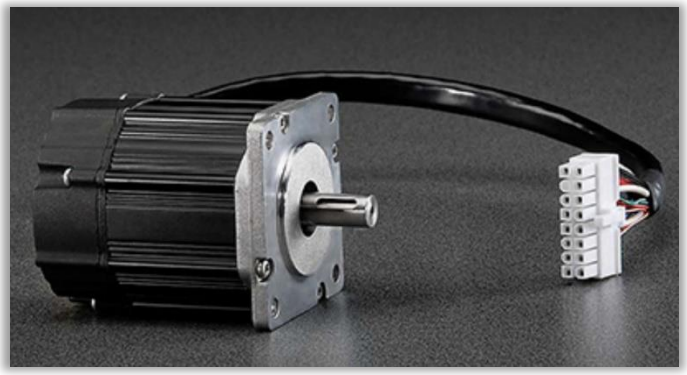
and periodic error	• Without on-axis encoders the worm wheel has seven (7) arcseconds or less peak to peak periodic error before correction.	The *peak-to-peak periodic error* for the Paramount right ascension gear is seven (7) arcseconds or less, *before periodic error correction*. The typical periodic error *after* periodic error correction is applied is one (1) arcsecond peak-to-peak or less. This means the tracking errors that are the result of the worm rotating are generally less than the errors introduced by atmospheric turbulence (local seeing) and are negligible. Coupled TPoint's *tracking* correction technology, called ProTrack™, the Paramount can acquire pinpoint stars in relatively long, unguided photos, even at moderate focal lengths.

Technical Specifications

Component	Specification	Details
Design	Equatorial fork	The equatorial fork design offers through-the-meridian tracking.
Composition		
Body and gears	6061 or 6063 aluminum	All mechanical components are manufactured and assembled in Golden, Colorado, USA. The only non-metal components are the worm block adjustment access hole covers, Delrin™ washers on the altitude axis retaining knobs, and the knob on the end of the hand paddle's joystick.
Worm gear	Brass	
Counterweights and counterweight shafts	Stainless steel	
Fasteners		
Control system electronics	MKS 5000 dual axis motion control system	Software Bisque's fourth-generation dual-axis motion control system features: • USB PC-to-mount interface for high-speed communication with TheSkyX Professional Edition

Component	Specification	Details
 *MKS 5000 dual-axis control system electronics.*		• LED and audible feedback for startup, homing, and error conditions • Integrated internal wiring for all mount electronics • Two-port USB hub on the Instrument Panel (near your equipment) • Tracking and "in-progress slews" are immediately stopped in the event the mount's payload encounters a fixed object, such as the side of the pier • Power supply included; Paramount Taurus max power output: 221W Max, 4.6A, +48V, Input: 100-240VAC ~50/60HZ • Field-upgradable firmware • Hand controller features an integrated mini-joystick controller and configurable five-position rate switch that allows single-handed mount control, an integrated bright red LED flashlight, a "hang anywhere" cable loop and 15-foot coiled hand paddle-to-mount cable • For mounts without on-axis encoders, programmable periodic error correction with periodic error curve fitting included with TheSkyX Professional Edition • Built-in 'ST-4 standard' autoguider port on the Instrument Panel. • Temperature-compensated internal oscillator precise to better than one part in 10 million to ensure accurate tracking rates over a wide temperature range

Component	Specification	Details
		• Built-in temperature sensor that allows the slew rate to be automatically reduced when the temperature drops • Soft "reboot" capability. This means that the control system can be restarted through software and does not have to be manually turned off, then on
Motors	NEMA 23 Brushless DC Servo motors with a single stack (Model 400) or double stack (Models 500/600) on the RA axis.	• All moving parts are on bearing surfaces and provide reliable operation that is suitable for all-night, every-clear-night use. • Fast slew speeds and consistent torque at all slew rates. Though good balance is always recommended, the Paramount can slew or track several foot-pounds out of balance. You'll spend less time fiddling with the telescope and more time acquiring data. • FEA designed with sintered Neodymium-Iron-Boron permanent magnet (no plastic) for optimal performance. • Optimized thermal design meets continuous high-torque demands. • Smooth rotation and quiet operation.
Work area illumination	Hand paddle LED	A built-in red LED on the hand paddle doubles as a flashlight that can be helpful during nightly setup tasks.
Accessories included		48V DC power supply, PC-to-mount USB cable, hand paddle, fork arm counterweight shaft and 10 pounds (4.5 kg) of fork-arm counterweights,



Brushless servo motors offer long life and reliable operation. Photo © Teknic.

Component	Specification	Details
		TheSkyX Pro with Add Ons for Mac, Windows, Linux and Raspbian, bubble level, hex wrench set.
Through-the-mount cabling	All the control system cabling is routed internally	Built-in cable conduits allow additional custom cables to be routed through the mount and up the fork arms.
Wi-Fi control	Wireless mount operation	The built-in *WiSky* control module allows the Paramount to be controlled wirelessly from an Internet-ready computer and TheSkyX Professional Edition, or with an iPhone or iPad running TheSky for iOS.

Physical Specifications

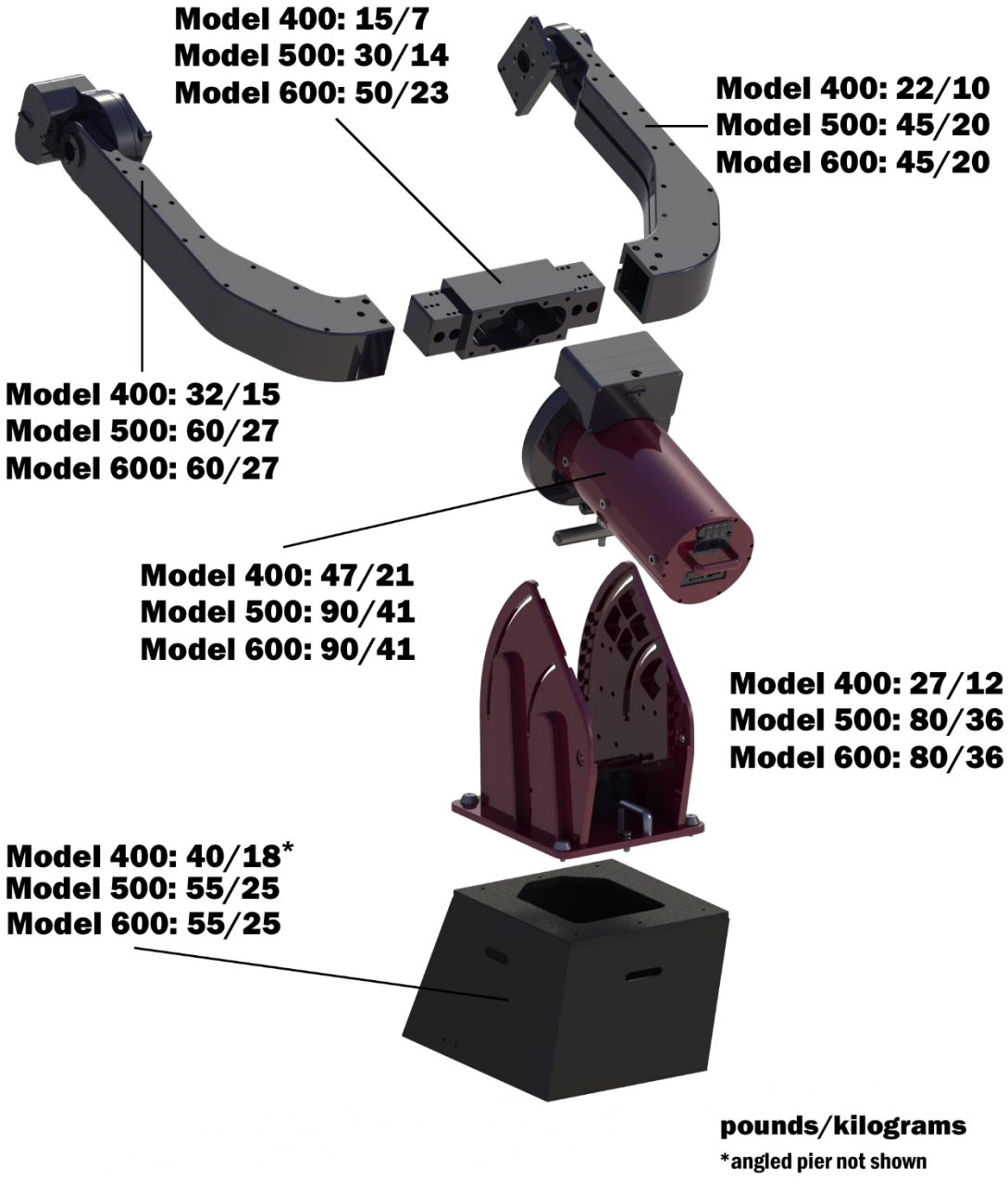
Equipment capacity	Model 400 • 150 lb. (70 kg) total instrument capacity. Model 500/600 • 400 lb. (180 kg) total instrument capacity.
Equatorial wedge polar axis	Polar axis can be adjusted from 0° to 58° using a built-in ratcheting altitude mechanism. A custom mounting pedestal can be manufactured for higher latitudes.
Tracking past meridian	The equatorial fork design permits tracking objects up to six (6) hours beyond the meridian.
Gears	Model 400 • Research-grade 11.5 in. (29 cm) 776-tooth aluminum right ascension gear. Model 500/600 • Research-grade 16 in. (38 cm) 735-tooth aluminum right ascension gear. All Models • 10 in. (25 cm) 420-tooth aluminum declination gear.

Construction	• 10 in. diameter right ascension tube. • 5 in. diameter right ascension shaft.
Bearings	Model 400 • 8 in. (20 cm) with ¾ in. cross section in right ascension. Model 500/600 • 9.5 in. (24 cm) with ¾ in. cross section in right ascension. All Models • 8 in. (20 cm) declination axis.
Fork arms	Machined 6061 aluminum with internal lightening. Model 400 • The fork can accommodate a single or multiple OTAs with an outer diameter of 14 in. (36 cm) up to 22 in. (55 cm). Model 500/600 • The fork can accommodate a single or multiple optical tube assemblies with an outer diameter of 24 in. (61 cm) up to 35 in. (89 cm). Note that 24 in. (61 cm) aperture telescopes from Officina Stellare™ and PlaneWave Instruments™ have an outer dimension with mounting plates of approximately 35 in. (89 cm).
Integrated mount base	Model 400 • Measures approximately 14 in. x 12 in. (36 cm x 30 cm) with 27 in. (43 cm) tall wedges. Model 500/600 • Measures approximately 20 in. x 16 in. (51 cm x 41 cm) with 23 in. (58 cm) tall wedges.
Altitude adjustment	¾ in. threaded adjuster with thrust bearings for smooth operation.
Azimuth adjustment	Mechanical, rotating push system with plus or minus 2.5° maximum adjustment.
Maximum slew speed	3.5 degrees per second in both axes. The factory default of 80% maximum slew rate works well with most payloads over a wide range of temperatures. Paramount mounts can slew at the maximum slew rate with a balanced

	payload that is approximately 50% or less of the total rated capacity, when the spring plunger pressure adjusted to factory standards at moderate ambient temperatures. As the mass of the payload increases, and/or the ambient temperature decreases, the mount may not be able to maintain maximum slew speeds. When near or above the stated capacity of the mount, or during cold temperature operation, slower maximum slew speeds and lower accelerations are required.
Weight	Model 400 • The total weight is approximately 142 lb. (65 kg). Model 500/600 • The total weight is approximately 375 lb. (170 kg). The mount breaks down into five separate components (not including the optional mounting base, see the *Components* diagram below for details) and can be assembled by a two-person team in about one hour.
Optional on-axis encoders	Renishaw encoders with 50 nanometer resolution tape provides better than 0.1 arcsecond resolution on each axis.
OTA mounting	OTA mounting is aided by a unique, built-in ratcheting system in the wedge. The OTA can be attached when the forks are horizontal, so that adjusting the fork spacing, attaching the OTA, and balancing the payload can be accomplished before raising the polar axis. The mechanical ratcheting system in the wedge allows the entire payload to be incrementally stepped up in six-degree increments. Once the mount's polar axis is approximately aligned, TheSkyX Professional Edition's Accurate Polar Alignment feature, coupled with the mount's mechanical fine-tuning mechanism, assure the mount is precisely aligned to the refracted pole.

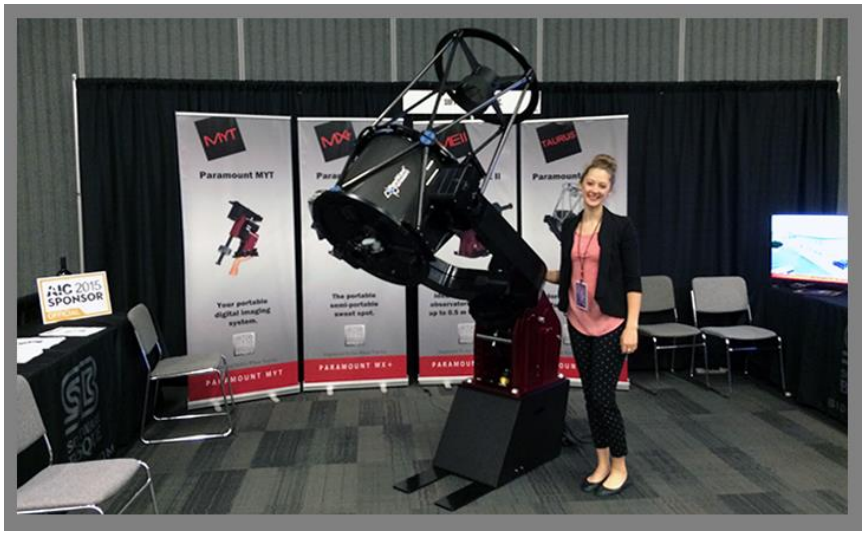
Fork arms can be placed horizontally to make mounting and balancing the optical tube assembly simpler.

Components


Model 400: 15/7
Model 500: 30/14
Model 600: 50/23
Model 400: 22/10
Model 500: 45/20
Model 600: 45/20
Model 400: 32/15
Model 500: 60/27
Model 600: 60/27
Model 400: 47/21
Model 500: 90/41
Model 600: 90/41
Model 400: 27/12
Model 500: 80/36
Model 600: 80/36
Model 400: 40/18*
Model 500: 55/25
Model 600: 55/25
pounds/kilograms
*angled pier not shown

Optional Accessories

Accessory	Price (USD)
Taurus Mounting Pier/Pedestal • Model 400: The Paramount Taurus can be mounted to the angled Software Bisque permanent pier. • Model 500/600: The Paramount Taurus can be mounted directly to the floor of the observatory with the optional welded aluminum mounting pedestal.	**Model 400: $800** **Model 500/600: $1,400**
10-ton Hydraulic Jack (Mounting Pedestal Required) • Model 400: Hydraulic Jack not available. • Model 500/600: The optional hydraulic jack can be mounted inside the pedestal so that the equatorial axis can be raised or lowered with ease.	**$3,000**
OTA Mounting Rails Optional optical tube assembly mounting hardware is available for Officina Stellare™ and PlaneWave Instruments™ telescopes. Custom mounting hardware for other OTAs can be designed and manufactured by Software Bisque as needed.	**$750**
TheSky for iOS Coupled with the WiSky module, control the Paramount from your iPhone or iPad. TheSky for iOS is available for download from the Apple™ App Store.	**$15 iPhone/$30 iPad**



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PARAMOUNT TAURUS

THE ROBOTIC TELESCOPE MOUNT ENGINEERED TO GO WHERE YOU GO.

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SOFTWARE BISQUE

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