SOFTWARE BISQUE

Introducing the New Series 6 German Equatorial Mounts

Paramount Robotic Mount Features and Specifications

Paramount MYT

Series 6

$7,995 – $13,995[1]

Ideal for portable use

70 lb. (32 kg) instrument capacity

140 lb. (64 kg) with counterweights

35 lb. (16 kg) mount weight

Paramount MX

Series 6

$10,995 – $16,995[1]

Mid-size for portable or permanent use

125 lb. (57 kg) instrument capacity

250 lb. (113 kg) with counterweights

54 lb. (24 kg) mount weight

Paramount ME

Series 6

$17,995 – $23,995[1]

Perfect for permanent and remote use

240 lb. (109 kg) instrument capacity

480 lb. (218 kg) with counterweights

85 lb. (38 kg) mount weight

Gear-driven Paramount robotic German equatorial mounts are available in three models:

- The portable *Paramount MYT* carries up to 11-in. (0.28 m) telescopes and all your digital imaging accessories (including the camera, autoguider, focuser, filter wheel and rotator).
- The *Paramount MX* supports up to 14-in. (0.35 m) telescopes with accessories.
- The *Paramount ME* shoulders up to 20-in. (0.5 m) telescopes with accessories.

[1]Mount price without and with optional extended temperature range on-axis absolute encoders, respectively.

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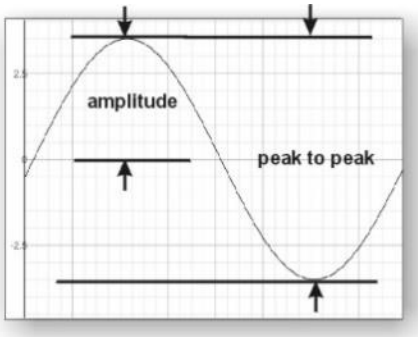
Critical Features and Performance Specifications (All Models)

Category	Feature/Specification	Details
Software 	TheSky™ Universal bundle includes interactive and easy-to-use observatory control software. Enjoy the benefits and productivity gains using one application to control your equipment.	TheSky™ Universal bundle retails for $1,095 and includes TheSky™ Professional with TPoint™, Cameras+, Domes, Multi-OS+, and Weather modules. The Multi-OS+ module lets you switch among multiple operating systems, including macOS™, Windows™, Ubuntu™ and Linux (x86_64 and ARM64 architectures). All conveniently integrated with a single look and feel across all platforms. 
Pointing Accuracy	TPoint™ delivers accuracy of 30 arcseconds or less. That accuracy applies to the *entire sky*, and not a limited area.	In theory, the Paramount can point your telescope to under one arcsecond (the limiting precision of the control system's encoders). In *practice*, you should expect to achieve repeatable, quantifiable pointing accuracies at or below 30 arcseconds RMS by employing TPoint's calibration and telescope modeling tools.
Tracking Accuracy	Note: We have Paramount™ MX owners who use TPoint™ and ProTrack™ to acquire 20-minute unguided exposures with spectacular results… *without* absolute encoders.	During imaging sessions, ProTrack™ continuously updates the mount's position in *both axes* to correct system-wide tracking errors, including tube flexures, atmospheric refraction, polar misalignment, harmonic errors from mis-centered encoders and more. On-axis absolute encoders alone *cannot* detect or correct these types of errors. A properly applied mount model is necessary to achieve superior unguided performance, with or without on-axis encoders. When used in conjunction with a rigid payload and a fixed-mirror telescope, Paramounts controlled by TheSky and TPoint deliver *unmatched pointing and tracking accuracy*.
Optional On-Axis Absolute Encoders	No homing required. Insignificant periodic error. Note: On-axis absolute encoders are not *required* to achieve exceptional imaging results. With motor-based encoders, a *one-time* PEC training procedure makes periodic error negligible.	The on-axis absolute ring encoders feature: • 26-bit Renishaw ring encoders with 0.02 arc second precision. • Periodic and other gear-based errors are effectively eliminated. • Homing is not required. • Fewer TPoint calibration points are required to generate a telescope model that produces exceptional pointing and tracking performance. • The extended temperature range (ETR) read heads have a minimum operating temperature of –40° C. • All Paramount Series 6 mounts can be upgraded with on-axis absolute ring encoders after purchase.
Nightly Startup	With *motor-based encoders*, initialize the mount and then observe. With *on-axis absolute encoders*, just go!	After cycling the power, and finding home, the Paramount has virtually identical pointing and tracking results from session to session. • Motor-based encoders are initialized by homing the mount. • Optional on-axis absolute encoders need no nightly initialization.

Critical Features and Performance Specifications (All Models)

Category	Feature/Specification	Details
Gear Backlash	Negligible	The spring-loaded worm-to-gear interface results in extremely small backlash in both the hour angle and declination axis.
Tracking Performance and Periodic Error	 *Graph showing the difference between amplitude and peak-to-peak periodic error.*	• With the optional on-axis absolute encoders, periodic error from the gears is effectively zero. • With motor-based encoders, the mechanical peak-to-peak periodic error in hour angle is seven (7) arcseconds or less, *before periodic error correction*. After a one-time training, the typical periodic error is 1 arcsecond peak-to-peak or less. That means the tracking errors from the Paramount worm gear are typically less than errors caused by local seeing. Correcting atmospheric refraction and other errors is what TPoint™ and ProTrack™ solve together and is what enables Paramounts without encoders to acquire pinpoint stars in relatively long, unguided photos.

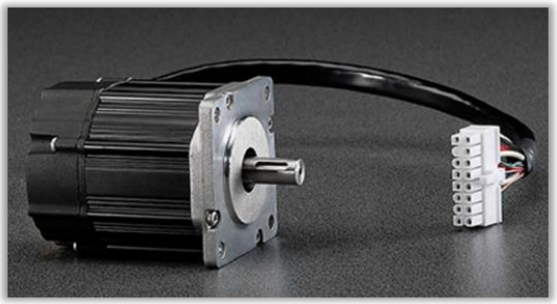
Technical Specifications (All Models)

Component	Specification	Details
Mount Type	German equatorial mount (GEM)	The GEM is a highly stable and extremely flexible design that is popular among amateur and professional astrophotographers.
Composition		
Body and gears	Aluminum (6061)	Virtually all of the mount's mechanical components are manufactured and assembled in Golden, Colorado, USA. A limited number of non-metallic components are used, such as access covers and plugs, Delrin™ washers on the altitude axis retaining knobs and the hand paddle's joystick mechanism.
Worm gears	Brass	
Counterweights, counterweight shafts, and fasteners	Stainless steel	
Telescope Control System	MKS 6000™ telescope control system (TCS).	The MKS 6000 TCS features: • USB Type C and Ethernet ports for high-speed communication with TheSky Professional. Or go wireless with Wi-Fi. • LED and audible feedback for startup, steady-state, homing, and error status. • Integrated internal wiring for all mount electronics. • In the event the mount's payload encounters a fixed object, tracking and slews are immediately stopped.

Technical Specifications (All Models)

Component	Specification	Details

 *The MKS 6000 TCS.*		• Paramount MYT and MX power supply (included):
		  ○ Power output: 48VDC 1.88A 90W max.
		  ○ Power input: 100-240V AC ~47-63 Hz at 4A.
		• Paramount ME power supply (included):
		  ○ Power output: 48VDC 4.6A 221W max.
		  ○ Power input: 100-240V AC ~50/60HZ.
		• Field-upgradable firmware.
		• Hand controller with integrated mini-joystick and configurable five position rate switch for single-handed mount control, an integrated bright red LED flashlight, large lanyard, and a 15-foot coiled cable.
		• For motor-encoder operation, TheSky Professional offers advanced periodic error correction curve fitting to minimize gear errors.
		• Precision temperature compensated internal oscillator to better than one part in 10 million ensures accurate tracking rates over a wide temperature range.
		• Built-in temperature sensor lowers the slew rate when the temperature drops.
		• After powered on, the TCS can be remotely restarted from TheSky Professional.

Motors  *All Paramount GEMs use the same powerful brushless DC servomotors for long life, and reliable operation. Photo © Teknic.*	Brushless DC servomotors	• 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. Spend less time fiddling with the mount 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.
Polar Alignment	TheSky's *Accurate Polar Alignment* feature	TheSky Professional's *Accurate Polar Alignment* feature uses the TPoint model to assist aligning the mount's polar axis at the refracted pole by

Technical Specifications (All Models)

Component	Specification	Details
	produces exceptional results.	centering the mechanical axis on a suitable bright star.
Slew Limits	Configurable from TheSky Professional	Slewing and tracking limits are configurable to mitigate equipment encountering physical limits, such as the side of the pier. The motors are also current limited so that slews automatically stop if an unexpected collision occurs.
Telescope Attachment	Versa-Plate™ Mounting Plate	The Versa-Plate allows most any optical tube assembly to be attached to the Paramount with OTA rings or using the integrated Losmandy™ D dovetail. • The drop-in dovetail makes attaching telescopes simple. • The Instrument Panel can be attached to either end of the Versa-Plate.
Instrument Panel Ports	The Versa-Plate offers integrated power ports, and an Ethernet ports near the telescope	The Instrument Panel has three XT60 power ports that can deliver continuous 12V DC at high amperages to your equipment. A pass-through Ethernet port can be used to connect TheSky Fusion or a single board computer to your network.
Worm and Worm Block Assembly		• Mechanical switches to disengage the worm and gear when balancing payloads. • Modular worm block can be replaced in the field.
Work Area Illumination	Hand paddle and control system LEDs	The built-in red LED flashlight on the hand paddle illuminates nightly setup tasks. The Paramount MX and ME have integrated red lights beneath the polar axis to illuminate your work area during setup.
Axes Locking Mechanism	Helps ensure safe, convenient setup.	Both Paramount MYT and Paramount MX axes incorporate a mechanical locking plunger to prevent axis rotation when adding or removing equipment. The Paramount ME uses separate locking bolts that can be installed to prevent axis rotation during setup.
Included Items	When comparing, be sure to consider what comes standard.	Counterweight(s), counterweight shaft, Versa-Plate, 48V DC power supply unit, PC-to-mount USB cable and Ethernet cable, hand paddle,

Technical Specifications (All Models)

Component	Specification	Details
		TheSky™ Universal bundle, ProTrack™, bubble level, and a standard hex wrench set.
Through-the-Mount Cabling	All cables are routed inside the mount.	Internal cable conduits allow additional custom cables to be routed through the mount.
Documentation	Paramount User Guide	The printed user guide is included with the mount and the latest revision can also be downloadable in PDF format from Bisque.com (log in required).

Physical Specifications

	MYT	MX	ME
Equipment Capacity[2] GEMs require counterweights to balance the optical payload.	70 lb. (32 kg) total instrument capacity (not including counterweights). The *total* Paramount MyT carrying capacity is 140 lb. (64 kg) including equipment.	125 lb. (57 kg) total instrument capacity (not including counterweights). The *total* Paramount MX carrying capacity is 250 lb. (113 kg) including equipment.	240 lb. (109 kg) total instrument capacity (not including counterweights). The *total* Paramount ME carrying capacity is 480 lb. (218 kg) including equipment.
Mount Weight Includes the weight of the Versa-Plate telescope mounting adaptor.	35 lb. (16 kg)	54 lb. (24 kg)	85 lb. (38 kg)
Counterweights[3] Stainless-steel construction with mar-resistant brass locking plungers.	One 20 lb. (9 kg) counterweight is included can balance about 25-30 lb. (11-15 kg) of equipment.	Two 20 lb. (9 kg) counterweights are included and can balance about 40-50 lb. (18-22 kg) of equipment.	Two 30 lb. (14 kg) counterweights are included and can balance about 60-70 lb. (27-32 kg) of equipment.
Counterweight Shaft Stainless-steel construction.	The 13 in. (33 cm) x 1.5 in. (3.81 cm) counterweight shaft can carry up to four 9 kg (20 lb.) or five 4 kg (10 lb.) counterweights.	The 16 in. (41 cm) long x 1.5-in. counterweight shaft can carry up to six counterweights.	The 18.5 in. (47 cm) x 1.875 in. counterweight shaft can carry up to six counterweights.
Equatorial wedge range for polar axis elevation adjustment	0° to 64°	0° to 70° An optional polar wedge is available for higher latitudes.	14° to 62° An optional polar wedge is available for latitudes outside this range.
Tracking past meridian	2 hours typical. Up to 4 hours depending on the telescope and latitude.	2 hours typical. Up to 4 hours depending on the telescope and latitude.	3 hours
Gears	Research-grade 6.5 in. (16.5 cm) 320 tooth right	Research-grade 7.5 in. (19 cm) 375 tooth right ascension and declination gears.	Research-grade 11.4 in. (29 cm) 576 tooth right ascension gear.

Physical Specifications

	MYT	MX	ME
	ascension and declination gears.		9.5 in. (24 cm) 475 tooth declination gear.
Bearings	5 in. (12.5 cm) contact ball bearings in both right ascension and declination.	6 in. (15 cm) contact ball bearings in both right ascension and declination axis.	8 in. (20 cm) 48-point contact ball bearings in both right ascension and declination axes.
External Finish	• Powder-coated red components. • Anodized black components.	• Powder-coated red components. • Anodized black components.	• Powder-coated red components. • Anodized black components.
Maximum Slew Rates[4]	8° per second in hour angle and declination.	5.4° per second in hour angle and declination.	4° per second in hour angle and declination.

[2] Additional counterweights may be required to balance heavier payloads.
[3] These values *do not* include the weight of the removable counterweight shaft or the counterweights. The Paramount's main body cannot be disassembled into smaller components.
[4] Maximum Slew Rates Disclaimer: The default slew rate is set to 80% of the maximum rate and works well with most payloads over a wide temperature range. Paramounts can slew at the *maximum slew rate* with a balanced payload that is approximately 50% of the total rated capacity or less, when the spring plunger pressure is adjusted properly and operating at moderate ambient temperatures.
As the mass of the payload increases, and/or the ambient temperature decreases, the mount may not be able to slew at the maximum slew speeds. For heavier payloads, or during cold temperature operation, the mount must be configured to run at a slower maximum slew speed and lower acceleration to prevent the motors from stalling. The Paramount MYT and MX can achieve maximum slew rates up to 10° per second by purchasing the optional higher wattage power supply.

Optional Accessories

	MYT	MX	ME
On-Axis Absolute Encoders (with Extended Temperature Range Read Heads) No periodic error, no homing required.	✓	✓	✓
Counterweight Shaft Extension Bar Extends the length of the standard counterweight shaft to help balance heavier payloads.	✓	✓	✓
Permanent Piers Piers are available in standard heights between 12 in. and 48 in. (30 cm to 122 cm). Custom-height piers up to 60 in. (152 cm) can be manufactured upon request.	✓	✓	✓
Pier Adaptor Plate A generic anodized aluminum adaptor plate that can be used to attach the Paramount to an existing permanent pier or tripod.	✓	✓	✓
Paramount Power Adaptor for EGO™ Batteries Power the Paramount mount using an EGO battery during portable use.	✓	✓	✓
Helium™ Tripod A lightweight, easy to setup, and extremely stable tripod for portable use.	✓	✓	✓

Optional Accessories

	MYT	MX	ME
Polar Wedge Allows the elevation of the Paramount's polar axis to reach low and high latitudes.	-	✓	✓
Large Dovetail Plate Enables the Paramount ME's Versa-Plate to accept optical tube assemblies that use the PlaneWave Instruments dovetails (and telescopes by Officina Stellare).	-	-	✓
TheSky Fusion Integrated computer, equipment power supply, and TheSky Imaging control software device.	✓	✓	✓
Telescope Mounting Rings Software Bisque manufactures telescope mounting rings for the Celestron™ C11, Celestron™ C14 and Meade™ 14-in. and Meade™ 16-in. telescopes.	✓	✓	✓

Helium™ Tripod
Model 200 (MYT/MX): **$2,400**
Model 400 (MX/ME): **$2,600**

48V DC EGO™ Battery to Paramount Power Adaptor: ***$242***
(EGO™ battery sold separately.)

TheSky Fusion **$1,895**

TheSky Fusion™ attaches to your telescope and lets you observe with TheSky Imaging and power all your equipment. Built-in Wi-Fi and Ethernet means you can image at the telescope, remotely from the comfort of your living room, or across the globe with any smartphone, tablet, desktop, or notebook computer.

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