

# 10 MICRON HPS MOUNTS

**TRUE PRECISION - FOR YOUR ASTRONOMICAL FUTURE**

• Unguided imaging • Satellite tracking • high-precision spectroscopy • Exoplanet search – even for field use!



**GM 1000 HPS**  
25kg (55 lbs)  
load capacity



**GM 2000 HPS**  
50kg (110 lbs)  
load capacity



**GM 3000 HPS**  
100kg (220 lbs)  
load capacity



**GM 4000 HPS**  
150kg (330 lbs)  
load capacity

## DRIVE MECHANICS

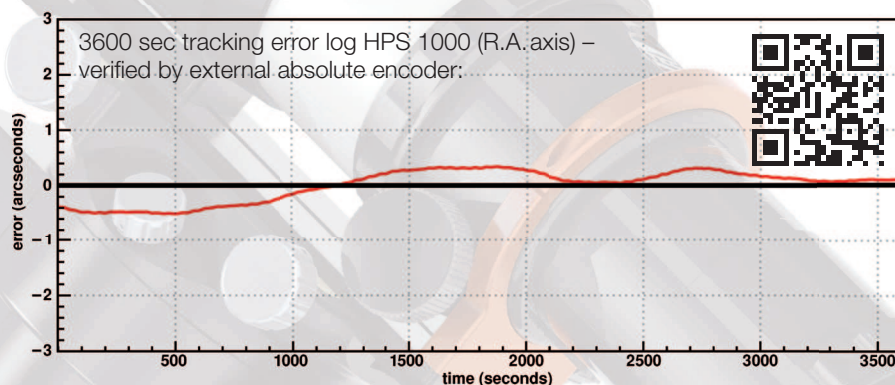
- Self-locking, high-precision worm-wheel-drives with classic friction clutches
- Internal wiring – no external mount cables
- High torque Servo DC motors eliminate imbalance motor stall
- Proprietary motor-electronics for easy servicing

## DRIVE ELECTRONICS

- Absolute on-axis encoders in RA & Dec, featuring more than 10 million increments (interpolated), fully encapsulated and calibrated
- Up to 0.5" RMS tracking accuracy - for long duration unguided imaging
- Closed loop (encoder controlled) satellite tracking
- speed - up to 20°/s
- Extremely low power consumption and miniature format (20 x 15 x 8cm) electronics
- After an observing session, the entire electronics box (motor electronics with Linux computer) and HC can be easily detached and protected from premature aging and moisture damage
- Service friendly design - electronics box and HC can be easily exchanged for service, without returning the precisely adjusted HPS mount

## FIRMWARE

- Automatic refraction and flexure correction functions implemented – the only way for perfect unguided tracking during long exposures
- Intuitively operated V2 software and QCI motor control system, integrated into an onboard Linux computer – intelligence built-in
- No external PC or laptop mandatory in the field – all functions in the onboard computer can be accessed via stand-alone hand control unit (HC)
- Precise multistar pointing models, entering satellite and comet trajectories, programming individual observing sessions and much more

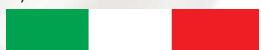


APOD 2012 : GM 2000 HPS and TEC 110 FL

NGC 2264: © Rolf Geissinger

*„Quality exists - when the price is long forgotten“ Sir Henry Royce - founder of RollsRoyce*

- Well documented firmware and drivers, working autonomously w/o additional planetarium software, without need for external RS-232 converters / USB ports
- Excellent documentation in English and German
- Electronic balance - requiring one time balancing only
- Ultra stable pointing models for safe East/West load reversal – no change of pointing model necessary when changing accessories
- Precise polar alignment – software aided and accomplished within minutes
- Fully remote controlled via your observatory PC with 10/100 LAN included, perfectly prepared for your future Internet observatory
- Remote diagnostics assist option via Internet



Authorized Dealer:



SPECIFICATIONS	GM 1000 HPS	GM 2000 HPS	GM 3000 HPS	GM 4000 HPS
Mount Type	German Equatorial Mount			
Weight (mount w/o acc.)	~ 19.5 kg – 43 lbs	~ 29 kg – 64 lbs	~ 60 kg – 132 lbs	~ 120 kg – 264 lbs
Weight, Ultraportable version (mount)	-----	~ 14 kg – 31 lbs + ~15 kg – 33 lbs (without accessories)	-----	-----
Instrument payload capacity	25 kg – 55 lbs	50 kg – 110 lbs	100 kg – 220 lbs	150 kg – 330 lbs
Latitude range	0° – 82° (90° optional)	20° – 70°	20° – 70°	23° – 70°
Azimuth fine adjustment range	+/- 7.5°	+/- 10°	+/- 10°	+/- 10°
Counterweight shaft	30 mm diameter, stainless steel, weight 1.7 kg – 3.7 lbs	40 mm diameter, stainless steel, weight 4 kg – 9 lbs	50 mm diameter, stainless steel, weight 8 kg – 18 lbs	60 mm diameter, stainless steel, weight 13 kg – 29 lbs
Axes	30 mm diameter, alloy steel	50 mm diameter, alloy steel	a.r. 80mm / dec. 50mm diameter, alloy steel	a.r. 85mm / dec. 80mm diameter, alloy steel
Bearings	Pre-loaded tapered roller bearings	Pre-loaded tapered roller bearing	Pre-loaded tapered roller bearing	Pre-loaded tapered roller bearing
Worm wheels	250 teeth, 125 mm diameter, B14 bronze	215 teeth, 172 mm diameter, B14 bronze	a.r. 315 teeth, 244 mm diameter, B14 bronze dec. 250 teeth, 192 mm diameter, B14 bronze	a.r. 430 teeth, 330 mm diameter, B14 bronze dec. 315 teeth, 244 mm diameter, B14 bronze
Worms	20mm diameter, tempered alloy steel, grinded and lapped	24mm diameter, tempered alloy steel, grinded and lapped	32mm / 24mm diameter, tempered alloy steel, grinded and lapped	32mm diameter, tempered alloy steel, grinded and lapped
Motors	2 axes AC servo brushless			
Power supply	24 V DC			
Power consumption	~ 0,5 A while tracking ~ 3 A at maximum speed ~ 4 A peak	~ 0,7 A while tracking ~ 3 A at maximum speed ~ 5 A peak	~ 1 A while tracking ~ 3 A at maximum speed ~ 5 A peak	~ 1.5 A while tracking ~ 5 A at maximum speed ~ 6 A peak
Go-to speed	Adjustable from 2°/s to 15°/s	Adjustable from 2°/s to 20°/s	Adjustable from 2°/s to 12°/s	Adjustable from 2°/s to 5°/s

## GENERAL SPECIFICATIONS

Transmission system	Backlash-free system with timing belt and automatic backlash recovery
Pointing accuracy	< 20" with internal 25-stars software mapping - max.100stars; possibility to use the Model Maker software for automated alignment operation.
Average tracking accuracy	~ 1" typical for 15 minutes ~ 0,6" RMS with internal 25-stars software mapping and compensation of system flexures and polar alignment errors
Security stop	+/- 30° past meridian in r.a. (software) +/- 45° past meridian in r.a. (mechanical)
Communication ports	RS-232 port; GPS port; autoguide ST-4 standard port; Ethernet 10/100 port
Database	Stars: by Common Names, Bayer designation, Flamsteed designation, Bright Star Catalogue, SAO, HIP, HD, PPM, ADS, GCVS. Deep-sky: M, NGC, IC, PGC ,UGC limited up to mV = 16. Solar system: Sun, Moon, planets, asteroids, comets, artificial satellites. Equatorial and altazimuth coordinates. User defined objects. Quick slewing positions recalls for frequent focusing or useful operation.
Firmware features	User defined mount parking positions, 2stars and 3stars alignment function, up to 100 alignment stars for modeling, correction of polar alignment and orthogonality errors, estimate of average pointing error, storage of multiple pointing models, sidereal, solar and lunar tracking speed adjustable on both axes, declination-based autoguide speed correction, adjustable horizon height limit, pointing and tracking past meridian, assisted electronic balance adjustment, manual, automatic or GPS based time and coordinates setting, dome control via RS-232, configurable atmospheric refraction, network settings, comets and asteroids filter, multi-language interface. Remote Assist via Internet connection.
PC control	Remote control via RS-232, Ethernet; proprietary 10Micron ASCOM driver, LX200 compatible protocol; update of firmware and orbital elements of comets, asteroids and artificial satellites via RS-232 or Ethernet; PC virtual KeyPad control panel via RS-232 or Ethernet. Optional: Integrated Wi-Fi module for connection with Smartphones, Ipads and Tablets.