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10 MICRON astro•technology
by COMEC-TECHNOLOGY

10 MICRON HPS MOUNTS

TRUE PRECISION – FOR YOUR ASTRONOMICAL FUTURE

BUILT-IN ABSOLUTE ENCODERS - UNGUIDED imaging! - even in field use!

NEW

GM 1000 HPS
25kg (55 lbs) load capacity

GM 2000 HPS II C
50kg (110 lbs) load capacity

GM 3000 HPS
100kg (220 lbs) load capacity

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

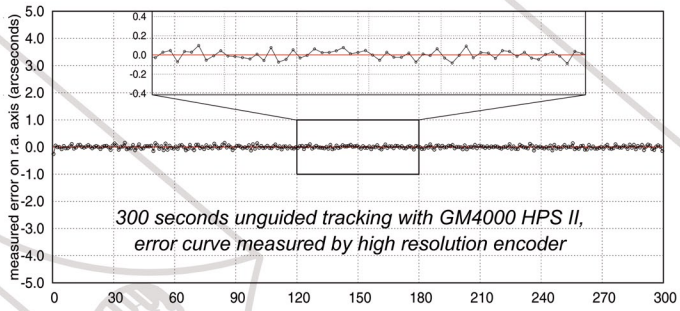
FEATURES

MECHANICS

- Premium materials and processing for high quality and durability
- No casting parts, all pieces are CNC milled
- High-precision, traditional worm-wheel drives and clutches for the best reliability
- Internal wiring – no external mount cables
- High torque brushless servo motors, maintenance free, allowing a pointing speed up to 20°/s (GM2000)
- Proprietary motor drive electronic board for easy servicing

FIRMWARE

- Very powerful firmware featuring advanced mount modeling, with several parameters computation (refraction, optical/mechanical flexures, leap second, mount orientation, object motion, clock syncronisation and temperature etc.) and special functions (dual tracking, assisted polar alignement procedure etc): the only way for perfect unguided tracking during long exposures (up to 0.6" RMS accuracy)
- Intuitively operated system, proprietary motor controller with temperature compensated clock, onboard industrial class Linux computer – intelligence built-in
- No external PC or laptop mandatory in the field – all functions in the onboard computer can be operated via stand-alone hand control unit (Keypad)
- Precise multistars pointing model suitable for applications such as high precision spectroscopy, TLE manager for satellite tracking, orbital parameters management for minor planets and comets, individual observing sessions management and much more
- Ultra stable pointing models for safe East/West load reversal – recordable models database for different telescope setups and accessories configurations
- Precise and fast polar alignment procedure, managed by the internal software and executable in minutes
- Fully remote control via your observatory PC through 10/100/1000 LAN or WiFi, thanks to a well documented command protocol and drivers, via custom software or standard planetarium software.
- Manual, Automatic (ClockSync proprietary software) or GPS based time; leap second support and full computation of the UT1-UTC timescales.
- Electronic balance feature
- Remote diagnostics web assist option with dedicated server.



300 seconds unguided tracking with GM4000 HPS II, error curve measured by high resolution encoder

PROFESSIONAL GRAPHIC KEYPAD INCLUDED:

- Stand alone control unit - no PC required - includes all necessary functions
- Rugged keypad with metal body and reliable industrial micro switches
- Large graphic display, with up to five text lines and status icon, heated for low temperature operation, dimmable display and keyboard with LED backlit keys

" The quality will remain long after the price is forgotten" - Henry Royce (founder of RollsRoyce)

ELECTRONICS

- Closed loop system with on axis encoders feedback
- Absolute encoders directly mounted on both RA & Dec axes, featuring <0.1 arcsec readout error, fully encapsulated and factory calibrated
- Extremely low power consumption and micro format (20 x 15 x 8cm) electronics
- Control box and keypad can be easily taken away after your observations for a better protection of the electronic components or for servicing, with no need to return your mount!
- Premium quality electric and electronic components for use in a wide range of operational temperatures
- Virtual Keypad tool on PC available for remote control

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Authorized 10Micron Dealer:

Made in Italy

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NEW

Specifications

Specifications	GM 1000 HPS	GM 2000 HPS II	GM 3000 HPS	GM 4000 HPS II
Mount Type	German Equatorial Mount			
Weight (mount w/o acc.)	~ 19.5 kg – *43 lbs*	----------	~ 65 kg – *143 lbs*	~ 125 kg – *276 lbs*
Weight, Combi version (mount)	----------	~ 18,5 kg – *40 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°	20° – 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 ~ 3.5 A at maximum speed ~ 4 A peak	~ 1.5 A while tracking ~ 4 A at maximum speed ~ 5 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 8°/s

General Specifications

Transmission system	Backlash-free system with timing belt and automatic backlash recovery - traditional worm gear mechanics
Pointing accuracy	< 20" with internal 25-stars software mapping - max.100 stars; modeling software " Model Maker " available for automatic alignment
Average tracking accuracy	~ 1" typical for 15 minutes / ~ 0,6" RMS with internal 25-stars model* (real sky observations) < 0.1" encoder readout error - *see "Firmware features" below for all details about our star modeling
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 10/100/1000 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, automatic (ClockSync proprietary software) manual or GPS time & site coordinates synchronization, leap seconds support and full accounting for the UT1-UTC timescale, configurable atmospheric refraction, direct Baader dome control via RS-232, network settings, comets and asteroids filter, multi-language interface. Remote Assist via Internet connection. We can connect to your mount from our facility for diagnostic and servicing
Keypad control	Rugged keypad with metal housing and reliable professional micro switches, Large graphic display – heated for operation under lowest temperatures, dimmable display and keyboard with back-lit keys, five information menu lines for coordinates, object information and symbols showing mount status and active external connections and accessories. All the functionality of the mount is available through the keypad without requiring an external PC
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, Integrated Wi-Fi for connection with smartphones and tablets and any wireless network

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