

In order to meet the needs of the most demanding astro-imagers and researchers, we have integrated the optional Renishaw RESOLUTE Absolute Encoders into our 1600GTO mount. These encoders and readheads comprise a true absolute non-contact optical encoder system, which offers the latest in technological advances to ensure accurate and reliable performance in the field. What will this mean for you? Near perfect periodic error correction and your mount will never be lost, which will result in greater productivity and hassle-free imaging sessions. Your mount will be invisible, as it should be.

Consider these features when the absolute encoders are installed in both axes:

- Absolute encoder knows the exact position of the gear angle of the mount when the power is applied.
- No separate homing sensor is needed. Homing can be set to any gear angle via a simple software command.
- Adjustable software slewing limits based on the position of the gear angle allow you to safely image several hours past the meridian.
- The R.A. encoder is used to set the exact sidereal rate to eliminate periodic error of the worm gear. When used in conjunction with our Astro-Physics Command Center (APCC) Pro version software (purchased separately), the sidereal rate can be trimmed in small increments and adjusted to any rate necessary to counter R.A. and Dec. drift due to flexure, atmospheric refraction, polar misalignment, etc.
- High immunity to dirt, scratches and light oils to withstand real-world observatory conditions.
- Sealed readhead for high reliability in harsh environments.
- Integral set-up LED on readhead for quick set-up and instant “health check” any time.
- Built-in position-checking algorithm constantly monitors calculations for ultimate safety and reliability.
- Low temperature version available.

RESOLUTE uses a unique single optical absolute track (a world first) combined with sophisticated optics. The readhead acts like an ultra fast miniature digital camera, taking photos of the coded scale of the encoder ring. Photos are analyzed by a high-speed DSP to determine absolute position. The built-in position check algorithm actively checks every reading. Advanced optics and position determination algorithms are designed to provide low noise and low sub-divisional error. The result is unparalleled performance.

Specifications

- One-piece 4” diameter stainless steel ring with a single track, true absolute scale marked directly onto the periphery. High accuracy graduations ensure outstanding metrology and reliability.
- Resolution: 67 million ticks per rotation, 0.019 arc second per tick.
- Accuracy is +/- 3 arc seconds over the entire 24 hour, 360 degree rotation. +/- 0.2 arc sec per hour typical accuracy.

- RESOLUTE Absolute Encoder:
Operating: -20 degrees C to +80 degrees C (-4 F to +176 F)
Storage: -20 degrees C to +80 degrees C (-4 F to +176 F)
- RESOLUTE ETR (Extended Temperature Range) Encoder:
Operating: -40 degrees C to +80 degrees C (-40 F to +176 F)
Storage: -40 degrees C to +80 degrees C (-40 F to +176 F)
- Operation down to -40 degrees C (-40 degrees F) in non-condensing environments is guaranteed by Renishaw. The encoder is also tough enough to survive the physical punishment of harsh environments with solid steel ring scales

We feel that even longer exposures with refractors are feasible since, typically, they only have a tiny amount of flexure compared to mirror scopes. This is particularly true if the object is straight up. However, since many optical systems have inherent flex issues and possible mirror movements and tracking rates vary from one part of the sky to another, APCC (Astro-Physics Command Center Pro version software, purchased separately) will provide additional corrections to make unguided imaging a reality for a wide variety of optical systems, assuming that the error is repeatable and can be modeled. Tests at the University of Hawaii with our 3600GTOPE equipped with an R.A. encoder and using the APCC Pro version with the APPM pointing model (beta version) already have shown that unguided exposures are possible with large Ritchey-Cretien imaging scopes. This will greatly enhance their research program.

Order Options

The 1600GTO can be used with the R.A. encoder only or both R.A. and Dec. If you order the R.A. encoder only, you will gain the advantage of minimizing your tracking error. However, you will not have the position angle and homing features since information from both axes is required.

You may order your 1600GTO with the Absolute Optical Encoder system installed and adjusted at Astro-Physics or you may order the kit at a later date to install yourself. This kit will include the stainless steel encoder ring precisely installed into the 1600GTO adapter, the readhead assembly, cables and the auxiliary GTOAE control box to install on your mount. The system will be tested as a whole prior to shipment to ensure that all components are functioning properly. In order to complete the assembly, a little manual dexterity is required to position the screws in a restrictive space. Total assembly time is estimated at 20-30 minutes for both encoders. This kit can be retrofit onto your 1600GTO when you are ready to take advantage of their capabilities. We will provide detailed instructions to guide you through this process.

R.A. and Dec. Absolute Encoder and Readhead

What's Included:

- R.A. and Dec. Absolute Encoders installed and aligned in adapter rings
- R.A. and Dec. Readheads with wire harness aligned in adapters
- GTOAE Control Box

- Cable from GTOAE Control Box to GTOCP3 Control Box
- Cable from GTOAE Control Box to Interface at rear of the R.A. axis
- Power Cable
- Control Box Clamp for GTOAE
- All required fasteners

Order

R.A. and Dec. Absolute Encoder and Readhead, installed at Astro-Physics (16AE-RD-I)

R.A. and Dec. Absolute Encoder and Readhead Kit, installed by customer (16AE-RD-KIT)

R.A. and Dec. Absolute Encoder and Readhead, low temperature version, installed at Astro-Physics (16AE-RD-L-I)

R.A. and Dec. Absolute Encoder and Readhead Kit, low temperature version, installed by customer (16AE-RD-L-KIT)

R.A. Absolute Encoder and Readhead

What's Included:

- R.A. Absolute Encoder installed and aligned in adapter ring
- R.A. Readhead with wire harness aligned in adapter
- GTOAE Control Box
- Cable from GTOAE Control Box to GTOCP3 Control Box
- Cable from GTOAE Control Box to Interface at rear of the R.A. axis
- Power Cable
- Control Box Clamp for GTOAE
- All required fasteners

Order

R.A. Absolute Encoder and Readhead, installed at Astro-Physics (16AE-R-I)

R.A. Absolute Encoder and Readhead Kit, installed by customer (16AE-R-KIT)

R.A. Absolute Encoder and Readhead, low temperature version, installed at Astro-Physics (16AE-R-L-I)

R.A. Absolute Encoder and Readhead Kit, low temperature version, installed by customer (16AE-R-L-KIT)

Note: The Astro-Physics Command Center (APCC) software is not included as part of this package since you may have purchased it separately at an earlier date. In that case, there is no reason to purchase a second license.