

## Installation Guide of Telescope Drive Master Encoder-adapter for CGEM mount

First of all, thank you very much for purchasing our product called "Telescope Drive Master" and congratulation for your decision. This system will improve the tracking accuracy of your Celestron equatorial mount dramatically independently from its original periodic error amplitude because both periodic and aperiodic errors of your mount will completely be eliminated using our real time, ultra high precision correction system, without using conventional autoguider. We guarantee that your tracking error will remain within 1" (one arc-second) range total (or  $\pm 0.5''$ ) within 95% of your exposure time. It means your mount will have the best tracking ability among the amateur and semipro equatorial mounts all over the world (even if your dome-shutter is closed...).

To achieve this unbelievable result, before the installation of your Telescope Drive Master, you need to complete a very accurate polar alignment process of course. Please find our proposed method to do that on the companion CD ROM or among [www.telescopedrivemaster.com](http://www.telescopedrivemaster.com) website's documents.

TDM controlling system contains two main logical units or parts: a high precision encoder unit (encoder and its mechanical adapter) attached directly onto the RA shaft of the mount and an electronic device (a sort of "black-box" with connectors), which receives the electrical signals arriving from the encoder unit and sends control instructions to the mount's driver via its autoguider input connector. So you will need to install the mechanical elements and the electronic device as well but do not worry: both of them can be done very easily.

Please find the drawing and description of electronic connections to be set in relevant part of User's Guide because this schematic is the same for every telescope mount. In this document you will find the mount specific instructions for mechanical adapter and encoder installation only.

Before starting it is highly important to emphasize that both encoder unit and its adapter elements are sensitive mechanical parts!!! Do not drop any of them; do not stress them during installation!!! Handle with care! Any damages of these parts can destroy product's accuracy.

Just Allen-wrenches, a Torch screwdriver (size T8 or T9) and a spanner in size 22mm will be needed for installation.

You need to find these parts in your TDM CGEM package. (Pictures by Pawel Hondra, Poland.)



Mechanical parts of the adapter have been assembled in one unit before delivery. These are the parts of the adaptor: cover, rotor (or encoder shaft) and stator (from left to right).



Before assembling parts during installation, please always check and clean all of the threads and surfaces of the lower end of the RA shaft and encoder adaptor elements if necessary. Use clean clothes (not nylon!) for smooth surfaces and a dry toothbrush to clean the internal and/or external thread(s) of the RA hollow shaft if it is necessary. Only the clean and tight mechanical contact between surfaces will provide correct mechanical coupling and positions.

Step 1:

Rotating it in counterclockwise direction, please remove the plastic cup of the RA shaft.



Step 2:

If you have a polar scope in the RA hollow shaft, please remove it. (If you want to complete rough polar alignment, please do it before this step.)

### Step 3:

Next step is attaching encoder shaft into the hollow shaft of RA axis. It is useful to fix the RA shaft of the mount against rotation before this point. Do not touch the long cylindrical surface of the encoder shaft with any metal tool (e.g. pliers)!!! Use spanner (size 22mm) only, maybe coach-wrench at the root of this part clockwise, as you can see below in the picture. Now, tighten it well enough. This part cannot have any offset compared to the RA axis. If threads and connecting surfaces are clean enough, the thread profile-angle will have to be able to centralize geometrical axes without any problem.



### Step 4:

Please screw the stator ring onto the house-casting of the RA shaft clockwise (this thread was used for fixing plastic end-cap previously) completely and fix it with three set screws using Allen-wrench (see below).



### Step 5:

At this point, please unscrew two black screws from the encoder coupling and remove the front part of the encoder coupling. (See coupling installation in details on [www.telescopedrivemaster.com](http://www.telescopedrivemaster.com) website' menu: Tools & Documents / Installation Guides / New Coupling Install.) Now, install the front part of the coupling onto the adaptor stator as below.



### Step 6:

Please check the released clamps on both front and back side of the encoder and push the encoder firmly but completely onto the previously installed and clean steel shaft. In this position, tighten the external clamping ring (Torch screwdriver T8 or T9). If the position of the encoder cable is not comfortable (e.g. it goes upward) you can remove both encoder and coupling front part and fix them again in appropriately rotated position.



Step 7:

Using Torch screwdriver (size T8 or T9) tighten the internal clamping ring as well. You can reach the clamping screw on the front side via slots of any flat springs created especially for this purpose (see below).



Step 8:

The main parts of the encoder adaptor have been installed so far. Now, please put the cover of the encoder to its place and fix it in proper position with three screws (cable slot is down). Push the cable into the gap of the cover.



Step 9:

Finally, please put the plastic cap back to the RA shaft for saving encoder against environmental influences.



Congratulation, you have successfully installed TDM encoder onto your equatorial mount and you have finished the most difficult part of the installation process!!!

You just need to create cable connections among telescope electric units according to the relevant part of the User's Guide.

Additionally, please find several useful tips and tricks in the User's Guide of TDM and other documents found on companion CD ROM or visiting [www.telescopedrivemaster.com](http://www.telescopedrivemaster.com) website.