

OS Worm-Gear mount manual

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Table of contents

OS Worm-Gear mount manual	1
1. Technical specification	3
2. Electronic	3
a. Power and connections.....	3
3. Procedura di sbloccaggio	4
4. Software.....	6
b. Maestro.....	6
5. Attachments.....	8

Tables:

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1. Technical specification

MOUNT
Two-arm fork layout, equatorial layout
Steel – aluminum frame.
Concrete base/pier interface provided. <i>Custom piers optional.</i>
Fine tuning settings for latitude and azimuth polar alignment.
FEA optimized structure for rigidity and proper frequencies damping.
Microprocessor controlled motors on both axes.
Full control from local/remote PC, basic functions from local hand pad.
DC Brushless high torque motors on both axes.
Hi precision worm gear transmission on both axis.
High resolution absolute encoder on axes (typical 25-27 bit/0,03-0,007 arcsec)
Real-time tracking correction and motion metrology on both axes
Programmable slewing/point speed, up to 10°/s. <i>Higher speed optional.</i>
Middle term (20 minutes) tracking precision +/-0,25 arcsec RMS.
Pointing error, typical (before mount modeling): 12 arcmin.
Pointing error, typical (after mount modeling): less than 10 arcsec.
Wide internal object database, expandable and online upgradable.
5 pre-set tracking speeds (sidereal, solar, lunar, “user” and “land mode”).
Non sidereal objects tracking capability.
Park and Homing functions.
Programmable input/output ports to communicate with (or trigger) external devices.
Hand pad brightness tuning.
Software selectable mount movement limits.
Electromechanical safety hard stop present.
Auto sync possible (sync on a bright star near the desired object).
Internal hi precision real time clock.
Automatic alignment from last position (resume).
Automatic alignment from park or home position.
TELESCOPE CONTROL SYSTEM
Complete pointing model functions.
Full TCS management software (Windows) provided.
ASCOM driver provided.
Software Bisque The Sky X Pro – Tpoint – Camera Add On licenses included.
Communication protocol and SDK provided, for third-party software development.
Power supply 220/110Vac, 50/60Hz, 2200 W max.

2. Electronic

a. Power and connections

To operate the mount need to be supplied with a 230/110Vac 2200W power line. Power to the mount is delivered by a standard VDE socket placed on the front panel of the mount.

Internal protection fuses ensure fail-safe in case of short circuits.

All the voltages needed to power the mount (PrimeTCS controller, Motors, Accessories) are derived from internal power supply units placed inside the equatorial head.

You can find two power supply unit inside the mount, one for the telescope accessories and the telescope control system (a 12Vdc – 480W power supply) and one to power both motors (70Vdc – 600W).

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3. Procedura di sbloccaggio

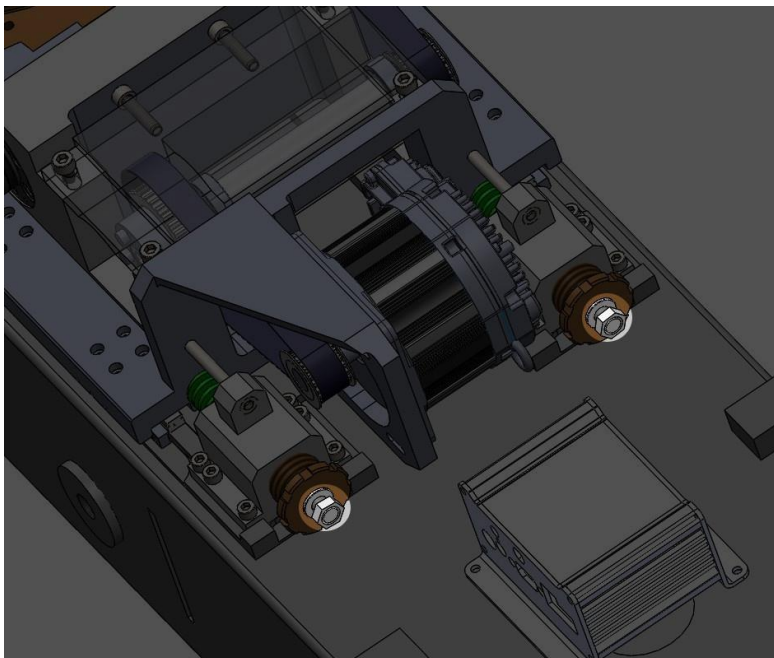


Figure 1: Gear retraction screws

The procedure to lock motors gearing is the same for both axis.

Motors, gearings and all the motion transmission part is attached to the linear rail.

To lock the gear on the worm you must unscrew the 2 bolts in figure 1 leaving a minimum spacing of 5mm between the nut and the bronze knob.

To lock the gear on the worm you need to unscrew the 2 bolts in figure 1 giving a space of about 5mm between the nut

and the bronze knob; during this operation is also useful to tilt a bit the axis back and forward to allow a perfect match between gear and worm.

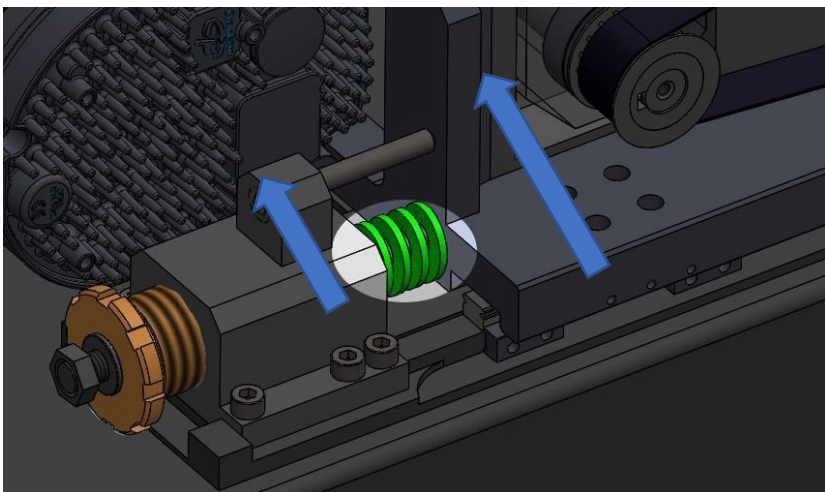


Figure 2 Spring loading screw

Pressure between gear and worm is modified turning the bronze knob.

Total force is given by the distance between the bronze knob and the holding block, this measure will act on the spring preload (figure 2).

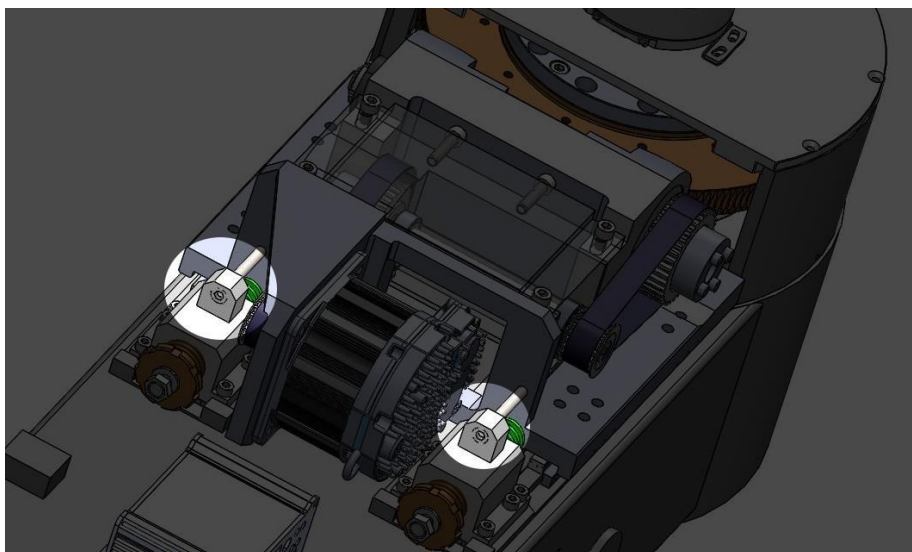


Figure 3: Sliding limits

The couple of hex socket screws in figure 3 are used to limit the maximum movement of the gearing assembly.

It's recommended to leave a gap of about 0.5mm to 1mm between the screw bottom and the gearing holder

4. Software

Software used for the mounts are:

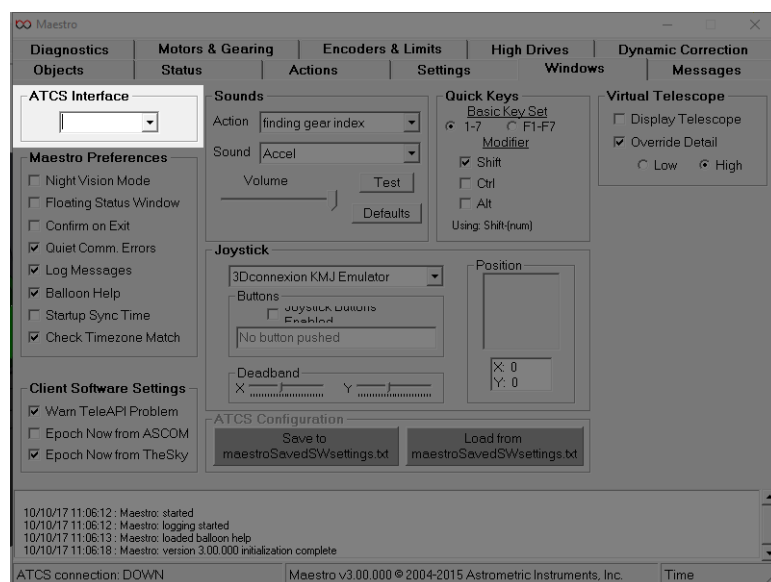
- Maestro (Astrometric Instruments)
- The Sky X (Software Bisque)
- Maxim DL (Difraction limited – NOT REQUIRED)

ATTENZIONE: Prima di installare il software Maestro assicurarsi che TheSkyX sia già installato sul PC!

b. Maestro – Basic settings

All settings are factory preloaded on the mount controller.

At the first start you need to select the correct serial port to where PrimeTCS is connected to. To do so go to the “Windows” tab and select the right serial port on the “ATCS Interface” section.



To be sure that you are choosing the right serial port is suggested to proceed as following:

- Turn on the PC leaving the USB mount cable unconnected
- Click on start, type devmgmt.msc and then enter.
- Once Device management window is opened scroll down to “Ports”
- Turn on the mount and connect the USB cable.
- Now on the tree element “Ports (COM and LPT)” a new COM will appear.
- On the Maestro interface choose the just appeared serial port

Figure 4: Maestro windows setting

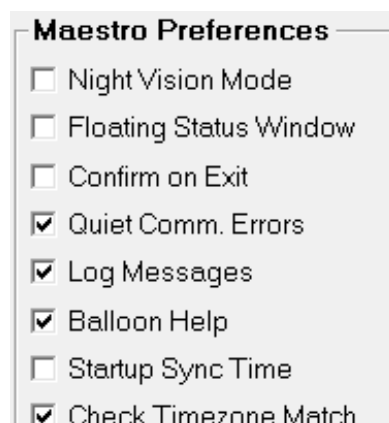


Figure 5: Maestro preferences

Set other preferences as you prefer.

It's suggested to flag the checkbox “Startup Sync Time”. If you flag this checkbox is also suggested to install an NTP client to ensure a good synchronization between the PC and the universal time.

Once you finished settings in this window close and open again Maestro.

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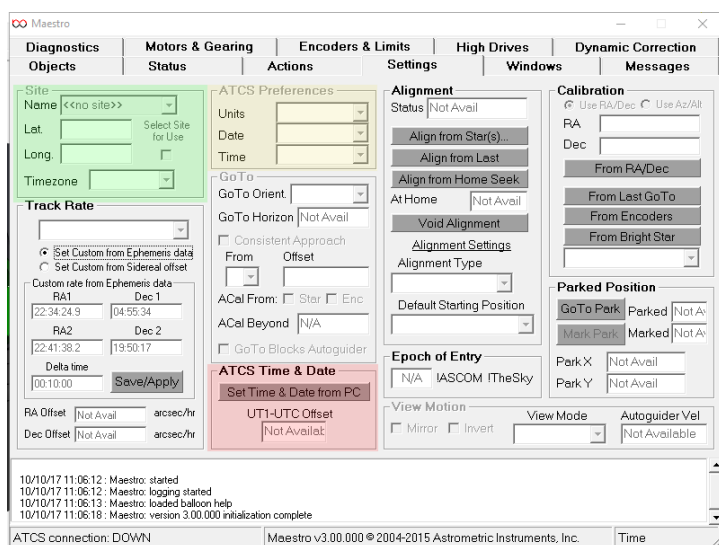


Figure 6: Maestro settings

On the settings tab ensure that latitude, longitude and timezone are correctly setted according to the observatory position (see green part of fig. 7).

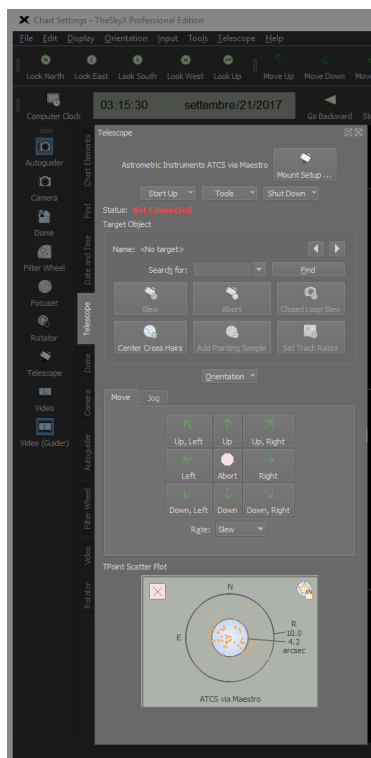
Set the preferred units (yellow highlighted).

Last: Ensure that time is synced with PC using the “Set Time & Date from PC” button (red highlighted)

c. Setup TheSkyX to work with Maestro

Once finished the Maestro setup we can start to set-up TheSkyX

WARNING: Maestro MUST be running while using TheSky X!



- Choose tab “Telescope”.
- Click on “Mount Setup”.
- On the new window click on “Mount setup” and select “Choose”
- Scroll down the drivers list and choose “ATCS via Maestro” from “Astrometric Instruments” and then click “Ok”
- Click again on “Mount setup” but, this time, choose “Connect”
- The “Status” label will change to “Connected”
- Close the window clicking on “Close”

After these settings you can easily connect to the telescope using the “StartUp” buotton and then “Connect telescope”

To sync the mount to a sky object proceed as follow (for this procedure we assume that focusing is already done):

- Point the telescope to a known celestial object, it’s not necessary to have a precise pointing, 1 or 2 deg of tolerance will not be a problem. For this example we chose to use Vega
- Choose the same object on the planetary (main) window and then proceed with Start Up -> Star synchronization.
- On the new window click on “Sync” near the label “on Vega”
- Switch to the “Camera” tab and click on “Take Photo” after has configured exposition time

- Once the frame is taken check if there are at least 7 or 8 stars, if not repeat the picture with an longer exposure.
- Right Click on the frame and then choose "To Image Link"
- On the new window ensure that the pixel scale is properly setted and choose "Known image scale".
- Click on "Find Astrometric Solution" and wait the solution.
- Once plate solving is done click on the planetary image and repeat the sync procedure.

d. Modelling

- Open TheSkyX
- Connect mount and CCD (for this procedure we assume that focusing is already done)
- From tools menu choose TPoint AddOn
- On the setup tab ensure to UNFLAG the Apply pointing correction
- Choose tab Calibration Run
- Select Automated Calibration
- On the setup tab choose the desired exposure time and ensure that the pixel scale is properly setted
- On the Create Pointing Targets tab choose the desired sky area and the number of stars
- Click on Acquire pointing samples and then Run.

e. Translate the model to Maestro/PrimeTCS

- Close the Automated calibration window
- Choose the Model tab
- Ensure to choose only the values on the list that only make the PSD lower
- Open the excel spreadsheet (TPointToDynaCorr.xls) and insert the choosen values on the C column of the first sheet. The unflagged values on TPoint need to be setted to 0 on the spreadsheet.
- Click on Generate maestroSavedDCSettings.txt, it will generate a file called maestroSavedDCSettings.txt on the current spreadsheet folder.
- Copy the txt file on the maestro installation folder (usually C:\Program Files (x86)\Astrometric\Maestro)
- Now on the maestro interface on the tab Dynamic Correction choose import maestroSavedDCSettings.txt

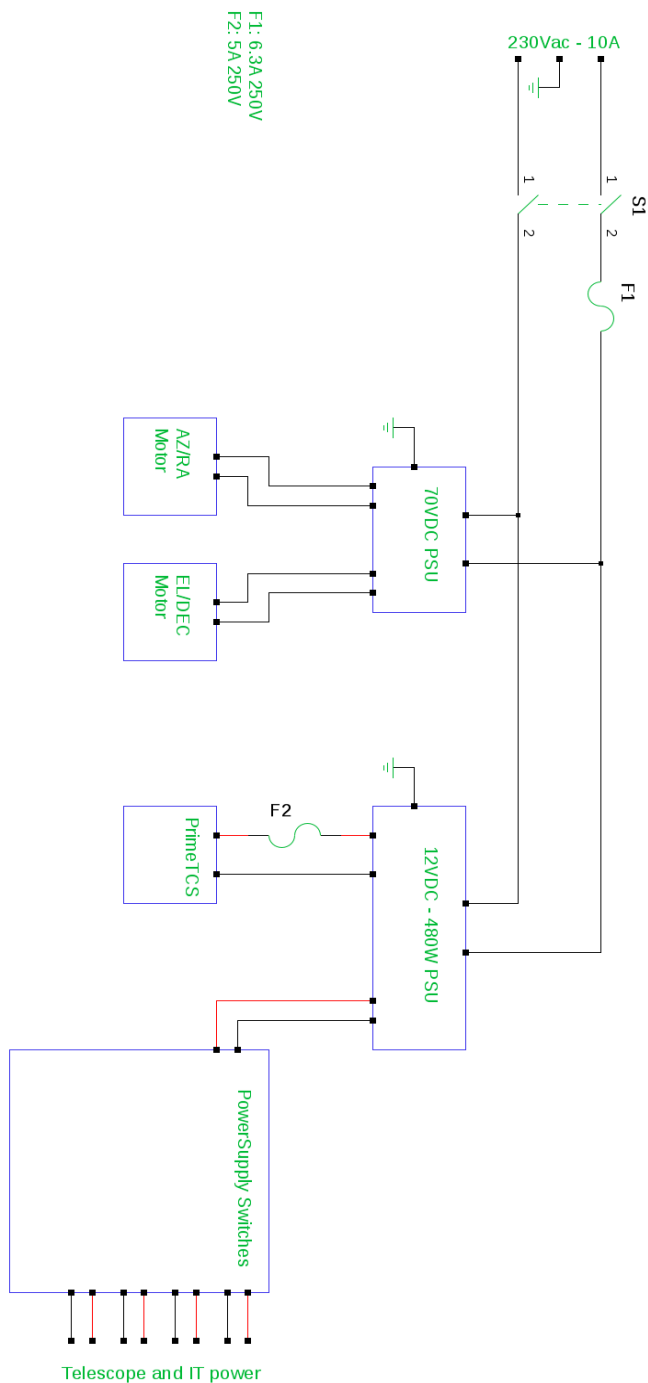
5. Attachments

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Figure 7: Head schematic



TITLE	OS Mount front panel/head cabling	
FILE:		
PAGE	1	OF 1
REVISION:		
DRAWN BY:	Alessio Galluzzo	