

Autoslew quick start guide

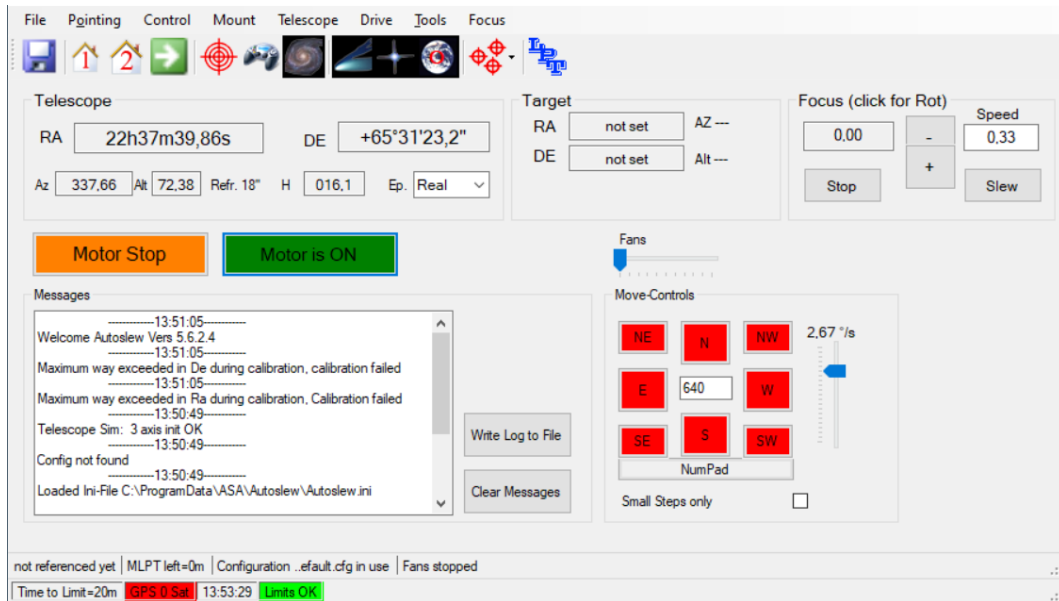


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1 General

1.1 Manufacturer address

ASA Astrosysteme GmbH

Galgenau 19
4212 Neumarkt i. M.
AUSTRIA

Phone: +43 7942 778 11-500
Email: office@astrosysteme.com
Homepage: <https://www.astrosysteme.com>



1.2 Support

If you experience problems or have further technical questions, feel free to contact our support at support@astrosysteme.com.

If you have questions concerning accessories or prices consult our sales department at sales@astrosysteme.com.

1.3 Changelog

Version #	Date	Change
A	2023-03	Release first version;

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2 Software concept

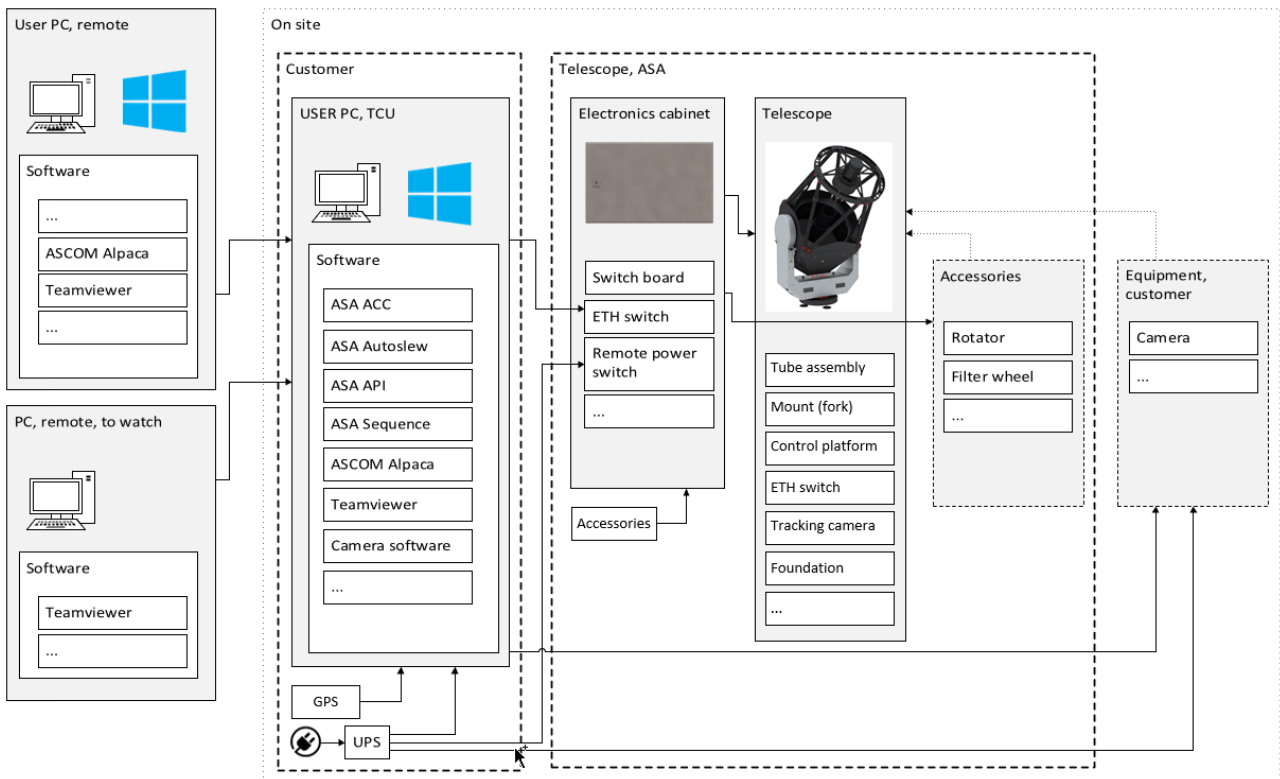
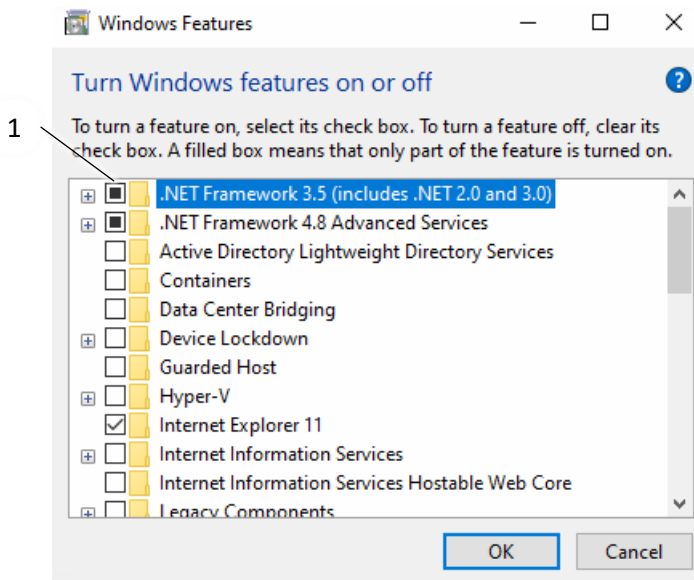


Figure 2.1: Software concept

3 Requirements USER PC, TCU

1. PC with Windows, see document ASA# 9600108;



Windows features

Press in your task bar.
 Type: windows features;
 Start: Windows features activate or deactivate;
 Check if .NET Framework 3.5 is installed/activated (1);

3.1 Advanced operation

2. ASCOM Platform 66;
3. ASA ACC;
4. ASA Sequence;
5. Camera software;
6. ...

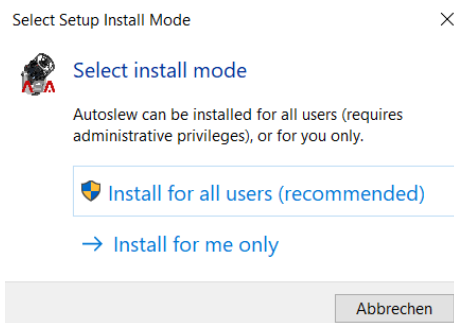
4 What is Autoslew?

Autoslew is a software provided by ASA for operating your device and its features. It provides an ASCOM Alpaca interface for establishing a connection to other astro-programs/devices.

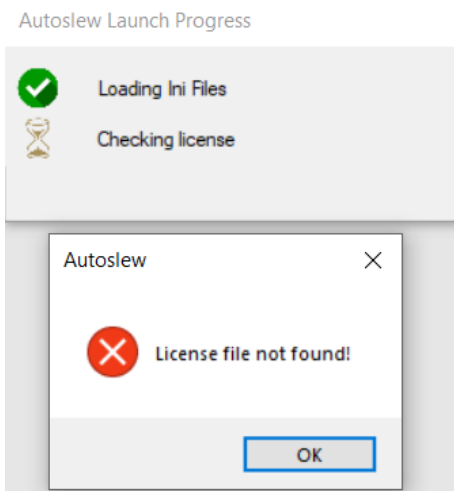
5 Installing



For a quick start guide see the document ASA#: 9600100.



Follow the installation process.
After successful installation start Autoslew.



Assign license.

Select your License file.

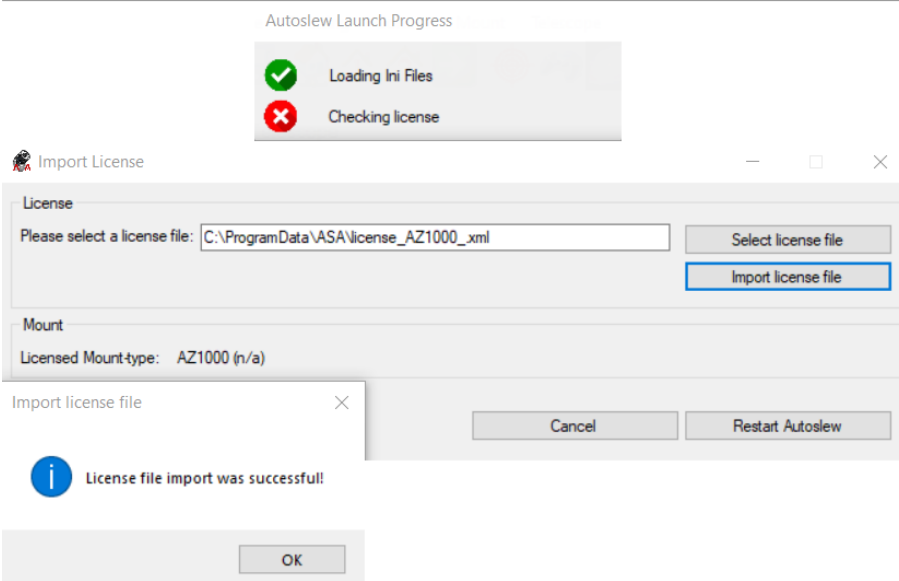
Download it from your member area at the ASA homepage.

Put the file on your hard disk.

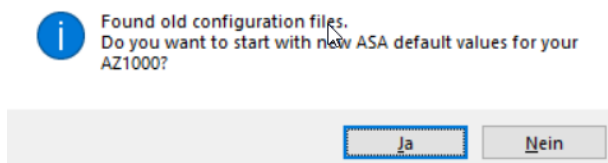
Start Autoslew.

Press **Select license file**.

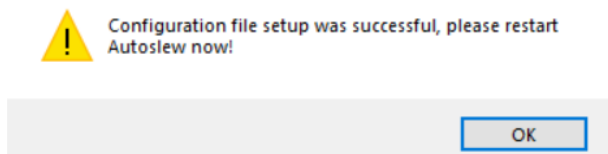
Press **Import license file**.



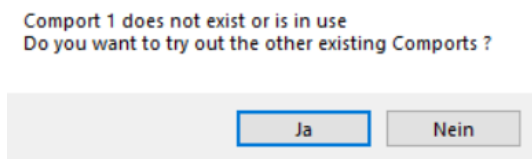
Import license file Confirm with **Yes**.



Import license file **Restart Autoslew**.



CIServo Confirm with **Yes**.
Usually, the program finds the right Comport



Autoslew



Meldungen



Axis 1:
Could not connect to controller !
Please check connections and power !
There was a problem during init of the mount
Please check power and connections, continuing in Sim Mode

OK

CIServoT



Comport 29 does not exist or is in use

OK

Autoslew



Fokus Turner:

OK

CIServo



If you get this error message
Check if the

- USB serial converter cable is connected;
- driver for the USB serial works properly;

There was no comport detected, please check connections

OK

No comport could establish connection to the mount on all tested ports !
Please check Power and USB Connection !

If you get this error message
Check if the power supply is connected
or is switched off.

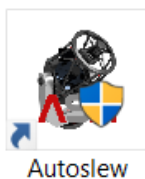
OK



Tip!

Always use the same USB port to connect your mount to your computer. This ensures that the COM-Port number does not change.

6 Start Autoslew with connected device



Start Autoslew on the TCU's desktop.

6.1 Main window

File Pointing Control Mount Telescope Drive Tools Focus

Telescope
RA 22h37m50,01s DE +65°30'43,4"
Az 035,35 Alt 44,26 Refr. 57" H -089,9 Ep. Real

Target
RA not set AZ --
DE not set Alt --

Focus (click for Rot)
0,00 - Speed 0,33
+ Slew Stop

Motor Stop Motor is ON

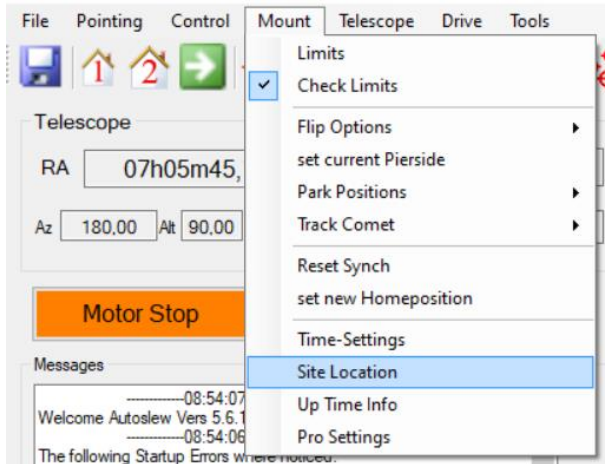
Messages
-----06:45:38-----
Could not find Foklist 1.in
-----14:15:05-----
Could not find Foklist 1.in
-----13:51:05-----
Welcome Autoslew Vers 5.6.2.4
-----13:51:05-----
Maximum way exceeded in De during calibration, calibration failed
-----13:50:49-----
Maximum way exceeded in Ra during calibration, Calibration failed
-----13:50:49-----
Telescope Sim: 3 axis init OK
-----13:50:49-----

Write Log to File
Clear Messages

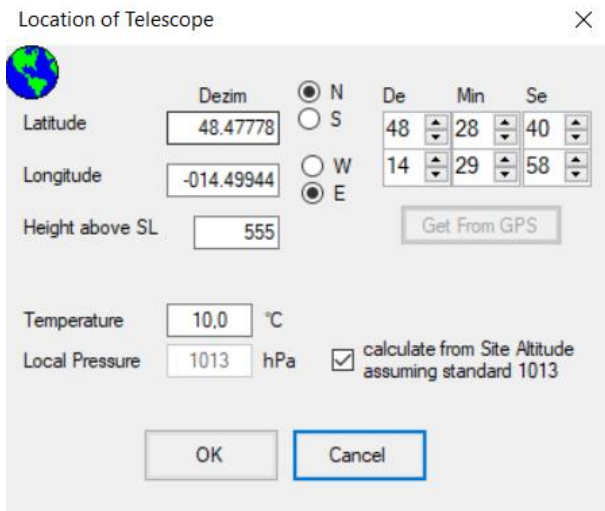
Fans
Move-Controls
NE N NW 2,67 °/s
E 640 W
SE S SW
NumPad
Small Steps only

not referenced yet | MLPT left=0m | Configuration ..efault.cfg in use | Fans stopped
Time to Limit=20m **GPS 0 Sat** 06:46:52 **Limits OK**

6.2 Location settings



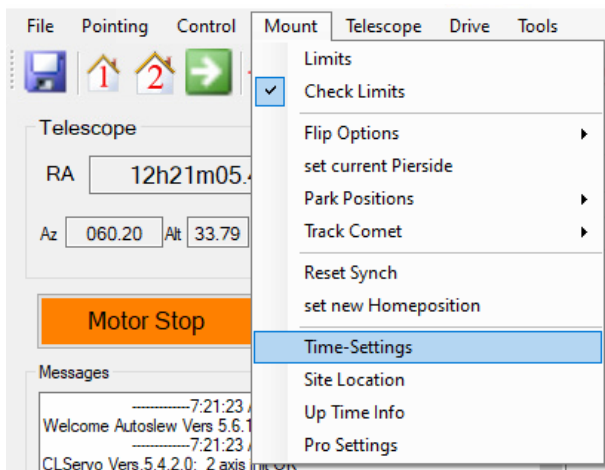
Goto **Mount** --> **Site Location**.



Enter the coordinates of your observatory location. Confirm by pressing **OK**.

If you have an GPS receiver, press the button **Get From GPS**.

6.3 Time settings



Goto **Mount** --> **Time-Settings**.

The following window opens, Figure 6.1; Choose **NTP Server (1)** or **GPS (2)**.

For information on the requirements of the GPS module see document ASA# 9600108.

Set your parameters.

If you have an GPS-receiver installed use (2);

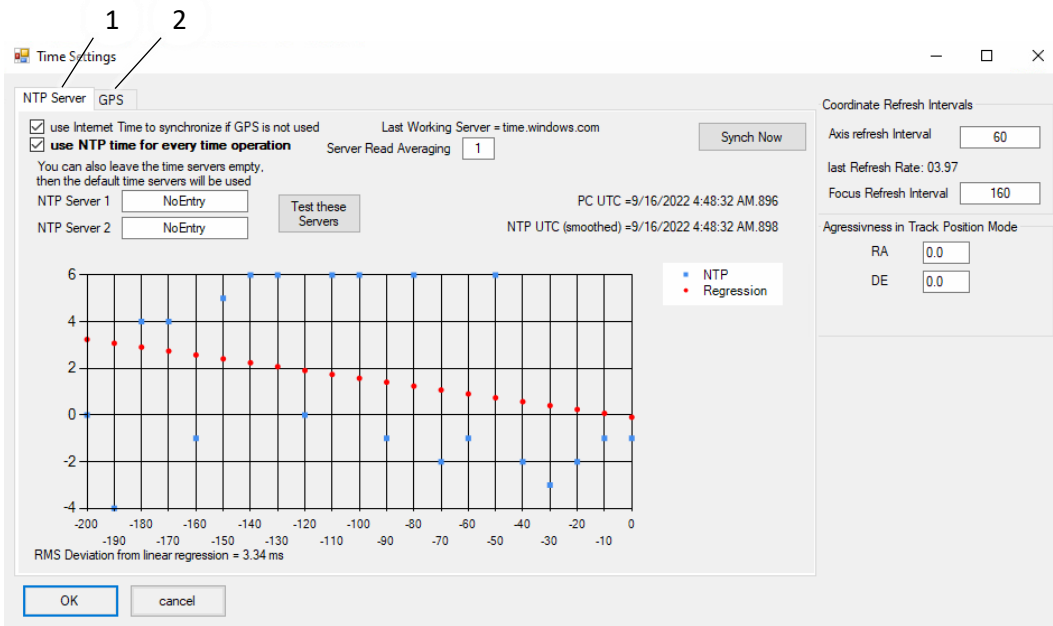
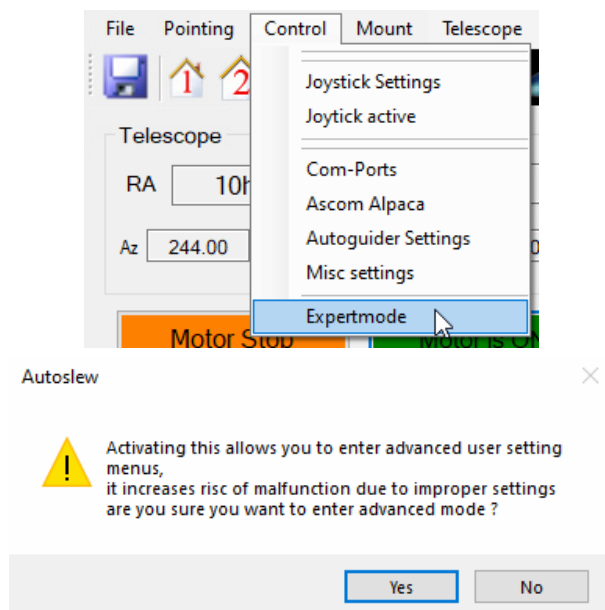


Figure 6.1: Time-Settings

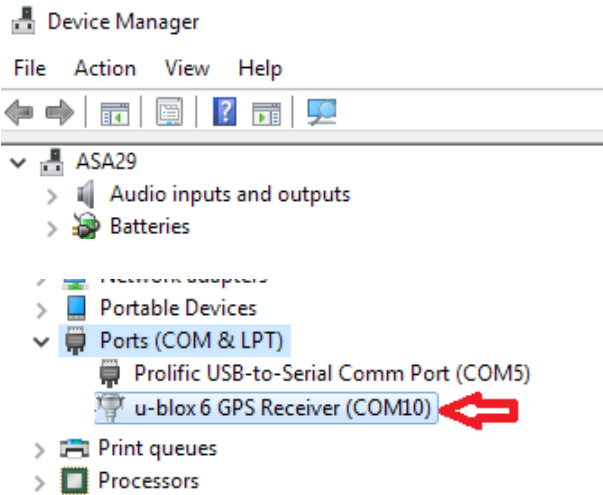


If you don't find the Time Settings activate the Expertmode.
Goto **Control --> Expertmode;**
Confirm with **Yes;**

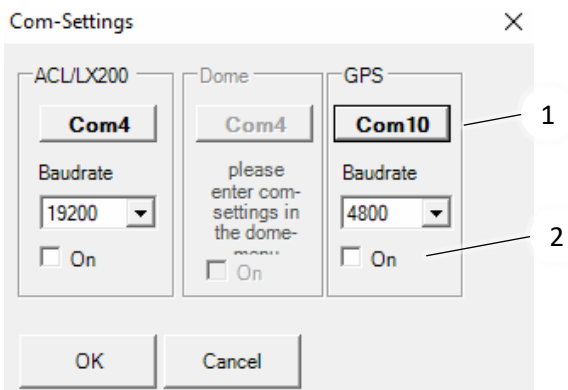
6.4 GPS receiver

For information on the requirements of the GPS module, see the document ASA# 9600108.

Using a GPS receiver is particularly recommended, because Autoslew can use it to get a very accurate location and time.

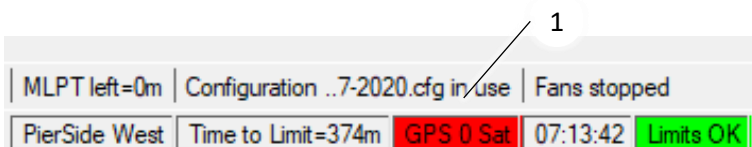


Connect your GPS receiver to the USB port of the USER PC (TCU) and install the required drivers. Open your windows device manager. At the ports-section there should appear a GPS receiver with a comport number. Remember this number. (10 in this case);

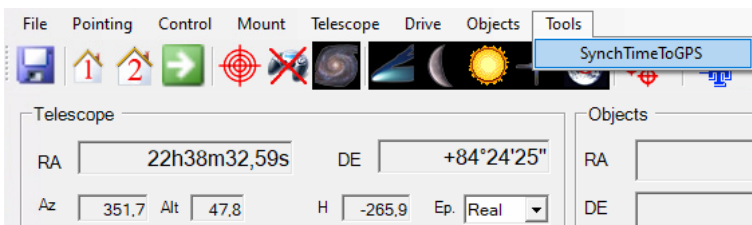


Switch to Autoslew. Go to **Control --> Com Ports**. Press (1); Enter the port number. Activate the checkbox (2) **On, ✓**; Confirm with **OK**.

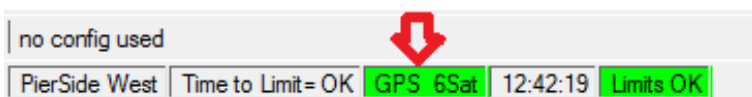
NOTE
 If you change the USB-Port or you add other devices to the computer (e.g., USB-hub, repeater cable, ...), the COM-Port might change. In this case you need to perform the **Com-Settings** again.




In the Autoslew info bar (1) you will see the number of satellites Autoslew receives signals from.



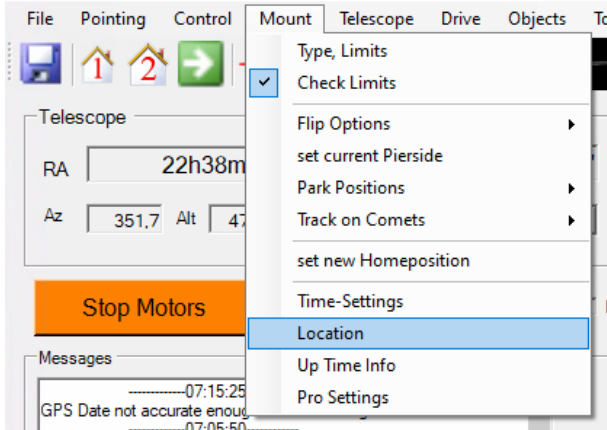
Now choose the feature **Tools --> SynchTimeToGPS**.



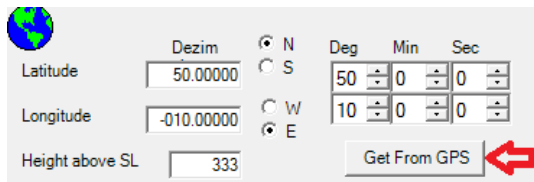
If your GPS-Receiver already receives sufficient signals, the display changes to green. The time value in Autoslew gets synchronized with the accurate time value received via satellite.

	<p>NOTE</p> <p>Make sure that the receiver has a visual connection to the sky. You can use an USB extension cord for that.</p> <p>It might take up to two minutes until the GPS-receiver receives sufficient signals. Please wait a while and click SynchTimeToGPS again. If the display is still red and shows GPS 0Sat, check the position of your receiver.</p>
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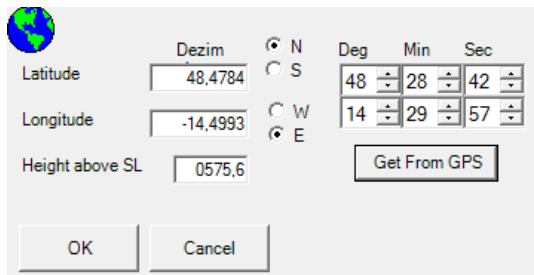
6.4.1 Set Location



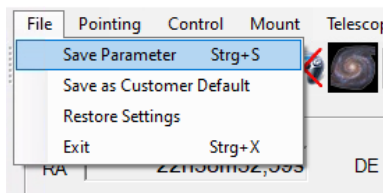
To set the location, determined by GPS, go to **Mount --> Location**.



Now the following window appears:
 Click **Get From GPS**.

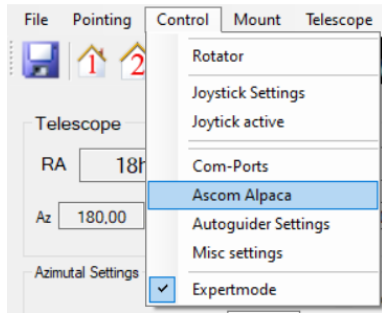


After closing the confirmation window, the right location coordinates should be filled-in automatically.
 Close this window with **OK**.



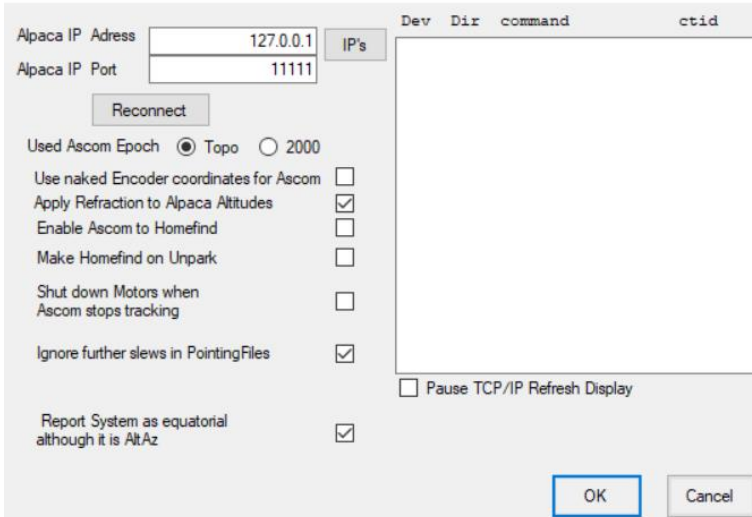
Save your settings with **File --> Save Parameter**.

6.5 ASCOM Alpaca

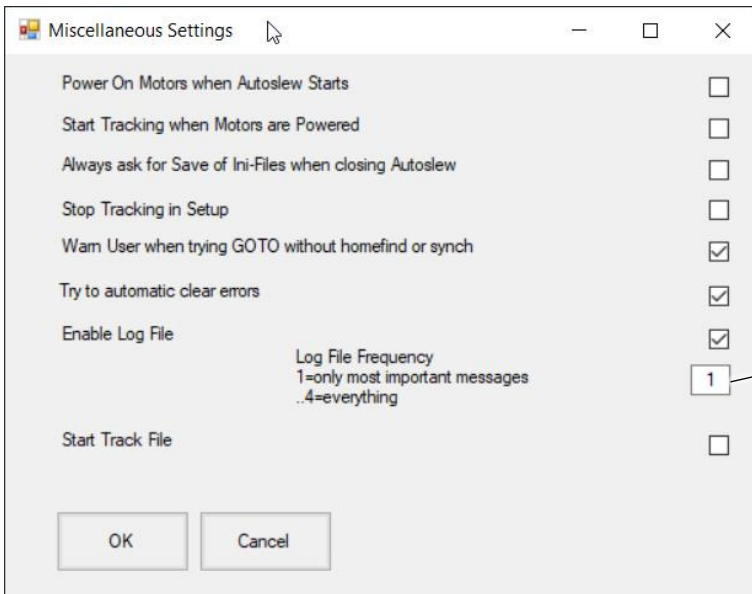


Goto **Control** --> **Ascom Alpaca**;
Configure your settings.

Ascom / Alpaca Remote settings



6.6 Logging



Goto **Control** --> **Misc settings**;
Enter the value in **Enable Log File**.

	<p>When all problems are solved, disable the log-files again. Otherwise Autoslew will create a new file at every start and use hard disk space.</p>
--	---

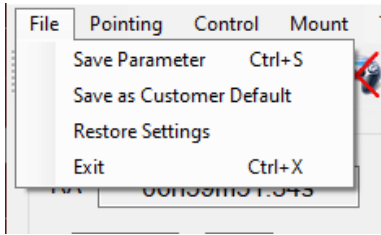
Windows Vista, Win7, 8, 10, 11:

C:\ProgramData\ASA\Autoslew\CIServoLogs

By default, the program data folder is hidden in windows. So, make hidden folders visible or just copy the file path above into the address bar of your windows explorer.

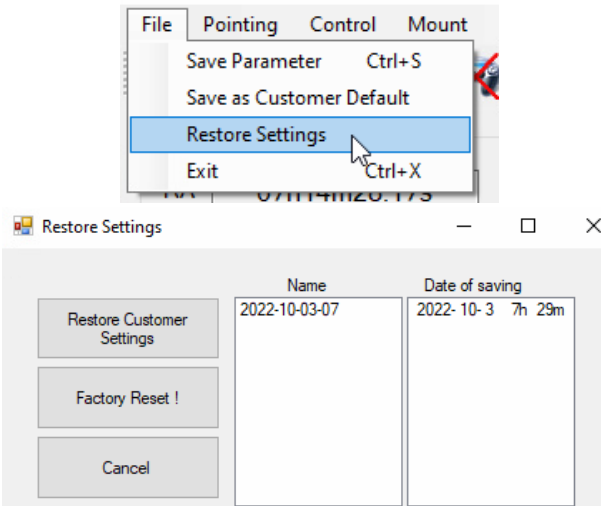
	In a case of support with the ASA support, choose the appropriate log-file and send it via email. This will help analysing the problem.
--	---

6.7 Save as Customer Default



If you have a nice working setup, goto **File --> Save as Customer Default (1)**;

6.8 Restore Settings, Factory Reset!



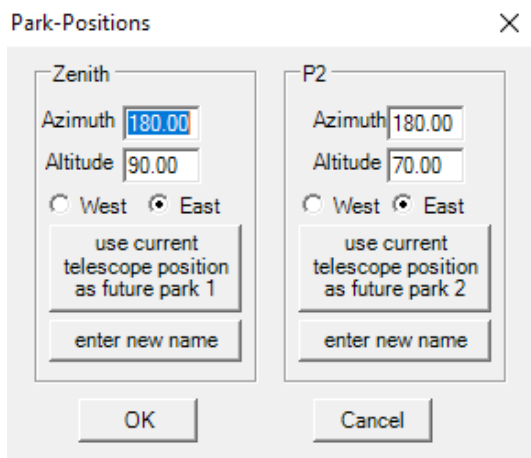
Goto **File --> Restore Settings**;

Choose between

1. **Restore Customer Settings**;
2. **Factory Reset !**;

7 Park positions

At the end of a session, park your device in a specific park position.



You can define two different positions.

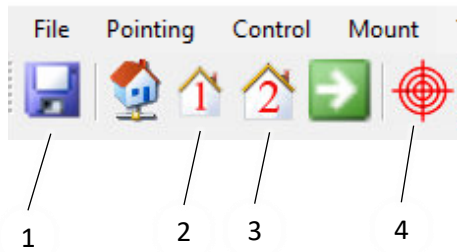
Move your device to the preferred park position manually with **move controls**.

Press **Mount** --> **Park Positions** --> **Set new Parkpositions**.

Press **use current telescope position as future park X**.

Confirm your changes with **OK**.

If you prefer you can also enter AZ and ALT values manually for the park positions.



Save these settings by pressing the **save-button** (1).

Choose your preferred **park position** (2, 3).

Press **Goto** (4), the device moves to the appropriate park position.

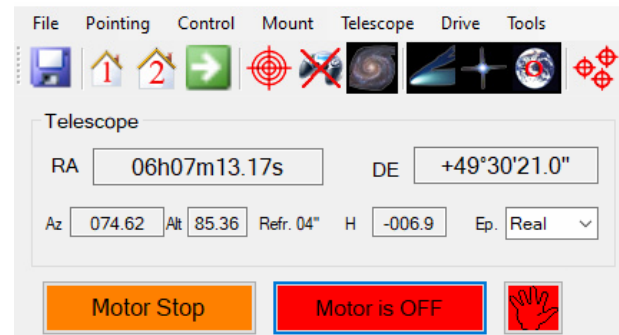
The motors stay on.

7.1 DDM



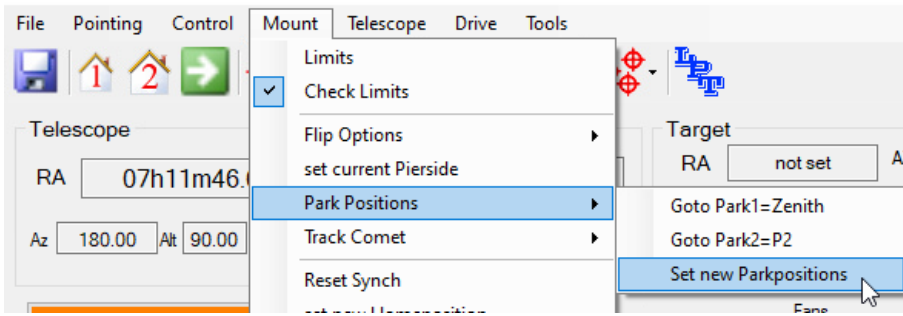
Figure 7.1: 180 / 90, Pier side East

Motor is OFF (red);

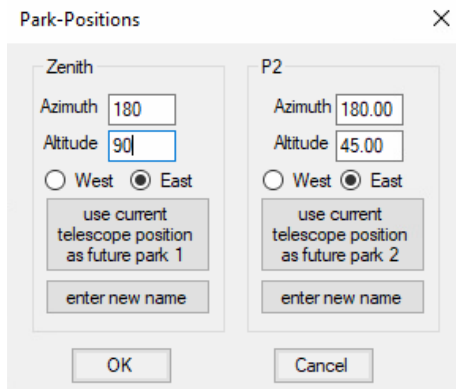


Move the device to this position.

Use a water level.



Press **Mount** --> **Park Positions** --> **Set new Parkpositions**.

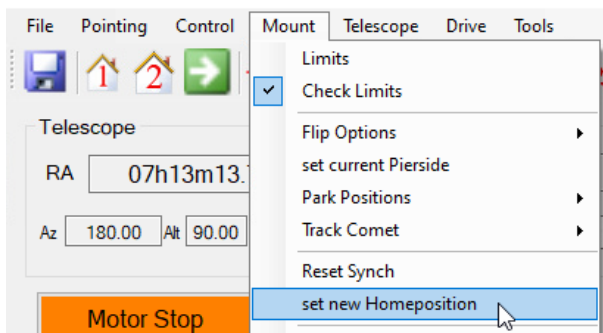
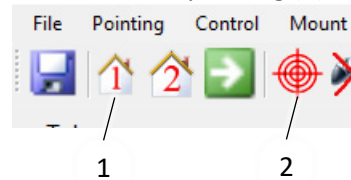


Zenith

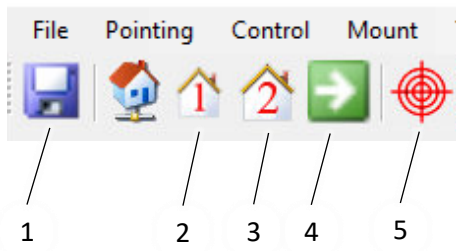
Set Mount to Position Azimuth **180**, Altitude **90**, Pier **East**.

Confirm your changes with **OK**.

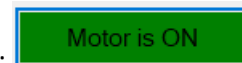
Continue with pressing (1), then (2);



Mount --> **set new Homeposition**;



Save these settings by pressing the **save-button** (1).



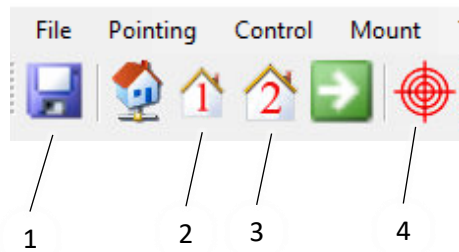
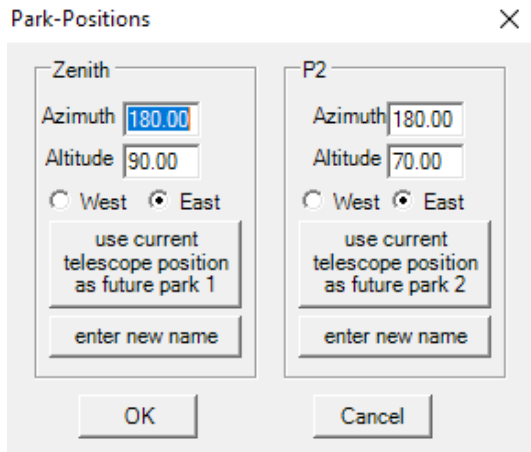
Check if motor is on:

Choose your preferred park position (2, 3).

Press **Slew** (4), the device moves to the appropriate park position.

The motors stay on.

7.2 Alt/Az



You can define 2 different positions.

Move your device to the preferred park position manually with **move controls**.

Press **Mount** --> **Park Positions** --> **Set new Parkpositions**.

Press **use current telescope position as future park X**.

Confirm your changes with **OK**.

If you prefer you can also enter AZ and ALT values manually for the park positions.


Save these settings by pressing the **save-button** (1).


Choose your preferred park position (2, 3).

Press **Goto** (4), the device moves to the appropriate park position.

The motors stay on.

8 Motor tuning

	<p>For the device flawless operation, it is absolutely essential that you optimize the weight balance of both axes as good as possible. For details consult the hardware manual of your device.</p>
---	---

	<p>The motor parameters are already preconfigured for your telescope. Nevertheless, they might need to be adapted, due to changes of your ground mounting or additional equipment on the telescope. So, we recommend reading this chapter even if you do not have to perform any changes of the motor parameters.</p>
---	---

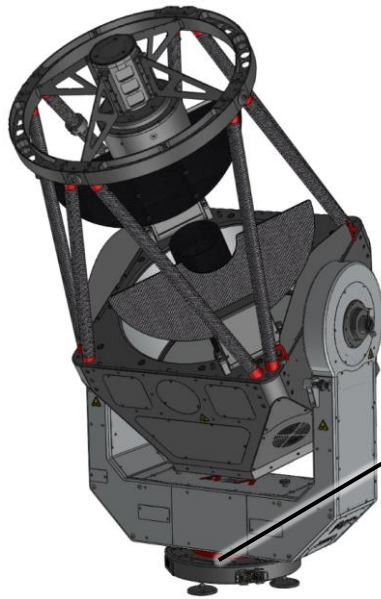
Tuning the motor parameters is absolutely essential for the device to operate properly. If the motor parameters are not optimized sufficiently there might appear vibrations, loud noise or irregular movements during slewing or tracking.

8.1 DDM

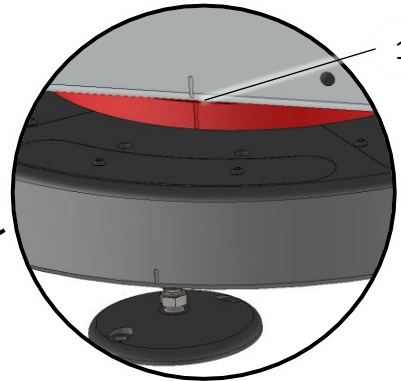


Before starting the motors put the DDM to this position.

8.2 Motor Tuning Alt/Az

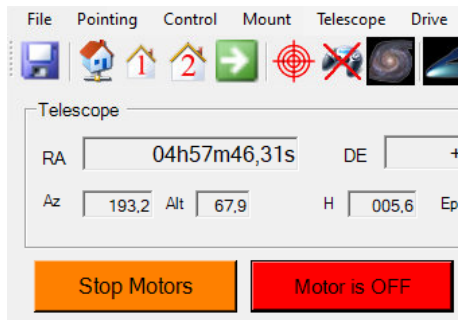


Before starting the motors put your device to the following position.
The altitude axis should be about 45° above horizon.



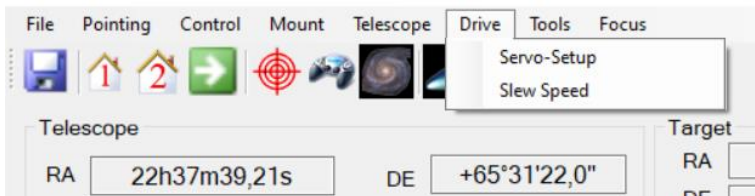
There is a marking on the telescope base (1) that illustrates the centre of the azimuth movement range.
Rotate the azimuth axis so that the telescope is aligned with this marking.

8.3 Work flow

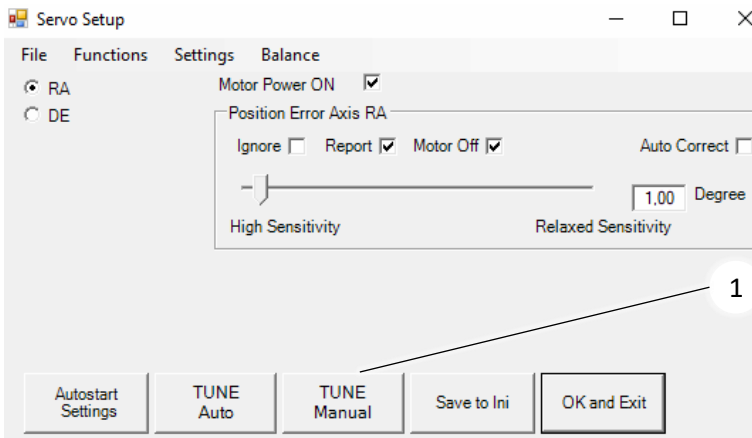


Start the motors by pressing the button **Motor is OFF**.
When the button turns green, the motors are in operation.


	There might be some humming or whistling sounds. Do not worry - nothing will be damaged. That just means that your motor parameters need to be optimized.
--	---



Go to **Drive --> Servo-Setup**.



Press **TUNE Manual** (1).

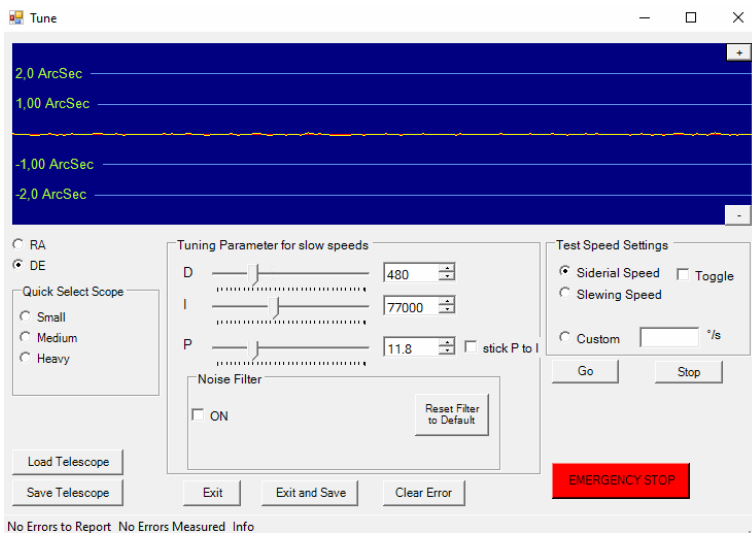


Because this software is also used for German mounts the two main axes are designated with RA and DE.

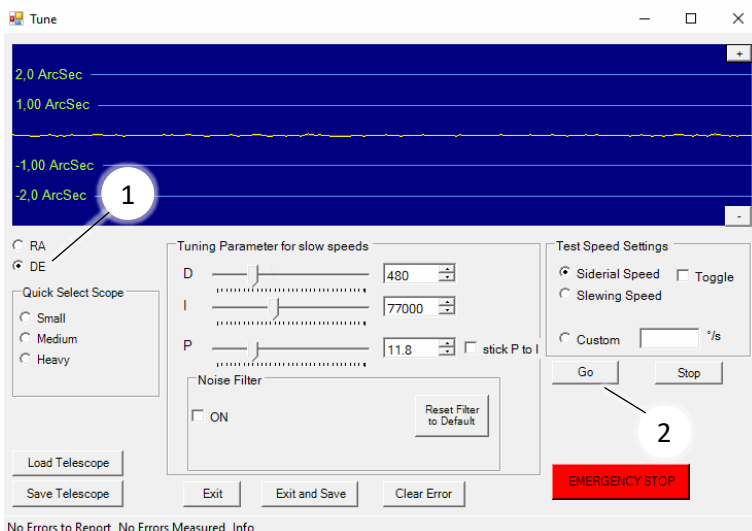
The following applies to AZ telescopes

RA means azimuth axis.

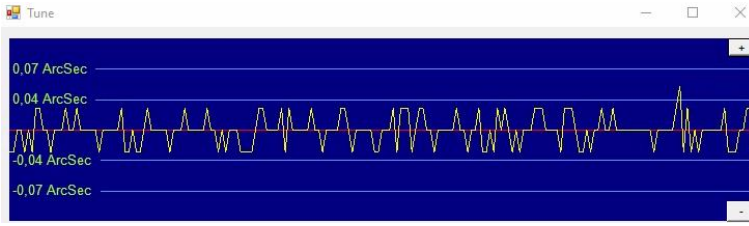
DE means altitude axis.



In this window you can adjust the PID parameters for the drives. The red line in the middle of the blue area represents the desired position. The motor controllers try to keep this desired position as good as possible. The PID parameters will influence how fast, accurate and stable this will work. Higher values improve the resistance against wind and other impacts, but make the system more receptive to oscillations. Find a compromise between stiffness and stability.



Start with the **DE** axis (1). If you press **Go** (2), the DE axis will start to move with sidereal speed. The appearing yellow line represents the actual position of the axis as measured by the encoders.



Press +/- for zooming.

In this case the motor parameters are already pretty good, as the yellow line follows the red line very accurately.



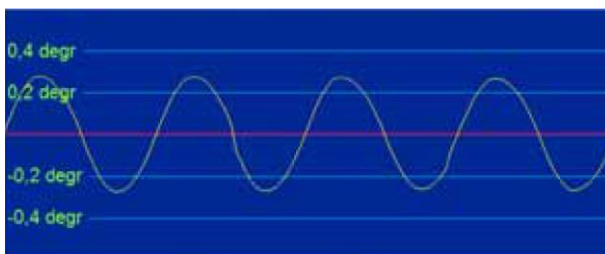
Try to tap your device with your fingers (Simulating wind) and watch the yellow line moving away from the desired position and coming back.

If you increase the PID values your device will react more aggressive to compensate such impacts, but if you are using too high parameters, it might happen that the device will start oscillating.

If you are satisfied with your settings, press the Stop button (1).

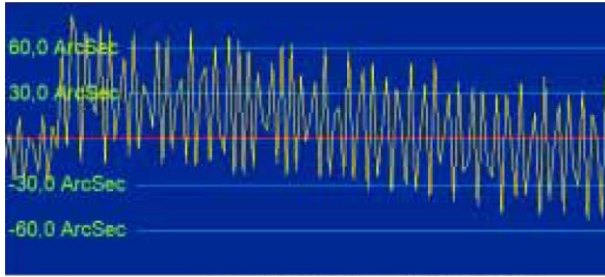
Now switch to the RA axis (2) and repeat the procedure.

8.4 Examples of situations with non-ideal parameters



Oscillation with low frequency

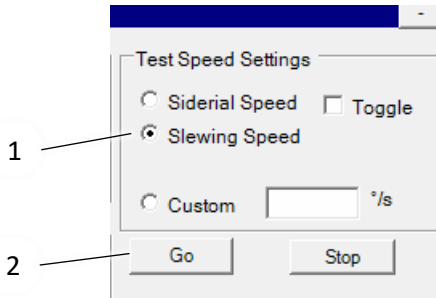
Try to increase your D value or decrease your I and P value



Oscillation with high frequency

Try to decrease your D value or increase your I and P value

8.5 Parameters for speed > 0,05 °/s



Autoslew uses 2 different sets of parameters for each axis.

You already adjusted the parameter sets for siderial speeds.

If you move the device with speeds higher than 0,05 °/s Autoslew will switch to another set of parameters that needs to be adjusted too.

Switch to **Slewing Speed** (1) and press **Go** (2).

Your device will now move a few degrees in one direction and then reverse.

These PID values can be much lower as we do not need as much stiffness for slewing as for tracking. Do not spend too much time to get the yellow line fitting to the red one.

For this set of parameters (used for slewing) it is absolutely sufficient that your device moves without noise and without obvious oscillations.

Adjust the parameters for Slewing Speed for the other axis too. After adjusting all these parameters press **Save and exit**.

Your motors are now ready for operation.

8.6 Additional features of the tuning window

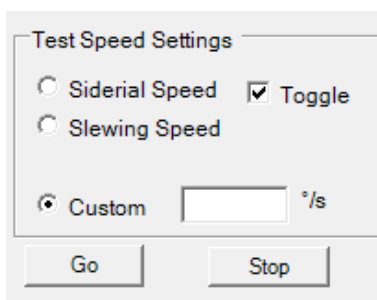
8.6.1 Noise Filter



In some cases, the device works better without using the default noise filter.

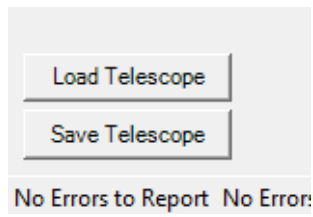
If you have problems with the motor tuning, try to disable it by unchecking the checkbox **ON**.

8.6.2 Custom speed



You can use **Custom** speed to use a user defined speed for motor tuning – not necessary for most users.

8.6.3 Save/Load Telescope



Here you can save your motor setup to a file on the hard disk.

This feature is mainly practicable for users of device's who often change their device setup.

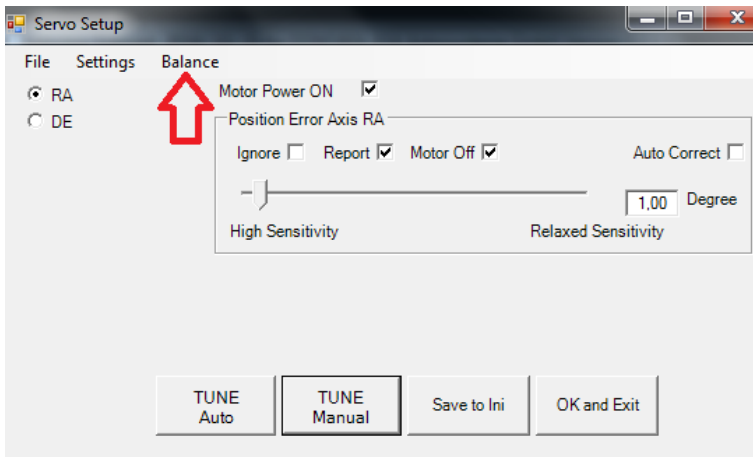
9 Optimizing weight balance

This step is particularly important if you are using a heavy setup and operate the mount near its maximum loading capacity. Bad weight balance means additional work for the motors and decreases stability and resistance against wind or other impacts.

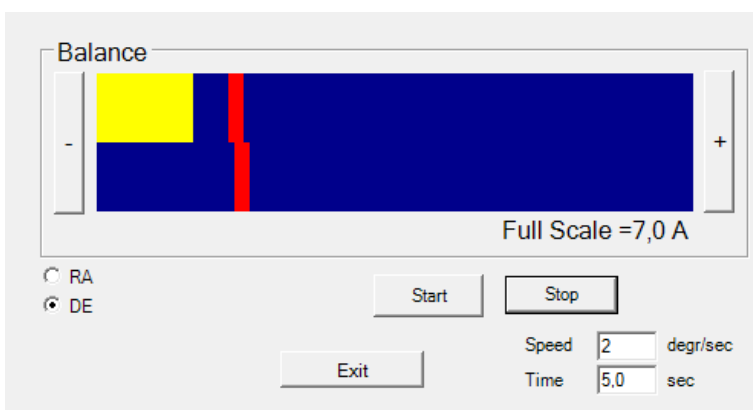
Autoslew can help you improving your weight balance, by moving every single axis forward and backwards and measuring the power consumption of each moving direction.



We recommend putting your mount in a position like on the following picture because bad weight balance has the biggest influence when both axes are horizontal.



Goto Drive --> Servo Setup --> Balance;



Start with the Declination Axis (choose DE).

Change the speed to 2 and press **Start**. Now you will see that the declination axis will move up and down.

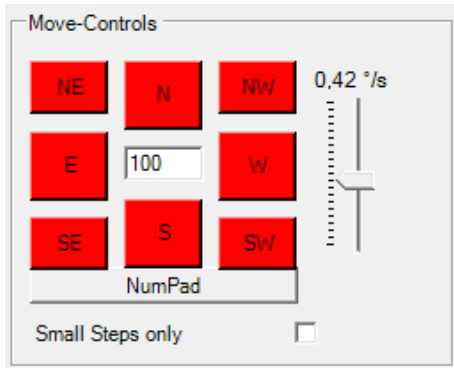
The yellow and red bars show the axis' power consumption for each moving direction.

Optimize the position of the balancing weights, so that the red bars get in one line (as good as possible).

Repeat this procedure for the RA axis.

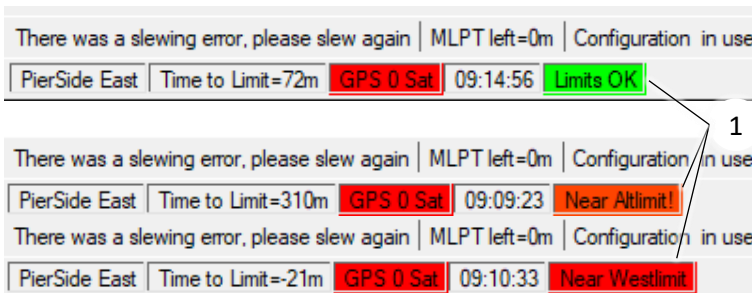
10 First device movements

10.1 Move Controls

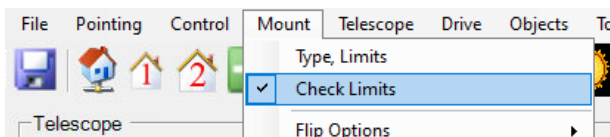


Use the **Move Controls** – buttons to move your device.
Adjust the movement speed with the slider next to the buttons.

10.2 Software limit

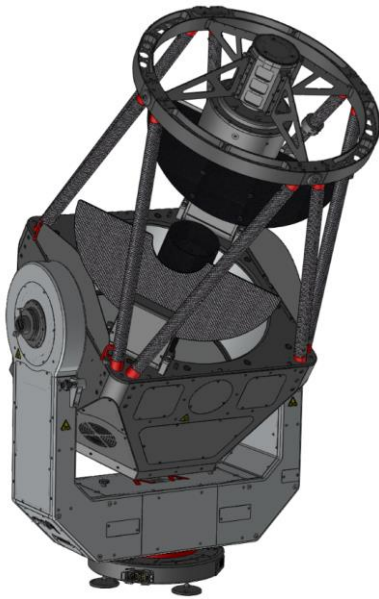


In some positions the device might not move because it is next to a software limit.
In this case the limit area (1) in the status bar of Autoslew turns from green to red.

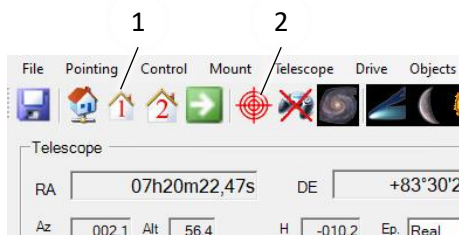


These limits do not work correctly until we tell the device what its current position is, by synchronizing on a certain object.
You can disable the software limits by pressing **Mount --> Check Limits**.

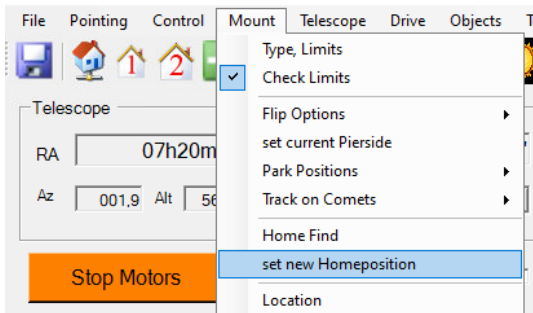
11 Synchronizing your telescope position for practicing



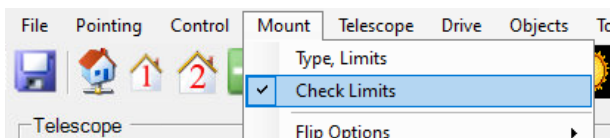
For training and testing purposes it is sufficient to synchronize the device roughly on a position. The following position is pretty suitable for that, as we know it without the need of visible stars. Just move your device to this position.



As default, Park Position 1 (1) is predefined as zenith east, so exactly this position. Now you can synchronize the device position to Park Position 1 by pressing the button for Park1 and then pressing the synch-button (2).



If you want to save this Synchronization for the next start, press **Mount --> set new Homeposition**.




Now enable the limits again. You should now be able to move your device within the normal range of the sky without getting into a software limit.

12 Tertiary mirror

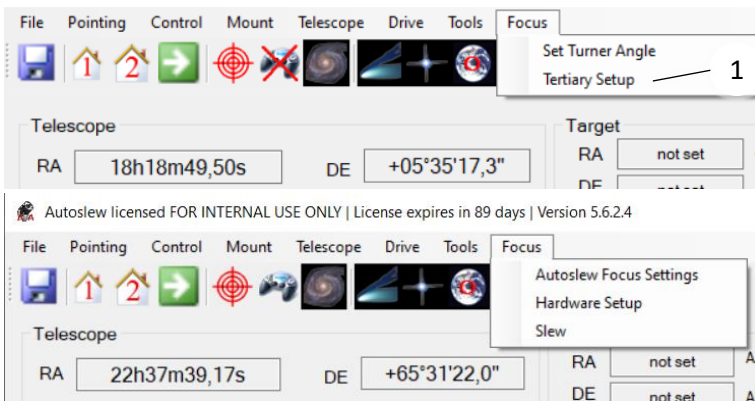
Only for devices with a tertiary mirror.

12.1 Motor tuning

The tertiary mirror is also driven by a torque motor direct drive which needs adjusted motor parameters to work properly.

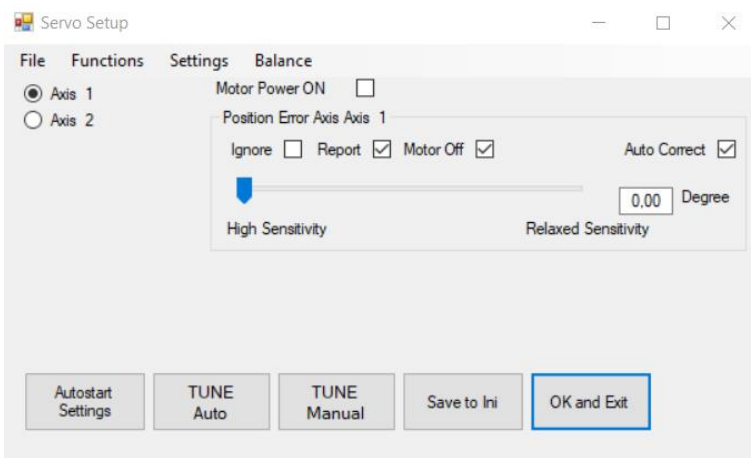


The motor parameters of your tertiary mirror drive are already tuned in the factory. So only change the settings if problems with vibration occur or noise coming from the tertiary mirror drive or when the tertiary mirror drive reports position errors.



To enter the motor setup press, **Focus -> Tertiary Setup (1)**.

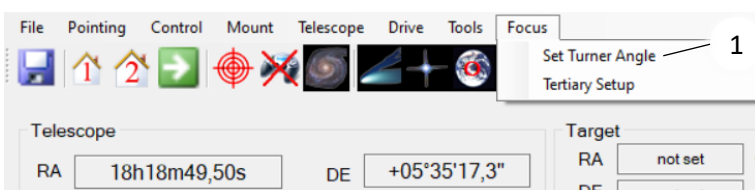
The motor tuning procedure is the same as for the main axis describe in chapter 8.2;



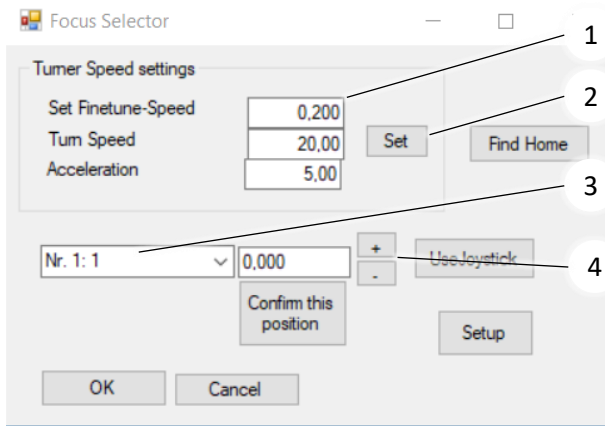
12.2 Adjust and save tertiary mirror angle

Insert the lasers to your nasmyth focus ports as described in the chapter collimation of the hardware manual.

The tertiary mirror has to be positioned so that the laser points directly to its origin.



Therefore press **Focus --> Set Turner Angle (1)**;



Change the movement speed by entering it in °/sec to the text field (1).

Confirm your changes by pressing **Set** (2).

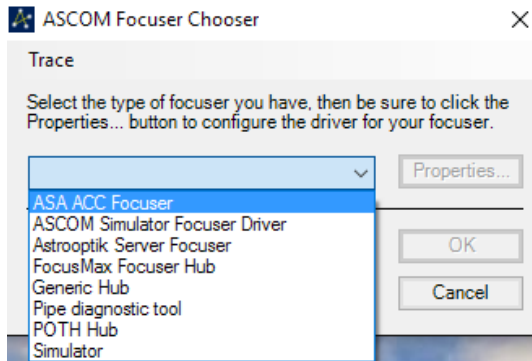
Switch between the nasmyth foci by choosing it in the drop-down menu (3).

Press the + or - buttons (4) to move the tertiary mirror.

13 ACC

For information see the document ASA# 9600090.

ACC is the software to control the functions of your product like focuser, derotator, mirror covers, ...



If you want to use third party software like FocusMax, MaximDL or others for focusing, you need to select **ASA ACC Focuser** in the **ASCOM Focuser Chooser** of your software.

14 Connecting Autoslew to a planetary software

Autoslew can be connected to many different planetary programs via ASCOM.

You can install any windows and ASCOM compatible planetary software on the USER PC.



Always ensure that time and location settings are correct in your planetary software and are equal to the settings in Autoslew.


14.1 Synchronizing your telescope position with ASA Sequence

For details see document ASA# 9600131, chapter Settings.

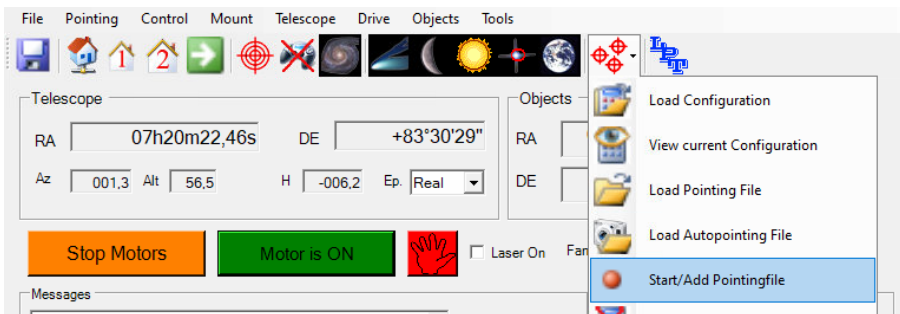
15 Creating a pointing model / pointing file

A pointing model enables Autoslew to compensate every repeatable error of your telescope and improves pointing and tracking accuracy significantly.

Therefore you need to move your telescope to some stars on the sky by using the planetary software. These stars will not appear in the centre of your camera chip/eyepiece. So, you need to manually centre them by using the move controls. Autoslew then compares the desired position (from star catalogue) with the actual position. It saves the deviation of each star and then calculates the pointing model to compensate these errors.

	<p>At first you should choose stars near your starting object and create a pointing model for a small area only. You can extend this model later by adding additional stars further away. This makes the stars easier to hit, as they will already appear near the centre of your camera chip (eyepiece).</p>
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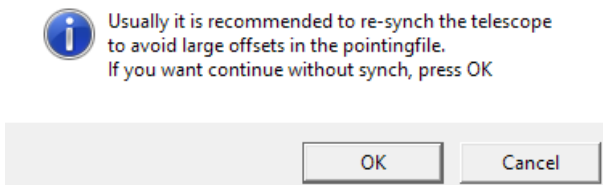
Here are the steps for creating a pointing model in detail:

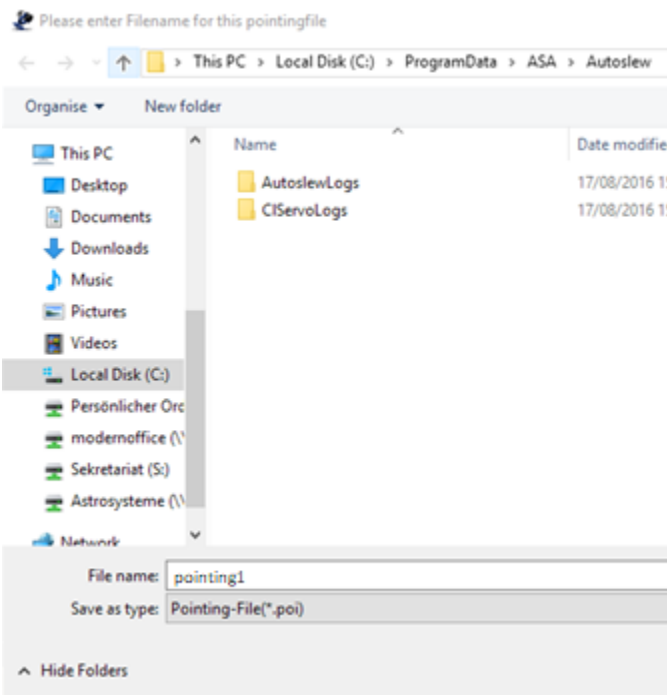


1. Synchronize on an object on the sky as described on the previous pages
2. Press **Start/Add Pointingfile**.

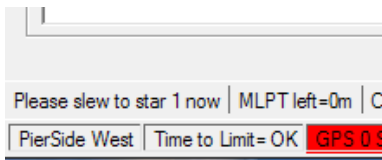
Autoslew

3. Confirm this message with **OK**, as you already synced before.

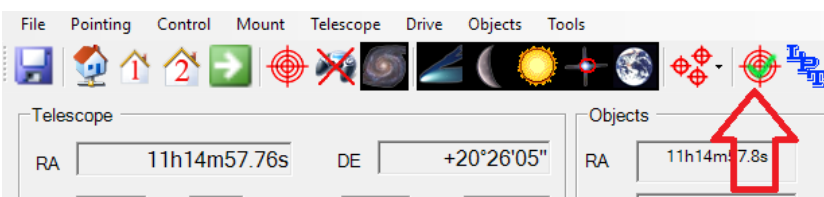




4. Now Autoslew asks you to enter a name for the pointing file and the directory where it should be saved at. Keep the default location, call the file **pointing1** and press the save button.



5. Autoslew will tell you what to do in the status bar in the lower left corner.
 6. Autoslew wants you to slew to the first star of our pointing model. As you are still pointing to the star, you used for synchronization you can use this star as the first star of your pointing model. Select this star again and press the slew button in your planetary software. The star should still be centred on our camera chip/eyepiece. So, you do not need to centre it, as Autoslew wants you to, in the status bar.

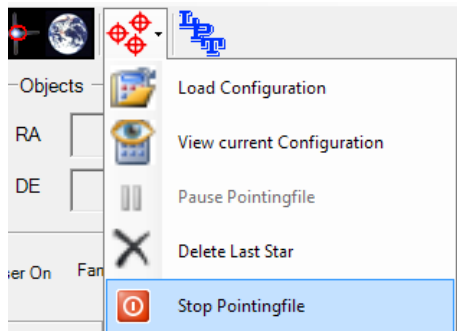


7. Confirm that the star is centred on your camera chip/eyepiece by pressing the crosshair button

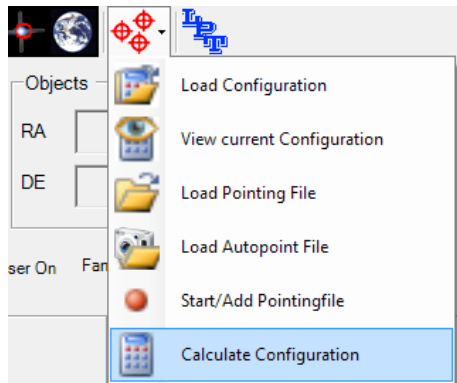
8. Now slew to the next star
 9. It will probably not appear in the middle of your camera chip/eyepiece. So, centre the star by moving the device with the move controls.

	<p>Caution Reduce the speed to 0.02-0.06 °/sec.</p>
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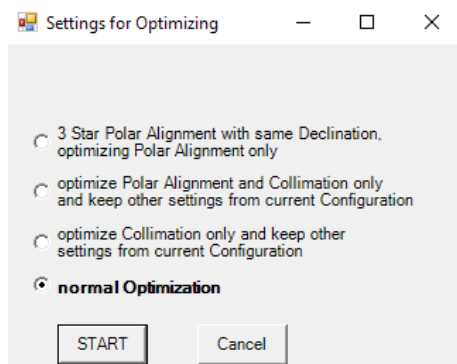
10. When it is centred, confirm again by pressing the crosshair button.
 11. Repeat these steps for at least one more star.



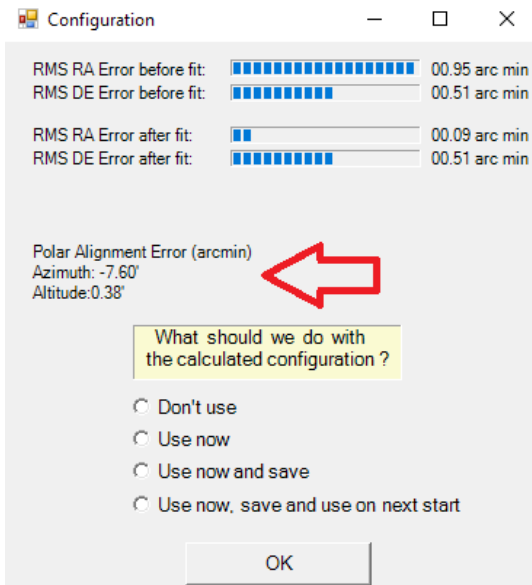
12. When you have enough stars, press **Stop Pointingfile**.



13. Press **Calculate Configuration**.



14. Choose **normal Optimization** and press **START**.



15. Now have a look at the **Polar Alignment Error**.

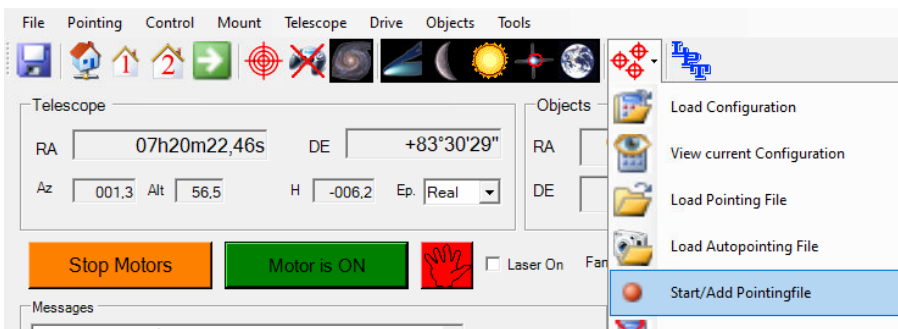
For a permanent setup we should seek for a maximum error of 5 arcmins in both axes. So that means that we need to change the mechanical adjustment of Alt and Az.

The software will tell us how to align the axes.

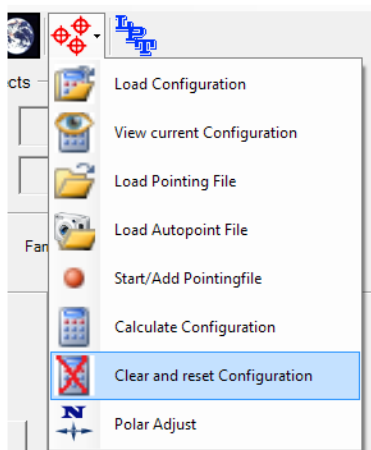
16. Choose **Use now** and press **OK**.

Save this configuration on your hard disk. It will be used automatically when you start Autoslew. Autoslew will now use this configuration to optimize pointing and tracking accuracy.

	The Configuration file contains all the information Autoslew needs for improving pointing and tracking accuracy gathered from the pointing model.
--	---



Extend your pointing by pressing **Start/Add Pointingfile** and create a new pointing model with the current configuration in use.



If you made a mistake when creating the pointing model or your pointing/tracking does not work properly with your current configuration, disable the configuration by pressing **Clear and reset Configuration**.

	For creating pointing models automatically or using MLPT (multi local precision tracking), you need to install MaximDL, Pinpoint and Sequence on your TCU. Find more details in the Sequence software manual ASA# 9600131;
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16 Autoguiding

For Autoguiding connect Autoslew to the program that reads out the autoguider CCD and measures the deviation with the device via ASCOM.

If you are using MaximDL, connect to ***Astrooptik Server Telescope***.

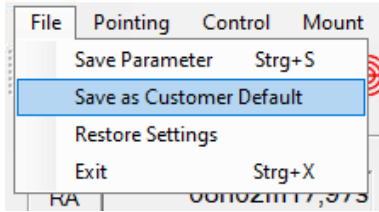
Set the autoguider options to ***Telescope*** instead of ***Relays***.

MaximDL will use ASCOM commands to direct the device to the selected positions.

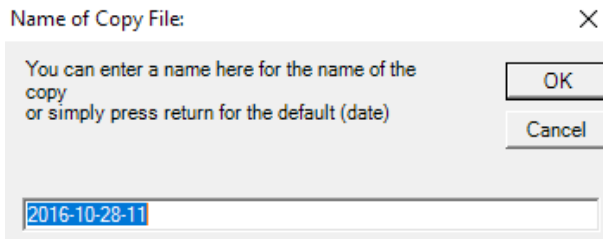
This procedure is much more accurate than using relays in dual loop encoder systems, because when Autoslew receives a command via ASCOM it will execute it with 0.1" accuracy with all backlash etc. involved, since it can measure this on the encoder.

17 Backup and restore settings

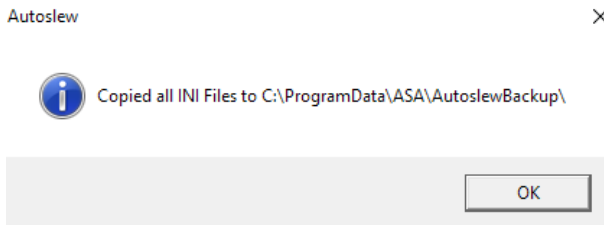
17.1 Save your personal settings



Save all your settings to a file on your hard disk. Press **File --> Save as Customer Default**.

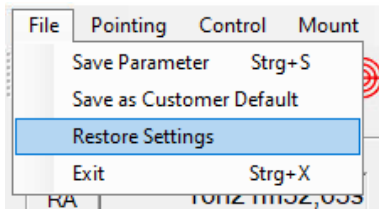


Enter the name of the backup file.



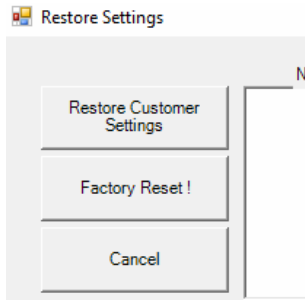
The backup files will be saved to C:\ProgramData\ASA\AutoslewBackup

17.2 Restoring personal settings



For restoring these settings press **File --> Restore Settings**. Choose the desired file and press **Restore Customer Settings**.

17.3 Factory reset



In case you have changed any settings by mistake or struggle with malfunctions, you can restore the factory settings and configure everything (motor settings, location, ...) from scratch.

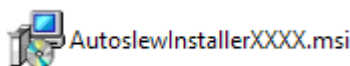
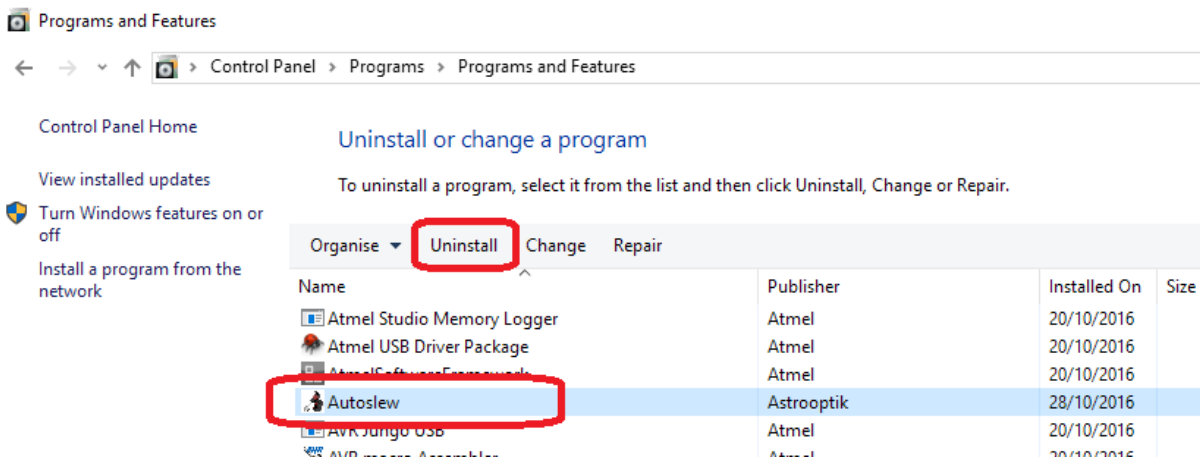
Press **File --> Restore Settings**.

Choose **Factory Reset !**.

18 Updating Autoslew

18.1 Uninstall current version

To update Autoslew to a newer version uninstall the current version from your windows control panel.




After that you just need to run the latest Autoslew Installer.

If you follow this procedure all the settings of Autoslew persist.

If you want to remove your settings, you need to delete the Settings folder after uninstalling --> described in the next chapter.

18.2 Remove Autoslew completely

This chapter describes how to remove Autoslew completely from your computer, including all the software settings.

	<p>Caution</p> <p>This is also the default folder for pointing files. Backup those in a separate directory if you want to keep them.</p>
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Uninstall Autoslew in your windows control panel.

Autoslew saves all its settings in the following directory: **C:\ProgramData\ASA\Autoslew**

Delete the **Autoslew** folder.



The ProgramData folder is hidden in Windows.
Activate to view hidden folders or copy the path to your explorer address bar.

If you install Autoslew the next time it will ask for your Autoslew serial key and start with default software settings.