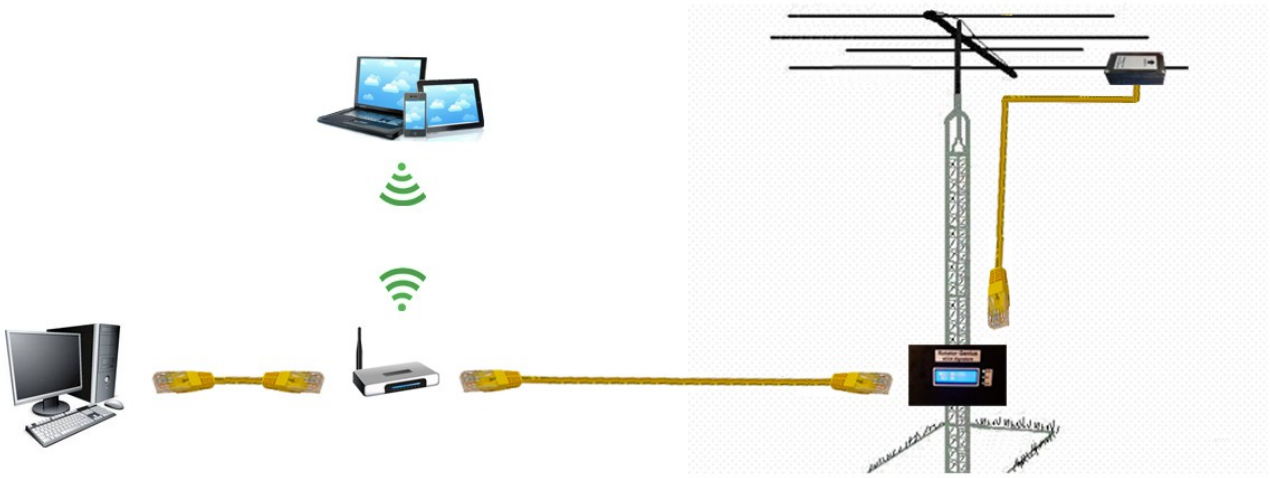
Rotator **G**enius
Instruction Manual

v1.3.3

OVERVIEW



Device connection overview

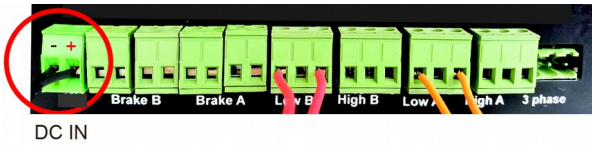
4O3A Signature Rotator Genius is a smart, high integration rotator controller. It uses an electromagnetic sensor for reading the antenna position. It can be controlled manually, or by a Windows or Android application.
Since it is a TCP/IP network device, it can be controller over the internet if necessary.
Rotator Genius is composed of the Control Unit and two Sensors. It is designed to control two rotators.
It is designed to be compatible with as many different rotators as possible.

POWERING THE DEVICE

To power the device, you need from 12V to 48V DC power supply. Use the voltage of your most demanding rotator, ex. if you need 48V for moving your rotator motor, supply it with 48V. More details in the CONNECTING ROTATORS section.

Connect and tighten your power supply wires to the green DC IN connector. **+** and **-** are marked on the picture below.

Power Connector



Device power socket

When the device gets powered, it will turn on its LED Display. It will read azimuth for the two sensors.

CONNECTING THE MAGNETIC SENSORS

The Magnetic Sensor reads out the magnetic azimuth and sends the position to the Rotator Genius. Sensors are pre calibrated.

The arrow on the sticker shows the direction it is pointing. Designed to be installed parallel to the ground, not tilted at all.

You need to place the Sensor at least 80cm away from metal materials such as iron and feromagnetics. You can mount it to the aluminium antenna bum.

The sensor is placed in a plastic waterproof housing, making it very light, so you can use plastic cable strips for mounting.

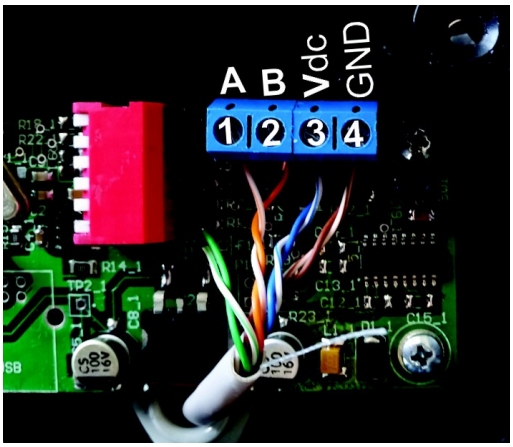
Magnetic Sensor

To connect the sensor, open it by unwinding the four screws on the box. It sends data over UTP network cable, using the RS485 protocol. Use two wires for VDC, two wires for GND, and two A and B wires for data.

Sensor wiring:

1. **ORANGE/WHITE** to **A**
2. **ORANGE** to **B**
3. **BLUE** and **BLUE/WHITE** to **VDC**
4. **BROWN** and **BROWN/WHITE** to **GND**

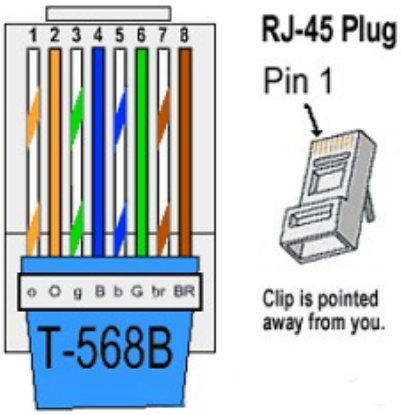
Green is unused, it is recommended to cut it off completely on this end.



Internal sensor wiring

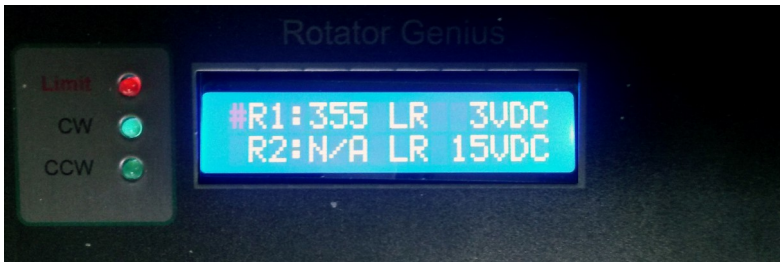
Device side wiring is using the T-568B standard, as described below:

1. **ORANGE/WHITE**
2. **ORANGE**
3. **GREEN/WHITE**
4. **BLUE**
5. **BLUE/WHITE**
6. **GREEN**
7. **BROWN/WHITE**
8. **BROWN**



RJ-45 pinout on the device side

Once connected, the azimuth should be displayed on the Rotator Genius LCD screen. Move it around and verify it works before installing it on your antenna. It should be parallel to the floor and moved only in X and Y axis, so place it on a flat surface such as a table.



LCD display on the front

On the front display you can see the azimuth value of connected sensors, as well as the set output voltage to motor. LEDs indicate if a rotator is out of configured limits, and if it's being controlled CW or CCW at the moment.

CONNECTING ROTATORS

Device can be used to power motors from from 12V to 48V. 15A for low range motors. High range motors for a single phase. A three phase can be driven on a separate high range port.

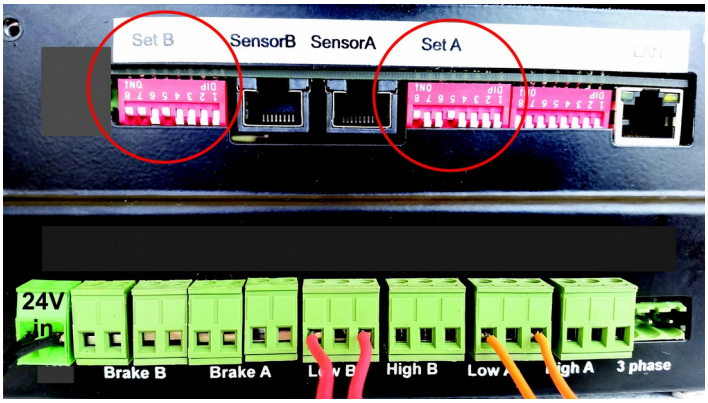
Separate DIP switches on the back are used to configure the rotators.

	OFF	**ON**
DIP1	Low Range Motor	High Range Motor
DIP2	CW and CCW normal	CW and CCW reversed
DIP3	*none*	*none*
DIP4	*Not using breaks*	*Using breaks*
DIP5	Soft Start Disabled	Soft Start Enabled
DIP6	DC Motor	AC Motor

DIP switch functions

DIP7	**DIP8**	Motor Voltage
OFF	OFF	25% of device voltage
OFF	ON	50% of device voltage
ON	OFF	75% of device voltage
ON	ON	100% of device voltage

DIP switch functions

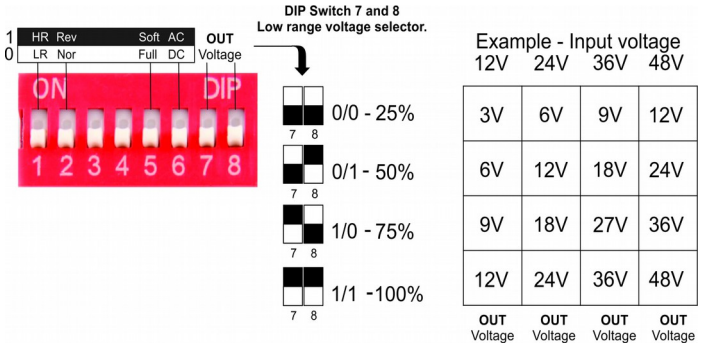


DIP switches on the back

High Range should be selected if your motor is 110VAC, 220VAC or 3 phase.

Low range motors are AC or DC from 6V to 48V. They must not exceed 15A of current.

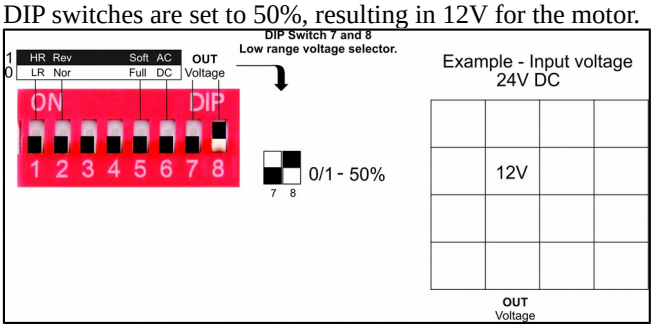
On the right you can see the table with examples of 12V, 24V, 36V and 48V power.
If for some reason the 25% increments are not enough, there is a small potentiometer inside the device on the PCB that can be used for fine tweaking, if necessary.



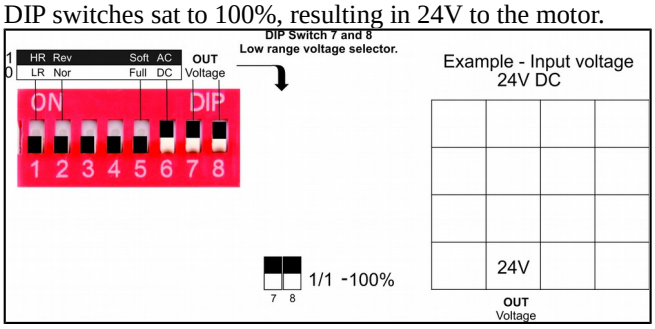
DIP switches and voltage modifiers

EXAMPLES

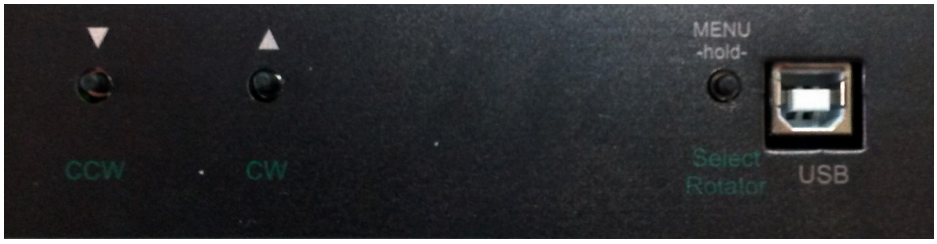
Example 1: 12VDC (Alpha spid). RG power – 24V DC.
DIP switches are set to 50%, resulting in 12V for the motor.



Example 2: 24VAC motor. RG power – 24V DC
DIP switches sat to 100%, resulting in 24V to the motor.



You can use the CW and CCW buttons on the device to move your motors manually. It is recommended to do so in order to test it. Use Select to switch between the selected rotators.



Control buttons on the top side

The control buttons on the back give the device basic stand alone functionallity. You can use them to:

- Rotate the towers manually
- Configure TCP/IP settings
- Configure Offset to compensate for magnetic declination

In normal mode, the green labels indicate the button function. Press the **<Select Rotator>** button shortly to switch between the the motor you control. A blinking indication of the selected motor will be displayed on the LCD display. Use **<CCW>** and **<CW>** buttons to move your antennas.

To configure the device, hold the **<MENU>** button for two seconds. Now, you can use the **<CCW>** and **<CW>** buttons to navigate between items. To configure a selected item, press the **<MENU>** button again. While configuring, the **<CCW>** and **<CW>** decrease and increase the values. Press the **<MENU>** button when you set the desired value.

CONNECTING WITH BRAKES

Since version 1.3.0 you can use your rotator breaks on Low Range motors.

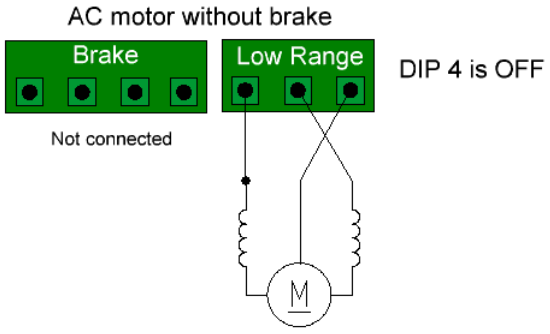
Voltage on the break must be the same as voltage on the rotors motor.

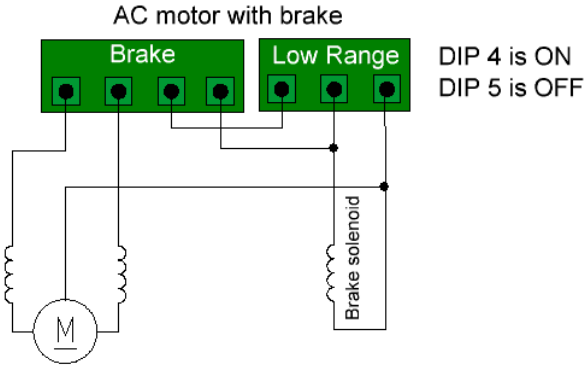
Set **DIP4** to **ON** to enable using this feature in software.
Set **DIP5** to **OFF** to disable soft start.

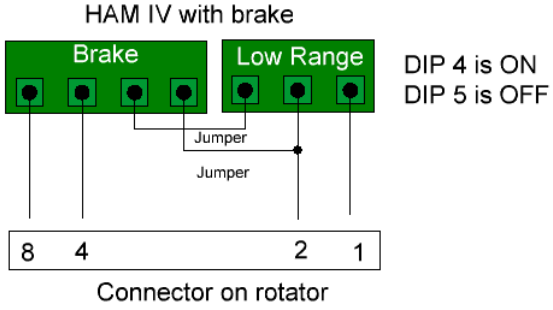
Soft start is not possible when using brakes.

Rewire your rotator to match the diagram below.

Common wire of AC motor is connected to the center pin. Motor ends are connected over the brake relays as on the diagram below.







When you execute the CW or CCW command the brake solenoid will be powered first about half a second before the motor. When you release the command, the motor will stop being powered and the break will be powered for half a second more. This enables the release of activation of the brake, by properly sequencing it.

NETWORK SETTINGS

Use the buttons on the device to set the network settings to your needs, as described above. Default settings:

Default IP: 192.168.1.250
Default Netmask: 255.255.255.0
Default Port: 9006
Default Offsets: 0

SENSOR CALIBRATION

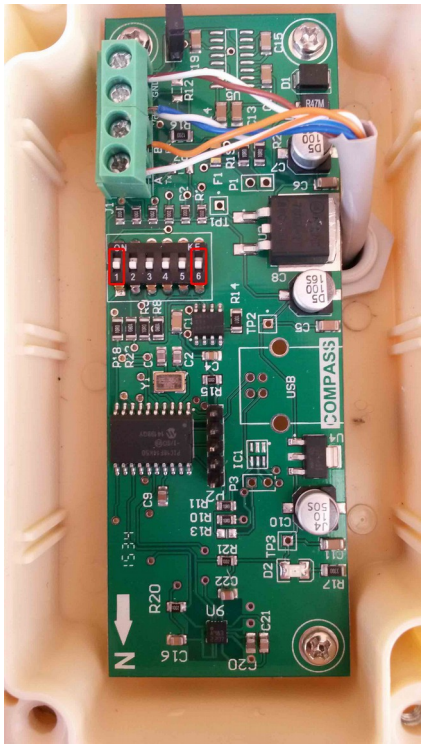
Sensors come pre calibrated from the factory. Do not attempt to do this unless you are absolutely sure it is necessary.

Calibration requirements and tips:

- The sensor should be attached to the boom in the same way it is going to be used.
- Your boom must be able to make full 360 dregree turns with your boom.
- The more full circles you make, the higher the precision will be. Around five is optimal. You can rotate in any direction, CW, CCW or mixed.
- The slower you rotate it while calibrating, the higher the precision will be.

Calibration process:

- In order to start the calibration process you need to disconnect the sensor from the device, and open the casing.
- Set **PIN 1** and **PIN 6** to **ON**, as shown on the picture. Do NOT youse a metal screwdriver for this, or it will mess up the readings.
- Connect the sensor back to the RG.
- There will be no reading on the LCD display or Panel Application during the calibration mode.
- When done, set **PIN 1** and **PIN 6** to **OFF**.
- The sensor should now be calibrated. You should get a reading on your LCD display or Panel Application.
- Repeat the process if not satisfied with the results.
- When done, seal back the box.

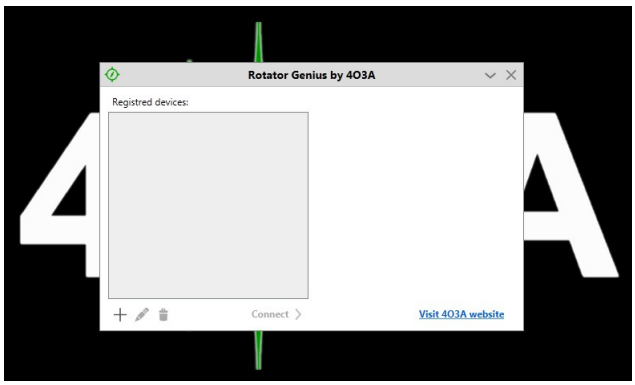


Calibration pins

CONTROL SOFTWARE

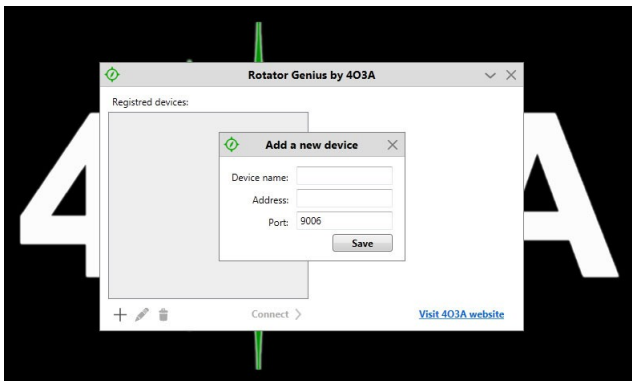
Download and install the latest Panel and firmware software from http://4o3a.com/index.php/downloads
At the time of writing, the version is **1.2.6**. If there is a newer software version out, look for the new manual as well.
The Panel software is made for Windows 7, 8 and 10.

Follow the setup. Rotator Genius icon will appear on your desktop.



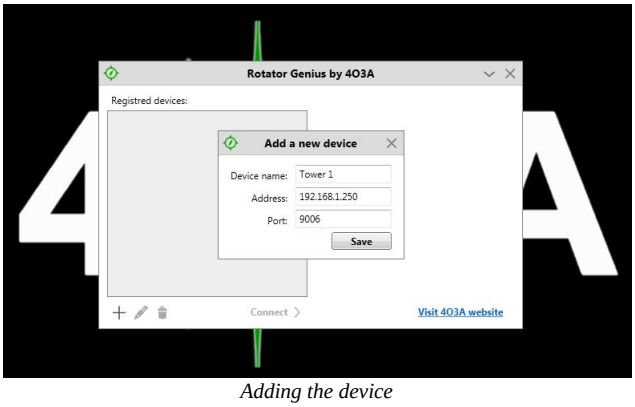
Device selection

This is how your window looks like when you first open the application. You first need to add your device to the list.
Press the **+** button to add.
The button to its right is the edit button, and finaly delete.



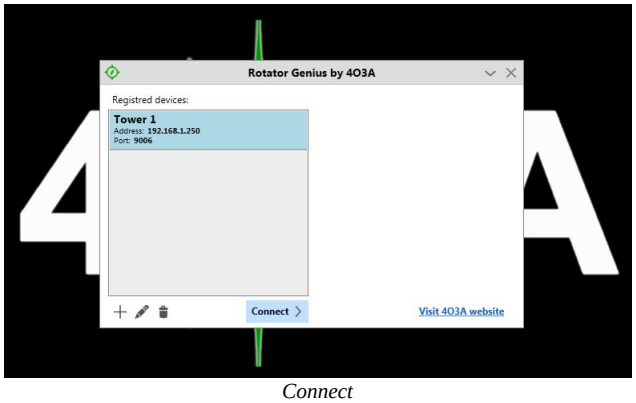
Add device

Name your device and enter its IP address and port number.
Check how to set your IP address and port number in the NETWORK SETTINGS section above.



Adding the device

Press Save when done.

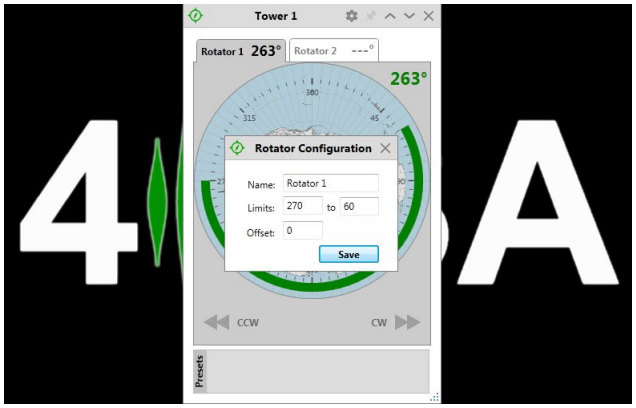


Connect

Select your rotator from the list, and click Connect.

RG Control Panel

This is the RG Control Panel. You can see your status and send commands from here.
It is recommended configure your rotators before attempting to move them.
Click the settings icon on the top of the window.

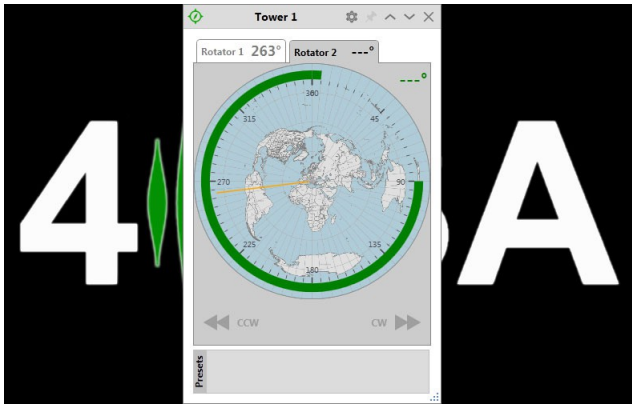


Rotator configuration

Name your rotator, and set the limits if you do not want your rotator to go beyond a certain point.
You will not be able to give it a target beyond the limits. However, if external factors move the antenna out of bounds, you will be able to use the CW and CCW buttons to move it back to the allowed aria.
In case your rotator has some inertia when stopping, you can compensate by adding the offset. This will stop the rotator the amount of set degrees before its final location.
Click Save when done.

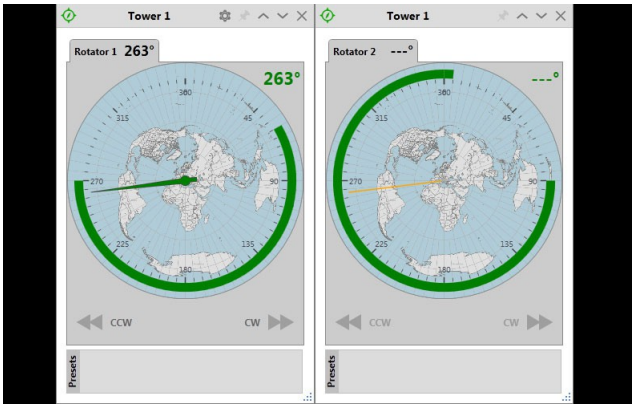
Setting the target

You can double click anywhere within limits to easily move your antenna to the desired azimuth. The green aria will start to flash, and the stop button will appear below the gadget. You can use it to stop at any time.
You can use the CW and CCW buttons to manually move if needed.



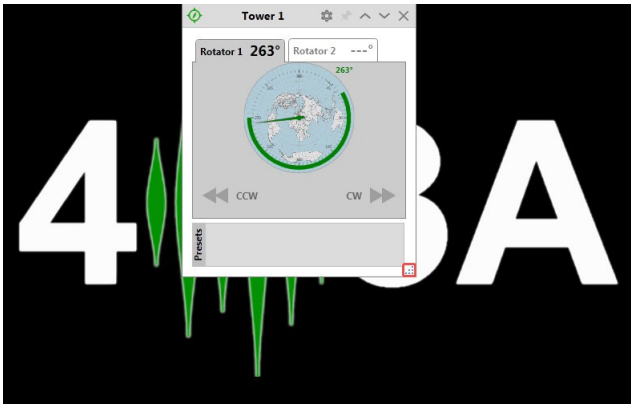
Tabs

There is a tab for each rotator. At the moment, Rotator 2 does not have a sensor connected.
The other rotator azimuth is represented as the orange line at all times.



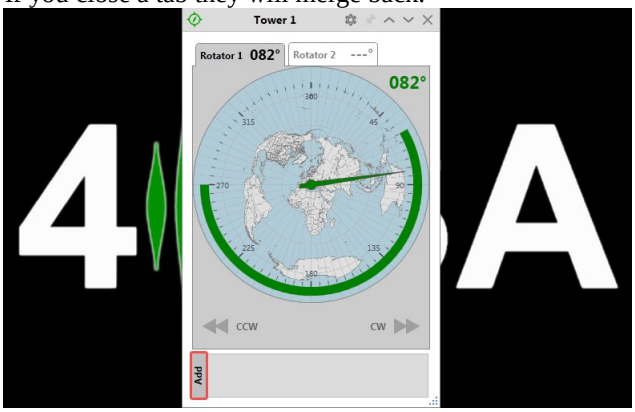
Separating tabs

You can right click the tab with your mouse to separate the windows.
If you close a tab they will merge back.



Resizing

In the bottom right corner you will find the re-size icon. Left click it with your mouse, hold, and move your mouse to resize it to your needs.



Add preset

After finding your optimum antenna positions you should save them as presets.
Click on the Add button.

Adding the preset

Enter your preset name, and the corresponding azimuth. Click Save when done.

Preset examples

We recommend naming your presets with the maximum of three letters, though it is not a technical limitation.

1.3.0 NEW FEATURES

Move by clicking the GO button

As well as double clicking you can now click on the azimuth you want to move once to and click the GO button below the gauge.

Rotate Manually

You can click on the Azimuth in the top right corner and enter a value manually, then click Rotate.

New Preset Features

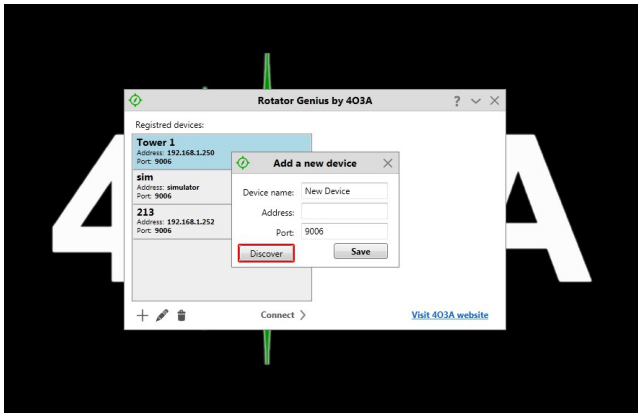
The presets now show the saved value on the label. When you mouse over them, they will let you know if they are within limits. Blue color indicates it is within limits.

Invalid Preset Value

Presets marked in red are indicating your preset value is out of bounds of limits. Clicking it will not issue a go command.

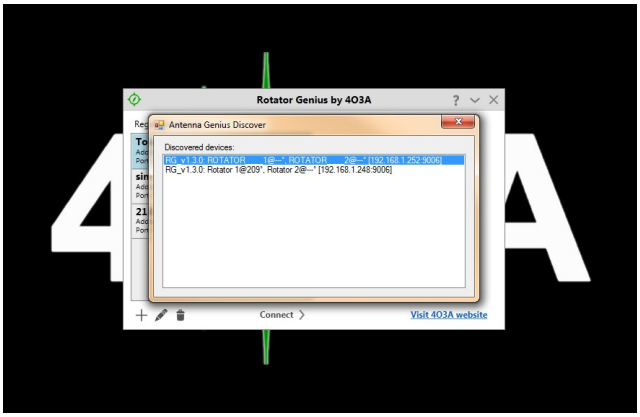
Offset

Declination is replaced by offset, both on the device and the panel. Instead of having one declination setting you now have different values for different sensors.



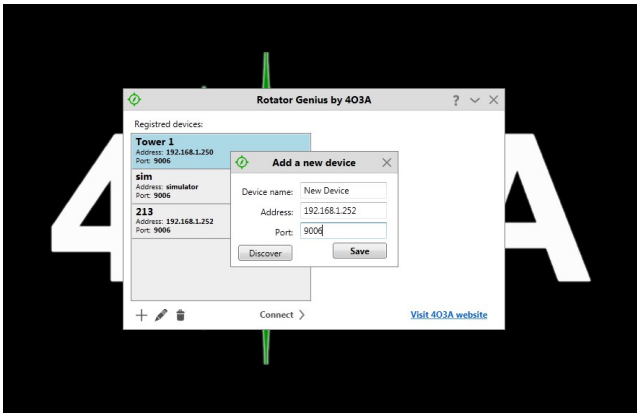
Discovery Protocol

The discovery protocol was implemented, allowing you to find your devices on the network easily.



Discovering Devices

Double click the discovered device to add it to your registered device list.



Adding a discovered device

Change the name if you wish and click save.

Thank you for purchasing our product and supporting the 4O3A community. You are a part of a small, but very special family now.

Please email any further questions, suggestions, comments, or anything else to support@4o3a.com

We would love to hear what you have to say. :)