Rotator RAS Controller Rot2Prog

AlfaSpid "AZ/EL"

Or

AlfaSpid EL

User Manual

DRAFT

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Introduction

The *A*lfaSpid RAS (AZ/EL) rotator is an extra heavy-duty rotator designed to run large satellite antennas and comes complete with an electronic control unit. The rotator is designed to be mounted pipe to pipe or on an optional adaptor plate for conventional in tower mounting. It can also be mounted outside of the tower on the mast, or used in a side mount configuration.

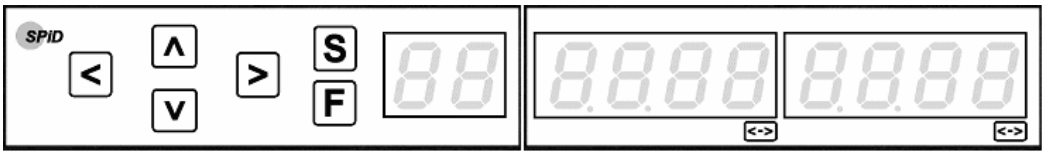
Shipping Contents

RAS Rotator 1
Rot2Prog controller 1
Spare Fuses 1
Custom Mouse 1

Technical Data

Rot2Prog and RAS
Input Voltage (Typical) ..... 12 – 24 Volts DC
Input Current (Nominal Draw) ..... 3 – 5 Amps
Motor ..... 12 – 24 Volts DC
Fuse ..... 8.0 AMP GMA
Rotation Speed (azimuth) ..... 120 sec (12 V) / 60 sec (24 V)
Rotation Speed (elevation) ..... 80 sec (12 V) / 40 sec (24 V)
Turning Torque (in-lbs) ..... 1400 (12 V) / 1740 (24 V)
Braking Torque (in-lbs) ..... > 14,000

Control Panel



Buttons

< - Left (Decrease)
^ - Up (Increase)
v -Down (Decrease)
> - Right (Increase)
S - Setup (configuration)
F - Function

Indicators

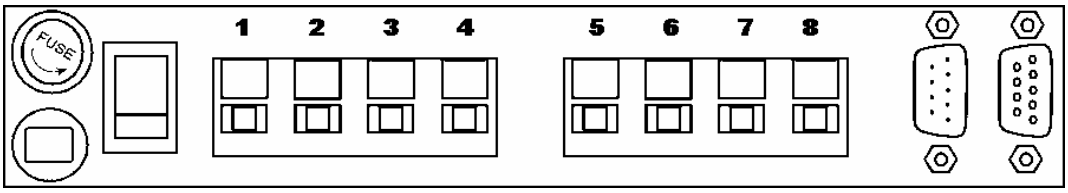
<-> -Dot Overlap - Over travel

7 segment 4-digit display

- Multifunction display

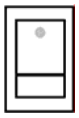
Elevation Azimuth

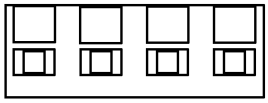
Rear Panel

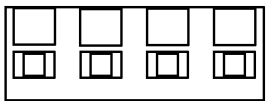


-Fuse Holder

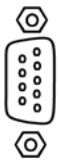

- Power Cord


- Power Switch


- Terminal Strip for azimuth control (1,2,3,4)


- Terminal Strip for elevation control (5,6,7,8)


-DB-9 connector (male) Custom *A*lfaSpid Mouse


-DB-9 connector (female) Computer interface

Installation

Wiring Connections

The rotator unit must be wired to the control unit with 8 wires cable. 4 wires – azimuth (1,2,3,4) and 4 wires - elevation (5,6,7,8). Diameter of wires in cable to connect the control unit to the rotator depends upon the distance between rotator and controller. The wire for the impulse sensing may be quite thin - #22 or similar, even for relatively long distances.

> ⚠ TIP:
> Before final installation of equipment, it is strongly suggested you check out all functions and connections on a workbench.

Length (distance)	Gauge Motor
10 m (32')	#18 (1.19 mm)
30 m (100')	#16 (1.42 mm)
60 m (200')	#14 (1.75 mm)

> ⚠ CAUTION:
> Do not accidentally switch the motor wires with the impulse wires.

Remove cover from the body and make connections as follows:

Azimuth:
1 Motor Drive to 1 on controller terminal
2 Motor Drive to 2 on controller terminal
3 Impulse Sense to 3 on controller terminal
4 Impulse Sense to 4 on controller terminal

Elevation:
5 Motor Drive to 5 on controller terminal
6 Motor Drive to 6 on controller terminal
7 Impulse Sense to 7 on controller terminal
8 Impulse Sense to 8 on controller terminal

Bench Testing of Control Box

The control box is normally expected to be operated from a 12 Volt DC supply, however it may be operated from other unregulated DC or AC sources as well. The output of supply source must be from 12 to 26 V, 6 Amps minimum.

The polarity of the power to the control box input leads is not critical, as a full wave bridge rectifier on the input will provide the proper polarity to the electronics.

TIP: *Because of several steering diodes in the motor path, the voltage delivered to the motor (neglecting wire loss)* ***will be about 1.4 volts less than the power supply voltage.*** *For longer runs and/or thin wiring a higher voltage (up to approx 24V) to the control unit is beneficial. A simple way to estimate if the voltage to the motor is adequate is by timing the rotation. Under no or a very small load, the 360 degree rotation time with 12V DC at the motor is about 120 second (2 minutes). With 24 V DC is about 60 second (1 minute). A DC Ammeter in the motor lead is also useful, it should indicate between 2 and 3 amps with a small load. On windy days or heavy load, the current may fluctuate up to 3 to 5 amps per motor.*

Notes – testing and troubleshooting


It is highly recommended to ground the Control Box.

Azimuth:

Pressing [>] should make the rotator move clockwise.
Pressing [<] should make the rotator move counter-clockwise**.**

If rotation is reversed, switch lines 1 and 2 on the back of the controller.
Impulse sense lines (3 & 4) have no polarity concerns.

Elevation:

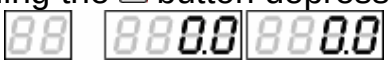
Pressing [∧] should make the rotator move up.
Pressing [∨] should make the rotator move down.

If rotation is reversed, switch lines 5 and 6 on the back of the controller.
Impulse sense lines (7 & 8) have no polarity concerns.

Part of the overload protection circuitry involves removing motor power if the controller receives no sense indication. If the motor turns for a few seconds and then you hear the relay in the control box drop out, the motor has either stalled or there is a problem in the impulse sense wiring. **The controller has not detected motor movement.**

Turn the unit OFF.

Resetting the Controller

While holding the F button depressed turn control unit back on. This will now show  on the display.

This feature can be used if, for any reason, the direction of the antenna becomes incorrect. This may be caused by antenna to mast slippage or incorrect initial alignment.

IMPORTANT:

Azimuth

In order to set the limits for both the Azimuth and the Elevation sections of the rotator, first always start by setting up the azimuth section by pointing the rotator to 0 degrees or true north. Now reset the controller as previously outlined above. The controller is now set for azimuth.

The *A*lfaSpid rotator is now set at the counter-clockwise end of its normal rotation range. Normal rotation range is in a clockwise direction for 360 degrees.

From the reset position, you can rotate counter-clockwise an additional 180 degrees in over-travel, as well 360 degrees clockwise, plus an additional 180 degrees into clockwise over-travel.

Counter-clockwise over-travel is indicated by a steady dot above the over-travel icon <-> . <-> . Rotation past 359 degrees into the clockwise over-travel is indicated by a blinking dot above the over-travel icon. <->

Elevation

Elevation, must be set to zero. To do this the controller and rotator must be positioned to zero degrees, both electronically and mechanically. Using the display down arrow (or the mouse) move the rotator to the full travel, which should be about (- 21.0). If the rotator stops and the display is not -21.0 then the mechanical stop in the rotator has been activated. After display on the controller reads -21.0 (or its lowest value) reset the unit by pressing the “F” button and turning on the power at the same time. Again, using the display down arrow (or the mouse) move the rotator to the full travel, which should be about (- 21.0), repeat this until there is no more travel.

Press the display up arrow until the 10.0 degree mark is met. Do a reset. Test for a full 180 degrees of travel. If it travel is 180 degrees or more then setup is correct. If it does not then repeat the process until it does. See section on “PP” for minor adjustments

Controller Operation

Technical Note:

The *A*lfaSpid controller has multiple modes of operation. You will need to become familiar with these modes to be able to make full use of your rotator.

[F] Function Mode

The [F] button steps through the function menus. The leftmost character on the display indicates the function mode you are currently in.


- Normal Operations Mode

- Half Auto Mode

- Auto Mode

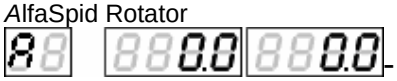
> ⚠ The 0 in the displays to the left will be replaced by your actual beam heading.


Normal Operations

In Normal Operations Mode, the [<], [∧], [∨], [>] buttons cause rotation as long as the buttons are pressed. Pressing [S] while in normal operations mode will take you to setup mode.


- Half Auto Mode

In Half Auto Mode, the [<], [∧], [∨], [>] buttons can be used to pre-select the desired beam heading. The heading displayed on the controller will rapidly change in the direction of desired rotation. Once the desired beam heading is shown on the display, release the key. Approximately ½ of a second after no key presses have been detected, the display will revert back to the actual beam heading, and rotation towards the desired heading will take place. Pressing any key while in transit to the desired heading will cancel the action.



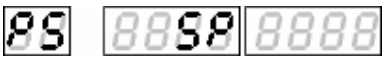
- Auto Mode

In Auto Mode, the controller will respond to commands from control software running on an attached computer. The <, ∧, ∨, > buttons can still be used, but pressing of any of them will cause cancelling the data from software.

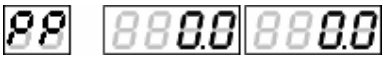
S Setup Mode

The S button steps through the setup menu, for modes other than manual control operate as **STOP**. The display cycles through each of the setup menu items.

- Rotator Transmission



- Program Simulation

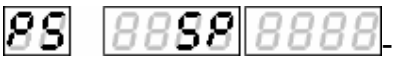


- Heading Adjust

High and Low Limit is not defined by user and is equal ±180° for azimuth and ±20° for elevation.

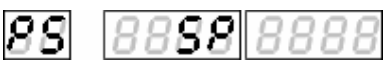
- Rotator Transmission

This value defines the accuracy of rotator operation.
1.0 means operating with up to 1 degree per pulse from rotator accuracy. On customized unit this may be some other value.



- Program Simulation

Program Simulation allows the user to set the serial communication protocol used by the rotator. When set to emulate another brand of rotator, the *A*lfaSpid will respond to commands,
If your favourite software supports a rotator, chances are, the *A*lfaSpid will be able to interface to your software. There are 2 modes available:



- *A*lfaSpid

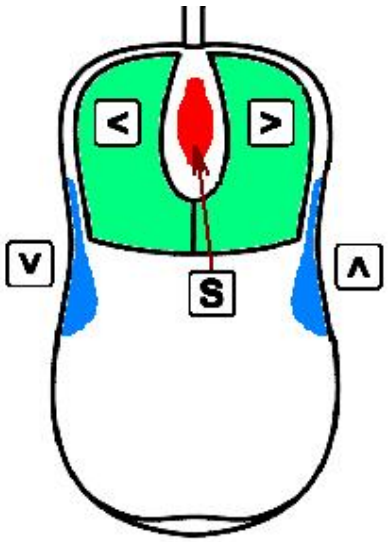
 - Yaesu

(GS232 protocol, 600 baud N, 1, 8 bits)
(Data rate 600, 1 STOP bit, no even parity bit)
Operating mode change <, >.

 - Heading Adjust

This setting can be used to make minor heading adjustments without causing the rotator to turn. If you notice that the heading displayed on the controller to a known signal source is out by a few degrees, you can change the heading displayed on the LED readout to match the known heading, rather than having to turn back to North and reset the controller. These settings are made by <, ∧, ∨, > buttons.

Mouse Controller



The optional mouse controller allows easy desktop access to the most commonly used front panel controls. These buttons are functionally equivalent to the corresponding front panel controls.

< - Left (Decrease)
^ -Up (Increase)
v -Down (Decrease)
> - Right (Increase)
S Setup Mode or **STOP**

⚠ The mouse controller is a highly modified computer mouse. You can not use a regular mouse with the *A*lfaSpid rotator nor vice-versa.

The mouse ball serves no function. The mouse simply provides an ergonomically pleasing case in which to mount the controls.