

# Instruction Manual



## **AlfaSPID Rotator - RAK** **AlfaSPID Controller - ROT**

# Introduction

Rev.1.12.01.

English translation and rewrite of this manual by,  
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The *AlfaSPID RAK 1* rotator consists of an extra heavy duty rotator (designed to run large communication antennas ) and an electronic control unit *ROT 1*. The rotator is designed to be mounted inside a tower or on a plate ( optional ), or can be mounted outside of the tower on the mast.

The rotator is meant to operate in cooperation with the packaged software including the logging program but is not necessary to use the PC software onlu the control box is required.

## Inventory - Contents

Rotator	1
Controller	1
Custom Mouse (optional)	1
Parallel Interface cable (Controller to PC)	1
CD-Rom with logging program / utilities	1
Check web site for updates <a href="http://www.alfaradio.ca/">http://www.alfaradio.ca/</a>	

### Technical Data

Input Voltage	12 V ( 12 V DC model)
Input Voltage	110 V ( 110 V AC model )
MAX Amps start surge	5 A (12 V DC model )
MAX Amps nominal draw	2 A (12 V DC model )
Motor	28 V
Fuse	0.5 A (110 V), 3.0 A (12 V )

After powering “ OFF “ the unit, the EPROM “will remember” all the last settings.

## Operational Control – Description

FRONTPANEL



Buttons- > CCW  
< CW  
**S** Setup mode  
**F** Function mode

**DOT** indicator for Rotation overlap appears above double red arrows  
**DOT** indicates “setup mode” appears above red “U”

## REAR panel



Fuse -

Power Cable

Power Switch

Connection strip :-      **“M”**           - Motor power lines     1 and 2  
                                  **“I”**           - Impulse control lines 3 and 4

DB9 (Male) Custom mouse

DB9 (Female) PC control interface ( Printer Port )

**ALWAYS ENSURE POWER CORD IS DISCONNECTED BEFORE MAKING ANY CONNECTIONS TO THE UNIT.**

Installation TIP : - Before any final installation of equipment, it is strongly suggested to check out all functions and connections on a work bench.

### Wiring Connections

The rotator unit must be wired to the control unit with 4-wire cable. The gauge of the 4 wire cable to connect the control unit to the rotator depends upon the distance between rotator and controller.

<u>Max Length</u>	<u>Gauge Motor</u>	<u>Gauge Impulse.</u>
10 m (32')	#18 (1.19 mm)	#18 (1.19 mm)
30 m (100')	#16 (1.42 mm)	#18 (1.19 mm)
over 30 m to 61 m		
61 m (200')	#14 (1.75 mm)	#18 (1.19 mm)

**CAUTION <>CAUTION <>CAUTION <>CAUTION <>CAUTION <>CAUTION <>**

**Be careful NOT to accidentally switch the “M” set of wires with the “I” connections.  
This will cause irreversible internal damage to your control unit.**

“M” motor connection :- Red 1 on controller to (+) on rotator body  
Black 2 on controller to ( - ) on rotator body

**Note** Pressing the right mouse button (or” > “on front panel) will make the rotator go **Clock Wise**. The left mouse button (or” < “on front panel) will make the rotator go **Counter Clock Wise**. If not reverse polarity of connections on back of the control unit.

“ I ” Impulse control lines 3 and 4 :- there is no polarity to be concerned with.

### Setup sequence

While on work bench do the following to ensure easier setup once on tower.

**Under normal circumstances the rotator comes "factory preset" to zero (North).**  
This is what to do in the event it is not zeroed.

**Zero the rotator to North:** (Assuming you are in the northern hemisphere. In southern hemisphere reverse your directions.)

With all wiring *safely* connected, put an arbitrary mark on the top of the rotator housing (pipe mount) turn rotator completely to the end of run CCW then to end of run CW. Find the mid way point. This will be North.

Turn the unit OFF.

While holding the **F** button depressed turn control unit back on. This will now show " 0 " on the display. This is now North.

In the southern hemisphere the procedure remains the same except that you will be zeroing on 180 .

To zero to 180 degrees, do the following :-

Press "**S**" button till you see a flashing P 0 on the display.

Then Press **<** you will then see flashing P180 , now press **F** to exit programming mode.

Now instead of zero you will be "zeroing" on 180 .

## Tech Note

Your rotator is actually capable of rotating 360 degrees PLUS an additional 180 degrees either direction past normal zero. By doing the above procedure you can best match the slack in your Coax cable loop between the mast and the tower to allow the antenna to have maximum over rotation capabilities in each direction.

We mention this so you are aware, and leave sufficient Coax length to accommodate this additional rotation.

You are now ready to mount the rotator on the tower, unless you wish to familiarize yourself further with the control panel operation on the bench. This way you can see what happens when you enter a given command.

## Control Panel Operation

Buttons-   <    CCW  
              >    CW        enough said :-)

These are duplicated on your “L” and “R” mouse buttons.

**F**   Function mode ( **F** button allows you to step through your Function menu )  
The first character of the LED display indicates the function mode. The choices are : blank, S, H, A and P. Please note that program certain values, such as the Scan limits and the Presets the function LED display MUST BE in the “blank” position.

**S**   Setup mode button allows you to step through the various programmable functions. In order, pressing **S** will step through Upper “H” and Lower “L” scan limits, P 0 and P 180 “zeroing” and then P 1 thru P 6 the rotator preset bearings.

Pressing the **S** button :-

**First press:** puts you into SCAN mode - display shows “**S**”

SCAN mode allows you to continuously rotate or “scan” between two preset values.

To enter your preset values, press the **S** button several times until no letter appears (i.e. blank) in the first LED display , then utilize the **S** button to enter the “High “ and “Low” parameters of rotation.

**Example:**

Press **S** , display now shows “**H**”. Set “**H**” to 200 degrees by holding the **<** or **>** button (or mouse ) till display shows 200.

Press **S** button until you see “**L**” on the display. Again by holding the appropriate **<** or **>** arrow (or mouse) button till display reads your desired other parameter. Lets use 50 degrees for example, your settings are now memorized in the units memory.

To utilize SCAN mode press **F** , display will show “**S**” (for Scan mode) then press **S** to energize the SCAN mode.

If your rotator is on the bench top you will see it rotate between 50 degrees and 200 degrees , back and forth continuously till you cancel it by pressing the “**S**” button again (or the singular black button on the mouse). The **S** button is used to TOGGLE the SCAN on or off (as does the black mouse button).

To exit from SCAN mode, press **F** button again.

**Second press:** of the **F** button puts you into HALF auto mode – display shows “H”. HALF auto mode allows you to quickly engage rotation from either the front panel or mouse buttons, with this difference from manual mode:-

Hold down a direction button **<** **>** or mouse button, let the display numbers roll over to the desired degrees, RELEASE the button. There will be a slight delay and the rotator will engage and swing around to the number you chose. Simply put, press and hold to degree desired, release, and it will go there.

**Third press:** of the **F** button puts you into AUTO mode.

The AUTO mode is exclusively used through the included software for logging and control.

Even in AUTO mode you can manually override by using the direction buttons on the control box or mouse buttons.

**Fourth press:** of the **F** button puts you into PRESET POSITION mode.

PRESET POSITION mode allows you to quickly point your antenna to a designated direction (you program them to suit your needs). Example: **P 1** = Europe, **P 2** = Australia, **P 3** = Japan etc. with one push of the button on your custom mouse. You have the choice of 6 positions (note the 6 grouped black buttons on the side of the mouse). Once you have entered your presets, pressing any of the 6 mouse buttons will briefly cause the display to show the preset value and then it will display the actual heading of the antenna “en route” to its preset heading.

To preset positions press the **F** button until the first letter is blank, then the **S** button as many times as required till you see **P 1** on the display, then with **<** or **>** keys or the mouse buttons set your number of degrees to the designated direction. Please note and remember **P 0** is NOT a preset but indicates where the rotator is “zeroed”.

Pressing the **S** button one more time, the display will show **P 2** . Now repeat the above programming procedure for the rest of the presets **P 3** to **P 6**.

To exit PRESET POSITION mode procedure press **F** button once.

To verify your programming of directions, do as follows: Press **S** button till display shows **P 1** , one press on **<** or **>** , or pressing the mouse buttons will show memorized direction ( in degrees ). Next press **S** again, the display will show **P 2** , one press on **<** or **>** will show memorized direction ( again in degrees )... repeat above procedure for **P 2** through **P 6**.

To exit the verification procedure press **F** button once.

## **Packaged Software Overview**

### Logging Program - LOG, SPID

Logging QSO's and associated information, prints QSL labels

Calculates Azimuth & Distance from Home QTH to entered call sign.

Control rotator (antenna) direction.

Functions with external call sign databases

Database sort and report print facilities

Display maps - sun & gray line, coordinates,

Map controllable point & click, command of rotator.

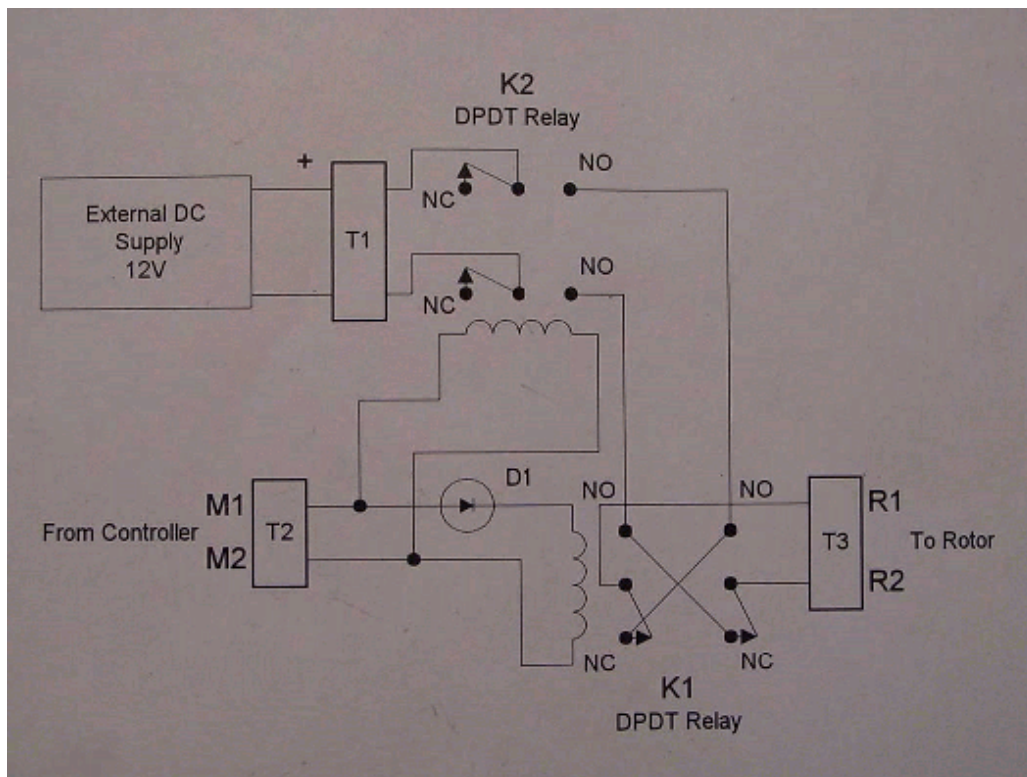
## USING this Rotator with LONG Cable Distances

by Don Moman, VE6JY

Since the motor uses relatively low voltage DC, a combination of long cable runs and/or thinner than required cable may reduce the voltage at the motor to an unacceptably low value. It may turn in warm weather or light winds but the power will not be available to rotate under more severe conditions.

While it is easy to say just use a heavier cable, this may be costly, impractical or both. I have one tower that is over 1700 feet (approx 500 meters away) and running large cable out there would be very expensive.

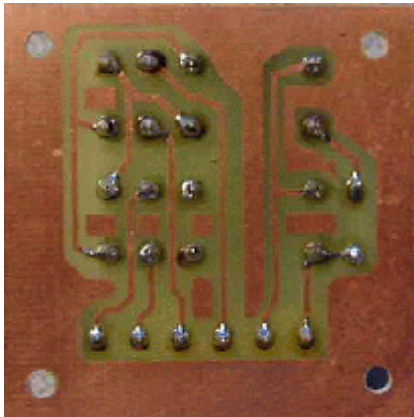
My solution is to use this rotator controller's output voltage to control another set of relays that will feed a higher voltage DC to the motor. In the above mentioned example, I find a voltage between 60 to 80 volts gave suitable performance. This is a pretty extreme case but it illustrates the versatility of this design. The external DC supply voltage needed will vary depending on the DC voltage rating of your motor, the cable size and length of the run. Typically 36 to 50 volts at 3-5 amps should be quite adequate. These DC motors are quite tolerant on their voltage ratings. Relay Board schematic



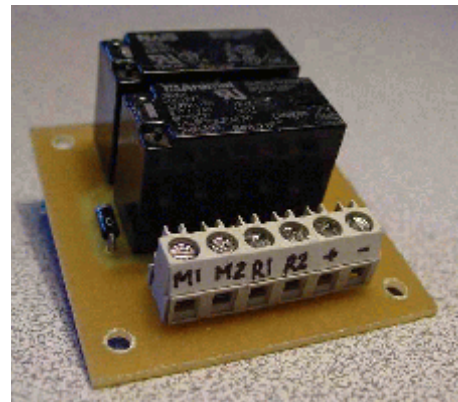
Relays chosen should be suitable for the proper coil voltage as well as appropriate current carrying capability. A relay capable of 5 to 10 amps DC is adequate. The diode in series with Relay K1 is any general purpose 1 amp style such as the 1N400x series. If the motor rotates incorrectly, simply reverse the leads to the motor or from the External DC Supply.

Certain models of the control may have the capability to, with a small modification, allow you to input your external DC voltage into the unit and use the internal relays to control the rotator as usual.

Relay Board (bottom view)



Relay (finished product )



This information is presented as a guide to help the user realize a solution to the long cable run situation.

If you do not feel comfortable wiring basic circuitry to do this, please contact Alfa Radio Ltd. ([www.alfaradio.ca](http://www.alfaradio.ca)). for a prewired solution.

*Prepared for Alfa Radio Ltd by VE6JY Don Moman Dec 6/2001*