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AlfaSpid Rotator

The AlfaSpid rotator is a medium to heavy duty antenna rotator in the same general class as the HyGain TailTwister or the Yaesu G-1000 but with advanced digital features, yet priced well under these and other competing rotators. Mechanical complexity is reduced to a minimum by utilizing a simple double worm drive system. Position readout is sensed with a magnetic reed switch. The controller features digital readout and a full complement of features. Controller features may be upgraded in the future with a plug in ROM board.

Preliminary Report and Ratings: 2002-02-11

From initial tests and experience with rotators already in the air, we expect this rotator to surpass the HyGain T2X and the Yaesu G1000, and possibly the Yaesu G2800 as well. Due to the worm drive and the excellent self braking characteristics, we feel it will survive high winds better than any of these. I have had one of these turning a 7 el 10m yagi 48 foot boom at 150 feet since the fall of 2001. It suffered no damage in winds excess of 90 km/hr recently. The mast did slip a bit in a joint between two mast sections (nothing to do with the rotator) but was easily re-zeroed from the shack – a great feature! Another local amateur has been turning a HyGain TH-11 over three winters now, with no problems even in extreme cold temperatures. He has another unit turning a 3 element triband quad on another tower. As soon as practical, one of these rotators will be tested turning a full size 3 el 40m yagi at 120 feet. I would not be testing it on this large an antenna if I did not expect it to survive.

The controller and rotator are designed to operate from a 12 volt DC source, such as a battery or your station power supply. It can also be a 12-16 VAC source. The motor itself is a 12 volt DC unit. This came about due to the fact that getting CSA or UL approval for a 120 volt AC line powered device is complex

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and expensive. It turned out, 12 DC volt operation is a great feature for portable and emergency operation. Standby current draw is very low, about 40 ma.

Although 12 volts is a low voltage to run over small and/or long conductors, there are several simple ways (info is included in the operator's manual) in which the rotator can be run over great distances and these turn out to be implemented much more easily than, for example, in AC powered (with the added complexity of a motor starting capacitor) unit like the TailTwister. I have a similar rotator using a DC motor which is 1700 feet away and is fed thru two paralleled # 22 gauge telephone wires. I have to use between 60 and 80 volts at the shack end to get enough voltage at the rotator, but this can be a simple unregulated supply that can be built quite cheaply.

I have tested the unit under 2 different voltage levels:

The rotating torque is ~1300 in lbs at 12v input (~10v at motor) and ~1740 IN LBS at 18v input (~16v at motor).

Braking torque is in excess of 9000 in lbs. This is roughly equivalent to a 200 lb person putting his full weight on the end of a 4 foot lever arm. I am confident that the unit will test to several times this amount.

For Comparison:

Torque (in lbs)	Rotating	Brake
AlfaSpid Rak1	1,300	>9,000
Yaesu 1000	600	5,975
Yaesu G2800	786	24,000
TailTwister	1,000	7,000

The DC motor relays – sealed units for long life - in the unit are heavy 20 amp types. Typical motor current draw is about 1 amp no load. Typical operation would be well within the Control unit fuse rating of 4 amps. The stall current increases to about 8 amps. **The unit senses that the motor is stalled and removes power after a few seconds.**

TailTwister vs AlfaSpid

While I was testing these units for their actual torque ratings, I also put several TailTwister rotators through the same test. None of the units are new but I tested several different boxes and control units; the results were similar. These are spare units I have in case I need to replace a rotator quickly. In the past I have used (and repaired) a number of these rotators. I have found in the past, although we generally expect the T2X rotator to have enough rotating torque for most antennas, it usually fails in the brake area. It was quickly obvious the T2X was not able to lift a 25 pound weight on a 37" arm which would equal 925 in-lbs. Two T2X units were tested with similar results. With a 36 VAC modified control box to help on long cable runs, the T2X came close to lifting the 25 lb weight but could not do so. The AlfaSpid rotator was able to pick up at least 35 pounds on a 37" arm, and with the higher voltage to the motor it lifted 47 pounds.

Watching the 2 units working gives more examples of the differences. While the DC motor slows down, it works hard and pulls more current before stalling. The AC motor in the T2X gives up much easier and just stops. The wedge brake of the T2X has problems releasing when the weight is still on it, where our worm drive doesn't have any problem holding or releasing. The T2X often falls back until the brake finds the next notch. Keep in mind the T2X has 60 brake segments built into the brake housing so each notch equates to 6 degrees. The AlfaSPID rotator has a tight worm so there is only a very small backlash in the gears, I estimate it to be less than 1 degree. For higher accuracy VHF/UHF applications this may be important.

Installation Features

The AlfaSpid rotator is designed to be mounted on a pipe mast (accepts up to ~ 2 3/8 inch mast) but adaptor units are available to mount on a flat rotator plate. While we are often more used to this method of mounting – myself included – I see several advantages in the pipe mounting system. It is simple and easy to install. Many of the heavier duty commercial guyed towers are designed to support a vertical pipe and it is a simple job to adapt this to our unit. Field Day, DX'pedition and other portable "tower" installations are often telescoping

sections of round mast. The unit can support large antennas even when mounted above the top of the tower. The 8 set bolts provide a great deal of holding power and, in my testing, were far less prone to slip than conventional U bolts. The control cable only requires 4 conductors, 2 of which should be as large as possible to reduce voltage drop to the motor.

Rotator Features:

- ❖ Low voltage - high torque DC gear head motor
- ❖ Quiet and powerful self braking action with double worm drive reduction
- ❖ Real steel housing and final worm drive – not soft pot metal or cast aluminum
- ❖ Uses inexpensive 4 conductor cable
- ❖ Sealed reed switch sensor technology for reliable all weather readout
- ❖ 1 degree positioning accuracy - tight tolerances for minimal play
- ❖ Rated for large loads even when mounted outside the tower
- ❖ Designed for simple mounting to approx 2" pipe mast – both ends
- ❖ Adaptors easily be made to mate with HyGain or other bolt patterns
- ❖ Coax can pass thru center of rotator - prevents cable damage

Controller Features:

- ❖ Full selection of manual, automatic, scanning and programmable modes
- ❖ Full manual available on the internet at: <http://alfaradio.ca/>
- ❖ Digital readout with 1 degree resolution
- ❖ Large easy to read soft green LEDs with flip down front panel cover
- ❖ Computer interface ability included
- ❖ Optional mouse control with 6 user programmable presets
- ❖ Low voltage DC operation from any 12 volt source (typically 2-5 amps)
- ❖ Ideal for camping, DX'peditions, VHF/UHF roving, etc.
- ❖ Simple optional adaptor to allow use on VERY long and/or thin cable runs
- ❖ Can be zeroed at any position to allow for installation inaccuracy or mast slippage
- ❖ Generous over-travel in either direction - with both mechanical and electronic limits
- ❖ Small front panel to simplify stacking several units – takes up less valuable space