



Satsio - Three Axis Small Dish Motorized Tracking Antenna Mount and Controller

- For use with 1.2m, 1.8m (single and dual optic) and 2.4m (single and dual optic)
- 5° to 90° Elevation and $\pm 60^\circ$ Azimuth range
- Optional Ku-band $\pm 90^\circ$ Polarization Motorization
- Beaconless NORAD tracking with optional beacon tracking
- User friendly positioner with automatic download of satellite names
- 0.01° accuracy absolute optical encoders
- Easy installation and set-up
- Constant tracking even during severe fading or sun outage

The S3 Satcom 'Satsio' Small Antenna Motorized Mount and Controller is specifically designed for small 1.2m, 1.8m and 2.4m antennas requiring automatic tracking or positioning. The mount provides inherently orthogonal azimuth and elevation motion giving accurate pointing with minimal set-up time. The addition of optional polarization motorization on Ku-band antennas allows for operation with multiple satellites. Moving from satellite to satellite is easy and quick - even if the destination satellite is in inclined orbit.

Motorization is provided by 36v dc linear actuators powered from the integral dc supply. Motor drives are PWM programmable for maximum control. Positional read-out is provided by absolute encoders meaning that position is known immediately without the need for indexing, even after a power failure. The mount itself is made from heavy gauge steel hot dip galvanized for maximum environmental protection. It fixes directly to a 3", 4", 5" or 6" nominal pipe, kingpost or non-penetrating mount.



The control unit has a front panel user interface comprising a 40 x 8 character display and operator keys, a web browser interface and also supports a full remote control protocol to allow integration into a station NMS. Relay contacts, analogue voltage inputs, status inputs and open collector outputs to interface to external equipment such as BUCs and waveguide switches presented via the web interface providing simple remote control of VSAT terminals without the expense of a full remote control system.

Accurate tracking of inclined orbit satellites using the system is possible without the use of a beacon receiver. The controller uses a mathematical model to calculate the position of the satellite and thanks to the precision mount is able to point the antenna in exactly the right direction. The pattern of movement of a satellite is described by ephemeris data expressed as a TLE or 'two line element'. Ephemeris data on all satellites is produced NORAD (part of the US Government) and is published on the internet in various formats. The controller automatically downloads the ephemeris data for all the geostationary satellites (in the form of a simple text file of approx 50kB) at regular intervals and uses it along with date, time and terrestrial location to calculate the azimuth, elevation and pol angle required for each satellite. The antenna is then pointed in accordance with the result allowing operation with the selected satellite. If necessary, pol angle can be peaked manually and then stored to account for pol angle offsets used by some operators. Updates are automatically downloaded once a day and an internet connection is only required at this time. The small amount of data to be transferred daily means that even slow dial-up connections are perfectly usable. The mathematical models are usually valid for at least 30 days and so temporary loss of internet connectivity does not cause any problem. Facilities are available to manually input the ephemeris data as a last resort. The downloaded ephemeris file also contains the names of every satellite. This allows easy access to different satellites by name when the controller is used as a positioner by non technical staff. The controller also has a beacon interface connection and this can be used with the integral alternative algorithm to provide conventional step-tracking.

The controller has been designed to provide robust operation and comprehensive monitoring of key systems. All external interfaces are opto-isolated and separate, isolated power supplies provide dc for the motors and controller operation. Monitoring of PSU, Motor and External DC voltages, average and peak motor currents, current trips and warnings, beacon levels and alarms and controller temperature are all provided. These are also entered into the event log which can be extracted from the controller for later analysis.

Antenna Type Availability		ASC 1.2m Single Offset type 123, ASC 1.8m Single Offset type 183, ASC 1.8m Dual Offset type 184, ASC 2.4m Single offset type 243 or ASC 2.4m Dual Offset type 244. Also Prodelin 1.8m Single Offset type 1194 and Prodelin 1.2m type 3120. Other antenna sizes or manufacturers on request.
Tracking Algorithms		NORAD tracking based on downloaded TLEs, Step-tracking using optional external beacon receiver
Mount Type		Elevation over Azimuth with Polarization motorization on Ku-band as option
Elevation Adjust. Range		5°-90° Continuous with electrical limit switches
Azimuth Adjust. Range		± 60° Continuous with electrical limit switches
Polarisation Adjust range		± 90° Continuous with 'Toggle Pol' for easy selection of opposite polarization (Ku-band only)
Slew Speed		1° per second for Az and El, 5° per second for Pol
Controller Interfaces	Front Panel	High contrast 40x8 character display with 6 soft keys, direction arrows, 'enter', 'clear' and 'home'. Bi-colour leds to indicate motor drive and direction, emergency stop.
	Web	Integral Web server with separate pages for PC and pocket tablet control. Allows manual uploading or input of TLE files. Provides accessibility to external I/O.
	RM&C	Fully featured remote control protocol for integration into larger NMS
Electrical Interfaces		Ethernet for connection to Internet and Web client, Serial for modem connection, 3 Encoder interfaces, 3 Motor interfaces (programmable from 8 to 30v), +24v DC Out, External DC input, 2 Beacon receiver inputs, emergency stop loop, External I/O available via web interface (16 Opto-isolated status inputs, 16 Opto-isolated inputs/open collector outputs, 8 clean contact relay closures, 2 analogue voltage inputs)
Mast Pipe Interface		3", 4", 5" or 6" nominal diameter depending on antenna. Adjustment on the mount allows up to 5° correction to be applied to achieve verticality
Temperature		-10°C to +40°C
Humidity		0 to 100% (Non Condensing)
Atmosphere		Salt, Pollutants and Contaminants as Encountered in Coastal and Industrial Areas
Solar Radiation		360 BTU/h/ft2
Shock and Vibration		As Encountered During Shipping and Handling
Dimensions	Controller	19" Rackmount, 2U, 400mm deep
	Mount	1000mm x 700mm x 600mm depending on antenna size
Weight	Controller	7kg
	Mount	30kg (1.2m), 45kg (1.8m) or 60kg (2.4m) excluding antenna. Pol Motor 7kg



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