

Model 990 Antenna Control System

Full featured linear drive control

The Model 990 Control Systems can be used with almost any full motion antenna for precision satellite, spacecraft, or celestial tracking applications.

- Tracking, Pointing, and Acquisition modes
- Single or multiple drives per axis, multiple axes
- AZ/EL, X-Y, HA/Dec, and AZ/EL/Tilt pedestals
- GEO, LEO, TT&C, RADAR, or Celestial applications
- Single or Multi-Band operation
- Wide dynamic range and fine control resolution



System

The system comprises an Antenna Control Unit (ACU), Tracking Receiver Unit (TRU) and a Power Drive Unit (PDU) which are linked via dedicated Ethernet connections. This provides flexibility in locating the key system components, allows for variable separation distances and provides immunity to electrical ground plane transients.

Tracking Accuracy

Optrack - Normally better than 5% of the receive beamwidth in winds of 30 mph gusting to 45 mph, satellite inclination of up to 15° and signal scintillation of up to 2 dB.

Monopulse - For dynamic targets, normally better than 3% of the receive beamwidth for 30mph gusting winds. Minimum scintillation sensitivity.

Pointing Accuracy

Normally better than 0.010° RMS in winds of 30 mph gusting to 45 mph as measured at the axis position transducer. The ACU bias correction Model will significantly suppress systematic errors affecting RF beam spatial accuracy.

Operational Modes			
Tracking	Pointing	Acquisition	Other
Optrack Steptrack Monopulse	Intelsat 11 Memtrack StarTrack Preset Designate NORAD TableTrack	Box Scan Spiral Scan Geo Scan Raster Scan	Maintenance Manual Stop Computer Simulator Polarization Test

Control units

Antenna Control Unit

The Antenna Control Unit (ACU) is the primary control and monitor interface point for the entire system, featuring embedded processing and a friendly touch screen windowed interface.

7RU ACU with 15 Inch Touch Screen



Features of the ACU are:

- Detailed status with color enhancement
- Easy touch screen operation
- Informative display with full text color readouts
- Extensive diagnostic monitoring and test capabilities
- Antenna and satellite simulators
- Time based active parameter display
- Ethernet ACU-PCU Control Link
- **ACU Options**
 - Dual/Remote ACUs
 - Fiber Optic Ethernet
 - Tracking Receiver Display with Spectrum Analyzer
 - Dual Ethernet

Tracking Receiver

2RU TRU with 4.3 Inch Touch Screens



- Beacon or Carrier
- Monopulse or Signal Strength for Optrack
- Digital Signal Processor (DSP) Based Receiver

Portable Maintenance Unit

The Portable Maintenance Unit (PMU) provides manually commanded, bi-directional control of all axes. It has the following features:

- Hand held ruggedized unit with a 50-ft pendant cable for convenient local operation at the antenna
- Backup means of moving antenna and is ACU independent
- Four line, 20 character display for axis positions, tracking signal strength, mode and scrolling status messages
- Modes include position jog, Hi/Lo speed (variable)
- Weather proof access junction boxes at convenient antenna locations
- Enable/Disable per axis



Manual Control Unit



The Manual Control Unit (MCU) provides manually commanded, bi-directional control of all axes.

- Slim, 1RU chassis
- PMU functionality

System Options

- CE Certified
- Fiber Optic ACU-PDU Link
- SNMP Monitor and Control
- Redundancy
- Manual Control Unit
- Rack mount Tracking Receivers
- Stainless Steel PDU for Salt Environment
- Extended temperature ranges
- Time Synchronization via NTP, IRIG-B or 1PPS
- High level EMI Suppression
- PDU configurable for various motor sizes and polarization controls
- Axis Stow Pin Control

Power drive components

Power Drive Unit (PDU)

The Power Drive Unit (PDU) provides all digital control to the linear DC drive motors and contains the hardware/firmware logic to close the position and tracking loops with high resolution. It also provides controlled maximum acceleration and deceleration profile limit windows.

A lockable handle secures the access doors while the system is operating. Lockout, tagout power disconnects are provided within the cabinet interior. Mounted in the enclosure is a panel assembly consisting of the Antenna Control Board (ACB) logic, power supply, motor controllers, and various ancillary devices. Status interlocks and position signals report to the ACB and, while in constant communication with the ACU, the ACB transmits information and receives commands to effect movement of any antenna axes. PDUs can be optionally equipped with EMI/RFI protection, and/or CE certification.

PDU Features

- The all digital ACB includes 3 embedded microprocessors for local position and rate loop closures
- Dedicated Ethernet link to ACU (fiber optic optional)
- Antenna interlock switches monitored by redundant hardware for microprocessor independent safety shutdown
- Self adjusting countertorque/preload and differential/delta tachometer compensation logic for multiple motor systems
- Available in Brushless DC, SCR, or Vector motor controller configurations

Transducers

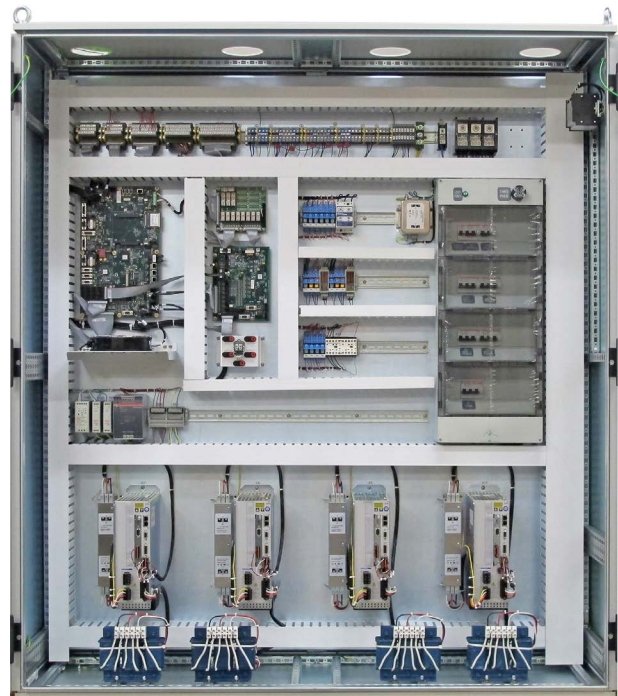
High Accuracy Resolver

- 0.0003° Resolution, 0.003° RMS Accuracy
- 20 bit, 16:1 multispeed electrical design



Position Encoders

- Absolute Position
- Available with resolution up to 29 bit, and accuracy to sub arc seconds



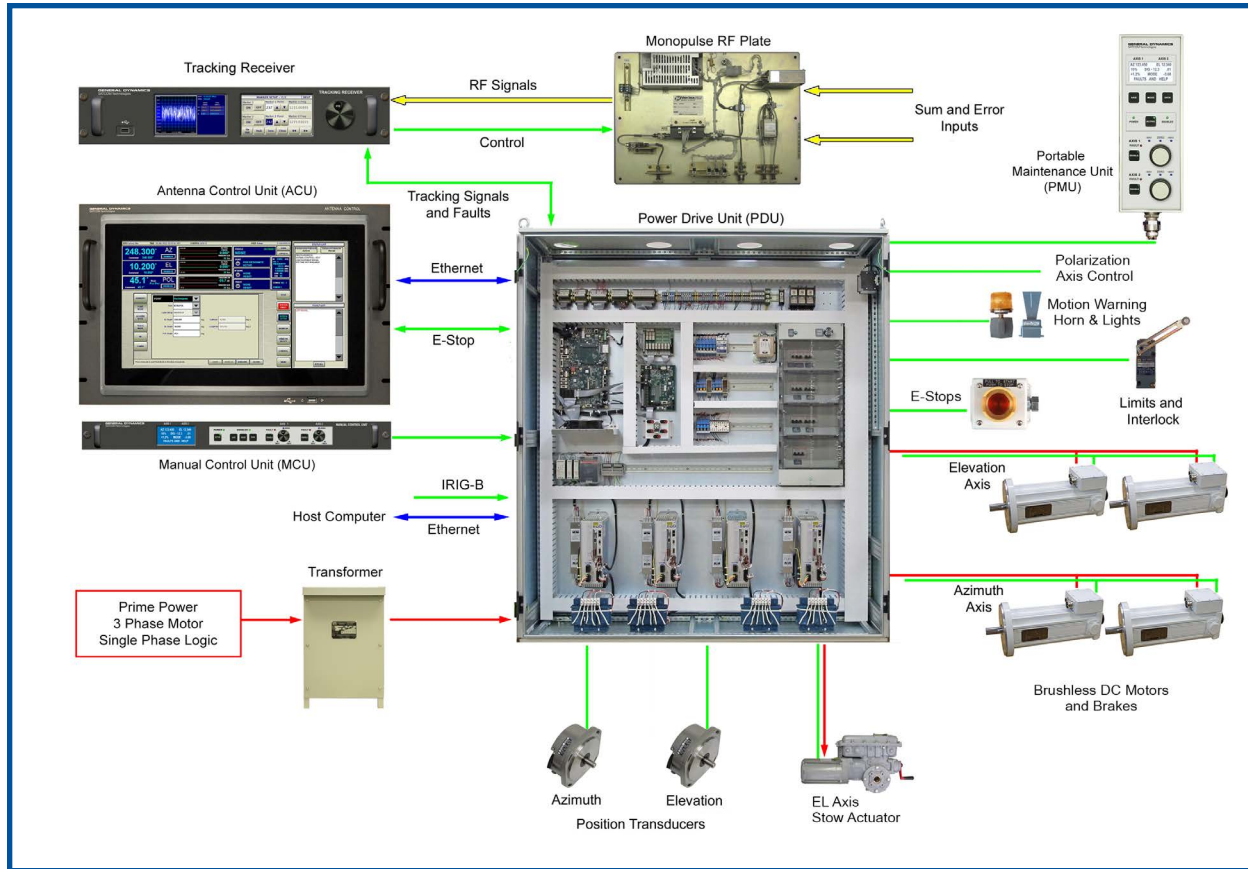
DC Brushless Motor

The motor has the following features:

- Outdoor rated (IP67), with epoxy painted laminations and exterior, stainless steel and anodized aluminum hardware, high grade lubrication and sealing, and pressure equalization diaphragm
- Optional handcrank access via extended rear shaft with personnel access safety interlock.
- High efficiency
- Ideal torque source
- Wide range of available configurations to match application requirements
- Resolver Sensor for smooth sine commutation
- DC Tach, Virtual Tach and Incremental Encoder Motor Rate Feedback



Typical Model 990 System Diagram



SPECIFICATIONS

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ACU	Size	Weight	Power
2RU rack mount chassis with slides	3.50" H x 19" W x 19.5" D	16 lbs	Single phase, 110-240 VAC 350 VA
7RU rack mount chassis with slides	12.25" H x 19" W x 3" D	10 lbs	Single phase, 110-240 VAC 350 VA
PDU			
Brushless DC, 4 Motor Cabinet	89" H x 77" W x 20" D	1600 lbs	208/380/415 VAC, 3ø, KVA motor dependent
MCU			
1RU rack mount chassis with slides	1.75" H x 19" W x 8" D	5 lbs	Powered by PDU
TRU			
2RU rack mount chassis with slides	3.50" H x 19" W x 19.5" D	23.5 lbs	90-264 VAC, 47-63 Hz, 200VA
Environmental	Temperature	Humidity	
Operating-Indoor	0° to 50° C	95% Non-Condensing	
Outdoor Specs	-20° to 50° C	95% Non-Condensing	

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