

Type 2731 and 2004 Series GRANGER™ Rotatable Log-Periodic Antennas



- 2-30 MHz Frequency Range
- Up to 25 kW Peak Power Rating, Depending on Type
- Horizontally Polarized
- 2.0: 1 VSWR
- High Gain
- Lightweight
- Easy to Install and Maintain
- Durable
- High Efficiency- Up to 98%
- Medium-and Long-Range Communications
- Two Versions-Full Tower Size and Compact Roof Size



Model 2731 wideband high power Rotatable Log-Periodic Antenna.

2731 Series Rotatable Log-Periodic Antennas

General Description

The 2731 Series RLPA Antennas are comprised of wire radiators on a strong and unusually light weight support structure. These radiators are full electrical length, providing maximum possible efficiency. The radiator curtains are also offered in versions with optional electrical loading permitting operation down to 2 MHz, with reduced efficiency and with the pattern tending to become high angle omnidirectional.

Features

Construction. The 2731 Series Antennas are the most cost effective of their class. The electrical and structural designs are based upon more than 2 years of experience. Antennas are fabricated of materials that have proven records of long life through use in every conceivable environment.

Rotation System

The 2731 Series Antennas may be used without a rotator for fixed direction services where their compact, single mast construction is advantageous.

The optional, 2500 series, electrical rotator system incorporates a field proven design with extra heavy-duty chain drive.

The rotators of the 2731 Series antennas utilize digital controls which provide improved operation at greater control distances. Antenna bearing data and proper operation is monitored and displayed at each control point.

Remote Control Systems

The 2500 Series Antenna Rotator

Control System is a microprocessor based system consisting of three units; a Master Control Unit (MCU) normally situated in the transmitter control room which is connected by two shielded, twisted pairs (up to 4,000 ft., 1,200 metres) to an Antenna control Unit (ACU) situated at the base of the support mast. The ACU houses the necessary circuits and relays to control the starting and stopping of the Antenna Rotator Unit, which is located at the top of the mast. Azimuth position, sensed by a digital shaft encoder located in the antenna rotator, is processed and fed back through the ACU to the MCU where selection of desired azimuth is made. Direction is indicated on three-digit LED display.

With the microprocessor operation it is possible to arrange that the MCU communicate with up to nine ACU's. Each antenna with its associated ACU is allocated a different identifying number during the initial installation. In use, the number of the antenna to be controlled is selected on the MCU by means of a push button decimal switch.

Extended Remote Control

It is also possible to control the antenna system remotely by using a second MCU located at a remote terminal. Commands originated on the remote MCU will be received by the MCU and passed on to the ACU. For remote operation greater than 4,000 ft. (1,220 metres) an FSK (Frequency Shift Keying) system transmitted over telephone lines of a radio link is available. Line isolating transformers are available to meet local PTT regulations as an option. A primary application is to relocate the operation of a receiving and/or transmitting antenna from remote sites to a central operations building.

Tower Lighting

A kit of lighting units is available for installation on the 2731 Series Antennas. The units provide obstruction lighting to meet all federal and commercial specifications. Lighting kits are typically required when a 2731 Series Antenna is installed near an airport.

**Erection Equipment (Optional)
Erection Kit with Manual Winch.**

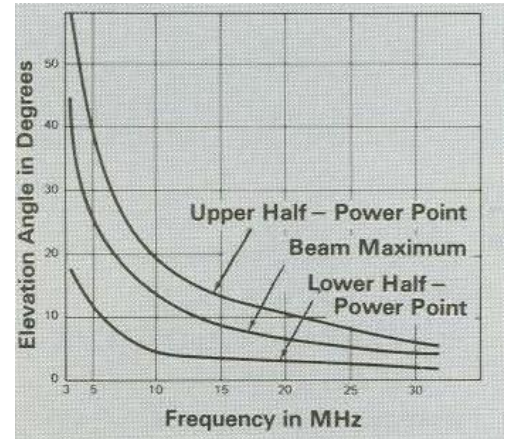
Includes manual winch, gin pole, stabilization guys and rigging equipment.

Erection Kit with 115 VAC, 60 Hz Electrical Winch. Includes same as above with 115 VAC, 60 Hz electric winch.

Erection Kit with 230 VAC, 50 Hz Electric Winch. Includes same as above with 230 VAC, 50 Hz electric winch.

Rigging Tool Kit. For tower assembly and guy tensioning.

Typical Elevation Plane Radiation Patterns



Characteristics

Polarization	Horizontal
Gain, 4-30 MHz	10 dBi nominal
Directional Gain, 2-4 MHz	8 dBi nominal
Front to Back Ratio	14 dB nominal
Azimuth Beamwidth (at half power points)	70° nominal
Cross Polarization	20 dB nominal
VSWR	2:1
Wind & Ice Capabilities Survival Rating, mph (km/h)	
Without Ice	140 (225)
With 0.5 in (12mm) Radial Ice	87 (139)
Rotation*	360°
Tower Height**	100 ft (30 m)
AC Power Required	115/230 VAC; 50/60 Hz, 2 KVA

* Available without rotator and control for fixed bearing operation.

** Towers 60 ft (18.3 m) and 80 ft (24.4 m) are also available.

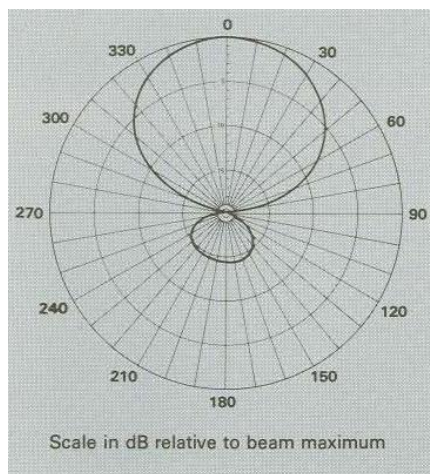
Ordering Information

Type Number*	Freq. Range MHz	Power kW	Input Connector Female	Gain, dBi	F/B Ratio dB	VSWR Max.	Efficiency, Percent	Turning Radius ft (m)
2731A-1-1	4-30	25	3-1/8" EIA	10 to 12	14	2.0	98	49 (14.9)
2731A-1-2	4-30	10	1-5/8" EIA	10 to 12	14	2.0	98	49 (14.9)
2731A-1-3	4-30	5	7/8" EIA	10 to 12	14	2.0	98	49 (14.9)
2731A-1-4	4-30	1	Type N Jack	10 to 12	14	2.0	98	49 (14.9)
2731A-11-41	2-30†	Receive	Type N Jack	Directional gain 7 to 12	Up to 14	2.0	90-98 (4.0 -30 MHz) 25-90 (3.0-4.0 MHz) 10-25 (2.0-3.0 MHz)	49 (14.9)
2731A-11-42	2-30†	1	Type N Jack	Directional gain 7 to 12	Up to 14	2.0	90-98 (4.0-30 MHz) 25-90 (3.0-4.0 MHz) 10-25 (2.0-3.0 MHz)	49 (14.9)
2731A-2-1	5.8-30	25	3-1/8" EIA	10	14	2.0	98	34 (10.3)
2731A-2-2	5.8-30	10	1-5/8" EIA	10	14	2.0	98	34 (10.3)
2731A-2-3	5.8-30	5	7/8" EIA	10	14	2.0	98	34 (10.3)
2731A-2-4	5.8-30	1	Type N Jack	10	14	2.0	98	34 (10.3)
2731A-21-41	2-30†	Receive	Type N Jack	Directional gain 5 to 12	Up to 14	2.0	90-98 (5.8-30 MHz) 25-90 (3.0-5.8 MHz) 6-25 (2.0-3.0 MHz)	34 (10.3)
2731A-21-42	2-30†	1	Type N Jack	Directional gain 5 to 12	Up to 14	2.0	90-98 (5.8-30 MHz) 25-90 (3.0-5.8 MHz) 6-25 (2.0-3.0 MHz)	34 (10.3)

* Rotation option must be specified separately.

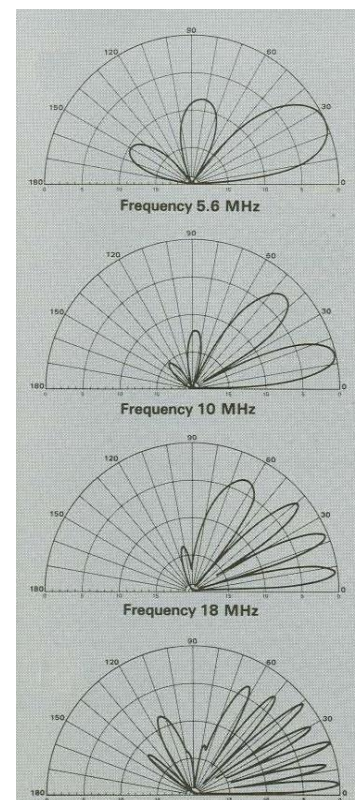
†Electrically loaded. VSWR increases below 4 MHz to a value of approximately 3.0:1 at 2 MHz.

Typical Azimuth Plane Radiation Pattern Data (all frequencies)



Model 2731 Elevation Plane

Radiation Pattern Data (Antenna mounted on 100 ft (30 m) tower) Scale in dB relative to beam maximum





Model 2004 rooftop general purpose Rotatable Log-Periodic Antenna (RLPA) mounted on Self-Supporting Articulated Tower* (SSAT), also suitable for ground mount applications.

2004 Series Compact Rooftop Rotatable Log- Periodic Antennas (RLPA)

General Description

The 2004 Series general purpose rooftop antenna provides both private and governmental organizations efficient directed communications capability. Embassies, airports, head quarter buildings, oil companies and other similar organizations utilize this compact rotatable array.

Application

In many cases, 2004 Series Antennas are installed on the roofs of buildings which are pitched or have many obstructions. The reduced turning radius of 23 ft (7m) decreases the chance of physical interference.

The arrays are designed with fully efficient half-wave radiators. There is no electrical loading on the basic types. The wire radiators are sloped forward to be less obtrusive and so require less turning room than the conventional tubular construction antenna arrays.

The 2004 Series Antennas are horizontally polarized, conservatively rated for full power with a continuous duty cycle and can withstand 100 mph (160 km/h) wind and 50 mph (80 km/h) wind with ½ in (13 mm) ice.

Support Mast Options

A sturdy, self-supporting articulated tower (SSAT) can be used in the 23 ft (7 m) or 33 ft (10 m) versions for rapid installation in a confined area. With erecting hardware installed, the permanent SSAT can elevate the 2004 Series Antennas in three minutes.

Other support masts include the fixed or guyed 23 ft (7 m), 33 ft (10 m) or 43 ft (13.1m) rooftop versions, or ground masts which range from 23 ft (7 m) to 78 ft (24 m). (See Application Note 3, Bulletin 1538.)

Rotator Unit

Type 2004 Series RLPA antennas are supplied with a heavy-duty electrical rotator unit/ Antennas may be ordered, however, without the rotator if a fixed bearing system is all that is required.

The rotator mounts within the tripod at the top of the mast tower. The remote control panel is connected by multicore power and control cable to the rotator unit. An extended remote control (ERC) system can be supplied by special order.

Extended Frequency Capability

As an option, the 6.2 MHz version antenna is offered with its lowest operating frequency extended down to 2.0 MHz through use of a suitable balun and electrical loading.

Optional Accessories

- Control and power cable
- Erection kit
- Tower lighting kit
- Paint kit
- Spares kit

Ordering Information *

Type Number	Freq. Range MHz	Power Rating kW Average	Peak	Azimuth Beam Width	Input Connector	Gain	F/B Ratio	VSWR nom.*	Freq. Band MHz	Efficiency Percent	Turning Radius ft (m)
2004-2	7.5-30	1	2	70°	50 ohm Type N Jack	8 dBi @7.5 MHz 12 dBi@30 MHz	12	2.0:1	7.5-30	98 No Electrical Loading	22.8 (6.95)
2004-3	6.2-30	1	2	70°	50 ohm Type N Jack	7 dBi@ 6.2 MHz 12 dBi@ 30 MHz	12	2.0:1	6.2-30	98 No Electrical Loading	28.5 (8.7)
2004-31	2.0-30	Receive Only	Receive Only	70° above 6 MHz	50 ohm Type N Jack	7 dBi@ 6.2 MHz 12 dBi@ 30 MHz	12	2.0:1	6.2-30 5.4-6.2 4.4-5.4 2.0-4.4	90 to 98 50 to 90 25 to 50 5 to 25	28.5 (8.7)
2004-32	2.0-30	1	2	70° above 6 MHz	50 ohm Type N Jack	7 dBi@ 6.2 MHz 12 dBi@ 30 MHz	12	2.0:1	6.2-30 5.4-6.2 4.4-5.4 2.0-4.4	90 to 98 50 to 90 25 to 50 5 to 25	28.5 (8.7)
2004-4	10.0-30	1	2	70° above 6 MHz	50 ohm Type N Jack	10 dBi@10 MHz 12 dBi@ 30 MHz	12	2.0:1	10-30	98 No Electrical Loading	17.76 (5.4)

* Complete type number requires addition of mast option from the following table.

Rotation option must be specified separately.

Mast Option Table

Mast	Height* ft(m)	Roof Mount	Ground Mount
Guyed 17" Face Steel Tower	23 (7.0)	-11	-21
	33 (10.0)	-12	-22
	43 (13.1)	-13	-23
	63 (19.2)	-	-24
	78 (23.8)	-	-25
Model 4000 SSAT (Self-Supporting Articulated Tower)	23 (7.0)	-14	-26
	33 (10.0)	-15	-27

* * VSWR depends up the height of the array above ground and the influence of unknown adverse factors in build-up areas, such as roof-tops where the antenna may be installed.

* Overall height includes triangular tower top.

