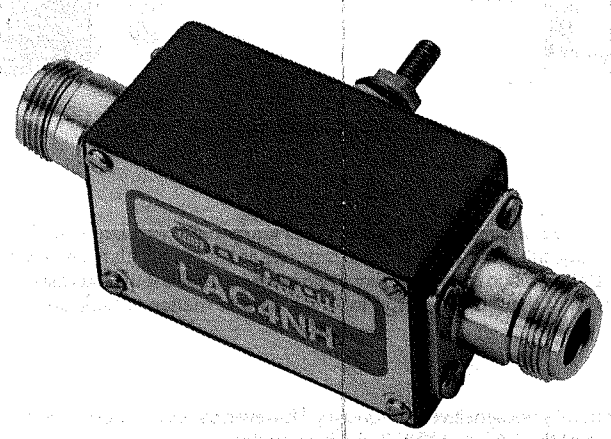
TECHNICAL DATA AND SPECIFICATIONS

cushcraft

LAC-4 SERIES
LIGHTNING ARRESTERS



Cushcraft LAC-4 Lightning Arresters

The Cushcraft LAC-4 series of lightning arresters are designed to protect radio equipment from static electricity and lightning induced surges that travel on coaxial transmission lines. The LAC-4 protects your equipment from surges up to 5,000 Amperes.

The Cushcraft LAC-4 is superior to other available devices because it presents a constant impedance to your transmission line. Mechanically the LAC-4 has been designed to last. All of the mechanical connections in the LAC-4 are positively secured. The gas discharge tube is easily changed by the user if necessary. Our lightning arresters feature a straight forward design. Check our documentation. We are more thorough in telling you what to expect of your LAC-4. The LAC-4 is packaged in an attractively styled diecast box. We have paid particular attention to the details of the fit and finish. The LAC-4 is another example of Cushcraft's committment to supplying quality performance products for radio applications.

THEORY OF OPERATION:

The LAC-4 is a gas discharge tube positioned on a short piece of 50 Ohm transmission line. This gas discharge tube nearly instantaneously changes from an open circuit to a short circuit in the presence of voltage and energy surges, thus providing a path for the surge to follow to ground. The LAC-4 is designed to provide a short circuit path to ground for any fast rise time pulse. It will normally protect sensitive communications equipment from damage. Failure of semiconductor devices is either energy or voltage related, depending upon the semiconductor family. P-N junction type devices (silicon transistors for example) have energy related failure modes. Other devices such as insulated gate FETs or MOS devices will suffer primarily voltage related failures.

The LAC-4 easily prevents energy related failures by the shunting effect of the device. Surge voltages are clamped (ie, limited) to less than 50 volts in about 100 nanoseconds. A typical lightning surge has a voltage rise time of around 2 microseconds. The accepted IEEE standard for testing transient suppressors is an 8 microsecond rise time. Clearly little voltage will be allowed through by the LAC-4.

Some voltage related semiconductor failures can occur even with a properly operating LAC-4. Insulated gate FETs are a prime example. Normally equipment using IGFETS include circuitry to protect these devices. Diodes and filters can provide a measure of protection for such fragile semiconductors. In any event, the LAC-4 will provide the main energy shunt to ground due to its very high current carrying capacity. Many costly repairs can be avoided by installing an LAC-4 in your feedline. With today's sensitive radio equipment, this type of protection has become a requirement.

AVAILABLE MODELS:

The LAC-4 series includes four models —

Model	Connector Type	Maximum Power	Impedance	Model	Connector Type	Maximum Power	Impedance
LAC-4	UHF Female	200 Watts	50 Ohms	LAC-4N	N-Female	200 Watts	50 Ohms
LAC-4H	UHF Female	2000 Watts	50 Ohms	LAC-4NH	N-Female	2000 Watts	50 Ohms

TYPICAL APPLICATIONS

- **Repeaters**
- **Remote Telemetry Transmitters**
- **Long Range Wireless Alarms**
- **Tower Mounted RF Equipment**
- **Amateur Radio Stations**
- **SWL Receivers**

And Other Communications Equipment

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INSTALLATION:

It is best to mount the LAC-4 as close to earth ground as possible. It should be mounted either indoors or inside a protected area. The most common installation is just inside the wall where the coaxial cable enters the building. This location is the best since the ground connection lead can be made the shortest length. It is good practice to attach the discharge terminal directly to ground. Sharp bends or loops in the ground wire should be avoided. Appropriate conductors such as #10 solid copper, bronze, or copper clad steel should be selected as the ground wire. (See National Electrical Codes). The dimensions of the LAC-4N are illustrated.

LAC-4 DIMENSIONS

LIFE EXPECTANCY AND FAILURE MODE:

The life of the gas discharge tube depends upon how often it is required to protect your equipment. Very large and frequent surges will reduce its life. Infrequent or small surges will have very little effect on the gas discharge tube. The LAC-4 may deteriorate as the gas tube is exercised. Deterioration may be detected while transmitting as either high VSWR or a warm discharge tube. Deterioration is not apparent when receiving until the unit has failed. When the tube completely fails, it fails shorted, thus giving you the greatest protection. Replacement of the gas discharge tube is a simple matter of replacing the cartridge which is available as a separate item.

SENSITIVITY TO FREQUENCY:

The LAC-4 design and the gas discharge tube are generally not sensitive to frequency. However, the connectors used to attach the LAC-4 to your transmission line are frequency sensitive. Table 1 shows the performance of the LAC-4 at VHF/UHF frequencies.

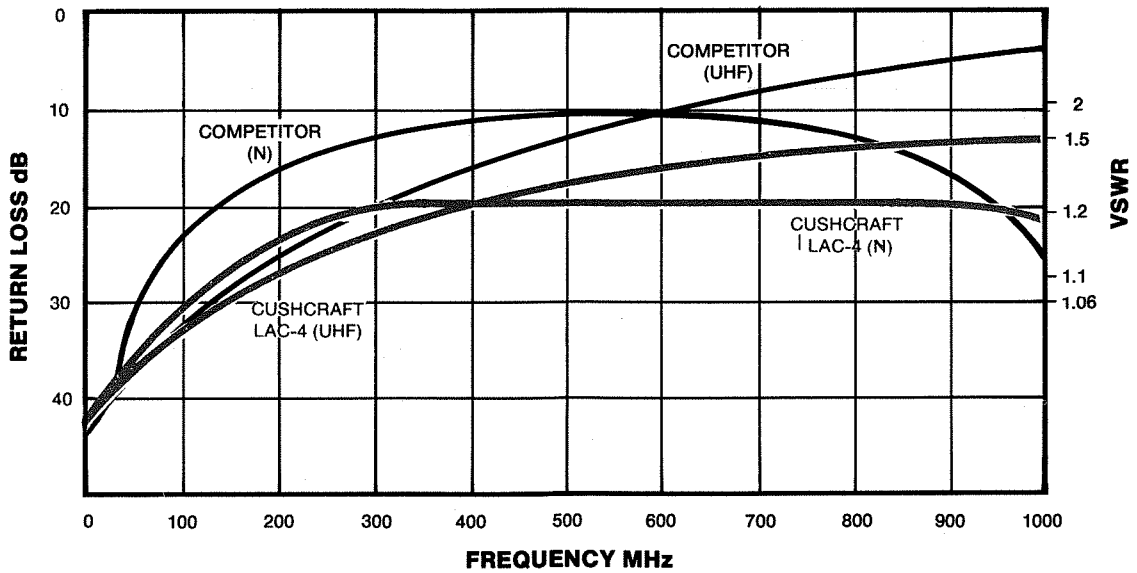
Table 1

Model	Frequency	Max. Power	Insertion Loss
LAC-4	30 MHz	200 W	Less than 0.1 dB
	150	200	Less than 0.1 dB
	500	100	0.25 dB typical
LAC-4H	30	2000	Less than 0.1 dB
	150	500	Less than 0.1 dB
	500	100	0.25 db typical

Model	Frequency	Max. Power	Insertion Loss
LAC-4N	30	200	Less than 0.1 dB
	150	200	Less than 0.1 dB
	500	200	Less than 0.1 dB
	1000	150	0.25 dB typical
LAC-4NH	30	2000	Less than 0.1 dB
	150	1000*	Less than 0.1 dB
	500	800*	Less than 0.1 dB
	1000	500*	0.15 dB typical

*Limited by Type-N connector design

RETURN LOSS/VSWR COMPARISON LAC-4 VS. COMPETITORS MODELS



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