

## Multistage Arrestors - Servicing/Testing

**NOTE:** This note applies to most NexTek multistage or "fine" protection units that use diode-based protection for maximum residual energy control, i.e. the NexTek [FPL](#) or [FPN](#) series of coaxial surge protection devices for GPS Receivers.

Since protection components like GDTs, Diodes, and other shunting types need significant voltage to "turn-on," it is difficult to completely assess the health of a unit with only a multimeter. However, there are multiple useful tests that can be done.

- I. Visual Inspection - Look for discoloration, blackening, melting (including the center pin) - i.e. any signs of a significant surge event and resulting damage, including damage to co-located equipment.
- II. Verify Radio Operation - As an alternative to a full-scale Network Analyzer sweep, units can be checked for normal operation on an example radio system, either in the field or in a test setup
- III. Thru-Continuity and Insulation Resistance – Test the FPL series for short/thru-continuity from center pin to center pin with a Multimeter tool for dc continuity protectors. At the same time, test to ensure that there is no continuity at the normal dc voltage(aka "open") between center pin and main body from either connector end, or check that the dc is flowing properly through the protector by equipment power indication
- IV. Check Protection Component Operation - Apply a slow-rising DC Voltage, with a current limit of approximately 1mA, to the arrestor protected port to verify basic operation and "Turn-On" Voltage is above the operational voltage. Observe polarity for dc applications, since reverse polarity will not usually pass through the protector successfully.

If a unit passes a visual inspection and works OK in a radio system, the best way to test the unit's readiness is to verify the Turn-On Voltage.

### Testing Diode Turn-On Voltage

This can be done with any current-limited slow rising DC power supply, or a tester like Bourns # 4030-01.

After disconnecting from the radio system, apply a slow-rising voltage to between center pin and shield (main body) of the Protected port of the arrestor. Some "surge arrestor" test boxes have a built-in Vpk meter, or if another DC supply is used then the Voltage Across the unit can be measured with a multimeter during the test.

Example Test Limit - For diode-based arrestors that have been installed and used in the field, the allowable test range should be within a -0%/+50% window from the Rated DC Protection Voltage.

For +5V rated units, the DC Voltage should rise to **5-8Vpk** before the diode forms a shunt and the power supply goes into current-limiting mode.

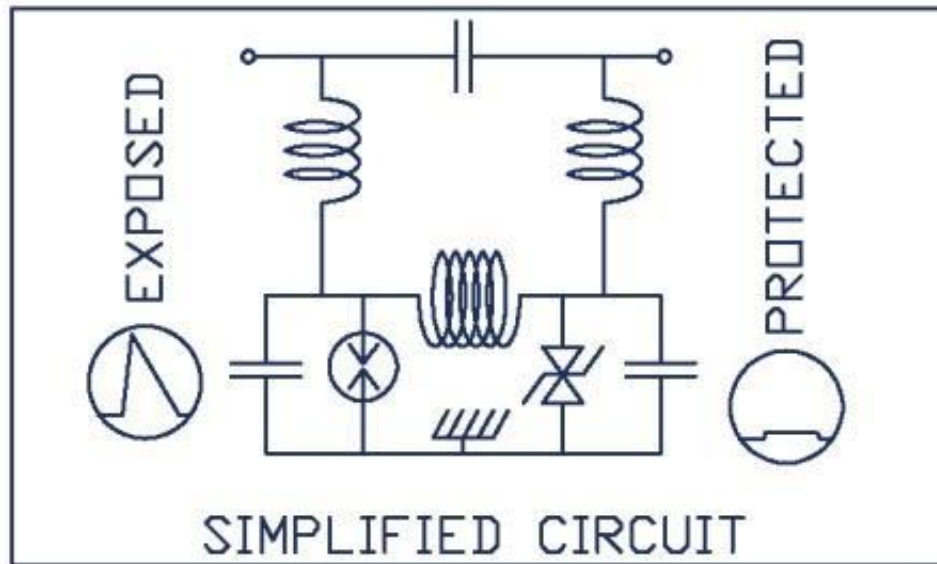


Sample NexTek Test Setup

### Summary

With a visual inspection to check for damage, a Turn-On voltage test to verify operation, and a Radio Operation test to prove that RF thru performance is adequate...It should be possible to screen and re-install used arrestors and minimize unneeded replacement & procurement.

### Simplified Circuit



#### **Electrical Properties When Operating Properly:**

- **Continuity/Short** between Center Pins on each end of the arrestor for DC Passing units
- A diode with a Turn-On Voltage of **5V, 12V, 24V, or 48V** (nominal) when applied between Protected port pin and Main Body/Ground, of the correct polarity