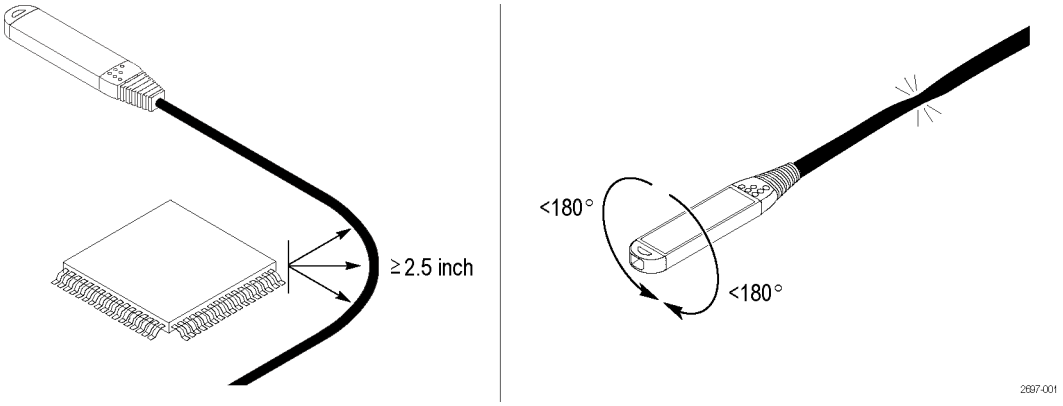
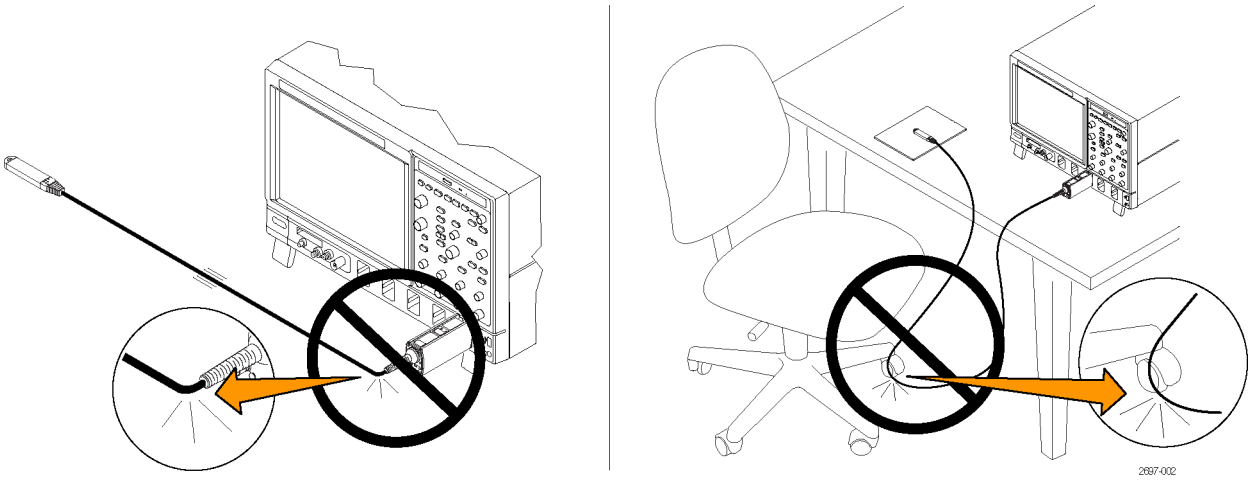
Precautions When Handling Probe Cables

Tektronix P7300 & P7500 Series probes are quality measurement tools and should be treated with care to avoid damage or performance degradation due to mishandling. Take the following precautions when handling the probe cables:

- Never over-bend the probe main or tip cables, which can put a permanent kink into the cable. When storing the probe do not coil it too tightly. It is best to use the protective foam carrying case which is designed to not exceed the minimum bend radius of 2.5 inches.
- To maximize probe life, limit the amount of cable twist relative to the probe control box to ±180 degrees. Always uncoil a probe cable gently before applying the twisting forces needed to orient the probe head for connection to the probe tip.



- Do not excessively pull or twist the probe cables when positioning the probe for measurements.
- Never crush the cable, as will occur when you run over the probe with a chair wheel or drop something heavy on the cable.



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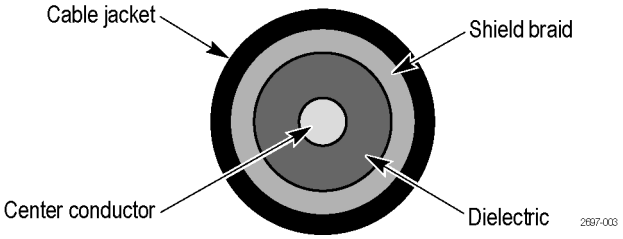
Cable Topology and Description

Tektronix P7300 & P7500 Series probes use several coaxial cables to transfer measured signals from the probe tip to the oscilloscope vertical channel input. The probe main cable connects the probe head to the probe control box, which attaches to the oscilloscope. This main cable is a composite of a coaxial signal cable surrounded by a group of small power and control wires. The probe tip cables connect the probe head to the connection point on the DUT (Device Under Test). The probe tip cables are smaller than the main cable in order to provide a more flexible connection to the DUT. These probe cables are all high performance components that need to be handled with care in order to preserve probe performance.

A flexible coaxial cable is composed of a center-conductor wire surrounded by a cylindrical dielectric, which is in turn surrounded by an outer conductor shield wrapped with an insulating plastic jacket. The center conductor wire is often stranded for greater flexibility and the outer conductor shield may be as simple as a single braid or a more complex structure with multiple shielding layers for better performance.



A coaxial cable is a transmission line structure which is used to transfer a high frequency signal with minimum distortion. Low distortion signal transmission requires stable characteristic impedance along the entire length of the cable path. The stability of a cable's characteristic impedance depends on the uniformity of the dielectric layer shape separating the center conductor wire from its surrounding shield conductor. The characteristic impedance also depends on the uniformity of the shield layer conductors which are securely wrapped around the dielectric layer. Because the cable dielectric layer is a soft plastic material it is subject to possible damage if the cable is stressed due to mishandling. Similarly the shield layer conductors are relatively fine wire structures that can be distorted into a non-uniform set due to mishandling overstress. Overstress can occur due to bending, twisting, pulling, or crushing of the cable.

The probe cables are low-loss cables with a relatively complex outer shield structure that is susceptible to overstress due to twisting. Since the dielectric layer of a cable is typically a flexible structure, it is generally not stressed excessively when a cable is twisted. The shield conductor is usually stiff enough that it can be permanently distorted if overstressed beyond its elastic limit. This is particularly true when a cable is twisted while still in a coiled shape, where the cable shield is already in a stressed condition. Always allow the probe cable to gently uncoil completely prior to use. It is also important to recognize that the probe main cable is captured mechanically at the control box and that twisting of the cable relative to that anchor point should be limited to ±180 degrees for maximum cable life.