Output ripple and noise (sometimes referred to as PARD or "Periodic and Random Deviations") can be defined as unwanted variations in the output voltage of a power supply. In switching power supplies this output noise is seen as a series of pulses with high frequency content and is therefore measured as a peak value (i.e. specified as "peak-to-peak").

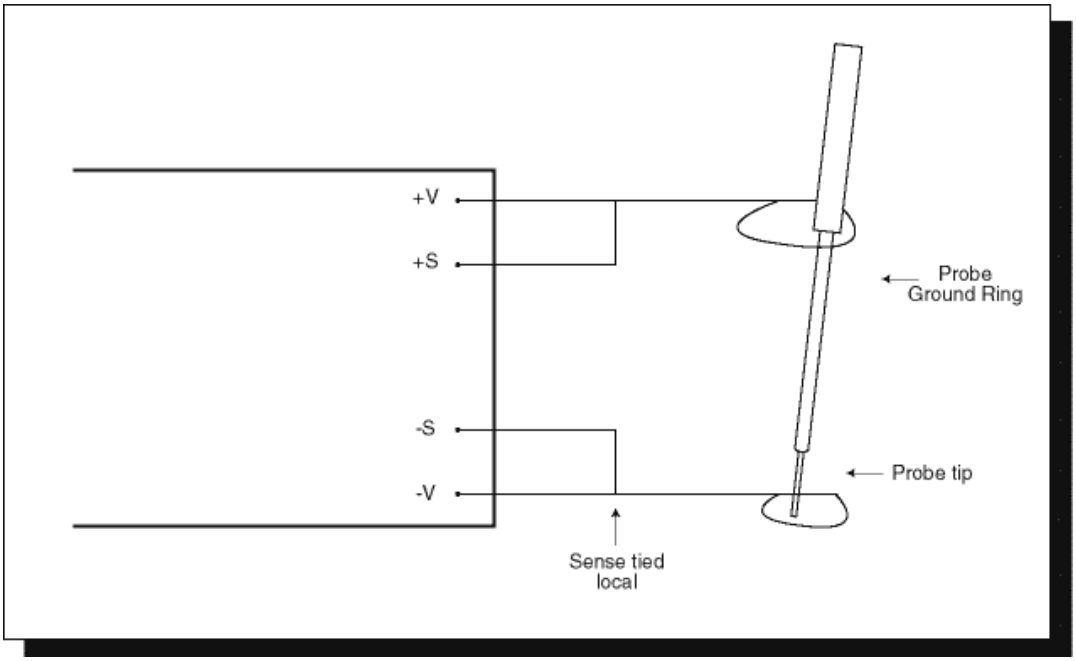
Triphase power supplies are specified and tested in our factory with a 20 MHz bandwidth oscilloscope. Measurements taken by a scope set at higher frequencies (i.e. 300 MHz) may produce significantly different results due to noise coupling on to the probe from sources other than the power supply.

Noise that is common to all output leads of a power converter with respect to the chassis is referred to as common mode noise. Noise that is apparent on one output lead with respect to corresponding output lead is referred to differential mode noise. Common mode noise is produced in switching action. Triphase typically minimizes the level of output common mode noise by incorporating line to chassis ground capacitors (on input and output leads) into the power converters. In most cases this is sufficient to minimize the level of common mode noise, however if further attenuation is required additional line to chassis ground capacitance may be added by the customer at the system level.

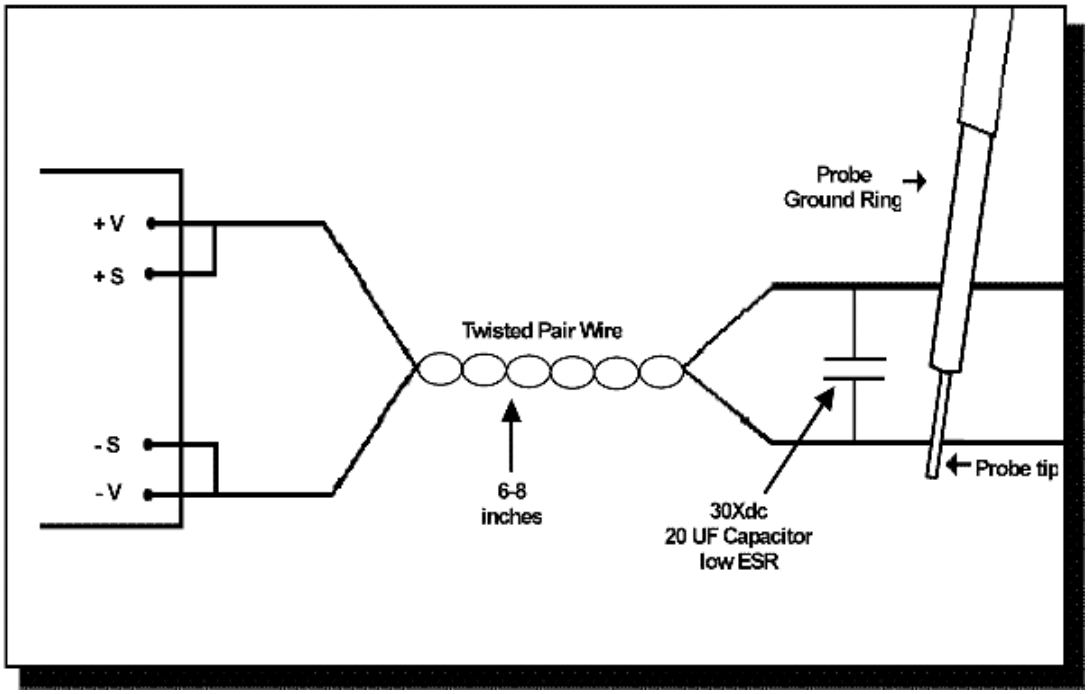
Triphase noise specifications (output ripple specifications) all reference the level of differential mode noise at a given bandwidth, not the level of common mode noise. The measurement of differential mode noise is detailed in the following paragraphs.

Measurement Techniques

The length of all measurements leads (especially the ground lead) should be minimized and the sense pins should be tied to their respective outputs (+Sense to +V out). We recommend measurement as close to the supply as possible. This can be accomplished by connecting a short bus wire (generally 0.5 inches or less, making a loop at the end to place at the probe) to the negative and positive outputs on the back side of the connector mate, then place the tip of the probe on the +output and ground ring (or ground band) on the -output for a true ripple measurement. This is displayed in figure 1b below:



Utilizing the probe ground ring (as opposed to a ground wire) will minimize the chance of noise coupling from sources other than the power supply. If this is not practical or possible then attach a 6 to 8 inch twisted pair wire to the outputs of the power supply and place a 10-20 uF tantalum capacitor (low ESR type, with an appropriate voltage rating) across the load. This test method is shown on figure 1c.



This test method will enable a remote measurement and eliminate any noise that may couple on to the extended leads coming off the converter.