

# PERFORMING TESTS ON SINGLE AND 3-PHASE ENERGY SUPPLIES

Electro Rent Testing Tips

## The Challenge : How to Stay Safe While Doing an Energy Survey

In most situations, voltages being measured for power quality analysis are lethal. This means that all possible safety precautions should be taken to eliminate the potential of injury or death. If you are unsure how to connect voltage and current probes, it is best not to tackle the measurement until safe plans are clearly identified. Remember to consider both yourself and people working with you. The golden rule of electrical safety is: if in doubt, don't do it.

If you are confident that you understand the device you are analyzing, there are some basic precautions you should always take:

- When you open a panel, your first step should be to draw the circuit on paper.
- If you have someone with you (this is advisable when doing dangerous work), talk through what you have planned. This might highlight mistakes or omissions that you had not previously discovered.
- Before connecting any instrumentation, ensure that the voltages expected are the ones you see. Some instruments are sensitive to polarity; it is not uncommon to find live and neutral reversed. This could have dire consequences for the instruments, let alone the readings.
- Care should be taken when using hand-held rechargeable instruments: the mains-powered charging adapters have breakdown voltages. If the adapter is

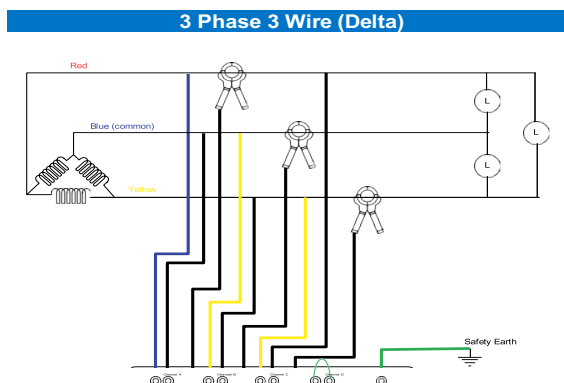
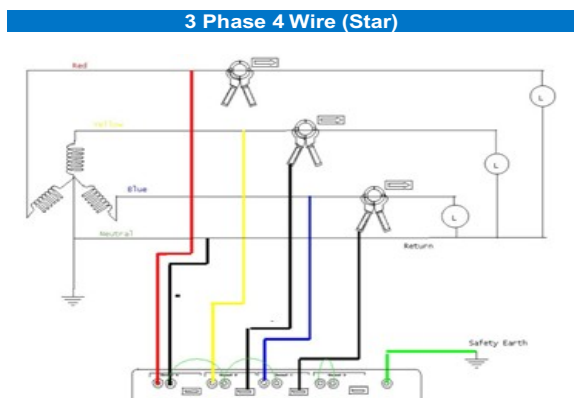
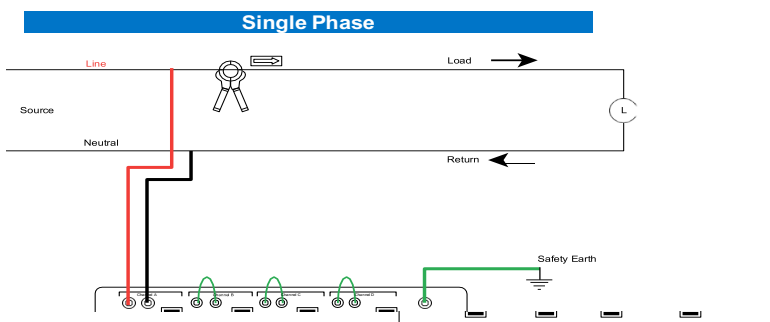
used while measuring a voltage with the 'common' input above the breakdown of the charging adapter, a flashover in the adapter risks damaging the adapter, instrument and device under test.

The condition of the leads connecting an instrument to the test points is as important as the condition of the instrument itself. It is imperative that test leads are suitable for the voltages being tested. You should also ensure they are in perfect working condition.

- Test leads for testing mains and HV should be at least CAT III 1000V rated.
- Worn or frayed test leads are a potential hazard to the user.
- Always inspect test leads before connecting the instrument to the test points. A reliable way to do this is to lay the test leads out and run them through your hand. Any distortions in the outer protection such as cuts, burns or frayed endings are easily felt.

It is imperative that test leads are suitable for the voltages being tested and are in perfect working condition.

Oscilloscopes present risks. Most use BNC connectors which are usually encased in metal and connected to the earth line. Care should be taken not to let the case contact a live point. It is advisable to use the safety connectors available in both the common 4mm test plug and BNC connector formats.



## Safety Notes

When monitoring power on high voltage systems and some low voltage systems, they are connected via VTs and CTs (Voltage Transformers and Current Transformers). These VTs and CTs will already exist on the system and must be certified against electric shock hazards.

- Note that analyzers are only rated up to 600V for direct connection and must never be directly connected to a higher voltage system.
- Certain current clamps are similarly rated to 600V. Others have little or no insulation and must never be connected to live uninsulated busbars or cables (refer to model).
- Before connecting to any system, ensure that the tester is suitably earthed via the separate connection provided. Do not rely on the mains lead earth in case the plug is inadvertently removed.

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