

# Testing Digital Relays – A Practical Guide from the Field

## 2. Apply Settings

Use the manufacturer’s software to install the supplied settings. Hopefully, the engineer has supplied a digital copy of the settings but you will most likely have to enter all the settings in by hand.

The supplied settings are often out of date because the setting engineer used an older version of the relay or similar model to create the settings. These slight differences can cause the relay to reject settings or round settings up or down to the next acceptable value. Carefully document each discrepancy and correct the settings to the best of your ability. After all of the settings have been accepted by the relay, save a copy of the file and print the settings. Compare every setting to the supplied setting to ensure they are identical. If changes are made, save and print the file and review it again. Repeat this process until the supplied and applied settings are identical.

After the settings have been entered and checked, STOP and do not proceed until the new setting changes have been approved by the powers that be.

## 3. Connect Your Relay Test Set

### A) AC Connections

For the purposes of this article, it is assumed that you are using a 3 phase test set. Protective relays today use positive, negative, and zero sequence components in their pick up calculations and these components can only be accurately simulated using 3 phase currents and voltages. While it is possible to test most elements using single phase test procedures, most of your testing time is often spent trying to fool the relay into thinking that 3 phase inputs exist.

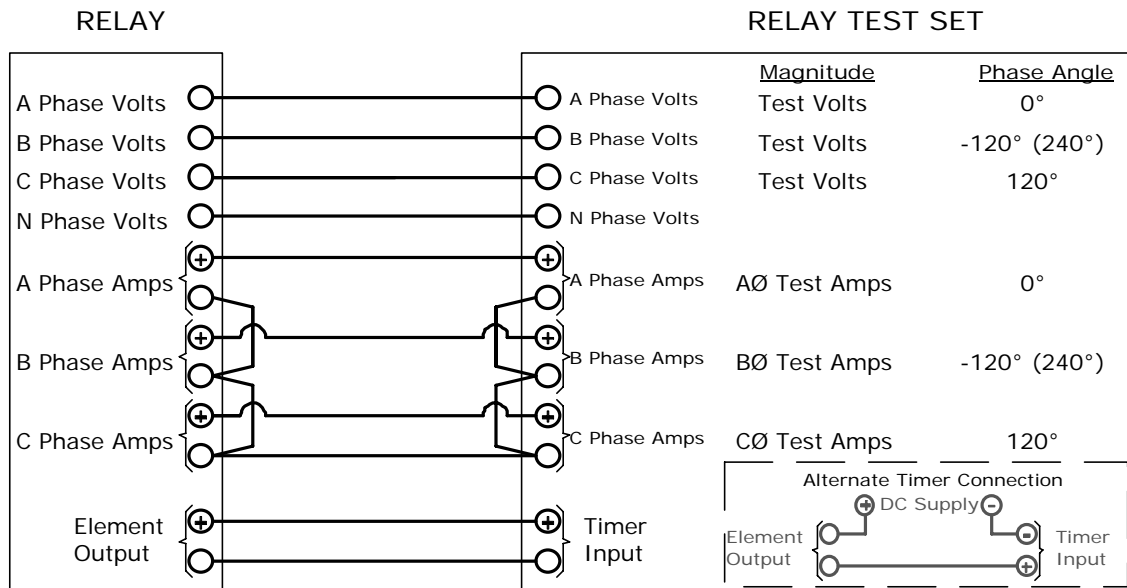


Figure 21-1: Relay Test Set Connections

It is possible to simulate three phase testing with 2 current and voltage channels and this connection is shown in the following figure.

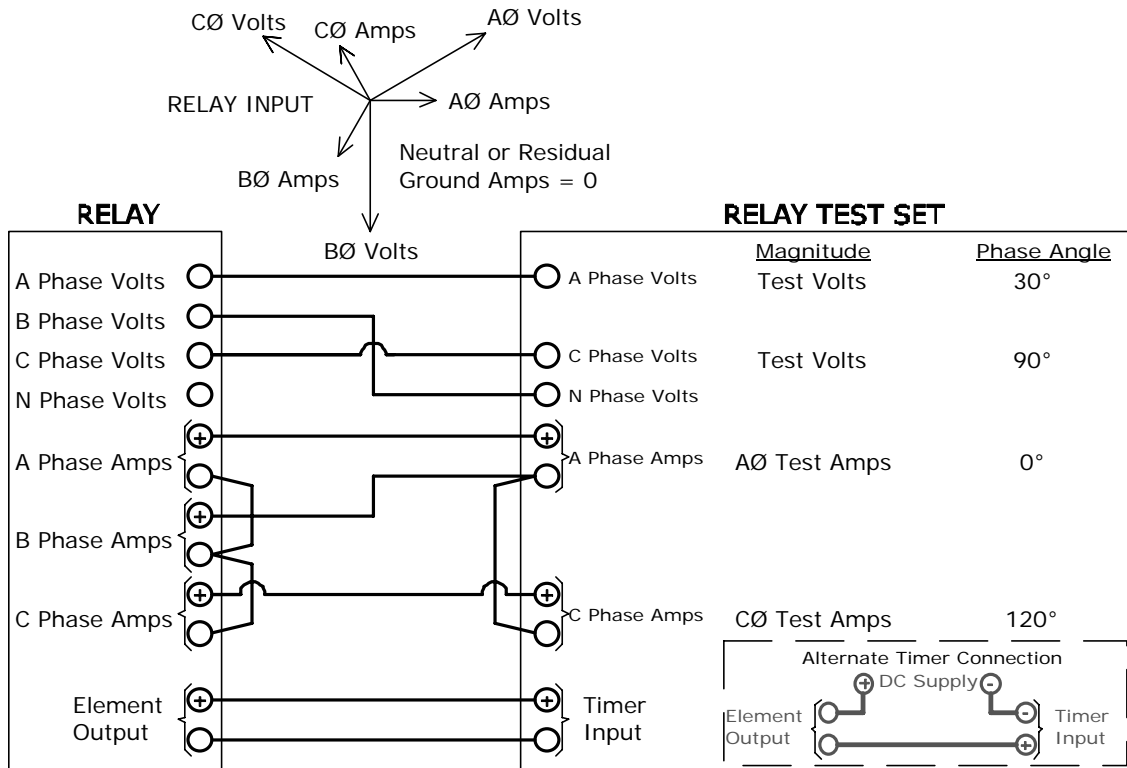


Figure 21-2: Three-Phase Test Set Connections using Two Phases

Connect your test set to simulate the CT and PT inputs. Our goal is to simulate real life conditions as best as possible. The following figure shows the AC connections from our example. All CT test switches have been opened to short the CT inputs and an isolating device has been inserted between the CT clips to isolate the top from the bottom.

Always pay attention to the PT connections and triple check that your test set is connected to the relay side of the test switch. If you are connected to the wrong side, you could back-feed the connected PTs and apply a dangerous voltage to the high-side of the PTs.