

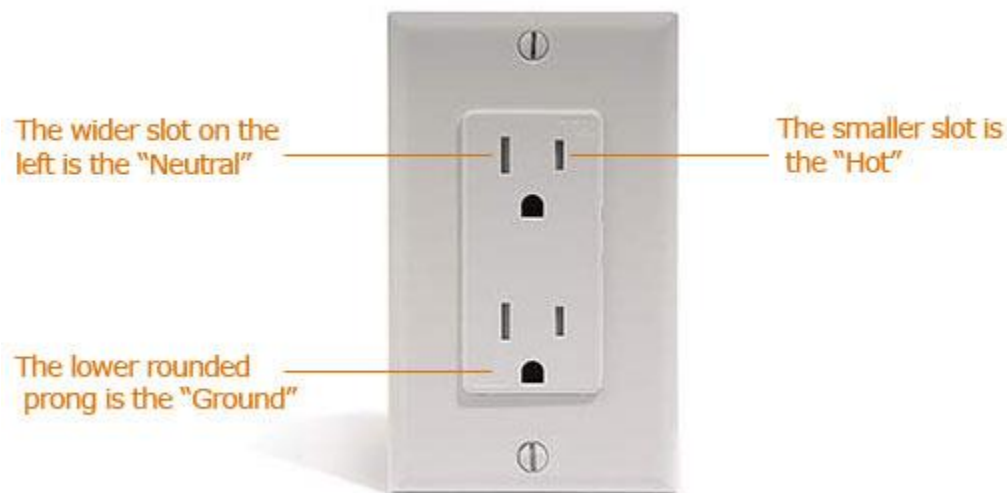
Three phase rectifier lab

Equipment

- 3 10:1 step down transformers with hot wire labeled.
- 1 extension cord.
- 6 power diodes.
- 1 10k Ω resistor.

Construct your power supply

You will be making a 4-wire $\sim 12V_{RMS}$ WYE three phase power supply using 3 transformers on three separate circuits. Splitting into two groups, and use one of the two corner lab stations (well situated for pulling power from 3 different circuits). Identify 3 outlets on different circuits labeled (-1, -3, -5) or (-2, -4, -6). Each outlet has a hot, neutral, and ground connection:



And each transformer has a red dot on its plug and cover denoting which side should be hot (left side). Turn off each transformer and plug it in with the correct orientation. Use extension cords so that the three transformers are situated side-by-side.

Wire the output of the transformers up in a WYE configuration using the right tap as neutral and the left as the hot wire. While the conventional color for neutral (see Table 1) is white, we have no white banana plug wires so use yellow instead as the next best thing.

Turn on your transformers and use your oscilloscope to arrange your transformers in a positive sequence (ϕ_A leads ϕ_B by 120° which leads ϕ_C by 120°) and record the order of the outlet labels in table 2.

¹ http://www.homemaintenancereminder.com/articles_openground.htm

Table 1: conventional colors for 3 phase AC power.

Wire use	Conventional color
Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Ground	Green, bare, or green and yellow striped.

Construct your full bridge 3-phase rectifier

Use 6 power diodes (conventional current flows out of the double contact side) to assemble a 3-phase full bridge rectifier using your newly constructed power supply.

Use the 10kOhm resistor as your load.

With a ground defeater in place on the oscilloscope, measure the voltage across the load and record it. Also record the peak-to-peak ripple amplitude. You may find a x10 probe to be useful.

Measure the neutral current and record it.

Data sheet

Table 2: Positive sequence three phase source.

Phase	Outlet label	Wire color

Rectifier output voltage (DC component):

Peak-to-peak ripple voltage.:

Ratio:

Neutral current (RMS value):