

COMMON AC POWER DISTRIBUTION CONFIGURATIONS

The input voltage needed to power electronic equipment is provided by the manufacture in the product specifications. Matching this requirement to the facility power available can often raise questions. This paper is intended to assist you in identifying the different power configurations that may be in your facility.

SINGLE PHASE 120

Single Phase 120 often called house current is the AC power used in commercial buildings and houses to power lights and small appliances. The output voltage is 120Vac line to neutral (L-N). Line to neutral may also be called phase to neutral. There is both a 2 wire and a 3 wire configuration. The 2 wire configuration consists of Phase A and Neutral. This configuration is older and is being replaced by the 3 wire configuration which adds the earth ground connection. The grounded neutral conductor and ground provides a significant safety improvement. See Figure 1. Depending on the actual local power distribution standards, the single phase the voltage may be listed as 110Vac, 115Vac, 117vac or 120 Vac. Even with these stated nominal vales, variation do occur due to grid power demands, transformer losses, and voltage drops due to wiring impedances.

Many low power Ametek power supplies can operate on single phase 120.

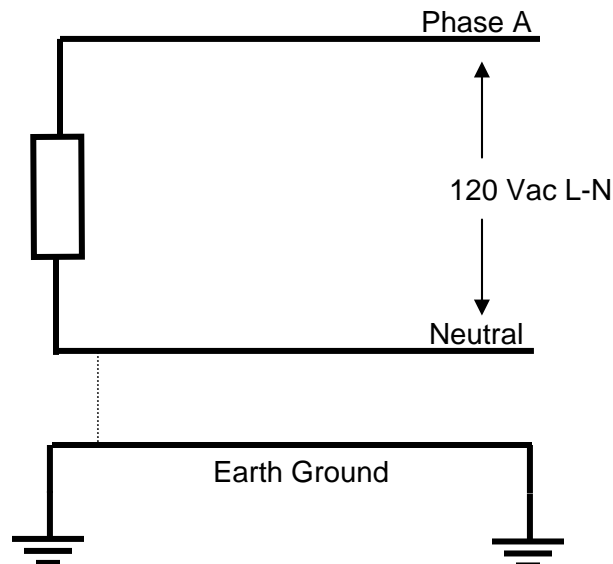


Figure 1 - Single Phase 120

Single Phase 120/240

Single phase 120/240 is commonly seen as the source for AC power to household cloths driers. It may also be called Split Phase 240. This configuration consists of 2 voltage legs that are 180 degrees apart. The voltage between the two legs (called phase to phase or line to line) is 240V and the phase to neutral voltage is 120V. The 120/240 notation identifies the phase to neutral voltage followed by the phase to phase voltage. Some list the phase to phase voltage first so it may also be called 240/120 single phase. See Figure 2. Medium power Ametek power supplies (< 5 kW) will operate on this voltage configuration.

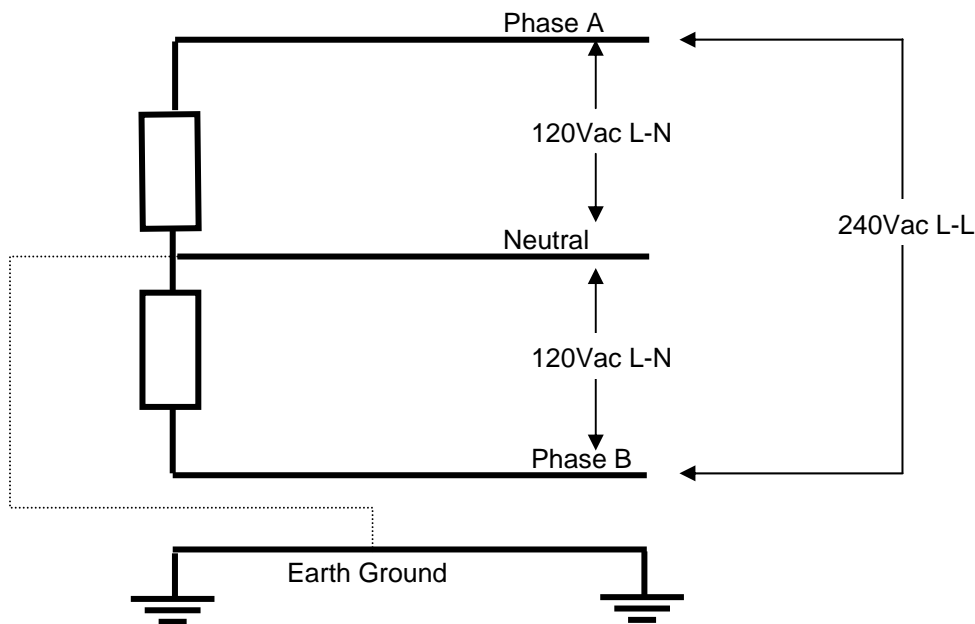


Figure 2 – Single Phase 120/240

3 Phase Configurations

AC power is usually distributed in a facility in a 3-phase system consisting of 5 wires. Three of the wires are current carriers and are called phases. These 3 phases are 120 degrees out of phase from each other. The fourth wire is the neutral wire. The neutral wire will not have current flowing in it as long as the current in the three phases are matched.

The 5th wire is Earth Ground. This system is commonly called a 3 phase wye because of the Y shape of the phases.

A 3 phase Wye configuration is shown in Figure 3.

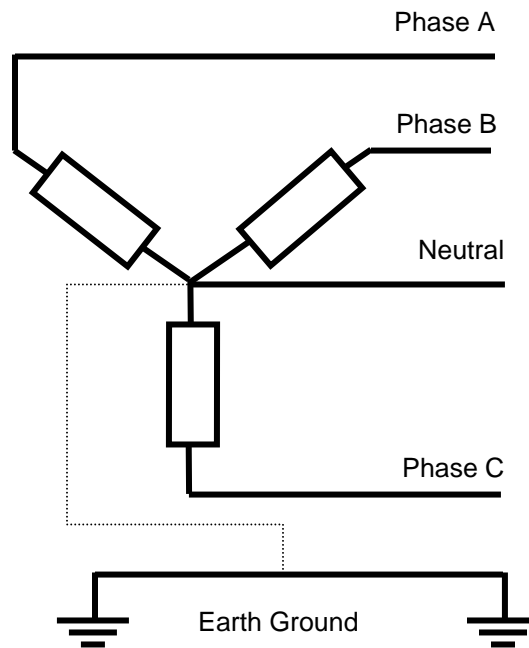


Figure 3 - Typical 3 phase WYE Configuration

In the USA the most common configuration is 208Y/120. This indicates that line to line (L-L) voltage is 208Vac in a WYE configuration and the line to neutral (L-N) voltage is 120Vac. It is also sometimes designated 120/208Vac, 120/208WYE, 208/120 WYE, 4 wire WYE or 120/208Y. See Figure 4. Most Ametek supplies > 5 kW will operate on this configuration.

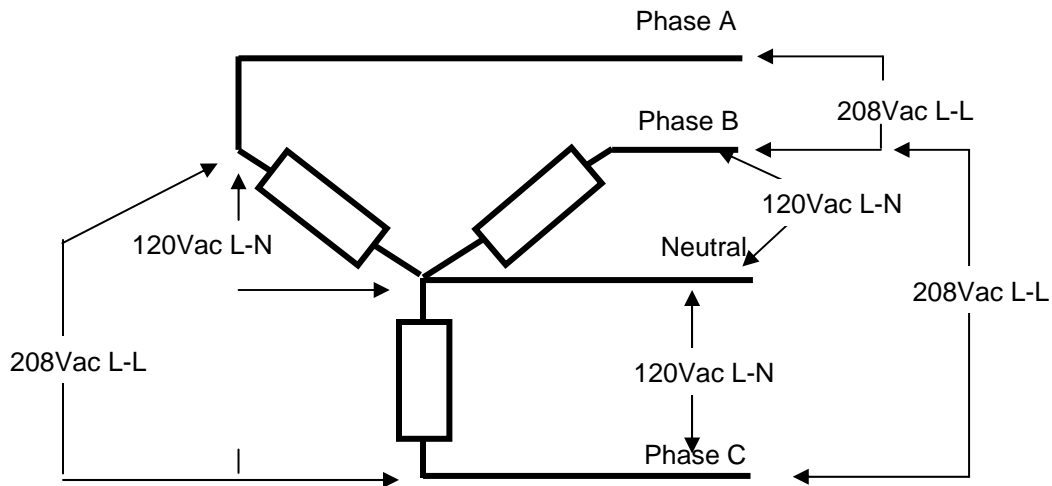


Figure 4 - 208Y/120 Configuration

For higher power capabilities another configuration in the USA is 480Y/277. In this case the line to line voltage is 480Vac in a WYE configuration and the line to neutral voltage is 277Vac. See Figure 5. This configuration is often an optional voltage for most AMETEK supplies 5 kW and larger.

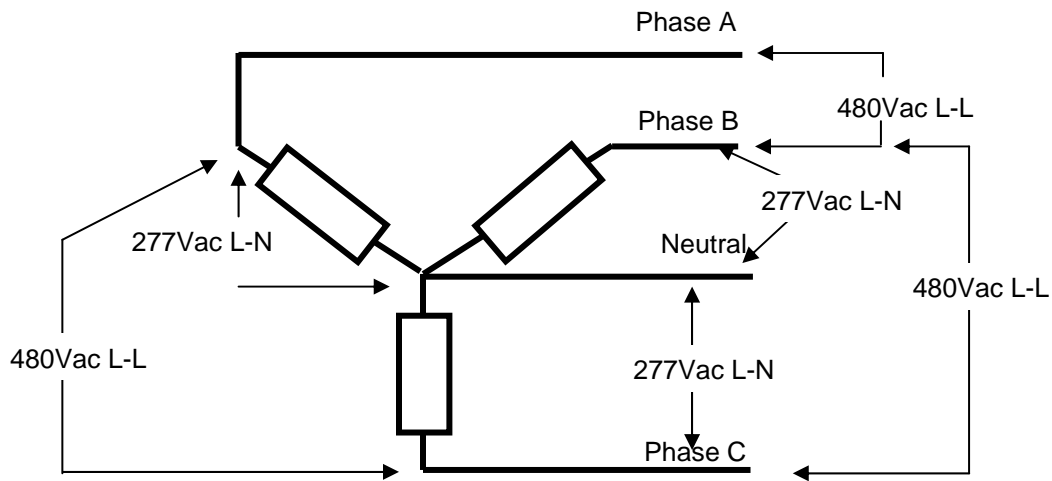


Figure 5 - 480Y/277 Configuration

