

Spacemaster's Guide to 3 Phase Load Balancing

One may think that three phase load balancing is simple with out setup, but a few quirks of our system conspire to make it completely bewildering unless you know what is going on. This guide assumes that you have already received the Rainbow Village Electrical Training or have read up on our electricity distribution plan. Do that first before coming here.

Problem Overview

1. Spider Boxes use twice as much power in the second leg as the first.
2. 600A distribution boxes are wired in an unintuitive way (Black, Blue) instead of (Blue, Black)
3. Therefore a naive set of connection will produce 2-3-4 ratio of power on the three legs.
4. The two phases that are wired into the 600A distribution go in a A B C A ... pattern left to right top to bottom, not a one leg per row as the case implies.
5. Therefore unless you understand how the distrio is wired + the spider imbalance, you will struggle, as you will find that the second and third phase will always be higher than the first.

Solution Overview

THREE PHASE LOAD BALANCING (2/2)

For convenience outlets,
color lights above them
indicate phase.

For 50amp outlets, each
consecutive outlet uses
different phases:

A	B	C	A
B	C	A	B
C	A	B	C



1. Identify which plugs correspond to the (Black, Red) and (Black, Blue) Phases, and make sure that all plugs are in those plugs, Do not use the (Red, Blue) Plugs, and move all plugs off of (Red, Blue) Plugs.
2. Balance between the two sets of plugs. Remember that not all power usage goes immediately back on, Use the change in amps when you turn off a wire to determine the load on the the wire, not the immediate draw
3. Once you have a possibly balanced setup, wait a minute then verify that the loads are actually balanced.

Why Does This Happen

The Spiderbox uneven power usage is due to how they are all wired. The first leg is wired to 2 sets of plugs and one circuit breaker, the second leg is wired to 4 sets of plugs and 2 circuit breakers. Therefore, on average, there will be twice as much current draw on the second leg of all 2 Phase 240 V wires to the spiderboxes as that one is plugged into twice as many plugs.

The plugs in the 600A distribution box are wired up (Black, Red), (Red, Blue), (Black, Blue). If the third leg was instead wired (Blue, Black) or if our loads were even, they would all be even at the distro. However, due to this wiring order, a naive set of plugs will put power on Black, Red, Blue in a 2-3-4 ratio as the second leg in each of the three pairings get twice as much current as the first.