SHUNT vs. SERIES R/R

This is a simplified explanation of the difference between

- SHUNT TYPE R/R (like OE or FET based)
- SERIES type R/R (like COMPUFIRE)

•All metric R/R's for 3 phase PM generators like the GS are shunt type.

- •Applies to OEM
- •Applies to FET based like FH012AA
- •Applies to old split R and Rs

•Aftermarket HD companies have been designing some SERIES type R/R for 3 phase PM generators.

- •These seem simpler but are more difficult to implement.
- •Benefits in reduced stator current and heating are evident from this explanation.

•COMPU-FIRE Part #: 55402 is a good choice for a size and power compatible 3 Phase SERIES regulator for about any metric bike.

CompuFire Regulator for 40 Amp 3-Phase Charging Systems
Dennis Kirk Part #: 209632
Manufacturer Part #: 55402

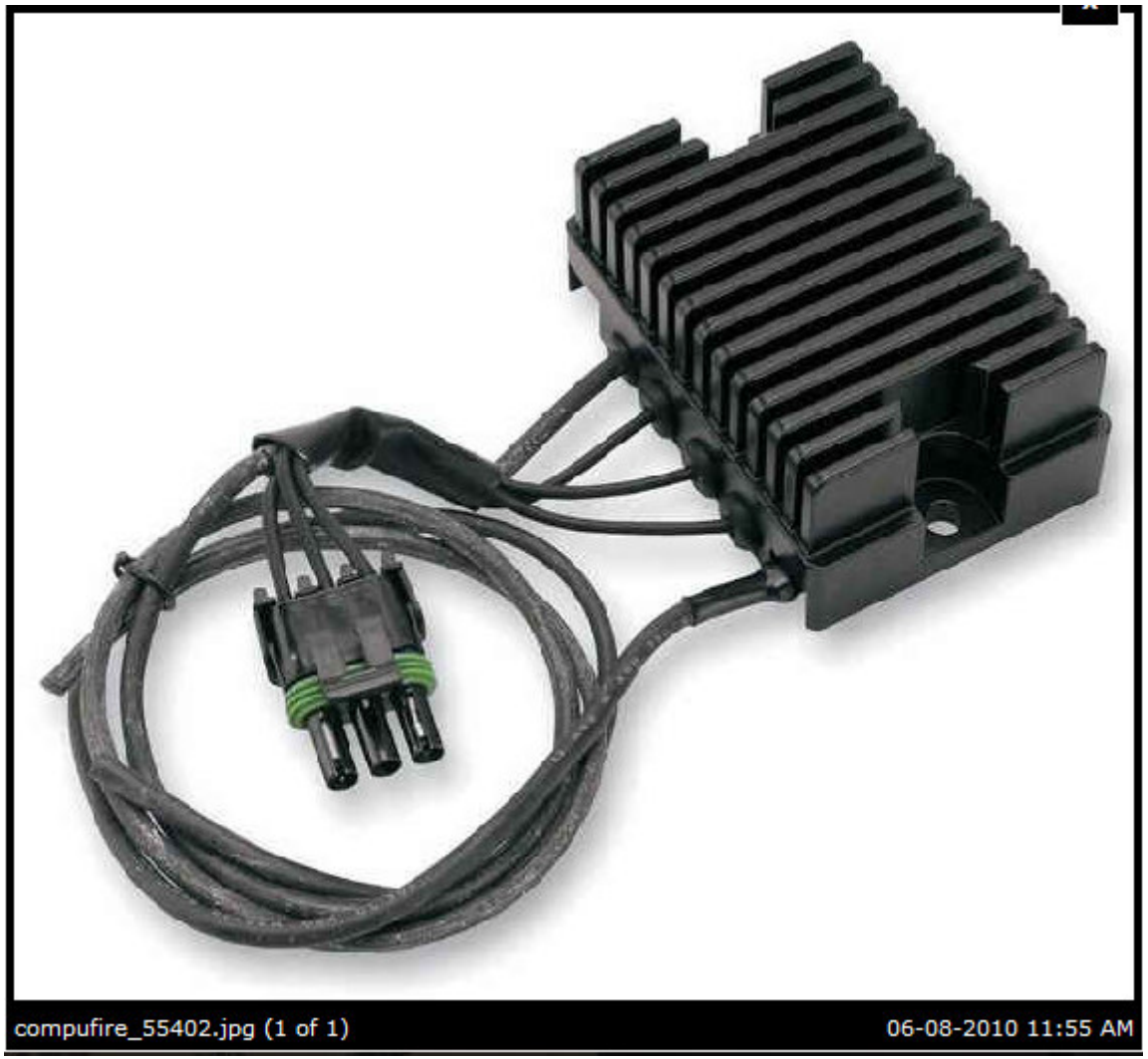
CompuFire Regulator for 40 Amp 3-Phase Charging Systems
Your Price: $194.99

Low Price Guarantee (details)

is 3.75"x2.5"x1.25“

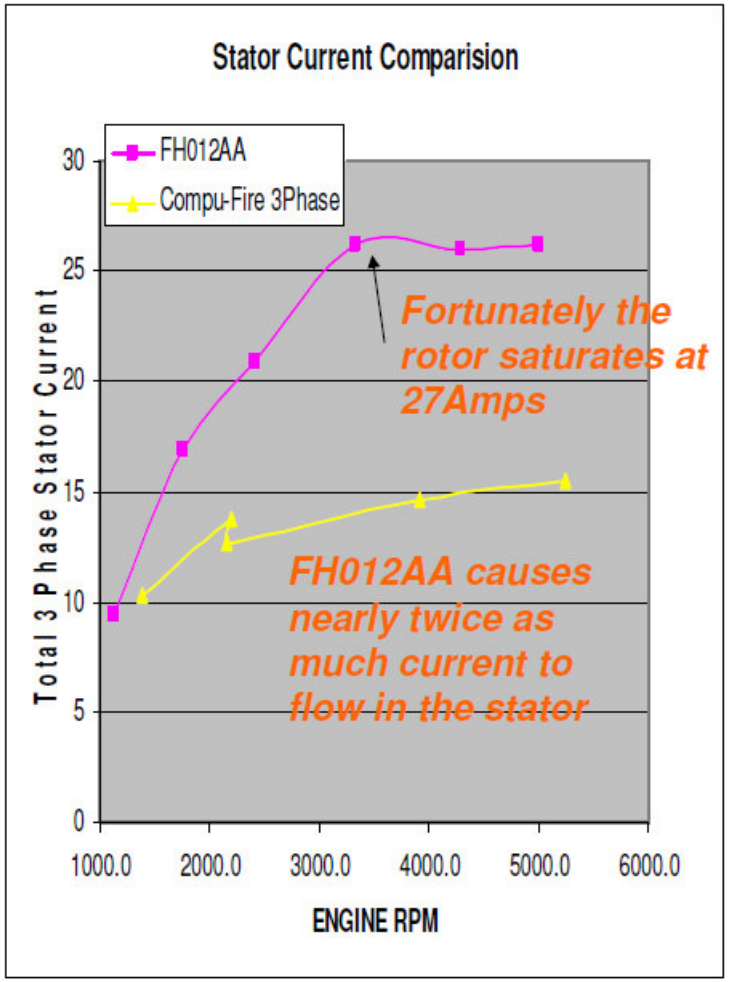
USMOTOMAN $180 Delivered.

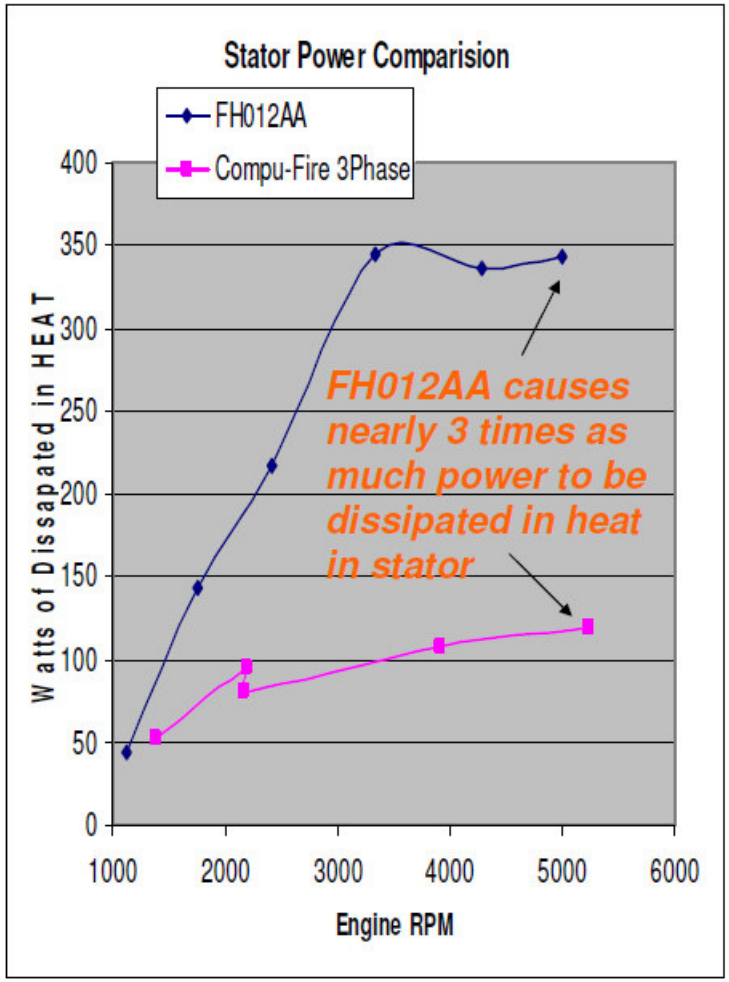
Compu-fire
3Phase Part #: 55402



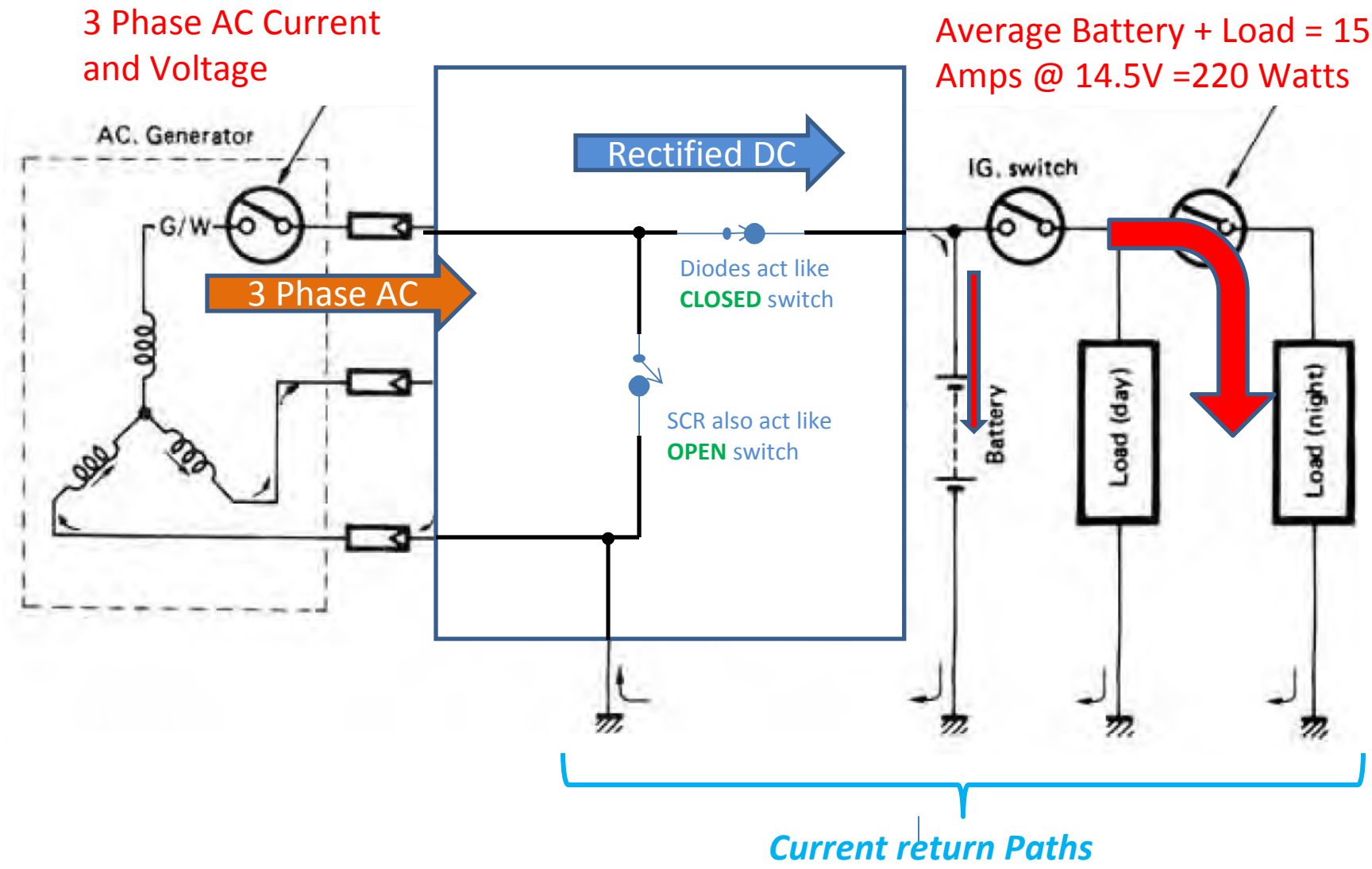
New SERIES does not require the stator to flow as much current and has 1/3 the power dissipation as the conventional SHUNT

Stator Performance Comparison SUMMARY

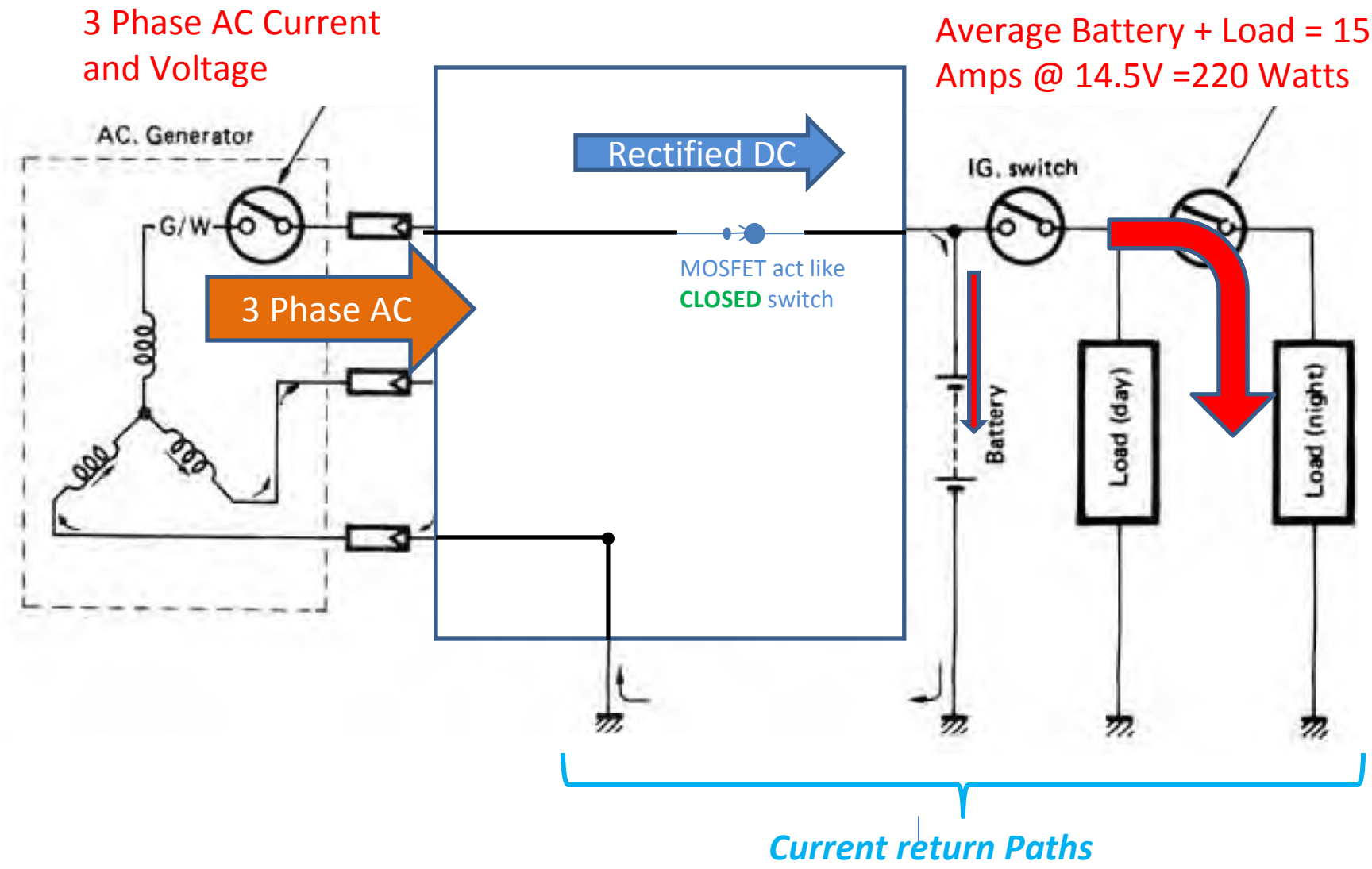




When GS SHUNT R/R is NOT Regulating



When COMPU-FIRE SERIES R/R is NOT Regulating



Non Regulating Comparison

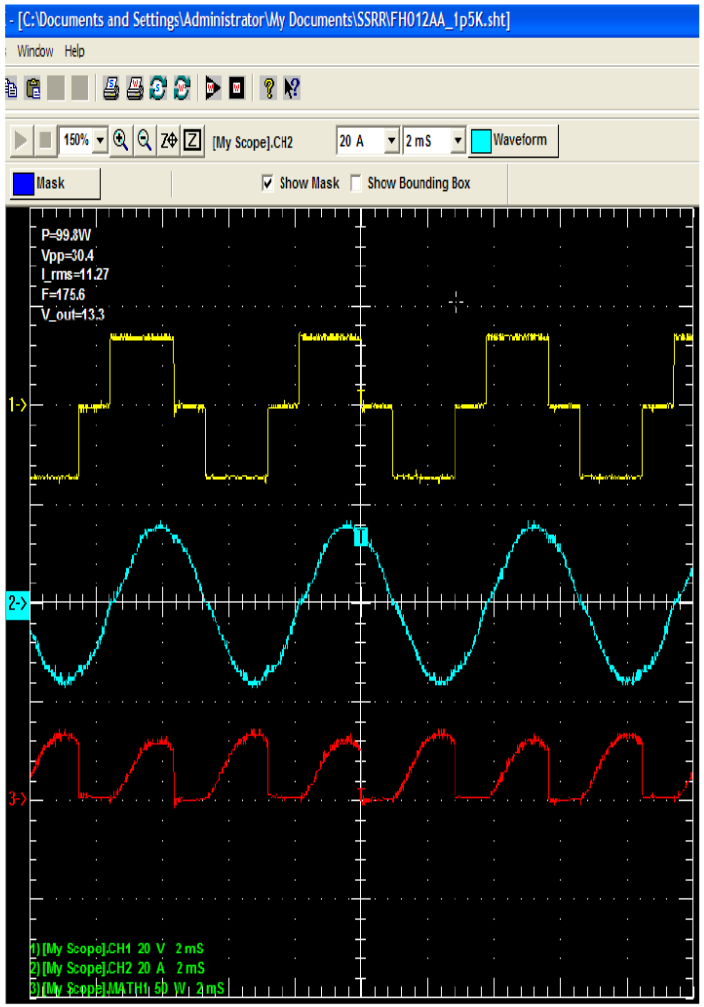
Both are very similar below 2K RPM

FH012AA
1.5K RPM

Yellow is leg to leg voltage

Blue is Leg current

Red is computed power



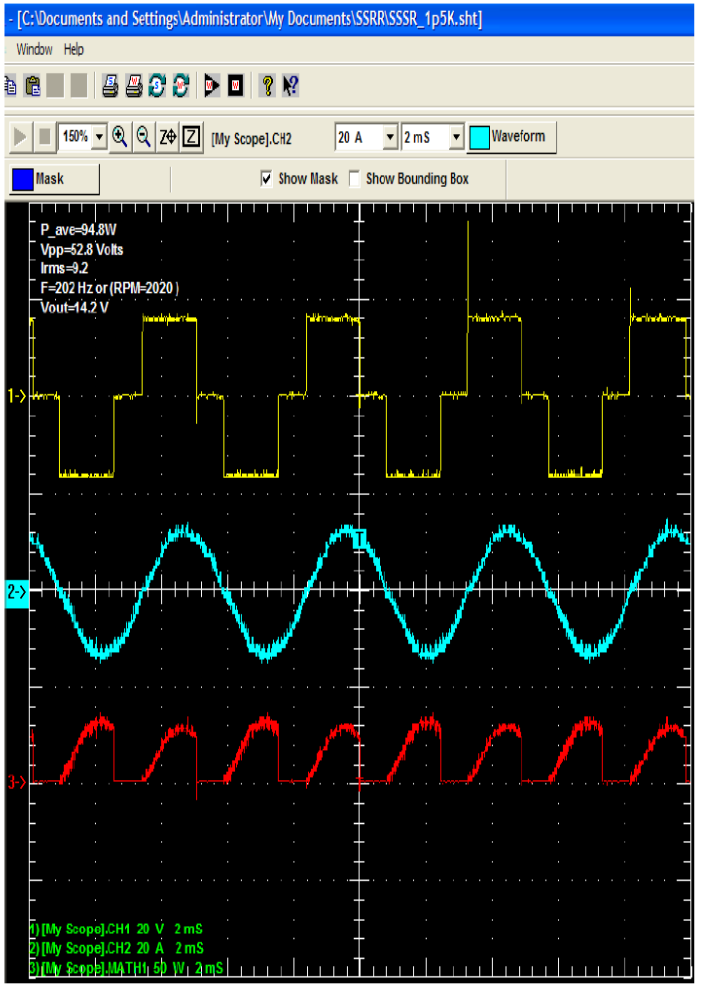
SSR 1.5K RPM

Still no regulation

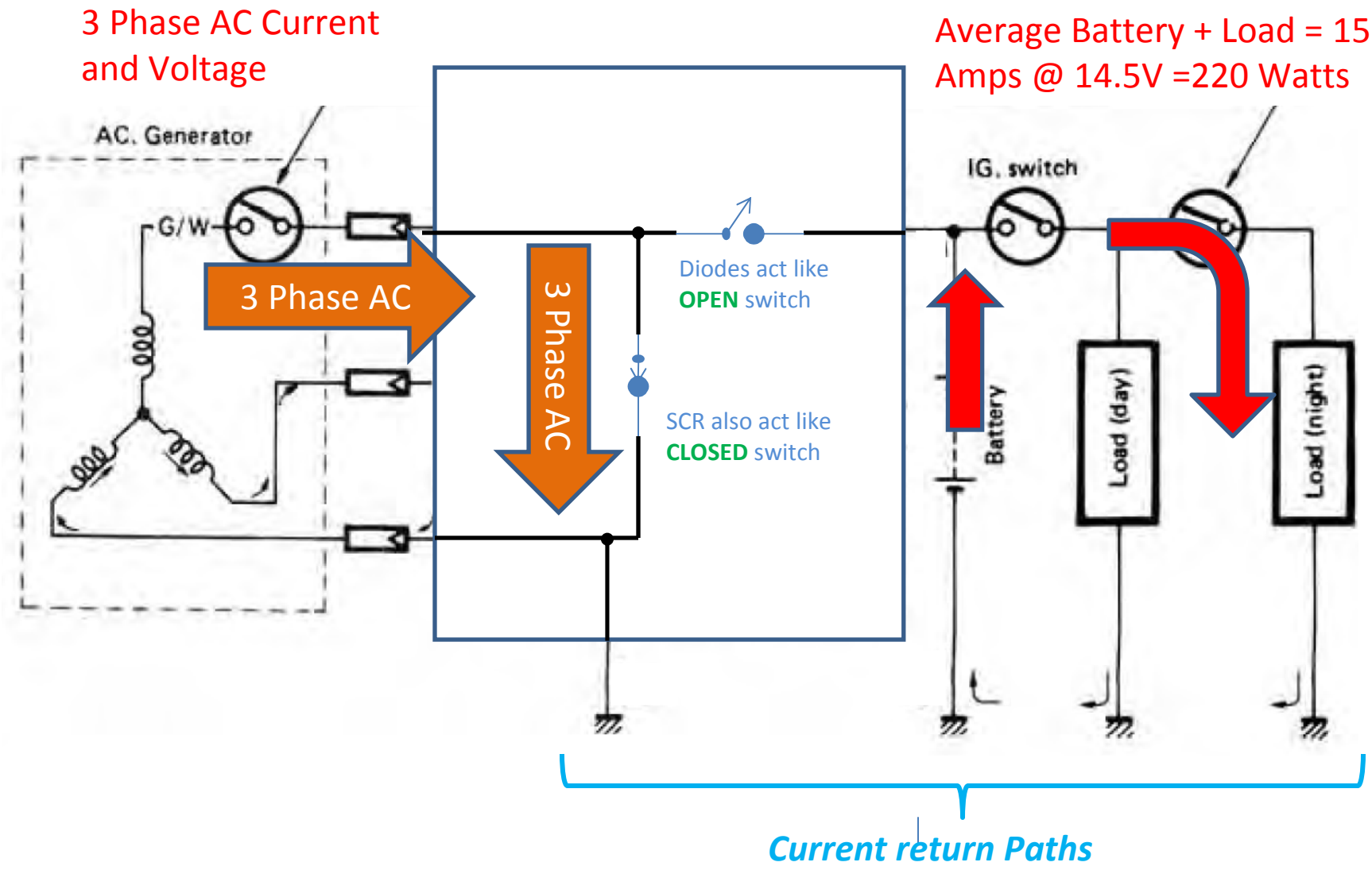
Yellow is leg to leg voltage

Blue is Leg current

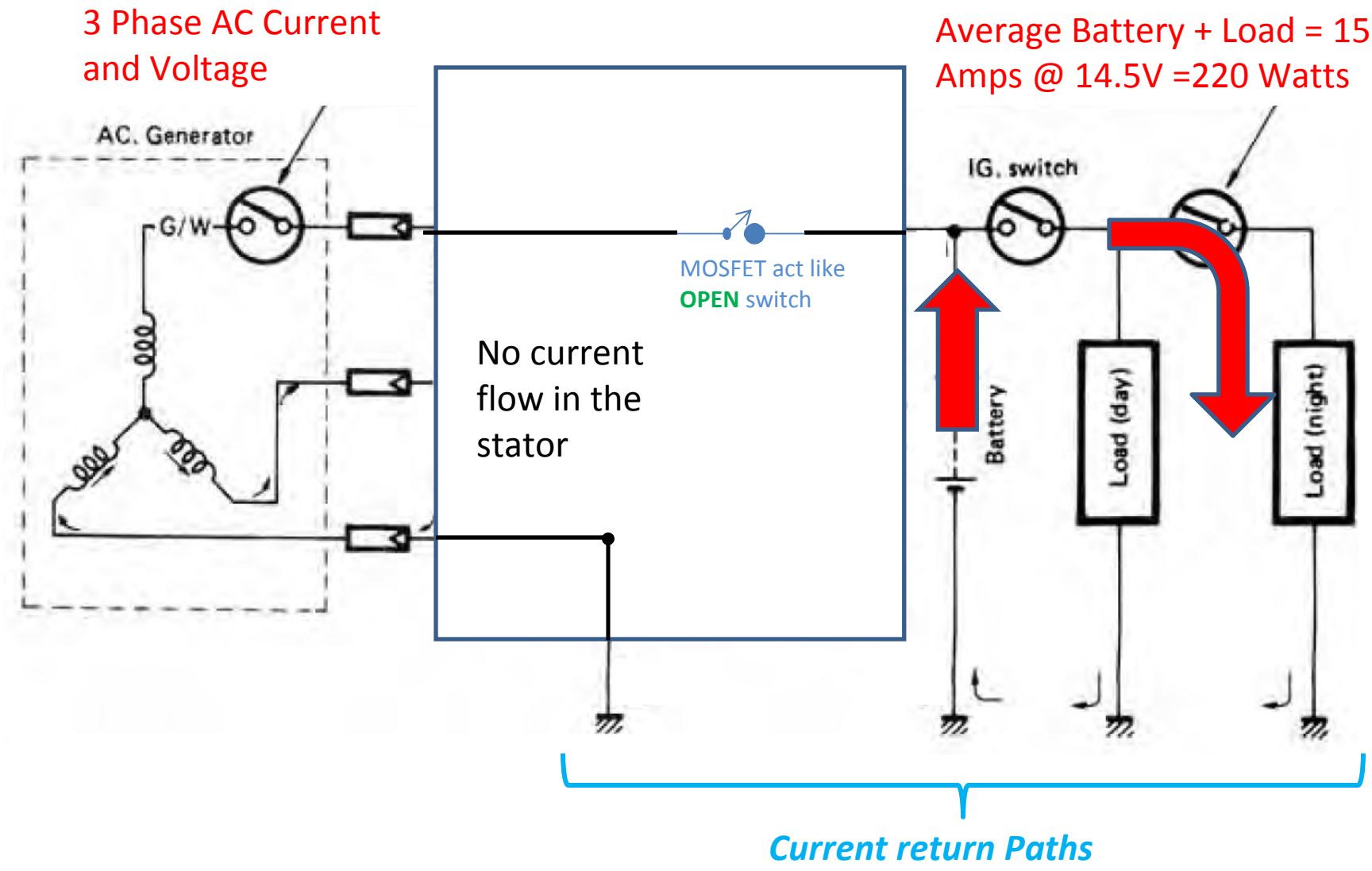
Red is computed power



When GS SHUNT R/R **IS** Regulating



When COMPU-FIRE SERIES R/R IS Regulating

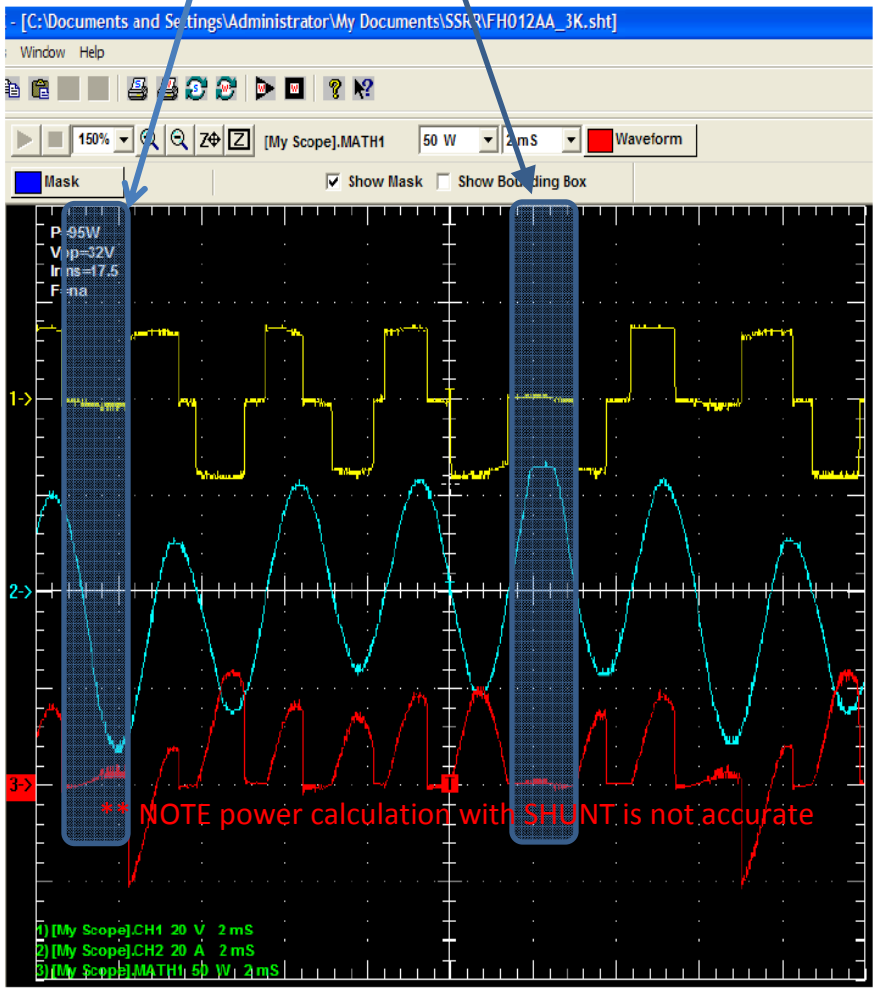


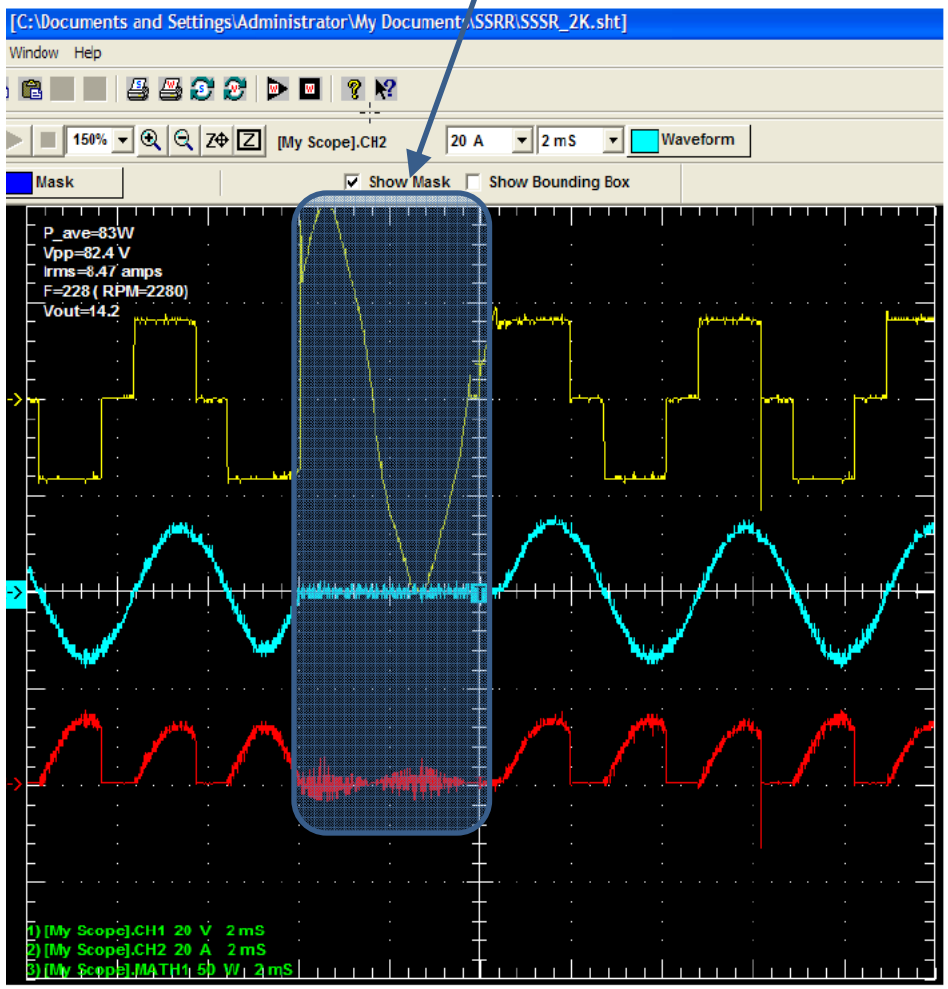
In Regulation Comparison

Stator shorts. Current Increases Voltage flat lines at the R/R

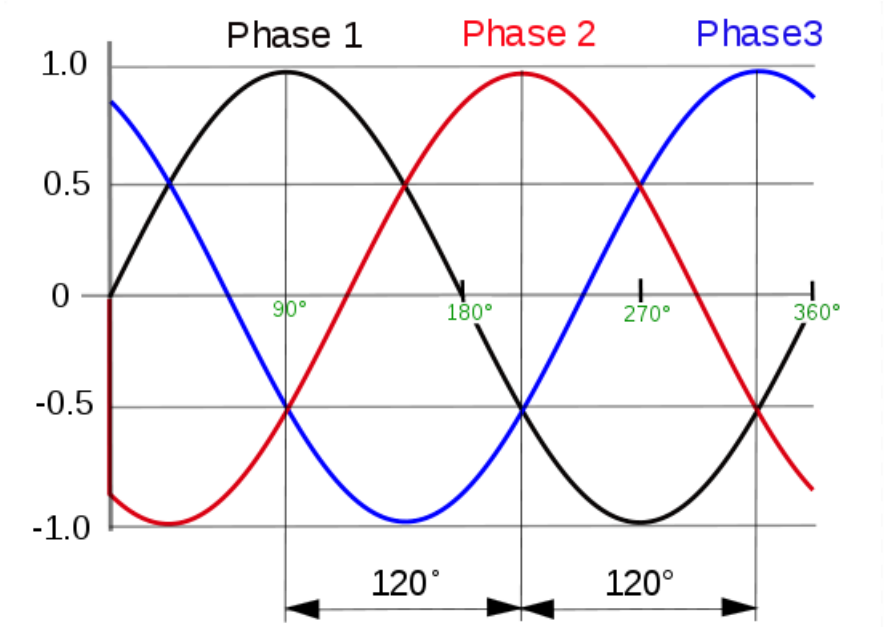
Both are nearly identical below 2K RPM

Stator goes open circuit. Current flow stops and Voltage rises

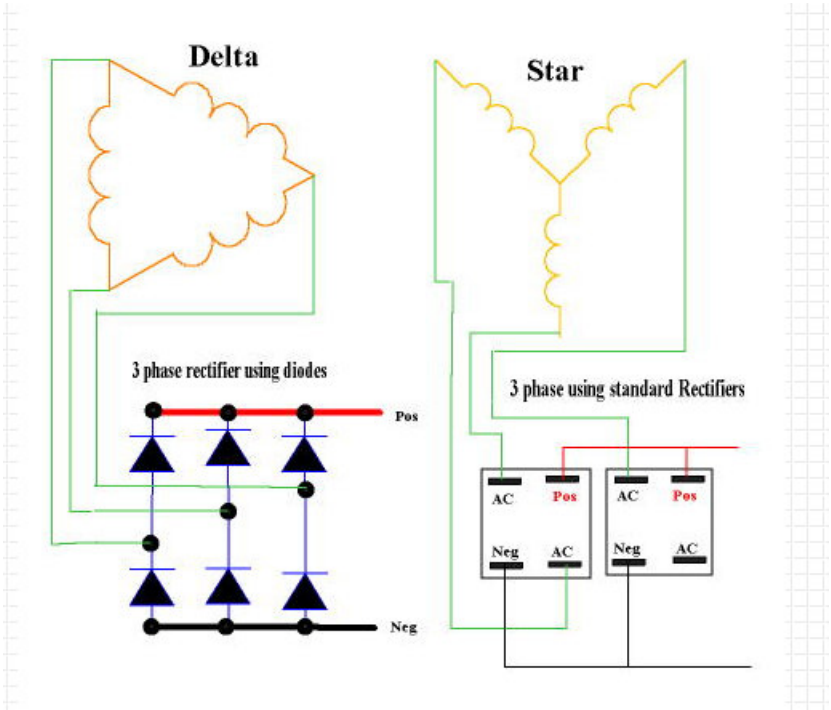




3 phase BACKUP CHARTS



3_phase_AC_waveform.svg (SVG file, nominally 548 × 408 pixels, file size: 26 KB)



http://eece.ksu.edu/~starret/581/3phase.html

Y to Δ Conversions

In terms of power, currents & line voltages, the following sources are the same and may be used interchangably in most cases. Note, the Y connection should be used in a one-line diagram.

Wye connected source ____ **Delta connected source**

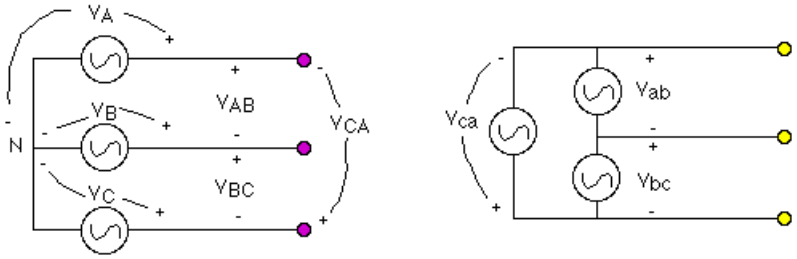


Figure 8: A Y Source

$V_A = V_{ab} / (\sqrt{3} \angle \underline{30^\circ})$

Figure 9: A Δ Source

$V_{ab} = V_A (\sqrt{3} \angle \underline{30^\circ})$

Similarly, the two loads given below are the same in terms of the resulting power, line currents and line voltages and can usually be substituted as desired. Note that the Y connection is the one needed for the one-line diagram!

Wye connected load ____ **Delta connected load**

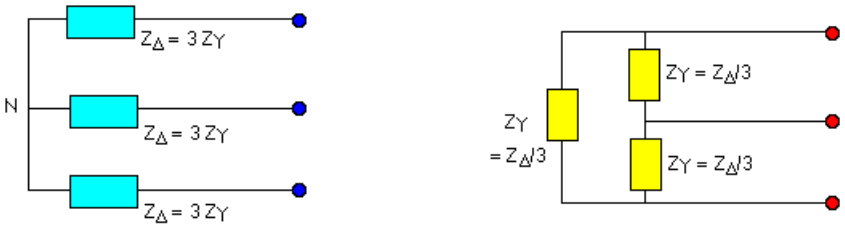


Figure 10: A Y Impedance Load

Figure 11: A Δ Impedance Load