



Helpful Generator Calculations

To Find	Known Values	Formula	
Ohm's Law	Current, Resistance, Voltage (Any 2)	$\frac{E}{I * R}$	
Rotor/Field Current	Field Resistance, Full-Load Excitation Voltage	$\frac{E_{Exc}}{R_{Fld}}$	
Field Voltage	Battery Voltage, Generator Output, Generator Voltage Configuration	$\left(\frac{E_{Gen.Output}}{E_{Battery}} \right) * 2$	
Frequency (Hz)	RPM, Poles	$\frac{RPM * Poles}{2 * 60}$	
# of Poles	Frequency, RPM	$\frac{2 * 60 * Hz}{RPM}$	
RPM	Frequency, Poles	$\frac{2 * 60 * Hz}{Poles}$	
To Find	Known Values	Single-Phase Formula	Three-Phase Formula
KW	Volts, Current, Power Factor	$\frac{E * I * PF}{1000}$	$\frac{E * I * 1.73 * PF}{1000}$
KVA	Volts, Current	$\frac{E * I}{1000}$	$\frac{E * I * 1.73}{1000}$
HP (Engine Output)	Generator KW, Generator Efficiency, Cooling Fan HP, Battery Charging HP	$\frac{KW}{Eff.} + HP_{Fan} + HP_{Charging}$	$\frac{KW}{Eff. * .746} + HP_{Fan} + HP_{Charging}$
KW (Required For Motor)	Motor HP, Motor Efficiency	$\frac{HP}{Eff.}$	$\frac{HP * .746}{Eff.}$
KVA (Required For Motor)	Motor HP, Motor Efficiency, Motor Power Factor	$\frac{HP}{Eff. * PF}$	$\frac{HP * .746}{Eff. * PF}$
Amps	HP, Volts, Generator Efficiency, Power Factor	$\frac{HP * 1000}{E * Eff. * PF}$	$\frac{HP * 746}{1.73 * E * Eff. * PF}$
Amps	KW, Volts, Power Factor	$\frac{KW * 1000}{E * PF}$	$\frac{KW * 1000}{E * 1.73 * PF}$
Amps	KVA, Volts	$\frac{KVA * 1000}{E}$	$\frac{KVA * 1000}{E * 1.73}$