



## Application Note

### *Using Preen Solid State AC Sources to Replace Motor and Rotary Generators*

Below is a quick glance and the differences between traditional Motor and Rotary Generators and Solid State Frequency Converters.

Comparative Features of Frequency Converter Units	
Motor and Rotary Frequency Converter	Solid State Frequency Converter
> 5 KVA, Less costly per kW (or KVA)	> 5 KVA, around 10% More costly per kW (or KVA) (in 1-3 KVA sizes, solid state tends to be less expensive)
Costs do not increase linearly with power; e.g., 3x power costs 1.5x dollars	Costs are more linear, e.g., 3x power costs 3x dollars (because hardware expansion is linear).
More attuned to larger applications 10 KVA plus	More attuned to smaller applications 1-5 KVA
Rugged floor mount construction	Generally in equipment racks or rack mountable
Generally fixed output frequency	Highly variable output frequency, typically 45-500 Hertz
MTBF: 20,000 to 32,000 Hrs. (belted) 30,000 to 60,000 Hrs. (single shaft)	MTBF: 50,000 Hrs.
Preventive maintenance is required, e.g., bearing maintenance, belt replacement (except single shaft units), cleaning air intakes and exhausts	Little or no preventive maintenance other than cleaning fans, exhausts
Some installation and setup is required, e.g., concrete pad, power circuits	Some installation and setup may be required, but usually less than rotary alternative

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Some environmental objections, e.g., audible noise, unit weight, space factor, etc.	Fewer environmental objections, e.g., generally quieter, lighter weight, etc.
Input to the converter's motor has lagging power factor that increases with load.	Input current has high crest factor that also causes leading power factor that increases with load.
Harmonic distortion and noise on the input power is not passed to the output	Harmonic distortion and noise on the input power is not normally passed to the output, some high frequency noise may be passed to output.
Output harmonic distortion is moderately low, typically <4 to 5%	Output harmonic distortion is lower, <0.05%,
Low output source impedance	Very low output source impedance
Can source heavy overload currents 2-4X for short periods of time, depends upon generator windings and momentum of rotating components. Overloads generally cause voltage reduction but not large waveform distortion	Can source overloads for generally shorter periods of time, depends upon capacitive storage in unit. Overloads may cause a sharp rise in distortion.
Full load efficiency 60 to 65% on smallest units (<6.25 KVA) up to 85 to 92% on large units	Full load efficiency 60 to 92 % all sizes
Efficiency varies with load, better with heavy loads	Efficiency varies with load, better with heavy resistive loads and lower output frequencies