



## **Advantages of PMG Excitation Support Systems Installed on Synchronous AC Generators**

1. A PMG with its appropriate regulator can enhance a generator's transient performance because it will provide a constant AC voltage input to the automatic voltage regulator (AVR) regardless of the generator's terminal voltage.

A synchronous generator whose AVR is taking its input power from the generator is termed a shunt excited generator. If the generator's terminal voltage is reduced as is seen with transient voltage dips upon the application of significant block loading or motor starting, the input voltage to the AVR is reduced by the percentage of transient voltage dip. This reduction in input voltage to the AVR reduces its ability to force swift recovery of the generator's terminal voltage, and may well impact the generator's ability to start relatively large motor loads.

2. A PMG with its appropriate regulator – such as a DVR2000E+ or DVR2000E/EC – will also provide 300% short circuit support for ten seconds at 60 Hz, without the addition of current boost/series boost systems.

When a down stream bolted fault is seen at any generator's terminals, the generator output voltage will drop to zero. For shunt excited generators, this will result in zero voltage input to the AVR, and therefore, the generator may be unable to force current flow long enough for down stream circuit interrupters to clear the fault, and the entire electrical system will be shut down. A PMG excitation support system will continue to provide input power to the AVR, and provide the excitation necessary to clear the fault.

3. When the load on the generator is nonlinear due to thyristor (SCR) power supplies such as UPS Systems, variable speed drives, etc., the load may produce notches on the voltage severe enough to cause misfiring of the power rectifiers in a shunt excited generator's AVR. When this occurs, the generator's terminal voltage will become unstable.

If the generator is fitted with a PMG, the input power to the AVR is isolated from these disturbances, and no voltage instability will occur.

4. A PMG is constructed with a permanent magnet rotor which has a very strong magnetic field. This eliminates the need for field flashing which is sometimes necessary with shunt type synchronous generators.