

Application Note

Utilizing the DECS-250 and Limiters to Protect a Generator when Connected to a Fluctuating Bus

In some applications, generators are paralleled to a utility or grid that has a fluctuating voltage level. In many instances, these voltage changes can happen very quickly. If a generator is paralleled to this type of network, an operator must monitor and constantly adjust the voltage set point to maintain proper var output from the generator being paralleled.

When a generator is operated against a utility in droop mode of operation, it is expected that the voltage is controlled and maintained by the utility. However, in the case of a fluctuating bus, the utility's voltage will vary. When this happens, the voltage regulator's primary function is to regulate and adjust the system voltage. Typically, the generator is much smaller in capacity than the bus and is not capable of doing this task. The automatic voltage regulator attempts to reach its set point and, as a result, increases or decreases excitation levels which increases or decreases the var output of the machine respectively.

If the AVR set point is higher than the bus voltage, the generator will produce or export vars. Excessive var flow out of the generator may cost the owner of the generation source additional money in power factor penalties and could damage the generator due to overexcitation or generator overload.

In the opposite scenario, if the AVR set point is lower than the bus voltage, the voltage regulator will decrease excitation and vars will flow into the machine. In this situation, the generator could operate outside its steady state

stability limits. This could result in excessive heating of the generator or even loss of synchronism, which can be detrimental to the machine, and/or penalties charged by the utility due to the poor power factor.

Basler Electric's DECS-250 can resolve these problems. The DECS-250 incorporates both an underexcitation var limiter and an overexcitation var limiter. These features will protect the machine from the detrimental effects caused by the utility voltage fluctuation.

The DECS-250 user can set multiple points within the generator steady state stability limits to create a protective limiter unique to that generator. This underexcitation limiter will keep excitation high enough to limit the amount of reactive power the generator will absorb. See Figure 1.

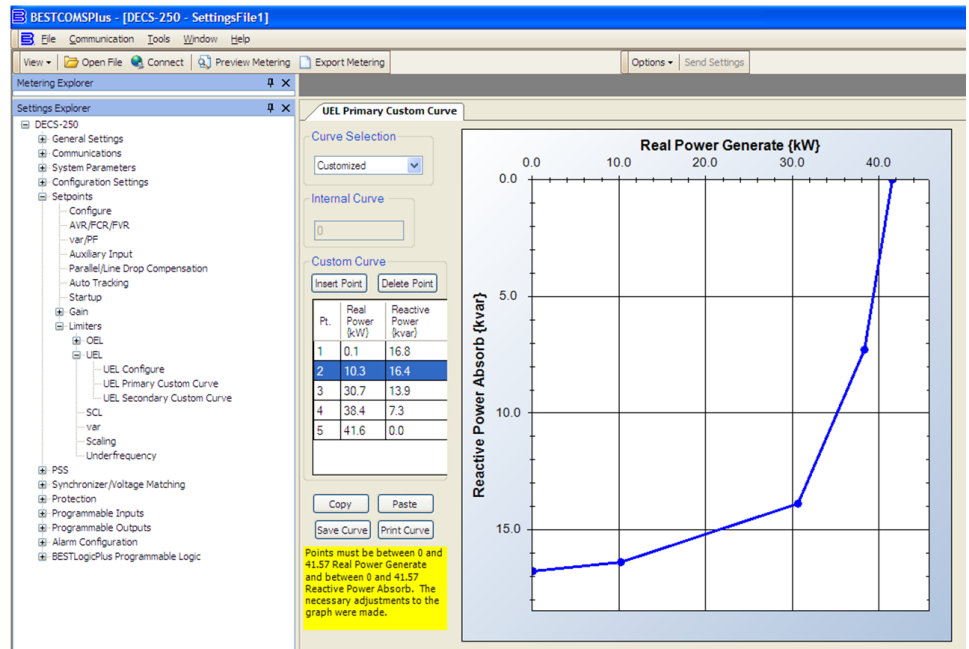


Figure 1: Example of an underexcitation limiter configuration in BESTCOMSPiUS®

The DECS-250 also incorporates a var export limiter. The user can preset the maximum amount of vars the generator will be allowed to export. In this situation, if the generator exceeds the var threshold, the DECS will limit or reduce excitation to regulate the amount of vars that are produced from the generator. See Figure 2.

Therefore, by utilizing the var limiting features of the DECS-250, the generator will operate within its capabilities. These limiters allow the generator to be operated in automatic voltage control mode to provide voltage support to the utility network while limiting the amount of vars the

machine can import or export. This saves the user money in terms of excessive potential utility penalties as well as giving assurance the generator is properly protected, offering years of reliable service.

For more information

If you have any questions, consult the Basler factory at +1 618.654.2341 or visit www.basler.com. If you would like additional information about the DECS-250, request a copy of the product bulletin (part no. SZPBULL) or the instruction manual (part no. 9440300990).

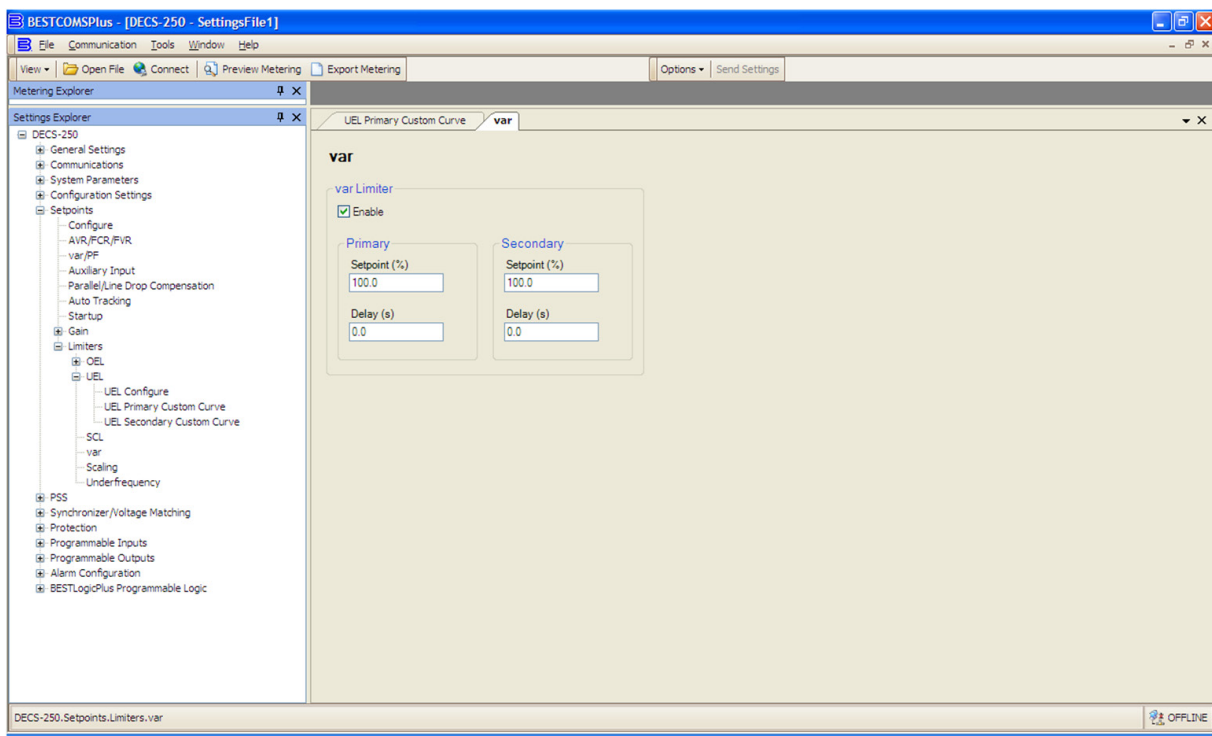


Figure 2: Example of a var export limiter configuration in BESTCOMPlus®