RSC-GRIDCODE • April, 2024
Published for the Basler Electric Power Systems Group

Application Note

Evolution of Grid Code Compliance: Basler Innovation Leads the Way

Grid Code So Far

Historically, large centralized power plants were the core of the utility power grid. These large machines provided the majority of the power and maintained the overall stability of the grid. As smaller distributed generation was added, the general rule was that in the event of a system disturbance, these smaller machines would disconnect from the power grid until the system was stabilized.

Over the last several years, the power grid has migrated. Many large centralized fossil fuel generators have been decommissioned and are no longer providing the backbone of the power grid. These large machines have been replaced with "green" power or renewable energy sources such as solar and wind. In addition, gensets using reciprocating engines or gas turbines have also been added to the network. These gensets play a key role in stabilizing the grid when the intermittent renewable power sources are not available.

Without the large centralized power plants, if these smaller machines and renewable sources followed the traditional method of disconnecting from the grid during system disturbances, the result would be large-scale blackouts. Because of this, changes were needed in the operations strategy of grid-connected machines. Therefore, agencies have developed new grid code requirements for machines and energy sources that comprise the utility grid. These energy resources must now be capable of riding through the system disturbances to maintain a stable power grid.

Basler Innovations

To meet the demand for these new requirements, Basler has developed new algorithms within the DECS-150 and DECS-250 product lines which make them compatible Evolution of Grid Code Compliance:

Basler Innovation Leads The Way with Grid Codes. The DECS is one of the leaders in meeting and exceeding the requirement of the voltage regulator to ride through these fault conditions.

Basler's easy-to-use BESTCOMS*Plus*® software (Figure 1) includes state of the art tools that facilitate commissioning and testing for grid code compliance.

Moving Forward

As more distributed generation systems are added to utility grids, additional grid code requirements have been created. Because grid conditions and topologies vary from country to country, likewise, the grid codes also vary. However, the different grid codes throughout the world have many similarities. Within the European Union, there has been a push to harmonize these standards. The European Commission put in place the Network Code Requirements for Generators which had a deadline for final implementation of May 17, 2019.

These regulations not only include renewable resources, but also conventional generating sources such as small turbine and reciprocating generator sets that are paralleled to the grid. Grid codes regularly contain requirements for power quality, protection equipment, plant control, and others. However, they also include requirements regarding the control of generators being paralleled to the network, such as:

- Real power control
- Reactive power control
- Voltage and frequency requirements
- Dynamic system requirements

Therefore, in these applications, the voltage regulator and/or control system must be capable of controlling the generator in accordance with these requirements.

Innovation in Action

Basler has further enhanced the DECS-150 and DECS-250 to be able to meet these stringent grid code requirements. These DECS products contain the ability to operate on the utility grid in multiple control modes as required by the local system.

The voltage regulators are required to meet the dynamic system requirements as well. The DECS products implement unique algorithms to maintain the desired operation during Low Voltage Ride Through (LVRT) (Figure 2) conditions as well as maintain grid operator specified frequency conditions. The Limited Frequency Sensitivity Mode (LFSM) (Figure 3) of the DECS provides the control and flexibility needed to meet the required operating criteria specified by the grid code standards.

For More Information

For more information, contact your Application Engineer or Technical Support at 618-654-2341 or visit us at www.basler.com.

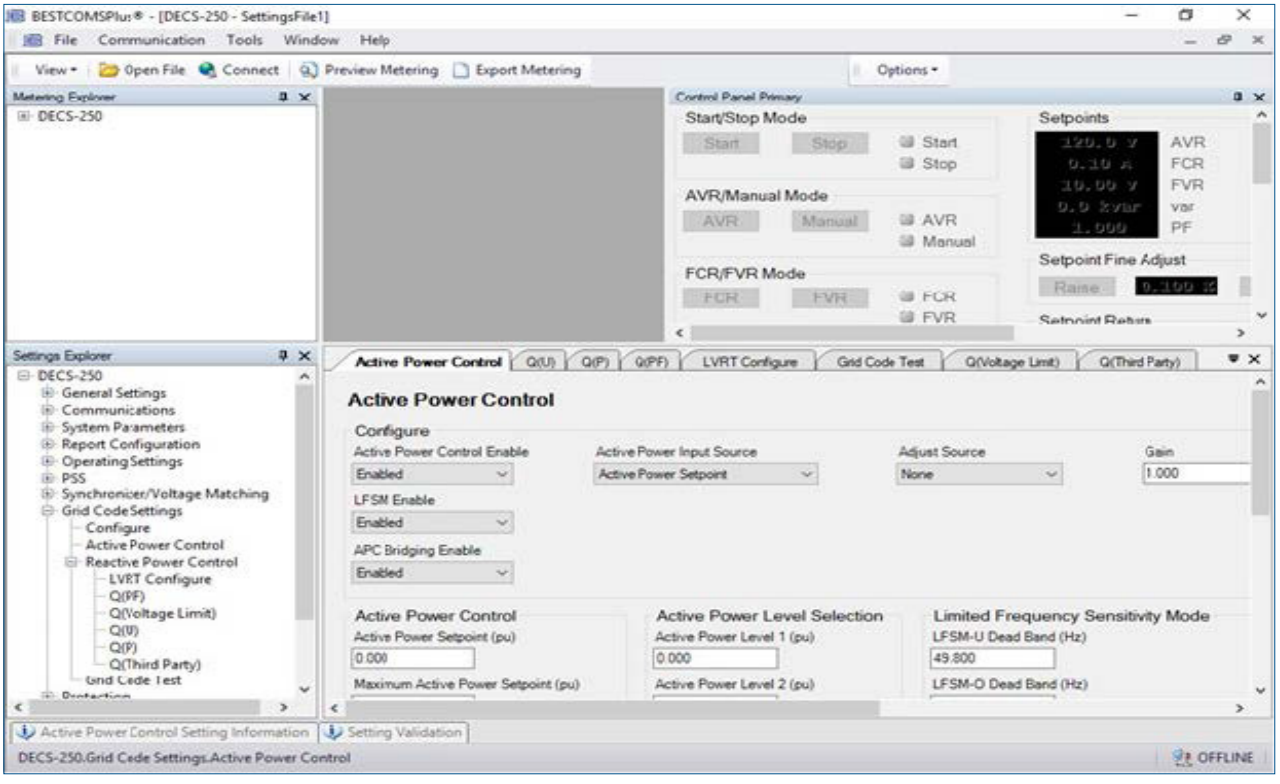

Figure 1 - BESTCOMS*Plus*® Screen

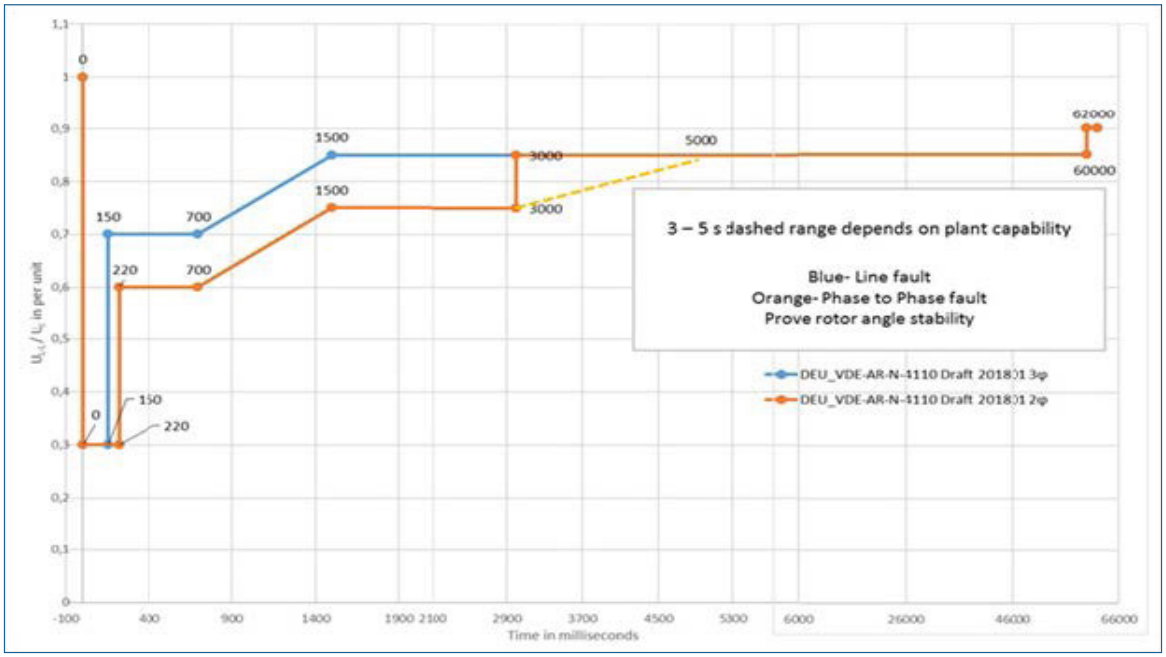

Figure 2 - BESTCOMS*Plus*® Screen - Low Voltage Ride Through

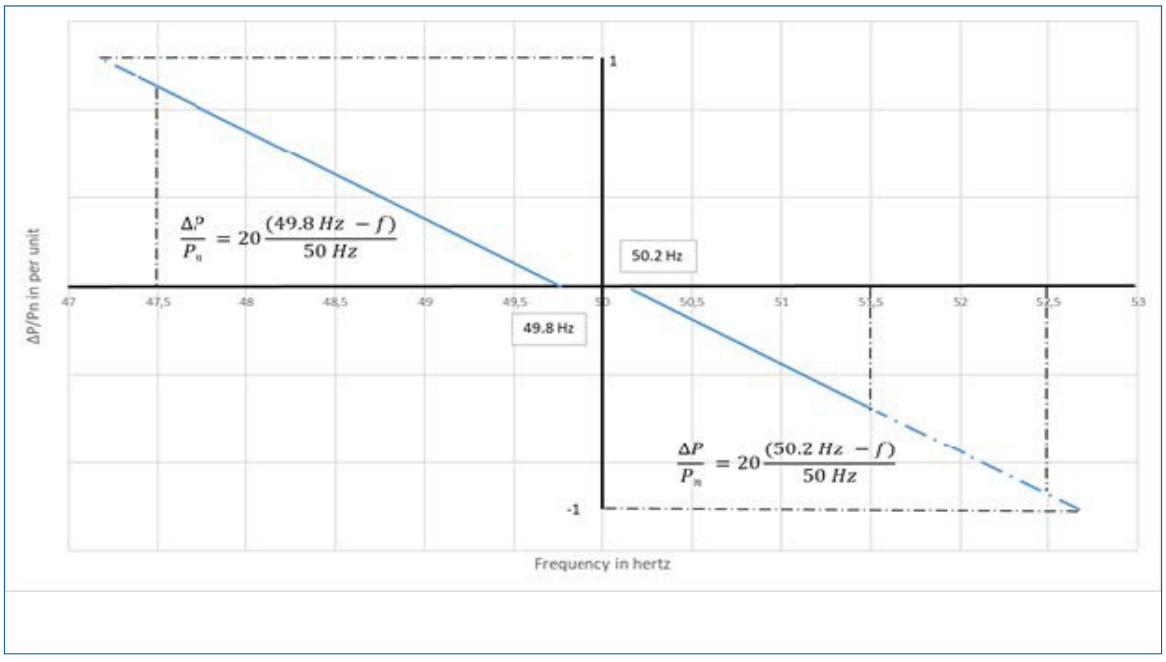

Figure 3 - BESTCOMS*Plus*® Screen - Limited Frequency Sensitivity Mode

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