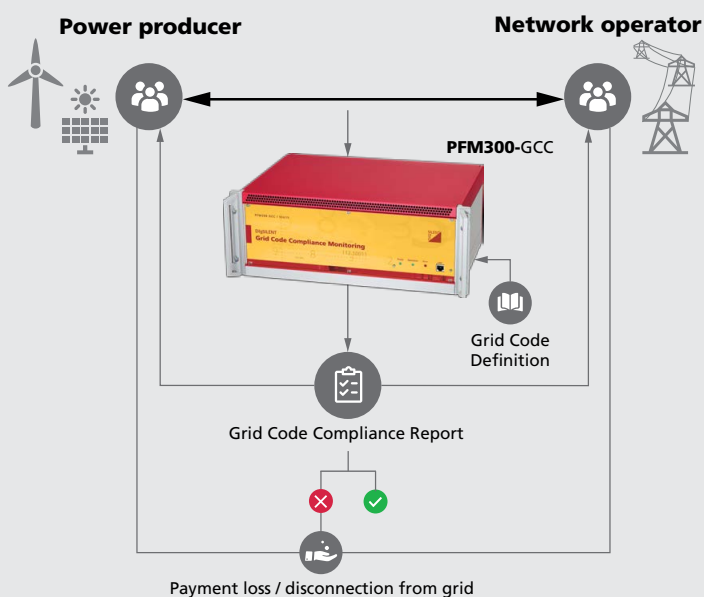


DIG SILENT Grid Code Compliance Monitoring PFM300-GCC

An increasing number of independent power producers (IPPs), such as wind, pv or conventional power plants, are connecting to public transmission and distribution grids. Grid connection contracts with grid operators include obligations to comply with performance requirements set out in the relevant grid codes. These grid codes will typically specify the expected behaviour of the plant during network disturbances, requirements for support of the steady-state and dynamic stability of the grid, and obligations relating to ancillary services provision and power quality. Non-compliance with these grid code requirements can result in payment reductions or even disconnection from the grid as well as conflicts between the parties involved.

The new **Grid Code Compliance Monitoring System PFM300-GCC** has been designed to carry out online audits of the compliance of your power plant with the grid code, automatically report on any grid code relevant issues and provide transparency between parties through traceability of non-compliance events. In this innovative solution DIG SILENT has successfully combined its considerable expertise in both hardware systems for monitoring and power system simulation software development, to provide an online assessment of grid code compliance.



KEY BENEFITS

- **Continuous online audit** of grid code compliance and instant notification of non-compliant behavior
- **Traceability** of grid code compliance triggered events via detailed reports
- **Remote access** to the online audit devices by all interested parties
- Reliable data basis for power plant **performance optimization** (e.g. power plant controller analysis and tuning)

FEATURES

Flexible monitor functions

- Frequency range
- LVRT, HVRT
- Reactive current behaviour based on voltage during LVRT
- Reactive power behaviour based on voltage or active power
- Active power behaviour controlled by frequency / voltage response regulation
- Meet Ramp Rate Control requirements
- Parameter settings can be static or dynamic via signal inputs

Online compliance status

- Compliance status via Event Viewer and web interface
- Traceability of all interim calculated values
- Report on grid code compliant network disturbances
- Power quality report according EN 50160
- Detailed plots and reproducible data basis

Comprehensive reports

- Interactive report generator
- Statistical report showing all non-compliant events
- Report on grid code compliant network disturbances
- Power quality report according EN 50160
- Detailed plots and reproducible data basis

Easy Configuration

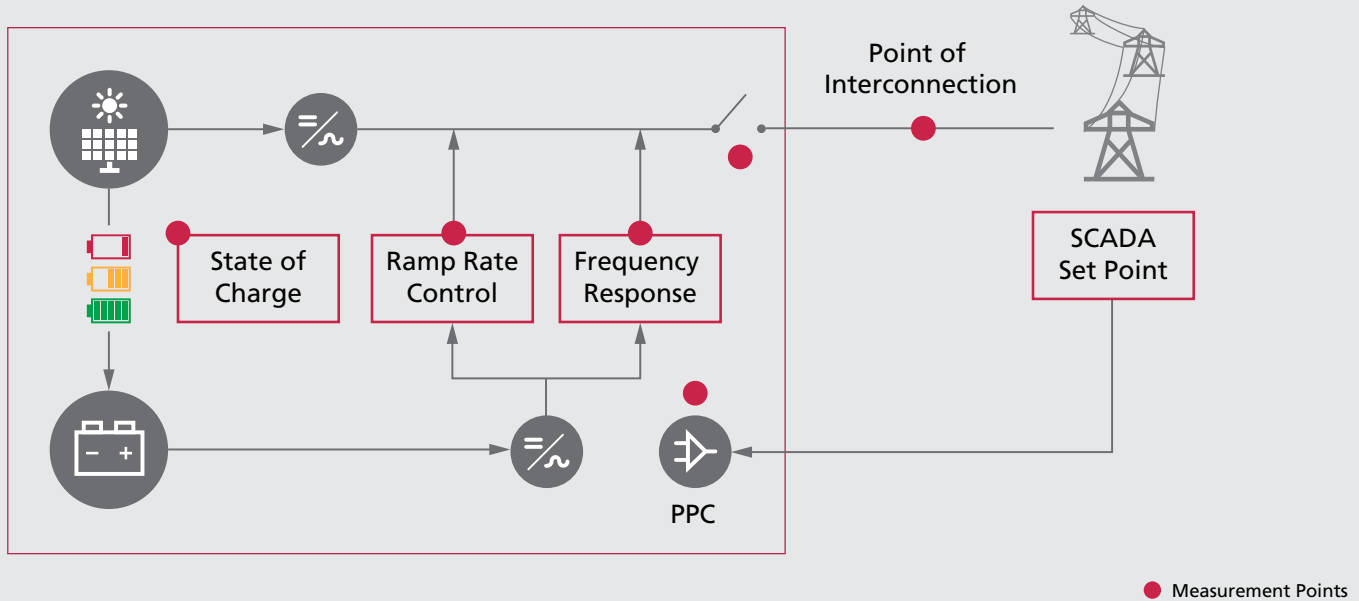
- Configuration via web-interface
- Templates available for common grid codes
- Parameter settings can be static or dynamic via signal inputs from SCADA
- Configurable additional inputs for further internal analysis

Multiple connection concept

- Simultaneous data delivery to multiple independent parties
- Independent report generation and data analysis by all parties via individual Master Stations

ADVANCED APPLICATION CASE

As well as providing the VT and CT signals from the point of connection, the PFM300-GCC offers monitoring of the plant status. In the case shown below, plant signals relating to the frequency response of the Battery Energy Storage Systems (BESS) and the pv generator are also evaluated. For other systems, turbine or governor signals can be recorded and included in the Grid Code Compliance Monitoring analysis, to check for compliance with the ramp rate control and frequency response settings. Similarly, voltage set points, dynamically changed by the network operator, can be monitored together with AVR signals.



HARDWARE VARIANTS:

Base Configuration

- For point of interconnection: 3xVT, 3xCT channels, breaker status and 3 channel set point measurement (Total 9 analogue and 8 digital channels). Incl. NTP/PTP time synchronization.

Custom Configuration

- Additional VT, CT and PPC signal inputs for advanced grid code requirements considering BESS systems or equivalent controllers.

TECHNICAL SPECIFICATIONS:

- 19" standard, 4/7HU
- 256GB internal SSD storage (1-2 years circulating buffer)
- Up to 5 LAN ports
- CAT IV300, CATIII 600V measurement inputs
- Slot based components for an easy upgrade
- IEC 61850 (ed.2) certified
- CB certification according IEC 61010-1 (ed.3), IEC 61010-2-030 (ed.1), IEC 61326-1 (ed.2)
- IEEE C37.118 (PMU) In-/Outputs
- Network performance monitor with continuous and trigger based recordings up to 2 samples/cycle
- Fault recorder with 15,15 kHz transient recording (instantaneous values)

