POWER PLANT CONTROLLER (PPC)

Reliable grid code compliance

FOR IMPROVED GRID INTEGRATION AND RELIABLE COMPLIANCE PROCEDURES:

HOW TO IMPROVE GRID STABILITY WITH CERTIFIED PV POWER PLANT CONTROL AND THUS GUARANTEE GRID-FRIENDLY PV SYSTEM CHARACTERISTICS

OVERVIEW BENEFITS

Flexible. Modular. Scalable.

The wide range of functions can also be expanded as necessary and can be adapted to the system topology for each specific project. Because all interfaces have a modular design, the application is highly scalable. With active and reactive power control, a Zero Feed-In (Zero Export) solution and reactive power compensation, many typical requirements are already implemented.

High transparency – greater planning security

With the blue'Log® XC, grid code compliance becomes a calculable factor, guaranteeing smooth approval processes for the grid connection – all thanks to the certified power plant characteristics of the Power Plant Controller (PPC) and the provision of simulation models when necessary. This ensures maximum transparency during grid integration and reduces the planning risk. In light of the European grid code harmonization and the enactment of the Technical Connection Rules for medium voltage (VDE-AR-N 4110) and high voltage (VDE-AR-N 4120) in Germany, meteocontrol has already obtained the necessary component certificate for the Power Plant Controller (PPC) based on the controller blue'Log® XC.

Easy commissioning: parameterizing instead of programming

Commissioning requires no programming knowledge. Thanks to clear user guidance and the industry-specific menu structure, even complex grid connection regulations can be complied quickly and easily by the user. Easier configuration reduces the commissioning costs and makes investments safe – from planning through to operation.

Manufacurer-independent and future-proof

Whether it is a mixed PV power plant with different inverter types or a heterogeneous PV system with inverters from different manufacturers, the flexible all-in-one driver of the blue'Log® X-Series copes easily with the large number of different communication protocols. Regular updates continuously expand the compatibility of the system for a sustainable, future-proof solution.

Full control over data with backups and analysis

The blue'Log® XC stores the recorded data for the PV system locally for at least 100 days. In combination with VCOM, the system solution offers unlimited longterm archiving. The control of the power plant can be analyzed in real-time on the controller itself and on basis of historic measurement values which can be exported from the system.

IT security

The X-Series ensures IT security thanks to user access management without standard users, integrated remote access with TLS encryption as well as configuration and data transmission with end-to-end encryption. Guaranteed security even after the router.

CERTIFIED ACC. TO

VDE-AR-N 4110 / 4120
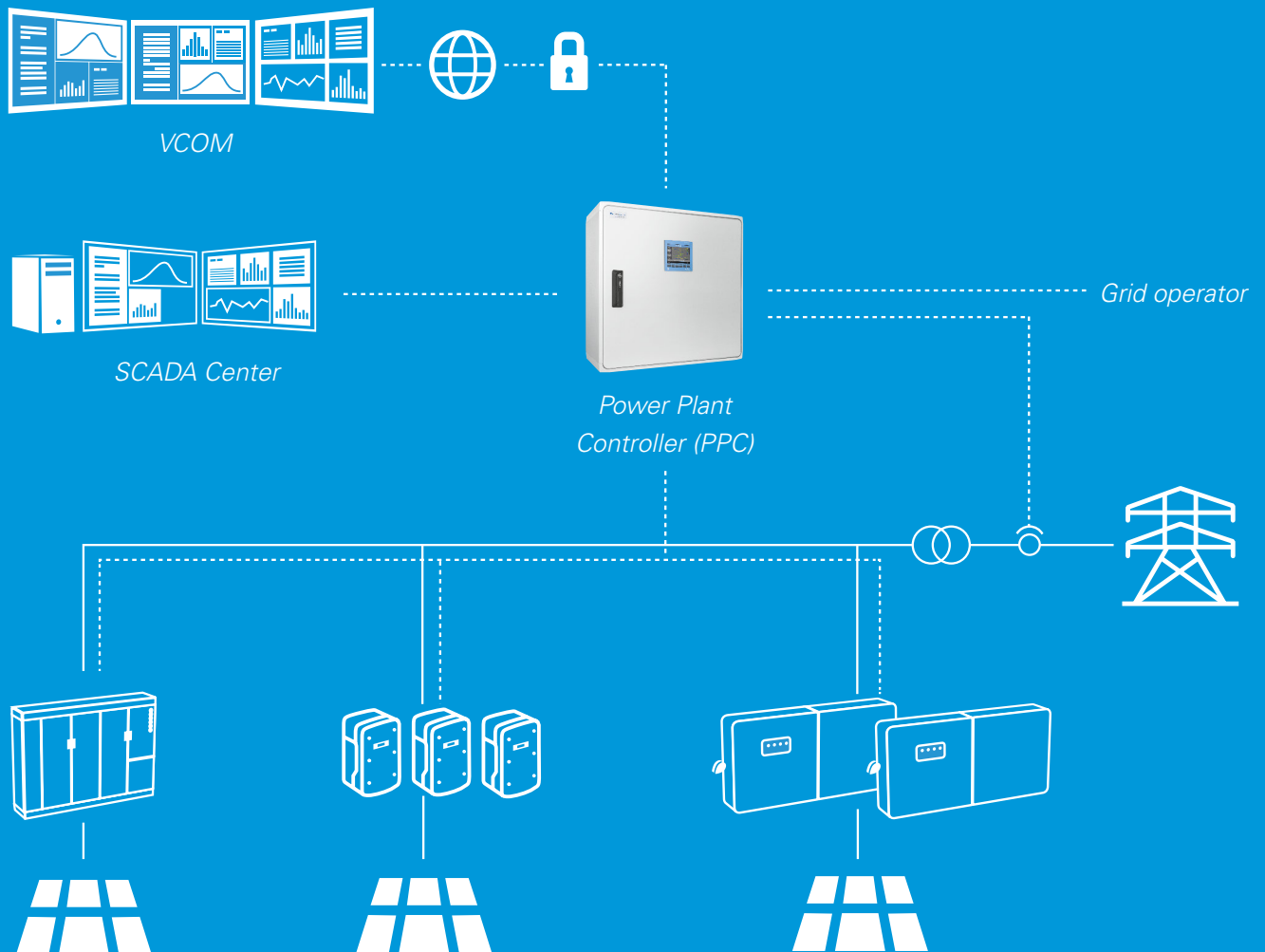
POWER PLANT CONTROLLER (PPC)

The reliable way to bring PV systems grid-connected. Anywhere in the world.

Every grid operator, every region and every country impose different technical requirements when it comes to connecting photovoltaic power plants to the transmission or distribution system. International grid codes differ from German ones but on the European level the Network Code (NC) Requirements for Generators (RfG) harmonize all national grid connection requirements across Europe. Within the EU all national grid codes have to be in-line with the NC RfG since April 27, 2019. The international requirements are continuously increasing and their diversity is enormous.

Some countries are very lax when it comes to power system security. PV systems shoot up out of the ground and maximum solar energy is fed into the grid which leads to a high PV penetration mostly in the distribution grids. This might work for a while with good-quality electricity grids. But the end is in sight. Other countries are aware of the need for action due to raising fluctuating feed of renewable energies such as solar energy and have set themselves ambitious development targets. For these countries, grid stability is already a matter of top priority.

FLEXIBLE. MODULAR. SCALABLE.

VCOM

SCADA Center

Power Plant
Controller (PPC)

Grid operator
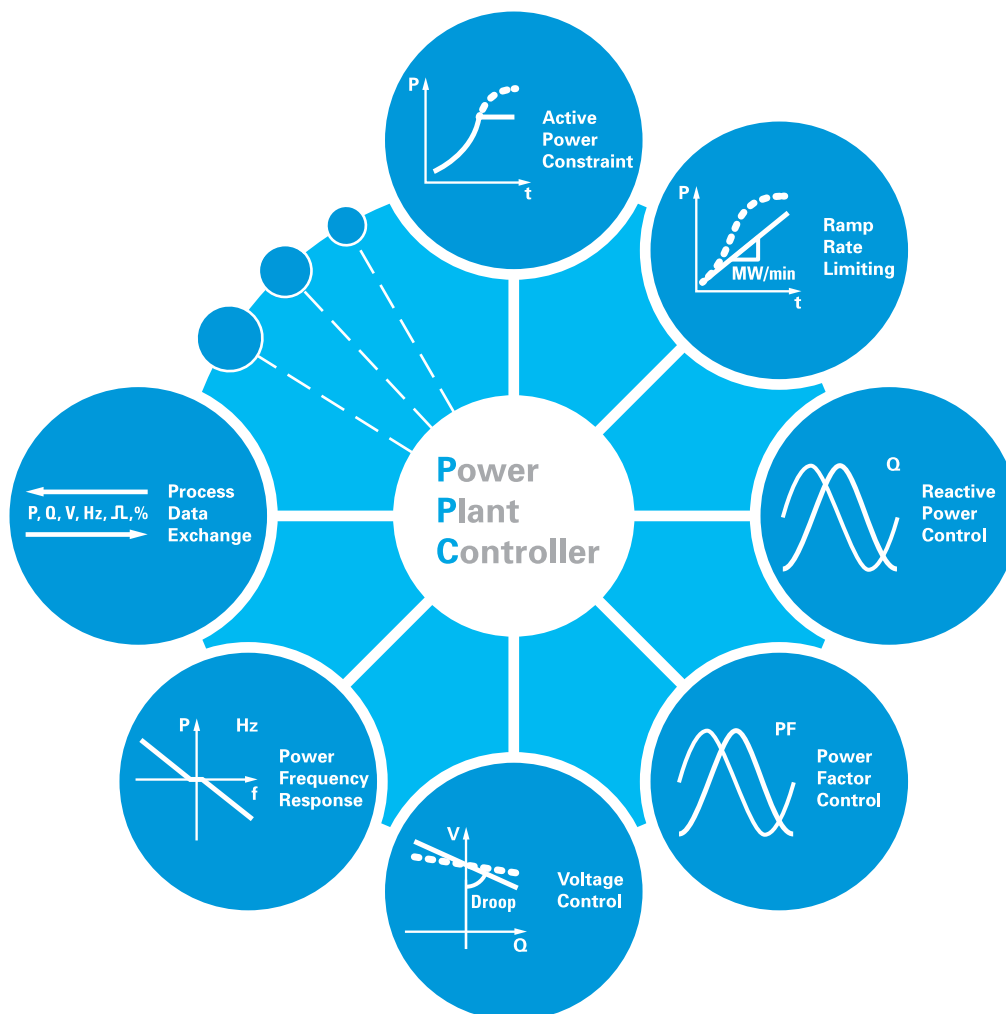
Turnkey solution for monitoring and power plant control

As the system constructor is faced with a high diversity of components, the right solution for controlling the planned system is needed. It must be compatible with the components installed, meet the existing requirements and be able to adapt quickly and flexibly to changing needs. An all-in-one solution is ideal here.

Regardless the used inverter topology or even when it comes to a retrofit and the necessity to replace existing inverters with new ones from other manufacturers, the blue'Log® XC assures a precise control with the best dynamic behavior even for heterogenious pv power plants.

After all, EPC companies and investors benefit doubly from a turnkey system for monitoring and plant control. It is economical and offers certainty during the planning phase and commissioning.

meteocontrol offers such a solution: the Power Plant Controller (PPC) in conjuction with the controllers and data loggers from the blue'Log® X-Series, the cloud-based monitoring platform VCOM and the SCADA Center for local operation and maintenance (O&M).

BLUE'LOG XC

*The core system of the meteocontrol Power Plant Controller (PPC)*

Thanks to extensive further developments, meteocontrol now offers significantly greater expertise when it comes to plant control. The blue'Log® XC is the core system of the meteocontrol Power Plant Controller (PPC). It features a new transparent controller core and makes control behavior understandable even under laboratory conditions. As a result, it can be ensured in advance that the local requirements can be met.

The possibility of providing the simulation model of the plant controller also allows support for the grid operator´s or certification bodies system studies (e.g. compliance system studies). Further expansions such as the integration of a VPN client offer key benefits,

especially for the solar power trading interface which is typical in Germany. As a result, you save time and money.

Furthermore, the blue'Log® XC with its high focus on usability allows an easy commissioning process. The graphical assistance ensures a quick configuration without the need of having programming knowledge. Even complex grid connection requirements can be considered through parameterizing the controller. The configuration of characteristic curve control (e.g. reactive power-voltage Q (V) characteristic curve) gives the user a direct feedback regarding the desired control behavior. The risk of misconfiguration can be reduced to a minimum.

USABILITY & SIMULATION MODEL
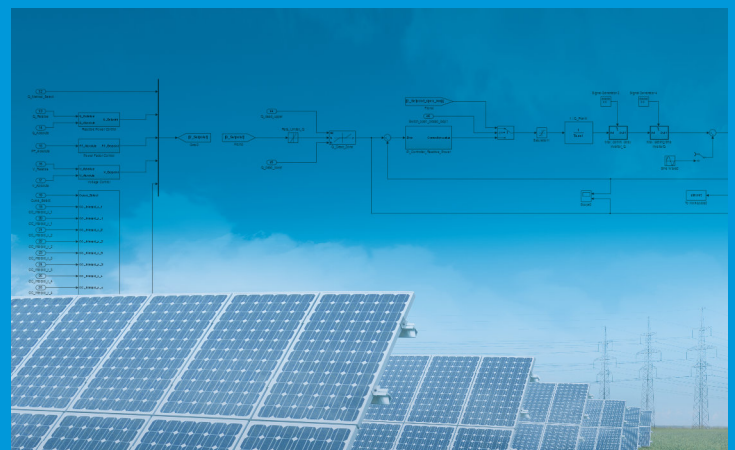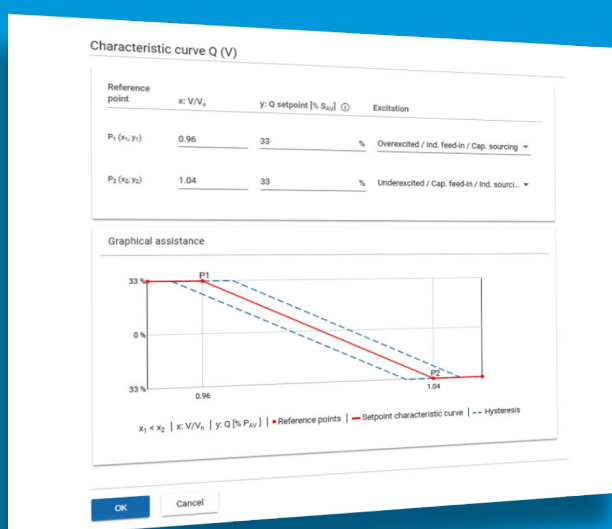
SIMULATION OF PV POWER PLANT CHARACTERISTICS

Distributed energy resource penetration studies

Impact on network security (Imbalance / Overload) through:

▶ Absolute Production Constraint (APC) / Active Power Curtailment

▶ Power Gradient Constraint (PGC) / Ramp Rate Limiting

Impact on network voltage stability through:

▶ Reactive Power (Q) Control

▶ Power Factor Control

▶ Voltage Control

Model Type

▶ Symmetrical steady-state (RMS) model

Software Environment

▶ MATLAB/Simulink

▶ PowerFactory

▶ PSS/E

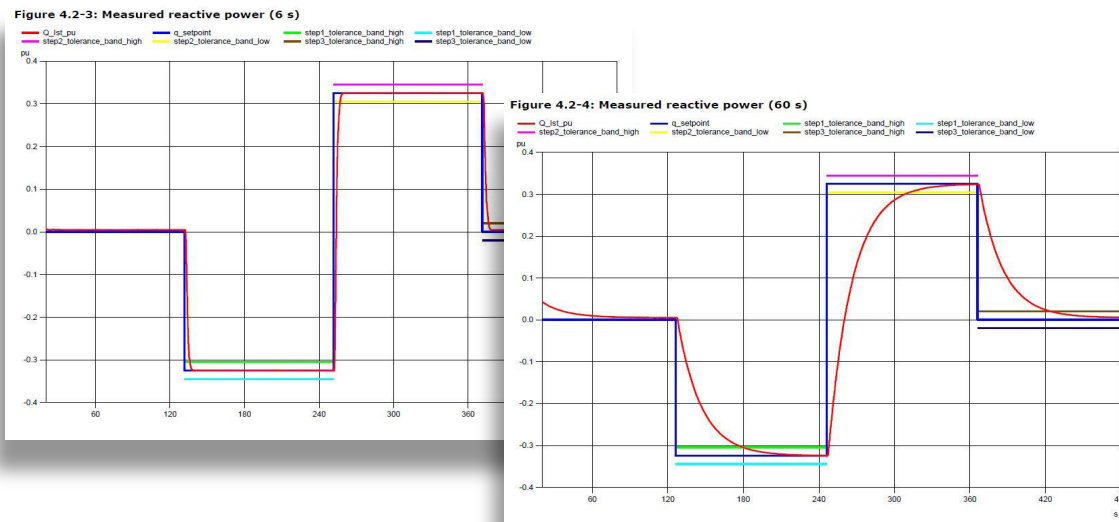# COMPLIANCE TESTS

Different control dynamics according to:

▶ VDE-AR-N 4110 (TCR) medium voltage
   ▶ Settling time $T_{settling, 95\%}$ = 6 ... 60s

Source: FGW TG3 test report: 'Measurement of a PGS controller according to FGW TG3 Rev. 25', Report No.: 10108385-A-1-A, DNV GL, 2019-02-28

CERTIFIED GRID CODE COMPLIANCE

The controller blue'Log® XC is certified according to the Technical Connection Rules for medium voltage (VDE-AR-N 4110) and high voltage (VDE-AR-N 4120) valid in Germany.

The electrical characteristics and functions of the controller were measured according to FGW TG3 and successfully awarded with a component certificate by the independent, accredited certification body DNV GL Renewables Certification according to FGW TG8.

The simulation model validated according to FGW TG4 can be used for system certification in order to evaluate the control behaviour of the active and reactive power control already in the planning phase.

Certificate no.
CC-GCC-TR8-04867-0