Applications of High Precision Power Analyzer, ScopeCorder and Battery Management System in Grid Connection

(Poster Session)

ZHANG Guoyue*1, YIN Xiaogang*1, Masahiro Kazumi*2
***1. Yokogawa Shanghai Trading Co., Ltd, Beijing, China**
***2. Yokogawa China Co., Ltd, Beijing, China**

Keywords: *Power Analyzer, ScopeCorder, PV, Wind Power; BDEW, VDE-AR-N4105, IEC61400-21, LVRT, Harmonics Analysis, Battery Management System*

Abstract

In recent years, Photovoltaic (PV) power has been greatly developed in China. A lot of large-scale PV power plants were built up and connected to the power grid. The PV power plants have larger scale and bigger impact to the main power grid. So, relevant tests must be carried out before PV power is connected to the main power grid. These tests include LVRT (Low Voltage Ride Through) test and power quality assessment tests which comply with BDEW or VDE-AR-N4105 standard. Based on the market requirement, Yokogawa Shanghai Trading Co., Ltd. developed a testing solution of PV power grid connection, and all of the tests meet the relevant international standards.

In this solution, the main measurement instruments include Yokogawa ScopeCorder DL850E and Yokogawa high precision power analyzer WT3000E. Figure 1 shows the structure of the whole solution. In this solution, DL850E is used to acquire waveforms of multiple voltage and current signals on grid side, and WT3000E is used to measure power quality parameters, such as power, harmonics, voltage fluctuation and flickers, etc. All of acquired data is uploaded to server PC, and the client PC can access these data and process them using dedicated analysis software provided by Yokogawa. Figure 2 shows a sample of the calculated results of LVRT testing. Through evaluation of the results, the engineers can determine whether the PV system meets the relevant standards of power grid connection. This PV power testing solution obtained user's acceptance because of its simple structure, high precision, and flexible software.

This testing solution can also be applied to wind power grid testing which complies with IDE61400-21.

Renewable energy often includes solar and wind energy generated from sources depending hugely on weather conditions, thus makes the power generation fluctuate dynamically. Electricity storage systems can be applied as a solution to ensure power supply stability. Batteries are suitable for electricity storage systems due to their ease of use. As Lithium-ion battery is a high energy density device involving risk of explosion hazard, it needs highly functional Battery Management System (BMS) to monitor each cell's voltage, temperature and current and to manage the battery status.