Application of ITECH IT7800 series in wind power industry

Introduction

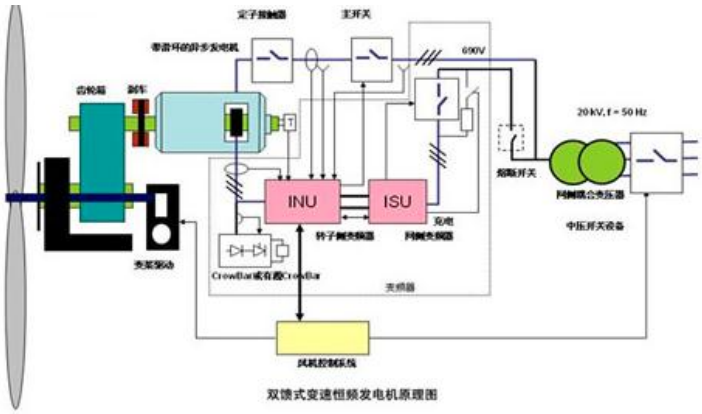
To mark the fifth anniversary of the Paris Agreement on climate change, the United Nations and relevant countries held a summit on climate ambition via video on December 12. At the summit, China put forward the following proposals:

"By 2030, China's carbon dioxide emissions per unit of GDP will drop by more than 65% compared to 2005, non-fossil energy will account for about 25% of primary energy consumption, and forest storage will increase by 6 billion cubic meters from 2005, and the total installed capacity of wind power and solar power will reach more than 1.2 billion kilowatts."

In 2019, China's non-fossil energy accounted for 15.3%, and the goal of 15% of the 16-year agreement signed in 2020 was completed one year ahead of schedule.

Renewable energy includes hydropower, wind power, solar energy, biomass energy, tidal energy, geothermal energy, etc. Wind energy is the kinetic energy obtained by the uneven heating of the earth's surface due to solar radiation, resulting in uneven pressure distribution in the atmosphere and moving the air in the horizontal direction. It is estimated that the available wind energy on the earth is about 2*107 MW, 10 times which of hydropower, only 1% of wind energy can meet the global energy demand. By the end of 2019, China had installed 210 million kW of wind power and generated 405.7 billion kWh of wind power, accounting for 5.5 percent of domestic power generation. New energy development targets for photovoltaic, wind power and other new energy industry is a shot in the arm.

Wind farm is the core part of wind power generation. The electrical part of wind farm is composed of primary part and secondary part. Wind farm electrical primary system can be divided into four main parts: wind turbine, collecting system, booster station and plant power system. The output voltage of the mainstream wind generator in the wind farm itself is 690V, which will be increased to 10kV or 35kV through the box-type booster transformer, and then boosted to 110kV or 220kV through the main transformer, and then connected to the grid through the high-voltage overhead line.



Manufacturers in the wind power industry require AC power supplies with AC 690Vrms output and rich programmable functions to complete wind turbine output simulation. Most of the AC programmable power supply on the market is about AC 300VRMS, which is difficult to meet the test requirements.

IT7800 series high power programmable AC/DC power supply, voltage ranges up to 350V L-N and 500V L-N. The IT7800 series provides multiple output modes such as single-phase, three-phase and reverse phase, which can be selected by the user through the panel menu. By programming, it can simulate three-phase unbalance, three-phase harmonic unbalance, lack of phase test, phase sequence reverse connection and other tests, which are flexible and cover more applications. Through the inverting mode, it can provide multiplier voltage output up to AC700/1000VRMS phase voltage, which can meet wind power generation, coal mine and other high voltage test requirements without series connection.

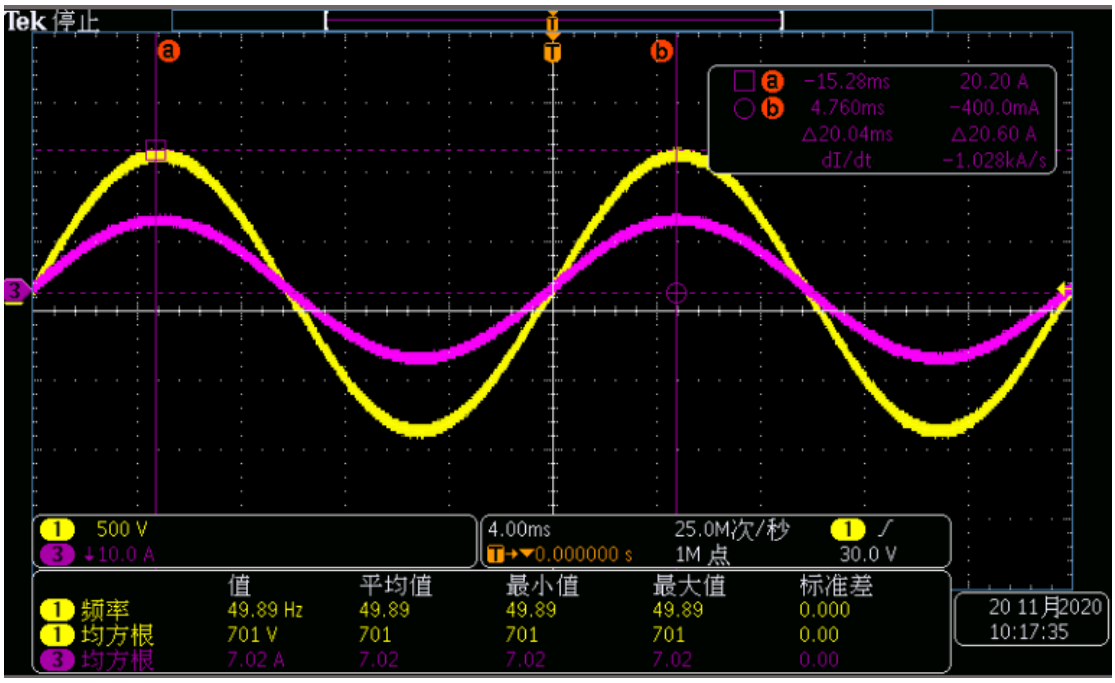


Figure 1 IT7800 measured 700Vrms output waveform

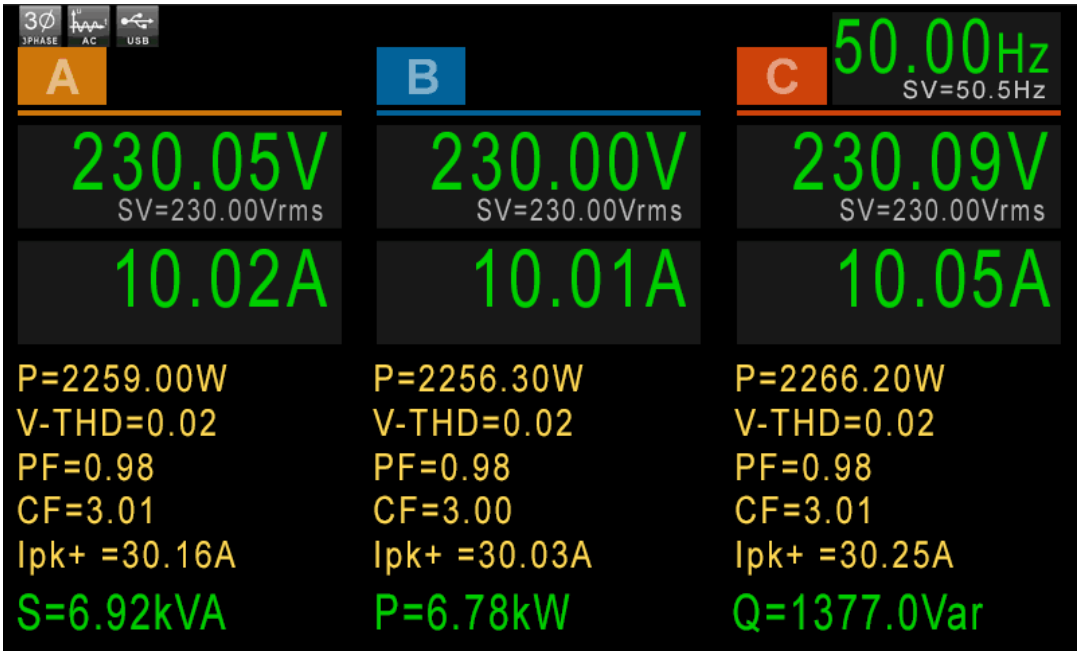


Figure 2 Schematic diagram of IT7800 three-phase mode output

IT7800 series is with high power density up to 15kVA in compact 3U rack space, power up to 960kVA by configuring master-slave parallel, output frequency up to 2400Hz, and has up to 50th harmonics simulation and analysis, single unit support to test 1~3 DUTs at the same time. IT7800 series can simulate arbitrary waveform output, support csv. file import, and has AC measurement and analysis functions, it can be widely used in different stages of research and development, production, and quality inspection in many fields such as distributed energy, smart grid, and new energy.