PCS-9564A

Dynamic Voltage Restorer (DVR)

With the increasing demand of new power load on power quality, power quality has been greatly concerned by power enterprises and users. When lightning strike, power grid fluctuation, and large-capacity impact load suddenly appear, voltage decline temporally will be inevitable.

Voltage decline can cause sensitive equipment, such as PLC controller, frequency conversion & speed regulation, various digital equipment, being damaged. As a result, production lines or motors are shut down, and many enterprises equipped with precision processing lines suffered economic losses.

PCS-9564A dynamic voltage restorer (DVR) is specially developed by NR to resolve the problem of voltage decline. DVR is installed between power grid and the sensitive load. Under normal conditions, the voltage of power grid is normal, and DVR is in the bypass state. When the voltage of power grid drops temporarily, the switches are quickly separated and the inverter unit is put into operation. The energy storage unit based on super capacitor is used to provide temporarily energy for the load. The system structure is shown as Figure 1.

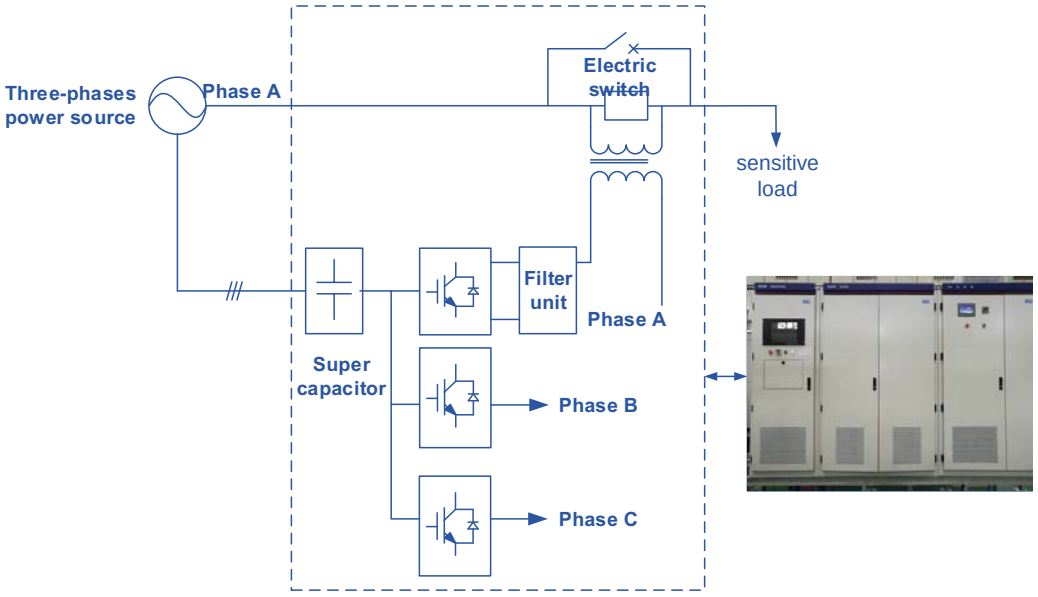

Figure 1 System Structure of DVR

System Structure

PCS-9564A DVR consists of power cabinet, control & startup cabinet and super capacitor cabinet.

- Power Cabinet
  The power cabinet is DVR's core component, which is composed of general converter module, filter and isolation transformer. Each general converter module is composed of power semiconductor components, and the power conversion is realized through flexible series and parallel combination.

- Control & Startup Cabinet
  The control & startup cabinet mainly contains control unit, auxiliary circuit, bypass switch and mechanical switch. The control power supply adopts the duplicated configuration of dual power supplies. The bypass switch and the mechanical switch serve as backup protection for the whole system. When there is a fault happens to the system, the bypass switch and the mechanical switch can be quickly closed to ensure that the power supply to loads is not affected.

- Super Capacitor Cabinet
  The super capacitor cabinet is mainly composed of DVR energy storage unit, which are composed of multiple super capacitor modules in series and parallel. It also contains the management system and the charge-discharge circuit of super capacitors.

Features

- Modular design
  The system adopts the modular design of standard units, which is convenient for maintenance and replacement, and can realize the configuration of multiple capacity through series or parallel modules

- Duplicated configuration
  Multiple bypass functions are provided, including electronic switch bypass (1ms), zero level bypass (1ms) of the inverter unit, fast mechanical switch bypass (3ms) and mechanical switch bypass (60ms). When there is an abnormality in DVR body, various fast bypass methods do not affect the normal power supply of the load.

- Intelligent self-check
  The DVR is in standby state for a long time, and it has intelligent self-check function, which automatically determines whether the core inverter unit in the DVR is in normal state, thus improving the reliability of the equipment.

- Fast compensation
  Low voltage detection technology based on voltage variation and rapid switching compensation technology are adopted. Low-voltage fault detection can be completed within 500us, the voltage can be compensated to the normal range within 2ms, and the total time from voltage incline to compensation completion is <3ms.