

Case Study

Automation System of Traction Power Supply for Guangtong to Dali Railway



Project Profile

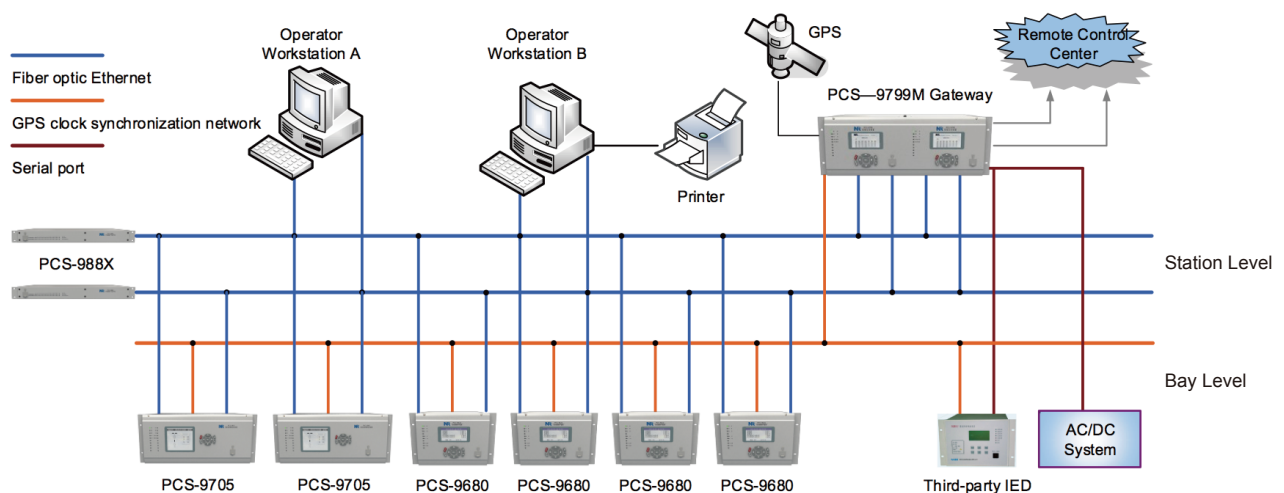
Guangtong to Dali railway is the first national double-line electrified railway with 200km/h target speed. This line is from Guangtong north station to Dali east station, and the new construction line length is 174.629km. A total of 7 stations are set up, including 5 new traction substations.

In the traction substation 220kV side adopts the line-transformer connection mode, the traction transformer adopts the Vv connection

mode, fixed standby mode, and has the Auto-transfer Switch device; 27.5kV side adopts sectionalized single-bus configuration, and the feeder circuit breaker adopts fixed standby.

NR provides automation system for five new traction substations, including PCS-9680 series protection devices, PCS-9700 SCADA system, tele - control system and so on.

System Structure



The station level network uses double star topological structure to transmit MMS message to realize the communication between bay level and station level.

PCS-9700 SCADA system consists of monitoring computer, printer and other equipment to achieve local monitoring of the traction substation, providing friendly man-machine interface for the operators to realize management and control functions at bay level.

Tele-control system uses dual redundancy configuration, communicate with the railway remote control center, send the equipment' operation information, receive remote control instructions to meet the requirements of unattended substation.

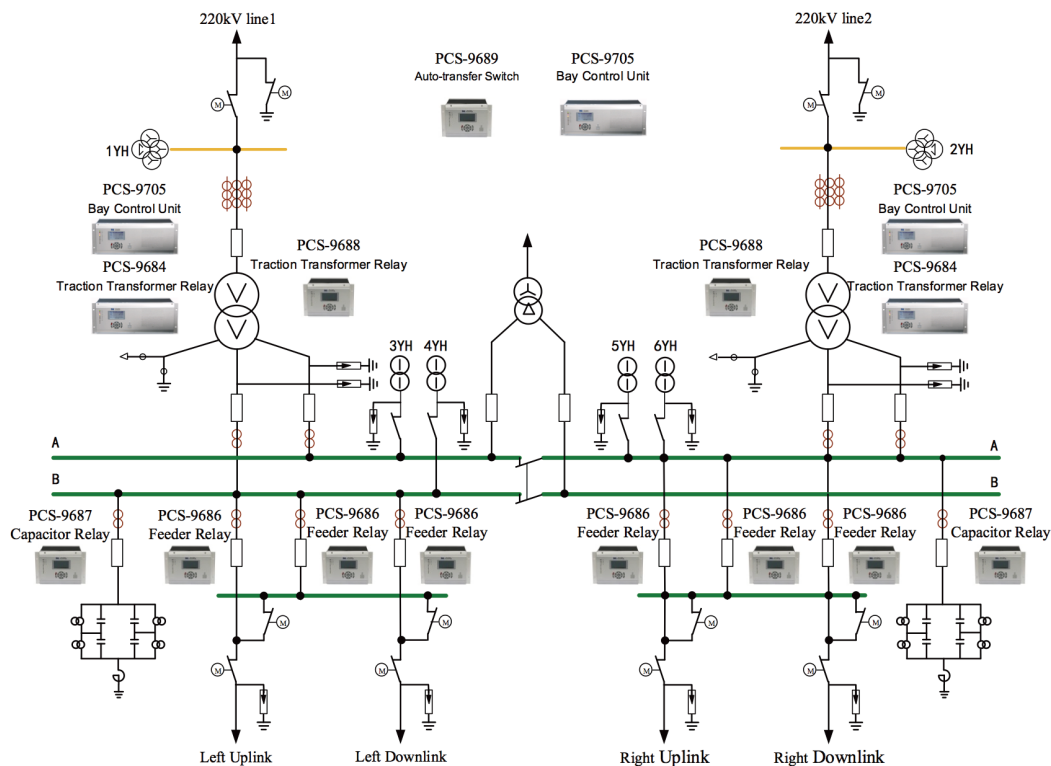
PCS-9799M Gateway has the functions of regular conversion, remote communication and GPS clock synchronization. It communicates with the dispatch system via the IEC60870-5-101, IEC60870-5-104 and other communication protocols. Through the network port or serial port, it access to the whole station protection measurement and control devices and the third-party intelligent equipments.

Bay level equipment, includes protection IEDs, monitor control IEDs, can provide protection, metering, control, and measurement functions for the whole station.

Introduction of Equipment Functions

PCS-9680 series protection & control devices are suitable for all four kinds of railway traction power supply mode, including direct feed, direct feed with negative (DN), booster transformer (BT) feed and

auto-transformer (AT) feed. Typical protection configuration of traction substation which in the railway form Guangtong to Dali is shown as the figure below.



PCS-9688 Transformer Differential Relay, realized traction transformer differential protection, suitable for single-phase connection, Vv connection, Y/Δ-11 connection, Scott connection, V/X connection and Y/Δ/Δ connection mode of traction transformer in electrified railway.

PCS-9684 Transformer Relay, integrated non-electricity protection and backup protection.

PCS-9686 Feeder Relay, equipped with the functions of self-adaption impedance protection, high resistance grounding protection, over-current protection, reclosing protection and fault locate functions, etc., provides protection measurement and control functions for railway 27.5kV traction network.

PCS-9687 Capacitor Relay, equipped with overcurrent protection, low voltage protection, overvoltage protection, unbalanced voltage and unbalanced current protection, provides protection measurement and control functions for the compensation devices of traction substation.

PCS-9689 Auto-transfer Switch is applicable to the traction substation of various connection modes (including double T-type connection and bridge-type connection) to realize the automatic switch function of income line and traction transformer.

PCS-9705 Bay Control Unit has the function of measuring and controlling, realizing the collection of traction transformer signal and other public signal.



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