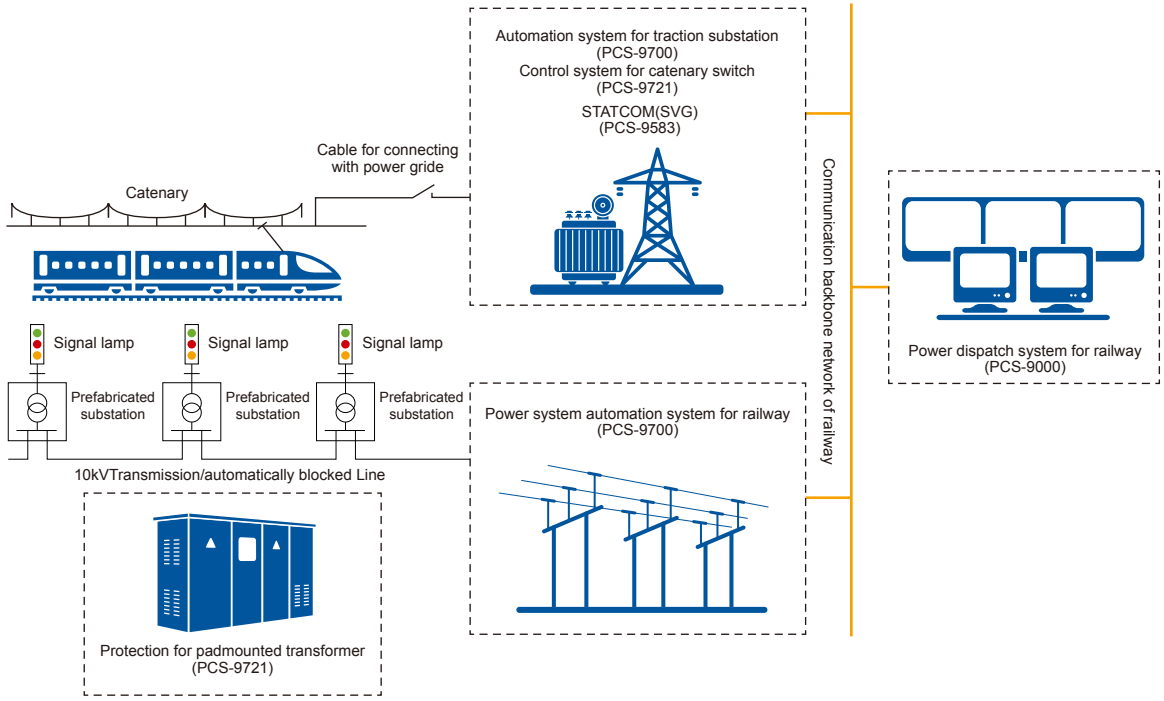
Railway Power Supply System Overall Solution

Overview

Railway power supply system includes railway traction and railway power system. Traction power supply system provides power supply for locomotive and it is the power source of the electrified railway. Railway power system provides power supply for the stations along the railway and vehicle's control system and it is directly related to the safe running of the locomotive. According to the requirement of railway power supply system, NR delivers practical and reliable overall solution, including traction power supply system, power dispatch system, railway power system and catenary switch, etc.



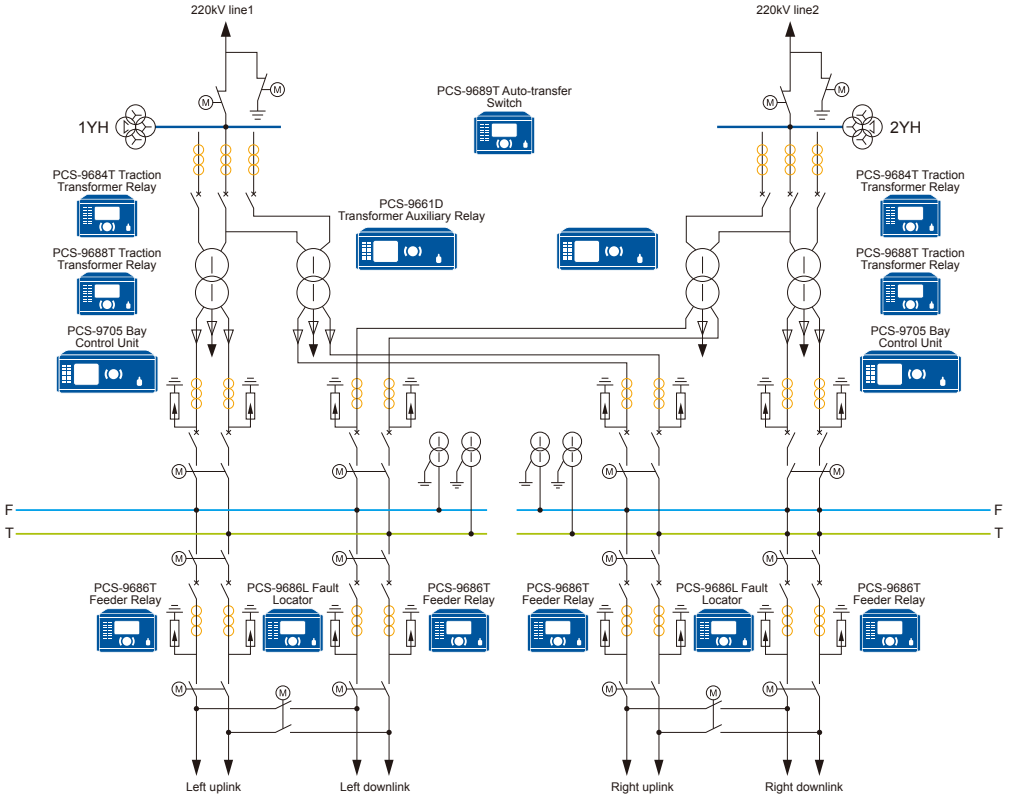
Feature

- First proposing the scheme of duplicated configuration, primary and backup protection in one relay for traction transformer protection of high-speed railway. Completely independent circuit from sampling circuit to trip it for two sets of relays, any fault in one relay does not affect the other relay.
- Based on the appeared successively relationship between power frequency variation of restrained current and power frequency variation of differential current, external and internal fault can be exactly discriminated, which can effectively prevent differential protection of traction transformer from mal-operation caused by external fault with CT saturation.
- Optional excitation inrush current judgment principles: second harmonic and waveform identification principle. Either or both principles can be selected by setting.
- AT fault location system with dynamic compensation algorithm, combining with various fault location techniques, such as suction current ratio, sway bracing and uplink/downlink current ratio, can fulfill 100m level precision of fault location for various types of faults.
- Load of railway power dispatch system is less than 25% under the avalanche test condition of 1.2 million data points and packet loss rate is zero. The system can meet the centralized access requirement of large-scale railway traction and electric power supply system.
- Besides measurement and control function, RTU of railway pad mounted transformer also supports remote signal, remote measurement and control, built-in route and communication management at the same time.
- Comparing with single AD sampling and single processor scheme normally employed in the railway protection devices, dual AD sampling and DSP configuration are more reliable and stable. Advanced hardware platform (UAPC) implementation has been proven through a large number of field applications.
- Application of IEC61850 communication protocol has the characteristics of high reliability, good real-time performance and state self-diagnosis.
- Based on the optical fiber communication, the system can real-time monitor the communication state, quickly locate the fault location and also can increase anti-interference ability. These can greatly improve the convenience of maintenance and repair of whole system.

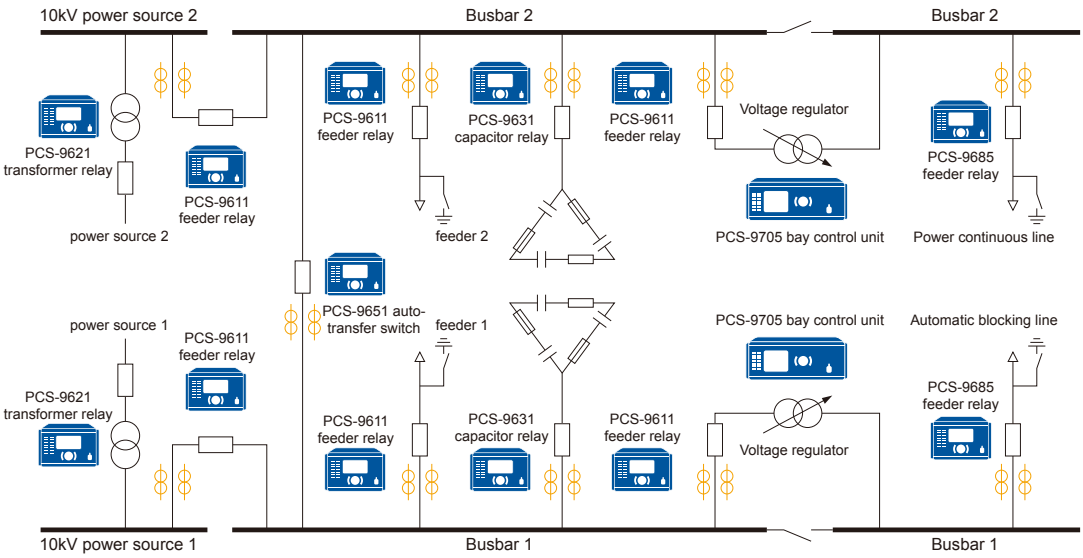
Product's Introduction

1. Traction Substation Relay-PCS-968xT Series Devices

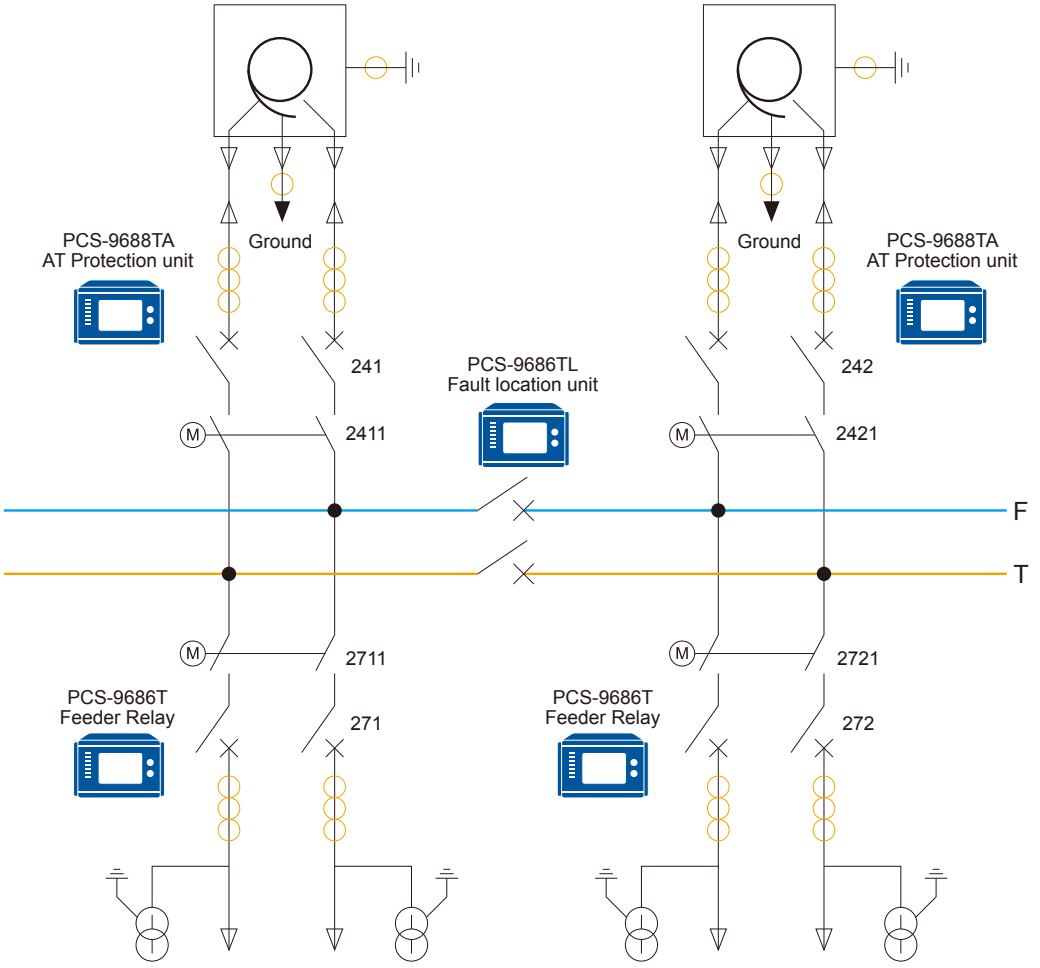
- PCS-9684T Transformer Backup Protection Device
- PCS-9685T Feeder Relay
- PCS-9686T Feeder Protection Device
- PCS-9687T Capacitor Protection Device
- PCS-9688T Transformer Differential Protection Device
- PCS-9689T Automatic Back-up Power Supply Device BZT
- PCS-9684TD Power Transformer Relay
- PCS-9688TA Auto-transformer Relay
- PCS-9686TL Fault Location Devices
- PCS-9686TR Wide-area Failure Wave-Recording Device



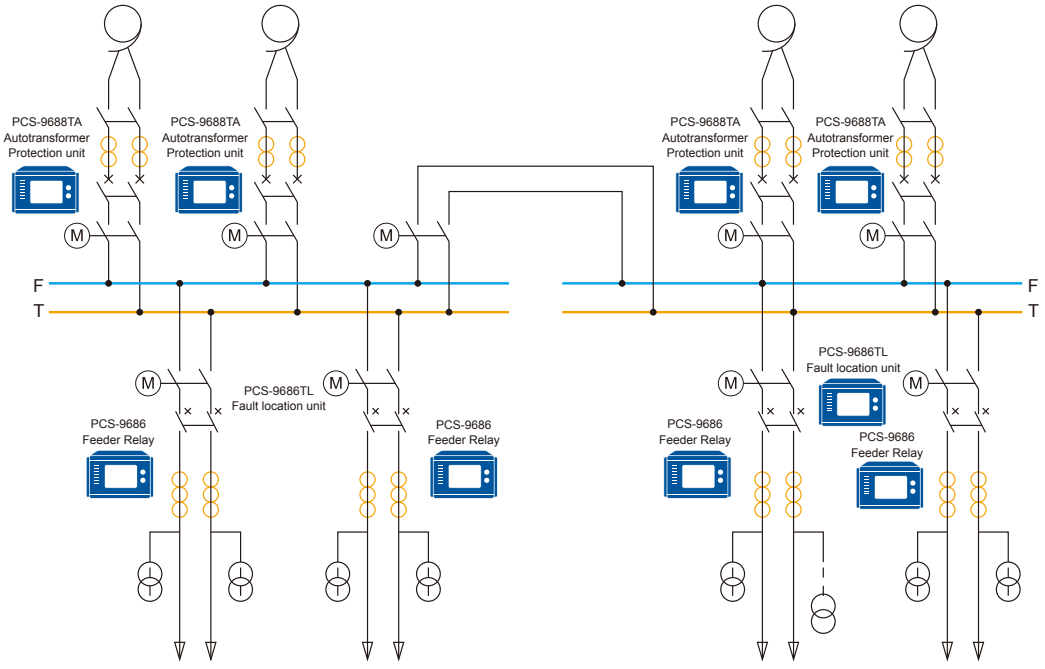
Traction substation protection configuration



Railway Power System Protection Configuration



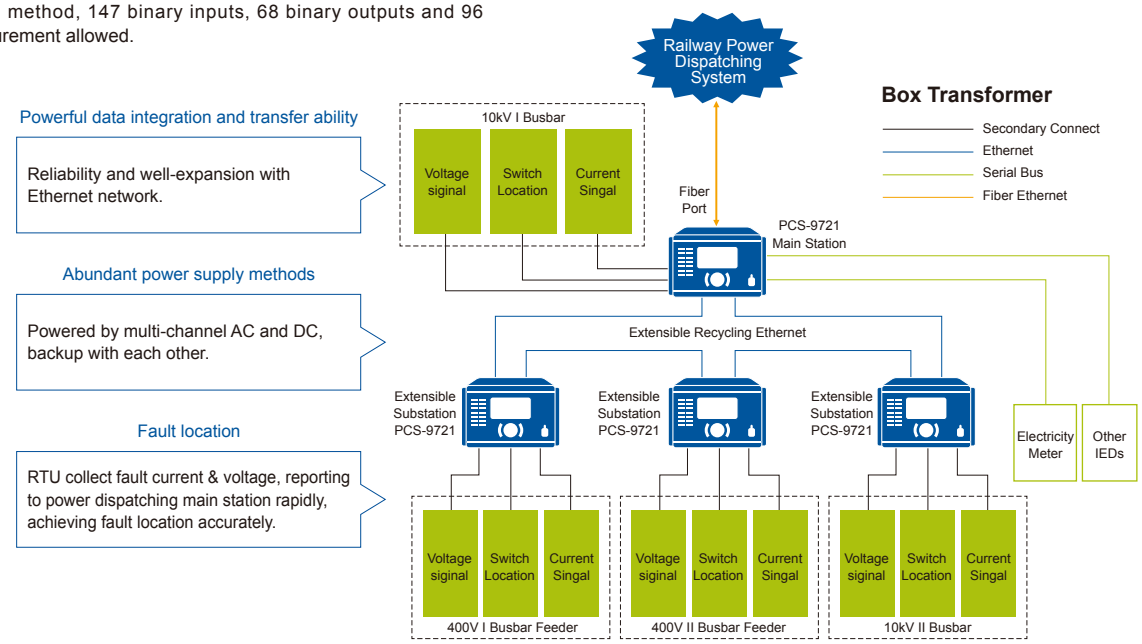
AT protection configuration



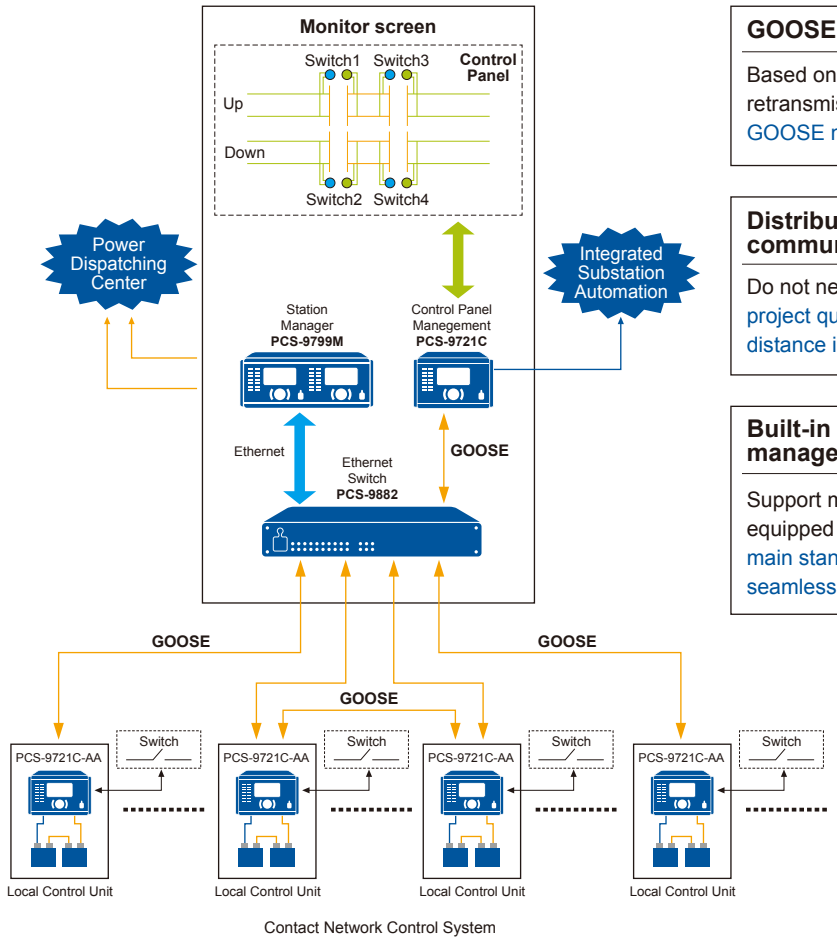
Branch Substation Protection Configuration

2.Monitoring & Control IED for box transformer & catenary switch-PCS-9721

PCS-9721 DTU for railway box transformer, with 1main and 3 branch configuration method, 147 binary inputs, 68 binary outputs and 96 remote measurement allowed.



PCS-9721 contacts network switch monitoring system



Contact Network Control System

GOOSE

Based on the function of highspeed retransmission mechanism,the biber GOOSE network is monitored in real time.

Distributed optical fiber communication

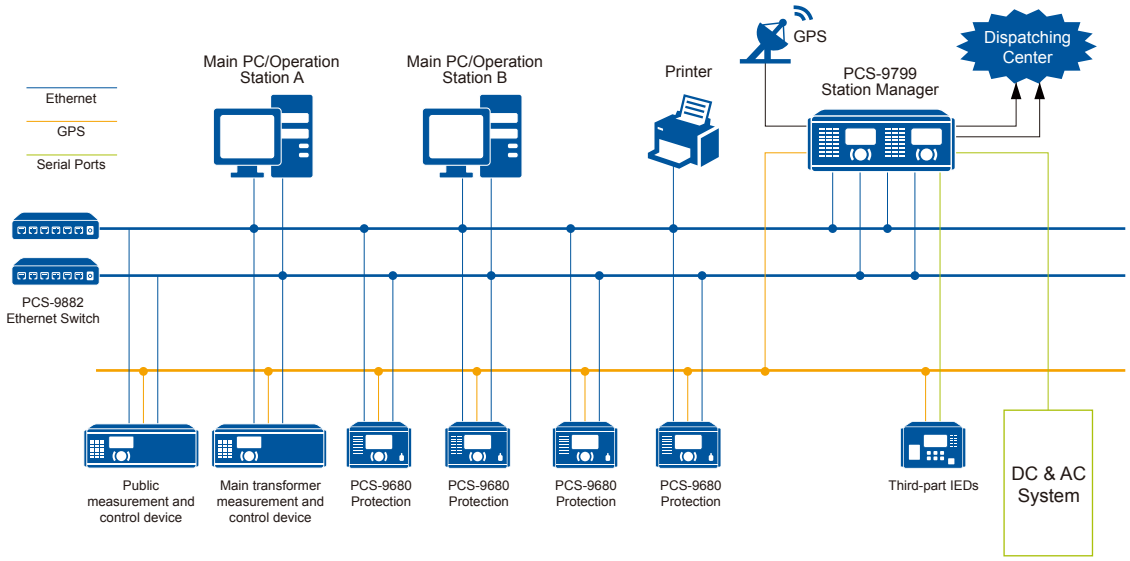
Do not need to lay cable,construction project quantity is small,transmission distance is far.

Built-in intelligent power management

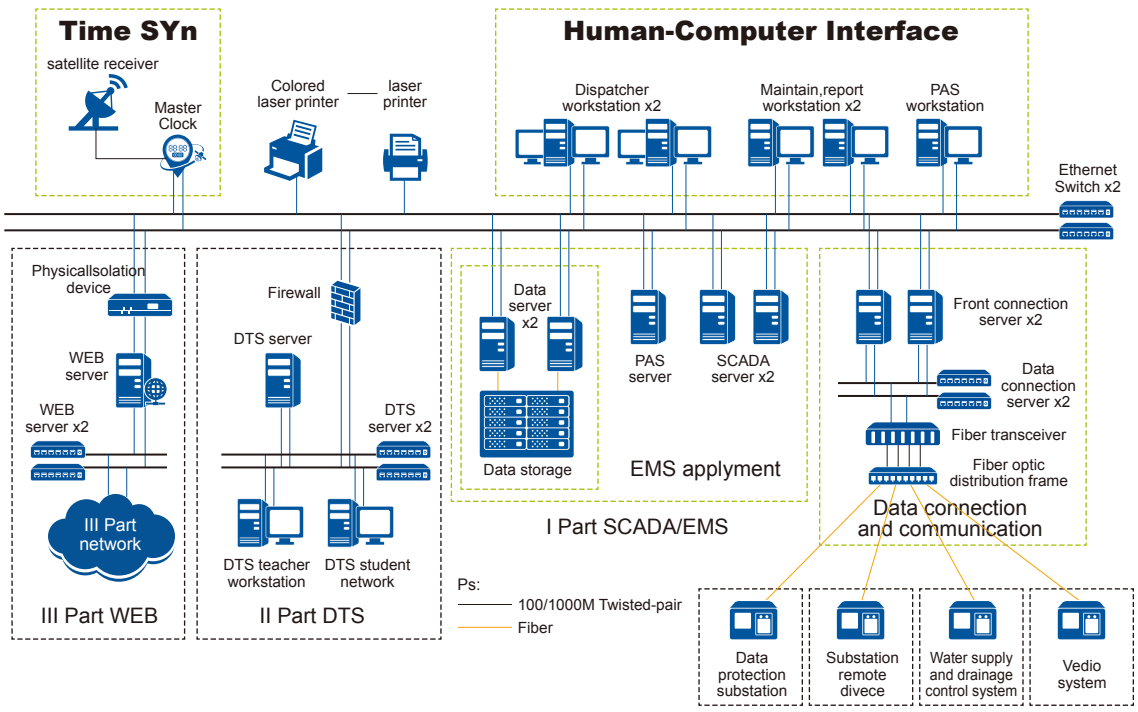
Support multi-power supply mode,and equipped with surge protection unit;the main standby power supply is backup, seamless switch.

3. SCADA & Dispatch System-PCS-9700, PCS-9000

PCS-9700: Traction Integrated Substation Automation System



PCS-9000: Power Dispatching System



Reference

- Marajchina Electrified Railway Project II, III
- Vietnam Ha Noi Urban Rail Transit Monitoring System
- China Guangtong-Dali Railway Project
- China Baotou-Xi'an Railway Project
- China Tianshui-Pingliang Railway Project
- China Xi'an-Hefei Railway Project
- China Chongqing-Wanzhou Railway Project

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