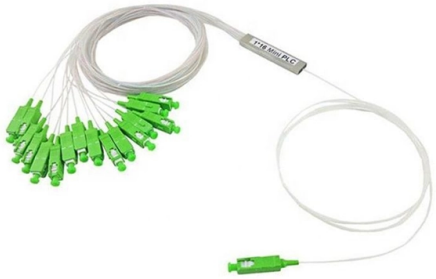
Construction Plan for Secondary Relay Protection of 35kV Substation



Overview

Substation Design Document With Drawings Substation Specifications For a thorough substation design, you'll 35kV Substation Electrical Design | PDF | Trans.

Key Takeaways

A robust secondary relay protection plan for a 35kV substation requires proper CT/VT placement, redundant protection groups, DC supply reliability, cable segregation, and adherence to IEC/IEEE standards. 1.

Overview of Secondary Systems

Secondary systems form the functional backbone of a substation, handling protection, control, and monitoring. For a 35kV substation, secondary systems typically include: Protection relays (overcurrent, differential, distance, breaker failure)Current Transformers (CTs) and Voltage Transformers (VTs)DC supply and battery systemsControl and indication circuitsCommunication interfaces for SCADA or remote monitoring 2.

Protection Philosophy

Redundancy: Implement Group A and Group B protection, where two independent systems can fully protect the same equipment. This ensures that a single failure does not compromise protection. Breaker failure protection: Use dual trip coils and breaker failure schemes to ensure backup tripping if the primary breaker fails.

CT/VT separation: Avoid sharing CT cores between protection groups to prevent mis-operation or loss of redundancy. 3.

© 2026 EXF OPTICAL NETWORKS - All rights reserved

CT and VT Arrangement

Primary C

Ts: Located closest to the breaker for fast fault detection.

Backup C

Ts: Positioned farther from the breaker to provide secondary protection. PT/VT connections: Use nodes to separate signals between relays, ensuring clear routing and minimal interference. Lead length minimization: Keep CT/VT wiring short to improve signal integrity and reduce common-mode failures.

4.

DC Supply and Reliability

Design D

C systems to remain operational during AC faults. Include battery chargers, redundant DC buses, and automatic transfer switches to maintain continuous relay operation. 5.

Panel and Cabling Design

Panel layout: Logical and physical separation of protection groups reduces commissioning errors and simplifies maintenance. Cable segregation: Prevents a single fire or mechanical event from disabling both primary and backup systems. Spare capacity: Include extra space in panels and cable trenches for future expansion or retrofits.

6.

Construction and Installation Considerations

Follow a stepwise construction plan: Finalize single-line diagram including all protective relays and CT/VT connections. Develop detailed wiring diagrams and panel layouts.

Install D

C supply, relays, and control panels with proper segregation.

Connect C

Ts and VTs according to primary and backup arrangements. Test protection schemes, including primary and backup tripping, breaker failure, and interlocks. Ensure compliance with IEC/IEEE standards and local utility requirements.

7.

© 2026 EXF OPTICAL NETWORKS - All rights reserved

Testing and Commissioning

Perform secondary injection tests for relays. Verify trip and alarm circuits. Conduct functional tests for redundancy and breaker failure schemes.

Document all wiring, test results, and commissioning procedures for future maintenance. 8.

Best Practices

Maintain environmental control in relay rooms (temperature, humidity, dust). Use fire protection measures for critical panels. Plan for future upgrades by including spare relays, cabling, and DC capacity. Ensure clear labeling of all CT/VT circuits and relay terminals. By following this structured approach, a 35kV substation can achieve high reliability, operational safety, and compliance with industry standards while ensuring that both primary and backup protection systems function effectively.

Article Content

35kV Substation Electrical Design | PDF | Transformer

This document is a graduation thesis on the electrical primary design of a 35kV substation. It includes an abstract that outlines the design of a 35kV substation and its digital transformation.

Secondary unit substations design guide

Use of the medium-voltage circuit breaker in conjunction with protective relaying provides a significantly higher level of protection for the transformer and low-voltage switchboard/switchgear

APPENDIX 5-B Electrical Design Drawings High Voltage Design

The relay logic will monitor the current as well as breaker status and if the breaker fails to operate after the time expires, relay will trip and lockout all the other 34.5kV circuit breakers as well as the high

Substation Construction Manual Guide

The document discusses all phases of project delivery from planning and design to construction and commissioning. It provides guidance on standards, quality assurance, documentation, and

Substation Secondary Systems Design: Best Practices & Engineering

Learn best practices for substation secondary systems design—covering protection and control, DC systems, relay panels, CT/VT circuits, redundancy, and compliant substation engineering.

© 2026 EXF OPTICAL NETWORKS - All rights reserved

Electric Design of 35kV Substation

This paper made a design about a 35/10kV step-down substation according to the load of a town. The main technical focus is the primary electrical part design and a small part of the secondary design in

Substation Construction Guide

Contemporary substation construction integrates digital technologies, smart grid capabilities, and enhanced security measures while maintaining the fundamental functions of voltage transformation,

Design and electrical calculations for 110 (220)/35/10 kV power

Primary substations in a network are used to step down a high voltage level in order to supply secondary substations by lower voltage. Usually they use 110 kV or 220 kV voltage level.

Relay Protection in HV/MV Substations: Calculations, Settings ...

Effective relay protection in HV/MV substations requires a thorough approach encompassing calculations, precise settings, meticulous coordination, informed relay selection, and

Electric Design of 35kV Substation

Electric Design of 35kV Substation Abstract: This paper made a design about a 35/10kV step-down substation according to the load of a town. The main technical focus is the primary electrical part

Mobile Prefabricated Substation | Trailer Type | Fast Power Solution

The Mobile Prefabricated Substation is a fully integrated, factory-assembled power solution designed for rapid deployment in emergency, temporary, or permanent power distribution applications. Built on a

IEEE_CED SubDesign

Recommended References: IEEE Standard for Relays and Relay Systems Associated with Electric Power Apparatus – IEEE C37.90 Transformer Protection – IEEE Std C37.91 Motor

Design Guide for Rural Substations

INSTRUCTIONS: This bulletin is an update and revision of previous REA Bulletin 65-1, “Design Guide for Rural Substations” (revised June 1978). Replace previous Bulletin 65-1 with this bulletin and file

HV Substation Design: Applications and Considerations

© 2026 EXF OPTICAL NETWORKS - All rights reserved

Synchronization of clocks Integration of protective relays with other IEDs Utilize outputs from “non-intelligent” devices as inputs to IEDs Don''t forget about test switches!!!

Arc Flash Study: Minimum Fault Current Matters

Arc flash study - Minimum fault current value is ALSO VERY IMPORTANT. The Arc energy depends on the fault currents, relay operating time (+ breaker opening time), switchgear dimensions, working ...

SUBSTATIONS ENGINEERING

Substations Committee. They develop the standards that govern all aspects of substations. In this way, this book contains the most recent technological developments regarding industry practice as wel as

(PDF) Primary design and protection of 110kV substation

Finally, we design a simple relay protection, and complete the design of the primary electrical part of 110kV substation.

Substations – Volume II

In addition, circuit quantities, configurations, and ratings; system and equipment protective relay schemes; the necessity for specialized equipment details of surge protection equipment; and

Related Video Reference

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

© 2026 EXF OPTICAL NETWORKS - All rights reserved

Contact Us

Continue your research online:

Website: https://explosivefunctions.co.za
Technical inquiry: https://explosivefunctions.co.za/contact.html
EU project coordination: Parque das Nações, Lisbon, Portugal

This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

© 2026 EXF OPTICAL NETWORKS - All rights reserved