**IEEE Std C37.99™-2000 (R2006)**
(Revision of IEEE Std C37.99-1990)

# IEEE Guide for the Protection of Shunt Capacitor Banks

Sponsor
**Power System Relaying Committee**
**of the**
**IEEE Power Engineering Society**

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**Abstract:** The protection of shunt power capacitor and filter banks are covered. Guidelines for reliable applications of protection methods intended for use in many shunt capacitor applications and designs are included. The protection of pole-mounted capacitor banks on distribution circuits and the application of capacitors connected directly to routing apparatus are not included.
**Keywords:** capacitor, fuseless, power capacitor, protection, relaying, shunt, unbalance protection

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# Introduction

(This introduction is not a part of IEEE Std C37.99-2000, IEEE Guide for the Protection of Shunt Capacitor Banks.)

IEEE Std C37.99-2000 incorporates a significant number of additions and changes since the guide was issued in 1990. Significant changes were made in the clauses dealing with capacitor bank and filter bank protection, unbalance relaying methods, and calculations. The annexes underwent significant changes. Other changes put this guide in line with present-day technologies related to the protection of externally fused, internally fused, fuseless, and unfused capacitor banks.

This guide was revised by the Shunt Capacitor Bank Protection Guide Revision Working Group of the Substation Protection Subcommittee of the Power System Relaying Committee of the IEEE Power Engineering Society. The working group membership at the time of completion of this revision was as follows:

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# Contents

# IEEE Guide for the Protection of Shunt Capacitor Banks

## 1. Overview

### 1.1 Scope

This guide applies to the protection of shunt power capacitor and filter banks. Included are guidelines for reliable applications of protection methods intended for use in many shunt capacitor applications and designs. The guide does not include a discussion of pole-mounted capacitor banks on distribution circuits or application of capacitors connected to rotating apparatus.

### 1.2 Purpose

This guide has been prepared to assist in the application of relays and other devices for the protection of shunt capacitor banks used in substations. It covers methods of protection for many commonly used shunt capacitor bank configurations. Capacitor bank design trade-offs are also discussed because bank design influences the protection. Additionally, this guide covers the protection of filter banks and large extra-high voltage (EHV) shunt capacitor banks.

## 2. References

This guide shall be used in conjunction with the following publications. If the following publications are superseded by an approved revision, the revision shall apply:

ANSI C37.06-1997, American National Standard AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis—Preferred Ratings and Related Required Capabilities.[1]

ANSI C37.66-1969 (Reaff 1988), American National Standard for Requirements for Oil-Filled Capacitor Switches for Alternating-Current Systems.

IEEE Std 18-1992, IEEE Standard for Shunt Power Capacitors.[2]

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[1]ANSI publications are available from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA (http://www.ansi.org/). The ANSI documents listed in Clause 2 are also available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA (http://standards.ieee.org/).