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IEEE Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control

IEEE Power and Energy Society

Sponsored by the
Power System Relaying Committee

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Abstract: Guidance for synchronization, calibration, testing, and installation of phasor measurement units (PMUs) applied in power systems is provided. The following are addressed in this guide: (a) Considerations for the installation of PMU devices based on application requirements and typical substation electrical bus configurations; (b) Techniques focusing on the overall accuracy and availability of the time synchronization system; (c) Test and calibration procedures for PMUs for laboratory and field applications; (d) Communications testing for connecting PMUs to other devices including Phasor Data Concentrators (PDCs).

Keywords: calibration, GPS, IEEE C37.242™, PMU, synchrophasor, testing

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Introduction

This introduction is not part of IEEE Std C37.242-2013, IEEE Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control.

Use of synchrophasor technology in the electric power industry is rapidly growing, moving from research and pilot projects into system-wide production level deployment. Accordingly, a practical guide for installing and testing phasor measurement units (PMUs) is expected to be very beneficial to field practitioners, sharing and leveraging the early experience that the pioneers in this area have accumulated. This document was developed by IEEE PES Power System Relaying Committee to guide and educate various professionals interested in deploying PMUs and using the associated synchrophasor data.

Contents

IEEE Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control

1. Overview

1.1 Scope

The document provides guidance for synchronization, calibration, testing, and installation of phasor measurement units (PMUs) applied in power system protection and control. The following are addressed in this guide:

a) Considerations for the installation of PMU devices based on application requirements and typical bus configurations.

b) Techniques focusing on the overall accuracy and availability of the time synchronization system.

c) Test and calibration procedures for PMUs for laboratory and field applications.

d) Communications testing for connecting PMUs to other devices including Phasor Data Concentrators (PDCs).