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IEEE Standard Specifications for Maintenance and Test of Distributed Control Systems in Thermal Power Stations: Maintenance and Testing

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IEEE Standard Specifications for Maintenance and Test of Distributed Control Systems in Thermal Power Stations: Maintenance and Testing

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Corporate Advisory Group
of the
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Abstract: The basic principles, items, methods, performance indicators, and acceptance requirements for the maintenance and testing of distributed control systems (DCSs) of thermal power plants are specified. This standard is mainly applicable to the maintenance and testing of DCSs of conventional thermal power plants in commercial operation.

Keywords: DCS, distributed control system, fault handling, I&C, IEEE 1865.1™, instrument and control, maintenance, operation service, repair, scheduled maintenance, technical management, test, thermal power plant

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Introduction

This introduction is not part of IEEE Std 1865.1™-2019, IEEE Standard Specifications for Maintenance and Test of Distributed Control Systems in Thermal Power Stations: Maintenance and Testing.

Distributed control systems (DCSs) are widely used today for monitoring and control of power-generating units and their auxiliary systems. However, there are several factors—for example, the quality of DCSs, technical and managerial problems, potential risks involving design and configuration, factory acceptance test, installation and commissioning, and the operation, maintenance, and test process of DCSs—that may directly or indirectly affect the safe, reliable, and economical operation of power-generating units.

The safe, reliable, and economical operation of the DCS is based on proper design and configuration, quality of installation and commissioning, and supported by effective maintenance and technical management. To assure long-term safe, stable, and reliable operation of DCS, it is necessary to exercise effective management and control throughout design and configuration, maintenance, test, and routine service and to exercise comprehensive management of safety-related external equipment, and their storage and operating environment and conditions.

Therefore, this standard is developed based on the summarization of experiences and expertise and lessons learned from the operational maintenance, repair, test, troubleshooting, and technical management to serve as an international technical and management standard.

This standard specifies the basic principle of repair and test, test performance indicators, and technical requirements for repair acceptance of DCSs. It mainly covers:

- Basic repair items and technical requirements
- Basic test items and technical requirements
- Technical requirements for functional repair and test of monitoring system
- Technical requirements for repair and test of common systems and circuits
- Repair and test acceptance

This standard deals with the basic repair items and quality requirements which are intended to provide the basis for restoring and confirming the quality of control system and equipment, minimizing the omissions in repair and maintenance, and improving the reliability of instrument and control (I&C) systems.

Also, it covers the technical criteria, test items, methods of the system, as well as the quality-acceptance criteria and post-repair acceptance items and criteria.

Contents

IEEE Standard Specifications for Maintenance and Test of Distributed Control Systems in Thermal Power Stations: Maintenance and Testing

1. Overview

1.1 Scope

This standard specifies the basic principles, contents, methods, performance indicators, and acceptance requirements for scheduled maintenance and testing of distributed control systems.

This standard applies to the maintenance and testing of distributed control systems (DCSs) of conventional thermal power plant in commercial operation. Reference may be made to this standard for factory acceptance tests, installation, commissioning, and site acceptance tests of DCSs of other types of power plants or DCS before commercial operation.

1.2 Purpose

This standard, based on the engineering principles, methods, practices, procedures, and field experience which have been demonstrated in many power plants, specifies the details, methods, and technical requirements of maintenance and tests after the technical modification or temporary or scheduled maintenance of a DCS of a thermal power plant. The standard aims to standardize maintenance and inspection, performance test, functional test, and acceptance of DCS, to provide guidance and basis for instrument and control (I&C) personnel of power plants to confirm DCS maintenance and test quality, and to eliminate defects impairing the operational reliability of units after maintenance and test.