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RECOMMENDED PRACTICE

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Signals and Communications Working Group

Wayside Signal ac Power System Inspection and Testing

Abstract: This recommended practice provides guidelines for inspecting and testing rail transit wayside signal ac power systems.

Keywords: ac, inspection, maintenance, power, test, testing, transfer switch, signal, wayside signal, wayside signal power system

Summary: This document establishes recommended guidelines for inspecting and testing rail transit wayside signal ac power systems.

Foreword

The American Public Transportation Association is a standards development organization in North America. The process of developing standards is managed by the APTA Standards Program's Standards Development Oversight Council (SDOC). These activities are carried out through several standards policy and planning committees that have been established to address specific transportation modes, safety and security requirements, interoperability, and other topics.

APTA used a consensus-based process to develop this document and its continued maintenance, which is detailed in the manual for the APTA Standards Program. This document was drafted in accordance with the approval criteria and editorial policy as described. Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

This document was prepared by the Signals and Communications Working Group as directed by the APTA Rail Transit Standards Policy Committee.

This document represents a common viewpoint of those parties concerned with its provisions, namely transit operating/planning agencies, manufacturers, consultants, engineers and general interest groups. The application of any recommended practices or guidelines contained herein is voluntary. APTA standards are mandatory to the extent incorporated by an applicable statute or regulation. In some cases, federal and/or state regulations govern portions of a transit system's operations. In cases where there is a conflict or contradiction between an applicable law or regulation and this document, consult with a legal adviser to determine which document takes precedence.

This document supersedes APTA RT-SC-RP-001-02, which has been revised. Below is a summary of changes from the previous document version:

- Migration to the new 2025 APTA document template which standardizes and reorganizes the document's content; a document summary and foreword were added; the scope and purpose have been combined and updated to be more specific.
- Updated list of participants.
- Updated definitions, abbreviations and acronyms to be consistent with standard definitions; specifically, RTS has been replaced with rail transit system throughout the document.

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Introduction

This introduction is not part of APTA RT-SC-RP-001-02, "Wayside Signal ac Power System Inspection and Testing."

APTA recommends the use of this document by:

- individuals or organizations that operate rail transit systems;
- individuals or organizations that contract with others for the operation of rail transit systems; and
- individuals or organizations that influence how rail transit systems are operated (including but not limited to consultants, designers and contractors).

Scope and purpose

This document establishes recommended guidelines for inspecting and testing rail transit wayside signal ac power systems. The purpose of this recommended practice is to verify that wayside signal ac systems and equipment are operating safely and as designed through periodic inspection and testing, thereby increasing reliability and reducing the risk of hazards and failures.

Wayside Signal ac Power System Inspection and Testing

1. Inspection and testing recommendations

1.1.1 Inspection and testing frequency

The inspection and testing procedures in this recommended practice should be performed when wayside signal ac power systems are placed in service; when they are modified, repaired or disarranged; or as otherwise deemed necessary by the rail transit system.

The rail transit system should determine the need for additional inspection and testing frequencies for wayside signal ac power systems. A review of the following factors may be useful in making this assessment:

- OEM-recommended intervals
- industry experience
- operating environment/conditions
- historical data
- reliability-centered maintenance program development
- failure analysis
- rail transit system testing and experience
- regulatory requirements

The frequency of tasks should comply with applicable federal, state and local regulations.

1.2 Training

The rail transit system and/or its maintenance contractors should develop and execute training programs that provide employees with the knowledge and skills necessary to safely and effectively perform the tasks outlined in this recommended practice.

1.3 Materials

The following materials are recommended for inspecting and testing wayside signal ac power systems:

- approved lubricants
- additional materials as required by the OEM and/or rail transit system

1.4 Tools

The following tools are recommended for inspecting and testing wayside signal ac power systems:

- meggering device*
- multimeter*
- rail transit system–approved portable radio
- standard tools carried by maintenance personnel
- additional tools as recommended by the OEM and/or rail transit system

NOTE: Tools marked with an asterisk (*) should be calibrated in accordance with OEM and/or rail transit system requirements.

1.5 Personal protective equipment

Personal protective equipment, as required by the rail transit system, should be worn at all times during inspection and testing.

1.6 Safety

Rail transit system safety rules, procedures and practices shall be followed at all times during inspection and testing.

1.7 Inspection and testing procedures

Wayside ac power system inspection and testing procedures may be modified for each rail transit system's requirements but should contain the steps listed in sections 1.7.1 and 1.7.2 as a minimum.

1.7.1 Inspection

1. Notify the Operations Control Center and/or other authorities of the inspection activities to be performed.
2. Check associated wiring for defective insulation, broken connectors, loose connections, corrosions and breaks.
3. Check all associated contactors, switchgear, indicators and controls for signs of burned contacts, loose connections, signs of overheating, corrosion and damage. Check equipment for proper operation.
4. Check all protection devices for loose connections, broken parts, corrosion and signs of damage. Check equipment for proper operation.
5. Check all equipment cases for loose connections, broken parts, corrosion and signs of damage. Check equipment for proper operation.
6. Clean and remove any dust or debris from enclosure interior.
7. Check all terminal boards for loose connections, corrosion and damage.
8. Inspect any associated circuit drawings stored in equipment enclosure. Replace any damaged or deteriorated drawings or instructions.
9. Remove any debris or paper from the equipment enclosure prior to testing.
10. Check all electrolyte levels if applicable.
11. Check all equipment cooling devices for proper operation.
12. Check equipment and investigate any unusual sounds or odors.
13. Notify the OCC and/or other authorities when the inspection is completed.

1.7.2 Testing

1. Notify the OCC and/or other authorities of the testing activities to be performed.
2. On systems equipped with transfer switches, initiate a transfer to the backup power source (emergency or reserve) for the system being tested, and investigate any unusual disruptions or noises.
3. On systems equipped with transfer switches, initiate a transfer back to the normal power source, verify transition to normal state, investigate any unusual disruptions or noises, and verify system timing if applicable.
4. Check any coils or transformers for unusual noises.
5. Check and note system voltages.
6. Test system for shorts, grounds and proper operation.
7. On systems with ground fault detection equipment, verify that no faults are detected, test the operations of the ground fault detection and reset the system.
8. On systems with battery banks, check specific gravity (if applicable), and check voltages of each individual cell (under load conditions if possible).
9. Perform additional testing as deemed necessary by the rail transit system to verify proper and safe system operation.
10. Notify the OCC and/or other authorities when testing is completed.

1.8 Correction of deficiencies

Deficiencies identified during wayside signal ac system inspection and testing should be corrected and documented in accordance with OEM and/or rail transit system requirements.

1.9 Documentation

Inspection and testing activities should be documented, reviewed and filed in accordance with rail transit system procedures.

Related APTA standard

APTA RT-SC-RP-018-03, "Vented Standby Battery Backup System Inspection and Maintenance"

References

This document should be used in conjunction with OEM specifications and rail transit system procedures for wayside ac signal power equipment inspection.

Definitions

hazard: Any real or potential condition that can cause injury, death or damage, or loss of equipment or property.

Operations Control Center (OCC): A location or locations designed, equipped and staffed for the purposes of monitoring and controlling rail transit system activities from a central location or locations. Also called *rail control center*, *rail operations center*, *rail service control center*.

original equipment manufacturer (OEM): The enterprise that initially designs and builds a piece of equipment.

personal protective equipment: All clothing and other work accessories designed to create a barrier against workplace hazards. Examples include safety goggles, blast shields, hard hats, hearing protectors, gloves, respirators, aprons and work boots.

rail transit system: The organization or portion of an organization that operates rail transit service and related activities. Also called *operating agency*, *operating authority*, *transit agency*, *transit authority*, *transit system*.

wayside signal ac power system: The system that provides ac power to rail transit signal systems typically including input transformer, inverters, converters, transfer switches, UPS systems, fault protection equipment, breakers and fuses.

Abbreviations and acronyms

OCC operations control center
OEM original equipment manufacturer
UPS uninterruptible power supply

Document history

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