SLOVENSKI STANDARD
SIST ENV 50152-3-1:1998

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Railway applications - Fixed installations - Particular requirements for a.c. switchgear - Part 3: Measurement, control and protection devices for specific use in a.c. traction systems - Section 1: Application guide

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Bahnanwendungen - Ortsfeste Anlagen - Besondere Anforderungen an Wechselstrom-Schalteinrichtungen -- Teil 3: Meß-, Steuer- und Schutzeinrichtungen für Wechselstrom-Bahnanlagen -- Hauptabschnitt 1: Anwendungsleitfaden

Applications ferroviaires - Installations fixes - Prescriptions particulières pour appareillage à courant alternatif -- Partie 3: Dispositifs de mesure, de commande et de protection pour usage spécifique dans les systèmes de traction à courant alternatif -- Section 1: Guide d'application

Ta slovenski standard je istoveten z: **ENV 50152-3-1:1998**

ICS:

29.120.50	Varovalke in druga medtokovna zaģ ita	Fuses and other overcurrent protection devices

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EUROPEAN PRESTANDARD

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ENV 50152-3-1

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English version

Railway applications - Fixed installations Particular requirements for a.c. switchgear Part 3: Measurement, control and protection devices for specific use in a.c. traction systems Section 1: Application guide

Bahnanwendungen - Ortsfeste Anlagen
Besondere Anforderungen an Wechselstrom-Schalteinrichtungen
Teil 3: Meß-, Steuerungs- und Schutzeinrichtungen für Wechselstrom
Hauptabschnitt 1: Anwendungsleitfaden

This European Prestandard (ENV) was approved by CENELEC on 1998-01-14 as a prospective standard for provisional application. The period of validity of this ENV is limited initially to three years. After two years the members of CENELEC will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard (EN).

CENELEC members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

This European Prestandard was prepared by SC 9XC, Electric supply and earthing systems for public transport equipment and ancillary apparatus (fixed installations) of Technical Committee CENELEC TC 9X, Electrical and electronic applications for railways.

A first draft was submitted to the CENELEC enquiry as prEN 50152-3-1. The CENELEC Technical Board agreed that the document be further processed as a prENV.

A revised draft was approved by CENELEC SC 9XC on 1998-01-14 as ENV 50152-3-1.

This document is the first section of part 3 of EN 50152. Part 3 is divided into sections to cover an application guide and a number of protection devices with specific features for a.c. railway applications.

Annexes designated "informative" are given for information only. In this ENV 50152-3-1 Annex A is informative.

Contents

Introduction

EN 50152-3 is divided in a number of sections as follows:

Section 1: Application guide
Section 2: Single phase current transformers
Section 3: Single phase voltage transformers

This number of sections is subject to future additions as soon as a protection device is considered suitable for standard requirements.

Section 1 is a guide. Further sections are normative and apply when the equipment is concerned with the specified characteristics.

1 Scope

ENV 50152-3-1 provides assistance, guidance and requirements in the design of protection, control and measuring systems in a.c. installations at traction voltages (see EN 50163) intended to provide a power supply to traction systems. This application guide identifies the characteristics and parameters of equipment used in the measurement, control and protection of a.c. traction systems. Guidance is given in the correct use of protection.

2 References

This Application Guide makes reference to the other parts of EN 50152, as well as to the other sections[1)] of part 3 and to EN 50163.

3 Measurement

Two types of measurements are made:

a) Measurement of current and voltage signals for connecting to instruments and telemetering;

b) Current and voltage signals used for operating protection relays on over-current, low impedance, over/under-voltage and short circuit or distance protection.

The class, ratio and burden shall be selected from the values in EN 50152-3-2 or EN 50152-3-3. The accuracy and purpose are dependant on the class selected.

1) Under preparation.

4 Closing control systems

4.1 General

The application of the features described below depends on the philosophy of the user's control system.

Closing control systems are usually only those which involve the electrical closing of switchgear devices. Their effect is to permit or inhibit a closure depending on the status of the system (and plant) and the compliance of specified requirements.

4.2 Anti-pumping

This system limits the closing device to effect a single attempt while the signal to close is maintained. If the device fails to complete a satisfactory close operation whilst the close signal is maintained, then attempts at further reclosing (pumping) are inhibited.

An anti-pumping can be achieved in the closing control circuit in various ways, either by using circuit breaker mechanism auxiliary switches or a timing relay. It only allows a single closing pulse to the closing device, which resets when the initial closing signal is released.

The purchaser should specify the need for anti-pumping feature.

4.3 Auto-reclose with variable reclose time and final lock out

Auto-reclose is only applied to line circuit breakers and its purpose is to restore the system voltage to the contact line automatically when there is a temporary loss of supply.

On traction systems a temporary loss of supply is not always due to permanent short circuits and an auto-reclose system can enhance the reliability of the system.

Auto-reclose is usually associated with a timing device which gives several attempts at reclosing with varying adjustable intervals of circuit dead time. After a prescribed number of unsuccessful recloses, then a lock out of the reclosing circuit shall be instigated. The lock out relay may then be either electrically or manually reset.

The purchaser should specify the need for this requirement and the following information:

a) Number of recloses: e.g. 2 recloses then lock out;
b) Reclosing time intervals: e.g. 0.3 s, followed by 180 s, followed by 180 s (see 4.104 of EN 50152-1);
c) Lock out reset: i.e. local or remote.

4.4 Undervoltage close inhibit

When used and fitted to an incoming circuit breaker on the secondary side of the traction transformer, the voltage signal is the voltage of the transformer. Unless the supply is available the circuit breaker cannot be closed.

When fitted to a line circuit breaker, the voltage signal is that of the busbar. Unless the busbar traction voltage is live, the line circuit breaker cannot be closed.

The loss of the voltage signal should give an alarm or automatic tripping of all circuits connected thereto. This effect is achieved by undervoltage relays with accurate pick up and drop off voltage levels, operating on to shunt trip devices and close inhibits.

The purchaser should specify the need for undervoltage close inhibit and the following information:

a) Minimum pick up voltage (kV);
b) Maximum drop off voltage (kV).

4.5 Line test device

This system is used on the line circuit breakers (L) before closing, to prevent the line circuit breaker closing on to a short circuit.

A typical basic line test circuit shown in figure 1.

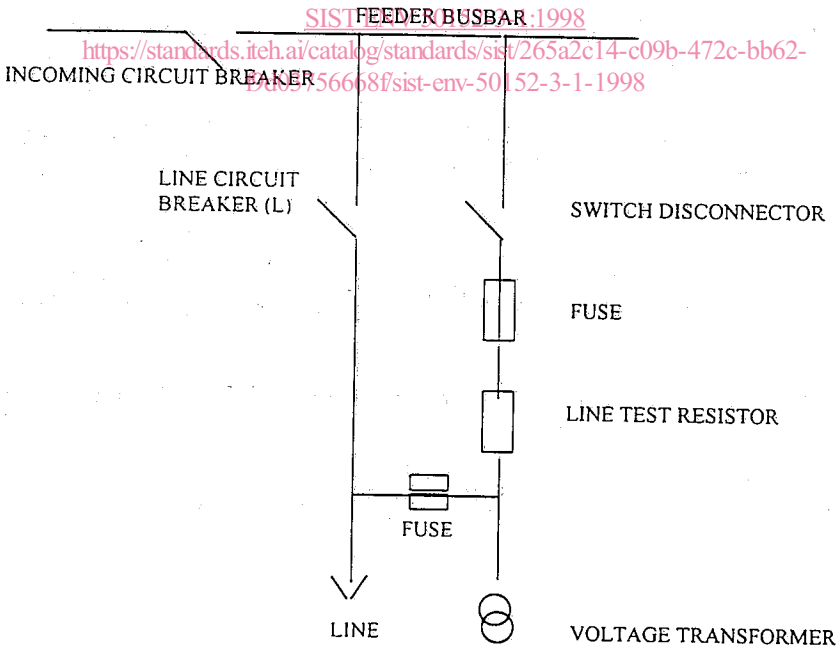

Figure 1: Typical line test circuit for line test device

This is achieved by inserting a resistor by means of a suitably rated load-break switch between the switchboard busbars and the contact line. The load impedance acts as a footing resistance to the inserted resistor and, by measuring the voltage between feeder and return circuit, it can allow or inhibit a close signal.

When the measured voltage is low or below a prescribed level, when there is an overload on the line, the close is inhibited. When this voltage is above a prescribed level, then there is probably only a standing vehicle and the close is permitted.

Line test devices may be coupled with auto-reclose schemes, thereby inhibiting a reclose if the original trip was due to a fault which had not be cleared itself in the dead time.

Line test devices can be by-passed if the line is already live from the line circuit breaker at the remote end.

The purchaser should specify the need for a line test device and the following information:

- value of the resistor and, by consequence, the current value to be chosen from 5 A to 25 A;
- whether the line test device is combined with auto-reclose.

5 Protection systems

5.1 Protection system of line circuit breakers

Line circuit breakers are only required to trip the faults on its own section of line.

The protection relays should be selected to have characteristics and settings which will discriminate between heavy load caused by trains on its section of line and faults of the line itself.

The characteristics may be selected from the following types of relays (see Annex A):

a) High set instantaneous overcurrent, with or without a variable time delay. Usually for close up faults.

b) Impedance relay with a specified characteristic (e.g. to protect the catenary).

c) Inverse time delay with selective pick up and time multiplier (e.g. to protect the catenary).

d) As c) but with thermal imaging to improve the protection of the catenary.

e) Reverse current, able to detect a current flowing from catenary to the incoming power supply. To discriminate regenerating current and a current due to a fault within the power supply network.

f) Loss of busbar voltage should give an alarm or automatic tripping of all line circuit breakers connected thereto.