IEC 60947-6-1

Edition 3.0 2021-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Low-voltage switchgear and controlgear – Part 6-1: Multiple function equipment – Transfer switching equipment

Appareillage à basse tension – Partie 6-1: Matériels à fonctions multiples – Equipement de transfert de source

IEC 60947-6-1:2021-03(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 29.120.40; 29.130.20

ISBN 978-2-8322-9448-2

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Part 6-1: Multiple function equipment – Transfer switching equipment

FOREWORD

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International Standard IEC 60947-6-1 has been prepared by sub-committee 121A: Low-voltage switchgear and controlgear, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage.

This third edition cancels and replaces the second edition published in 2005, and its Amendment 1:2013. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

– clarification of scope and object;
– clarification of terms and definitions;
– removal of unnecessary definitions;
– modification of characteristics;

– modification of utilization categories definitions;
– introduction of new markings requirements;
– addition of new requirements for clearances and creepage distances;
– addition of new requirements and tests for mechanical and electrical interlocks;
– clarification of transfer sequences;
– modification of requirements for rated short-time withstand currents;
– modification of new requirements for electromagnetic compatibility;
– clarification of performance requirements for CB type TSE, in alignment with requirements stated in IEC 60947-2;
– addition of new test sequence V: Critical load current performance of equipment with DC ratings.

The text of this document is based on the following documents:

FDIS	Report on voting
121A/403/FDIS	121A/411/RVD

Full information on the voting for the approval of this document can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts in the IEC 60947 series, published under the general title *Low-voltage switchgear and controlgear*, can be found on the IEC website.

This document shall be read in conjunction with IEC 60947-1:2020, *Low voltage switchgear and controlgear – Part 1: General rules*.

The provisions of the general rules are applicable to IEC 60947-1 where specifically called for. General rules clauses and subclauses thus applicable as well as tables, figures and appendices are identified by reference to IEC 60947-1:2020, for example, 1.2.3, Table 4, or Annex A of IEC 60947-1:2020.The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The availability of power in low voltage electrical installations is playing an ever increasing role in modern society. In actual fact, this requirement is a fundamental characteristic for the creation of economically and functionally efficient installations. A system able to switch a load from one source to another safely and with minimum disturbance to the load reduces problems caused by faulty conditions in the normal supply to the minimum.

All these operations, commonly known as “transfer switching”, control the installations and can be done automatically, remotely or manually.

Therefore, an installation with installed “transfer switching” capability:

– ensures the continuity of production processes;
– provides a backup source of power if the main network is out of service;
– reduces the effect caused by network faults on parts of the installation;
– achieves a good compromise between reliability, simplicity and cost-effectiveness;
– provides the facility manager and managing system with a power source able to supply all or part of the installation.

Key factors motivating customers to use Transfer Switch Equipment (TSE) include:

– the continuous world growth population, the increasing number of electronic devices and the new demands of electric vehicles;
– the mediated pressure on climate change with a resulting increase in the cost of energy;
– the evolution of the electricity market with a greater number of alternate energy sources;
– the user’s expectations of better grid reliability, better economic performance, and a desire to manage their energy.

Stakeholders involved in the management of electricity also have new expectations:

– customers want to reduce the cost of their energy and to have a quality energy supply;
– suppliers want to reinforce confidence to their customers;
– producers expect to optimize their investments;
– governments and regulators are willing to create a competitive and sustainable energy market.

Today, the performance of Transfer Switching Equipment is defined by TSE manufacturers and also by this document. Consultants, integrators, facility managers and end users rely on this document for their power availability needs.

Transfer switching are often realised by implementing a transfer function within the electrical installation, but this critical function can be inappropriately designed. Using a TSE following the requirements of this document ensures the safety and the performance of the transfer function which are necessary for reaching the objectives listed above.

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 6-1: Multiple function equipment – Transfer switching equipment

1 Scope

This document applies to transfer switching equipment (TSE), to be used in power systems for ensuring the continuity of the supply and allowing the energy management of the installation, by transferring a load between power supply sources, the rated voltage of which does not exceed 1 000 V AC or 1 500 V DC.

It covers:

– manually operated transfer switching equipment (MTSE);

– remotely operated transfer switching equipment (RTSE);

– automatic transfer switching equipment (ATSE), including the controller.

It does not cover:

1) TSE configurations that are either not manufacturer tested and/or not marked according to this document as a complete transfer switch;
2) auxiliary contacts (for guidance, see IEC 60947-5-1);
3) transfer switches used in explosive atmospheres (for guidance, see IEC 60079 (all parts));
4) embedded software design (for guidance, see IEC TR 63201);
5) cybersecurity aspects (for guidance, see IEC TS 63208);
6) TSE rated for direct-on-line starting asynchronous motor of design NE and HE, according to IEC 60034-12:2016 (for guidance, see AC-3e utilisation category according IEC 60947-4-1:2018);
7) other types of TSE under consideration including closed transition TSE, overlapping neutral TSE, multi-source TSE (i.e. TSE with more than two sources of supply), stand-alone ATS controllers, bypass isolation TSE, TSE with load-shedding functions and bus-tie TSE.

NOTE TSE used for safety services and for emergency escape lighting systems as described in IEC 60364-5-56 are subject to specific rules and/or legal requirements.

The object of this document is to state:

1) the characteristics of the equipment;
2) the conditions of the equipment with respect to:
   a) operation for which the equipment is intended;
   b) operation and behaviour in case of specified abnormal conditions, for example, short-circuit;
   c) dielectric properties;
3) the tests intended to confirm that these conditions have been met and the methods for performing these tests;
4) the product information to be provided by the manufacturer.