UL 1008S

STANDARD FOR SAFETY

Solid-State Transfer Switches

UL Standard for Safety for Solid-State Transfer Switches, UL 1008S

First Edition, Dated November 15, 2012

SUMMARY OF TOPICS:

This revision of ANSI/UL 1008S dated April 22, 2025 includes the withdrawal and replacement of ANSI/ISA MC96.1, Temperature-Measurement Thermocouples, 32.12.

Text that has been changed in any manner or impacted by ULSE's electronic publishing system is marked with a vertical line in the margin.

The revised requirements are substantially in accordance with Proposal(s) on this subject dated March 7, 2025.

No Text on This Page

NOVEMBER 15, 2012
(Title Page Reprinted: April 22, 2025)

ANSI/UL 1008S-2025

HISTORICAL NOTE

Prior to the publication of this first edition these requirements were covered by Supplement A of the Standard for Safety for Transfer Switch Equipment, UL 1008.

UL 1008S

Standard for Solid-State Transfer Switches

First Edition

November 15, 2012

This ANSI/UL Standard for Safety consists of the First edition including revisions through April 22, 2025.

The most recent designation of ANSI/UL 1008S as an American National Standard (ANSI) occurred on April 22, 2025. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to ULSE at any time. Proposals should be submitted via a Proposal Request in ULSE's Collaborative Standards Development System (CSDS) at https://csds.ul.com.

No Text on This Page

CONTENTS

INTRODUCTION

CONSTRUCTION

PERFORMANCE

INTRODUCTION

1 Scope

1.1 These requirements cover solid state automatic transfer switches intended for use in ordinary locations to provide for lighting and power only in optional stand-by systems in accordance with Article 702 of the National Electrical Code, ANSI/NFPA 70.

1.2 Solid-state transfer switches are not for use as service entrance equipment unless marked as such.

1.3 These requirements cover transfer switch equipment rated at 6000 A or less and 600 V or less.

1.4 These requirements cover transfer switches together with their associated control devices including voltage sensing relays, frequency sensing relays, time delay relays, and the like.

1.5 An automatic transfer switch as covered by these requirements is a device that automatically transfers a common load from a normal supply to an alternate supply in the event of failure of the normal supply, and automatically returns the load to the normal supply when the normal supply is restored.

Exception: An automatic transfer switch is allowed to be provided with a logic control circuit that inhibits automatic operation of the device from either a normal to an alternate supply, or from an alternate to a normal supply when the switch reverts to automatic operation upon loss of power to the load.

1.6 A non-automatic transfer switch as covered by these requirements is a device, operated manually by a physical action, or electrically by a remote control, for transferring a common load between a normal and alternate supply.

1.7 A transfer switch may incorporate overcurrent protection for the main power circuits.

1.8 These requirements cover completely enclosed transfer switches and also open types intended for mounting in other equipment such as switchboards.

1.9 Transfer switches are rated in amperes and are generally considered to be acceptable for total system transfer, which includes control of motors, electric-discharge lamps, electric-heating loads, and tungsten-filament lamp loads as referred to in 1.10.

1.10 A transfer switch intended for total system transfer as indicated in 1.9 is considered to be acceptable for the control of tungsten-filament lamp loads not exceeding 30 percent of the switch ampere rating unless the switch has been investigated for a higher percentage of lamp load and marked accordingly.

1.11 A transfer switch may be limited to use with one or more specific types of load if investigated accordingly and marked as indicated in 47.11.

2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this standard shall comply with the requirements for that component. See Appendix A for a list of standards covering components generally used in the products covered by this standard.

2.2 A component is not required to comply with a specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or

b) Is superseded by a requirement in this standard.

2.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

2.5 A component not marked with a short-circuit current rating is considered rated for use in a circuit having a maximum available fault current as shown in Table 2.1.

2.6 The short-circuit current available in the secondary circuit of a transformer rated 10 kVA or less is considered to be 5000 amperes or less.

2.7 The short-circuit current available on the load side of a 15 ampere current-limiting circuit breaker or Class CC, G, J, RK1, RK5, or T fuse is considered to be 5000 amperes. In a single phase 120-volt circuit, the short-circuit current available on the load side of a 20 ampere circuit breaker or Class CC, G, J, RK1, RK5, or T fuse is considered to be 10,000 amperes or less.

Table 2.1
Assumed maximum short-circuit current ratings for unmarked components

Component	Short-circuit current rating, kA
1. Circuit breaker (including GFCI type)	5
2. Clock-operated switch	5
3. Fuseholder	10
4. Lighting fixture (circuit) internal	5
5. Miniature fuse	10[a]
6. Plug fuse	10
7. Industrial control equipment:	
a. Auxiliary device	5
b. Motor controllers or switches (other than mercury tube type)	5
c. Mercury tube switches:	
Rated over 60 amperes or over 250 volts	5
Rated 250 volts or less, 60 amperes or less, and over 2 kVA	3.5[b]
Rated 250 volts or less and 2 kVA or less	1[b]
8. Meter socket base	10
9. Photoelectric switches	5
10. Receptacle (GFCI type)	2
11. Receptacle (other than GFCI type)	10
12. Snap switch	5
13. Terminal block	10
14. Thermostat	5

Table 2.1 Continued on Next Page

Table 2.1 Continued

Component	Short-circuit current rating, kA
[a] The use of these fuses is limited to 125-volt circuits that do not leave the transfer switch.	
[b] This rating is below the minimum specified in Table 35.1 and the component shall either:	
1) Be investigated for the minimum short-circuit current rating specified in Table 35.1, or	
2) Be located on the load-side of a suitable current-limiting overcurrent protective device.	

3 Units of Measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

4 Undated References

4.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

5 Glossary

5.1 For the purpose of this standard the following definitions apply.

5.2 ACCESSIBLE PART – A part located so that it can be contacted by a person, either directly or by means of a probe or tool during user servicing, or that is not recessed the required distance behind an opening.

5.3 BARRIER – A partition for the insulation or isolation of electric circuits, for the isolation of electric arcs, or for isolation of moving parts or hot surfaces. In this respect, a barrier may serve as a portion of an enclosure or as a functional part.

5.4 CONTROL CIRCUIT – A circuit that carries electric signals directing the performance of a transfer switch. A control circuit does not carry main power current.

5.5 ENCLOSURE – That portion of a transfer switch that reduces the accessibility and unintentional contact of a part that may involve a risk of fire, electric shock or injury to persons, or reduces the risk of propagation of flame, sparks, and molten metal initiated by an electrical disturbance occurring within.

5.6 LIVE PART – Denotes metal or conductive parts that, during intended use, have a potential difference with respect to ground or any other conductive part.

5.7 OPERATOR – Trained persons having familiarity with the construction and operation of the equipment, and the risks involved, including, but not limited to, persons who may periodically open a transfer switch to repair or maintain electrical or mechanical components.

5.8 POLLUTION DEGREE 1 – No pollution or only dry, nonconductive pollution occurs. The pollution has no influence.

5.9 POLLUTION DEGREE 2 – Normally, only nonconductive pollution occurs; however, temporary conductivity caused by condensation may be expected.

5.10 POLLUTION DEGREE 3 – Conductive pollution occurs, or dry, nonconductive pollution occurs that becomes conductive due to condensation that is expected.

5.11 PRIMARY CIRCUIT – Wiring and components that are conductively connected to the preferred or alternate source of supply or another branch circuit.

5.12 PRINTED-WIRING BOARD – The finished combination of a pattern of conductive paths either on, in, or both on and in (multilayer) a sheet of insulating material, including printed components, and the base material.

5.13 RISK OF ELECTRIC SHOCK – A risk of electric shock is considered to exist at any part if the potential between the part and earth ground or any other accessible part is greater than 42.4 V peak AC or 60 V DC, and the continuous current flow through a 1500 Ω resistor connected across the potential exceeds 5 mA.

5.14 RISK OF INJURY TO PERSONS – A condition that exists when stationary parts (such as sharp metal edges and projections), moving parts, falling objects, inadequate mechanical strength of material, or the physical instability of the equipment are such that injury to persons may result.

5.15 SECONDARY CIRCUIT – A circuit conductively connected to the secondary winding of an isolating power supply transformer.

5.16 SERVICING – Any form of servicing that can be performed by personnel other than those who are trained to maintain the unit. Some examples of user servicing are:

a) The installation of accessories.

b) The replacement of lamps and fuses, or the resetting of circuit breakers located in a user access area.

c) The making of routine operating adjustments necessary to adapt the unit for different intended functions.

d) Routine cleaning.

5.17 SWITCH, TRANSFER – An automatic or nonautomatic device for transferring load conductor connections from one power source to another.

5.18 TOOL – A hand-held implement, such as a wrench, screwdriver, or any other object that may be used during servicing, including a coin, key or other object that can be used to operate a lock, screw latch, or similar fastening means.

CONSTRUCTION

6 General

6.1 A transfer switch intended for use as service equipment shall comply with the applicable requirements for service equipment and be marked in accordance with 47.3.

7 Enclosure

7.1 An enclosure provided shall comply with the Standard for Industrial Control Equipment, UL 508. See also 7.2 and 7.3.

7.2 For a transfer switch intended for use as service equipment, the enclosure thickness shall not be less than 0.053 inch (1.35 mm) if of uncoated steel, 0.056 inch (1.42 mm) if of zinc–coated steel, and 0.075 inch (1.91 mm) if of aluminum.

7.3 The enclosure of a transfer switch may be provided with ventilating openings which comply with the requirements in 7.4 – 7.18.

7.4 A ventilating opening shall be designed and located so that no flame or molten metal is emitted during arcing normally encountered during acceptable performance of the overload test described in the Overload Test, Section 31, and the withstand and closing tests described in Withstand, Section 35.

7.5 Unless the opening is remote from the arcing part, the requirement in 7.4 necessitates the interposing of an acceptable barrier between a ventilating opening and a possible source of arcing such as a switch, fuse, and the like, as noted in 7.6 – 7.8.

7.6 The barrier shall be of such dimensions and so located that straight lines drawn from any arcing part past the edge of the barrier define an area at the plane of the opening 1/4 inch (6.4 mm) beyond the edges of the opening.

7.7 A sheet steel barrier shall not be less than 0.053 inch (1.35 mm) thick if uncoated and not less than 0.056 inch (1.42 mm) thick if zinc-coated.

Exception: The barrier may be of steel of less thickness provided that its strength and rigidity is not less than that of a flat sheet of steel having the same dimensions as the barrier and having the specified thickness.

7.8 A nonmetallic barrier shall not be less than 1/4 inch (6.4 mm) thick and shall be supported to give acceptable strength and rigidity.

Exception: The thickness of a nonmetallic barrier may be less than 1/4 inch (6.4 mm) if the barrier is so located and supported that it is not subject to mechanical abuse during installation and is so located that it has acceptable strength and rigidity.

7.9 A ventilating opening in an enclosure shall have such size or shape, or shall be so covered by screening or by an expanded, perforated, or louvered metal panel, that a test rod having the diameter specified in 7.10 will not enter the opening.

7.10 The test rod mentioned in 7.9 shall be 33/64 inch (13.1 mm) in diameter if the plane of the opening is less than 4 inches (102 mm) from an uninsulated live part, or 49/64 inch (19.4 mm) in diameter if the plane of the opening is 4 inches (102 mm) or more from such parts.

7.11 A louver shall not be more than 12 inches (305 mm) long.

7.12 The size, shape, and location of a ventilating opening shall not unduly weaken the overall enclosure.

7.13 The total area of enclosure material removed from a wall for the purpose of ventilation or for the insertion of a ventilating panel or screen together with total area of ventilating openings formed from the enclosure material shall not exceed 25 percent of the area of the entire surface of any wall in which such ventilating openings are located.

7.14 The 25 percent limitation mentioned in 7.13 may be exceeded provided that means of reinforcement, such as stiffeners, are employed and the enclosure complies with 7.12.

7.15 The area of an opening covered by a louvered, perforated, or expanded metal panel that is thinner than the enclosure, shall not exceed 200 square inches (0.129 m^2). A ventilated closing panel of 0.053 inch (1.35 mm) if uncoated, 0.056 inch (1.42 mm) if zinc-coated or thinner steel or wire mesh of 14 AWG

(1.63 mm diameter) or smaller wire shall not be used to enclose an opening of more than 80 square inches (0.052 m^2).

7.16 The wires of a screen of a ventilating opening shall not be smaller than 16 AWG (1.29 mm diameter) if the screen openings are 1/2 square inch (323 mm^2) or less in area, and not smaller than 12 AWG (2.05 mm diameter) for larger screen openings. A supplementary screen of smaller openings may be additionally provided. The supplementary screen shall not be considered in the evaluation of the ventilating opening screen.

7.17 Perforated sheet steel and sheet steel employed for expanded-metal mesh shall not be less than 0.042 inch (1.07 mm) thick if uncoated, or 0.045 inch (1.14 mm) thick if zinc-coated, if the mesh openings or perforations are 1/2 square inch (323 mm^2) or less in area, and shall be not less than 0.080 inch (2.03 mm) thick if uncoated or 0.084 inch (2.13 mm) thick if zinc-coated for larger openings.

Exception: Where the indentation of a guard or enclosure cannot alter the clearance between uninsulated live parts and grounded metal so as to affect performance adversely or reduce spacings below the minimum values in Table 26.1, 0.020 inch (0.51 mm) if uncoated or 0.023 inch (0.58 mm) if zinc-coated expanded metal mesh may be employed. See 7.15.

7.18 A ventilating opening in the top of the enclosure shall be covered by a hood or protective shield spaced above the opening to reduce the possibility of the entry of foreign material.

7.19 An enclosure shall be marked with a type number indicating the external conditions for which it is acceptable. See Table 7.1. The marking may be on the inside or outside surface, but shall be visible after installation. See 47.54.

Table 7.1
Enclosure types and tests

Designation	Intended use and description	Requirement or qualification tests[a]
1	Indoor use primarily to provide protection against contact with the enclosed equipment and against a limited amount of falling dirt.	Rod Entry[b] and Rust Resistance or Corrosion Protection.
2	Indoor use to provide a degree of protection against limited amounts of falling water and dirt.	Drip, Rod Entry[b], and Rust Resistance or Corrosion Protection.
3	Outdoor use to provide a degree of protection against windblown dust and windblown rain; undamaged by the formation of ice on the enclosure.	Outdoor Dust or Hose, Icing, Protection Against Corrosion, and Rain.
3R	Outdoor use to provide a degree of protection against falling rain; undamaged by the formation of ice on the enclosure.	Icing, Protection Against Corrosion, Rain and Rod Entry.
3S	Outdoor use to provide a degree of protection against windblown dust, windblown rain, and sleet; external mechanisms remain operable while ice laden.	Outdoor Dust or Hose, Icing, Protection Against Corrosion, and Rain.
4	Either indoor or outdoor use to provide a degree of protection against falling rain, splashing water, and hose-directed water; undamaged by the formation of ice on the enclosure.	Hosedown, Icing and Protection Against Corrosion.
4X	Either indoor or outdoor use to provide a degree of protection against falling rain, splashing water, and hose-directed water; undamaged by the formation of ice on the enclosure; resists corrosion.	Hosedown, Icing, and Protection Against Corrosion.

Table 7.1 Continued on Next Page