

UL 1664

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Immersion-Detection Circuit-Interrupters

Underwriters Laboratories Inc. (UL)
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UL Standard for Safety for Immersion-Detection Circuit-Interrupters, UL 1664

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SUMMARY OF TOPICS

New Performance Requirements for IDCIs with Electronics Connected to the Load Side of the Contacts (Tease Test)

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The following table lists the future effective dates with the corresponding item.

Future Effective Date	References
January 3, 2007	18.4

The new and revised requirements are substantially in accordance with UL's Proposal(s) on this subject dated April 7, 2005 and October 25, 2005

The revisions dated January 3, 2006 include a reprinted title page (page1) for this Standard.

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the applicant elects this option, it should be noted that compliance with all the requirements in this Standard will be required as a condition of continued Recognition and Follow-Up Services after the effective date, and understanding of this should be signified in writing.

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Page	Date
1-6	January 3, 2006
7-8	October 26, 1995
9	January 3, 2006
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18-20B	January 3, 2006
21-23	October 26, 1995
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24A	January 3, 2006
24B	August 18, 1998
25	October 26, 1995
26-27	January 3, 2006
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UL 1664

Standard for Immersion-Detection Circuit-Interrupters

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October 26, 1995

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Revisions of this Standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest set of revised requirements.

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INTRODUCTION

1 Scope

1.1 These requirements cover immersion-detection circuit-interrupters that interrupt the electric circuit to an appliance in the event of an accidental immersion of the appliance. They are intended to interrupt the circuit at a predetermined current level that is less than that required to operate the overcurrent protective device of the supply circuit upon immersion of the connected appliance. The function is not to be dependent on the presence of a grounded object.

1.2 These requirements cover immersion-detection circuit-interrupters for use only in cord-connected appliances intended for connection to alternating-current circuits of 250 V or less. They are not to be provided with a general purpose outlet receptacle, cord connector body, or the like. Devices complying with these requirements are acceptable for use as components in an end product where the acceptability of the combination is to be determined.

1.3 The acceptability of an immersion-detection circuit-interrupter in any particular application depends upon its ability to be used continuously under the conditions that prevail in actual service. Accordingly, for a particular application, an immersion-detection circuit-interrupter may be affected by the requirements for the equipment it is used in, and it may be necessary to additionally evaluate features or performance characteristics that are not specified in this standard.

1.4 This Standard does not cover ground-fault circuit-interrupters, which are covered by the Standard for Ground-Fault Circuit-Interrupters, UL 943.

1.5 *Deleted January 3, 2006*

2 Glossary

2.1 For the purpose of this standard, the following definitions shall apply:

2.2 ACCESSIBLE PART – A part so located that it can be contacted by a person, either directly or by means of a probe or tool.

2.3 CORD-CONNECTED – Denotes connection to a supply circuit by way of a flexible cord terminating in an attachment plug.

2.4 ENCLOSURE – Any surface or surrounding structure that prevents access to a real or potential risk of electric shock or injury to persons.

2.5 ENERGIZED PART – A part at some potential with respect to another part, or to earth.

2.6 INDOOR USE – Use in an indoor location or where exposure to rain is not likely to occur.

2.7 LEAKAGE CURRENT – Denotes all currents including capacitively coupled currents which may be conveyed between energized parts of a circuit and either ground or other parts.

2.8 ORDINARY TOOLS – Pliers, and flat-bladed and cross recessed-head (Phillips type) screwdrivers.

2.9 TRIP – Denotes automatic interruption by the immersion-detection circuit-interrupter of the electric circuit to the load.

3 Components

3.1 Except as indicated in 3.2, 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.

3.2 A component need not comply with a specific requirement that:

- a) Involves a feature or characteristic not needed in the application of the component in the product covered by this standard, or
- b) Is superseded by a requirement in this standard.

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

3.4 Specific components are recognized as being 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 for which they have been recognized.

4 Units of Measurement

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

5 References

5.1 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.

CONSTRUCTION

6 Mechanical Assembly

6.1 An immersion-detection circuit-interrupter shall be formed and assembled so that it will have the strength and rigidity necessary to resist abuses to which it is likely to be subjected, without producing or increasing a risk of fire, electric shock or injury to persons due to total or partial collapse with resulting reduction of spacings, loosening or displacement of parts, or other serious defects.

6.2 An immersion-detection circuit-interrupter shall have all parts reliably secured in place.

6.3 An immersion-detection circuit-interrupter shall be constructed so that it will not be necessary to open or remove the enclosure when used as intended.

6.4 Lampholders, switches, and other similar components shall be mounted securely and shall be prevented from turning by more than friction between surfaces. For example the use of a lockwasher is acceptable to prevent the turning of a device having a single hole mounting means.

Exception No. 1: A lampholder of a type in which the lamp cannot be replaced, (such as a neon pilot or indicator light in which the lamp is sealed-in by a nonremovable jewel), need not be prevented from turning if rotation cannot reduce spacings below the minimum acceptable values or produce stress on a connector.

Exception No. 2: A switch or other similar component shall be securely mounted and prevented from turning, unless the turning of such a component is part of the design of the unit and introduces no additional risk of fire or electrical shock, such as reduced spacings below the minimum acceptable values or stress on a connection.

6.5 An indicator light shall be one in which the lamp is sealed-in, such as by a nonremovable jewel.

6.6 A switch shall be located within the unit enclosure in such a manner as not to be accessible or exposed to tampering, nor subject to damage during normal use. This requirement does not apply to the actuating means of a switch.

6.7 The maximum acceptable moment, center of gravity, dimensions, and weight of a direct plug-in unit shall comply with the requirements specified in (a), (b), (c) and (d). See Figure 6.1 and 6.8 and 6.9:

- a) The quotient of WY/Z shall not exceed 48 ounces (1361 g);
- b) The quotient of WY/S shall not exceed 48 ounces (1361 g);
- c) The product of WX shall not exceed 80 ounce-inches (0.56 N·m); and
- d) The weight of a unit shall not exceed 28 ounces (794 g).

6.8 Definitions for the symbols used in 6.7 are as follows:

- a) W is the weight of the unit in ounces (g);
- b) Y is the distance illustrated in Figure 6.1 in inches (mm);
- c) Z is the lesser of the two distances, Z_1 or Z_2 , as illustrated in Figure 6.1. in inches (mm);
- d) S is the lesser of the two distances, S_1 or S_2 , as illustrated in Figure 6.1 in inches (mm); and
- e) X is the greater of the two distances, X_1 or X_2 , as illustrated in Figure 6.1 in inches (mm).

6.9 The moment and weight specified in 6.7 are to be determined as follows:

- a) For units with an output cord, the cord is to be cut off at the enclosure, or at the strain-relief means if the strain-relief means is outside the enclosure.
- b) For units with directly mounted accessories, the values are to be measured with the accessories in place.

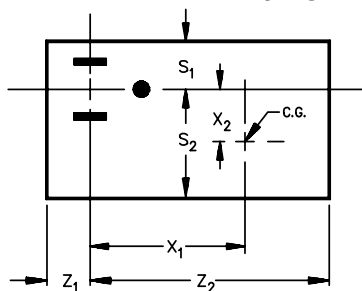
6.10 When inserted in a parallel-blade duplex receptacle, any part of a unit, including output wiring, shall not interfere with full insertion of an attachment plug into the adjacent receptacle. See Figure 6.2.

Exception: A unit that renders the adjacent receptacle completely unusable in any one mounting position is acceptable.

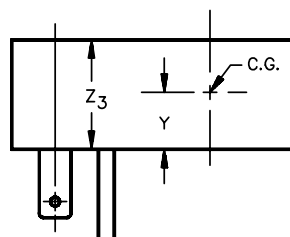
6.11 A mounting tab shall not be provided with the unit.

6.12 The enclosure of a unit shall be capable of being gripped for removal from the receptacle to which it is connected. The perimeter of the face section from which the blades project shall not be less than 5/16 inch (7.9 mm) from any point on either blade.

Figure 6.1
Dimensions of a direct plug-in unit



FRONT VIEW

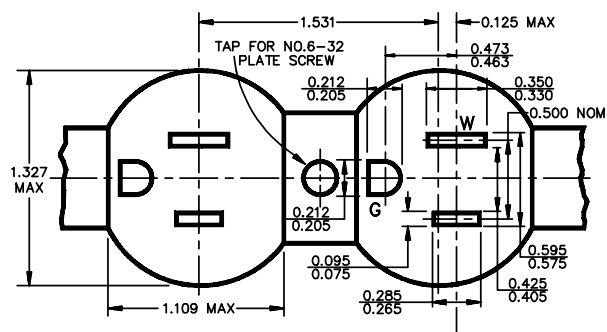
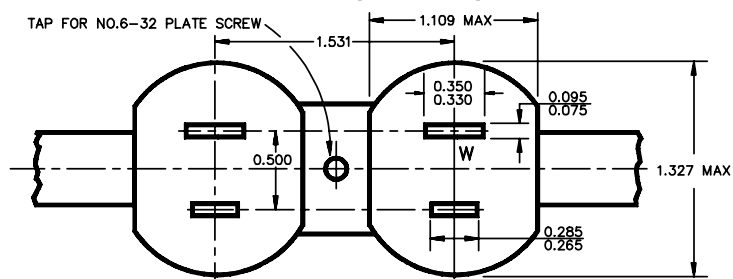


SIDE VIEW

C.G. = Center of Gravity

CP100

Figure 6.2
Parallel receptacle duplex



S3076

7 Enclosure

7.1 General

7.1.1 An immersion-detection circuit-interrupter shall be provided with an enclosure that shall house all current-carrying parts other than primary blades and output leads. The enclosure shall have the strength and properties necessary to reduce the risk of mechanical damage to the various parts.

7.1.2 If access to the interior of a unit can present a risk of fire, electric shock, or injury to persons, seams and joints of the enclosure shall be assembled by welding, riveting, the use of screws or fasteners that are not removable by the use of an ordinary tool, (see 2.8), or the equivalent. For enclosure parts secured together by adhesive, see 7.3.2.

Exception: A unit containing components that may require factory assembly may have the enclosure assembled by screws or other fasteners removable by an ordinary tool, provided there is means to discourage user-tampering such as sealing of one or more of the assembly fasteners. Potting compound, encapsulation, or equivalent means provided to comply with this requirement shall be in place when the units are subjected to the Enclosure Tests outlined in 7.3.1 and the Crushing Resistance Test, Section 36.

7.1.3 Cross recessed-head screws (Phillips type), spring clips, and the like are considered to be defeatable by an ordinary tool.

7.2 Metal enclosures

7.2.1 An enclosure constructed of sheet metal shall be formed from stock having a thickness not less than that specified in Table 7.1. The thickness of enclosure sheet metal, other than steel or aluminum, shall not be less than that specified in Table 7.1 for uncoated steel, and shall have the necessary strength and rigidity.

Table 7.1
Thickness of sheet metal enclosures

	Minimum acceptable thickness	
	inch	(mm)
Uncoated steel	0.026	(0.66)
Zinc-coated steel	0.029	(0.74)
Aluminum	0.040	(1.02)

7.2.2 A lanced tab provided for internal component mounting may have a small opening caused by die clearance if:

- The opening caused by the tab is substantially closed by the mounted component; and
- The tab is located on the surface of the enclosure with the supply-connector pins.