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**Connecting devices for low-voltage
circuits for household and similar
purposes — Part 1: General requirements**

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard based on the Industrial Standardization Law.

Consequently, **JIS C 2814-1:2001** is replaced with this Standard.

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JIS C 2814 series consists of the following 5 parts under the general title “*Connecting devices for low-voltage circuits for household and similar purposes*”:

Part 1: General requirements

Part 2-1: Particular requirements for connecting devices as separate entities with screw-type clamping units

Part 2-2: Particular requirements for connecting devices as separate entities with screwless-type clamping units

Part 2-3: Particular requirements for connecting devices as separate entities with insulation-piercing clamping units

Part 2-4: Particular requirements for twist-on connecting devices

Connecting devices for low-voltage circuits for household and similar purposes — Part 1 : General requirements

Introduction

This Japanese Industrial Standard has been prepared based on the second edition of IEC 60998-1 published in 2002 with some modifications of the technical contents to conform to the power distribution situation in Japan.

The portions given dotted underlines are the matters not given in the corresponding International Standard. A list of modifications with the explanations is given in Annex JB.

1 Scope

This Standard specifies the connecting devices as separate entities for the connection of two or more rigid conductors (solid or stranded) or flexible conductors (complying with JIS C 3664, IEC 60344 or relevant JISs), having a cross-sectional area of 0.2 mm² or over to and including 35 mm² with a rated voltage of 1 000 V or under a.c. at frequency of not exceeding 1 000 Hz, or of 1 500 V or under d.c. used for household and similar purposes.

NOTE 1 The rated connecting capacities lower than 0.5 mm² shall be referred to IEC 60344 and those equal to or higher than 0.5 mm² shall be referred to JIS C 3664 except those conforming to relevant JISs.

NOTE 2 "Rigid conductor" includes both "solid conductor" and "stranded conductor" ("concentric lay stranded conductor" and "compacted circular stranded conductor"). Also, "flexible conductor" refers to "bunch stranded conductor" (see Annex JA).

NOTE 3 In the corresponding International Standard, terminals for AWG conductors are included in the scope; however, AWG conductors are excluded from the scope since they are treated for reference in this Standard. The relationship between mm² and AWG size is shown in Annex B.

NOTE 4 The relevant JISs refer to JISs on electric wires which specify the standard rated connecting capacities of Type 2 shown in 6.2.

This Standard is not applicable to the connecting devices that require the use of special tools other than for twist-on connecting devices and insulation piercing connecting devices.

This Standard contains the particular requirements to be used together with JIS C 2814-2 standard group (hereafter referred to as "Part 2") containing detailed particular

requirements.

- Connecting devices with screw-type clamping units (JIS C 2814-2-1)
- Connecting devices with screwless-type clamping units (JIS C 2814-2-2)
- Connecting devices with insulation-piercing clamping units (JIS C 2814-2-3)
- Connecting devices with twist-on connecting devices (JIS C 2814-2-4)
- [Connecting boxes (JIS C 2814-2-5) are deleted.]

NOTE 5 The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

IEC 60998-1 : 2002 *Connecting devices for low-voltage circuits for household and similar purposes — Part 1 : General requirements* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and JIS are IDT (identical), MOD (modified), and NEQ (not equivalent) according to ISO/ IEC Guide 21.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. For standards indicated below, only the editions of the indicated year shall be applied and any revisions (including amendments) made thereafter shall not be applied.

JIS C 0920 : 2003 *Degrees of protection provided by enclosures (IP Code)*

NOTE : Corresponding International Standard : IEC 60529 : 2001 *Degrees of protection provided by enclosures (IP Code)* (IDT)

JIS C 0922 : 2002 *Protection of persons and equipment by enclosures for electrical apparatus — Probes for verification*

NOTE : Corresponding International Standard : IEC 61032 : 1997 *Protection of persons and equipment by enclosures — Probes for verification* (IDT)

JIS C 2134 : 2007 *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

NOTE : Corresponding International Standard : IEC 60112 : 2003 *Method for the determination of the proof and the comparative tracking indices of solid insulating materials* (IDT)

JIS C 3664 : 2007 *Conductors of insulated cables*

NOTE : Corresponding International Standard : IEC 60228 : 2004 *Conductors of insulated cables* (IDT)

JIS C 6065 : 2007 *Audio, video and similar electronic apparatus — Safety requirements*

JIS C 60068-2-32 : 1995 *Environmental testing Part 2 : Tests. Test Ed : Free fall*

NOTE : Corresponding International Standard : **IEC 60068-2-32** : 1975 *Environmental testing. Part 2 : Tests. Test Ed : Free fall* (IDT)

JIS C 60068-2-75 : 2004 *Environmental testing — Part 2-75 : Tests — Test Eh : Hammer tests*

NOTE : Corresponding International Standard : **IEC 60068-2-75** : 1997 *Environmental testing — Part 2-75 : Tests — Test Eh : Hammer tests* (IDT)

JIS C 60695-2-10 : 2004 *Fire hazard testing — Glow-wire apparatus and common test procedure*

NOTE : Corresponding International Standard : **IEC 60695-2-10** : 2000 *Fire Hazard testing — Part 2-10 : Glowing/hot-wire based test methods Glow-wire apparatus and common test procedure* (IDT)

JIS C 60695-10-2 : 2000 *Fire hazard testing — Part 10-2 : Abnormal heat — Ball pressure test*

NOTE : Corresponding International Standard : **IEC 60695-10-2** : 1995 *Fire hazard testing — Part 10 : Guidance and test methods for the minimization of the effects of abnormal heat on electrotechnical products involved in fires — Section 2 : Method for testing products made from non-metallic materials for resistance to heat using the ball pressure test — Basic safety publication* (IDT)

JIS H 8610 : 1999 *Electroplated coatings of zinc on iron or steel*

NOTE : Corresponding International Standard : **ISO 2081** : 1986 *Metallic coatings — Electroplated coatings of zinc on iron or steel* (MOD)

JIS H 8617 : 1999 *Electroplated coatings of nickel and chromium*

NOTE : Corresponding International Standard : **ISO 1456** : 1988 *Metallic coatings — Electrodeposited coatings of nickel plus chromium and of copper plus nickel plus chromium* (MOD)

JIS H 8619 : 1999 *Electroplated coatings of tin*

NOTE : Corresponding International Standard : **ISO 2093** : 1986 *Electroplated coatings of tin — Specification and test methods* (MOD)

IEC 60344 : 2007 *Calculation of d.c. resistance of plain and coated copper conductors of low-frequency cables and wires — Application guide*

3 Terms and definitions

For the purposes of this Standard, the following terms and definitions shall apply.

3.1 connection

electrical connection between two or more conductors or between a conductive part and one or more conductors

3.2 junction

connection between two or more conductor ends

3.3 tapping

connection of a conductor end (called "tapped conductor") to any point of another conductor (called "main conductor")

3.4 connecting device

device for electrical connection of two or more conductors including one or more terminals and, if necessary, insulation and/or ancillary parts (see Annex A)

3.5 terminal

conductive part of one pole including one or more clamping units and insulation, if necessary (see Annex A)

3.6 clamping unit

part of a terminal necessary for the mechanical clamping and the electrical connection of the conductor including the part necessary to ensure correct contact pressure (see Annex A)

3.7 ancillary part

part of a connecting device providing electrical and mechanical protection and/or mounting, for example, a base, an enclosure, a mounting rail, etc. (see Annex A)

3.8 rated connecting capacity

cross-sectional area or diameter of conductor to be connected as stated by the manufacturer of the connecting device (for Type 1 and Type 2, see 7.6 A)

— In the case of Type 1, the meaning shall be as follows.

- a) For the connecting device exclusively for the rigid conductor or for the combined use of rigid conductor and flexible conductor, the maximum cross-sectional area of rigid conductor
- b) For the connecting device exclusively for the flexible conductor, the maximum cross-sectional area of flexible conductor

— In the case of Type 2, the meaning shall be as follows.

- a) For the connecting device for solid conductor, diameter of connectable solid conductor
- b) For the connecting device for stranded conductor and flexible conductor, cross-sectional area of connectable conductor

3.9 rated insulation voltage

voltage of a part, device or piece of equipment to which electric strength test and creepage distance are referred

3.10 rated current

current assigned to the device by the manufacturer

3.11 clearance

shortest distance in air between two conductive parts

3.12 creepage distance

shortest distance along the surface of an insulating material between two conductive parts

3.13 ambient temperature

temperature of the air surrounding the connecting device together with its enclosure, if any

3.14 temperature rise

difference between the temperature of the part under test, together with its enclosure, if any, measured under load determined by the test specification and the ambient temperature

3.15 multiway terminal device

connecting device that consists of several terminals insulated from each other in a common housing of insulating material which are capable of being subdivided by the user to make connecting devices consist of one or more terminals

3.16 unprepared conductor

conductor which has been cut and the insulation of which has been removed over a certain length for insertion into a terminal

NOTE : A conductor the shape of which is arranged for introduction into a terminal, or of which the strands are twisted to consolidate the end, is considered to be an unprepared conductor.

4 General

Connecting devices shall be so designed and constructed as to be reliable for the performance thereof and without danger to the user or surroundings in normal use.

Compliance shall be checked by carrying out all tests specified.

5 General notes on tests

5.1 Tests according to this Standard shall be the type test.

5.2 Unless otherwise specified, the samples shall be tested as delivered and installed as in normal use at an ambient temperature of $20\text{ °C} \pm 5\text{ °C}$.

5.3 The tests shall be carried out in the order of clauses.

5.4 Unless otherwise specified, three samples shall be submitted to all the tests and this Standard is conformed if all the tests are met. If only one sample does not satisfy a test due to an assembly or manufacturing fault, that test and any preceding ones which may have influenced the results of the test shall be repeated, and also the following

tests shall be carried out in the required sequence on another full set of samples, all of which shall comply with the requirements.

NOTE : The applicant may submit the additional set of samples which may be requested when one sample fail together with the number of samples specified in 5.4. The testing station will then, without further request, test additional samples and will reject only if a further failure occurs. If the additional set of samples is not submitted at the same time, the failure of one sample will entail rejection.

6 Main characteristics

6.1 The preferred values of the rated insulation voltage of the connecting device shall be 125 V, 250 V, 300 V, 400 V, 500 V, 600 V, 690 V, 800 V, 1 000 V a.c. and d.c., and 1 500 V d.c.

6.2 The standard rated connecting capacities of Type 1 shall be 0.2 mm², 0.34 mm², 0.5 mm², 0.75 mm², 1 mm², 1.5 mm², 2.5 mm², 4 mm², 6 mm², 10 mm², 16 mm², 25 mm² and 35 mm².

The standard rated connecting capacities of Type 2 shall be ϕ 1.6 mm, ϕ 2.0 mm, ϕ 2.6 mm, 0.5 mm², 0.75 mm², 1.25 mm², 2 mm², 3.5 mm², 5.5 mm², 8 mm², 14 mm² and 22 mm² [see 5.2 (Rated applicable wire) of JIS C 2811].

6.2A The standard rated current shall be 7A, 12 A, 15 A, 20A, 30A and 50 A (applicable only to Type 2).

6.3 Those of which the ambient temperature exceeds 40 °C require "T" marking.

The preferred values shall be 55 °C, 85 °C, 110 °C, 140 °C and 200 °C. If other values are used, they shall be multiples of 5.

7 Classification

Connecting devices as separate entities shall be classified as follows.

7.1 Classification according to number of terminals

- single terminal device
- multiway terminal device

7.2 Classification according to function

- junction device
- tapping device
- junction and tapping device

7.3 Classification according to protection against electric shock

- device without protection

- device with protection

7.4 Classification according to means of fixing

- device without means of fixing (location is only ensured by the stiffness of the conductors connected)
- device with means of fixing (location is ensured by screws, rail supports or similar associated means, or by own fixing means)

7.5 Classification according to maximum ambient temperature (rated temperature) of use of connecting device

- device without "T" marking for ambient temperature not higher than 40 °C
- device with "T" marking for ambient temperature higher than 40 °C

7.6 Classification according to protection against harmful ingress of water and humidity and against solid foreign objects

For the IP Code, see JIS C 0920.

7.6A Classification according to conductor to be connected

- device to which conductor in accordance with JIS C 3664 or IEC 60344 shall be connected (hereafter referred to as "Type 1")
- device to which conductor in accordance with relative JISs other than the above shall be connected (hereafter referred to as "Type 2")

8 Marking

8.1 The following markings shall be put on the main part.

- a) rated connecting capacity in mm² or ϕ marking, or rated current in amperes

When the rated current only is marked on the body, the range of connectable conductor size shall be described in the instruction manual, etc.

- b) rated insulation voltage in volts
- c) maximum ambient temperature of use in °C for the case over 40 °C (T_{__}) (see 6.3 and 8.3)
- d) type reference (for example, a catalogue number)
- e) manufacturer's or responsible vendor's name or trademark or identification mark
- f) IP code, if greater than IP20

For very small devices with a surface insufficient for marking, only the markings of d) and e) need to be indicated on the device. In such cases, all the markings specified shall be visible on the smallest package unit.

8.2 For multiway terminal devices, the required marking shall be complete on at least any two adjacent devices.