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**Information technology equipment —
Safety — Part 22: Equipment to be
installed outdoors**

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Contents

	Page
Introduction	1
1 Scope	1
2 Normative references	2
3 Terms and definitions	4
4 Conditions for outdoor equipment	5
5 Marking and instructions	7
6 Protection from electrical shock in an outdoor location	7
7 Wiring terminals for connection of external conductors	8
8 Construction requirements for outdoor enclosures	8
9 Protection of equipment within an outdoor enclosure	12
10 Mechanical strength of outdoor enclosures	14
11 Outdoor equipment containing valve regulated or vented batteries	15
Annex A (normative) Water-saturated sulfur dioxide atmosphere	18
Annex B (normative) Water spray test	19
Annex C (normative) Ultraviolet light conditioning test	22
Annex D (normative) Gasket tests	23
Annex E (informative) Rationale	25
Bibliography	28
Annex JA (informative) Comparison table between JIS and corresponding International Standard	30

Foreword

This Japanese Industrial Standard has been established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal for establishment of Japanese Industrial Standard submitted by Japan Business Machine and Information System Industries Association (JBMIA)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act.

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Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, published patent application or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, published patent application or utility model rights.

NOTE Based on Article 9 of the Supplementary Provisions to the Unfair Competition Prevention Act etc., any submission of proposal, or employment of procedures such as deliberation by the Japanese Industrial Standards Committee under the previous Industrial Standardization Act shall be deemed to have been conducted pursuant to the provision of Article 12, paragraph (1) of the revised Industrial Standardization Act.

JIS C 6950 series consists of the following 2 parts under the general title *Information technology equipment — Safety*:

JIS C 6950-1 *Part 1: General requirements*

JIS C 6950-22 *Part 22: Equipment to be installed outdoors*

Information technology equipment — Safety — Part 22 : Equipment to be installed outdoors

Introduction

This Japanese Industrial Standard has been prepared based on **IEC 60950-22:2016**, Edition 2, with some modifications of the technical contents in consideration of power supply circumstances in Japan.

The dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JA.

This Standard is intended for use with **JIS C 6950-1** and to be applied as addition to **JIS C 6950-1**.

1 Scope

1.1 Equipment covered

This Standard specifies the safety requirements for information technology equipment intended to be installed in an outdoor location (hereafter referred to as outdoor equipment).

This Standard also applies, where relevant, to outdoor enclosures suitable for direct installation in the field and supplied for housing information technology equipment to be installed in an outdoor location.

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

IEC 60950-22 : 2016 *Information technology equipment — Safety — Part 22 : Equipment to be installed outdoors* (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 21-1**.

1.2 Application of requirements

For outdoor equipment and outdoor enclosures, requirements in **JIS C 6950-1** and this Standard apply. If requirements specified in these standards differ, requirements in this Standard takes precedence.

Each installation may have particular requirements. Some examples are given in **4.2**.

In addition, requirements for protection of the outdoor equipment against the effects of direct lightning strikes are not covered by this Standard. For information on this subject, see **JIS Z 9290-1**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. For standards with the year indication, only the editions of the indicated year shall be applied and the revisions (including amendments) made thereafter shall not be applied. For those without the indication of the year, the most recent editions (including amendments) shall be applied.

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

NOTE Corresponding International Standard : IEC 60529 : 1989 *Degrees of protection provided by enclosures (IP Code)*, Amendment 1 : 1999 and Amendment 2 : 2013

JIS C 6011-1 *Mechanical structures for electronic equipment — Tests for IEC 60917 and IEC 60297 series — Part 1 : Environmental requirements, test set-up and safety aspects for cabinets, racks, subracks and chassis under indoor conditions*

NOTE Corresponding International Standard : IEC 61587-1 : 2011 *Mechanical structures for electronic equipment — Tests for IEC 60917 and IEC 60297 series — Part 1 : Environmental requirements, test set-up and safety aspects for cabinets, racks, subracks and chassis under indoor conditions*

JIS C 6950-1 *Information technology equipment — Safety — Part 1 : General requirements*

NOTE Corresponding International Standard : IEC 60950-1 : 2005 *Information technology equipment — Safety — Part 1 : General requirements*, Amendment 1 : 2009 and Amendment 2 : 2013

JIS C 60068-2-11 *Basic environmental testing procedures Part 2 : Tests — Test Ka : Salt mist*

NOTE Corresponding International Standard : IEC 60068-2-11 *Basic environmental testing procedures — Part 2-11 : Tests — Test Ka : Salt mist*

JIS C 60364 (series) *Low-voltage electrical installations*

JIS C 62368-1 : 2018 *Audio/video, information and communication technology equipment — Part 1 : Safety requirements*

NOTE Corresponding International Standard : IEC 62368-1 : 2014 *Audio/video, information and communication technology equipment — Part 1 : Safety requirements*

JIS K 6258 *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

NOTE Corresponding International Standard : ISO 1817 *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

JIS K 7127 *Plastics — Determination of tensile properties — Part 3 : Test conditions for films and sheets*

NOTE Corresponding International Standard : ISO 527-3 *Plastics — Determination of tensile properties — Part 3 : Test conditions for films and sheets*

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JIS K 7161-1 *Plastics — Determination of tensile properties — Part 1 : General principles*

NOTE Corresponding International Standard : ISO 527-1 *Plastics — Determination of tensile properties — Part 1 : General principles*

JIS K 7161-2 *Plastics — Determination of tensile properties — Part 2 : Test conditions for moulding and extrusion plastics*

NOTE Corresponding International Standard : ISO 527-2 *Plastics — Determination of tensile properties — Part 2 : Test conditions for moulding and extrusion plastics*

JIS K 7164 *Plastics — Determination of tensile properties — Part 4 : Test conditions for isotropic and orthotropic fibre-reinforced plastic composites*

NOTE Corresponding International Standard : ISO 527-4 *Plastics — Determination of tensile properties — Part 4 : Test conditions for isotropic and orthotropic fibre-reinforced plastic composites*

JIS K 7165 *Plastics — Determination of tensile properties — Part 5 : Test conditions for unidirectional fibre-reinforced plastic composites*

NOTE Corresponding International Standard : ISO 527-5 *Plastics — Determination of tensile properties — Part 5 : Test conditions for unidirectional fibre-reinforced plastic composites*

JIS K 7171 *Plastics — Determination of flexural properties*

NOTE Corresponding International Standard : ISO 178 *Plastics — Determination of flexural properties*

IEC 60364 (all parts) *Low-voltage electrical installations*

NOTE Corresponding Japanese Industrial Standards : JIS C 60364 (series) *Low-voltage electrical installations*

IEC 61643 (all parts) *Low-voltage surge protective devices*

NOTE Corresponding Japanese Industrial Standards : JIS C 5381 (series) *Low-voltage surge protective devices*

ISO 179 (all parts) *Plastics — Determination of Charpy impact properties*

NOTE Corresponding Japanese Industrial Standards : JIS K 7111 (series) *Plastics — Determination of Charpy impact properties*

ISO 180 *Plastics — Determination of Izod impact strength*

NOTE Corresponding Japanese Industrial Standard : JIS K 7110 *Plastics — Determination of Izod impact strength*

ISO 3231 *Paints and varnishes — Determination of resistance to humid atmospheres containing sulfur dioxide*

ISO 4892-1 *Plastics — Methods of exposure to laboratory light sources — Part 1 : General guidance*

NOTE Corresponding Japanese Industrial Standard : JIS K 7350-1 *Plastics — Methods of exposure to laboratory light sources Part 1 : General guidance*

ISO 4892-2 *Plastics — Methods of exposure to laboratory light sources — Part 2 : Xenon-arc lamps*

NOTE Corresponding Japanese Industrial Standard : JIS K 7350-2 *Plastics — Methods of exposure to laboratory light sources — Part 2 : Xenon-arc lamps*

ISO 4892-4 *Plastics — Methods of exposure to laboratory light sources — Part 4 : Open-flame carbon-arc lamps*

NOTE Corresponding Japanese Industrial Standard : JIS K 7350-4 *Plastics — Methods of exposure to laboratory light sources — Part 4 : Open-flame carbon-arc lamps*

ISO 8256 *Plastics — Determination of tensile-impact strength*

NOTE Corresponding Japanese Industrial Standard : JIS K 7160 *Plastics — Determination of tensile-impact strength*

ISO 14993 *Corrosion of metals and alloys — Accelerated testing involving cyclic exposure to salt mist, “dry” and “wet” conditions*

ISO 21207 *Corrosion tests in artificial atmospheres — Accelerated corrosion tests involving alternate exposure to corrosion-promoting gases, neutral salt-spray and drying*

ASTM D471-98 *Standard Test Method for Rubber Property — Effect of Liquids*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS C 6950-1**, and the following apply.

3.1

outdoor location

location for equipment where protection from the weather and other outdoor influences provided by a building or other structure is limited or non-existent

3.2

outdoor equipment

equipment specified by the manufacturer to be installed where exposed wholly or partly to the environmental conditions in an outdoor location

NOTE Transportable equipment, for example, a laptop or notebook computer, or a telephone, is not outdoor equipment unless specified by the manufacturer for continuous use in an outdoor location.

3.3

outdoor enclosure

part of outdoor equipment that is exposed to the adverse conditions in an outdoor location and that is intended to protect the interior of the equipment from those conditions

NOTE 1 An outdoor enclosure can also perform the functions of one or more of the following : a fire enclosure; an electrical enclosure; a mechanical enclosure.

NOTE 2 A separate cabinet or housing into which the equipment is placed can provide the function of an outdoor enclosure.

4 Conditions for outdoor equipment

4.1 Ambient air temperature

Outdoor equipment and outdoor enclosures shall be suitable for use at any ambient air temperature in the range specified by the manufacturer.

If not specified by the manufacturer, the range of ambient air temperature shall be taken as :

- minimum ambient temperature : $-33\text{ }^{\circ}\text{C}$
- maximum ambient temperature : $+40\text{ }^{\circ}\text{C}$

Compliance shall be checked by visual inspection and by evaluation of the data provided by the manufacturer.

NOTE 1 The temperature values are based on **JIS C 60721-3-4** class 4K2. These temperatures do not take into account severe environments (for example, extremely cold or extremely warm), nor do they include provision for heating by radiation from the sun (solar loading).

NOTE 2 Attention is drawn to **JIS C 6011-1** for additional information on performance levels C1, C2 and C3.

NOTE 3 In Finland, Norway and Sweden, the temperature in winter can be extremely low. For outdoor equipment this will demand special design so that the equipment can stand transport, erection and operation/service at temperatures down to $-50\text{ }^{\circ}\text{C}$.

4.2 Mains supply

4.2.1 General

Mains-operated outdoor equipment shall be suitable for the highest mains transient voltage expected in the installation location.

Consideration shall be given to all of the following :

- the prospective fault current of the supply to outdoor equipment can be higher than for equipment installed indoor (hereafter referred to as indoor equipment) (see **JIS C 60364-4-43**); and
- the mains transient voltage for outdoor equipment can be higher than for indoor equipment.

Within a certain overvoltage category, components within outdoor equipment that reduce the mains transient voltage or the prospective fault current shall comply with

the requirements of the **IEC 61643** series.

NOTE 1 The overvoltage category of outdoor equipment is normally considered to be one of the following (see **JIS C 6950-1, Annex Z**) :

- if powered via the normal building installation wiring, overvoltage category II;
- if powered directly from the mains distribution system, overvoltage category III;
- if at, or in the proximity of, the origin of the electrical installation, overvoltage category IV.

NOTE 2 For further information regarding protection from overvoltages, see **IEC 60364-5-53**.

NOTE 2A In Japan, requirements in a specific installation location are specified in the Ministerial Order for Establishment of Technical Standards for Electrical Equipment (Ordinance No. 52 of the Ministry of International Trade and Industry of 1997). Requirements for outdoor wiring and indoor wiring (power code or cable) are specified in the Interpretation of Technical Standards for Electrical Equipment (20130215 Circular Notice No. 4).

Compliance shall be checked by visual inspection and by evaluation of the installation instructions.

4.2.2 Mains transient voltage on AC mains supply

Outdoor equipment that is part of the building installation, or that may be subject to transient overvoltages exceeding those for overvoltage category II, shall be designed for overvoltage category III or IV, unless additional protection is to be provided internally or externally to the outdoor equipment when installed. In this case, the installation instructions shall state the need for such additional protection. Clearances in outdoor equipment designed for overvoltage category III or IV shall comply with Annex G of **JIS C 6950-1**. The insulation system used in such outdoor equipment shall be capable of withstanding the test voltage given in Table 5C of **JIS C 6950-1**.

Compliance shall be checked by visual inspection, testing and evaluation of the installation instructions.

4.2.3 Mains transient voltage on DC mains supply

The transient voltage on a d.c. mains supply depends on the source and the installation of the d.c. mains supply. When determining the d.c. mains transient voltage, the installation and the source of the d.c. mains shall be taken into account. If these are not known, the mains transient voltage on the d.c. mains supply shall be assumed to be 1.5 kV.

The manufacturer shall declare the mains transient voltage on the d.c. mains supply in the installation instructions.

Compliance shall be checked by evaluation of the installation instructions.

4.3 Rise of earth potential

Attention is drawn to the fact that during fault clearing conditions, hazardous voltages may exist and be accessible for longer periods than for indoor equipment and special earthing conditions are necessary. These earthing conditions are typically specified in local installation codes.

NOTE In Japan, these requirements are contained in the Interpretation of Technical Standards for Electrical Equipment. In the USA, these requirements are contained in the National Electrical Code. In Canada, they are contained in the Canadian Electrical Code.

Compliance shall be checked by evaluation of the installation instructions.

5 Marking and instructions

The installation instructions for outdoor equipment shall include details of any special features needed for protection from conditions in the outdoor location (see 1.7.2 of JIS C 6950-1).

Example If Class 0I equipment specified in JIS C 6950-1 is installed outdoors, the risk of electric shock increases. Therefore, it should be installed by service personnel or installation workers who have knowledge of installation of electrical equipment

If a manufacturer of an outdoor enclosure that is intended for direct installation in the field and supplied for housing equipment to be installed in an outdoor location, classifies a product in accordance with JIS C 0920, the IP code shall be declared; however, it is not required to mark the IP code on the outdoor enclosure. It is not required to make such a declaration for outdoor equipment.

Compliance shall be checked by evaluation of the installation instructions.

6 Protection from electrical shock in an outdoor location

6.1 Voltage limits of user-accessible parts in outdoor locations

User-accessible conductive parts of outdoor equipment in an outdoor location shall meet the requirements for an SELV circuit in 2.2.2 and 2.2.3 of JIS C 6950-1, except that the voltage limits shall not exceed :

- 15 V a.c., 21.2 V peak, or 30 V d.c. under normal operating conditions (see 2.2.2 of JIS C 6950-1),
- 15 V a.c., 21.2 V peak, or 30 V d.c. for longer than 0.2 s under single fault conditions. Moreover, the voltage shall not exceed 30 V a.c., 42.4 V peak or 60 V d.c. for 0.2 s or less (see 2.2.3 of JIS C 6950-1)

The exception in 2.2.3 of JIS C 6950-1 relating to 2.3.2.1 b) of the same publication, does not apply to user-accessible conductive parts.

NOTE 1 Lower voltage limits apply because the contact resistance of the body is reduced when subjected to wet conditions.

NOTE 2 In Denmark, the installation rules require the maximum safe to touch nominal voltage to be 6 V a.c. r.m.s. or 15 V ripple-free d.c. for outside

environment, where the installation normally can be humid or wet due to the weather condition including area with shelters, but not in protected walls e.g. carports.

Compliance shall be checked by measurement.

6.2 Limited current circuits in outdoor locations

The requirements of 2.4 of JIS C 6950-1 apply to outdoor equipment without change.

6.3 Protection for socket-outlet in outdoor locations

A residual current protective device (RCD) with rated residual operating current not exceeding 30 mA shall be used in the mains supply of outside equipment to socket-outlets intended for general use and with a rated current not exceeding 20 A in outdoor locations.

The RCD shall be an integral part of the outdoor equipment or of the building installation. If the RCD is part of the building installation, instructions for installations of the RCD shall be provided with the outdoor equipment.

Compliance shall be checked by visual inspection and by evaluation of the installation instructions.

7 Wiring terminals for connection of external conductors

The mains supply terminations for outdoor equipment that is intended to be powered :

- via the normal building installation wiring, shall be as specified in 3.3 of JIS C 6950-1;
- directly from the mains distribution system, shall be as specified in the relevant standard(s) of JIS C 60364 or IEC 60364 series.

NOTE For other terminals, JIS C 6950-1 applies.

Compliance shall be checked by visual inspection.

8 Construction requirements for outdoor enclosures

8.1 General

Protection against corrosion shall be provided for outdoor enclosures by the use of suitable materials or by the application of a protective coating applied to the exposed surface, taking into account the intended conditions of use.

Parts, such as dials or connectors, that serve as a functional part of an outdoor enclosure shall comply with the same external environmental protection requirements as for the outdoor enclosure.

NOTE 1 Aspects affecting safety which require the integrity of the outdoor enclosure through the life of the product include :

- continued protection against access to hazardous parts, including after mechanical strength tests;