

JIS

JAPANESE INDUSTRIAL STANDARD

**Plugs and receptacles
for domestic and
similar general use**

Ⓒ JIS C 8303-1993

Translated and Published

by

Japanese Standards Association



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J I S

Plugs and receptacles for domestic and
similar general use

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1. Scope This Japanese Industrial Standard specifies plugs and receptacles used for connection between the wiring and the cord or for mutual connection between cords in electric circuits of 50 Hz or 60 Hz in frequency and a.c. 250 V or less in voltage (hereafter referred to as "connectors"). The ambient temperature at which these connectors are used shall be not more than 40°C.

Remarks 1. This Standard also covers connectors incorporating pilot lamps or earth terminals, and connectors of waterproof type, clamp type and slip check type, and also connectors for plastic surface raceways for interior wiring (hereafter referred to as "raceway connectors").

2. This Standard does not cover connectors for special purposes, such as connectors for industrial works where they are handled particularly under severe conditions, connectors of explosion-proof type, and of floor mounting type as well as connectors equipped with automatic circuit breaking mechanism and with timer.

3. The following Standards are cited in this Standard:

JIS C 3301 Rubber insulated flexible cords

JIS C 3306 Polyvinyl chloride insulated flexible cords

JIS C 3307 600 V Polyvinyl chloride insulated wires

JIS C 3312 600 V grade polyvinyl chloride insulated and sheathed portable power cables

JIS C 3342 600 V polyvinyl chloride insulated and sheathed cables

JIS C 8306 Testing methods for wiring devices

JIS C 8316 Flush plates

JIS C 8336 Boxes for rigid metal conduits

JIS C 8375 Mounting frame for interchangeable wiring devices of large square boss type

JIS C 8425 Plastic surface raceways for interior wiring

JIS H 3100 Copper and copper alloy sheets, plates and strips

JIS H 3110 Phosphor bronze and nickel silver sheets plates and strips

JIS H 8610 Electroplated coatings of zinc on iron and steel

JIS K 6915 Phenolic molding compounds

JIS K 6916 Urea-formaldehyde molding compounds

4. The International Standards corresponding to this Standard are given below.

IEC 83 (1975) Plugs and socket-outlets for domestic and similar general use Standards.

IEC 309 (1979) Plugs, socket-outlets and couplers for industrial purposes.

IEC 884-1 (1987) Plugs and socket-outlets for household and similar purposes. Part 1: General requirements.

5. The units and numerical values shown in { } in this Standard are based on the traditional units and are appended for informative reference.

2. Definitions The main terms used in this Standard shall be as follows:

- (1) plug and receptacle connector A connector consisting of an attachment plug and a receptacle which enables, at any time, easy electrical connection and/or disconnection between the wiring and the cord or between individual cords by inserting or withdrawing the plug into or from the receptacle.
- (2) attachment plug A device consisting of blades, joints with cords (including cable) sheathed with insulating material, etc. capable of being inserted into or withdrawn from a receptacle by hand. There are two kinds of flat blade and clamp type blade specified in (7).

It is called the plug as the generic name.

- (3) socket-outlet (fixed socket-outlet) A kind of plug receptacle of connector consisting of a blade receiver, connection terminals with wiring and other parts, capable of being fixed to structural members, appliances or the like.
- (4) cord connector body (portable socket-outlet) This is a kind of receptacle of connector having a blade receiver, means for connecting cords (including cable). It is used, without fixing, for extension of cords.

- (5) multiple tap (portable multiple socket-outlet) This is a kind of receptacle of a connector consisting of blade receivers (two or more sets of openings), joints with cords (including captive cables) and blades for connection to power source. It is used, without fixing, to branch out two or more circuits from one socket-outlet or one cord.

Multiple taps include table taps intended to be used on the table or the like, pendant type multiple taps intended to be used being suspended by a cord, and plug-in-type multiple taps (also called triangle taps) provided with blades for connection to power source.

- (6) slip-check type This is a kind of receptacle of a connector consisting of blade receivers, terminals for wiring connection, etc. It is so constructed that the plug does not slip out easily, when the plug of (1) in Attached Fig. 1 or (1) in Attached Fig. 2 is inserted and turned in right direction.
- (7) locking type This is a kind of connector, in which the blades and blade receivers are curved in circular arc. It is so constructed that the plug does not slip out, when the mating plug is inserted and turned in right direction. The plug in this case is called a locking type plug.
- (8) waterproof type This is a connector which is so constructed that it can be used outdoors where it is splashed with rain or the like. It is classified into water-tight type and rain-proof type according to the grade of waterproof.
- (9) union ring This is an annular nut used for waterproofing of joints between the plug and blade receiver of a waterproof type connector. Usually, it belongs to the plug, has a gasket, and engages with the external screw thread provided on the receptacle. It tightens the gasket to ensure waterproofing.
- (10) terminal This is a part of a connector provided for electrical and mechanical connection with external electric wires (including cords).
- (11) screwless terminal This is a terminal so constructed that connection is automatically made by inserting the conductor of wire (solid annealed copper wire) directly into the terminal.
- (12) molded-on connector This is a connector, in which the terminal and cord are connected by welding, crimping, caulking, or by other means, and this assembly is molded with thermoplastic resin or the like.
- (13) rewirable connector This is a connector made by assembling, other than molded-on connectors.
- (14) connector with shutter A connector having a shutter which automatically shields the blade receiving hole.
- (15) connector with pilot lamp A connector which incorporates a pilot lamp in a part of the connector. There are two systems i.e. the lamp is operated by the line voltage or by the load current passing through the connector.
- (16) connector with earth terminal A connector having a terminal to which the user connects the earthing conductor of an electrical appliance.

- (17) multiple type A recessed type socket-outlet which has dimensions shown in Attached Fig. 10(1), and satisfies such requirements that three socket-outlets, at the maximum, can be attached and detached to the mounting from shown in the same attached figure when the boss is oval or square, or to the mounting frame of large square multiple wiring apparatus specified in JIS C 8375 when the boss is large square boss, the above assembly can be mounted to the switch box for one switch specified in Attached Fig. 2 of JIS C 8336 and the socket outlets so accommodated in the box can be combined with the appropriate plate shown in Attached Fig. 1 (Tumbler plate, plug socket plate, plate for composite apparatus) of JIS C 8316.
- (18) movable blade type A power supply plug in which the blades are rotatable.
- (19) raceway connector A kind of receptacle of connector which is consisting of blade receivers, wiring terminals, etc. and can be recessed in and fixed to the plastic surface raceway for interior wiring specified in JIS C 8425.

3. Classification, number of poles, pole arrangement and rating

The classification of connectors, the number of poles, pole arrangement and ratings shall be as shown in Table 1. However, the rated currents of molded-on connectors and cord connector bodies shall be as specified in Table 2 according to the size (nominal sectional area of conductor) of the cord attached.

Table 1. Classification, number of poles, pole arrangement and rating of connectors

Classification		Number of poles	Pole arrangement ⁽¹⁾		Rating	Attached Fig.		
Designation	Type		Blade	Blade receiver				
Plug, socket-outlet, cord connector body	Normal type, rain-proof type, watertight type	2			15A 125V	1. (1)		
					15A 250V	1. (2)		
					20A 125V	1. (3)		
					20A 250V	1. (4)		
					30A 250V	1. (5)		
					15A 125V	Blade receiver 1.(6) Blade 1.(1)		
					20A 125V	Blade receiver 1.(7) Blade 1.(3)		
					20A 250V	1. (8)		
		2 (with earthing pole)			15A 125V	2. (1)		
					15A 250V	2. (2)		
					20A 125V	2. (3)		
					20A 250V	2. (4)		
					30A 250V	2. (5)		
					50A 250V	2. (6)		
					20A 125V	Blade receiver 2.(7) Blade 2.(3)		
					20A 250V	2. (8)		
		3			15A 250V	3.		
					20A 250V			
					30A 250V			
		3 (with earthing pole)			15A 250V	4.		
					20A 250V			
					30A 250V			
		Locking type plug, locking type socket-outlet, locking type cord connector body	Normal type, rain-proof type	2			15A 125V	5. (1)
							20A 250V	5. (2)

Table 1. (Continued)

Classification		Number of poles	Pole arrangement ⁽¹⁾		Rating	Attached Fig.
Designation	Type		Blade	Blade receiver		
Locking type plug, locking type socket-outlet, locking type cord connector body	Normal type, rain-proof type	2			30A 250V	3. (3)
		2 (with earthing pole)			15A 125V	6. (1)
					15A 250V	6. (2)
					20A 250V	6. (3)
					30A 250V	6. (4)
					20A 250V	7. (1)
					30A 250V	7. (2)
		3 (with earthing pole)			20A 250V	8.
		2	 ⁽²⁾	 ⁽²⁾	(10A 125V)	1. (1)
					12A 125V	
					15A 125V	
					(10A 125V)	Blade receiver 1.(6) Blade 1.(1)
					12A 125V	
					15A 125V	
		2 (with earthing pole)			(10A 125V)	Blade receiver 2.(1), (9), Blade 2.(1)
					12A 125V	
					15A 125V	
Multiple tap	Normal type	2			(10A 125V)	5. (1)
					12A 125V	
					15A 125V	
		2 (with earthing pole)			(10A 125V)	5. (1)
					12A 125V	
					15A 125V	

- Notes (1) The pole arrangement for water-tight type connectors is not specified.
- (2) Polarity does not need to be fixed for connectors are not necessarily polarized, except socket-outlet, if polarization is unnecessary for practical use or is difficult due to construction.
- (3) As for the pole arrangement of plug, that given in Attached Fig. 1. (1) is also used for blade receiver of 1. (7), and those given in Attached Figs. 1. (1), 1. (3), and 2. (1) are also used for blade receiver of 2. (7).
- (4) As for the pole arrangement of plug, that given in Attached Fig. 1 (2) is also used for blade receiver of 1.8, and those given in Attached Figs. 1. (2), 1. (8) and 2. (2) are also used for plug receiver of 2. (8).

- Remarks 1. The types are classified according to the waterproof construction. However, the normal type is not provided with waterproofing means.
2. The number of poles shall be indicated by the number of poles of the blades or blade receivers intended for constant carriage of current and shall not include the number of poles exclusively used for earthing.
3. The combination of the kind of connector, number of poles, and rating is specified in Attached Figs. 1 to 8 along with the pole arrangement.

Table 2. Rated current of molded-on connector and cord connector body

Size of attached cord (nominal sectional area of conductor) mm ²		0.75	1.25	2.0	3.5
Rated current of connector A	General cord	7	12	15	20
	Heat-resistant cord	7 or 8	14	15	20

- Remarks 1. The rated currents of connectors shall not exceed the values shown in Table 1 even when the permissible current of the attached cord is larger than the rated current of the respective connectors specified in Table 1.
2. The heat-resistant cord shall be Class 2 polyvinyl chloride insulated flexible cord specified in JIS C 3306 or rubber insulated flexible cord of JIS C 3301, except natural rubber insulated ones.
3. The attached cord shall have, at least, the sectional area specified in Table 2, even if a cord with a sectional area other than that specified in JIS C 3301 or JIS C 3306, or a cord consisting of component wires of thinner diameter is used.

4. Performances

4.1 Retaining force When a connector is tested according to 6.2, the retaining force of the blade receiver shall conform to the value specified in Table 3 according to the number of poles and rated current. However, this does not apply to locking type and slip-check type connector.

Table 3. Retaining force

Number of poles	Rated current A	Retaining force N {kgf}
2 poles	15 or less	10 to 60 { 1.02 to 6.12} ✓
	20	15 to 60 { 1.53 to 6.12}
	30	20 to 100 { 2.04 to 10.2}
2 poles (with earthed pole), 3 poles	15 or less	15 to 60 { 1.53 to 6.12}
	20	20 to 100 { 2.04 to 10.2}
	30, 50	30 to 120 { 3.06 to 12.2}
3 poles (with earthed pole)	15 or less	20 to 80 { 2.04 to 8.16}
	20	30 to 130 { 3.06 to 13.2}
	30	40 to 150 { 4.08 to 15.3}

4.2 Temperature rise When the test of 6.3 is performed, the temperature rise of the contact between the blade and the blade receiver and that of the screwless terminal and the blade of movable blade type shall not exceed the following values:

(1) Contact between blade and blade receiver

Rated current 15 A or less 30°C

Rated current 20 A or more 40°C

(2) Screwless terminal 35°C

(3) Blade of movable blade type 35°C

4.3 Contact resistance When the test of 6.4 is performed, the contact resistance between the blade and the blade receiver of earthing pole shall not exceed 50 mΩ.

4.4 Make and break When the test of 6.5 is performed, no short circuit between poles or other trouble harmful to use shall appear.

The pilot lamp, if equipped, shall operate surely.

4.5 Insulation resistance When the test of 6.6 is performed, the insulation resistance shall be 100 MΩ or more before the make and break test, and 5 MΩ or more after the same test.

4.6 Dielectric withstand voltage When connectors are tested according to 6.7, they shall withstand this test.

4.7 Resistance to heat When the test of 6.8 is performed, softening, deformation, swelling, or other abnormalities harmful to use shall not occur on synthetic resin moldings or rubber moldings.

4.8 Strength of screw terminal and lead-wire joint When the test of 6.9 is performed, the strength of the screw terminal and lead-wire joint shall comply with the following requirements:

- (1) For screw terminals Terminals or terminal screws shall not break.
- (2) For connectors with lead wires The joint with lead wire shall not be damaged.

4.9 Strength of blade fixing part When the test of 6.10 is performed, the following requirements shall be satisfied:

- (1) When connectors having blades fixed by caulking or screwing and not held or fixed at the outlet are tested according to 6.10 (1), the blade fixing parts shall not be damaged.
- (2) When connectors other than (1), having round or flat enclosure, and molded-on ones whose blade-support circumference is covered by such a hard insulating material as thermosetting resin are tested according to 6.10 (2), the blades shall not drop out of their fixed part.
- (3) Molded-on connectors shall comply with the following requirements. However, molded-on connectors in which the circumference of blade support is covered with hard insulation material such as thermo-setting resin are excluded.
 - (a) When the test of 6.10 (3)(a) is performed, the force required to bend the blades shall be not less than 40 N{4.08 kgf}.
 - (b) When the test of 6.10 (3)(b) is performed, the blades shall not break down or the enclosure of the blade fixing part shall not be damaged.
 - (c) When the test of 6.10 (3)(c) is performed, the blades shall not be broken.

4.10 Rotating property of movable plug type When the test of 6.19 is performed, no short circuit between poles or trouble detrimental to use, shall appear.

4.11 Strength of enclosure When the tests of 6.11 are performed, there shall be no damage of the enclosure or other trouble harmful to use. However, the enclosure compression test shall be applied exclusively to plugs, cord connector bodies, and multiple taps; the pendulum free fall test exclusively to plugs, cord connector bodies, and multiple taps having cord connecting parts; and the single body free fall test exclusively to plug-in-type multiple taps.

4.12 Strength of cord anchorage (cord tension releasing device) When the test of 6.12 is performed to check the strength of cord anchorage of connectors with cord and connectors which can connect cord, the displacement

between the supply cord and the connected internal terminal shall not exceed 2 mm. However, this is not applicable to connectors other than plugs, cord connector bodies, and multiple taps (excluding plug-in-type multiple taps).

4.13 Strength of cord outlet (cord flexural performance) When connectors with cord are tested according to 6.13, for the strength of cord outlet, no short circuit between lines shall occur, and the rate of broken wires shall not exceed 20 %.

4.14 Performance of screwless terminals When the tests of 6.14 to 6.17 are performed, screwless terminals shall comply with the following requirements.

The wires used in these tests shall be the insulated solid annealed copper wire specified in JIS C 3307.

Terminals allowing connection with wires of two or more sizes (nominal) shall be tested by using the wires of the minimum and the maximum sizes (nominal) on separate specimen connectors.

- (1) **Tensile strength** When the test of 6.14 is performed, no coming out of the wire, damage on terminal parts, or other trouble harmful to use shall appear.
- (2) **Bending strength** When the test of 6.15 is performed, the requirements of 4.2 shall be satisfied without occurrence of coming out of the wire, damage to terminal parts, or other trouble harmful to use.
- (3) **Terminal heat cycle** This test shall be performed according to 6.16 by using specimens which have been subjected to the temperature rise test of 6.3, and the difference between the temperature rise at 25th cycle and that at 125th cycle shall not exceed 8°C.
- (4) **Withstand overcurrent** When the test of 6.17 is performed, there shall be no trouble harmful to use on the terminal parts.

4.15 Endurance to ammonia gas When the test of 6.18 is performed, there shall be no damage or cracking on the terminal screws or other brass members. However, this test is not applicable to connectors other than socket-outlets.

4.16 Tensile load When the test of 6.20 is performed, there shall be no damage on the enclosure or cord grips or other trouble.

4.17 Waterproof When the test of 6.21 is performed, waterproof of connectors shall comply with the following requirements:

- (1) For rain-proof type connectors, no ingress of water shall be found in the live parts.
- (2) For water-tight type connectors, no ingress of water shall be found in the connector.
- (3) The insulation resistance shall be not less than 5 MΩ.
- (4) When the test of 6.7 is performed, the connector shall withstand the test.

4.18 Flame retardance When the test of 6.22 is performed, flame retardance of molded-on connector body integrated with supply wire or the like, shall be such that the flame goes out naturally within 60 s after removal of the flame.

5. Construction, dimensions and material

5.1 Construction in general The construction of connectors shall comply with the following requirements:

- (1) The connector shall have a correct shape and be durable.
- (2) Insertion and withdrawal of the plug shall be smooth and the electrical contact shall be sure.
- (3) There shall be no risk of contact of a person with the live metal parts in normal service condition.
- (4) There shall be no risk of occurrence of short circuit or earthing due to electric arc at the time of make or break (insertion or withdrawal of the plug).
- (5) For connectors having a metal enclosure (box and lid) or the like which is liable to be reached by arcs, such parts of the enclosure shall be provided with a lining of insulating material or the like.
- (6) The wire or cord entry shall be treated to prevent damage of the wire or cords.
- (7) Conducting metal parts and fixtures shall either be firmly installed by a method to prevent loosening, or be provided with effective means to restrict their movement to prevent adverse effects on their function.
- (8) The parts which are clamped by screws or rivets to pass current shall not be clamped with an insulating material liable to shrink under service conditions inserted between the conductors. If means are provided to prevent poor contact even when the insulation shrinks, such a case is an exception.
- (9) Connectors to be connected with cord, shall provide a space to allow treatment of cord end or a suitable tension releasing means at the joint of terminal and cord so that the cord tension is not directly exerted on the terminal.
- (10) The number of working threads of terminal screws shall be not less than two.
- (11) The lid shall not drop out in normal service conditions.

In connectors having screwed lid, one or more screw threads shall engage.

- (12) Live metal parts on the accessible surface and on the back surface of the base of surface type connectors (those installed on the surfaces of structural members and the like), shall be recessed from respective surfaces by not less than 3 mm and filled with a suitable quantity of a water resistant insulating, mixture (excluding sulfur), which does not soften at 65°C, by a method to prevent its dropping out. However, the filling with the mixtures may be omitted if the live metal parts on the back surface of the base have a clearance of 6 mm or more and a creepage distance of 10 mm or more from the mounting face.

- (13) The mounting frame of a multiple socket-outlet (refer to Attached Fig. 10) shall be capable of fixing the socket-outlet firmly.
- (14) Plugs and cord connector bodies shall have a size to allow easy insertion and withdrawal by hand and be provided with a slip-preventing means.
- (15) Connectors having the earth pole or neutral pole shall have such a construction that the blade of earthing pole contacts earlier than other blades when the said plug is pushed in and disconnects later than other blades when the plug is pulled out.
- (16) In molded-on multiple taps, the blade receiving parts shall not be fixed directly with soft thermoplastic resin (soft vinyl chloride, etc.).
- (17) The roots (the parts which are not inserted into the blade receiver) of folded blades [refer to Attached Fig. 1 (1) and Attached Fig. 2 (1)] shall be fixed not to drop out of the body, by bending them in L-shape or by other means.
- (18) Connectors having lead wires in place of terminals shall comply with the following requirements:
 - (a) The lead wires shall be wires or cords conforming to JIS C 3307, JIS C 3306, JIS C 3301, JIS C 3312, JIS C 3342 or at least equivalent.
 - (b) The joint between the terminal and the wire or the cord shall be securely connected by means of caulking, welding or the like.
- (19) In a movable blade type plug, the blade shall rotate smoothly over the movable range and shall ensure electrical contact.

5.2 Terminals Terminals, terminal screws and screwless terminals to be connected with wires or cords shall comply with the following requirements:

- (1) Excluding the terminals of connectors integral with lead wires or cords, terminals shall have such a construction that wires or cords having a size corresponding to the rated current can be easily and securely connected.
- (2) A terminal which clamps the wire or cord directly by the head of the terminal screw (hereafter referred to as the "screw terminal") shall be large fillister head machine screws (Informative reference Fig. 1) or screws having at least equivalent clamping effect thereto. However, the terminal screws of earth poles shall be slotted hexagon head machine screws (Informative reference Fig. 2) or slotted head machine screws having at least equivalent clamping effect thereto.
- (3) Terminal screws shall be made of brass. However, terminal screws of 30 A or more in rated current and not intended to carry current directly (excluding terminal screws for earth poles) may be made of steel plated as specified Class 2 - Grade 2 in JIS H 8610⁽⁵⁾ or better.

Note ⁽⁵⁾ Terminal screws made of steel, shall comply with 17.2 of JIS C 8306.

- (4) The size (nominal) of terminal screws shall, at least, have the value shown in Table 4 corresponding to the rated current. However, the terminal screws of earth poles shall have a size not less than M 4 (M 3.5 for terminal screws of 15 A or less in rated currents).

Table 4. Size of terminal screws (Nominal)

Rated current A		10, 12, 15	20	30	50
Designation of terminal screw (Nominal)	For screw terminals	M 4 ⁽⁶⁾	M 4	M 4.5	M 5
	For terminals by other clamping means	M 3.5	M 4	M 4.5	M 5

Note ⁽⁶⁾ Terminal screws intended for connection with cords only may be M 3.5 for 10 A, 12 A and 15 A.

- (5) Terminal screws shall not also be used for fixing of parts other than wires or cords. However, terminal screws which will not cause loosening of such parts when the wire or cord is attached or detached are exempted from the above requirement.
- (6) A terminal screw for earth pole which is fastened by fingers shall be so constructed that it can be fastened by fingers sufficiently, and will not work loose easily.
- (7) Screwless terminals shall comply with the following requirements:
- (a) The ratings of the devices shall be not more than 20 A.
 - (b) The construction shall be such that the conductor of the wire or cord (hereafter referred to as the "conductor") is supported between metal bodies under sufficient pressure without harmful damage to the conductor.
 - (c) The construction shall be such that the conductor can be directly inserted into and connected with the terminal correctly and easily and no harmful effect is given to the function of the device or to the terminal part when the conductor of the specified length is inserted to a sufficient depth.
 - (d) The construction shall allow easy detachment of the conductor by hand. In this case, simple tools in daily use (for example, a screw driver) may be used as an aid, but the terminals shall be so constructed that no harmful effect is given to the terminal or other parts by the use of such tools.
 - (e) A terminal in which two or more conductors are connected, shall have such a construction that individual conductor is connected, supported, and detached independently. However, it may be so constructed that all the conductors can be detached simultaneously.
 - (f) The length of the conductor required for connection shall be clearly marked on each connector.
- (8) Cords or cables* used for molded-on connectors shall be those complying with the provisions of JIS C 3301, JIS C 3306, JIS C 3312 or JIS C 3342, or at least equivalent.
- (9) The construction of shifting terminal shall be such that the wire corresponding to the apparatus rating, (minimum $\phi 1.6$ mm solid wire or 2 mm² stranded wire) can be connected.

5.3 Insulation The insulation used in connectors shall comply with the following requirements:

- (1) The insulation used for fixing of conducting metal parts shall be either of ceramic materials, phenol resin molding as specified in JIS K 6915, urea resin molding as specified in JIS K 6916 or at least equivalent. However, for plugs, cord connector bodies, and multiple taps, rubber moldings, polyvinyl chloride moldings, or similar less hygroscopic insulation may be used.
- (2) The insulation used for enclosure, lids and the like shall be of ceramic materials, phenol resin, urea resin, acrylonitrilebutadiene-styrene (ABS resin), acrylonitrilestyrene (AS resin), polyvinyl chloride, rubber (synthetic rubber for waterproof type) or similar less hygroscopic insulating materials.
- (3) Mounting frames made of synthetic resins shall consist of insulating materials which are excellent in mechanical characteristics and less hygroscopic.
- (4) Except for those specified in the above (1) to (3), insulating materials used shall have characteristics suitable for the location at which they are used.

5.4 Materials of conductive metal parts Materials of conductive metal parts shall comply with the following requirements:

- (1) The material of conductive metal parts other than those specified in (2) shall be copper or copper alloys.
- (2) The material of conductive metal parts acting as spring shall be phosphor bronze specified in JIS H 3110, brass specified in JIS H 3100, or similar spring characteristics and rust-resistant metals.
- (3) The caulking rivets and the like used for mutual connection between conductive metal parts shall be made of copper or copper alloys.

5.5 Material of non-conductive metal parts The materials of metal parts which are not intended to be conductive shall comply with the following requirements:

- (1) The materials of springs shall be hard steel wires, piano wires, phosphor bronze, or stainless steel.
- (2) The materials other than those specified in (1) shall be steel plated for rust prevention or other rust-resistant metals.

5.6 Shapes and dimensions of blades and blade receiving holes The shapes and dimensions of blades and blade receiving holes other than those of the locking type connectors shall be as shown in Attached Figs. 1 to 4 according to the number of poles, pole arrangement, and rating.

The shapes of parts for which the dimensions are not specified in the Attached Figs. 1 to 9 are shown as examples.

5.7 Dimensions of mounting parts of recessed socket-outlets The dimensions of mounting parts of recessed socket-outlets of normal type and of multiple type shall be as given in Attached Figs. 9 and 10 respectively. If socket-outlets are built in an apparatus, furniture, raceway connector or the like, the dimensions of mounting parts and bosses are not necessarily comply with Attached Figs. 9 and 10.

The dimensions of multiple socket-outlet without mounting frame shall comply with Attached Fig. 10 under the condition that the outlet is fixed to the mounting frame.

5.8 Dimensions of cable entry The dimensions of cable entry of normal exposed type socket-outlets shall conform to Table 5.

Table 5. Size of cable entry

Unit: mm

Rated current		15 A	20 A	30 A	50 A
Dimensions of cable entry (minimum value)	Single-core	7	8	9	13
	2-core	7 x 12	8 x 14	9 x 14	13 x 23
	3-core	7 x 16	8 x 19	9 x 19	13 x 34

Remarks: The dimensions for 2-core and 3-core cables are specified for parallel type cables (VVF) specified in JIS C 43342.

5.9 Insulation distances The insulation distances shall comply with the following requirements, unless otherwise specified.

- (1) The clearance and creepage distance between the live metal parts of different polarity, between the live metal parts and the dead metal parts liable to be earthed or to come contact with a personal body, and between the live parts and the surface of non-metallic parts, shall be not less than 3 mm each. However, for the parts, excluding terminal parts for connection with wires or cords, where components are firmly fixed and no deposition of metal powder is anticipated and components are fixed by walls of insulating materials, the distance may be 1.5 mm or more if the rated voltage is 125 V or 2 mm or more if the voltage is 250 V.
- (2) The thickness of an accessible enclosure of insulating material with which live metal parts are in contact shall be not less than 0.8 mm.

5.10 Symbols of poles For connectors having an earth pole or a pole of earth side, symbols shall be clearly marked on the terminals or the base in the vicinity as follows:

- (1) Earth pole and earth terminal shall be marked with graphic symbol $\oplus$, letter symbol PE, or letters "protective earth". However, the marking may be $\perp$, E, G, earth, or earth terminal for the time being.
- (2) Pole of earth side shall be marked with the letter symbol N or W.

5.11 Locking type, slip-check type connectors The construction, dimensions, and materials of locking type, slip-check type connectors shall comply with the following requirements in addition to those specified in 5.1 to 5.10.

- (1) Locking type socket-outlet and locking type cord connector body as well as slip-check type socket-outlet and slip-check type cord connector body shall have such construction that the blades catch the blade receivers in proper position of contact when respective adaptable plug is inserted into it and turned to the right, and the blades can be withdrawn when the plug is turned to left from the said position. The direction of turning shall be marked.

Further, the plug shall not rotate or come out easily due to the twisting of the cord.

- (2) Excluding the molded-on type, connectors to be connected with cords shall be provided with cord grips or mechanism to release cord tension so that the cord tension is not exerted on the joint between the terminal and the cord.
- (3) Locking type plug and locking type cord connector body shall have shapes which facilitate gripping when withdrawing and inserting the plug.
- (4) The shapes and dimensions of blades and blade receiving holes shall conform to Attached Figs. 5 to 8. However, that, the slip-check type shall comply with Attached Fig. 1 (6) and Attached Fig. 2 (9).

5.12 Waterproof connectors The construction, dimensions, and material of waterproof connectors shall comply with the following requirements in addition to compliance with provisions of 5.1 to 5.11.

- (1) Rain-proof connectors shall comply with the following requirements:
 - (a) The construction shall be such, in normal service conditions, that it is difficult that water can enter into the connector through wire or cord entries, mounting holes, other openings on the enclosure, etc.
 - (b) Socket-outlets shall have construction to prevent the penetration of water from the blade receiving holes without the plug inserted, by suitable means such as a shutter.
 - (c) For surface type socket-outlets having live metal parts on the mounting side, there shall be a clearance of not less than 4 mm between the surface of that part and the mounting face for the socket-outlet. The live metal parts shall be recessed by not less than 3 mm from the mounting face, and the spaces shall be filled with less hygroscopic insulating mixtures (excluding sulfur) to seal the live metal parts in such a manner as to prevent the dropping out of the insulating compound.
 - (d) The shapes and dimensions of blades and blade receiving holes shall be as specified in 5.6 and 5.11 (4).

- (2) Watertight connectors shall comply with the following requirements:
- (a) The construction shall be such that no water can enter into the connector under normal service conditions.
 - (b) The construction shall be such that the dropping out of the plug can be prevented by suitable means such as a union ring so that the plug does not drop out due to the tension exerted on the cord in the condition of the plug being inserted.
 - (c) Socket-outlets and cord connector bodies shall have such a construction that no water can enter through the blade receiving holes with the plug detached.
 - (d) Plugs and connector bodies shall have cord grips so that the tension exerted on the cord is not exerted on the joint between the cord and the terminal.
 - (e) The construction shall be such that plugs having the blade specified in Table 1 cannot be inserted into the watertight connectors.
- (3) Lids, union rings, and the like used for waterproofing shall be connected with the connector by suitable means such as a chain to avoid the risk of missing of such parts.
- (4) Metallic materials used for the parts exposed to rain water shall be rust-resistant and durable metals, or steel or iron treated for deterrent to rusting. however, the material of springs shall be phosphor bronze as specified in JIS H 3110 or stainless steel.
- (5) The material used for gaskets shall be a material resistant to deterioration, such as synthetic rubber.

6. Testing methods

6.1 Construction test The method specified in 3. of JIS C 8306 shall be applied. In addition, the items specified in 5. and 9. of this Standard shall be investigated.

The mounting dimensions of attachment plug shall be measured at the root of blade (in a plane where the plug mates with the socket outlet) and the width and thickness shall be measured at a position almost $\frac{2}{3}$ of the total length from the root.

6.2 Retaining force test The method specified in 6. of JIS C 8306 shall be applied.

6.3 Temperature rise test The method specified in 4. of JIS C 8306 shall be applied. When it is difficult to disassemble, however, the temperature rise of the blade receiver may be measured at the root of plug.

For connectors of recessed type which are mounted to a structure other than a switch box, the measurements shall be carried out with the connector mounted as close as in practical service.

6.4 Contact resistance test The method specified in 5. (1) or 5. (2) of JIS C 8306 shall be applied.

6.5 Make and break test The make and break test shall be performed in accordance with 10. of JIS C 8306 under the following conditions:

- (1) For connectors having blade receivers of a rated currents not exceeding 20 A, a make and break operation is repeated 5,000 cycles continuously at a rate of 20 cycles per minute under application of current in both the make and break operations, in accordance with Table 5 (b) of 10. (7) specified in JIS C 8306. Then the test of Table 3 (a) of 10. (6) specified in JIS C 8306 shall be carried out.

For a connector having a shutter so constructed that the shutter is opened by being pushed by the tip of the plug blade, the test plug shall be replaced every 1,000 cycles of the make and break operation.

- (2) For a connector having blade receivers of a rated current 30 A or 50 A, the test shall be performed in accordance with Table 3 (a) of 10. (6) specified in JIS C 8306.
- (3) For locking type and slip-check type connectors, the test shall be performed in accordance with Table 3 (a) of 10. (6) specified in JIS C 8306.

6.6 Insulation resistance test The insulation resistance test shall be performed in accordance with 7. of JIS C 8306.

For connectors having pilot lamps or the like between poles, the test shall be performed with such pilot lamps removed.

6.7 Dielectric withstand voltage test The dielectric withstand voltage test shall be performed in accordance with 8. of JIS C 8306.

The test shall be performed on a connector to be mounted to a place other than switch box, with the connector mounted as in practical service, and on a connector having pilot lamp or the like between poles, with the lamp removed.

6.8 Heat resistance test The heat resistance test shall be performed in accordance with 14. of JIS C 8306. However, the test shall be performed at 100°C for 1 h for products of thermosetting resin molding, and at 80°C for 7 h for thermoplastic resin-molded products and rubber-molded products.

6.9 Strength test of screw terminal and lead-wire joint The strength test of screw terminal and lead-wire joint shall be performed as follows:

- (1) The strength test of screw terminal part shall be performed in accordance with (1) of 13.1.1 and (2) of 13.1.1 of JIS C 8306.
- (2) The connector with lead wire shall be tested as specified in 13.1.3 of JIS C 8306.

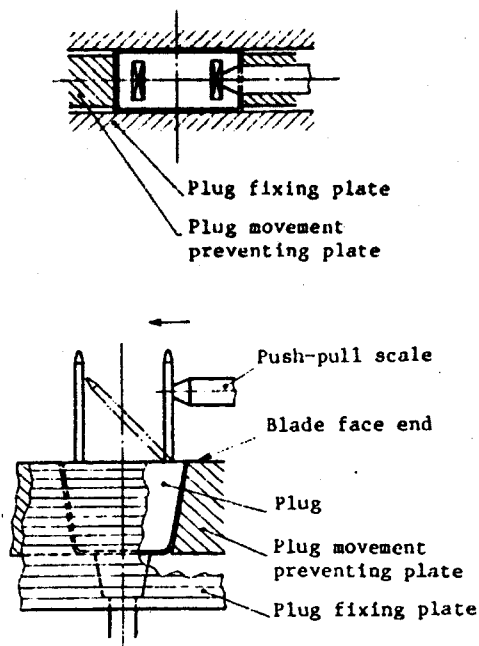
6.10 Test for strength of blade fitting part The test for strength of blade fitting parts shall be performed as follows for connectors having normal type 2-pole plugs excluding earthing pole of 15 A or less in rated current, with the exception of locking-type.

- (1) For connectors in which the blades are fixed by caulking or screws, and the outlet of blades is not held or fixed; the enclosure is fixed on a suitable testing base, a force is applied on the tip of blades (the part having a hole) in the direction at right angles to the blade surface (wide surface) and the force is gradually increased to reach 100 N {10.2 kgf}, the force is maintained at this value for 1 min and then existence or non-existence of damage on the fitting parts is checked.
- (2) For connectors having flat-shape and round-shape enclosure other than those of (1) and molded-on connectors in which the periphery of blade support is covered with rigid insulation such as thermosetting resins; a flat steel plate, having holes of such a size as to allow a gap of about 1 mm around the blade, is placed horizontally, the specimen connector is placed on the plate so that its blades protrude downward from the centers of the holes, a gradually increasing tensile force is applied straightly downward on the tips of the blades (the part of hole) so that the force is exerted simultaneously on the two blades, the force is gradually increased to 100 N {10.2 kgf}, the force is maintained at this value for 2 min and then existence or non-existence of dropping out of blades is checked. However, for connectors having blade fitting parts consisting of soft insulating material such as polyvinyl chloride, the force used shall be 70 N {7.14 kgf}.
- (3) For molded-on connectors, the test shall be performed according to the following (a), (b) and (c):

Molded-on connectors in which the circumference of blade support is covered with hard insulating material such as thermosetting resin are excluded. Provided that, (a) applies to folded blades and (c) to solid blades.

- (a) The specimen is allowed to stand in air at $20 \pm 2^\circ\text{C}$ for about 1 h, immediately it is fixed as shown in Fig. 1, a force is applied to the tip of one of the blades (the part of hole) in the direction at right angles to the surface (wide surface) of the blade, the force is gradually increased and the value of the force when the blade tip touches the other blade is measured.
- (b) The specimen is allowed to stand in air at $20 \pm 2^\circ\text{C}$ for about 1 h, immediately it is fixed as shown in Fig. 2, and one of the blades is moved alternately to the right and left, through an angle of 15° in each direction continuously 30 times at a rate of 10 times per minute.
- (c) The blade is fixed as shown in Fig. 3 and is moved alternately to the right and left, through an angle of 30° in each direction, 5 times.

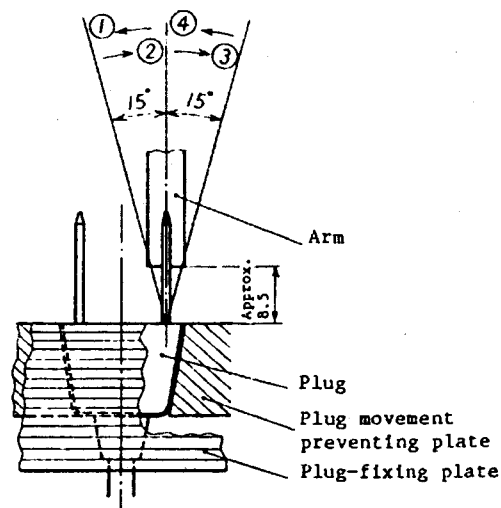
Fig. 1. Loading direction to blade



Unit: mm

Remarks: The plug fixing plate shall fix the plug at the corresponding plug surface, and the plug movement preventing plate shall be placed in close contact with the corresponding plug surface. If the plug surface is uneven, movement may be prevented at two or more points, with one of the points positioned at the blade face end.

Fig. 2. Fixing and reciprocating angle of blade

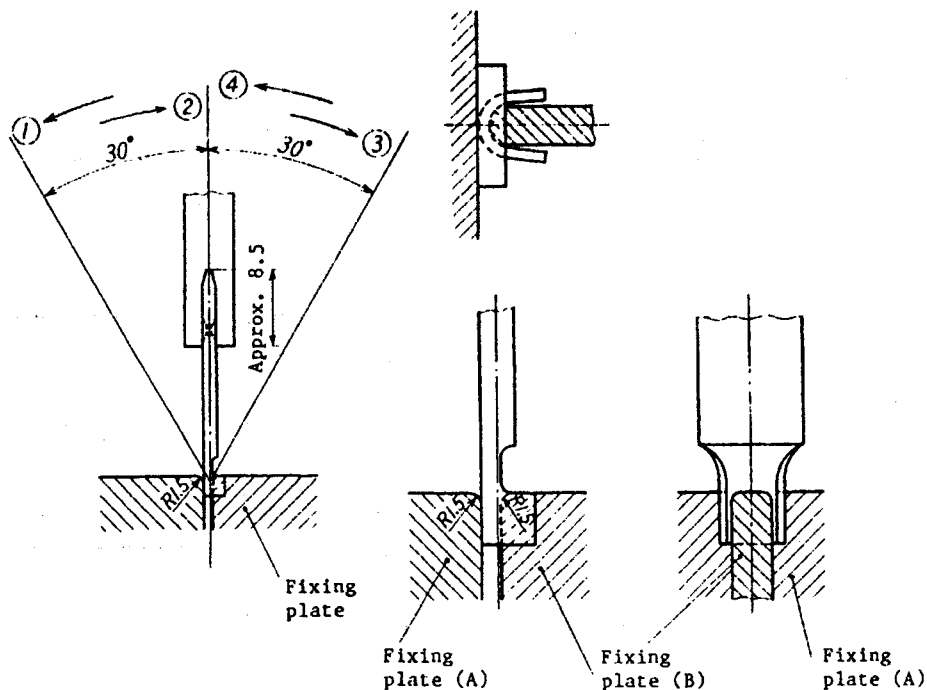


Unit: mm

- Remarks 1. The plug fixing plate shall fix the plug at the corresponding plug surface, and the plug movement preventing plate shall be placed in close contact with the corresponding plug surface. If the plug surface is uneven, movement may be prevented at two or more points, with one of the points positioned at the blade face end.
2. The number of times shall be counted by taking the movement of ① - ② as one time and the movement of ③ - ④ as one time.

Fig. 3. Fixing and reciprocating angle of blade

Unit: mm



Remarks: The number of times shall be counted by taking the movement of ① - ② as one time, and the movement of ③ - ④ as one time.

6.11 Enclosure strength tests The tests for the strength of enclosure shall be performed as follows:

- (1) Enclosure compressing test The test of 13.5.2 of JIS C 8306 shall be performed.
- (2) Pendulum free fall test The test of 13.5.3 (1) of JIS C 8306 shall be performed. However, the height of fall (H) shall be 1 m, length of cord (L) shall be 1 m and the number of times of falling shall be three.
- (3) Single body free fall test The test of 13.5.3 (2) of JIS C 8306 shall be performed. However, the height of fall (H) shall be 1 m and the number of times of falling shall be three.

6.12 Strength test of cord anchorage (cord tension releasing device)
The test of 13.2.1 of JIS C 8306 shall be performed.

6.13 Strength test of cord outlet (cord flexural performance) The test of 13.2.2 (2) of JIS C 8306 shall be performed.

6.14 Tensile strength test of screwless terminal The test of 13.1.2 (1) of JIS C 8306 shall be performed.

6.15 Bending test of screwless terminal The test of 13.1.2 (2) of JIS C 8306 shall be performed.

6.16 Cyclic heating test of screwless terminal The test of 16. of JIS C 8306 shall be performed. When there is no shifting terminals, however, the test shall be performed under such a state that a plug corresponding to the pole arrangement of the specimen to which about 30 cm of the cord specified in Table 2 is connected is inserted into the specimen.

When there are shifting terminals, the test shall be performed on all terminals of the same specimen.

6.17 Withstand overcurrent test of screwless terminal The test of 12. of JIS C 8306 shall be performed. The connecting wire shall be as specified in Table 2 of JIS C 8306, and the test current shall be 1000 A.

6.18 Ammonia gas durability test The test of 18. of JIS C 8306 shall be performed.

The duration of test and tightening torque of the terminal screw for terminal with screw shall be as follows:

- (1) The duration of test shall be 24 h.
- (2) Tightening torque of the terminal screw shall be $\frac{2}{3}$ of the value specified in Table 7 of JIS C 8306.

6.19 Rotating test of movable plug-blade type The movable plug-blade type connector shall be rotated continuously 1000 times at a rate of 20 times per minute, under the conditions of (a) rated load test given in Table 5 in 10. (7) of JIS C 8306, where reciplocation from the center of movable range to one end of the range and back to the center is counted as one time.

6.20 Tensile load test The tensile load test for locking type and slip-check type connectors shall be performed as follows:

- (1) The specimen plug and cord connector body, socket-outlet or multiple tap are correctly assembled as in normal service conditions, a tensile force is applied between the plug and the cord connector body, socket-outlet or multiple tap, the force is gradually increased to 300 N {30.6 kgf}, and then the force is maintained at this value for 1 min. For slip-check type, however, the load shall be 100 N {10.2 kgf}.
- (2) A cord is properly connected to the specimen plug or cord connector body, a tensile force is applied between the cord and the connector, the force is gradually increased to 200 N {20.4 kgf}, and then the force is maintained at this value for 1 min. For slip-check type, however, the load shall be 100 N {10.2 kgf}.

6.21 Waterproof test The waterproof test of waterproof-type connectors shall be performed in accordance with 9. of JIS C 8306.

6.22 Flame retardance test The flame retardance test shall be carried out in such a manner that the cord connector body is held horizontally. The central part of the body is burnt by reducing flame of about 130 mm long produced by a Bunsen burner, and the period after removal of the flame until the burning dies out naturally is measured.

7. Inspection

7.1 Type inspection The type inspection shall be performed by testing the same specimen connector by the testing methods of 6. in the order of the following items, and the test results shall comply with the requirements of 4., 5. and 9. However, the tests of (1), (13) to (26) may be performed by using separate specimen connectors.

The tests of (2) and (4) to (9) shall be carried out on connectors having blade receivers and movable plug-blade type.

- (1) Construction
- (2) Retaining force (excluding locking type)
- (3) Insulation resistance
- (4) Temperature rise
- (5) Contact resistance (for only connector with earthing pole)
- (6) Make and break (at rated load, overload)
- (7) Rotation of movable plug-blade type (for only connector of movable plug-blade type)
- (8) Retaining force (excluding locking type)
- (9) Temperature rise
- (10) Contact resistance (for only connector with earthing pole)
- (11) Insulation resistance
- (12) Dielectric withstand voltage
- (13) Resistance to heat
- (14) Terminal strength (excluding molded-on type)
- (15) Enclosure strength (enclosure compressing test is applicable only to plugs, cord connector bodies and table taps; pendulum free fall test only to plugs, cord connector bodies, and multiple taps having joints with cord; and single body free fall test only to insertion type multiple taps.)
- (16) Blade fitting strength (for only normal type, 2-pole, 15 A or less plugs, excluding locking type.)
- (17) Strength of cord anchoring (cord tension releasing device) (applicable only to connectors with cords excluding locking type, and connectors which can connect a cord.)
- (18) Cord outlet strength (cord flexural performance) (applicable only to connectors with cord.)
- (19) Tensile strength of screwless terminal (applicable only to connectors having screwless terminals.)

- (20) Bending of screwless terminal (applicable to connectors having screwless terminals only.)
- (21) Terminal heat cycle of screwless terminal (applicable only to connectors having screwless terminals.)
- (22) Withstand overcurrent of screwless terminal (applicable only to connectors having screwless terminals.)
- (23) Endurance to ammonia gas (for only socket-outlets.)
- (24) Tensile load (for only locking type and slip-check type.)
- (25) Waterproof (for only waterproof connectors.)
- (26) Flame retardance (for only molded-on cord connector body.)

7.2 Acceptance inspection The acceptance inspection shall be performed on the same specimen connector according to 6. in the order of the following items, and the test results shall comply with the requirements of 4.1, 4.5, 4.6, 5. and 9. However, a part of the inspection items may be omitted subject to agreement between the parties concerned with acceptance.

- (1) Construction
- (2) Insulation resistance
- (3) Dielectric withstand voltage
- (4) Retaining force (for only connectors having blade receivers, but excluding locking type connectors.)

8. Designation of products The product shall be designated by the type, number of poles, and rating.

Examples 1. Plug 2-pole 15 A 125 V

- 2. Plug with earthing pole 2-pole 15 A 125 V
- 3. Multiple tap 2-pole 10 A 125 V
- 4. Socket-outlet 3-pole 20 A 250 V
- 5. Surface socket-outlet 3-pole 20 A 250 V
- 6. Recessed socket-outlet 2-pole 15 A 125 V
- 7. Locking type plug 2-pole 15 A 125 V
- 8. Locking type surface socket-outlet 3-pole 20 A 250 V
- 9. Rain-proof socket-outlet 2-pole 30 A 250 V
- 10. Watertight plug 2-pole 20 A 250 V
- 11. Watertight cord connector body 30 A 250 V
- 12. Slip-check type socket-outlet 2-pole 15 A 125 V

9. Marking The following items shall be marked clearly and indelibly on the surface of the enclosure or at an easily visible position of each product.

- (1) Rated voltage
- (2) Rated current
- (3) Name of manufacturer or its abbreviation
- (4) Size (nominal) of cables or cords connectable to the terminals (for only connectors having screwless terminals.)
- (5) Length of conductor to be inserted into the terminals (for only connectors having screwless terminals.)
- (6) Kind of waterproof (Omitted for normal type)

Related standards:

JIS B 0205 Metric coarse screw threads

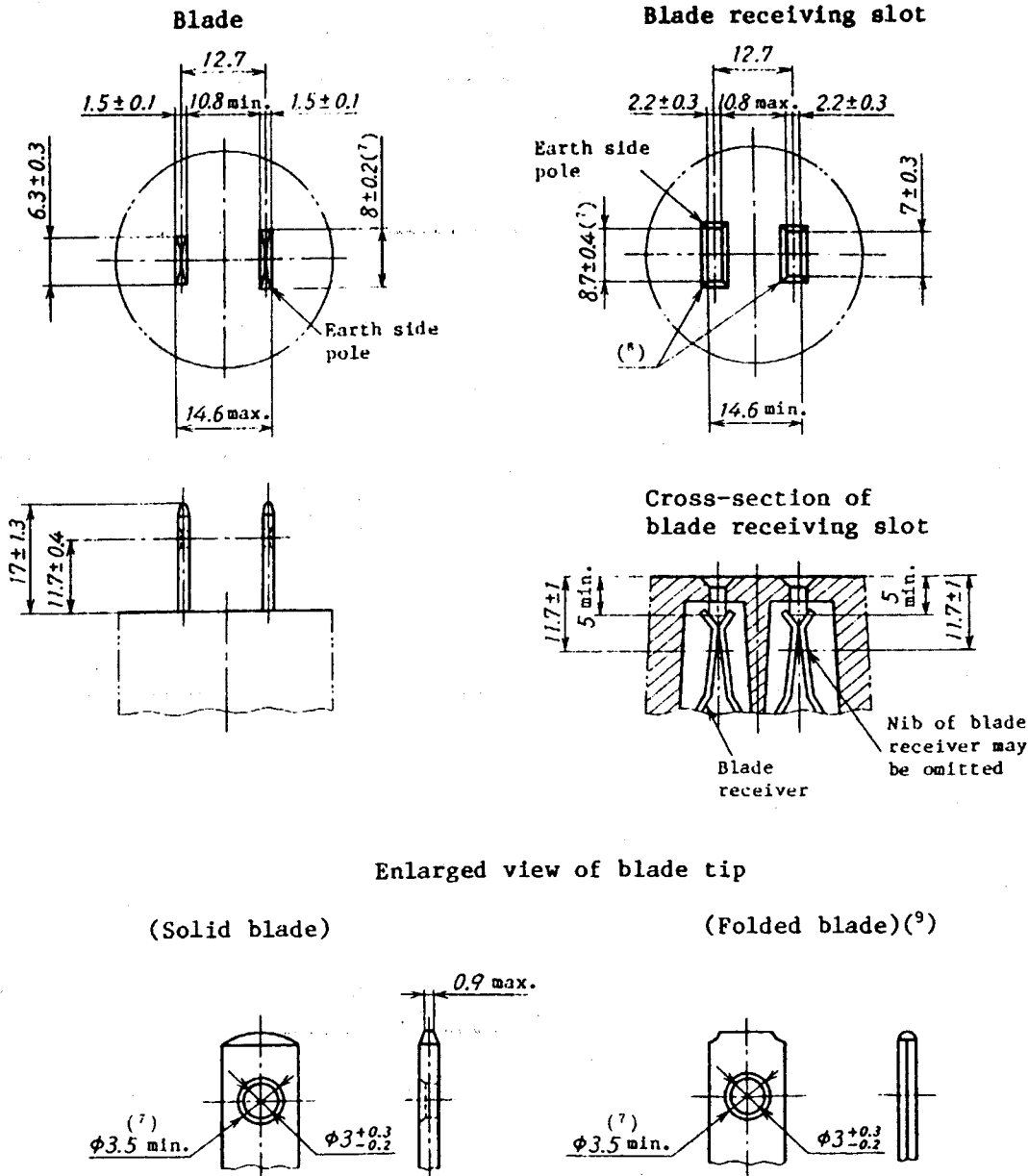
JIS B 1012 Cross recesses for screws

26
C 8303-1993

Attached Fig. 1. Two-pole connector
(Shape of blade receiver shows one example.)

(1) 15 A 125 V

Unit: mm



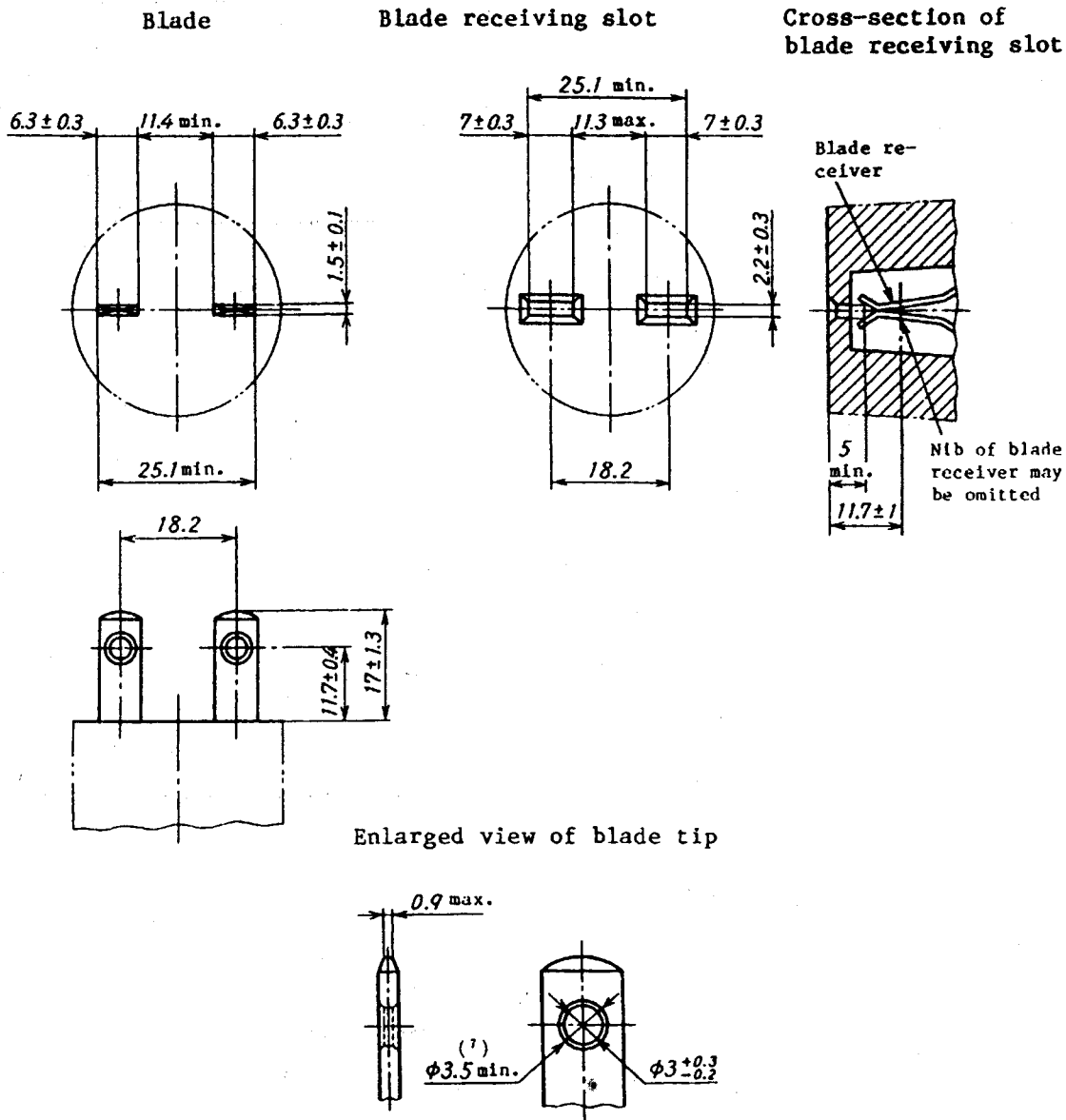
- Notes ⁽⁷⁾ Where blades are not polarized, the blade width shall be 6.3 ± 0.3 mm, and the width of the blade receiving slot shall be 7 ± 0.3 mm. The chamfering of the blade holes shall be applied to both sides.
- ⁽⁸⁾ The chamfering of insertion holes may be partially omitted if it is difficult due to manufacturing process.
- ⁽⁹⁾ In the case of folded blades, the thickness of material plate shall be 0.6 mm or larger, and ribs or the like may be provided. However, the finished thickness shall be 1.5 ± 0.1 mm and the rated current shall be 7 A or less.

- Remarks 1. The dimensions not accompanied by tolerances show basic size.
2. The tip of plug blade shall be smooth.
3. The plug insertion port of blade receiving slot shall be chamfered.

Attached Fig. 1 (Cont'd)

(2) 15 A 250 V

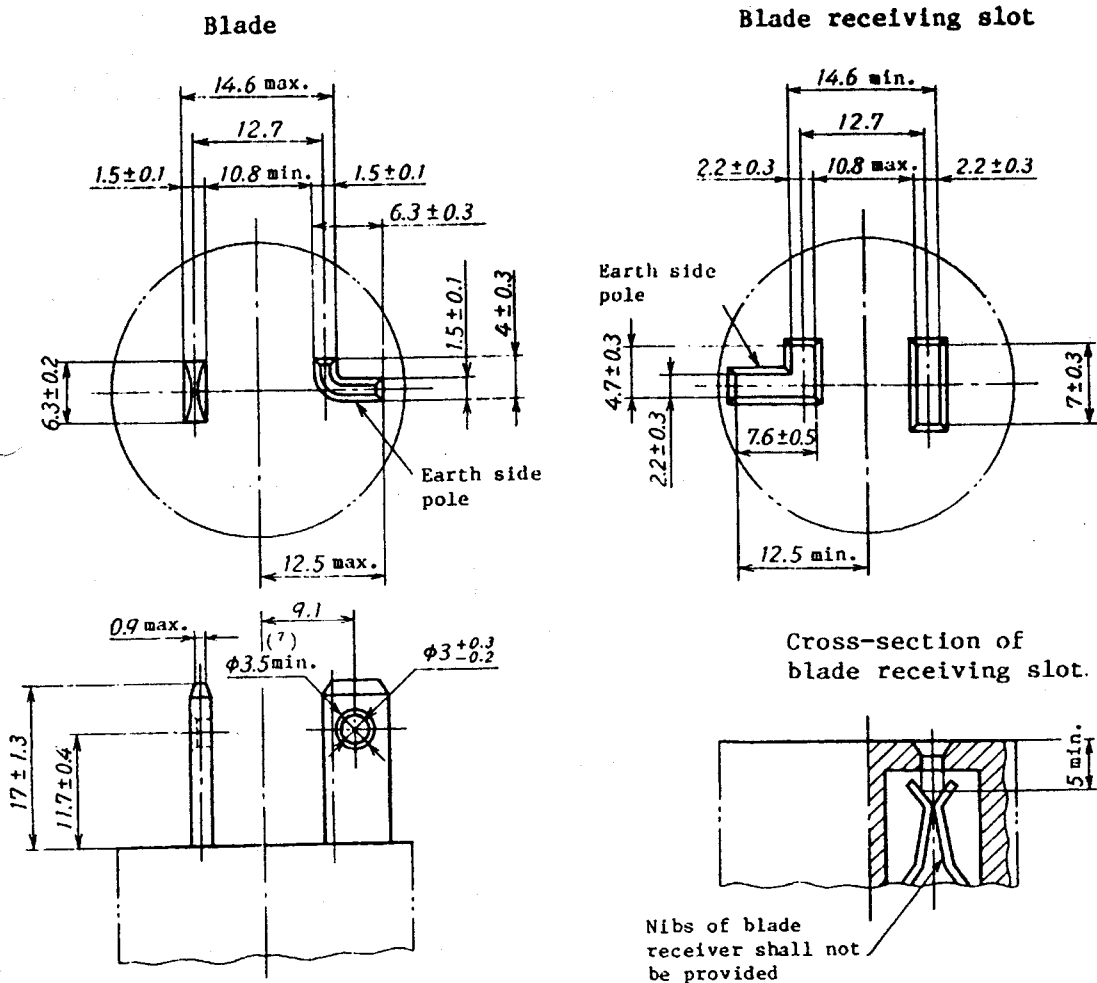
Unit: mm



Attached Fig. 1 (Cont'd)

(3) 20 A 125 V

Unit: mm

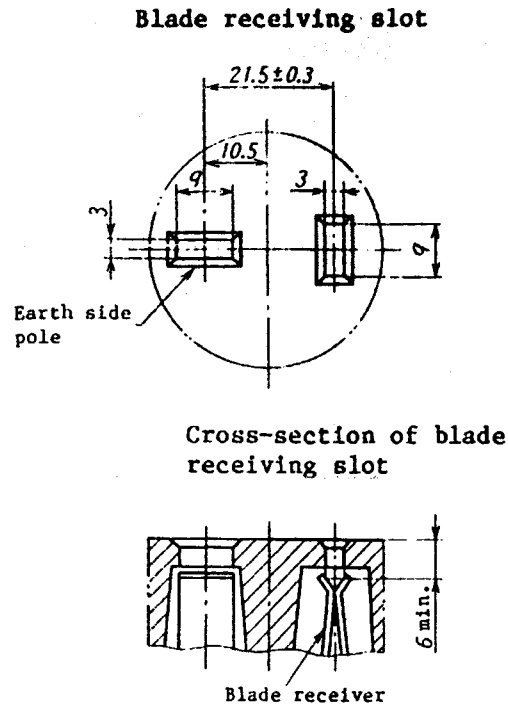
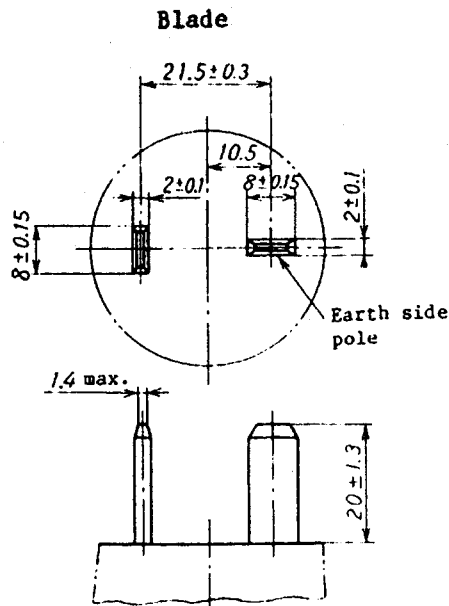


Remarks: The dimensions of nib hole on the blade of the earth side pole is applicable with respect to the longitudinal direction of blade and not applicable to the traverse direction of the blade.

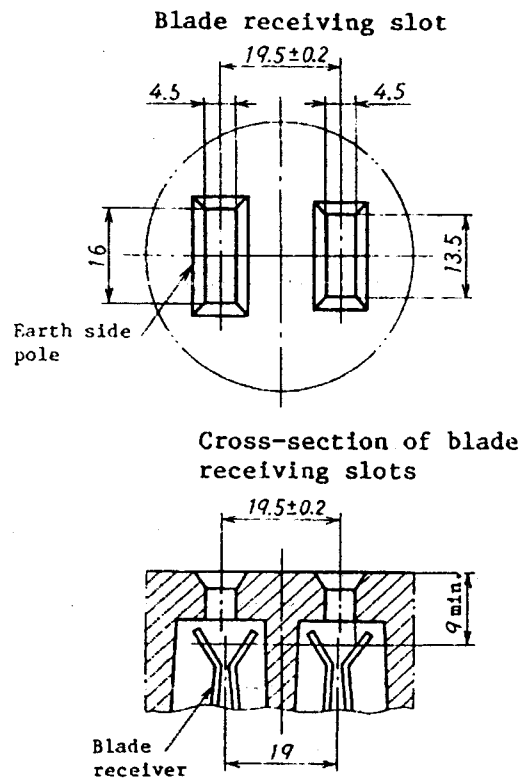
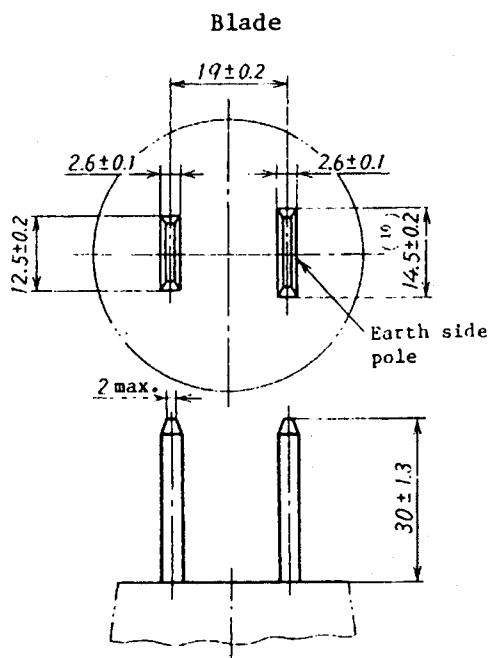
Attached Fig. 1 (Cont'd)

(4) 20 A 250 V

Unit: mm



(5) 30 A 250 V



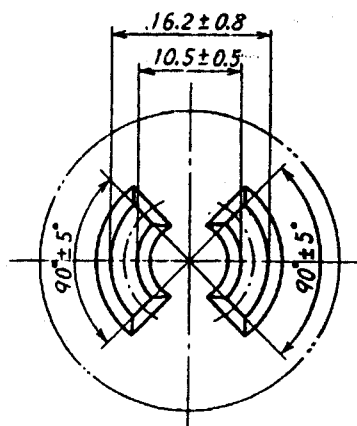
Note (¹⁰) Where blades are not polarized, the blade width shall be 12.5 ± 0.2 mm.

Attached Fig. 1 (Cont'd)

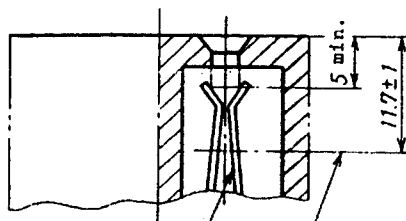
(6) 15 A 125 V (Slip-check type)

Unit: mm

Blade receiving slot



Cross-section of blade
receiving slot



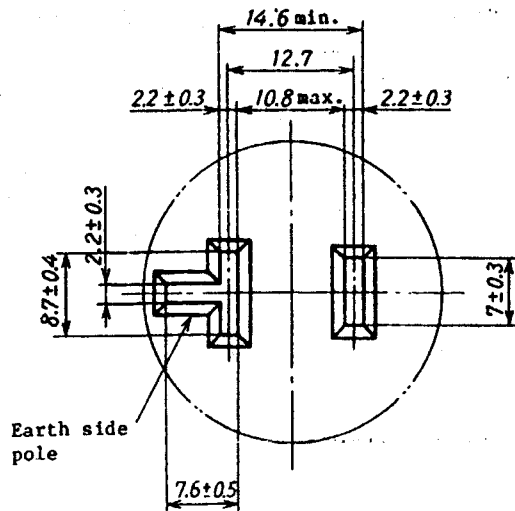
Blade receiver Center line of nib

Attached Fig. 1 (Cont'd)

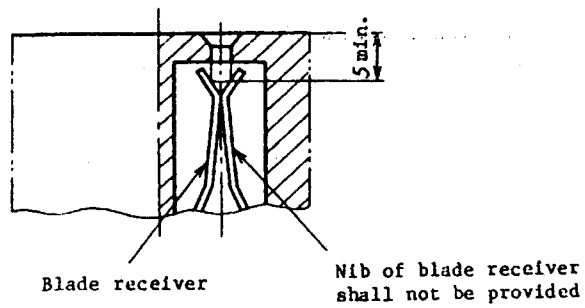
(7) 20 A 125 V

Unit: mm

Blade receiving slot



Cross section of blade receiving slot

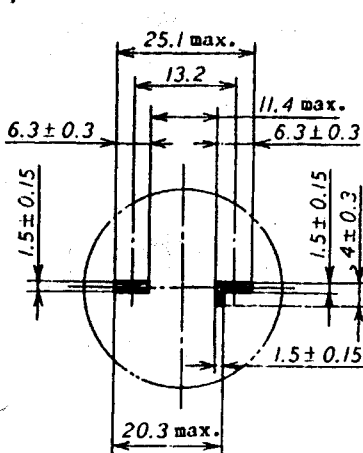


Attached Fig. 1 (Cont'd)

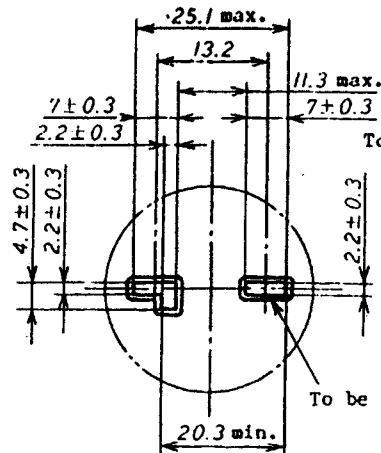
(8) 20 A 250 V

Unit: mm

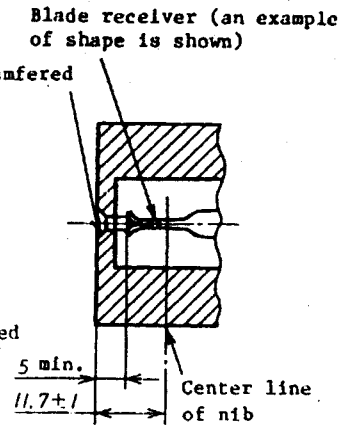
Blade



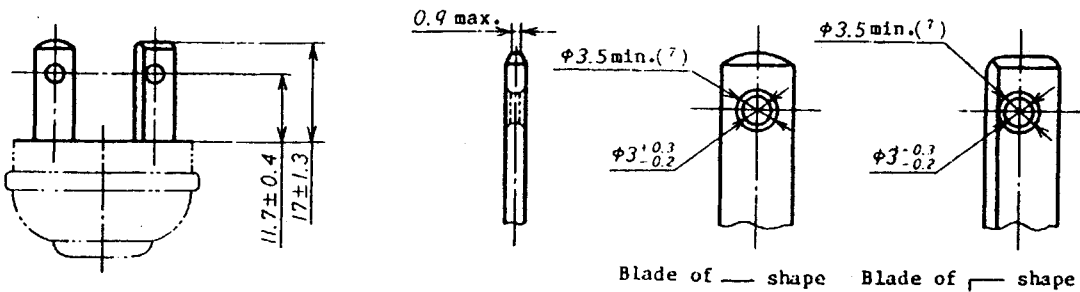
Blade receiving slot



Cross section of blade receiving slot



Enlarged view of blade tip

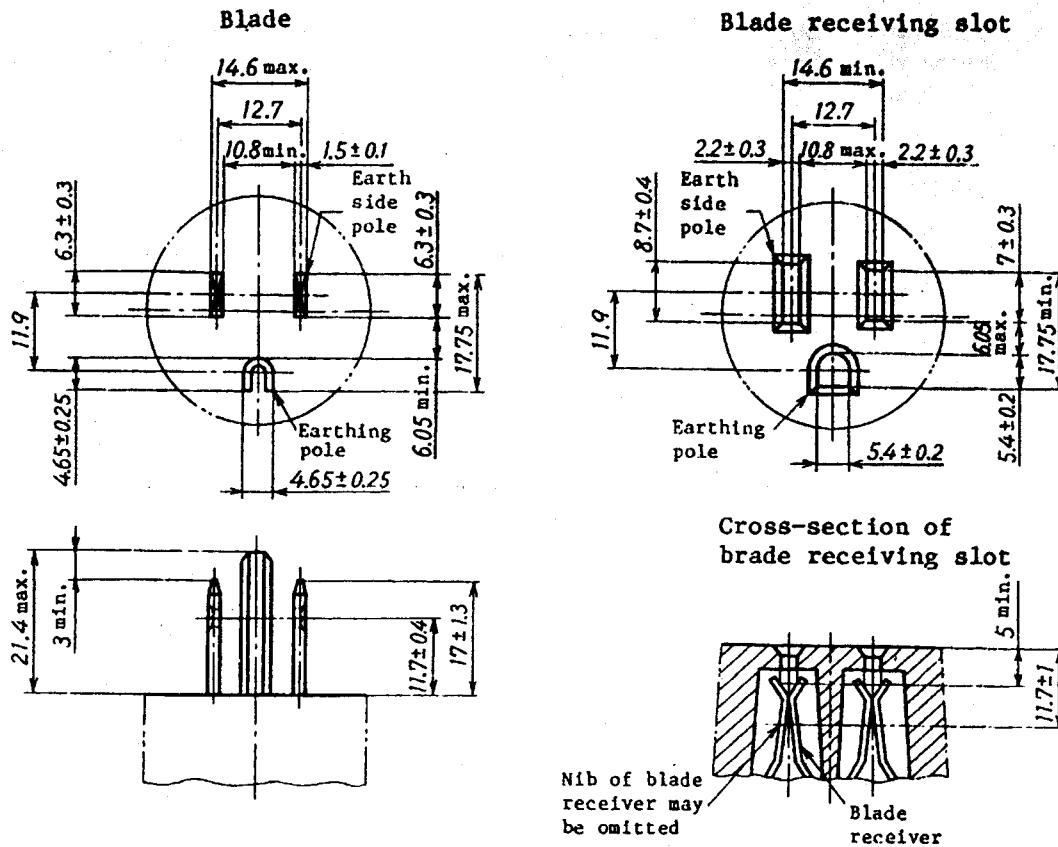


Remarks: The dimension of hole in a blade of J shape is applicable to the longitudinal direction of blade, but not applicable to the lateral direction of blade.

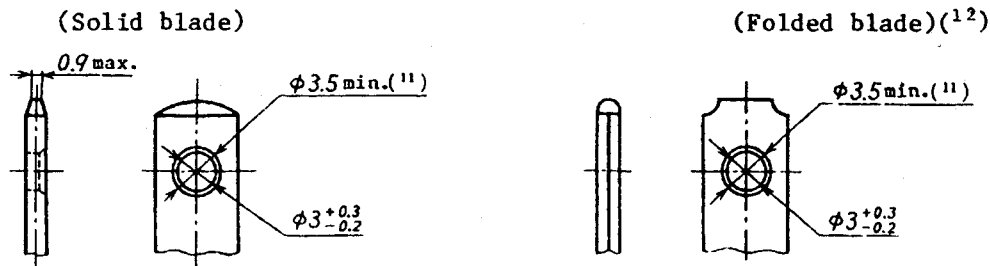
Attached Fig. 2. Two-pole connector with earthing pole
(Shape of blade receiver shows one example)

(1) 15 A 125 V

Unit: mm



Enlarged view of blade head



Notes ⁽¹¹⁾ The chamfering of nib hole of blade shall be made on both sides.

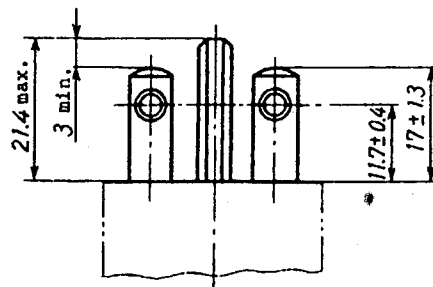
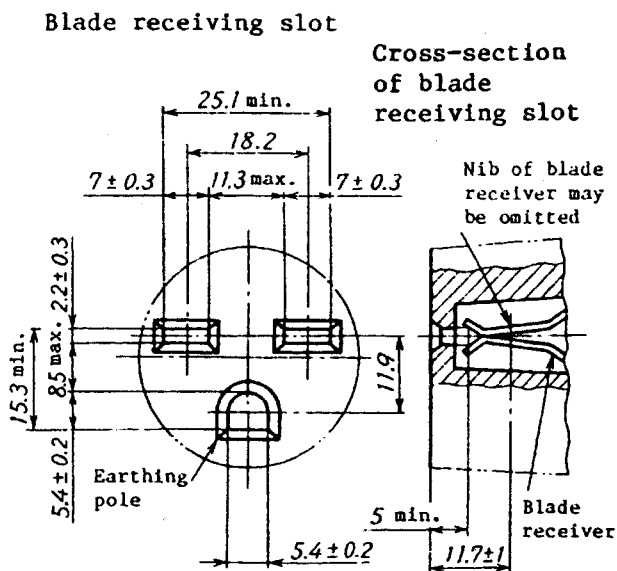
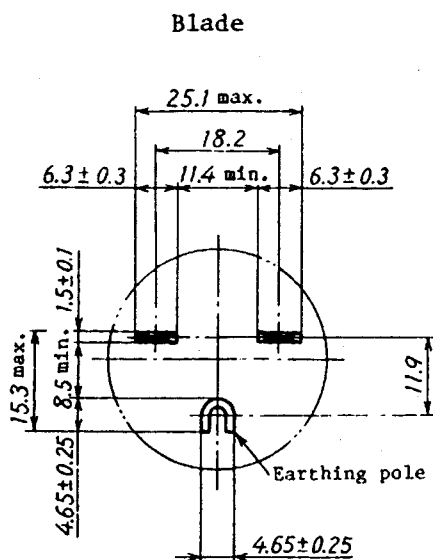
⁽¹²⁾ In the case of folded blades, the thickness of material plate shall be 0.6 mm or more, and ribs or the like may be attached. However, the finished thickness shall be 1.5 ± 0.1 mm, and the rated current shall be not more than 7 A.

- Remarks 1. The blade of the earthing pole may be a round pin.
[This is the same in (2), (3), (4), (5), (6), (7) and (8) of Attached Fig. 2.]
2. The nib hole dimensions of 11.7 ± 1 mm is not applicable to the earthing pole.
[This is the same in (2), (4), (8) and (9) of Attached Fig. 2.]
3. The dimensions not accompanied by tolerances show basic size.
4. The tip of plug blade shall be smooth.
5. The plug insertion port of blade receiving slot shall be chamfered.

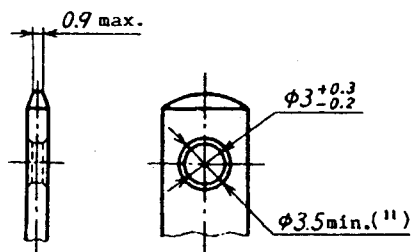
Attached Fig. 2 (Cont'd)

(2) 15 A 250 V

Unit: mm



Enlarged view of blade head



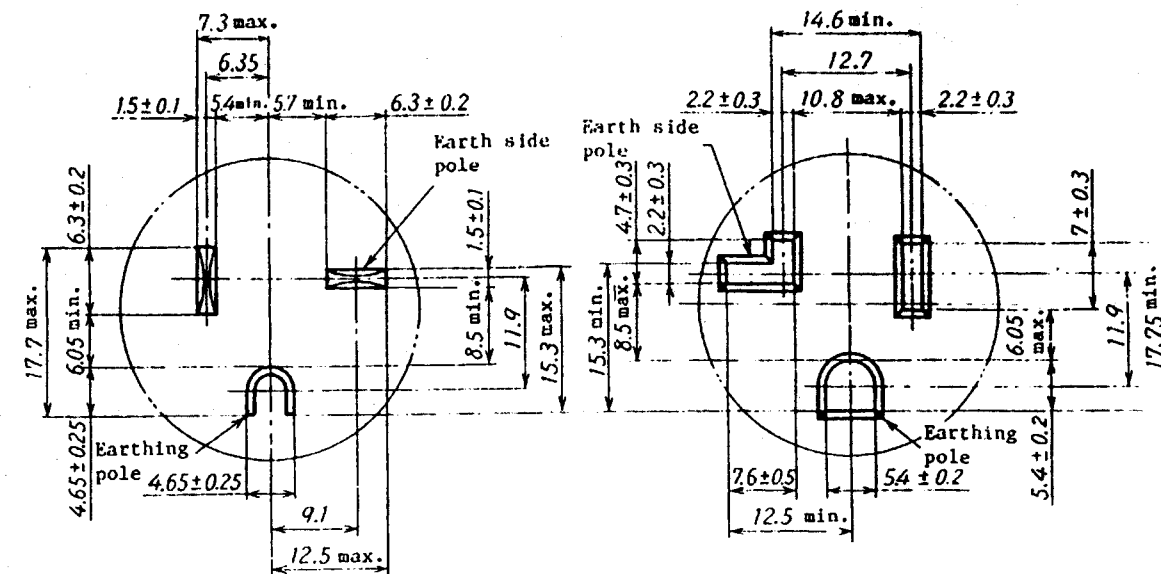
Attached Fig. 2 (cont'd)

(3) 20 A 125 V

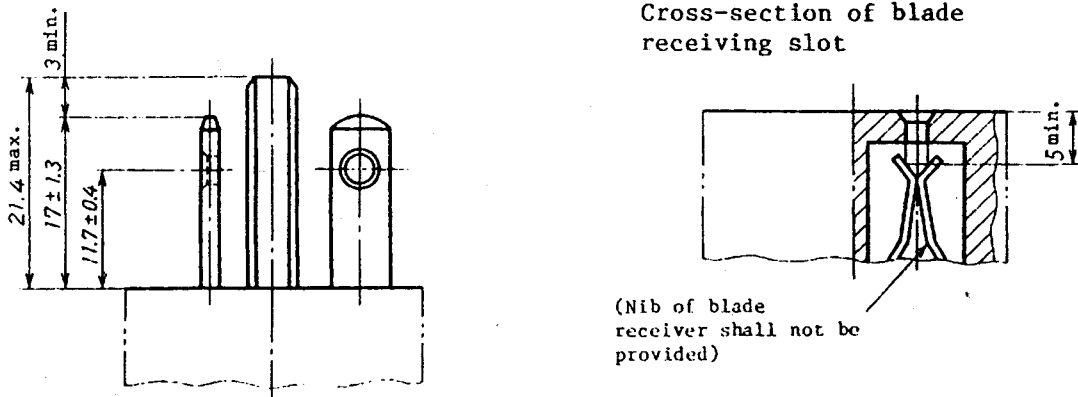
Unit: mm

Blade

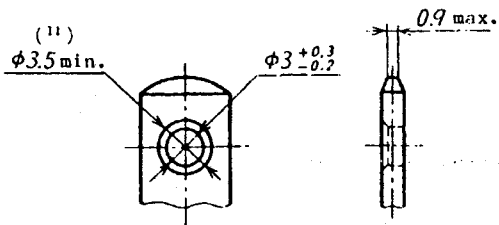
Blade receiving slot



Cross-section of blade
receiving slot



Enlarged view
of blade head



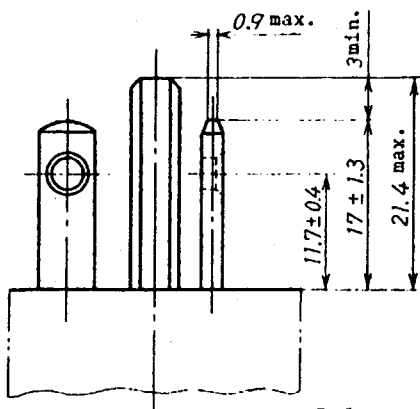
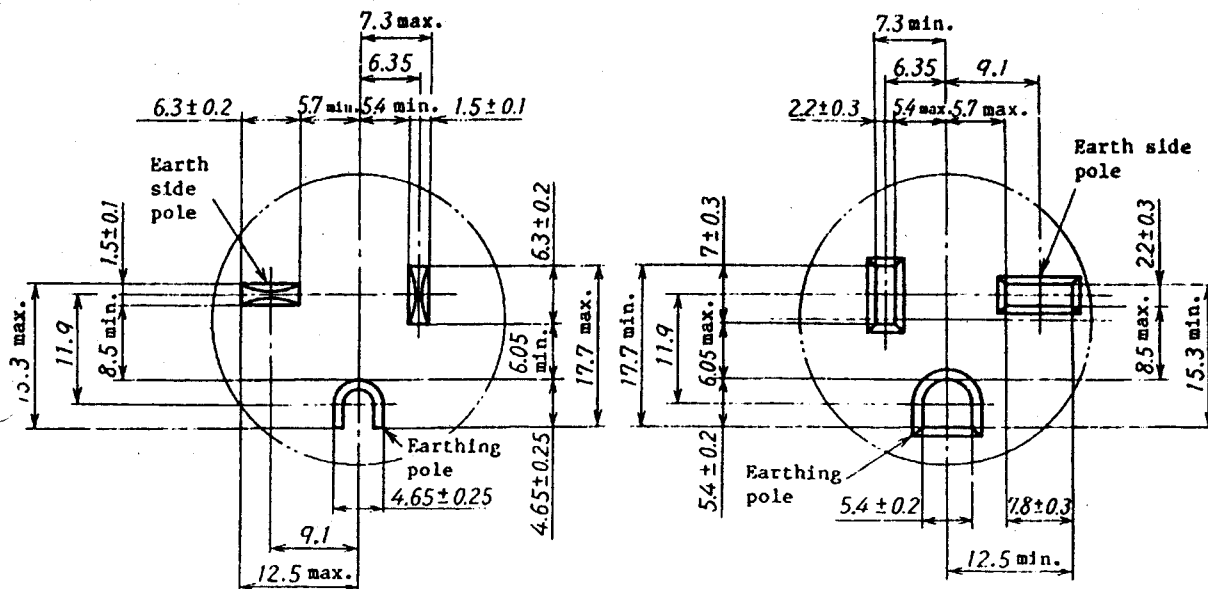
Attached Fig. 2 (Cont'd)

(4) 20 A 250 V

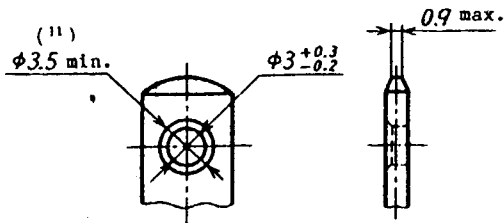
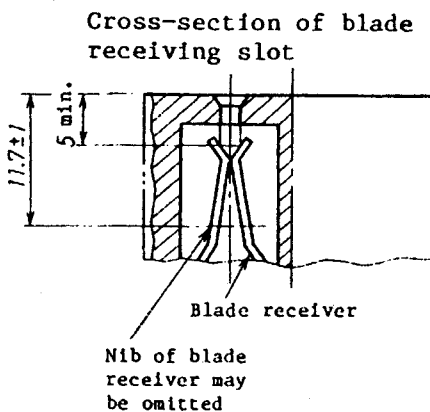
Unit: mm

Blade

Blade receiving slot



Enlarged view of blade head



Attached Fig. 2 (Cont'd)

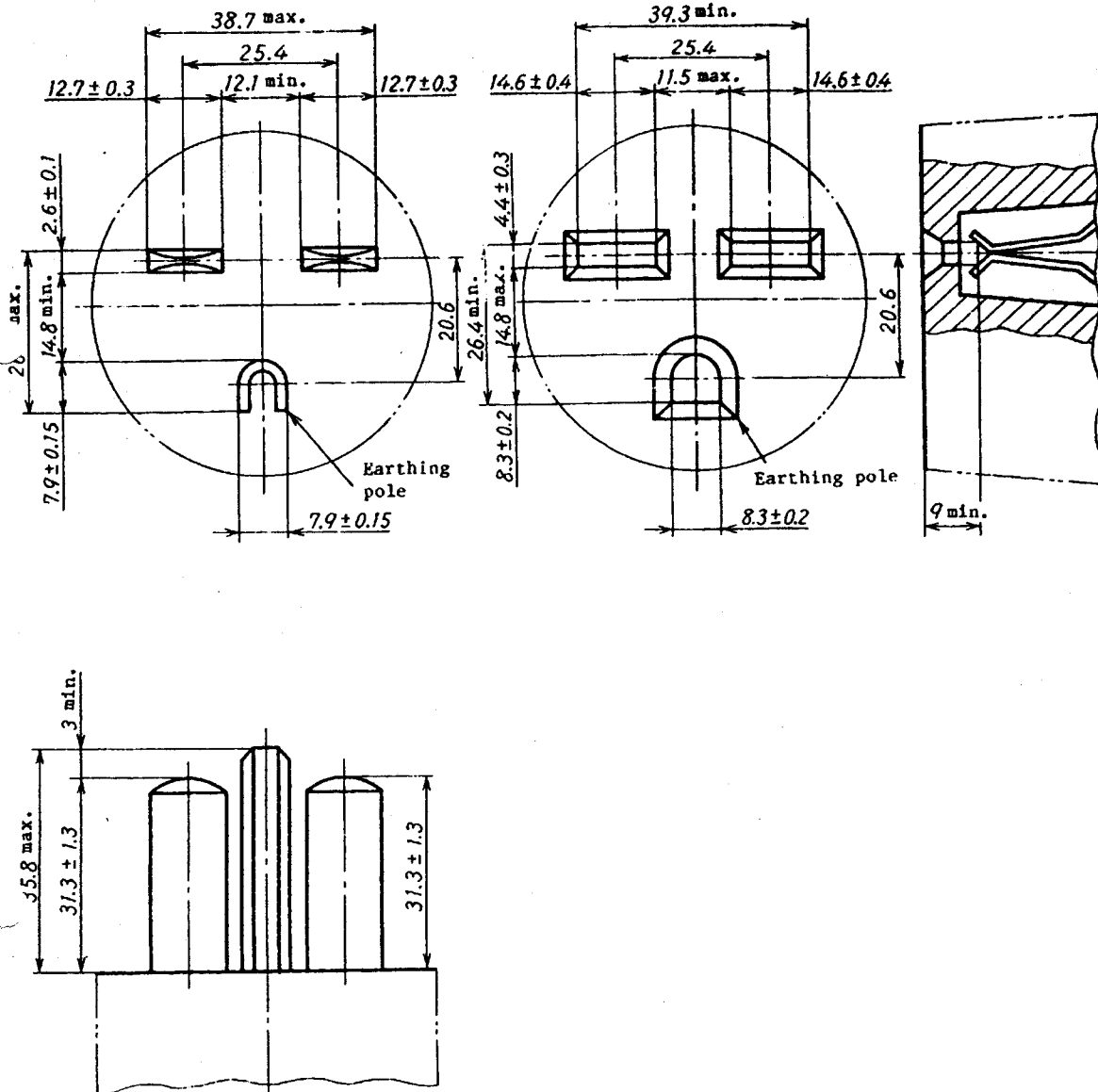
(5) 30 A 250 V

Unit: mm

Blade

Blade receiving slot

Cross-section
of blade receiving
slot

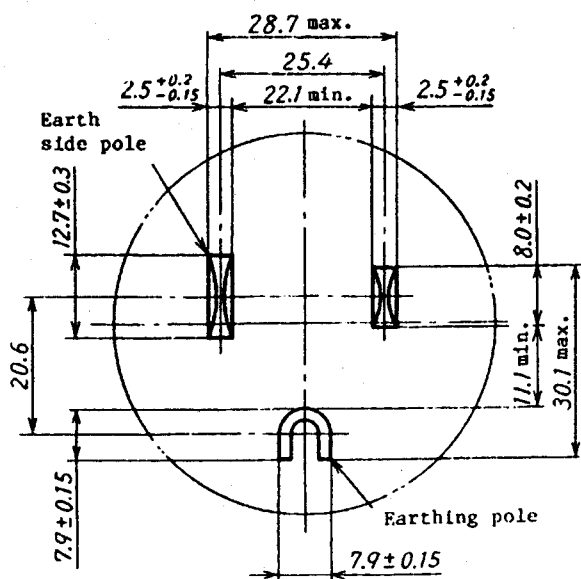


Attached Fig. 2 (Cont'd)

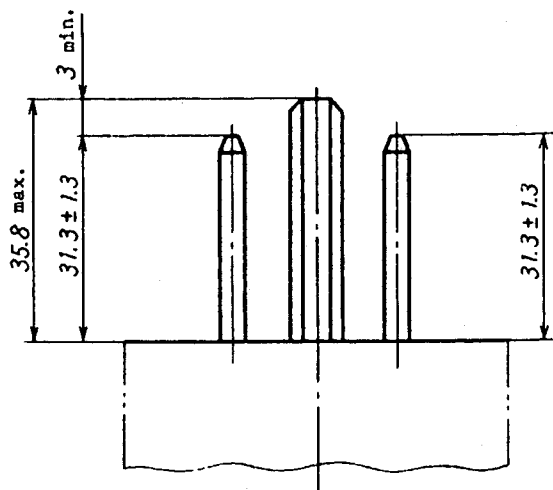
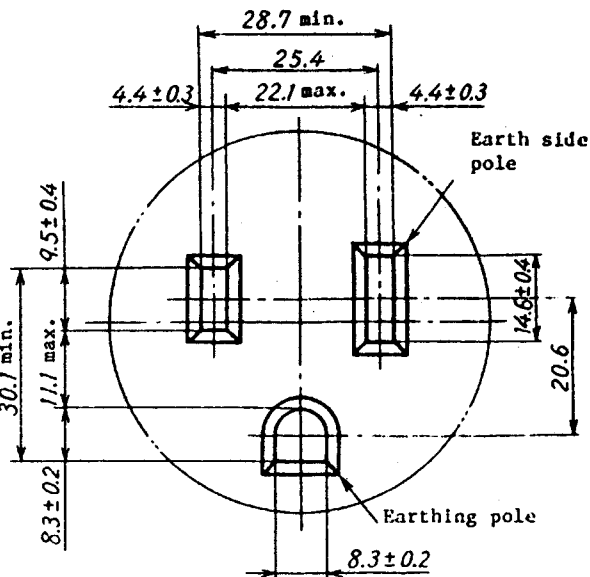
(6) 50 A 250 V

Unit: mm

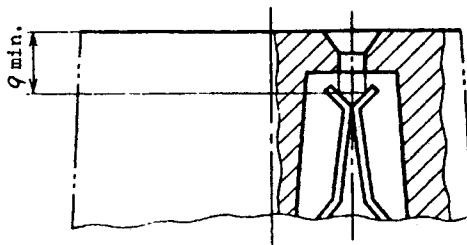
Blade



Blade receiving slot



Cross-section of blade receiving slot



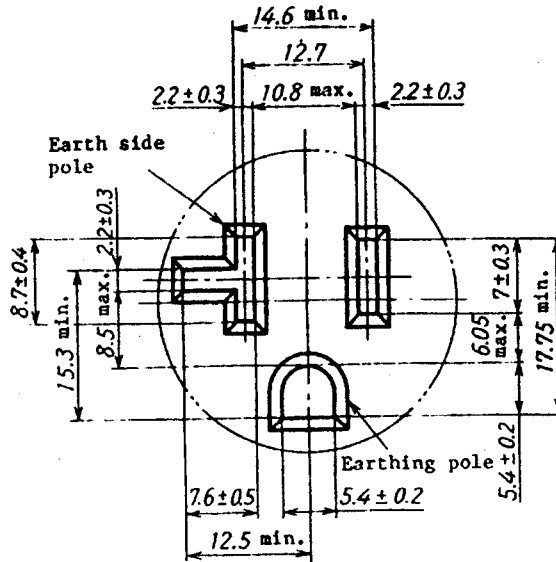
Remarks: Marking of earth side may be omitted.

Attached Fig. 2 (Cont'd)

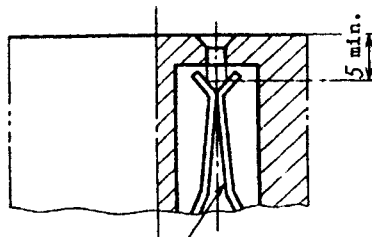
(7) 20 A 125 V

Unit: mm

Blade receiving slot



Cross-section of blade receiving slot

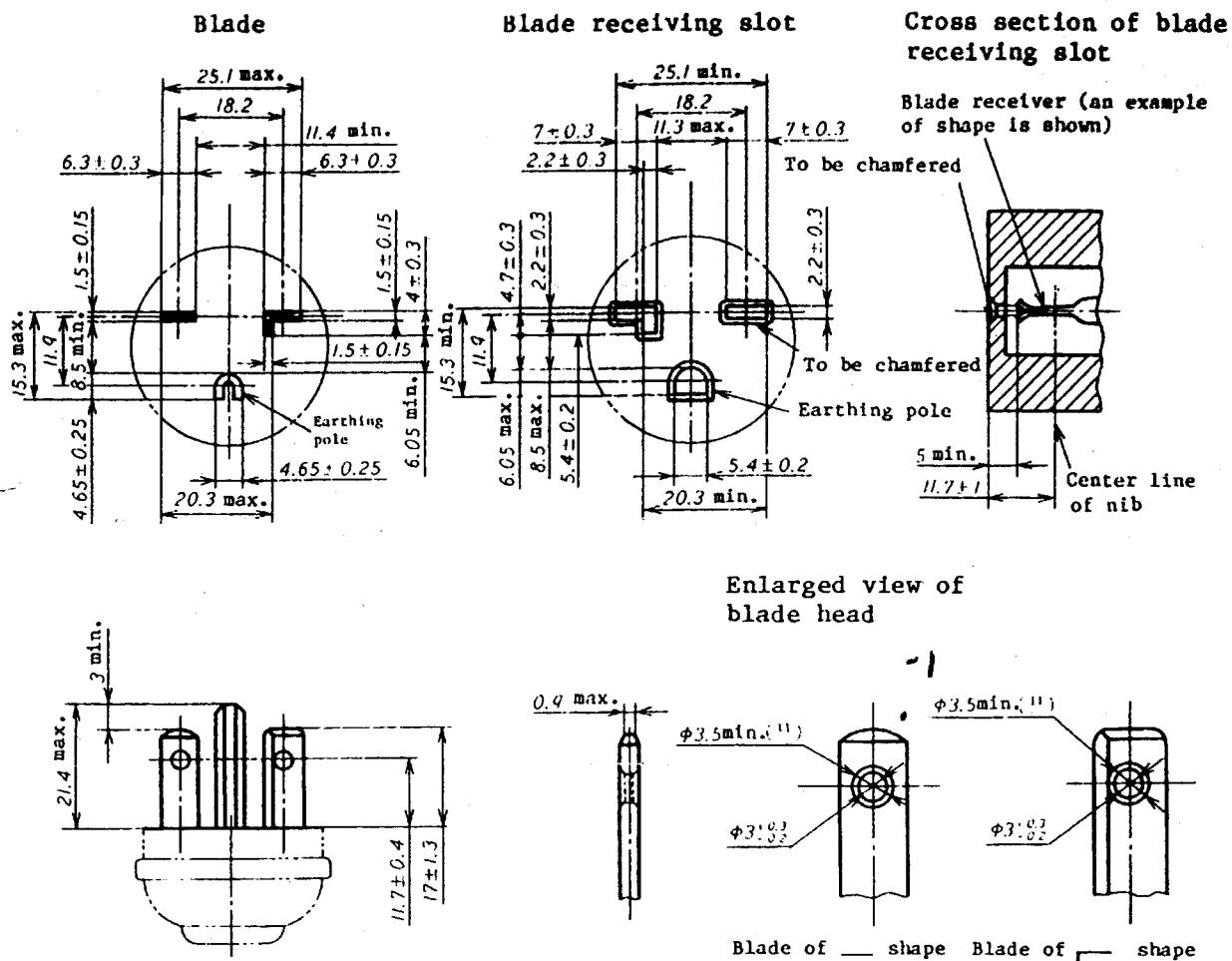


Nib of blade receiver shall not be provided

Attached Fig. 2 (Cont'd)

(8) 20 A 250 V

Unit: mm



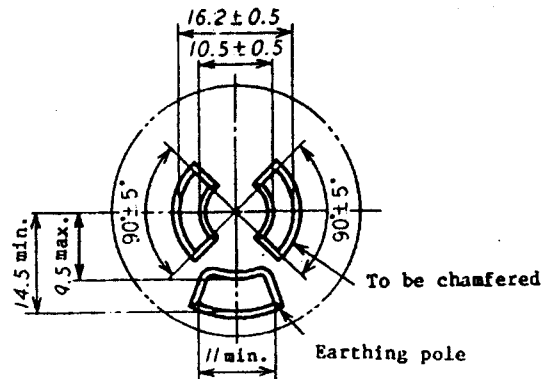
Remarks: The dimension of hole in a blade of II shape is applicable to the longitudinal direction of blade, but not applicable to the lateral direction of blade.

Attached Fig. 2 (Cont'd)

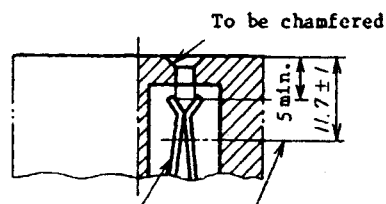
(9) 15 A 125 V (slip-check type)

Unit: mm

Blade receiving slot



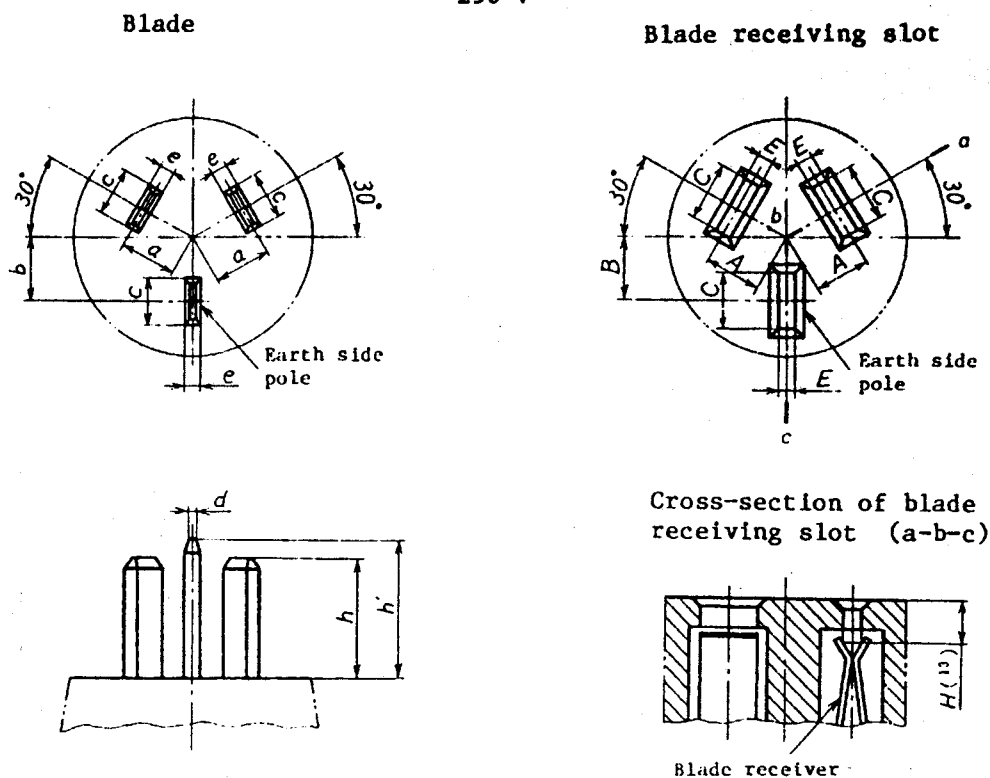
Cross-section of blade receiving slot



Blade receiver (an example of shape is shown) Center line of nib

Attached Fig. 3. Three-pole connector
(Shape of blade receiver shows one example.)

250 V



Note (13) The value of H shall be same for all the three-poles.

Dimensions of blade

Unit: mm

Rated current	A	a	b	c	e	h	h'	d
15		8 ± 0.15	10 ± 0.15	6 ± 0.15	1.4 ± 0.1	17	20	0.9 max.
20		9.5 ± 0.15	11 ± 0.2	8 ± 0.15	2 ± 0.1	20	23	1.4 max.
30		13.5 ± 0.2	13.5 ± 0.2	12.5 ± 0.2	2.6 ± 0.1	30	33	2.0 max.

Dimensions of blade receiving slot

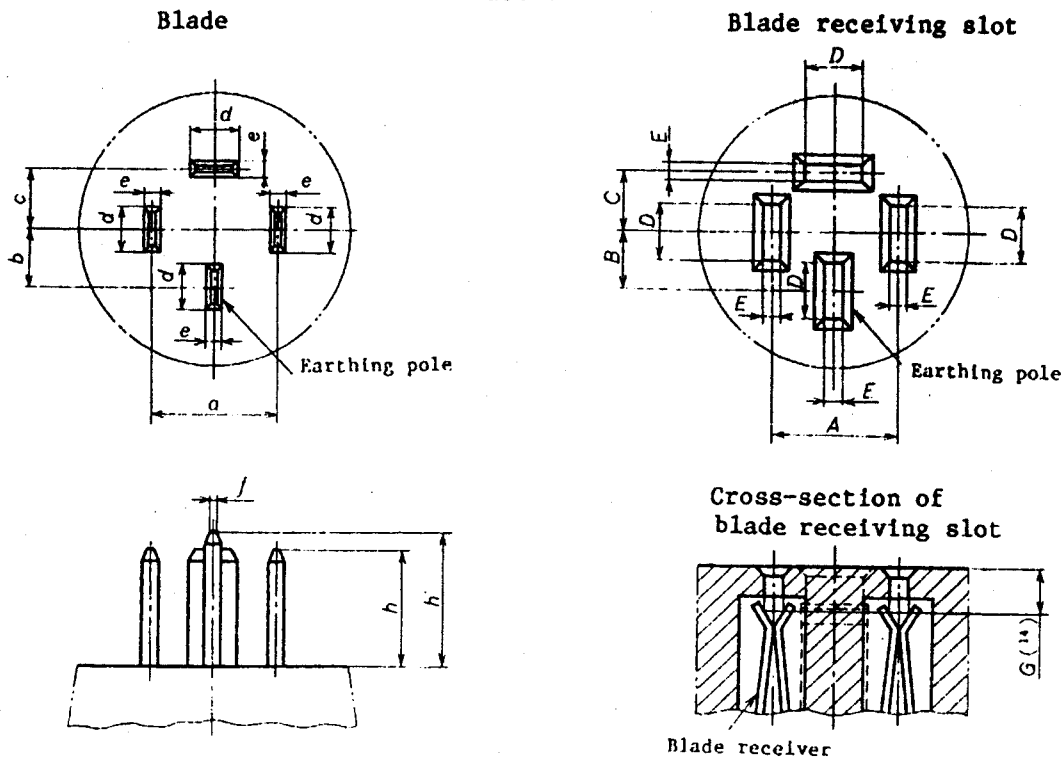
Unit: mm

Rated current	A	A	B	C	E	H
15		8 ± 0.15	10 ± 0.15	7.5	2.5	5 min.
20		9.5 ± 0.15	11 ± 0.2	9.5	3	6 min.
30		13.5 ± 0.2	13.5 ± 0.2	14	4.5	9 min.

- Remarks
1. The dimensions not accompanied by tolerances show basic size.
 2. The tip of plug blade shall be smooth.
 3. The plug insertion port of blade receiving slot shall be chamfered.

Attached Fig. 4. Three-pole connector with earthing pole
(Shape of blade receiver shows one example.)

250 V



Note (1⁴) The value of G shall be same for three poles and earthing pole.

Dimensions of blade

Unit: mm

Rated current A	a	b	c	d	e	f	h	h'
15	15 ± 0.2	11 ± 0.15	7.5 ± 0.15	6 ± 0.15	1.4 ± 0.1	0.9 max.	17	20
20	20.6 ± 0.2	9.5 ± 0.15	10.3 ± 0.15	8 ± 0.15	2 ± 0.1	1.4 max.	20	23
30	35 ± 0.2	17.5 ± 0.15	17.5 ± 0.15	12.5 ± 0.2	2.6 ± 0.1	2.0 max.	30	33

Dimensions of blade receiving slot

Unit: mm

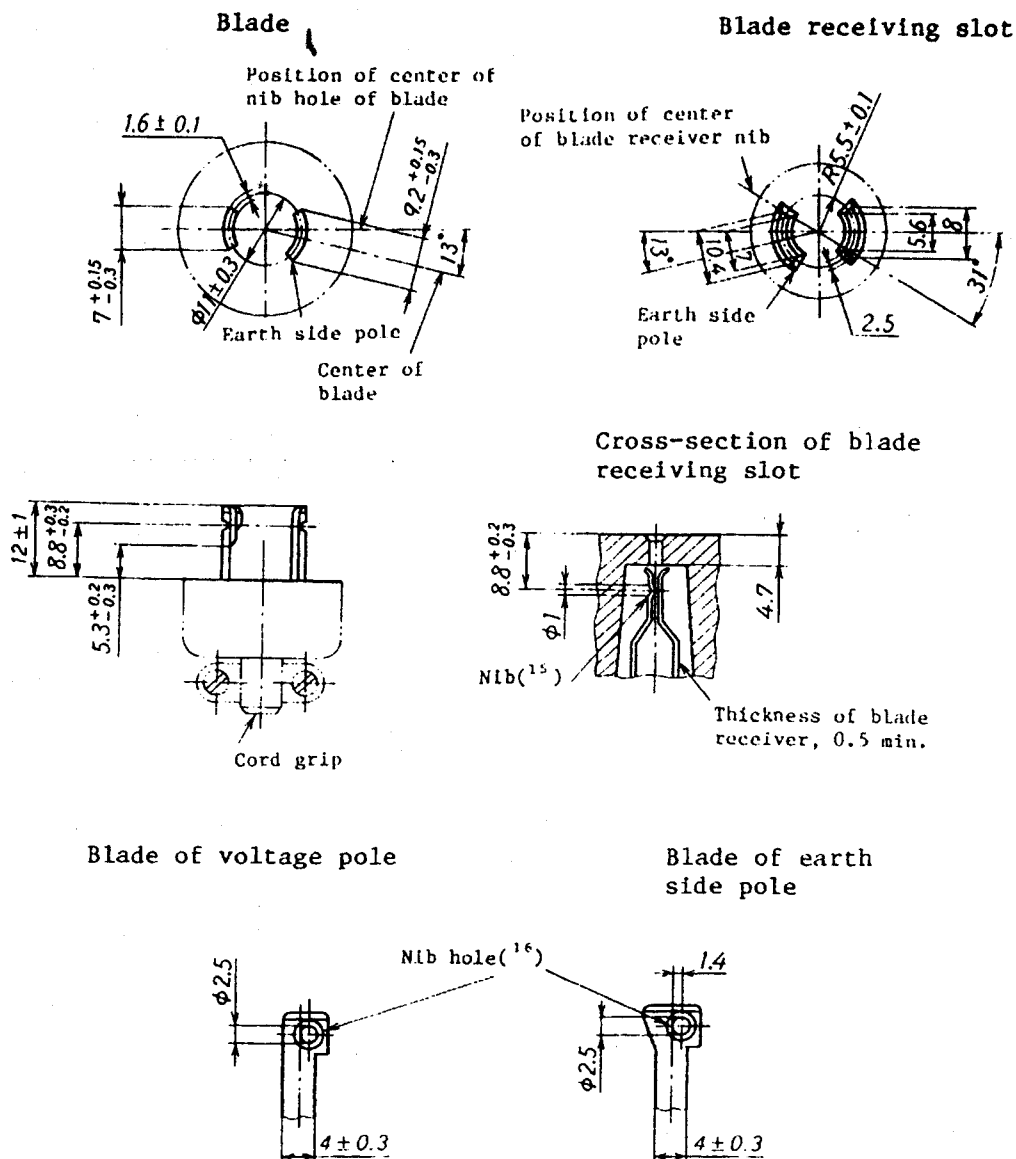
Rated current A	A	B	C	D	E	G
15	15 ± 0.2	11 ± 0.15	7.5 ± 0.15	7	2.5	5 min.
20	20.6 ± 0.2	9.5 ± 0.15	10.3 ± 0.15	9	3	6 min.
30	35 ± 0.2	17.5 ± 0.15	17.5 ± 0.15	13.5	4.5	9 min.

- Remarks
1. The dimensions not accompanied by tolerances show basic size.
 2. The tip of plug blade shall be smooth.
 3. The plug insertion port of blade receiving slot shall be chamfered.

Attached Fig. 5. Two-pole locking type connector
(Shape of blade receiver shows one example.)

(1) 15 A 125 V

Unit: mm



Notes (15) Nib of blade receiver shall be attached on the side to contact with outside of the blade.

(16) The chamfering of nib hole of blade shall be made on outside of each blade.

Remarks 1. The dimensions not accompanied by tolerances show basic size.

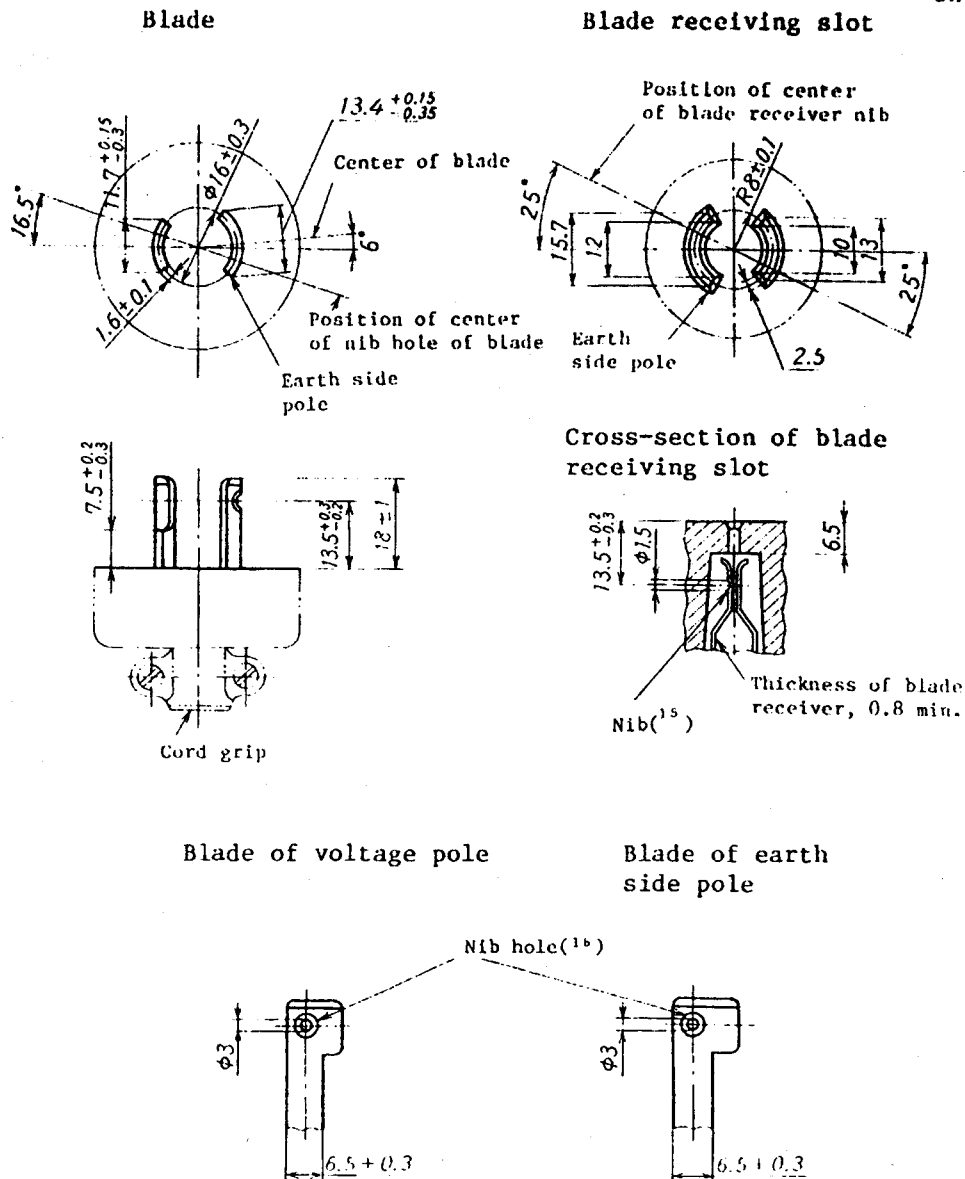
2. The tip of plug blade shall be smooth.

3. The plug insertion port of blade receiving slot shall be chamfered.

Attached Fig. 5 (Cont'd)

(2) 20 A 250 V

Unit: mm



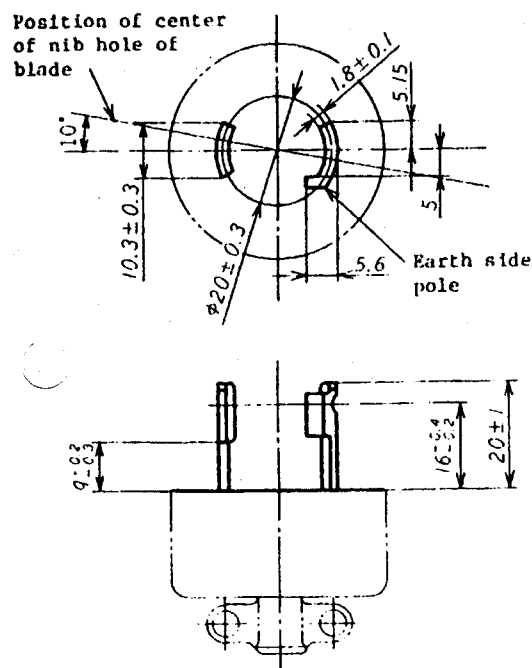
Remarks: Marking of earth side may be omitted.

Fig. 5. (Continued)

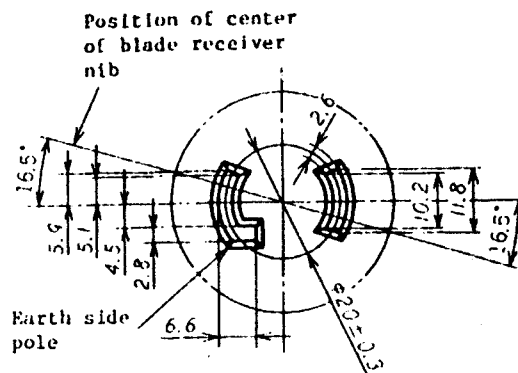
(3) 30 A 250 V

Unit: mm

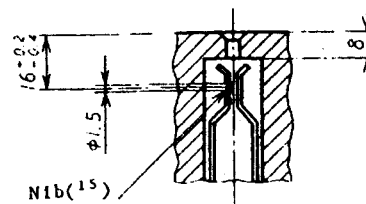
Blade



Blade receiving slot

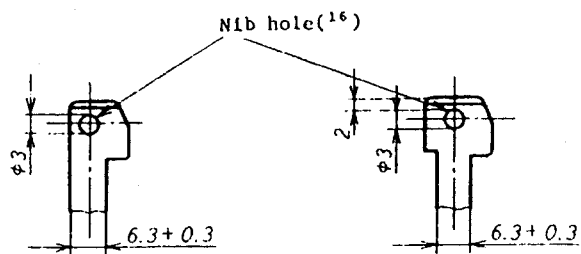


Cross-section of blade receiving slots



Blade of voltage pole

Blade of earth side pole

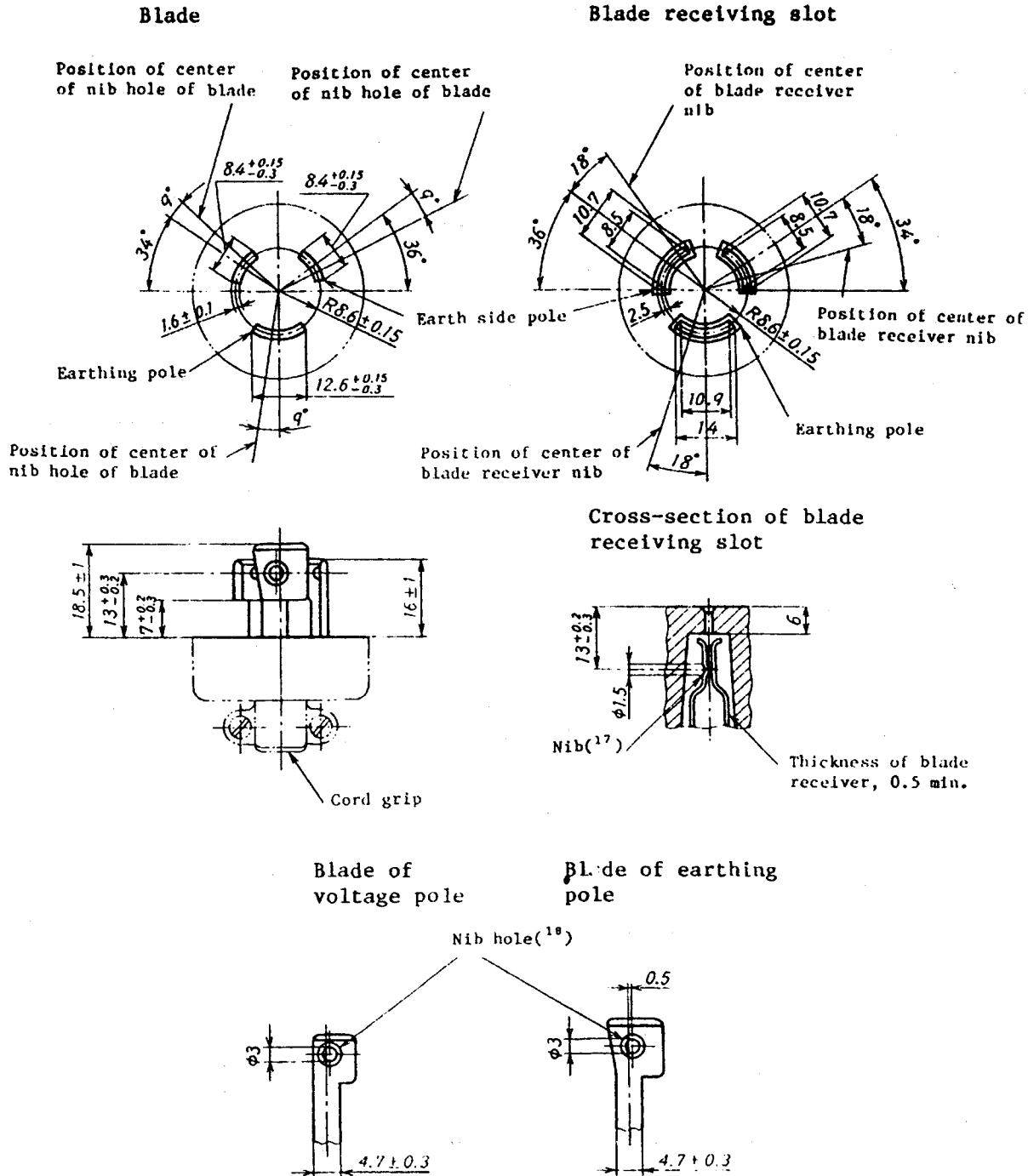


Remarks: Marking of earth side may be omitted.

Attached Fig. 6. Two-pole locking type connector with earthing pole
(Shape of blade receiver shows one example.)

(1) 15 A 125 V

Unit: mm

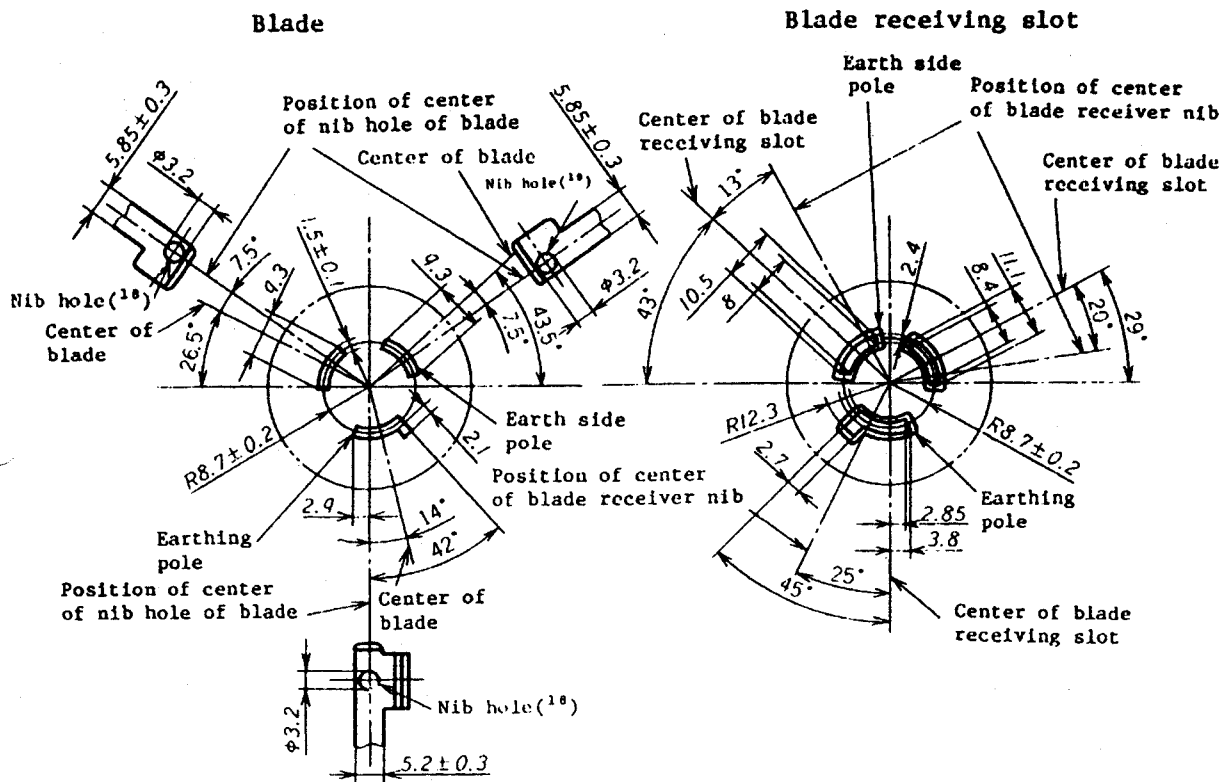


- Notes (17) Nib of blade receiver shall be attached on the side to contact with outside of the blade.
- (18) The chamfering of nib hole of blade shall be made on outside of each blade.
- Remarks 1. The dimensions not accompanied by tolerances show basic size.
2. The tip of plug blade shall be smooth.
3. The plug insertion port of blade receiving slot shall be chamfered.

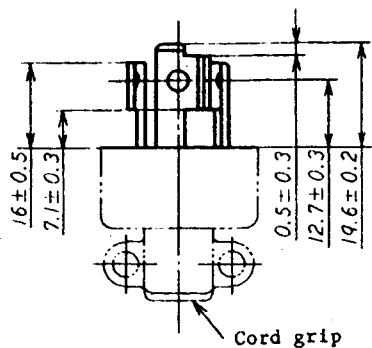
Attached Fig. 6. (Continued)

(2) 15 A 250 V

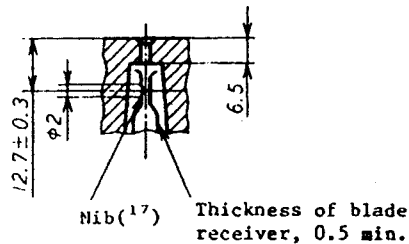
Unit: mm



Blade of earthing pole



Cross-section of blade
receiving slot



Remarks: Marking of earth side may be omitted.

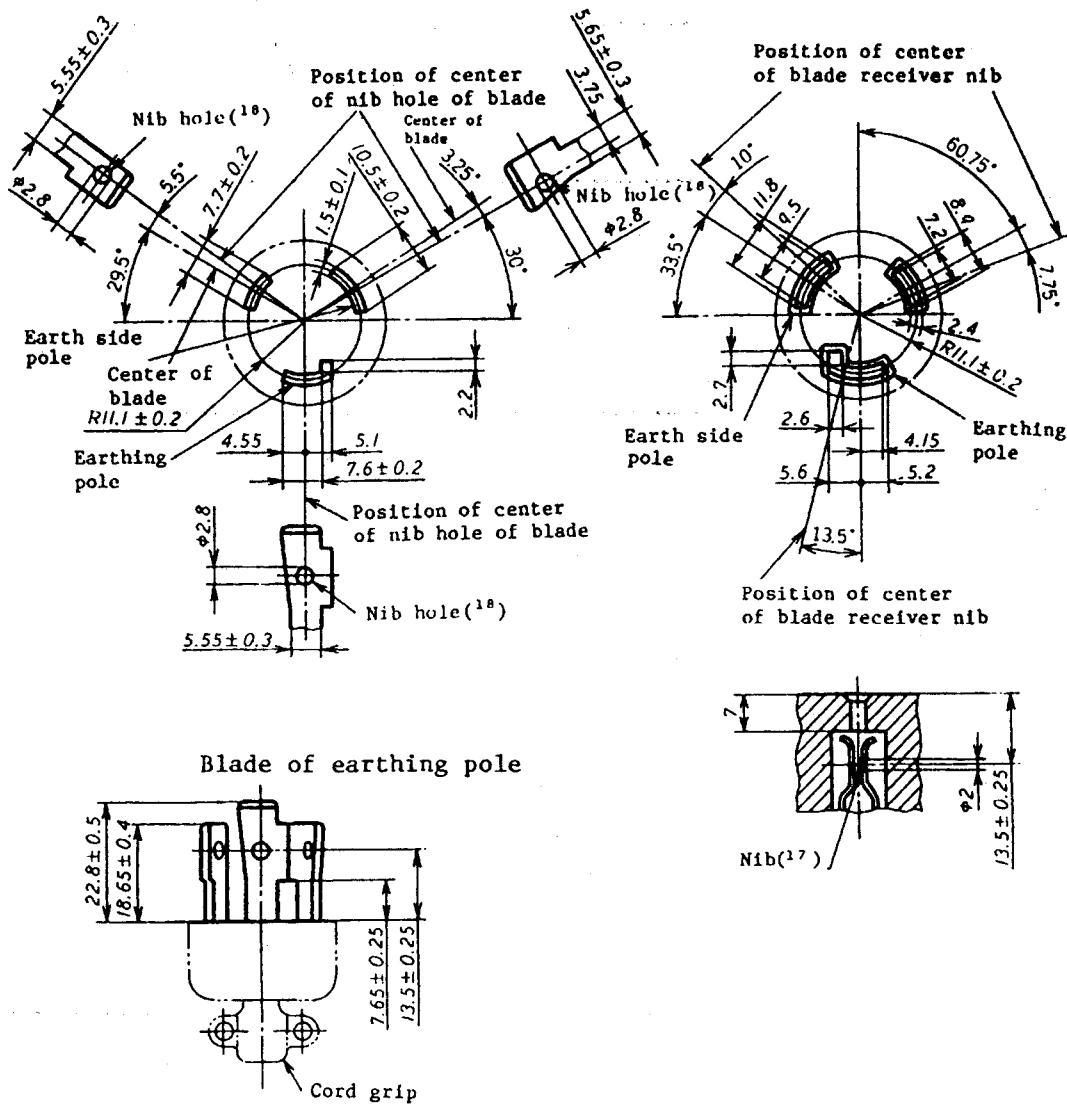
Attached Fig. 6. (Continued)

(3) 20 A 250 V

Unit: mm

Blade

Blade receiving slot

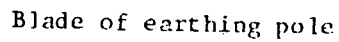


Remarks: Marking of earth side may be omitted.

(4) 30 A 250 V

Unit: 1000

Blade receiving slot



Remarks: Marking of earth side may be omitted.

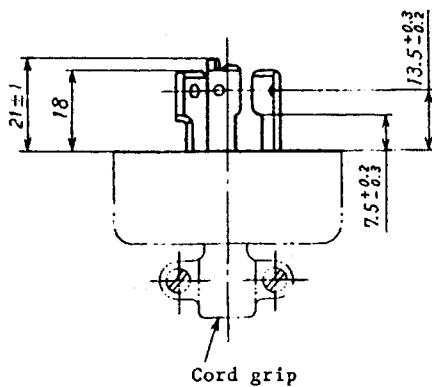
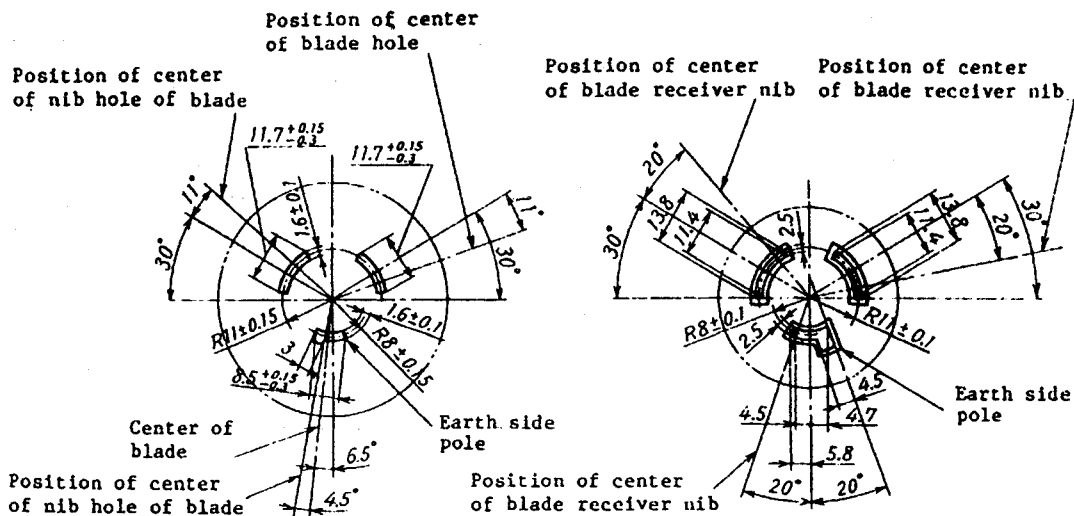
Attached Fig. 7. Three-pole locking type connector
(Shape of blade receiver shows one example.)

(1) 20 A 250 V

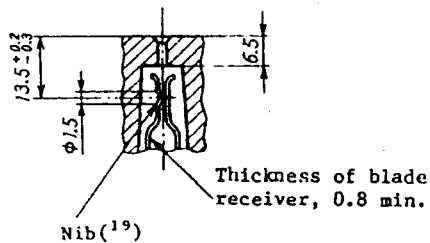
Unit: mm

Blade

Blade receiving slot

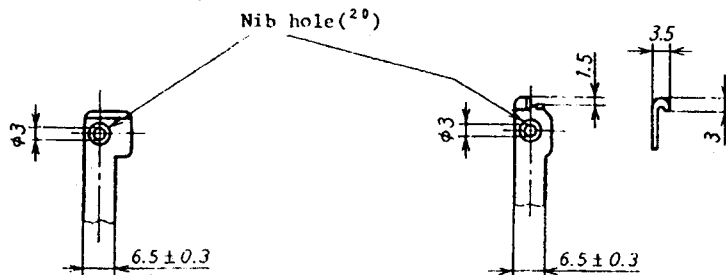


Cross-section of blade receiving slot



Blade of voltage pole

Blade of earth side pole



Notes (19) Nib of blade receiver shall be attached on the side to contact with outside of the blade.

(20) The chamfering of nib hole of blade shall be made on outside of each blade.

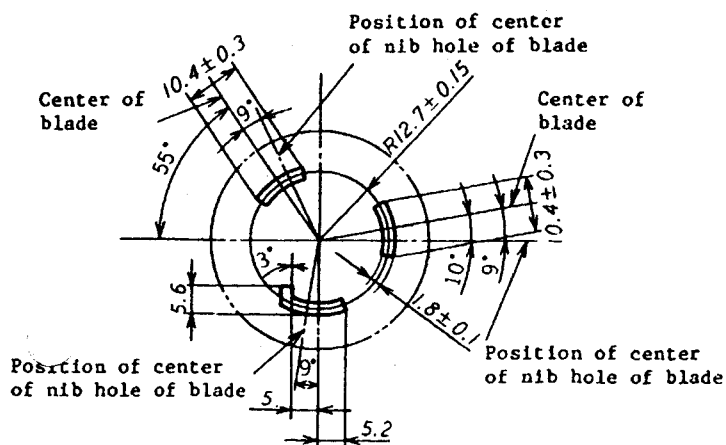
Remarks 1. The dimensions not accompanied by tolerances show basic size.
2. The tip of plug blade shall be smooth.
3. The plug insertion port of blade receiving slot shall be chamfered.

Attached Fig. 7 (Cont'd)

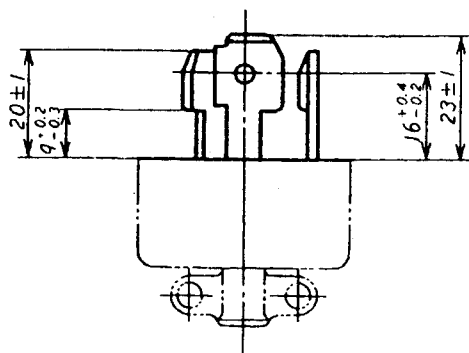
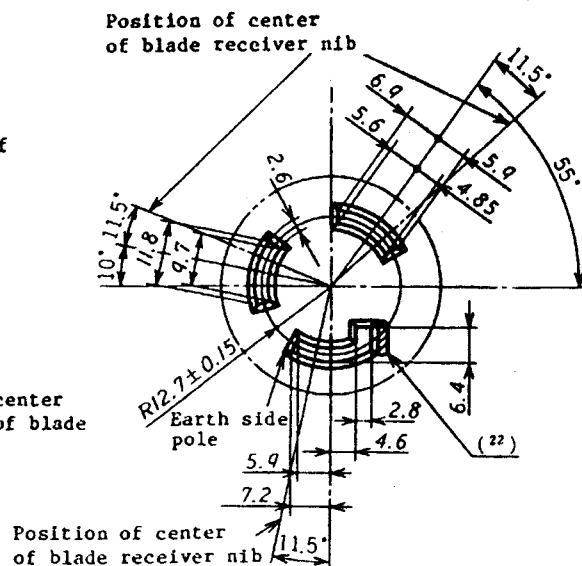
(2) 30 A 250 V

Unit: mm

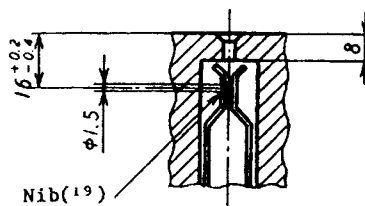
Blade



Blade receiving slot

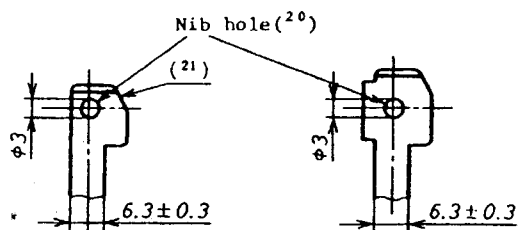


Cross-section of blade receiving slot



Blade of voltage pole

Blade of earth side pole



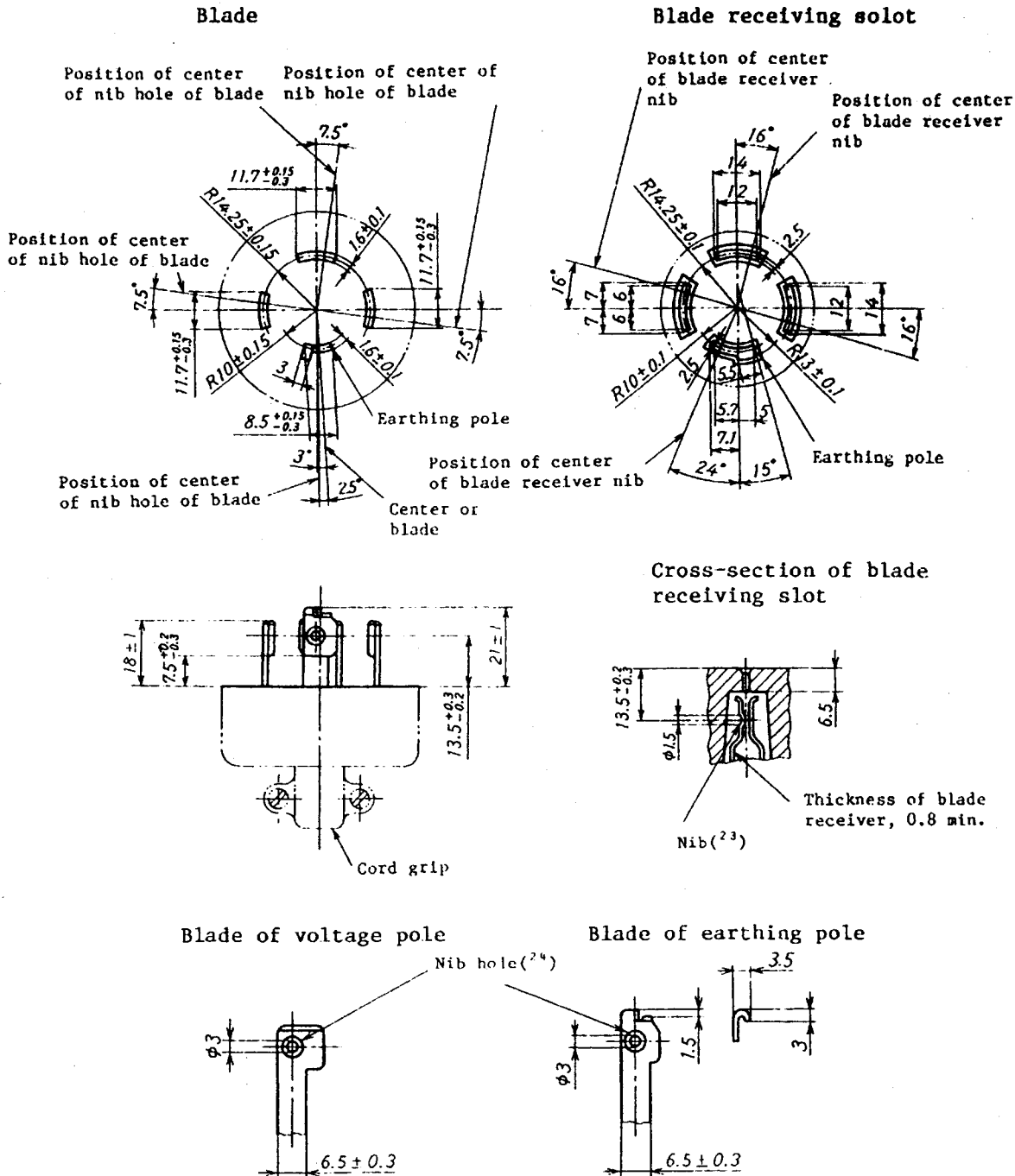
Notes ⁽²¹⁾ Cut of the tip may be omitted.

⁽²²⁾ A stopper for folded part of earth side pole blade specified in Fig. L11-30P of NEMA WD-6 may be provided at the rear of blade receiving slot.

Attached Fig. 8. Three-pole locking type connector with earthing pole
(Shape of blade receiver shows one example.)

20 A 250 V

Unit: mm



Notes (23) Nib of blade receiver shall be attached on the side to contact with outside of the blade.

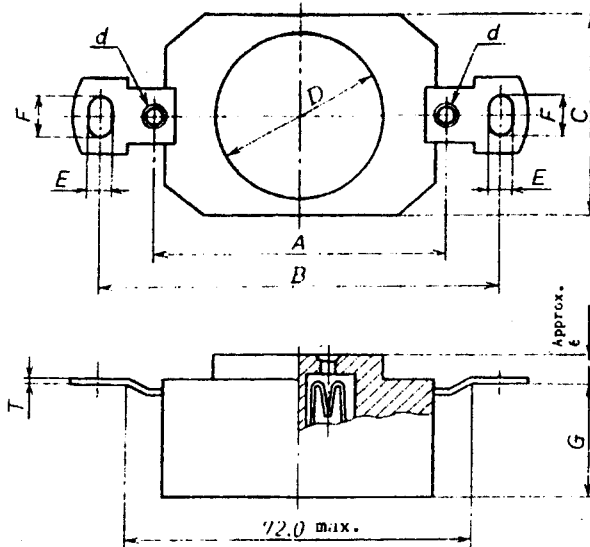
(24) The chamfering of nib hole of blade shall be made on outside of each blade.

Remarks 1. The dimensions not accompanied by tolerances show basic size.
2. The tip of plug blade shall be smooth.
3. The plug insertion port of blade receiving slot shall be chamfered.

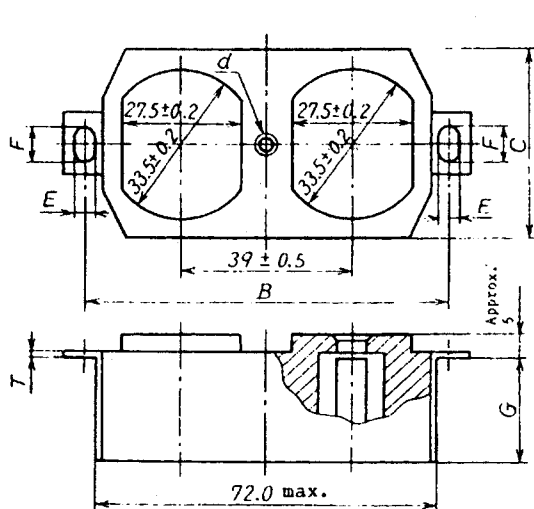
Attached Fig. 9. Recessed type socket-outlet
(Excluding multiple type)

Unit: mm

Round type



Duplex type



Square type

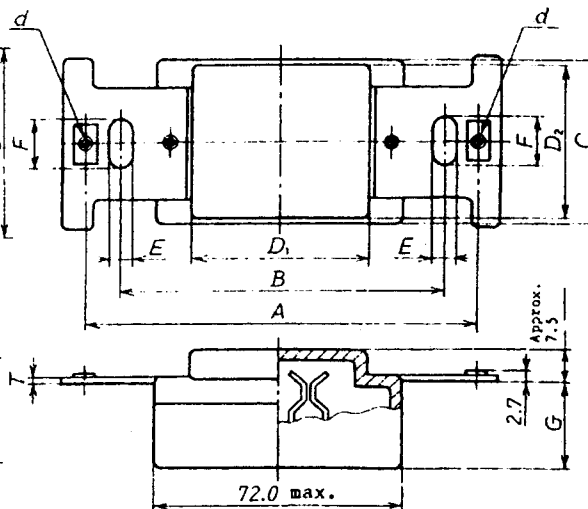


Table of dimensions of recessed socket-outlet (Excluding multiple type)

Unit: mm

Position specified	Symbol	Boss		Round type			Duplex type	Square type
		Rated current A	Number of poles	15	20	30, 50		
Distance between plate fixing screw holes	A	2, 3		60.5 ± 0.4	60.5 ± 0.4	60.5 ± 0.4 (²⁵ ₅)	15	-
Distance between box mounting holes	B	2, 3		83.5 ± 0.4	83.5 ± 0.4	83.5 ± 0.4 (²⁵ ₅)	-	101 ± 0.4
Width of body(³³)	C	2		43 max.	43 max.	43 max.(³²)	43 max.	43 max.
		3		43 max.	43 max.	91 max.		
Diameter of boss	D	2		34.5 ^{-0.5} ₀ (²⁷)	34.5 ^{-0.5} ₀	40.5 ^{+0.5} ₀ (³¹)	-	D 46 D 38
		3		34.5 ^{-0.5} ₀	34.5 ^{-0.5} ₀ (²⁸)	57 ^{+0.5} ₀		
Diameter of plate fixing screws	d	2, 3		3.5	3.5	3.5	3.5	3.5
Width of box mounting holes	E	2, 3		5 ± 0.5	5 ± 0.5	5 ± 0.5	5 ± 0.5	5 ± 0.5
Length of box mounting holes	F	2, 3		7.5 min.	7.5 min.	7.5 min.	7.5 min.	7.0 min.
Depth of body	G	2, 3		30 max.(²⁹)	30 max.(²⁹)	45 max.	30 max.(²⁹)	35 max.
Thickness of metal fixture (³⁰)	T	2, 3		1.2 min.	1.2 min.	1.6 min.	1.2 min.	1.2 min.

- Notes (²⁵) This dimension does not apply to socket-outlets of 50 A rated current.
- (²⁶) A two-unit switch box shall be used for socket-outlets of two-pole type with earthing pole, three-pole type, and three-pole type with earthing pole. Consequently, the lateral distance between box mounting holes shall be 46 ± 0.4 mm.
- (²⁷) This may be $25.5^{+0.5}_0$ mm for locking type socket-outlets.
- (²⁸) The boss diameter for locking type three-pole socket-outlets with earthing pole shall be $40.5^{+0.5}_0$ mm.
- (²⁹) This may be 35 mm or smaller for socket-outlets of three-pole type, three-pole type with earthing pole, and locking type.
- (³⁰) The thickness indicates the nominal value of thickness of the base material plate.
- (³¹) This shall be $57^{+0.5}_0$ mm for two-pole socket-outlets with earthing pole.
- (³²) This shall be 91 mm or smaller for two-pole socket-outlets with earthing pole.
- (³³) This specified value 43 mm or smaller may be replaced by 46 mm or smaller for socket-outlets with the side surface of the body covered with an insulating material.

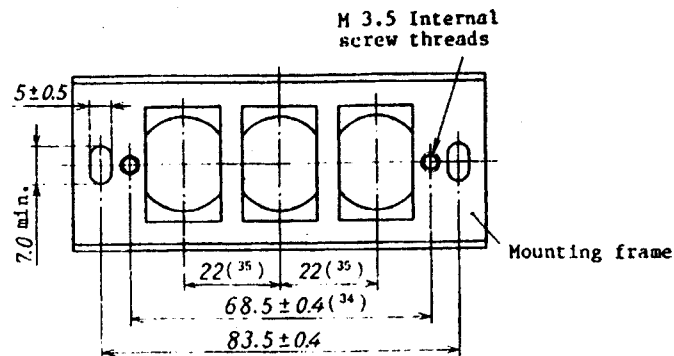
- Remarks 1. The dimensions not accompanied by tolerances show basic size.
2. The plug insertion port of blade receiving slot shall be chamfered.

Attached Fig. 10. Dimensions of multiple type socket-outlet
(Shape of mounting frame shows one example.)

For single-unit switch box

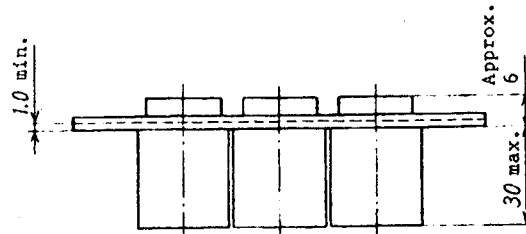
Unit: mm

(1) For oval and square bosses



Notes (³⁴) The dimension 60.5 ± 0.4 mm may be used where a single socket-outlet is installed.

(³⁵) The dimension 22 indicates the pitch between bosses.



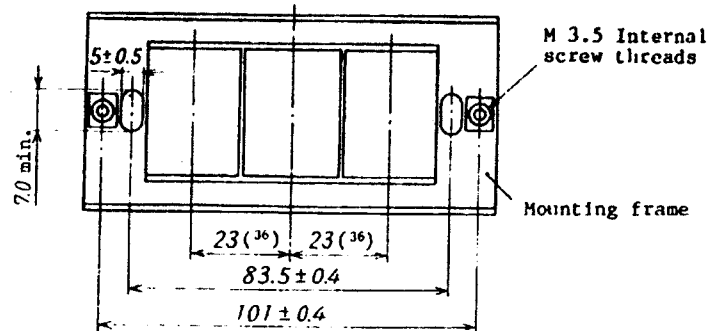
Remarks 1. Socket-outlet assembly which contains two or three bosses of the same shape and dimensions are also included (the same applies in this Attached Figure.)

2. The dimensions of multiple socket-outlet without mounting frame show when it is fixed to the mounting frame shown in Attached Fig. 9 (the same applies in this Attached Figure.)

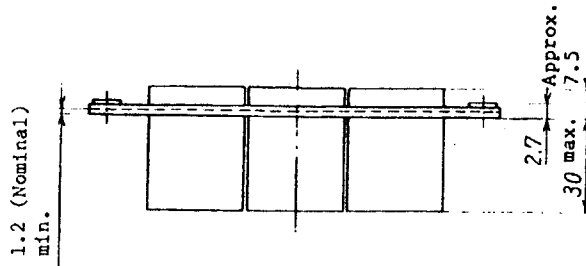
Attached Fig. 10 (Cont'd)

Unit: mm

(2) For large square bosses



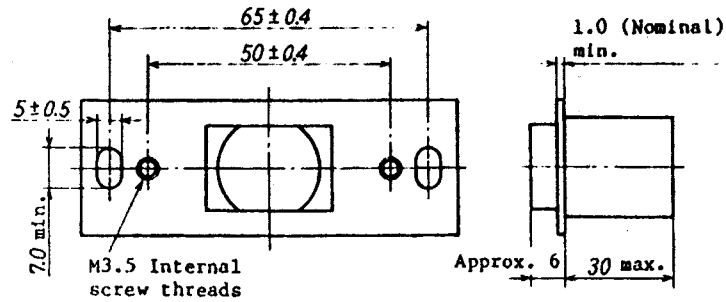
Note (36) The dimension 23 indicates the pitch between bosses.



Attached Fig. 10 (Cont'd)

For small-size switch box

Unit: mm

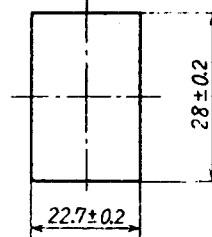
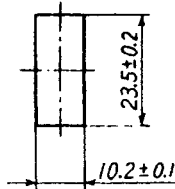
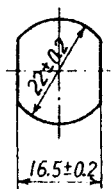


Shape and dimensions of boss of socket-outlet

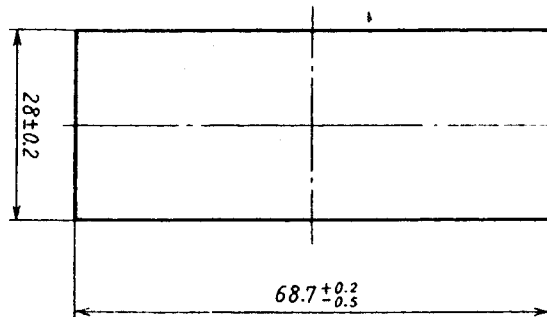
Oval boss

Square boss

Large square boss

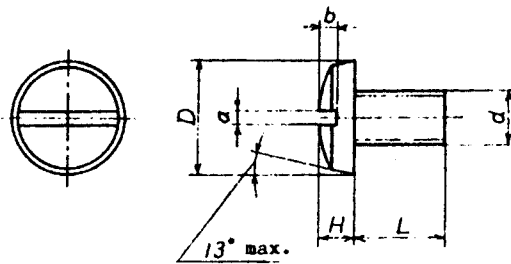


Large square boss (for 3 units)



Informative reference Fig. 1. Large fillister head machine screws

(1) Slotted screw

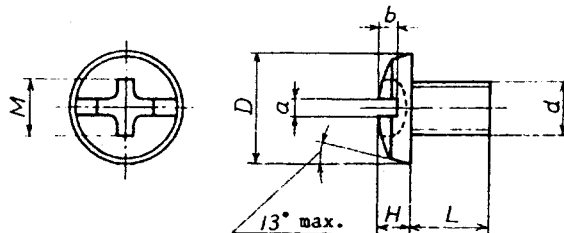


Unit: mm

Outer diameter of screw (nominal)	<i>d</i>	3	3.5	4	4.5	5	6
Diameter of head	<i>D</i>	6.5±0.3	7.5±0.3	8.5±0.3	10.5±0.5	11.5±0.5	13.0±0.5
Height of head	<i>H</i>	1.6	2.0	2.4	3.0	3.6	3.7
Width of slot	<i>a</i>	0.8	1.0	1.0	1.2	1.2	1.2
Depth of slot	<i>b</i>	0.8	1.0	1.2	1.6	2.0	2.0
Length of screw	<i>L</i>	4, 5, 6	5, 6, 7	6, 7, 8	8, 9, 10	8, 10, 12	11, 12, 13
Pitch of threads	<i>P</i>	0.5	0.6	0.7	0.75	0.8	1.0

Remarks: The screw threads are based on JIS B 0205.

(2) Slotted cross recessed head screw



Unit: mm

Outer diameter of screw (nominal)	<i>d</i>	3	3.5	4	4.5	5	6
Diameter of head	<i>D</i>	6.5±0.3	7.5±0.3	8.5±0.3	10.5±0.5	11.5±0.5	13.0±0.5
Height of head	<i>H</i>	1.9	2.2	2.5	3.0	3.6	3.7
Width of slot	<i>a</i>	0.8	1.0	1.0	1.2	1.2	1.2
Depth of slot	<i>b</i>	0.8	1.0	1.2	1.6	2.0	2.0
Cross recess number ⁽¹⁾		2	2	2	2	2	3
Length of cross recess (maximum)	<i>M</i>	3.6	3.9	4.2	4.6	4.9	6.2
Indentation depth of cross recess ⁽²⁾	<i>Q</i>	1.01 to 1.53	1.30 to 1.83	1.60 to 2.13	1.99 to 2.53	2.29 to 2.83	2.31 to 2.86
Length of screw	<i>L</i>	4, 5, 6	5, 6, 7	6, 7, 8	8, 9, 10	8, 10, 12	11, 12, 13
Pitch of threads	<i>P</i>	0.5	0.6	0.7	0.75	0.8	1.0

Notes ⁽¹⁾ The cross recess number is based on JIS B 1012.

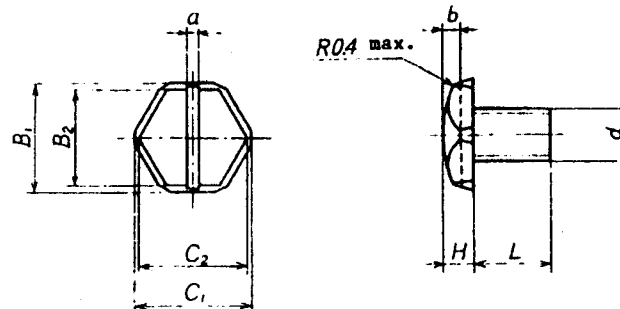
⁽²⁾ Symbol *Q* indicates the gauge penetration depth of cross recess.

Remarks: The screw threads are based on JIS B 0205.

Informative reference Fig. 2. Slotted hexagon head machine screws
(For earthing terminals)

(1) Slotted screw

Unit:mm



Outer diameter of screw (nominal)	d	3.5	4	4.5	5	6
Width across flats (lower)	B_1	7.2	8.5	9.9	11.2	12.7
Width across flats (upper)	B_2	6.4	7.5	8.7	9.8	11.1
Maximum diameter of head (lower)	C_1	7.5 ± 0.3	8.8 ± 0.3	10.2 ± 0.3	11.5 ± 0.3	13.0 ± 0.3
Maximum diameter of head (upper)	C_2	7.2	8.5	9.9	11.2	12.7
Height of head	H	2.0	2.4	3.0	3.6	3.7
Width of slot	a	1.0	1.0	1.2	1.2	1.2
Depth of slot	b	1.0	1.2	1.6	2.0	2.0
Length of screw	L	5, 6, 7	6, 7, 8	8, 9, 10	8, 10, 12	11, 12, 13
Pitch of threads	P	0.6	0.7	0.75	0.8	1.0

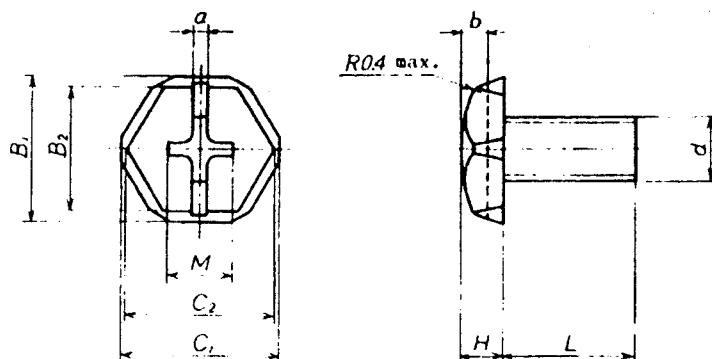
Remarks 1. The direction of the slot may be arbitrarily specified.

2. The screw threads are based on JIS B 0205.

Informative reference Fig. 2 (Cont'd)

(2) Slotted cross recess screw

Unit: mm



Outer diameter of screw (nominal)	<i>d</i>	3.5	4	4.5	5	6
Width across flats (lower)	<i>B₁</i>	7.2	8.5	9.9	11.2	12.7
Width across flats (upper)	<i>B₂</i>	6.4	7.5	8.7	9.8	11.1
Maximum diameter of head (lower)	<i>C₁</i>	7.5±0.3	8.8±0.3	10.2±0.3	11.5±0.3	13.0±0.3
Maximum diameter of head (upper)	<i>C₂</i>	7.2	8.5	9.9	11.2	12.7
Height of head	<i>H</i>	2.2	2.5	3.0	3.6	3.7
Width of slot	<i>a</i>	1.0	1.0	1.2	1.2	1.2
Depth of slot	<i>b</i>	1.0	1.2	1.6	2.0	2.0
Cross recess number ⁽³⁾		2	2	2	2	3
Length of cross recess (maximum)	<i>M</i>	3.9	4.2	4.6	4.9	6.2
Indentation depth of cross recess ⁽⁴⁾	<i>Q</i>	1.30 to 1.83	1.60 to 2.13	1.90 to 2.53	2.29 to 2.83	2.31 to 2.86
Length of screw	<i>L</i>	5, 6, 7	6, 7, 8	8, 9, 10	8, 10, 12	11, 12, 13
Pitch of thread	<i>P</i>	0.6	0.7	0.75	0.8	1.0

Notes ⁽³⁾ The cross recess number is based on JIS B 1012.

⁽⁴⁾ Symbol *Q* indicates the gauge penetration depth in the cross recess.

Remarks 1. The direction of the slot may be arbitrarily specified.

2. The screw threads are based on JIS B 0205.

C 8303-1993
Edition 1

Japanese Text

Established by Minister of International Trade and Industry

Date of Establishment: 1950-03-13

Date of Revision: 1993-07-01

Date of Public Notice in Official Gazette: 1993-07-21

Investigated by: Japanese Industrial Standards Committee

Divisional Council on Electricity

This English translation is published by:
Japanese Standards Association
1-24, Akasaka 4, Minato-ku,
Tokyo 107 Japan

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Printed in Tokyo by
Hohbunsha Co., Ltd.