

Australian Standard[®]

Electricity metering

Part 4: Socket mounting system



This Australian Standard® was prepared by Committee EL-011, Electricity Metering Equipment. It was approved on behalf of the Council of Standards Australia on 14 June 2006. This Standard was published on 12 July 2006.

The following are represented on Committee EL-011:

- Australian Chamber of Commerce and Industry
 - Australian Electrical and Electronic Manufacturers Association
 - Electrical Regulatory Authorities Council
 - Electricity Engineers Association (New Zealand)
 - Energy Networks Association
 - Ministry of Economic Development (New Zealand)
 - NEMMCO
 - National Measurement Institute
-

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee.

Keeping Standards up-to-date

Australian Standards® are living documents that reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued.

Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments that may have been published since the Standard was published.

Detailed information about Australian Standards, drafts, amendments and new projects can be found by visiting **www.standards.org.au**

Standards Australia welcomes suggestions for improvements, and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at **mail@standards.org.au**, or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 1284.4—2006

Electricity metering

Part 4: Socket mounting system

RECONFIRMATION NOTICE

Technical Committee EL-011 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 12 May 2016.

The following are represented on Technical Committee EL-011:

Australian Chamber of Commerce and Industry
Australian Energy Council
Australian Energy Market Operator
Australian Industry Group
Consumers Federation of Australia
Electrical Regulatory Authorities Council
Energy Networks Association
National Electrical and Communications Association
National Measurement Institute

NOTES

Australian Standard[®]

Electricity metering

Part 4: Socket mounting system

Originated as AS 1284.4—1991.
Previous edition 1994.
Third edition 2006.

COPYRIGHT

© Standards Australia

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Published by Standards Australia GPO Box 476, Sydney, NSW 2001, Australia

ISBN 0 7337 7616 7

PREFACE

This Standard was reviewed by the Australian members of the Joint Standards Australia/Standards New Zealand committee EL-011, Electricity Metering Equipment. After consultation with stakeholders in both countries Standards Australia and Standards New Zealand decided to republish this Australian Standard without technical alteration. Referenced documents have been updated to current editions.

The objective of this Standard is to provide the electricity metering industry with a dimensional and performance specification that will ensure that sockets, plug-in devices and other components of the system produced by different manufacturers are directly interchangeable and suitable for their intended purpose in terms of safety and performance.

This Standard is Part 4 of AS 1284, *Electricity metering*, which is published in Parts as follows:

- Part 1: General purpose induction watthour meters
- Part 4: Socket mounting system (this Standard)
- Part 10.1: Data exchange for meter reading, tariff and load control—Direct local data exchange via hand-held unit (HHU)—IEC Standard interface
- Part 10.2: Data exchange for meter reading, tariff and load control—Direct local data exchange via hand-held unit (HHU)—ANSI Standard interface
- Part 11: Single-phase multifunction watthour meters
- Part 12: Polyphase multifunction (non-demand) watthour meters (Class 1)
- Part 13: In-service compliance testing

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

CONTENTS

	Page
FOREWORD.....	4
 SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE	5
1.2 APPLICATION	5
1.3 REFERENCED DOCUMENTS	5
1.4 DEFINITIONS	6
 SECTION 2 SOCKET	
2.1 ARRANGEMENT	7
2.2 HOUSING	7
2.3 LIVE PARTS.....	7
2.4 HOUSING ASSEMBLY	8
2.5 DUST MEMBRANE	9
2.6 LOCATING PLATE.....	10
2.7 MARKINGS.....	10
2.8 SOCKET AS SUPPLIED	10
 SECTION 3 PLUG-IN DEVICE.....	
	14
 SECTION 4 RETAINING COVER	
4.1 ARRANGEMENT	17
4.2 MOULDING	17
4.3 SEALING SCREWS	17
4.4 DIMENSIONS.....	17
4.5 MARKINGS	17
 SECTION 5 BLANKING PLATE	
5.1 MOULDING	19
5.2 DIMENSIONS	19
 SECTION 6 COMPLETE ASSEMBLY	
6.1 SCOPE OF SECTION	20
6.2 DOUBLE INSULATION	20
6.3 ENTRY OF SEALING WIRE	20
6.4 ENTRY OF DUST AND WATER	20
 APPENDICES	
A STANDARD CONNECTION ARRANGEMENTS	21
B STANDARD ARRANGEMENTS FOR MULTIPLE SOCKETS.....	27
C INFORMATION TO BE SUPPLIED WITH ENQUIRY AND ORDER	31

FOREWORD

The socket mounting system for electricity meters specified herein was developed in Australia in the mid-1970s. It was based on the North American plug-in system of the 1930s. (That system is complicated by the three-wire 120 V–0–120 V supply system.)

The basic design involves a single-element meter with three blades, and a socket with three jaws, A, N, L; the heavy current jaws (A and L) are arranged at an angle of 90° to each other in order to facilitate self-alignment of the blades and to avoid the application of torque to the current coil of the meter during insertion.

The positions of the three jaws are staggered in order that, for those meters where it is applicable, disconnection of supply can be carried out simply and safely by removing and reinserting the meter 90° anticlockwise from its ‘normal’ position and resealing the installation, all without touching the associated circuit wiring. No meter can be inserted ‘upside-down’ or in any position other than ‘normal’ or ‘disconnected’.

However, in certain circumstances, a plug-in meter (or other device) might create a safety hazard to the installer if it were inserted in the ‘disconnected’ position; accordingly a ‘non-rotatable’ plug-in base is specified for such a meter or device to prevent insertion in other than the ‘normal’ position.

Staggering of jaws also facilitates factory connection of multiple sockets with straight sealed busbars, thereby achieving a significant reduction in space and in installation cost. The system allows for surface connection or back connection of wiring according to requirement.

Two additional jaws are provided for other purposes (see Appendix A). Bridging facilities are provided in the socket (see Figure 2.1) to accommodate an external shorting bridge for use in changing a meter without interrupting supply (or open-circuiting a current transformer).

The same jaw arrangement will also accept other devices for metering and load control purposes. Two sockets can be located adjacent to each other to allow a meter and a load control device to be conveniently interconnected (see Appendix B).

STANDARDS AUSTRALIA

Australian Standard
Electricity metering

Part 4: Socket mounting system

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies safety, performance and interchangeability requirements for sockets rated 500 V, 125 A, for plug-in devices, for retaining covers, and for blanking plates. This Standard also specifies standard connection arrangements (see Appendix A), and standard arrangements for multiple sockets (see Appendix B).

NOTES:

- 1 Where a socket is to be used with a device rated at more than 100 A, the socket should be wired with a minimum of 35 mm copper cable to terminals A and L.
- 2 To facilitate the specification and purchase of sockets and other components, the Standard lists information which should be supplied with enquiry and order (see Appendix C).

1.2 APPLICATION

This Standard is intended to be read in conjunction with AS 1284.1.

1.3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

1284 Electricity metering

1284.1 Part 1: General purpose induction watthour meters

60068.2.75 Part 2.75: Environmental testing—Tests—Test Eh: Hammer tests

60529 Degrees of protection provided by enclosures (IP Code)

AS/NZS

3100 Approval and test specification—General requirements for electrical equipment

60695.2.11 Part 2.11: Fire hazard testing—Glowing/hot wire based test methods—Glow-wire flammability test method for end-products

IEC

60028 International standard of resistance for copper

ISO

75 Plastics —Determination of temperature of deflection under load

75-2 Part 2: Plastics and ebonite

1.4 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

1.4.1 Blanking plate

A component intended to prevent access to live parts of a socket in the absence of any plug-in device, and held by a retaining cover.

1.4.2 Dust membrane

A component of a socket intended to provide protection against ingress of dust to a socket pending installation of a plug-in device or blanking plate.

1.4.3 Locating plate

A component of a socket intended to provide protection of the fingers of a person installing a plug-in device in a live socket.

1.4.4 Plug-in base

The base of a device fitted with contact blades and intended for insertion in a socket.

1.4.5 Plug-in device

A watthour meter or control device having a plug-in base.

1.4.6 Retaining cover

A component for retaining a plug-in device in a socket.

1.4.7 Socket

A device for fixing at the metering location of an electrical installation, having jaws intended for making a detachable connection with the blades of a plug-in meter or plug-in load control device.

1.4.8 Socket housing assembly

A socket without its locating plate and dust membrane.

SECTION 2 SOCKET

2.1 ARRANGEMENT

The socket shall consist of an assembly of a housing assembly and a locating plate with a disposable dust membrane attached to it. A housing assembly shall consist of a housing and three, four or five jaws and associated terminals.

2.2 HOUSING

2.2.1 Material

The housing shall be made from a rigid thermally stable insulating material that is non-hygroscopic and will not release gases or vapours that might corrode or discolour internal metal parts in service.

The material of which the terminal block is made shall be capable of passing the tests given in ISO 75-2 for a temperature of 135°C and a pressure of 1.8 MPa (Method A).

2.2.2 Mechanical strength

The housing shall have adequate mechanical strength and be constructed so that it can withstand the conditions of rough handling and transport that may be expected.

When the housing is rigidly mounted and struck three times with an impact energy of 0.5 J on every potentially weak point (other than a designed knockout position) with a spring hammer in accordance with AS 60068.2.75, the housing shall show no damage likely to affect its performance; in particular, live parts shall not have become exposed, the housing shall show no visible cracks, and there shall not have been such distortion as to damage insulating barriers or to reduce creepage distances or clearances.

2.2.3 Water absorption

When a housing is immersed in water at 20±5°C for 48 h, it shall not swell, delaminate, warp, or show any other physical or chemical change to a degree which would be liable to impair the safety of the socket mounting system.

2.2.4 Ignitability and combustion propagation

The housing shall withstand the glow-wire test specified in AS/NZS 60695.2.11, the test temperature of the wire being 960±10°C.

2.2.5 Knockouts

Knockouts shall be provided at the back of the housing but shall not be breached unless required for back connection. Knockouts shall not be provided at the top, bottom, or sides of the housing unless required for surface wiring or busbar connection.

2.3 LIVE PARTS

2.3.1 Jaws

The jaws shall be made from a material that will provide adequate contact pressure, low contact resistance, and resistance to corrosion under adverse conditions throughout the life of the socket.

An acceptable material is extra hard bronze with a minimum conductivity of 35% IACS*, of tensile strength 450 MPa to 500 MPa, and of hardness 75-85 Rockwell B and a minimum elongation of 2% in 50 mm.

* International Annealed Copper Standard (IEC 60028).

To provide complete traceability to source, jaws shall be marked (possibly in code) by the manufacturer to indicate the manufacturer and the place of manufacture.

Any burr on the edges of the jaw towards the busbar shall not exceed 0.08 mm.

When the jaw is tested as follows, there shall be no cracking of the material:

- (a) Mount the jaw hard against a flat metal surface using a full-width pressure plate, thus simulating normal assembly.
- (b) Slowly bend each of the legs outwards through 90° to the flat surface.

2.3.2 Terminals

Terminals shall provide for the laying-in of cable conductors in a plane parallel to the mounting plane of the socket.

Terminals shall permit direct laying-in and release of the cable.

Each terminal shall incorporate a pressure plate that is capable of reliably clamping a multi-stranded conductor in the range 4 mm to 50 mm using a torque of 5 N.m without permanent distortion of any part of the terminal.

Each terminal shall withstand without failure an overtightening torque of 10 N.m applied to the screw.

NOTE: This test should be done using a solid conductor.

2.3.3 Bridging facilities

Two terminals with threaded holes shall be provided to allow the connection of a bridge between terminals A and L while a plug-in meter is connected but with the retaining cover removed (see Figure 2.1). The bridging terminals and the links to terminals A and L shall be capable of withstanding without damage a continuous current of 40 A.

2.3.4 Corrosion resistance

All current-carrying parts shall be plated with a minimum of 0.001 mm tin or other non-toxic material giving equivalent corrosion resistance and electrical conductivity. All other live parts shall have equivalent corrosion resistance thereto.

2.4 HOUSING ASSEMBLY

2.4.1 Dimensions

The housing assembly shall conform to the dimensions specified in Figure 2.1 and incorporate two metal inserts with threaded holes for securing the retaining cover to the socket. When mounted on a plane surface in the normal manner, the housing shall be held rigidly without distortion. To allow for minor irregularities in the surface of the meter panel, all parts at the back of the socket shall be located at least 1 mm clear of the intended mounting surface plane.

2.4.2 Clearance and creepage distances

The clearance between live parts connected to different terminals shall be not less than 4 mm and the corresponding creepage distance shall be not less than 8 mm.

2.4.3 Thermal stability

When the socket, complete with all parts except the membrane, is subjected to the following test sequence, there shall be no loosening of parts, nor any distortion, twisting or displacement of parts:

- (a) Place the socket in a test enclosure at 100°C, maintain for 24 h.
- (b) Transfer the socket to a test enclosure at 0°C, maintain for 10 min.
- (c) Transfer the socket to a test enclosure at 100°C, maintain for 10 min.

- (d) Repeat Items (b) and (c) for a total of 10 cycles.
- (e) Remove the socket and allow it to return to room temperature.

Compliance shall be checked by dimensional measurement.

2.4.4 Insertion and removal of test blades

When each jaw installed in a socket at ambient temperature between 20°C and 30°C is subjected to 20 normal insertions and removals of a smooth steel blade of 2.39 ± 0.04 mm thickness and 10 mm width, the withdrawal force of the blade shall be not less than 50 N and not more than 200 N.

2.4.5 Continuous-current withstand

When determined as follows, the temperature rises of the terminals shall not exceed 35°C and those of the jaws shall not exceed 50°C:

- (a) Mount the socket on a panel in the normal manner and connect in accordance with Appendix A, Figure A1, using 1 m lengths of 25 mm V-75 single-insulated, unsheathed, stranded copper cable for the current circuit.
- (b) Fit thermocouples on terminals and jaws as shown in Figure 2.2.
- (c) Fit the locating plate, an induction meter rated 240 V, 15–100 A with a nominal loss of 10.0 ± 0.2 W in its current circuit at 100 A, and a retaining cover (see Figure 2.2).
- (d) Install the assembly so that it is protected from draughts and direct solar radiation at an ambient temperature between 20°C and 30°C.
- (e) Connect a load of 100 A and energize the voltage circuit at 240 V.
- (f) Measure the temperature rise at each point after 4 h.

2.4.6 Short-time overcurrent withstand

When a socket is tested as follows, it shall show no sign of any physical damage, and there shall be no annealing of jaws:

- (a) Mount the socket on a panel in the normal manner and connect lengths of 25 mm V-75 single-insulated, unsheathed, stranded copper cable to terminals A and L.
- (b) Fit the locating plate, an induction meter rated 15–100 A with a nominal loss of 10 W in its current circuit, and a retaining cover (see Figure 2.2).
- (c) Install the assembly so that it is protected from draughts and direct solar radiation at an ambient temperature between 20°C and 30°C.
- (d) Pass a current of 7000 A for 3 cycles (60 ms) from terminal A to terminal L through the meter current coil.

Lack of annealing shall be demonstrated by repeating the test specified in Clause 2.4.4 after which the average withdrawal force shall not have changed by more than 10% from the average of the final 10 values prior to the application of overcurrent, and shall remain within the limits specified in Clause 2.4.4.

2.5 DUST MEMBRANE

A dust membrane made of a flexible insulating material shall be temporarily affixed to the underside of the locating plate.