BS 7856:2017



BSI Standards Publication

Specification for special design and other features of alternating current watthour meters for active energy for use in the UK (Accuracy Classes A and B)



BS 7856:2017 BRITISH STANDARD

Publishing and copyright information

The BSI copyright notice displayed in this document indicates when the document was last issued.

© The British Standards Institution 2017

Published by BSI Standards Limited 2017

ISBN 978 0 580 95803 8

ICS 17.220.20

The following BSI references relate to the work on this document: Committee reference PEL/13 $\,$

Draft for comment 16/30348626 DC

Amendments/corrigenda issued since publication

Date Text affected

BRITISH STANDARD BS 7856:2017

Contents		Page
	Foreword	ii
1	Scope	1
2	Normative references	1
3	Terms and definitions	1
4	Mechanical features	2
	Table 1 — Dimensions and spacing of fixing holes and terminals	3
	Figure 1 — Spacing of fixing holes and terminals for single-phase, two-wire meter	4
5	Electrical features	5
	Table 2 — Standard currents for meters of Class A or Class B	5
	Figure 2 — Diagrams of connections for a single-phase, two-wire, one-rate meter	7
	Figure 3 — Diagrams of connections and graphical symbols for a two-element meter used on	
	three-wire systems	8
	Figure 4 — Diagrams of connections and graphical symbols for a two-element meter used on a	
	two-phase, four-wire system	9
	Figure 5 — Diagrams of connections and graphical symbols for a three-element meter used on a	
	three-phase, four-wire system	10
6	Other features	11
Annex A	(normative) Test method of a terminal's ability to safely clamp standard UK cables	12
	Figure A.1 — Test arrangement for clamping ability of a meter terminal	13
Annex B	(normative) External rate switching logic for multi-rate meters	14
	Table B.1 — Sequence for multi-rate registers having two to eight rates	14
Annex C	(normative) Long-term overcurrent test requirements	15
Annex D	(normative) Performance criteria for load switches inside meters	16
	Table D.1 — Performance criteria for supply control and load control switches	16
	Figure D.1 — Polyphase meter supply control switch test timing	17
	Figure D.2 — Contact resistance derived from mV drop measured at meter terminals at $I_{ m max}$	18
Annex E	(normative) Sealing criteria	19
Annex F	(informative) Operational considerations related to switches inside meters	20
	Figure F.1 — Typical heating in a 100 AI $_{ m max}$ meter when subjected to 1.45 $^*I_{ m max}$	21
	Table F.1 — Thermal stresses on a 100 A SCS protected by various OCPD ratings	22
	Table F.2 — Characteristics of OCPDs in common domestic use in the UK	23
	Figure F.2 — Current levels for determining OCPD characteristics	24
	Bibliography	26

Summary of pages

This document comprises a front cover, and inside front cover, pages i to iv, pages 1 to 26, an inside back cover and a back cover.

BS 7856:2017 BRITISH STANDARD

Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 July 2017. It was prepared by Technical Committee PEL/13, *Electricity meters*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes BS 7856:2013, which is withdrawn.

Relationship with other publications

The standard specifies several conditions which are more stringent than currently exist within other European metering standards, reflecting the differences in working practices that exist between the United Kingdom and other European Union member states. It is, however, important to note that this British Standard is intended to augment the provisions of certain European standards (see <u>Clause 2</u>, "Normative references") and so, in instances where this document is non-prescriptive, the provisions of these other standards prevail and are therefore to be taken into account.

Information about this document

This standard has been revised to take account of the introduction of the IEC standard for electricity meter safety (IEC 62052-31) and developments in the UK metering market, principally the rollout of smart metering to the residential market. The decision to further revise the standard came about because of:

- the incorporation of a supply control switch in every meter, particularly with regard to design
 considerations related to appropriate utilization categories, switch life (endurance) concerns
 and the thermal stresses placed upon such switches during overcurrent episodes. Furthermore,
 to give advice relating to supply control switches within polyphase meters in order to avoid
 issues due to partial switching arising from fault conditions;
- the inadequacies of some forms of service fusing as a means of providing protection to metering equipment and the need to align the overload requirements with British national specifications e.g. $1.45 I_{\rm max}$;
- the need to ensure that the provisions for installation sealing arrangements continue to meet the national specifications within the MOCOPA [N1].

In addition, legacy sections relating to meters of older design have been removed. Reference to current transformer operated metering has also been removed as the majority of the standard no longer applies to such metering equipment. However, at the time of writing, consideration is being given to additional work to incorporate current transformer operated metering in an additional standard.

The decision has also been taken to convert BS 7856 from a Code of Practice to a Specification as some of the new requirements relating to the national specifications are normative and safety related.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

BRITISH STANDARD BS 7856:2017

> Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. "organization" rather than "organisation").

Requirements in this standard are drafted in accordance with *Rules for the structure and drafting of UK standards*, subclause **G.1.1**, which states, "Requirements should be expressed using wording such as: 'When tested as described in Annex A, the product shall ...'". This means that only those products that are capable of passing the specified test will be deemed to conform to this standard.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

BS 7856:2017 BRITISH STANDARD

BRITISH STANDARD BS 7856:2017

1 Scope

This British Standard specifies requirements for special design and other features of newly manufactured directly connected alternating current watthour meters with ratings up to and including $100 \, A \, I_{\text{max}}$ for installation in domestic and small commercial/industrial premises.

This standard is principally aimed at the UK market, although it might also be of use to other markets. Within the UK the standard is aimed at manufacturers who intend to design and market meters, meter operators engaged in meter installation activities and those involved in meter procurement, such as energy suppliers and meter asset providers.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document, including any amendments, applies.

Standards publications

BS 6004:2012, Electric cables — PVC insulated and PVC sheathed cables for voltages up to and including 300/500 V, for electric power and lighting

BS EN 50470-1:2006, Electricity metering equipment (a.c.) — Part 1: General requirements, tests and test conditions — Metering equipment (Class indexes A, B and C)

BS EN 50470-2:2006, Electricity metering equipment (a.c.) — Part 2: Particular requirements — Electromechanical meters for active energy (Class indexes A and B)

BS EN 50470-3:2006, Electricity metering equipment (a.c.) — Part 3: Particular requirements — Static meters for active energy (Class indexes A, B and C)

BS EN 60947-1:2007+A2:2014, Low-voltage switchgear and controlgear — Part 1: General rules

BS EN 62052-11, Electricity metering equipment (AC) — General requirements, tests and test conditions — Part 11: Metering equipment

BS EN 62052-31:2016, Electricity metering equipment (AC) — General requirements, tests and test conditions — Part 31: Product safety requirements and tests

IEC 60502-1, Power cables with extruded insulation and their accessories for rated voltages from 1 kV $(U_m = 1.2 \text{ kV})$ up to 30 kV $(U_m = 36 \text{ kV})$ — Part 1: Cables for rated voltages of 1 kV $(U_m = 1.2 \text{ kV})$ and 3 kV $(U_m = 3,6 \; kV)$

Other publications

MOCOPA, Meter Operation Code of Practice Agreement, www.mocopa.org.uk [N1]

[N2] WELMEC, Guide for sealing of Utility meters, WELMEC 11.3 Issue 1 May 2012

Terms and definitions

For the purposes of this British Standard the terms and definitions given in BS EN 50470 (all parts):2006, BS EN 62052-11, BS EN 62052-31, IEC 60502-1 and the following apply.