

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

---

**Electricity metering data exchange – The DLMS/COSEM suite –  
Part 4-7: DLMS/COSEM transport layer for IP networks**

**Échange des données de comptage de l'électricité – La suite DLMS/COSEM –  
Partie 4-7: Couche transport DLMS/COSEM pour réseaux IP**





## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2015 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

#### IEC Catalogue - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

#### IEC publications search - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)

More than 60 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [csc@iec.ch](mailto:csc@iec.ch).

### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

### A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

#### Catalogue IEC - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

#### Recherche de publications IEC - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

#### Glossaire IEC - [std.iec.ch/glossary](http://std.iec.ch/glossary)

Plus de 60 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [csc@iec.ch](mailto:csc@iec.ch).

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



---

**Electricity metering data exchange – The DLMS/COSEM suite –  
Part 4-7: DLMS/COSEM transport layer for IP networks**

**Échange des données de comptage de l'électricité – La suite DLMS/COSEM –  
Partie 4-7: Couche transport DLMS/COSEM pour réseaux IP**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

---

ICS 17.220; 35.110; 91.140.50

ISBN 978-2-8322-2609-4

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references .....	7
3 Terms, definitions and abbreviations .....	8
3.1 Terms and definitions.....	8
3.2 Abbreviations .....	8
4 Overview .....	9
5 The DLMS/COSEM connection-less, UDP-based transport layer .....	10
5.1 General.....	10
5.2 Service specification for the DLMS/COSEM UDP-based transport layer .....	11
5.2.1 General .....	11
5.2.2 The UDP-DATA service .....	12
5.3 Protocol specification for the DLMS/COSEM UDP-based transport layer.....	14
5.3.1 General .....	14
5.3.2 The wrapper protocol data unit (WPDU).....	14
5.3.3 The DLMS/COSEM UDP-based transport layer protocol data unit.....	15
5.3.4 Reserved wrapper port numbers (wPorts) .....	16
5.3.5 Protocol state machine .....	16
6 The DLMS/COSEM connection-oriented, TCP-based transport layer .....	16
6.1 General.....	16
6.2 Service specification for the DLMS/COSEM TCP-based transport layer .....	17
6.2.1 General .....	17
6.2.2 The TCP-CONNECT service.....	18
6.2.3 The TCP-DISCONNECT service .....	21
6.2.4 The TCP-ABORT service .....	23
6.2.5 The TCP-DATA service.....	24
6.3 Protocol specification for the DLMS/COSEM TCP-based transport layer .....	26
6.3.1 General .....	26
6.3.2 The wrapper protocol data unit (WPDU).....	26
6.3.3 The DLMS/COSEM TCP-based transport layer protocol data unit .....	27
6.3.4 Reserved wrapper port numbers .....	27
6.3.5 Definition of the procedures .....	27
Annex A (informative) Converting OSI-style TL services to and from RFC-style TCP function calls.....	32
A.1 Transport layer and TCP connection establishment.....	32
A.2 Closing a transport layer and a TCP connection.....	33
A.3 TCP connection abort .....	34
A.4 Data transfer using the TCP-DATA service .....	35
INDEX .....	37
Bibliography.....	38
Figure 1 – DLMS/COSEM as a standard Internet application protocol .....	9
Figure 2 – Transport layers of the DLMS/COSEM_on_IP profile.....	10
Figure 3 – Services of the DLMS/COSEM connection-less, UDP-based transport layer.....	12

Figure 4 – The wrapper protocol data unit (WPDU) .....	15
Figure 5 – The DLMS/COSEM connection-less, UDP-based transport layer PDU (UDP-PDU) .....	15
Figure 6 – Services of the DLMS/COSEM connection-oriented, TCP-based transport layer .....	18
Figure 7 – The TCP packet format .....	27
Figure 8 – TCP connection establishment .....	28
Figure 9 – TCP disconnection .....	29
Figure 10 – Data transfer using the DLMS/COSEM TCP-based transport layer .....	30
Figure 11 – High-level state transition diagram for the wrapper sublayer.....	31
Figure A.1 – TCP connection state diagram .....	32
Figure A.2 – MSC and state transitions for establishing a transport layer and TCP connection .....	33
Figure A.3 – MSC and state transitions for closing a transport layer and TCP connection .....	34
Figure A.4 – Polling the TCP sublayer for TCP abort indication.....	34
Figure A.5 – Sending an APDU in three TCP packets .....	35
Figure A.6 – Receiving the message in several packets .....	36
Table 1 – Reserved wrapper port numbers in the UDP-based DLMS/COSEM TL .....	16

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICITY METERING DATA EXCHANGE –  
THE DLMS/COSEM SUITE –****Part 4-7: DLMS/COSEM transport layer for IP networks**

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this International Standard may involve the use of a maintenance service concerning the stack of protocols on which the present standard IEC 62056-4-7 is based.

The IEC takes no position concerning the evidence, validity and scope of this maintenance service.

The provider of the maintenance service has assured the IEC that he is willing to provide services under reasonable and non-discriminatory terms and conditions for applicants throughout the world. In this respect, the statement of the provider of the maintenance service is registered with the IEC. Information may be obtained from:

DLMS User Association  
Zug/Switzerland  
[www.dlms.com](http://www.dlms.com)

International Standard IEC 62056-4-7 has been prepared by IEC technical committee 13: Electrical energy measurement and control.

This first edition cancels and replaces IEC 62056-47 published in 2006. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) This standard is applicable now both for IP4 and IPv6 networks;
- b) Latest editions of the IEC 62056 suite are referenced.
- c) DLMS/COSEM IANA-registered port numbers added.

The text of this standard is based on the following documents:

CDV	Report on voting
13/1570/CDV	13/1595/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62056 series, published under the general title *Electricity metering data exchange – The DLMS/COSEM suite*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**