

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Enterprise-control system integration –  
Part 5: Business to manufacturing transactions**

**Intégration du système de commande d'entreprise –  
Partie 5: Transactions entre systèmes de gestion de commande d'entreprise et  
systèmes de fabrication**



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2011 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 la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland  
Email: [inmail@iec.ch](mailto:inmail@iec.ch)  
Web: [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.

- Catalogue of IEC publications: [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

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 It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: [www.iec.ch/online\\_news/justpub](http://www.iec.ch/online_news/justpub)

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

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

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: [www.iec.ch/webstore/custserv](http://www.iec.ch/webstore/custserv)

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: [csc@iec.ch](mailto:csc@iec.ch)  
Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00

### A propos de la CEI

La Commission Electrotechnique Internationale (CEI) 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 CEI

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

- Catalogue des publications de la CEI: [www.iec.ch/searchpub/cur\\_fut-f.htm](http://www.iec.ch/searchpub/cur_fut-f.htm)

Le Catalogue en-ligne de la CEI vous permet d'effectuer des recherches en utilisant différents critères (numéro de référence, texte, comité d'études,...). Il donne aussi des informations sur les projets et les publications retirées ou remplacées.

- Just Published CEI: [www.iec.ch/online\\_news/justpub](http://www.iec.ch/online_news/justpub)

Restez informé sur les nouvelles publications de la CEI. Just Published détaille deux fois par mois les nouvelles publications parues. Disponible en-ligne et aussi par email.

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

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International en ligne.

- Service Clients: [www.iec.ch/webstore/custserv/custserv\\_entry-f.htm](http://www.iec.ch/webstore/custserv/custserv_entry-f.htm)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions, visitez le FAQ du Service clients ou contactez-nous:

Email: [csc@iec.ch](mailto:csc@iec.ch)  
Tél.: +41 22 919 02 11  
Fax: +41 22 919 03 00

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Enterprise-control system integration –  
Part 5: Business to manufacturing transactions**

**Intégration du système de commande d'entreprise –  
Partie 5: Transactions entre systèmes de gestion de commande d'entreprise et  
systèmes de fabrication**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

PRICE CODE  
CODE PRIX

**XE**

ICS 25.040.99; 35.100; 35.200

ISBN 978-2-88912-378-0

## CONTENTS

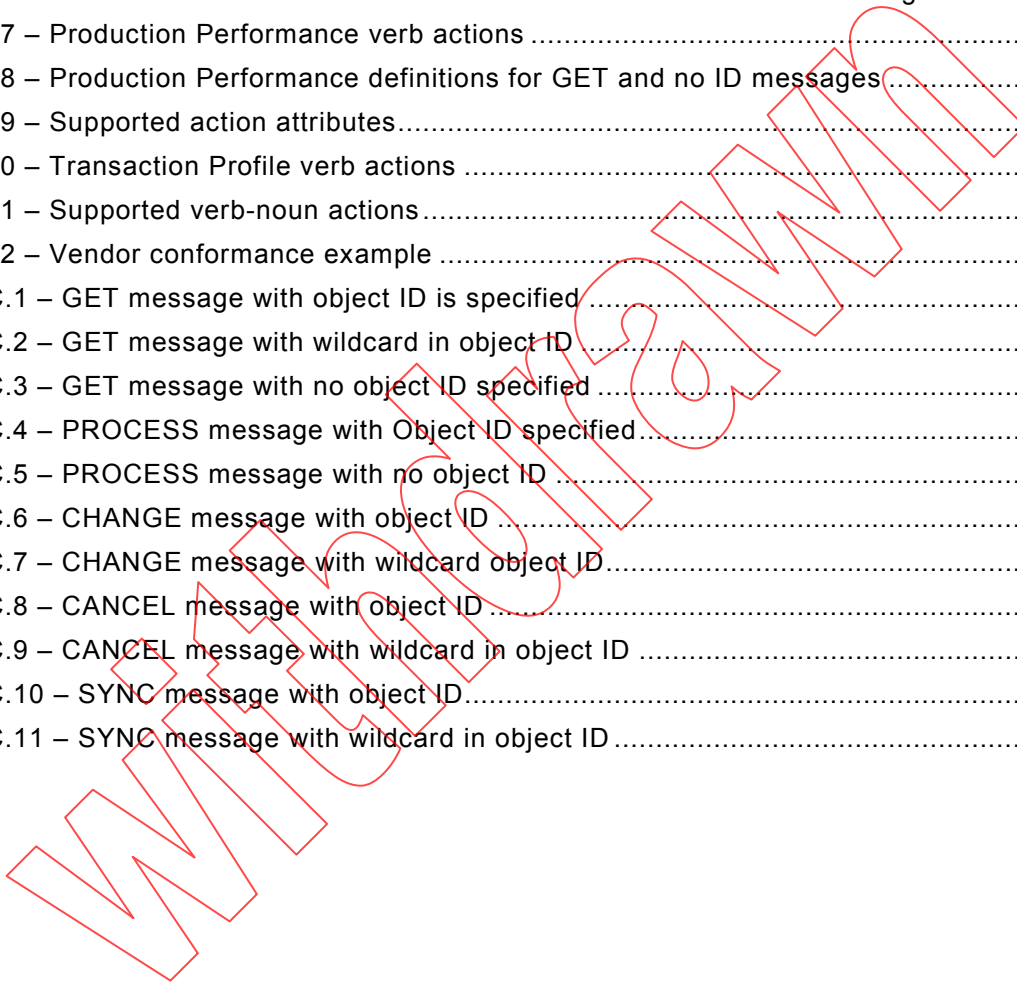
FOREWORD.....	7
INTRODUCTION.....	9
1 Scope.....	10
2 Normative references .....	10
3 Terms, definitions and abbreviations .....	10
3.1 Terms and definitions .....	10
3.2 Abbreviations .....	11
4 Transaction messages and verbs .....	11
4.1 General.....	11
4.2 Transaction models.....	12
4.3 Message structure.....	13
4.3.1 General structure.....	13
4.3.2 Application identification area.....	14
4.3.3 Data area .....	14
4.3.4 Message nouns .....	14
4.3.5 Wildcard .....	15
5 Message verbs .....	16
5.1 Verbs and transaction models .....	16
5.2 GET verb.....	18
5.3 SHOW verb .....	19
5.4 PROCESS verb.....	20
5.5 ACKNOWLEDGE verb.....	20
5.6 CHANGE verb .....	22
5.7 CANCEL verb.....	22
5.8 CONFIRM verb.....	23
5.9 RESPOND verb.....	24
5.10 SYNC verb.....	24
5.11 SYNC ADD verb.....	25
5.12 SYNC CHANGE verb.....	25
5.13 SYNC DELETE verb.....	25
6 Message nouns.....	26
6.1 General.....	26
6.2 Defined message contents .....	26
6.2.1 Transaction service profile.....	26
6.2.2 Personnel class .....	26
6.2.3 Person.....	26
6.2.4 Qualification test specification .....	26
6.2.5 Equipment class .....	27
6.2.6 Equipment .....	27
6.2.7 Equipment capability test specification .....	27
6.2.8 Maintenance request .....	27
6.2.9 Maintenance work order .....	27
6.2.10 Maintenance response.....	27
6.2.11 Material class .....	27
6.2.12 Material definition .....	27
6.2.13 Material lot .....	27

6.2.14	Material subplot.....	28
6.2.15	QA test Specification .....	28
6.2.16	Process segment.....	28
6.2.17	Production capability .....	28
6.2.18	Product definition .....	28
6.2.19	Production schedule.....	29
6.2.20	Production performance .....	29
6.3	Personnel model .....	30
6.3.1	Personnel model elements .....	30
6.3.2	Personnel class verbs .....	30
6.3.3	Personnel class verb actions .....	30
6.3.4	Person verbs .....	33
6.3.5	Person verb actions.....	33
6.3.6	Qualification test specification verbs.....	36
6.3.7	Qualification test specification verb actions .....	36
6.4	Equipment model .....	38
6.4.1	Equipment model elements.....	38
6.4.2	Equipment class verbs.....	38
6.4.3	Equipment class verb actions .....	38
6.4.4	Equipment verbs.....	41
6.4.5	Equipment verb actions .....	41
6.4.6	Equipment capability test specification verbs.....	44
6.4.7	Equipment capability test specification test verb actions.....	44
6.5	Maintenance model.....	46
6.5.1	Maintenance model elements .....	46
6.5.2	Maintenance request verbs.....	46
6.5.3	Maintenance request verb actions .....	46
6.5.4	Maintenance response verbs .....	47
6.5.5	Maintenance response verb actions.....	48
6.5.6	Maintenance work order verbs .....	48
6.5.7	Maintenance work order verb actions .....	49
6.6	Material model.....	50
6.6.1	Material model elements.....	50
6.6.2	Material class verbs.....	50
6.6.3	Material class verb actions .....	50
6.6.4	Material definition verbs .....	53
6.6.5	Material definition verb actions .....	53
6.6.6	Material lot verbs.....	56
6.6.7	Material lot verb actions .....	56
6.6.8	Material subplot verbs .....	59
6.6.9	Material subplot verb actions.....	59
6.6.10	QA test specification verbs .....	62
6.6.11	QA test specification verb actions.....	62
6.7	Process segment model .....	64
6.7.1	Process segment model elements .....	64
6.7.2	Process segment verbs .....	64
6.7.3	Process segment verb actions .....	64
6.8	Production capability model.....	66
6.8.1	Production capability model elements.....	66

6.8.2	Production capability verbs.....	66
6.8.3	Production capability verb actions .....	66
6.9	Product definition model.....	70
6.9.1	Production definition model elements .....	70
6.9.2	Product definition verbs .....	70
6.9.3	Product definition verb actions.....	70
6.10	Production schedule model .....	71
6.10.1	Production schedule model element .....	71
6.10.2	Production schedule verbs.....	72
6.10.3	Production schedule verb actions .....	72
6.11	Production performance model .....	75
6.11.1	Production performance model elements .....	75
6.11.2	Production performance verbs .....	76
6.11.3	Production performance verb actions.....	76
6.12	Transaction Profile .....	78
7	Completeness, compliance and conformance .....	80
7.1	Completeness .....	80
7.2	Compliance .....	80
7.3	Conformance.....	80
Annex A (informative)	Transaction models and business scenario examples.....	83
Annex B (informative)	Questions on the use of transactions.....	94
Annex C (informative)	Patterns for Verbs.....	97
Annex D (informative)	General rules for identifying nouns from object models .....	102
Bibliography.....		105
Figure 1 – Typical exchanged messages in a transaction.....		13
Figure 2 – Typical exchanged data set.....		13
Figure 3 – Typical layout of an application identification area.....		14
Figure 4 – GET with wildcard and SHOW response.....		15
Figure 5 – GET and SHOW transaction.....		19
Figure 6 – GET and SHOW transaction with a CONFIRM always .....		20
Figure 7 – PROCESS/ACKNOWLEDGE transaction.....		21
Figure 8 – Example of ACKNOWLEDGE to a process message .....		21
Figure 9 – CHANGE/RESPOND transaction.....		22
Figure 10 – CANCEL message .....		22
Figure 11 – Example of a GET message with Confirm OnError .....		23
Figure 12 – Confirm Message .....		24
Figure 13 – SYNC ADD transaction with confirmation .....		25
Figure 14 – SYNC DELETE transaction with no confirmation .....		26
Figure 15 – Object grouping for the personnel model .....		30
Figure 16 – Object grouping for the equipment model .....		38
Figure 17 – Object grouping for the maintenance model .....		46
Figure 18 – Object grouping for the material model.....		50
Figure 19 – Object grouping for the process segment model.....		64
Figure 20 – Object grouping for the production capability model .....		66

Figure 21 – Object grouping for the product definition model .....	70
Figure 22 – Object grouping for the production schedule model .....	72
Figure 23 – Object grouping for the production performance model.....	75
Figure 24 – Transaction profile model .....	78
Figure A.1 – Coordination of planning and operations processes .....	83
Figure A.2 – Push model – Production schedule and production performance.....	84
Figure A.3 – Pull model – Production schedule and production performance.....	85
Figure A.4 – Publish model – Production schedule and production performance .....	85
Figure A.5 – Push model – Production schedule changes .....	86
Figure A.6 – Publish model – Production schedule changes.....	86
Figure A.7 – Push model – Production schedule cancelled .....	87
Figure A.8 – Push and pull model – Schedule cancelled .....	87
Figure A.9 – Push model – Daily production performance .....	88
Figure A.10 – Pull model – Daily production performance .....	88
Figure A.11 – Publish model – Daily production schedule .....	89
Figure A.12 – Pull and push model – Production capability and production schedule .....	89
Figure A.13 – Publish and push model – Production capability and production schedule.....	90
Figure A.14 – Push and pull model – Schedule changes .....	91
Figure A.15 – Publish model – Schedule changes after capability changes .....	91
Figure A.16 – Push model – Material lot added, material lot quantity changed .....	92
Figure A.17 – Publish and push model – Material quantity changes .....	92
Figure A.18 – Push and pull model – Material quantity changes .....	93
Figure D.1 – Object model with composite relationships .....	103
Figure D.2 – Object model with non composite relationships.....	104
Figure D.3 – Example of multiple composite objects .....	104
Table 1 – Defined verbs .....	17
Table 2 – Acknowledge request options .....	20
Table 3 – Acknowledge element .....	21
Table 4 – Respond options .....	22
Table 5 – Confirmation request options.....	23
Table 6 – Respond element .....	24
Table 7 – Personnel class verb actions .....	31
Table 8 – Person verb actions .....	34
Table 9 – Qualification test specification verb actions .....	37
Table 10 – Equipment class verb actions .....	39
Table 11 – Equipment verb actions .....	42
Table 12 – Equipment capability test specification verb actions .....	45
Table 13 – Maintenance request verb actions .....	47
Table 14 – Maintenance response verb actions.....	48
Table 15 – Maintenance work order verb actions .....	49
Table 16 – Material Class verb actions .....	51
Table 17 – Material definition verb actions .....	54

Table 18 – Material lot verb actions .....	57
Table 19 – Material subplot verb actions .....	60
Table 20 – QA test verb actions .....	63
Table 21 – Process segment verb actions .....	65
Table 22 – Production Capability verb actions .....	67
Table 23 – Production capability element definitions for GET and no ID messages .....	69
Table 24 – Product definition verb actions .....	71
Table 25 – Production schedule verb actions .....	73
Table 26 – Production Schedule element definitions for GET and no ID messages .....	75
Table 27 – Production Performance verb actions .....	76
Table 28 – Production Performance definitions for GET and no ID messages .....	78
Table 29 – Supported action attributes .....	79
Table 30 – Transaction Profile verb actions .....	80
Table 31 – Supported verb-noun actions .....	81
Table 32 – Vendor conformance example .....	82
Table C.1 – GET message with object ID is specified .....	97
Table C.2 – GET message with wildcard in object ID .....	98
Table C.3 – GET message with no object ID specified .....	98
Table C.4 – PROCESS message with Object ID specified .....	98
Table C.5 – PROCESS message with no object ID .....	99
Table C.6 – CHANGE message with object ID .....	99
Table C.7 – CHANGE message with wildcard object ID .....	99
Table C.8 – CANCEL message with object ID .....	100
Table C.9 – CANCEL message with wildcard in object ID .....	100
Table C.10 – SYNC message with object ID .....	100
Table C.11 – SYNC message with wildcard in object ID .....	101



## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ENTERPRISE-CONTROL SYSTEM INTEGRATION –****Part 5: Business to manufacturing transactions**

## 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.

International Standard IEC 62264-5 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation.

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

CDV	Report on voting
65E/100/CDV	65E/156/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.