



DPC: 24 / 30498336 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 12 August 2024

Origin: International

Latest date for receipt of comments: 25 September 2024

Project No. 2024/02222

Responsible committee: PEL/38 Instrument transformers

Interested committees:

Title: BS EN IEC 61869-2 Instrument transformers

Part 2: Additional requirements for current transformers

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

**WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD.
THIS DRAFT IS NOT CURRENT BEYOND 25 September 2024**

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <http://standardsdevelopment.bsigroup.com>

Responsible Committee Secretary: Lilly Malik (BSI)

Direct tel:

E-mail: lilly.malik@bsigroup.com

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
------------------	------------------------

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

PROJECT NUMBER: IEC 61869-2 ED2	
DATE OF CIRCULATION: 2024-08-02	CLOSING DATE FOR COMMENTS: 2024-10-25
SUPERSEDES DOCUMENTS: 38/782/RR	

IEC TC 38 : INSTRUMENT TRANSFORMERS		
SECRETARIAT: Italy		SECRETARY: Mr Filippo Frugoni
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 13,SC 17C,TC 85,TC 95		HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED: Electricity transmission and distribution		

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any local regulations or technical reasons that may exist and should be considered should this proposal proceed, recognizing that failure to address such requirements could result in the need for new or existing "In Some Countries" clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE:

Instrument transformers - Part 2: Additional requirements for current transformers

NOTE FROM TC/SC OFFICERS:

Copyright © 2024 International Electrotechnical Commission, IEC. All rights reserved. It is permitted to download this electronic file, to make a copy and to print out the content for the sole purpose of preparing National Committee positions. You may not copy or "mirror" the file or printed version of the document, or any part of it, for any other purpose without permission in writing from IEC.

CONTENTS

1		
2		
3	FOREWORD.....	7
4	INTRODUCTION.....	10
5	1 Scope.....	11
6	2 Normative references	11
7	3 Terms, definitions, symbols and abbreviated terms.....	11
8	3.1 Terms and definitions.....	11
9	3.2 Symbols and abbreviated terms	11
10	4 Normal and special environmental conditions	12
11	5 Ratings.....	12
12	5.1 General.....	12
13	5.2 Voltage ratings.....	12
14	5.2.1 Highest voltage for equipment (U_m).....	12
15	5.2.2 Power system earthing	12
16	5.2.3 Standard values for rated primary voltage (U_{pr}).....	12
17	5.2.4 Standard values for rated secondary voltage (U_{sr})	13
18	5.2.5 Rated auxiliary power supply voltage (U_{ar}).....	13
19	5.3 Current ratings.....	13
20	5.3.1 Standard values for rated primary current (I_{pr})	13
21	5.3.2 Standard values for rated secondary current (I_{sr})	13
22	5.3.3 Standard values for rated continuous thermal current (I_{cth})	13
23	5.3.4 Short-time current ratings	13
24	5.4 Dielectric ratings	14
25	5.4.1 General	14
26	5.4.2 Rated primary terminal insulation level	14
27	5.4.3 Other requirements for primary terminal insulation	14
28	5.4.4 Between-section insulation requirements	14
29	5.4.5 Insulation requirements for secondary terminals and low-voltage	
30	components.....	14
31	5.5 Rated frequency (f_r)	14
32	5.6 Output ratings	14
33	5.6.1 Rated output for inductive instrument transformers and CVTs	14
34	5.6.2 Rated burden for LPITs	15
35	5.6.3 Standard values for the rated delay time for EITs (t_{dr}).....	15
36	5.7 Accuracy requirements	15
37	5.7.1 General	15
38	5.7.2 Rated accuracy classes	15
39	5.7.3 Accuracy class extension for harmonics	21
40	5.7.4 Accuracy requirements for harmonics	21
41	5.7.5 Harmonic requirements for LPIT protection accuracy classes	21
42	5.7.6 Anti-aliasing filter for EIT using digital data processing	21
43	6 Design and construction	21
44	6.1 Requirements for liquids used in equipment.....	21
45	6.2 Requirements for gases used in equipment.....	21
46	6.3 Requirements for solid materials uses in equipment.....	22

47	6.4	Requirements for temperature rise of parts and components	22
48	6.4.1	General	22
49	6.4.2	Influence of altitude on temperature rise	22
50	6.5	Requirements for earthing equipment	22
51	6.5.1	General	22
52	6.5.2	Earthing of the enclosure	22
53	6.5.3	Electrical continuity	22
54	6.6	Requirements for the external insulation	22
55	6.7	Mechanical requirements	22
56	6.8	Multiple chopped impulses on primary terminals	22
57	6.9	Internal arc fault protection	22
58	6.10	Degrees of protection by enclosures	22
59	6.11	Electromagnetic compability (EMC)	23
60	6.11.1	General	23
61	6.11.2	Requirements for immunity	23
62	6.11.3	Requirements for emission	23
63	6.11.4	Requirements for transmitted overvoltage (TOV)	23
64	6.11.5	Requirements for radio interference voltage (RIV)	23
65	6.12	Corrosion	23
66	6.13	Markings	23
67	6.13.1	General	23
68	6.13.2	Terminal markings	23
69	6.13.3	Rating plate markings	24
70	6.14	Requirements for LPIT secondary terminal connection	26
71	6.15	EIT secondary signal noise	26
72	6.16	Fire hazard	26
73	6.17	Pressure withstand of gas-filled enclosures	27
74	6.18	Failure detection of EIT	27
75	6.19	Operability	27
76	6.20	Reliability and dependability of electronic part of EIT	27
77	6.21	Vibration requirements	27
78	6.22	Storage climatic conditions withstand capability	27
79	7	Tests	27
80	7.1	General	27
81	7.1.1	Classification of tests	27
82	7.1.2	Lists of tests	27
83	7.1.3	Sequence of tests	28
84	7.1.4	Testing conditions	29
85	7.2	Type tests	29
86	7.2.1	General	29
87	7.2.2	Temperature rise test	29
88	7.2.3	Impulse voltage withstand test on primary terminals	30
89	7.2.4	Wet test for outdoor type instrument transformers	30
90	7.2.5	Electromagnetic compatibility (EMC) tests	30
91	7.2.6	Tests for accuracy	30
92	7.2.7	Verifications of the degree of protection by enclosures	32
93	7.2.8	Enclosures tightness test at ambient temperature	33
94	7.2.9	Proof test for the gas-filled enclosure	33

95	7.2.10	Mechanical tests.....	33
96	7.2.11	Voltage withstand test of low-voltage components and secondary	
97		terminals	33
98	7.2.12	Storage climatic environmental tests.....	33
99	7.2.13	Vibration test	33
100	7.2.14	Durability of marking	33
101	7.2.15	Test for accuracy for harmonics and low frequencies	33
102	7.2.16	Test for anti-aliasing	33
103	7.2.201	Short-time current test	33
104	7.3	Routine tests	34
105	7.3.1	Power-frequency voltage withstand tests on primary terminals	34
106	7.3.2	Partial discharge measurement.....	34
107	7.3.3	Power frequency voltage withstand between sections	34
108	7.3.4	Power frequency voltage withstand tests on secondary terminals	35
109	7.3.5	Power frequency voltage withstand tests for low-voltage components.....	35
110	7.3.6	Test for accuracy	35
111	7.3.7	Verifications of markings	36
112	7.3.8	Enclosure tightness test at ambient temperature	36
113	7.3.9	Pressure test for the gas-filled enclosure	36
114	7.3.10	Determination of capacitance and dielectric dissipation factor	37
115	7.3.201	Determination of the secondary winding resistance (R_{ct}).....	37
116	7.3.202	Determination of the secondary loop time constant (T_S).....	37
117	7.3.203	Test for rated knee point e.m.f. (E_K) and exciting current at E_K	38
118	7.3.204	Inter-turn overvoltage test.....	38
119	7.3.205	Determination of the instrument security factor (FS) of measuring	
120		current transformers	39
121	7.3.206	Determination of the remanence factor	39
122	7.4	Special tests	40
123	7.4.1	Multiple chopped impulse test on primary terminals	40
124	7.4.2	Transmitted overvoltage test.....	40
125	7.4.3	Internal arc test	40
126	7.4.4	Enclosure tightness test at low and high temperatures.....	40
127	7.4.5	Insulation resistance measurement on secondary terminals	40
128	7.4.6	Corrosion test.....	40
129	7.4.7	Fire hazard test	40
130	7.4.8	Thermo-mechanical endurance test	40
131	7.4.9	Vibration and shock tests.....	40
132	7.4.10	Test for accuracy versus harmonics and low frequencies	40
133	7.4.11	Seismic qualification	40
134	7.5	Commissioning test	40
135	7.6	Sample tests	40
136	8	Rules for transport, storage, erection, operation and maintenance.....	40
137	9	Safety	41
138	10	Influence of products on the natural environment.....	41
139	Annex A (normative)	Identification of test specimen	42
140	Annex B (informative)	Recommendation for contents of failure report	43
141	Annex C (informative)	Fire hazard	44
142	Annex D (informative)	Sample test.....	45

143	Annex E (informative) Technique used in temperature rise test of transformers to	
144	determine the thermal time constant by an experimental estimation.	46
145	Annex F (informative) Guide for the extension of validity of type test or special tests of	
146	instrument transformers	47
147	Annex G (informative) Guidance for the calculation of equivalent diameter in case of	
148	irregular shape of insulating part	48
149	Annex H (informative) Test circuits	49
150	Annex I (normative) Seismic qualification of instrument transformers	50
151	Annex 2A (normative) Protective current transformers classes P, PR	51
152	2A.1 Vector diagram	51
153	2A.2 Turns correction	51
154	2A.3 The error triangle	52
155	2A.4 Composite error	52
156	2A.5 Direct test for composite error	53
157	2A.6 Alternative method for the direct measurement of composite error	54
158	2A.7 Use of composite error	55
159	Annex 2B (normative) Protective current transformer classes for transient	
160	performance	56
161	2B.1 Basic theoretical equations for transient dimensioning	56
162	2B.1.1 Short-circuit	56
163	2B.1.2 Transient dimensioning factor K_{td}	57
164	2B.1.3 C-O-C-O duty cycles	61
165	2B.2 Measurement of the core magnetization characteristic	64
166	2B.2.1 General	64
167	2B.2.2 A.C. method	65
168	2B.2.3 D.C. method	67
169	2B.2.4 Capacitor discharge method	70
170	2B.3 Direct test for determination of the error at limiting conditions	71
171	2B.3.1 General	71
172	2B.3.2 Direct test	71
173	2B.3.3 Determination of the factor of construction	73
174	Annex 2C (normative) Proof of low-leakage reactance type	75
175	Annex 2D (informative) Alternative measurement of the ratio error (ε)	76
176	Annex 2E (normative) Determination of the turns ratio error	78
177	Annex 2F (informative) Short-time current test arrangements	79
178	2F.1 Arrangement for tests	79
179	2F.1.3 Multiratio Current Transformers	81
180	2F.1.3.1 Primary windings	81
181	2F.1.3.2 Secondary windings	81
182	2F.2 Test procedure	81
183	Annex 2G (informative) Method to calculate ratio error and phase displacement at	
184	power factor 0,8 bases on a measurement performed with power factor 1,0	82
185	Annex 2H (normative) Legacy burden values	83
186	2H.1 Legacy output values	83
187	2H.2 Legacy limits of current error and phase displacement for measuring current	
188	transformers	83
189	2H.3 Legacy limits of current error and phase displacement for protective current	
190	transformers class P and class PR	84

191		
192	Figure 2A.1 – Vector Diagram	51
193	Figure 2A.2 – Error triangle.....	52
194	Figure 2A.3 – Typical current waveforms	53
195	Figure 2A.4 – Basic circuit for 1:1 current transformer	53
196	Figure 2A.5 – Basic circuit for current transformer with any ratio.....	54
197	Figure 2A.6 – Alternative test circuit	54
198	Figure 2B.1 – Short-circuit current for two different fault inception angles	57
199	Figure 2B.2 – $\psi_{\max}(t)$ as the curve of the highest flux values, considering all relevant	
200	fault inception angles γ	57
201	Figure 2B.3 – Relevant time ranges for calculation of transient factor	58
202	Figure 2B.4 – Determination of K_{tf} in time range 1 at 50 Hz for $T_{\text{S}} = 1,8 \text{ s}$	60
203	Figure 2B.5 – Determination of K_{tf} in time range 1 at 60 Hz for $T_{\text{S}} = 1,5 \text{ s}$	60
204	Figure 2B.6 – Determination of K_{tf} in time range 1 at 16,7 Hz for $T_{\text{S}} = 5,5 \text{ s}$	60
205	Figure 2B.7 – Flux course in a C-O-C-O cycle of a non-gapped core	62
206	Figure 2B.8 – Limiting the magnetic flux by considering core saturation	63
207	Figure 2B.9 – Basic circuit	64
208	Figure 2B.10 – Determination of remanence factor by hysteresis loop	67
209	Figure 2B.11 – Circuit for d.c. method.....	67
210	Figure 2B.12 – Time-amplitude and flux-current diagrams	68
211	Figure 2B.13 – Recordings with shifted flux base line	69
212	Figure 2B.14 – Circuit for capacitor discharge method	70
213	Figure 2B.15 – Typical records for capacitor discharge method	71
214	Figure 2B.16 – Measurement of error currents	73
215	Figure 2D.1 – Simplified equivalent circuit of the current transformer	76
216	Figure 2F.1 – Test arrangement for CT with $U_{\text{m}} \leq 52 \text{ kV}$	79
217	Figure 2F. 2 – Test arrangement for CT with $U_{\text{m}} > 52 \text{ Kv}$	80
218		
219		

INTERNATIONAL ELECTROTECHNICAL COMMISSION

INSTRUMENT TRANSFORMERS –

Part 2: Additional requirements for current transformers

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 closely 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.

IEC 61869-2 has been prepared by IEC technical committee 38: Instrument transformers. It is an International Standard.

.

This second edition cancels and replaces the first edition published in 2012. This edition constitutes a technical revision.

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

FDIS	Report on voting
38/XX/FDIS	38/XX/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

This Part 2 is to be used in conjunction with, and is based on, IEC 61869-1, *General Requirements* –second edition (2023), however the reader is encouraged to use its most recent edition.

This Part 2 follows the structure of IEC 61869-1 and supplements or modifies its corresponding clauses.

For additional clauses, subclauses, figures, tables, annexes or notes, the following numbering system is used:

- a) clauses, subclauses, tables, figures and notes that are numbered starting from 201 are additional to those in Part 1;
- b) additional annexes are lettered 2A, 2B, etc.

A list of all the parts in the IEC 61869 series, published under the general title *Instrument transformers*, can be found on the IEC website. An overview of the planned set of standards at the date of publication of this document is given below. The updated list of standards issued by IEC TC38 is available at the website: www.iec.ch.

Product family standard	Product standard	Title
61869-1 General requirements	61869-2	Additional requirements for current transformers
	61869-3	Additional requirements for inductive voltage transformers
	61869-4	Additional requirements for combined transformers
	61869-5	Additional requirements for capacitive voltage transformers
	61869-7	Additional requirements for low-power voltage transformers
	61869-8	Additional requirements for low-power current transformers
	61869-9	Digital interface for instrument transformers
	61869-10	Additional requirements for current sensors
	61869-11	Additional requirements for voltage sensors
	61869-12	Additional requirements for combined low-power instrument transformers
	61869-13	Stand-alone merging unit (SAMU)

	61869-14	Additional requirements for current transformers for DC applications
	61869-15	Additional requirements for voltage transformers for DC applications
	61869-16	TEDS (Transducer Electronic Data Sheet) for instrument transformers
	61869-99	Glossary of terms

290

291 The theoretical background for the dimensioning according to the electrical requirements has
292 become much more complex. In order to keep this standard as user-friendly as possible, the
293 explanation of the background information will be transferred to the Technical Report
294 IEC 61869-100 TR.

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

- 298 • reconfirmed,
- 299 • withdrawn,
- 300 • replaced by a revised edition, or
- 301 • amended.

302

303

INTRODUCTION

A new introduction in part 2 will be added.

This document is the first revision of the standard IEC 61869-2, defining additional requirements for current transformers.

The main modifications of this revision are listed below:

- xxxx
- transfer of the definitions to the TC 38 Glossary IEC 61869-99
-

INSTRUMENT TRANSFORMERS –

Part 2: Additional requirements for Current Transformers

1 Scope

Clause 1 of IEC 61869-1:2023 is replaced by the following:

This part of IEC 61869 is applicable to newly manufactured inductive current transformers intended for applications where the nominal voltage is higher than 1 kV AC, for measuring, protection and control purposes, with rated frequencies from 15 Hz to 400 Hz.

NOTE A bushing type current transformer, although having no primary insulation level for itself is often placed on a system with a nominal voltage > 1 kV AC and therefore falls within the scope of this document. Example: CT placed around an HV bushing or a cable.

~~The general requirements for instrument transformers for applications in LV systems (nominal voltage ≤ 1 kV AC) are covered by the standard IEC 61869-201.~~

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

Clause 2 of IEC 61869-1:2023 is applicable with the following additions:

IEC 61869-1:2023, *Instrument Transformers – Part 1: General requirements*

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions of IEC 61869-99 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
 - ISO Online browsing platform: available at <https://www.iso.org/obp>
- [SOURCE: IEC 60050-321:1986, 321-02-25]

3.2 Symbols and abbreviated terms

AIS	air-insulated switchgear
CT	current transformer
EMC	electromagnetic compatibility
F	mechanical load

f_r	rated frequency
F_{rel}	relative leakage rate
GIS	gas-insulated switchgear
I_{arc}	rated internal arc fault current
I_{cth}	rated continuous thermal current
I_{dyn}	rated dynamic current
I_{pr}	rated primary current
I_{sr}	rated secondary current
I_{psc}	rated short-circuit current
I_{th}	rated short-time thermal current
IT	instrument transformer
K_r	rated transformation ratio
k_{se}	superelevation factor
PD	partial discharge
U_m	highest voltage for equipment
U_{sys}	highest voltage of the system
S_r	rated output – rated output power
Z_{br}	rated burden
ZPA	zero period acceleration
ε	ratio error
ε_c	composite error
$\Delta\varphi$	phase displacement

4 Normal and special environmental conditions

Clause 4 of IEC 61869-1:2023 applies.

5 Ratings

5.1 General

Subclause 5.1 of IEC 61869-1:2023 applies.

5.2 Voltage ratings

5.2.1 Highest voltage for equipment (U_m)

Subclause 5.2.1 of IEC 61869-1:2023 applies.

5.2.2 Power system earthing

Subclause 5.2.2 of IEC 61869-1:2023 applies.

5.2.3 Standard values for rated primary voltage (U_{pr})

Subclause 5.2.3 of IEC 61869-1:2023 is not applicable.

5.2.4 Standard values for rated secondary voltage (U_{sr})

Subclause 5.2.4 of IEC 61869-1:2023 is not applicable.

5.2.5 Rated auxiliary power supply voltage (U_{ar})

Subclause 5.2.5 of IEC 61869-1:2023 is not applicable.

5.3 Current ratings**5.3.1 Standard values for rated primary current (I_{pr})**

The standard values for rated primary current are:

10 – 12,5 – 15 – 20 – 25 – 30 – 40 – 50 – 60 – 75 A,

and their decimal multiples or fractions.

The preferred values are those underlined.

5.3.2 Standard values for rated secondary current (I_{sr})

The standard values for rated secondary current are:

1 A - 5 A.

For protective current transformers for transient performance, the standard value of the rated secondary current is 1 A.

5.3.3 Standard values for rated continuous thermal current (I_{cth})

The standard value for rated continuous thermal current is the rated primary current.

When a rated continuous thermal current greater than the rated primary current is specified, the preferred values are 120 %, 150 % and 200 % of rated primary current.

5.3.4 Short-time current ratings**5.3.4.1 Rated short-time thermal current (I_{th})**

A rated short-time thermal current (I_{th}) shall be assigned to the transformer.

The standard value for the duration of the rated short-time thermal current is 1 s.

5.3.4.2 Rated dynamic current (I_{dyn})

The standard value of the rated dynamic current (I_{dyn}) is 2,5 times the rated short-time thermal current (I_{th}).

5.3.4.3 Rated internal arc fault current (I_{arc})

Subclause 5.3.4.3 of IEC 61869-1:2023 applies.

5.4 Dielectric ratings

5.4.1 General

Subclause 5.4.1 of IEC 61869-1:2023 applies.

5.4.2 Rated primary terminal insulation level

Subclause 5.4.2 of IEC 61869-1:2023 applies.

5.4.3 Other requirements for primary terminal insulation

Subclause 5.4.3 of IEC 61869-1:2023 applies.

5.4.4 Between-section insulation requirements

Subclause 5.4.4 of IEC 61869-1:2023 applies.

5.4.5 Insulation requirements for secondary terminals and low-voltage components

5.4.5.1 General requirements

Subclause 5.4.5.1 of IEC 61869-1:2023 applies with the following addition:

The secondary winding insulation of class PX and class PXR current transformers having a rated knee point e.m.f. $E_k \geq 2\text{ kV}$ shall be capable of withstanding a rated power frequency withstand voltage of 5 kV r.m.s. for 60 s.

5.4.5.2 Special requirements for LPITs

Subclause 5.4.5.2 of IEC 61869-1:2023 is not applicable.

5.4.5.3 DC insulation resistance requirement

Subclause 5.4.5.3 of IEC 61869-1:2023 applies.

5.4.5.201 Inter-turn insulation requirements

The rated withstand voltage for inter-turn insulation shall be 4,5 kV peak.

For class PX and class PXR current transformers having a rated knee point e.m.f. of greater than 450 V, the rated withstand voltage for the inter-turn insulation shall be a peak voltage of 10 times the r.m.s. value of the specified knee point e.m.f., or 10 kV peak, whichever is the lower.

Note 201 Due to the test procedure, the wave shape can be highly distorted.

Note 202 In accordance with the test procedure 7.3.204, lower voltage values could result.

5.5 Rated frequency (f_r)

Subclause 5.5 of IEC 61869-1:2023 applies.

5.6 Output ratings

5.6.1 Rated output for inductive instrument transformers and CVTs

5.6.1.1 General

Subclause 5.6.1.1 of IEC 61869-1:2023 applies.

5.6.1.2 Rated output values

The standard values of rated output for measuring classes and protective classes P and PR are:

1 – 10 and 25 VA.

The power factor shall be 1.

For legacy burden definitions, see Annex 2H.

If legacy burdens are specified, shall be mentioned in the enquiry and on the nameplate. See Annex 2H.

NOTE It is recommended to increase ALF instead of increasing the rated output. For more information refer to technical report IEC TR 61869-100.

The standard rated output for class TPX, TPY and TPZ current transformers are expressed as a resistive burden in Ω

0,5 – 1 – 2

The preferred value is underlined. The values are based on a rated secondary current of 1 A. For current transformers having a rated secondary current other than 1 A, the above values shall be adjusted in inverse ratio to the square of the current.

For a given transformer, provided one of the values of rated output is standard and associated with a standard accuracy class, the declaration of other rated outputs, which may be non-standard values, but associated with other standard accuracy classes, is not precluded.

EXAMPLE: 10VA class 0.2S & 25VA class 0.5

5.6.2 Rated burden for LPITs

Subclause 5.6.2 of IEC 61869-1:2023 is not applicable.

5.6.3 Standard values for the rated delay time for EITs (t_{dr})

Subclause 5.6.3 of IEC 61869-1:2023 is not applicable.

5.7 Accuracy requirements

5.7.1 General

Subclause 5.7.1 of IEC 61869-1:2023 applies.

5.7.2 Rated accuracy classes

5.7.2.201 Measuring current transformers

5.7.2.201.1 Standard accuracy classes

For measuring current transformers, the accuracy class is designated by the highest permissible percentage of the ratio error (ε) at rated primary current and rated output.

The standard accuracy classes for measuring current transformers are:

0,1 – 0,2S – 0,2 – 0,5S – 0,5 – 1

5.7.2.201.2 Limits of ratio error (ε) and phase displacement for measuring current transformers

For classes 0,1 – 0,2 – 0,5 and 1, the ratio error and phase displacement at rated frequency shall not exceed the values given in Table 201 where the output can assume any value from 1 VA to 100 % of the rated output indicated in 5.6.1.2.

For classes 0,2S and 0,5S the ratio error and phase displacement at the rated frequency shall not exceed the values given in Table 202 where the output can assume any value from 1 VA and 100 % of the rated output indicated in 5.6.1.2.

NOTE In general the prescribed limits of ratio error and phase displacement are valid for any given position of an external conductor spaced at a distance in air not less than that required for insulation in air at the highest voltage for equipment (U_m).

Table 201 – Limits of ratio error and phase displacement for measuring current transformers (classes 0.1 to 1)

Accuracy class	Ratio error $\pm \%$				Phase displacement							
					$\pm$ Minutes				$\pm$ Centiradians			
	at current (% of rated)				at current (% of rated)				at current (% of rated)			
	5	20	100	120	5	20	100	120	5	20	100	120
0,1	0,40	0,20	0,10	0,10	15,0	8,0	5,0	5,0	0,45	0,24	0,15	0,15
0,2	0,75	0,35	0,20	0,20	30,0	15,0	10,0	10,0	0,9	0,45	0,3	0,3
0,5	1,50	0,75	0,50	0,50	90,0	45,0	30,0	30,0	2,7	1,35	0,9	0,9
1	3,00	1,50	1,00	1,00	180,0	90,0	60,0	60,0	5,4	2,7	1,8	1,8

NOTE Due to the measurement resolution of 2 digits for ratio error and 1 digit for phase displacement, zeros are added.

Table 202 – Limits of ratio error and phase displacement for measuring current transformers (classes 0,2S and 0,5S)

Accuracy class	Ratio error $\pm \%$					Phase displacement									
						$\pm$ Minutes					$\pm$ Centiradians				
	at current (% of rated)					at current (% of rated)					at current (% of rated)				
	1 ^a	5	20	100	120	1 ^a	5	20	100	120	1 ^a	5	20	100	120
0,2 S	0,75	0,35	0,20	0,20	0,20	30,0	15,0	10,0	10,0	10,0	0,9	0,45	0,3	0,3	0,3
0,5 S	1,50	0,75	0,50	0,50	0,50	90,0	45,0	30,0	30,0	30,0	2,7	1,35	0,9	0,9	0,9

^a In some applications (e.g., renewable energy sources), it may be necessary to specify an accuracy in the lower end of the primary current range. In those cases, the lower limit of accuracy for 1% of the primary current may be lowered to 0,25% of the primary current subjected to agreement between manufacturer and purchaser. (The specify primary range should be noted in the rating plate).

NOTE Due to the measurement resolution of 2 digits for ratio error and 1 digit for phase displacement, zeros are added.

5.7.2.201.3 Extended current ratings

Current transformers of accuracy classes 0.1 to 1 may be marked as having an extended current rating provided they comply with the following two requirements:

- the rated continuous thermal current shall be the rated extended primary current.
- the limits of ratio error and phase displacement prescribed for 120 % of rated primary current in Table 201 shall be retained up to the rated extended primary current.

The rated extended primary current shall be expressed as a percentage of the rated primary current.

5.7.2.201.4 Instrument security factor

An instrument security factor may be specified.

Standard values are: FS 5 and FS 10

5.7.2.202 Protective current transformers

5.7.2.202.1 General

Three different approaches are designated to define protective current transformers (see Table 203). In practice, each of the three definitions may result in the same physical realization.

Table 203 – Characterisation of protective classes

Designation	Limit for remanent flux	Explanation
P PR	no ^{a)} yes	Defining a current transformer to meet the composite error requirements of a short-circuit current under symmetrical steady state conditions
PX PXR	no ^{a), b)} yes ^{b)}	Defining a current transformer by specifying its magnetizing characteristic
TPX TPY TPZ	no ^{a)} yes yes	Defining a current transformer to meet the transient error requirements under the conditions of an asymmetrical short-circuit current
^{a)} Although there is no limit of remanent flux, gaps are allowed, e.g. in split core current transformers.		
^{b)} To distinguish between PX and PXR, the remanent flux criteria is used.		

For all protection classes, a dimensioning factor (K_{ALF} , K_X , K_{SSC} , K_{td}) exists which can be understood as the ratio of the e.m.f. at limiting conditions to the e.m.f. at rated output and rated current. They can be compared with each other, but care must be taken with conversions between different classes.

For example, a class TPY with $R_b = 5$ Ohms, $K_{SSC} = 20$ and $K_{td} = 5,5$ can be equivalent to 5 VA 10 PR 110, but a K_{ALF} of 110 suggest an extremely high short circuit of 320 kA, for which the CT is not built because the rated short-time thermal current is exceeded.

More information can be found in clause 10 of IEC TR 61869-100:2017.

5.7.2.202.2 Class P protective current transformers

5.7.2.202.2.1 Standard accuracy limit factors (K_{ALF})

The standard values for K_{ALF} are:

5 – 10 – 15 – 20 – 30

5.7.2.202.2.2 Standard accuracy classes

The accuracy class is designated using the highest permissible percentage of the composite error, followed by the letter "P" (standing for "protection") and the ALF value.

The standard accuracy classes for protective current transformers are:

5P and 10P

5.7.2.202.2.3 Error limits for class P protective current transformers

At rated frequency and with rated burden connected, the ratio error, phase displacement and composite error shall not exceed the limits given in Table 204

Table 204 – Error limits for protective current transformers class P and PR

Accuracy class	Ratio error at rated primary current $\pm \%$	Phase displacement at rated primary current		Composite error at rated accuracy limit primary current $\%$
		$\pm$ Minutes	$\pm$ Centiradians	
5P and 5PR	1	60	1,8	5
10P and 10PR	3	–	–	10

5.7.2.202.3 Class PR protective current transformers

5.7.2.202.3.1 Standard accuracy limit factor (K_{ALF})

The standard values for K_{ALF} are:

5 – 10 – 15 – 20 – 30

5.7.2.202.3.2 Standard accuracy classes

The accuracy class is designated by the highest permissible percentage of the composite error, followed by the letters "PR" (indicating protection low remanence) and the ALF value.

The standard accuracy classes for low remanence protective current transformers are:

5PR and 10PR

5.7.2.202.3.3 Error limits for class PR protective current transformers

At rated frequency and with rated burden connected, the ratio error, phase displacement and composite error shall not exceed the limits given in Table 204.

5.7.2.202.3.4 Remanence factor (K_R)

The remanence factor (K_R) shall not exceed 10 %.

NOTE The insertion of one or more gaps in the core is a method for limiting the remanence factor.

5.7.2.202.3.5 Secondary loop time constant (T_s)

The secondary loop time constant may be specified optionally.

5.7.2.202.3.6 Secondary winding resistance (R_{ct})

The upper limit of the secondary winding resistance may be specified optionally.

5.7.2.202.4 Class PX and class PXR protective current transformers

The performance of class PX protective current transformers shall be specified in terms of the following:

- rated primary current (I_{pr});
- rated secondary current (I_{sr});
- rated turns ratio;
- rated knee point e.m.f. (E_k);
- upper limit of exciting current (I_e) at the rated knee point e.m.f. and/or at a stated percentage thereof.
- upper limit of secondary winding resistance (R_{ct}).

Instead of specifying the rated knee point e.m.f. (E_k) explicitly, E_k may be calculated as follows:

$$E_k = K_x \times (R_{ct} + R_b) \times I_{sr}$$

In this case, the rated resistive burden (R_b) and the dimensioning factor (K_x) shall be specified, and the choice of R_{ct} is left to the manufacturer.

For class PX, the turns ratio error shall not exceed $\pm 0,25$ %.

For class PXR, the turns ratio error shall not exceed ± 1 %.

For class PXR, the remanence factor shall not exceed 10 %.

NOTE 201 To ensure a remanence factor ≤ 10 %, class PXR current transformers can comprise gaps.

NOTE 202 For large class PXR cores with low ampere-turns, it may be difficult to meet the remanence factor requirement. In such cases, a remanence factor higher than 10 % can be agreed.

5.7.2.202.5 Protective current transformers for transient performance**5.7.2.202.5.1 Error limits for TPX, TPY and TPZ current transformers**

With rated resistive burden connected to the current transformer, the ratio error and the phase displacement at rated frequency shall not exceed the error limits given in Table 205.

When the specified duty cycle (or a duty cycle corresponding to the specified transient dimensioning factor K_{td}) is applied to the current transformer connected to the rated resistive burden, the transient errors $\hat{\epsilon}$ (for TPX and TPY) or $\hat{\epsilon}_{ac}$ (for TPZ) shall not exceed the limits given in Table 205.

All error limits are based on a secondary winding temperature of 75°C.

Table 205 – Error limits for TPX, TPY and TPZ current transformers

Class	At rated primary current			Transient error limits under specified duty cycle conditions
	Ratio error ± %	Phase displacement		
		Minutes	Centiradians	
TPX	0,5	± 30	± 0,9	$\hat{\varepsilon}=10\%$
TPY	1,0	± 60	± 1,8	$\hat{\varepsilon}=10\%$
TPZ	1,0	180 ± 18	5,3 ± 0,6	$\hat{\varepsilon}_{ac}=10\%$

NOTE 201 In some cases, the absolute value of the phase displacement may be of less importance than achieving minimal deviation from the average value of a given production series.

NOTE 202 For TPY cores, the following equation can be used under the condition that the appropriate E_{al} value does not exceed the linear part of the magnetizing curve:

$$\hat{\varepsilon} = \frac{K_{td}}{2\pi f_R \times T_s} \times 100\%$$

5.7.2.202.5.2 Limits for remanence factor (K_R)

TPX: no limit

TPY: $K_R \leq 10\%$

TPZ: $K_R \leq 10\%$

NOTE For TPZ cores, a remanence factor $\ll 10\%$ is given by the design. Therefore, the remanent flux can be neglected.

5.7.2.202.5.3 Specification methods

The two specification methods are illustrated in Table 206.

The standard definition offers the possibility to specify “overall requirements” which cover the requirements of different duty cycles. With the alternative definition, the choice of one specific duty cycle cannot describe all protection requirements. The specifications shall not be mixed, otherwise the current transformer may be over-determined.

Table 206 – Specification Methods for TPX, TPY and TPZ current transformers

Standard specification	Alternative specification
Class designation (TPX, TPY or TPZ)	Class designation (TPX, TPY or TPZ)
Rated symmetrical short-circuit current factor K_{SSC}	Rated symmetrical short-circuit current factor K_{SSC}
Rated value of transient dimensioning factor K_{td}	Duty cycle, consisting of: For C-O cycle: t'_{al} For C-O-C-O cycle: $t'_{al}, t', t_{fr}, t''_{al}$

Rated value of secondary loop time constant T_S (for TPY class only, depending on the application)	Rated primary time constant T_p
Rated resistive burden R_b	Rated resistive burden R_b

NOTE 201 For current transformers with tapped secondary windings, the given accuracy requirements can be fulfilled for one ratio only.

NOTE 202 For current transformers with primary reconnection set, the accuracy requirements may be fulfilled for different ratios. In this case, attention should be paid to the factor of construction F_c which can be influenced by the configuration of the primary conductors.

NOTE 203 In the standard specification, K_{td} is usually given by the supplier of the protection devices and T_S could be also specified if needed, only for TPY cores.

For TPY class the value of T_S must be indicated on the rating plate.

5.7.2.203 Class assignments for selectable ratio current transformers

5.7.2.203.1 Accuracy performance for current transformers with primary reconnection

For all accuracy classes, the accuracy requirements refer to all specified reconnections.

5.7.2.203.2 Accuracy performance for current transformers with tapped secondary windings

For all accuracy classes, the accuracy requirements refer to the highest transformation ratio, unless specified otherwise.

When required by the purchaser, the manufacturer shall give information about the accuracy performance at lower ratios.

5.7.3 Accuracy class extension for harmonics

Subclause 5.7.3 of IEC 61869-1:2023 applies.

5.7.4 Accuracy requirements for harmonics

Subclause 5.7.4 of IEC 61869-1:2023 applies.

5.7.5 Harmonic requirements for LPIT protection accuracy classes

Subclause 5.7.5 of IEC 61869-1:2023 is not applicable.

5.7.6 Anti-aliasing filter for EIT using digital data processing

Subclause 5.7.6 of IEC 61869-1:2023 is not applicable.

6 Design and construction

6.1 Requirements for liquids used in equipment

Subclause 6.1 of IEC 61869-1:2023 applies.

6.2 Requirements for gases used in equipment

Subclause 6.2 of IEC 61869-1:2023 applies.

6.3 Requirements for solid materials uses in equipment

Subclause 6.3 of IEC 61869-1:2023 applies.

6.4 Requirements for temperature rise of parts and components

6.4.1 General

Subclause 6.4.1 of IEC 61869-1:2023 applies modifying the first paragraph with the following one:

The temperature rise of windings, magnetic circuits and any other parts in a current transformer when carrying a primary current equal to the rated continuous thermal current, with a unity power-factor burden corresponding to the rated output, shall not exceed the appropriate value given in Table 12 of IEC 61869-1:2023. These values are based on the service conditions given in Clause 4.2.1

6.4.2 Influence of altitude on temperature rise

Subclause 6.4.2 of IEC 61869-1:2023 applies.

6.5 Requirements for earthing equipment

6.5.1 General

Subclause 6.5.1 of IEC 61869-1:2023 applies.

6.5.2 Earthing of the enclosure

6.5.2.1 GIS enclosure

Subclause 6.5.2.1 of IEC 61869-1:2023 applies.

6.5.2.2 Enclosure of low-voltage components

Subclause 6.5.2.2 of IEC 61869-1:2023 is not applicable.

6.5.3 Electrical continuity

Subclause 6.5.3 of IEC 61869-1:2023 applies.

6.6 Requirements for the external insulation

Subclause 6.6 of IEC 61869-1:2023 applies.

6.7 Mechanical requirements

Subclause 6.7 of IEC 61869-1:2023 applies.

6.8 Multiple chopped impulses on primary terminals

Subclause 6.8 of IEC 61869-1:2023 applies.

6.9 Internal arc fault protection

Subclause 6.9 of IEC 61869-1:2023 applies.

6.10 Degrees of protection by enclosures

All subclause 6.10 of IEC 61869-1:2023 applies.

6.11 Electromagnetic compability (EMC)**6.11.1 General**

Subclause 6.11.1 of IEC 61869-1:2023 is replaced by the following:

For current transformers, the following EMC requirements are specified:

- requirements for transmitted overvoltage (6.11.4);
- requirements for radio interference voltage (RIV), applicable to high-voltage parts of the equipment (6.11.5).

6.11.2 Requirements for immunity

Subclause 6.11.2 of IEC 61869-1:2023 is not applicable.

6.11.3 Requirements for emission

Subclause 6.11.3 of IEC 61869-1:2023 is not applicable.

6.11.4 Requirements for transmitted overvoltage (TOV)

Subclause 6.11.4 of IEC 61869-1:2023 applies.

6.11.5 Requirements for radio interference voltage (RIV)

Subclause 6.11.5 of IEC 61869-1:2023 applies.

6.12 Corrosion

Subclause 6.12 of IEC 61869-1:2023 applies.

6.13 Markings**6.13.1 General**

Subclause 6.13.1 of IEC 61869-1:2023 applies.

6.13.2 Terminal markings**6.13.2.1 General rules**

Subclause 6.13.2.1 of IEC 61869-1:2023 applies.

6.13.2.2 Method of marking

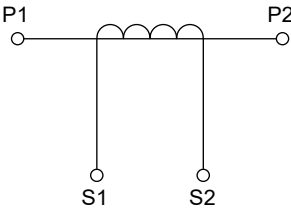
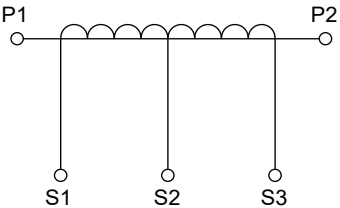
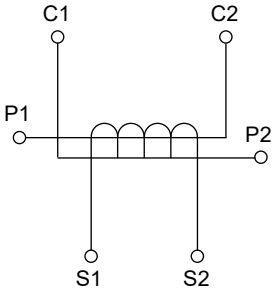
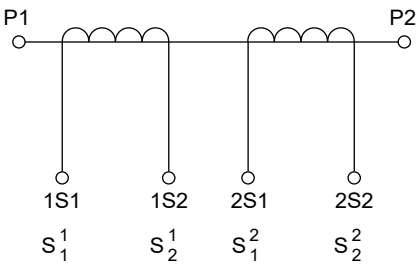
Subclause 6.13.2.2 of IEC 61869-1:2023 applies.

6.13.2.3 Markings to be used

The markings of current transformer terminals shall be as indicated in Table 207.

668

Table 207 – Marking of terminals

Primary terminals		
Secondary terminals	Single-ratio transformer	Transformer with an intermediate tapping on secondary winding
Primary terminals		
Secondary terminals	Transformer with primary winding in 2 sections intended for connections either in series or in parallel	Transformer with 2 secondary windings; each with its own magnetic core (two alternative markings for the secondary terminals)

669

670 6.13.2.4 Indication of relative polarities

671 Subclause 6.13.2.4 of IEC 61869-1:2023 applies.

672 6.13.3 Rating plate markings

673 Subclause 6.13.3 of IEC 61869-1:2023 applies with the following additional markings:

- 674 a) the rated short-time thermal current (I_{th}), (e.g. $I_{th} = 40$ kA);
- 675 b) the rated dynamic current (I_{dyn}) if it differs from $2,5 \times I_{th}$ (e.g. $I_{dyn} = 85$ kA);
- 676 c) the rated continuous thermal current (I_{cth}) if different from the rated primary current.

677 EXAMPLE 1
678 For single core current transformer with secondary taps: $I_{cth} = 150$ %
679 (meaning 150 % of the rated primary current for each tap)

680 EXAMPLE 2
681 For current transformers with several cores of different ratios
682 (e.g. 300/5 A and 4000/1 A): $I_{cth} = 450$ A
683 (meaning 450 A as the maximum continuous thermal current through all cores of the current transformer)

684 EXAMPLE 3
685 For current transformers with primary reconnection (4x300/1 A): $I_{cth} = 4 \times 450$ A
686 (meaning continuous thermal current of 450, 900 or 1800 A, depending on the primary reconnection)

687 A current transformer satisfying the requirements of several combinations of output and
688 accuracy class may be marked according to all of them.

689 EXAMPLE 4 5 VA cl. 0,5; 10 VA cl. 5P20

690 EXAMPLE 5 5 VA cl. 1; 3 VA cl. 0,5

EXAMPLE 6 5 VA cl.1 & 5P20

For a current transformer with outputs defined according to edition 1.0 of IEC 61869-2, the expression "Annex 2H" must be added after the rated output. (See Annex 2H).

EXAMPLE 7 30VA cl 0,5 FS10 "Annex 2H"

6.13.3.201 Specific marking of the rating plate of a measuring current transformer

The accuracy class and instrument security factor (if specified) shall be indicated following the indication of the corresponding rated output.

EXAMPLE 1 5 VA cl. 0,5

EXAMPLE 2 5 VA cl. 0,5 FS 10

Current transformers having an extended current rating (see 5.7.2.201.3) shall have this rating indicated immediately following the class designation.

EXAMPLE 3 5 VA cl. 0,5 ext.150 % FS 10

For current transformers having an extended burden range (see **Error! Reference source not found.**), this rating shall directly precede the class indication.

EXAMPLE 4 1-5 VA class 0,2 (meaning burden range from 1 to 5 VA at class 0,2)

NOTE The rating plate can contain information concerning several combinations of ratios, burdens and accuracy classes that the transformer can satisfy at the same ratio. In this case, non-standard values of burden can be used.

EXAMPLE 5 5 VA class 1; 3 VA class 0,5

For current transformers having an extended primary range in the low end, this range shall be indicated.

EXAMPLE 6 5 VA class 0,2S from 0,25% to 120% of I_{pr}

6.13.3.202 Specific marking of the rating plate of a class P protective current transformer

The rated accuracy limit factor shall be indicated following the corresponding rated output and accuracy class.

EXAMPLE 5 VA class 5P10

6.13.3.203 Specific marking of the rating plate of class PR protective current transformer

The rated accuracy limit factor shall be indicated following the corresponding rated output and accuracy class.

EXAMPLE 1 5 VA class 5PR10

If specified, the following parameters shall also be indicated:

- the secondary loop time constant (T_s);
- the upper limit of the secondary winding resistance (R_{ct});

EXAMPLE 2 5 VA class 5PR10, $T_s = 200$ ms, $R_{ct} \leq 2,4 \Omega$

6.13.3.204 Specific marking of the rating plate of class PX and PXR protective current transformers

The class requirements may be indicated as follows: