

# LVD TEST REPORT

#### On Behalf of

## ZHEJIANG DIXSEN ELECTRICAL CO., LTD

## Current transformer

Models: ABO-30, ABO-40, ABO-60, ABO-85, ABO-100, ABO-125, ABO-30T, ABO-B, ABO-C (5~5000/5A)

CE

Prepared for : ZHEJIANG DIXSEN ELECTRICAL CO., LTD

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Tested By :

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# TEST REPORT IEC 61869-2:2012

# Instrument transformers -Part 2: Additional requiremenb for current transformers

Report reference No . ..... ET14115275-LVD

Testing laboratory ...... Shenzhen Easy Test Electronic Products Co., Ltd.

Shenzhen, China

Testing location ...... As above

Applicant1 ..... ZHEJIANG DIXSEN ELECTRICAL CO., LTD

Address ....... Daoqiao Industrial Zone, Wenzhou, Zhejiang, China

Manufacturer...... ZHEJIANG DIXSEN ELECTRICAL CO., LTD

Standard :: IEC 61869-2:2012

Test procedure ...... : LVD Scheme

Procedure deviation ...... N.A.

Non-standard test method ...... N.A

Type of test object ...... Current Transformer

Trademark Dixsen

ABO-B, ABO-C (5~5000/5A)

Ratio See page 4



#### Particulars: test item vs. test requirements

Equipment mobility...... Fixed equipment

Operating condition...... Continuous

Protection against ingress of water ...: IPX0

#### Possible test case verdicts:

test object does not meet the requirement...... F(ail)

#### General remarks:

(see remark #)" refers to a remark appended to the report.

(see appended table)" refers to a table appended to the report.

Throughout this report a comma is used as the decimal separator.

The test results presented in this report relate only to the object tested.

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Copy of marking plate:

**Current Transformer** 

Model: ABO-30

Ratio: 200/5A

Class: 0.5

Burden: 5VA

Ith=60In 0.72/5KV

FS 5 50/60Hz

IEC 61869-2:2012

CEX

Dixsen

Remark: These models: ABO-30, ABO-40, ABO-60, ABO-85, ABO-100, ABO-125, ABO-30T, ABO-B, ABO-C (5~5000/5A) are identical in structure, schematic circuit and critrical component except for different model and voltage, so all tests were performed with ABO-30.



1835	IEC 61869-2:2012	TEST TEST	-55
Clause	Requirement – Test	Result - Remark	Verdict
	ENS ENSY TEN	TYTES' TEST TE	5 - 1
5	Ratings	AS' EASY DASY I"	PIE
5.3	Rated insulation levels	TEST LEST LOT	P
5.3.2	Rated primary terminal insulation level	EASY CASY TE	TEP
	Clause 5.3.2 of IEC 61869-1:2007 is applicable with following:	the addition of the	ST -TE
EAST TEST	For a current transformer without primary winding and without primary insulation of its own, the value Um = 0,72 kV is assumed.	Um = 0,72 kV	EASY P TEST
5.3.5	Insulation requirements for secondary terminals	ST EN EAS EAS	PAS
187 TE	Clause 5.3.5 of IEC 61869-1:2007 is applicable with following:	the addition of the	17 Fed -
TEST EAS	The secondary winding insulation of class PX and class PXR current transformers having a rated knee point e.m.f. Ek ≥ 2 kV shall be capable of withstanding a rated power frequency withstand voltage of 5 kV r.m.s. for 60 s.	5 KV TEST EASY TEST	SY TEST PEAS EST
5.3.201	Inter-turn insulation requirements	-ST EAST	EPP
N TEST	The rated withstand voltage for inter-turn insulation shall be 4,5 kV peak.	EASY TEST	ST TPST
EST EAST TEST	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.	EASY TEST EASY TEST EASY TEST EASY TEST EASY TEST	EST EA EAPY TEST
5.5	Rated output	CY TEST	TES P
5.5.201	Rated output values	EAST EAST EAST	€ P <sup>S</sup>
ASY TEST	The standard values of rated output for measuring classes, class P and class PR are: 2.5-5.0- 10- 15and 30VA.	5VA EASY TES	ASY PEST
TES!	Values above 30 VA may be selected to suit the application.	EASY TEST TEST	TESN
5.5.202	Rated resistive burden values	TEST TEST	N
ASY TES	Standard values for rated resistive burden in R for class TPX, TPY and TPZ current transformers are: $0.5\text{-}1\text{-}2\text{-}5\Omega$	TEST TEST CEST	ASYN F
TE	The preferred values are underlined.	ERSY LASY C	N



45
Verdict

		CA 691
TEST E	The values are based on a rated secondary current of I 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.	TEST EASY TEST EASY TENT
5.6	Rated accuracy class	AS EAS' EAS'
5.6.201	Measuring current transformers	TEST TEST BY
5.6.203.1	Accuracy class designation for measuring current transformers	ST EAST EAST EAST PAST
ENSY TES	For measuring current transformers, the accuracy class is designated by the highest permissible percentage of the ratio error (E) at rated primary current and rated output.	EASY TEASY TEST EASY TEST
5.6.201.2	Standard accuracy classes	ENS' ENS' PASY
EST ENTE	The standard accuracy classes for measuring current transformers are: 0.1-0.2-02S-0.5-0.5S-1-3-5	0.5 TEST TEST P TEST P TEST P TEST
5.6.201.3	Limits of ratio error (E) and phase displacement for measuring current transformers	SY TEST AN TEST NET
IEST EAST	For classes 0,I - Q,2 - 0,5 and i, the ratio error and phase displacement at rated frequency shall not exceed the values given in Table 201 where the burden can assume any value from 25 % to 100 % of the rated output.	EASY TEST EASY TEST N TE
ASY TEST	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 burden can assume any value from 25 % and 100 % of the rated output.	TEST EASY TEST EASY TEST NEW
ASY TEST	For class 3 and class 5, the ratio error at rated frequency shall not exceed the values given in Table 203 where the burden can assume any value from 50 % to 100 % of the rated output. There are no specified limits of phase displacement for class 3 and class 5.	EST EASY TEST EASY TEST EASY NEW TEST EASY TEST EASY TEST EASY TEST
EASY TES	For all classes, the burden shall have a power-factor of 0,8 lagging except that, when the burden is less than 5 VA, a power-factor of 1,0 shall be used, with a minimum value of 1 VA.	EASY TEST EASY TEST EASY NES
5.6.201.4	Extended burden range	EASY EASY TEN
EST EAST	For all measuring; classes, an extended burden range can be specified. The ratio error and phase displacement shall not exceed the limits of the appropriate class given in Table 201, Table	EASY TEST TEST TEST NIES



	EASY TEST EASY TEST EASY TEST EASY TEST	EASY TEST EASY TEST	EASY TEST
	TEST TEST EN	Reference No.: ET1411	5275-LVD
et er	IEC 61869-2:2012	Result - Remark	Verdict
Clause	Requirement – Test	Result - Remark	F
ST TES	202 and Table 203 for the range of secondary burden from 1 VA up to rated output.	SY TEST TEST TE	ASY TES
TEST E	The power factor shall be 1,0 over the full burden range. The maximum rated output is limited to 15 VA.	TEST TEST TEST	TENT
6.6.201.5	Extended current ratings	TEST TEST	N
ASY TEO	Current transformers of accuracy classes 0.1 to 1 ma an extended current rating provided they comply with requirements:	ay be marked as having the following two	EASY TE
780 NSY	a) the rated continuous thermal current shall be the rated extended primary current.	EAS' EASY EAS	NAS
EASY TES	b) 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.	EASY TEST EASY T	EASN TE
5.6.201.6	Instrument security factor	ENS" ENST	SY P
888	An instrument security factor may be specified.	5 755 7551	P
178	Standard values are:	EAST EAST EAST	P
69	FS 5 and FS 10	FS 5	P
5.6.202	Protective current transformers	EAST EAST	SP
5.6.202.1	General	TEST TEST	es P
EAST T	Three different approaches are designated to define protective current transformers (see Table 204).	EAST EAST EAST	EP
SH TEST	In practice, each of the three definitions may result in the same physical realization.	EST EAST EAST	SY P
5.6.202.2	Class P protective current transformers	NSY TE SY TES	LES N
5.6.202.2	Standard accuracy limit factors (ALF)	TEST EN TEST EAS	N
5.6.202.2	Accuracy class desiignation	EST EAST EAST	EAS'N
5.6.202.2	194 SY TE TES	TEST EAST EAST	NS
5.6.202.2	transformers	ENSY ENSY TEASY T	ASYNE
5.6.202.3	Class PR protective current transformers	I LES, LES, LES,	N



-csT +	OT EAST	IEC 61869-2:2012	Reference No.: E	T14115275-LVD
Clause	Requirement - Test	en ENS	Result - Remark	Verdict
			TEST TEST	75

EASY TEST EASY TEST EASY

5.6.202	.3 Accuracy class designation	ERSY
5.6.202		TEN
5.6.202	transformers	ST N
5.6.202. .5	3 Remanence factor (K <sub>R</sub> )	EASN
5.6.202. .6		ST N
5.6.202.3 .7	Secondary winding resistance (Rct)	SASP 1
5.6.202.4	Class PX and class PXR protective current transformers	Po <sup>T</sup>
5.6.202.5	Protective current transformers for transient performance	EST NEP
5.6.202.5		PST
EASY T	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 206.	EST EA
6.202.5	All error limits are based on a secondary winding temperature of 75°C.  Limits for remanence factor (KR)	SY PEST
6.202.5	Specification Methods	ESIN
0.202.5	LEST EAST EAST ASY TEST TEST OF	N. CT
ST EP	The two specification methods are illustrated in Table 207.	ST TES
EASY TEST	In some cases, the choice of one specific duty cycle cannot describe all protection requirements.  Therefore, the alternative definition offers the possibility to specify "overall requirements", which cover the requirements of different duty cycles.	EASY N
181	the current transformer may be over data.	(SY )
.203	transformers	EN .
.203.1	Accuracy performance for current transformers with primary reconnection	N



	IEC 61869-2:2012	JES TEST	- 123
Clause	Requirement – Test	Result - Remark	Verdict
EL	END CAST NOT TO TES	1 755) -01	-T
ASY TES	For all accuracy classes, the accuracy requirements refer to all specified reconnections.	ASY EASY TE	PIE
5.6.203.2	Accuracy performance for current transformers with tapped secondary windings	TEST TEST OF TEST	TE BY
T EASY	For all accuracy classes, the accuracy requirements refer to the highest transformation ratio, unless specified othemise.	ASY TEST EAST EAST	ST PAS
EASY F	When required by the purchaser, the manufacturer shall give information about the accuracy performance at lower ratios.	TEST EAST EAST	EAST P
5.201	Standard values far rated primary current	T EN EAD EA	N
9T TE	The standard values for rated primary current are: 10-12.5-15-20-25-30-40-50-60-75A	EASY TEST TEST	S N
5.202	Standard values for rated secondary current	TEST EST ET	P
N TEST	The standard values for rated secondary current are 1 A and 5 A.	5 A EASY EASY	N P
ST EM	For protective current transformers for transient performance, the standard value of the rated secondary current is 1 A.	EASY TEST TEST	EST P
5.203	Standard values for rated continuous thermal current	Y TEST ON TEST	Pst
EAS	The standard value for rated continuous thermal current is the rated primary current.	EST TEST EAT E	PE
EASY T	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.	SY TEST EASY TEST EASY	EP
5.204	Short-time current ratings	est er ear ear	P E
5.204.1	Rated short-time thermal current (Ith)	LASY TEST	TESTP
EASY	A rated short-tirr nt (Ith)s hall be assigned to the transformer.	Ith=60In	EP
ASY TES	The standard value for the auration of the rated short-time thermal current is 1 s.	AST EASY EASY TO	ASY P
5.204.2	Rated dynamic current (ldyn)	TEST TEST	P
EASY	The standard value of the rated dynamic current (ldy,) is 2,5 times the rated short-time thermal current (lth)	TEST EAST EAST	EPS'

6	Design and construction	T REP
6.4	Requirements for temperature rise of parts and components	EAS PSY
6.4.1	General	P



	IEC 61869-2:2012	TES, LES,	10
Clause	Requirement – Test	Result - Remark	Verdict
END	EAST LAST LES ON TES TES	1 (651 - 651	T EN
ASY TES	This clause of IEC 61 869-1 :2007 is applicable with the addition of the following:	ASY EASY TE	EASPTE
TEST E	The temperature rise 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	TEASY TEST EASY TEST	TEST ST PAS
EASY TEY	output, shall not exceed the appropriate value given in Table 5 of IEC 61869-1:2007.	TEST EAST EAST	EASY
17EST	These values are based on the service conditions given in Clause 4.	EASY TEASY TE	P
3.13	Markings	TEST TEST	P
5.13.201	Terminal markings	EASY EASY	P
3.13.201 1	General rules	TEST TEST TEST	Par
EAS	The terminal markings shall identify:	EST EST ET EP	-EP
5	a) the primary and secondary windings;	EASY TEN SY	P
EVA	b) the winding sections, if any;	TEST TO EN	P
5Y 7EST	c) the relative polarities of windings and winding sections;	ST EASY TEASY TES	SY P
FS1	d) the intermediate taps, if any.	SY TES'	ESTP
6.13.201. 2	Method of marking	TEST TEST TEST	P
SY TEN	The marking shall consist of letters followed, or preceded where necessary, by numbers. The letters shall be in block capitals.	TEST EAST EAST E	ASY PE
6.13.201. 3	Markings to be used	TEST EAST	EPSY
ASY TES	The markings of current transformer terminals shall be as indicated in Table 208.	EST EST EAST	ASYP
6.13.201 .4	Indication of relative polarities	EASY EASY TEAS	PS
NSY TEST	All the terminals marked P1, S1 and C1 shall have the same polarity at the same instant.	EASY TE EASY TES	PE
6.13.202	Rating plate markings	TEST TEST	P
6.13.202. 1	General (ES) TEST TEST TEST	ST EAST EAST EAS	P
CY TES	The markings related to the particular accuracy cla Subclauses 6.13.202.2 to 6.1 3.202.6	sses are given in	- NS+T



161	IEC 61869-2:2012		
Clause	Requirement – Test	Result - Remark	Verdict
5 -6	a) the rated primary and according	7537 -97	-3 Er
ASY TES	a) the rated primary and secondary current (e.g. 100/1 A);	See page 4.	PIE
TEST E	b) the rated short-time thermal current (lth)(e-g. lth = 40 k A);	See page 4.	P
EASY	c) the rated dynamic current (ldyn) it differns from) 2.5 x lth(e.g ldyn = 85 kA);	T EAST EAST EAS	NAS
EASY TES	<ul> <li>d) on current transformers with two or more secondary windings, the use of each winding and its corresponding terminals;</li> </ul>	ASY TEASY TEST	EASP
TES'	<ul> <li>e) the rated continuous thermal current if different from the rated primary current.</li> </ul>	EASY TEST	Y TEP
6.13.202. 2	Specific marking of the rating plate of a measuring current transformer	ASY TEST ON TEST OF	ST N
EAST Y TEST	The accuracy class and instrument security factor (if any) shall be indicated following the indication of the corresponding rated output.	TEST EAST EAST	N
6.13.202. 3	Specific marking of the rating plate of a class P protective current transformer	ST TEST EN TEST	ST N
EASY TEST	The rated accuracy limit Factor shall be indicated following the corresponding rated output and accuracy class.	Y TEST EAST TEST	EASY
3.13.202. 4	Specific marking of the rating plate of class PR protective current transformers	ST EAST EAST EA	NEAS
EASY TE	The rated accuracy limit factor shall be indicated following €he corresponding rated output and accuracy class.	V TEST EASY EASY	EN
5X 75	If specified, the following parameters shall also be in	dicated:	CYTES
-61 En	- the secondary loop time constant (Ts);	651 651	N
EASY	- the upper limit of the secondary winding resistance (RCT);	EASY TEST TEST	N
5.13.202.	Specific marking of the rating plate of class PX and PXR protective current transformers	SY TEST TEST TEST	NEST
EST EN	The class requirements may be indicated as follows:	EST TEST F	N
LEY Y	- the rated turns ratio	EAST LOY	Nex
-61	- the rated knee point e.m.f. (Ek);	TEST TEST EAT	N
SY TEA	- the upper limit of exciting current (le) at the rated knee point e.m.f. and/or at the stated percentage thereof;	EST EASY TEST	ASY N E
EASY	- the upper limit of secondary winding resistance (Rct)	EAST EAST EAST	Ne
755	If specified, the following parameters shall also be income	dicated:	1

EASY TEST EASY

TES



191	IEC 61869-2:2012	Result - Remark	Verdict
lause	Requirement – Test	Result - Kernark	T END
65	- the dimensioning factor (Kx);	ASY LASY TE SY TE	NES
Pa 15-	- the rated resistive burden [Rb).	TEST ST ST	EA N E
-65	TET EAST EAST EAST EAST	EASY TEST	185
3.13.202.	Specific marking of the rating plate of current transformers for transient performance	ST TEST ENTENTE	ST N
NSY TEN	SY TEST TEST TEST TEST	TOT EN EN	EVa.
7 = 51	Tests	SY TES SY TES	P
7.1 - 151	General	ST EN EA	PAS
7.1.2	Lists of tests	ASY TEST TEST	P CE
7.2	Type tests	TOT EAT	EAP
7.2.2	Temperature-rise test	ST NSY TE SY TES	Po
7.2.2.201	Test set up	GET GT ET ET	Per
651	IEC 61869-1:2007, 7.2.2 is applicable with the foll	owing additions:	67
	The current transformer shall be mounted in a manner representative of the mounting in service and the secondary windings shall be loaded with the burdens according to 6.4.1. However, becaus the position of the current transformer in each switchgear installation can be different, the test setup arrangement is left to the manufacturer.	e ST EASY TEST EASY TEST	SY TEST PEN TEST
ASY TEST	For current transformers in three phase gas- insulated metal enclosed switchgear, all three phases have to be tested at the same time.	EASY TEASY TES	P
7.2.2.202	Measurement of the ambient temperature	CRSY SP TES	462
T EASY ASY TEST	The sensors to measure the ambient temperature shall be distributed around the current transformed at an appropriate distance according to the current transformer ratings and at about half-height of the transformer, protected from direct heat radiation.	nt est EAST EAST TE	ST PES
TEST EASY	To minimise the effects of variation of cooling-air temperature, particularly during the last test period, appropriate means should be used for the temperature sensors such as heat sinks with a time-constant approximately equal to that of the	es EAST EAST EAST	EST P
Y TEST	transformer.  The average readings of two sensors shall be used for the test.	SY EASY TEST	P
7.2.2.203		(ES) TEST	P



	IEC 61869-2:2012	TES TEST	2051
Clause	Requirement – Test	Result - Remark	Verdict
2 El	END EAST AST OF THE	7851 851	1 6
EASY TES	the test duration is t equal to three times the current transformer thermal time constant;	ASY EASY TE EASY TE	EASPIE
Y TEST EASY	- the rate of temperature rise of the windings (and of the top oil of oil-immersed current transformers) does not exceed 1 K per hour during three consecutive temperature rise readings.	TEASY TEST EAST	ST PAS
EASY F	The manufacturer shall estimate the thermal time constant by one of the following methods:	TEST EAST EAST	EASP
Y TEST EASY	- before the test, based on the results of previous tests on a similar design. The thermal time constant shall be confirmed during the temperature rise test.	ST EASY EASY TEST EAS	P.AS
EASY SY TEST EAS'	- during the test, from the temperature rise curve(s) or temperature decrease curve(s) recorded during the course of the test and calculated according to Annex 2D.	TEST EASY TEST	EAS' SY TPST
EASY TE	- during the test, as the point of intersection between the tangent to the temperature rise curve originating at 0 and the maximum estimated temperature rise.	EASY EASY TEST EASY	EAPY T
ST ENS	- during the test, as the time elapsed until 63 % of maximum estimated temperature rise.	EST TEST ENTEST E	PE
7.2.2.204	Temperatures and temperature rises	EAS' EASY	P
ASY TEST	The purpose of the test is to determine the average temperature rise of the windings and, for oil-immersed transformers, the temperature rise of the top oil, in steady state when the losses resulting from the specified service conditions are generated in the current transformer.	EASY TEST EASY TEST	ASY PETEST
ASY TEST	The average temperature of the windings shall, when practicable, be determined by the resistance variation method, but for windings of very low resistance, thermometers, thermocouples or other appropriate temperature sensors may be employed.	EASY TEST EASY TEST	ASY P
EASY TEST	Thermometers or thermocouples shall measure the temperature rise of parts other than windings. The top-oil temperature shall be measured by sensors applied to the top of metallic head directly in contact with the oil.	ASY TEST EASY TEST	EASYPTE'
ST EASY	The temperature rises shall be determined by the difference with respect to the ambient temperature measured as indicated in 7.2.2.202.	ENTEST EAST EAST	PAS PAS



	IEC 61869-2	:2012	201
Clause	Requirement – Test	Result - Remark	Verdict

7.2.2.205	Test modalities for current transformers having	-657 -67	PE
2.2.200	Um < 450 kV	TES TES	- FS1
EASY	The test shall be performed by applying the rated continuous thermal current to the primary winding.	T EAST EAST EAST	PASY
7.2.2.206	Test modalities far oil-immersed current transformers having Um ≥556 kV	ASY TE EASY TE	NIES
EN E	The test shall be performed by simultaneously apply current Transformer:	ing the following to the	1E51 F
EASY	the rated continuous thermal current to the primary winding;	ST EAST EAST EAS	NAS
EASY TES	The test current may also be applied by energizing one or more secondary windings, if the voltages at the secondary terminals of the energizing cores are at least as high as if connected to rated	EASY TEST EASY T	EASYTE
	burden, with the primary winding shod-circuited and the non-supplied secondary winding(s) connected to the rated burden(s).	EASY TEST EASY TEST EA	EST EAS
EASY SY TEST SY EAS	the highest voltage of the equipment divided by $\sqrt{3}$ between the primary winding and earth. One terminal of each secondary winding shall be connected to earth.	Y TEST TEST TEST	SY TN EAST
7.2.3	Impulse voltage withstand test an primary terminals	EAST EAST EAST	BUT
75.	IEC 61869-1:2007, 7.2.3.1 applicable with the additi	ion of the following:	7551
ASY TEST EA	The test voltage shall be applied between the terminals of the primary winding (connected together) and earth. The frame, case (if any), and core (if intended to be earthed) and all terminals of the secondary winding(s) shall be connected to earth.	EST EAST EAST E	TEST P EASY
ASY EI	For three-phase current transformers for gas insulated substations, each phase shall be tested, one by one. 'During the test on each phase, the other phases shall be earthed.	EASY TEST EASY TEST	TESP E
TES	For the acceptance criteria of gas-insulated metal enclosed transformers, refer to IEC62 271-203:2011, Clause 6.2.4.	ASY TEST TEST TEST	ASY PES
7.2.3.1	General	TES TEST TEST	P
7.2.6	Tests for accuracy	EAS' EAS' EAS	PS
7.2.6.201	Test for ratio error and phase displacement of measuring current transformers	SY TEST A TEST A TE	P



-67 Er	IEC 61869-2:2012	TEST TEST	251
Clause	Requirement – Test	Result - Remark Ver	
ST FEST	TEST EAST EAST EAST EAST TE	LASY TEST TEST TE	ST EN
EAS E TEST E ST EASY	To prove compliance with 5.6.201.3, 5.6.201.4 and 5.6.201.5, accuracy measurements shall be made at each value of current given in Table 201, Table 202 and Table 203 respectively, at the highest and at the lowest value of the specified burden range.	TEST TEST EASY TEST	EAS TEP ST EAS
EASY TEV	Transformers having an extended current rating shall be tested at the rated extended primary current instead of 120 % of rated current.	TEST EASY EASY	EASYTE
7.2.6.202	Determination of the instrument security factor (FS) of measuring current transformers	ST EAS' EASY EA	P
7.2.6.203	Test for composite error of class P and PR protective current transformers	EASY TEST TEST	ST P
EAS	The following two test procedures are given:		EN
EASY TEST	a) Compliance with the limits of composite error given in Table 205 shall be demonstrated by a direct test in which a substantially sinusoidal current equal to the rated accuracy limit primary current is passed through the primary winding with the secondary winding connected 20 a burden of	EASY TEST EASY TEST EASY TEST EASY TEST EASY	EAP TEST
SY TES	magnitude equal to the rated burden but having, at the discretion of the manufacturer, a power factor between O,8 inductive and unity (see 2A.4, 2A.5, 2A.6, 2A.7.	EST EASY EASY TEST E	SY TES
EASY TEST	The test may be carried out on a transformer similar to the one being supplied, except that reduced insulation may be used, provided that the same geometrical arrangement is retained.	EN TEST EASY TEST	EASY POT TEST
EASY T	As far as very high primary currents and single-bar primary winding current transformers are concerned, the distance between the return primary conductor and the current transformer should be taken into account from the point of view of reproducing service conditions.	EASY TEST EASY TEST EASY	EPSY
TEST EA	b) For low-leakage reactance current transformers according to Annex 2C, the direct test may be replaced by the following indirect test.	EASY TEST TEST	TEST E
ASY TEST	The exciting voltage shall be measured with an instrument which has a response proportional to the average of the rectified signal, but calibrated in r.m.sThe exciting current shall be measured using an r.m.s measuring instrument having a	TEST EASY TEST EASY TEST	ASY P
TEST	minimum crest factor of 3.  In determining the composile error by the indirect method, a possible correction of the turns ratio need not be taken into account.	ASY TEST EAST TEST TE	ST PLE



-61	IEC 61869-2:2012	TES'	7657
Clause	Requirement – Test	Result - Remark	Verdict
EL	EAS CAST LOY TES	755 561	1
7.2.6.204	Test far error at limiting conditions for class TPX, TPY and TPZ protective current transformers	ASY EASY TE	NE
TEST E	The purpose of the type test is to prove the compliance with the requirements at limiting conditions. For test methods refer to Annex 2B	TEST TEST TEST	TENT
7.2.6.205	Test of low-leakage reactance type for class PX and PXR protective current transformers	NSY TEST OF TEST	ST N
EASY	The proof of low-leakage reactance shall be made according to Annex 2C.	TEST EAST EAST	EASN
7.2.201	Short-time current tests	EASY LASY TE	TP
7.3	Routine tests	ST TEST EN	N
7.3.1	Power-frequency voltage withstand tests on primary terminals	EASY EASY TEASY T	N
6'	This clause of IEC 61869-1 is applicable with the ac	ddition of the Following:	795
EST EASY TE	The test voltage shall be applied between the short-circuited primary winding and earth. The short-circuited secondary windings), the frame, case (if any) and core (if there is a special earth terminal) shall be connected to earth.	EASY TEST EASY TEST EASY	EST N EST N
7.3.5	Tests for accuracy	ST TEST TEST	N
7.3.5.201	Tests for ratio error and phase displacement of measuring current transformers	EST FEST EAST E	NE
ENSY TE	The routine test for accuracy is in principle the same as the type test in 7.2.6.201, but routine tests at a reduced number of currents and/or burdens are permissible provided it has been shown by type tests on a similar transformer that	SY TEST EASY TEST EASY	EASY NS
	such a reduced number of tests are sufficient to prove compliance with 5.6.201.3	TEST TEST	TEST
7.3.5.202	Tests for ratio error and phase displacement of class P and PR protective current transformers	TEST EAST EAST	EN N
7.3.5.203	Test for composite error of class P and PR protective current transformers	ASY EASY TE	NS N
7.3.5.204	Test for ratio error and phase displacement for class TPX, TRY and TPL protective current transformers	EASY TEST EASY TEST	TESN
7.3.5.205	Test for error at limiting conditions for class TPX, TPY and TPZ protective current transformers	SY TEST OF TE	N
7.3.5.206	Test for turns ratio error far class PX and PXR protective current transformers	TEST ENTEST TEST	N
7.3.201	Determination of the secondary winding resistance (Rct)	782	N
7.3.202	Determination of the secondary loop time constant (Ts)	EASY TEST TEST TEST	N



	EC 61869-2:2012	TES TES	1851
lause	Requirement – Test	Result - Remark	Verdict
.3.203	Test for rated knee point e.m.f. (Ek) and exciting current at Ek	ASY TENSY TEST	N.E
7.3.204	Inter-turn overvoltage test	TES TEST	N
7.4	Special tests	EAS EAS	N
7.4.3	Measurement of capacitance and dielectric dissipation factor	ASY TES TEST TEST	S N
7.4.6	Internal arc fault test	1691 LOT EN	ENN
7.5	Sample tests	NOY TE ON TES	N
7.5.1	Determination of the remanence factor	ST ST EN EAT	N
7.5.2	Determination of the instrument security factor (FS) of measuring current transformers	EASY TEST TEST	N
EN	EAS' EASY EASY TEST	TEST TEST TEST	205
Annex 2A	Protective current transformers classes P, PR	EST EAST EAST EA	N
2A.1	Vector diagram	ASY TO SY TEO SY	ES. N
2A.2	Turns correction	LOT EN EN	E N
2A.3	The error triangle	SY TEST	No
2A.4	Composite error	ST ET ET ET	N.
2A.5	Direct test for composite error	ASY TES SY TES	ES.N
2A.6	Alternative method for the direct measurement of composite error	TEST EAST EAST	EN
2A.7	Use of composite error	AD EASY DASY	N
EP EP	ST EAST LAST TEST TEST	1661 TEST EST "	- 1
Annex 2B	Protective current transformer classes for transient performance	T EASY EASY EASY	N
2B.1	Basic theoretical equations for transient dimensioning	EASY TEST TEST	NE NE
2B.1.1	Short-circuit	EST TEST	N
2B.1.2	Transient dimensioning factor Ktd	EAS' EAS' EAS'	N
2B.1.3	C-0-C-0 duty cycles	TEST TEST	N
2B.2	Measurement of the core magnetization characteristic	EASY EASY	ASIN
2B.2.1	General	Y TEST TEST	N N
2B.2.2	A.C. method	S EN EAS EAS	N
2B.2.2.1	Determination of the magnetizing inductance Lm	SY TES TEST	N
2B.2.2.2	Determination of the error at limiting conditions	EAS' EAS'	SN



-61	IEC 61869-2:2012	TEN TEST	-651
Clause	Requirement – Test	Result - Remark	Verdict
4 EL	EAST EAST AST TES	TEST -ST	at Er
2B.2.2.3	Determination of the remanence factor Kr	ASY TASY TE ASY TE	NE
2B.2.3	B.C. method	TEST EST EN	N
2B.2.3.1	General	ENSY TEST	N
2B.2.3.2	Determination of the remanence factor KR	T LEST OF EAST	N
2B.2.3.3	Determination of the magnetizing inductance Lm	EASY LASY TO SY TI	N
2B.2.3.4	Determination of the error at limiting conditions	TEST EST EN	EPON
2B.2.4	Capacitor discharge method	EASY TEST	N
2B.3	Direct test for determination of the error at limiting conditions	ST TEST EAT	ST N
2B.3,1	General	ENS ENSY	N
2B.3.2	Direct test	(TEST TEST	N
2B.3.3	Determination of the factor of construction	EAST EAST CA	S N
est er	ET EAST EAST DET TO	7 1EST TEST	25T E
Annex 2C	Proof of law-leakage reactance type	TEST EAST EAST	EPN
TES!	TEST TEST ST EAST EAST	EASY LASY TE	C4 189
Annex 2D	Technique used in temperature rise test of oil-in determine the thermal constant by an experimen		ESTNE
EASY	EASY TEST TEST TEST TEST	ENS' ENS'	EAST
Annex 2E	Alternative measurement of the ratio error (E)	SY TEASY TES	SY NºS
EST E	ST EAST EAST EAST TENSY	TEST TEST	TEST F
Annex 2F	Determination of the turns ratio error	EAST EAST EASY	ENO.



7.2.2	Table: temperature- rise	test EAS' EASY	P
Test co	ndition	Attained a steady temperature when the rate of temperature rise does not exceed 1 K per hour.	1 6 T
Burden.		5VA	Key Tex 35
Primary	current	200A 5 TEST	-
Ambien	t temperatureT1(°C)	25.1 ST EAST EAST EAST	
Ambien	t temperatureT2(°C)	25.0°C	A Part Pro
Temper	ature of part/at:	Test(K)	Required Tmax(K
Winding	(1) AS' EAS' AS	63.2	105
Winding	1(2) (8)	64.8	105
Winding	1(3) ASY	63.6 65	105
Winding	1(4)	EAST EAST 151	105
l Windir	ng (5)	62.9	105
Winding	(6) (6)	62.5 ST 62.5	105
Enclosu	ire(1)	TES 40.6	55
Enclosu	ire (2)	EAS 39.5	55
Suppler	mentary information:	Y TEST TEST FOT EAT	ENS ENS
- 29	T OT EA	EAST TAST STATES	165 TEST

7.2.3	Table: Impulse tests on primary	winding	TES' TESP
test voltage ap	plied between	test voltage (V)	breakdown (Yes/No)
Input and Plastic Enclosure With Metal Foil		5000Vac	No TEST
AS' EASY	ASY TES TEST	1857 -657	EN ENS EN
TEST TEST	CT EAST EAST	EASY NEY TE	EN TEST TEST
Supplementary	information:	I ST E	EAS' EAS'



Object /Part Manu	factured.		18 M 289 11 129	File
	e Mark	Type/ Model	Technical data	No./Licen ce No.
Winding	1851 Je	185 78	130℃	OL UL
Plastic Enclsoure	-EASY	EASY TE EASY T	V-0, 80℃	ST UL

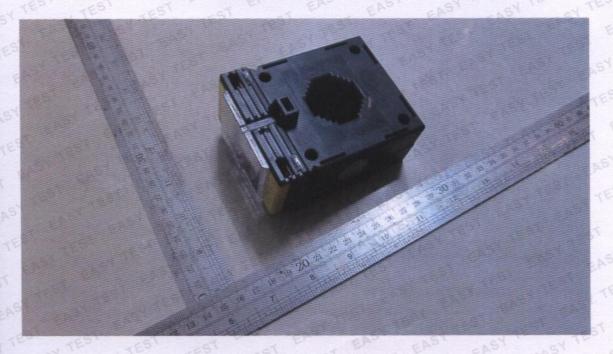
EASY TEST EASY



# APPEDIX A - EUT PHOTOS A.1 EUT PHOTO-WHOLE VIEW OF UNIT



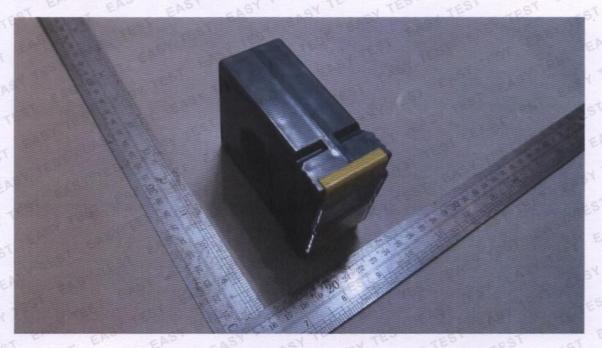
## A.2 EUT PHOTO-FRONT VIEW OF UNIT



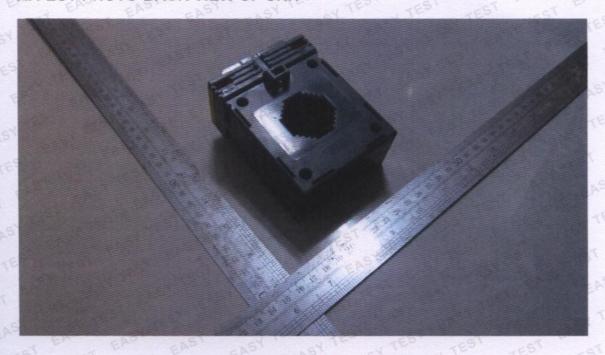
Shenzhen Easy Test Electronic Products Co., Ltd.
Unit 1914, No.1 Tairan Ninth Road, Chegongmiao, Futian, Shenzhen, China
Phone: 0755-8378 2883 FAX: 0755-8378 1887 Http://www.etstochina.com



#### A.3 EUT PHOTO-SIDE VIEW OF UNIT



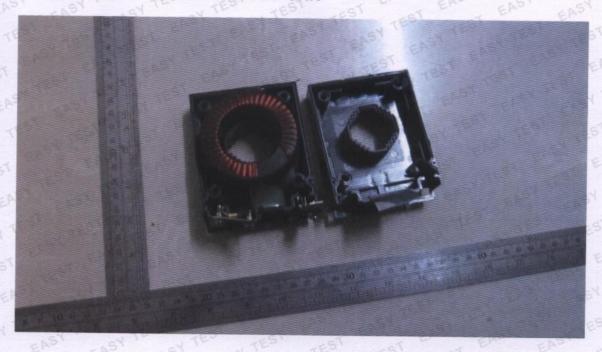
## A.4 EUT PHOTO-BACK VIEW OF UNIT



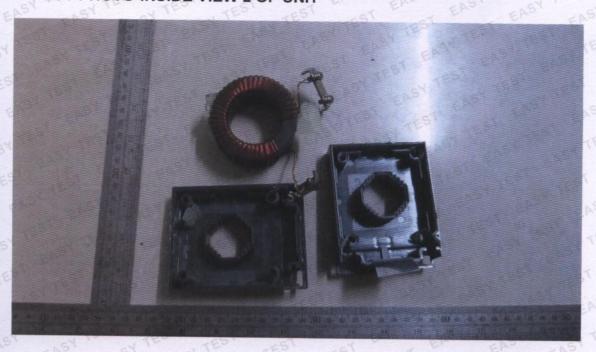
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# A.5 EUT PHOTO-INSIDE VIEW 1 OF UNIT



## A.6 EUT PHOTO-INSIDE VIEW 2 OF UNIT



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