ABB

Technical Laboratory

TEST REPORT No. 1VLR 016444

issued by Technical laboratory in accordance with EN 17025

Test Object : **Current Instrument Transformer**

Type : **CTS 38 X Sch**

Ratings:

Design: cast resin insulated for indoor use			
Serial number:		024273 / 2005	024276 / 2005
Rated primary current	[A]	100	600
Rated secondary current	[A]	1	5
Highest system voltage	[kV]	38,5	38,5
Power frequency withstand voltage	[kV]	80	80
Lightning-impulse withstand voltage	[kV]	180	180
Rated output	[VA]	30 / 15	15
Accuracy class		0,5 / 5P	0,2S
Rated short - time thermal current	[kA]	20	31,5
Rated dynamic current	[kA]	50	65
Rated frequency	[Hz]	50	50
FS / ALF		10 / 10	10 / -

Manufacturer: KPB Intra s.r.o, BUČOVICE

Test performed : Dielectric tests according to requirements of customer:
Lightning impulse test on primary winding
Power - frequency withstand test on primary windings
Partial discharge measurement

Test specification : ČSN EN 60044 – 1 (2001), IEC 60044 – 1 (1997), ČSN 333201 (2002)
GOST1516.3-96, KPB Intra s.r.o, order Nr. 003000366/2005

Test results : The transformers **CTS 38 X**, serial number 024277 / 2005 and 024280 / 2005, have been tested in accordance with IEC 60044-1, ČSN EN 60044 – 1 (2001), ČSN 333201 (2002) and GOST1516.3-96.
Transformers are considered to comply with the above standards.

ABB s.r.o. - organizační jednotka EJF ZKUŠEBNA E 1 3

TECHNICKÁ LABORATOŘ S ČINNOSTÍ UZNANOU SZZL ABB s.r.o. Org. jednotka EJF Brno Technická laboratoř 1028

Date of test : 7. 10. 2005

12. 10. 2005
Date of issue

Test manager

Laboratory manager

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- The transformers CTS 38 X Sch, serial number 024273 / 2004 and 024276 / 2005 have been subjected to the following dielectric tests and measurement::

TEST PROGRAM:	standard
1. **Verification of terminal markings**	ČSN EN 60044-1, cl. 8.1, GOST1516.3-96 IEC 60044-1, cl. 8.1, ČSN 333201
2. **Lightning - impulse test**	ČSN EN 60044-1, cl. 7.3, GOST1516.3-96, čl. 7 IEC 60044-1, cl. 7.3, ČSN 333201
3. **Power - frequency withstand test on primary winding**	ČSN EN 60044-1, cl. 8.2, GOST1516.3-96, čl. 7 IEC 60044-1, cl. 8.2, ČSN 333201
4. **Partial discharge measurement**	ČSN EN 60044-1, cl. 8.2 IEC 60044-1, cl. 8.2

Results of tests performed on transformer CTS 38 X Sch:

All tests and measurements have been performed in Technical laboratory ABB s.r.o EJF, Brno.

Ambient air conditions during tests:

Temperature: 21,4° C
Rel. humidity: 44,3 %
Pressure: 1012 hPa

Devices and equipment used:

Test transformer 100 kV Nr. 93425
Measuring system TETTEX type 9124 Nr. 136810
Impulse generator TUR Dresden Nr. 94272
Digital Impulse Voltage Measuring System TR – AS 25-8 , Dr.STRAUSS

List of symbols used:

I_p	Rated primary current	[A]
I_s	Rated secondary current	[A]
P	Rated output	[VA]
U_m	Highest system voltage	[kV]
f	Rated frequency	[Hz]
I_{th}	Rated short - time thermal current	[kA]
I_{dyn}	Rated dynamic current	[kA]
U_{zk}	Test voltage	[kV]

Standard: ČSN EN 60044 – 1 (2001), IEC 60044 – 1 (1997), GOST1516.3-96, ČSN 333201(2002)					
TYPE :	**CTS 38 X Sch**			**Serial No. :**	024273/2005
Ratings:					
I_p [A]	100	I_s [A]	1	**P** [VA]	30 / 15
Accuracy	0,5 / 5P	**FS**	10	**ALF**	10
U_m/ U_{zk} [kV]	38,5 / 80 / 180	**f** [Hz]	50	I_{th} / I_{dyn}[kA]	20 / 50

1. Verification of terminal markings :

- It was verified that the terminal markings are correct and in accordance with drawings.

2. Lightning - impulse test:

- Test voltage applied between short-circuited primary winding and earth. The short-circuited secondary windings and the frame connected to earth.
- Voltage form was in accordance with IEC 60060-1

Test voltage	impulses	flashovers	Result:
+ 180 kV	15	0	has passed
– 180 kV	15	0	has passed
Test voltage	impulses	flashovers	Result:
+ 190 kV	15	0	has passed
– 190 kV	15	0	has passed

3. Power-frequency withstand test on primary windings:

- Test voltage applied between short-circuited primary winding and earth. The short-circuited secondary windings and the frame connected to earth:

Test voltage	frequency	test duration	Result:
80 kV	50 Hz	60 sec.	has passed

4. Partial discharge measurement:

- The test voltage applied between short- circuited primary winding and earth. The short-circuited secondary windings and the frame connected to earth:

Test voltage	Partial discharge level	Result:
$U_{zk} = 1,2\ U_m = 46,2$ kV	q = 28 pC	has passed
$U_{zk} = 1,2\ U_m / \sqrt{3} = 26,7$ kV	q = 6 pC	has passed

Standard: ČSN EN 60044 – 1 (2001), IEC 60044 – 1 (1997), GOST1516.3-96, ČSN 333201(2002)					
TYPE :	**CTS 38 X Sch**			**Serial No. :**	024276/2005
RATINGS :					
I_p [A]	600	I_s [A]	5	**P** [VA]	15
Accuracy	0,2S	**FS**	10	**ALF**	--
U_m/ U_{zk} [kV]	38,5 / 80 / 180	**f** [Hz]	50	I_{th} / I_{dyn}[kA]	31,5 / 65

1. Verification of terminal markings :

- It was verified that the terminal markings are correct and in accordance with drawings.

2. Lightning - impulse test:

- Test voltage applied between short-circuited primary winding and earth. The short-circuited secondary windings and the frame connected to earth.
- Test voltage has been gradually increased up to 220kV.
- Voltage form was in accordance with IEC 60060-1

Test voltage	impulses	flashovers	Result:
+ 180 kV	15	0	has passed
– 180 kV	15	0	has passed
+ 185 kV	15	0	has passed
- 185 kV	15	0	has passed
+ 190 kV	15	0	has passed
– 190 kV	15	0	has passed
+ 195 kV	15	0	has passed
- 195 kV	15	0	has passed
+ 200 kV	15	0	has passed
- 200 kV	15	0	has passed

- Test voltage of positive polarity has been gradually increased by 5kV: 207kV, 208kV, 214kV, 215kV ...

Test voltage	impulses	flashovers	Result:
+ 220 kV	15	0	has passed

- Test voltage of negative polarity has been gradually increased by 5kV: 206kV, 211kV, 214kV, 218kV ...

Test voltage	impulses	flashovers	Result:
- 220 kV	15	1 (polarity change)	has passed

3. Power-frequency withstand test on primary windings:

- Test voltage applied between short-circuited primary winding and earth. The short-circuited secondary windings and the frame connected to earth:

Test voltage	frequency	test duration	Result:
80 kV	50 Hz	60 sec.	has passed

4. Partial discharge measurement:

- The test voltage applied between short- circuited primary winding and earth. The short-circuited secondary windings and the frame connected to earth:

Test voltage	Partial discharge level	Result:
$U_{zk} = 1,2\ U_m = 46,2$ kV	q = 17 pC	has passed
$U_{zk} = 1,2\ U_m / \sqrt{3} = 26,7$ kV	q = 7 pC	has passed