



Inženýrsko-výrobní elektrotechnický podnik, a.s.

619 00 Brno, Videnska 117a

MEASURING TRANSFORMERS LABORATORY

TEST PROTOCOL No. 73 – 0053/05

CTS 25 Sch Current Measuring Transformers

(laboratory stamp)

(signature)

Ing. Rada Vlastimil

Measuring transformers laboratory manager
IVEP a.s.


In Brno on 22 February 2005

Changes and amendments in this protocol can be done only in measuring transformers laboratory of IVEP a.s.

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	Test protocol No. 73 – 0053/05 Test subject: CTS 25 Sch Current Measuring Transformers		Page: 1
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Type: CTS 25 Sch		Test type: Type test	
Rated values: Highest voltage for equipment 25 kV Serial number 009839 Rated transfer 15 // 5A Rated load 10 VA Accuracy class 0.5S Serial number 009913 Rated transfer 30 - 60 // 5A Rated load 10 VA Accuracy class 0.5S Rated frequency 50 Hz Isolation class E		Tested according to: CSN EN 60044-1 IEC 60044-1 CSN 351301 IEC 185 CSN 351360 Test customer: KPB INTRA s.r.o. Zdanska 477 685 01 Bucovice	
Serial Number: 009839, 009913		Atmospheric conditions: Temperature: °C Pressure: hPa Air humidity: %	
Products manufacturer: KPB INTRA s.r.o. Zdanska 477 685 01 Bucovice		Samples delivered on: 2002 - 2004	
Test result: VTS 25 Sch current measuring transformers – Schneider design, producer KPB INTRA s.r.o., <p style="text-align: center;">comply</p> <p style="text-align: center;">with the type test conditions pursuant to CSN EN 60044-1, IEC 60044-1, CSN 35 1301, IEC 185, and CSN 351360.</p> <p style="text-align: right;">(laboratory stamp)</p>			
Test date: 6/2002 - 4/2004	Tested by: Ing. Vlastimil Rada (signature) Ing. Maskova Hana (signature)	Chief: Ing. Vlastimil Rada (signature)	



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In the laboratory of measuring transformers of IVEP, a.s. and the technical laboratory ABB, a type test according to standards CSN EN 60044-1, IEC 60044-1, and CSN 35 1301 was performed on two pieces of current measuring transformers of type CTS 25 Sch - Schneider design, for purpose of expansion of the Decision of type approval No. 2416/96/1. The measuring transformers were produced according to the assembly drawing no. 011001 and the winding data 1102021 and 1102014.

The type test was performed in this scope:

1. Terminal designation correctness check

The measuring transformers of current type CTS 25 Sch complied with CSN EN 60044-1 Art. 8.1., IEC 60044-1 Art. 8.1, and CSN 35 1301 Art. 16.

2. Atmospheric impulse primary winding test

The test was performed on measuring transformer s.no. 009913 in the technical laboratory of ABB with positive and negative polarity of test voltage +/- 125 kV.

The test results are stated in the test protocol No. 1VLRO16193.

Measuring transformers of current type CTS 25 Sch complied with CSN EN 60044-1 Art. 7.3.2, IEC 60044-1 Art. 7.3.2, and CSN 35 1301 Art. 14.

3. Industrial frequency alternate voltage primary winding test

The test was performed in the technical laboratory of ABB with test voltage 50 kV / 50 Hz for a period of 1 minute at measuring transformer of current s.no. 009913.

The test results are stated in the test protocol No. 1VLRO16193.

Measuring transformers of current type CTS 25 Sch complied with CSN EN 60044-1 Art. 8.2, IEC 60044-1 Art. 8.2, and CSN 35 1301 Art. 17.

4. Test using alternate voltage of secondary winding

The test was performed in the measuring transformer laboratory of IVEP, a.s. using alternate voltage of 3 kV/50 Hz for a period of 1 minute between the shorted secondary terminals and the transformer parts grounded in operation.

The measuring transformers of current type CTS 25 Sch complied with CSN EN 60044-1 Art. 8.3, IEC 60044-1 Art. 8.3, and CSN 35 1301 Art. 18.

5. Measuring of partial discharges

The measuring was performed at the current transformer s.no. 009913 in the technical laboratory of ABB. The measured values of partial discharges are stated in the test protocol No. 1VLRO16193.

The measuring transformer of current type CTS 25 Sch complied with CSN EN 60044-1 Art. 8.2, IEC 60044-1 Art. 8.2, and CSN 35 1301 Art. 17 for both types of grounding in HV grids.

6. Accuracy test

The test was performed on both measuring transformers of current for the rated secondary load of 10 VA in the accuracy class of 0.5S. The measuring was performed using the differential method and equipment by Tettex for verification of current measuring transformers type 2761, s.no. 136'127 - Calibration sheet no. 8017-KL-0061-04. During measuring, the following was also used:

Current measuring transformer - comparator Tettex type 4764, s.no. 135'233 - Calibration sheet no. 132-KL-1048-03

Current load Tettex type 3671/KK, s. no. 135'897 - Calibration sheet no. 817-KL-653-3/00

The measured values of current and angle errors within the range of 1 to 120 % I_N are stated in the following table No. 1.



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Table of Measured Values No. 1

Serial No.	Errors	Rated primary current %					Load [VA]
		1	5	20	100	120	
009839	ε_I [%]	+ 0.34	+ 0.35	+ 0.35	+ 0.35	+ 0.36	2.5
	δ_I [°]	+ 9.23	+ 7.90	+ 5.97	+ 2.81	+ 2.44	
	ε_I [%]	-0.20	-0.11	+ 0.01	+ 0.17	+ 0.18	10
	δ_I [°]	+ 14.82	+ 9.92	+ 3.46	-2.31	-2.37	
009913 1S1-1S2	ε_I [%]	+ 0.28	+ 0.28	+ 0.28	+ 0.28	+ 0.28	2.5
	δ_I [°]	+ 8.41	+ 7.25	+ 5.34	+ 3.05	+ 2.81	
	ε_I [%]	-0.19	-0.11	-0.01	+ 0.14	+ 0.15	10
	δ_I [°]	+ 12.80	+ 8.25	+ 3.02	-1.49	-1.79	
009913 1S1-1S3	ε_I [%]	+ 0.16	+ 0.16	+ 0.15	+ 0.15	+ 0.15	2.5
	δ_I [°]	+ 2.81	+ 2.64	+ 1.91	+ 1.43	+ 1.20	
	ε_I [%]	+ 0.04	+ 0.05	+ 0.07	+ 0.10	+ 0.10	10
	δ_I [°]	+ 4.08	+ 3.16	+ 1.75	+ 0.45	+ 0.27	

From the aforementioned measuring and the measuring performed at the prototypes of measuring transformers of current type CTS 25 - see protocol of IVEP, a.s. No. 80-12849 and the design of current leading parts of measuring transformers of current CTS 25 Sch, these basic measuring parameters result:

Primary I_N range 5 - 1 250 A

Secondary I_N 1 and 5 A

Number of measuring windings 1 - 3

Accuracy classes: 0.2, 0.2S, 0.5, 0.5S, 1, 3

Number of securing windings 1 - 2

Accuracy classes 5P, 10P

Rated secondary loads depending on the size of primary ampere threads and the required accuracy classes are within the range of 2.5 - 60 VA. All combinations of rated secondary loads and accuracy classes must comply with the requirements of TPM 2272-99 when verifying the measuring transformers of current of accuracy classes 0.2, 0.2S, 0.5, 0.5S.

For other accuracy classes and measuring and securing windings, the provisions of corresponding standards apply.

The maximal rated permanent thermal primary current is 1 250 A.

The current measuring transformers type CTS 25 Sch complied with CSN EN 60044-1 Art. 11, 12.3, IEC 60044-1 Art. 11, 12.3, and CSN 35 1301 Art. 26, 37.

Further tests that were performed at the prototypes of type CTS 25 according to standards CSN 35 1360 and IEC 185 are in their performance identical to standards CSN EN 60044-1, IEC 60044-1, and CSN 35 1301 and their results apply also to CTS 25 Sch.

7. Thread insulation test

The test was performed at the prototypes of measuring transformers of current type CTS 25 and their results are stated in the test protocol of IVEP, a.s. No. 80-12849.

The measuring transformers of current type CTS 25 Sch complied with CSN EN 60044-1 Art. 8.4, IEC 60044-1 Art. 8.4, and CSN 35 1301 Art. 19.

8. Instrument security factor and overall error measuring

The results of the measuring at the prototypes of measuring transformers of current type CTS 25 are stated in the test protocol of IVEP, a.s. No. 80-12849. The measuring transformers of current type CTS 25 Sch complied with CSN EN 60044-1 Art. 11.6 and 12.5, IEC 60044-1 Art. 11.6, 12.5, and CSN 35 1301 Art. 31 and 40.



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9. Short circuit test

The test was performed at the prototypes of measuring transformers of current type CTS 25 and its results are stated in the test protocol of IVEP a.s. No. 80-12849, No. 88-0257, and the test record from the short circuit facility Bechovice No. 96-079.

The measuring transformers of current type CTS 25 Sch complied with CSN EN 60044-1 Art. 7.1, IEC 60044-1 Art. 7.1, and CSN 35 1301 Art. 12.

10. Heating test

The test was performed at the prototypes of measuring transformers of current type CTS 25 Sch and its results are stated in the test protocol of IVEP, a.s. No. 80-12849.

Measuring transformers of current CTS 25 Sch complied with CSN EN 60044-1 Art. 7.2, IEC 60044-1 Art. 7.2, and CSN 35 1301 Art. 13 for insulation class E.