



Inženýrsko – výrobní elektrotechnický podnik, a.s.

619 00 Brno, Videnska 117

TEST PROTOCOL No. 82 – 0641

**VTs 38 Internal Instrument Voltage
Transformer**

(testing station stamp)

(signature)
Ing. Jaromir Mudra, CSc.

In Brno on: 27 July 1998

Warning: Content of this protocol can not be published without permission of the test customer.
Only entire protocol can be published and with written permission of the test laboratory.

TEST PROTOCOL No. 82 – 0641 Test subject: VTS 38 Internal Instrument Voltage Transformer		Page: 1
		Number of pages: 6
Type: VTS 38	Test type: partial	
	Tested according to: IEC 186 CSN 35 1360, CSN 35 1302	
Rated values: Rated voltage transfers: 30000/.3/100/.3/100/3 V 30000/.3/100/.3/100/3 V	Test customer: KPB INTRA s.r.o. Fucikova 860 685 01 Bucovice	
	Order number: KPB-Z-98004 dated 11 July 1998	
	Sample registration numbers: Reg. No. 215-217/98 Serial No. 001848-001850 Drawing No.: KPB-T-0701	
	Atmospheric conditions: Temperature: 28 °C Pressure: 1020.9 hPa Humidity: 46 %	
Product manufacturer: KPB INTRA s.r.o. Fucikova 860 685 01 Bucovice	Protocol contains: Text pages: 6 Tables: Oscillograms: Diagrams: Drawings: Photographs:	Table of distribution: IVEP RT 2x Client 1x
Samples delivered on: 22 July 1998		
Test results: Internal instrument voltage transformers type VTS 38, producer KPB Intra, s.r.o., in design 30000/.3/100/.3/100/3 and 35 000/.3/100/.3/100/3 V P a s s e d the insulation tests according to CSN 35 1360, CSN 35 1302, and IEC 186.		
Test date: 22 - 27 July 1998	Tested by: Ing. Jaromir Mudra, CSc.	Testing station chief: Ing. Jaromir Mudra, CSc. (Stamp and signature)



TEST PROTOCOL No. 82 – 0641
Test subject: VTS 38 Internal Instrument Voltage
Transformer

Page: 2

Number of pages: 6

On 22 to 27 July 1998, insulation tests with impulse and alternate voltage were performed in the laboratory of IVEP a.s. Brno based on the order No. KPB-Z-980040 of KPB Intra, s.r.o. at 3 pieces of instrument voltage transformers type VTS 38 in design 30000/.3/100/.3/100/3V and 35000/.3/100/.3/100/3V according to CSN 35 1302, CSN 35 1360, and IEC 186.

Test equipment

Impulse generator 1.2 MV, Haefely, 1.2/50 μ s, 30 kJ
compiled to 400 kV
Two-beam impulse oscilloscope, Haefely, type 72 E
Impulse peak voltmeter, Haefely, type 64 M
Transformer cascade, 500 kV, 150 kVA, Siemens
Capacity voltage divider 600 kV, Haefely, with peak voltmeters Trüb - Täuber

Test procedure and scope

In accordance with standards CSN 35 1360 and IEC 186, tests using atmospheric impulse 1.2/ 50 μ s in both polarities using short-term alternate voltage of frequency 200 Hz for a period of 30 s and frequency 50 Hz for a period of 1 minute during the tests of insulation between the windings were performed at the transformers. The tested transformers were installed in a horizontal position on a metallic grounded board during the tests.

Tested instrument transformers

Ref. no. of sample 215/98: Type VTS 38, KPB Intra s.no. 001850, p. y. 1998, 30000/.3/100/.3V/100/3V
38/80/180V kV, 500 VA, CSN 35 1360

Ref. no. of sample 216/98: Type VTS 38, KPB Intra s.no. 001849, p. y. 1998, 35000/.3/100/.3V/100/3V
38/80/180V kV, 500 VA, CSN 35 1360

Ref. no. of sample 217/98: Type VTS 38, KPB Intra s.no. 001848, p. y. 1998, 35000/.3/100/.3V/100/3V
38/80/180V kV, 500 VA, CSN 35 1360

Test results

Used symbols:

+U, -U - Rated sustained voltage during atmospheric impulse 1.2/50 μ s, positive and negative wave (peak value)

Records 15/0 and 5/0 mark 15 impulses, possibly 5 impulses without flashover.

U - Rated short-term alternate sustained voltage (effective value)



TEST PROTOCOL No. 82 – 0641
Test subject: VTS 38 Internal Instrument Voltage Transformer

Page: 3

Number of pages: 6

1. Insulating tests according to CSN 35 1302, CSN 35 1360

- Insulation test using impulse voltage (CSN 35 1360, Art. 123)
- Insulation test using alternate voltage (CSN 35 1360, Art. 124)
- Thread insulation test (CSN 35 1360, Art. 125)

1.1. Instrument Voltage Transformer, Type VTS 38

30000/.3/100/.3/100/3 V

Serial number 001850, p. y. 1998, ref. no. 215/98

1.1.1. Insulation test using impulse voltage

- | | |
|------------------|----------------|
| + U = 180 kV/5/0 | - satisfactory |
| - U = 180 kV/5/0 | - satisfactory |

1.1.2. Insulation test using alternate voltage

- Test of insulation between the primary and secondary winding
U = 2.0 kV/50 Hz/1 min. - satisfactory
- Test of insulation of secondary winding against primary winding and grounded parts
U = 2.0 kV/50 Hz/1 min. - satisfactory

1.1.3. Test of thread insulation

- | | |
|-----------------------|----------------|
| U = 80 kV/200 Hz/30 s | - satisfactory |
|-----------------------|----------------|

1.2. Instrument Voltage Transformer, Type VTS 38

35000/.3/100/.3/100/3 V

Serial number 001849, p. y. 1998, ref. no. 216/98

1.2.1. Insulation test using impulse voltage

- | | |
|------------------|----------------|
| + U = 180 kV/5/0 | - satisfactory |
| - U = 180 kV/5/0 | - satisfactory |

1.2.2. Insulation test using alternate voltage

- Test of insulation between the primary and secondary winding
U = 2.0 kV/50 Hz/1 min. - satisfactory
- Test of insulation between the measuring and auxiliary winding
U = 2.0 kV/50 Hz/1 min. - satisfactory
- Test of insulation of secondary winding against primary winding and grounded parts
U = 2.0 kV/50 Hz/1 min. - satisfactory

1.2.3. Test of thread insulation

- | | |
|-----------------------|----------------|
| U = 80 kV/200 Hz/30 s | - satisfactory |
|-----------------------|----------------|



TEST PROTOCOL No. 82 – 0641
Test subject: VTS 38 Internal Instrument Voltage
Transformer

Page: 4

Number of pages: 6

1.3. Instrument Voltage Transformer, Type VTS 38

35000/.3/100/.3/100/3 V

Serial number 001848, p. y. 1998, ref. no. 217/98

1.3.1. Insulation test using impulse voltage

+ U = 180 kV/5/0

- satisfactory

- U = 180 kV/5/0

- satisfactory

1.3.2. Insulation test using alternate voltage

- Test of insulation between the primary and secondary winding

U = 2.0 kV/50 Hz/1 min.

- satisfactory

- Test of insulation between the measuring and auxiliary winding

U = 2.0 kV/50 Hz/1 min.

- satisfactory

- Test of insulation of secondary winding against primary winding and grounded parts

U = 2.0 kV/50 Hz/1 min.

- satisfactory

1.3.3. Test of thread insulation

U = 80 kV/200 Hz/30 s

- satisfactory

2. Insulation tests according to IEC 186

- Insulation test using impulse voltage (IEC 186, Art. 13)

- Insulation test of primary winding using alternate voltage (IEC 186, Art. 9.2.2. and Art. 16)

- Insulation test of secondary winding using alternate voltage (IEC 186, Art. 17).

2.1. Instrument voltage transformer, type VTS 38,

30 000/.3/100/.3/100/3 V

s. no. 001850, p. y. 1998, ref. no. 215/98

2.1.1. Insulation test using impulse voltage

+ U = 170 kV/15/0

- satisfactory

- U = 170 kV/15/0

- satisfactory

2.1.2. Insulation test of primary winding using alternate voltage

- Test of primary winding terminal that is grounded during operation

U = 3.0 kV/50 Hz/1 min

- satisfactory

- Test of primary winding

U = 70 kV/200 Hz/30 s

- satisfactory

IVEP 2-020



TEST PROTOCOL No. 82 – 0641
Test subject: VTS 38 Internal Instrument Voltage Transformer

Page: 5

Number of pages: 6

2.1.3. Insulation test of secondary winding using alternate voltage

- Test of insulation between the primary and secondary winding

$\bar{U} = 3.0 \text{ kV}/50 \text{ Hz}/1 \text{ min}$ - satisfactory

- Test of insulation between the secondary winding and the grounded skeleton

$\bar{U} = 3.0 \text{ kV}/50 \text{ Hz}/1 \text{ min}$ - satisfactory

2.2. Instrument voltage transformer, type VTS 38,

35 000/.3/100/.3/100/3 V

s. no. 001849, p. y. 1998, ref. no. 216/98

2.2.1. Insulation test using impulse voltage

+ $U = 170 \text{ kV}/15/0$ - satisfactory

- $U = 170 \text{ kV}/15/0$ - satisfactory

2.2.2. Insulation test of primary winding using alternate voltage

- Test of primary winding terminal that is grounded during operation

$\bar{U} = 3.0 \text{ kV}/50 \text{ Hz}/1 \text{ min}$ - satisfactory

- Test of primary winding

$\bar{U} = 70 \text{ kV}/200 \text{ Hz}/30 \text{ s}$ - satisfactory

2.2.3. Insulation test of secondary winding using alternate voltage

- Test of insulation between the primary and secondary winding

$\bar{U} = 3.0 \text{ kV}/50 \text{ Hz}/1 \text{ min}$ - satisfactory

- Test of insulation between the measuring and auxiliary winding

$\bar{U} = 3.0 \text{ kV}/50 \text{ Hz}/1 \text{ min}$ - satisfactory

- Test of insulation of the secondary windings against the grounded skeleton

$\bar{U} = 3.0 \text{ kV}/50 \text{ Hz}/1 \text{ min}$ - satisfactory

2.3. Instrument voltage transformer, type VTS 38,

35 000/.3/100/.3/100/3 V

s. no. 001848, p. y. 1998, ref. no. 217/98



TEST PROTOCOL No. 82 – 0641
Test subject: VTS 38 Internal Instrument Voltage
Transformer

Page: 6

Number of pages: 6

2.3.1. Insulation test using impulse voltage

+ U = 170 kV/15/0	- satisfactory
- U = 170 kV/15/0	- satisfactory

2.3.2. Insulation test of primary winding using alternate voltage

- Test of primary winding terminal that is grounded during operation	
U = 3.0 kV/50 Hz/1 min	- satisfactory

- Test of primary winding	
U = 70 kV/200 Hz/30 s	- satisfactory

2.3.3. Insulation test of secondary winding using alternate voltage

- Test of insulation between the primary and secondary winding	
U = 3.0 kV/50 Hz/1 min	- satisfactory

- Test of insulation between the measuring and auxiliary winding	
U = 3.0 kV/50 Hz/1 min	- satisfactory

- Test of insulation of the secondary windings against the grounded skeleton	
U = 3.0 kV/50 Hz/1 min	- satisfactory

Conclusion:

The tested instrument transformers type VTS 38, producer KPB Intra, have passed the insulation tests according to CSN 35 1302, CSN 35 1360, and IEC 186.