

**Test Object:** Current Instrument Transformer

**Type:** CTS 25 – Schneider version

**Ratings:**

|                                             |        |               |
|---------------------------------------------|--------|---------------|
| Design: cast resin insulated for indoor use |        |               |
| Serial number:                              |        | 009913 / 2002 |
| Rated primary current                       | [ A ]  | 30 - 60       |
| Rated secondary current                     | [ A ]  | 5             |
| Rated output                                | [ VA ] | 10            |
| Accuracy class                              |        | 0,5           |
| Highest system voltage                      | [ kV ] | 25            |
| Power frequency withstand voltage           | [ kV ] | 50            |
| Lightning-impulse withstand voltage         | [ kV ] | 125           |
| Rated frequency                             | [ Hz ] | 50            |
| Rated short - time thermal current          | [ kA ] | 16            |
| Rated dynamic current                       | [ kA ] | 40            |
| FS / ALF                                    |        | < 5 / -       |

**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), ČSN 351301 (10/1997)  
IEC 60044 – 1 (1997)

**Test results:** The transformer CTS 25, version Schneider has been tested in accordance with IEC 60044-1, ČSN EN 60044 – 1 (2001) and ČSN 35 13 01 (10/1997). Transformer is considered to comply with the above standards.

**Date of test :** 15. 3. 2003

19. 3. 2003

**Date of issue**

Otakar Beneš  
**Test manager**

Zdeněk Otřisal  
**Laboratory manager**

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- The test object produced in accordance with the description has been subjected to the type tests in compliance with Standard ČSN EN 60044-1(2001) and ČSN 351301 (1997) and IEC 60044-1 (1996),

**TEST PROGRAM:**

standard

- |                                                         |                                                                                            |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------|
| 1. Verification of terminal markings                    | ČSN EN 60044-1, cl. 8.1<br>IEC 60044-1, cl. 8.1                                            |
| 2. Lightning impulse test                               | ČSN 351301, cl.16<br>ČSN EN 60044-1, cl. 7.3<br>IEC 60044-1, cl. 7.3                       |
| 3. Power - frequency withstand test on primary windings | ČSN 351301, cl. 14<br>ČSN EN 60044-1, cl. 8.2<br>IEC 60044-1, cl. 8.2                      |
| 4. Partial discharge measurement                        | ČSN 351301, cl. 17<br>ČSN EN 60044-1, cl. 8.2<br>IEC 60044-1, cl. 8.2<br>ČSN 351301, cl.17 |

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

**Persons attending the tests:**

Ing. Hana Mašková, IVEP Brno  
Ing. Vlastimil Rada, IVEP Brno

**Contents:**

Results of tests performed on transformer: CTS 25, serial No.: 009913 / 2002

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**Devices and equipment used:**

Test transformer 100 kV Nr. 93425  
Measuring system and PD - detector 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::**

|            |                                    |        |
|------------|------------------------------------|--------|
| $I_n, I_p$ | 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 ] |
| $q$        | Partial discharge level            | [ pC ] |

|                       |               |                      |     |                                           |         |
|-----------------------|---------------|----------------------|-----|-------------------------------------------|---------|
| TYPE :                |               | CTS 25               |     | Serial No. : 009913/2002                  |         |
| RATINGS :             |               |                      |     |                                           |         |
| I <sub>p</sub> [ A ]  | 30 - 60       | I <sub>s</sub> [ A ] | 5   | P [ VA ]                                  | 10      |
| Accuracy              | 0,5           | FS                   | < 5 | ALF                                       | --      |
| U <sub>i</sub> [ kV ] | 25 / 50 / 125 | f [ Hz ]             | 50  | I <sub>th</sub> / I <sub>dyn</sub> [ kA ] | 16 / 40 |

**1. Verification of terminal markings :** ČSN EN 60044-1, cl. 8.1, IEC 60044-1, cl. 8.1  
ČSN 351301, cl. 16

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

**2. Lightning - impulse test:** ČSN EN 60044-1, cl. 7.3, IEC 60044-1, cl. 7.3  
ČSN 351301, cl. 14

- 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, for the test voltages and oscillograms reference is made to annex 1.

| Test voltage | impulses | flashovers | Result:    |
|--------------|----------|------------|------------|
| + 125 kV     | 15       | 0          | has passed |
| - 125 kV     | 15       | 0          | has passed |

**3. Power-frequency withstand test on primary windings:** ČSN 351301, cl. 17, IEC 60044-1, cl. 8.2  
ČSN EN 60044-1, cl. 8.2

- 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:    |
|--------------|-----------|---------------|------------|
| 50 kV        | 50 Hz     | 60 sec.       | has passed |

**4. Partial discharge measurement:** ČSN EN 60044-1, cl. 8.2, IEC 60044-1, cl. 8.2  
ČSN 351301, cl.17

- 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:    |
|-------------------------------------------------|-------------------------|------------|
| $U_{zk} = 1,2 U_m = 30 \text{ kV}$              | $q = 48 \text{ pC}$     | has passed |
| $U_{zk} = 1,2 U_m / \sqrt{3} = 17,3 \text{ kV}$ | $q = 1 \text{ pC}$      | has passed |

Impulse Voltage Test No. CTS 25

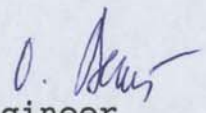
Test Report No.: 16193

Date of Test : 14.3.2003 Protocol No.: CTS 25  
Work Number : Order No.: /  
Testobject : Current instrument transformer  
Serial No. : 009913/2002  
Specification : IEC 60044-1, CSN EN 60044-1  
Testfield : ABB EJF  
Remarks :

temperature 23 °C atm.press. 1019 mbar humidity g/m3 24 %

The Testobject passed / ~~did not pass~~ / the tests without objection.

Sign:

Benes   
Testengineer

Otrisal   
Inspector

The Testresults are found in the following documentation.

## LI Lightning Impulse Voltage

| No. | Up kV  | Ip A | Remarks |
|-----|--------|------|---------|
| 1   | + 125  |      |         |
| 2   | + 126  |      |         |
| 3   | + 127  |      |         |
| 4   | + 126  |      |         |
| 5   | + 126  |      |         |
| 6   | + 126  |      |         |
| 7   | + 128  |      |         |
| 8   | + 33.3 |      |         |
| 9   | + 127  |      |         |
| 10  | + 128  |      |         |
| 11  | + 126  |      |         |
| 12  | + 126  |      |         |
| 13  | + 126  |      |         |
| 14  | + 125  |      |         |
| 15  | + 126  |      |         |
| 16  | + 126  |      |         |
| 17  | + 125  |      |         |
| 18  | - 125  |      |         |
| 19  | - 125  |      |         |
| 20  | - 126  |      |         |
| 21  | - 125  |      |         |
| 22  | - 125  |      |         |
| 23  | - 125  |      |         |
| 24  | - 125  |      |         |
| 25  | - 125  |      |         |

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D-96163 Gundelsheim

Impulse Voltage Test No. CTS 25

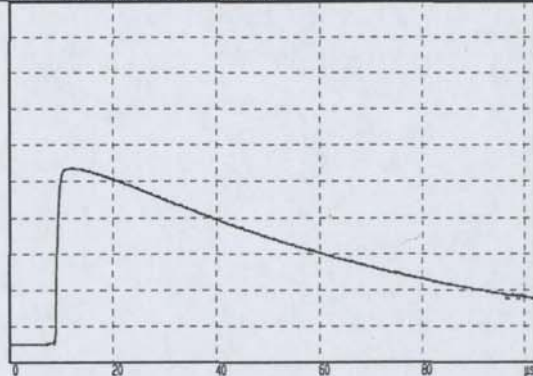
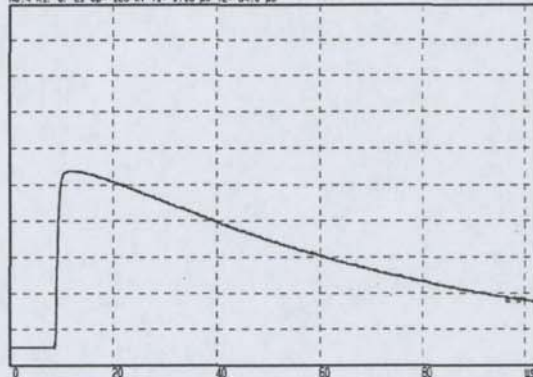
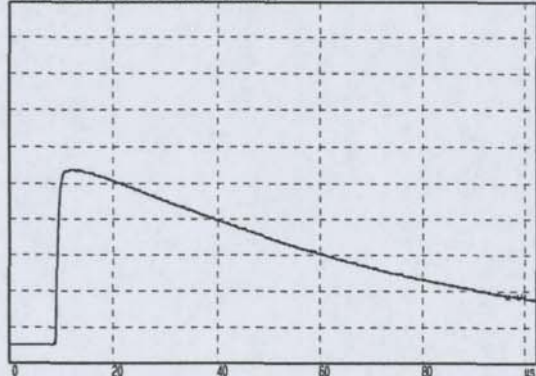
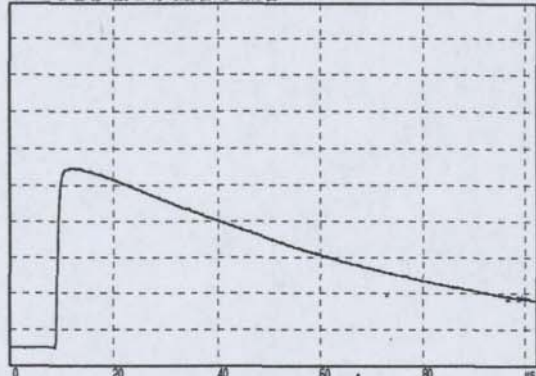
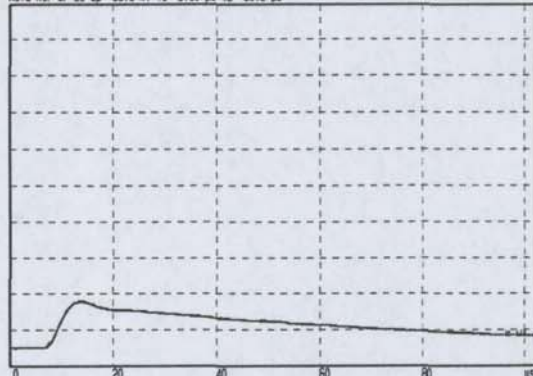
Test Report No.: 16193

LI Lightning Impulse Voltage

| No. | Up kV | Ip A | Remarks |
|-----|-------|------|---------|
| 26  | - 126 |      |         |
| 27  | - 125 |      |         |
| 28  | - 125 |      |         |
| 29  | - 125 |      |         |
| 30  | - 125 |      |         |
| 31  | - 125 |      |         |
| 32  | - 126 |      |         |

## Impulse Voltage Test No. CTS 25

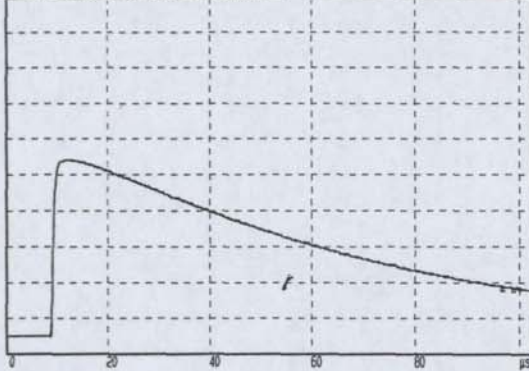
Test Report No.: 16193

No. 1 Kt: U: LT Up= 126 kV T1= 1.24  $\mu$ s T2= 53.6  $\mu$ sNo. 1  
Device: 1205-B  
U1 250.125kV  
U1 250-Scaler 817.7No. 2 Kt: U: LT Up= 126 kV T1= 1.25  $\mu$ s T2= 53.6  $\mu$ sNo. 2  
Device: 1205-B  
U1 250.125kV  
U1 250-Scaler 817.7No. 3 Kt: U: LT Up= 127 kV T1= 1.22  $\mu$ s T2= 53.7  $\mu$ sNo. 3  
Device: 1205-B  
U1 250.125kV  
U1 250-Scaler 817.7No. 4 Kt: U: LT Up= 126 kV T1= 1.15  $\mu$ s T2= 54.0  $\mu$ sNo. 4  
Device: 1205-B  
U1 250.125kV  
U1 250-Scaler 817.7No. 5 Kt: U: LT Up= 126 kV T1= 1.21  $\mu$ s T2= 53.9  $\mu$ sNo. 5  
Device: 1205-B  
U1 250.125kV  
U1 250-Scaler 817.7No. 6 Kt: U: LT Up= 126 kV T1= 1.21  $\mu$ s T2= 54.1  $\mu$ sNo. 6  
Device: 1205-B  
U1 250.125kV  
U1 250-Scaler 817.7No. 7 Kt: U: LT Up= 128 kV T1= 1.23  $\mu$ s T2= 53.6  $\mu$ sNo. 7  
Device: 1205-B  
U1 250.125kV  
U1 250-Scaler 817.7No. 8 Kt: U: LT Up= 33.3 kV T1= 5.10  $\mu$ s T2= 50.9  $\mu$ sNo. 8  
Device: 1205-B  
U1 250.125kV  
U1 250-Scaler 817.7

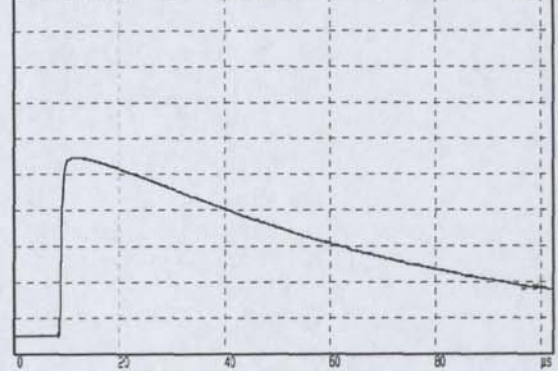
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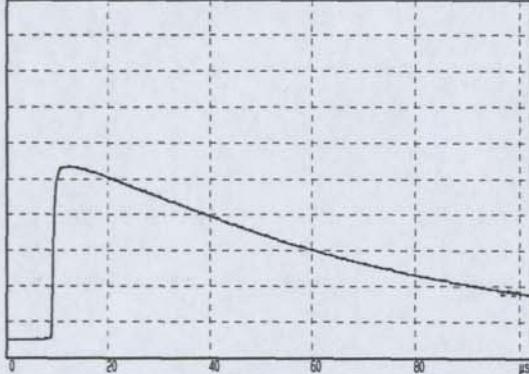
No. 9 Kl: U: LT UC= 127 kV Ti= 1.21 µs T2= 53.5 µs

No. 9  
Device: T205-B  
K1 500.120V  
K1 Pre-scalar 817.7

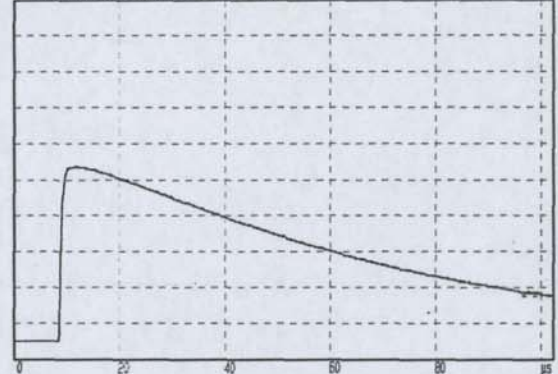
No. 10 Kl: U: LT UC= 126 kV Ti= 1.21 µs T2= 53.6 µs

No. 10  
Device: T205-B  
K1 500.120V  
K1 Pre-scalar 817.7

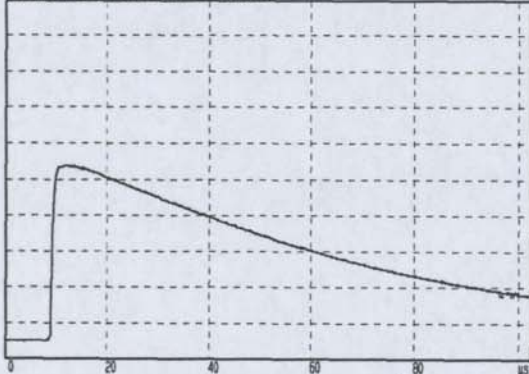
No. 11 Kl: U: LT UC= 126 kV Ti= 1.23 µs T2= 53.5 µs

No. 11  
Device: T205-B  
K1 500.120V  
K1 Pre-scalar 817.7

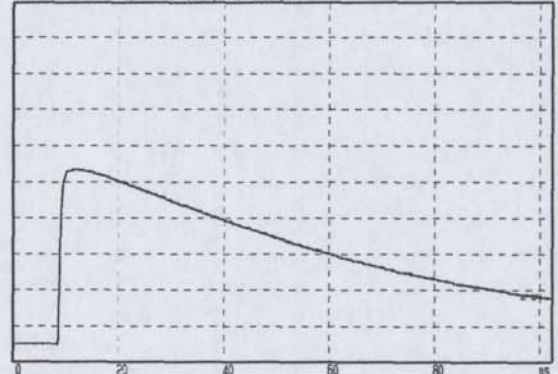
No. 12 Kl: U: LT UC= 126 kV Ti= 1.21 µs T2= 53.5 µs

No. 12  
Device: T205-B  
K1 500.120V  
K1 Pre-scalar 817.7

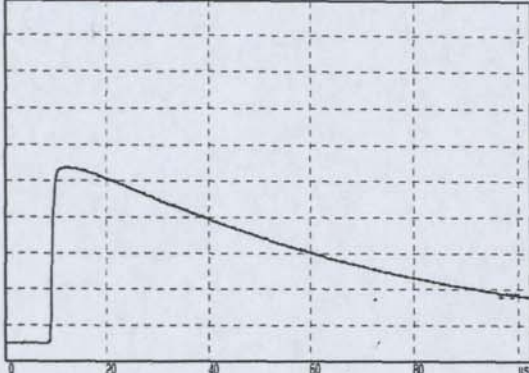
No. 13 Kl: U: LT UC= 126 kV Ti= 1.22 µs T2= 53.7 µs

No. 13  
Device: T205-B  
K1 500.120V  
K1 Pre-scalar 817.7

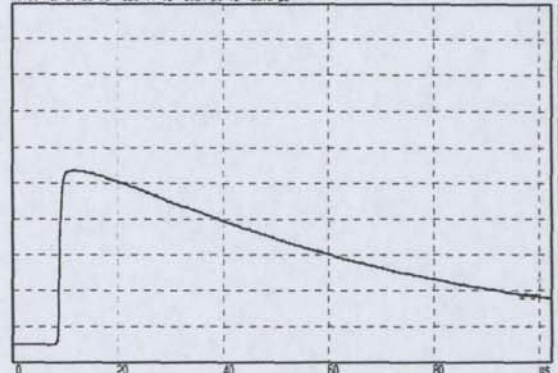
No. 14 Kl: U: LT UC= 126 kV Ti= 1.22 µs T2= 53.6 µs

No. 14  
Device: T205-B  
K1 500.120V  
K1 Pre-scalar 817.7

No. 15 Kl: U: LT UC= 126 kV Ti= 1.24 µs T2= 53.6 µs

No. 15  
Device: T205-B  
K1 500.120V  
K1 Pre-scalar 817.7

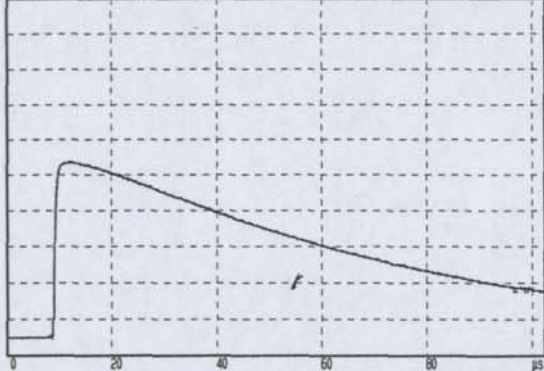
No. 16 Kl: U: LT UC= 126 kV Ti= 1.24 µs T2= 53.5 µs

No. 16  
Device: T205-B  
K1 500.120V  
K1 Pre-scalar 817.7

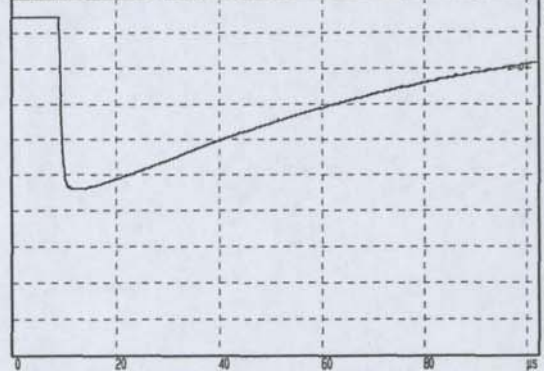
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Test Report No.: 16193

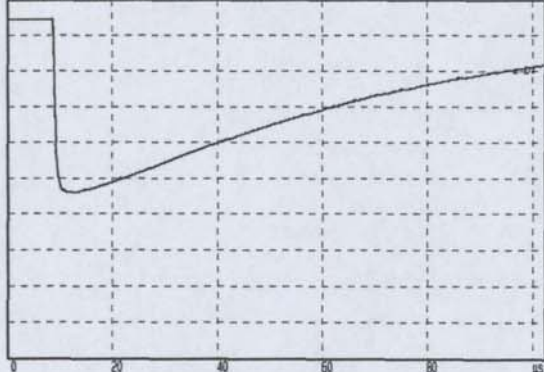
No. 17 Kt: U: LT Up: -125 kV Ti: 1.15 µs Tz: 54.0 µs

No. 17  
device: T205-B  
K1 200.100V  
K1 pre-scaler 817.7

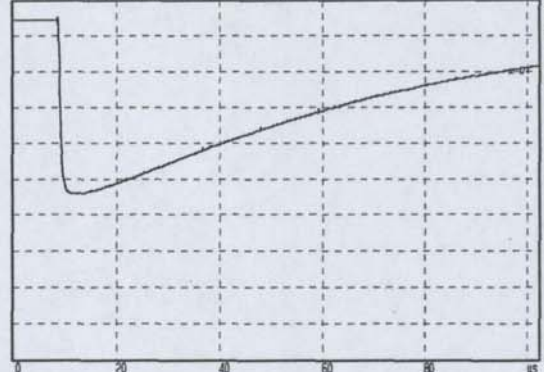
No. 18 Kt: U: LT Up: -125 kV Ti: 1.21 µs Tz: 54.0 µs

No. 18  
device: T205-B  
K1 200.100V  
K1 pre-scaler 817.7

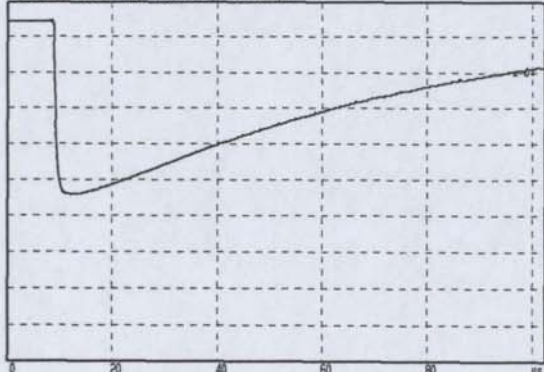
No. 19 Kt: U: LT Up: -125 kV Ti: 1.27 µs Tz: 54.0 µs

No. 19  
device: T205-B  
K1 200.100V  
K1 pre-scaler 817.7

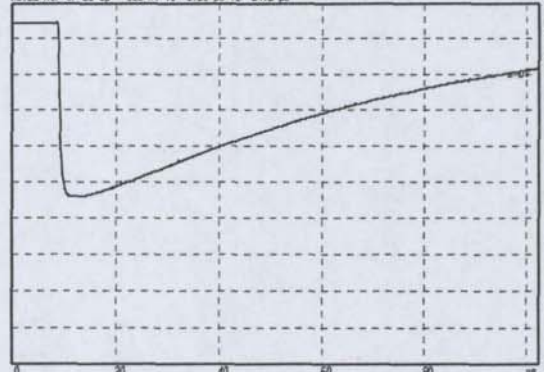
No. 20 Kt: U: LT Up: -125 kV Ti: 1.24 µs Tz: 53.7 µs

No. 20  
device: T205-B  
K1 200.100V  
K1 pre-scaler 817.7

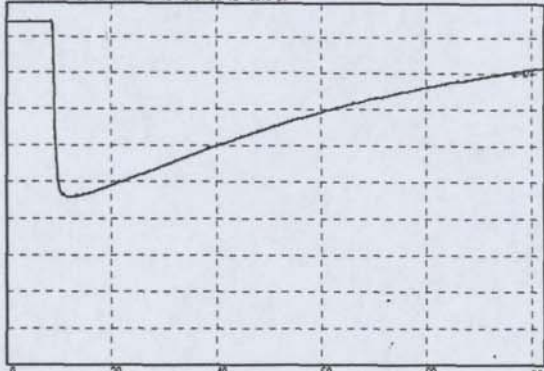
No. 21 Kt: U: LT Up: -125 kV Ti: 1.23 µs Tz: 54.2 µs

No. 21  
device: T205-B  
K1 200.100V  
K1 pre-scaler 817.7

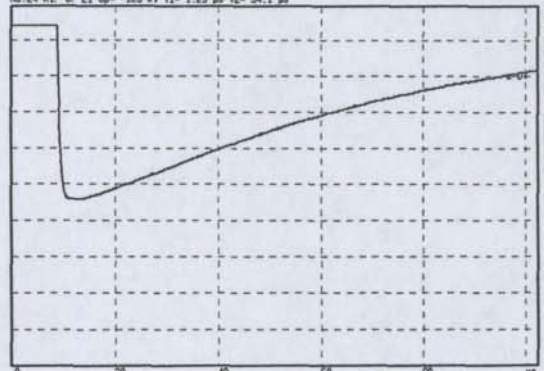
No. 22 Kt: U: LT Up: -125 kV Ti: 1.21 µs Tz: 54.2 µs

No. 22  
device: T205-B  
K1 200.100V  
K1 pre-scaler 817.7

No. 23 Kt: U: LT Up: -125 kV Ti: 1.24 µs Tz: 53.8 µs

No. 23  
device: T205-B  
K1 200.100V  
K1 pre-scaler 817.7

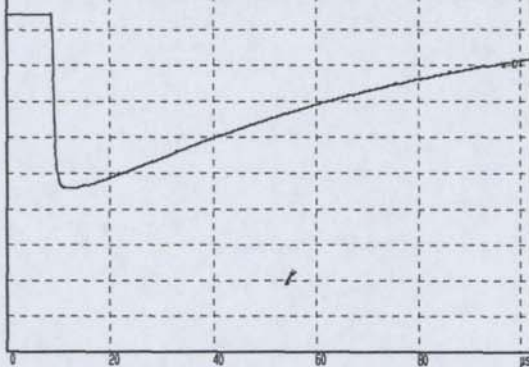
No. 24 Kt: U: LT Up: -125 kV Ti: 1.23 µs Tz: 54.1 µs

No. 24  
device: T205-B  
K1 200.100V  
K1 pre-scaler 817.7

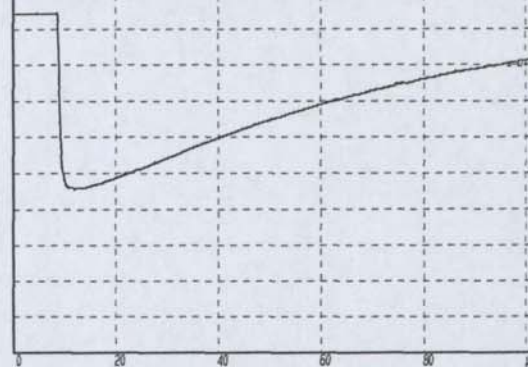
## Impulse Voltage Test No. CTS 25

Test Report No.: 16193

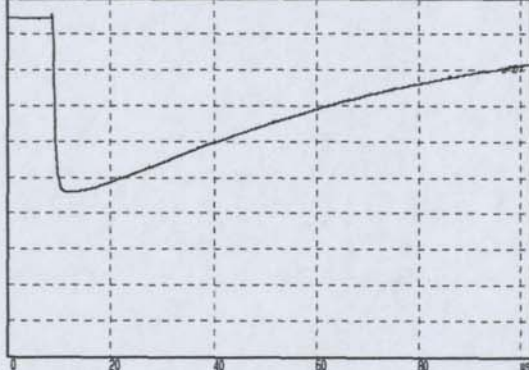
No. 25 KI: U: LI Up= -125 kV T1= 1.20 µs T2= 54.1 µs

No. 25  
device: T205-B  
KI: 200.125V  
KI: SPE=SCALE 817.7

No. 26 KI: U: LI Up= -125 kV T1= 1.20 µs T2= 53.7 µs

No. 26  
device: T205-B  
KI: 200.125V  
KI: SPE=SCALE 817.7

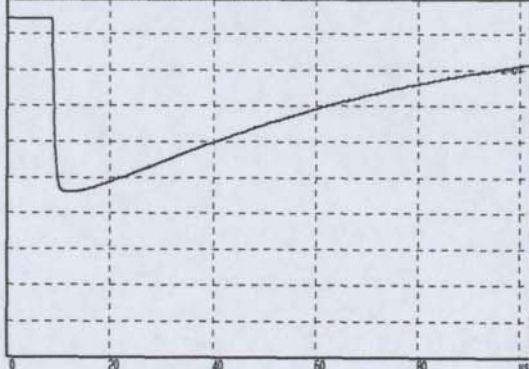
No. 27 KI: U: LI Up= -125 kV T1= 1.20 µs T2= 54.2 µs

No. 27  
device: T205-B  
KI: 200.125V  
KI: SPE=SCALE 817.7

No. 28 KI: U: LI Up= -125 kV T1= 1.20 µs T2= 54.1 µs

No. 28  
device: T205-B  
KI: 200.125V  
KI: SPE=SCALE 817.7

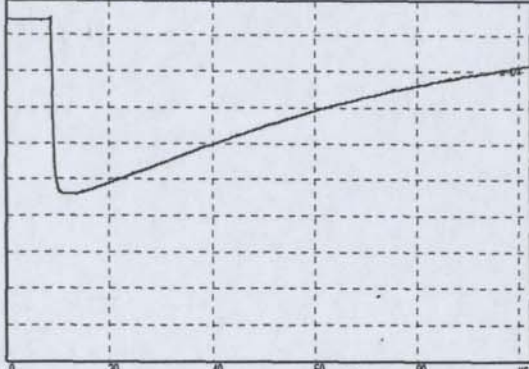
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No. 29  
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KI: 200.125V  
KI: SPE=SCALE 817.7

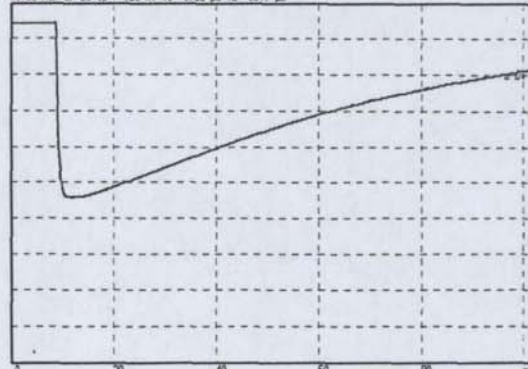
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No. 30  
device: T205-B  
KI: 200.125V  
KI: SPE=SCALE 817.7

No. 31 KI: U: LI Up= -125 kV T1= 1.19 µs T2= 54.0 µs

No. 31  
device: T205-B  
KI: 200.125V  
KI: SPE=SCALE 817.7

No. 32 KI: U: LI Up= -125 kV T1= 1.20 µs T2= 53.7 µs

No. 32  
device: T205-B  
KI: 200.125V  
KI: SPE=SCALE 817.7