DIRECTION
DES ÉTUDES ET RECHERCHES
LES LABORATOIRES DE GÉNIE ÉLECTRIQUE
LES RENARDIÈRES

EDF
Electricité de France

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PORTÉE
COMMUNIQUÉE
SUR DEMANDE
ESSAIS

TEST REPORT HM22/ 21-810/2

Equipment : Capacitor Voltage Transformer CCV 525

Désignation : rated primary voltage 500 / √3 kV
rated frequency 50 Hz

Manufacturer : ALSTOM T & D Balteau

Purpose of the tests : TYPE TESTS

Applicant for the tests : ALSTOM

Date(s) and place of the tests : From 2nd to 13th November 1998, 420 kV testing area.
Les Renardières - LGE
High Voltage Testing Station.

The tests were carried out according to : IEC 186 (2nd edition, 1987), Amendment 2 (1995-09), IEC 358 (2nd edition, 1990-05).

The performance of the equipment tested and the results obtained are recorded in the enclosed tables of results, oscillograms and photographs.

The report comprises the following documents:

Characteristics of the equipment	page : 3	List of tests performed	page : 4
Test conditions	pages : 5 to 14	Tables of test results	pages : 5 to 14
Photograph	page : 15	Oscillograms in appendix	: n°1 to n°33

The report includes 15 pages & 1 appendix

Reproduction of this test report is authorized only in the form of a complete photographic facsimile with the written authorization of laboratory and the applicant.

Executive responsible for the tests

S. SURIER

Laboratory Manager
High Voltage Testing Station

Philippe MONPERT

Les Renardières, the 30 / 11 / 98

Indice E RAP.dot 020197

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REFERENCE DOCUMENTS

Identification file of apparatus

Drawing n° 8162909 dated on 25/09/97
Adress plate n° XS8001 dated on 11/03/98

Standard documents

Standard IEC 186 (2nd edition, 1987), Amendment 2 (1995-09),
Standard IEC 358 (2nd edition, 1990-05)

Test request

Test proposition from EDF LGE reference M22/JDF/16/06/98 15:21, dated on 16/06/98
Test acceptance from ALSTOM reference AD/sg. 98 9570 dated on 08/04/98

Test program

Dated on 16/10/98, reference : HM 22 / 21- 810 / 1

EXTERNAL CONTACTS WITH THE LABORATORY

Responsible for co-ordination of tests for the applicant :	M.JOUNAY (ALSTOM T&D)
Present for the tests :	
- Applicant's representatives :	M.JOUNAY, M. SALFATI (ALSTOM T&D)
- Other person present :	M. PONCE DE LEON (UTE)

LABORATORY STAFFS

Tests responsible :	S. SURIER
Technicians for tests :	JR BOUSQUET

Name and adress of engineer responsible for co-ordination of tests :

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DIFFUSION

Original : Chef Adjoint du LGE puis Responsable d'Essais
(1) Chef de Service Adjoint puis archives LGE
(2) Demandeur : M JOUNAY (ALSTOM)
(1) Chargé d'Affaires

1. APPARATUS CHARACTERISTICS according to XS8001-02 and -201 document

- Name : Capacitor Voltage Transformer
- Type : CCV 525
- Serial number : 98-XS800102/017
- Rated frequency : 50 Hz
- Highest voltage : Um = 525 kV
- Rated primary voltage : 500 / √3 kV
- Rated secondary voltage: 200 / √3 V (1a1-1n et 2a1-2n)
  100 / √3 V (1a2-1n et 2a2-2n)

- Power and accuracy class : 100 VA - Cl. 0.5
- Rated capacitance : 5100 pF (-5 %, + 10%)
- Rated voltage factor : 1.5 Un - 30 s
- Temperature-rise burden: 1000 VA
- Insulation level : 525 / 620 / 1800 / 1175 kV
- Manufacturer : ALSTOM T&D

2. APPARATUS IDENTIFICATION

- A visual identification was made according to n° 8162909 drawing. (see reference document).
- Informations noticed on descriptive plate of the apparatus under test are the same as those mentioned above.

CHRONOLOGICAL LIST OF TESTS PERFORMED

REFERENCES	TYPE OF TESTS	DATE AND PLACE OF TESTS (1)	PAGE n°	OBSERVATIONS
IEC 358 § 7	Capacitance measurement at power frequency	HVTS 420 kV testing area 2/11/98	5	Without electromagnetic unit
NEMA Publication 107 - 01/94 edition	Radio influence voltage (RIV)	HVTS 420 kV testing area 2/11/98	6, 7	With
IEC 186 Amend. 2 § 13, 14	Switching impulse test	HVTS 420 kV testing area 3 & 4/11/98	8, 9	With
IEC 186 Amend. 2 § 13 and 18	Lightning & chopped impulses test	HVTS 420 kV testing area 5/11/98	10, 11	With
IEC 358 § 7	Capacitance measurement at power frequency	HVTS 420 kV testing area 6/11/98	5	Without electromagnetic unit
IEC 358 § 11	Discharge test	HVTS 420 kV testing area 6/11/98	12	Without electromagnetic unit
IEC 358 § 7	Capacitance measurement at power frequency	HVTS 420 kV testing area 6/11/98	5	Without electromagnetic unit
IEC 186 Amendment 2 § 16 & IEC 186 Amendment 2 § 16.4 A procedure , table 3D	Power frequency withstand test of voltage capacitor divider & partial discharge measurement	HVTS 420 kV testing area 13/11/98	13, 14	Without electromagnetic unit
IEC 358 § 7	Capacitance measurement at power frequency	HVTS 420 kV testing area 13/11/98	5	Without electromagnetic unit

Measurement uncertainties :

For the dielectric tests

The estimated uncertainty at two standard deviations in the pulsed wave peak value measurements is ± 3 %.

The estimated uncertainty at two standard deviations in the r.m.s. voltage measurements at 50 Hz is 2 %.

For the climatic tests

Unless otherwise indicated, the uncertainty in the temperature measurements by the temperature probes is rounded up to ± 2°C.

CAPACITANCE MEASUREMENT AT POWER FREQUENCY
(Standard IEC 358 § 7)

1 - Test conditions

The apparatus under test is installed on a 2 meters high frame. An empty tank is placed instead of the electromagnetic unit tank.

The low voltage terminal (HF) and the tank are earthed together through the Tettex bridge.

These tests are performed at ambient temperature, four times during the whole tests.

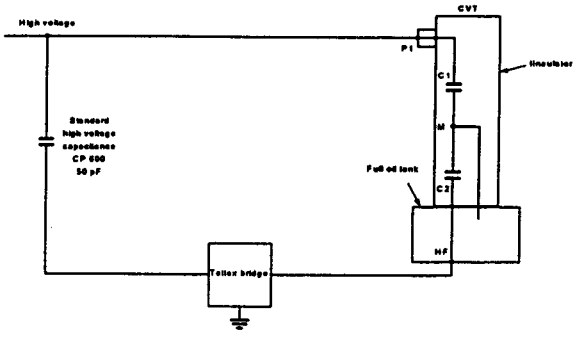
2 - Test procedure

U1n= 500 / √ 3

The capacitance measurement is read at nominal frequency at 28.9 and 288.7 kV.

The capacitance measurement shall not differ from rated capacitance by more than - 5% or +10%.

3 - Test circuit diagram



4 - Results

Conditions	Temperature	Voltage (kV)	C (pF)	Tg δ	Date of test :
Before RIV	T=18.5°C	28.9 288.7	**5182** **5184**	7.29 10^{-4} 6.76 10^{-4}	2/11/98
After lightning & chopped impulses	T=17.8°C	28.9 288.7	**5177** **5179**	7.16 10^{-4} 6.69 10^{-4}	6/11/98
After discharge test	T=18.4°C	28.9 288.7	**5175** **5177**	7.11 10^{-4} 6.65 10^{-4}	6/11/98
After partial discharge test	T=17.5°C	28.9 288.7	**5189** **5192**	7.1 10^{-4} 6.86 10^{-4}	13/11/98
Measurement Accuracy	± 0,6°C	± 3%	± 0,5 % of C measured (Tettex bridge)	± 0,5 10^{-4} (Tettex bridge)	

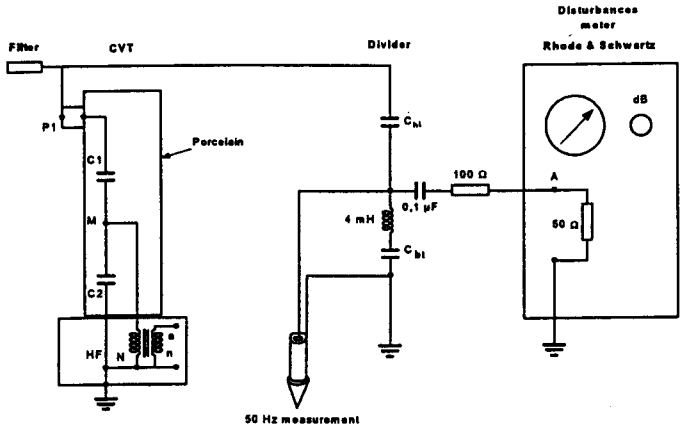
Specification : ***0,95 Cn ≤ C ≤ 1,1 Cn (4845 pF ≤ C ≤ 5610 pF)***
Tg δ ≤ *0.005*

RADIO INFLUENCE VOLTAGE (RIV)
(NEMA Publication 107 - 01/94 edition)

1 - Test conditions

The measurement frequency is **1 MHz**
The Metering instrument used for the radio disturbance is the meter.
RHODE & SCHWARZ n°TC 351010 . (According to ANSI C63.2)

2 - Test circuit diagram



3 - Test procedure

A - Object Disconnected

1 - Test circuit attenuation measurement (see procedure on next page)

Signal applied : 100 mV - 1 MHz
Value 1 = 13.3 mV (82.5 dBµV)
Value 2 = 100 mV (100 dBµV)

P = Value 1 / Value 2 = **0.13**

2 - Ambient noise measurement

The RIV level is measured with the voltage levels 333 kV.

The background RIV level must be less than **250 µV** (50 % of specified value) **at 333kV.**

For 333 kV, RIV = 4 µV

B - Object connected

1 - Test circuit attenuation measurement (see procedure on next page)

Signal applied : 100 mV - 1 MHz
Value 1 = 17.8 mV (85 dBµV)
Value 2 = 100 mV (100 dBµV)

P = Value 1 / Value 2 = **0.18**

2 - Measurements of radioelectric disturbances due to the tested object

See page 7, § **4 - Results**

RADIO INFLUENCE VOLTAGE (RIV)
(NEMA Publication 107 - 01/94 edition)

Test circuit attenuation measurement procedure

An AC voltage of 100 mV r.m.s (It must be at least ten times the ambient level, which is measured by the radio noise meter when tuned to the output of the signal generator), 1MHz, is applied
- between high voltage terminal of the object and earth -> Value 1 (µV)
- and at the meter input. -> Value 2 (µV)

The **Circuit RIV Factor (P)** is deduced by ratio (µV) : P = Value 1 / Value 2

4 - Results

Measurement of radioelectric disturbances due to the tested object

The P factor of the circuit is applied for each measurement .

Radioelectric disturbances level is deduced from the measured values by the following relations :

- Mesured Value (µV) = $10^{(\text{measured value (dB)})/20}$ *(The meter gives 0 dB for 1 µV)*
- **RIV level (µV) = Measured Value (µV) / P**

Test Voltage (kV rms)	333 (5 min.)	91	125	160	195	225	260	300	318	335	370	400	435	335
Measured Value (dBµV)	12	-3	-3	-3	-3	0	10	15	15	25	25	25	33	30
Measured Value (µV)	4,0	0,7	0,7	0,7	0,7	1,0	3,2	5,6	5,6	17,8	17,8	17,8	44,7	31,6
RIV level (µV)	22	4	4	4	4	6	18	31	31	99	99	99	248	176

The RIV level due to the Object must be **less than 500 µV** at the voltage level **333 kV rms.**

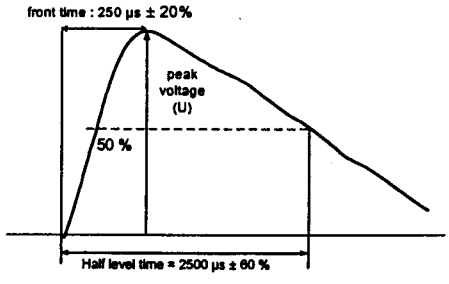
SWITCHING IMPULSE TEST
(Standard IEC 186 Amendment 2 (1995-09) § 13, 14)

1. Test conditions

The apparatus under tests is installed on a 2 meters high frame and tested with its electromagnetic unit tank. N, n terminals and tank are earthed separately of HF terminal.

The impulses are applied between P1 terminal and the earth.
Test voltage : **1175 kV ± 3%**

Tolerance on the waveform (according to IEC 60-1, 2nd édition Nov. 1989 :



2 . Test procedure

2.1 Dry test in positive polarity with application of atmospheric conditions (see appendix, oscillograms n° 1 to 5).

2.1.1 One 50% positive impulse.

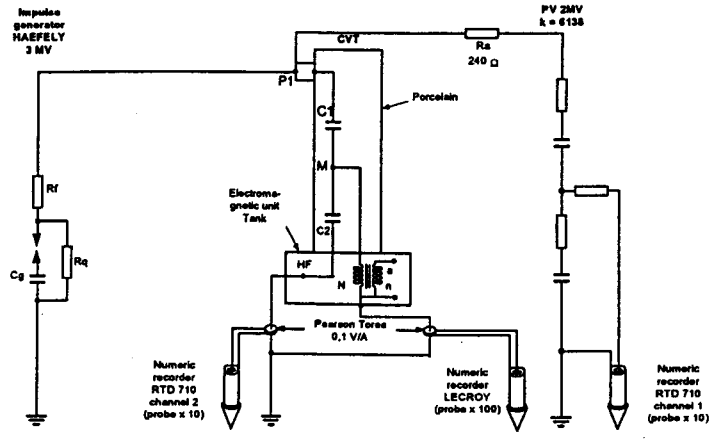
2.1.2 Fifteen 100% positive impulses.

2.2 Wet test in positive (see appendix, oscillograms n° 6 to 10) and **negative*** (see appendix, oscillograms n° 11 to 15) polarities

2.1 Recording of precipitation conditions (see page 7) and application of procedure 2.1.1 & 2.1.2

(Negative test have been asked from customer)*

3 . Test circuit diagram



4. Results

No disruptive discharge was detected during this test .

SWITCHING IMPULSE TEST
(Standard IEC 186 Amendment 2 (1995-09) § 13, 14)

The tests were performed according to IEC publication 60.1, 9.1 article.

Measurements consisted of vertical movements (max. length : 1m) of the apparatus under test.

Ambient temperature : 19°C

Precipitation conditions :

PARAMETERS NOTE	MEASURED VALUES				SPECIFIED VALUES
Average precipitation rate (mm/mn)	Low	Middle Low	Middle Top	Top	
- Horizontal components	1.1	1.1	1.2	1.2	1,0 to 2,0
- Verticale components	1.7	1.4	1.9	1.8	1,0 to 2,0
Limit values (mm/mn) for any individual measurement					
- Horizontal component	1.15				± 0,5 from average
- Verticale component	1.7				± 0,5 from average
Temperature of water (°C)	18				Ambient temperature ± 15
Resistivity of water at 20°C	108 (µS/cm)				100 ± 15 (Ω.m) or $^{+18}_{-13}$ 100 (µS/cm)

LIGHTNING & CHOPPED IMPULSES TEST
(Standard IEC 186 Amendment 2 (1995-09) § 13 and 18)

1. Test conditions

This is a combination of tests between full lightning impulses test and chopped impulses test .

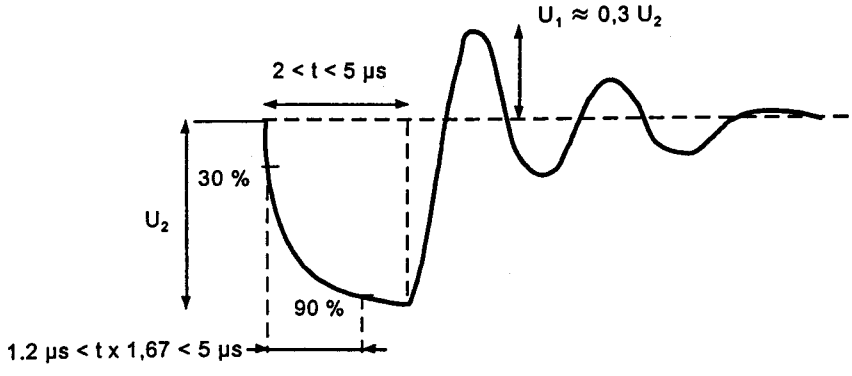
The apparatus under tests is installed on a 2 meters high frame and tested with its electromagnetic unit tank. N, n terminals and tank are earthed separately of HF terminal.

The impulses are applied between P1 terminal and the earth.
Test voltage : **1800 kV ± 3%**

- Tolerance on the full waveform (according to IEC 186, 2nd édition (1987) § 50 & Amend.2 (1995-09) §13) :

1.2 - 5 µs / 40 - 60 µs

Tolerance on the chopped waveform (according to IEC 186, amendment 2 (1995 - 09) § 18) :



Nota : U_1 value must be < at 30% of U_2 value, this level adjustment can be obtained with adding of resistor (< 10 Ω) between the apparatus under test and triggered sphere gap.

2 - Test procedure

negative polarity:

1°/ One 60 % full impulse (see appendix, oscillograms n° 16, 17)

2°/ One 100 % full impulse (see appendix, oscillograms n° 18, 19)

3°/ Two 100% chopped impulses (see appendix, oscillograms n° 20, 21)

4°/ Two 100% full impulses (see appendix, oscillograms n° 22 to 25)

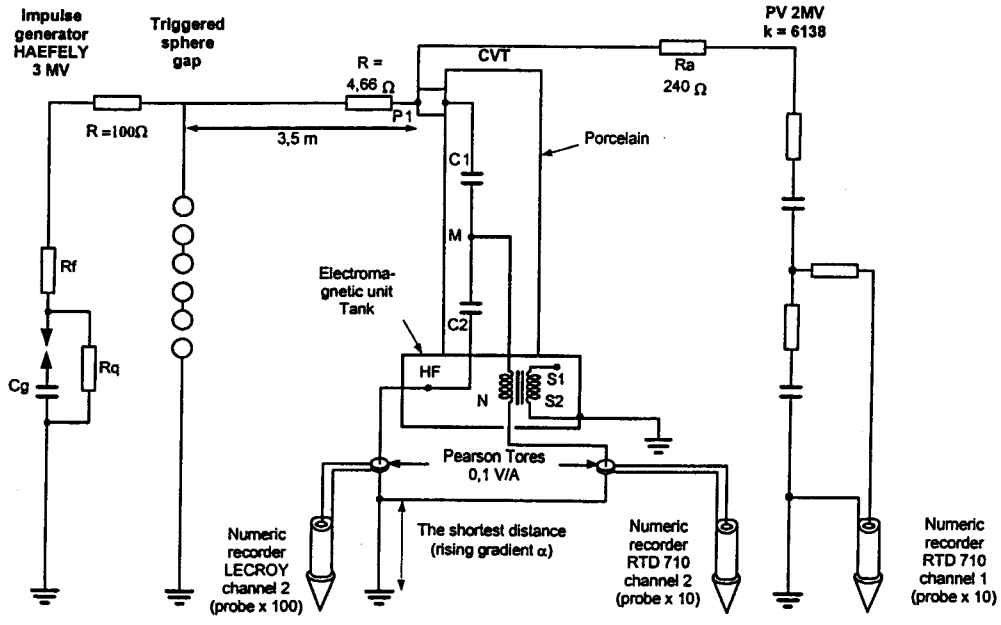
Positive polarity:

1°/ three 100% full impulses (see appendix, oscillograms n° 26 to 31)

In each case, current waveforms are recorded.

LIGHTNING & CHOPPED IMPULSES TEST
(Standard IEC 186 Amendment 2 (1995-09) § 13 and 18)

3 - Test circuit diagram



4 - Results

For every kind of applied impulses, no appreciable change of measured currents and voltages appears between first and last recording.

DISCHARGE TEST
(Standard IEC 358 § 11)

1. Test conditions

The apparatus under test is installed on a 2 meters high frame. An empty tank is placed instead of the electromagnetic unit tank.

The HF terminal is earthed.

A negative lightning impulse is applied between the line and earth terminals of the apparatus. It shall then be discharged through a rod gap so situated as to obtain a discharge frequency between 0.5 and 1 MHz.

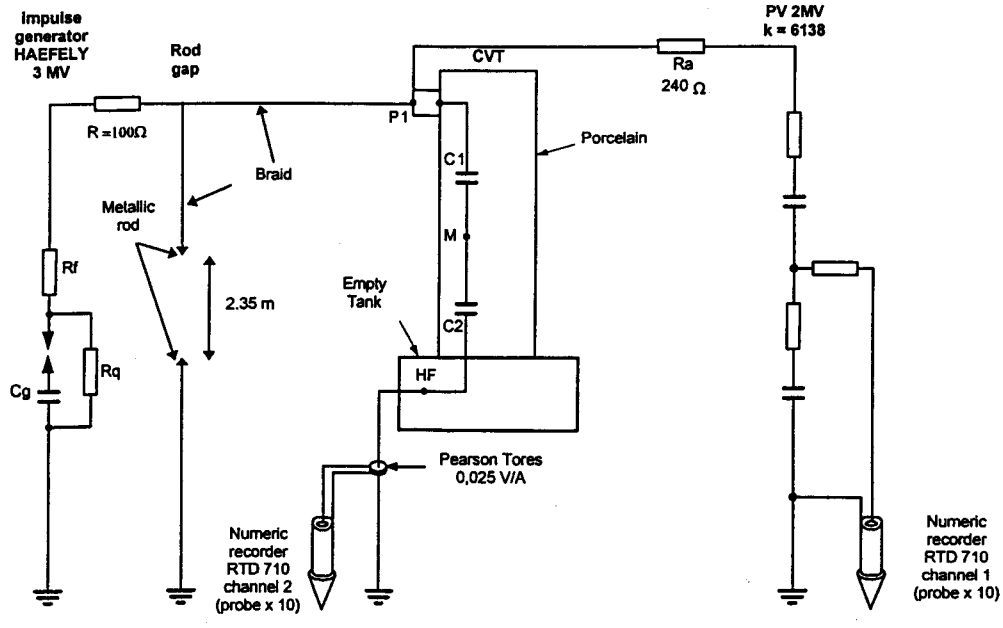
- Tolerance on the waveform (according to IEC 186, 2nd édition (1987) § 50 & Amend.2 (1995-09) §13) :
1.2 - 5 µs / 40 - 60 µs

Test voltage : **1800 kV ± 3%**

2. Test procedure

The test is made twice within 5 minutes.

3 - Test circuit diagram



4 - Results

See appendix, oscillograms n° 32 to 33 and capacitance measurement on page 5

POWER FREQUENCY WITHSTAND TEST OF VOLTAGE CAPACITOR DIVIDER (Standard IEC 186 Amendment 2 § 16))

1 - Test conditions.

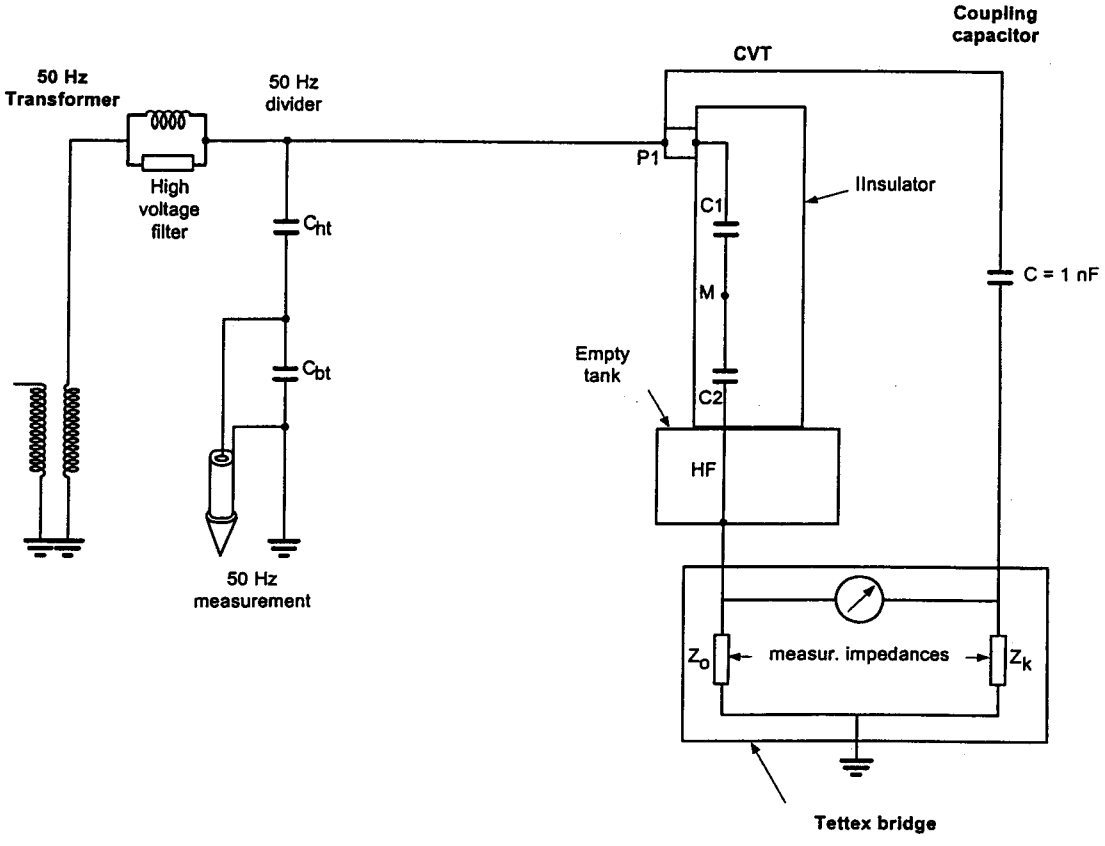
This test is combined with partial discharge measurement discribed on page 14.

The apparatus under tests is installed on a 2 meters high frame. An empty tank is placed instead the electromagnetic unit tank.

2 - Test procedure

A **50 Hz** test voltage of **680 kV** is applied during **1 minute** between P1 terminal and the earth. The low voltage terminal (HF) and the tank are earthed together through the partial discharge Tettex bridge.

3 - Test circuit diagram



4 - Results

No disruptive discharge was detected during this test .

PARTIAL DISCHARGE MEASUREMENT
(Standard IEC 186 Amendment 2 § 16.4 procedure A, table 3D)

1 - Test conditions

This test has been carried out after power frequency withstand test of voltage capacitor divider(see page 13).

The measurement carries out a bridge method, using a wide band amplifier.

2 - Test circuit diagram

(see page 13)

3 - Test procedure

3-1 Balancing of the bridge

A calibration signal of 1000 pC is applied between the earth and the high voltage terminal. Bridge elements are adjusted so as to get a maximum rejection level of this common mode signal.

The corresponding rejection level is measured by short-circuiting successively measure impedances of each bridge branch.

- Short-circuited object branch: τ = 100/200
- Short-circuited CK branch: τ =100/200

3-2 Calibration of the system

A calibration signal of 10 pC with a 100 Hz repeating frequency, is applied to the apparatus under test terminals.

Measurer gain is adjusted so as to get a direct reading of DP peak level.

3-3 Background noise measurement

Power transformer connected with voltage at 0 kV level, we read the background noise (see table, column n° 3).

3-4 Partial discharges measurement of the apparatus under test

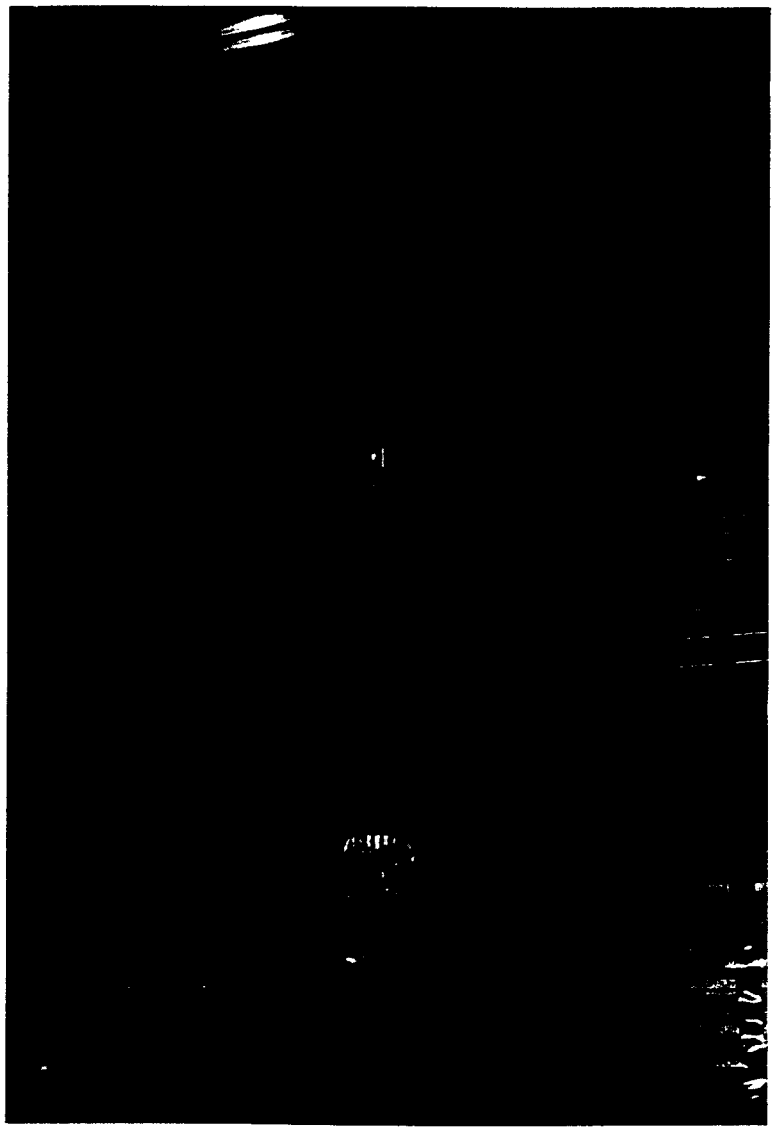
Um = 525 kV

After 50 Hz dielectric test at Ue (680 kV) during 60 s, we respectively measure at following voltage levels (see table, line n° 1) the corresponding partial discharges level.

4 - Results

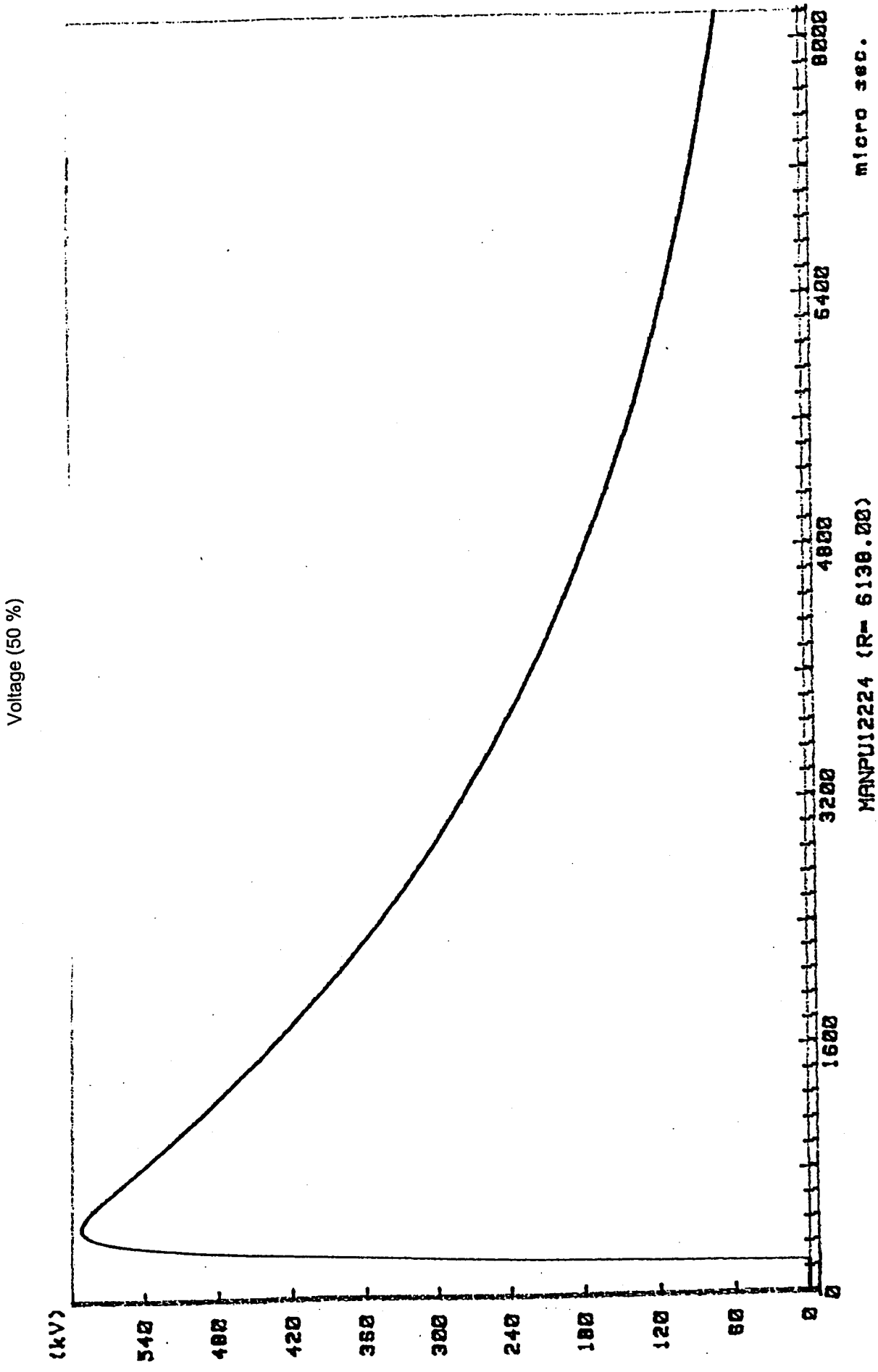
	voltage (kV rms)	0 Um (Background noise)	630	680 (Ue 1 mn)	630 (Ue 1 mn)	367,5 (Ue 1 mn)	346 (Ue 1 mn)
Level applied with calibrator (pC)	discharge level (pC)	**1,8**	**5**	**6**	**4**	**1,8**	**1,8**
10	Incertitudes (+/-pC)	<0.53	0,61	0,61	0,53	<0.53	<0.53
Specification			< 10 pC	not specified	< 10 pC	< 5 pC	< 3 pC

PHOTOGRAPH OF THE APPARATUS UNDER TEST



APPENDIX

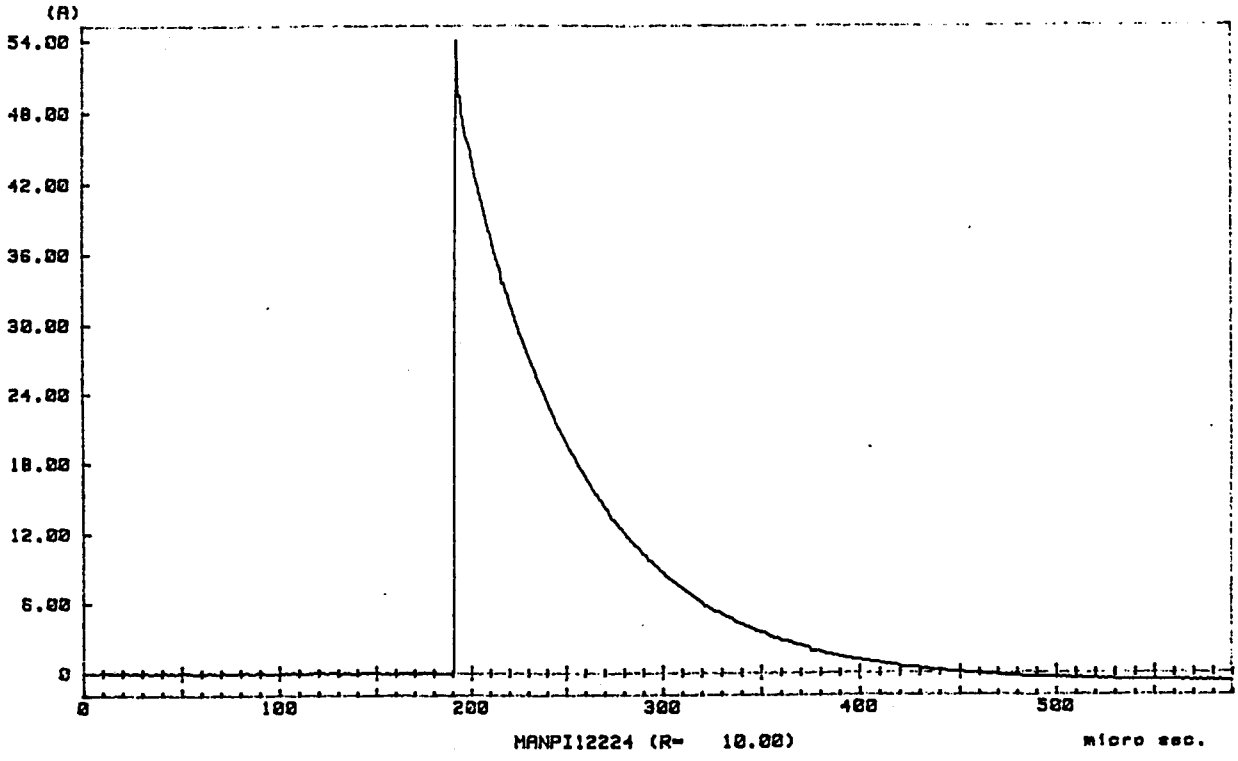
Oscillogram n° 1



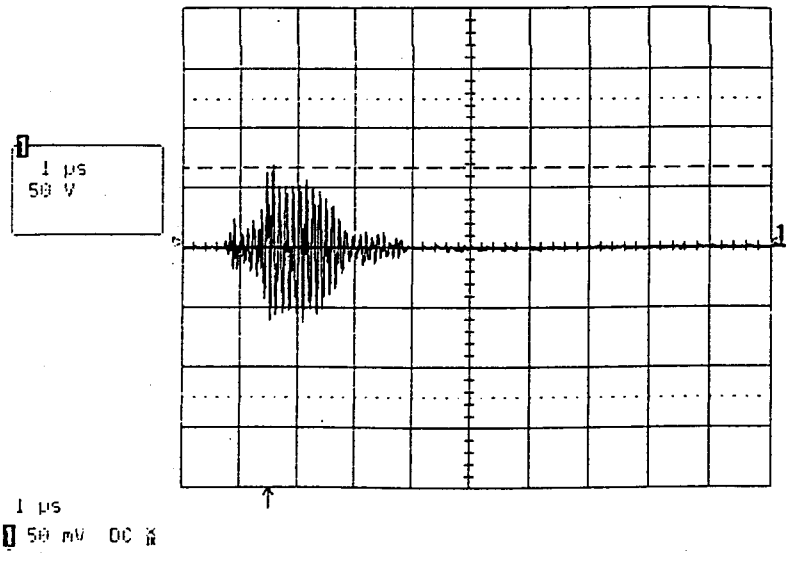
T.c.t (10/2/97)

Oscillogram n° 2

Current waveform in HF terminal (50 %)

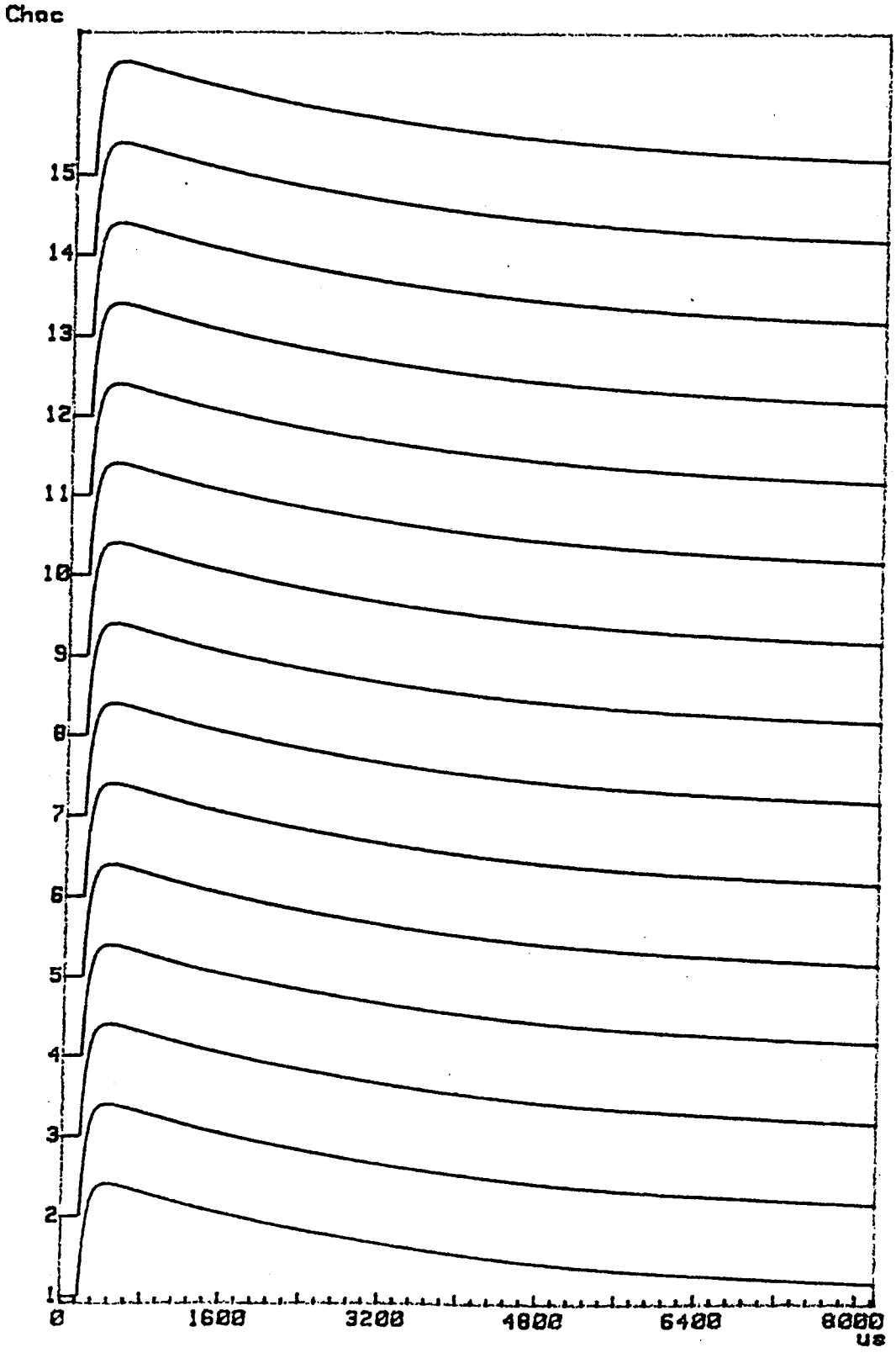


Current waveform in N, n, tank terminals, I = 62 Â (50 %)

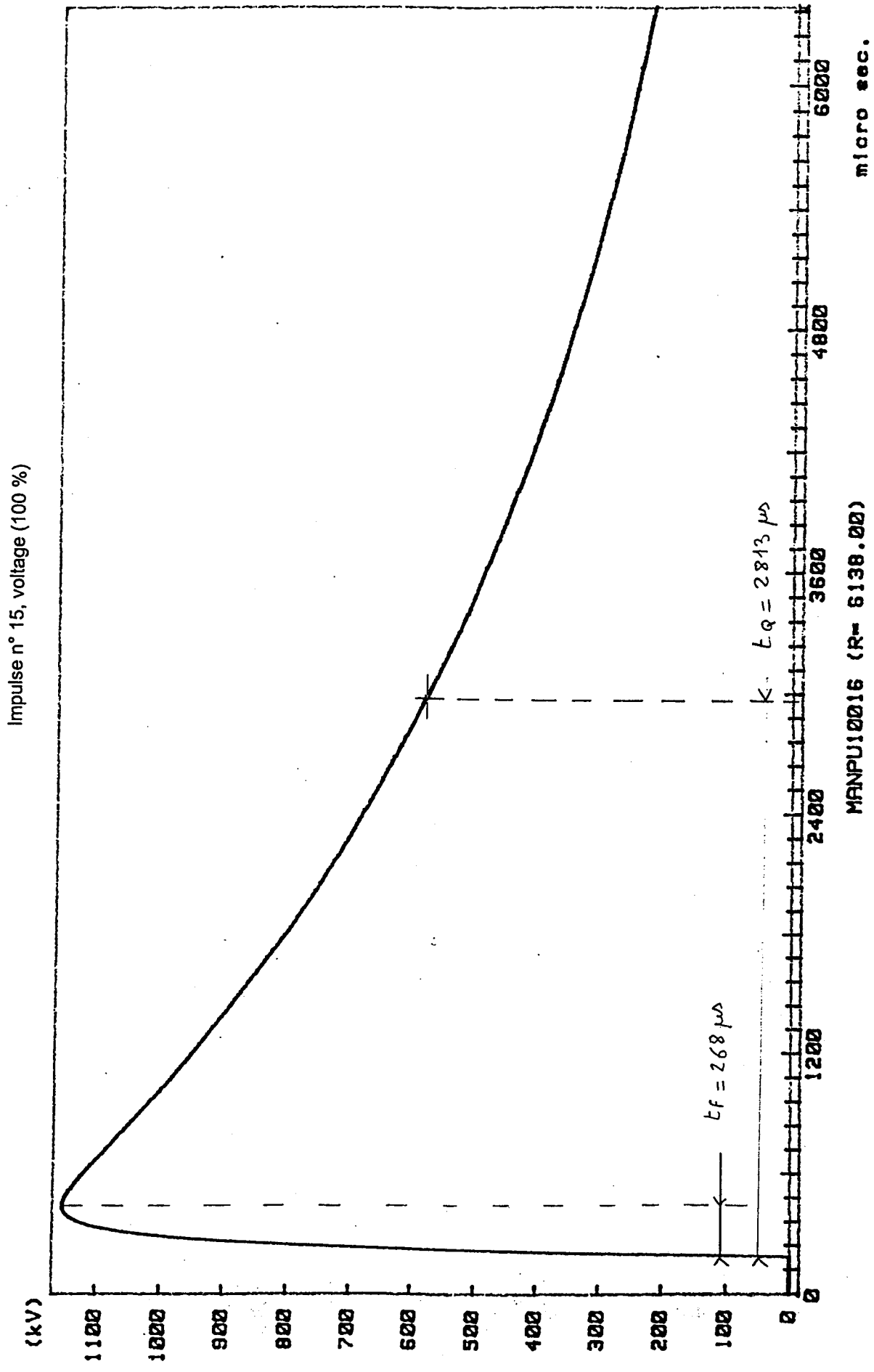


Oscillogram n° 3

100 % 15 positive impulses serie

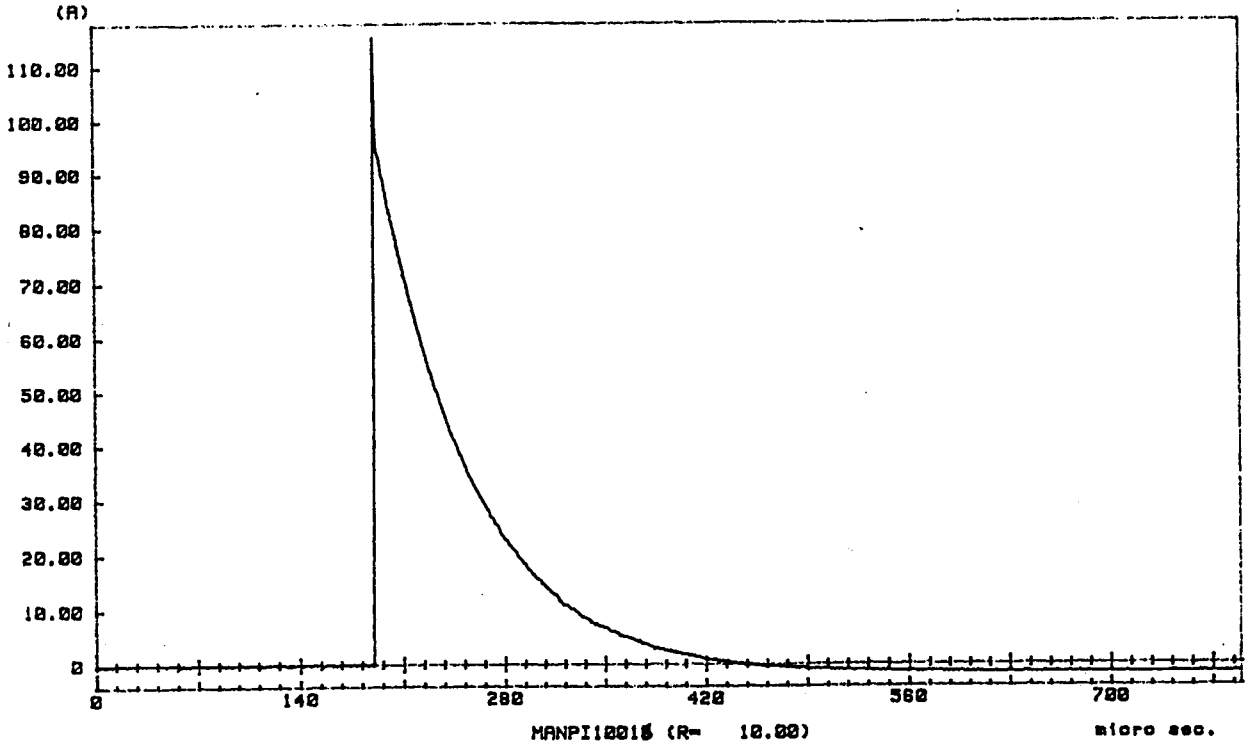


Oscillogram n° 4

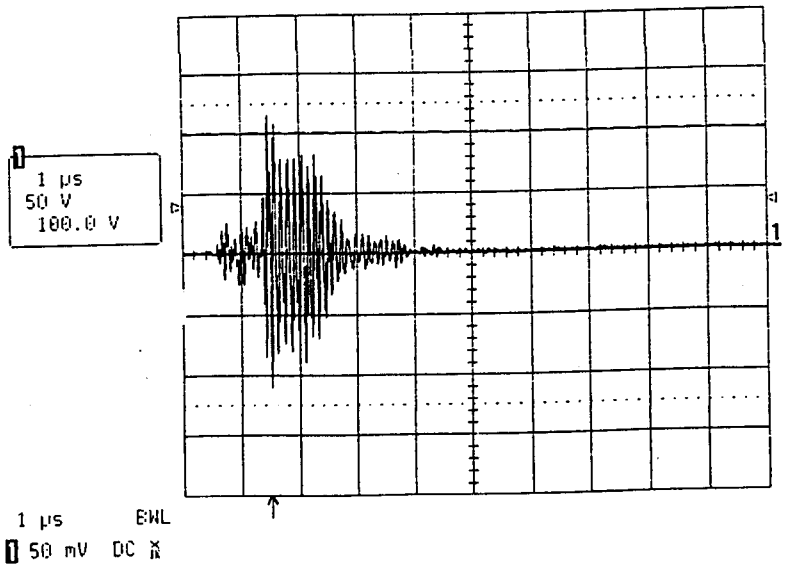


Oscillogram n° 5

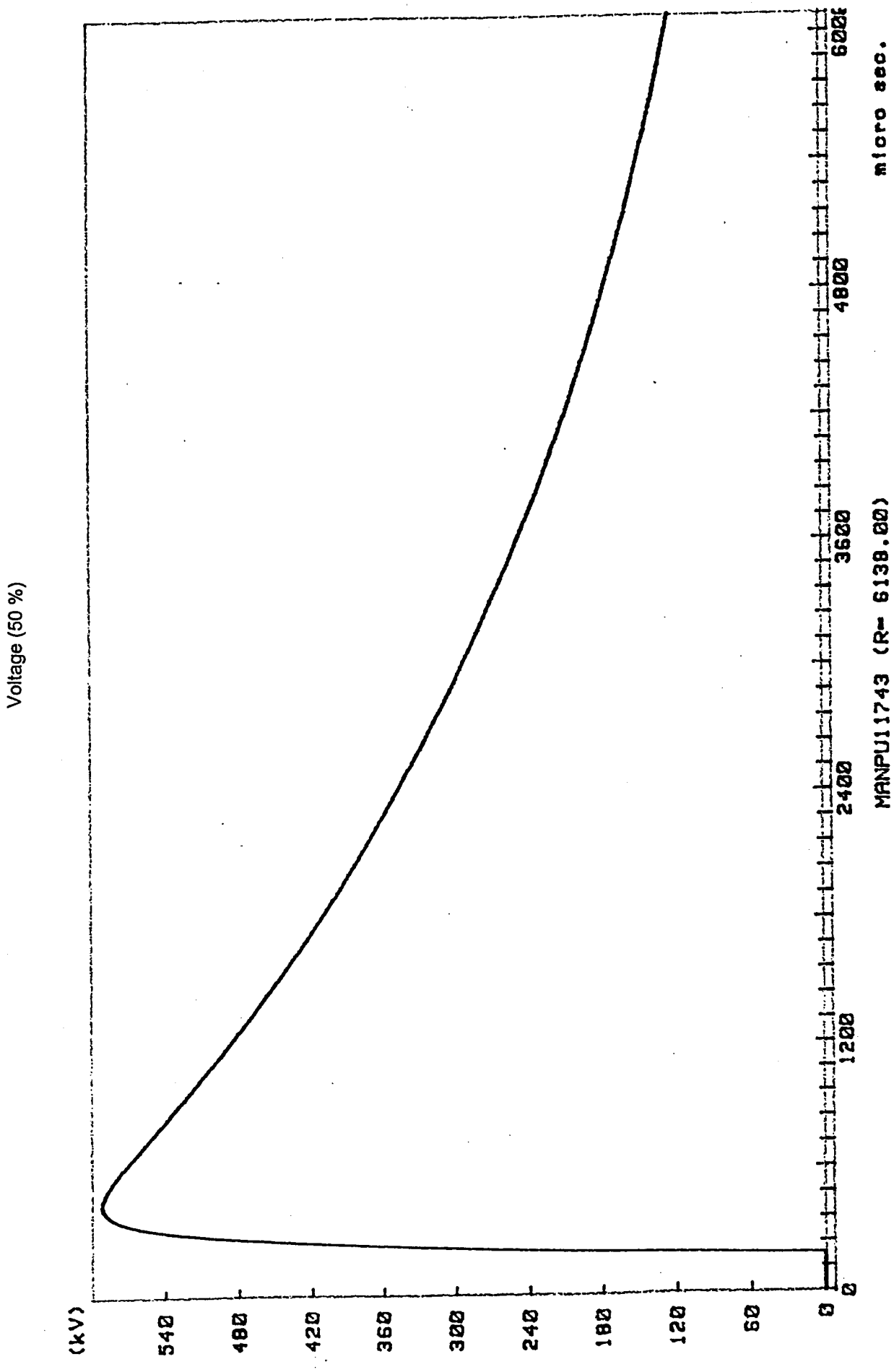
n° 15 current waveform in HF terminal (100 %)



n° 15 current waveform in N, n, tank terminals, I = 100 Â (100 %)



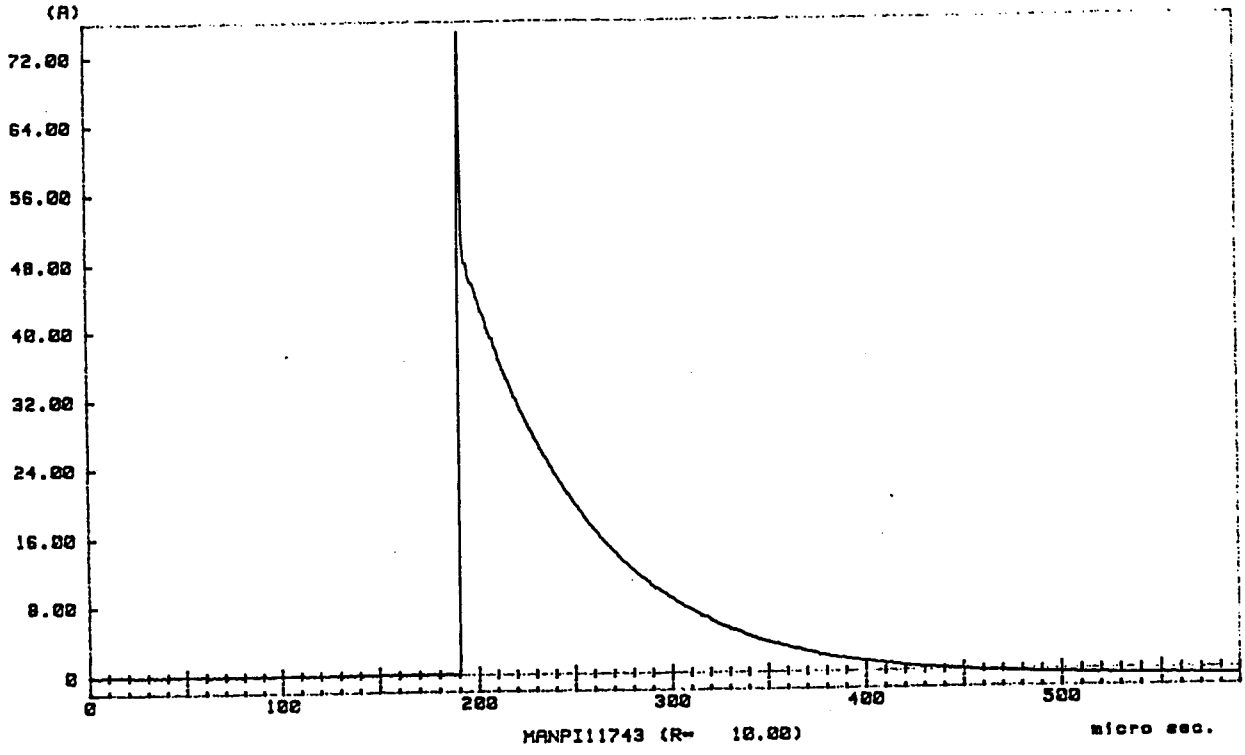
Oscillogram n° 6



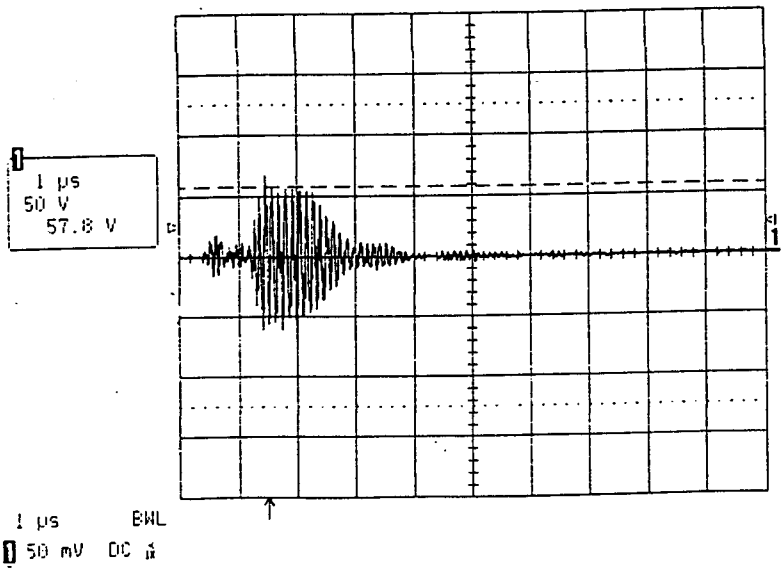
T.c.t (10/2/97)

Oscillogram n° 7

Current waveform in HF terminal (50 %)

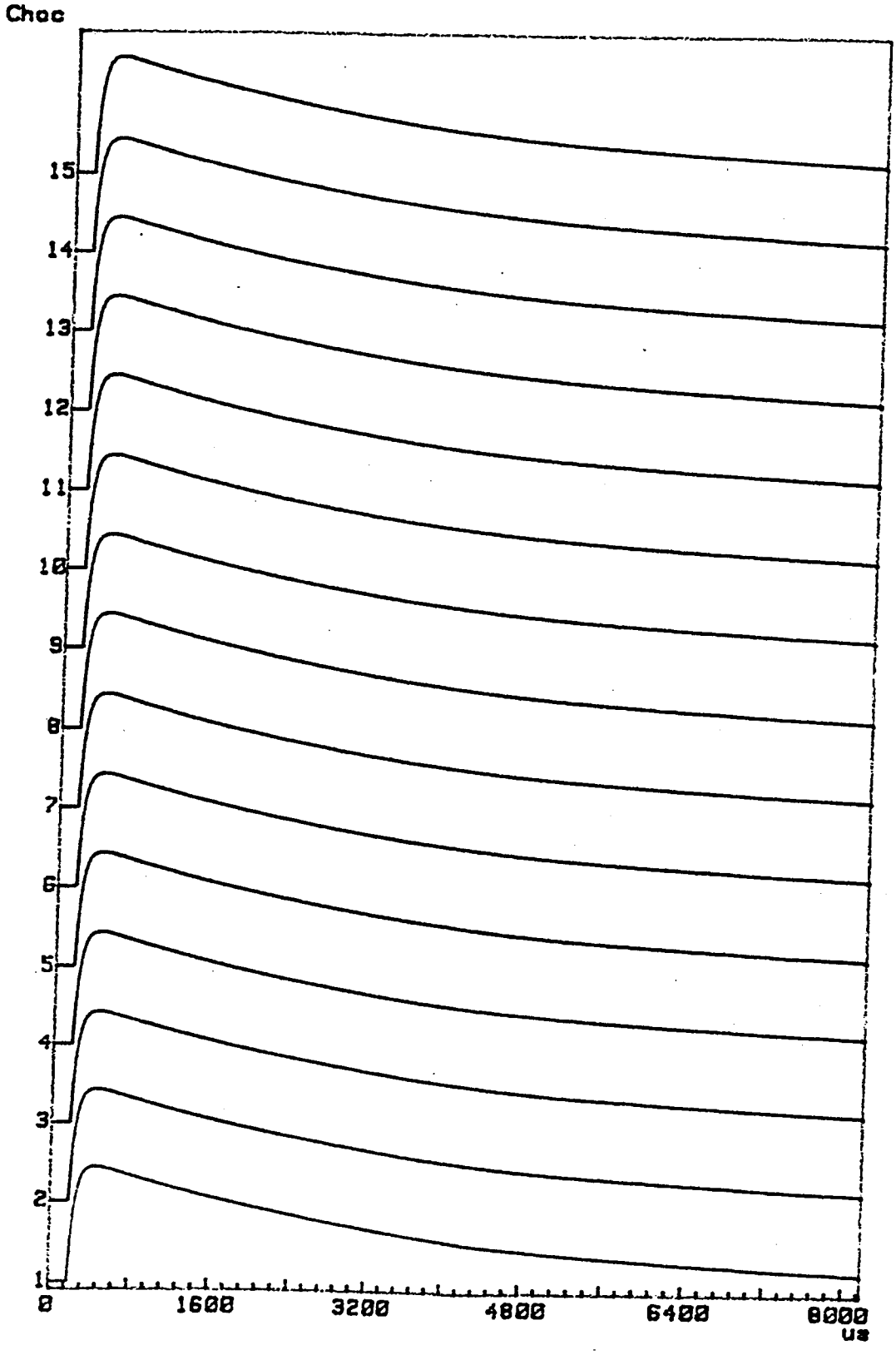


Current waveform in N, n, tank terminals, I = 57.8 Â (50 %)



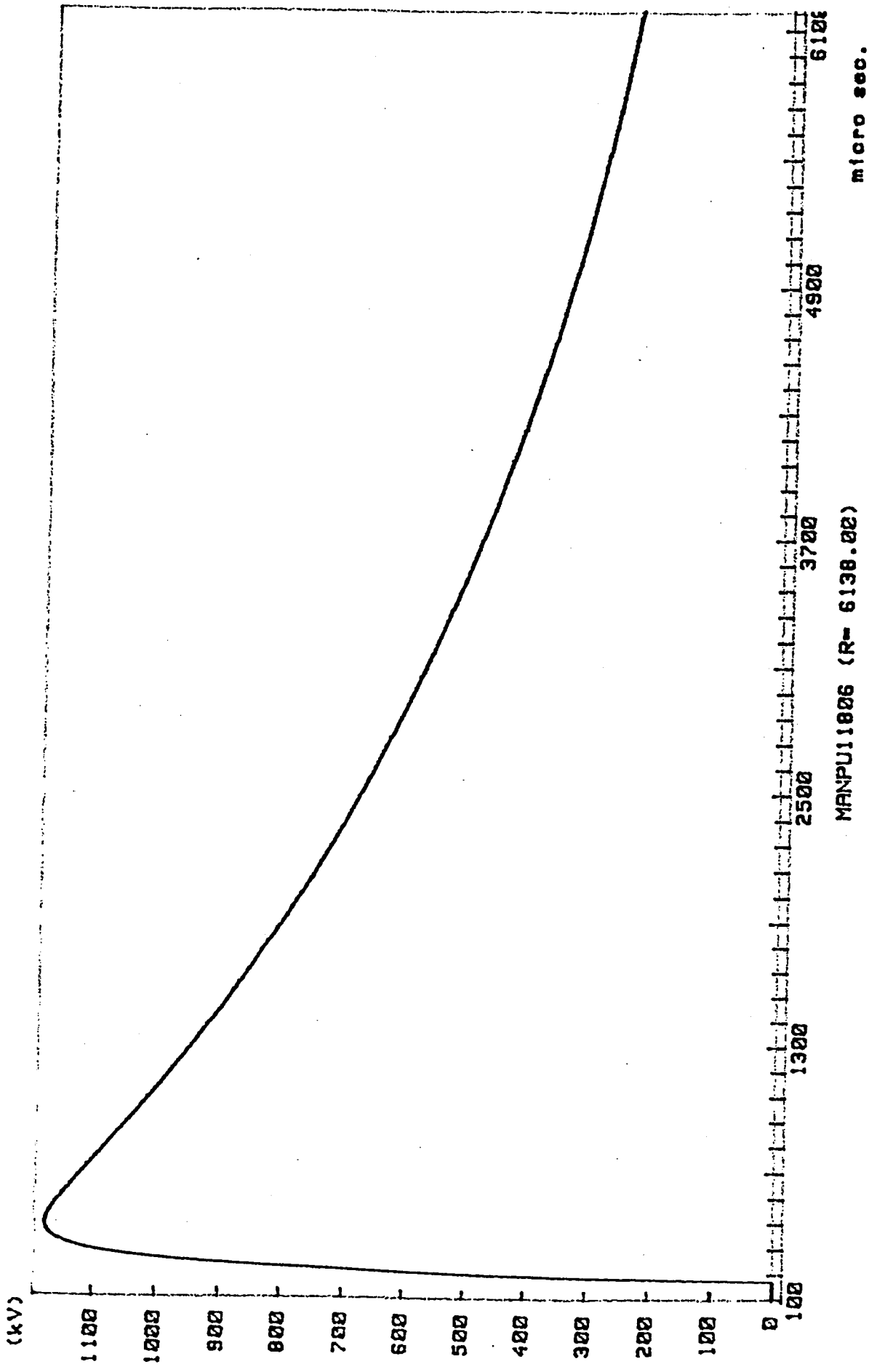
Oscillogram n° 8

100 % 15 positive impulses serie



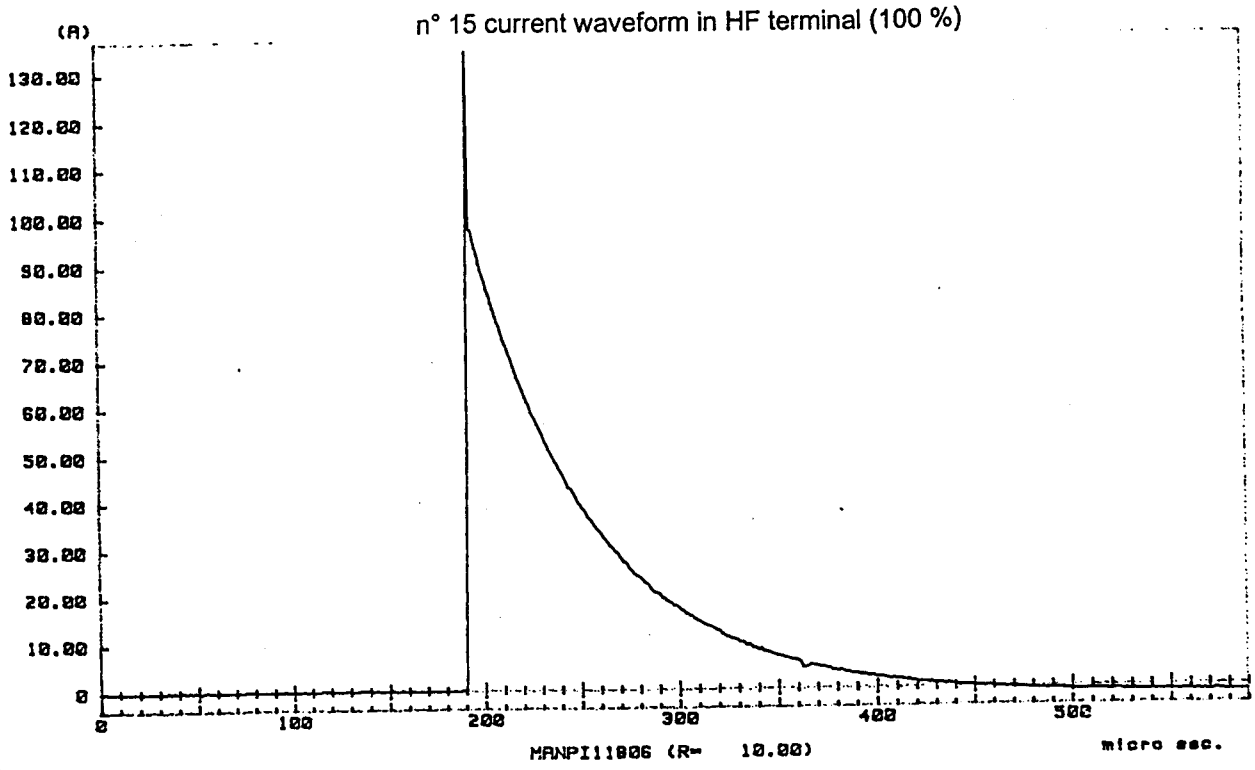
Oscillogram n°9

Impulse n° 15, voltage (100 %)

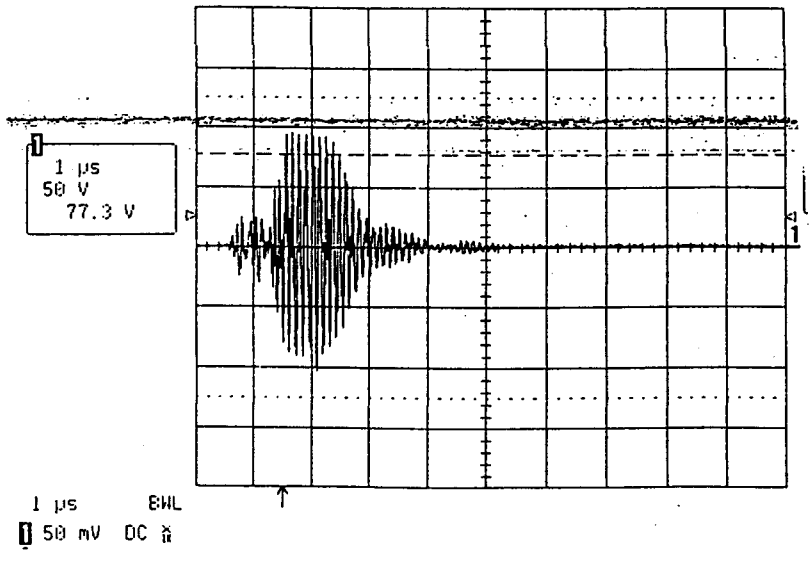


Oscillogram n° 10

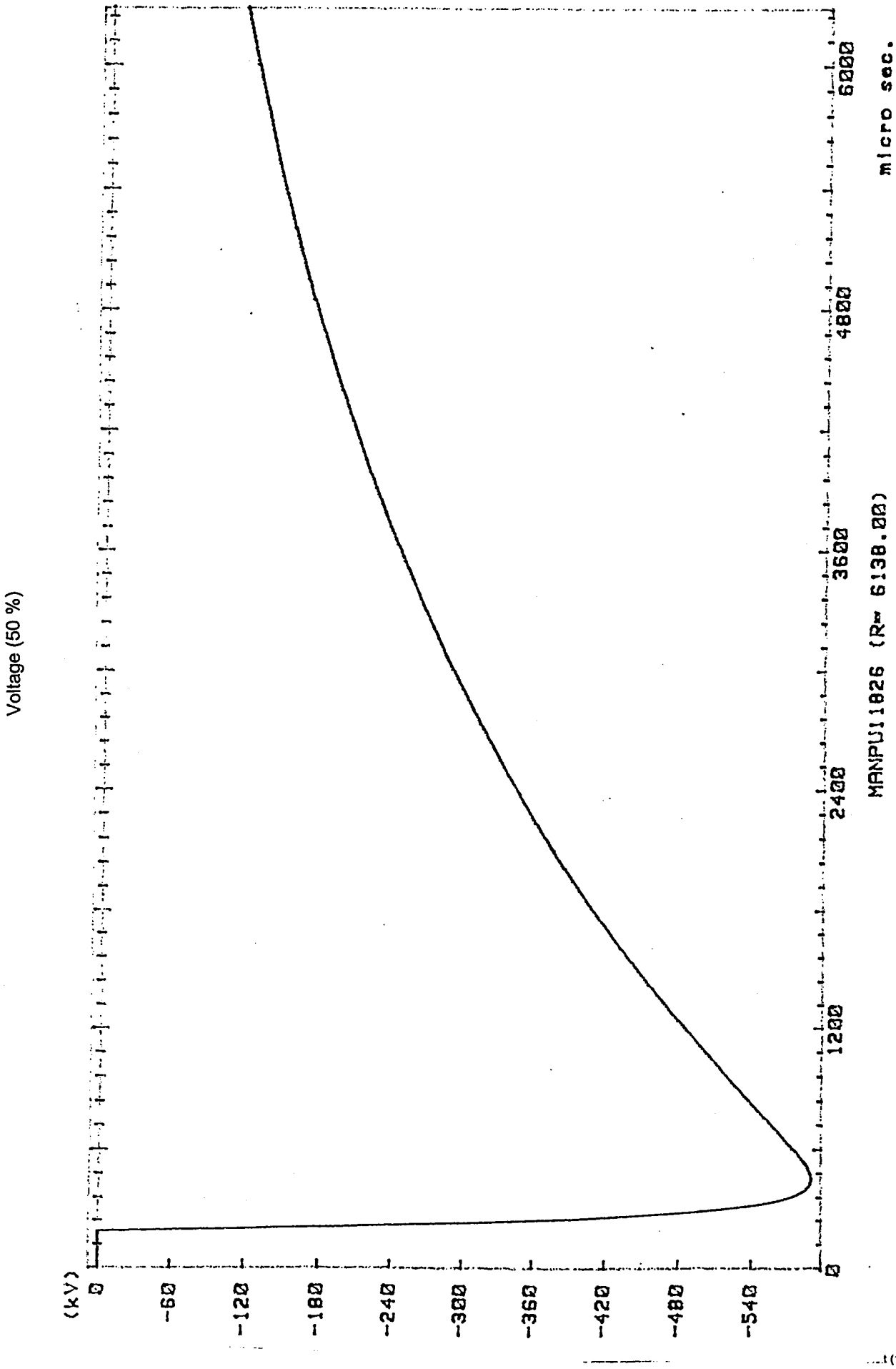
n° 15 current waveform in HF terminal (100 %)



n° 15 current waveform in N, n, tank terminals, I = 77.3 Â (100 %)

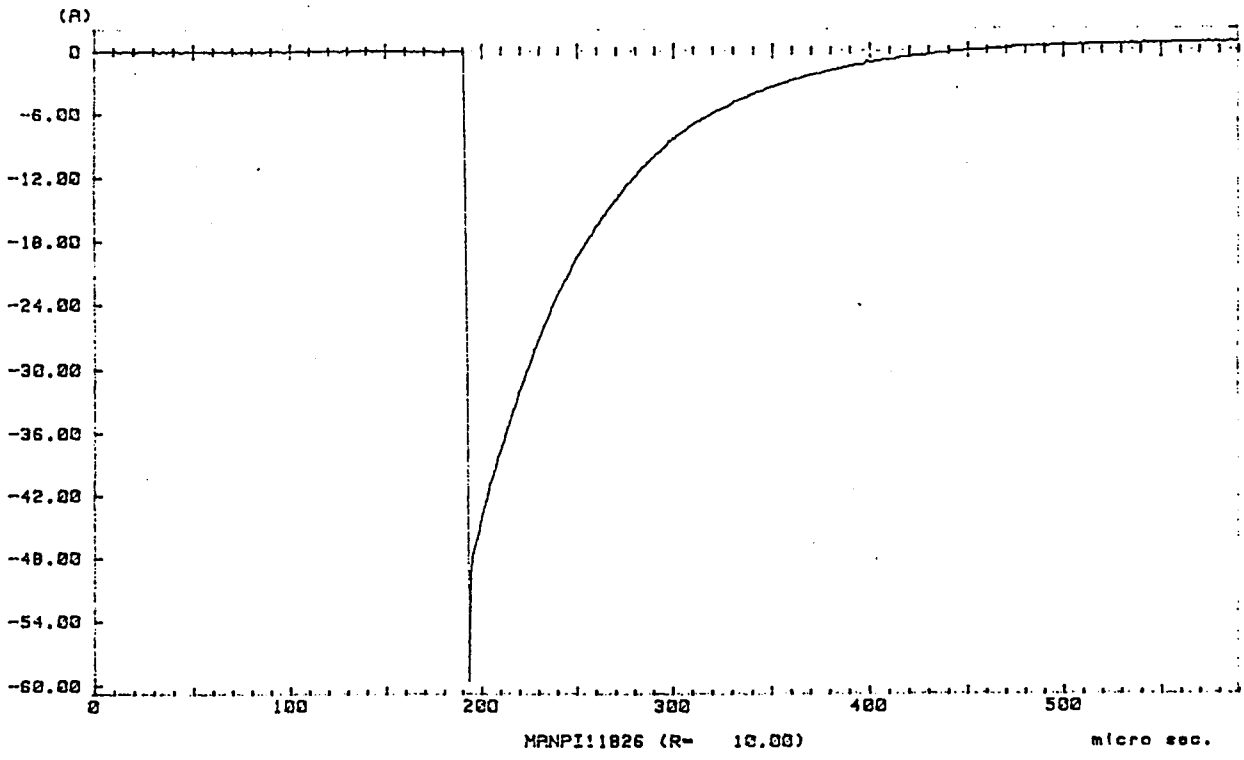


Oscillogram n° 11

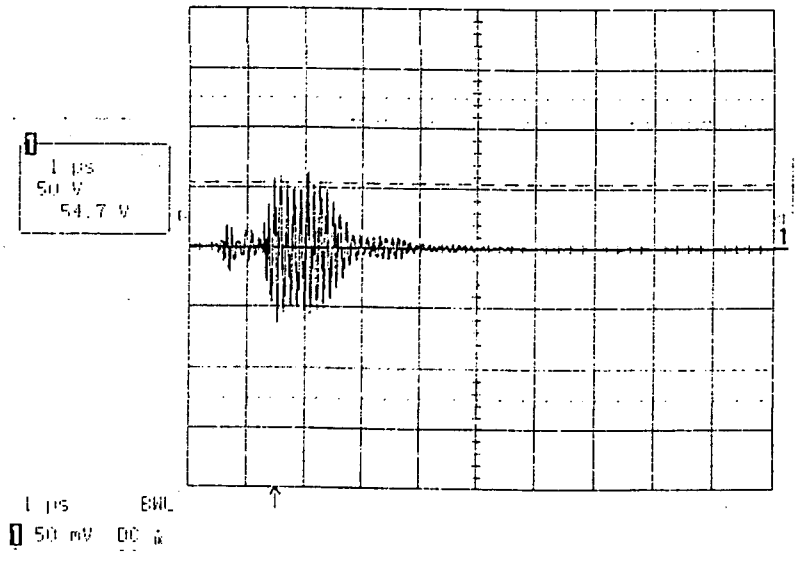


Oscillogram n° 12

Current waveform in HF terminal (50 %)

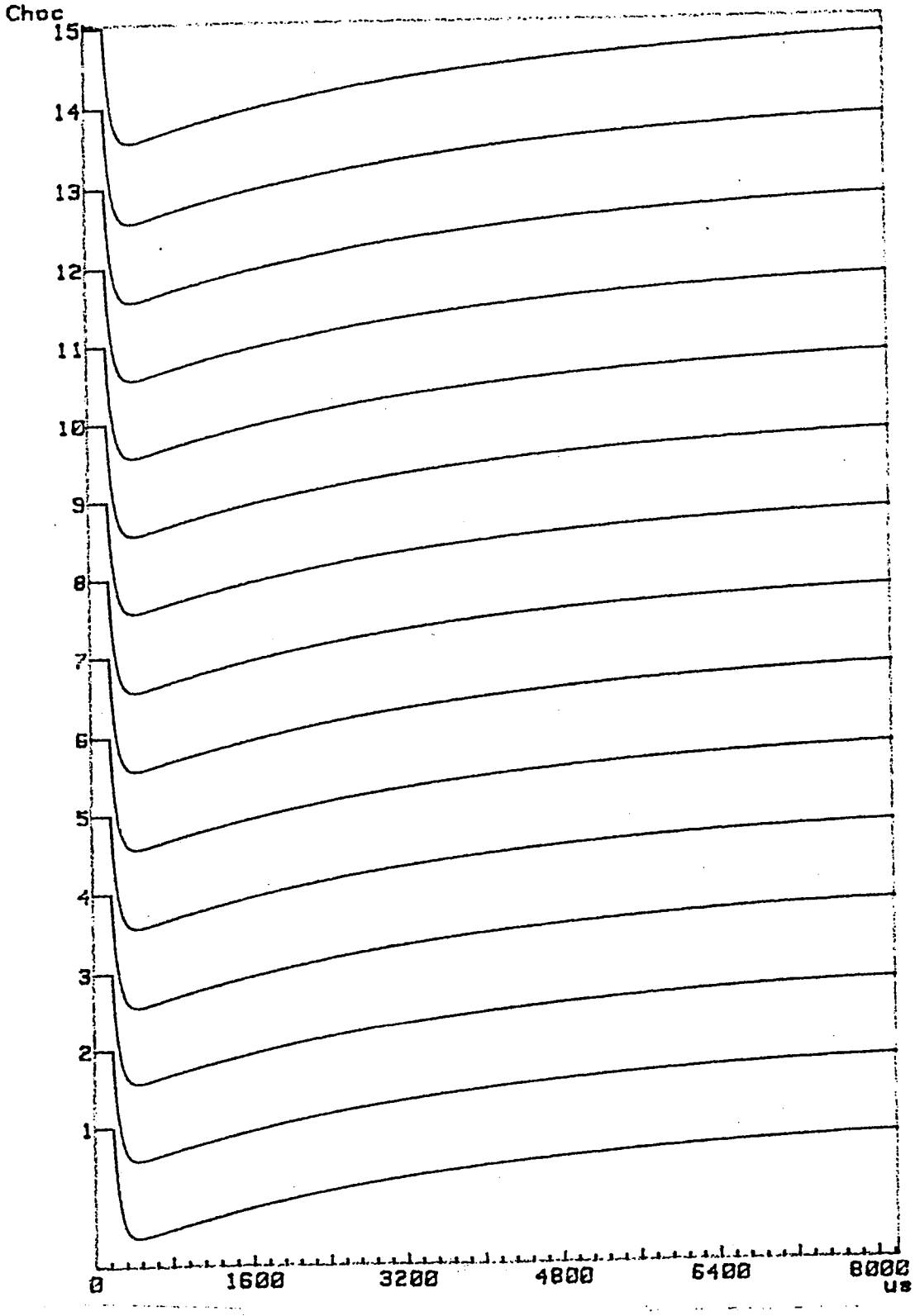


Current waveform in N, n, tank terminals, I = 54.7 Â (50 %)



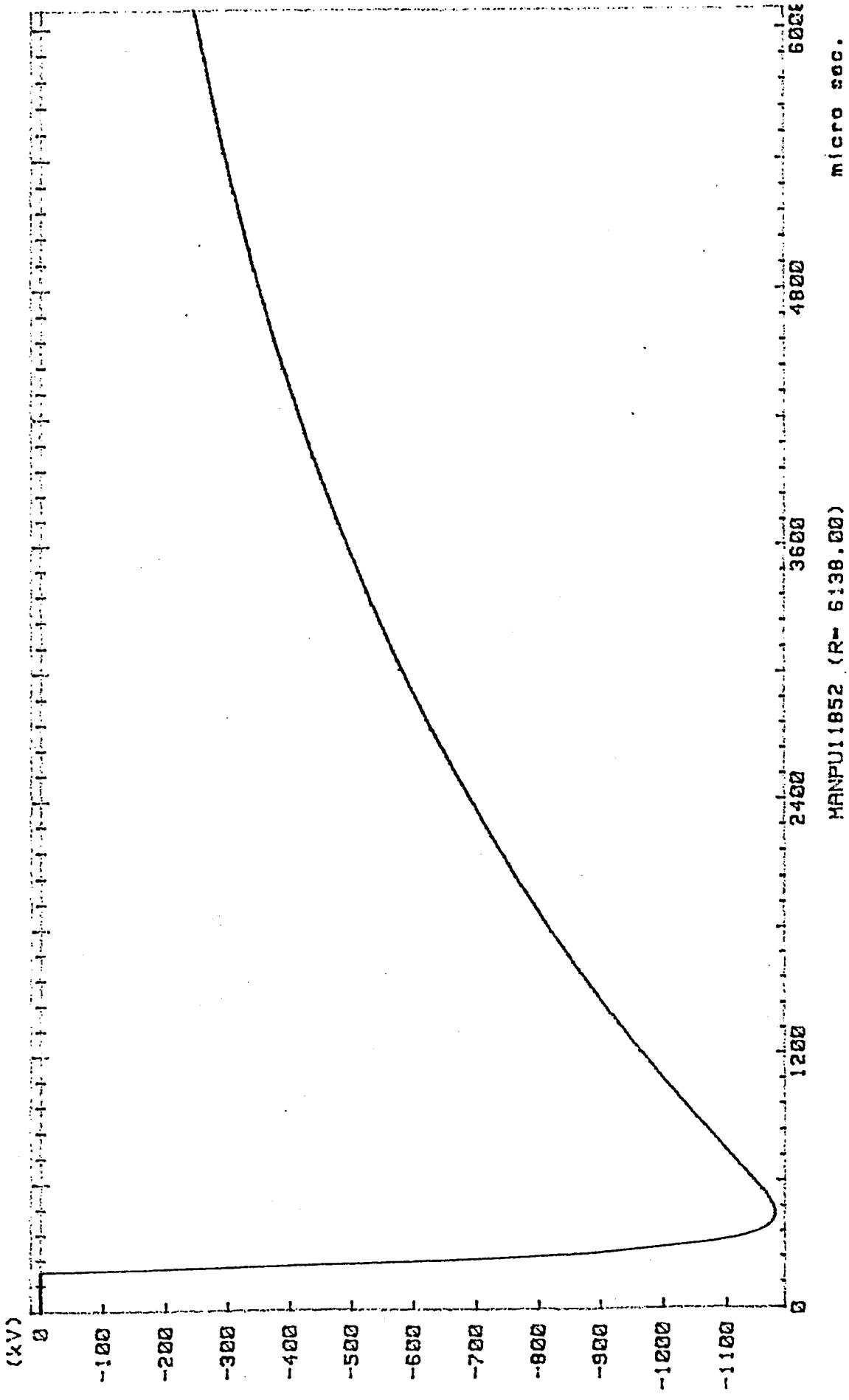
Oscillogram n° 13

100 % 15 negative impulses serie



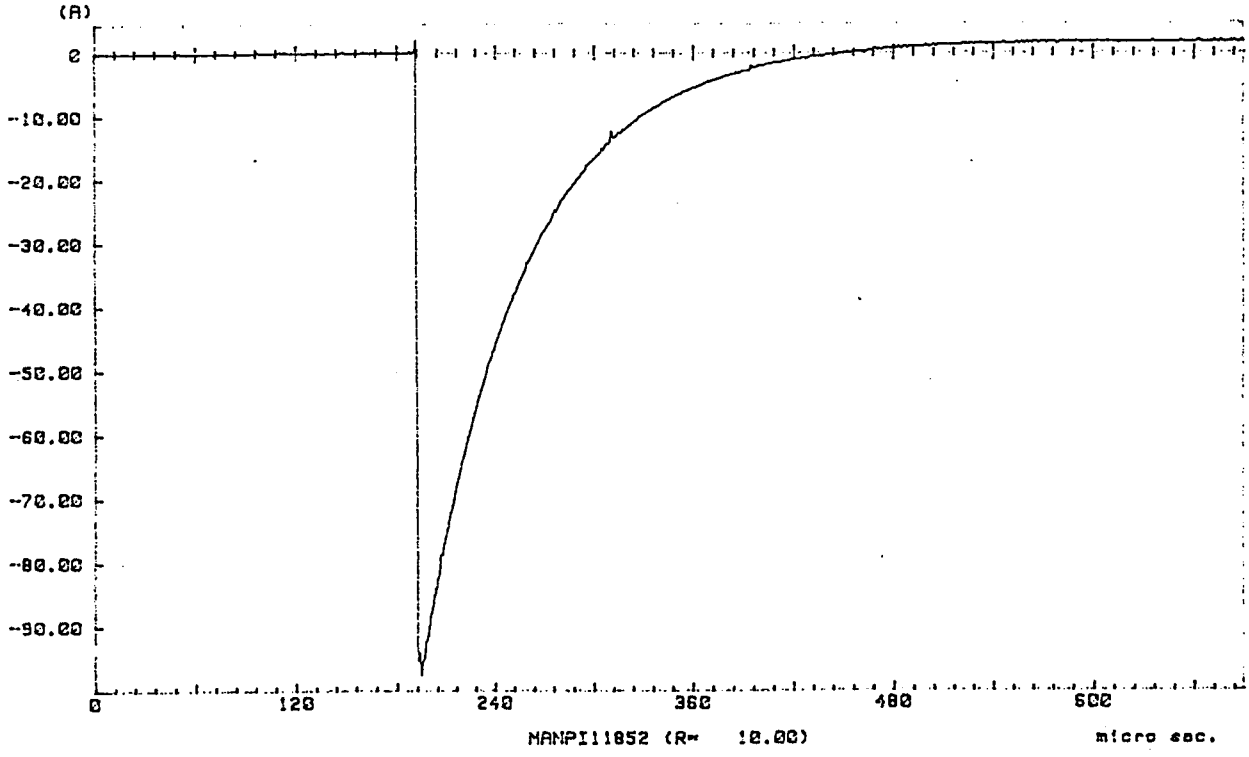
Oscillogram n° 14

Impulse n° 15, voltage (100 %)

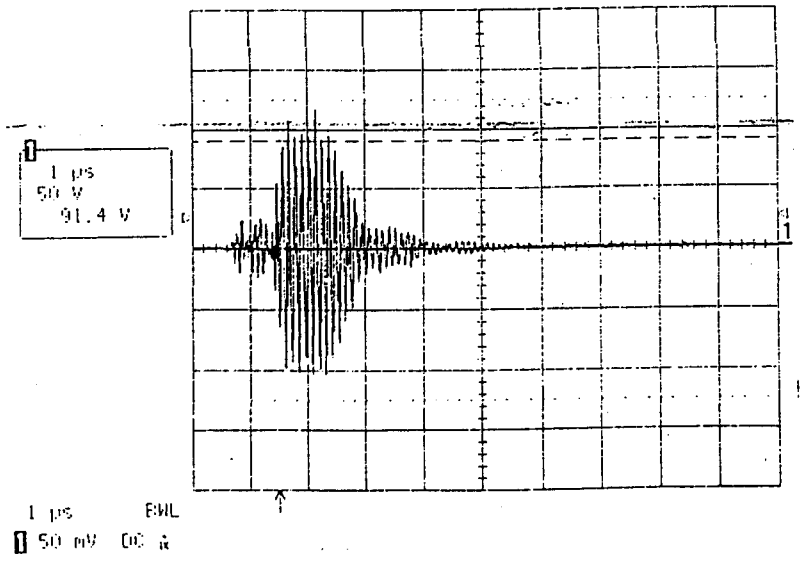


Oscillogram n° 15

n° 15 current waveform in HF terminal (100 %)

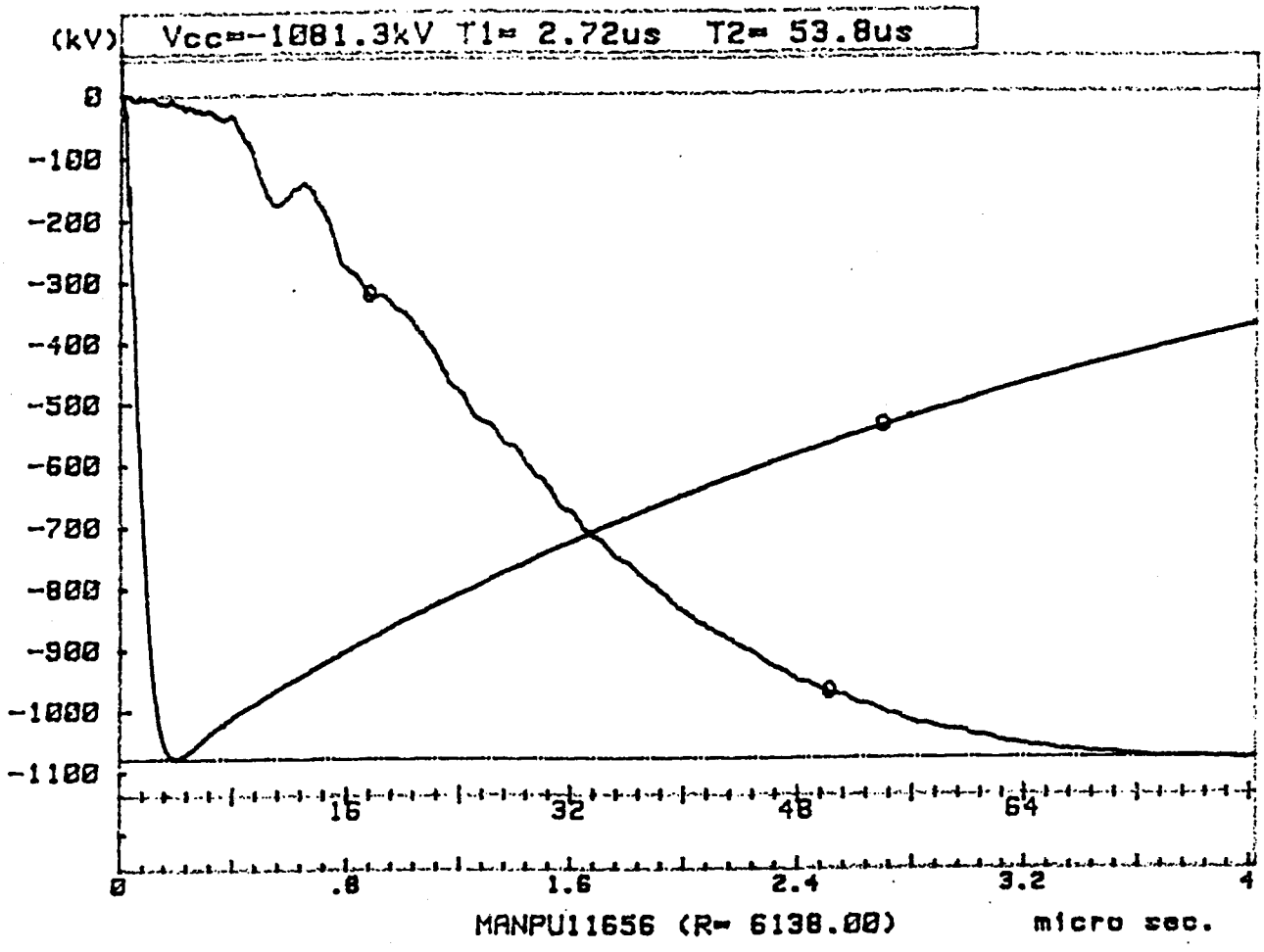


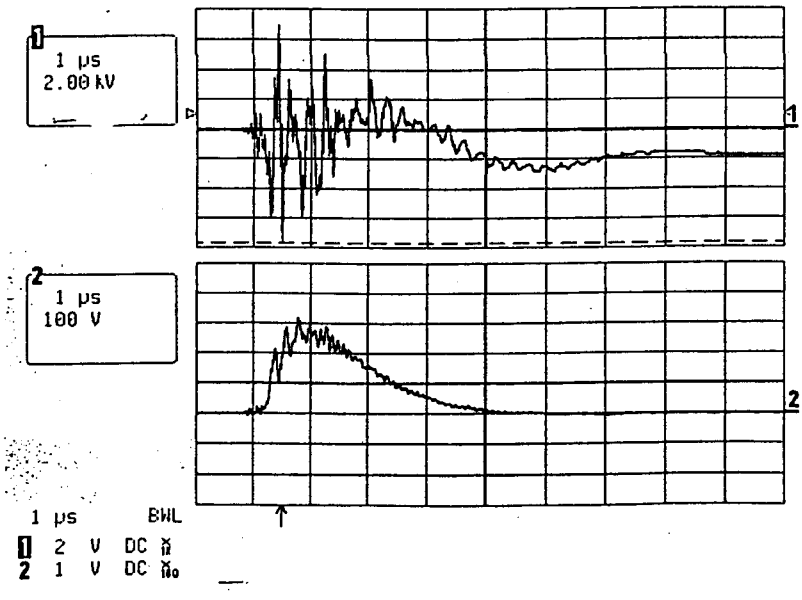
n° 15 current waveform in N, n, tank terminals, I = 91.4 Â (100 %)



Oscillogram n° 16

Voltage (60 %)



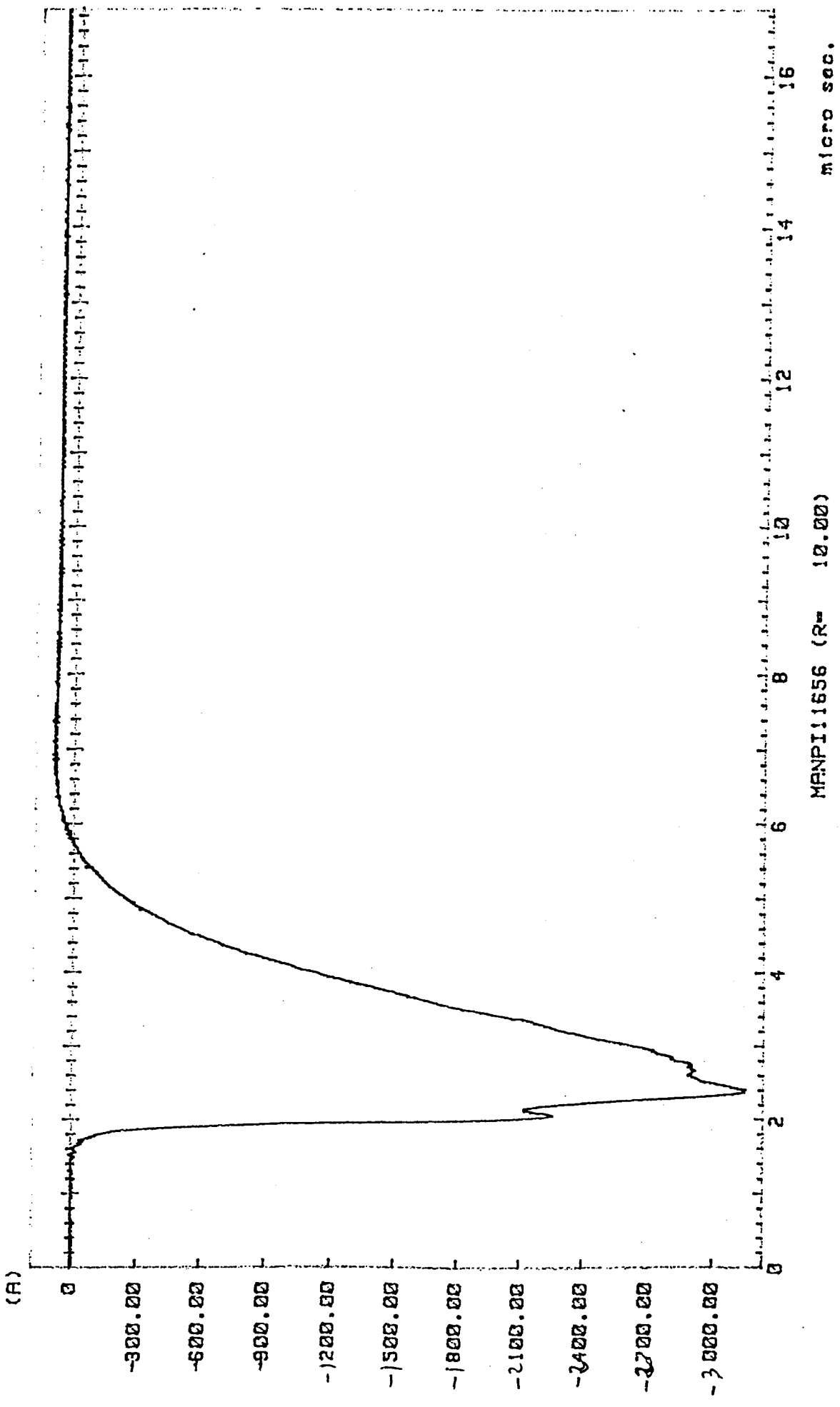


Voltage waveform
to u1a1 - 1n terminals,
U = 7.56 kV peak (60 %)

Current waveform
in N, n, tank terminals,
I = 266 Â (60 %)

Oscillogram n° 17

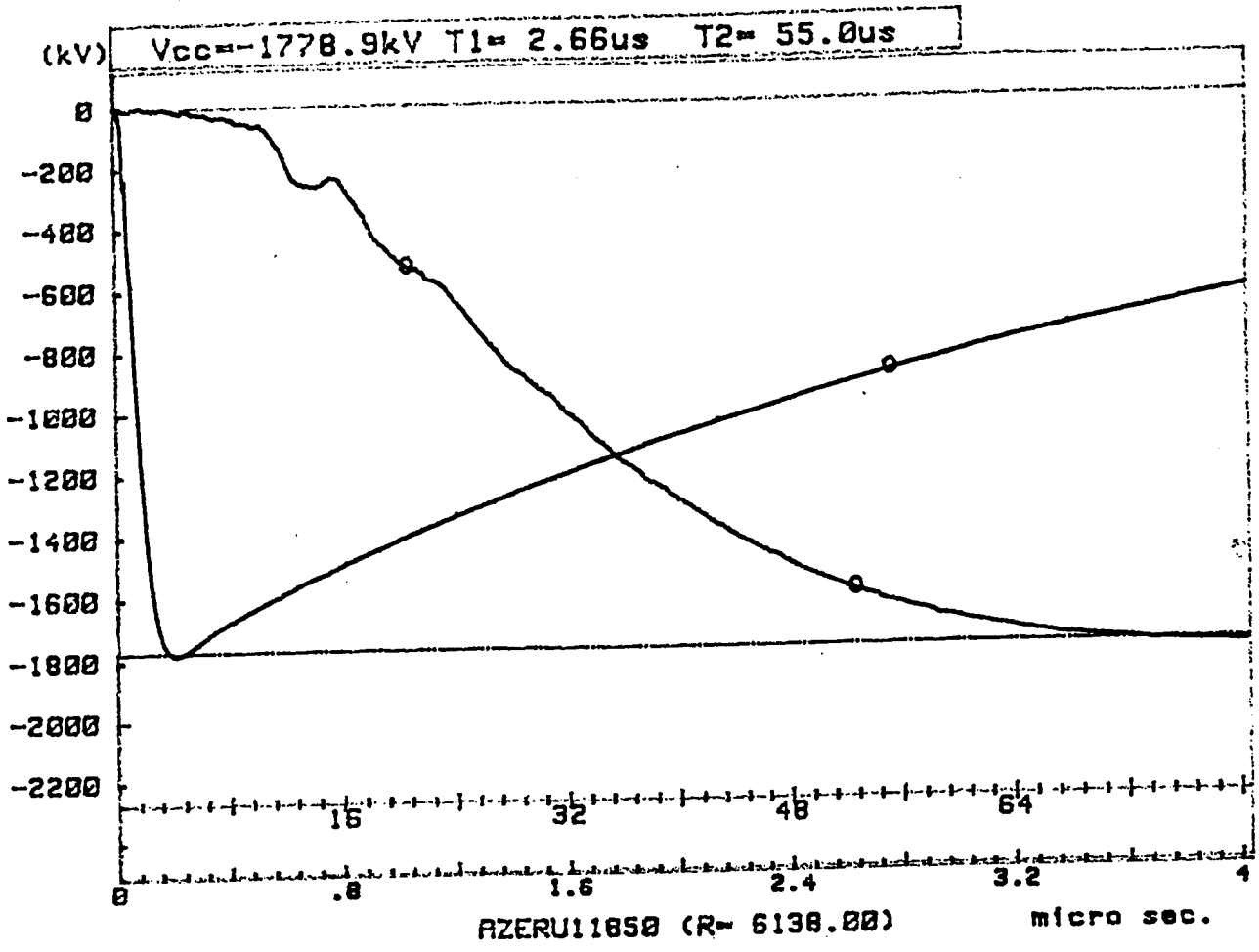
current waveform in HF terminal (60 %)

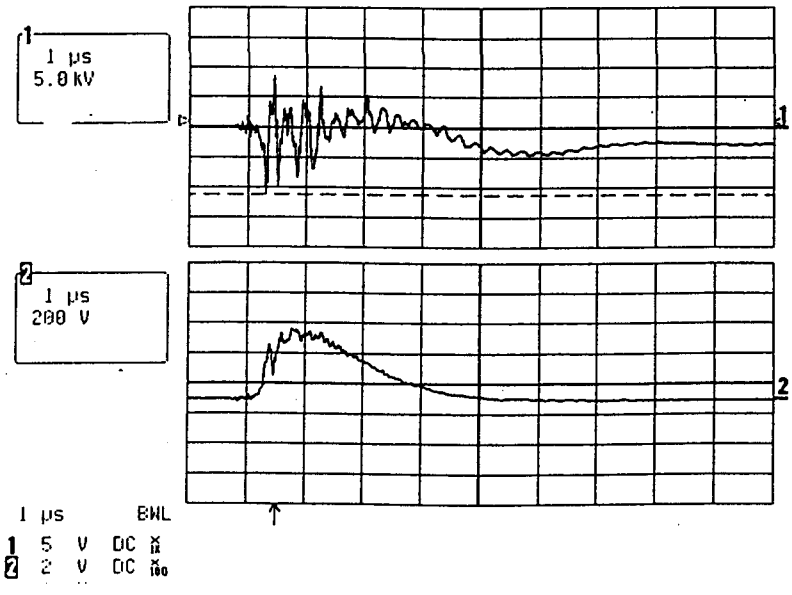


T.c.t (10/2/97)

Oscillogram n° 18

Voltage (100 %)



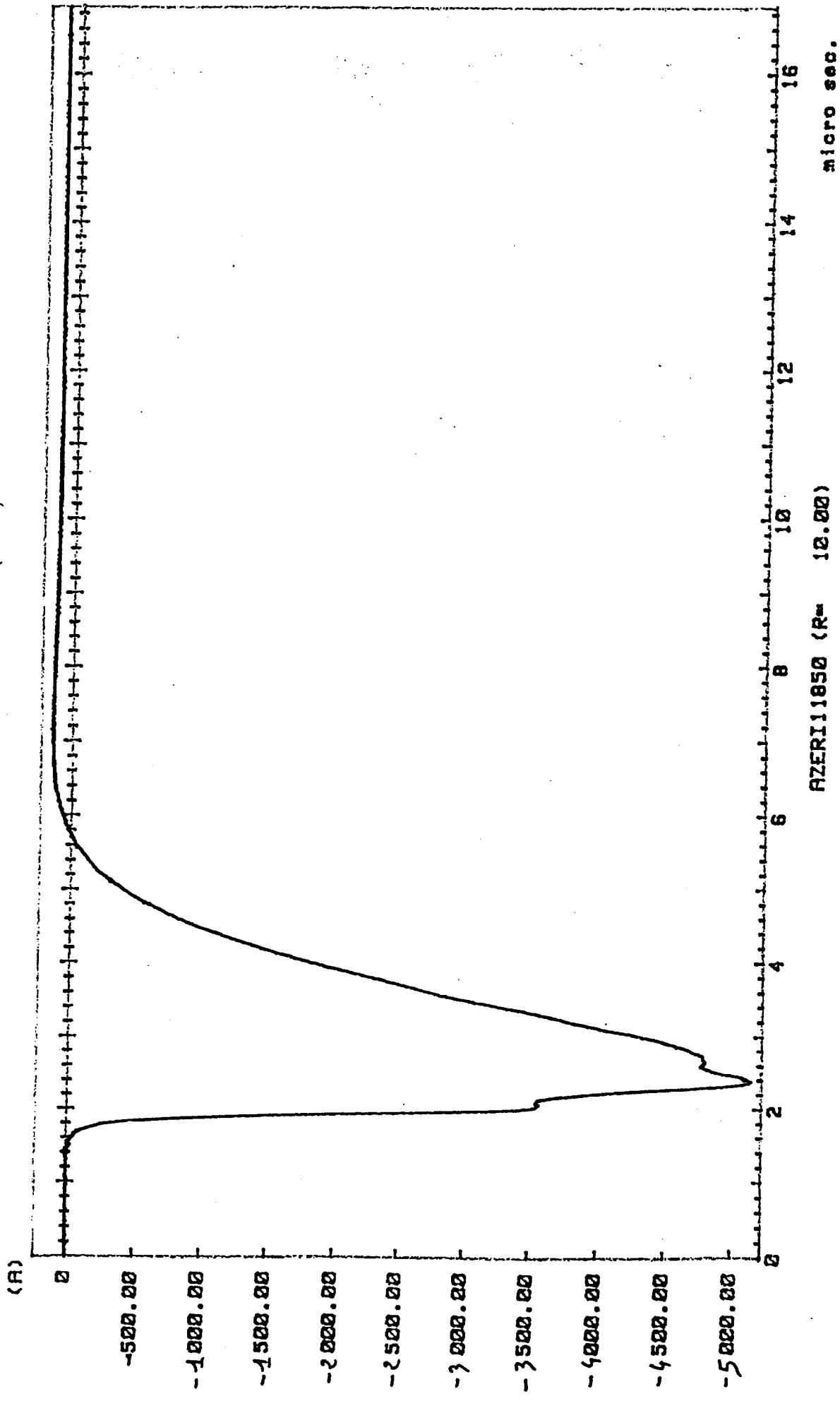


Voltage waveform
to u1a1 - 1n terminals,
U = 11 kV peak (100 %)

Current waveform
in N, n, tank terminals,
I = 420 Â (100 %)

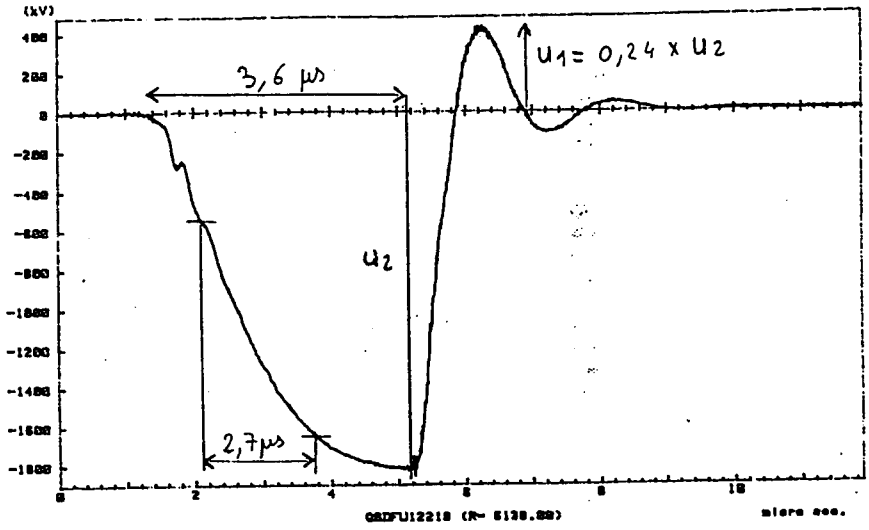
Oscillogram n° 19

current waveform in HF terminal (100 %)

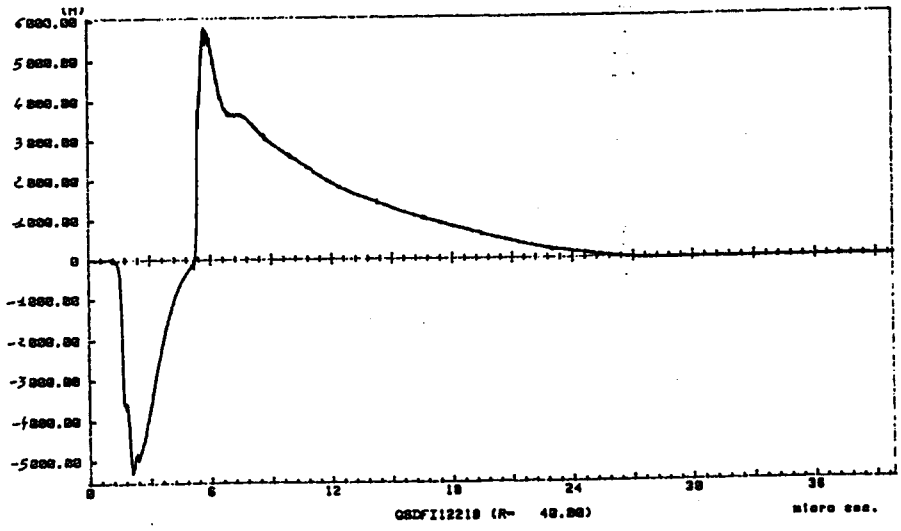


Oscillogram n° 20

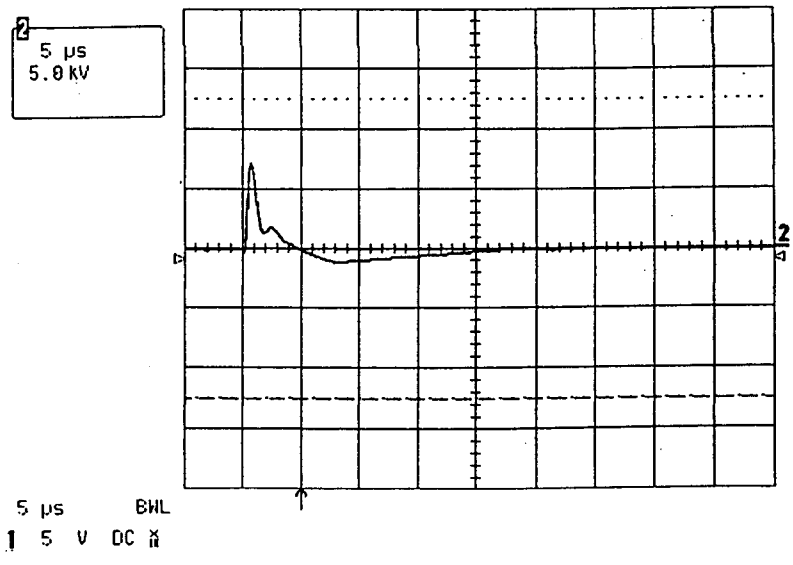
1st chopped voltage waveform (100%)



1st chopped current waveform in HF terminal (100 %)

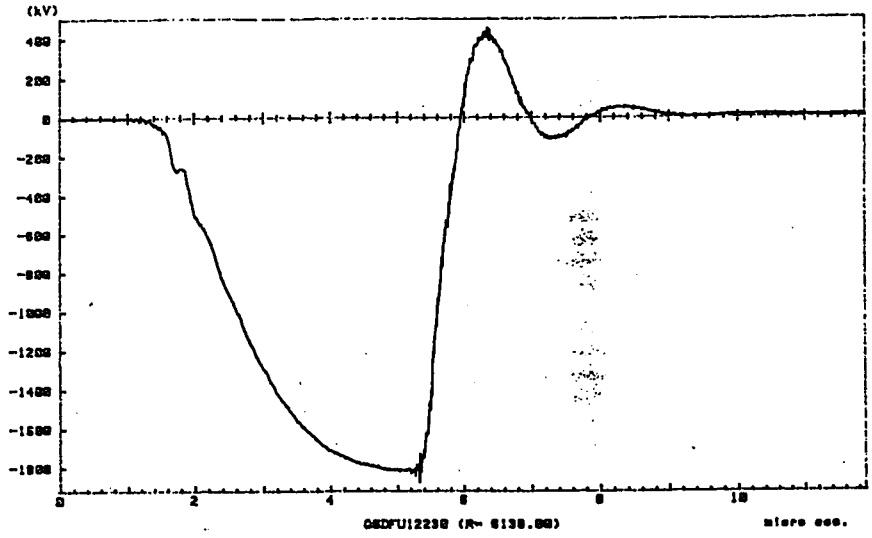


1st chopped current waveform in N, n, tank terminals, I = 7.3 kÂ (100 %)

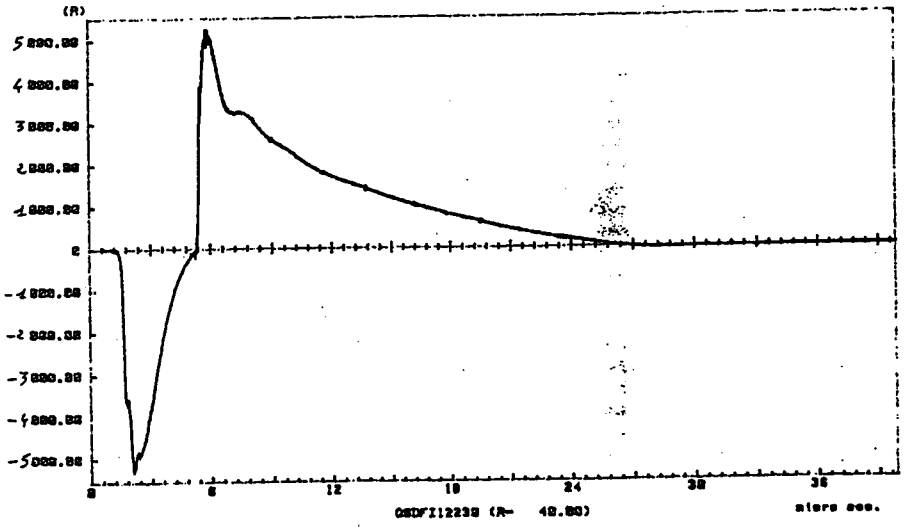


Oscillogram n° 21

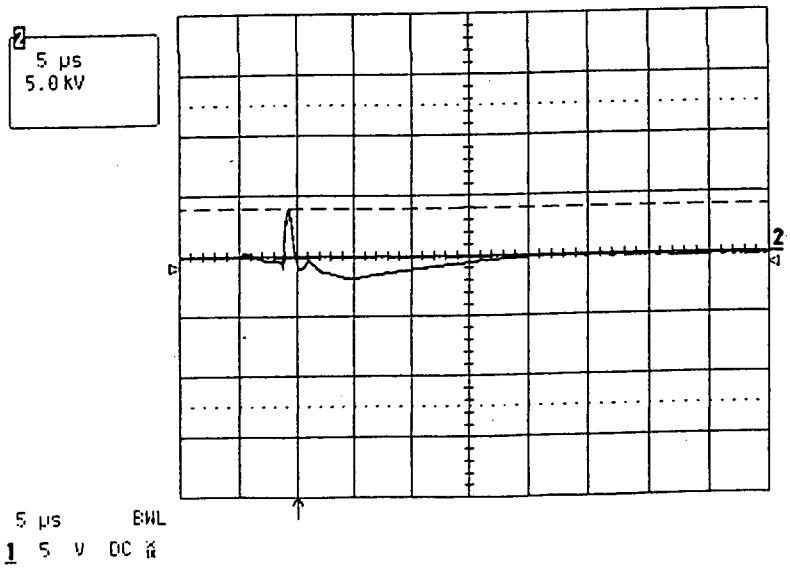
2nd chopped voltage waveform (100%)



2nd chopped current waveform in HF terminal (100 %)

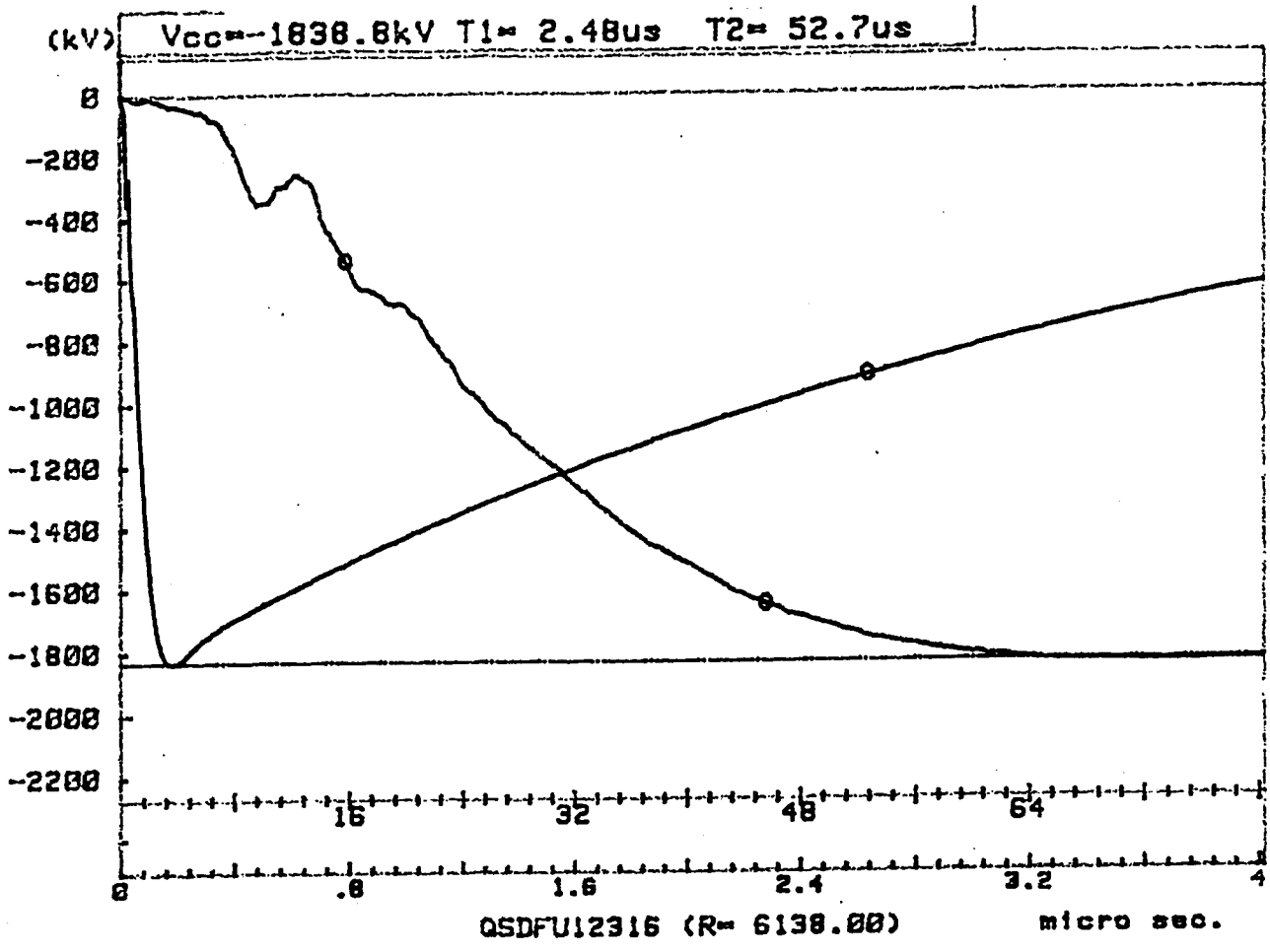


2nd chopped current waveform in N, n, tank terminals, I = 4 kÂ (100 %)

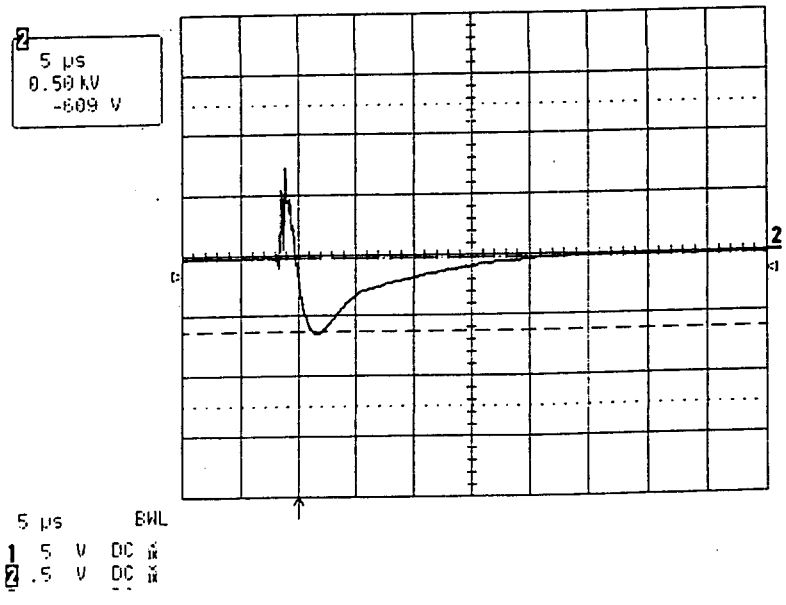


Oscillogram n° 22

1st voltage waveform (100%)

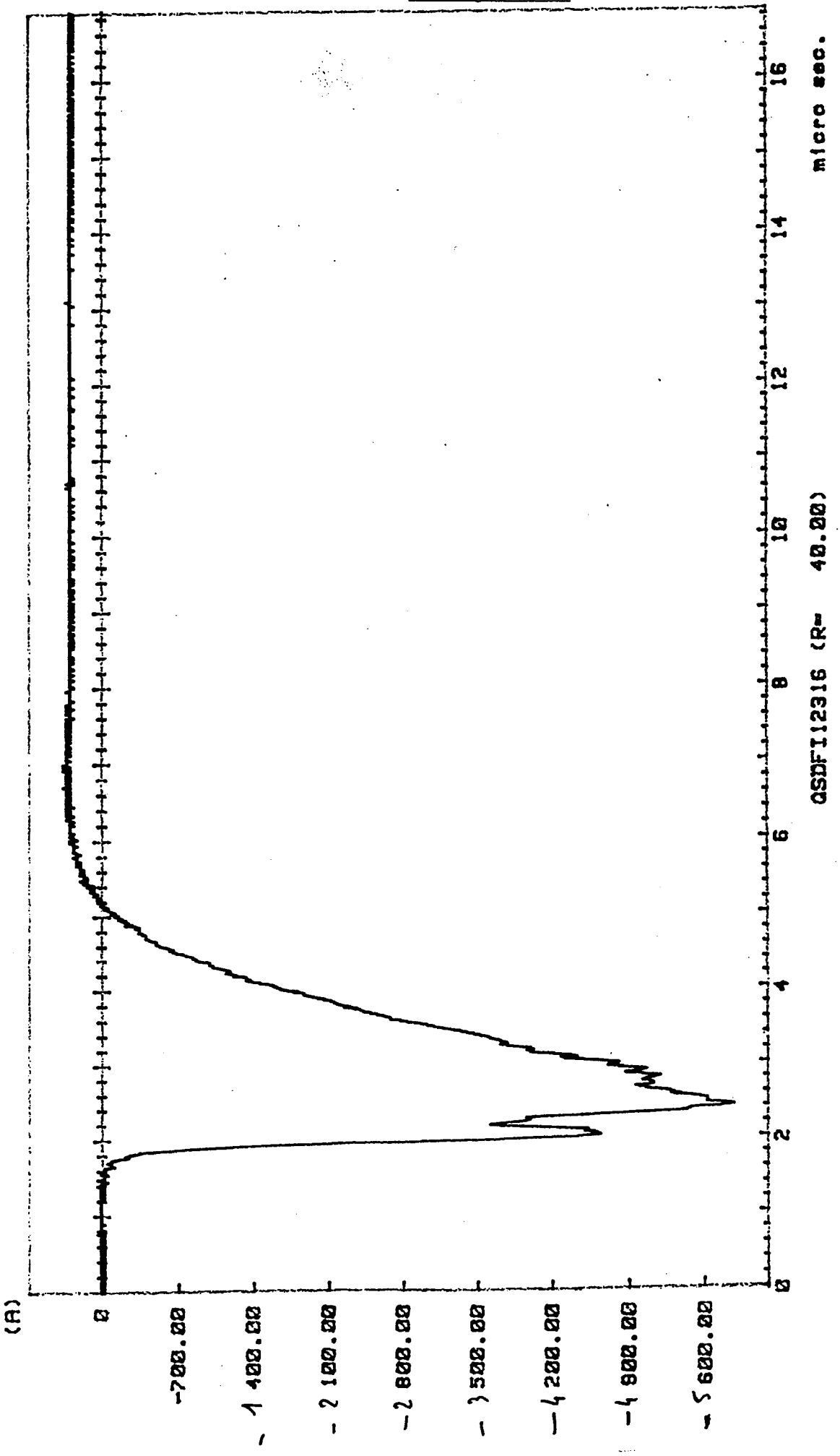


1st current waveform in N, n, tank terminals, I = 609 Â (100 %)



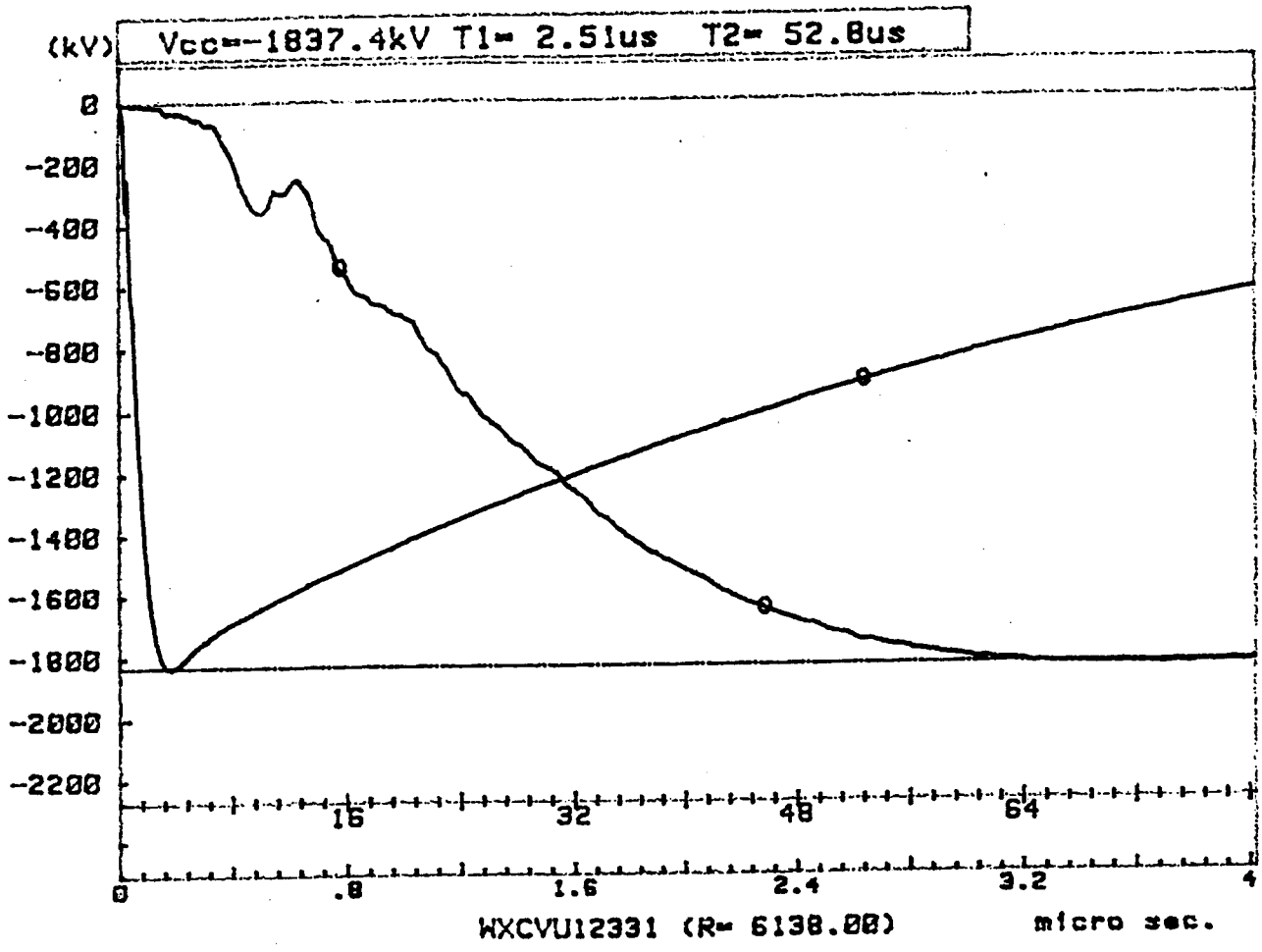
Oscillogram n° 23

1st current waveform in HF terminal (100 %)

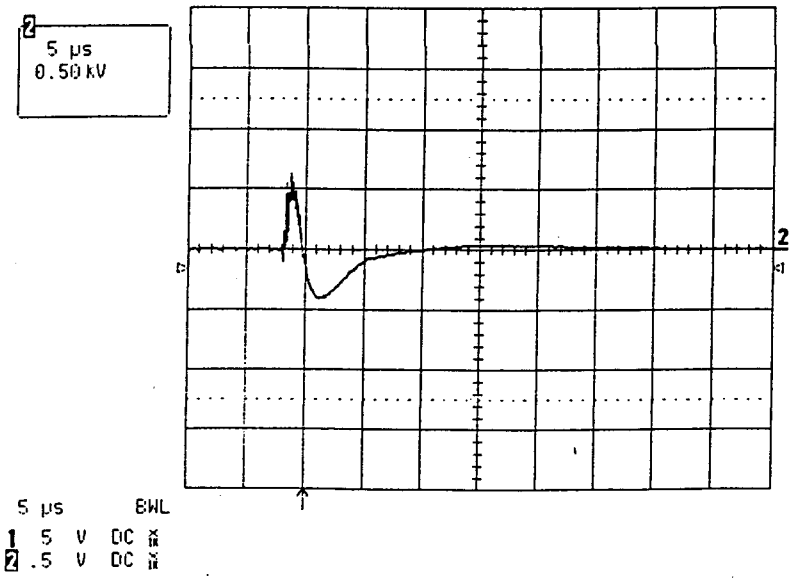


Oscillogram n° 24

2nd voltage waveform (100%)

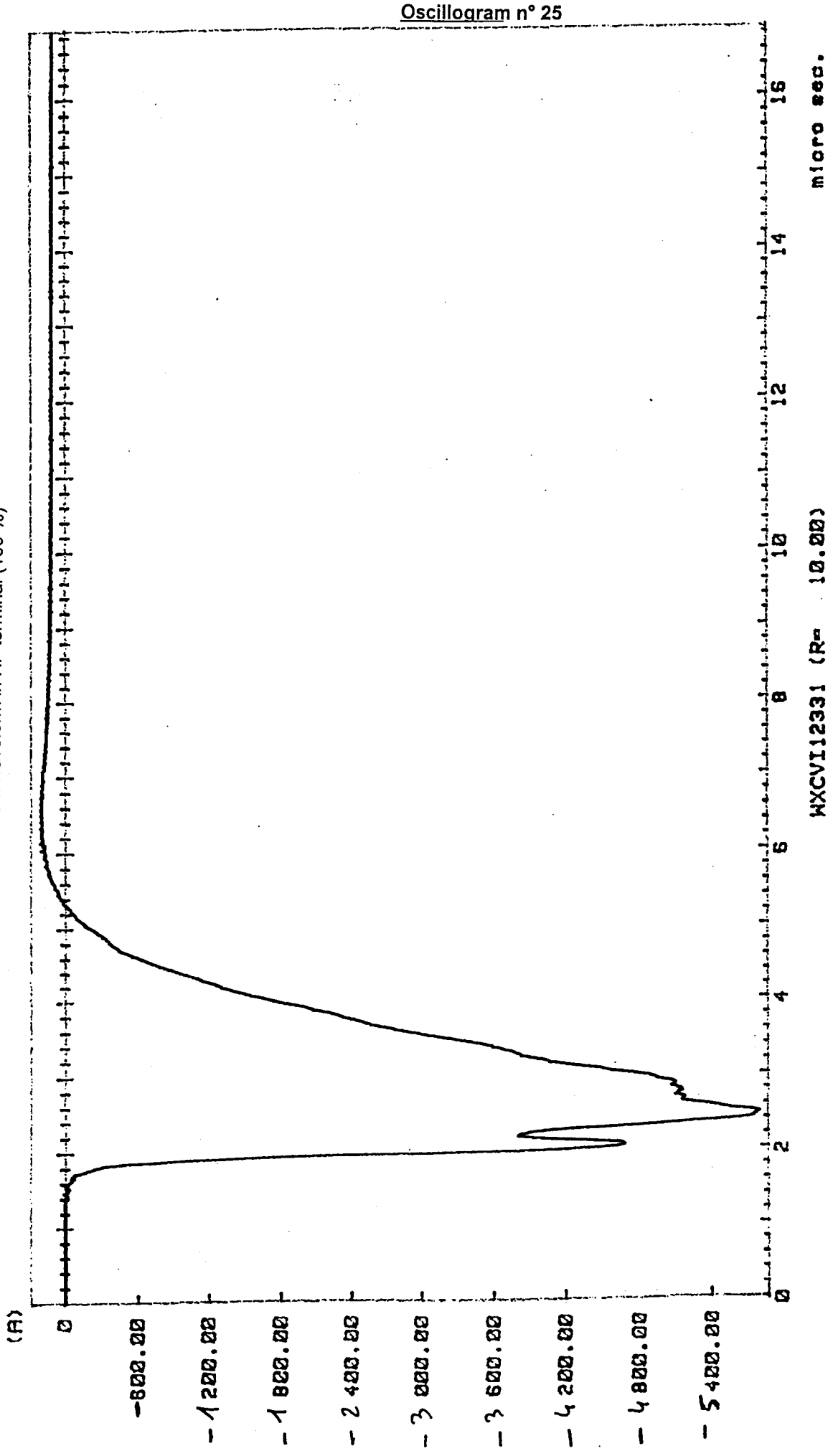


2nd current waveform in N, n, tank terminals, I = 500 Â (100 %)



Oscillogram n° 25

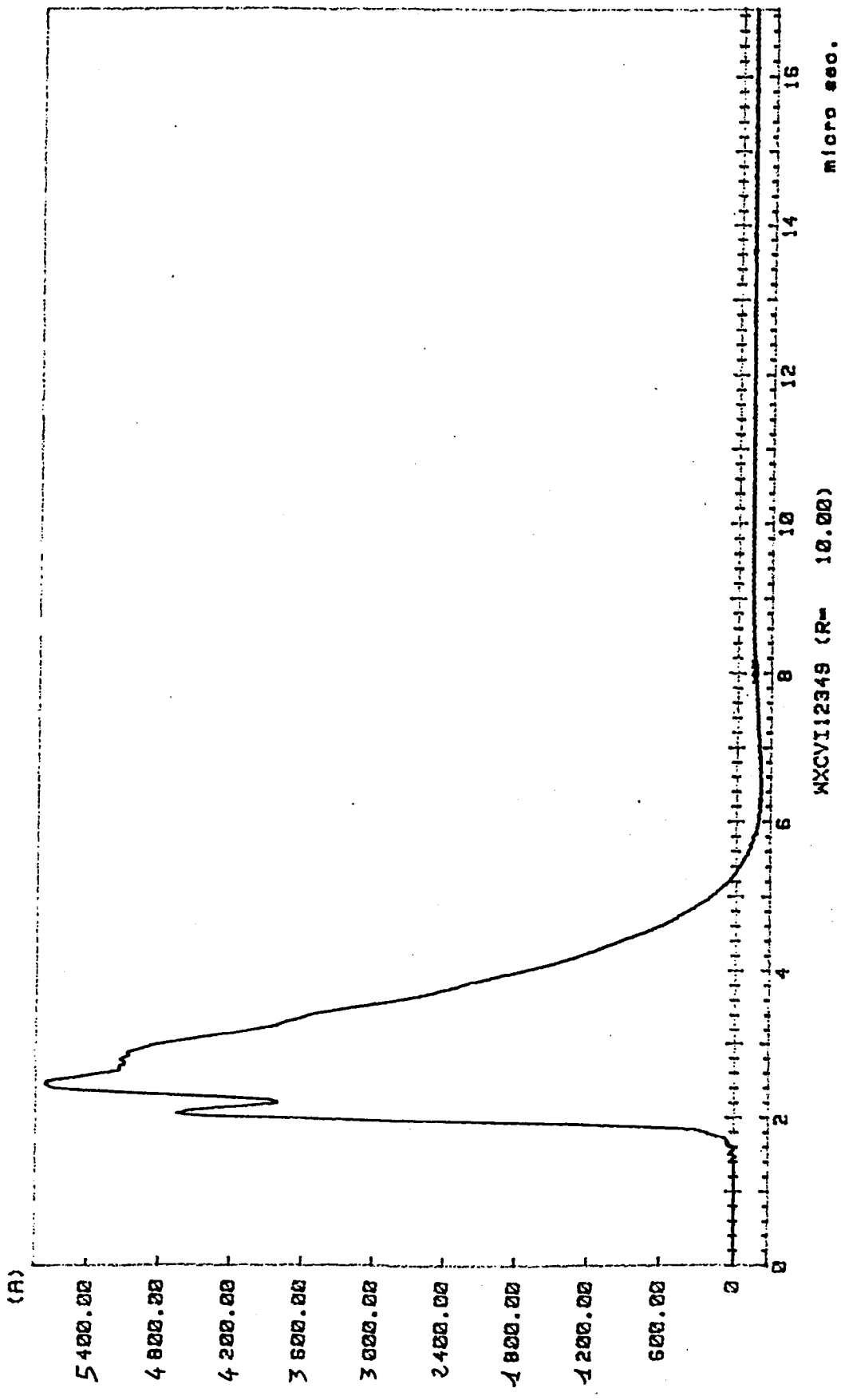
2nd current waveform in HF terminal (100 %)



T.c.t (10/2/97)

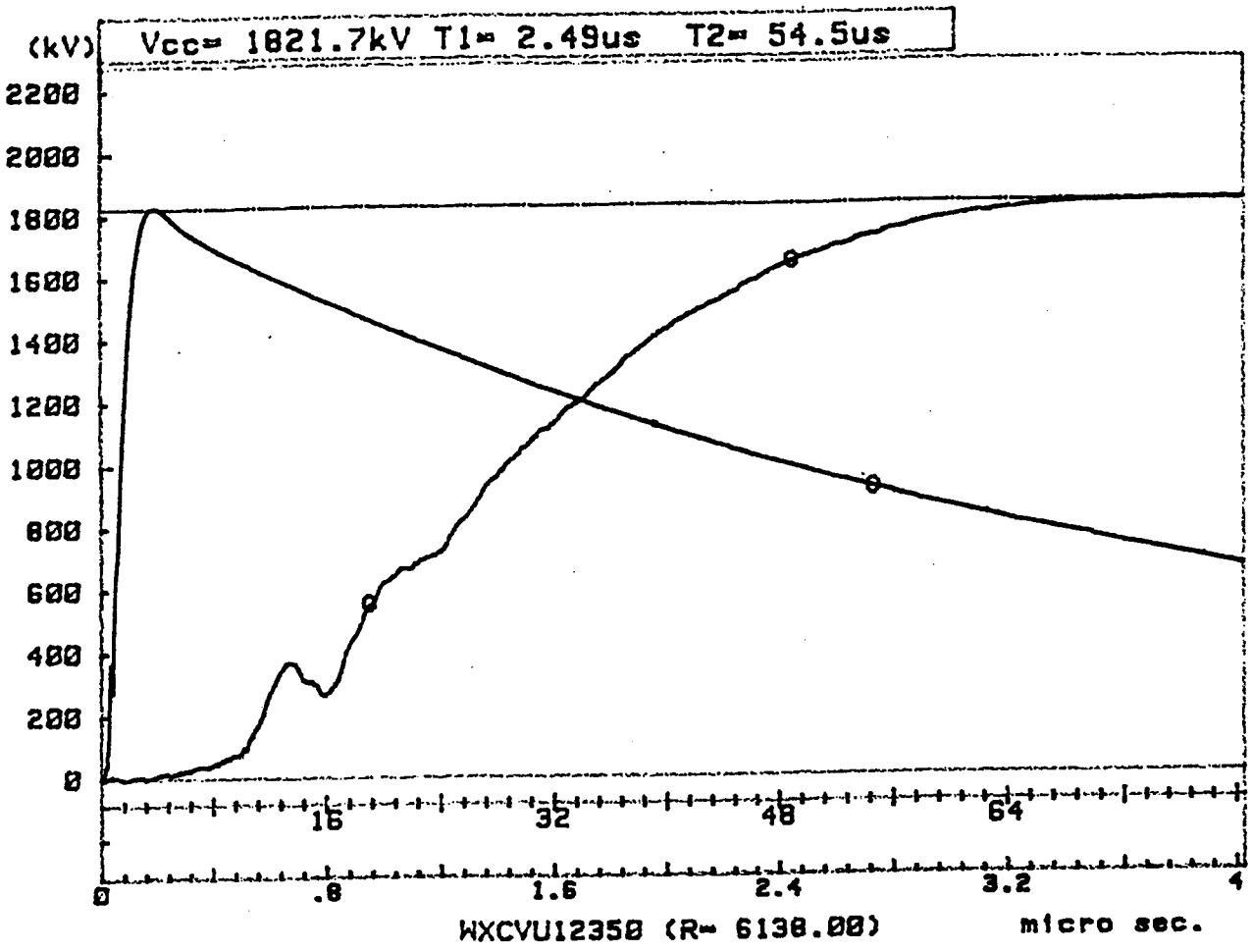
Oscillogram n° 27

1st current waveform in HF terminal (100 %)

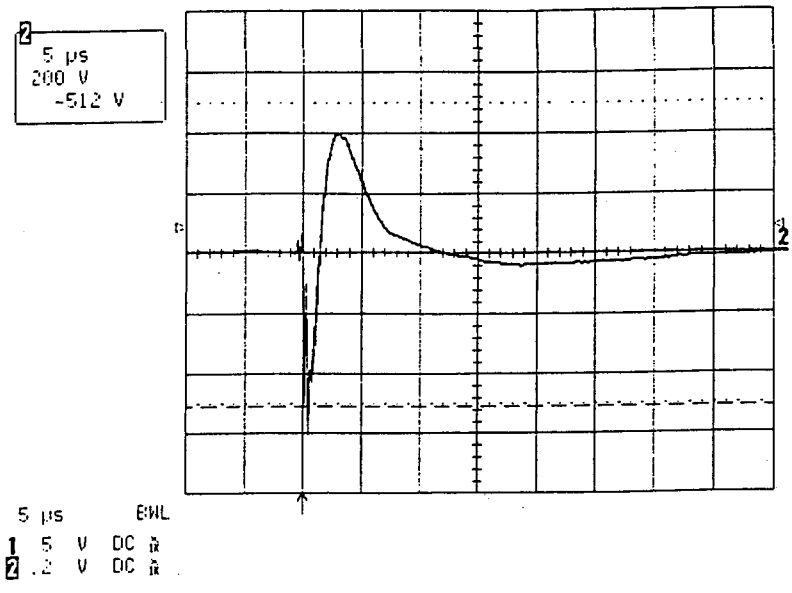


Oscillogram n° 28

2nd voltage waveform (100%)

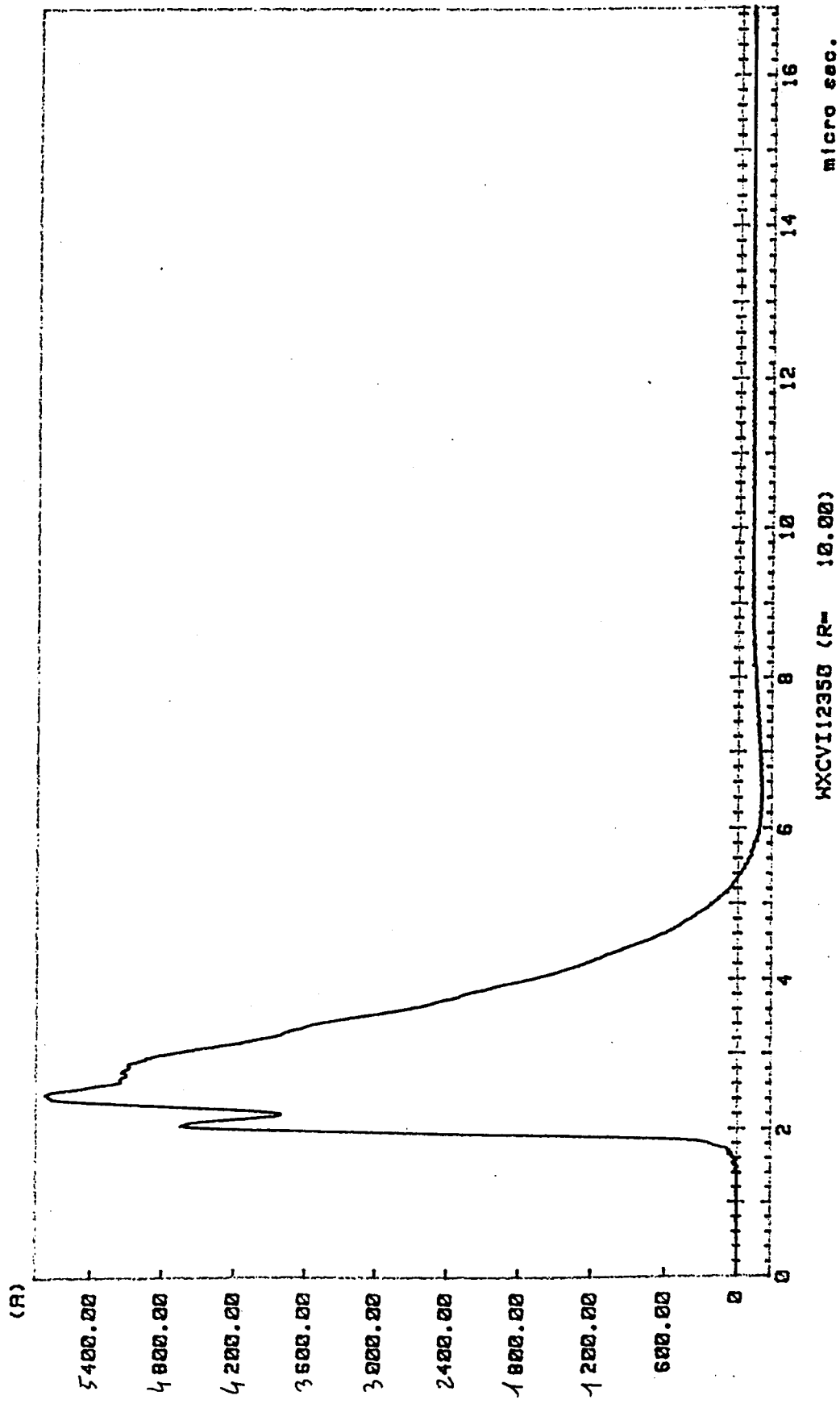


2nd current waveform in N, n, tank terminals, I = 512 Â (100 %)



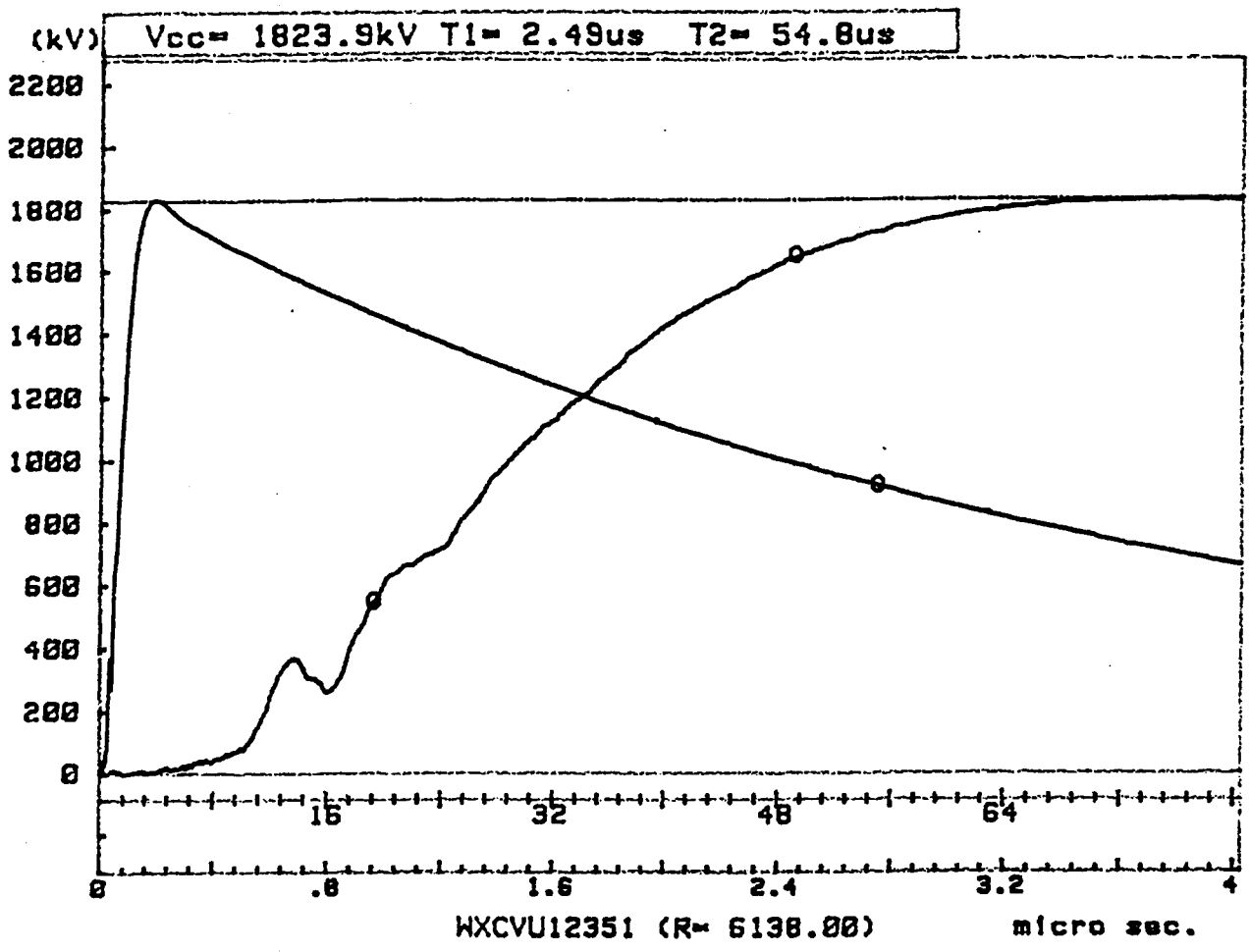
Oscillogram n° 29

2nd current waveform in HF terminal (100 %)

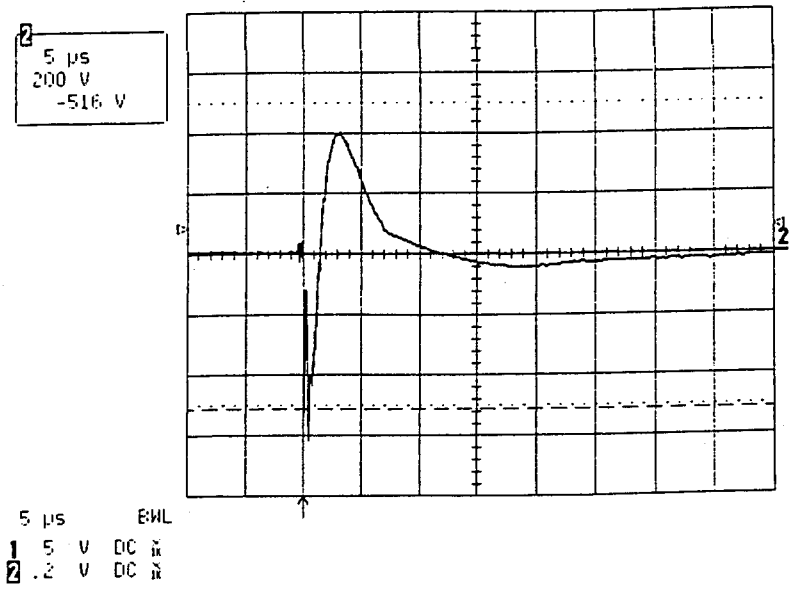


Oscillogram n° 30

3rd voltage waveform (100%)

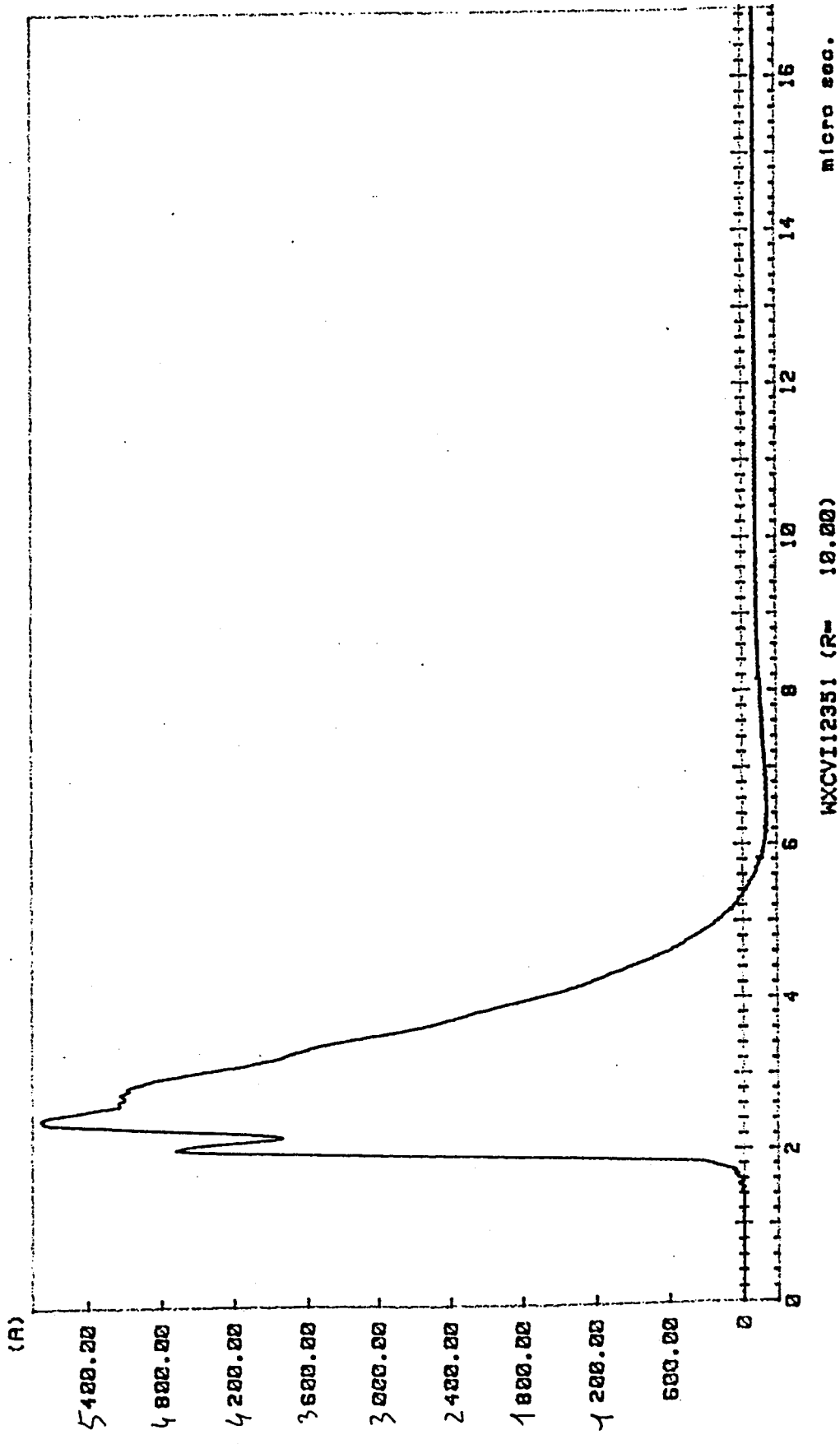


3rd current waveform in N, n, tank terminals, I = 516 Â (100 %)



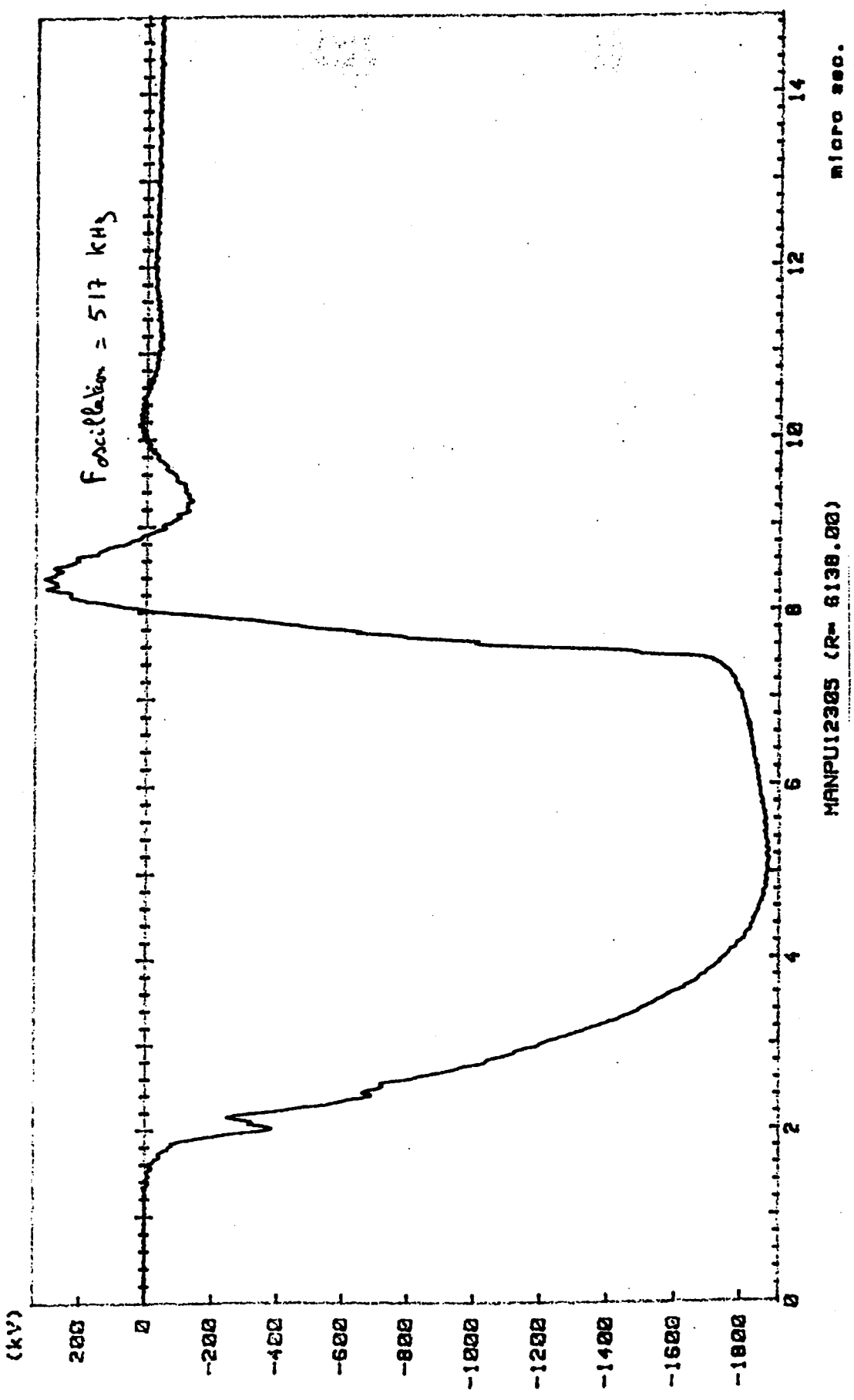
Oscillogram n° 31

3rd current waveform in HF terminal (100 %)



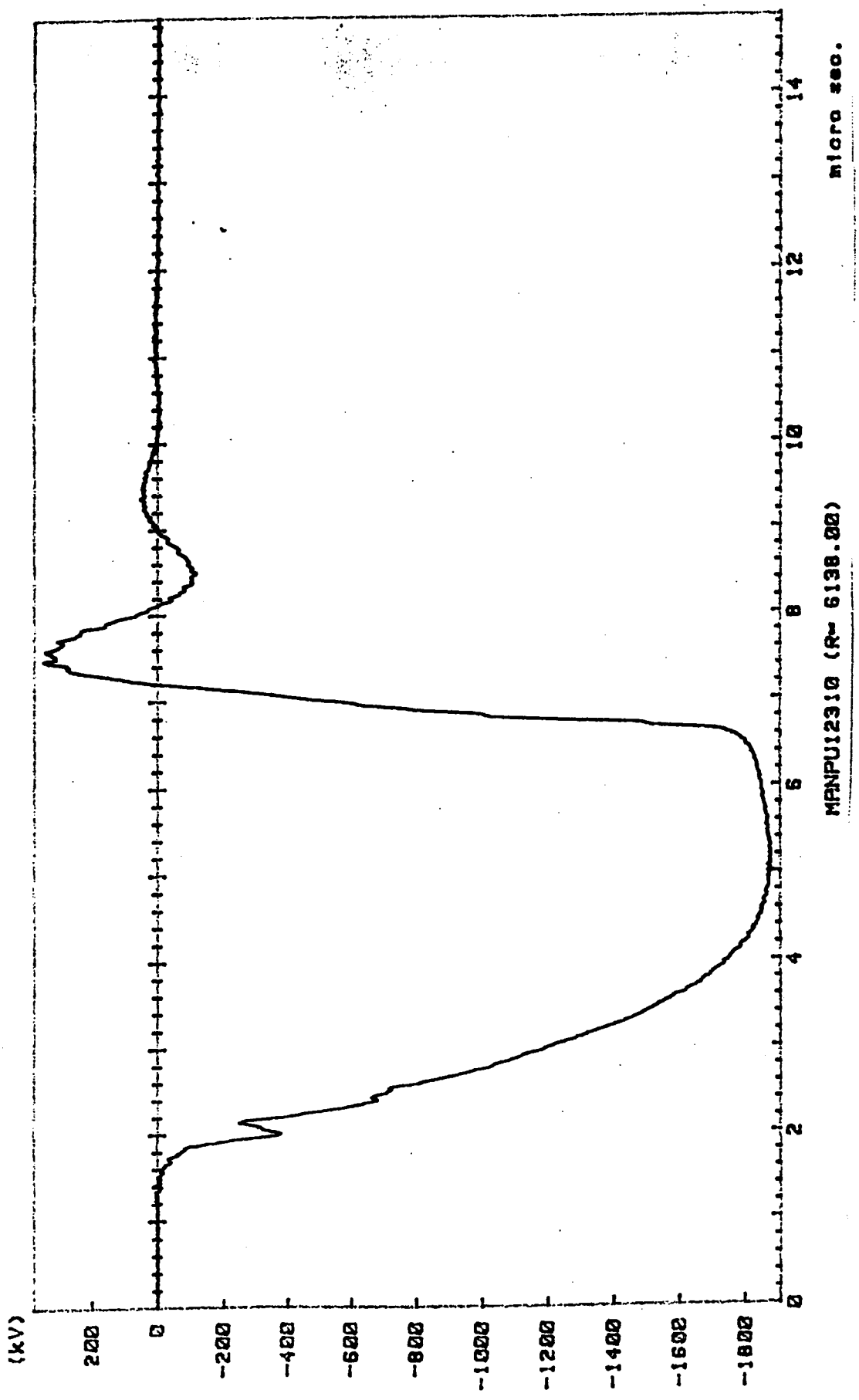
Oscillogram n° 32

1 st negative chopped impulse (100%), (discharge test)



Oscillogram n° 33

2 nd negative chopped impulse (100%), (discharge test)



GEC ALSTHOM
T&D

TRANSFORMADOR CAPACITIVO
DE TENSION
CCV 525
n°

1a1-1n	500000/√3	//	200/√3 V
	100 VA		cl 0.5
1a2-1n	500000/√3	//	100/√3 V
	100 VA		cl 0.5
2a1-2n	500000/√3	//	200/√3 V
	100 VA		cl 0.5
2a2-2n	500000/√3	//	100/√3 V
	100 VA		cl 0.5

Cn = 5100 pF -5+10%

Factor de tensión 1.5 Un 30s

Potencia termica 1000 VA

525 / 620 / 1800 / 1175 kV

50 Hz CEI 186/358

N°

GEC ALSTHOM
T&D

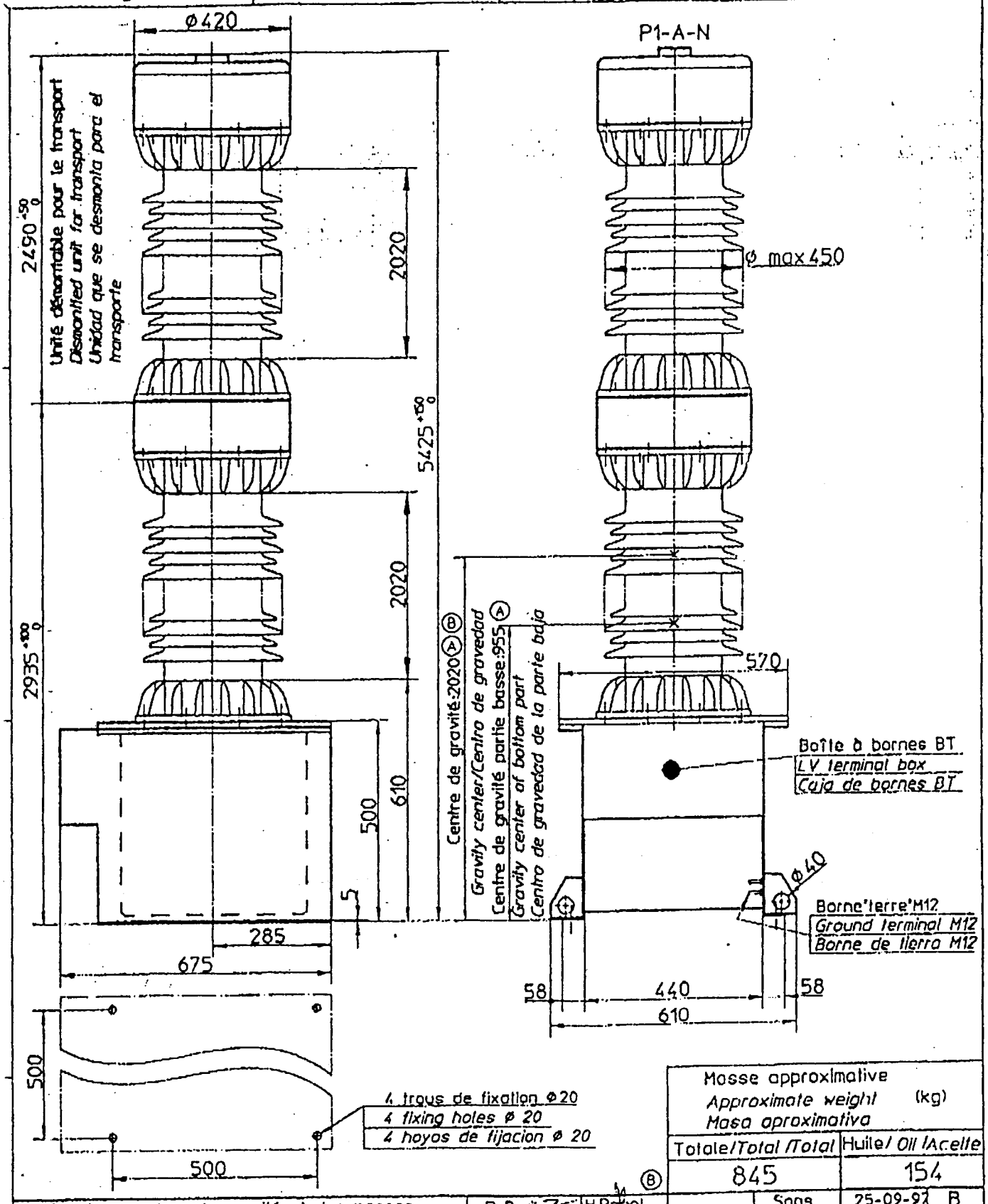
MATIERE : 8.337.439
8.342.406

GEC ALSTHOM T&D	PLACA DE CARACTERISTICAS			XS8001	-201
			G.Charton	repère	
	Z/CREATION	11/03/98	Deville	DSCP	PAGE 1/1

TRANSFORMADOR DE TENSION CAPACITIVO

-Posición	2
-Cantidad	16
-Tipo 20B	CCV 525
-Norma	CEI 186/358
-Tension nominal de servicio	500000/√3 V ef
-Tensión máxima de servicio	525 kV ef
-Tensión de ensayo primario-tierra (1 min)	620 kV ef
-Tensión básica de impulso (onda plena 1.2/50 µs)	1800 kV cr
-Tensión básica de impulso (onda cortada)	N.A kV cr
-Tensión al choque de maniobras (250/2500 µs)	1175 kV cr
-Tension de ensayo secundario(s)/Tierra (1 min)	3 kV ef
-Tensión de ensayo P2-HF/Tierra (1 min)	4 kV ef
-Tensión de ensayo definida para una altitud inferior a	1000 m
-Frecuencia	50 Hz
-Plano de dimensiones	8 162 909
-Aislador de porcelana de color	marron
Linea de fuga (nominal)	4000 mm
Linea de fuga desarrollada (nominal)	12954 mm
-Aceite aislante de las columna capacitiva Jarylec)	8 343 549
-Aceite aislante de las parte electromagnética (Shell diala D)	8 343 513
-Tratamientode las superficies (metalización 80 µm)	8 343 507
-Pruebas de rútina según norma	8 343 502
-Accesorios Incluidos : Indicator de aceite sobre las partes capacitiva y magnética	Si
Membrana de dilatación y caja de bornes con placa movil	Si
Tapa para sacar muestra y llenado	Si
Esquema de conexiones	Si
Placa de caracteristicas	Si
Borne rectangular aluminio 80x80x16 mm	Si
Tornillos de tierra (2 M12)	8 352 603
Sin fusible BT	Si
-Accessorios alta frecuencia Cuchilla de puesta a tierra	Si
Descargador	Si
Bobina de drenaje 10 mH	Si
Temperaturas ambientes	min-10 max+43 °C
Velocidad del viento	25 m/s
Condiciones sísmicas	N.A
Esfuerzo de tracción max sobre el borne primario	1000 N
Fijación de una T.O 4 M12 diam. 220 mm	Si
Peso de T.O	200 kg
- Capacidad nominal (Cn)	5100 pF -5+10%
- Factor de tensión	1.5 Un 30s
- Rango de alta frecuencia	50-450 kHz
- Capacidad térmica máxima	1000 VA
- Tang. Delta del ángulo de pérdida	<=0.5 %

Sec.	Tens.Prim	U.sec	VA	Clase	Cos Phi	Observaciones
1a1-1n	500000/√3	200/√3	100	cl 0.5		
1a2-1n	500000/√3	100/√3	100	cl 0.5		**1a-1n y 2a-2n**
2a1-2n	500000/√3	200/√3	100	cl 0.5		**cargas simultaneas**
2a2-2n	500000/√3	100/√3	100	cl 0.5		
			0			
			0			
			0			
			0			



Masse approximative / Approximate weight / Masa aproximativa (kg)	
Totale/Total/Total	Huile/Oil/Aceite
845	154

Modif. valeur centres de gravité et des masses.	P Baril	H.Regal		Sans	25-09-97	B
Modif. valeur centres de gravité	P Baril	H.Regal		Sans	11-04-97	A
Création	P Baril	H.Regal			26.03.97	Z
Nature des modifications	Dessiné	Vérifié	Validé	DEM N°	Date	Indice

GEC ALSTHOM T & D

Désignation: TRANSFORMATEUR CONDENSATEUR DE TENSION / CAPACITOR VOLTAGE TRANSFORMER / TRANSFORMADOR CAPACITIVO DE TENSION — CCV 525

Page 1/1

Balteau Montrouge FRANCE	Format	Echelle		Dossier	Repère	Identification
	A4	Sans		X 57	DEX	8162909