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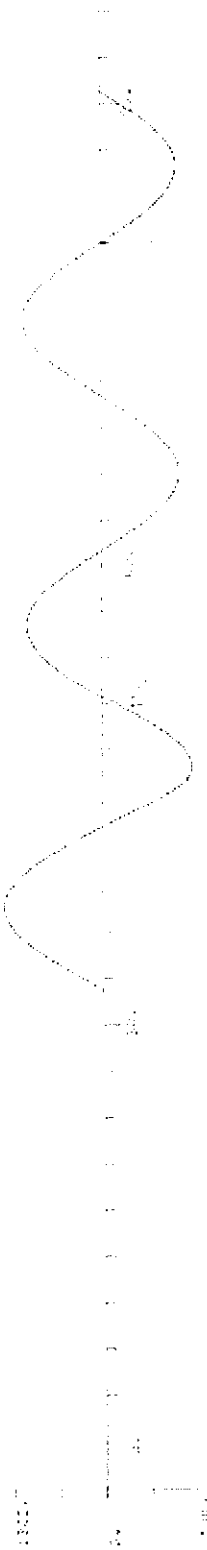
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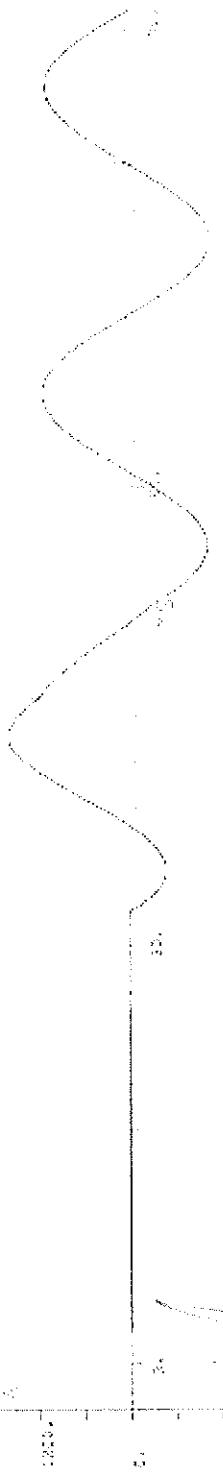
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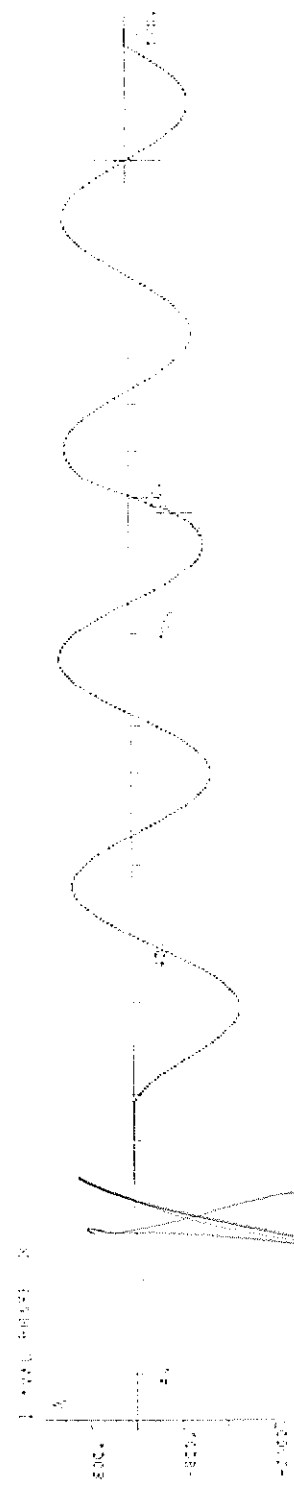
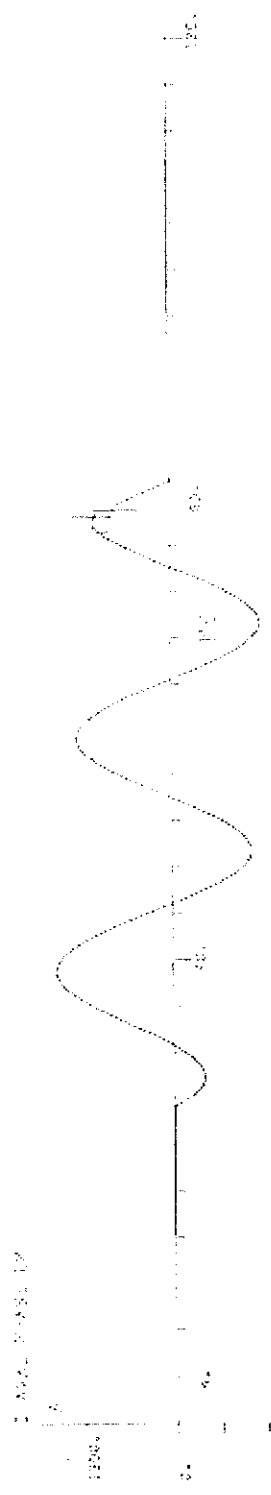
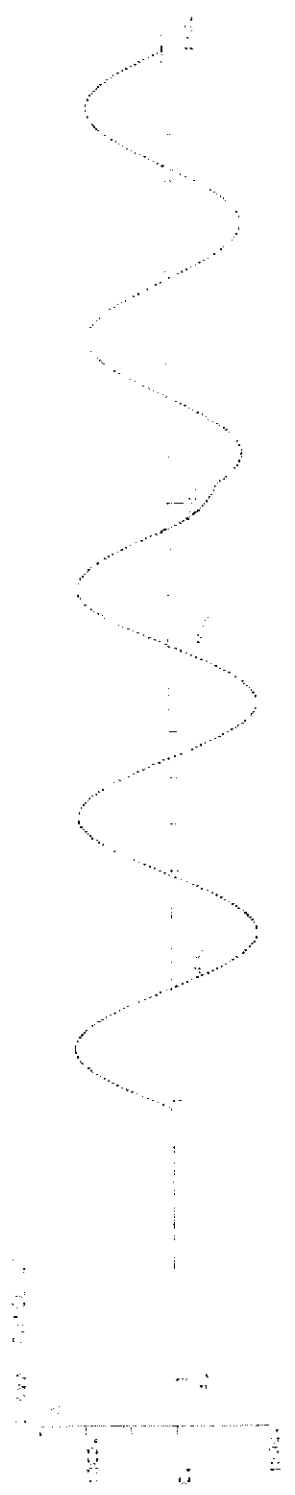
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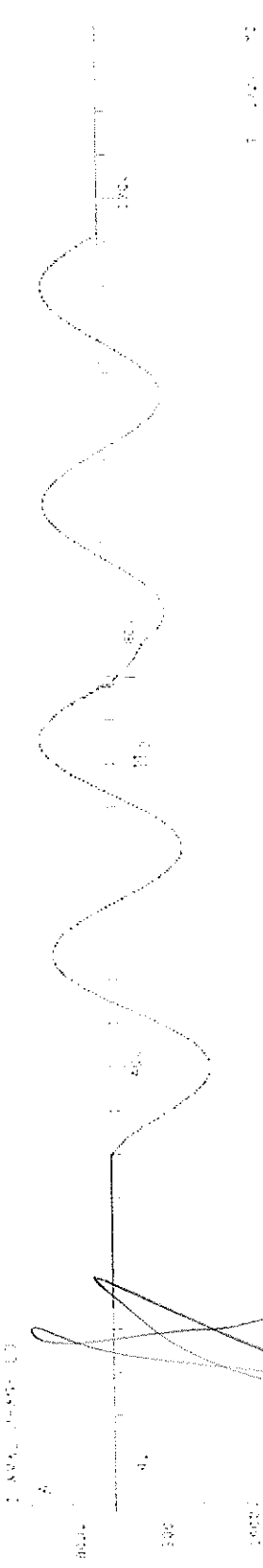
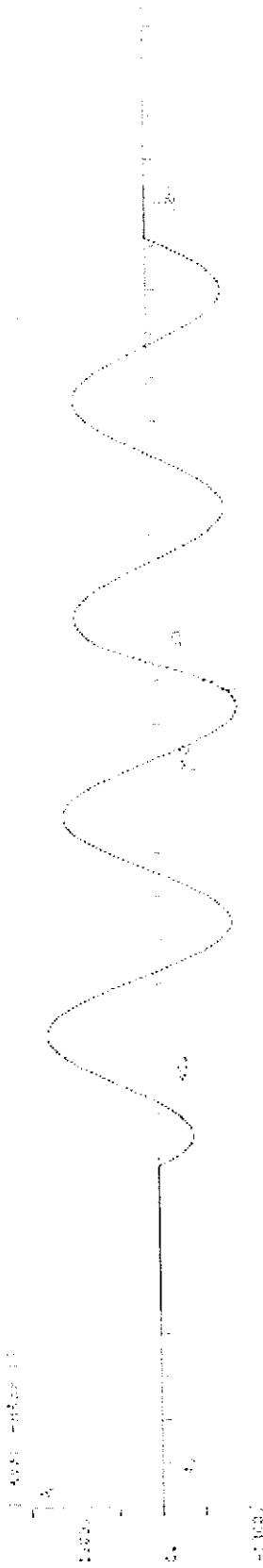
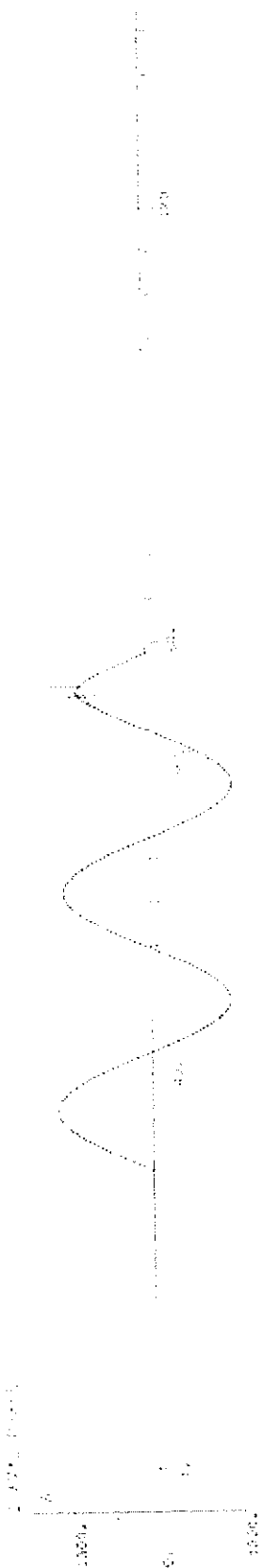
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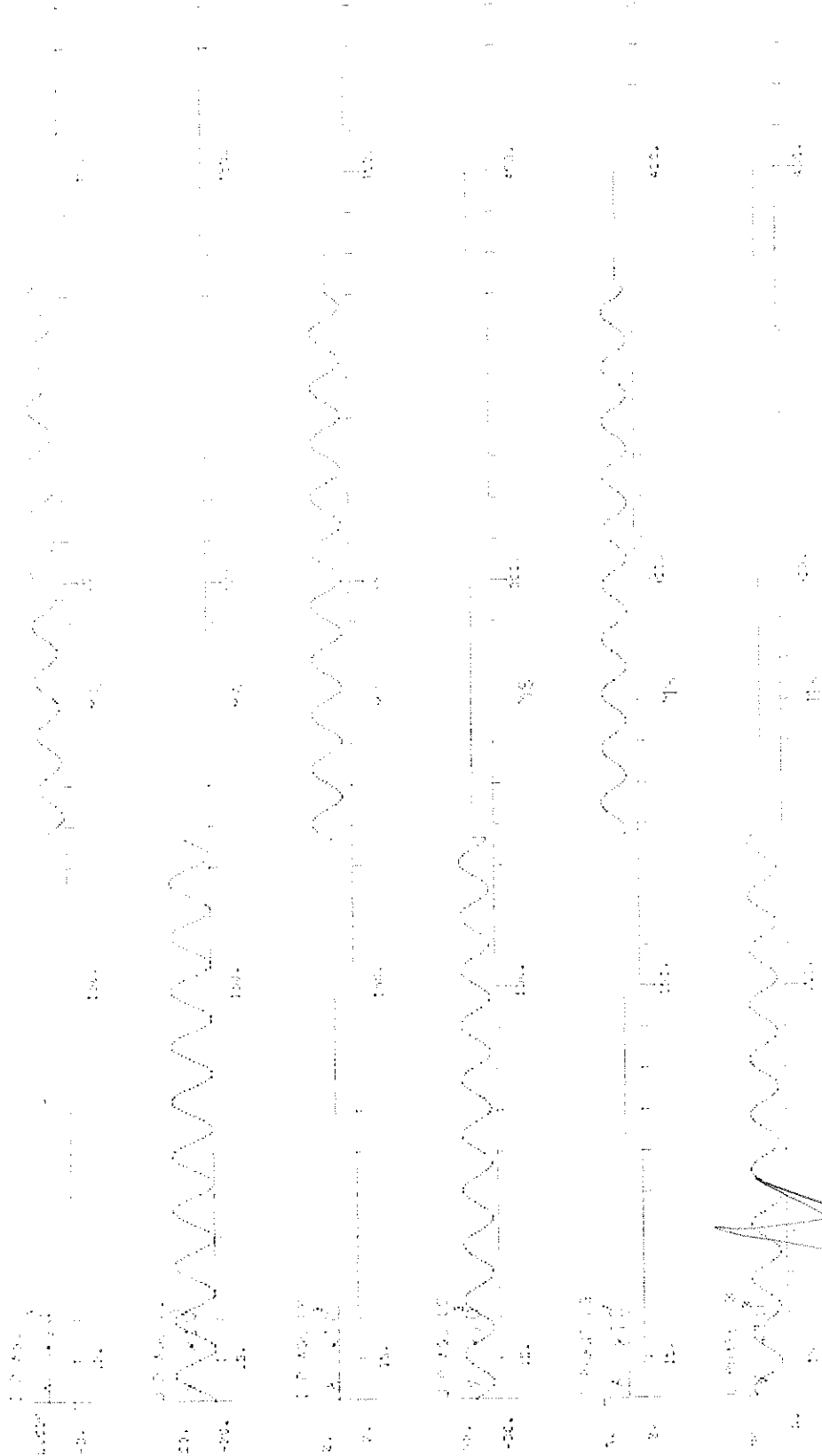


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ECG
 12-lead
 100%
 25mm/sec
 10mm/mV
 100%
 25mm/sec
 10mm/mV

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100% SENSITIVITY
 100% GAIN
 100% SPEED
 100% PAPER SPEED
 100% PAPER TENSION

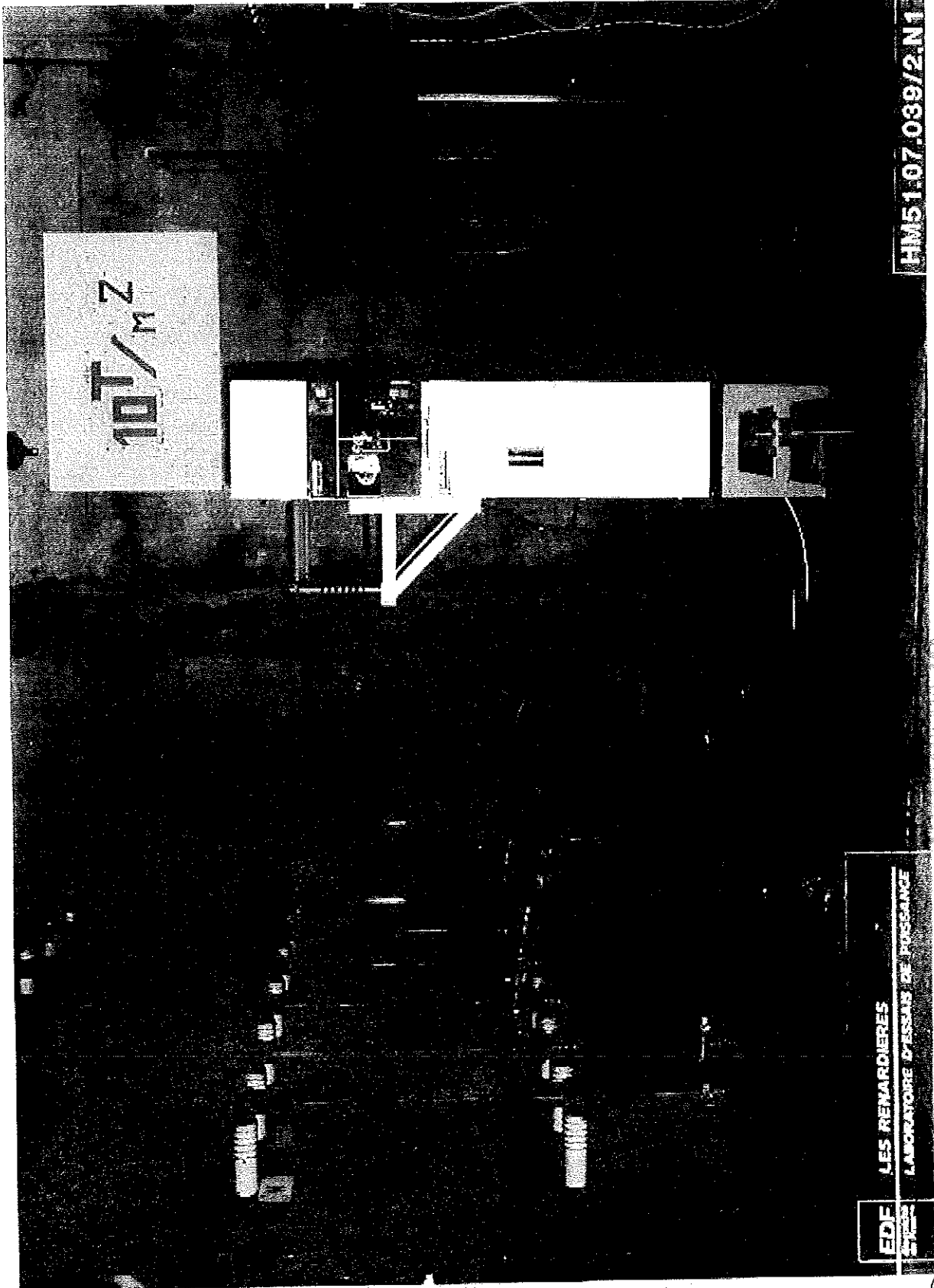
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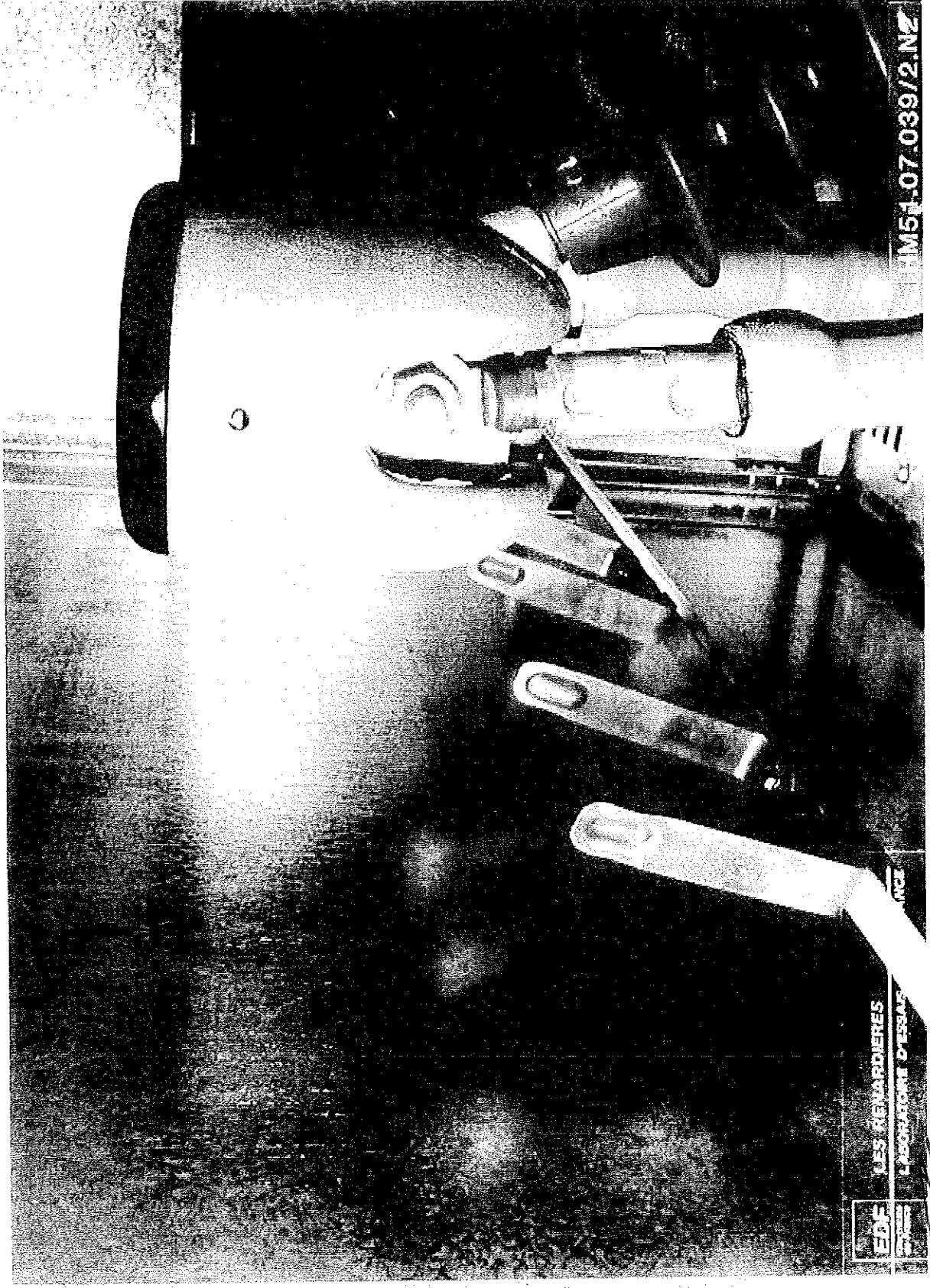
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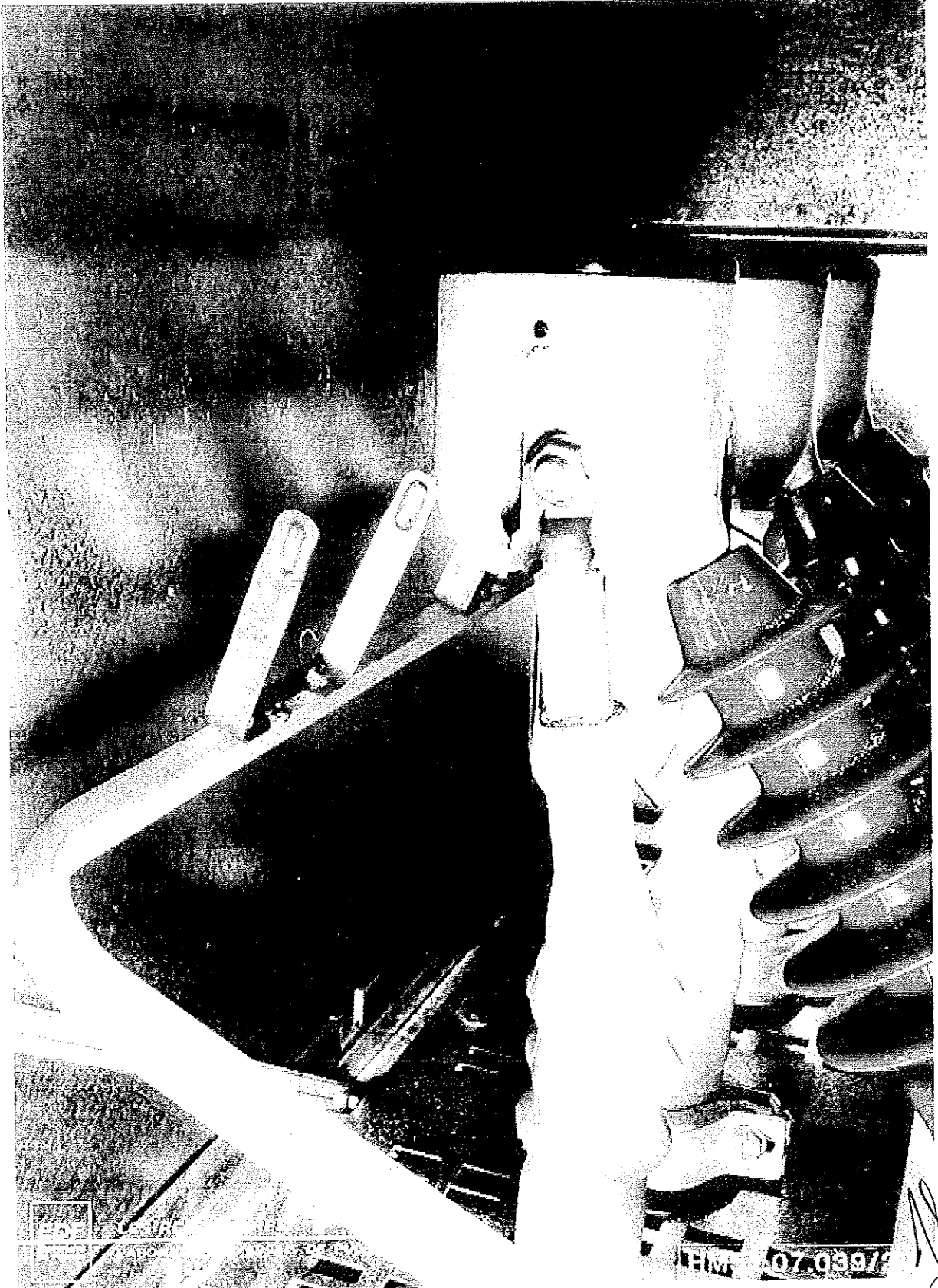
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AB3665b

ESEF

ensemble des stations d'essais Françaises
BP n° 1
77250 Moret sur Long

TEST REPORT No. AB 3665 b

Apparatus : High-voltage switch

Designation : SM6 inside cubicle SM6 type QM

Rated voltage 24 kV-Rated normal current 200 A-Rated frequency 50/60 Hz

Manufacturer : MERLIN GERIN - Grenoble - FRANCE

Object : Single capacitor bank current switching tests rated at :

135 A - 24 kV

Short-circuit making tests rated at :

31.5 kA peak - 24 kV

Tested for : MERLIN GERIN

Date(s) of tests : 13 - 14 - 15 - 18 / 04 / 1994

These tests were carried out in accordance with : **Customer request based on NFC standard 64.130 (1992) § 6.101.12**

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

The responsibility for conformity of any apparatus having the same designation with that tested rests with the Manufacturer.

The documents forming part of this report are :

Ratings of the apparatus	page(s) 2 to 4
Record of proving tests	page(s) 5
Conditions of proving tests	page(s) 6 to 11
Test result tables	page(s) 12 to 31
Oscillograms	page(s) 32 to 81
Photographs	page(s) none

The test report comprises 81 page(s)

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Grenoble 22 / 02 / 1995

Technical Manager

Testing Station Manager

Ph. MAUDUIT

J.C. OKERMAN

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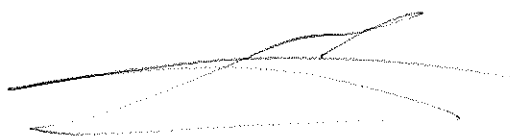
No. AB 3665 b

page 2

RATINGS OF THE METAL-ENCLOSED SWITCHGEAR ACCORDING TO IEC 298

Manufacturer	: MERLIN GERIN
Designation	: Cubicle SM6 type QM
Number of phases	: 3
Voltage	kV: 24
Power frequency withstand voltages (1 min)	
- to earth and between phases	kV: 50
- across the isolation distance	kV: 60
Lightning impulse withstand voltages	
- to earth and between phases	kV: 125
- across the isolation distance	kV: 145
Frequency	Hz: 50/60
Normal current	A: 200
Peak withstand current	kA: 31.5
Short-time withstand currents	
- main circuit	kA: 12.5
- earthing switch	kA: 12.5
- earth bar	kA: 12.5
Duration of short-circuit	s: 1
Arcing withstand due to an internal fault	kA: /
- duration	s: /
- type of accessibility	: /
Degree of protection	: IP2XC
Dimensions	: /
Weight	: /
Drawing(s) No.	: 3729262 A
The metal-enclosed switchgear, is equipped with : 1 switch SM6	

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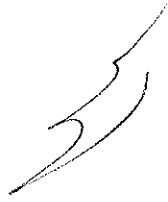
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No. AB 3665 b

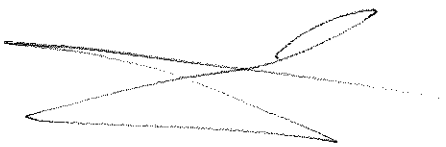
page 3



RATINGS OF THE HV SWITCH ACCORDING TO IEC 265

Manufacturer	: MERLIN GERIN
Designation	: SM6
Number of poles	: 3
Type of switch	: with increased operating frequency
Class	: indoor
Voltage	kV: 24
Power frequency withstand voltage (1 min)	kV: 50
Lighting impulse withstand voltage	kV: 125
Frequency	Hz: 50/60
Normal current	A : 200
Breaking capacities	
Mainly active load	A : 200
No-load transformer	A : /
Closed-loop	A : 200
Cable-charging	A : 25
Line-charging	A : /
Earth-fault	A : 75
Cable-charging under earth-fault conditions	A : 44
Making capacity	kA: 31.5
Peak withstand current	kA peak : 31.5
Short-time withstand current	kA R.M.S. : 12.5
- duration	s : 1
Mechanical endurance	Operating cycles : 1000
Interrupting medium	: gas SF6
Absolute pressure required at 20 °C	bar : 1.4
Operating temperatures	minimum °C : - 25 maximum °C : + 55
Degree of protection	: IP2XC
Drawing(s) No.	: /

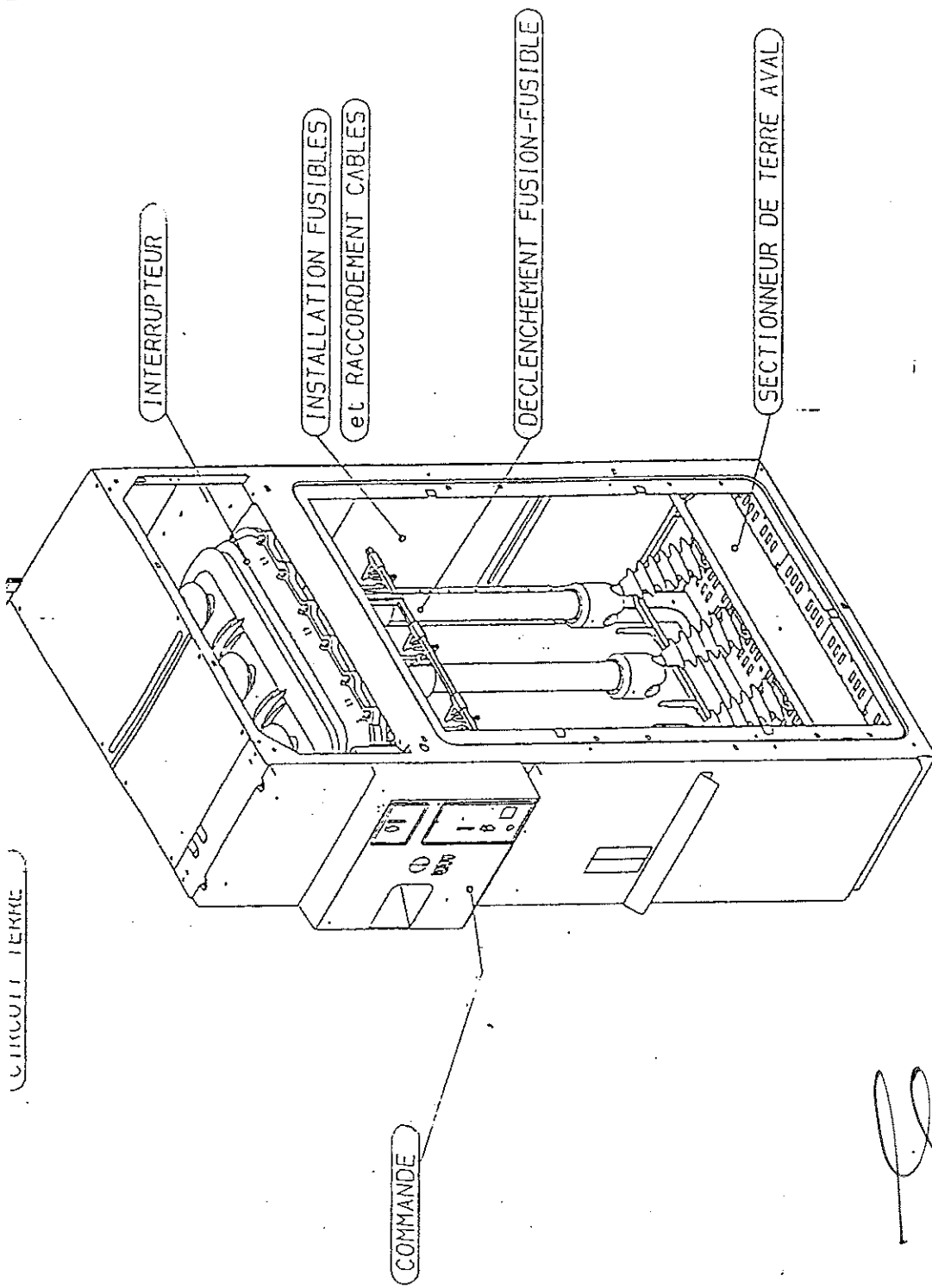
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Page 3729262
Indice modif. A

MERLIN GERIN

CELLULE
INTERRUPTEUR
PROTECTION (G1)

SM6

Ind. (note)	Date	Modification/qualification

Ind. (note)	Date	Modification/qualification

Édition originale/first issue
Modification/qualification

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No. AB 3665 b

page 5

RECORD OF PROVING TESTS

Apparatus No. :

test type and test-duty	Page
- Calibration of the supply circuit A : 1.29 kA - 24 kV	8
- Calibration of the supply circuit B : 6.98 kA - 24 kV	10
- No-load operations before tests	12
- Single-capacitor bank switching current tests	
Test-duty No.4 : 10 CO at 133/138 A - 24.8/25.3 kV	13 to 16
Test-duty No.2 : 10 CO at 145/148 A - 26.5/27.0 kV	17 to 20
Test-duty No.1 : 10 CO at 46.0/49.0 A - 24.4/24.9 kV	21 to 24
Test-duty No.3 : 10 CO at 46.0/47.7 A - 24.2/24.7 kV	25 to 28
- 2 making tests at short-circuit making current at: 31.5 kA peak - 24.6/24.7 kV	29
- No-load operations after tests	30
- Measurement of the resistance of the main circuit before and after tests	31

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Manufacturer Representative(s) : Mr MESTRALLET

MERLIN GERIN/DMT

Test Manager

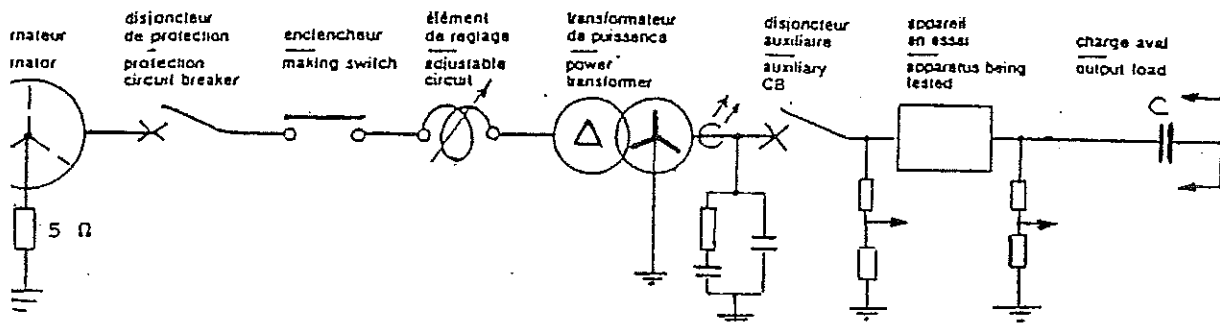
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TEST CIRCUIT FOR SINGLE CAPACITOR BANK CURRENT SWITCHING TESTS



Note : - The measuring devices of the voltage on load side were not suited;
- The voltage drop does not exceed 10 % 100 ms after arc extinction.

CONDITIONS OF PROVING TESTS

- Supply by the upper switch connections
- The fuses are replaced by rigid connections
- Pressure of the interrupting medium : 0.4 bar gauge
- Control devices supply : 85 % of the rated voltage : 187 Vac
- The time of supply of the opening coil is changed by 1 ms after each test
- The duration between two successive operations is 3 to 5 minutes
- The metallic enclosure is connected to earth point by cable 50 mm². The fault current is recorded on the oscillograms

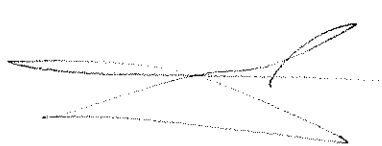
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Test-duties No.1 and 2

The short-circuit current reaches 10 % of the rated short-time withstand current of the switch

Test-duties No.3 and 4

The short-circuit current reaches 56 % of the rated short-time withstand current of the switch



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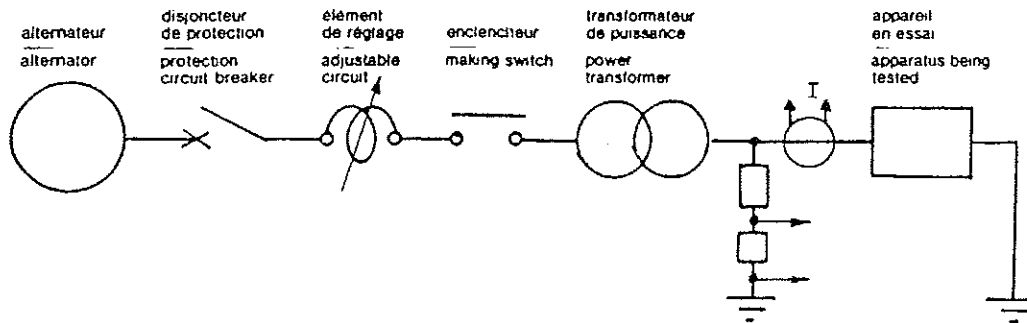
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No. AB 3665 b

page 7

TEST CIRCUIT FOR THE SHORT-CIRCUIT MAKING TESTS



CONDITIONS OF PROVING TESTS

- Supply by the upper switch connections
- The short-circuit is on lower switch connections
- Pressure of the interrupting medium : 0.4 bar gauge
- Control devices supply : 85 % of the rated voltage : 187 Vac

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No. AB 3665 b

page 8

CALIBRATION OF THE SUPPLY CIRCUIT A

Oscillogram	No.	B 3665.94.04.13.014			
Circuit : 100 %		phase 1	phase 2	phase 3	
Frequency	Hz	50			
Measure of the R.M.S. current	Time	ms	20	20	20
	Value	kA	1.29	1.30	1.27
	Average	kA	1.29		
Aperiodic component	Value	%	75	70	6
Peak current	kA	3.45	3.50	2.00	
Power factor		0.05			

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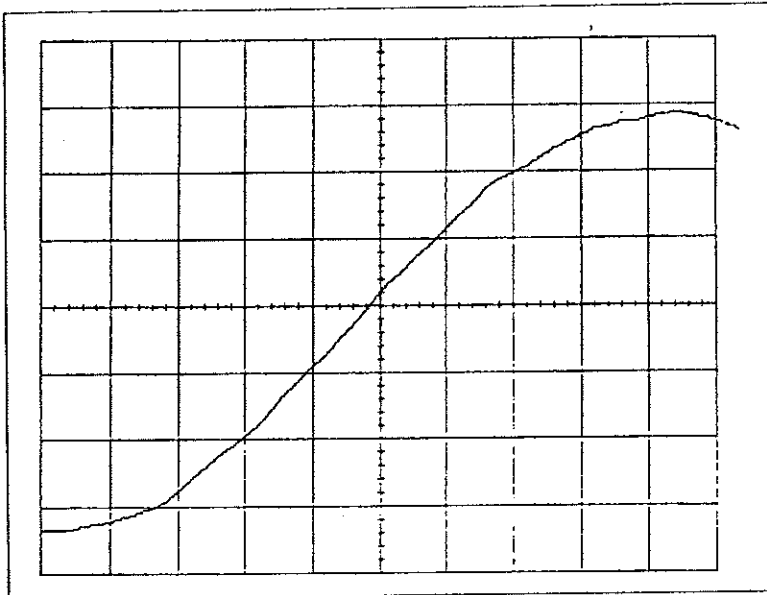
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No. AB 3665 b

page 9

PROSPECTIVE TRV OF THE SUPPLY CIRCUIT A

Circuit : 1.29 kA - 24 kV



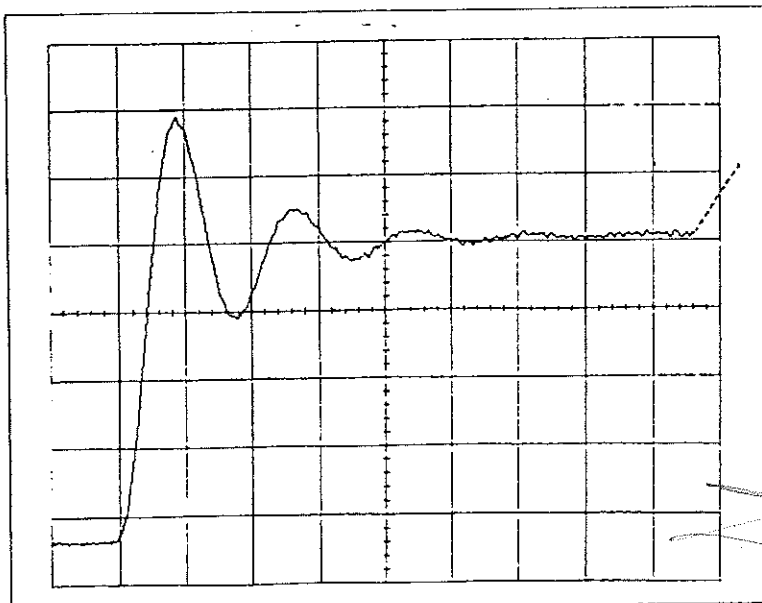
Time base : 10 μs /unit

$$t_3 = 78 \mu\text{s}$$

$$t_d = 9 \mu\text{s}$$

$$k = 1.42$$

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Time base : 0.1 ms /unit

$$k = 1.42$$

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No. AB 3665 b

page 10

CALIBRATION OF THE SUPPLY CIRCUIT B

Oscillogram	No.	B 3665.94.04.13.015			
Circuit : 50 %		phase 1	phase 2	phase 3	
Frequency	Hz	50			
Measure of the R.M.S. value	Time	ms	10	10	10
	Value	kA	3.59	3.48	3.40
	Average	kA	3.49		
Aperiodic component	Value	%	93	66	32
Peak current	kA	9.78	8.50	6.15	
Power factor		0.03			

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Circuit : 100 %		phase 1	phase 2	phase 3	
Frequency	Hz	50			
Measure of the R.M.S. value	Time	ms	10	10	10
	Value	kA	7.18	6.96	6.80
	Average	kA	6.98		
Aperiodic component	Value	%	93	66	32
Peak current	kA	19.6	17.2	12.3	
Power factor		0.03			

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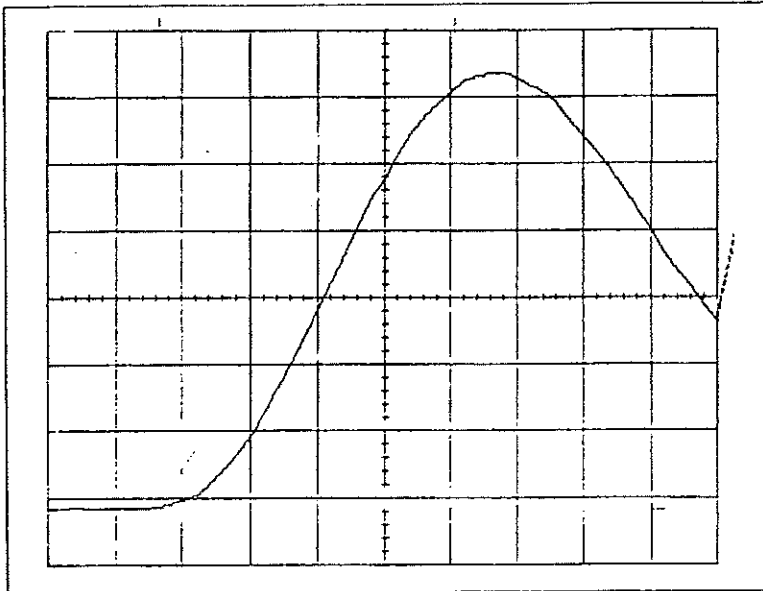
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No. AB 3665 b

page 11



PROSPECTIVE TRV OF THE SUPPLY CIRCUIT B



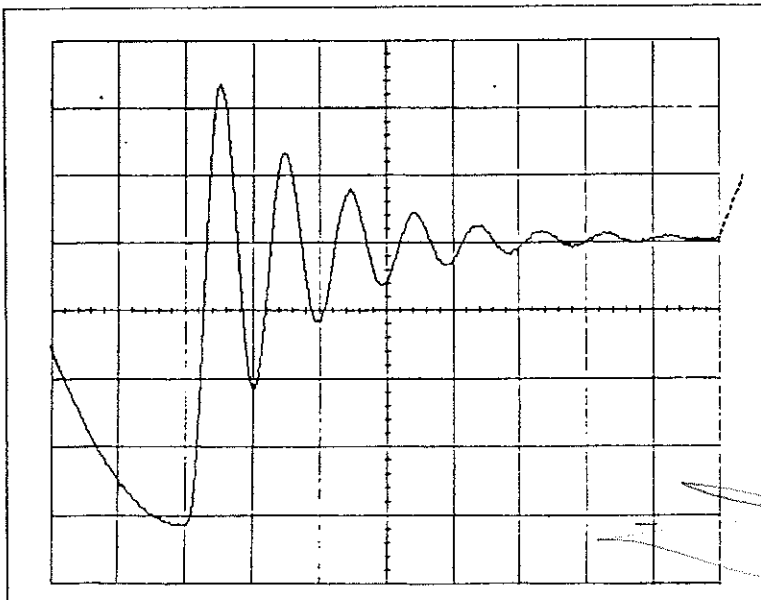
Circuit : 6.98 kA - 24 kV

$$t_3 = 88 \mu\text{s}$$

$$t_d = 15 \mu\text{s}$$

$$k = 1.55$$

Time base : 20 μs /unit



$$k = 1.55$$

Time base : 0.2 ms /unit

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No. AB 3665 b

page 12

RESULTS OF THE NO-LOAD OPERATIONS BEFORE TESTS

RATINGS

Motor supply voltage : 220 Vac
Pressure of the interrupting medium : 0.4 bar gauge
Supply voltage of the opening coil : 220 Vac
Supply voltage of the closing coil : 220 Vac

Oscillogram No. B 3665.94.04.13			011	012	013	
Operating sequence			C - 0	C - 0	C - 0	
Motor supply voltage		Vac	242	220	187	
Pressure of the interrupting medium	gauge	bar	0.4	0.4	0.4	
	absolute	bar	1.4	1.4	1.4	
Supply voltage of the coil	opening	Vac	242	220	187	
	closing	Vac	242	220	187	
Time	opening	ms	20.5	19	25	
	closing	ms	60	59	67.5	

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No. AB 3665 b

page 13

RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 4

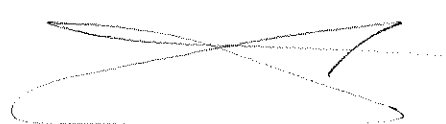
Operating conditions of the apparatus : See page 6

Test conditions : See pages 6 - 10 - 11

Apparatus condition before tests : Having performed the single capacitor bank tests of test report No. AB 3665 a

Oscillogram No. B 3665.94.04.14			062			t	063			t	064	
Operating sequence			C-0				C-0				C-0	
Applied voltage		kV	23.9				24.2				24.1	
Peak current		A	410	740	880	800	450	930	920	720	460	
Closing time		ms	45.0				48.0				54.0	
Broken current	per phase	A	131	131	138	131	138	138	134	138	134	
	average	A	133				136				135	
Aperiodic component		%	< 20				< 20				< 20	
Recovery voltage	per phase	kV	14.5	14.1	14.3	14.3	14.5	14.7	14.3	14.3	14.5	
	average	kV	14.3				14.5				14.4	
	phase to phase	kV	24.8				25.1				24.9	
Time	opening	ms	25				25				25	
	arcing	ms	7				10				11	
	break	ms	32.0				35.0				36.0	
Remarks												

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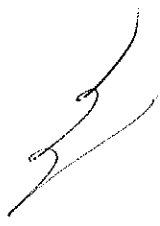

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No. AB 3665 b

page 14



RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 4

Operating conditions of the apparatus : See page 6

Test conditions : See pages 6 - 10 - 11

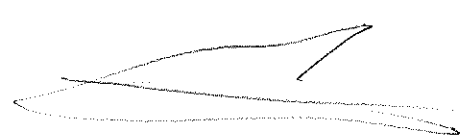
Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.14			065			t	066			t	067		
Operating sequence			C-0				C-0				C-0		
Applied voltage		kV	24.2				24.1				24.2		
Peak current		A	580	860	820	860	400	870	740	930	760		
Closing time		ms	51.0				48.0				42.0		
Broken current	per phase	A	134	138	134	134	138	138	134	134	138		
	average	A	135				137				135		
Aperiodic component		%	< 20				< 20				< 20		
Recovery voltage	per phase	kV	14.5	14.7	14.3	14.3	14.5	14.5	14.3	14.5	14.5		
	average	kV	14.5				14.4				14.4		
	phase to phase	kV	25.1				24.9				24.9		
Time	opening	ms	25				25				25		
	arcing	ms	10.5				10				7.5		
	break	ms	35.5				35.0				32.5		
Remarks													

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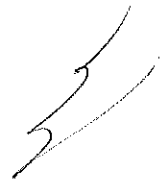


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No. AB 3665 b

page 15



RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 4

Operating conditions of the apparatus : See page 6

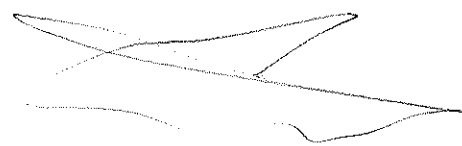
Test conditions : See pages 6 - 10 - 11

Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.14			068			t	069			t	070	
Operating sequence			C-0				C-0				C-0	
Applied voltage		kV	24.2				24.2				23.9	
Peak current		A	560	880	880	950	880	740	680	870	810	
Closing time		ms	40.0				44.0				42.5	
Broken current	per phase	A	134	138	138	134	134	138	138	138	138	
	average	A	137				135				138	
Aperiodic component		%	< 20				< 20				< 20	
Recovery voltage	per phase	kV	14.7	14.5	14.3	14.5	14.5	14.5	14.5	14.7	14.3	
	average	kV	14.5				14.5				14.5	
	phase to phase	kV	25.1				25.1				25.1	
Time	opening	ms	25				25				25	
	arcing	ms	6.5				8.5				8	
	break	ms	31.5				33.5				33.0	
Remarks												

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No. AB 3665 b

page 16



RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 4

Operating conditions of the apparatus : See page 6

Test conditions : See pages 6 - 10 - 11

Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.14			071	t		t	
Operating sequence			C-O		C-O		C-O
Applied voltage		kV	24.0				
Peak current		A	500	860	910		
Closing time		ms	45.0				
Broken current	per phase	A	134	134	138		
	average	A	135				
Aperiodic component		%	< 20				
Recovery voltage	per phase	kV	14.7	14.5	14.3		
	average	kV	14.6				
	phase to phase	kV	25.3				
Time	opening	ms	25				
	arcing	ms	7				
	break	ms	32.0				
Remarks							

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Apparatus condition after tests : No deterioration was noted

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1410

VOLTA

centre d'essais
station d'essais à grande puissance
F-38050 Grenoble cedex 9

No. AB 3665 b

page 17

RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 2

Operating conditions of the apparatus : See page 6

Test conditions : See pages 6 - 8 - 9

Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.15			078			t	079			t	080		
Operating sequence			C-0				C-0				C-0		
Applied voltage		kV	23.7				23.9				24.1		
Peak current		A	530	730	530	600	660	320	430	730	540		
Closing time		ms	42.0				43.5				46.5		
Broken current	per phase	A	148	145	145	148	145	148	148	148	148		
	average	A	146				147				148		
Aperiodic component		%	< 20				< 20				< 20		
Recovery voltage	per phase	kV	15.2	15.2	15.6	15.2	15.6	15.6	15.6	15.6	15.6		
	average	kV	15.3				15.5				15.6		
	phase to phase	kV	26.5				26.8				27.0		
Time	opening	ms	25				25				25		
	arcing	ms	6.5				9				8.5		
	break	ms	31.5				34.0				33.5		
Remarks													

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1411

RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 2

Operating conditions of the apparatus : See page 6

Test conditions : See pages 6 - 8 - 9

Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.15		081			t	082			t	083		
Operating sequence		C-0				C-0				C-0		
Applied voltage		kV 23.9				24.1				23.8		
Peak current		A	480	440	730	300	550	720	560	730	410	
Closing time		ms 41.5				41.0				48.0		
Broken current	per phase	A	148	148	148	148	145	141	152	145	145	
	average	A	148			145			147			
Aperiodic component		%	< 20			< 20			< 20			
Recovery voltage	per phase	kV	15.6	15.6	15.0	15.2	15.6	15.2	15.6	15.6	15.6	
	average	kV	15.4			15.3			15.6			
	phase to phase	kV	26.7			26.5			27.0			
Time	opening	ms	25			25			25			
	arcing	ms	13.5			9			6			
	break	ms	38.5			34.0			31.0			
Remarks												

OPERA
BREVETÉ

1412

VOLTA

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F-38050 Grenoble cedex 9

No. AB 3665 b

page 19

RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 2

Operating conditions of the apparatus : See page 6

Test conditions : See pages 6 - 8 - 9

Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.15			084			t	085			t	086		
Operating sequence			c-0				c-0				c-0		
Applied voltage		kV	23.9				23.9				23.9		
Peak current		A	440	720	570	750	330	570	620	410	720		
Closing time		ms	45.0				52.0				53.5		
Broken current	per phase	A	152	148	148	145	145	145	148	141	148		
	average	A	149				145				146		
Aperiodic component		%	< 20				< 20				< 20		
Recovery voltage	per phase	kV	15.6	15.6	15.6	15.2	15.6	15.6	15.6	15.6	15.6		
	average	kV	15.6				15.5				15.6		
	phase to phase	kV	27.0				26.8				27.0		
Time	opening	ms	25				25				25		
	arcing	ms	13				9				11		
	break	ms	38.0				34.0				36.0		
Remarks													

 VOLTAGE
 CURRENT
 TIME




 1413

VOLTA

centre d'essais
station d'essais à grande puissance
F-38050 Grenoble cedex 9

No. AB 3665 b

page 20

RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 2

Operating conditions of the apparatus : See page 6

Test conditions : See pages 6 - 8 - 9

Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.15			087	t		t	
Operating sequence			C-0		C-0		C-0
Applied voltage		kV	24.0				
Peak current		A	160	320	540		
Closing time		ms	52.0				
Broken current	per phase	A	148	148	148		
	average	A	148				
Aperiodic component		%	< 20				
Recovery voltage	per phase	kV	15.2	15.6	15.2		
	average	kV	15.3				
	phase to phase	kV	26.5				
Time	opening	ms	25				
	arcing	ms	9.5				
	break	ms	34.5				
Remarks							

OPERAZIONE
PROMO C

Apparatus condition after tests : No deterioration was noted

RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 1

Operating conditions of the apparatus : See page 6

Test conditions : See pages 6 - 8 - 9

Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.18		091			t	092			t	093			
Operating sequence		C-0				C-0				C-0			
Applied voltage		kV			24.0			24.1			24.1		
Peak current		A	320	380	250	150	300	350	200	340	330		
Closing time		ms			48.5			40.5			40.0		
Broken current	per phase	A	47.7	46.0	46.0	46.0	46.0	46.0	49.5	49.5	49.5		
	average	A	46.6			46.0			49.0				
Aperiodic component		%	< 20			< 20			< 20				
Recovery voltage	per phase	kV	14.1	14.5	13.8	14.3	14.3	14.3	14.5	14.5	14.1		
	average	kV	14.1			14.3			14.4				
	phase to phase	kV	24.4			24.8			24.9				
Time	opening	ms	25			25			25				
	arcing	ms	12.5			7.5			7				
	break	ms	37.5			32.5			32.0				
Remarks													

OPERATIONAL
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1415



RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 1

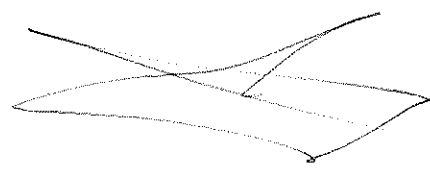
Operating conditions of the apparatus : See page 6

Test conditions : See pages 6 - 8 - 9

Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.18			094			t	095			t	096		
Operating sequence			C-0				C-0				C-0		
Applied voltage		kV	23.9				23.9				23.9		
Peak current		A	350	190	260	290	190	330	330	340	160		
Closing time		ms	48.0				49.5				43.5		
Broken current	per phase	A	47.7	49.5	46.0	49.5	46.0	47.7	49.5	46.0	47.7		
	average	A	47.7				47.7				47.7		
Aperiodic component		%	< 20				< 20				< 20		
Recovery voltage	per phase	kV	14.3	14.1	14.1	14.3	14.5	14.1	14.3	14.3	14.1		
	average	kV	14.2				14.3				14.2		
	phase to phase	kV	24.6				24.8				24.6		
Time	opening	ms	25				25				25		
	arcing	ms	13				6.5				7.5		
	break	ms	38.0				31.5				32.5		
Remarks													

VOLTA
CENTRE D'ESSAIS
A GRANDE PUISSANCE



1416

VOLTA

centre d'essais
station d'essais à grande puissance
F-38050 Grenoble cedex 9

No. AB 3665 b

page 23

RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 1

Operating conditions of the apparatus : See page 6

Test conditions : See pages 6 - 8 - 9

Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.18			097			t	098			t	099		
Operating sequence			C-0				C-0				C-0		
Applied voltage		kV	23.8				23.9				24.2		
Peak current		A	170	310	350	310	350	210	280	210	340		
Closing time		ms	41.5			46.0			50.5				
Broken current	per phase	A	49.5	47.5	47.7	49.5	47.7	47.7	49.5	49.5	47.7		
	average	A	48.3			48.3			48.9				
Aperiodic component		%	< 20			< 20			< 20				
Recovery voltage	per phase	kV	14.1	14.1	14.1	14.1	14.3	14.1	14.3	14.5	14.1		
	average	kV	14.1			14.1			14.3				
	phase to phase	kV	24.4			24.4			24.8				
Time	opening	ms	25			25			25				
	arcing	ms	9.5			11			9.0				
	break	ms	34.5			36.0			34.0				
Remarks													

VIVIANO
OPINIANO
CORRADI

1417

VOLTA

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 station d'essais à grande puissance
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No. AB 3665 b

page 24

RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 1

Operating conditions of the apparatus : See page 6

Test conditions : See pages 6 - 8 - 9

Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.18			100	t		t	
Operating sequence			c-0		c-0		c-0
Applied voltage		kV	23.9				
Peak current		A	340	150	280		
Closing time		ms	49.0				
Broken current	per phase	A	49.5	47.7	47.7		
	average	A	48.3				
Aperiodic component		%	< 20				
Recovery voltage	per phase	kV	14.3	14.5	14.1		
	average	kV	14.3				
	phase to phase	kV	24.8				
Time	opening	ms	25				
	arcing	ms	14.5				
	break	ms	39.5				
Remarks							

OPERATIONAL
 PROGRAM
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Apparatus condition after tests : No deterioration was noted

1418

VOLTA

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No. AB 3665 b

page 25

RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 3

Operating conditions of the apparatus : See page 6

Test conditions : See pages 6 - 10 - 11

Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.18			101			t	102			t	103	
Operating sequence			C-0				C-0				C-0	
Applied voltage		kV	24.1				24.1				24.0	
Peak current		A	220	500	500	540	360	500	460	540	310	
Closing time		ms	43.5				49.0				49.0	
Broken current	per phase	A	47.7	46.0	47.7	47.7	47.7	47.7	46.0	47.7	47.7	
	average	A	47.1				47.7				47.1	
Aperiodic component		%	< 20				< 20				< 20	
Recovery voltage	per phase	kV	14.3	14.1	14.0	14.1	14.1	13.8	14.1	14.1	13.8	
	average	kV	14.1				14.0				14.0	
	phase to phase	kV	24.4				24.2				24.2	
Time	opening	ms	25				25				25	
	arcing	ms	6				12				5	
	break	ms	31.0				37.0				30.0	
Remarks												

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1419



RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 3

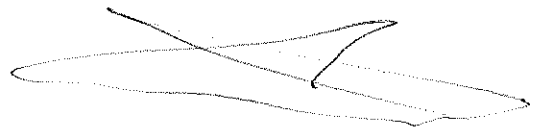
Operating conditions of the apparatus : See page 6

Test conditions : See pages 6 - 10 - 11

Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.18		104			t	105			t	106			
Operating sequence		C-0				C-0				C-0			
Applied voltage		kV			24.0			24.1			23.9		
Peak current		A	240	490	520	300	470	520	150	500	520		
Closing time		ms			39.5			43.5			41.0		
Broken current	per phase	A	46.0	46.0	46.0	47.7	46.0	46.0	46.0	47.7	47.7		
	average	A	46.0			46.6			47.1				
Aperiodic component		%			< 20			< 20			< 20		
Recovery voltage	per phase	kV	14.1	14.1	13.8	14.1	14.1	13.8	14.3	14.1	13.8		
	average	kV	14.0			14.0			14.1				
	phase to phase	kV	24.2			24.2			24.4				
Time	opening	ms	25			25			25				
	arcing	ms	7			6			9.5				
	break	ms	32.0			31.0			34.5				
Remarks													

VOLTA
 CENTRE D'ESSAIS
 A GRANDE PUISSANCE



1420

RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 3

Operating conditions of the apparatus : See page 6

Test conditions : See pages 6 - 10 - 11

Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.18			107			t	108			t	109		
Operating sequence			C-0				C-0				C-0		
Applied voltage		kV	23.8				24.1				24.2		
Peak current		A	240	400	200	400	520	390	300	520	480		
Closing time		ms	46.0				42.5				41.5		
Broken current	per phase	A	46.0	46.0	46.0	46.0	47.7	46.0	47.7	47.7	47.7		
	average	A	46.0				46.6				47.1		
Aperiodic component		%	< 20				< 20				< 20		
Recovery voltage	per phase	kV	14.1	14.3	14.0	14.3	14.3	14.0	14.3	14.5	14.0		
	average	kV	14.1				14.2				14.3		
	phase to phase	kV	24.4				24.6				24.7		
Time	opening	ms	25				25				25		
	arcing	ms	6.5				6				6.5		
	break	ms	31.5				31.0				31.5		
Remarks													

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 OPERATIONS

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1421

RESULTS OF THE MAKING AND BREAKING TESTS

Test-duty : Test-duty No. 3

Operating conditions of the apparatus : See page 6

Test conditions : See pages 6 - 10 - 11

Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.18			110	t		t	
Operating sequence			C-0		C-0		C-0
Applied voltage		kV	24.2				
Peak current		A	220	470	470		
Closing time		ms	49.5				
Broken current	per phase	A	47.7	46.0	46.0		
	average	A	46.6				
Aperiodic component		%	< 20				
Recovery voltage	per phase	kV	14.5	14.5	14.0		
	average	kV	14.3				
	phase to phase	kV	24.7				
Time	opening	ms	25				
	arcing	ms	10.7				
	break	ms	35.7				
Remarks							

ALVARADO
 OPERARIO
 C. GARCIA

Apparatus condition after tests : No deterioration was noted

1422

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No. AB 3665 b

page 29

RESULTS OF THE SHORT-CIRCUIT MAKING TESTS

Apparatus in test : Switch SM6 inside cubicle SM6 type QM


Operating conditions of the apparatus : See page 7

Test conditions : See page 7

Apparatus condition before tests : Having performed the previous tests

Oscillogram No. B 3665.94.04.18			117	t	118	t	
Operating sequence			c		c		c
Applied voltage		kV	24.6		24.7		
Peak current	11	kA	18.9		31.5		
	12	kA	30.8		19.4		
	13	kA	31.5		28.7		
Making current	11	kA	12.8		12.9		
	12	kA	13.0		12.8		
	13	kA	12.7		12.7		
	average	kA	12.8		12.8		
Time	pre-arcing	ms	/		/		
	closing	ms	41.0		38		
	current	ms	150		150		
Fuse							
Remarks							

Apparatus condition after tests : No deterioration was noted.



REPRISE
 OPERATIONS




1423

VOLTA

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No. AB 3665 b

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RESULTS OF THE NO-LOAD OPERATIONS AFTER TESTS**RATINGS**

Motor supply voltage : 220 Vac
 Pressure of the interrupting medium : 0.4 bar gauge
 Supply voltage of the opening coil : 220 Vac
 Supply voltage of the closing coil : 220 Vac

Oscillogram No. B 3665.94.04.18			119	120	121	
Operating sequence			C - O	C - O	C - O	C - O
Motor supply voltage		Vac	242	220	187	
Pressure of the interrupting medium	gauge	bar	0.4	0.4	0.4	
	absolute	bar	1.4	1.4	1.4	
Supply voltage of the coil	opening	Vac	242	220	187	
	closing	Vac	242	220	187	
Time	opening	ms	24	28.5	25	
	closing	ms	39	47	41	

BREVETÉ
 DÉPOSÉ
 VOLTA




1424

VOLTA

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station d'essais à grande puissance
F-38050 Grenoble cedex 9

No. AB 3665 a

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MEASUREMENT OF THE RESISTANCE OF THE MAIN CIRCUIT

Measurement of the voltage drop under 100 Adc

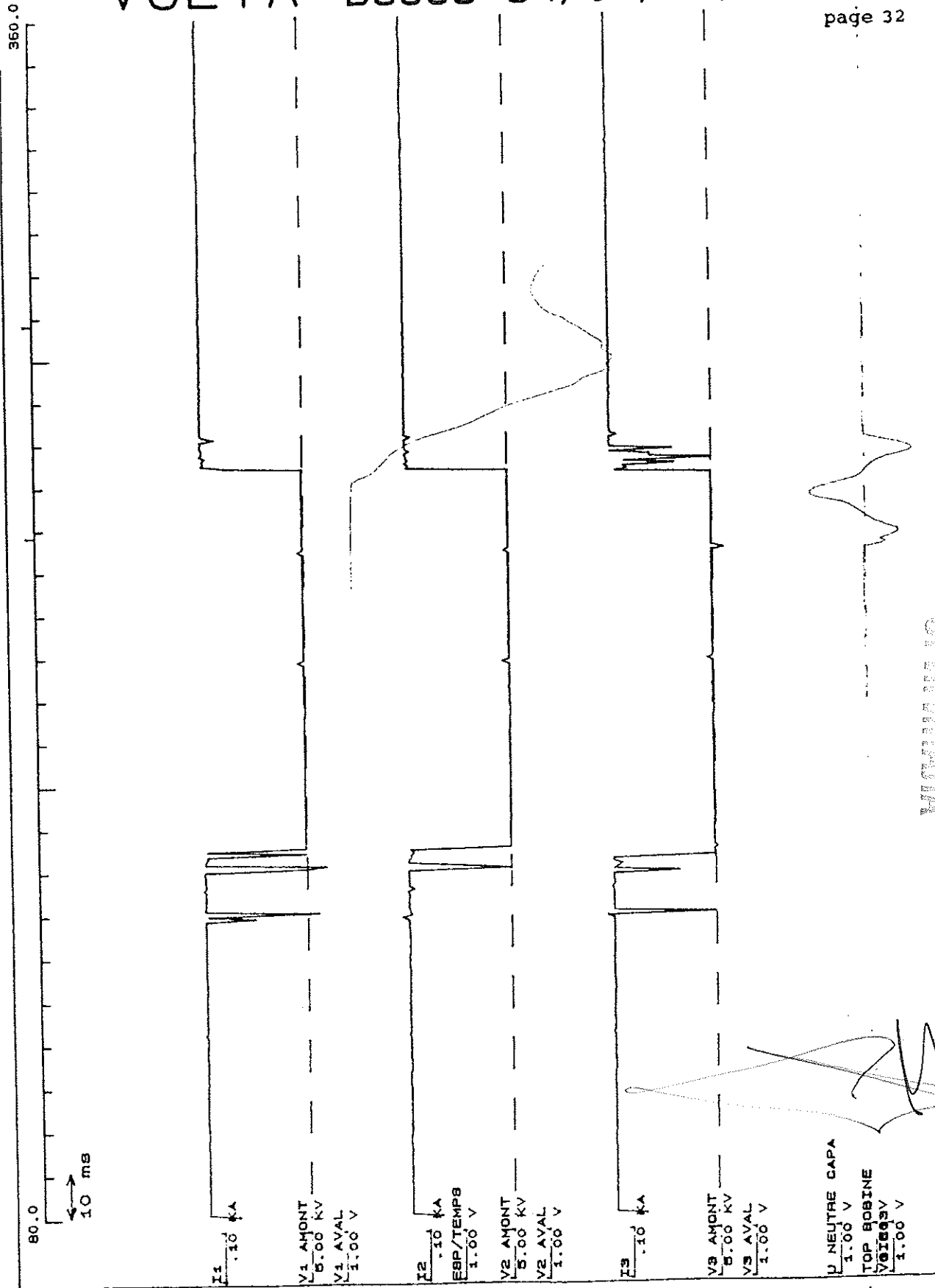
Voltage drop (mV)	Pole 1	Pole 2	Pole 3
Before tests	6.50	7.16	6.64
After tests	5.85	6.24	6.60
Ratio after / before	0.82	0.87	0.99

Satisfactory results : Variations of the voltage drops below 20 %

REPRODUCTION
INTERDITE

1425

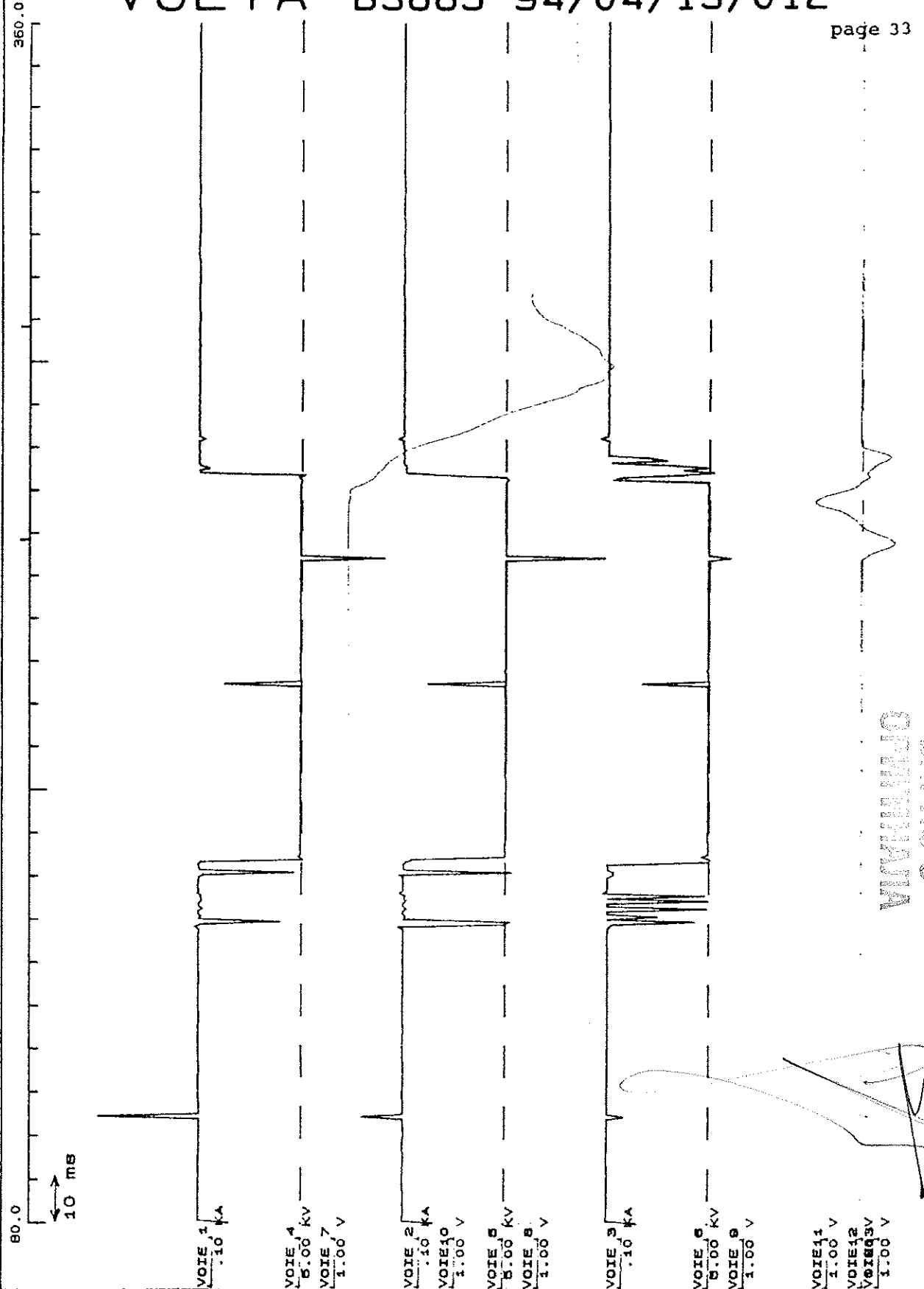
VOLTA B3665 94/04/13/011



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 OTHMAR

1426

VOLTA B3665 94/04/13/012

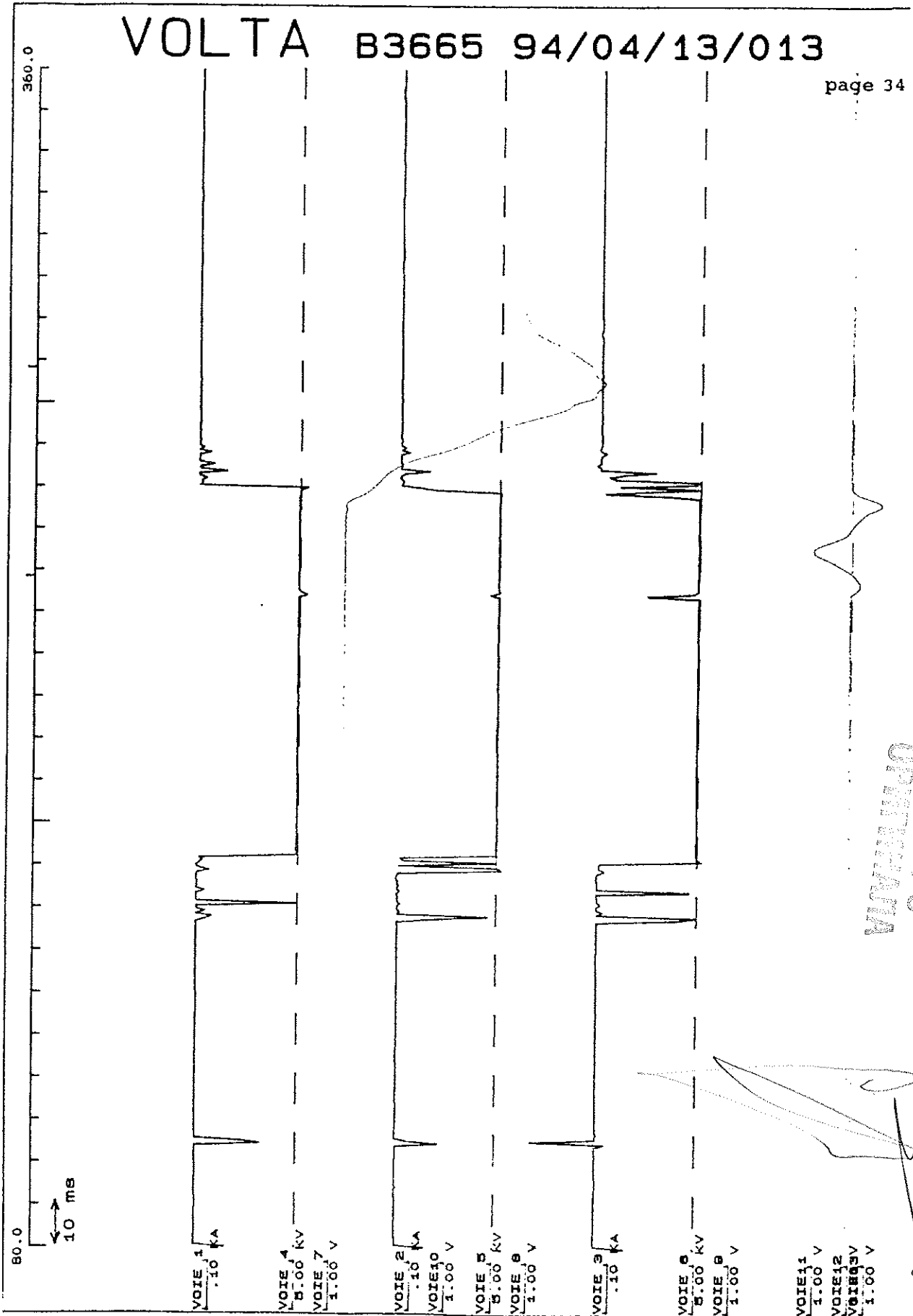


ВЕРИО С
ОПТИМА

1427

VOLTA B3665 94/04/13/013

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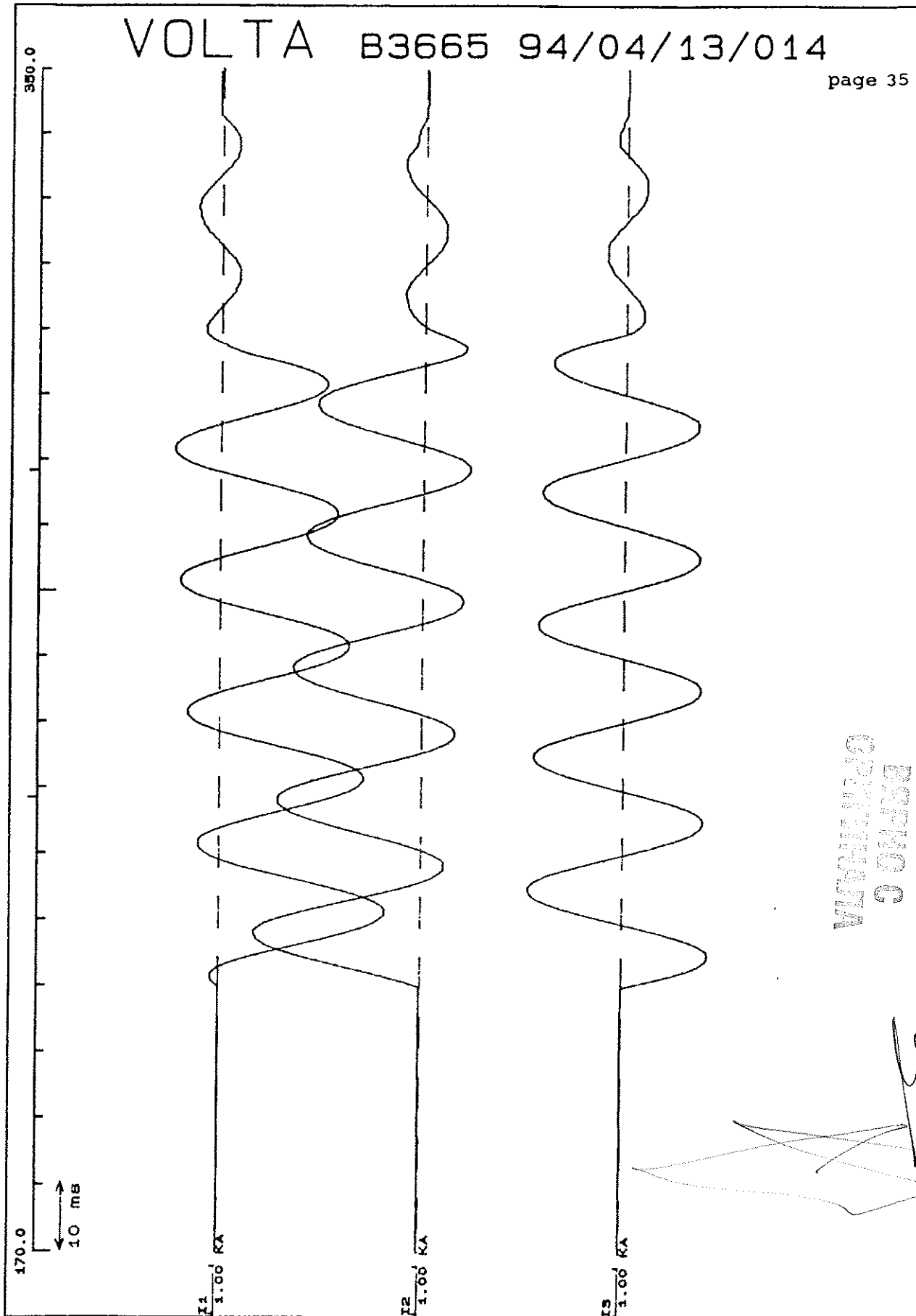
ВРЪНО С
ОПТИМАЛНА

1428

59

VOLTA B3665 94/04/13/014

page 35



ВЕРНО
ОПРЕДЕЛЕНА

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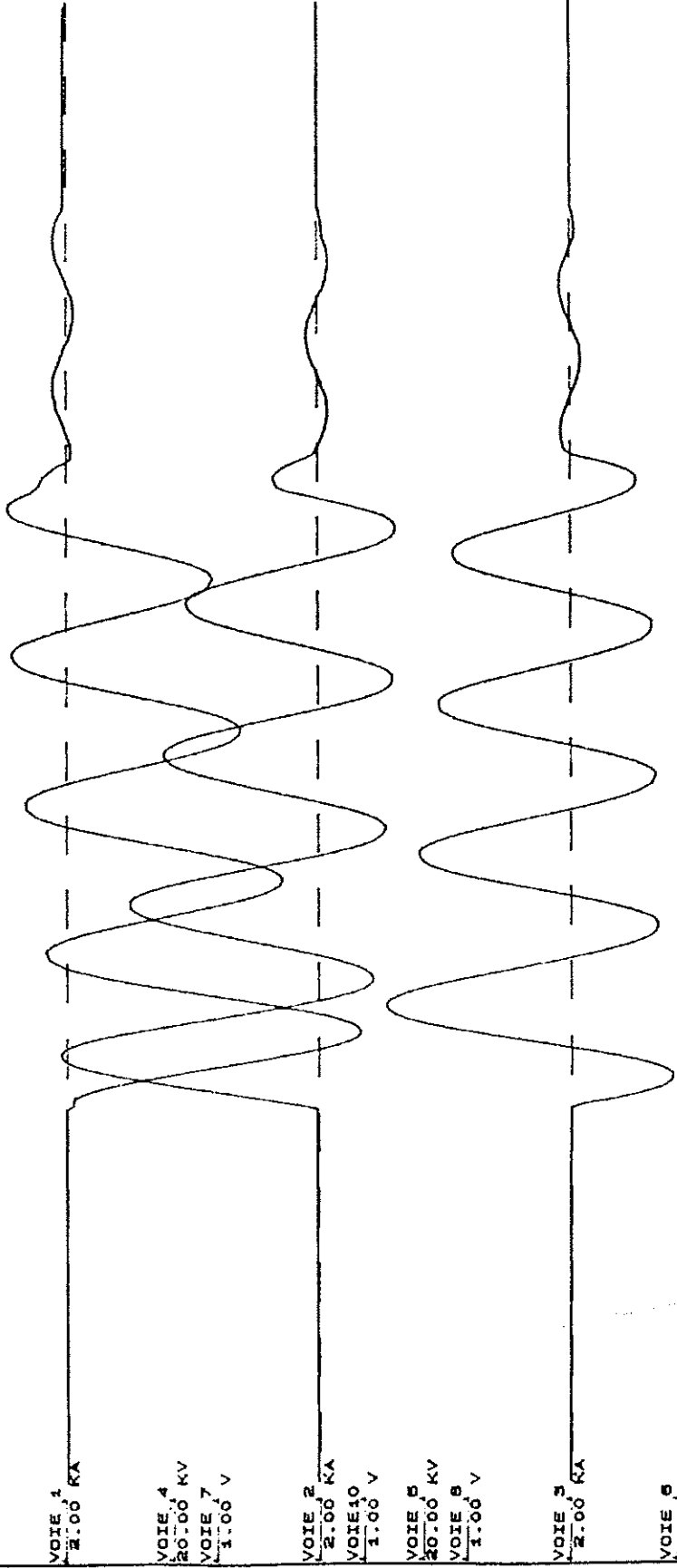
1429

VOLTA B3665 94/04/13/015

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100.0
300.0
10 MS



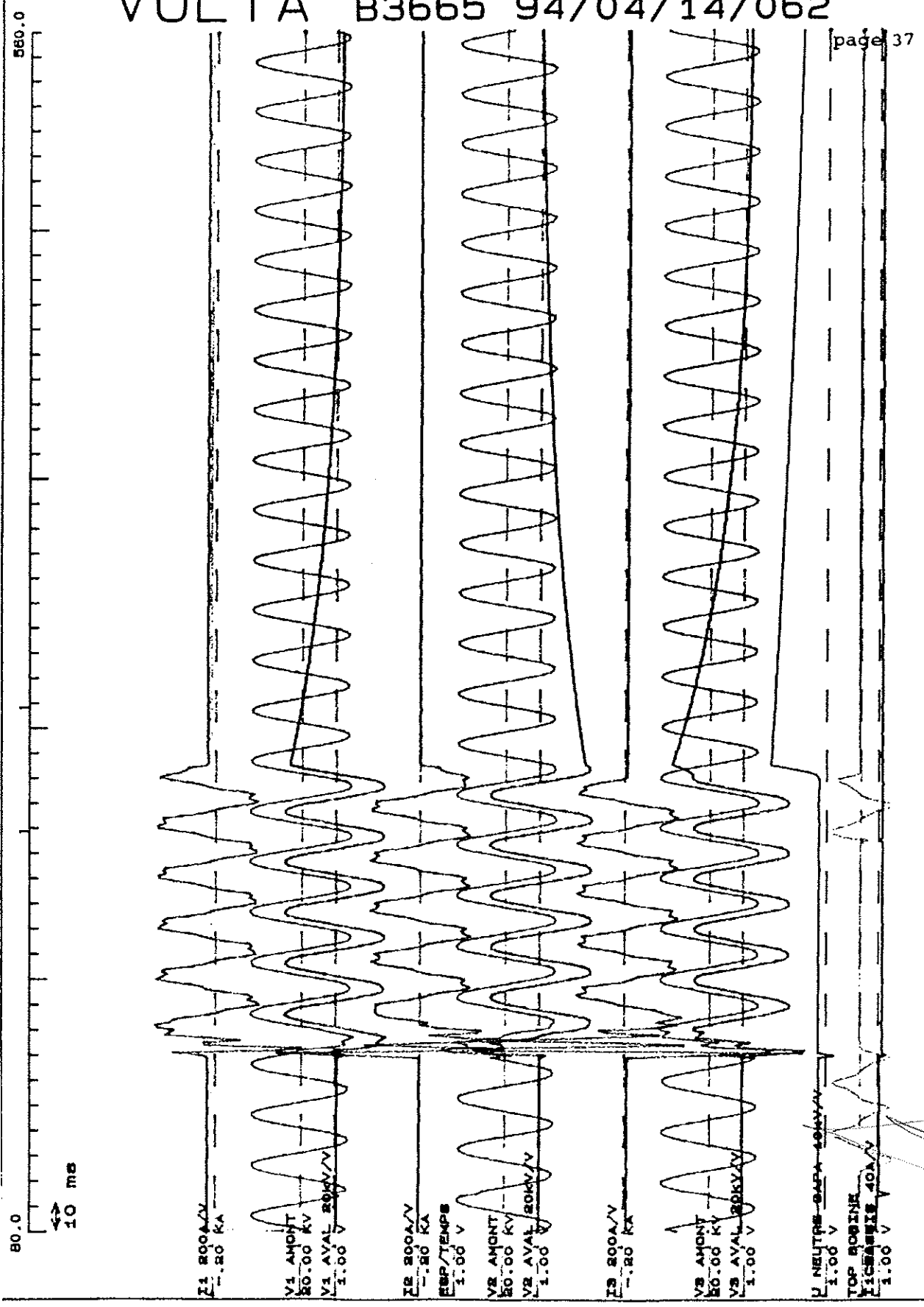
VOIE 1 2.00 KA
 VOIE 4 20.00 KV
 VOIE 7 1.00 V
 VOIE 2 2.00 KA
 VOIE 10 1.00 V
 VOIE 5 20.00 KV
 VOIE 8 1.00 V
 VOIE 3 2.00 KA
 VOIE 6 20.00 KV
 VOIE 9 1.00 V
 VOIE 11 1.00 V
 VOIE 12
 VOIE 13 1.00 V

ВЕРНО
ОТМЕЧАЮ

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1430

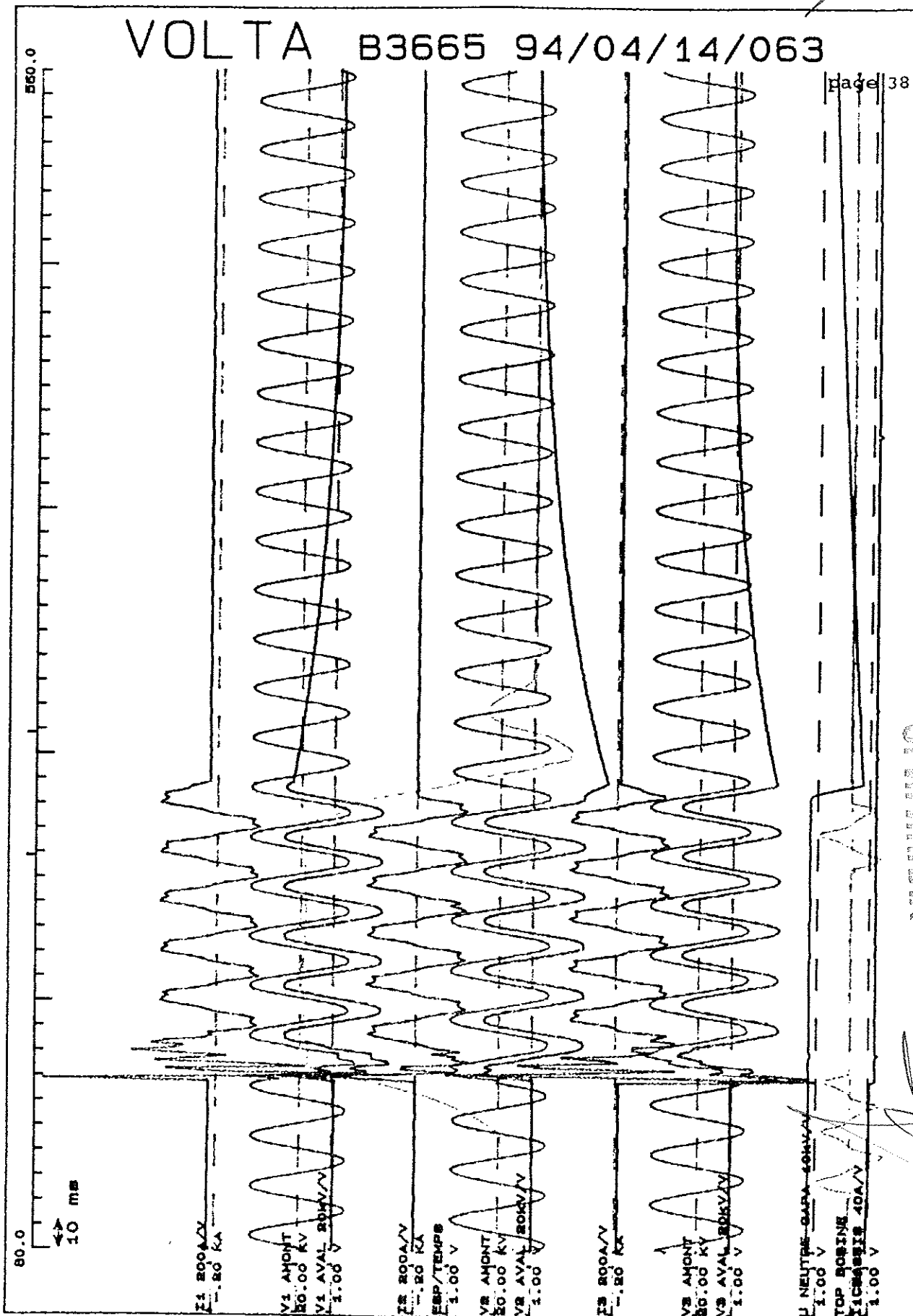
VOLTA B3665 94/04/14/062



PARMO C
OPM/MAITA

1431

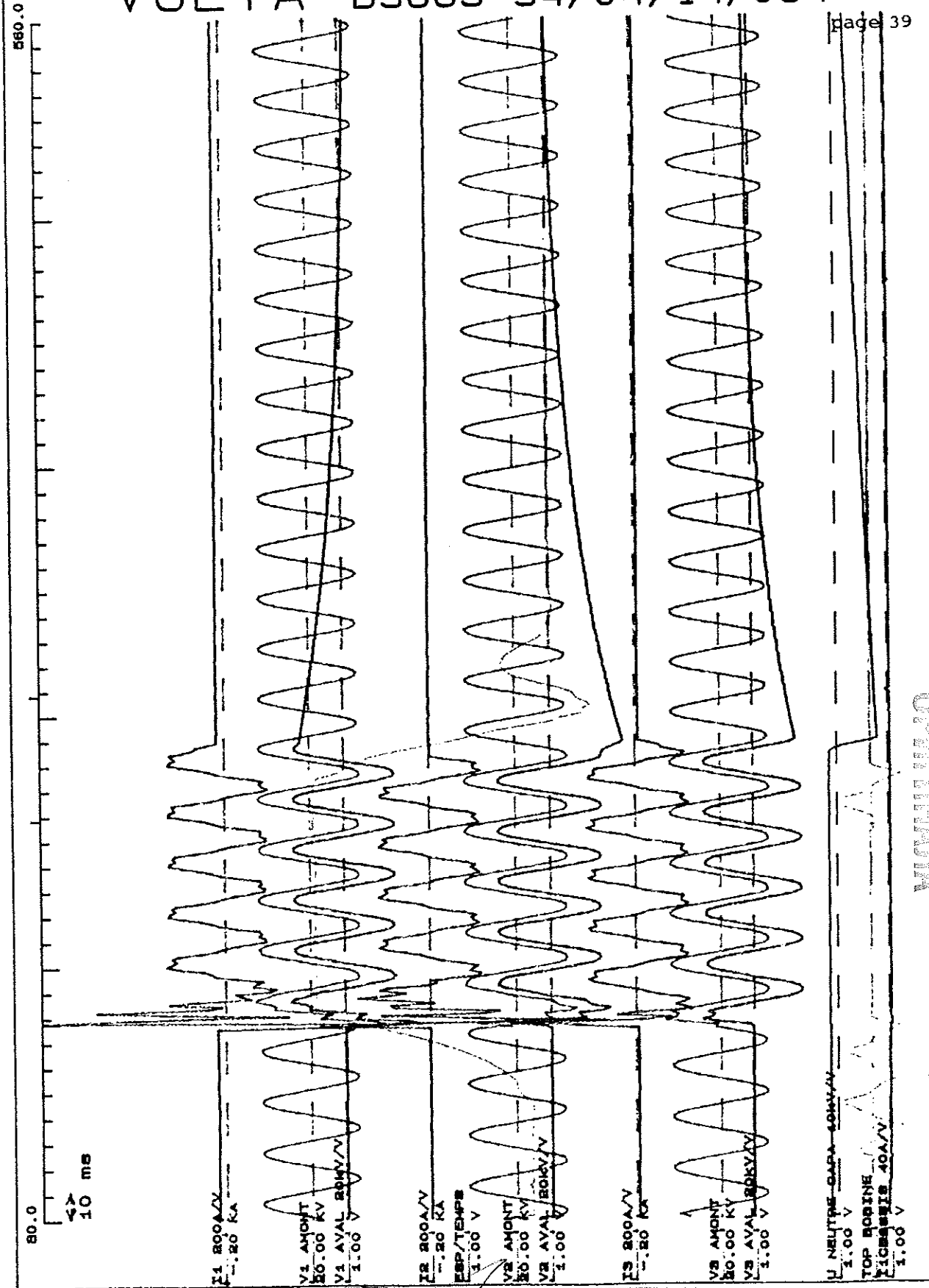
VOLTA B3665 94/04/14/063



BRUNO C
OPINIANA

1432

VOLTA B3665 94/04/14/064

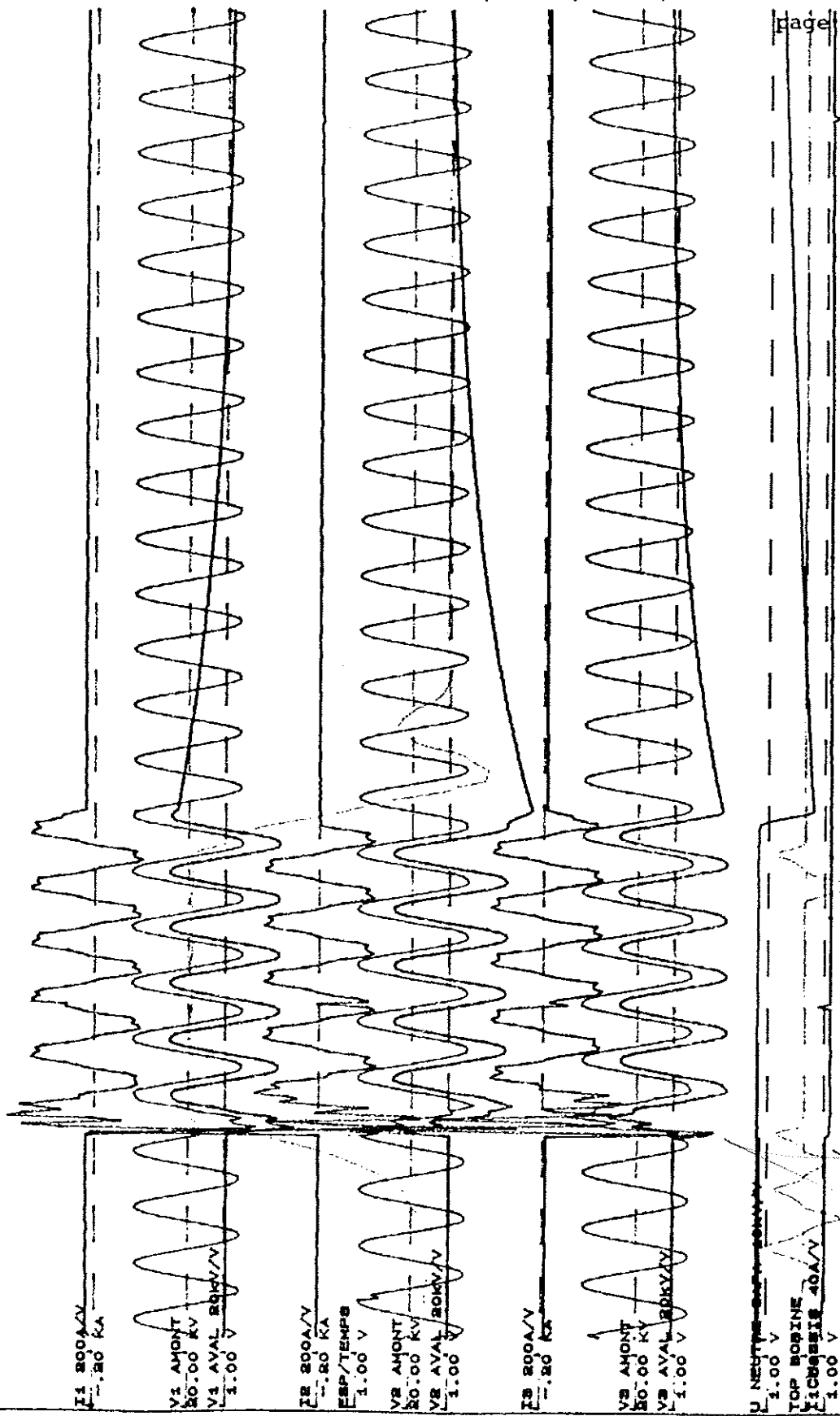


ВЕРНО С
ОПРЕДЕЛЕНА

1433

VOLTA B3665 94/04/14/065

80.0 560.0
10 ms



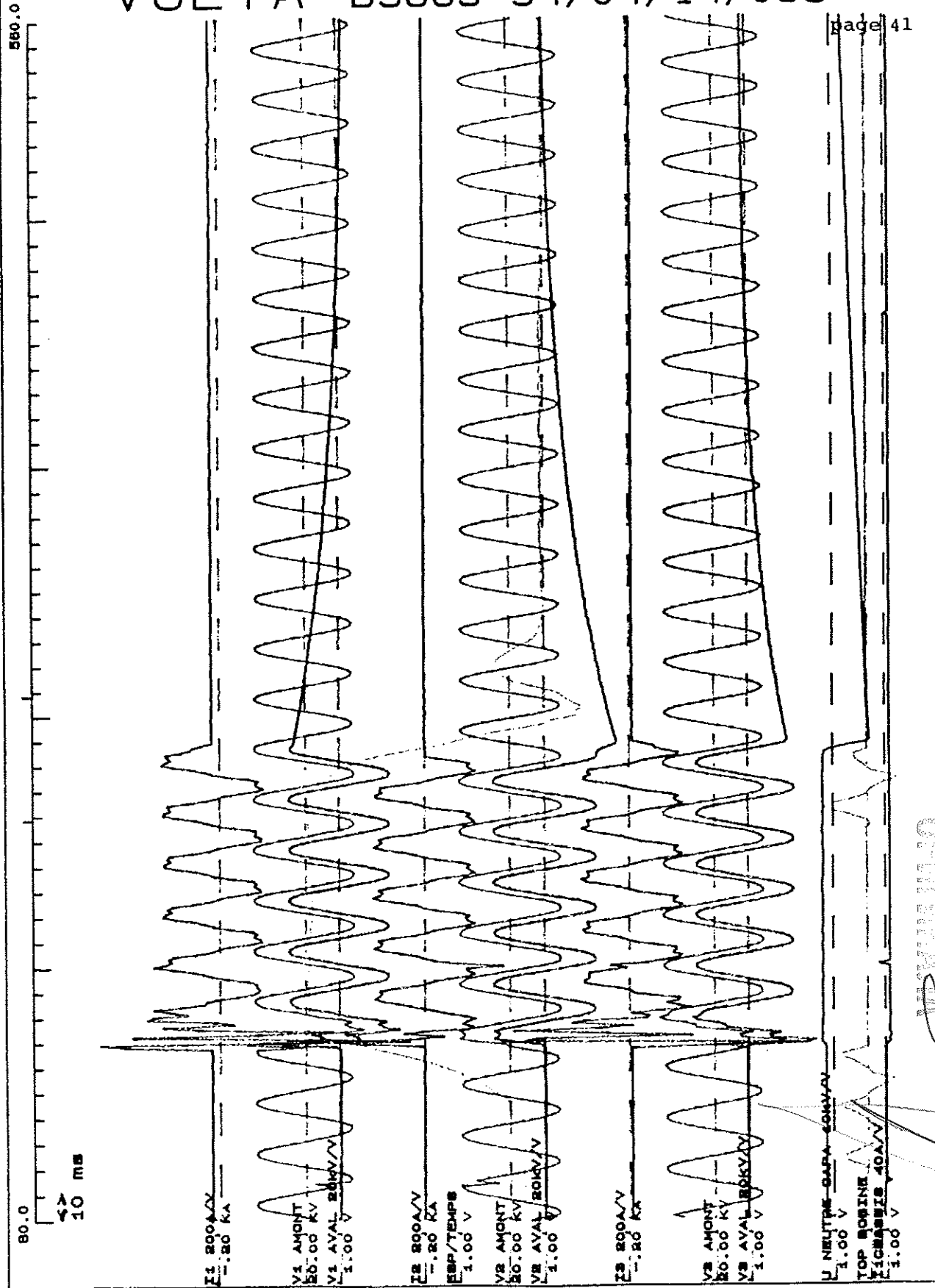
PROF. C. OPINIA

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1434

VOLTA B3665 94/04/14/066

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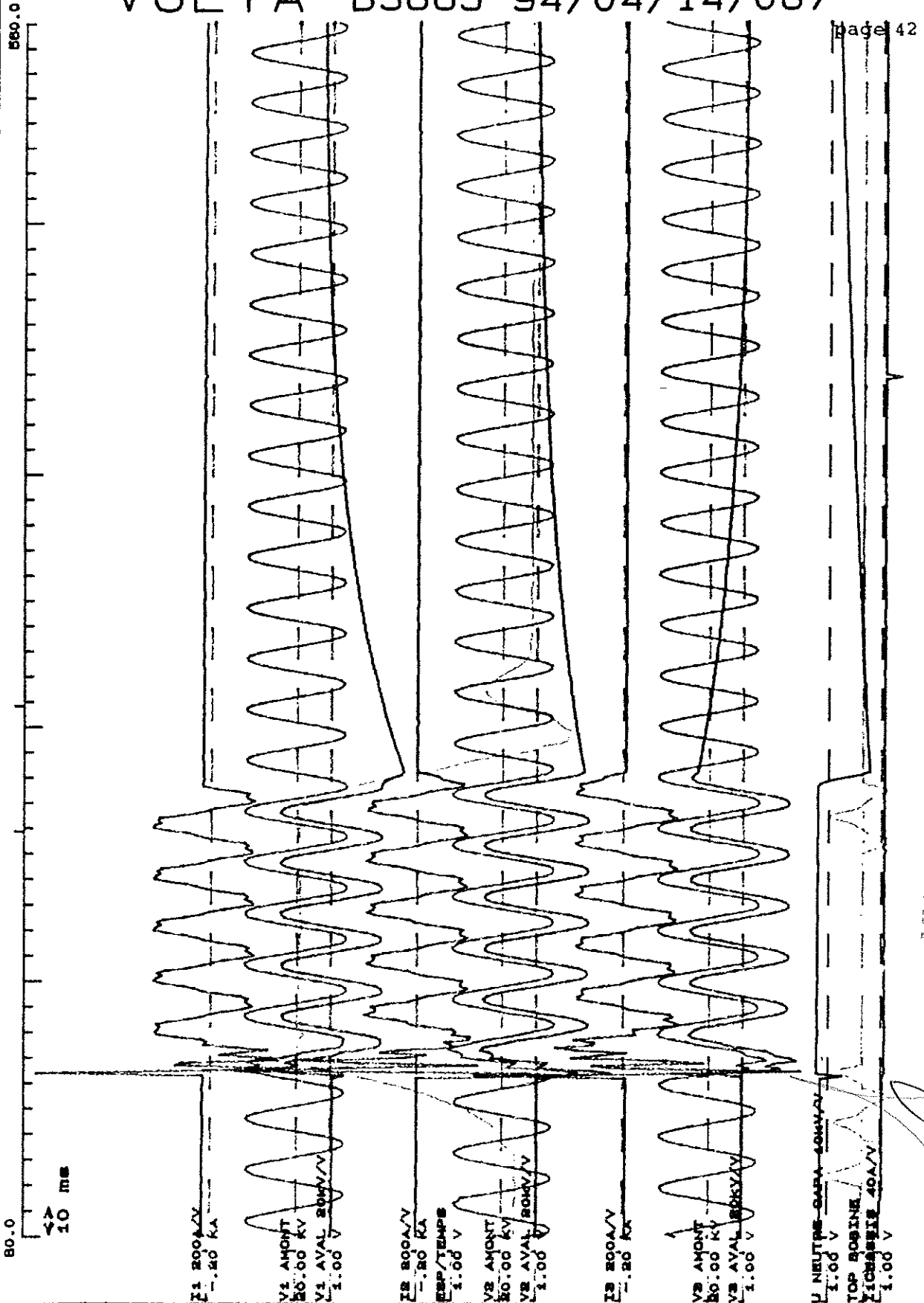


ESP/TEMPS
1.00 V

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1435

VOLTA B3665 94/04/14/067

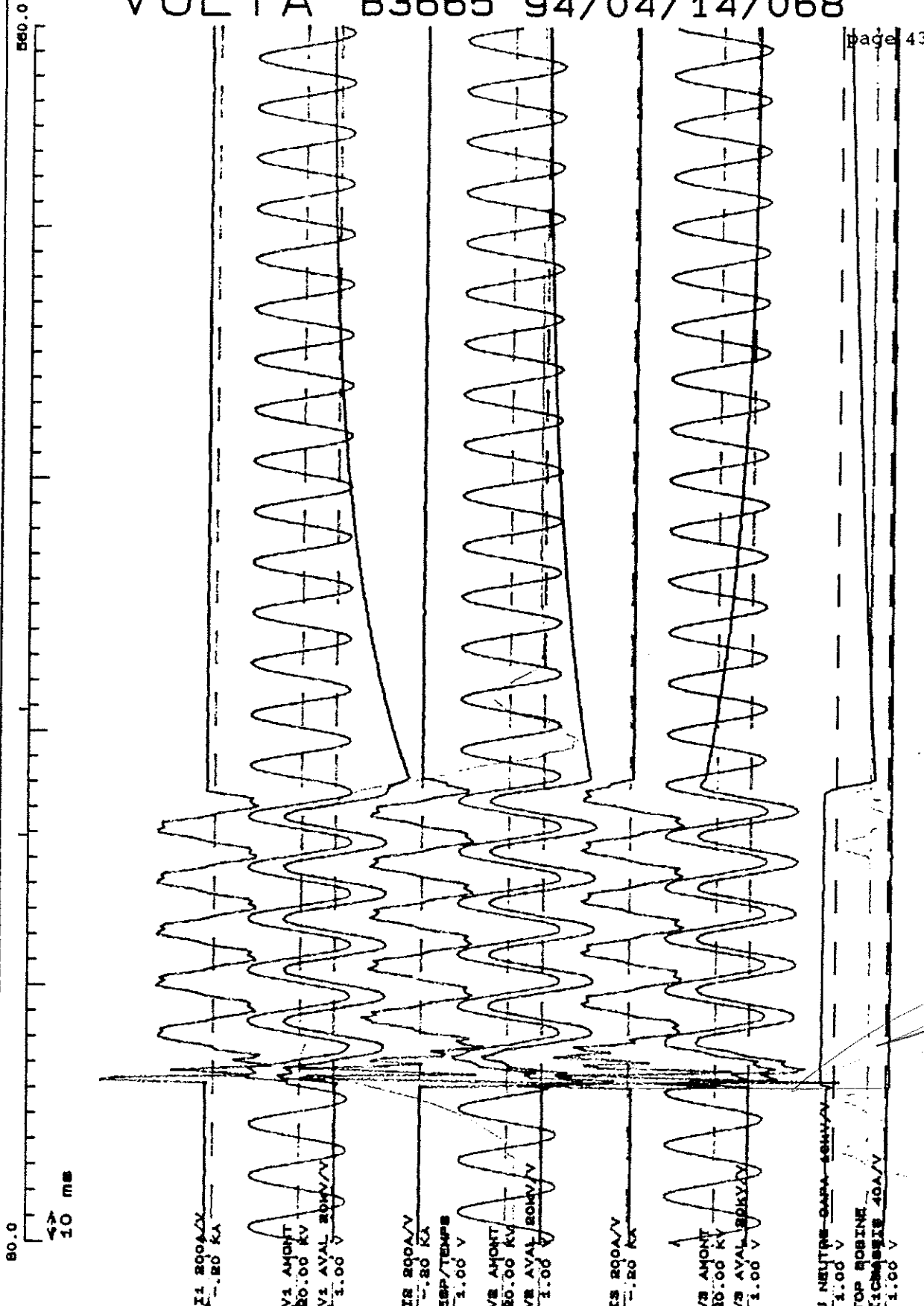


ROBINO C
OPERAIA

1436

VOLTA B3665 94/04/14/068

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BRUNO C
OPINIANO

1437

VOLTA B3665 94/04/14/069

560.0

80.0

10 ms

I1 200A/V
--20 KA

V1 ANONT
20.00 KV
V1 AVAL 20KV/V
1.00 V

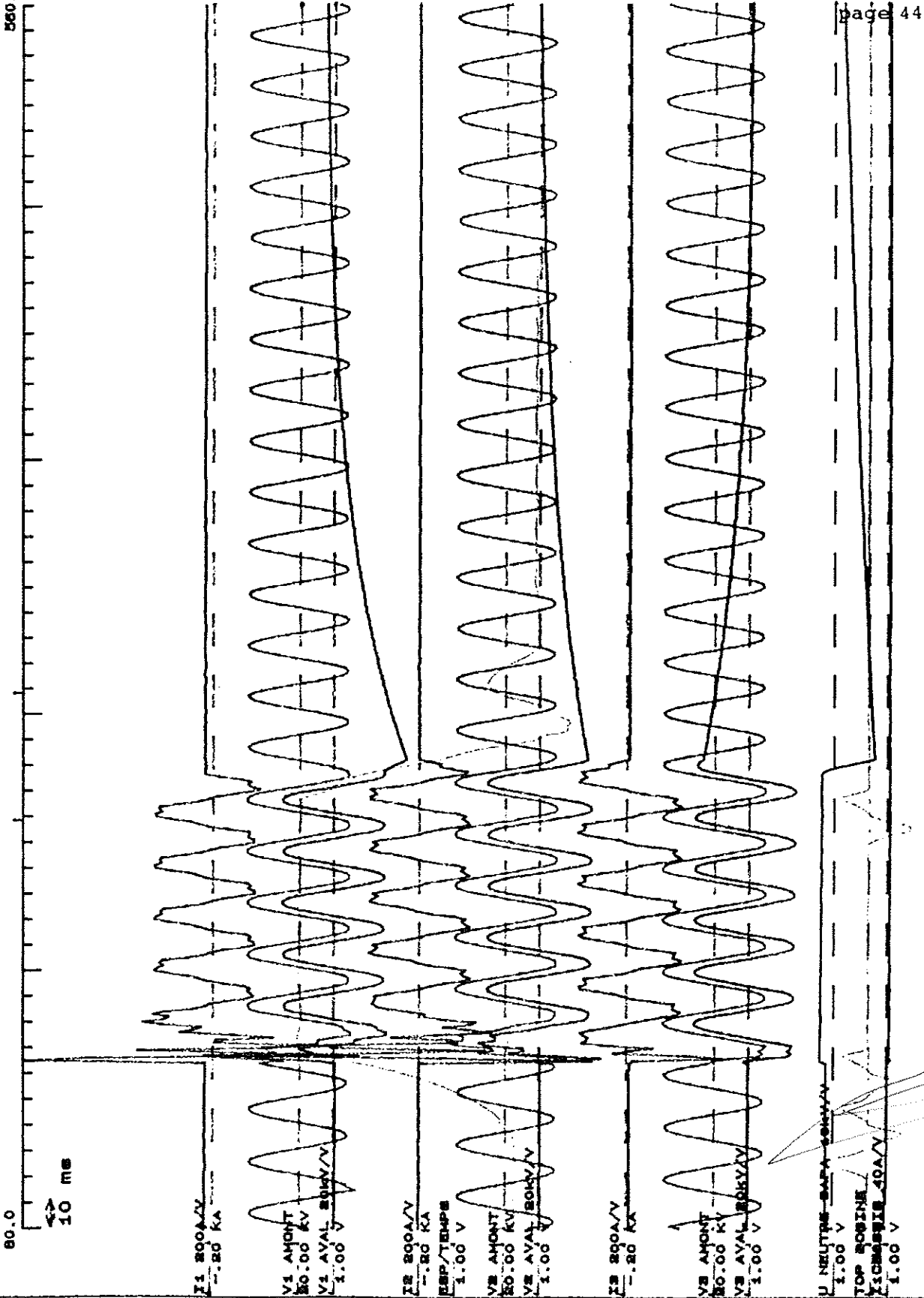
I2 200A/V
--20 KA
ESP/TEMP
1.00 V

V2 ANONT
20.00 KV
V2 AVAL 20KV/V
1.00 V

I3 200A/V
--20 KA

V3 ANONT
20.00 KV
V3 AVAL 20KV/V
1.00 V

U NEUTRE-SAPA-20KV/V
1.00 V
TOP ROFINE
VICHESSE 40A/V
1.00 V



PROF. C. OPTIMIZIA

Signature

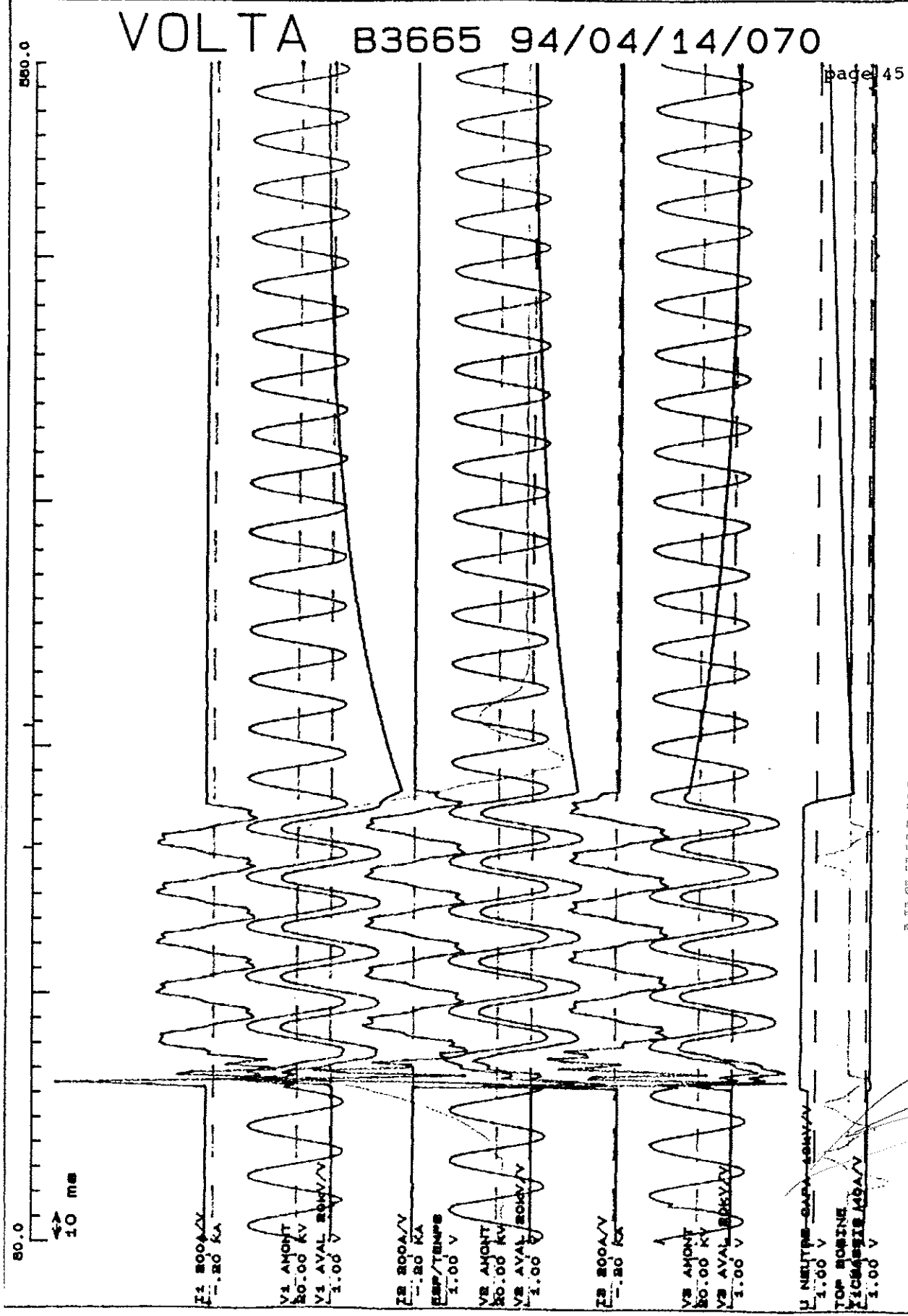
1438

Signature

VOLTA B3665 94/04/14/070

[Handwritten signature]

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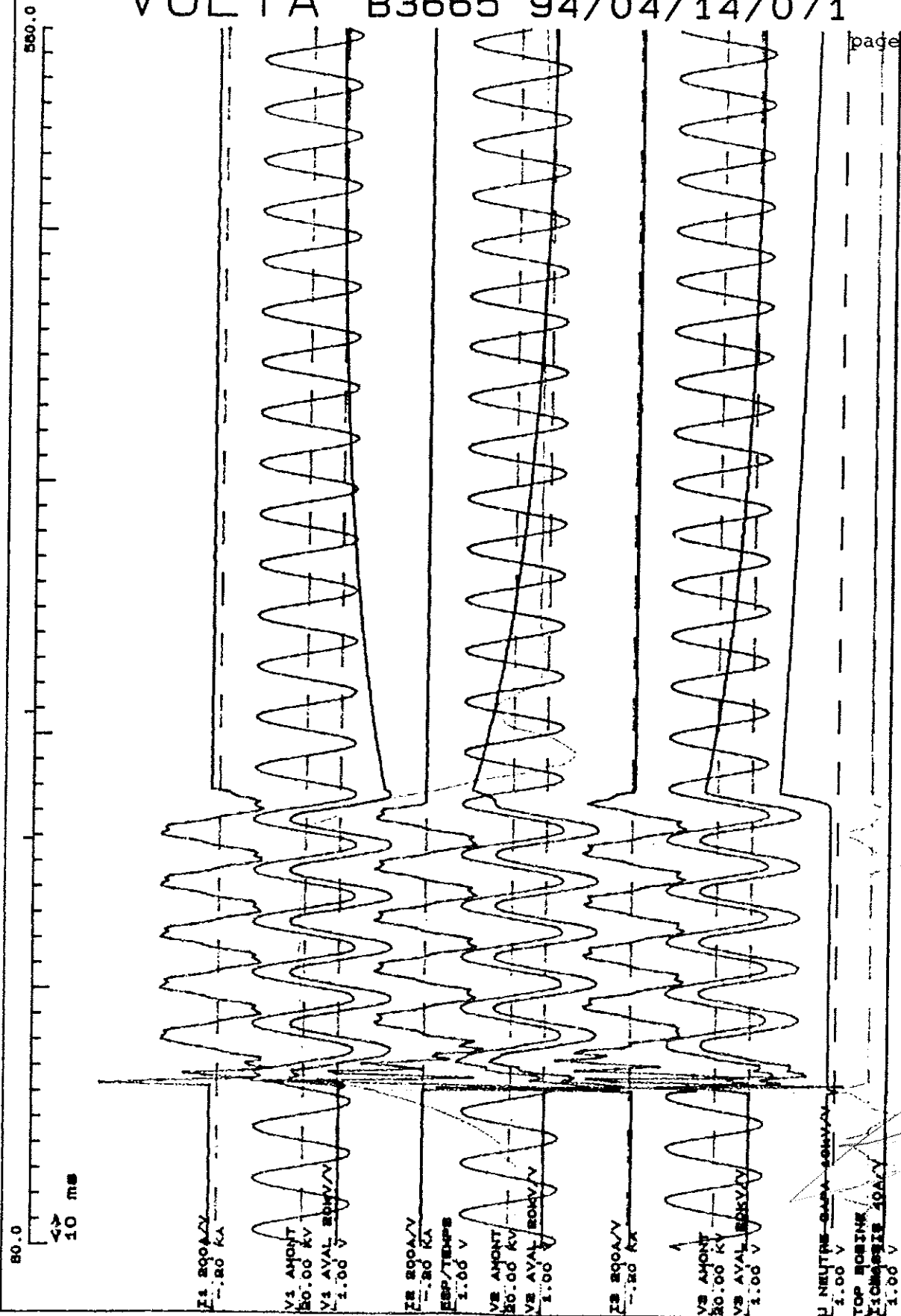


PROJETO C
OPERACIONAL

[Handwritten signature]

1439

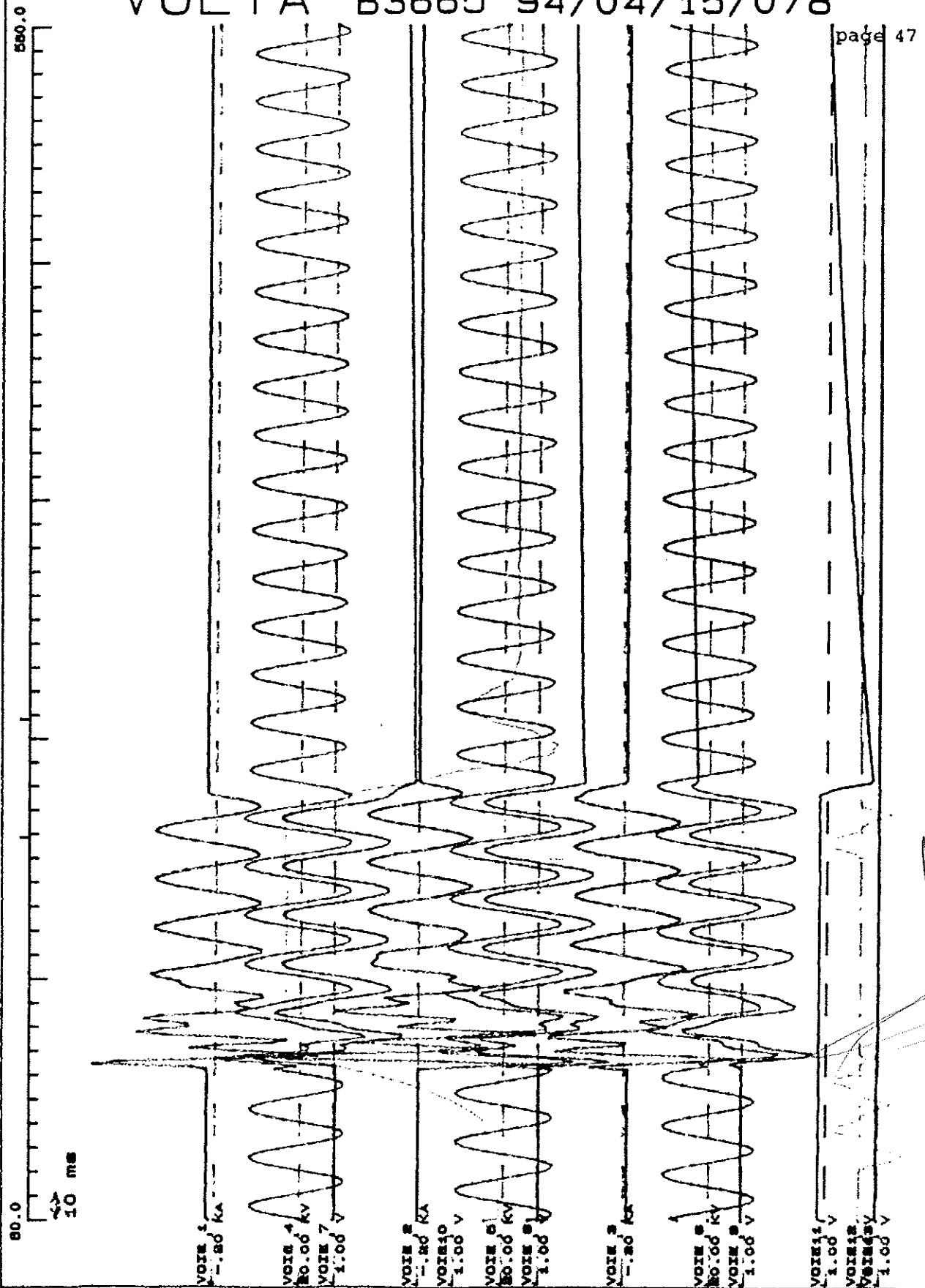
VOLTA B3665 94/04/14/071



VIVIANO
OMILIA
3 ONUB

1440

VOLTA B3665 94/04/15/078



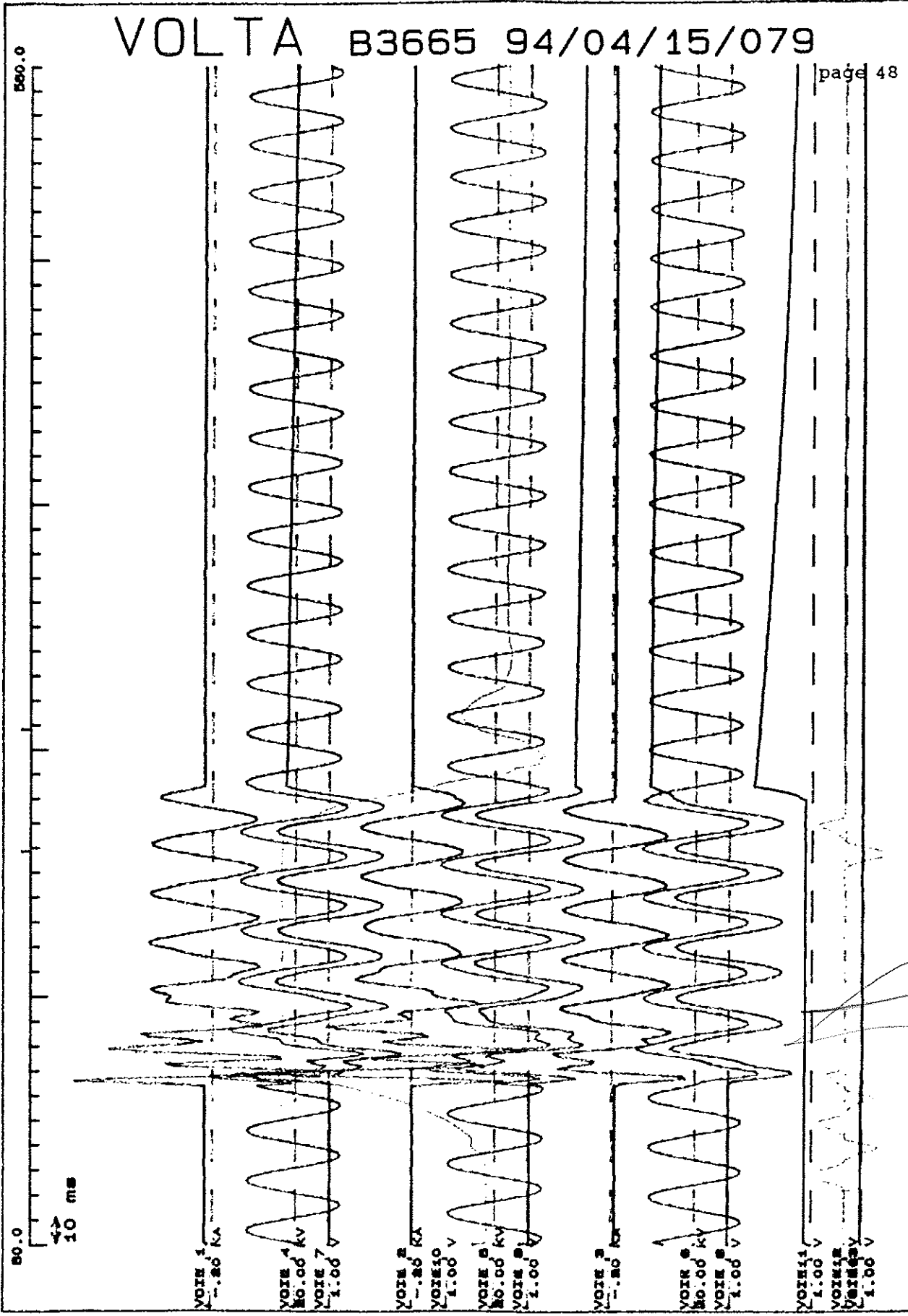
BRUNO C
OPINIA

[Handwritten signature]

1441

23

VOLTA B3665 94/04/15/079



ВЕРИЖА
ОПТИМАЛНА

R

Handwritten signature

Handwritten signature

1442

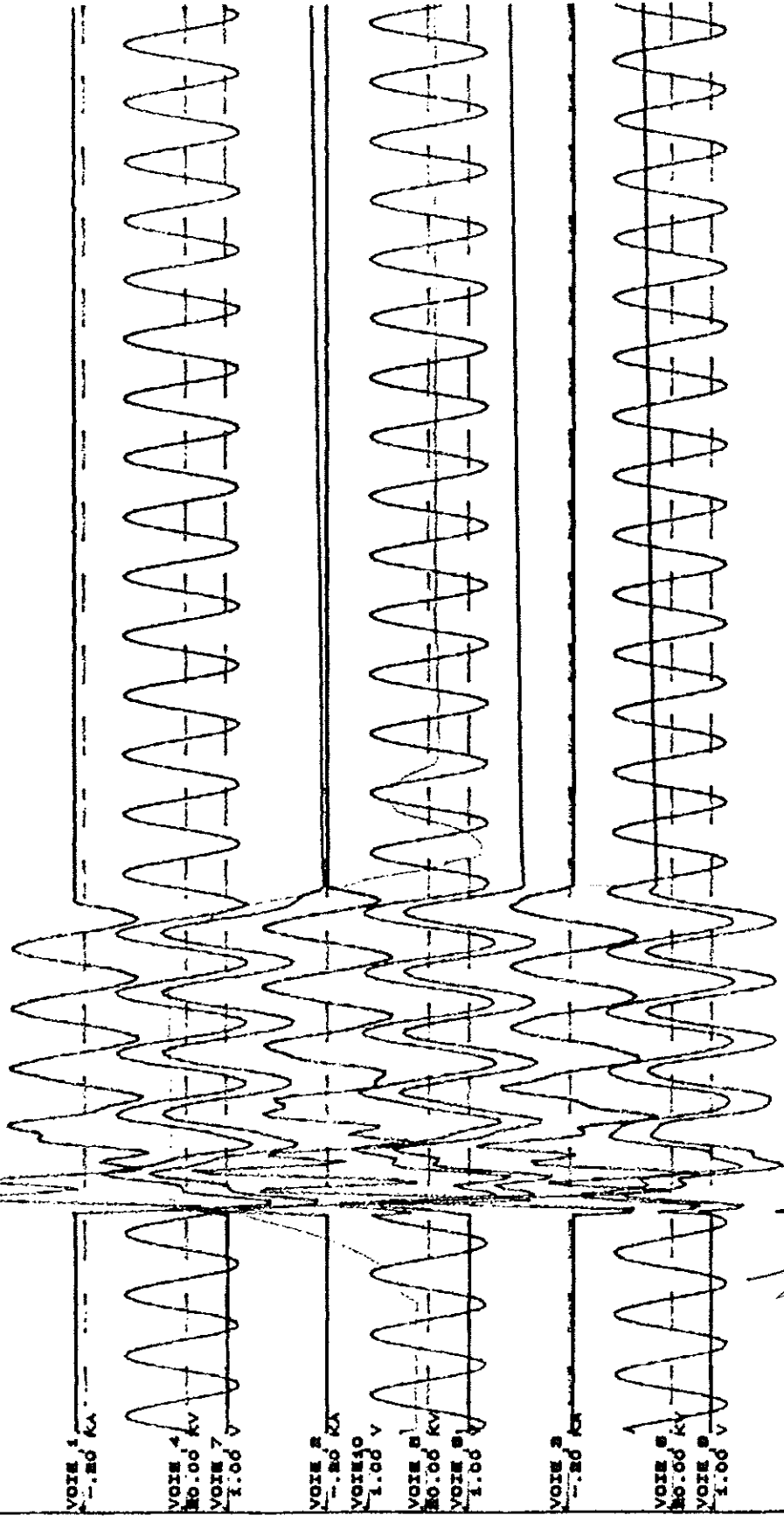
9

VOLTA B3665 94/04/15/080

80.0

10 ms

40



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ПРОМО С
ОПТИМАЛ

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

1443

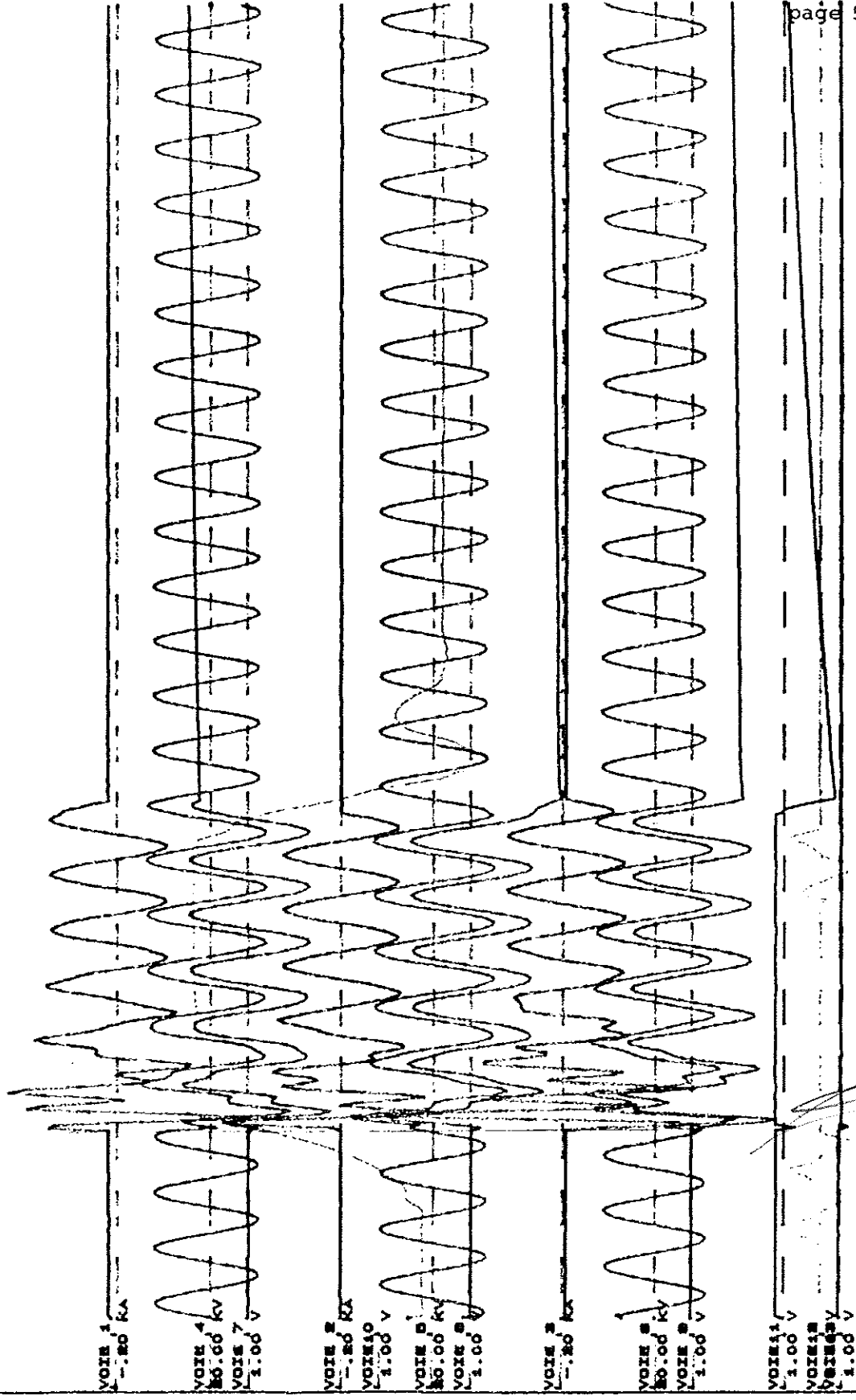
3

VOLTA B3665 94/04/15/081

500.0

80.0

10 ms



PERIODO
OPERAÇÃO

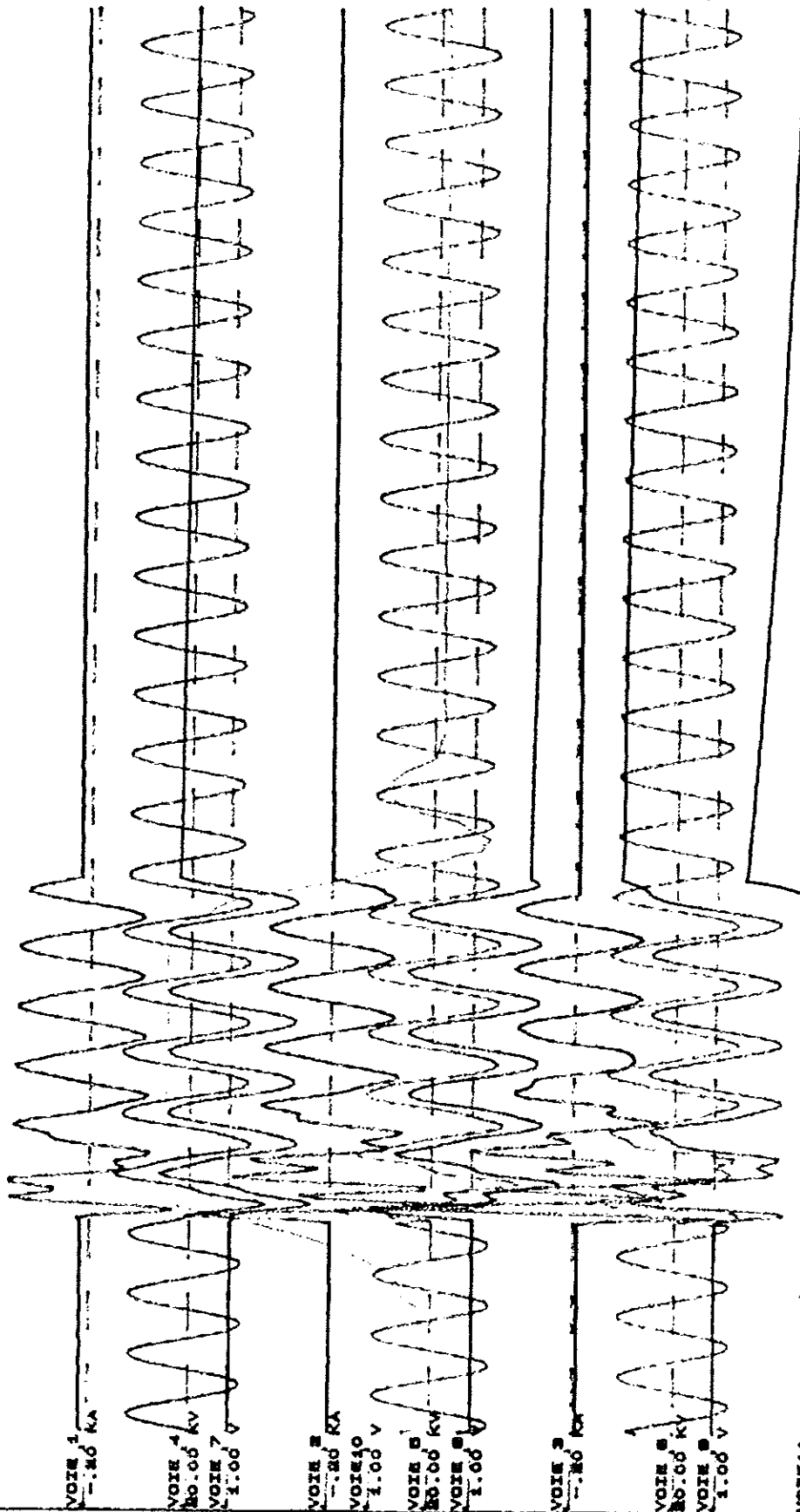
1444

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80.0

10 ms

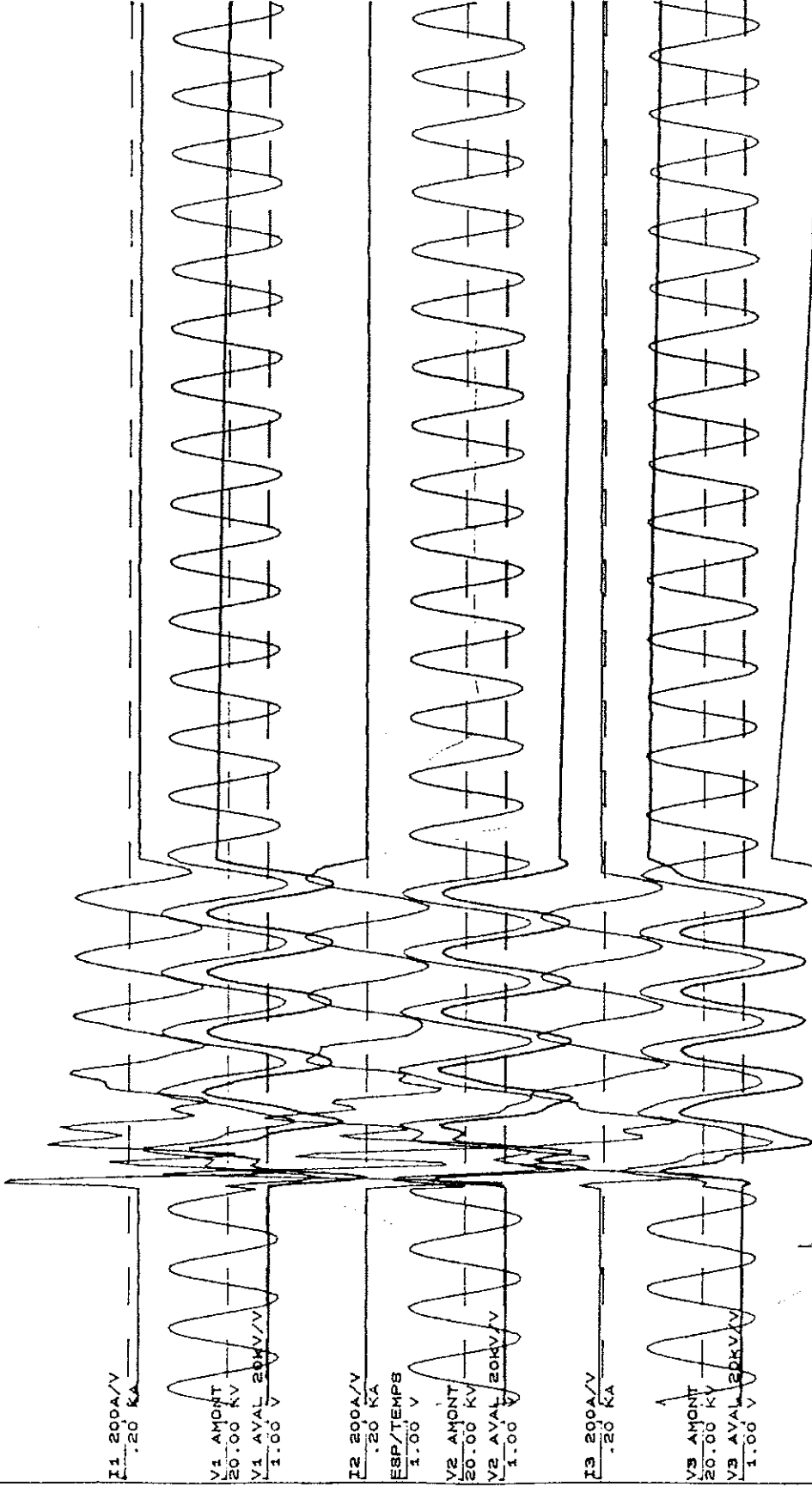


BRUNO C
OPTIMALE

1445

VOLTA B3665 94/04/15/083

80.0 560.0
10 ms



I1 200A/V
.20 KA

V1 AMONT
20.00 KV
V1 AVAL 20KV/V
1.00 V

I2 200A/V
.20 KA

ESP/TEMPS
1.00 V

V2 AMONT
20.00 KV
V2 AVAL 20KV/V
1.00 V

I3 200A/V
.20 KA

V3 AMONT
20.00 KV
V3 AVAL 20KV/V
1.00 V

U NEUTRE 40A/V
1.00 V

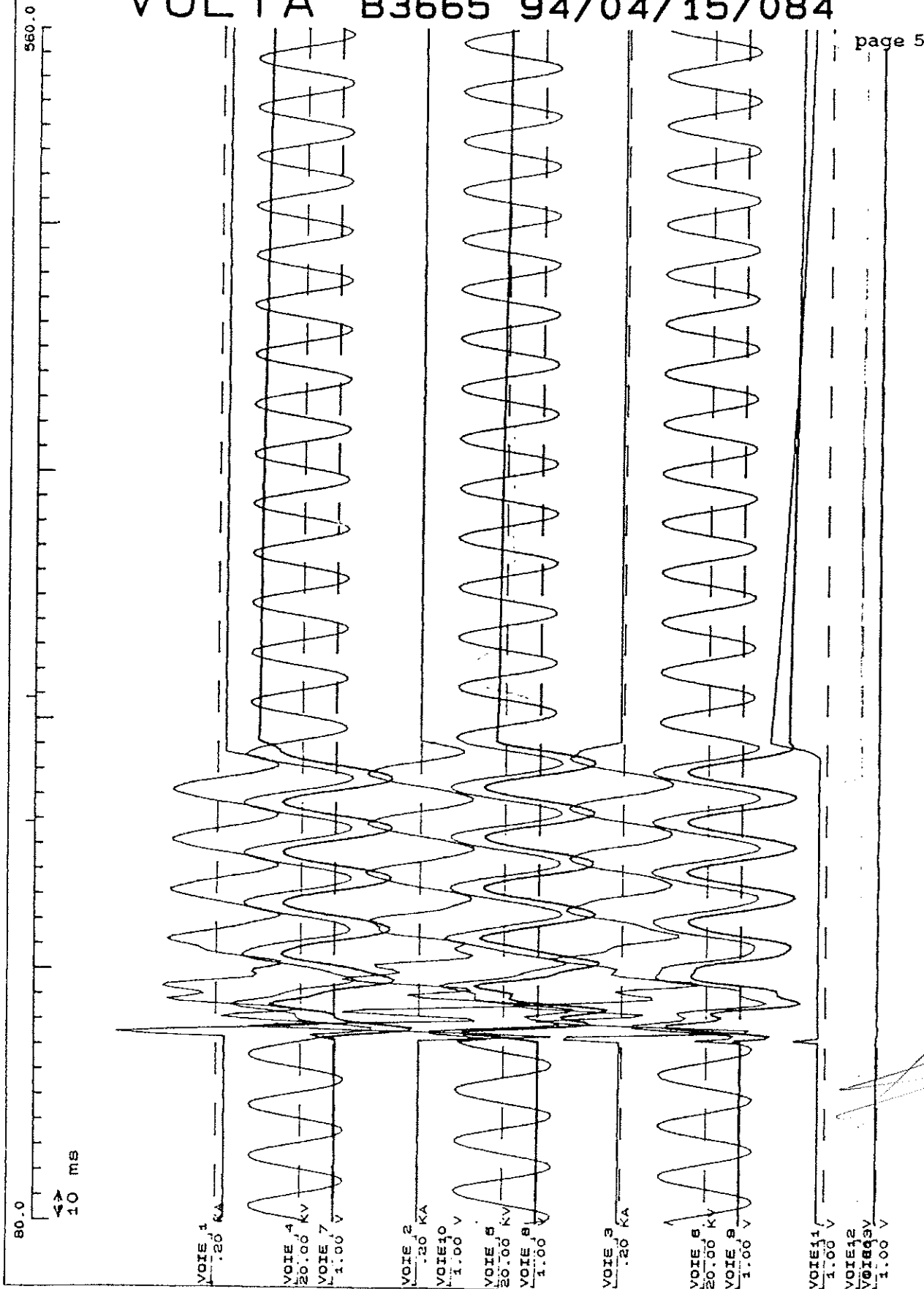
TOP BOBINE
TICBASIS 40A/V
1.00 V

Operado
B
94/04/15/083

1446

VOLTA B3665 94/04/15/084

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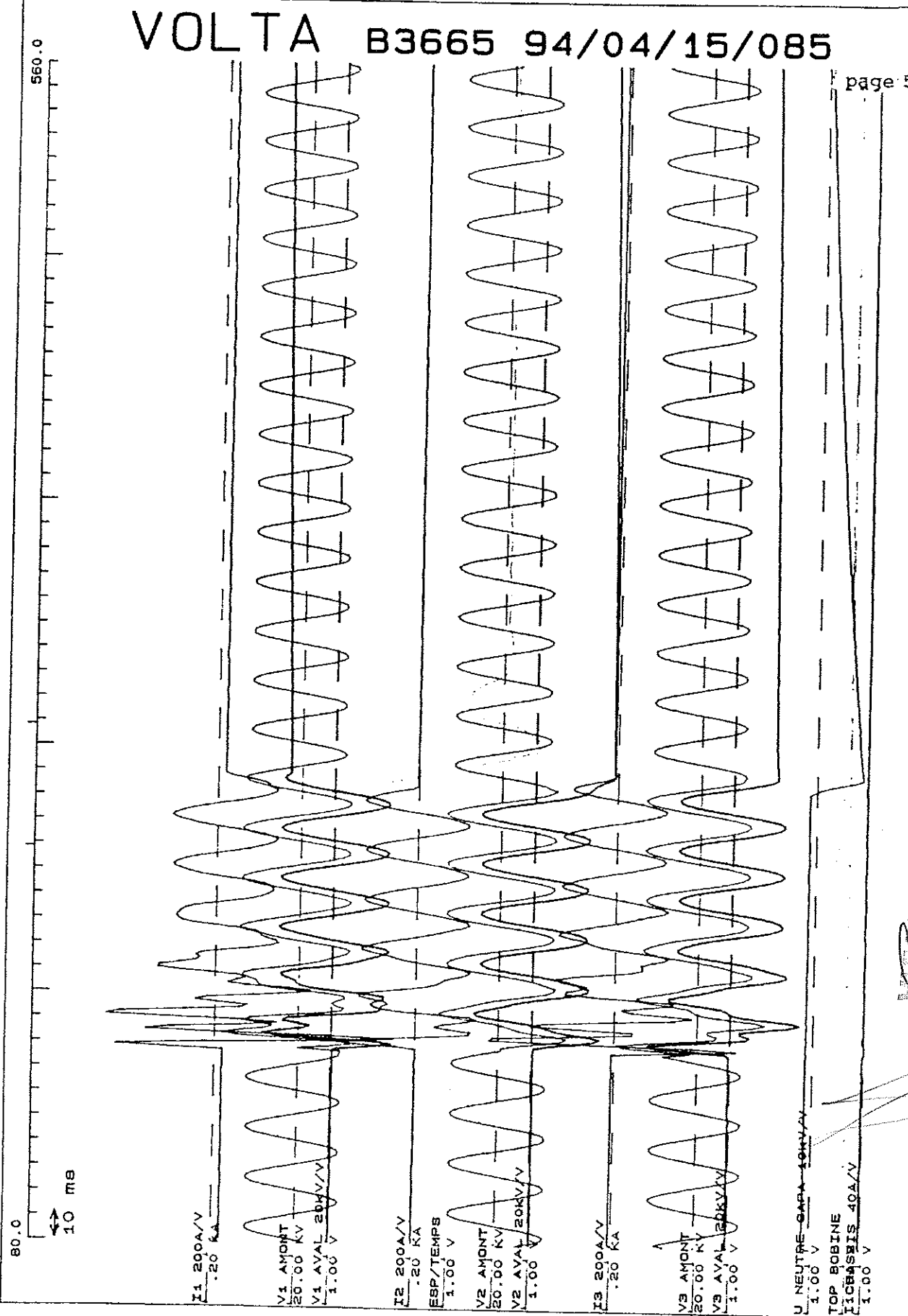
OPINIA
C. G. G. G.

1447

29

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1448

1448