

ТОМ 4

**Открита процедура за сключване на рамково
споразумение с предмет: „Доставка на комплектни
комутационни устройства” Реф№ PPD 16-049**

Възложител: „ЧЕЗ Разпределение България” ЕАД

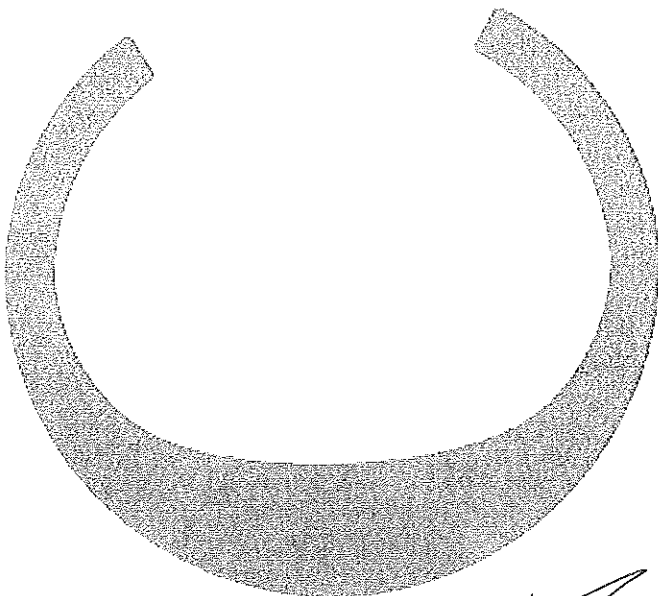
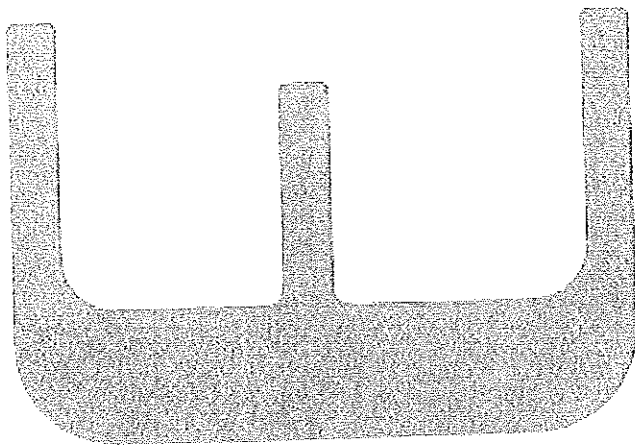
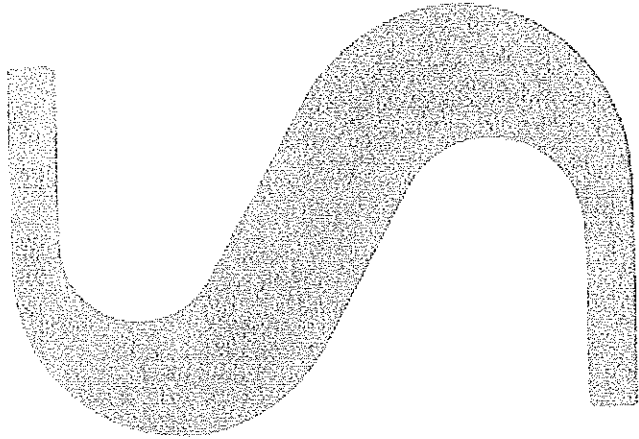
**Предложение за изпълнение
на поръчката**

1714

51249028XA

[Handwritten mark]

GPS91/15186



[Handwritten signature]

RECEIVED
1991
[Handwritten mark]

[Handwritten mark]
4714A

client: MERTIN GEBEL s.r.l. - Arese (MI)

object: Three pole motor enclosed air insulated synchronous GMS system type 1W, fitted with an enclosed operating emergency stop non isolated switch type T 386.

characteristics of the tested object assigned by the Client:

rated voltage: 17.5/21 kV - rated current: 400 A - rated frequency: 50 Hz
other characteristics listed on page 2

the tests have been made in accordance with client's instructions (based on IEC 255 (1983))

test date: June 18th, 1991
June 19th, 1991

the performance of the apparatus tested and the observations made during the tests have been recorded in the table with the test results and conclusions

this document is composed by 12 pages, 100 conclusions

Arese, August 8th, 1991 test engineer

File Number

01/21/2001
02/06/2001
03/01/2001
04/01/2001

rated characteristics of the tested object assigned by the client.

| | | |
|--------------------------------------|--------------|----|
| voltage | 110/220 | WV |
| frequency | 50 | Hz |
| normal current | 400 | A |
| short-circuit making current | 50 | KA |
| short time withstand current | 20 | KA |
| short-circuit duration | 1 | s |
| mainly active load breaking current | 400 | A |
| cable chopping breaking current | 15 | KA |
| no-load transformer breaking current | 10 | KA |
| air pressure for interruption | 2.0 bar abs. | |

Identification of the object referred.

The tested object truly conforms to the drawings of its type supplied by the Client. These drawings identified by GESI with operating points and numbered GES-91/013161 1 to 12 are assembled in a folder.

This test report is not a permit to use the facility nor do the results given necessarily confirm the ratings or values of the main list and the drawings may not be replaced otherwise than in the case without GESI's authorization.

Table of tests performed

| date | type of test | with loop |
|----------------------------|---|--------------|
| June 19th, 19th 1991 | THREE-PHASE MAINLY ACTIVE LOAD CURRENT SWITCHING TESTS | P |
| June 18th 1991 | No.100 tests with 400 A at 24 KV | P |
| June 19th 1991 | No.20 tests with 20 A at 24 KV | P |
| June 19th 1991 | THREE-PHASE NO-LOAD TRANSFORMER CURRENT SWITCHING TESTS | P |
| June 19th 1991 | No.10 tests with 15 A at 24.2 KV | P |
| June 19th 1991 | THREE-PHASE CABLE-CHARGE CURRENT SWITCHING TESTS | P |
| June 19th 1991 | No.20 tests with 20 A at 24.2 KV | P |

tests witnessed by

Mr. LAURENCE - MERLIN GERIN S.A.
 Ms. Subroque - MERLIN GERIN S.A.

This test report is not a final result of our laboratory work and the results given hereafter may be corrected by the manufacturer.
 This document may not be reproduced elsewhere without the written authorization of CFRSI.

arrangement of the object for the tests.

The tested apparatus was assembled with the other apparatus of 230 system (see photo on page 12).
The figure below shows the electric diagram of the complete system (single phase diagram of a three phase circuit) :



- 1 : switch under test
- 2-3 : auxiliary switches
- A-B-C : cables

During the tests the cables A were connected to the supply, the switch 2 was in closed position and the cables B were connected to the load. The switch 3 was in open position.

The metal enclosure was insulated from earth but connected thereto by a copper wire 0.1 mm in diameter and 30 cm long to indicate any significant leakage current to earth.

Three-phase mainly active load current switching tests

test duty with 400 A at 24.0 kV

test circuit conditions

circuit diagram see page: 10

supply circuit

power factor: < 0.2 impedance 6.9 Ω
 frequency: 50 Hz [20 % of the total impedance of the circuit]
 neutral condition: earthed
 TRV: ac 44 kV 63 86 μs

load circuit

power factor: 0.74 frequency: Hz
 neutral condition: insulated damping factor:

control voltage of operating device for: closing - V
 opening - V
 motor - V
 gas operating pressure for: operation - bar abs.
 breaking 2.4 bar abs.

conditions of the apparatus before the tests: new

tests performed: no.100 tests with operating sequence C0
 test no.: 1 to 100
 oscillograms no.: 4 to 105
 test voltage: 24 kV
 test current: 400A
 minimum arcing time: 8 ms
 maximum arcing time: 15 ms

The tested switch has always cleared the current.
 No overvoltage was observed on supply and load side of the circuit.

conditions of the apparatus after the tests: external parts as before the tests
 internal parts not inspected.

CRS-91/015186

three-phase mainly active load current switching tests

test duty with 20 A at 24.0 kV

test circuit conditions

circuit diagram see page: 10

supply circuit
 power factor: < 0.2 impedance: 0.5 Ω
 frequency: 50 Hz
 neutral condition: earthed
 TRV : ac 44 kV 13 04 μs

load circuit
 power factor: 0.73 frequency: 50 Hz
 neutral condition: insulated damping factor:

control voltage of operating devices for: closing = V
 opening = V
 motor = V
 gas operating pressure for : operation = bar abs.
 breaking = 1.4 bar abs.

conditions of the apparatus before the tests : as after the test no. 100

tests performed no.20 tests with operating sequence 00
 test no. 101 to 120
 oscillograms no. 104 to 123
 test voltage 24 kV
 test current 20A
 minimum arcing time 6 ms
 maximum arcing time 11 ms

This tested switch has always cleared the current.
 No overvoltage was observed on supply and load side of the circuit.

conditions of the apparatus after the tests: external parts as before the tests.
 internal parts not inspected.

2

Three-phase no-load transformer current switching tests

load duty: with 15.0 A at 24.4 kV

test circuit conditions

circuit diagram see page: 10

supply circuit
 power factor: 0.82 Impedance: 6.0 Ω
 frequency: 50 Hz
 neutral condition: earthed
 TRV: ac 44 kV L3 R4 μs

load circuit
 power factor: 0.12 frequency: 500 Hz
 neutral condition: insulated damping factor: 0.25

control voltage of operating devices for: closing - V, opening - V, motor - V
 gas operating pressure for: operation - 1.4 bar abs., breaking - 1.4 bar abs.

conditions of the apparatus before the tests: as after the test no.120

| test | no. | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 |
|-----------------------------|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| oscillogram | no. | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | | | |
| operating duty | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| voltage | | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 |
| with | phase-to-neutral kV | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 |
| open | | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 |
| apparatus | phase-to-phase kV | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 |
| inrush making current | kA | - | - | - | - | - | - | - | - | - | - | - | - | - |
| maximum closing overvoltage | supply side kV | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | load side kV | - | - | - | - | - | - | - | - | - | - | - | - | - |
| breaking current | A | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 |
| | average A | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 |
| maximum opening overvoltage | supply side kV | 22.0 | 22.0 | 21.0 | 21.0 | 23.0 | 22.0 | - | 23.0 | 24.0 | 25.0 | | | |
| | load side kV | 22.0 | 22.0 | 24.0 | 23.0 | 25.0 | 25.0 | 23.0 | 25.0 | 25.0 | 25.0 | | | |
| restrikes | no. | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | phase | - | - | - | - | - | - | - | - | - | - | - | - | - |
| duration of | closing ms | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | opening ms | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | prearc ms | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | arc ms | 11 | 11 | 10 | 10 | 12 | 11 | 10 | 12 | 11 | 13 | | | |

conditions of the apparatus after the tests: external parts as before the tests, internal parts not inspected.

This test report is the copyright of CEESI. It may not be reproduced or used in any way without CEESI's authorization.

1721

23

Three-phase cable-charging current switching tests

Test duty with 29.0 A at 24.2 kV

Test circuit conditions

Circuit diagram see page 11

Supply circuit

power factor < 0.15 short-circuit current: 2 kA

frequency: 50 Hz

TRV: 66 kV ± 3.84 μs

Load circuit

capacitance of capacitor banks: CW1 = 6.6 μF (insulated)

voltage decay at 100 ms after final arc extinction < 10 %

voltage with open apparatus: 14.0 kV phase-to-neutral 24.2 kV phase-to-phase

control voltage of operating devices for: closing - V

opening - V

motor - V

gas operating pressure for:

operation - 1 bar abs.

breaking - 1.4 bar abs.

conditions of the apparatus before the tests: as after the test no. 133

| test | no. | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 |
|-----------------------|-------------|------|------|------|------|------|------|------|------|------|------|
| oscillogram | no. | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 |
| operating duty | | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O |
| voltage | | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 |
| with phase-to-neutral | kV | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 |
| closed | | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 |
| apparatus | | | | | | | | | | | |
| phase-to-phase | kV | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 |
| inrush making current | kA | - | - | - | - | - | - | - | - | - | - |
| maximum closing | supply side | 34.0 | 37.0 | 34.0 | 35.0 | 37.0 | 35.0 | 35.0 | 35.0 | 35.0 | 37.0 |
| overvoltage | load side | 34.0 | 37.0 | 34.0 | 35.0 | 37.0 | 35.0 | 35.0 | 35.0 | 35.0 | 37.0 |
| breaking current | | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 |
| | A | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 |
| | average | A | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 |
| maximum opening | supply side | - | - | - | - | - | - | - | - | - | - |
| overvoltage | load side | 27.0 | 28.0 | 27.0 | 27.0 | 27.0 | 28.0 | 27.0 | 28.0 | 28.0 | 27.0 |
| retries | no. | - | - | - | - | - | - | - | - | - | - |
| | phase | - | - | - | - | - | - | - | - | - | - |
| duration of | closing | ms | - | - | - | - | - | - | - | - | - |
| | opening | ms | - | - | - | - | - | - | - | - | - |
| | prearc | ms | - | - | - | - | - | - | - | - | - |
| | arc | ms | 9 | 8 | 8 | 8 | 8 | 8 | 9 | 7 | 9 |

conditions of the apparatus after the tests:

cont'd.

Handwritten signature and date: 11/22



Three-phase cable-charging current switching tests

cont'd

| test | no. | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | |
|-------------------------------|------------------|------|------|------|------|------|------|------|------|------|------|------|
| oscillogram | no. | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | |
| operating duty | | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O | |
| voltage with closed apparatus | phase-to-neutral | kV | | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | |
| | | kV | | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | |
| | | kV | | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | |
| through making current | phase-to-phase | kV | | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | |
| | | kA | | - | - | - | - | - | - | - | - | |
| | | kA | | - | - | - | - | - | - | - | - | |
| maximum closing overvoltage | supply side | kV | 35.0 | 38.0 | 41.0 | 35.0 | 31.0 | 34.0 | 35.0 | 33.0 | 34.0 | 30.0 |
| | load side | kV | 35.0 | 38.0 | 41.0 | 35.0 | 31.0 | 34.0 | 35.0 | 33.0 | 34.0 | 30.0 |
| breaking current | A | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | |
| | | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | |
| | | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | |
| average | A | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | |
| maximum opening overvoltage | supply side | kV | - | - | - | - | - | - | - | - | - | |
| | load side | kV | 28.0 | 30.0 | 27.0 | 29.0 | 28.0 | 26.0 | 29.0 | 27.0 | 28.0 | 28.0 |
| gestrikes | no. | - | - | - | - | - | - | - | - | - | - | |
| | phase | - | - | - | - | - | - | - | - | - | - | |
| duration of | closing | ms | - | - | - | - | - | - | - | - | - | |
| | opening | ms | - | - | - | - | - | - | - | - | - | |
| | prearc | ms | - | - | - | - | - | - | - | - | - | |
| | arc | ms | 5 | 9 | 9 | 10 | 9 | 8 | 10 | 8 | 5 | |

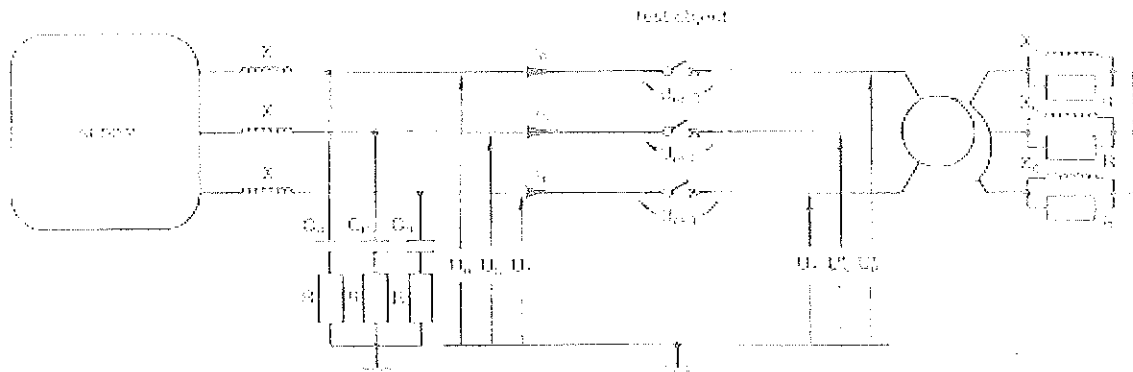
conditions of the apparatus after the tests: external parts as before the tests, internal parts not inspected

note after all the tests : the performance of the apparatus is considered satisfactory for the tests performed.

This test report is not a certificate of conformity, nor do the results given necessarily confirm the ratings supplied by the manufacturer. This document may not be reproduced otherwise than in its entirety without CESI's authorization.

[Handwritten signature and number 1223]

circuit diagram



signature of the responsible person of the test department

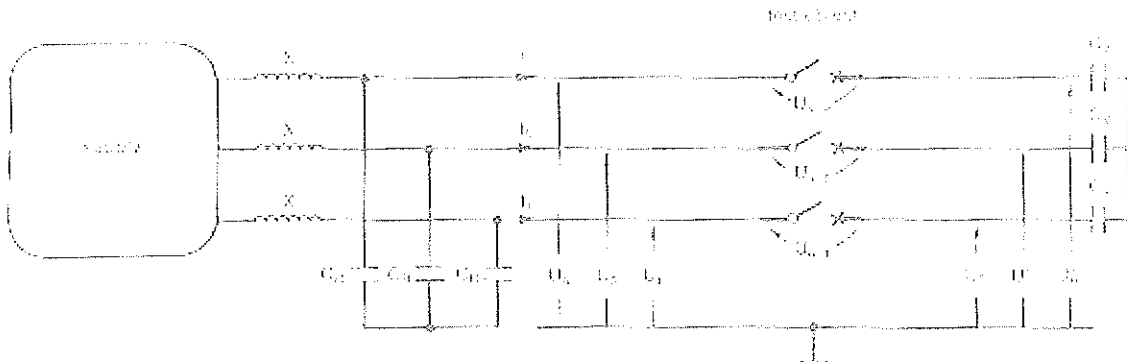
~~Signature~~

This test report is not a certificate of conformity, nor do the results given necessarily confirm the claims advanced by the manufacturer.
This document may not be reproduced otherwise than in its entirety without TESI's authorization.

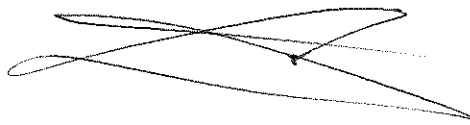
Signature
1824



circuit-diagram



Handwritten note: this is a schematic diagram of the test setup for the wallplug.

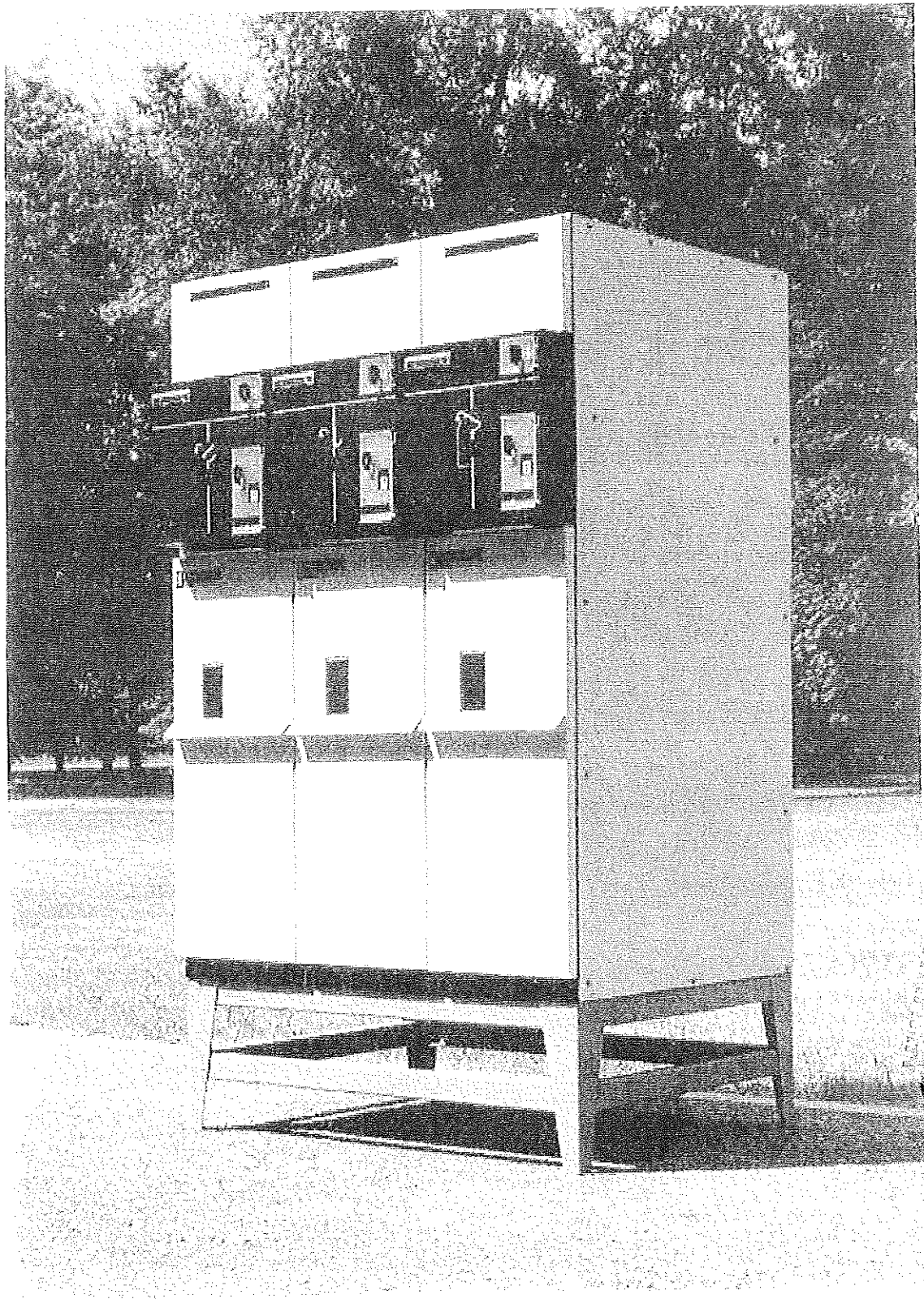


This test report is not a contract or certificate, nor do the results given necessarily count on the safety supplied by the manufacturer. This document may not be reproduced otherwise than in its entirety without CESI's authorization.

Handwritten text: 10/25/91

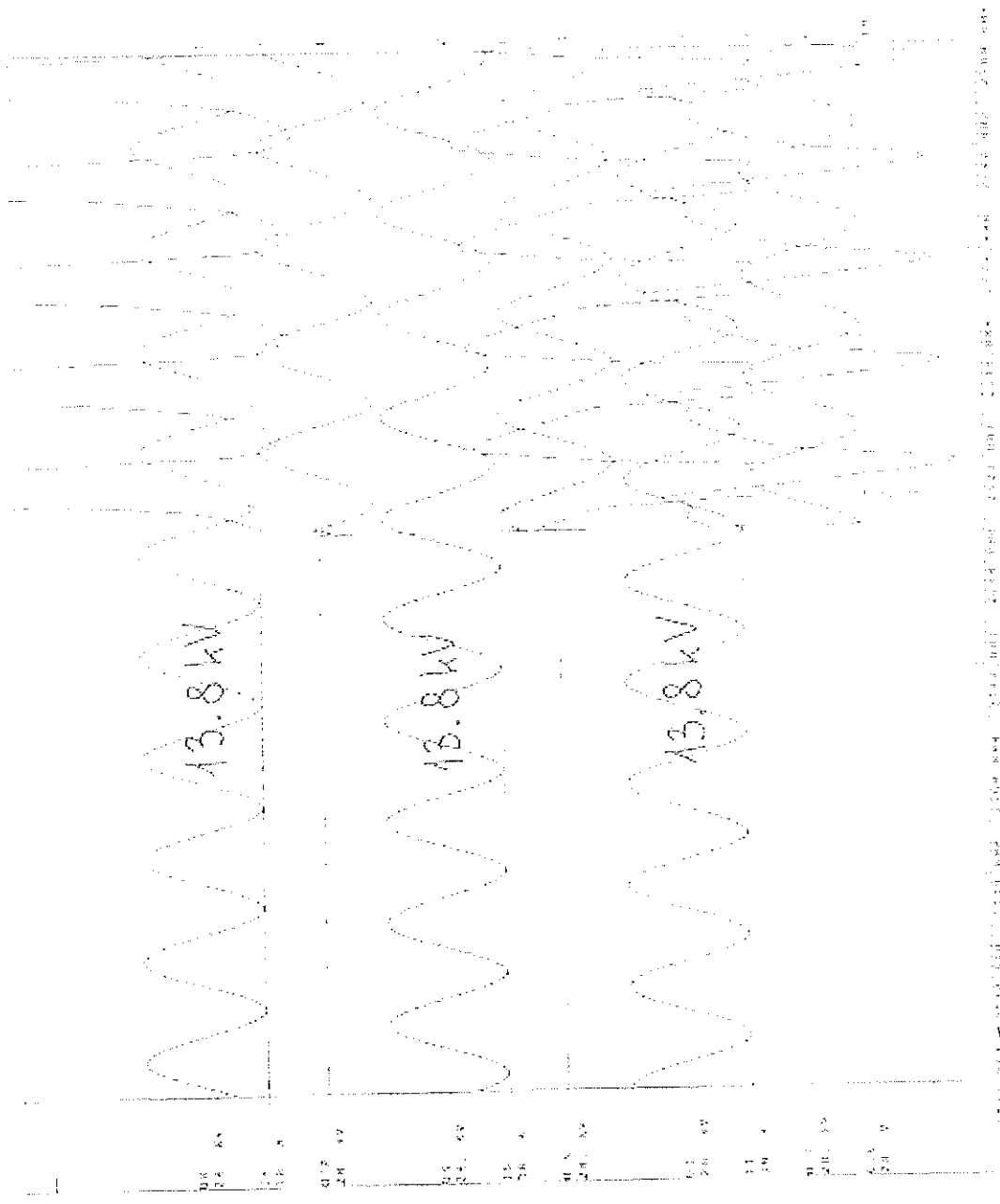
Handwritten signature or mark.

1025



This test report is not a certificate of conformity and the test results do not necessarily reflect the ratings supplied by the manufacturer. This document may not be reproduced otherwise. This work is strictly confidential.

1726



This set of waveforms was taken from the test rig on 12/11/2014. The test rig was set up to run at 13.8 kW. The waveforms show the voltage and current signals for the test rig. The voltage signals are shown in the top row and the current signals are shown in the bottom row. The waveforms are arranged in a 3x4 grid. The first three columns each have a handwritten label '13.8 kW' centered above their respective waveforms.

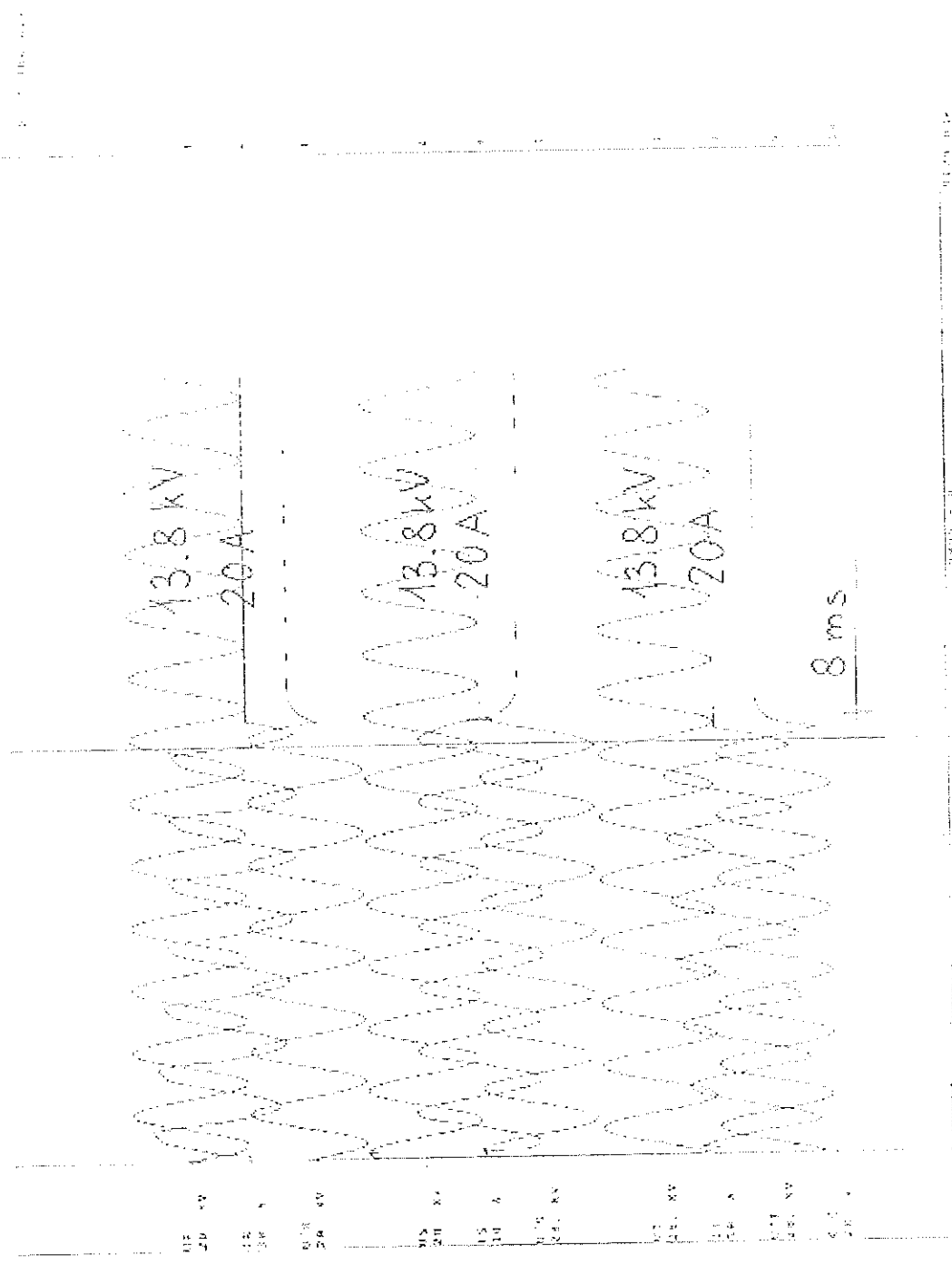
[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

NR27



CH1: 10.000 V (10.000 V/div) 10.000 ns (10.000 ns/div) 10.000 ns (10.000 ns/div) 10.000 ns (10.000 ns/div)

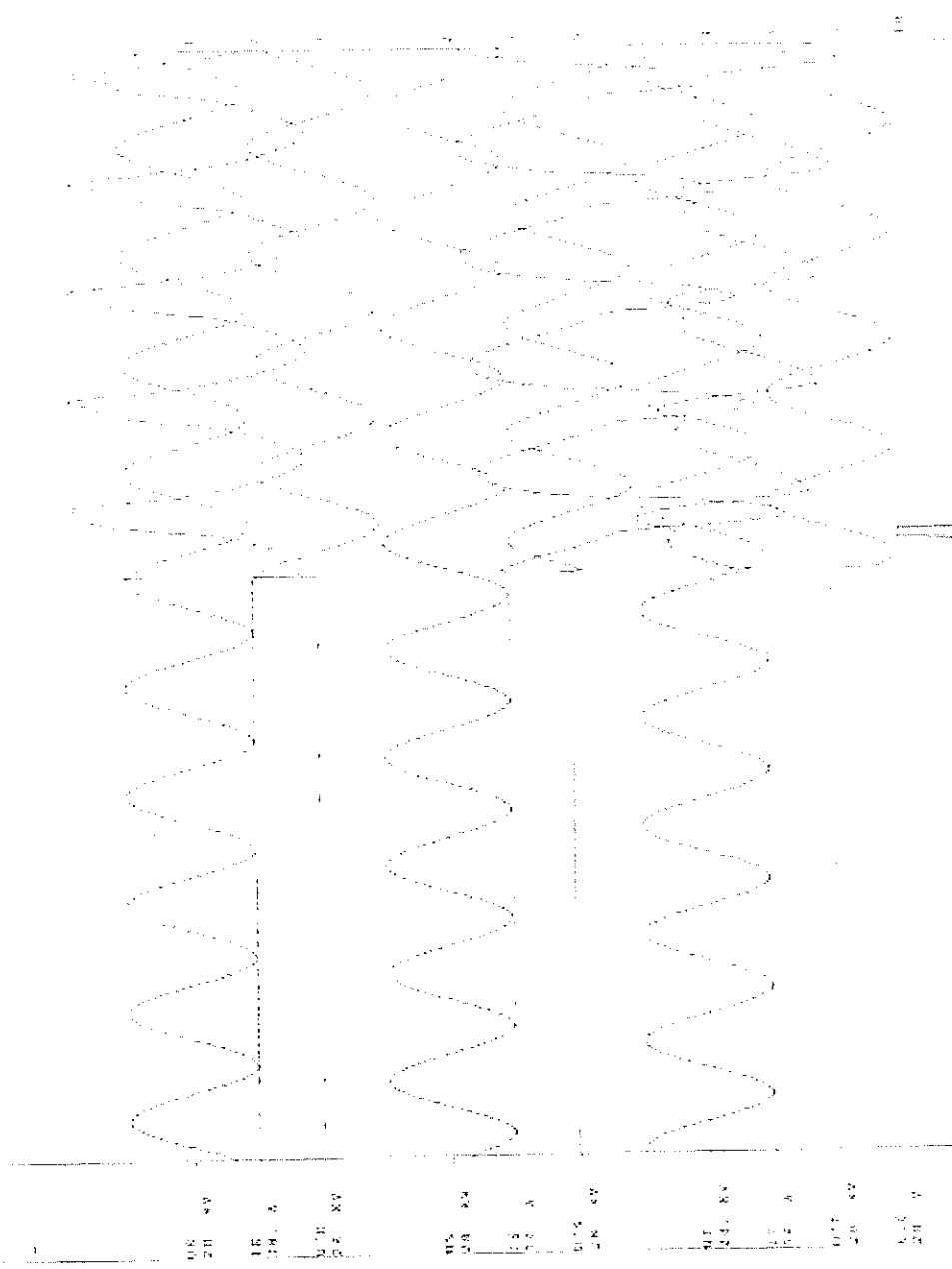
[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

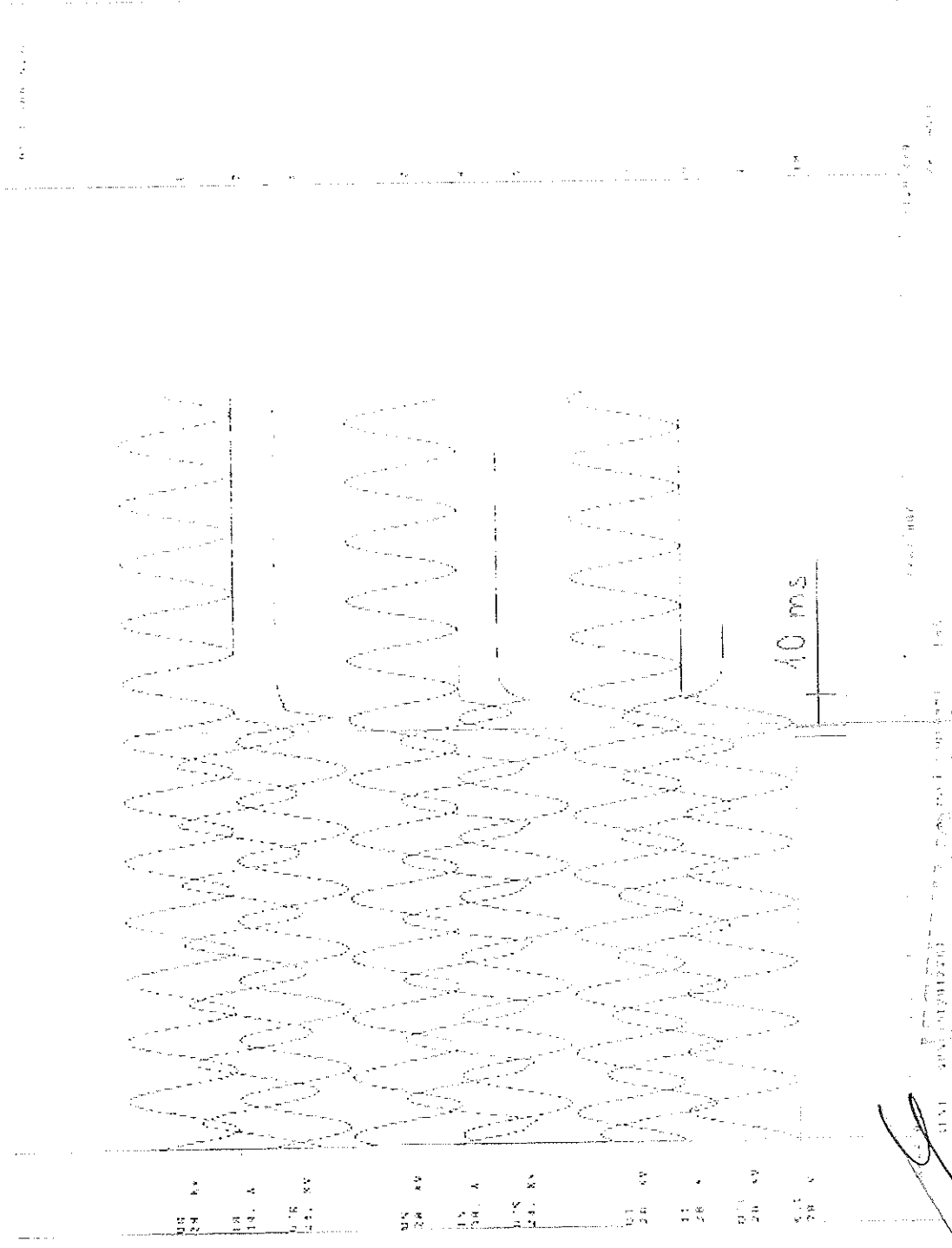
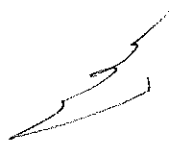
[Handwritten mark]



Handwritten notes and a signature on the right side of the page, partially overlapping the waveform diagram.

[Large handwritten signature]

[Large handwritten signature]



100 kV
 200 kV
 100 A
 200 A
 100 V
 200 V
 100 V
 200 V
 100 V
 200 V
 100 V
 200 V

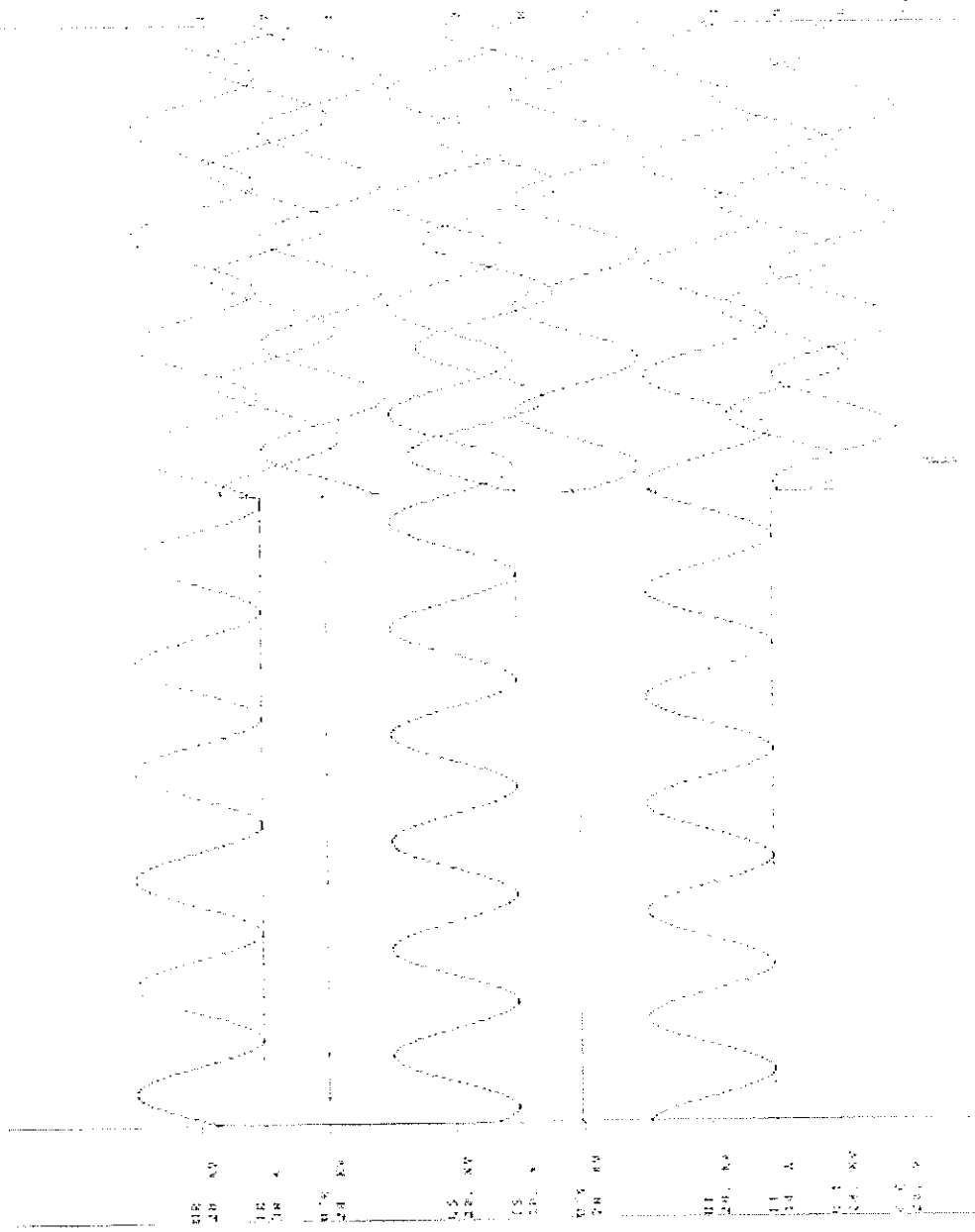
100 kV
 200 kV
 100 A
 200 A
 100 V
 200 V
 100 V
 200 V
 100 V
 200 V
 100 V
 200 V

100 kV
 200 kV
 100 A
 200 A
 100 V
 200 V
 100 V
 200 V
 100 V
 200 V

[Large handwritten signature]

100 kV
 200 kV
 100 A
 200 A
 100 V
 200 V
 100 V
 200 V
 100 V
 200 V

ARSO



UR 4V
 UR 4
 UR 4V
 UR 4V
 UR 4
 UR 4V
 UR 4
 UR 4V

~~A~~

The following is a summary of the work done on the
 project during the last week. The results are as
 follows:

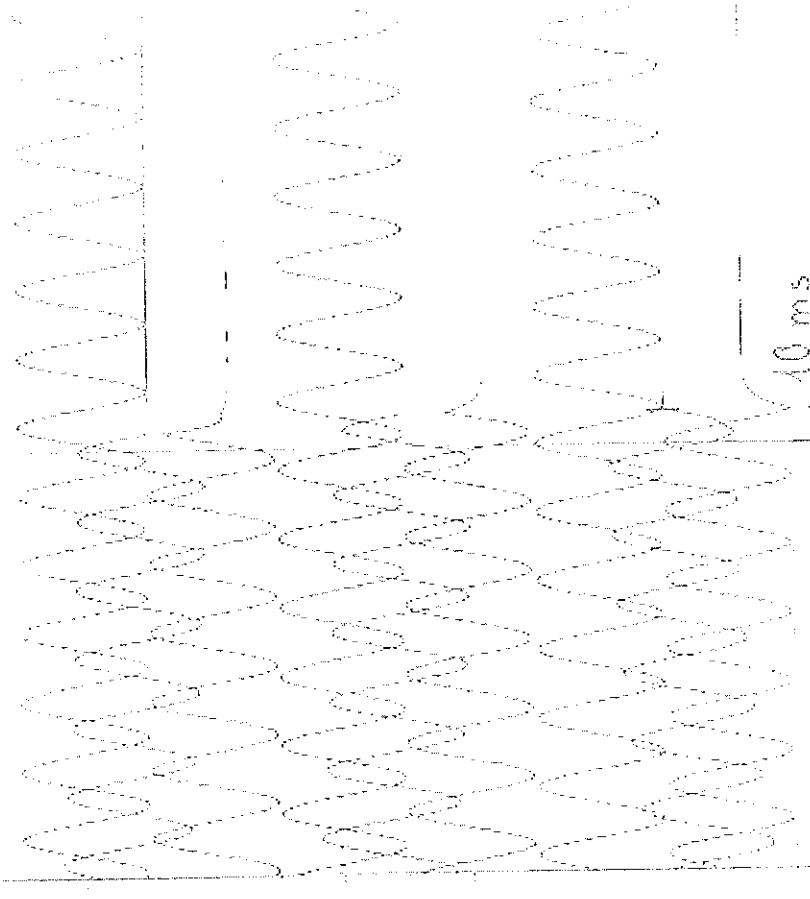
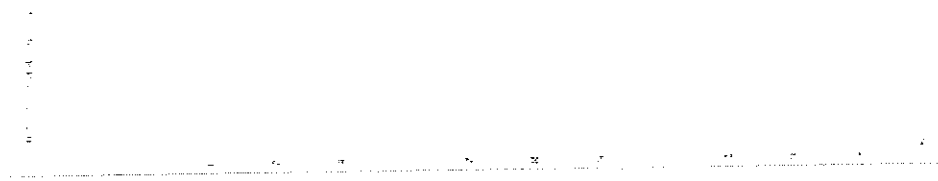
1. The first part of the project was to determine
 the frequency response of the system. This was done
 by measuring the output for various input frequencies.
 The results are shown in the following graph.

(Handwritten signature)

(Handwritten signature)

(Handwritten signature)

Handwritten initials at the top right of the page.



II
I
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6

DATE: 08/28/88
TIME: 09:30

PATIENT: [unclear]

DR: [unclear]

ECG: [unclear]

STATION: [unclear]

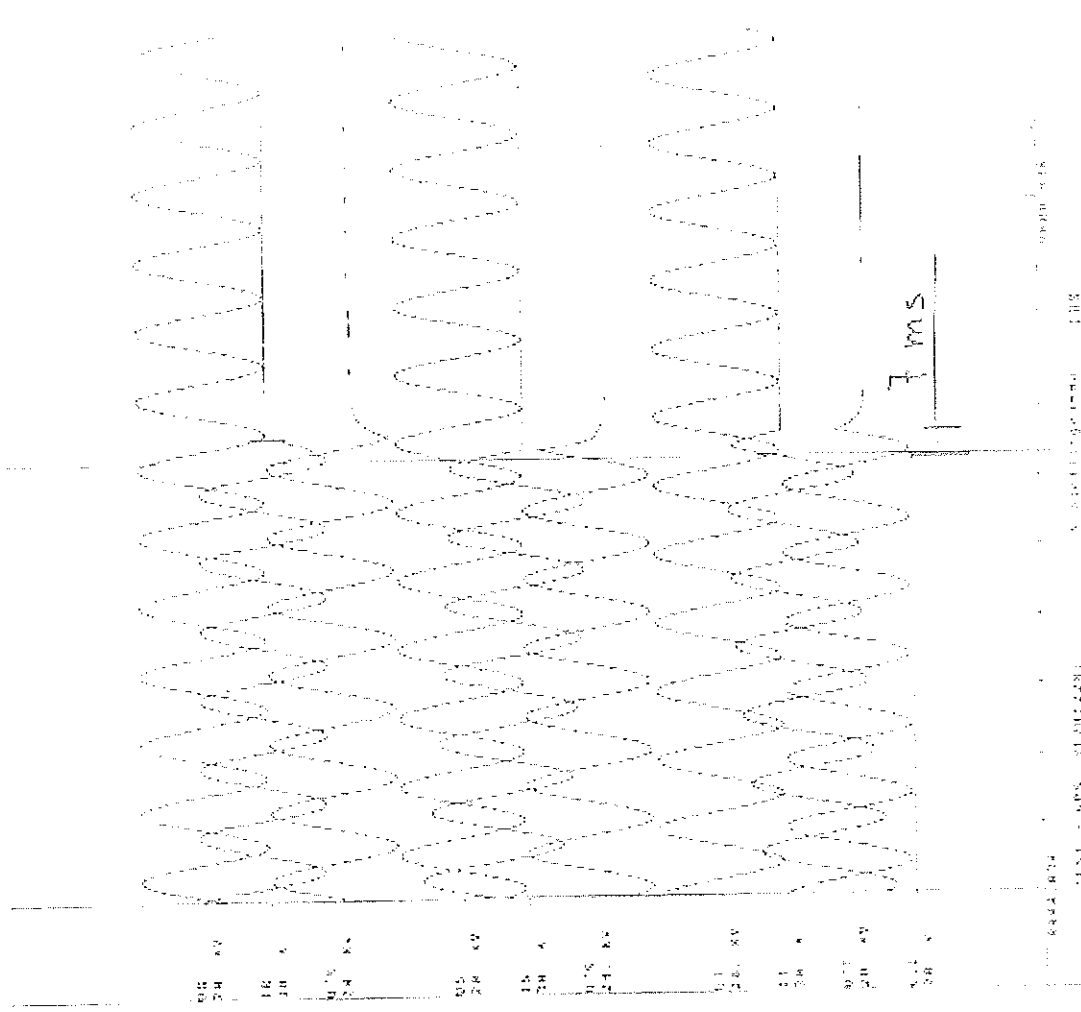
Handwritten signature or scribble in the lower left area.

Handwritten signature or scribble in the lower right area.

Handwritten signature or scribble at the bottom right.

Handwritten signature

11/22/88 10:11 AM



7ms

11/22/88 10:11 AM
 11.22 V
 100.00 Hz
 1.00 V
 10.00 ns
 100.00 Hz
 1.00 V
 10.00 ns

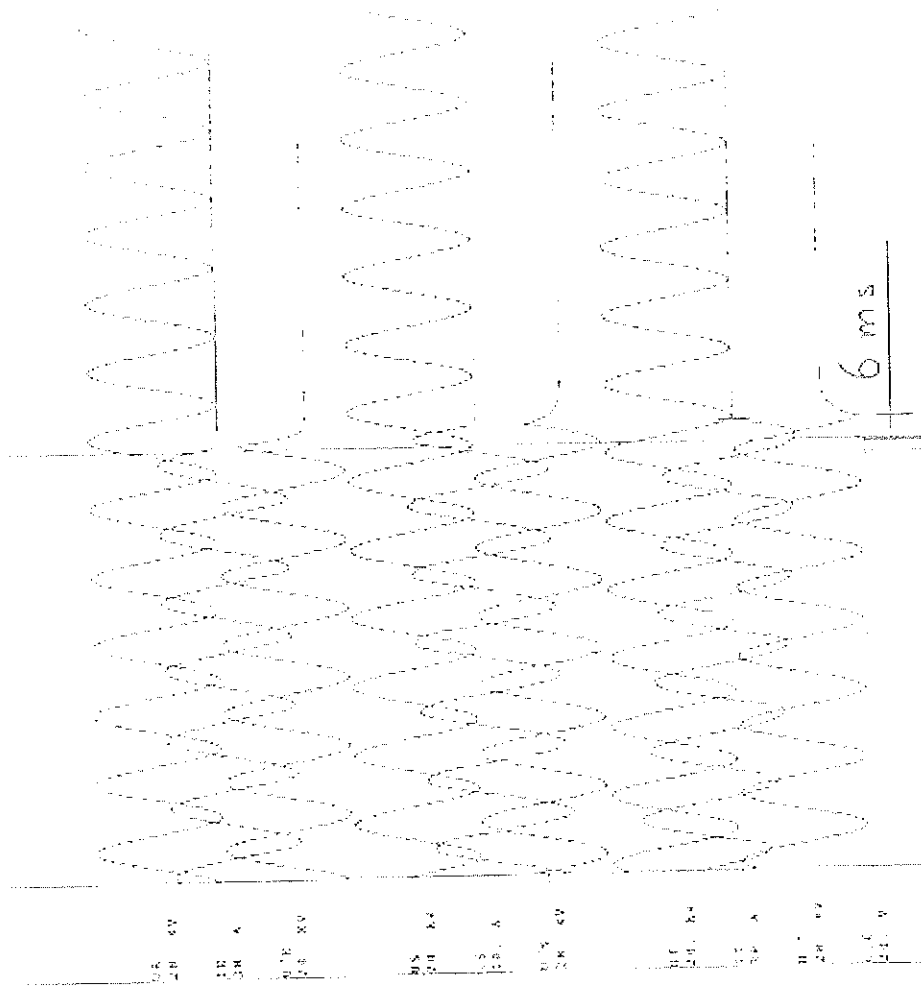
Handwritten signature

~~*Handwritten signature*~~

Handwritten signature

1233

Handwritten signature at the top right of the page.



31.04.1954
108 5515

108 5515

102

102

102

102

102

102

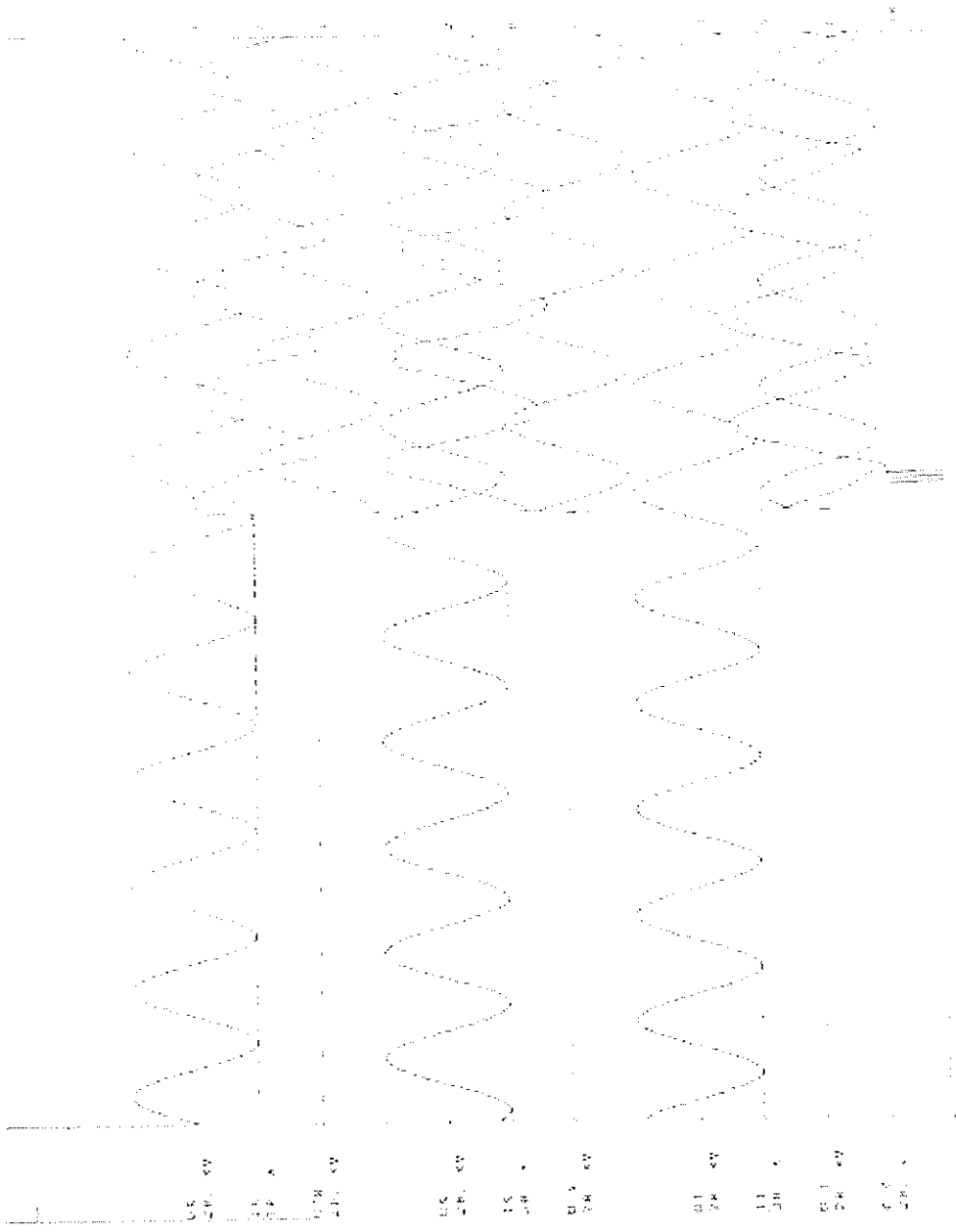
102

102

Large handwritten scribble at the bottom of the page.

1734

[Handwritten signature]



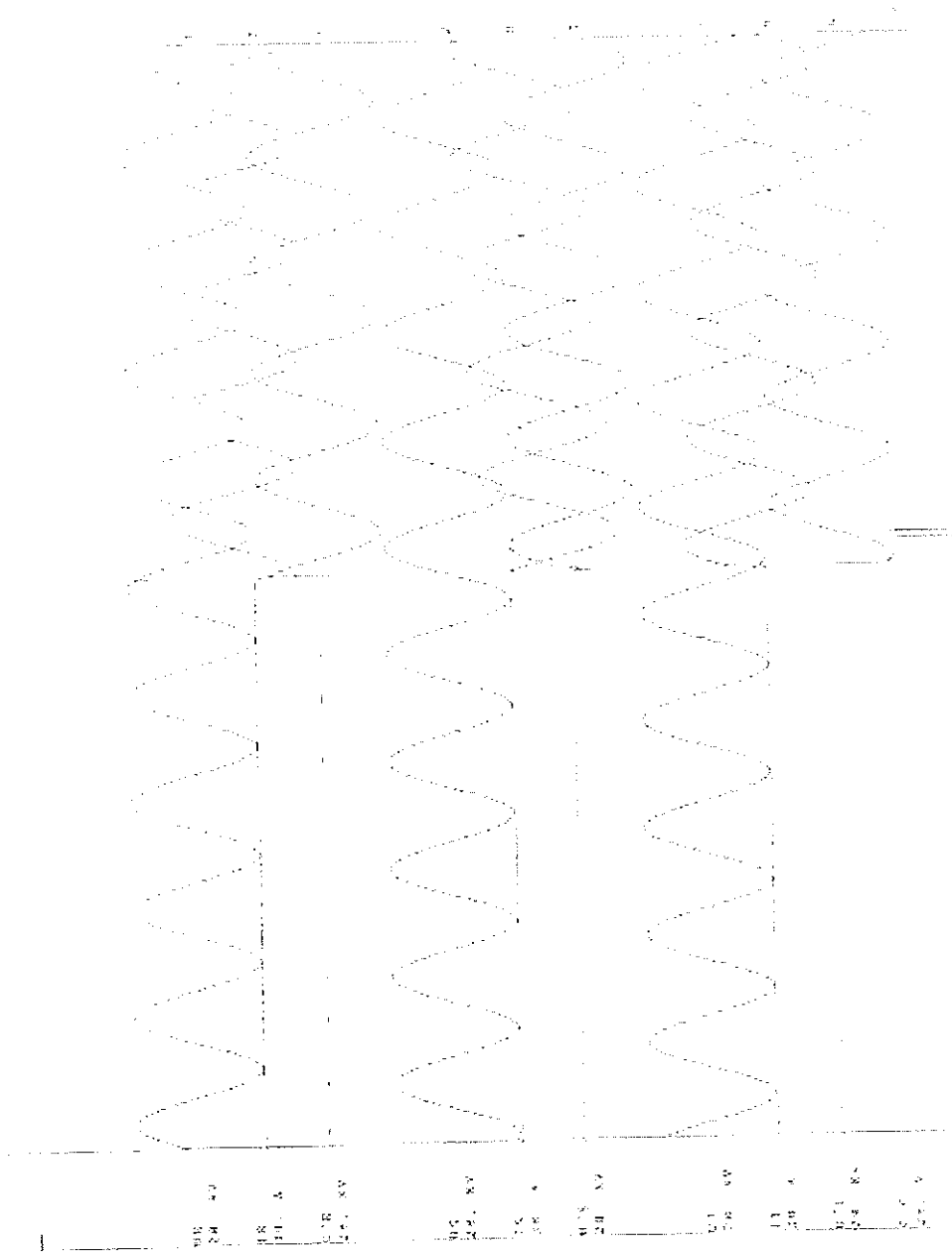
ECG tracing showing a regular rhythm with a rate of approximately 70-80 bpm. The P waves are upright in leads I, II, III, aVL, aVF, and V4-V6, and inverted in leads aVR and V1. The QRS complexes are narrow and appear to be in a sinus rhythm. The ST segment is mostly flat, and the T waves are upright and of moderate amplitude in most leads.

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]



... ..

... ..

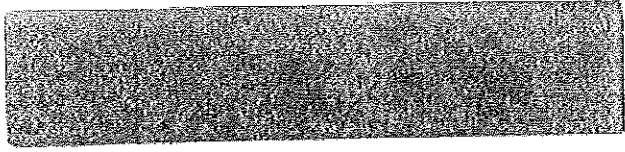
... ..

[Handwritten signature]

[Large handwritten signature]

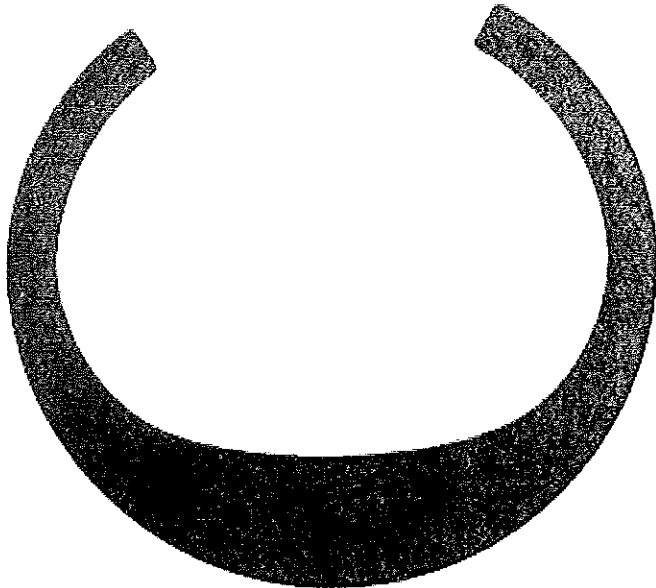
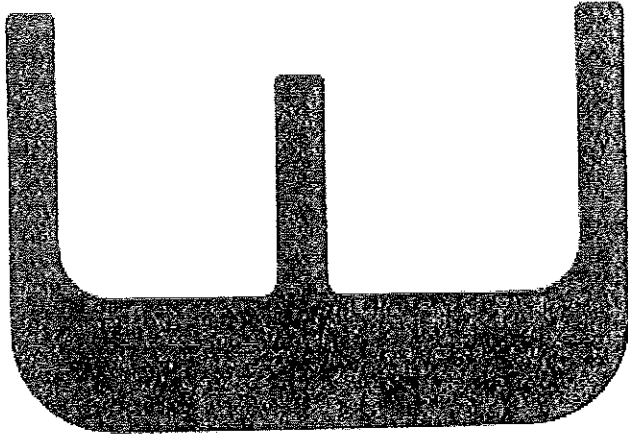
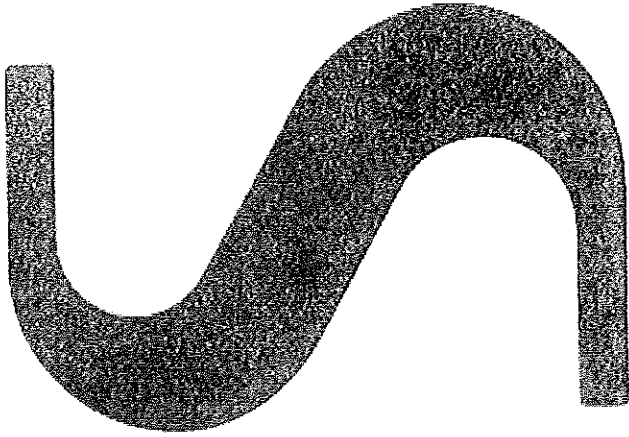
[Handwritten signature]

[Handwritten mark]



51249032XA

GPS91/15191



[Faint, illegible text]

[Handwritten mark]

[Handwritten mark]

[Handwritten mark]

client MERLIN GERIN S.A. - Grenoble (France)

object Three pole metal enclosed air insulated switchgear SM6 system type (M. Filled with an increased operating frequency SF6 gas insulated switch type IQ SM6.

characteristics of the tested object assigned by the client

rated voltage 17.5/24 kV rated current 200 A rated frequency 50 Hz
 other characteristics listed on page 2

the tests have been made in accordance with client's instructions based on IEC 265 (1984)

test data June 19th, 1991
 June 20th, 1991

the performance of the apparatus tested and the observations made during the tests have been recorded in the table with the test results and oscillograms

this document is composed by 9 pages, 260 oscillograms

milan, August 9th, 1991

test engineer

F. Lo Monaco
 F. Lo Monaco

91/012283
 120100 234300 160201 453700 530010

[Handwritten signature]

[Handwritten signature]

91/012283
 keywords : 120100 234300 160201 453700 530010

This test report is not a certificate of conformity, nor do the results given necessarily confirm the ratings supplied by the manufacturer. This document may not be reproduced otherwise than in its original form without CESI's authorization.



rated characteristics of the tested object assigned by the client

| | | |
|--------------------------------------|---------|----------|
| voltage | 17.5/24 | kV |
| frequency | 50 | Hz |
| normal current | 200 | A |
| short-circuit making current | 50 | kA |
| short-time withstand current | 20 | kA |
| short-circuit duration | 1 | s |
| mainly active load breaking current | 200 | A |
| no-load transformer breaking current | 5 | A |
| gas pressure for interruption | 1.4 | bar abs. |

identification of the object effected.

The tested object truly conforms to the drawings of its type supplied by the Client. These drawings identified by CESI with embossing press and numbered GPS- 01/015192 1 to 13 are assembled in a folder.

Vertical stamp or text on the right side of the page, possibly a date or reference number.

Large handwritten signature or scribble in the bottom left area.

Handwritten signature or mark on the right side of the page.

This test report is not a certificate of conformity, nor do the results given necessarily confirm the ratings supplied by the manufacturer. This document may not be reproduced otherwise than in its entirety without CESI's authorization.

Handwritten signature or mark at the bottom right of the page.

table of tests performed

| date | type of test | see page |
|----------------------------|--|----------|
| June 19th 1991 | THREE-PHASE MAINLY ACTIVE LOAD CURRENT SWITCHING TESTS No.100 tests with 200 A at 24 kV | 5 |
| June 19th, 20th 1991 | No.20 tests with 10.5 A at 24 kV | 6 |
| June 20th 1991 | THREE-PHASE NO-LOAD TRANSFORMER CURRENT SWITCHING TESTS No.10 tests with 1.7 A at 24.4 kV | 7 |

REPORTEUR: ...
 DATE: ...

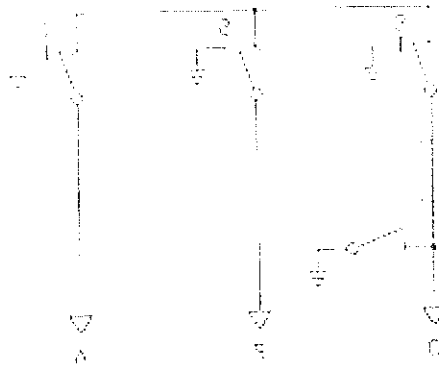
tests witnessed by

Mr. Laurent - MERLIN GERIN S.A.
 Mr. Dubroqua - MERLIN GERIN S.A.

This test report is not a certificate of conformity, nor do the results given necessarily confirm the ratings supplied by the manufacturer.
 This document may not be reproduced otherwise than in its entirety without CEESI's authorization.

arrangement of the object for the tests

The tested apparatus was assembled with two other apparatus of SKS system (see photo on page 9).
The figure below shows the electric diagram of the complete setting (single phase diagram of a three phase circuit) :



3 : switch under test
1-2 : auxiliary switches
A-B-C : cables

During the tests the cables A were connected to the supply, the switch 1 was in closed position and the cables C were connected to the load. The switch 2 was in open position.

The metal enclosure was insulated from earth but connected thereto by a copper wire 0.1 mm in diameter and 30 mm long to indicate any significant leakage current to earth.

The fuses were replaced by cylindric copper connections having the same dimensions of fuses.

This test report is not a certificate of conformity, nor do the results given necessarily confirm the ratings supplied by the manufacturer.
This document may not be reproduced otherwise than in its entirety without CESI's authorization.

three-phase mainly active load current switching tests

test duty with 200 A at 24.0 kV

test circuit conditions

circuit diagram see page 4

supply circuit
 power factor: < 0.2 impedance 13.9 Ω
 frequency: 50 Hz [20 % of the total impedance of the circuit]
 neutral condition: earthed
 TRV : uc 42 kV t3 93 μs

load circuit
 power factor: 0.73 frequency: - Hz
 neutral condition: insulated damping factor: -

control voltage of operating device for: closing - V
 opening - V
 motor - V
 gas operating pressure for : operation - bar abs.
 breaking 1.4 bar abs.

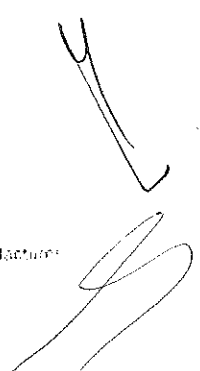
conditions of the apparatus before the tests : new

tests performed no.100 tests with operating sequence CO
 test no. 1 to 100
 oscillograms no. 154 to 253
 test voltage 24 kV
 test current 200 A
 minimum arcing time 7 ms
 maximum arcing time 14 ms

The tested switch has always cleared the current.
 No overvoltage was observed on supply and load side of the circuit.

conditions of the apparatus after the tests: external parts as before the tests
 internal parts not inspected.

015191
 31/01
 015191

Three-phase mainly active load current switching tests
 test duty with 10.5 A at 24.3 kV

Test circuit conditions

circuit diagram see page: 10

supply circuit
 power factor: < 0.2 impedance 13.9 Ω
 frequency: 50 Hz
 neutral condition: earthed
 TRV : ac 42 kV L1 93 μs

load circuit
 power factor: 0.73 frequency: - Hz
 neutral condition: insulated damping factor: -

control voltage of operating devices for: closing - V
 opening - V
 motor - V
 gas operating pressure for : operation - bar abs.
 breaking 1.4 bar abs.

conditions of the apparatus before the tests : as after the test no. 100

tests performed no. 20 tests with operating sequence G0
 test no. 101 to 120
 oscillogramm no. 254 to 273
 test voltage 24 kV
 test current 10.5 A
 minimum arcing time 5 ms
 maximum arcing time 10 ms

The tested switch has always cleared the current.
 No overvoltage was observed on supply and load side of the circuit.

conditions of the apparatus after the tests: external parts as before the tests
 internal parts not inspected.

C
 E
 S
 I
 S
 T
 R
 U
 M
 1
 9
 9
 1

three-phase no-load transformer current switching tests

with 3.70 A at 24.0 kV

test circuit conditions

circuit diagram see page: 8

supply circuit
 power factor: < 0.2 impedance 6.3 Ω
 frequency: 50 Hz
 neutral condition: earthed
 TRV : uc 43 kV ul 89 μs

load circuit
 power factor: 0.12 frequency: 500 Hz
 neutral condition: insulated damping factor: 0.15

control voltage of operating devices for: closing - V
 opening - V
 motor - V
 gas operating pressure for: operation - bar abs.
 breaking 1.4 bar abs.

conditions of the apparatus before the tests : as after the test no.120

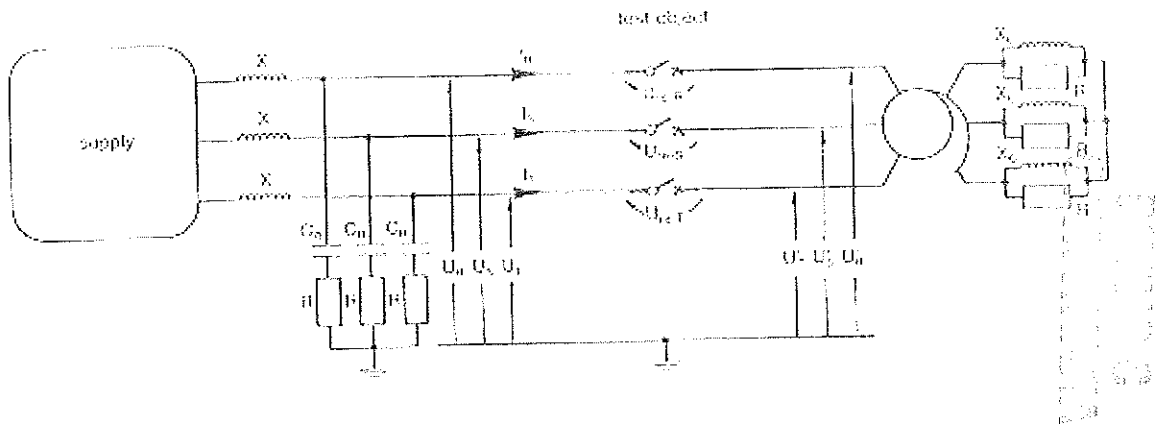
| test | no. | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 |
|-----------------------------|---------------------|------|------|------|------|------|------|------|------|------|------|
| oscillogram | no. | 274 | 275 | 276 | 277 | 278 | 279 | 280 | 281 | 282 | 283 |
| operating duty | | o | o | o | o | o | o | o | o | o | o |
| voltage with open apparatus | phase-to-neutral kV | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 |
| | | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 |
| | | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 |
| phase-to-phase kV | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 |
| | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 |
| | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 |
| Inrush making current | kA | - | - | - | - | - | - | - | - | - | - |
| maximum closing overvoltage | supply side kV | - | - | - | - | - | - | - | - | - | - |
| | load side kV | - | - | - | - | - | - | - | - | - | - |
| breaking current | A | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 |
| | | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 |
| | | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 |
| average | A | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 | 3.70 |
| maximum opening overvoltage | supply side kV | 24.0 | - | - | - | - | - | - | - | - | - |
| | load side kV | 31.0 | 34.0 | 33.0 | 31.0 | 33.0 | 27.0 | 26.0 | 32.0 | 30.0 | 29.0 |
| restriction | no. | - | - | - | - | - | - | - | - | - | - |
| | phase | - | - | - | - | - | - | - | - | - | - |
| duration of | closing | ms | - | - | - | - | - | - | - | - | - |
| | opening | ms | - | - | - | - | - | - | - | - | - |
| | prearc | ms | - | - | - | - | - | - | - | - | - |
| | arc | ms | 5 | 7 | 7 | 6 | 0 | 6 | 6 | 8 | 9 |

conditions of the apparatus after the tests: external parts as before the tests, internal parts not inspected

note after all the tests : the performance of the apparatus is considered satisfactory for the tests performed.

This test report is not a certificate of conformity, nor do the results given necessarily confirm the ratings supplied by the manufacturer. This document may not be reproduced otherwise than in its entirety without CESI's authorization.

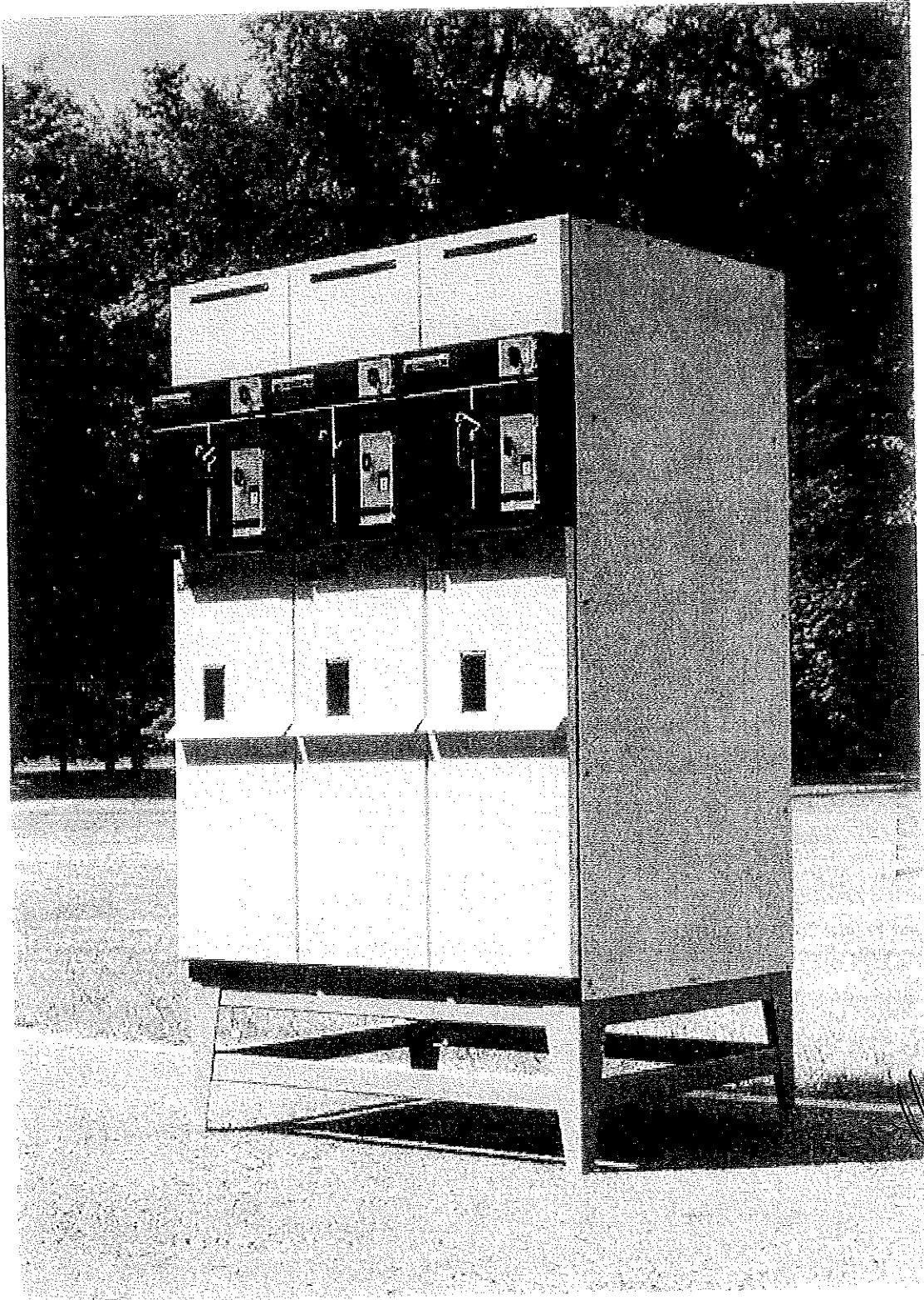
circuit-diagram



same test in this diagram are the same as on the oscillogram

This test report is not a certificate of conformity, nor do the results given necessarily confirm the results supplied by the manufacturer.
 This document may not be reproduced otherwise than in its entirety without CESI's authorization.

1245



1246

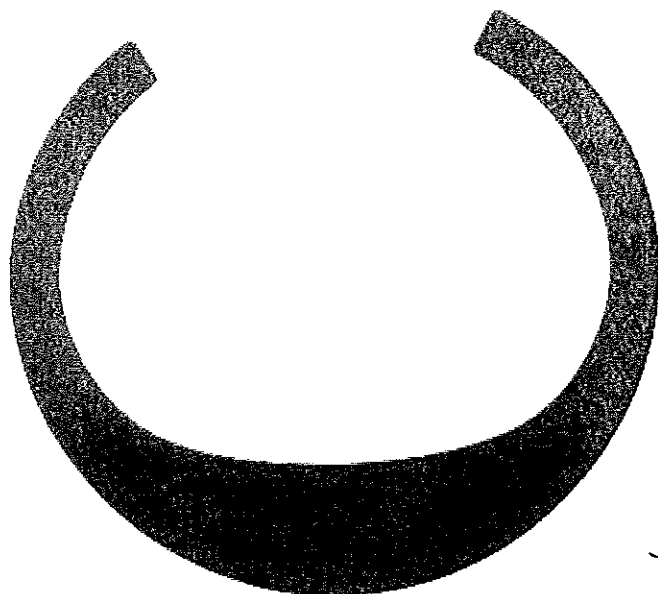
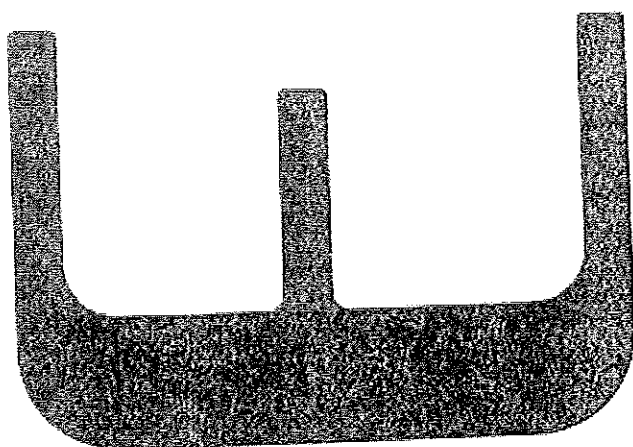
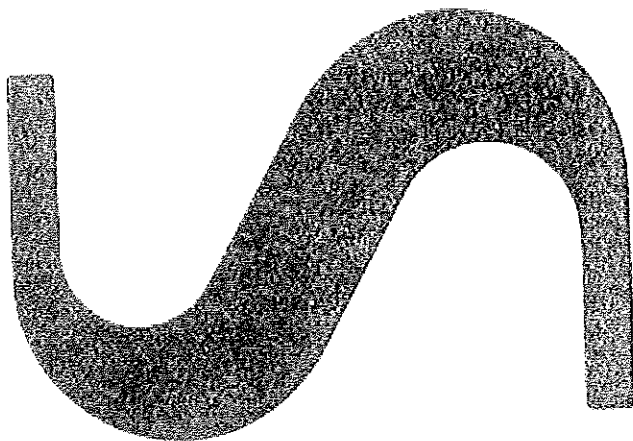
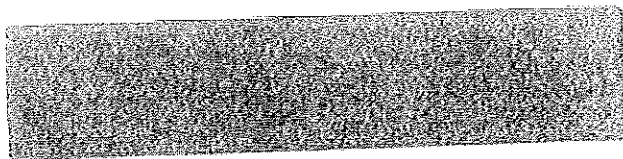
This test report is not a certificate of conformity, nor do the results herein necessarily confirm the ratings supplied by the manufacturer. This document may not be reproduced otherwise than in its entirety without CESI's authorization.

1246

[Handwritten mark]

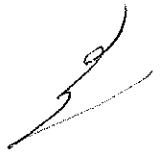
51249036XA

GPS91/15199



REPRODUCTION
OF
ORIGINAL

[Handwritten signature]



client: MERLIN GERIE S.A. - Grenoble (France)

object: Three pole metal enclosed air insulated switchgear SM6 system type 10, fitted with an increased operating frequency SF6 gas insulated switch type I SM6.

characteristics of the tested object assigned by the Client

rated voltage 17.5/24 kV rated current 630 A rated frequency 50 Hz
other characteristics listed on page 2

the tests have been made in accordance with client's instructions based on IEC 265 (1983)

test date: June 19th, 1991

the performance of the apparatus tested and the observations made during the tests have been recorded in the table with the test results and oscillograms

this document is composed by 10 pages, 50 oscillograms.

RECEIVED
1991 JUN 20 10 00 AM

Grenoble, August 19th, 1991

test engineer

F. Lo Monaco

keywords : 91/01228J 126100 234308 350201 450307 53001D

this test report is not a certificate of conformity, nor do the results given necessarily confirm the ratings supplied by the manufacturer. this document may not be reproduced otherwise than in its entirety without CESI's authorization.

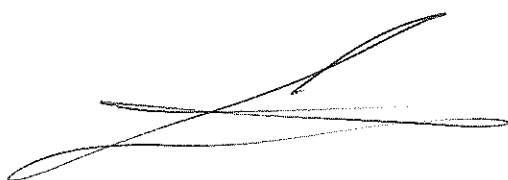
rated characteristics of the tested object assigned by the client

| | | |
|--------------------------------------|--------------|----|
| voltage | 17.5/24 | kV |
| frequency | 50 | Hz |
| normal current | 630 | A |
| short-circuit making current | 50 | kA |
| short-line withstand current | 20 | kA |
| short-circuit duration | 1 | s |
| cable charging breaking current | 25 | A |
| no-load transformer breaking current | 10 | A |
| gas pressure for interruption | 1.4 bar abs. | |

Identification of the object effected.

The tested object truly conforms to the drawings of its type supplied by the client. These drawings identified by CESI with embossing press and numbered CPS- 91/015161 1 to 12 are assembled in a folder.

RECEIVED
 1991
 10/10/91
 10/10/91




This test report is not a certificate of conformity, nor do the results given necessarily confirm the ratings supplied by the manufacturer. This document may not be reproduced otherwise than in its entirety without CESI's authorization.

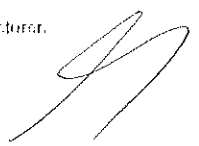




Table of tests performed

| date | type of test | see page |
|-------------------|---|----------|
| June 19th 1991 | THREE-PHASE NO-LOAD TRANSFORMER CURRENT SWITCHING TESTS No.10 tests with 15 A at 24.4 kV | 5 |
| June 19th 1991 | THREE-PHASE CABLE-CHARGING CURRENT SWITCHING TESTS No.20 tests with 29 A at 24.2 kV | 6-7 |

1991 JUN 20 10 02 AM
 1991 JUN 20 10 02 AM

Tests witnessed by

Mr. Leudens - MERLIN GERIN S.A.
 Mr. Dabroque - MERLIN GERIN S.A.

This test report is not a certificate of conformity, nor do the results given necessarily confirm the ratings supplied by the manufacturer.
 This document may not be reproduced otherwise than in its entirety without CESI's authorization.

arrangement of the object for the tests

The tested apparatus was assembled with two other apparatus of SMS system (see photo on page 8).
 The figure below shows the electric diagram of the complete setting (single phase diagram of a three phase circuit):



- 1 : switch under test
- 2-3 : auxiliary switches
- A-B-C : cables

During the tests the cables A were connected to the supply, the switch 1 was in closed position and the cables B were connected to the load. The switch 3 was in open position.

The metal enclosure was insulated from earth but connected thereto by a copper wire 0.1 mm in diameter and 30 mm long to indicate any significant leakage current to earth.

This test report is not a certificate of conformity, nor do the results given necessarily confirm the ratings supplied by the manufacturer.
 This document may not be reproduced otherwise than in its entirety without CESI's authorization.

three-phase no-load transformer current switching tests

test duty with 15.0 A at 24.4 kV

test circuit conditions

circuit diagram see page: 3

supply circuit
 power factor: < 0.2 impedance 5.0 Ω
 frequency: 50 Hz
 neutral condition: earthed
 20V : no 34 kV 13 84 μs

load circuit
 power factor: 0.19 frequency: 500 Hz
 neutral condition: insulated damping factor: 0.125

control voltage of operating devices for: closing V
 opening - V
 motor - V
 gas operating pressure for: operation - bar abs.
 breaking 1.4 bar abs.

conditions of the apparatus before the tests: new

| test | no. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|-----------------------------|---------------------|------|------|------|------|------|------|------|------|------|------|
| oscillogram | no. | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 |
| operating duty | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| voltage with open apparatus | phase to-neutral kV | 14.1 | 14.1 | 14.1 | 14.1 | 24.4 | 14.1 | 14.1 | 14.1 | 14.1 | 14.1 |
| | phase-to-phase kV | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 | 24.4 |
| inrush making current | kA | - | - | - | - | - | - | - | - | - | - |
| maximum closing overvoltage | supply side kV | - | - | - | - | - | - | - | - | - | - |
| | load side kV | - | - | - | - | - | - | - | - | - | - |
| breaking current | | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 |
| | | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 |
| | average A | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 |
| maximum opening overvoltage | supply side kV | 22.0 | 22.0 | 21.0 | 21.0 | 23.0 | 22.0 | - | 21.0 | 24.0 | 23.0 |
| | load side kV | 22.0 | 24.0 | 24.0 | 23.0 | 25.0 | 23.0 | 23.0 | 23.0 | 25.0 | 24.0 |
| restrikes | no. | - | - | - | - | - | - | - | - | - | - |
| | phase | - | - | - | - | - | - | - | - | - | - |
| duration of | closing | ms | - | - | - | - | - | - | - | - | - |
| | opening | ms | - | - | - | - | - | - | - | - | - |
| | prepare | ms | - | - | - | - | - | - | - | - | - |
| | arc | ms | 11 | 11 | 13 | 10 | 12 | 11 | 10 | 12 | 11 |

conditions of the apparatus after the tests: external parts as before the tests, internal parts not inspected.

This test report is not a certificate of conformity, nor are the results given necessarily nor limit the ranges supplied by the manufacturer. This document may not be reproduced otherwise than in its entirety without CESI's authorisation.

three-phase cable-charging current switching tests

test duty with 29.0 A at 24.2 kV

test circuit conditions

circuit diagram see page 5

supply circuit
 power factor: $\cos \phi = 0,15$ short-circuit current: 2 kA
 frequency: 50 Hz
 TRV: up to 44 kV 13 86 μs

load circuit
 capacitance of capacitor banks: CMI = 5.6 μF (insulated)
 voltage decay at 100 ms after final arc extinction $< 10\%$

voltage with open apparatus: 14.0 kV phase-to-neutral 24.2 kV phase-to-phase

control voltage of operating devices for:
 closing - V
 opening - V
 motor - V
 operation - ear abs.
 breaking 1.4 bar abs.

conditions of the apparatus before the tests: as after the test no. 10

| test no. | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|
| oscillogram no. | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 |
| operating duty | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O |
| voltage with closed apparatus | | | | | | | | | | |
| phase-to-neutral kV | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 |
| phase-to-phase kV | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 |
| through making current kA | - | - | - | - | - | - | - | - | - | - |
| maximum closing overvoltage | | | | | | | | | | |
| supply side kV | 24.0 | 27.0 | 24.0 | 25.0 | 27.0 | 25.0 | 25.0 | 25.0 | 25.0 | 27.0 |
| load side kV | 24.0 | 27.0 | 24.0 | 25.0 | 27.0 | 25.0 | 25.0 | 25.0 | 25.0 | 27.0 |
| breaking current | | | | | | | | | | |
| A | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 |
| average | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 |
| maximum opening overvoltage | | | | | | | | | | |
| supply side kV | - | - | - | - | - | - | - | - | - | - |
| load side kV | 27.0 | 28.0 | 27.0 | 27.0 | 27.0 | 28.0 | 27.0 | 28.0 | 28.0 | 27.0 |
| restrikes | | | | | | | | | | |
| no. | - | - | - | - | - | - | - | - | - | - |
| phase | - | - | - | - | - | - | - | - | - | - |
| duration of | | | | | | | | | | |
| closing ms | - | - | - | - | - | - | - | - | - | - |
| opening ms | - | - | - | - | - | - | - | - | - | - |
| pre-arc ms | - | - | - | - | - | - | - | - | - | - |
| arc ms | 9 | 9 | 8 | 8 | 8 | 8 | 9 | 9 | 9 | 9 |

conditions of the apparatus after the tests: -

cont'd.

This test report is not a certificate of conformity, nor do the results given necessarily conform to the data supplied by the manufacturer. This document may not be reproduced or revised without the written authorization of CESI.

Three phase cable-charging current switching tests
 cont'd

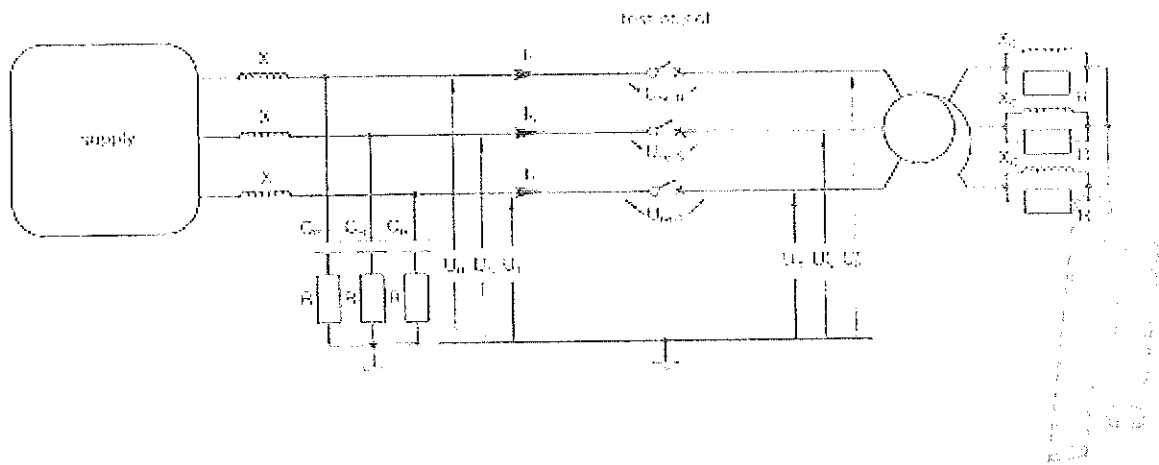
| test | no. | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
|-------------------------------|---------------------|------|------|------|------|------|------|------|------|------|------|
| oscillogram | no. | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 |
| operating duty | | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O |
| voltage with closed apparatus | phase-to-neutral kV | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 |
| | phase-to-phase kV | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 | 24.2 |
| inrush making current | kA | - | - | - | - | - | - | - | - | - | - |
| maximum closing overvoltage | supply side kV | 35.0 | 36.0 | 41.0 | 35.0 | 31.0 | 34.0 | 35.0 | 35.0 | 34.0 | 34.0 |
| | load side kV | 35.0 | 36.0 | 41.0 | 35.0 | 31.0 | 34.0 | 35.0 | 35.0 | 34.0 | 34.0 |
| breaking current | A | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 |
| | average A | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 |
| maximum opening overvoltage | supply side kV | - | - | - | - | - | - | - | - | - | - |
| | load side kV | 28.0 | 30.0 | 27.0 | 29.0 | 28.0 | 26.0 | 29.0 | 27.0 | 28.0 | 28.0 |
| restrikes | no. | - | - | - | - | - | - | - | - | - | - |
| | phase | - | - | - | - | - | - | - | - | - | - |
| duration of | closing | ms | - | - | - | - | - | - | - | - | - |
| | opening | ms | - | - | - | - | - | - | - | - | - |
| | gears | ms | - | - | - | - | - | - | - | - | - |
| | arc | ms | 5 | 5 | 9 | 10 | 9 | 8 | 10 | 8 | 8 |

conditions of the apparatus after the tests: external parts as before the tests, internal parts not inspected

note after all the tests : the performance of the apparatus is considered satisfactory for the tests performed.

This test report is not a certificate of conformity. For do the test is given necessarily proof on the ratings supplied by the manufacturer. This document may not be reproduced other wise than in its entirety without CESI's authorization.

circuit diagram

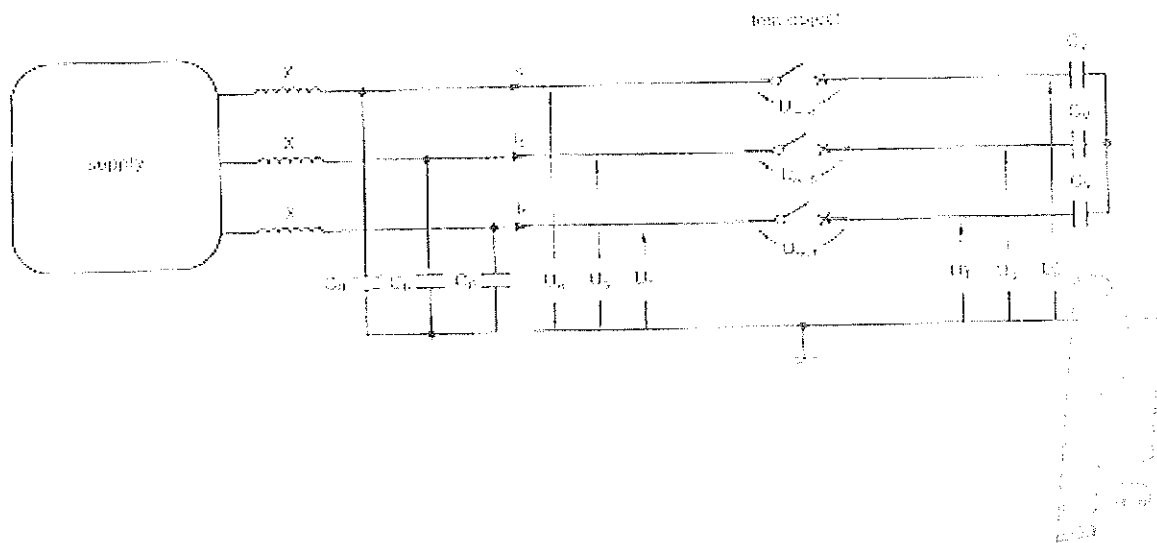


symbols used in this diagram are the same as on the oscillograms

This test report is not a certificate of conformity, nor do the results given necessarily confirm the ratings supplied by the manufacturer. This document may not be reproduced otherwise than in its entirety without CEB's authorization.

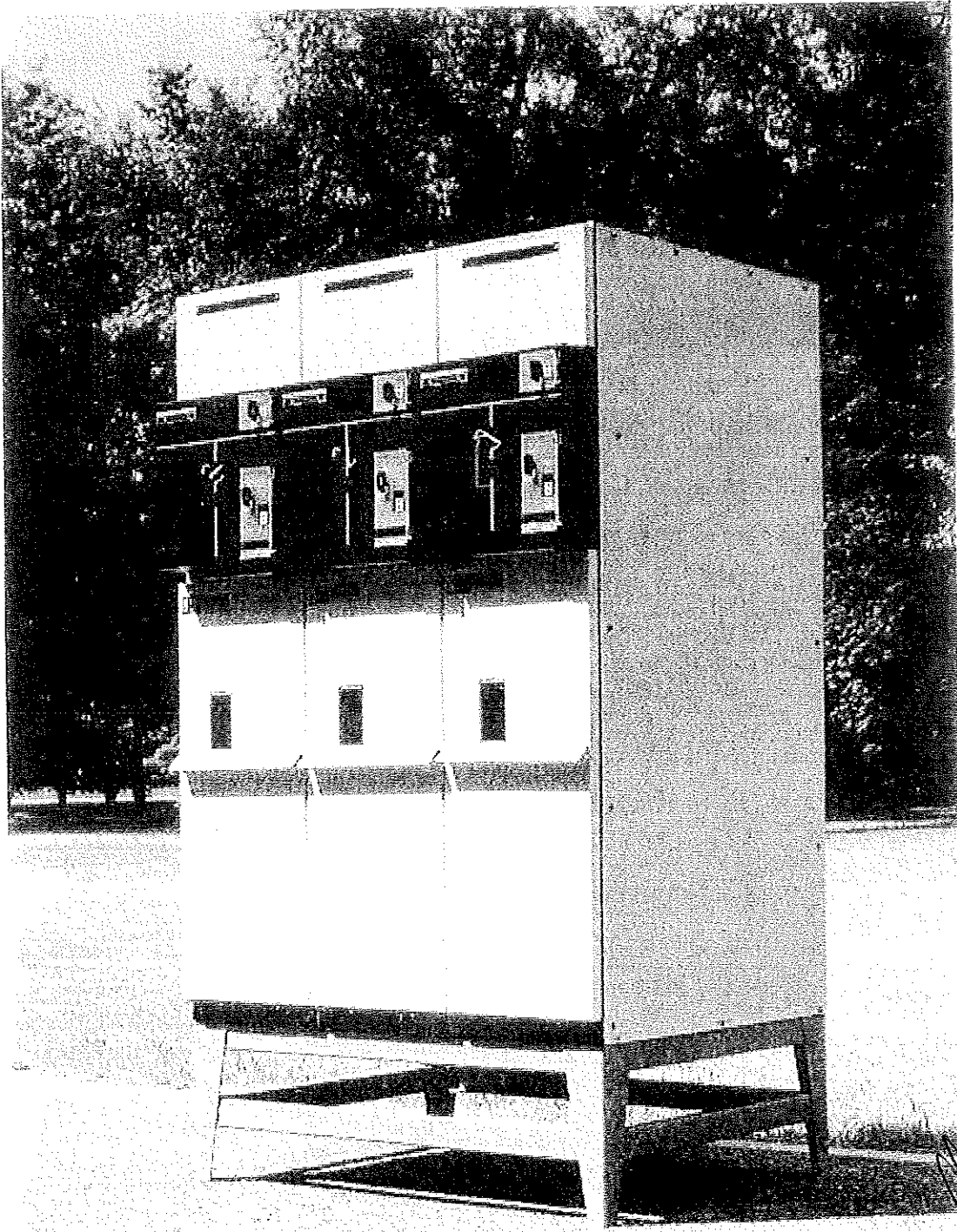
1255

circuit diagram



components used in this diagram are the same as on the test object

This test report is not a certificate of conformity, nor do the results given necessarily confirm the ratings supplied by the manufacturer. This document may not be reproduced otherwise than in its entirety without CESI's authorization.

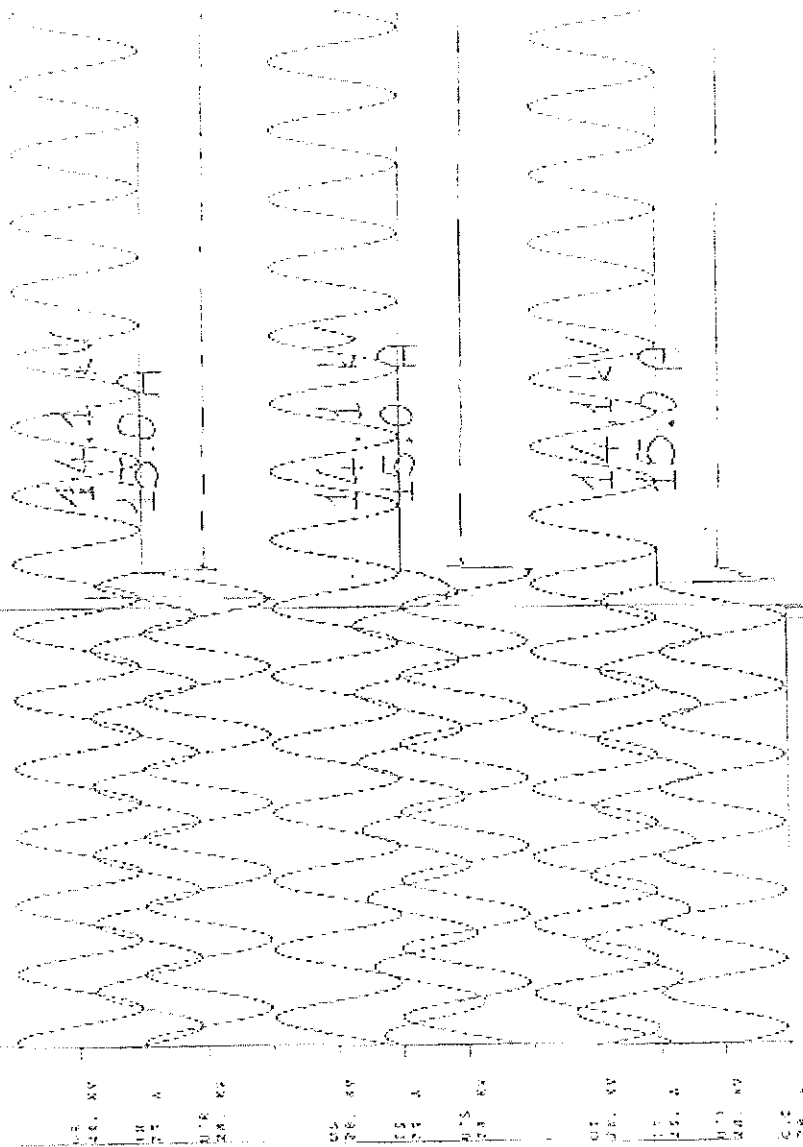


PROTECTOR
CORPORATION

This test report is not a certificate of conformity, nor do the results herein necessarily confirm the ratings supplied by the manufacturer. This document may not be reproduced otherwise than in its entirety without CESI's authorization.

1252

8-22-1985



Handwritten signature

Handwritten signature

11-1985

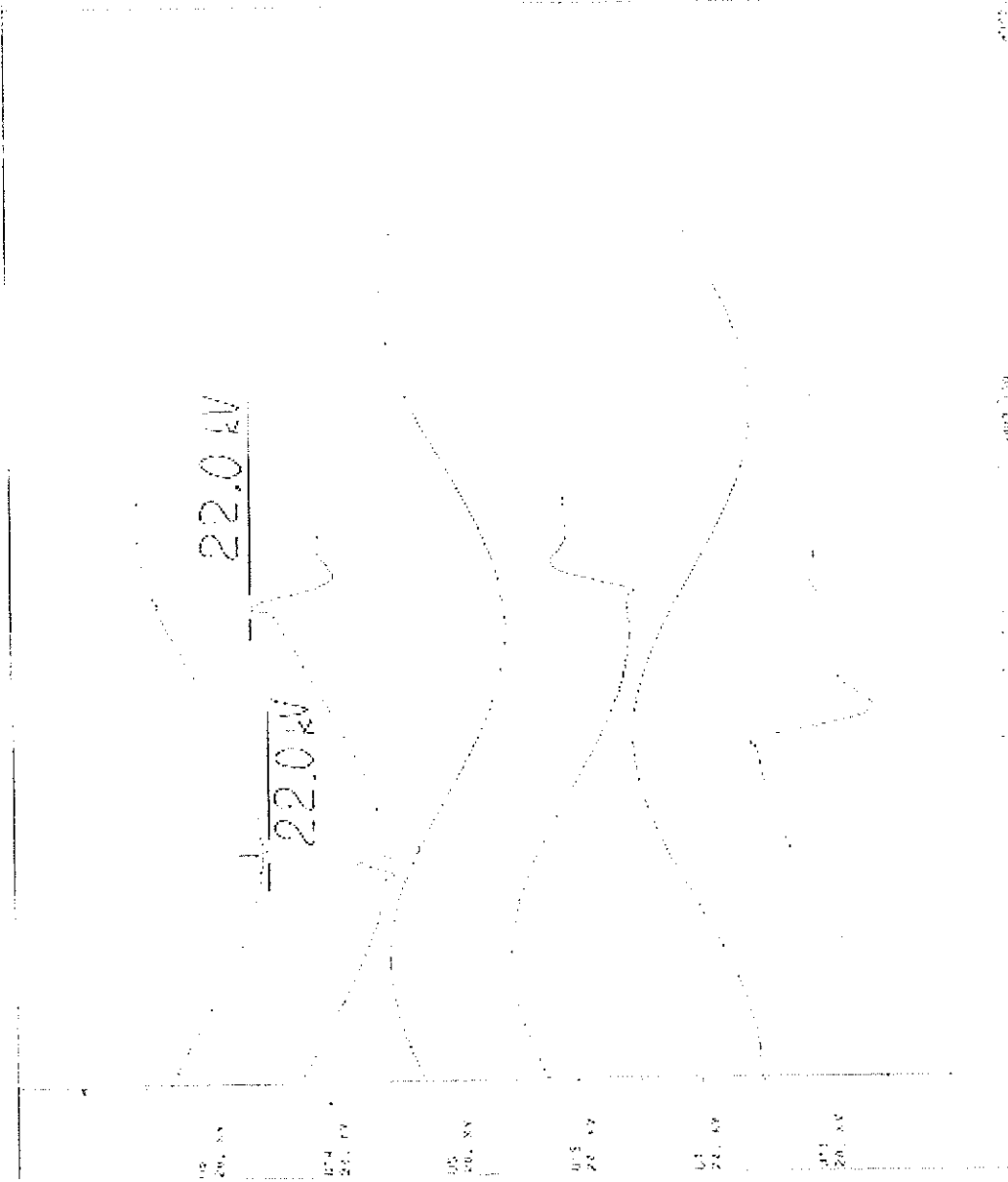
DATE: 11/19/85
 TIME: 10:00 AM
 HOURS: 10:00 AM - 5:00 PM
 PATIENT: [illegible]
 PHYSICIAN: [illegible]

Handwritten signature

Handwritten signature

Handwritten signature

1. Name
2. Address
3. Project
4. Date



1. Name
2. Address
3. Project
4. Date

1. Name
2. Address
3. Project
4. Date

1. Name
2. Address
3. Project
4. Date

1. Name
2. Address
3. Project
4. Date

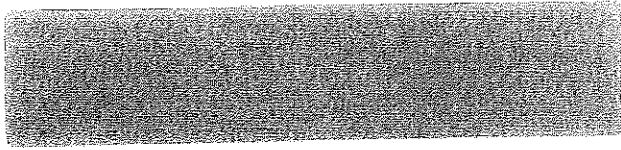
1. Name
2. Address
3. Project
4. Date

1. Name
2. Address
3. Project
4. Date

[Handwritten signature]

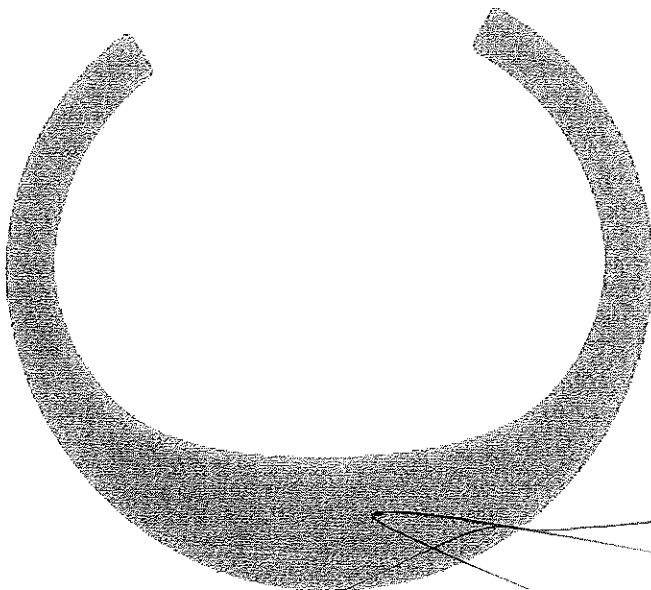
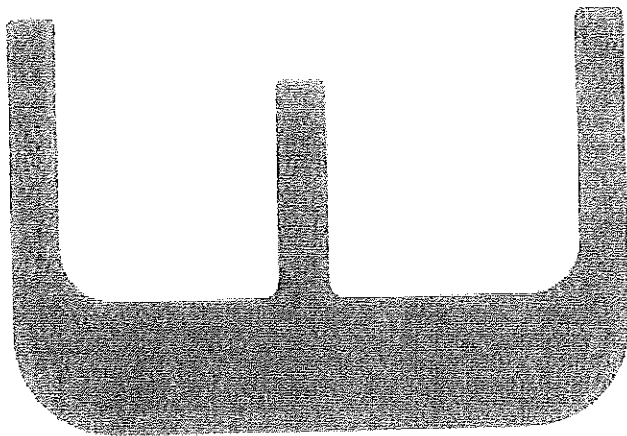
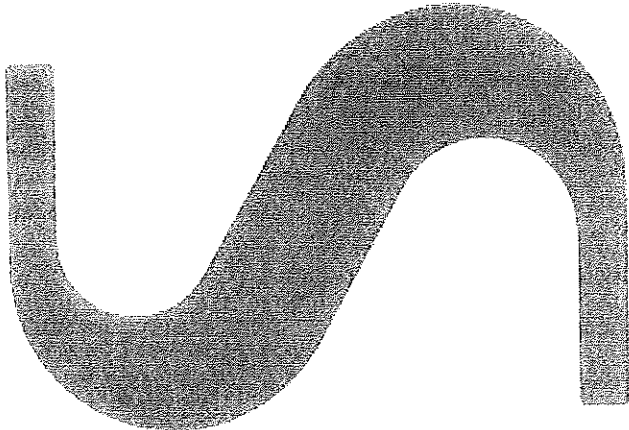
[Handwritten signature]

[Handwritten signature]



51249040XA

GPS91/15213



51249040XA
GPS91/15213

[Handwritten signature]

client: MERLIN GERIN S.A. - Grouble (France)

object: three pole metal enclosed air insulated switchgear GMS system type 10.
Filled with an increased operating frequency SF6 gas insulated switch
type T 385.

characteristics of the tested object assigned by the Client:

rated voltage 12 kV rated current 630 A rated frequency 50 Hz
other characteristics listed on page 2

The tests have been made in accordance with client's instructions
based on IEC 265 (1953)

test date: June 26th, 1991

The performance of the apparatus tested and the observations made during the
tests have been recorded in the table with the test results and oscillograms

this document is composed by 13 pages. 110 oscillograms

milan, August 23rd, 1991 test engineer

P. Le Bonaco

91/012215
keywords : 120100 234303 250205 450401 510010

This test report is not a certificate of conformity, nor do the results necessarily confirm the ratings supplied by the manufacturer.
This document may not be reused otherwise than in its entirety without CESI's authorization

rated characteristics of the tested object assigned by the client

| | |
|--------------------------------------|--------------|
| voltage | 12 kV |
| frequency | 50 Hz |
| normal current | 630 A |
| short-circuit making current | 50 kA |
| short time withstand current | 20 kA |
| short-circuit duration | 1 s |
| mainly active load breaking current | 630 A |
| cable charging breaking current | 25 A |
| no-load transformer breaking current | 16 A |
| gas pressure for interruption | 1.4 bar abs. |

identification of the object effected.

The tested object truly conforms to the drawings of its type supplied by the Client. These drawings identified by CEST with embossing press and numbered GPS- 91/015161 1 to 12 are assembled in a folder.

CEST
Société Anonyme
12, rue de la République
1000 Bruxelles
Téléphone 53 25 26
Telex 31 00 00
Fax 53 25 26

table of tests performed

| date | type of test | page |
|---|----------------------------------|------|
| THREE-PHASE MAINLY ACTIVE LOAD CURRENT SWITCHING TESTS | | |
| June 26th 1991 | No.100 tests with 630 A at 12 KV | 3 |
| June 26th 1991 | No.20 tests with 35 A at 12 KV | 5 |
| THREE-PHASE NO-LOAD TRANSFORMER CURRENT SWITCHING TESTS | | |
| June 26th 1991 | No.10 tests with 15 A at 12 KV | 7 |
| THREE-PHASE CABLE-CHARGING CURRENT SWITCHING TESTS | | |
| June 26th 1991 | No.20 tests with 25 A at 12 KV | 8-9 |

100
 20
 10
 20

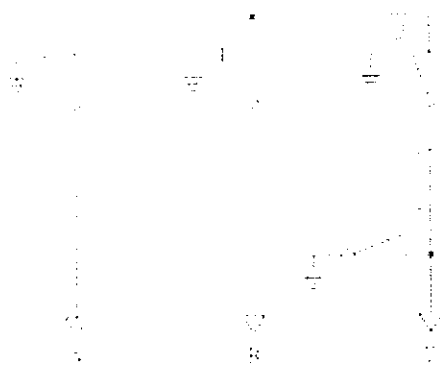
tests witnessed by

Mr. Laurens - MERLIN GERIN S.A.
 Mr. Dubroqua - MERLIN GERIN S.A.

This test report is not a certificate of conformity, nor do the tests given necessarily confirm the ratings specified by the manufacturer. This document may not be reproduced otherwise than in its entirety without CESI's authorization.

arrangement of the object for the tests

The tested apparatus was assembled with two other apparatus of SMG system (see photo on page 121).
The figure below shows the electric diagram of the complete setting (simple phase diagram of a three phase circuit) :



- 1 : switch and earthing switch under test
- 2-1 : auxiliary switches
- A-B-C : cables

During the tests the cables B were connected to the supply, the switch 2 was in closed position and the cables A were connected to the load. The switch 3 was in open position.

The metal enclosure was insulated from earth but connected thereto by a copper wire 0.1 mm in diameter and 10 cm long to indicate any significant leakage current to earth.

121
122
123
124

three-phase mainly active load current switching tests

Test duty _____ with 630 A at 12.0 kV

test circuit conditions

circuit diagram see page: 10

supply circuit
 power factor: < 0.2 impedance 2.2 Ω
 frequency: 50 Hz (75 % of the total impedance of the circuit)
 neutral condition: earthed
 TRV: up to 21 kV 15 62 μs

load circuit
 power factor: 0.75 frequency: - Hz
 neutral condition: insulated damping factor: -

control voltage of operating device for: closing - V
 opening - V
 motor - V
 operation - bar abs.
 breaking 1.4 bar abs.

conditions of the apparatus before the tests: new

tests performed no.100 tests with operating sequence 00
 test no. 1 to 100
 oscillograms no. 4 to 103
 test voltage 12 kV
 test current 630 A
 minimum arcing time 7 ms
 maximum arcing time 13 ms

The tested switch has always cleared the current.
 No overvoltage was observed on supply and load side of the circuit.

conditions of the apparatus after the tests: external parts as before the tests
 internal parts not inspected.

three-phase mainly active load current switching tests

test duty _____ with 35 A at 12.0 kV

test circuit conditions

circuit diagram see page: 10

supply circuit
 power factor: < 0.2 Impedance 2.2 Ω
 frequency: 50 Hz
 neutral condition: earthed
 TRV : up 21 kV up 52 μs

load circuit
 power factor: 0.73 frequency: _____ Hz
 neutral condition: insulated damping factor: _____

control voltage of operating devices for: closing - V
 opening - V
 motor - V
 gas operating pressure for: operation - bar abs.
 breaking 1.4 bar abs.

conditions of the apparatus before the tests : as after the test no. 100

tests performed no.20 tests with operating sequence CO
 test no. 101 to 120
 oscillograms no. 104 to 123
 test voltage 12 kV
 test current 35 A
 minimum arcing time 7 ms
 maximum arcing time 10 ms

The tested switch has always cleared the current.
No overvoltage was observed on supply and load side of the circuit.

conditions of the apparatus after the tests: external parts as before the tests
internal parts not inspected.

three-phase no-load transformer current switching tests

test duty with 15.0 A at 12.0 kV

test circuit conditions

circuit diagram see page: 10

supply circuit
 power factor: 0.2 impedance 1.2 Ω
 frequency: 50 Hz
 neutral condition: earthed
 TRV: up 21 kV t3 62 μs

load circuit
 power factor: 0.07 frequency: 500 Hz
 neutral condition: inductive damping factor: 0.15

control voltage of operating devices for: closing - V
 opening - V
 error - V
 gas operating pressure for: operation - bar abs.
 breaking 1.4 bar abs.

conditions of the apparatus before the tests: as after the test no. 120

| Test | no. | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 |
|-----------------------------|---------------------|------|------|------|------|------|------|------|------|------|------|
| oscillogram | no. | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 |
| operating duty | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| voltage with open apparatus | phase-to-neutral kV | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 |
| | phase-to-phase kV | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 |
| inrush making current | kA | - | - | - | - | - | - | - | - | - | - |
| maximum closing overvoltage | supply side kV | - | - | - | - | - | - | - | - | - | - |
| | load side kV | - | - | - | - | - | - | - | - | - | - |
| breaking current | A | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 |
| | average A | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 |
| maximum opening overvoltage | supply side kV | - | - | - | - | - | - | - | - | - | - |
| | load side kV | 16.0 | 12.0 | 15.0 | 13.0 | 13.0 | 14.0 | 11.0 | 12.0 | 13.0 | 14.0 |
| restrikes | no. | - | - | - | - | - | - | - | - | - | - |
| | phase | - | - | - | - | - | - | - | - | - | - |
| duration of | closing ms | - | - | - | - | - | - | - | - | - | - |
| | opening ms | - | - | - | - | - | - | - | - | - | - |
| | pre-arc ms | - | - | - | - | - | - | - | - | - | - |
| | arc ms | 10 | 9 | 7 | 9 | 9 | 9 | 8 | 10 | 10 | 9 |

conditions of the apparatus after the tests: external parts as before the tests, internal parts not inspected.

three-phase cable-charging current switching tests

test duty with 28.0 A at 12.0 kV

test circuit conditions

circuit diagram see page: 11

supply circuit
 power factor < 0.15 short-circuit current: 2 KA
 frequency: 50 Hz
 TRV: 60 21 kV t3 62 μs

load circuit
 capacitance of capacitor banks: CV1 = 13 μF (insulated)
 voltage decay at 100 ms after final arc extinction < 10 %

voltage with open apparatus: 6.90 kV phase-to-neutral 12.0 kV phase-to-phase

control voltage of operating devices for: closing - V
 opening - V
 motor - V
 gas operating pressure for: operation - bar abs.
 breaking 1.4 bar abs.

conditions of the apparatus before the tests: as after the test no. 130

| test | no. | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 |
|-------------------------------|---------------------|------|------|------|------|------|------|------|------|------|------|
| oscillogram | no. | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 |
| operating duty | | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O |
| voltage with closed apparatus | phase-to-neutral kV | 6.90 | 6.90 | 6.50 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 |
| | | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 |
| | | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 |
| phase-to-phase kV | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 |
| | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 |
| | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 |
| inrush making current | kA | - | - | - | - | - | - | - | - | - | - |
| maximum closing overvoltage | supply side kV | 19.0 | 17.0 | 17.0 | 16.0 | 18.0 | 16.8 | 17.7 | 16.7 | 16.0 | 16.4 |
| | load side kV | 19.0 | 17.0 | 17.0 | 16.0 | 18.0 | 16.8 | 17.7 | 16.7 | 16.0 | 16.4 |
| breaking current | A | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 |
| | | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 |
| | | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 |
| average | A | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 |
| maximum opening overvoltage | supply side kV | - | - | - | - | - | - | - | - | - | - |
| | load side kV | 14.0 | 13.0 | 13.0 | 14.0 | 13.0 | 13.0 | 13.0 | 14.0 | 13.0 | 13.0 |
| restriker | no. | - | - | - | - | - | - | - | - | - | - |
| | phase | - | - | - | - | - | - | - | - | - | - |
| duration of | closing | ms | - | - | - | - | - | - | - | - | - |
| | opening | ms | - | - | - | - | - | - | - | - | - |
| | pre-arc | ms | - | - | - | - | - | - | - | - | - |
| | arc | ms | 8 | 7 | 6 | 5 | 7 | 9 | 9 | 7 | 8 |

conditions of the apparatus after the test:

cont.'d.

three-phase cable-charging current switching tests
 cont'd

| test | no. | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 |
|-------------------------------|---------------------|------|------|------|------|------|------|------|------|------|------|
| oscillogram | no. | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 |
| operating duty | | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O | C-O |
| voltage with closed apparatus | phase-to-neutral kV | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 | 6.90 |
| | phase-to-phase kV | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 |
| inrush making current | kA | - | - | - | - | - | - | - | - | - | - |
| maximum closing overvoltage | supply side kV | 17.9 | 17.0 | 15.4 | 19.0 | 19.0 | 16.0 | 16.0 | 18.5 | 15.0 | 15.0 |
| | load side kV | 17.9 | 17.0 | 15.4 | 19.0 | 19.0 | 16.0 | 16.0 | 18.5 | 15.0 | 15.0 |
| breaking current | A | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 |
| | average A | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 |
| maximum opening overvoltage | supply side kV | - | - | - | - | - | - | - | - | - | - |
| | load side kV | 13.0 | 13.0 | 14.0 | 14.0 | 13.5 | 13.5 | 13.5 | 13.5 | 14.0 | 13.5 |
| remarks | no. | - | - | - | - | - | - | - | - | - | - |
| | phase | - | - | - | - | - | - | - | - | - | - |
| duration of | closing ms | - | - | - | - | - | - | - | - | - | - |
| | opening ms | - | - | - | - | - | - | - | - | - | - |
| | prearc ms | - | - | - | - | - | - | - | - | - | - |
| | arc ms | 9 | 8 | 9 | 7 | 5 | 8 | 8 | 9 | 9 | 9 |

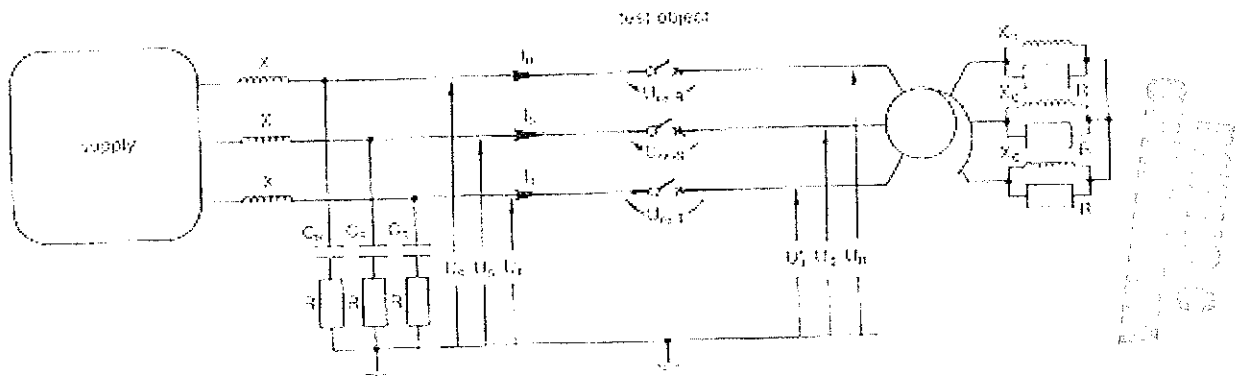
conditions of the apparatus after the tests: external parts as before the tests, internal parts not inspected

note after all the tests : the performance of the apparatus is considered satisfactory for the tests performed.

This test report is not a certificate of conformity, nor do the results given necessarily confirm the ratings supplied by the manufacturer. This document may not be reproduced otherwise than in its entirety without CESI's authorization.

1769

circuit-diagram



symbols used in the diagram are the same as in the recalled annex

~~Signature~~

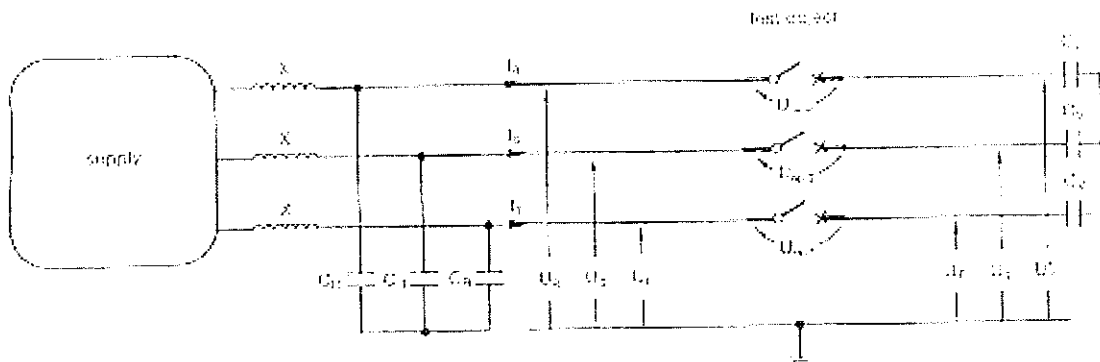
Signature

This test report is not a certificate of conformity, nor do the results given necessarily confirm the ratings supplied by the manufacturer. This document may not be reproduced otherwise than in its entirety without CCSI's authorization.

Signature



circuit-diagram



Handwritten text: *Handwritten notes or signature*

same as in the diagram on the same as on the description

Large handwritten signature or scribble

Handwritten signature

This test report is not a certificate of conformity, nor do the results given necessarily confirm the ratings supplied by the manufacturer. This document may not be reproduced otherwise than in its entirety without CESI's authorization.

Handwritten signature

1721

[Handwritten mark]



[Faint vertical text or stamp]

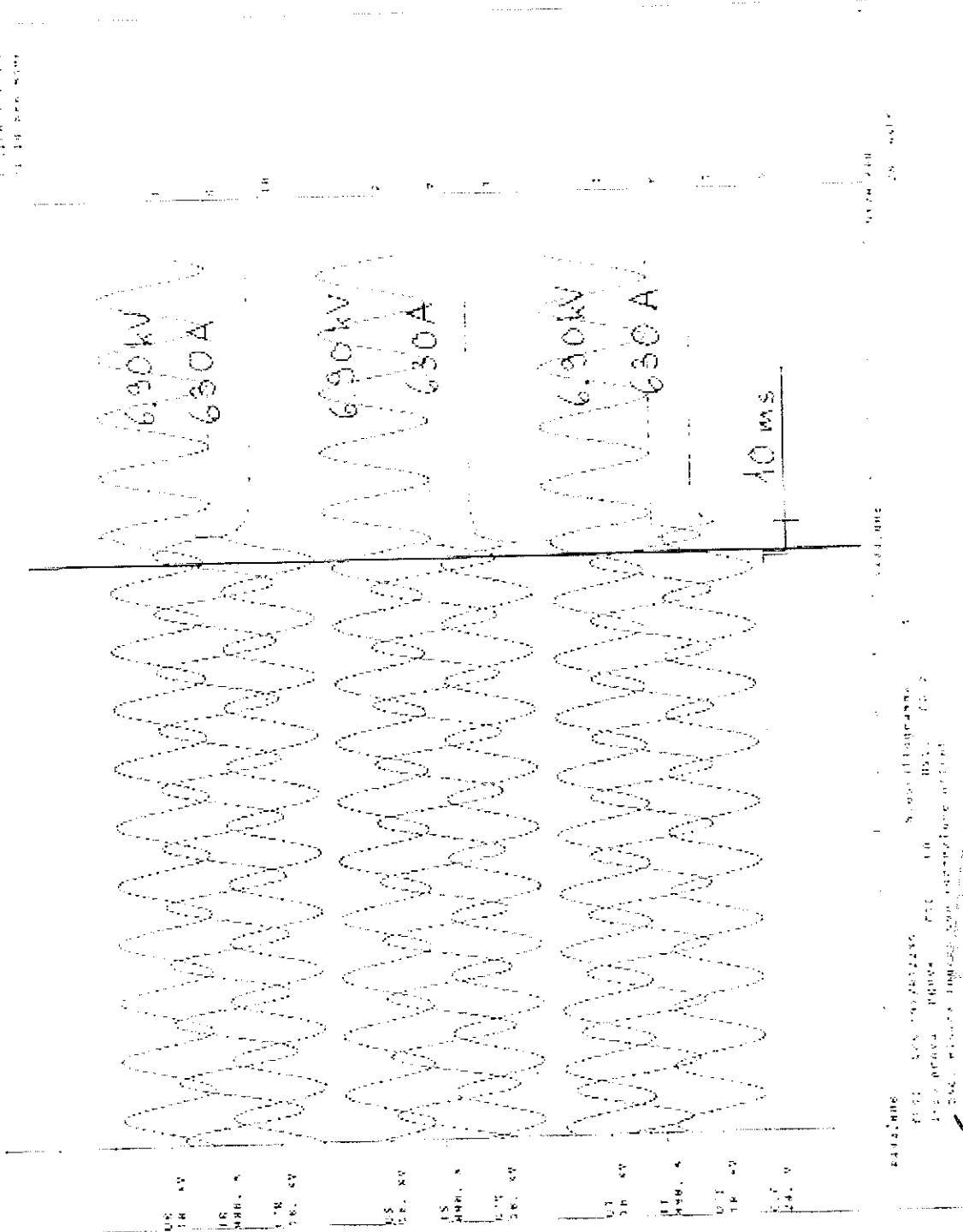
[Handwritten signature]

[Handwritten signature]

1772

~~This test report is not a certificate of conformity, nor do the results guarantee necessarily the conformity of the product with the requirements of the standard.~~

TIME 100 NS



TIME 100 NS

TIME 100 NS

CH1: 6.90kV (20.00V) [6.90kV] [1.000] [50.00ns] [0.00ns] [0.00ns]
 CH2: 630A (10.00A) [630A] [1.000] [50.00ns] [0.00ns] [0.00ns]
 CH3: 6.90kV (20.00V) [6.90kV] [1.000] [50.00ns] [0.00ns] [0.00ns]

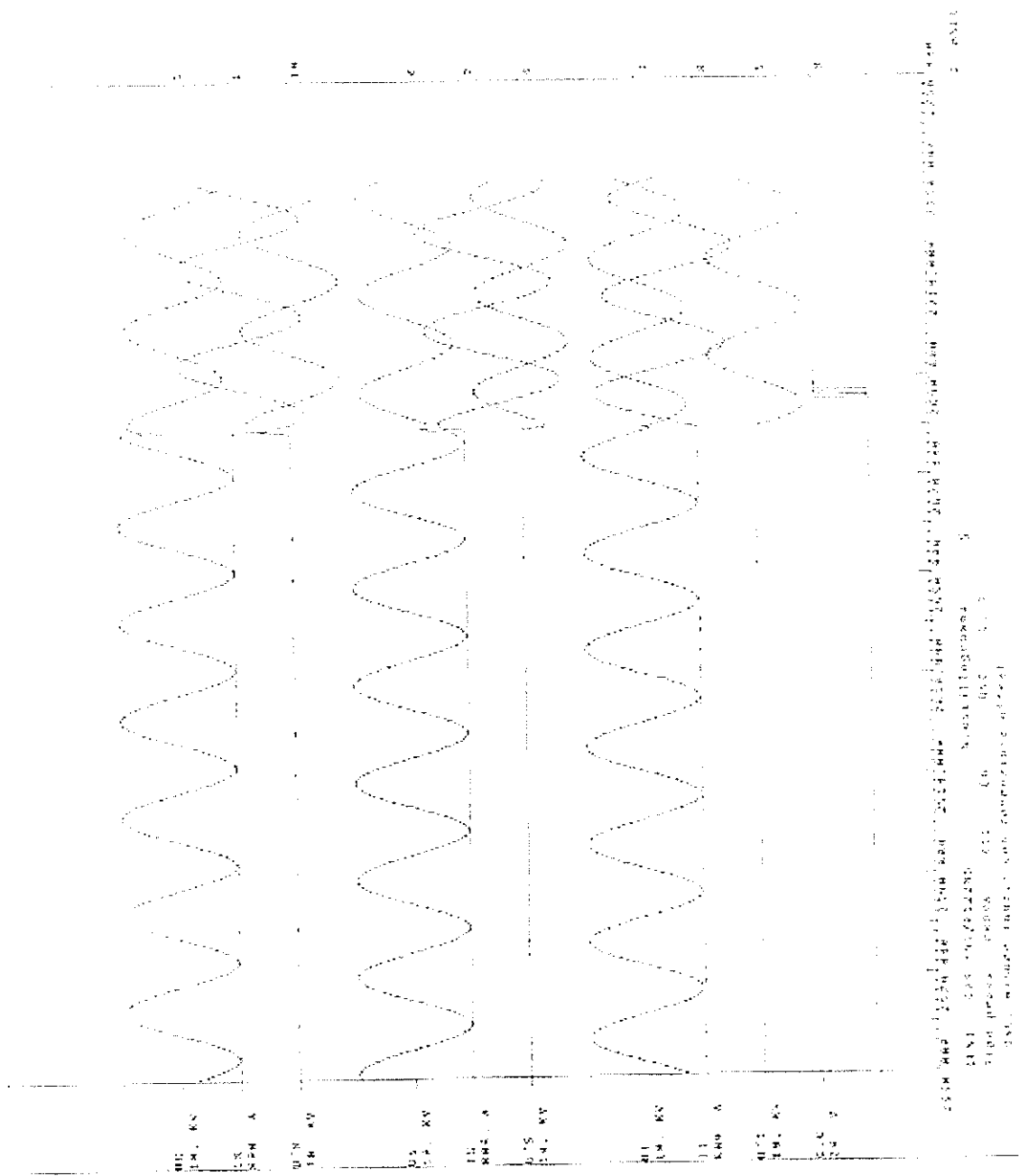
P. J. P. / S. J. P. / G. J. P. / B. J. P. / C. J. P. / D. J. P. / E. J. P. / F. J. P. / G. J. P. / H. J. P. / I. J. P. / J. J. P. / K. J. P. / L. J. P. / M. J. P. / N. J. P. / O. J. P. / P. J. P. / Q. J. P. / R. J. P. / S. J. P. / T. J. P. / U. J. P. / V. J. P. / W. J. P. / X. J. P. / Y. J. P. / Z. J. P.

Handwritten initials/signature at the top right of the page.

Handwritten initials/signature at the bottom right of the page.

NR24

2/2



ECG 12/18

[Handwritten signature]

[Handwritten signature]

12/18

[Large handwritten signature]