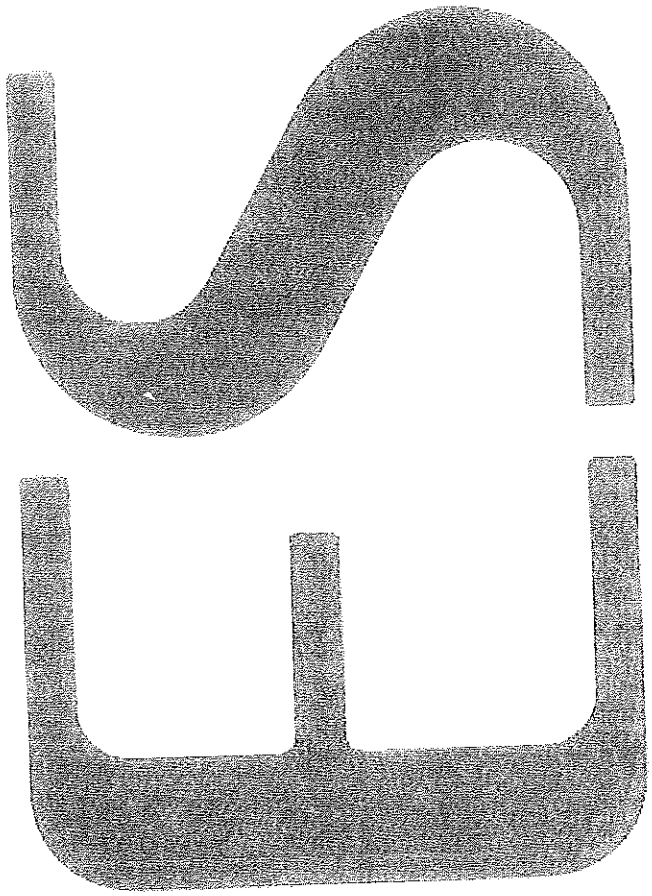
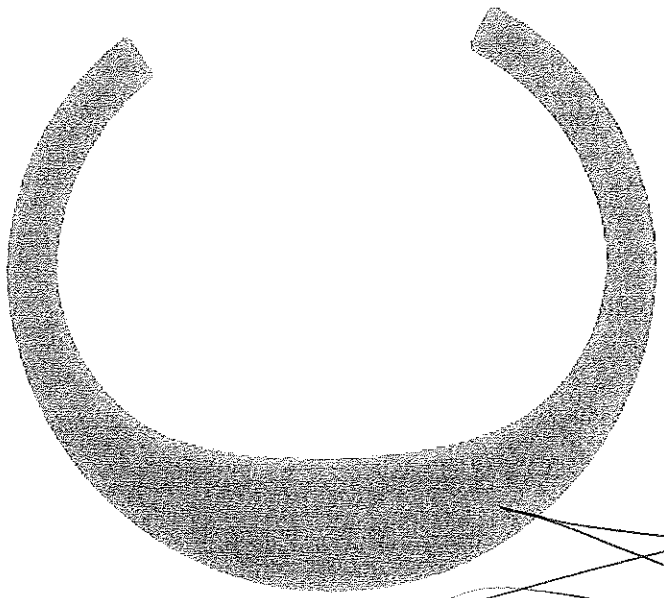
1286

[redacted]

5124906 8XA

GPS91/15178





1777

CESI

test report

GPS-91/015178

client MERLIN GERIN S.A. Grenoble (France)

object Three pole metal enclosed air insulated switchgear SM6 system type IM- 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 18th, 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 11 pages, 12 oscillograms

milan, August 7th, 1991

test engineer

F. Lo Monaco

91/012283
keywords : 120100 334308 360204 410707 930010

rated characteristics of the tested object assigned by the client

switch	17.5/24	kV
voltage	50	Hz
frequency	630	A
rated current	40	kA
short-circuit making current	16	kA
short-time withstand current	1	s
short circuit duration		
earthing switch		
short-circuit making current	40	kA
short-time withstand current	16	kA
short-circuit duration	1	s
gas pressure for interruption	1.3 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- 91/015167 - to 12 are assembled in a folder.

1789

Table of tests performed

Date	Type of test	CPS page
	SHORT-TIME AND PEAK WITHSTAND CURRENT TESTS	
June 18th 1991	No.1 test with 16 kA for 1 s on the switch	5
June 19th 1991	No.1 test with 16 kA for 1 s on the earthing switch	6
	SHORT-CIRCUIT MAKING TESTS	
June 20th 1991	No.2 tests with 41.5 kA and 41 kA (peak) at 24 kV on the switch	6
June 21th 1991	No.2 tests with 41 kA and 35.5 kA (peak) at 24 kV on the earthing switch	7
	THREE PHASE MAINLY ACTIVE LOAD CURRENT SWITCHING TESTS	
June 28th 1991	No.2 tests with 400 A at 24 kV	8

Tests witnessed by

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

1780

Arrangement of the object for the tests

The tested apparatus was assembled with two other apparatus of same system (see photo on page 11).
The figure below shows the electric diagram of the complete meeting (single phase diagram of a three phase circuit) :

1 : switch and earthing switch under test

2 3 : auxiliary switches

A-B-C : cables

For the short time current test on the switch : cables A connected to the supply, switches 1 and 2 in closed position, cables B short circuited at the bottom.

For the short time current test on the earthing switch : cables A connected to the supply, earthing switch 1 in closed position.

For the short circuit making tests on the switch : cables A connected to the supply switch 2 in closed position, cables B short circuited at the bottom.

For the short circuit making tests on the earthing switch : cables A connected to the supply.

For the mainly active load current switching tests : cables A connected to the supply, switch 2 in closed position, cables B connected to the load.

During all the tests the switch 3 was in open position.

During the tests on the switch 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.

1R81

short time and peak withstand current tests

test circuit conditions

circuit diagram see page 9 power factor < 0.15 frequency 50 Hz

test arrangement: see page 4

conditions of the apparatus before the tests: new

test	oscill.	duration	test current			
			maximum peak value	r.m.s. value	average	notes
no.	no.	s	kA	kA	kA	
1	1	1.01	- - 41.0	16.0 16.0 16.0	16.0	test on the switch
2	2	1.01	- - 41.0	15.8 15.8 15.8	15.8	test on the earthing switch

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

1782

three phase short circuit making tests

tests on the switch with 16.0 kA 24.0 kV

test circuit conditions:

circuit diagram see page 9 power factor < 0.15 frequency 50 Hz

conditions of the apparatus before the tests as after the test no.1

test	no.	3	4			
oscillograms	no.	284	285			
operating duty		C	C			
applied voltage (phase-to-neutral)	kV	13.8 13.8 13.8	13.8 13.8 13.8			
making current (peak value) phase	kA	41.5 R	41.0 S			
current	kA	16.0 16.0 16.0	16.0 16.0 15.0			
duration of	closing ms					
	release ms	-	-			
control voltage of operating devices for	closing V	-	-			
	motor V	-	-			
gas operating pressure for	operation bar	-	-			
	interruption bar	1.4	1.4			

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

1283

three phase short circuit making tests

tests on the earthing switch with 16.0 kA 24.0 kV

test circuit conditions

circuit diagram see page 5 power factor < 0.15 frequency 50 Hz

conditions of the apparatus before the tests: as after the test no.2

test	no.	5	6
oscillograms	no.	286	287
operating duty		C	C
applied voltage (phase-to-neutral)	kV	13.8 13.8 13.8	13.8 13.8 13.8
making current (peak value) phase	kA	41.0 [illegible]	39.5 [illegible]
current	kA	16.0 16.0 16.0	16.0 16.0 16.0
duration of closing	ms	-	-
duration of pressure	ms	-	-
control voltage of operating devices for closing	V	-	-
control voltage of operating devices for motor	V	-	-
gas operating pressure for operation	bar	-	-
gas operating pressure for interruption	bar	1.4	1.4

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 400 A at 24.0 kV

test circuit conditions

circuit diagram see paper 10

supply circuit
power factor: < 0.3
frequency: 50 Hz
neutral condition: earthed
TRV : as 4% kV t3 86 µs

impedance 6.0 Ω
(20 % of the total impedance of the circuit)

load circuit
power factor: 0.7
neutral condition: insulated

frequency: Hz
damping factor:

control voltage of operating devices for: closing -- V
opening V
motor -- V

gas operating pressure for : operation -- bar abs.
breaking 1.6 bar abs.

conditions of the apparatus before the tests : as after the test no.4

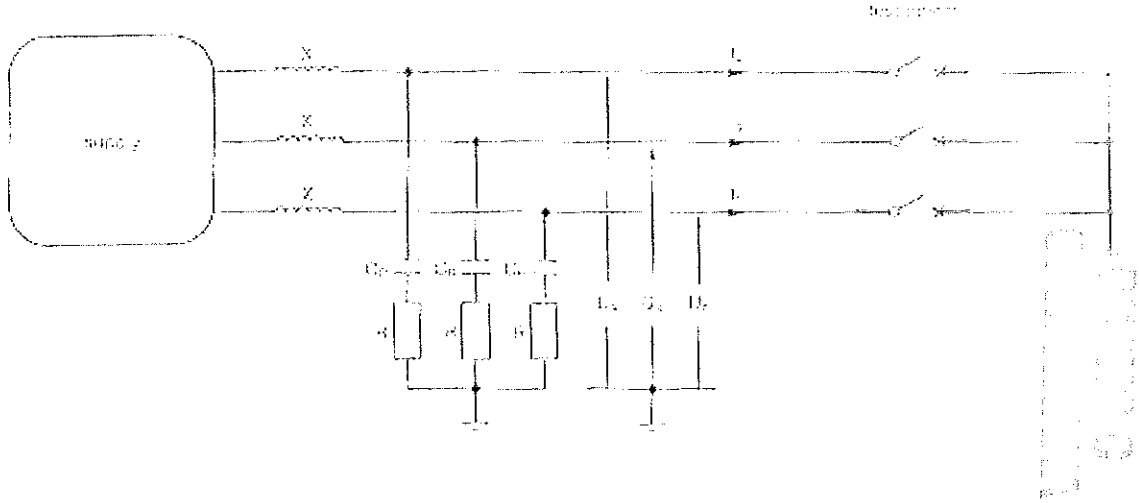
test		no.	7	8
oscillogram		no.	288	289
operating duty			C-O	C-O
voltage with open apparatus	phase-to-neutral	kV	13.8 13.8 13.8	13.8 13.8 13.8
	phase-to-phase	kV	24.0	24.0
inrush making current		kA	-	-
maximum closing overvoltage	supply side	kV	-	-
	load side	kV	-	-
breaking current		A	400 400 400	400 400 400
	average	A	400	400
maximum opening overvoltage	supply side	kV	-	-
	load side	kV	-	-
restrikes		no.	-	-
		phase	-	-
duration of	closing	ms	-	-
	opening	ms	-	-
	prearc	ms	-	-
	arc	ms	10	11

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.

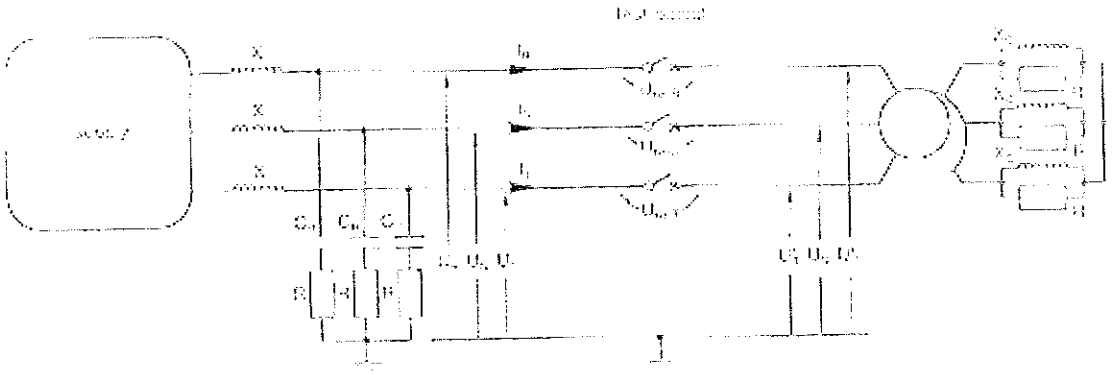
1285

circuit diagram

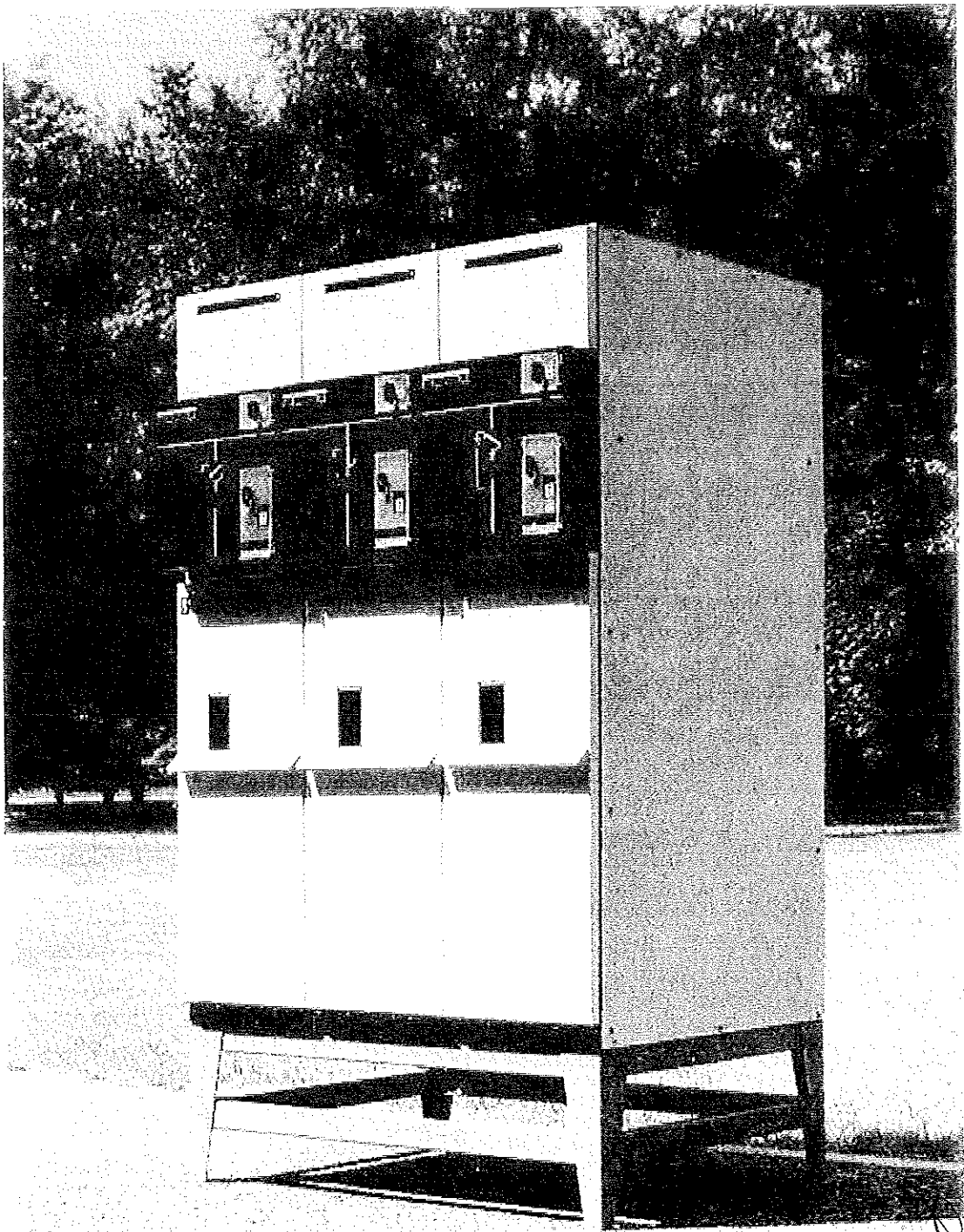


1286

circuit diagram

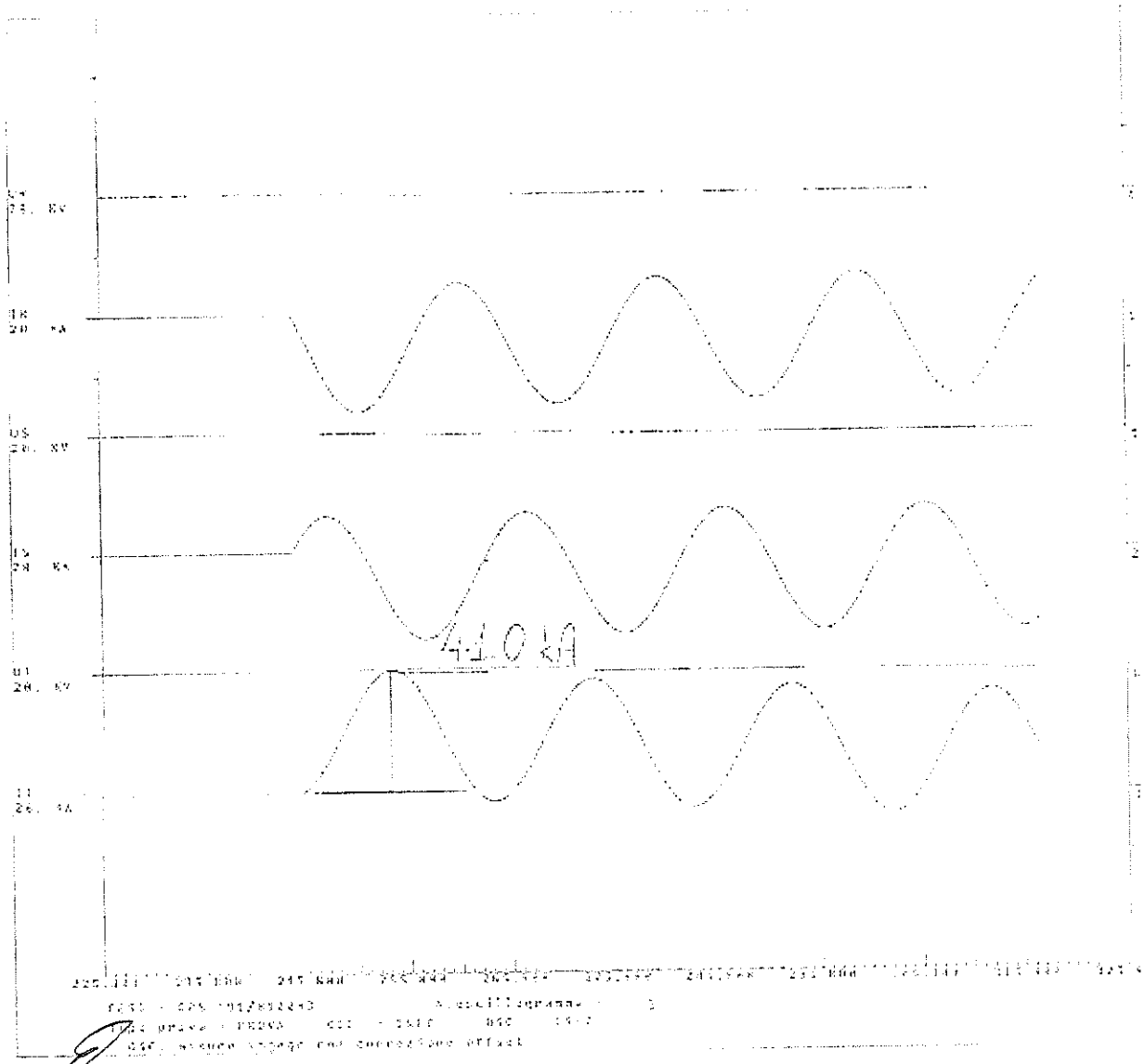


1282

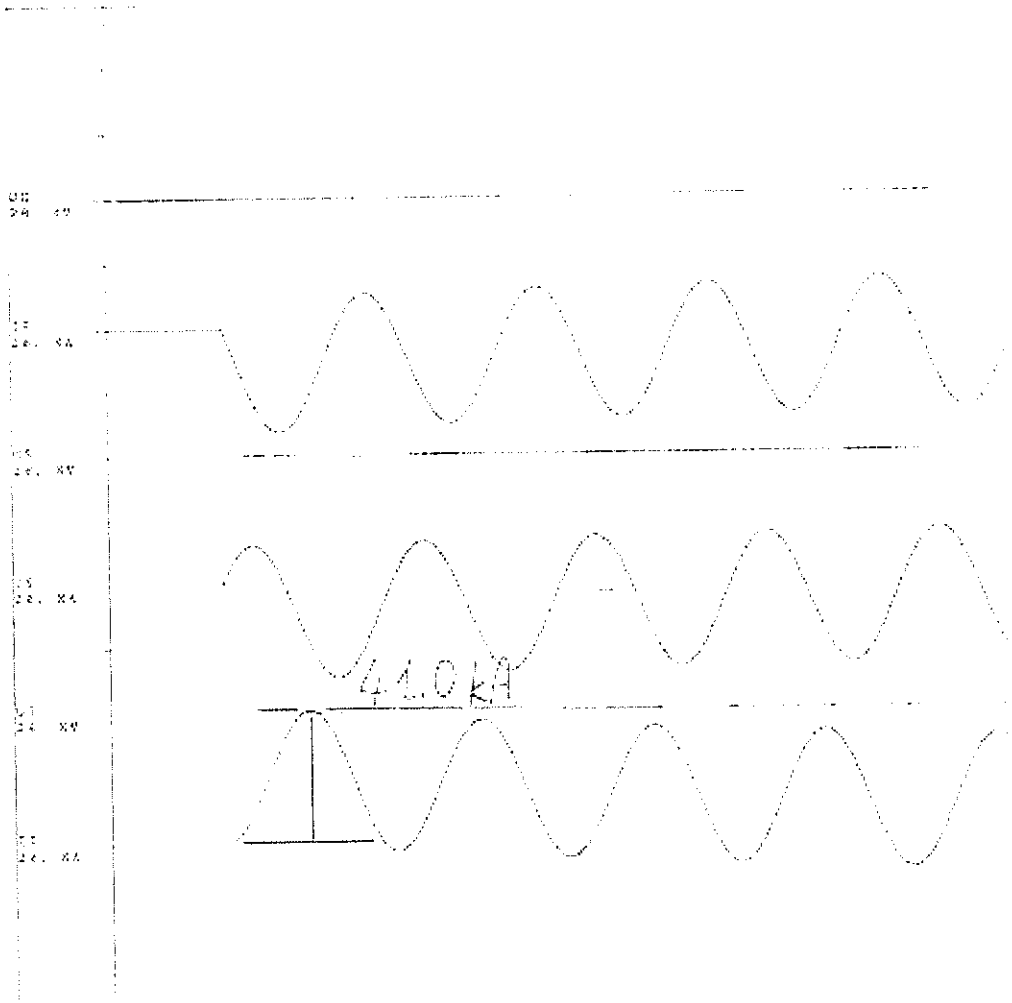


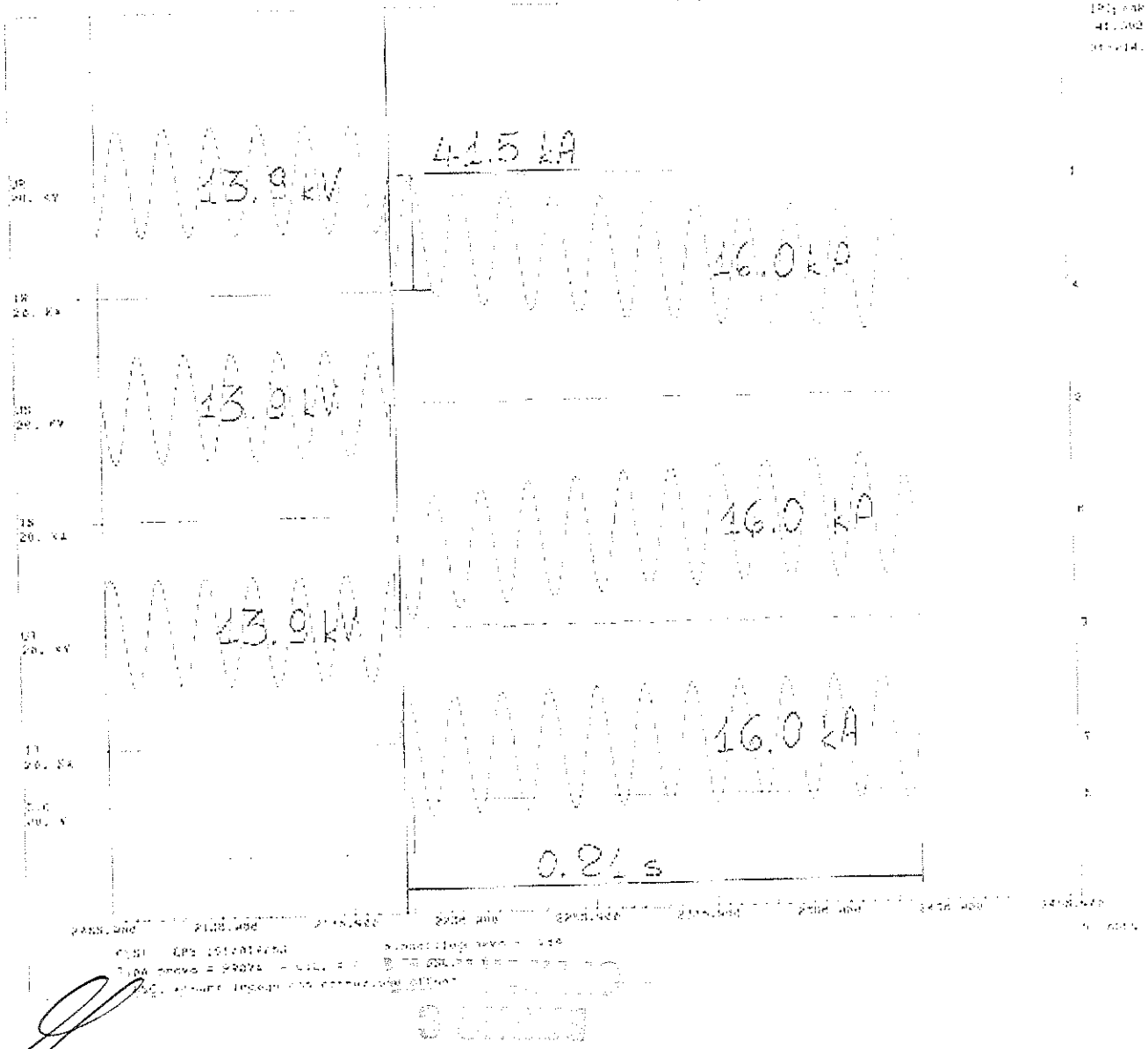
1989

1890

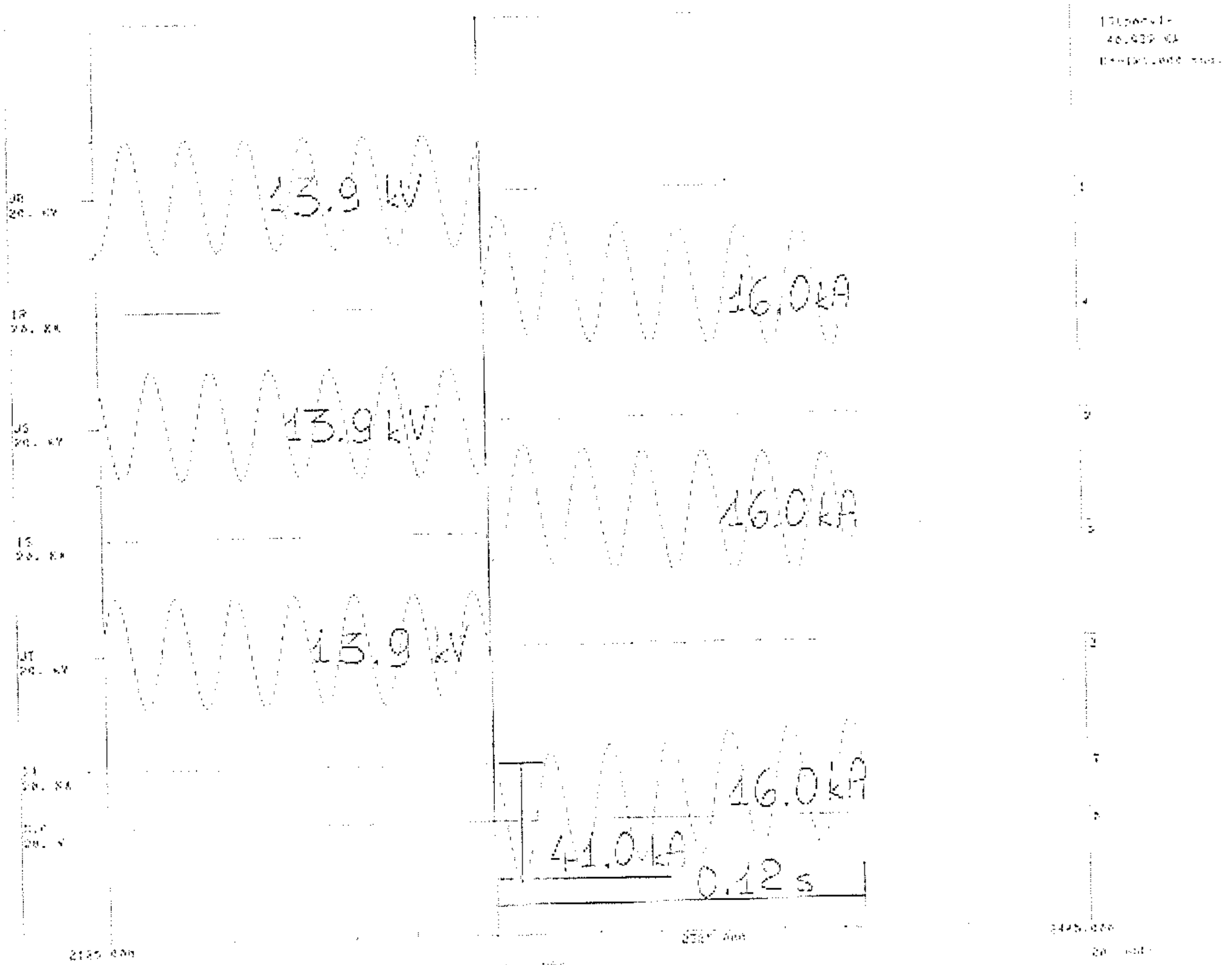

4.1.0 kA

1R92

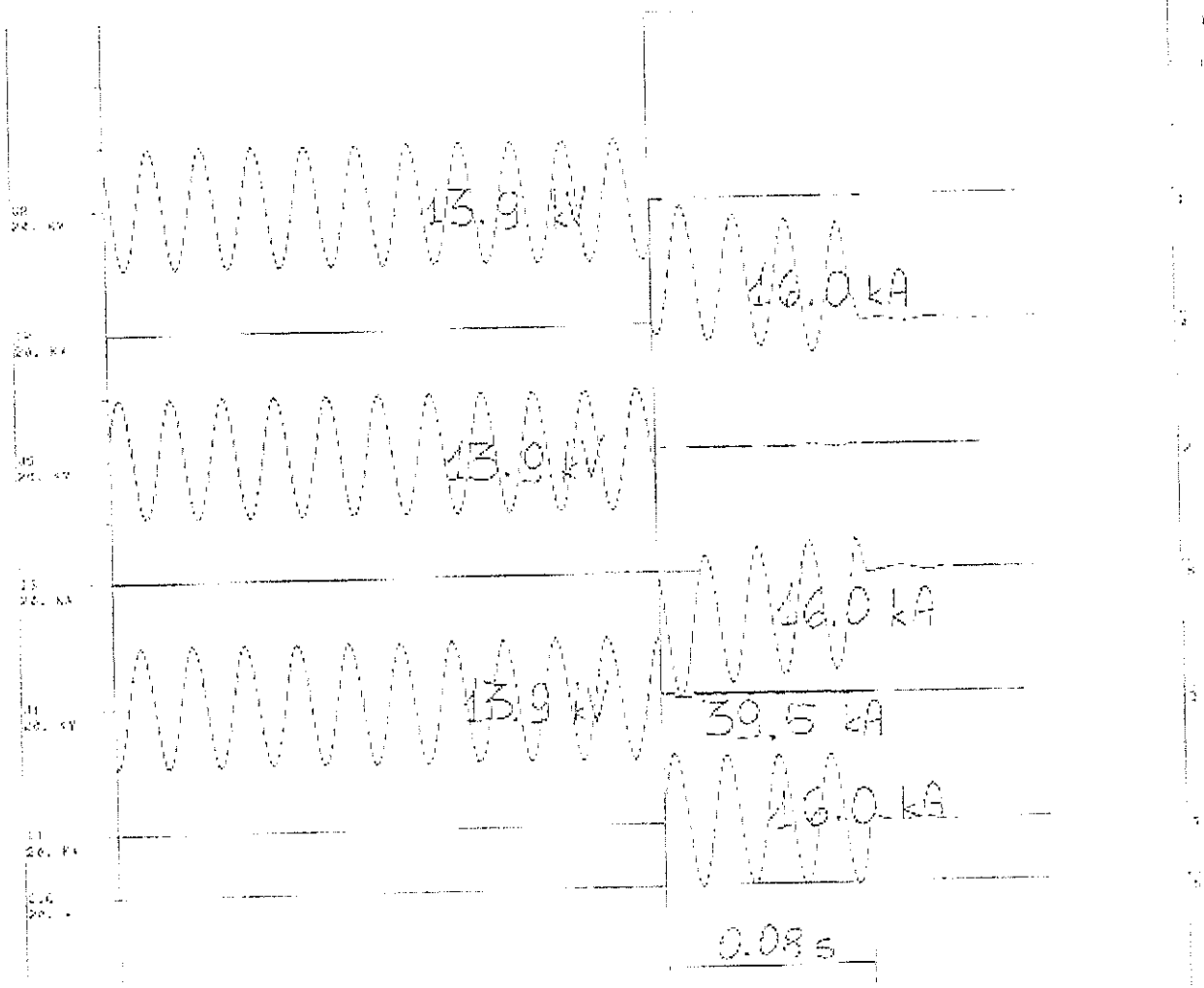

41.0kH

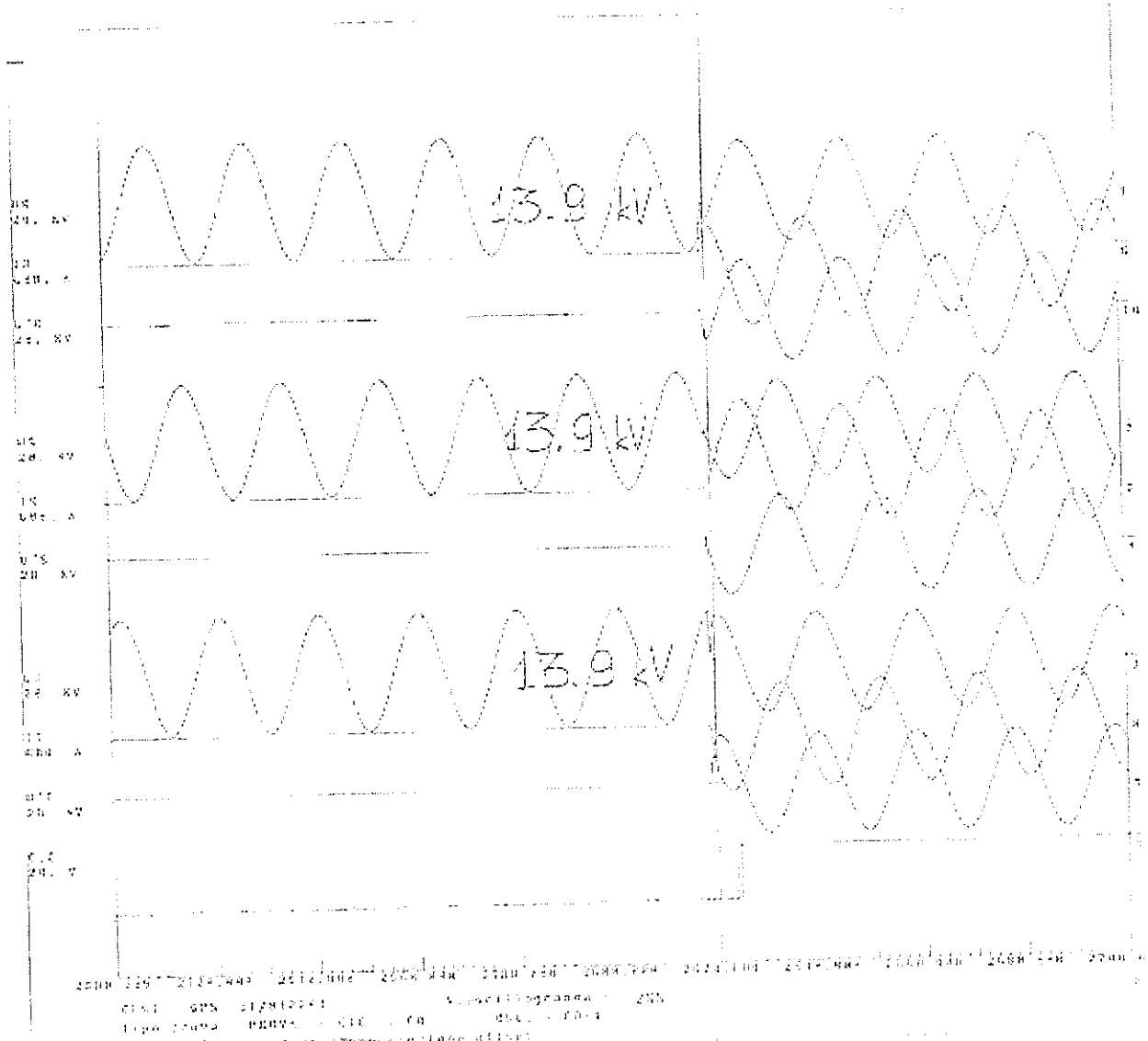

13.9 kV
4.15 kA
16.0 kA
13.9 kV
16.0 kA
13.9 kV
16.0 kA
0.21 s

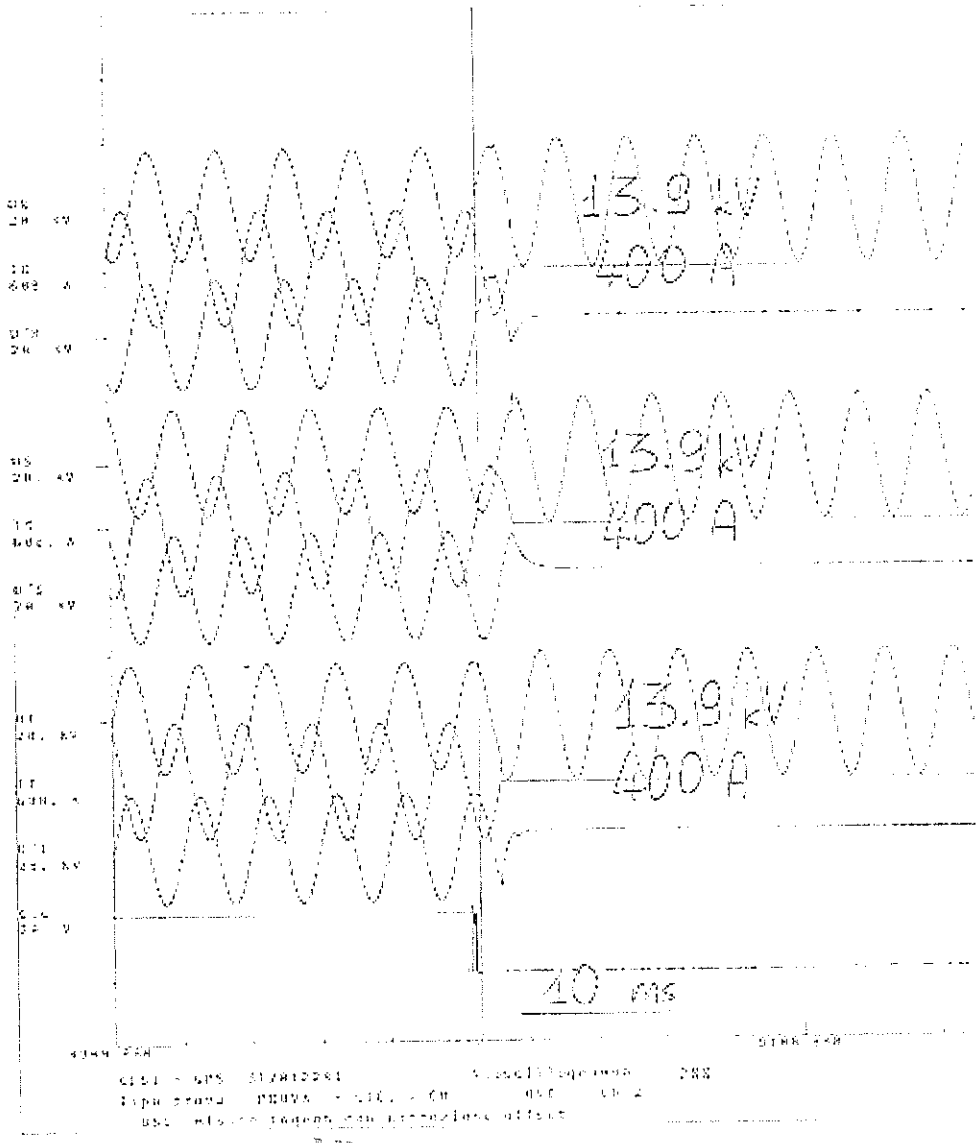
1296



13.9 kV
13.9 kV
13.9 kV
16.0 kA
16.0 kA
16.0 kA
41.0 kA
0.12 s


15.9 kV
46.0 kA
15.9 kV
46.0 kA
15.9 kV
39.5 kA
46.0 kA
0.08 s


13.9 kV
13.9 kV
13.9 kV


13.9 kV
400 A
13.9 kV
400 A
13.9 kV
400 A
10 ms

1800

51249069XA

GPS91/15200

1802

CESI

test report

GPS-91/015200

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

object Three pole metal enclosed air insulated switchgear SM6 system type QM. Fitted 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 694 (1980)

test date June 18th, 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 7 pages, 2 oscillograms

milan, August 19th, 1991 test engineer

F.Lo Monaco

91/012283
keywords : 120100 234108 360206 450707 5380..

1803

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	40	kA
short-time withstand current	16	kA
short-circuit duration	1	s
gas pressure for interruption	1.4	bar abs.
earthing switch downstream the fuse		
short-time withstand current	7	kA

identification of the object offered.

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- 91/013162 1 to 11 are assembled in a folder.

1804

table of tests performed

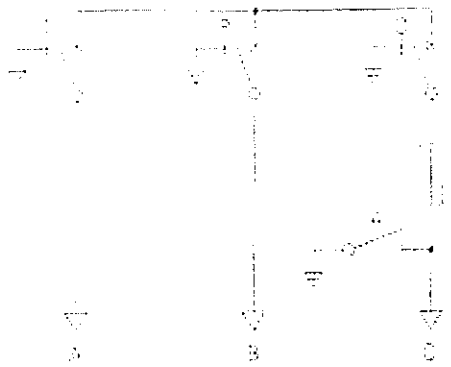
date	type of test	see page
	SHORT TIME AND PEAK WITHSTAND CURRENT TEST	
June 18th 1991	Test on the earthing switch downstream the fuse with 2 kA for 1 s.	5

tests witnessed by Mr. Laurens - MERLIN GERIN S.A.
Mr. Dubroque - MERLIN GERIN S.A.

1805

Arrangement of the object for the tests

The tested apparatus was assembled with two other apparatus of SM6 system (see photo on page 7).
The figure below shows the electric diagram of the complete nutting (single phase diagram of a three phase circuit) :



4 : earthing switch under test

1-2-3 : auxiliary switches

A-B-C : cables

During the tests the cables C were connected to the supply and the switch 4 was in closed position. All the other switches were in open position.

short-time and peak withstand current tests

test circuit conditions

circuit diagram see page 6 power factor < 0.15 frequency 50 Hz

test arrangement: see page 4

conditions of the apparatus before the tests: new

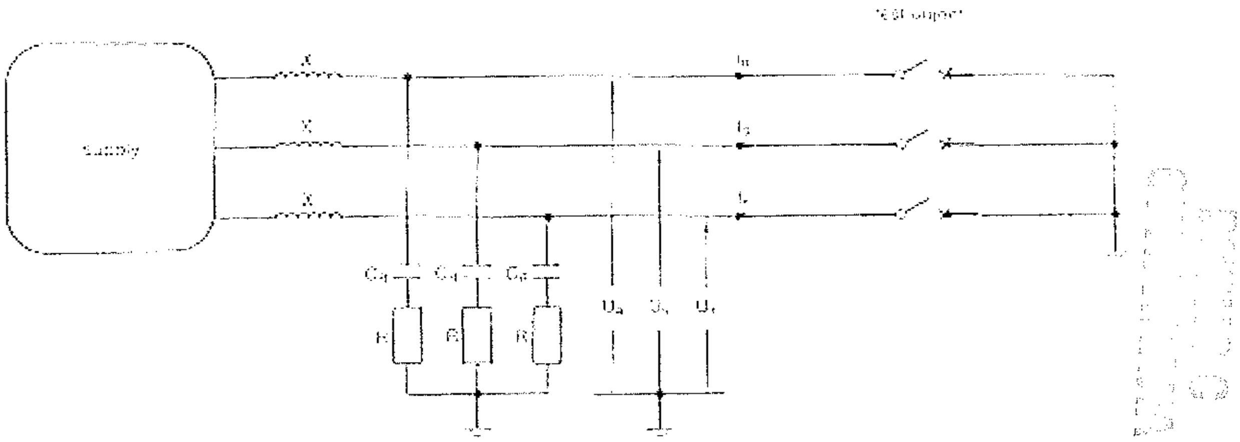
test no.	manoeuvres no.	duration s	test current: maximum peak value kA	test current: r.m.s. value kA	test current: average kA	notes
1	3	1.01	– – 5.20	2.00 2.00 2.00	2.00	after the test the earthing switch operated correctly.

conditions of the apparatus after the tests: as before the test

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

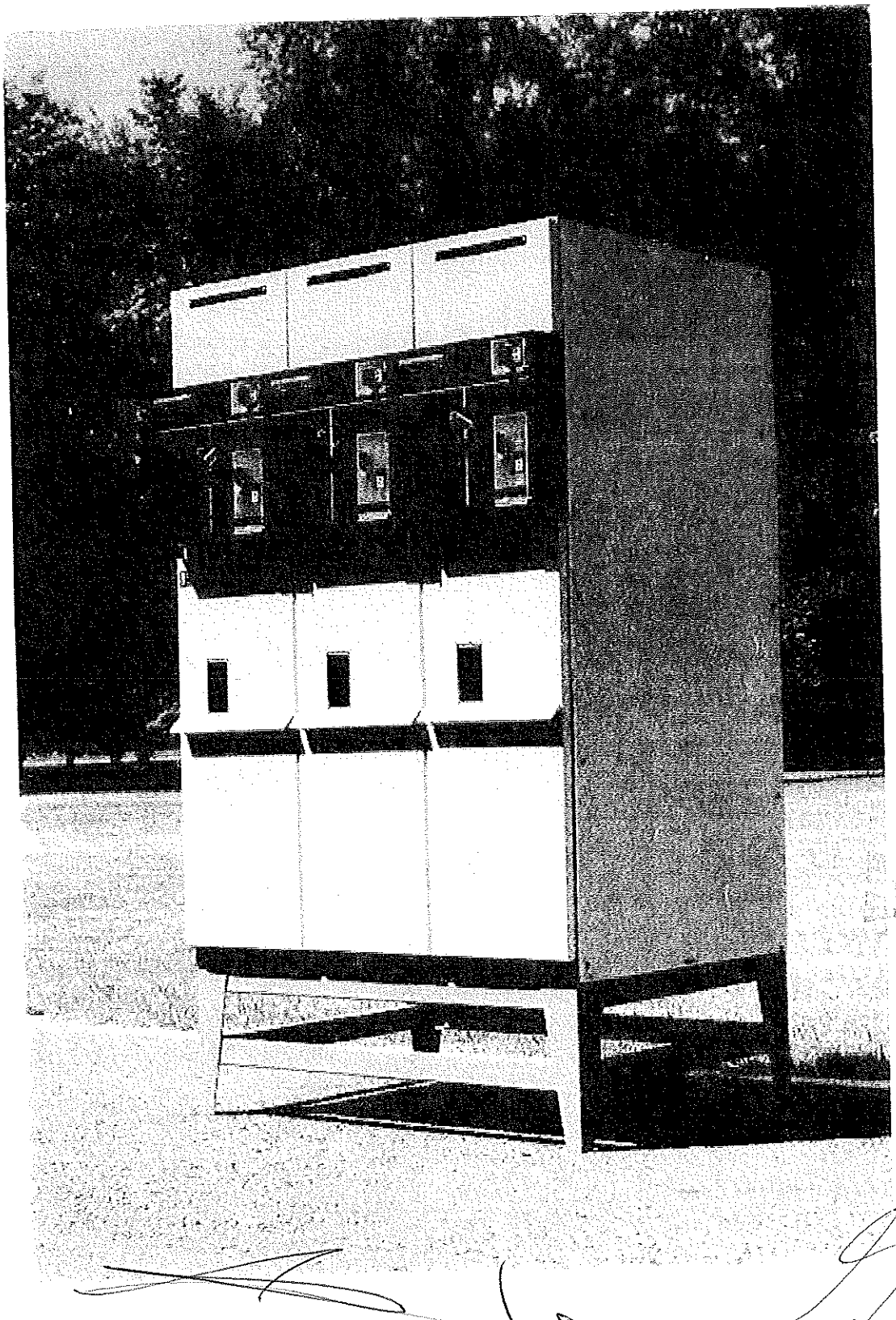
1802

circuit-diagram



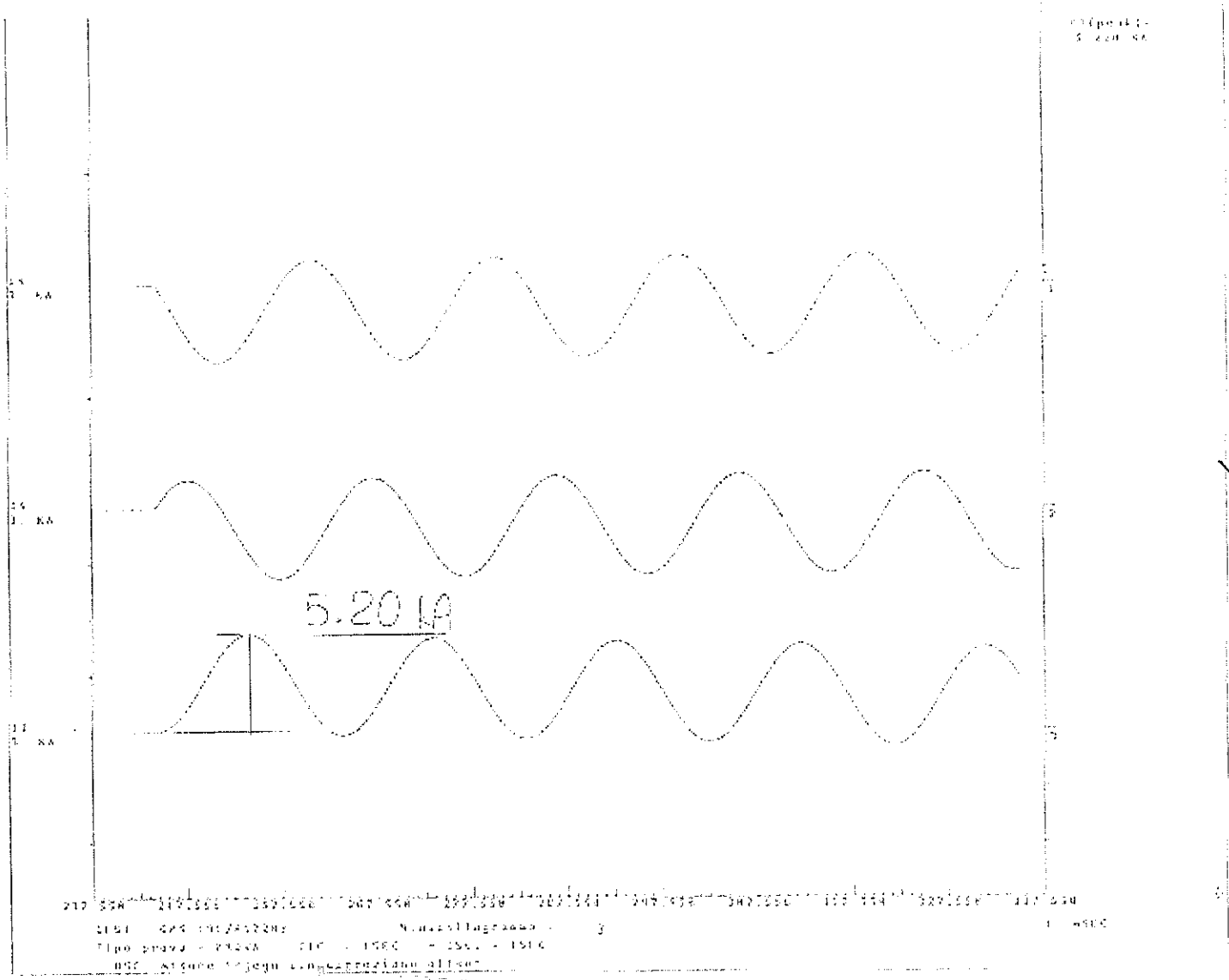
symbols used in this diagram are the same as on the oscillograms

1808



1809

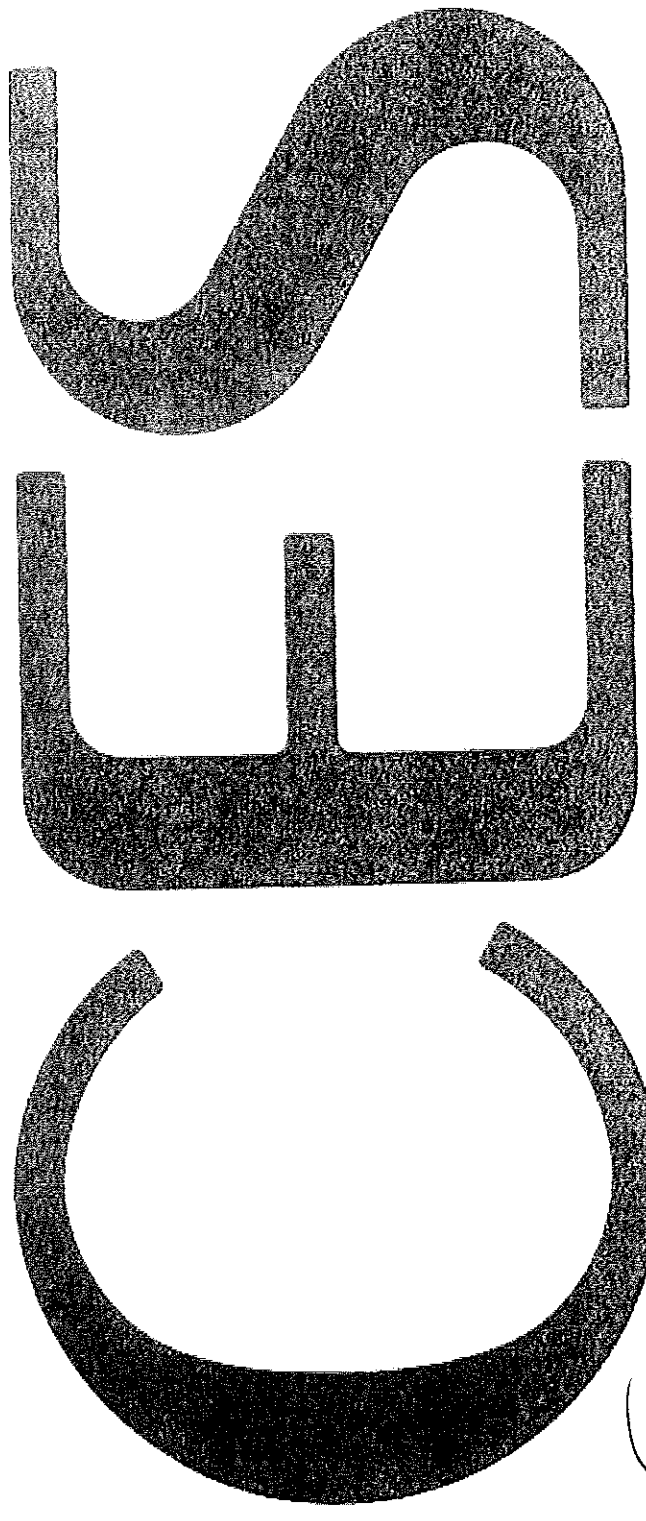
1810


5.20 A

[redacted]

51249070XA

GPS91/15201



1812

CESI **test report** GPS-91/015201

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

object Three pole metal enclosed air insulated switchgear SM6 system type QM. Fitted 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 694 (1980)

test date June 18th, 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 7 pages, 2 oscillograms

Milan, August 19th, 1991

test engineer

P.Lo Monaco

01/012283
keywords : 120100 234308 360201 450707 530010

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
gas pressure for interruption	1.4	bar abs.
earthing switch downstream the fuse		
short-time withstand current	2	kA

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- 91/015163 1 to 13 are assembled in a folder.

1814

table of tests performed

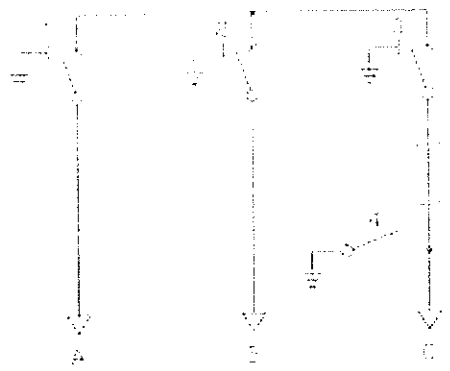
date	type of test	see page
	SHORT-TIME AND PEAK WITHSTAND CURRENT TEST	
June 18th 1991	Test on the earthing switch downstream the fuse with 2 kA for 1 s.	5

tests witnessed by Mr. Laurens - MERLIN GERIN S.A.
Mr. Dubreuque - MERLIN GERIN S.A.

1815

arrangement of the object for the tests

The tested apparatus was assembled with two other apparatus of SM6 system (see photo on page 7).
The figure below shows the electric diagram of the complete setting (single phase diagram of a three phase circuit) :



4 : earthing switch under test

1-2-3 : auxiliary switches

A-B-C : cables

During the tests the cables C were connected to the supply and the switch 4 was in closed position. All the other switches were in open position.

1816

short-time and peak withstand current tests

test circuit conditions

circuit diagram see page 6 power factor < 0.15 frequency 50 Hz

test arrangement: see page 4

conditions of the apparatus before the test: new

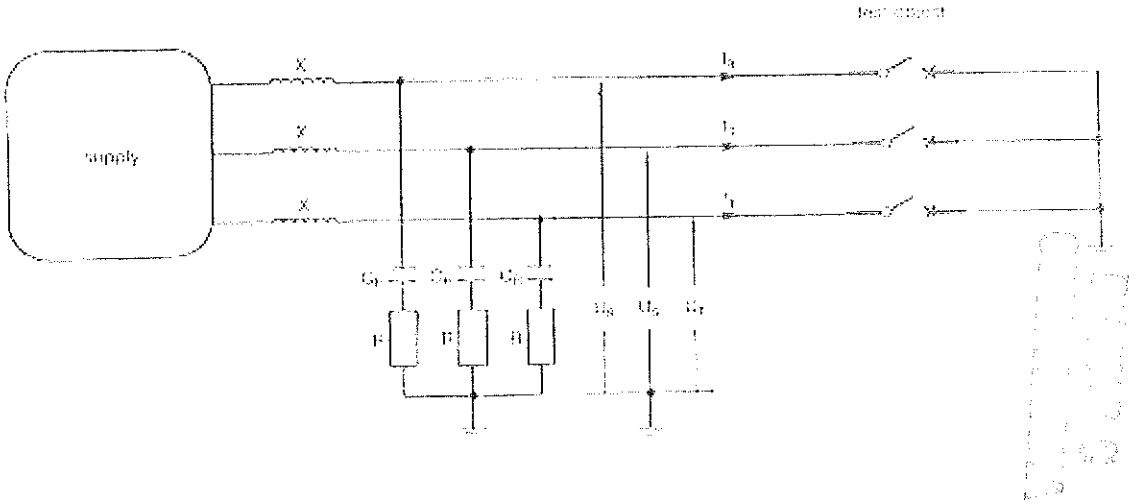
test no.	oscill. no.	duration s	test current: maximum peak value kA	test current: r.m.s. value kA	test current: average kA	notes
1	3	1.01	- - 5.20	2.00 2.00 2.00	2.00	after the test the earthing switch operated correctly.

conditions of the apparatus after the test: as before the test

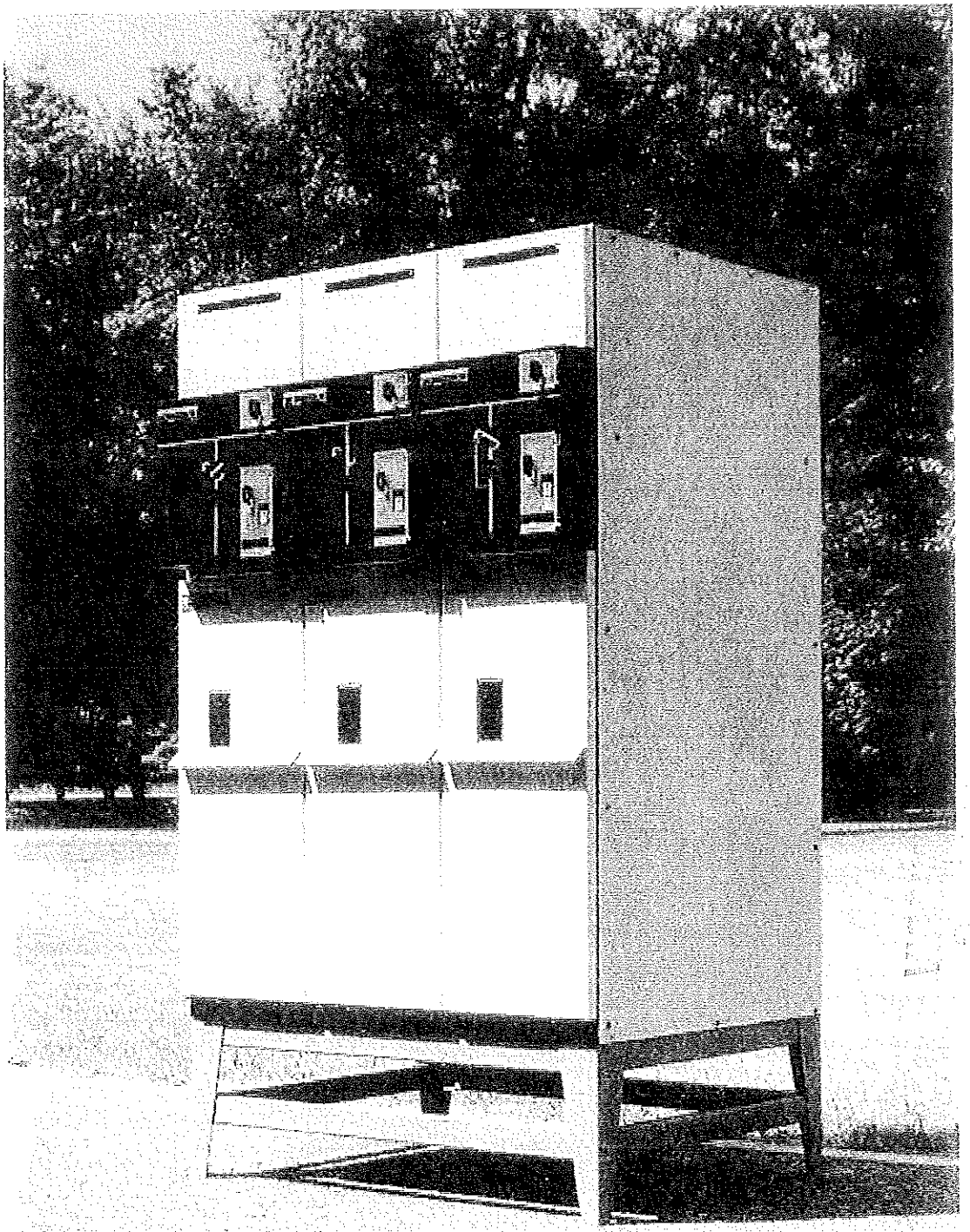
note after the test : the performance of the apparatus is considered satisfactory for the test performed.

1817

circuit-diagram



1818



1819

1820

1821

51249072XA

GPS91/15203

[redacted]

SEC

1822

CESI **test report** GPS 91/015283

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

object Three pole metal enclosed air insulated switchgear SM6 system type IM. Fitted with an increased operating frequency SF6 gas insulated switch type I SM6.

characteristics of the tested object assigned by the Client

rated voltage 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 694 (1980)

test date June 21st, 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 7 pages, 4 oscillograms

Milan, August 22nd, 1991

test engineer

F.Lo Monaco

91/015284
keywords : 120100 234308 360201 450302 530010

rated characteristics of the tested object assigned by the client

switch		
voltage	24	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
earthing switch		
short-circuit making current	50	kA
short-time withstand current	20	kA
short circuit duration	1	s
gas pressure for interruption	1.4 bar abs.	

identification of the object offered.

The tested object truly conforms to the drawings of its type supplied by the Client. Those drawings identified by CESI with embossing press and numbered GPS- 91/015261 1 to 12 are assembled in a folder.

1824

table of tests performed

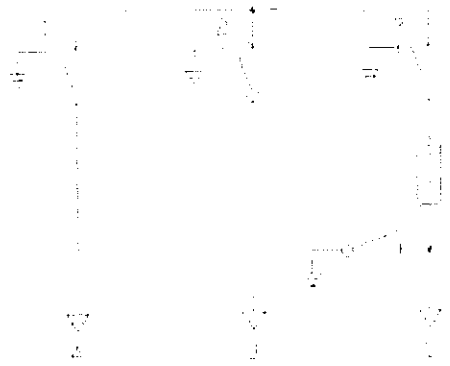
date	type of test	new page
	SHORT-TIME AND PEAK WITHSTAND CURRENT TESTS	
June 21st 1991	No.1 test with 20 kA for 1 s on the switch	5
June 21st 1991	No.1 test with 20 kA for 1 s on the earthing switch	9

tests witnessed by Mr. Laurens - MERLIN GERIN S.A.
Mr. Dubroqua - MERLIN GERIN S.A.

1825

arrangement of the object for the tests

The tested apparatus was assembled with two other apparatus of SM6 system (see photos on page 7).
The figure below shows the electric diagram of the complete setting (single phase diagram of a three phase circuit) :



1 : switch and earthing switch under test

2-3 : auxiliary switches

A-B-C : cables

For the short time current test on the switch : cables A connected to the supply, switches 1 and 2 in closed position, cables B short circuited at the bottom.

For the short time current test on the earthing switch : cables A connected to the supply,earthing switch 1 in closed position.

During the test on the switch 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.

short-time and peak withstand current tests

test circuit conditions

circuit diagram see page 6 power factor < 0.15 frequency 50 Hz

test arrangement: see page 4

conditions of the apparatus before the tests: new

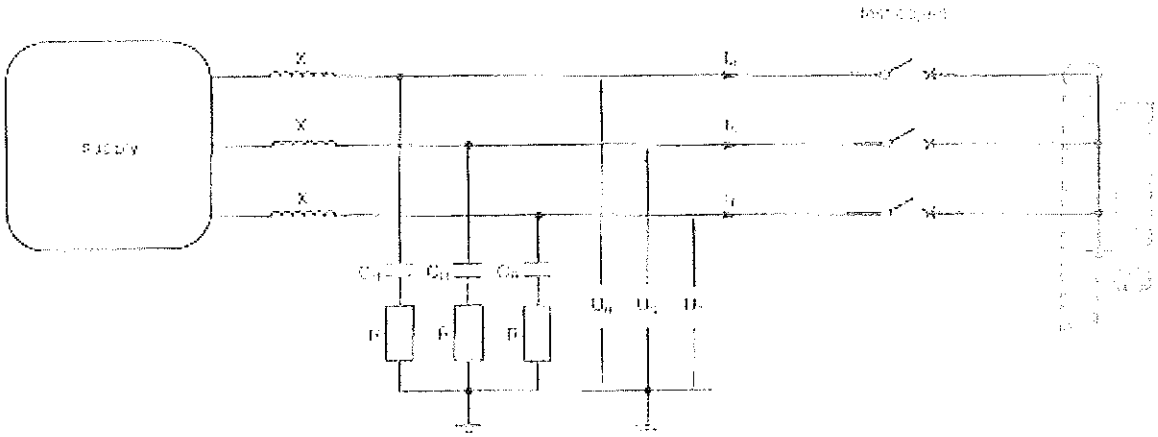
Test	oscill.	duration	Test current			notes
			maximum peak value	r.m.s. value	average	
no.	no.	s	kA	kA	kA	
1	1	1.01	- - 50.0	20.0 20.0 20.0	20.0	test on the switch
2	2	1.01	- - 50.0	20.0 20.0 20.0	20.0	test on the earthing switch

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

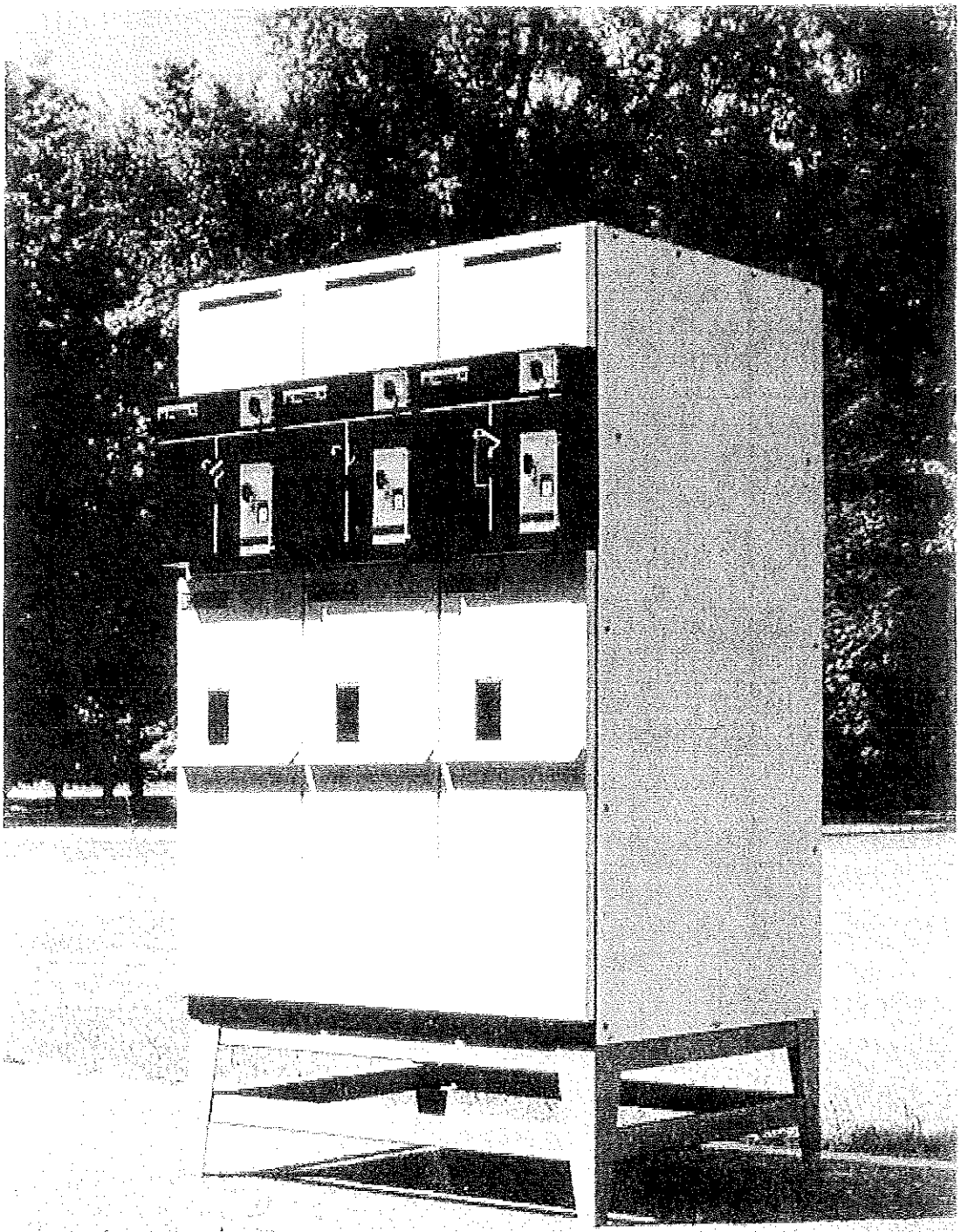
note after the tests : the performance of the apparatus is considered satisfactory for the tests performed.

1827

circuit-diagram:



1828



1829

1830

1831

1832

1637

51249139XA

MP91/012987

[redacted]

SEC

1834

CESI test report

MP-91/012907

CLIENT : MERLIN GERIN - GRENOBLE CEDEX (France)

APPARATUS TESTED : THREE POLE METAL-ENCLOSED AIR INSULATED SWITCHGEAR SM6 SYSTEM TYPE IM. Fitted with an increased operating frequency SF6 gas insulated switch type I SM6. (see photo 001).

DESIGNATION : IM

CHARACTERISTICS ASSIGNED BY THE CLIENT TO THE APPARATUS:

- Rated voltage (U) : 17.5/24 kV
- Rated normal current : 400 A

Other characteristics are listed on page 2.

TESTS PERFORMED :

- Measurement of the resistance of the main circuit
- Verification of temperature rise limits

TESTS MADE IN ACCORDANCE WITH : the Client instruction based on IEC STANDARD Publication 298 (1981) and IEC 694 (1980).

DATE OF TESTS : 18th June 1991

The performance of the apparatus tested and the observations made during the tests, have been recorded in the tables with the results and oscillograms.

this document is composed by 7 pages

Milan, 17th September 1991

Responsible for the document
(U. [illegible])

91/012842
Keywords 120100 255105 310204 440204 530310 676509

1835

OTHER CHARACTERISTICS ASSIGNED BY THE CLIENT TO THE APPARATUS

- Rated frequency	:	50 Hz
- Rated short-time withstand current of the main circuit	:	20 kA
- Rated peak withstand current of the main circuit	:	50 kA
- Rated duration of short-circuit	:	1 s
- Rated short-time withstand current of the earthing circuit	:	20 kA
- Rated peak withstand current of the earthing circuit	:	50 kA
- Rated duration of short-circuit	:	1 s

THE TESTS WERE WITNESSED BY:

Mr. LAURENS - MERLIN GERIN S.A.

Mr. DUBROQUA - MERLIN GERIN S.A.

IDENTIFICATION OF THE APPARATUS:

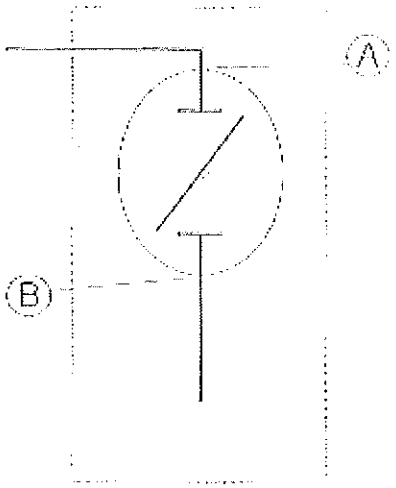
The tested apparatus truly conforms to the drawings of its type supplied by the Client. These drawings, identified by CESI with embossing press and numbered GPS 91/015161 from 001 to 012 are assembled in a folder.

1836

CONTENTS

1837

MEASUREMENT OF THE RESISTANCE OF THE MAIN CIRCUIT



MEASURE (see the above figure)	PHASE	BEFORE THE TEMPERATURE RISE TEST		AFTER THE TEMPERATURE RISE TEST	
		AMBIENT AIR TEMPERATURE °C	RESISTANCE mΩ	AMBIENT AIR TEMPERATURE °C	RESISTANCE mΩ
A - B	1	23.7	0.049	25.3	0.043
A - B	2	23.7	0.051	25.3	0.042
A - B	3	23.7	0.047	25.3	0.043

1838

VERIFICATION OF TEMPERATURE RISE LIMITS

Test arrangement

- The apparatus tested was placed on the floor of the test room in the same conditions as in normal service.

- The three phase a.c. low-voltage supply was connected to the incoming terminals of the apparatus tested by means of one flexible aluminium conductor per phase having a cross-sectional area of 240 mm² and 2 meters in length.

Measurement of the temperature

- The ambient air temperature was obtained from the average of the temperatures measured by means of three copper-constantane thermocouples immersed inside oil pumps containing about half a litre of oil, distributed around the apparatus tested at about its average height and at a distance of about 1m.

- The temperature of all other parts were measured by copper-constantane thermocouples.

Test currents

- The test was carried out with a three-phase current having a r.m.s. value of 400 A - 50 Hz.

1839

Test results

The maximum temperature rise at the thermal steady state (Δt ≤ 1°C/h) with an ambient air temperature of 23.9 °C was:

MEASURED PARTS	TEMPERATURE RISE K Measured	Admitted
- Incoming terminal, phase 1	31.4	65
- Incoming terminal, phase 2	30.5	65
- Incoming terminal, phase 3	29.6	65
- Upper fixed contact of the switch-disconnector,phase 1	26.3	65
- Upper fixed contact of the switch-disconnector,phase 2	27.0	65
- Upper fixed contact of the switch-disconnector,phase 3	25.0	65
- Upper moving contact of the switch-disconnector,phase 1	27.5	65
- Upper moving contact of the switch-disconnector,phase 2	27.7	65
- Upper moving contact of the switch-disconnector,phase 3	26.4	65
- Lower moving contact of the switch-disconnector,phase 1	27.9	65
- Lower moving contact of the switch-disconnector,phase 2	27.7	65
- Lower moving contact of the switch-disconnector,phase 3	26.5	65
- Lower fixed contact of the switch-disconnector,phase 1	27.3	65
- Lower fixed contact of the switch-disconnector,phase 2	27.3	65
- Lower fixed contact of the switch-disconnector,phase 3	26.1	65
- Ambient SF6 temperature inside the pole of the switch-disconnector, phase 1	19.2	-
- Ambient SF6 temperature inside the pole of the switch-disconnector, phase 2	19.0	-
- Ambient SF6 temperature inside the pole of the switch-disconnector, phase 3	18.9	-
- Main bus-bar, phase 1	26.1	-
- Main bus-bar, phase 2	27.2	-
- Main bus-bar, phase 3	25.4	-

1840

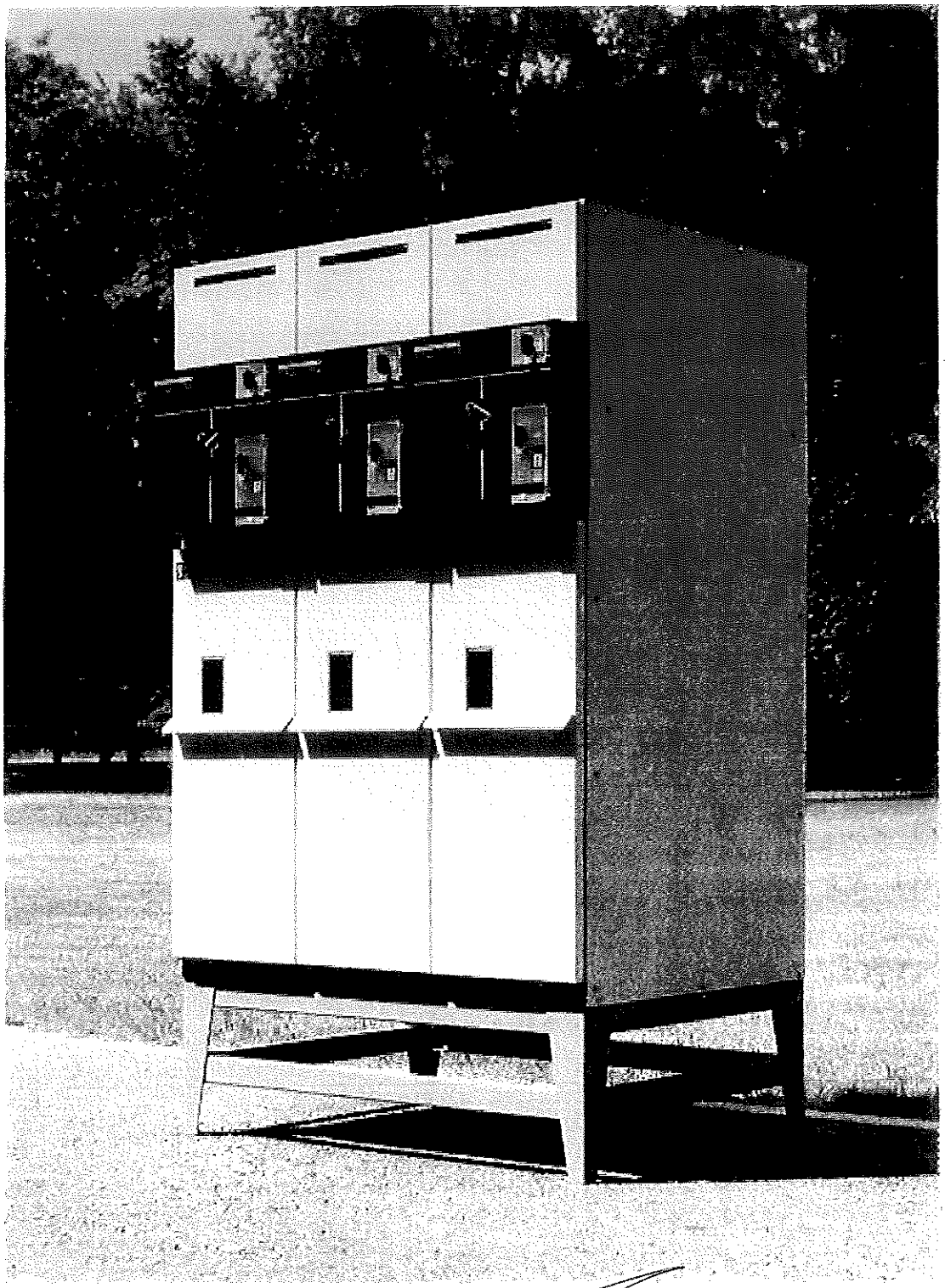


PHOTO 001

1841

51249142XA

MP91/012992

CESI

test report

MP-91/012992

CLIENT : MERLIN GERIN - GRENOBLE CEDEX (France)

APPARATUS TESTED : THREE POLE METAL-ENCLOSED AIR INSULATED SWITCHGEAR SM6 SYSTEM TYPE IM. Fitted with an increased operating frequency SF6 gas insulated switch type I SM6. (see photo 001).

DESIGNATION : IM

CHARACTERISTICS ASSIGNED BY THE CLIENT TO THE APPARATUS:

- Rated voltage (U) : 17.5/24 kV
- Rated normal current : 630 A

Other characteristics are listed on page 2.

TESTS PERFORMED : - Measurement of the resistance of the main circuit
- Verification of temperature rise limits

TESTS MADE IN ACCORDANCE WITH : the Client instruction based on IEC STANDARD Publication 298 (1981) and IEC 694 (1980).

DATE OF TESTS : 18th June 1991

The performance of the apparatus tested and the observations made during the tests, have been recorded in the tables with the results and oscillograms.

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Milan, 17th September 1991

Responsible for the document
(U. [illegible])

91/012992
Keywords: 120100 235105 310203 440208 530310 624408

1843

OTHER CHARACTERISTICS ASSIGNED BY THE CLIENT TO THE APPARATUS

- Rated frequency	:	50 Hz
- Rated short-time withstand current of the main circuit	:	20 kA
- Rated peak withstand current of the main circuit	:	50 kA
- Rated duration of short-circuit	:	1 s
- Rated short-time withstand current of the earthing circuit	:	20 kA
- Rated peak withstand current of the earthing circuit	:	50 kA
- Rated duration of short-circuit	:	1 s

THE TESTS WERE WITNESSED BY:

Mr. LAURENS - MERLIN GERIN S.A.

Mr. DUBROQUA - MERLIN GERIN S.A.

IDENTIFICATION OF THE APPARATUS:

The tested apparatus truly conforms to the drawings of its type supplied by the client. These drawings, identified by CESI with embossing press and numbered GPS 91/013161 from 001 to 012 are assembled in a folder.

1844

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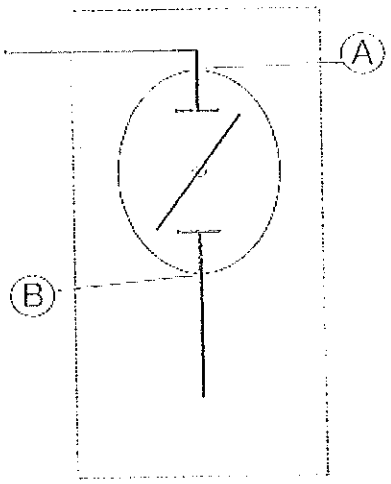
1845

MEASUREMENT OF THE RESISTANCE OF THE MAIN CIRCUIT



MEASURE (see the above figure)	PHASE	BEFORE THE TEMPERATURE RISE TEST		AFTER THE TEMPERATURE RISE TEST	
		AMBIENT AIR TEMPERATURE °C	RESISTANCE mΩ	AMBIENT AIR TEMPERATURE °C	RESISTANCE mΩ
A - B	1	23.7	0.049	25.3	0.043
A - B	2	23.7	0.051	25.3	0.042
A - B	3	23.7	0.047	25.3	0.040

1846

VERIFICATION OF TEMPERATURE RISE LIMITS

Test arrangement

- The apparatus tested was placed on the floor of the test room in the same conditions as in normal service.

- The three phase a.c. low-voltage supply was connected to the incoming terminals of the apparatus tested by means of one flexible copper conductor per phase having a cross-sectional area of 240 mm^2 and 2 meters in length.

Measurement of the temperature

- The ambient air temperature was obtained from the average of the temperatures measured by means of three copper-constantane thermocouples immersed inside oil sumps containing about half a litre of oil, distributed around the apparatus tested at about its average height and at a distance of about 1m.

- The temperature of all other parts were measured by copper-constantane thermocouples.

Test currents

- The test was carried out with a three-phase current having a r.m.s. value of 630 A - 50 Hz.

1847

Test results

The maximum temperature rise at the thermal steady state ($\Delta t \leq 1°C/h$) with an ambient air temperature of 23.8 °C were:

MEASURED PARTS	TEMPERATURE RISE K Measured	Admitted
- Incoming terminal, phase 1	52.0	65
- Incoming terminal, phase 2	52.0	65
- Incoming terminal, phase 3	51.3	65
- Upper fixed contact of the switch-disconnector,phase 1	52.9	65
- Upper fixed contact of the switch-disconnector,phase 2	55.4	65
- Upper fixed contact of the switch-disconnector,phase 3	51.5	65
- Upper moving contact of the switch-disconnector,phase 1	54.4	65
- Upper moving contact of the switch-disconnector,phase 2	55.5	65
- Upper moving contact of the switch-disconnector,phase 3	53.6	65
- Lower moving contact of the switch-disconnector,phase 1	51.6	65
- Lower moving contact of the switch-disconnector,phase 2	52.2	65
- Lower moving contact of the switch-disconnector,phase 3	50.5	65
- Lower fixed contact of the switch-disconnector,phase 1	47.8	65
- Lower fixed contact of the switch-disconnector,phase 2	48.4	65
- Lower fixed contact of the switch-disconnector,phase 3	47.4	65
- Ambient SF6 temperature inside the pole of the switch-disconnector, phase 1	37.4	-
- Ambient SF6 temperature inside the pole of the switch-disconnector, phase 2	37.6	-
- Ambient SF6 temperature inside the pole of the switch-disconnector, phase 3	37.9	-
- Main bus-bar, phase 1	56.2	-
- Main bus-bar, phase 2	59.1	-
- Main bus-bar, phase 3	55.0	-

1898

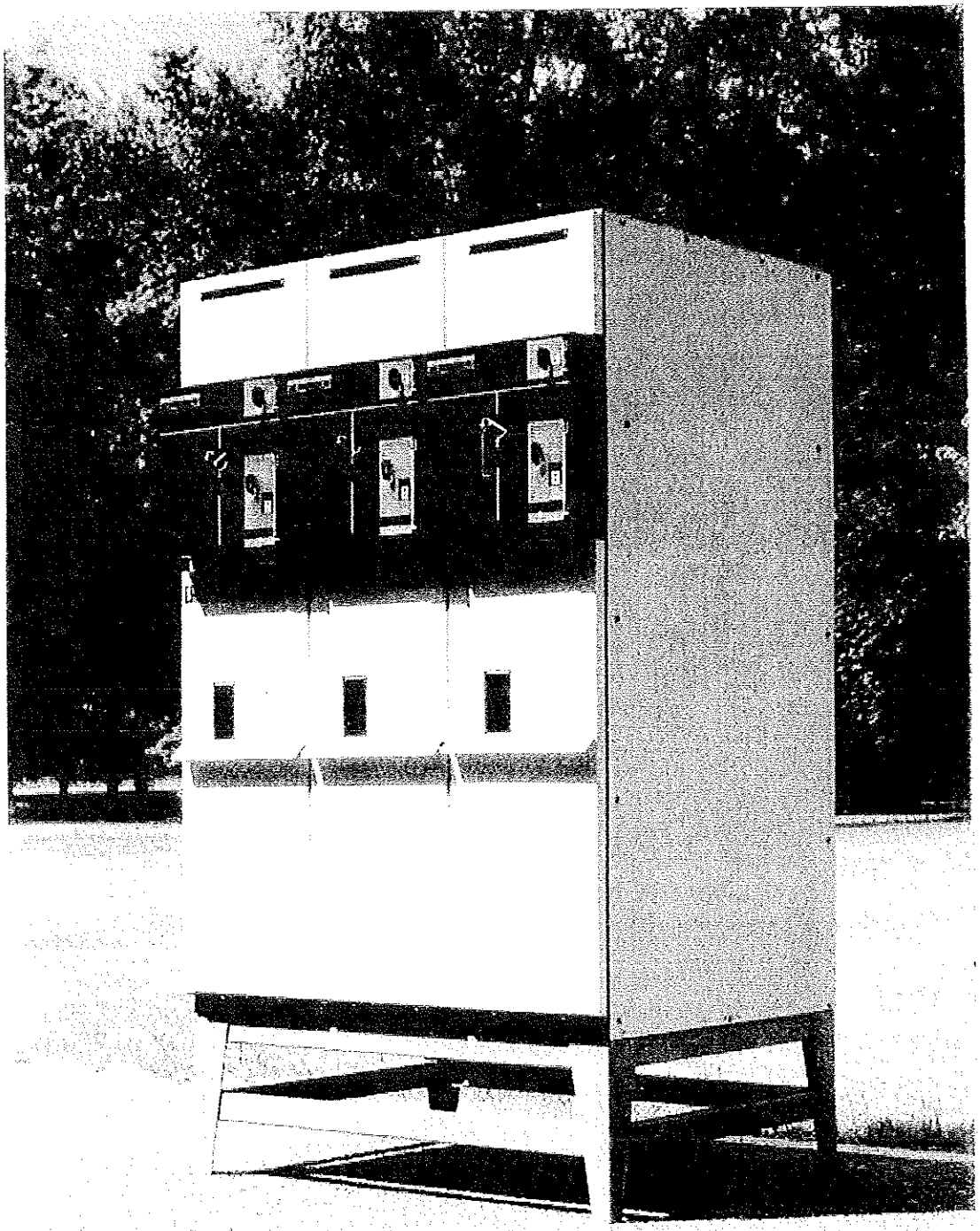


PHOTO 001

1849

51249153XA

MP91/013008

CESI

test report

MP-91/013003

CLIENT : MERLIN GERIN GRENOBLE CEDEX (France)

APPARATUS TESTED : THREE POLE METAL-ENCLOSED AIR INSULATED SWITCHGEAR SM6 SYSTEM TYPE QM. Fitted with an increased operating frequency SF6 gas insulated switch type IQ SM6.
(see photo 001).

DESIGNATION : QM

CHARACTERISTICS ASSIGNED BY THE CLIENT TO THE APPARATUS:

- Rated voltage (U) : 12 kV
- Rated normal current : 200 A

Other characteristics are listed on page 7.

TESTS PERFORMED : - Measurement of the resistance of the main circuit
- Verification of temperature rise limits

TESTS MADE IN ACCORDANCE WITH : the Client instruction based on IEC STANDARD Publication 298 (1981) and IEC 694 (1980).

DATE OF TESTS : 18th June 1991

The performance of the apparatus tested and the observations made during the tests, have been recorded in the tables with the results and oscillograms.

this document is composed by 7 pages

Milan, 19th September 1991

Responsible for the document
(U. Levi)

91/012668
Keywords 120100 235105 310204 440208 530018 624400

1851

OTHER CHARACTERISTICS ASSIGNED BY THE CLIENT TO THE APPARATUS

- Rated frequency	:	50 Hz
- Rated short-time withstand current of the main circuit	:	25 kA
- Rated peak withstand current of the main circuit	:	62.5 kA
- Rated duration of short-circuit	:	1 s
- Rated short-time withstand current of the earthing circuit	:	25 kA
- Rated peak withstand current of the earthing circuit	:	62.5 kA
- Rated duration of short-circuit	:	1 s

CHARACTERISTICS OF THE FUSE-LINK

- Manufacturer	:	MERLIN GERIN S.A.
- Designation	:	FUSARC
Rated current	:	250 A

THE TESTS WERE WITNESSED BY:

Mr. LAURENS - MERLIN GERIN S.A.

Mr. BUSNOQUA - MERLIN GERIN S.A.

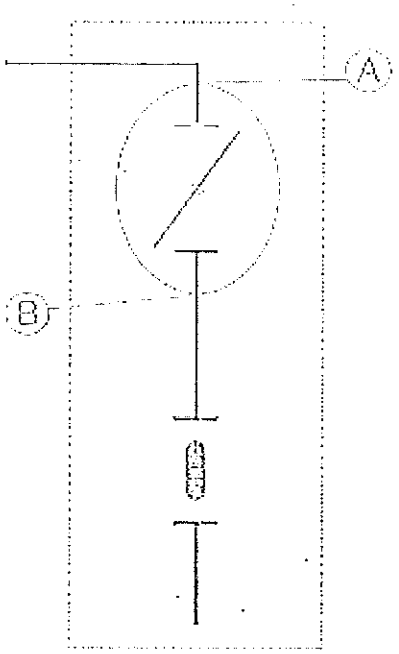
IDENTIFICATION OF THE APPARATUS:

The tested apparatus truly conforms to the drawings of its type supplied by the client. Those drawings, identified by CESI with embossing press and numbered dis. 91/015162 from 001 to 013 are assembled in a folder.

1852

CONTENTS

MEASUREMENT OF THE RESISTANCE OF THE MAIN CIRCUIT



MEASURE (see the above figure)	PHASE	BEFORE THE TEMPERATURE RISE TEST		AFTER THE TEMPERATURE RISE TEST	
		AMBIENT AIR TEMPERATURE °C	RESISTANCE mΩ	AMBIENT AIR TEMPERATURE °C	RESISTANCE mΩ
A - B	1	23.4	0.057	25.4	0.057
A - B	2	23.4	0.057	25.4	0.060
A - B	3	23.4	0.054	25.4	0.062

1854