

证明书 certificate

兹证明

石家庄永瑞电力设备有限公司 跌落式熔断器检测报告检验依据 GB/T15166.3-2008 标准 不低于 IEC 60282-2 检测标准。

To Whom It May Concern:

This is to certify that Shijiazhuang Yongrui Electrical Equipment Co., Ltd. The test report of the Fuse cut out is based on the GB / T15166.3-2008 standard and is not less rigid to the IEC 60282-2 test standard.as it is one to one copy IEC 60282-2.

National Hight-low Voltage Electrical Apparatus Quality
Supervision and Inspection Center

国家高低压电器质量监督检验中心

Gansu Electric Apparatus Research Institute

甘肃电器科学研究院

签名

Signature:

日期：2019年12月6日

Date: Dec 06,2019

甘肃电器科学研究院 地址：甘肃省天水市秦州区长开路 6-6 号 邮编：741018

电话：：0938-8387399 传真：0938-8383344 <http://www.gsdky.com>

证明书

certificate

兹证明

石家庄永瑞电力设备有限公司 跌落式熔断器检测报告(报告编号: XG18012281)
标准 GB/T15166.3-2008. 英文翻译属实

To Whom It May Concern:

This is to certify that Shijiazhuang Yongrui Electrical Equipment Co., Ltd. Fuse cut out test report
(Report No.: XG18012281) Standard GB / T15166.3-2008. The English translation is genuine.

National High-low Voltage Electrical Apparatus Quality
Supervision and Inspection Center

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甘肃电器科学研究院 地址: 甘肃省天水市秦州区长开路 6-6 号 邮编: 741018

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(English Translation)

TEST REPORT

Sample name: Drop out fuse

Model:HRW12-12/200-16

Customer:

Test category:Type test

**National High-low Voltage Electrical Apparatus
Quality Supervision and Inspection Center**

GansuElectricApparatusResearchInstitute

National High and Low Voltage Electrical Apparatus Quality Supervision and Inspection Center		Inspection Report	Commission number: WG18012149
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	Following blank		
Remarks	The test project included in this report was completed at No. 66 Changkai Road, Qinzhou District, Tianshui City, Gansu Province.		

National High and Low Voltage Electrical Apparatus Quality Supervision and Inspection Center		Inspection Report		Commission number: WG18012149			
Test conclusion							
Sample model, name: HRW12-12/200-16 drop out fuse Entrusted by: Shijiazhuang Yongrui Electrical Equipment Co., Ltd. Entrusted company address: Shancheng Village, Weibo Town, Xinji City Manufacturer: Shijiazhuang Yongrui Electrical Equipment Co., Ltd. Manufacturer address: Shancheng Village, Weibo Town, Xinji City Test items Insulation test [power frequency withstand voltage (dry test): fuses in and out of the line end to ground 42kV, fuse base between the input and output line ends 48kV; (wet test) fuses in and out of the line end to the ground 34kV, the fuse base between the input and output line ends 48kV; lightning impulse voltage: fuse inlet and outlet line end to the ground 75kV, fuse base between the inlet and outlet line 85kV] Internal resistance measurement [measured value] Temperature rise test [200A] Mechanical test Pre-arc time-current characteristics [576A 600s; 1150A 10s; 4650A 0.1s] Action time-current characteristic Break test Test method 1: Breaking current 16kA (200A, 100A each 3 times) Test method 2: breaking current 9.6kA-12.8kA (200A, 100A each 3 times) Test method 3: breaking current 3.2kA~4.8kA (200A, 100A each time) Test method 4: breaking current 400A~500A (100A 2 times) Test method 5: breaking current 270A~330A (100A 2 times) Test based on GB/T15166.3-2008 "High-voltage AC breakers - Part 3: Jet fuses" The test results of the tested items are in compliance with the load standards and technical documents, and the corresponding performance of the test items is qualified							
Preparation	Lijun	Review	Wangweijuan	Approval	Liuyan	Approved	Huxinming
signature	Lijun	signature	Wangweijuan	signature	Liuyan	signature	Huxinming
Date	2018.2.9	Date	2018.2.9	Date	2018.2.9	Date	2018.2.9

National High and Low Voltage Electrical Apparatus Quality Supervision and Inspection Center	Inspection Report	Commission number: WG18012149	
Overview			
Sample model, name: HRW12-12/200-16 drop out fuse Manufacturer: Shijiazhuang Yongrui Electrical Equipment Co., Ltd. Manufacturer address: Shancheng Village, Weibo Town, Xinji City Factory number: 1801060012 Factory date: January 2018 Sample acceptance date: January 31, 2018 Contract Effective Date: January 31, 2018			
	Rated voltage: kV		12
	Rated current: A		200
	Rated frequency: Hz		50
	Rated short-circuit breaking current: kA		16
	Rated short-time power frequency withstand voltage	Dry test kV	42
		Wet test kV	34
	Rated lightning impulse withstand voltage	Dry test kV	75
	Rated short-duration power frequency withstand voltage (fracture)	Dry test kV	48
		Wet test kV	48
	Rated lightning impulse withstand voltage (fracture)	Dry test kV	85
loop resistance: $\mu \Omega$		/	
Description	1.3 fuse base and 3 fuse tubes; fuse and base number: #40, #41, #42 2. Fuse number (200A): #01-#14 3. Fuse number (100A): #21-#31		
Delegate representative: Wang Zhanhao			
Test date: from 2018.2.1 to 2018.2.7			

Sample photo**Product shape photo (including shape and nameplate)**

Terms	Inspection items and inspection requirements	Measurement or observation	test result
		#40#01	
6.4	2) Lightning impulse voltage test (1.2/50us) (dry test) Qualified ambient air temperature: (+10-+40° C) humidity:(%) Air pressure: (pa) Atmospheric correction factor: Kt Apply voltage: see part (kV) Number of tests: 15 times for positive and negative polarity Interval time: ≥1s Fuse in and out of the line end to ground (75 soil 3% kV) -A to a between Applied voltage Positive polarity Oscillogram number Applied voltage negative polarity Oscillogram number	12 56 88730 1.0 15 1 No breakdown or discharge phenomenon +75.4~+74.6 XG18012281+ 75-001 -75.5~-74.7 XG18012281- 75-001	qualified
	Fuse base between the inlet and outlet ends (85 soil 3% kV) -A to a between Applied voltage positive polarity Oscillogram number Applied voltage negative polarity Oscillogram number: -ato A a between Applied voltage positive polarity Oscillogram number: Applied voltage negative polarity Oscillogram number The schematic diagram of the test circuit is shown in Note: F-shell and base A-fuse on the port a-fuse lower port	 No breakdown or discharge phenomenon +85.5~+84.8 XG18012281+ 85-001 -85.5~-84.7 XG18012281- 85-001 No breakdown or discharge phenomenon +85.3~+84.9 XG18012281+ 85-002 -85.7~-84.8 XG18012281- 85-002 Figure 1.	

Terms	Inspection items and inspection requirements	Measurement or observation	test result
		#41#02	
8.6	Internal resistance measurement before temperature rise test Ambient temperature: +10 - +40° C Measuring method: DC voltage drop method Measured resistance value (m Ω)	15 DC voltage drop method 0.98	qualified

Terms	Inspection items and inspection requirements		Measurement or observation	test result
			#41 #02	
6.5	Temperature rise test Ambient temperature: +10~+40° C Test current: 200+2%A Power frequency: 50Hz Surrounding wind speed: <0.5m/s Connecting conductor: 95×3 (mm ² *m)		15 200 50 <0.5 95×3	qualified
	Location number	Allowable temperature rise (K)	Measured value	
	1m from the entry point	/	33	
	1	65	35	
	2	65	36	
	3	65	39	
	4	65	38	
	5	/	42	
	6	65	39	
	7	65	37	
	1m from the outgoing line	/	34	
	Temperature rise difference between the incoming end and the incoming line 1m	≤5	3	
	The temperature rise difference between the outlet end and the outlet end 1m	≤5	4	
	Schematic diagram of main loop temperature rise measurement point		XG18012281-W	

Terms	Inspection items and inspection requirements	Measurement or observation	test result
		#41#02	
8.6	Internal resistance measurement after temperature rise test Qualified ambient temperature: +10-+40° C Measuring method: DC voltage drop method DC voltage drop method Measured resistance value (m Ω) Resistance change rate: ≤20%	20 DC voltage drop method 1.01 3.1	Qualified
6.8	Mechanical stability test 1. Mechanical strength test of fuse base and current-carrying parts The fuse shall be capable of withstanding deformation and damage of 500 times without hindering normal operation; 2. Fuse mechanical strength test 1) Static test: Apply the specified 60N axial pull on the fuse, and gradually apply the tension until the specified value. The hold time is not less than 30min. The fuse must not slip or deform. 2) Dynamic test: the fuse is installed in the specified fuse, and the operation procedure is combined and divided 20 times. The fuse must not slip or deform.	Yes No slip, deformation Combined and divided 20 times, No slip, deformation	Qualified

Terms	Inspection items and inspection requirements	Measurement or observation	test result
		#41,#05~07	
6.7	Time ---current characteristic test Ambient temperature: +10~+40℃ Sample status: Connecting wire: 95×3 (mm²×m) Initial state: Cold state Rated current:200A Test current:576A Fuse time:600s Test current:1150A Fuse time:10s Expected oscillogram number: oscillogram number: Test current:4650A Fuse time:100ms Expected oscillogram number: oscillogram number:	16 Intact 95×3 Cold state 200	Qualified
		#05	
		576 219.7	
		#06	
		1180 6.9	
		XG18012281-SY01 XG18012281-ST01	
		#07	
		4710 173.0 XG18012281-SY02 XG18012281-ST02	

Terms	Inspection items and inspection requirements	Measurement or observation	test result
		#42, #08~10	
6.7	Action time current characteristic test Sample status: Power frequency recovery voltage: KV Rated current:200A Test current: A Fuse time: s Test current: A Fuse time: s oscillogram number: Test current: A Fuse time: s oscillogram number:	Intact 12 200	Qualified
		#08	
		520 600	
		#09	
		1120 10 XG18012281-T01	
		#10	
		4210 0.1 XG18012281-T02	

Terms	Inspection items and inspection requirements	Measurement or observation	test result
		#42	
6.6	Closing test Rated operation sequence: O Number of test: 3 Test voltage: 12KV Breaking current: 16KA Transient recovery voltage $U_c=23.8KV$ $T_3=121\mu s$ Expected oscillogram number:	O 3 12 16 23.8 121 XG18012281-1-Y01	Qualified
		#42,#21	
		O1 100 9.8 11.8 <0.10 7 XG18012281-1-T01	
		#06	
		O2 100 9.5 11.8 <0.10 XG18012281-1-T02	
	Operation method O1 Fuse rated current:100A Flow time: ms Power frequency recovery voltage: KV Power factor: $\cos \phi$: <0.10 Closing angle after voltage zero crossing: $-5^\circ \sim +15^\circ$ oscillogram number:	4710 173.0 XG18012281-SY02 XG18012281-ST02	

Terms	Inspection items and inspection requirements	Measurement or observation	test result
		#42	
6.6	Closing test Rated operation sequence: O3 Fuse rated current: 100A Flow time: ms Power frequency recovery voltage: KV Power factor: $\cos \phi$: <0.10 Closing angle after voltage oscillogram number:	O3 100 11.0 11.8 <0.10 143 XG18012281-1-T03	Qualified
		#42,#08	
	Operation method O1 Fuse rated current:200A Flow time: ms Power frequency recovery voltage: KV Power factor: $\cos \phi$: <0.10 Closing angle after voltage zero crossing: $-5^{\circ} \sim +15^{\circ}$ oscillogram number:	O1 200 9.8 11.8 <0.10 8 XG18012281-1-T01	
		#42, #09	
	Operation method O2 Fuse rated current:200A Flow time: ms Power frequency recovery voltage: KV Power factor: $\cos \phi$: <0.10 Closing angle after voltage zero crossing: $85^{\circ} \sim 105^{\circ}$ oscillogram number:	O2 200 10.5 11.8 <0.10 93 XG18012281-1-T02	

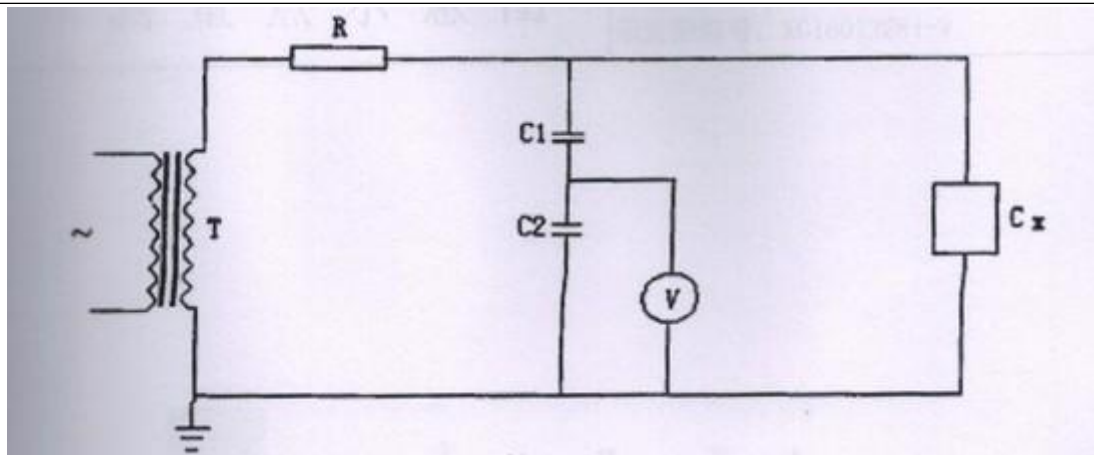
Terms	Inspection items and inspection requirements	Measurement or observation	test result
		#42	
6.6	Closing test-- Test method1 Rated operation sequence: O₃ Fuse rated current: 200A Flow time: ms Power frequency recovery voltage: KV Power factor: $\cos \phi$: <0.10 Closing angle after voltage zero crossing: 130° ~150° oscillogram number:	O3 200 11.1 11.8 <0.10	Qualified
		142 XG18012281-1-T06	
		#42	
6.6	Closing test-- Test method 2 Rated operation sequence: O Number of test: 3 Test voltage: 12KV Breaking current: 9.6~12.8KA Transient recovery voltage Uc=23.8KV T3=121us Expected oscillogram number:	O 3 12 12.0 23.8 121 XG18012281-2-Y01	
		#42, #24	
	Operation method O₁ Fuse rated current:100A Flow time: ms Power frequency recovery voltage: KV Power factor: $\cos \phi$: <0.10 Closing angle after voltage zero crossing: -5° ~+15° oscillogram number:	O1 100 8.3 11.8 <0.10	
		7 XG18012281-2-T01	

Terms	Inspection items and inspection requirements	Measurement or observation	test result
		#42, #25	
6.6	Closing test-- Test method 2 Rated operation sequence: O2 Fuse rated current: 100A Flow time: ms Power frequency recovery voltage: KV Power factor: $\cos \phi$: <0.10 Closing angle after voltage zero crossing: 85° ~105° oscillogram number:	O2 100 8.9 11.8 <0.10 91 XG18012281-2-T02	Qualified
		#42,#08	
	Operation method O₃ Fuse rated current:100A Flow time: ms Power frequency recovery voltage: KV Power factor: $\cos \phi$: <0.10 Closing angle after voltage zero crossing: 130° ~150° oscillogram number:	O3 100 9.1 11.9 <0.10 142 XG18012281-2-T03	
		#42, #09	
	Operation method O₁ Fuse rated current:200A Flow time: ms Power frequency recovery voltage: KV Power factor: $\cos \phi$: <0.10 Closing angle after voltage zero crossing: -5° ~+15° oscillogram number:	 O1 200 8.7 11.8 <0.10 8 XG18012281-2-T04	

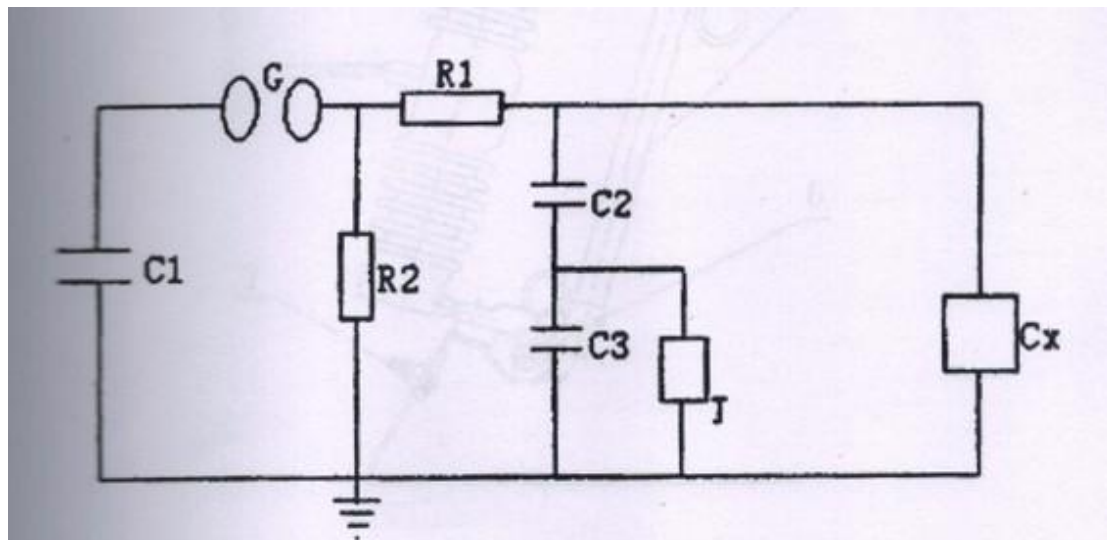
Terms	Inspection items and inspection requirements	Measurement or observation	test result
		#42, #12	
6.6	Closing test-- Test method 2 Rated operation sequence: O2 Fuse rated current: 200A Flow time: ms Power frequency recovery voltage: KV Power factor: $\cos \phi$: <0.10 Closing angle after voltage zero crossing: 85° ~105° oscillogram number:	O2 200 8.2 11.8 <0.10 9 XG18012281-2-T05	Qualified
		#42,#13	
	Operation method O ₃ Fuse rated current:200A Flow time: ms Power frequency recovery voltage: KV Power factor: $\cos \phi$: <0.10 Closing angle after voltage zero crossing: 130° ~150° oscillogram number:	O3 200 9.3 11.8 <0.10 141 XG18012281-2-T06	
		#42, #09	
	Closing test-- Test method 3 Rated operation sequence: O Number of test: 1 Test voltage: 12KV Breaking current: 3.2~4.8KA Transient recovery voltage Uc=23.8KV T3=121us Expected oscillogram number:	O 1 12 4.2 23.8 121 XG18012281-3-Y01	

Terms	Inspection items and inspection requirements	Measurement or observation	test result
		#42, #27	
6.6	Closing test-- Test method 3 Operation sequence: O₁ Fuse rated current: 100A Flow time: ms Power frequency recovery voltage: KV Power factor: $\cos \phi$: <0.10 Closing angle after voltage zero crossing: 85° ~105° oscillogram number:	O1 100 11.7 11.8 <0.10 94 XG18012281-3-T01	Qualified
		#42,#13	
	Operation method O₁ Fuse rated current:200A Flow time: ms Power frequency recovery voltage: KV Power factor: $\cos \phi$: <0.10 Closing angle after voltage zero crossing: 85° ~105° oscillogram number:	O1 200 12.3 11.9 <0.10 91 XG18012281-2-T06	
		#42	
	Closing test-- Test method 4 Rated operation sequence: O Number of test: 2 Test voltage: 12KV Breaking current:400~500A Expected oscillogram number:	O 2 12 450 XG18012281-4-Y01	

Terms	Inspection items and inspection requirements	Measurement or observation	test result
		#42, #27	
6.6	Closing test-- Test method 4 Operation sequence: O1 Fuse rated current: 100A Flow time: ms Power frequency recovery voltage: KV Power factor: $\cos \phi$: 0.1~0.2 Closing angle after voltage zero crossing: Arbitrarily oscillogram number:	O1 100 11.7 11.8 <0.10 94 XG18012281-3-T01	Qualified
		#42,#13	
	Operation method O1 Fuse rated current:200A Flow time: ms Power frequency recovery voltage: KV Power factor: $\cos \phi$: <0.10 Closing angle after voltage zero crossing: 85° ~105° oscillogram number:	O1 200 12.3 11.9 <0.10 91 XG18012281-2-T06	
		#42	
	Closing test-- Test method 4 Rated operation sequence: O Number of test: 2 Test voltage: 12KV Breaking current:400~500A Expected oscillogram number:	O 2 12 450 XG18012281-4-Y01	



T-power frequency test transformer **C1, C2** -power frequency divider
V-power frequency voltmeter **R**-protective resistor **Cx** - sample
 1min power frequency voltage test schematic



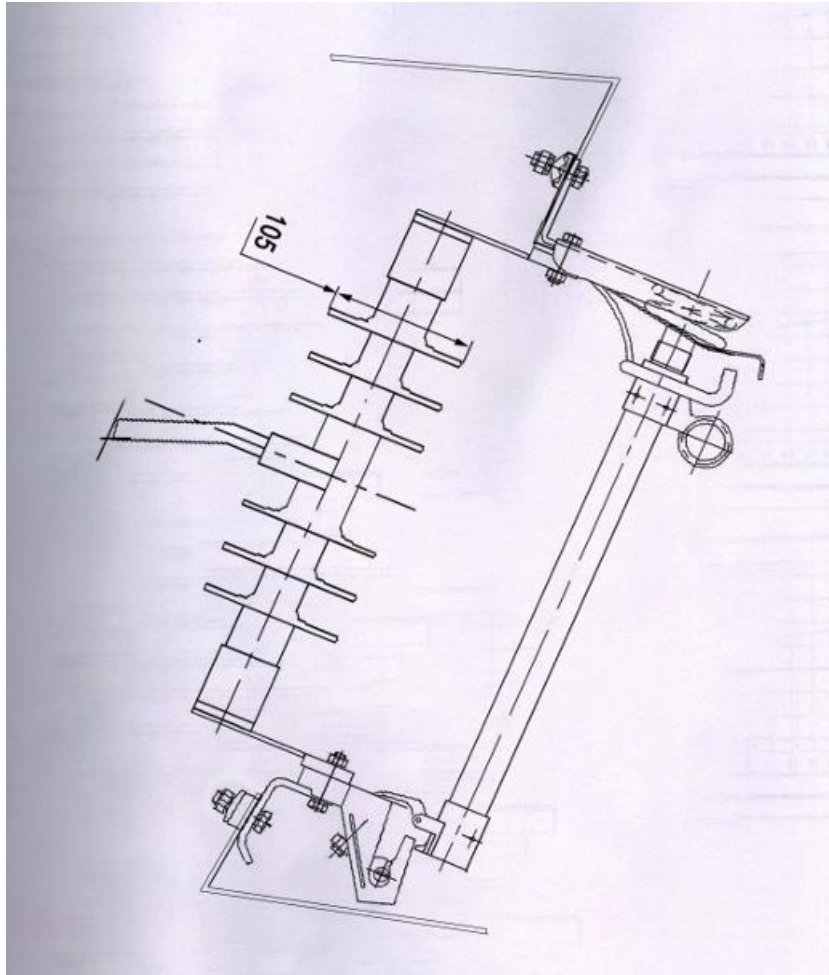
R1, R2, C1, G-impact voltage generator **J-DMS3012** digital oscilloscope
C2, C3 shock divider **Cx** test sample
 1.2/5 μ s lightning impulse voltage test schematic

figure 1

**Temperature rise measurement point
diagram**

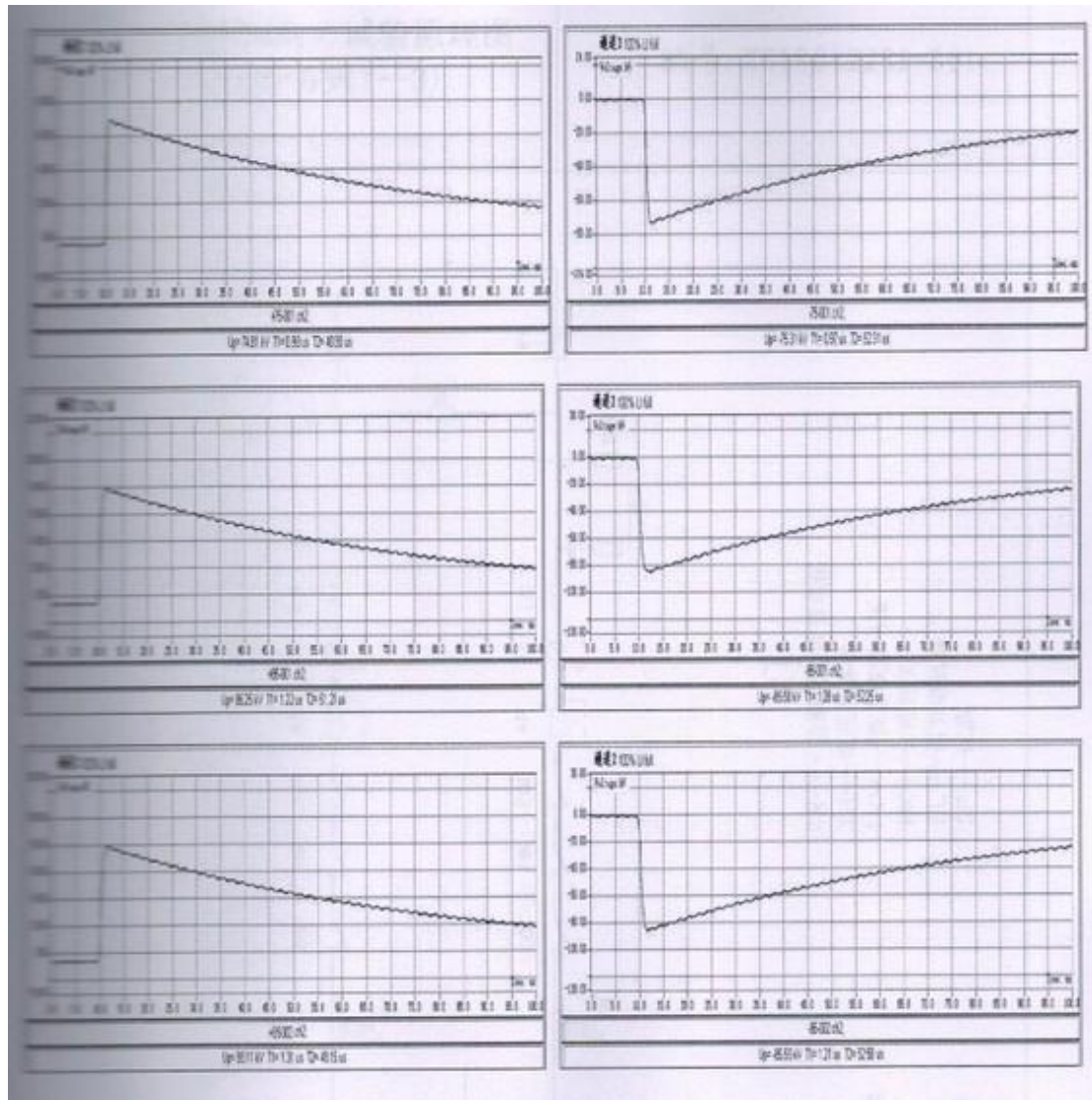
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Schematic number: XG1801228-W



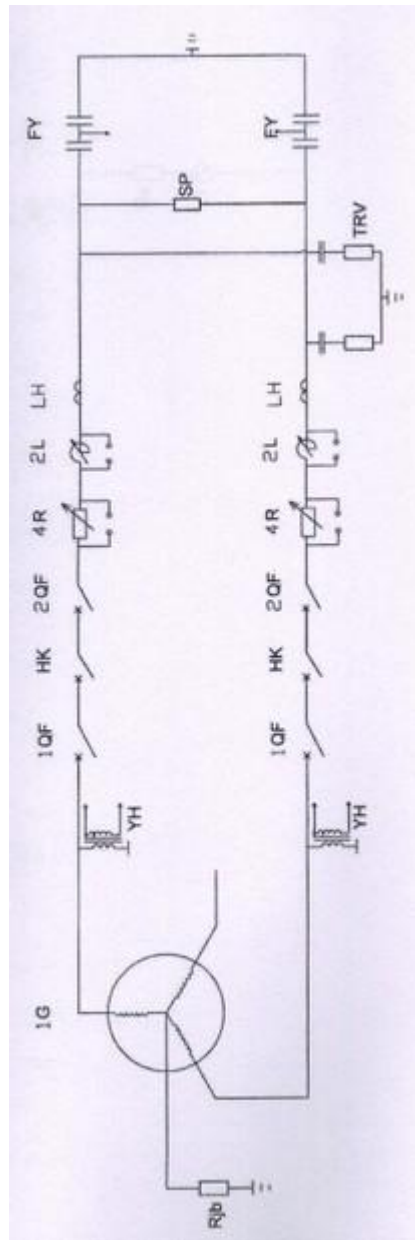
Shock oscillogram

Report number: XG18012281



Single-phase breaking capacity test schematic

No.: XG18012281-S01



RJb--grounding resistor

4R---power factor adjusting resistor

1G one-short-circuit generator

YH-voltage transformer

2QF one-operating circuit breaker

TRV transient recovery voltage

FY one-by-one voltage divider

HK -- closing switch

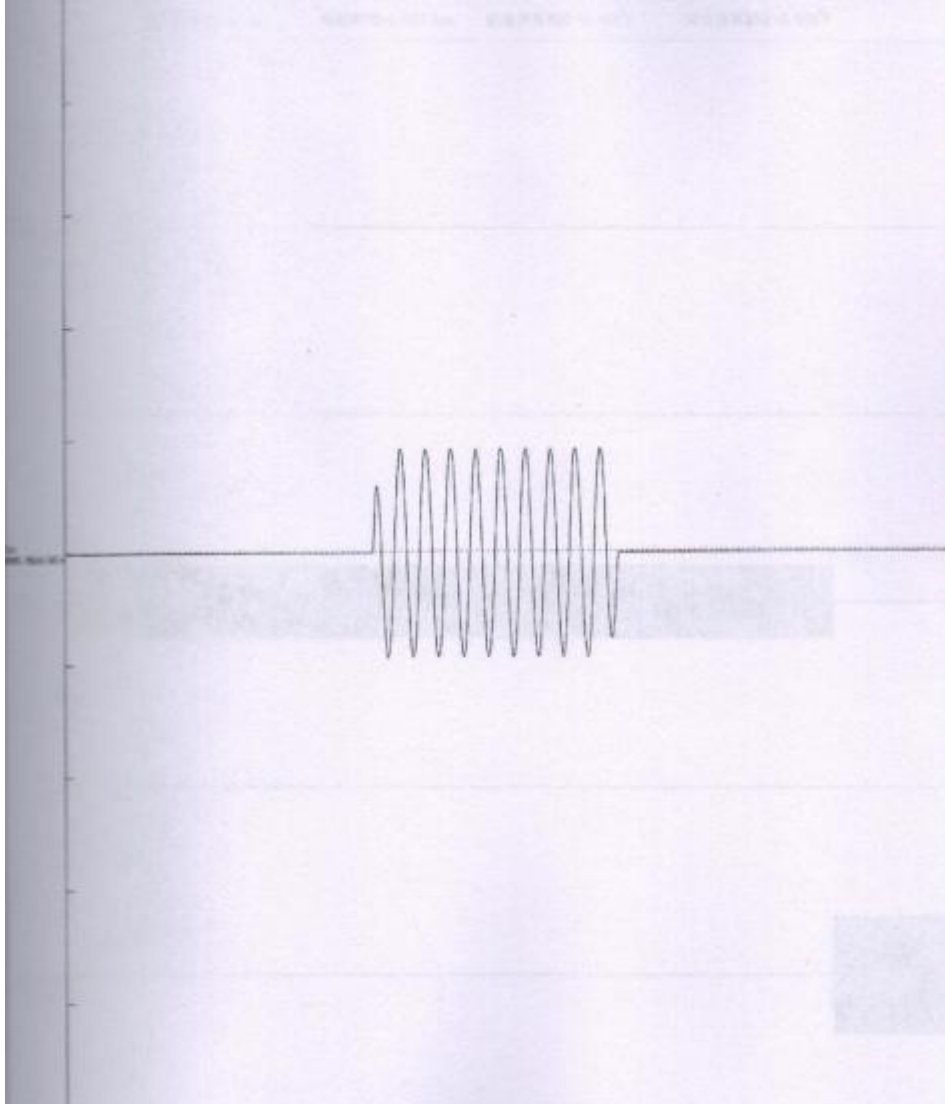
LH--current transformer

2L--tuning reactor

1QF --protection circuit breaker

SP --test sample

Single phase breaking capacity test principle (Test method4-5)	No. :XG18012281-S02
RJb---grounding resistor 1G one-short-circuit generator 2QF one-operating circuit breaker FY one-by-one voltage divider LH--current transformer 1QF --protection circuit breaker Rs---Load Resistance 4R---power factor adjusting resistor YH-voltage transformer TRV transient recovery voltage HK -- closing switch 2L---tuning reactor SP --test sample LT---Regulating reactor	

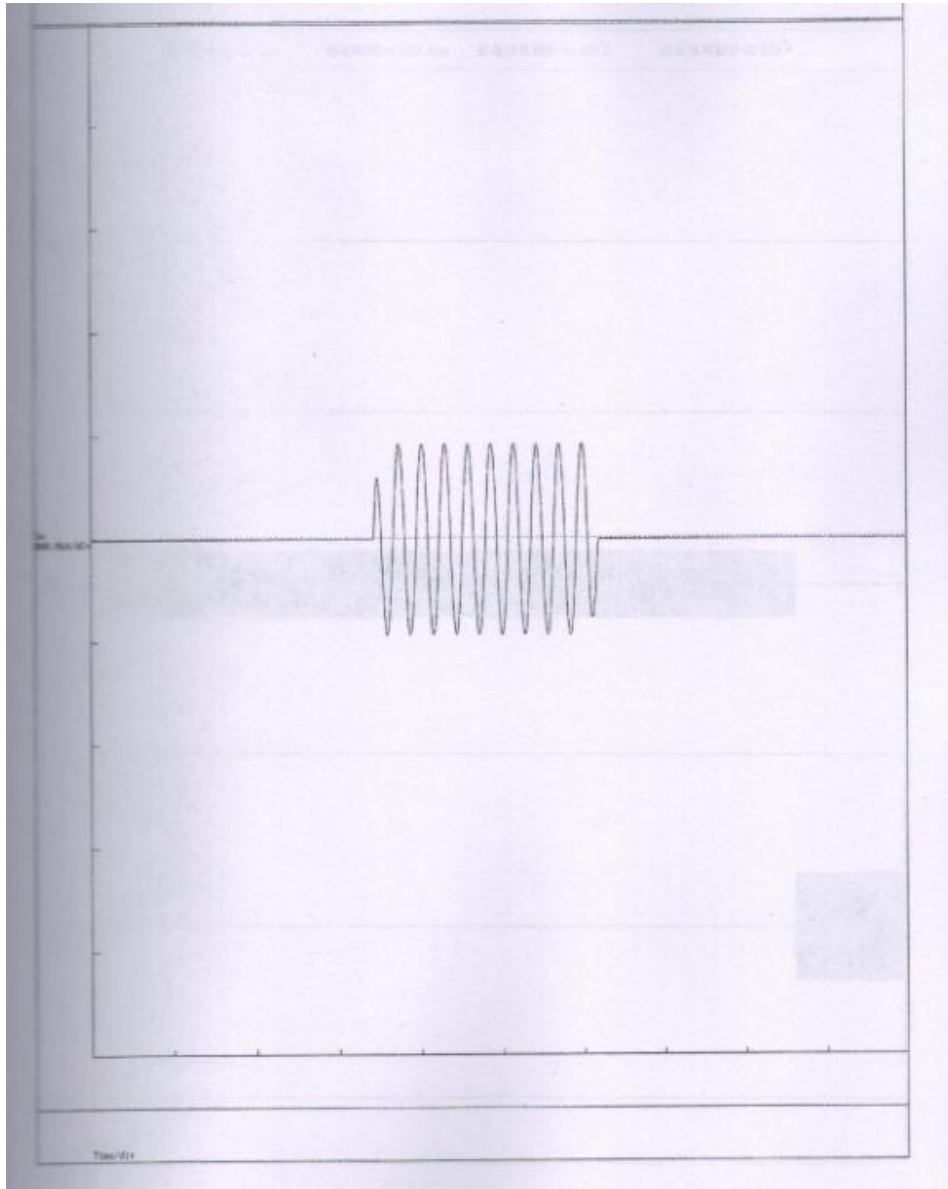
Single phase pre-wave**Oscillogram number:XG18012281-SY01**

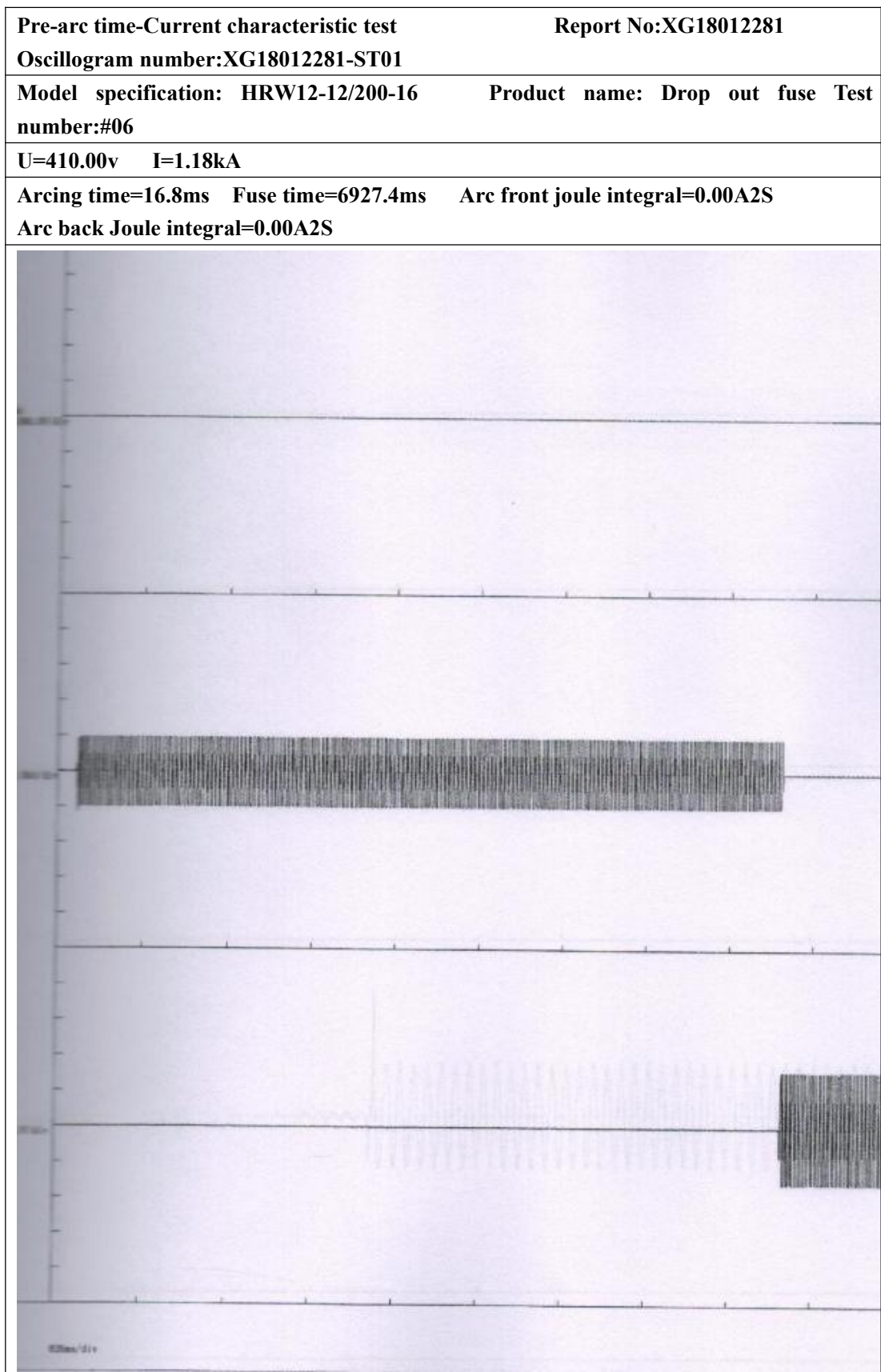
Single phase pre-wave

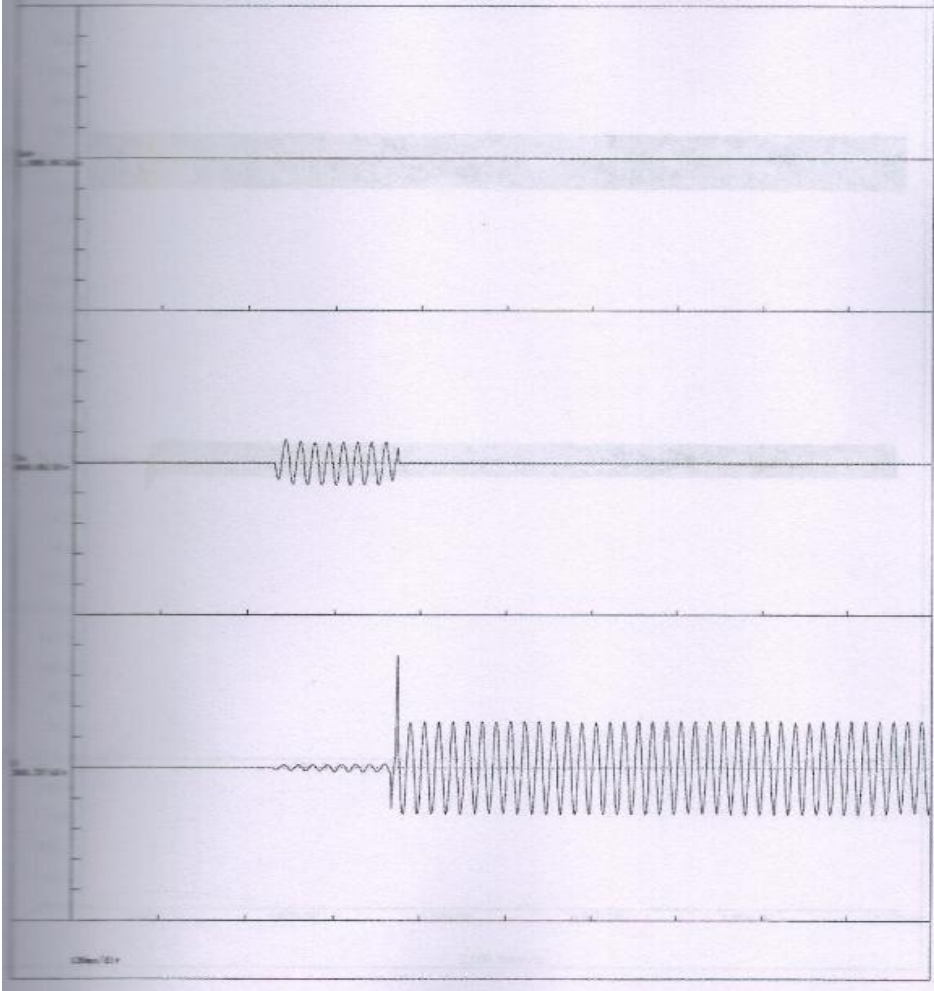
Oscillogram number:XG18012281-SY02

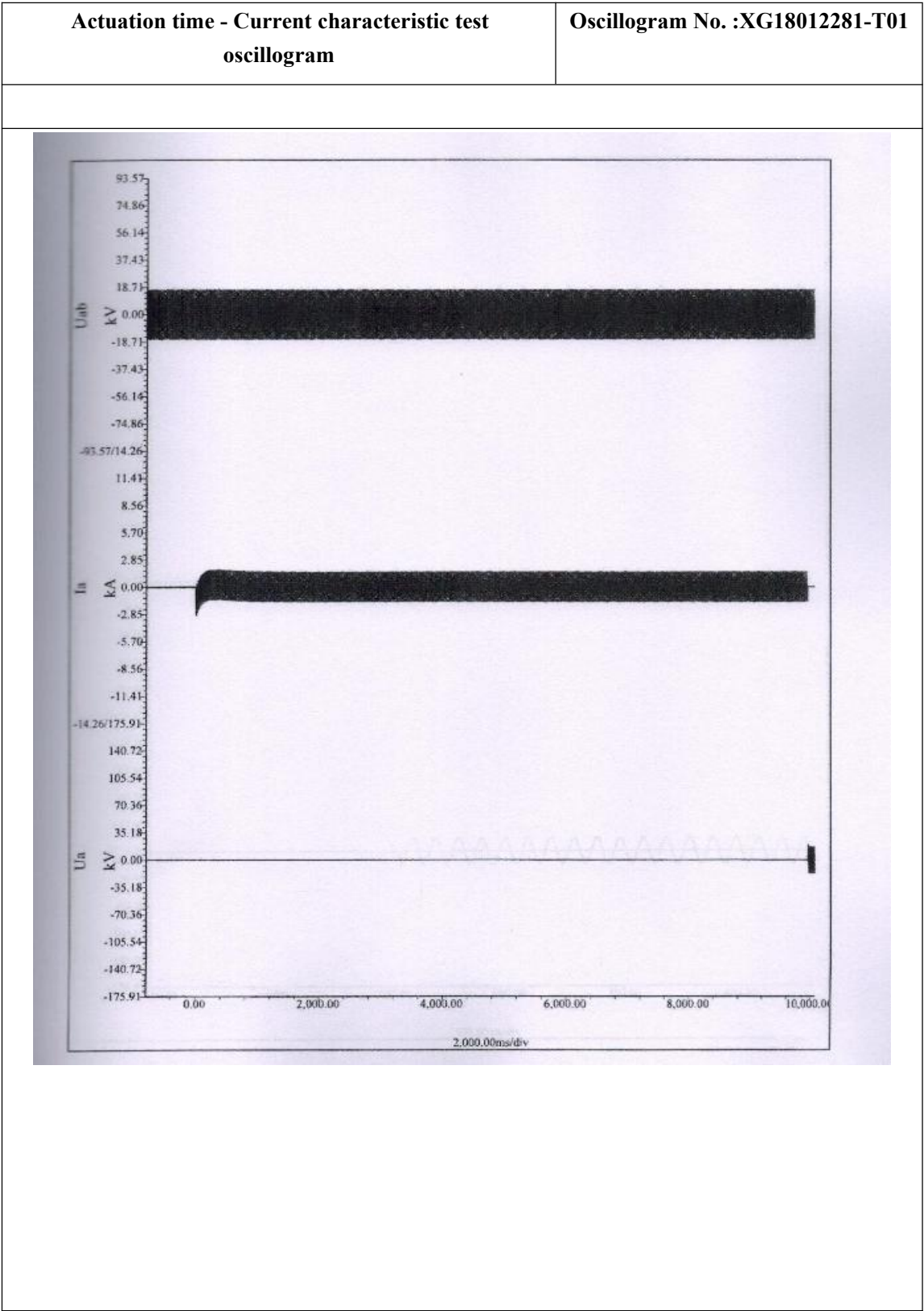
U=410.0V

I=4.71KA



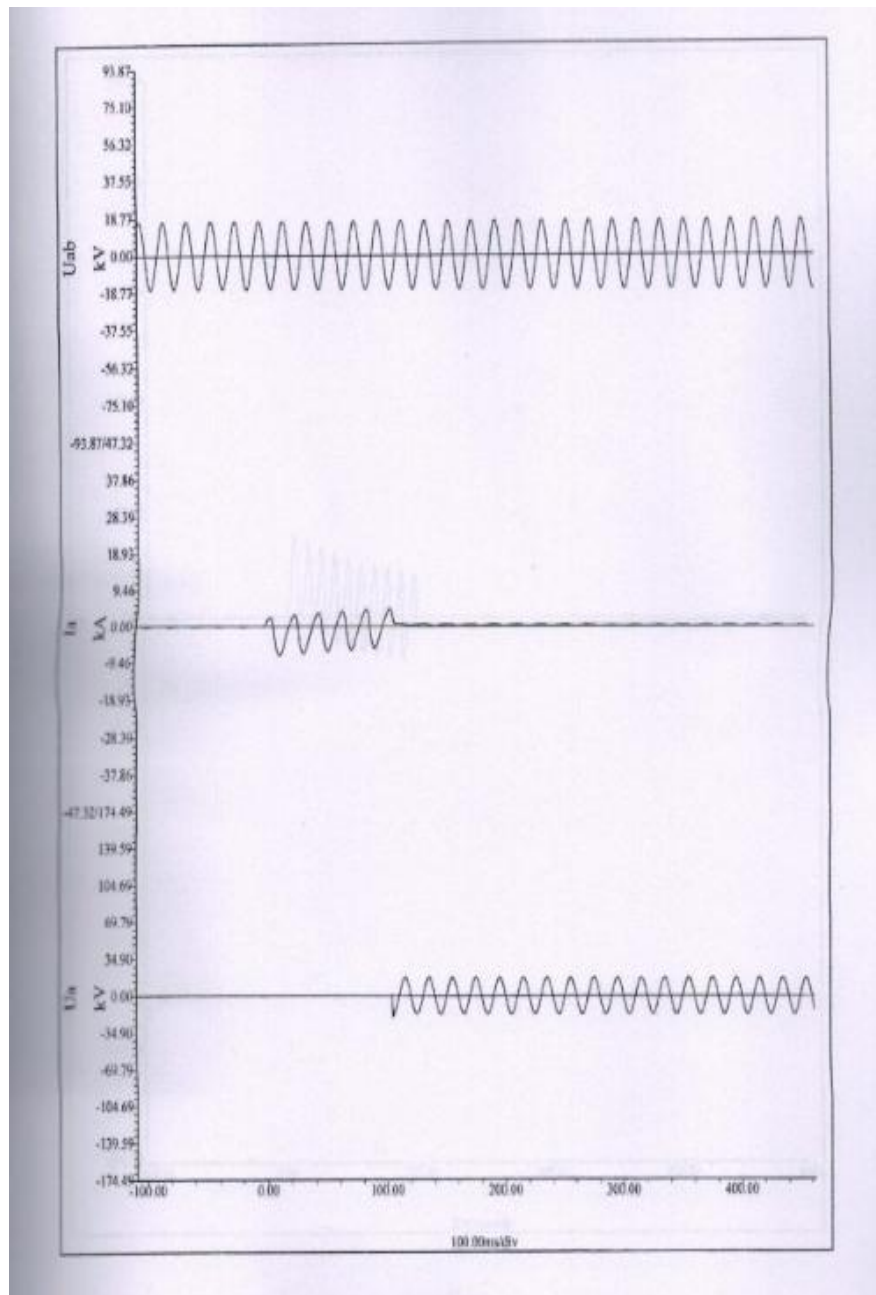


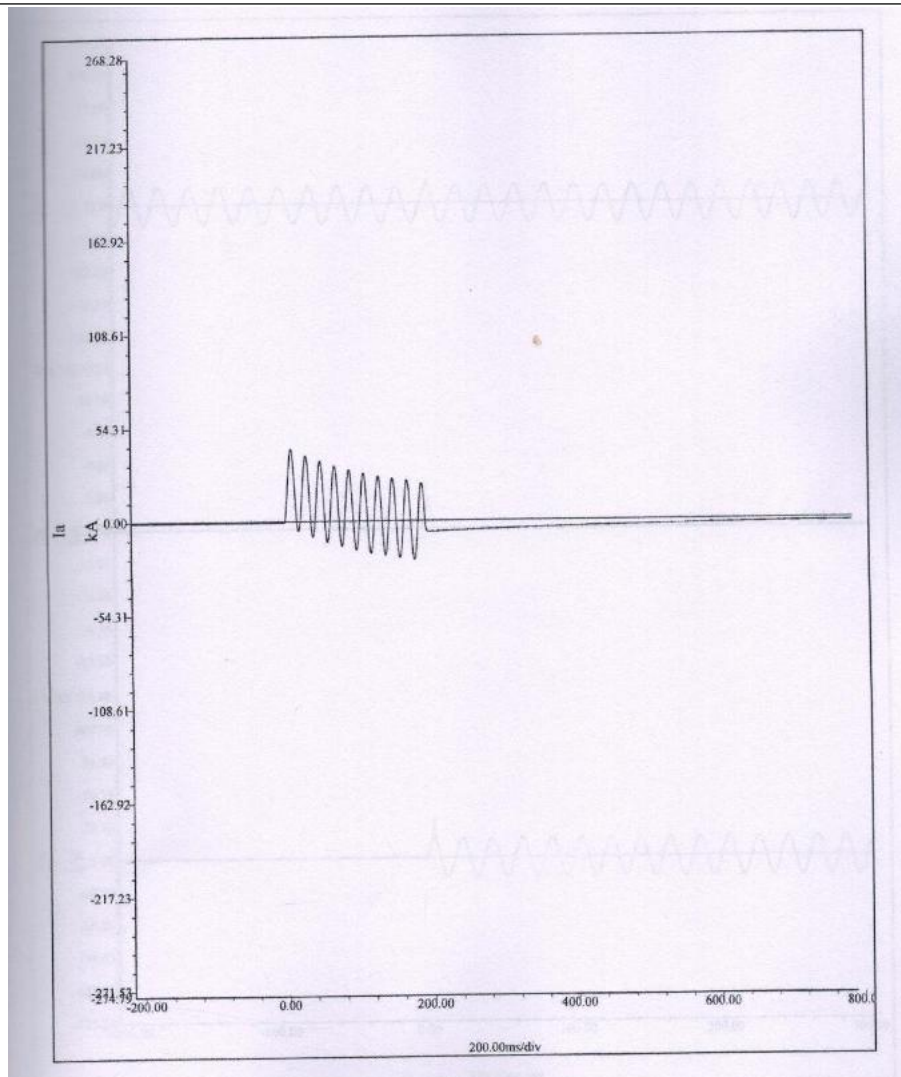
Pre - arc time - Current characteristic test		Report No. XG18012281
Oscillogram No.: XG18012281-ST02		
Model specification: ERW12-12/200-16 Product Name: drop out fuse test No.: #07		
Expected wave parameter:	U=410.00V	I=4.7KA
Arc time=13.7ms Fuse time=173.0ms Joule integration before arc=0.00A2S		
Joule integration before arc=0.00 A2S		
		

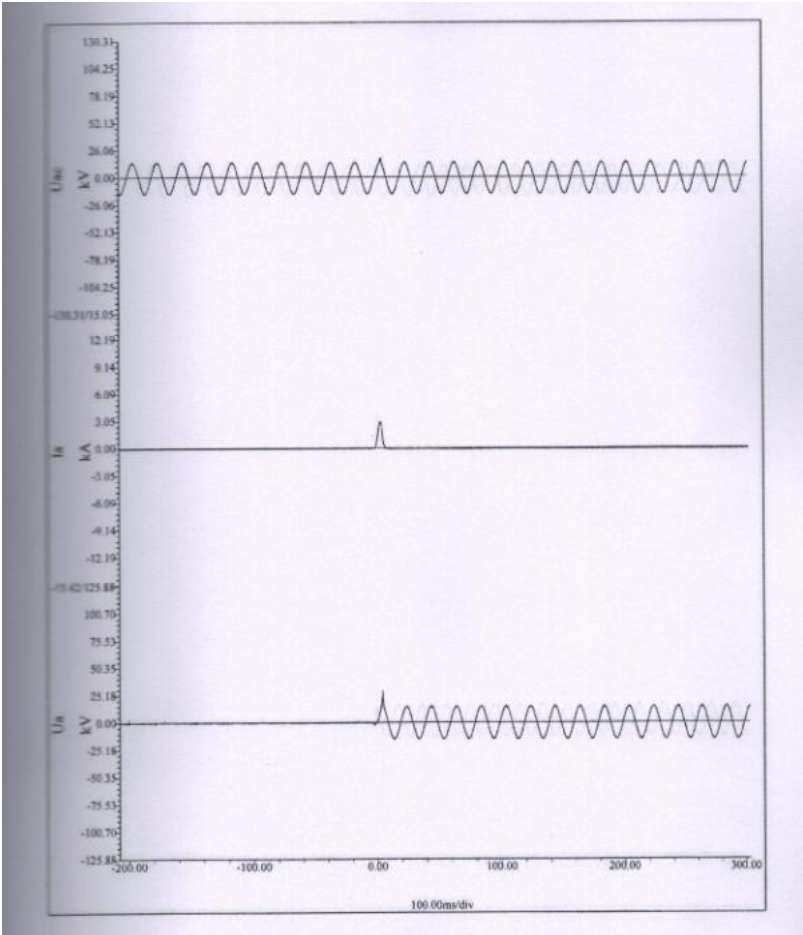


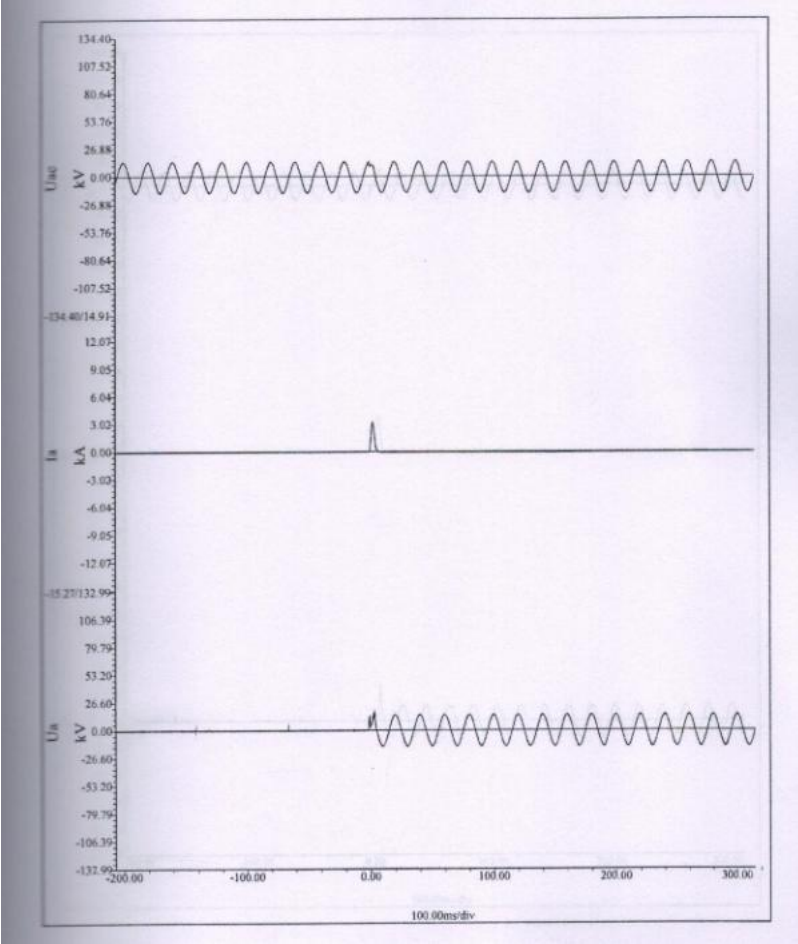
**Actuation time - Current characteristic test
oscillogram**

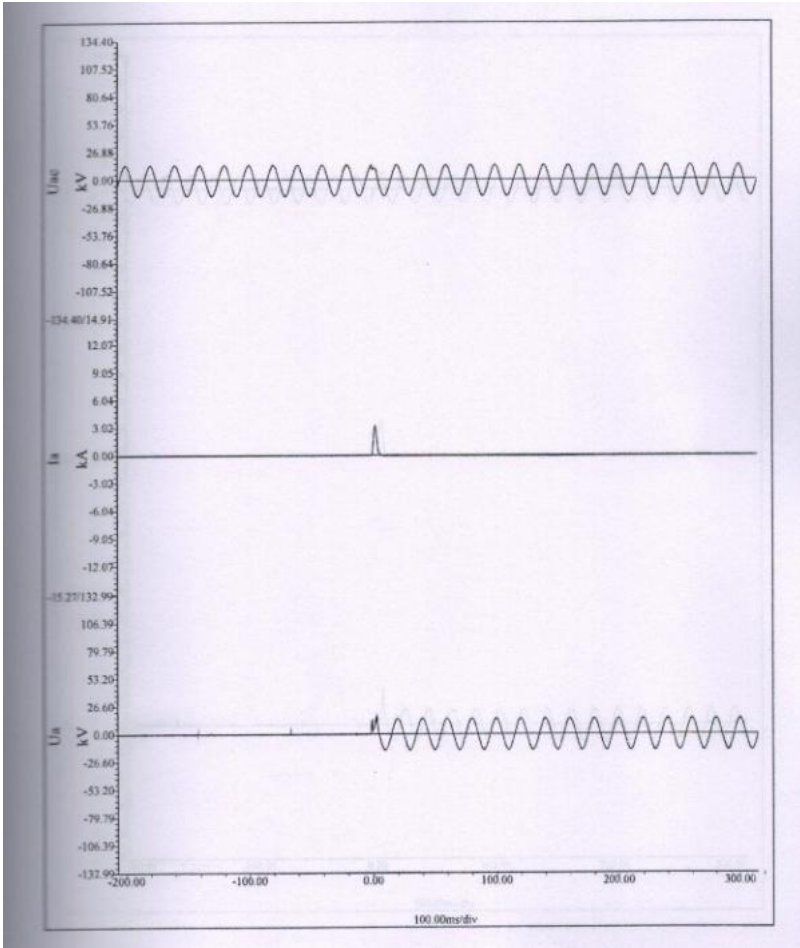
**Oscillogram
No. :XG18012281-T02**

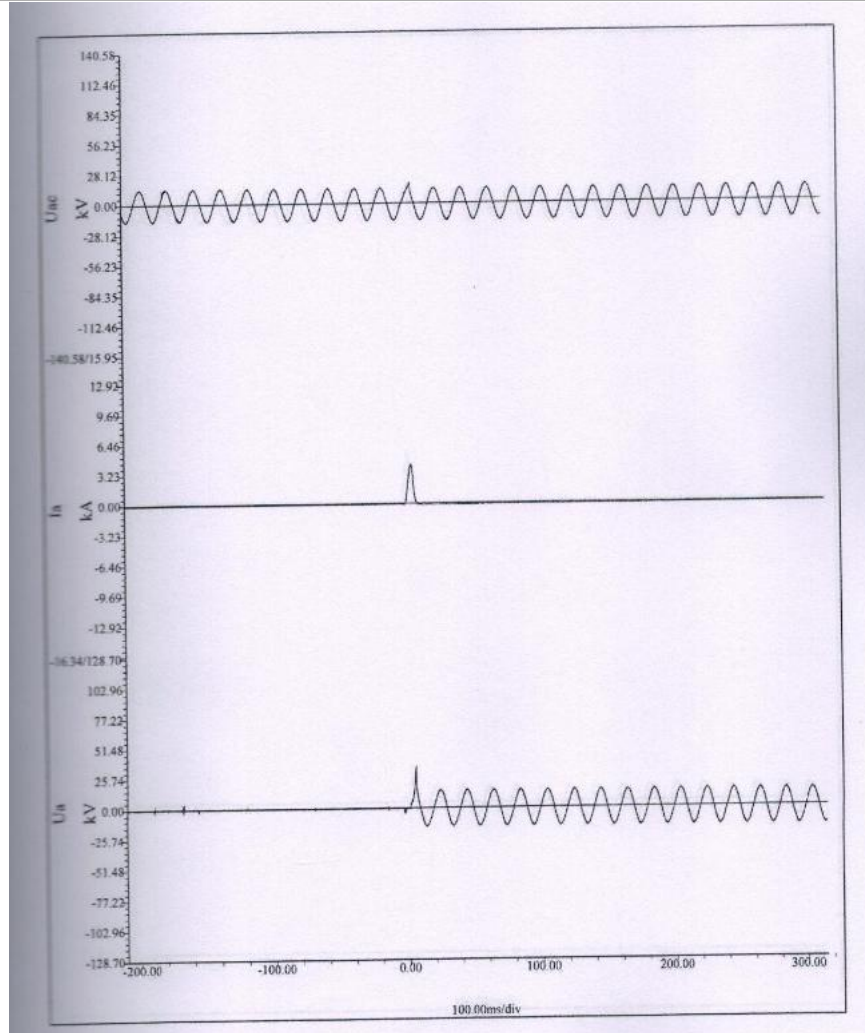


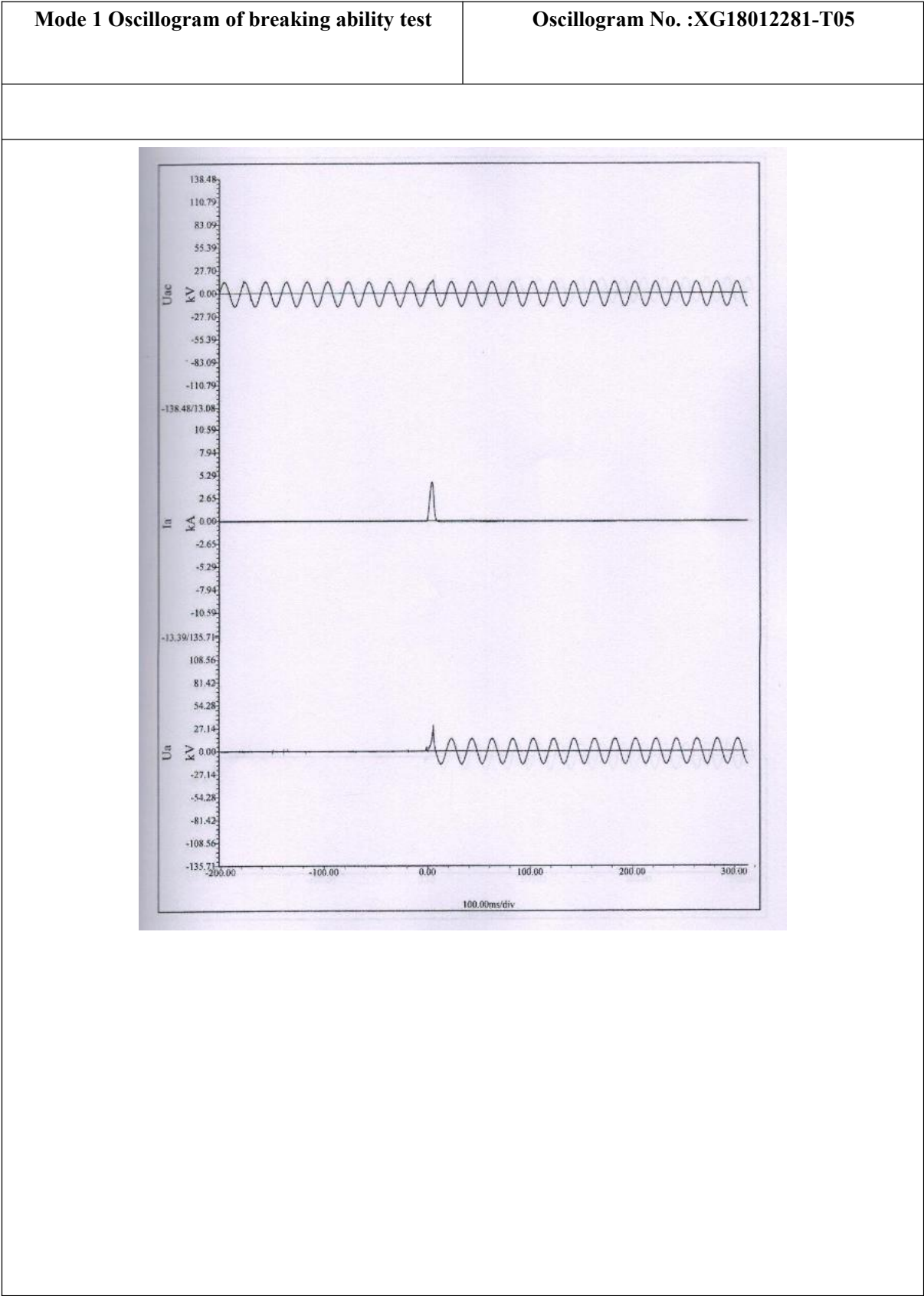
**Mode 1 Expected Wave of Breaking Capacity
Test****Oscillogram No. :XG18012281-Y01**

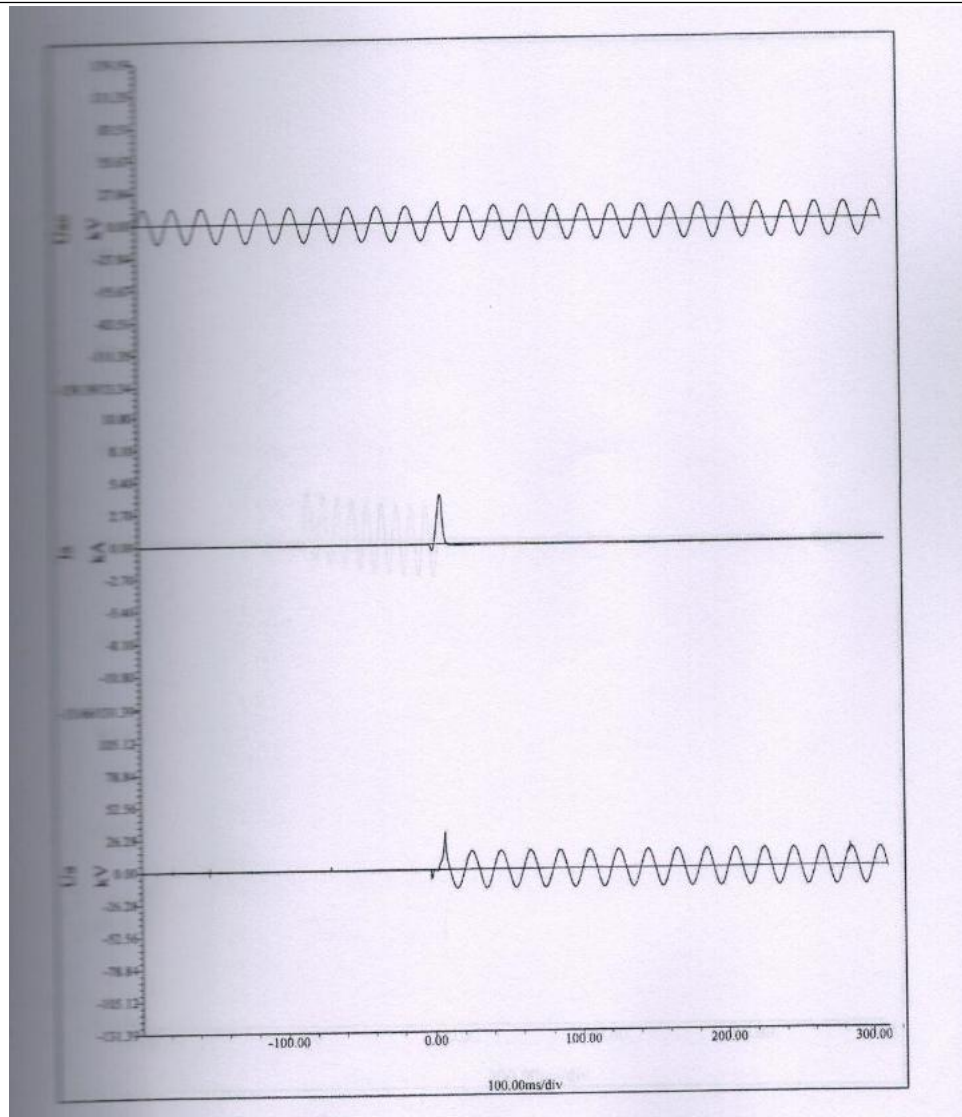
Mode 1 Oscillogram of breaking ability test	Oscillogram No. :XG18012281-T01
	

Mode 1 Oscillogram of breaking ability test	Oscillogram No. :XG18012281-T02
	

Mode 1 Oscillogram of breaking ability test	Oscillogram No. :XG18012281-T03
	

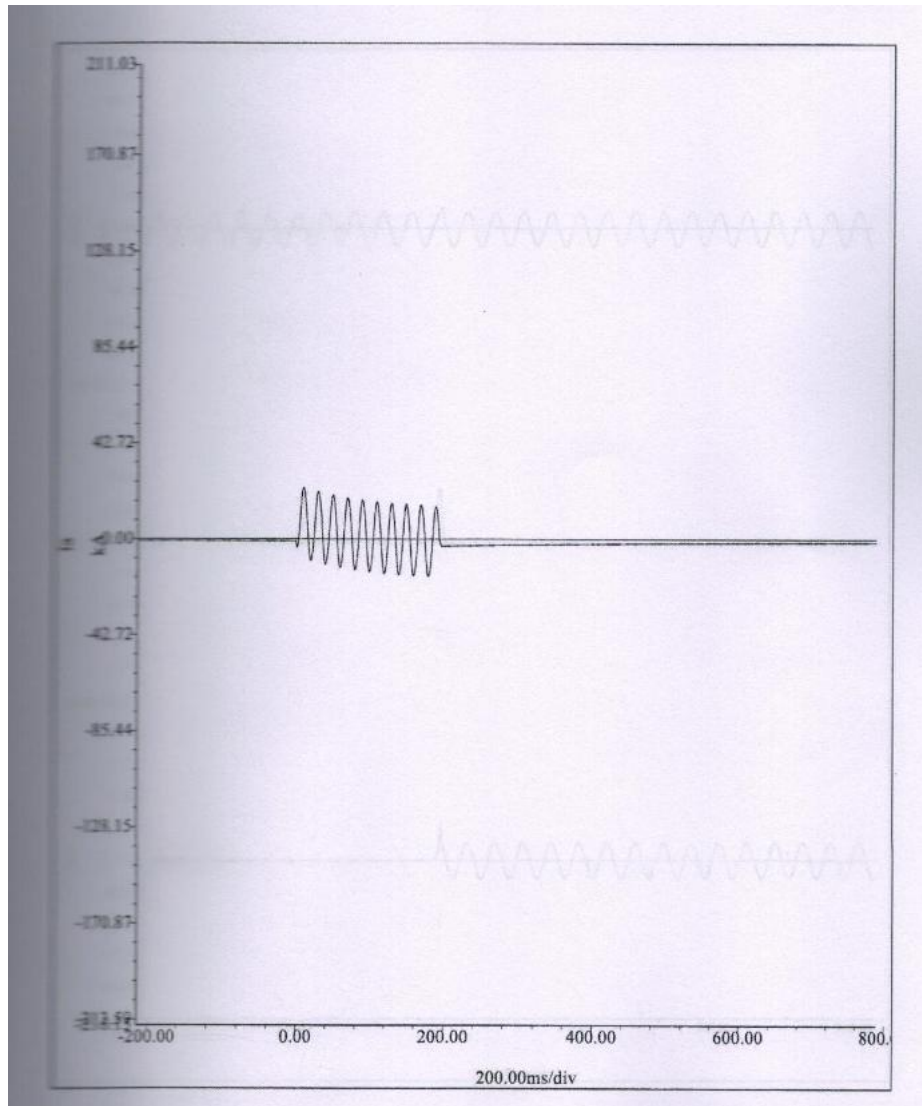
Mode 1 Oscillogram of breaking ability test**Oscillogram No. :XG18012281-T04**



Mode 1 Oscillogram of breaking ability test**Oscillogram No. :XG18012281-T06**

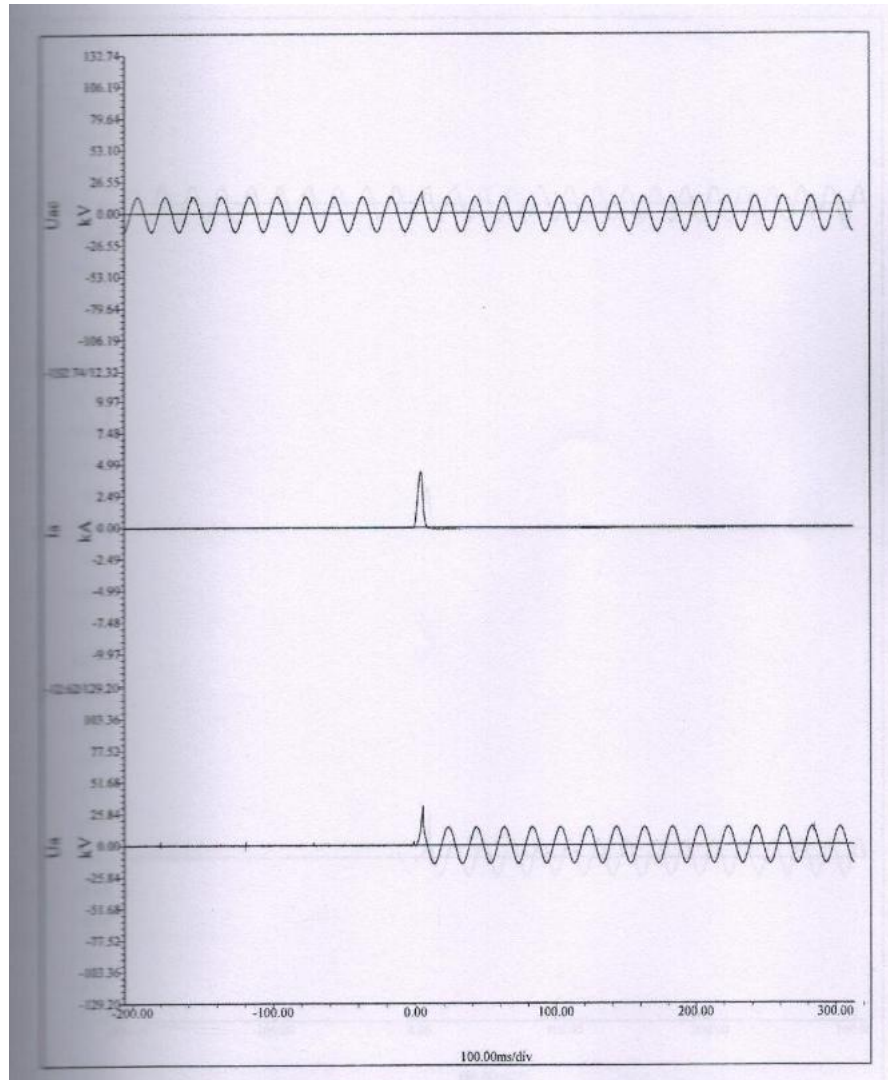
**Mode 2 Expected Wave of Breaking Capacity
Test**

Oscillogram No. :XG18012281-2-Y01



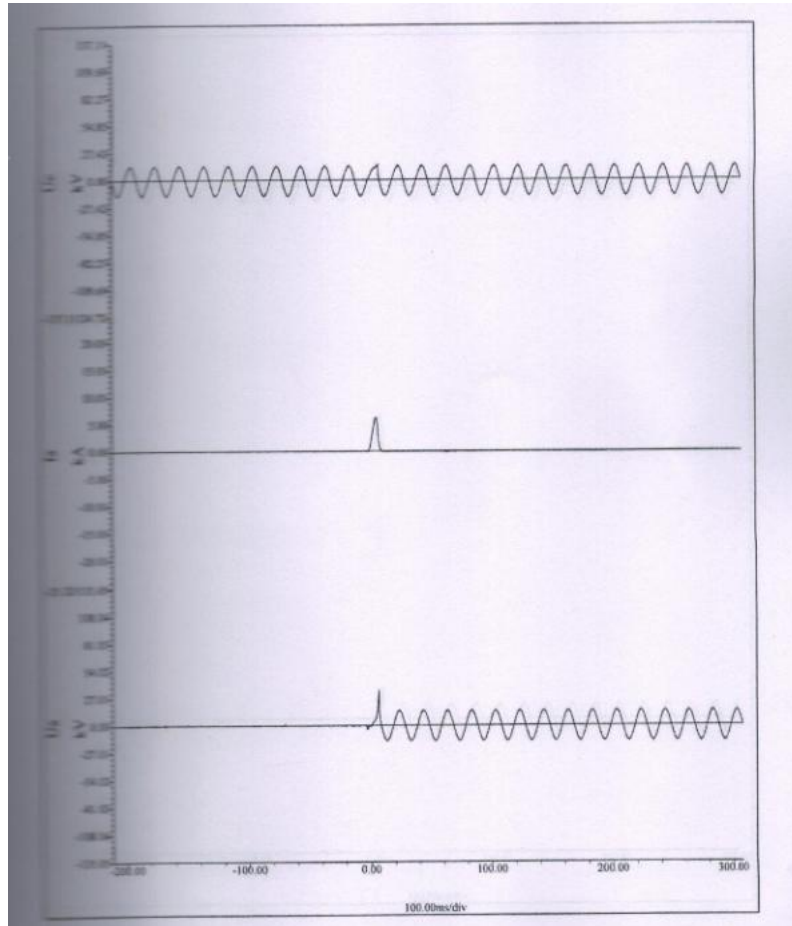
Mode 2 oscillogram of breaking ability test

Oscillogram No. :XG18012281-2-T01



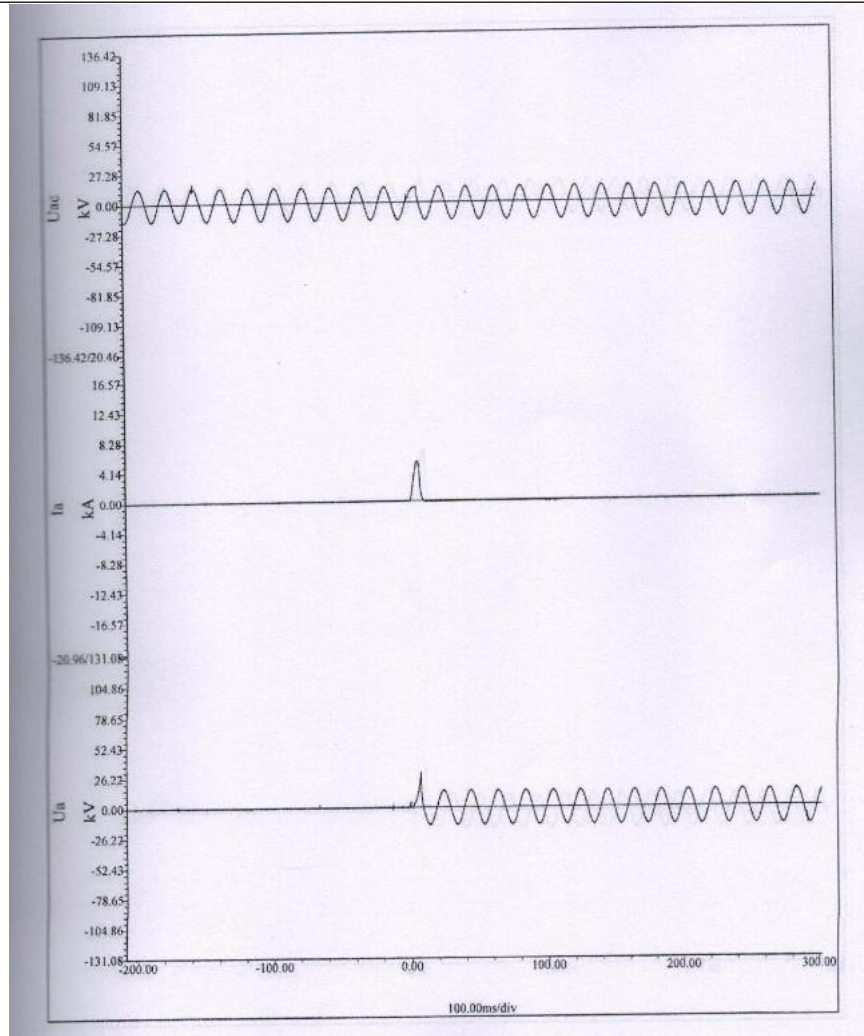
**Mode 2 Oscillogram of breaking ability
test**

Oscillogram No. :XG18012281-2-T02



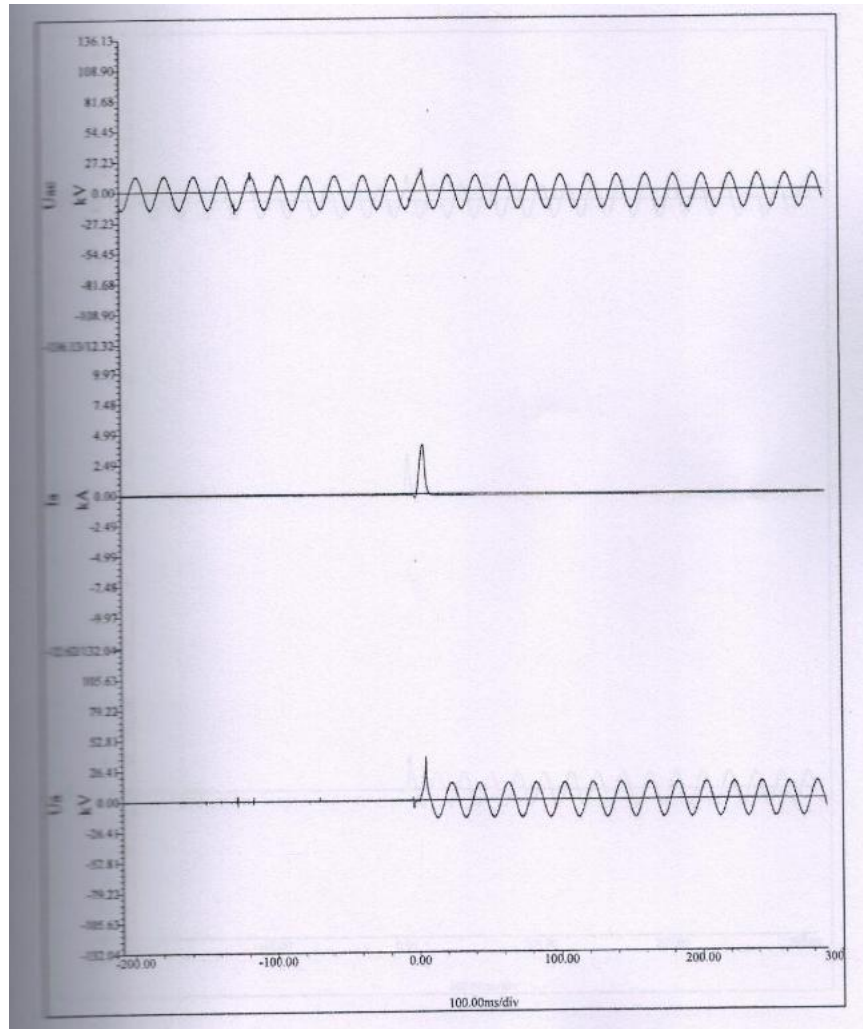
Mode 2 Oscillogram of breaking ability test

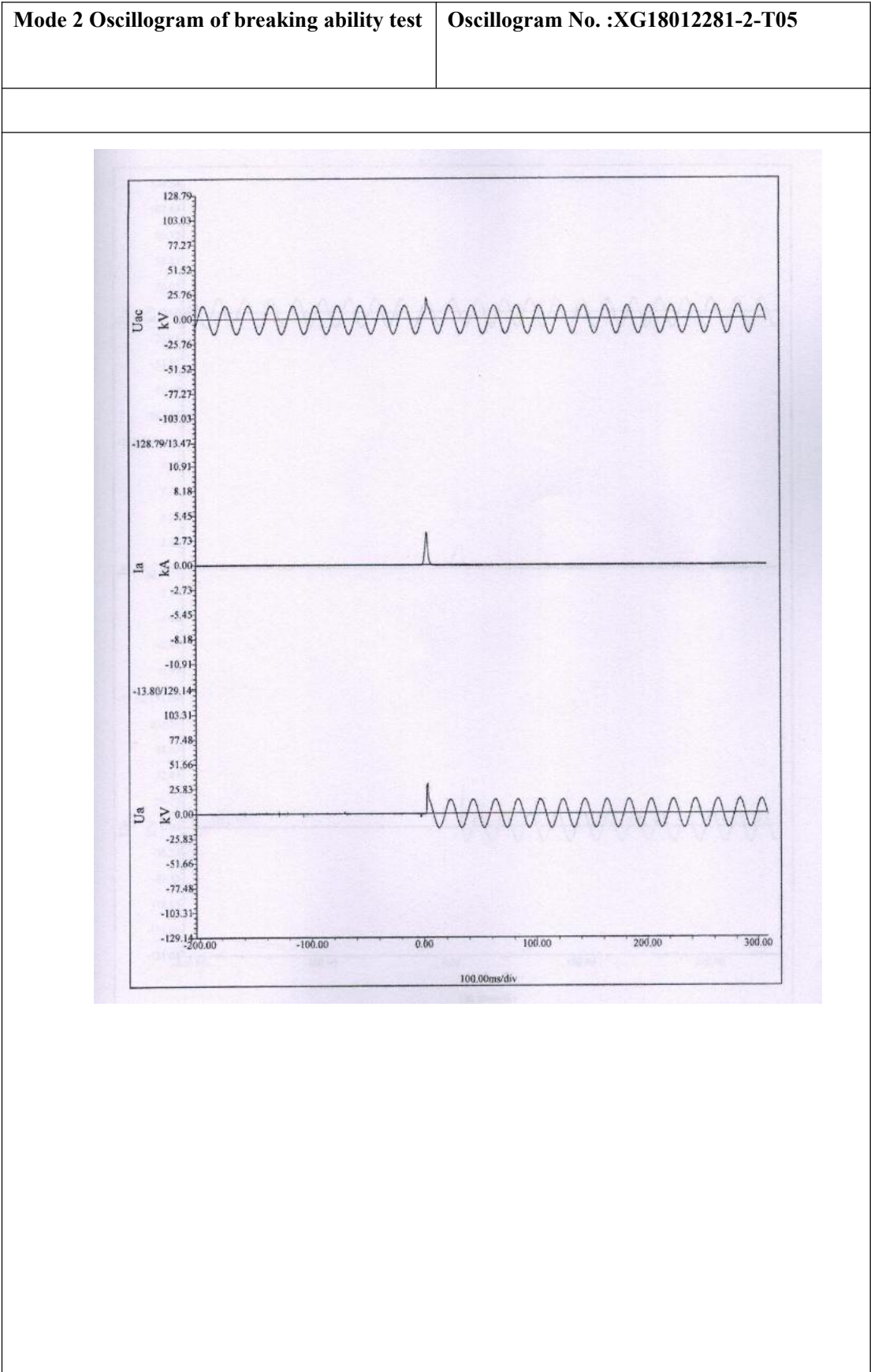
Oscillogram No. :XG18012281-2-T03

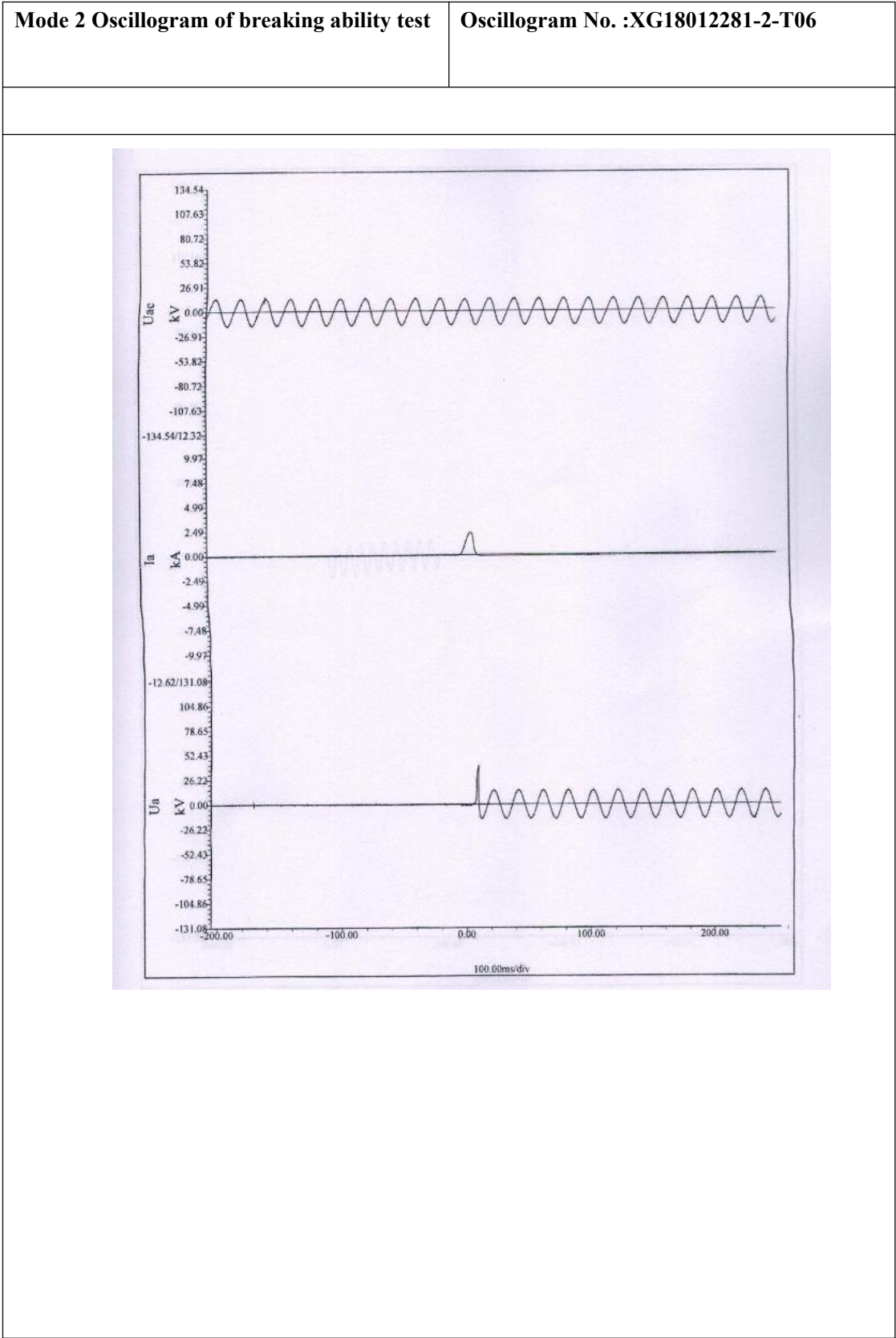


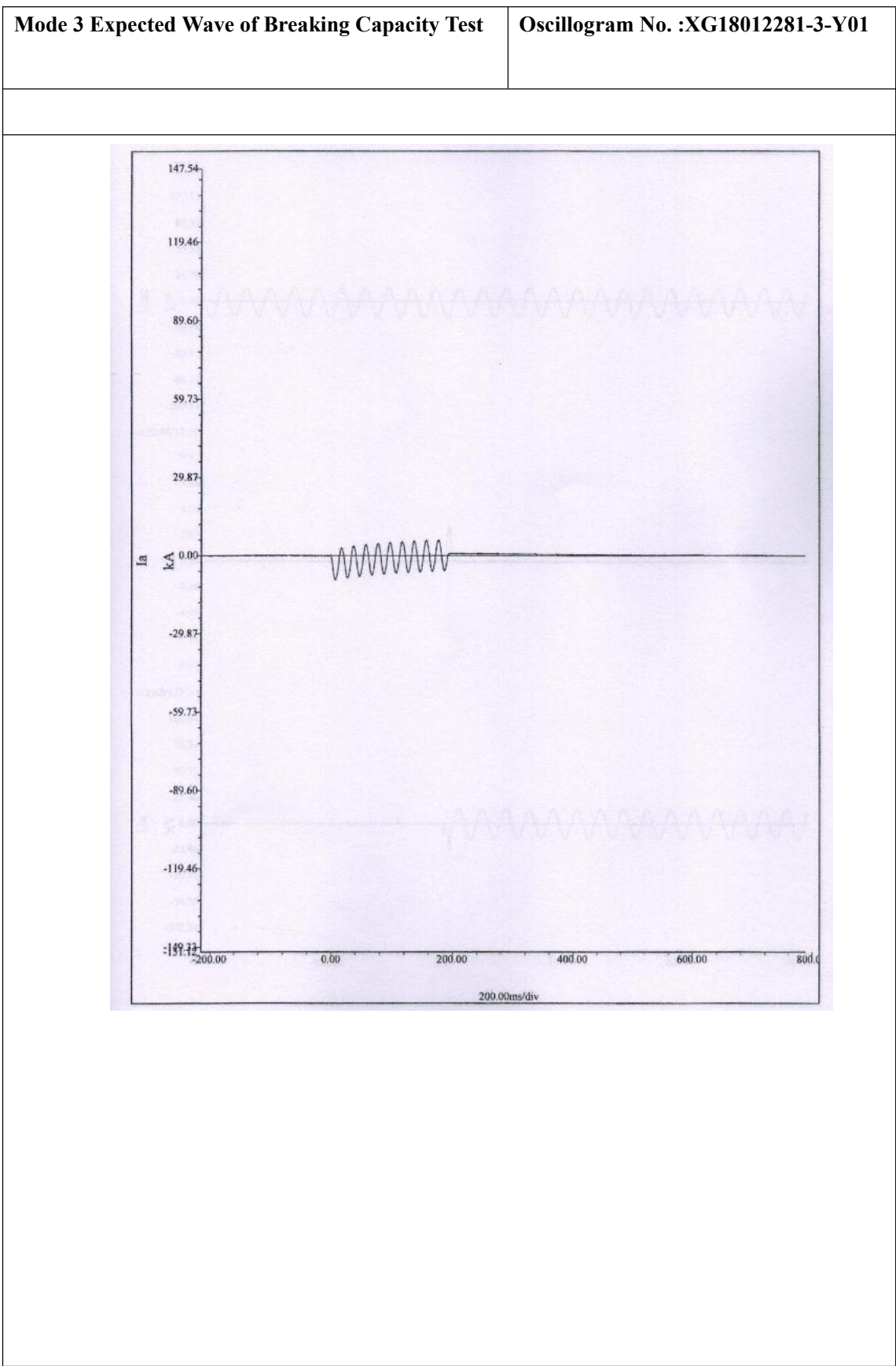
Mode 2 Oscillogram of breaking ability test

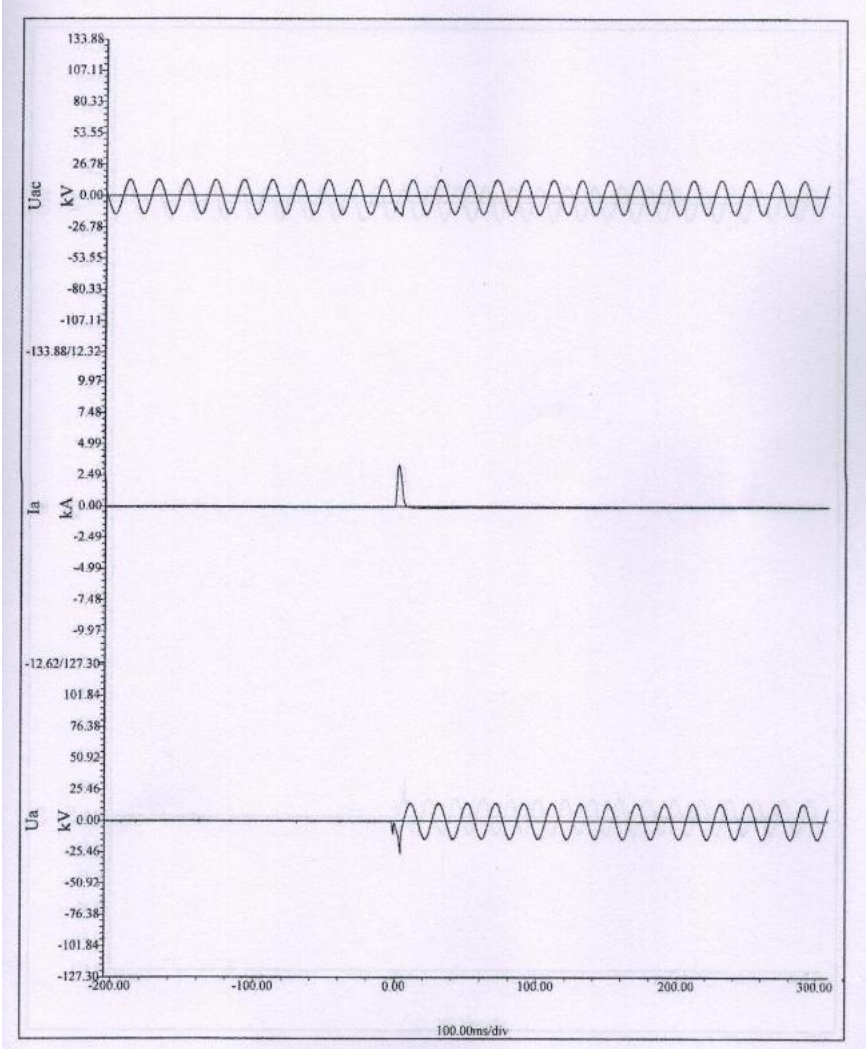
Oscillogram No. :XG18012281-2-T04



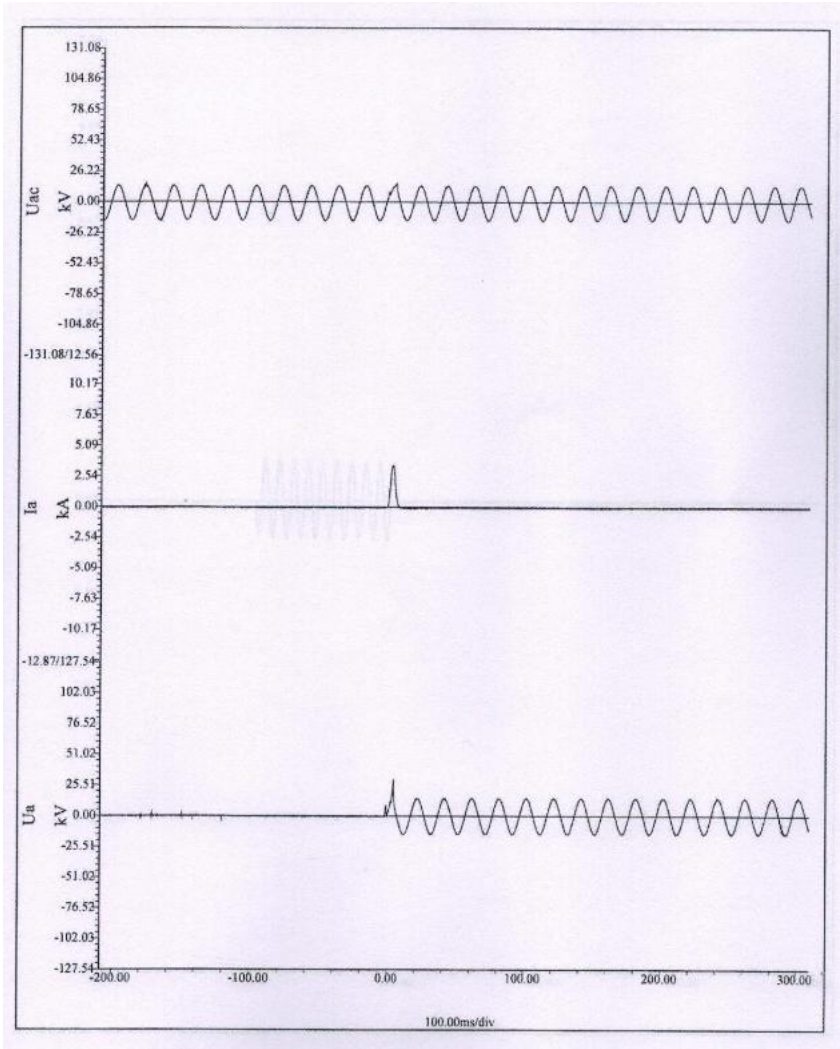


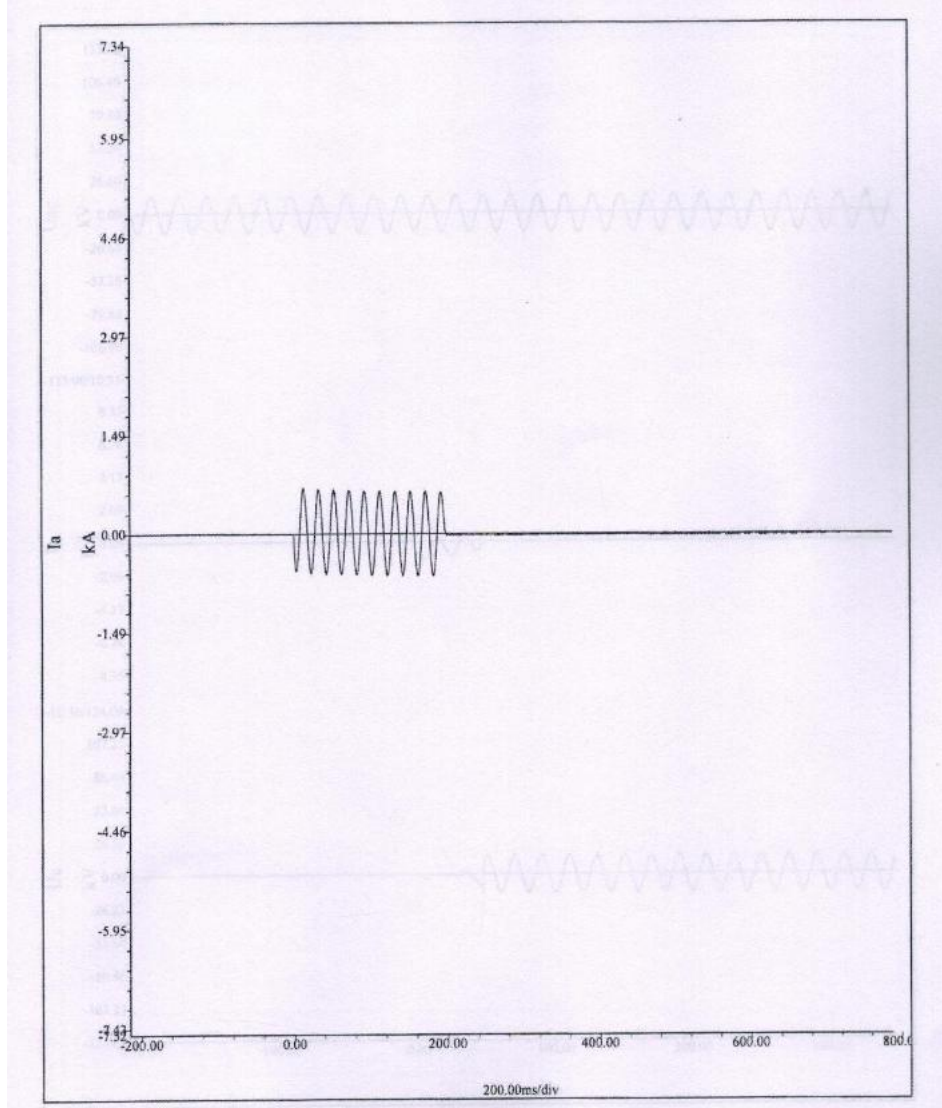


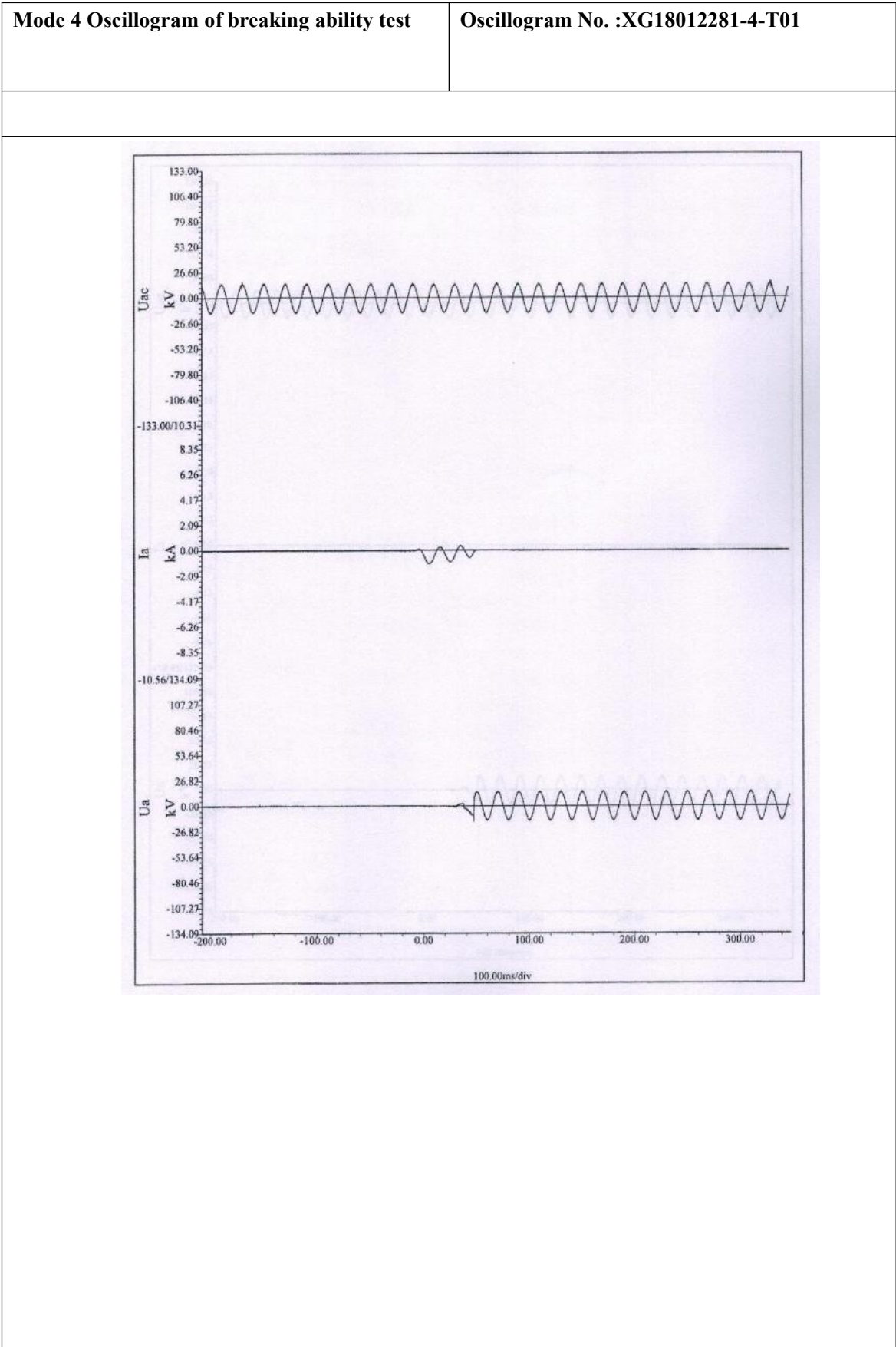


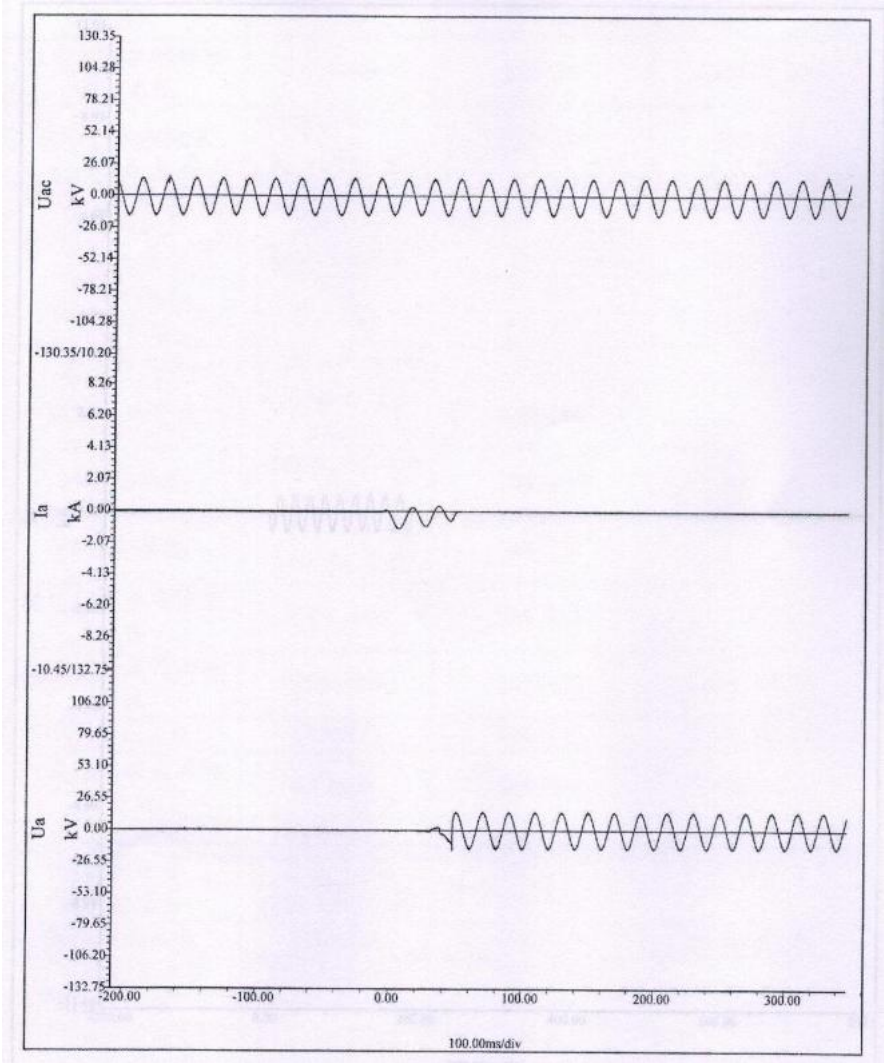
Mode 3 Oscillogram of breaking ability test	Oscillogram No. :XG18012281-3-T01
	

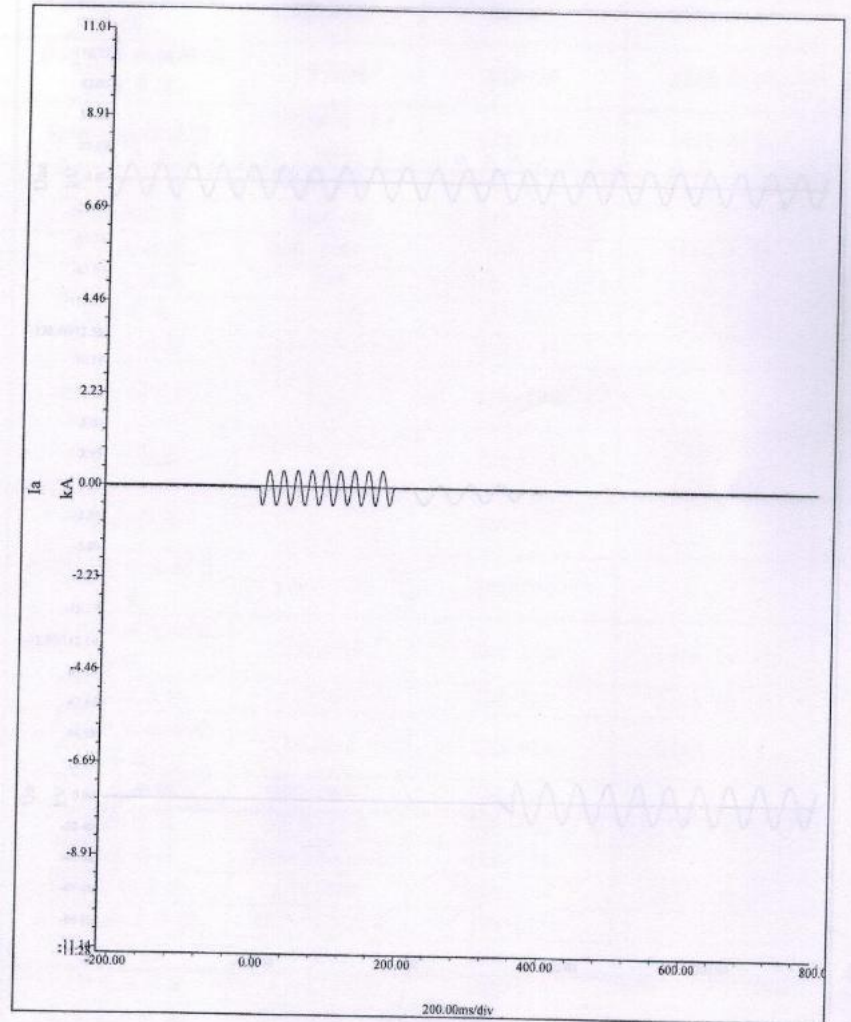
Mode 3 Oscillogram of breaking ability test	Oscillogram No. :XG18012281-3-T02
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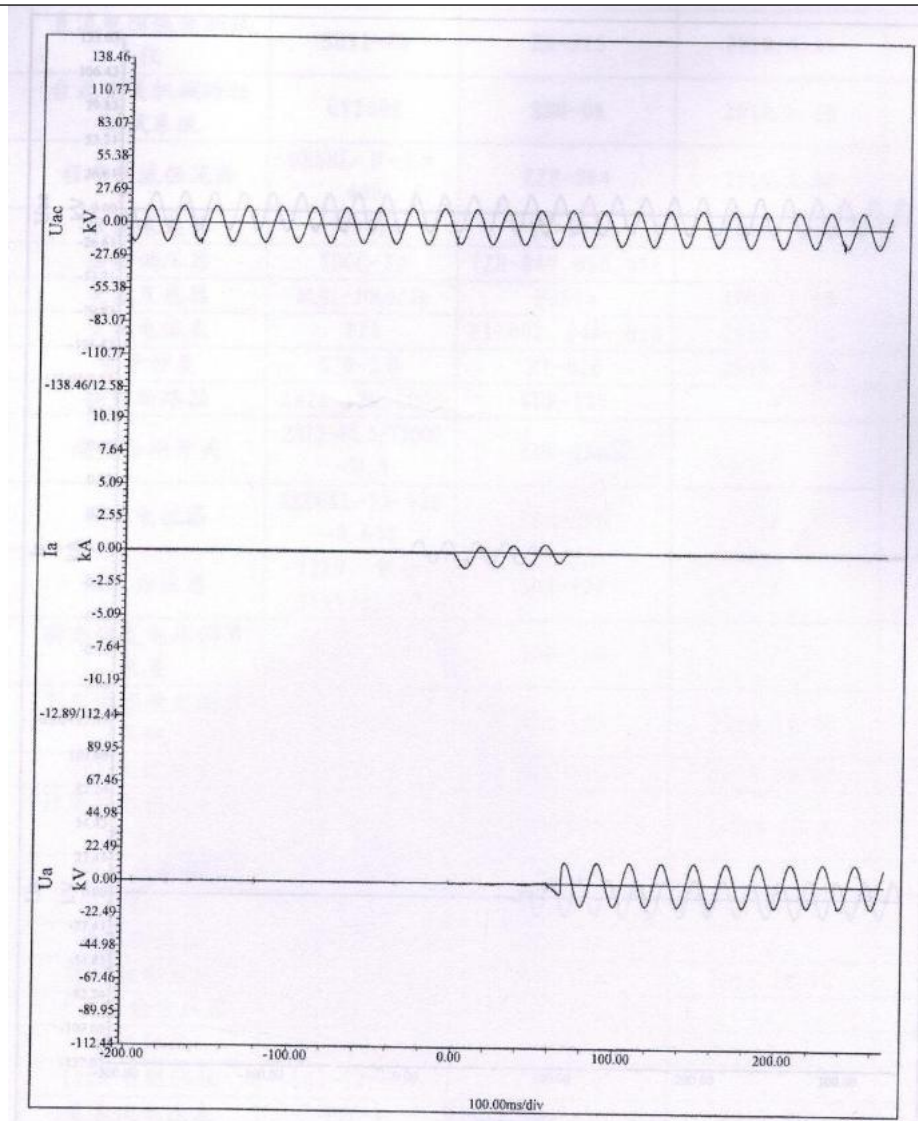


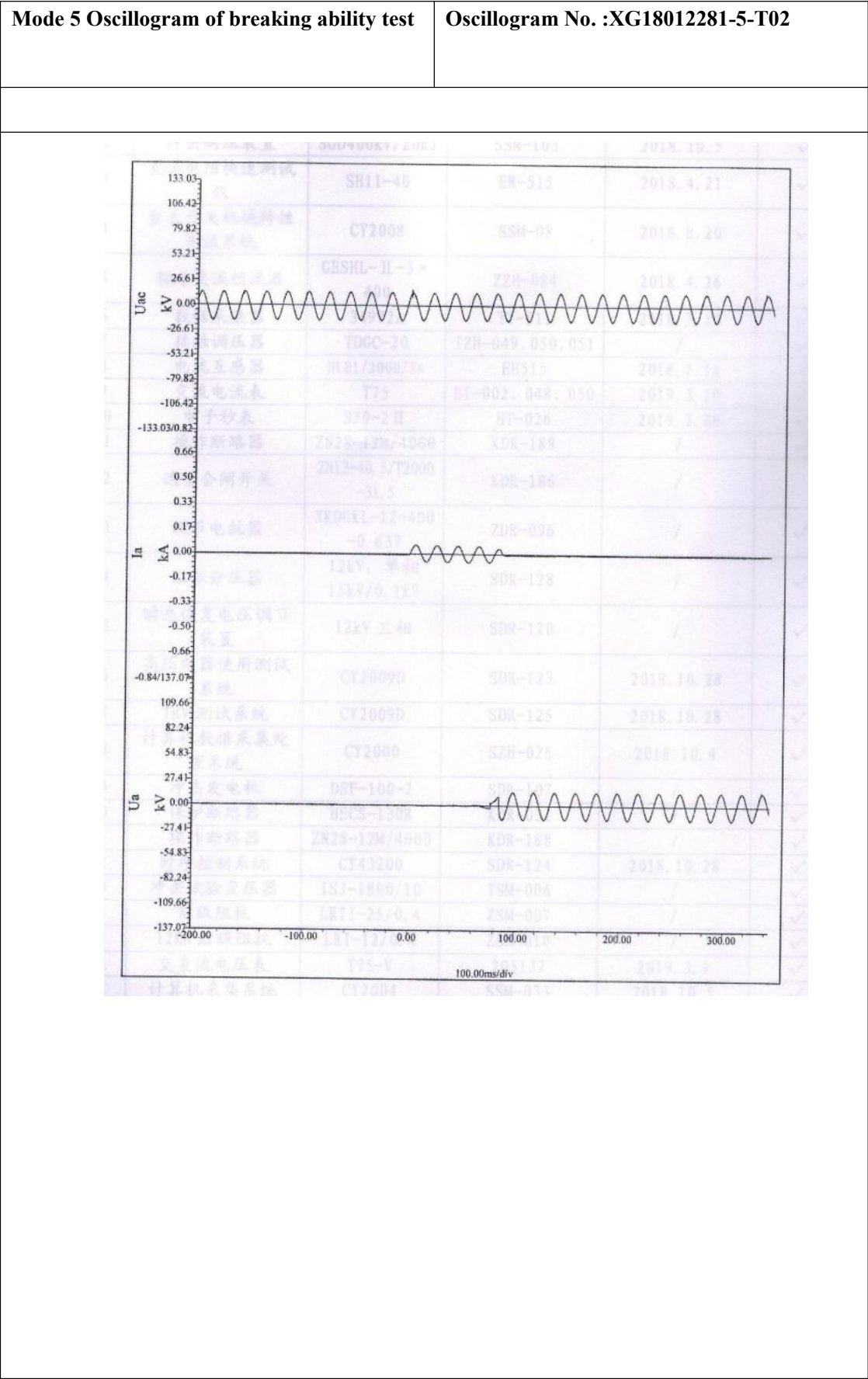
Mode 4 Expected Wave of Breaking Capacity Test**Oscillogram No. :XG18012281-4-Y01**



Mode 4 Oscillogram of breaking ability test	Oscillogram No. :XG18012281-4-T02
	

Mode 5 Expected Wave of Breaking Capacity Test	Oscillogram No. :XG18012281-5-Y01
	

Mode 5 Oscillogram of breaking ability test**Oscillogram No. :XG18012281-5-T01**



List of test instruments and equipment

Serial Number	Name	Model	Numbering	Validity period of calibration	This time uses (✓)
1	frequency voltage withstand test device	YDTW-100KVA /150KV	SSM-099	2018.10.5	✓
2	Impact pressure device	SGD400KV/20KJ	SSM-103	2018.10.5	✓
3	Direct Current Resistance Rapid Tester	SH11-40	ER-515	2018.4.21	✓
4	Bench switch mechanical characteristic testing system	CY2008	SSM-08	2018.8.20	✓
5	Program AC Constant Current Source	GESHL- II -3X400	ZZH-084	2018.4.26	✓
6	data acquisition unit	34972A	TT-511	2018.7.19	✓
7	varitran	TDGC-20	TZH-049、050、 051	/	✓
8	Current transformer	HLB1/2000/5A	EH-515	2018.7.18	✓
9	AC ammeter	T75	EI-002、048/050	2019.3.10	✓
10	cronometro	SJ9-2 II	HT-026	2019.3.20	✓
11	Operating circuit breaker	ZN28-12M/4000	KDR-188	/	✓
12	Type selection closing switch	ZN12-40.5/T200 0-31.5	KDR-186	/	✓
13	Regulating reactor	XKDGKL-12-40 0-0.637	ZDR-096	/	✓
14	Resistor-capacitor voltage divider	12KV, single phase 15kv/0.1kv	SDR-128	/	✓
15	Transient recovery voltage regulating device	12kv Three phase	SDR-120	/	✓

16	Test System for High Voltage Electrical Appliances	CY2009D	SDR-123	2018.10.28	✓
17	TRV Test System	CY2009D	SDR-125	2018.10.28	✓
18	Computer Data Acquisition and Processing System	CY2000	SZH-026	2018.10.4	✓
19	Impact generator	DSF-100-2	SDR-107	/	✓
20	Protection circuit breaker	HECS-130R	KDR-032	/	✓
21	Operating circuit breaker	ZN28-12M/4000	KDR-188	/	✓
22	Timing control system	CY43200	SDR-124	2018.10.28	✓
23	Impact test transformer	ISJ-1800/10	TSM-006	/	✓
24	Front impedance	LR II -25/0.4	ZSM-007	/	✓
25	12kA Post - Stage Impedance	LR I -12/0.4	ZSM-010	/	✓
26	AC / DC voltmeter	T75-V	205137	2019.3.9	✓
27	Computer acquisition system	CY2004	SSM-033	2018.10.5	✓
28	Counterweight sandbag	1100KG	/	/	✓
29	Digital stopwatch	415	HT-001	2019.3.20	✓
	The following blanks				