

TEST RECORD

NO. 03160-15-0534

THS Industria e Comercio Ltda.
Rua Ernesto Biester, 59
CEP 04777-120 - Sao Paulo
BRAZIL

CLIENT

THS Industria e Comercio Ltda.

MANUFACTURER

Low-voltage fuses

TEST OBJECT

800A - KTU-5216/1
1200A - KTU-5216/2
1875A - KTU-5216/3
2825A - KTU-5216/4
3000A - KTU-5216/5

TYPE

Test samples

SERIAL NO.

Rated voltage	600 V AC	RATED CHARACTERISTICS GIVEN BY THE CLIENT
Rated current	800/1200/1875/2825/3000 A	
Rated frequency	50 Hz	
Rated breaking high current	200 kA	
Rated breaking low current	$I_n \times 300\%$	

Following UL 248-13

NORMATIVE DOCUMENT

- Verification of operation at rated voltage – High current
- Verification of operation at rated voltage – Maximum energy
- Verification of operation at rated voltage – Low current

TEST PERFORMED


06 to 10 August 2015

DATE OF TEST

See 4.7

TEST RESULT

This test document comprises 75 sheets.



CHRISTIAN JURASCHEK
Test engineer in charge

Berlin, 20 August 2015

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The test results relate only to the object tested

Independent test laboratory accredited by the German Accreditation Body DAkkS, Deutsche Akkreditierungsstelle GmbH, in the fields of high-voltage switchgear and their components, cables and conductors as well as industrial low-voltage apparatus.

IPH Institut „Prüffeld für elektrische Hochleistungstechnik“ GmbH (IPH, Berlin) is a subsidiary of CESI S.p.A, Milan.

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1. Present at the test

Mr.	Christian Juraschek	IPH test engineer in charge
Mr.	Rainer Borchert	IPH test engineer
Mr.	Christian Kruscha	IPH test engineer
Mr.	Winfried Moritz	IPH test engineer

2. Test performed

- Verification of operation at rated voltage – High current
- Verification of operation at rated voltage – Maximum energy
- Verification of operation at rated voltage – Low current V

3. Identity of the test object

3.1 Technical specifications and characteristics

The technical specifications and characteristics of the test object are defined by the following parameters and have been specified by the client.

Test object:	Low-voltage fuses		
Type:	800A - KTU-5216/1		
	1200A - KTU-5216/2		
	1875A - KTU-5216/3		
	2825A - KTU-5216/4		
	3000A - KTU-5216/5		
Manufacturer:	THS Industria e Comercio Ltda.		
Serial No.:	Test samples		
Year of manufacture:	2015		
Data:	Rated voltage		600 V AC
	Rated current	800/1200/1875/2825/3000	A
	Rated frequency		50 Hz
	Rated breaking high current		200 kA
	Rated breaking low current		$I_n \times 300\%$ kA

3.2 Identity documents

The manufacturer confirms that the test object has been manufactured in compliance with the drawings given in this document. IPH did not verify this compliance in detail.

The identity of the test object is fixed by the following drawings and data submitted by the client:

Name of drawing	Drawing No.	Date of drawing	Author	Notes
FUSE FOR NETWORK PROTECTOR HRC-L FAST - ACTING, 2500, 2825, 3000A, 600V, 200KA	NP-01	03.2015	THS Industria e Comercio Ltda.	Sheet 73
FUSE FOR NETWORK PROTECTOR HRC-L FAST - ACTING, 800, 1200, 1600, 1825, 2000A, 600V, 200KA	NP-02	03.2015	THS Industria e Comercio Ltda.	Sheet 74
CARTIDGE FUSE CLASS L	5216	25.02.05	THS Industria e Comercio Ltda.	Sheet 75

Test objects received by IPH on: 24 July 2015

4. Verification of breaking capacity

4.1 Test laboratory

Low-voltage test laboratory, test room 1

4.2 Normative document

Following UL 248-13

4.3 Required test parameters

Test duty	High current	Maximum energy	Low current
Test No.	1	2	5a
Power-frequency recovery voltage	600 V	600 V	600 V
Test frequency	50 Hz	50 Hz	50 Hz
Prospective current	200 kA	-	-
Peak current at interruption / Peak of prospective r.m.s. current	Not applicable	0.7 ...1.0	Not applicable
Closing angle	Not specified	70 ... 90° el.	Random
Initiation of arcing after voltage zero	60 ... 90° el.	Not specified	Not applicable
Power factor $\cos \varphi$	0.2 max.	0.2 max.	0.8 max.
Duration of recovery voltage	30 s	30 s	60 s

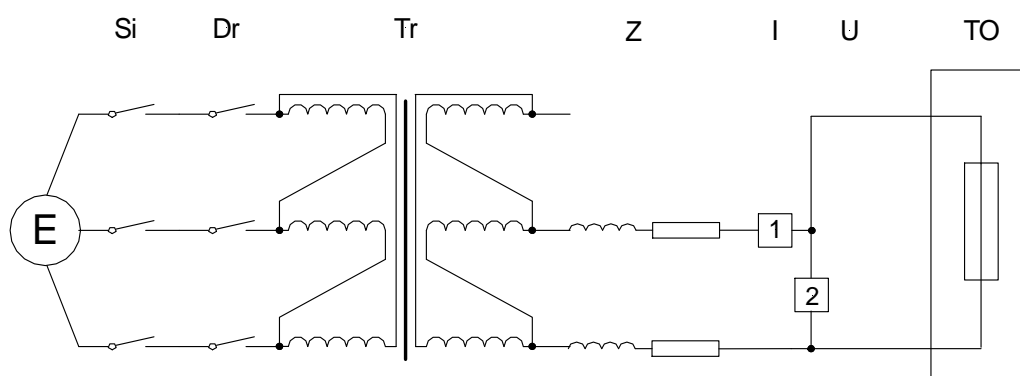
4.4 Test arrangement

Following UL 248-13

4.5 Test and measuring circuits

Technical data of test circuits

Test requirement	Verification of AC breaking capacity 5a
Test No.	2155731 to 2155750
Test frequency	50 Hz
Current measurement	Shunt
Voltage measurement	RC divider



E Power supply (grid)
 Si Master breaker
 Dr Making switch
 Z Test current impedance
 Tr Short-circuit transformer

TO Test object
 I Current measurement
 U Voltage measurement
 1, 2 Measuring points

Diagram 1: Test circuit diagram

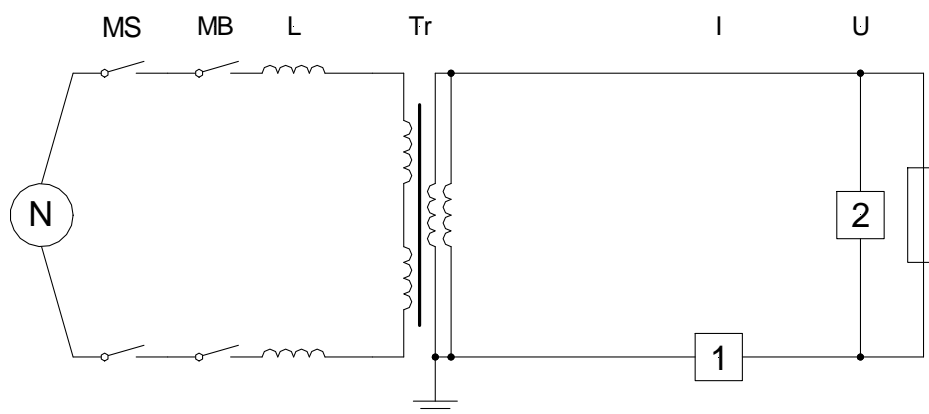
Technical data of measuring circuits

Measuring point	Measured quantity	Measuring sensor/device
1	Short-circuit current	Shunt
2	Voltage	RC divider

4.6 Test and measuring circuits

Technical data of test circuits

Test requirement		Verification of breaking capacity
Test No.	Test duty 1	115 4050 to 115 4064
Test No.	Test duty 2	115 4066 to 114 4085
Number of phases	(Test circuit)	2
Number of poles/phases	(Test object)	1
Test frequency	Hz	50
Power factor $\cos \varphi$		< 0.2
Earthing conditions	Grid	Not earthed
	Short-circuit transformer	Earthed
	Short-circuit point	--



N	Power supply (grid)	Tr	Short-circuit transformer
MS	Master breaker	I	Current measurement
MB	Making switch	U	Voltage measurement
L	Current limiting reactor	1, 2	Measuring points

Figure 2: Test circuits

Technical data of measuring circuits

Measuring point	Symbol	Measured quantity	Measuring sensor/device
1	i	Current	Shunt
2	u	Voltage	RC divider

Recording instrument: BE 256 transient recorder system

4.7 Test results

Test requirement: Test duty 1
 Fuse type: 1200 A KTU-5216/2
 Condition of test object before test: New

Test No.		1154050	1154051	1154052
Test sample No.		1	2	3
Rated current of fuse-link	A	1200	1200	1200
Test voltage	V	605	605	605
Prospective peak current	kA	464	464	464
Prospective breaking current I_p	kA	200	200	200
Power factor $\cos \varphi$		0.14	0.14	0.14
Making angle	°el.	57.3	55.6	55.6
Initiation of arcing after voltage zero	°el.	75.1	55.5	72.4
Melting current i_s	kA	63.9	63.8	64.3
Cut-off current	kA	70.7	71.8	70.6
Melting time	ms	0.92	0.92	0.92
Arcing time	ms	2.89	2.96	2.95
Operating time	ms	3.82	3.77	3.87
Melting integral	10^6 A ² s	1.29	1.29	1.29
Arcing integral	10^6 A ² s	5.64	5.54	5.65
Operating integral	10^6 A ² s	7.33	7.24	7.24
Arcing energy	10^3 VAs	104	103	103
Peak switching voltage	kV	1.24	1.27	1.27
Recovery voltage	V	605	607	608
Note		-	-	-
Evaluation		OK	OK	OK

Notes:

OK - The fuse is capable of correctly breaking the prospective current.

Test results (continued)

Test requirement: Test duty 1
 Fuse type: 1875 A KTU-5216/3
 Condition of test object before test: New

Test No.		1154053	1154054	1154055
Test sample No.		4	5	6
Rated current of fuse-link	A	1875	1875	1875
Test voltage	V	605	605	605
Prospective peak current	kA	464	464	464
Prospective breaking current I_p	kA	200	200	200
Power factor $\cos \varphi$		0.14	0.14	0.14
Making angle	°el.	54.4	53.9	56.3
Initiation of arcing after voltage zero	°el.	78.7	78.6	81.2
Melting current i_s	kA	91.0	92.4	94.8
Cut-off current	kA	106	101	102
Melting time	ms	1.32	1.34	1.36
Arcing time	ms	2.93	2.95	2.84
Operating time	ms	4.25	4.29	4.19
Melting integral	10^6 A ² s	3.65	3.81	4.13
Arcing integral	10^6 A ² s	13.1	13.5	12.7
Operating integral	10^6 A ² s	18.3	19.0	18.4
Arcing energy	10^3 VAs	171	175	170
Peak switching voltage	kV	1.26	1.24	1.26
Recovery voltage	V	609	609	609
Note		-	-	-
Evaluation		OK	OK	OK

Notes:

OK - The fuse is capable of correctly breaking the prospective current

Test results (continued)

Test requirement: Test duty 1
 Fuse type: 800 A KTU-5216/1
 Condition of test object before test: New

Test No.		1154056	1154057	1154058
Test sample No.		7	8	9
Rated current of fuse-link	A	800	800	800
Test voltage	V	605	605	605
Prospective peak current	kA	464	464	464
Prospective breaking current I_p	kA	200	200	200
Power factor $\cos \varphi$		0.14	0.14	0.14
Making angle	°el.	55.7	58.7	55.0
Initiation of arcing after voltage zero	°el.	68.8	71.6	68.4
Melting current i_s	kA	50.2	49.4	51.1
Cut-off current	kA	57.0	56.0	56.6
Melting time	ms	0.71	0.72	0.73
Arcing time	ms	3.08	3.11	3.11
Operating time	ms	3.8	3.82	3.84
Melting integral	10^6 A ² s	0.61	0.59	0.65
Arcing integral	10^6 A ² s	3.4	3.1	3.3
Operating integral	10^6 A ² s	4.04	3.77	4.04
Arcing energy	10^3 kVAs	75.0	71.6	75.1
Peak switching voltage	kV	1.25	1.25	1.26
Recovery voltage	V	609	609	609
Note		-	-	-
Evaluation		OK	OK	OK

Notes:

OK - The fuse is capable of correctly breaking the prospective current.

Test results (continued)

Test requirement: Test duty 1
 Fuse type: 2825 A KTU-5216/4
 Condition of test object before test: New

Test No.		1154059	1154060	1154061
Test sample No.		10	11	12
Rated current of fuse-link	A	2825	2825	2825
Test voltage	V	605	605	605
Prospective peak current	kA	464	464	464
Prospective breaking current I_p	kA	200	200	200
Power factor $\cos \varphi$		0.14	0.14	0.14
Making angle	°el.	58.4	57.9	56.8
Initiation of arcing after voltage zero	°el.	89.4	88.5	89
Melting current i_s	kA	140	131	143
Cut-off current	kA	150	141	131
Melting time	ms	2.02	1.89	1.97
Arcing time	ms	3.34	3.44	3.49
Operating time	ms	5.36	5.33	5.46
Melting integral	10^6 A ² s	13.4	11.0	12.2
Arcing integral	10^6 A ² s	33.1	29.5	28.9
Operating integral	10^6 A ² s	54.5	47.1	48.2
Arcing energy	10^3 kVAs	281	278	286
Peak switching voltage	kV	1.13	1.20	1.21
Recovery voltage	V	609	607	607
Note		-	-	-
Evaluation		OK	OK	OK

Notes:

OK - The fuse is capable of correctly breaking the prospective current.

Test results (continued)

Test requirement: Test duty 1
 Fuse type: 3000 A KTU-5216/5
 Condition of test object before test: New

Test No.		1154062	1154063	1154064
Test sample No.		13	14	15
Rated current of fuse-link	A	3000	3000	3000
Test voltage	V	605	605	605
Prospective peak current	kA	464	464	464
Prospective breaking current I_p	kA	200	200	200
Power factor $\cos \varphi$		0.14	0.14	0.14
Making angle	°el.	53.3	50.5	50.0
Initiation of arcing after voltage zero	°el.	89.6	87.2	88.1
Melting current i_s	kA	135	135	140
Cut-off current	kA	148	145	150
Melting time	ms	1.97	2.01	2.08
Arcing time	ms	3.44	3.46	3.65
Operating time	ms	5.42	5.47	5.73
Melting integral	$10^6 \text{ A}^2\text{s}$	12.2	12.2	13.6
Arcing integral	$10^6 \text{ A}^2\text{s}$	33.4	31.9	33.8
Operating integral	$10^6 \text{ A}^2\text{s}$	53.7	51.9	56.5
Arcing energy	10^3 VAs	296	297	320
Peak switching voltage	kV	1.19	1.20	1.20
Recovery voltage	V	607	608	607
Note		-	-	-
Evaluation		OK	OK	OK

Notes:

OK - The fuse is capable of correctly breaking the prospective current.

Test results (continued)

Test requirement: Test duty 2
 Fuse type: 3000 A KTU-5216/5
 Condition of test object before test: New

Test No.		1154066	1154067	1154068
Test sample No.		16	17	18
Rated current of fuse-link	A	3000	3000	3000
Test voltage	V	605	605	605
Prospective peak current	kA	331	331	331
Prospective breaking current I_p	kA	141	141	141
Power factor $\cos \varphi$		0.13	0.13	0.13
Making angle	°el.	0.1	2.45	2.58
Initiation of arcing after voltage zero	°el.	66.0	66.5	67.3
Melting current i_s	kA	129	128	130
Cut-off current	kA	139	139	141
Peak current at interruption / Peak of prospective r.m.s. current	kA	0.70	0.70	0.71
Melting time	ms	3.60	3.50	3.53
Arcing time	ms	3.51	3.87	4.28
Operating time	ms	7.11	7.36	7.81
Melting integral	10^6 A ² s	14.6	14.1	14.8
Arcing integral	10^6 A ² s	31.1	42.6	38.7
Operating integral	10^6 A ² s	54.0	56.7	63.8
Arcing energy	10^3 kVA ^s	300	349	380
Peak switching voltage	kV	1.19	1.28	1.23
Recovery voltage	V	660	614	617
Note		-	-	-
Evaluation		OK	OK	OK

Notes:

OK - The fuse is capable of correctly breaking the prospective current

Test results (continued)

Test requirement: Test duty 2
 Fuse type: 2825 A KTU-5216/4
 Condition of test object before test: New

Test No.		1154069	1154071	1154072
Test sample No.		19	20	21
Rated current of fuse-link	A	2825	2825	2825
Test voltage	V	605	605	605
Prospective peak current	kA	331	312	312
Prospective breaking current I_p	kA	141	131	131
Power factor $\cos \varphi$		0.13	0.13	0.13
Making angle	°el.	1.01	2.35	2.73
Initiation of arcing after voltage zero	°el.	64.4	68.1	68.9
Melting current i_s	kA	121	120	119
Cut-off current	kA	131	129	127
Peak current at interruption / Peak of prospective r.m.s. current	kA	0.66	0.70	0.69
Melting time	ms	3.57	3.59	3.64
Arcing time	ms	3.96	4.05	4.15
Operating time	ms	7.53	7.65	7.79
Melting integral	10^6 A ² s	12.3	12.7	12.3
Arcing integral	10^6 A ² s	28.6	27.2	27.5
Operating integral	10^6 A ² s	48.6	47.6	47.5
Arcing energy	10^3 kVA _s	329	333	335
Peak switching voltage	kV	1.31	1.34	1.32
Recovery voltage	V	617	616	615
Note		ME crit: 0.66	-	-
Evaluation		NOT OK	OK	OK

Notes:

OK - The fuse is capable of correctly breaking the prospective current

Test results (continued)

Test requirement: Test duty 2
 Fuse type: 1875 A KTU-5216/3
 Condition of test object before test: New

Test No.		1154075	1154077	1154078
Test sample No.		23	24	25
Rated current of fuse-link	A	1875	1875	1875
Test voltage	V	605	605	605
Prospective peak current	kA	231	162	162
Prospective breaking current I_p	kA	98	70.3	70.3
Power factor $\cos \varphi$		0.13	0.15	0.15
Making angle	°el.	1.84	2.74	2.38
Initiation of arcing after voltage zero	°el.	60.5	74.7	74.0
Melting current i_s	kA	74.8	72.9	71.7
Cut-off current	kA	80.1	77.2	76.4
Peak current at interruption / Peak of prospective r.m.s. current	kA	0.58	0.78	0.77
Melting time	ms	3.22	3.95	3.93
Arcing time	ms	3.43	3.50	3.66
Operating time	ms	6.65	7.45	7.59
Melting integral	10^6 A ² s	4.29	5.16	4.92
Arcing integral	10^6 A ² s	9.88	9.06	9.22
Operating integral	10^6 A ² s	16.5	17.1	17.0
Arcing energy	10^3 kVA _s	183	185	190
Peak switching voltage	kV	1.31	1.32	1.32
Recovery voltage	V	614	611	610
Note		ME crit: 0.58	-	-
Evaluation		NOT OK	OK	OK

Notes:

OK - The fuse is capable of correctly breaking the prospective current

Test results (continued)

Test requirement: Test duty 2
 Fuse type: 1200 A KTU-5216/2
 Condition of test object before test: New

Test No.		1154073	1154079	1154081
Test sample No.		22	26	27
Rated current of fuse-link	A	1200	1200	1200
Test voltage	V	605	605	605
Prospective peak current	kA	312	162	91.7
Prospective breaking current I_p	kA	131	70.3	39.6
Power factor $\cos \varphi$		0.13	0.15	0.15
Making angle	°el.	0.17	3.39	1.93
Initiation of arcing after voltage zero	°el.	41.0	57.8	73.2
Melting current i_s	kA	52.1	48.1	39.8
Cut-off current	kA	54.8	51.2	43.0
Peak current at interruption / Peak of prospective r.m.s. current	kA	0.30	0.51	0.77
Melting time	ms	2.24	2.99	3.92
Arcing time	ms	4.10	3.58	3.58
Operating time	ms	6.33	6.57	7.5
Melting integral	10^6 A ² s	1.41	1.67	1.49
Arcing integral	10^6 A ² s	3.82	3.86	3.18
Operating integral	10^6 A ² s	5.86	6.40	5.61
Arcing energy	10^3 kVAs	99.5	114	106
Peak switching voltage	kV	1.14	1.29	1.27
Recovery voltage	V	616	611	612
Note		ME crit: 0.3	ME crit: 0.51	-
Evaluation		NOT OK	NOT OK	OK

Notes:

OK - The fuse is capable of correctly breaking the prospective current

Test results (continued)

Test requirement: Test duty 2
 Fuse type: 800 A KTU-5216/1
 Condition of test object before test: New

Test No.		1154082	1154084	1154085
Test sample No.		28	29	30
Rated current of fuse-link	A	800	800	800
Test voltage	V	605	605	605
Prospective peak current	kA	91.7	70.4	70.4
Prospective breaking current I_p	kA	39.6	30.6	30.6
Power factor $\cos \varphi$		0.15	0.15	0.15
Making angle	°el.	1.57	3.99	3.77
Initiation of arcing after voltage zero	°el.	64.8	74.0	73.4
Melting current i_s	kA	32.6	30.9	30.6
Cut-off current	kA	35.5	33.4	33.2
Peak current at interruption / Peak of prospective r.m.s. current	kA	0.63	0.77	0.77
Melting time	ms	3.48	3.85	3.83
Arcing time	ms	3.55	3.44	3.59
Operating time	ms	7.02	7.29	7.42
Melting integral	10^6 A ² s	0.87	0.90	0.87
Arcing integral	10^6 A ² s	1.92	1.72	1.77
Operating integral	10^6 A ² s	3.29	3.13	3.17
Arcing energy	10^3 kVA _s	82.0	78.1	80.7
Peak switching voltage	kV	1.27	1.27	1.26
Recovery voltage	V	611	614	615
Note		ME crit: 0.63	-	-
Evaluation		NOT OK	OK	OK

Notes:

OK - The fuse is capable of correctly breaking the prospective current

Test results (continued)

Test requirement: Test duty 5a
 Fuse type: 800 A KTU-5216/1
 Condition of test object before test: New

Test No.		2155731	2155732	2155733	2155734
Test sample No.		-	1	2	3
Rated current of fuse-link	A	-	800	800	800
Test voltage	V	618	618	618	618
Prospective peak current	kA	4.07	4.07	4.07	4.07
Prospective breaking current I_p	kA	2.38	2.38	2.38	2.38
Power factor $\cos \varphi$		0.48	0.48	0.48	0.48
Cut-off current	kA	-	2.47	2.76	2.78
Melting time	s	-	130.4	101.4	110.5
Arcing time	ms	-	7.52	9.70	8.50
Operating time	s	-	130.4	101.4	110.5
Arcing integral	$10^3 \text{ A}^2\text{s}$	-	20.9	28.1	26.9
Arcing energy	kVAs	-	4.18	5.67	5.90
Peak switching voltage	V	-	1264	1122	1747
Recovery voltage	V	-	623	619	619
Note		1)	-	-	-
Evaluation		-	OK	OK	OK

Notes:

OK - The fuse is capable of correctly breaking the prospective current.

1) Current setting of the prospective test values

Test results (continued)

Test requirement: Test duty 5a
 Fuse type: 1200 A KTU-5216/2
 Condition of test object before test: New

Test No.		2155735	2155737	2155738	2155739
Test sample No.		-	1	2	3
Rated current of fuse-link	A	-	1200	1200	1200
Test voltage	V	618	618	618	618
Prospective peak current	kA	6.04	6.04	6.04	6.04
Prospective breaking current I_p	kA	3.59	3.59	3.59	3.59
Power factor $\cos \varphi$		0.51	0.51	0.51	0.51
Cut-off current	kA	-	3.48	3.70	2.80
Melting time	s	-	53.2	59.6	61.8
Arcing time	ms	-	51.2	8.96	13.5
Operating time	s	-	53.3	59.6	61.8
Arcing integral	$10^3 \text{ A}^2\text{s}$	-	52.3	54.0	41.4
Arcing energy	kVAs	-	9.93	8.65	8.32
Peak switching voltage	V	-	1063	1204	1284
Recovery voltage	V	-	617	619	619
Note		1)	-	-	-
Evaluation		-	OK	OK	OK

Notes:

OK - The fuse is capable of correctly breaking the prospective current.

1) Current setting of the prospective test values

Test results (continued)

Test requirement: Test duty 5a
 Fuse type: 1875 A KTU-5216/3
 Condition of test object before test: New

Test No.		2155736	2155740	2155741	2155742
Test sample No.		1	-	2	3
Rated current of fuse-link	A	1875	-	1875	1875
Test voltage	V	618	618	618	618
Prospective peak current	kA	6.04	9.45	9.45	9.45
Prospective breaking current I_p	kA	3.59	5.61	5.61	5.61
Power factor $\cos \varphi$		0.51	0.50	0.50	0.50
Cut-off current	kA	3.59	-	6.24	5.43
Melting time	s	363.4	-	50.7	52.8
Arcing time	ms	100	-	17.3	13.0
Operating time	s	363.5	-	50.7	52.8
Arcing integral	$10^3 \text{ A}^2\text{s}$	119	-	176	119
Arcing energy	kVAs	14.8	-	17.9	13.5
Peak switching voltage	V	1167	-	1240	1230
Recovery voltage	V	619	-	621	621
Note		$I = 1.9 \times I_n$	1)	-	-
Evaluation		OK	-	OK	OK

Notes:

OK - The fuse is capable of correctly breaking the prospective current.

1) Current setting of the prospective test values

Test results (continued)

Test requirement: Test duty 5a
 Fuse type: 2825 A KTU-5216/4
 Condition of test object before test: New

Test No.		2155743	2155744	2155745	2155746
Test sample No.		-	1	2	3
Rated current of fuse-link	A	-	2825	2825	2825
Test voltage	V	618	618	618	618
Prospective peak current	kA	14.13	14.13	14.13	14.13
Prospective breaking current I_p	kA	8.41	8.41	8.41	8.41
Power factor $\cos \varphi$		0.51	0.51	0.51	0.51
Cut-off current	kA	-	7.31	8.59	5.12
Melting time	s	-	104.5	91.8	85.7
Arcing time	ms	-	16.8	15.9	11.8
Operating time	s	-	104.5	91.9	85.7
Arcing integral	$10^3 \text{ A}^2\text{s}$	-	223	331	151
Arcing energy	kVAs	-	23.6	23.3	17.4
Peak switching voltage	V	-	1110	1201	1150
Recovery voltage	V	-	619	618	620
Note		1)	-	-	-
Evaluation		-	OK	OK	OK

Notes:

OK - The fuse is capable of correctly breaking the prospective current.

1) Current setting of the prospective test values

Test results (continued)

Test requirement: Test duty 5a
 Fuse type: 3000 A KTU-5216/5
 Condition of test object before test: New

Test No.		2155747	2155748	2155749	2155750
Test sample No.		-	1	2	3
Rated current of fuse-link	A	-	3000	3000	3000
Test voltage	V	618	618	618	618
Prospective peak current	kA	14.89	14.89	14.89	14.89
Prospective breaking current I_p	kA	8.94	8.94	8.94	8.94
Power factor $\cos \varphi$		0.52	0.52	0.52	0.52
Cut-off current	kA	-	7.16	9.18	6.87
Melting time	s	-	98.0	92.4	87.6
Arcing time	ms	-	12.5	11.4	21.3
Operating time	s	-	98.0	92.4	87.7
Arcing integral	$10^3 \text{ A}^2\text{s}$	-	259	173	223
Arcing energy	kVAs	-	20.1	14.8	24.6
Peak switching voltage	V	-	1090	1137	1158
Recovery voltage	V	-	620	621	619
Note		1)	-	-	-
Evaluation		-	OK	OK	OK

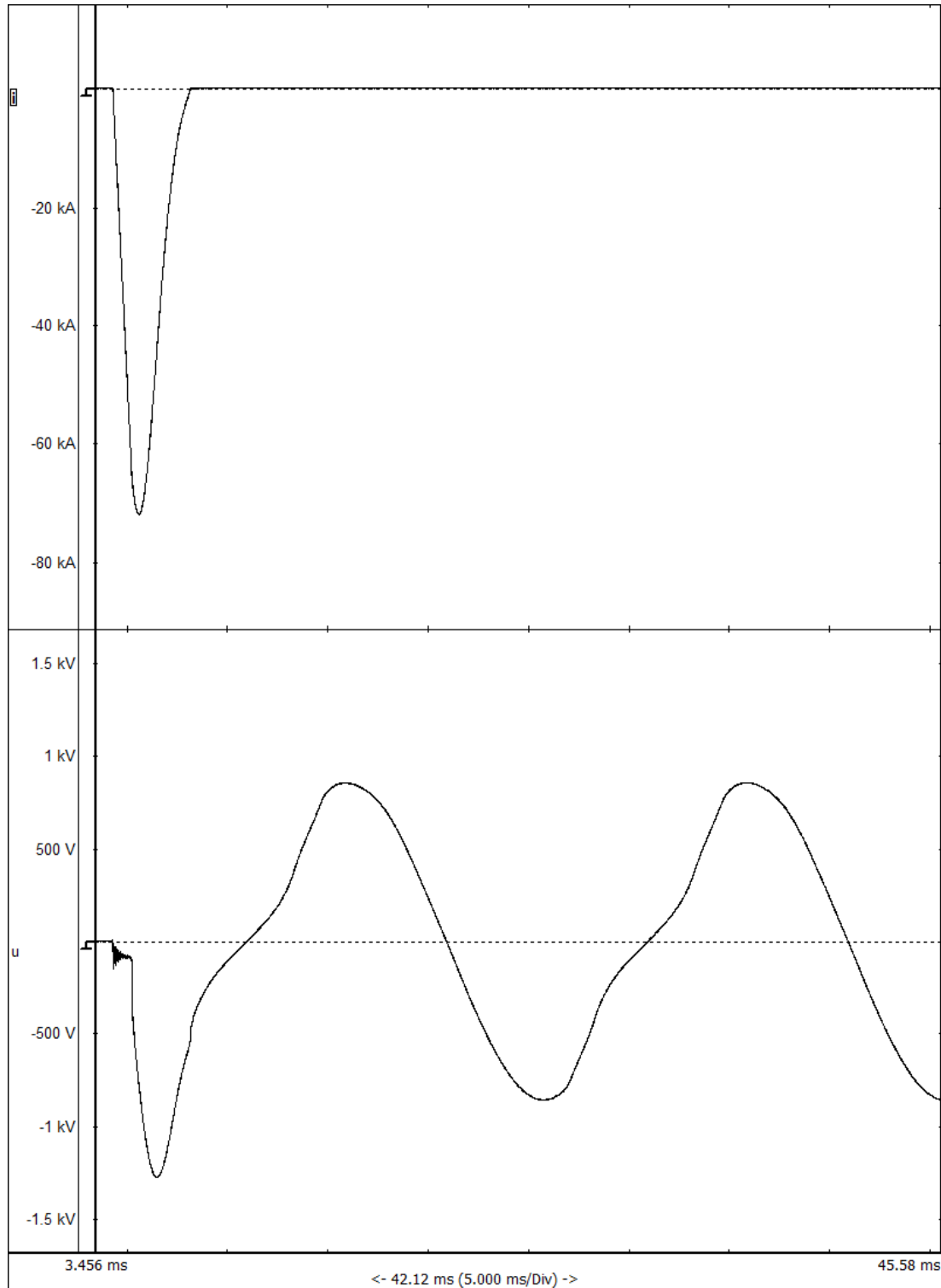
Notes:

OK - The fuse is capable of correctly breaking the prospective current.

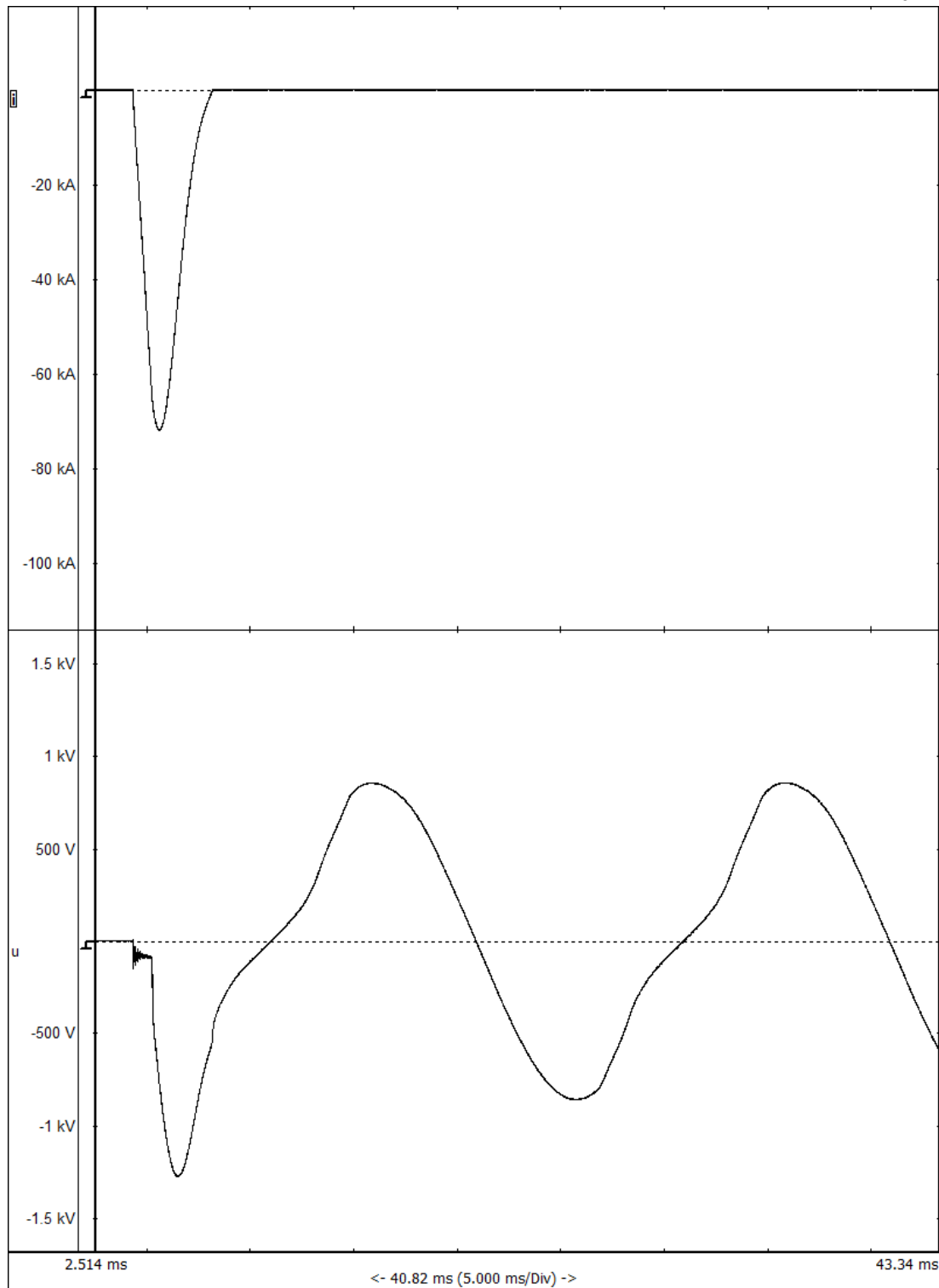
1) Current setting of the prospective test values

5. Oscillograms

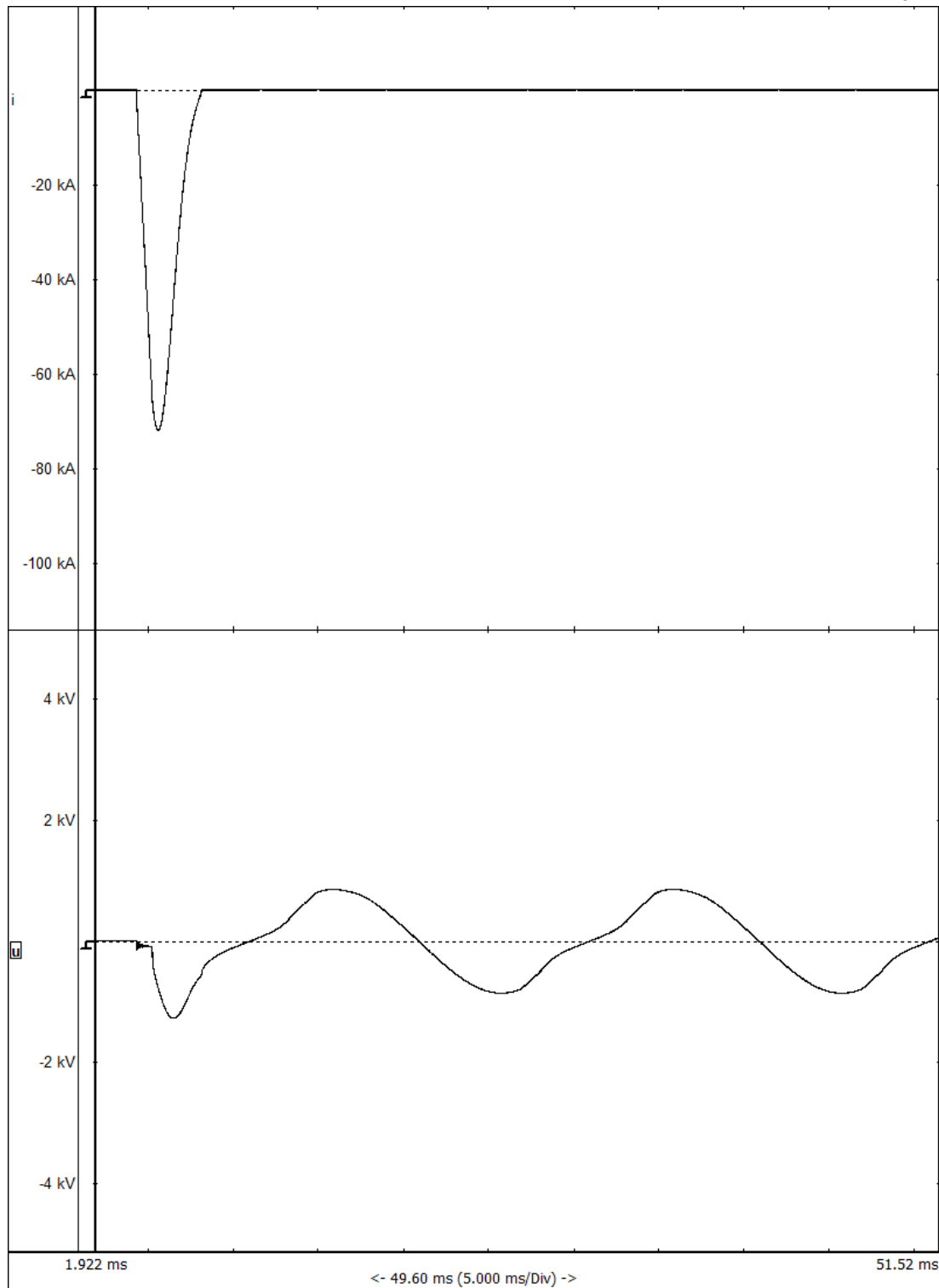
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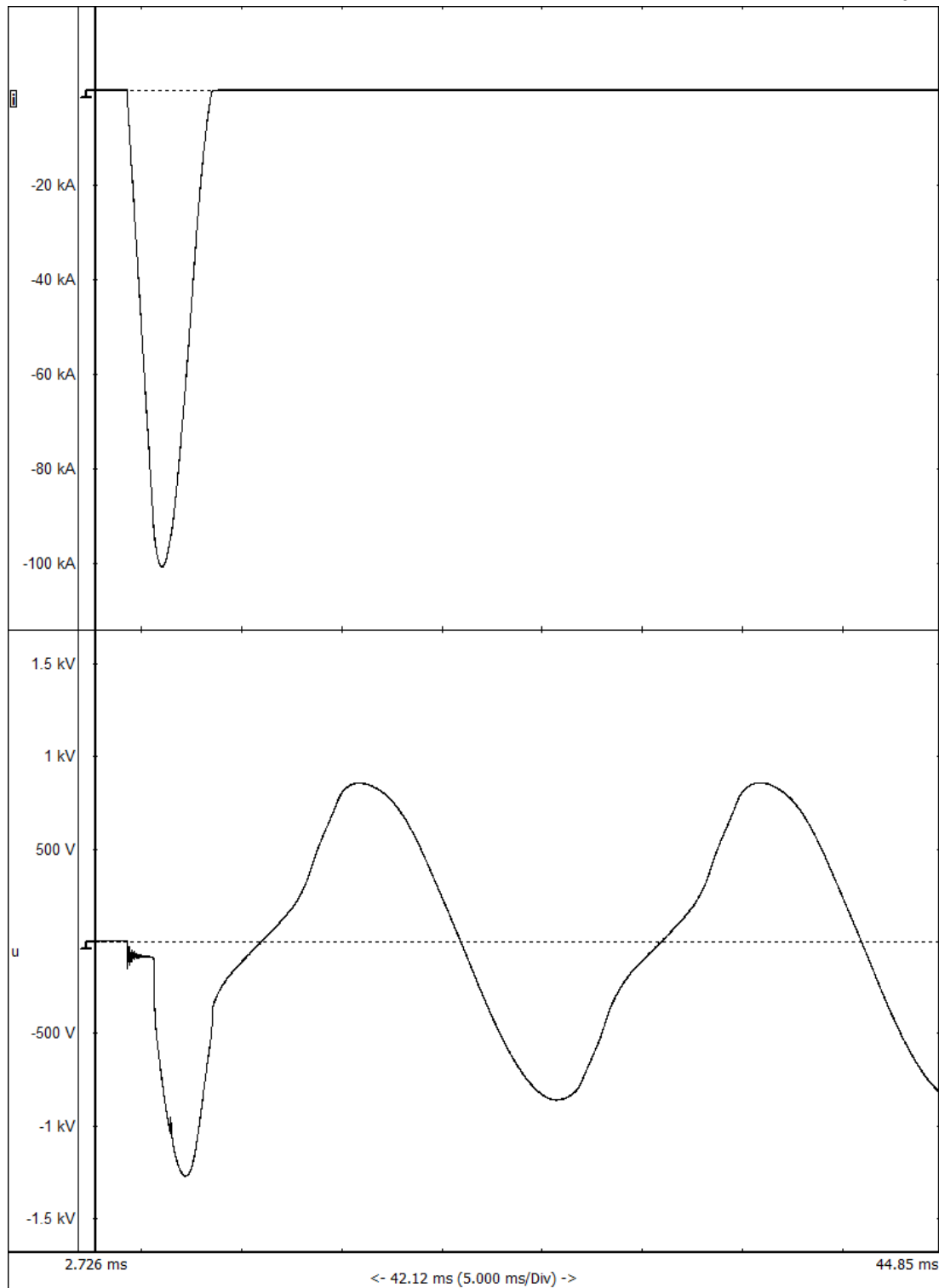
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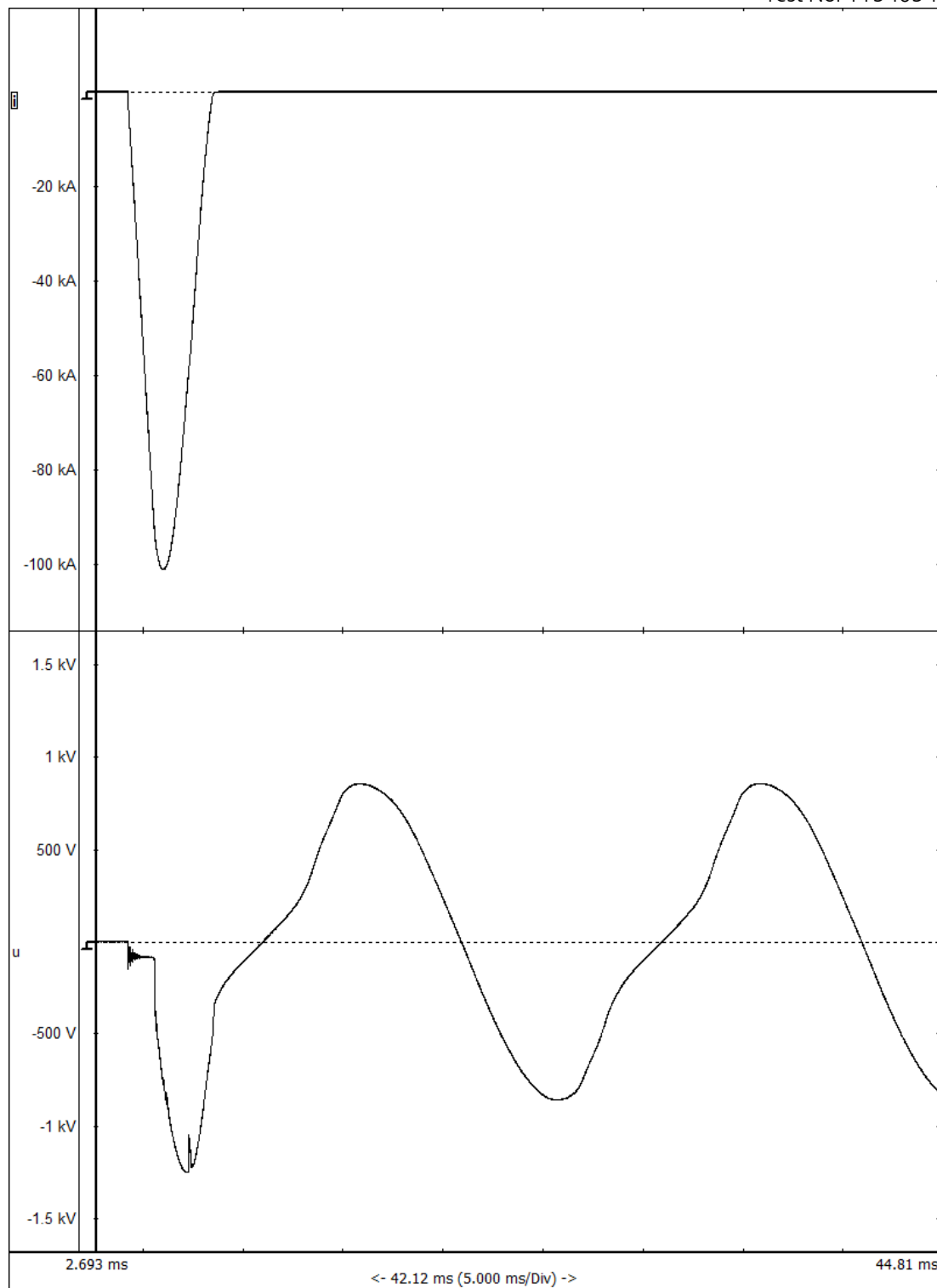
Test No: 1154052



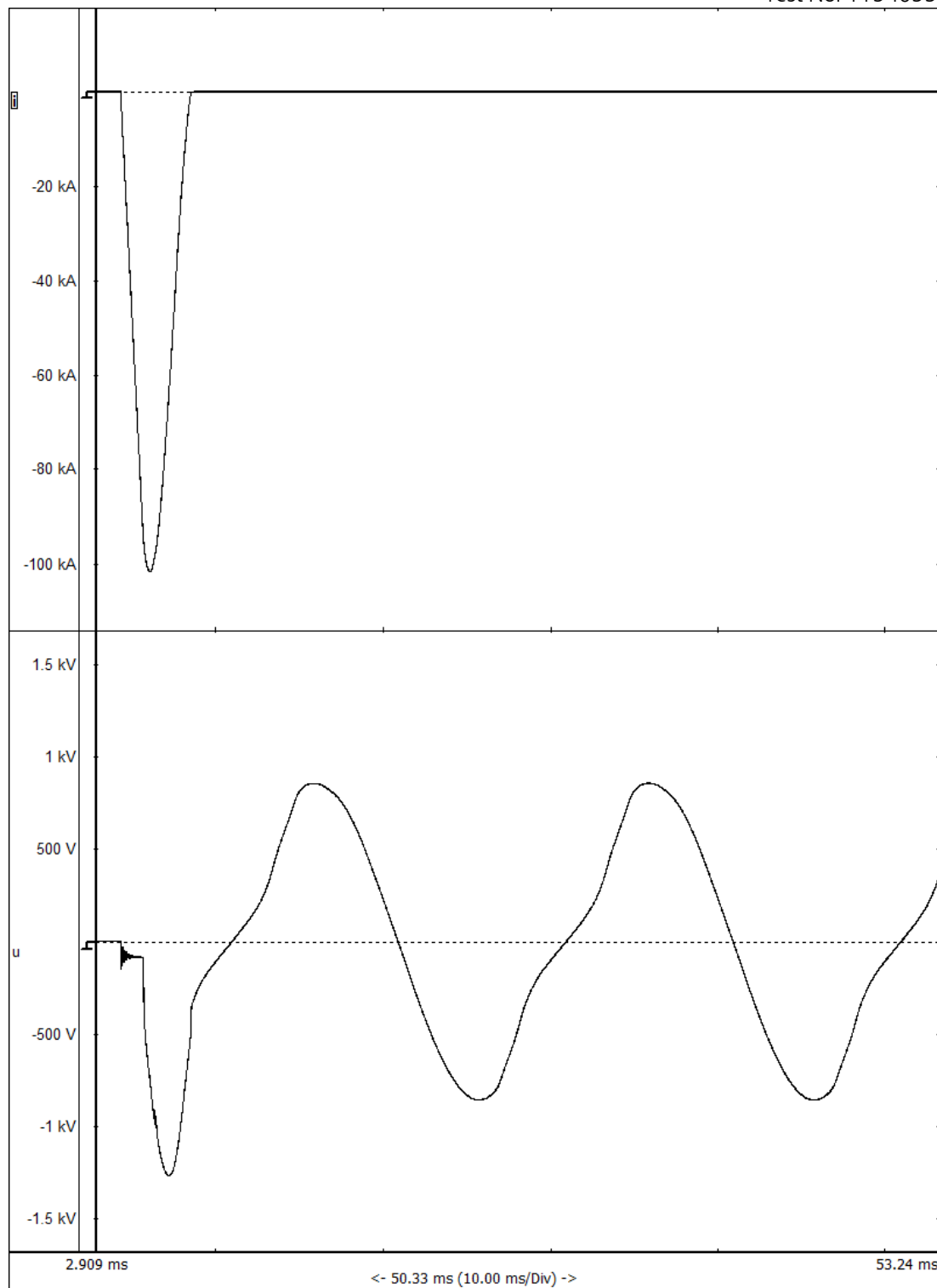
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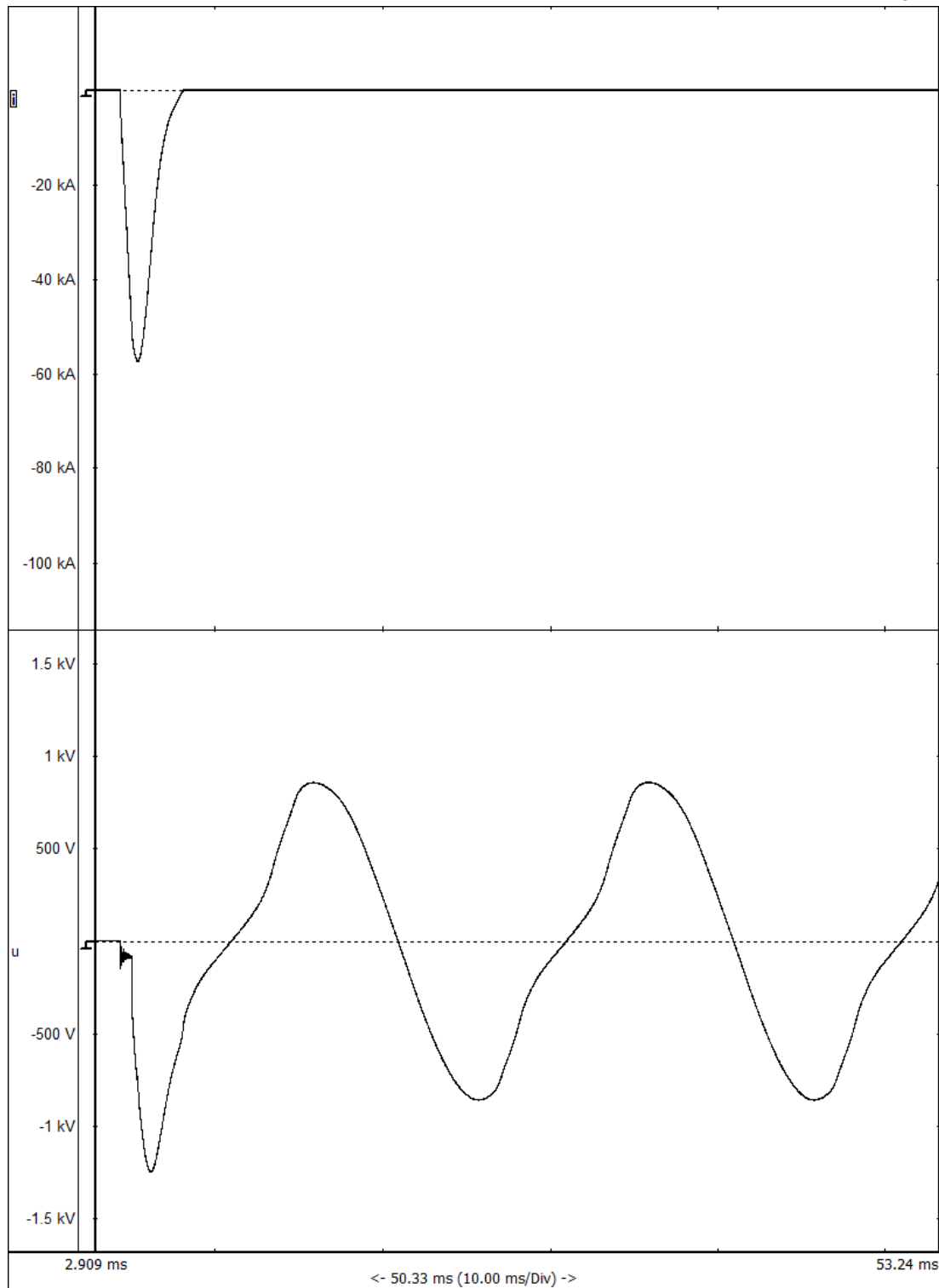
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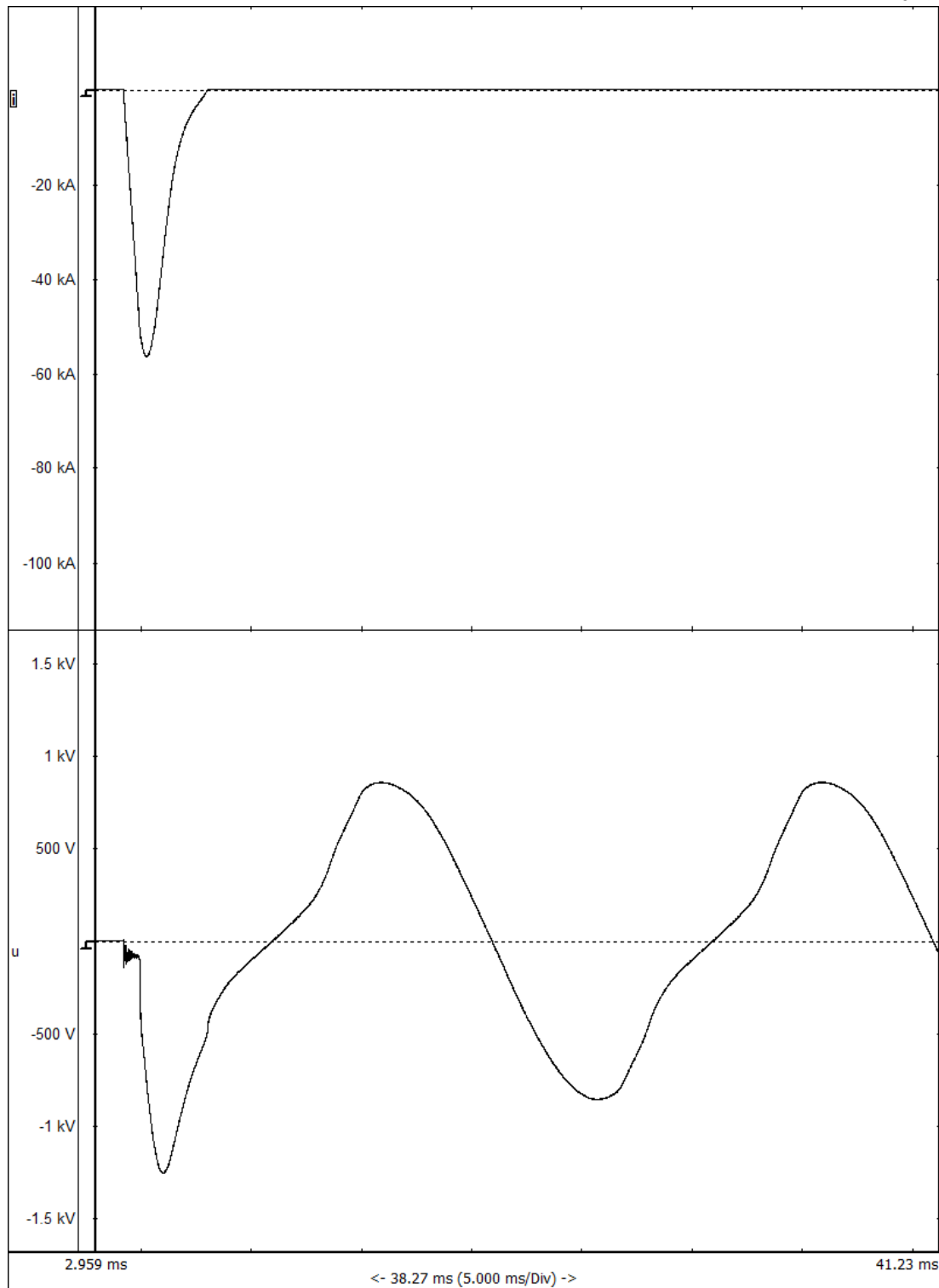
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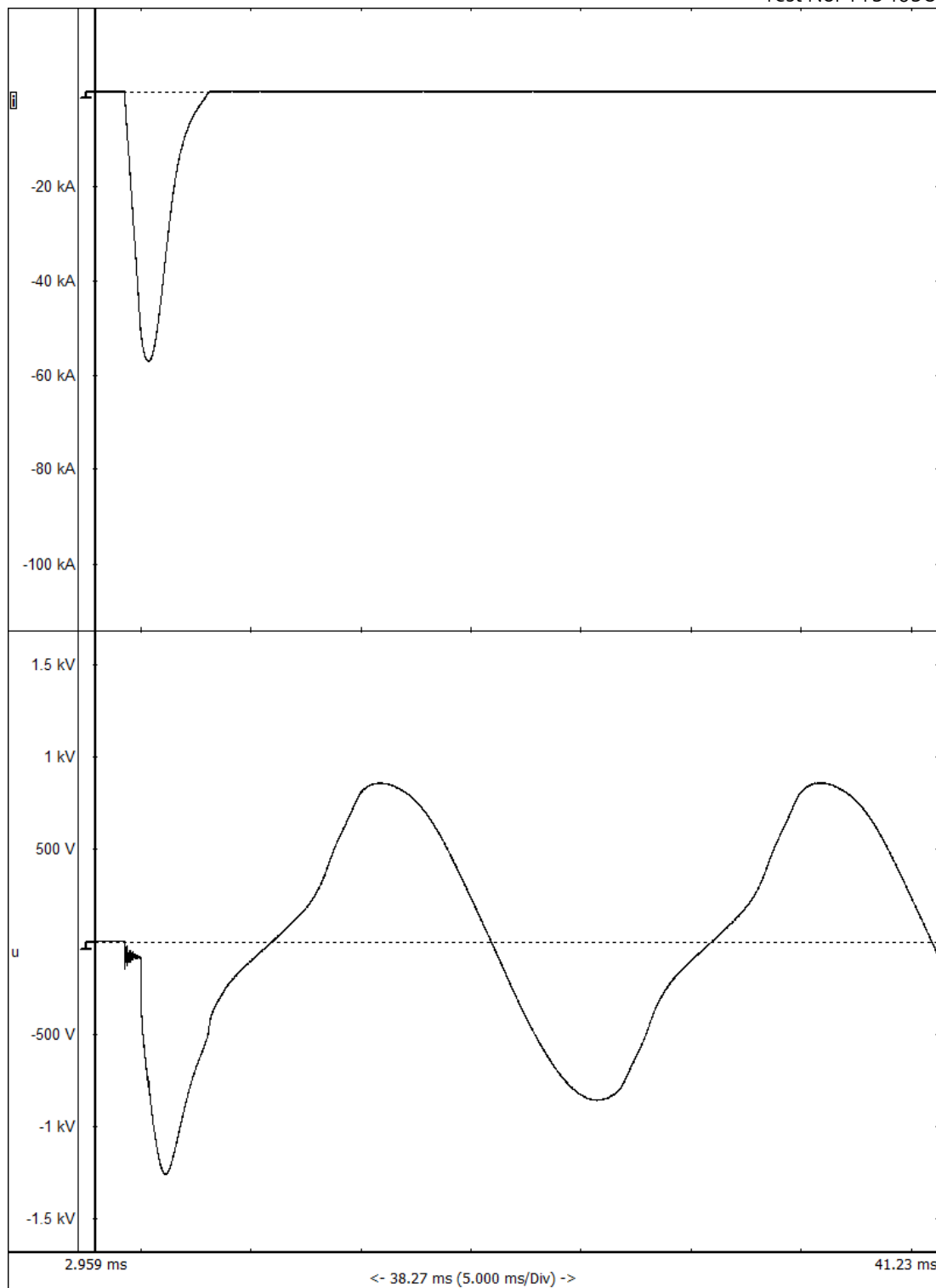
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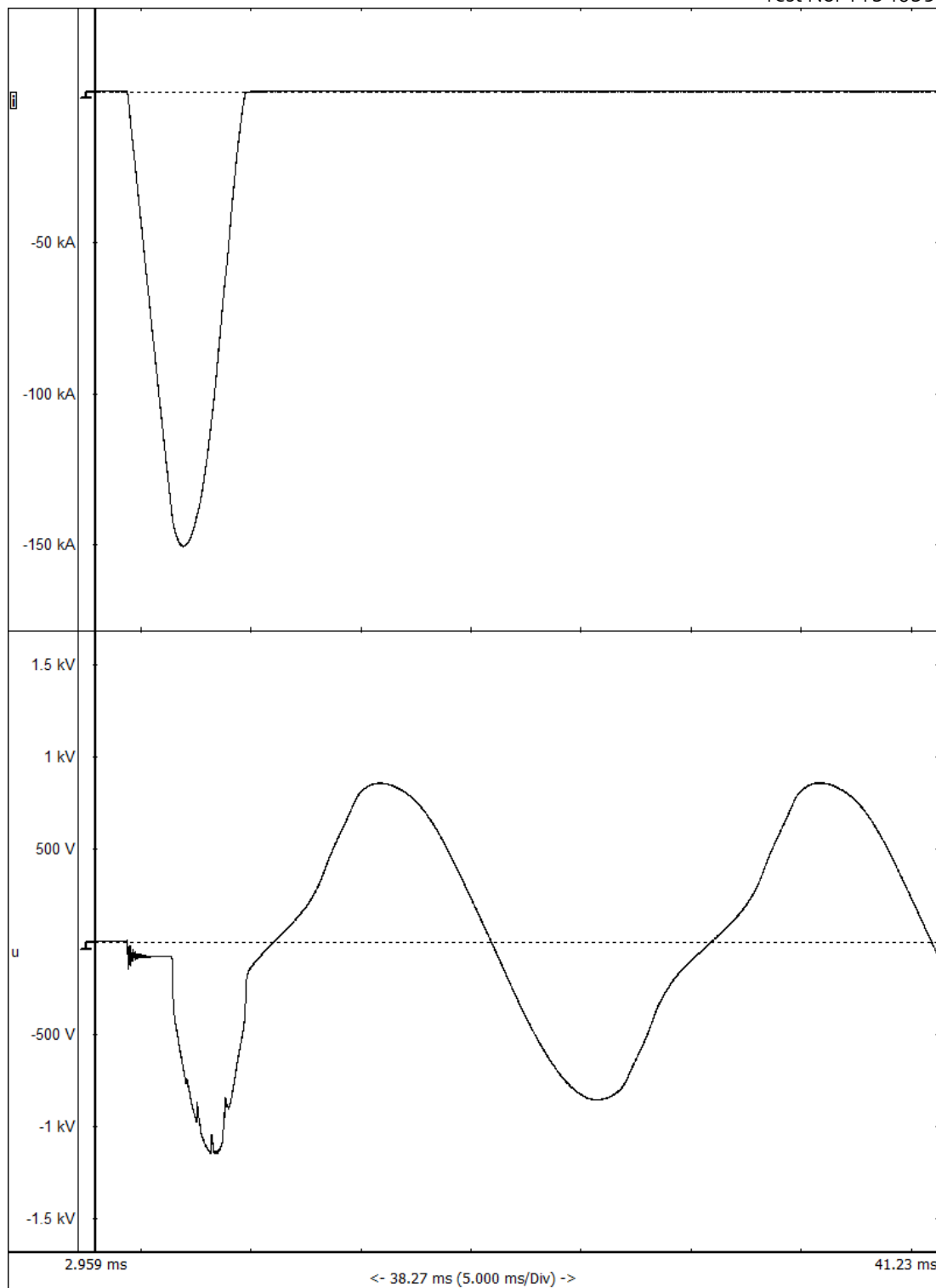
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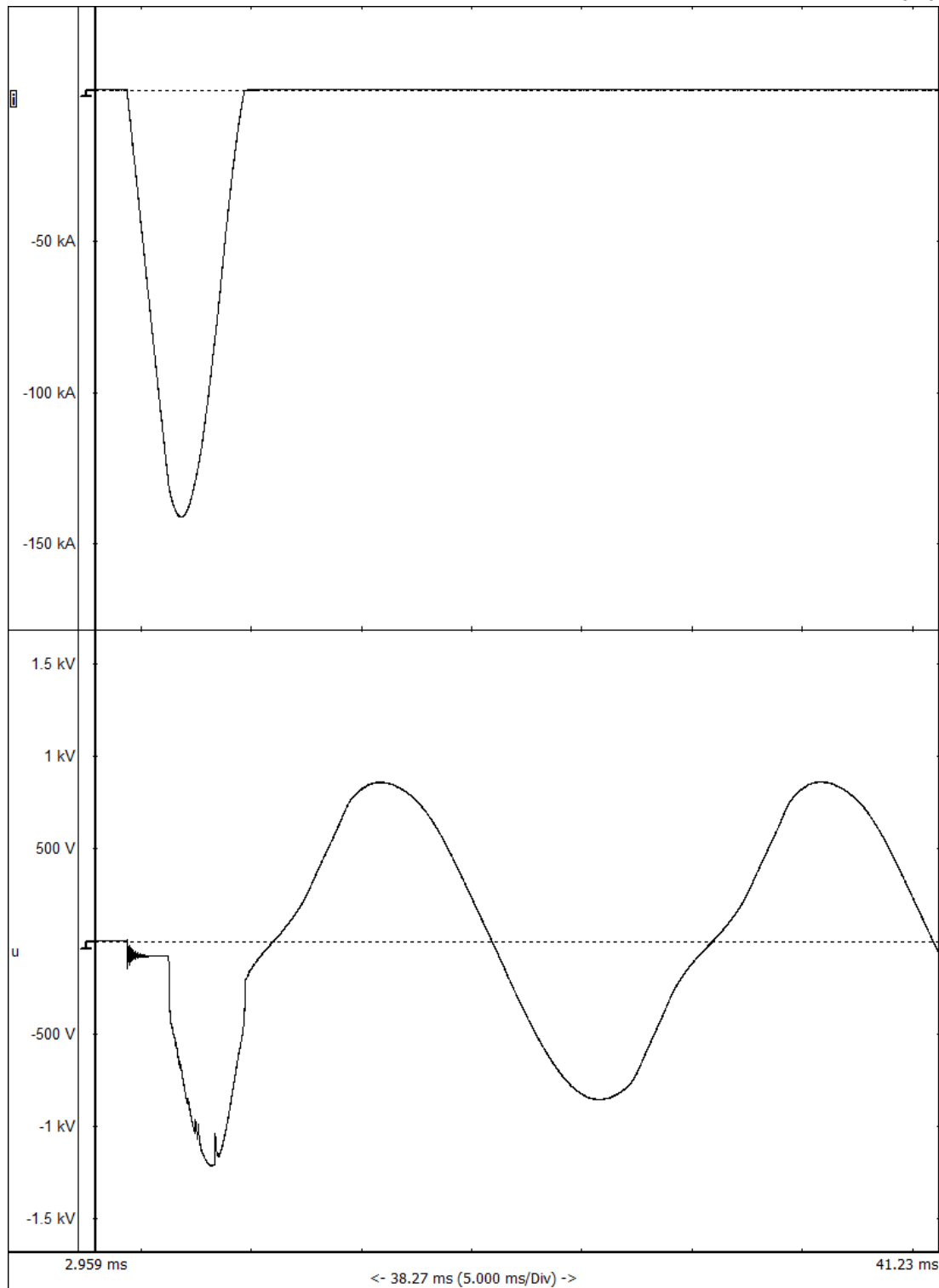
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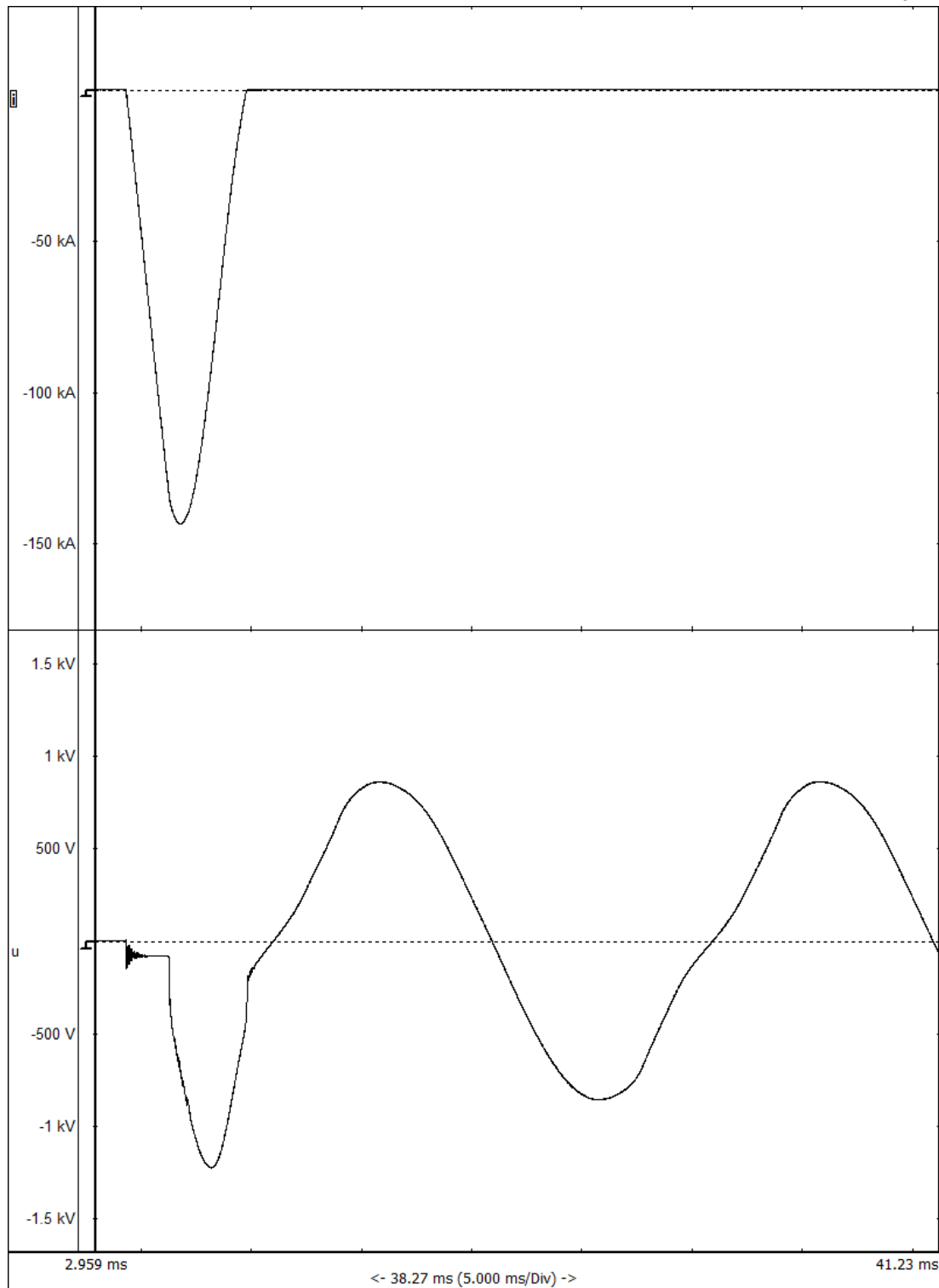
Test No: 1154059



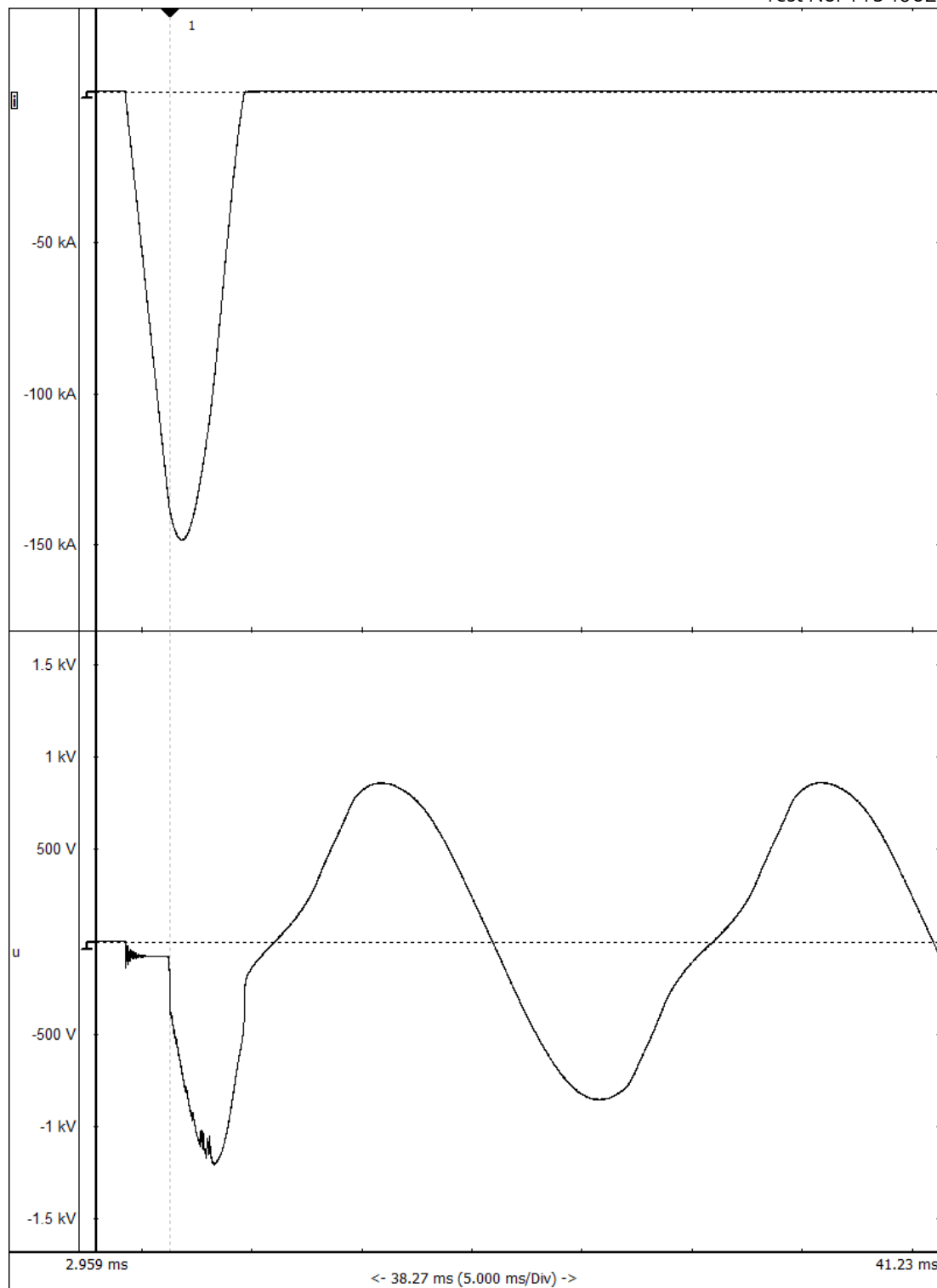
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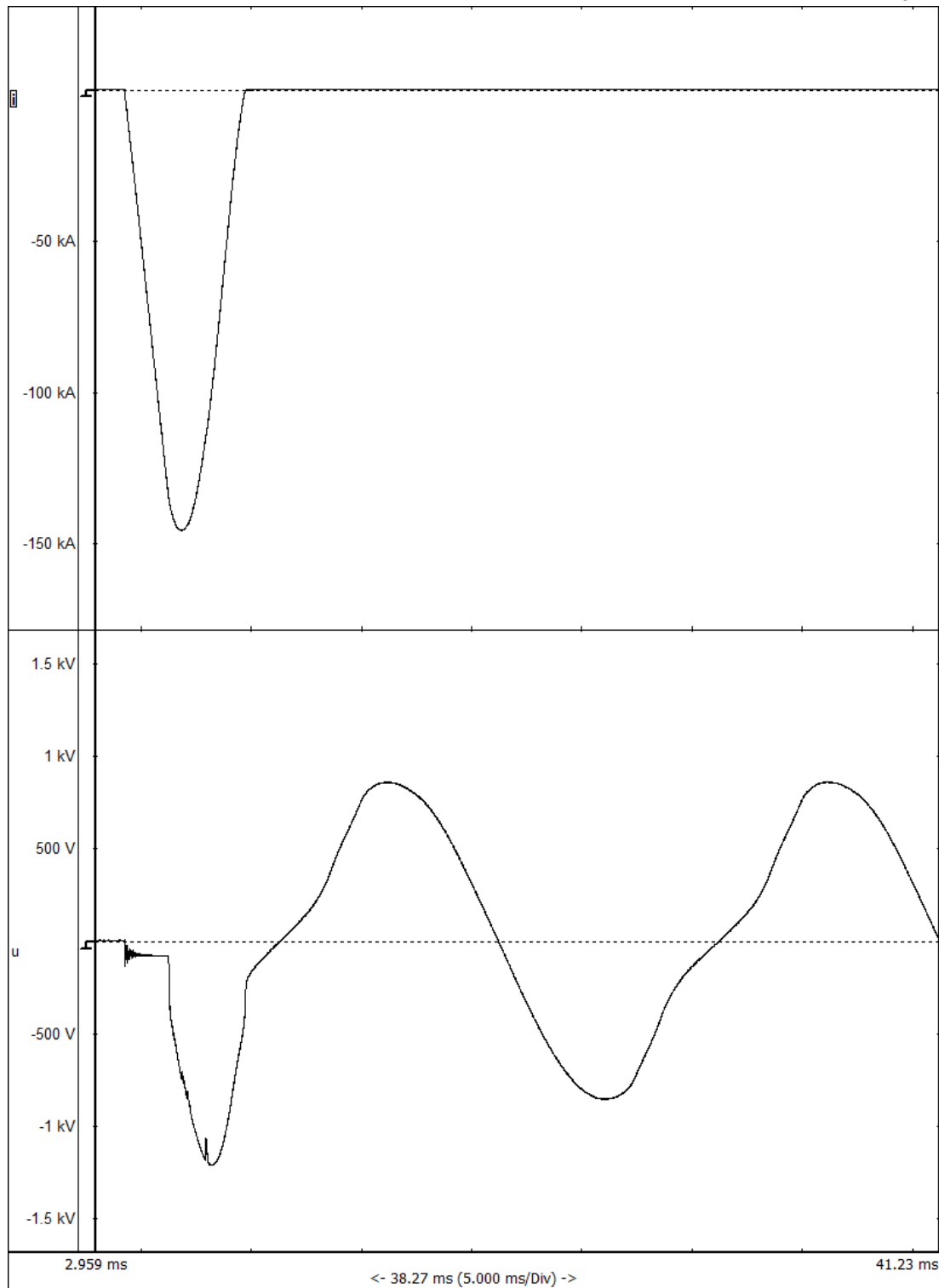
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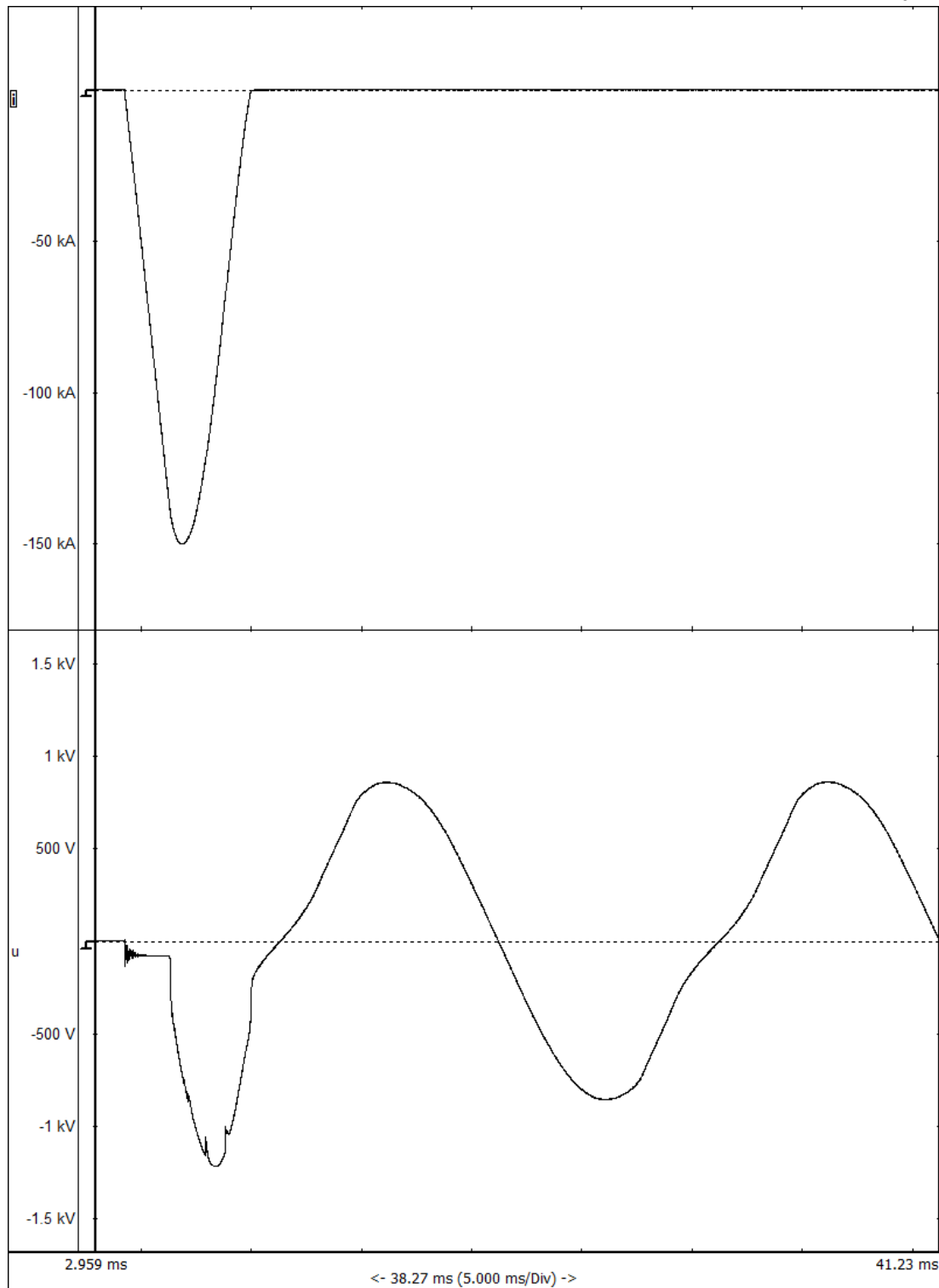
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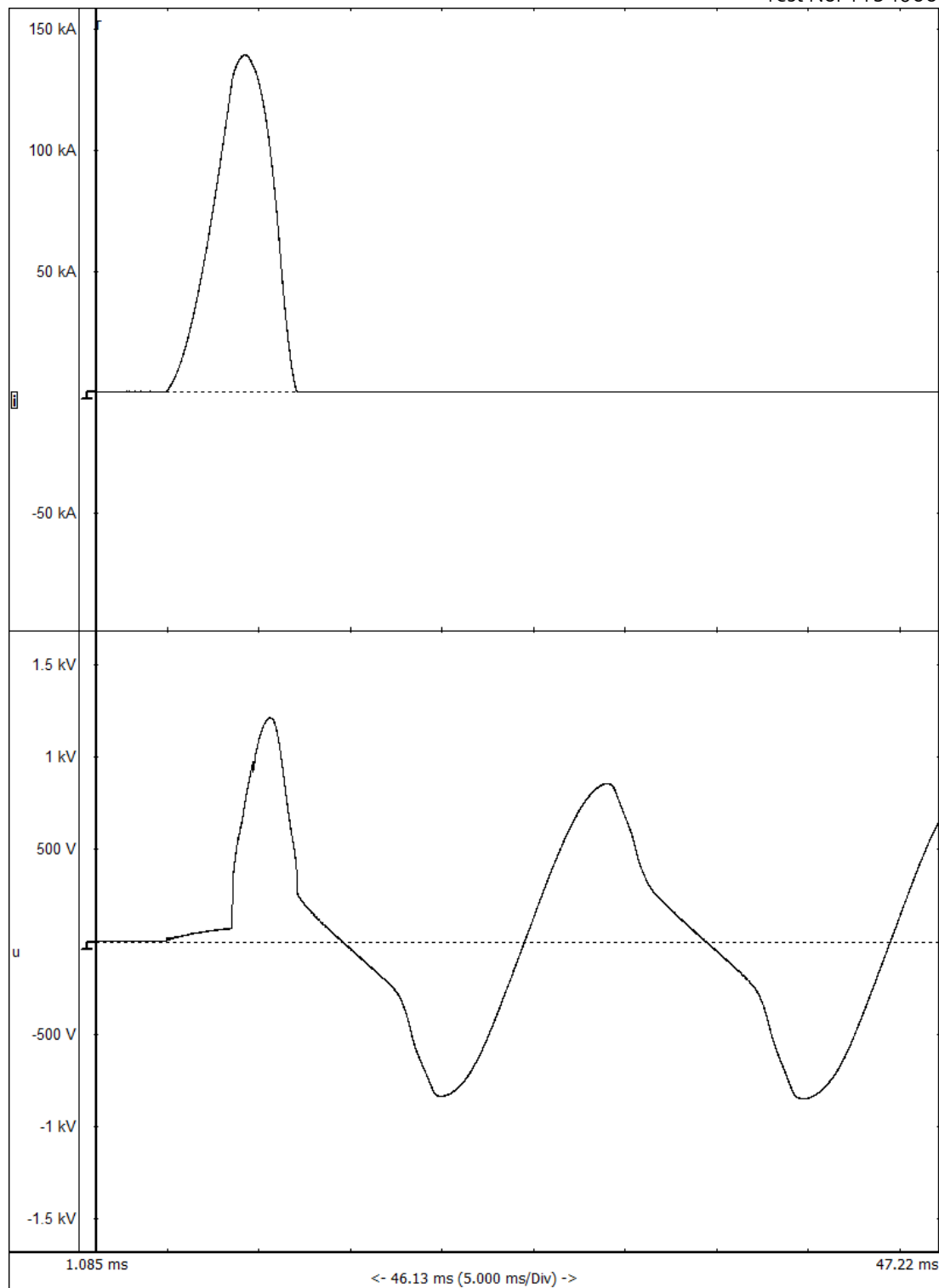
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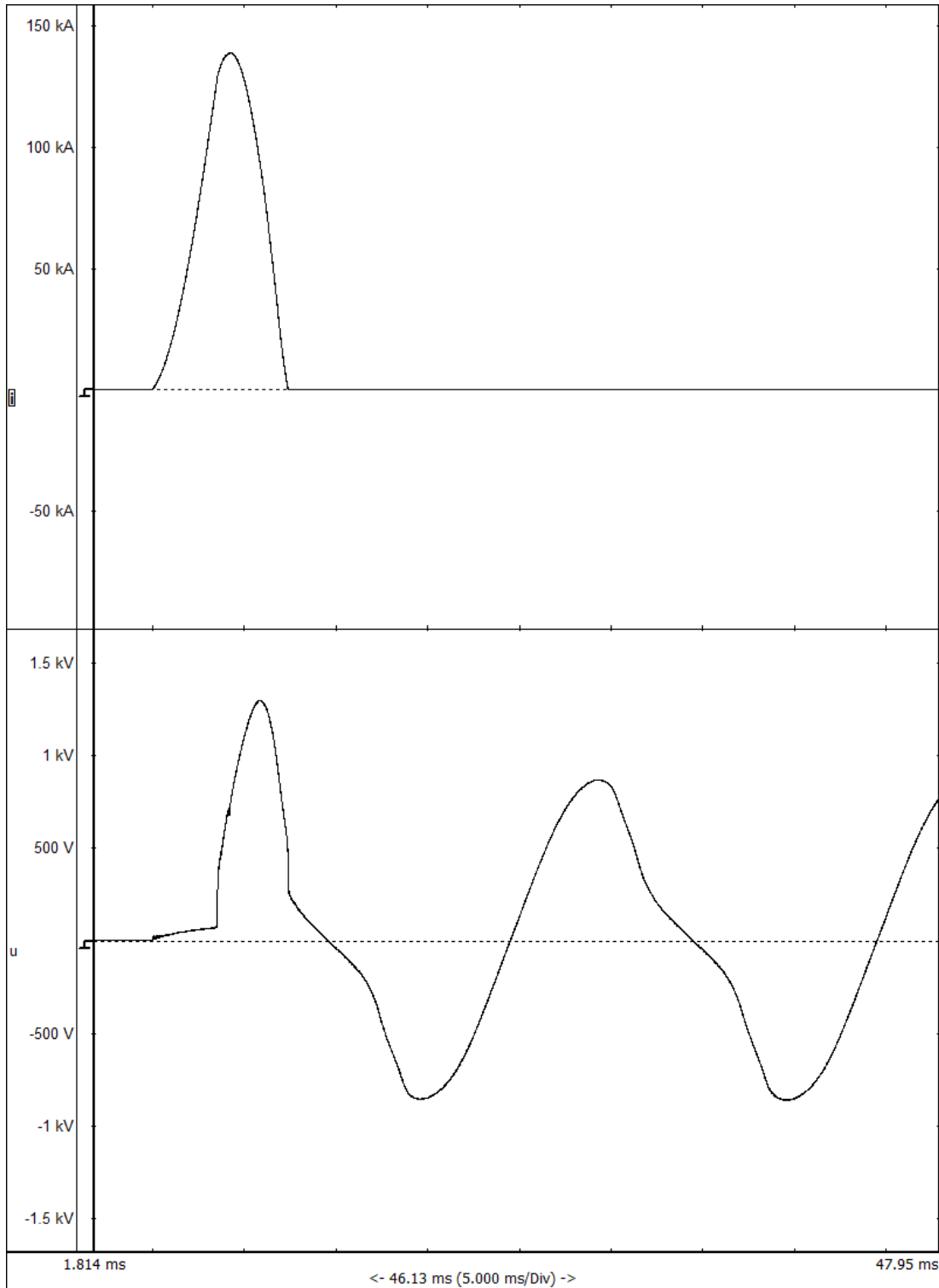
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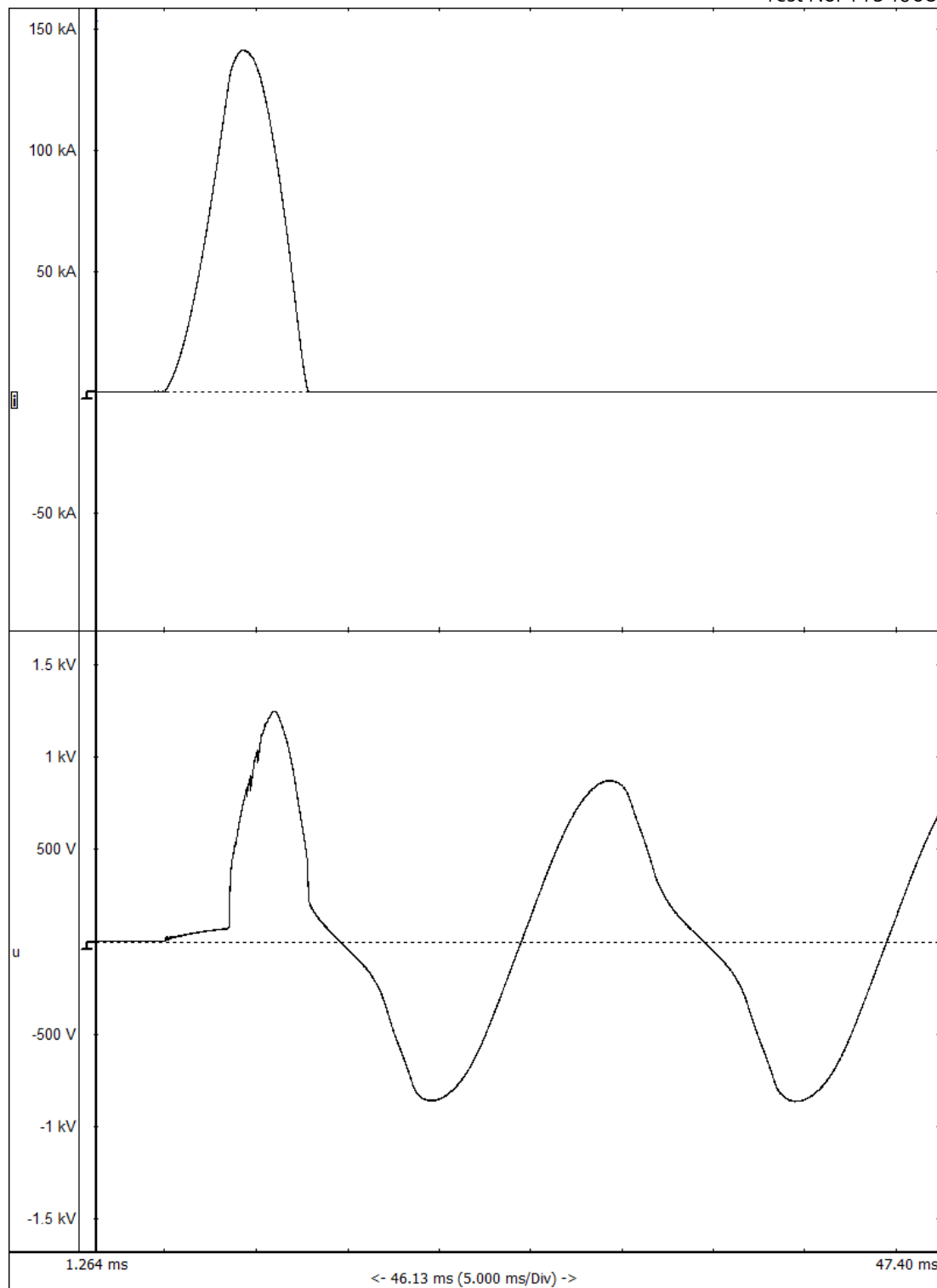
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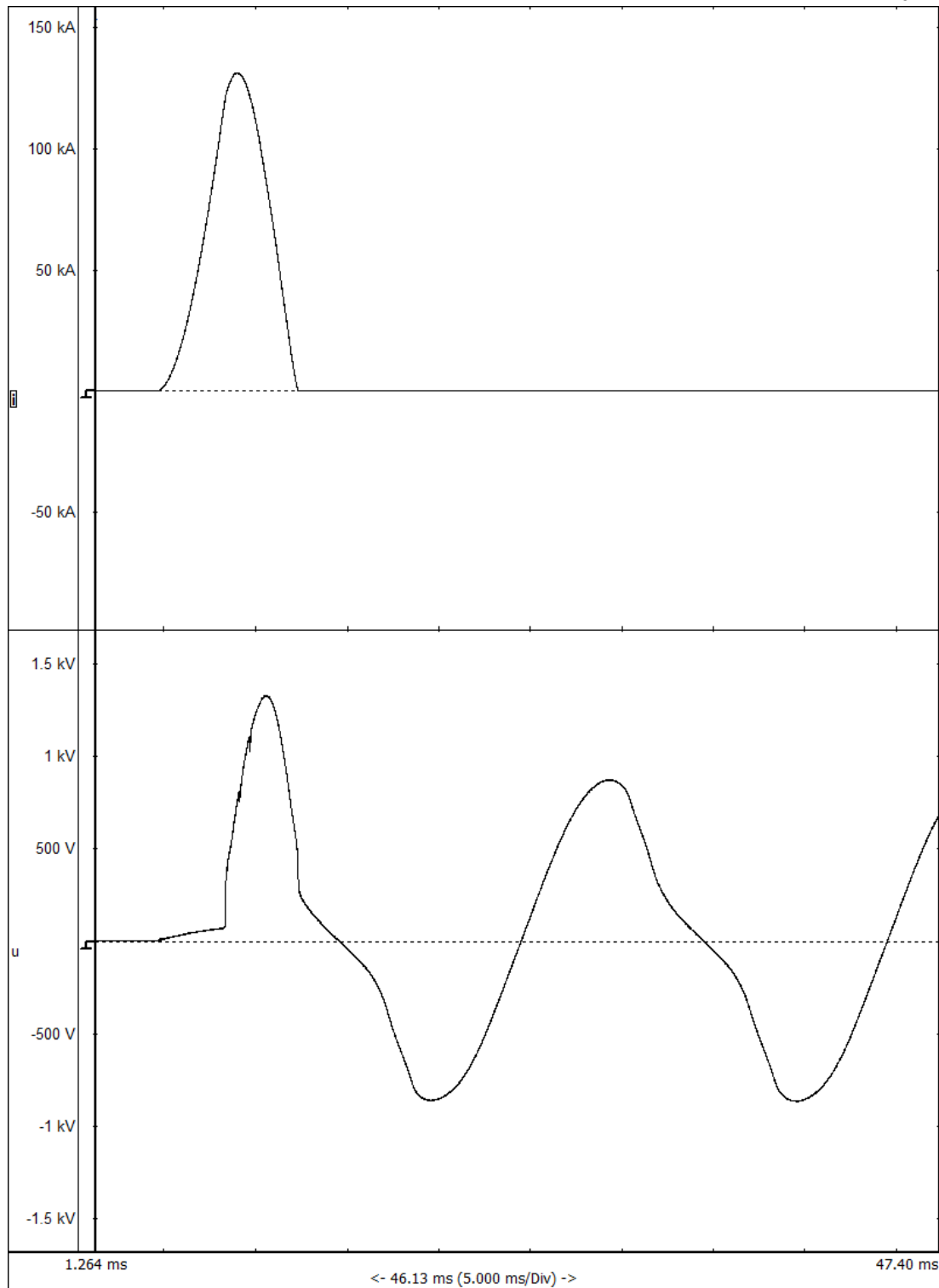
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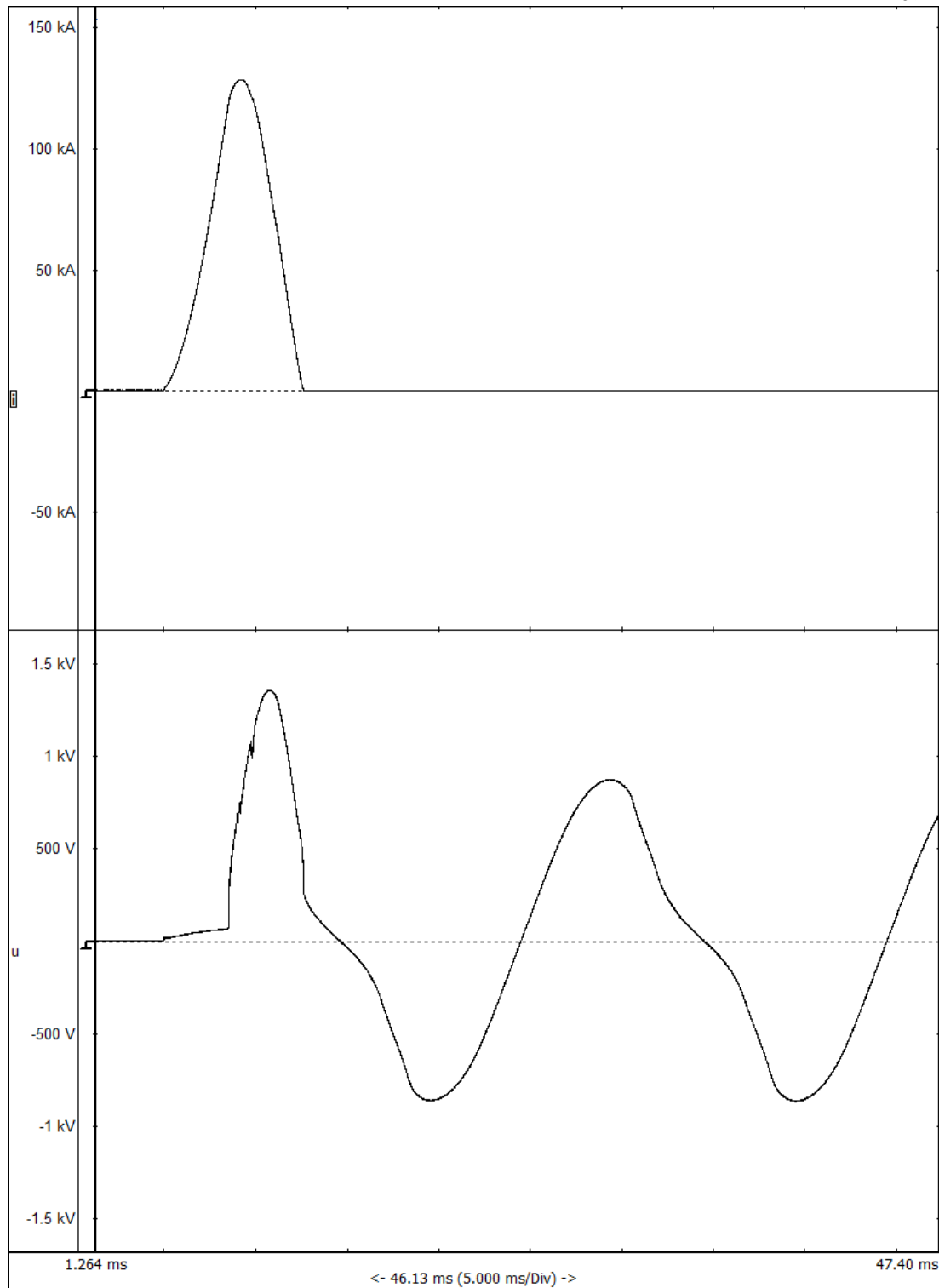
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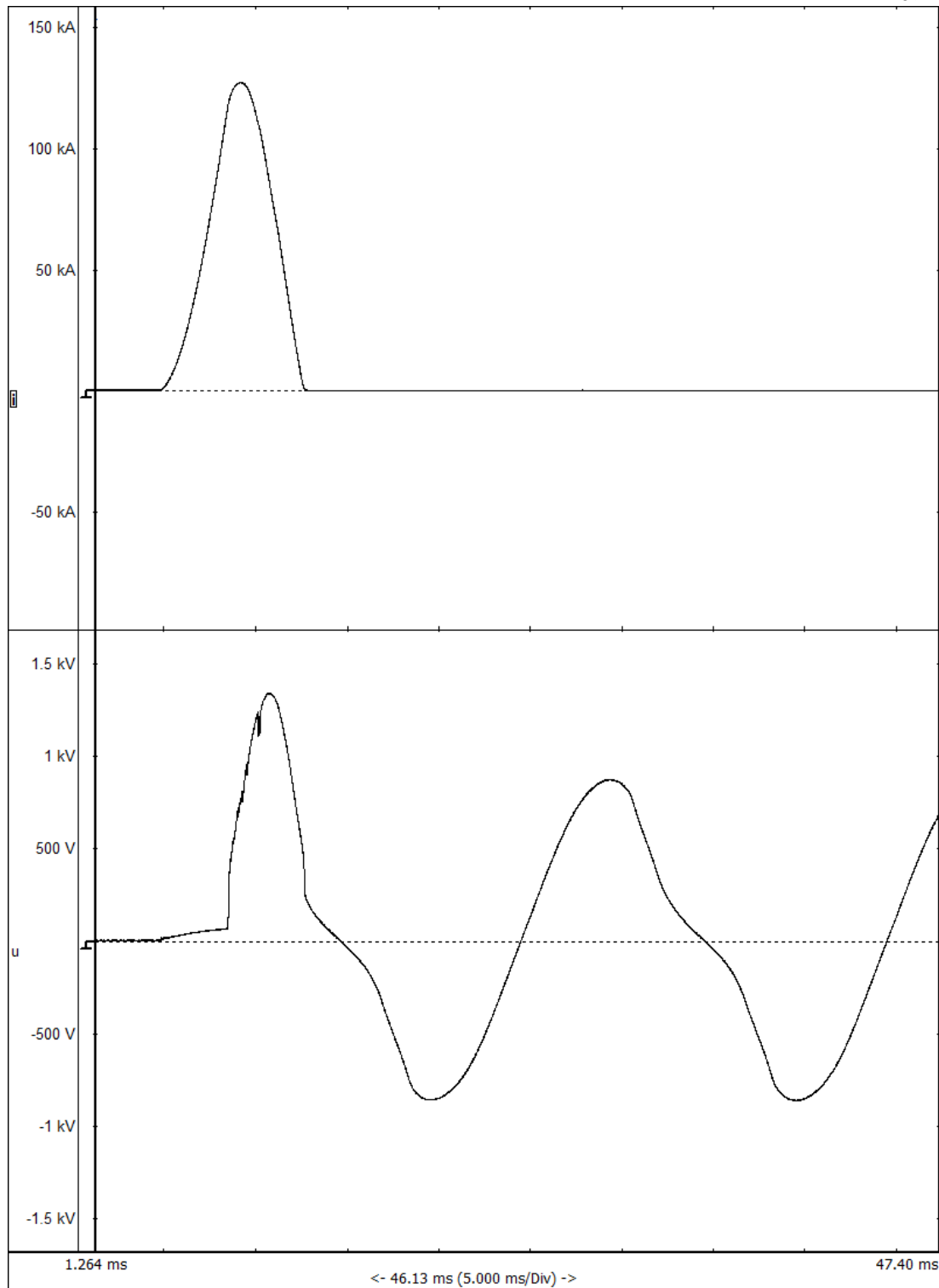
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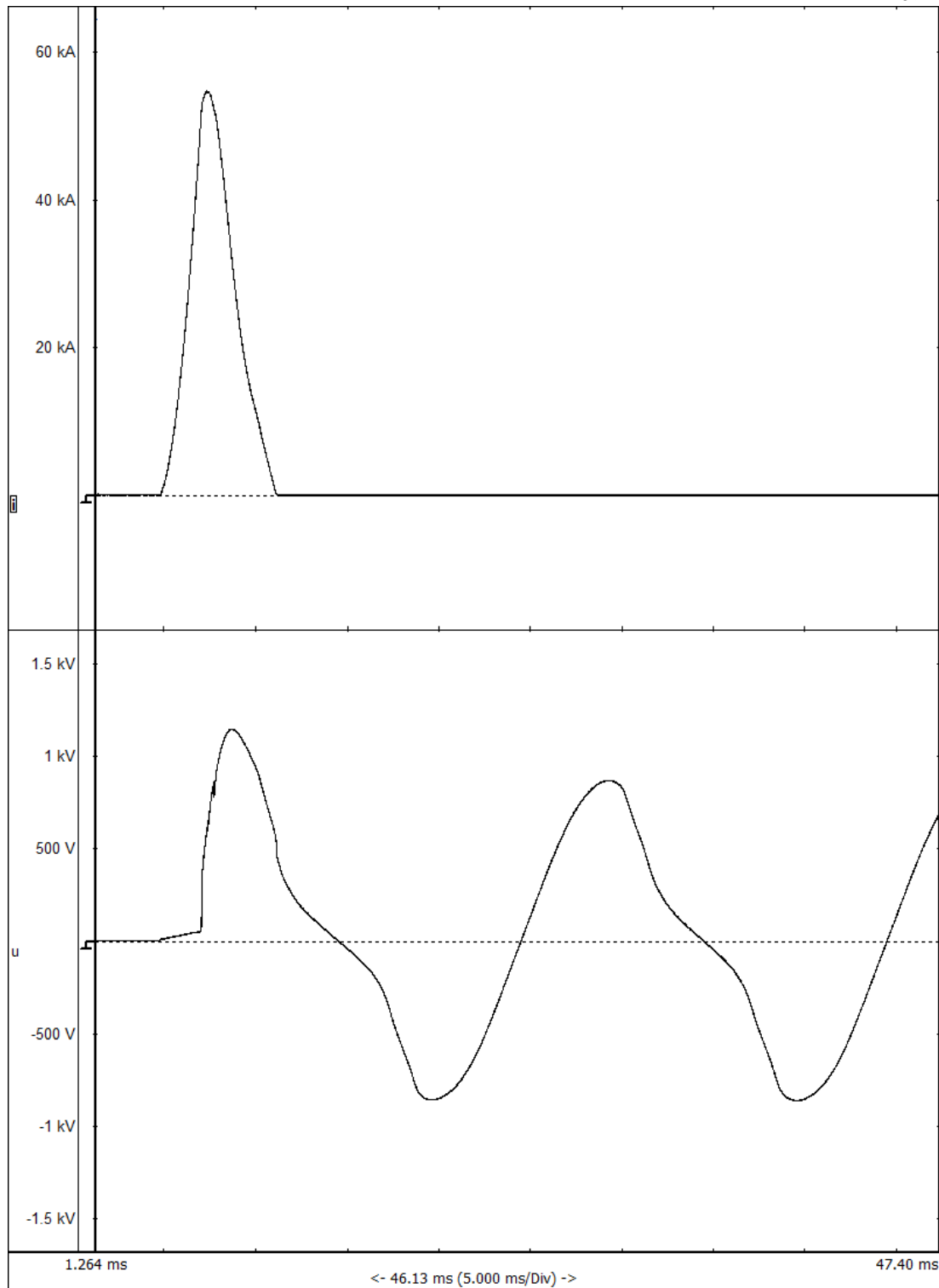
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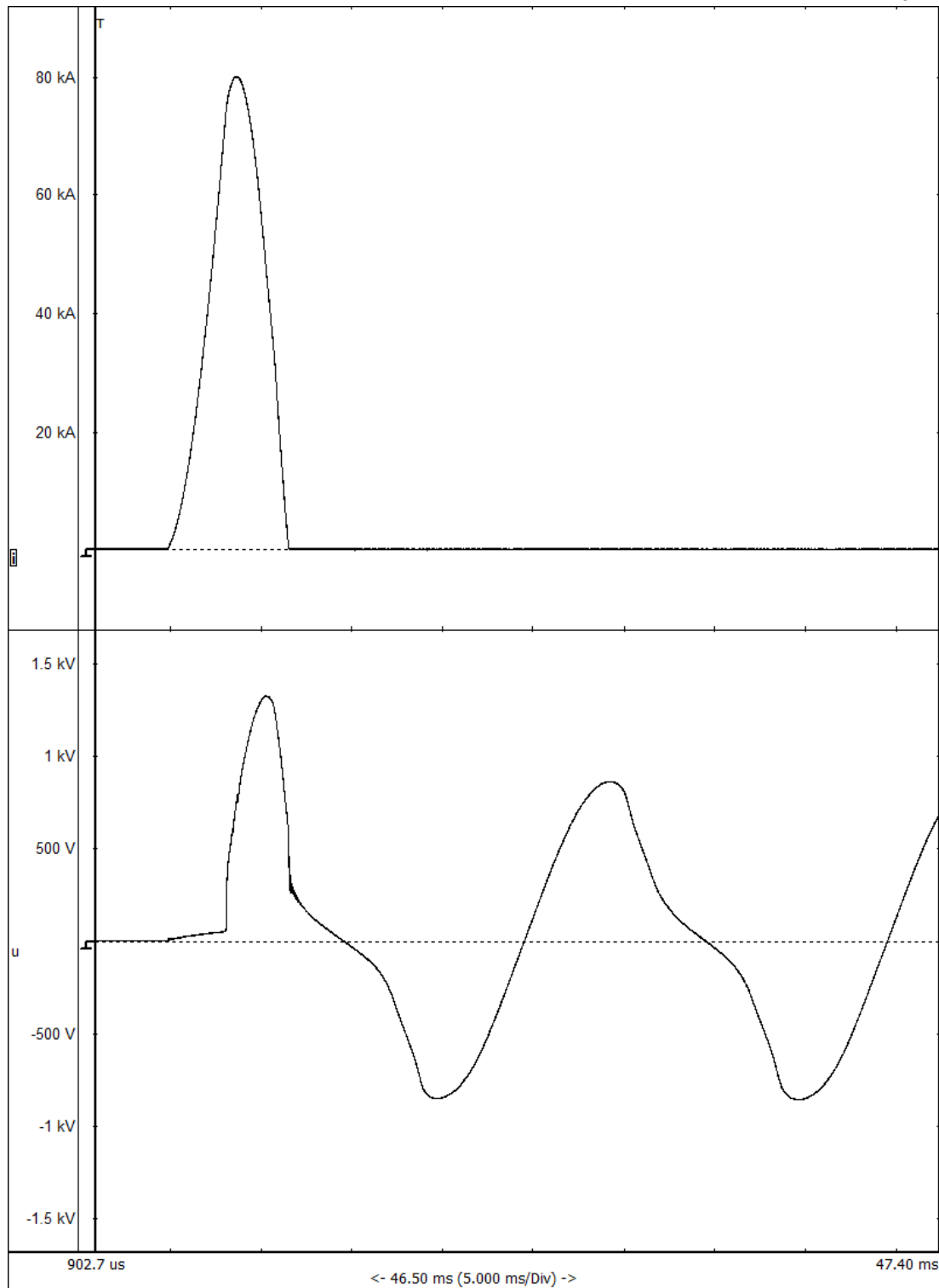
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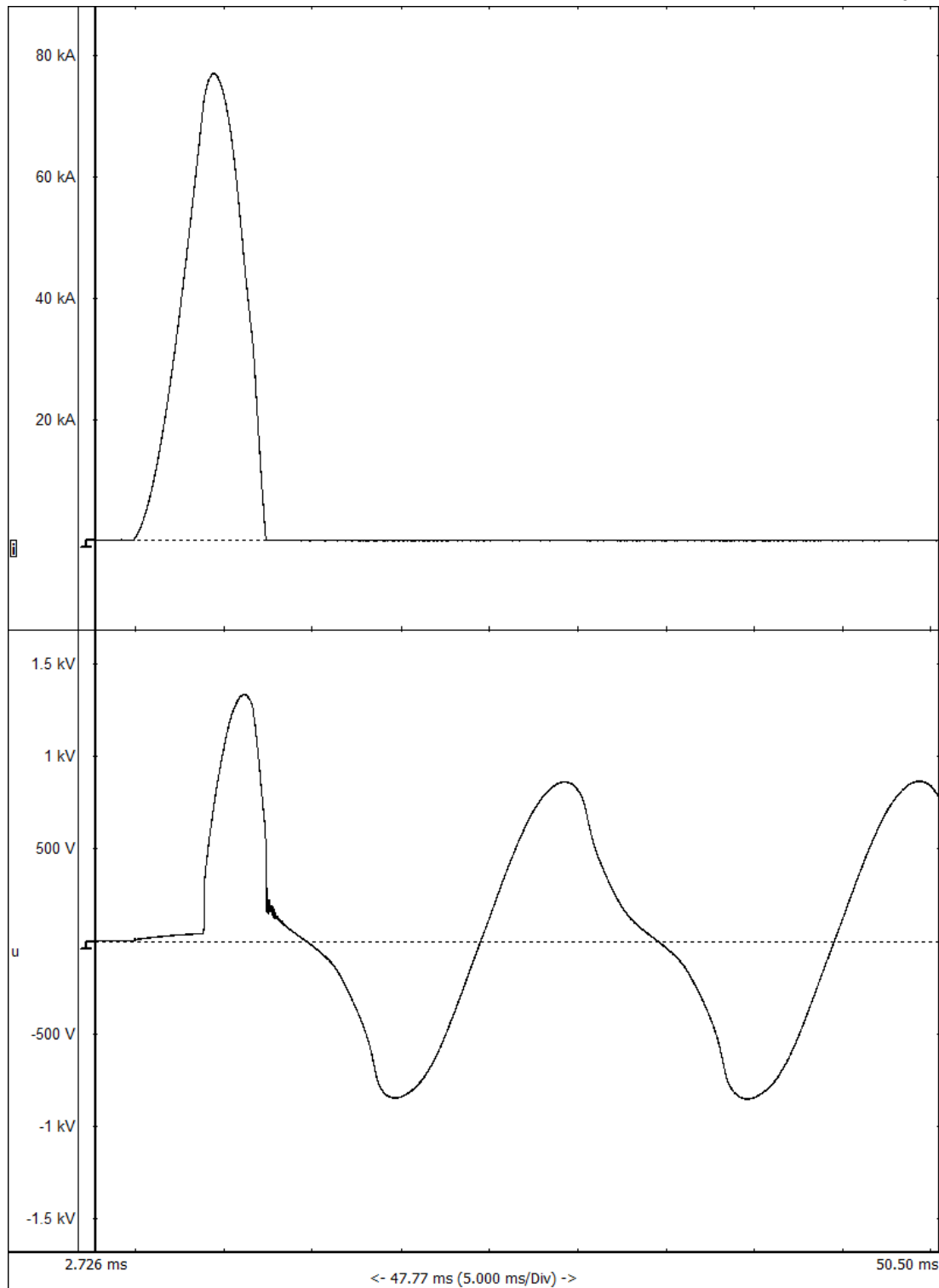
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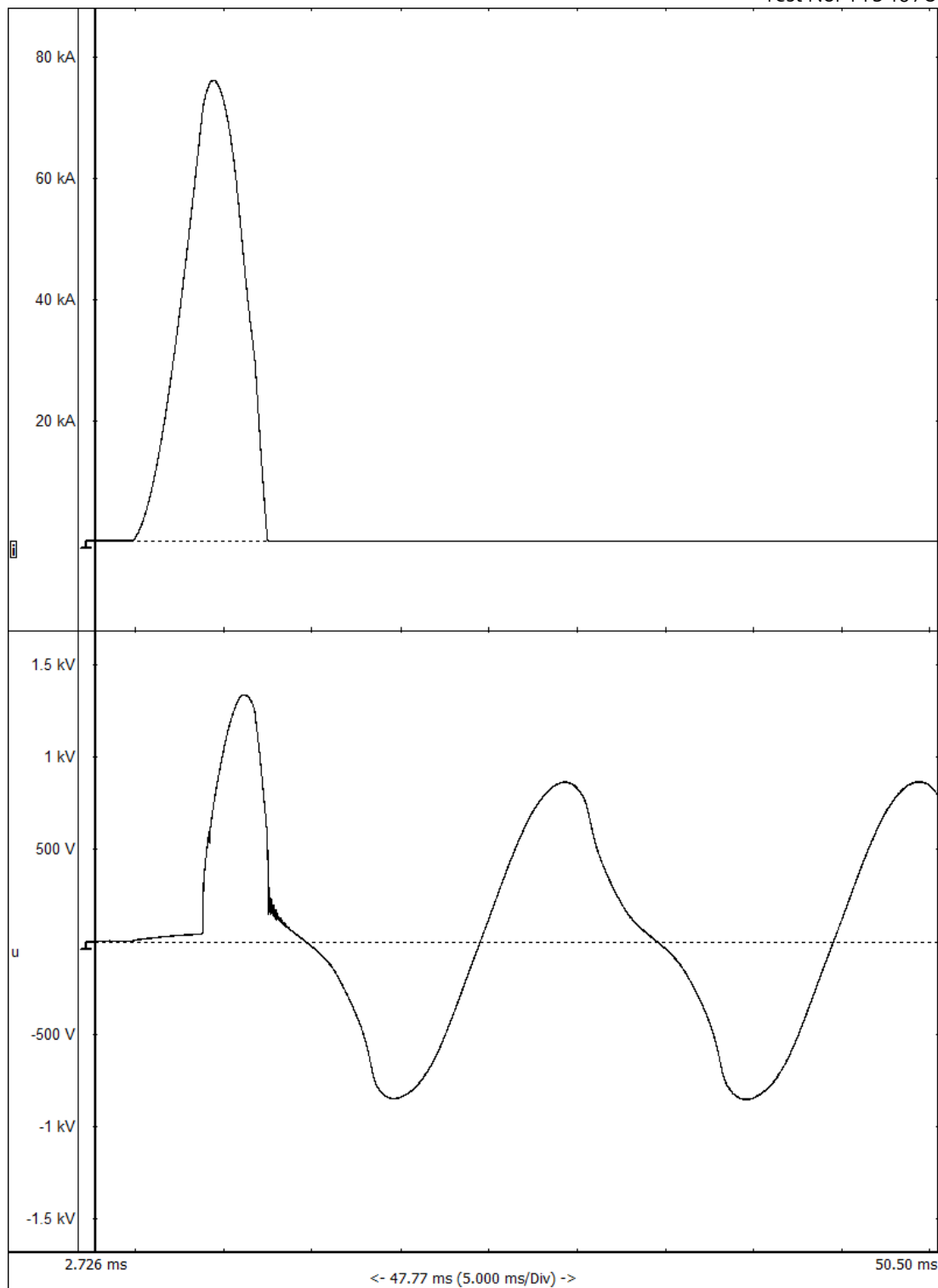
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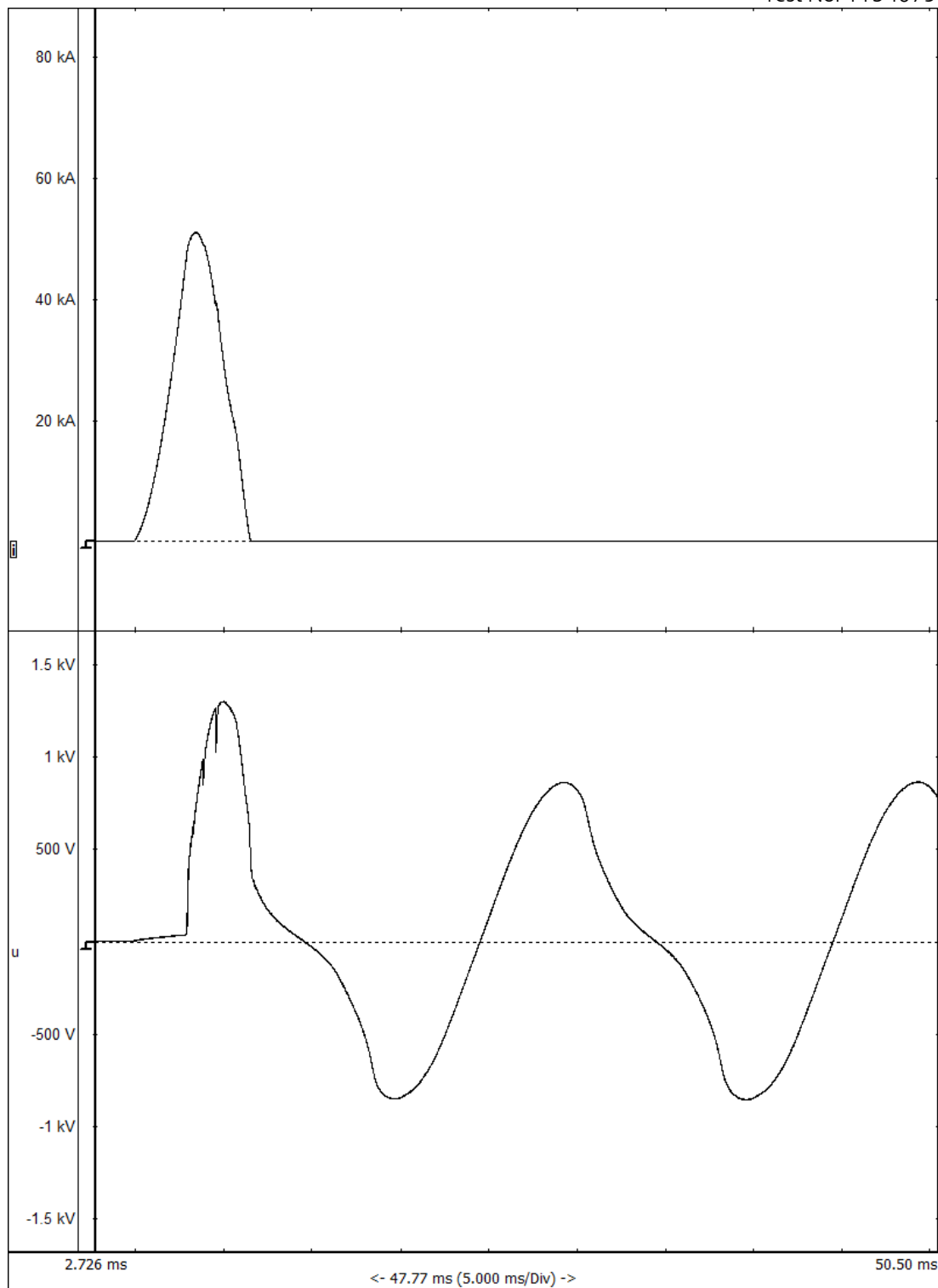
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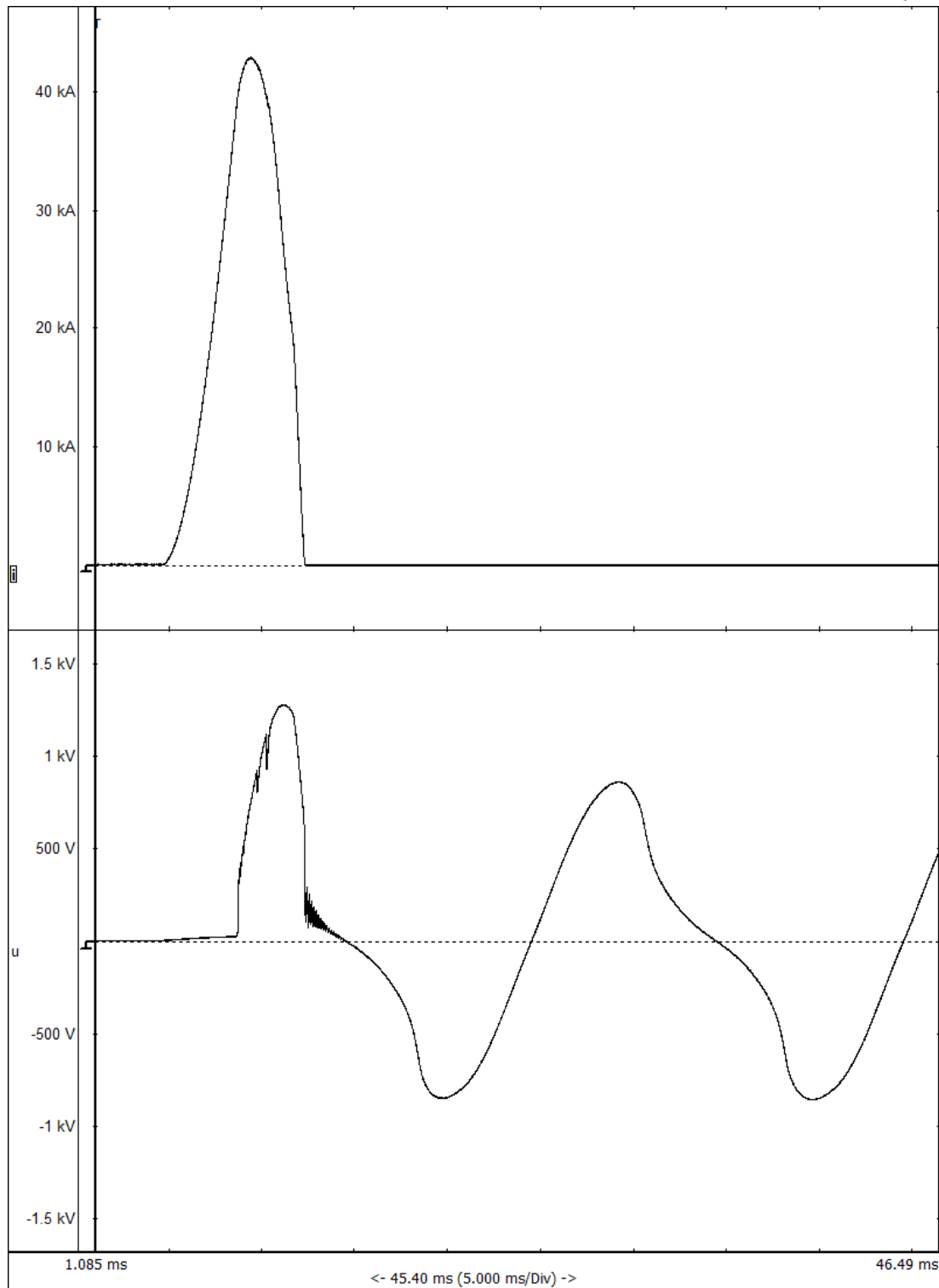
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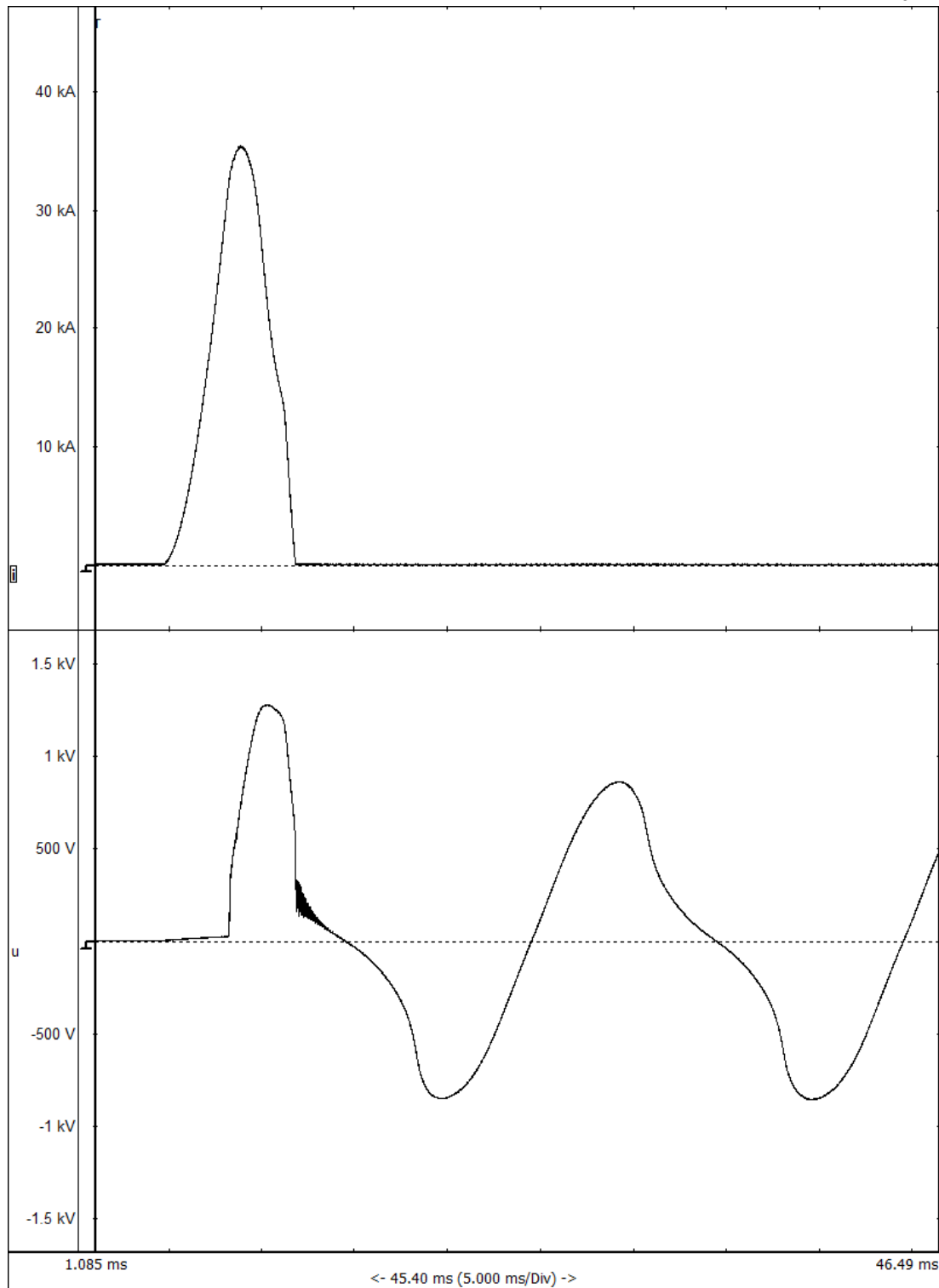
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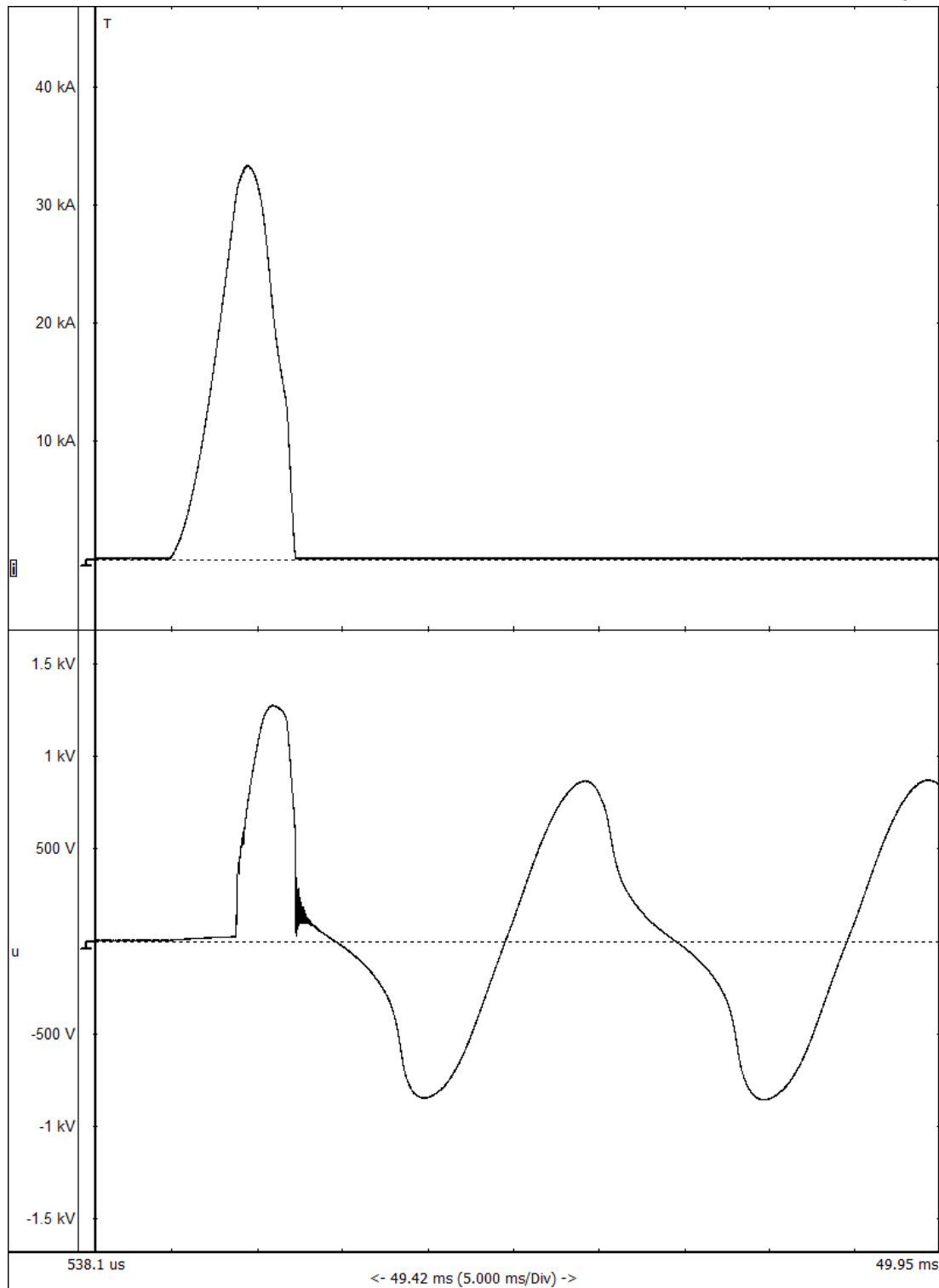
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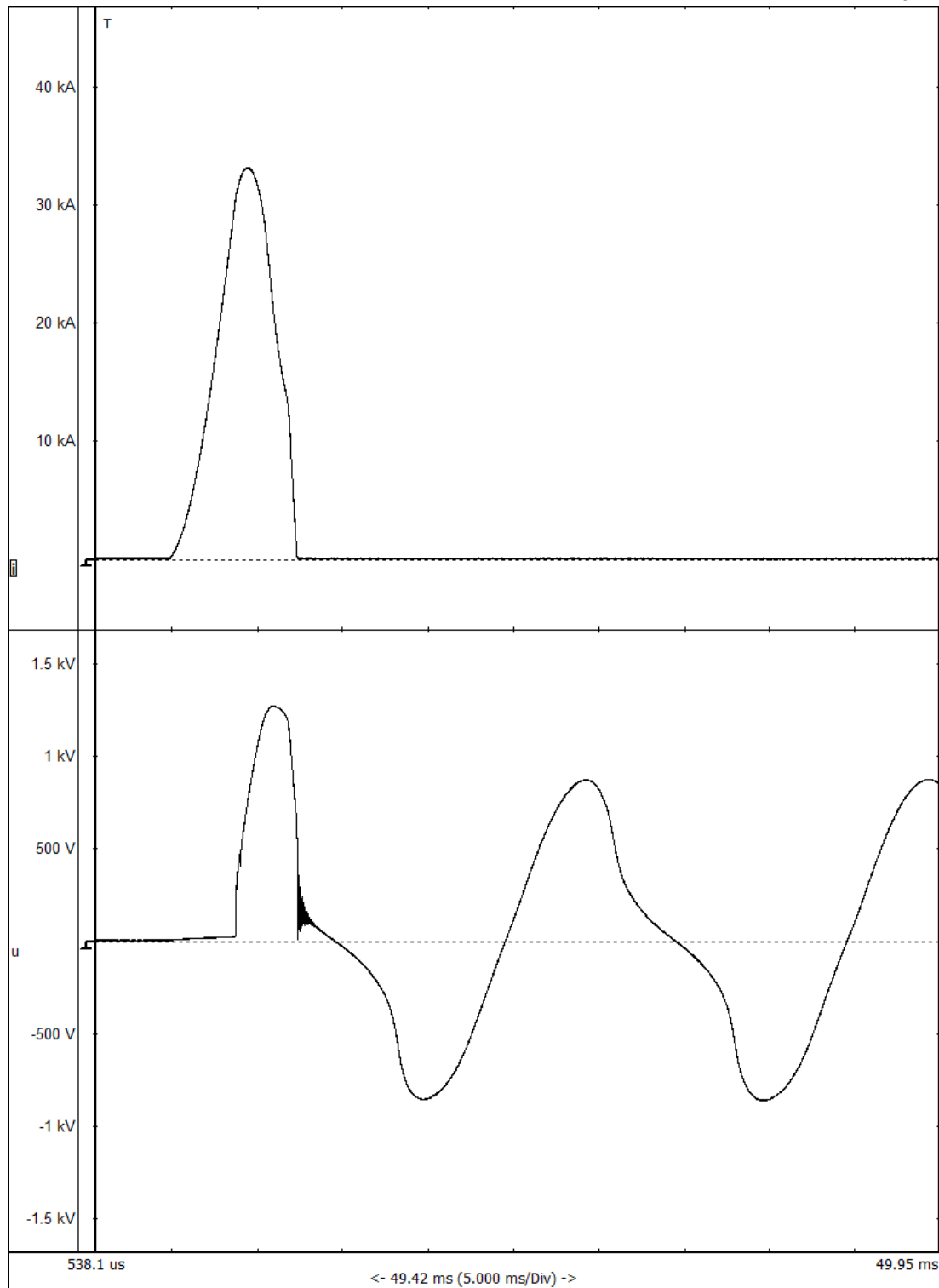
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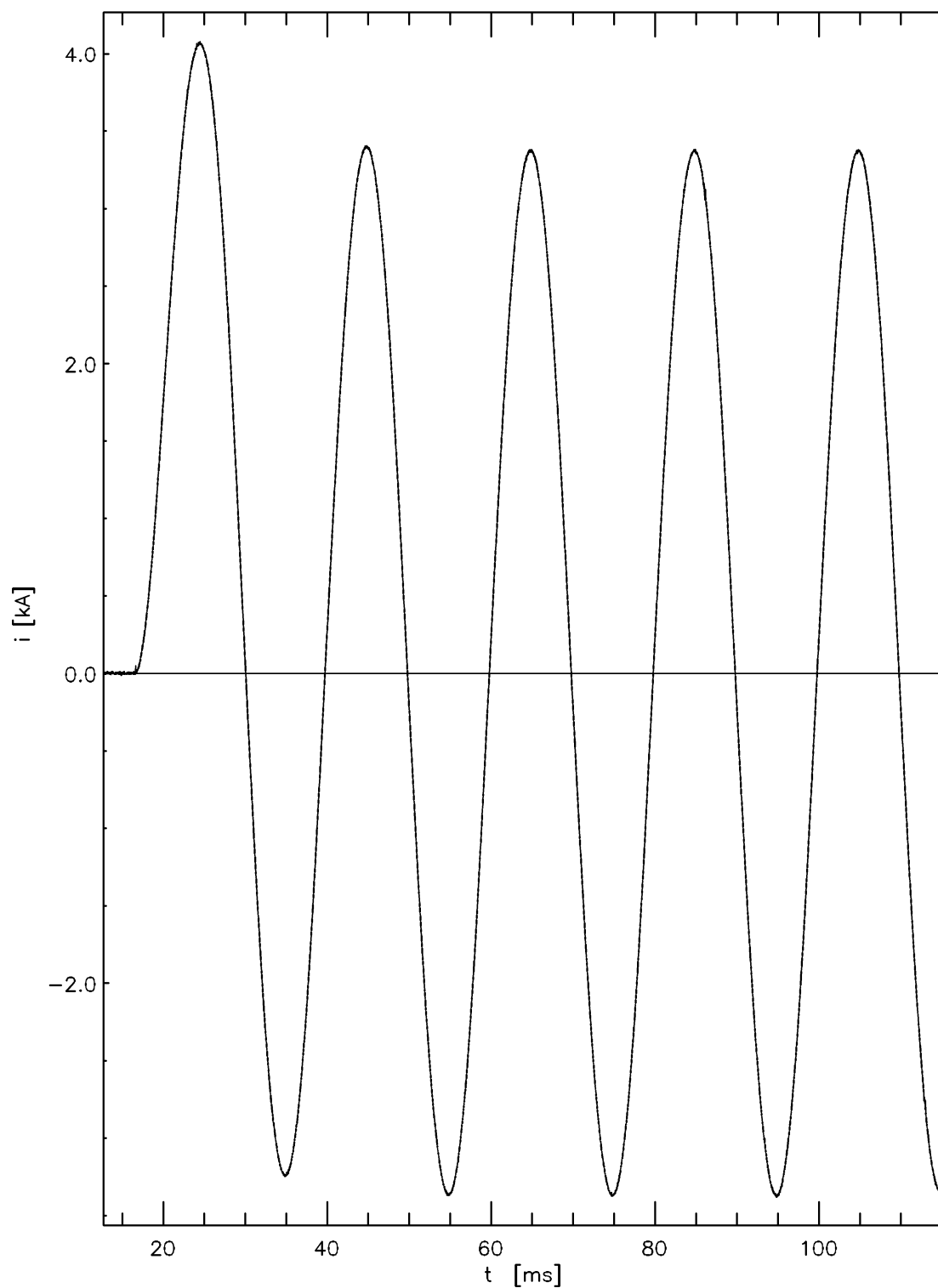
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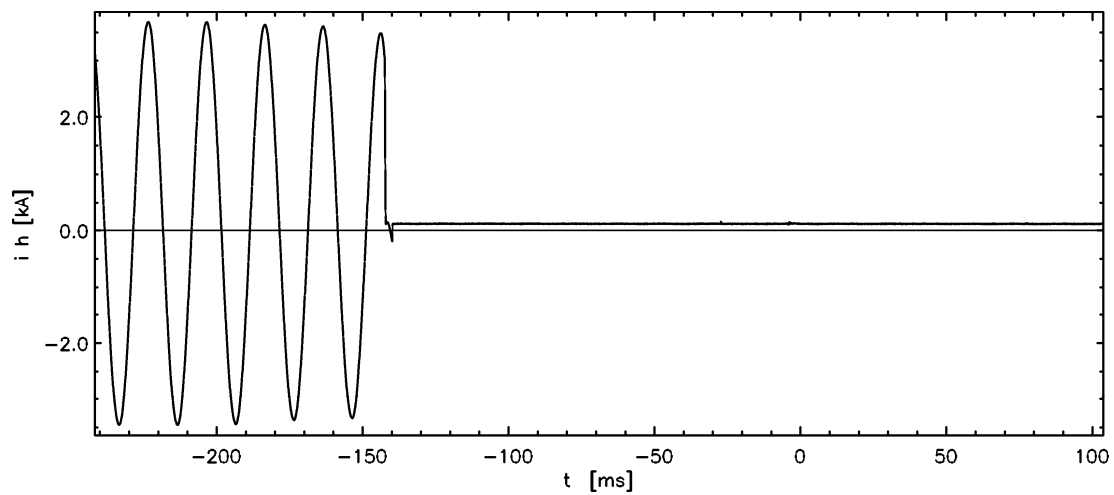
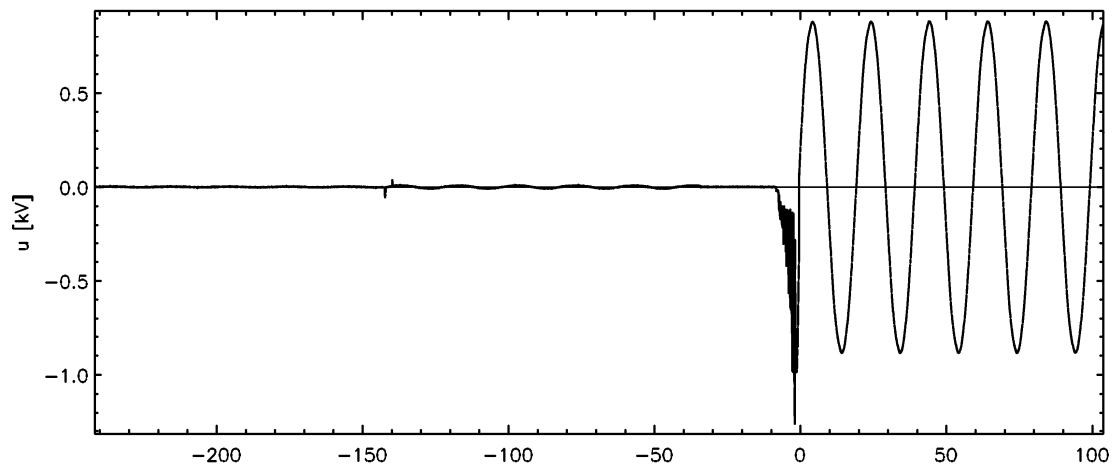
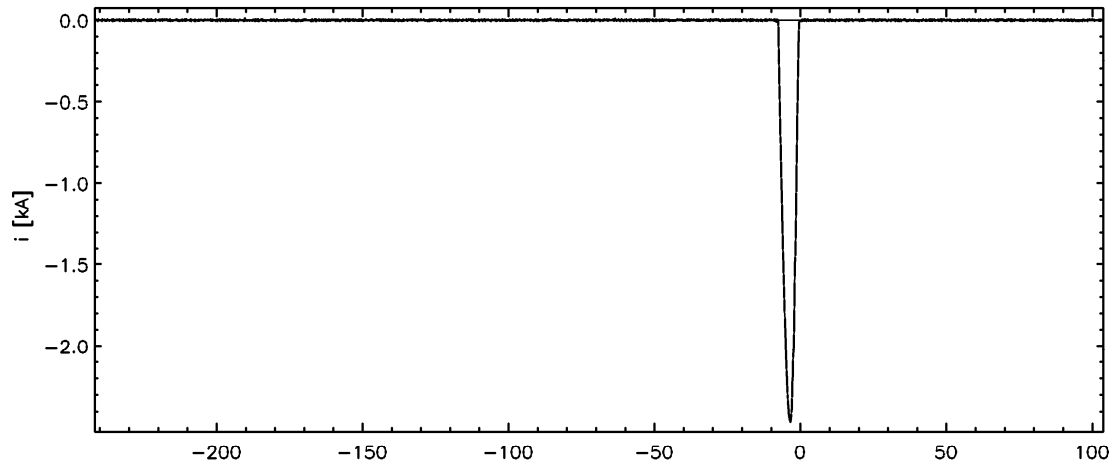
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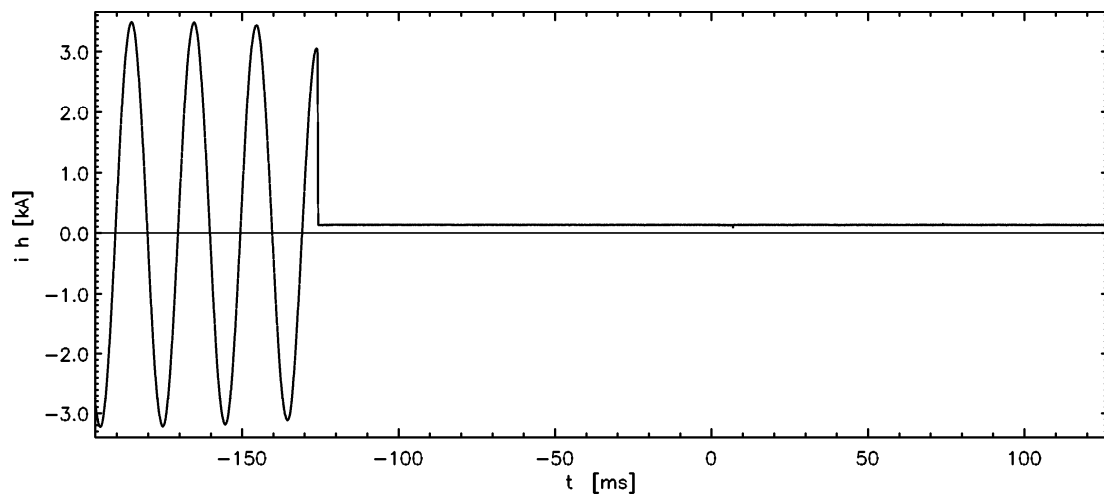
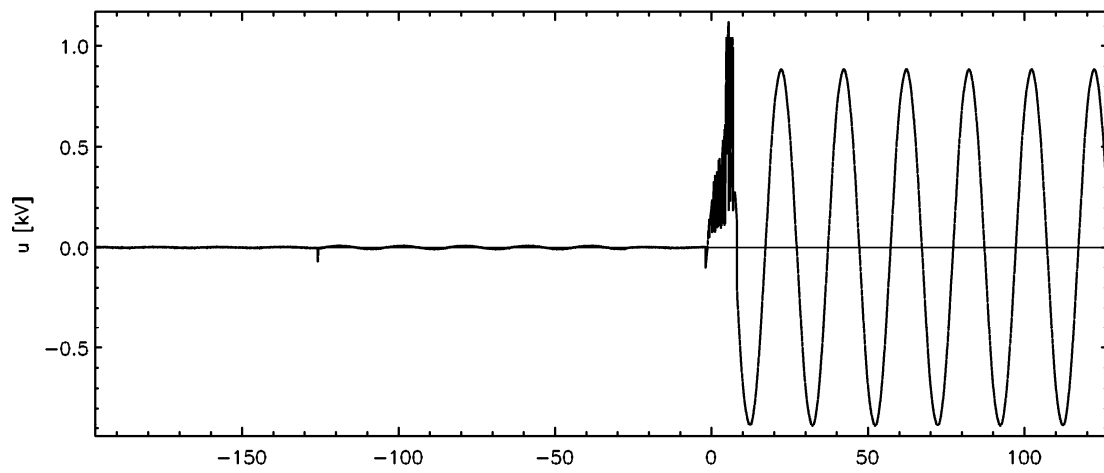
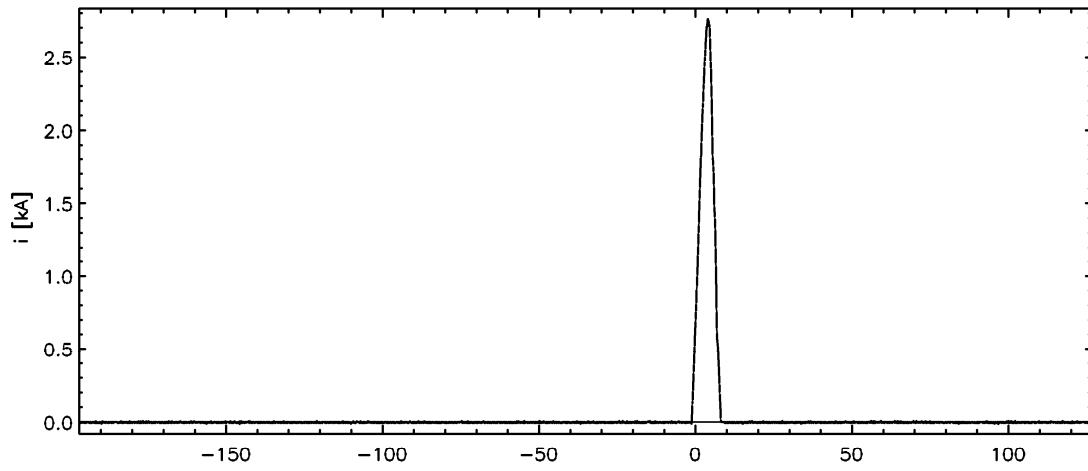
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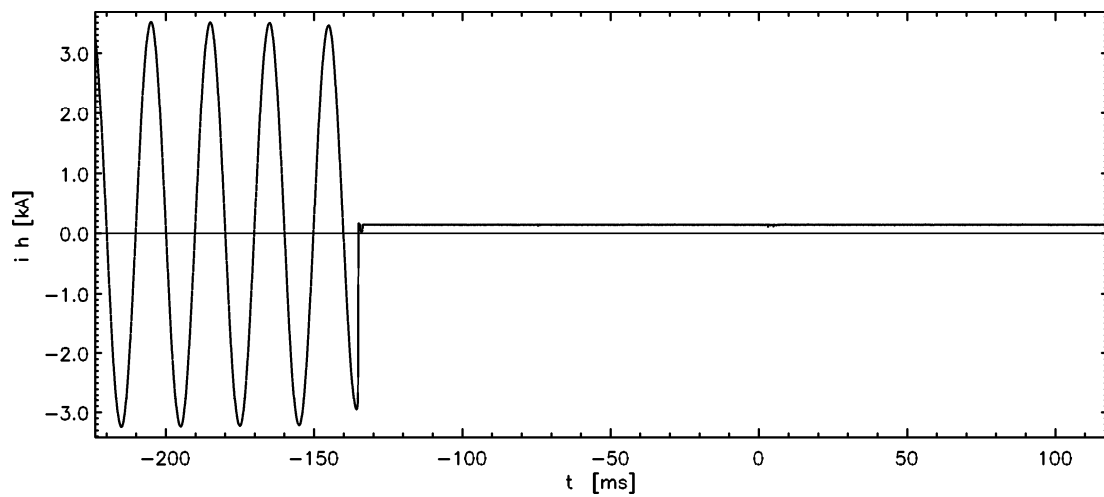
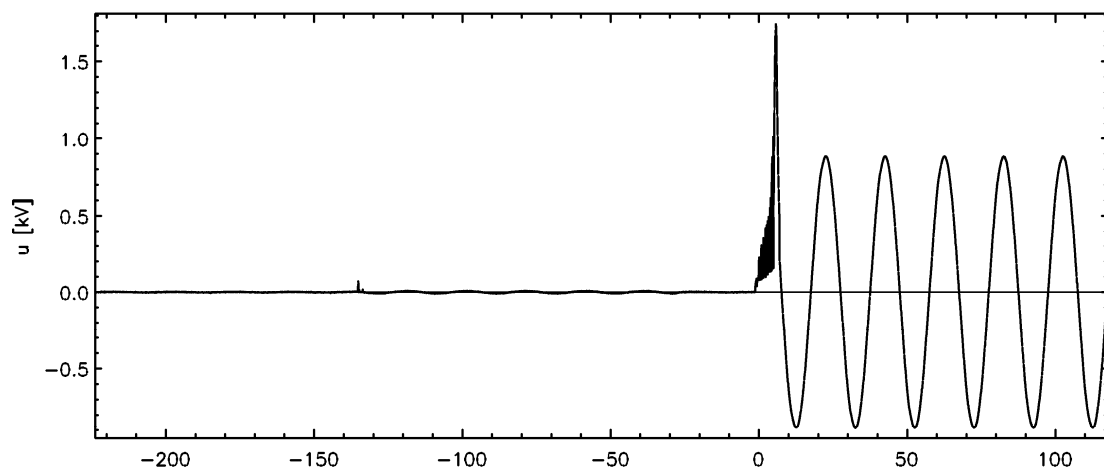
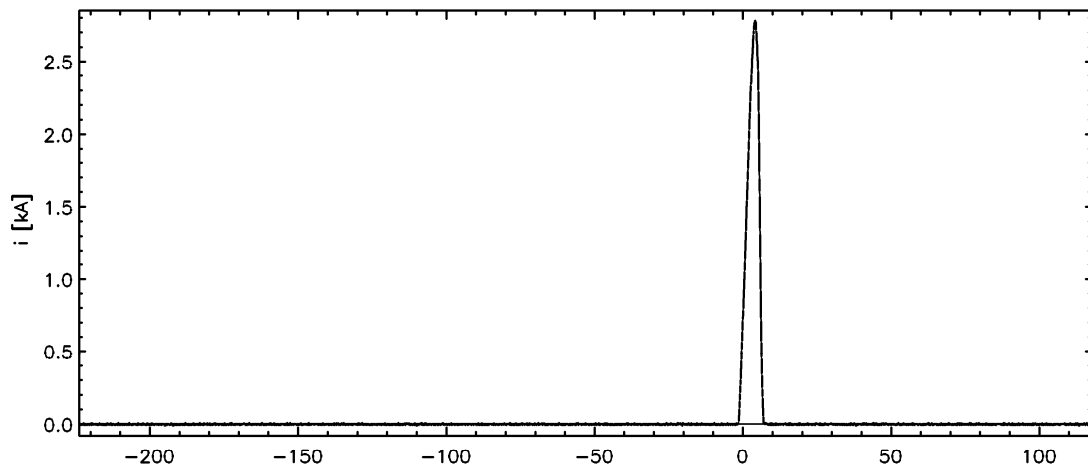
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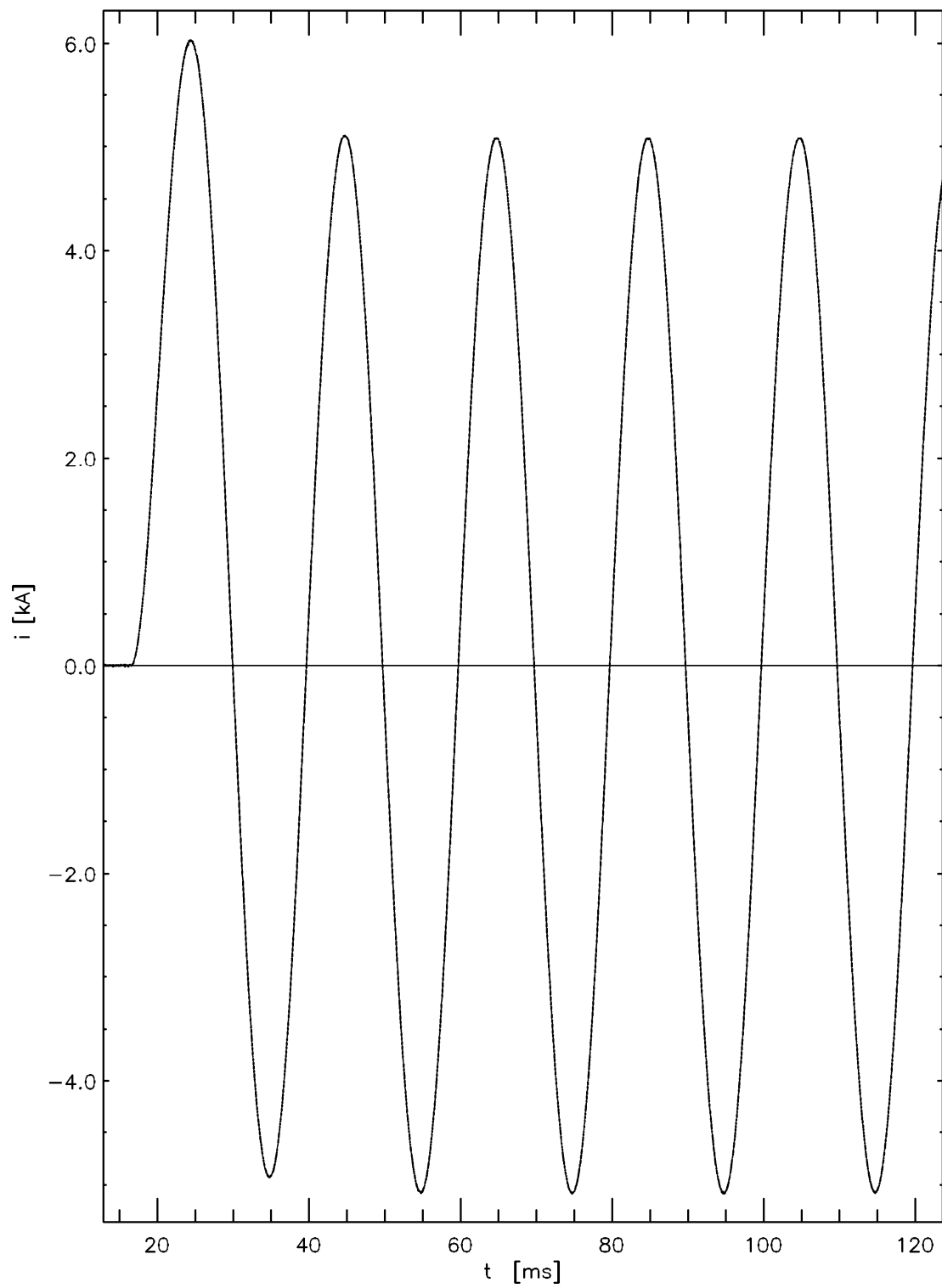
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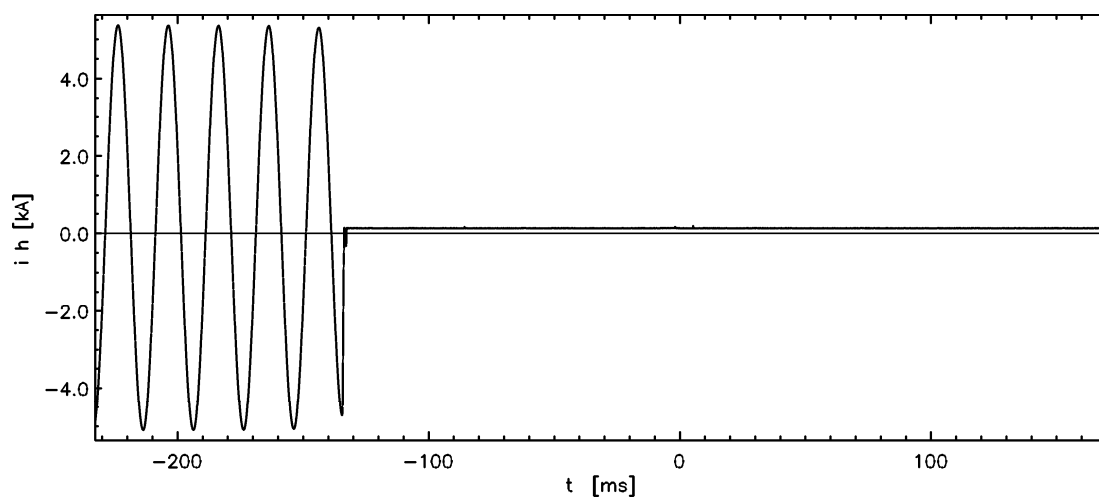
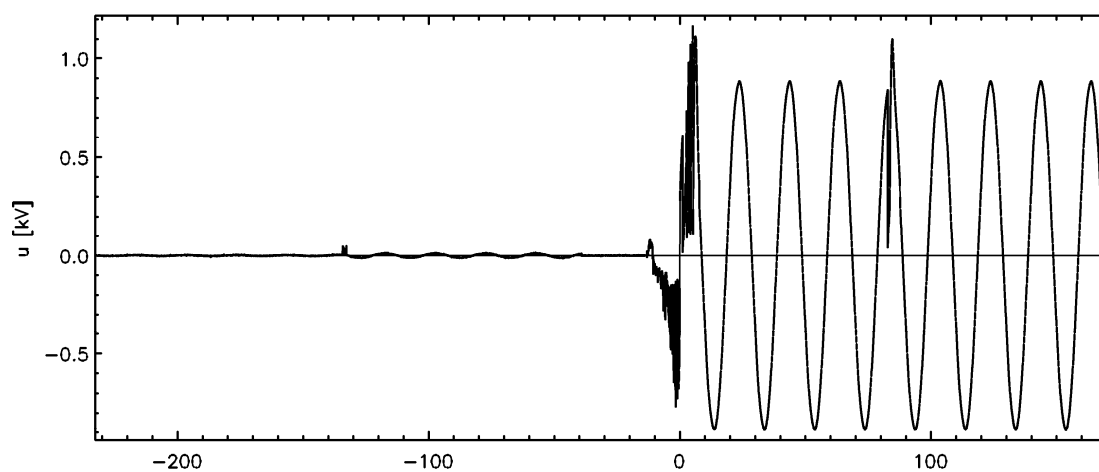
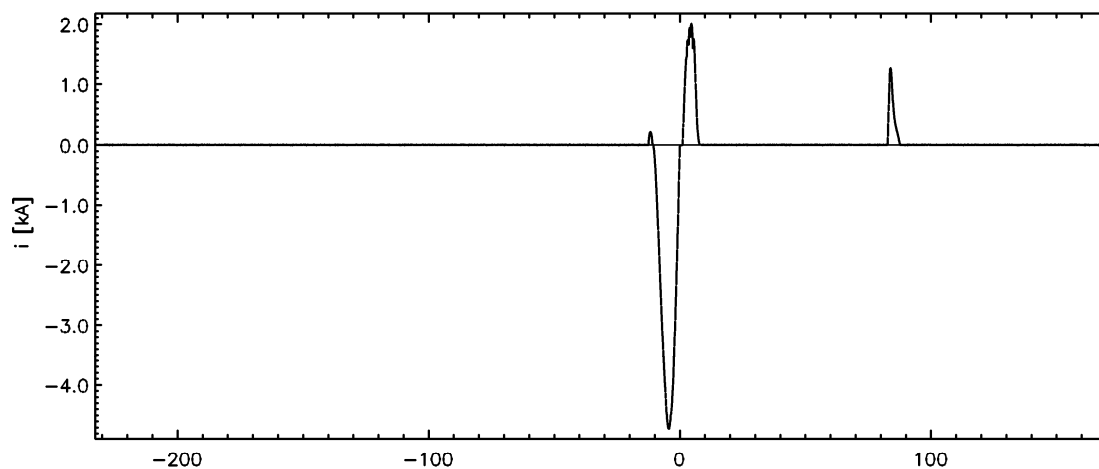
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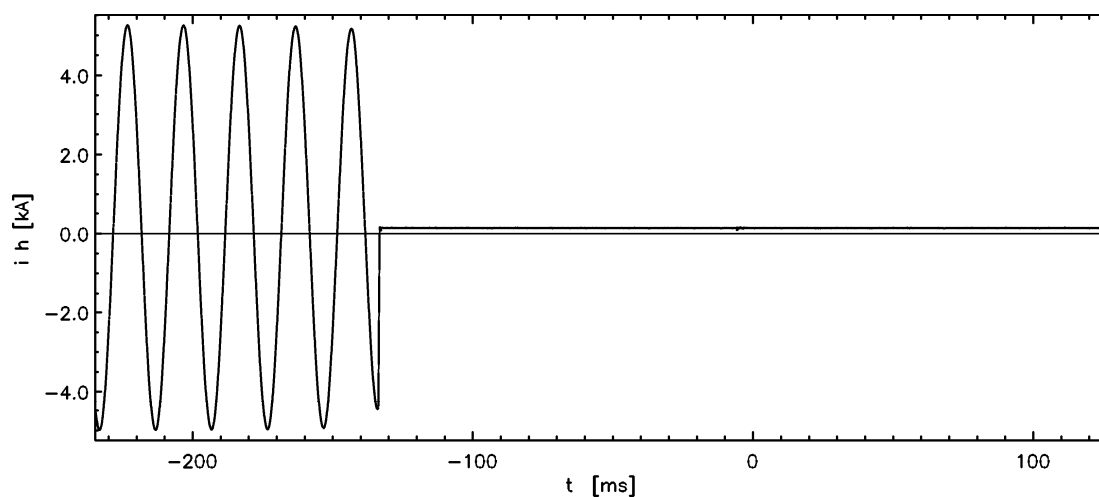
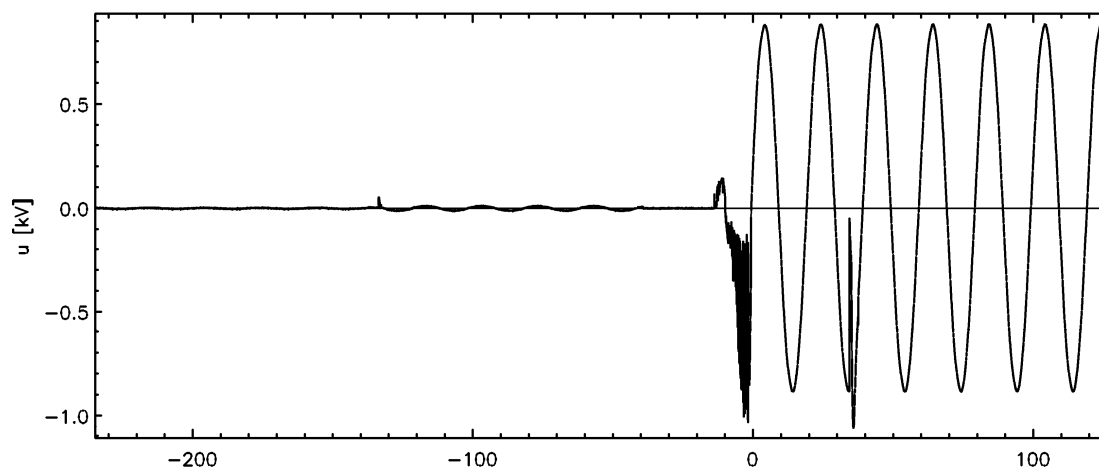
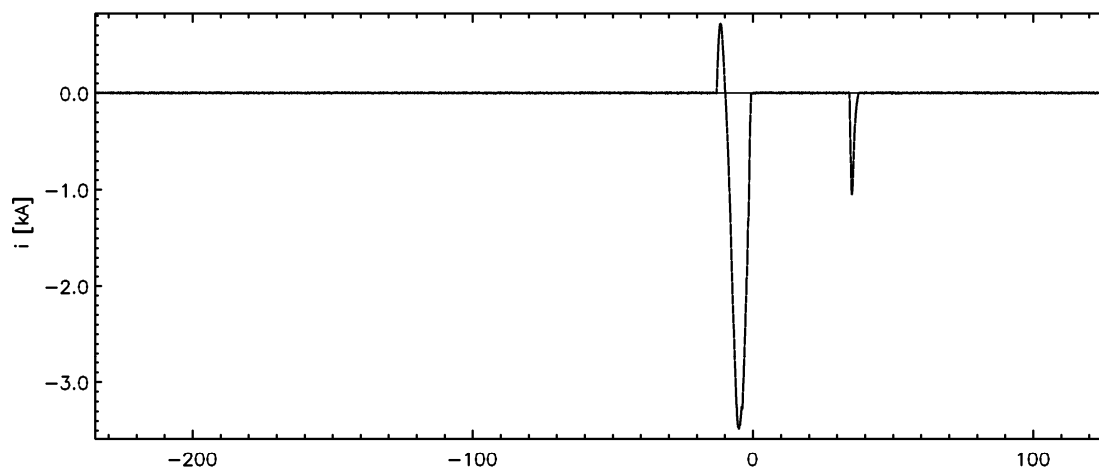
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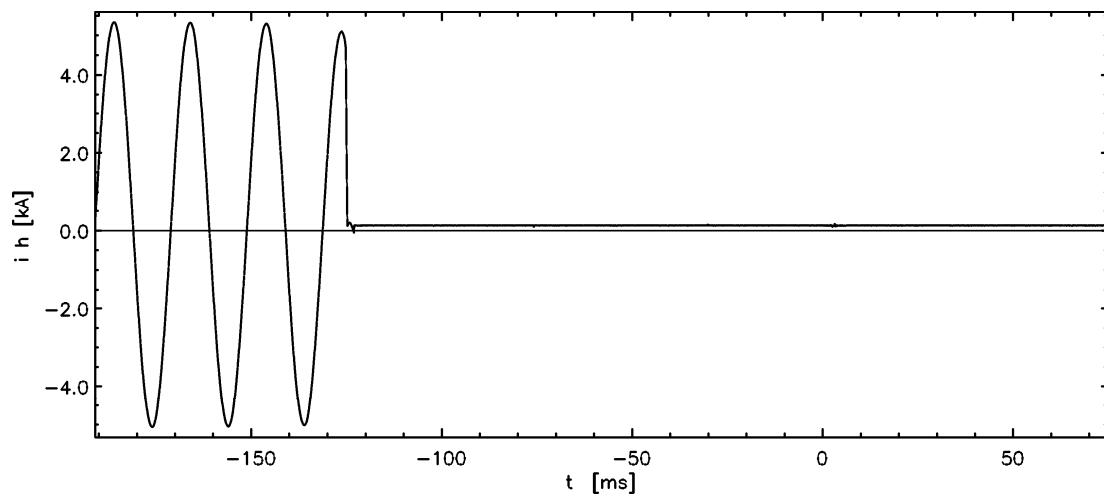
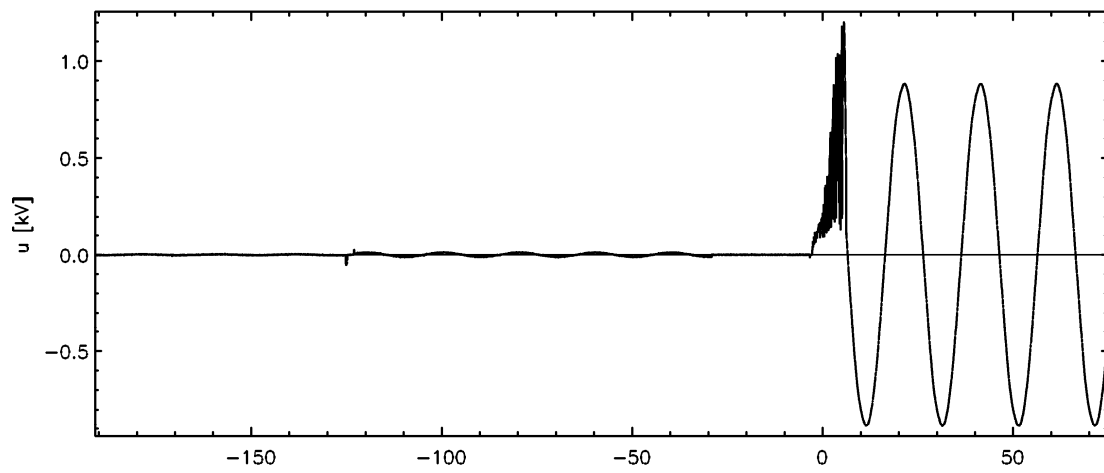
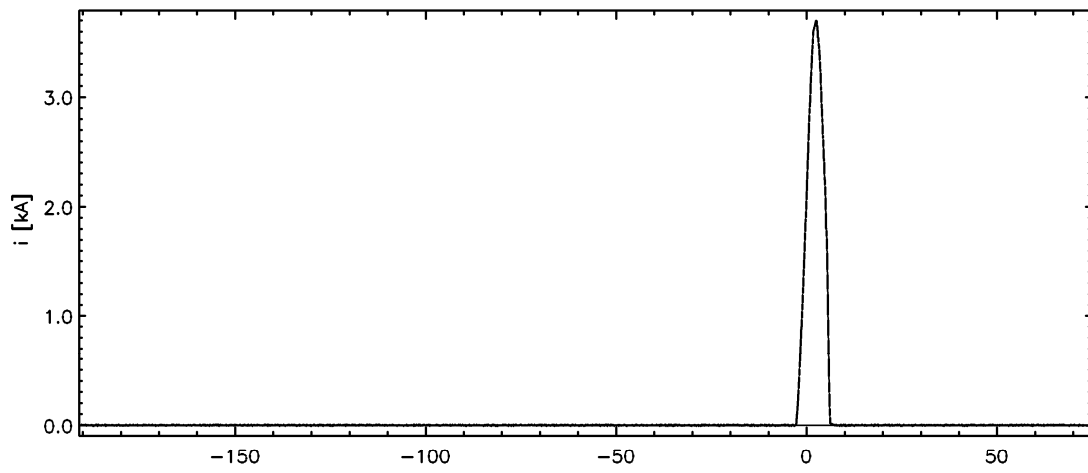
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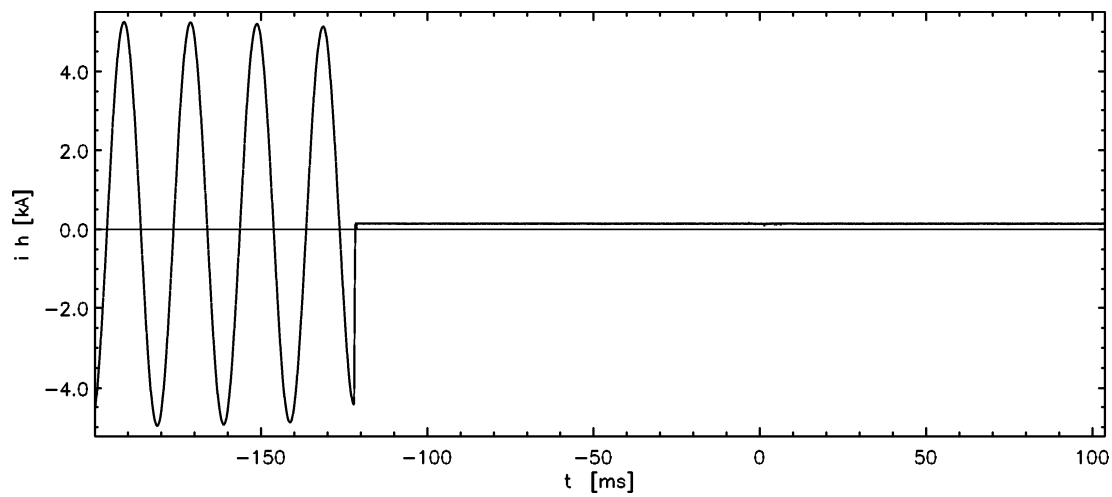
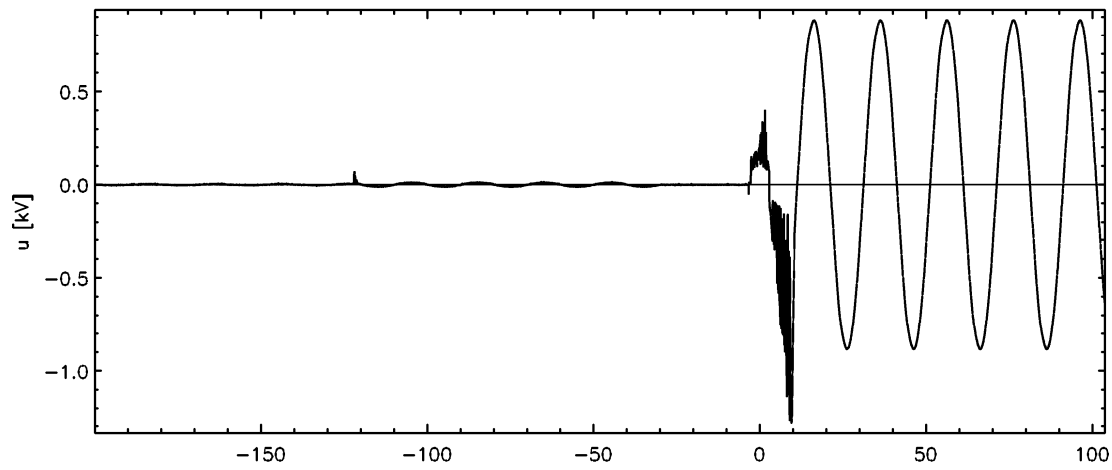
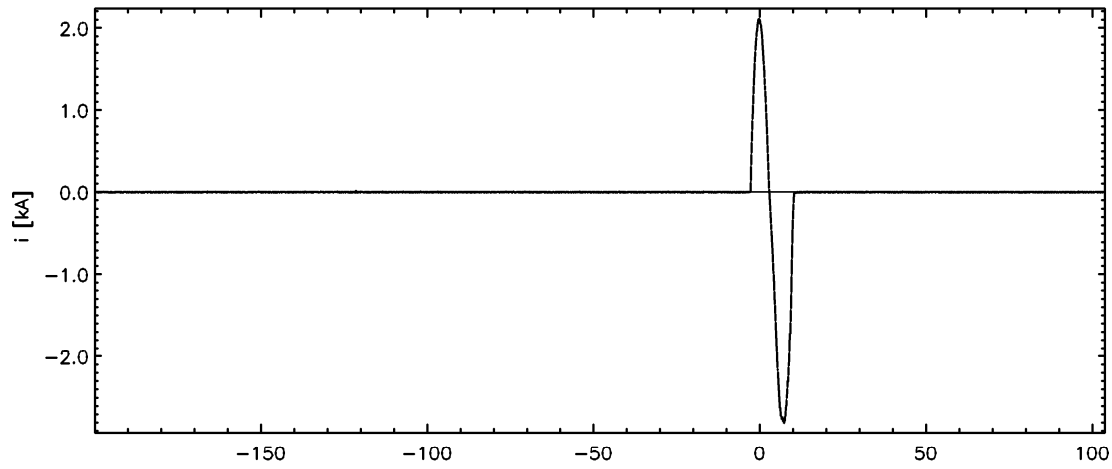
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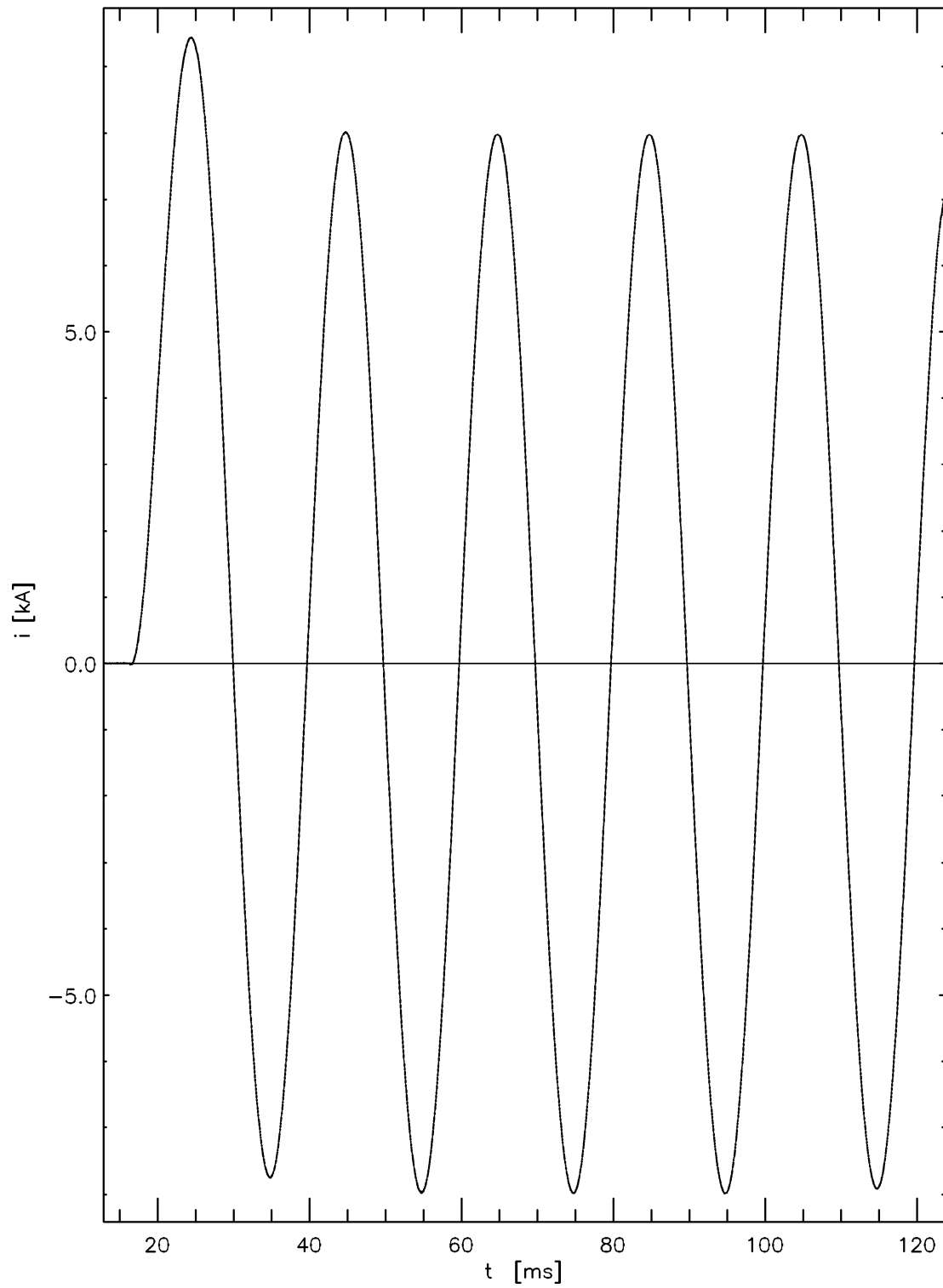
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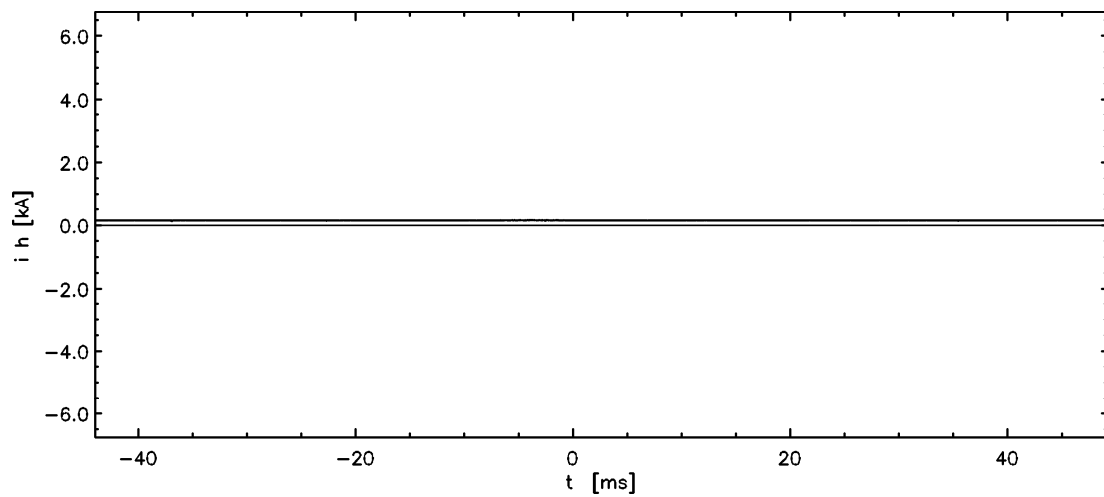
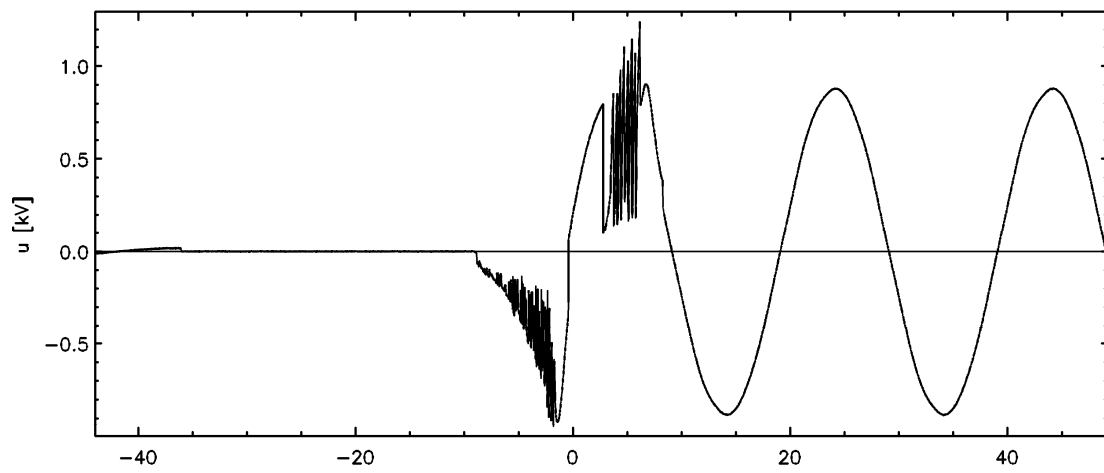
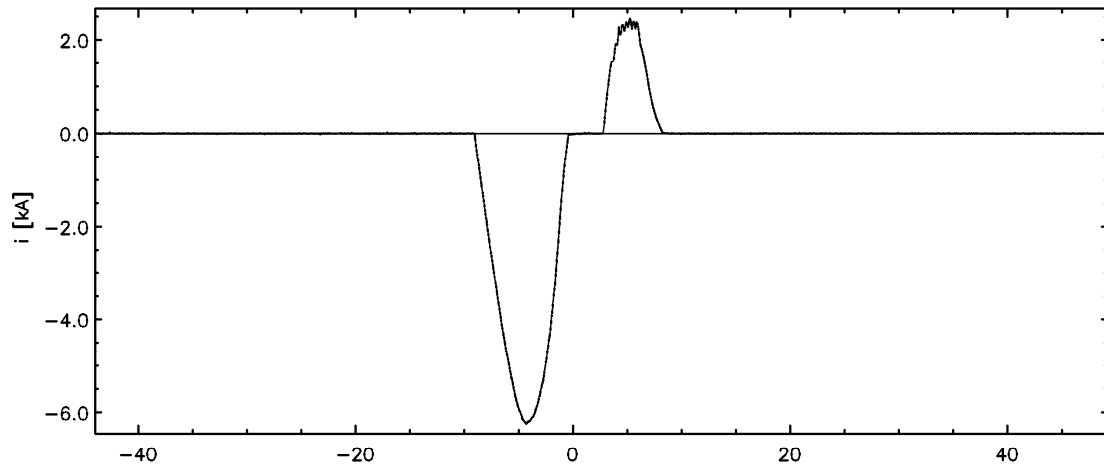
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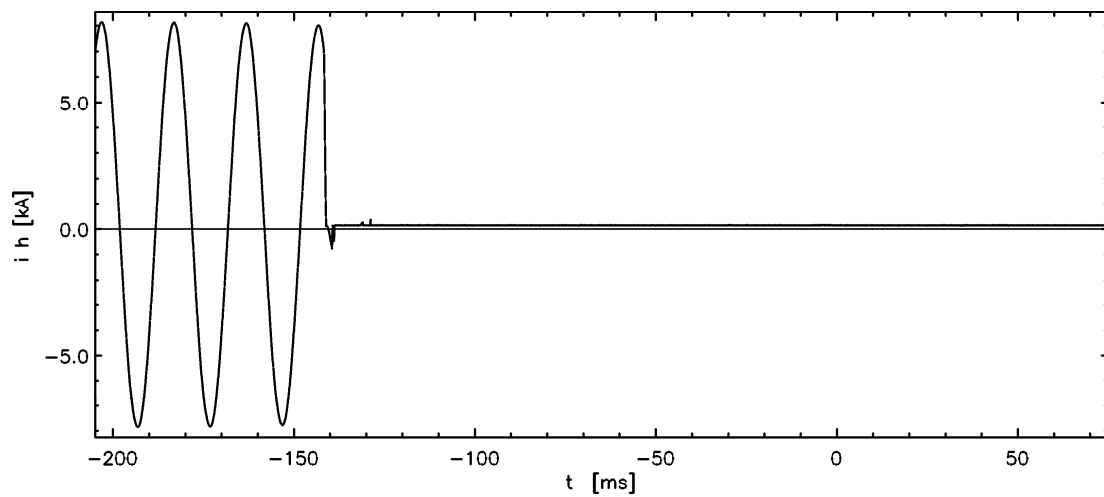
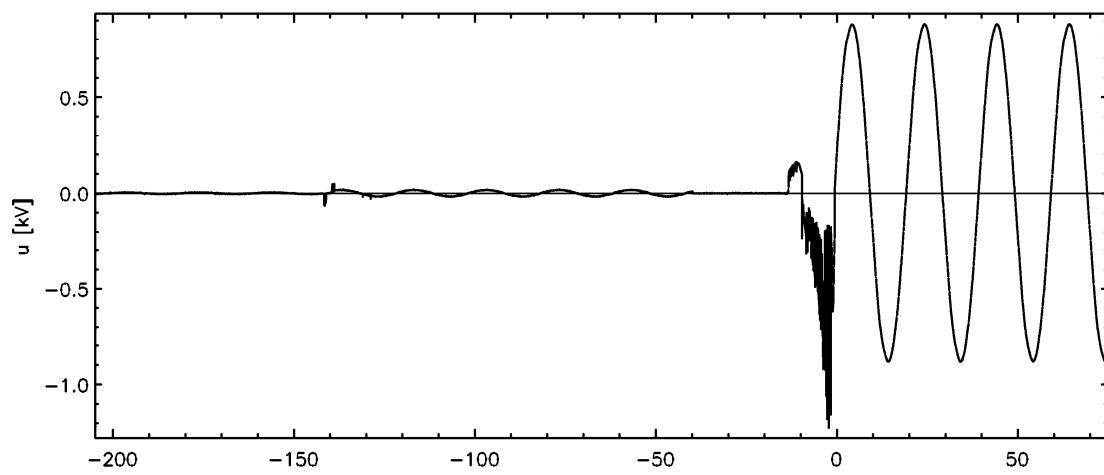
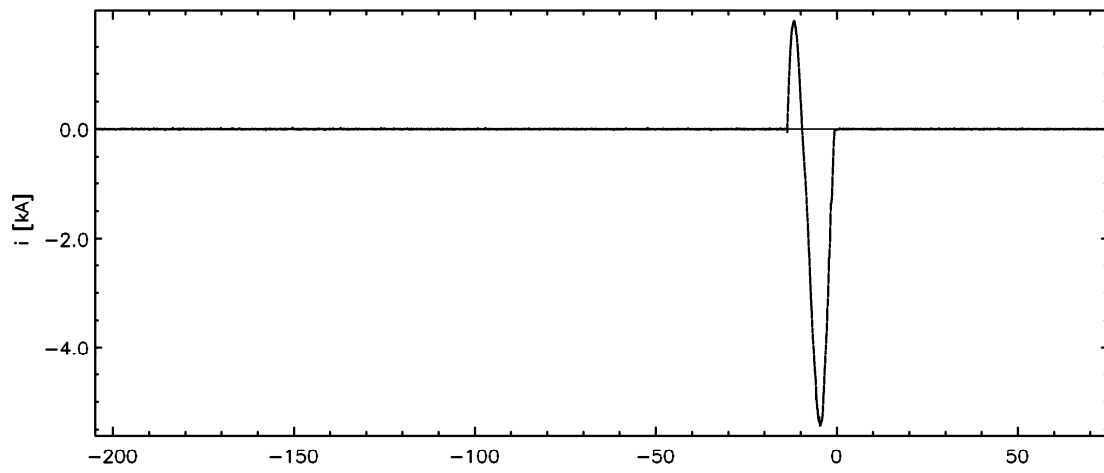
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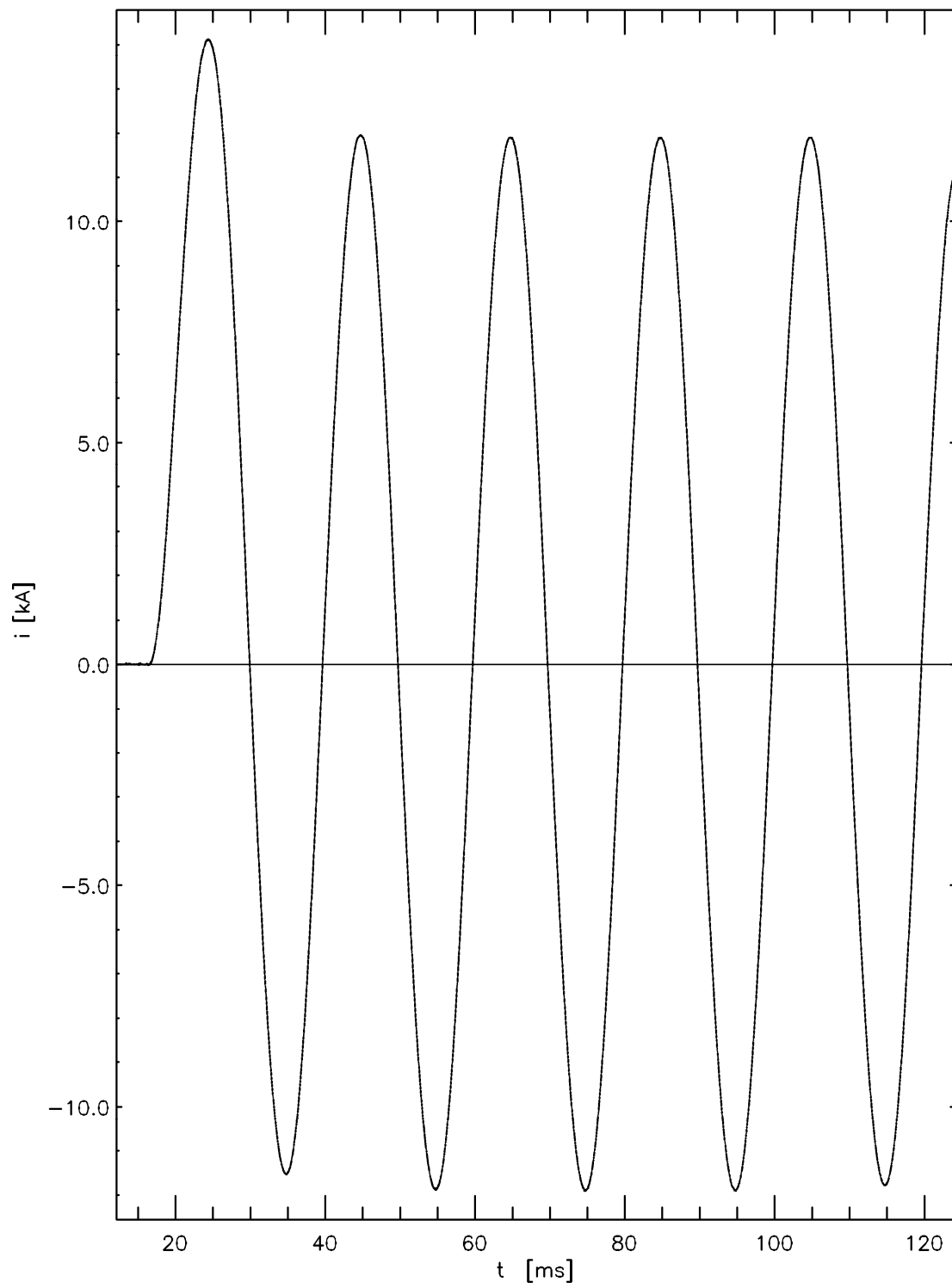
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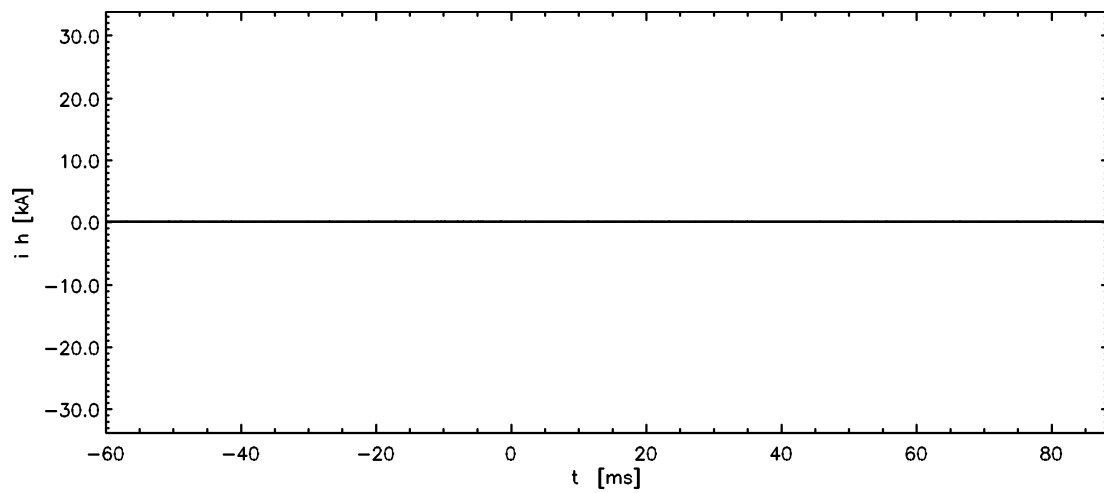
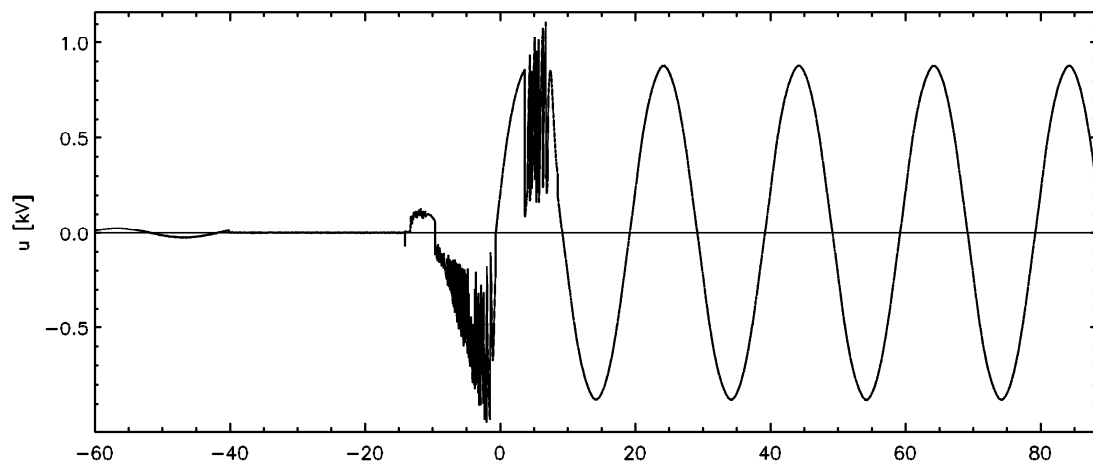
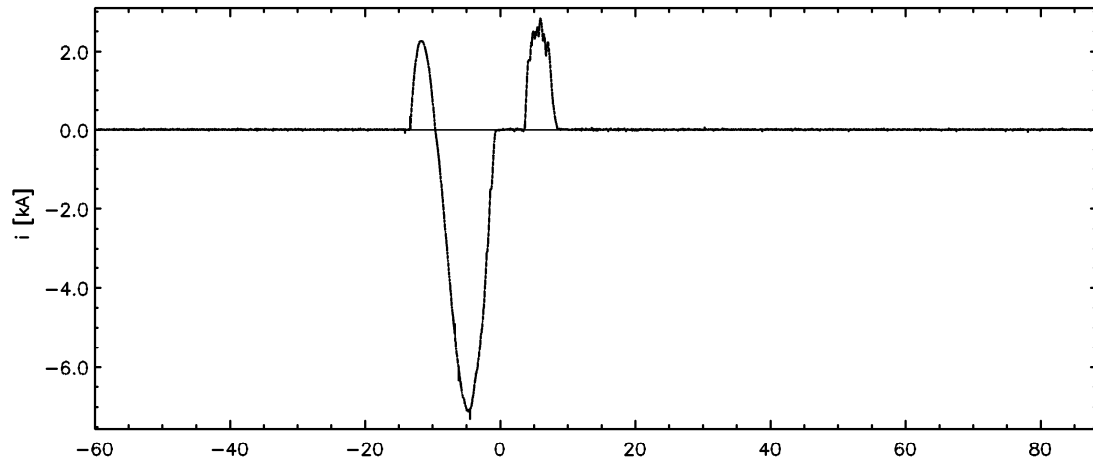
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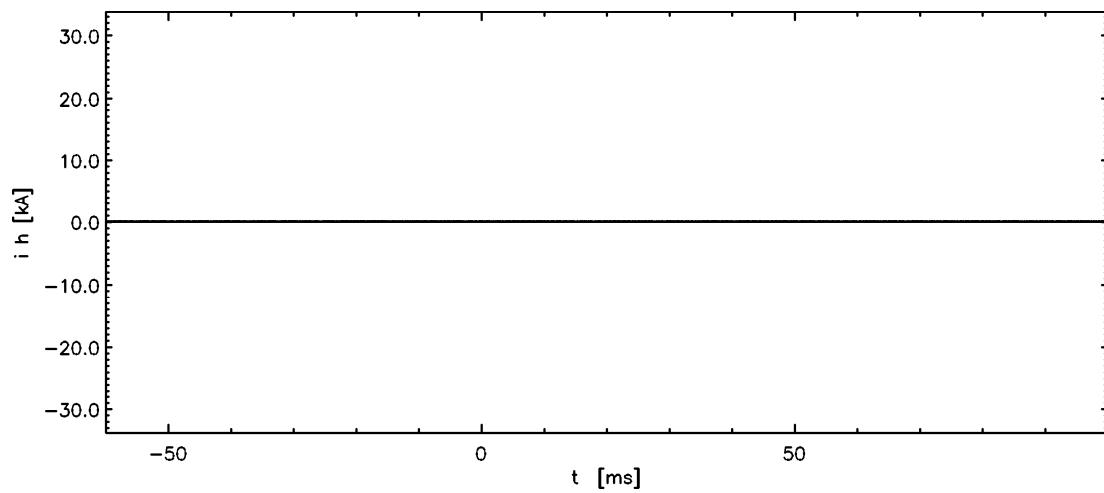
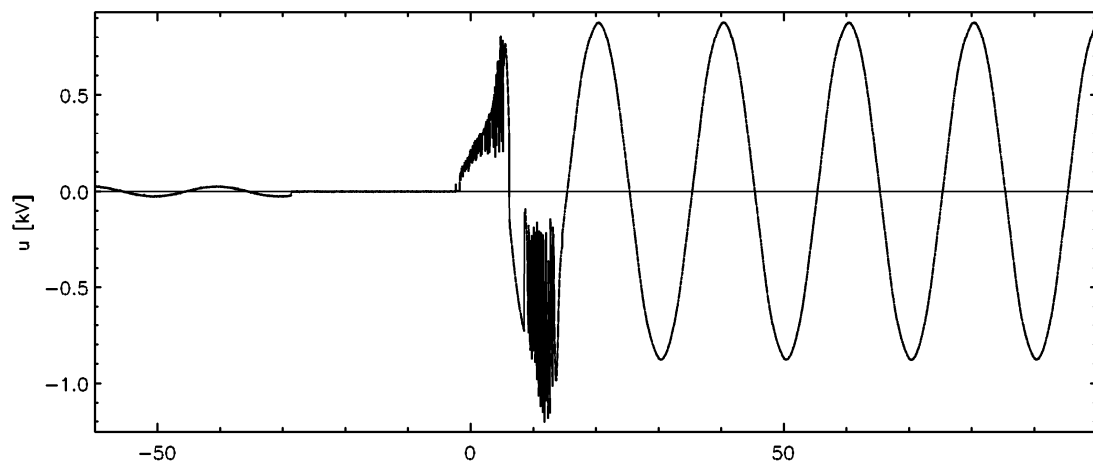
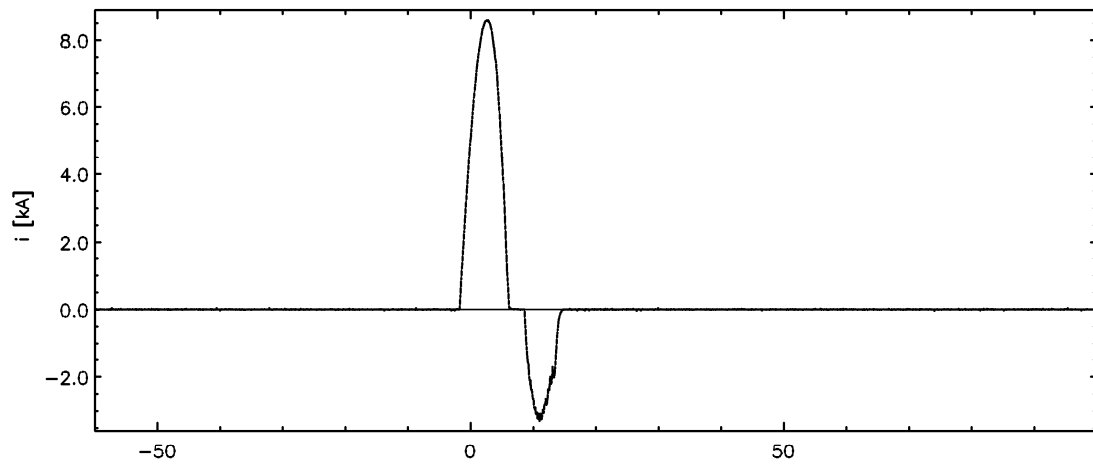
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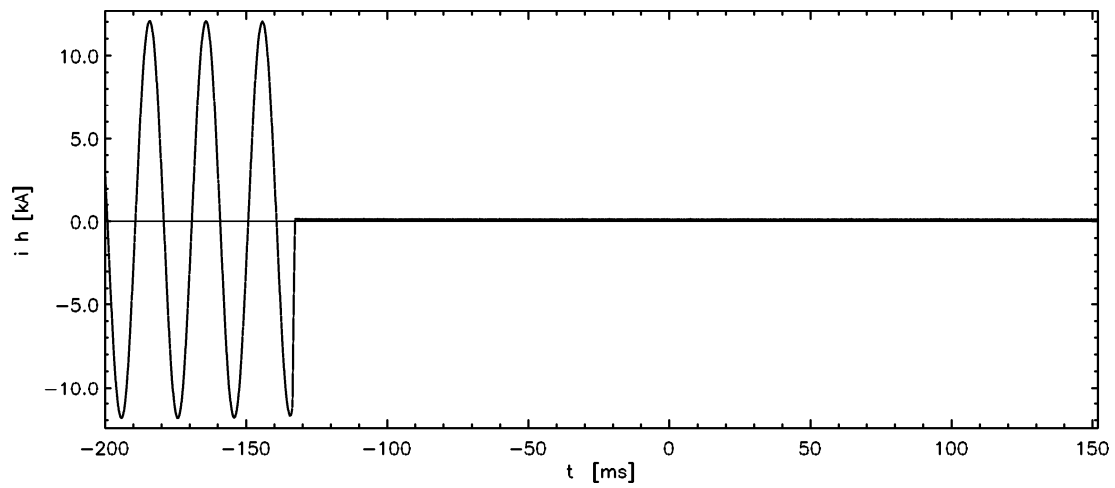
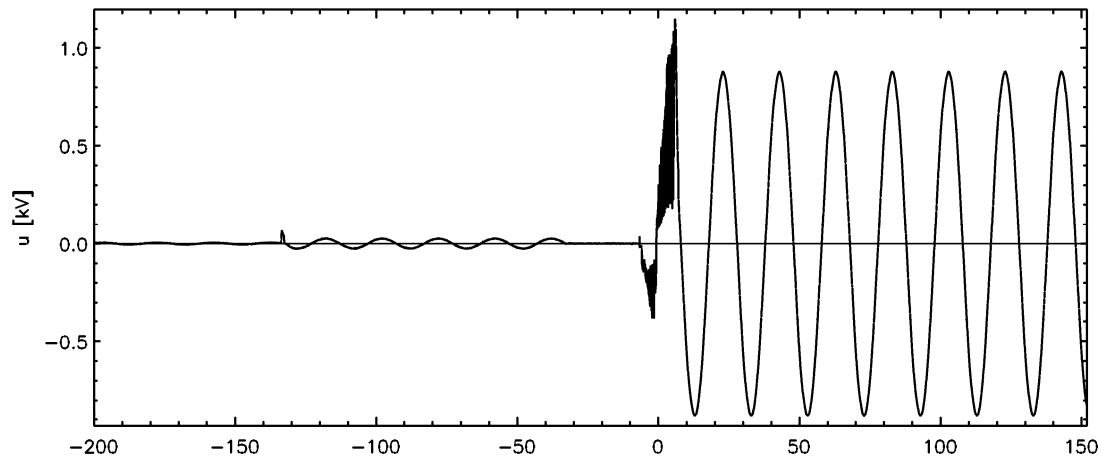
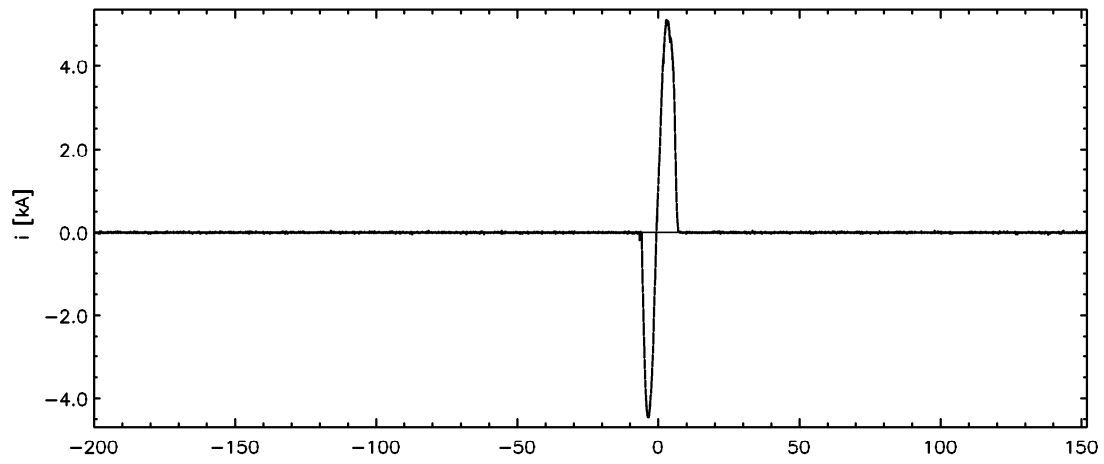
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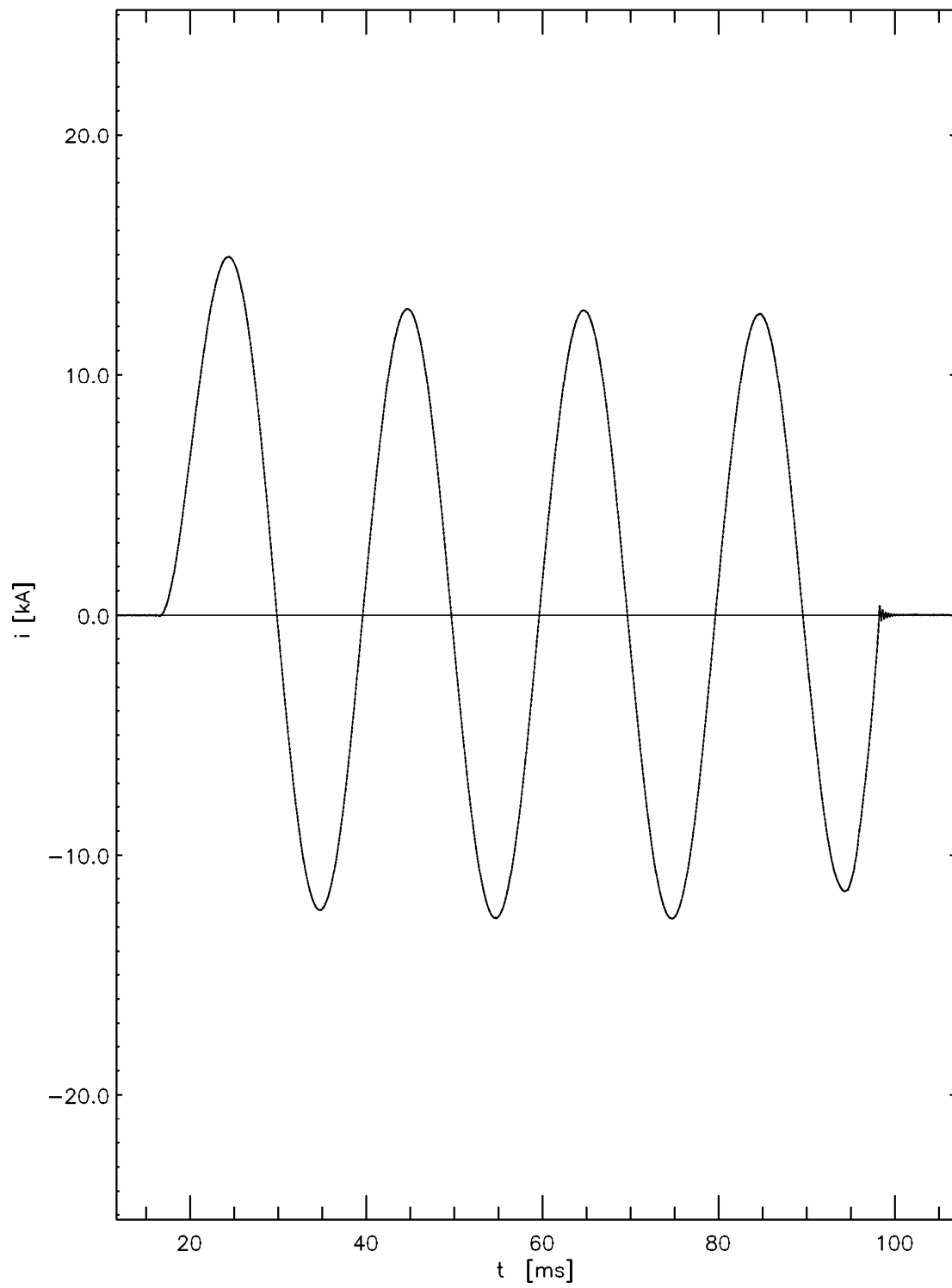
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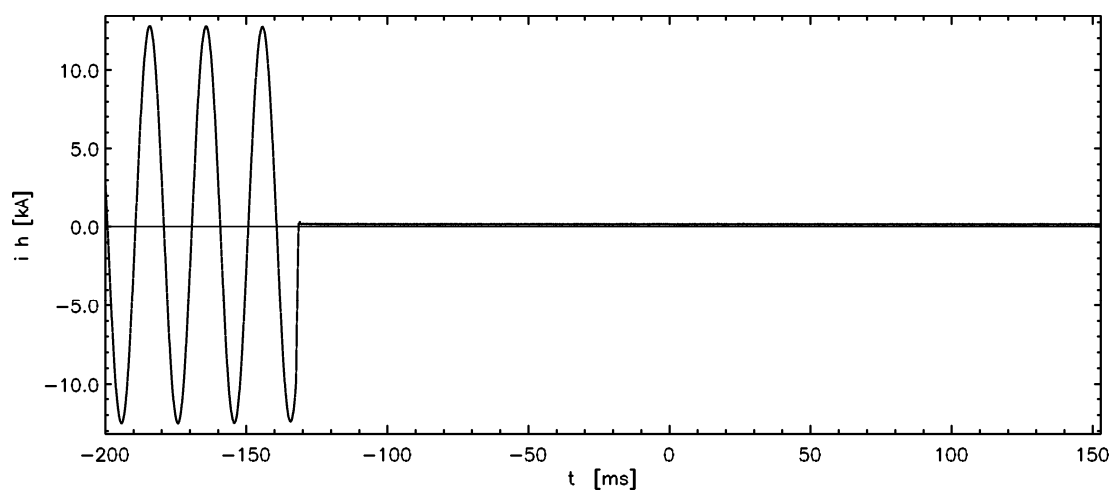
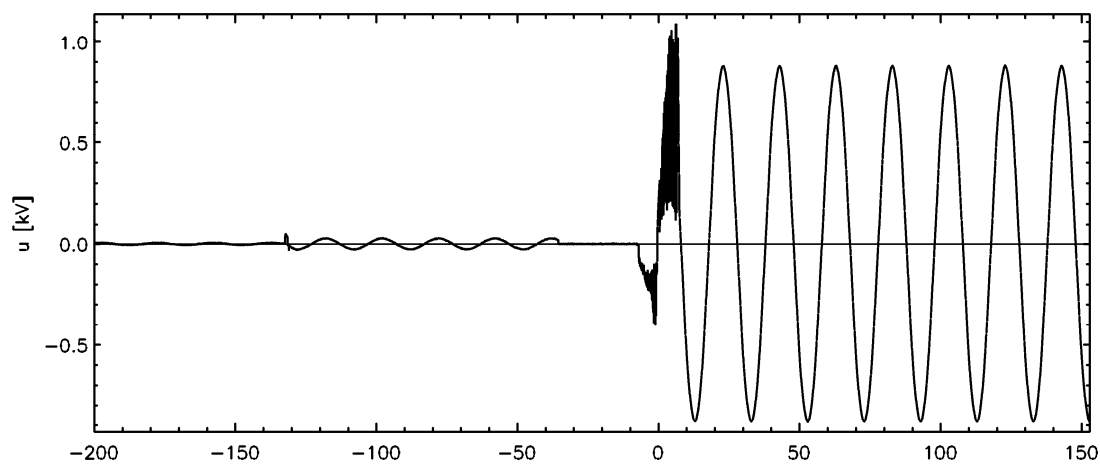
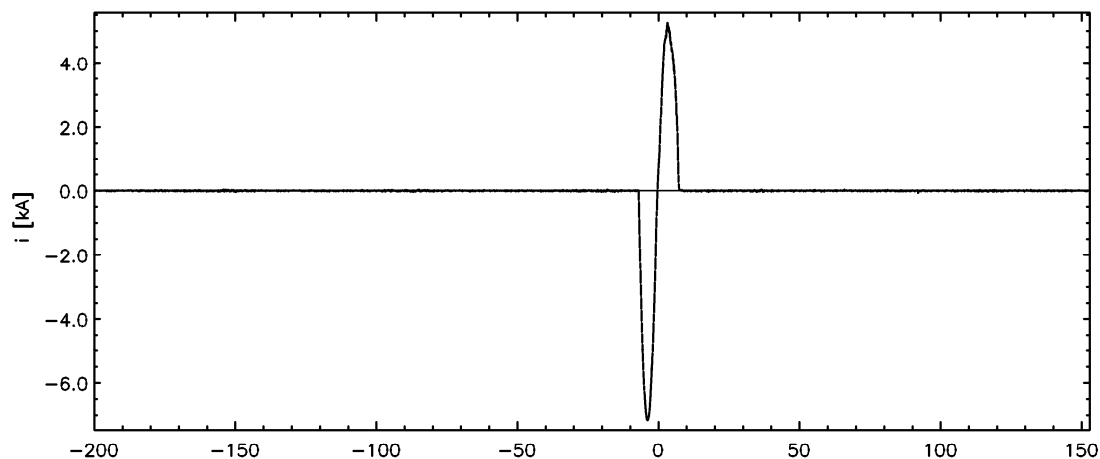
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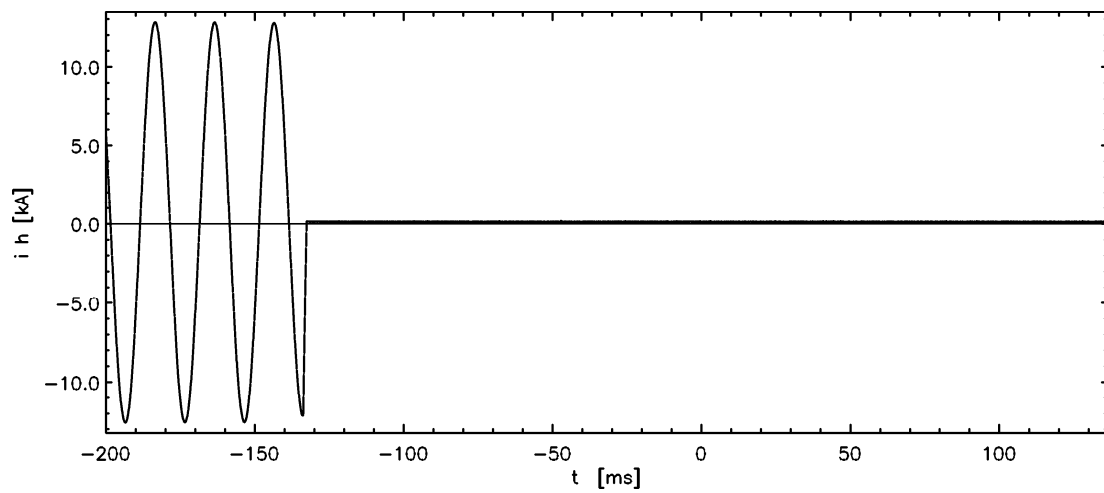
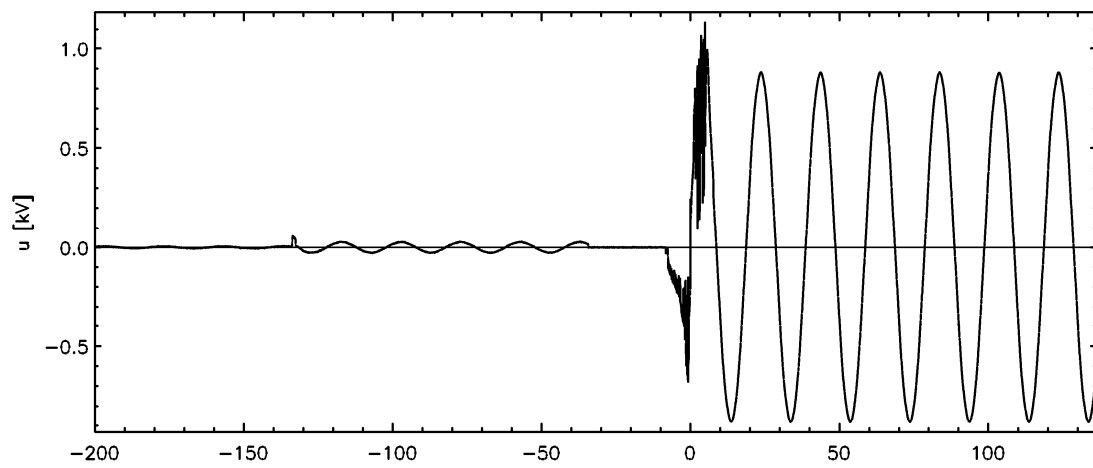
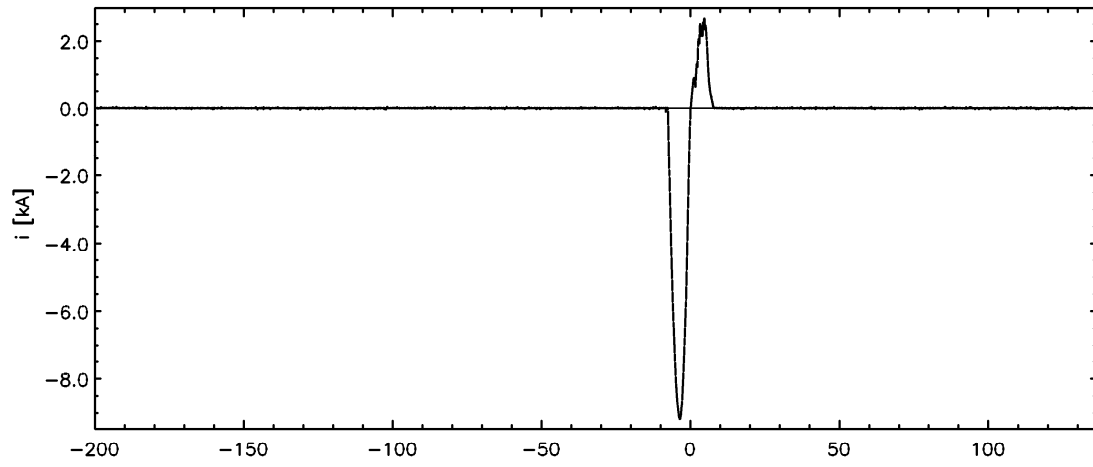
Test-No. 2155747



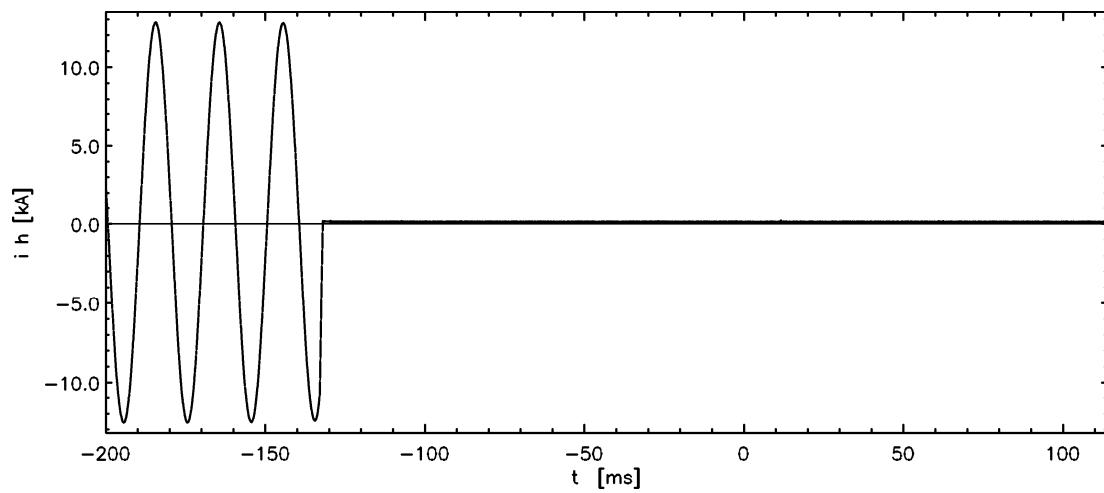
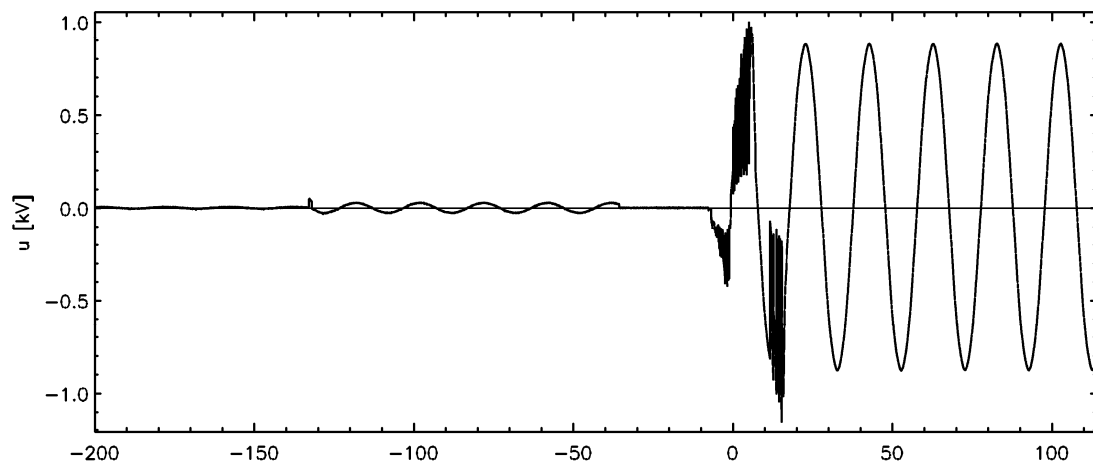
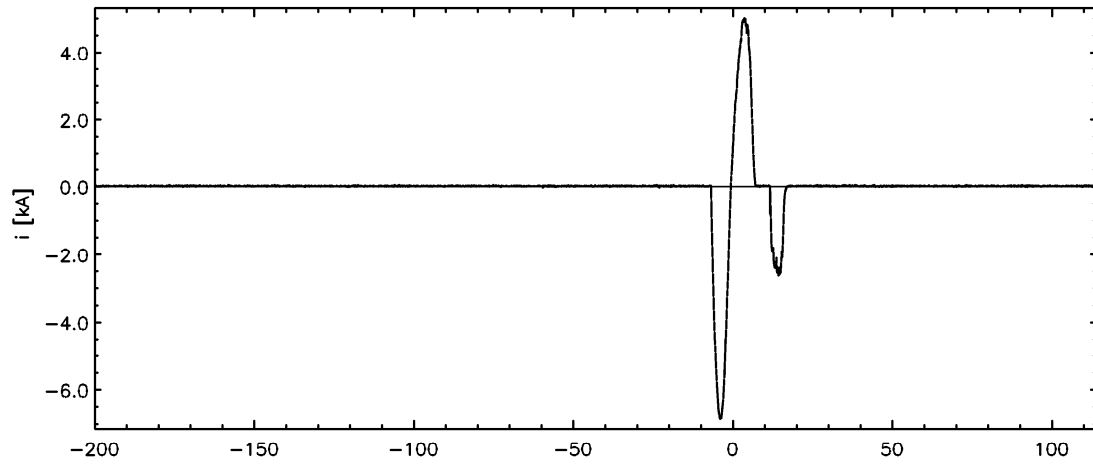
Test-No. 2155748



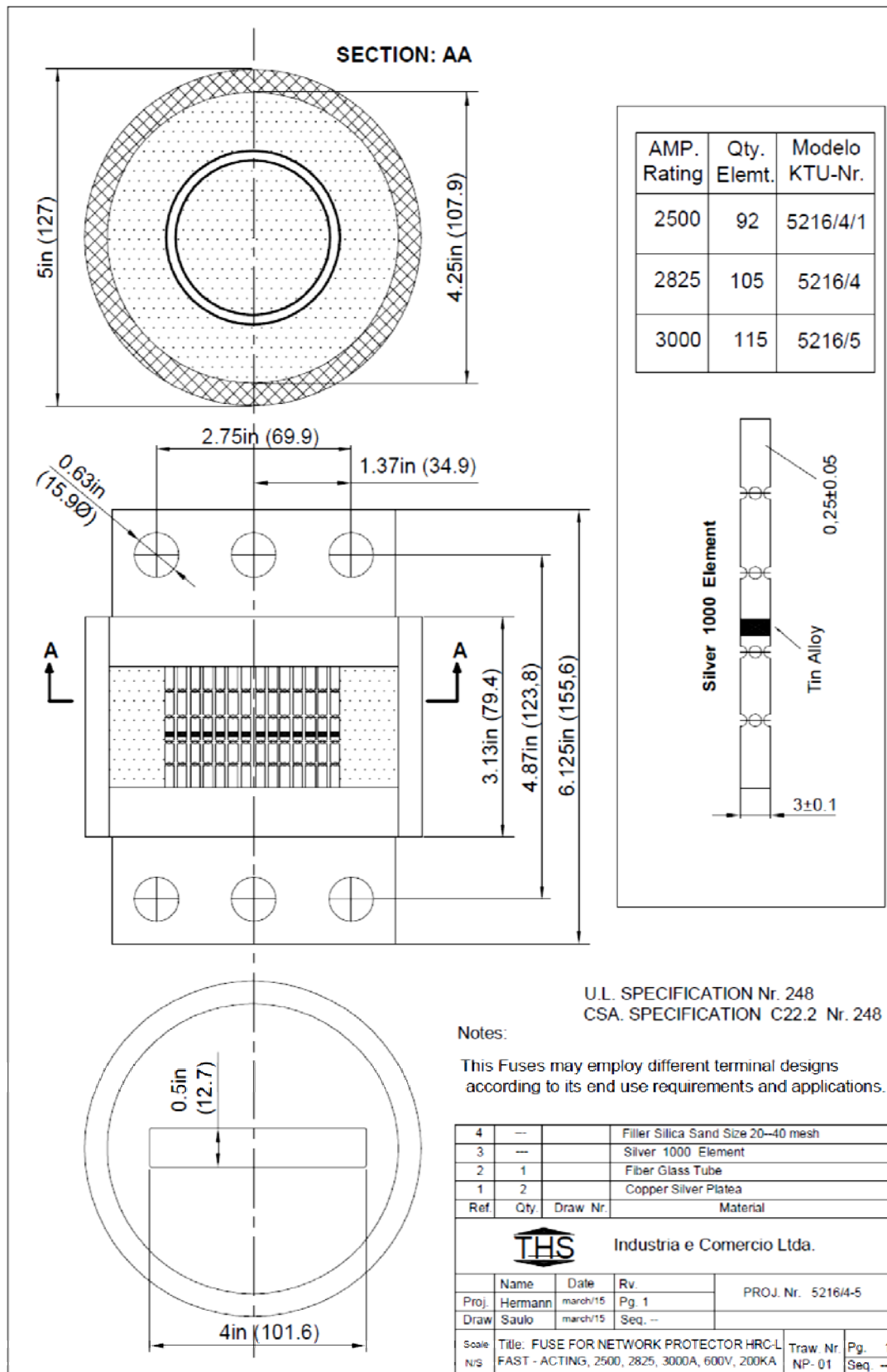
Test-No. 2155749

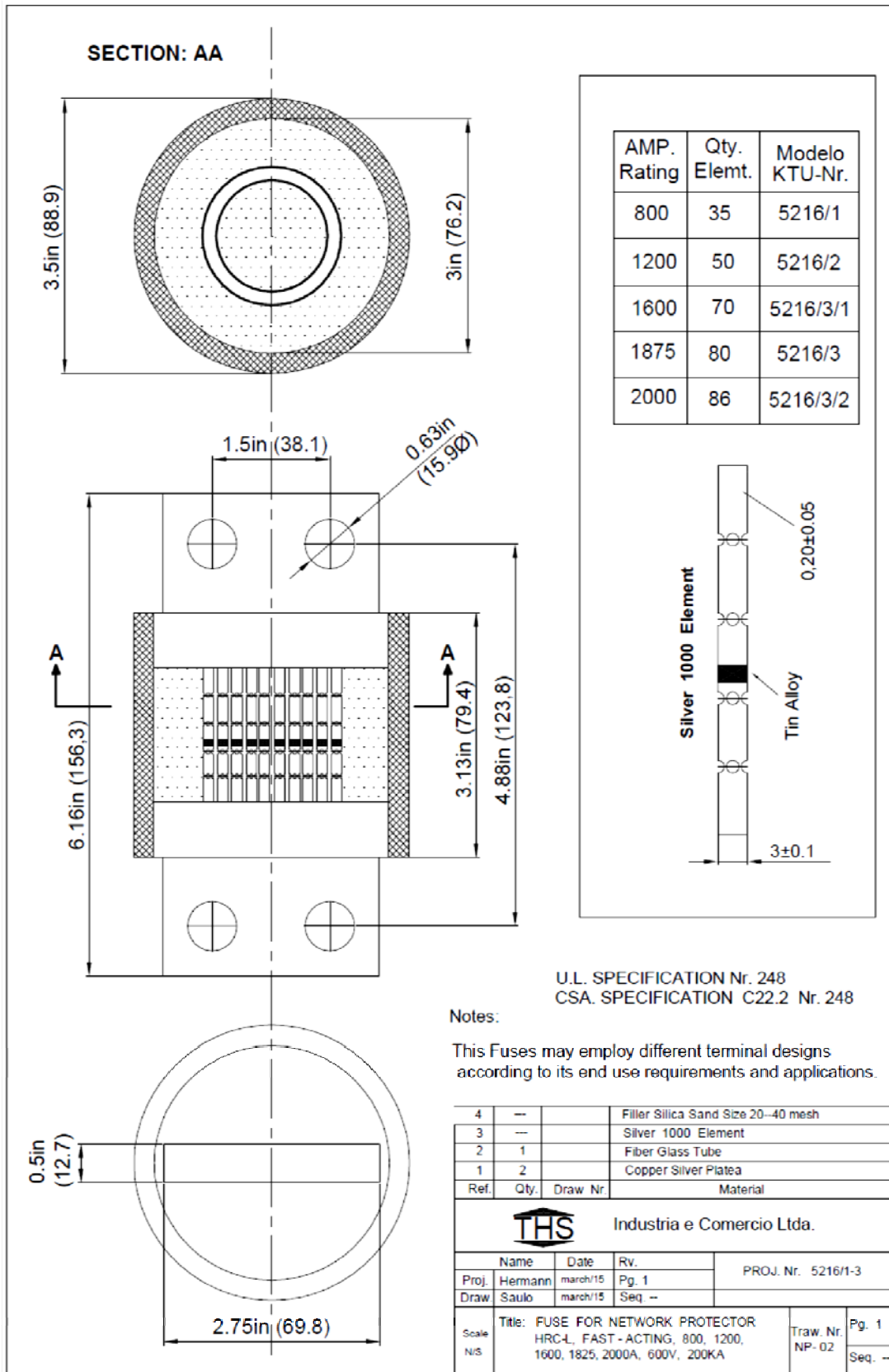


Test-No. 2155750



6. Drawings

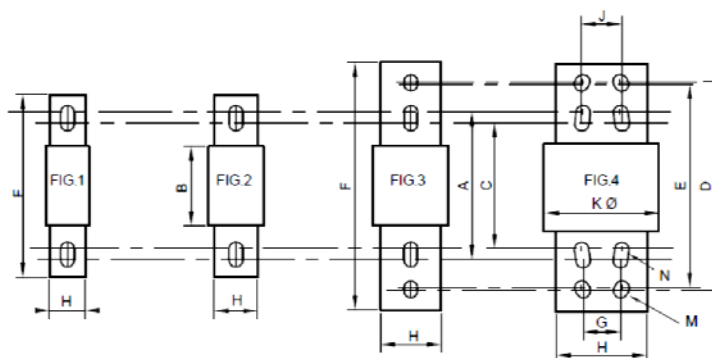




CARTRIDGE FUSE TYPE LFA, HRC-L FAST- ACTING
600V, 800 - 3000A, INTERRUPTING RARING 200KA



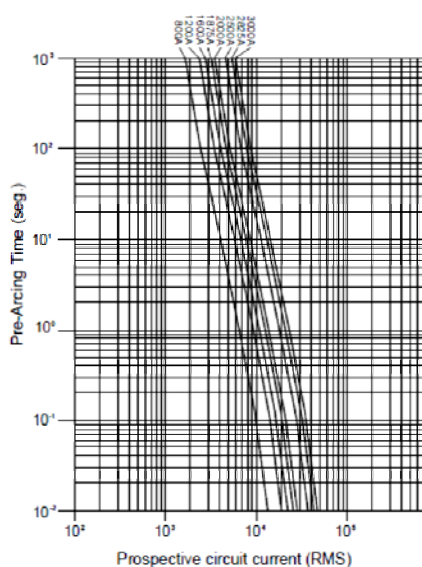
Standard - UL - 248 / CSA - C22.2 No. 106 - M90



FUSE DIMENSIONS:

AMPERES	FIG.	A	B	C	D	E	F	G	H	J	K	M	N
400 a 600	FIG. 1	63/4"	33/4"	53/4"	----	----	85/8"	----	2" X 5/16"	----	2"	5/8" X 11/8"	----
601 a 800	FIG. 2	63/4"	33/4"	53/4"	----	----	85/8"	----	2" X 3/8"	----	2 1/2"	5/8" X 11/8"	----
801 a 1200	FIG. 3	63/4"	33/4"	53/4"	9 1/2"	9 1/4"	10 3/4"	----	2" X 3/8"	----	2 1/2"	5/8" X 3/4"	5/8" X 11/8"
1201 a 1600	FIG. 3	63/4"	33/4"	53/4"	9 1/2"	9 1/4"	10 3/4"	----	2 3/8" X 7/16"	----	3"	5/8" X 3/4"	5/8" X 11/8"
1601 a 2000	FIG. 3	63/4"	33/4"	53/4"	9 1/2"	9 1/4"	10 3/4"	----	2 3/4" X 1/2"	----	3 1/2"	5/8" X 3/4"	5/8" X 11/8"
2001 a 2500	FIG. 4	63/4"	4"	53/4"	9 1/2"	9 1/4"	10 3/4"	15/8"	3 1/2" X 3/4"	13/4"	5"	5/8" X 3/4"	5/8" X 11/8"
2501 a 3000	FIG. 4	63/4"	4"	53/4"	9 1/2"	9 1/4"	10 3/4"	15/8"	4" X 3/4"	13/4"	5"	5/8" X 3/4"	5/8" X 11/8"

TIME - CURRENT CURVES



Ratings:

- * Voltage 600Vac
- * Interrupting rating 200KA
- * Ampere ratings 800 - 3000A

Features and Benefits

- * high breaking capacity,
- * low switching voltage,
- * low power dissipation,
- * silver element design,
- * high current limiting,
- * excellent performance,



Industria e Comercio Ltda

CARTRIDGE FUSE CLASS L

Data	25.02.05	CURRENT	800-3000A
Des.	HS		
Ver.	HS	VOLTAGE	600V
Esc.	s/e		
		Draw Nr.	5216