TEST REPORT

KERI

한국전기연구원
KOREA ELECTROTECHNOLOGY RESEARCH INSTITUTE

INFORMATION SHEET

KERI(Korea Electrotechnology Research Institute) issues a Type Test Certificate and a Test Report as below.

1. Type Test Certificate

A Certificate contains a record of a series of type tests carried out strictly in accordance with IEC, and/or regional standard and national standard that are identical to IEC standard. The equipment tested has fulfilled the requirements of this standard and the relevant ratings assigned by the manufacturer are endorsed by KERI. The Certificate is applicable only to the equipment tested. KERI is responsible for the validity and the contents of the Certificate. The responsibility for conformity of any apparatus having the same designation as the one tested rests with the manufacturer. The certificate contains the essential drawings and a description of the equipment tested. Detailed rules are given in KERI's Type Test Certification Procedure.

2. Test Report

2.1 Type Test Report

A Type Test Report contains a record of a series of type tests carried out strictly in accordance with a standard recognized by KERI. The equipment tested has fulfilled the requirements of this standard and the relevant ratings assigned by the manufacturer are endorsed by KERI. The Type Test Report is applicable only to the equipment tested. KERI is responsible for the validity and the contents of the Type Test Report. The responsibility for conformity of any apparatus having the same designation as the one tested rests with the manufacturer. The Type Test Report contains the essential drawings and a description of the equipment tested. Detailed rules are given in KERI's Test Procedure.

2.2 Performance Test Report

A Performance Test Report contains a record of one or more tests which have been carried out according to the client's instructions. These tests are not necessarily in accordance with a recognized standard. The test results do not verify ratings of the test object. Detailed rules are given in KERI's Test Procedure.

KERI issues three types of Performance Test Report.

2.2.1 The tests have been carried out strictly in accordance with a recognized standard. The apparatus has complied with the relevant requirements.

This sentence will appear on the front page of Performance Test Report if the tests have been performed in accordance with a recognized standard, but the series of tests does not completely fulfil the requirements for a Certificate of Compliance (for example, if the number of test series is not a complete series of type tests). The Report contains verified drawings and a description of the equipment tested. The condition of the test object after the tests is assessed and recorded in the Report.

2.2.2 The tests have been carried out in accordance with the client's instructions. Test procedure and test parameters were based on a recognized standard.

This sentence will appear on the front page of Performance Test Report if the number of test duties, the test procedure and the test parameters are based on a recognized standard and related to the ratings assigned by the manufacturer. Verification of the drawings (if submitted) and assessment of the condition after the tests is only done on the client's request.

2.2.3 The tests have been carried out according to the client's instructions.

This sentence will appear on the front page of Performance Test Report if the test shots, test procedure and/or test parameters are not in accordance with a recognized standard.

3 KERI is a member of STL(Short-circuit Testing Liaison) and the accredited testing laboratory under Clause 2 of Article 2 in "Guidelines on certified testing criteria and methods for electrical equipment" (Public Notice No. 2008-120, Ministry of Knowledge Economy, Korea).

TEST REPORT

CLASSIFICATION	Performance Test
APPARATUS	SF6 Gas Circuit Breaker with Live Tank and common Operating Mechanism
DESIGNATION	120-SFM-32B (Common operating mechanism) 145 kV 3 150 A 40 kA 50 Hz
RECEIPT No.	TRD12C00034 (January 10, 2012)
APPLICANT	Crompton Greaves Ltd. (India) A-3 MIDC, Ambad, Nasik 422 010 Maharashtra, India
MANUFACTURER	Crompton Greaves Ltd. (India) A-3 MIDC, Ambad, Nasik 422 010 Maharashtra, India
DATE OF TESTS	April 28, 2011
DATE OF ISSUE	April 24, 2012

The tests have been carried out strictly in accordance with IEC 62271-110:2009-01 , subclauses 6.115 (Shunt Reactor).

The apparatus has complied with the relevant requirements.

This Test Report has been issued by KERI.

The test results are shown in the records of tests with the performance of the apparatus tested and the observations made during the tests. The oscillograms are attached hereto.

The Test Report applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designations with that tested rests with the Manufacturer.

TOTAL No. OF PAGES(117) : records (18), photographs (2), circuit diagrams (2), drawings & descriptions (1), attachments(2), oscillograms (92)

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Photographs :

Photo. HP01 : After shunt reactor current switching tests

Photo. HP02 : Contact after reactor current switching tests

Circuit diagrams and parameters :

Fig. HP01 : Circuit for shunt reactor current switching tests

Fig. HP02 : Circuit for voltage test as a condition check

Drawings :

The manufacturer guarantees that the test object submitted is manufactured in accordance with the followings drawings. KERI verified that these drawings adequately represent the test object.

The following drawing is included in this test report.

Reference No.	Drawing No.	Revision No.	Date
001	3949627	0	2011.03.28

The following drawing have been returned to the manufacturer and listed for reference.

Reference No.	Drawing No.	Revision No.	Date
002	3949634	0	2011.04.04
003	4949635	0	2011.04.04
004	4949628	1	2011.04.13
005	3943042	1	2011.04.06
006	2940037	3	2011.04.06
007	3940631	1	2009.11.16
008	3941858	1	2011.04.05
009	4944176	3	2011.04.06
010	3949227	8	2011.04.06
011	3949357	1	2010.10.02
012	3949646	0	2011.04.02
013	4941863	3	2006.09.11
014	4944045	2	2010.11.12
015	4944005	10	2010.11.13.

Attachments

Attachment HP01 : Prospective TRV for test duty 1

Attachment HP02 : Prospective TRV for test duty 2, 3, 4

SF_6 Gas Circuit Breaker with Live Tank and common Operating Mechanism

Manufacturer	Crompton Greaves Ltd.
Type	120-SFM-32B (Separate operating mechanism)
Serial number	34342C

Ratings of the test object assigned by manufacturer and proved by tests

Shunt reactor switching current	
Load circuit 1 test currents	315 A
Load circuit 2 test currents	100 A

Ratings of the test object assigned by manufacturer

Number of poles	3 Phase
The number of interrupters per pole	1
Voltage	145 kV
Normal current	3 150 A
Frequency	50 Hz
Short-circuit breaking current	40 kA
Short-circuit making current	100 kA
Transient Recovery Voltage	
u_1	133 kV
u_c	249 kV
t_1	67 μs
t_2	268 μs
RRRV	2 kV/μs
First-pole-to-clear factor	1.5
Circuit Breaker suitable for systems other than earthed neutral	
Method of operation	Three-phase common operating device
Closing	Spring, charged by motor
Opening	Spring, charged at closing
Supply voltage	
Motor	AC / DC 230 V
Closing device	DC 110 V
Opening device	DC 110 V
Operating sequence	O - 0.3 s - CO - 3 min - CO
Enclosure	Live tank type
SF_6 gas pressure(gauge)	
Rated	0.7 MPa
Minimum	0.6 MPa

List of the tests

Test items	Standard and clause	Test date	Sheet No.
1 No-load operation checks	-	April 29, 2011	6/117
2 Shunt reactor current switching tests	IEC 62271-110:2009-01 6.115	April 29, 2011	7/117 - 14/117
3 No-load operation checks	-	April 29, 2011	15/117
4 Voltage tests as a condition check	IEC 62271-100:2008-04 6.2.11	April 29, 2011	16/117 - 17/117
5 Description of tests	-	-	18/117

Measurement uncertainty

The measurement uncertainties listed below are the expanded uncertainties at the confidence level of approximately 95 % (coverage factor k=2) guaranteed by KERI:

High power test	
Current	± 5 %
Voltage	± 5 %

1 No-load operation checks

Test results						
Test number	Operating duty	Supply voltage (DC)		Closing time	Opening time	Remarks
		Close V	Open V	ms	ms	
HPC 1104-312	O	-	110	-	25.9 25.4 24.4	Before ShR (TD1)
	0.3 s CO	110	110	81.6 81.9 83.4	25.7 25..3 24.5	
HPC 1104-313	CO	110	110	82.7 83.1 84.7	25.2 24.9 24.4	
Condition during and after test	The test object operated normally.					

2 Shunt reactor current switching tests

2.1 Shunt reactor current switching tests (Test duty 1)

Test requirements	
Test voltage	125.6 kV
TRV	u_c = 337 kV, t_3 = 126 ㎲
Test current	315 A
Test frequency	50 Hz
SF_6 gas pressure	0.7 MPa(gauge)
Control voltage	Open : DC 110 V
Operating sequence	O - 20 times

Test results									
Condition before test	New and clean Test phase : A								Test circuit : Fig. HP01
Test number	Operating duty	Test voltage kV	Test current A	Arcing time ms	Breaking time ms	Uma kV	Uw kV	Umr kV	Remarks
-	Amplitude factor = 1.96, t_3 = 120 ㎲ (refer to the attachment HP01)								TRV check
HPC 1104-315	O	126	300	6.2	32.1	188	-	175	
HPC 1104-316	O	126	300	5.3	31.2	186	-	172	
HPC 1104-317	O	126	300	4.3	30.2	183	-	169	
HPC 1104-318	O	126	300	13.7	39.6	208	286	195	
HPC 1104-319	O	126	300	12.8	38.7	208	255	195	
HPC 1104-320	O	126	300	11.7	37.6	189	143	177	

Note Uma : suppression peak voltage to earth
Uw : voltage across circuit-breaker at the instant of re-ignition
Umr : load side voltage peak to earth (if more than Uma)

Test results									
Test number	Operating duty	Test voltage kV	Test current A	Arcing time ms	Breaking time ms	Uma kV	Uw kV	Umr kV	Remarks
HPC 1104-321	O	126	300	10.5	36.4	200	-	187	
HPC 1104-322	O	126	300	9.4	35.3	186	-	175	
HPC 1104-323	O	126	300	8.7	34.6	193	-	180	
HPC 1104-324	O	126	300	7.5	33.4	185	-	174	
HPC 1104-325	O	126	300	6.4	32.3	186	-	177	
HPC 1104-326	O	126	300	14.7	40.6	203	473	187	
HPC 1104-327	O	126	300	4.3	30.2	178	-	178	
HPC 1104-328	O	126	300	3.4	29.3	186	-	174	
HPC 1104-329	O	126	300	12.1	38.0	189	374	177	
HPC 1104-330	O	126	300	11.1	37.0	199	160	185	
HPC 1104-331	O	126	300	10.3	36.2	192	26	177	
HPC 1104-332	O	126	300	9.2	35.1	187	-	175	
HPC 1104-333	O	126	300	8.2	34.1	188	-	175	
HPC 1104-334	O	126	300	7.2	33.1	188	-	175	
Condition during or after test	The test object operated normally. No visible damages externally.								

Note Uma : suppression peak voltage to earth.
Uw : voltage peak across contacts at the instant of re-ignition.
Umr : voltage peak of load circuit to earth.

2.2 Shunt reactor current switching tests (Test duty 2)

Test requirements	
Test voltage	125.6 kV
Load circuit TRV	u_c = 337 kV, t_3 = 224 μs
Test current	100 A
Test frequency	50 Hz
SF_6 gas pressure	0.7 MPa(gauge)
Control voltage	Open : DC 110 V
Operating sequence	O - 20 times

Test results									
Condition before test	After shunt reactor current switching tests (Test duty 1) Test phase : A								Test circuit : Fig. HP01
Test number	Operating duty	Test voltage kV	Test current A	Arcing time ms	Breaking time ms	Uma kV	Uw kV	Umr kV	Remarks
-	Amplitude factor = 1.98, t_3 = 219 μs (refer to the attachment HP02)								TRV check
HPC 1104-336	O	126	104	6.3	32.2	188	-	174	
HPC 1104-337	O	126	104	5.3	31.2	193	-	179	
HPC 1104-338	O	126	104	4.4	30.3	190	-	177	
HPC 1104-339	O	126	104	13.3	39.2	219	363	201	
HPC 1104-340	O	126	104	12.2	38.1	222	268	201	
HPC 1104-341	O	126	104	11.4	37.3	218	88.6	202	

Note Uma : suppression peak voltage to earth.
Uw : voltage peak across contacts at the instant of re-ignition.
Umr : voltage peak of load circuit to earth.

Test results									
Test number	Operating duty	Test voltage kV	Test current A	Arcing time ms	Breaking time ms	Uma kV	Uw kV	Umr kV	Remarks
HPC 1104-342	O	126	104	10.4	36.3	202	-	188	
HPC 1104-343	O	126	104	9.5	35.4	203	-	189	
HPC 1104-344	O	126	104	17.8	43.7	247	360	214	
HPC 1104-345	O	126	104	7.4	33.3	195	-	182	
HPC 1104-346	O	126	104	6.2	32.1	194	-	181	
HPC 1104-347	O	126	104	5.4	31.3	194	-	181	
HPC 1104-348	O	126	104	4.6	30.5	192	-	179	
HPC 1104-349	O	126	104	3.3	29.2	188	-	175	
HPC 1104-350	O	126	104	12.2	38.1	233	304	218	
HPC 1104-351	O	126	104	11.2	37.1	223	183	200	
HPC 1104-352	O	126	104	10.1	36.0	305	-	190	
HPC 1104-353	O	126	104	9.3	35.2	200	-	186	
HPC 1104-354	O	126	104	8.3	34.2	195	-	181	
HPC 1104-355	O	126	104	7.4	33.3	186	-	172	
Condition during or after test	The test object operated normally. No visible damages externally.								

Note Uma : suppression peak voltage to earth.
Uw : voltage peak across contacts at the instant of re-ignition.
Umr : voltage peak of load circuit to earth.

2.3 Shunt reactor current switching tests (Test duty 3)

Test requirements	
Test voltage	125.6 kV
Load circuit TRV	u_c = 337 kV, t_3 = 224 μs
Test current	100 A
Test frequency	50 Hz
SF_6 gas pressure	0.7 MPa(gauge)
Control voltage	Open : DC 110 V
Operating sequence	O - 18 times

Test results									
Condition before test	After shunt reactor current switching tests (Test duty 2) Test phase : A								Test circuit : Fig. HP01
Test number	Operating duty	Test voltage kV	Test current A	Arcing time ms	Breaking time ms	Uma kV	Uw kV	Umr kV	Remarks
-	Amplitude factor = 1.98, t_3 = 219 μs (refer to the attachment HP02)								TRV check
HPC 1104-356	O	126	104	13.4	39.3	225	281	213	
HPC 1104-357	O	126	104	13.1	39.0	207	363	182	
HPC 1104-358	O	126	104	3.2	29.1	187	-	173	
HPC 1104-359	O	126	104	13.3	39.2	212	354	199	
HPC 1104-360	O	126	104	13.1	39.0	205	390	194	
HPC 1104-361	O	126	104	13.3	39.2	215	354	191	

Note Uma : suppression peak voltage to earth.
Uw : voltage peak across contacts at the instant of re-ignition.
Umr : voltage peak of load circuit to earth.

Test results									
Test number	Operating duty	Test voltage kV	Test current A	Arcing time ms	Breaking time ms	Uma kV	Uw kV	Umr kV	Remarks
HPC 1104-362	O	126	104	13.3	39.2	230	473	224	
HPC 1104-363	O	126	104	13.9	39.8	190	-	177	
HPC 1104-364	O	126	104	3.8	29.7	192	-	178	
HPC 1104-365	O	126	104	3.7	29.6	190	-	177	
HPC 1104-366	O	126	104	3.6	29.5	181	354	169	
HPC 1104-367	O	126	104	14.0	39.9	210	351	203	
HPC 1104-368	O	126	104	12.9	38.8	229	314	331	
HPC 1104-369	O	126	104	12.8	38.7	222	305	201	
HPC 1104-370	O	126	104	12.8	38.7	213	352	206	
HPC 1104-371	O	126	104	12.5	38.4	224	332	216	
HPC 1104-372	O	126	104	12.6	38.5	211	314	188	
HPC 1104-373	O	126	104	12.7	38.6	218	323	207	
Condition during or after test	The test object operated normally. No visible damages externally.								

Note Uma : suppression peak voltage to earth.
Uw : voltage peak across contacts at the instant of re-ignition.
Umr : voltage peak of load circuit to earth.

2.4 Shunt reactor current switching tests (Test duty 4)

Test requirements	
Test voltage	125.6 kV
Load side TRV	u_c = 337 kV, t_3 = 224 ㎲
Test current	100 A
Test frequency	50 Hz
SF_6 gas pressure	0.6 MPa(gauge)
Control voltage	Open : DC 110 V
Operating sequence	O - 10 times

Test results									
Condition before test	After shunt reactor current switching tests (Test duty 3) Test phase : A								Test circuit : Fig. HP01
Test number	Operating duty	Test voltage kV	Test current A	Arcing time ms	Breaking time ms	Uma kV	Uw kV	Umr kV	Remarks
-	Amplitude factor = 1.98, t_3 = 219 ㎲ (refer to the attachment HP02)								TRV check
HPC 1104-374	O	126	104	6.1	32.0	196	-	183	
HPC 1104-375	O	126	104	4.3	30.2	190	-	177	
HPC 1104-376	O	126	104	12.2	38.1	222	268	201	
HPC 1104-377	O	126	104	10.3	36.2	199	-	187	
HPC 1104-378	O	126	104	8.6	34.5	201	-	187	
HPC 1104-379	O	126	104	6.5	32.4	199	-	186	

Note Uma : suppression peak voltage to earth.
Uw : voltage peak across contacts at the instant of re-ignition.
Umr : voltage peak of load circuit to earth.

Test results									
Test number	Operating duty	Test voltage kV	Test current A	Arcing time ms	Breaking time ms	Uma kV	Uw kV	Umr kV	Remarks
HPC 1104-380	O	126	104	14.0	39.9	225	325	211	
HPC 1104-381	O	126	104	12.3	38.2	202	266	187	
HPC 1104-382	O	126	104	10.3	36.2	210	17	192	
HPC 1104-383	O	126	104	8.3	34.2	194	-	181	
Condition during or after test	The test object operated normally. No visible damages externally.								

Note Uma : suppression peak voltage to earth.
Uw : voltage peak across contacts at the instant of re-ignition.
Umr : voltage peak of load circuit to earth.

3 No-load operation checks

Test results						
Test number	Operating duty	Supply voltage (DC)		Closing time	Opening time	Remarks
		Close V	Open V	ms	ms	
HPC 1104-384	O	-	110	-	26.0 25.3 24.4	After shunt reactor current switching tests
	0.3 s CO	110	110	81.5 81.9 83.5	25.3 24.9 24.5	
HPC 1104-385	CO	110	110	82.2 82.9 84.4	25.2 24.7 24.5	
Condition during and after test	The test object operated normally.					

4 Voltage tests as a condition check

Test requirements	
Wave shape	u_c = 390 kV, t_3 = 39 μs (-10 ~+200 %)
The number of tests	5 times/each polarity

Test results				
Condition before test	After shunt reactor current switching tests Test phase : A			Test circuit : Fig. HP02
Test number	Applied position	Test voltage		Remarks
		u_c kV	t_3 μs	
HPC 1104-387	Fixed contact	+390	99	
HPC 1104-388		+390	99	
HPC 1104-389		+394	99	
HPC 1104-390		+395	99	
HPC 1104-391		+395	99	
HPC 1104-392		-395	99	
HPC 1104-393		-396	99	
HPC 1104-394		-395	99	
HPC 1104-395		-390	99	
HPC 1104-396		-393	99	

Test results				
Test number	Applied position	Test voltage		Remarks
		u_c kV	t_3 μs	
HPC 1104-397	Moving contact	-391	99	
HPC 1104-398		-395	99	
HPC 1104-399		-392	99	
HPC 1104-400		-393	99	
HPC 1104-401		-396	99	
HPC 1104-402		+390	99	
HPC 1104-403		+390	99	
HPC 1104-404		+394	99	
HPC 1104-405		+395	99	
HPC 1104-406		+396	99	
Condition during and after test	No visible damages externally.			

5 Description of tests

5.1 These tests were carried out with the sample supplied and confirmed by client.

Photographs

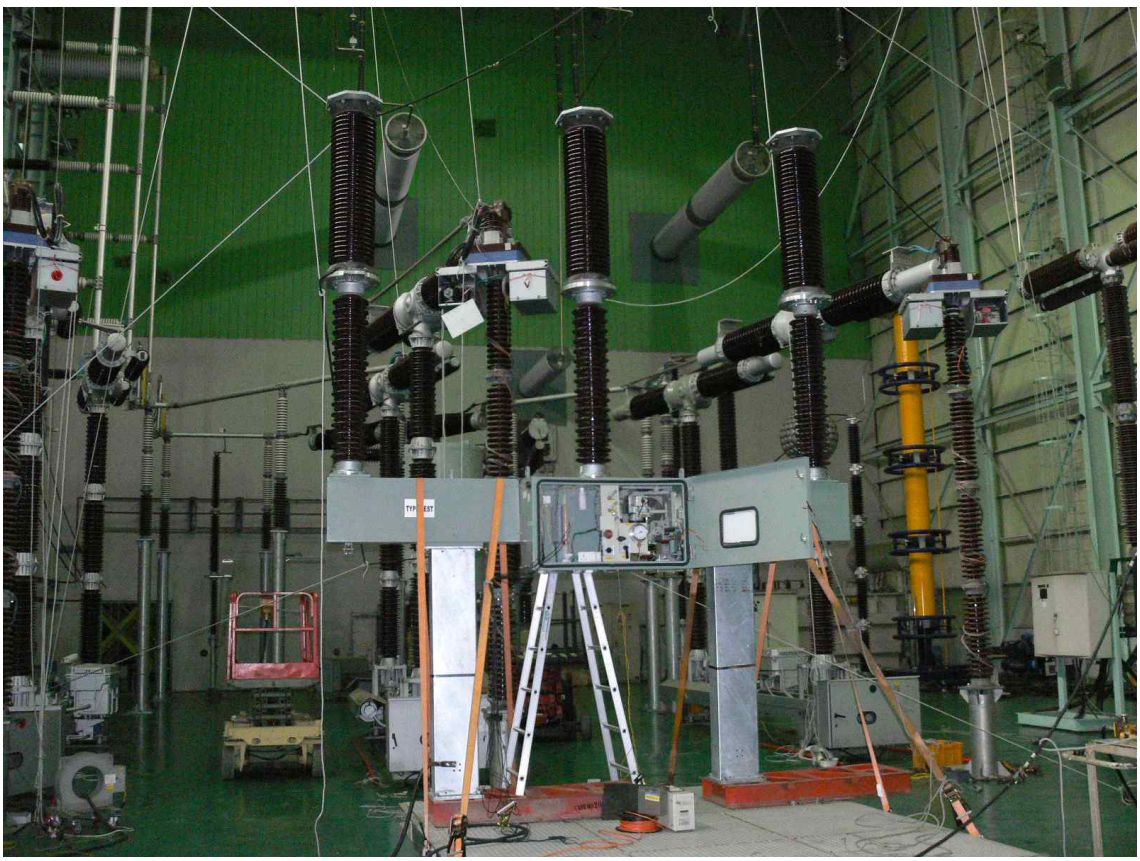


Photo. HP01 : After shunt reactor current switching tests

Photographs

Photo. HP02 : Contact after reactor current switching tests

Circuit parameters

Items		Fig. HP01		Fig. HP02			
		ShR(TD1)	ShR (TD2, 3, 4)	Condition check			
Test cell		TC-4	TC-4	TC-4			
Power frequency Hz		50	50	-			
Number of phase		1	1	1			
Generator	connection	Y	Y	-			
	neutral	E	E	-			
TRV tuning capacitor C_g μF		3.6	3.6	-			
Current limiting reactor CLR Ω		0.000 0.000 -	0.000 0.000 -	- - -			
Transformer bank	connection	P/S	P/S	-			
	ratio kV	18/96	18/96	-			
	neutral	-	-	-			
Resistance in series R_s Ω		-	-	-			
TRV tuning element	Resistance R_e Ω	-	-	-			
	Capacitance C_e μF	-	-	-			
	Resistance R_T Ω	-	-	-			
	Capacitance C_T μF	-	-	-			
Load	Resistance R_L Ω	-	-	-			
	Reactance L_L mH	1 330	3 800	-			
	Capacitance C_L μF	-	-	-			
Earthing	Resistance R_N Ω	-	-	-			
	Capacitance C_N μF	-	-	15.67			
Synthetic circuit	Inductance L_{V1} mH	-	-	13.18			
	Capacitance C_{V1} μF	-	-	137.50			
	Resistance R_{T1} Ω	-	-	0.13			
	Capacitance C_{T1} μF	-	-	-			
	Inductance L_{V2} mH	-	-	-			
	Capacitance C_{V2} μF	-	-	-			
	Resistance R_{T2} Ω	-	-	-			
	Capacitance C_{T2} μF	-	-	-			
Power frequency inductance L_{pf} H		-	-	-			
Artificial line	Inductance L_S μH	-	-	-			
	Inductance L_R μH	-	-	-			
	Capacitance C_1 pF	-	-	-			
	Resistance R Ω	-	-	-			
Short circuit point		E	E	E			

Note) E : Earthed, I : Isolated, P, S, △ & Y : Transformer's parallel, series, delta and star connection Transformer ratio voltage based on phase to neutral.

Circuit diagrams

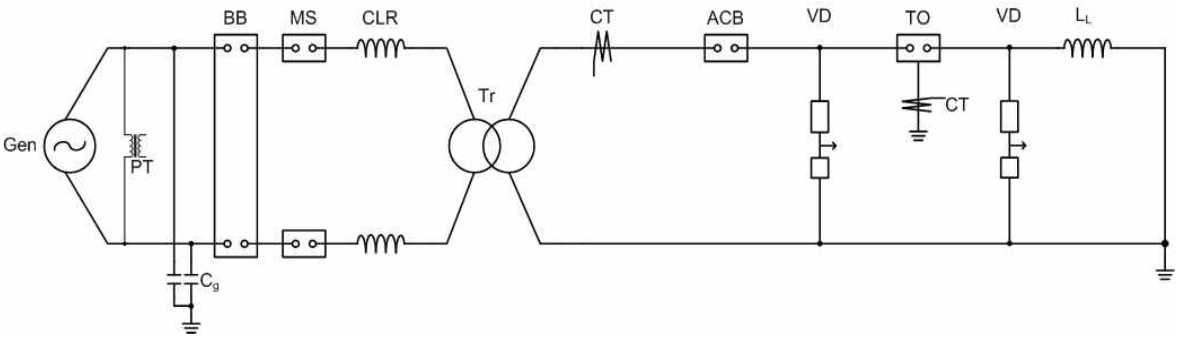


Fig. HP01 : Circuit for shunt reactor current switching tests

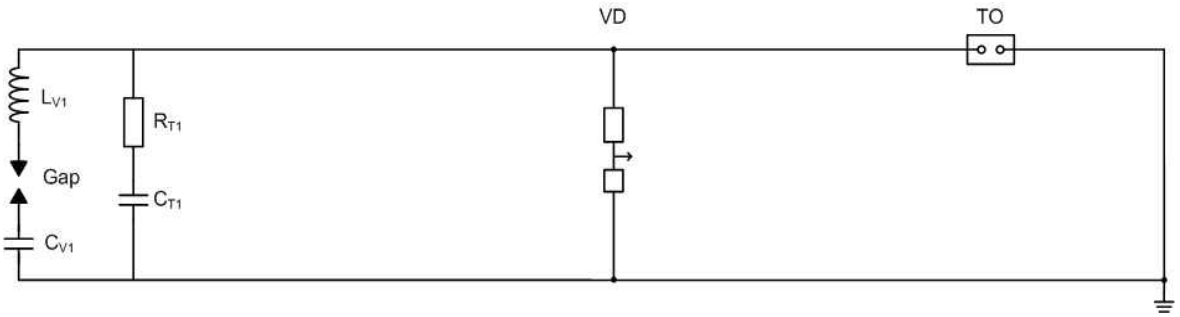
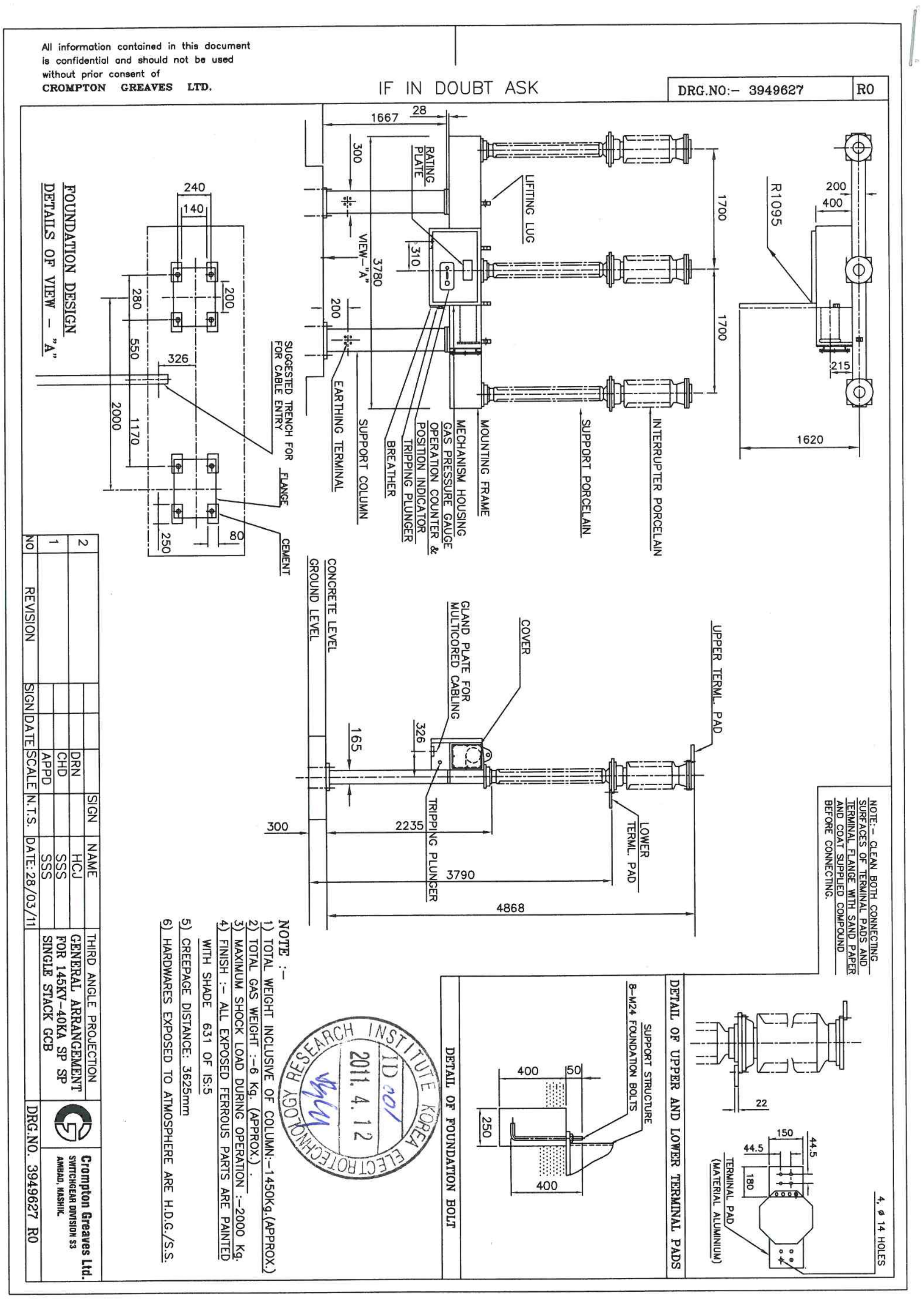


Fig. HP02 : Circuit for voltage test as a condition check

Gen	----------	Generator
PT	----------	Potential transformer
Cg	----------	Capacitor for generator
BB	----------	Back-up circuit breaker
MS	----------	Making switch
CLR	----------	Current limiting reactor
Tr	----------	Transformer bank
CT	----------	Current transformer
TO	----------	Test object
ACB	----------	Auxiliary circuit breaker
VD	----------	Voltage divider
C_{V1}	----------	Main capacitor
L_{V1}	----------	TRV tuning reactor
C_{T1}	----------	TRV tuning capacitor
R_{T1f}	----------	TRV tuning resistor
L_L	----------	Reactor of load

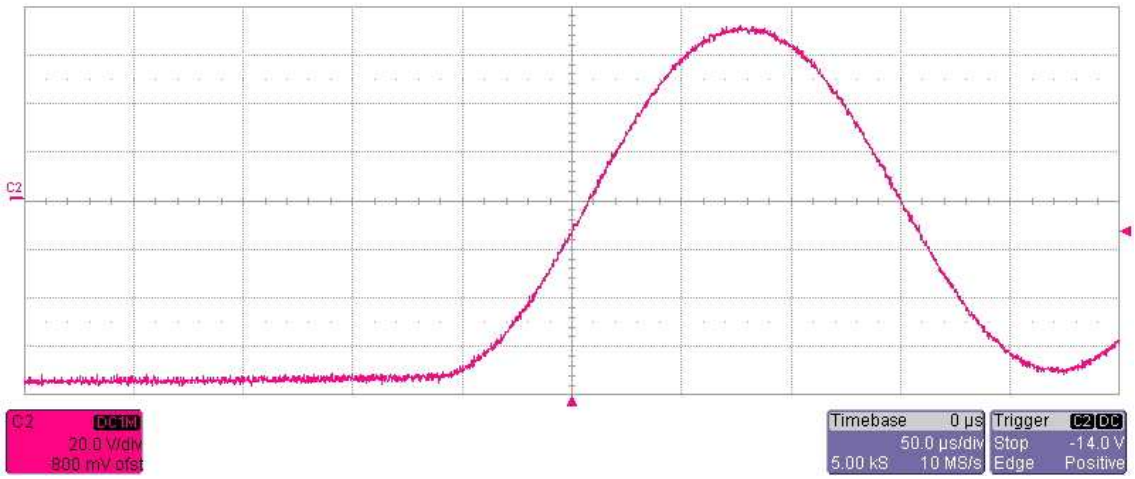
Drawings



All information contained in this document is confidential and should not be used without prior consent of CROMPTON GREAVES LTD.
IF IN DOUBT ASK
DRG.NO:- 3949627
R0
FOUNDATION DESIGN
DETAILS OF VIEW - "A"
SUGGESTED TRENCH FOR CABLE ENTRY
FLANGE
CEMENT
LIFTING LUG
RATING PLATE
VIEW-"A"
EARTHING TERMINAL
SUPPORT COLUMN
BREATHER
TRIPPING PLUNGER
POSITION INDICATOR
OPERATION COUNTER &
GAS PRESSURE GAUGE
MECHANISM HOUSING
MOUNTING FRAME
SUPPORT PORCELAIN
INTERRUPTER PORCELAIN
CONCRETE LEVEL
GROUND LEVEL
GLAND PLATE FOR MULTICORED CABLING
COVER
UPPER TERML. PAD
LOWER TERML. PAD
TRIPPING PLUNGER
NOTE:- CLEAN BOTH CONNECTING SURFACES OF TERMINAL PADS AND TERMINAL FLANGE WITH SAND PAPER AND COAT SUPPLIED COMPOUND BEFORE CONNECTING.
NOTE :-
1) TOTAL WEIGHT INCLUSIVE OF COLUMN:-1450Kg.(APPROX.)
2) TOTAL GAS WEIGHT :-6 Kg. (APPROX.).
3) MAXIMUM SHOCK LOAD DURING OPERATION :-2000 Kg.
4) FINISH :- ALL EXPOSED FERROUS PARTS ARE PAINTED WITH SHADE 631 OF IS:5
5) CREEPAGE DISTANCE: 3625mm
6) HARDWARES EXPOSED TO ATMOSPHERE ARE H.D.G./S.S.
DETAIL OF FOUNDATION BOLT
SUPPORT STRUCTURE
8-M24 FOUNDATION BOLTS
DETAIL OF UPPER AND LOWER TERMINAL PADS
TERMINAL PAD (MATERIAL ALUMINIUM)
4, ø 14 HOLES
KOREA ELECTROTECHNOLOGY RESEARCH INSTITUTE
2011. 4. 12
THIRD ANGLE PROJECTION
GENERAL ARRANGEMENT FOR 145KV-40KA SP SP SINGLE STACK GCB
Crompton Greaves Ltd.
SWITCHGEAR DIVISION S3
AMBAD, NASHIK.
DRN HCJ
CHD SSS
APPD SSS
SCALE N.T.S.
DATE:28/03/11
DRG.NO. 3949627 R0
NO REVISION SIGN DATE

Attachments

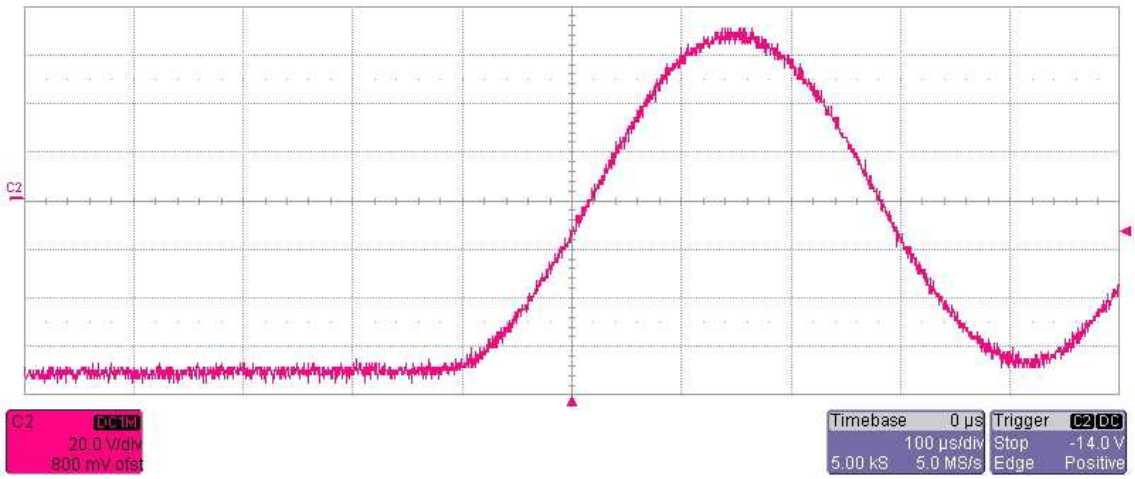
Attachment HP01 : Prospective TRV for test duty 1



	Measured value	Unit
K_{af}	1.96	-
t_3	120	us

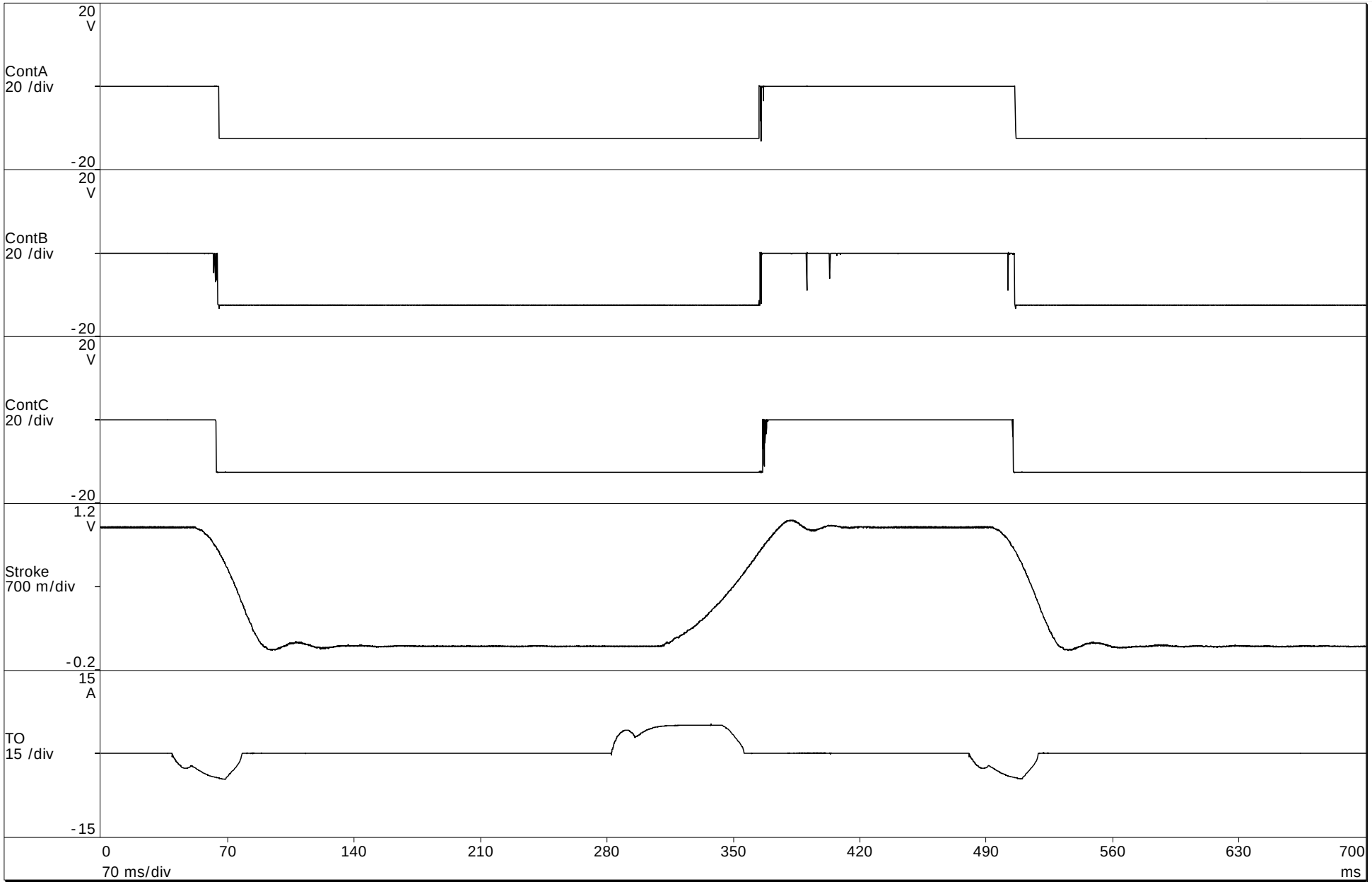
Attachments

Attachment HP02 : Prospective TRV for test duty 2, 3, 4



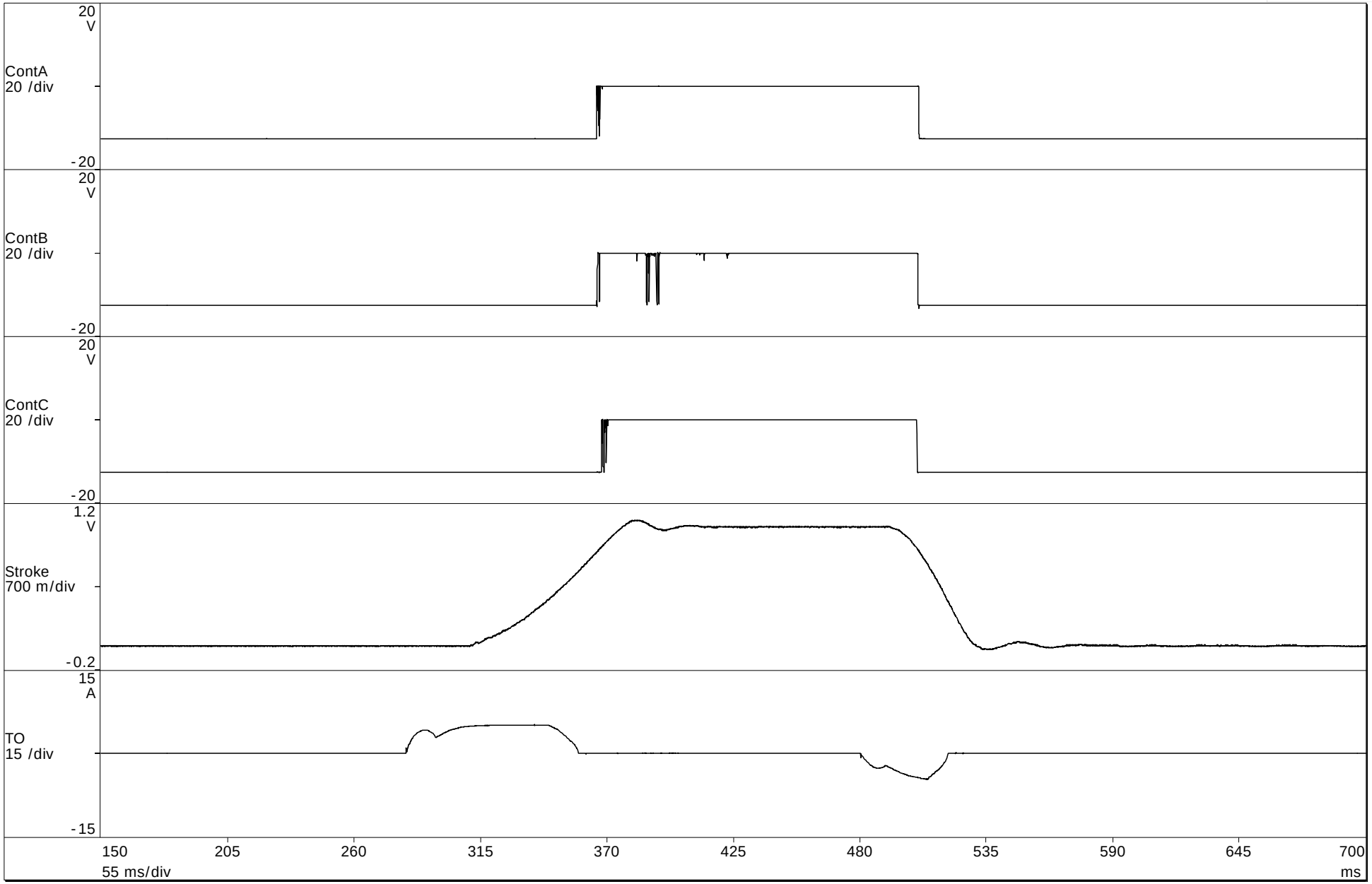
	Measured value	Unit
K_{af}	1.98	-
t_3	219	us

HPC 1104 - 312



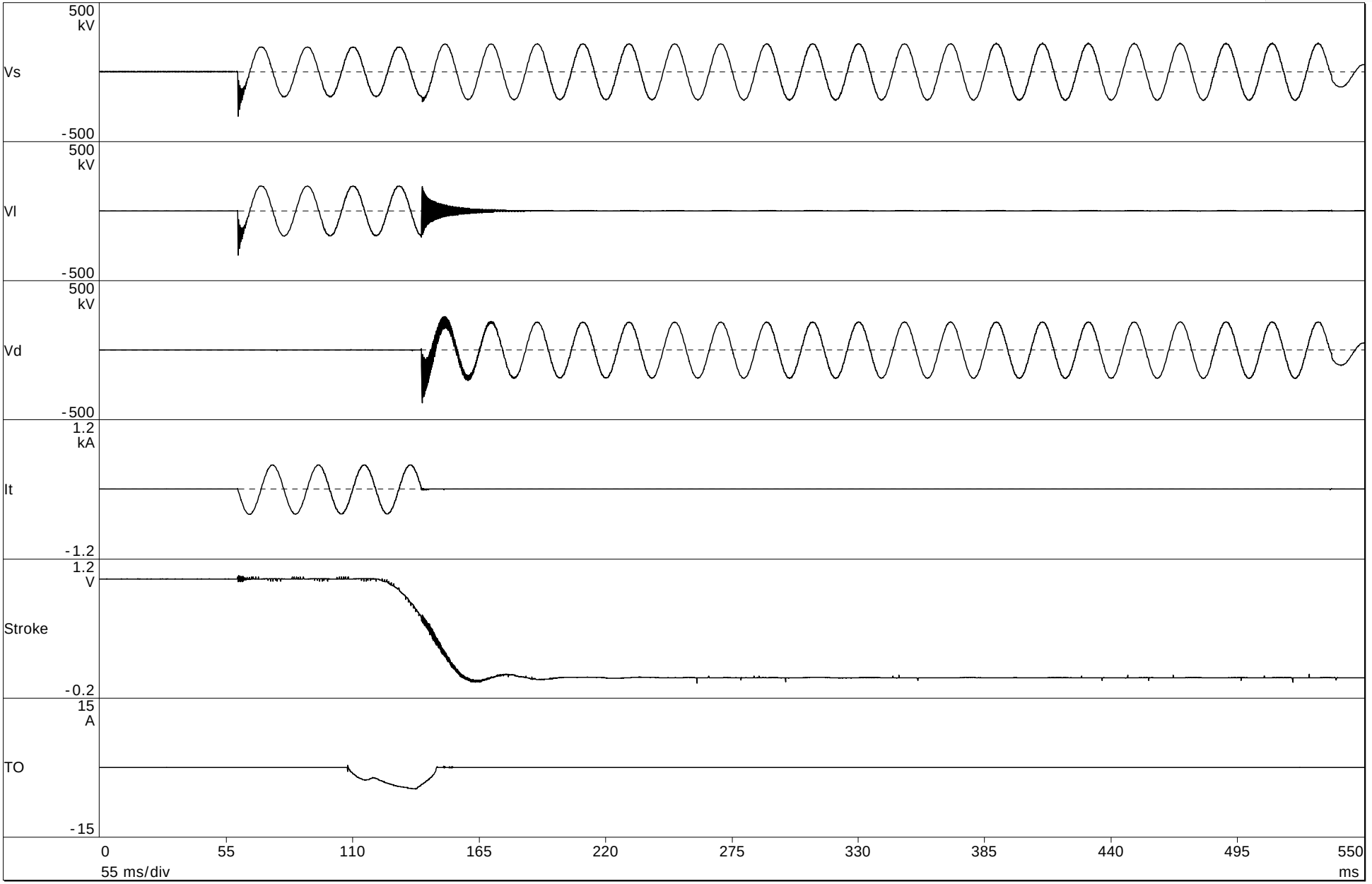
High Power Testing Department 1

HPC 1104 - 313



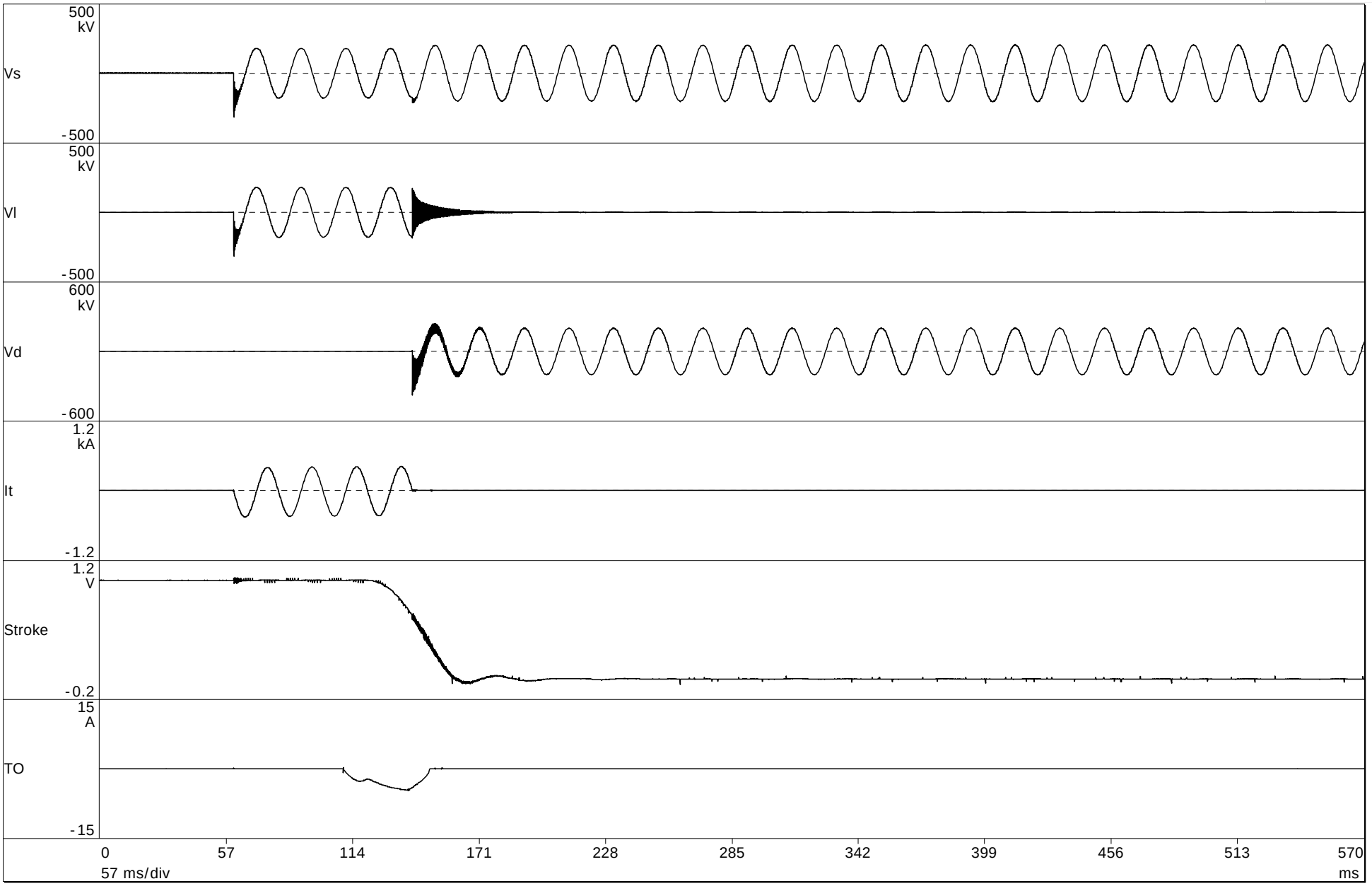
High Power Testing Department 1

HPC 1104 - 315



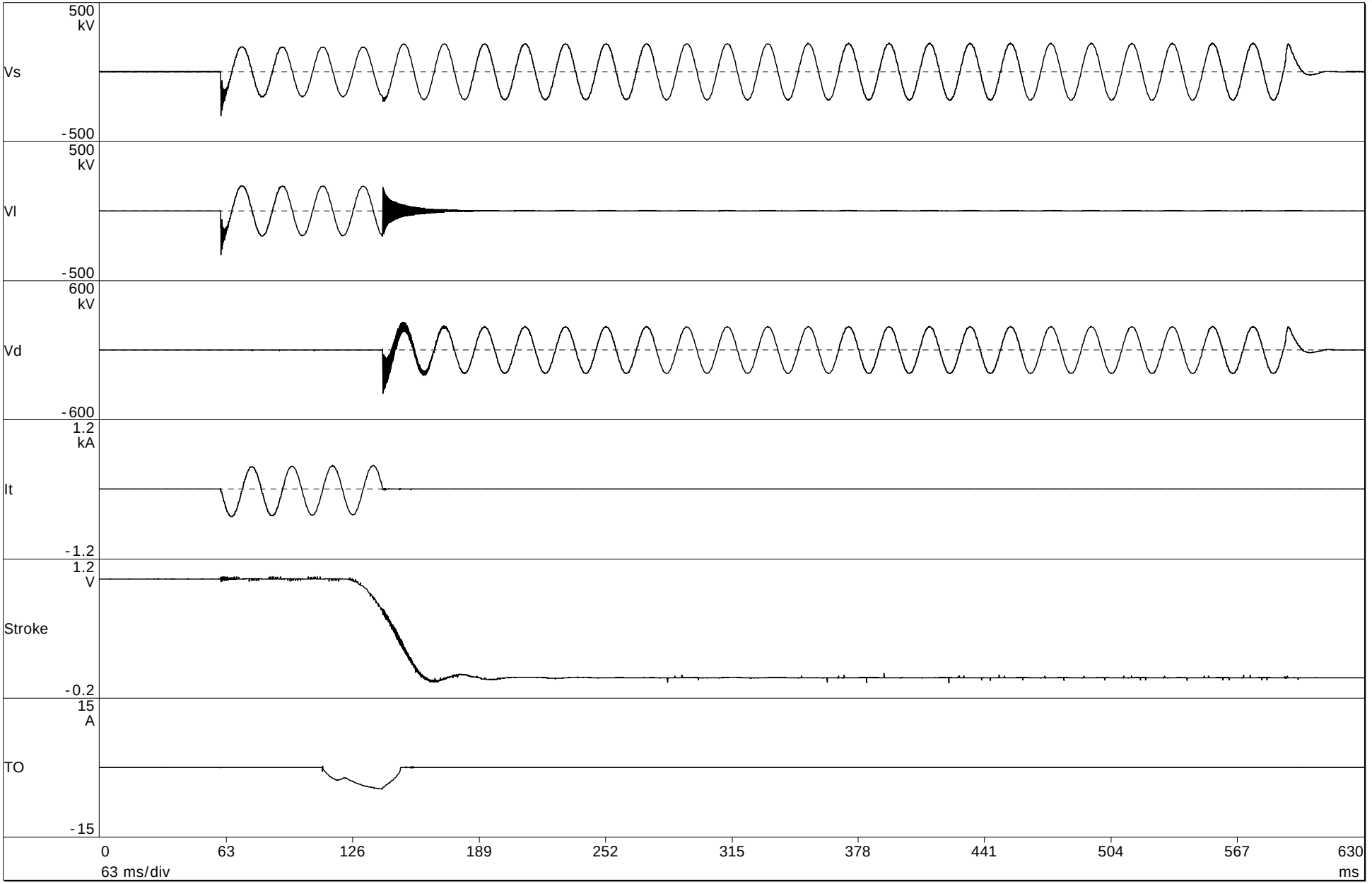
High Power Testing Department 1

HPC 1104 - 316



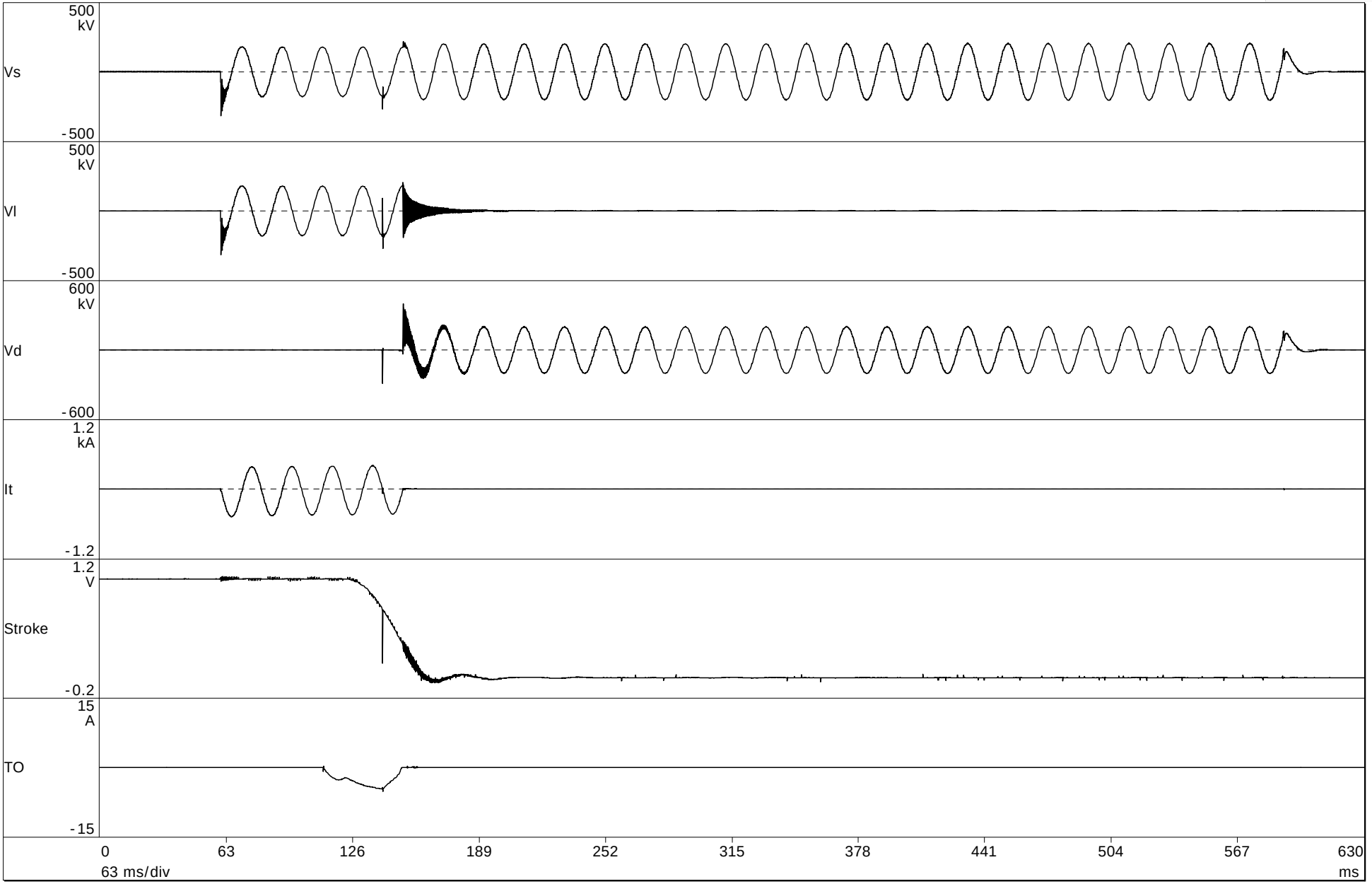
High Power Testing Department 1

HPC 1104 - 317



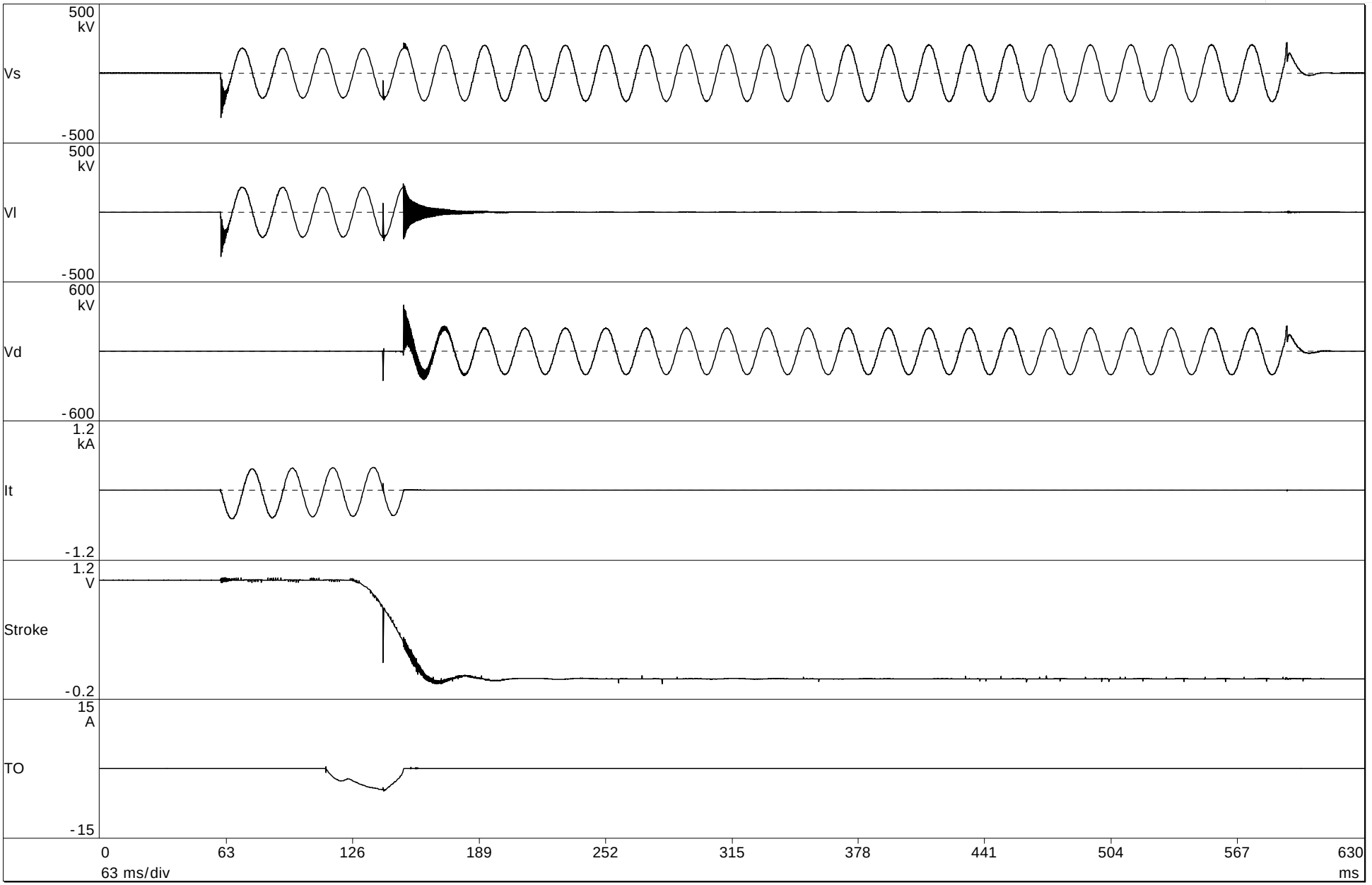
High Power Testing Department 1

HPC 1104 - 318



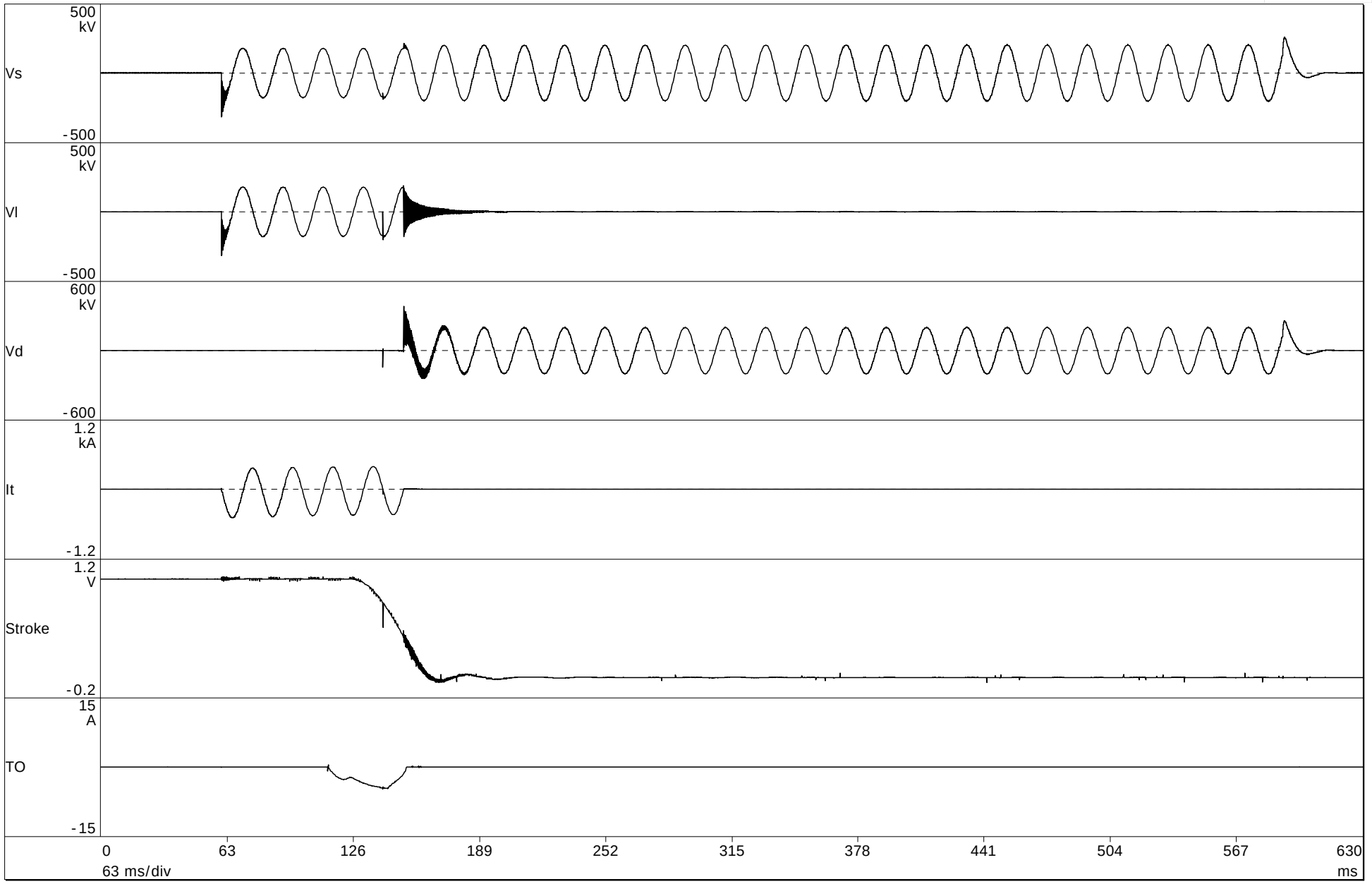
High Power Testing Department 1

HPC 1104 - 319



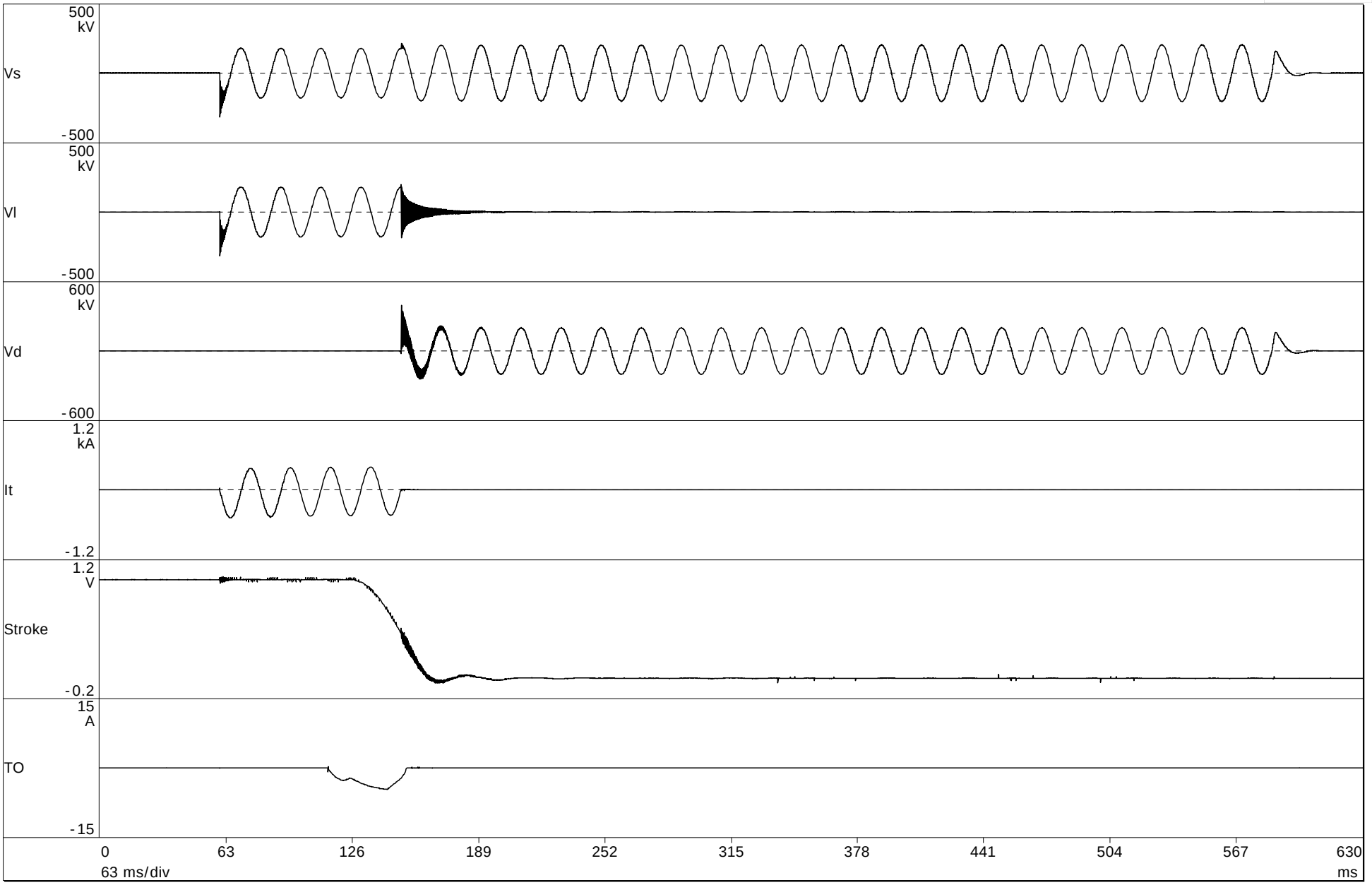
High Power Testing Department 1

HPC 1104 - 320



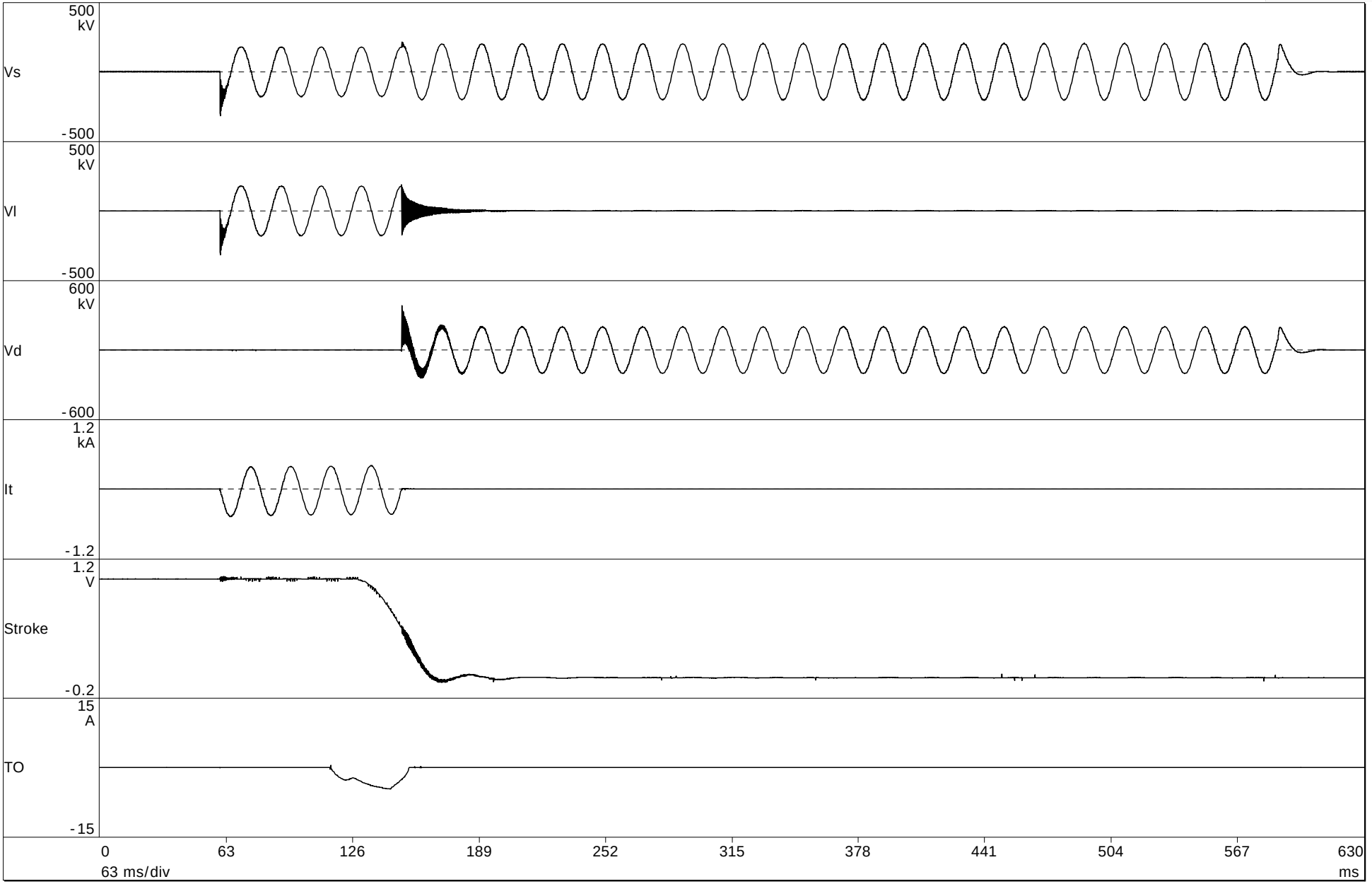
High Power Testing Department 1

HPC 1104 - 321



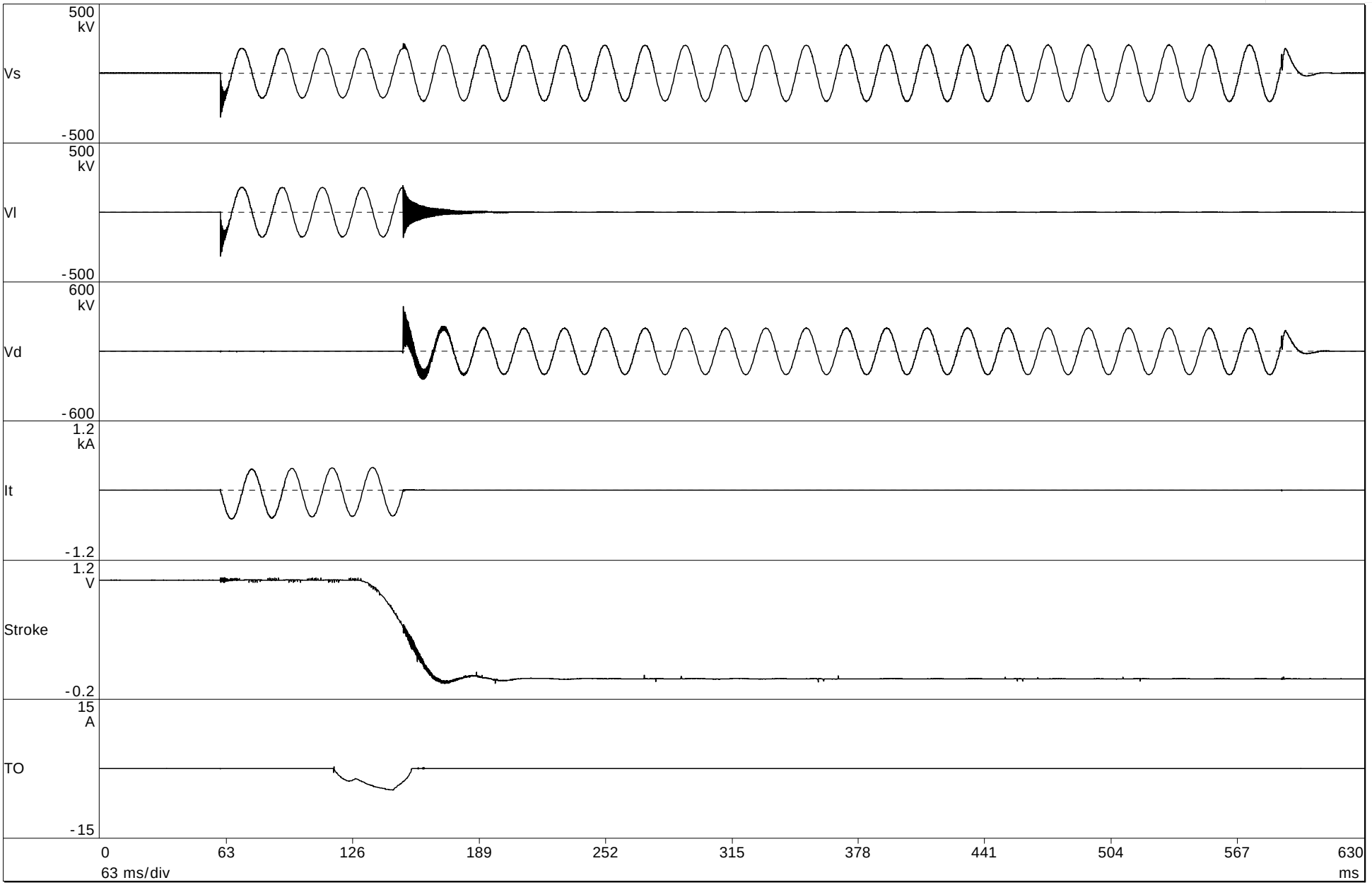
High Power Testing Department 1

HPC 1104 - 322



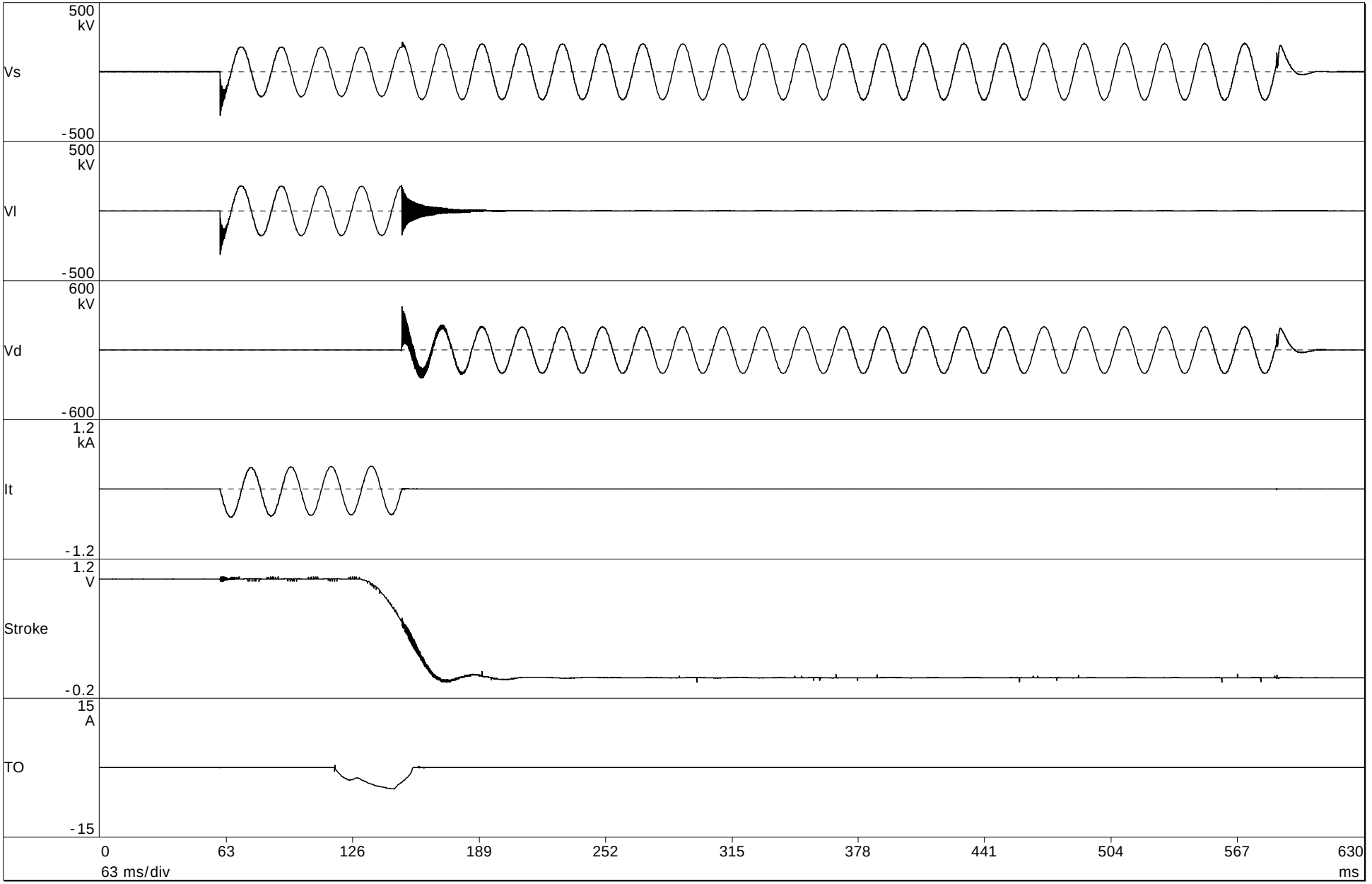
High Power Testing Department 1

HPC 1104 - 323



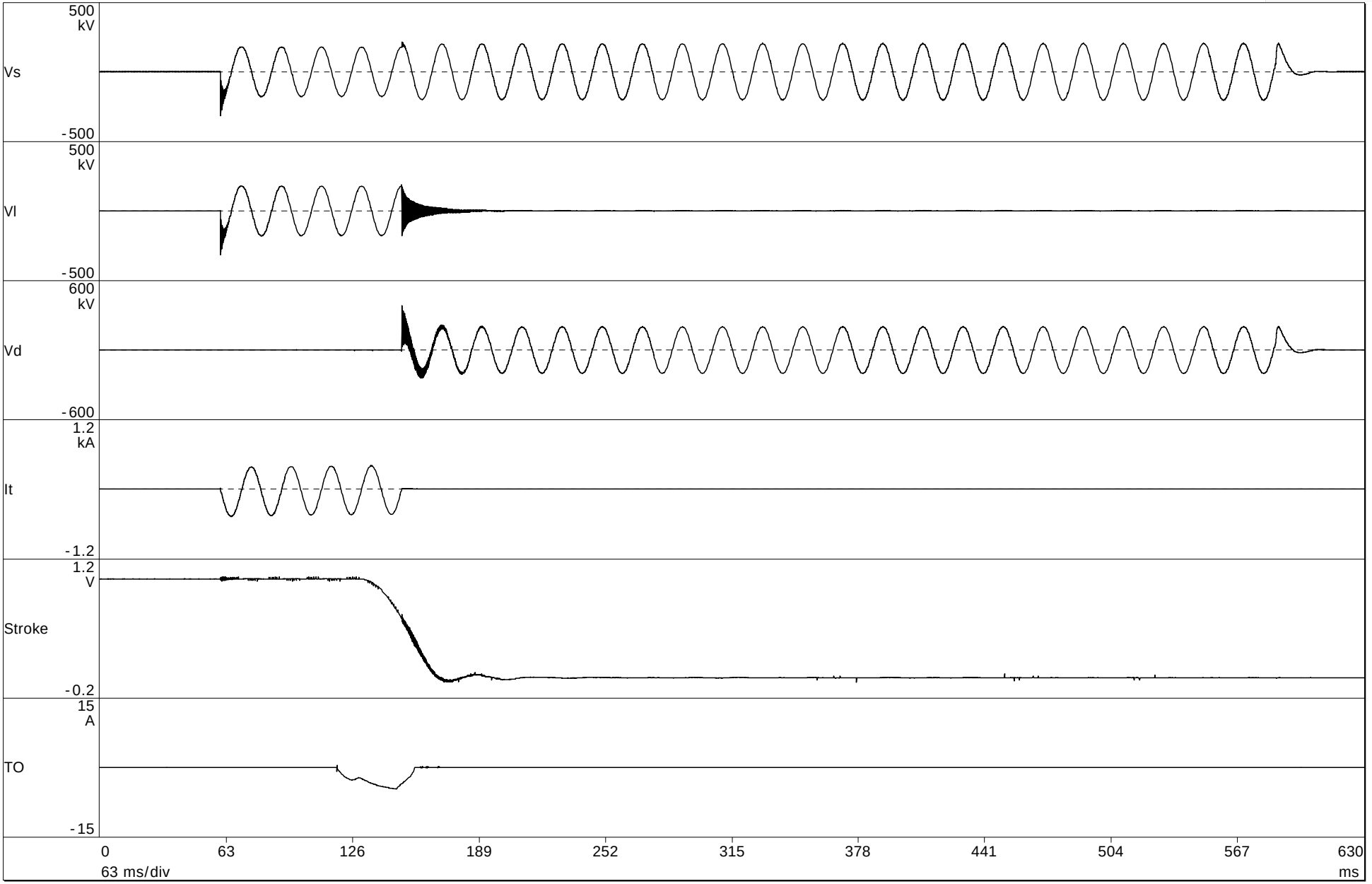
High Power Testing Department 1

HPC 1104 - 324



High Power Testing Department 1

HPC 1104 - 325



High Power Testing Department 1

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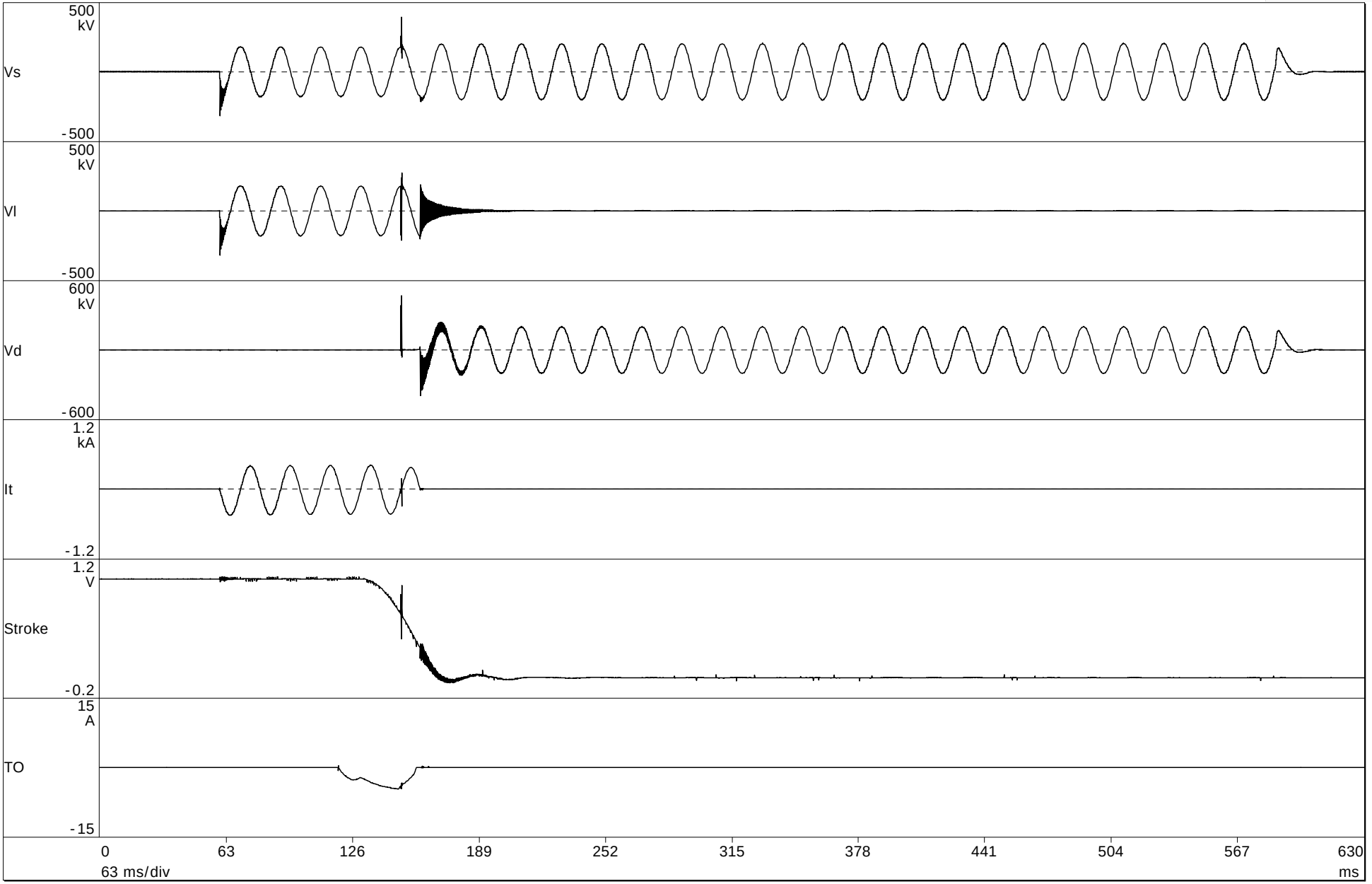
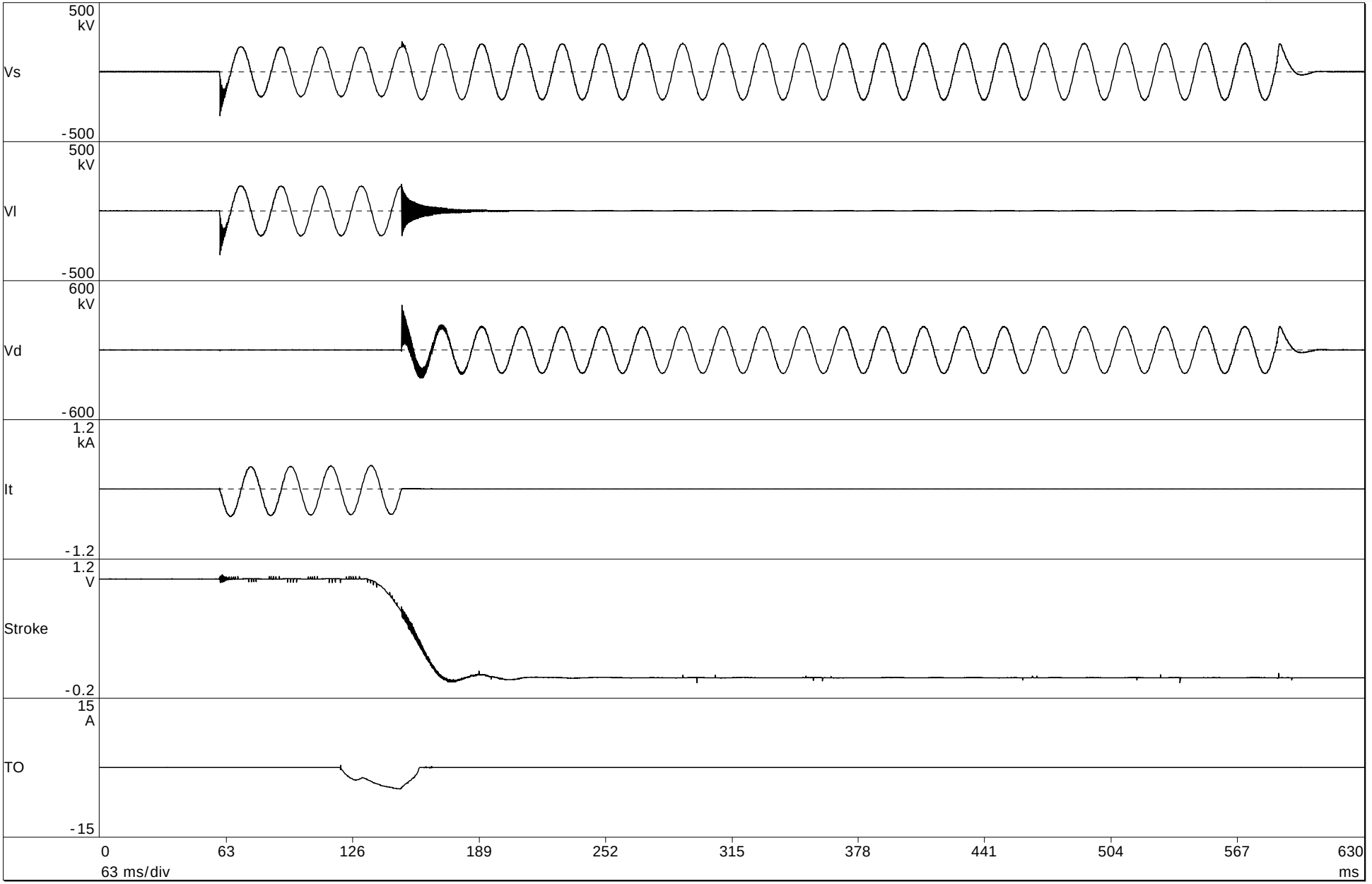


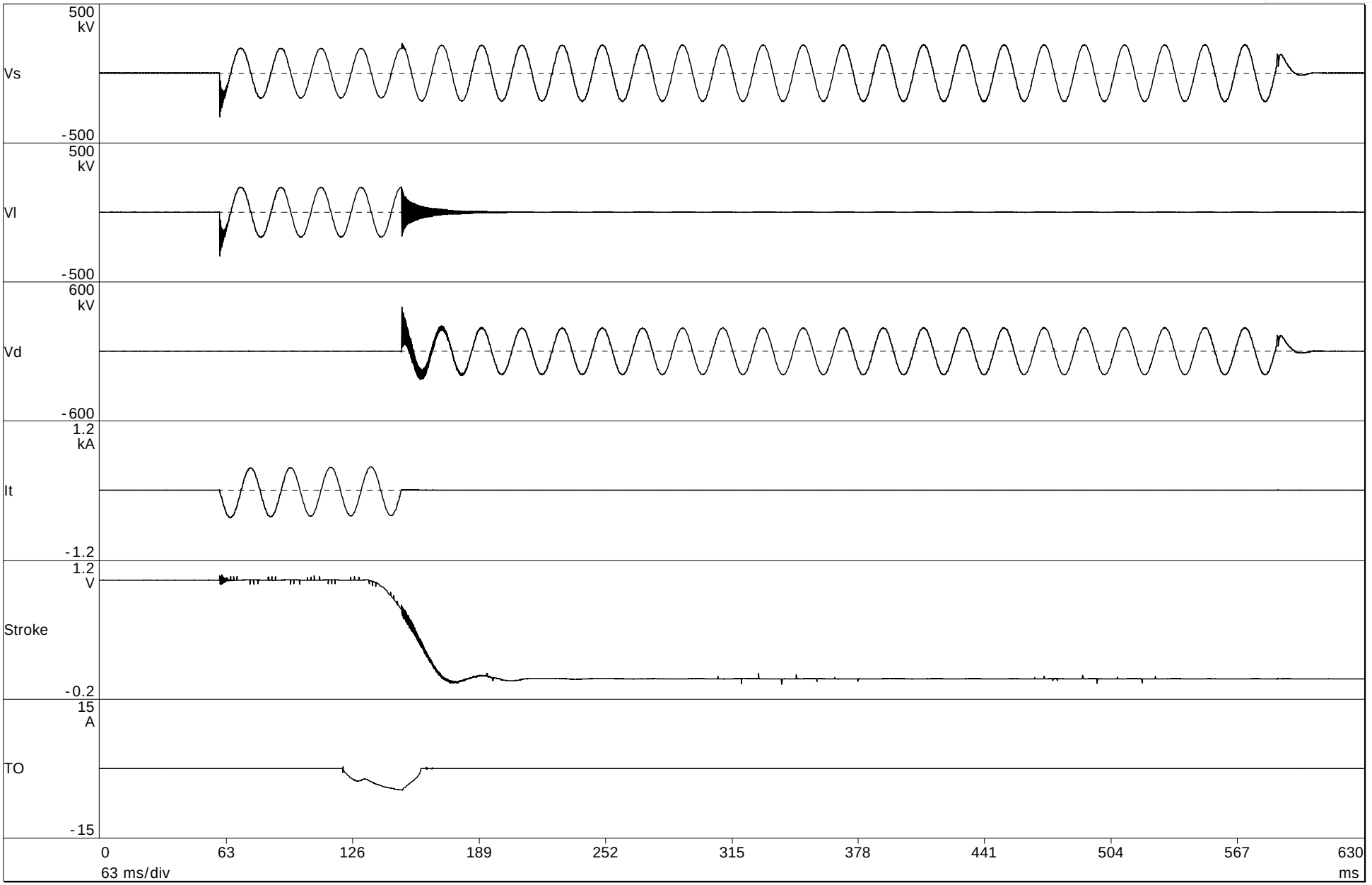
High Power Testing Department 1

HPC 1104 - 327



High Power Testing Department 1

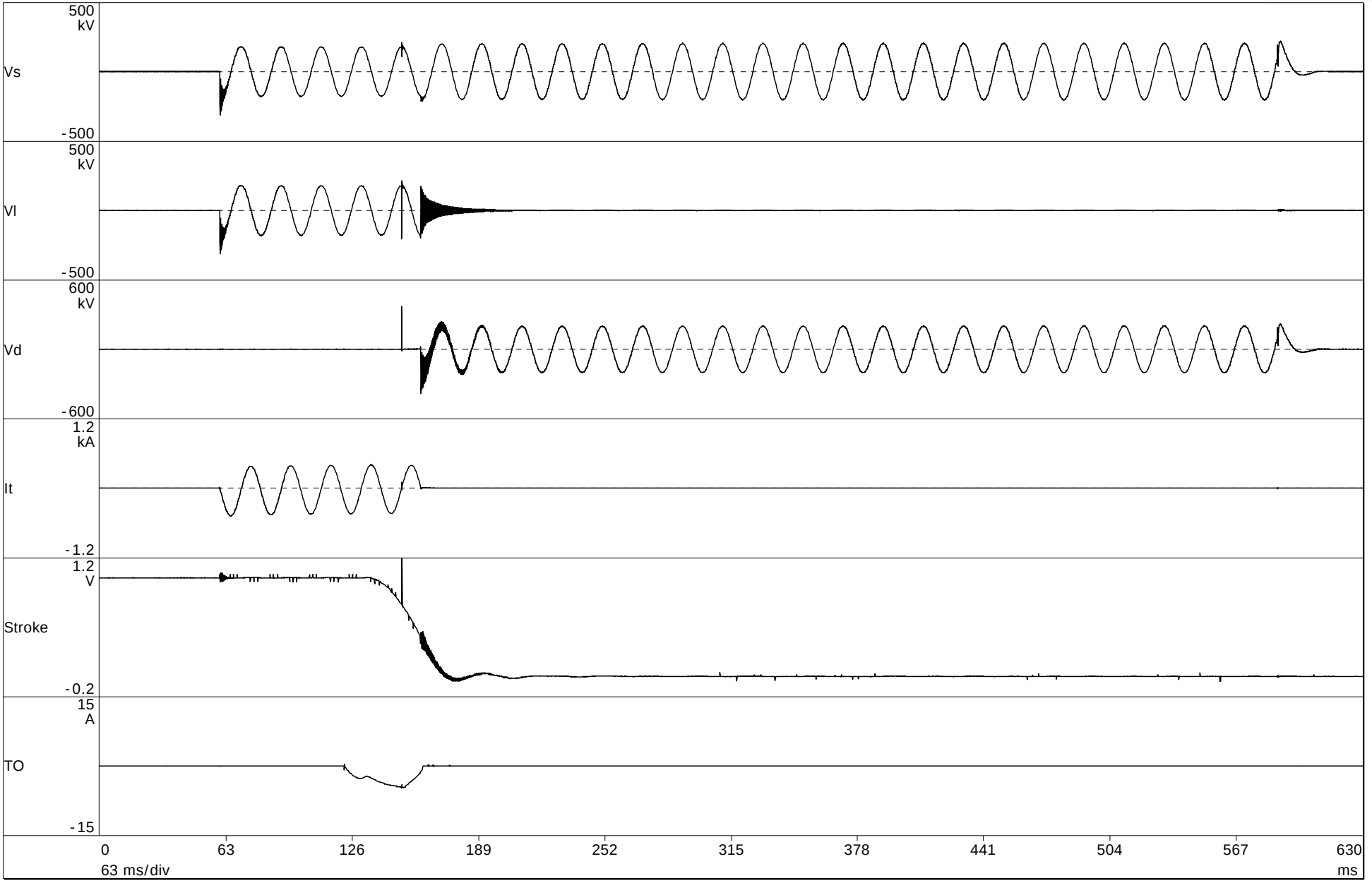
HPC 1104 - 328



High Power Testing Department 1

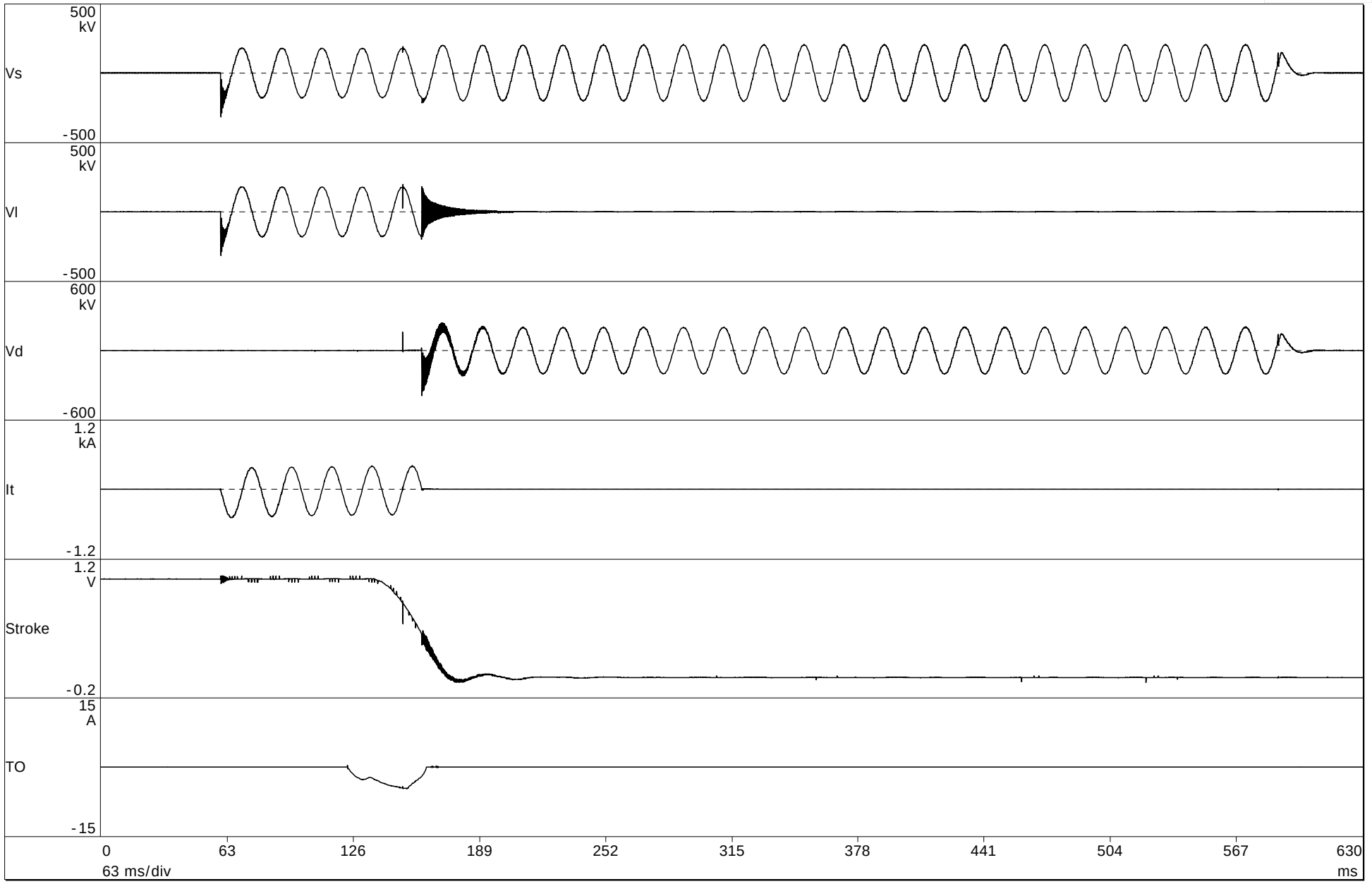
HPC 1104 - 329

KERI



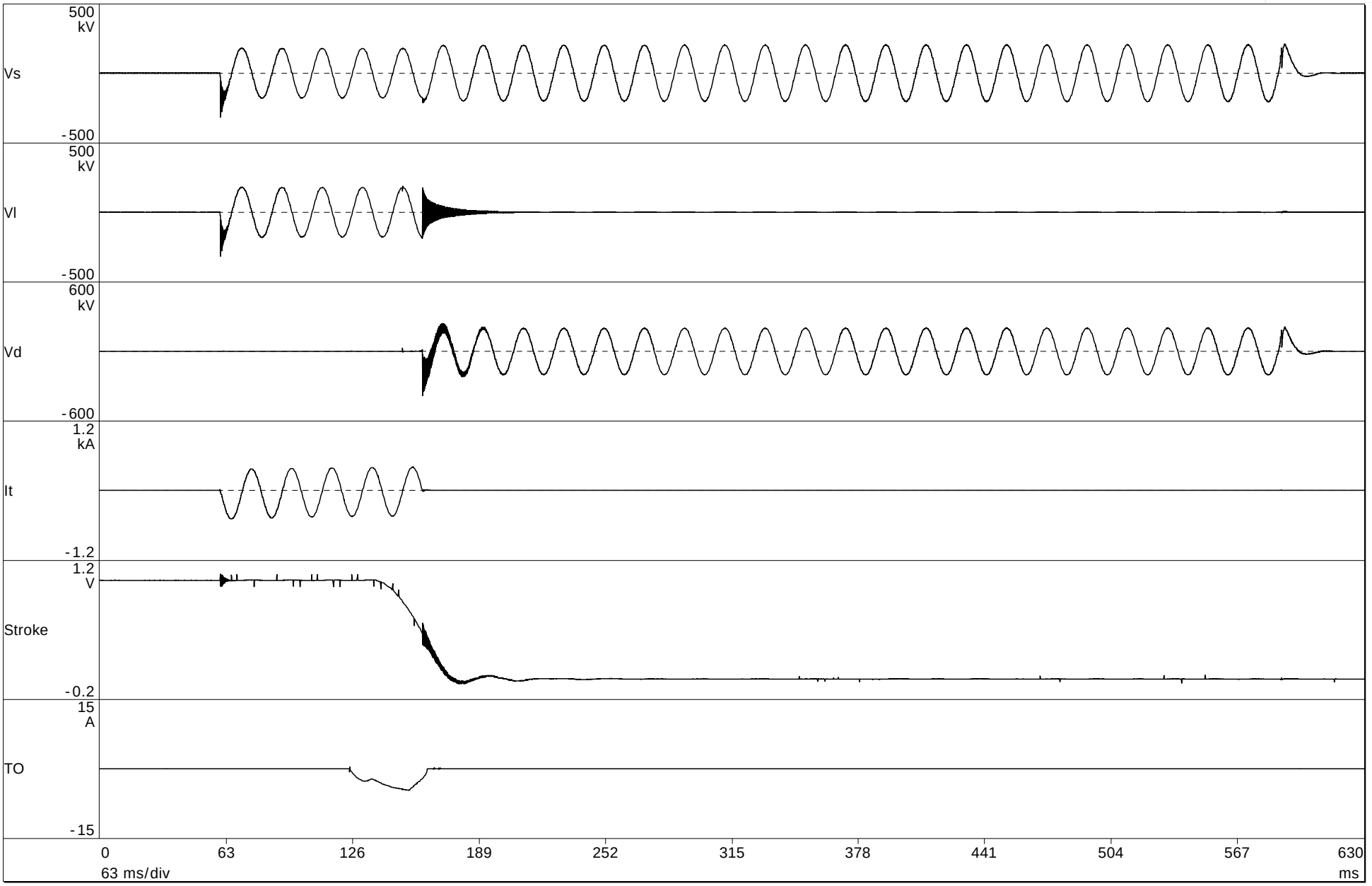
High Power Testing Department 1

HPC 1104 - 330



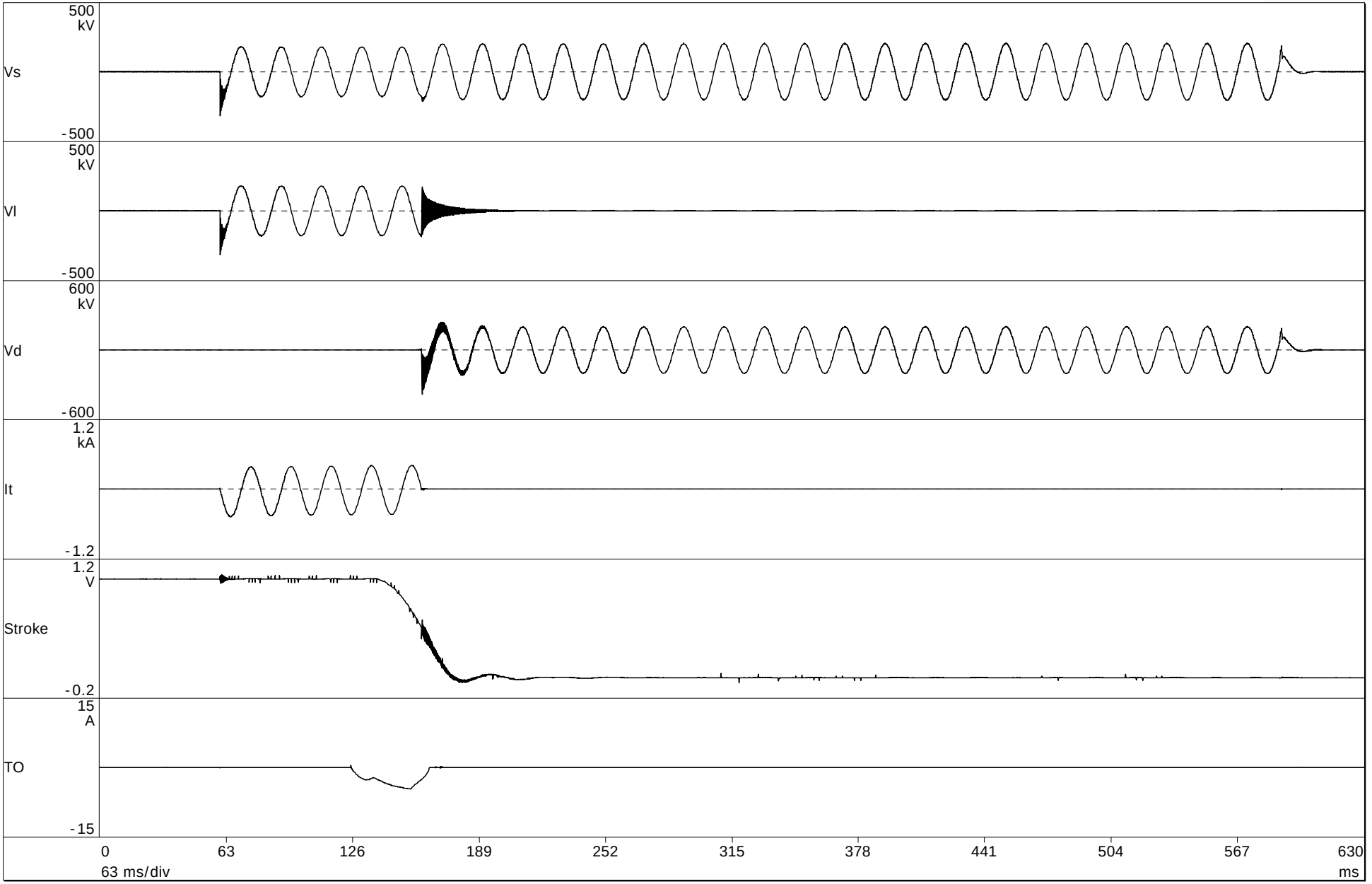
High Power Testing Department 1

HPC 1104 - 331



High Power Testing Department 1

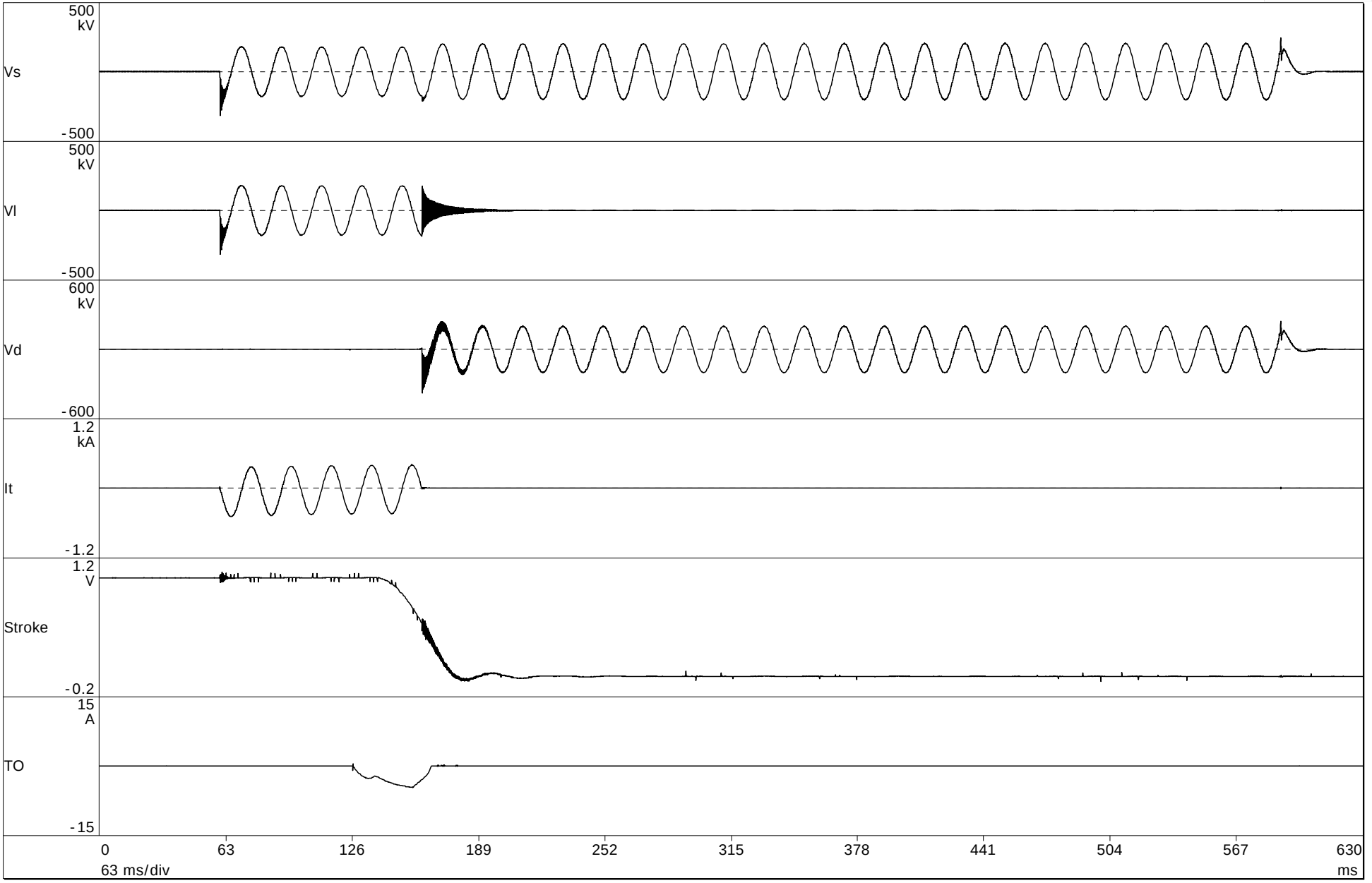
HPC 1104 - 332



High Power Testing Department 1

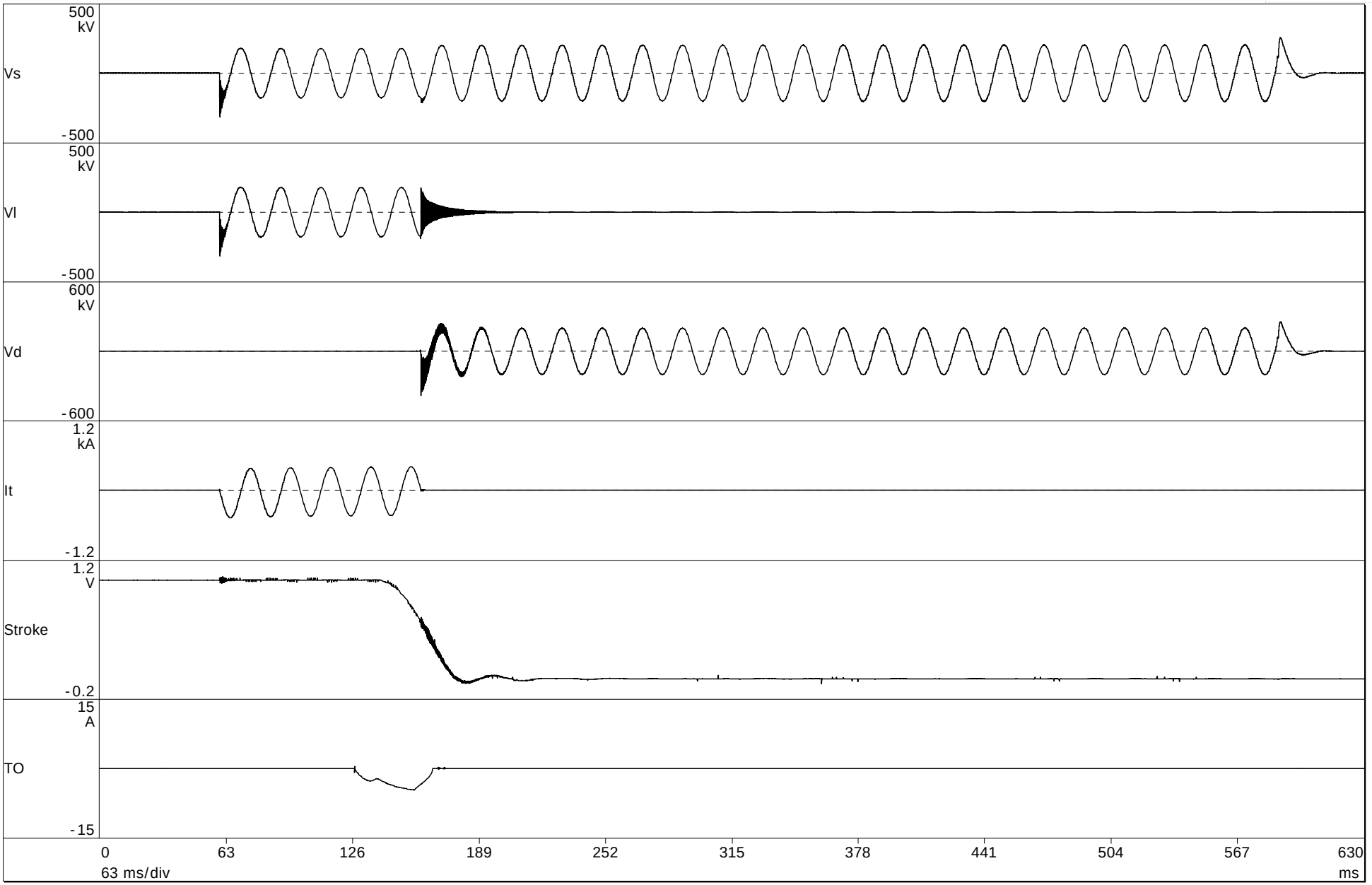
HPC 1104 - 333

KERI



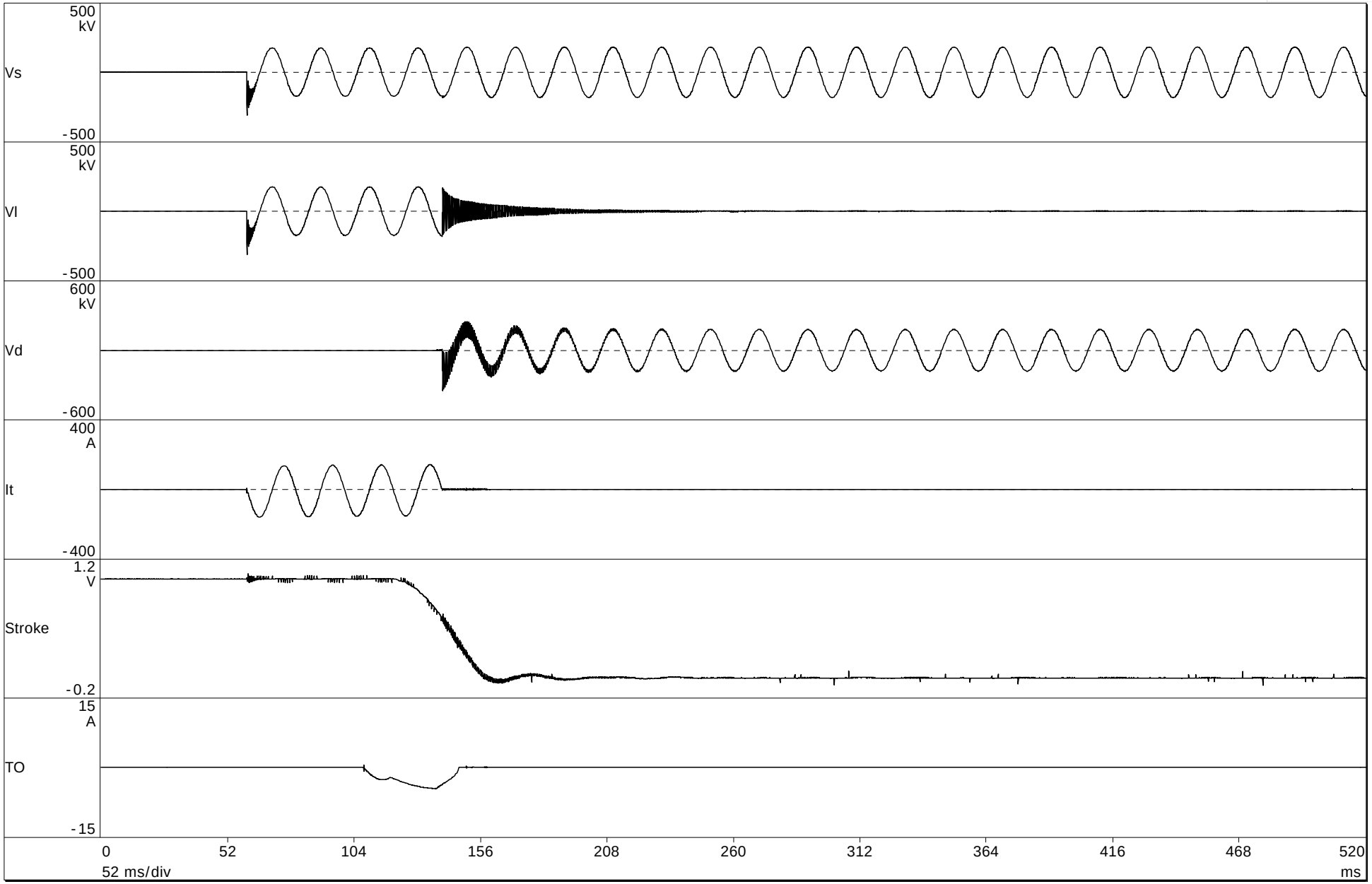
High Power Testing Department 1

HPC 1104 - 334



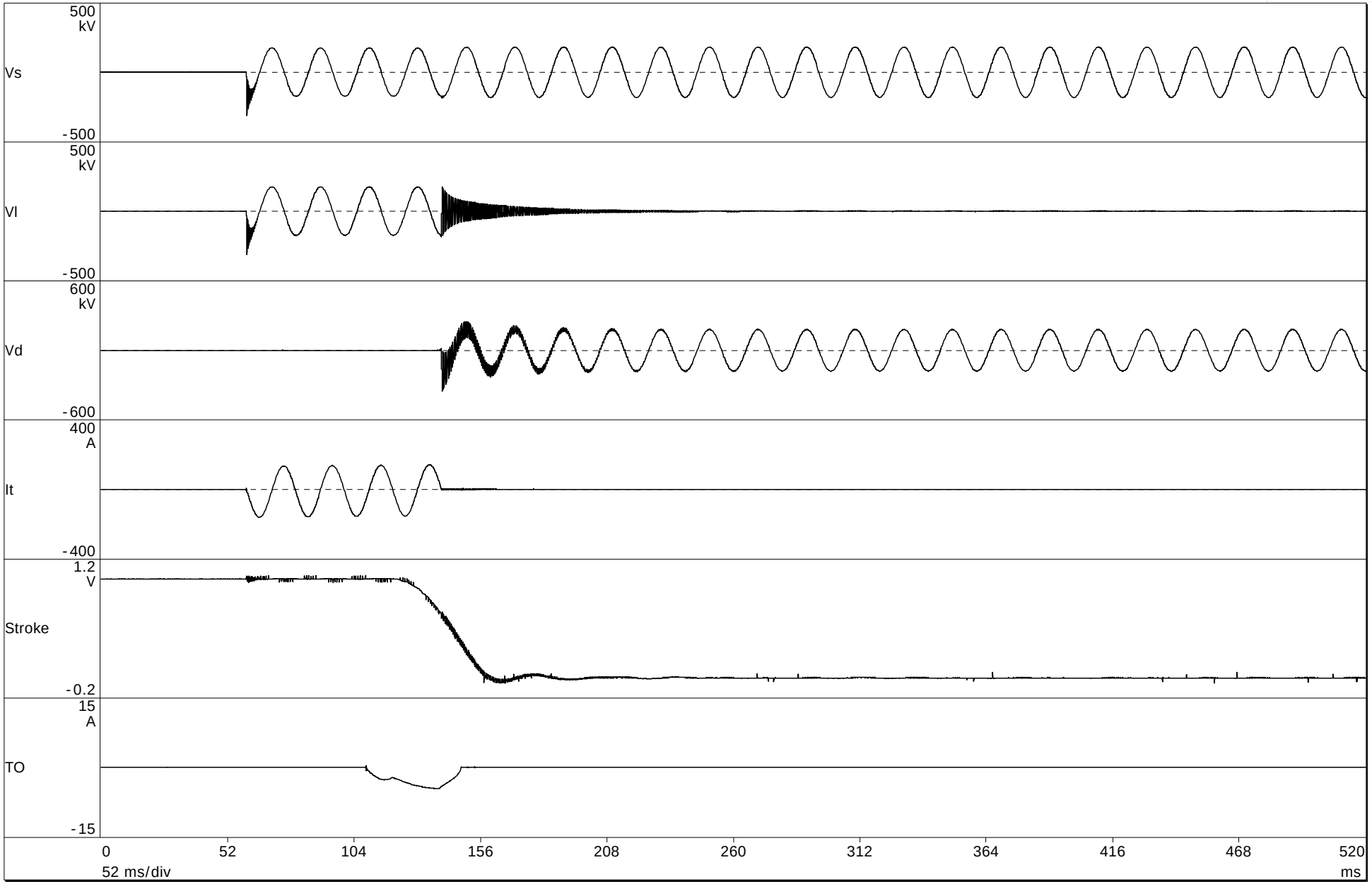
High Power Testing Department 1

HPC 1104 - 336



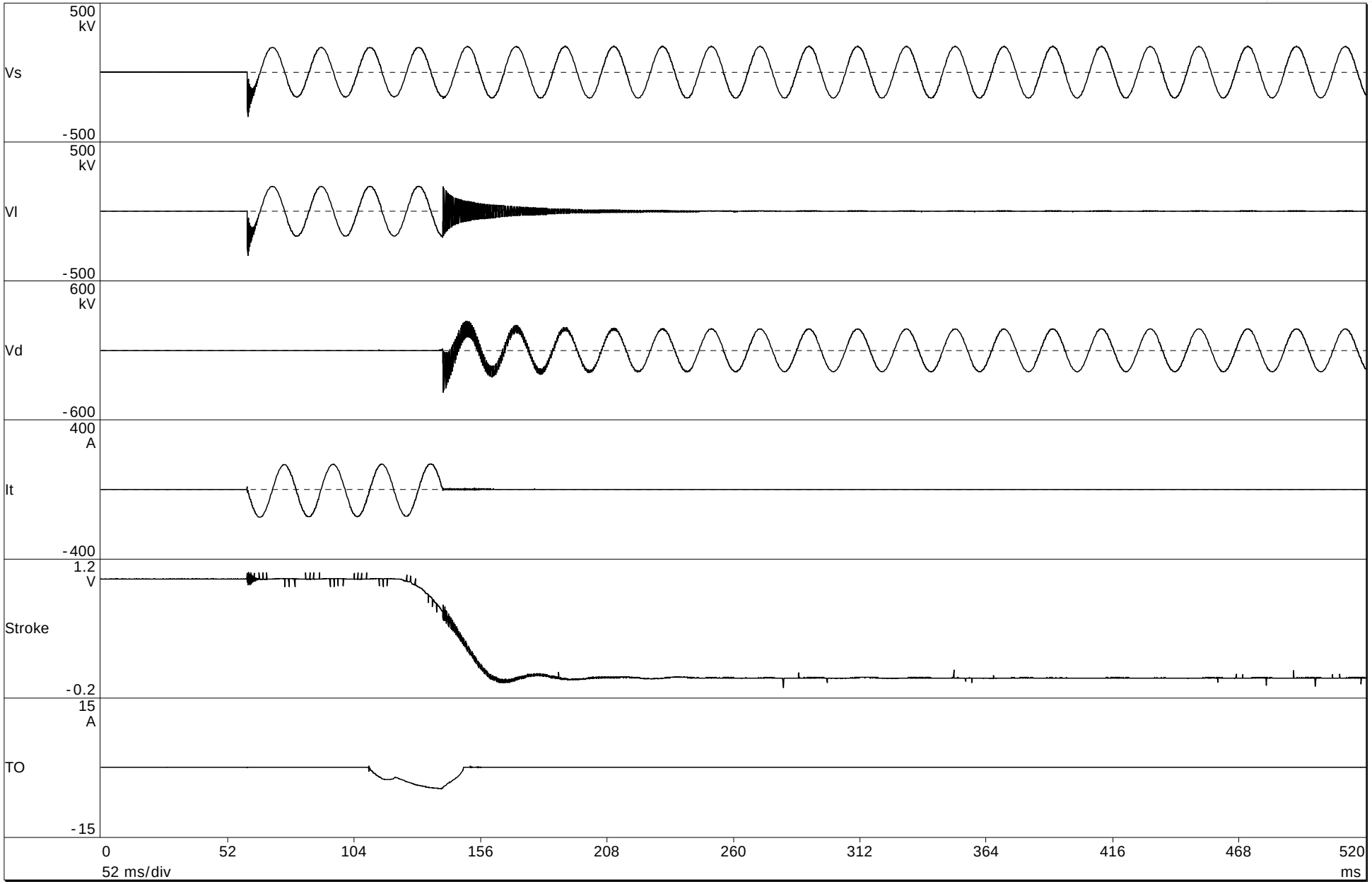
High Power Testing Department 1

HPC 1104 - 337



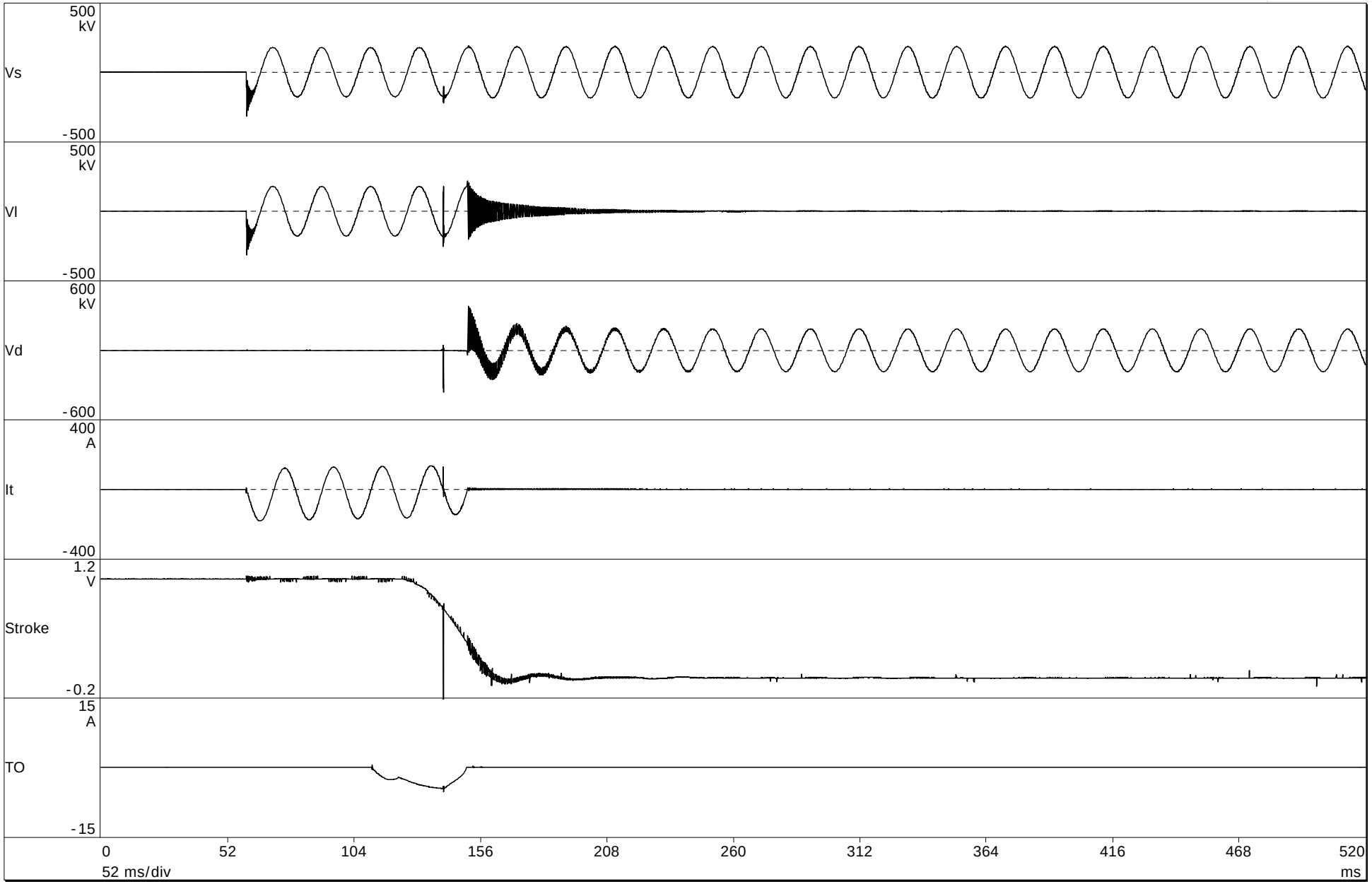
High Power Testing Department 1

HPC 1104 - 338



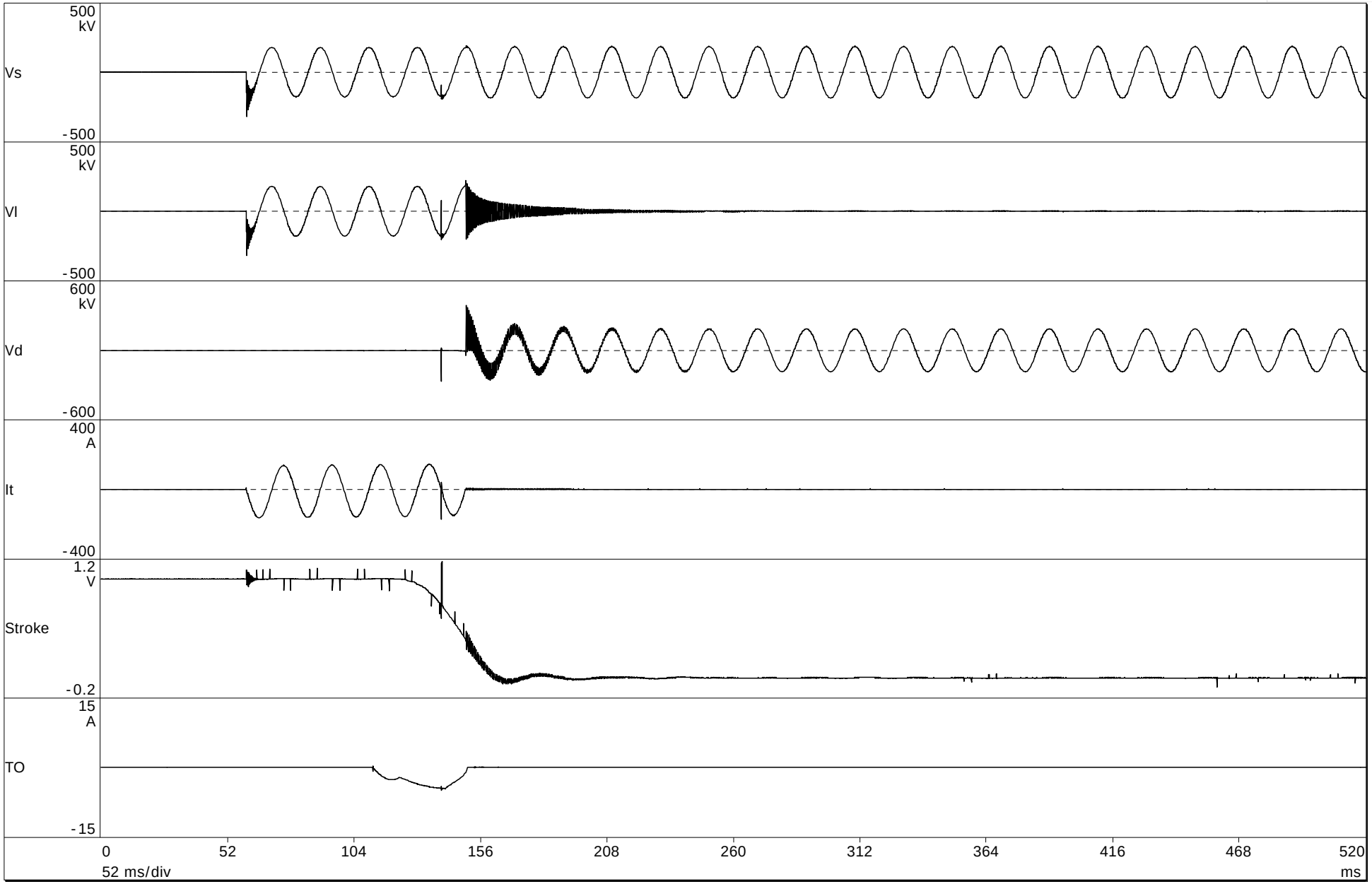
High Power Testing Department 1

HPC 1104 - 339



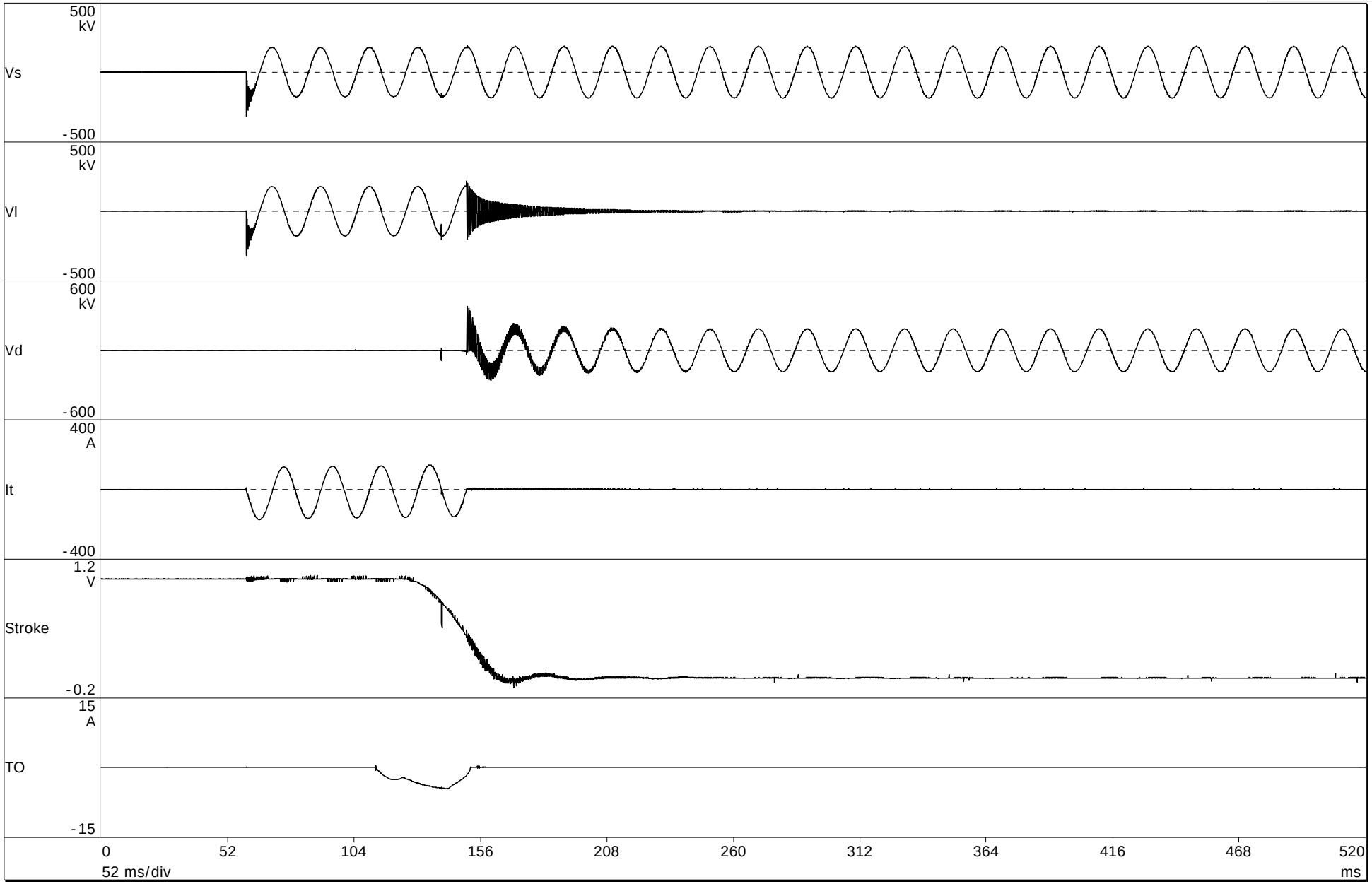
High Power Testing Department 1

HPC 1104 - 340



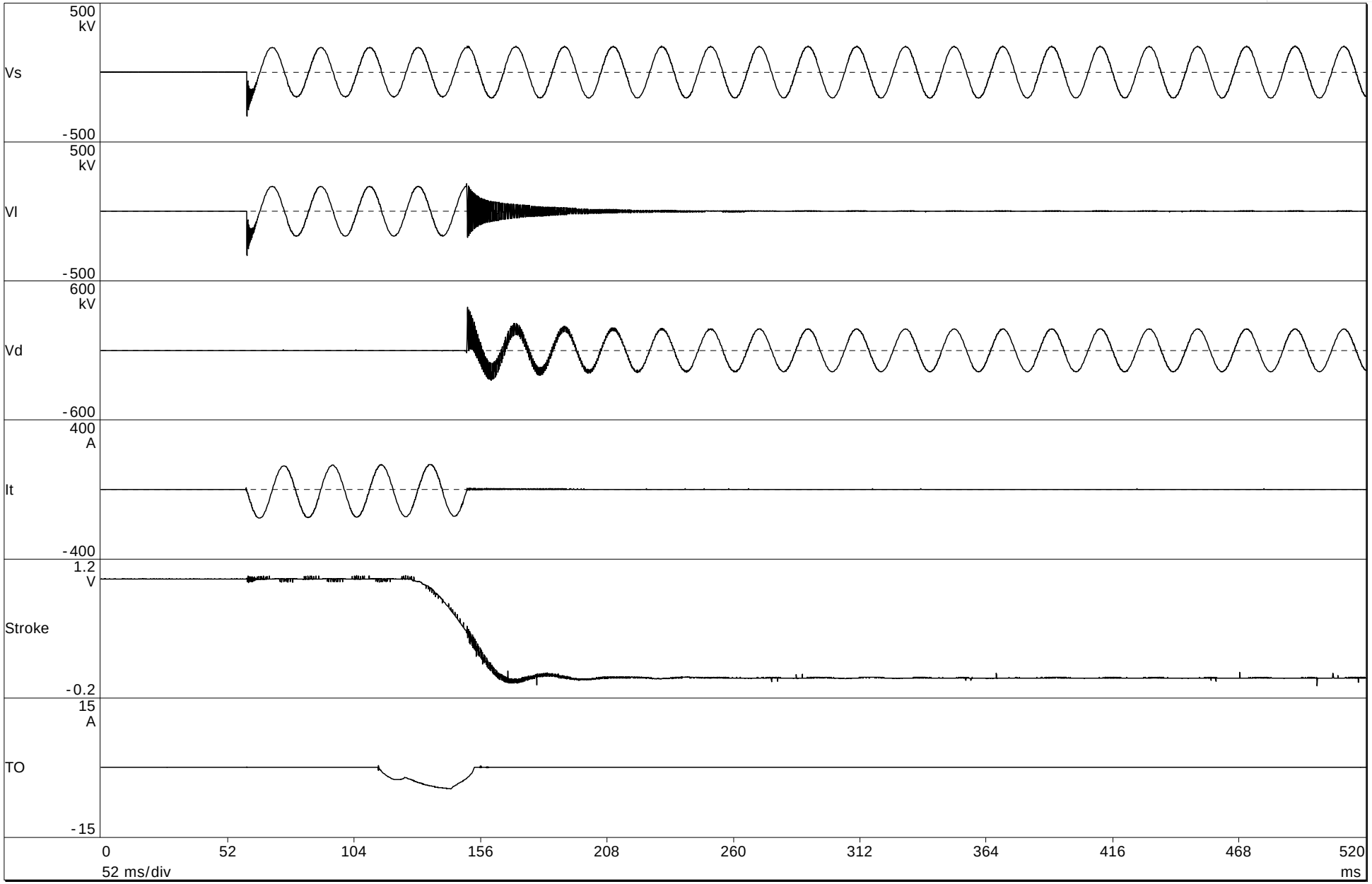
High Power Testing Department 1

HPC 1104 - 341



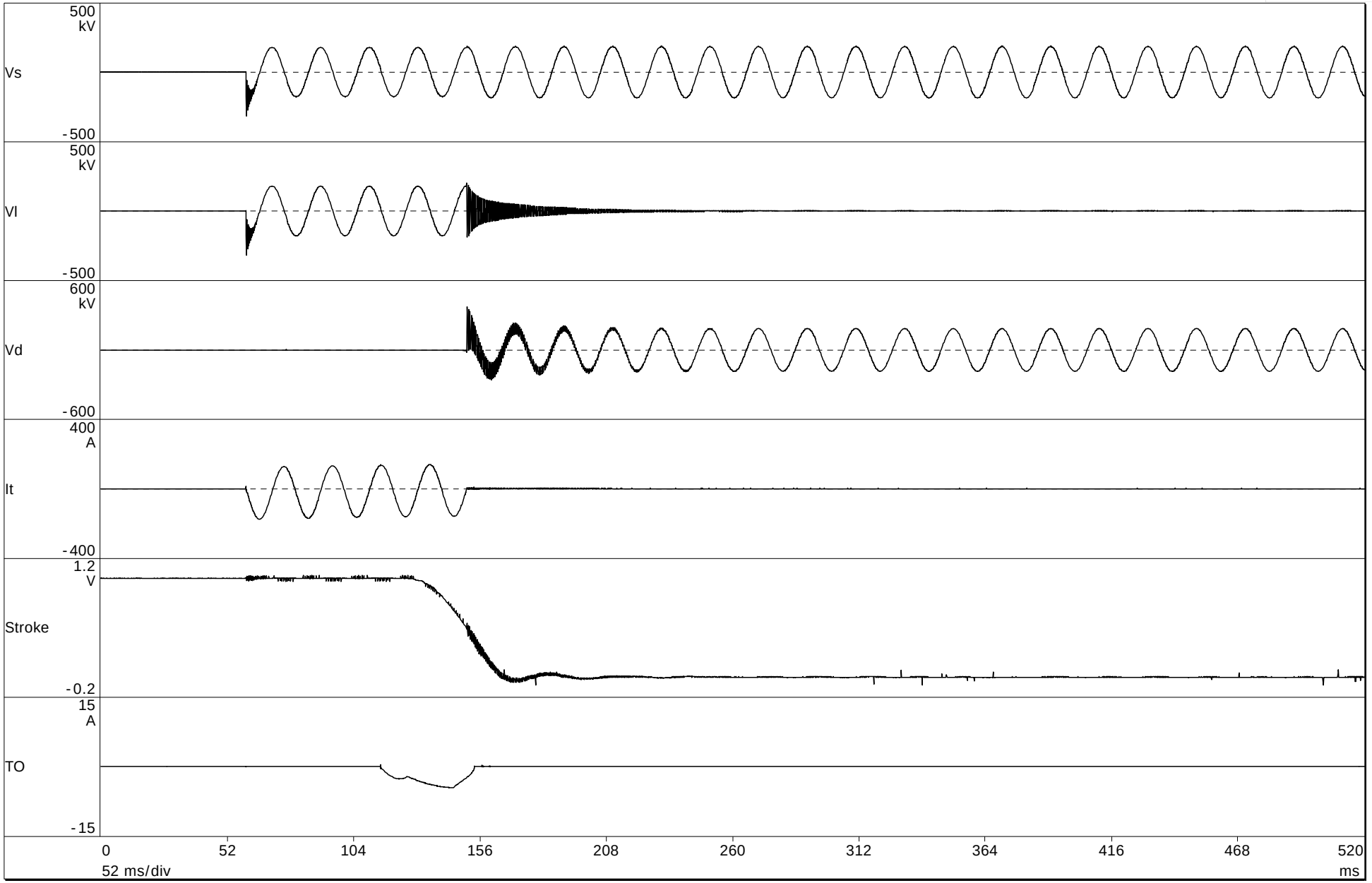
High Power Testing Department 1

HPC 1104 - 342



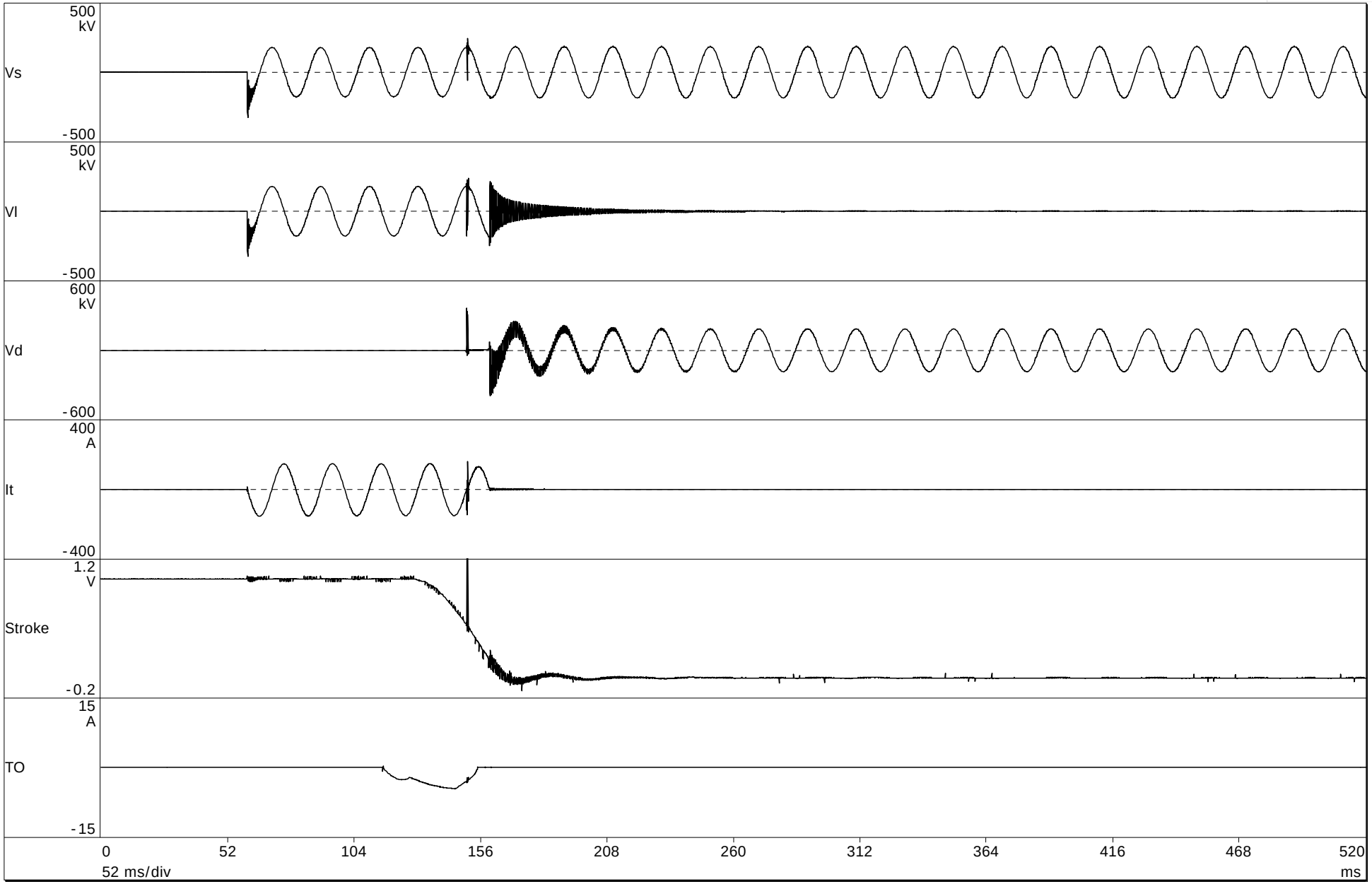
High Power Testing Department 1

HPC 1104 - 343



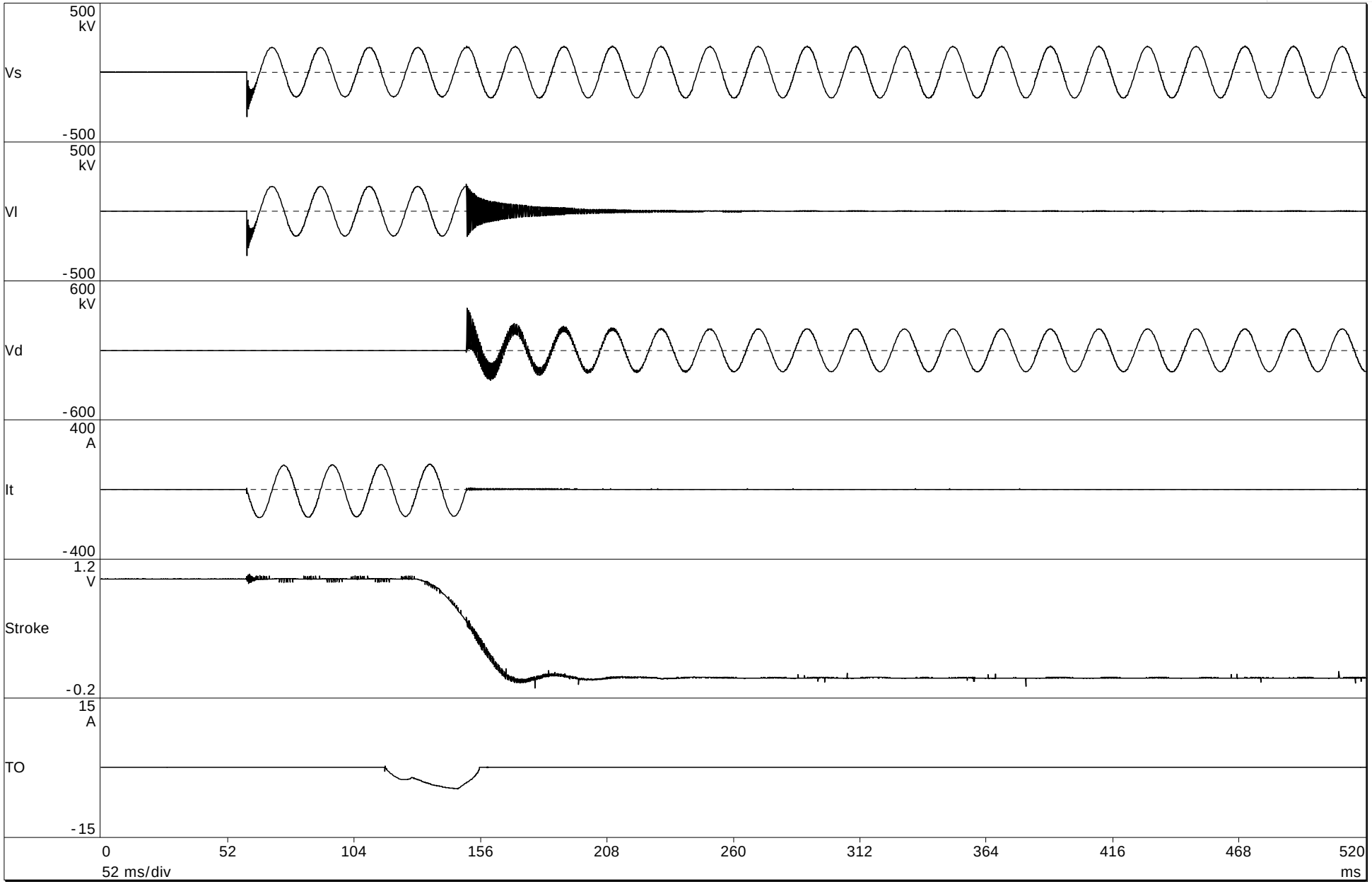
High Power Testing Department 1

HPC 1104 - 344



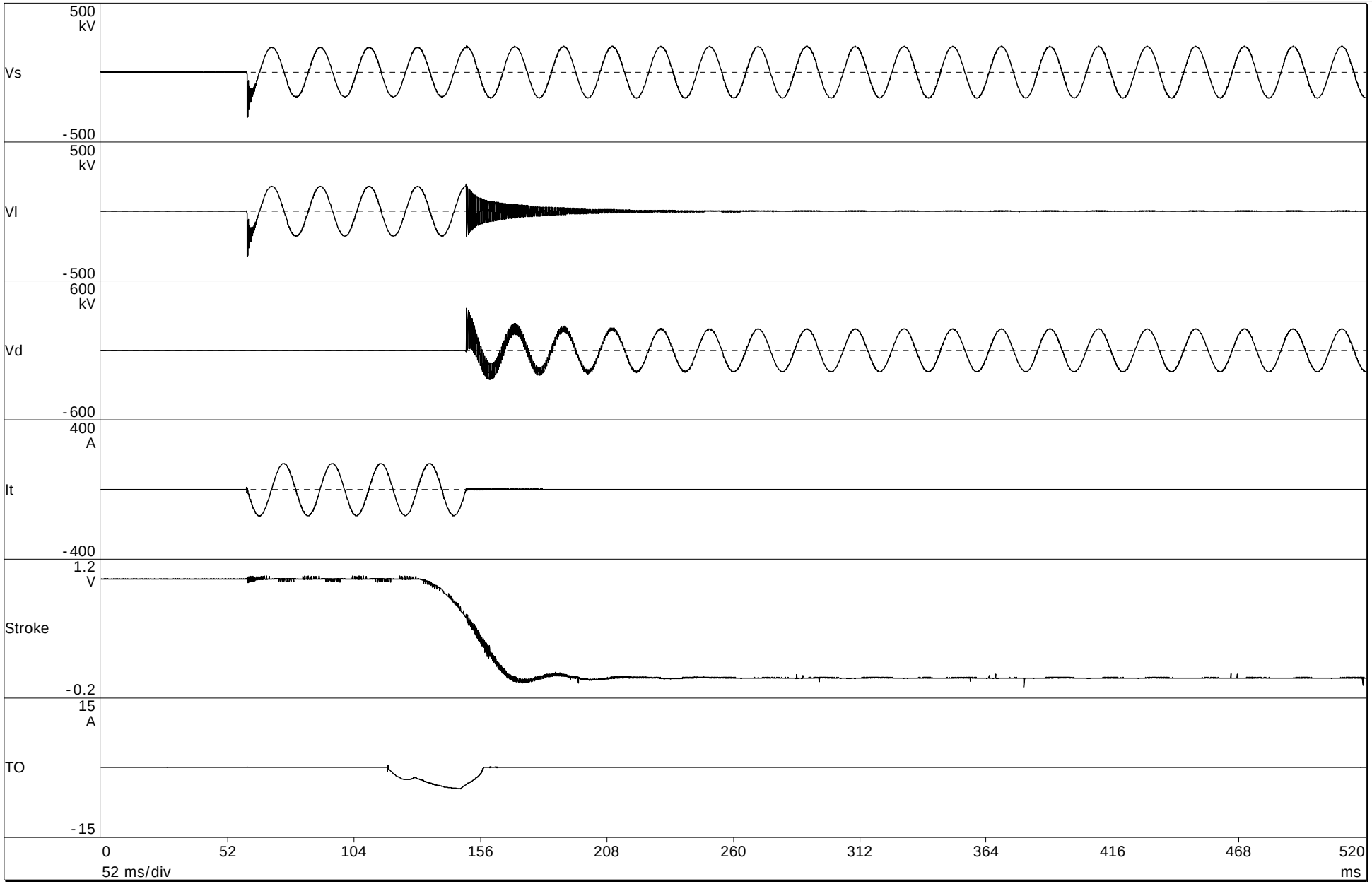
High Power Testing Department 1

HPC 1104 - 345



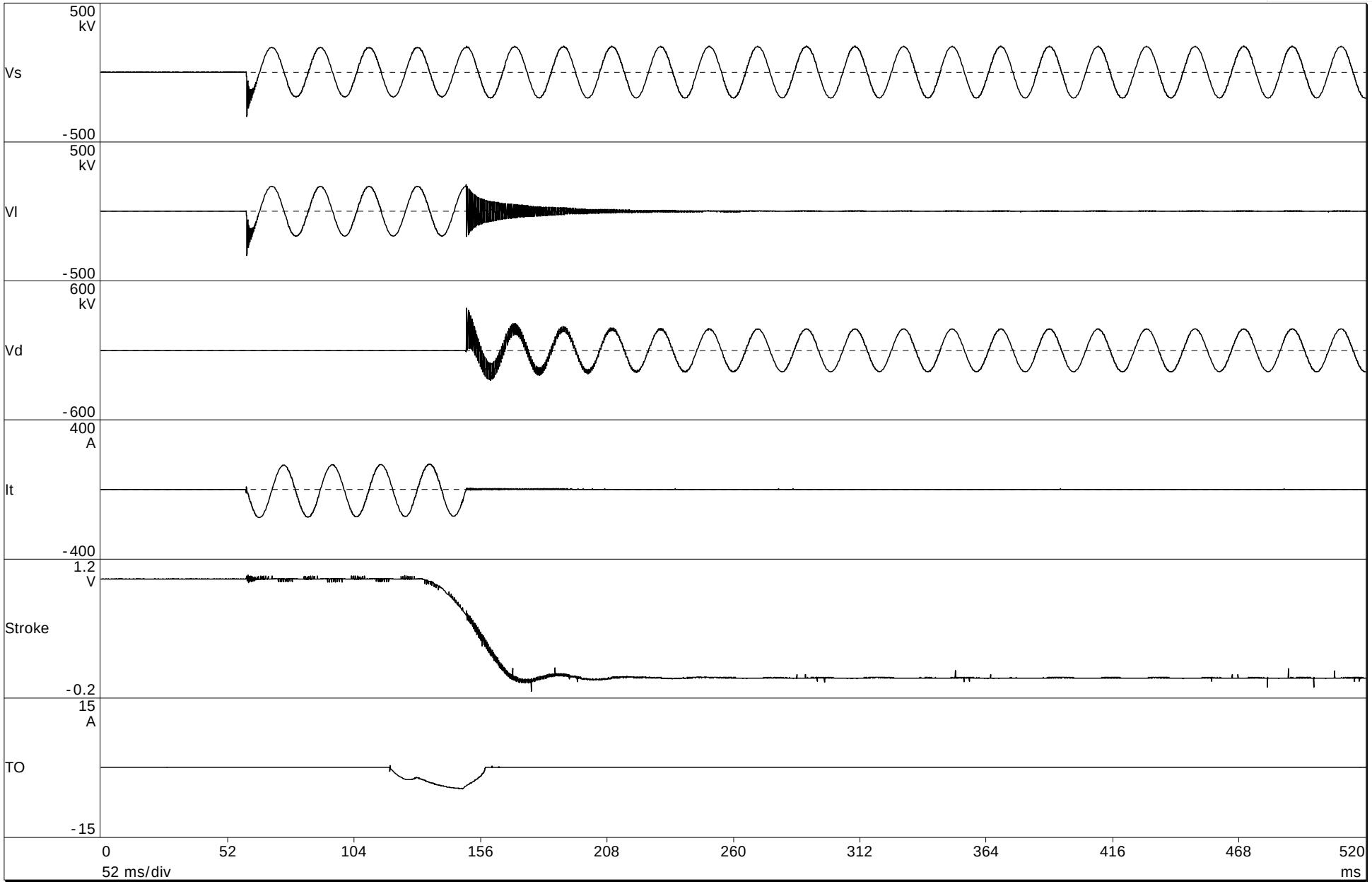
High Power Testing Department 1

HPC 1104 - 346



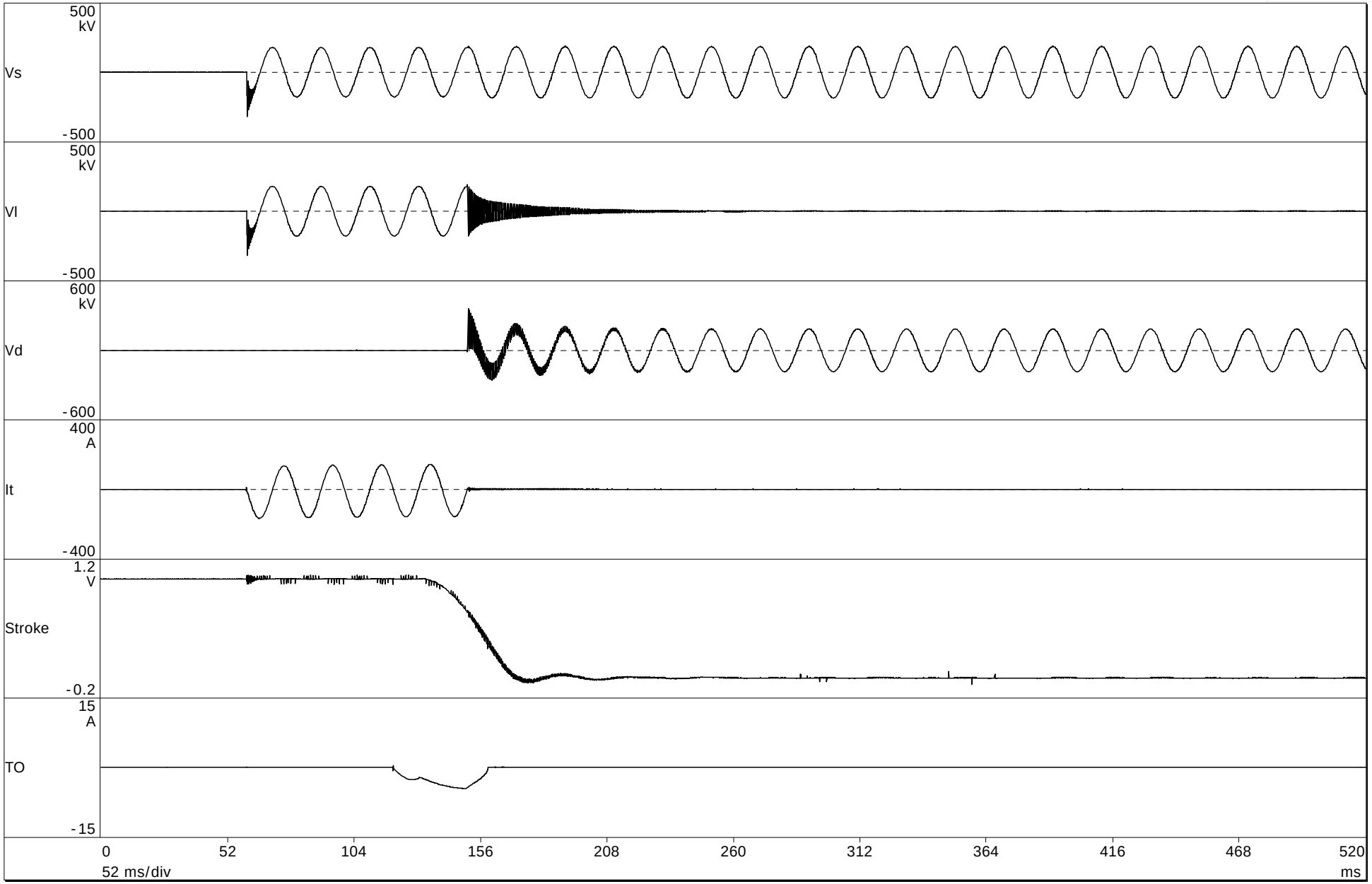
High Power Testing Department 1

HPC 1104 - 347



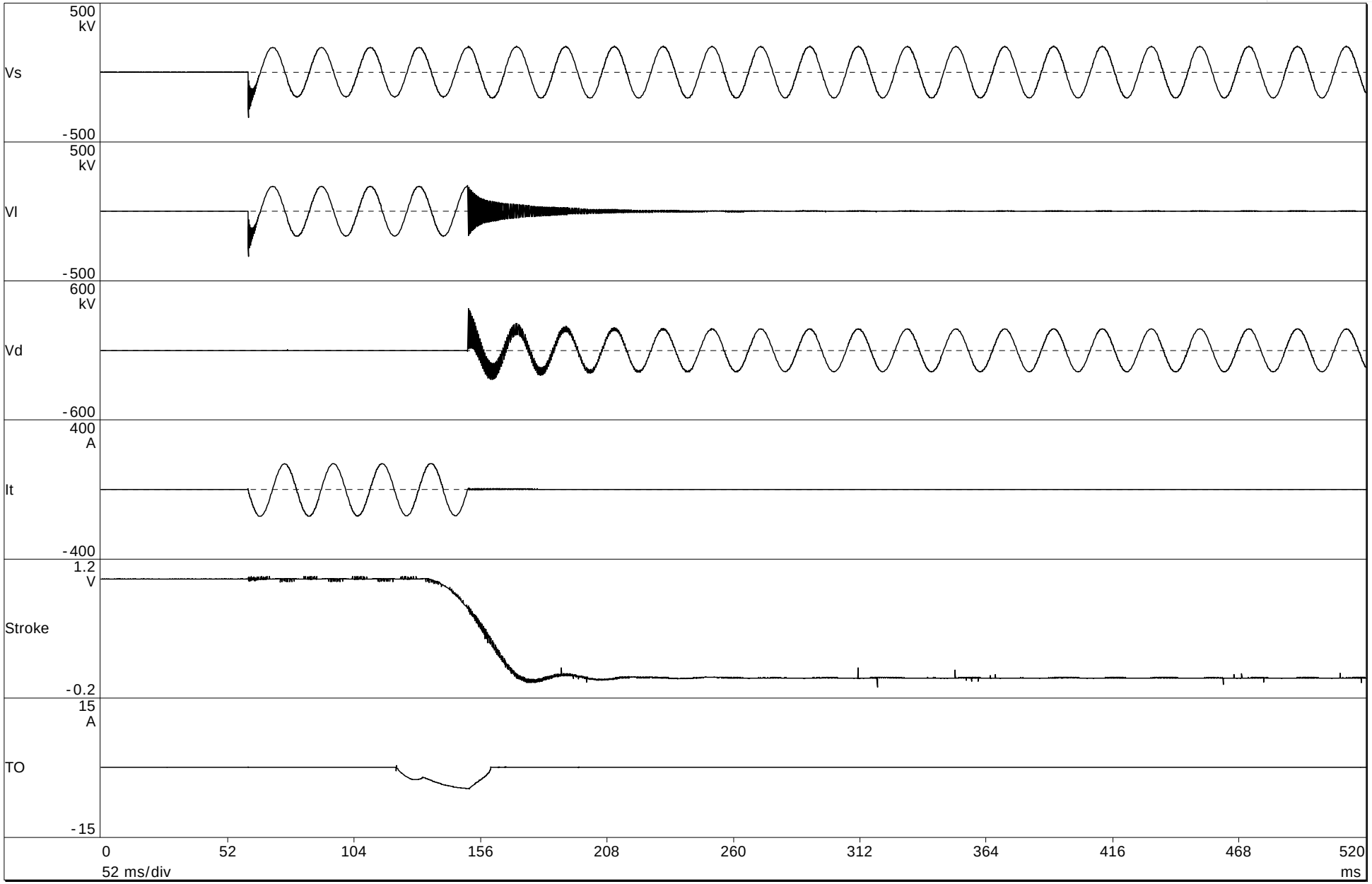
High Power Testing Department 1

HPC 1104 - 348



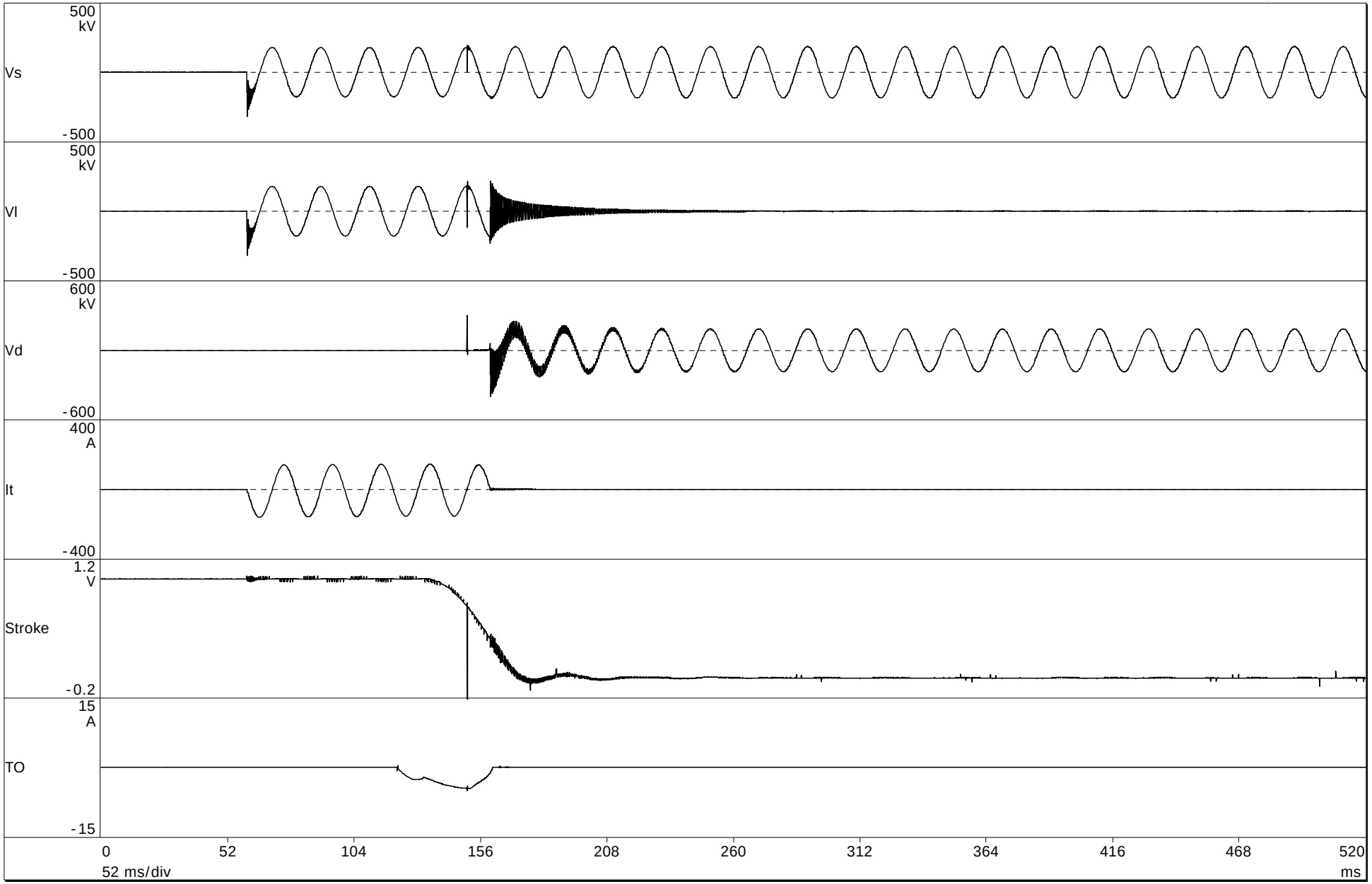
High Power Testing Department 1

HPC 1104 - 349



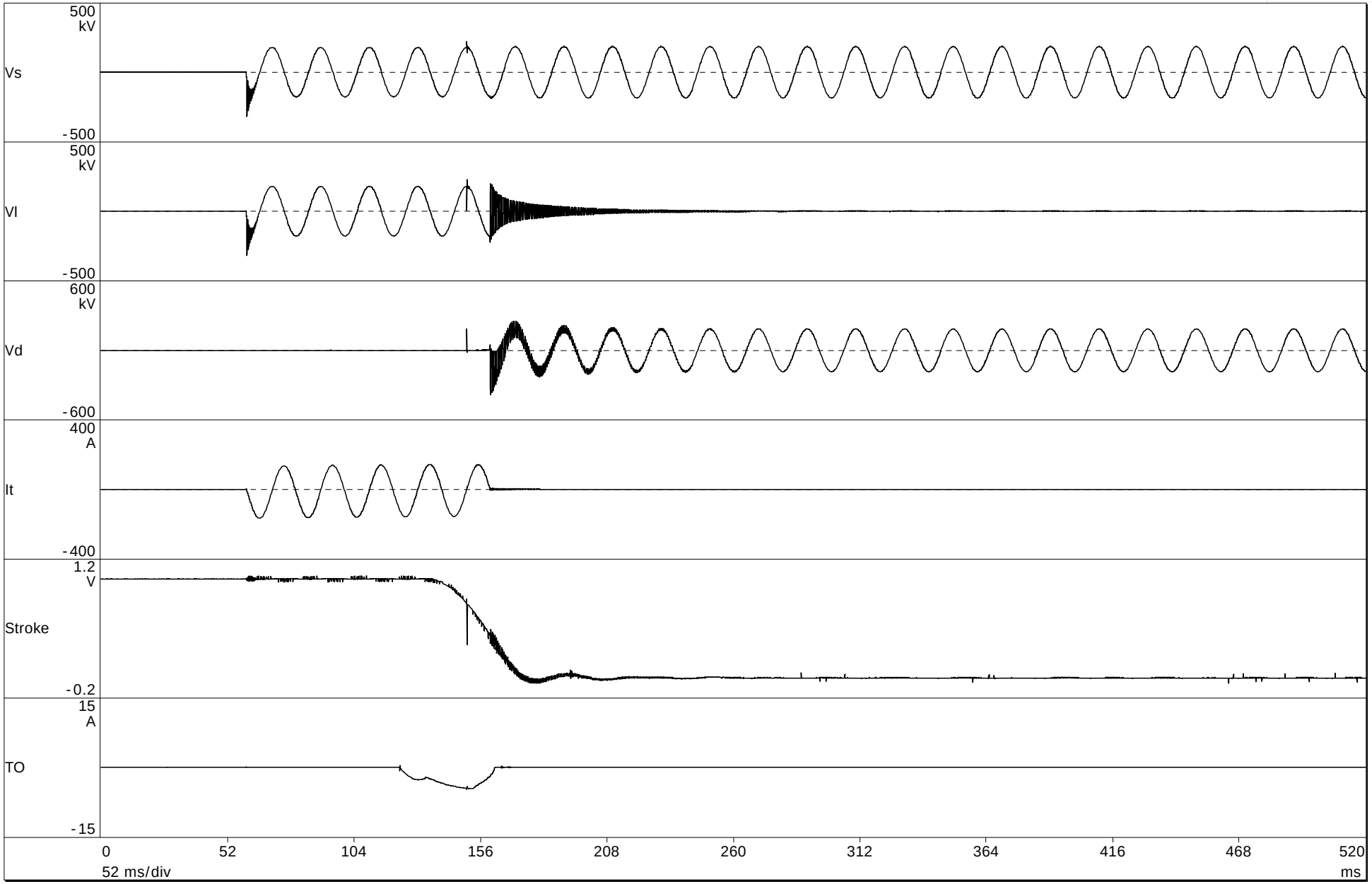
High Power Testing Department 1

HPC 1104 - 350



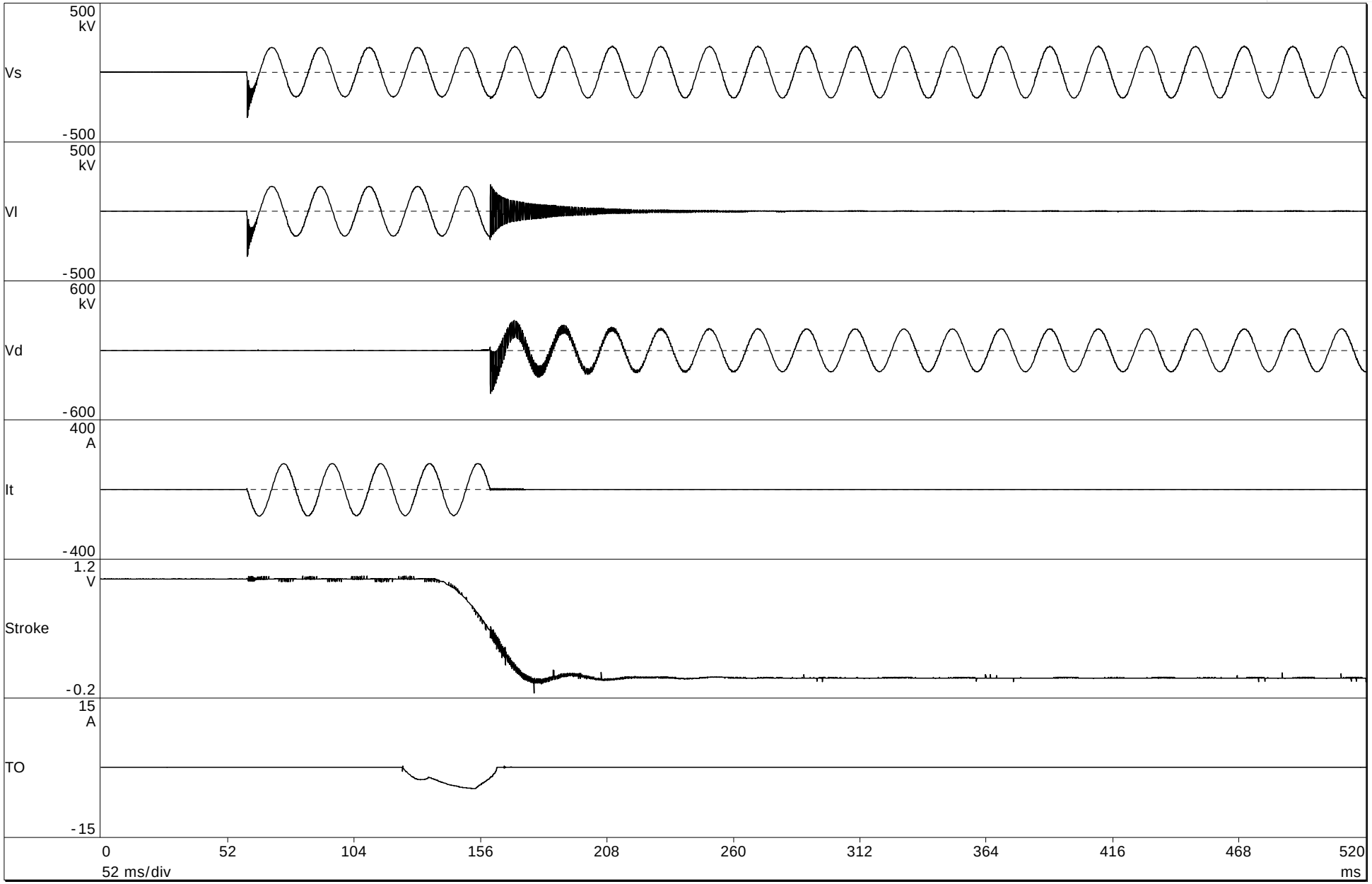
High Power Testing Department 1

HPC 1104 - 351



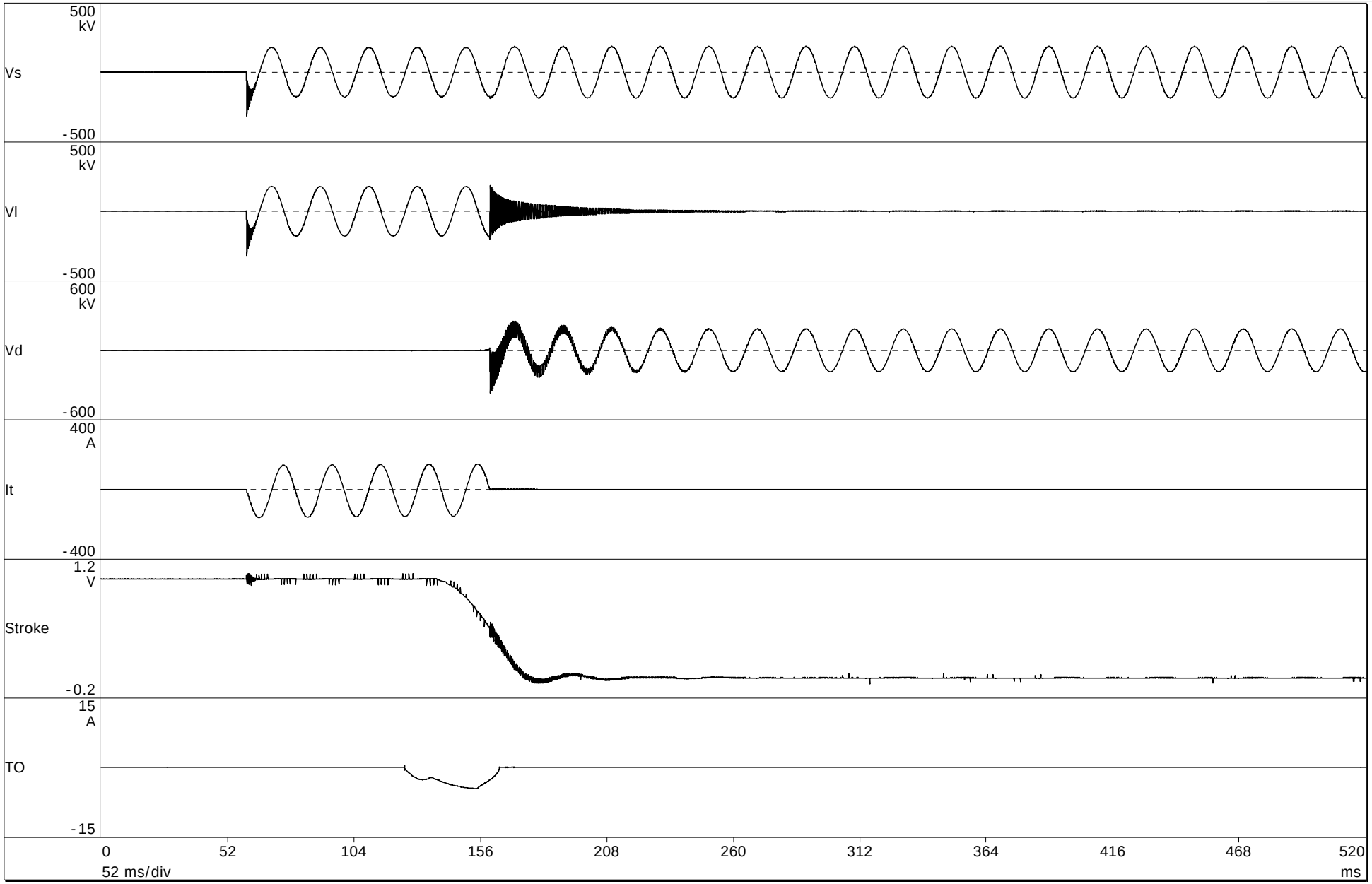
High Power Testing Department 1

HPC 1104 - 352



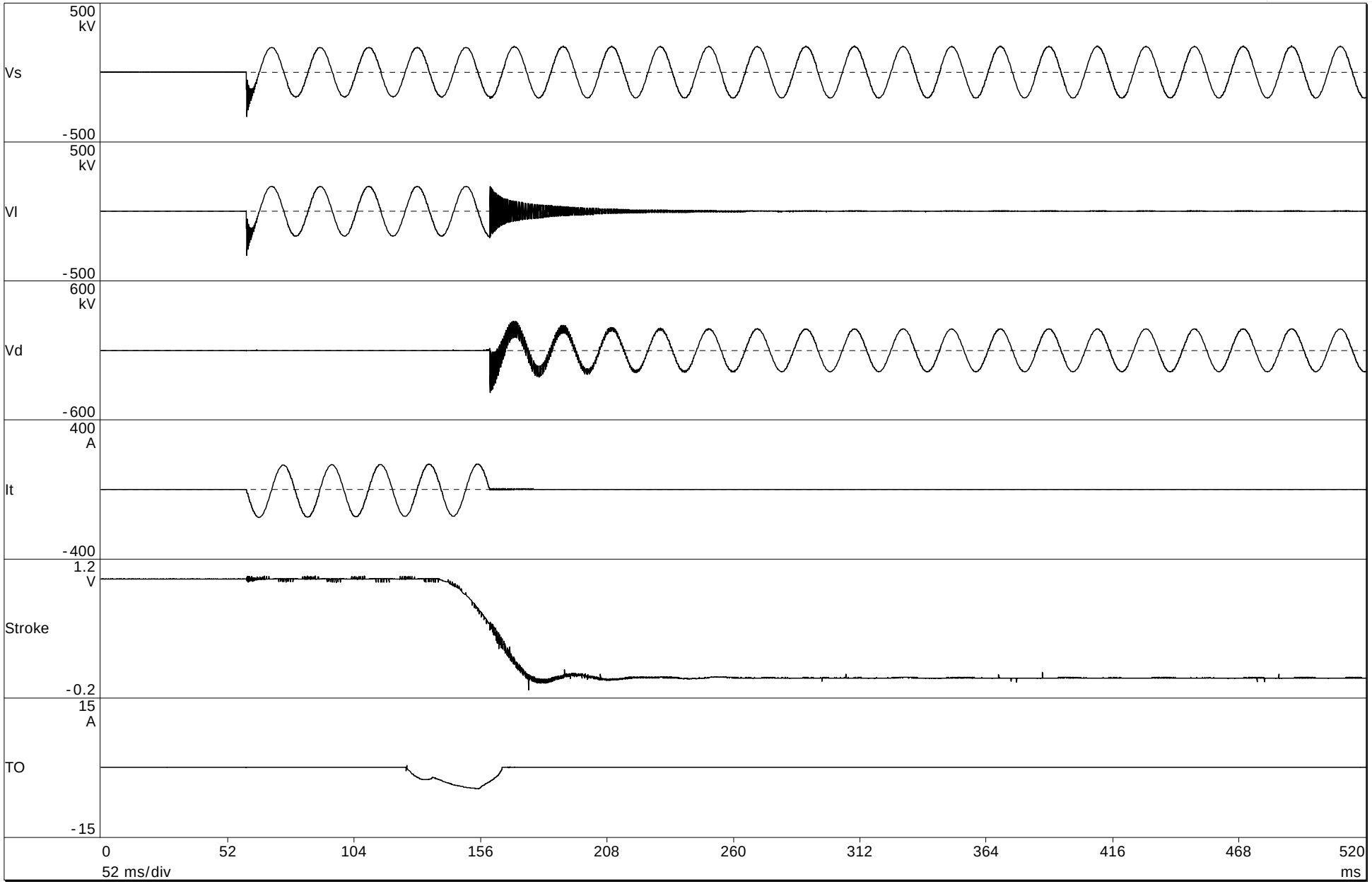
High Power Testing Department 1

HPC 1104 - 353



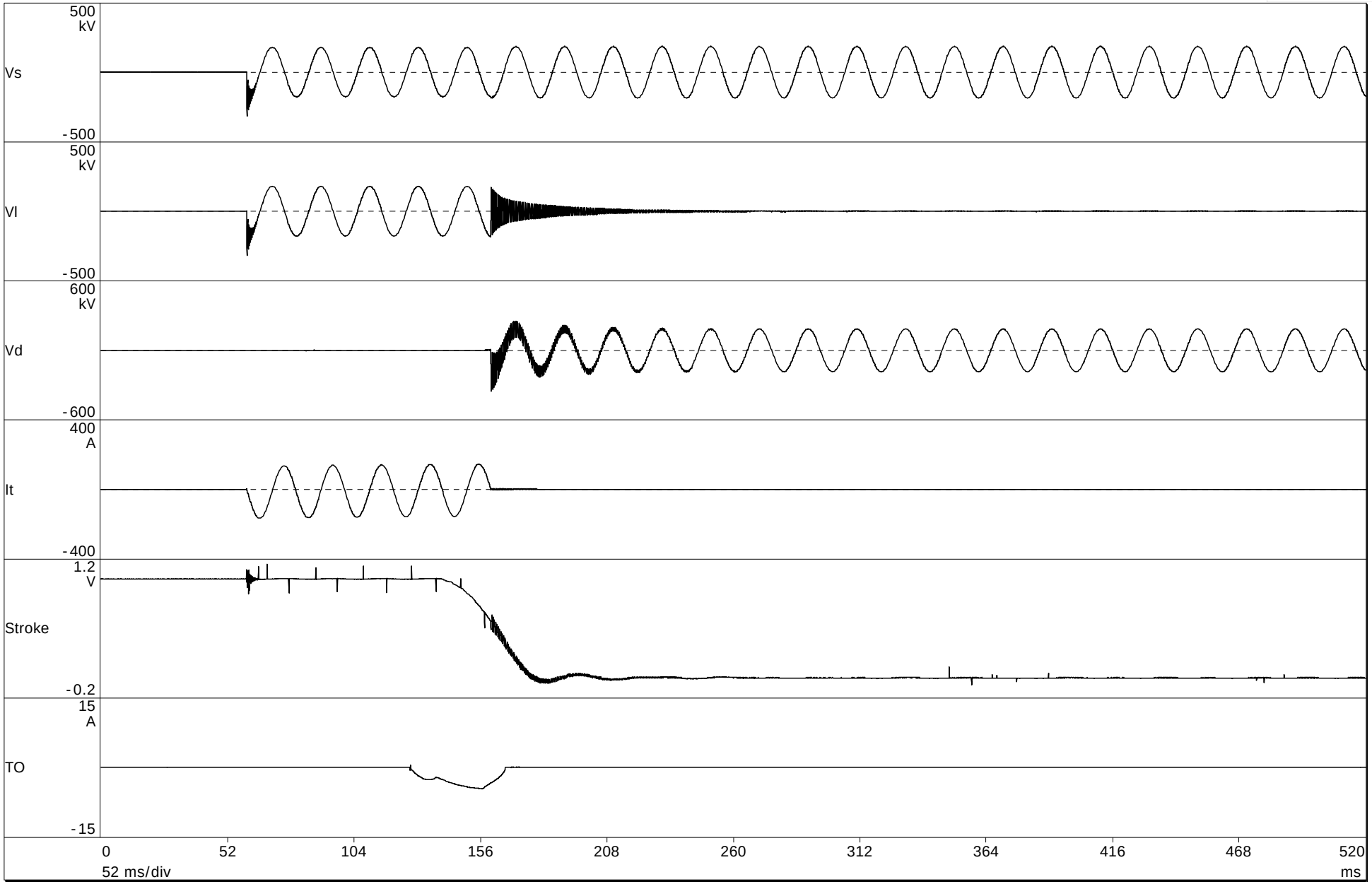
High Power Testing Department 1

HPC 1104 - 354



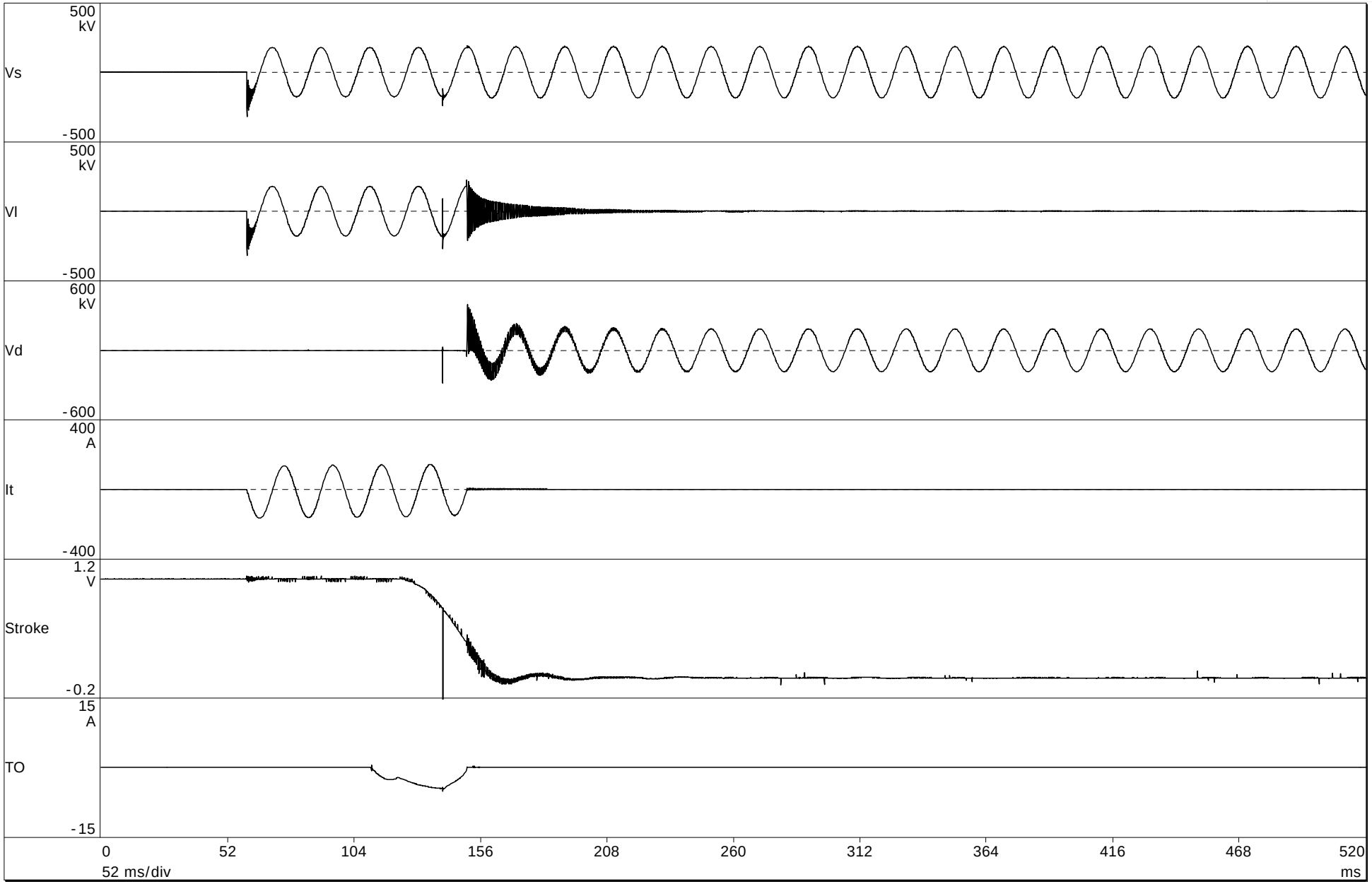
High Power Testing Department 1

HPC 1104 - 355



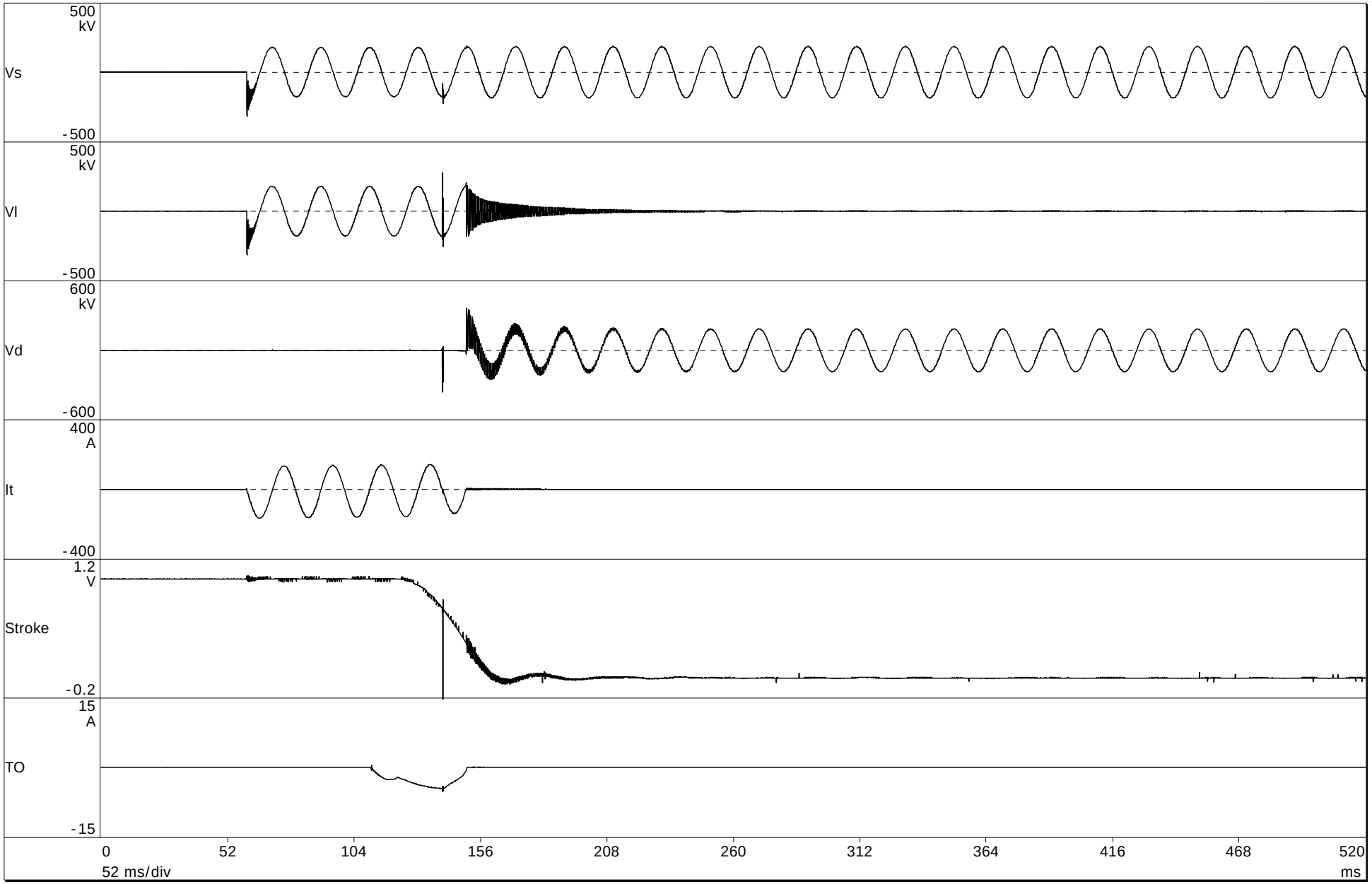
High Power Testing Department 1

HPC 1104 - 356



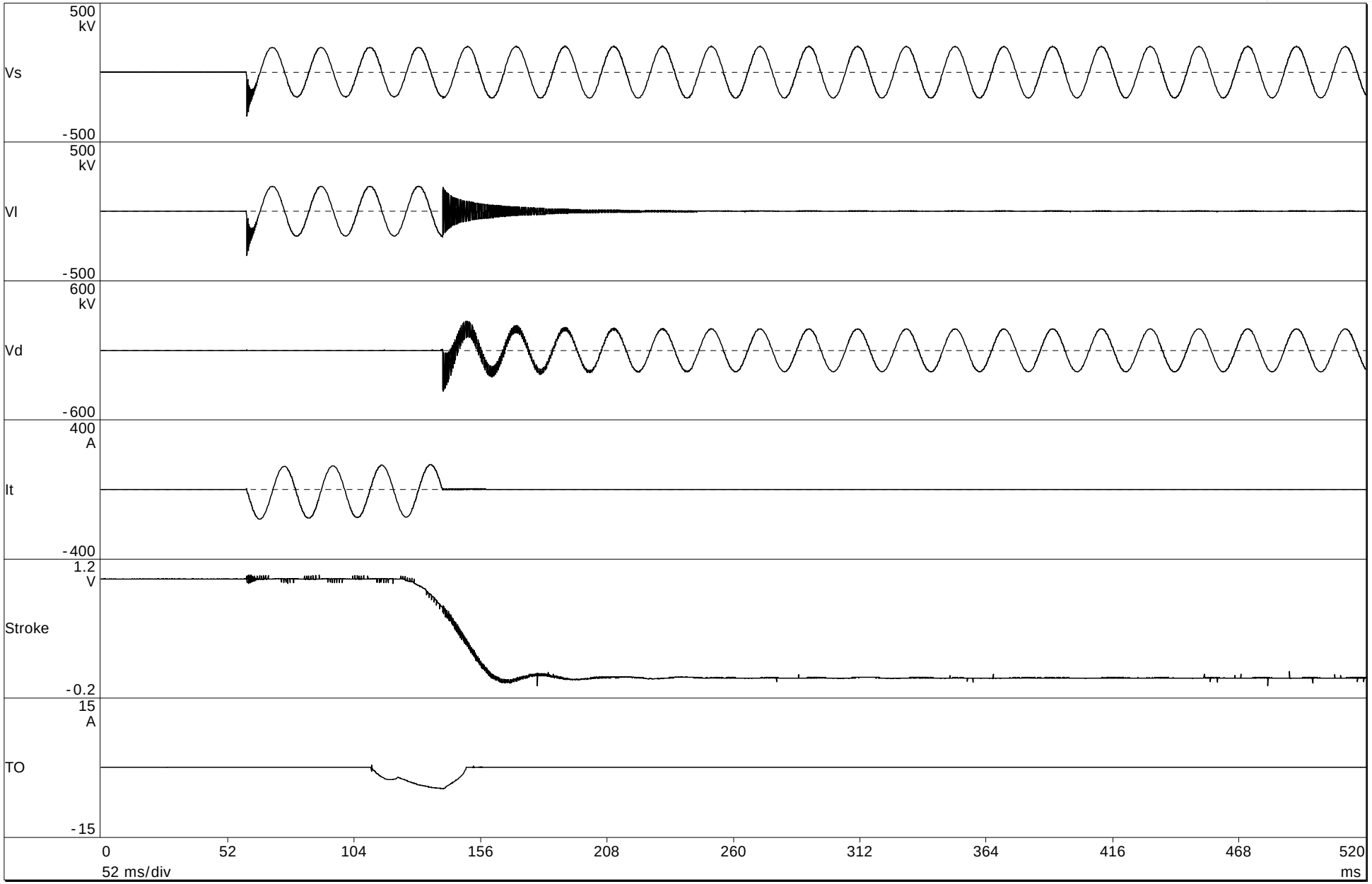
High Power Testing Department 1

HPC 1104 - 357



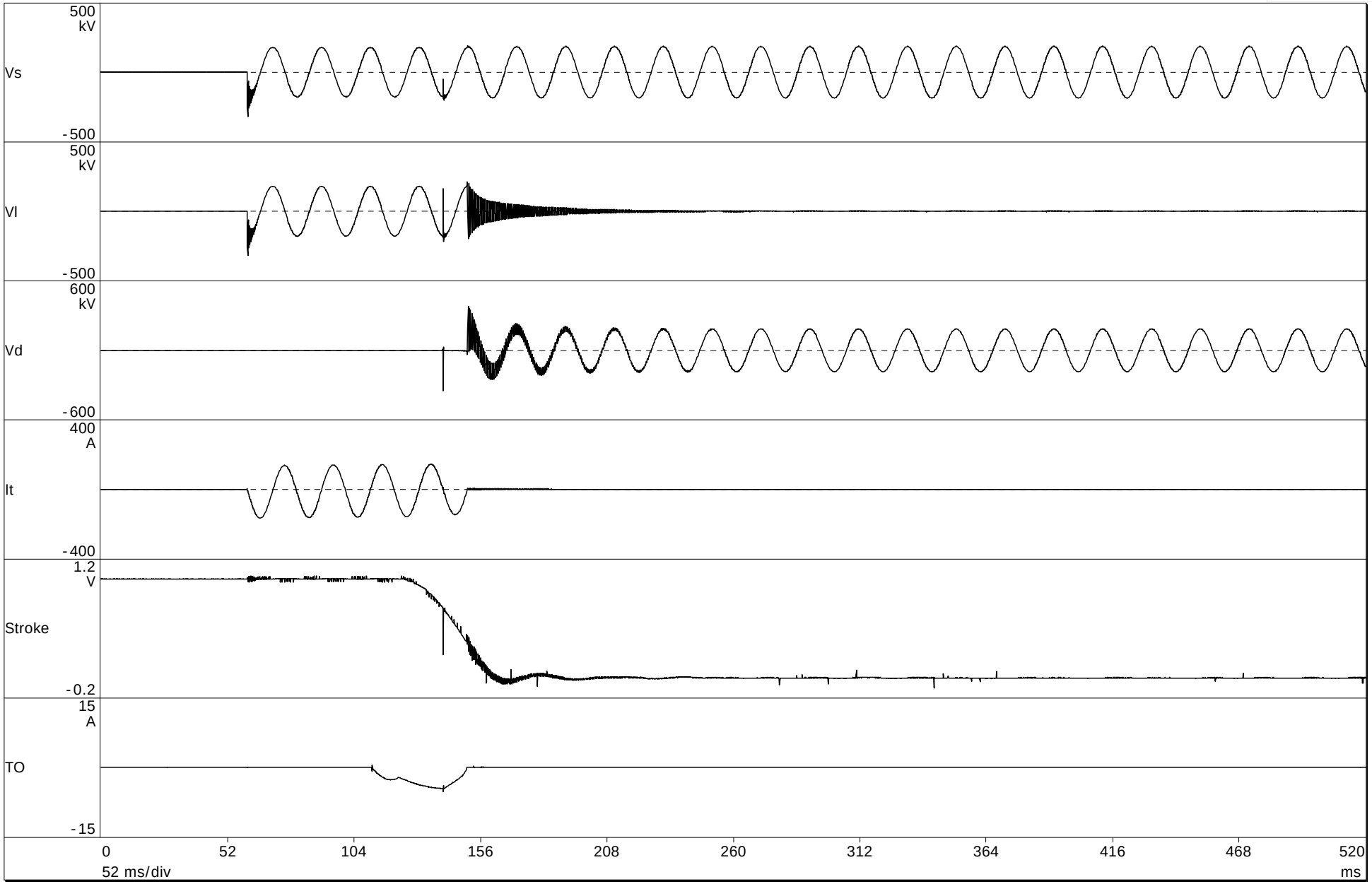
High Power Testing Department 1

HPC 1104 - 358



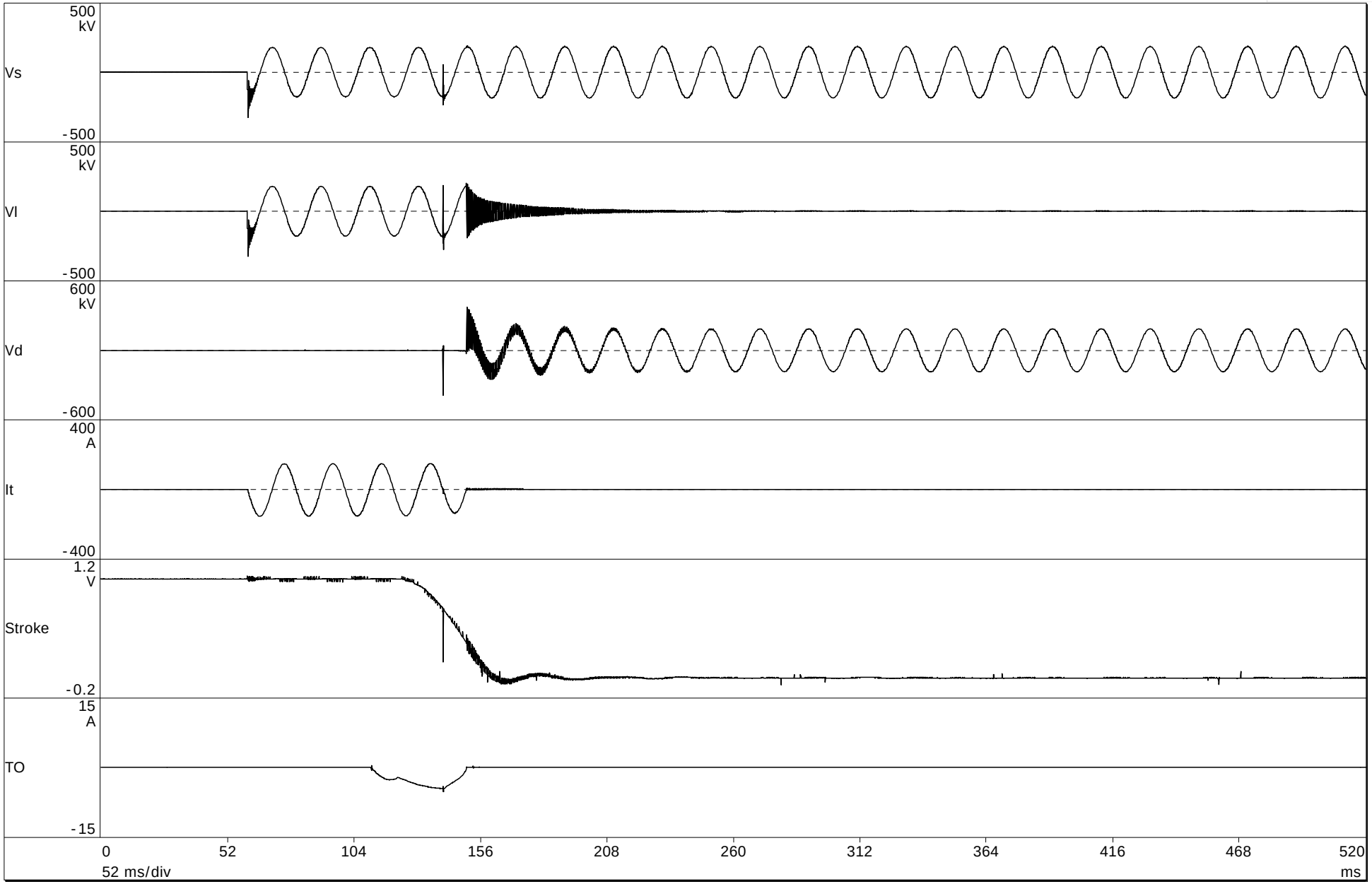
High Power Testing Department 1

HPC 1104 - 359



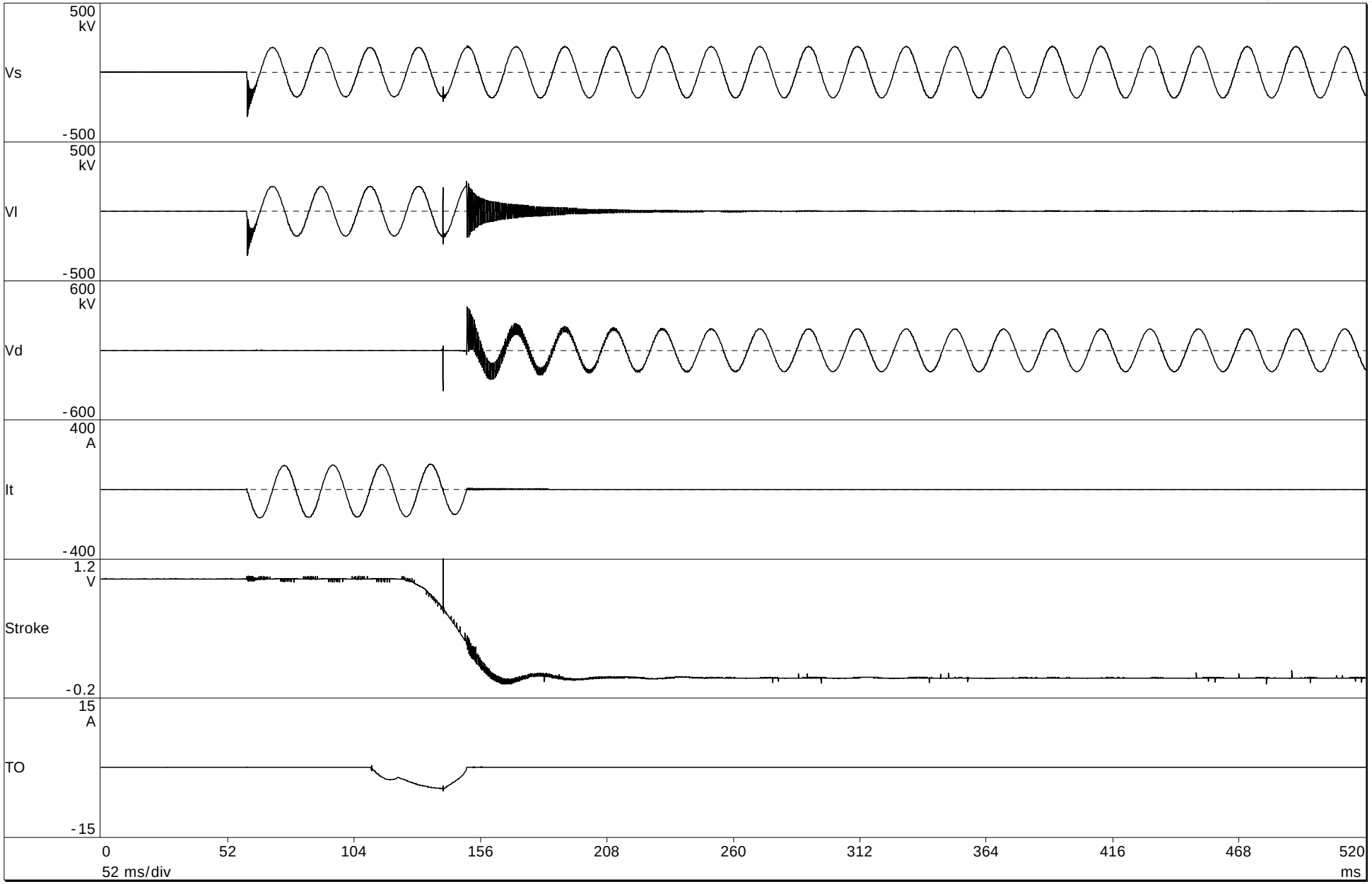
High Power Testing Department 1

HPC 1104 - 360



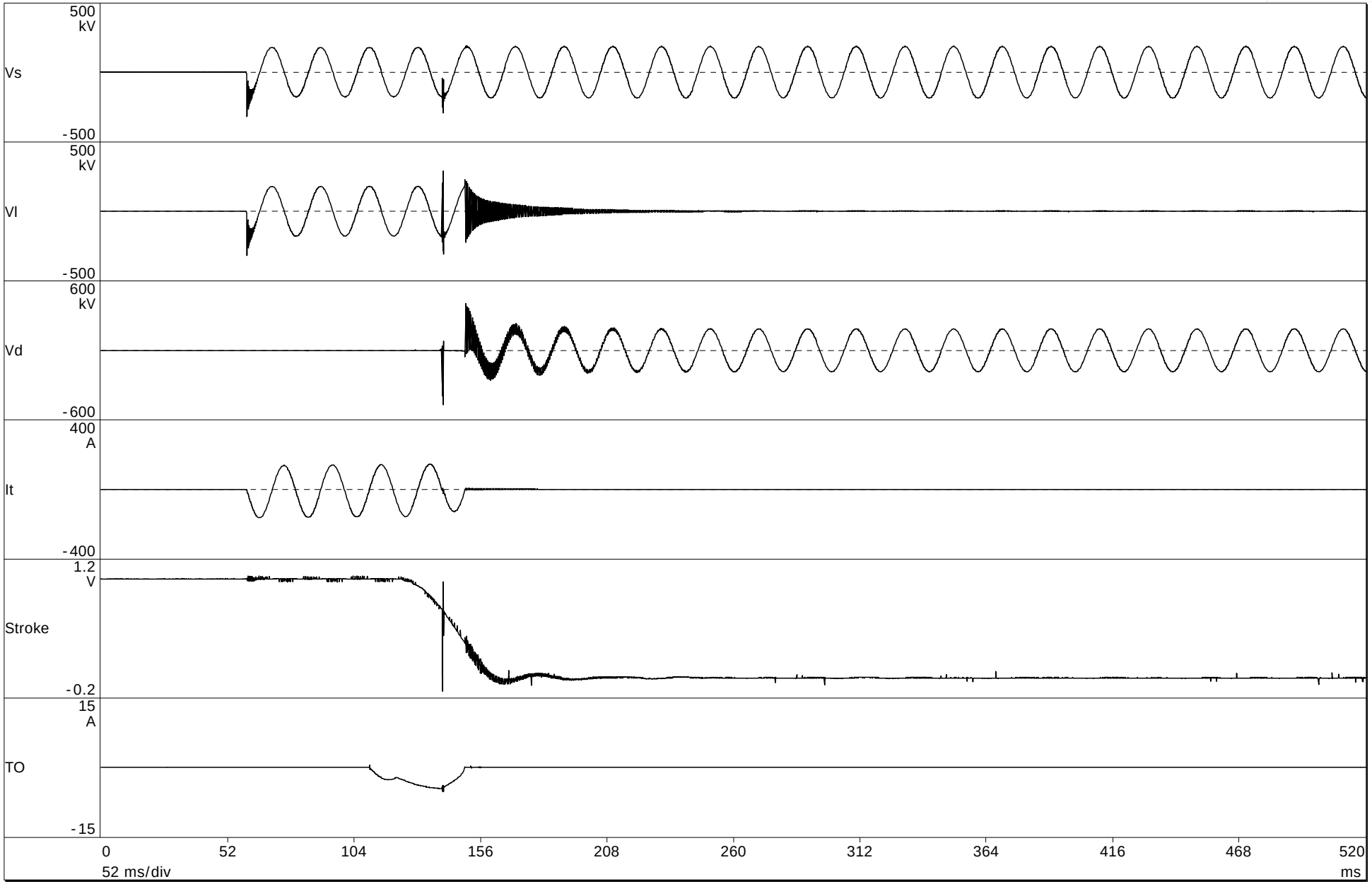
High Power Testing Department 1

HPC 1104 - 361



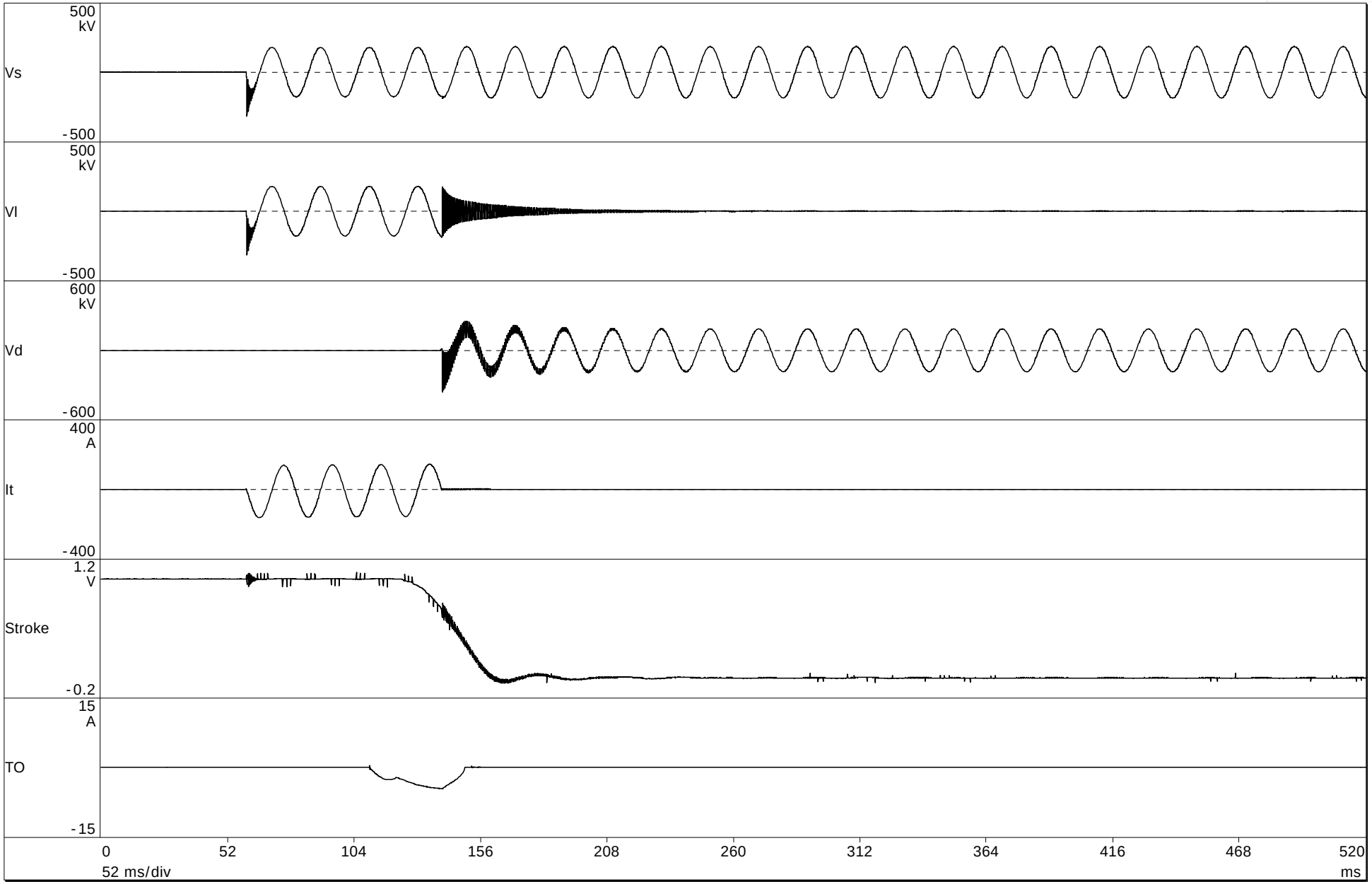
High Power Testing Department 1

HPC 1104 - 362



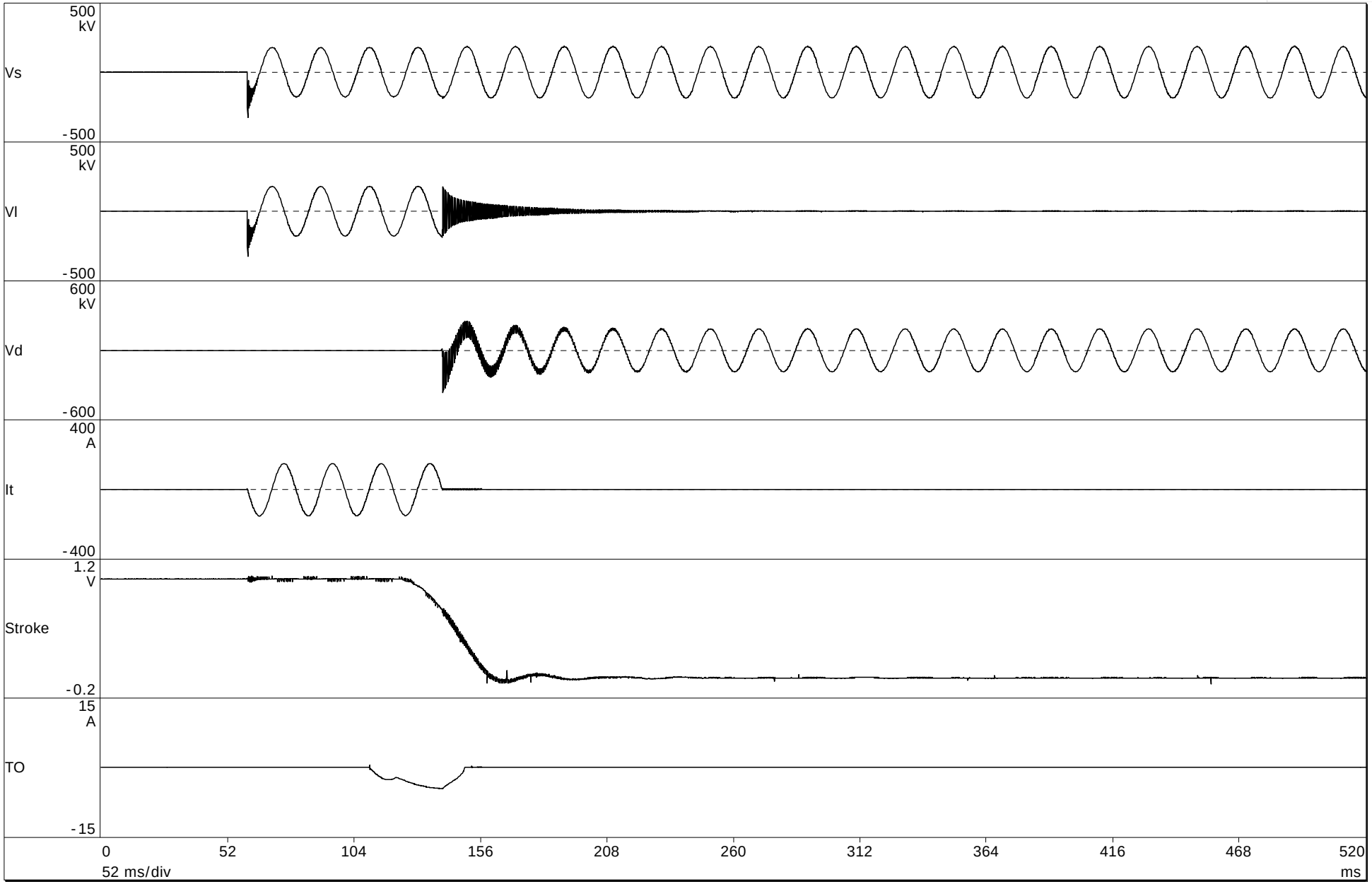
High Power Testing Department 1

HPC 1104 - 363



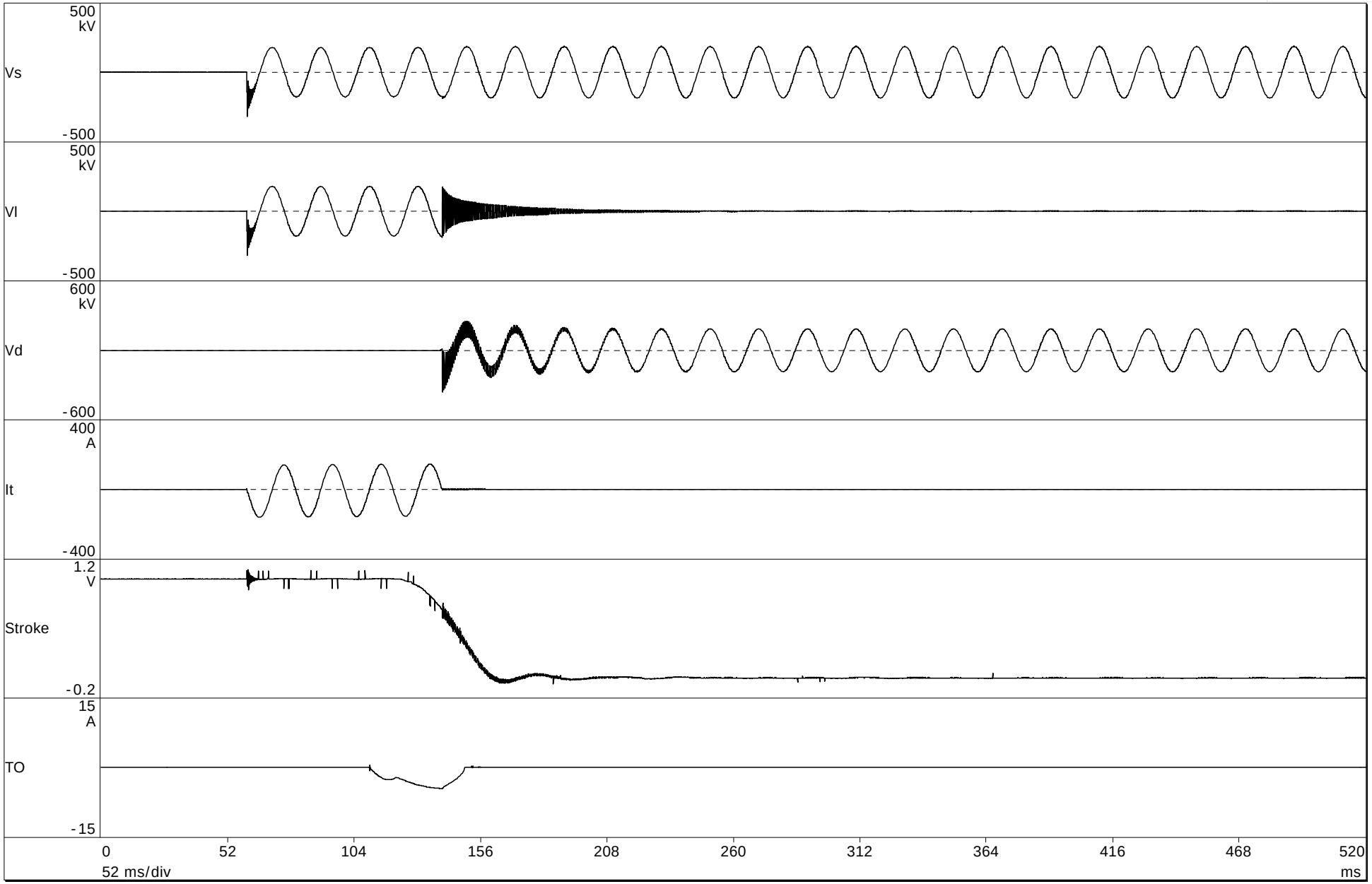
High Power Testing Department 1

HPC 1104 - 364



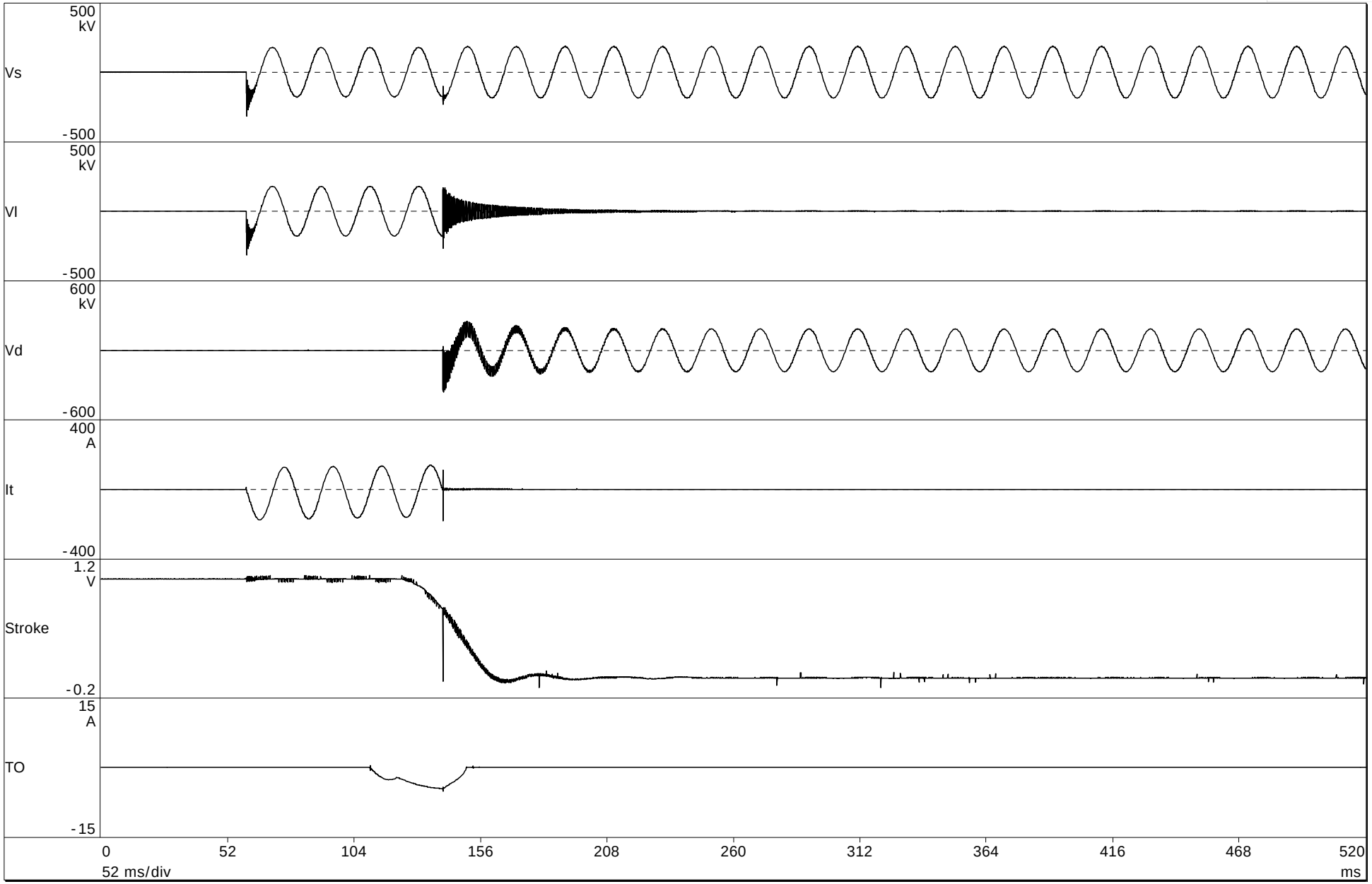
High Power Testing Department 1

HPC 1104 - 365



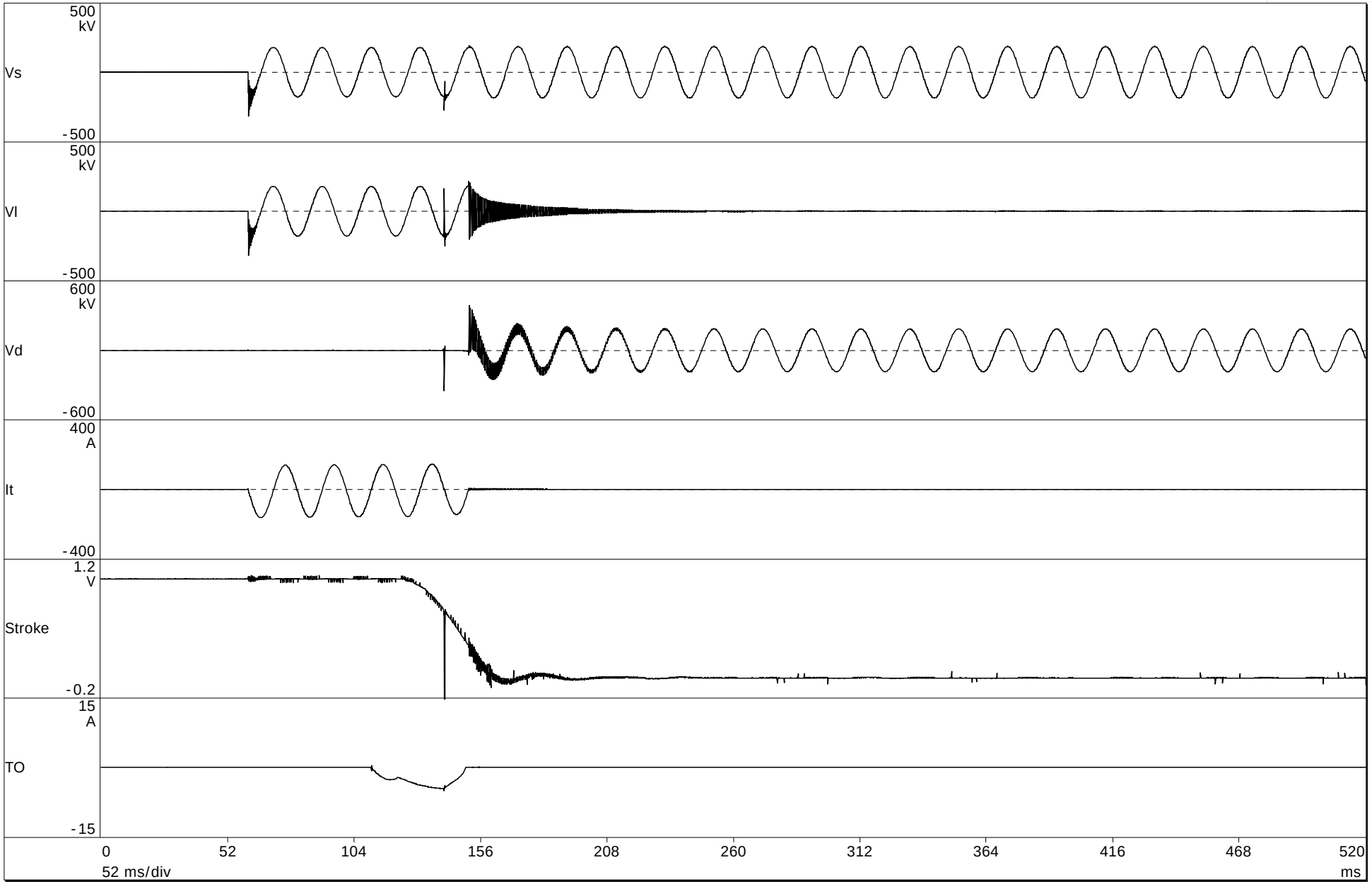
High Power Testing Department 1

HPC 1104 - 366



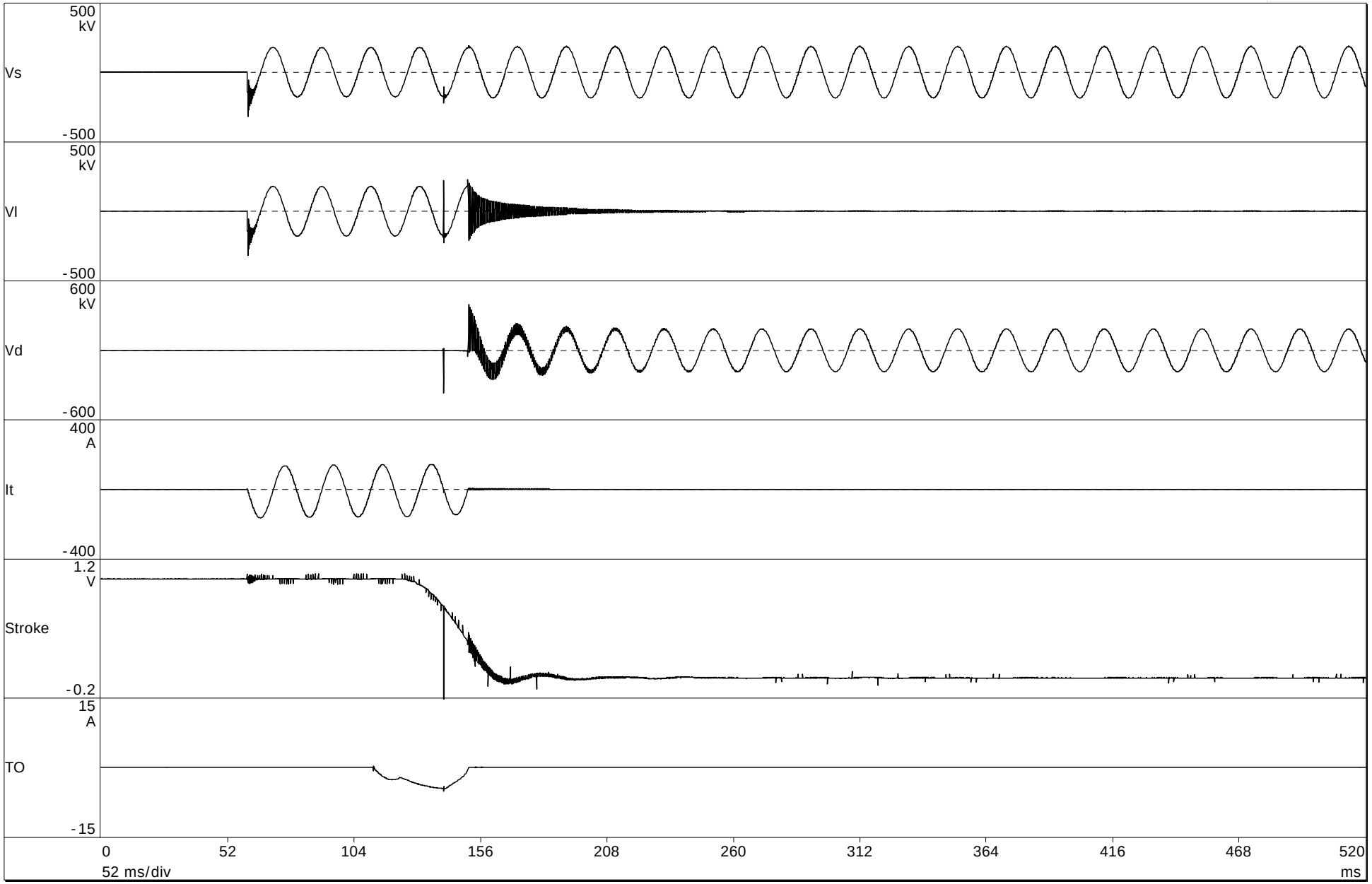
High Power Testing Department 1

HPC 1104 - 367



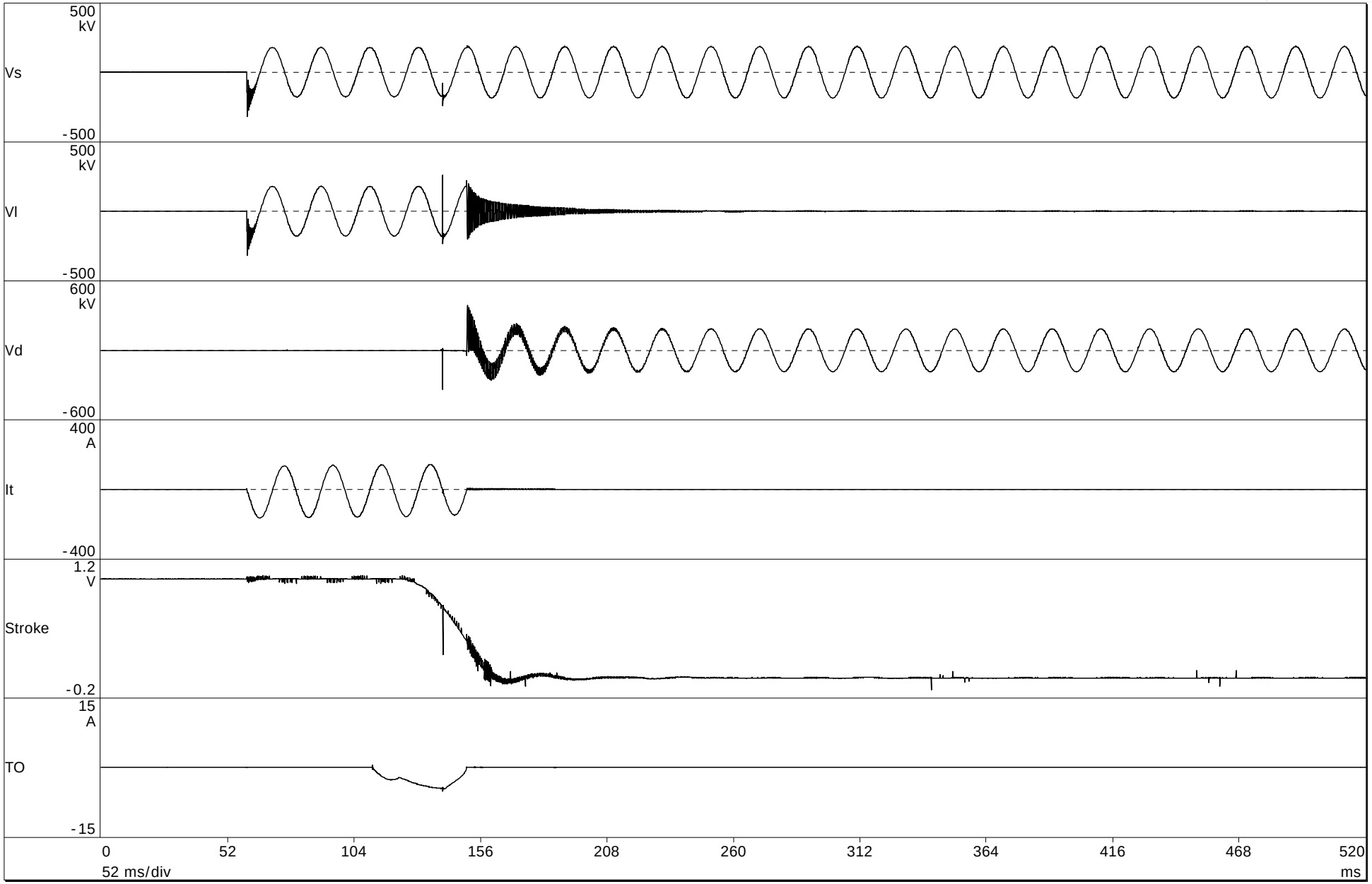
High Power Testing Department 1

HPC 1104 - 368



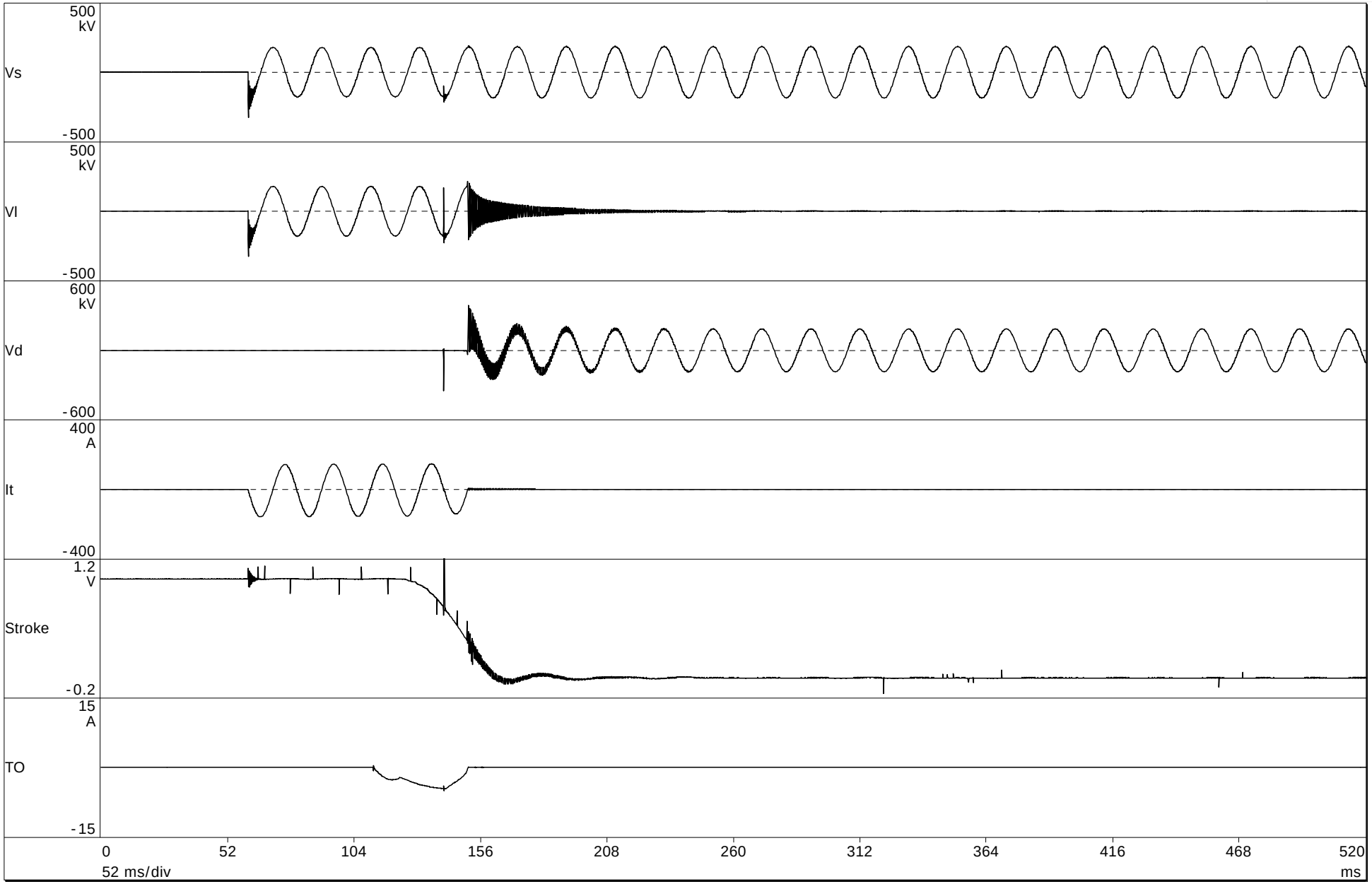
High Power Testing Department 1

HPC 1104 - 369



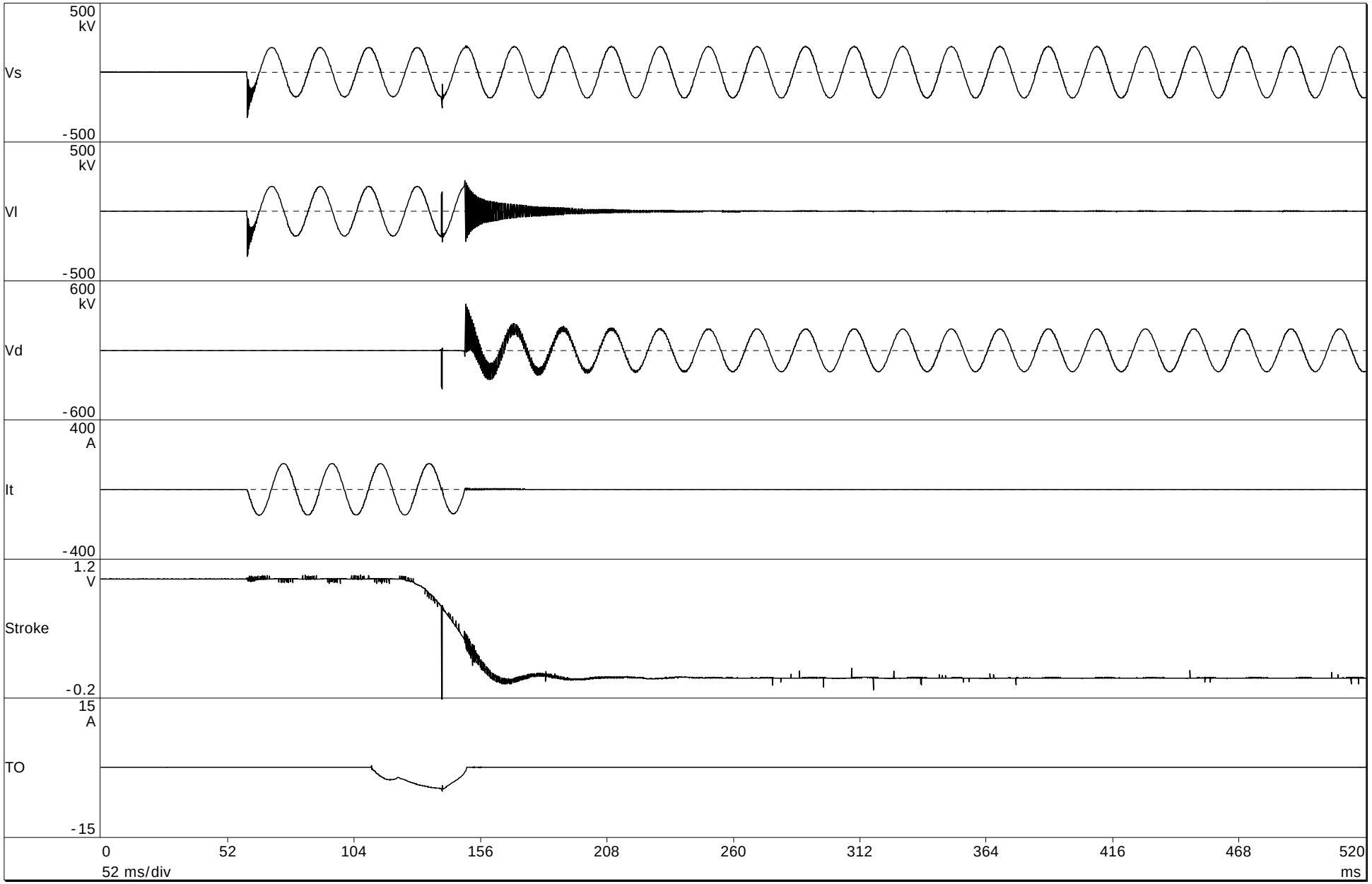
High Power Testing Department 1

HPC 1104 - 370



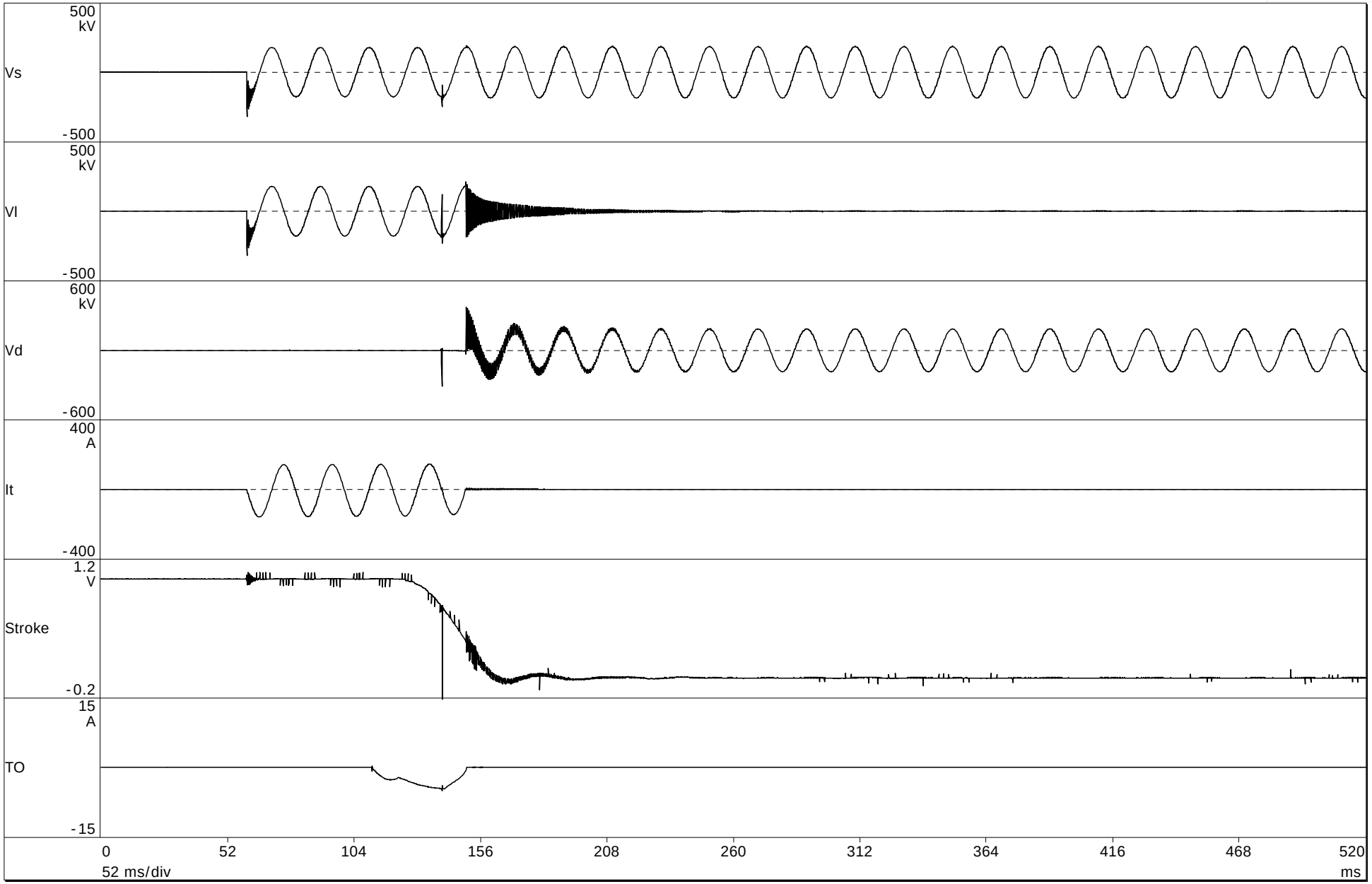
High Power Testing Department 1

HPC 1104 - 371



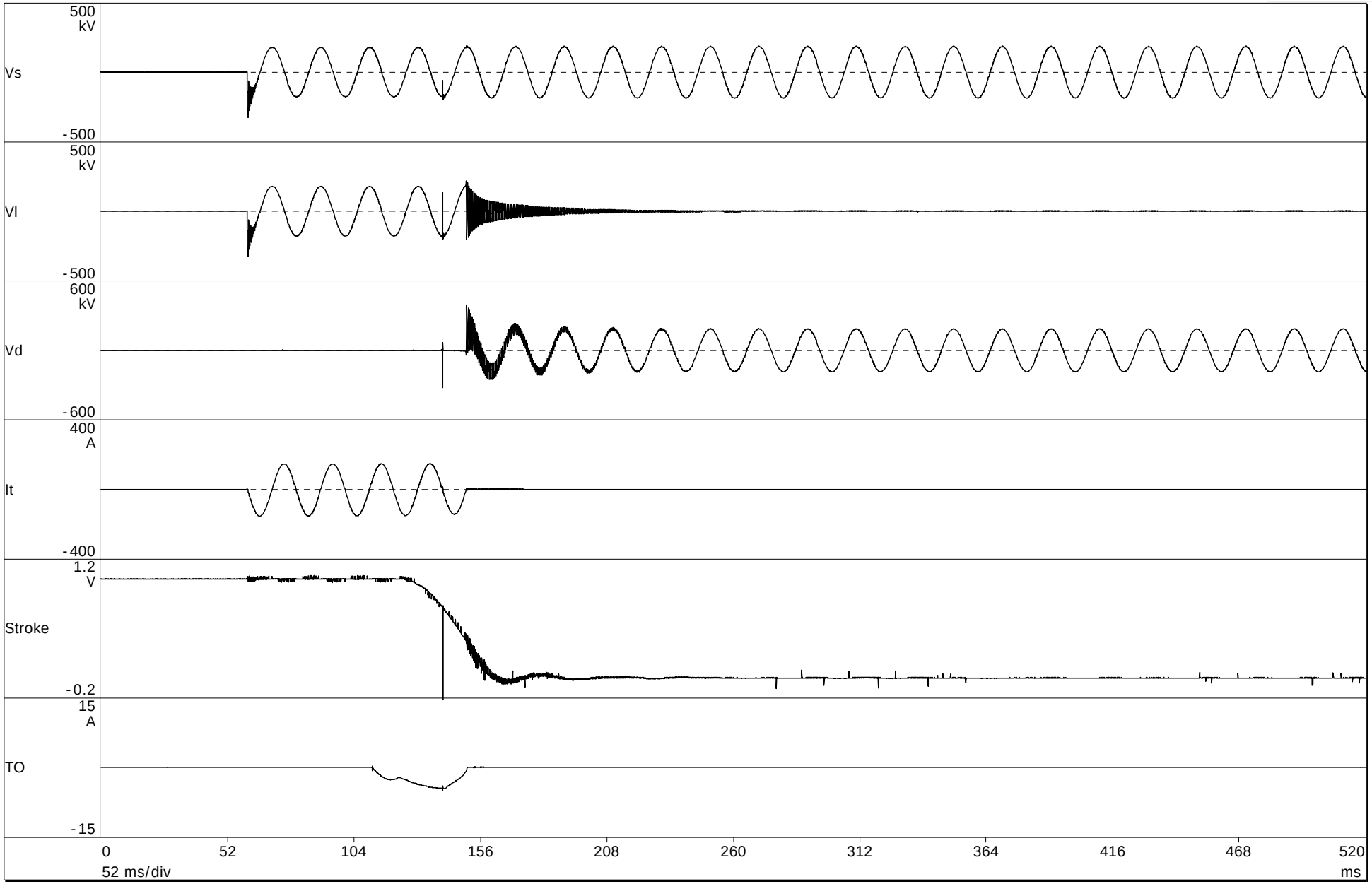
High Power Testing Department 1

HPC 1104 - 372



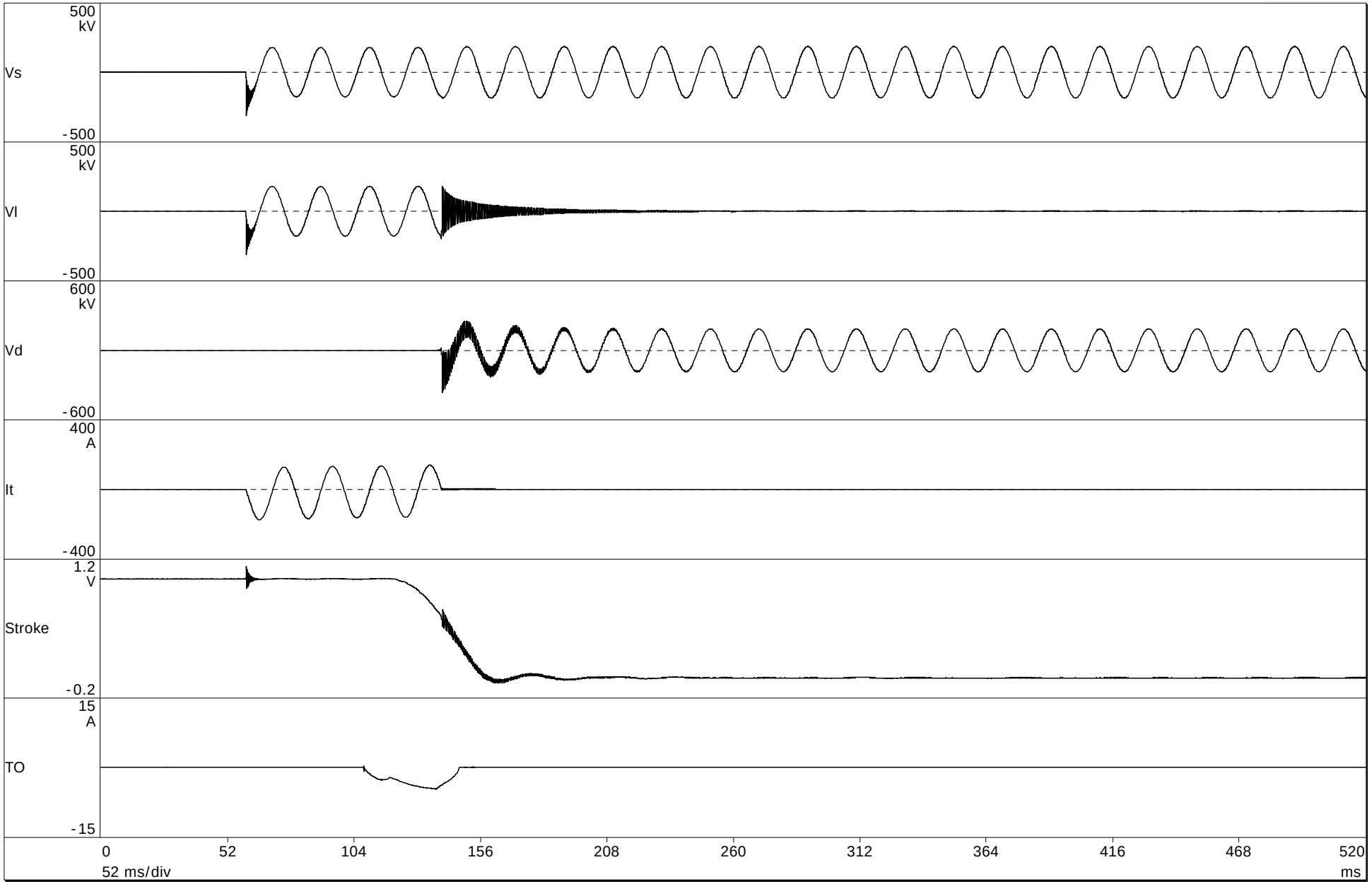
High Power Testing Department 1

HPC 1104 - 373



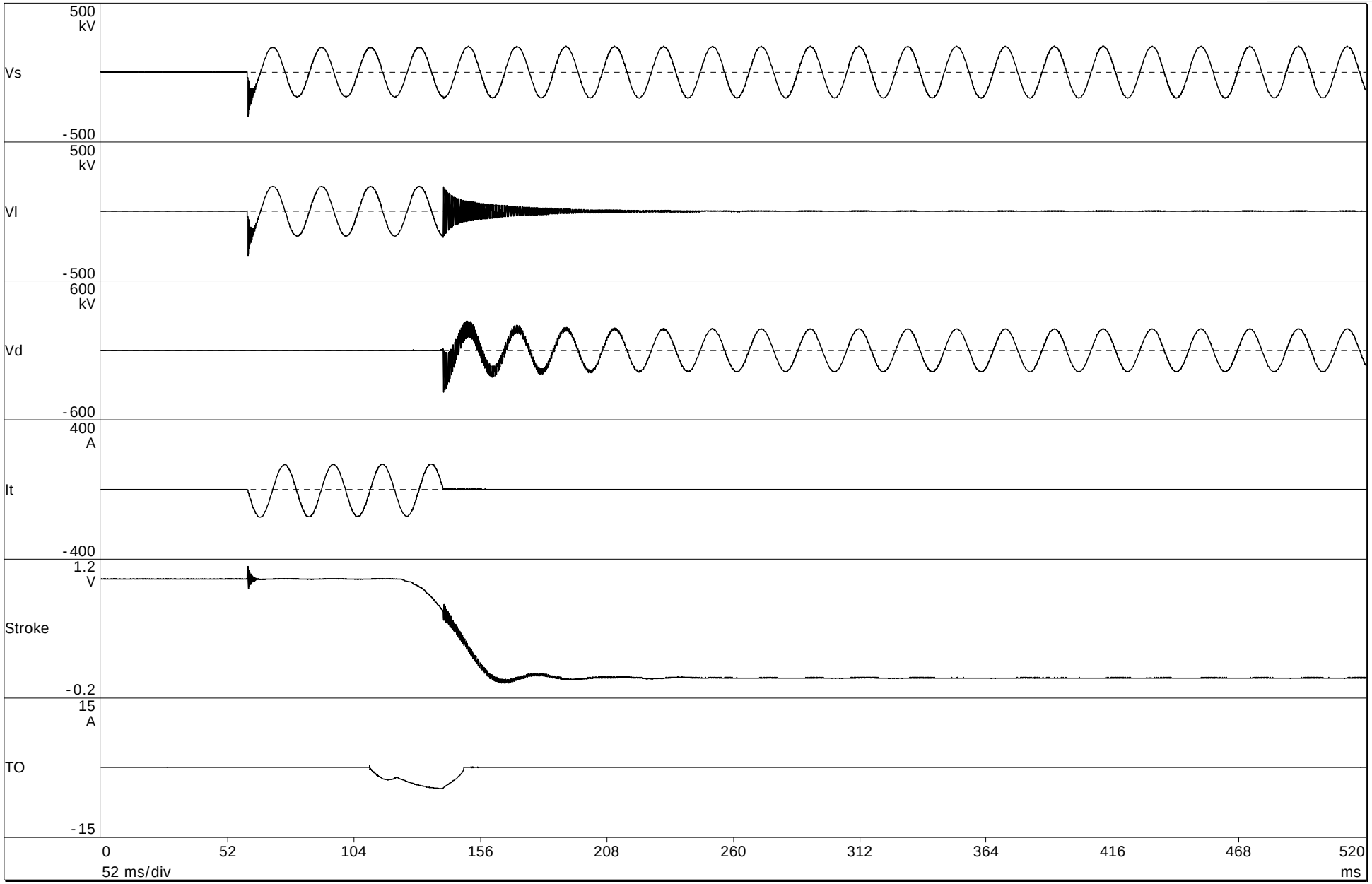
High Power Testing Department 1

HPC 1104 - 374



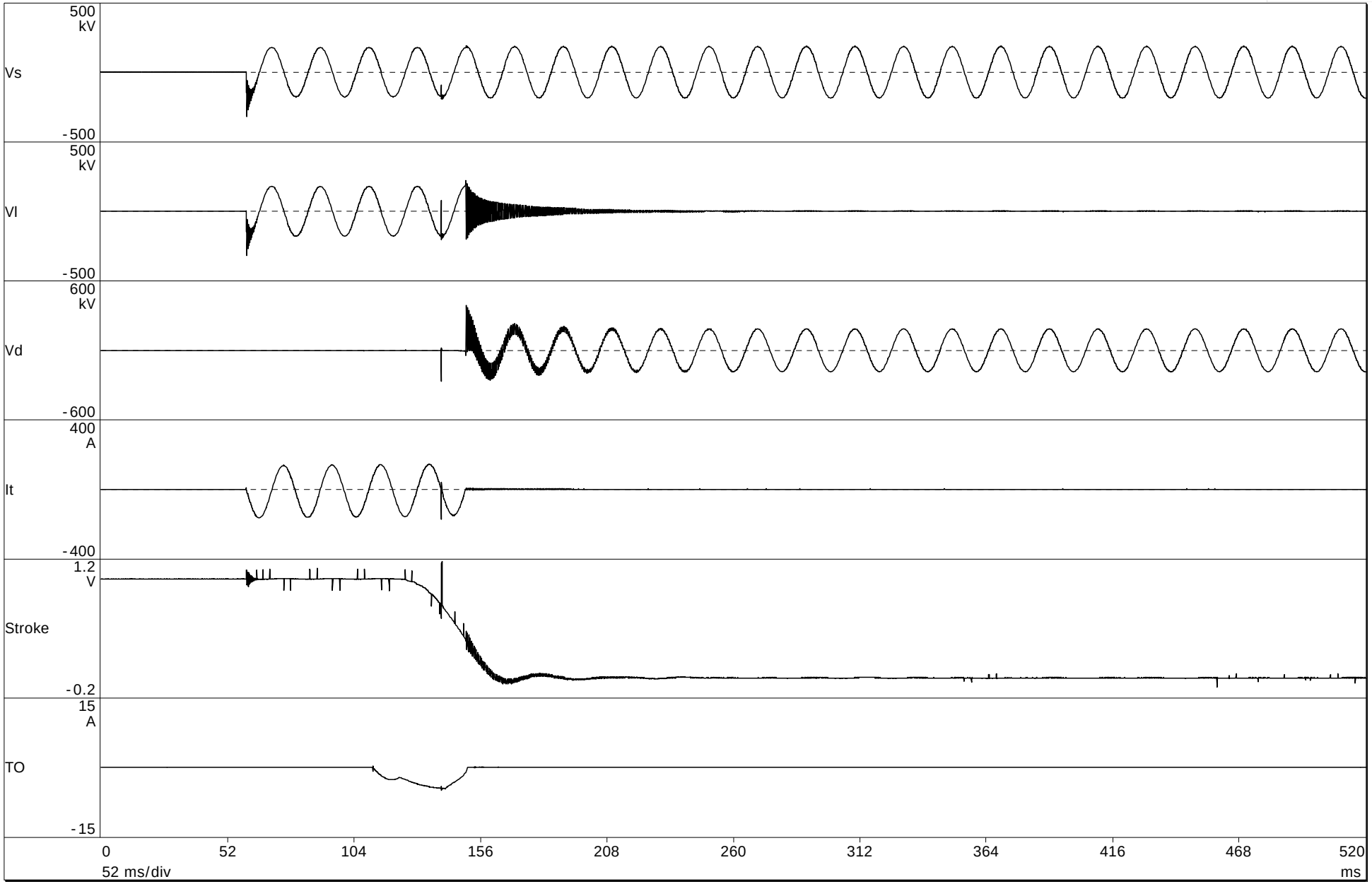
High Power Testing Department 1

HPC 1104 - 375



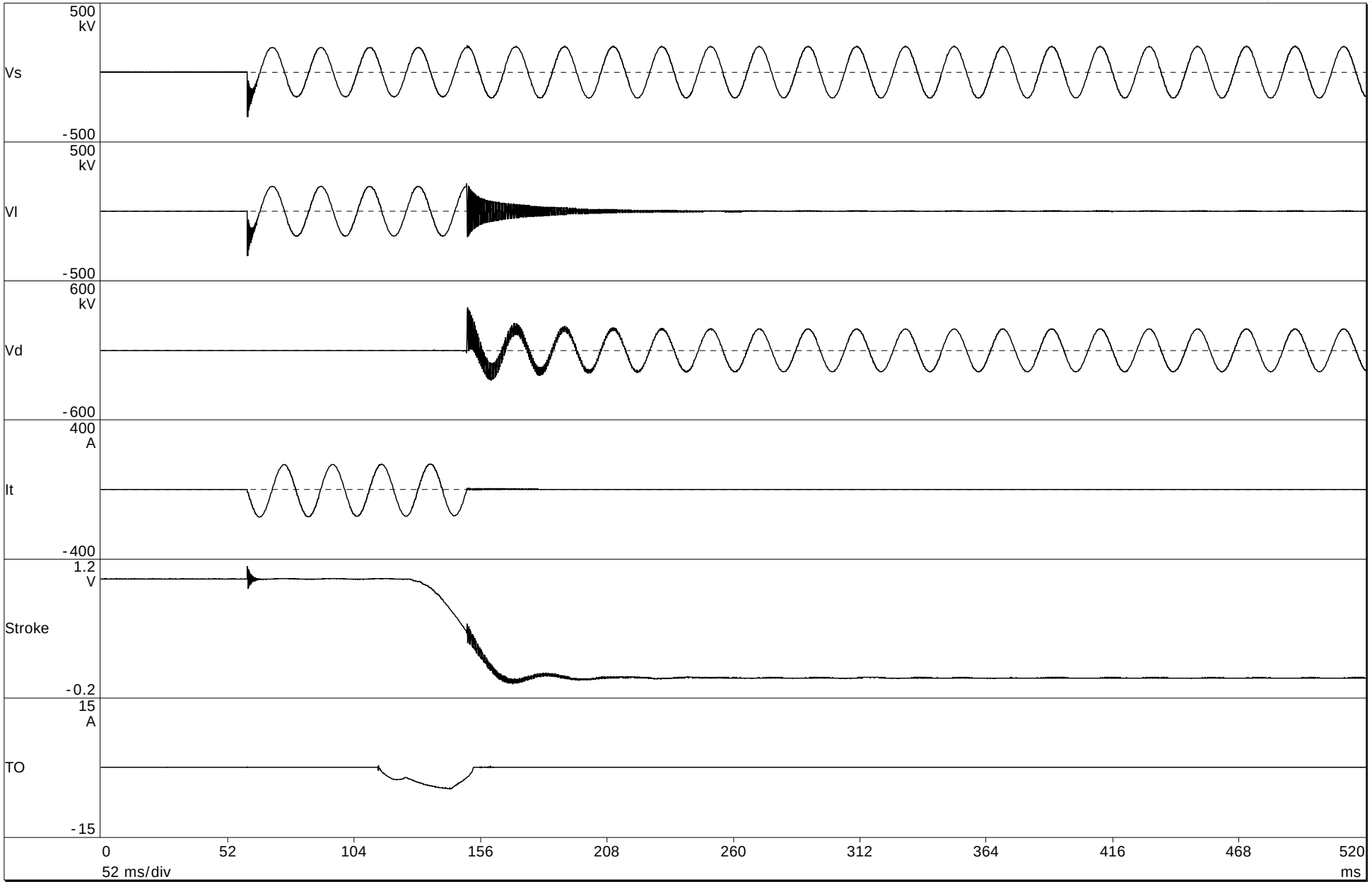
High Power Testing Department 1

HPC 1104 - 376



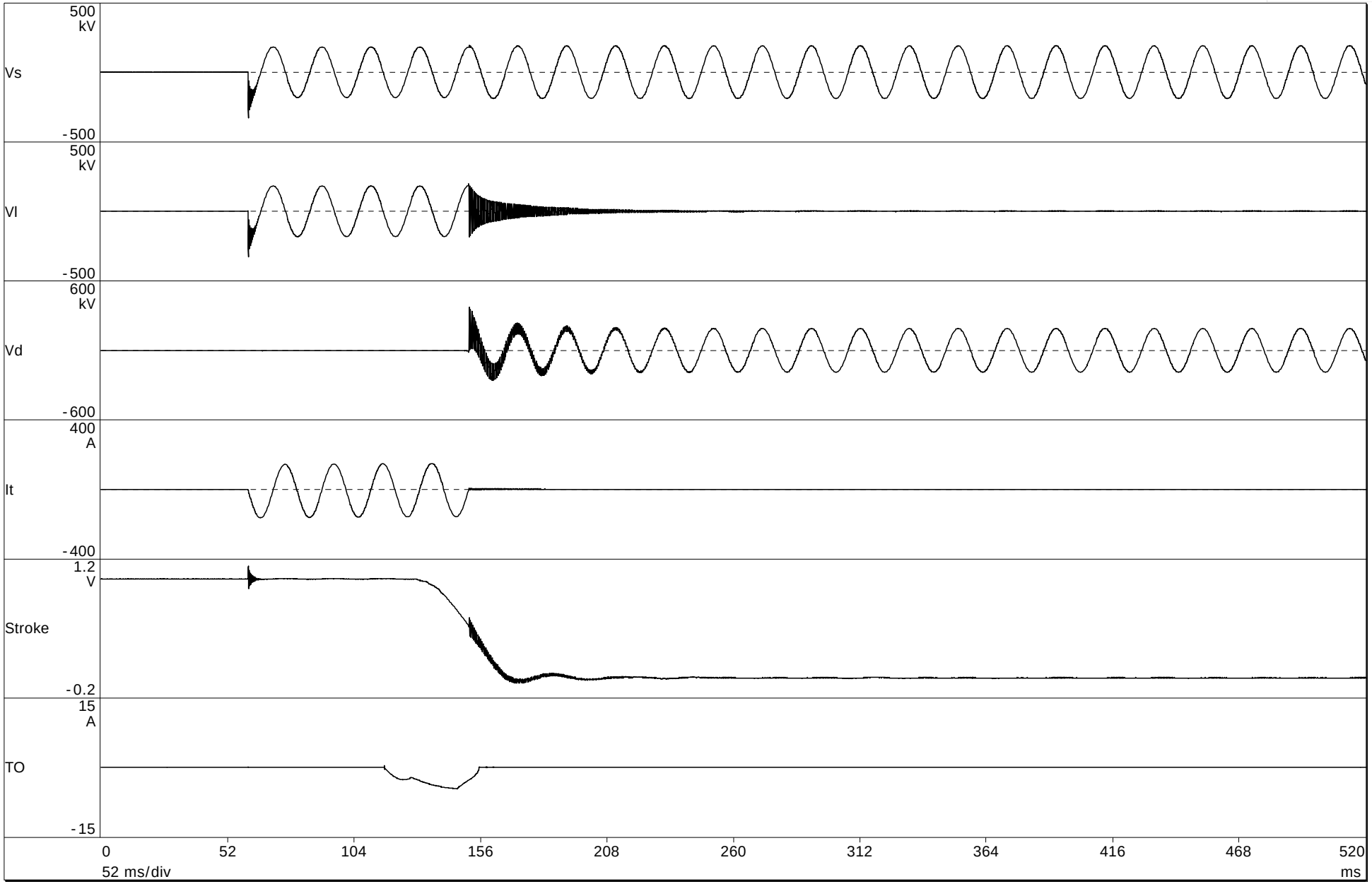
High Power Testing Department 1

HPC 1104 - 377



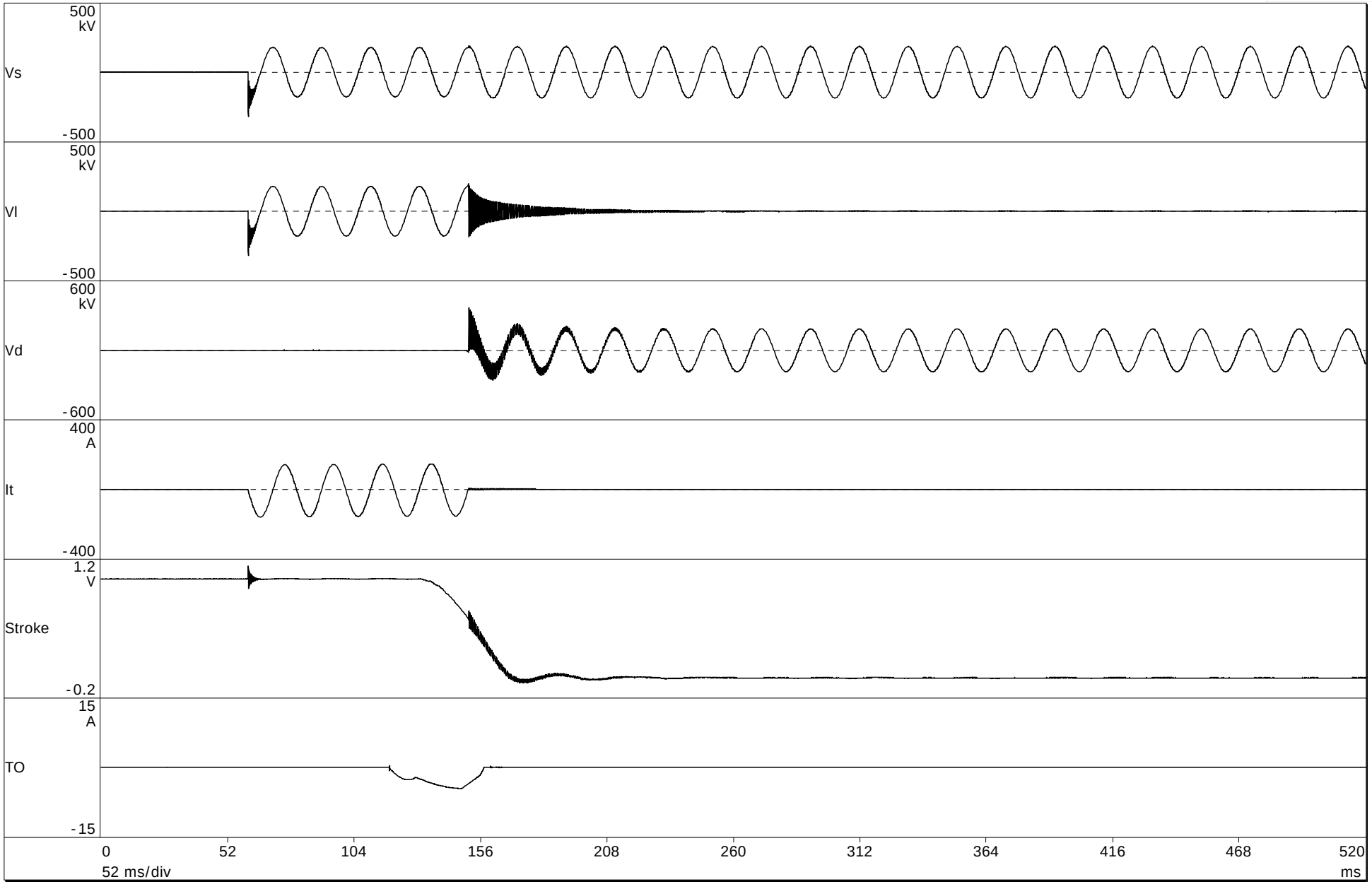
High Power Testing Department 1

HPC 1104 - 378



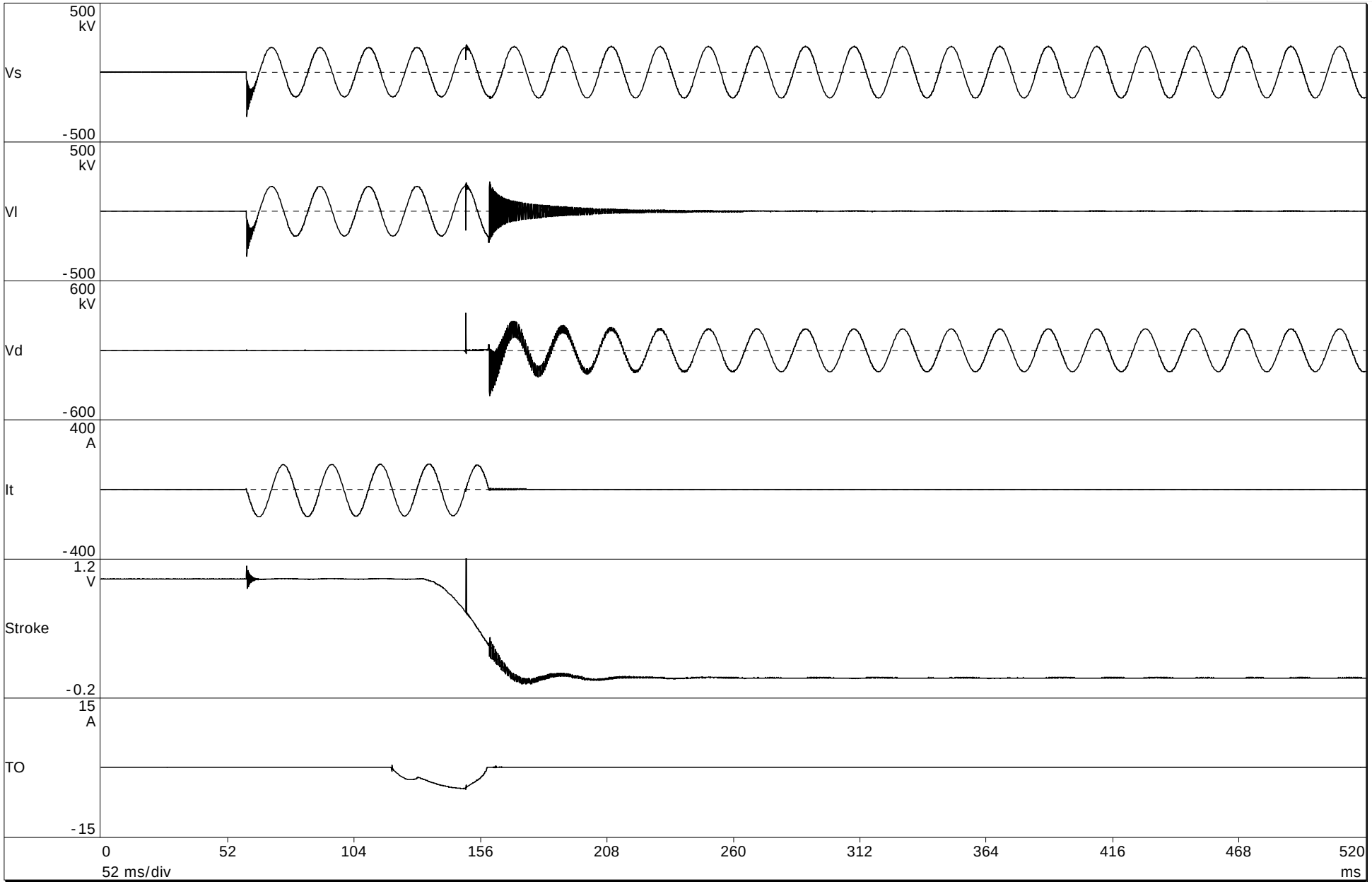
High Power Testing Department 1

HPC 1104 - 379



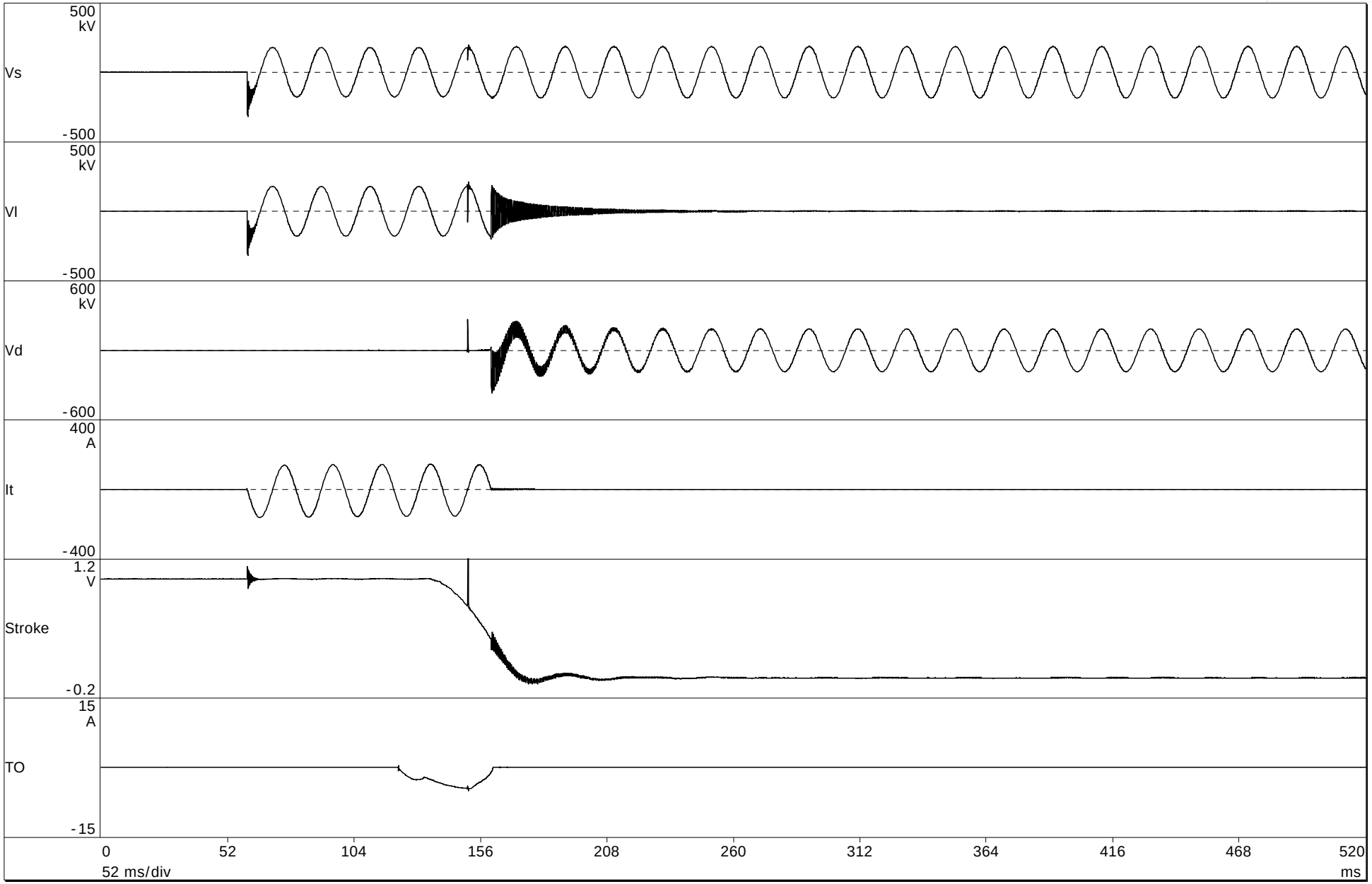
High Power Testing Department 1

HPC 1104 - 380



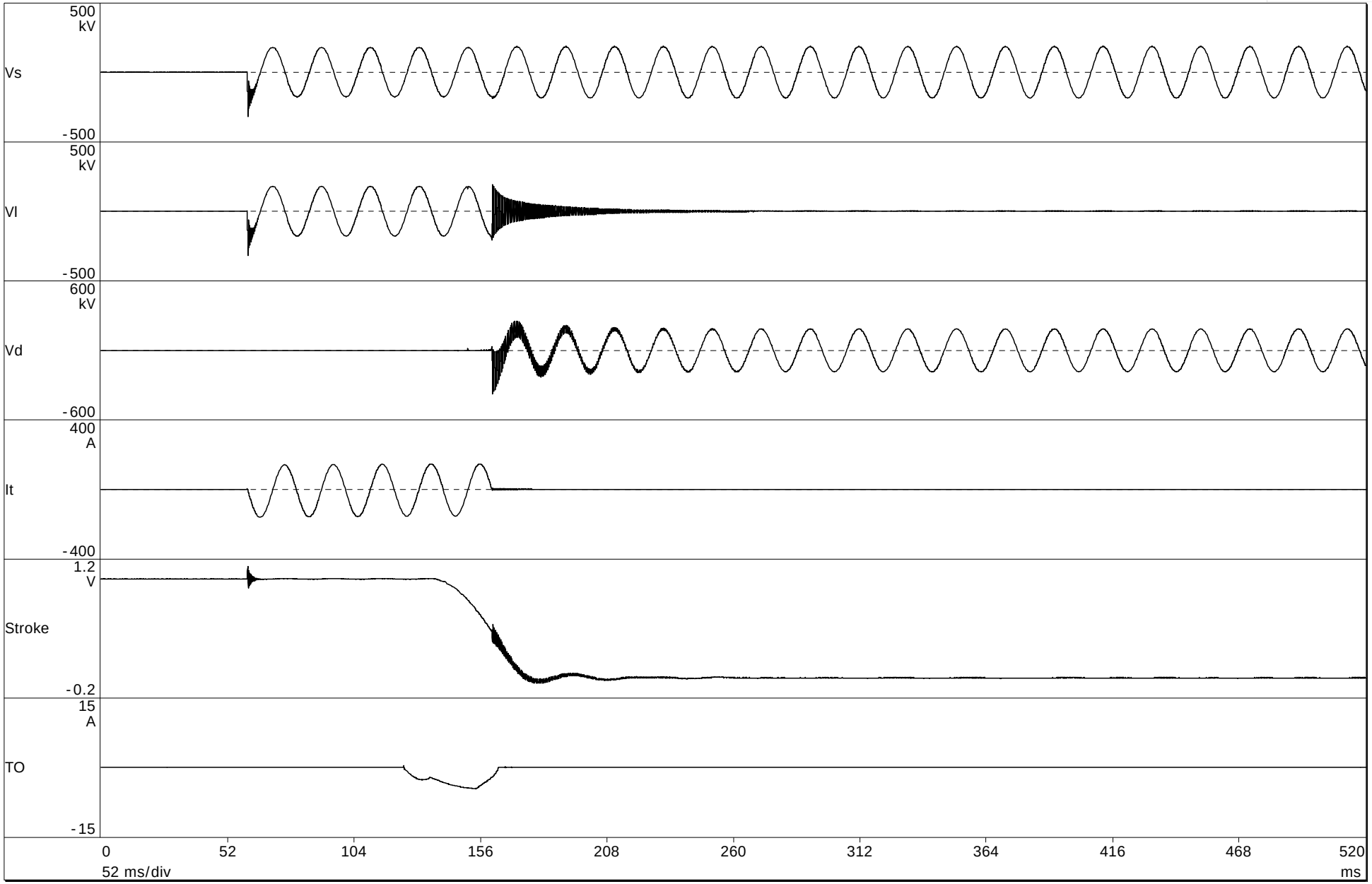
High Power Testing Department 1

HPC 1104 - 381



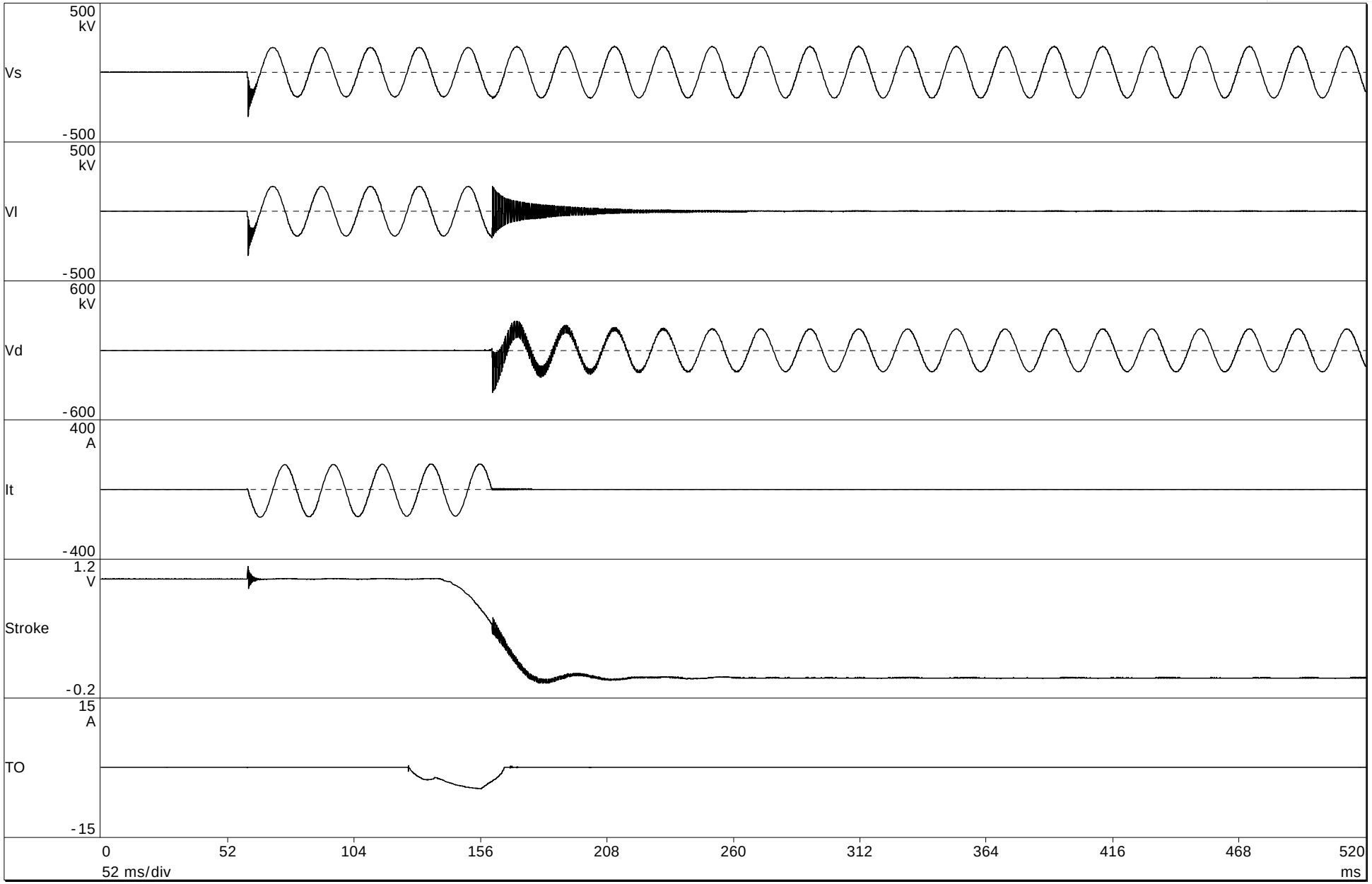
High Power Testing Department 1

HPC 1104 - 382



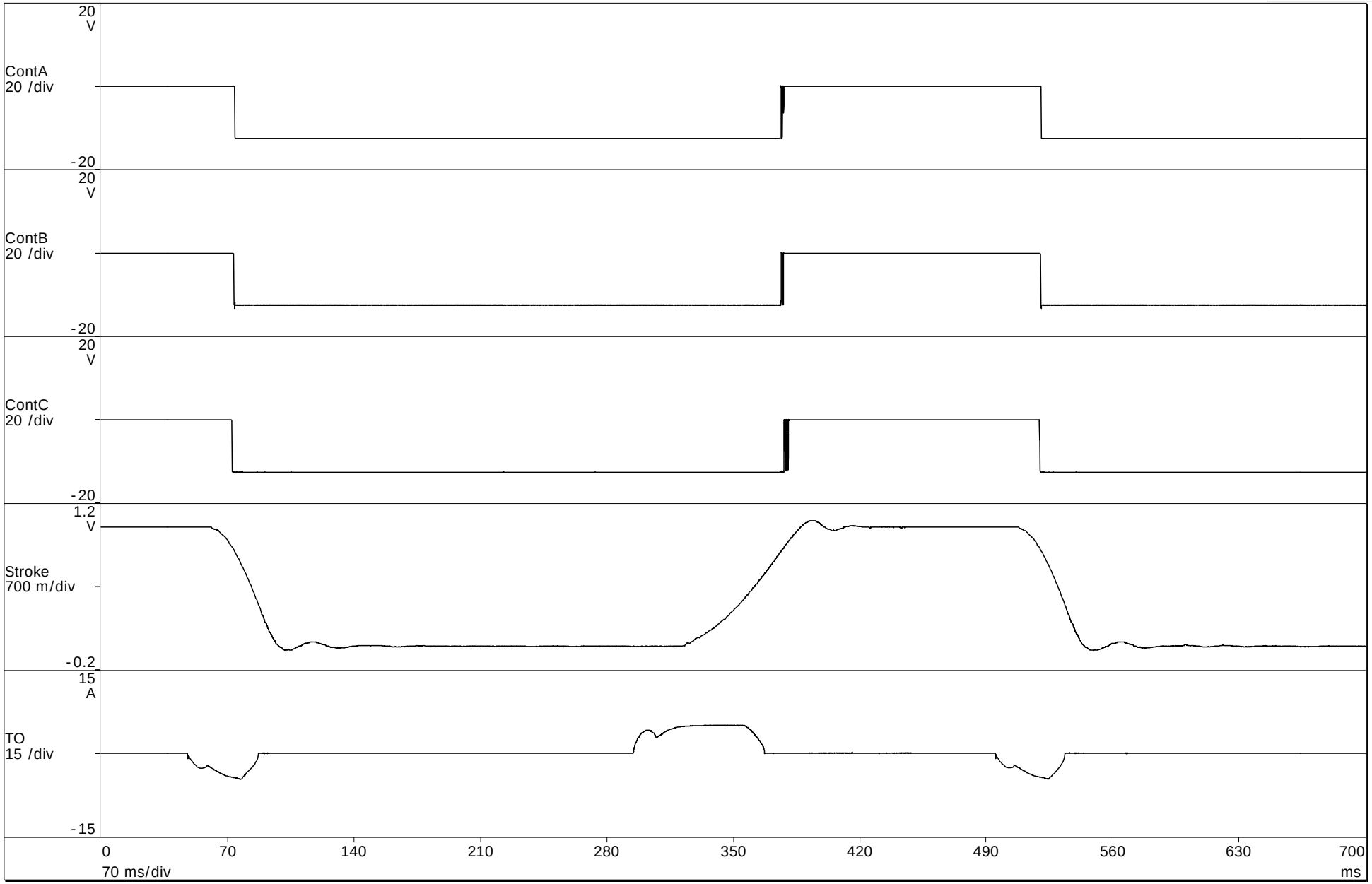
High Power Testing Department 1

HPC 1104 - 383



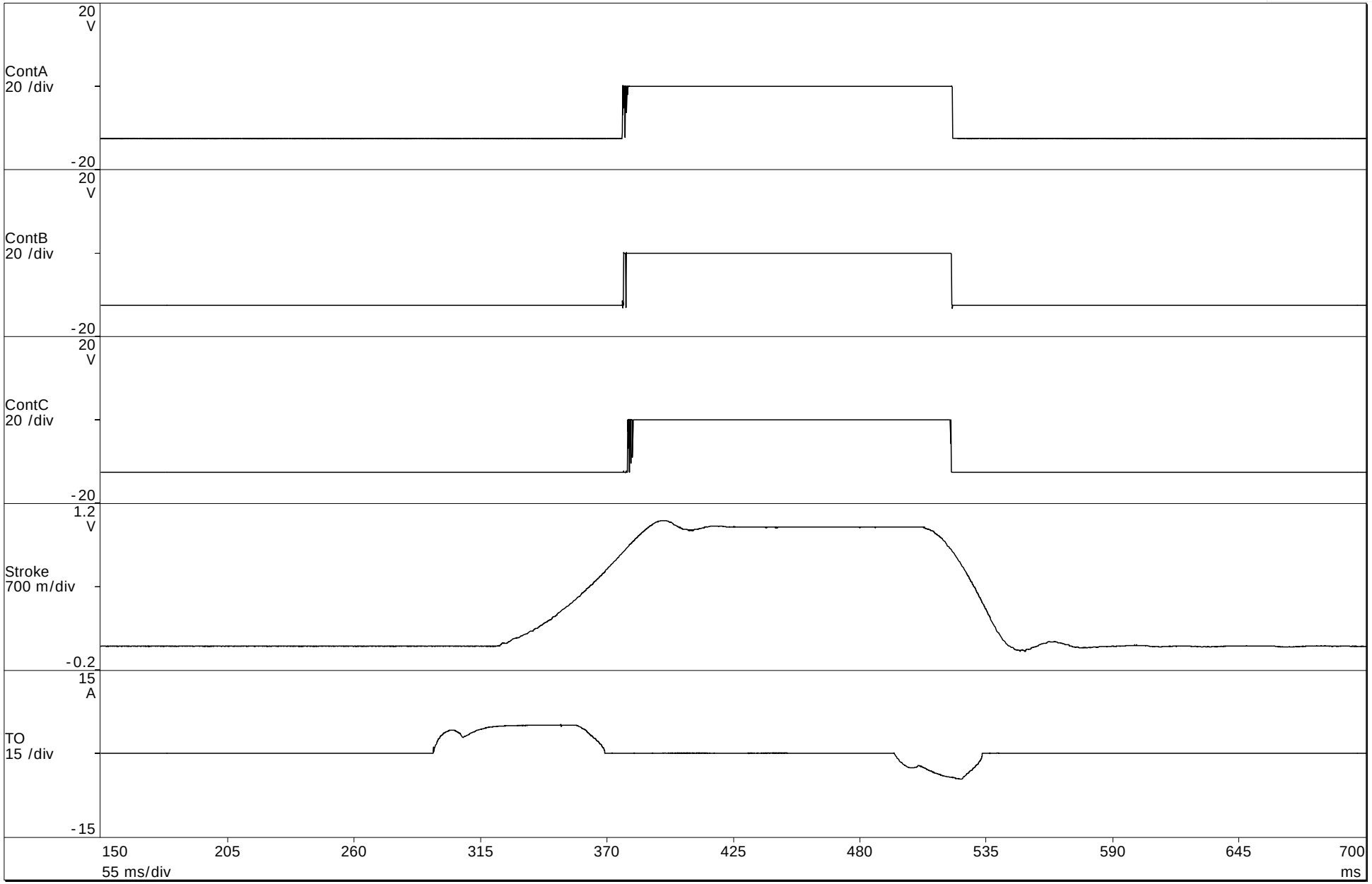
High Power Testing Department 1

HPC 1104 - 384



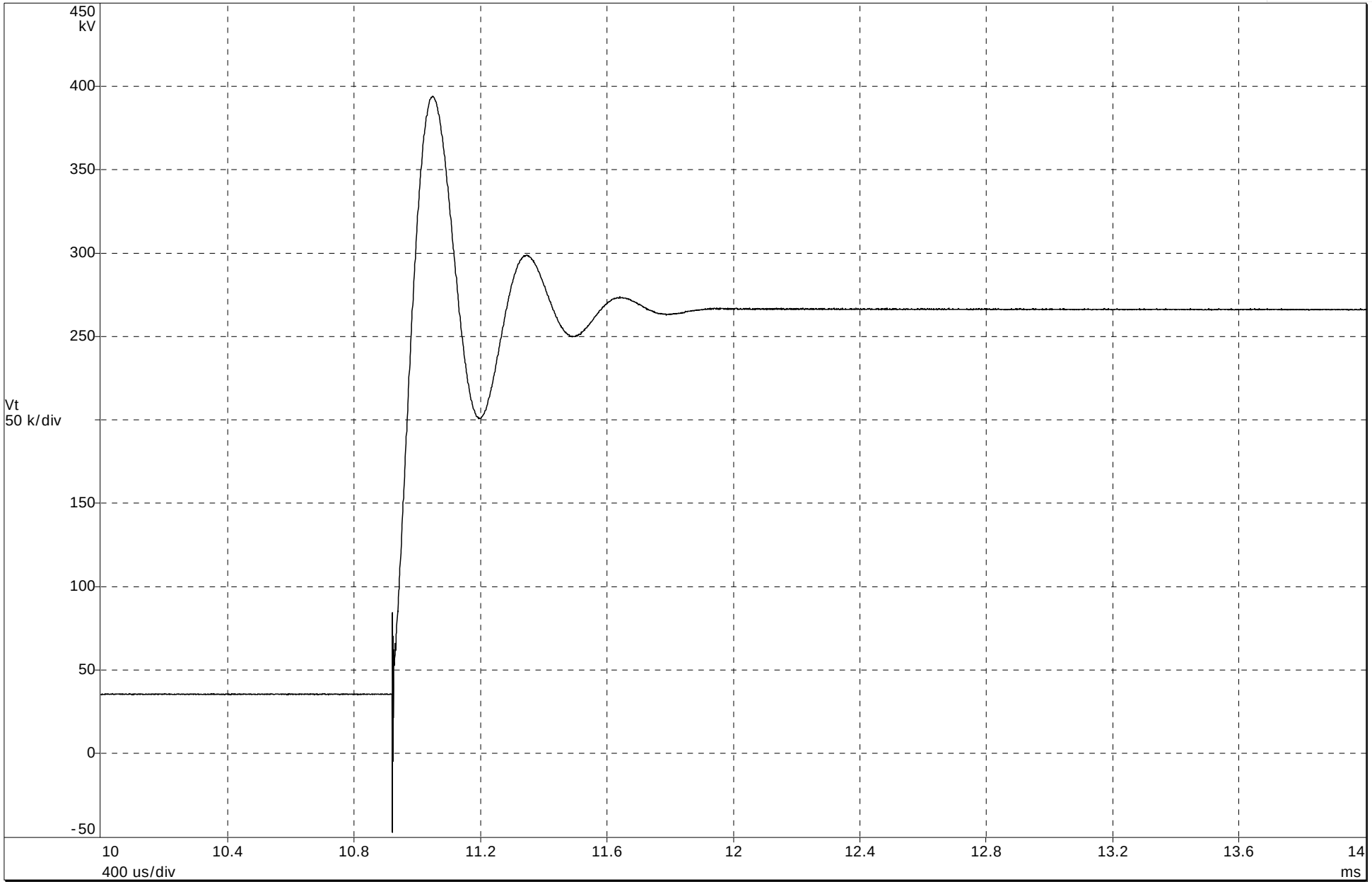
High Power Testing Department 1

HPC 1104 - 385



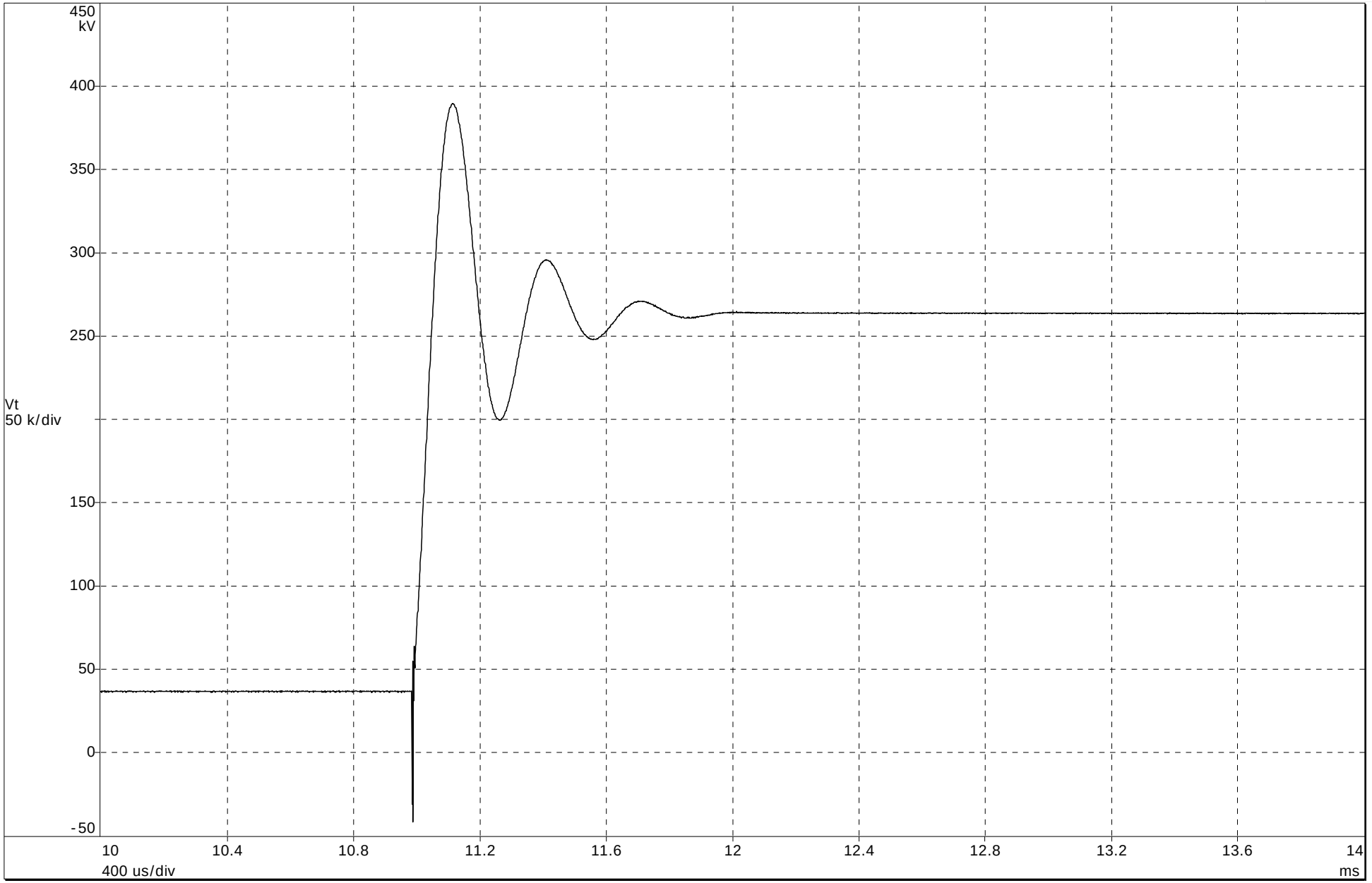
High Power Testing Department 1

HPC 1104 - 387



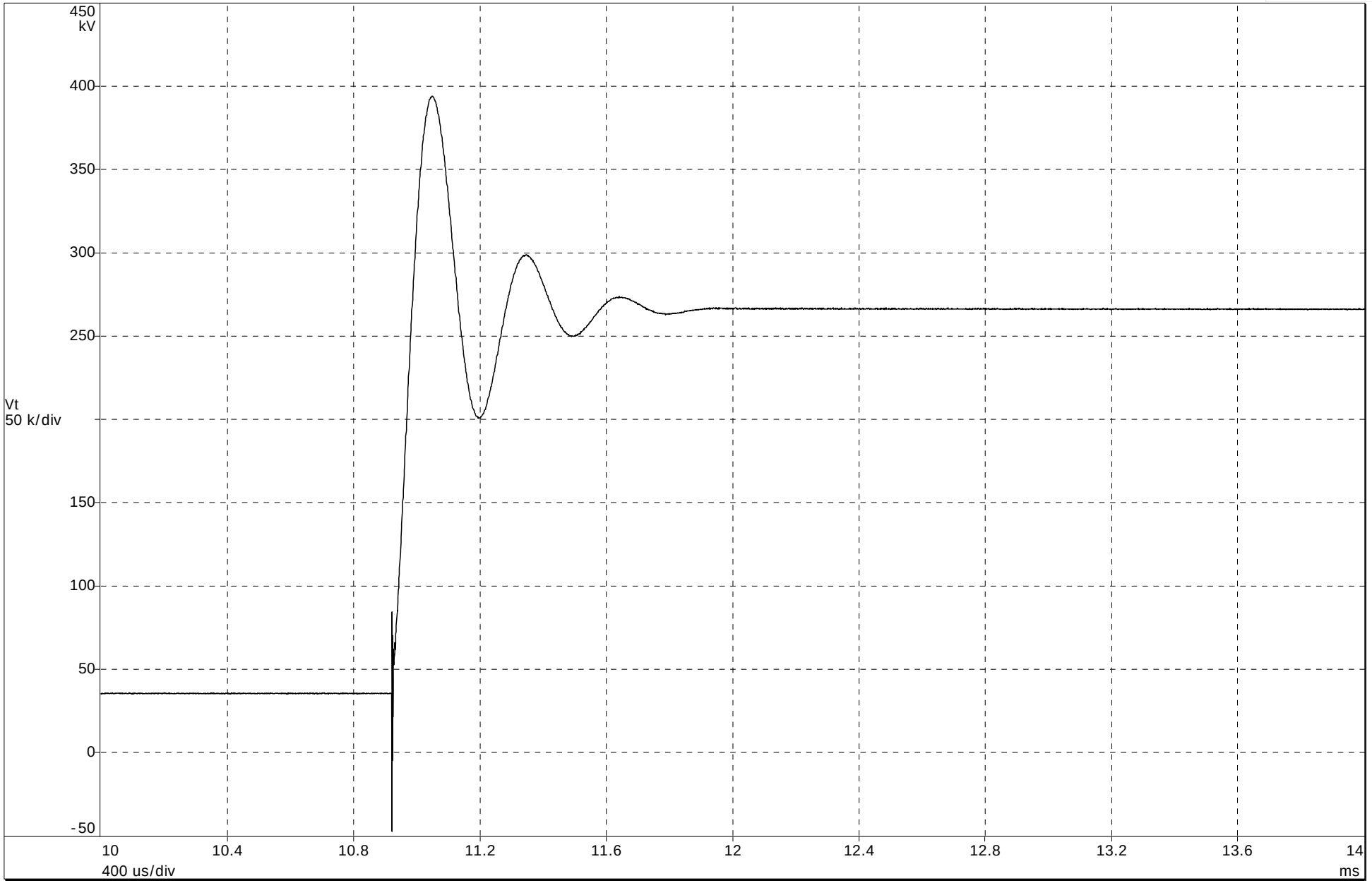
High Power Testing Department 1

HPC 1104 - 388



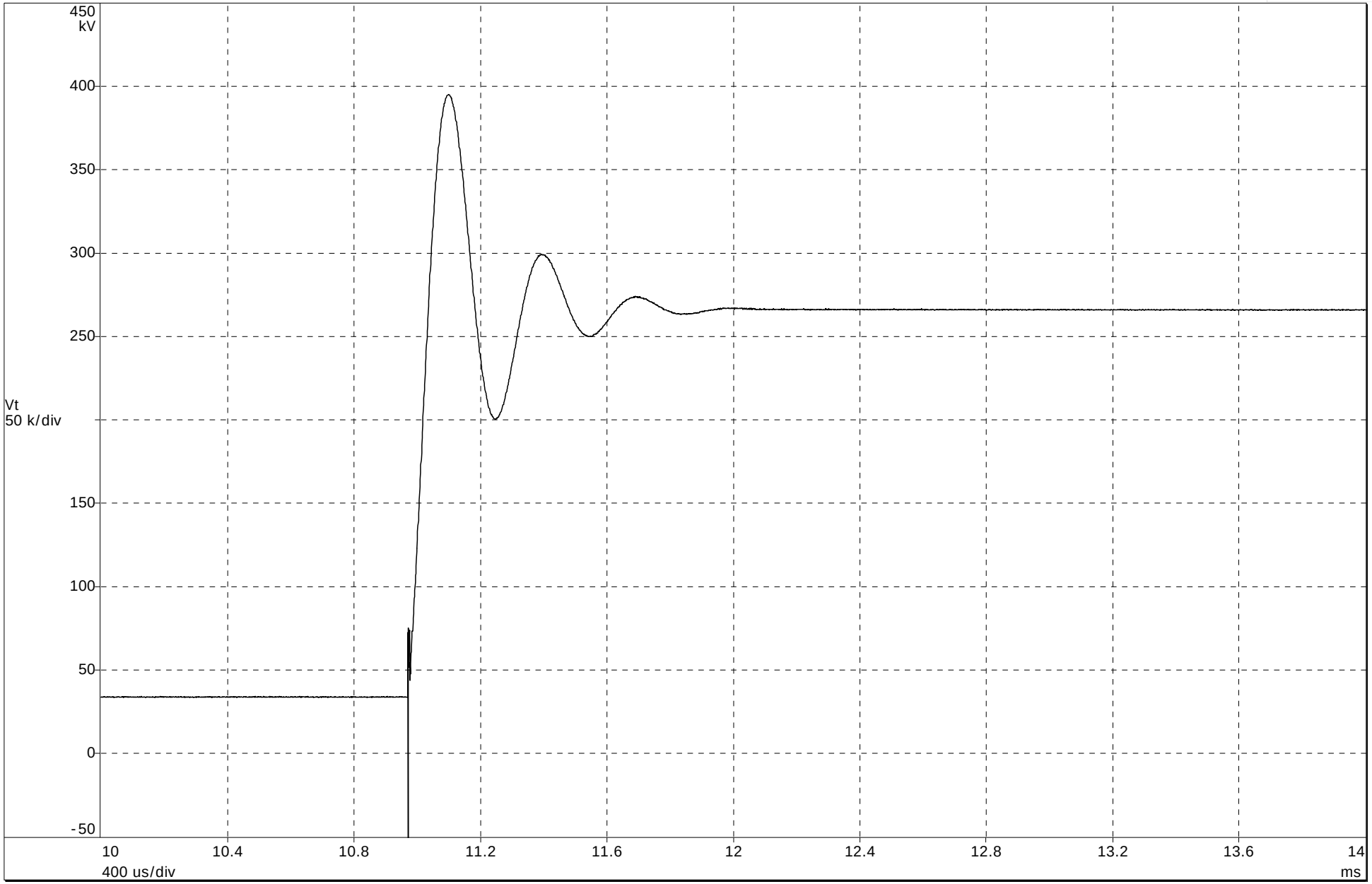
High Power Testing Department 1

HPC 1104 - 389



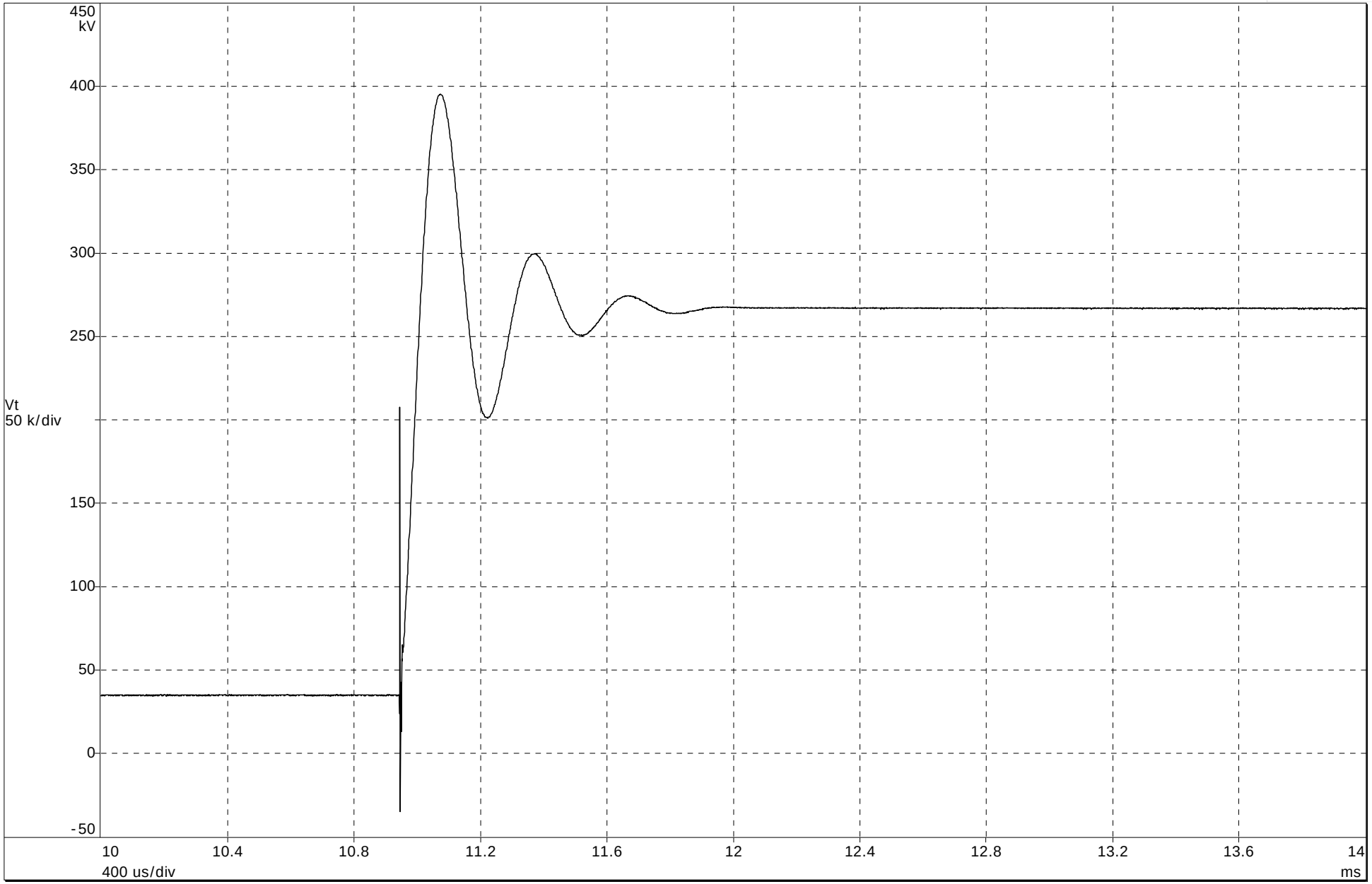
High Power Testing Department 1

HPC 1104 - 390



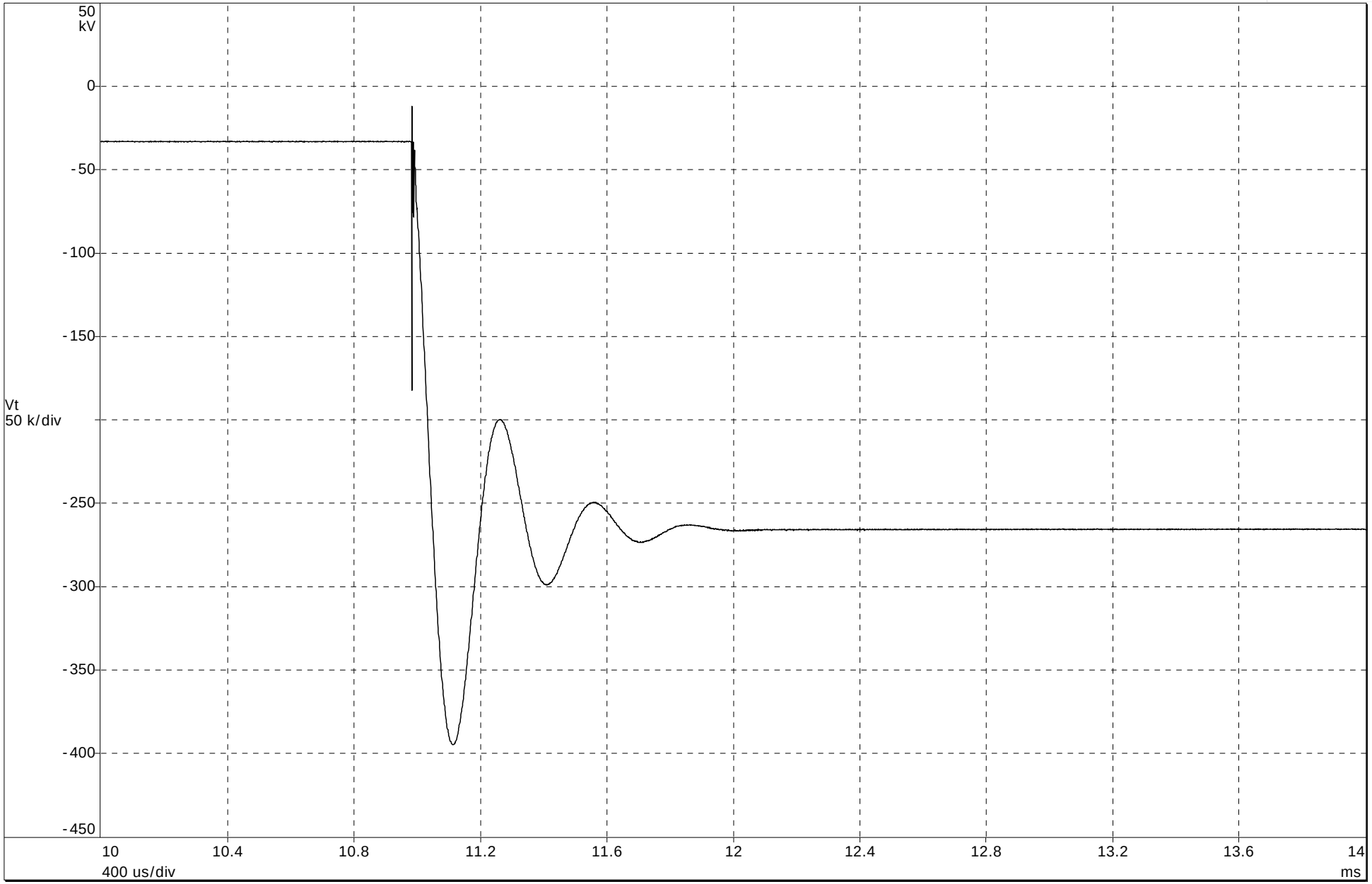
High Power Testing Department 1

HPC 1104 - 391



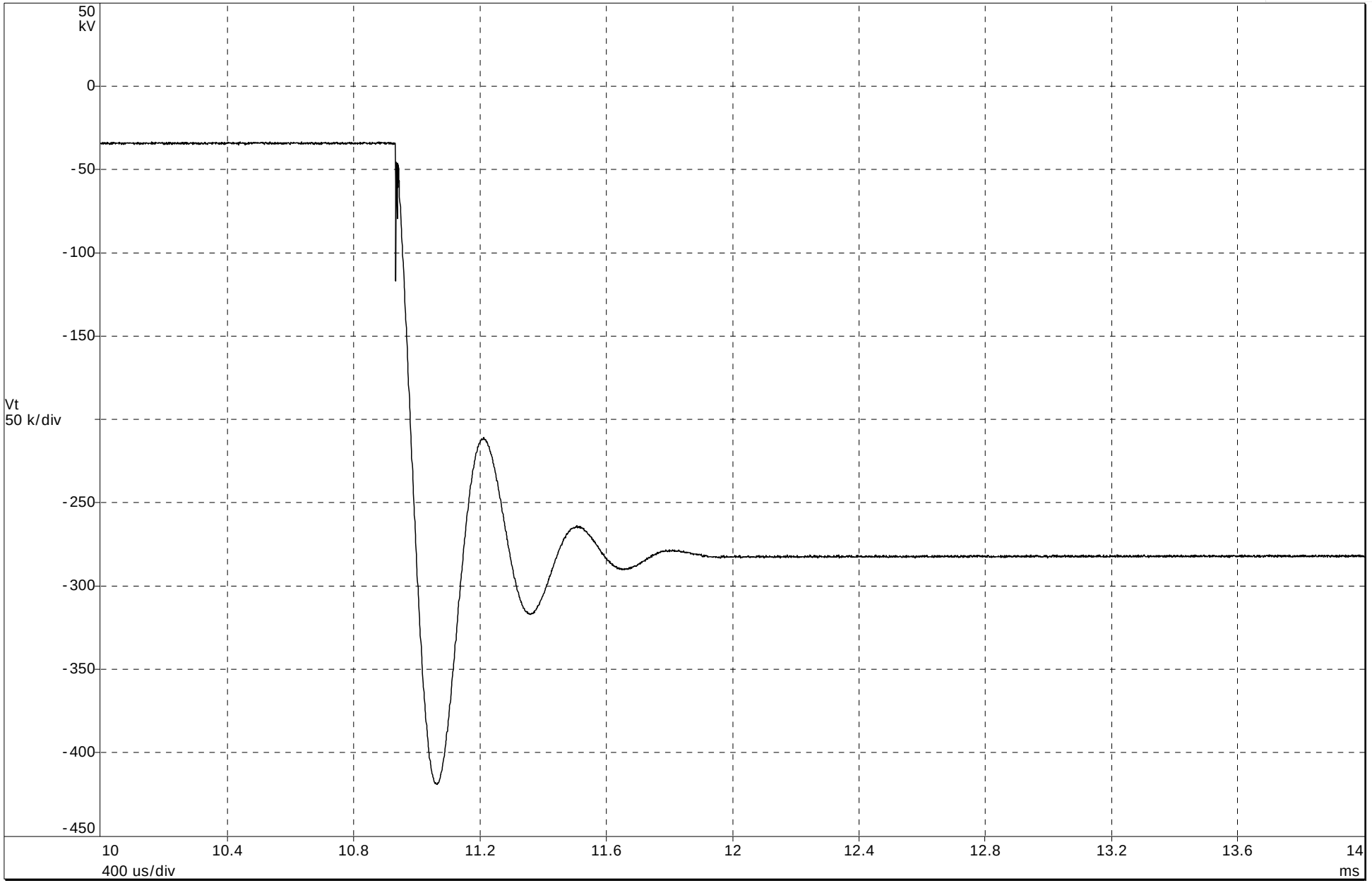
High Power Testing Department 1

HPC 1104 - 392



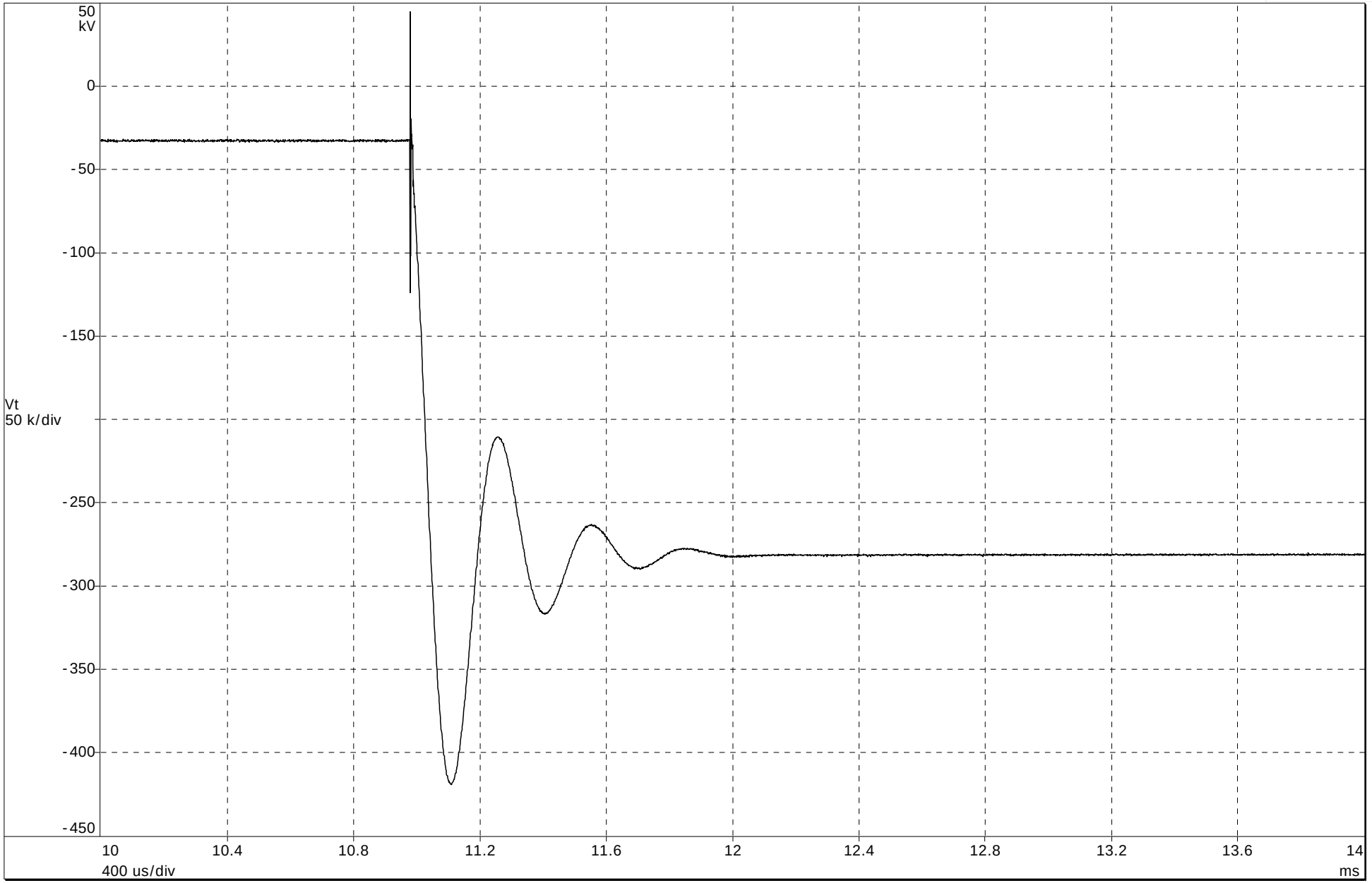
High Power Testing Department 1

HPC 1104 - 393



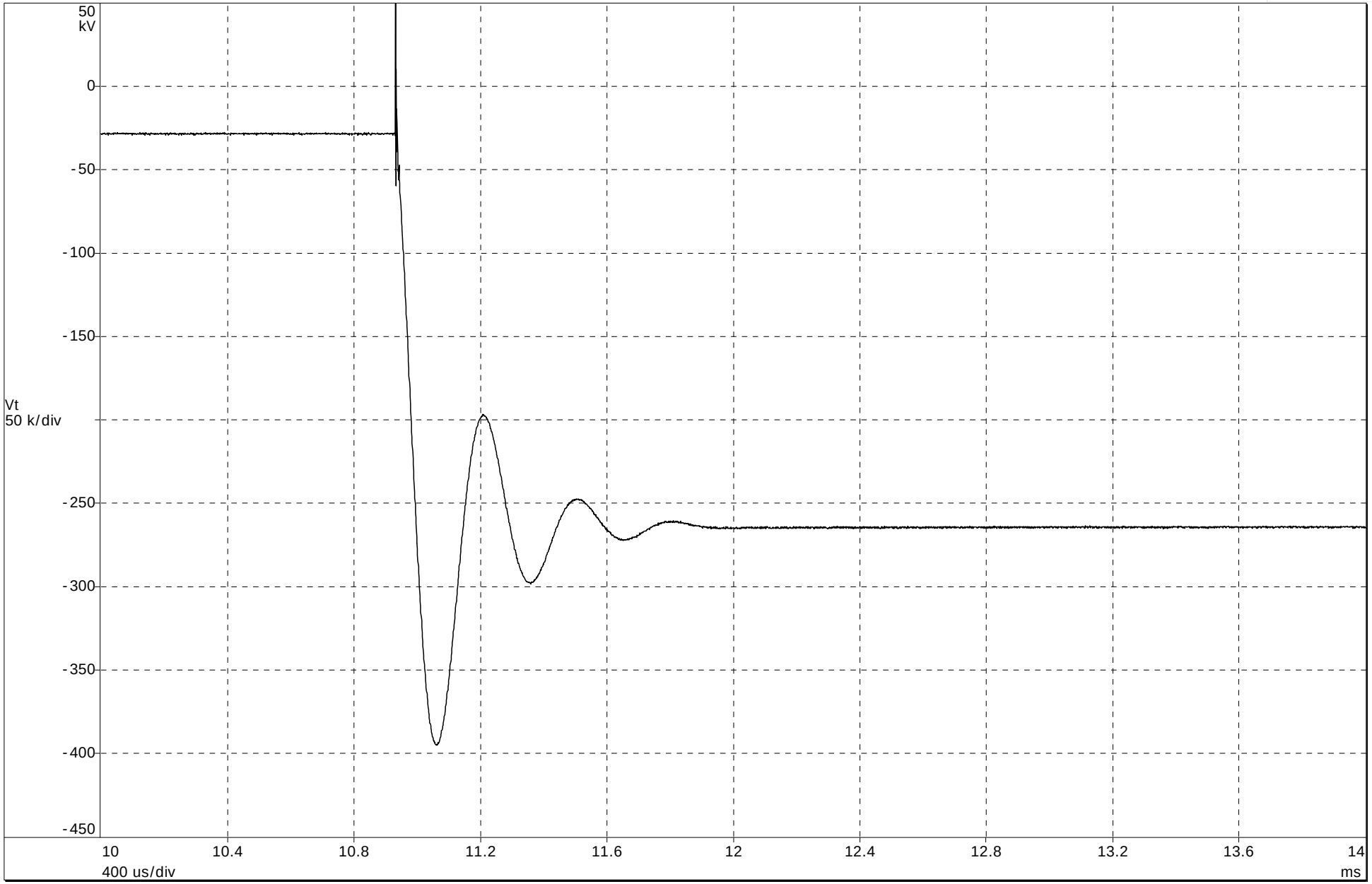
High Power Testing Department 1

HPC 1104 - 394



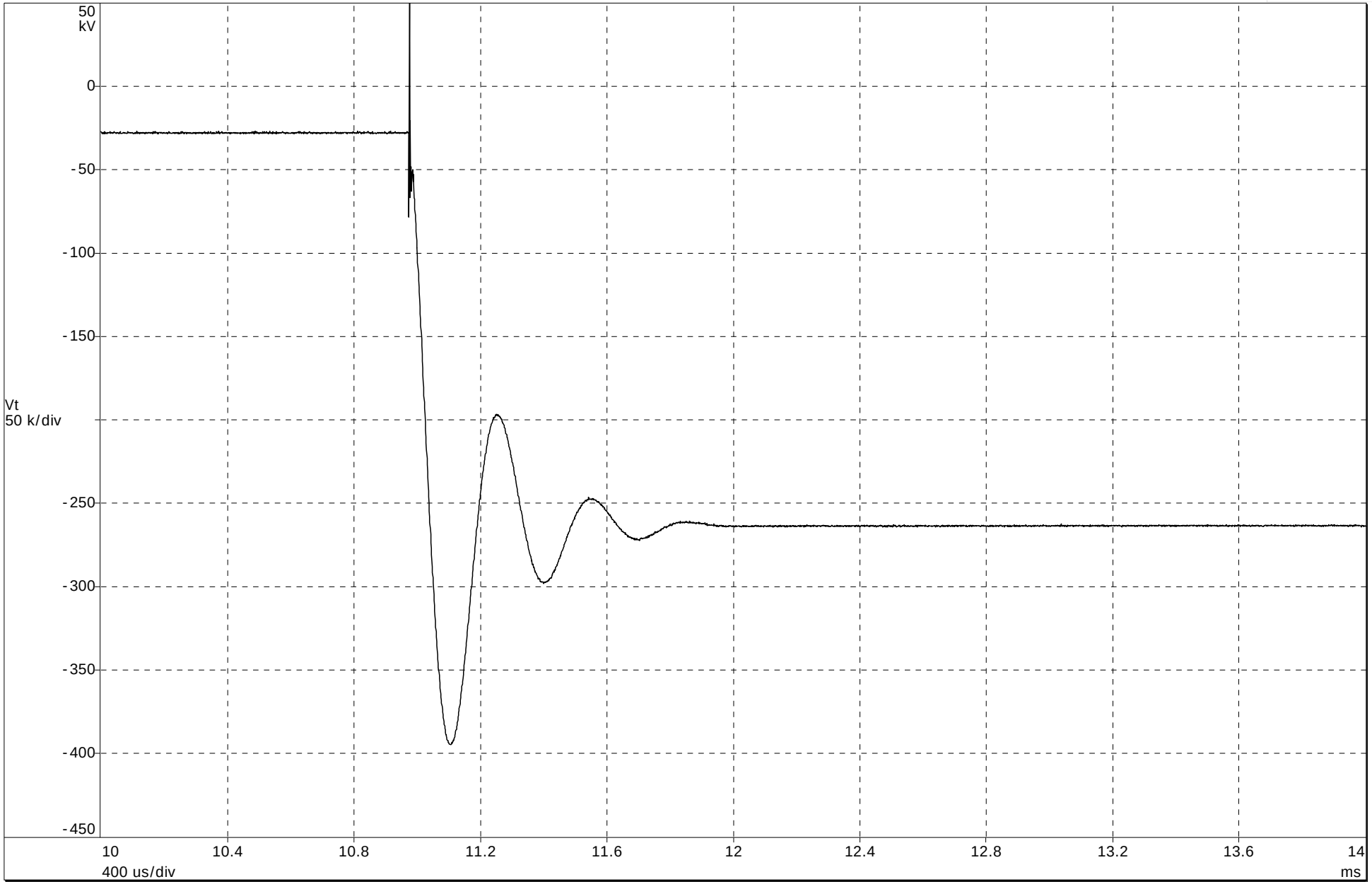
High Power Testing Department 1

HPC 1104 - 395



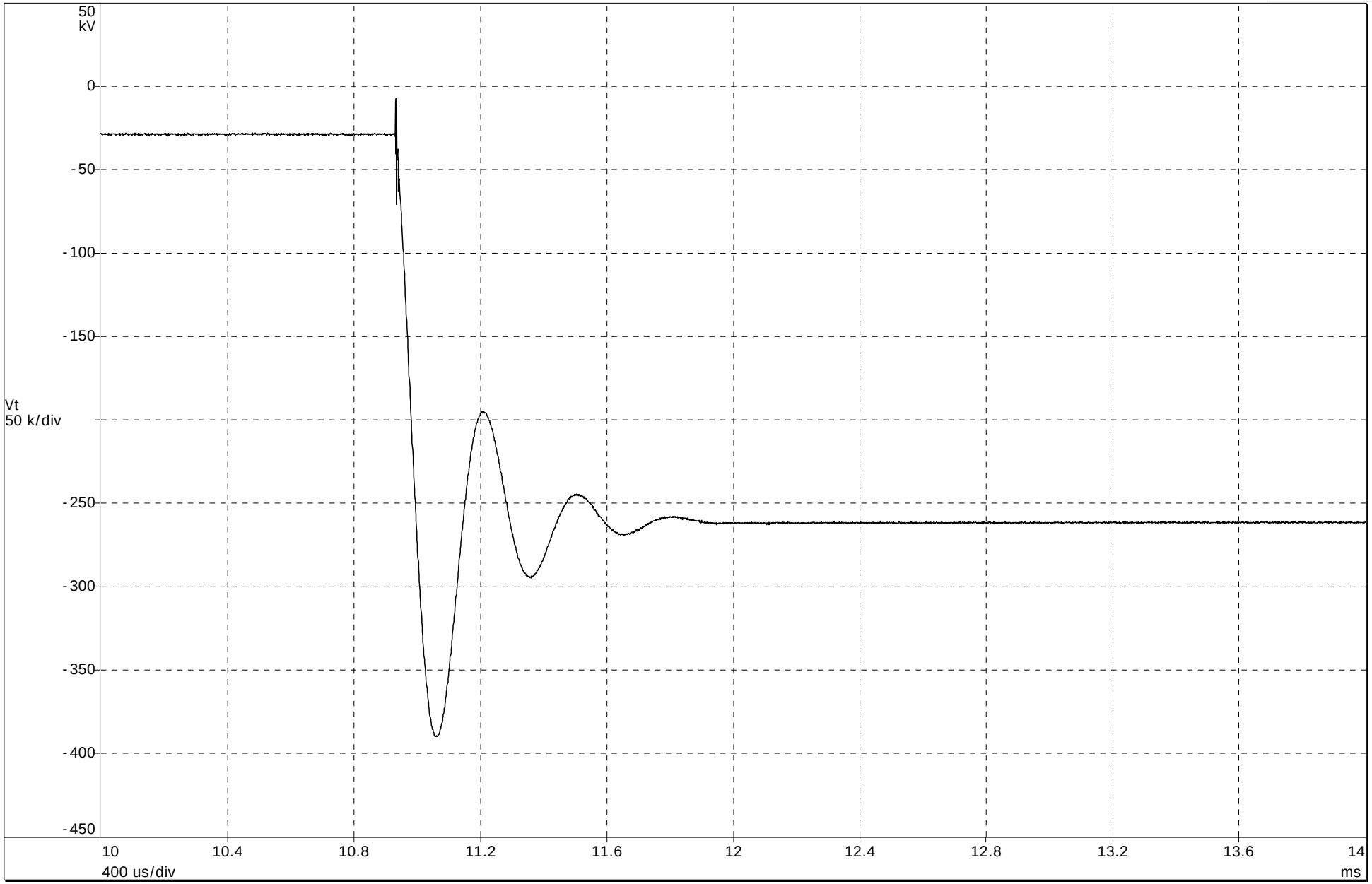
High Power Testing Department 1

HPC 1104 - 396



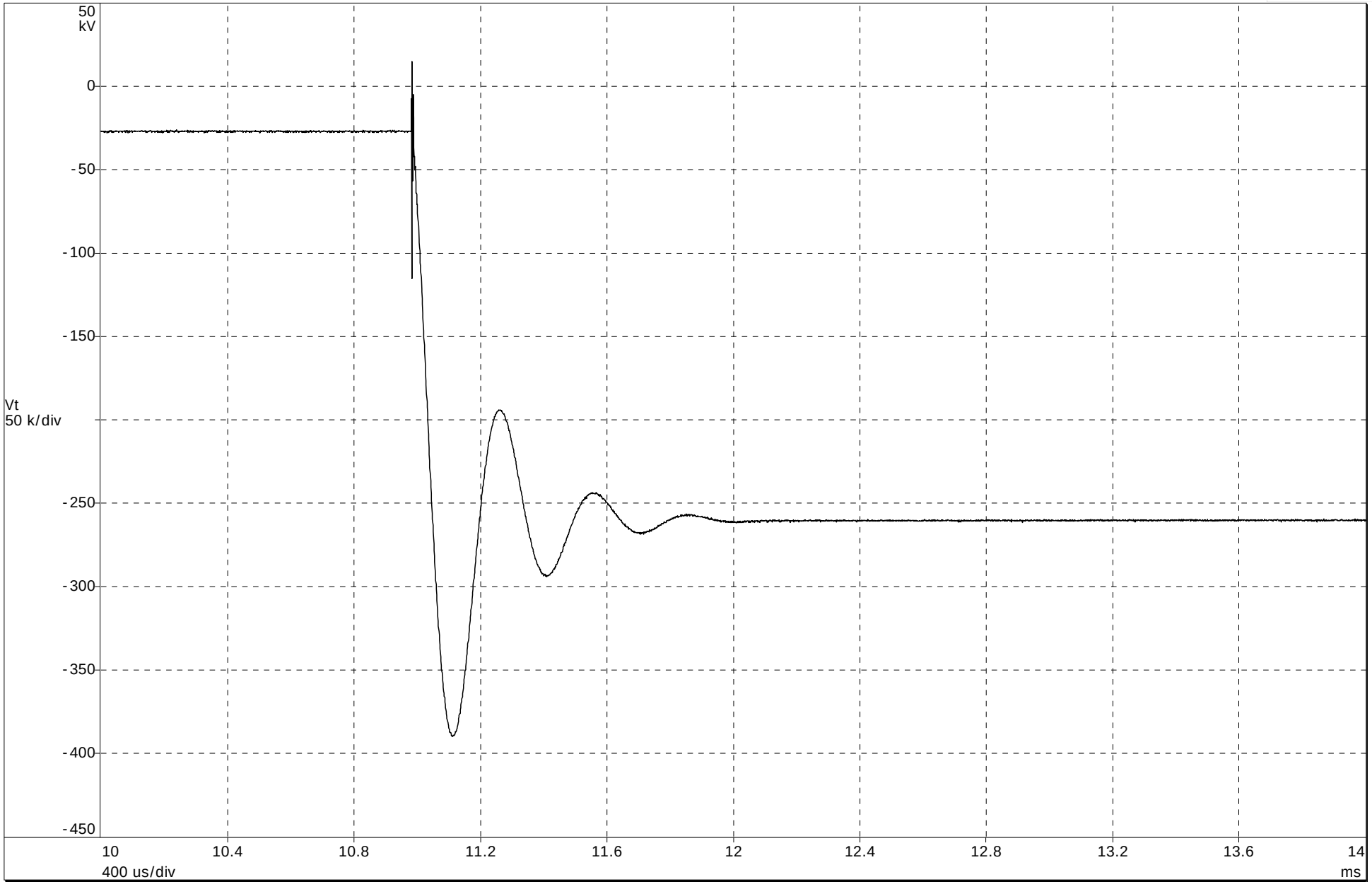
High Power Testing Department 1

HPC 1104 - 397



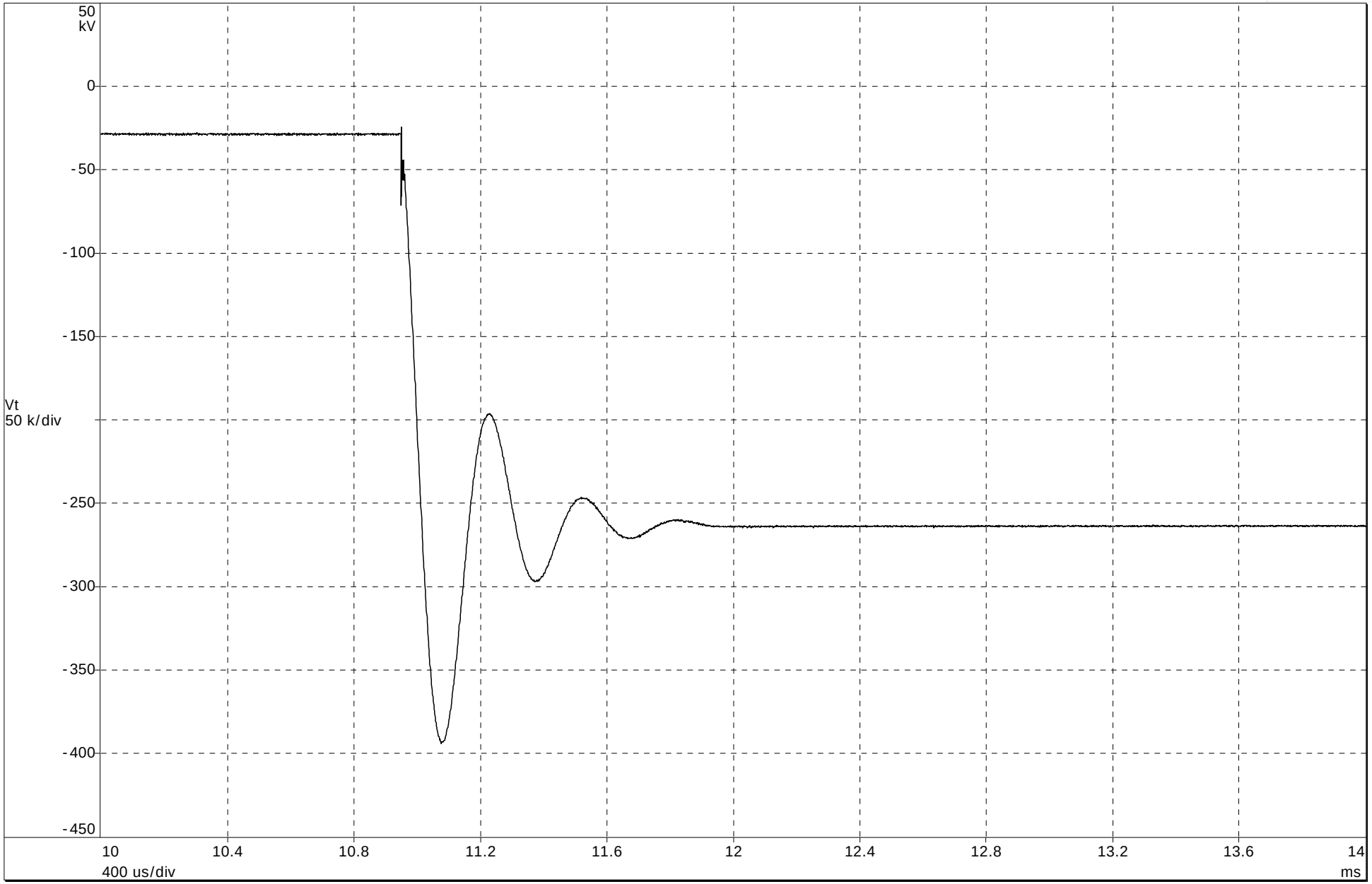
High Power Testing Department 1

HPC 1104 - 398



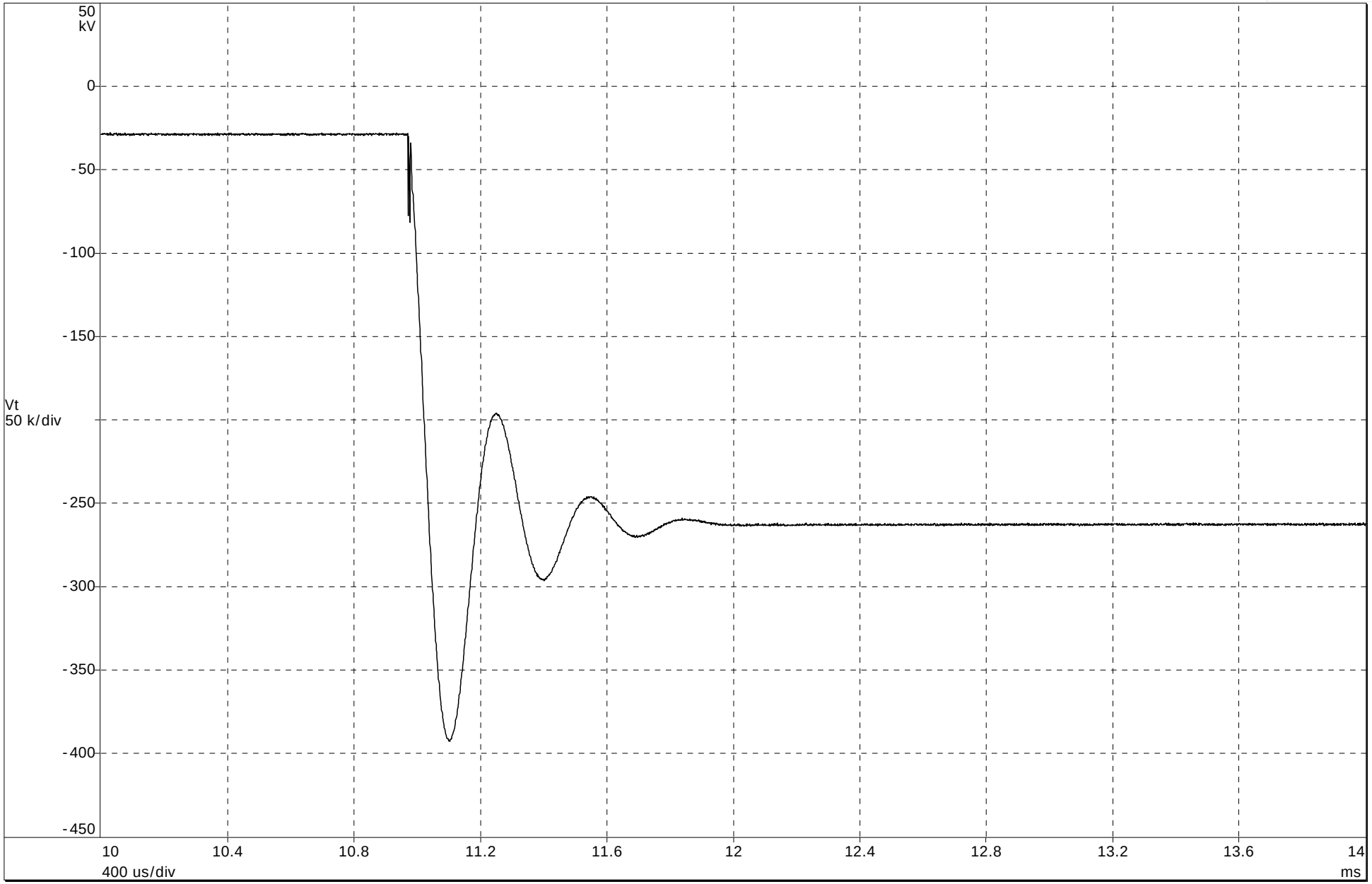
High Power Testing Department 1

HPC 1104 - 399



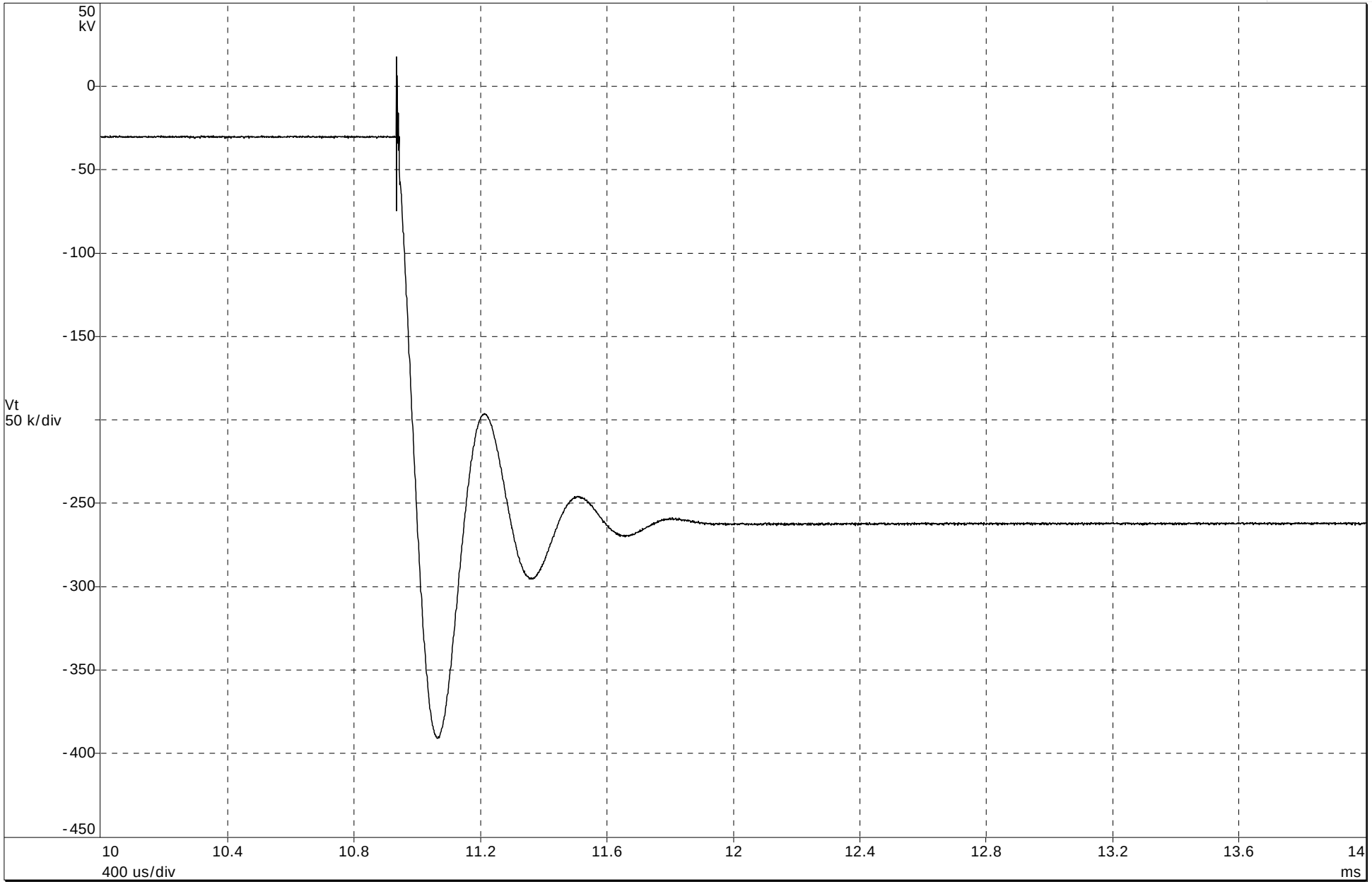
High Power Testing Department 1

HPC 1104 - 400



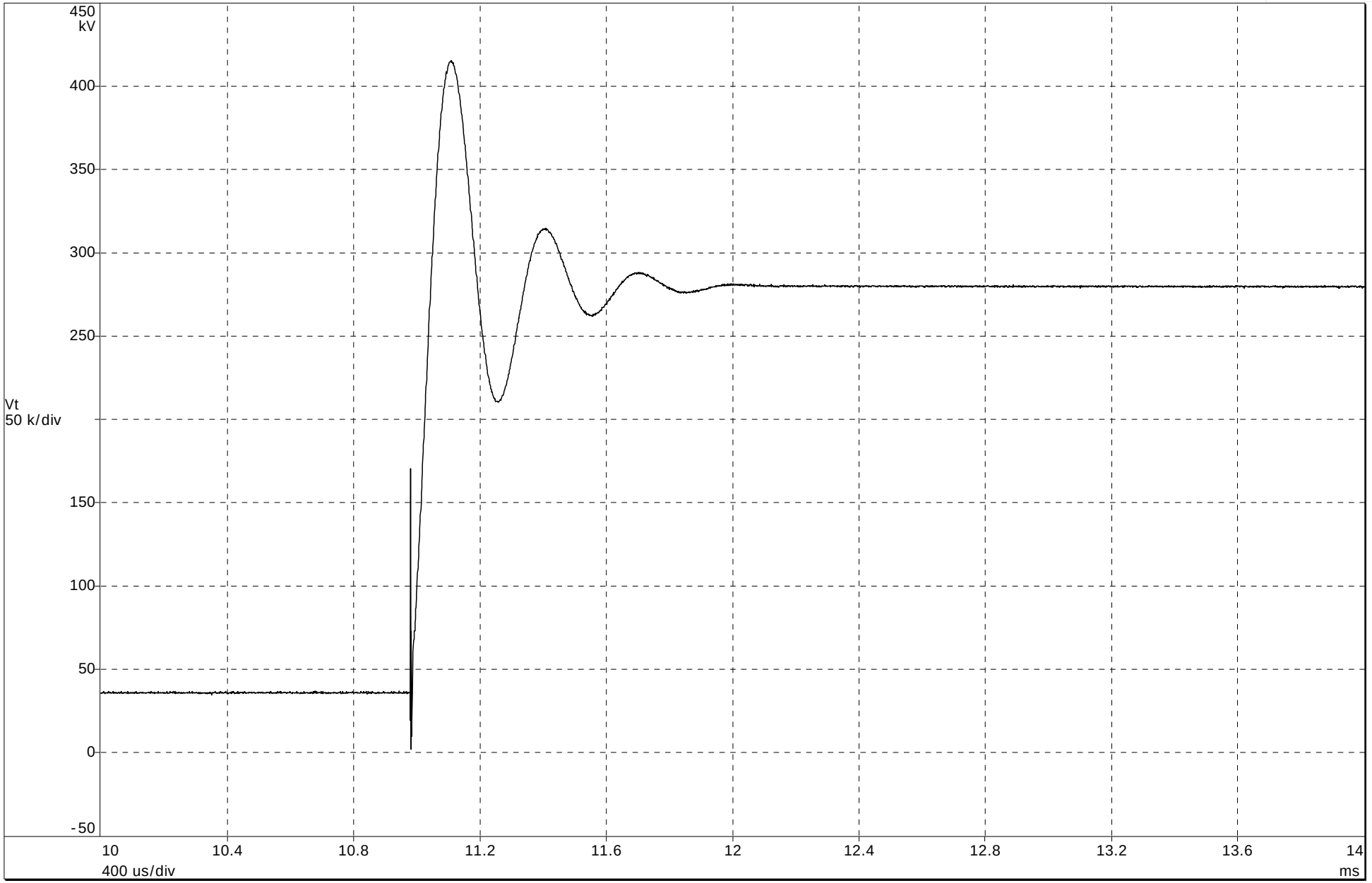
High Power Testing Department 1

HPC 1104 - 401



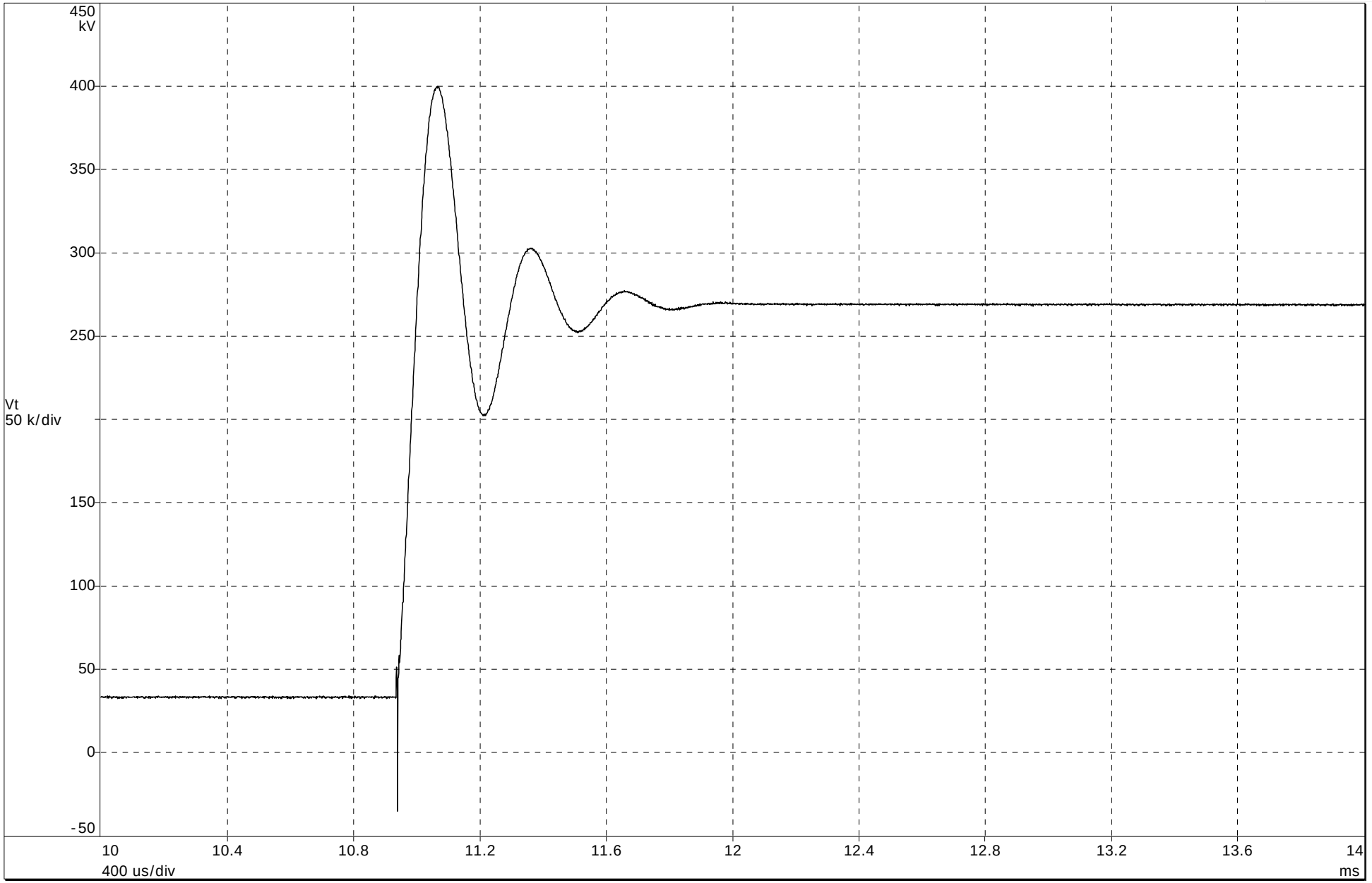
High Power Testing Department 1

HPC 1104 - 402



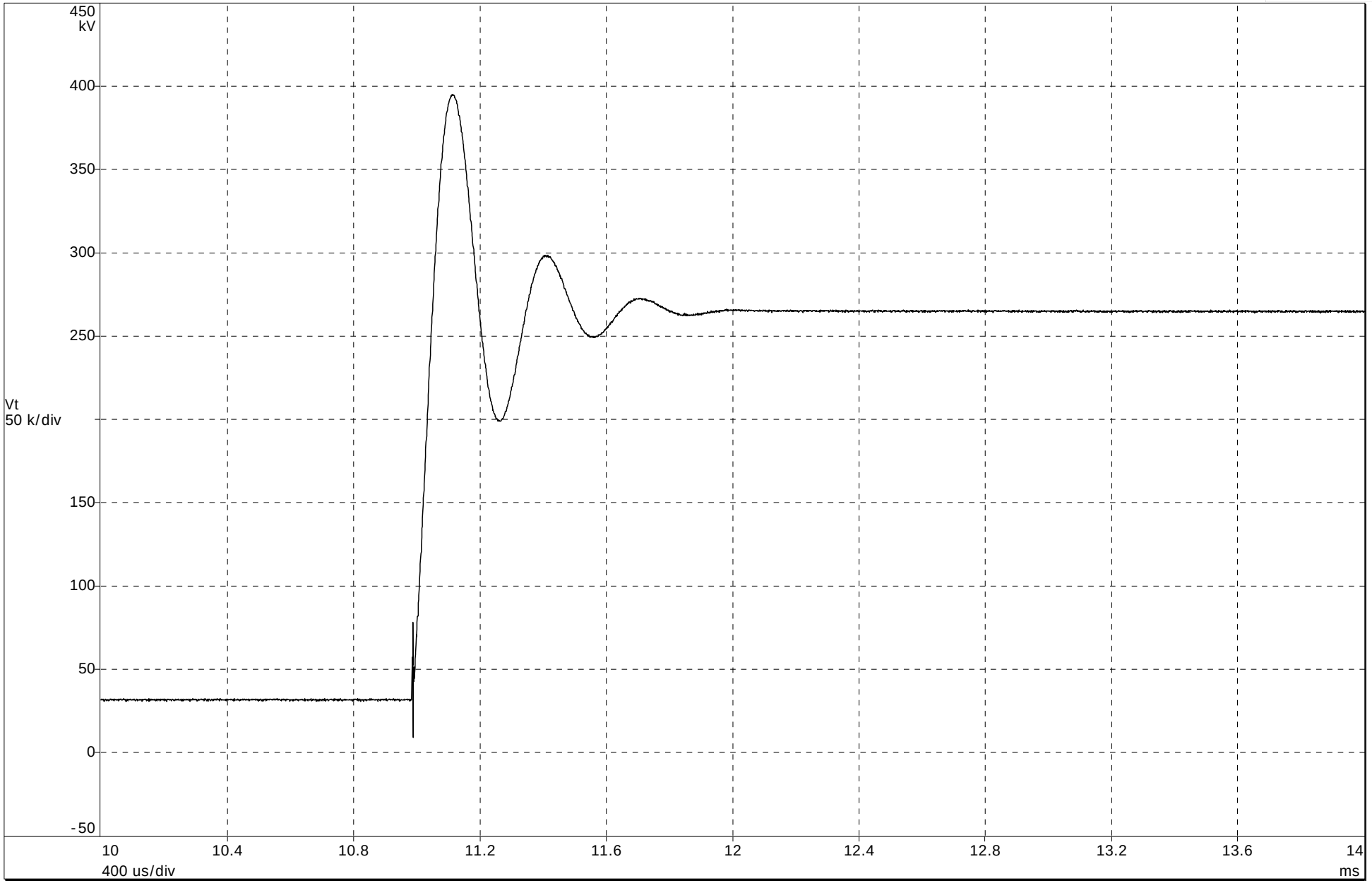
High Power Testing Department 1

HPC 1104 - 403



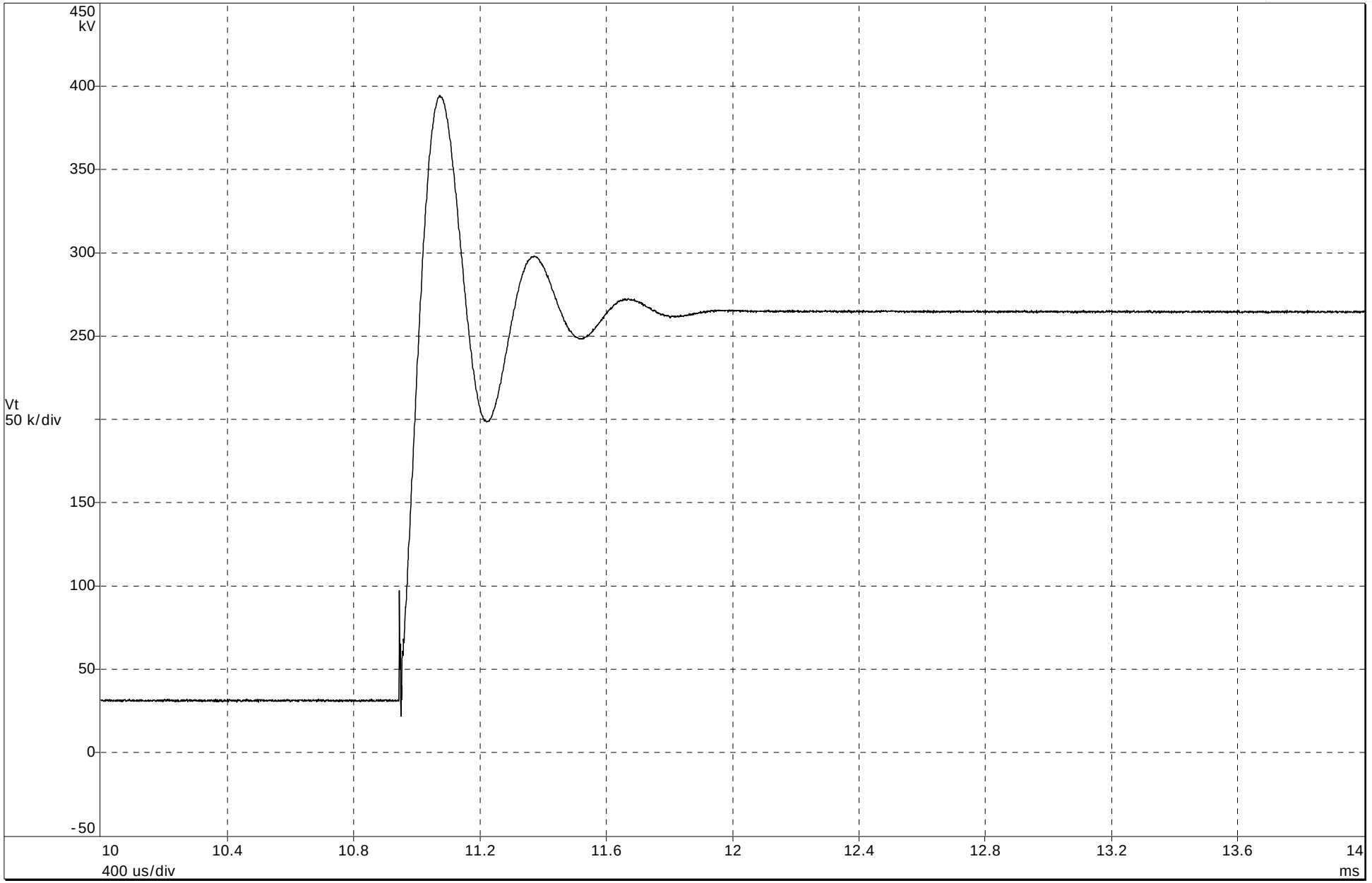
High Power Testing Department 1

HPC 1104 - 404



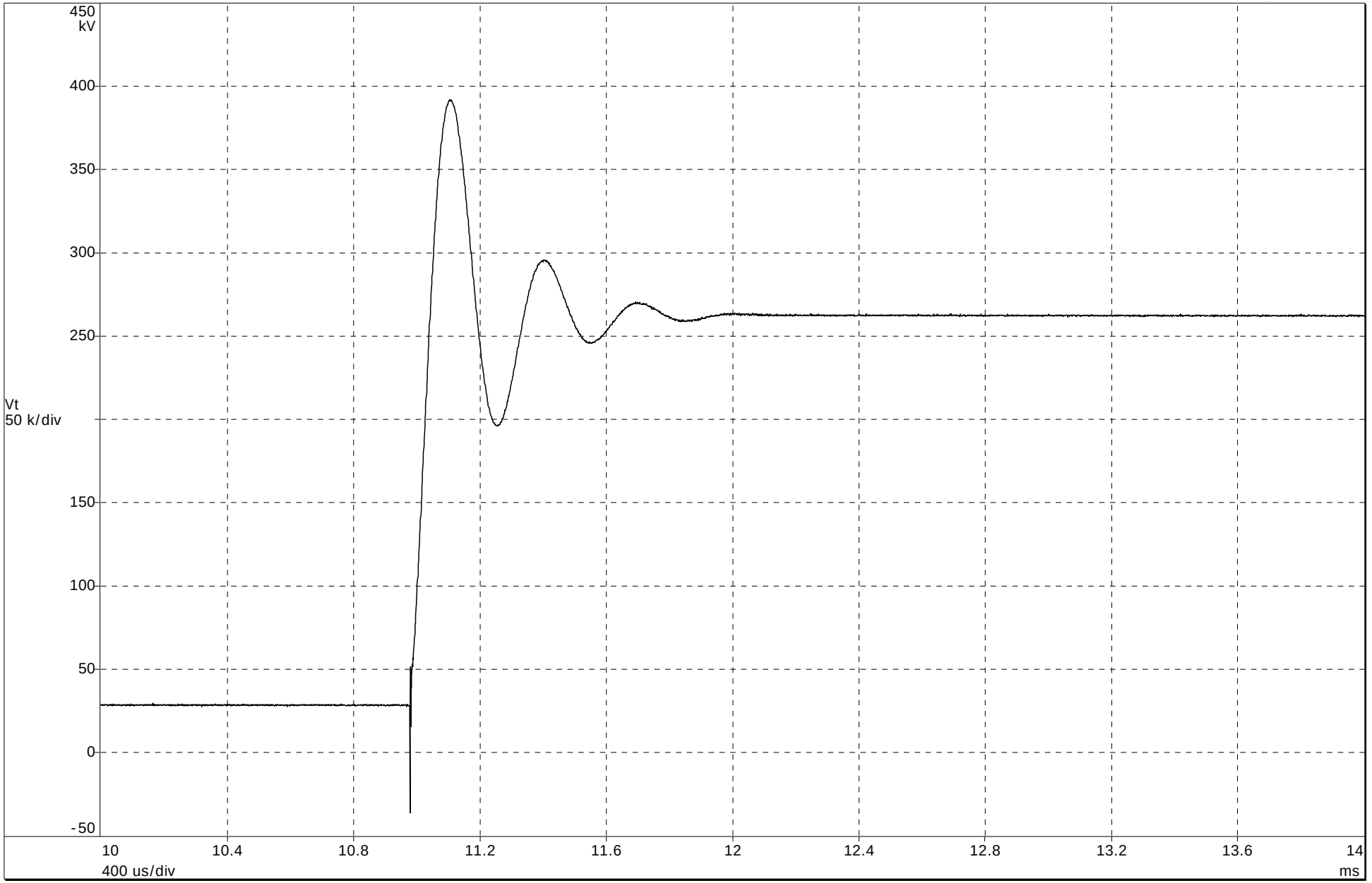
High Power Testing Department 1

HPC 1104 - 405



High Power Testing Department 1

HPC 1104 - 406



High Power Testing Department 1