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DOT HS 807 437

January 1989

Final Report

Final Report of 180° Fixed Flat Barrier Impacts of a 1983 Ford Thunderbird 2-Door Coupe in Support of Crash III Damage Algorithm Reformation

The United States Government does not endorse products or manufacturers. Trade or manufacturers' names appear only because they are considered essential to the object of this report.

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15. Supplementary Notes																									
16. Abstract Three 180° fixed flat barrier impact tests were conducted for research and development in support of the CRASH III damage algorithm reformulation. These tests were conducted on a 1983 Ford Thunderbird 2-door coupe, VIN 1FABP4634DH120510, at the Transportation Research Center of Ohio. The following three tests were conducted on one vehicle: <table border="1"> <thead> <tr> <th>TEST NO.</th> <th>DATE</th> <th>TIME</th> <th>SPEED (mph)</th> <th>AVERAGE CUMULATIVE CRUSH</th> </tr> </thead> <tbody> <tr> <td>890119-1</td> <td>1/19/89</td> <td>945</td> <td>10.5</td> <td>2.8</td> </tr> <tr> <td>890119-2</td> <td>1/19/89</td> <td>1020</td> <td>18.8</td> <td>16.4</td> </tr> <tr> <td>890119-3</td> <td>1/19/89</td> <td>1330</td> <td>34.7</td> <td>45.2*</td> </tr> </tbody> </table> *Average corrected cumulative crush for 890119-3 (See Section 5).						TEST NO.	DATE	TIME	SPEED (mph)	AVERAGE CUMULATIVE CRUSH	890119-1	1/19/89	945	10.5	2.8	890119-2	1/19/89	1020	18.8	16.4	890119-3	1/19/89	1330	34.7	45.2*
TEST NO.	DATE	TIME	SPEED (mph)	AVERAGE CUMULATIVE CRUSH																					
890119-1	1/19/89	945	10.5	2.8																					
890119-2	1/19/89	1020	18.8	16.4																					
890119-3	1/19/89	1330	34.7	45.2*																					
17. Key Words 180° Fixed Flat Barrier Impact Crash III Damage Algorithm Reformation.			18. Distribution Statement Document is available to the public from the National Technical Information Service, Springfield, VA 22161																						
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SECTION 1.0
PURPOSE AND TEST SUMMARY

The purpose of the three 180° fixed flat barrier impact tests was for research and development in support of the CRASH III damage algorithm reformulation.

The 1983 Ford Thunderbird was equipped with a 3.8 liter, 6-cylinder, inline, gas engine with a 3-speed automatic transmission. The intended total test weight of the vehicle was 3582 pounds. The actual weight was 3563 pounds, including 250 pounds of steel plate ballast secured in each driver's and right front passenger's side.

The crash event was recorded by two (2) high-speed cameras.

SECTION 2.0
VEHICLE INFORMATION

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Ford Motor Corporation VIN: 1FABP4634DH120510
MAKE/MODEL: Ford/Thunderbird MODEL YEAR: 1983
BODY STYLE: 2-door coupe COLOR: yellow
ENGINE DATA: TYPE: inline CYLINDERS: 6 DISPLACEMENT: 3.8 liter
 X GAS, DIESEL, TURBOCHARGE
TRANSMISSION DATA: 3 SPEED, MANUAL, X AUTOMATIC, FWD, X RWD, 4WD
DATE VEHICLE RECEIVED: 1/12/89 ODOMETER READING: 2138.0
DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	Yes
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	Yes	AIR CONDITIONING	No
RADIO	No	ANTI-SKID BRAKE	No
CLOCK	Yes	REAR WINDOW DEFROSTER	Yes
OTHER	None		

DATA FROM CERTIFICATION LABEL ON LEFT DOOR FACE OR "B" POST:

VEHICLE MANUFACTURED BY: Ford Motor Corporation
DATE OF MANUFACTURE: 3/83
GVWR: 4200 LBS.
GAWR: FRONT 1046 LBS.; REAR 2040 LBS.

The rear of the vehicle was supported by a dolly.

TEST VEHICLE INFORMATION, CONT'D

WHEELBASE: 103.2

MAXIMUM WIDTH: 71.5

WEIGHT OF TEST VEHICLE WITH REQUIRED OCCUPANTS AND LUGGAGE:

RIGHT FRONT	857 LBS.	RIGHT REAR	948 LBS.
LEFT FRONT	807 LBS.	LEFT REAR	951 LBS.
TOTAL FRONT WEIGHT	1664 LBS.	(46.7% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1899 LBS.	(53.3% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	3563 LBS.		

WEIGHT OF BALLAST SECURED IN VEHICLE TRUNK AREA: 0 LBS.

VEHICLE TIRE DATA:

TIRES ON VEHICLE (MFR. & LINE, SIZE): Firestone WR12 P195/75R14

RECOMMENDED COLD TIRE PRESSURE: FRONT: 30 psi; REAR: 30 psi

SIDEWALL PLY RATING: 1 ply

BIAS PLY, BELTED OR RADIAL? Radial

IS SPARE TIRE "SPACE SAVER"? NA

IS SPARE TIRE STANDARD EQUIPMENT? NA

VEHICLE ATTITUDES:

DELIVERED:	LF: 29.2;	RF: 28.6;	LR: 29.0;	RR: 29.1
PRE-TEST:	LF: 27.6;	RF: 27.1;	LR: 27.9;	RR: 29.8
POST-TEST:	LF: 27.5;	RF: 27.1;	LR: 30.5;	RR: 30.6

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

TEST ANOMALIES

Noise in the form of spikes was observed in the plots for the contact switches OTH1, OTH2, OTH3, OTH4, OTH5. * The switches were used to record the time of vehicle contact with the wall, as well as the time of vehicle separation from the barrier wall. The switches were damaged by the crush of the vehicle's bumper against the rigid barrier. The switches were replaced following each test which contained spikes. This is not the standard use of such switches.

*CONTACT SWITCH MNEMONICS:

OTH1 Vehicle contact switch - Left
OTH2 Vehicle contact switch - Center
OTH3 Vehicle contact switch - Right
OTH4 Barrier contact switch - Left
OTH5 Barrier contact switch - Right

SECTION 3.0

TEST #890119-1 SUMMARY

TEST CONDITIONS:

TEST NUMBER: 890119-1

DATE OF TEST: 1/19/89

TIME OF TEST: 945

AMBIENT TEMPERATURE AT IMPACT AREA: 70° F

SUBJECT VEHICLE DATA:

	<u>ACTUAL</u>	<u>INTENDED</u>
TEST WEIGHT (lbs.)	3563	3582
VEHICLE ORIENTATION (deg.)	180	180
VEHICLE VELOCITY (mph.)	10.5	10.0
MAXIMUM CRUSH (in.)	3.5	
AVERAGE CRUSH = $\frac{\{C1+C6+C2+C3+C4+C5\}}{5}$ (in.)	2.8	

TEST NUMBER 890119-1

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

No	LOCATION	X*	Y*	Z*	POSITIVE		NEGATIVE	
					DIRECTION		DIRECTION	
					MAX G MSEC		MAX G MSEC	
1	VEHICLE FRAME	171.7	17.4	21.5				
	SIDE RAIL - LEFT							
	LONGITUDINAL				1.4	180.0	9.8	41.0
2	VEHICLE FRAME	171.7	-17.4	21.5				
	SIDE RAIL - RIGHT							
	LONGITUDINAL				1.3	1.1	9.5	40.5

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES

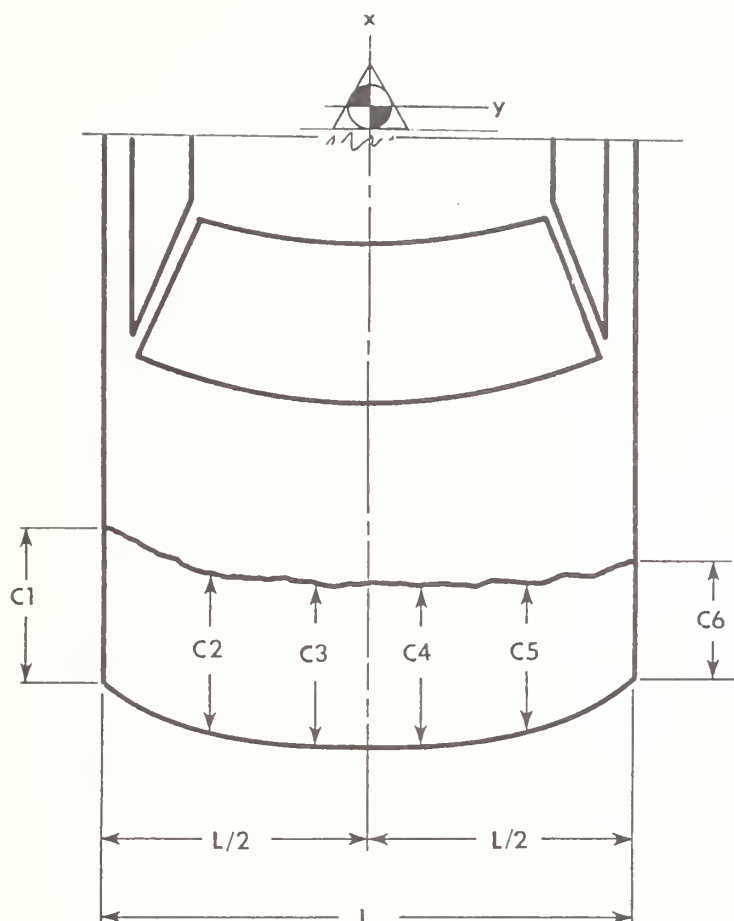
REFERENCE: X: FORWARD FROM REAR BUMPER
 Y: LEFTWARD FROM VEHICLE CENTERLINE
 Z: UPWARD FROM GROUND LEVEL

TEST #890119-1

CONTACT SWITCH LOCATIONS AND DATA SUMMARY

LOCATION	SEPARATION TIME (MSEC)
VEHICLE CONTACT SWITCH - LEFT	108.1
VEHICLE CONTACT SWITCH - CENTER	141.8 Y
VEHICLE CONTACT SWITCH - RIGHT	105.0 Y
BARRIER CONTACT SWITCH - LEFT	140.0 Y
BARRIER CONTACT SWITCH - RIGHT	122.9 Y

Y See TEST ANOMALIES



NOTE: L is pre-test length of contact surface.
 C1 through C6 are spaced equally apart.
 CL is taken at centerline of vehicle.
 All measurements are in inches.

Vehicle 1983 Ford Thunderbird - Test #890119-1

	PRE-TEST	POST-TEST	CRUSH
L	<u>57.6</u>		
C1	<u>195.4</u>	C1 <u>193.1</u>	C1 <u>2.3</u>
C2	<u>196.4</u>	C2 <u>193.9</u>	C2 <u>2.5</u>
C3	<u>196.9</u>	C3 <u>194.1</u>	C3 <u>2.8</u>
C4	<u>196.9</u>	C4 <u>193.8</u>	C4 <u>3.1</u>
C5	<u>196.6</u>	C5 <u>193.4</u>	C5 <u>3.2</u>
C6	<u>195.6</u>	C6 <u>192.1</u>	C6 <u>3.5</u>
CL	<u>197.0</u>	CL <u>194.0</u>	CL <u>3.0</u>

TEST #890119-1

CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Right mid tight	Photosonic 1B	25	498	Impact overall
2	Right side tight	Photosonic 1B	50	501	Impact closeup

SECTION 4.0

TEST #890119-2 SUMMARY

TEST CONDITIONS:

TEST NUMBER: 890119-2

DATE OF TEST: 1/19/89

TIME OF TEST: 1020

AMBIENT TEMPERATURE AT IMPACT AREA: 70° F

SUBJECT VEHICLE DATA:

	<u>ACTUAL</u>	<u>INTENDED</u>
TEST WEIGHT (lbs.)	3563	3582
VEHICLE ORIENTATION (deg.)	180	180
VEHICLE VELOCITY (mph.)	18.8	18.6
MAXIMUM CUMULATIVE CRUSH (in.)	16.7	
AVERAGE CUMULATIVE CRUSH $\frac{\{C1+C6+C2+C3+C4+C5\}}{5}$ (in.)	16.4	

VEHICLE ATTITUDES:

POST-TEST: LF: 26.5; RF: 26.2; LR: 32.8; RR: 33.1

TEST NUMBER 890119-2

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX	G MSEC	MAX	G MSEC
1	VEHICLE FRAME	171.7	17.4	21.5				
	SIDE RAIL - LEFT							
	LONGITUDINAL				0.8	318.9	10.3	12.1
2	VEHICLE FRAME	171.7	-17.4	21.5				
	SIDE RAIL - RIGHT							
	LONGITUDINAL				1.2	328.9	9.1	41.9

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

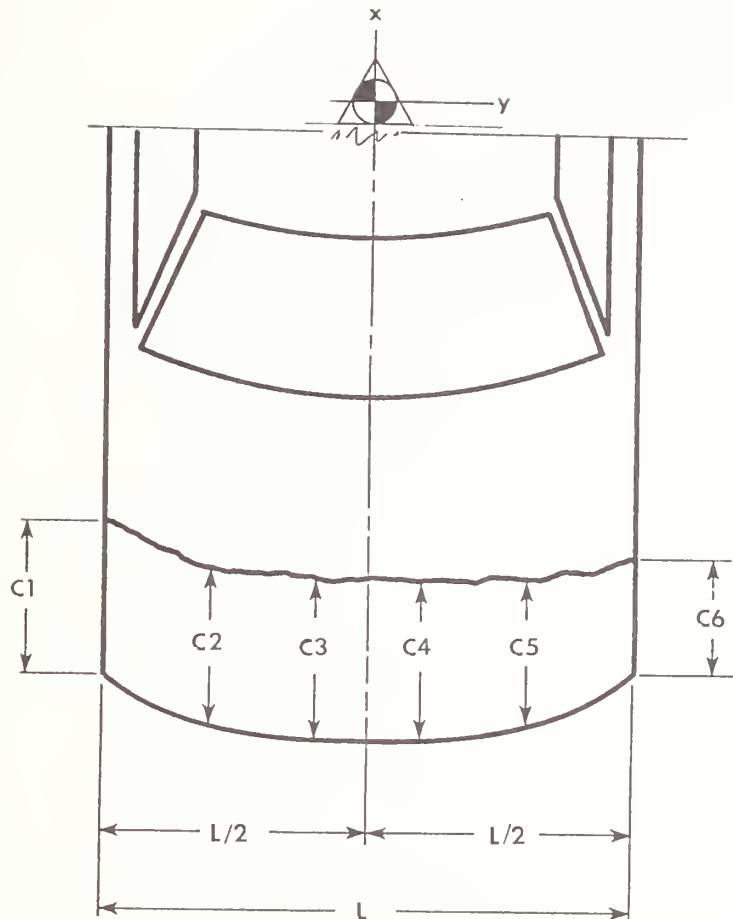
REFERENCE: X: FORWARD FROM REAR BUMPER
Y: LEFTWARD FROM VEHICLE CENTERLINE
Z: UPWARD FROM GROUND LEVEL

TEST #890119-2

CONTACT SWITCH LOCATIONS AND DATA SUMMARY

LOCATION	SEPARATION TIME (MSEC)
VEHICLE CONTACT SWITCH - LEFT	338.8
VEHICLE CONTACT SWITCH - CENTER	137.5
VEHICLE CONTACT SWITCH - RIGHT	137.4
BARRIER CONTACT SWITCH - LEFT	--- γ
BARRIER CONTACT SWITCH - RIGHT	337.5

γ See TEST ANOMALIES



NOTE: L is pre-test length of contact surface.
 C1 through C6 are spaced equally apart.
 CL is taken at centerline of vehicle.
 All measurements are in inches.

Vehicle 1983 Ford Thunderbird - Test #890119-2

PRE-TEST*		POST-TEST	CUMULATIVE CRUSH
L	<u>57.6</u>		
C1	<u>195.4</u>	C1 <u>179.5</u>	C1 <u>15.9</u>
C2	<u>196.4</u>	C2 <u>180.2</u>	C2 <u>16.2</u>
C3	<u>196.9</u>	C3 <u>180.5</u>	C3 <u>16.4</u>
C4	<u>196.9</u>	C4 <u>180.2</u>	C4 <u>16.7</u>
C5	<u>196.6</u>	C5 <u>180.1</u>	C5 <u>16.5</u>
C6	<u>195.6</u>	C6 <u>178.9</u>	C6 <u>16.7</u>
CL	<u>197.0</u>	CL <u>180.4</u>	CL <u>16.6</u>

*Pre-test measurements taken from test #890119-1.

TEST #890119-2

CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Right mid tight	Photosonic 1B	25	493	Impact overall
2	Right side tight	Photosonic 1B	50	500	Impact closeup

SECTION 5.0

TEST #890119-3 SUMMARY

The vehicle's rear bumper was removed following test number 890119-2, since the rear bumper was contacting the ground preventing further motion of the vehicle. Measurements of the vehicle were taken before and after the bumper was removed to determine the differences in the vehicle's lengths caused by removing the bumper. These differences were subtracted from the apparent cumulative crush values computed following test number 890119-3 to calculate a "corrected cumulative crush". These values are shown below:

	Post-Test 890119-2 with rear bumper	-	Post-Test 890119-2 without rear bumper	=	Difference
C1	179.5		178.2		1.3
C2	180.2		178.2		2.0
C3	180.5		178.2		2.3
C4	180.2		178.0		2.2
C5	180.1		177.7		2.4
C6	178.9		177.1		1.8
CL	180.4		178.2		2.2

	Apparent cumulative crush 890119-3	-	Difference (from above)	=	Corrected cumulative crush 890119-3
C1	45.2		1.3		43.9
C2	47.3		2.0		45.3
C3	48.2		2.3		45.9
C4	48.4		2.2		46.2
C5	47.1		2.4		44.7
C6	45.4		1.8		43.6
CL	48.1		2.2		45.9

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

TEST CONDITIONS:

TEST NUMBER: 890119-3

DATE OF TEST: 1/19/89

TIME OF TEST: 1330

AMBIENT TEMPERATURE AT IMPACT AREA: 70° F

SUBJECT VEHICLE DATA:

	<u>ACTUAL</u>	<u>INTENDED</u>
TEST WEIGHT (lbs.)	3563	3582
VEHICLE ORIENTATION (deg.)	180	180
VEHICLE VELOCITY (mph.)	34.7	35.0
MAXIMUM CORRECTED CUMULATIVE CRUSH (in.)	45.9	
AVERAGE CORRECTED CUMULATIVE CRUSH $\frac{\{C1+C6+C2+C3+C4+C5\}}{2}$ (in.)	45.2	

VEHICLE ATTITUDES:

POST-TEST: LF: 25.8; RF: 26.1; LR: 32.4; RR: 33.3

TEST NUMBER 890119-3

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX	G MSEC	MAX	G MSEC
1	VEHICLE FRAME	171.7	17.4	21.5				
	SIDE RAIL - LEFT							
	LONGITUDINAL				2.0	215.3	27.5	90.1
2	VEHICLE FRAME	171.7	-17.4	21.5				
	SIDE RAIL - RIGHT							
	LONGITUDINAL				1.8	255.4	24.3	77.5

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

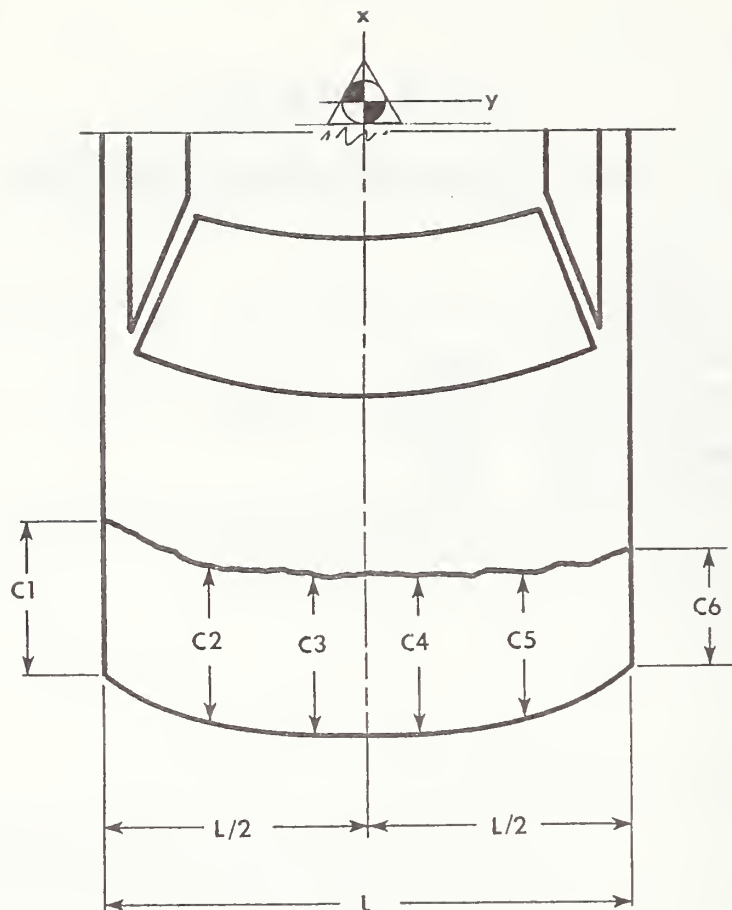
REFERENCE: X: FORWARD FROM REAR BUMPER
Y: LEFTWARD FROM VEHICLE CENTERLINE
Z: UPWARD FROM GROUND LEVEL

TEST #890119-3

CONTACT SWITCH LOCATIONS AND DATA SUMMARY

LOCATION	SEPARATION TIME (MSEC)
VEHICLE CONTACT SWITCH - LEFT	22.5γ
VEHICLE CONTACT SWITCH - CENTER	24.9γ
VEHICLE CONTACT SWITCH - RIGHT	200.0γ
BARRIER CONTACT SWITCH - LEFT	173.6γ
BARRIER CONTACT SWITCH - RIGHT	---γ

γ See TEST ANOMALIES



NOTE: L is pre-test length of contact surface.
 C1 through C6 are spaced equally apart.
 CL is taken at centerline of vehicle.
 All measurements are in inches.

Vehicle 1983 Ford Thunderbird - Test #890119-3

	PRE-TEST*	POST-TEST**	APPARENT CUMULATIVE CRUSH***	CORRECTED CUMULATIVE CRUSH****
L	<u>57.6</u>			
C1	<u>195.4</u>	C1 <u>150.2</u>	C1 <u>45.2</u>	C1 <u>43.9</u>
C2	<u>196.4</u>	C2 <u>149.1</u>	C2 <u>47.3</u>	C2 <u>45.3</u>
C3	<u>196.9</u>	C3 <u>148.7</u>	C3 <u>48.2</u>	C3 <u>45.9</u>
C4	<u>196.9</u>	C4 <u>148.5</u>	C4 <u>48.4</u>	C4 <u>46.2</u>
C5	<u>196.6</u>	C5 <u>149.5</u>	C5 <u>47.1</u>	C5 <u>44.7</u>
C6	<u>195.6</u>	C6 <u>150.2</u>	C6 <u>45.4</u>	C6 <u>43.6</u>
CL	<u>197.0</u>	CL <u>148.9</u>	CL <u>48.1</u>	CL <u>45.9</u>

*Pre-test measurements were taken from test #890119-1 (including vehicle's rear bumper).

**Post-test measurements does not include the vehicle's rear bumper since it was removed following test #890119-2.

***Apparent cumulative crush = (Pre-test) - (Post-test)

****Corrected cumulative crush = (Pre-test) - (Post-test) - (Difference from Page No. 5-2)

TEST #890119-3

CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Right mid tight	Photosonic 1B	25	498	Impact overall
2	Right side tight	Photosonic 1B	50	500	Impact closeup

APPENDIX A
PHOTOGRAPHS

TEST #890119-1
LIST OF PHOTOGRAPHS

1. PRE-TEST OVERALL LEFT SIDE VIEW
2. POST-TEST OVERALL LEFT SIDE VIEW
3. PRE-TEST OVERALL RIGHT SIDE VIEW
4. POST-TEST OVERALL RIGHT SIDE VIEW
5. PRE-TEST OVERALL REAR VIEW
6. POST-TEST OVERALL REAR VIEW
7. PRE-TEST LEFT REAR VIEW
8. PRE-TEST RIGHT REAR VIEW
9. PRE-TEST BARRIER CONTACT SWITCH
10. POST-TEST ONBOARD CLOSE-UP - VIEW 1
11. POST-TEST ONBOARD CLOSE-UP - VIEW 2



Figure A-1. PRE-TEST OVERALL LEFT SIDE VIEW



Figure A-2. POST-TEST OVERALL LEFT SIDE VIEW



Figure A-3. PRE-TEST OVERALL RIGHT SIDE VIEW



Figure A-4. POST-TEST OVERALL RIGHT SIDE VIEW



Figure A-5. PRE-TEST OVERALL REAR VIEW



Figure A-6. POST-TEST OVERALL REAR VIEW



Figure A-7. PRE-TEST LEFT REAR VIEW



Figure A-8. PRE-TEST RIGHT REAR VIEW



Figure A-9. PRE-TEST BARRIER CONTACT SWITCH



Figure A-10. POST-TEST ONBOARD CLOSE-UP - VIEW 1

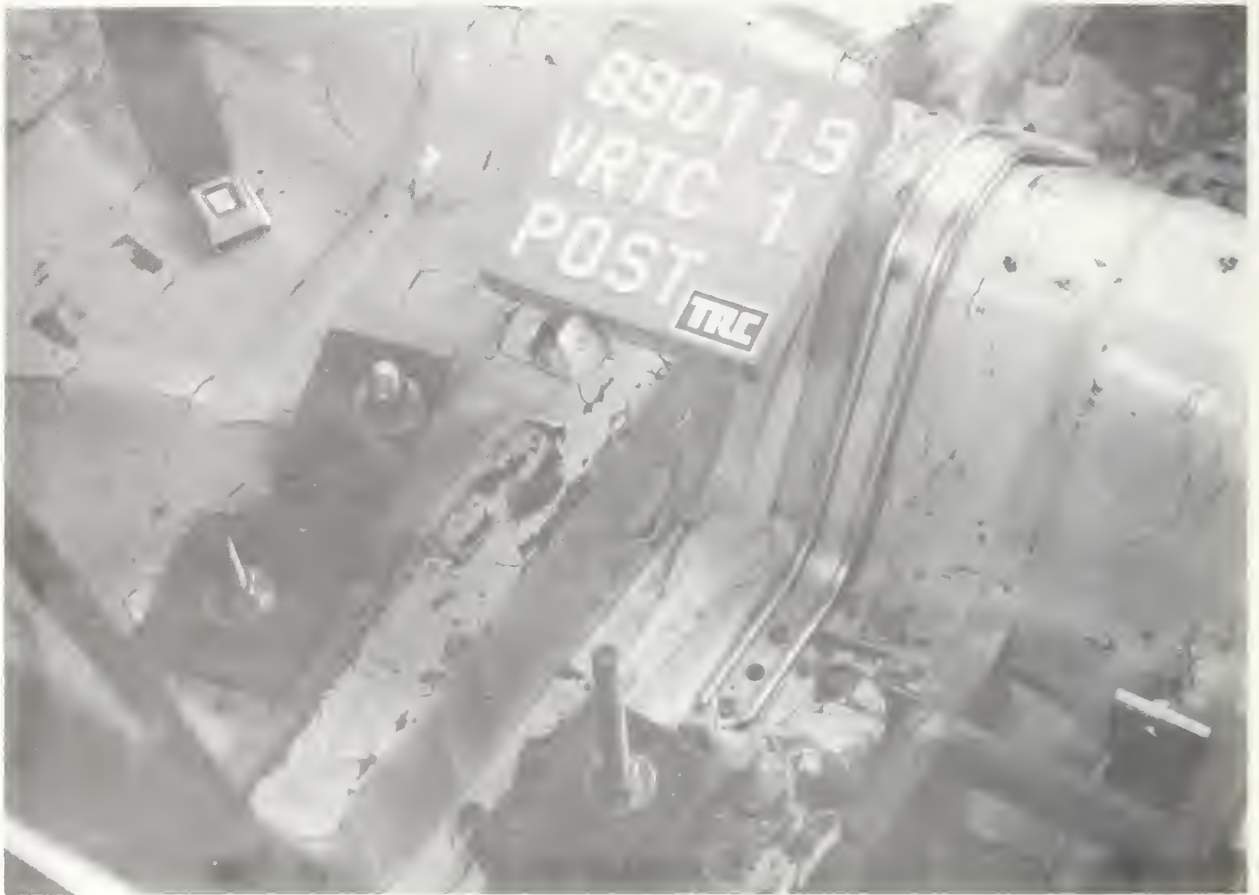


Figure A-11. POST-TEST ONBOARD CLOSE-UP - VIEW 2

TEST #890119-2
LIST OF PHOTOGRAPHS

12. POST-TEST OVERALL LEFT SIDE VIEW
13. POST-TEST OVERALL RIGHT SIDE VIEW
14. POST-TEST OVERALL REAR VIEW
15. POST-TEST ONBOARD CLOSE-UP - VIEW 1
16. POST-TEST ONBOARD CLOSE-UP - VIEW 2
17. POST-TEST ONBOARD CLOSE-UP - VIEW 3
18. POST-TEST UNDERBODY CLOSE-UP - VIEW 1
19. POST-TEST UNDERBODY CLOSE-UP - VIEW 2
20. POST-TEST UNDERBODY CLOSE-UP - VIEW 3



Figure A-12. POST-TEST OVERALL LEFT SIDE VIEW



Figure A-13. POST-TEST OVERALL RIGHT SIDE VIEW

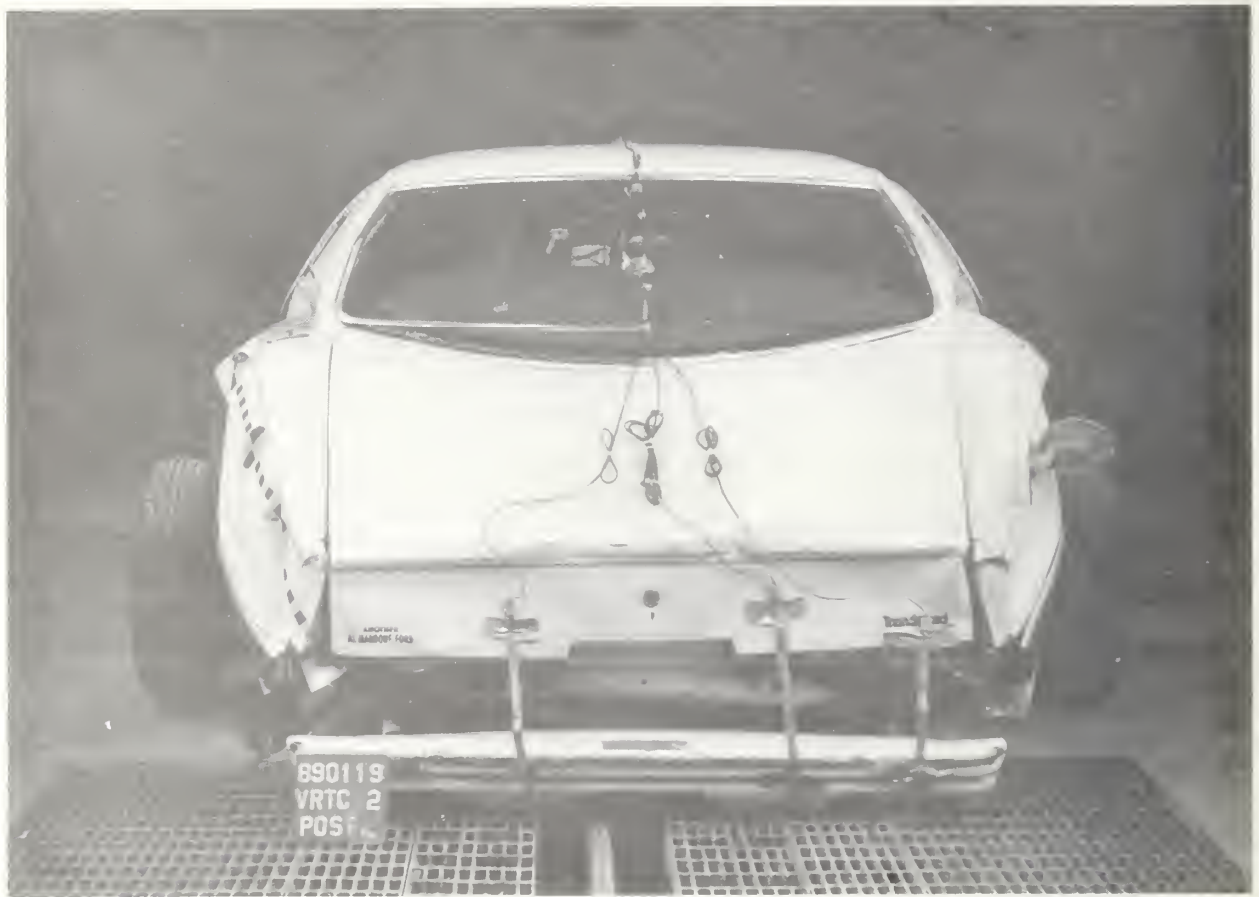


Figure A-14. POST-TEST OVERALL REAR VIEW



Figure A-15. POST-TEST ONBOARD CLOSE-UP - VIEW 1



Figure A-16. POST-TEST ONBOARD CLOSE-UP - VIEW 2



Figure A-17. POST-TEST ONBOARD CLOSE-UP - VIEW 3



Figure A-18. POST-TEST UNDERBODY CLOSE-UP - VIEW 1



Figure A-19. POST-TEST UNDERBODY CLOSE-UP - VIEW 2



Figure A-20. POST-TEST UNDERBODY CLOSE-UP - VIEW 3

TEST #890119-3

LIST OF PHOTOGRAPHS

- 21. POST-TEST OVERALL LEFT SIDE VIEW
- 22. POST-TEST OVERALL REAR VIEW
- 23. POST-TEST OVERALL RIGHT SIDE VIEW
- 24. POST-TEST ONBOARD CLOSE-UP - VIEW 1
- 25. POST-TEST ONBOARD CLOSE-UP - VIEW 2
- 26. POST-TEST UNDERBODY CLOSE-UP - VIEW 1
- 27. POST-TEST UNDERBODY CLOSE-UP - VIEW 2
- 28. POST-TEST UNDERBODY CLOSE-UP - VIEW 3
- 29. POST-TEST UNDERBODY CLOSE-UP - VIEW 4



Figure A-21. POST-TEST OVERALL LEFT SIDE VIEW

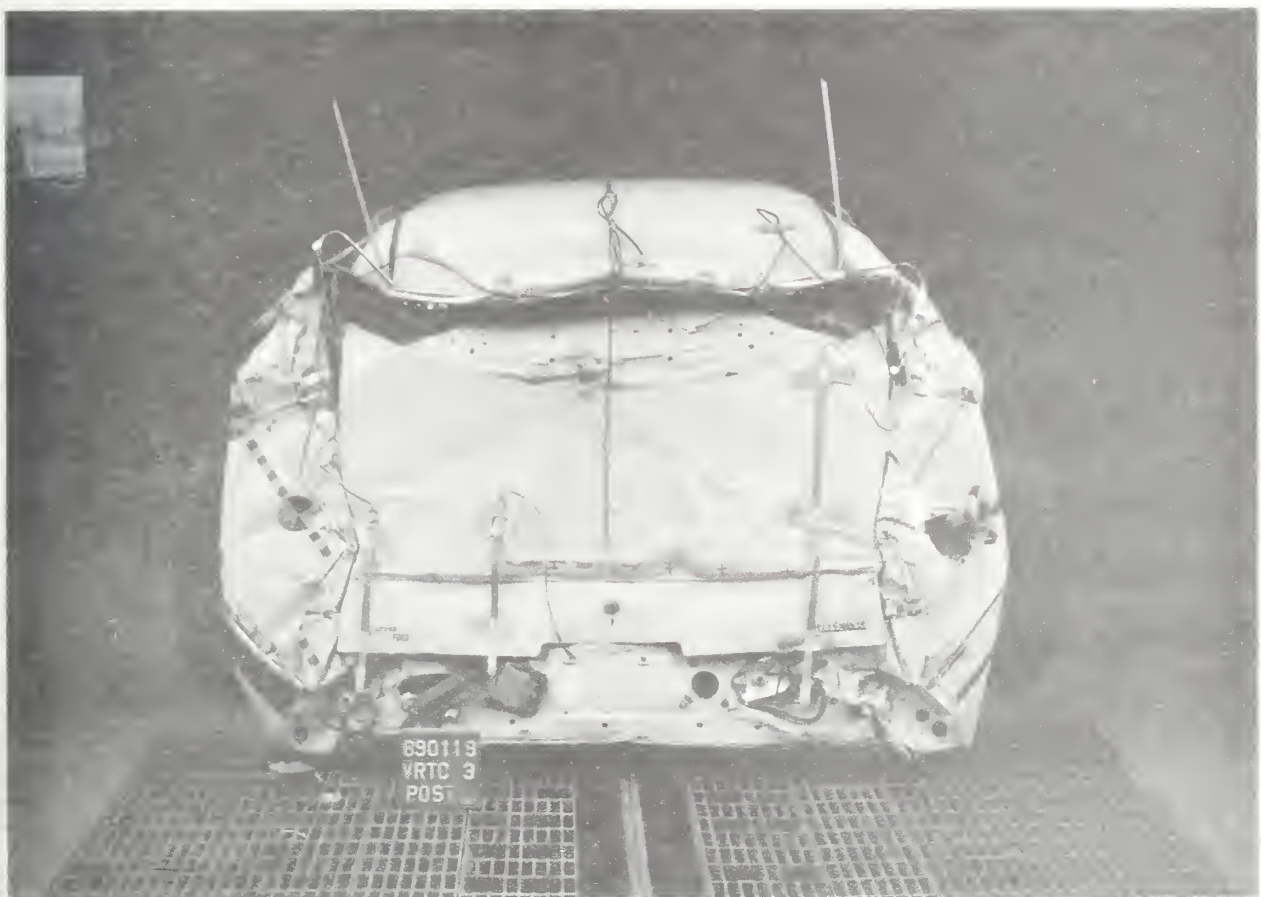


Figure A-22. POST-TEST OVERALL REAR VIEW



Figure A-23. POST-TEST OVERALL RIGHT SIDE VIEW



Figure A-24. POST-TEST ONBOARD CLOSE-UP - VIEW 1



Figure A-25. POST-TEST ONBOARD CLOSE-UP - VIEW 2



Figure A-26. POST-TEST UNDERBODY CLOSE-UP - VIEW 1



Figure A-27. POST-TEST UNDERBODY CLOSE-UP - VIEW 2



Figure A-28. POST-TEST UNDERBODY CLOSE-UP - VIEW 3



Figure A-29. POST-TEST UNDERBODY CLOSE-UP - VIEW 4

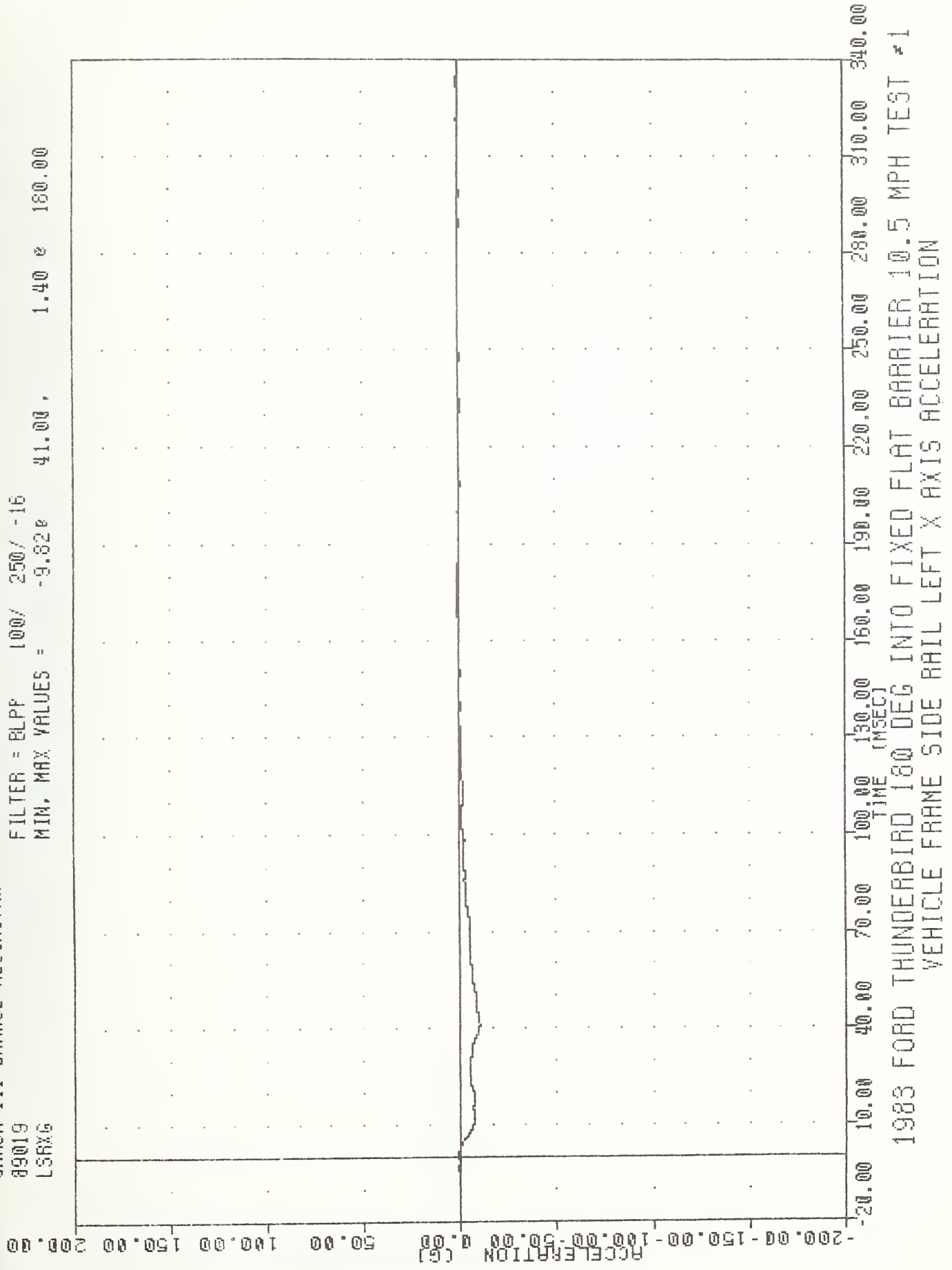


APPENDIX B
DATA PLOTS



VRTC-1 , 890119-1
 CRASH III DAMAGE ALGORITHM
 89019
 LSRXG

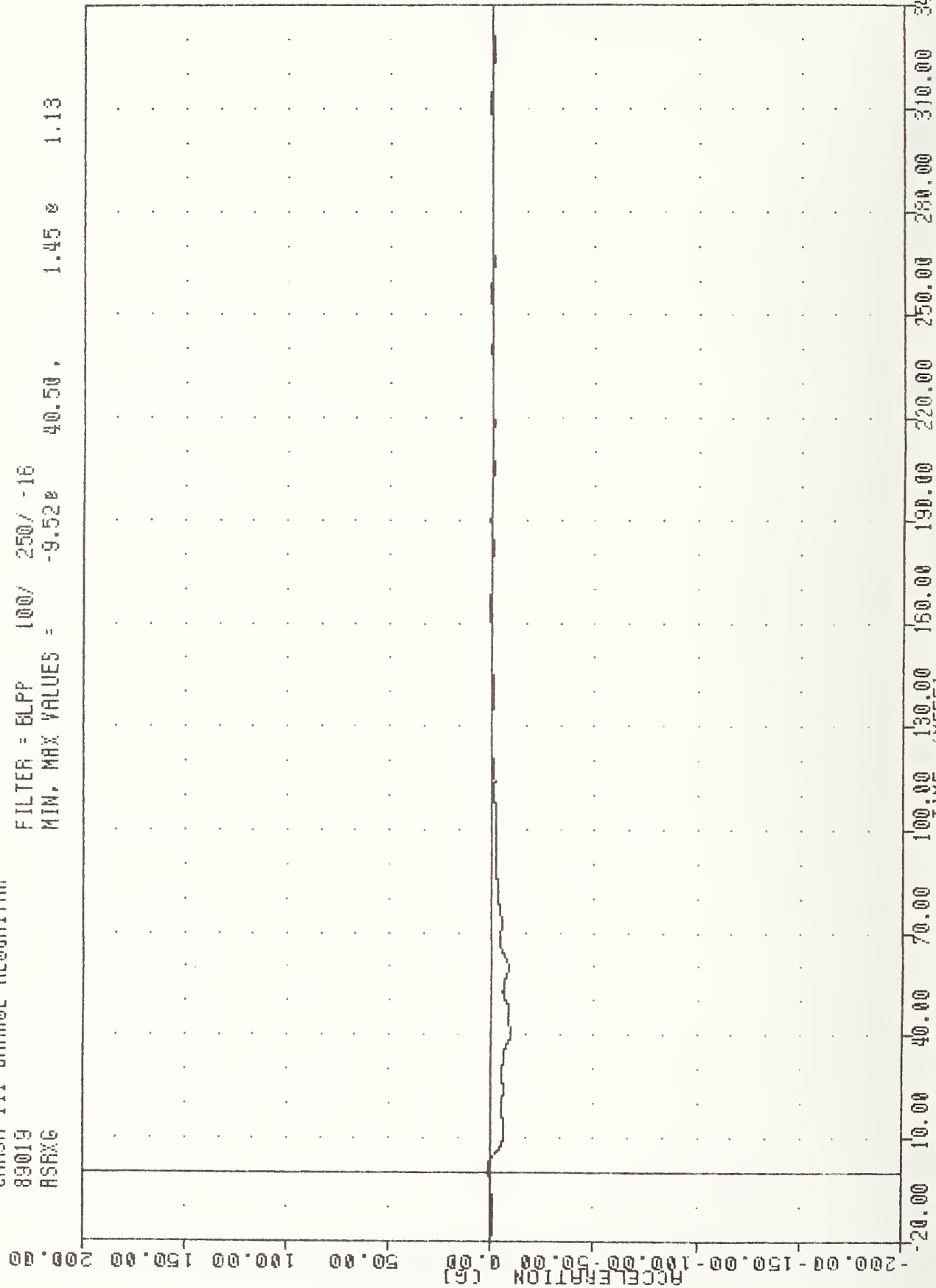
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 MIN. MAX VALUES = -9.82e 41.00 , 1.40 e 180.00



VRTC-1 , 890119-1
 CRASH III DAMAGE ALGORITHM
 89019
 RSRXG

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -9.52e 40.50 ,

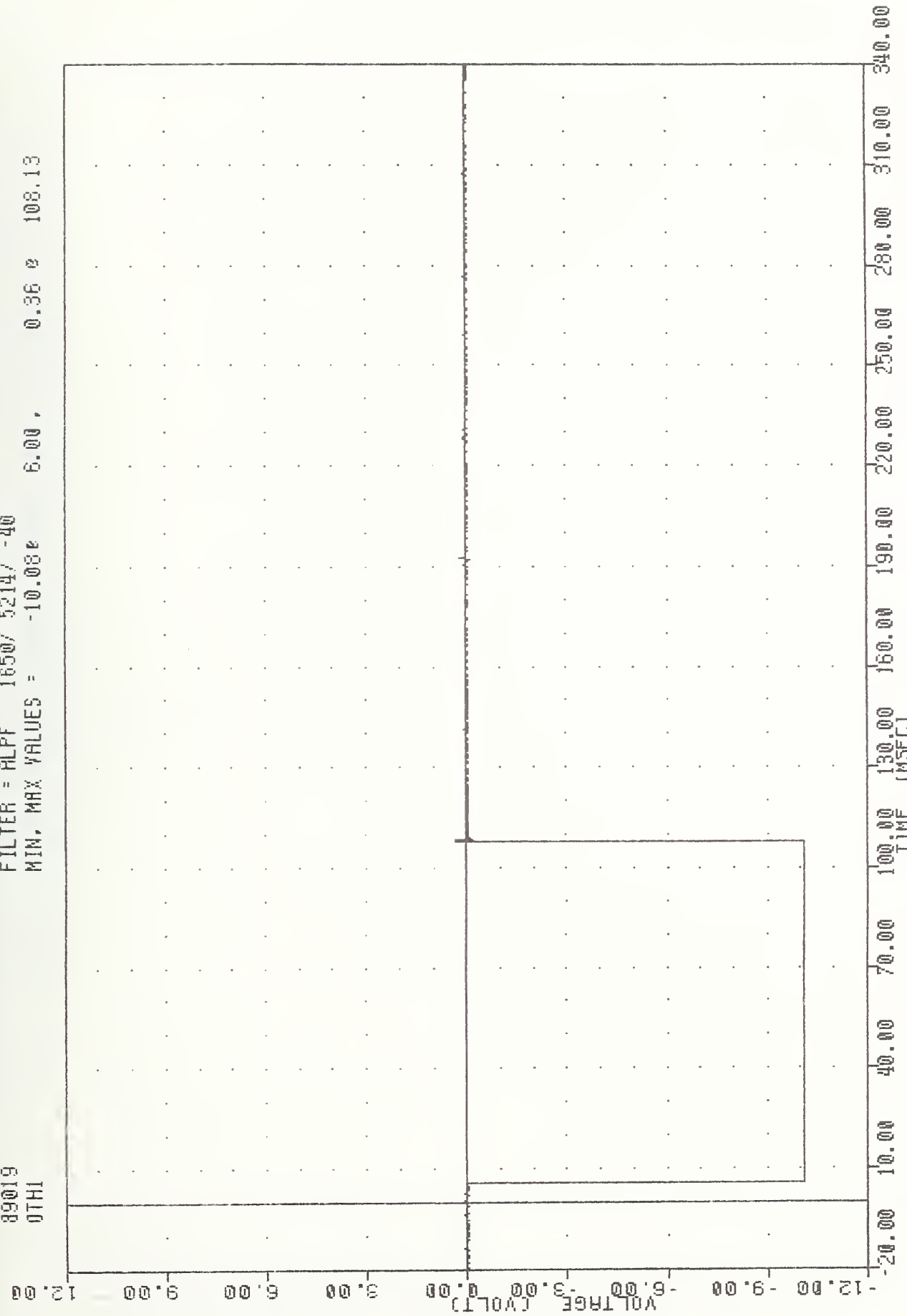
1.45 e 1.13



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 10.5 MPH TEST #1
 VEHICLE FRAME SIDE RAIL RIGHT X AXIS ACCELERATION

VRTC-1 , 890119-1
CRASH III DAMAGE ALGORITHM
89019
0TH1

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -10.08e 6.00, 0.36 e 108.13

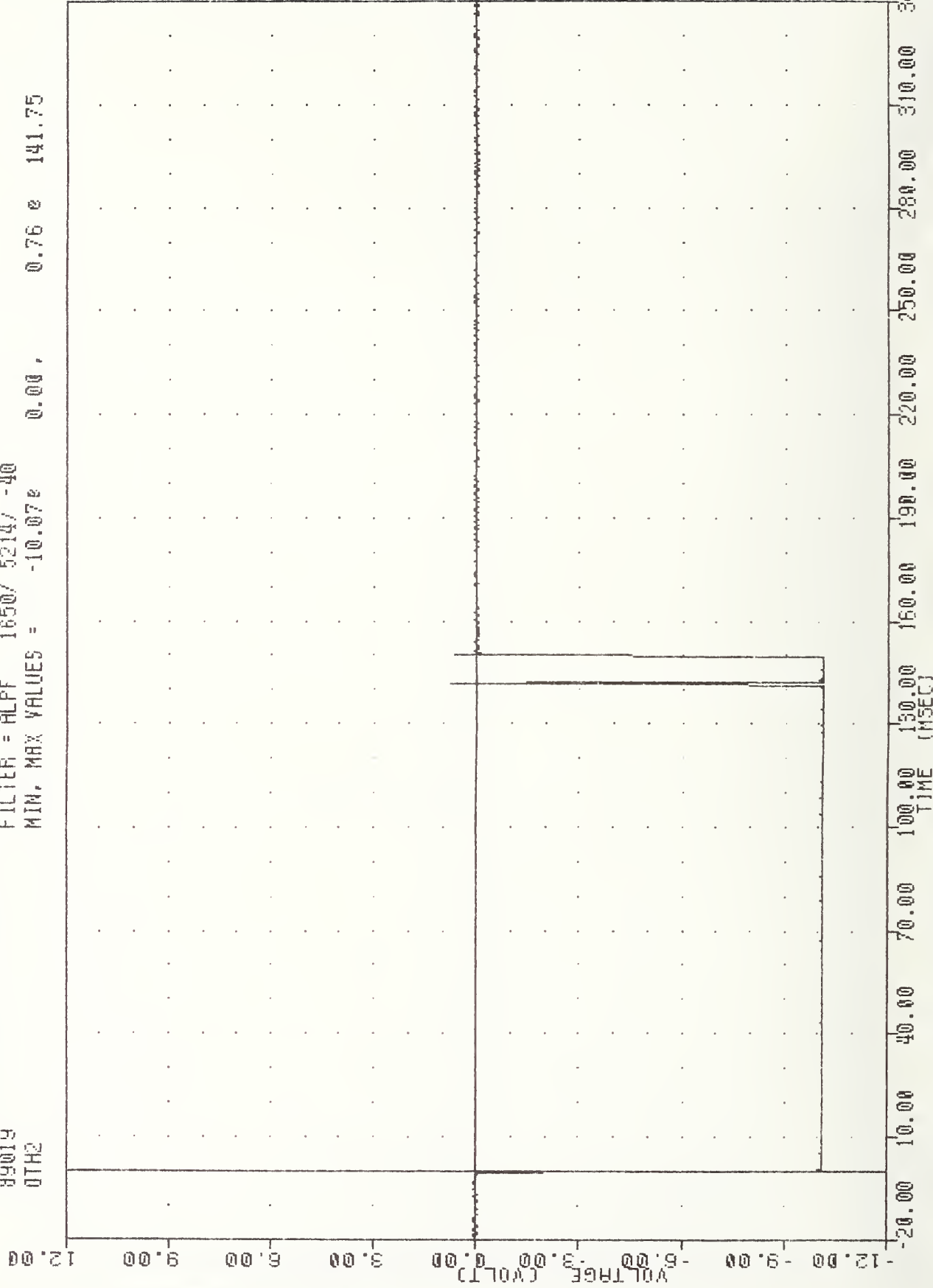


1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 10.5 MPH TEST #1
VEHICLE CONTACT SWITCH - LEFT

VRTC-1
 CRASH III DAMAGE ALGORITHM
 89019
 0TH2

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -10.07e

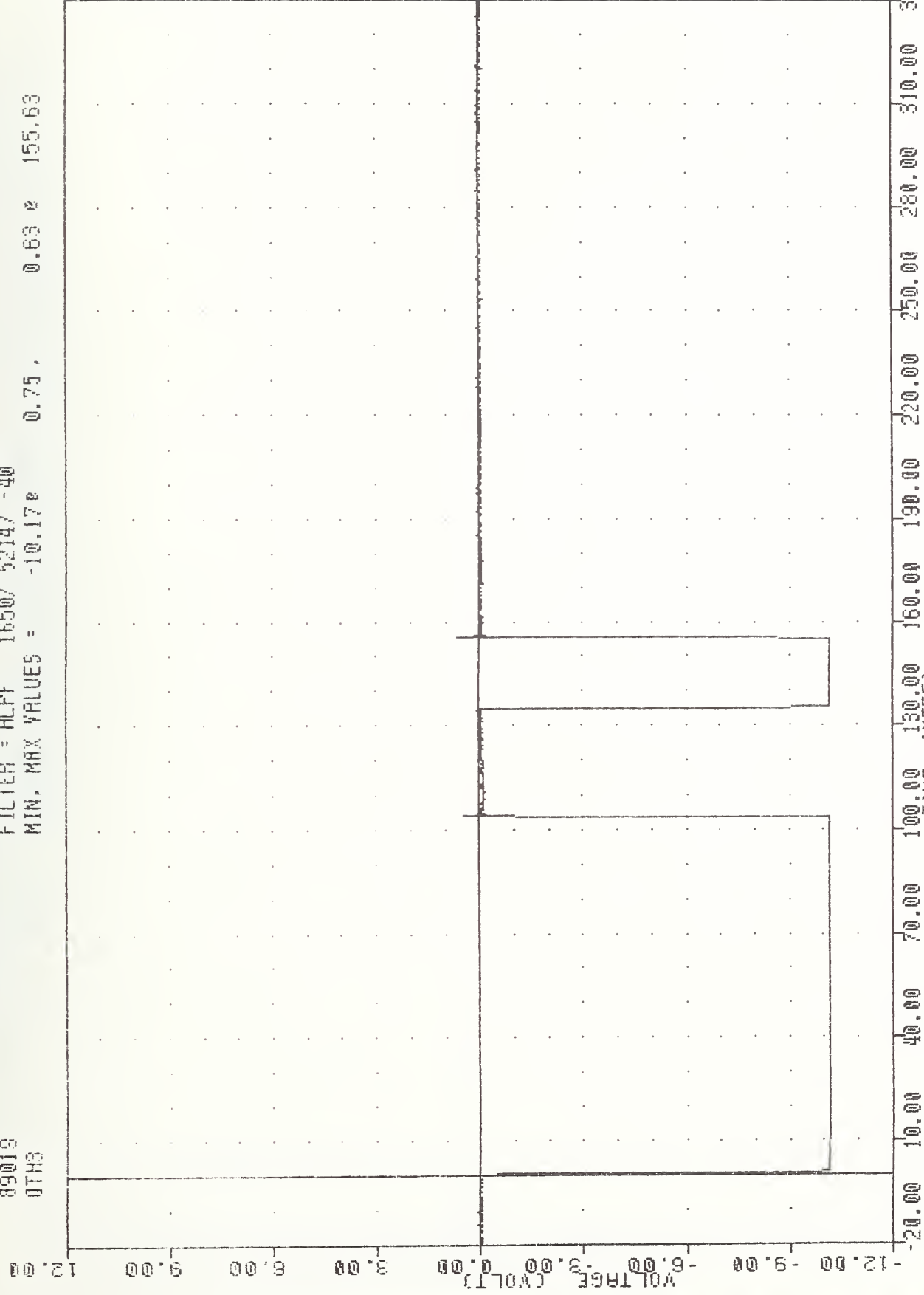
0.00, 0.76 e 141.75



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 10.5 MPH TEST #1
 VEHICLE CONTACT SWITCH - CENTER

WRTC-1 . 890119-1
 CRASH III DAMAGE ALGORITHM
 89019
 0TH3

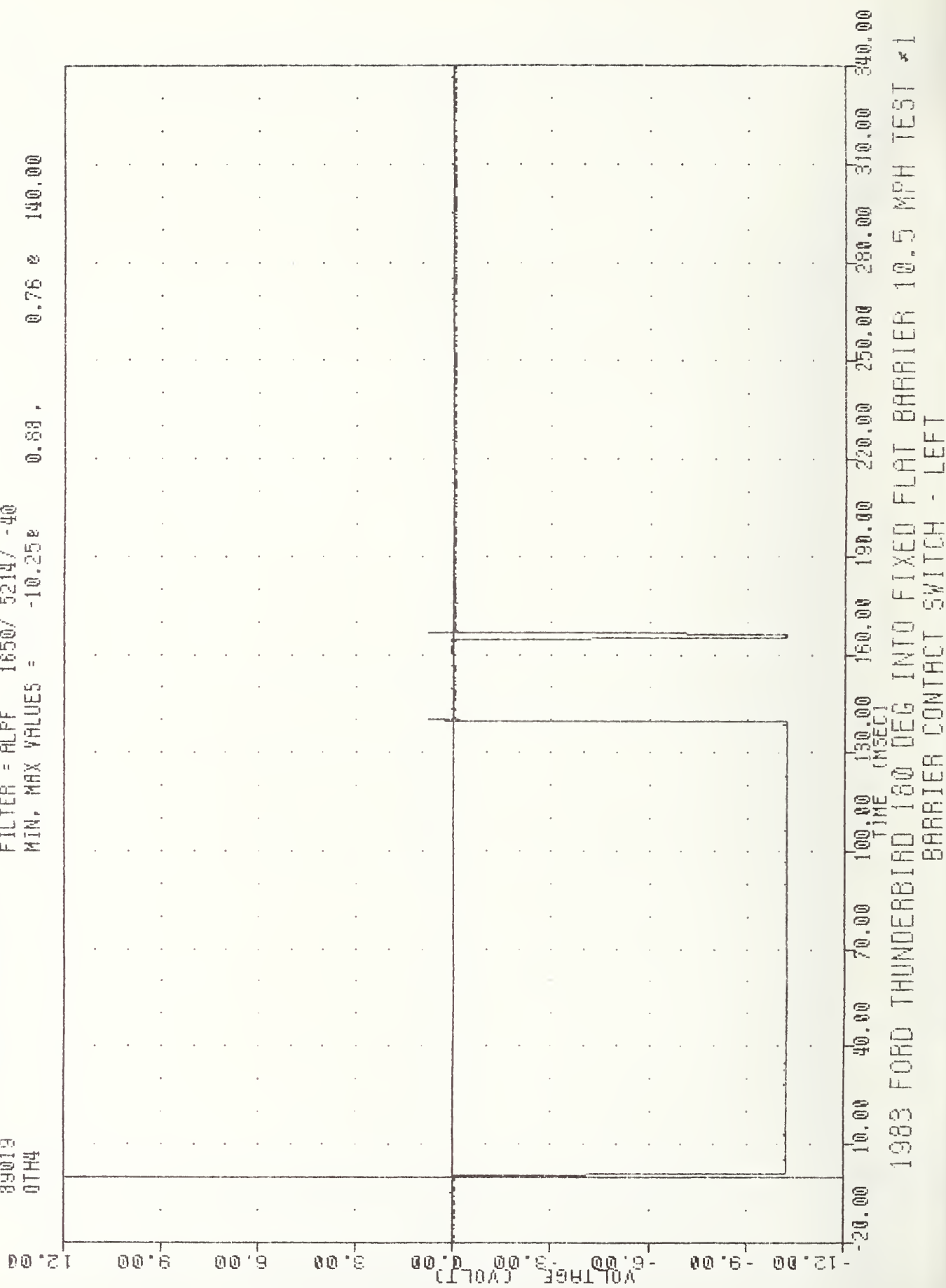
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -10.17e 0.75, 0.63 e 155.63



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 10.5 MPH TEST #1
 VEHICLE CONTACT SWITCH - RIGHT

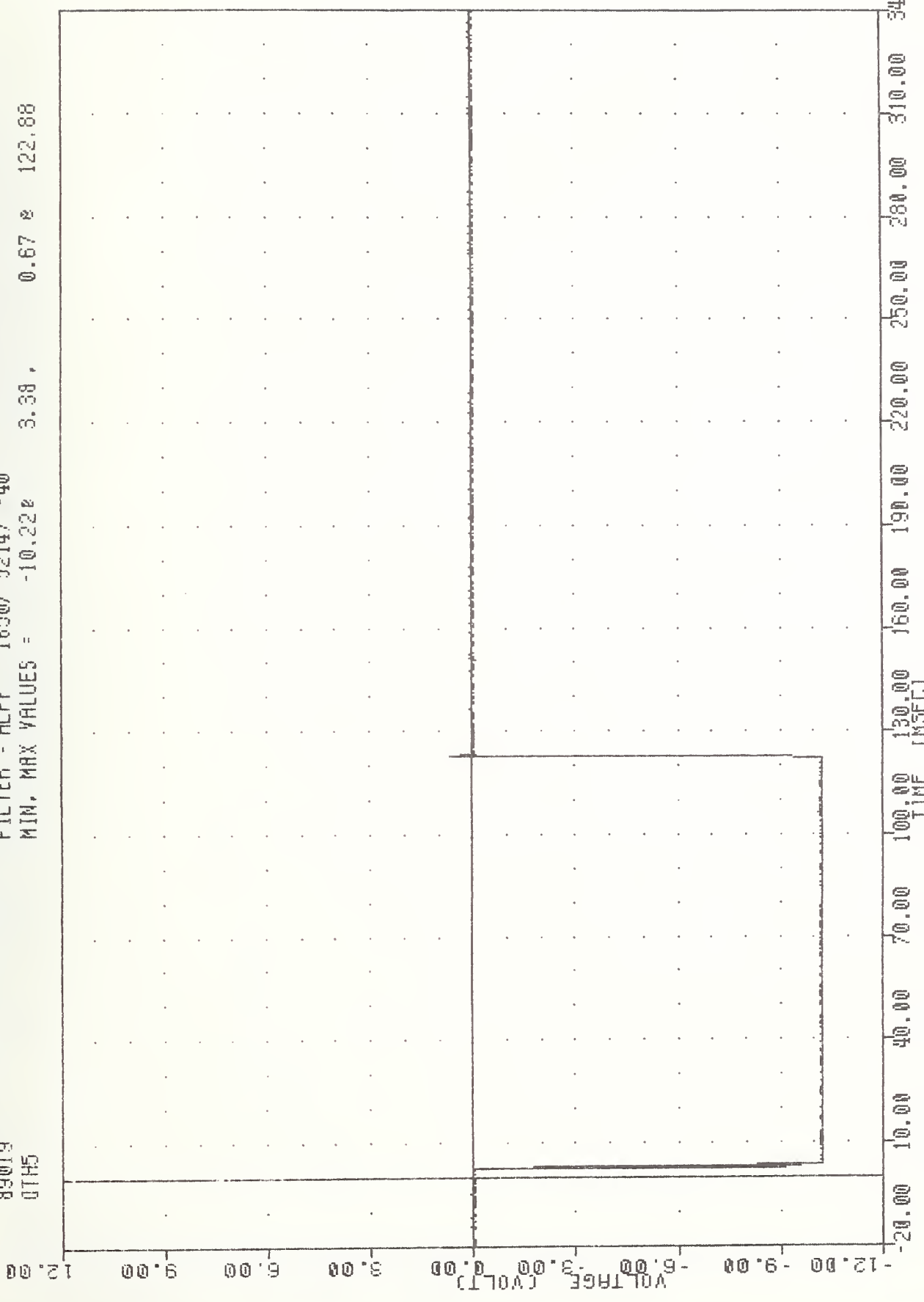
VRIC-1 - 890119-1
 CRASH III DAMAGE ALGORITHM
 89019
 0TH4

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -10.25e 0.88 , 0.75 e 140.00



VRTC-1 , 890119-1
 CRASH III DAMAGE ALGORITHM
 89019
 QTH5

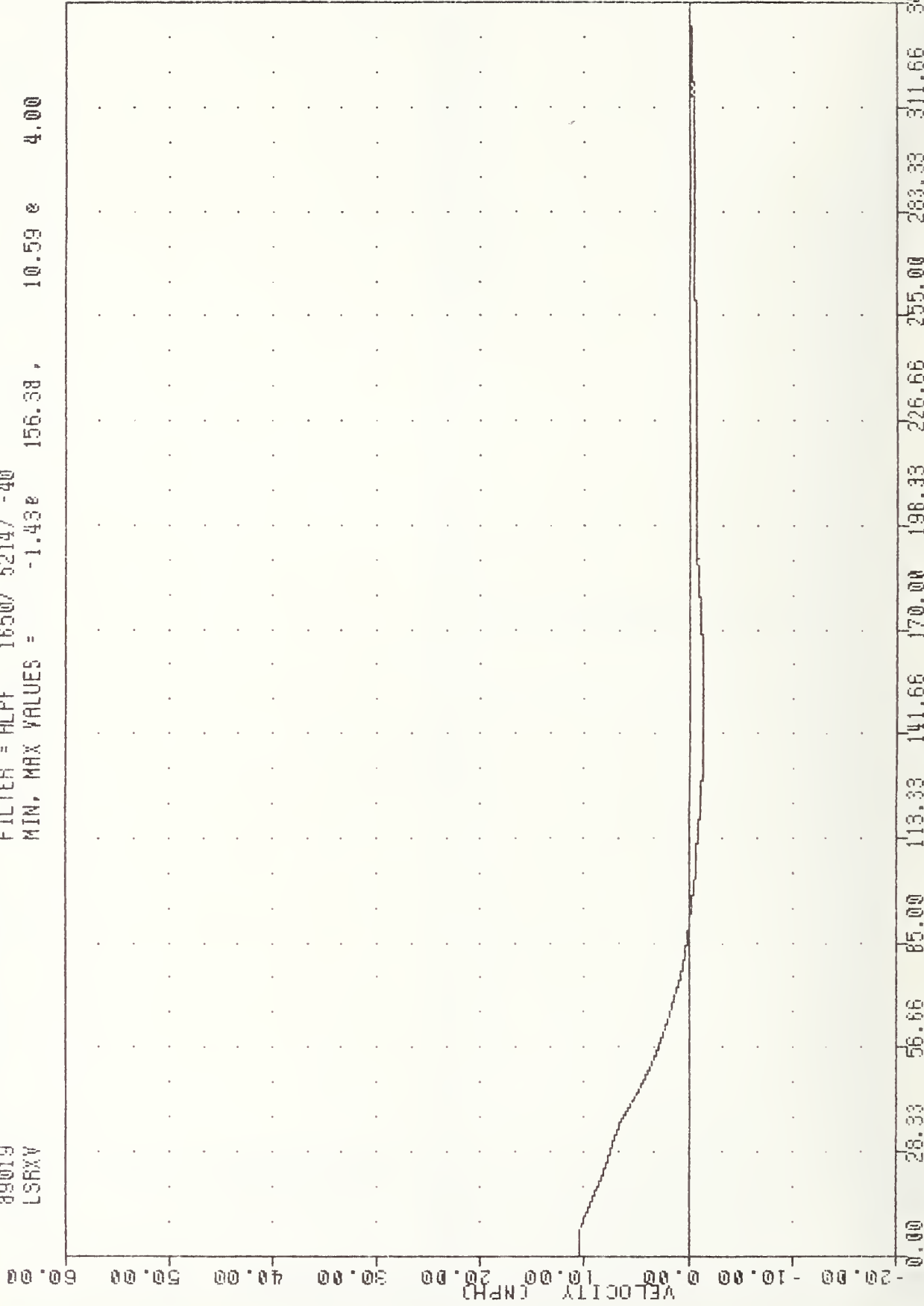
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -10.22e 3.38, 0.67 e 122.88



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 10.5 MPH TEST #1
 BARRIER CONTACT SWITCH - RIGHT

WRTC-1
CRASH III DAMAGE ALGORITHM
89019
LSRXV

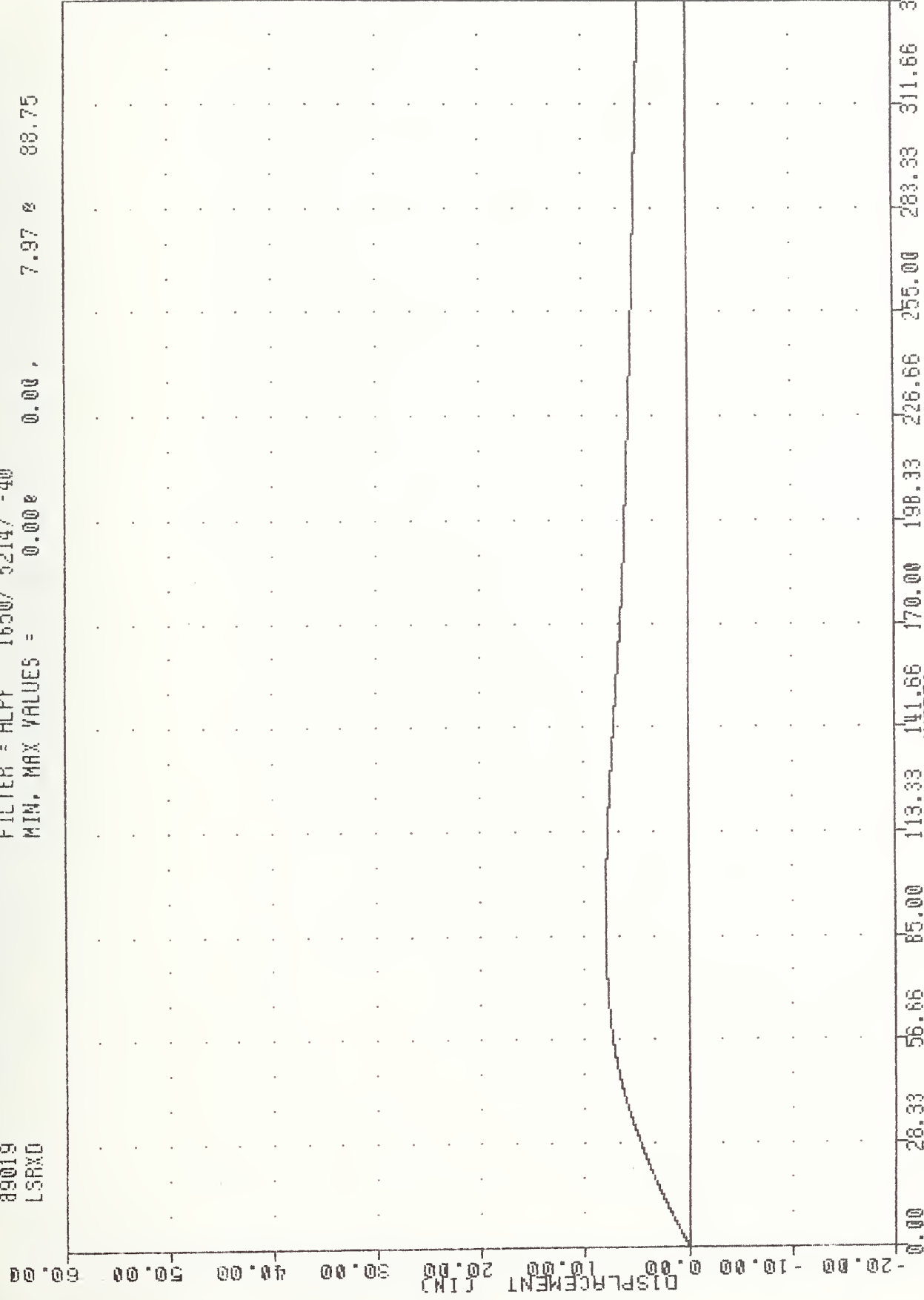
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -1.43e 156.38, 10.59 e 4.00



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 10.5 MPH TEST #1
VEHICLE FRAME SIDE RAIL LEFT X AXIS VELOCITY

VRTC-1 , 890119-1
 CRASH III DAMAGE ALGORITHM
 89019
 LSRXD

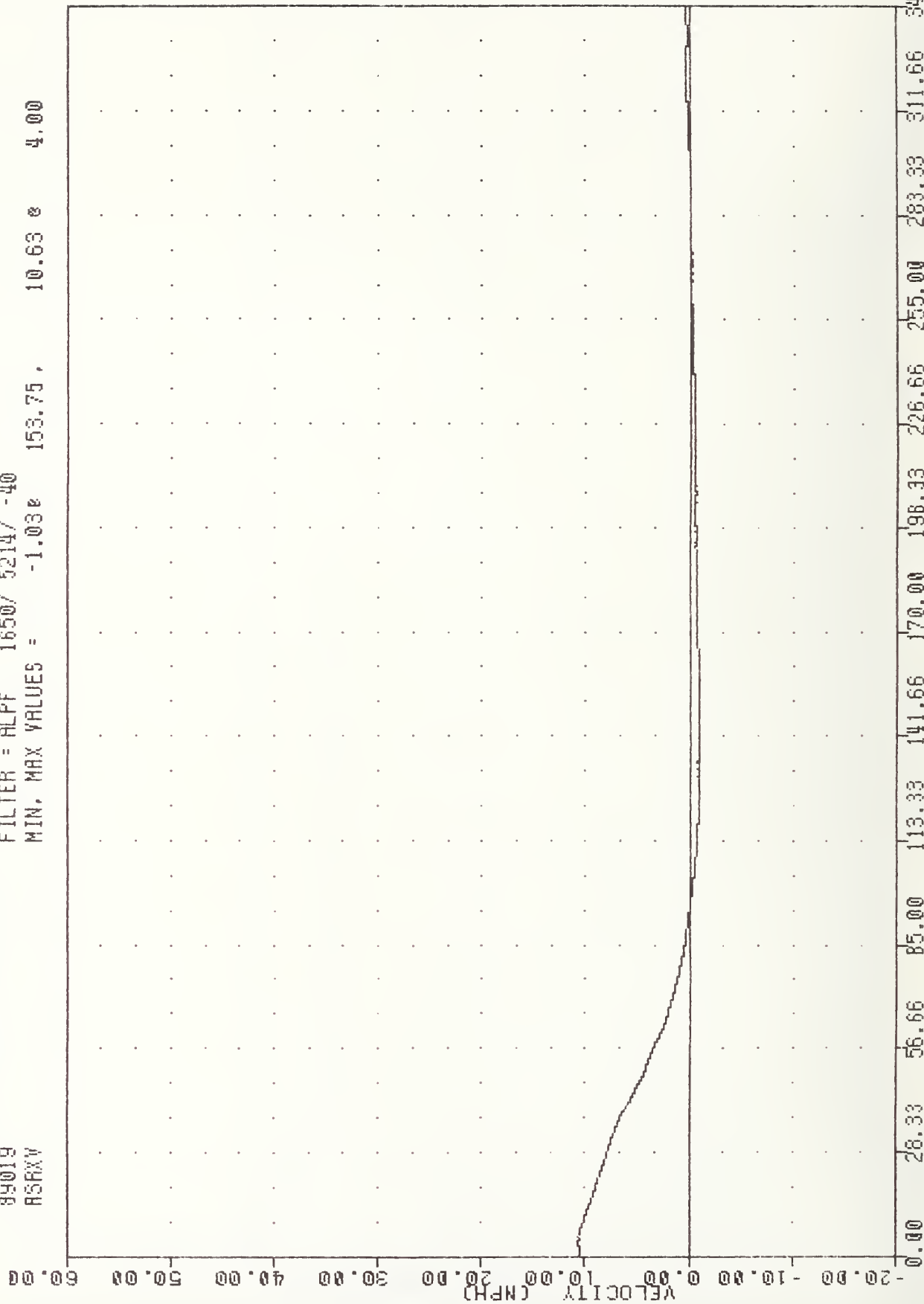
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.00e 0.00 , 7.97 e 88.75



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 10.5 MPH TEST #1
 VEHICLE FRAME SIDE RAIL LEFT X AXIS DISPLACEMENT

WRTC-1 , 890119-1
 CRASH III DAMAGE ALGORITHM
 89019
 RSRXV

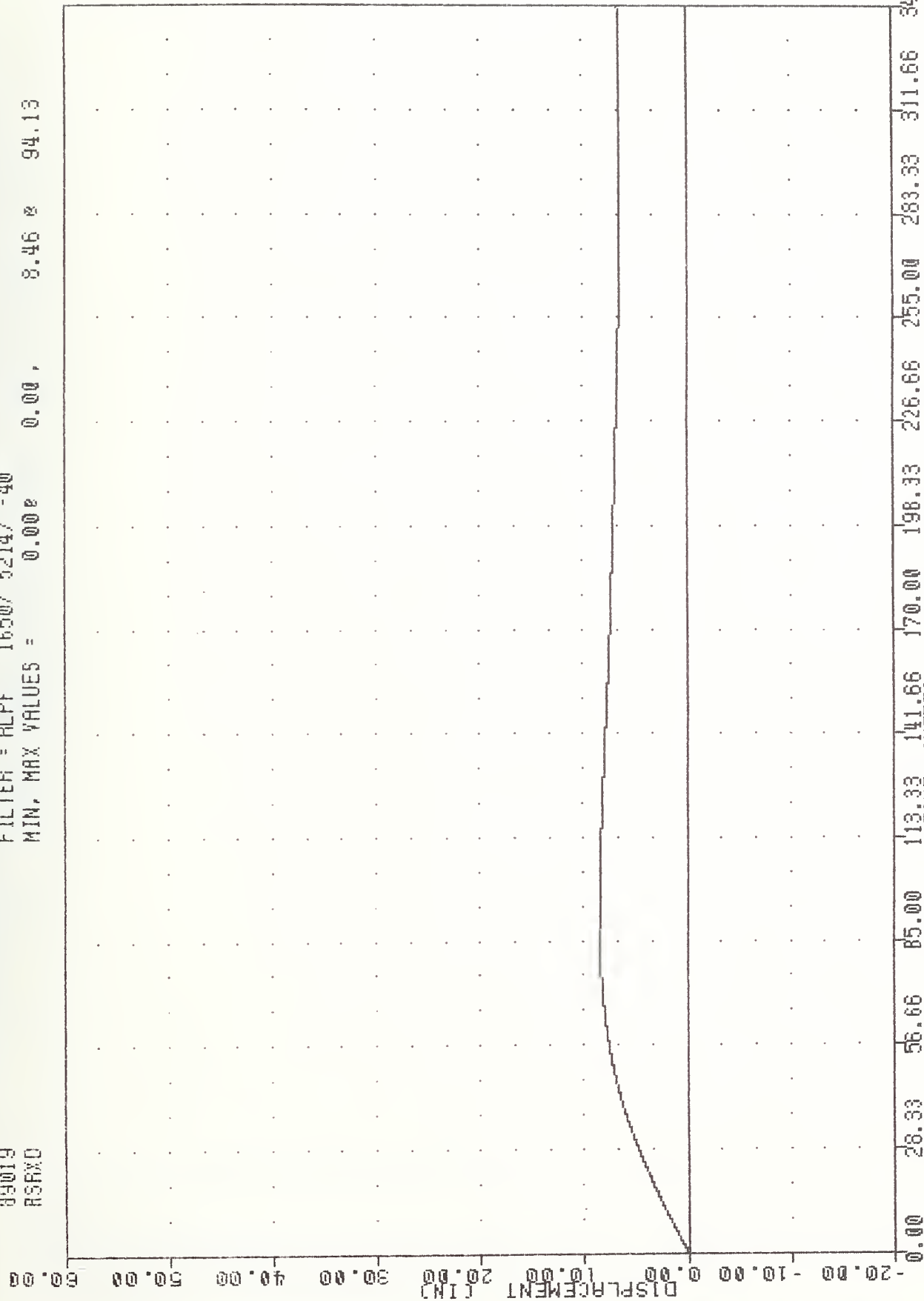
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -1.03e 153.75, 10.63 e 4.00



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 10.5 MPH TEST #1
 VEHICLE FRAME SIDE RAIL RIGHT X AXIS VELOCITY

VRTC-1 , 890119-1
 CARSH III DAMAGE ALGORITHM
 89019
 RSRXD

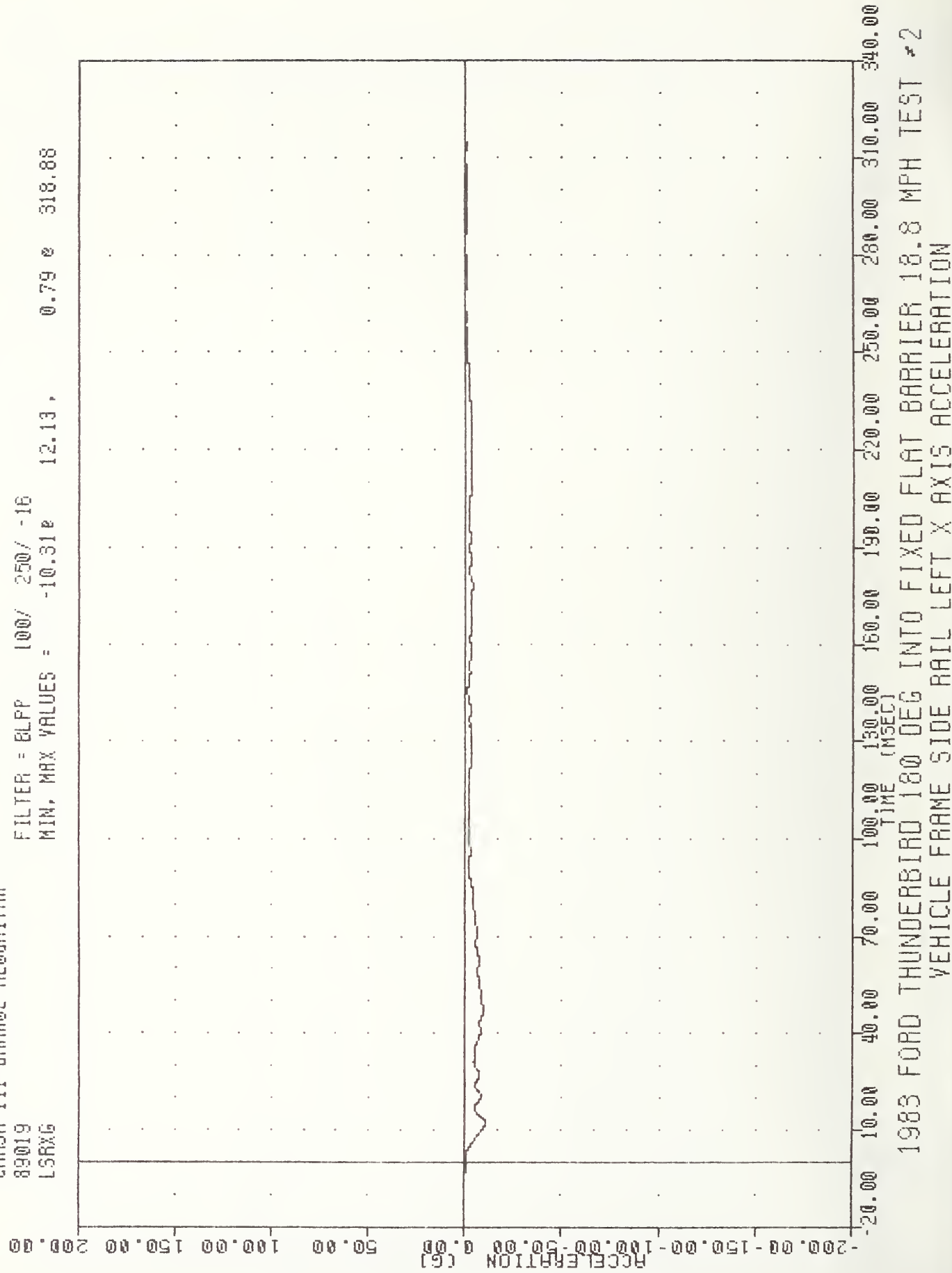
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.00e 0.00 , 8.46 e 94.13



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 10.5 MPH TEST #1
 VEHICLE FRAME SIDE RAIL RIGHT X AXIS DISPLACEMENT

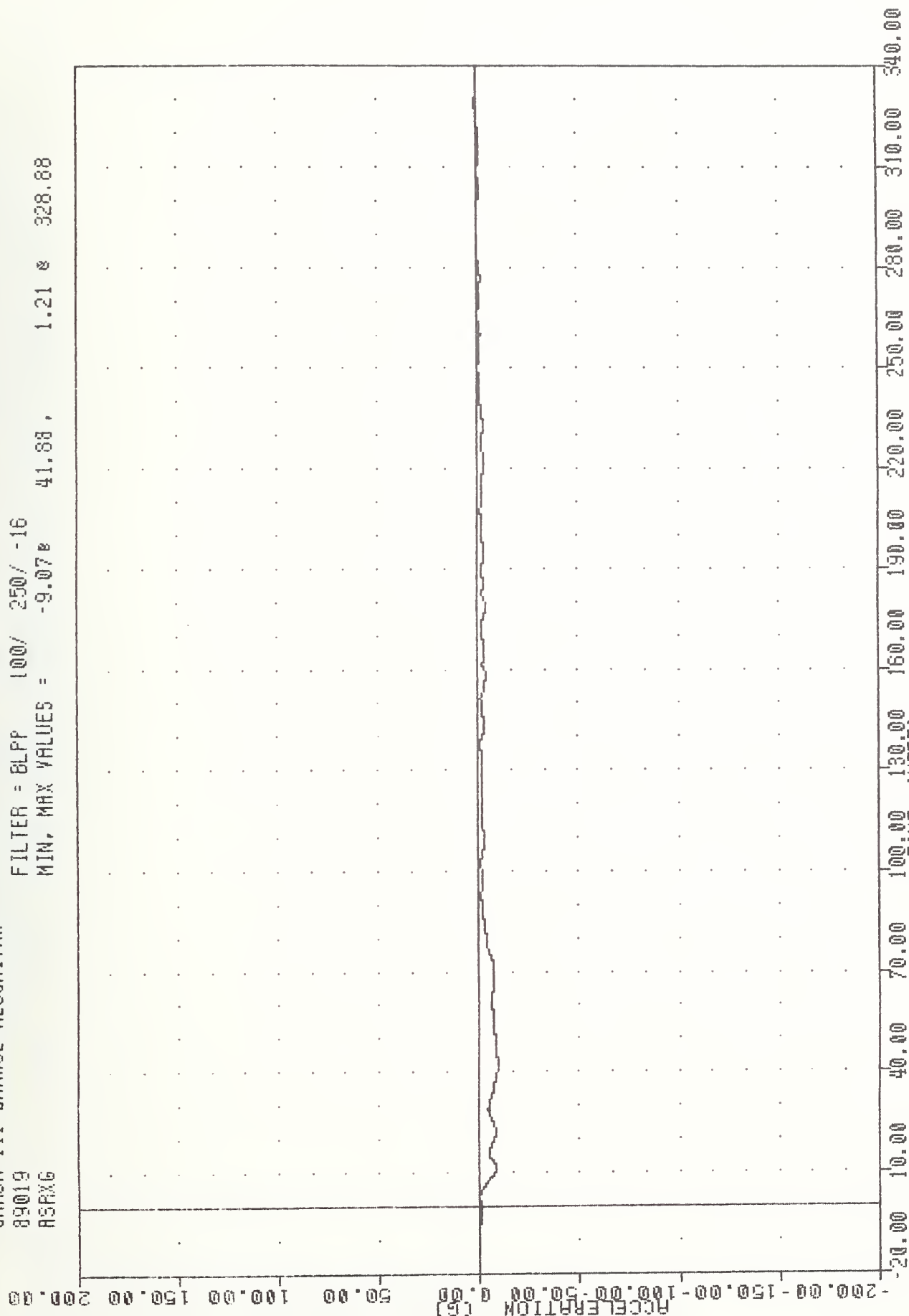
VRTC-2 , 890119-2
CRASH III DAMAGE ALGORITHM
89019
LSRXG

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -10.31e 12.13 , 0.79 e 318.88



VRTC-2 , 890119-2
 CRASH III DAMAGE ALGORITHM
 89019
 ASRXG

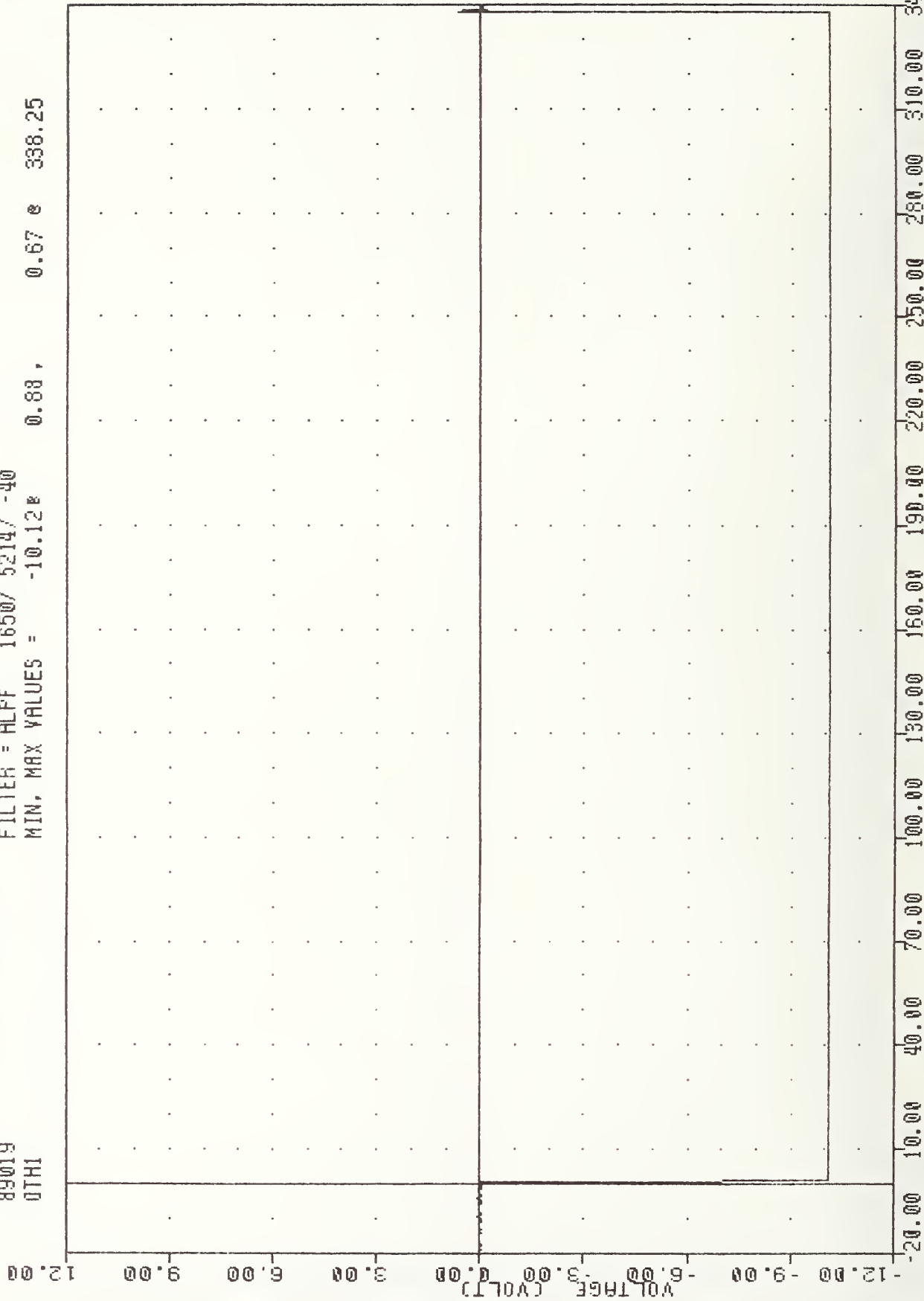
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -9.07e 41.88, 1.21 e 328.88



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 18.8 MPH TEST #2
 VEHICLE FRAME SIDE RAIL RIGHT X AXIS ACCELERATION

VRTC-2 , 890119-2
 CRASH III DAMAGE ALGORITHM
 89019
 0TH1

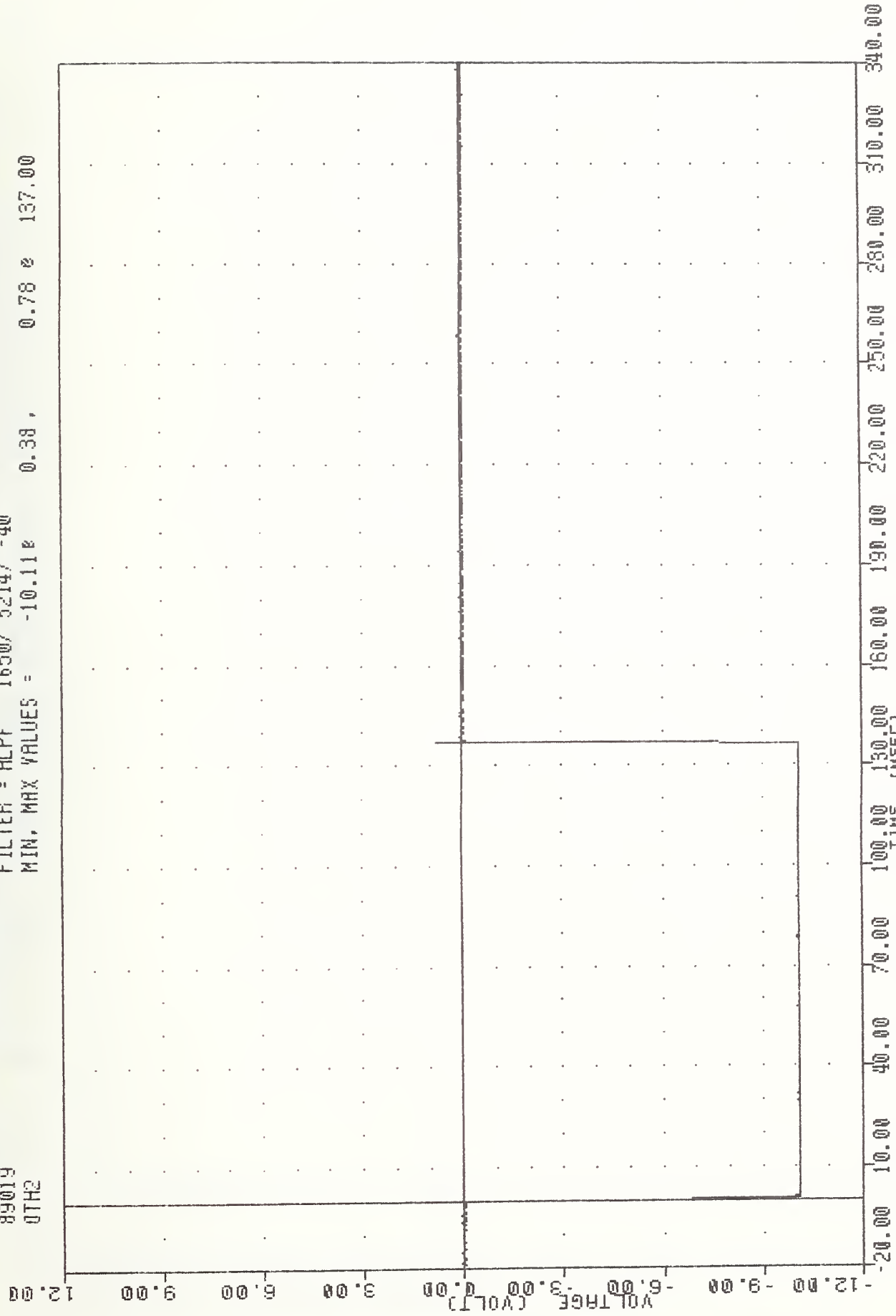
FILTER = ALFF 1650/ 5214/ -40
 MIN. MAX VALUES = -10.12* 0.88 , 0.67 * 338.25



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 18.8 MPH TEST #2
 VEHICLE CONTACT SWITCH - LEFT

WRTC-2 , 890119-2
 CRASH III DAMAGE ALGORITHM
 89019
 0TH2

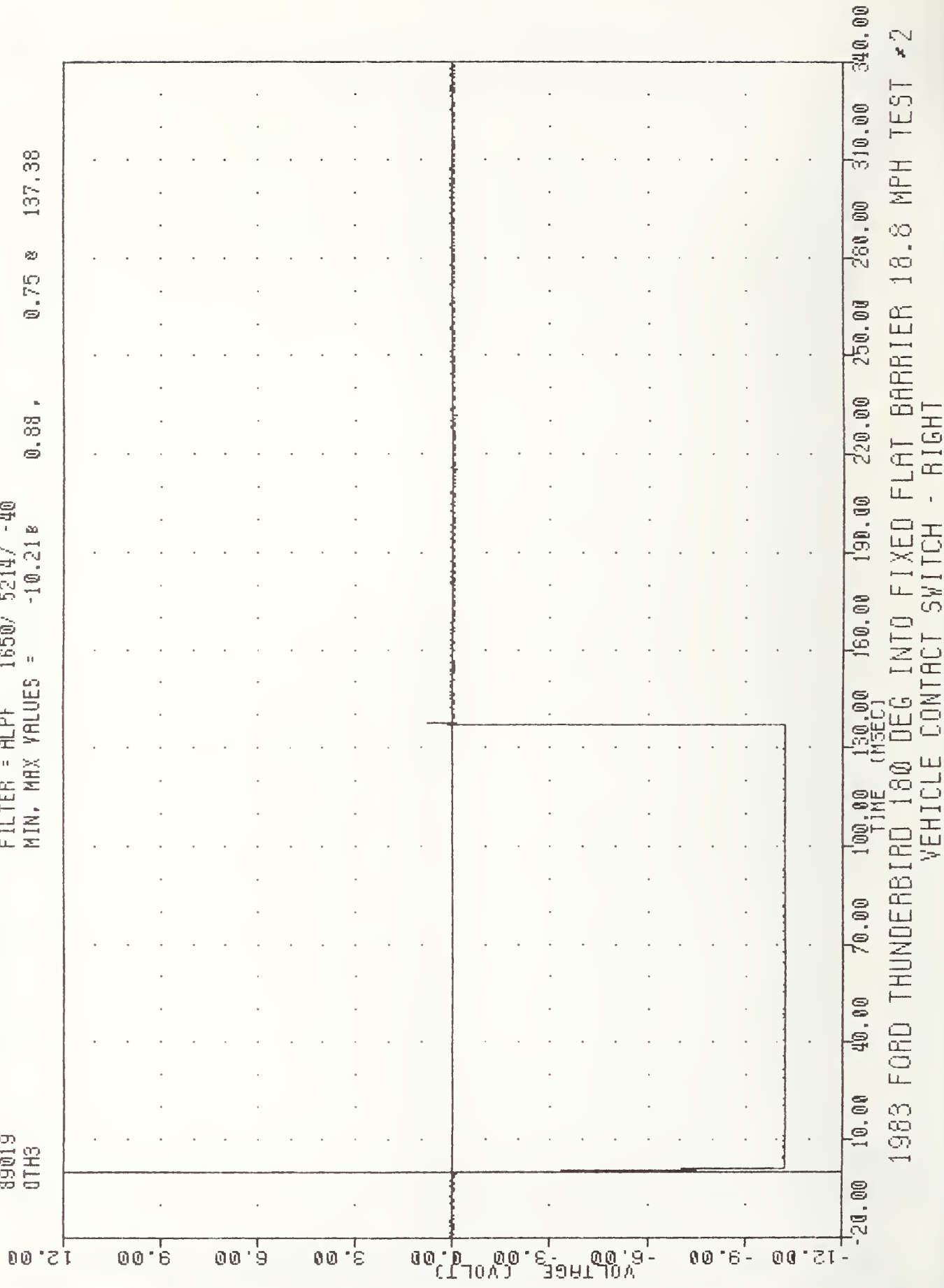
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -10.11e 0.38 , 0.78 e 137.00



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 18.8 MPH TEST #2
 VEHICLE CONTACT SWITCH - CENTER

VRTC-2 , 890119-2
CARSH III DAMAGE ALGORITHM
89019
QTH3

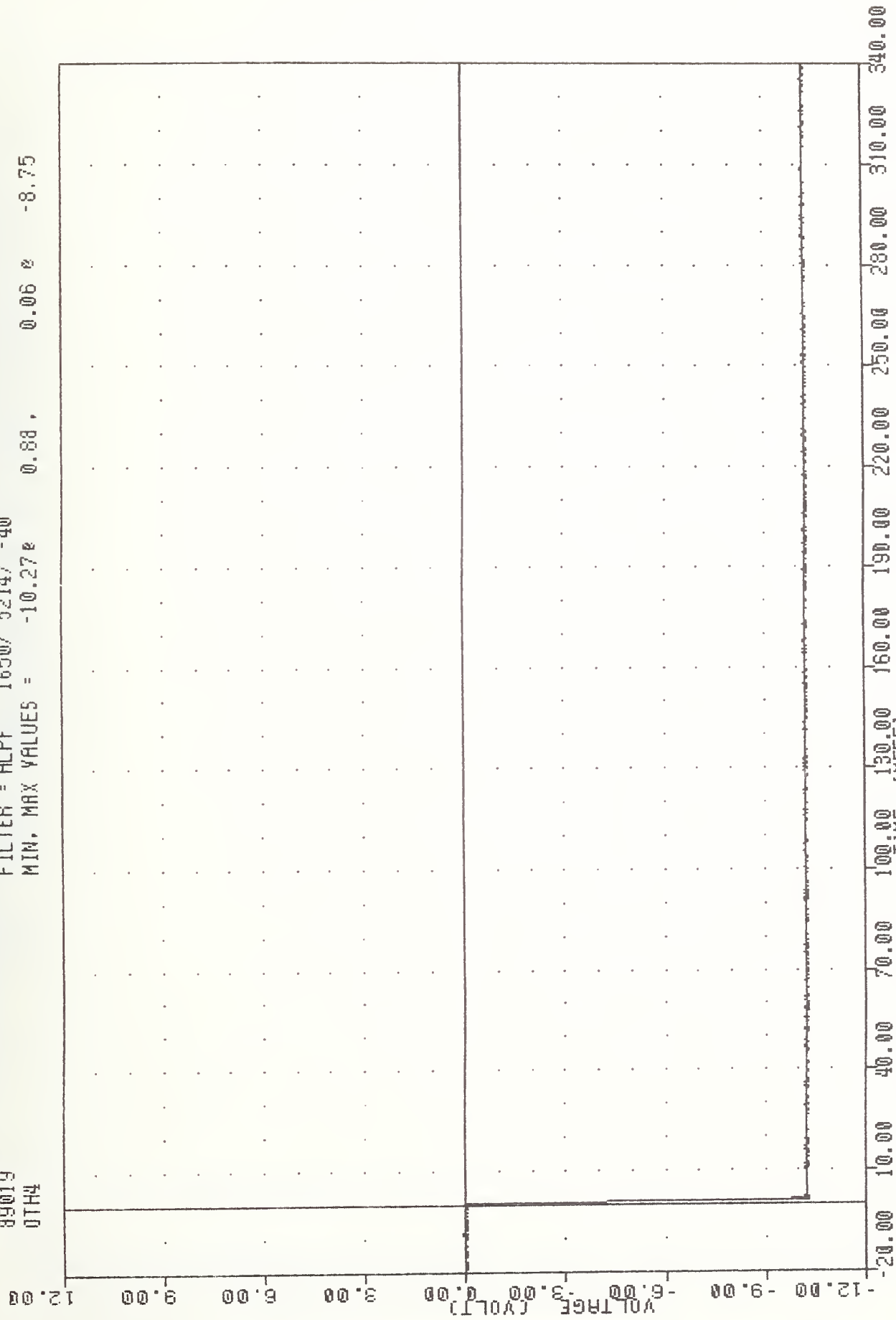
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -10.218 0.88, 0.75 8 137.38



VRIC-2 , 890119-2
 CRASH III DAMAGE ALGORITHM
 89019
 0TH4

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -10.27e

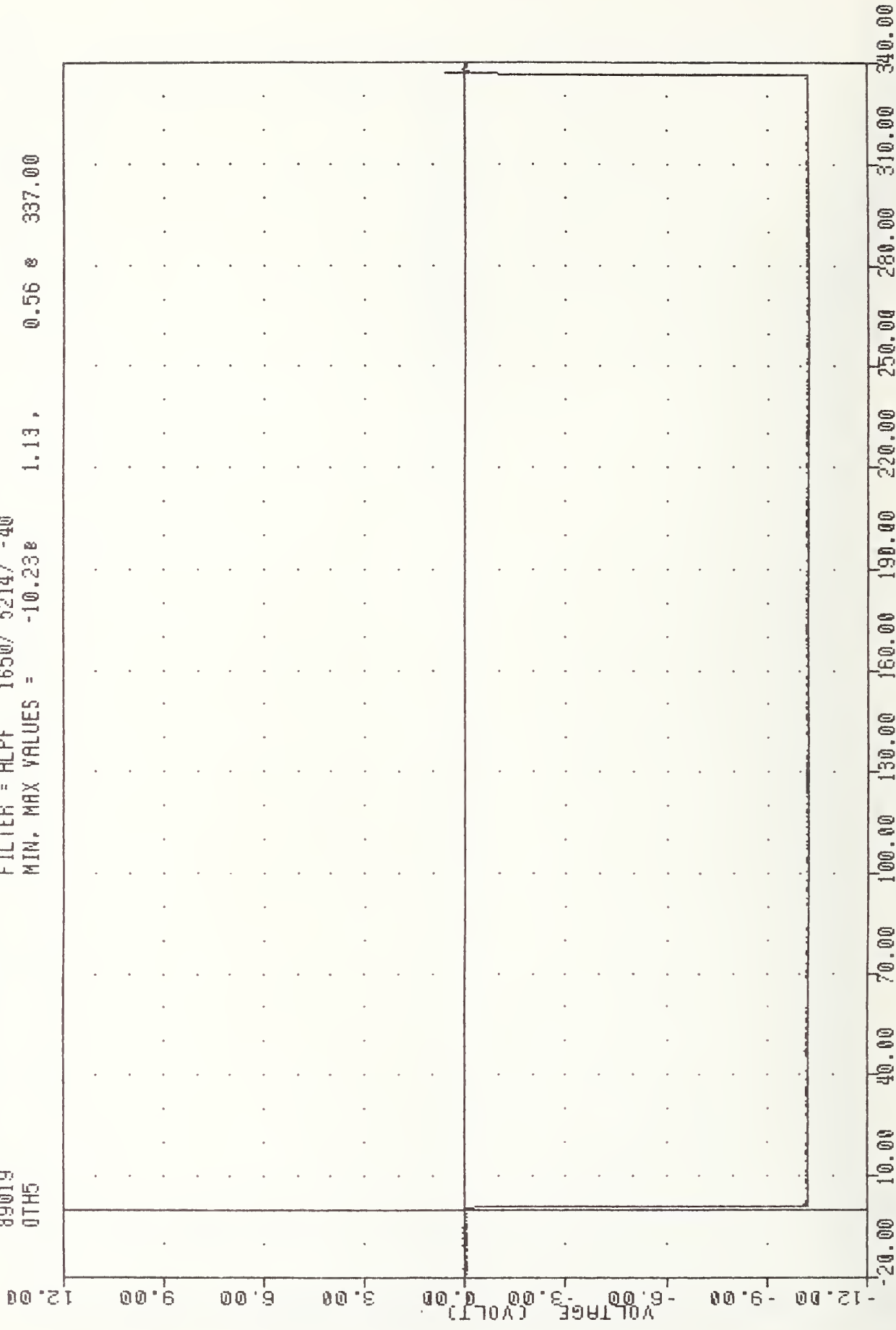
0.88 , 0.06 e -8.75



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 18.8 MPH TEST #2
 BARRIER CONTACT SWITCH - LEFT

VRTC-2 , 890119-2
 CRASH III DAMAGE ALGORITHM
 89019
 0TH5

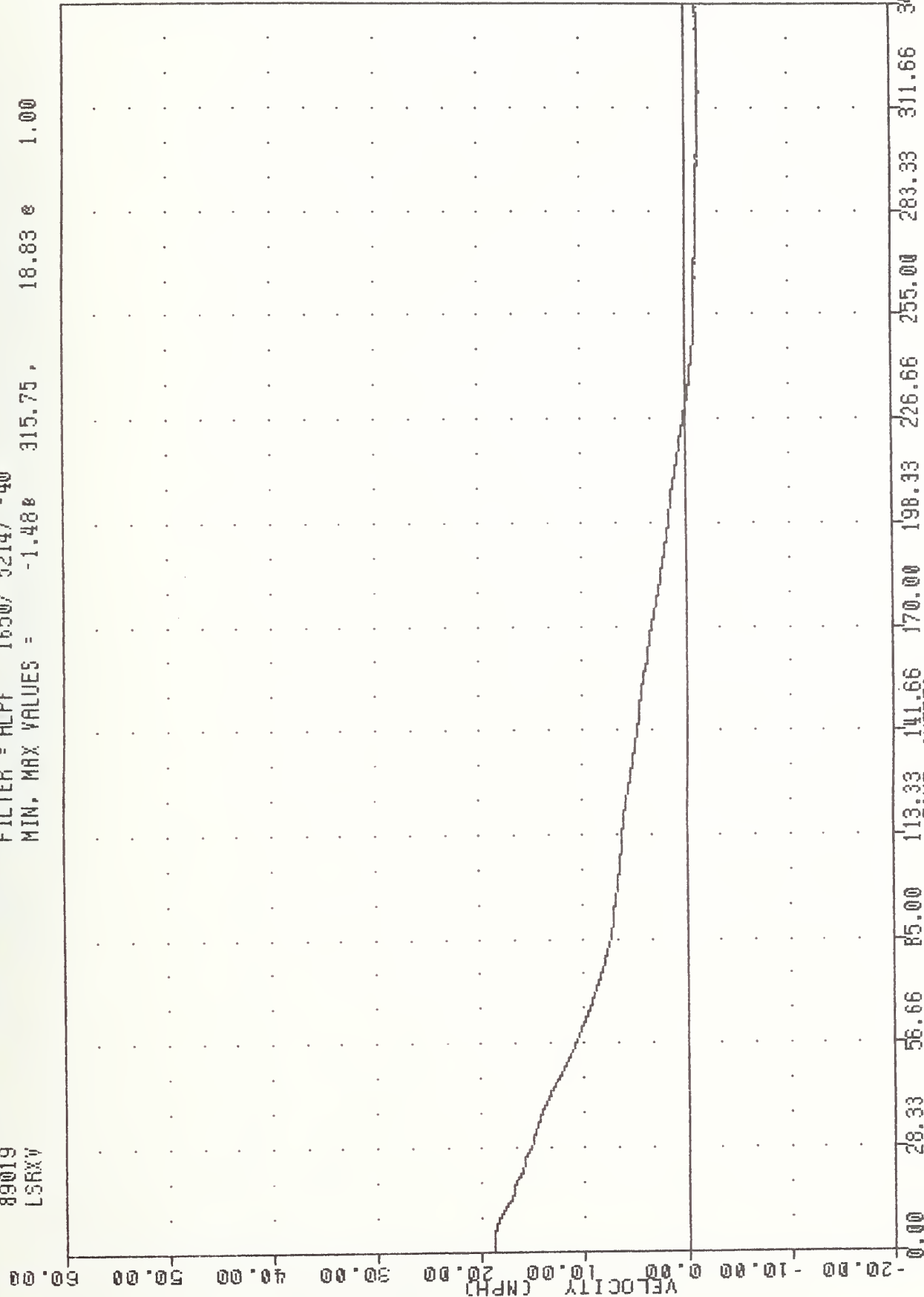
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -10.238 1.13, 0.56 337.00



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 18.8 MPH TEST #2
 BARRIER CONTACT SWITCH - RIGHT

VRTC-2 , 890119-2
 CRASH III DAMAGE ALGORITHM
 89019
 LSRXY

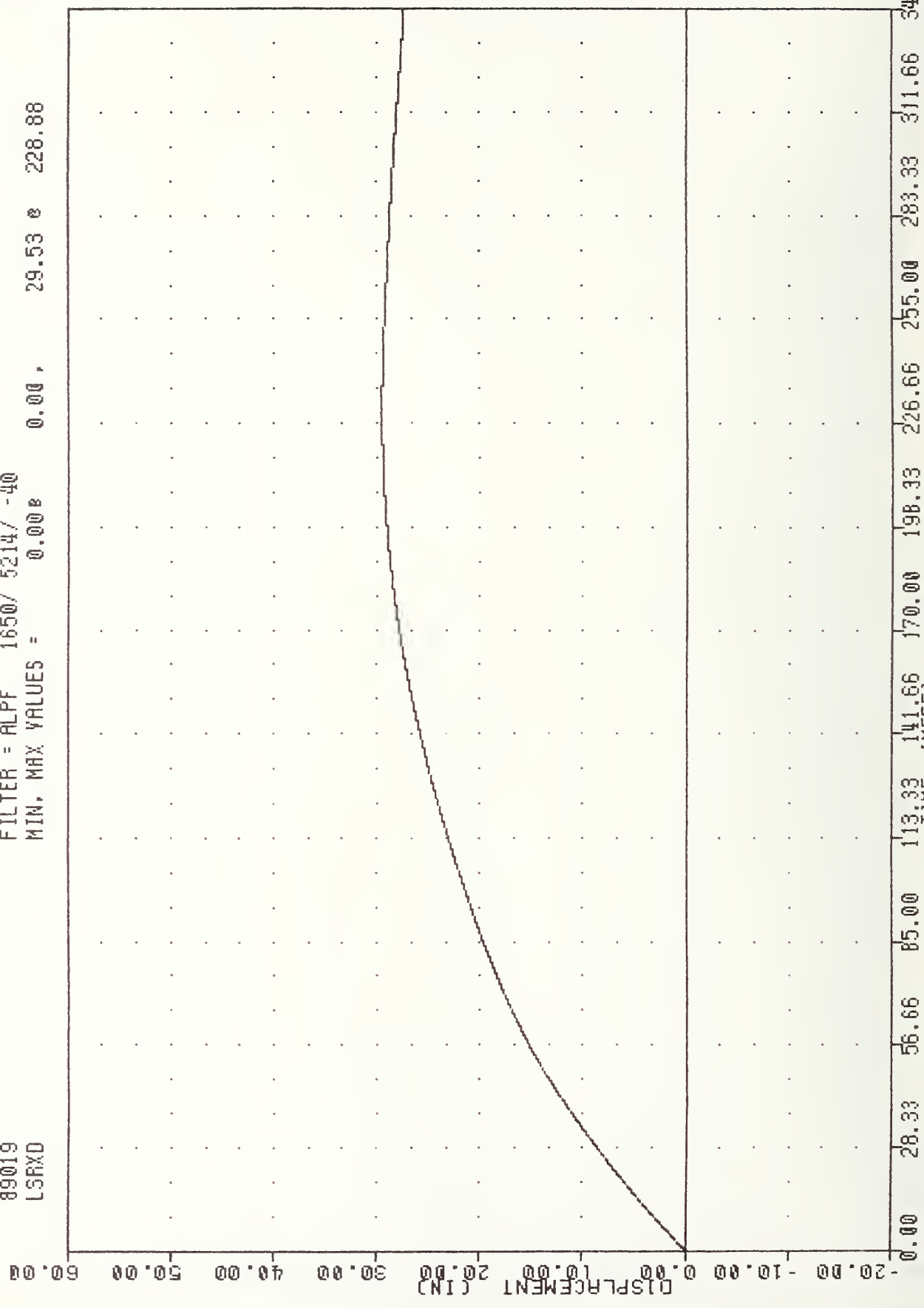
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -1.488 315.75 , 18.83 1.00



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 18.8 MPH TEST #2
 VEHICLE FRAME SIDE RAIL LEFT X AXIS VELOCITY

VRTC-2 , 890119-2
 CRASH III DAMAGE ALGORITHM
 89019
 LSRXD

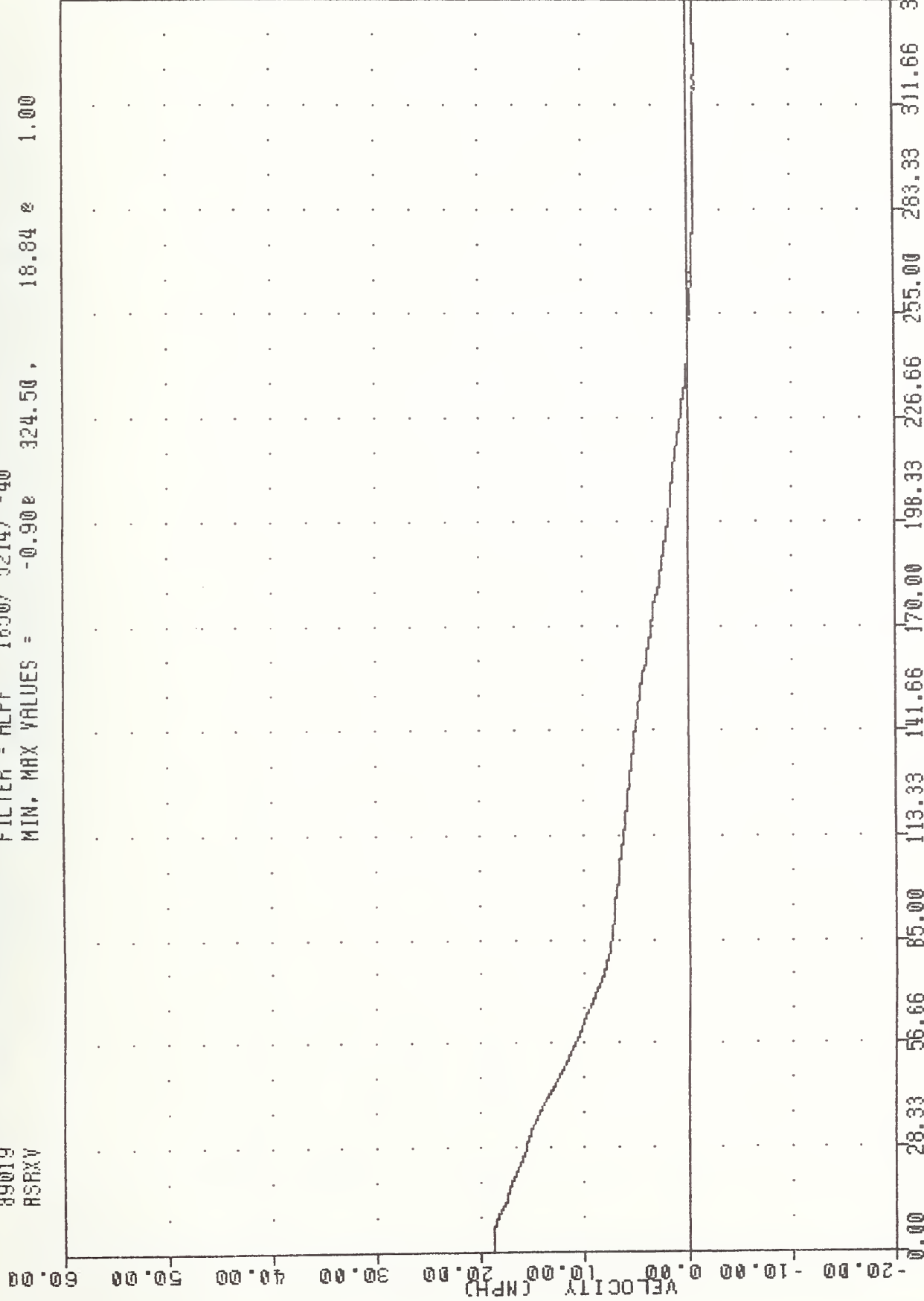
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 0.00 0.00 , 29.53 228.88



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 18.8 MPH TEST #2
 VEHICLE FRAME SIDE RAIL LEFT X AXIS DISPLACEMENT

VRTC-2 , 890119-2
 CRASH III DAMAGE ALGORITHM
 89019
 RSRXV

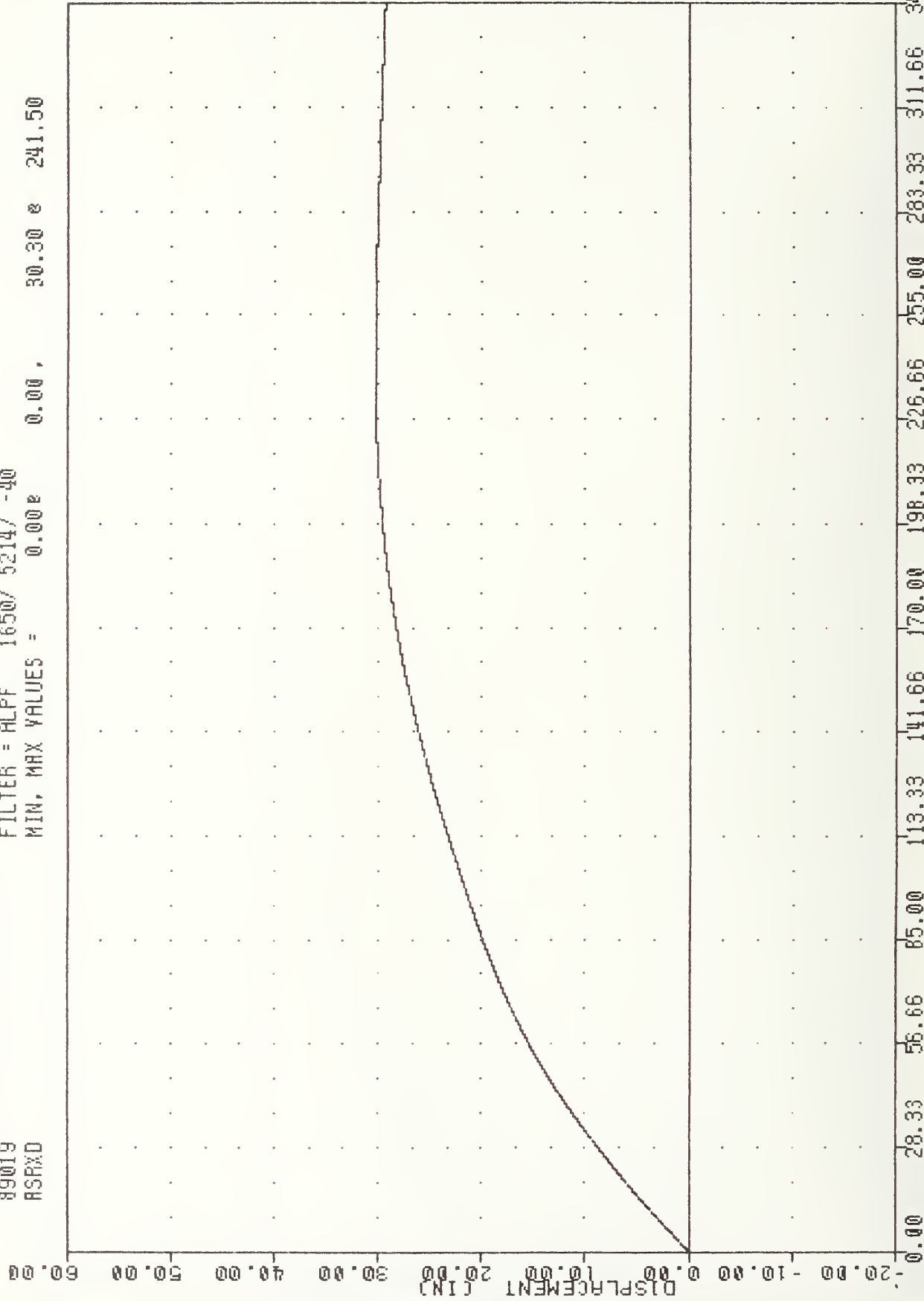
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -0.90e 324.50 , 18.84 e 1.00



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 18.8 MPH TEST #2
 VEHICLE FRAME SIDE RAIL RIGHT X AXIS VELOCITY

VRTC-2 , 890119-2
 CRASH III DAMAGE ALGORITHM
 89019
 RSRXD

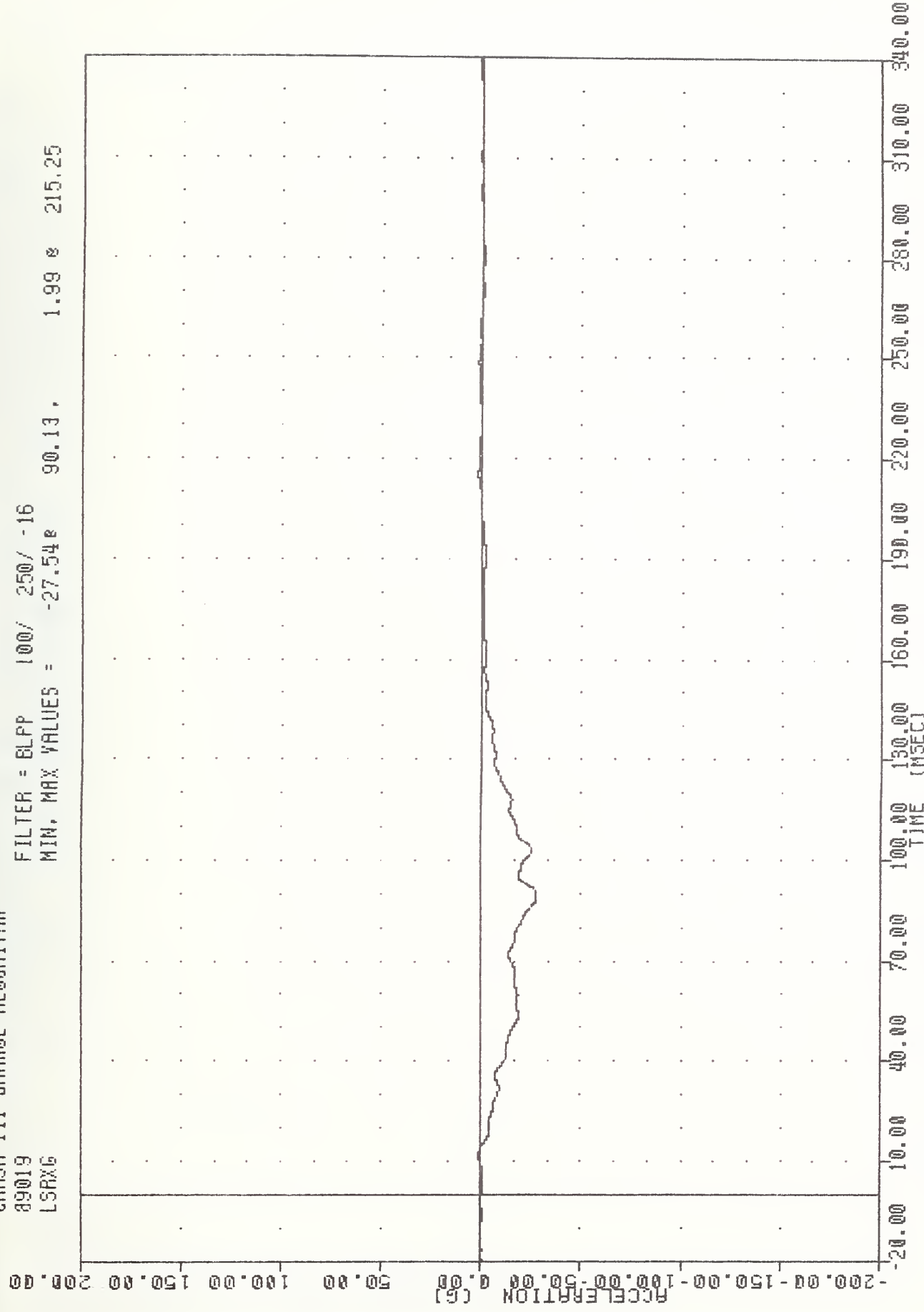
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.00e 30.30 e 241.50



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 18.8 MPH TEST #2
 VEHICLE FRAME SIDE RAIL RIGHT X AXIS DISPLACEMENT

VRTC-3 , 890119-3
CRASH III DAMAGE ALGORITHM
89019
LSRXG

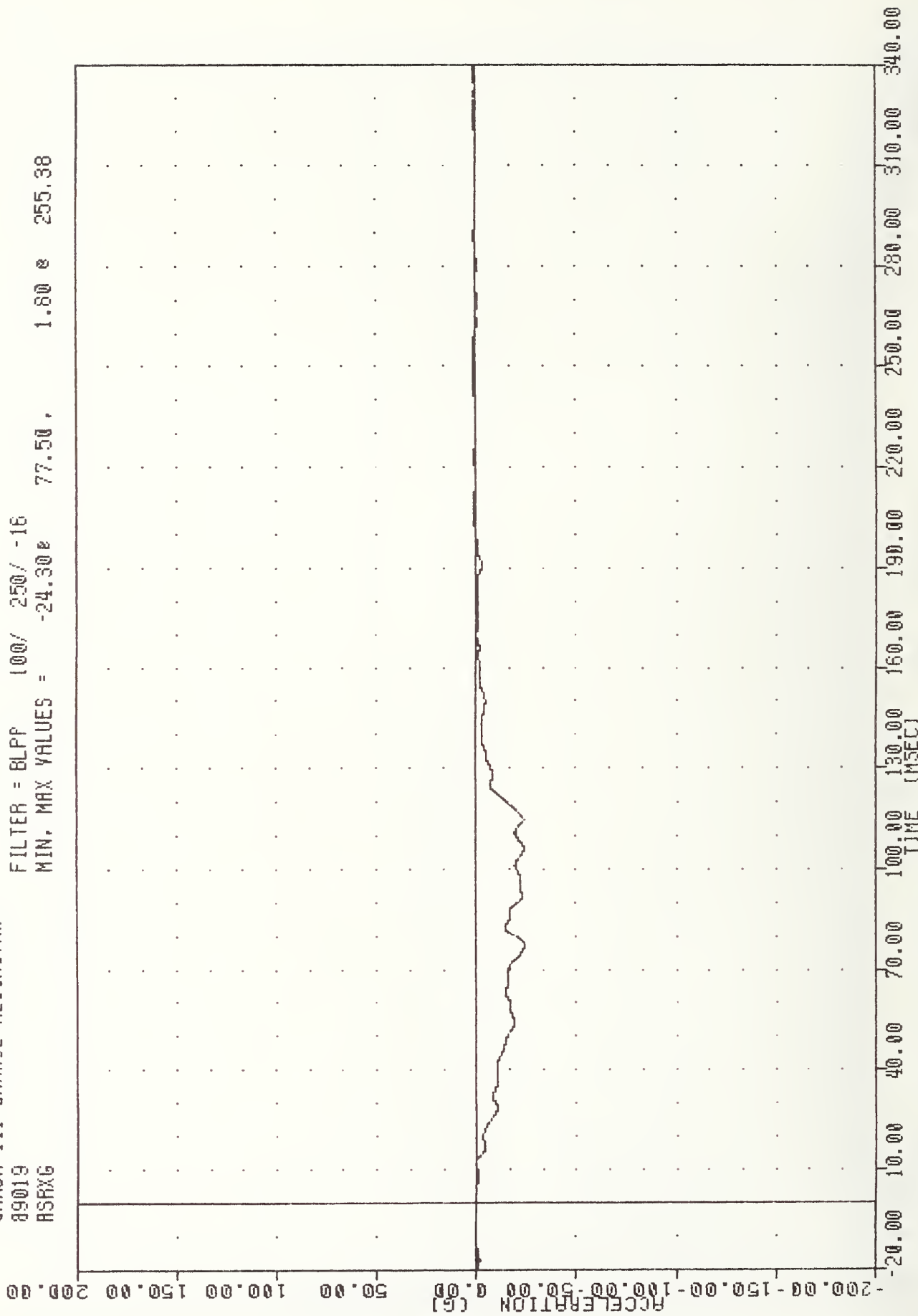
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -27.54e 90.13, 1.99 e 215.25



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 34.7 MPH TEST #3
VEHICLE FRAME SIDE RAIL LEFT X AXIS ACCELERATION

VRTC-3 , 890119-3
CRASH III DAMAGE ALGORITHM
89019
RSRXG

FILTER = BLPP 100/ 250/ -18
MIN. MAX VALUES = -24.300 77.50 , 1.80 255.38

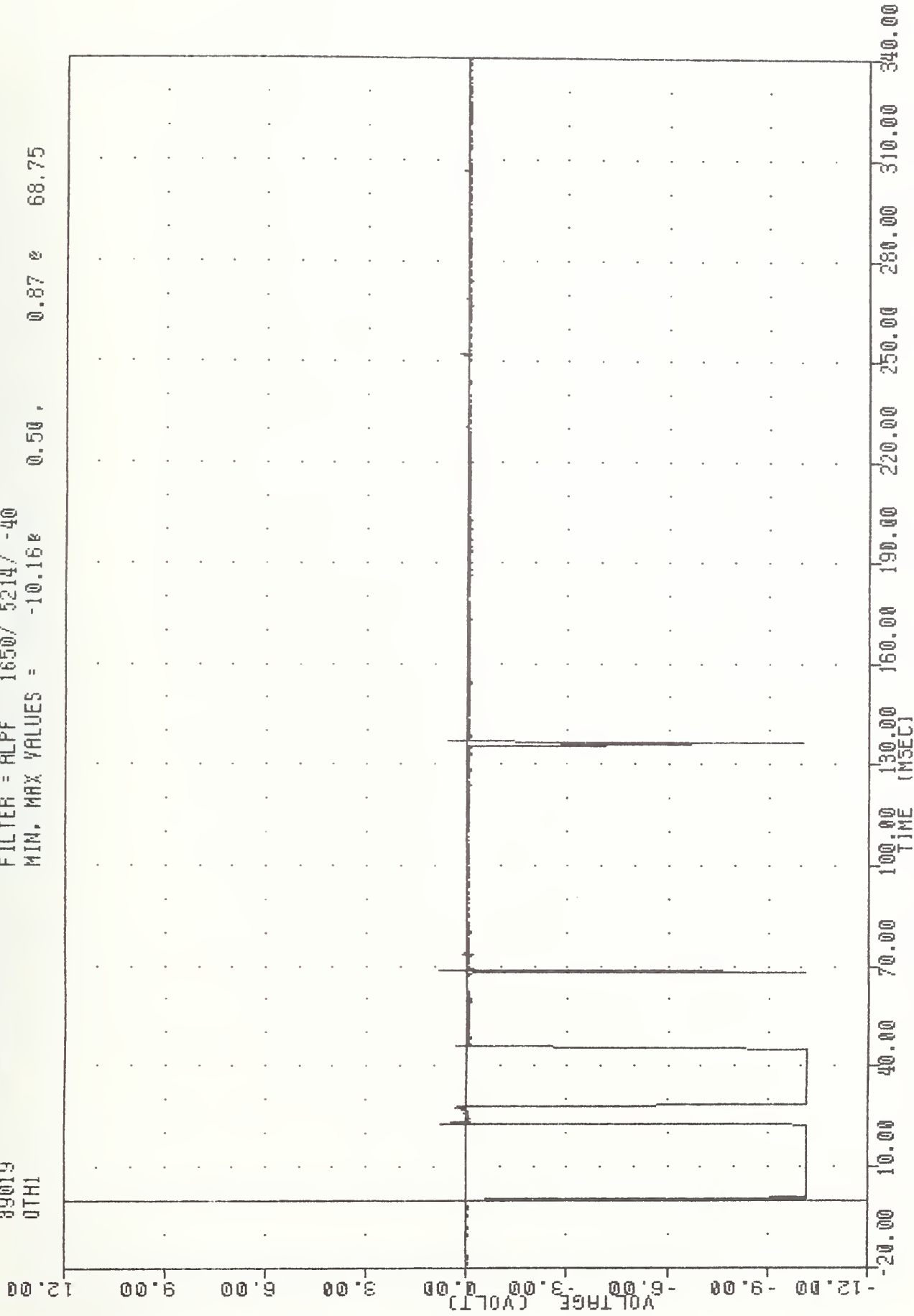


1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 34.7 MPH TEST #3
VEHICLE FRAME SIDE RAIL RIGHT X AXIS ACCELERATION

VRTC-3
 CRASH III DAMAGE ALGORITHM
 89019
 0TH1

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -10.16e

0.50, 0.87 e 68.75



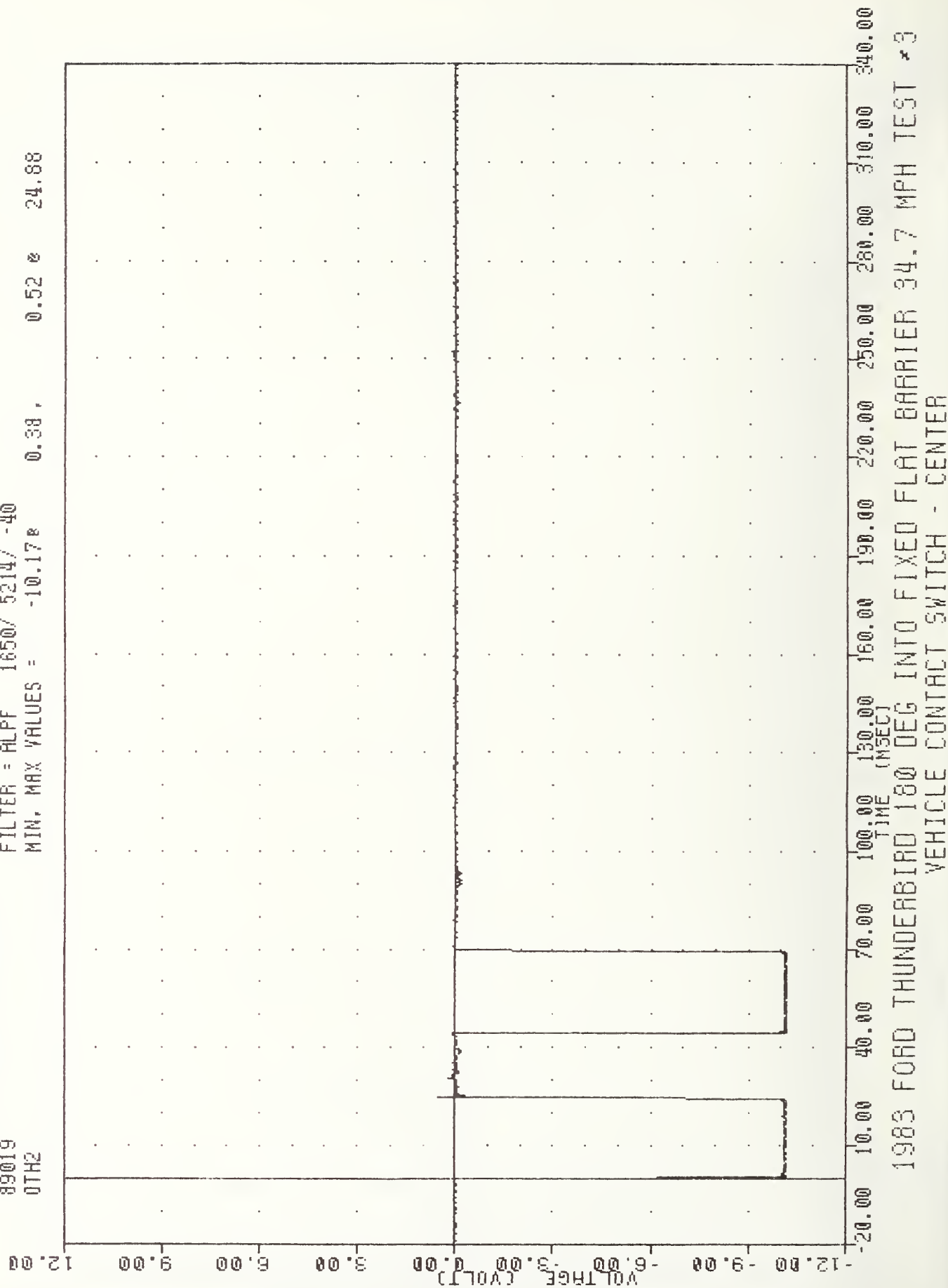
1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 34.7 MPH TEST #3
 VEHICLE CONTACT SWITCH - LEFT

VRTC-3
 CRASH III DAMAGE ALGORITHM
 89019
 0TH2

890119-3

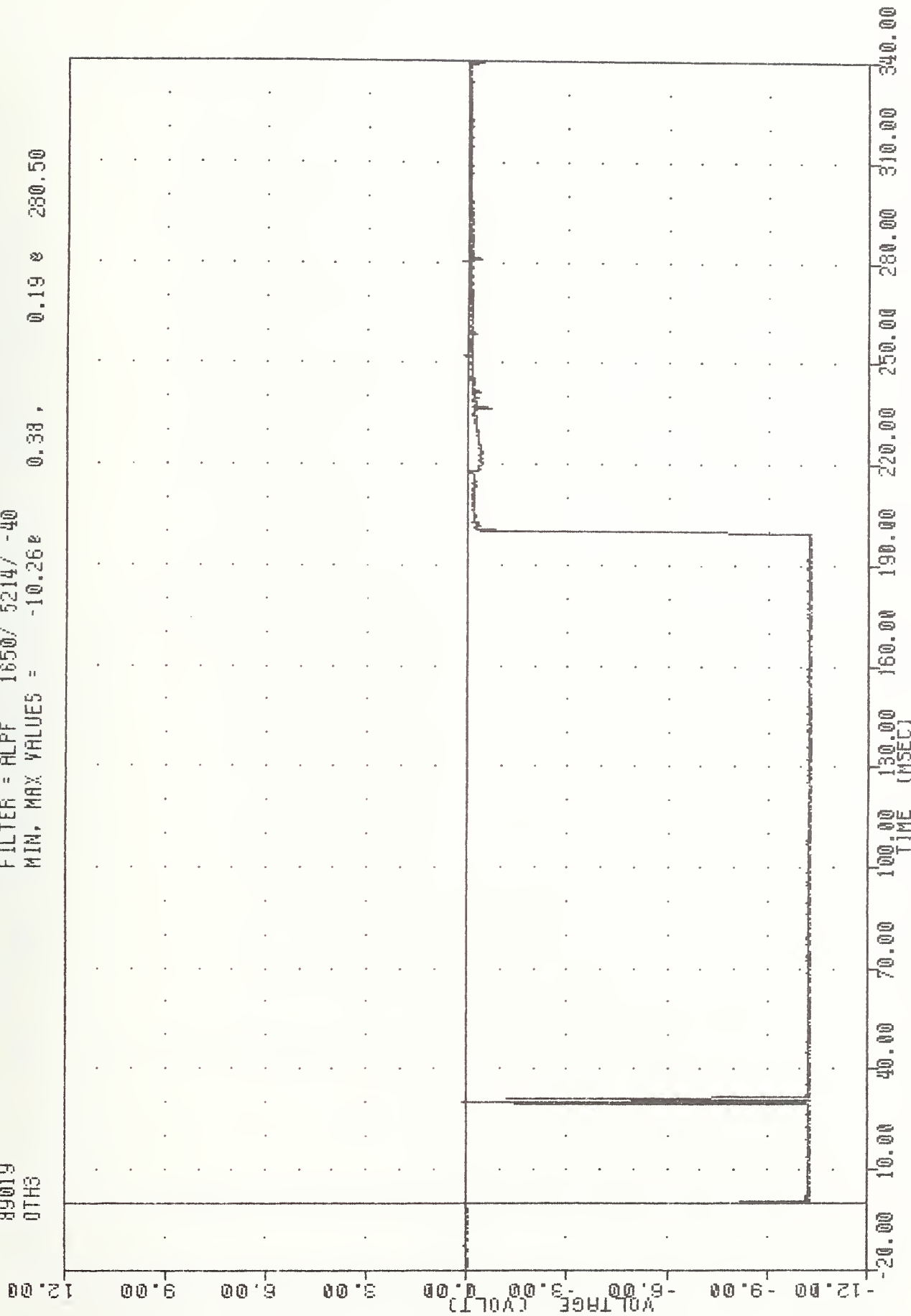
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -10.178

0.38, 0.52 24.88



VRTC-3 , 890119-3
 CRASH III DAMAGE ALGORITHM
 89019
 0TH3

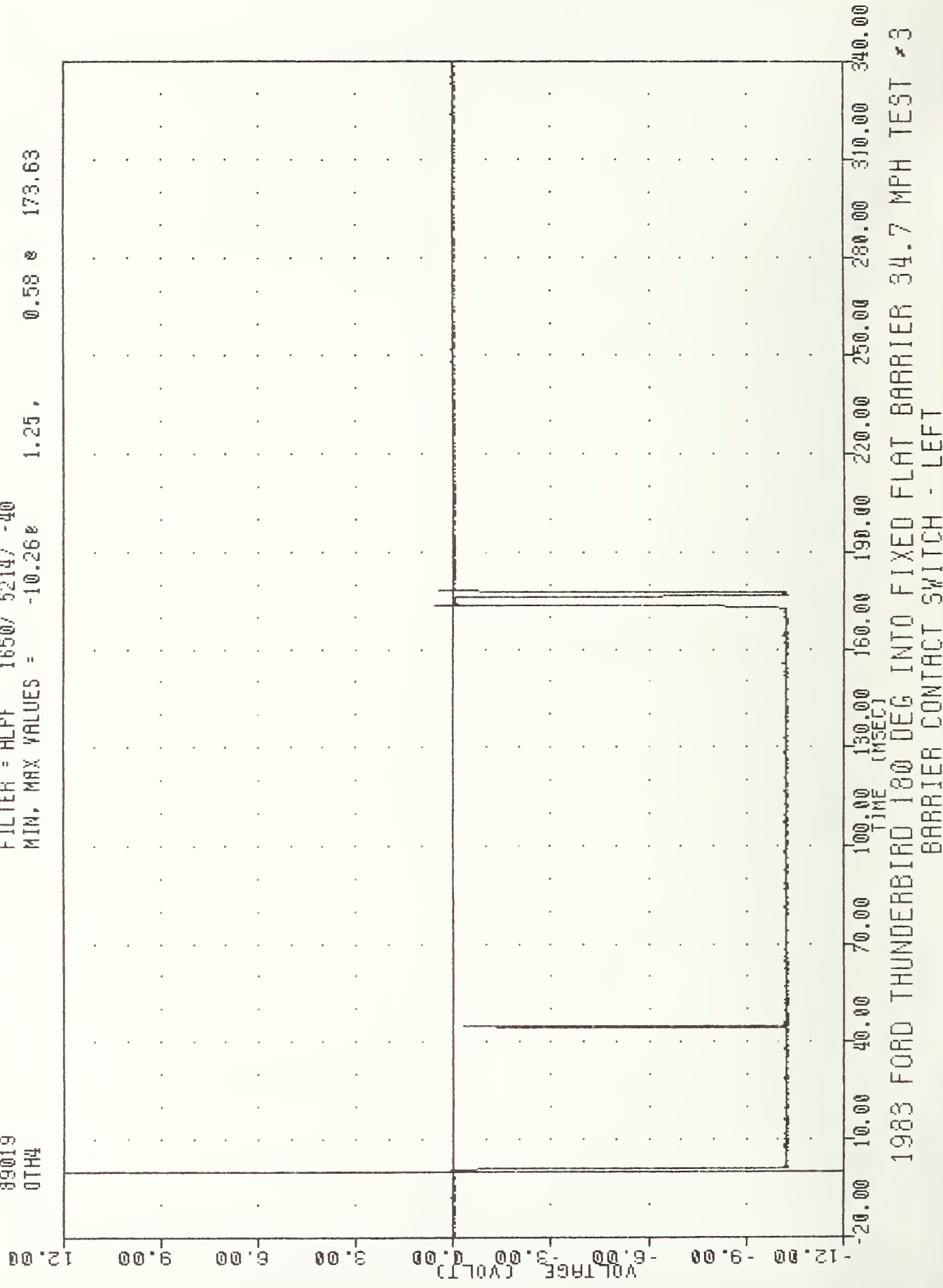
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -10.26e 0.38 , 0.19 e 280.50



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 34.7 MPH TEST #3
 VEHICLE CONTACT SWITCH - RIGHT

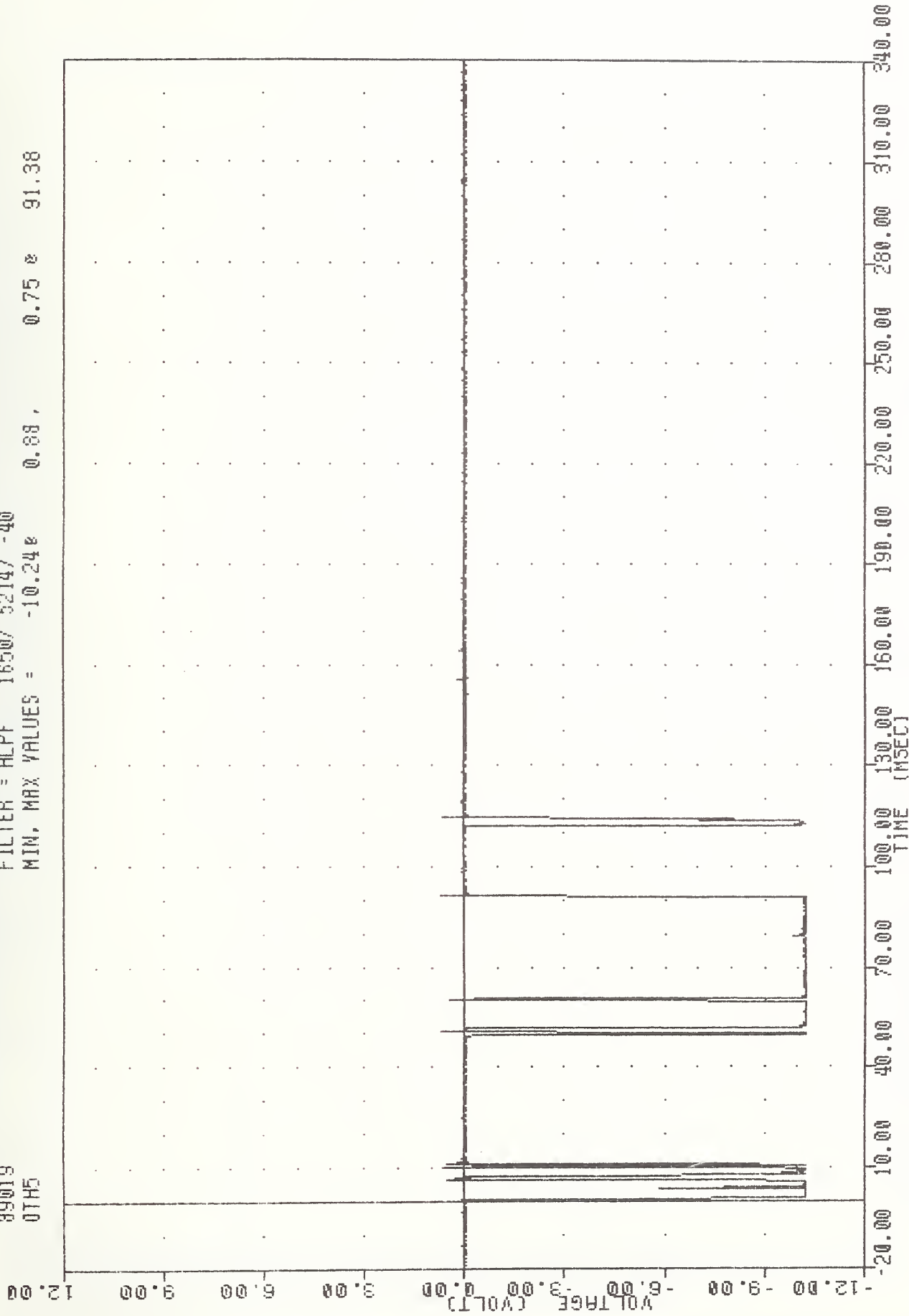
VRTC-3 , 890119-3
CRASH III DAMAGE ALGORITHM
89019
0TH4

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -10.26 1.25, 0.58 173.63



VRTC-3 , 890119-3
 CRASH III DAMAGE ALGORITHM
 89019
 0TH5

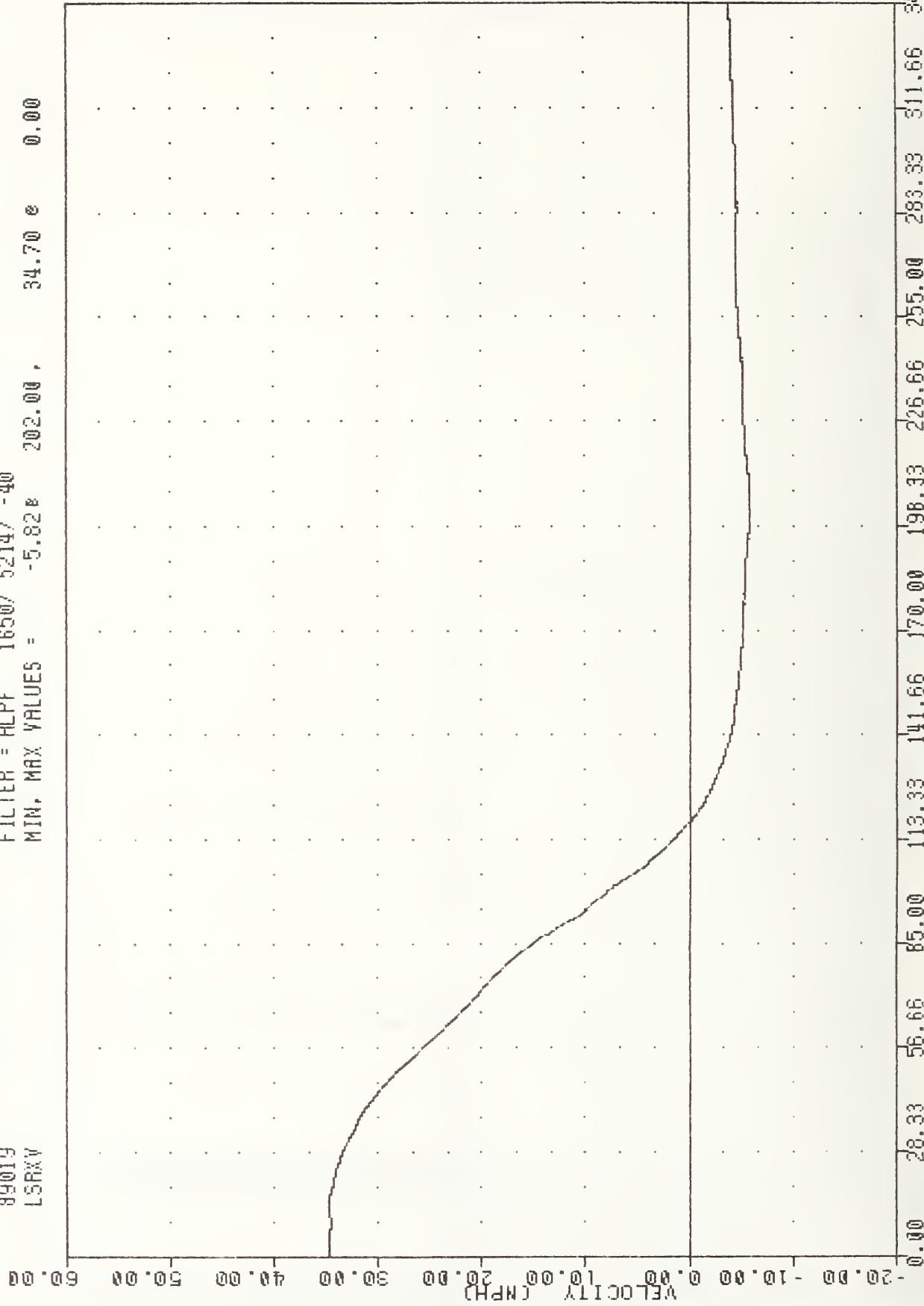
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -10.24e 0.88 , 0.75 e 91.38



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 34.7 MPH TEST #3
 BARRIER CONTACT SWITCH - RIGHT

VRTC-3 , 890119-3
 CRASH III DAMAGE ALGORITHM
 89019
 LSRXV

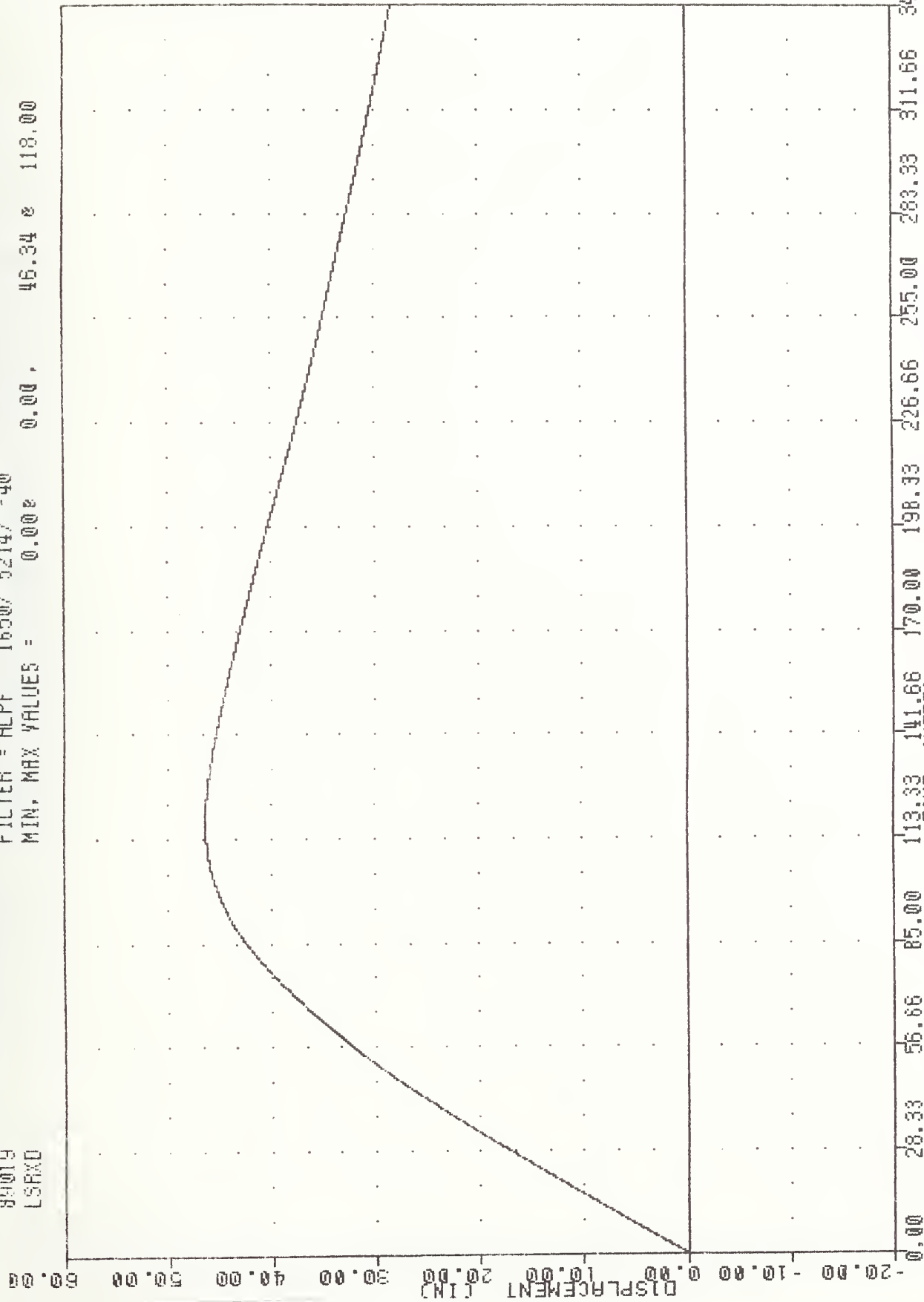
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -5.820 202.00 , 34.70 0.00



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 34.7 MPH TEST #3
 VEHICLE FRAME SIDE RAIL LEFT X AXIS VELOCITY

VRTC-3 , 890119-3
 CRASH III DAMAGE ALGORITHM
 89019
 LSRXD

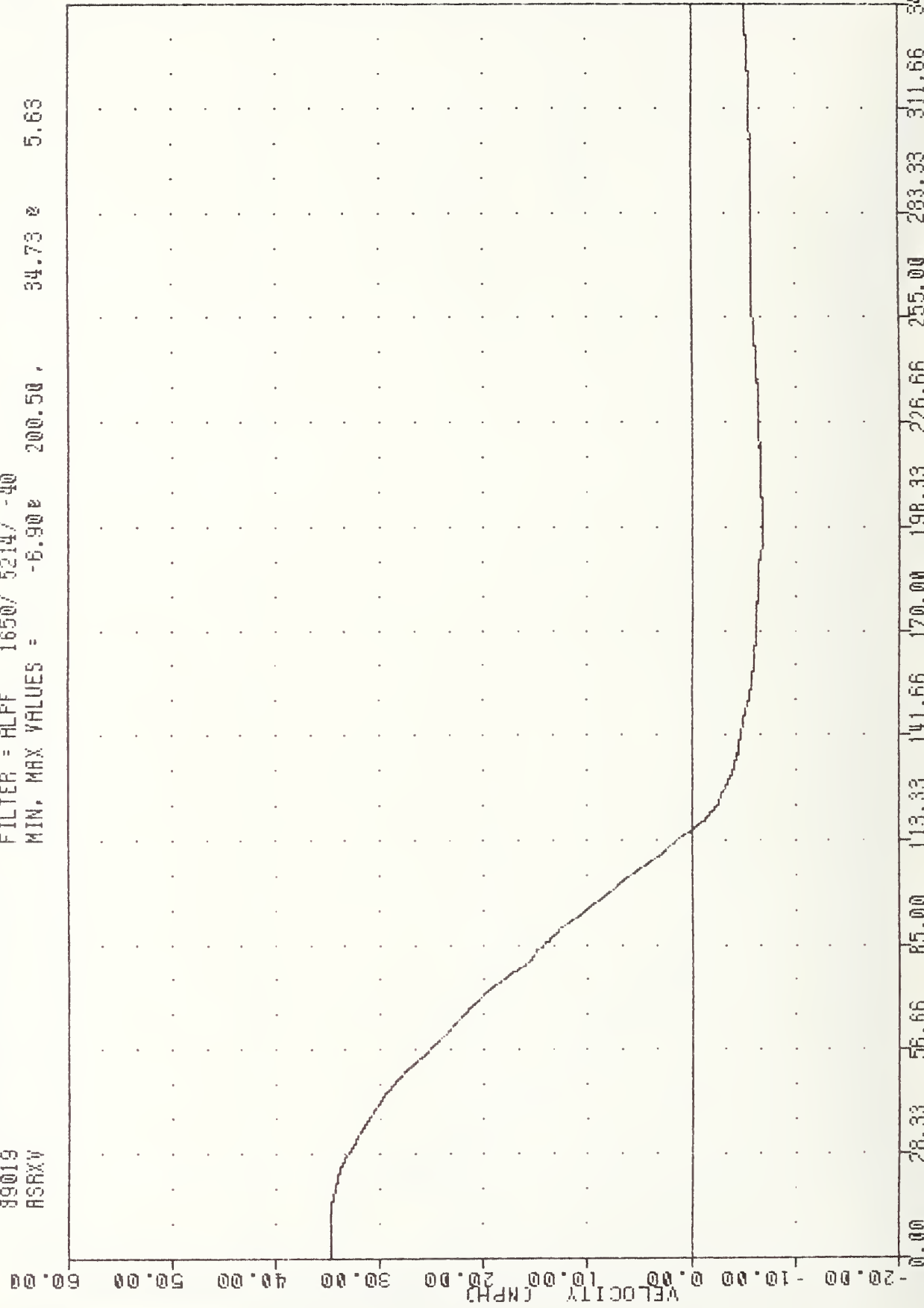
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.000 46.34 118.00



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 34.7 MPH TEST #3
 VEHICLE FRAME SIDE RAIL LEFT X AXIS DISPLACEMENT

VRTC-3 , 890119-3
 CRASH III DAMAGE ALGORITHM
 89019
 ASRXV

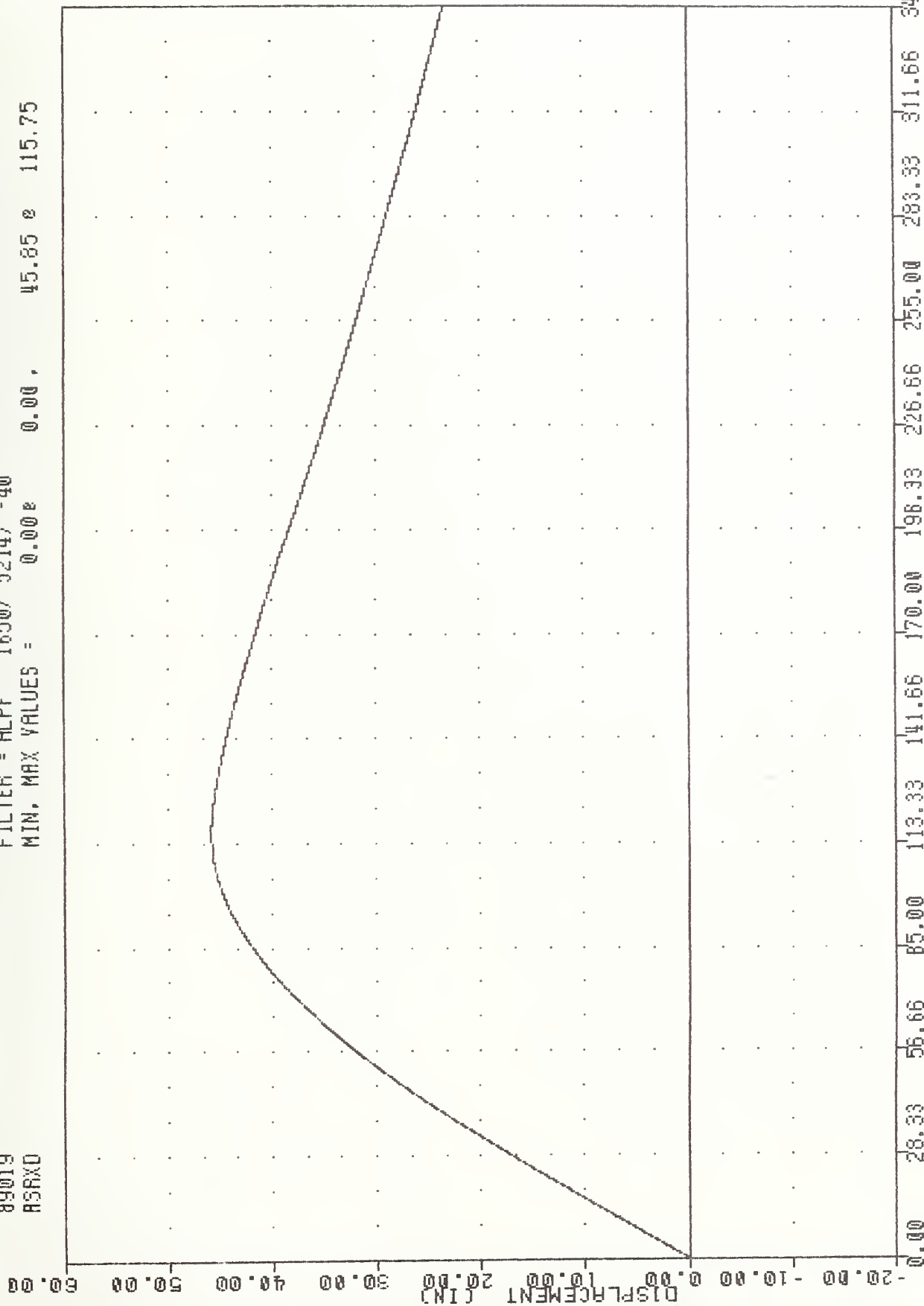
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -6.900 200.50 , 34.73 5.63



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 34.7 MPH TEST #3
 VEHICLE FRAME SIDE RAIL RIGHT X AXIS VELOCITY

VRTC-3 , 890119-3
 CRASH III DAMAGE ALGORITHM
 89019
 RSRXD

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 0.00 0.00 , 45.85 0 115.75



1983 FORD THUNDERBIRD 180 DEG INTO FIXED FLAT BARRIER 34.7 MPH TEST #3
 VEHICLE FRAME SIDE RAIL RIGHT X AXIS DISPLACEMENT



PL 242 - Ed

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