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Frank R. Speck
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DOT HS 807 775
Final Report

June 1991

Final Report of a 1987 Hyundai Excel into a 0° Frontal Pole Barrier in Support of Crash III Damage Algorithm Reformulation

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16. Abstract Four (4) 0° frontal pole barrier impact tests were conducted for research and development in support of the crash III damage algorithm reformulation. These tests were conducted on a 1987 Hyundai Excel 4-door sedan, VIN KMHLF21J8HU188748, at the Transportation Research Center of Ohio. The following four tests were conducted on the vehicle:																														
<table border="1"> <thead> <tr> <th>TEST NO.</th> <th>DATE</th> <th>TIME</th> <th>SPEED (mph)</th> <th>MAXIMUM CUMULATIVE CRUSH (in.)</th> </tr> </thead> <tbody> <tr> <td>910502-1</td> <td>05/02/91</td> <td>1011</td> <td>9.5</td> <td>11.2</td> </tr> <tr> <td>910502-2</td> <td>05/02/91</td> <td>1106</td> <td>9.6</td> <td>12.8</td> </tr> <tr> <td>910502-3</td> <td>05/02/91</td> <td>1326</td> <td>14.6</td> <td>17.5</td> </tr> <tr> <td>910502-4</td> <td>05/02/91</td> <td>1510</td> <td>29.6</td> <td>29.4</td> </tr> </tbody> </table>						TEST NO.	DATE	TIME	SPEED (mph)	MAXIMUM CUMULATIVE CRUSH (in.)	910502-1	05/02/91	1011	9.5	11.2	910502-2	05/02/91	1106	9.6	12.8	910502-3	05/02/91	1326	14.6	17.5	910502-4	05/02/91	1510	29.6	29.4
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17. Key Words 0° Frontal Pole Barrier Impact Crash III Damage Algorithm Reformulation.			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 four (4) 0° frontal pole barrier impact tests was for research and development in support of the CRASH III damage algorithm reformulation. The intended impact point of the centerline of the pole barrier was the vehicle's longitudinal centerline. The pole barrier was 12.0 inches in diameter.

The 1987 Hyundai Excel was equipped with a 89.6 CID, 4-cylinder, transverse, gasoline engine with a 5-speed manual transmission. The test weight of the vehicle was 2173 pounds.

The test vehicle was instrumented with four (4) accelerometers to measure vehicle X-axis and Y-axis acceleration.

The crash test events were recorded by two (2) high-speed motion picture cameras.

SECTION 2.0

VEHICLE INFORMATION

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Hyundai Motor Corporation

MAKE/MODEL: Excel/GL

VIN: KMHLF21J8HU188748

BODY STYLE: 4-door sedan

MODEL YEAR: 1987

COLOR: Red

ENGINE DATA: TYPE: transverse CYLINDERS: 4 DISPLACEMENT: 89.6 CID

TRANSMISSION DATA: 5 SPEED, X MANUAL, AUTOMATIC, X FWD, RWD, 4WD

DATE VEHICLE RECEIVED: 04/25/91

ODOMETER READING: 61,216.0

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING Yes
POWER BRAKES Yes
POWER SEATS No
POWER WINDOWS No
TINTED GLASS Yes
RADIO No
CLOCK Yes
OTHER Sunroof

AUTOMATIC TRANSMISSION No
AUTOMATIC SPEED CONTROL No
TILTING STEERING WHEEL No
TELESCOPING STEERING WHEEL No
AIR CONDITIONING No
ANTI-SKID BRAKE No
REAR WINDOW DEFROSTER Yes

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? Yes
2. DOES VEHICLE SHOW EVIDENCE OF PRIOR ACCIDENT HISTORY? No
3. DOES VEHICLE SHOW ANY SIGNIFICANT CORROSION? No
4. CONDITION OF THE FRONT/REAR BUMPER AND FRAME: Good

CERTIFICATION DATA FROM VEHICLE'S LABEL:

VEHICLE MANUFACTURED BY: Hyundai Motor Corporation

DATE OF MANUFACTURE: 03/87

VIN: KMHLF21J8HU188748

GVWR: 3185 LBS

CAWR: FRONT: 1653 LBS., REAR: 1587 LBS.

TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Goodyear Corsa GT P175/70R13

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 35 PSI
REAR: 35 PSI

SPARE TIRE (MFR., LINE, SIZE): None

TYPE OF SEATS: FRONT: Bucket
REAR: Bench

TYPE OF FRONT SEAT BACKS: Manually adjustable

MAXIMUM WIDTH: 63.4 INCHES

WHEELBASE: 94.0 INCHES

LOCATION OF LABEL STATING TIRE & CAPACITY DATA: Glovebox

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P155/80R13, P175/70R13

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

DESIGNATED SEATING CAPACITY: 2 FRONT 3 REAR 5 TOTAL

VEHICLE CAPACITY WEIGHT: 816 LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES):

DELIVERED ATTITUDE: LF 25.9; RF 25.9; LR 24.0; RR 24.0

PRE-TEST ATTITUDE: LF 25.9; RF 25.9; LR 24.0; RR 24.0

TEST VEHICLE INFORMATION CONT'D

WEIGHT OF TEST VEHICLE AS RECEIVED (WITH MAXIMUM FLUIDS):

RIGHT FRONT	654 LBS.	RIGHT REAR	426 LBS.
LEFT FRONT	660 LBS.	LEFT REAR	434 LBS.
TOTAL FRONT WEIGHT	1314 LBS.	(60.4% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	860 LBS.	(39.6% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT 2174 LBS.			

WEIGHT OF TEST VEHICLE:

RIGHT FRONT	632 LBS.	RIGHT REAR	462 LBS.
LEFT FRONT	610 LBS.	LEFT REAR	469 LBS.
TOTAL FRONT WEIGHT	1242 LBS.	(57.2% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	931 LBS.	(42.8% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT 2173 LBS.			

WEIGHT OF BALLAST SECURED IN VEHICLE: 0 LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 40.3 INCHES REARWARD OF FRONT WHEEL CENTERLINE

CRUSH MEASUREMENTS AT VEHICLE BUMPER HEIGHT (20 INCHES)

LOCATION	0	1	2	3	4	5	6	7	8
	X	Y	X	Y	X	Y	X	Y	X
PRE-TEST	79.2	16.5	81.2	16.5	84.0	16.5	87.0	16.6	93.0
POST-TEST 1	79.2	16.5	81.2	16.5	84.0	16.5	87.0	16.6	93.0
POST-TEST 2	79.2	16.5	81.2	16.5	84.0	16.5	87.0	16.6	93.0
POST-TEST 3	79.2	16.5	81.2	16.5	84.0	16.5	87.0	16.6	93.0
POST-TEST 4	78.5	18.1	80.6	18.1	83.2	18.0	86.2	18.0	92.2
LOCATION	9	10	11	12	13	14	15	16	17
	X	Y	X	Y	X	Y	X	Y	X
PRE-TEST	105.0	16.8	108.0	16.6	111.0	16.8	114.0	16.8	120.0
POST-TEST 1	105.0	16.8	108.0	16.6	111.0	16.8	114.0	16.8	120.0
POST-TEST 2	105.0	16.8	108.0	16.6	111.0	16.8	114.0	16.8	120.0
POST-TEST 3	105.0	16.8	108.0	16.6	111.0	16.8	114.0	16.8	120.0
POST-TEST 4	104.4	18.1	107.2	18.5	110.2	18.5	113.2	18.6	118.5
LOCATION	18	19	20	21	22	23	24	25	26
	X	Y	X	Y	X	Y	X	Y	X
PRE-TEST	132.0	16.8	135.0	16.8	138.0	16.8	141.0	16.9	144.0
POST-TEST 1	132.0	16.8	134.3	16.9	137.2	17.1	140.3	17.1	143.3
POST-TEST 2	132.0	16.8	134.5	16.8	137.5	16.9	140.6	16.8	143.4
POST-TEST 3	131.4	18.5	134.4	18.9	137.4	18.5	140.5	18.9	143.7
POST-TEST 4	129.1	20.6	132.3	20.6	135.2	20.6	138.4	20.9	141.6

All measurements are in inches. Column readings are three inches apart starting from the left B-pillar and continuing around the front of the vehicle to the right B-pillar.
 All X-axis measurements taken from a reference plane parallel to the rear bumper.
 All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.

CRUSH MEASUREMENTS AT VEHICLE BUMPER HEIGHT (20 INCHES)

LOCATION	27		28		29		30		31		32		33		34		35	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
PRE-TEST	159.0	19.5	160.5	20.2	161.4	23.0	162.1	26.0	162.5	29.1	162.8	32.1	163.0	35.1	163.2	38.1	163.3	41.1
POST-TEST 1	159.4	20.1	164.1	23.4	163.7	26.2	162.7	29.2	161.5	32.1	162.2	34.9	159.8	37.4	157.8	40.0	156.2	42.6
POST-TEST 2	159.8	20.0	164.9	24.5	163.9	27.1	162.2	30.0	161.0	32.8	159.2	35.5	157.8	37.8	155.8	40.0	153.2	41.8
POST-TEST 3	160.4	23.7	164.5	29.7	162.9	32.4	161.2	34.7	159.2	36.7	156.6	39.0	154.5	40.7	151.8	42.0	149.5	42.8
POST-TEST 4	157.0	30.6	156.8	38.1	154.4	39.9	151.9	41.3	149.1	42.4	146.2	43.5	143.6	44.3	140.2	45.0	137.5	45.3
LOCATION	36	37	38	39	40	41	42	43	44									
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
PRE-TEST	163.2	44.1	163.4	47.1	163.4	50.1	163.3	53.1	163.4	56.1	163.1	59.1	163.0	62.1	162.7	65.1	162.2	68.2
POST-TEST 1	153.9	44.8	152.2	47.1	153.5	49.8	155.1	52.5	157.0	54.5	158.6	57.2	159.9	60.2	161.0	62.7	162.3	65.8
POST-TEST 2	151.2	43.9	150.5	46.5	151.0	49.4	152.8	51.0	154.9	53.5	157.1	56.0	158.6	58.5	160.3	61.2	161.5	63.8
POST-TEST 3	147.0	44.9	146.2	46.8	147.0	49.7	148.5	51.5	151.0	53.3	153.4	54.5	156.0	57.8	157.8	59.9	159.5	61.9
POST-TEST 4	135.4	46.7	134.1	50.7	133.8	50.0	135.0	52.7	137.1	54.5	139.2	55.6	142.9	55.5	145.3	56.1	148.4	57.4
LOCATION	45	46	47	48	49	50	51	52	53									
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
PRE-TEST	161.9	71.2	161.1	74.1	160.1	77.1	157.4	76.9	154.4	77.2	151.4	77.6	148.4	77.7	145.4	78.1	142.4	78.8
POST-TEST 1	162.9	68.4	163.6	71.0	163.9	74.1	157.2	76.3	154.2	77.1	151.1	77.5	148.1	78.0	145.1	78.0	141.9	78.6
POST-TEST 2	162.6	66.6	163.5	69.4	164.3	72.2	157.1	75.9	154.2	76.2	151.1	76.8	148.1	77.4	145.2	77.8	141.9	78.2
POST-TEST 3	161.3	65.0	163.1	68.0	164.1	70.4	157.4	76.3	154.5	77.3	151.3	78.0	148.3	78.5	145.4	79.5	142.2	79.4
POST-TEST 4	151.2	58.0	153.8	59.3	156.2	60.5	155.4	70.5	152.6	72.0	149.4	74.5	146.4	76.3	143.5	78.7	140.1	79.3

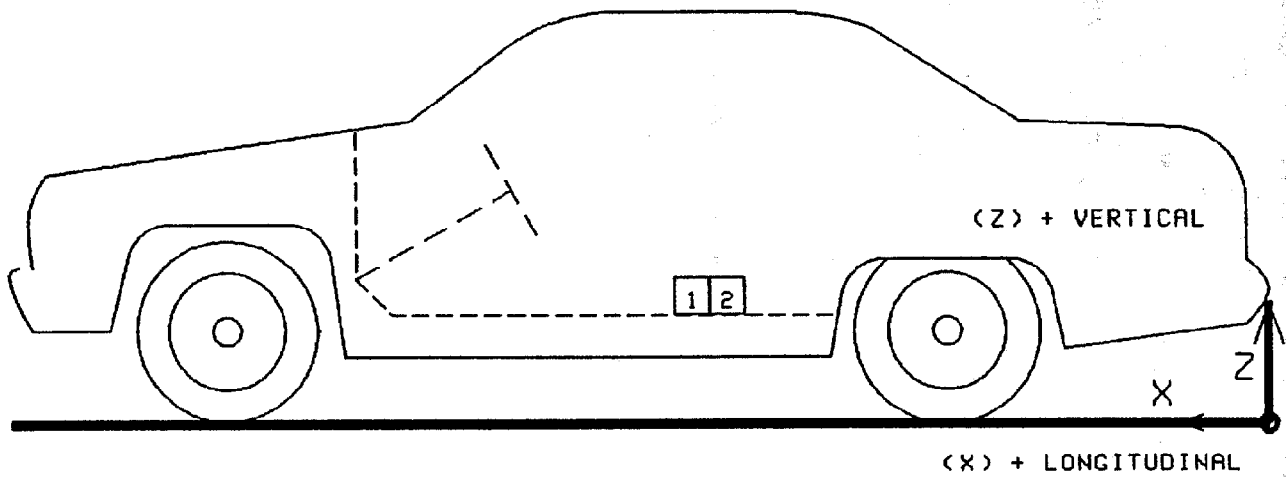
All measurements are in inches. Column readings are three inches apart starting from the left B-pillar and continuing around the front of the vehicle to the right B-pillar.
 All X-axis measurements taken from a reference plane parallel to the rear bumper.
 All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.

CRUSH MEASUREMENTS AT VEHICLE BUMPER HEIGHT (20 INCHES)

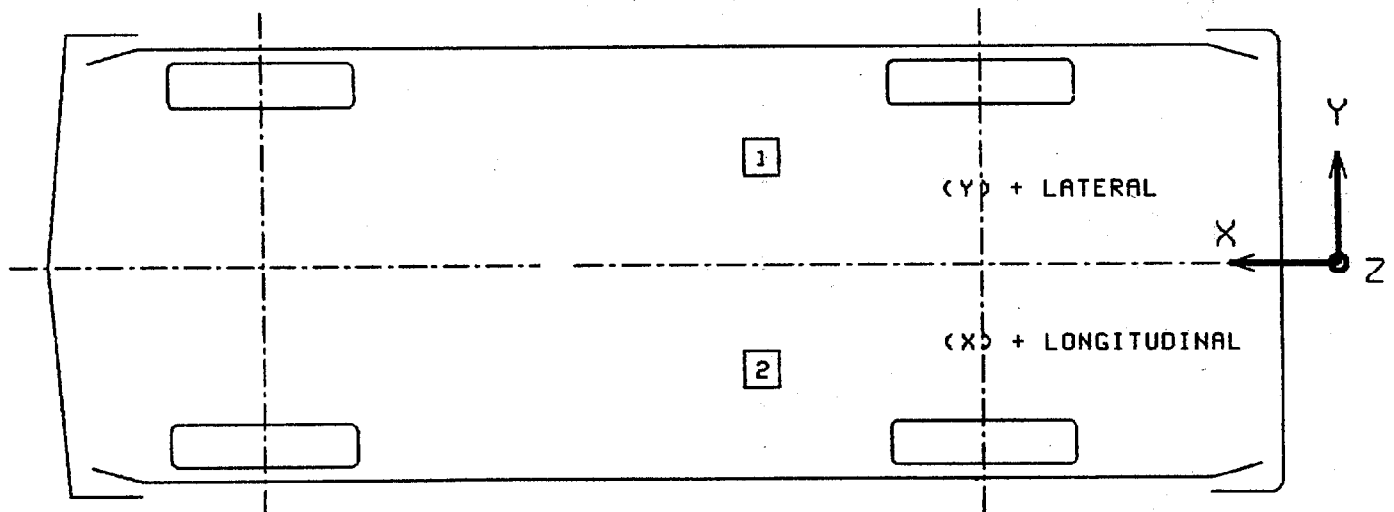
LOCATION	54		55		56		57		58		59		60		61		62	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
PRE-TEST	139.4	78.9	136.4	79.2	133.4	78.9	130.4	78.8	127.2	79.0	124.4	79.0	121.4	79.2	118.2	78.9	115.2	79.1
POST-TEST 1	139.0	79.1	135.9	78.8	133.0	78.9	130.4	78.8	127.2	79.0	124.4	79.6	121.4	79.2	118.2	78.9	115.2	79.1
POST-TEST 2	139.1	78.3	136.0	78.8	133.1	78.5	130.4	78.8	127.2	79.0	124.4	79.0	121.4	79.2	118.2	78.9	115.2	79.1
POST-TEST 3	139.2	79.6	136.1	80.0	133.2	80.0	130.5	79.9	127.2	80.3	124.4	80.7	121.2	80.3	118.1	80.5	115.2	79.1
POST-TEST 4	136.9	79.4	133.8	79.0	130.9	78.7	128.2	79.5	124.7	80.3	122.1	79.9	119.2	81.0	116.2	82.5	114.6	80.3
LOCATION	63		64		65		66		67		68		69		70		71	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
PRE-TEST	112.2	78.9	109.2	79.2	106.2	78.9	103.2	79.2	100.2	78.9	97.2	79.0	94.2	79.1	91.4	79.0	88.4	79.2
POST-TEST 1	112.2	78.9	109.2	79.2	106.2	78.9	103.2	79.2	100.2	78.9	97.2	79.0	94.2	79.1	91.4	79.0	88.4	79.2
POST-TEST 2	112.2	78.9	109.2	79.2	106.2	78.9	103.2	79.2	100.2	78.9	97.2	79.0	94.2	79.1	91.4	79.0	88.4	79.2
POST-TEST 3	112.2	78.9	109.2	79.2	106.2	78.9	103.2	79.2	100.2	78.9	97.2	79.0	94.2	79.1	91.4	79.0	88.4	79.2
POST-TEST 4	111.8	81.0	108.6	80.7	105.6	80.6	102.4	81.6	99.6	80.7	96.6	81.0	93.6	81.3	90.7	81.0	87.8	80.5

All measurements are in inches. Column readings are three inches apart starting from the left B-pillar and continuing around the front of the vehicle to the right B-pillar.
 All X-axis measurements taken from a reference plane parallel to the rear bumper.
 All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.

VEHICLE ACCELEROMETER PLACEMENT

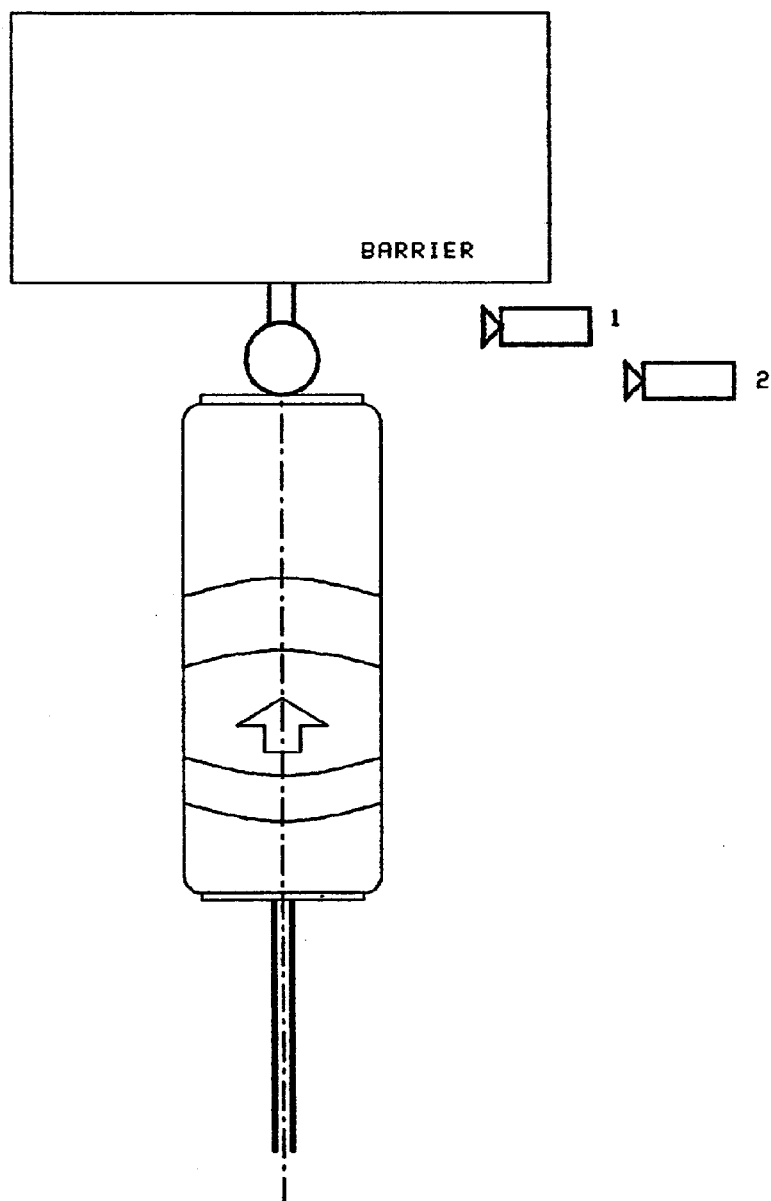


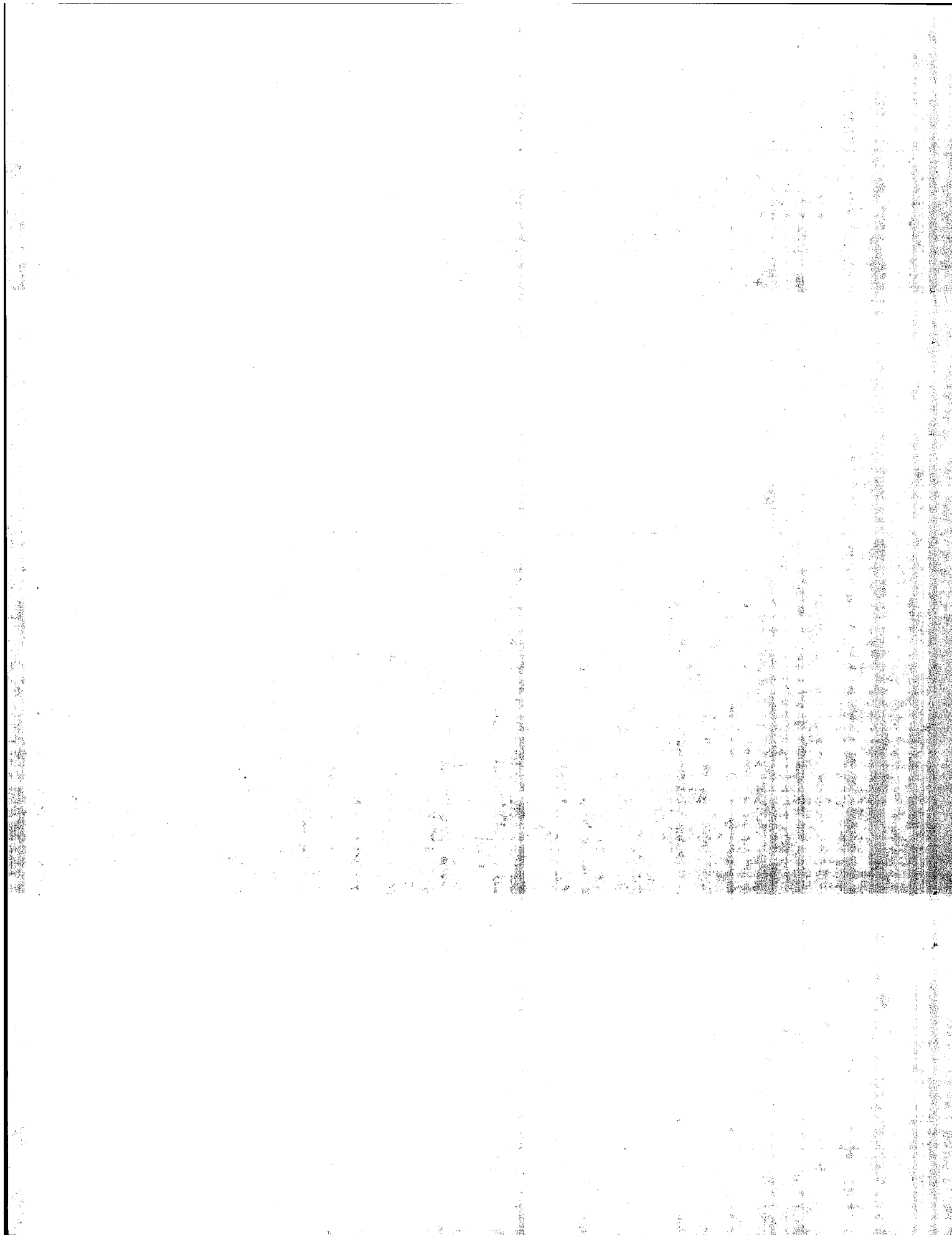
SIDE VIEW



BOTTOM VIEW

CAMERA POSITIONS





SECTION 3.0

TEST 910502-1 SUMMARY

TEST CONDITIONS

TEST NUMBER: 910502-1

DATE OF TEST: 05/02/91

TIME OF TEST: 1011

AMBIENT TEMPERATURE AT IMPACT AREA: 59° F

INTENDED IMPACT VELOCITY: 10.0 MPH

ACTUAL IMPACT VELOCITY: 9.5 MPH

SUBJECT VEHICLE DATA

LENGTH OF DIRECT CONTACT DAMAGE: 10.5

MAXIMUM CUMULATIVE CRUSH
AT VEHICLE BUMPER HEIGHT: 11.2

VEHICLE ATTITUDES:

POST-TEST: LF: NA; RF: NA; LR: NA; RR: NA

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

VEHICLE CRUSH AT VEHICLE BUMPER HEIGHT

TEST NO. 910502-1

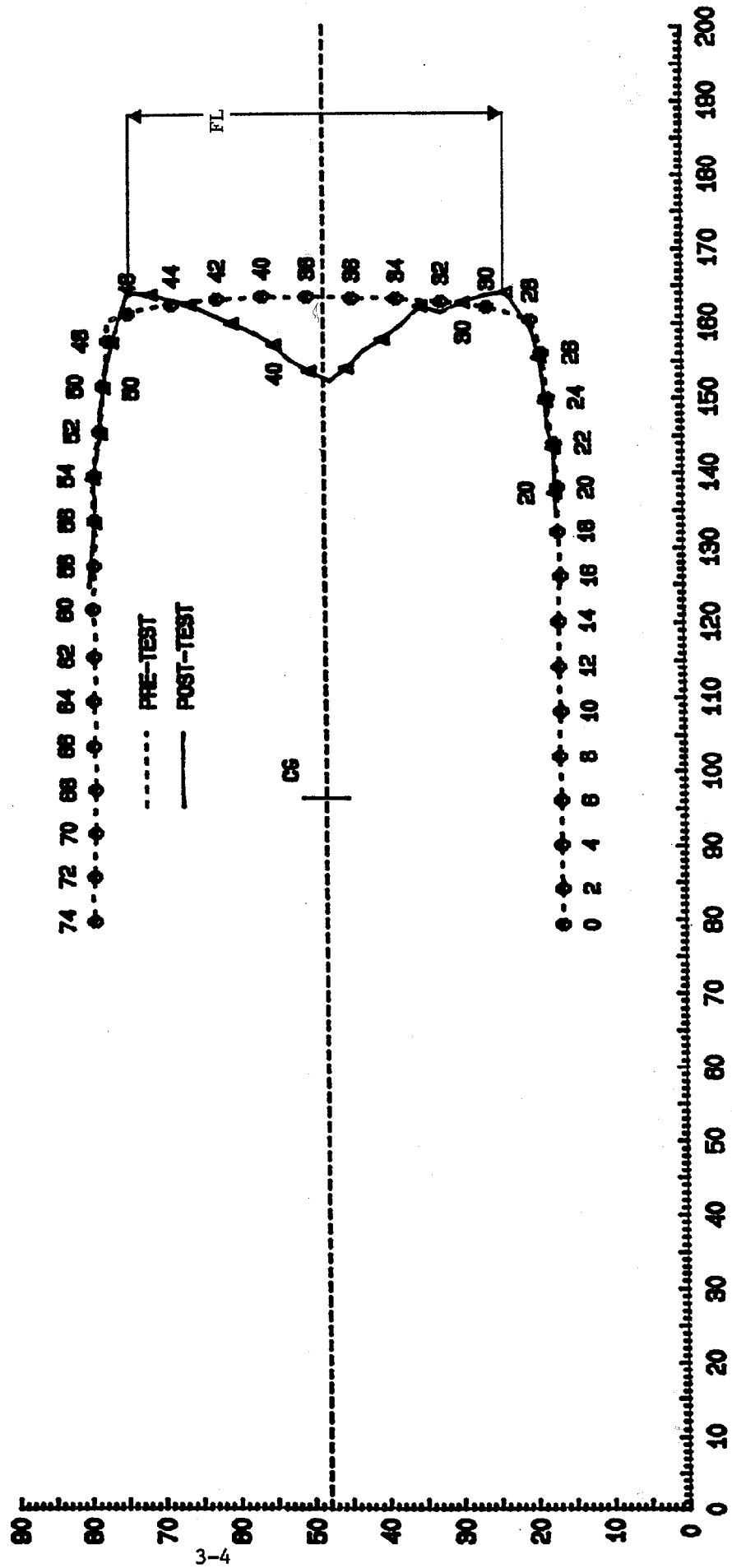
L	<u>57.5</u>
C1	<u>-3.1</u>
C2	<u>1.6</u>
C3	<u>6.5</u>
C4	<u>8.8</u>
C5	<u>0.9</u>
C6	<u>-2.5</u>
CL	<u>11.2</u>

NOTES: L is pre-test length of damage surface
CL is vehicle centerline

Measurements C1 - C6 were spaced equally apart over the post-impact corner to corner length of the vehicle front. This distance is defined as length "FL" on the vehicle crush profile plot.

ALL MEASUREMENTS ARE IN INCHES

TEST 1 -- VEHICLE CRUSH PROFILE



VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 910502-1

J. LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
				MAX	G MSEC	MAX	G MSEC
LEFT REAR SEAT	64.8	17.5	14.2				
ACCELERATION							
LONGITUDINAL				1.1	149.4	8.0	98.5
LATERAL				0.6	174.8	0.6	228.6
RESULTANT				8.0	98.5		
RIGHT REAR SEAT	64.5	-16.6	14.4				
ACCELERATION							
LONGITUDINAL				0.9	148.6	8.2	95.3
LATERAL				0.7	105.6	0.5	78.9
RESULTANT				8.2	95.3		

ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM VEHICLE'S REAR BUMPER
 Y: + LEFTWARD FROM VEHICLE'S LONGITUDINAL CENTERLINE
 Z: + UPWARD FROM GROUND LEVEL

TEST NO. 910502-1
CAMERA INFORMATION

CAMERA NUMBER	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Right side overall	Photosonic 1B	13	495	Impact overall
2	Right side closeup	Photosonic 1B	25	500	Impact closeup

SECTION 4.0

TEST 910502-2 SUMMARY

TEST CONDITIONS

TEST NUMBER: 910502-2

DATE OF TEST: 05/02/91

TIME OF TEST: 1106

AMBIENT TEMPERATURE AT IMPACT AREA: 61° F

INTENDED IMPACT VELOCITY: 10.0 MPH

ACTUAL IMPACT VELOCITY: 9.6 MPH

SUBJECT VEHICLE DATA

LENGTH OF DIRECT CONTACT DAMAGE: 12.0

MAXIMUM CUMULATIVE CRUSH
AT VEHICLE BUMPER HEIGHT: 12.8

VEHICLE ATTITUDES:

POST-TEST: LF: NA; RF: NA; LR: NA; RR: NA

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

VEHICLE CRUSH AT VEHICLE BUMPER HEIGHT

TEST NO. 910502-2

L	<u>57.5</u>
C1	<u>-2.6</u>
C2	<u>2.2</u>
C3	<u>8.8</u>
C4	<u>11.9</u>
C5	<u>2.8</u>
C6	<u>-3.1</u>
CL	<u>12.5</u>

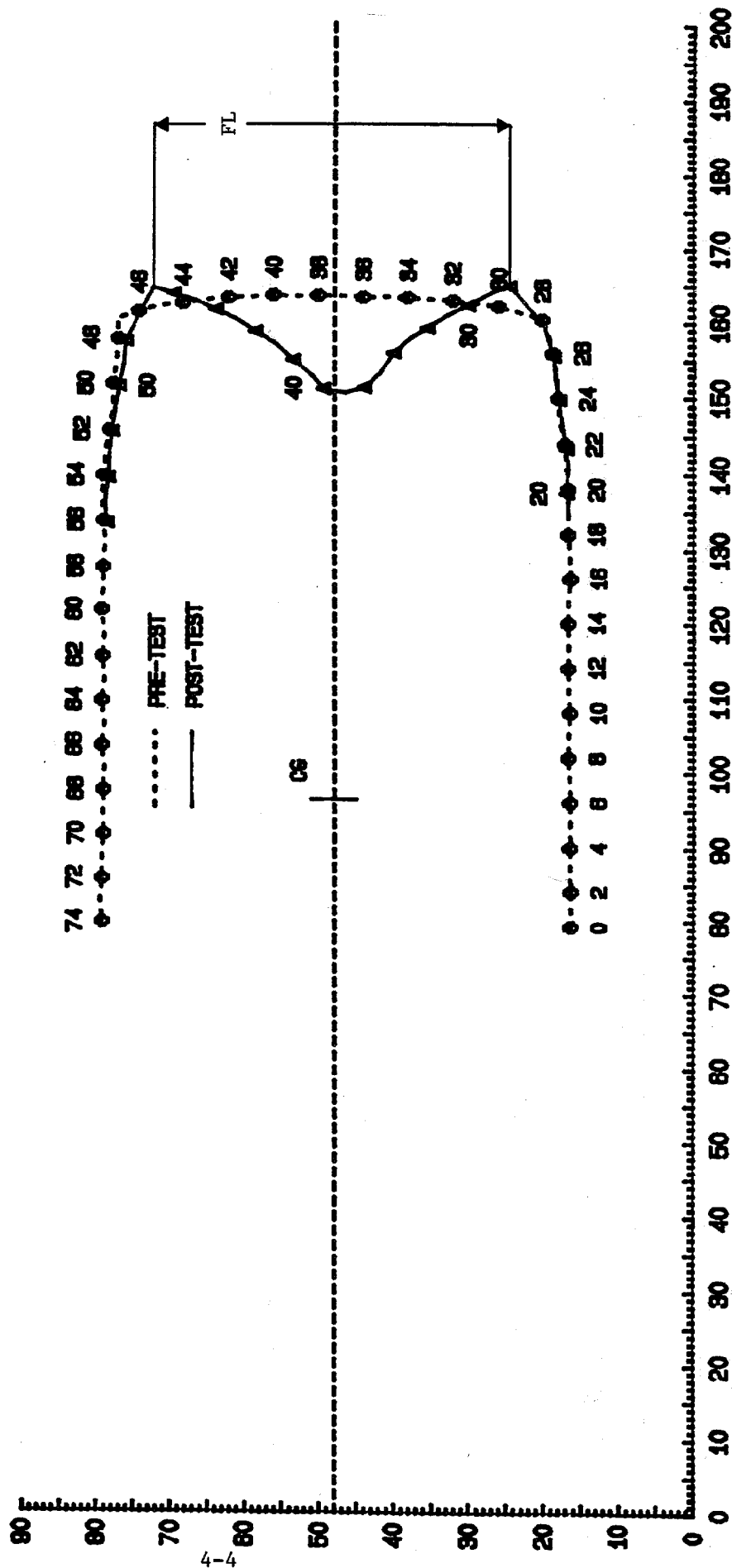
NOTES: L is pre-test length of damage surface

CL is vehicle centerline

Measurements C1 - C6 were spaced equally apart over the post-impact corner to corner length of the vehicle front. This distance is defined as length "FL" on the vehicle crush profile plot.

ALL MEASUREMENTS ARE IN INCHES

TEST 2 -- VEHICLE CRUSH PROFILE



VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 910502-2

No. LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
				MAX	G MSEC	MAX	G MSEC
1 LEFT REAR SEAT	64.8	17.5	14.2				
ACCELERATION							
LONGITUDINAL				1.6	116.4	15.2	58.8
LATERAL				1.1	111.4	1.3	70.0
RESULTANT				15.3	58.8		
2 RIGHT REAR SEAT	64.5	-16.6	14.4				
ACCELERATION							
LONGITUDINAL				2.0	113.5	15.3	58.3
LATERAL				0.9	110.3	0.8	58.0
RESULTANT				15.3	58.3		

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM VEHICLE'S REAR BUMPER
Y: + LEFTWARD FROM VEHICLE'S LONGITUDINAL CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

TEST NO. 910502-2
CAMERA INFORMATION

CAMERA NUMBER	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Right side overall	Photosonic 1B	13	493	Impact overall
2	Right side closeup	Photosonic 1B	25	495	Impact closeup

SECTION 5.0

TEST 910502-3 SUMMARY

TEST CONDITIONS

TEST NUMBER: 910502-3

DATE OF TEST: 05/02/91

TIME OF TEST: 1326

AMBIENT TEMPERATURE AT IMPACT AREA: 68° F

INTENDED IMPACT VELOCITY: 15.0 MPH

ACTUAL IMPACT VELOCITY: 14.6 MPH

SUBJECT VEHICLE DATA

LENGTH OF DIRECT CONTACT DAMAGE: 12.0

MAXIMUM CUMULATIVE CRUSH

AT VEHICLE BUMPER HEIGHT: 17.5

VEHICLE ATTITUDES:

POST-TEST: LF: NA; RF: NA; LR: NA; RR: NA

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

VEHICLE CRUSH AT VEHICLE BUMPER HEIGHT

TEST NO. 910502-3

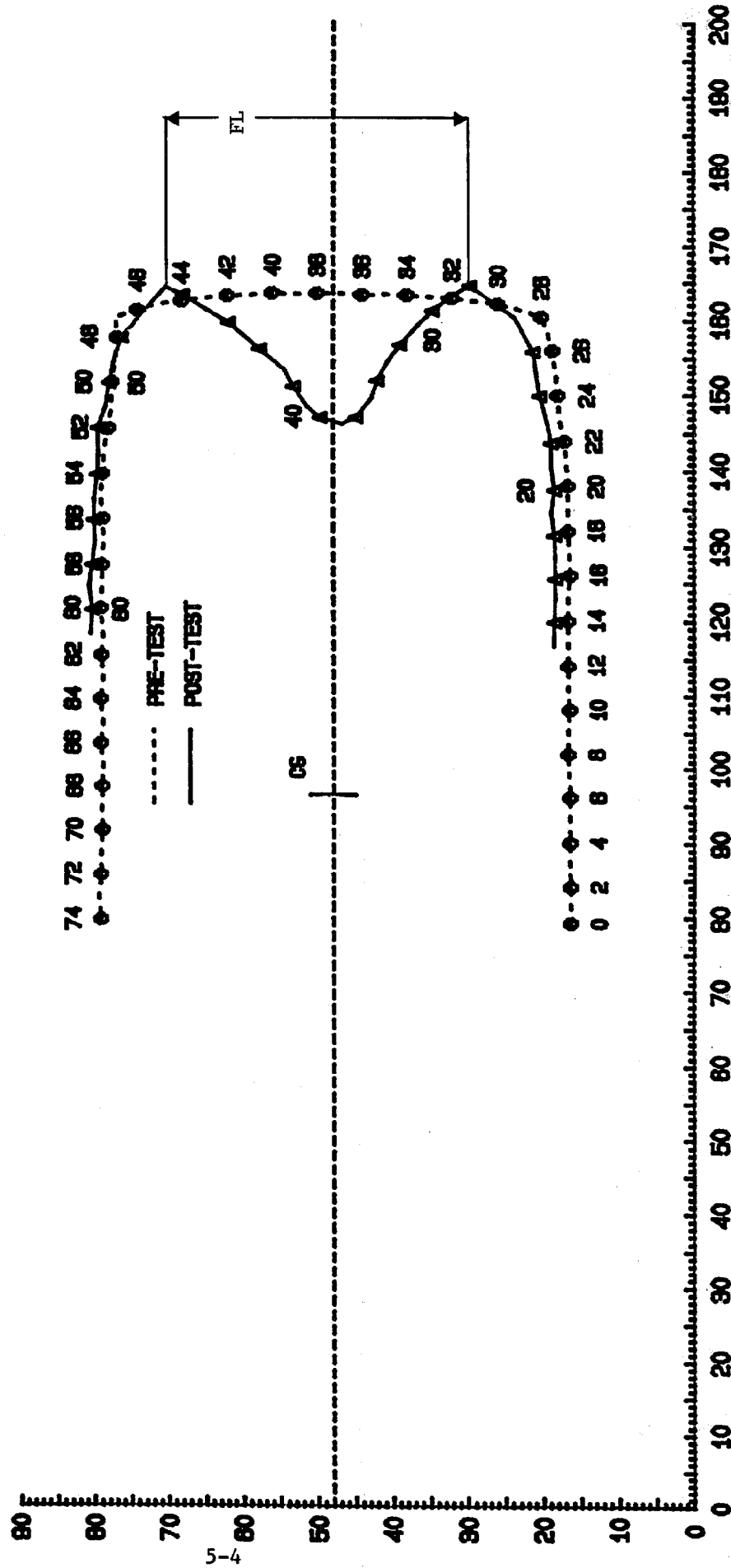
L	<u>57.5</u>
C1	<u>-2.2</u>
C2	<u>3.8</u>
C3	<u>10.6</u>
C4	<u>16.5</u>
C5	<u>5.0</u>
C6	<u>-1.9</u>
CL	<u>16.9</u>

NOTES: L is pre-test length of damage surface
CL is vehicle centerline

Measurements C1 - C6 were spaced equally apart over the post-impact corner to corner length of the vehicle front. This distance is defined as length "FL" on the vehicle crush profile plot.

ALL MEASUREMENTS ARE IN INCHES

TEST 3 -- VEHICLE CRUSH PROFILE



VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 910502-3

No. LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
				MAX G MSEC		MAX G MSEC	
1 LEFT REAR SEAT	64.8	17.5	14.2				
ACCELERATION							
LONGITUDINAL				3.8	184.6	19.2	59.1
LATERAL				1.6	90.4	1.5	48.9
RESULTANT				19.3	59.1		
2 RIGHT REAR SEAT	64.5	-16.6	14.4				
ACCELERATION							
LONGITUDINAL				3.0	187.5	20.8	52.8
LATERAL				2.2	73.0	1.5	40.9
RESULTANT				20.8	52.8		

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM VEHICLE'S REAR BUMPER
Y: + LEFTWARD FROM VEHICLE'S LONGITUDINAL CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

TEST NO. 910502-3
CAMERA INFORMATION

CAMERA NUMBER	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Right side overall	Photosonic 1B	13	498	Impact overall
2	Right side closeup	Photosonic 1B	25	498	Impact closeup

SECTION 6.0

TEST 910502-4 SUMMARY

TEST CONDITIONS

TEST NUMBER: 910502-4

DATE OF TEST: 05/02/91

TIME OF TEST: 1510

AMBIENT TEMPERATURE AT IMPACT AREA: 70° F

INTENDED IMPACT VELOCITY: 30.0 MPH

ACTUAL IMPACT VELOCITY: 29.6 MPH

SUBJECT VEHICLE DATA

LENGTH OF DIRECT CONTACT DAMAGE: 13.9

MAXIMUM CUMULATIVE CRUSH
AT VEHICLE BUMPER HEIGHT: 29.4

VEHICLE ATTITUDES:

POST-TEST: LF: 27.6; RF: 26.2; LR: 23.8; RR: 23.0

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

VEHICLE CRUSH AT VEHICLE BUMPER HEIGHT

TEST NO. 910502-4

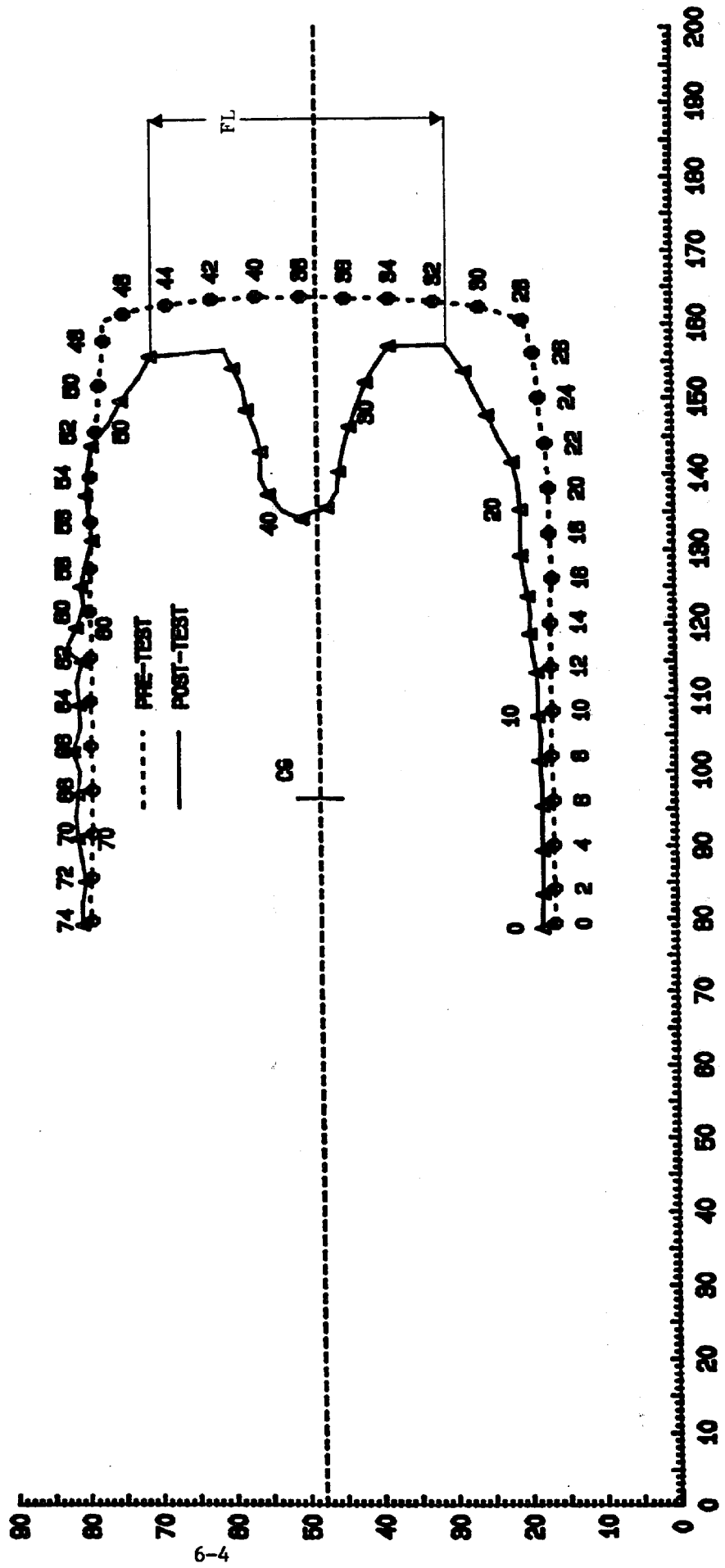
L	<u>57.5</u>
C1	<u>6.9</u>
C2	<u>6.9</u>
C3	<u>26.6</u>
C4	<u>28.1</u>
C5	<u>6.6</u>
C6	<u>5.9</u>
CL	<u>28.1</u>

NOTES: L is pre-test length of damage surface
CL is vehicle centerline

Measurements C1 - C6 were spaced equally apart over the post-impact corner to corner length of the vehicle front. This distance is defined as length "FL" on the vehicle crush profile plot.

ALL MEASUREMENTS ARE IN INCHES

TEST 4 - VEHICLE CRUSH PROFILE



VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 910502-4

No. LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
				MAX	G MSEC	MAX	G MSEC
1 LEFT REAR SEAT	64.8	17.5	14.2				
ACCELERATION							
LONGITUDINAL				3.1	112.8	34.3	32.3
LATERAL				3.5	19.5	2.7	4.6
RESULTANT				34.3	32.1		
2 RIGHT REAR SEAT	64.5	-16.6	14.4				
ACCELERATION							
LONGITUDINAL				3.8	111.5	33.8	31.4
LATERAL				3.2	53.6	2.4	4.1
RESULTANT				33.9	31.4		

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM VEHICLE'S REAR BUMPER
Y: + LEFTWARD FROM VEHICLE'S LONGITUDINAL CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

TEST NO. 910502-4
CAMERA INFORMATION

CAMERA NUMBER	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Right side overall	Photosonic 1B	13	495	Impact overall
2	Right side closeup	Photosonic 1B	25	498	Impact closeup

APPENDIX A

PHOTOGRAPHS

TEST NO. 910502-1
LIST OF PHOTOGRAPHS

1. PRE-TEST FRONT VIEW
2. POST-TEST FRONT VIEW
3. PRE-TEST LEFT SIDE VIEW
4. POST-TEST LEFT SIDE VIEW
5. PRE-TEST LEFT SIDE CLOSEUP VIEW
6. POST-TEST LEFT SIDE CLOSEUP VIEW
7. PRE-TEST RIGHT SIDE VIEW
8. POST-TEST RIGHT SIDE VIEW
9. PRE-TEST RIGHT SIDE CLOSEUP VIEW
10. POST-TEST RIGHT SIDE CLOSEUP VIEW
11. PRE-TEST REAR VIEW
12. POST-TEST REAR VIEW
13. PRE-TEST LEFT FRONT THREE-QUARTER VIEW
14. POST-TEST LEFT FRONT THREE-QUARTER VIEW
15. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW
16. POST-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-1. PRE-TEST FRONT VIEW



Figure A-2. POST-TEST FRONT VIEW



Figure A-3. PRE-TEST LEFT SIDE VIEW



Figure A-4. POST-TEST LEFT SIDE VIEW



Figure A-7. PRE-TEST RIGHT SIDE VIEW



Figure A-8. POST-TEST RIGHT SIDE VIEW



Figure A-5. PRE-TEST LEFT SIDE CLOSEUP VIEW



Figure A-6. POST-TEST LEFT SIDE CLOSEUP VIEW



Figure A-9. PRE-TEST RIGHT SIDE CLOSEUP VIEW



Figure A-10. POST-TEST RIGHT SIDE CLOSEUP VIEW



Figure A-11. PRE-TEST REAR VIEW



Figure A-12. POST-TEST REAR VIEW



Figure A-13. PRE-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-14. POST-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-15. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-16. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

TEST NO. 910502-2
LIST OF PHOTOGRAPHS

1. POST-TEST FRONT VIEW
2. POST-TEST LEFT SIDE VIEW
3. POST-TEST LEFT SIDE CLOSEUP VIEW
4. POST-TEST RIGHT SIDE VIEW
5. POST-TEST RIGHT SIDE CLOSEUP VIEW
6. POST-TEST REAR VIEW
7. POST-TEST LEFT FRONT THREE-QUARTER VIEW
8. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

TEST NO. 910502-3

LIST OF PHOTOGRAPHS

1. POST-TEST FRONT VIEW
2. POST-TEST LEFT SIDE VIEW
3. POST-TEST LEFT SIDE CLOSEUP VIEW
4. POST-TEST RIGHT SIDE VIEW
5. POST-TEST RIGHT SIDE CLOSEUP VIEW
6. POST-TEST LEFT FRONT THREE-QUARTER VIEW
7. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

TEST NO. 910502-4
LIST OF PHOTOGRAPHS

1. POST-TEST FRONT VIEW
2. POST-TEST LEFT SIDE VIEW
3. POST-TEST LEFT SIDE CLOSEUP VIEW
4. POST-TEST RIGHT SIDE VIEW
5. POST-TEST RIGHT SIDE CLOSEUP VIEW
6. POST-TEST REAR VIEW
7. POST-TEST LEFT FRONT THREE-QUARTER VIEW
8. POST-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-1. POST-TEST FRONT VIEW



Figure A-2. POST-TEST LEFT SIDE VIEW



Figure A-3. POST-TEST LEFT SIDE CLOSEUP VIEW



Figure A-4. POST-TEST RIGHT SIDE VIEW



Figure A-5. POST-TEST RIGHT SIDE CLOSEUP VIEW



Figure A-6. POST-TEST REAR VIEW



Figure A-7. POST-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-8. POST-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-1. POST-TEST FRONT VIEW



Figure A-2. POST-TEST LEFT SIDE VIEW



Figure A-3. POST-TEST LEFT SIDE CLOSEUP VIEW



Figure A-4. POST-TEST RIGHT SIDE VIEW



Figure A-5. POST-TEST RIGHT SIDE CLOSEUP VIEW



Figure A-6. POST-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-7. POST-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-1. POST-TEST FRONT VIEW



Figure A-2. POST-TEST LEFT SIDE VIEW



Figure A-3. POST-TEST LEFT SIDE CLOSEUP VIEW



Figure A-4. POST-TEST RIGHT SIDE VIEW



Figure A-5. POST-TEST RIGHT SIDE CLOSEUP VIEW



Figure A-6. POST-TEST REAR VIEW



Figure A-7. POST-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-8. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

APPENDIX B

DATA PLOTS

DATA PLOTS

TEST NO. 910502-1

CRASH III DAMAGE ALGORITHM

91122

TLRXG1

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES =

-8.01e

98.50,

1.12 e

149.38

60.00

45.00

30.00

15.00

0.00

-15.00

-30.00

-45.00

-60.00

ACCELERATION (G)

-20.00

10.00

40.00

70.00

100.00

130.00

160.00

190.00

220.00

250.00

280.00

310.00

340

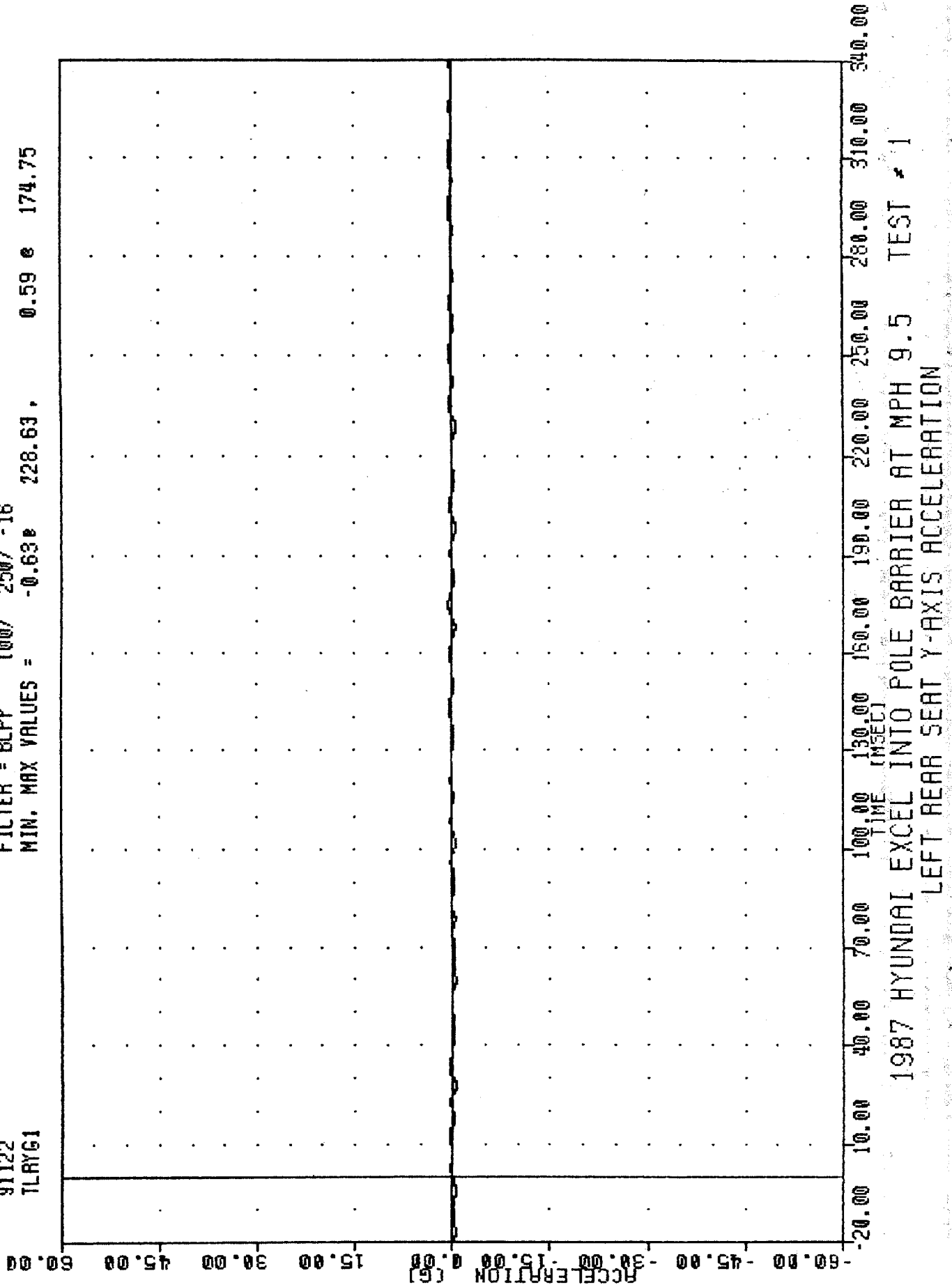
TIME (MSEC)

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.5 TEST # 1

LEFT REAR SEAT X-AXIS ACCELERATION

TRC
 CRASH III DAMAGE ALGORITHM
 91122
 TLRYG1

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -0.63 228.63 0.59 174.75



CRASH III DAMAGE ALGORITHM

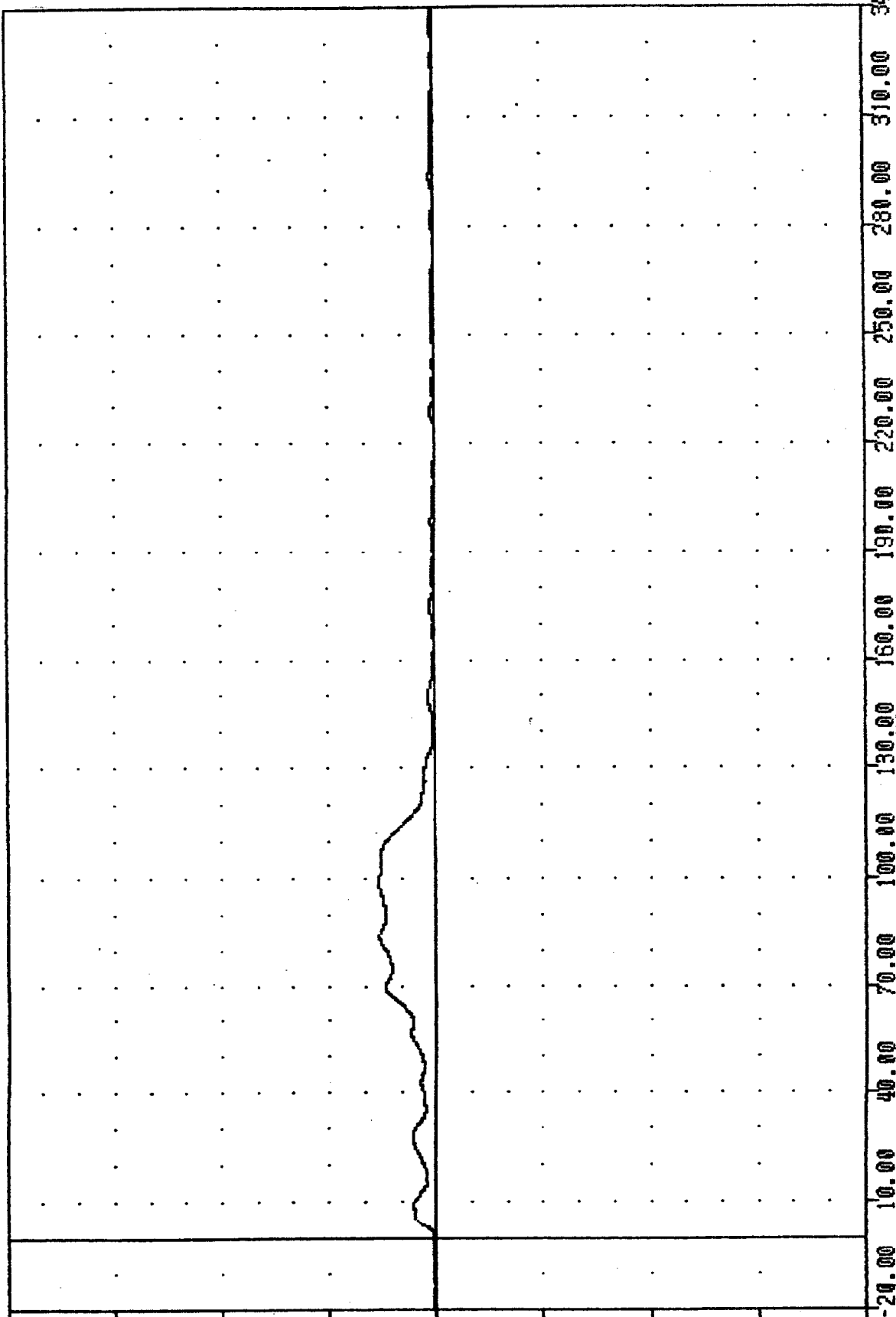
91122

TLR61

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = 0.00E 321.00 , 8.01 E 98.50

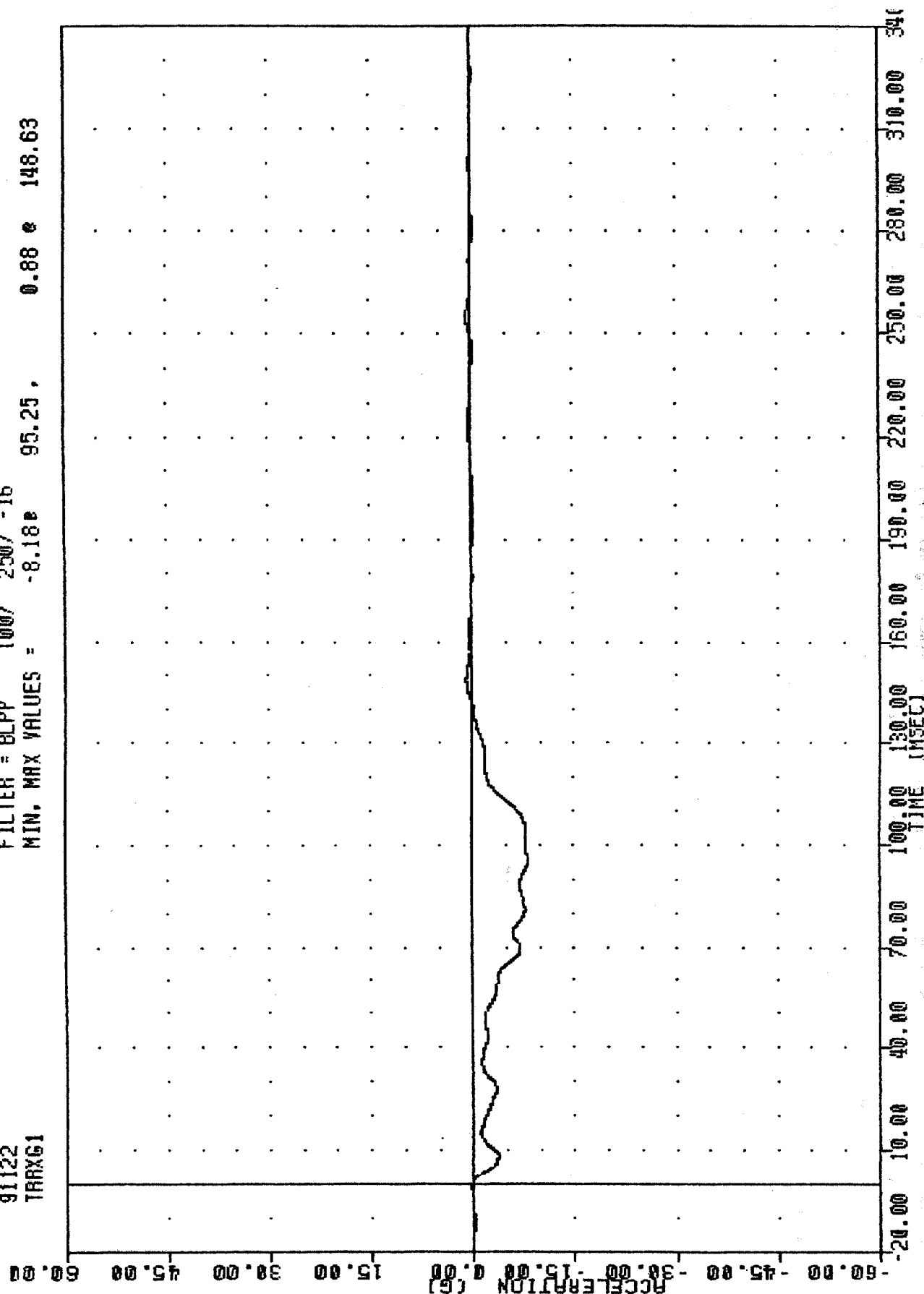
ACCELERATION (G)



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.5 TEST # 1
LEFT REAR SEAT RESULTANT ACCELERATION

TRC 910502-1
 CRASH III DAMAGE ALGORITHM
 91122
 TRAXG1

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -8.18e 95.25 , 0.88 e 148.63



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.5 TEST # 1
 RIGHT REAR SEAT X-AXIS ACCELERATION

CRASH III DAMAGE ALGORITHM

91122
TTRY61

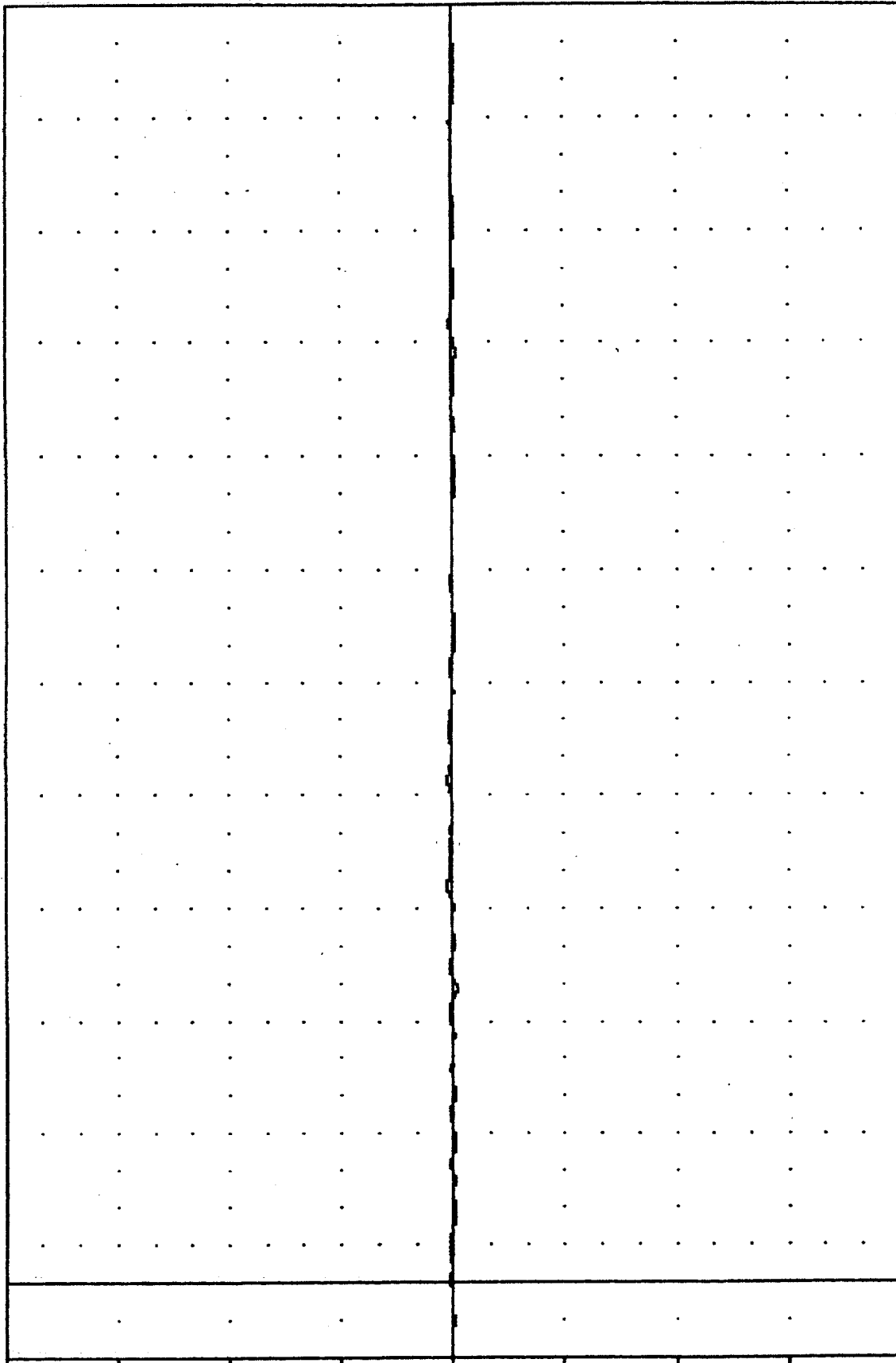
FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -0.500 78.88 0.69 105.63

60.00
45.00
30.00
15.00
0.00
-15.00
-30.00
-45.00
-60.00

B7

ACCELERATION (G)



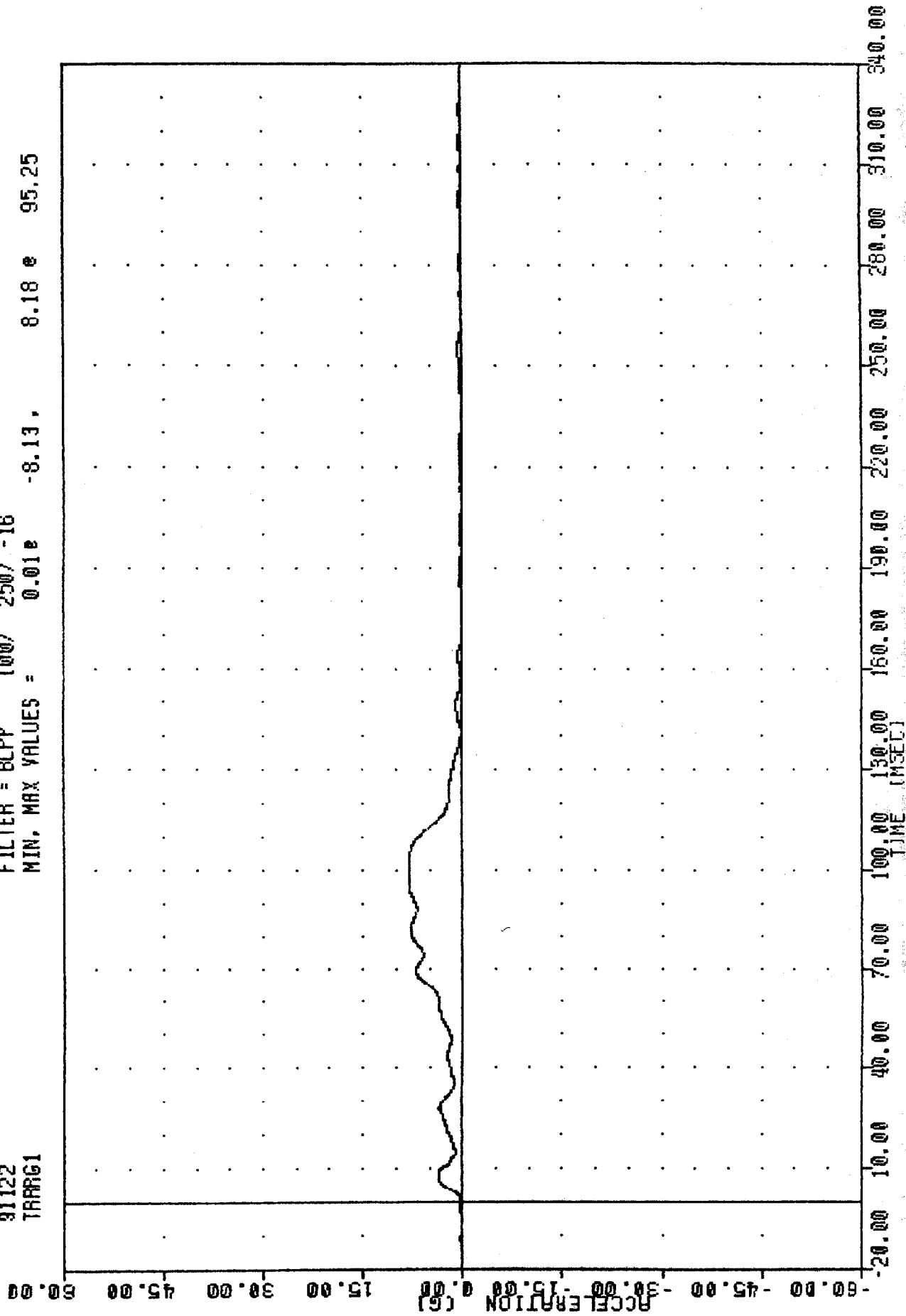
20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

TIME (MSEC)

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.5 TEST # 1
RIGHT REAR SEAT Y-AXIS ACCELERATION

TRC
CRASH III DAMAGE ALGORITHM
91122
TARG1

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = 0.012 -8.13, 8.18 e 95.25



CRASH III DAMAGE ALGORITHM

91122
TLRXV1

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES = -2.41e 142.13, 9.52 e 2.38

40.00

30.00

20.00

10.00

0.00

-10.00

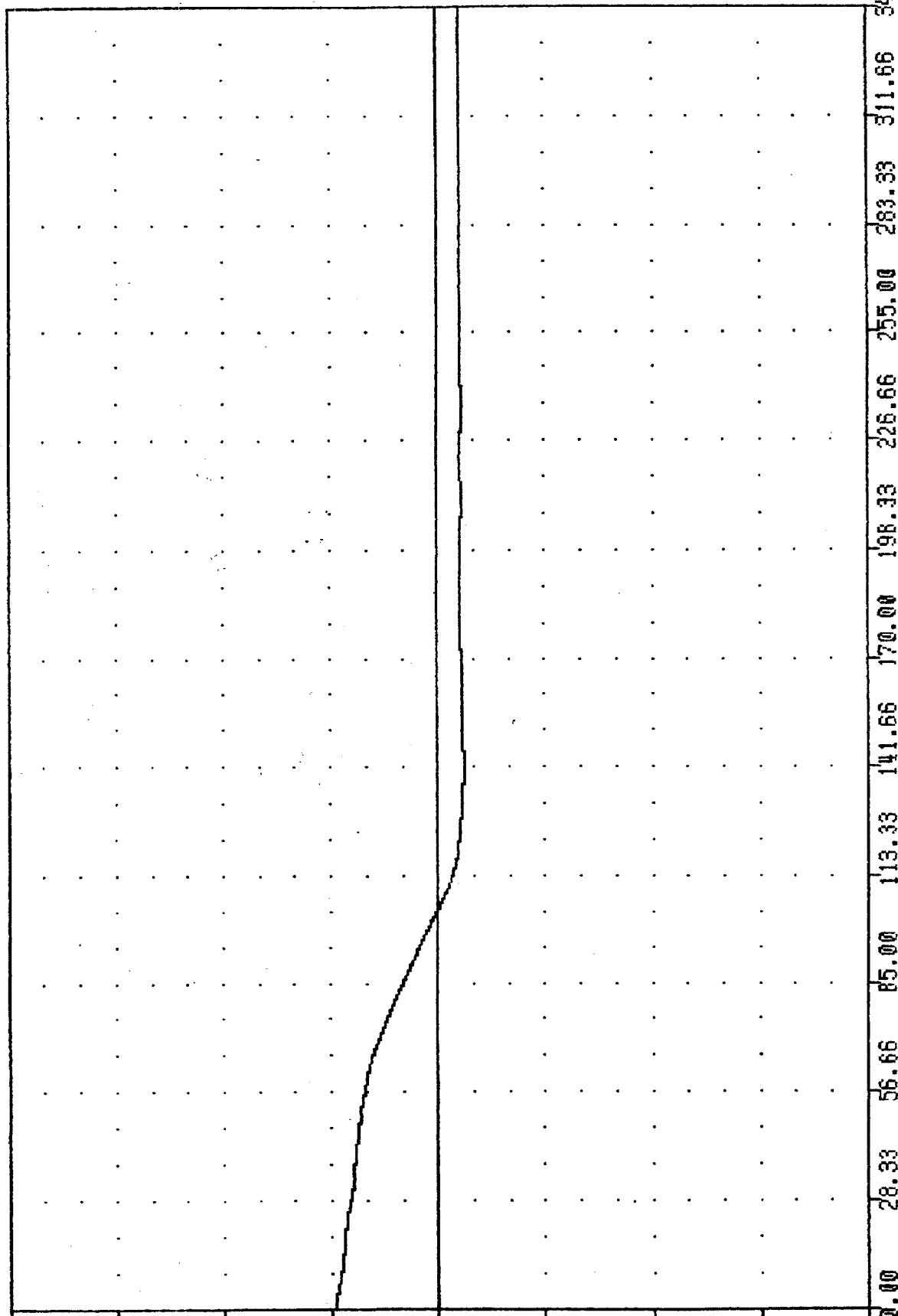
-20.00

-30.00

-40.00

89

VELOCITY (MPH)



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

TIME (MSEC)

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.5 TEST # 1

LEFT REAR SEAT X-AXIS VELOCITY

TRC
 CRASH III DAMAGE ALGORITHM
 91122
 TLRX01

, 910502-1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = 0.00 11.46 104.63

70.00

60.00

50.00

40.00

30.00

20.00

10.00

0.00

-10.00

-20.00

-30.00

-40.00

-50.00

-60.00

-70.00

-80.00

-90.00

-100.00

-110.00

-120.00

-130.00

-140.00

-150.00

-160.00

-170.00

-180.00

-190.00

-200.00

-210.00

-220.00

-230.00

-240.00

-250.00

-260.00

-270.00

-280.00

-290.00

-300.00

-310.00

-320.00

-330.00

-340.00

-350.00

-360.00

-370.00

-380.00

-390.00

-400.00

-410.00

-420.00

-430.00

-440.00

-450.00

-460.00

-470.00

-480.00

-490.00

-500.00

-510.00

-520.00

-530.00

-540.00

-550.00

-560.00

-570.00

-580.00

-590.00

-600.00

-610.00

-620.00

-630.00

-640.00

-650.00

-660.00

-670.00

-680.00

-690.00

-700.00

-710.00

-720.00

-730.00

-740.00

-750.00

-760.00

-770.00

-780.00

-790.00

-800.00

-810.00

-820.00

-830.00

-840.00

-850.00

-860.00

-870.00

-880.00

-890.00

-900.00

-910.00

-920.00

-930.00

-940.00

-950.00

-960.00

-970.00

-980.00

-990.00

-1000.00

-1010.00

-1020.00

-1030.00

-1040.00

-1050.00

-1060.00

-1070.00

-1080.00

-1090.00

-1100.00

-1110.00

-1120.00

-1130.00

-1140.00

-1150.00

-1160.00

-1170.00

-1180.00

-1190.00

-1200.00

-1210.00

-1220.00

-1230.00

-1240.00

-1250.00

-1260.00

-1270.00

-1280.00

-1290.00

-1300.00

-1310.00

-1320.00

-1330.00

-1340.00

-1350.00

-1360.00

-1370.00

-1380.00

-1390.00

-1400.00

-1410.00

-1420.00

-1430.00

-1440.00

-1450.00

-1460.00

-1470.00

-1480.00

-1490.00

-1500.00

-1510.00

-1520.00

-1530.00

-1540.00

-1550.00

-1560.00

-1570.00

-1580.00

-1590.00

-1600.00

-1610.00

-1620.00

-1630.00

-1640.00

-1650.00

-1660.00

-1670.00

-1680.00

-1690.00

-1700.00

-1710.00

-1720.00

-1730.00

-1740.00

-1750.00

-1760.00

-1770.00

-1780.00

-1790.00

-1800.00

-1810.00

-1820.00

-1830.00

-1840.00

-1850.00

-1860.00

-1870.00

-1880.00

-1890.00

-1900.00

-1910.00

-1920.00

-1930.00

-1940.00

-1950.00

-1960.00

-1970.00

-1980.00

-1990.00

-2000.00

-2010.00

-2020.00

-2030.00

-2040.00

-2050.00

-2060.00

-2070.00

-2080.00

-2090.00

-2100.00

-2110.00

-2120.00

-2130.00

-2140.00

-2150.00

-2160.00

-2170.00

-2180.00

-2190.00

-2200.00

-2210.00

-2220.00

-2230.00

-2240.00

-2250.00

-2260.00

-2270.00

-2280.00

-2290.00

-2300.00

-2310.00

-2320.00

-2330.00

-2340.00

-2350.00

-2360.00

-2370.00

-2380.00

-2390.00

-2400.00

-2410.00

-2420.00

-2430.00

-2440.00

-2450.00

-2460.00

-2470.00

-2480.00

-2490.00

-2500.00

-2510.00

-2520.00

-2530.00

-2540.00

-2550.00

-2560.00

-2570.00

-2580.00

-2590.00

-2600.00

-2610.00

-2620.00

-2630.00

-2640.00

-2650.00

-2660.00

-2670.00

-2680.00

-2690.00

-2700.00

-2710.00

-2720.00

CRASH III DAMAGE ALGORITHM

91122

TLRYV1

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES = -0.14e 105.38e

0.24e 340.00

40.00

30.00

20.00

10.00

0.00

-10.00

-20.00

-30.00

-40.00

B11

VELOCITY (MPH)

0.00

28.33

56.66

85.00

113.33

141.66

170.00

198.33

226.66

255.00

283.33

311.66

34

(MSEC)

TIME

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.5 TEST # 1

LEFT REAR SEAT Y-AXIS VELOCITY

TRC , 910502-1
 CRASH III DAMAGE ALGORITHM
 91122
 TLRD1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -0.13e 267.63, 0.06 e 69.00

70.00

60.00

50.00

40.00

30.00

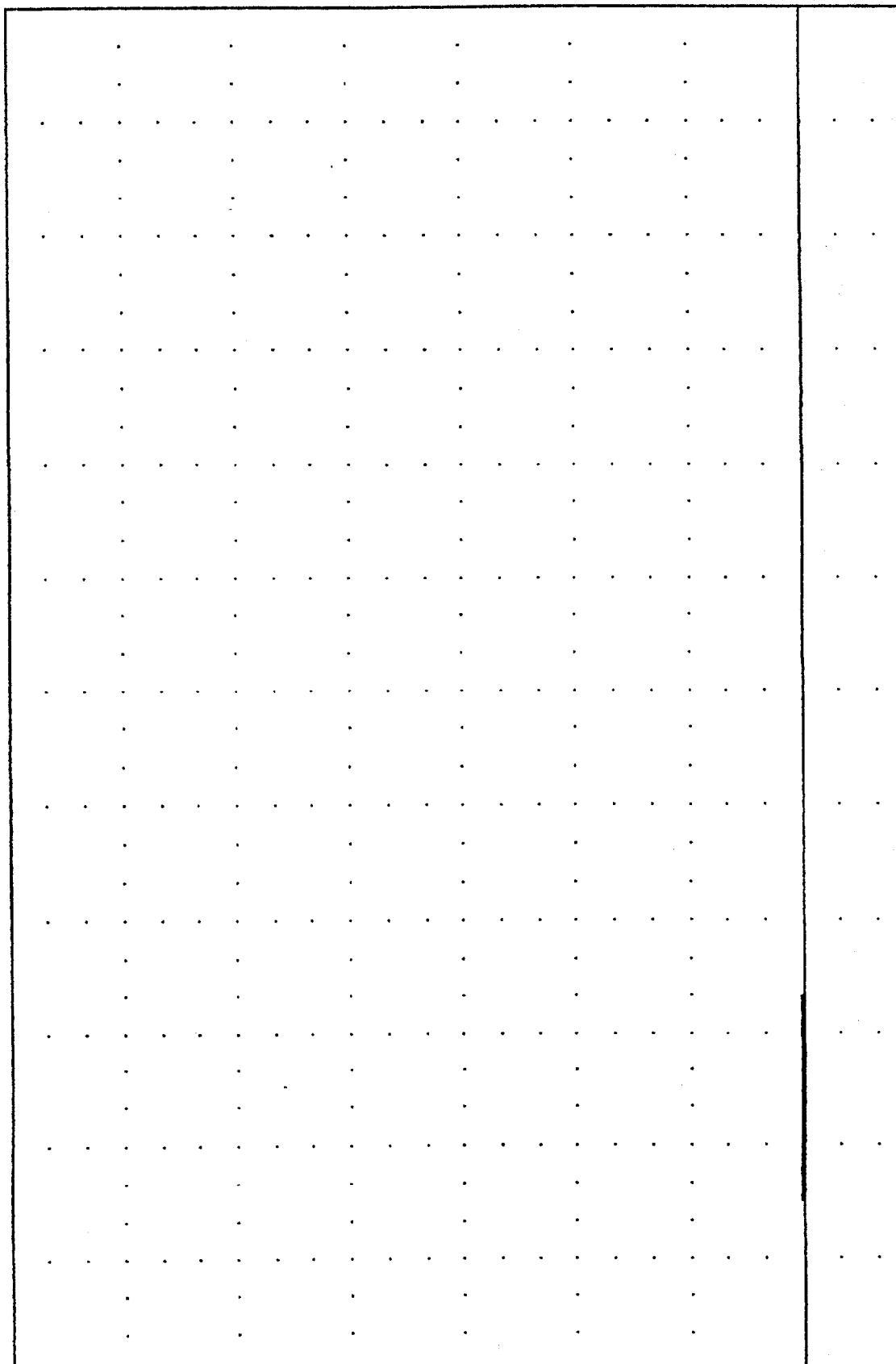
20.00

10.00

0.00

-10.00

B12



TIME (MSEC)	28.33	56.66	85.00	113.33	141.66	170.00	198.33	226.66	255.00	283.33	311.66	340.00
DISPLACEMENT (IN)												

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.5 TEST # 1
 LEFT REAR SEAT Y-AXIS DISPLACEMENT

CRASH III DAMAGE ALGORITHM

91122

TLRRV1

FILTER = BLPP

300/ 750/ -16

MIN. MAX VALUES =

0.13

104.63,

9.52

2.38

40.00

30.00

20.00

10.00

0.00

-10.00

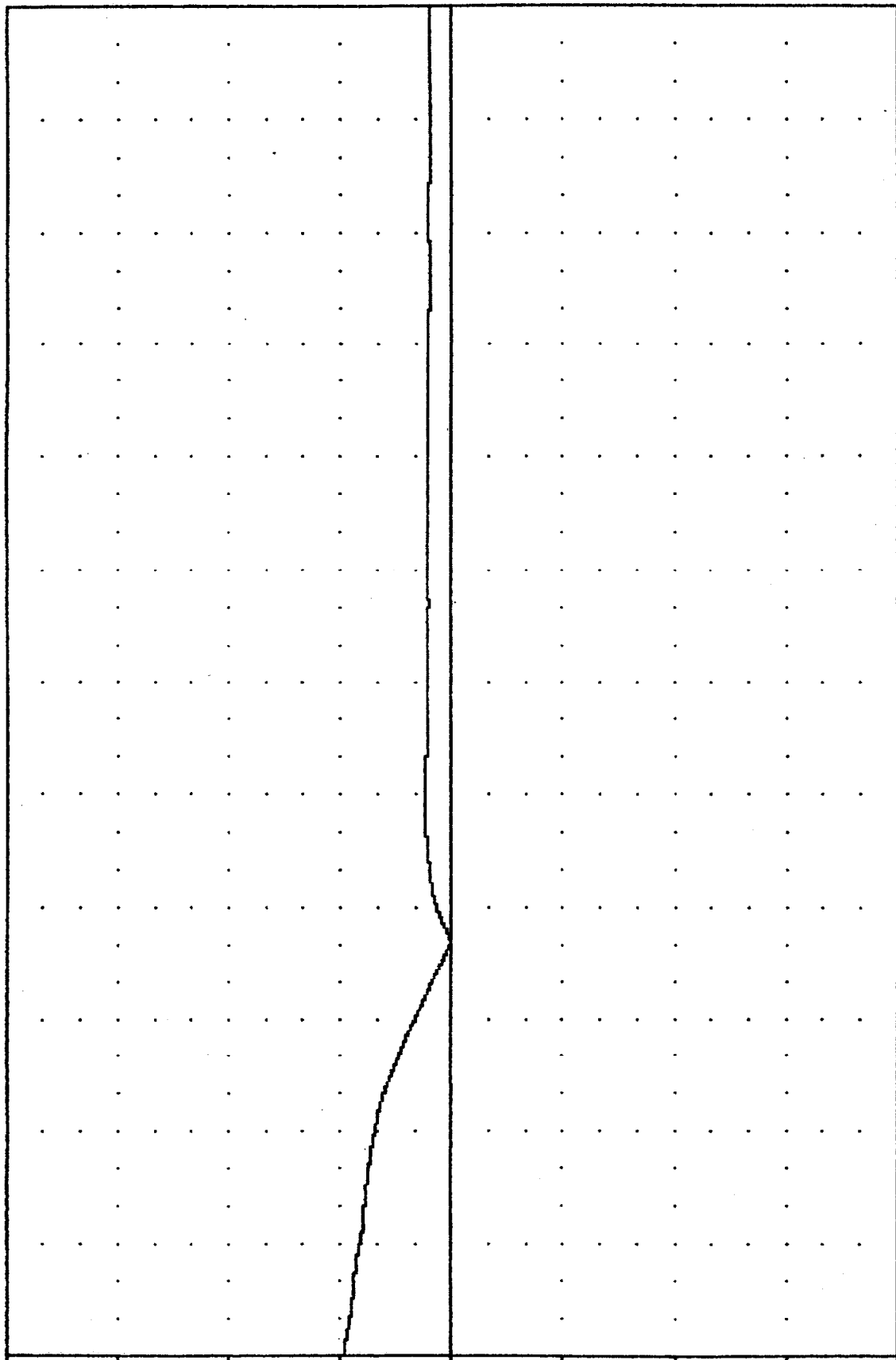
-20.00

-30.00

-40.00

B13

VELOCITY (MPH)



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 341.66

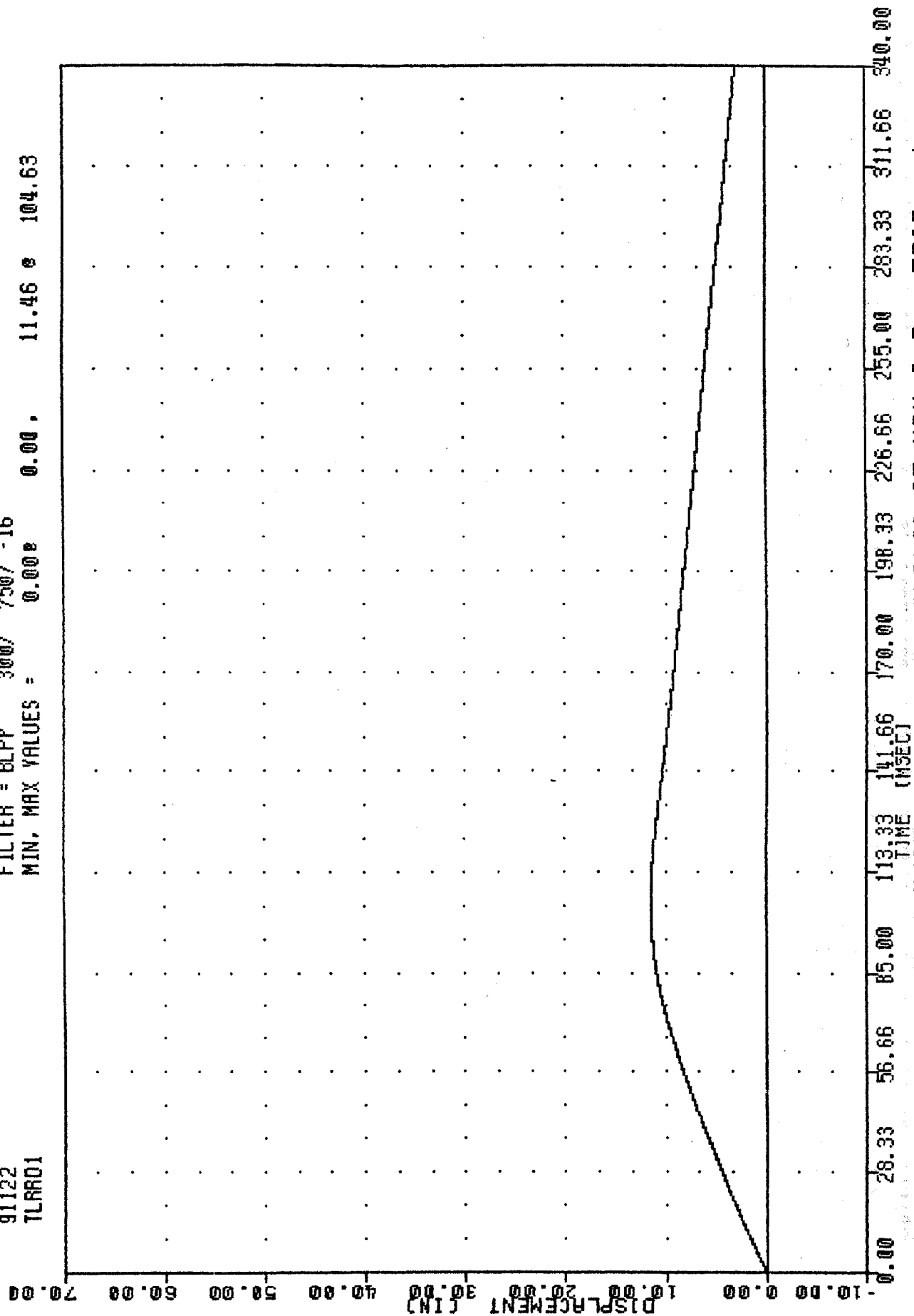
TIME (MSEC)

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.5 TEST # 1

LEFT REAR SEAT VELOCITY RESULTANT

TRC 910502-1
 CRASH III DAMAGE ALGORITHM
 91122
 TLRR01

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = 0.00 0.00 11.46 104.63



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.5 TEST # 1
 LEFT REAR SEAT DISPLACEMENT RESULTANT

CRASH III DAMAGE ALGORITHM

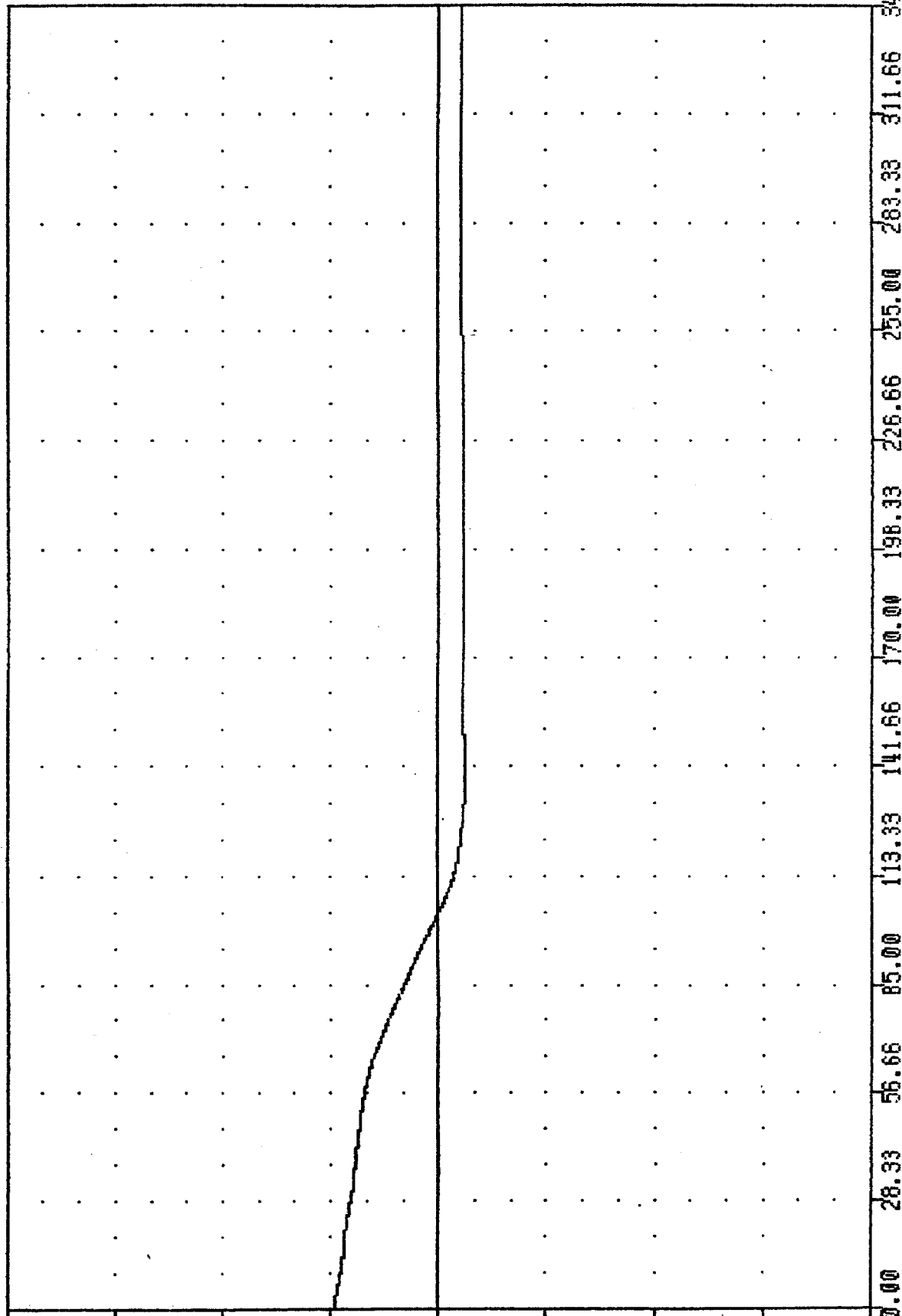
91122

TRRXV1

FILTER = BLPP 300/ -16

MIN. MAX VALUES = -2.49e 141.50 9.52 e 2.25

VELOCITY (MPH)



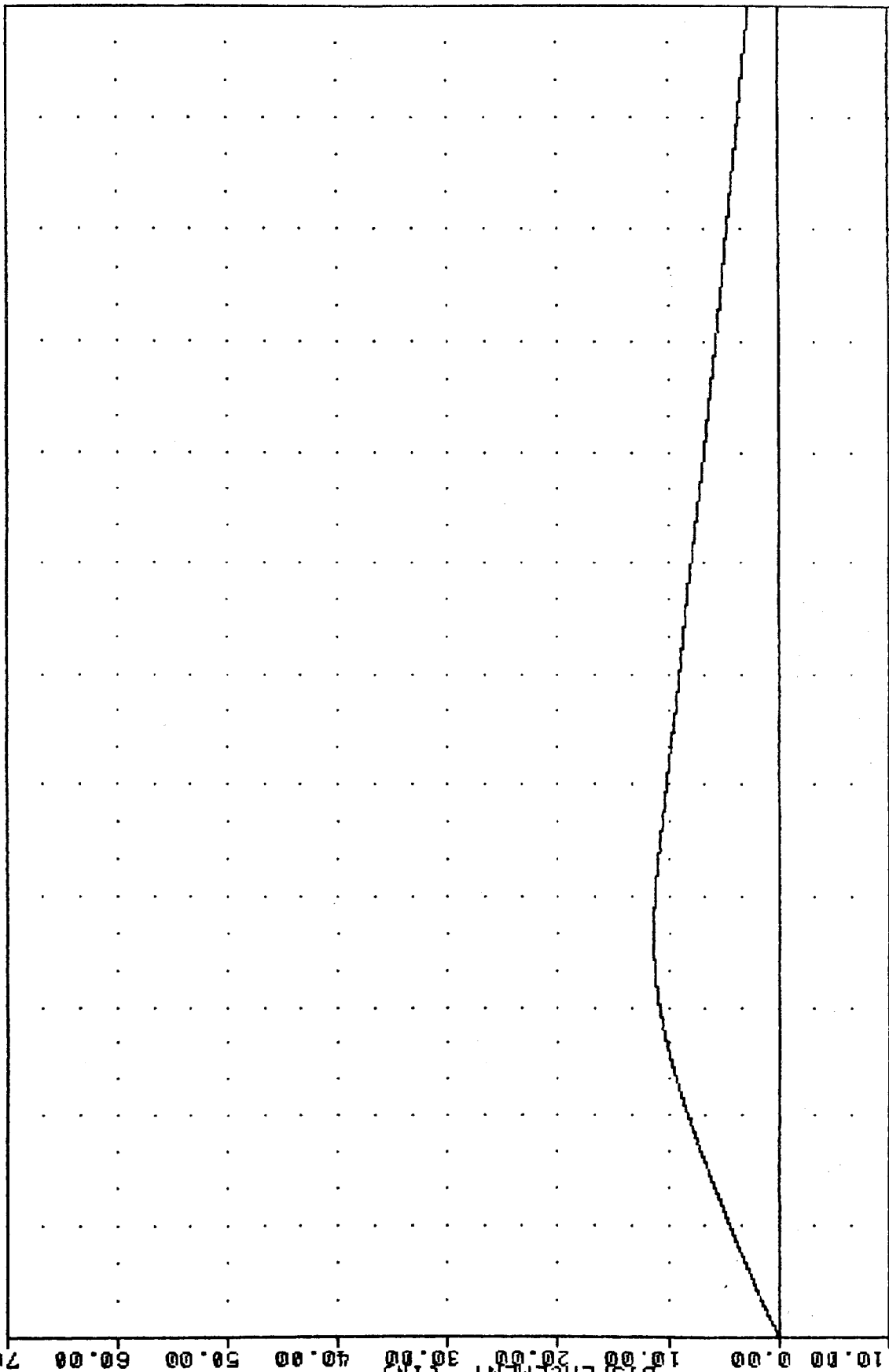
B15

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.5 TEST # 1
RIGHT REAR SEAT X-AXIS VELOCITY

TRC , 910502-1
 CRASH III DAMAGE ALGORITHM
 91122
 TRRXD1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 0.00e 0.00 , 11.35 e 103.75

DISPLACEMENT (IN)



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.5 TEST # 1
 RIGHT REAR SEAT X-AXIS DISPLACEMENT

FILTER = PLPF 300/ 750/ -16

MIN. MAX VALUES =

3000

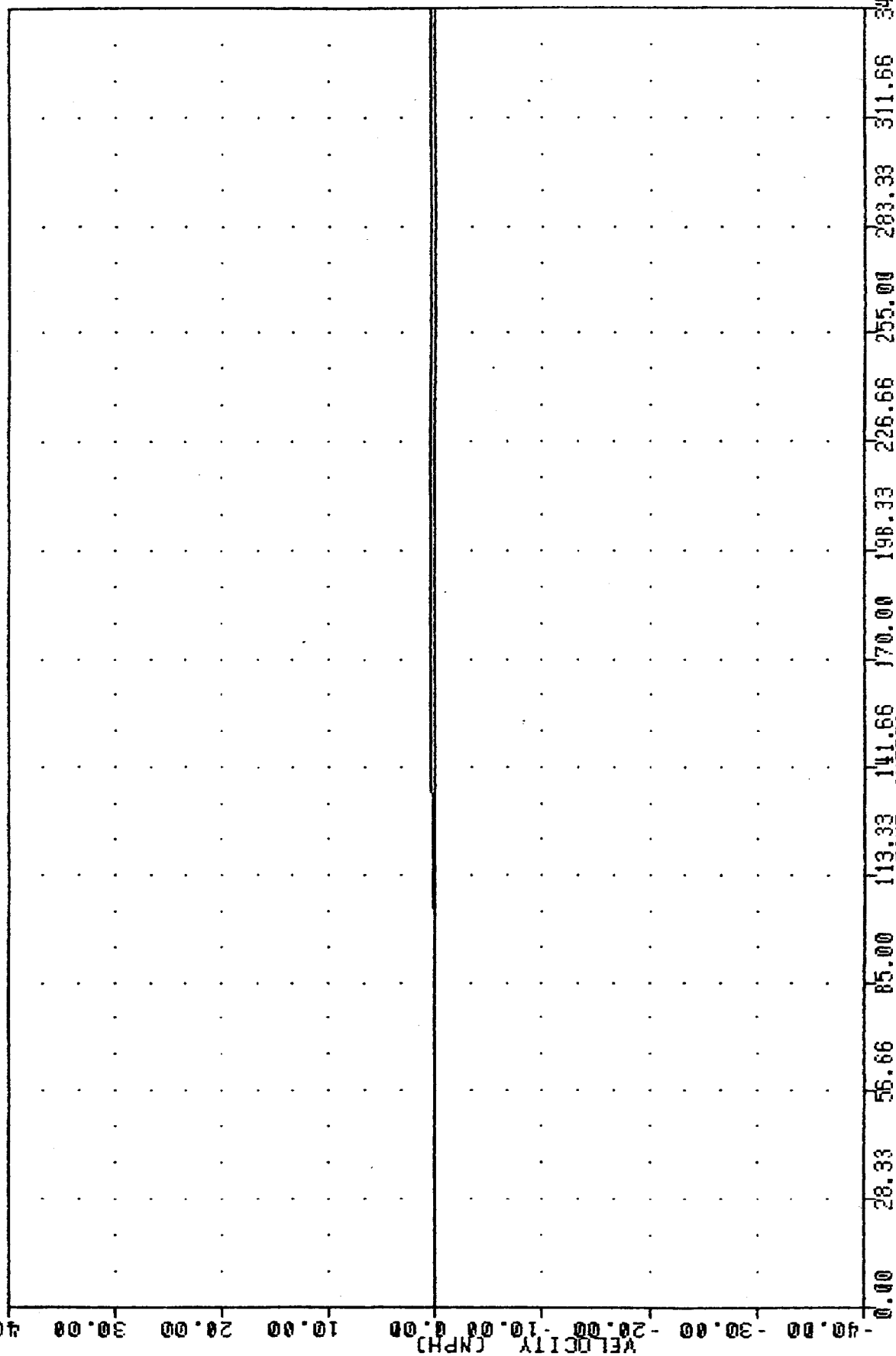
0.000

11.000

0.57 8

208.50

B17



35

55

33

11

99

33

50

99

33

5

9

3

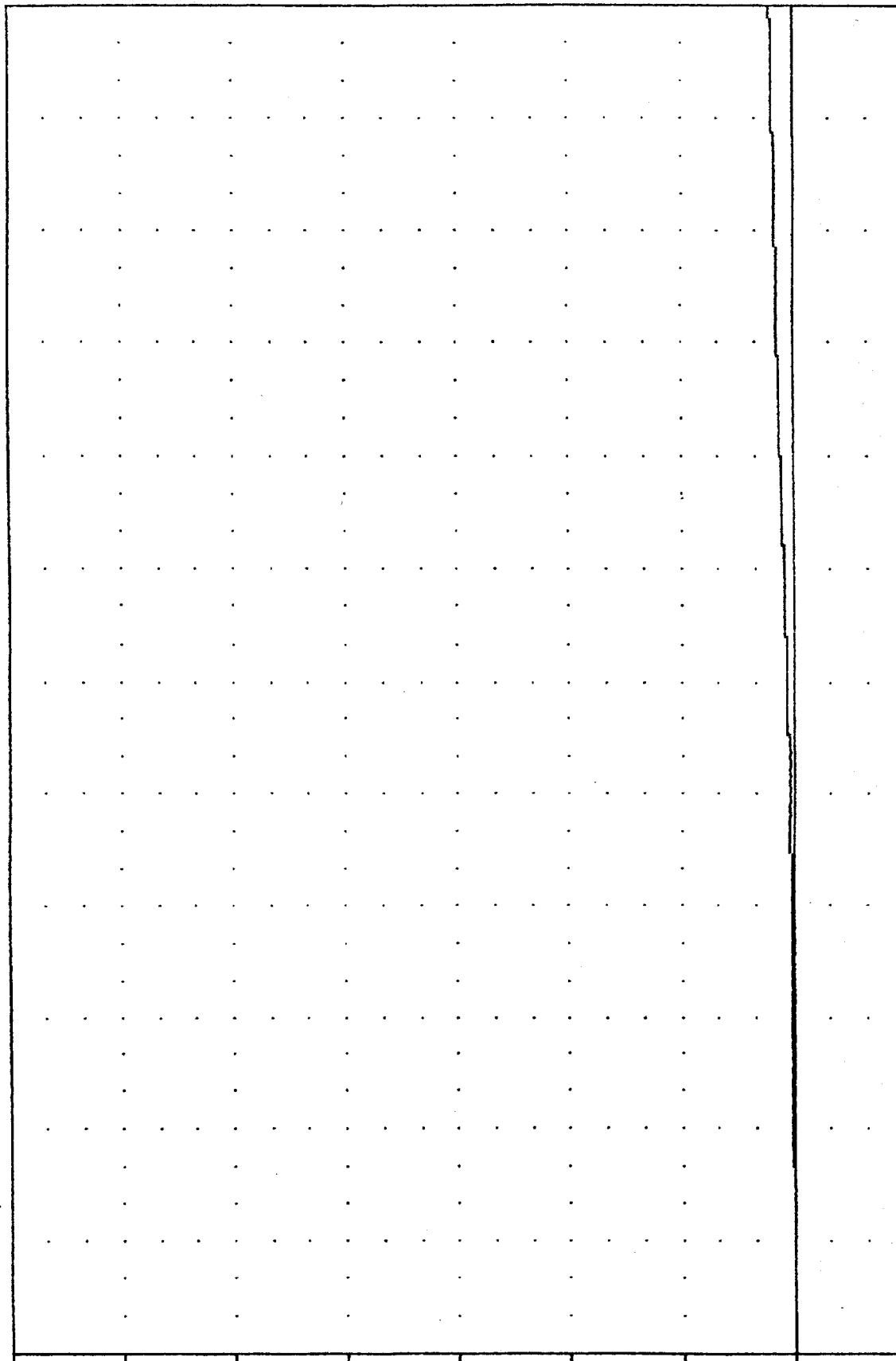
3

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.5 TEST # 1

TRC , 910502-1
 CRASH III DAMAGE ALGORITHM
 91122
 TRAY01

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 0.00 1.97 e 340.00

DISPLACEMENT (IN)



TIME (MSEC)	DISPLACEMENT (IN)	TEST #
0.00	28.33	1
28.33	56.66	1
56.66	85.00	1
85.00	113.33	1
113.33	141.66	1
141.66	170.00	1
170.00	198.33	1
198.33	226.66	1
226.66	255.00	1
255.00	283.33	1
283.33	311.66	1
311.66	340.00	1

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.5
 RIGHT REAR SEAT Y-AXIS DISPLACEMENT

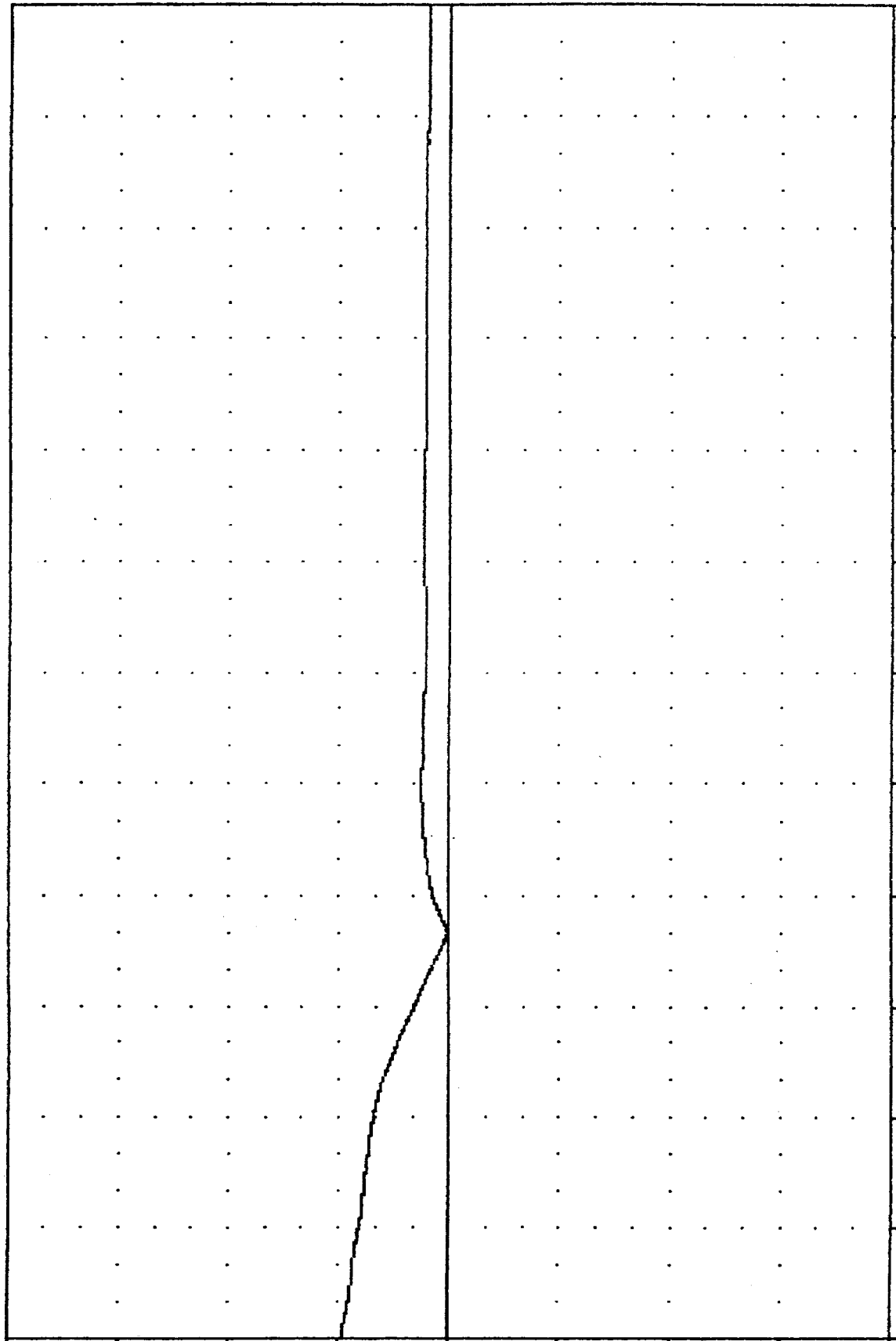
CRASH III DAMAGE ALGORITHM

91122
TARRV1

FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = 0.14e 103.63.

9.52 e 2.25

VELOCITY (MPH)



0.00 25.00 50.00 75.00 100.00 113.33 141.66 170.00 198.33 225.00 250.00 275.00 300.00 325.00 340.00

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.5 TEST # 1
RIGHT REAR SEAT VELOCITY RESULTANT

TRC 910502-1
 CRASH III DAMAGE ALGORITHM
 91122
 TRAD1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = 0.000 0.00 11.35 103.75

70.00

60.00

50.00

40.00

30.00

20.00

10.00

0.00

-10.00

-20.00

-30.00

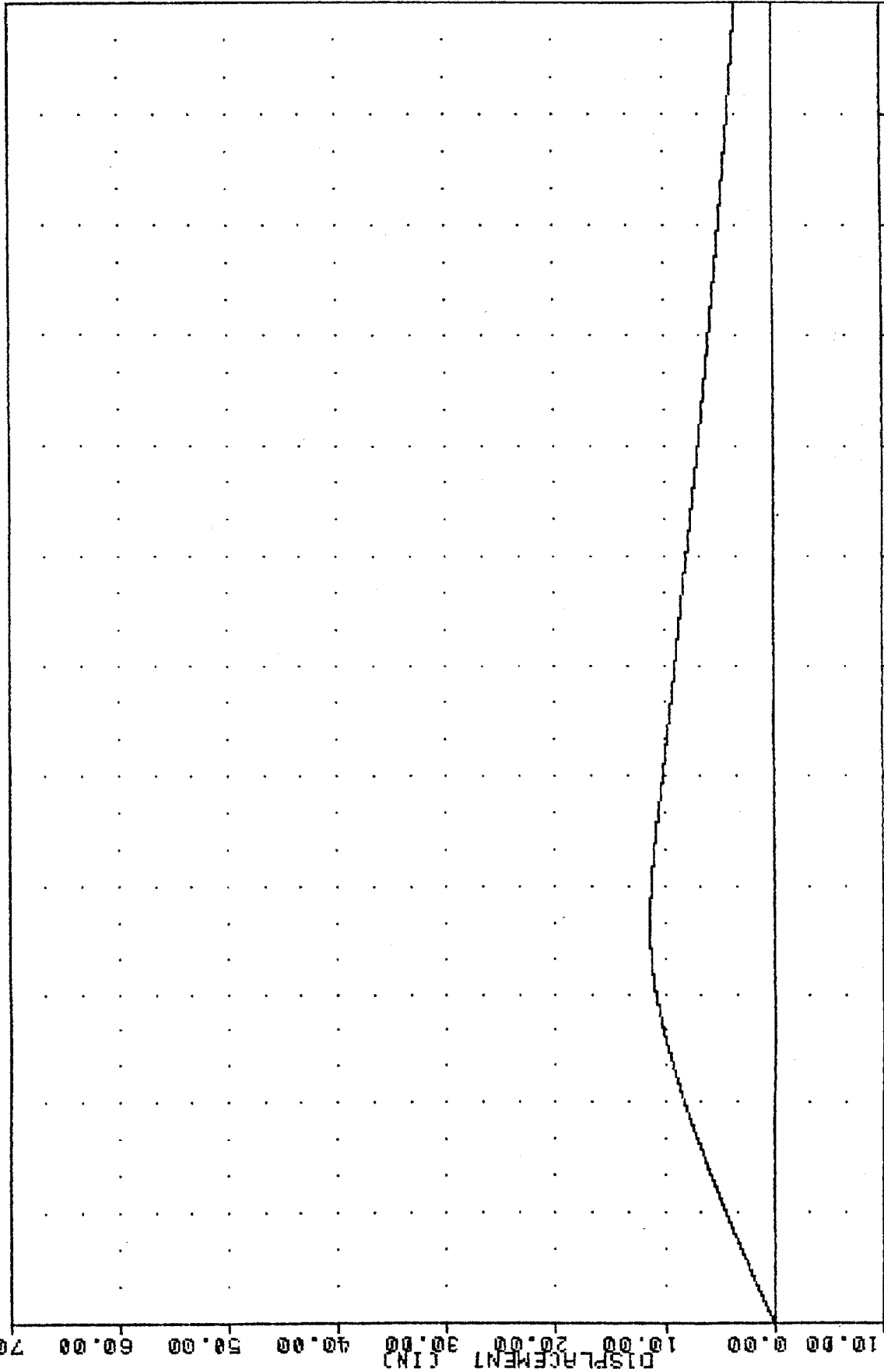
-40.00

-50.00

-60.00

-70.00

B20



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.5 TEST # 1
 RIGHT REAR SEAT DISPLACEMENT RESULTANT

DATA PLOTS

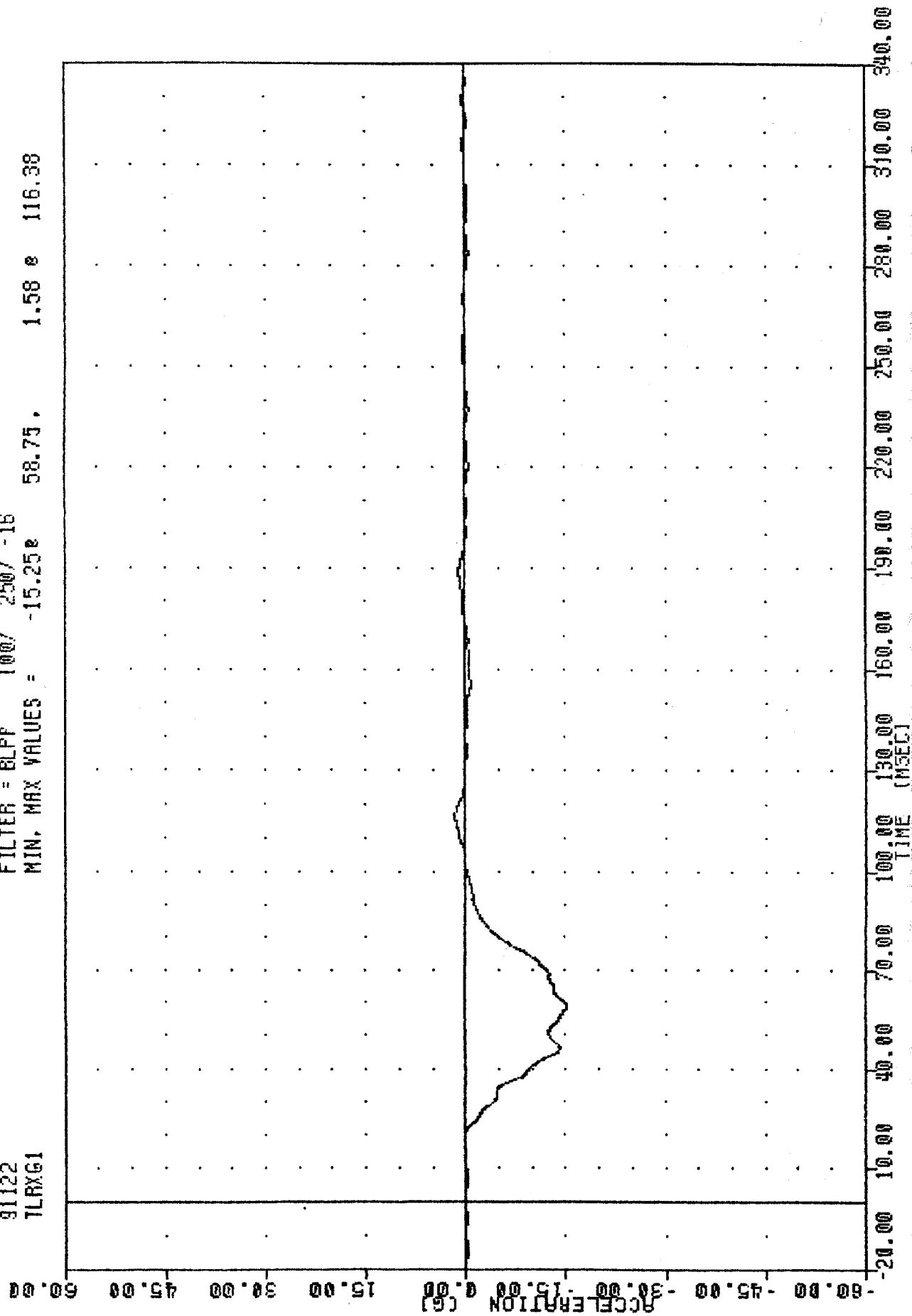
TEST NO. 910502-2

B21

TRC
 CRASH III DAMAGE ALGORITHM
 91122
 TLRXG1

, 910502-2

FILTER = BLPP 100/ 250/ -18
 MIN, MAX VALUES = -15.25e 58.75, 1.58 e 116.38



CRASH III DAMAGE ALGORITHM

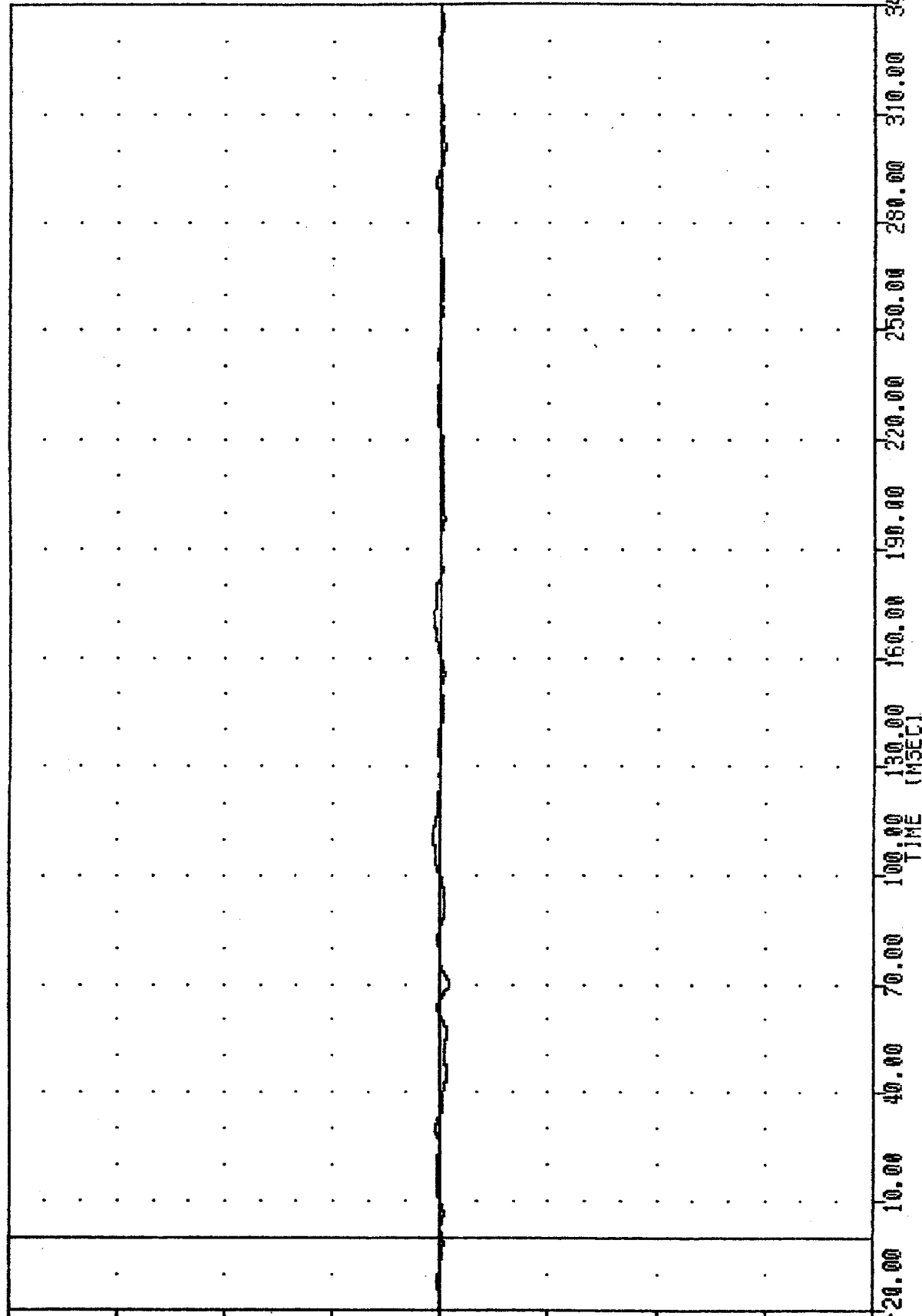
91122

TLRYG1

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -1.27e 70.00, 1.07 e 111.38

ACCELERATION [G]

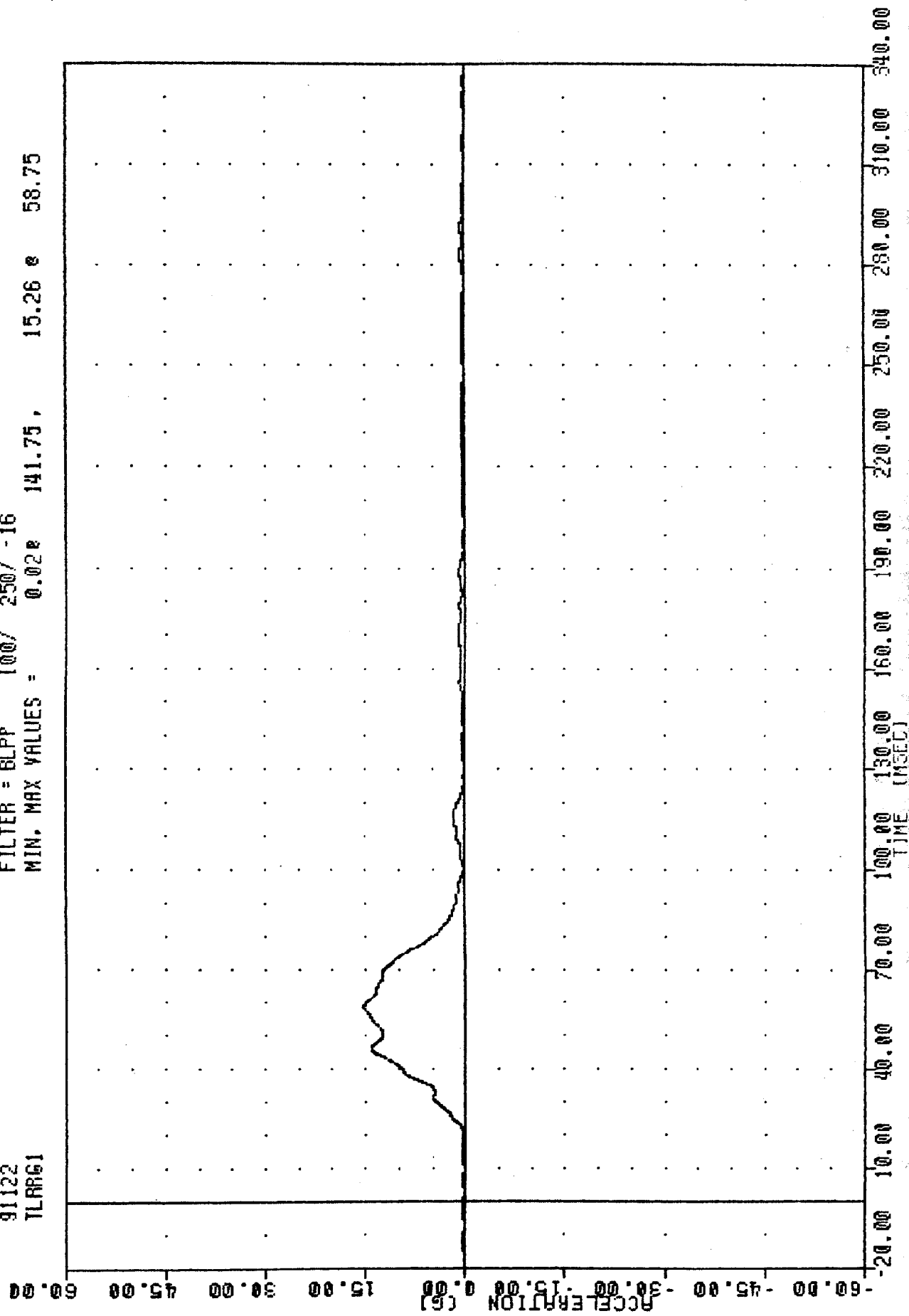


1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2
LEFT REAR SEAT Y-AXIS ACCELERATION

TRC
 CRASH III DAMAGE ALGORITHM
 91122
 TLARG1

910502-2

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = 0.020 141.75, 15.26 e 58.75



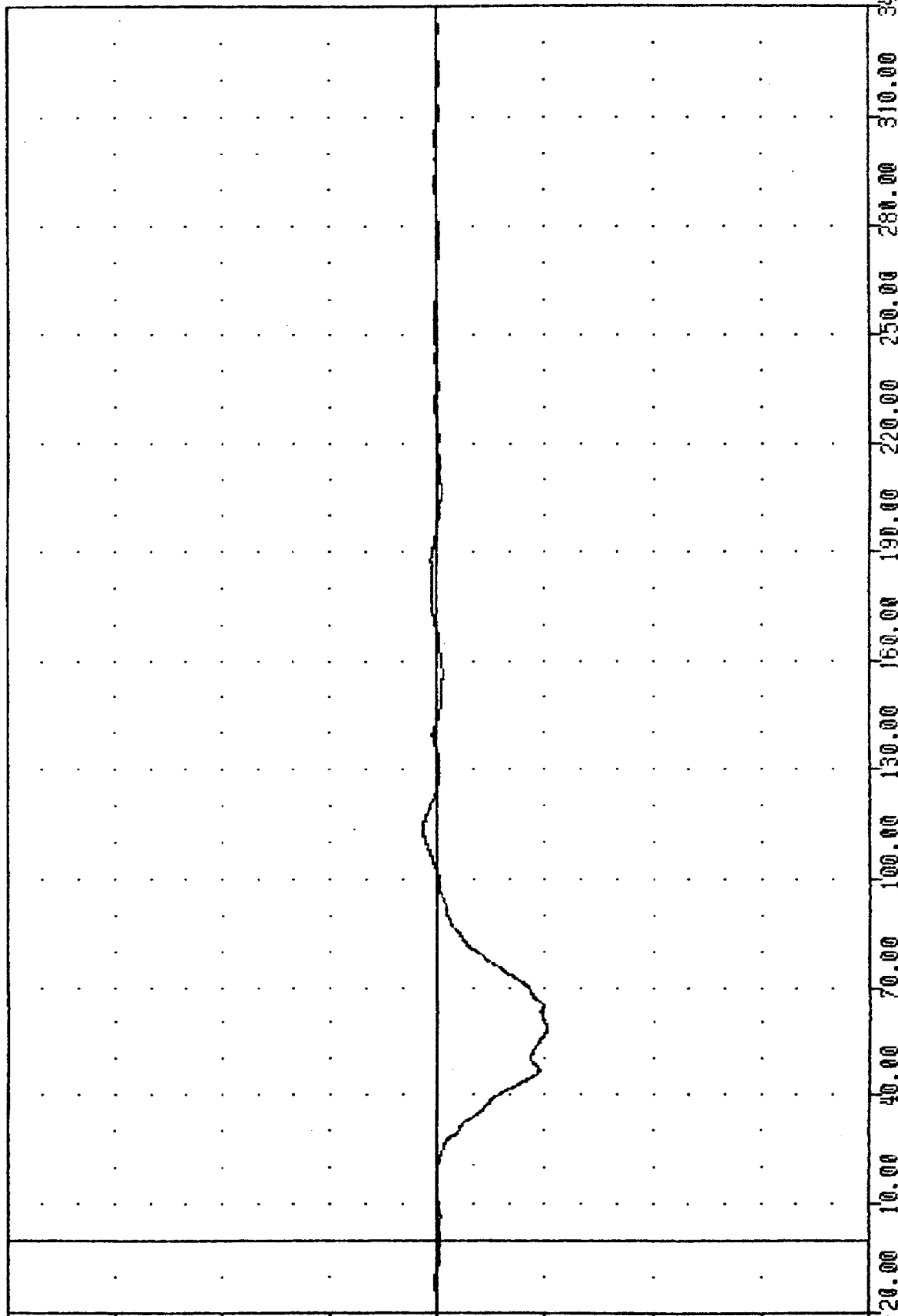
CRASH III DAMAGE ALGORITHM

91122
TRRXG1

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = -15.26 58.25 2.03 113.50

ACCELERATION (G)



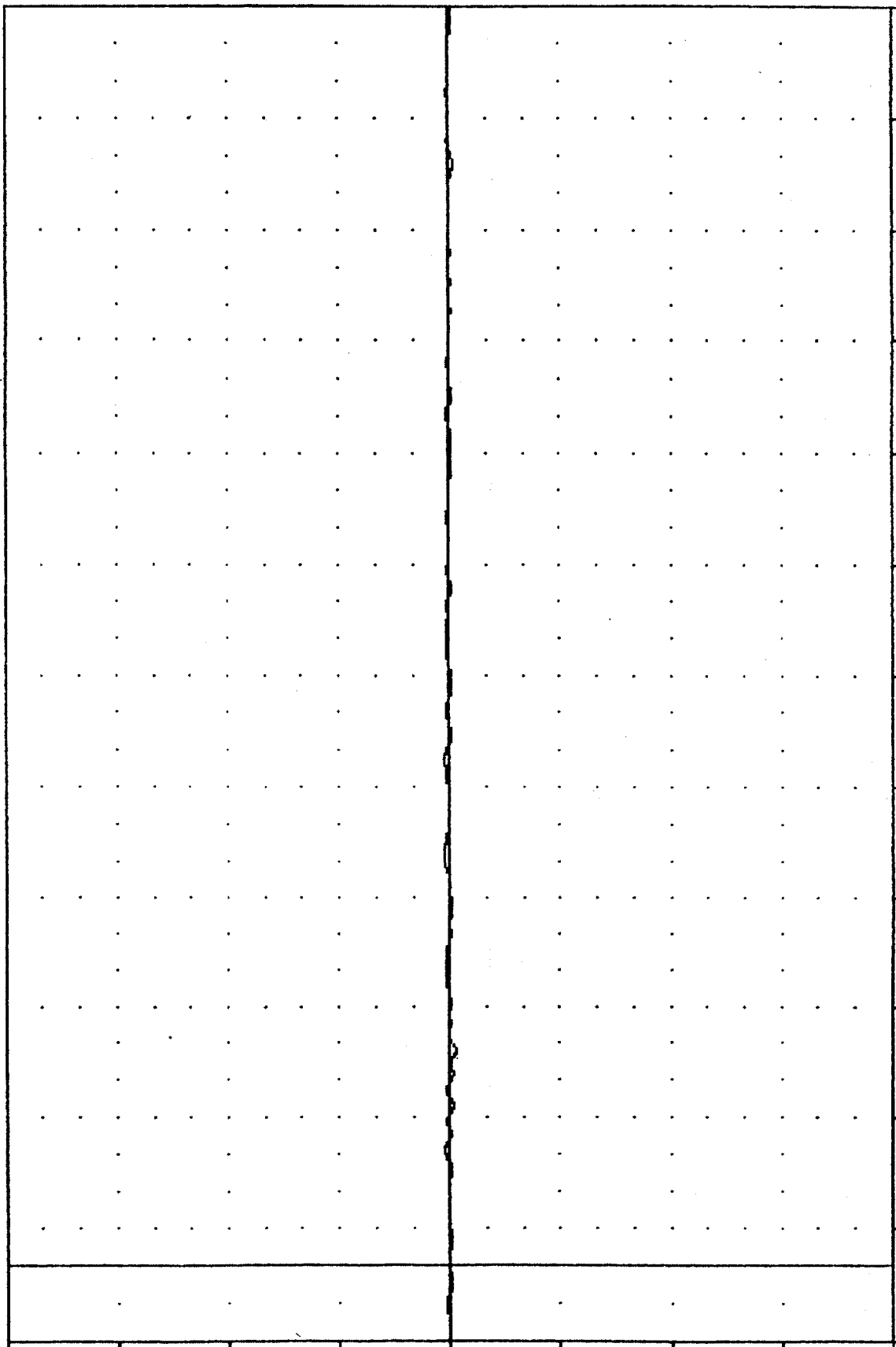
B25

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2
RIGHT REAR SEAT X-AXIS ACCELERATION

TRC , 910502-2
 CRASH III DAMAGE ALGORITHM
 91122
 TRAY61

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -0.84e 58.00 , 0.87 e 110.25

ACCELERATION (G)



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2
 RIGHT REAR SEAT Y-AXIS ACCELERATION

CRASH III DAMAGE ALGORITHM

91122

TRRG1

FILTER = BLPP 100/ 250/ -16

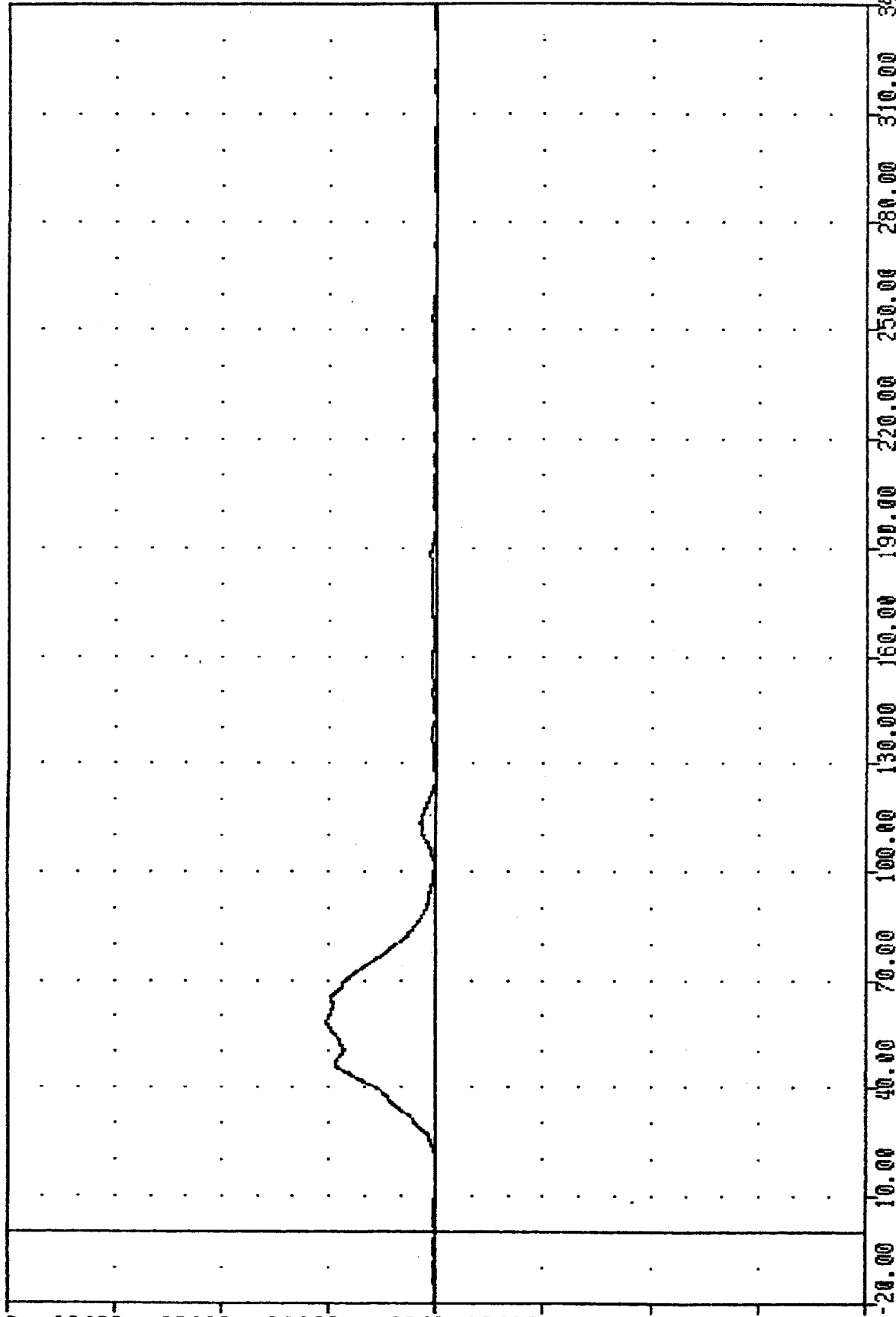
MIN. MAX VALUES = 0.01e

101.38.

15.28 e

58.25

ACCELERATION (G)

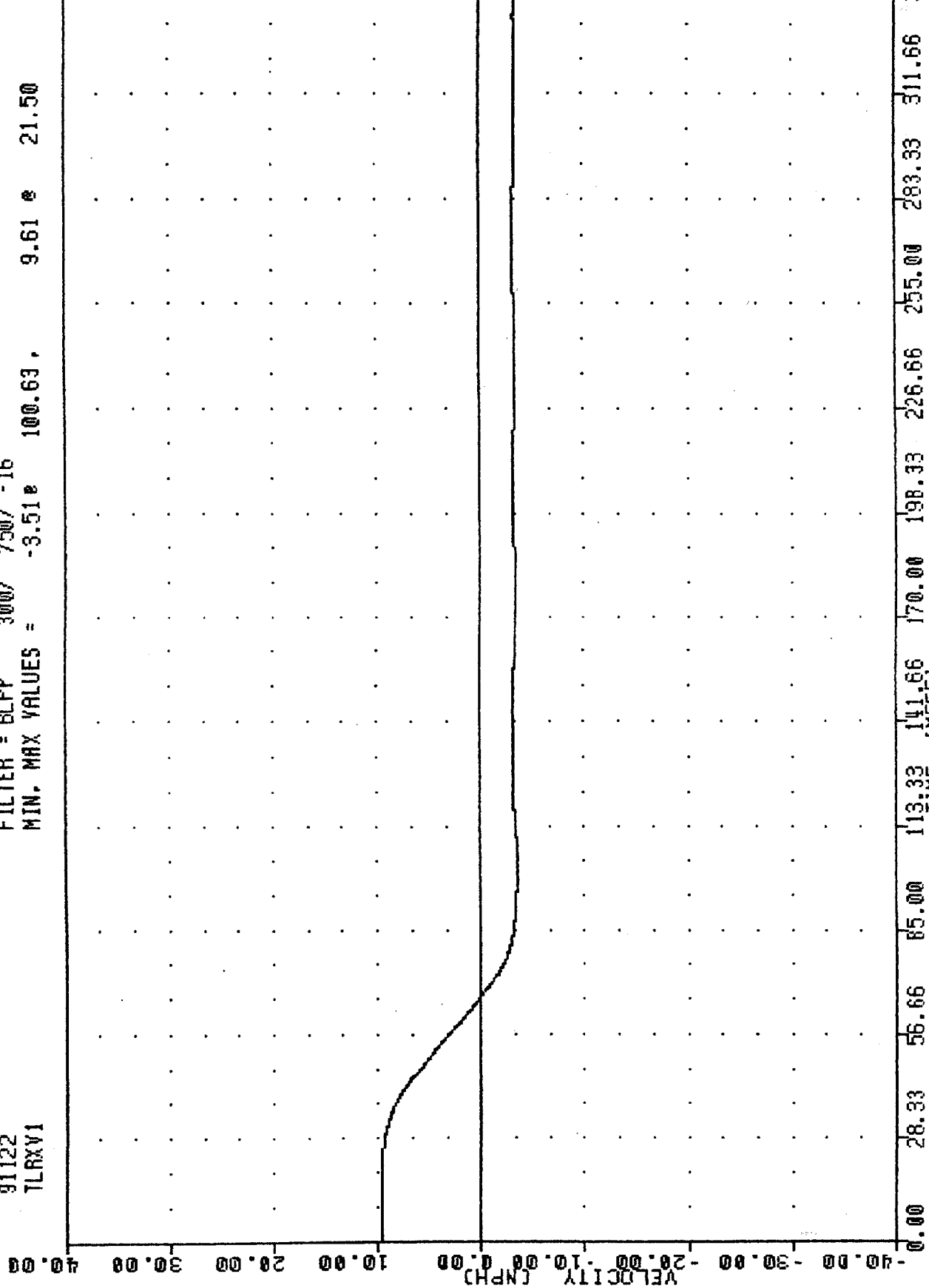


1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2

RIGHT REAR SEAT RESULTANT ACCELERATION

TRC
 CRASH III DAMAGE ALGORITHM
 91122
 TLRXV1

FILTER = BLFP 300/ 750/ -16
 MIN. MAX VALUES = -3.51e 100.63, 9.61 e 21.50



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2
 LEFT REAR SEAT X-AXIS VELOCITY

CRASH III DAMAGE ALGORITHM

91122

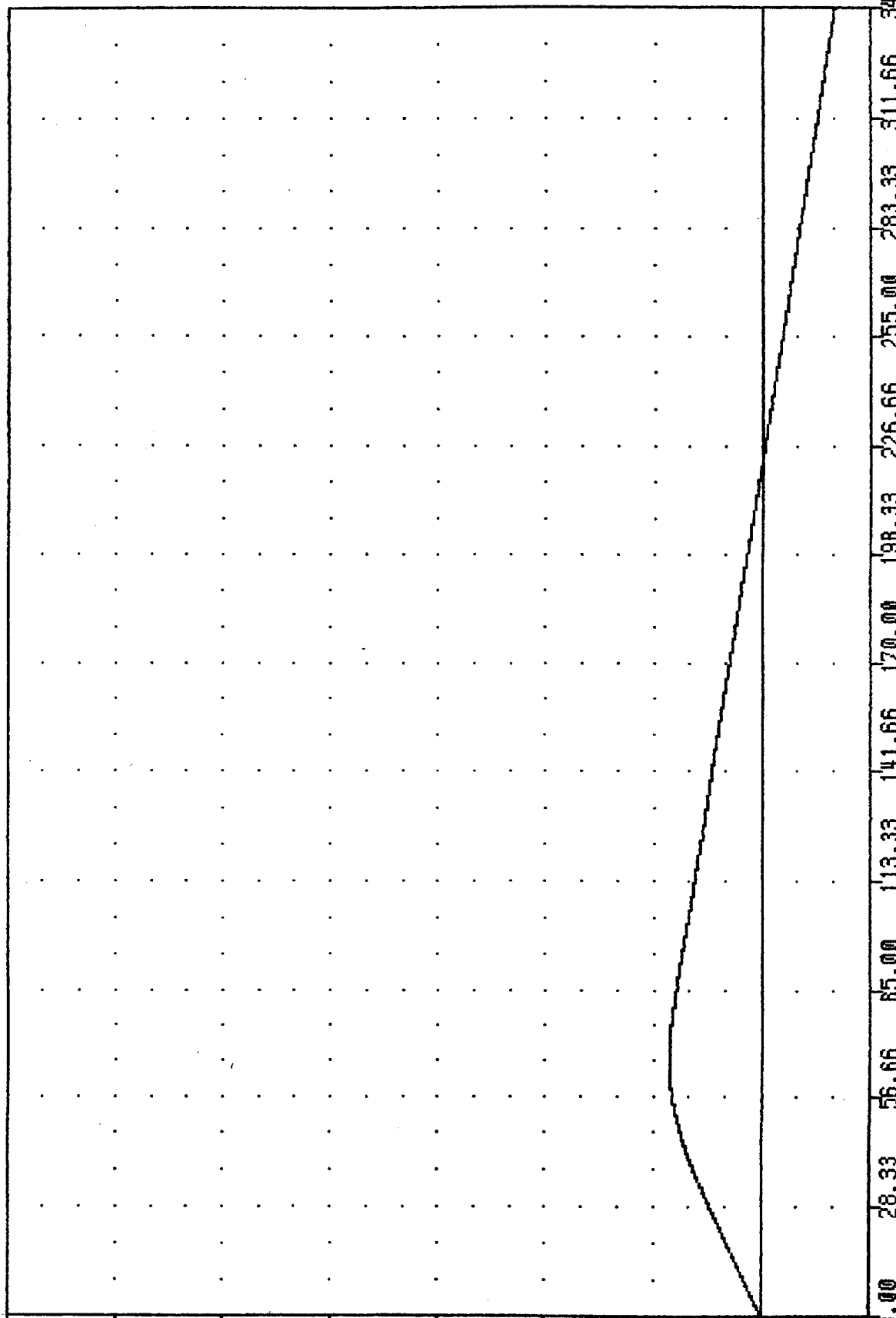
FILTER = BLPP 300/ 750/ -16

TLRXD1

MIN. MAX VALUES = -6.75* 340.00 ;

8.49 * 66.88

DISPLACEMENT (IN)



B29

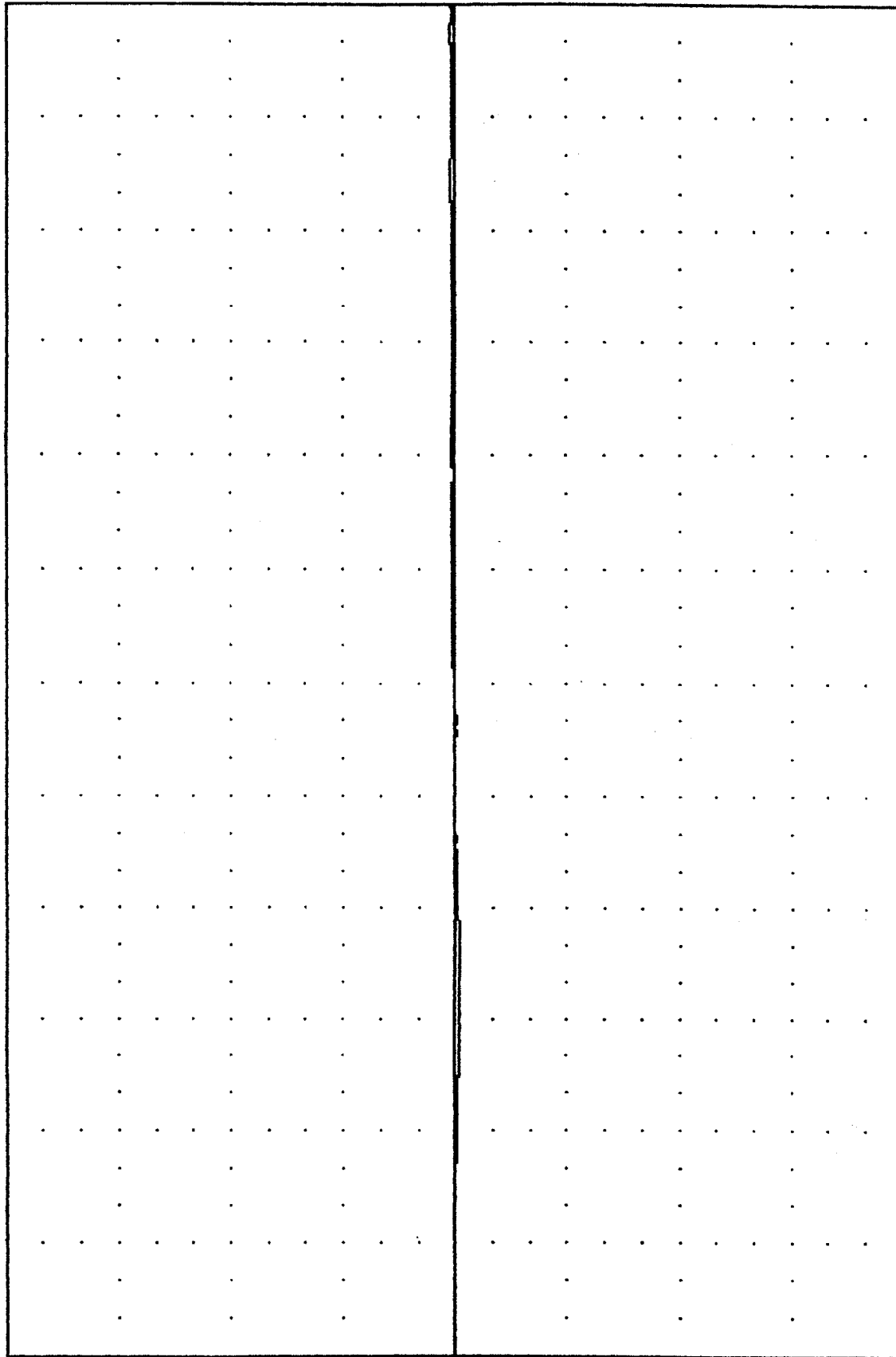
1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2
LEFT REAR SEAT X-AXIS DISPLACEMENT

TRC
 CRASH III DAMAGE ALGORITHM
 91122
 TLRYV1

, 910502-2

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -0.41e 100.63. 0.42 e 294.25

40.00
 30.00
 20.00
 10.00
 0.00
 -10.00
 -20.00
 -30.00
 -40.00
 VELOCITY (MPH)



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2
 LEFT REAR SEAT Y-AXIS VELOCITY

CRASH III DAMAGE ALGORITHM

91122

TLAYD1

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES = -0.32e 166.00, 0.53e 340.00

70.00

60.00

50.00

40.00

30.00

20.00

10.00

0.00

-10.00

-20.00

-30.00

-40.00

-50.00

-60.00

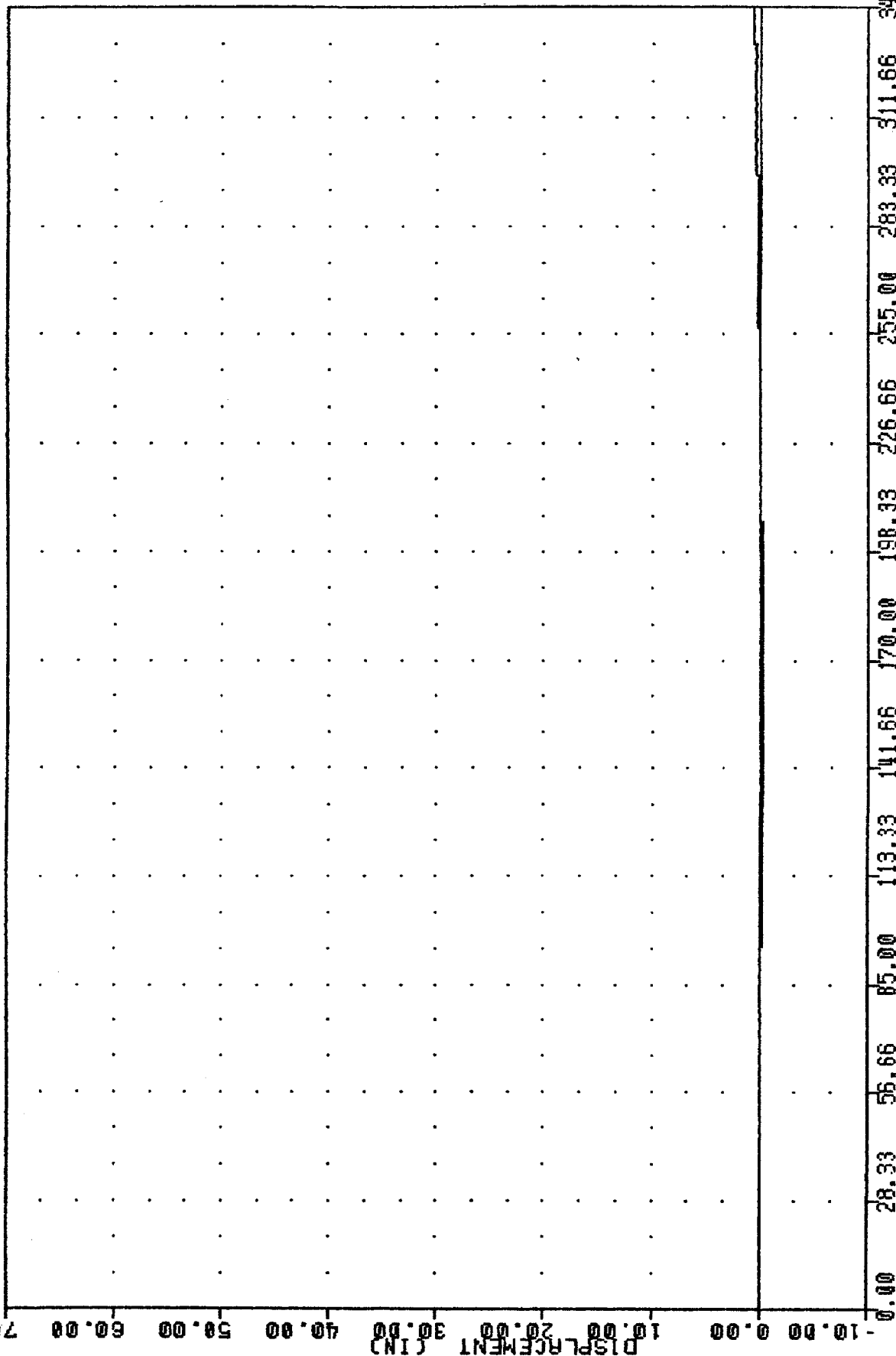
-70.00

-80.00

-90.00

-100.00

B31

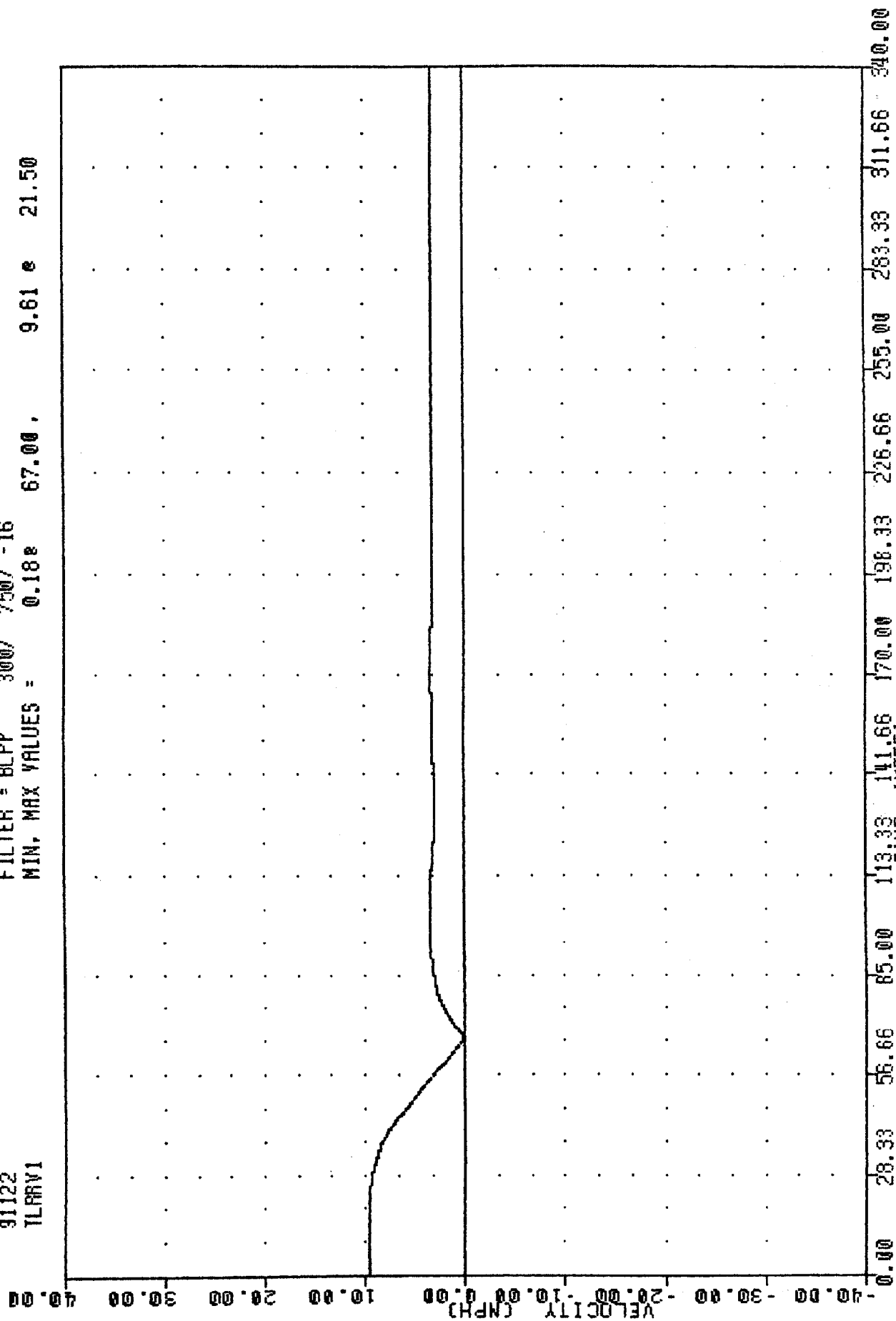


1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2

LEFT REAR SEAT Y-AXIS DISPLACEMENT

TRC , 910502-2
 CRASH III DAMAGE ALGORITHM
 91122
 TLRRV1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 0.18e 67.00, 9.61 e 21.50



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2
 LEFT REAR SEAT VELOCITY RESULTANT

CRASH III DAMAGE ALGORITHM

91122
TLR001

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = 0.00e 8.49 e 66.88

70.00

60.00

50.00

40.00

30.00

20.00

10.00

0.00

-10.00

-20.00

-30.00

-40.00

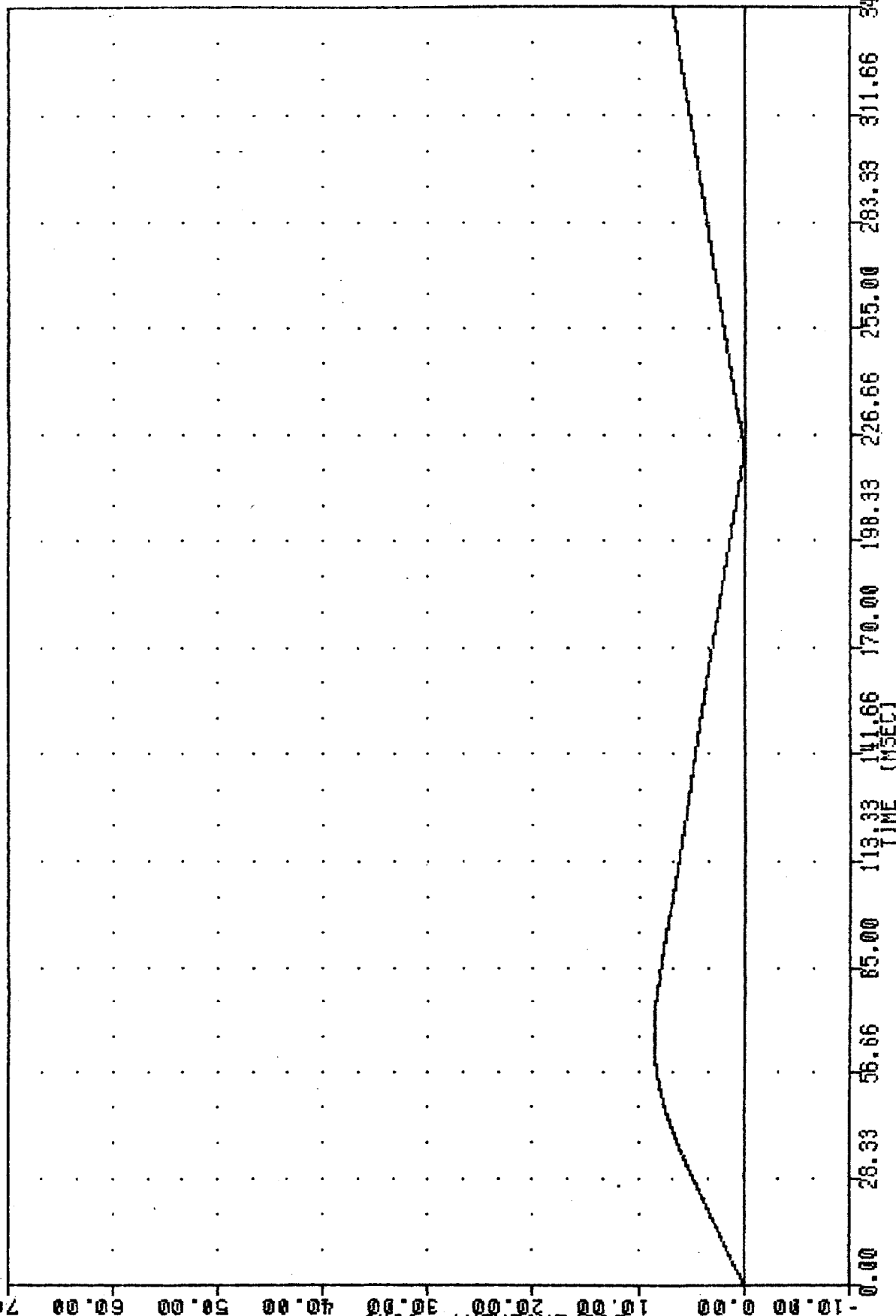
-50.00

-60.00

-70.00

DISPLACEMENT (IN)

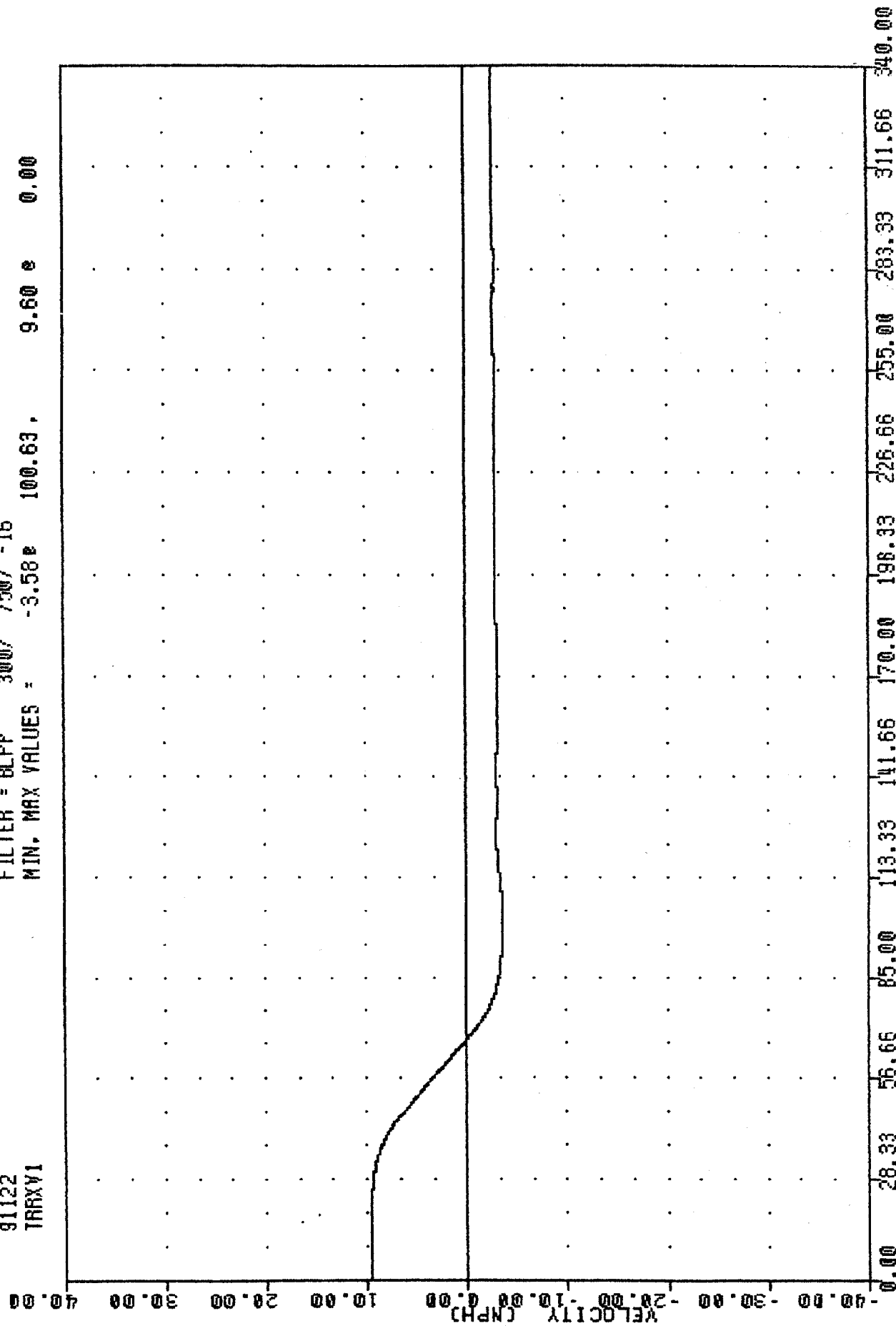
B33



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2
LEFT REAR SEAT DISPLACEMENT RESULTANT

TRC , 910502-2
 CRASH III DAMAGE ALGORITHM
 91122
 TRRXV1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -3.58 100.63 9.60 0.00



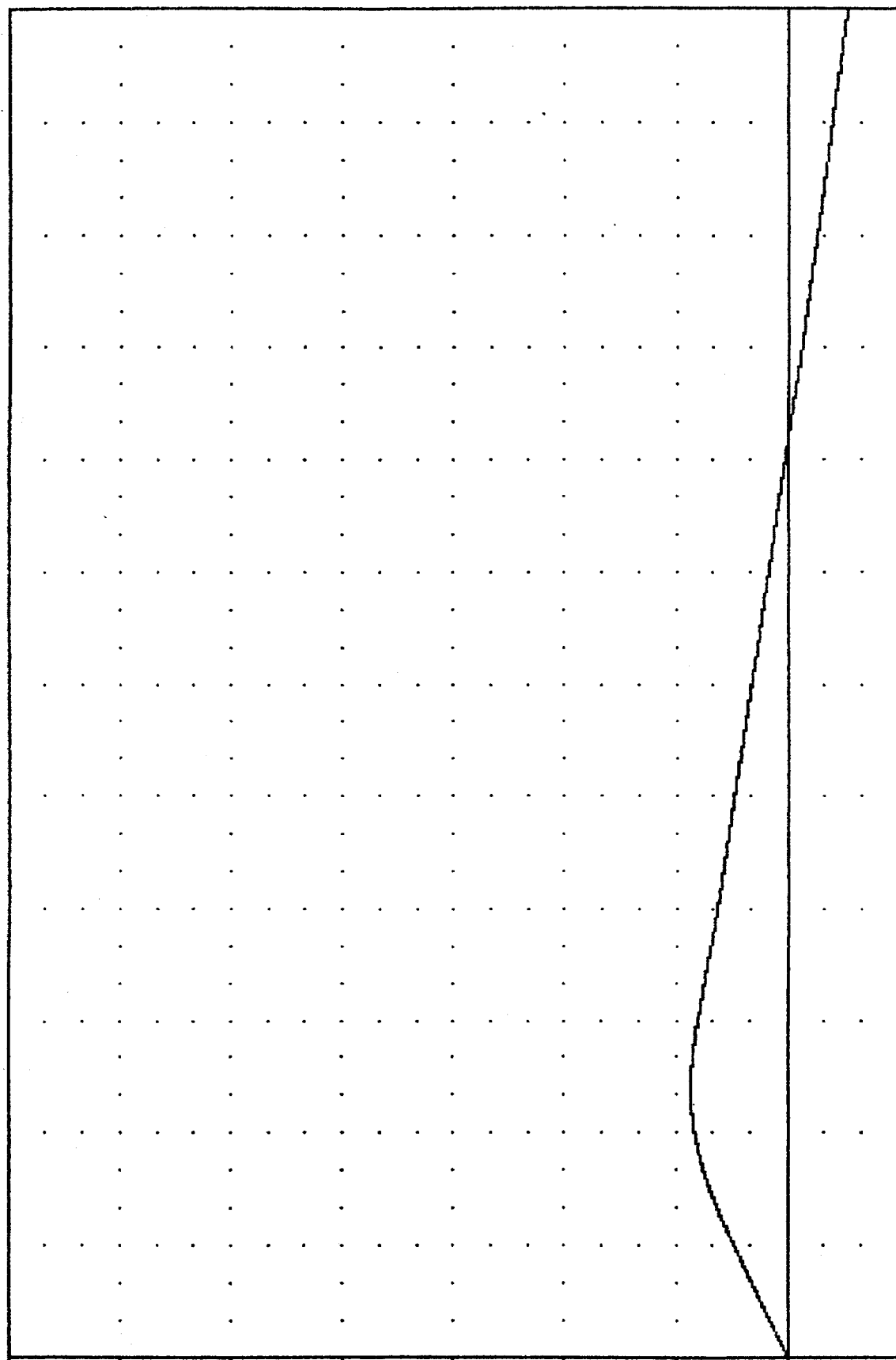
1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2
 RIGHT REAR SEAT X-AXIS VELOCITY

CRASH III DAMAGE ALGORITHM

91122
TRRX01

FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -5.39e 340.00 , 8.62 e 67.25

DISPLACEMENT (IN)

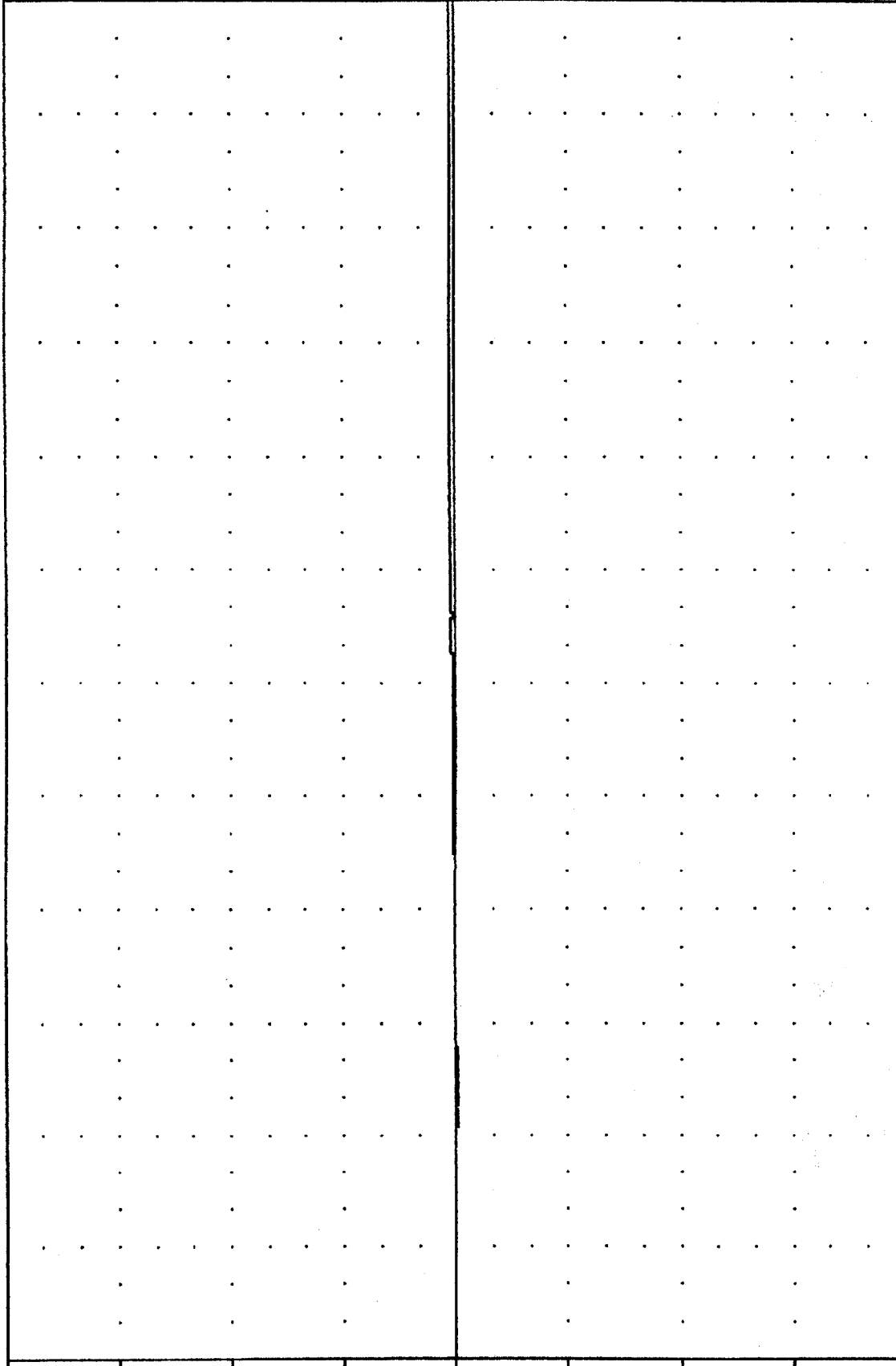


1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2
RIGHT REAR SEAT X-AXIS DISPLACEMENT

TRC
CRASH III DAMAGE ALGORITHM
91122
TRRYV1

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -0.08e 73.13, 0.49 e 332.63

40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2
RIGHT REAR SEAT Y-AXIS VELOCITY

CRASH III DAMAGE ALGORITHM
 91122
 TRYD1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 83.75 . 1.49 @ 340.00

70.00

60.00

50.00

40.00

30.00

20.00

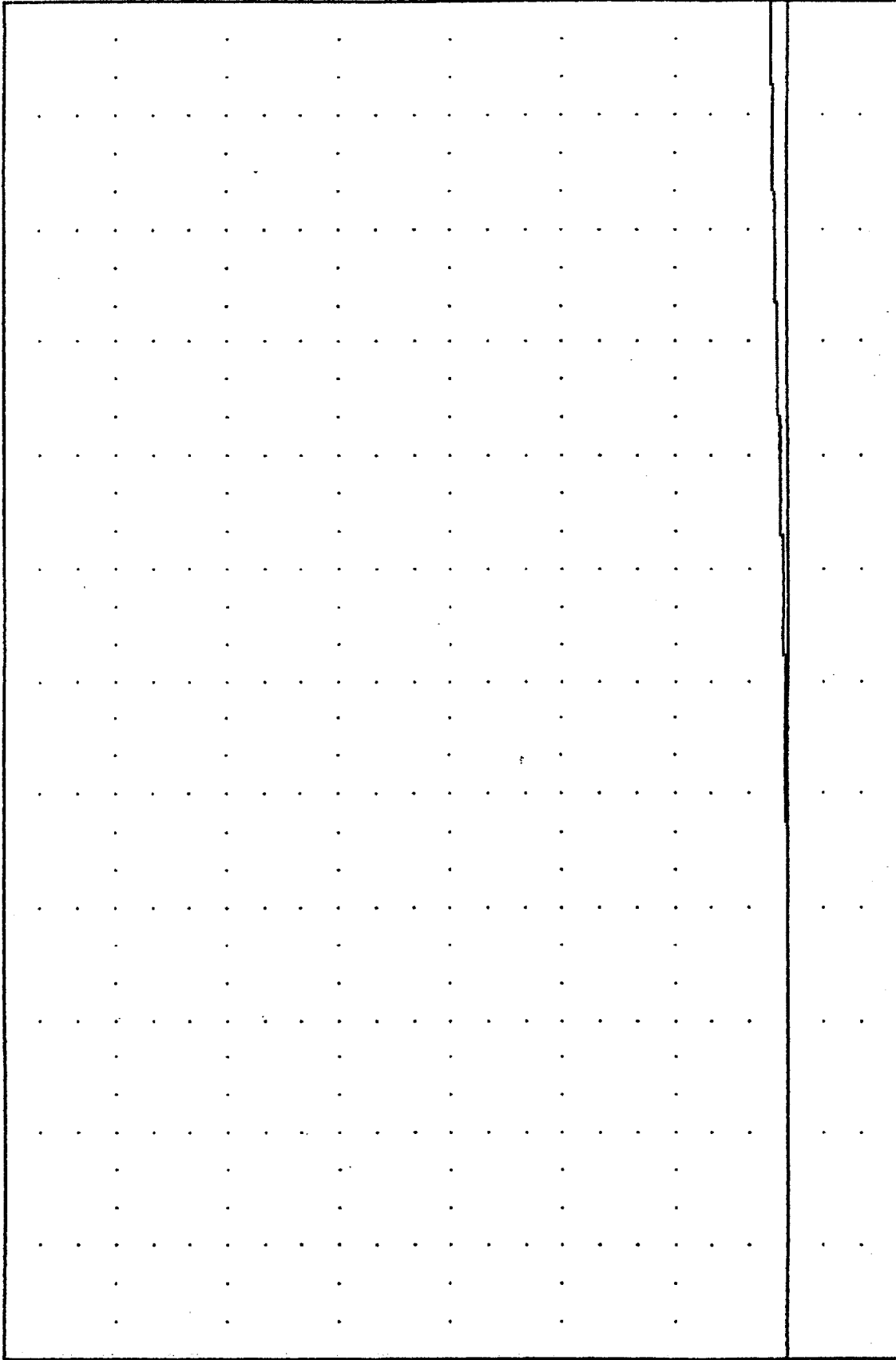
10.00

0.00

-10.00

-20.00

B37

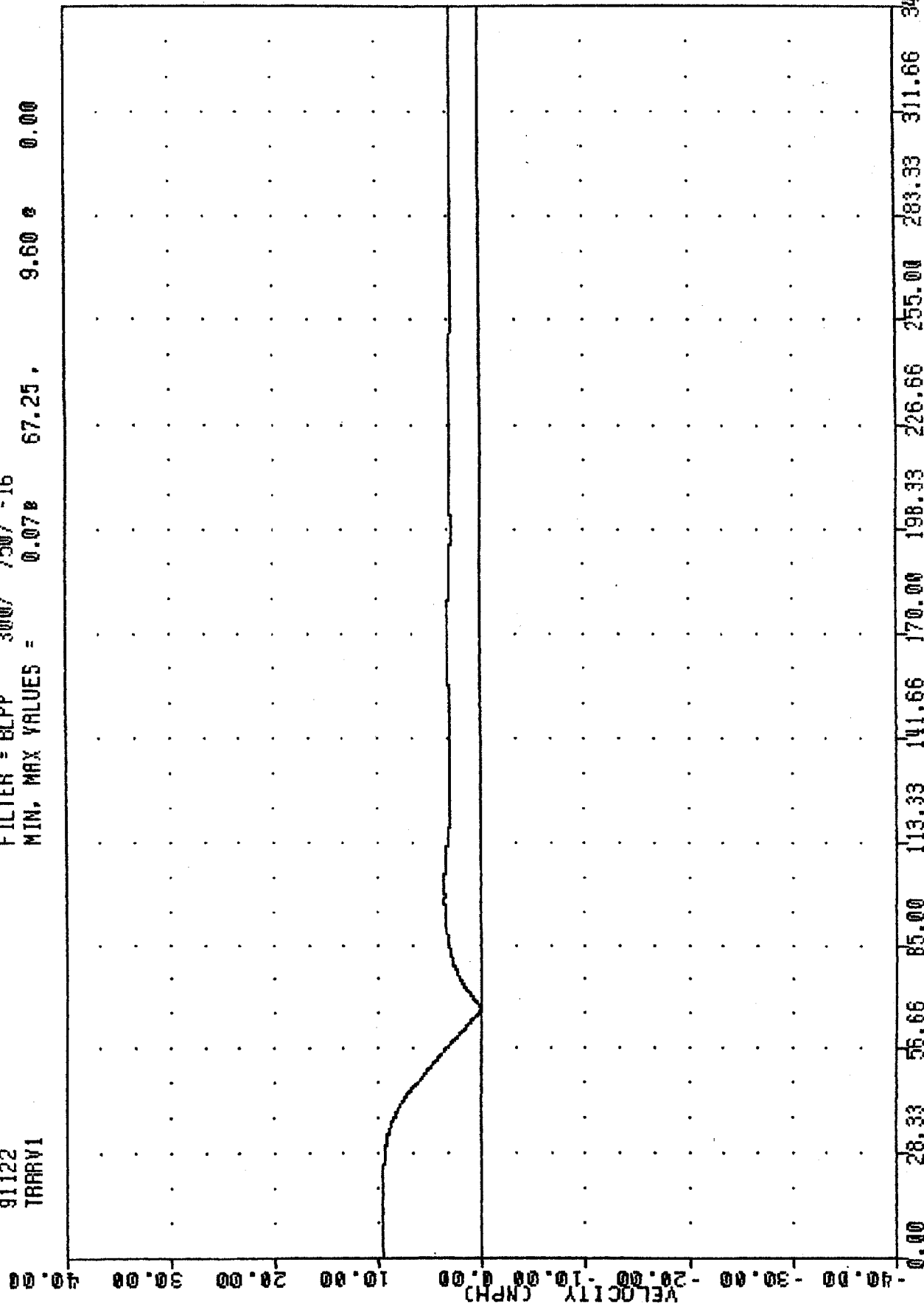


0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2
 RIGHT REAR SEAT Y-AXIS DISPLACEMENT

TRC , 910502-2
 CRASH III DAMAGE ALGORITHM
 91122
 TARRV1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 0.07 67.25 9.60 0.00



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2
 RIGHT REAR SEAT VELOCITY RESULTANT

CRASH III DAMAGE ALGORITHM

91122
TRAD1

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES = 0.000 0.00 8.62 67.25

70.00

60.00

50.00

40.00

30.00

20.00

10.00

0.00

-10.00

-20.00

-30.00

-40.00

-50.00

-60.00

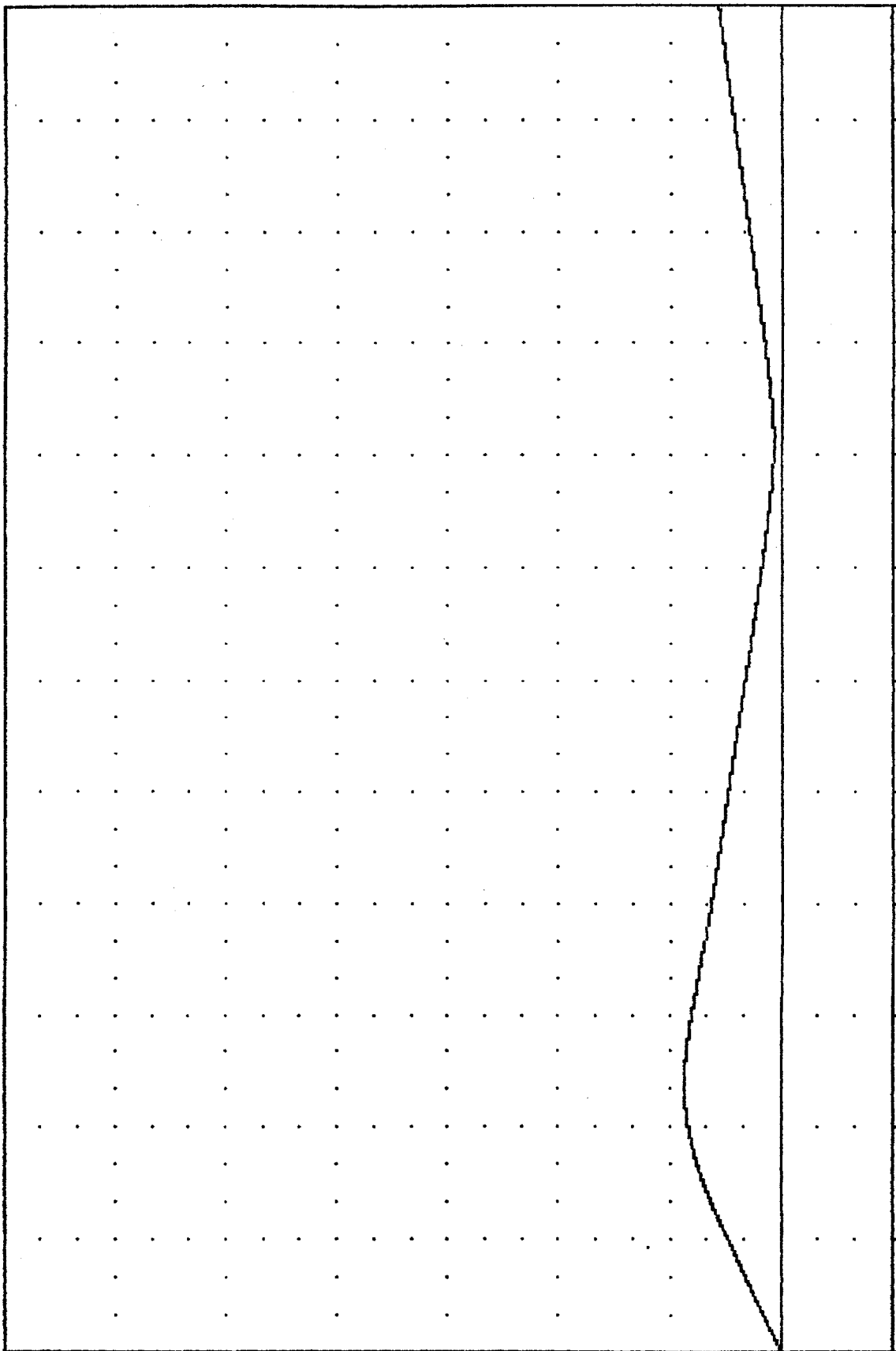
-70.00

-80.00

-90.00

DISPLACEMENT (IN)

B39



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

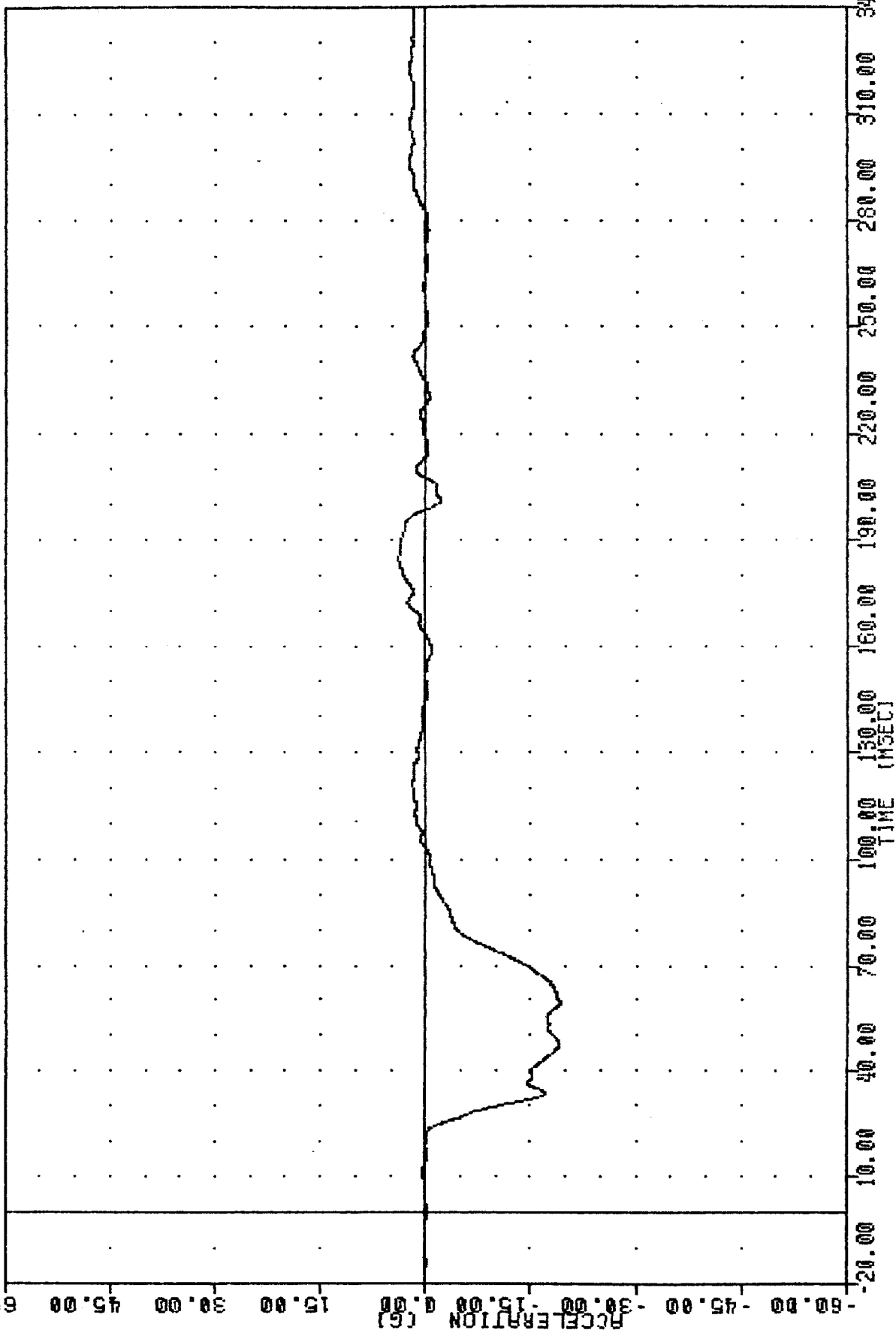
1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 9.6 TEST # 2
RIGHT REAR SEAT DISPLACEMENT RESULTANT

DATA PLOTS

TEST NO. 910502-3

CRASH III DAMAGE ALGORITHM
91122
TLAXG1

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -19.23 59.13 3.80 184.63



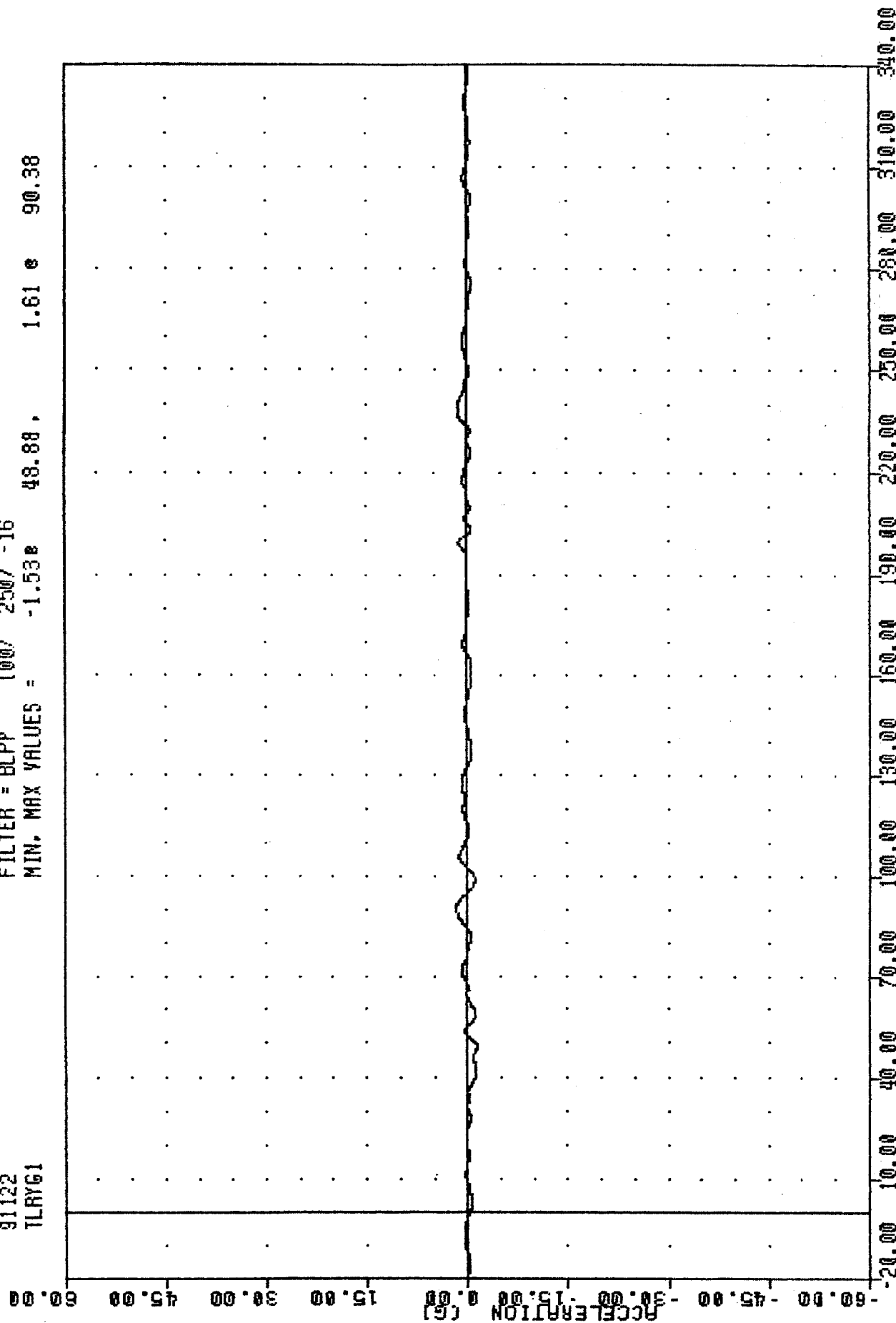
B41

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3
LEFT REAR SEAT X-AXIS ACCELERATION

TRC
 CRASH III DAMAGE ALGORITHM
 91122
 TLRYG1

, 910502-3

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -1.53 48.88 1.61 90.38



B42

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3
 LEFT REAR SEAT Y-AXIS ACCELERATION

CARD 111 UNKNOW PLACEMENT

91122

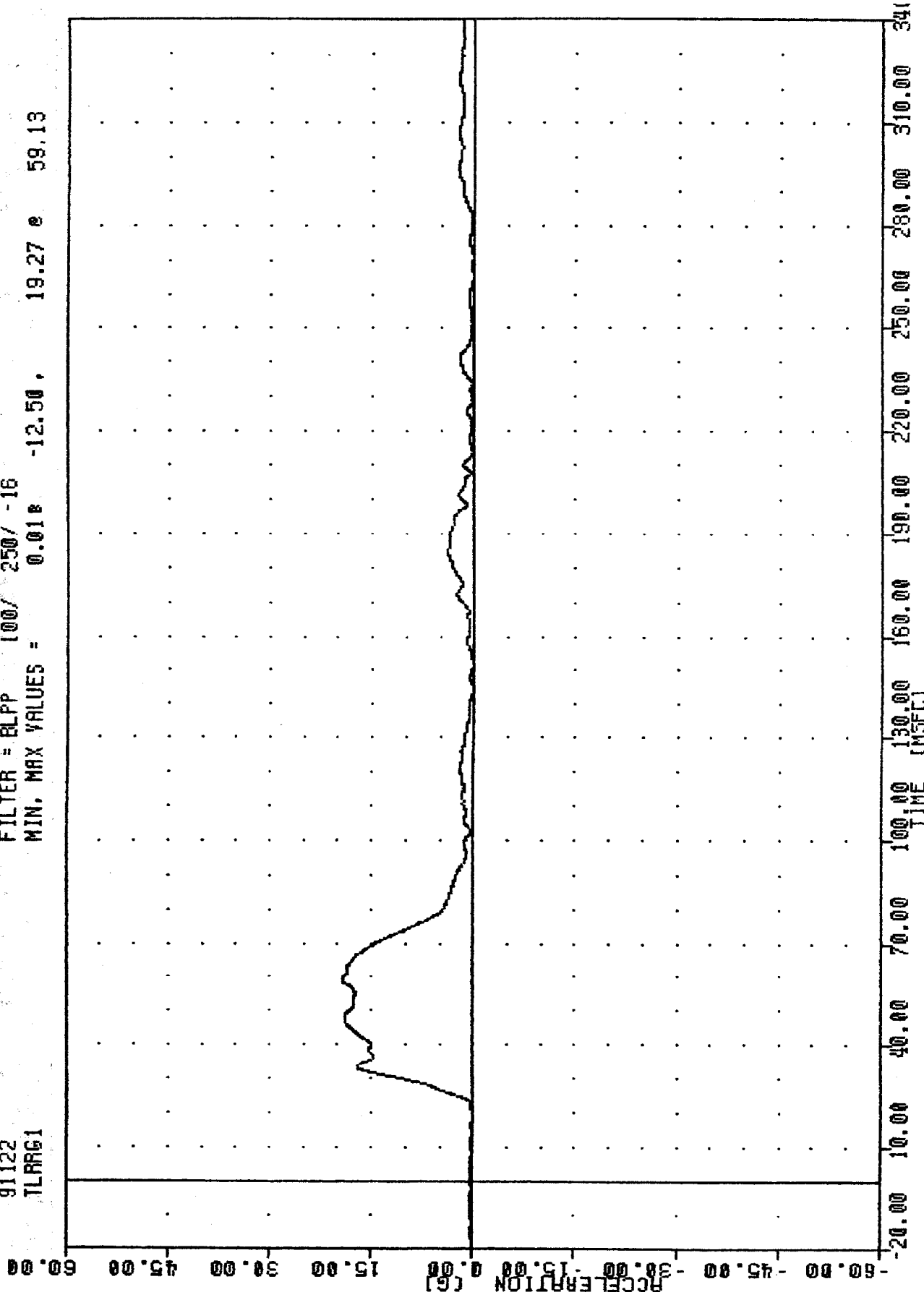
TLRG1

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES = 0.018 -12.50 ,

19.27 e 59.13

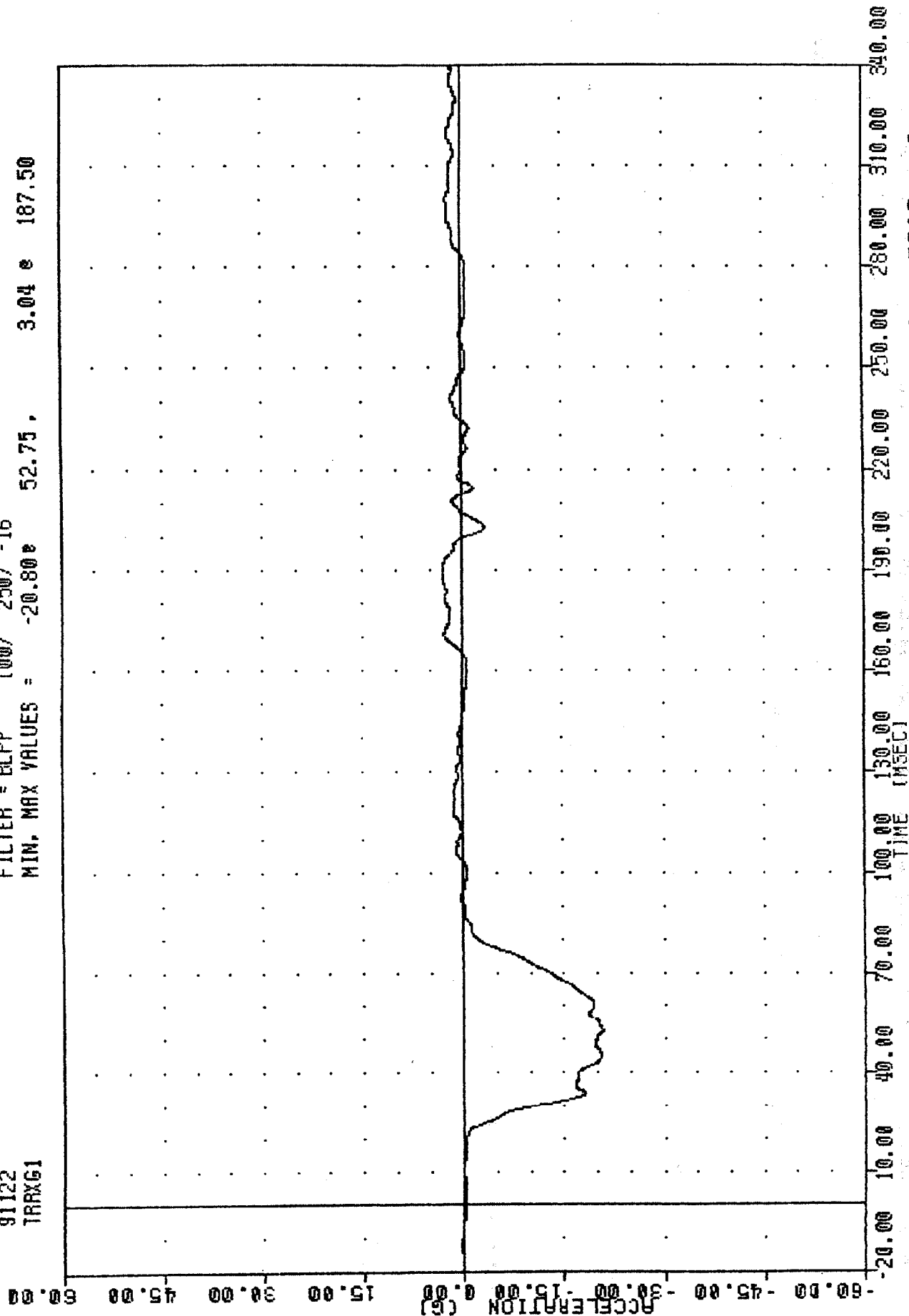
B43



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3
LEFT REAR SEAT RESULTANT ACCELERATION

TRC , 910502-3
CRASH III DAMAGE ALGORITHM
91122
TRRXG1

FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -20.80e 52.75, 3.04 e 187.50



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3
RIGHT REAR SEAT X-AXIS ACCELERATION

CRASH III DAMAGE ALGORITHM

91122

TRYG1

FILTER = BLPP 100/ 250/ -16

MIN, MAX VALUES =

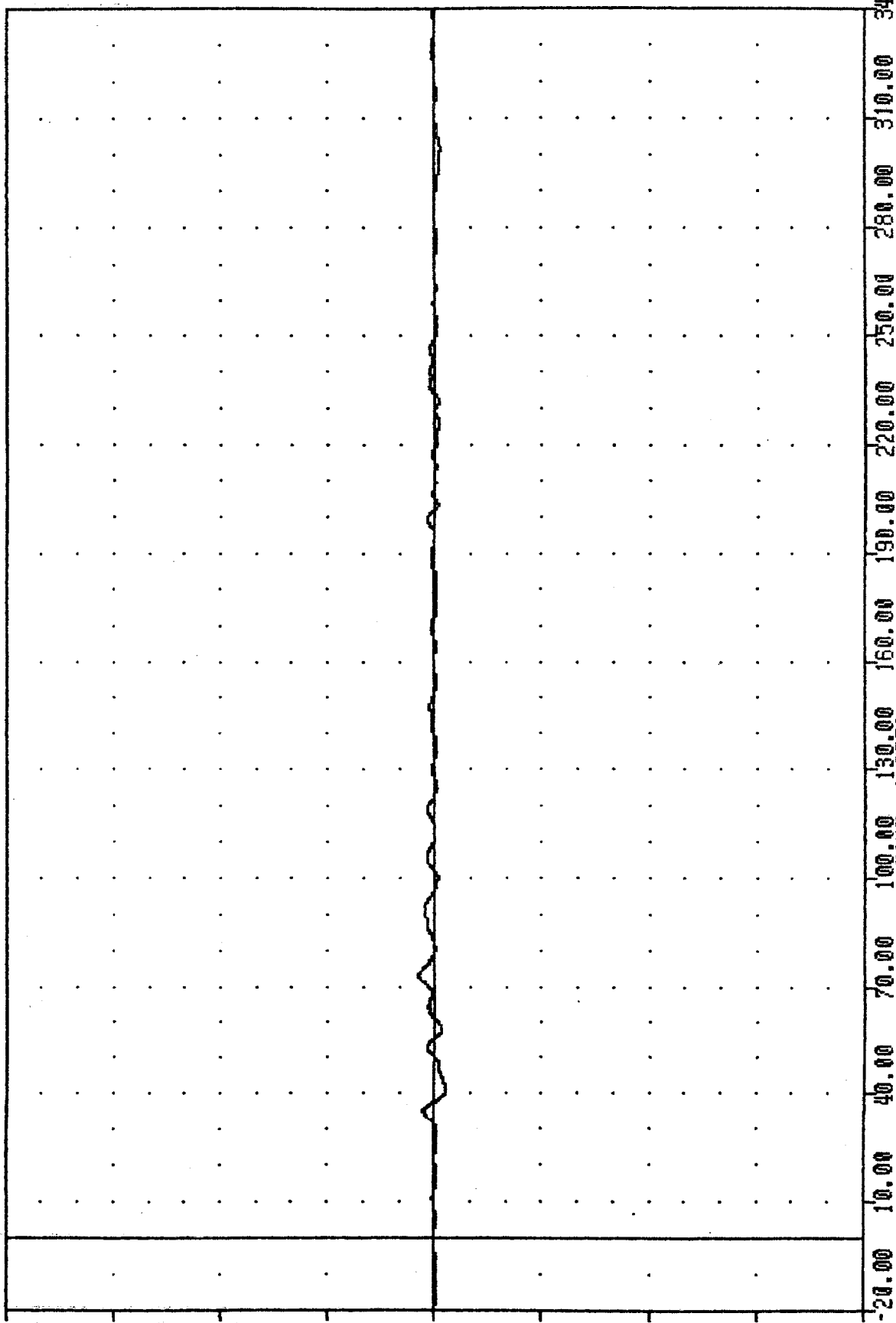
40.88

2.21

73.00

ACCELERATION (G)

B45

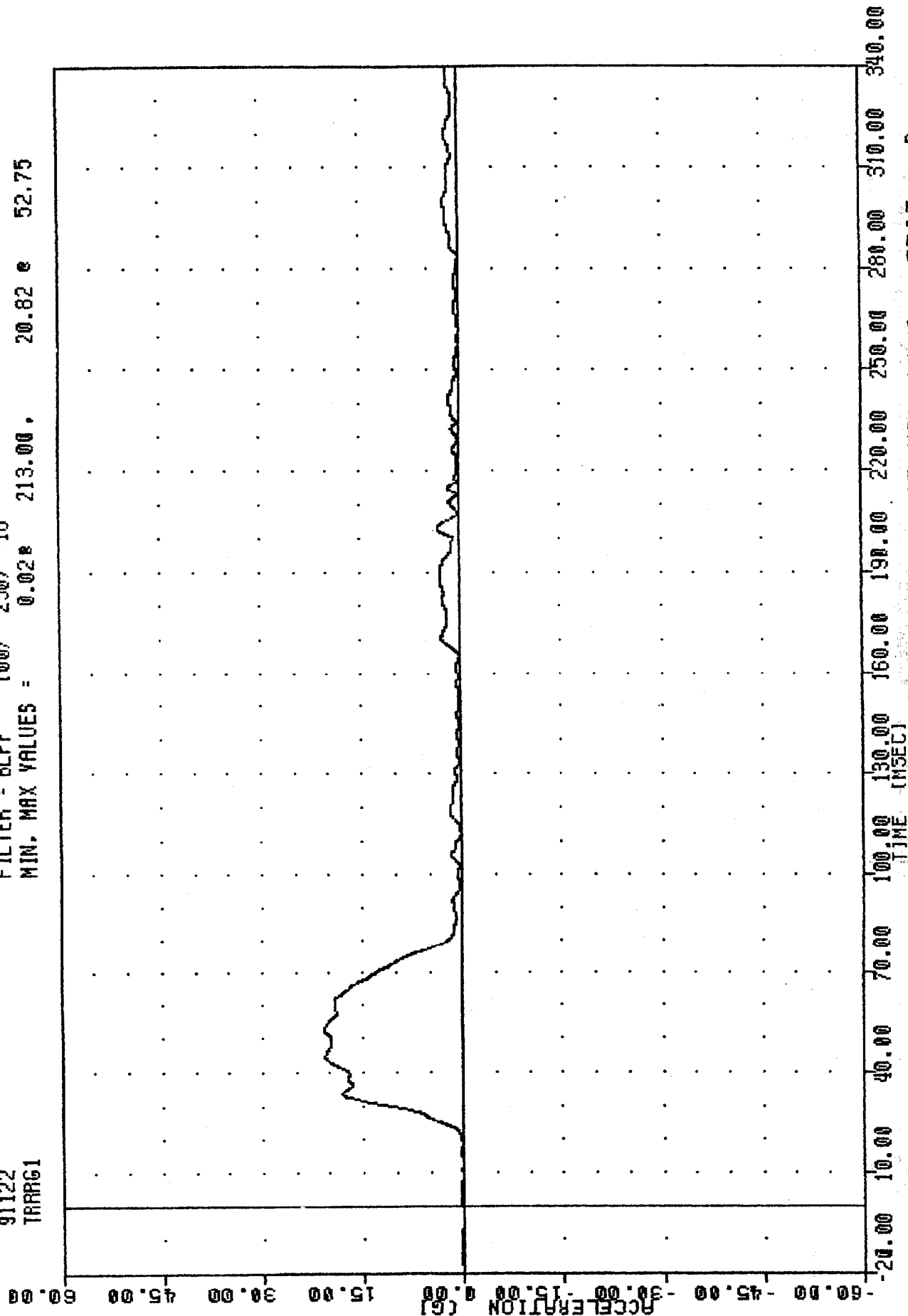


1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3
RIGHT REAR SEAT Y-AXIS ACCELERATION

TRC
CRASH III DAMAGE ALGORITHM
91122
TRRG1

, 910502-3

FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = 0.028 213.00, 20.82 e 52.75



B46

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3
RIGHT REAR SEAT RESULTANT ACCELERATION

CHRS 111 DAMAGE ALGORITHM

91122

TLRXV1

FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES =

104.25.

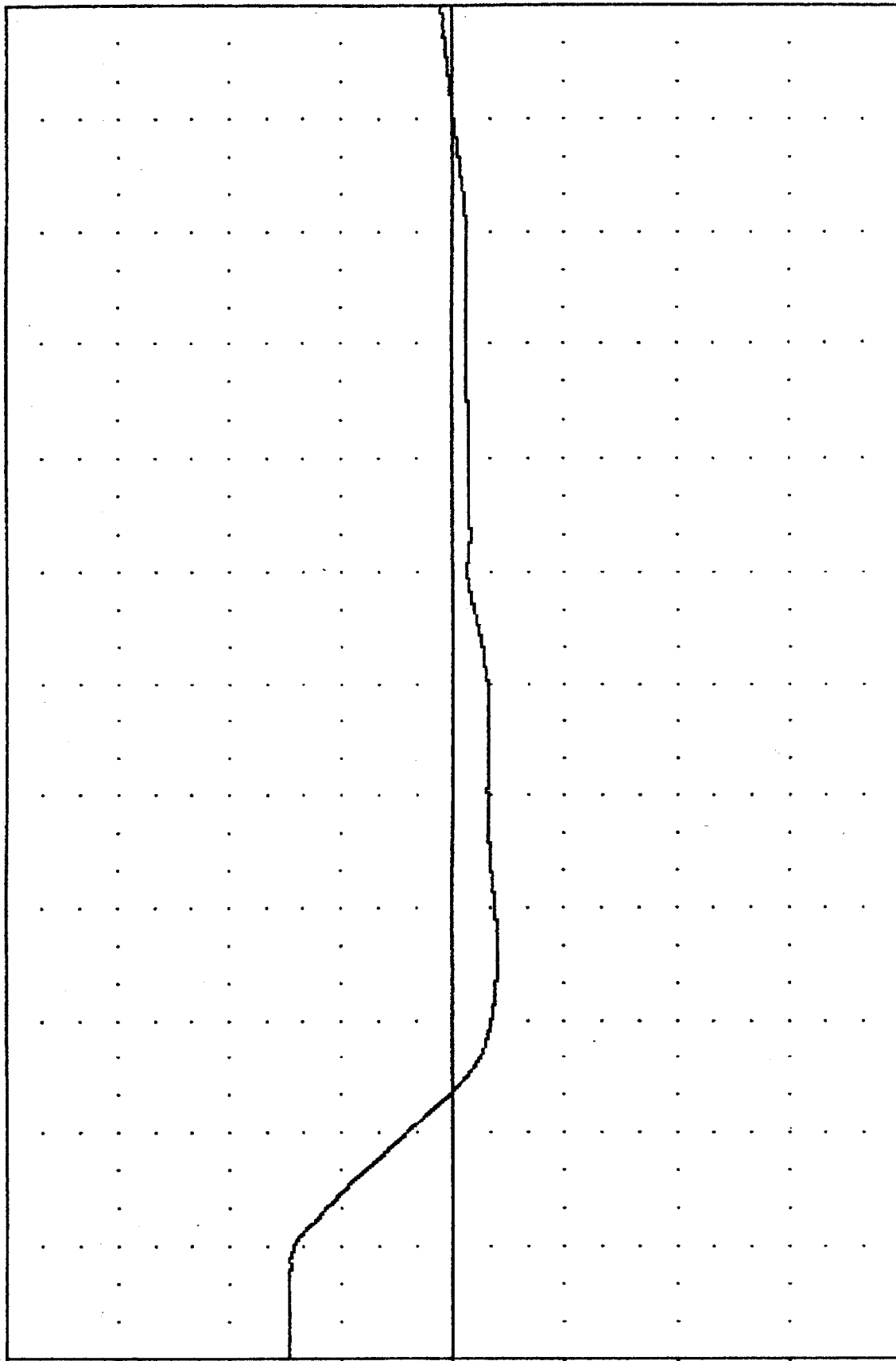
14.63 e

13.63

B47

40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00

VELOCITY (MPH)



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 341.66

TIME (MSEC)

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3

LEFT REAR SEAT X-AXIS VELOCITY

TRC
CRASH III DAMAGE ALGORITHM
91122
TLRXD1

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = 0.00e 12.38 e 66.88

70.00

60.00

50.00

40.00

30.00

20.00

10.00

0.00

-10.00

-20.00

-30.00

-40.00

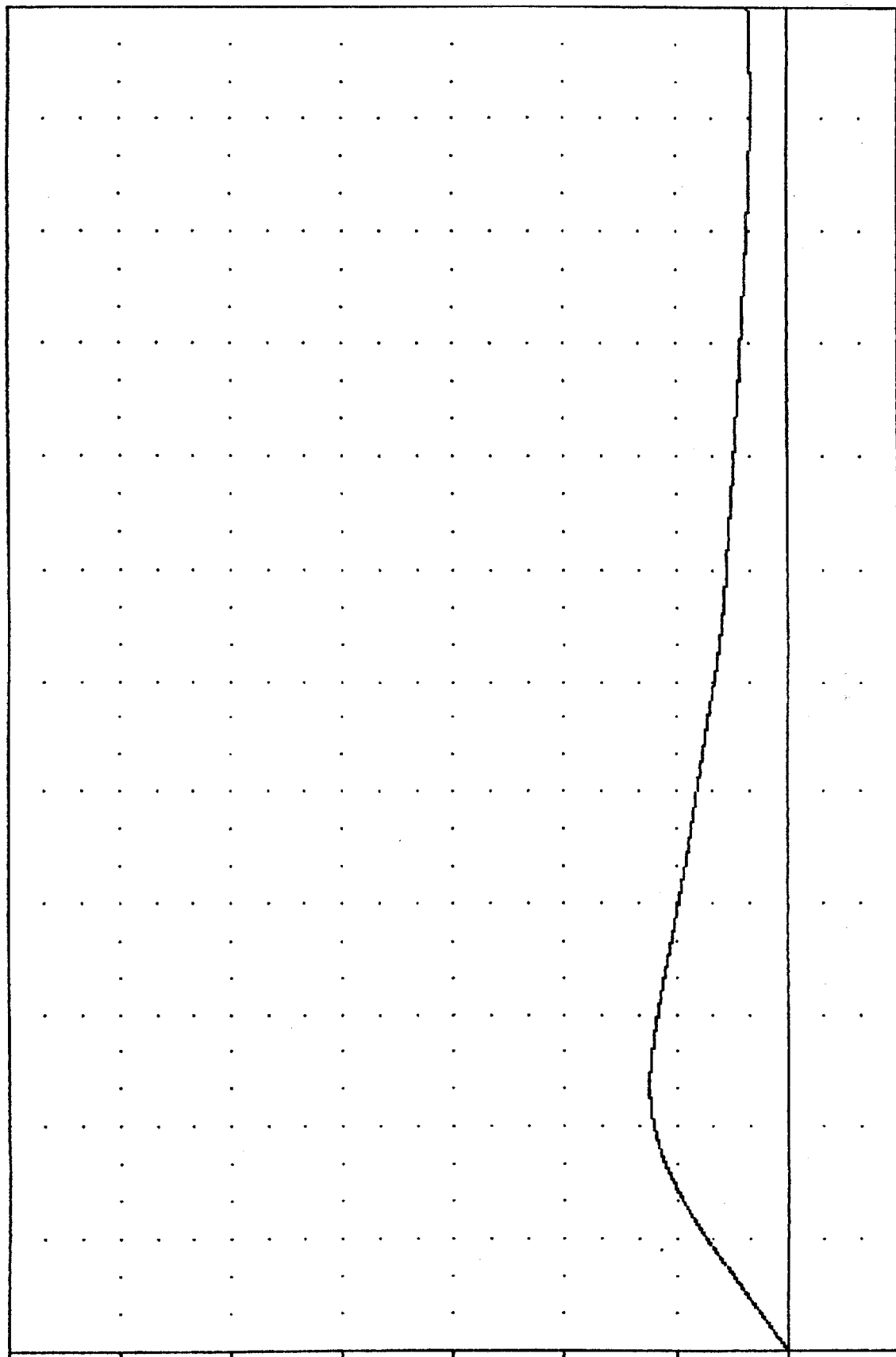
-50.00

-60.00

-70.00

DISPLACEMENT (IN)

B48



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3
LEFT REAR SEAT X-AXIS DISPLACEMENT

CRASH III DAMAGE ALGORITHM

91122

TLRYV1

FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES = -0.59e

67.75 . 0.15 e 268.13

40.00

30.00

20.00

10.00

0.00

VELOCITY (MPH)

-10.00

-20.00

-30.00

-40.00

0.00

28.33

56.66

85.00

113.33

141.66

170.00

198.33

226.66

255.00

283.33

311.66

340

TIME (MSEC)

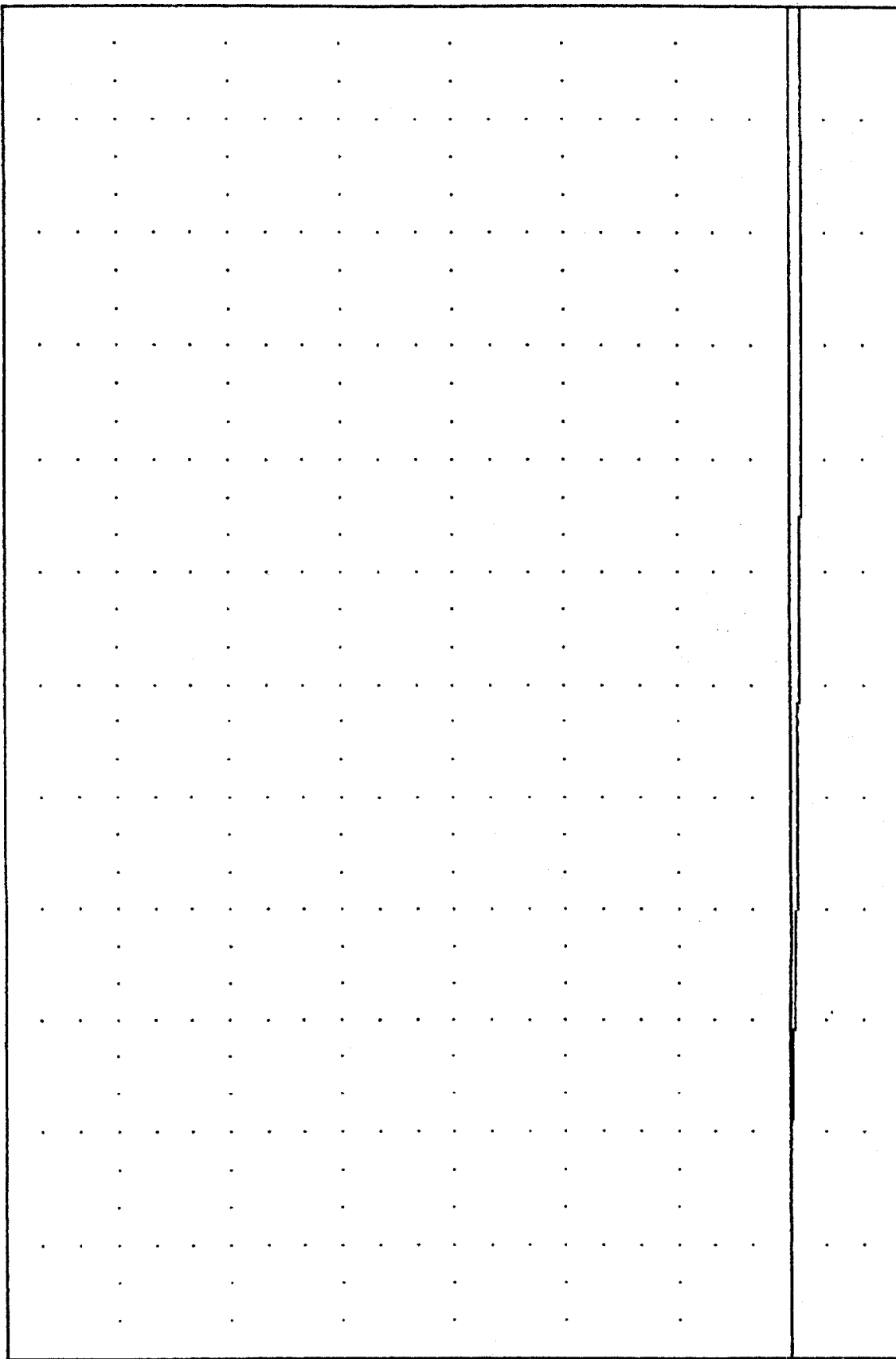
1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3

LEFT REAR SEAT Y-AXIS VELOCITY

TRC
CRASH III DAMAGE ALGORITHM
91122
TLAY01

FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -1.12e 245.50, 0.00 e 0.00

DISPLACEMENT (IN)
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
-10.00



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00
TIME (MSEC)
1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3
LEFT REAR SEAT Y-AXIS DISPLACEMENT

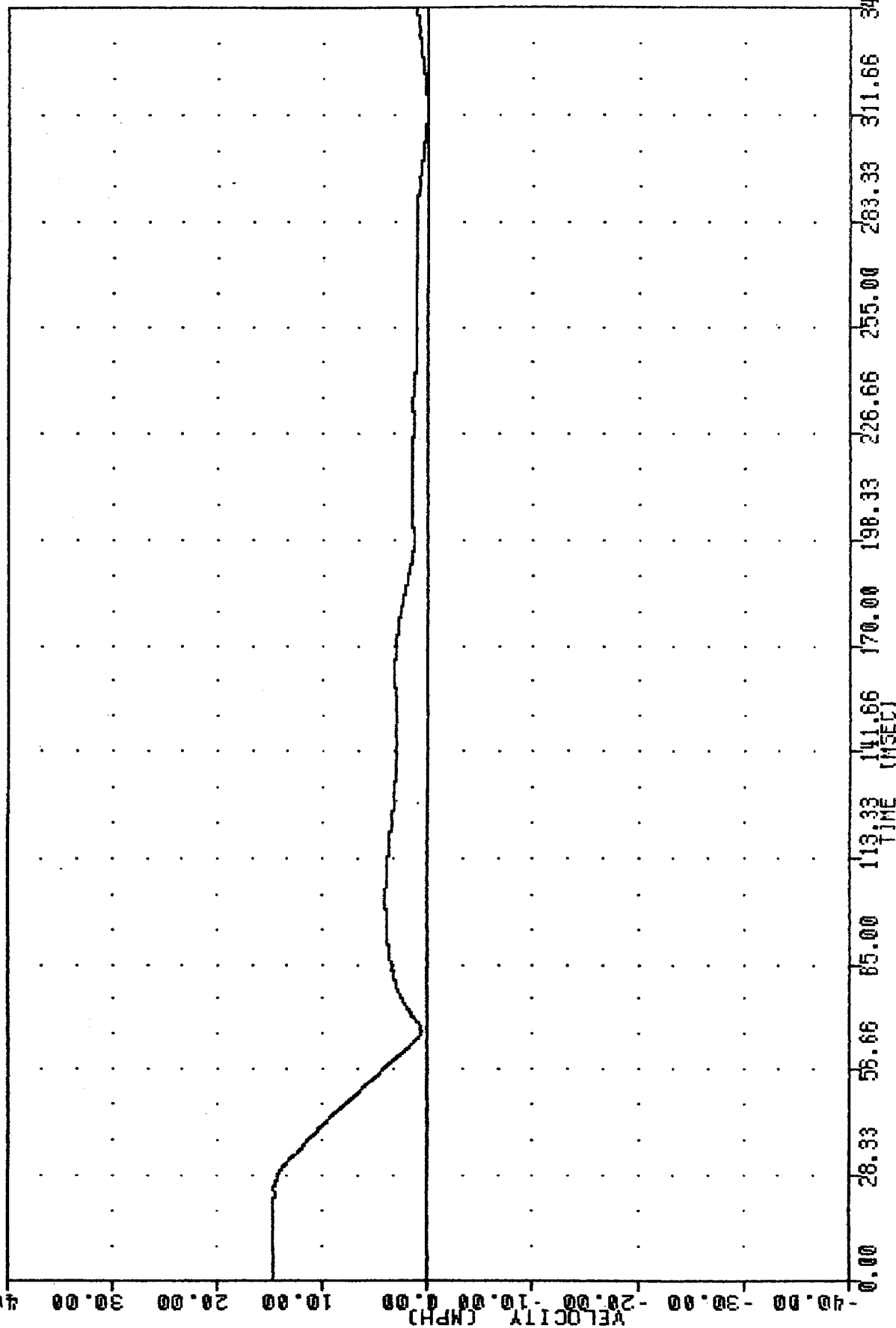
CRASH III DAMAGE ALGORITHM

91122
TLRAY1

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = 0.068 313.88, 14.63 e 13.63

40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00

B51



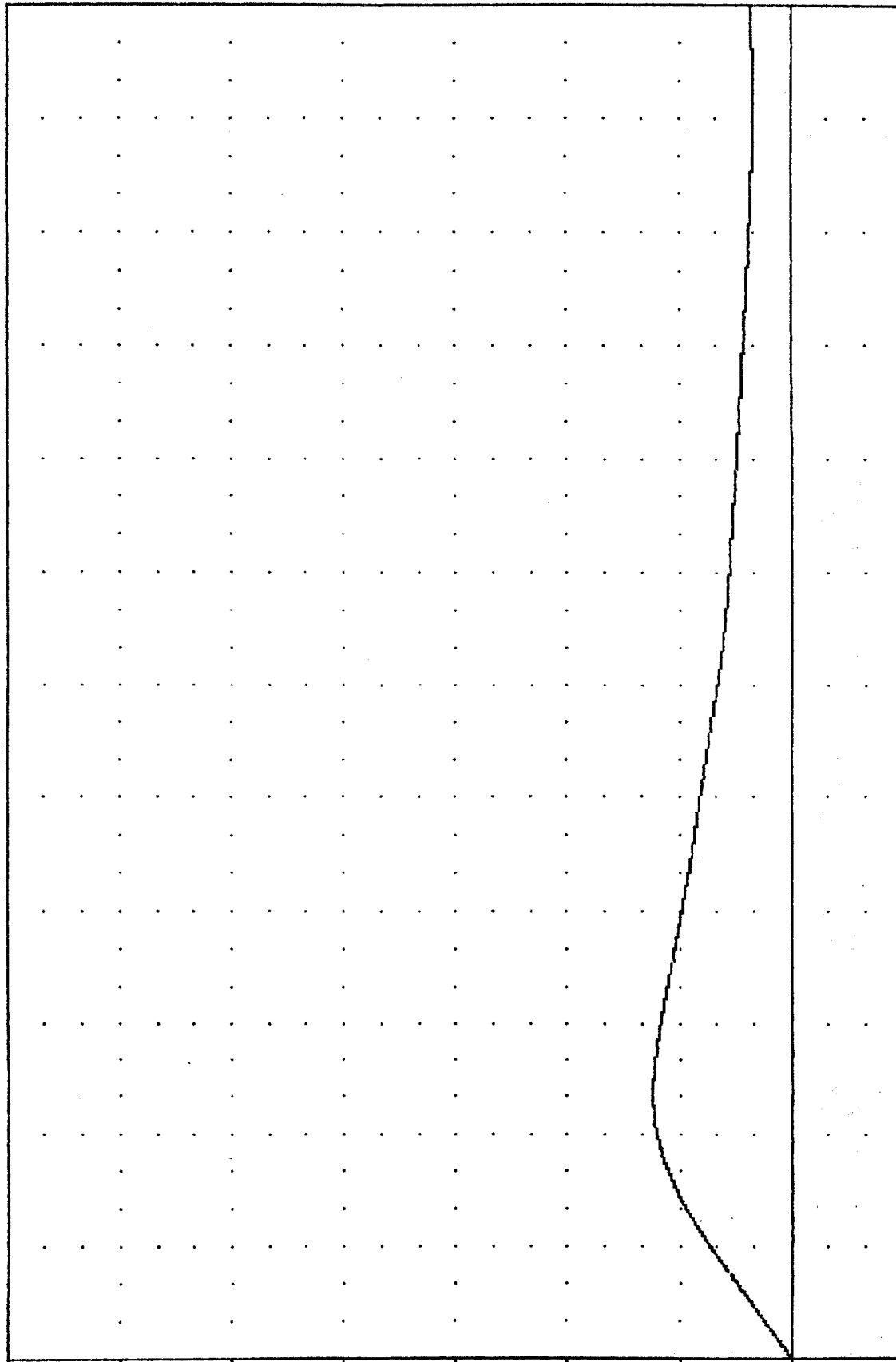
1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3
LEFT REAR SEAT VELOCITY RESULTANT

TRC
 CRASH III DAMAGE ALGORITHM
 91122
 TLRD1

, 910502-3

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = 0.000 0.00 12.38 0 57.00

DISPLACEMENT (IN)



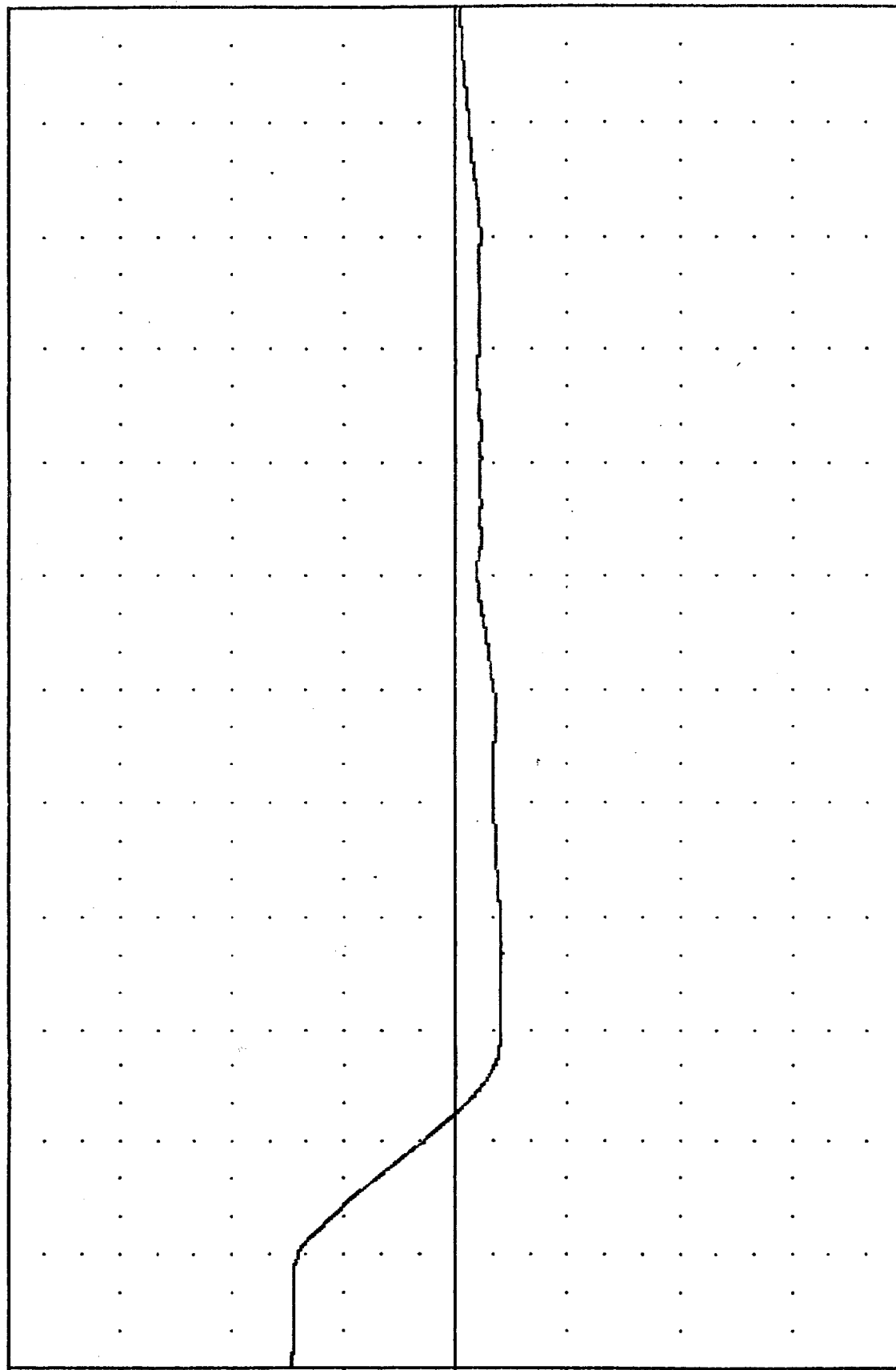
0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.8 TEST # 3
 LEFT REAR SEAT DISPLACEMENT RESULTANT

CRASH III DAMAGE ALGORITHM
 91122
 TRRXV1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -4.08e 104.38e 14.60e 0.00

VELOCITY (MPH)



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3
 RIGHT REAR SEAT X-AXIS VELOCITY

TRC
CRASH III DAMAGE ALGORITHM
91122
TRAXD1

910502-3

FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -0.36e 340.00. 11.86 e 63.63

70.00

60.00

50.00

40.00

30.00

20.00

10.00

0.00

-10.00

-20.00

-30.00

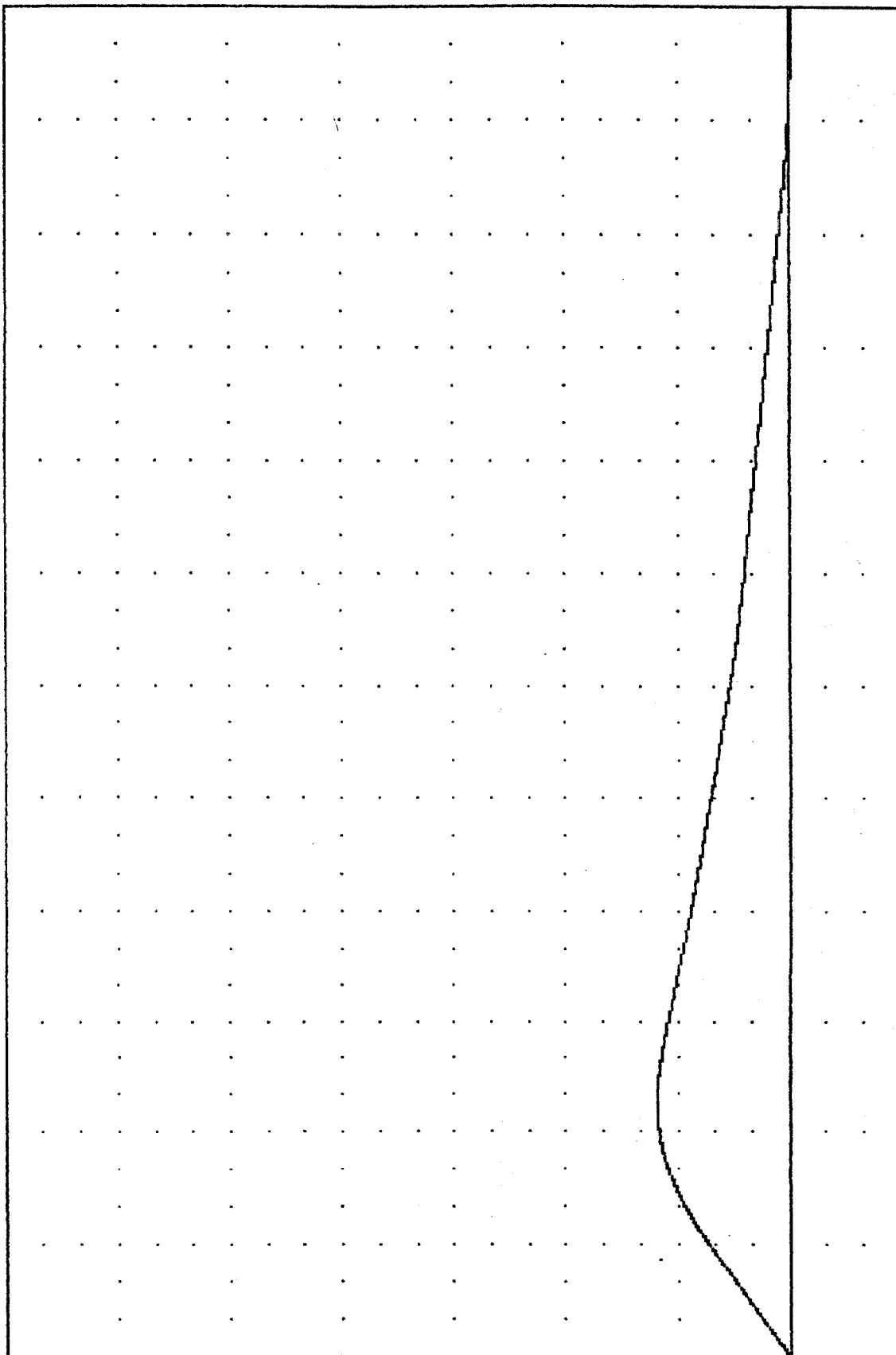
-40.00

-50.00

-60.00

-70.00

DISPLACEMENT (IN)



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3
RIGHT REAR SEAT X-AXIS DISPLACEMENT

CRASH III DAMAGE ALGORITHM

91122
TRAVV1

FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES =

50.38 .

0.94 e 272.88

40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00

B55

VELOCITY (MPH)

0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340

TIME (MSEC)

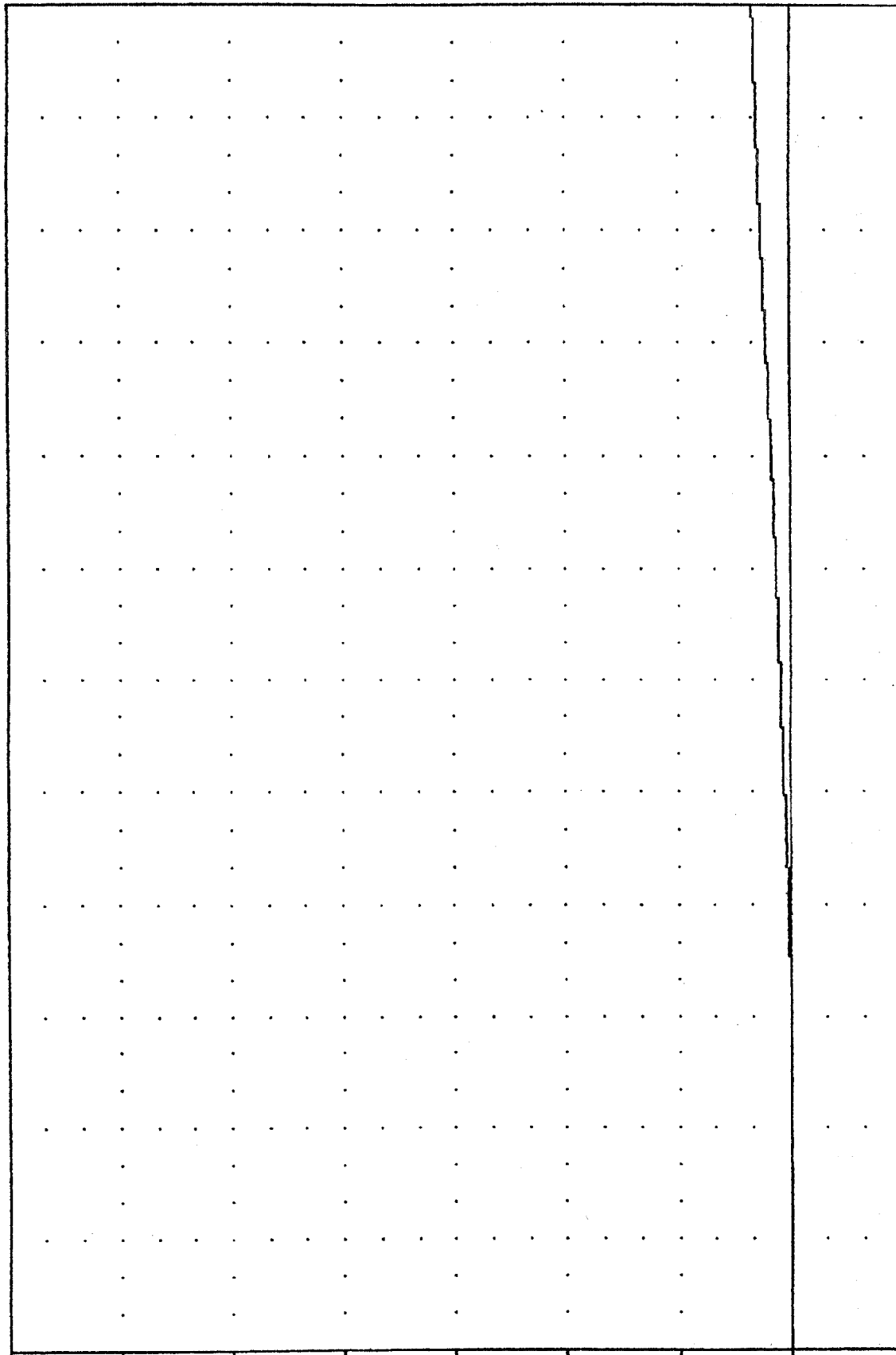
1987 HYUNDAI

EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3
RIGHT REAR SEAT Y-AXIS VELOCITY

TRC 910502-3
 CRASH III DAMAGE ALGORITHM
 91122
 TRAYD1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -0.09e 72.63, 3.27 e 340.00

DISPLACEMENT (IN)



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00
 1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3
 RIGHT REAR SEAT Y-AXIS DISPLACEMENT

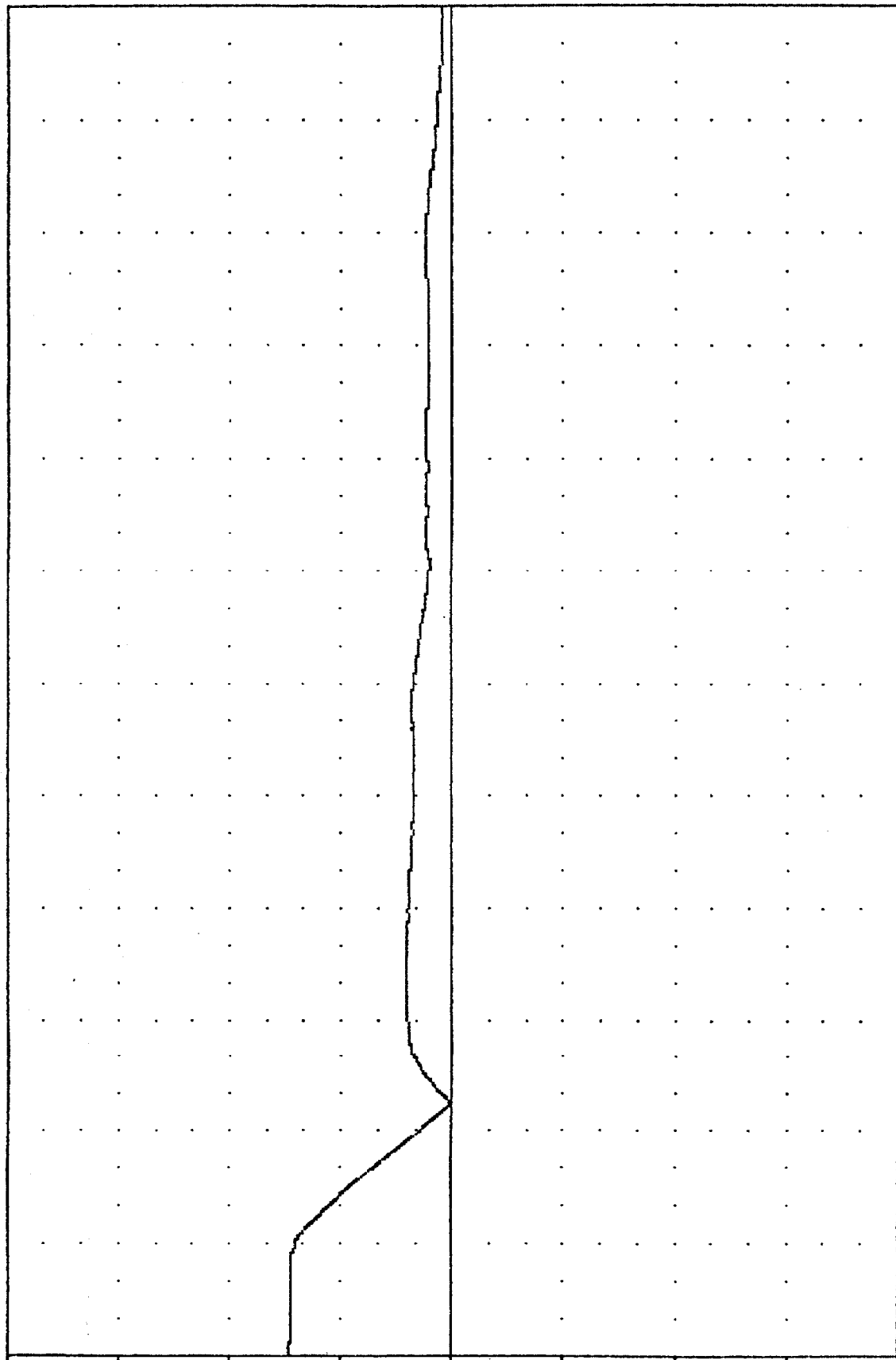
CRASH III DAMAGE ALGORITHM
91122
TRAV1

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = 0.17e 0.00

63.63 14.60 e 0.00

40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00

VELOCITY (MPH)



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 341.66

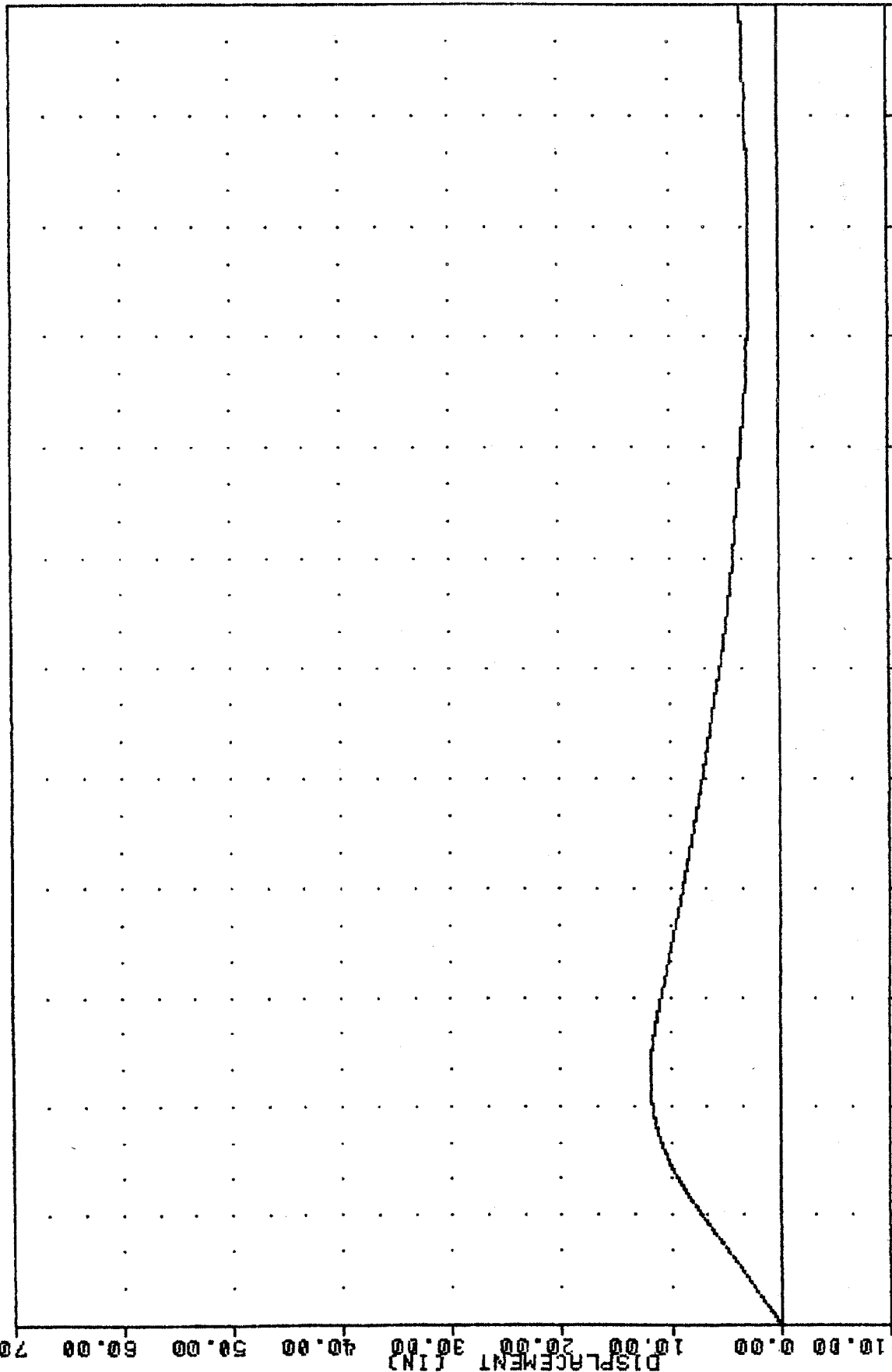
TIME (MSEC)

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3
RIGHT REAR SEAT VELOCITY RESULTANT

TRC , 910502-3
 CRASH III DAMAGE ALGORITHM
 91122
 TRPRD1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = 0.00 11.86 e 63.63

70.00



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00

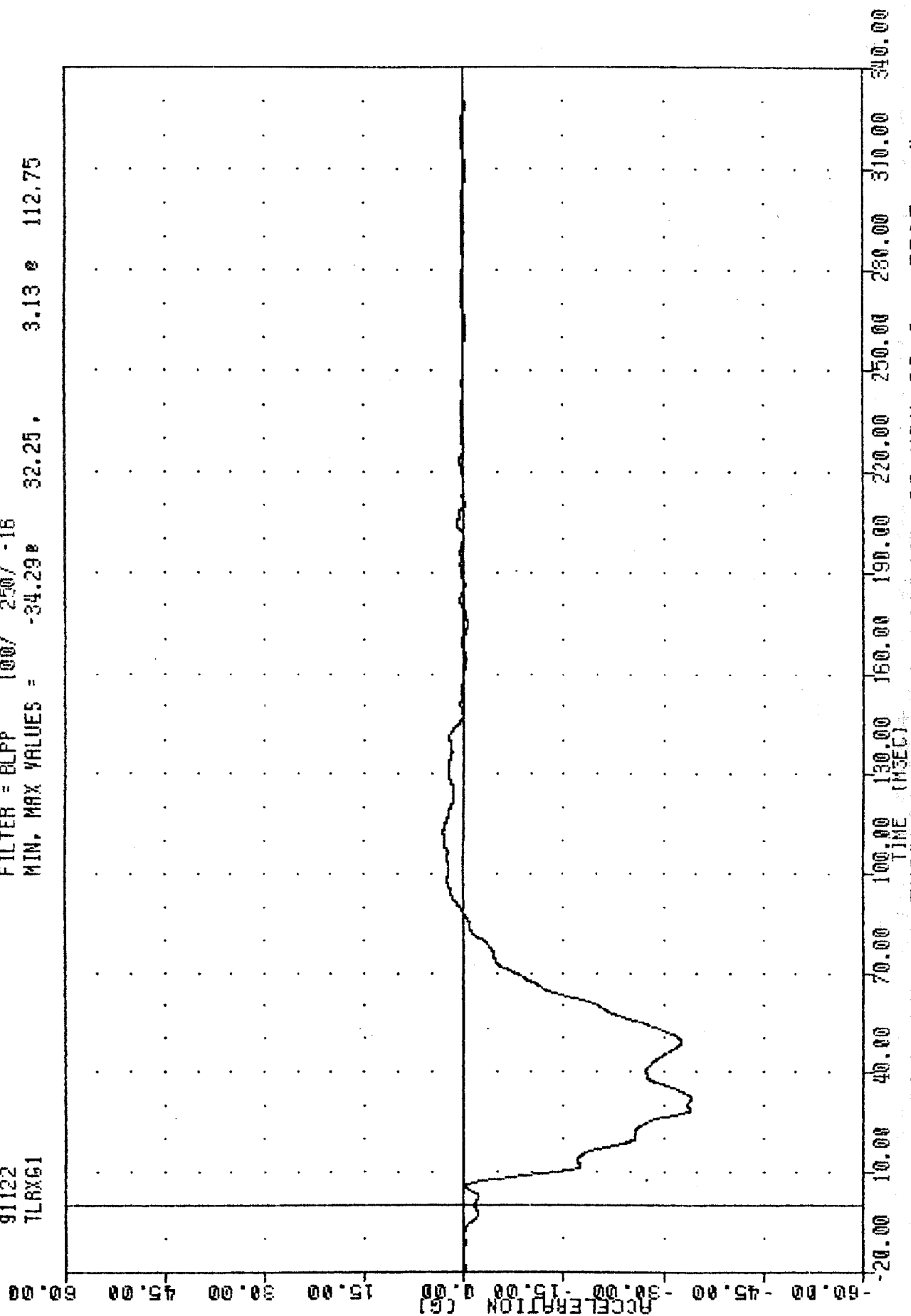
1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 14.6 TEST # 3
 RIGHT REAR SEAT DISPLACEMENT RESULTANT

DATA PLOTS

TEST NO. 910502-4

TRC , 910502-4
CRASH III DAMAGE ALGORITHM
91122
TLRXG1

FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -34.29 3.13 112.75



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
LEFT REAR SEAT X-AXIS ACCELERATION

CRASH III DAMAGE ALGORITHM

91122

TLRYG1

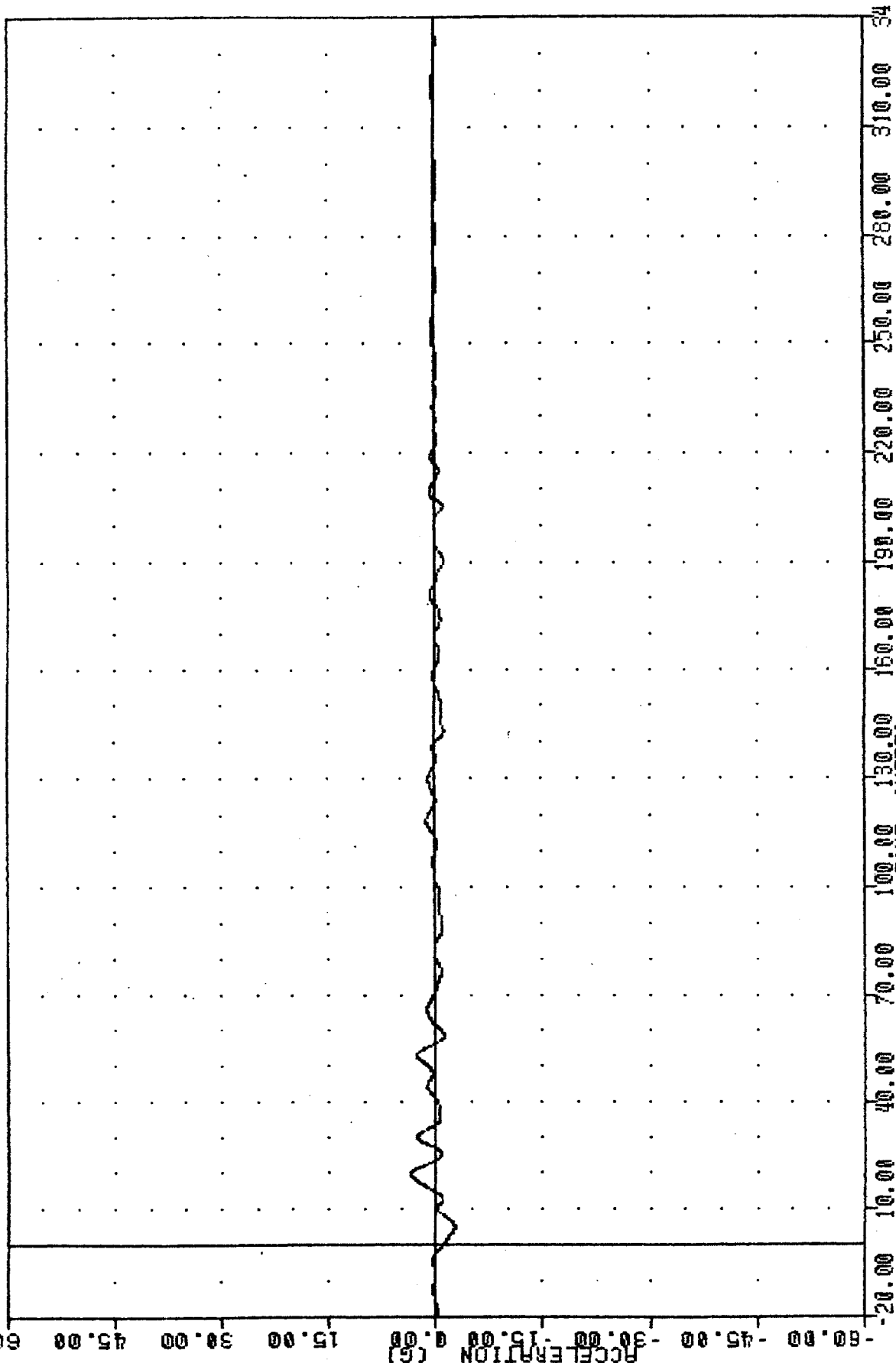
FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -2.70e

4.63,

3.54 e 19.50

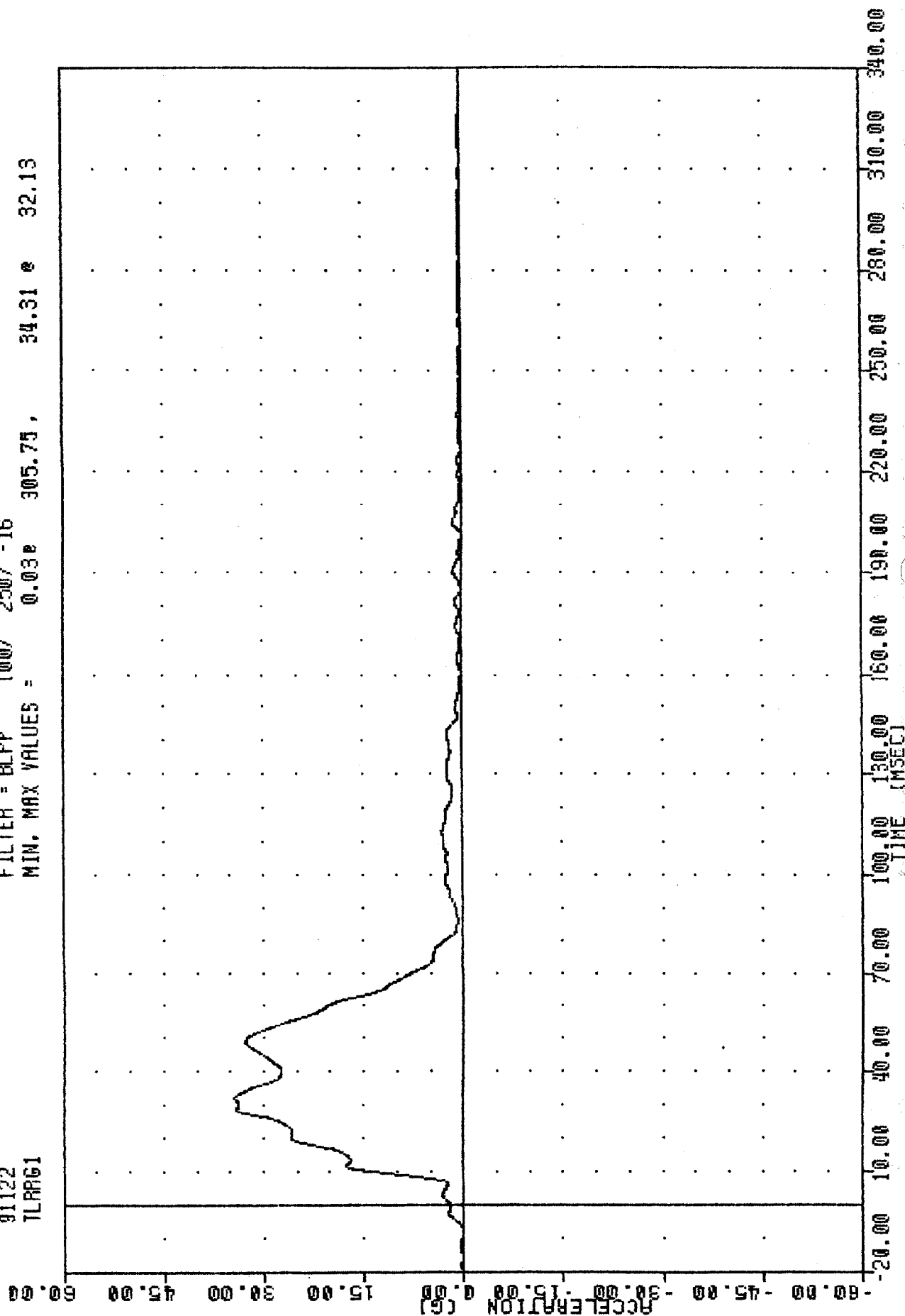
B61



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
LEFT REAR SEAT Y-AXIS ACCELERATION

TRC 910502-4
 CRASH III DAMAGE ALGORITHM
 91122
 TLRG1

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = 0.03e 305.75, 34.31 e 32.13



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
 LEFT REAR SEAT RESULTANT ACCELERATION

CRASH III DAMAGE ALGORITHM

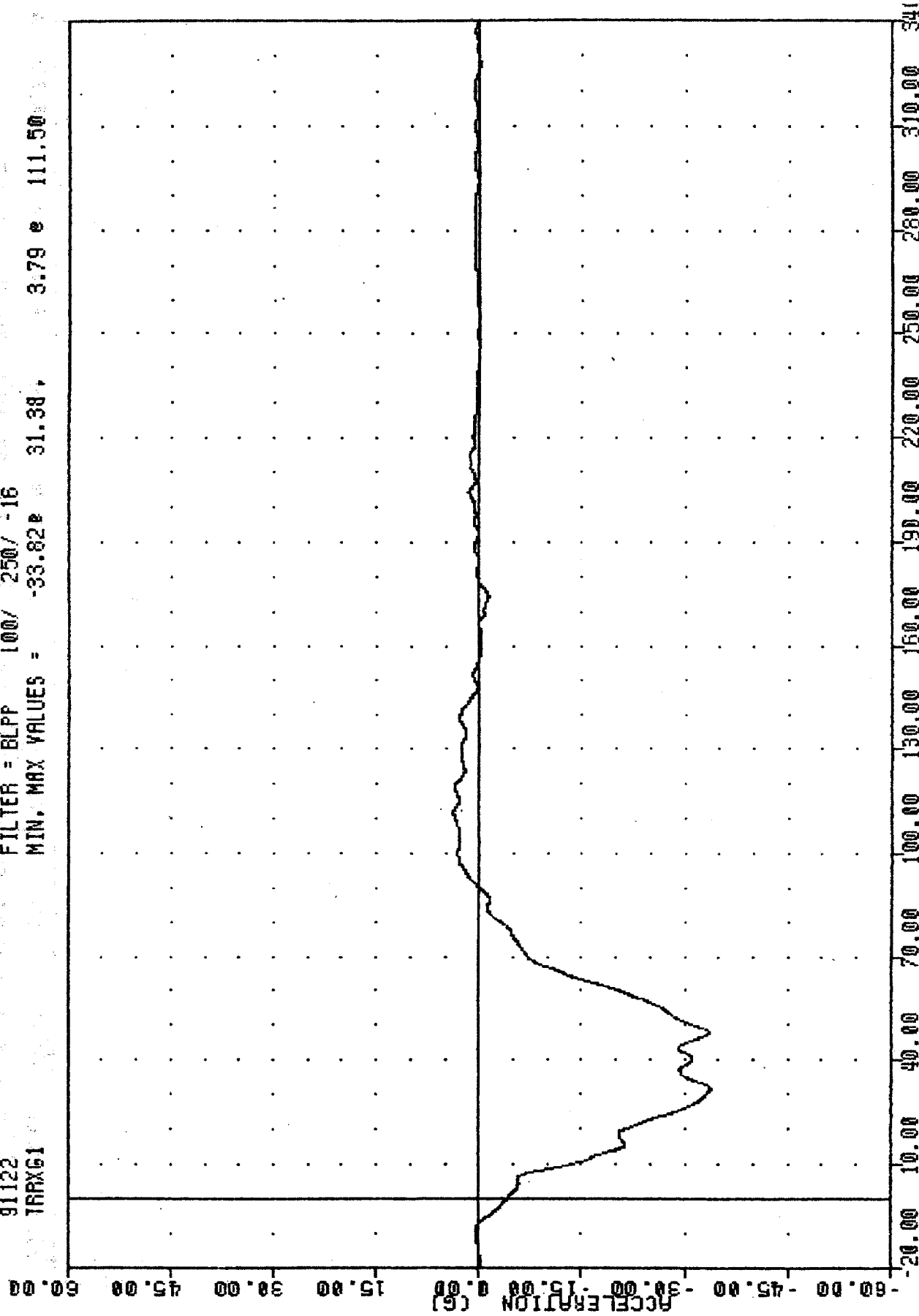
91122

TRPXG1

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -33.82 31.38 3.79 111.50

B63



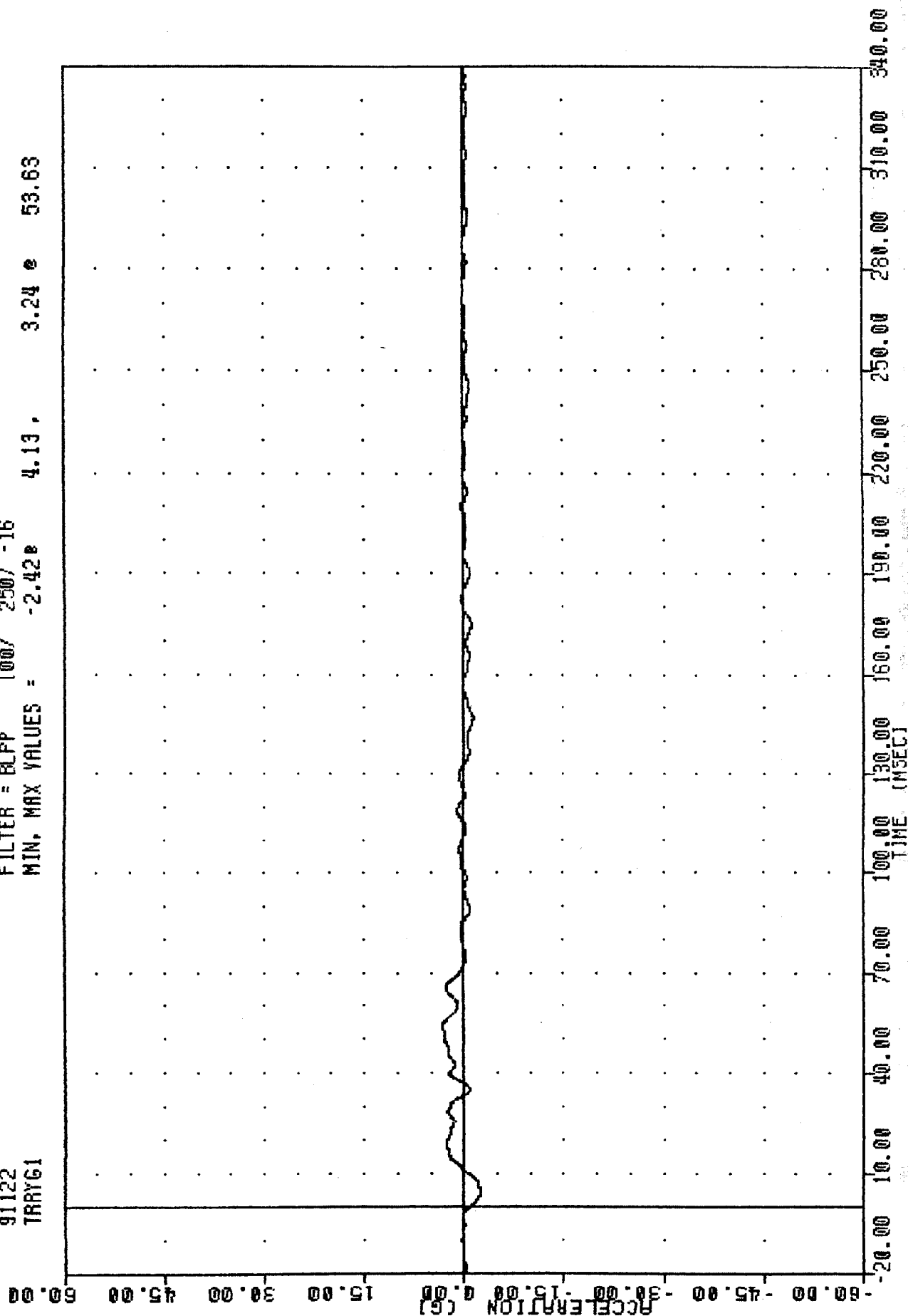
1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4

RIGHT REAR SEAT X-AXIS ACCELERATION

TRC
CRASH III DAMAGE ALGORITHM
91122
TRYG1

, 910502-4

FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = 4.13, 3.24 e 53.63



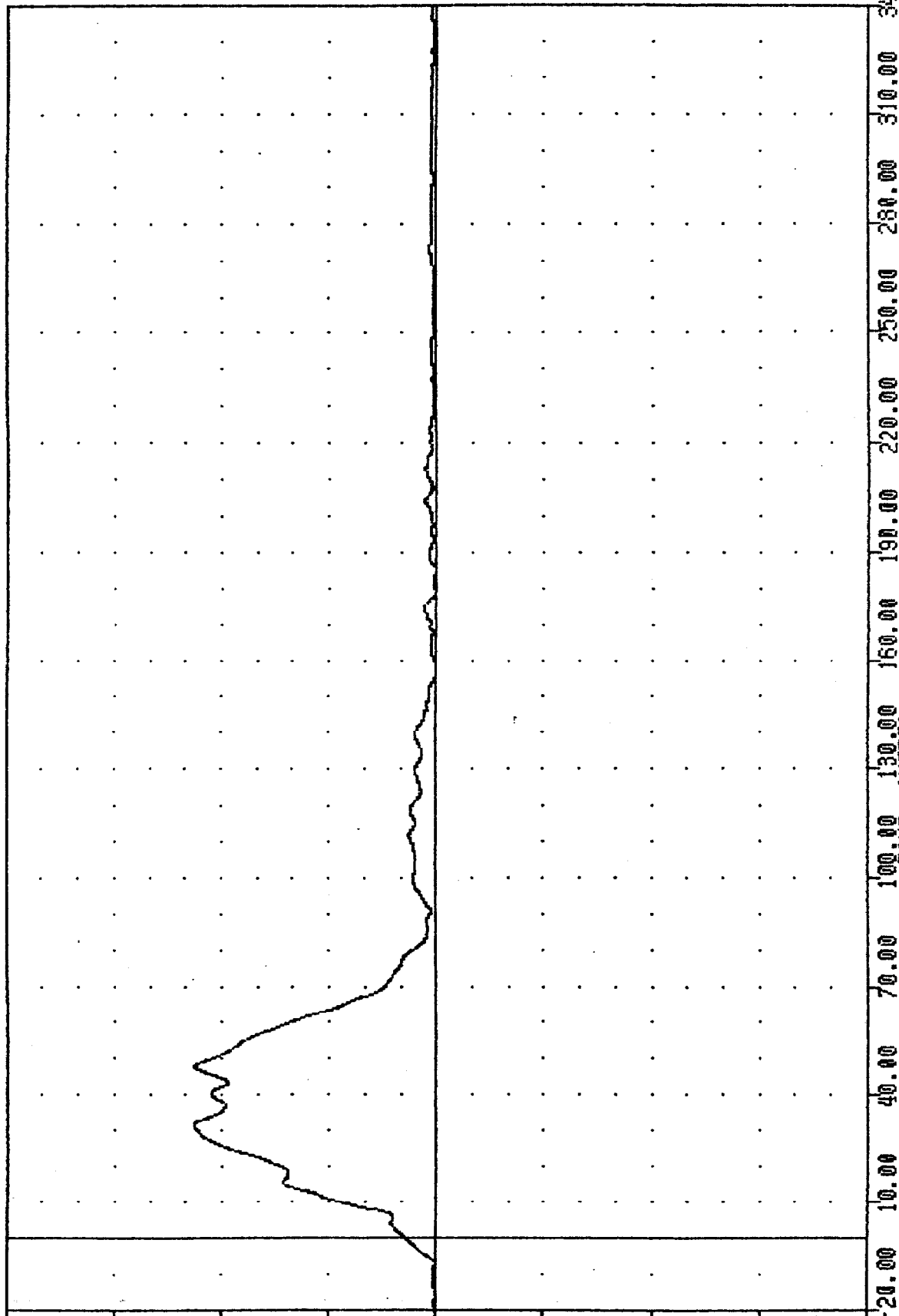
1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
RIGHT REAR SEAT Y-AXIS ACCELERATION

CRASH III DAMAGE ALGORITHM

91122
TRRG1

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = 0.01e -7.13, 33.86 e 31.38

ACCELERATION (G)



B65

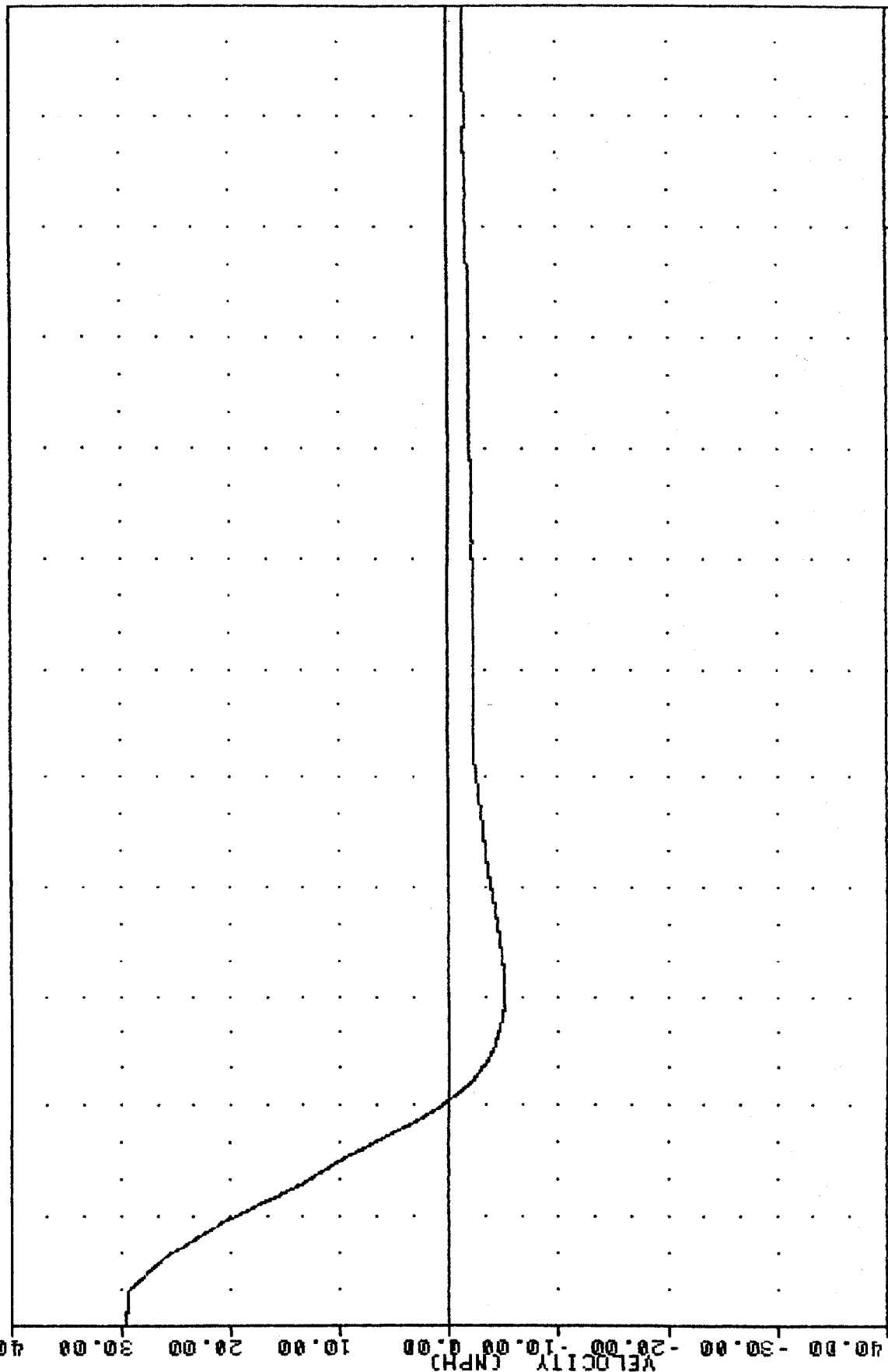
1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
RIGHT REAR SEAT RESULTANT ACCELERATION

TRC
 CRASH III DAMAGE ALGORITHM
 91122
 TLRXV1

910502-4

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -5.050 88.38 29.60 0.00

VELOCITY (MPH)



B66

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
 LEFT REAR SEAT X-AXIS VELOCITY

CRASH III DAMAGE ALGORITHM

91122
TLRX01

FILTER = BLPP 300/ 750/ -16

MIN. MAX VALUES = 0.00e 0.00. 18.08 e 58.00

70.00

60.00

50.00

40.00

30.00

20.00

10.00

0.00

DISPLACEMENT (IN)

10.00

20.00

30.00

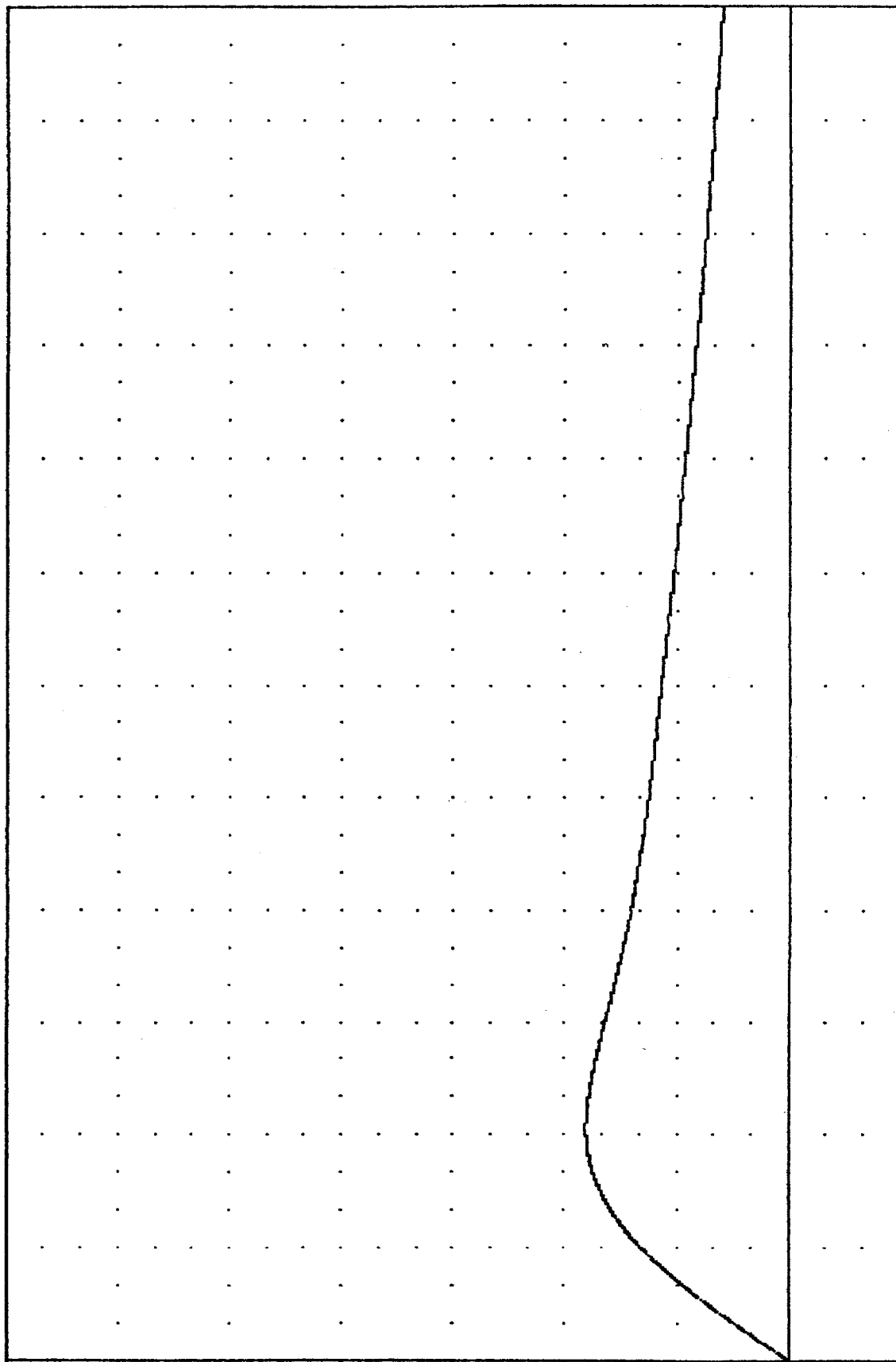
40.00

50.00

60.00

70.00

B67



TIME (MSEC)	DISPLACEMENT (IN)
0.00	0.00
28.33	1.00
56.66	2.00
85.00	3.00
113.33	4.00
141.66	5.00
170.00	6.00
198.33	7.00
226.66	8.00
255.00	9.00
283.33	10.00
311.66	11.00
340.00	12.00

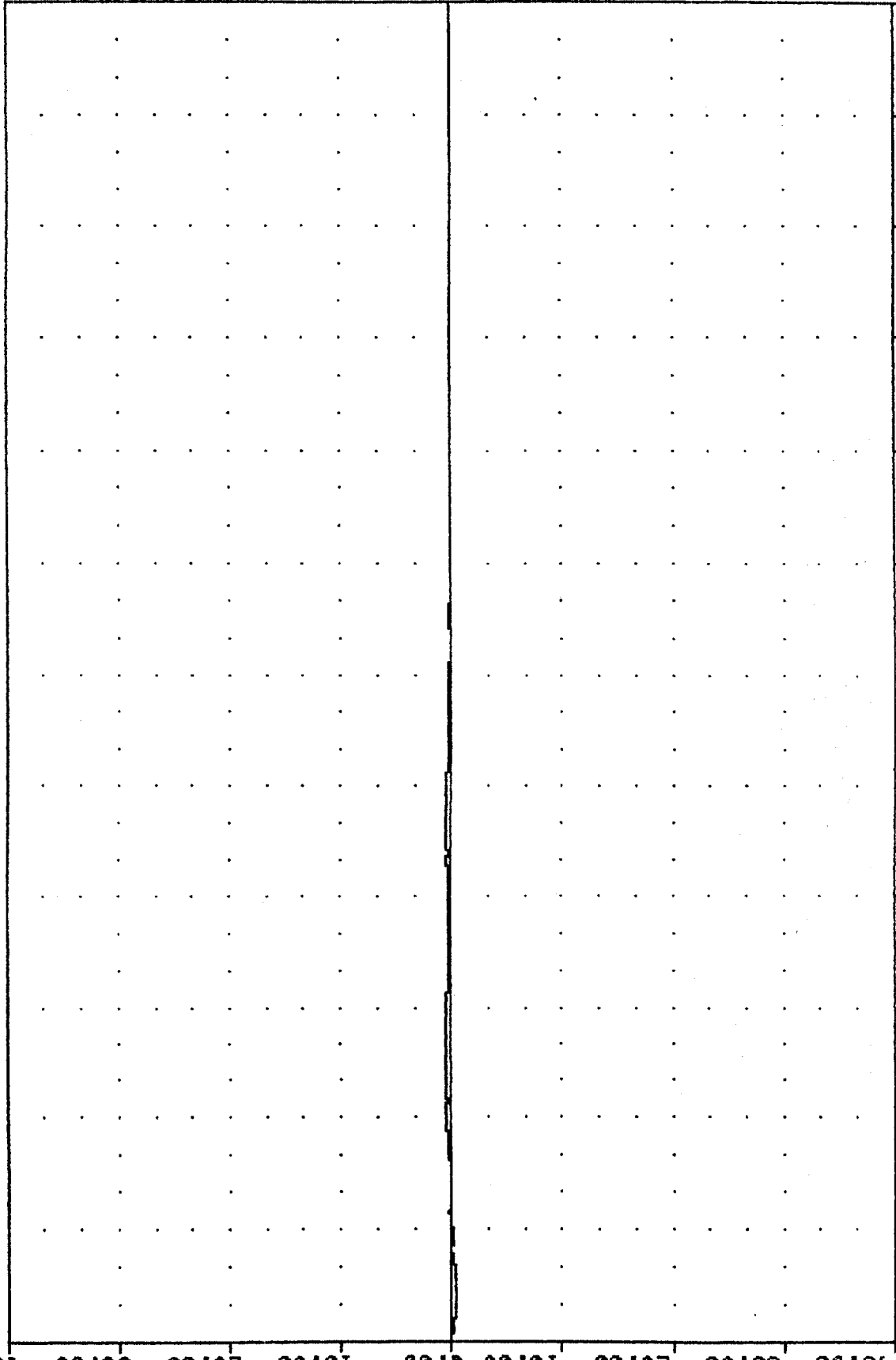
1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.8 TEST # 4

LEFT REAR SEAT-X-AXIS DISPLACEMENT

TAC
CRASH III DAMAGE ALGORITHM
91122
TLRYV1

FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -0.46 0.53 0 69.63

40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
VELOCITY (MPH)

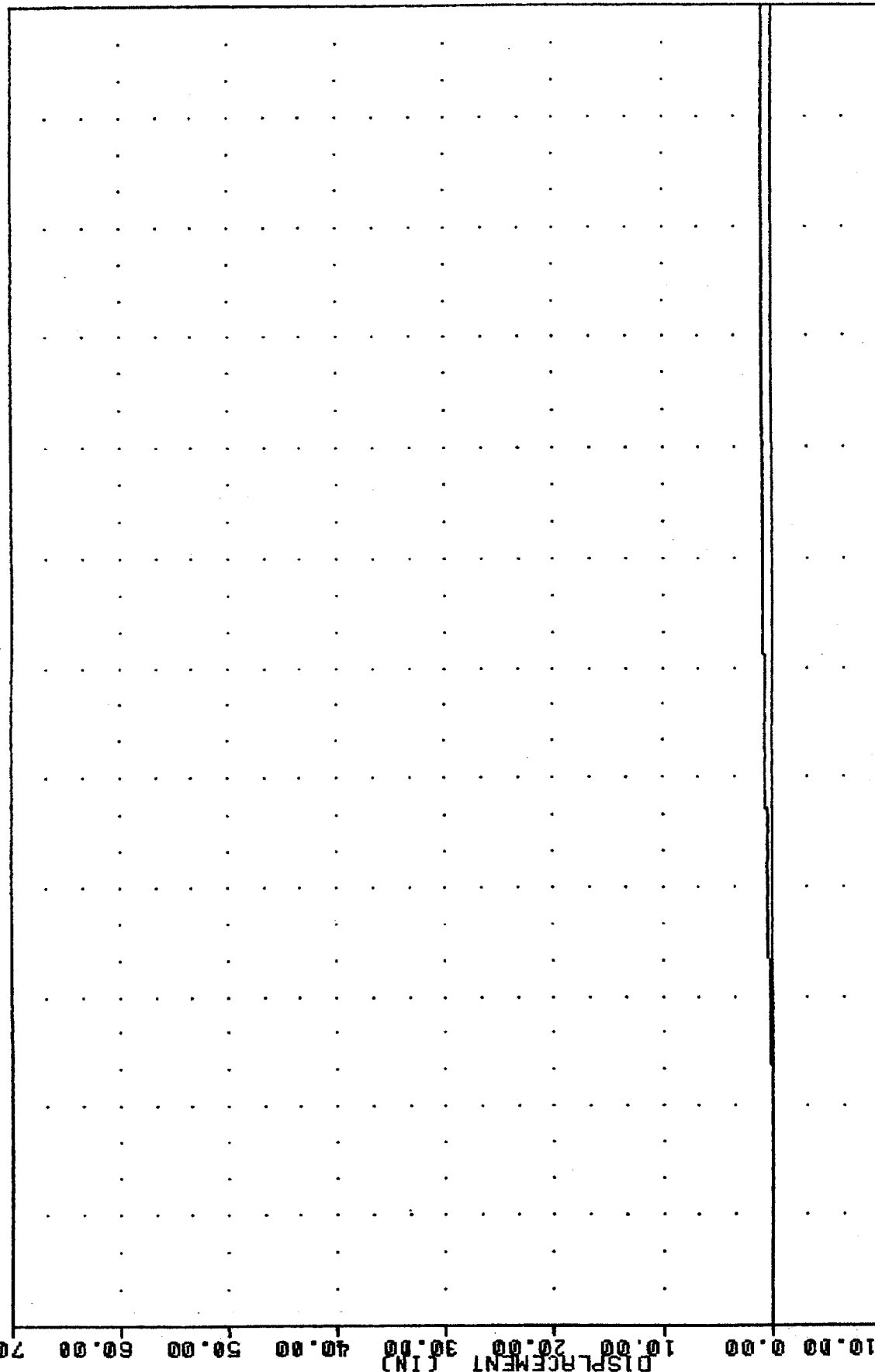


0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00
TIME (MSEC)
1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
LEFT REAR SEAT Y-AXIS VELOCITY

CRASH III DAMAGE ALGORITHM
 91122
 TLRYDI

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -0.12e 29.88, 0.83 e 340.00

70.00



B69

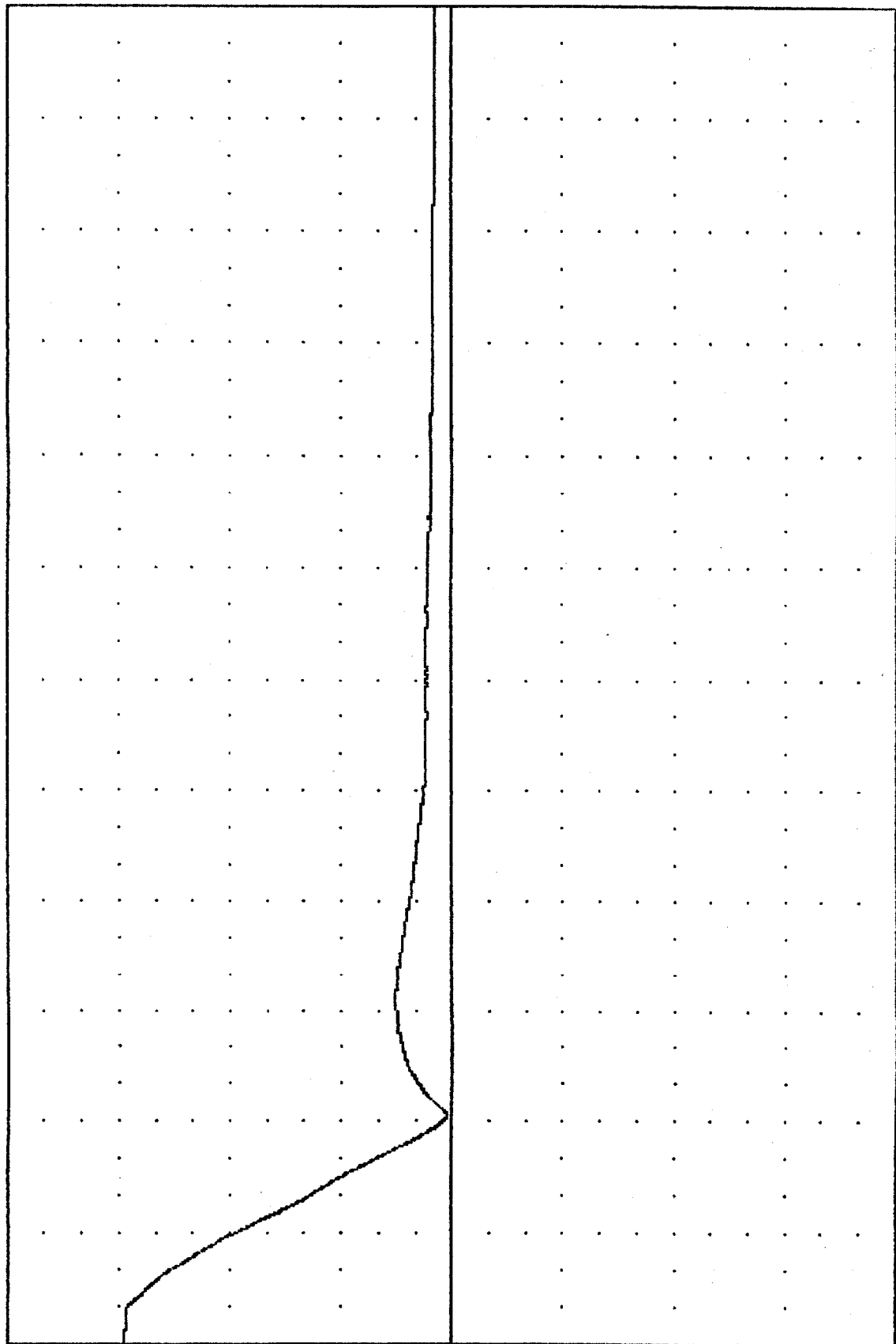
0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00
 TIME (INSEC)
 1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
 LEFT REAR SEAT Y-AXIS DISPLACEMENT

TRC
CRASH III DAMAGE ALGORITHM
91122
TLRRV1

, 910502-4

FILTER = BLFP 300/ 750/ -16
MIN, MAX VALUES = 0.43e 29.60 e 0.00

VELOCITY (MPH)



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00
1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
LEFT REAR SEAT VELOCITY RESULTANT

CRASH III DAMAGE ALGORITHM

91122
TLRD1

FILTER = BLPP 300/ 750/ -16

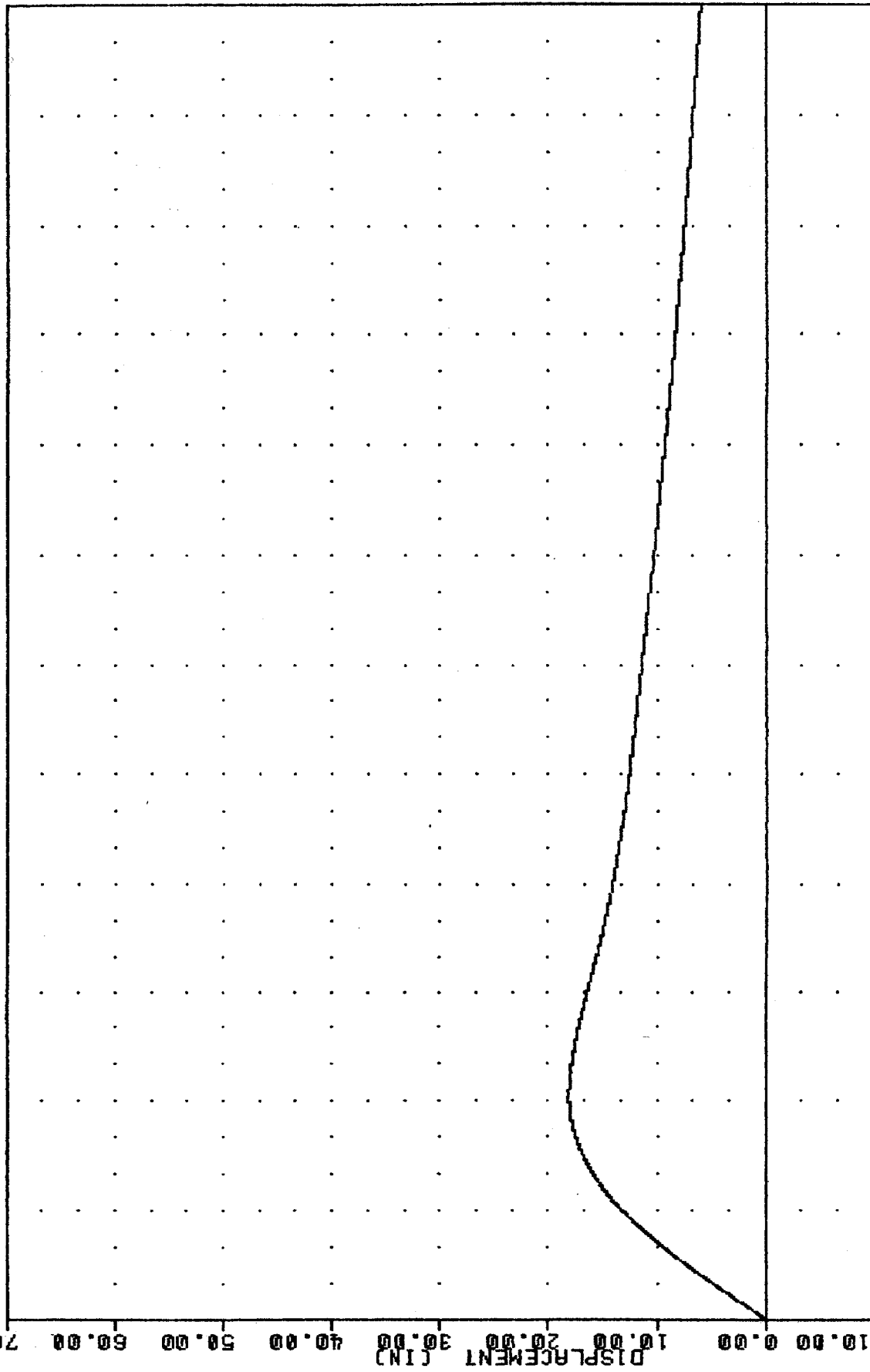
MIN. MAX VALUES =

0.00

18.08

58.00

70.00

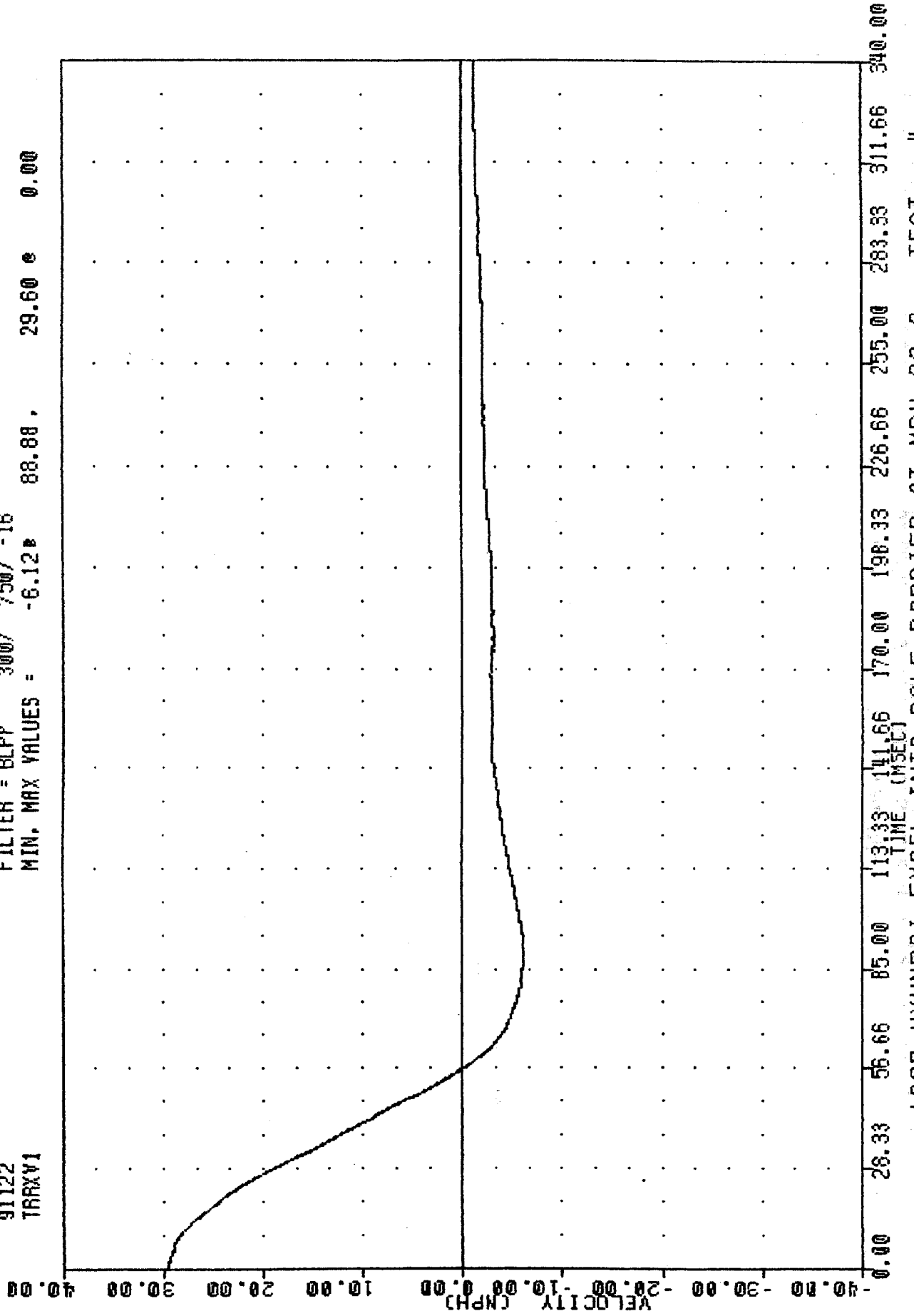


B71

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
LEFT REAR SEAT DISPLACEMENT RESULTANT

TRC , 910502-4
 CRASH III DAMAGE ALGORITHM
 91122
 TRAXV1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -6.12 88.88 , 29.60 e 0.00



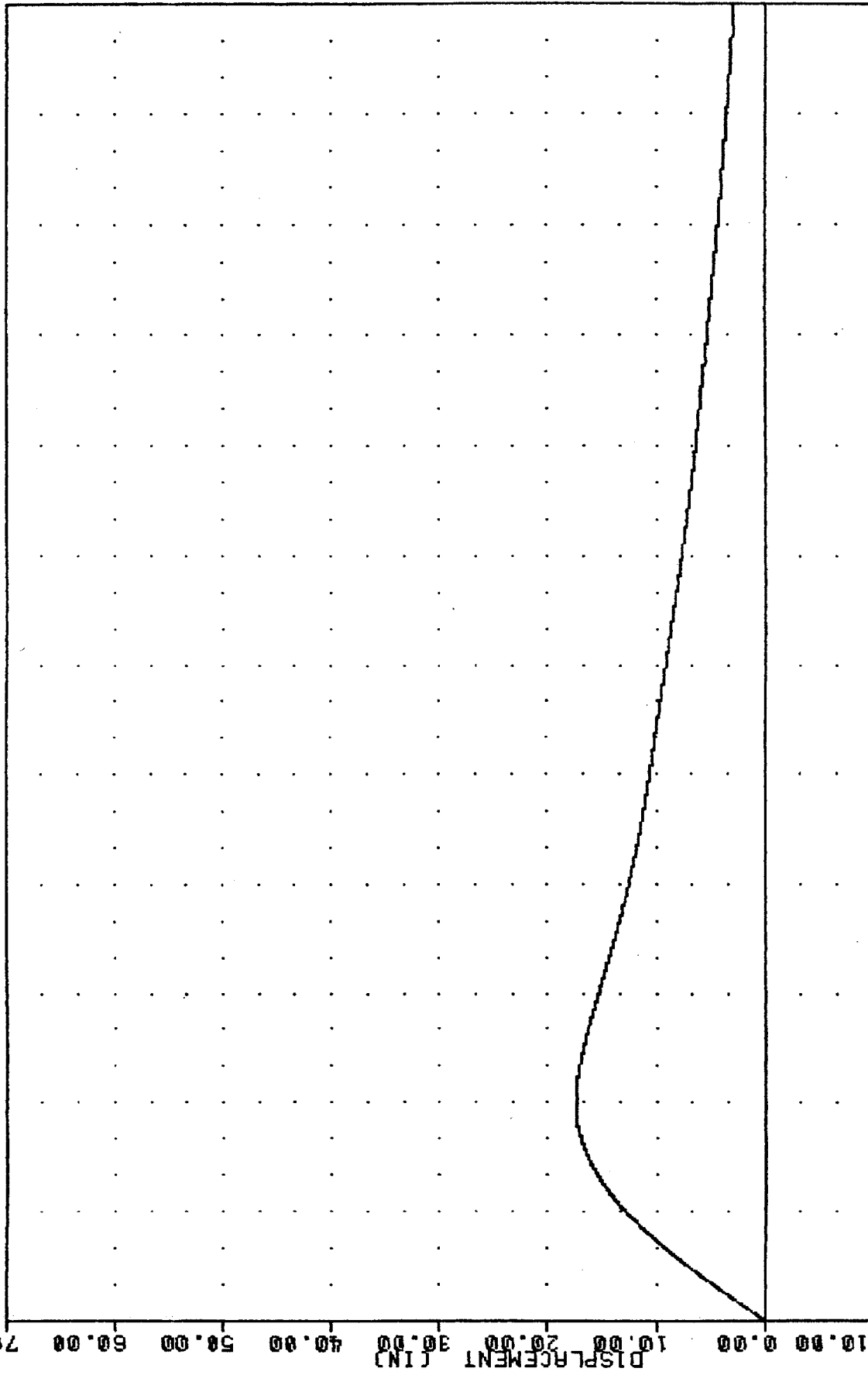
1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
 RIGHT REAR SEAT X-AXIS VELOCITY

CRASH III DAMAGE ALGORITHM

91122
TRXD1

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = 0.00 17.42 e 56.50

DISPLACEMENT (IN)



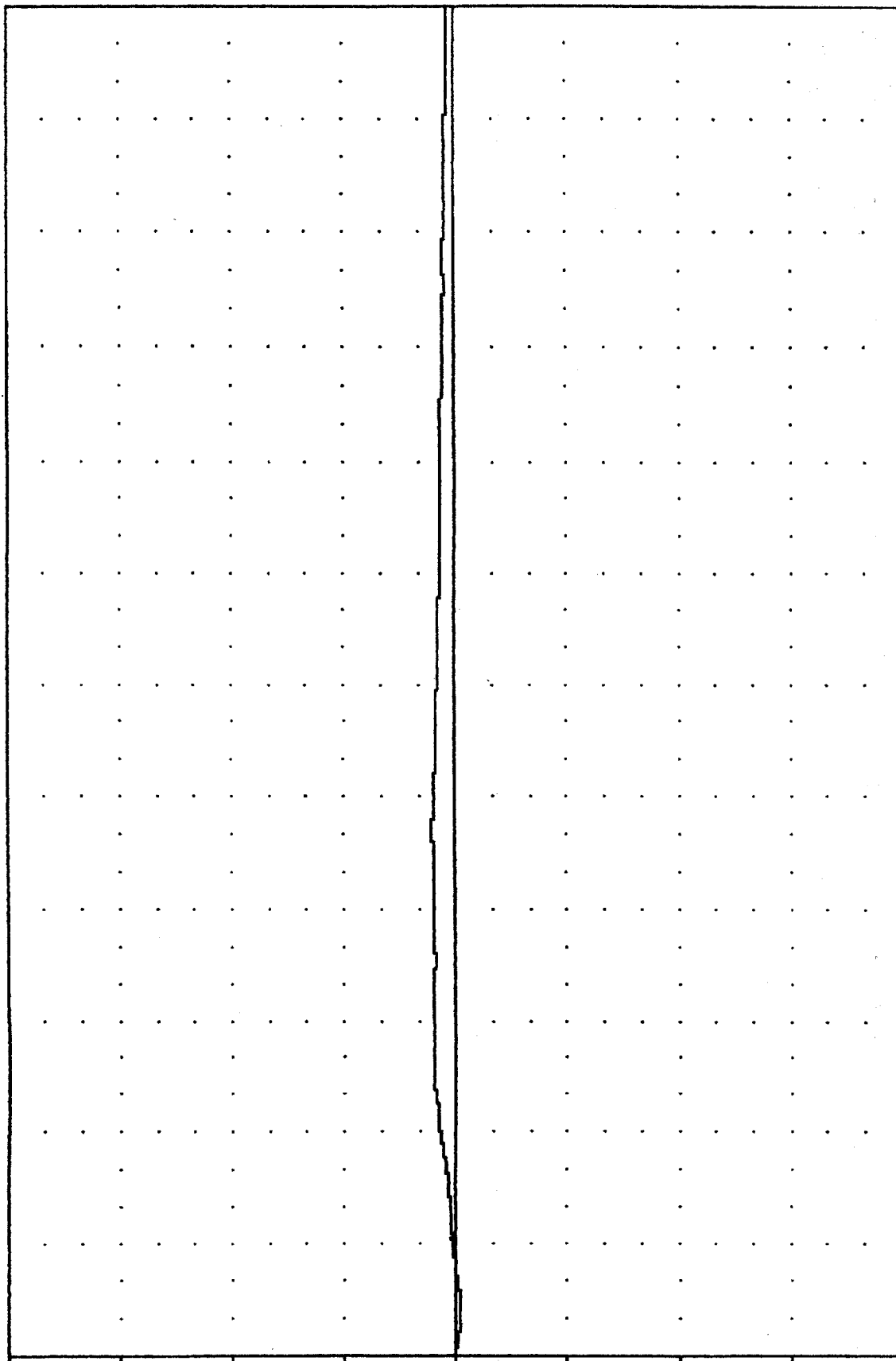
B73

1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
RIGHT REAR SEAT X-AXIS DISPLACEMENT

TRC , 910502-4
 CRASH III DAMAGE ALGORITHM
 91122
 TRRYV1

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -0.46 9.88 2.09 131.75

VELOCITY (MPH)



0.00 28.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00
 TIME (MSEC)
 1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
 RIGHT REAR SEAT Y-AXIS VELOCITY

CRASH III DAMAGE ALGORITHM

91122

TRAYD1

FILTER = BLPP 300/ 750/ -16

MIN, MAX VALUES = -0.09# 21.25, 7.36 # 340.00

70.00

60.00

50.00

40.00

30.00

20.00

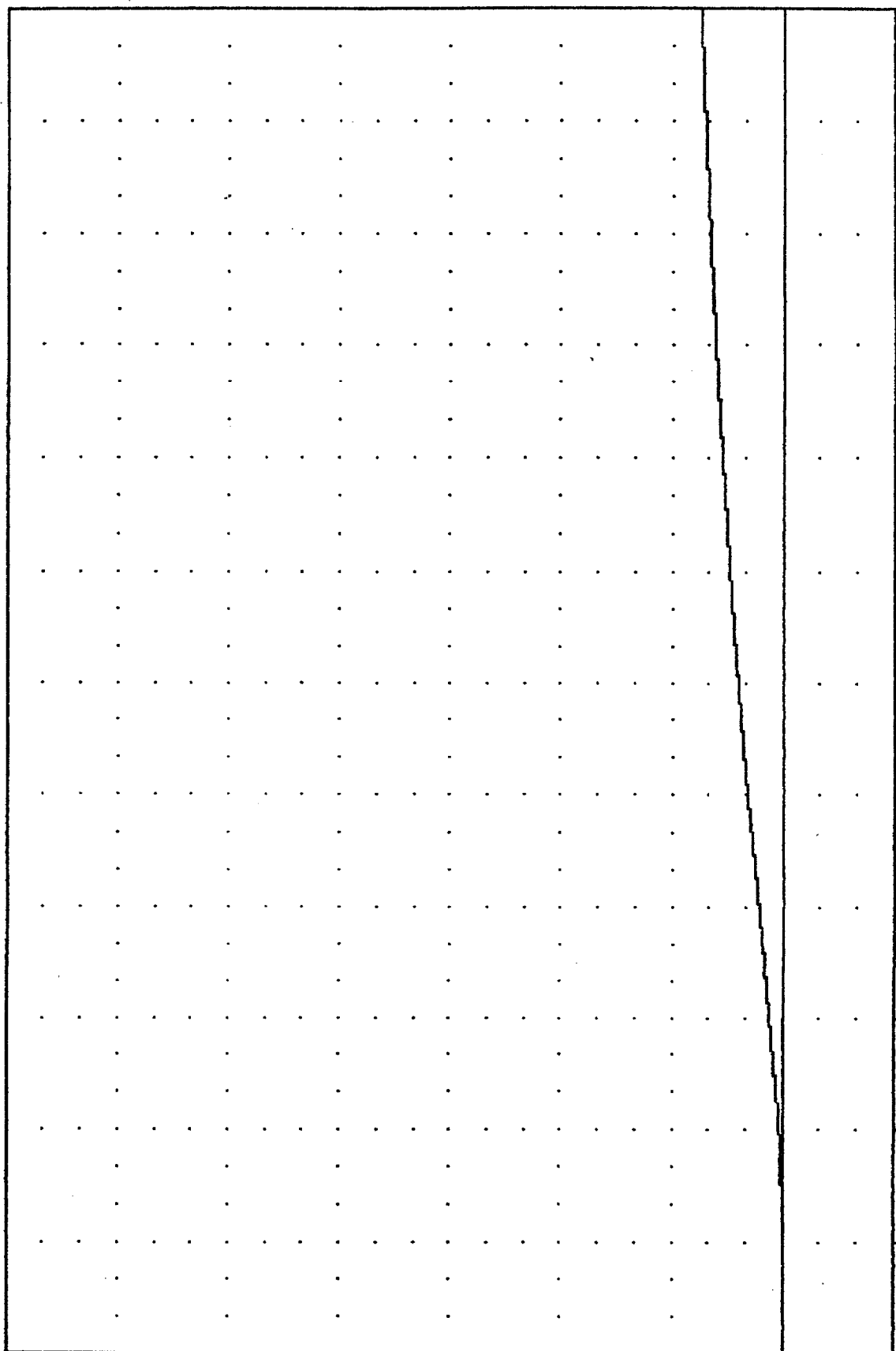
10.00

0.00

-10.00

-10.00

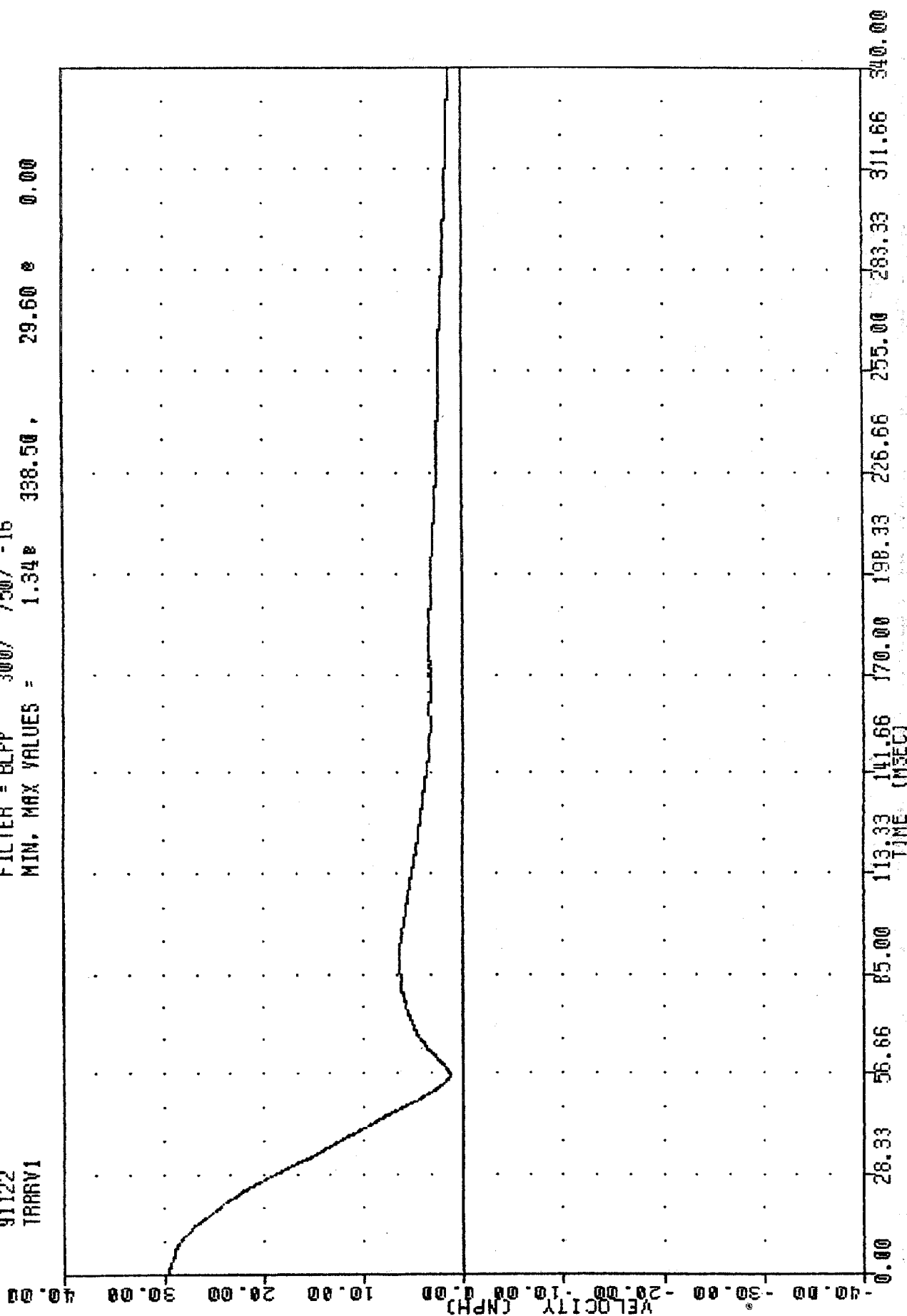
DISPLACEMENT (IN)



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
RIGHT REAR SEAT Y-AXIS DISPLACEMENT

TRC
CRASH III DAMAGE ALGORITHM
91122
TRRV1

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = 1.34e 338.50, 29.60 e 0.00



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
RIGHT REAR SEAT VELOCITY RESULTANT

CRASH III DAMAGE ALGORITHM

91122
TRRD1

FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = 0.00e

0.00, 17.42 e 56.50

70.00

60.00

50.00

40.00

30.00

20.00

10.00

0.00

DISPLACEMENT (IN)

10.00

20.00

30.00

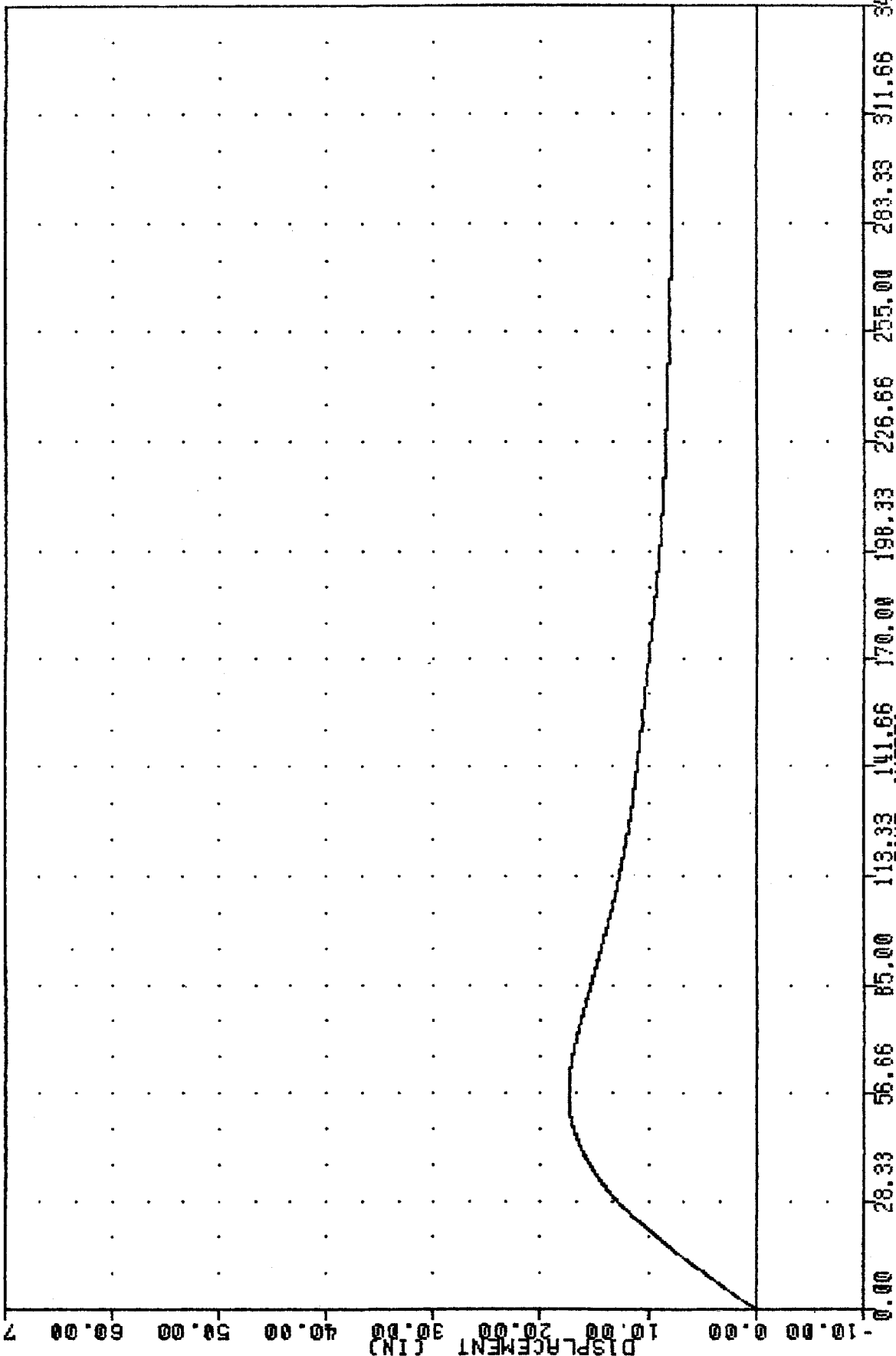
40.00

50.00

60.00

70.00

877



1987 HYUNDAI EXCEL INTO POLE BARRIER AT MPH 29.6 TEST # 4
RIGHT REAR SEAT DISPLACEMENT RESULTANT

APPENDIX C

MISCELLANEOUS TEST INFORMATION

VEHICLE ACCELEROMETER INFORMATION

NO.	LOCATION	AXIS	MFR	MODEL	ORIENTATION	
					S/N	(+ SENSING)
1	LEFT REAR SEAT	X	ENDEVCO	7264	CH97H	REAR
	LEFT REAR SEAT	Y	ENDEVCO	7264	CJ39H	RIGHT
2	RIGHT REAR SEAT	X	ENDEVCO	7264	CG21H	REAR
	RIGHT REAR SEAT	Y	ENDEVCO	7264	BY01J	RIGHT

SIGN CONVENTION

ALL DUMMY, BARRIER AND VEHICLE CHANNELS:

+X: FORWARD

+Y: LEFTWARD

+Z: UPWARD

+FORCE: TENSION