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**DOT HS 807 773  
Final Report**

**October 1990**

# **Final Report of 270° Contoured Moving Barrier Impact Into a 1984 Audi 5000 4-Door Sedan in Support of Crash III Damage Algorithm Reformation**

DOT HS 807 773

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7. Author(s) N.A. El-Habash, Project Engineer, TRC		6. Performing Organization Code	
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16. Abstract  Four 270° contoured moving barrier impact tests were conducted for research and development in support of the crash III damage algorithm reformulation. These tests were conducted on a 1984 Audi 5000 4-door sedan, VIN WAUFB0444EN099818, at the Transportation Research Center of Ohio. The following four tests were conducted on the vehicle:		13. Type of Report and Period Covered FINAL REPORT SEPT. - OCT., 1990	
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SECTION 1.0  
PURPOSE AND TEST SUMMARY

The purpose of the four 270° contoured moving barrier impact tests was for research and development in support of the CRASH III damage algorithm reformulation.

The 1984 Audi 5000 was equipped with a 2.2 liter, 5-cylinder, inline, gas engine with a 3-speed automatic transmission. The intended total test weight of the vehicle was 2726 pounds. The actual weight was 2720 pounds.

The contoured moving barrier actual weight was 2726 pounds, frontal width was 67.0 inches, barrier height was 31.5 inches, bumper width was 6.0 inches and height of the bumper centerline was 17.5 inches. The contoured moving barrier was intended to impact the driver's side of the vehicle at 270°. The leading edge of the contact was to be 22.5 inches forward of the vehicle's center of gravity.

The test vehicle was equipped with center of gravity accelerometers oriented to measure vehicle X and Y-axis accelerations and right front and rear sill accelerometers oriented to measure vehicle Y-axis accelerations.

The moving barrier (impactor) was equipped with center of gravity accelerometers oriented to measure X and Y-axis accelerations.

The crash test event was recorded by two (2) high speed motion picture cameras.

SECTION 2.0

VEHICLE INFORMATION

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Audi NSU Auto Union AG

MAKE/MODEL: Audi 5000

VIN: WAUFB0444EN099818

BODY STYLE: 4-door sedan

MODEL YEAR: 1984

NHTSA NO.: NA

COLOR: Gold

ENGINE DATA: TYPE: inline CYLINDERS: 5 DISPLACEMENT: 2.2 liter

TRANSMISSION DATA: 3 SPEED,     MANUAL, X AUTOMATIC, X FWD,     RWD,     4WD

DATE VEHICLE RECEIVED: NA

ODOMETER READING: 41,871

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

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

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: Audi NSU Auto Union AG

DATE OF MANUFACTURE: 1/84

VIN: WAUFB0444EN099818

GVWR: 3946 LBS

GAWR: FRONT: 2194 LBS., REAR: 2028 LBS.

TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Continental Contact P185/70R14

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 36 PSI  
REAR: 36 PSI

SPARE TIRE (MFR., LINE, SIZE): T115/70D15 Continental

TYPE OF SEATS: FRONT: Buckets  
REAR: Bench

TYPE OF FRONT SEAT BACKS: Manually adjustable

MAXIMUM WIDTH: 71.5 INCHES

WHEELBASE: 105.5 INCHES

LOCATION OF LABEL STATING TIRE & CAPACITY DATA: \*

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL: \*

RECOMMENDED TIRE SIZE:

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

DESIGNATED SEATING CAPACITY: \_\_\_FRONT \_\_\_REAR \_\_\_TOTAL

VEHICLE CAPACITY WEIGHT: \_\_\_\_\_ LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES):

DELIVERED ATTITUDE: LF 27.1 ;RF 26.9 ;LR 25.9 ;RR 25.6

PRE-TEST ATTITUDE: LF 25.9 ;RF 26.8 ;LR 25.0 ;RR 25.3

\*THE VEHICLE DID NOT CONTAIN TIRE AND CAPACITY LABEL.

TEST VEHICLE INFORMATION CONT'D

WEIGHT OF TEST VEHICLE AS RECEIVED (EMPTY FLUIDS):

RIGHT FRONT	950 LBS.	RIGHT REAR	471 LBS.
LEFT FRONT	853 LBS.	LEFT REAR	551 LBS.
TOTAL FRONT WEIGHT	1803 LBS.	(63.8% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1022 LBS.	(36.2% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT 2825 LBS.			

TEST VEHICLE'S TARGET TEST WEIGHT: \*

TARGET TEST WEIGHT = 2726 LBS

WEIGHT OF TEST VEHICLE:

RIGHT FRONT	917 LBS.	RIGHT REAR	447 LBS.
LEFT FRONT	840 LBS.	LEFT REAR	516 LBS.
TOTAL FRONT WEIGHT	1757 LBS.	(64.6% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	963 LBS.	(35.4% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	2720 LBS.	( 0.2% UNDER TARGET TEST WEIGHT)	

WEIGHT OF BALLAST SECURED IN VEHICLE: None LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: Exhaust, rear seat and battery.

CG = 37.4 INCHES REARWARD OF FRONT WHEEL CENTERLINE

\*Target test weight was established as the weight of the unballasted moving barrier with the contoured barrier face.

VEHICLE FRONT CRUSH MEASUREMENTS AT VEHICLE BUMPER HEIGHT (20.5 INCHES)

LOCATION	0	1	2	3	4	5	6	7	8									
PRE-TEST	13.6	18.4	13.4	20.9	12.7	23.9	12.1	26.9	11.8	29.8	11.2	32.7	10.8	35.8	10.4	38.8	10.1	41.1
POST-TEST 1	13.8	16.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 2	15.1	13.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 3	18.6	14.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 4	30.8	15.5	29.3	17.8	27.5	20.4	26.0	23.0	24.6	25.8	23.5	28.3	22.0	31.1	21.1	33.8	19.6	36.1

LOCATION	9	10	11	12	13	14	15	16	17									
PRE-TEST	9.9	44.7	9.5	47.7	9.6	50.6	9.9	53.7	10.1	56.7	10.5	59.7	10.9	62.8	11.3	65.8	11.8	68.1
POST-TEST 1	NA	NA	8.3	46.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 2	NA	NA	9.5	43.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 3	NA	NA	11.5	44.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 4	18.8	39.4	17.2	42.1	16.6	45.0	15.8	48.1	15.6	50.9	14.6	53.9	14.5	56.9	14.1	60.0	13.6	63.0

LOCATION	18	19	20	21	22	23	24	25	26									
PRE-TEST	12.4	71.8	12.8	74.8	13.2	77.6	14.6	80.2	17.5	81.4	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 1	NA	NA	NA	7.9	76.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 2	NA	NA	NA	12.0	73.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 3	NA	NA	NA	14.3	74.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 4	12.9	66.0	12.6	69.0	12.4	71.8	13.1	74.7	15.4	76.4	NA	NA	NA	NA	NA	NA	NA	NA

All measurements are in inches. Column readings are three inches apart from left to right on vehicle.  
 All X-axis measurements taken from a reference plane 200 inches from and parallel to the rear bumper.  
 All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline  
 Post-test 4 Y-axis measurements taken from a reference plane 72 inches from and parallel to the vehicle longitudinal centerline.

LEFT SIDE CRUSH MEASUREMENTS AT MOVING BARRIER BUMPER HEIGHT (17.5 INCHES)

LOCATION	1	2	3	4	5	6	7	8	9									
PRE-TEST	16.1	17.1	19.4	16.5	22.2	16.1	25.3	15.9	28.3	15.6	31.2	15.2	34.2	14.8	36.9	14.2	40.1	15.0
POST-TEST 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	41.6	14.0
POST-TEST 2	19.0	13.4	21.9	13.2	25.1	12.9	28.1	12.8	31.1	12.8	34.1	12.5	36.9	12.5	40.2	12.0	43.4	12.9
POST-TEST 3	21.3	13.8	24.3	13.5	27.4	13.5	30.2	13.5	35.6	13.6	36.1	13.6	39.4	13.2	42.2	13.9	46.4	15.2
POST-TEST 4	33.5	15.2	36.4	15.5	41.9	20.0	45.4	21.2	47.8	22.3	50.1	23.4	53.2	24.8	55.8	26.0	58.1	28.9

LOCATION	10	11	12	13	14	15	16	17	18									
PRE-TEST	42.8	14.9	45.8	14.5	48.9	14.5	51.8	14.3	54.9	14.2	57.8	14.1	61.0	13.9	64.6	14.2	67.5	14.2
POST-TEST 1	44.6	13.7	47.6	13.6	50.5	13.7	53.7	13.8	56.7	14.0	59.6	14.3	62.8	15.3	65.6	17.9	68.1	19.1
POST-TEST 2	46.2	12.9	49.2	13.2	52.2	13.8	55.4	14.3	58.2	14.7	60.9	16.0	64.1	18.4	67.1	21.2	68.5	23.3
POST-TEST 3	48.9	16.0	51.6	16.8	54.9	17.5	57.9	18.2	60.4	20.0	63.4	21.1	65.8	24.0	65.9	37.6	70.1	39.8
POST-TEST 4	57.3	31.4	61.9	33.9	63.6	36.2	64.2	38.6	66.2	41.1	67.8	44.0	71.1	48.5	72.1	54.3	72.3	56.0

LOCATION	19	20	21	22	23	24	25	26	27									
PRE-TEST	70.5	14.3	73.6	14.1	76.7	14.2	79.5	14.2	82.5	14.2	85.6	14.1	88.8	14.1	91.7	14.1	94.6	14.0
POST-TEST 1	71.1	19.1	75.0	19.7	78.1	19.9	81.1	20.1	84.2	20.1	87.2	20.1	90.2	20.1	93.0	19.9	96.0	20.0
POST-TEST 2	71.2	24.2	75.5	24.5	78.4	24.8	81.6	24.9	84.6	24.9	87.8	24.8	90.8	24.8	93.8	24.7	96.7	24.5
POST-TEST 3	72.7	31.3	76.8	31.5	79.8	31.6	82.8	31.5	85.8	31.5	88.5	31.3	91.8	31.1	94.5	31.0	97.4	30.9
POST-TEST 4	71.4	57.5	75.6	60.9	79.1	61.2	81.9	61.3	83.9	61.5	87.4	61.4	91.4	61.2	94.8	61.5	98.8	61.5

All measurements are in inches. Column readings are three inches apart from front to rear on vehicle.  
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 All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.  
 Post-test 4 Y-axis measurements taken from a reference plane 72 inches from and parallel to the vehicle longitudinal centerline.

LEFT SIDE CRUSH MEASUREMENTS AT MOVING BARRIER BUMPER HEIGHT (17.5 INCHES)

LOCATION	28	29	30	31	32	33	34	35	36									
	X	Y	X	Y	X	Y	X	Y	X									
PRE-TEST	97.7	14.0	100.6	14.0	103.2	14.0	106.1	14.2	109.5	14.1	112.5	14.1	115.4	14.2	118.5	14.2	121.5	14.3
POST-TEST 1	99.0	19.9	101.9	19.2	104.8	19.8	108.0	19.8	111.1	19.6	114.0	19.6	117.0	19.8	119.5	19.9	122.4	19.9
POST-TEST 2	99.8	24.6	102.9	24.6	105.5	24.5	108.6	24.4	111.8	24.2	114.9	24.4	117.9	24.4	120.9	24.6	123.8	24.8
POST-TEST 3	100.4	31.0	103.6	30.8	106.5	30.8	109.4	30.5	112.5	30.5	115.4	30.5	118.6	30.5	121.8	30.8	124.6	31.0
POST-TEST 4	101.5	62.0	104.9	62.4	107.0	62.7	109.5	62.9	112.8	63.2	116.9	63.8	119.7	64.4	122.5	65.0	125.9	65.6

LOCATION	37	38	39	40	41	42	43	44	45									
	X	Y	X	Y	X	Y	X	Y	X									
PRE-TEST	124.4	14.3	127.5	14.5	130.4	14.5	133.5	14.6	137.5	14.6	139.7	14.8	142.5	14.8	144.8	14.5	147.4	14.3
POST-TEST 1	125.8	19.9	128.9	20.0	131.5	19.4	134.2	18.1	137.0	16.9	140.0	15.8	143.0	15.0	146.2	13.8	149.3	14.5
POST-TEST 2	126.7	24.9	129.7	24.9	132.6	24.8	134.6	22.8	136.8	20.5	138.9	18.6	141.9	15.9	146.2	15.6	149.0	15.3
POST-TEST 3	127.6	30.8	130.7	31.2	133.5	31.2	136.2	30.1	138.0	28.0	138.4	24.9	141.2	19.2	145.8	18.2	148.6	18.0
POST-TEST 4	128.4	66.1	130.4	66.7	135.0	67.4	138.5	66.9	138.2	65.8	137.2	63.2	138.3	49.6	145.3	47.2	147.4	45.9

LOCATION	46	47	48	49	50	51	52	53	54									
	X	Y	X	Y	X	Y	X	Y	X									
PRE-TEST	150.2	14.3	153.9	14.4	156.8	14.7	159.7	14.8	162.8	14.9	166.2	14.4	169.8	15.8	172.8	15.6	175.4	15.6
POST-TEST 1	152.2	14.6	155.2	14.6	158.2	14.7	161.1	14.9	164.1	15.1	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 2	151.2	15.9	154.9	15.1	157.8	15.0	160.6	15.1	163.5	15.2	167.5	14.4	170.2	15.4	173.4	15.4	176.5	15.4
POST-TEST 3	151.6	17.4	154.5	17.2	157.2	17.1	160.4	17.0	163.5	16.8	167.5	15.9	170.4	17.9	173.4	16.4	179.6	16.9
POST-TEST 4	150.9	44.9	153.3	44.0	156.9	43.1	157.8	42.2	161.4	41.3	166.0	38.6	169.5	39.6	172.0	40.1	175.1	40.5

All measurements are in inches. Column readings are three inches apart from front to rear on vehicle. All X-axis measurements taken from a reference plane 200 inches from and parallel to the rear bumper. All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline. Post-test 4 Y-axis measurements taken from a reference plane 72 inches from and parallel to the vehicle longitudinal centerline.

LEFT SIDE CRUSH MEASUREMENTS AT MOVING BARRIER BUMPER HEIGHT (17.5 INCHES)

LOCATION	55	56	57	58	59	60	61	62	63							
PRE-TEST	178.4	16.2	184.1	15.4	187.1	16.9	190.1	17.3	193.1	17.5	195.8	18.0	200.0	78.0	NA	NA
POST-TEST 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	197.1	17.8	200.1	78.0	NA	NA
POST-TEST 2	179.4	15.8	182.4	16.0	185.4	15.4	188.3	16.5	191.1	16.8	194.1	17.2	197.1	78.2	NA	NA
POST-TEST 3	179.4	17.2	182.2	17.4	185.1	17.6	188.0	17.9	191.1	18.1	194.1	18.2	196.9	78.6	NA	NA
POST-TEST 4	178.1	40.5	181.1	40.6	184.6	40.8	188.3	41.1	189.5	41.2	192.8	41.8	195.6	101.5	NA	NA

LOCATION	63	64	65
PRE-TEST	NA	NA	NA
POST-TEST 1	NA	NA	NA
POST-TEST 2	NA	NA	NA
POST-TEST 3	NA	NA	NA
POST-TEST 4	NA	NA	NA

#61 LEFT REAR CORNER  
#62 RIGHT REAR CORNER

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All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.  
Post-test 4 Y-axis measurements taken from a reference plane 72 inches from and parallel to the vehicle longitudinal centerline.

LEFT SIDE CRUSH MEASUREMENTS AT VEHICLE SILL HEIGHT (11.5 INCHES)

LOCATION	1	2	3	4	5	6	7	8	9
PRE-TEST	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 1	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 4	NA	NA	NA	NA	NA	NA	NA	NA	NA

LOCATION	10	11	12	13	14	15	16	17	18
PRE-TEST	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 1	NA	NA	NA	NA	NA	NA	NA	NA	67.8
POST-TEST 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 3	NA	NA	NA	NA	NA	NA	NA	NA	70.8
POST-TEST 4	NA	NA	NA	NA	NA	NA	NA	NA	73.1

LOCATION	19	20	21	22	23	24	25	26	27									
PRE-TEST	70.8	17.0	73.9	16.9	76.8	17.0	79.9	16.9	82.9	16.9	85.9	16.9	88.9	16.8	91.8	16.8	94.8	16.8
POST-TEST 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 2	73.5	23.2	76.5	24.0	79.1	24.0	81.9	23.8	84.8	23.8	88.0	23.8	90.9	23.9	93.8	24.0	96.6	24.0
POST-TEST 3	74.0	30.5	77.0	31.2	79.7	31.0	82.8	30.5	89.6	30.4	88.6	30.2	91.7	30.0	94.4	30.2	97.6	30.0
POST-TEST 4	75.3	58.5	77.4	62.4	80.4	62.8	83.9	62.3	87.8	62.2	90.9	62.2	93.6	62.2	96.8	62.2	97.7	62.2

All measurements are in inches. Column readings are three inches apart from front to rear on vehicle. All X-axis measurements taken from a reference plane 200 inches from and parallel to the rear bumper. All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline. Post-test 4 Y-axis measurements taken from a reference plane 72 inches from and parallel to the vehicle longitudinal centerline.

LEFT SIDE CRUSH MEASUREMENTS AT VEHICLE SILL HEIGHT (11.5 INCHES)

LOCATION	28	29	30	31	32	33	34	35	36
PRE-TEST	97.9	101.0	103.9	106.9	109.9	112.9	115.9	118.8	121.9
POST-TEST 1	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 2	99.8	102.5	105.5	108.4	111.6	114.2	116.4	119.4	122.3
POST-TEST 3	100.5	103.5	106.6	109.4	112.2	114.6	116.3	119.2	121.9
POST-TEST 4	103.2	106.2	108.8	111.3	114.4	116.5	118.8	122.8	125.5

LOCATION	37	38	39	40	41	42	43	44	45
PRE-TEST	124.9	127.9	130.9	133.9	136.9	139.9	17.4	NA	NA
POST-TEST 1	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 2	125.1	128.0	130.9	134.0	137.0	139.6	18.4	NA	NA
POST-TEST 3	125.4	127.9	130.6	133.6	136.4	138.9	21.5	NA	NA
POST-TEST 4	127.2	129.5	131.8	136.1	138.4	138.4	53.5	NA	NA

LOCATION	46	47	48	49	50	51	52	53	54
PRE-TEST	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 1	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 4	NA	NA	NA	NA	NA	NA	NA	NA	NA

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 All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.  
 Post-test 4 Y-axis measurements taken from a reference plane 72 inches from and parallel to the vehicle longitudinal centerline.

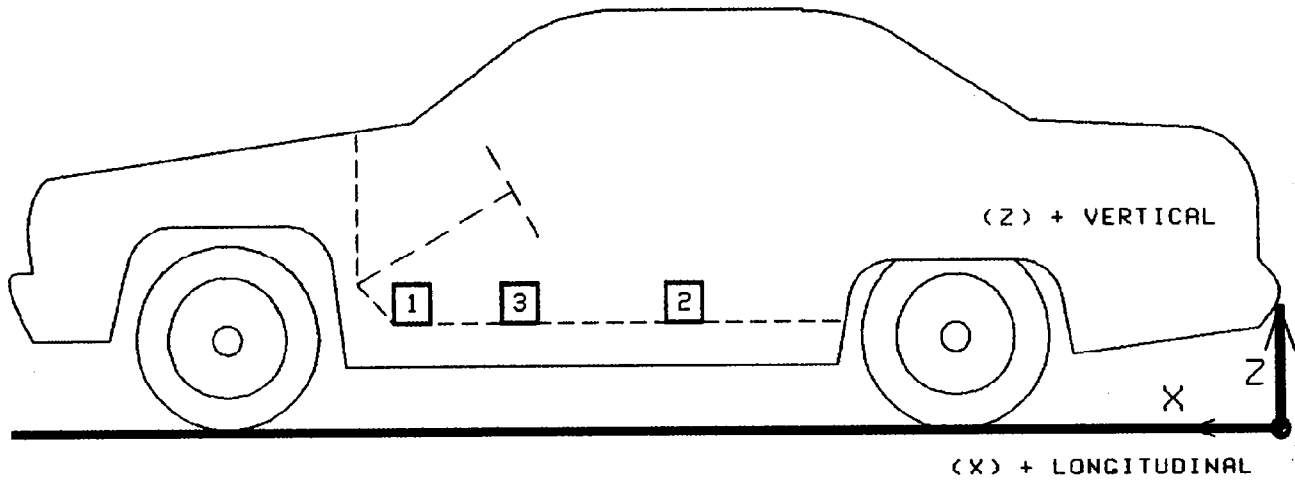
LEFT SIDE CRUSH MEASUREMENTS AT VEHICLE SILL HEIGHT (11.5 INCHES)

LOCATION	55	56	57	58	59	60	61	62	63
PRE-TEST	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 1	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 2	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 3	NA	NA	NA	NA	NA	NA	NA	NA	NA
POST-TEST 4	NA	NA	NA	NA	NA	NA	NA	NA	NA

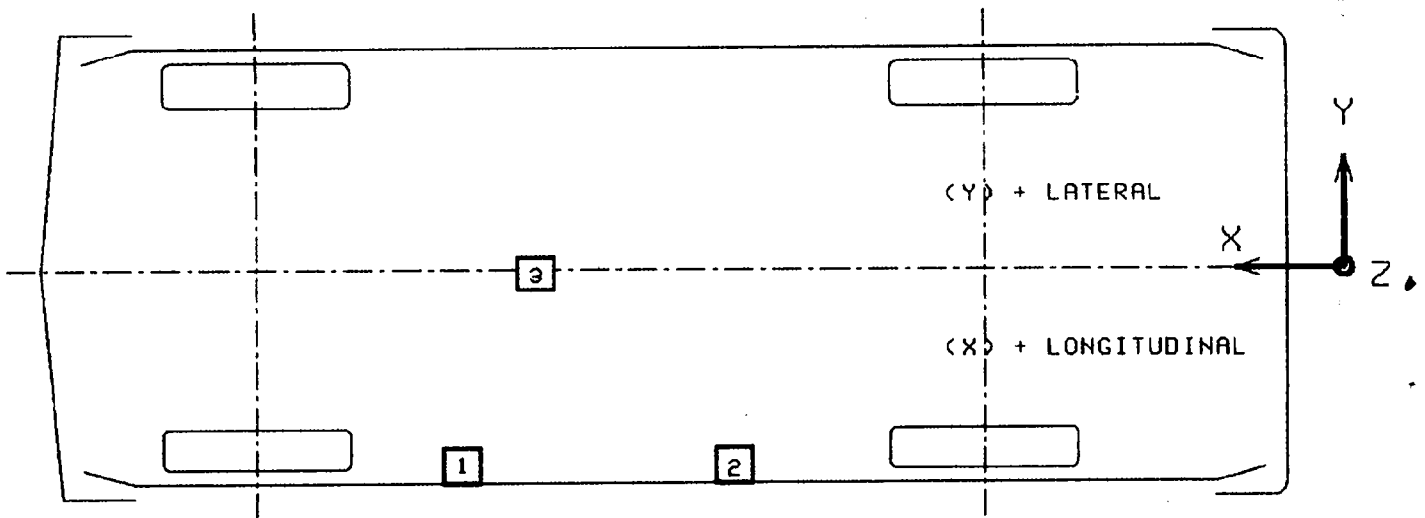
LOCATION	64	65	66
PRE-TEST	NA	NA	NA
POST-TEST 1	NA	NA	NA
POST-TEST 2	NA	NA	NA
POST-TEST 3	NA	NA	NA
POST-TEST 4	NA	NA	NA

All measurements are in inches. Column readings are three inches apart from front to rear on vehicle.  
 All X-axis measurements taken from a reference plane 200 inches from and parallel to the rear bumper.  
 All Y-axis measurements taken from a reference plane 48 inches from and parallel to the vehicle longitudinal centerline.  
 Post-test 4 Y-axis measurements taken from a reference plane 72 inches from and parallel to the vehicle longitudinal centerline.

# VEHICLE ACCELEROMETER PLACEMENT

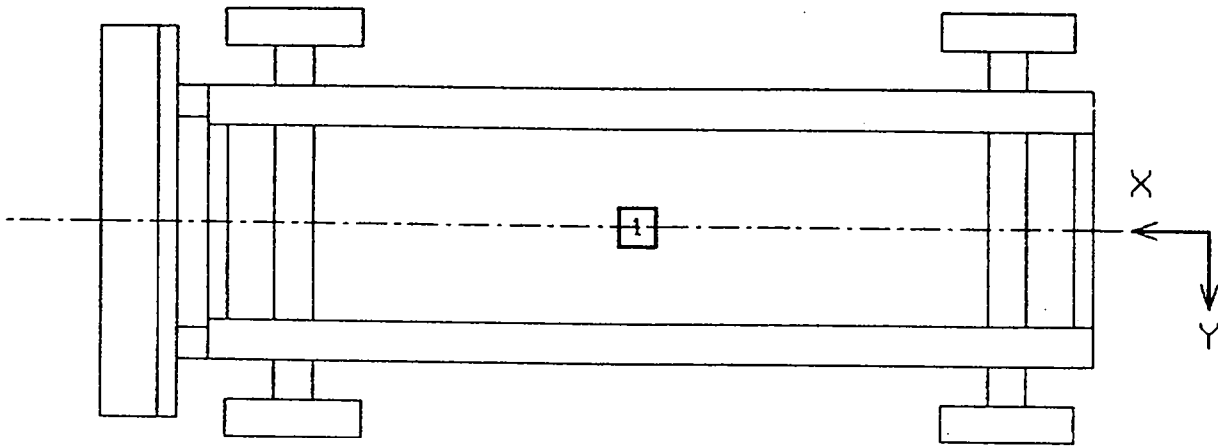


SIDE VIEW

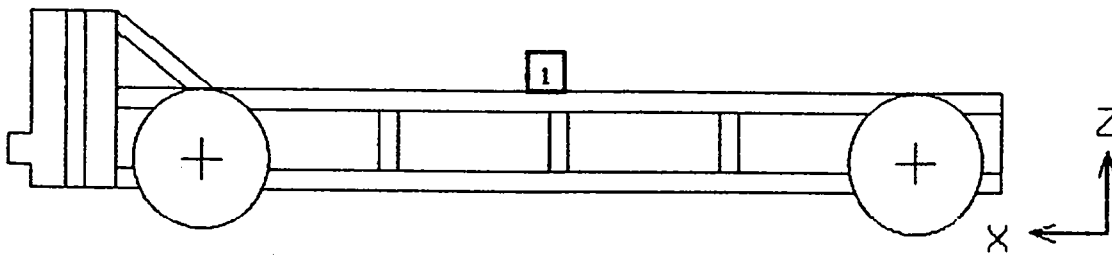


BOTTOM VIEW

# ACCELEROMETER PLACEMENT

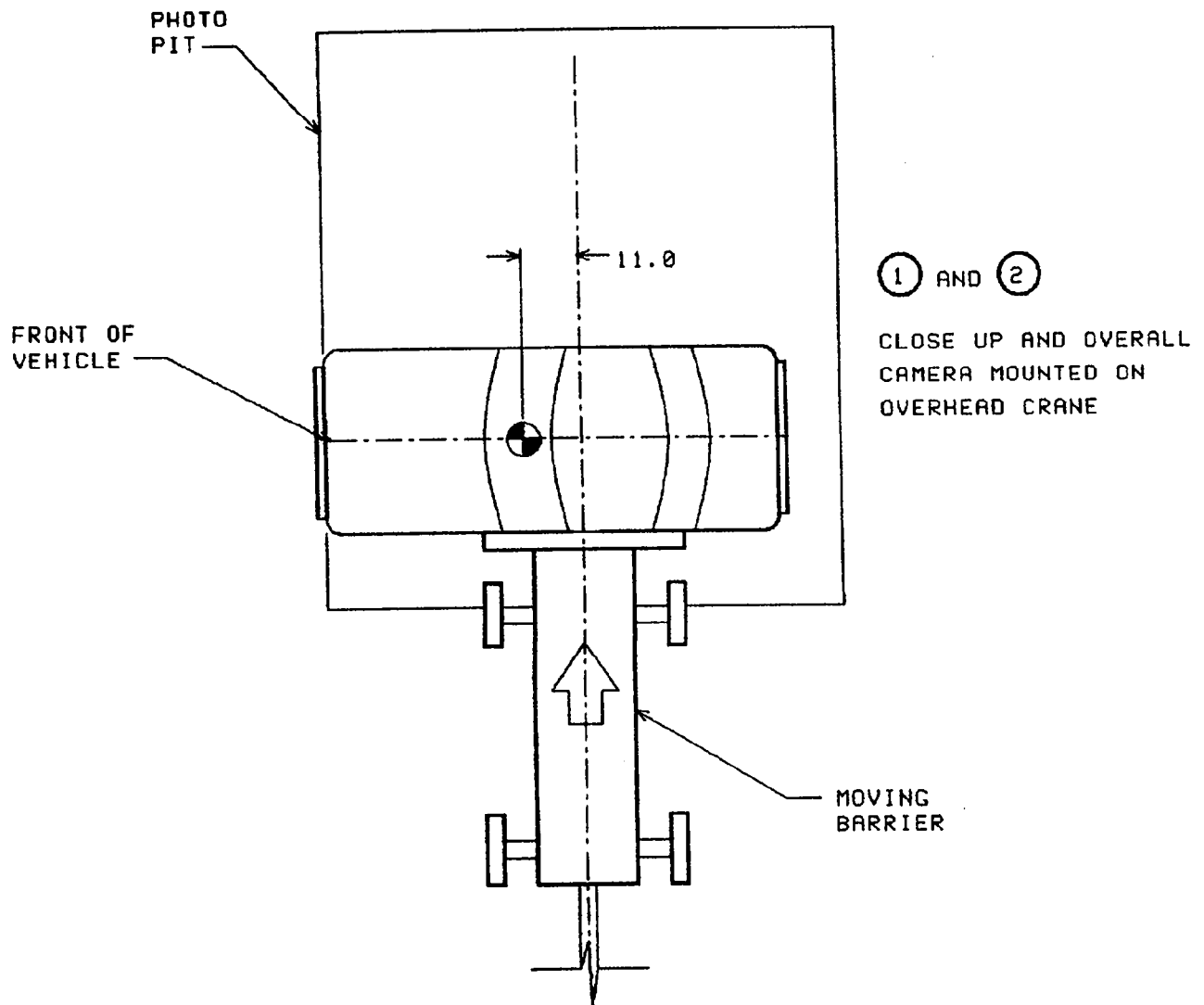


TOP VIEW



SIDE VIEW

# CAMERA POSITIONS



SECTION 3.0

TEST 900924-1 SUMMARY

TEST CONDITIONS

TEST NUMBER: 900924-1

DATE OF TEST: 9/24/90

TIME OF TEST: 1108

AMBIENT TEMPERATURE AT IMPACT AREA: 65° F

INTENDED MOVING BARRIER VELOCITY: 15.0 MPH

ACTUAL MOVING BARRIER VELOCITY: 15.2 MPH

SUBJECT VEHICLE DATA

DIRECT CONTACT DAMAGE LENGTH 65.9

MAXIMUM CUMULATIVE CRUSH AT MOVING  
BARRIER BUMPER HEIGHT 5.9

MAXIMUM CUMULATIVE CRUSH AT VEHICLE  
SILL HEIGHT NA\*

VEHICLE ATTITUDES:

POST-TEST: LF: 26.2; RF: 26.6; LR: 25.0; RR: 25.2

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

\*POST-TEST SILL MEASUREMENTS WERE NOT RECORDED FOR THIS TEST SINCE THE SILL DEFORMATION WAS VIRTUALLY IDENTICAL TO THE BARRIER BUMPER HEIGHT DEFORMATION.

IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Audi 5000

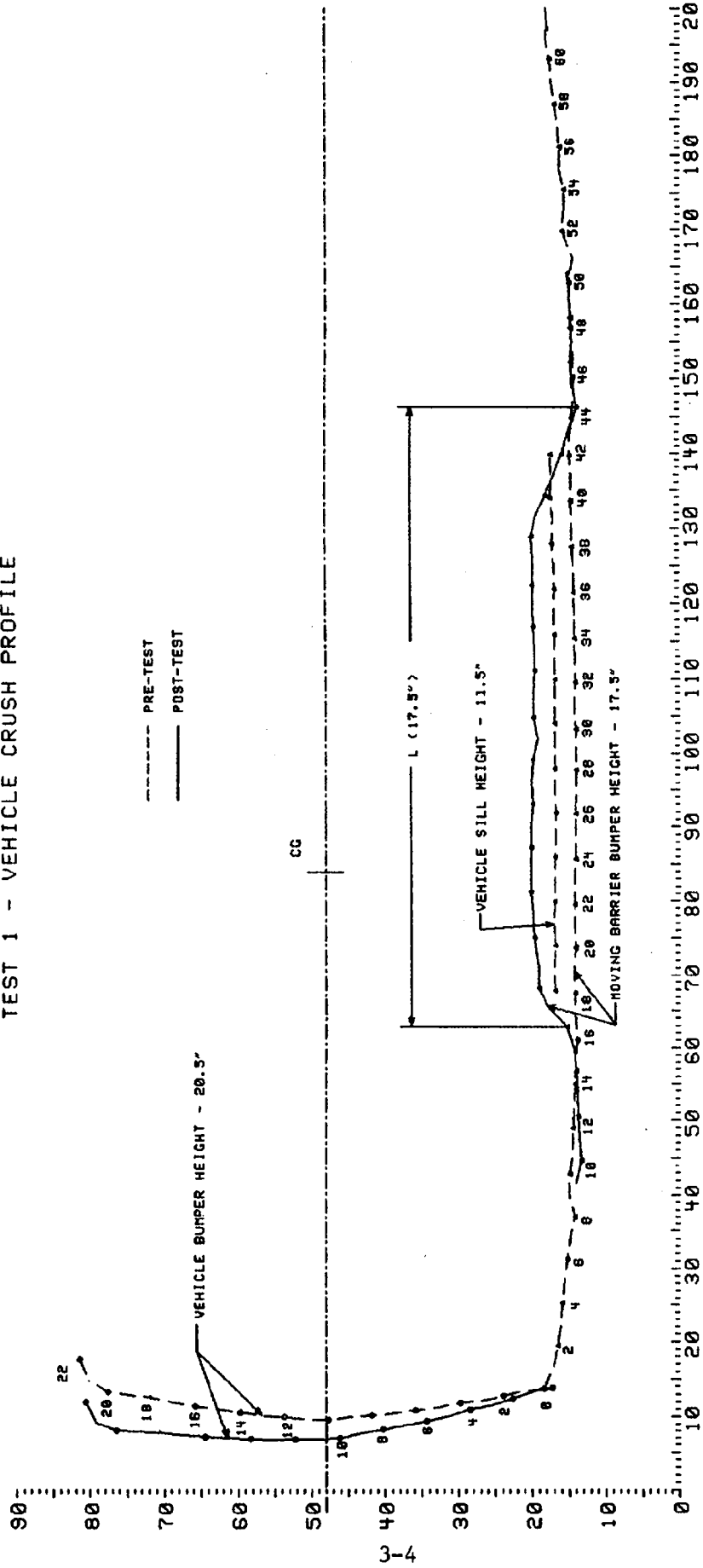
TEST NUMBER: 900924-1

ALL MEASUREMENTS ARE IN INCHES  
PRE-TEST      POST-TEST\*      DIFF.

<u>NO.</u>	<u>TYPE OF MEASUREMENT</u>	<u>PRE-TEST</u>	<u>POST-TEST*</u>	<u>DIFF.</u>
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	193.4	NA	NA
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	180.8	NA	NA
X3	REAR SURFACE OF VEHICLE TO FIREWALL	151.2	NA	NA
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	128.6	NA	NA
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	128.8	NA	NA
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	129.3	NA	NA
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	129.6	NA	NA
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	89.3	NA	NA
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	89.2	NA	NA
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	90.4	NA	NA
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	90.6	NA	NA
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	127.6	NA	NA
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	127.3	NA	NA
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	146.7	NA	NA
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	147.0	NA	NA
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	115.7	NA	NA
X17	CENTER OF STEERING COLUMN TO "A" POST	13.2	NA	NA
X18	CENTER OF STEERING COLUMN TO HEADLINER	17.9	NA	NA
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	188.4	NA	NA
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	188.7	NA	NA
X21	LENGTH OF ENGINE BLOCK	22.0	NA	NA

\*POST-TEST MEASUREMENTS WERE INADVERTENTLY NOT RECORDED

# TEST 1 - VEHICLE CRUSH PROFILE



VEHICLE CRUSH

TEST NO. 900924-1

AT MOVING BARRIER BUMPER HEIGHT		AT VEHICLE SILL HEIGHT*	
L	<u>85.1</u>	L	<u>NA</u>
C1	<u>0.0</u>	S1	<u>NA</u>
C2	<u>5.9</u>	S2	<u>NA</u>
C3	<u>5.4</u>	S3	<u>NA</u>
C4	<u>5.4</u>	S4	<u>NA</u>
C5	<u>5.1</u>	S5	<u>NA</u>
C6	<u>0.0</u>	S6	<u>NA</u>

DETERMINATION OF VEHICLE CRUSH:

A reference line was constructed connecting the end points of the vehicle's damaged surface. Six equally spaced points were defined along the reference line and labeled C1 through C6 (or S1 through S6 for sill height crush) with the rearmost point of the damaged surface defined as C1 (or S1) and the forwardmost point defined as C6 (or S6). The actual crush distance is a measurement taken perpendicular to and from the reference line at each point (C1 through C6 or S1 through S6) to the vehicle's damaged surface.

NOTES: L is total length of damage surface  
C1 through C6 and S1 through S6 are spaced equally apart  
ALL MEASUREMENTS ARE IN INCHES

\*POST-TEST SILL MEASUREMENTS WERE NOT RECORDED FOR THIS TEST SINCE THE SILL DEFORMATION WAS VIRTUALLY IDENTICAL TO THE BARRIER BUMPER HEIGHT DEFORMATION.

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 900924-1

No. LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
				MAX G	MSEC	MAX G	MSEC
1 RIGHT FRONT SILL ACCELERATION LATERAL	107.1	-26.4	12.8	2.5	91.8	9.3	50.3
2 RIGHT REAR SILL ACCELERATION LATERAL	77.9	-26.3	12.5	1.5	164.3	8.3	54.8
3 VEHICLE CG ACCELERATION LONGITUDINAL	106.3	0.0	15.1	3.3	13.1	3.6	41.0
LATERAL				2.9	129.9	12.7	11.3
RESULTANT				12.7	11.3		

\* 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

MOVING BARRIER ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 900924-1

No. LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
				MAX G	MSEC	MAX G	MSEC
1 MOVING BARRIER	75.2	0.0	12.3				
CG ACCELERATION							
LONGITUDINAL				0.5	171.6	7.4	33.3
LATERAL				1.2	85.5	1.3	78.9
RESULTANT				7.5	33.0		

\* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

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

TEST #900924-1

CAMERA INFORMATION

<u>CAMERA NO.</u>	<u>LOCATION</u>	<u>TYPE</u>	<u>LENS (mm)</u>	<u>SPEED (fps)</u>	<u>PURPOSE OF CAMERA DATA</u>
1	Overhead wide	Photosonic 1B	13	500	Impact overall
2	Overhead tight	Photosonic 1B	25	505	Impact close-up

SECTION 4.0

TEST 900924-2 SUMMARY

TEST CONDITIONS

TEST NUMBER: 900924-2

DATE OF TEST: 9/24/90

TIME OF TEST: 1446

AMBIENT TEMPERATURE AT IMPACT AREA: 69° F

INTENDED MOVING BARRIER VELOCITY: 20.0 MPH

ACTUAL MOVING BARRIER VELOCITY: 20.1 MPH

SUBJECT VEHICLE DATA

DIRECT CONTACT DAMAGE LENGTH 66.4

MAXIMUM CUMULATIVE CRUSH AT MOVING  
BARRIER BUMPER HEIGHT 10.7

MAXIMUM CUMULATIVE CRUSH AT VEHICLE  
SILL HEIGHT 5.9

VEHICLE ATTITUDES:

POST-TEST: LF: 25.9; RF: 26.3; LR: 25.3; RR: 24.7

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Audi 5000

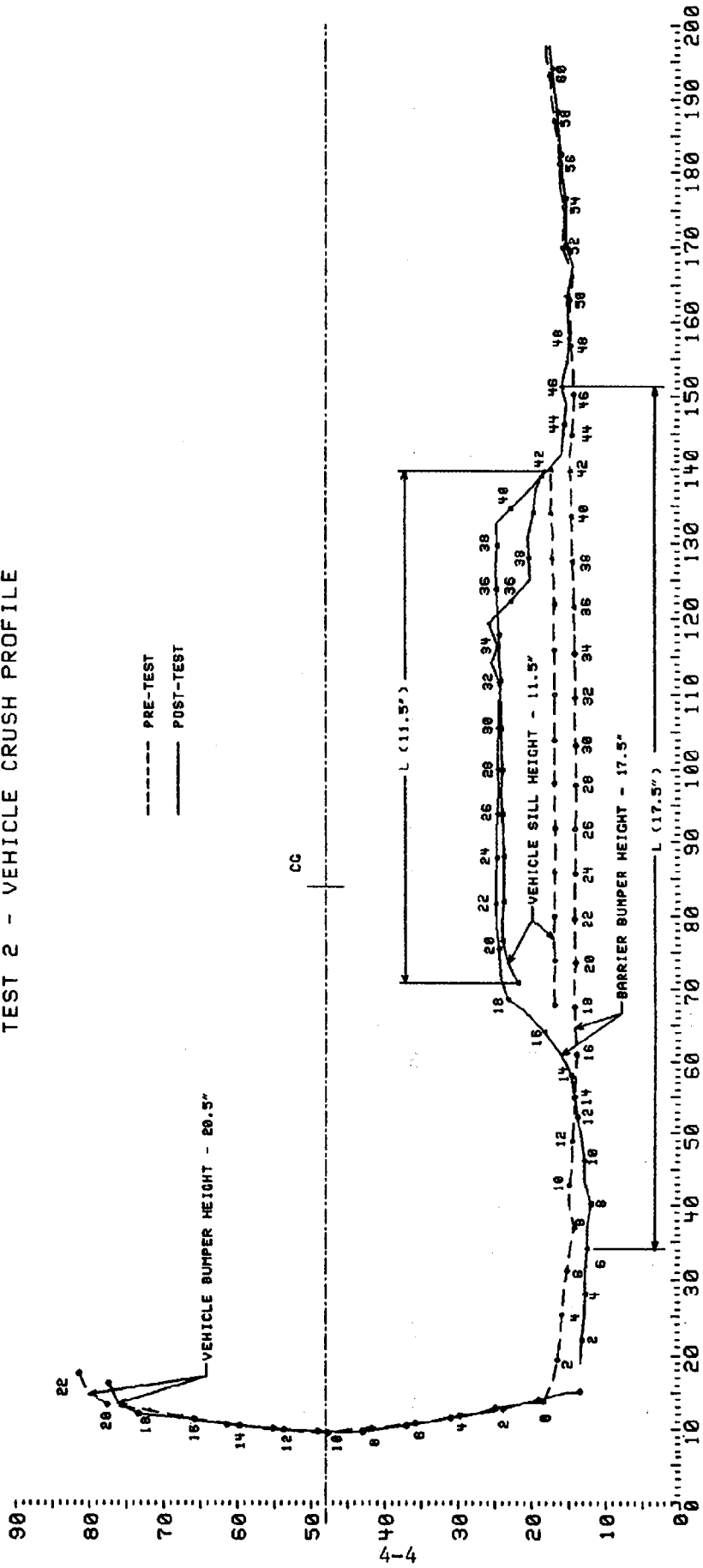
TEST NUMBER: 900924-2

ALL MEASUREMENTS ARE IN INCHES

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	193.4	192.6	0.8
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	180.8	179.6	1.2
X3	REAR SURFACE OF VEHICLE TO FIREWALL	151.2	150.5	0.7
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	128.6	129.1	-0.5
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	128.8	127.0	1.8
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	129.3	130.0	-0.7
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	129.6	129.0	0.6
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	89.3	89.8	-0.5
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	89.2	87.8	1.4
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	90.4	91.1	-0.7
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	90.6	90.2	0.4
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	127.6	128.2	-0.6
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	127.3	127.6	-0.3
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	146.7	147.1	-0.4
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	147.0	144.2	2.8
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	115.7	115.0	0.7
X17	CENTER OF STEERING COLUMN TO "A" POST	13.2	13.2	0.0
X18	CENTER OF STEERING COLUMN TO HEADLINER	17.9	17.0	0.9
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	188.4	189.8	-1.4
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	188.7	186.2	2.5
X21	LENGTH OF ENGINE BLOCK	22.0	22.0	0.0

NOTE: PRE-TEST VEHICLE MEASUREMENTS ARE FOR THE UNDEFORMED VEHICLE.

# TEST 2 - VEHICLE CRUSH PROFILE



VEHICLE CRUSH

TEST NO. 900924-2

AT MOVING BARRIER BUMPER HEIGHT

AT VEHICLE SILL HEIGHT

L	<u>104.1</u>	L	<u>69.7</u>
C1	<u>0.0</u>	S1	<u>0.0</u>
C2	<u>9.6</u>	S2	<u>5.9</u>
C3	<u>9.6</u>	S3	<u>4.6</u>
C4	<u>10.7</u>	S4	<u>3.7</u>
C5	<u>5.6</u>	S5	<u>2.4</u>
C6	<u>0.0</u>	S6	<u>0.0</u>

**DETERMINATION OF VEHICLE CRUSH:**

A reference line was constructed connecting the end points of the vehicle's damaged surface. Six equally spaced points were defined along the reference line and labeled C1 through C6 (or S1 through S6 for sill height crush) with the rearmost point of the damaged surface defined as C1 (or S1) and the forwardmost point defined as C6 (or S6). The actual crush distance is a measurement taken perpendicular to and from the reference line at each point (C1 through C6 or S1 through S6) to the vehicle's damaged surface.

NOTES: L is total length of damage surface

C1 through C6 and S1 through S6 are spaced equally apart

ALL MEASUREMENTS ARE IN INCHES

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 900924-2

No. LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
				MAX G	MSEC	MAX G	MSEC
1 RIGHT FRONT SILL ACCELERATION LATERAL	107.1	-26.4	12.8	1.8	86.5	22.6	14.6
2 RIGHT REAR SILL ACCELERATION LATERAL	77.9	-26.3	12.5	2.0	125.0	16.7	14.0
3 VEHICLE CG ACCELERATION	106.3	0.0	15.1				
LONGITUDINAL				7.1	19.0	7.2	9.8
LATERAL				8.2	24.5	50.4	13.8
RESULTANT				50.4	13.6		

\* 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

MOVING BARRIER ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 900924-2

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX G	MSEC	MAX G	MSEC
1	MOVING BARRIER	75.2	0.0	12.3				
	CG ACCELERATION							
	LONGITUDINAL				0.4	308.1	12.7	16.8
	LATERAL				2.1	104.9	2.7	41.0
	RESULTANT				12.8	16.9		

\* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

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

TEST #900924-2

CAMERA INFORMATION

<u>CAMERA NO.</u>	<u>LOCATION</u>	<u>TYPE</u>	<u>LENS (mm)</u>	<u>SPEED (fps)</u>	<u>PURPOSE OF CAMERA DATA</u>
1	Overhead wide	Photosonic 1B	13	500	Impact overall
2	Overhead tight	Photosonic 1B	25	500	Impact close-up

SECTION 5.0

TEST 900925-1 SUMMARY

TEST CONDITIONS

TEST NUMBER: 900925-1

DATE OF TEST: 9/25/90

TIME OF TEST: 936

AMBIENT TEMPERATURE AT IMPACT AREA: 68° F

INTENDED MOVING BARRIER VELOCITY 20.0 MPH

ACTUAL MOVING BARRIER VELOCITY 20.0 MPH

SUBJECT VEHICLE DATA

DIRECT CONTACT DAMAGE LENGTH 70.8

MAXIMUM CUMULATIVE CRUSH AT MOVING  
BARRIER BUMPER HEIGHT 16.8

MAXIMUM CUMULATIVE CRUSH AT VEHICLE  
SILL HEIGHT 5.9

VEHICLE ATTITUDES:

POST-TEST: LF: 25.9; RF: 27.0; LR: 24.9; RR: 24.4

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Audi 5000

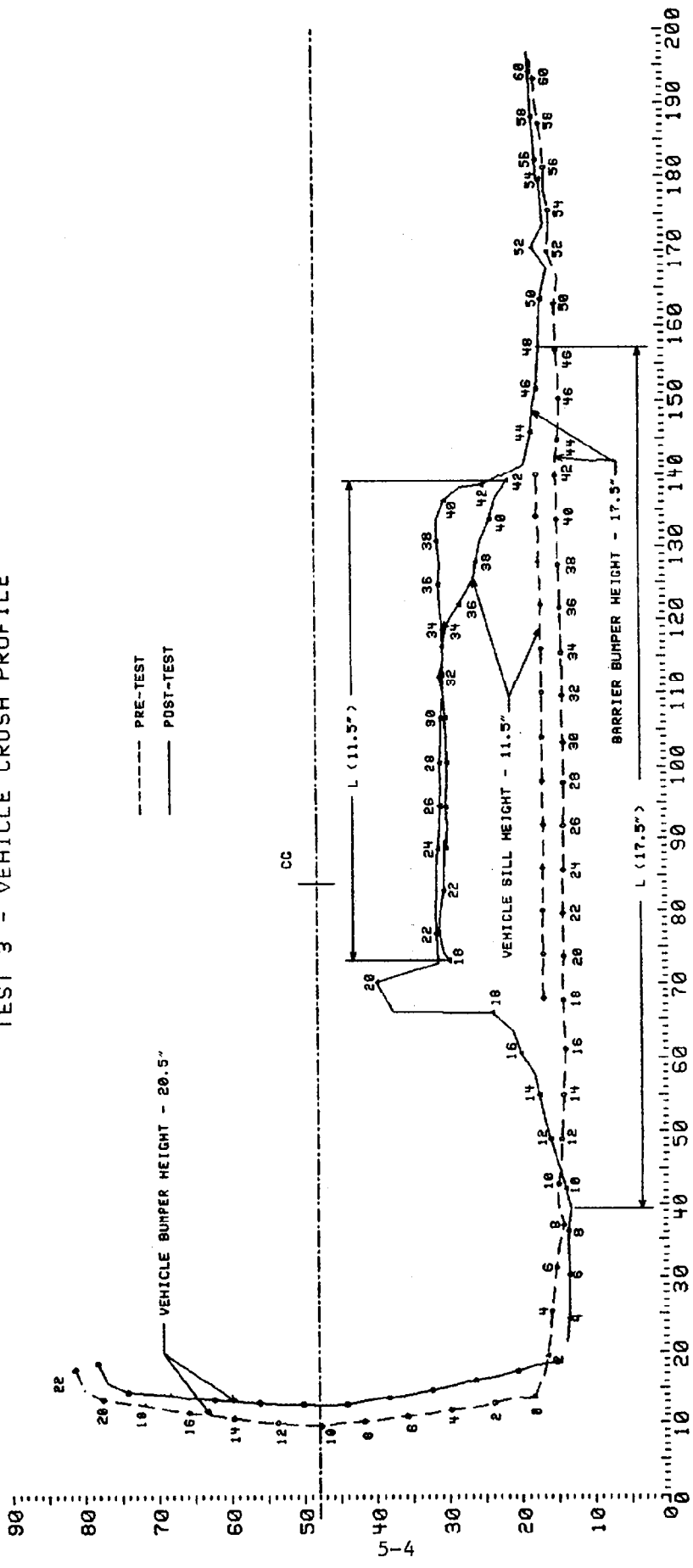
TEST NUMBER: 900925-1

ALL MEASUREMENTS ARE IN INCHES

<u>NO.</u>	<u>TYPE OF MEASUREMENT</u>	<u>PRE-TEST</u>	<u>POST-TEST</u>	<u>DIFF.</u>
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	193.4	190.2	-3.2
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	180.8	177.1	3.7
X3	REAR SURFACE OF VEHICLE TO FIREWALL	151.2	148.2	3.0
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	128.6	129.2	-0.6
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	128.8	126.2	2.6
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	129.3	130.2	-0.9
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	129.6	127.5	2.1
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	89.3	89.9	-0.6
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	89.2	87.0	2.2
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	90.4	91.2	-0.8
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	90.6	88.5	2.1
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	127.6	128.8	-1.2
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	127.3	126.8	0.5
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	146.7	146.9	-0.2
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	147.0	142.1	4.9
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	115.7	112.8	2.9
X17	CENTER OF STEERING COLUMN TO "A" POST	13.2	12.5	0.7
X18	CENTER OF STEERING COLUMN TO HEADLINER	17.9	16.5	1.4
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	188.4	186.9	1.5
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	188.7	183.5	5.2
X21	LENGTH OF ENGINE BLOCK	22.0	22.0	0.0

NOTE: PRE-TEST MEASUREMENTS ARE FOR THE UNDEFORMED VEHICLE.

TEST 3 - VEHICLE CRUSH PROFILE



VEHICLE CRUSH

TEST NO. 900925-1

AT MOVING BARRIER BUMPER HEIGHT

AT VEHICLE SILL HEIGHT

L	<u>113.5</u>	L	<u>67.0</u>
C1	<u>0.0</u>	S1	<u>0.0</u>
C2	<u>14.8</u>	S2	<u>3.2</u>
C3	<u>15.1</u>	S3	<u>5.9</u>
C4	<u>16.8</u>	S4	<u>3.8</u>
C5	<u>6.5</u>	S5	<u>2.6</u>
C6	<u>0.0</u>	S6	<u>0.0</u>

DETERMINATION OF VEHICLE CRUSH:

A reference line was constructed connecting the end points of the vehicle's damaged surface. Six equally spaced points were defined along the reference line and labeled C1 through C6 (or S1 through S6 for sill height crush) with the rearmost point of the damaged surface defined as C1 (or S1) and the forwardmost point defined as C6 (or S6). The actual crush distance is a measurement taken perpendicular to and from the reference line at each point (C1 through C6 or S1 through S6) to the vehicle's damaged surface.

NOTES: L is total length of damage surface

C1 through C6 through S1 through S6 are spaced equally apart

ALL MEASUREMENTS ARE IN INCHES

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 900925-1

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX G	MSEC	MAX G	MSEC
1	RIGHT FRONT SILL ACCELERATION LATERAL	107.1	-26.4	12.8	4.1	52.9	23.3	15.9
2	RIGHT REAR SILL ACCELERATION LATERAL	77.9	-26.3	12.5	1.5	115.4	16.1	11.1
3	VEHICLE CG ACCELERATION	106.3	0.0	15.1				
	LONGITUDINAL				11.9	17.1	17.5	9.6
	LATERAL				33.7	16.6	107.0	9.5
	RESULTANT				108.4	9.5		

\* 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

MOVING BARRIER ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 900925-1

No. LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
				MAX G	MSEC	MAX G	MSEC
1 MOVING BARRIER	75.2	0.0	12.3				
CG ACCELERATION							
LONGITUDINAL				0.8	129.3	12.9	6.0
LATERAL				3.2	101.5	2.5	16.0
RESULTANT				12.9	6.0		

\* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

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

TEST #900925-1

CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Overhead wide	Photosonic 1B	13	500	Impact overall
2	Overhead tight	Photosonic 1B	25	505	Impact close-up

SECTION 6.0

TEST 900925-2 SUMMARY

TEST CONDITIONS

TEST NUMBER: 900925-2

DATE OF TEST: 9/25/90

TIME OF TEST: 1139

AMBIENT TEMPERATURE AT IMPACT AREA: 71° F

INTENDED MOVING BARRIER VELOCITY: 40.0 MPH

ACTUAL MOVING BARRIER VELOCITY: 40.1 MPH

SUBJECT VEHICLE DATA

DIRECT CONTACT DAMAGE LENGTH 75.7

MAXIMUM CUMULATIVE CRUSH AT MOVING  
BARRIER BUMPER HEIGHT 32.4

MAXIMUM CUMULATIVE CRUSH AT VEHICLE  
SILL HEIGHT 9.5

VEHICLE ATTITUDES:

POST-TEST: LF: 23.2; RF: 26.2; LR: 23.6; RR: 24.4

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Audi 5000

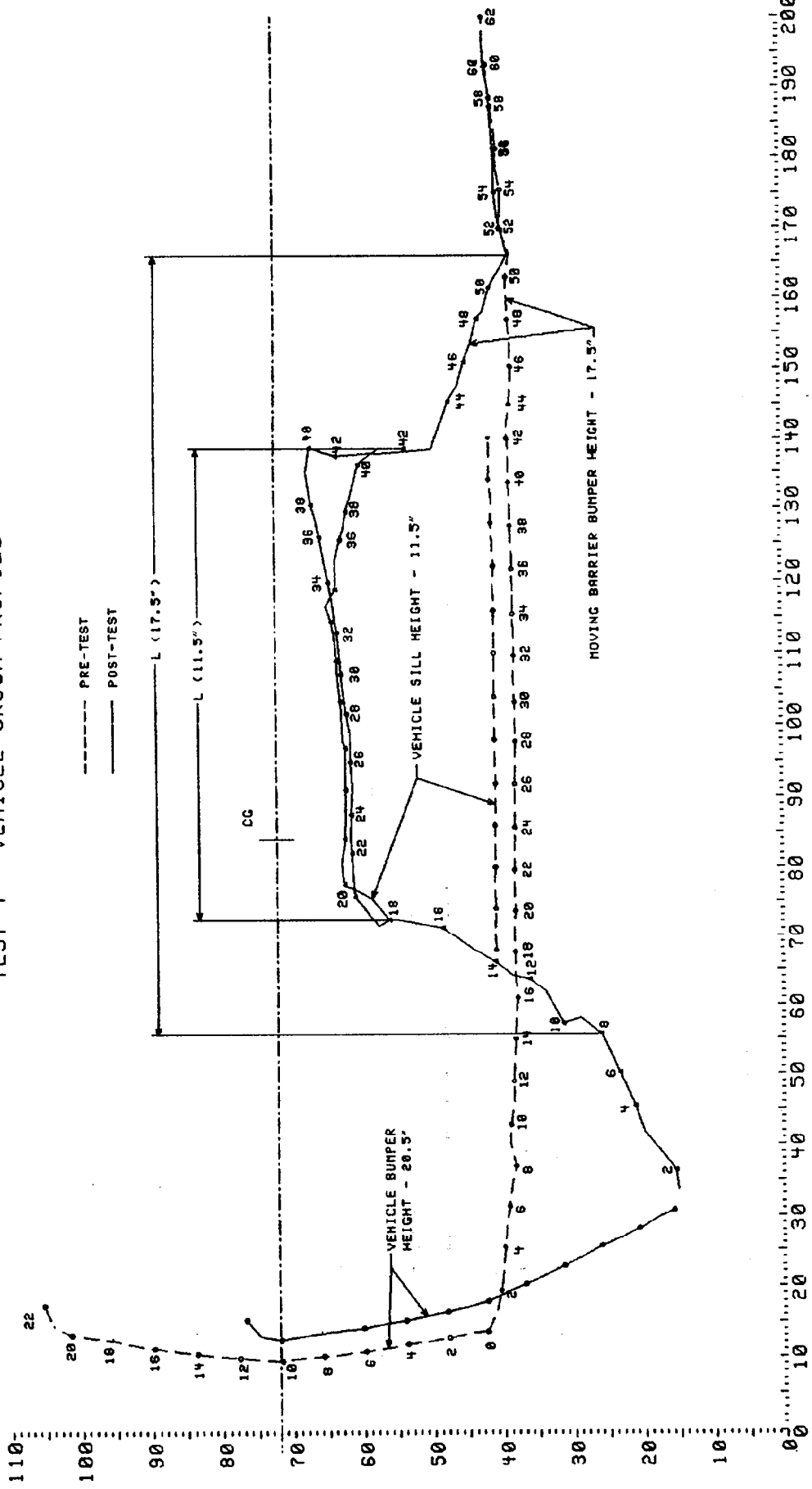
TEST NUMBER: 900925-2

ALL MEASUREMENTS ARE IN INCHES

NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	193.4	183.8	9.6
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	180.8	174.9	5.9
X3	REAR SURFACE OF VEHICLE TO FIREWALL	151.2	147.8	3.4
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	128.6	130.4	-1.8
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	128.8	122.1	6.7
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	129.3	131.2	-1.9
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	129.6	125.3	4.3
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	89.3	91.1	-1.8
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	89.2	84.8	4.4
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	90.4	92.1	-1.7
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	90.6	86.4	4.2
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	127.6	129.5	-1.9
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	127.3	125.2	2.1
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	146.7	149.1	-2.4
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	147.0	134.3	12.6
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	115.7	110.5	5.2
X17	CENTER OF STEERING COLUMN TO "A" POST	13.2	13.5	-0.3
X18	CENTER OF STEERING COLUMN TO HEADLINER	17.9	12.9	5.0
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	188.4	198.8	-10.4
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	188.7	171.8	16.9
X21	LENGTH OF ENGINE BLOCK	22.0	22.0	0.0

NOTE: PRE-TEST MEASUREMENTS ARE FOR THE UNDEFORMED VEHICLE.

# TEST 4 - VEHICLE CRUSH PROFILE



VEHICLE CRUSH

TEST NO. 900925-2

AT MOVING BARRIER BUMPER HEIGHT

AT VEHICLE SILL HEIGHT

L	<u>111.9</u>	L	<u>67.0</u>
C1	<u>0.0</u>	S1	<u>0.0</u>
C2	<u>12.2</u>	S2	<u>6.5</u>
C3	<u>31.4</u>	S3	<u>9.5</u>
C4	<u>31.4</u>	S4	<u>5.4</u>
C5	<u>32.4</u>	S5	<u>7.0</u>
C6	<u>0.0</u>	S6	<u>0.0</u>

DETERMINATION OF VEHICLE CRUSH:

A reference line was constructed connecting the end points of the vehicle's damaged surface. Six equally spaced points were defined along the reference line and labeled C1 through C6 (or S1 through S6 for sill height crush) with the rearmost point of the damaged surface defined as C1 (or S1) and the forwardmost point defined as C6 (or S6). The actual crush distance is a measurement taken perpendicular to and from the reference line at each point (C1 through C6 or S1 through S6) to the vehicle's damaged surface.

- NOTES: L is total length of damage surface  
C1 through C6 and S1 through S6 are spaced equally apart  
ALL MEASUREMENTS ARE IN INCHES

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 900925-2

No. LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
				MAX G	MSEC	MAX G	MSEC
1 RIGHT FRONT SILL ACCELERATION LATERAL	107.1	-26.4	12.8	7.8	66.3	47.1	13.6
2 RIGHT REAR SILL ACCELERATION LATERAL	77.9	-26.3	12.5	4.7	67.8	41.8	15.3
3 VEHICLE CG ACCELERATION LONGITUDINAL	106.3	0.0	15.1	14.0	11.9	9.6	7.5
LATERAL				36.0	20.8	123.2	8.5
RESULTANT				123.4	8.5		

\* 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 NUMBER 900925-2

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX G	MSEC	MAX G	MSEC
1	MOVING BARRIER	75.2	0.0	12.3				
	CG ACCELERATION							
	LONGITUDINAL				0.6	247.5	26.6	6.4
	LATERAL				4.2	33.4	6.3	25.6
	RESULTANT				26.6	6.4		

\* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

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

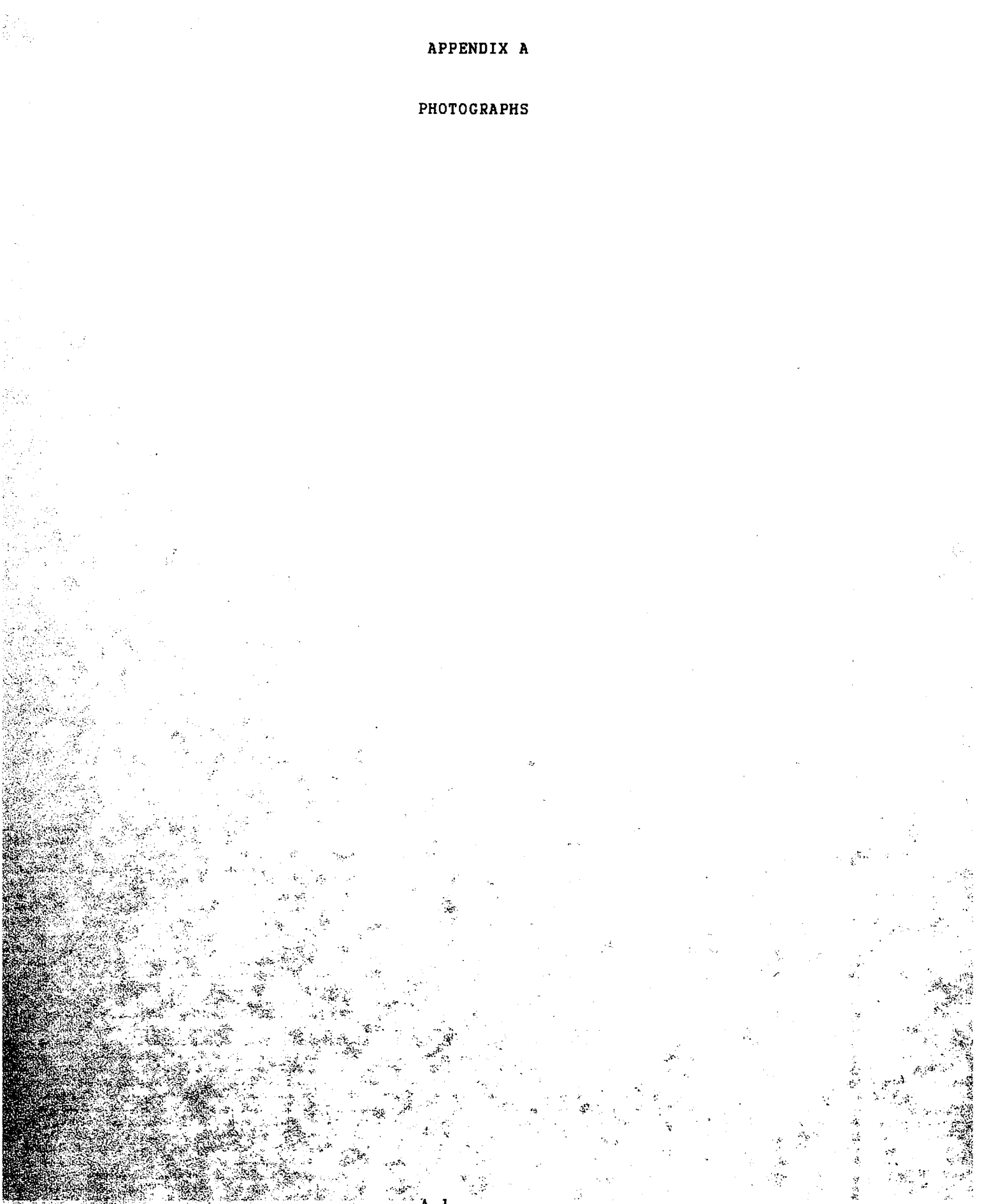
TEST #900925-2

CAMERA INFORMATION

<u>CAMERA NO.</u>	<u>LOCATION</u>	<u>TYPE</u>	<u>LENS (mm)</u>	<u>SPEED (fps)</u>	<u>PURPOSE OF CAMERA DATA</u>
1	Overhead wide	Photosonic 1B	13	500	Impact overall
2	Overhead tight	Photosonic 1B	25	507	Impact close-up

APPENDIX A

PHOTOGRAPHS



LIST OF PHOTOGRAPHS

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



Figure A-1. PRE-TEST OVERALL FRONT VIEW



Figure A-2. POST-TEST OVERALL FRONT VIEW



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



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



Figure A-5. PRE-TEST OVERALL REAR VIEW



Figure A-6. POST-TEST OVERALL REAR VIEW



Figure A-7. PRE-TEST OVERALL RIGHT SIDE VIEW



Figure A-8. POST-TEST OVERALL RIGHT SIDE VIEW



Figure A-9. PRE-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-10. POST-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-11. PRE-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-12. POST-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-13. PRE-TEST CLOSE-UP LEFT REAR VIEW



Figure A-14. POST-TEST CLOSE-UP LEFT REAR VIEW



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



Figure A-16. POST-TEST LEFT SIDE CLOSE-UP VIEW

TEST #900924-2  
LIST OF PHOTOGRAPHS

17. POST-TEST OVERALL FRONT VIEW
18. POST-TEST OVERALL LEFT SIDE VIEW
19. POST-TEST OVERALL REAR VIEW
20. POST-TEST OVERALL RIGHT SIDE VIEW
21. POST-TEST LEFT FRONT THREE-QUARTER VIEW
22. POST-TEST LEFT REAR THREE-QUARTER VIEW
23. POST-TEST CLOSE-UP LEFT REAR VIEW
24. POST-TEST RIGHT FRONT THREE-QUARTER VIEW
25. POST-TEST LEFT SIDE CLOSE-UP VIEW



Figure A-17. POST-TEST OVERALL FRONT VIEW



Figure A-18. POST-TEST OVERALL LEFT SIDE VIEW



Figure A-19. POST-TEST OVERALL REAR VIEW



Figure A-20. POST-TEST OVERALL RIGHT SIDE VIEW



Figure A-21. POST-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-22. POST-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-23. POST-TEST CLOSE-UP LEFT REAR VIEW



Figure A-24. POST-TEST RIGHT FRONT THREE-QUARTER VIEW



Figure A-25. POST-TEST LEFT SIDE CLOSE-UP VIEW

TEST #900925-1

LIST OF PHOTOGRAPHS

26. POST-TEST OVERALL FRONT VIEW
27. POST-TEST OVERALL LEFT SIDE VIEW
28. POST-TEST OVERALL REAR VIEW
29. POST-TEST OVERALL RIGHT SIDE VIEW
30. POST-TEST LEFT FRONT THREE-QUARTER VIEW
31. POST-TEST LEFT REAR THREE-QUARTER VIEW
32. POST-TEST CLOSE-UP LEFT REAR VIEW
33. POST-TEST LEFT SIDE CLOSE-UP VIEW
34. POST-TEST SET-UP DEVICE MEASUREMENTS - VIEW 1
35. POST-TEST SET-UP DEVICE MEASUREMENTS - VIEW 2

TEST #900925-2  
LIST OF PHOTOGRAPHS

36. POST-TEST OVERALL FRONT VIEW
37. POST-TEST OVERALL LEFT SIDE VIEW
38. POST-TEST OVERALL REAR VIEW
39. POST-TEST OVERALL RIGHT SIDE VIEW
40. POST-TEST LEFT FRONT THREE-QUARTER VIEW
41. POST-TEST LEFT REAR THREE-QUARTER VIEW
42. POST-TEST CLOSE-UP LEFT REAR VIEW
43. POST-TEST LEFT SIDE CLOSE-UP VIEW



Figure A-26. POST-TEST OVERALL FRONT VIEW



Figure A-27. POST-TEST OVERALL LEFT SIDE VIEW



Figure A-28. POST-TEST OVERALL REAR VIEW



Figure A-29. POST-TEST OVERALL RIGHT SIDE VIEW



Figure A-30. POST-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-31. POST-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-32. POST-TEST CLOSE-UP LEFT REAR VIEW



Figure A-33. POST-TEST LEFT SIDE CLOSE-UP VIEW



Figure A-34. POST-TEST SET-UP DEVICE MEASUREMENTS - VIEW 1

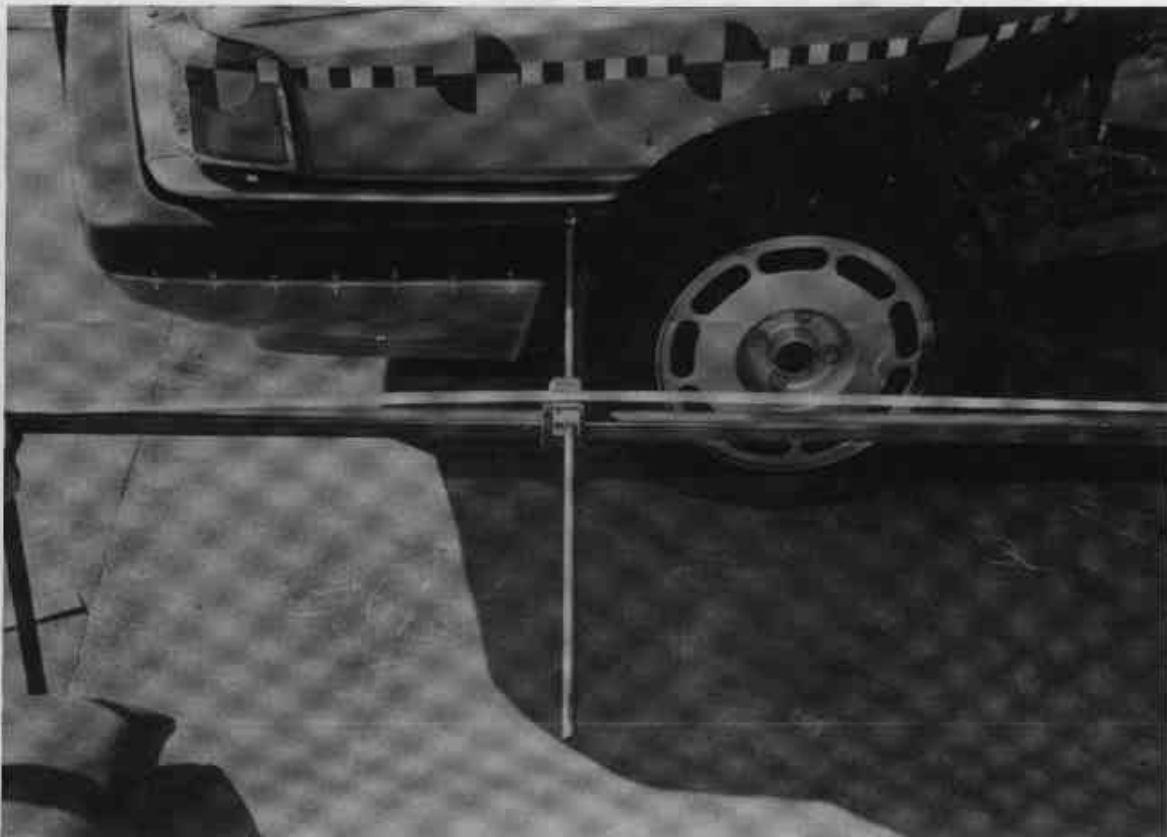


Figure A-35. POST-TEST SET-UP DEVICE MEASUREMENTS - VIEW 2



Figure A-36. POST-TEST OVERALL FRONT VIEW



Figure A-37. POST-TEST OVERALL LEFT SIDE VIEW



Figure A-38. POST-TEST OVERALL REAR VIEW



Figure A-39. POST-TEST OVERALL RIGHT SIDE VIEW



Figure A-40. POST-TEST LEFT FRONT THREE-QUARTER VIEW



Figure A-41. POST-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-42. POST-TEST CLOSE-UP LEFT REAR VIEW

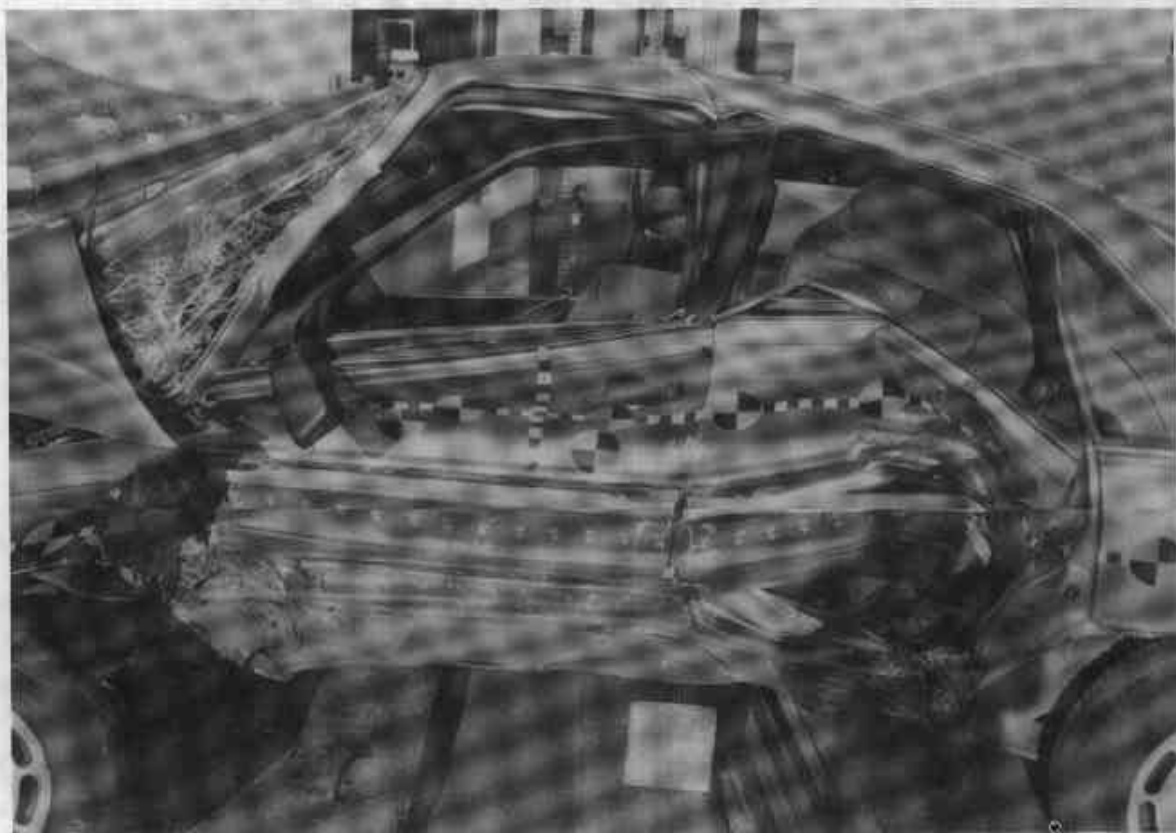


Figure A-43. POST-TEST LEFT SIDE CLOSE-UP VIEW

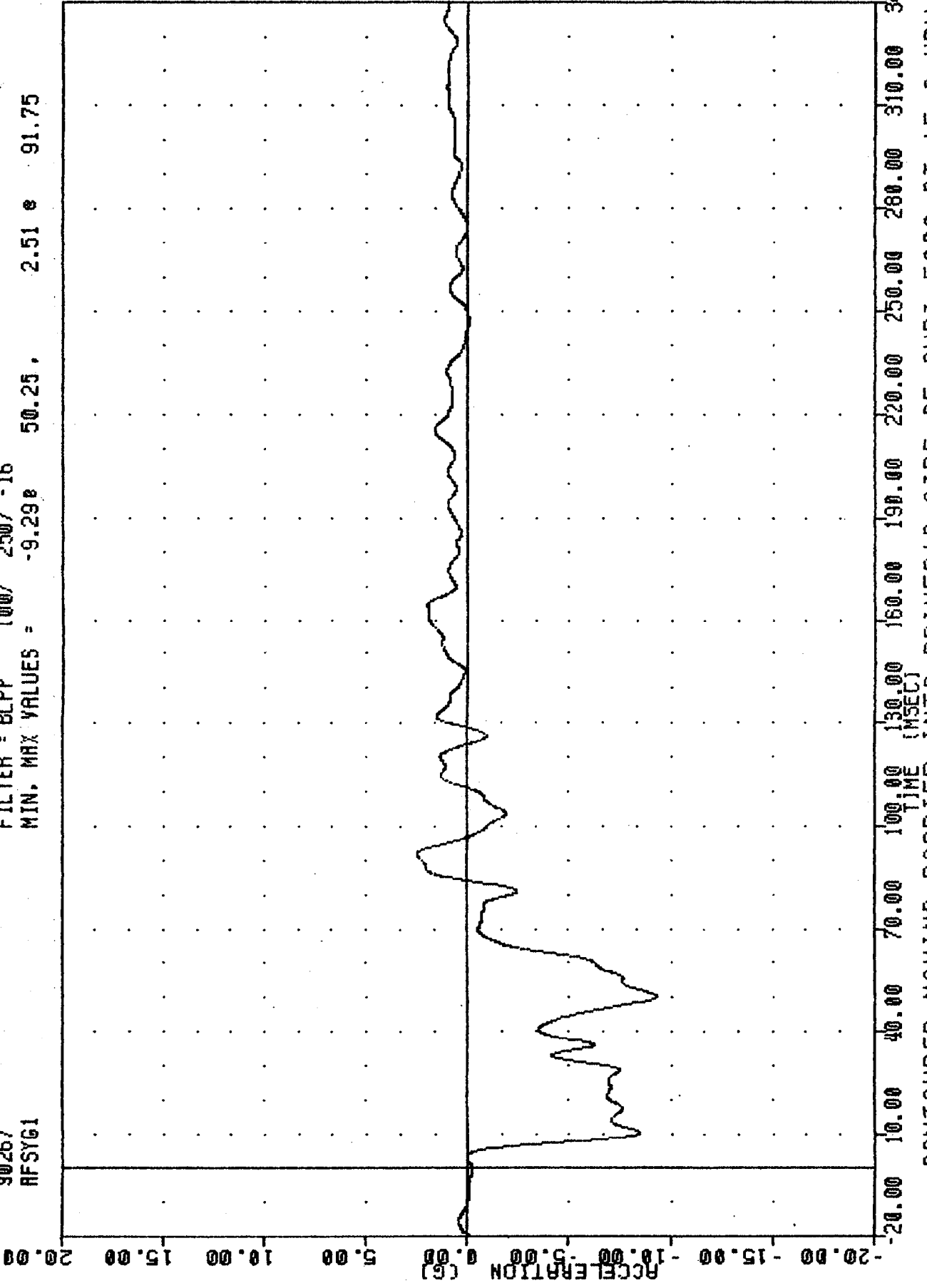
**APPENDIX B**

**DATA PLOTS**

TEST #900924-1

900924-1 \* TRC  
CRASH III DAMAGE ALGORITHM  
90267  
RFSYG1

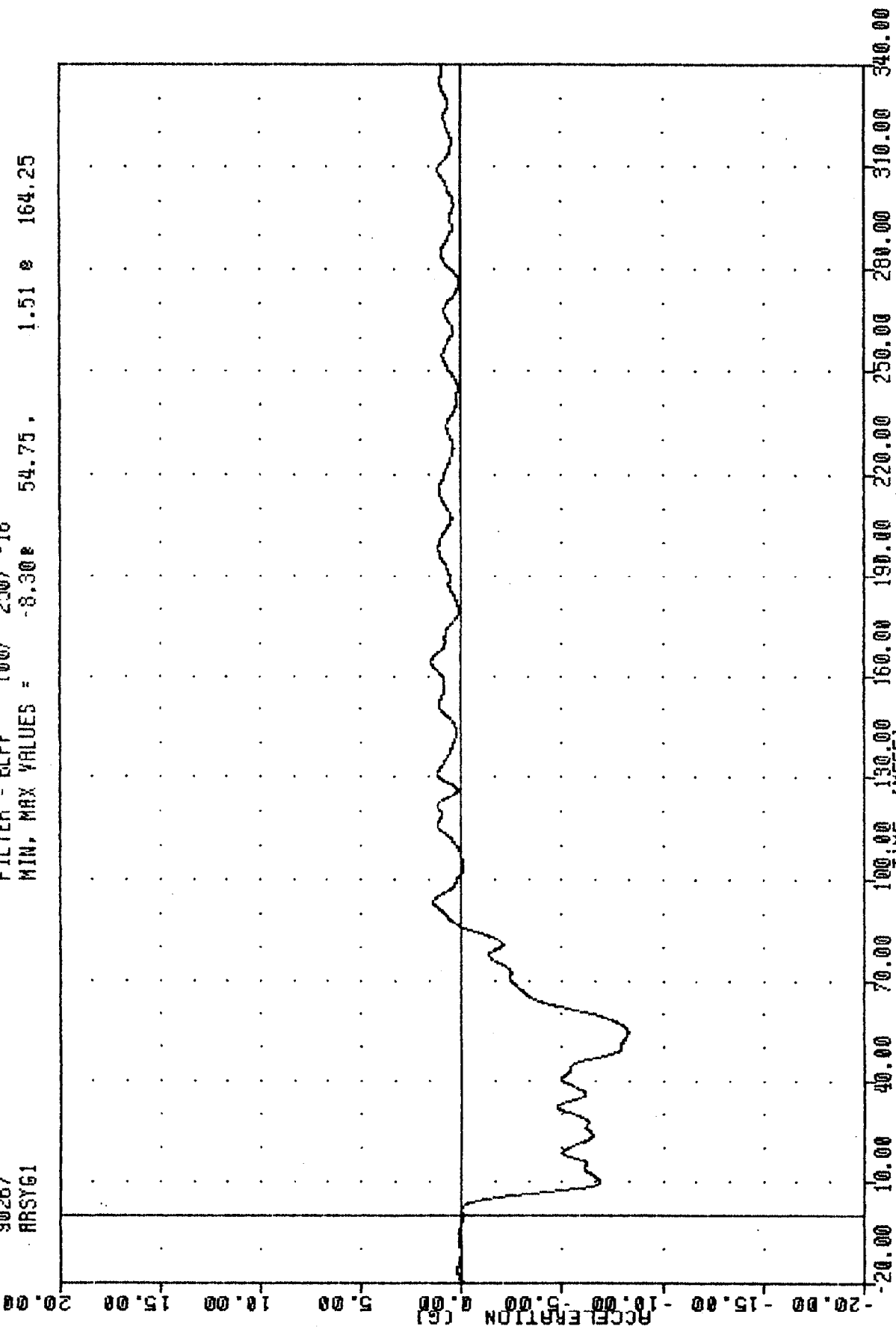
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -9.298 50.25, 2.51 e 91.75



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #1  
RIGHT FRONT SILL Y-AXIS ACCELERATION

900924-1 , TRC  
 CRASH III DAMAGE ALGORITHM  
 90267  
 ARSY61

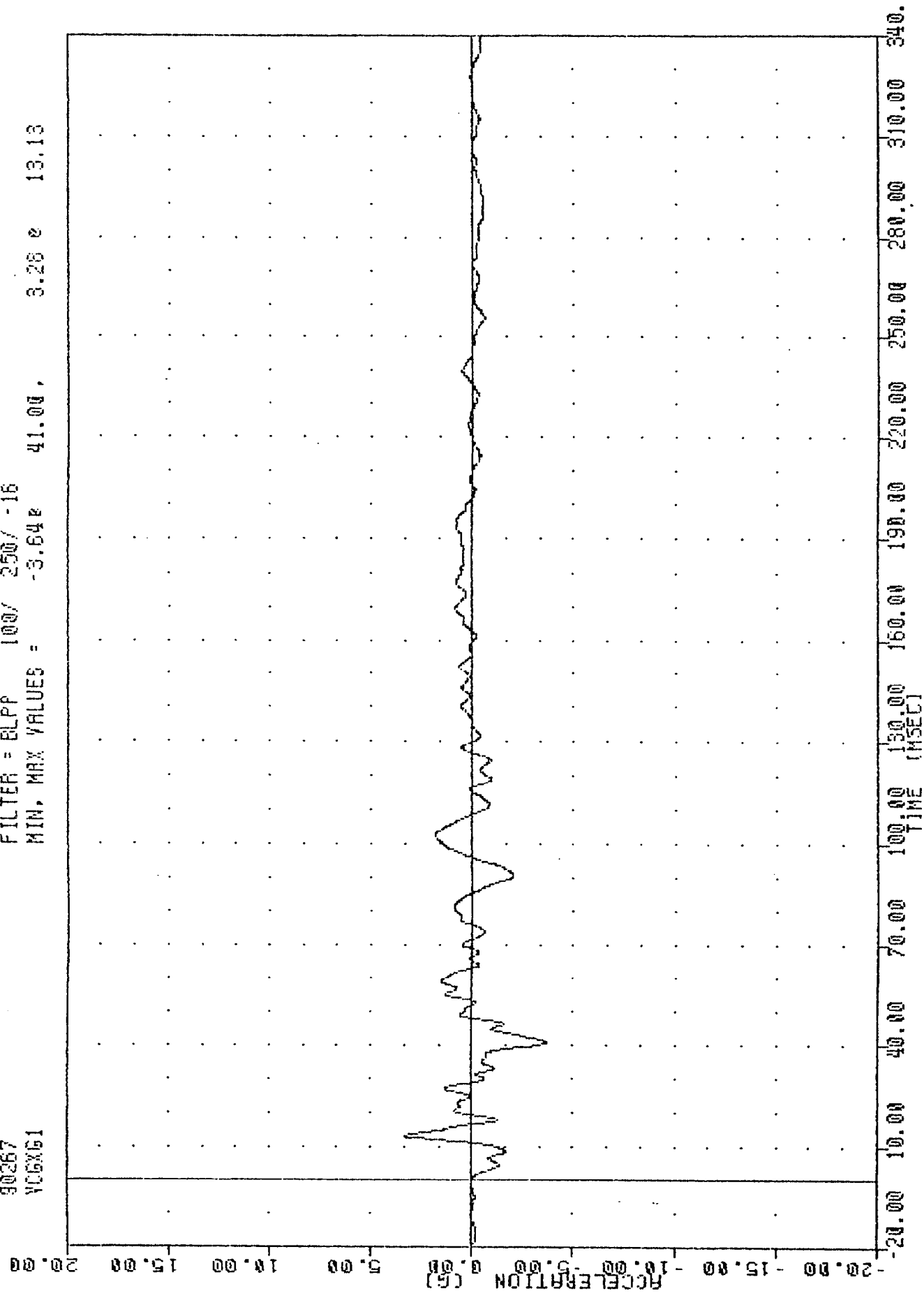
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = -8.30E 54.75, 1.51 e 164.25



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #1  
 RIGHT REAR SILL Y-AXIS ACCELERATION

CRASH III DAMAGE ALGORITHM  
90267  
YC6XG1

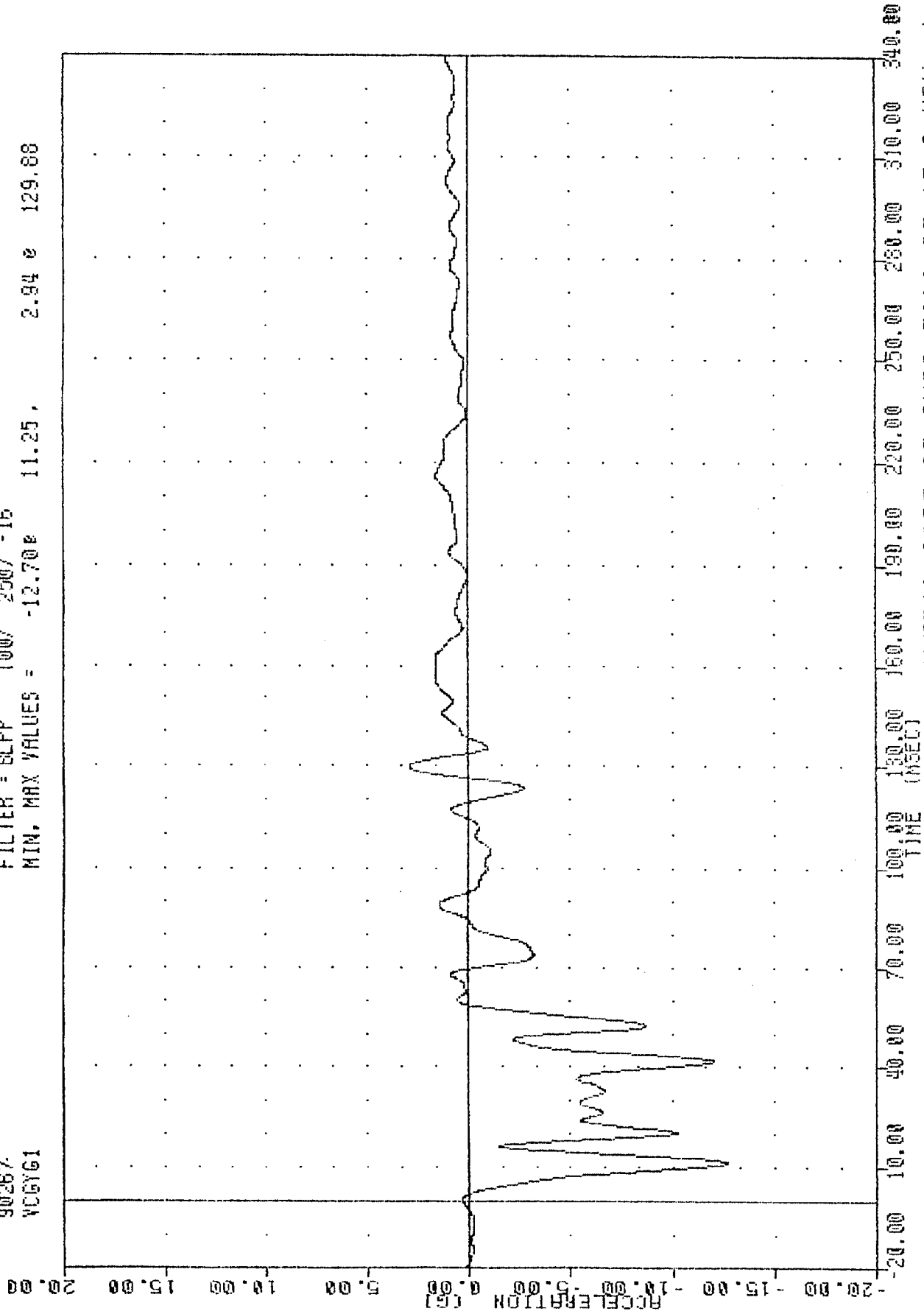
FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = 41.00, 3.26 e 13.13



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #  
VEHICLE CG X-AXIS ACCELERATION (PERPENDICULAR TO IMPACT DIRECTION)

900924-1 , TRC  
CRASH III DAMAGE ALGORITHM  
90267.  
YD6Y61

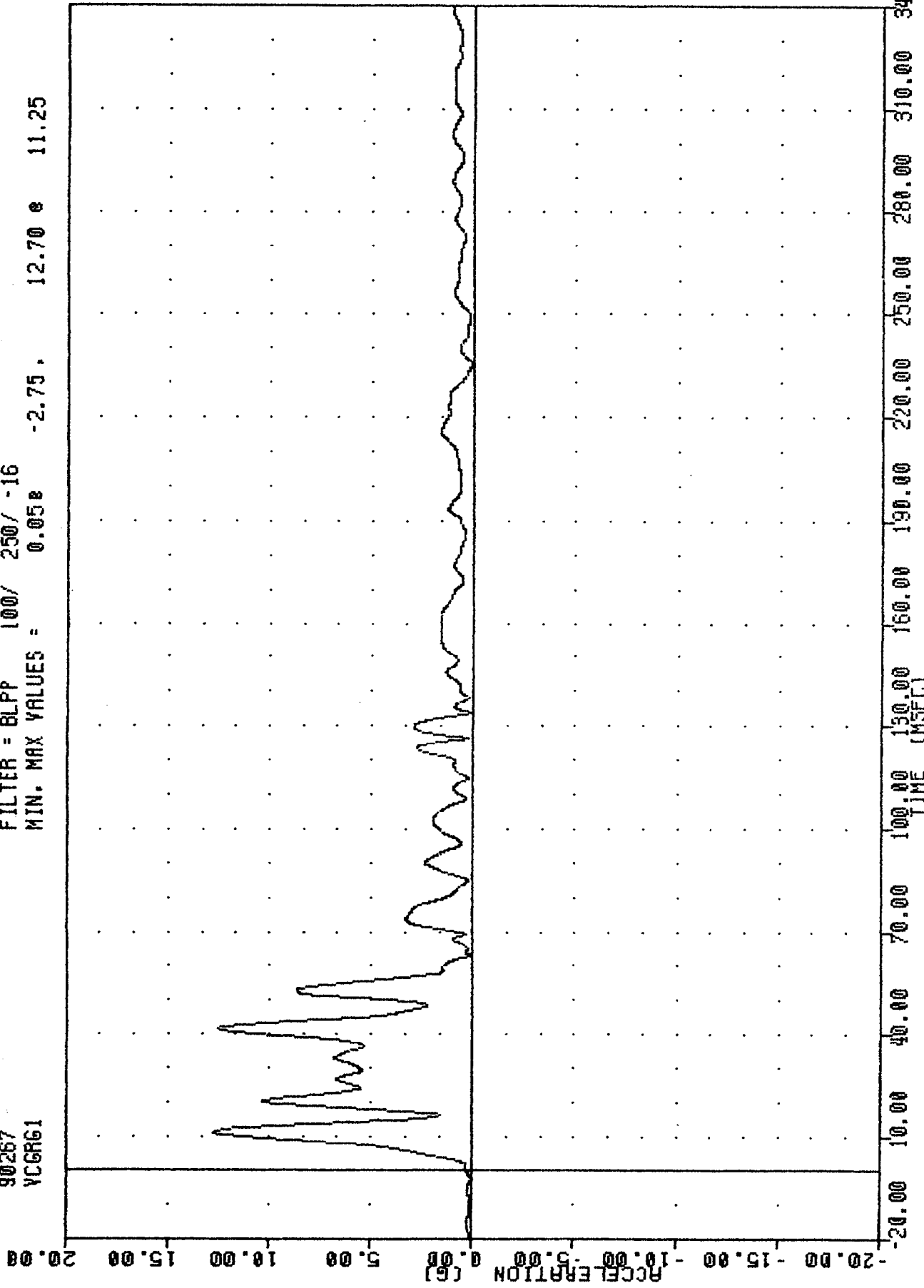
FILTER = 5LFP 100/ 250/ -16  
MIN. MAX VALUES = -12.70e 11.25, 2.94 e 129.88



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #1  
VEHICLE CG Y-AXIS ACCELERATION (IMPACT DIRECTION)

900929-1 , IKC  
CRASH III DAMAGE ALGORITHM  
90267  
YCGRG1

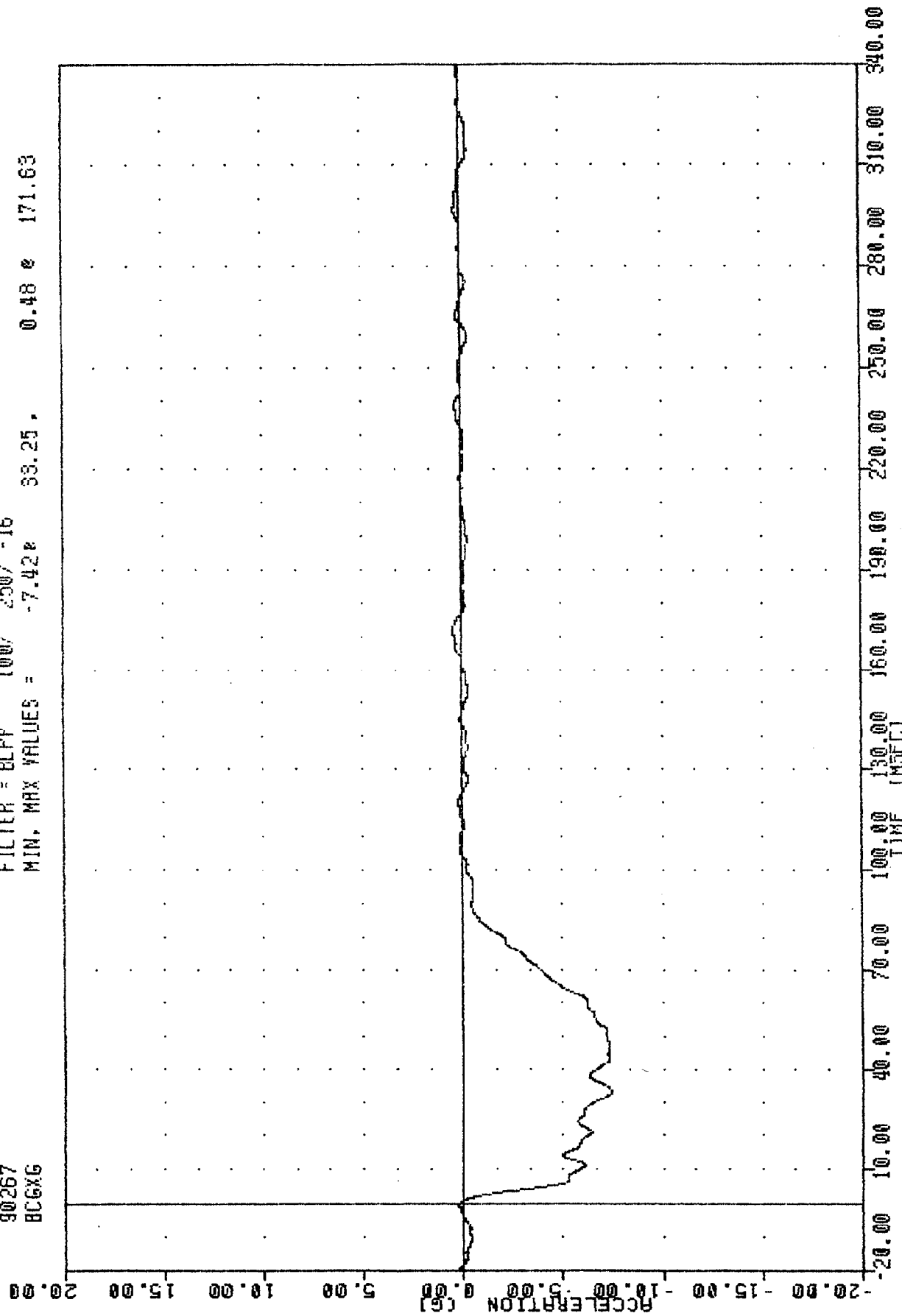
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = 0.058 -2.75 . 12.70 e 11.25



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #1  
VEHICLE CG RESULTANT ACCELERATION

900924-1 , TRC  
CRASH III DAMAGE ALGORITHM  
90267  
BC6XG

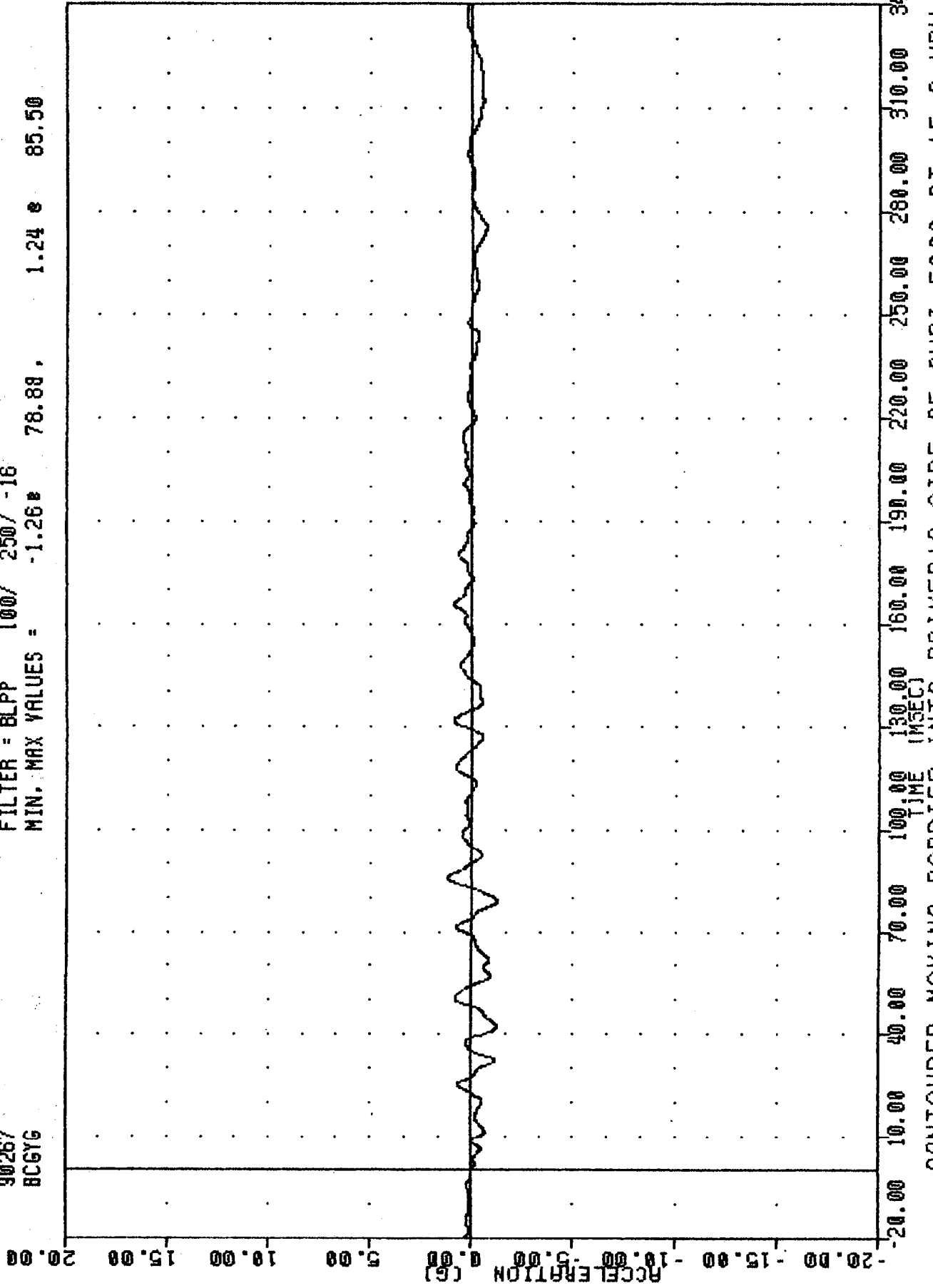
FILTER = BLFF 100/ 250/ -16  
MIN. MAX VALUES = -7.42g 33.25g 0.48g 171.63



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #1  
MOVING BARRIER CENTER OF GRAVITY X-AXIS ACCELERATION

900924-1 , TRC  
CRASH III DAMAGE ALGORITHM  
90267  
BC6YG

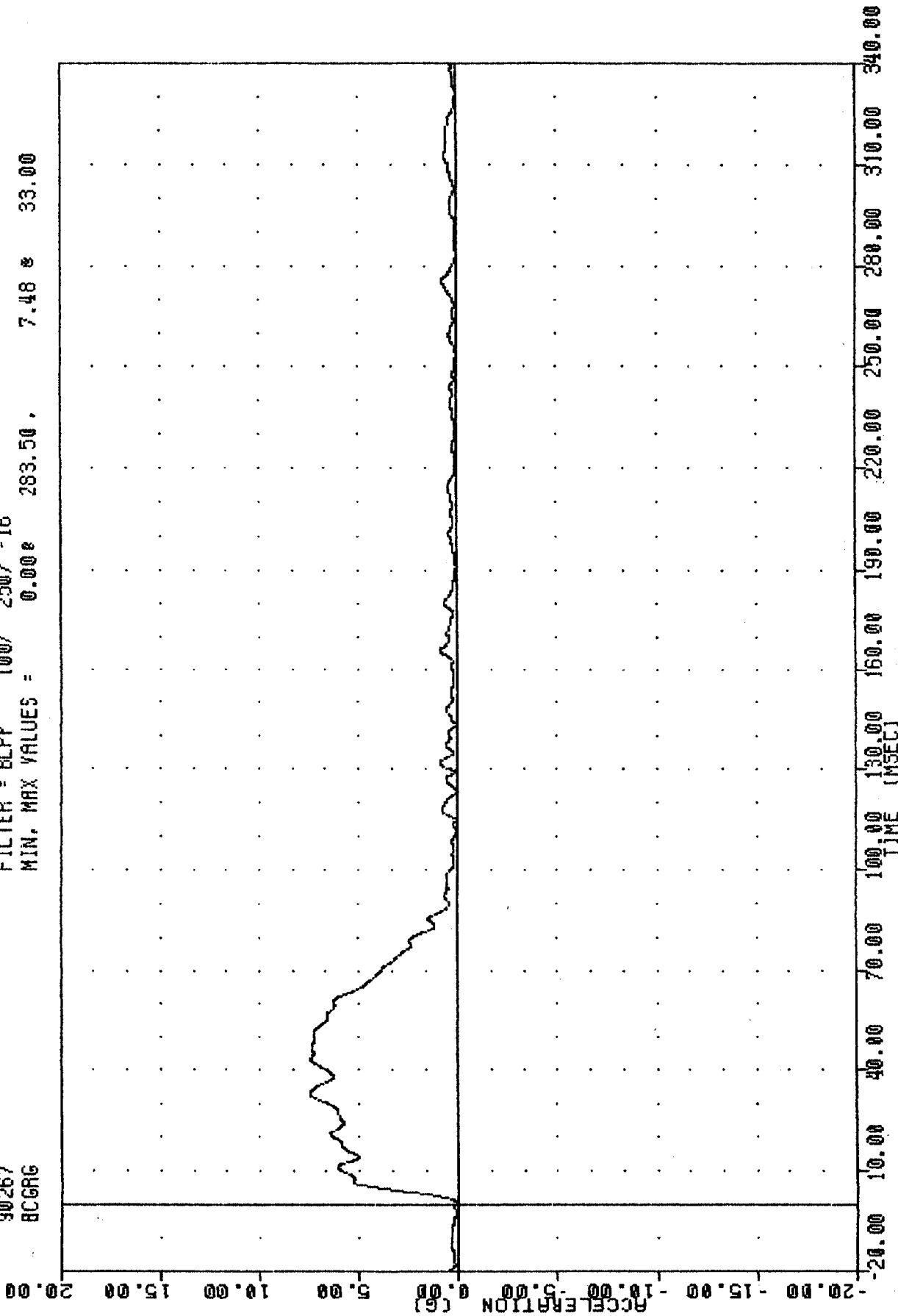
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -1.26e 78.88, 1.24 e 85.50



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #1  
MOVING BARRIER CENTER OF GRAVITY Y-AXIS ACCELERATION

300924-1 , TRC  
CRASH III DAMAGE ALGORITHM  
30267  
BCGRG

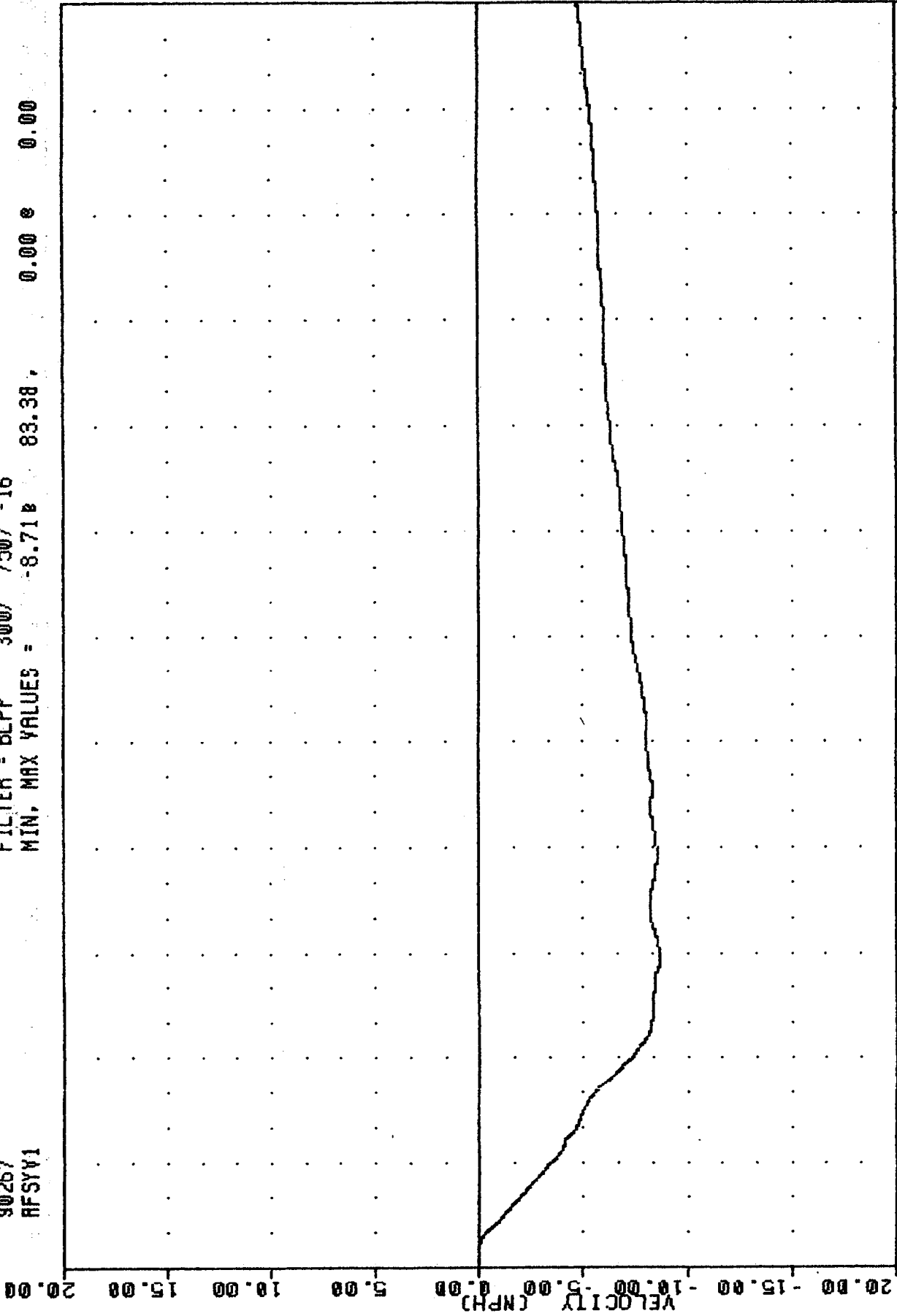
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = 0.00e 283.50 , 7.48 e 33.00



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #1  
MOVING BARRIER CENTER OF GRAVITY RESULTANT ACCELERATION

900924-1 , TRC  
 CRASH III DAMAGE ALGORITHM  
 90267  
 RFSYV1

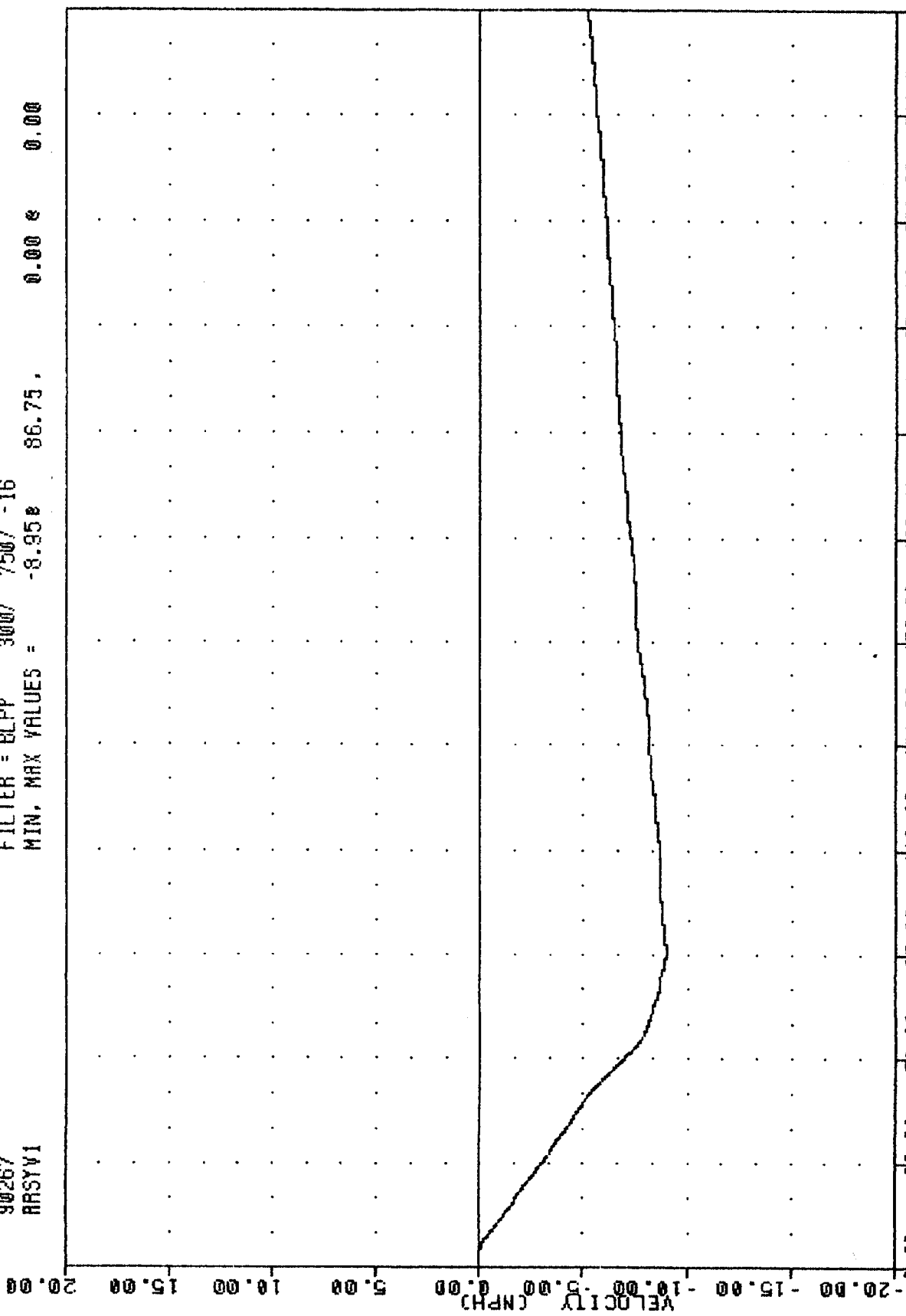
FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -8.718 83.38, 0.00 e 0.00



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #1  
 RIGHT FRONT SILL Y-AXIS VELOCITY

900924-1 , TRC  
 CRASH III DAMAGE ALGORITHM  
 90267  
 RFSYV1

FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -8.958 86.75 , 0.00 e 0.00

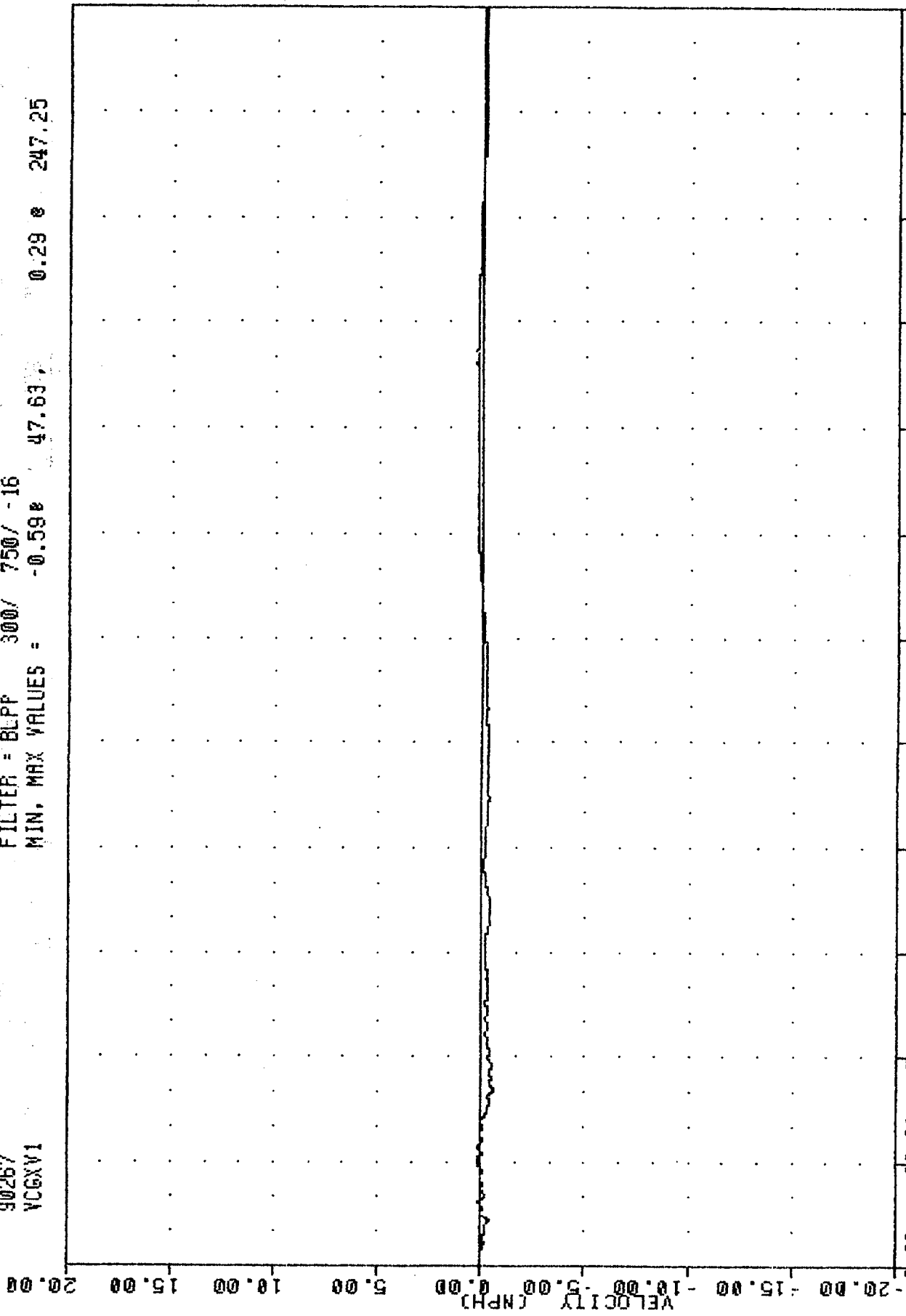


B12

CONToured MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #1  
 RIGHT REAR SILL Y-AXIS VELOCITY

900924-1 . IRC  
 CRASH III DAMAGE ALGORITHM  
 90267  
 VCGXV1

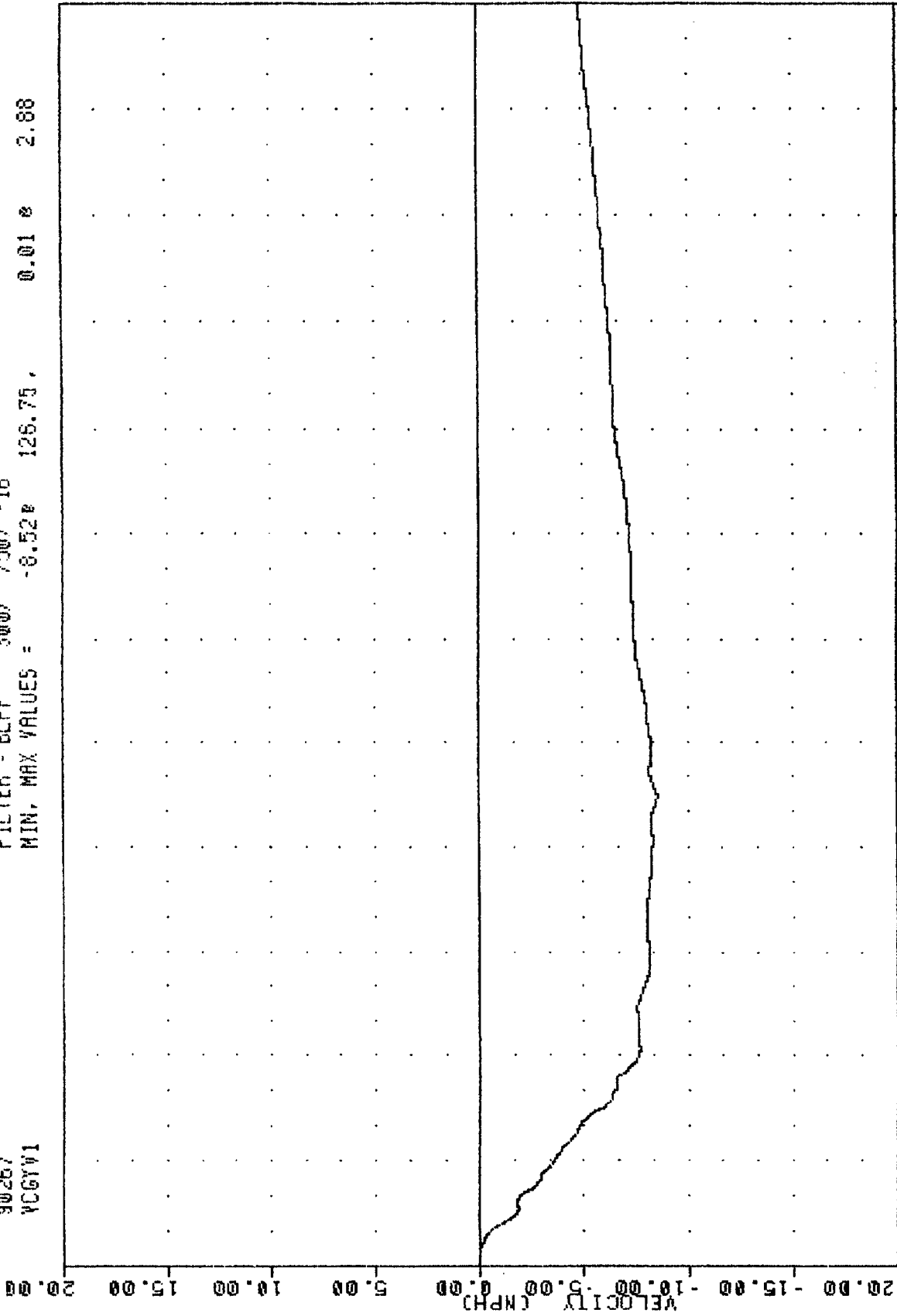
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -0.59e 47.63 0.29 e 247.25



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #  
 VEHICLE CG X-AXIS VELOCITY (PERPENDICULAR TO IMPACT DIRECTION)

300924-1 , TAC  
 CRASH III DAMAGE ALGORITHM  
 90287  
 YCGYV1

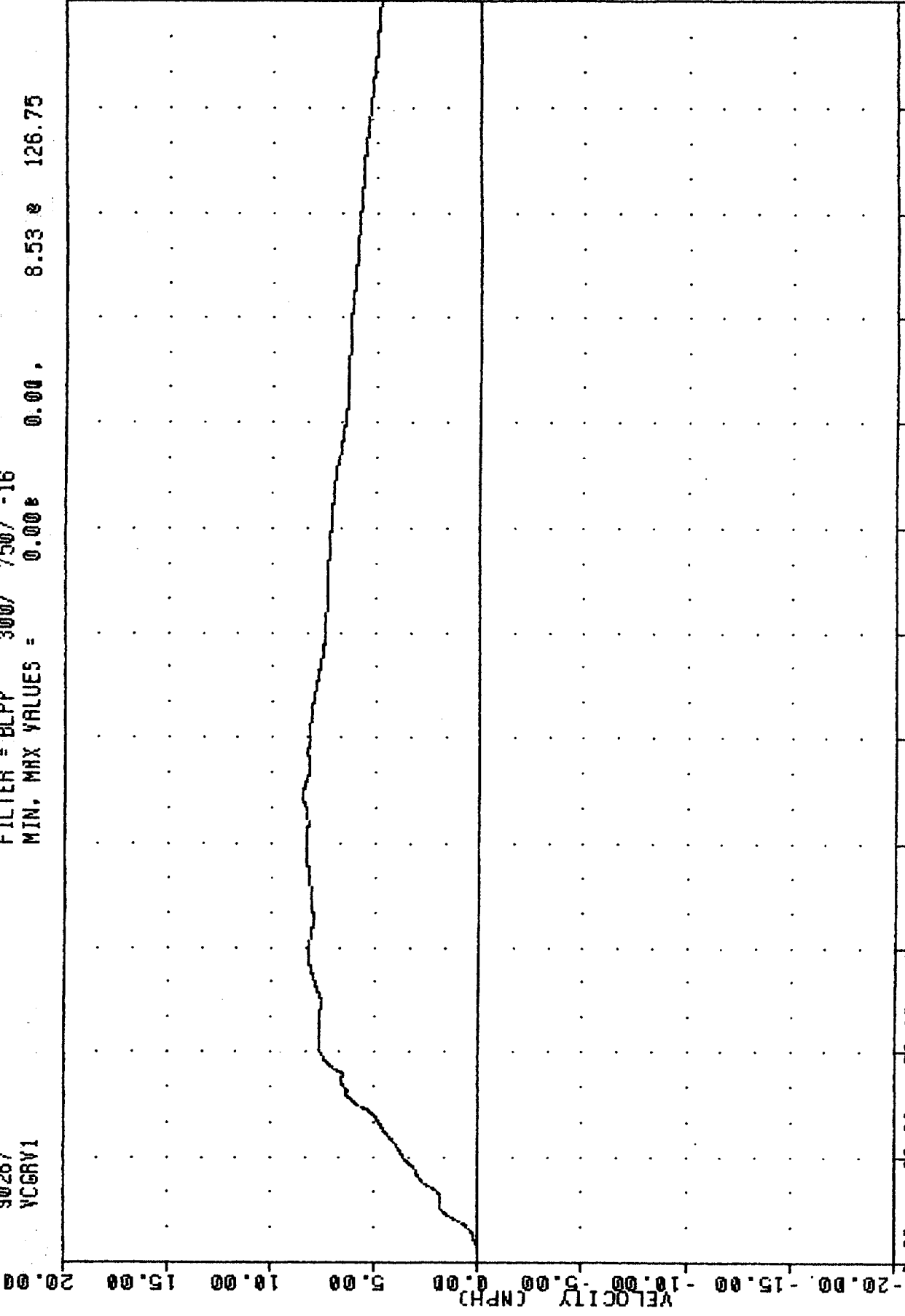
FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -8.528 126.75, 0.01 e 2.88



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #1  
 VEHICLE CG Y-AXIS VELOCITY (IMPACT DIRECTION)

900924-1 IRC  
 CRASH III DAMAGE ALGORITHM  
 90267  
 VCGRV1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 0.00 e 0.00 , 8.53 e 126.75

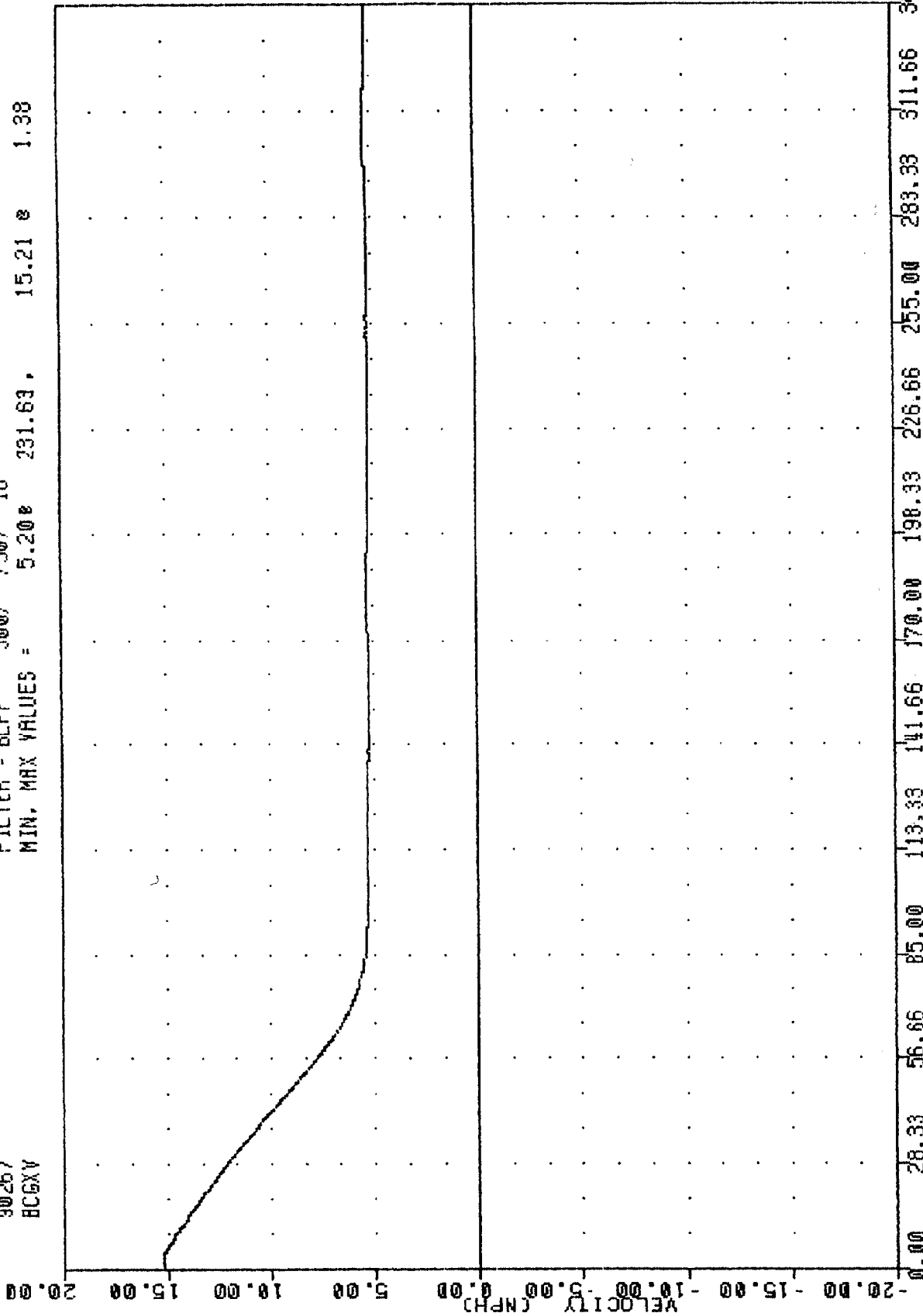


0.00 28.33 56.66 85.00 113.33 141.66 170.00 196.33 226.66 255.00 283.33 311.66 340.00  
 TIME (MSEC)  
 CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #1  
 VEHICLE CG RESULTANT VELOCITY

900924-1 , TRC  
 CRASH III DAMAGE ALGORITHM

90267  
 HCGXY

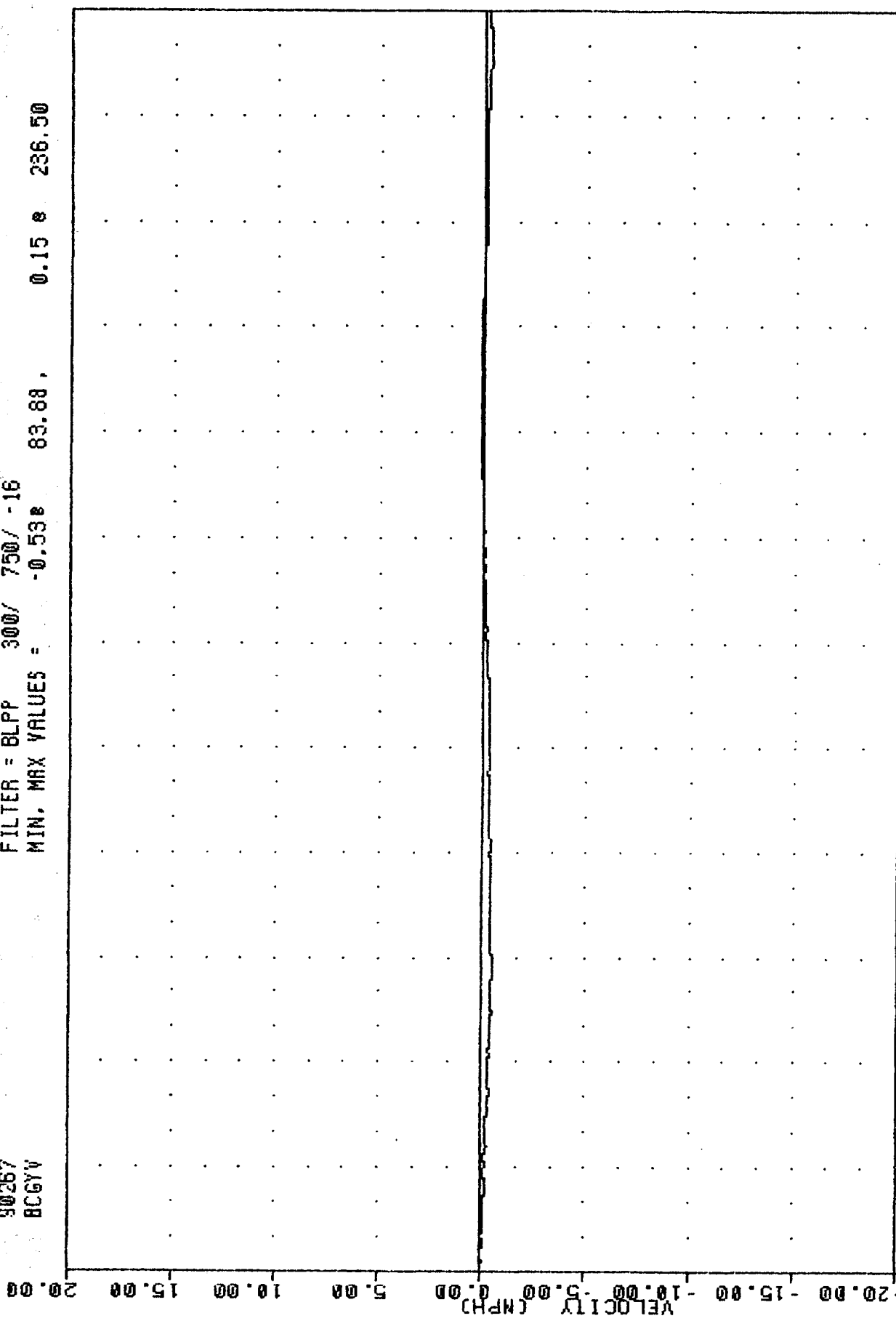
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 5.20e 231.63, 15.21 e 1.38



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #1  
 MOVING BARRIER CENTER OF GRAVITY X-AXIS VELOCITY

300024-1, INC.  
 CRASH III DAMAGE ALGORITHM  
 90267  
 BCGYV

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -0.53e 83.88, 0.15 e 236.50

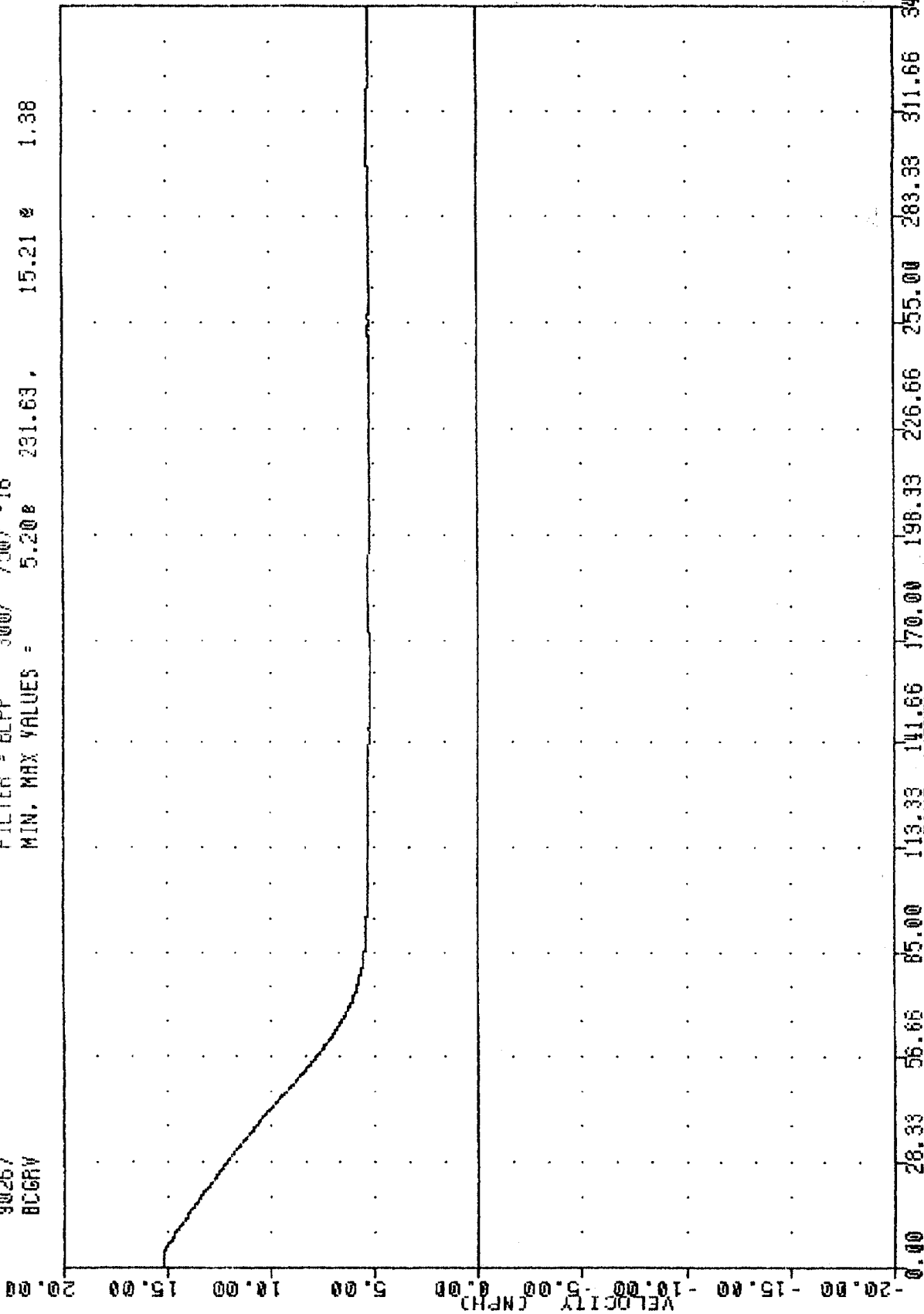


TIME (MSEC)	VELOCITY (MPH)
0.00	
28.33	
56.66	
85.00	
113.33	
141.66	
170.00	
198.33	
226.66	
255.00	
283.33	
311.66	
340.00	

CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #1  
 MOVING BARRIER CENTER OF GRAVITY Y-AXIS VELOCITY

900924-1 , T&C  
 CRASH III DAMAGE ALGORITHM  
 90267  
 BCGRY

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 5.208 231.63 , 15.21 e 1.38

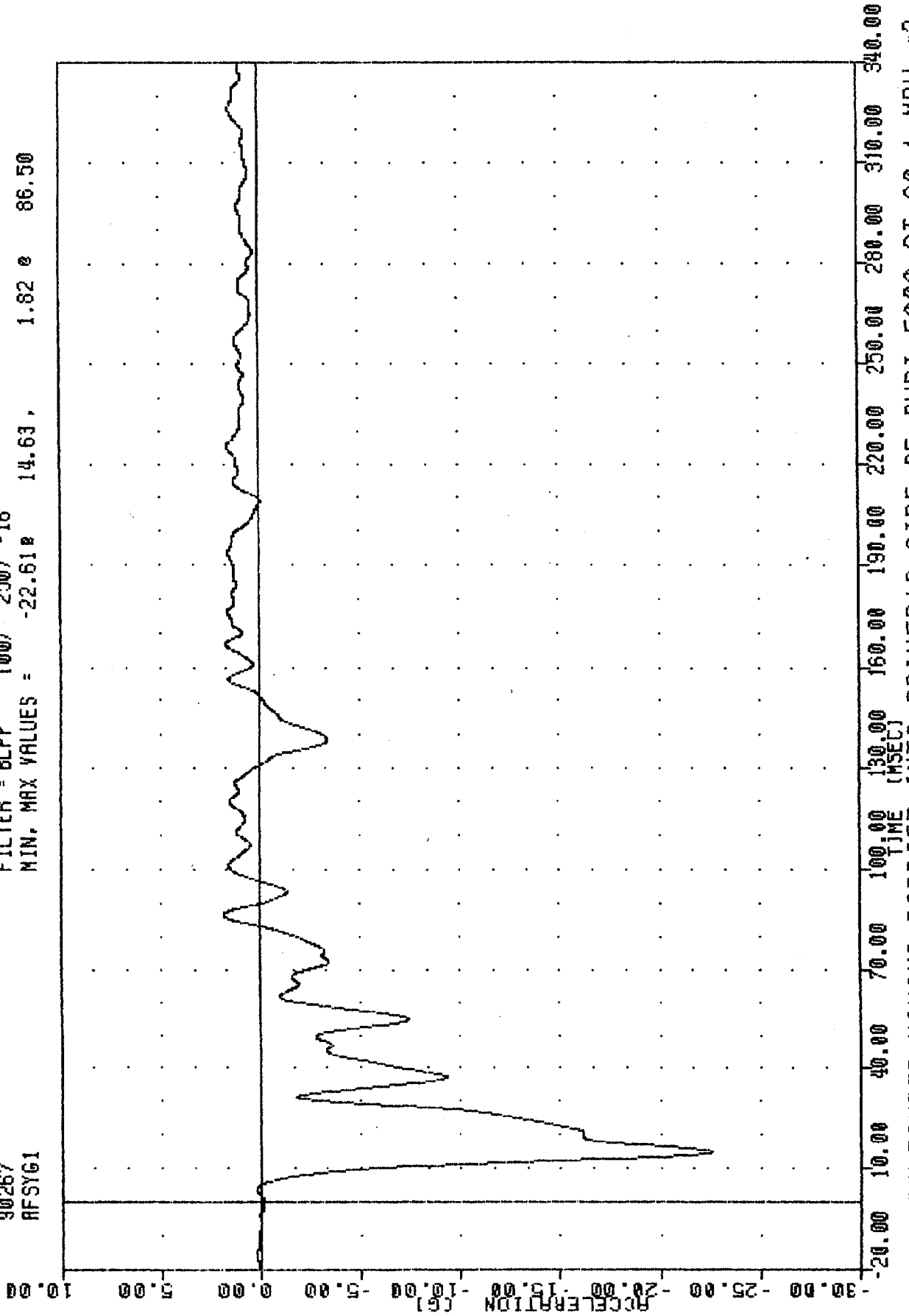


CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 15.2 MPH #1  
 MOVING BARRIER CENTER OF GRAVITY RESULTANT VELOCITY



900924-2 , TRC  
CRASH III DAMAGE ALGORITHM  
90267  
AFSYG1

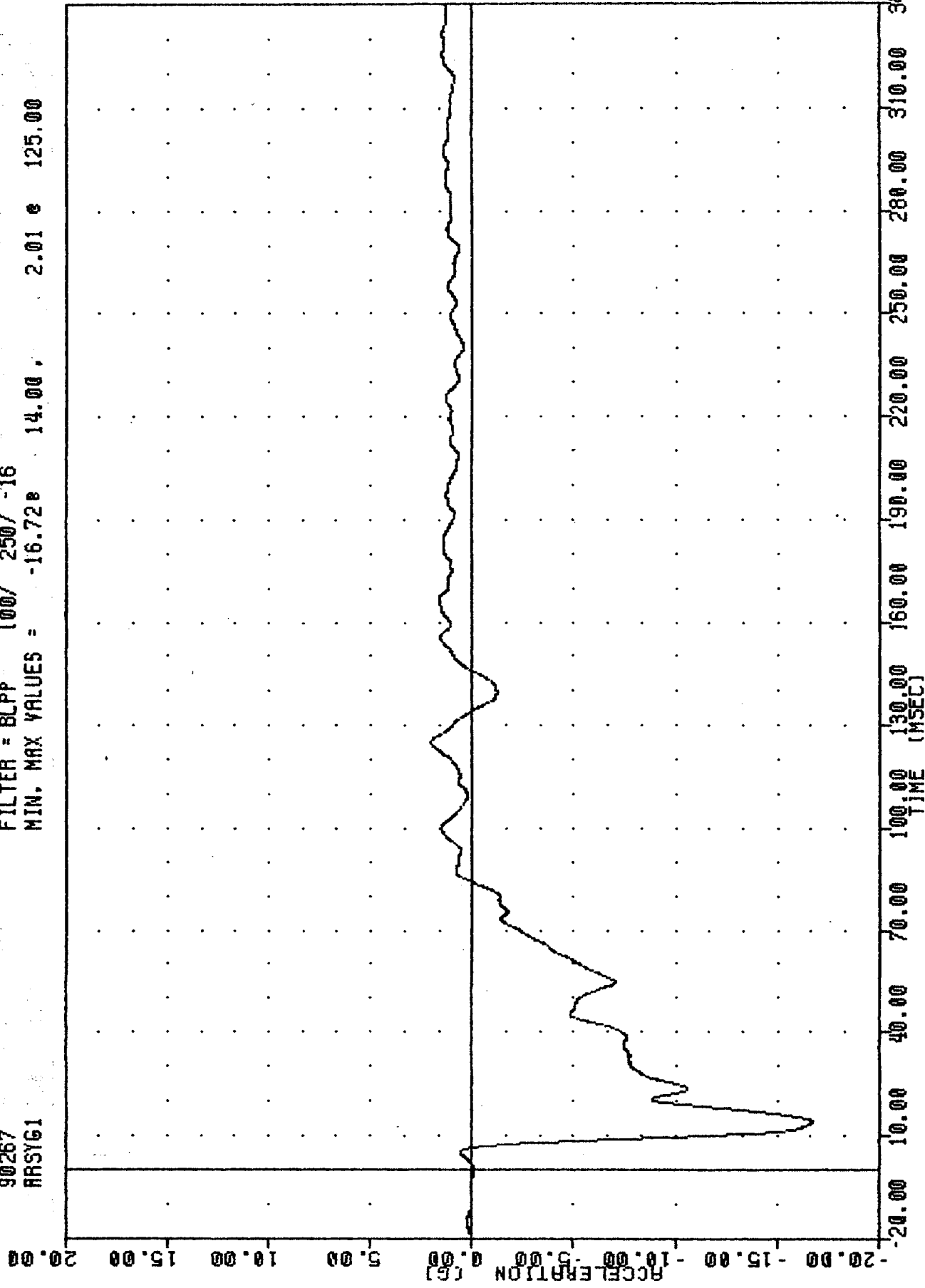
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -22.61R 14.63, 1.82 0 86.50



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
RIGHT FRONT SILL Y-AXIS ACCELERATION

900924-2, INC  
CRASH III DAMAGE ALGORITHM  
90267  
ARSYG1

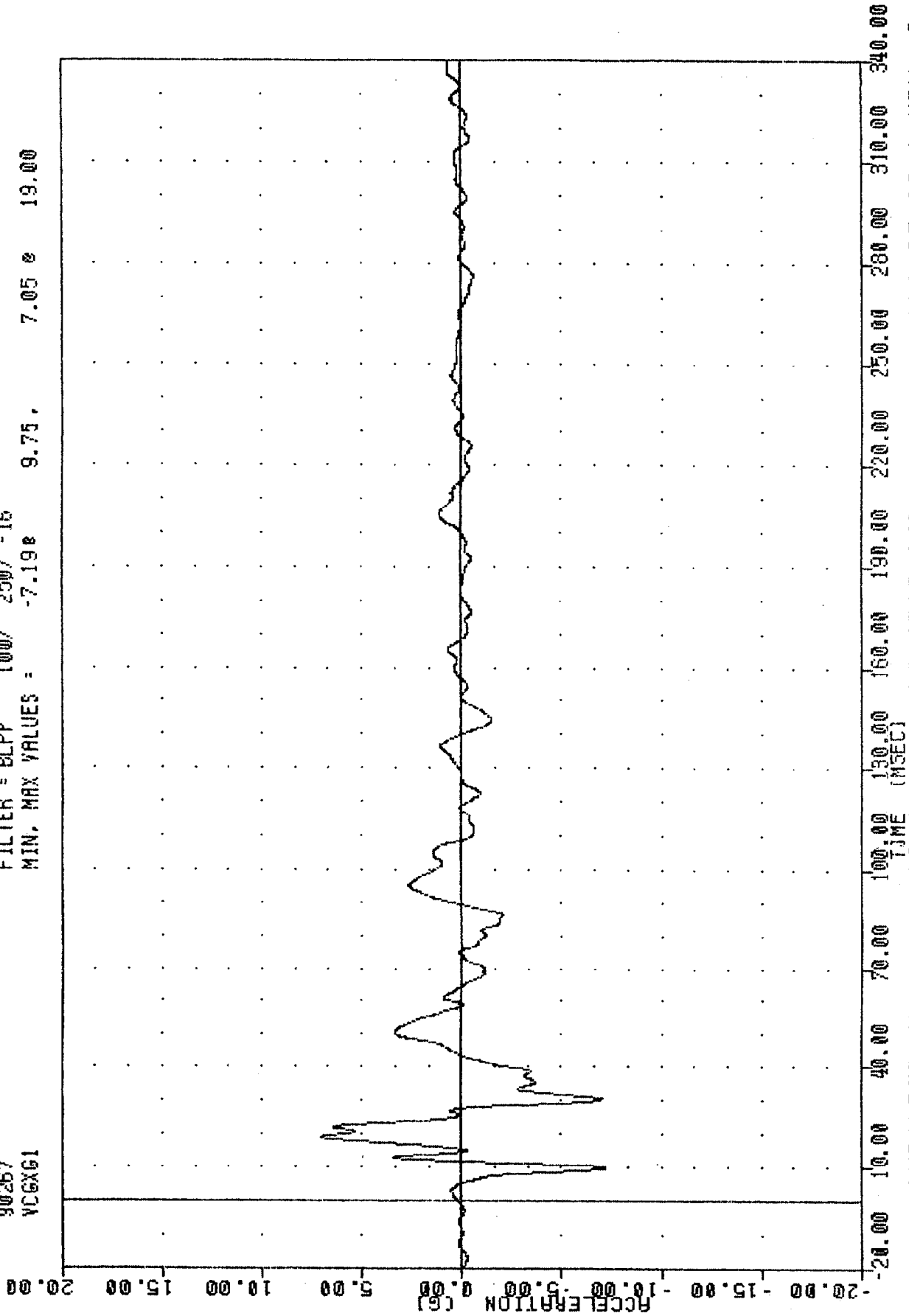
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -16.72e 14.00, 2.01 e 125.00



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
RIGHT REAR SILL Y-AXIS ACCELERATION

900924-2 .TRC  
CRASH III DAMAGE ALGORITHM  
90267  
VCGXG1

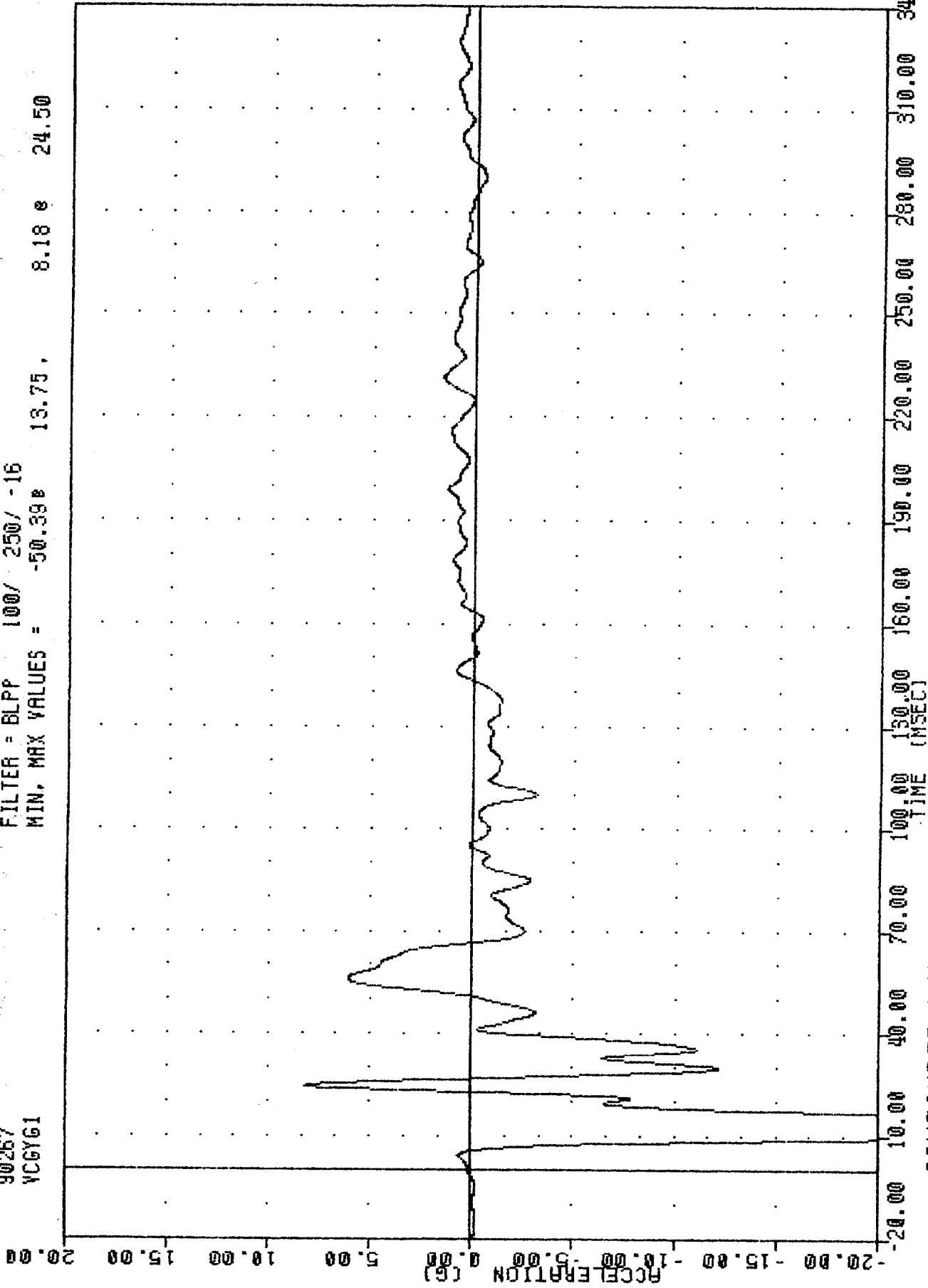
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -7.19e 9.75, 7.05 e 19.00



CONToured MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
VEHICLE CG X-AXIS ACCELERATION (PERPENDICULAR TO IMPACT DIRECTION)

CRASH III DAMAGE ALGORITHM  
90267  
VCGY61

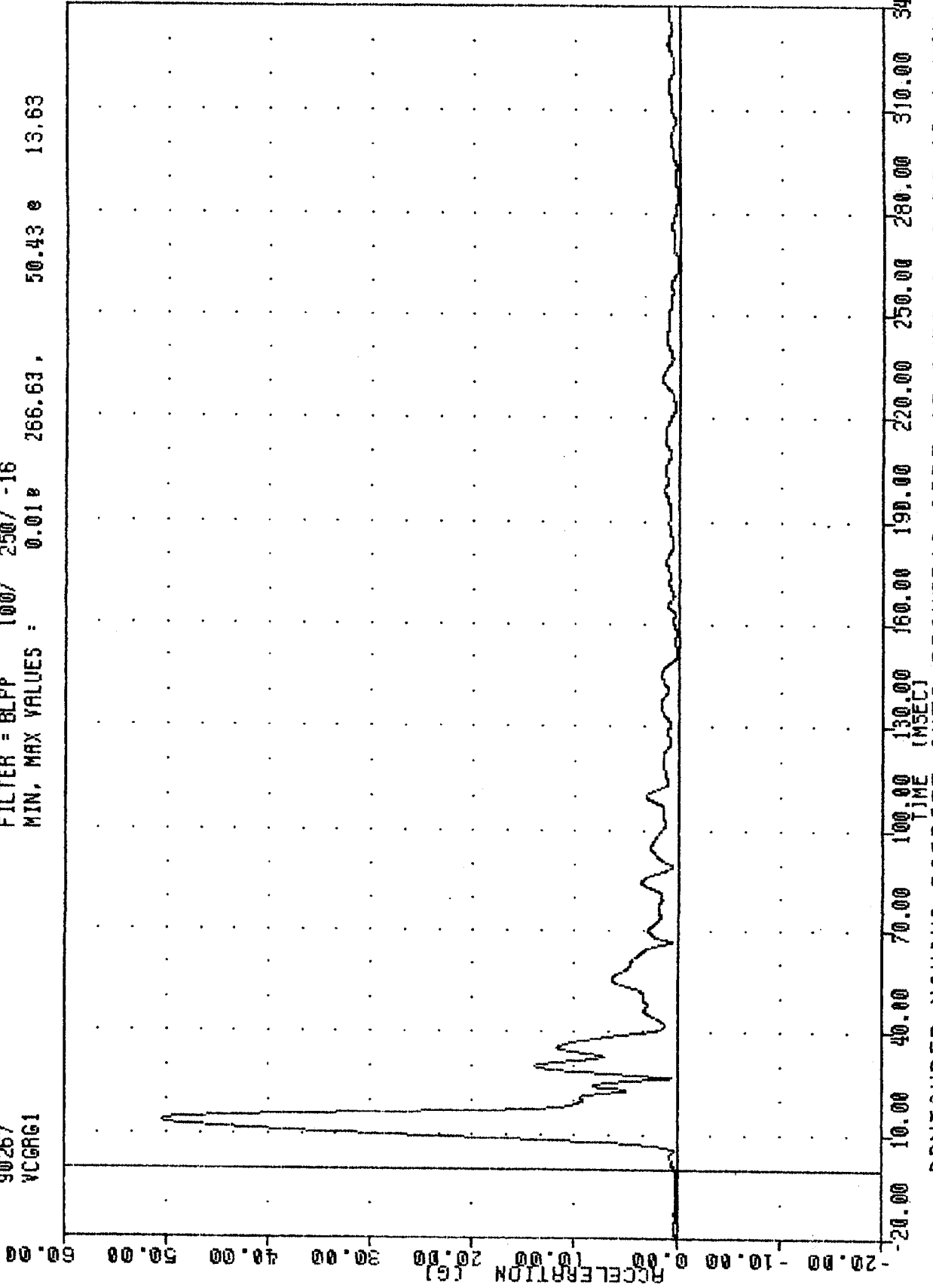
FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = -50.39 8.18 24.50



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
VEHICLE CG Y-AXIS ACCELERATION (IMPACT DIRECTION)

900924-2 , TRC  
CRASH III DAMAGE ALGORITHM  
90267  
VCGRG1

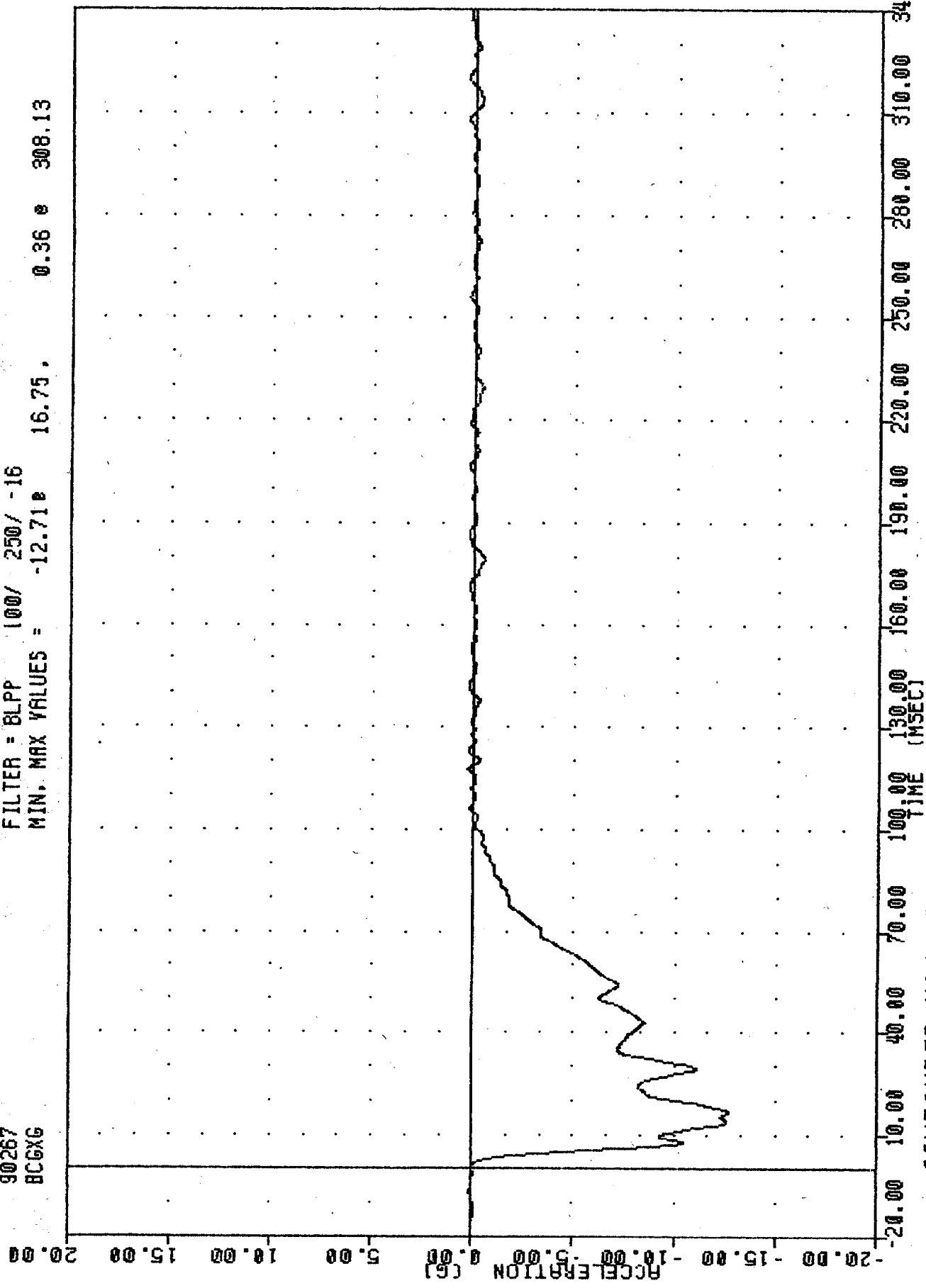
FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES : 0.01 e 266.63 , 50.43 e 13.63



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
VEHICLE CG RESULTANT ACCELERATION

CRASH III DAMAGE ALGORITHM  
90267  
BC6XG

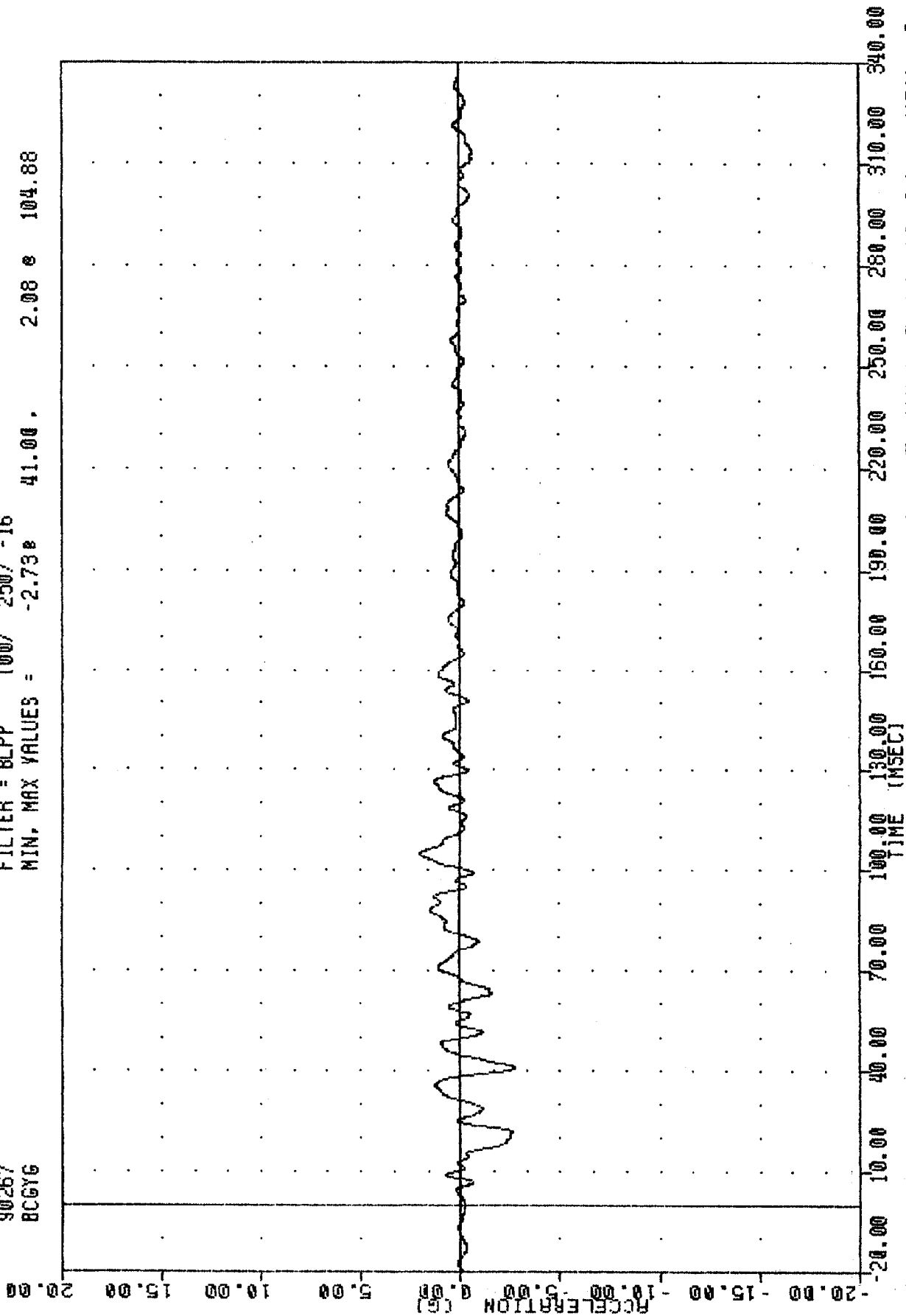
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -12.71 e 16.75, 0.36 e 308.13



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
MOVING BARRIER CENTER OF GRAVITY X-AXIS ACCELERATION

900924-2 , TRC  
CRASH III DAMAGE ALGORITHM  
90267  
BC6YG

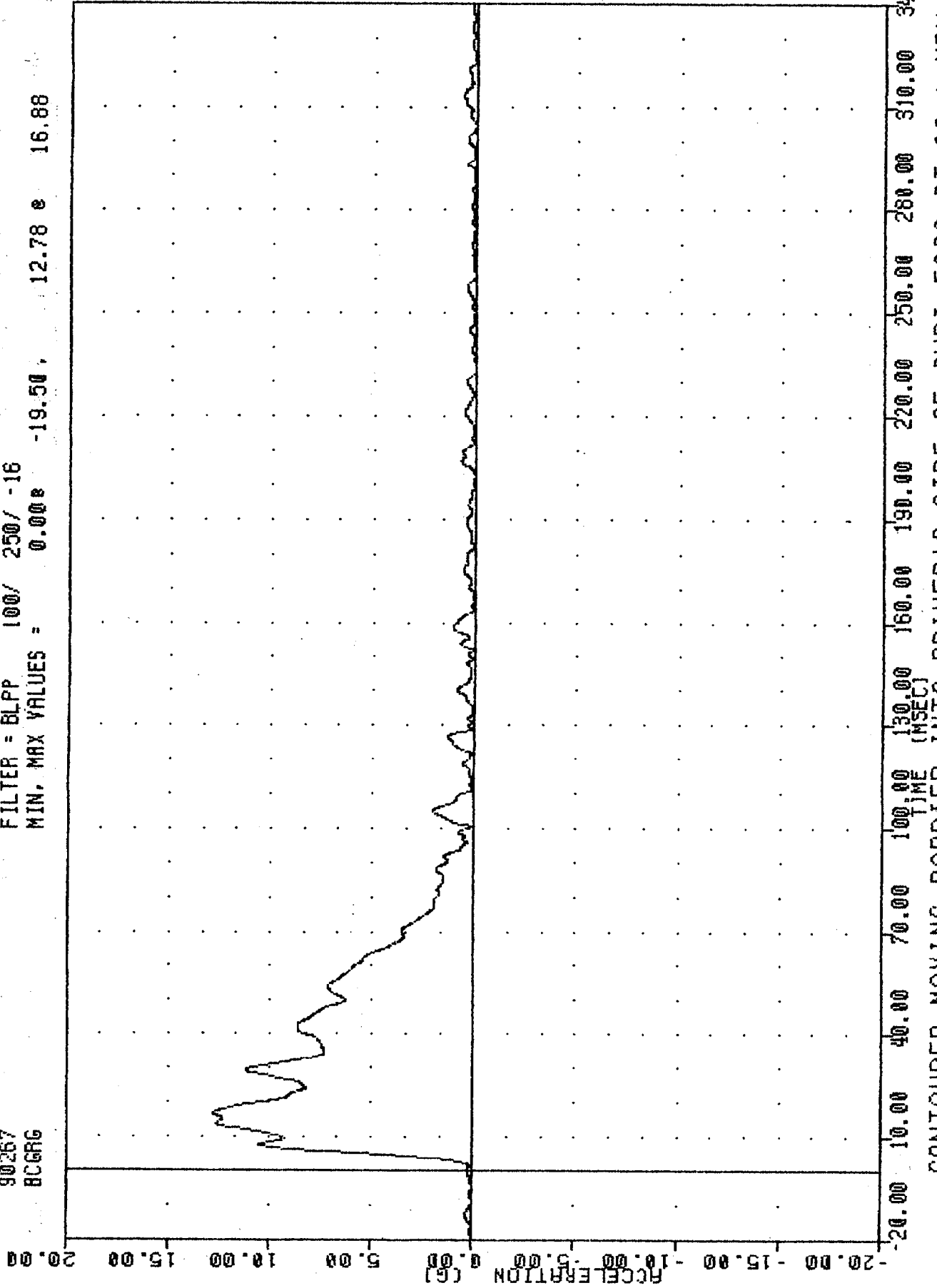
FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = -2.73e 41.00, 2.08 e 104.88



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
MOVING BARRIER CENTER OF GRAVITY Y-AXIS ACCELERATION

900924-2, IRC  
CRASH III DAMAGE ALGORITHM  
90267  
BCGRG

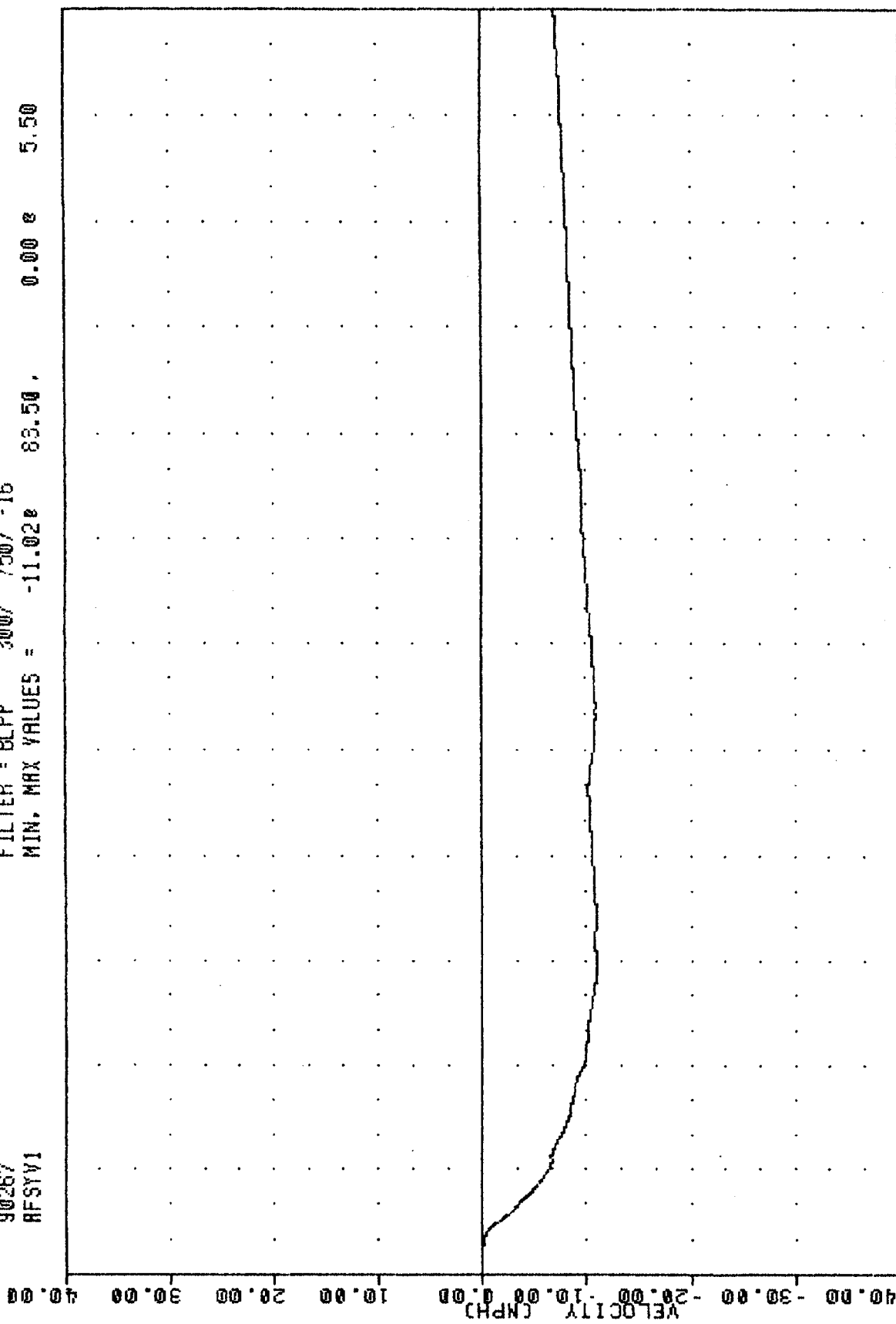
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = 0.00e -19.50, 12.78 e 16.88



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
MOVING BARRIER CENTER OF GRAVITY RESULTANT ACCELERATION

900924-2 , TRC  
 CRASH III DAMAGE ALGORITHM  
 90267  
 AFSYV1

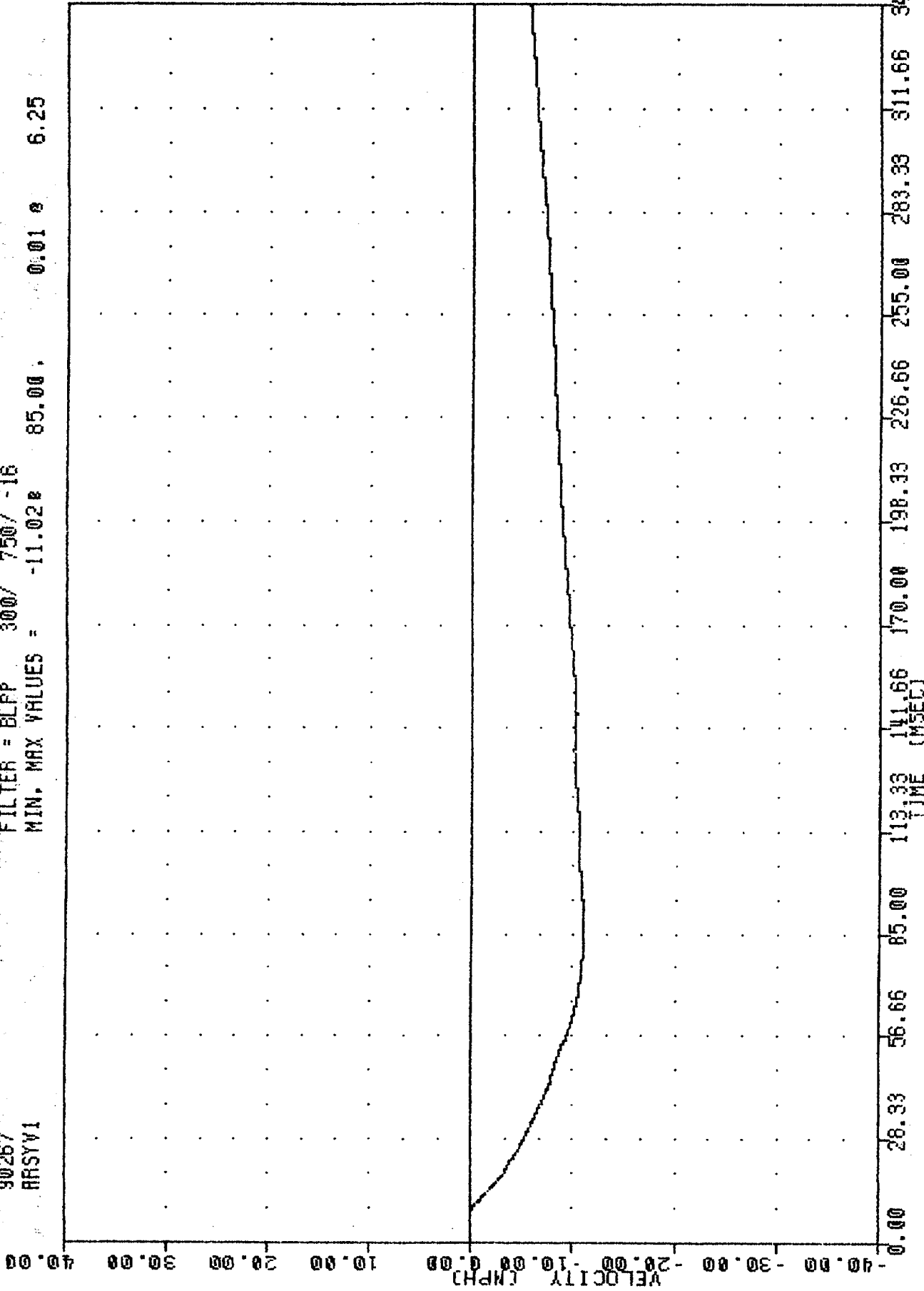
FILTER = BLFP 300/ 750/ -16  
 MIN. MAX VALUES = -11.02e 83.50 , 0.00 e 5.50



CONToured MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
 RIGHT FRONT SILL Y-AXIS VELOCITY

9W0329-2  
 CRASH III DAMAGE ALGORITHM  
 90267  
 ARSYV1

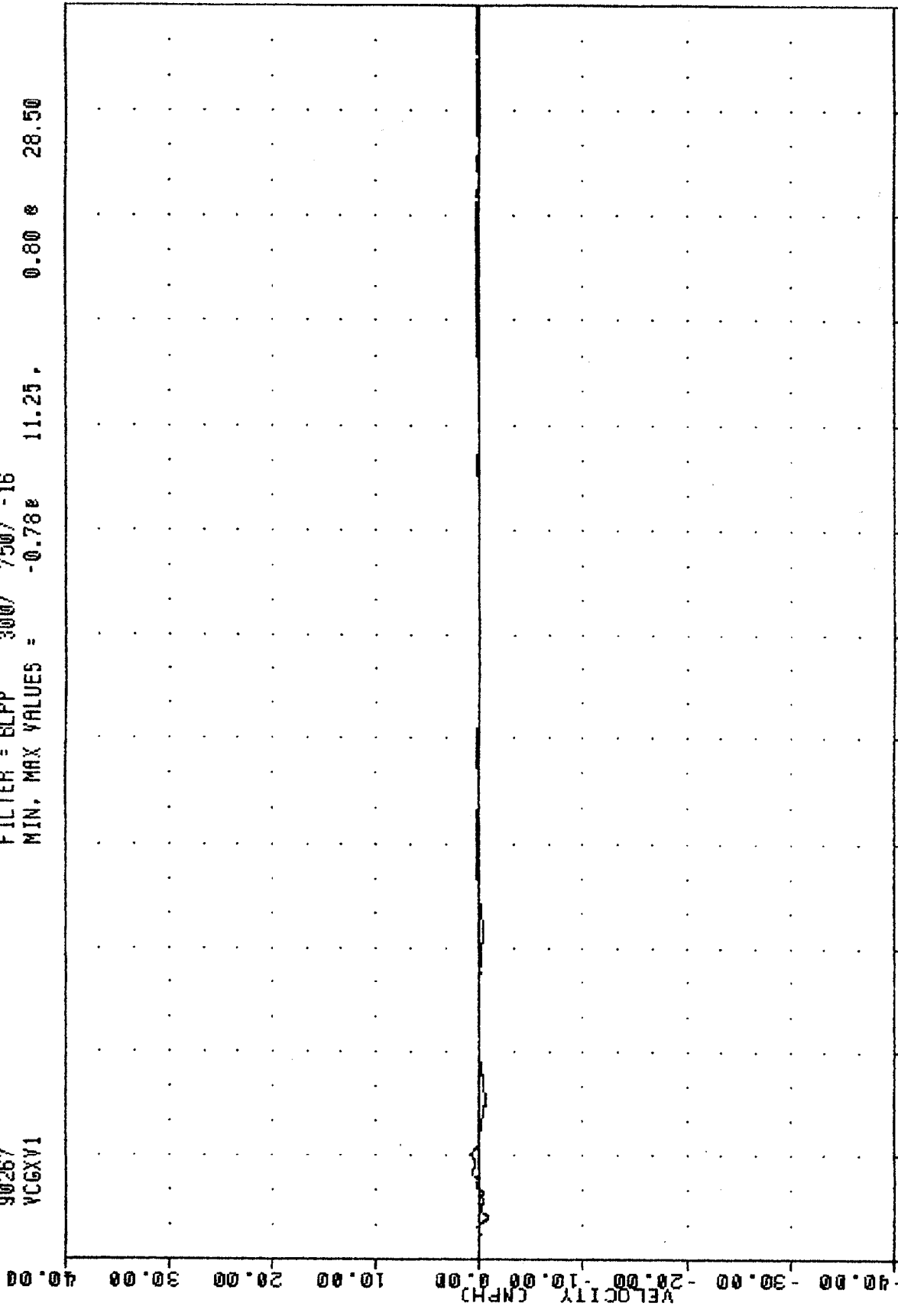
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -11.02e 85.00e 0.01e 6.25



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
 RIGHT REAR SILL Y-AXIS VELOCITY

900924-2 , TRC  
 CRASH III DAMAGE ALGORITHM  
 90267  
 YCGXV1

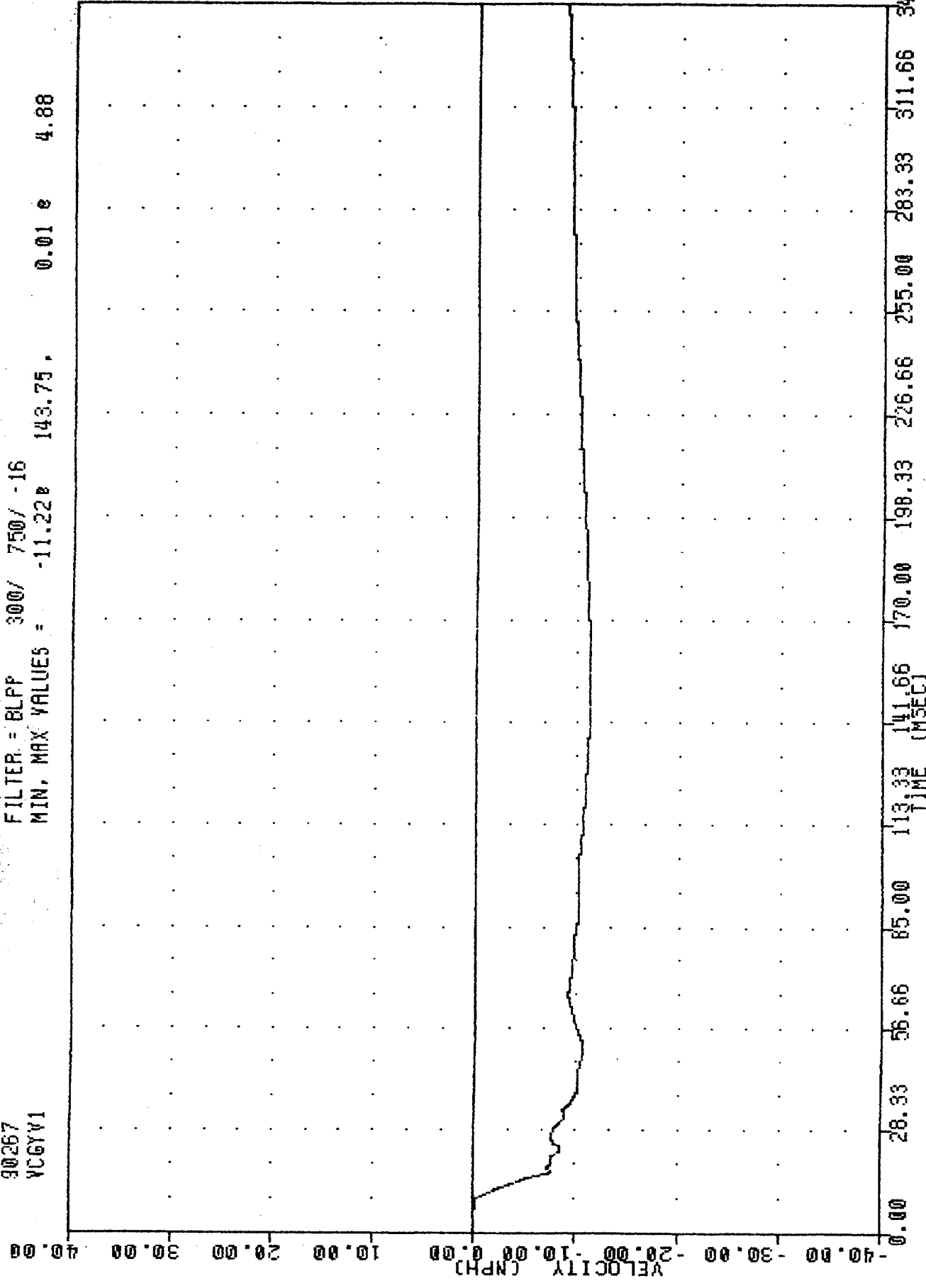
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -0.78e 11.25. 0.80 e 28.50



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
 VEHICLE CG X-AXIS VELOCITY (PERPENDICULAR TO IMPACT DIRECTION)

CRASH III DAMAGE ALGORITHM  
 30267  
 YCGYV1

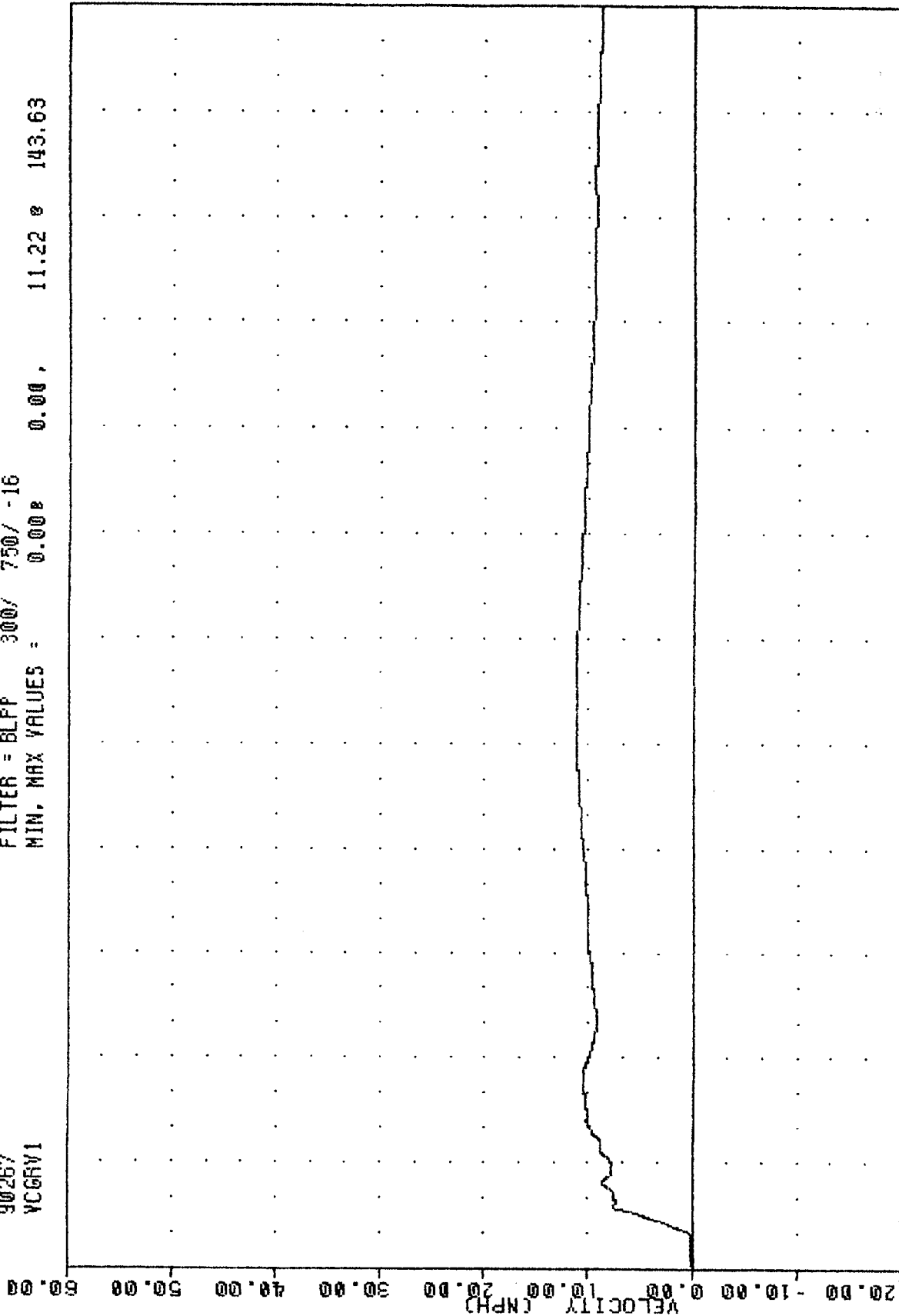
FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -11.22e 143.75, 0.01 e 4.88



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
 VEHICLE CG Y-AXIS VELOCITY (IMPACT DIRECTION)

900924-2 , TRC  
 CRASH III DAMAGE ALGORITHM  
 90267  
 YCGRY1

FILTER = BLFF 300/ 750/ -16  
 MIN, MAX VALUES = 0.00 0.00 , 11.22 e 143.63

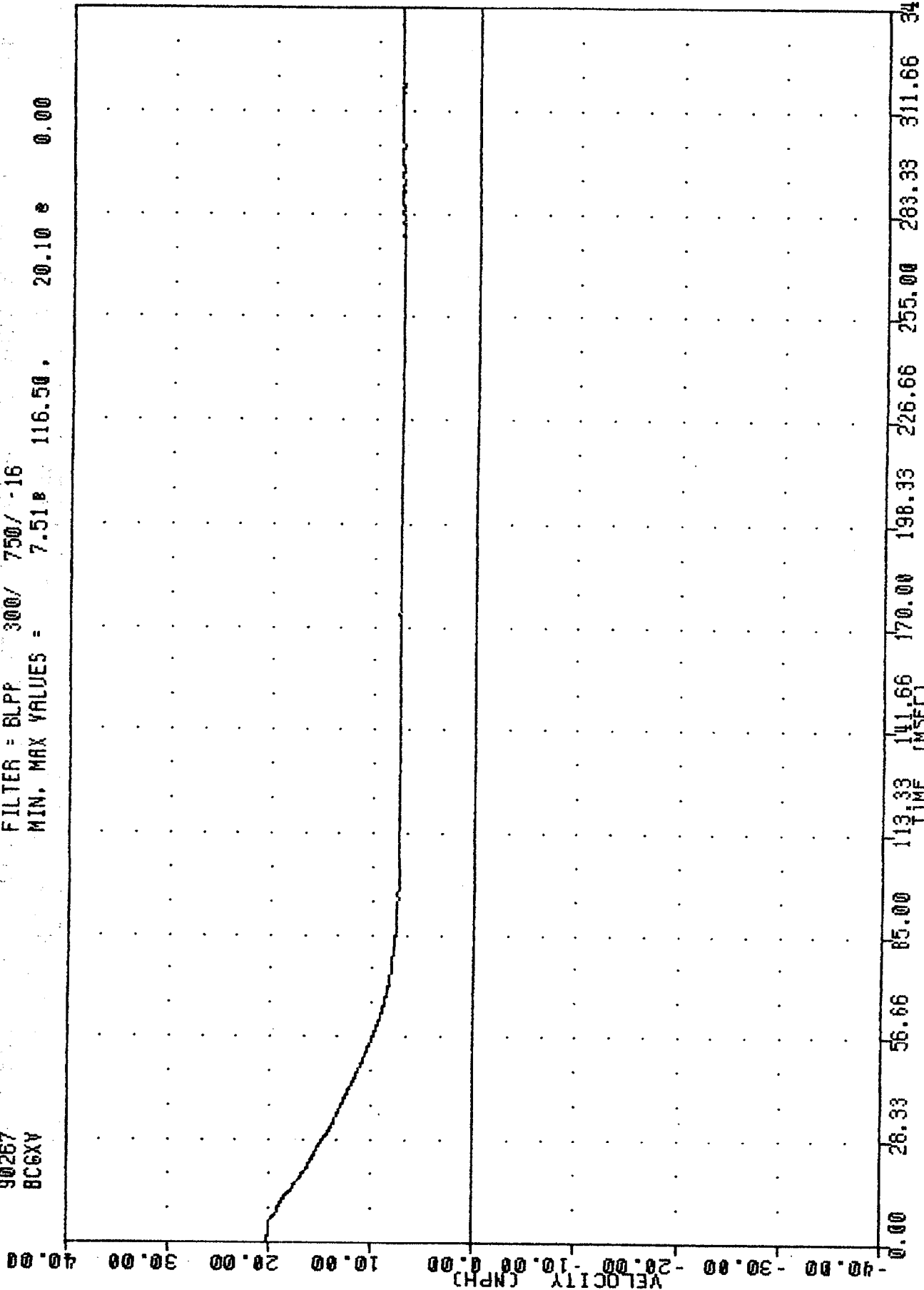


0.00	28.33	56.66	85.00	113.33	141.66	170.00	198.33	226.66	255.00	283.33	311.66	340.00
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CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
 VEHICLE CG RESULTANT VELOCITY

90267  
BC6XY  
CRASH III DAMAGE ALGORITHM

FILTER = BLPP 300/ 750/ -16  
MIN. MAX VALUES = 7.51 B 116.50 . 20.10 e 0.00

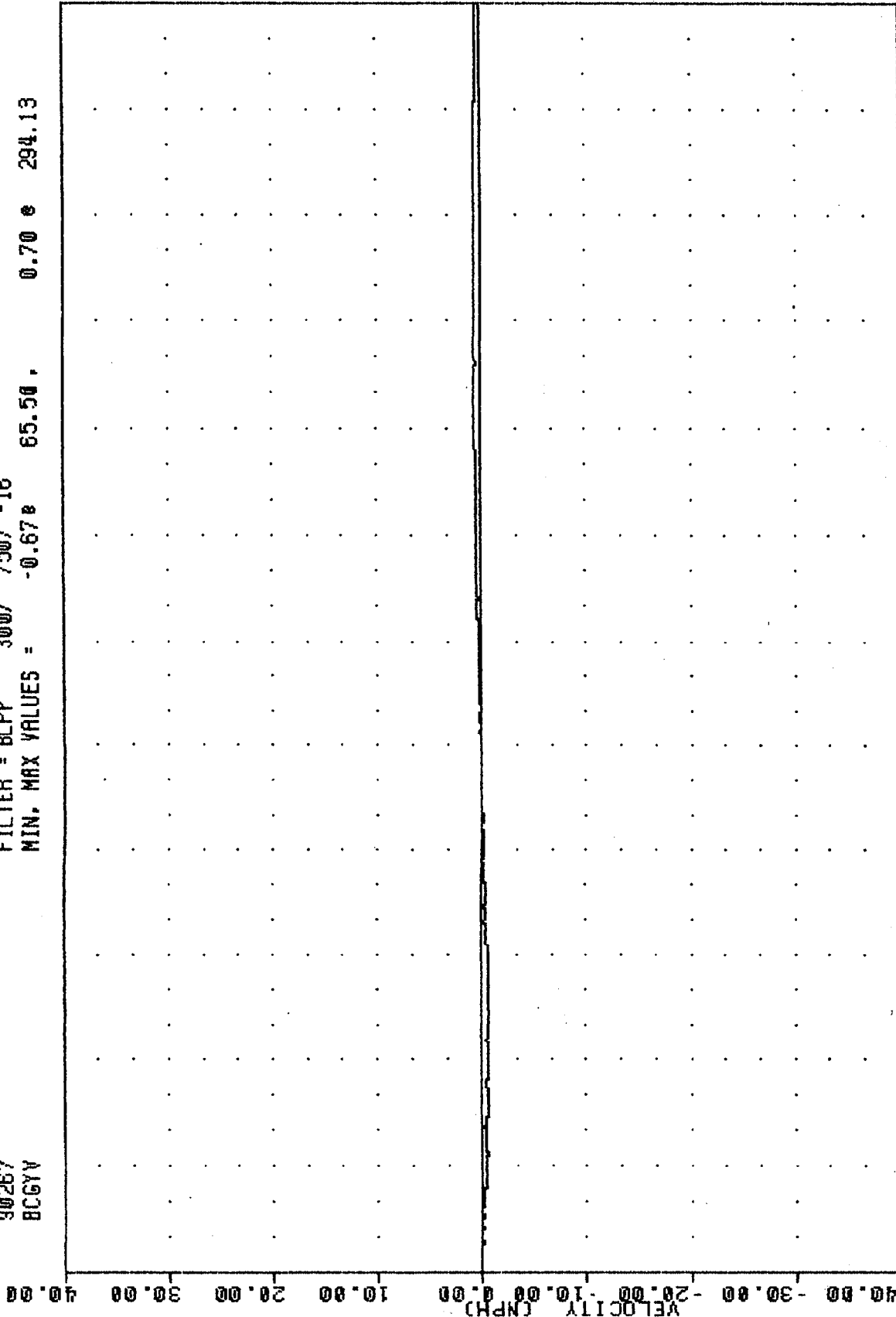


833

CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
MOVING BARRIER CENTER OF GRAVITY X-AXIS VELOCITY

900924-2 , TRC  
 CRASH III DAMAGE ALGORITHM  
 30267  
 BCGYV

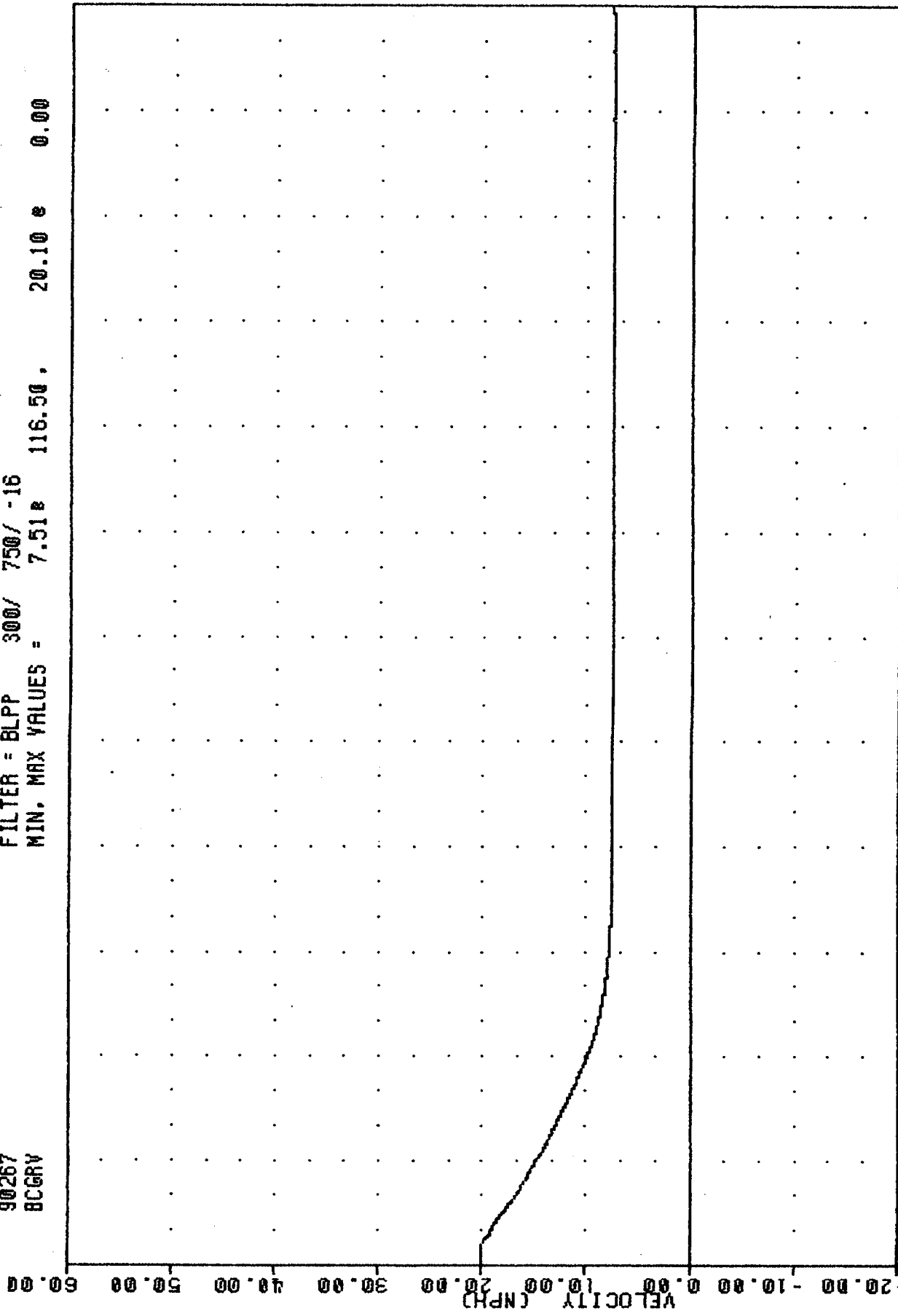
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -0.67e 65.50 . 0.70 e 294.13



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)  
 CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
 MOVING BARRIER CENTER OF GRAVITY Y-AXIS VELOCITY

900929-2 P INC  
 CRASH III DAMAGE ALGORITHM  
 90267  
 BCGRV

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 7.51E 20.10 e 0.00

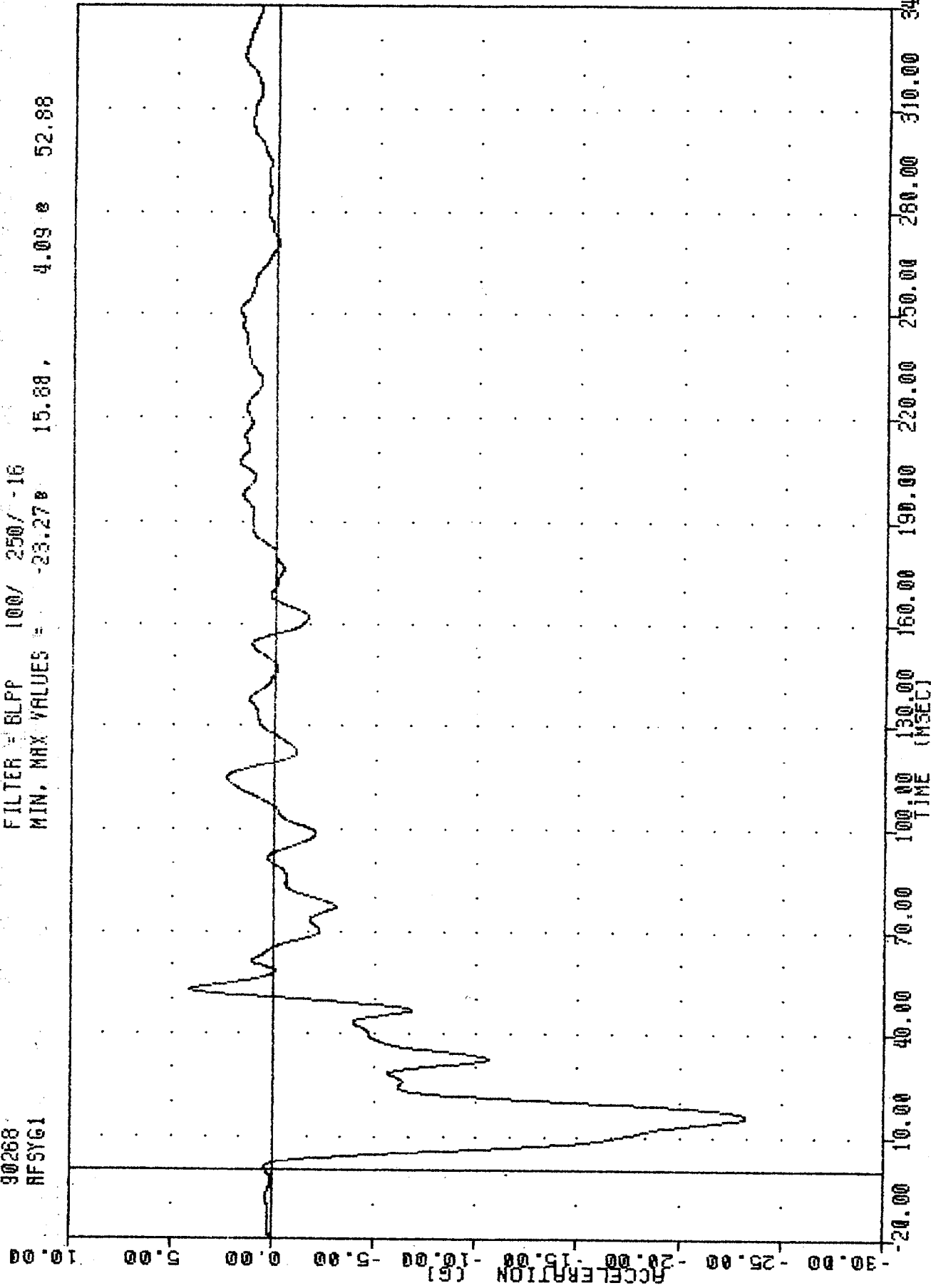


B35

CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.1 MPH #2  
 MOVING BARRIER CENTER OF GRAVITY RESULTANT VELOCITY

CRASH III DAMAGE ALGORITHM  
90268  
RFSYG1

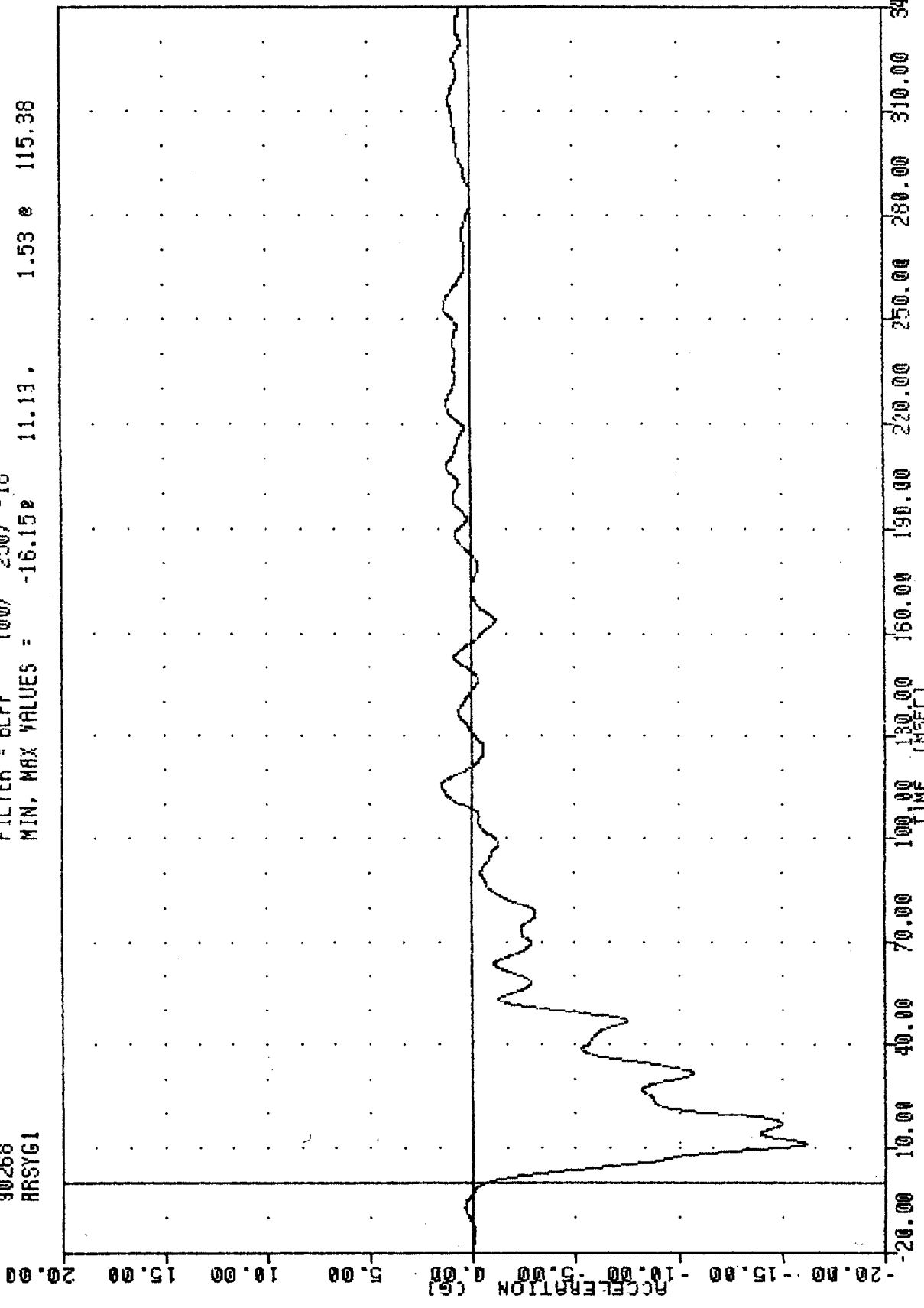
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -23.27 15.88 4.09 52.88



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.0 MPH #1  
RIGHT FRONT SILL Y-AXIS ACCELERATION

900925-1 , TRC  
CRASH III DAMAGE ALGORITHM  
90268  
RRSYG1

FILTER = BLPF 100/ 250/ -16  
MIN, MAX VALUES = -16.152 11.13, 1.53 e 115.38



B38

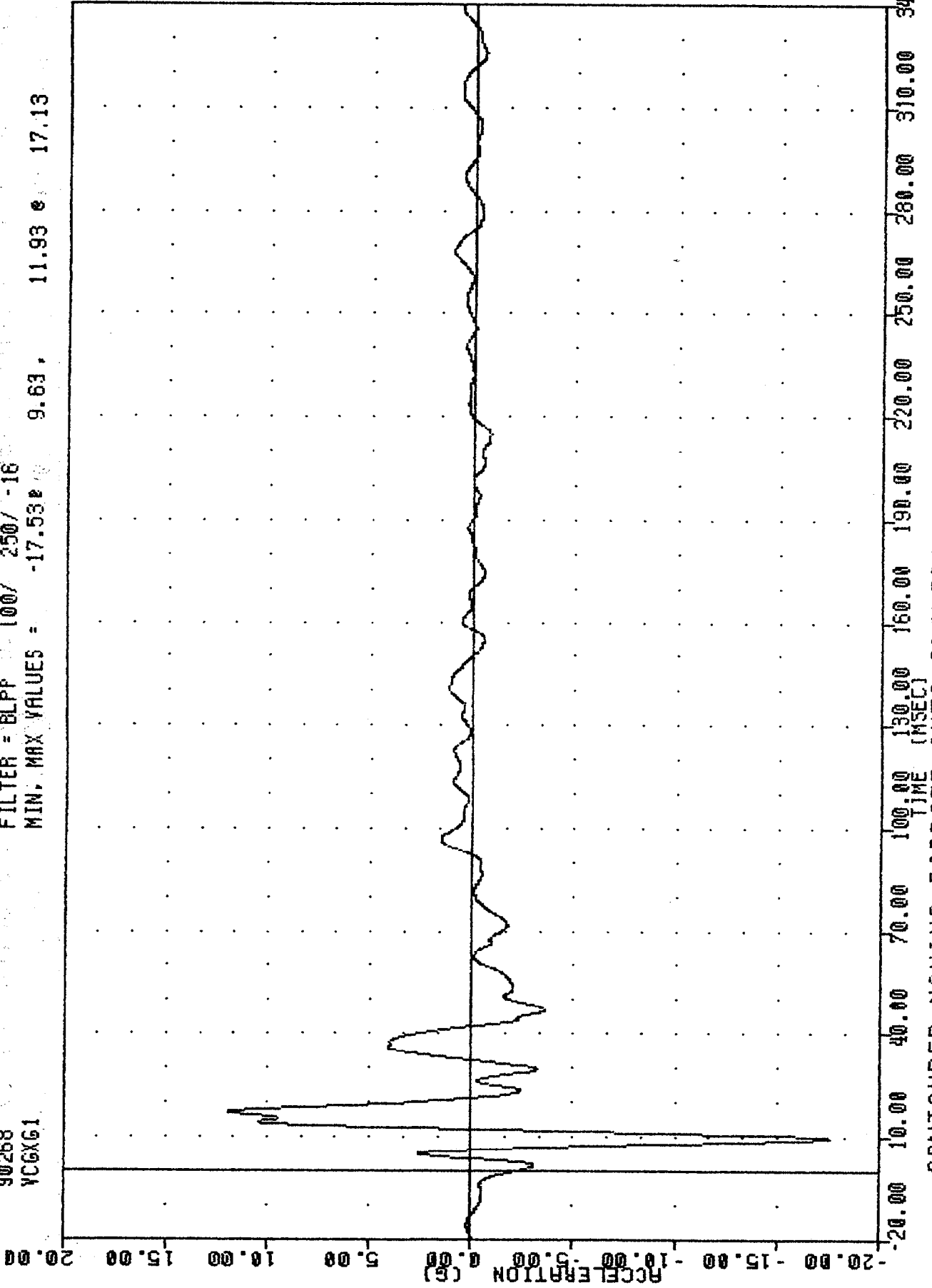
CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.0 MPH #1  
RIGHT REAR SILL Y-AXIS ACCELERATION

CRASH III DAMAGE ALGORITHM

90268  
YCGXG1

FILTER = BLPF 100/ 250/ -16

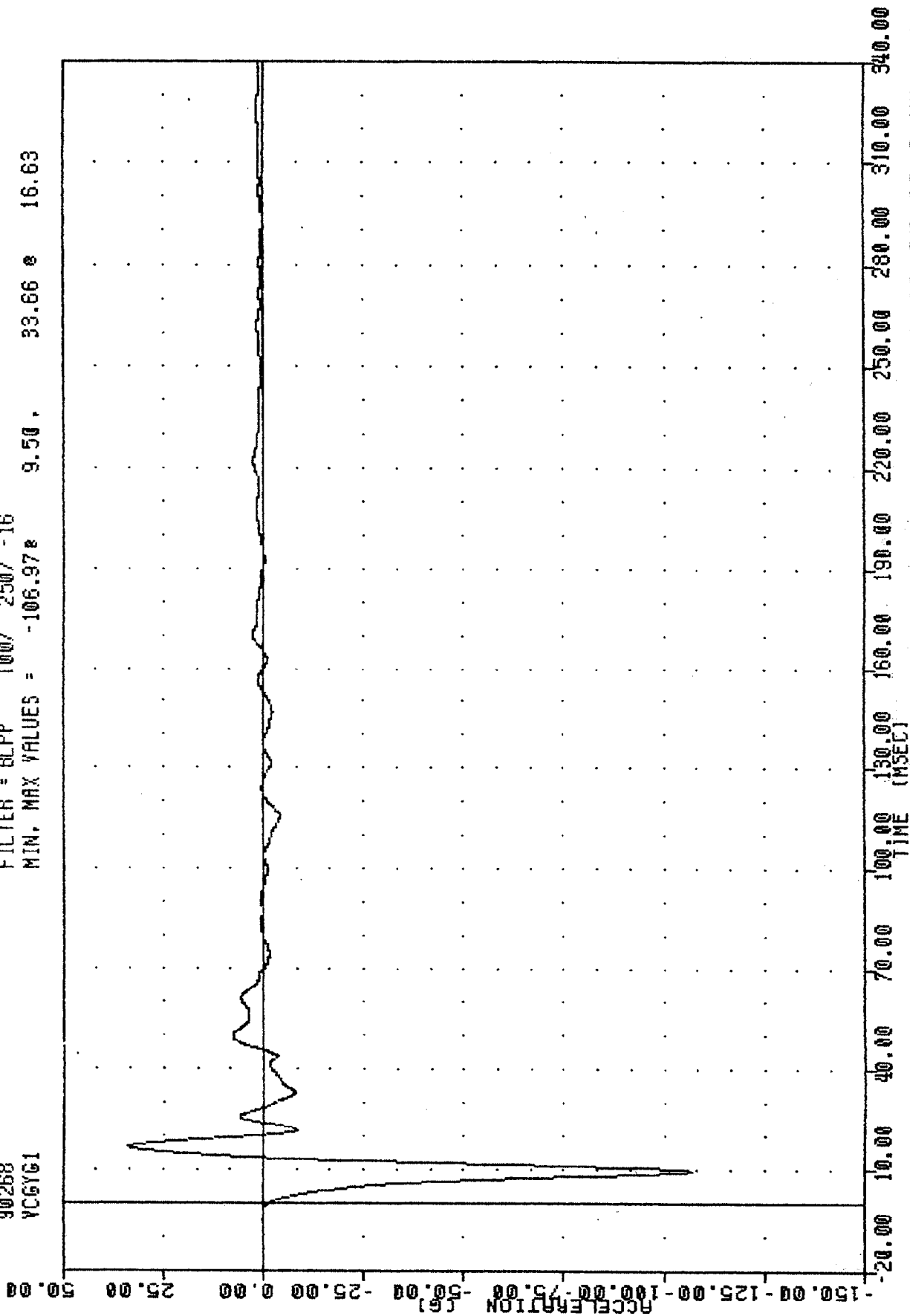
MIN. MAX VALUES = -17.53 9.63, 11.93 e 17.13



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.0 MPH #1  
VEHICLE CG X-AXIS ACCELERATION (PERPENDICULAR TO IMPACT DIRECTION)

900925-1 , TRC  
CRASH III DAMAGE ALGORITHM  
90268  
YCGYG1

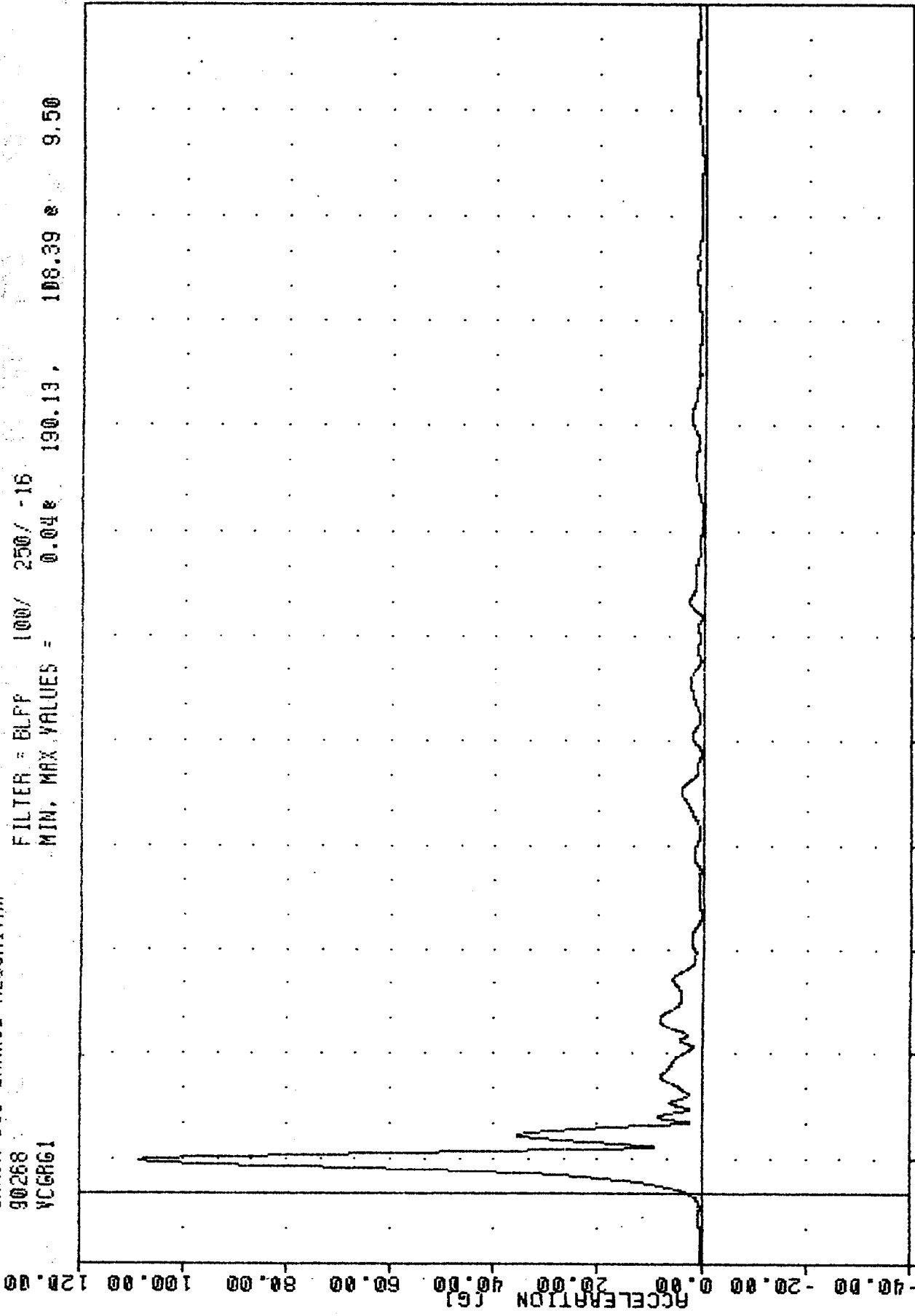
FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = -106.97 9.50 , 33.66 16.63



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.0 MPH #1  
VEHICLE CG Y-AXIS ACCELERATION (IMPACT DIRECTION)

CRASH III DAMAGE ALGORITHM  
 90268  
 YCGRG1

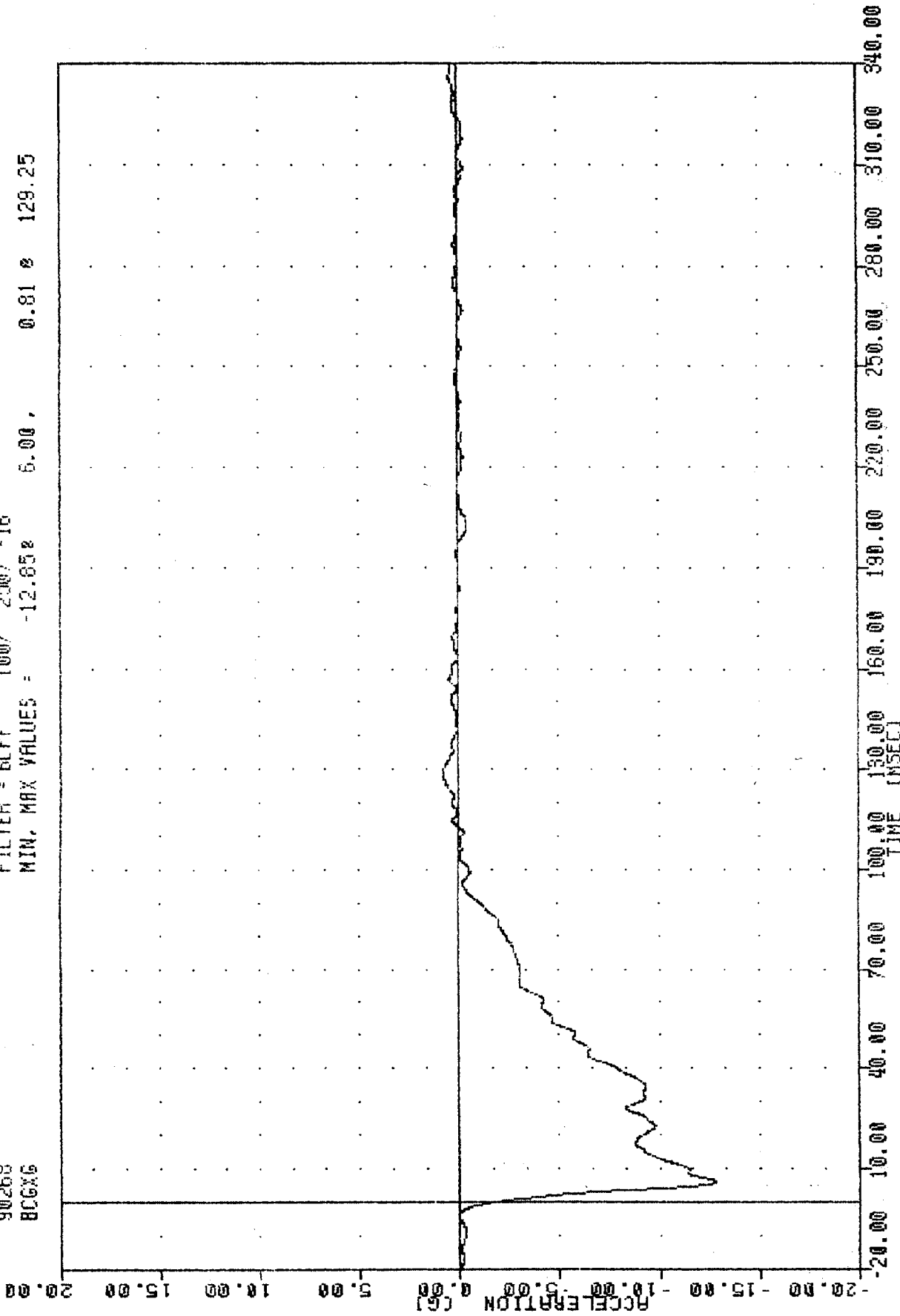
FILTER = BLFF 100/ 250/ -16  
 MIN, MAX VALUES = 0.04 190.13, 108.39 9.50



-40.00 -20.00 0.00 20.00 40.00 60.00 80.00 100.00 120.00  
 ACCELERATION (G)  
 -20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00  
 TIME (MSEC)  
 CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.0 MPH #1  
 VEHICLE CG RESULTANT ACCELERATION

900925-1 , TRC  
CRASH III DAMAGE ALGORITHM  
90268  
BCCXG

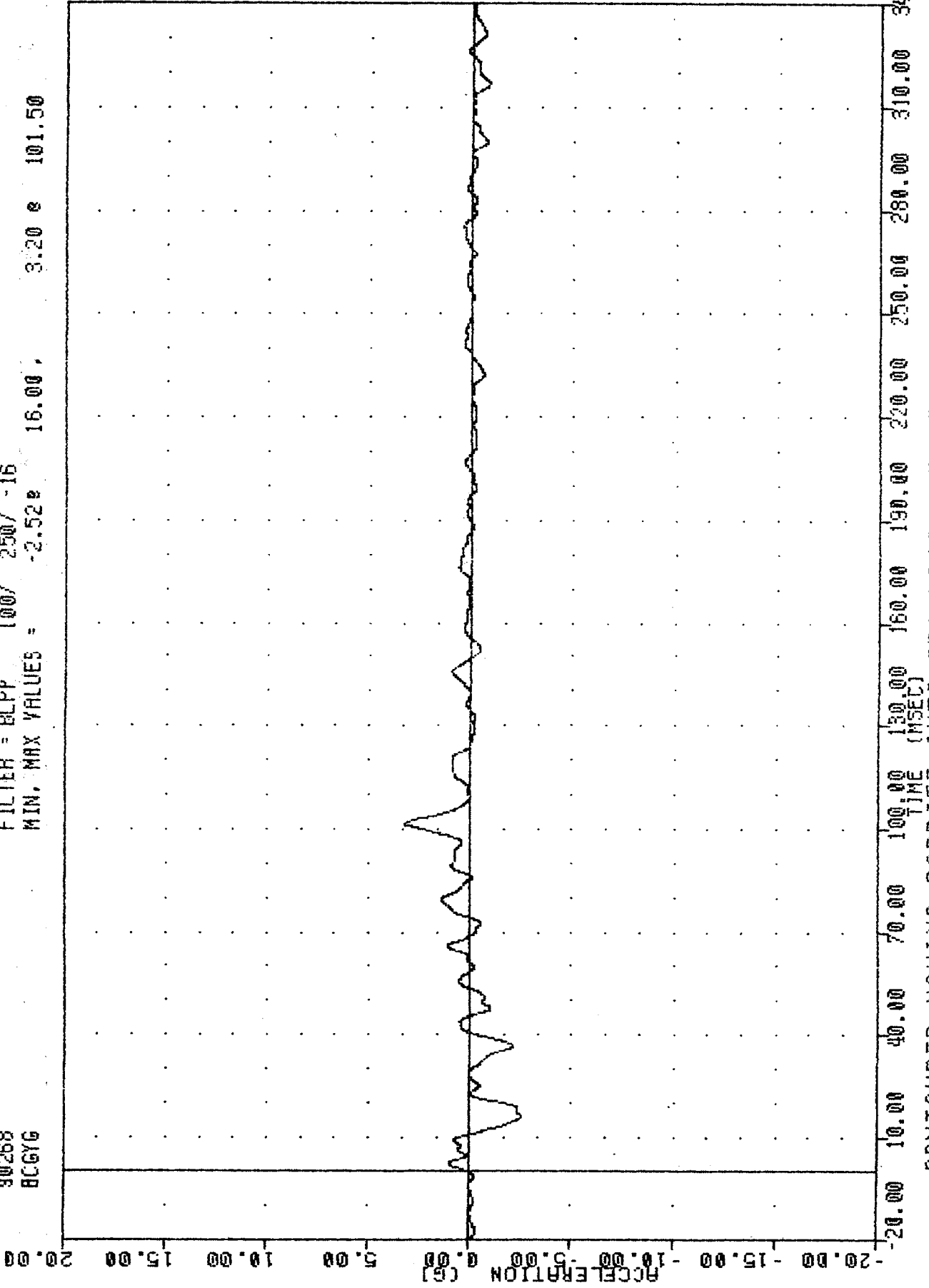
FILTER = BLPF 100/ 250/ -16  
MIN, MAX VALUES = -12.65% 6.00, 0.81 @ 129.25



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.0 MPH #1  
MOVING BARRIER CENTER OF GRAVITY X-AXIS ACCELERATION

900925-1 .TAC  
CRASH III DAMAGE ALGORITHM  
90268  
BCGYG

FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = -2.52e 16.00, 3.20 e 101.50



B43

CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.0 MPH #1  
MOVING BARRIER CENTER OF GRAVITY Y-AXIS ACCELERATION

900925-1 , T6C  
CRASH III DAMAGE ALGORITHM  
90258  
BCCRG

FILTER = BLFF 100/ 250/ -15  
MIN, MAX VALUES = 0.01e 189.13, 12.87 \* 6.00

20.00

15.00

10.00

5.00

0.00

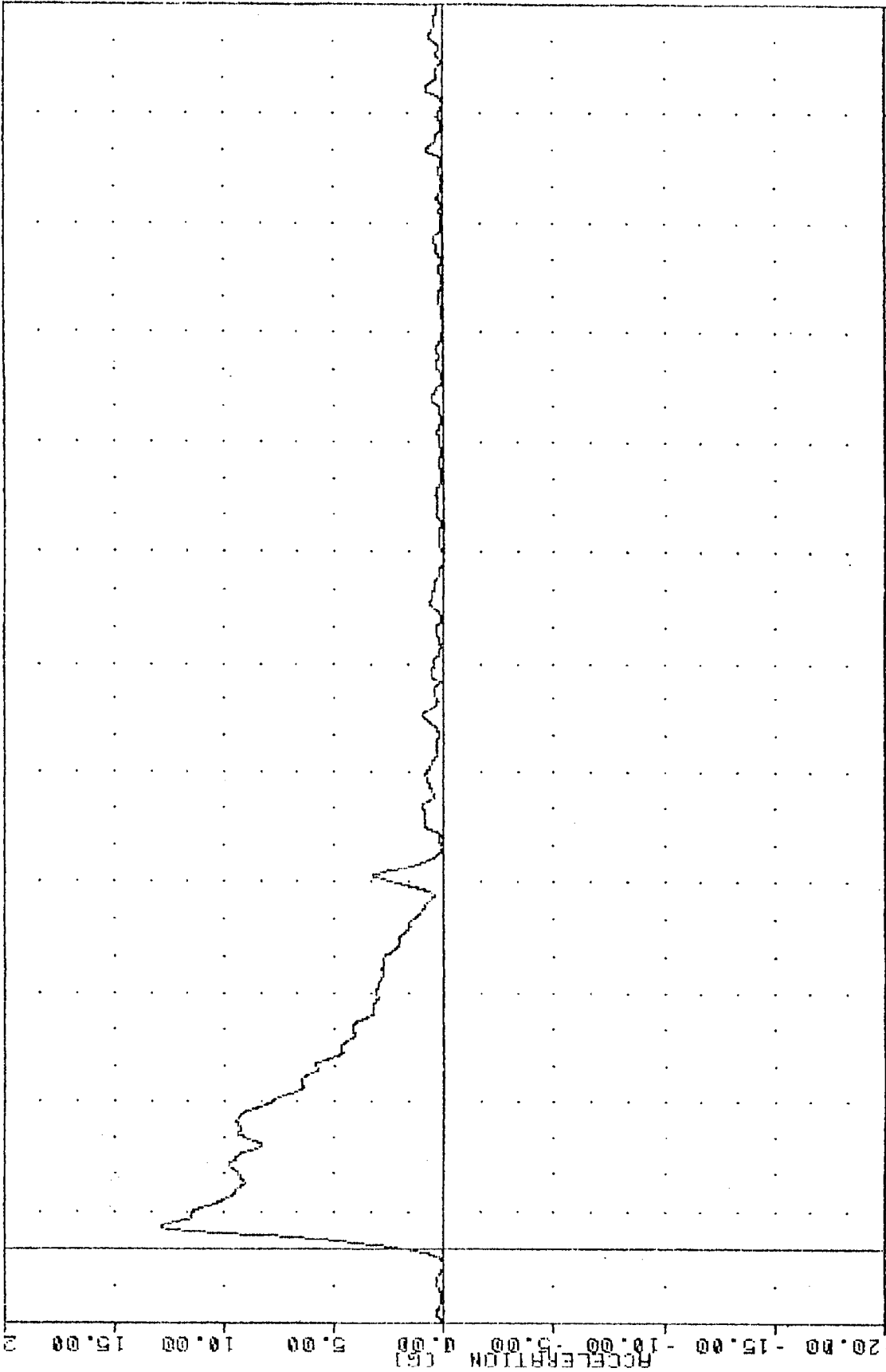
-5.00

-10.00

-15.00

-20.00

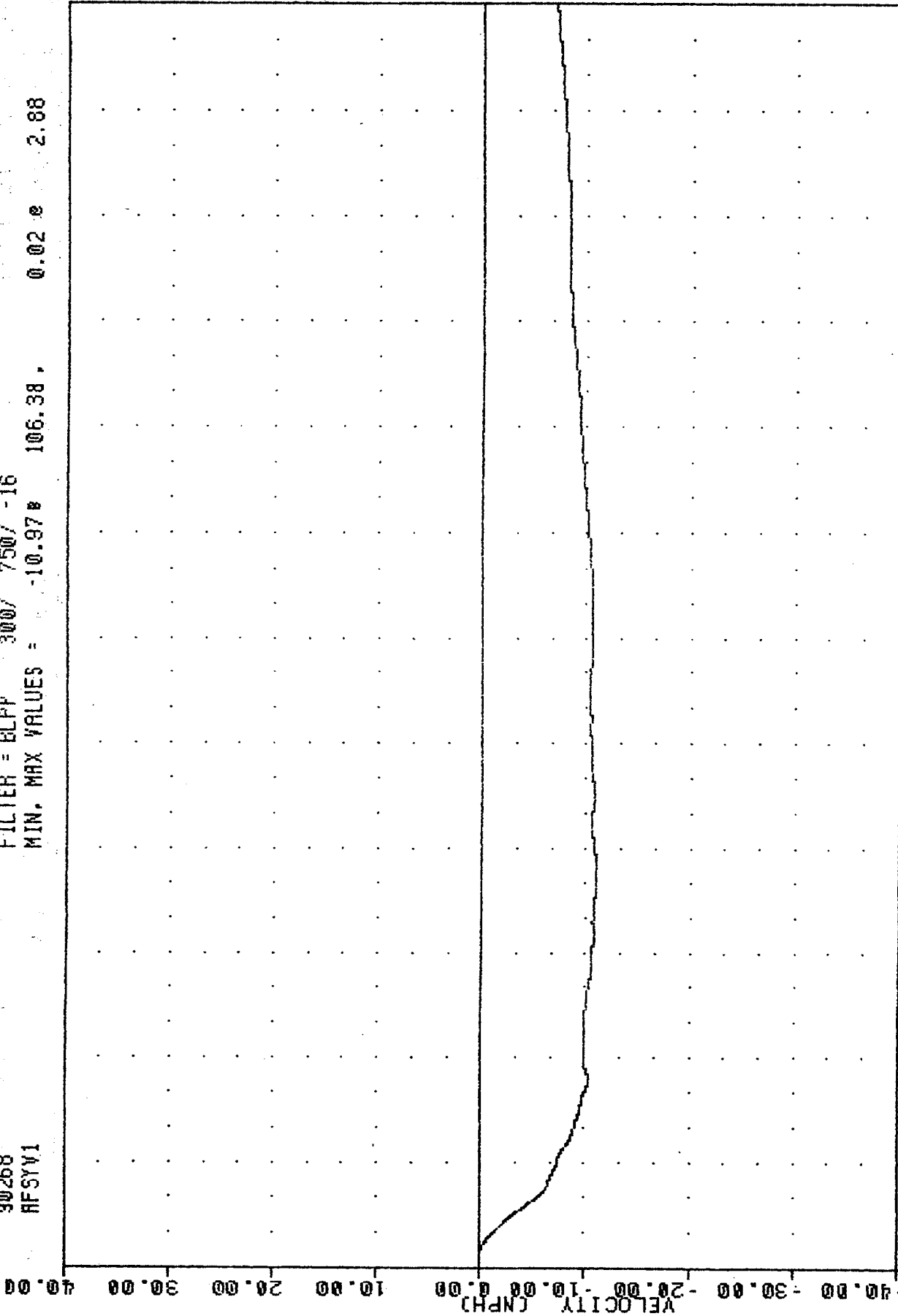
B44



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)  
CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.0 MPH #1  
MOVING BARRIER CENTER OF GRAVITY RESULTANT ACCELERATION

900925-1 , TRC  
 CRASH III DAMAGE ALGORITHM  
 90268  
 AFSYV1

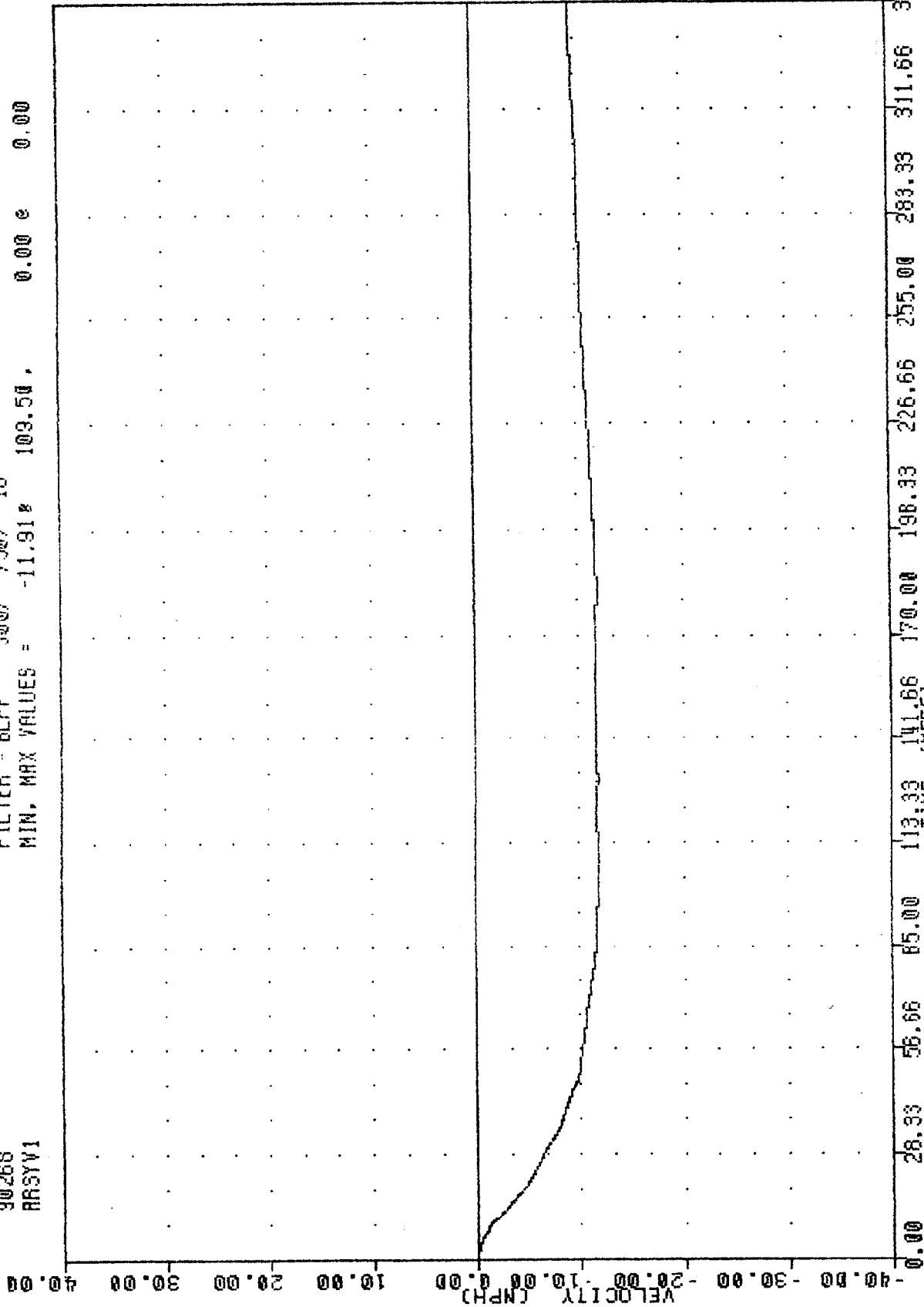
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -10.97 106.38 0.02 e 2.88



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.0 MPH #1  
 RIGHT FRONT SILL Y-AXIS VELOCITY

900925-1 , TRC  
 CRASH III DAMAGE ALGORITHM  
 90268  
 AR3YV1

FILTER = 6LFF 300/ 750/ -16  
 MIN, MAX VALUES = -11.91% 103.50 , 0.00 e 0.00

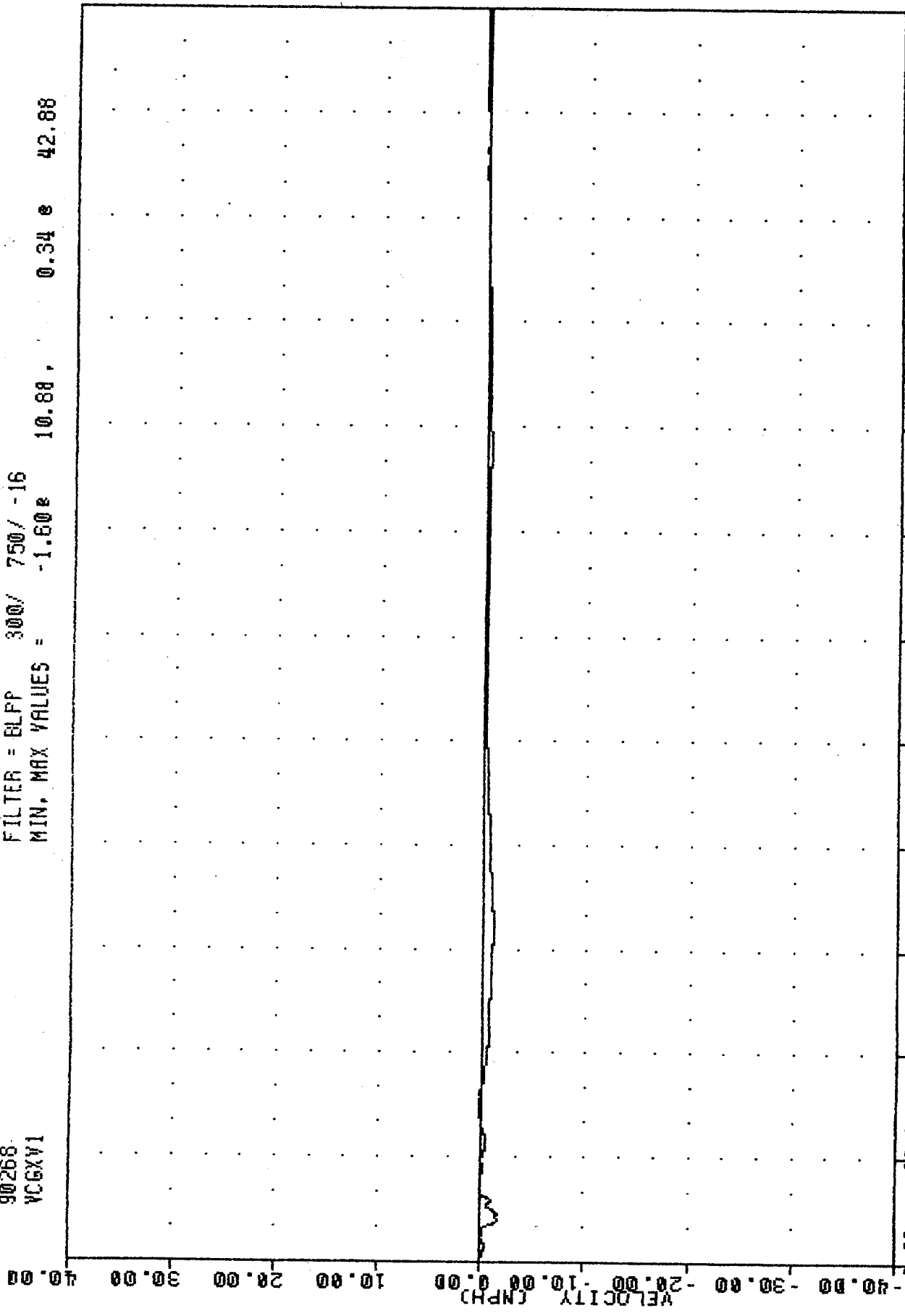


B46

CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.0 MPH #1  
 RIGHT REAR SILL Y-AXIS VELOCITY

300020-1 , TRC  
 CRASH III DAMAGE ALGORITHM  
 90268  
 YCGXV1

FILTER = BLFF 300/ 750/ -16  
 MIN. MAX VALUES = -1.60e 10.88 , 0.34 e 42.88

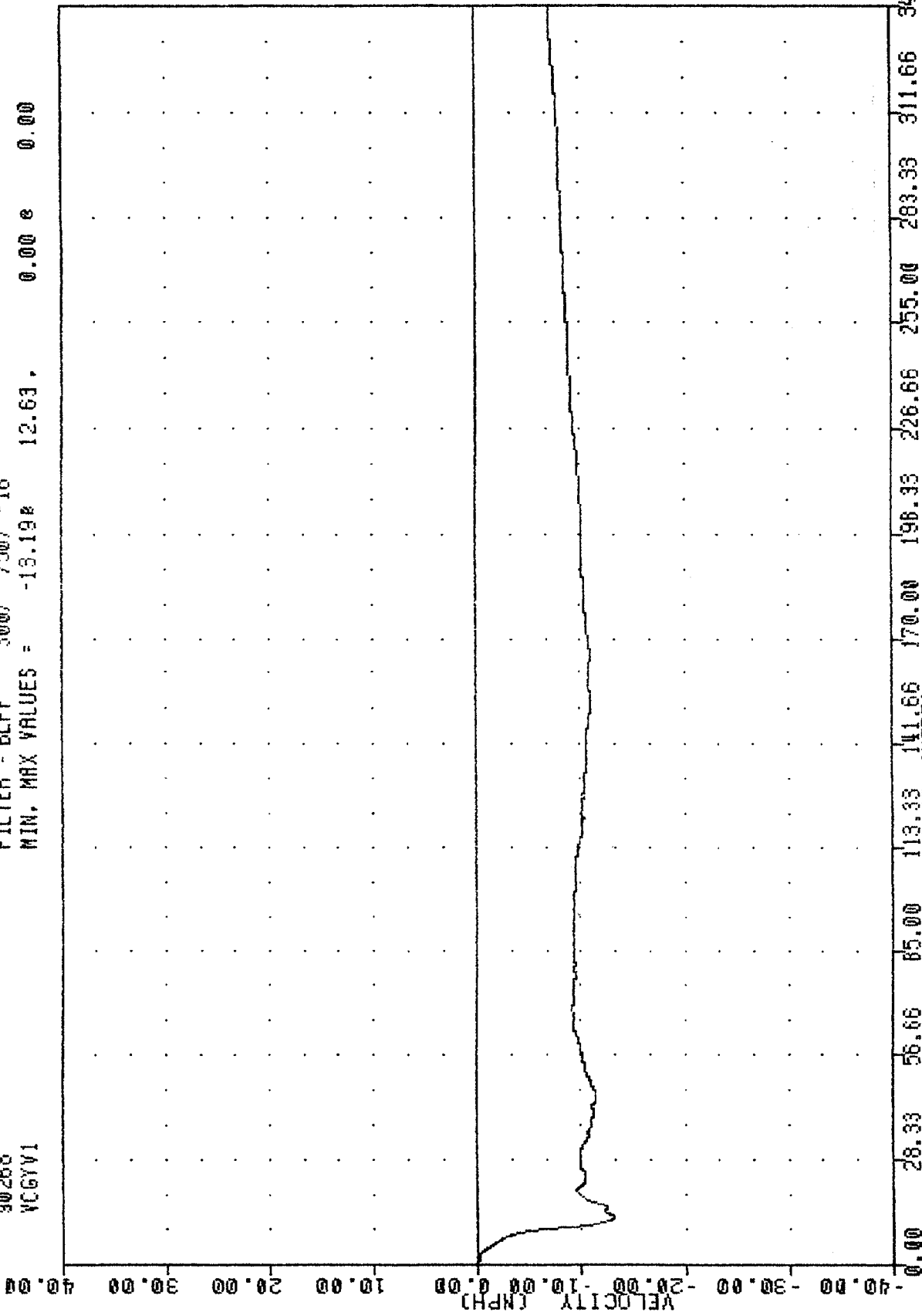


TIME (MSEC)	VELOCITY (MPH)
0.00	0.00
28.33	0.00
56.66	0.00
85.00	0.00
113.33	0.00
141.66	0.00
170.00	0.00
198.33	0.00
226.66	0.00
255.00	0.00
283.33	0.00
311.66	0.00
340.00	0.00

CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.0 MPH  
 VEHICLE CG X-AXIS VELOCITY (PERPENDICULAR TO IMPACT DIRECTION)

900925-1 , TAC  
 CRASH III DAMAGE ALGORITHM  
 90268  
 VCGYV1

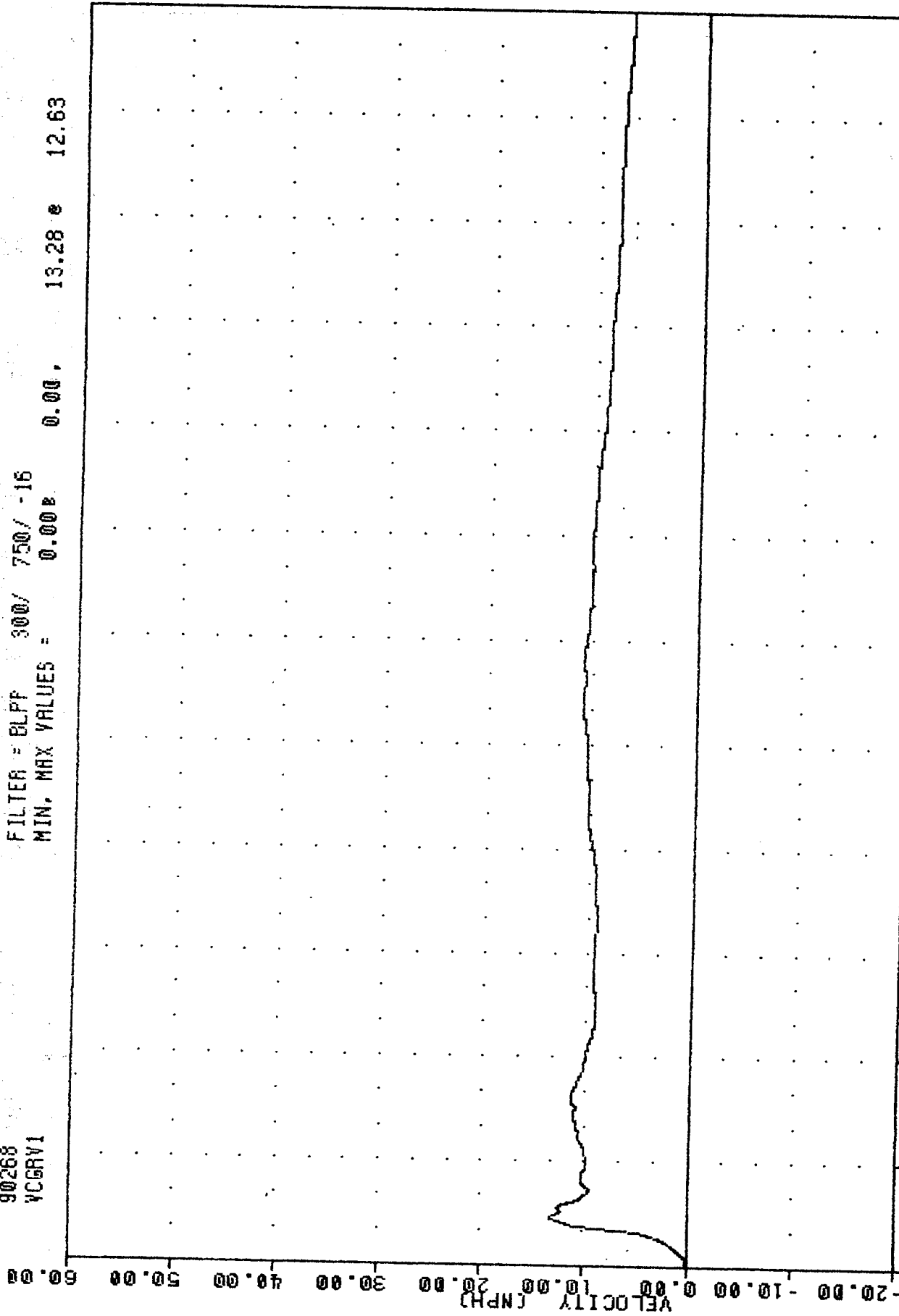
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -13.19# 12.63. 0.00 e 0.00



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 50000 AT 20.0 MPH #1  
 VEHICLE CG Y-AXIS VELOCITY (IMPACT DIRECTION)

CRASH III DAMAGE ALGORITHM  
 90268  
 YCGRV1

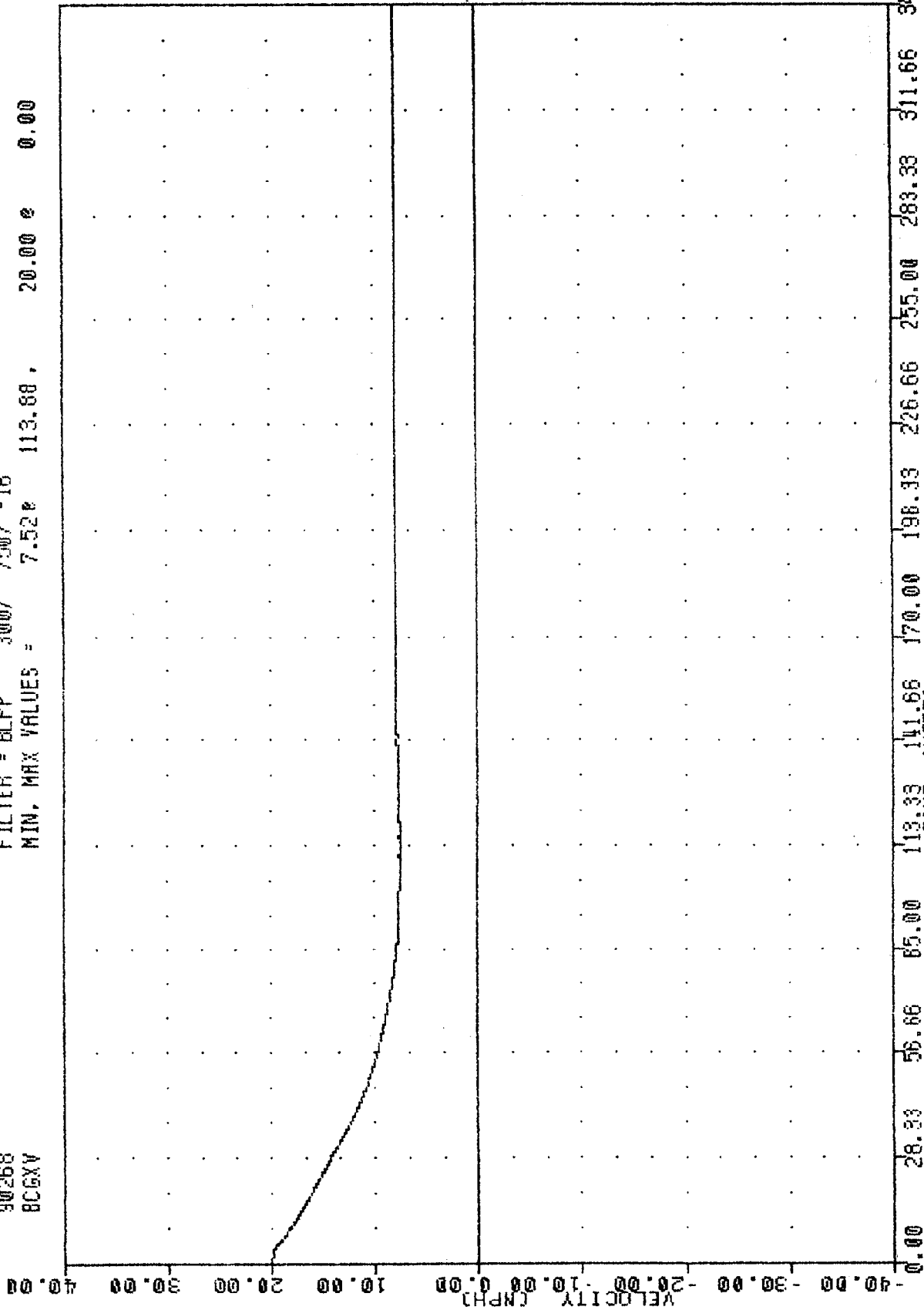
FILTER = BLPF 300/ 750/ -16  
 MIN. MAX VALUES = 0.00 13.28 e 12.63



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)  
 CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.0 MPH #1  
 VEHICLE CG RESULTANT VELOCITY

900925-1 , IRC  
 CRASH III DAMAGE ALGORITHM  
 90268  
 BCGXY

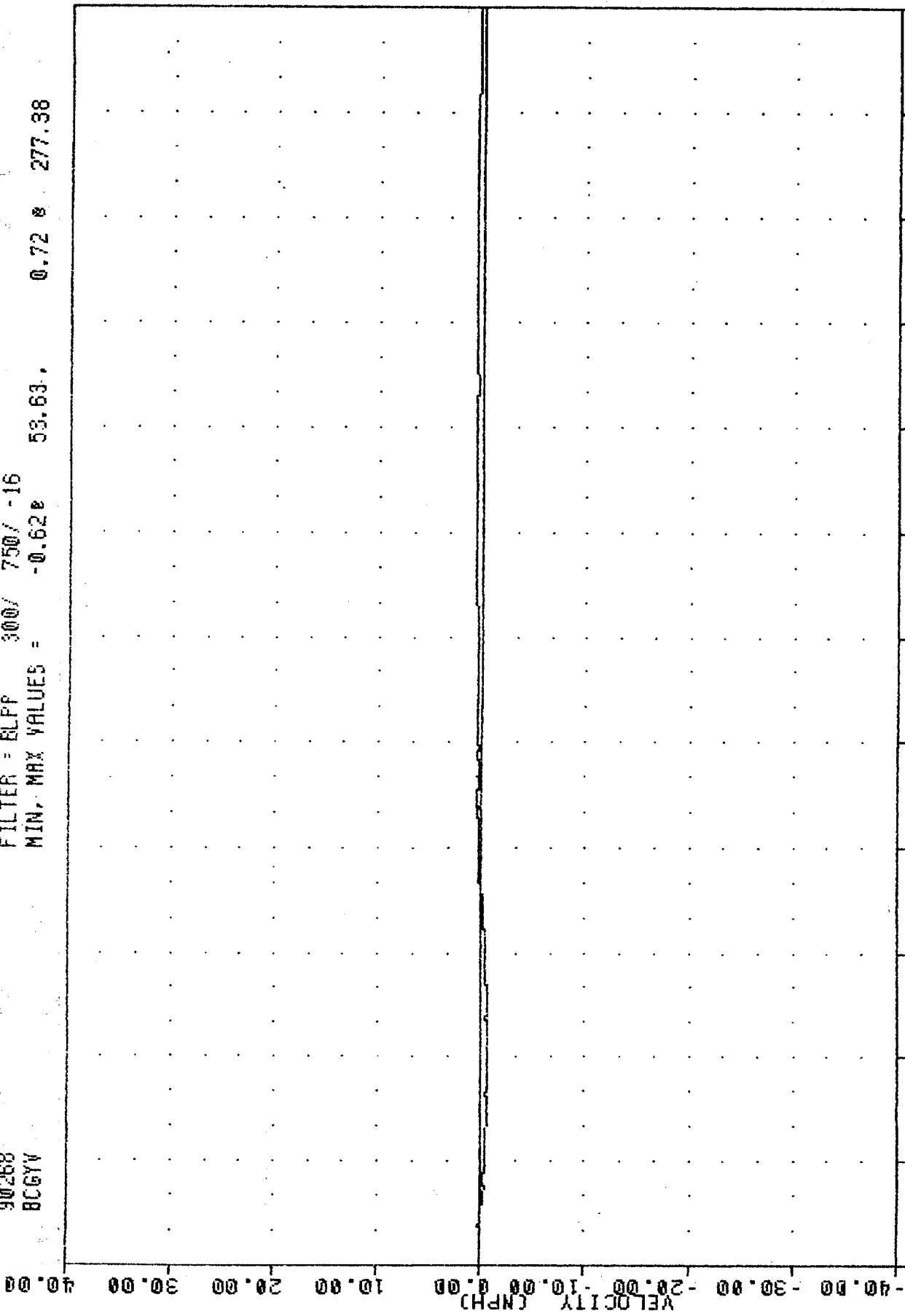
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 7.52e 20.00 e 0.00



CONToured MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.0 MPH #1  
 MOVING BARRIER CENTER OF GRAVITY X-AXIS VELOCITY

900925-1 TRC  
 CRASH III DAMAGE ALGORITHM  
 90268  
 BCGYV

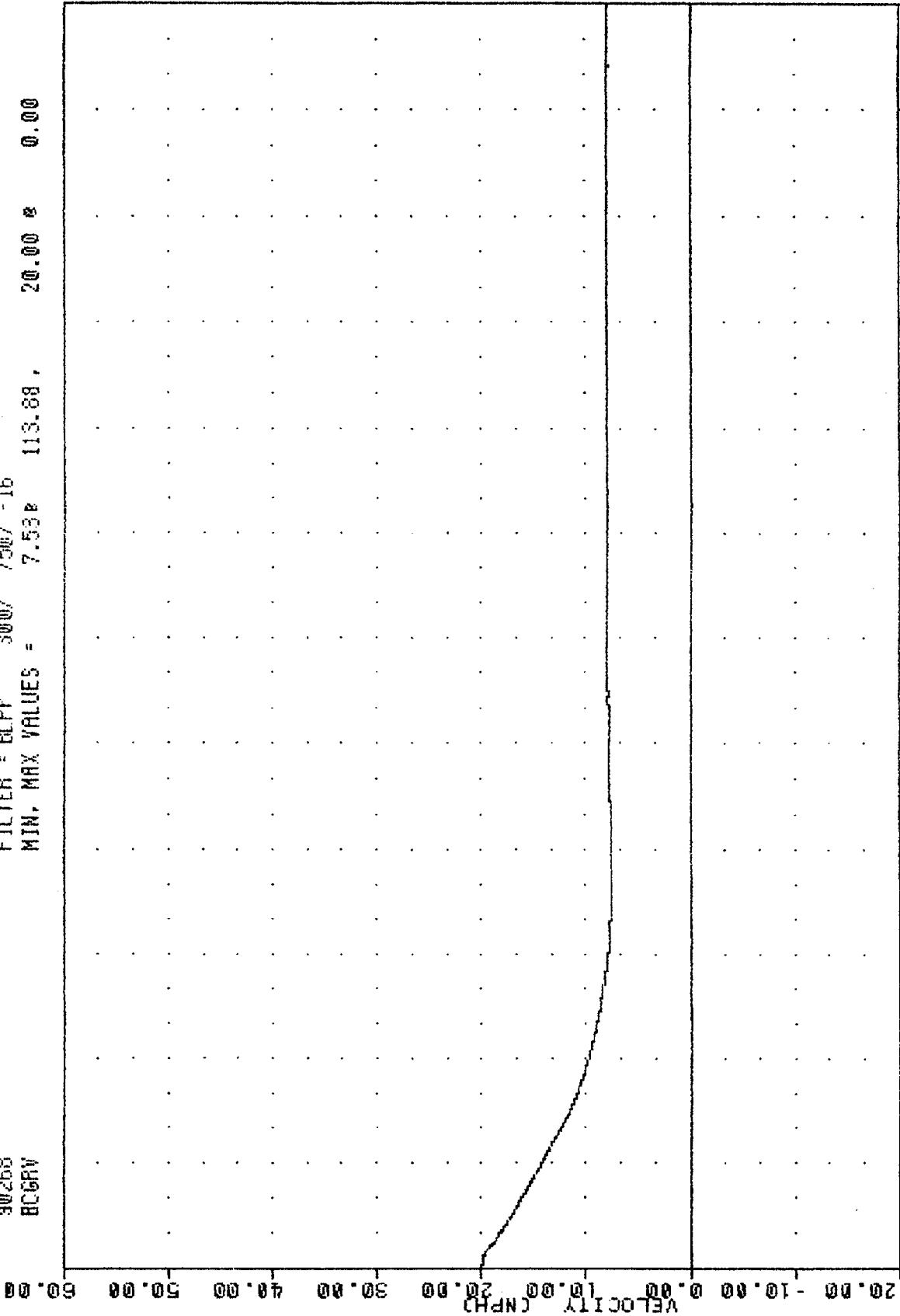
FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -0.62e 53.63, 0.72 e 277.38



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)  
 CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.0 MPH #1  
 MOVING BARRIER CENTER OF GRAVITY Y-AXIS VELOCITY

900925-1 , TAC  
 CRASH III DAMAGE ALGORITHM  
 90268  
 BCGRV

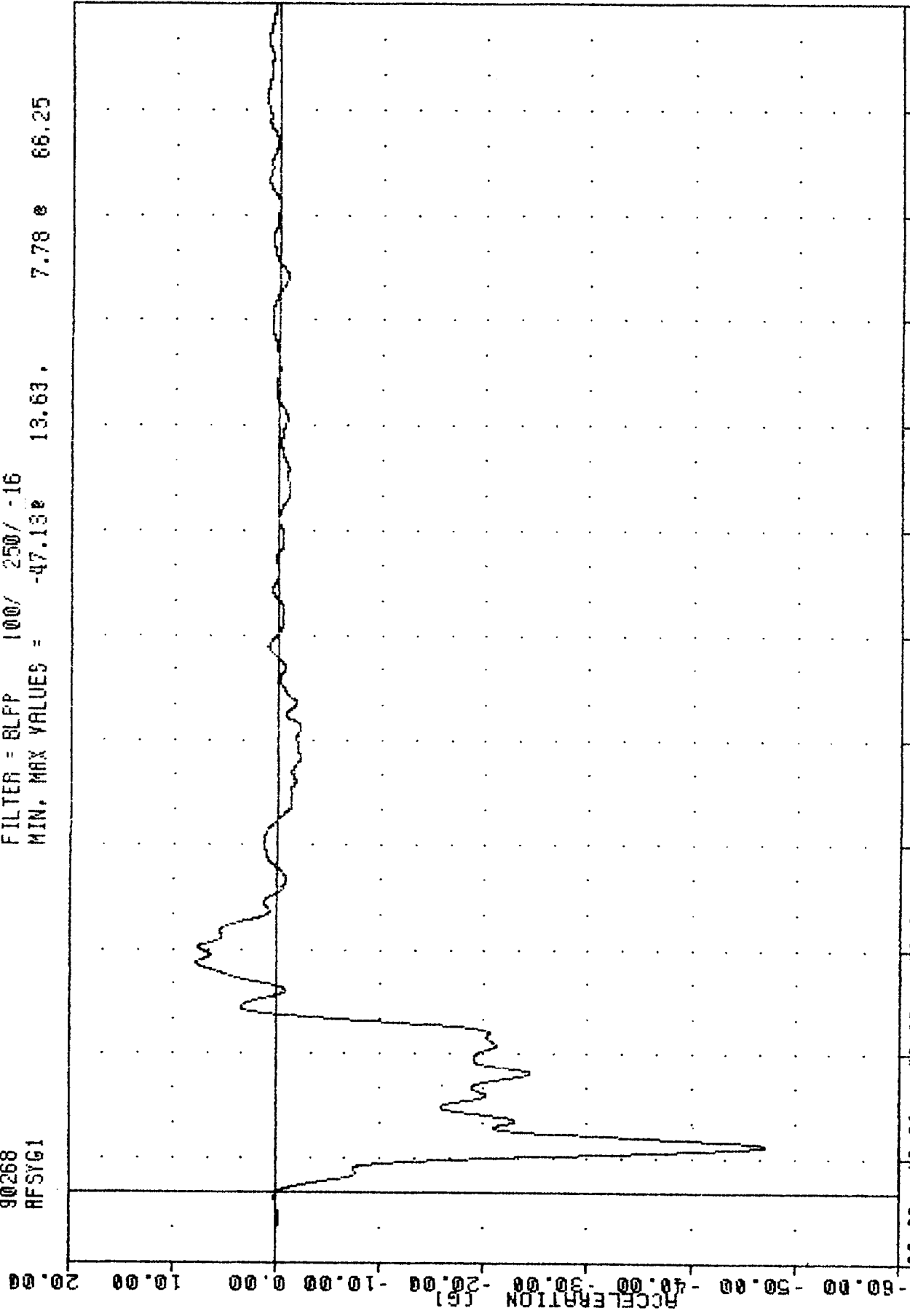
FILTER = BLFF 500/ 750/ -16  
 MIN, MAX VALUES = 7.53P 113.68 , 20.00 & 0.00



0.00 26.33 56.66 85.00 113.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00  
 TIME (MSEC)  
 CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 20.0 MPH #1  
 MOVING BARRIER CENTER OF GRAVITY RESULTANT VELOCITY

900920-2, INC.  
CRASH III DAMAGE ALGORITHM  
90268  
RFSYG1

FILTER = BLFP 100/ 250/ -16  
MIN. MAX VALUES = -47.13e 13.63. 7.78 e 66.25

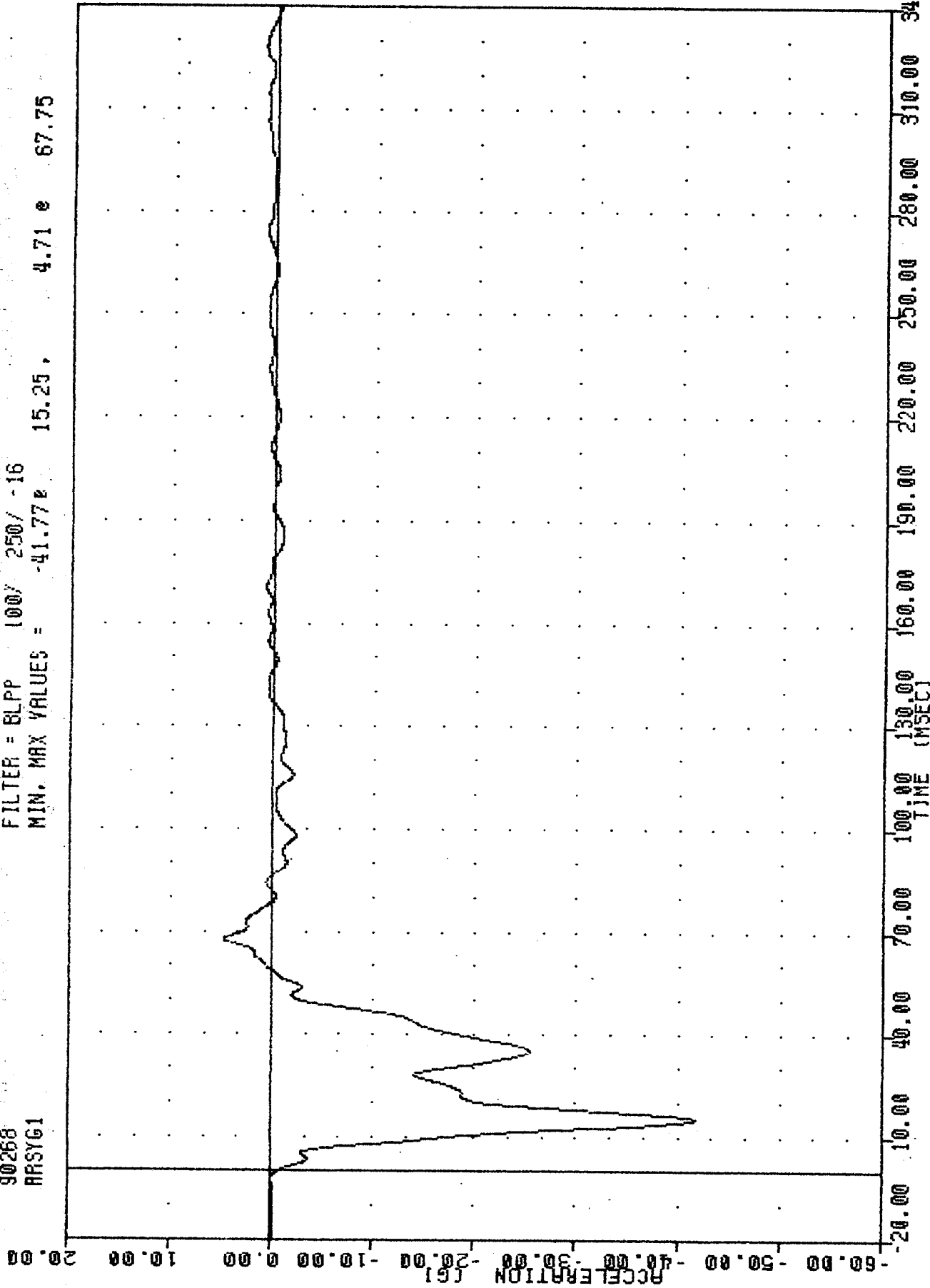


CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 40.1 MPH #2  
RIGHT FRONT SILL Y-AXIS ACCELERATION

TEST #900925-2

90258  
CRASH III DAMAGE ALGORITHM  
90258  
ARSYG1

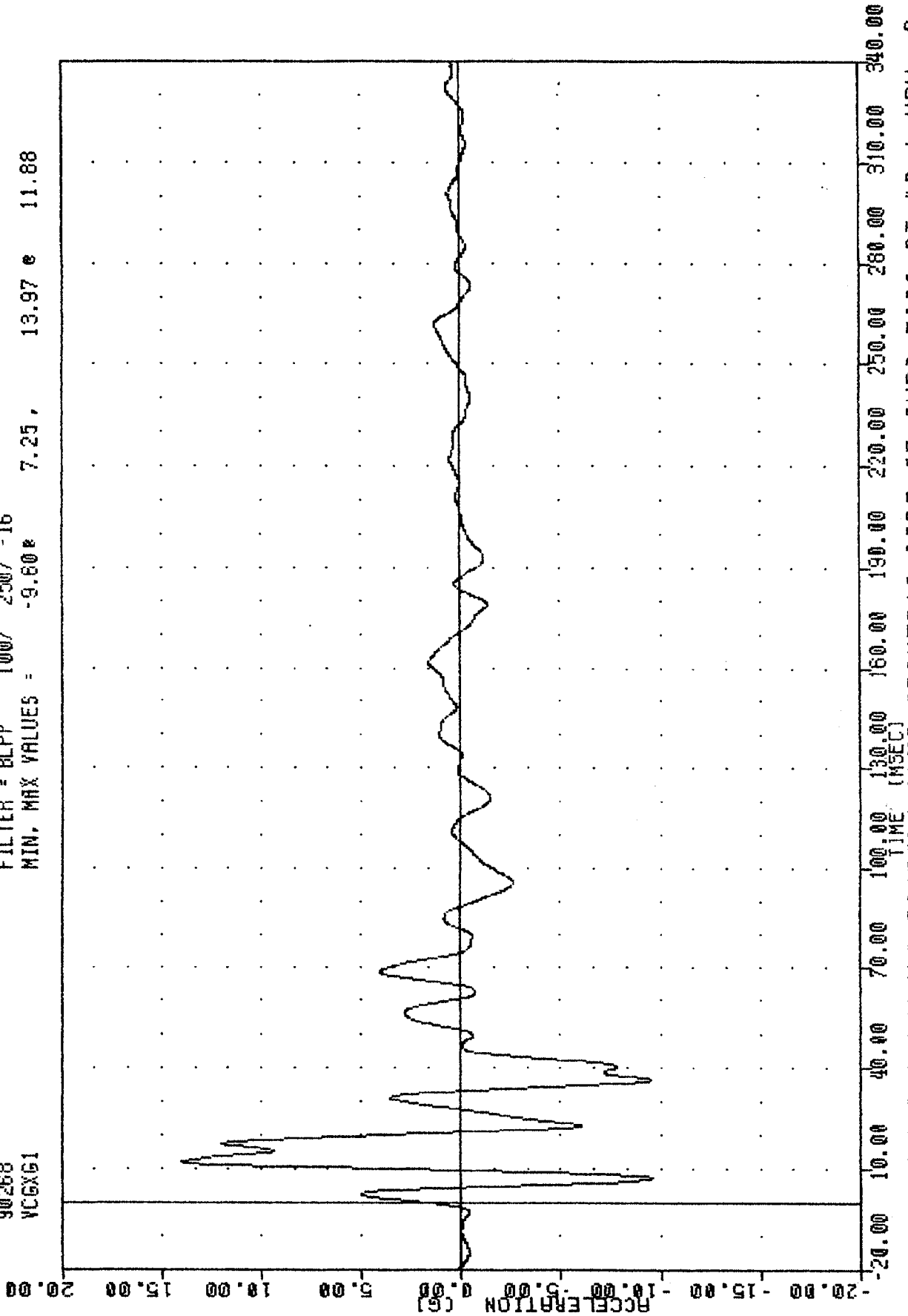
FILTER = BLPP 100% 250/ -16  
MIN. MAX VALUES = -41.77e 4.71 e 67.75



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 40.1 MPH #2  
RIGHT REAR SILL Y-AXIS ACCELERATION

900925-2 , TRC  
 CRASH III DAMAGE ALGORITHM  
 90268  
 VCGXG1

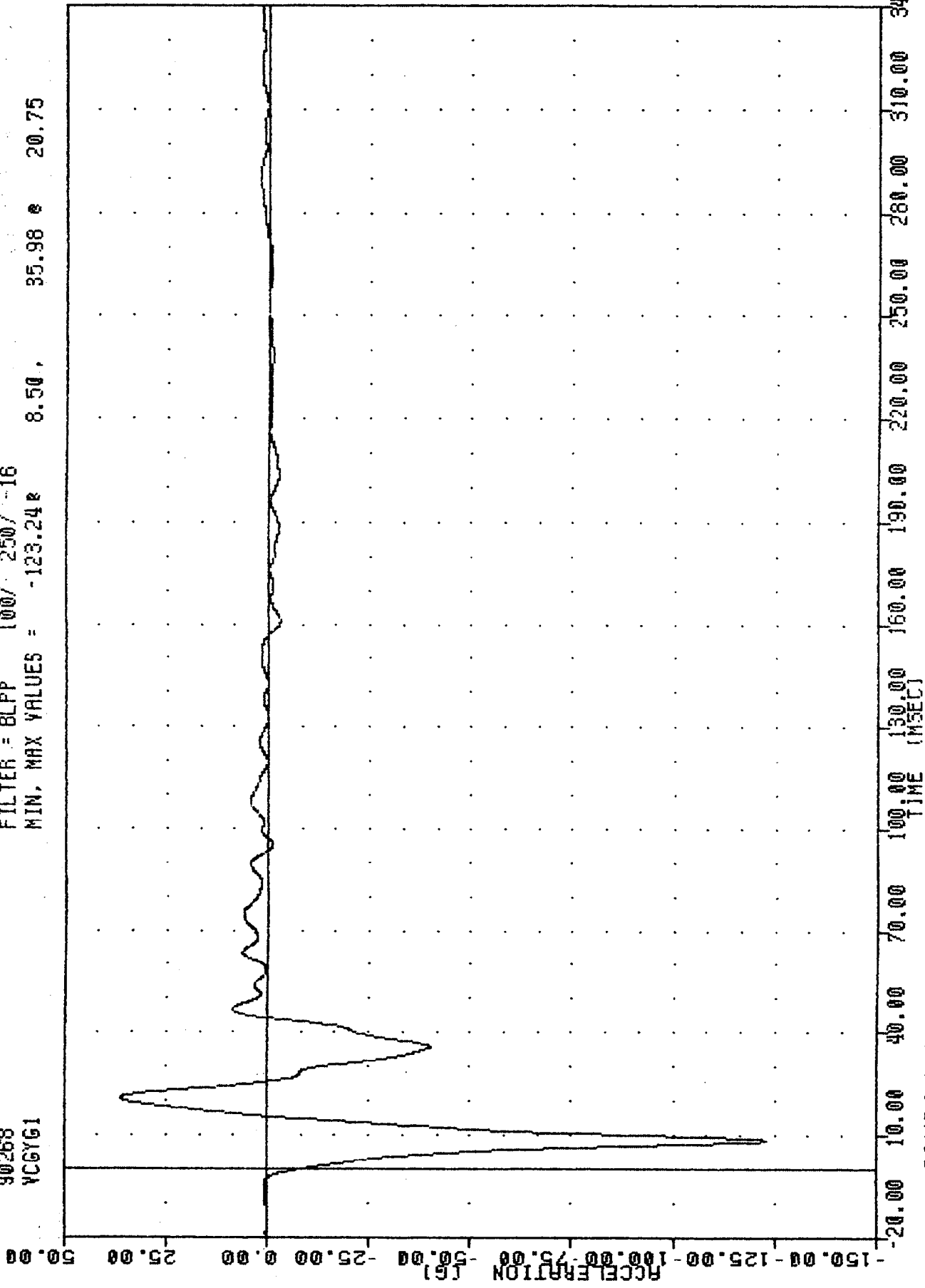
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = -9.80 e 13.97 e 11.88



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 40.1 MPH #2  
 VEHICLE CG X-AXIS ACCELERATION (PERPENDICULAR TO IMPACT DIRECTION)

30002012  
CRASH III DAMAGE ALGORITHM  
90268  
YCGYG1

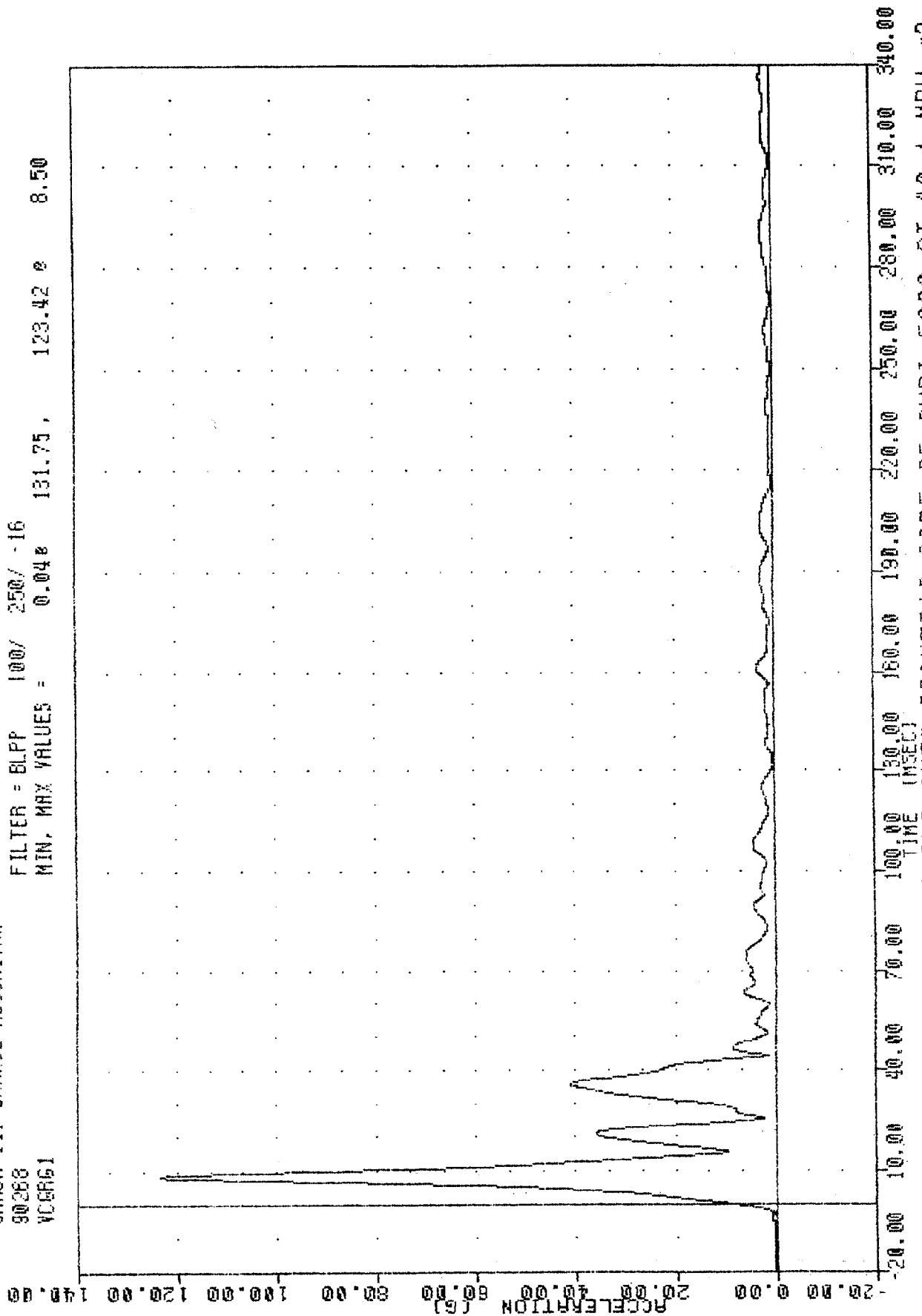
FILTER = BLPP 100/ 250/ -16  
MIN. MAX VALUES = -123.248 8.50, 35.98 20.75



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 40.1 MPH #2  
VEHICLE CG Y-AXIS ACCELERATION (IMPACT DIRECTION)

900925-2 , TRC  
 CRASH III DAMAGE ALGORITHM  
 90268  
 VCER61

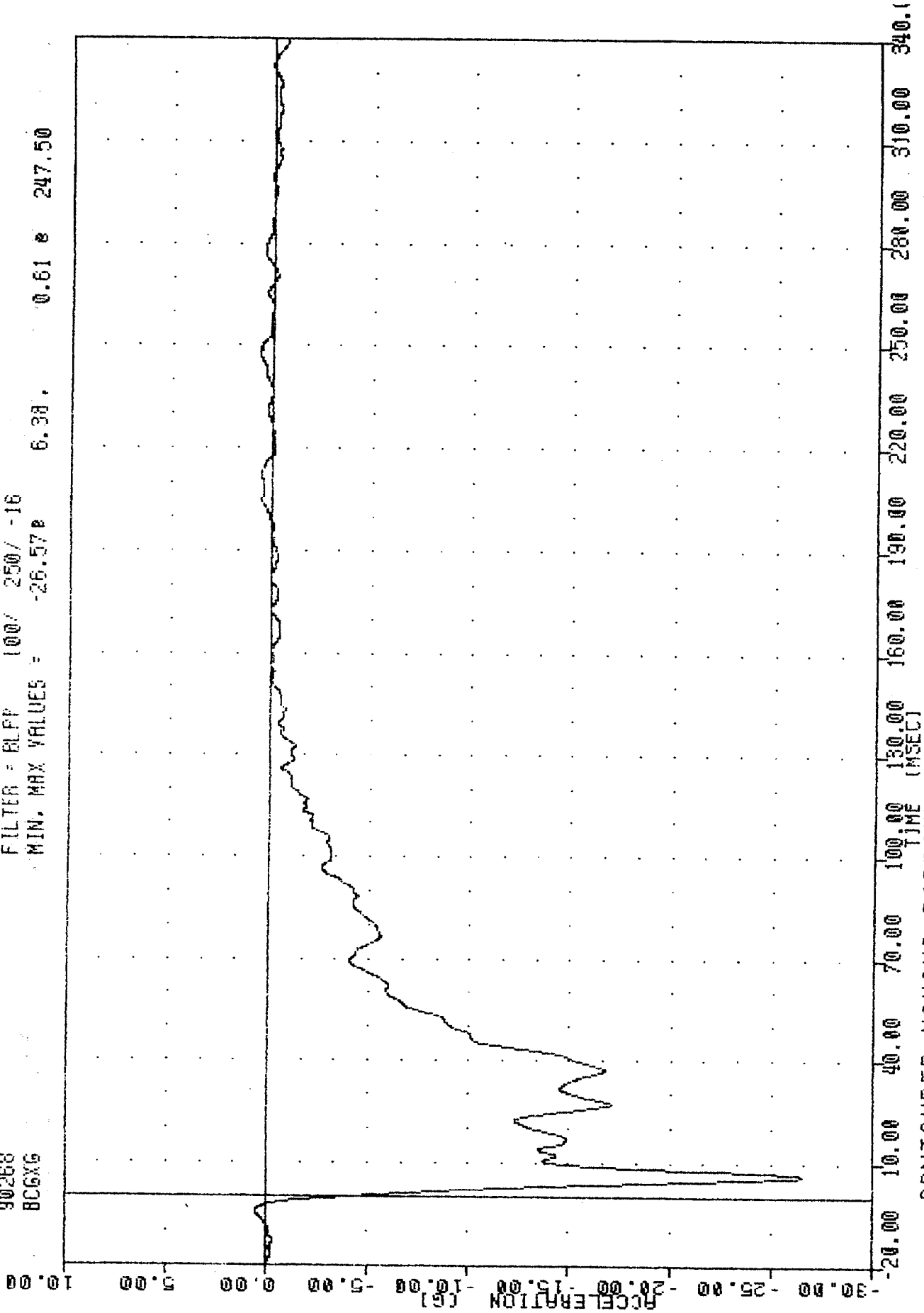
FILTER = BLPP 100/ 250/ -16  
 MIN. MAX VALUES = 0.04e 131.75, 123.42 e 8.50



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 40.1 MPH #2  
 VEHICLE CG RESULTANT ACCELERATION

900925-2 TAC  
CRASH III DAMAGE ALGORITHM  
90268  
BCGXG

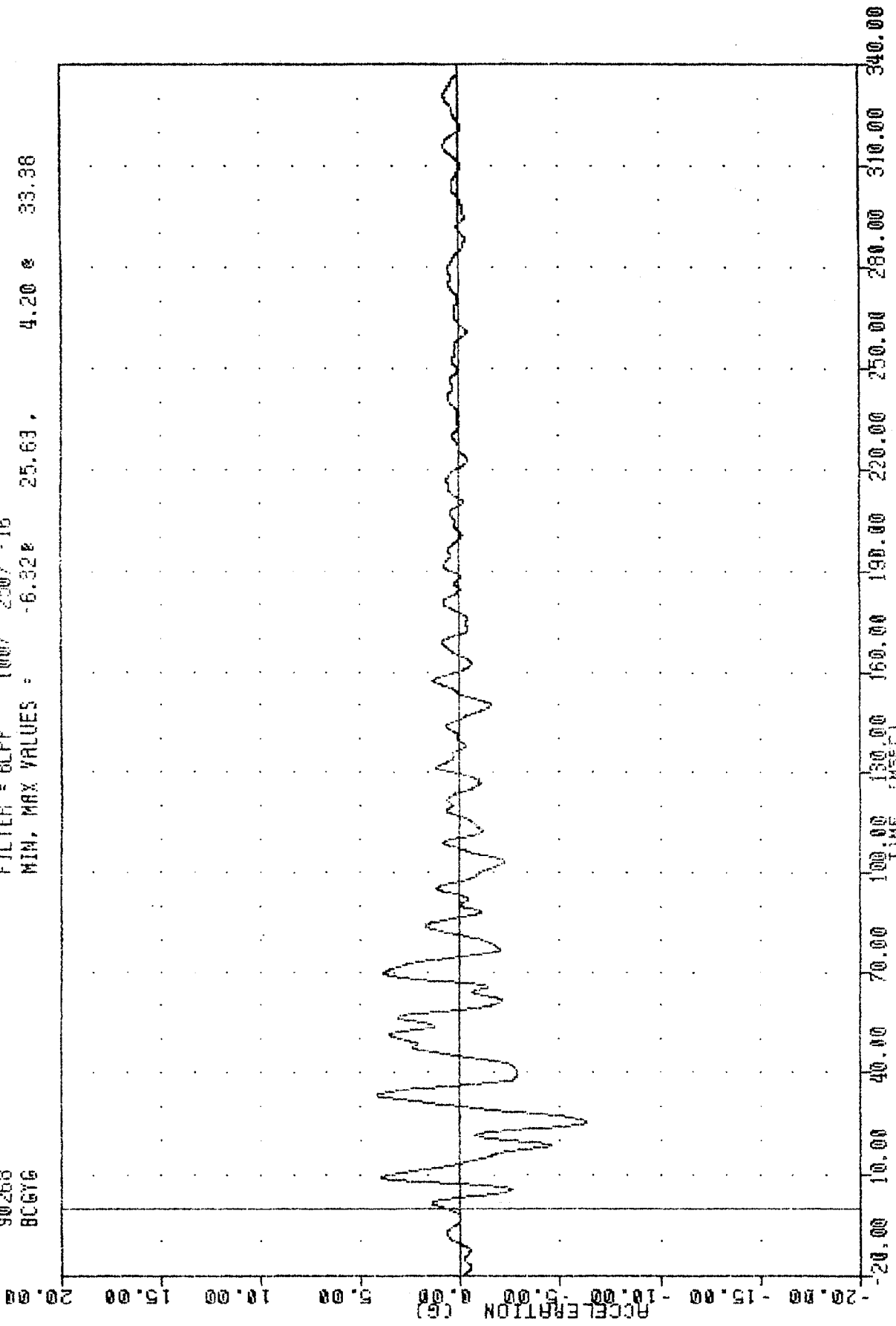
FILTER = BLFF 100/ 250/ -16  
MIN. MAX VALUES = -26.57 6.38 0.61 e 247.50



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 40.1 MPH #2  
MOVING BARRIER CENTER OF GRAVITY X-AXIS ACCELERATION

900925-2 , TRC  
CRASH III DAMAGE ALGORITHM  
90268  
BCG16

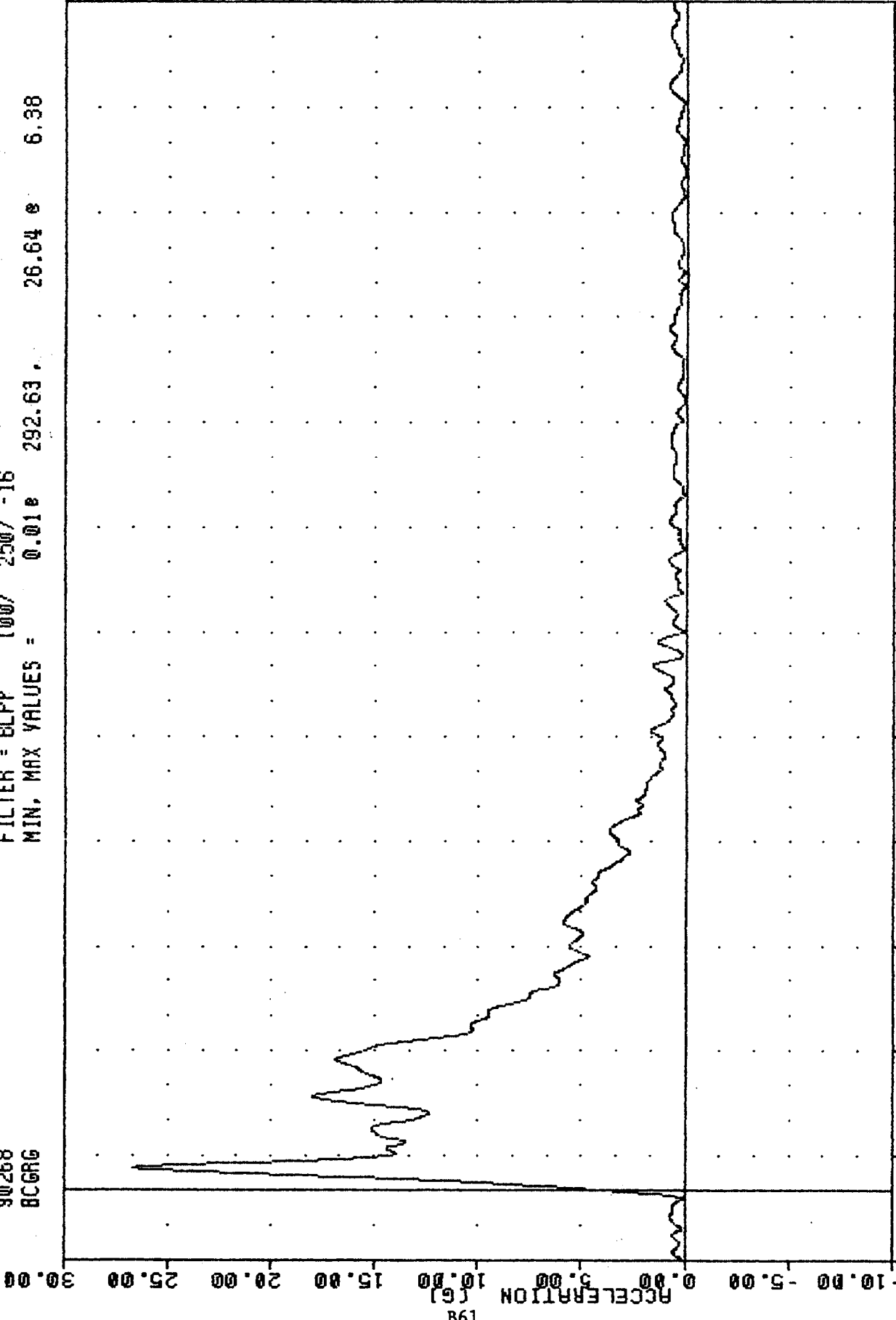
FILTER = BLPP 100/ 250/ -16  
MIN, MAX VALUES = -6.32% 25.63, 4.20 e 33.38



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 50000 AT 40.1 MPH #2  
MOVING BARRIER CENTER OF GRAVITY Y-AXIS ACCELERATION

900925-2 , TRC  
 CRASH III DAMAGE ALGORITHM  
 90268  
 BCGRG

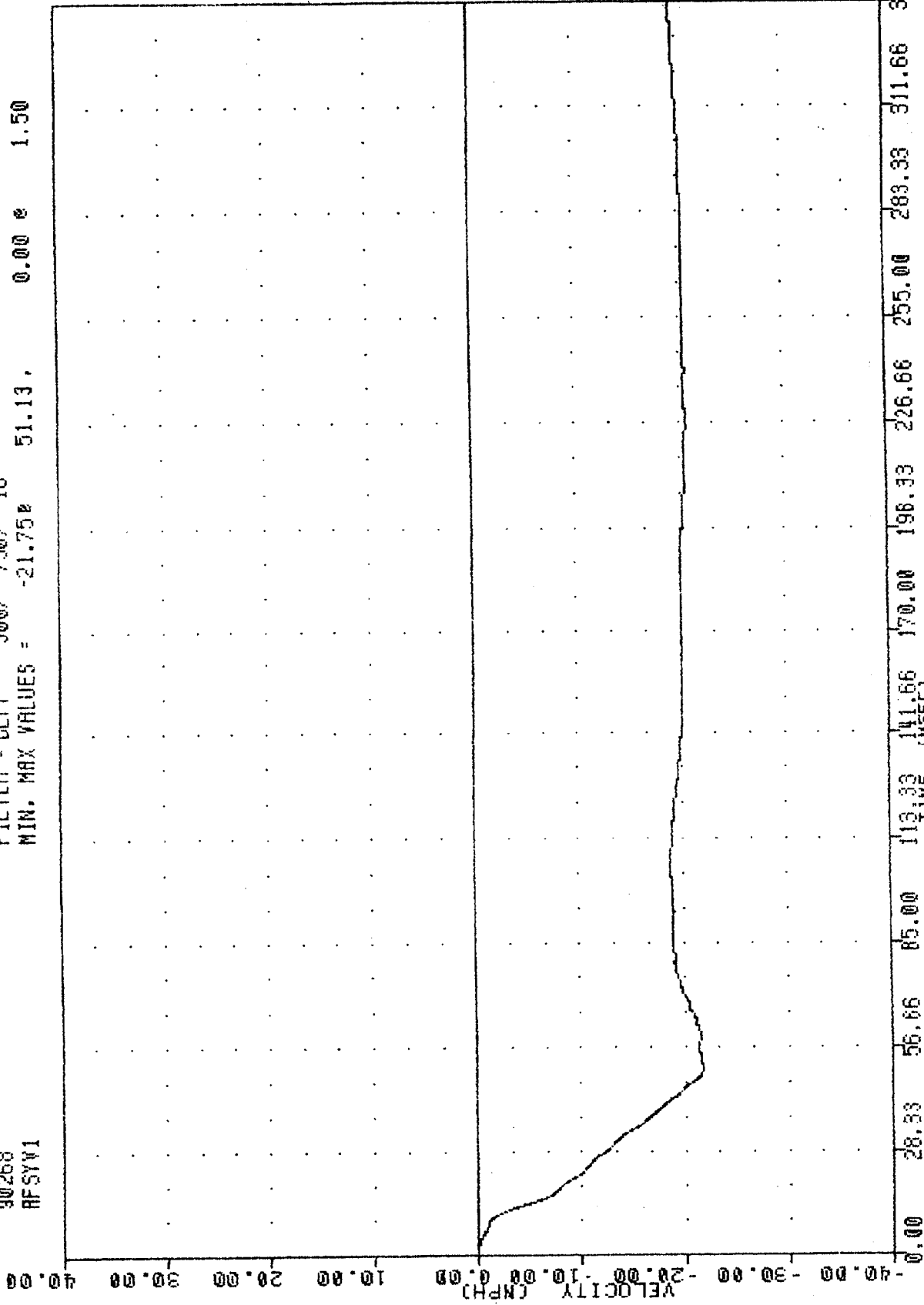
FILTER = BLPP 100/ 250/ -16  
 MIN, MAX VALUES = 0.01e 292.63, 26.64 e 6.38



-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)  
 CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 40.1 MPH #2  
 MOVING BARRIER CENTER OF GRAVITY RESULTANT ACCELERATION

900925-2 , T8C  
 CRASH III DAMAGE ALGORITHM  
 90268  
 RFSYV1

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = -21.75e 51.13, 0.00 e 1.50

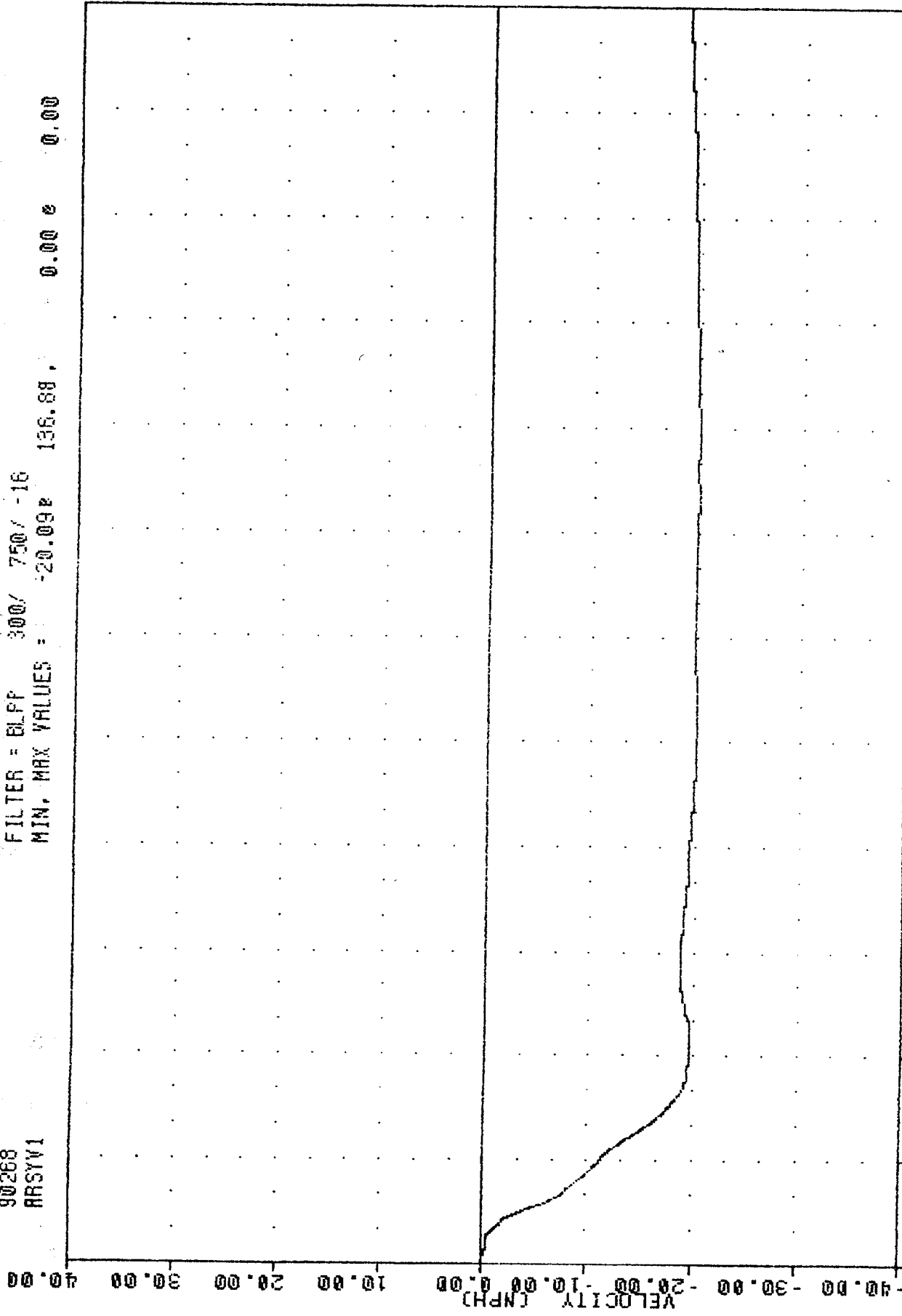


B62

CONToured MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 40.1 MPH #2  
 RIGHT FRONT SILL Y-AXIS VELOCITY

900020-2  
 CRASH III DAMAGE ALGORITHM  
 90268  
 ARSYV1

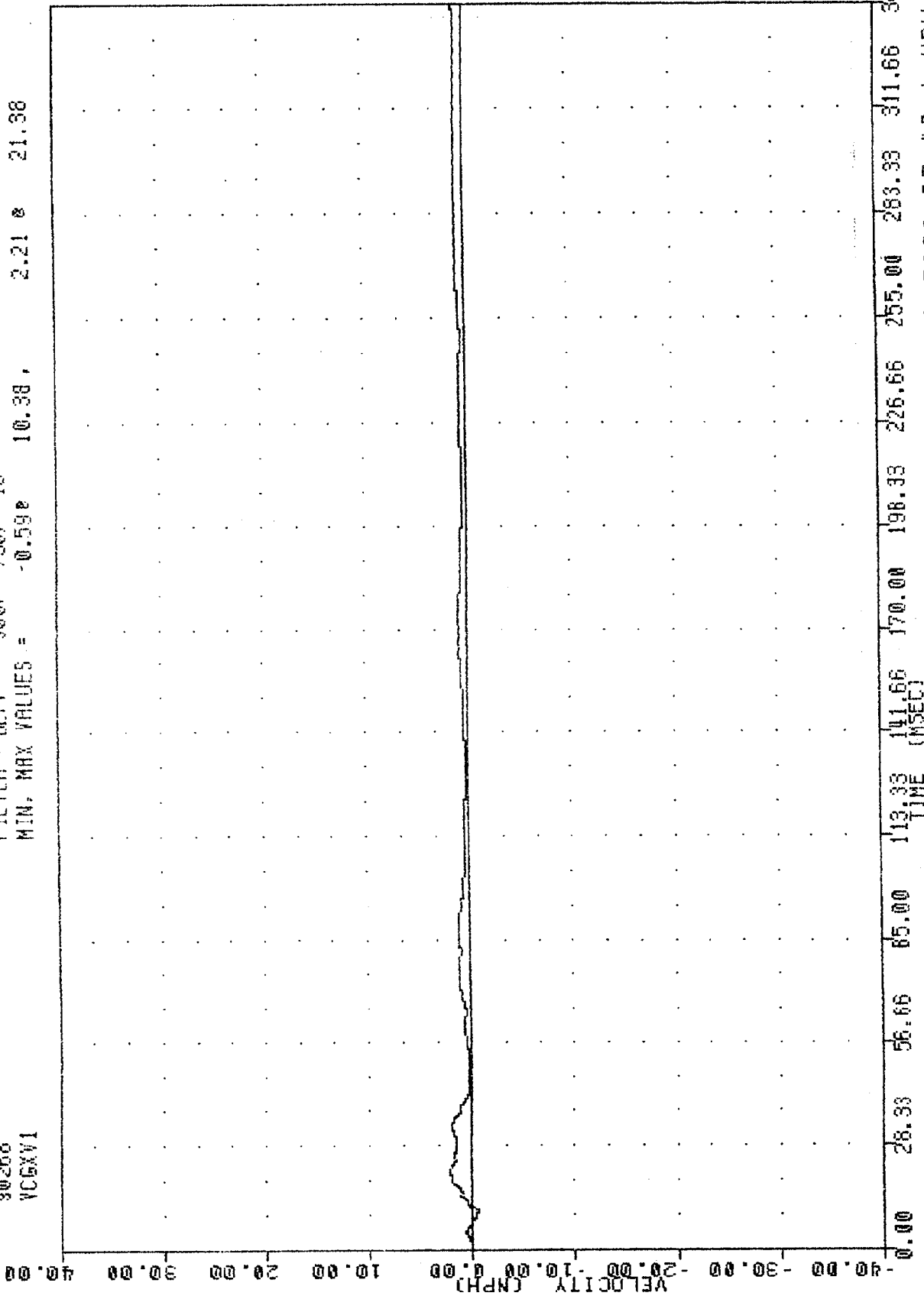
FILTER = BLFF 300/ 750/ -16  
 MIN. MAX VALUES = -20.09E 136.88E 0.00E 0.00



0.00 28.33 56.66 85.00 119.33 141.66 170.00 198.33 226.66 255.00 283.33 311.66 340.00  
 TIME (MSEC)  
 CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 40.1 MPH #2  
 RIGHT REAR SILL Y-AXIS VELOCITY

900925-2 , TRC  
 CRASH III DAMAGE ALGORITHM  
 90268  
 VCGXV1

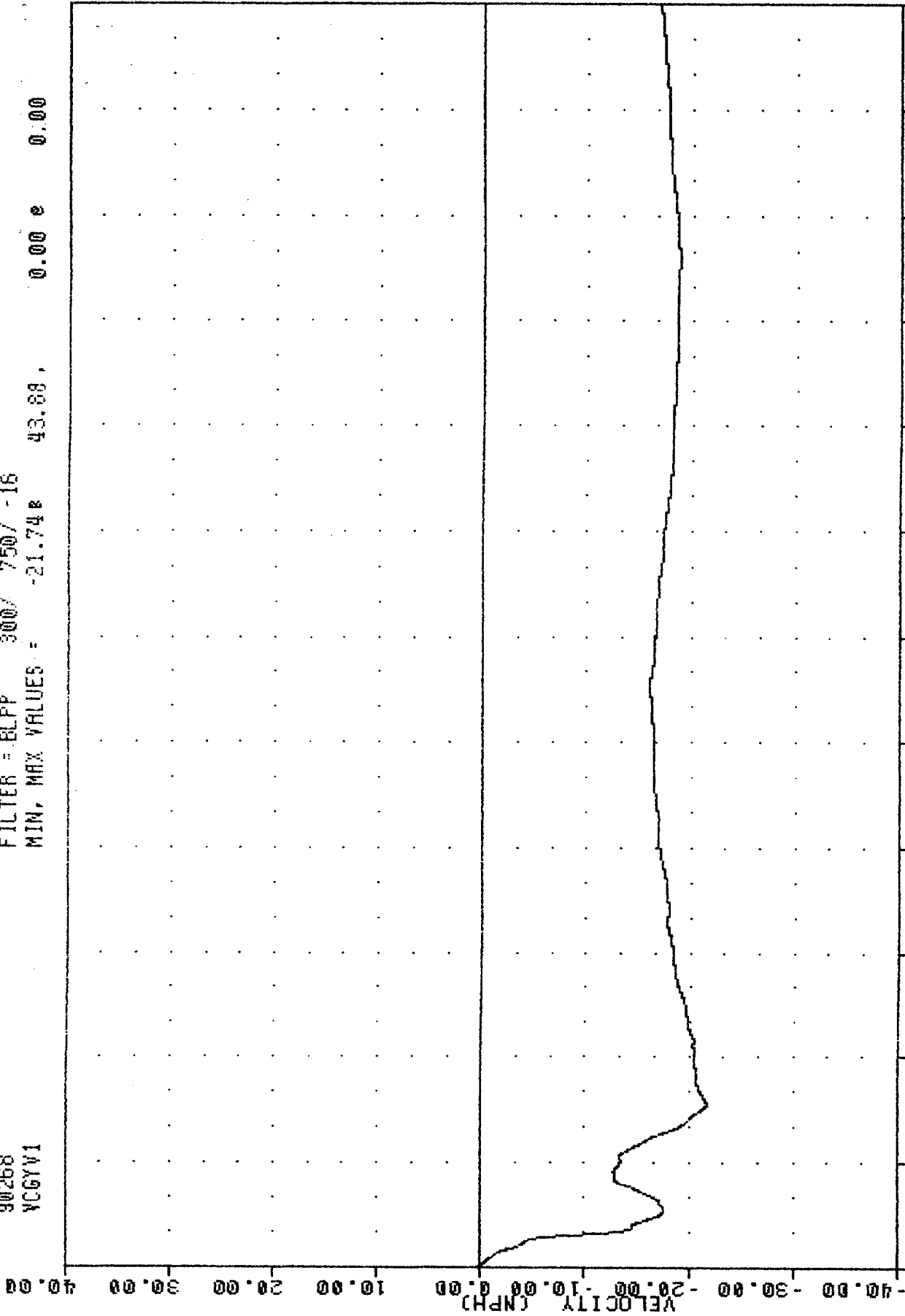
FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -0.59e 10.38 , 2.21 e 21.38



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 40.1 MPH #2  
 VEHICLE CG X-AXIS VELOCITY (PERPENDICULAR TO IMPACT DIRECTION)

900925-2 TRC  
 CRASH III DAMAGE ALGORITHM  
 90268  
 YCGYV1

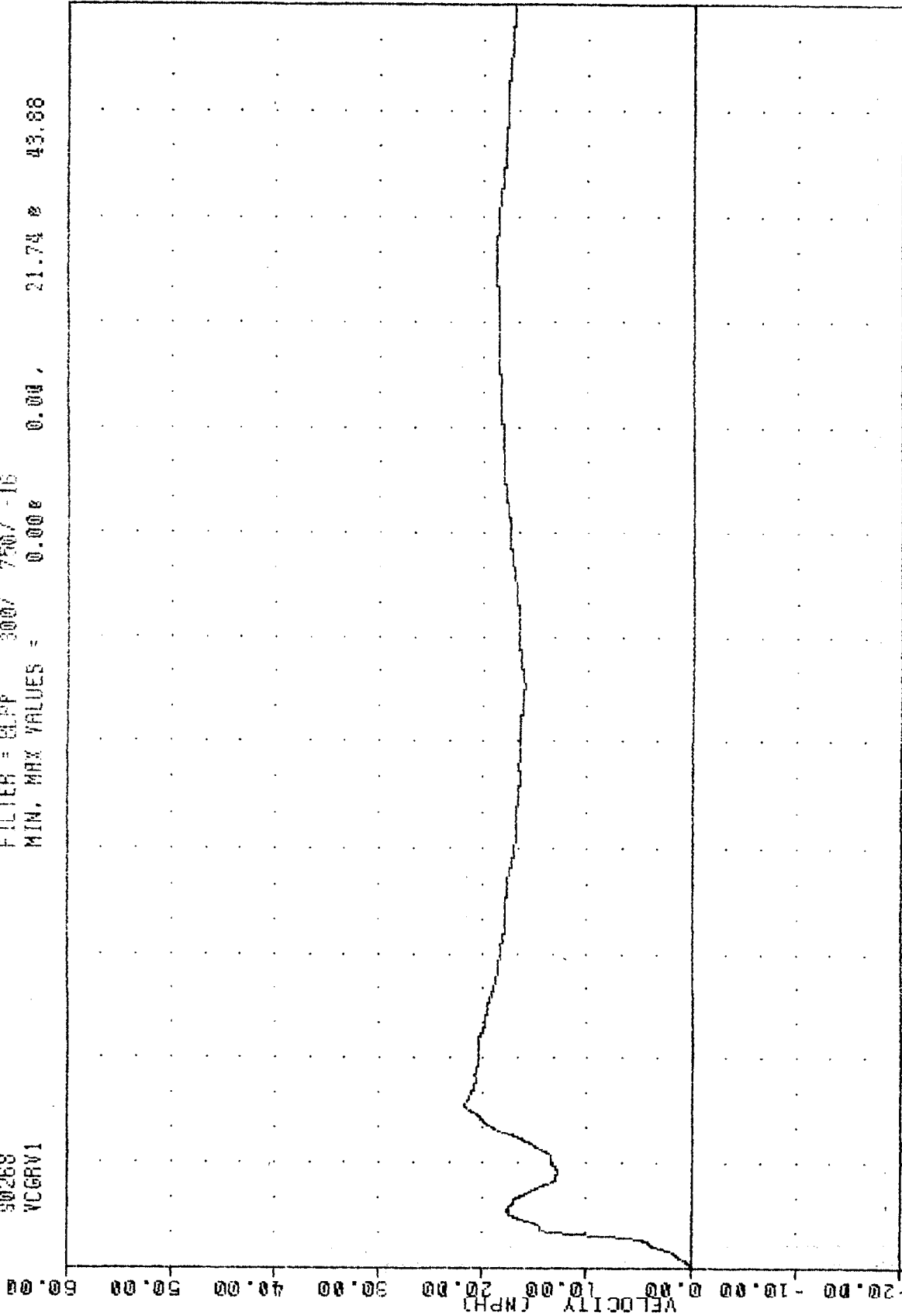
FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -21.74 43.68, 0.00 e 0.00



CONToured MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 40.1 MPH #2  
 VEHICLE CG Y-AXIS VELOCITY (IMPACT DIRECTION)

900423-2 , IRC  
 CRASH III DAMAGE ALGORITHM  
 50268  
 YCGRV1

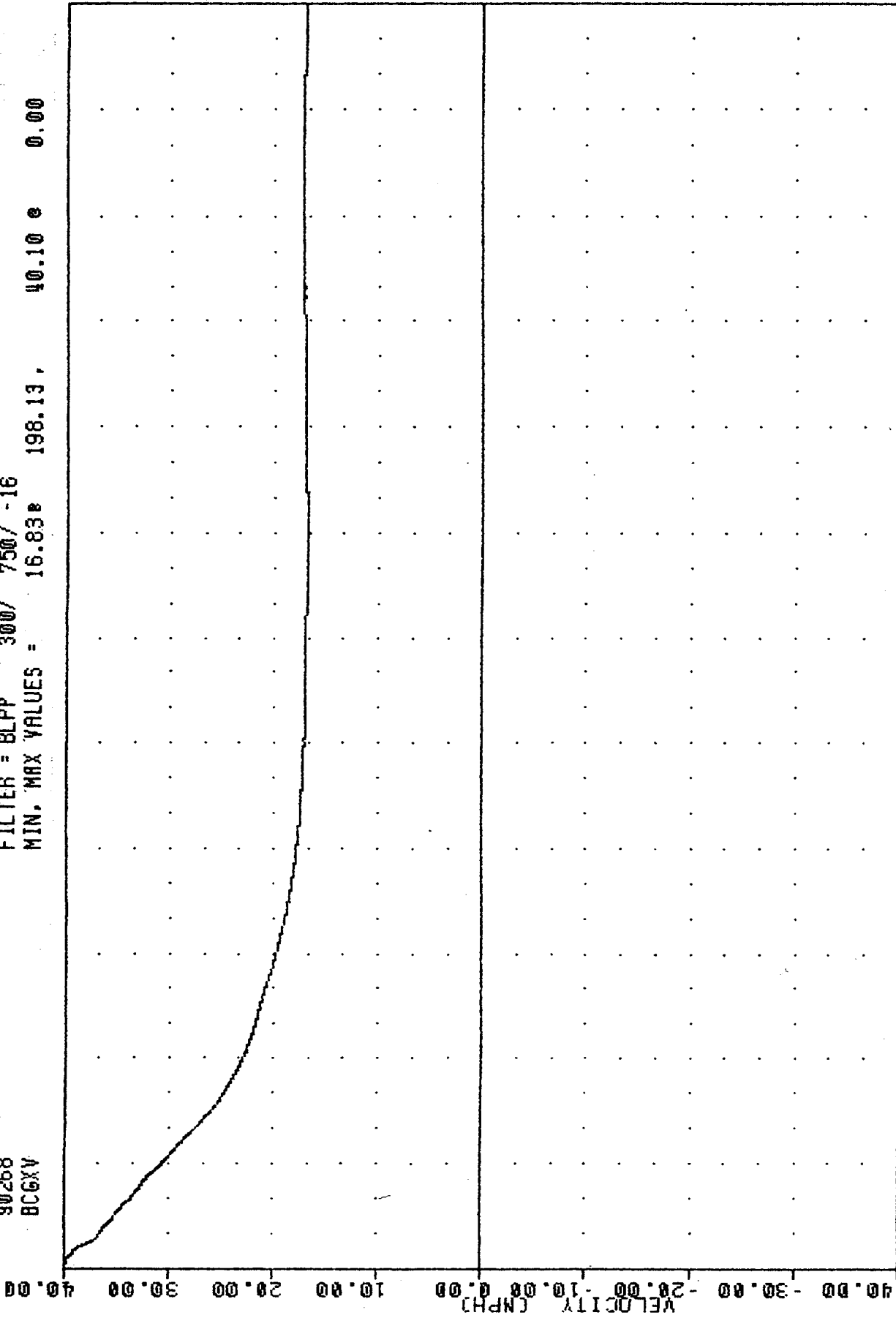
FILTER = BLPF 3007 750.7 -16  
 MIN. MAX VALUES = 0.00e 21.74 e 43.88



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 40.1 MPH #2  
 VEHICLE CG RESULTANT VELOCITY

900925-2 , TRC  
 CRASH III DAMAGE ALGORITHM  
 90268  
 BCGXV

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 16.83e 198.13, 40.10 e 0.00

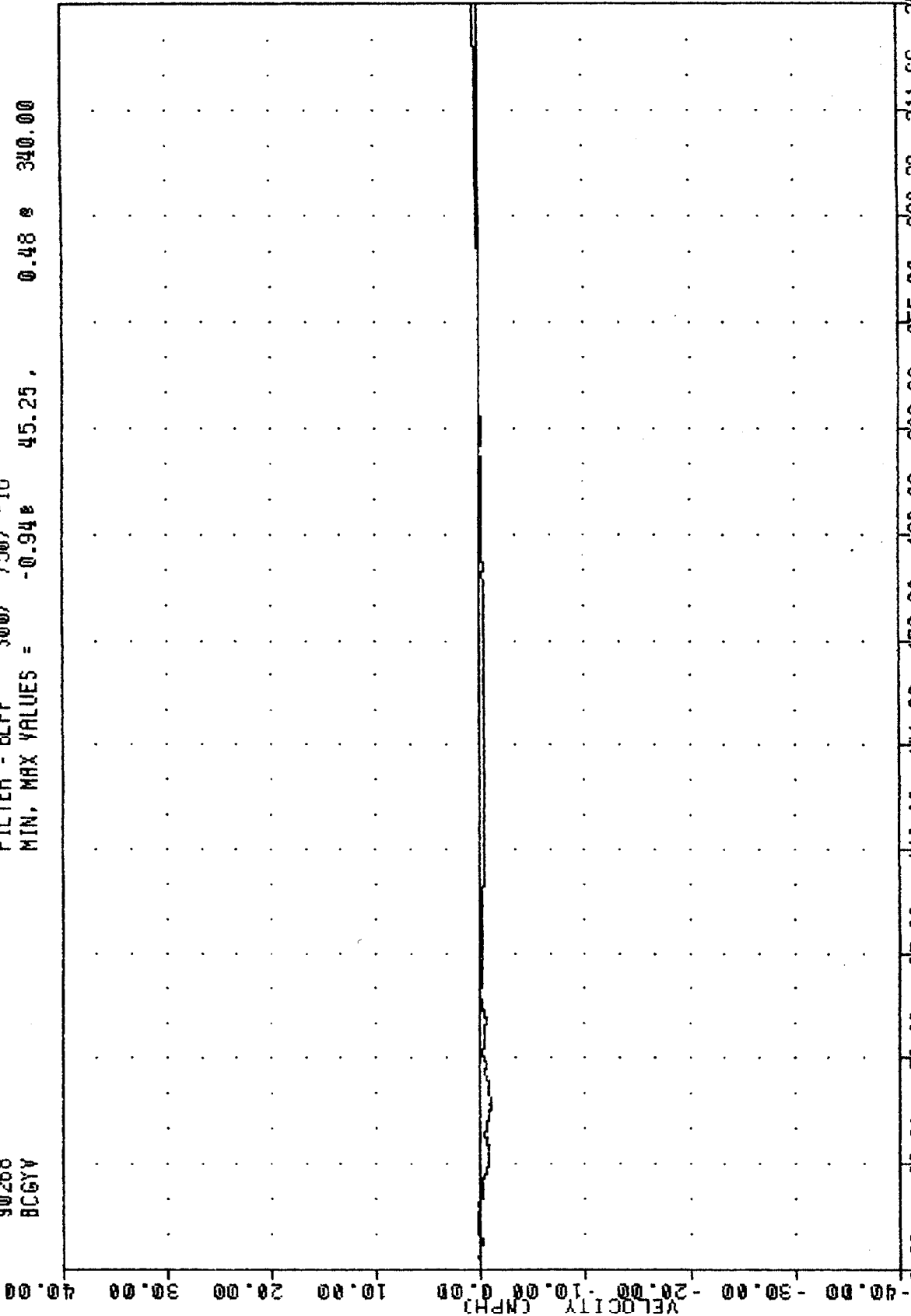


0.00	28.33	56.66	85.00	113.33	141.66	170.00	198.33	226.66	255.00	283.33	311.66	340.00
				TIME	(MSEC)							

CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 40.1 MPH #2  
 MOVING BARRIER CENTER OF GRAVITY X-AXIS VELOCITY

900925-2 . TRC  
 CRASH III DAMAGE ALGORITHM  
 90268  
 BCGYV

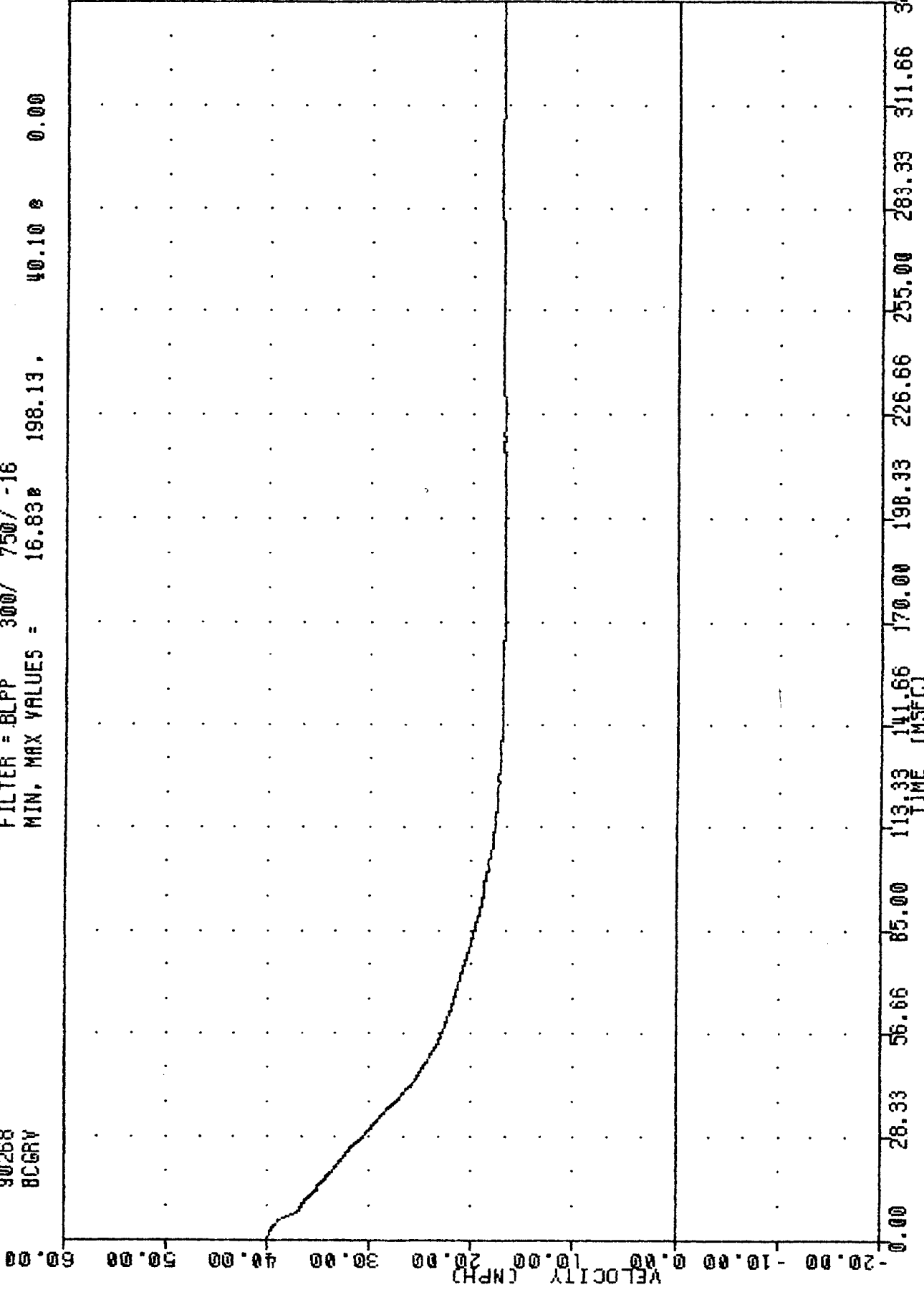
FILTER = BLPP 300/ 750/ -16  
 MIN, MAX VALUES = -0.94e 45.25, 0.48 e 340.00



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 40.1 MPH #2  
 MOVING BARRIER CENTER OF GRAVITY Y-AXIS VELOCITY

9W0925-2 , TAC  
 CRASH III DAMAGE ALGORITHM  
 90268  
 BCGRV

FILTER = BLPP 300/ 750/ -16  
 MIN. MAX VALUES = 16.83 198.13 40.10 0.00



CONTOURED MOVING BARRIER INTO DRIVER'S SIDE OF AUDI 5000 AT 40.1 MPH #2  
 MOVING BARRIER CENTER OF GRAVITY RESULTANT VELOCITY

APPENDIX C

MISCELLANEOUS TEST INFORMATION

VEHICLE ACCELEROMETER INFORMATION

NO.	LOCATION	AXIS	MFR	MODEL	ORIENTATION	
					S/N	(+ SENSING)
1	RIGHT FRONT SILL	Y	ENDEVCO	7264	CF111	LEFT
2	RIGHT REAR SILL	Y	ENDEVCO	7264	CB25H	LEFT
3	VEHICLE CENTER/GRAVITY	X	ENDEVCO	7264	CL73H	REAR
	VEHICLE CENTER/GRAVITY	Y	ENDEVCO	7264	CJ34H	RIGHT

SIGN CONVENTION

ALL DUMMY, BARRIER AND VEHICLE CHANNELS:

+X: FORWARD

+Y: LEFTWARD

+Z: UPWARD

+FORCE: TENSION

MOVING BARRIER ACCELEROMETER INFORMATION

NO.	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
1	MOVING BARRIER					
	CENTER OF GRAVITY	X	ENDEVCO	7264	CF93H	FORWARD
	MOVING BARRIER					
	CENTER OF GRAVITY	Y	ENDEVCO	7264	CJ04H	LEFT

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