

2014 117

SIDE IMPACT AGGRESSIVENESS
ATTRIBUTES

MDB-TO-CAR SIDE IMPACT TEST OF
A 26° CRABBED MOVING DEFORMABLE BARRIER
TO A 1982 VOLKSWAGEN RABBIT
AT 38.9 MPH

PREPARED BY:
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FINAL REPORT
OCTOBER 1984

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
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400 SEVENTH STREET, S.W.
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16. Abstract This test report documents one of a series of twelve crash tests to evaluate the side impact aggressiveness attributes of various deformable barrier face configurations. The configurations to be used are designated as "Lowered Stiffness", "Altered Profile" and "Lowered Bumper". In addition, four pole tests will be conducted. Testing was conducted on a 1982 diesel Volkswagen Rabbit 2-door hatchback at the TRCO Crash Test Facility, East Liberty, Ohio. The test vehicle was structurally unmodified but contained additional padding on the driver's side door, the left rear quarter panel and the left rear side header. The test vehicle was impacted on the left side by a moving deformable barrier designated as "Lowered Stiffness", crabbled to 26°, at 38.9 mph. Occupant responses of two side impact dummies were measured. One dummy was located in the driver's designated seating position and one was located in the left rear passenger position. The test date was September 13, 1984 and the ambient temperature was 78° F.					
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures			
Symbol	When You Know	Multiply by	To Find
LENGTH			
in	inches	2.5	centimeters
ft	feet	30	centimeters
yd	yards	0.9	meters
mi	miles	1.6	kilometers
AREA			
in ²	square inches	6.5	square centimeters
ft ²	square feet	0.09	square meters
yd ²	square yards	0.8	square meters
mi ²	square miles	2.6	square kilometers
acres	acres	0.4	hectares
MASS (weight)			
oz	ounces	28	grams
lb	pounds	0.45	kilograms
	short tons	0.9	metric ton
	(2000 lb)		
VOLUME			
tsp	teaspoons	5	milliliters
Tbsp	tablespoons	15	milliliters
in ³	cubic inches	16	milliliters
fl oz	fluid ounces	30	milliliters
c	cups	0.24	liters
pt	pints	0.47	liters
qt	quarts	0.95	liters
gal	gallons	3.8	liters
ft ³	cubic feet	0.03	cubic meters
yd ³	cubic yards	0.76	cubic meters
TEMPERATURE (exact)			
°F	degrees Fahrenheit	5/9 (after subtracting 32)	degrees Celsius

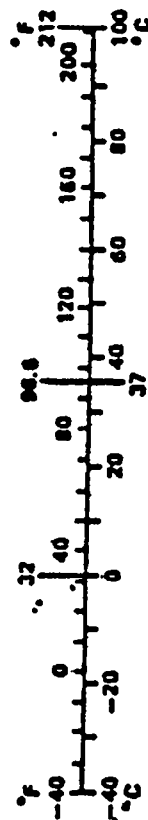


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SECTION 1.0

PURPOSE AND INTRODUCTION

PURPOSE

The main purpose of this test was to evaluate the side impact aggressiveness of a deformable barrier face designated as "Lowered Stiffness". In all, there will be twelve crash tests involving deformable barrier faces designated as "Lowered Stiffness", "Altered Profile" and "Lowered Bumper". In addition, four pole tests will be conducted. The vehicle was tested using conditions not currently contained in a Federal Motor Vehicle Safety Standard.

INTRODUCTION

A stationary 1982 diesel Volkswagen Rabbit 2-door hatchback was impacted on the left side by a Moving Deformable Barrier (MDB) on September 13, 1984. The barrier face was designated as "Lowered Stiffness". In order to obtain this lowered stiffness of 25 psi, 44 holes with a nominal diameter of 2 1/2 inches were drilled into the aluminum honeycomb, equally spaced throughout the barrier face. The test was to simulate an intersection collision with the striking vehicle traveling at 35 mph and the struck vehicle traveling at 17.5 mph. The orientation angle of the striking vehicle was 90° counterclockwise with respect to the longitudinal axis of the struck vehicle. The impact point was to be 37 inches forward of the vehicle center of gravity which is defined by accident investigation to be the midpoint of the wheelbase.

To simulate this collision, the MDB was to be towed into the stationary Volkswagen Rabbit at 39.1 mph with the MDB's wheels crabbed clockwise to 26°. The actual test speed was 38.9 mph and the actual impact point was 37.0 inches forward of the midpoint of the Volkswagen Rabbit's wheelbase.

The vehicle was structurally unmodified, but contained additional padding in the driver's door, the left rear quarter panel and the left rear side header.

Section 2 contains General Test and Vehicle Parameter Data. Section 3 contains data required by R & D. Appendix A contains pre-test and post-test vehicle and dummy photographs. Appendix B contains Data Plots, and Appendix C consists of Dummy Certification data.

SECTION 2.0
GENERAL TEST AND VEHICLE PARAMETER DATA

The following data sheets describe the General Test and Vehicle Parameter Data.

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Volkswagen of America, Inc.

MAKE/MODEL: Volkswagen Rabbit Diesel VIN: 1VWBG0174CV056284

BODY STYLE: 2-Door Hatchback MODEL YEAR: 1982

NHTSA NO.: R & D COLOR: Mahogany

ENGINE DATA: TYPE: Transverse CYLINDERS: 4 DISPLACEMENT 1700 CC

TRANSMISSION DATA: 4 Speed Manual

DATE VEHICLE RECEIVED: 8/28/84 ODOMETER READING: 64050

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	No	AUTOMATIC TRANSMISSION	No
POWER BRAKES	No	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	No	AIR CONDITIONING	No
RADIO	No	ANTI-SKID BRAKE	No
CLOCK	Yes	REAR WINDOW DEFROSTER	Yes
OTHER			

REMARKS:

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

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

VEHICLE MANUFACTURED BY: Volkswagen of America, Inc.

DATE OF MANUFACTURE: 1982

GVWR: 2822 LBS.,

GAWR: FRONT 1609 LBS., REAR 1278 LBS.

*Windshield cracked on right side, pitted in the center and the left rear tail light assembly was dented and rusted.

VEHICLE TIRE DATA

RECOMMENDED COLD TIRE PRESSURE: FRONT 27 psi; REAR 31 psi

TIRES ON VEHICLE (MFG. & LINE, SIZE): Michelin XZX P155 80 R 13

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 2

IS SPARE TIRE "SPACE SAVER"? No

IS SPARE TIRE STANDARD EQUIPMENT? Yes

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

RIGHT FRONT	660	LBS.	RIGHT REAR	310	LBS.
LEFT FRONT	650	LBS.	LEFT REAR	340	LBS.
TOTAL FRONT WEIGHT	1310		LBS. (66.8 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	650		LBS. (33.2 % OF TOTAL VEHICLE WEIGHT)		
TOTAL DELIVERED WEIGHT	1960		LBS.		

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 24 1/4	;LF 24 1/4	;RR 24 1/2	;LR 24 1/4
PRE-TEST ATTITUDE:	RF 23 1/4	;LF 23 3/4	;RR 21 1/2	;LR 21 3/4
POST-TEST ATTITUDE:	RF 22 1/8	;LF 24 5/8	;RR 21	;LR 20 7/8

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 185 LBS. CARGO:

RIGHT FRONT	730	LBS.	RIGHT REAR	550	LBS.
LEFT FRONT	700	LBS.	LEFT REAR	570	LBS.
TOTAL FRONT WEIGHT	1430		LBS. (56.1 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1120		LBS. (43.9 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	2550		LBS.		

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

TEST FLUID DATA

TEST FLUID TYPE: RED STODDARD SOLVENT #2; SPEC. GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

"USEABLE" CAPACITY*: NA GALLONS

TEST VOLUME: 5.0 GALLONS

FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): 10.0 GALLONS

DETAILS OF FUEL SYSTEM: DNA

ELECTRIC FUEL PUMP: No

FUEL INJECTION: Yes

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT OPERATING? DNA

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL ON DOOR, POST, GLOVEBOX, ETC.

VEHICLE LOAD (UP TO CAPACITY): FRONT 27 psi; REAR 27 psi

RECOMMENDED TIRE SIZE: P 155 SR 13 LOAD RANGE X B, C,

VEHICLE CAPACITY: TYPES OF SEATS: Front - Bucket
Rear - Bench

NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 2 FRONT

2 REAR

CARGO LOAD 185 LBS.

4 TOTAL

TOTAL 785 LBS.

*WITH ENTIRE FUEL SYSTEM FILLED WITH FUEL TANK THROUGH CARBURETOR BOWL.

TEST CONDITIONS

TEST NUMBER: 840913

DATE OF TEST: September 13, 1984

TIME OF TEST: 11:40

WIND VELOCITY: 5-10 mph 243° SW

HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA: 78° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 82° F

SUBJECT VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
VEHICLE TEST WEIGHT (LBS.)	2550	2553
MDB TEST WEIGHT (LBS.)	2990	3000
MDB VELOCITY (MPH)*	38.9	39.1
IMPACT POINT (INCHES)**	37.0	37.0

DUMMIES

	<u>DRIVER</u>	<u>MIDDLE PASSENGER</u>	<u>RT. FRONT PASSENGER</u>	<u>LEFT REAR PASSENGER</u>	<u>RT. REAR PASSENGER</u>
TYPE:	SID			SID	
SERIAL NO.:	06			U02	
INSTRUMENTATION:					
HEAD ACCEL.:	Yes			Yes	
CHEST ACCEL.:	Yes (Upper/Lower)			Yes (Upper/Lower)	
FEMUR L.C.'S:	No			No	
OTHER:	Pelvis/Ribs			Pelvis/Ribs	
RESTRAINT SYSTEM:	Both dummies were unrestrained				

* As measured over final one foot of travel.

** As measured forward of the midpoint of the vehicle's wheelbase.

VISIBLE DUMMY CONTACT POINTS:

	DRIVER 06	PASSENGER U02
Head	<u>Right B-Pillar, Barrier Face, Seat Back Left and Right Side</u>	<u>C-Pillar</u>
Chest	<u>Inner Door Panels</u>	<u>Left Rear Quarter Panel</u>
Abdomen	<u>Driver's Inner Door Panel</u>	<u>Left Rear Quarter Panel</u>
Left Knee	<u>Driver's Inner Door Panel</u>	<u>Left Rear Quarter Panel</u>
Right Knee	<u>Left Knee</u>	<u>Left Knee</u>

DOOR OPENING:

	LEFT	RIGHT
Front	<u>DNA*</u>	<u>Easy</u>
Rear	<u>DNA</u>	<u>DNA</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Front	<u>No</u>	<u>Yes</u>
Rear	<u>Yes</u>	<u>Yes</u>

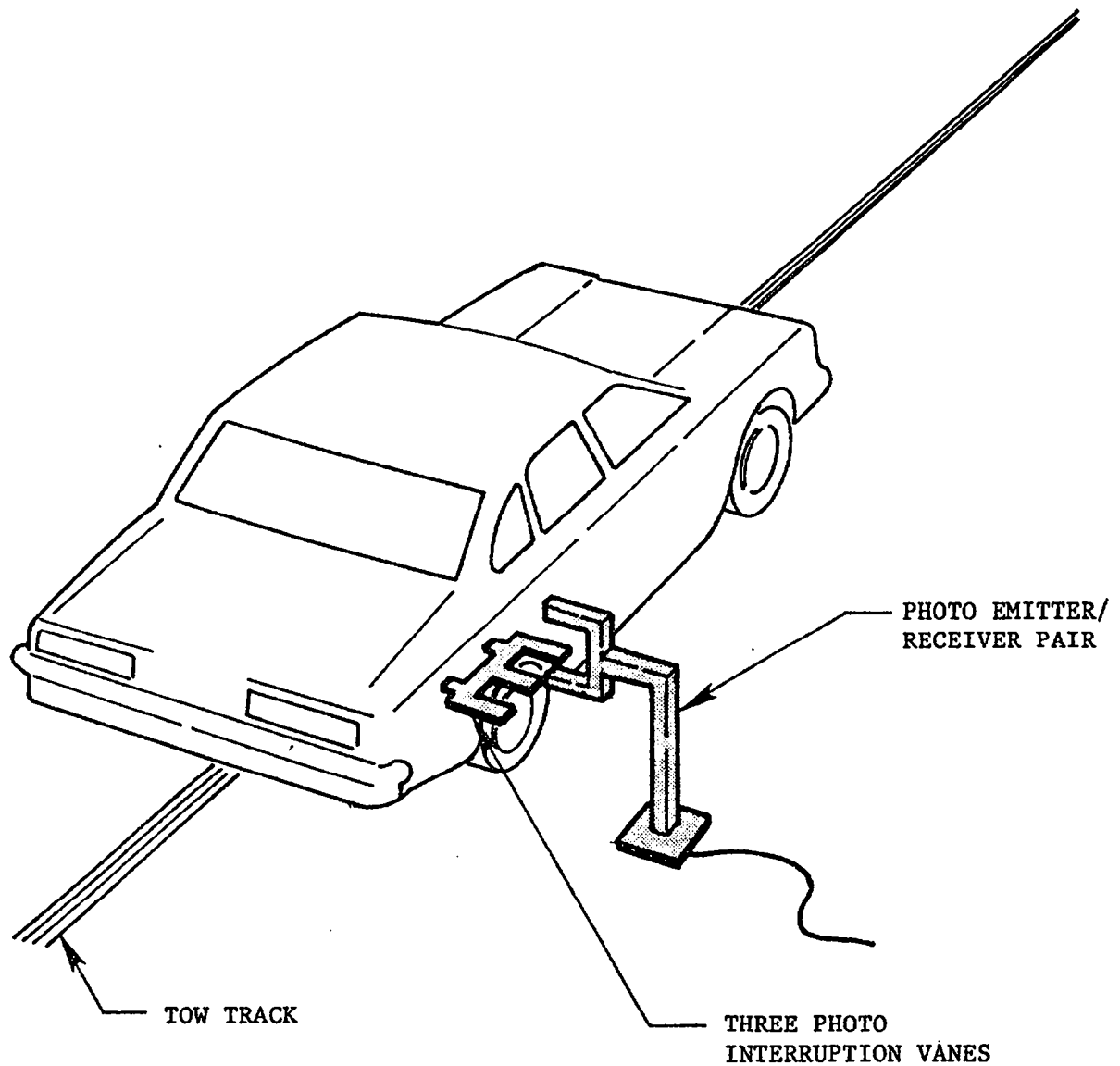
GLAZING DAMAGE:

Windshield shattered, left front and rear side
windows shattered, no backlight damage.

OTHER NOTABLE IMPACT EFFECTS:

*The driver's door was to remain closed for subsequent door opening effort studies.

IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane is located two inches before impact.

The vanes have one foot spacing.

VEHICLE TEST WEIGHT CALCULATION

$$\begin{aligned}\text{Test Weight} &= \text{Unloaded Delivered Weight*} + \\ &\quad \text{Number of Dummies X 174 lbs.} + \\ &\quad \text{Cargo Weight} \\ &= 2020 + 2 \times 174 + 185 \text{ lbs.} \\ &= 2553 \text{ lbs.}\end{aligned}$$

To achieve test weight, 5.0 gallons of Stoddard Solvent were added in the fuel tank. The weight of the test vehicle was measured by placing each wheel on a Loadmeter Corporation Hiway Loadometer.

$$\begin{aligned}\text{* Unloaded Delivered Weight} &= \text{Measured Weight} + \text{Estimated 10 Gallons Fuel} \\ &= 1960 \text{ lbs} + 60 \text{ Lbs} \\ &= 2020 \text{ lbs}\end{aligned}$$

TEST ANOMALIES

The cable for the Left Front Door accelerometer in Position 8, LFDYG2, appears to have been "pinched" from 65 to 115 msec and from 155 to 250 msec. In between these times the cable seemed to straighten out and record accurate data.

SECTION 3.0
DATA REQUIRED BY R & D

The following pages are included in this section:

1. Dummy temperature control and position data
2. Dummy kinematic summary
3. Vehicle crush data
4. Dummy and vehicle accelerometer location and data summary
5. High speed camera information
6. Transducer information

DUMMY TEMPERATURE CONTROL AND POSITIONING

The vehicle was kept inside the temperature controlled crash test building until approximately 2 hours prior to the test. Temperature inside the vehicle and ambient temperature at the crash area were recorded. Dummy temperature while outside the crash test building was maintained portably until approximately 1 minute prior to the test.

The following table summarizes the steps taken to position the instrumented, calibrated dummies in the test vehicle.

DUMMY PLACEMENT AND POSITIONING

<u>SIDE IMPACT DUMMY</u>	<u>DRIVER DSP</u>	<u>REAR PASSENGER DSP</u>
HEAD	Surface of transverse instrument mounting platform is as horizontal as possible without inducing torso movement & midsagittal plane falls in longitudinal plane.	Surface of transverse instrument mounting platform is as horizontal as possible without inducing torso movement & midsagittal plane falls in longitudinal plane.
UPPER TORSO	Placed against seat back. Midsagittal plane is vertical and centered on bucket seat.	Placed against seat back. Midsagittal plane is vertical and contained in the same longitudinal plane as the driver's midsagittal plane.
LOWER TORSO	Midsagittal plane is vertical and centered on bucket seat.	Midsagittal plane is vertical and contained in the same longitudinal plane as the driver's midsagittal plane.
UPPER LEGS (thighs or femurs)	Placed against seat cushion. Planes defined by femur and tibia centerlines are as close as possible to vertical.	Placed against seat cushion. Planes defined by femur and tibia centerlines are as close as possible to vertical.
KNEES	Knees set 14.5" apart between pivot bolt head outer surfaces. Outer surface of right knee pivot bolt is 8.6" from midsagittal plane of dummy. Outer surface of left knee pivot bolt is 5.9" from midsagittal plane of dummy.	Located so that planes defined by femur and tibia centerlines are as close as possible to vertical.
LOWER LEGS	Plane defined by femur and tibia centerlines are as close as possible to vertical longitudinal plane.	Plane defined by femur and tibia centerlines are as close as possible to vertical longitudinal plane.
RIGHT FOOT	Placed on undepressed accelerator pedal -- rearmost point of heel on floorplan in plane of pedal.	Centerline falls in vertical longitudinal plane. Placed on floor as far forward as possible without front seat interference.
LEFT FOOT	Placed on toeboard -- rearmost point of heel on floorpan as close as possible to intersection of toeboard and floorpan. Centerline falls in vertical longitudinal plane.	Centerline falls in vertical longitudinal plane. Placed on floor as far forward as possible without front seat interference.

*NOTE: THE SIDE IMPACT DUMMY DOES NOT INCLUDE ARMS.

DUMMY IN-VEHICLE POSITION RECORDING SHEET

VEHICLE NHTSA NO. R & D

MFR./MAKE/MODEL: Volkswagen Rabbit

FRONT SEAT TYPE: BENCH
 X BUCKET
 SPLIT BENCH

ADJUSTER TYPE: X MANUAL
 POWER

BUCKET SEAT BACK TYPE: FIXED
 X ADJUSTABLE

TECHNICIANS:

1. P. Clay
2. B. Miller
3. D. LeVally

POSITIONING DATE: 9/13/84

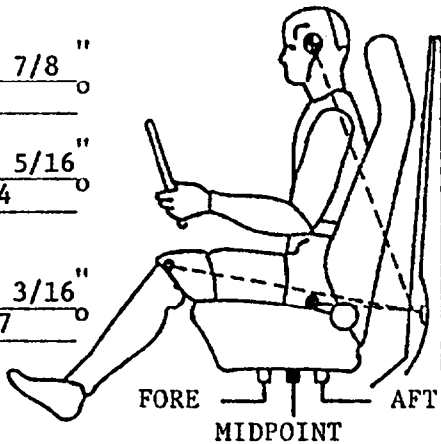
AMBIENT TEMP.: 68° F. TIME: 7:00

DRIVER DUMMY # 06

HEAD 21 7/8 "
 TARGET*38

KNEE 32 5/16 "
 JOINT 104

APPROX.
 "H" 19 3/16 "
 POINT 127

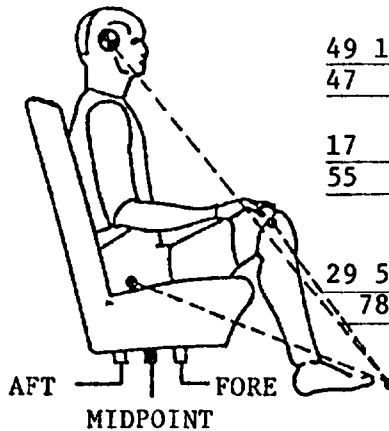


REAR PASSENGER DUMMY # U02

49 1/2 "HEAD
47 °TARGET**

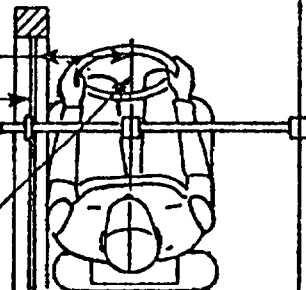
17 "KNEE
55 °JOINT

APPROX.
29 5/8 " "H"
78 °POINT



DOOR
 GLASS
 HEIGHT***
11 3/16 "
10 9/16 "

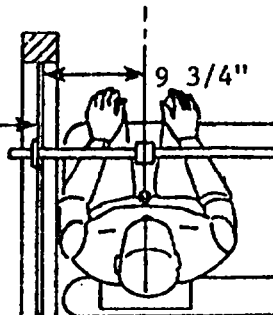
LATERAL BAR
 ADJUSTABLE
 POINTER



DRIVER
 DUMMY #
 06

DOOR
 GLASS
 HEIGHT

DNA

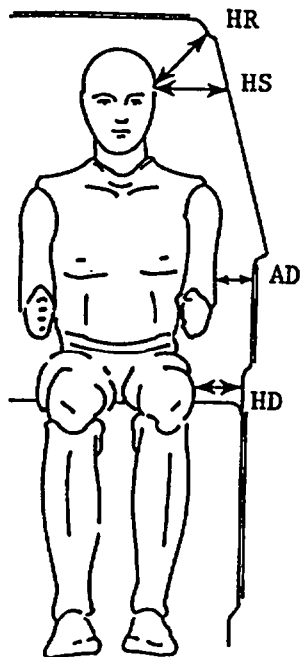
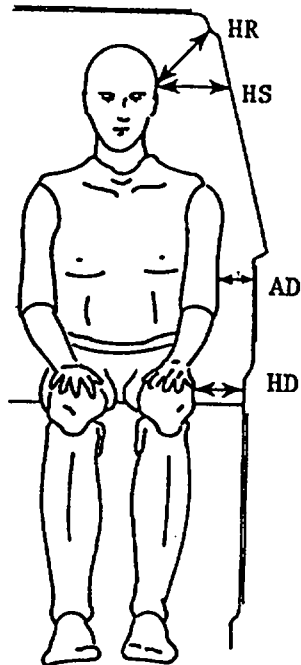


PASSENGER
 DUMMY #
 U02

*All driver dummy dimensions referenced to top of striker bolt and all angles referenced to vertical.

**All passenger dummy dimensions referenced to front seat back latch bolt with front seat in mid-position and all angles referenced to vertical.

***Door glass height is equal on the right and left side of vehicle at dummy nose level.



DRIVER
06

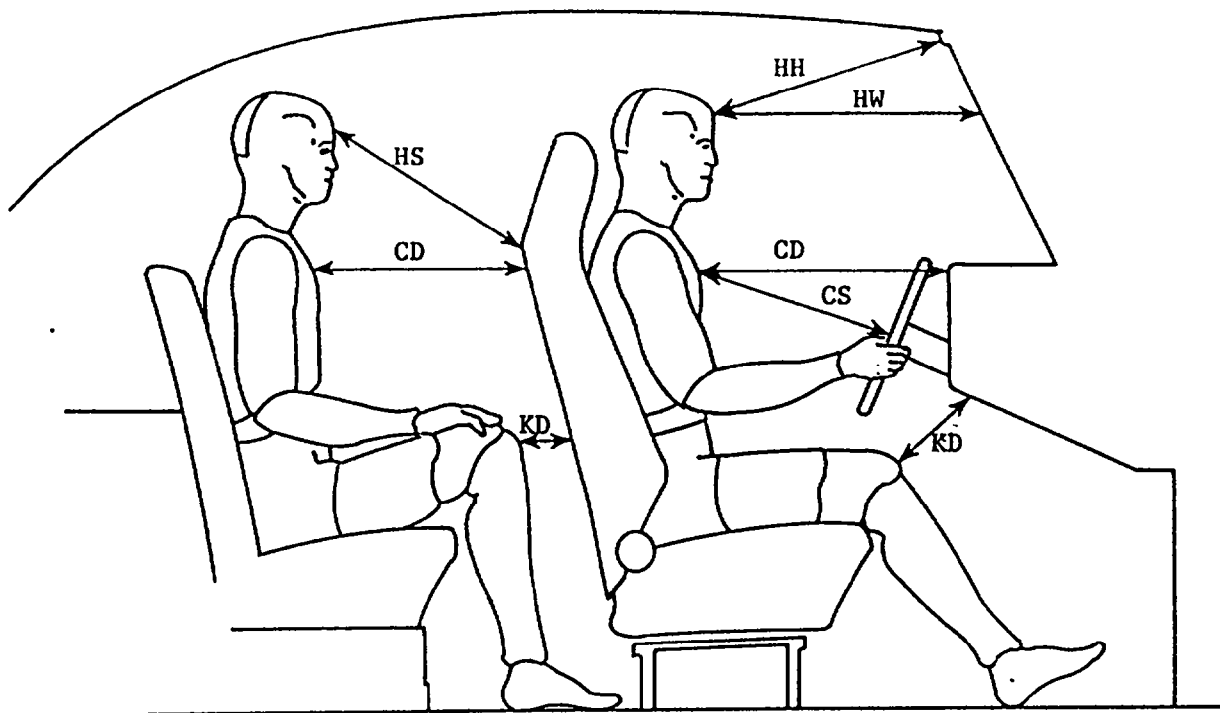
PASSENGER
U02

HR	6 1/4	4 5/8*
HS	7 5/8	7 5/8
AD	1/2*	4 5/8*
HD	5 5/8*	2 1/8*

ALL MEASUREMENTS IN INCHES

*Measurements were made from the dummy to the modified padding.

DUMMY LATERAL CLEARANCE DIMENSIONS



DRIVER

PASSENGER

06

U02

HH	13	DNA
HW	17 1/2	DNA
HS	DNA	25 3/16
CD	18 3/16	19 7/8
CS	10 15/16	DNA
KDL	4 5/16	5 7/8
KDR	3 15/16	5 3/8

ALL MEASUREMENTS IN INCHES

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

DUMMY KINEMATIC SUMMARY

DRIVER

During impact, the dummy's torso contacted the driver's inner door panel and the head contacted the driver's side glass and possibly the top of the deformable barrier face. The dummy rebounded from the driver's door and the torso struck the front passenger's door while the head struck the right side B-pillar. The dummy came to rest seated in the front passenger seat facing the driver's side with its feet on the driver's side floor.

PASSENGER

During impact, the dummy's torso contacted the left rear inner quarter panel and the head contacted the C-pillar near the side header. After the dummy's torso struck the inner quarter panel, the dummy came to rest seated in the left rear passenger's seat with the torso leaning to the right and its feet underneath the driver's seat.

VEHICLE EXTERIOR PROFILES AND STATIC CRUSH

ZERO DISTANCE AT PROJECTED IMPACT POINT*

LOCATION	HEIGHT (in)	6	0	6	12	18	24	30	36	42	48	54	60	66	72	78
		PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)														
Axle Height	11.8	X	X	20.0	19.9	19.9	19.9	19.9	19.9	20.0	20.0	20.1	20.2	20.3	X	X
H-Point	20.0	X	17.0	18.1	18.2	18.1	18.1	18.1	18.1	18.1	18.2	18.3	18.3	18.4	17.0	X
Mid Door	25.0	16.5	17.9	17.8	17.8	17.7	17.7	17.6	17.6	17.7	17.8	17.8	17.8	17.9	18.0	17.3
Window Sill	35.0	20.0	19.6	19.4	19.4	19.4	19.3	19.3	19.3	19.4	19.4	19.5	19.6	19.7	19.9	20.0
Window Top	54.0	X	X	X	X	X	27.4	27.1	27.0	26.9	26.9	26.9	26.9	27.0	27.2	27.5

POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)

Axle Height	11.8	X	X	27.1	29.6	29.0	28.5	27.8	27.3	26.9	26.6	26.3	25.0	23.6	X	X
H-Point	20.0	X	27.1	30.7	32.3	32.4	32.5	32.6	32.3	32.0	31.9	32.1	31.2	30.0	26.3	X
Mid Door	25.0	24.1	25.9	28.9	31.3	31.5	31.8	31.9	33.0	32.3	32.4	32.8	32.6	31.9	28.6	24.0
Window Sill	35.0	22.5	23.2	23.8	28.9	29.5	30.3	31.0	31.7	32.8	33.3	34.9	34.6	31.6	27.4	23.9
Window Top	54.0	X	X	X	X	X	30.6	30.4	30.5	30.9	31.4	31.6	30.8	30.0	29.5	29.1

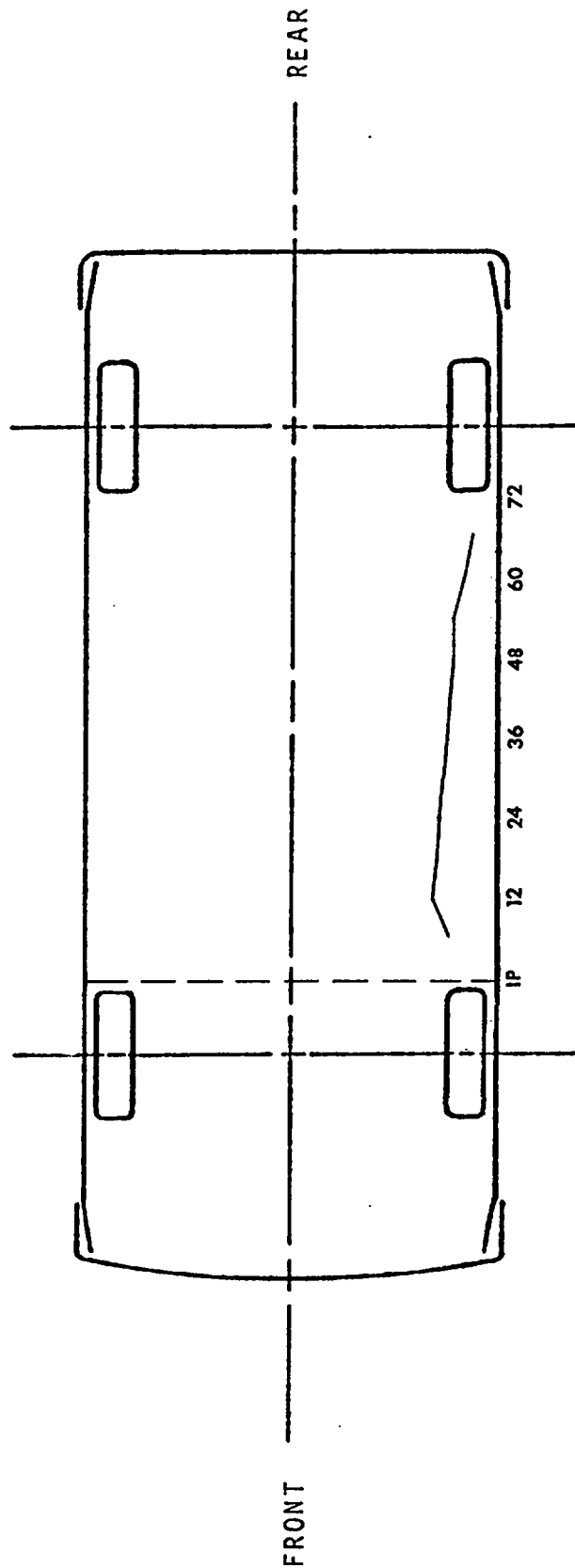
STATIC CRUSH (IN)

Axle Height	11.8	X	X	7.1	9.7	9.1	8.6	7.9	7.4	6.9	6.6	6.2	4.8	3.3	X	X
H-Point	20.0	X	10.1	12.6	14.1	14.3	14.4	14.5	14.2	13.9	13.7	13.8	12.9	11.6	9.3	X
Mid Door	25.0	7.6	8.0	11.1	13.5	13.8	14.1	14.3	15.4	14.6	14.6	15.0	14.8	14.0	10.6	6.7
Window Sill	35.0	2.5	3.6	4.4	9.5	10.1	11.0	11.7	12.4	13.4	13.9	15.4	15.0	11.9	7.5	3.9
Window Top	54.0	X	X	X	X	X	3.2	3.3	3.5	4.0	4.5	4.7	3.9	3.0	2.3	1.6

* Projected impact point is 37 inches forward of driver's side wheelbase midpoint. Column readings are front to rear from left to right.

** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

VEHICLE EXTERIOR STATIC CRUSH PROFILE

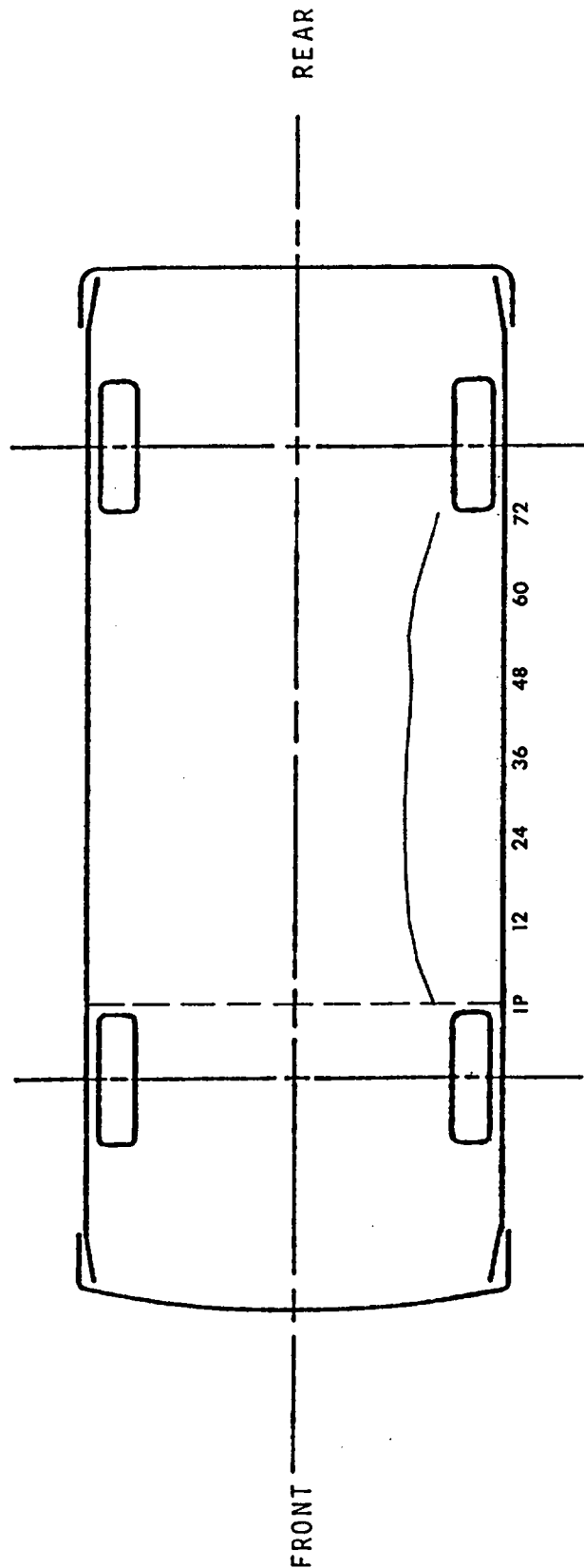


PROFILE LEVEL EQUALS AXLE HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Length of Car = 154.25"
Width of Car = 63.25"

Maximum Crush = 9.7"
Length of Crush = 60" (approximately)

VEHICLE EXTERIOR STATIC CRUSH PROFILE

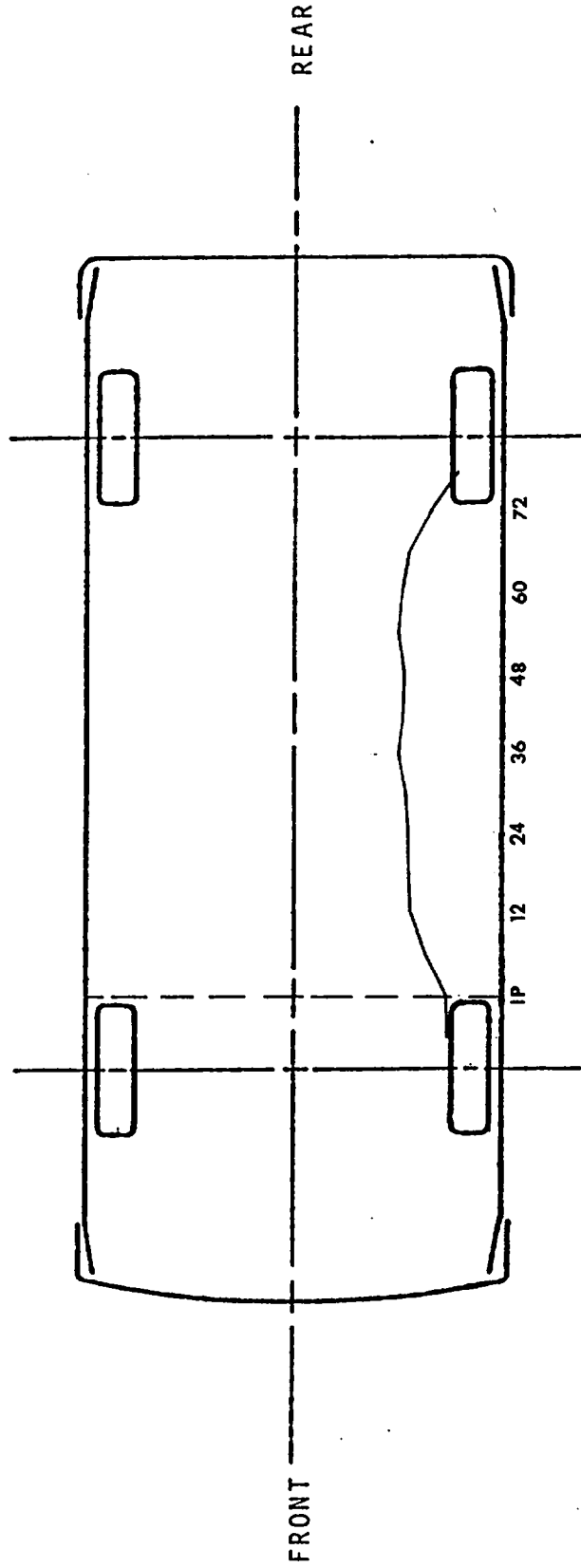


PROFILE LEVEL EQUALS H-POINT HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Length of Car = 154.25"
Width of Car = 63.25"

Maximum Crush = 14.5"
Length of Crush = 72" (approximately)

VEHICLE EXTERIOR STATIC CRUSH PROFILE

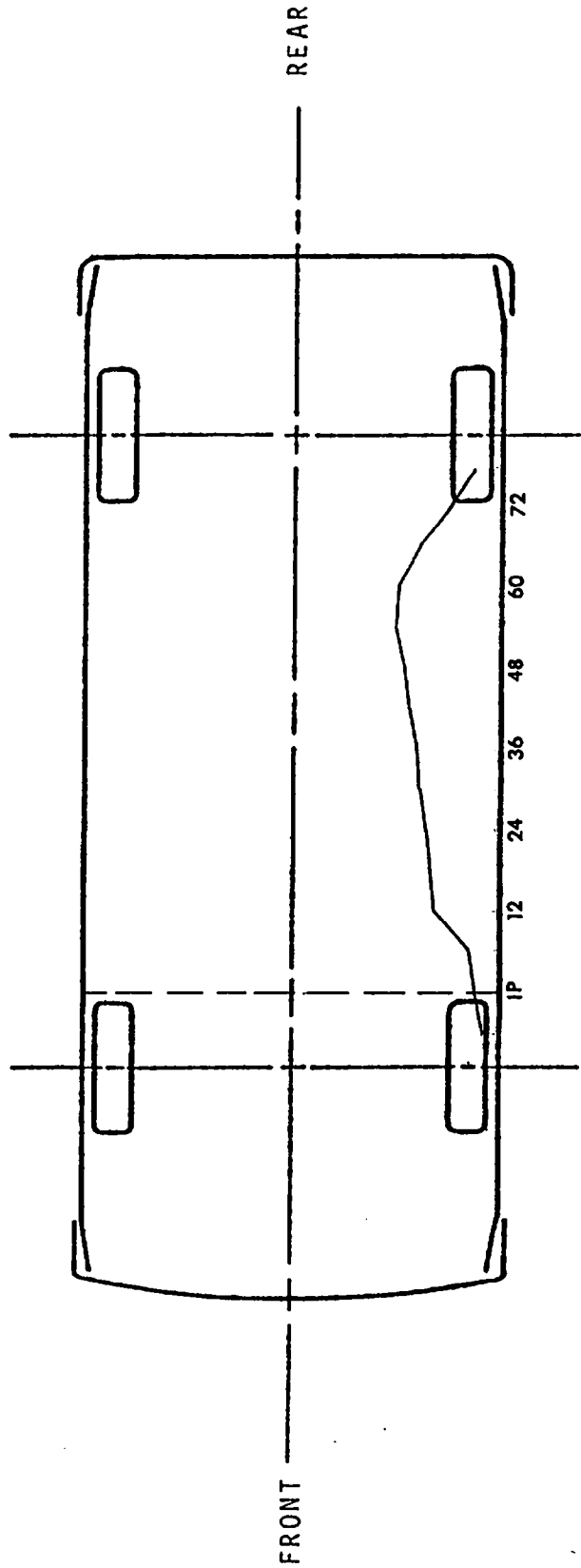


PROFILE LEVEL EQUALS MID-DOOR HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Length of Car = 154.25"
Width of Car = 63.25"

Maximum Crush = 15.4"
Length of Crush = 84" (approximately)

VEHICLE EXTERIOR STATIC CRUSH PROFILE

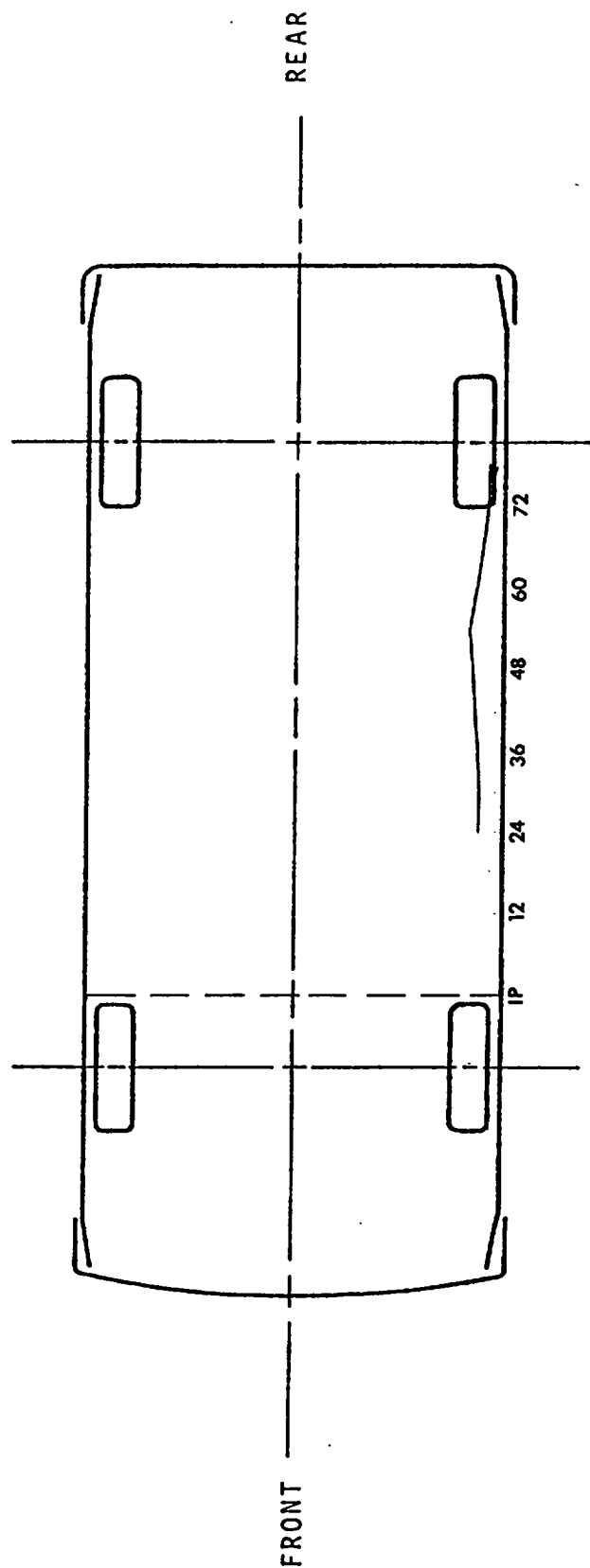


PROFILE LEVEL EQUALS WINDOW SILL HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Length of Car = 154.25"
Width of Car = 63.25"

Maximum Crush = 15.4"
Length of Crush = 84" (approximately)

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Length of Car = 154.25"
Width of Car = 63.25"

Maximum Crush = 4.7
Length of Crush = 54" (approximately)

SIDE IMPACT DUMMY DATA SUMMARY

	DRIVER DUMMY				PASSENGER DUMMY			
	POSITIVE		NEGATIVE		POSITIVE		NEGATIVE	
	DIRECTION*		DIRECTION**		DIRECTION*		DIRECTION**	
	MAX	TIME	MAX	TIME	MAX	TIME	MAX	TIME
	(g)	(msec)	(g)	(msec)	(g)	(msec)	(g)	(msec)
HEAD ACCELERATION								
LONGITUDINAL	11.26	121.13	135.39	73.63	56.88	135.88	28.19	77.75
LATERAL	59.00	73.13	13.05	24.63	69.07	48.13	13.69	136.63
VERTICAL	4.33	17.88	67.95	58.25	42.39	55.25	30.73	43.50
RESULTANT		151.68 @	73.63			73.44 @	50.50	
HIC	1067.84	from 39.25 to 78.63			477.59	from 41.38 to 64.13		
CHEST ACCELERATION								
UPPER SPINE								
LONGITUDINAL	17.97	60.62	14.87	52.50	3.56	28.75	27.35	50.63
LATERAL (P)***	73.65	32.50	27.42	58.13	41.83	43.75	2.46	23.12
LATERAL (R)***	78.11	33.13	26.72	58.13	43.52	43.75	2.64	23.12
VERTICAL	10.29	60.00	9.72	37.50	6.43	20.00	22.86	52.50
RESULTANT (P)		75.21 @	32.50			44.75 @	43.75	
RESULTANT (R)		79.66 @	33.13			46.33 @	43.75	
DELTA V (MPH)****		26.9 @	49.37 (P)			25.7 @	105.62 (P)	
		27.7 @	50.00 (R)			26.6 @	105.62 (R)	
LOWER SPINE								
LONGITUDINAL	27.23	46.25	25.36	51.25	3.07	66.25	23.48	48.75
LATERAL (P)	94.84	24.38	23.58	50.00	55.46	40.63	8.20	59.38
LATERAL (R)	100.28	23.75	21.52	50.00	57.80	40.63	6.91	58.13
VERTICAL	10.83	21.25	1.54	38.12	7.56	47.50	8.33	65.63
RESULTANT (P)		96.40 @	24.38			57.06 @	33.75	
RESULTANT (R)		101.55 @	23.75			58.95 @	33.75	
DELTA V (MPH)		32.1 @	45.62 (P)			23.3 @	81.25 (P)	
		34.1 @	46.25 (R)			25.7 @	81.88 (R)	
LEFT UPPER RIB								
LATERAL (P)	91.25	20.62	8.11	42.50	44.94	44.38	---	--- E
LATERAL (R)	92.67	20.00	10.34	60.00	48.00	45.00	---	--- E
DELTA V (MPH)		28.1 @	57.50 (P)			29.5 @	115.00 (P)	
		27.8 @	57.50 (R)			31.1 @	115.00 (R)	
LEFT LOWER RIB								
LATERAL (P)	77.90	18.75	54.25	55.00	56.00	46.25	0.57	52.50
LATERAL (R)	85.84	18.13	56.97	55.00	52.79	46.88	6.49	52.50
DELTA V (MPH)		29.5 @	51.88 (P)			27.3 @	75.00 (P)	
		30.2 @	51.88 (R)			27.1 @	74.38 (R)	
PELVIS ACCELERATION								
LONGITUDINAL	3.74	58.62	23.36	24.38	8.47	20.63	---	---O
LATERAL	94.68	25.00	3.81	68.00	---	---O	10.17	77.25
VERTICAL	10.72	45.63	8.74	17.63	16.58	31.75	11.28	29.88
RESULTANT		97.30 @	25.00			---	---O	
DELTA V (MPH)		28.4 @	63.38			28.0 @	63.25O	

SIDE IMPACT DUMMY DATA SUMMARY CONTD

		DRIVER DUMMY				PASSENGER DUMMY			
		POSITIVE DIRECTION*		NEGATIVE DIRECTION**		POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
		MAX (in)	TIME (msec)	MAX (in)	TIME (msec)	MAX (in)	TIME (msec)	MAX (in)	TIME (msec)
RIB DEFLECTION	†	1.96	47.25	---	--- ε	1.78	77.13	---	--- ε

* LONGITUDINAL:	FORWARD	**LONGITUDINAL:	REARWARD
LATERAL:	RIGHTWARD	LATERAL:	LEFTWARD
VERTICAL:	UPWARD	VERTICAL:	DOWNWARD

*** (P) = Primary Sensor, (R) = Redundant Sensor

**** For dummy channels, Delta V is the velocity change at the approximate time of separation from the contact area.

† Compression: Positive

ε There were no negative values in the time interval of interest.

o The CTM has judged that intermittent rattling has occurred in these channels and, therefore, the peak values reported are questionable as are applicable resultants and Delta V's.

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	RIGHT SILL AT FRONT SEAT (LONGITUDINAL) (LATERAL) (VERTICAL) (RESULTANT)	83.4	23.5	10.0				
		$\Delta V = -2.1$ mph @ 100.75 msec			3.70	32.75	8.12	18.88
		$\Delta V = 17.3$ mph @ 100.75 msec			15.44	37.25	0.70	98.38
					3.66	62.00	9.82	35.25
						17.18 @ 36.25		
2	RIGHT SILL AT REAR SEAT (LONGITUDINAL) (LATERAL) (VERTICAL) (RESULTANT)	61.5	23.6	9.0				
		$\Delta V = \text{---}$ --- τ			5.43	33.63	7.77	19.13
		$\Delta V = 19.8$ mph @ 100.75 msec			16.82	58.75	---	--- ϵ
					6.63	23.13	9.05	36.38
						17.36 @ 36.25		
3	REAR DECK OVER AXLE (LONGITUDINAL) (LATERAL) (VERTICAL) (RESULTANT)	32.0	0.0	7.0				
		$\Delta V = -1.9$ mph @ 100.75 msec			6.45	27.13	15.94	20.13
		$\Delta V = 24.7$ mph @ 100.75 msec			19.75	21.75	0.44	100.75
					4.12	31.62	9.27	42.75
						25.25 @ 20.75		
4	LEFT SILL AT REAR SEAT (LATERAL)	61.0	-23.8	8.5				
		$\Delta V = 11.2$ mph @ 76.63 msec			29.85	7.88	4.16	65.00
5	LEFT SILL AT FRONT SEAT (LATERAL)	83.4	-23.4	10.0				
		$\Delta V = \text{---}$ --- τ			62.83	8.38	65.65	14.13
6	LEFT FRONT DOOR CENTERLINE (LATERAL)	80.8	-25.8	23.4				
		$\Delta V = \text{---}$ --- τ			69.73	11.13	81.61	21.50
7	RIGHT REAR COMPARTMENT (LONGITUDINAL)	31.0	16.5	15.0				
					4.49	34.38	10.50	20.63
8	MIDREAR OF LEFT FRONT DOOR (LATERAL)	60.6	-26.4	23.4				
		$\Delta V = \text{---}$ --- γ			204.94	7.50 γ	215.56	27.00 γ
9	UPPER LEFT FRONT DOOR CENTERLINE (LATERAL)	81.5	-25.6	32.5				
		$\Delta V = \text{---}$ --- τ			214.78	16.88	166.31	27.13
10	MIDFRONT OF LEFT FRONT DOOR (LATERAL)	99.6	-25.8	22.3				
		$\Delta V = 22.9$ mph @ 16.25 msec			112.59	7.00	72.41	23.75
11	UPPER REAR OF LEFT REAR DOOR (LATERAL)	70.4	-25.9	32.3				
		$\Delta V = \text{---}$ --- τ			180.54	19.38	365.64	26.25

* Reference: X - Rear Bumper (+ Forward), Y - Vehicle Centerline (+ To Right),
Z - Ground Level (+ Up)

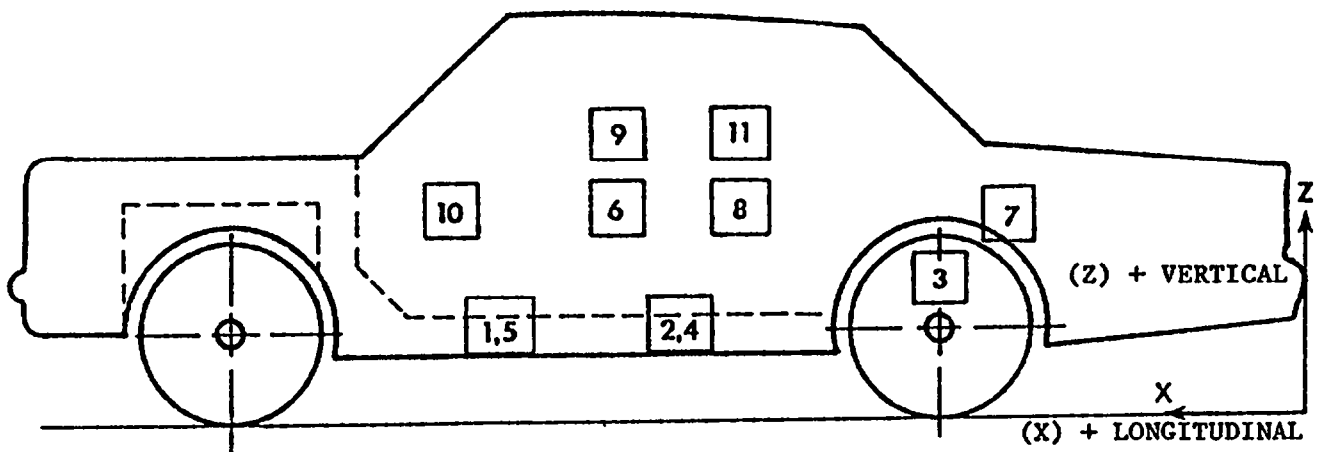
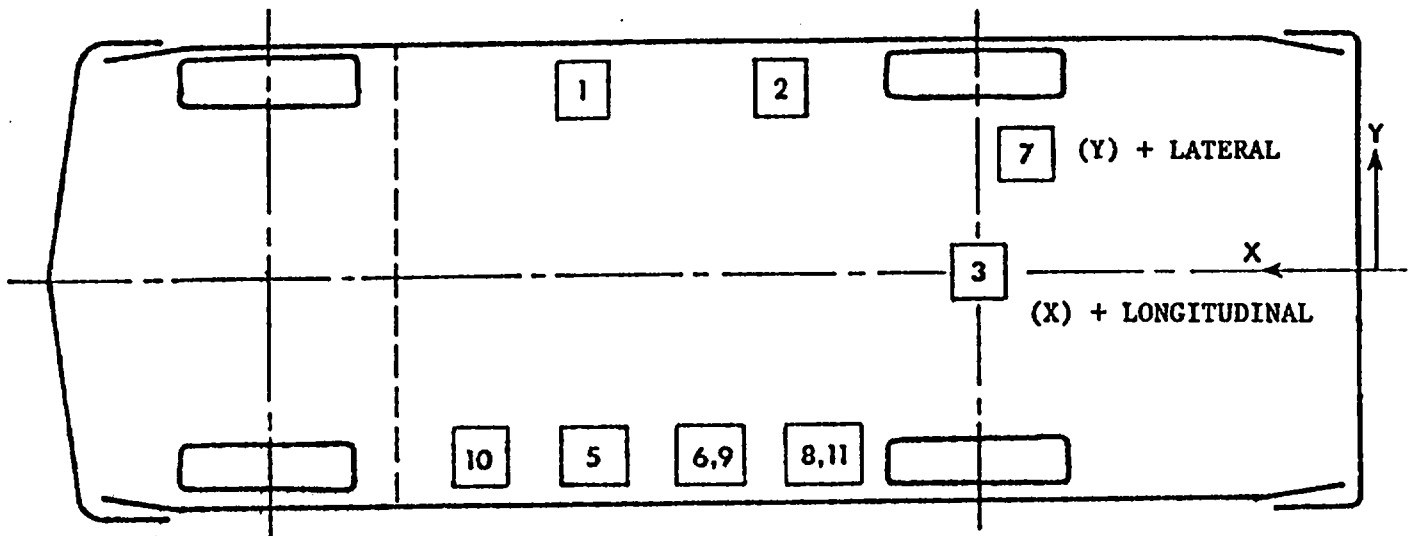
All measurements of accelerometer locations in inches.

γ See TEST ANOMALIES

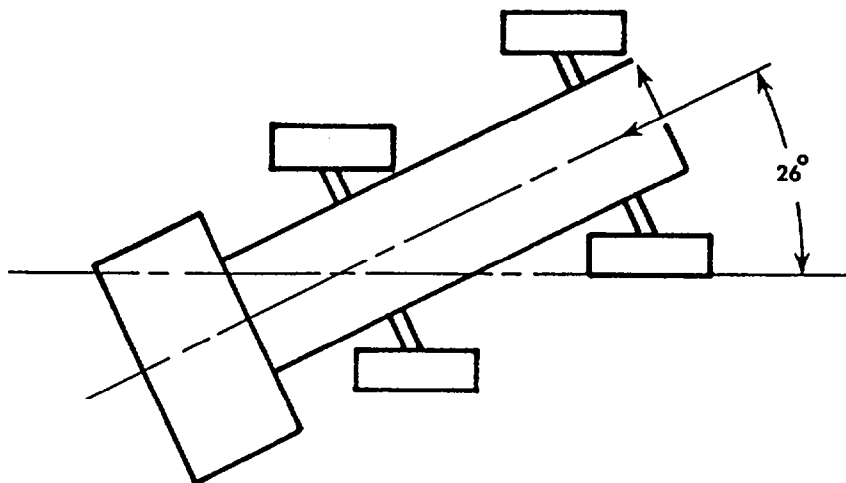
ϵ There were no negative values in the time interval of interest.

τ This Delta V appears unrealistic.

VEHICLE ACCELEROMETER LOCATIONS



MOVING BARRIER ACCELEROMETER LOCATIONS AND DATA SUMMARY



NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	CENTER OF GRAVITY	74.5	0.0	11.5				
	(LONGITUDINAL)	$\Delta V = -17.4 \text{ mph @ } 100.75 \text{ msec}$			---	---	14.39	38.25
	(LATERAL)	$\Delta V = -4.8 \text{ mph @ } 100.75 \text{ msec}$			0.63	0.00	5.22	25.00
	(VERTICAL)				12.30	50.75	13.93	60.75
	(RESULTANT)					17.23 @ 60.62		
2	FRONT FRAME MEMBER	130.3	0.0	11.3				
	(LONGITUDINAL)	$\Delta V = -18.2 \text{ mph @ } 100.75 \text{ msec}$			---	---	22.59	20.00
3	REAR FRAME MEMBER	23.3	0.0	11.5				
	(LONGITUDINAL)	$\Delta V = -16.4 \text{ mph @ } 100.75 \text{ msec}$			---	---	13.23	37.75

* Reference: X - Rear Most Point of Frame (+ To Forward), Y - Barrier Centerline (+ To Right), Z - Ground Level (+ To Up)

All measurements of accelerometer locations in inches.

* There were no positive values in the time interval of interest.

HIGH SPEED CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Overhead	Photosonic 1B	8	487	Vehicle dynamics
2	Overhead	Photosonic 1B	25	500	Close-up of impact point
3	Onboard MDB	Photosonic 1B	25	495	Close-up of impact point
4	Onboard MDB	Stalex	13	505	Driver kinematics
5	Ground level - right	Hycam	25	507	Overall view
6	Ground level - left	Photosonic 1B	17	515	Overall view
7	Onboard vehicle	Photosonic 1B	8	800	Driver kinematics - front view
8	Onboard vehicle	Photosonic 1B	8	802	Driver kinematics
9	Onboard vehicle	Photosonic 1B	8	800	Passenger kinematics

NOTE: CAMERAS ARE NUMBERED ACCORDING TO SPLICING SEQUENCE OF FILM.
 (24 fps) REAL TIME MOVIE FILM COVERAGE OF PRE-CRASH, POST-CRASH
 AND CRASH EVENT SPLICED AT START AND END OF FILM.

LOCATIONS OF OFFBOARD HIGH SPEED CAMERAS

CAMERA NO.	X	Y	Z
1	0	0	25'
2	0	0	25'
5	24'10"	58'8"	45"
6	-20'11"	-11'	45"

Origin of Coordinate System is Point of Impact

+X = Forward with Respect to Striking Vehicle's Velocity Vector
+Y = Rightward with Respect to Striking Vehicle's Velocity Vector
+Z = Upward with Respect to Striking Vehicle's Velocity Vector

NON-GOVERNMENT FURNISHED TRANSDUCER INFORMATION

PARAMETER BEING MEASURED	TYPE OF TRANSDUCER	MODEL NUMBER	SERIAL NUMBER	MFGR.	DATE OF LAST CALIBRATION	SENSITIVITY	DESIRED FULL SCALE (ENGR. UNITS)
BOGXG	Accel	4-202-0001	18845	Bell Howell	5/2/84	0.237 MV/G	50 G
BOGYG	Accel	4-202-0001	18858	Bell Howell	5/2/84	0.236 MV/G	50 G
BOGZG	Accel	4-202-0001	18857	Bell Howell	5/2/84	0.239 MV/G	50 G
BFCXG	Accel	4-202-0001	18240	Bell Howell	5/2/84	0.239 MV/G	50 G
BRCXG	Accel	4-202-0001	19022	Bell Howell	5/2/84	0.220 MV/G	50 G

All dummy and struck vehicle accelerometers were Government Furnished Equipment and were Endevco 2264 Accelerometers.

APPENDIX A
PHOTOGRAPHS



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

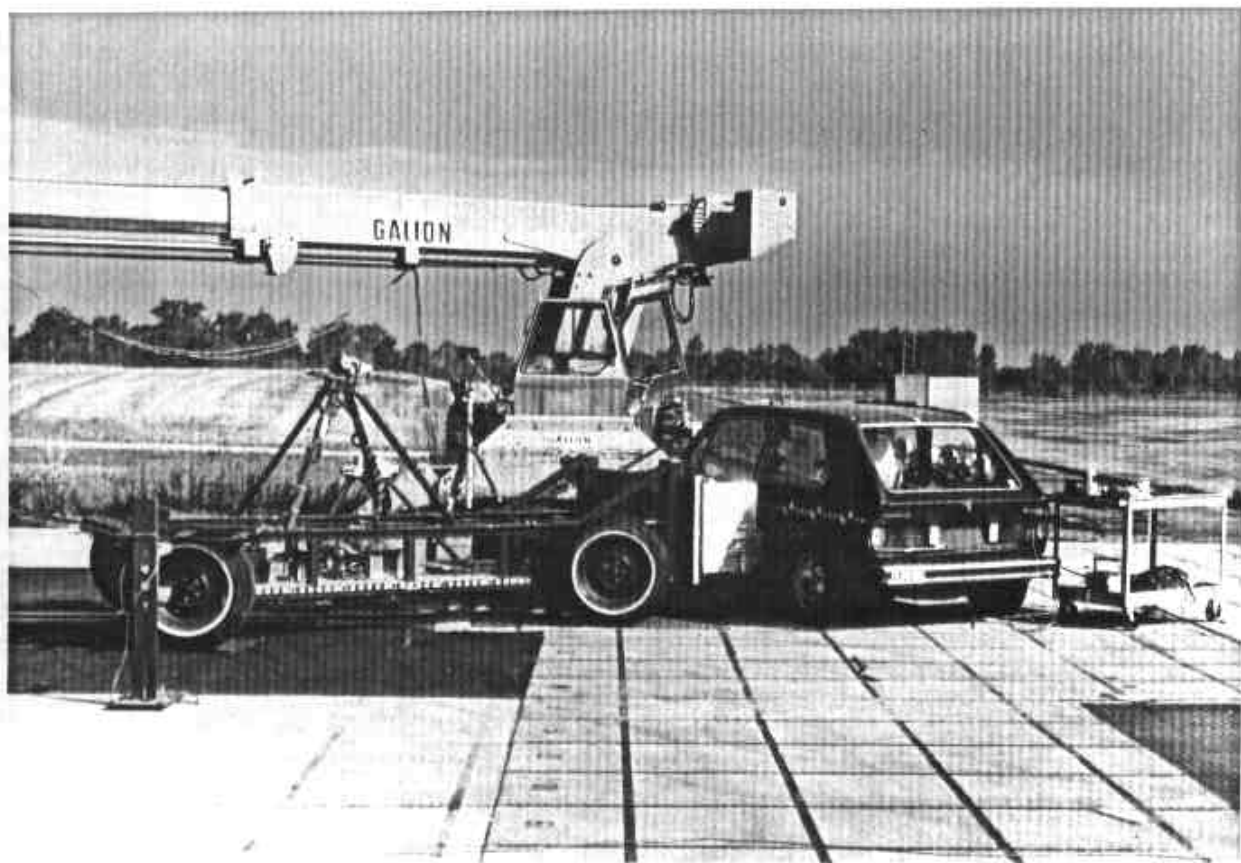


Figure A-2. PRE-TEST OVERALL - VIEW 2
A-2

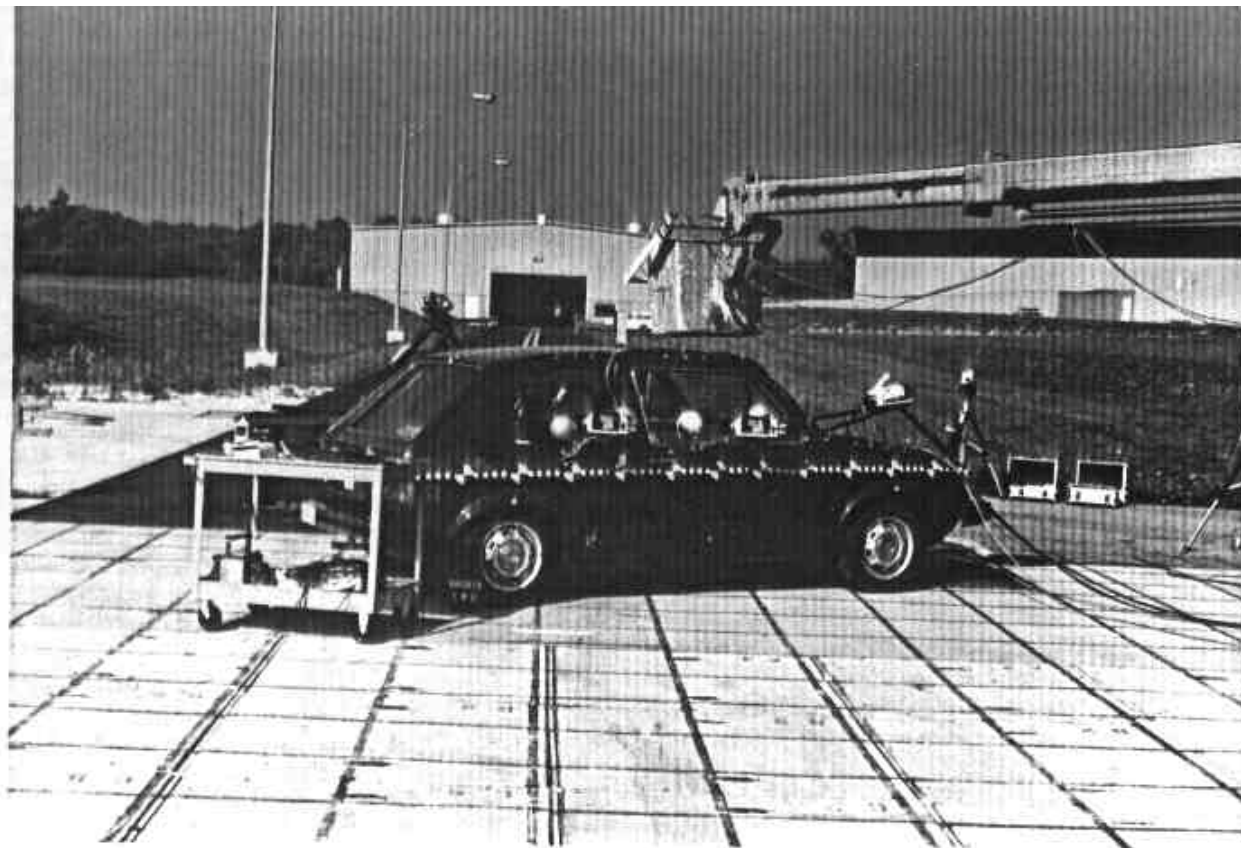


Figure A-3. PRE-TEST OVERALL - VIEW 3



Figure A-4. PRE-TEST OVERALL - VIEW 4
A-3

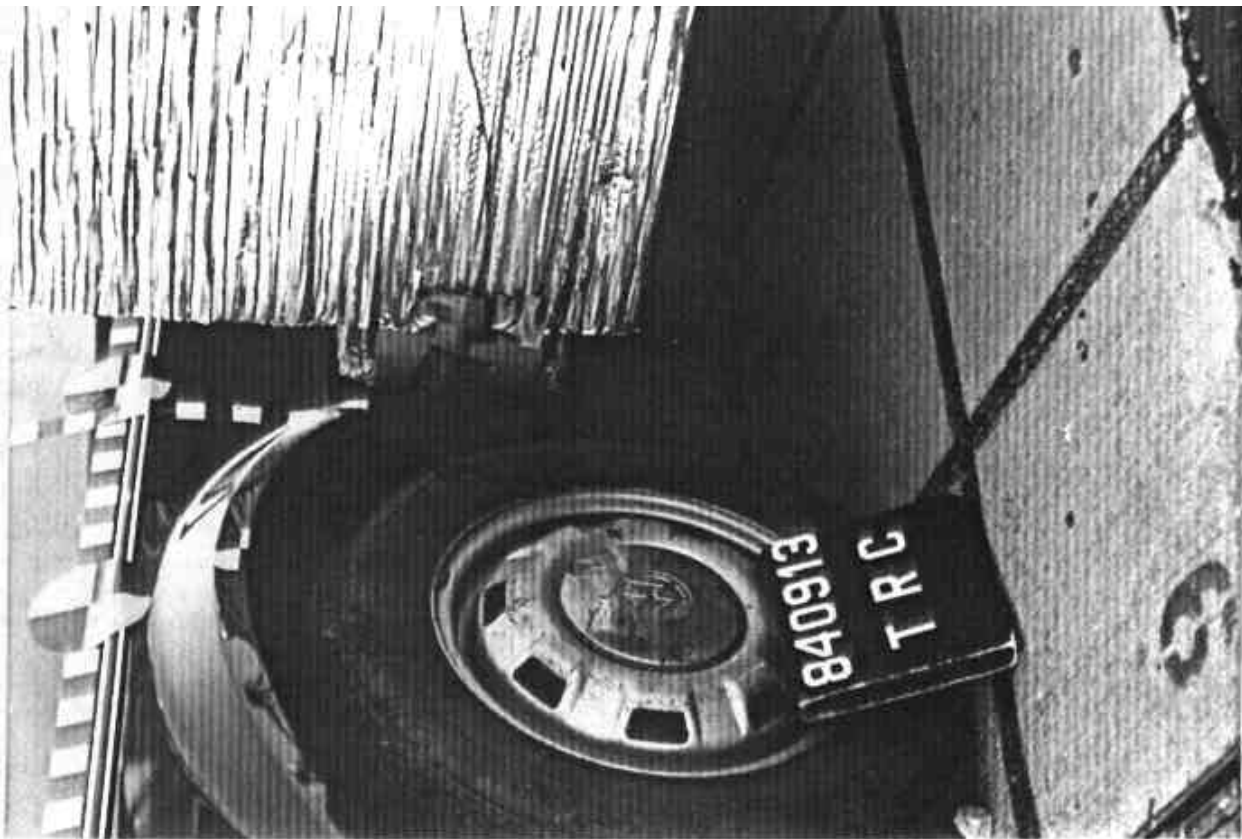


Figure A-5. PRE-TEST CLOSEUP -- VIEW 1



Figure A-6. PRE-TEST CLOSEUP - VIEW 2
A-4

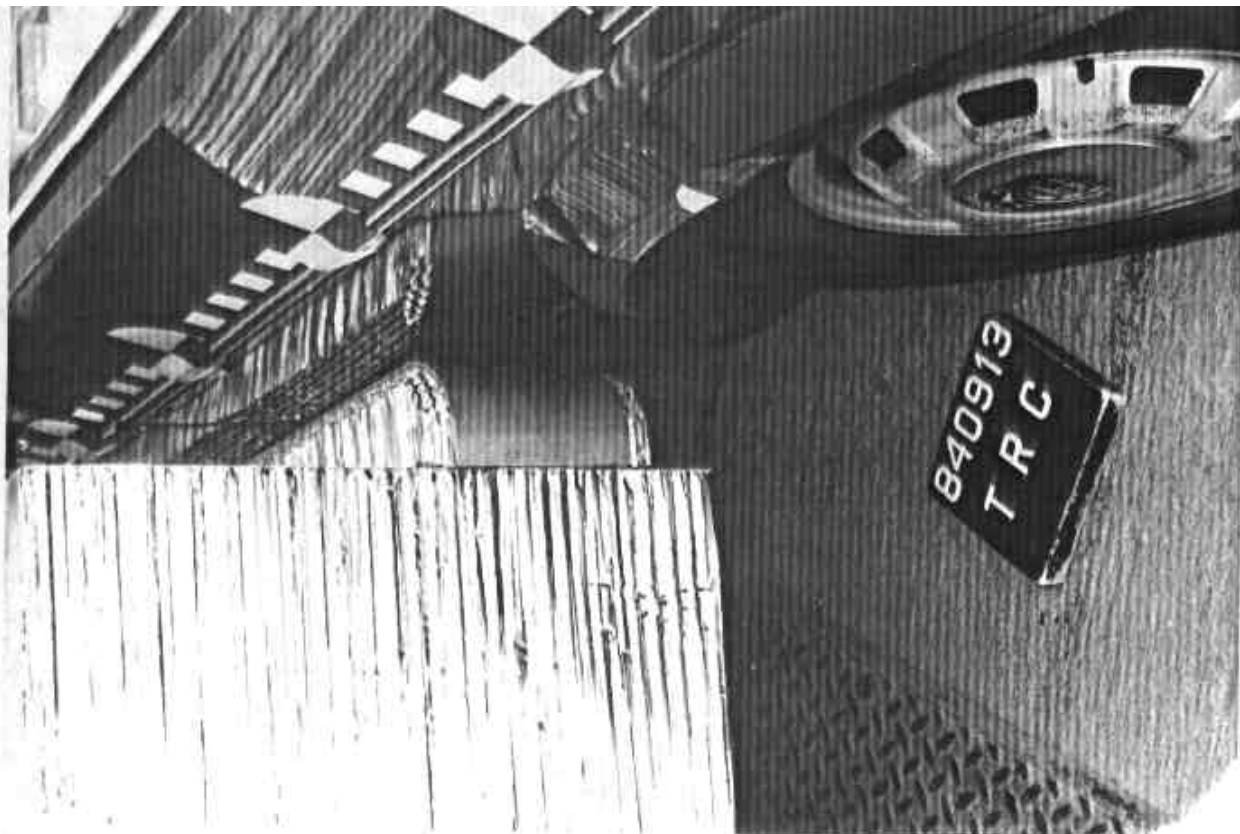


Figure A-7. PRE-TEST CLOSEUP - VIEW 3

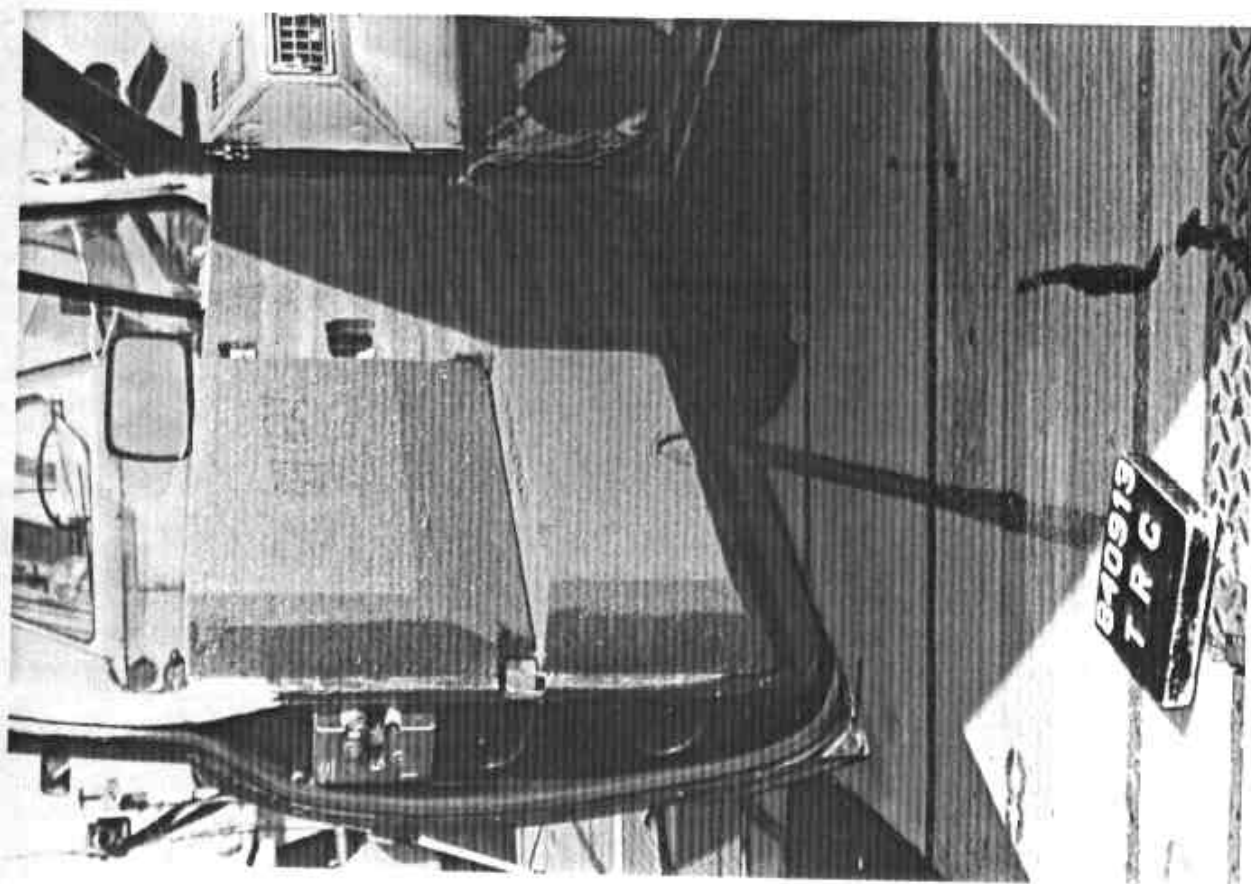


Figure A-8. PADDING MODIFICATIONS - VIEW 1
A-5

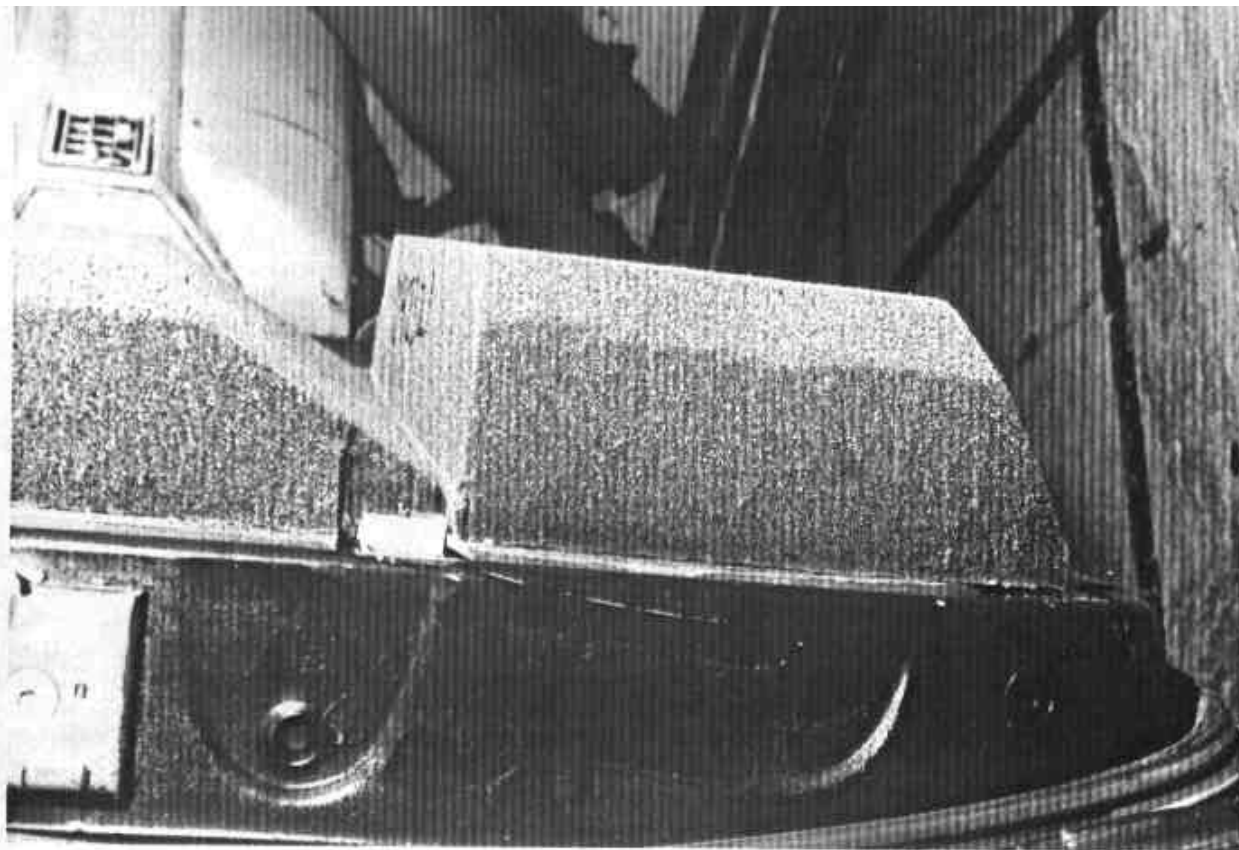


Figure A-9. PADDING MODIFICATIONS - VIEW 2

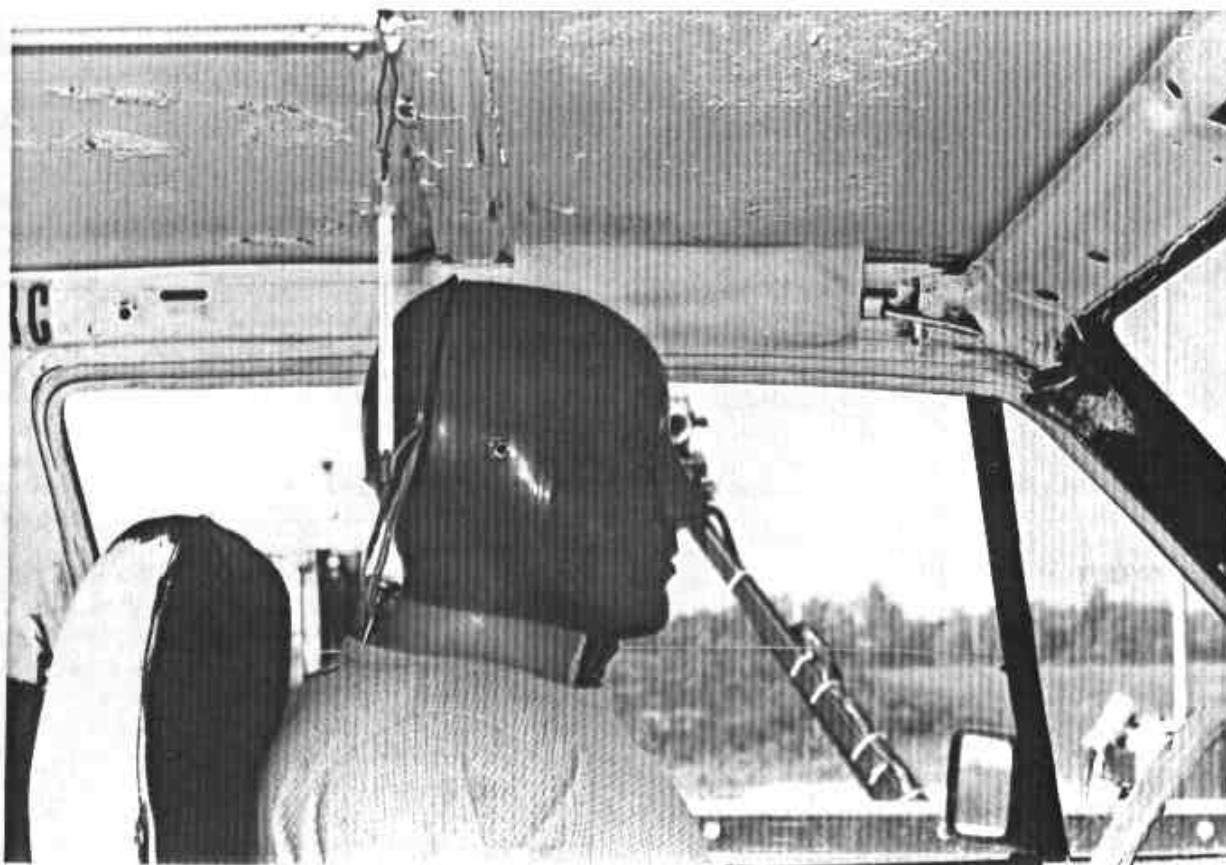


Figure A-10. PRE-TEST DRIVER DUMMY - VIEW 1

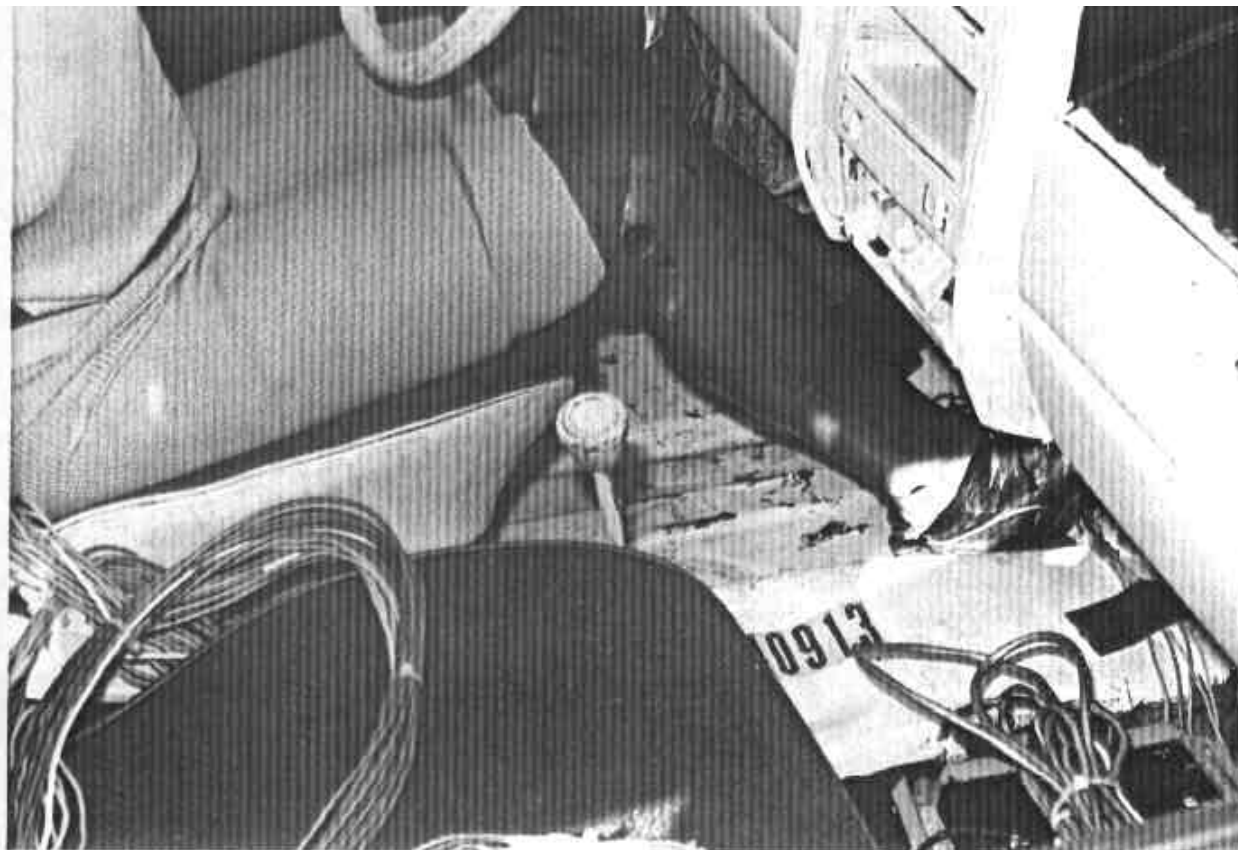


Figure A-11. PRE-TEST DRIVER DUMMY - VIEW 2



Figure A-12. PRE-TEST PASSENGER DUMMY - VIEW 1
A-7



Figure A-12. PRE-TEST PASSENGER DUMMY - VIEW 2

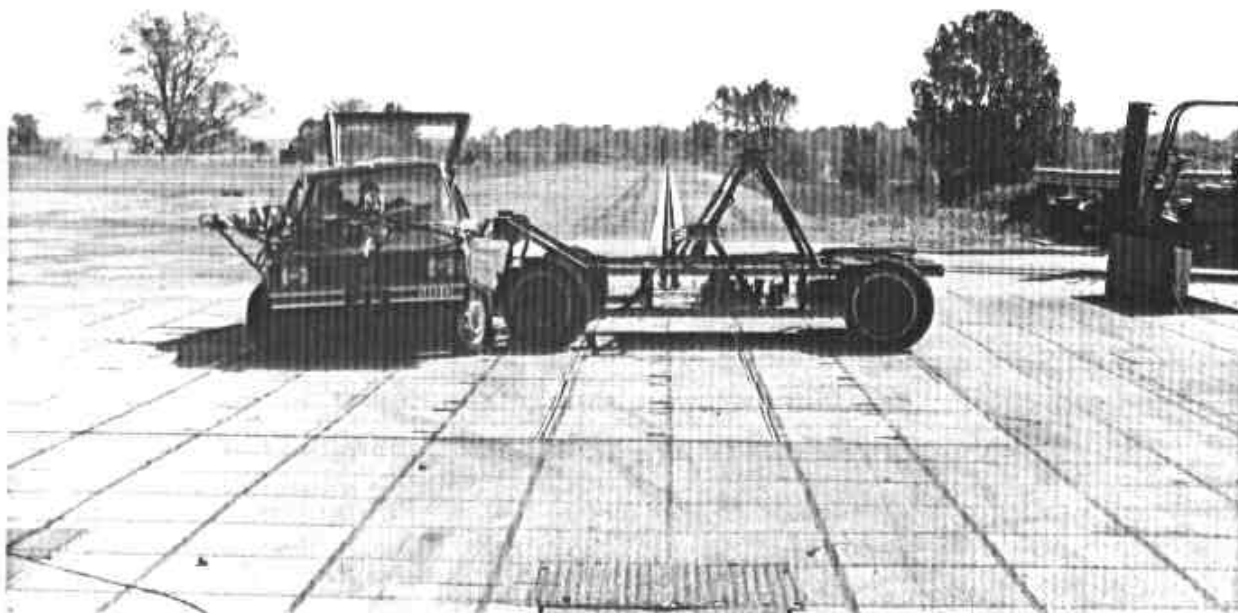


Figure A-14. POST-TEST OVERALL - VIEW 1
A-8

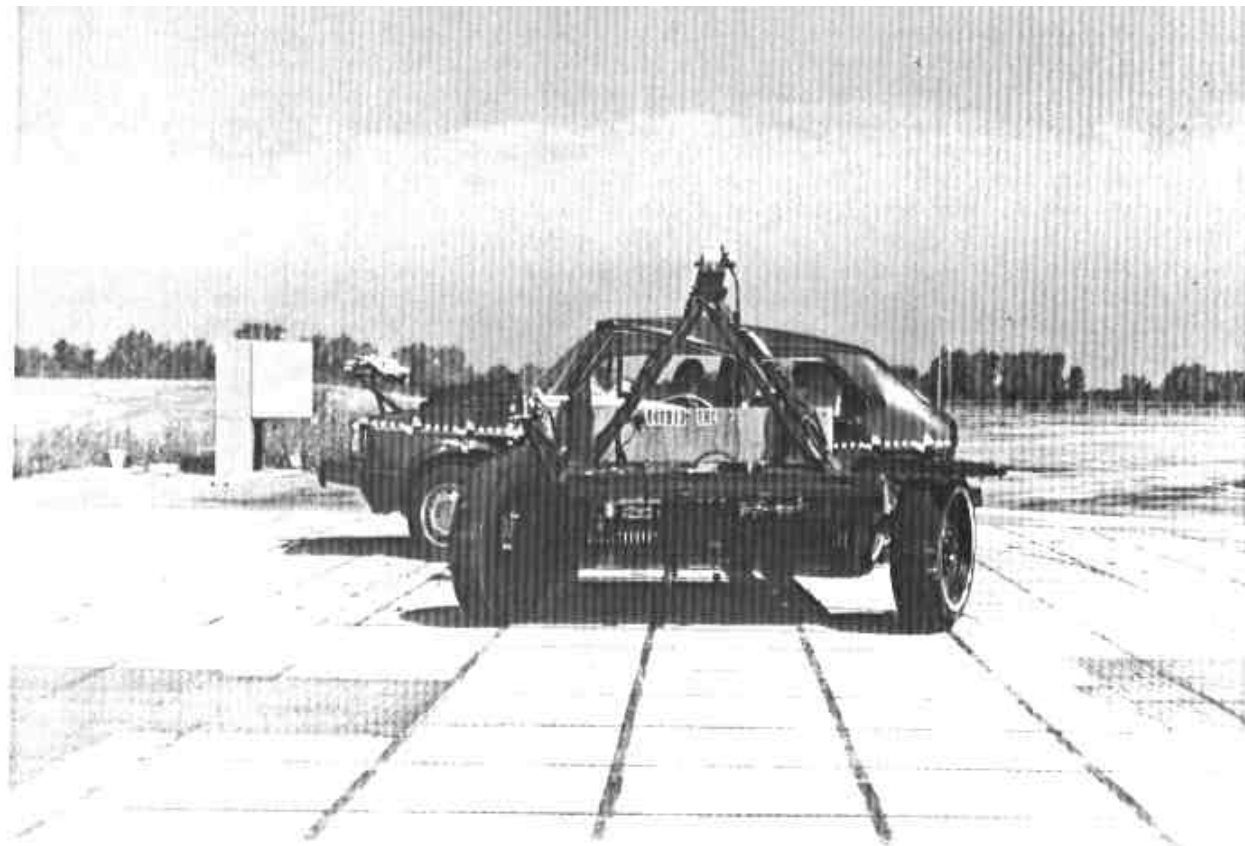


Figure A-15. POST-TEST OVERALL - VIEW 2

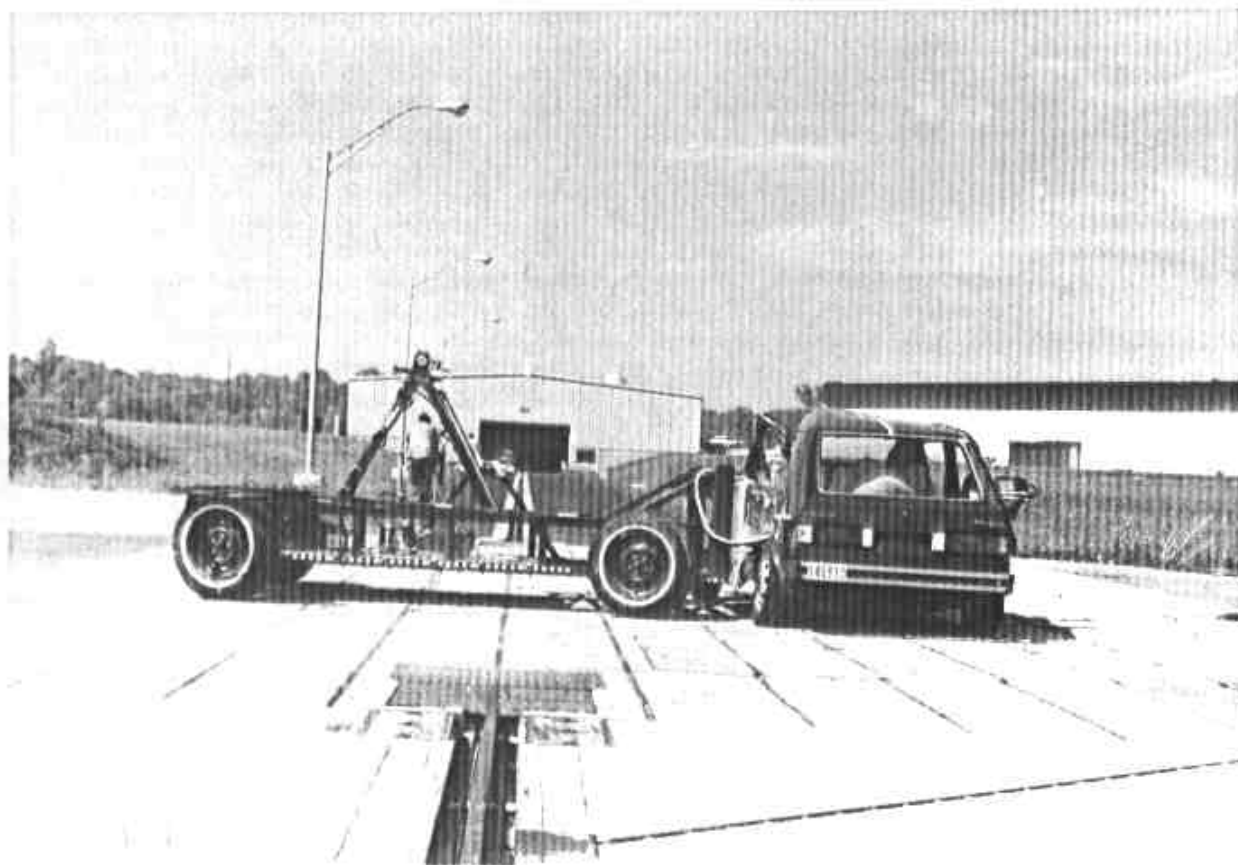


Figure A-16. POST-TEST OVERALL - VIEW 3
A-9



Figure A-17. POST-TEST OVERALL - VIEW 4

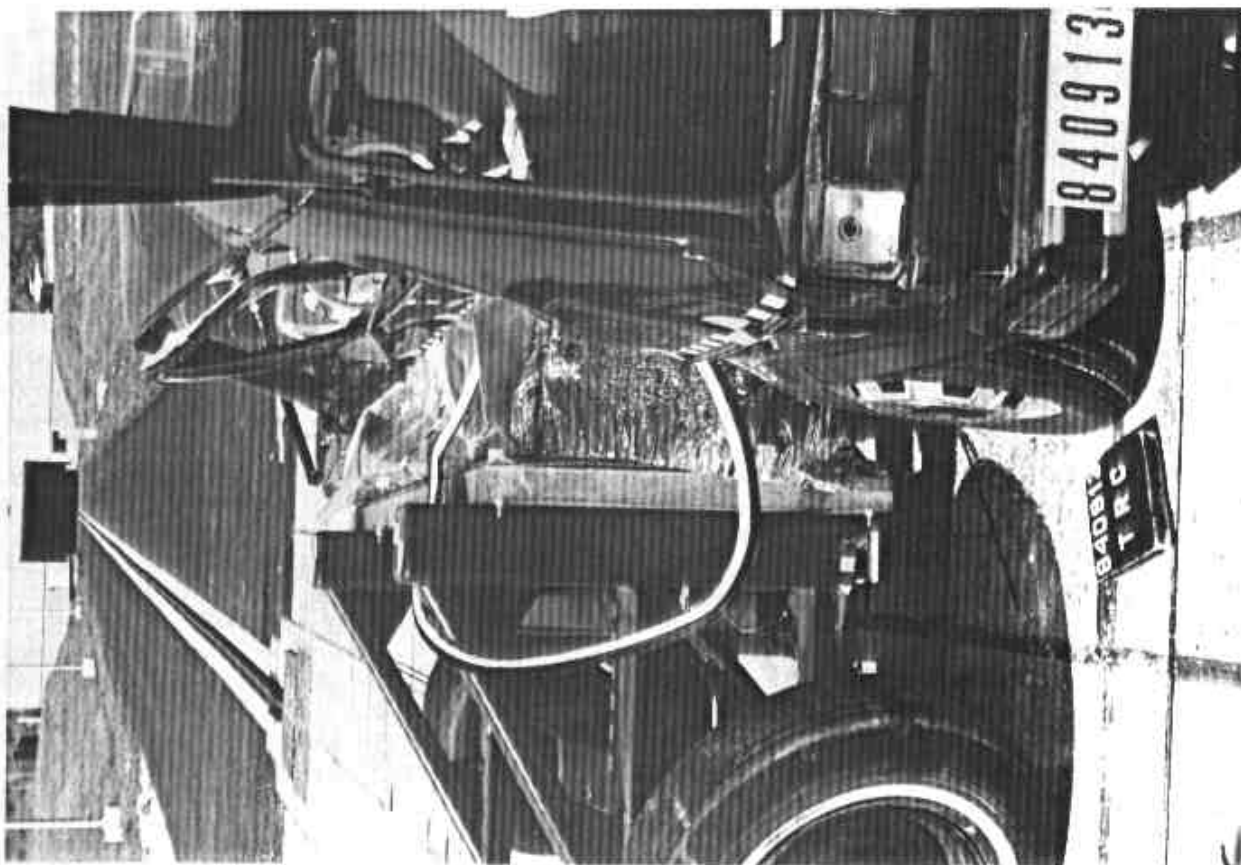


Figure A-18. POST-TEST CLOSEUP
A-10

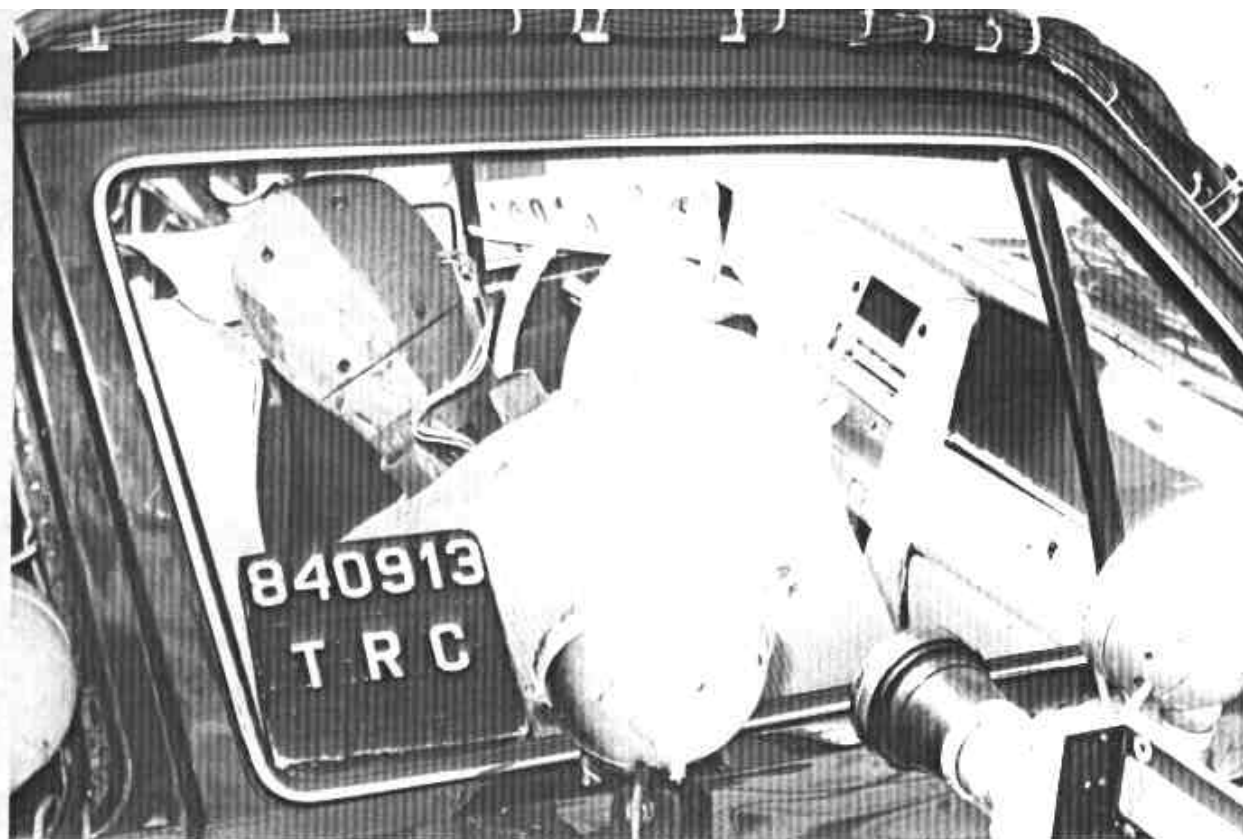


Figure A-19. POST-TEST DRIVER DUMMY - VIEW 1



Figure A-20. POST-TEST DRIVER DUMMY - VIEW 2
A-11

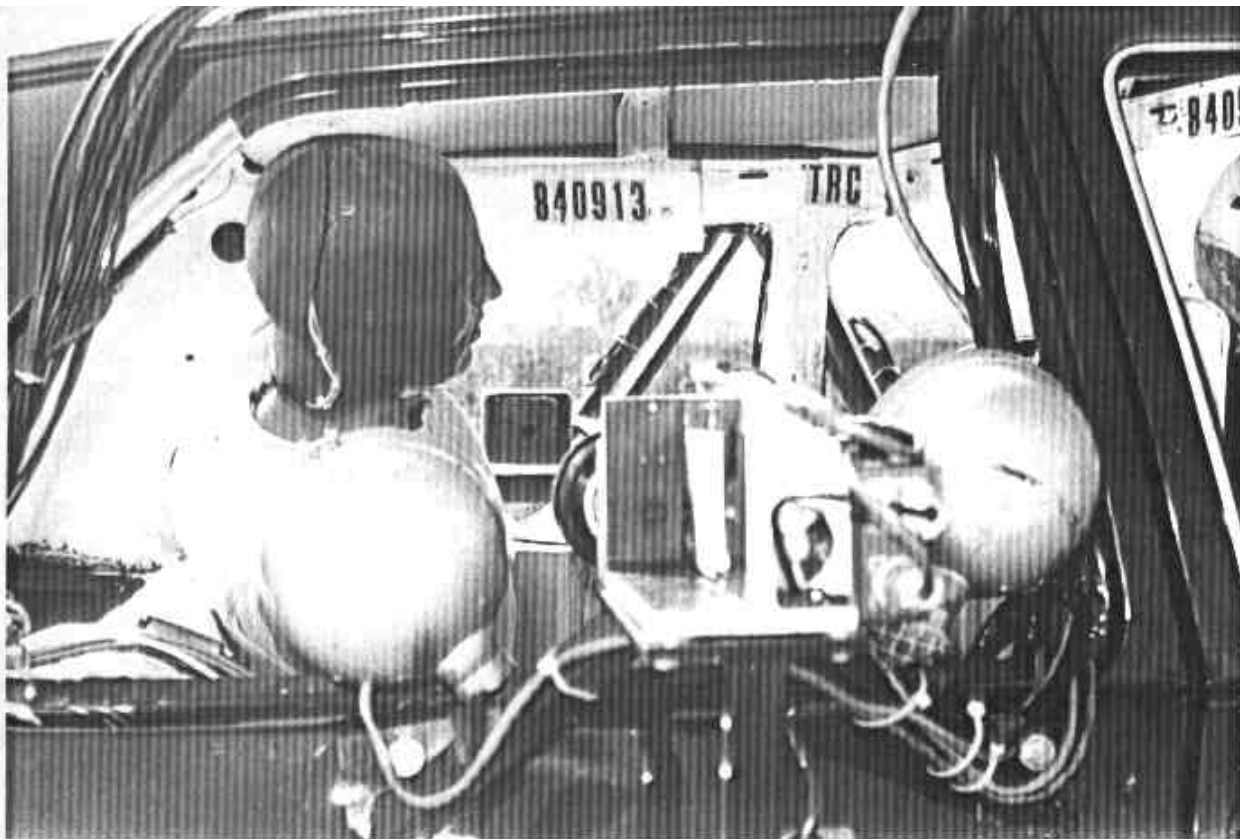


Figure A-21. POST-TEST PASSENGER DUMMY - VIEW 1

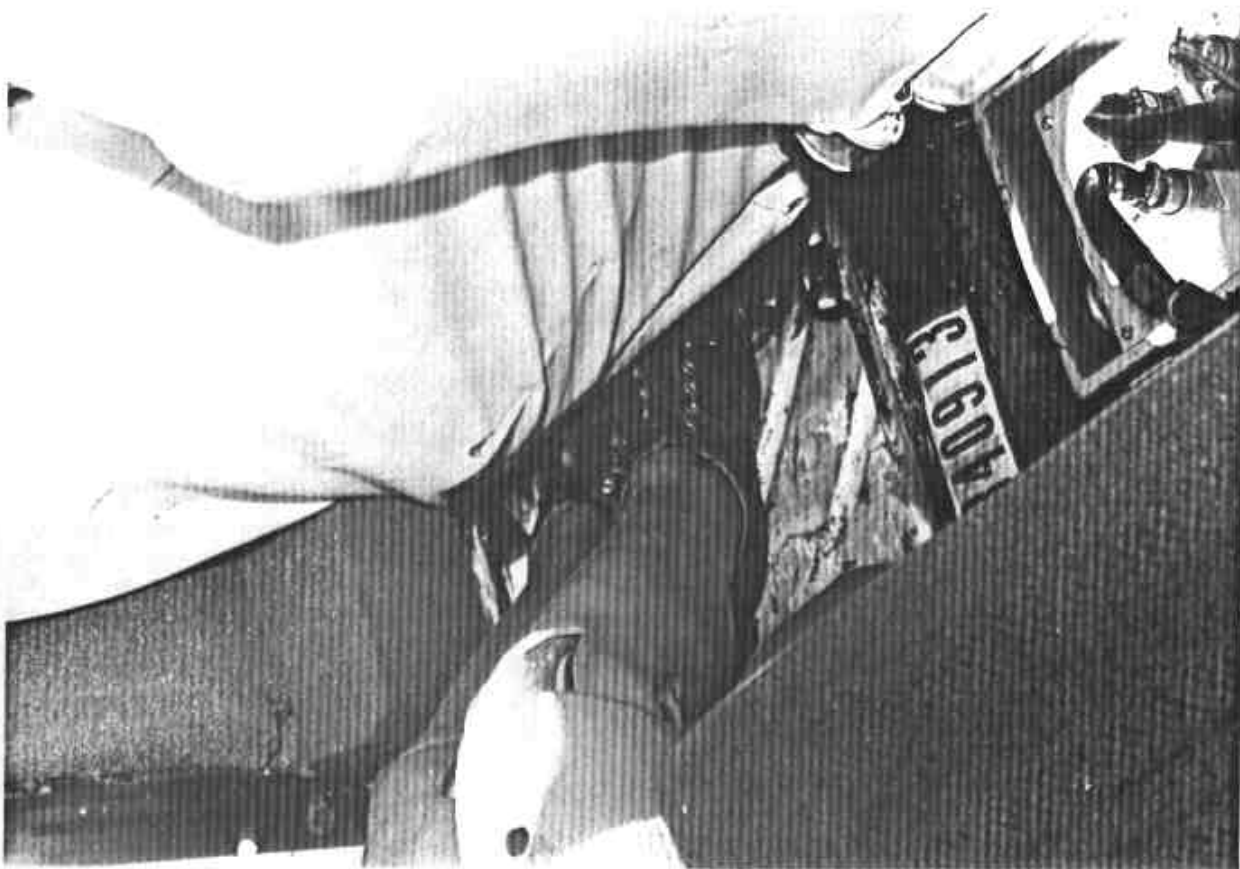


Figure A-22. POST-TEST PASSENGER DUMMY - VIEW 2
A-12

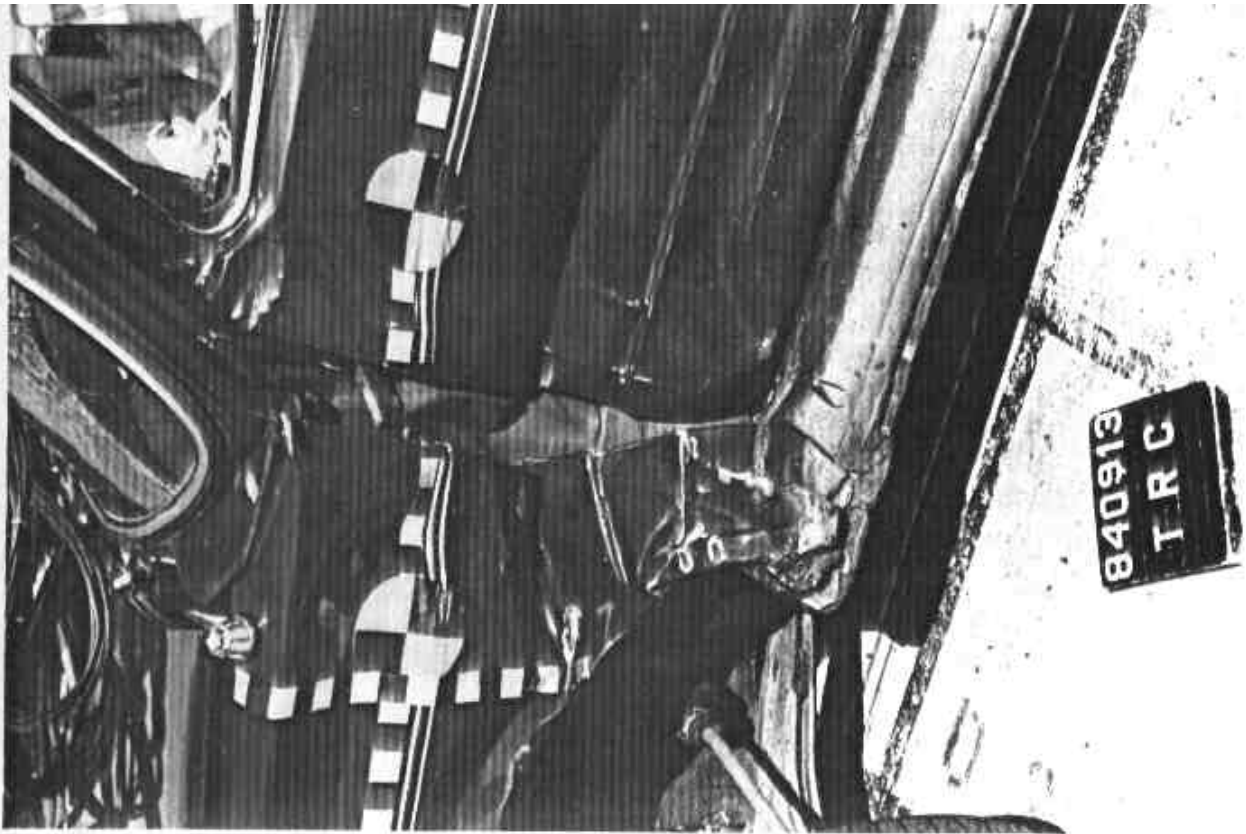


Figure A-23. POST-TEST VEHICLE DAMAGE - VIEW 1



Figure A-24. POST-TEST VEHICLE DAMAGE - VIEW 2

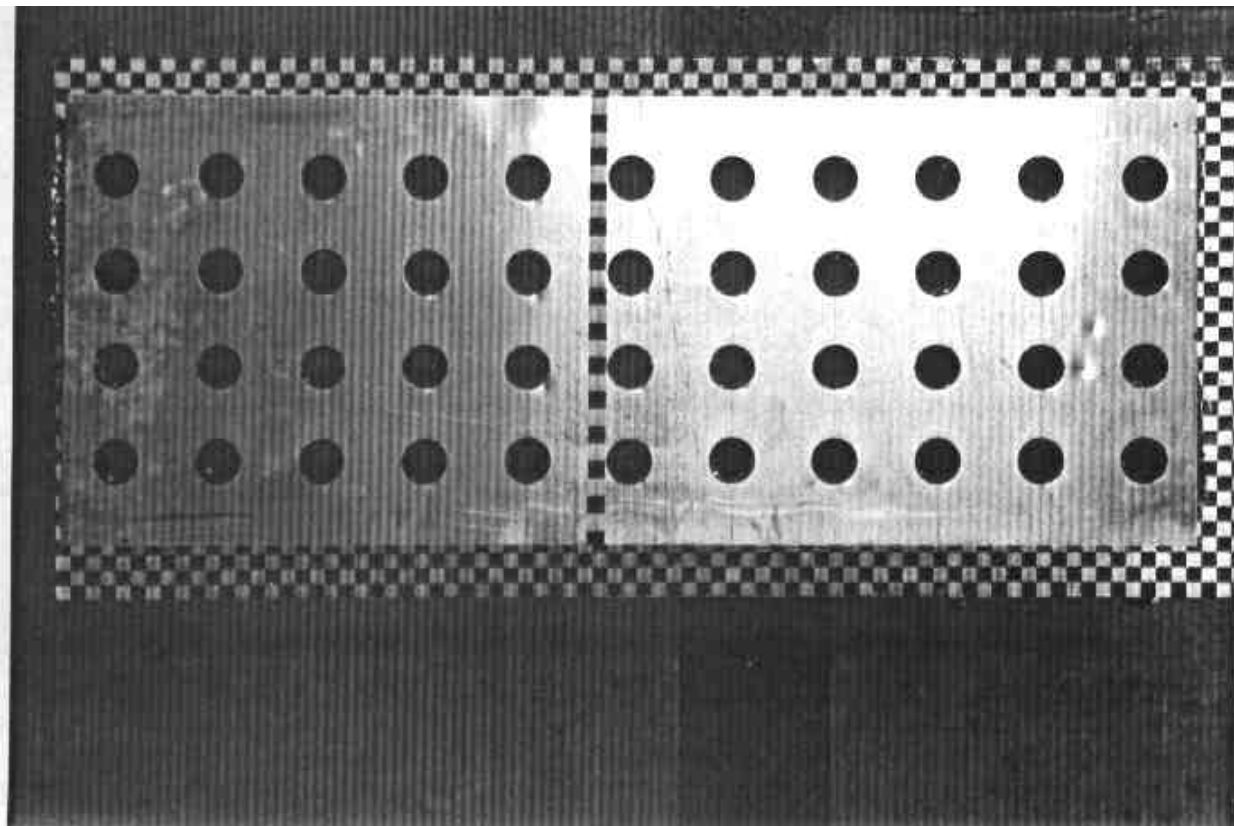


Figure A-25. PRE-TEST MDB FACE - VIEW 1

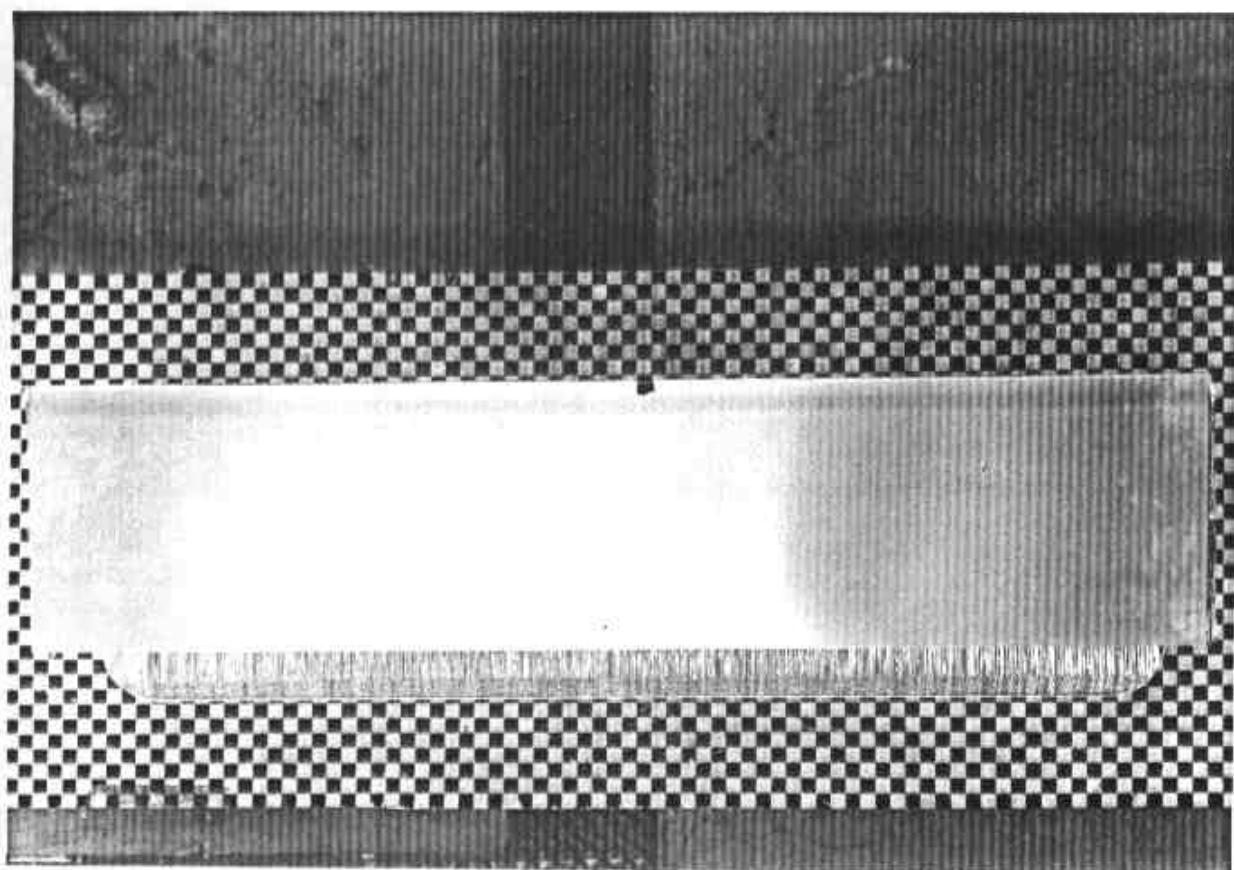


Figure A-26. PRE-TEST MDB FACE - VIEW 2
A-14

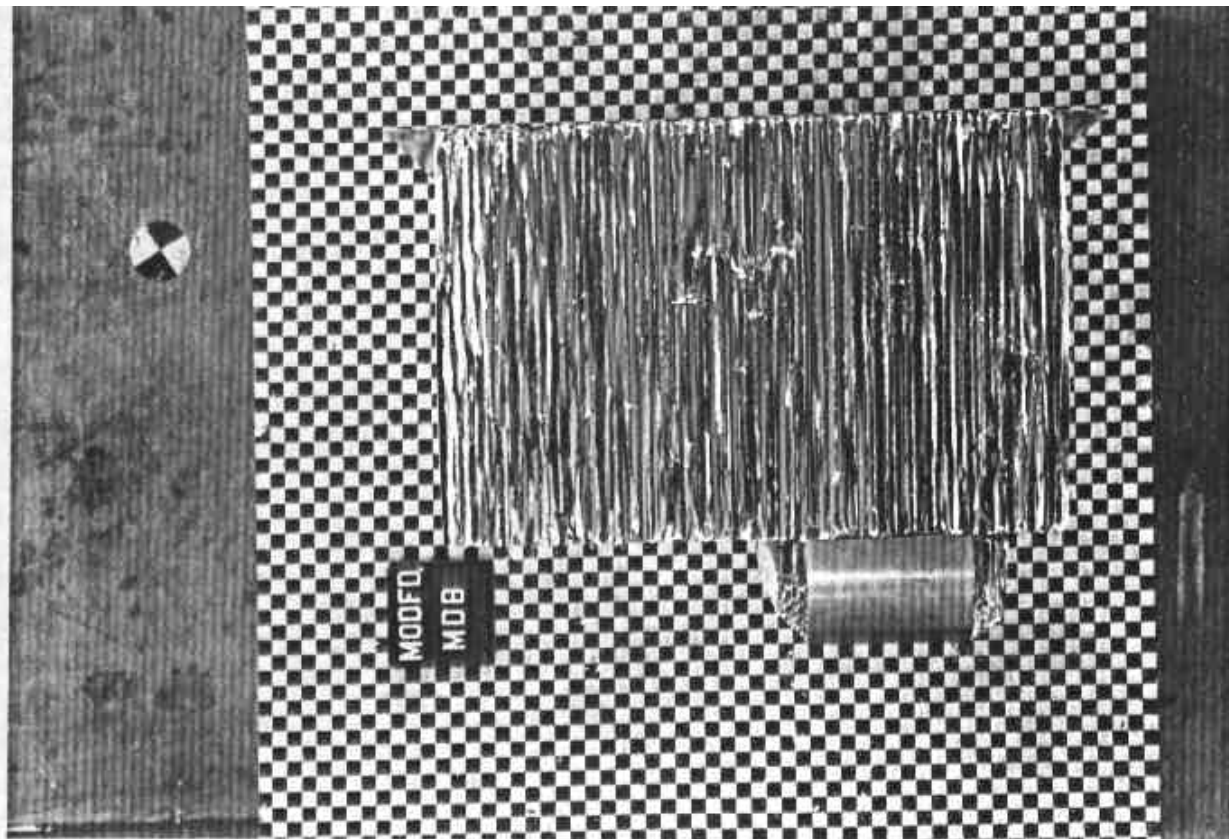


Figure A-27. PRE-TEST MDB FACE - VIEW 3

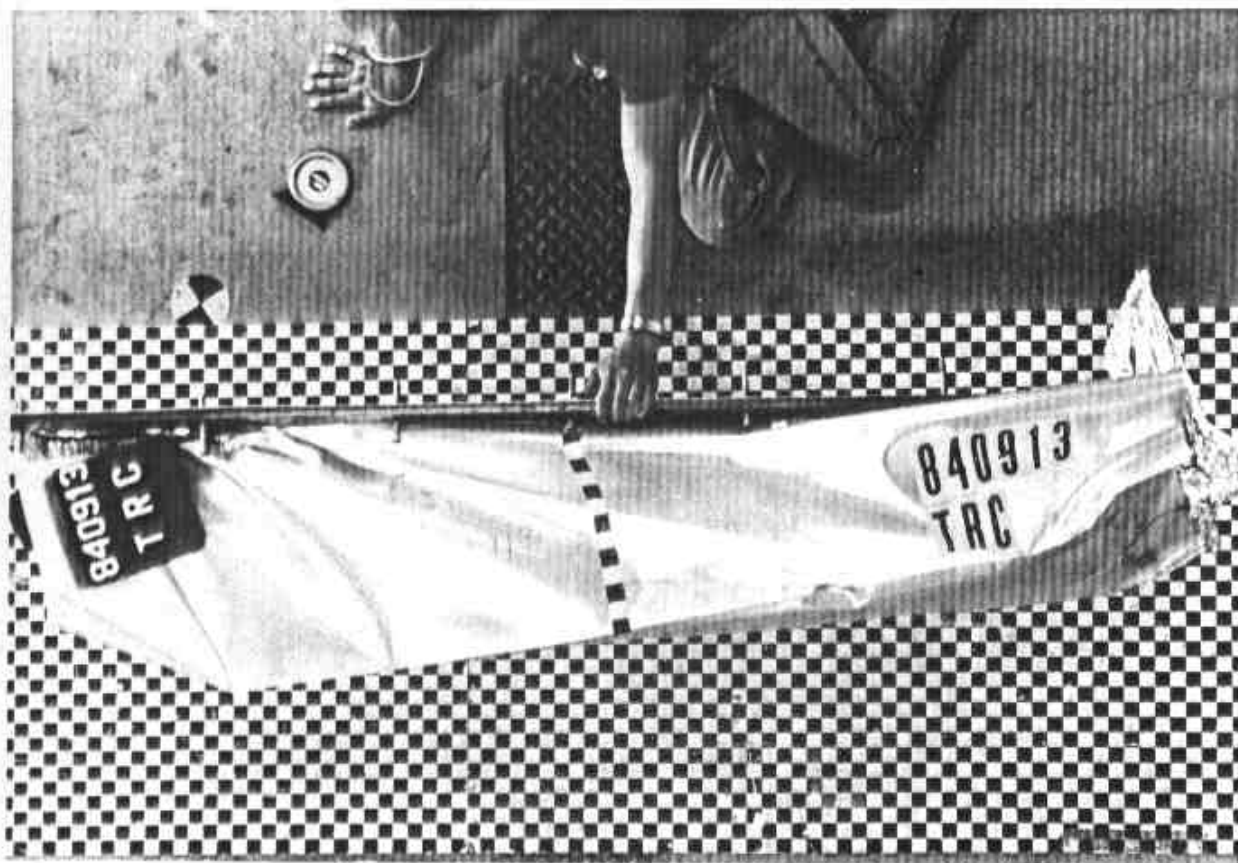


Figure A-28. POST-TEST MDB FACE - VIEW 1
A-15

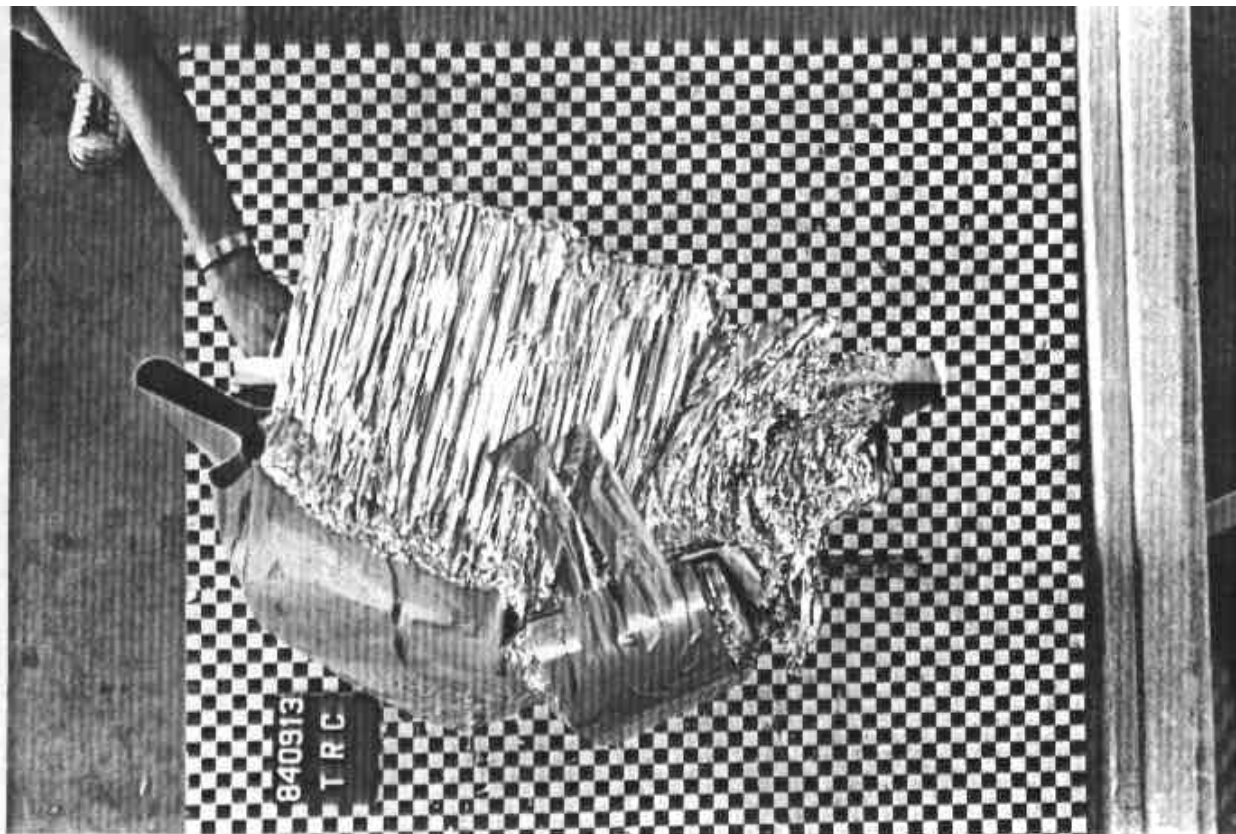


Figure A-29. POST-TEST MDB FACE - VIEW 2

APPENDIX B

DATA PLOT PRESENTATION

Data plots generated from the crash test data are presented on the following pages. All data are recorded on magnetic tape for inclusion in the NHTSA crash test data base system. The data was filtered according to SAE J211, except dummy thorax data which was filtered using the HSRI filter.

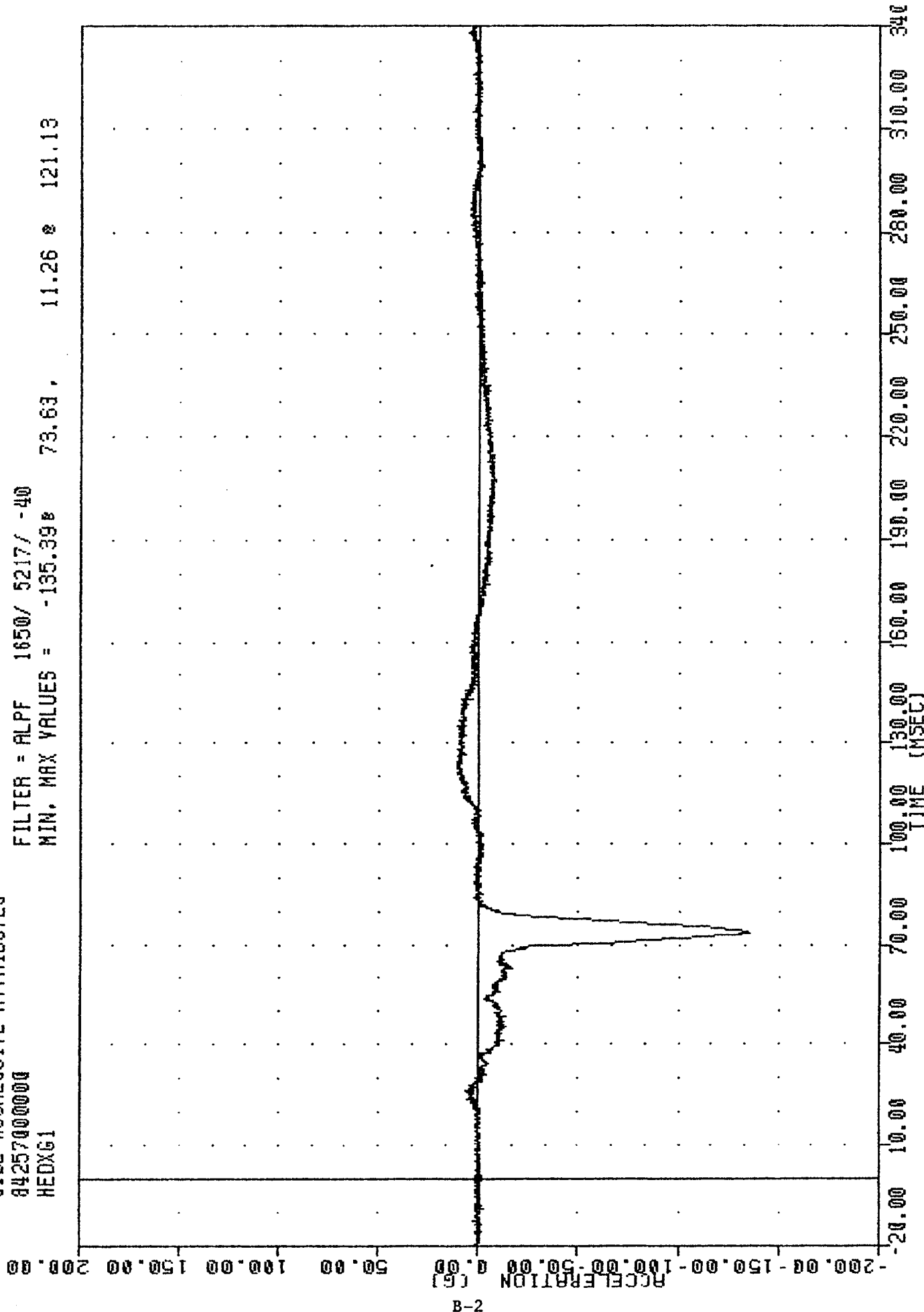
SIDE HGGRESSIVE ATTRIBUTES

84257000000

HEDXG1

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -135.39 73.63 , 11.26 121.13



B-2

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER HEAD ACCELERATION X AXIS

84257000000

HEGYG1

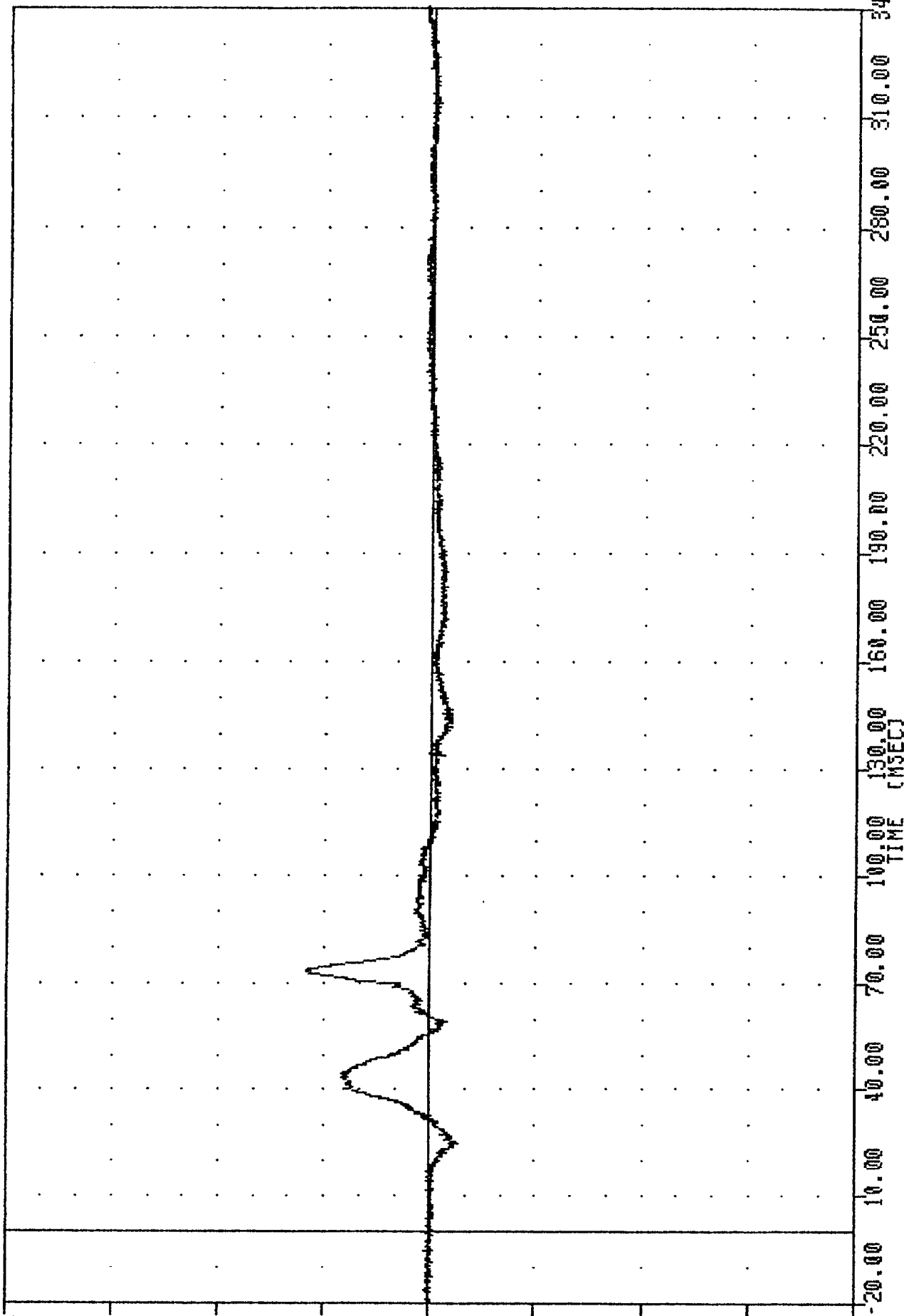
FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -13.05e

24.63, 59.00 e 73.13

ACCELERATION (G)

B-3



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER HEAD ACCELERATION Y AXIS

SIDE IMPRESSIVE ATTRIBUTES

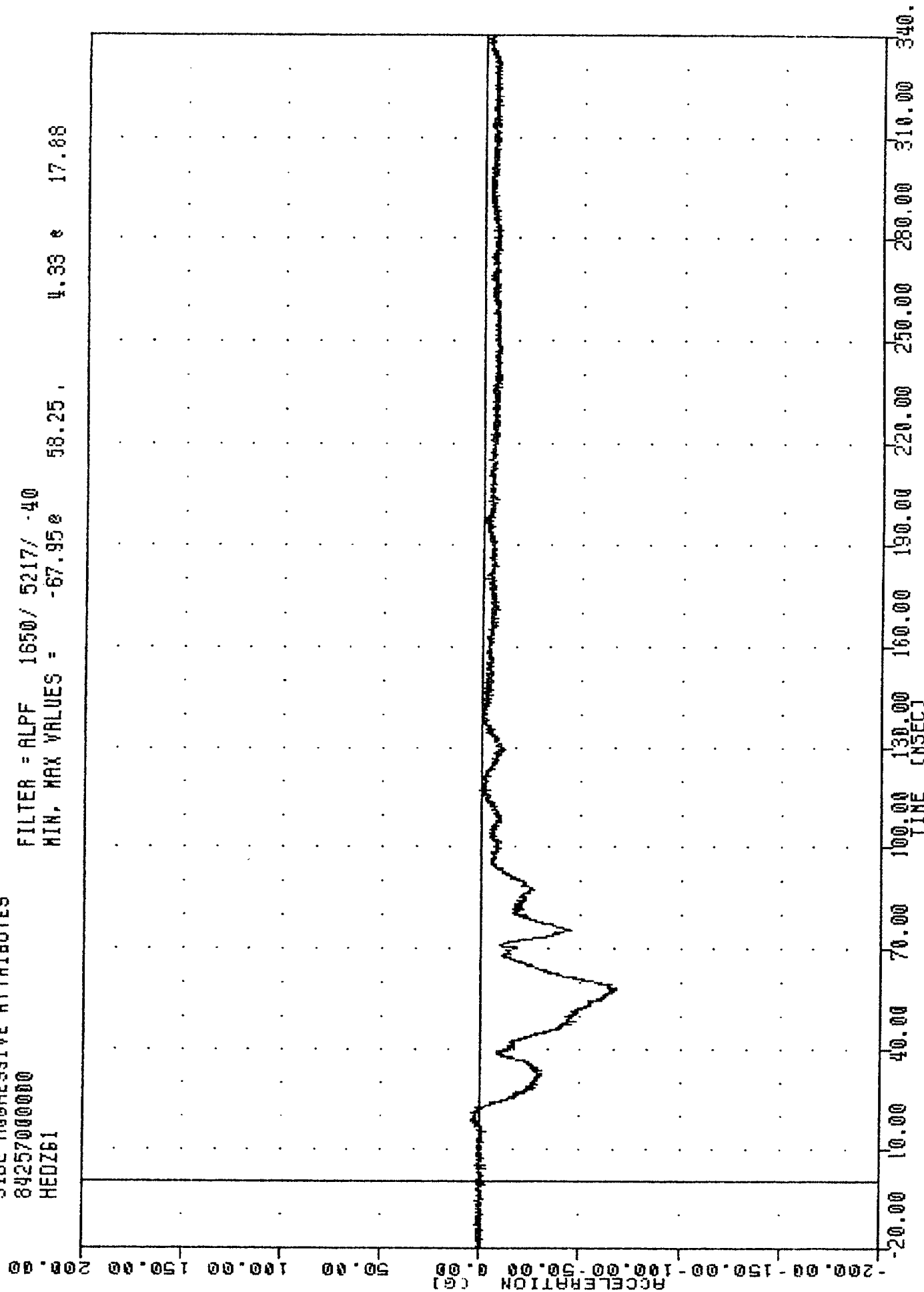
84257000000

HE0261

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -67.950 58.25 ,

4.33 17.88



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER HEAD ACCELERATION Z AXIS

SIDE AGGRESSIVE ATTRIBUTES

84257000000

HEORC1

FILTER = ALPF 1650/ 5217/ -40

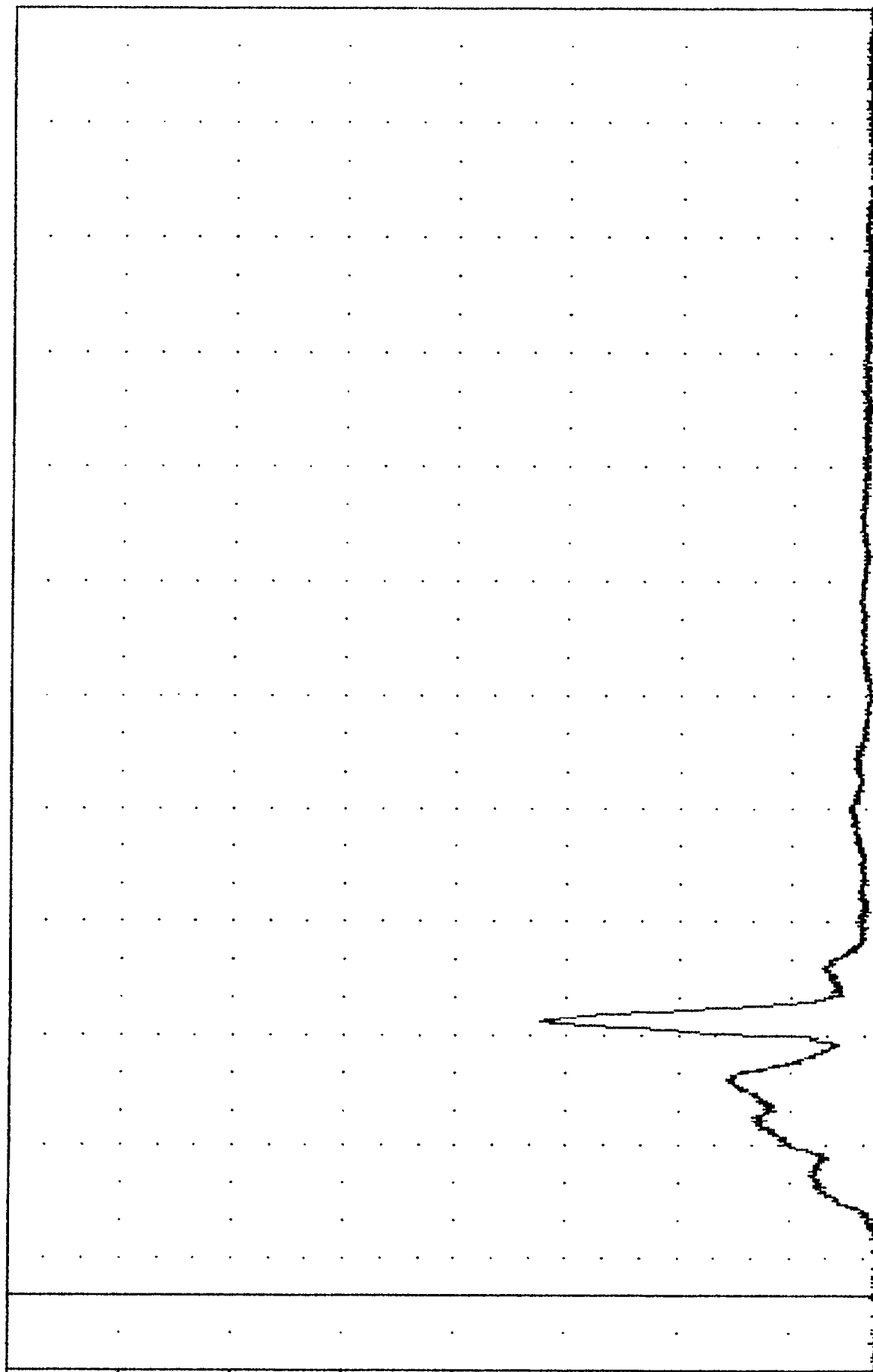
MIN. MAX VALUES = 0.12e

-5.00,

151.68 g

73.63

ACCELERATION (g)



TIME (msec)

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER HEAD RESULTANT

SIDE IMPRESSIVE ATTRIBUTES

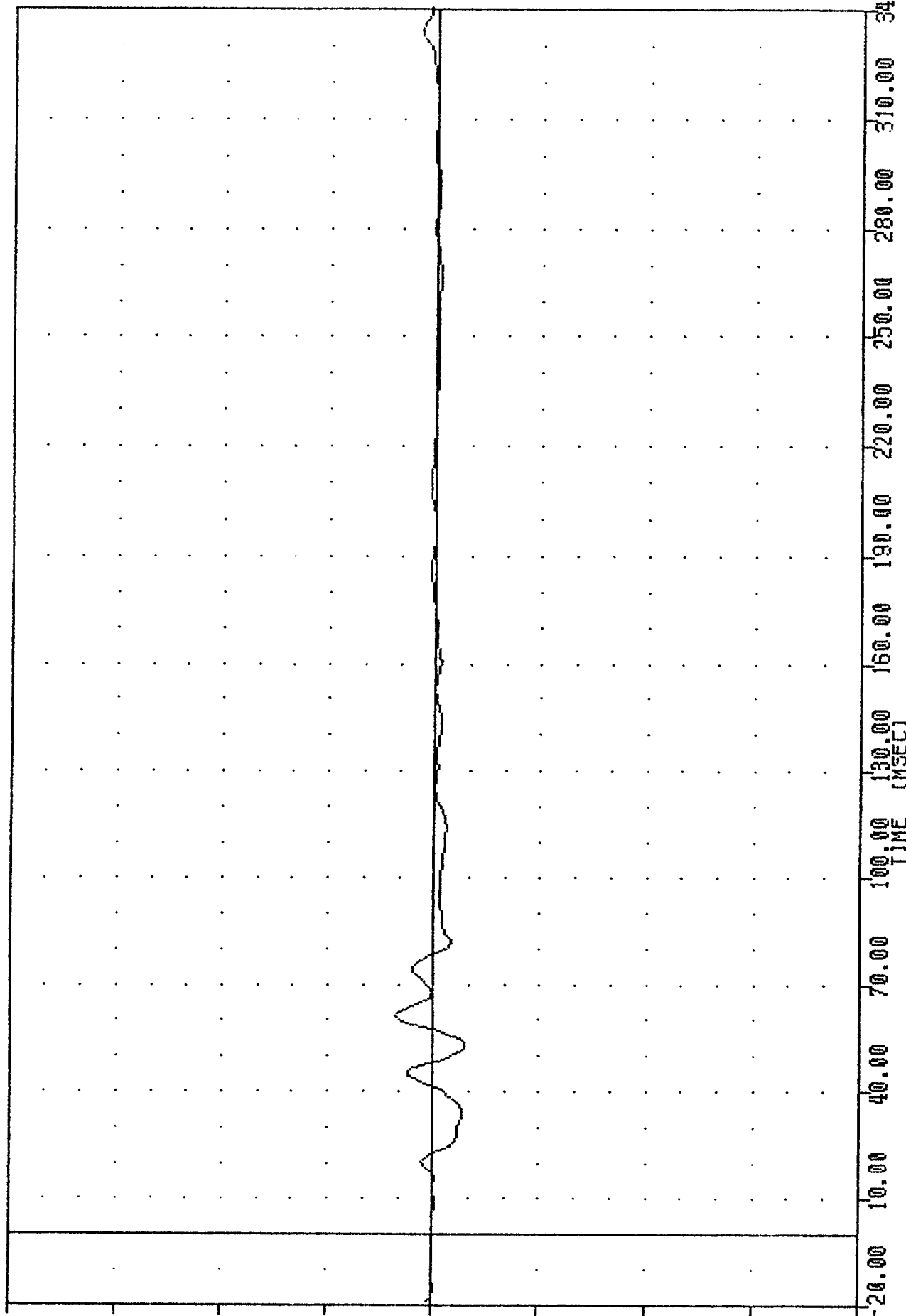
84257000000

101XG1

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -14.87 52.50 , 17.97 60.62

ACCELERATION [G]



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE ACCELERATION X AXIS

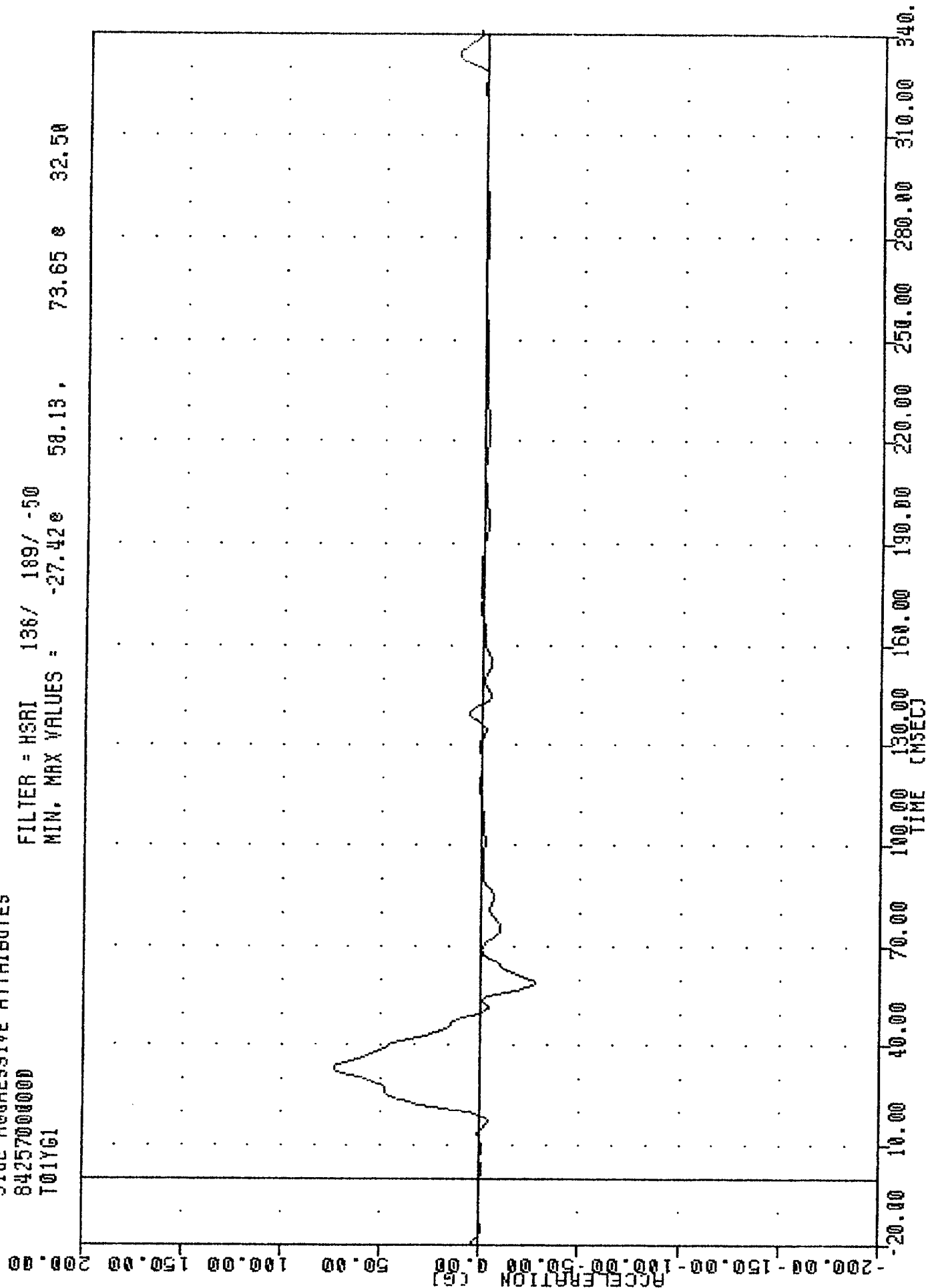
SUBJECTIVE ATTRIBUTES

84257000000

T01Y61

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -27.42° 58.13, 73.65 & 32.50



B-7

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE ACCELERATION Y AXIS

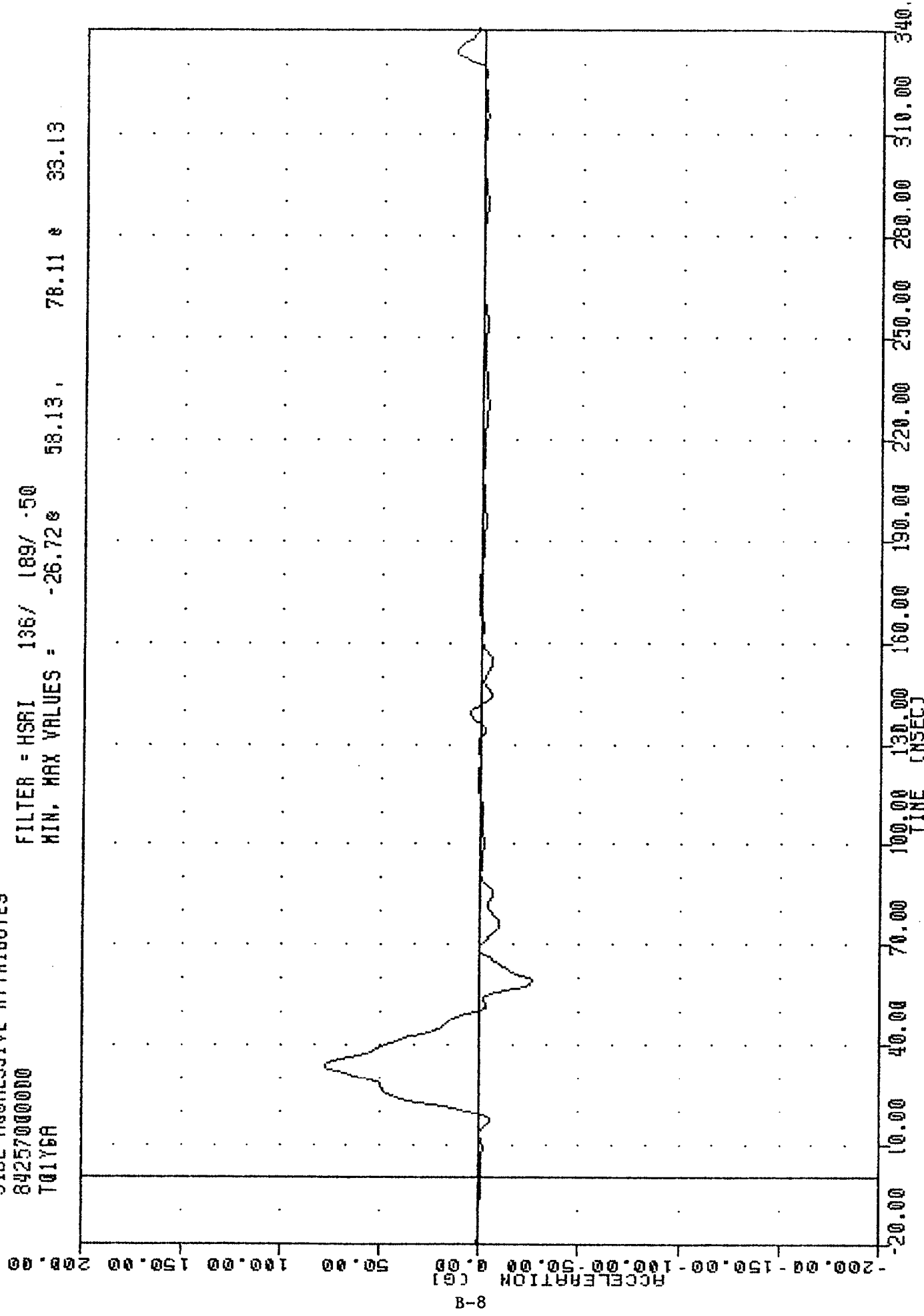
SIDE IMPRESSIVE HIGHLIGHTS

84257000000

T01Y6A

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -26.72 58.13 78.11 33.13



B-8

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE ACCELERATION -2 Y AXIS

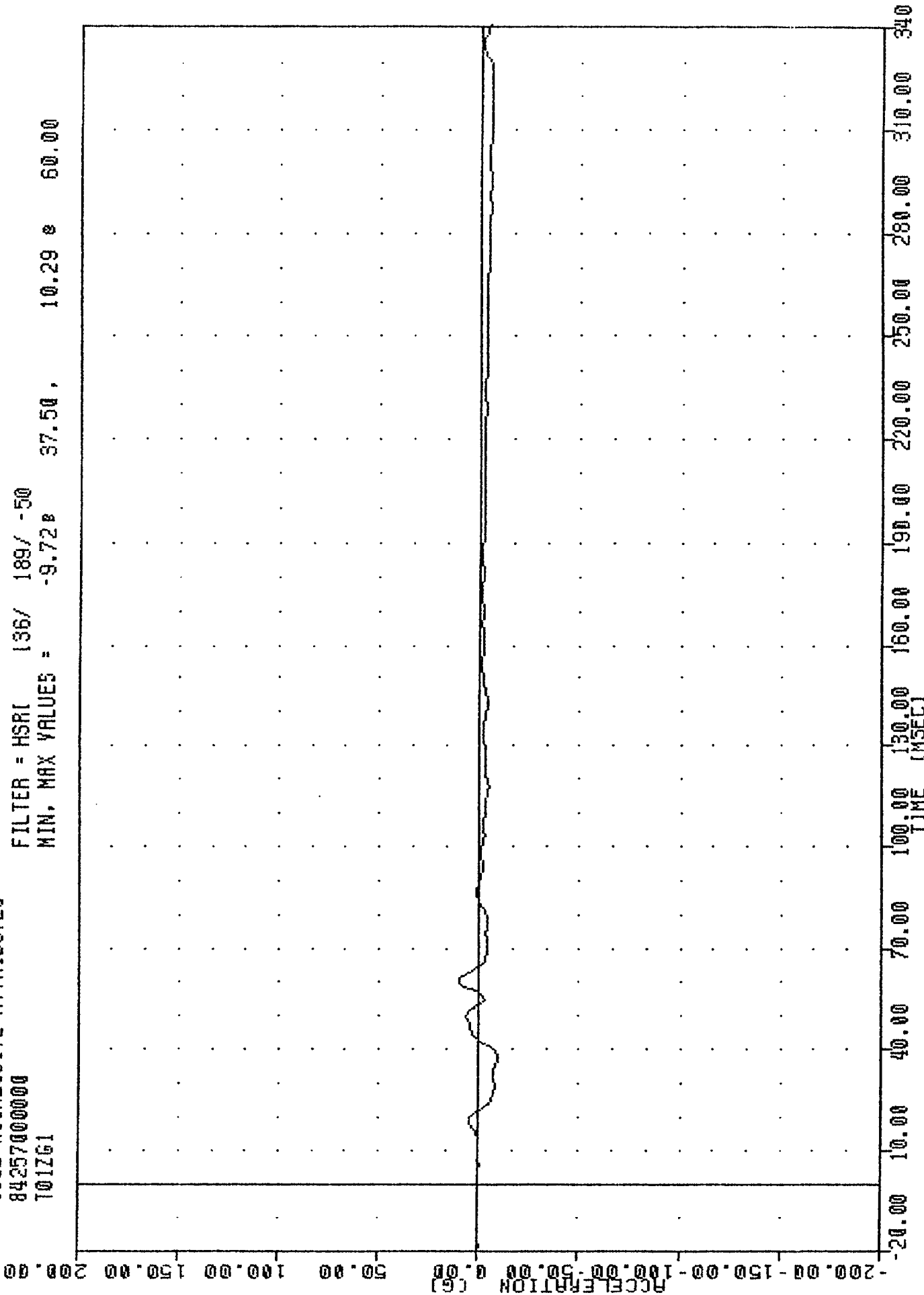
SIDE AGGRESSIVE ATTRIBUTES

84257000000

701ZG1

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -9.72 37.50, 10.29 60.00



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE ACCELERATION Z AXIS

SIDE IMPRESSIVE HIIHIBUTES

84257000000

701RG1

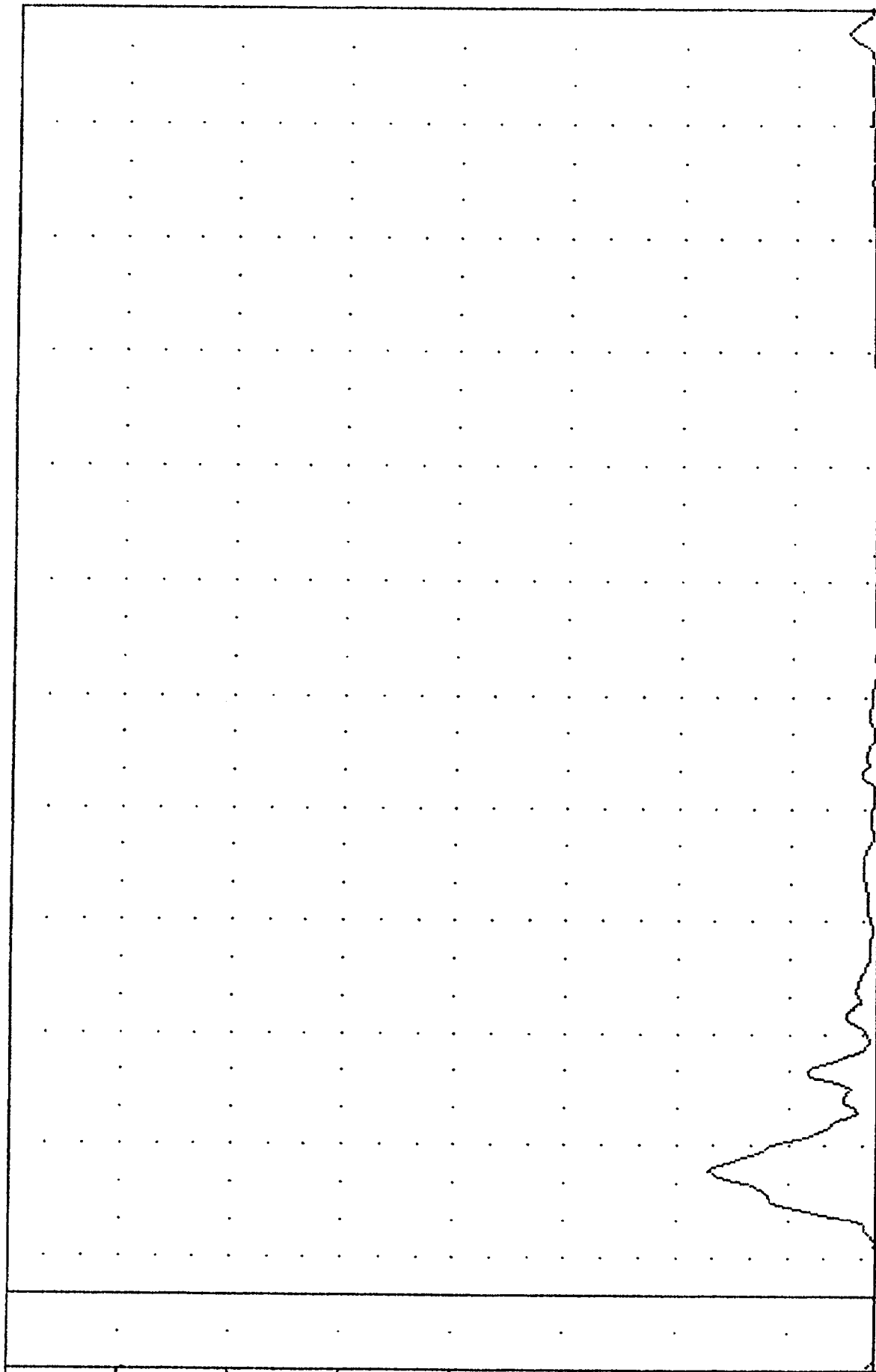
FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = 0.078

10.63, 75.21 @ 32.50

ACCELERATION (G)

B-10



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE RESULTANT

DATE RECORDED: 11/11/1963

84257000000

T01RGA

FILTER = HSRI

136/ 189/ -50

MIN, MAX VALUES =

0.21e

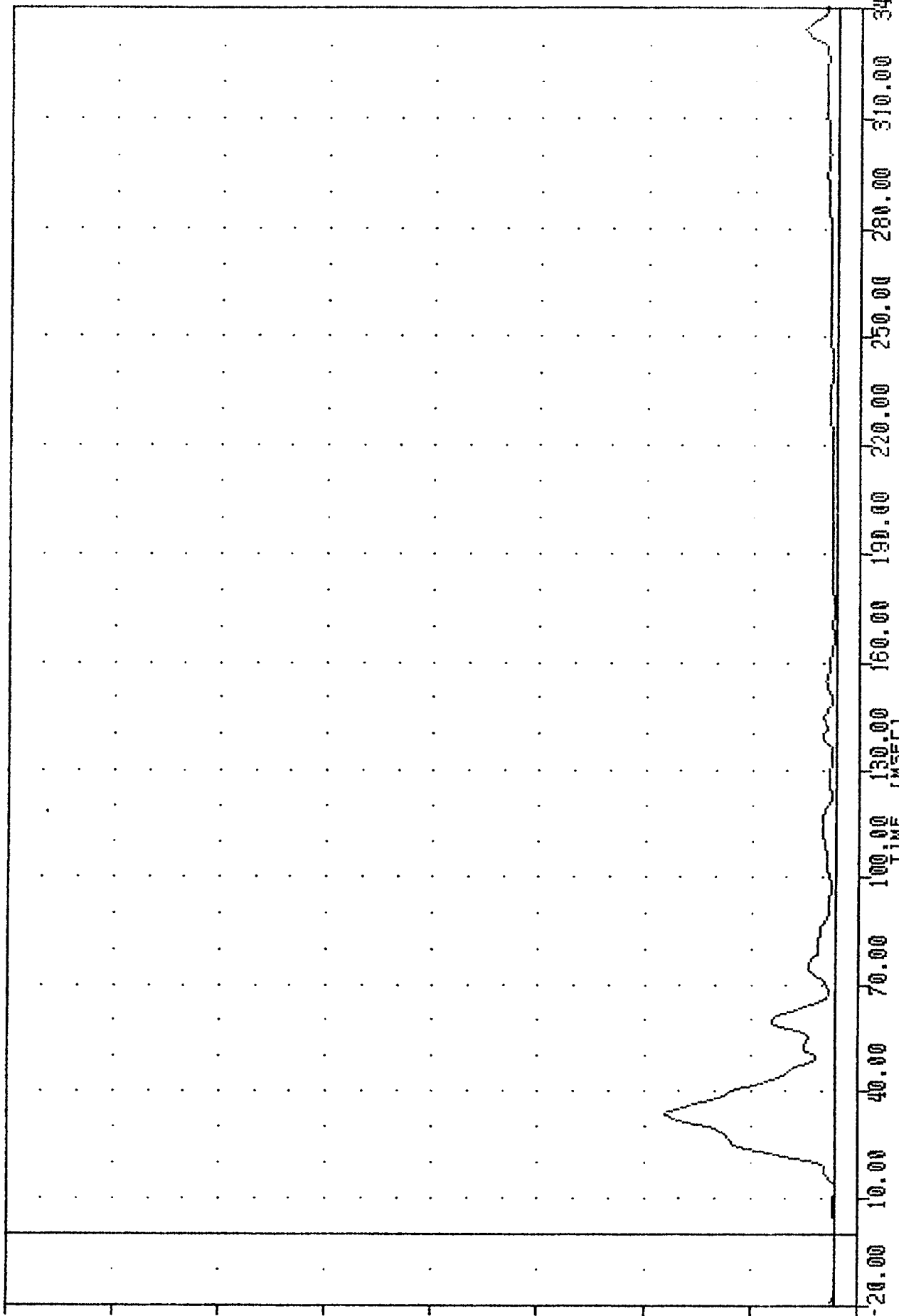
-13.13,

79.66 e

33.13

ACCELERATION (G)

B-11



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE RESULTANT USING T01YGA

SIDE IMPRESSIVE ATTRIBUTES

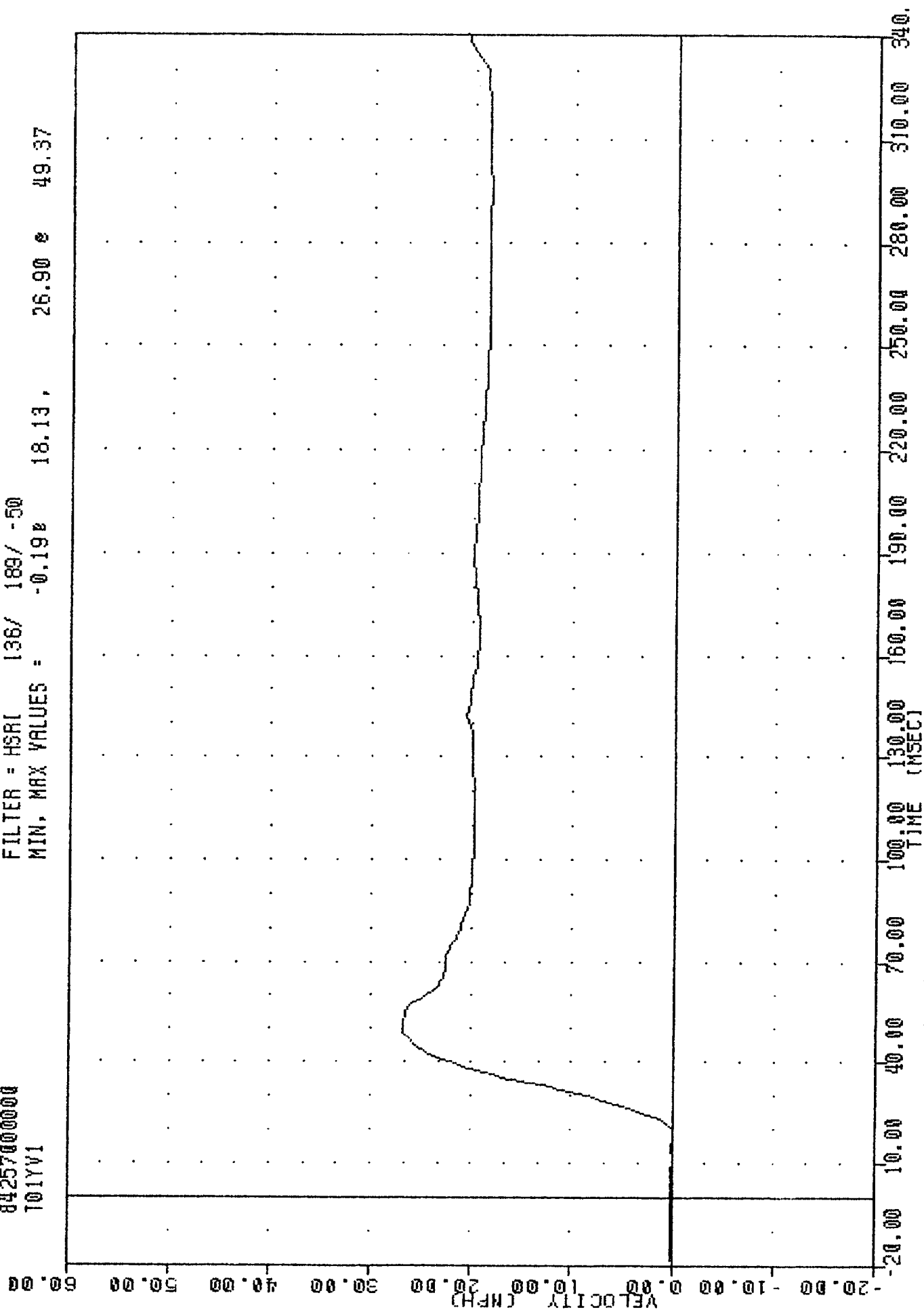
84257000000

T01YV1

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -0.19e 18.13, 26.90 e 49.37

B-12



SIDE AGGRESSIVE ATTRIBUTES

84257000000

T01YVR

FILTER = HSRI 136/ 189/ -50

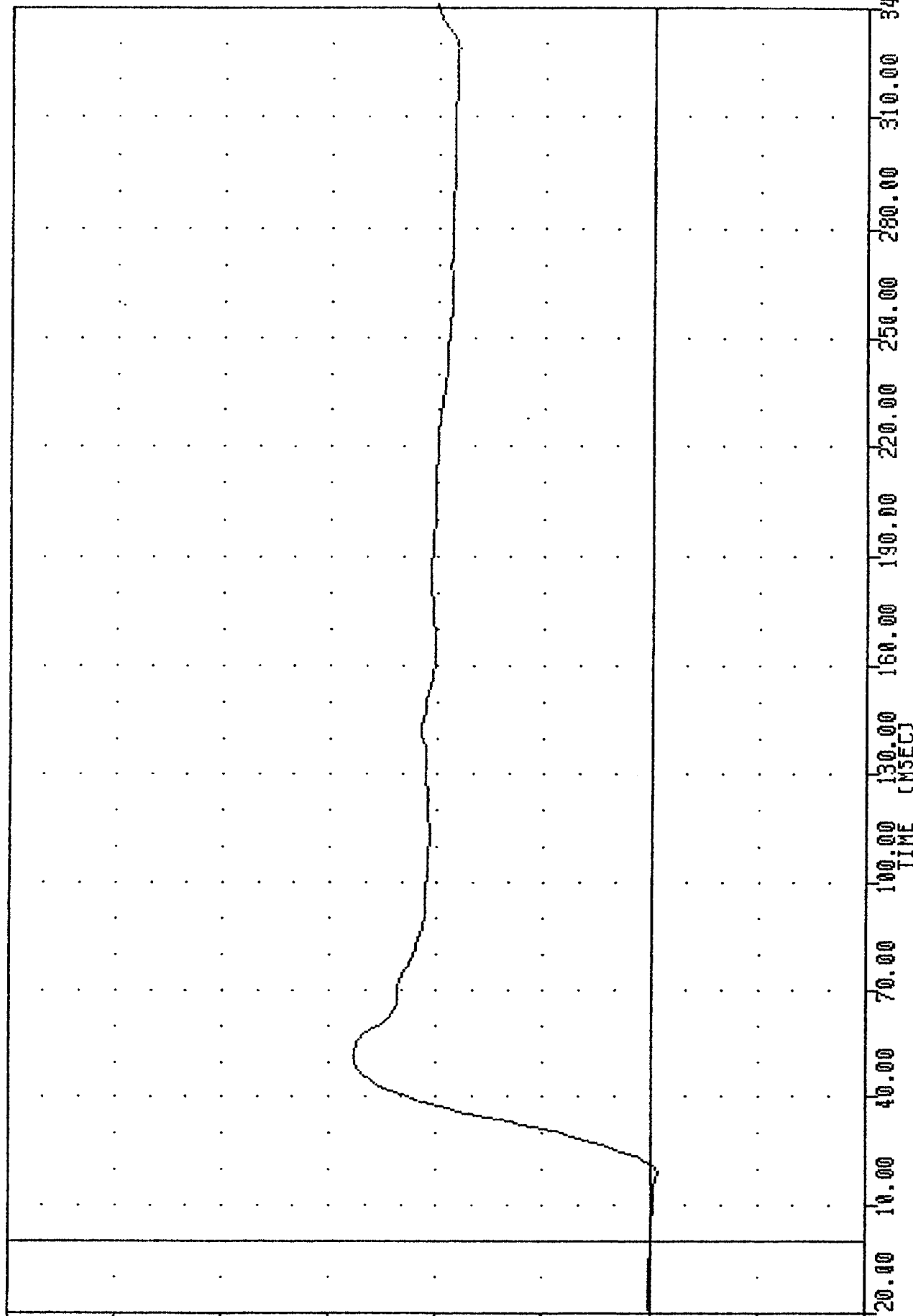
MIN, MAX VALUES = -0.65%

18.13 ,

27.74 @ 50.00

VELOCITY (MPH)

B-13



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T01YGR

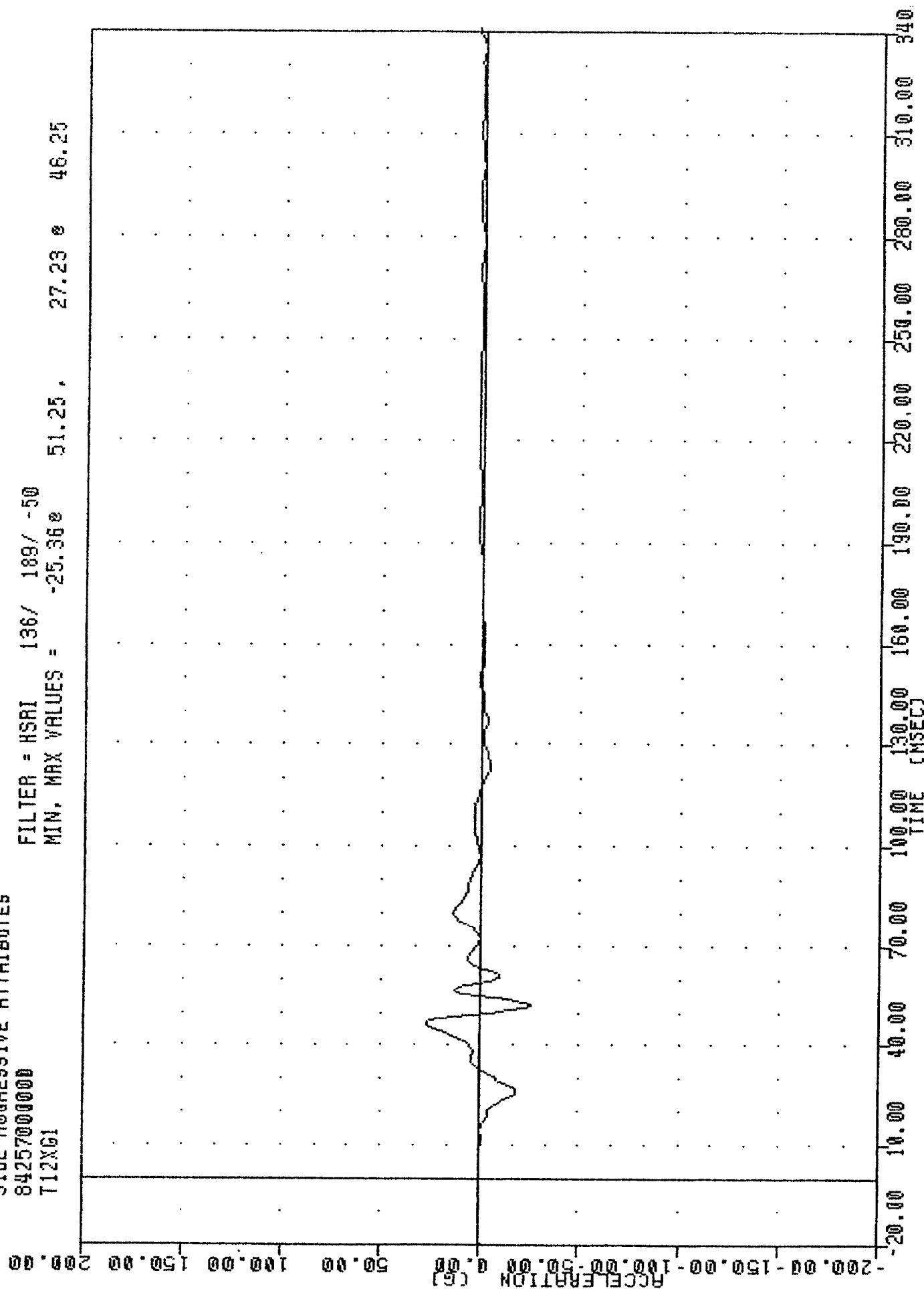
DATE RECORDED: 11/11/85

84257000000

T12XG1

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -25.36 51.25, 27.23 46.25



B-14

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE ACCELERATION X AXIS

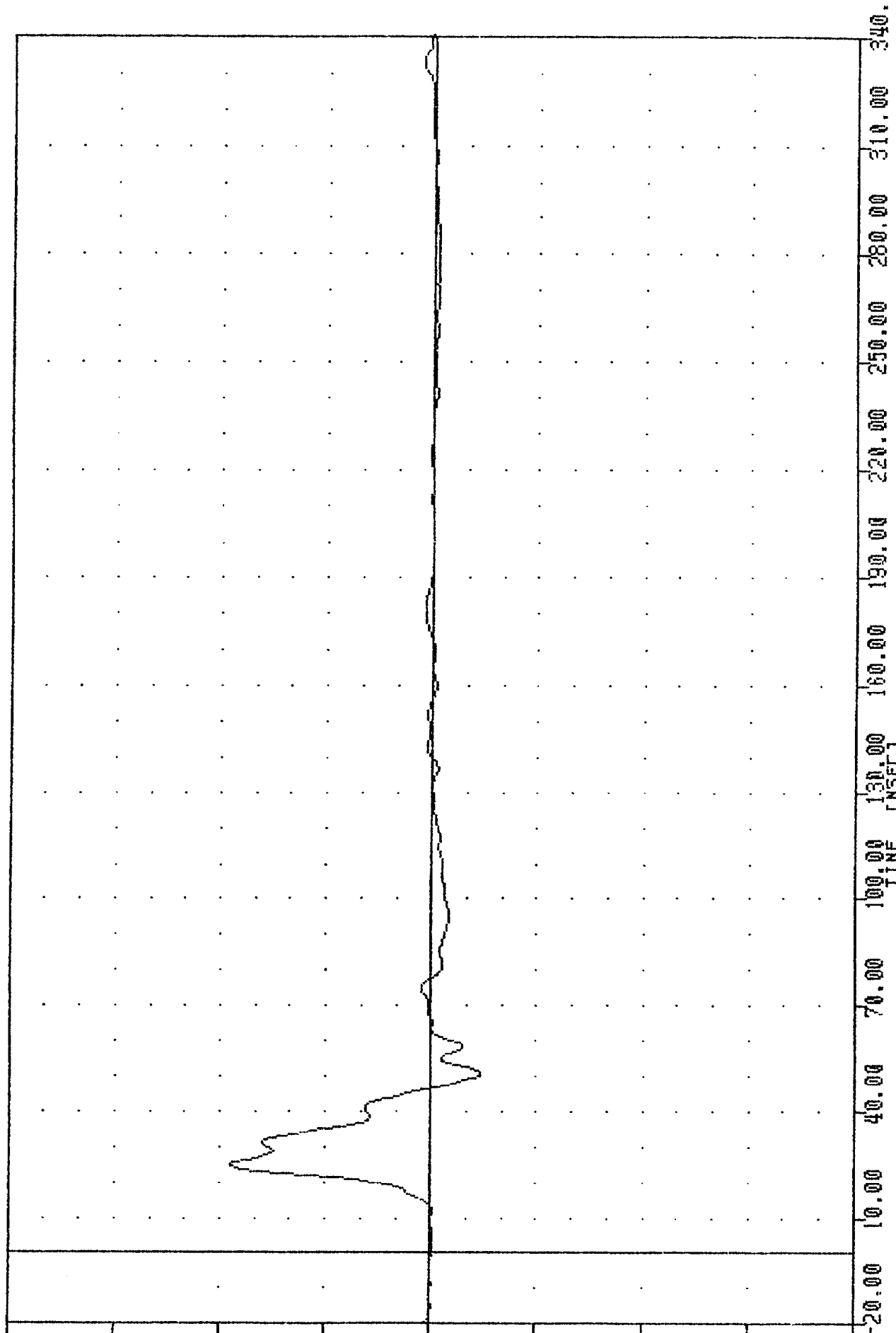
84257000000

T12Y61

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -23.58 50.00 , 94.84 24.38

B-15
ACCELERATION (G)



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE ACCELERATION Y AXIS

SIDE IMPRESSIVE ATTRIBUTES

84257000000

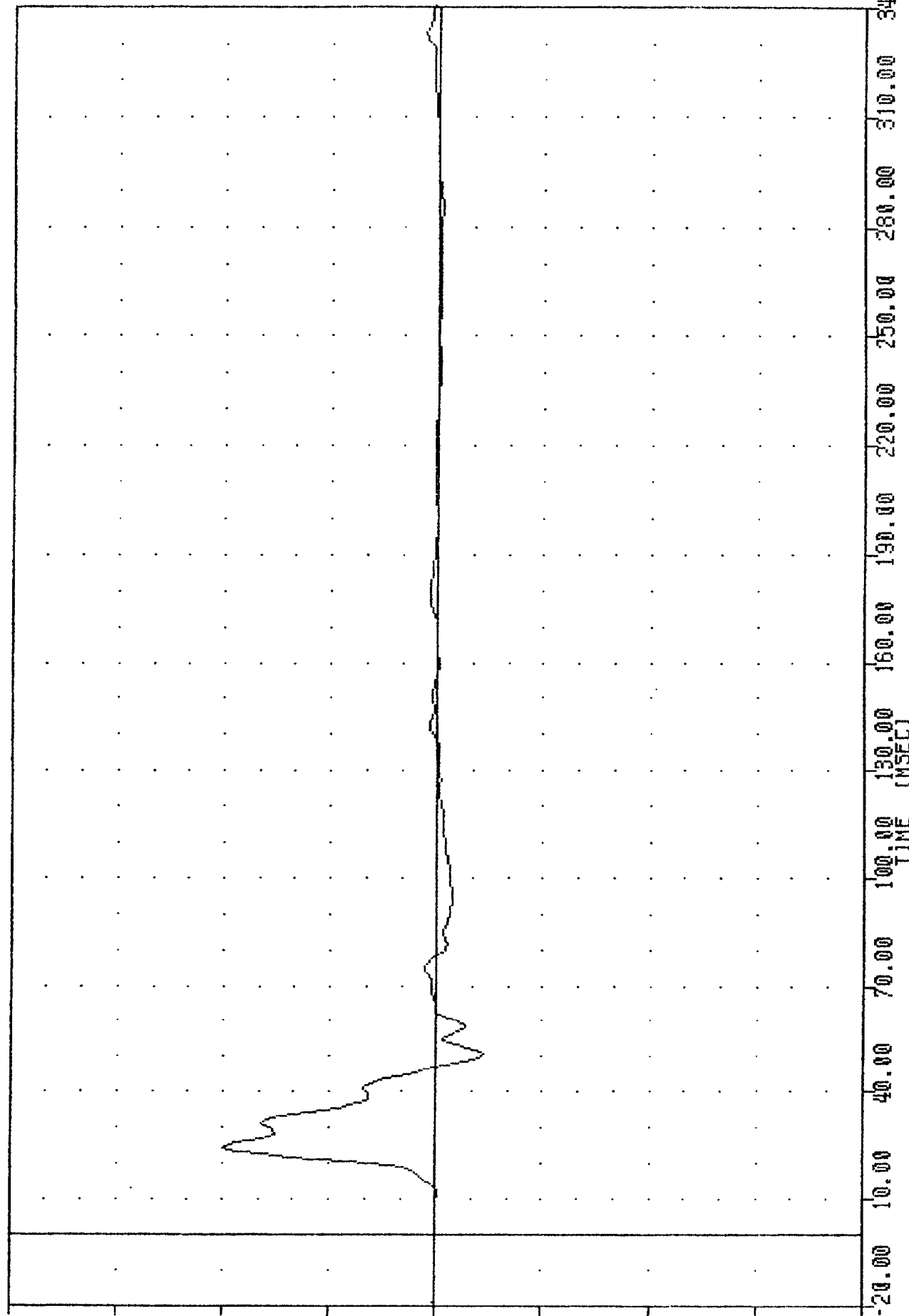
T12YGA

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -21.52 50.00, 100.28 23.75

ACCELERATION (G)

B-16



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE ACCELERATION #2 Y AXIS

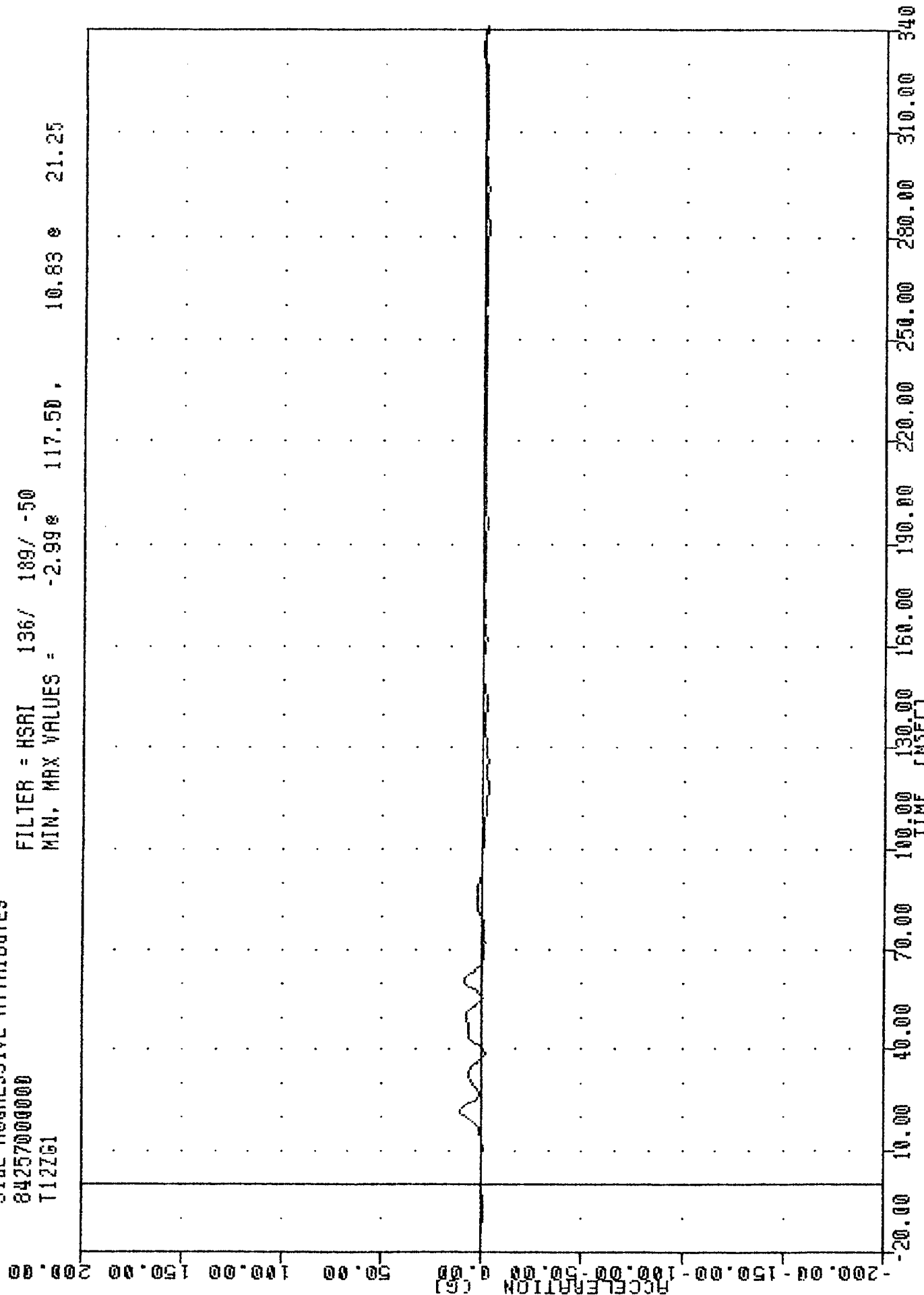
SIDE IMPRESSIVE HIGHLIGHTS

84257000000

T12261

FILTER = HSRI 136/ 189/ -50

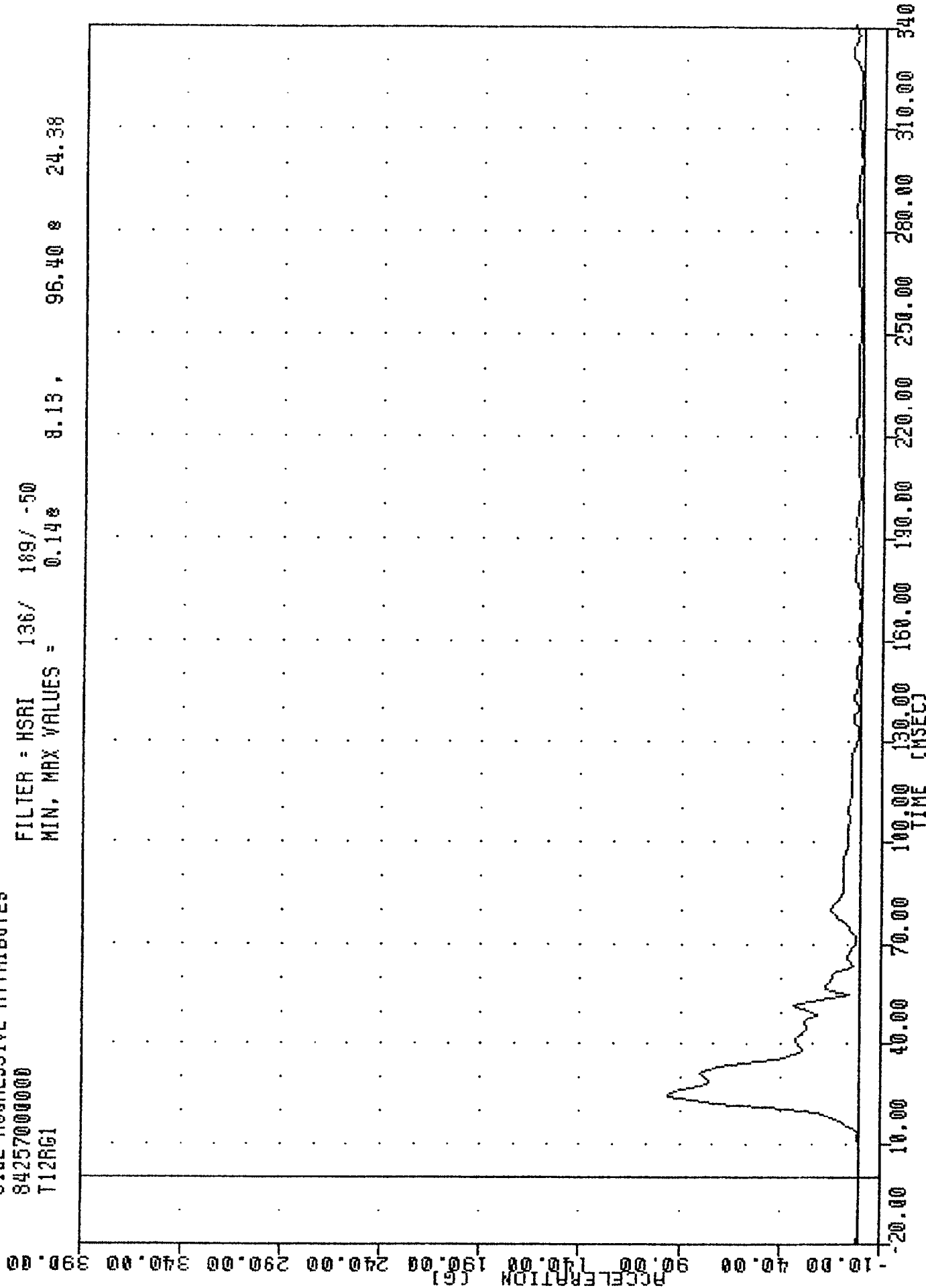
MIN. MAX VALUES = -2.99 117.50, 10.83 21.25



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE ACCELERATION Z AXIS

3100 IMPEDANCE HEADS
 84257000000
 T12R61

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.148 8.13, 96.40 8 24.38



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER LOWER SPINE RESULTANT

SIDE AGGRESSIVE ATTRIBUTES

84257000000

T12RGA

FILTER = HSRI 136/ 189/ -50

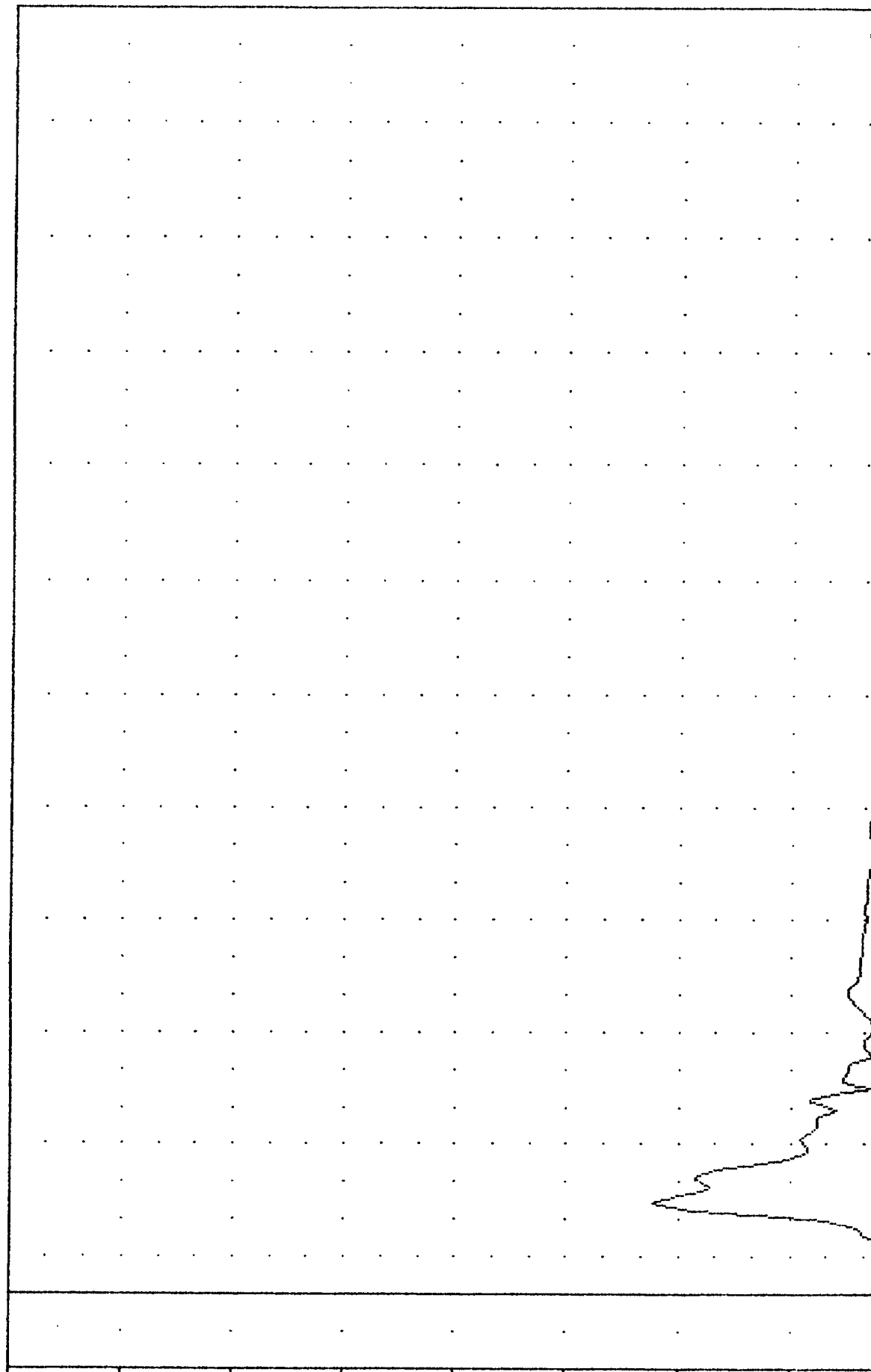
MIN. MAX VALUES = 0.07e

5.00,

101.55 e

23.75

ACCELERATION (G)



TIME (msec)

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE RESULTANT USING T12YGA

842570000000

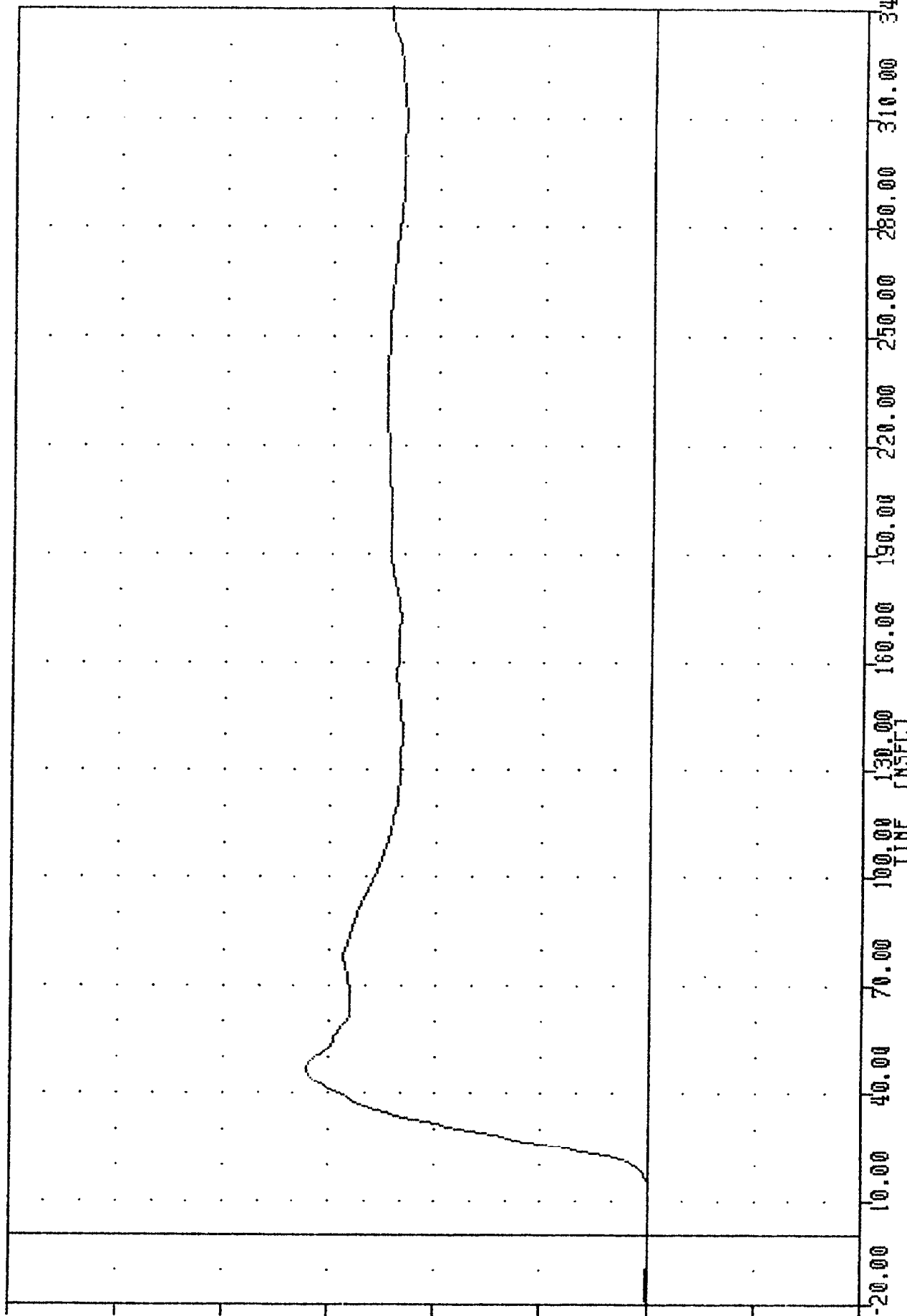
T12YV1

FILTER = HSRI 136/ 189/ .50

MIN. MAX VALUES = -0.15e 12.50 , 32.14 * 45.62

VELOCITY (CMFH)

B-20



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T12YGI

SIDE AGGRESSIVE ATTRIBUTES

84257000000

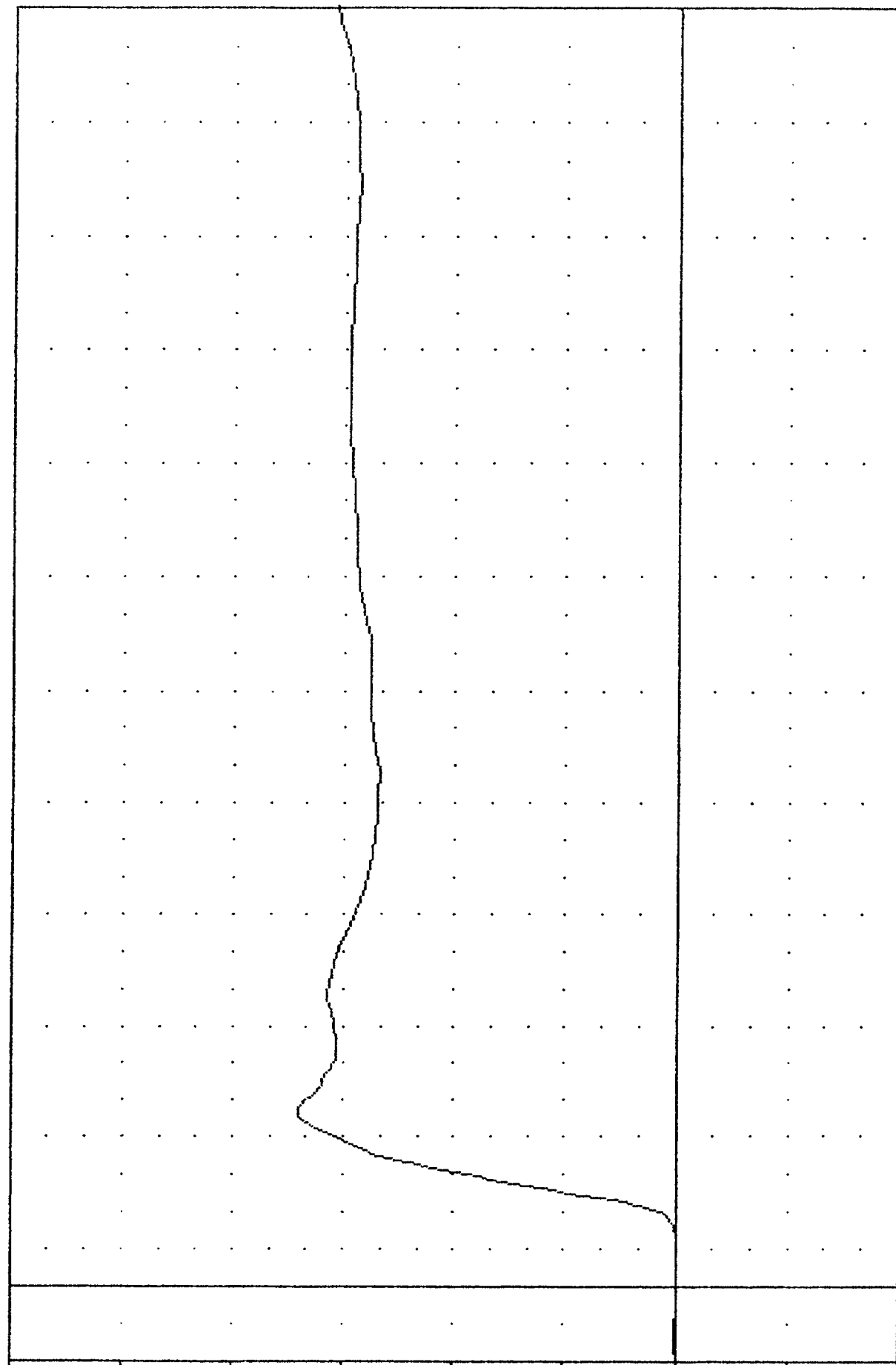
T12YVA

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -0.030 12.50 , 34.10 @ 46.25

B-21

VELOCITY (MPH)



TIME (MSEC)

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING T12YGA

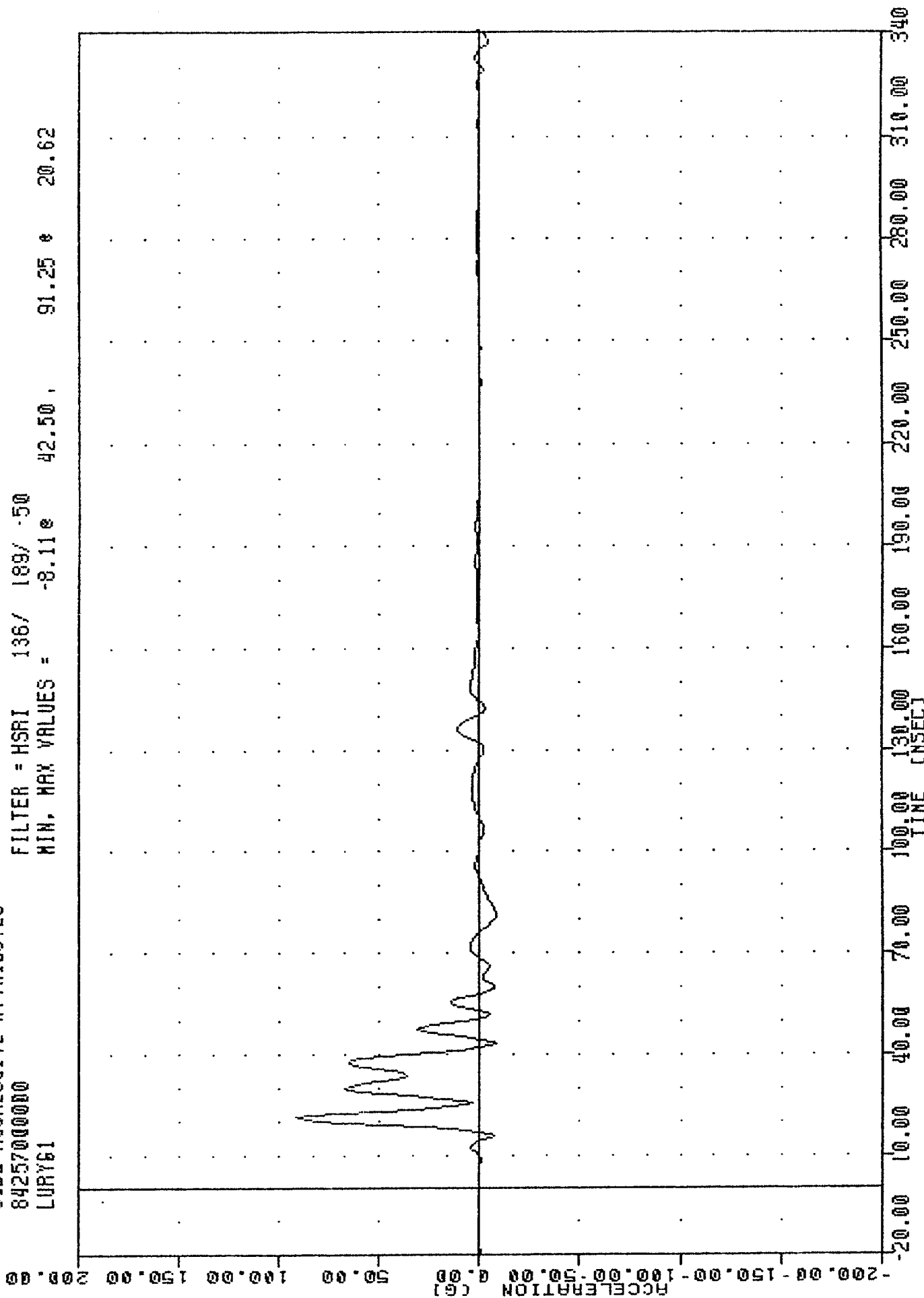
SIDE AGGRESSIVE ATTRIBUTES

84257000000

LURY61

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -8.11e 42.50 , 91.25 e 20.62



B-22

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT UPPER RIB ACCELERATION Y AXIS

SIDE AGGRESSIVE ATTRIBUTES

84257000000

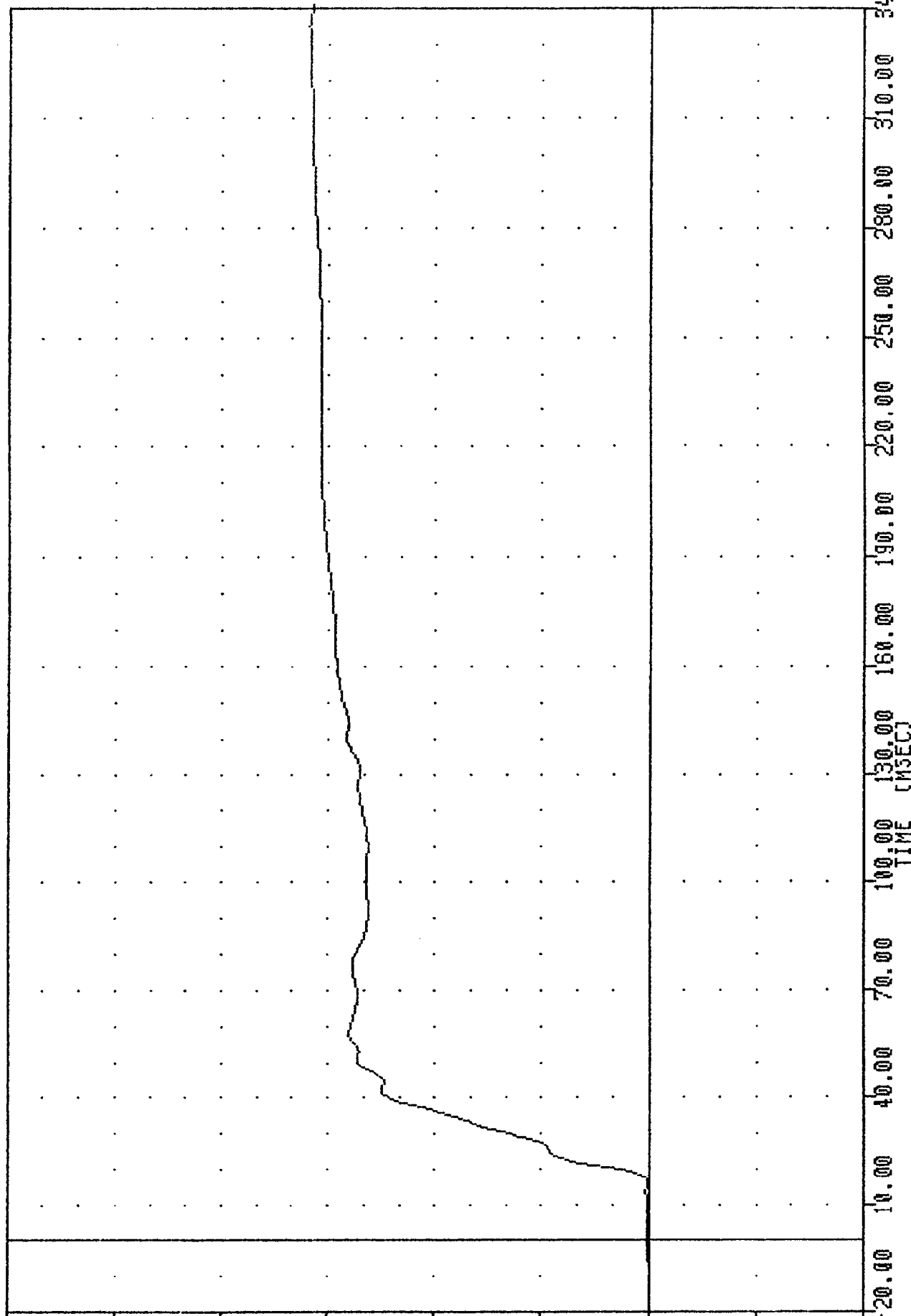
LURYV1

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -0.028 -17.50, 31.83 334.38

VELOCITY (MPH)

B-23



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LURYG1

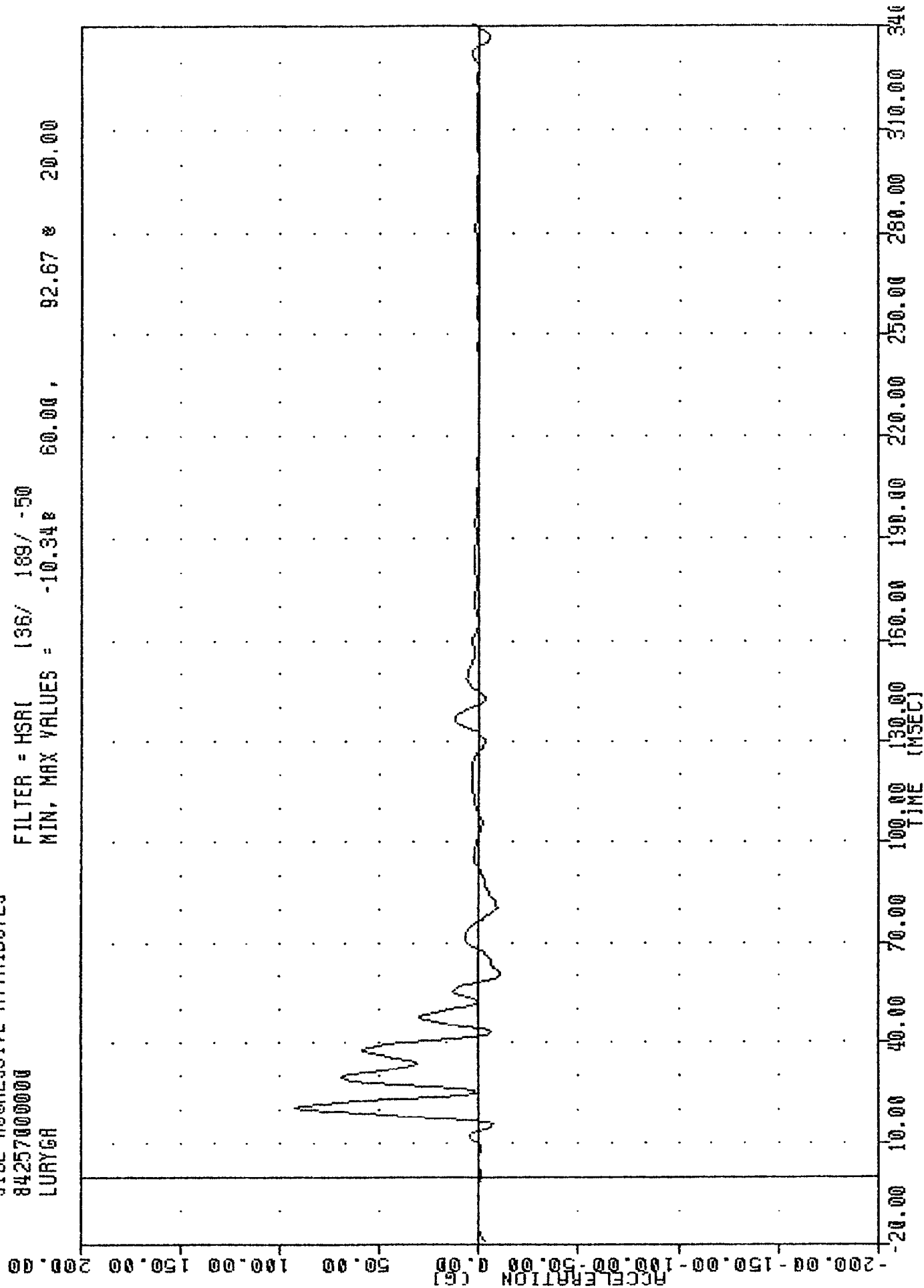
SIDE IMPRESSIVE HIGHLIGHTS

84257000000

LURYGA

FILTER = HSR1 136/ 189/ -50

MIN. MAX VALUES = -10.34 60.00 , 92.67 20.00



B-24

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT UPPER RIB ACCELERATION -2 Y AXIS

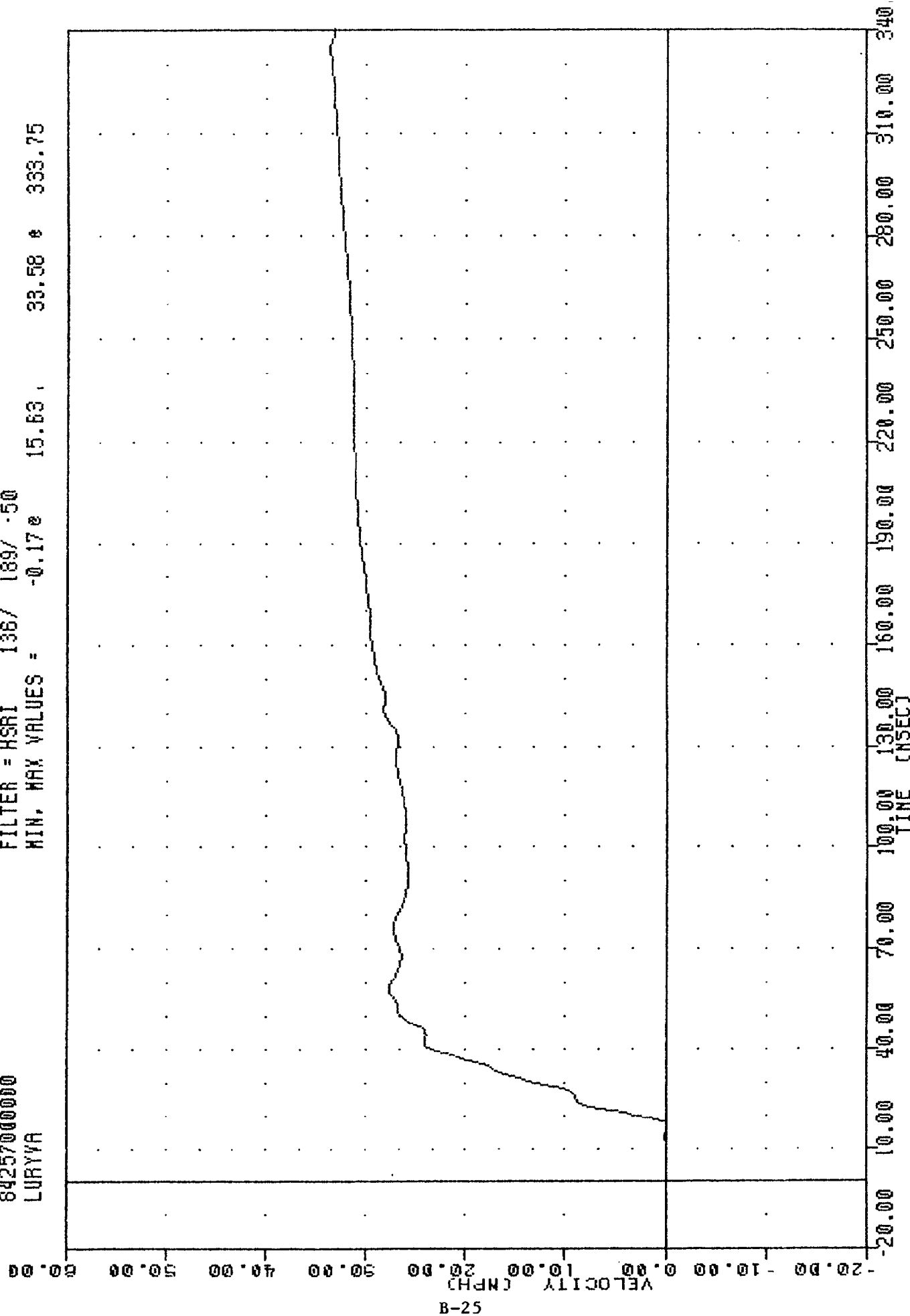
SIDE AGGRESSIVE ATTRIBUTES

84257000000

LURYVA

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -0.17 15.63 33.58 333.75



52-B

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LURYGA

TIME NECESSARY TO MINIMIZE

84257000000

LLAYG1

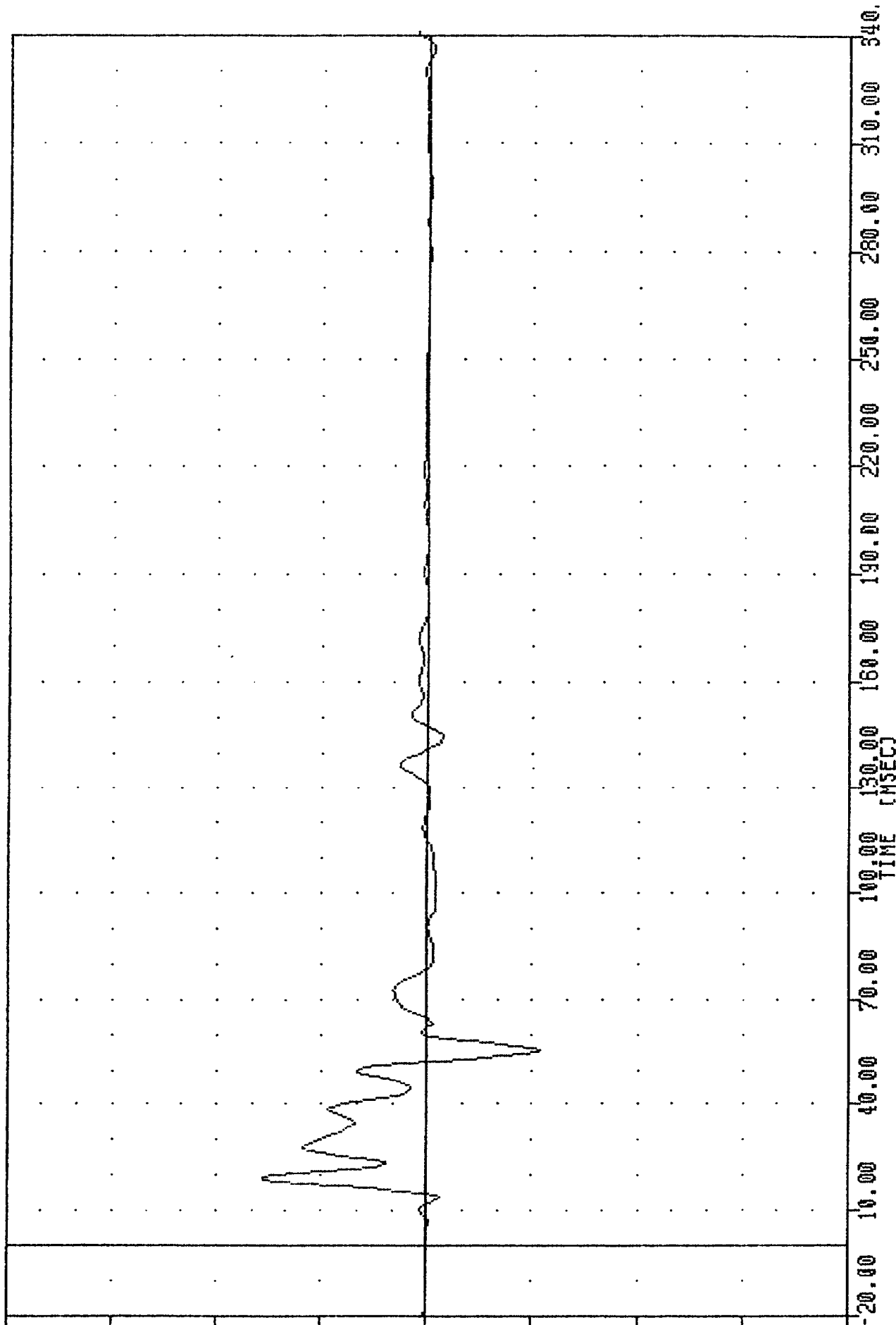
FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -54.25e 55.00e

77.90 e 18.75

ACCELERATION (G)

B-26



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT LOWER RIB ACCELERATION Y AXIS

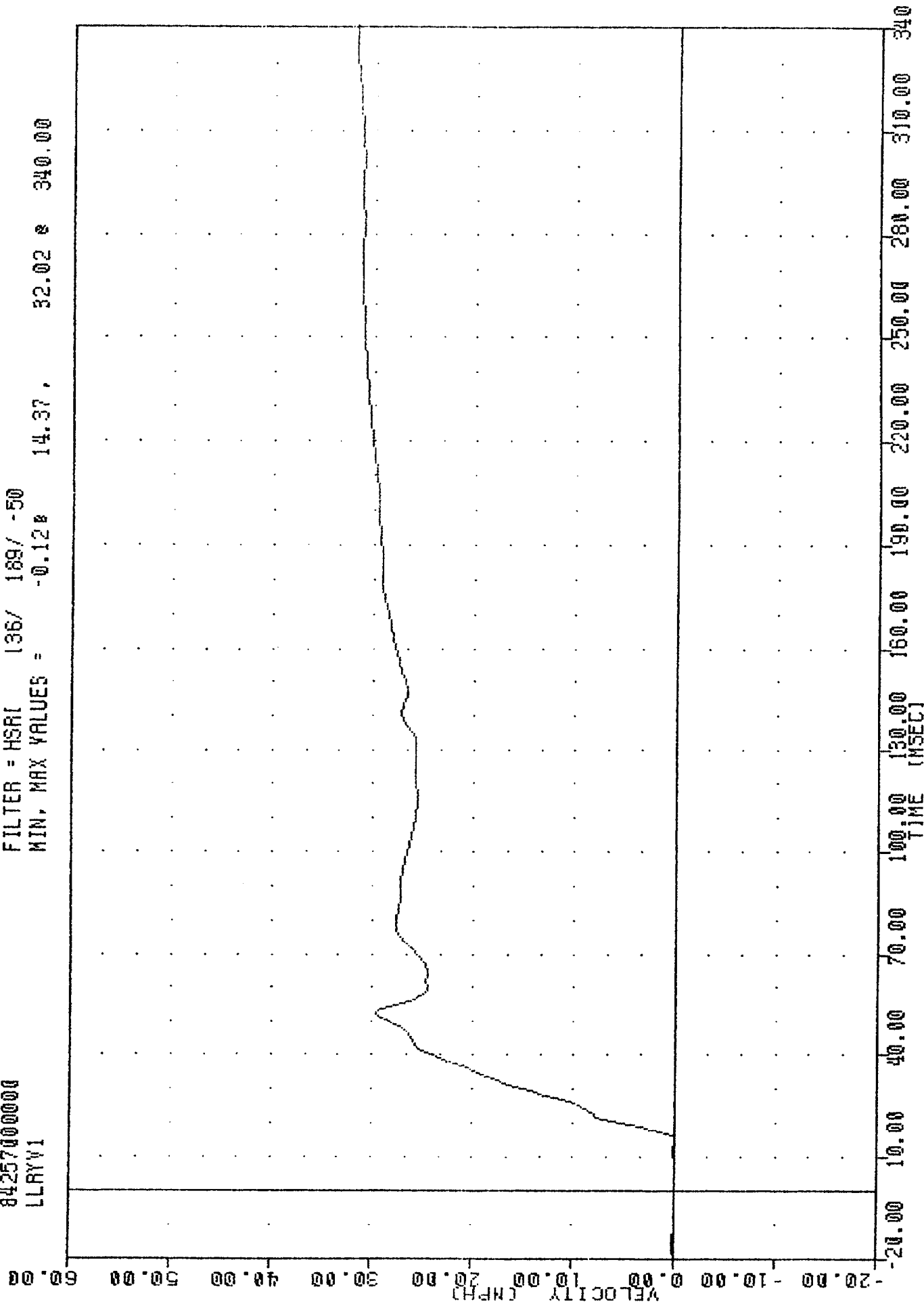
NAME: 84257000000

LLRYV1

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -0.128 14.37, 32.02 & 340.00

B-27



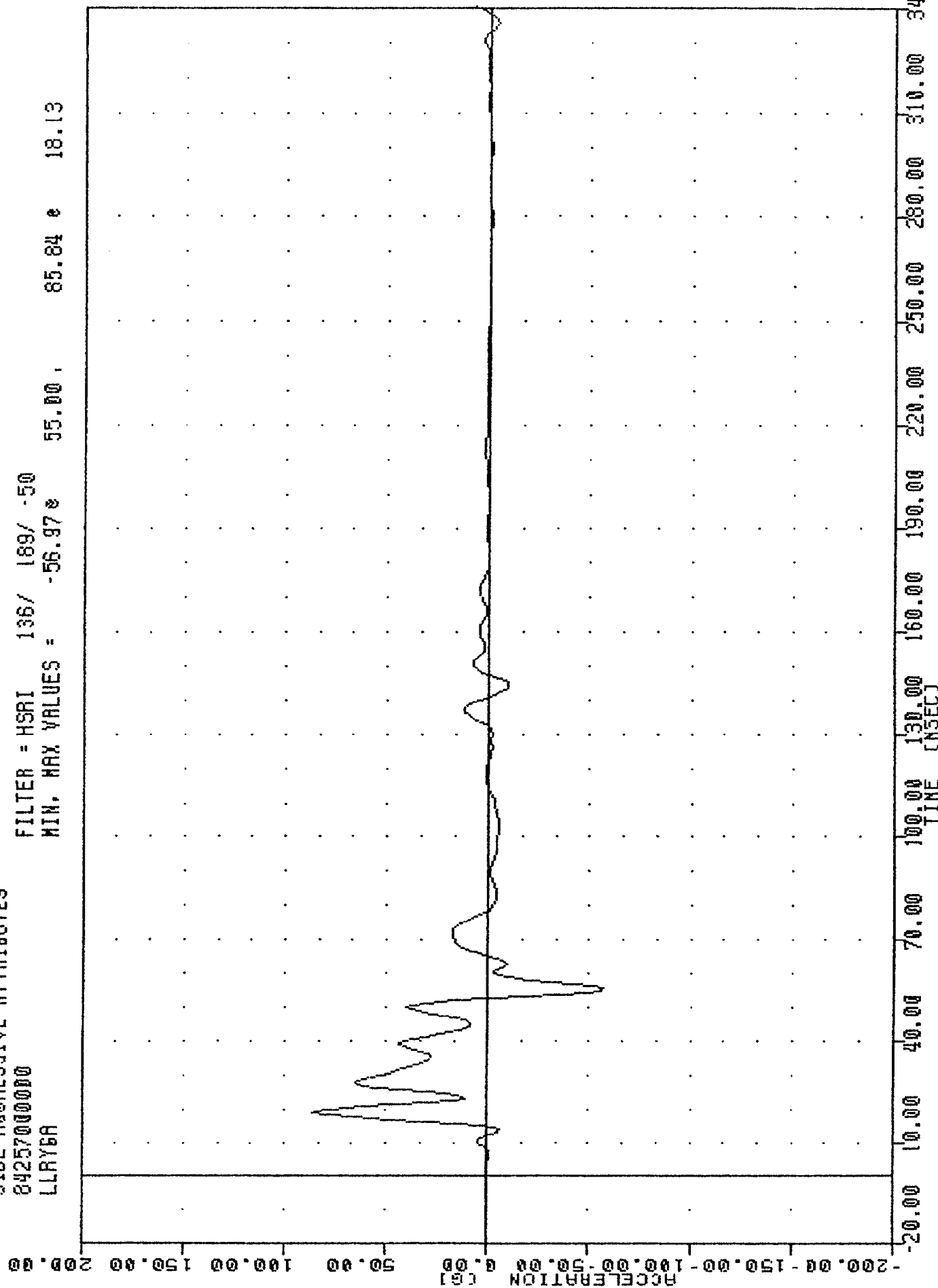
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LLRYG1

FILTER = HSPH 136/ 89/ -50

LLRY6A

MIN. MAX. VALUES =	-56.97	55.00
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85.84 @ 18.13



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT LOWER RIB ACCELERATION - 2 Y AXIS

SIDE IMPRESSIVE ATTRIBUTES

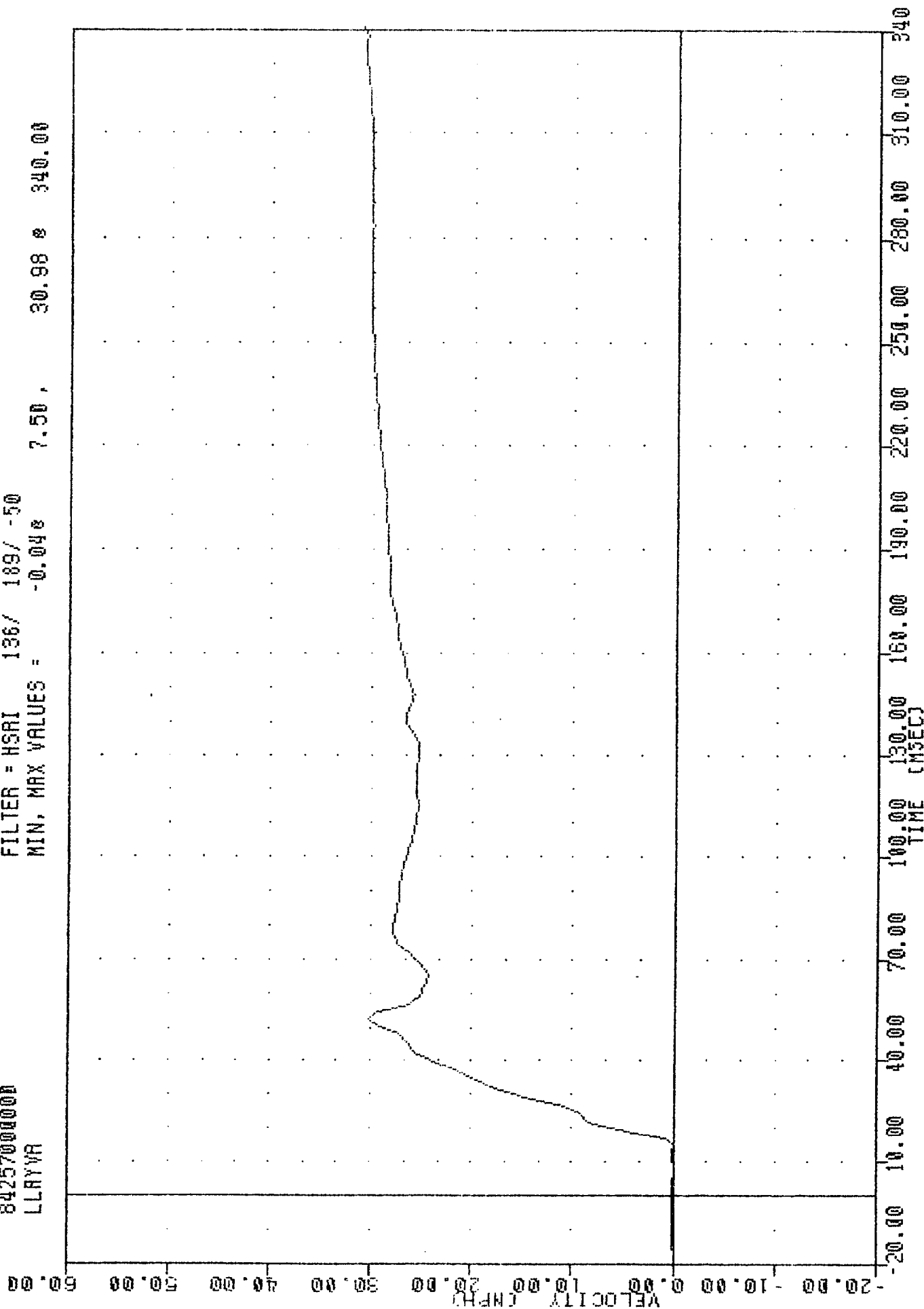
84257000000

LLAYVR

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -0.048 7.50, 30.98 340.00

B-29



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING LLAYGA

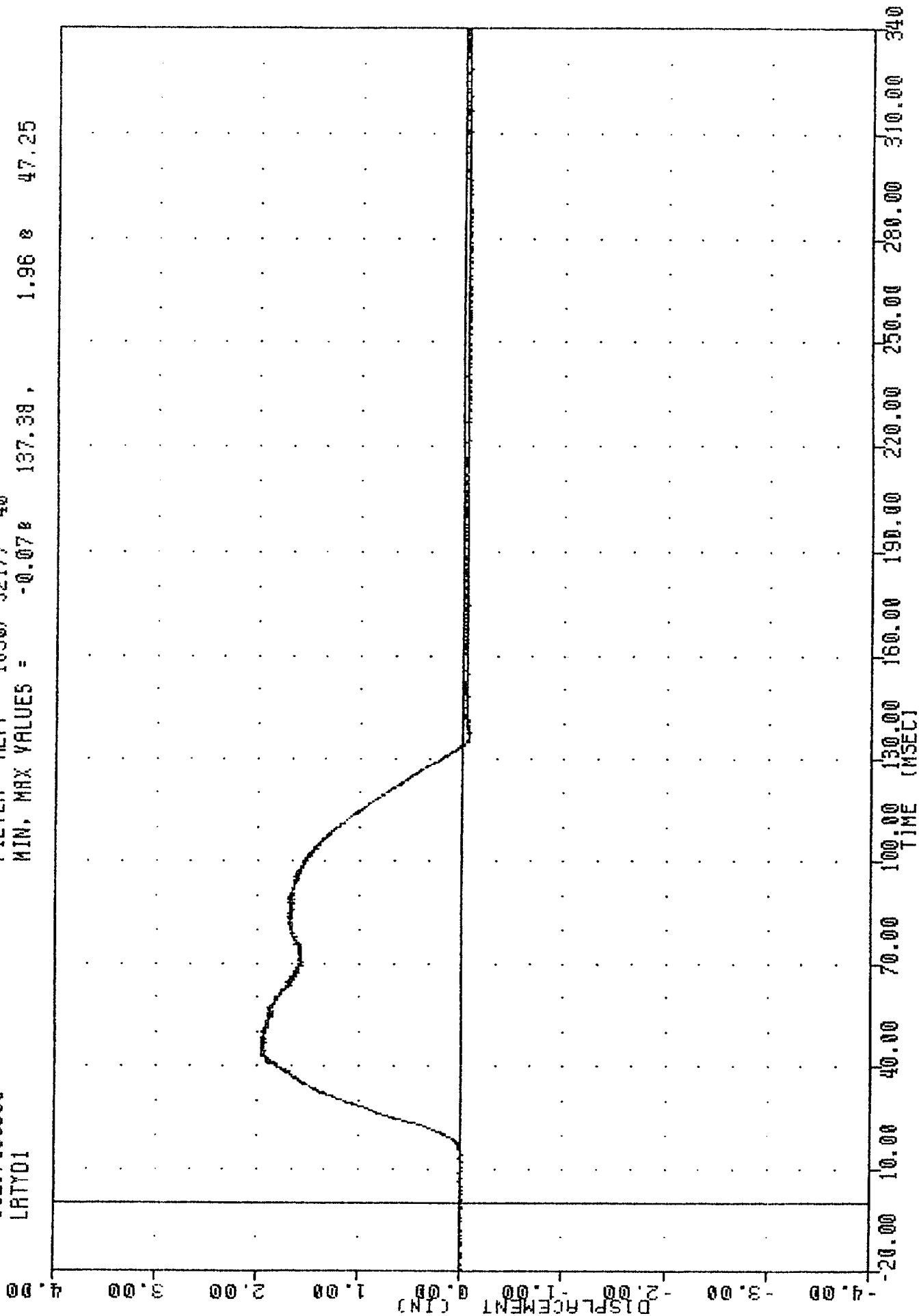
SIDE IMPRESSIVE MEASUREMENTS

84257000000

LATY01

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -0.078 137.38 , 1.96 8 47.25



B-30

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT RIB TO SPINE DISPLACEMENT INCHES

SIDE IMPRESSIVE ATTRIBUTES

84257000000

PEVXG1

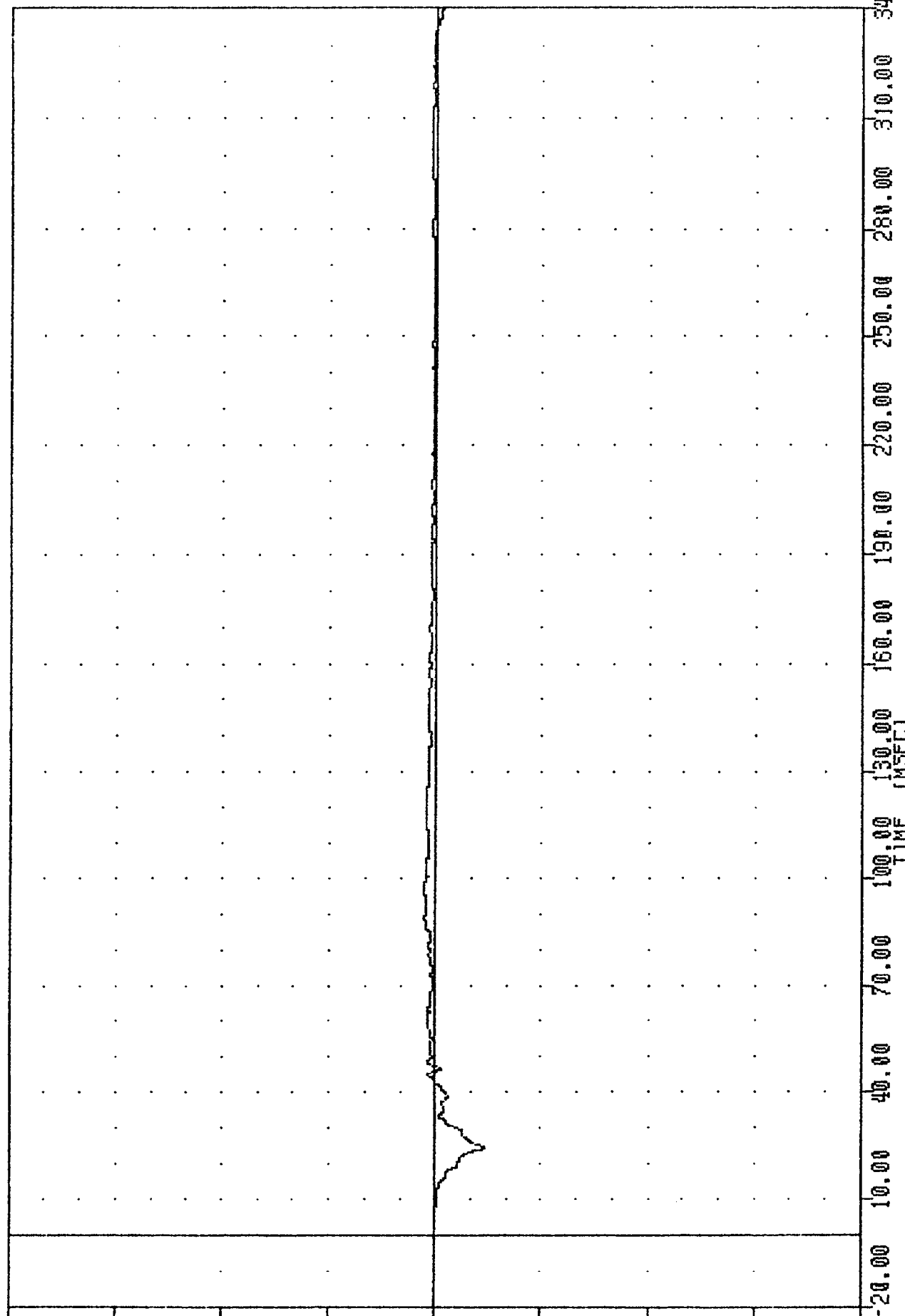
FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -23.36e

24.38 , 5.47 e 97.50

ACCELERATION (G)

B-31



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER PELVIS ACCELERATION X AXIS

SIDE AGGRESSIVE ATTRIBUTES

84257000000

PEVYG1

FILTER = BLPF

300/ 949/ -10

MIN. MAX VALUES =

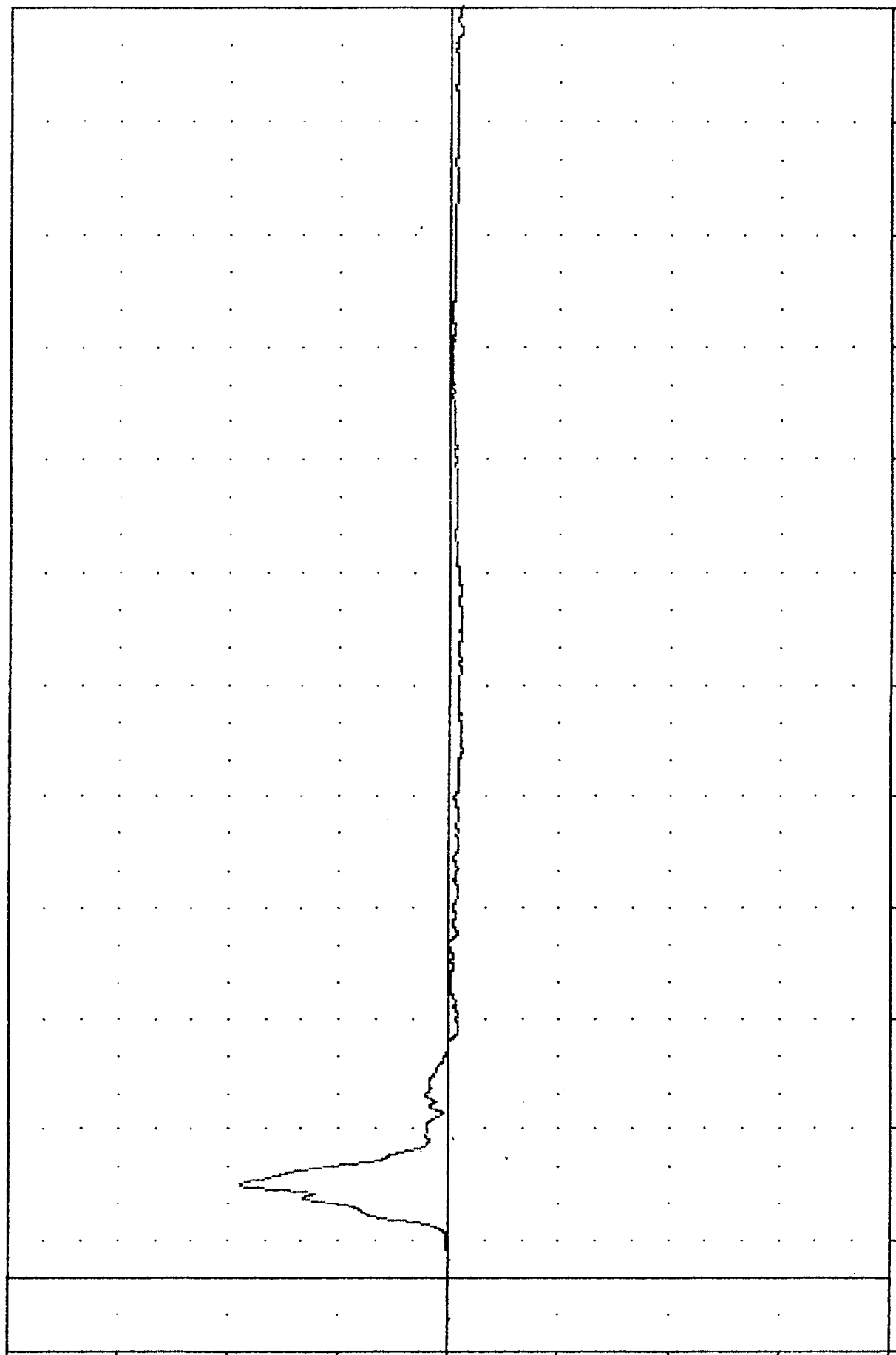
-5.70e

142.13,

94.68 e

25.00

ACCELERATION [G]



B-32

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER PELVIS ACCELERATION Y AXIS

SIDE IMPRESSIVE ATTRIBUTES

84257000000

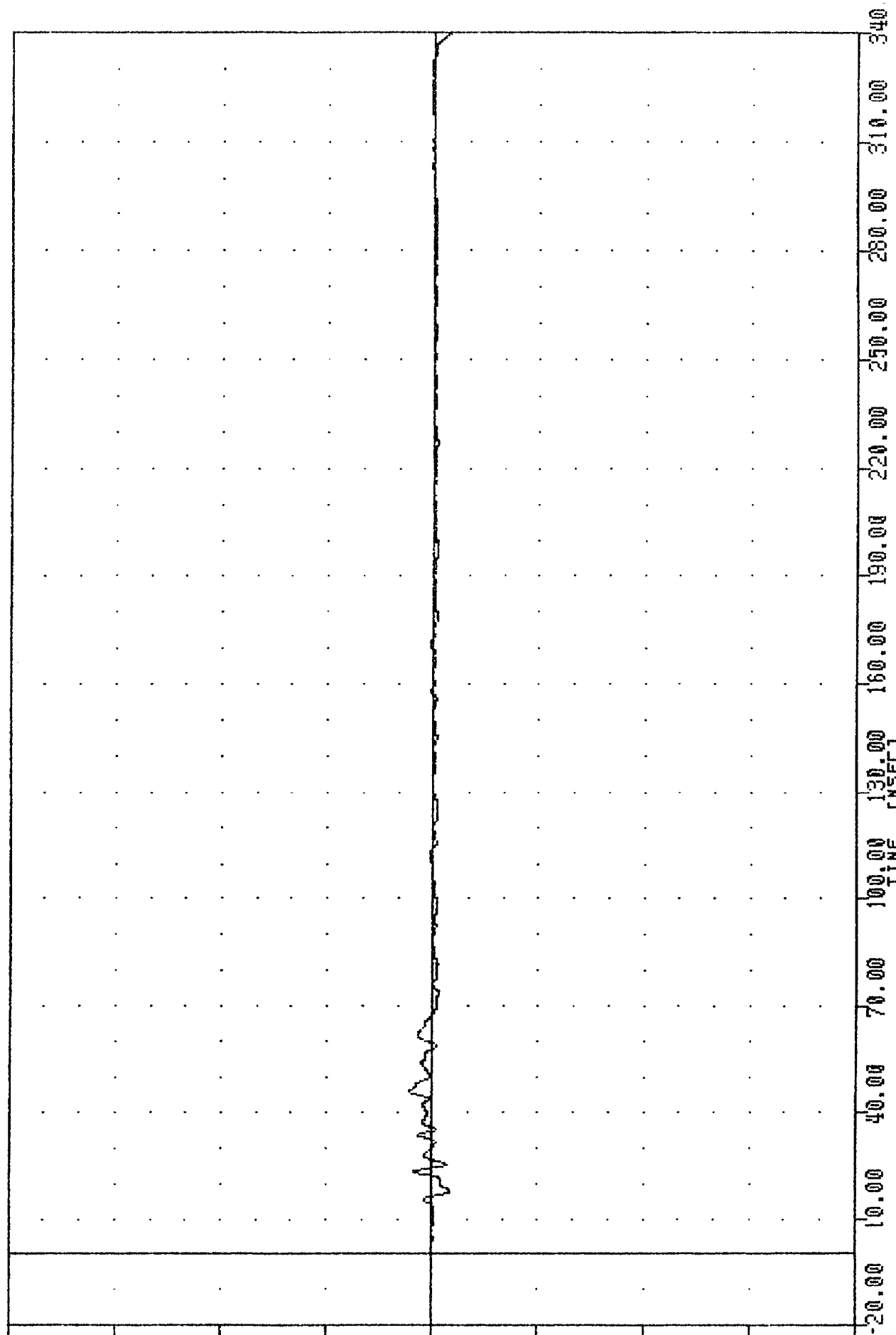
PEVZ61

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -8.748 17.63, 10.72 e 45.63

ACCELERATION (G)

B-33



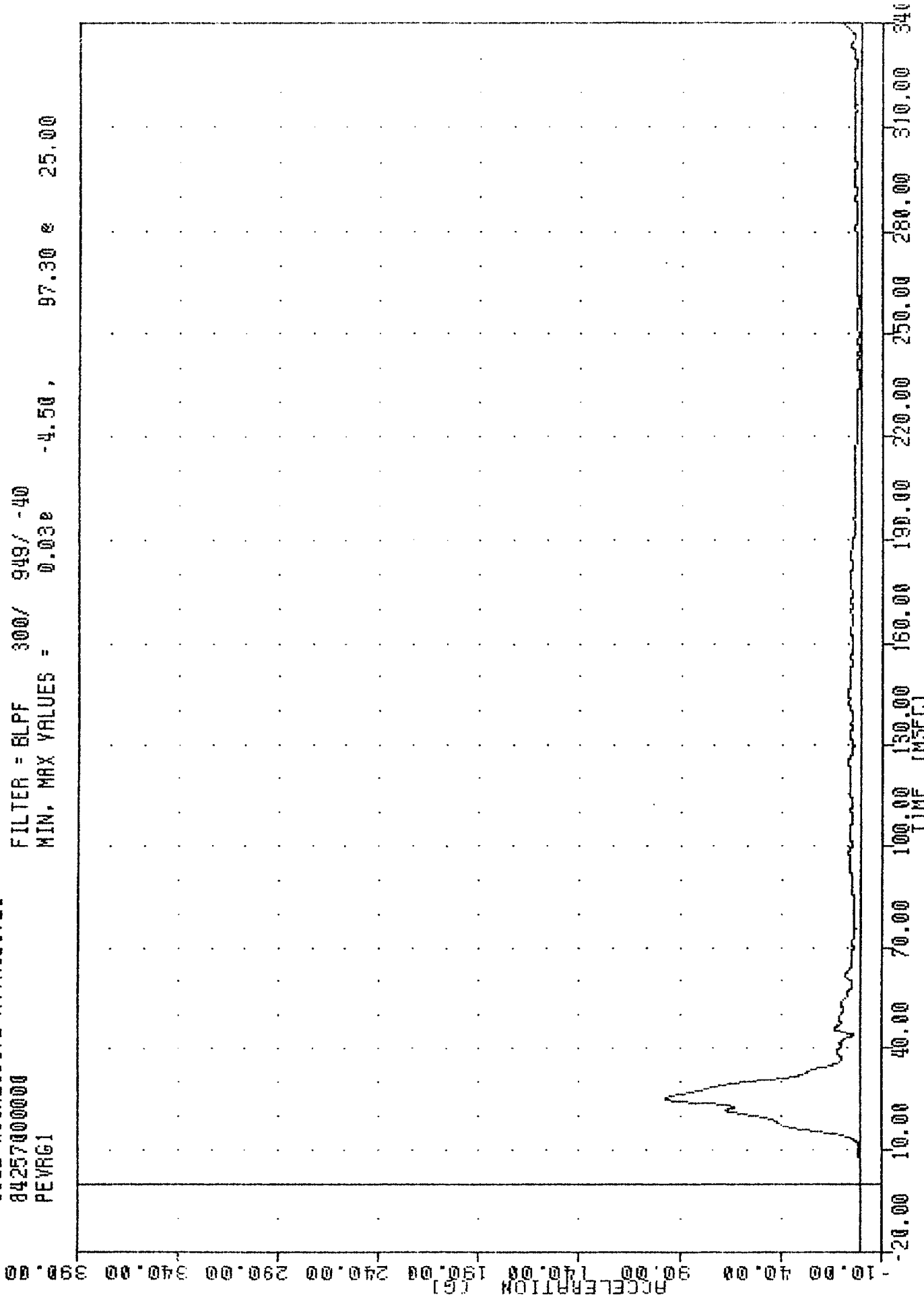
SIDE AGGRESSIVE ATTRIBUTES

84257000000

PEVRG1

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = 0.030 -4.50 , 97.30 @ 25.00



-20.00 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

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER PELVIS RESULTANT

SIDE IMPRESSIVE HISTOGRAMS

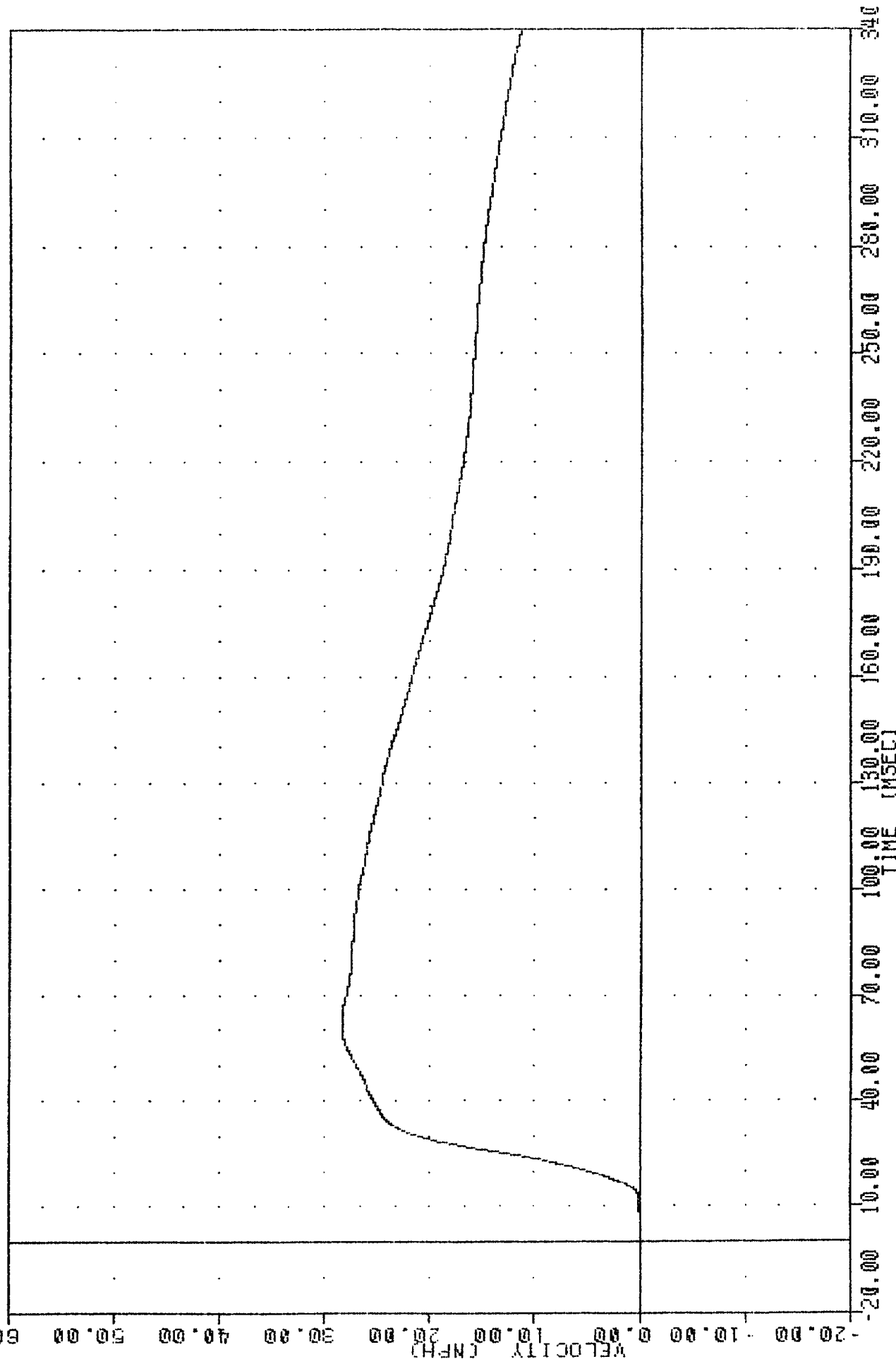
84257000000

PEVYV1

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -0.028 5.50 , 28.39 8 63.38

B-35



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING PEVYGI

SIDE AGGRESSIVE ATTRIBUTES

84257000000

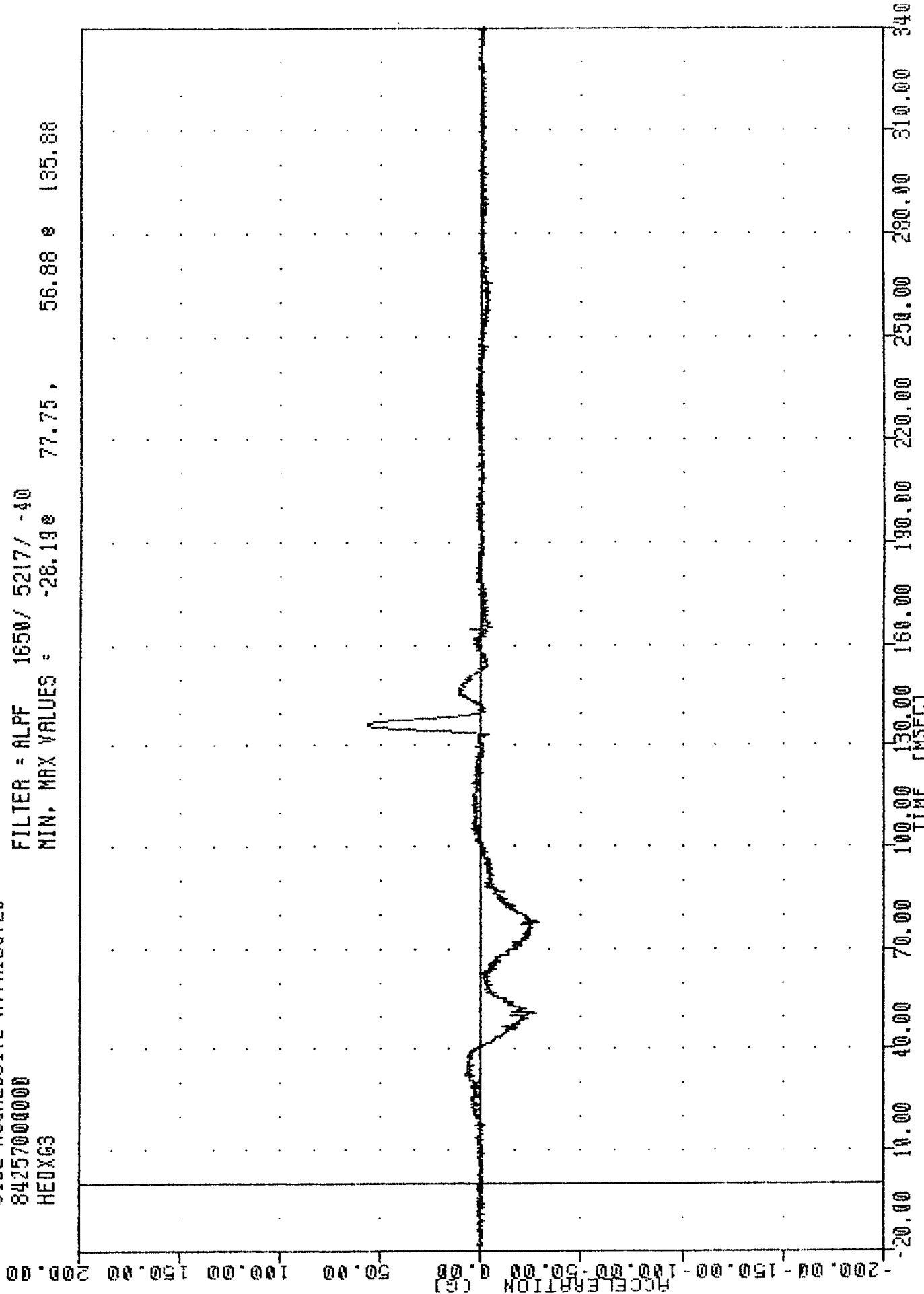
HEDXG3

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -28.198

77.75 ,

56.88 8 135.88



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD ACCELERATION X AXIS

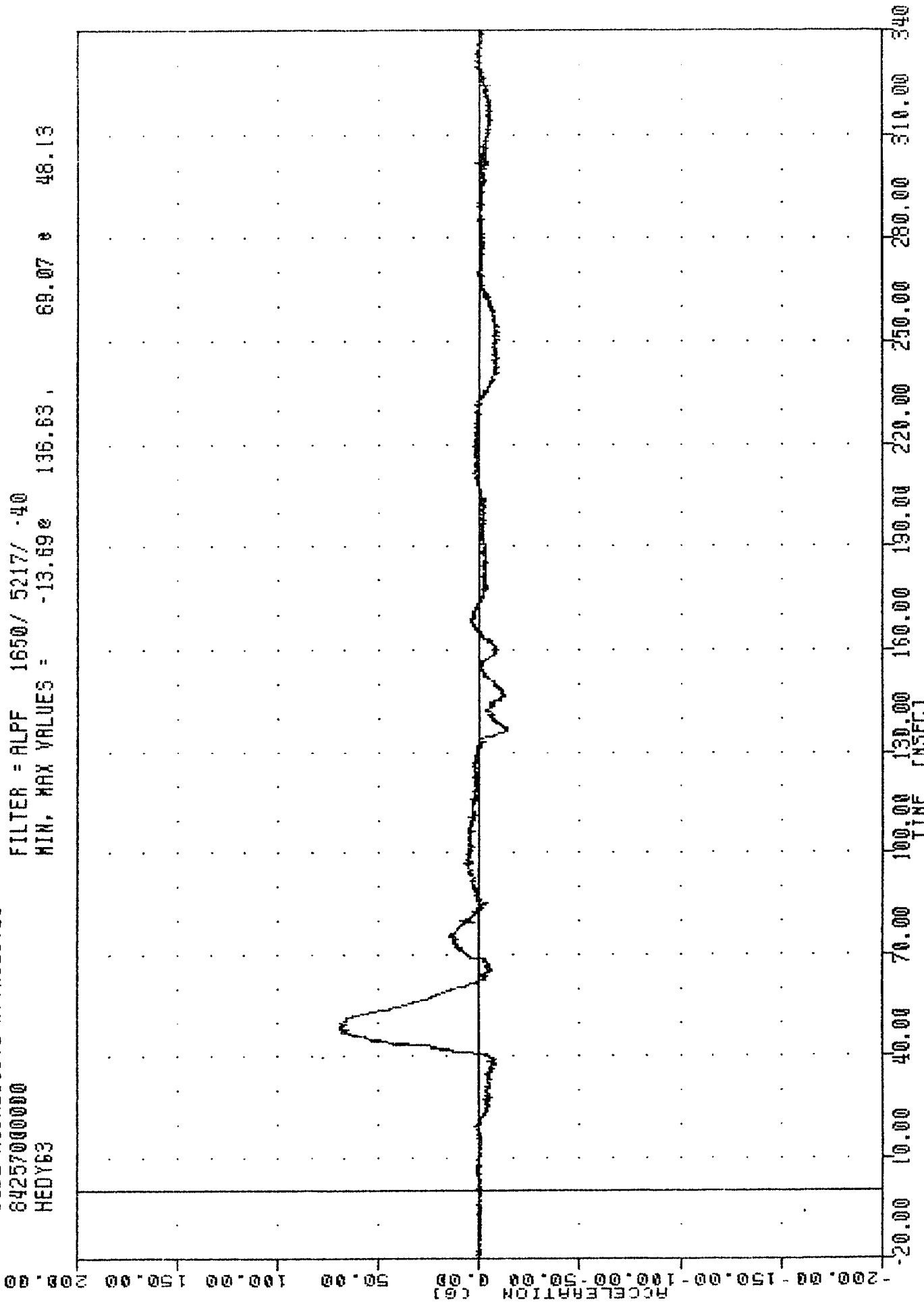
SIDE AGGRESSIVE ATTRIBUTES

84257000000

HEDY63

FILTER = ALPF 1650/ 5217/ -40

MIN. MAX VALUES = -13.69e 136.63 , 69.07 e 48.13



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD ACCELERATION Y AXIS

BLUE INCREMENTAL HISTOGRAMS

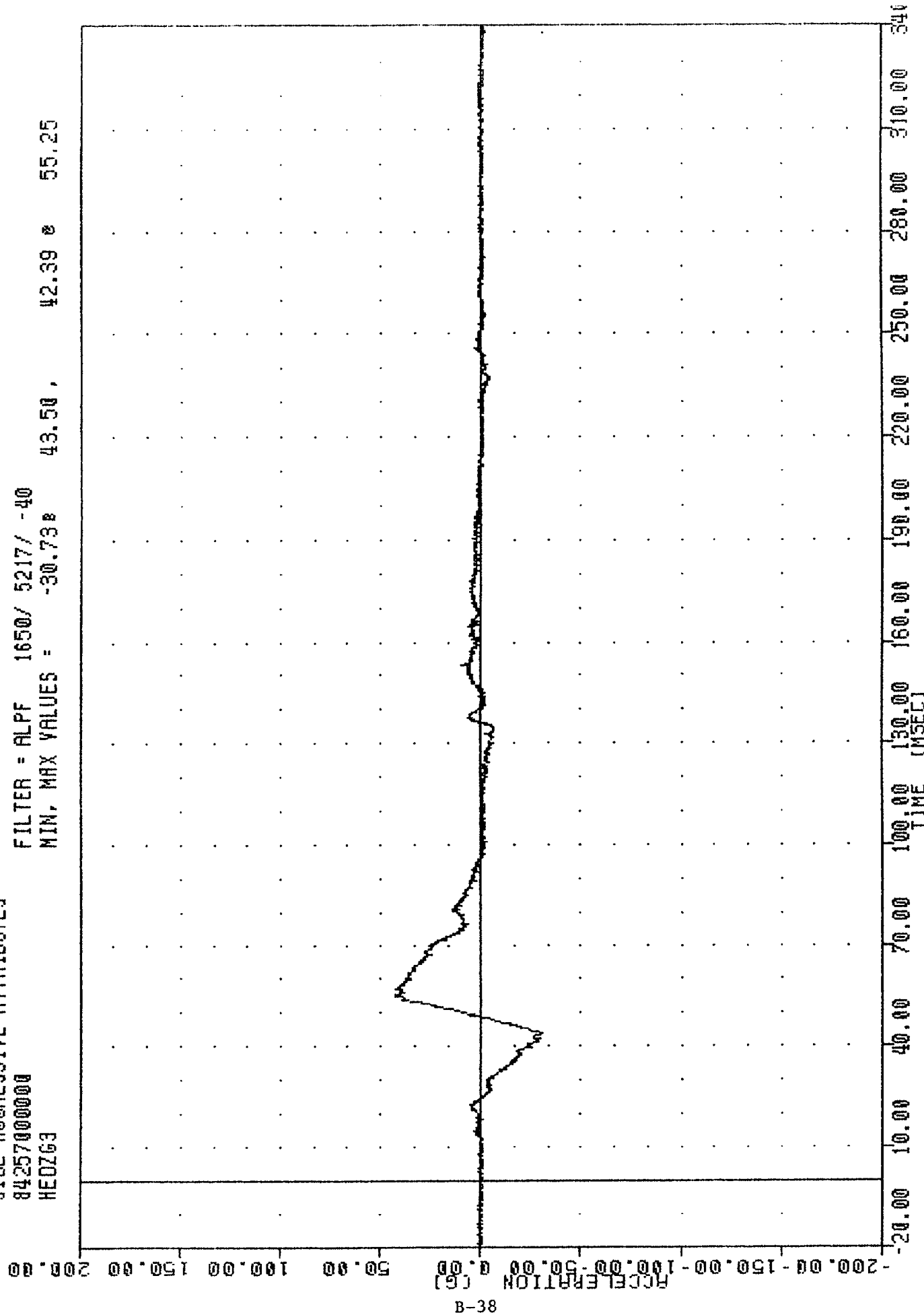
84257000000

HE0263

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -30.73 43.50 ,

42.39 55.25



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD ACCELERATION Z AXIS

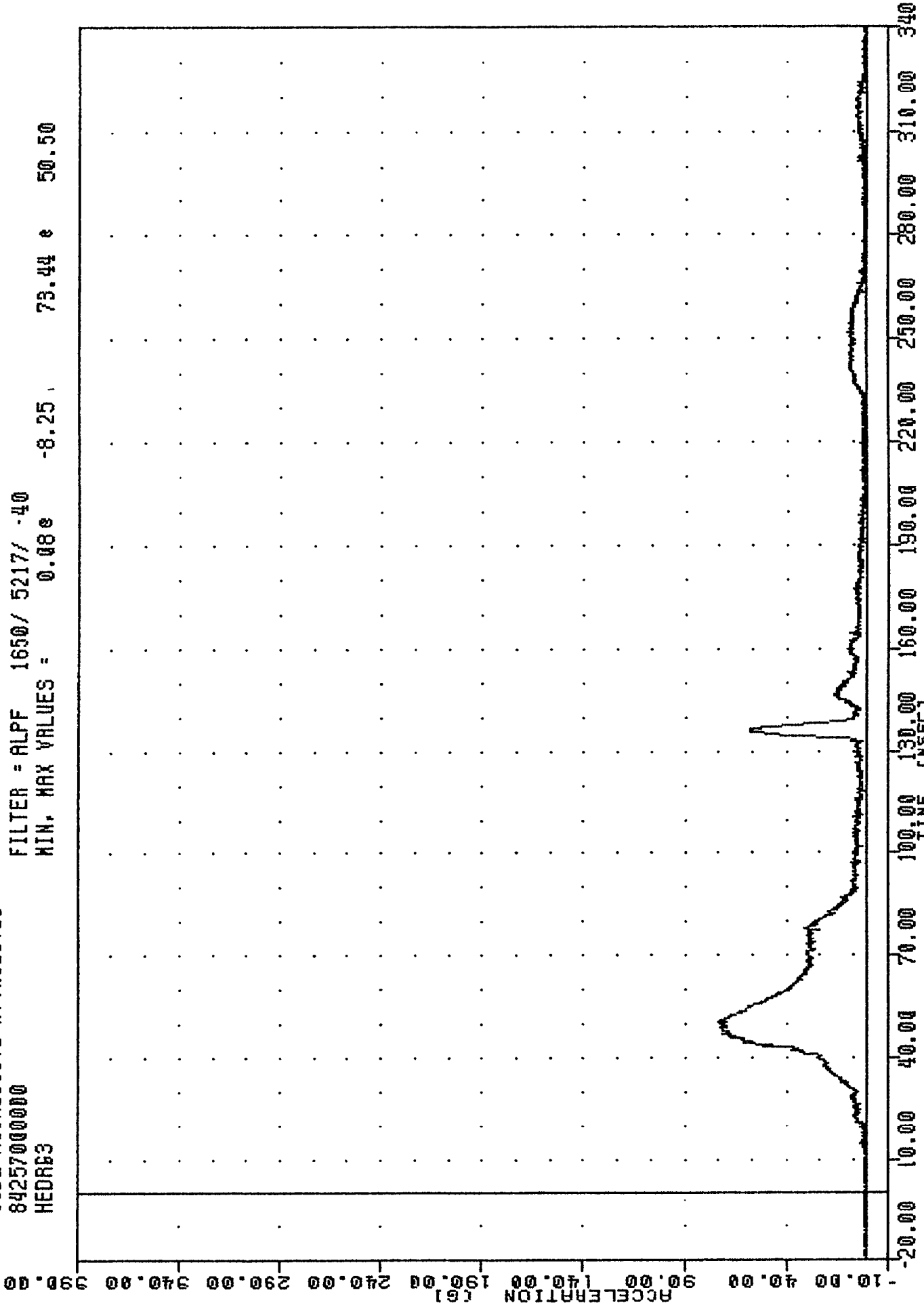
SIDE AGGRESSIVE ATTRIBUTES

84257000000

HEDR63

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = 0.088 -8.25 , 73.44 e 50.50



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD RESULTANT

SIDE AGGRESSIVE ATTRIBUTES

84257000000

T01XG3

FILTER = HSRI 136/ 189/ -50

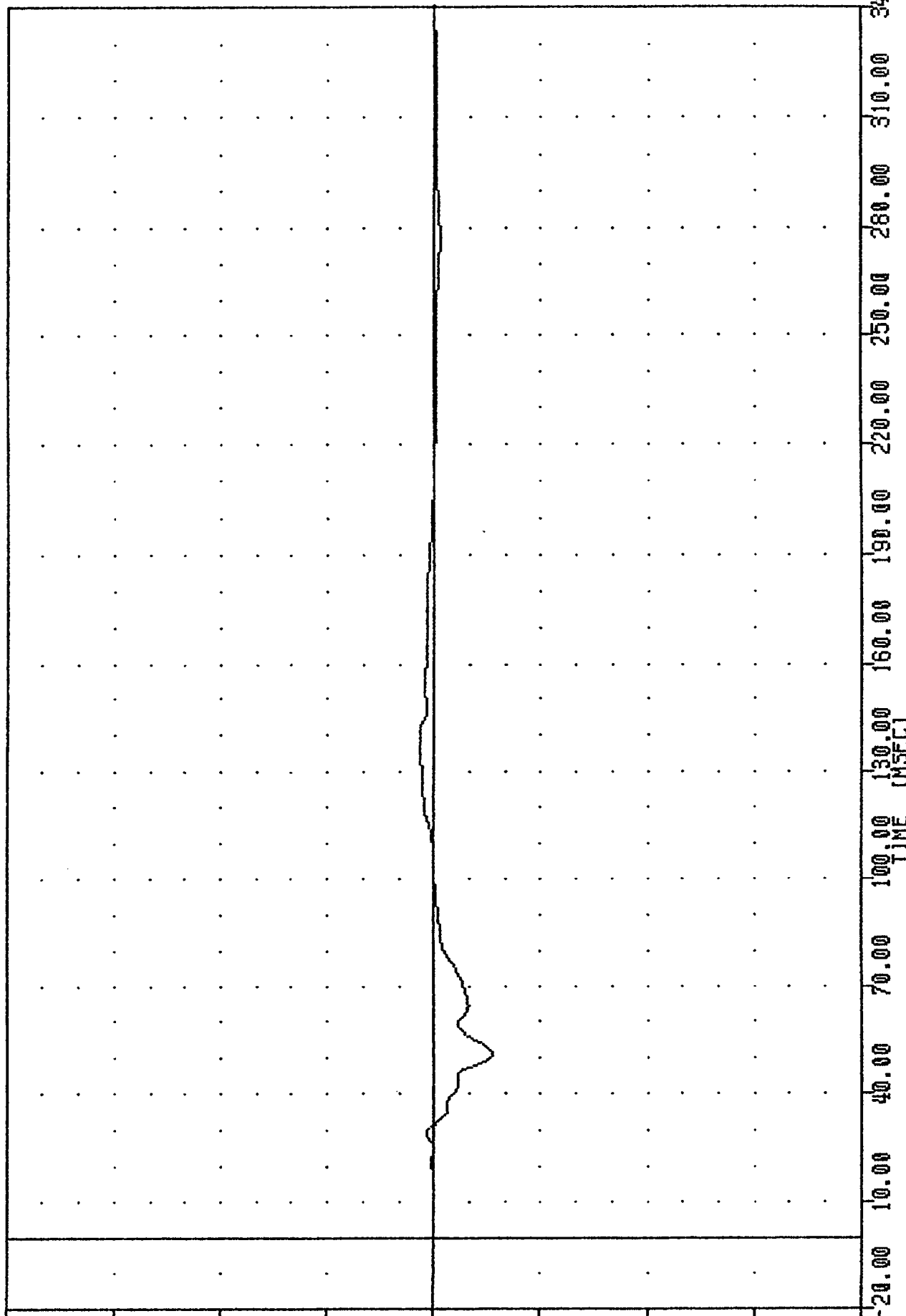
MIN, MAX VALUES = -27.350

50.63,

7.12 @ 139.38

ACCELERATION (G)

B-40



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

PASSENGER UPPER SPINE ACCELERATION X AXIS

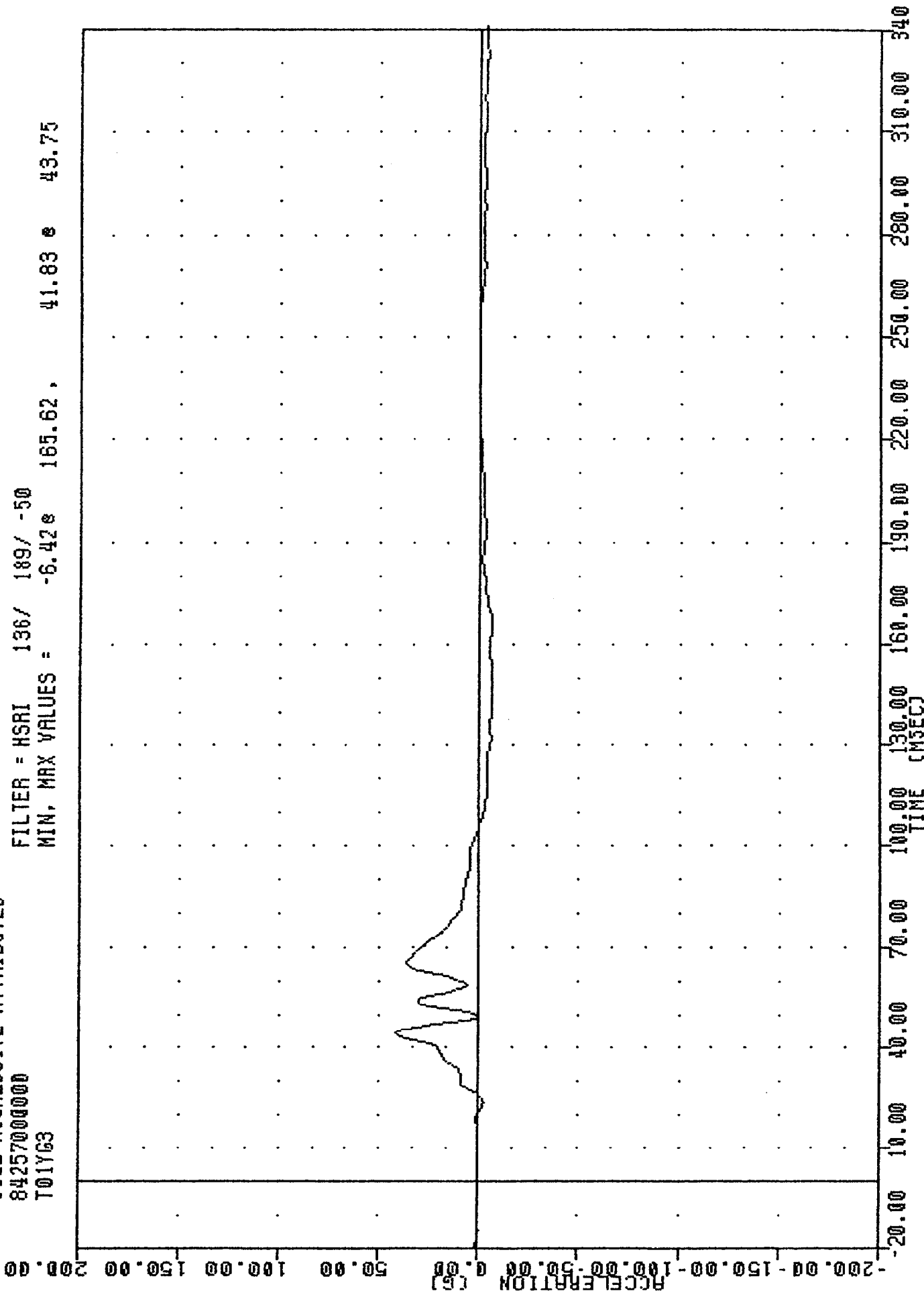
SIDE AGGRESSIVE ATTRIBUTES

842570000000

T01Y63

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -6.42 165.62, 41.83 43.75



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE ACCELERATION Y AXIS

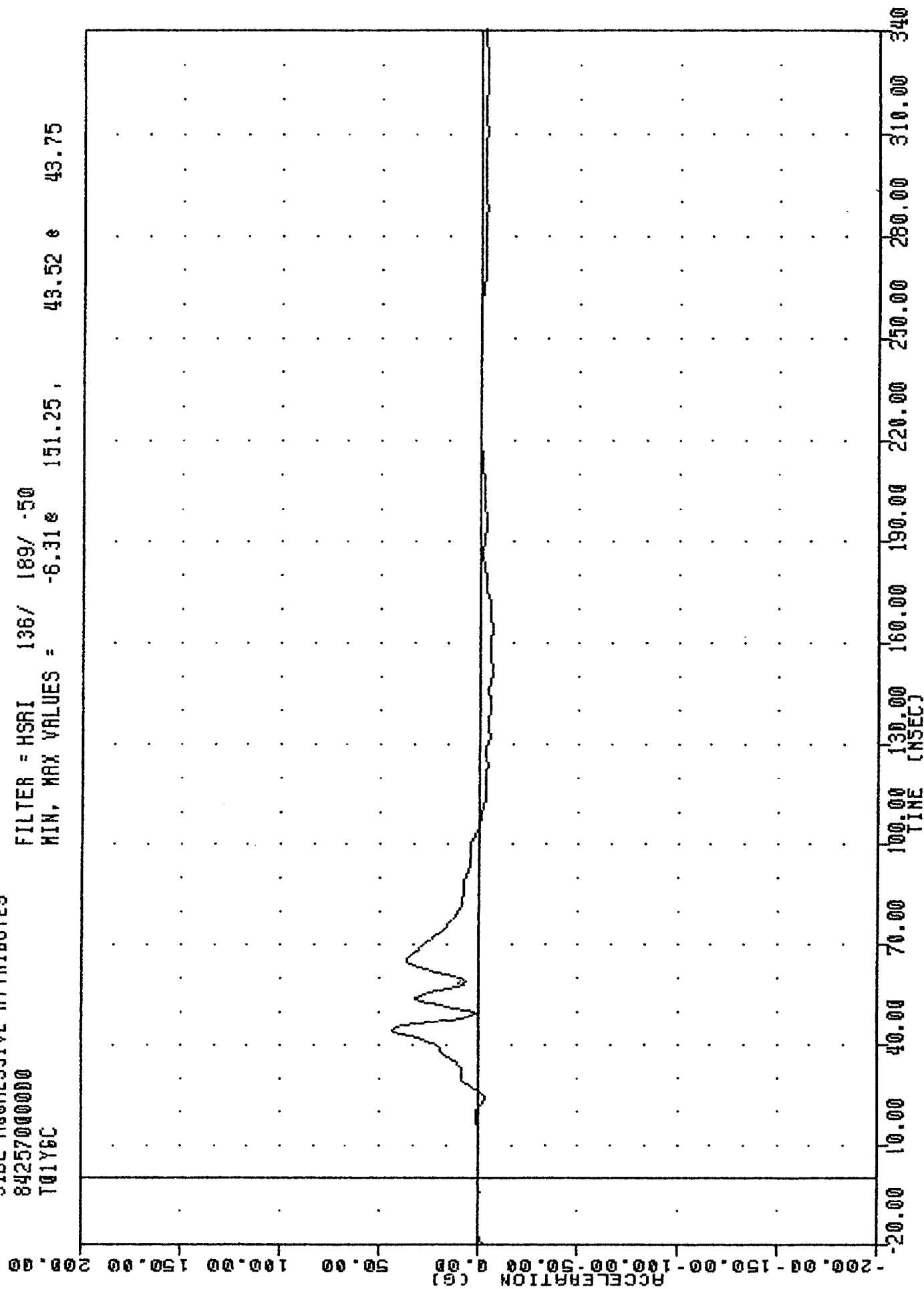
SIDE AGGRESSIVE ATTRIBUTES

84257000000

T01Y6C

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -6.31e 151.25 , 43.52 e 43.75

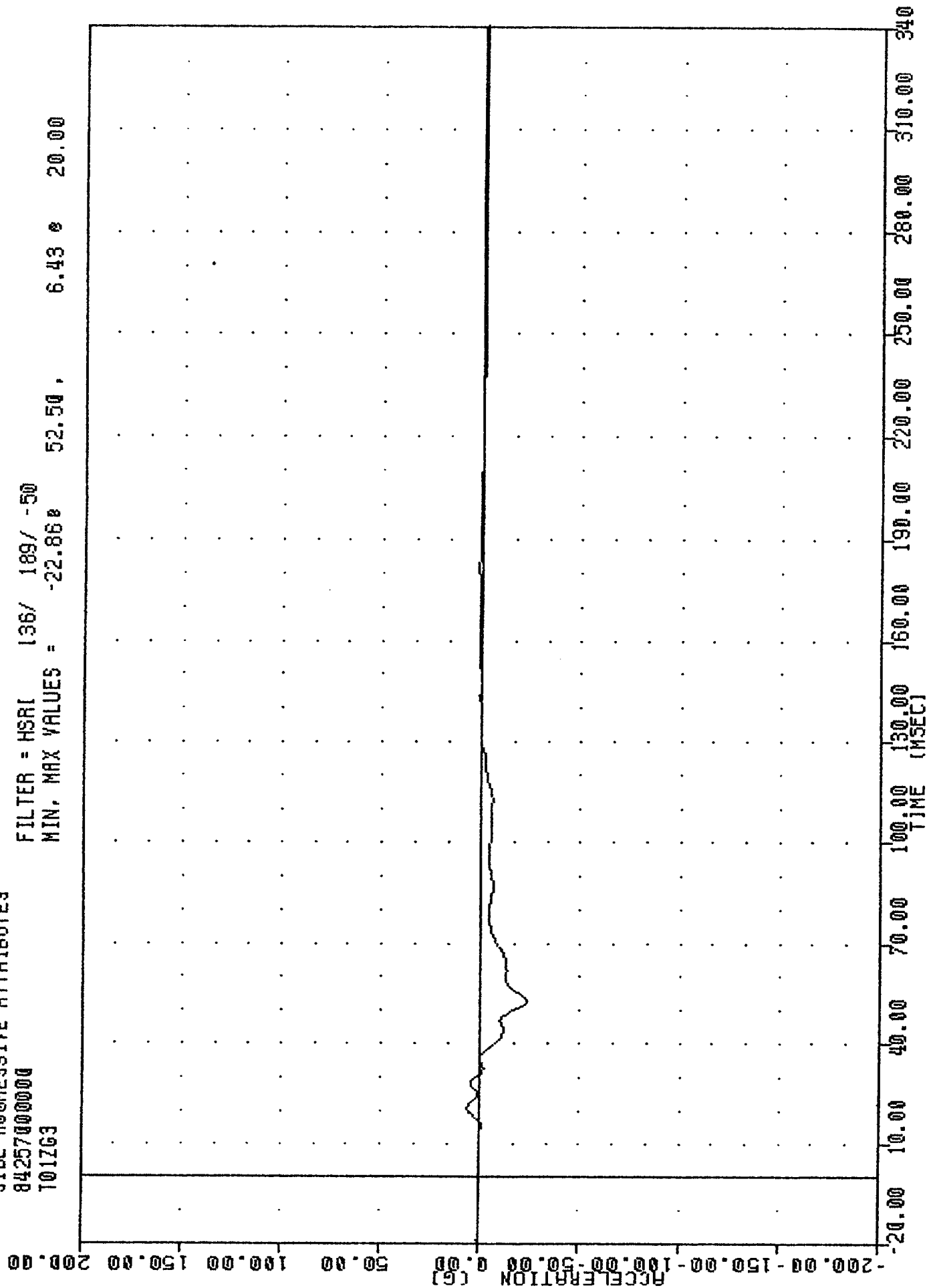


B-42

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE ACCELERATION -2 Y AXIS

SIDE IMPRESSIVE HISTORIES
 84257000000
 101263

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -22.86 52.50 , 6.43 20.00



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER UPPER SPINE ACCELERATION Z AXIS

SIDE IMPRESSIVE ATTRIBUTES

84257000000

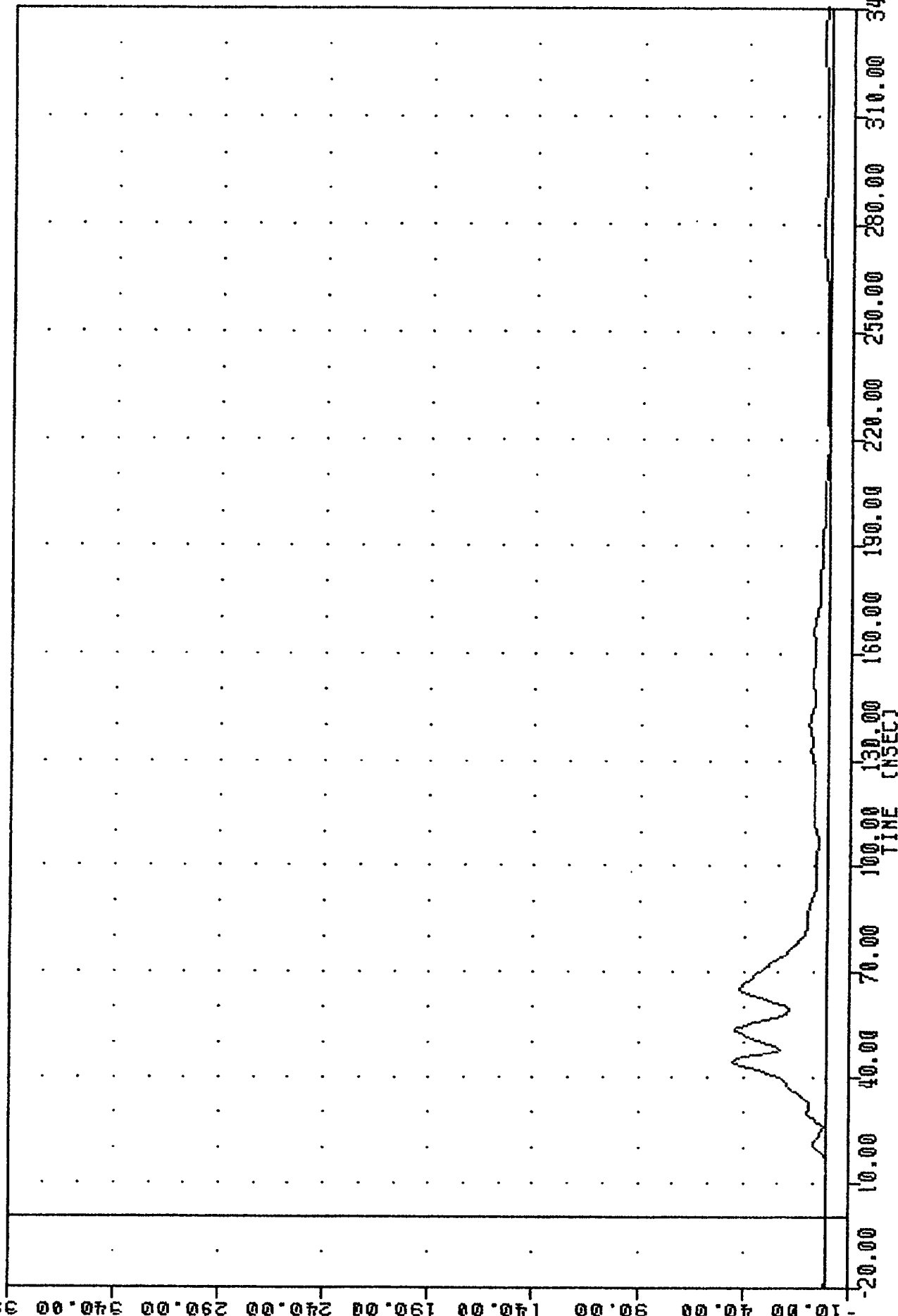
T01R63

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = 0.09 -17.50, 44.75 43.75

ACCELERATION (G)

B-44



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE RESULTANT

SIDE IMPRESSIVE HISTOGRAMS

84257000000

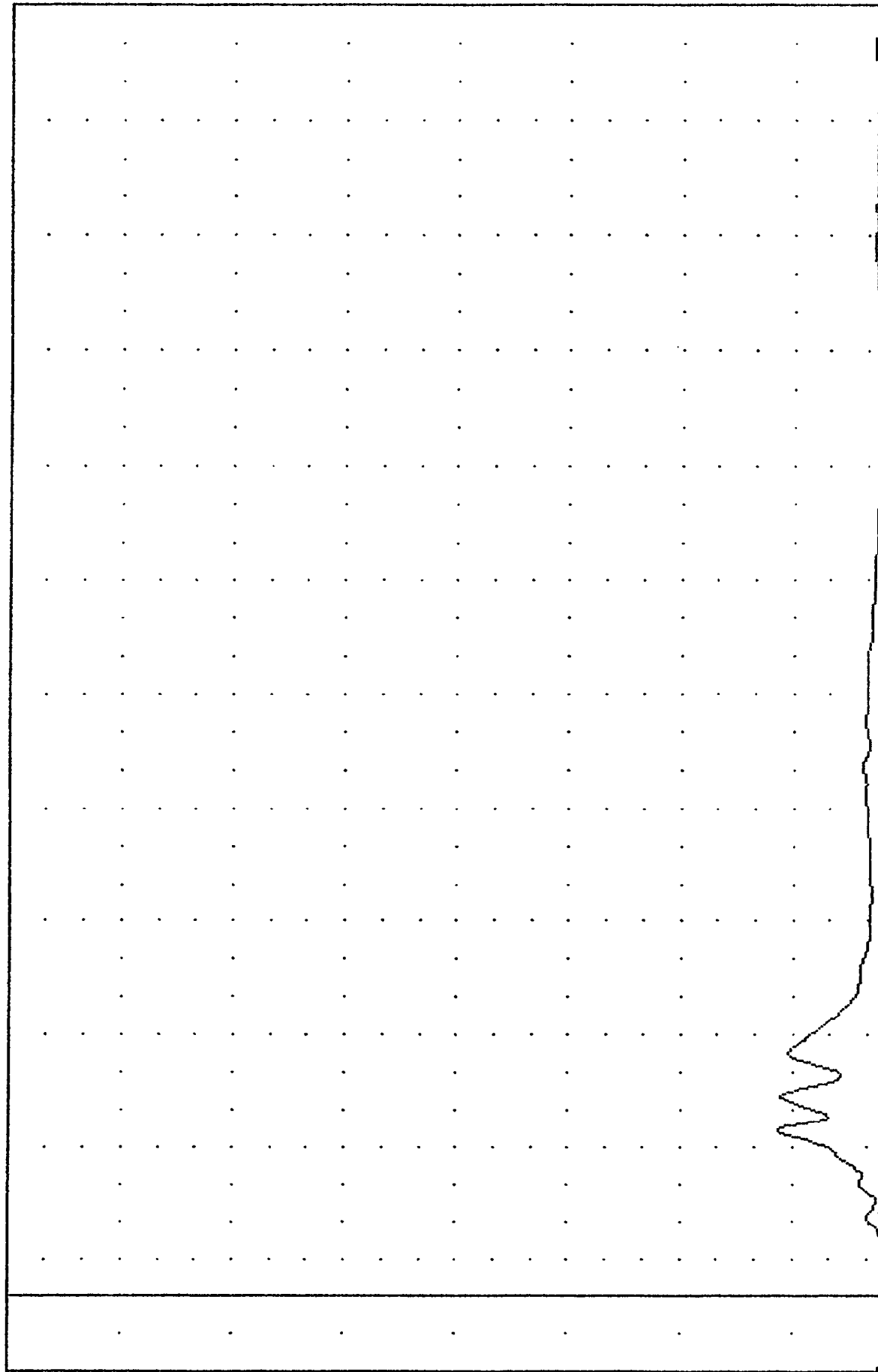
T01REC

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = 0.068 -1.88, 46.33 e 43.75

ACCELERATION (G)

B-45



-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

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE RESULTANT USING T01YGC

DATA INTERRUPTED BY INTERRUPT

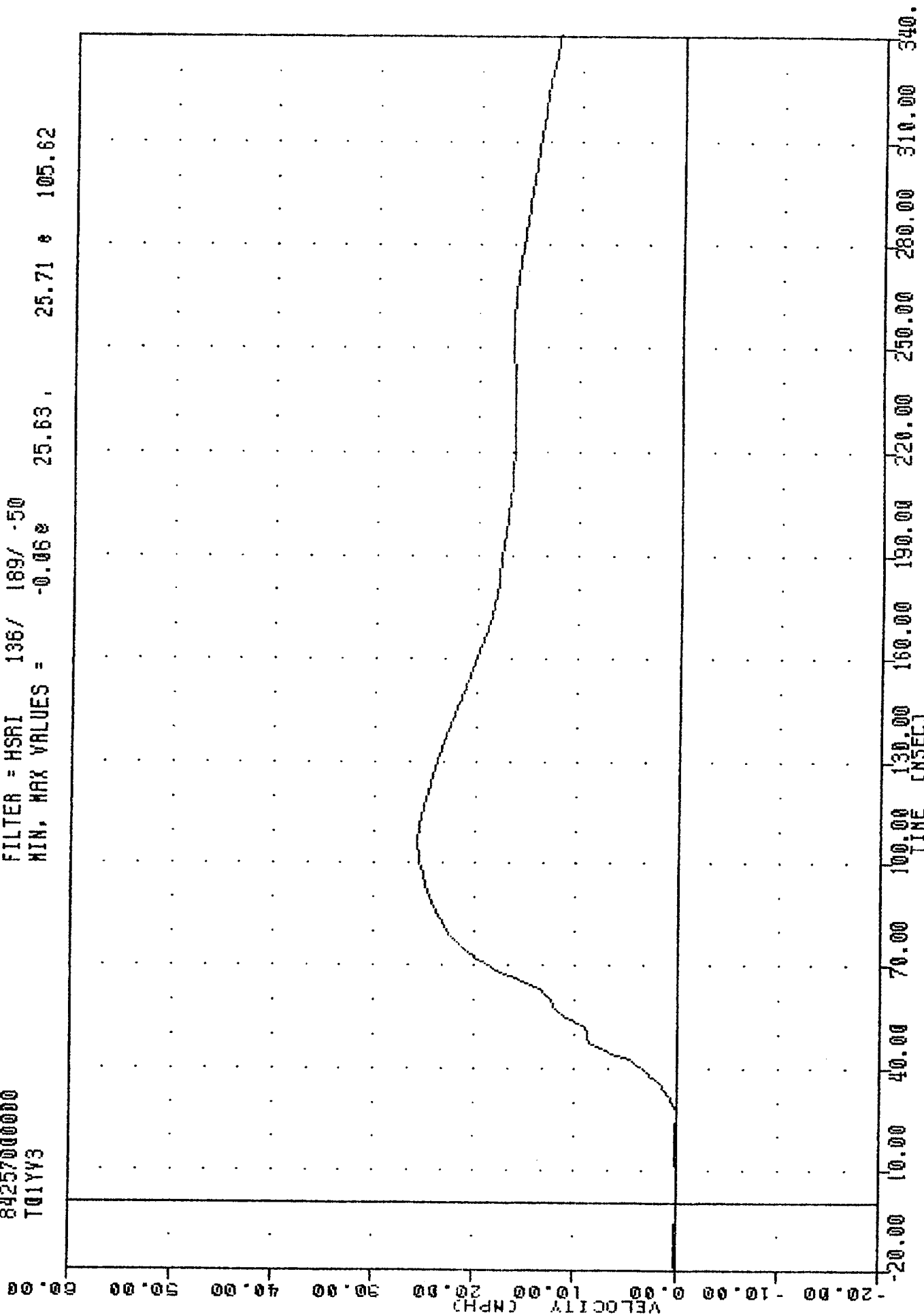
84257000000

T01YV3

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -0.06 25.63 25.71 105.62

B-46



DATE RECORDED: 11/11/1963

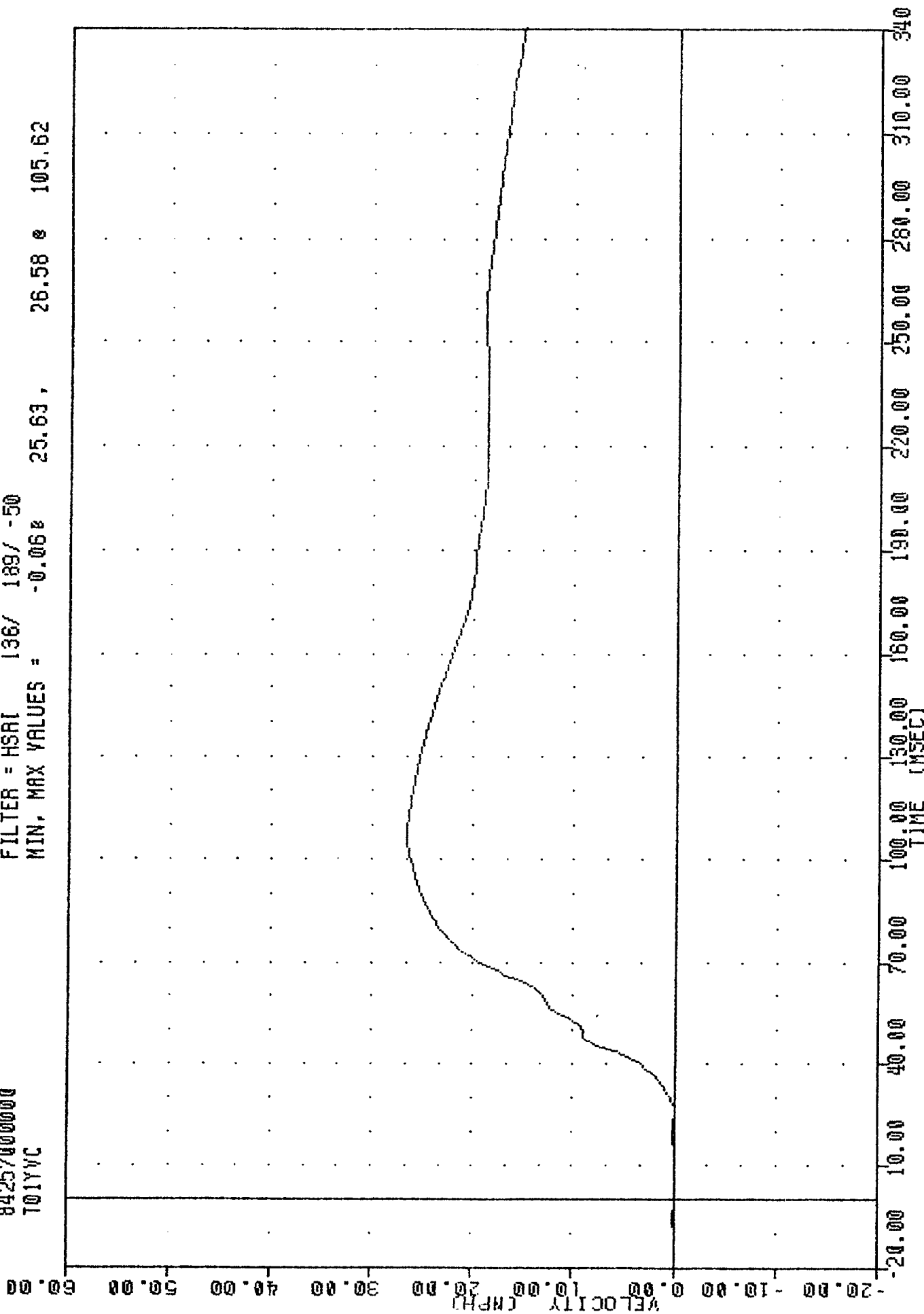
84257000000

T01YVC

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -0.068

25.63, 26.58 @ 105.62



B-47

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T01YGC

SINE HUGHESVILLE H1111111111

84257000000

T12XG3

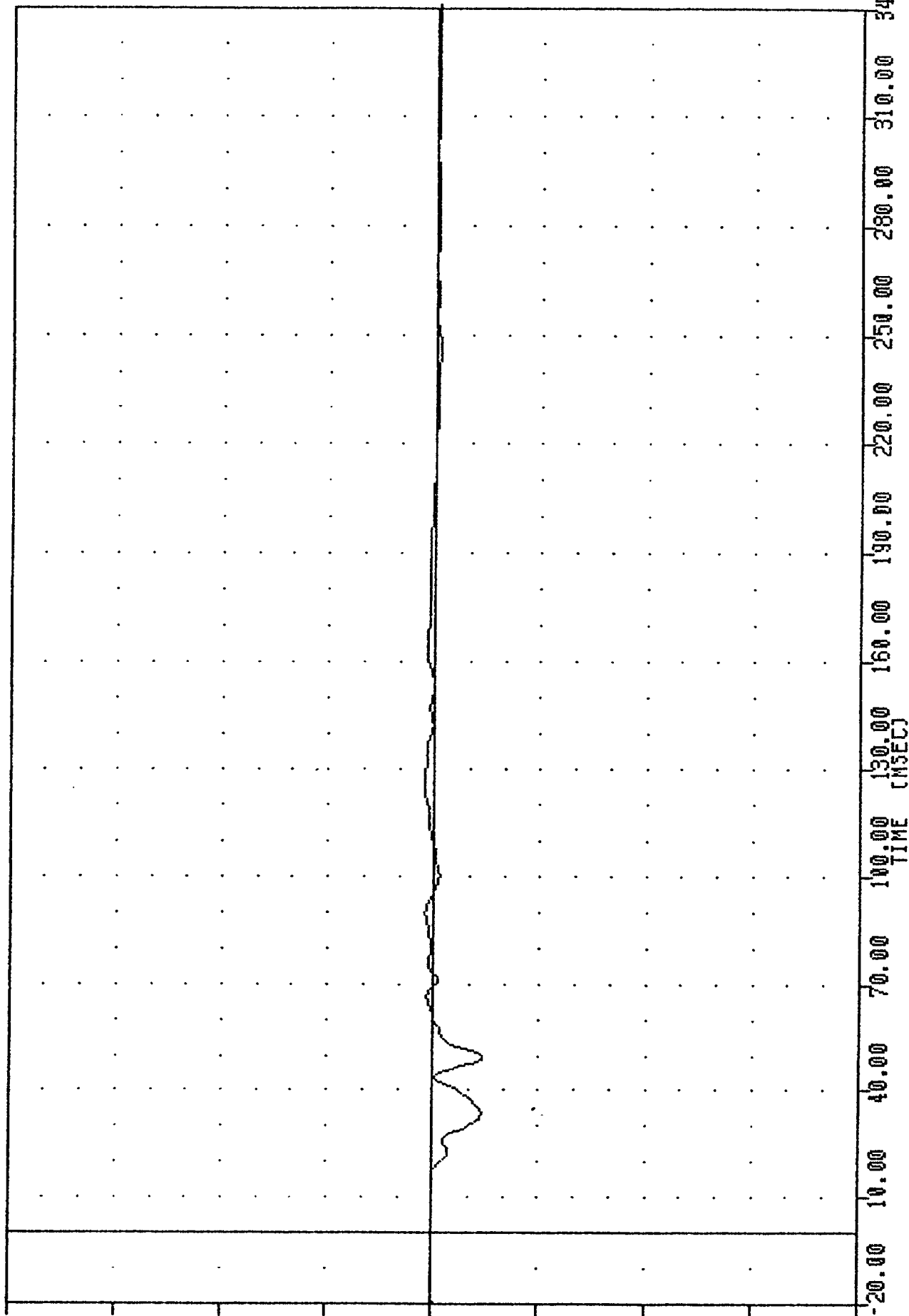
FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -23.48 48.75,

4.70 124.38

ACCELERATION (G)

B-48



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE ACCELERATION X AXIS

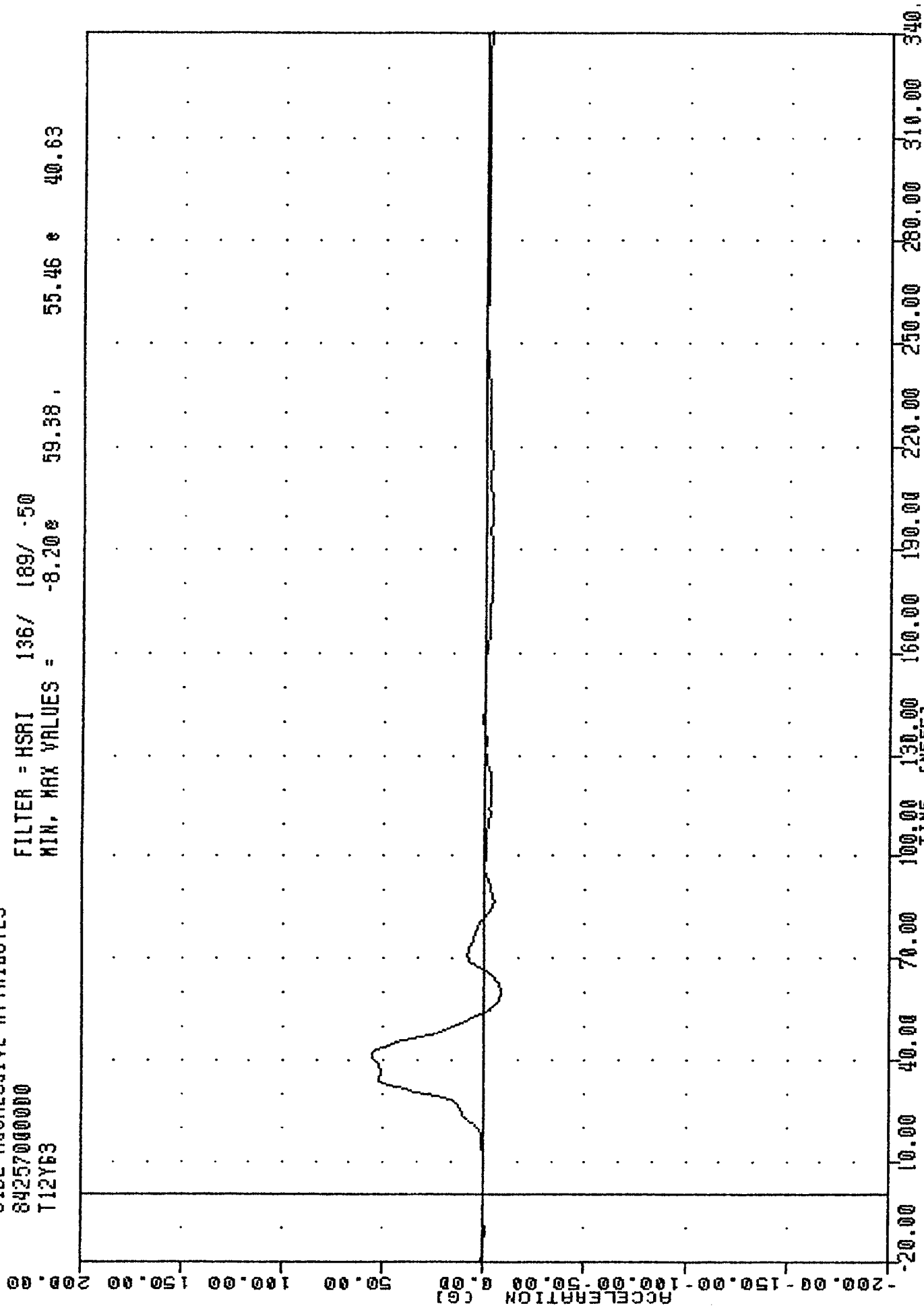
SIDE IMPRESSIVE MINIBUUES

84257000000

T12Y63

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -8.20 55.46 40.63



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE ACCELERATION Y AXIS

MIN.	MAX	VALUES =	-6.91	58.13	57.80	40.63
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MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE ACCELERATION -2 Y AXIS

SIDE IMPRESSIVE ATTRIBUTES

84257000000

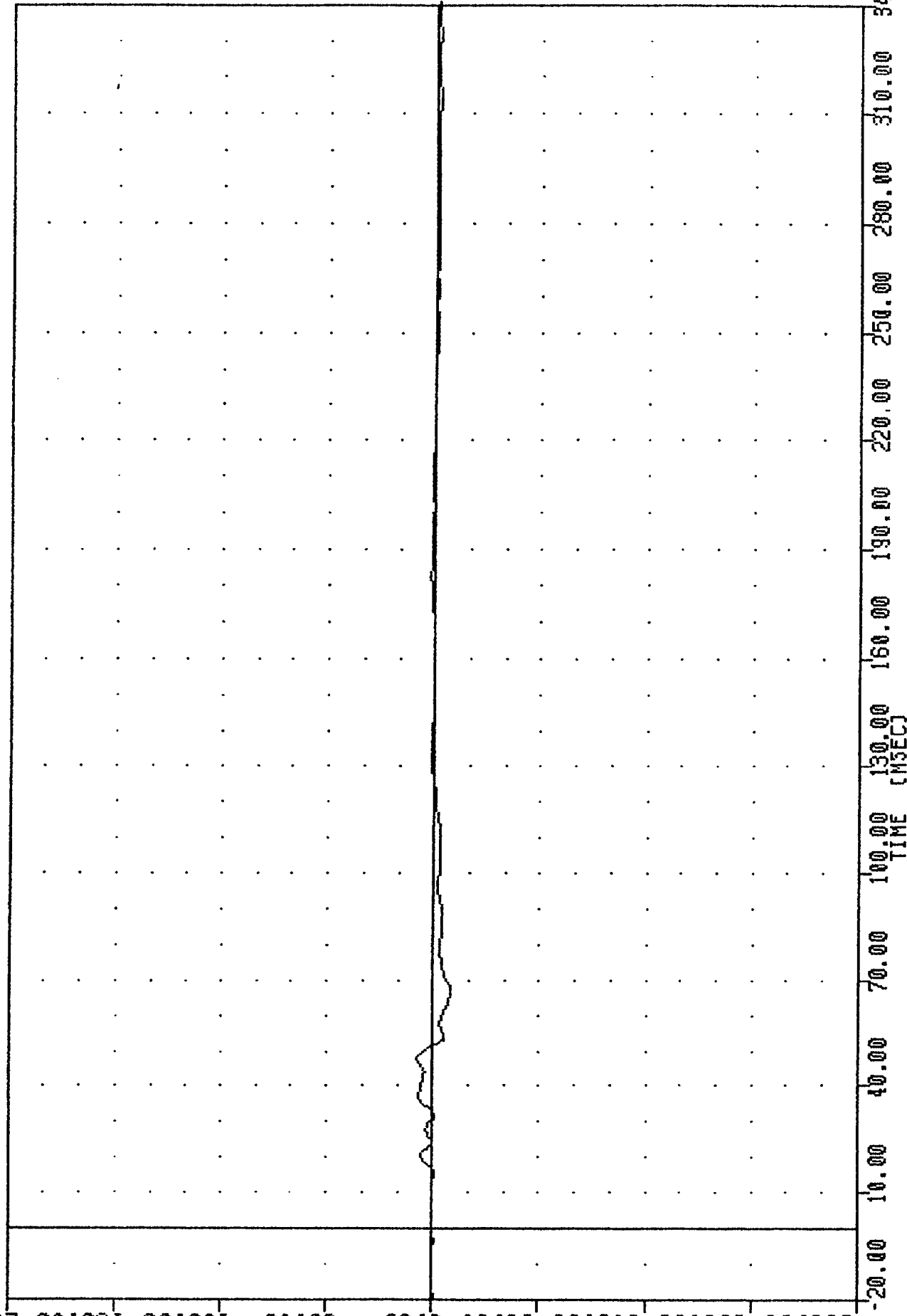
T12ZG3

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -8.33e 65.63, 7.56 e 47.50

ACCELERATION (G)

B-51



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE ACCELERATION Z AXIS

SIDE IMPRESSIVE ATTRIBUTES

84257000000

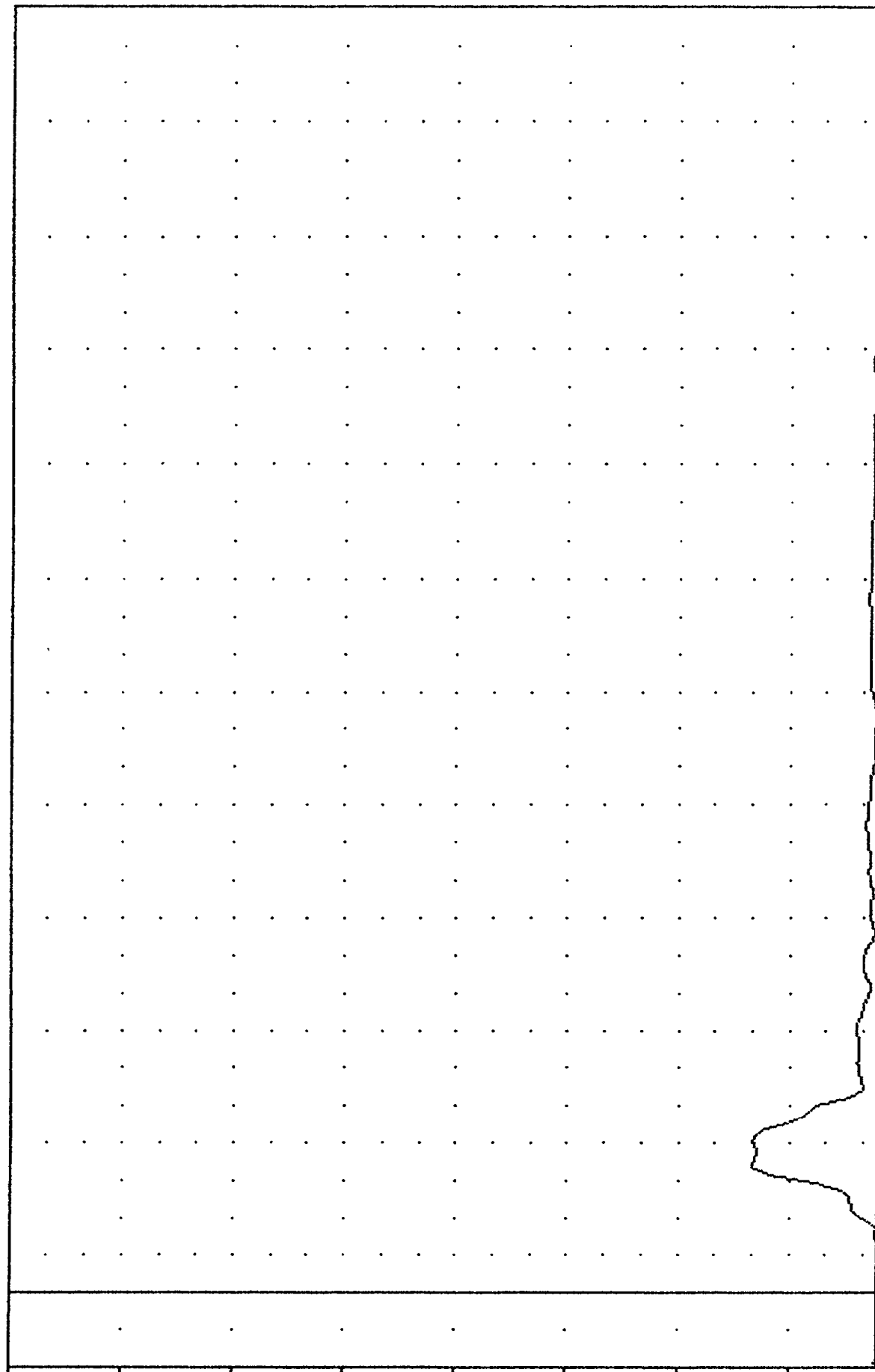
T12RG3

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = 0.050

-0.63, 57.06 33.75

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)

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE RESULTANT

842570000000

T12RGC

FILTER = HSRI

136/ 189/ -50

MIN. MAX VALUES =

0.08

-13.13

58.95

33.75

ACCELERATION (G)

B-53



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE RESULTANT T12YGC

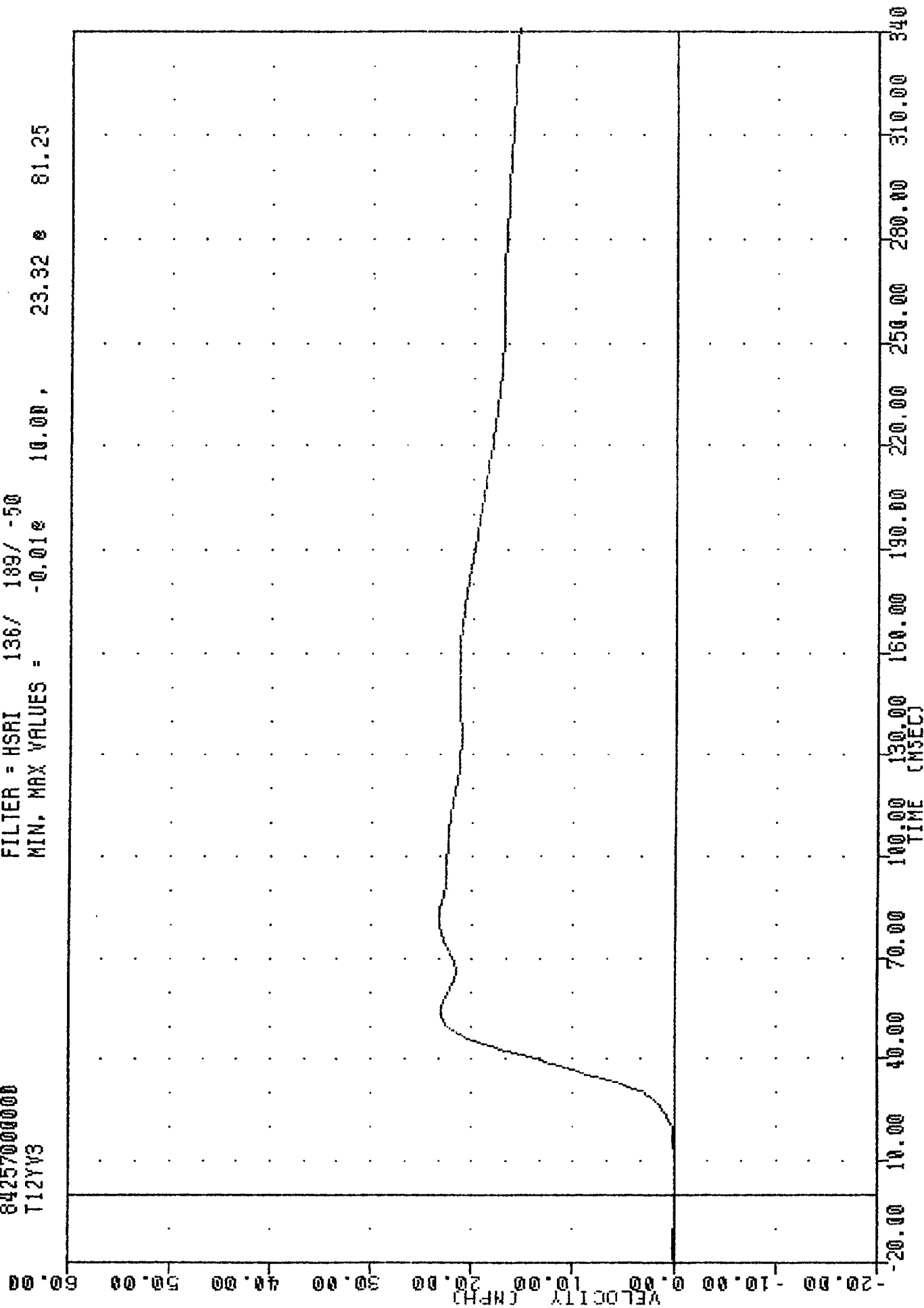
SIDE AGGRESSIVE ATTRIBUTES

84257000000

T12YV3

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -0.01e 10.00, 23.32 e 81.25



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T12Y63

FILTER = HSRI 136/ 189/ .50

84257000010

T12Y4C

FILTER = HSR1

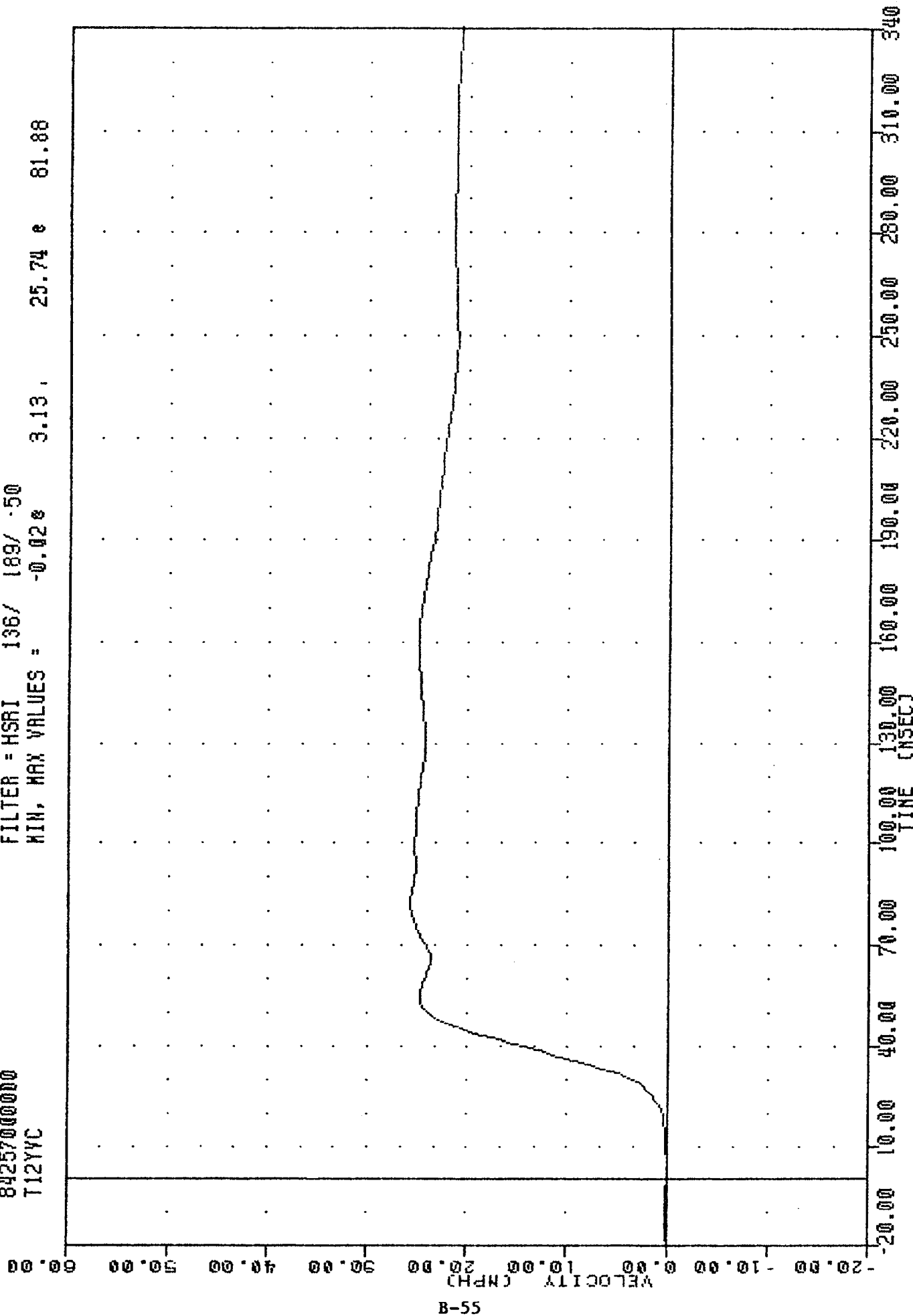
MIN, MAX VALUES =

1961 1897-50

-0.128

3.13 -

25.74 e 81.88



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING T12YGC

SIDE IMPRESSIVE HISTOGRAMS

84257000000

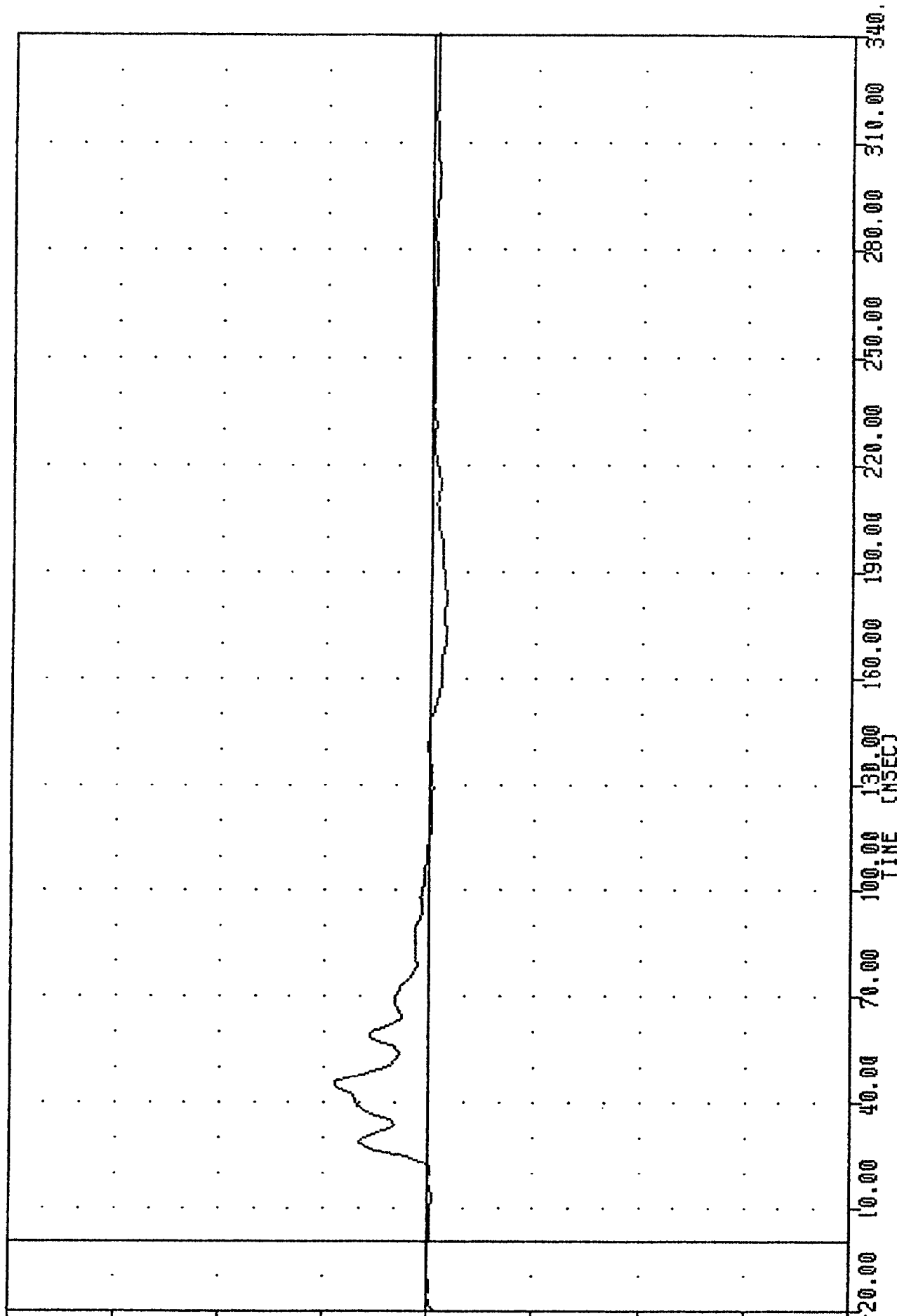
LURY63

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -7.38e 182.50, 44.94 e 44.38

ACCELERATION [G]

B-56



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT UPPER RIB ACCELERATION Y AXIS

SIDE AGGRESSIVE ATTRIBUTES

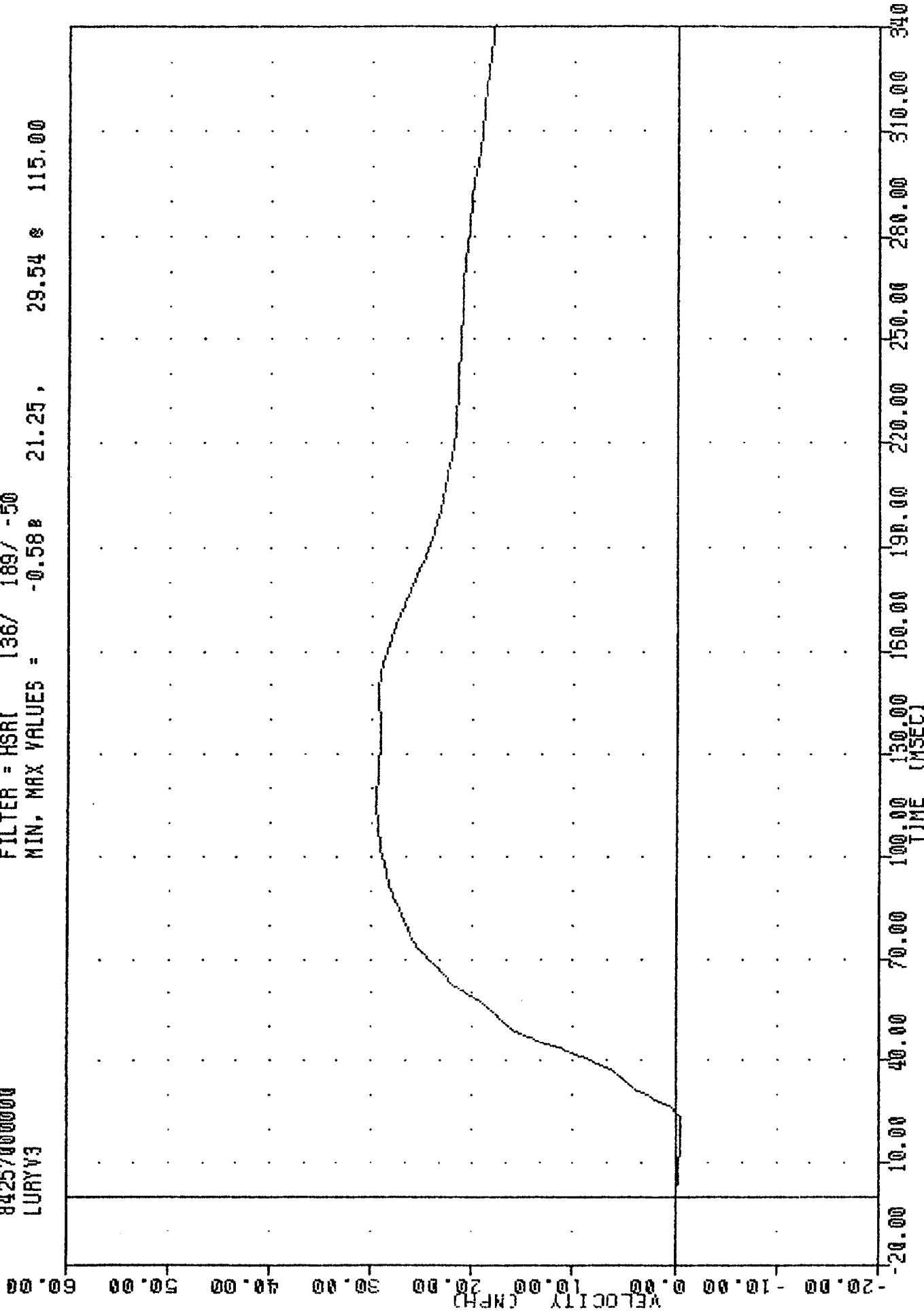
84257000000

LURYV3

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -0.588 21.25 , 29.54 & 115.00

B-57



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING LURYG3

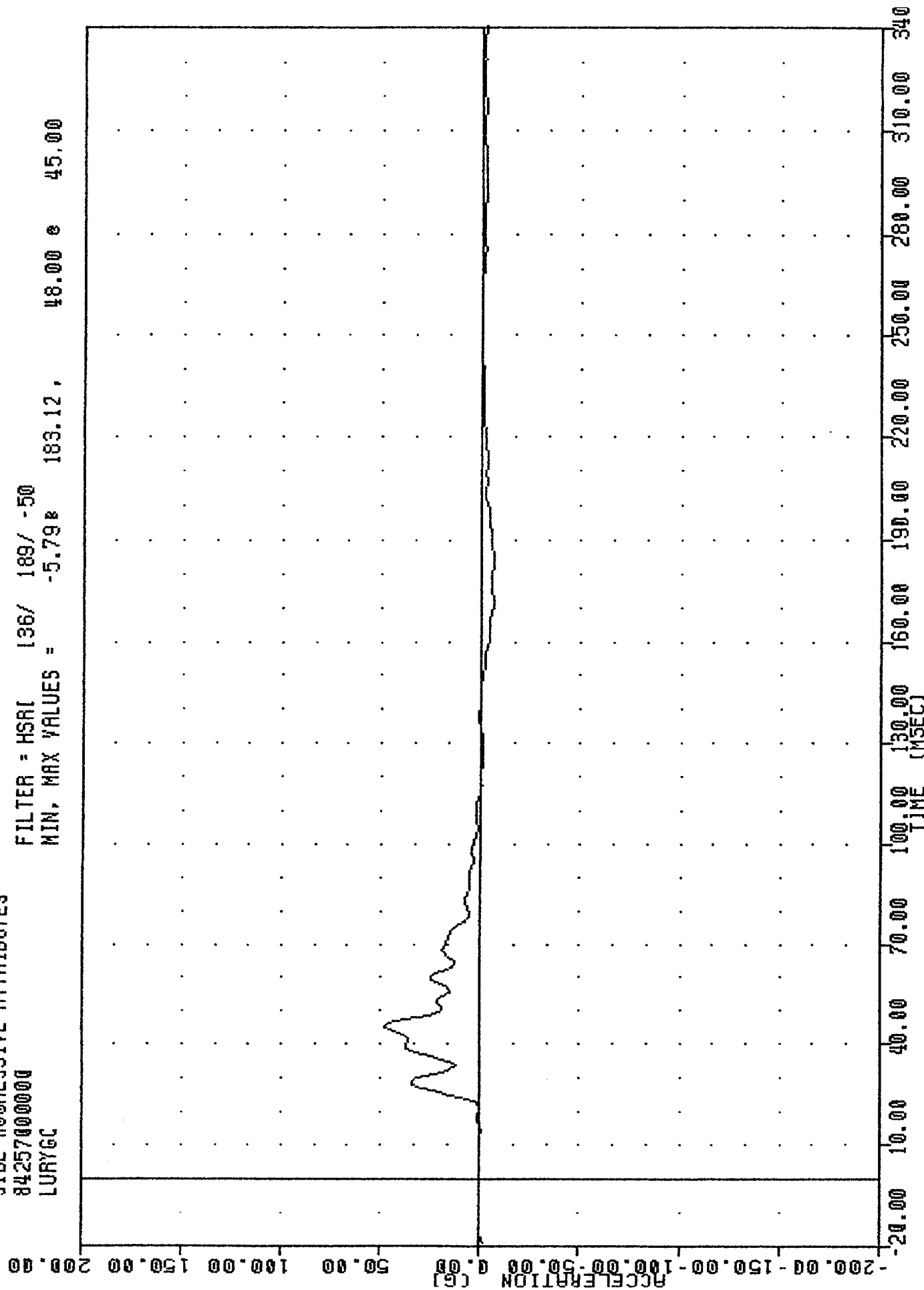
SIDE AGGRESSIVE ATTRIBUTES

84257000000

LURYGC

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -5.79 183.12, 48.00 45.00



B-58

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT UPPER RIB ACCELERATION -2 Y AXIS

SIDE IMPRESSIVE ATTRIBUTES

84257000000

LURYVC

FILTER = HSRI

136/ 189/ -50

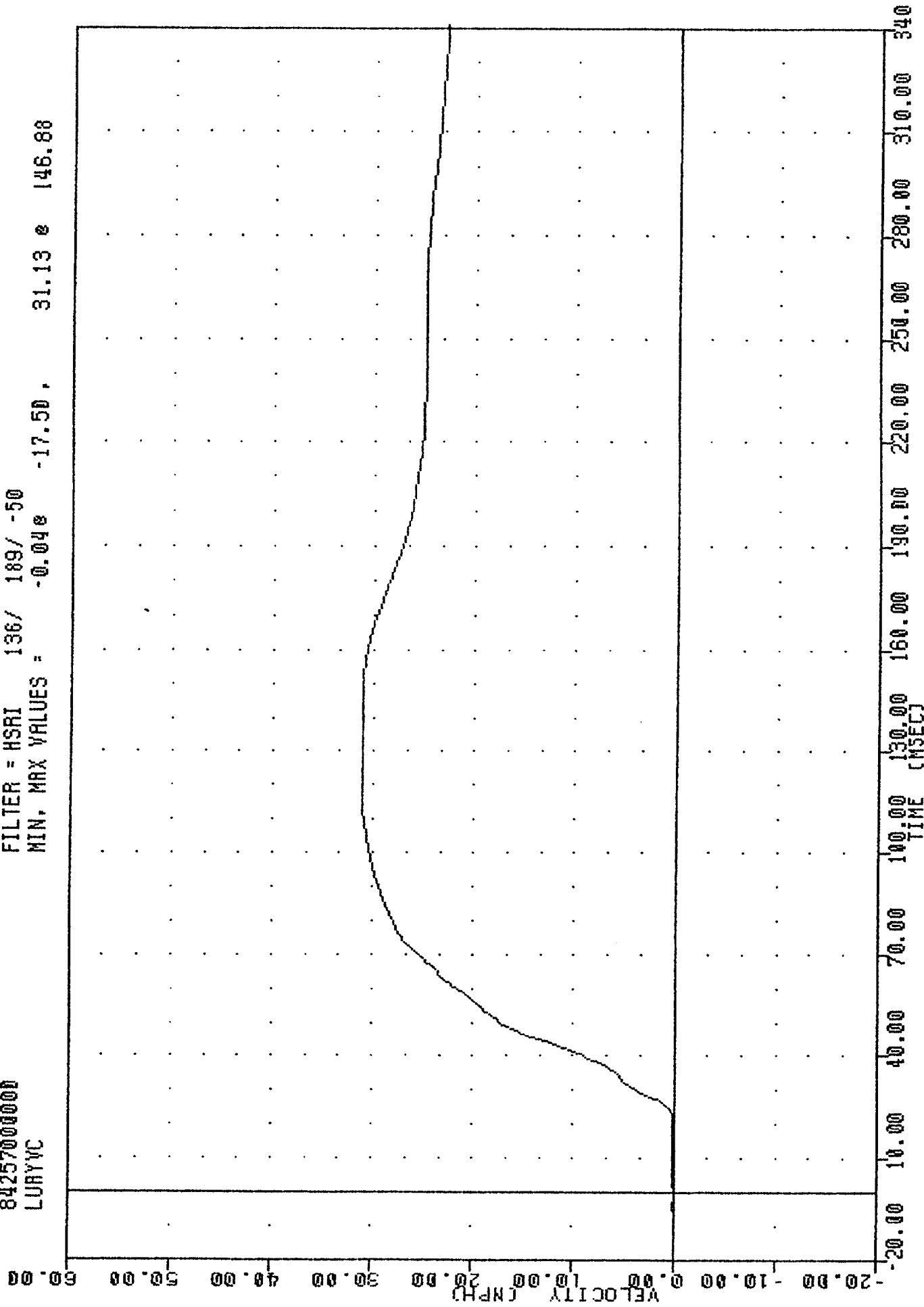
MIN. MAX VALUES =

-0.040

-17.50,

31.13 @ 146.88

B-59



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LURYGC

DATE RECESSIVE MINIMITIES

84257000000

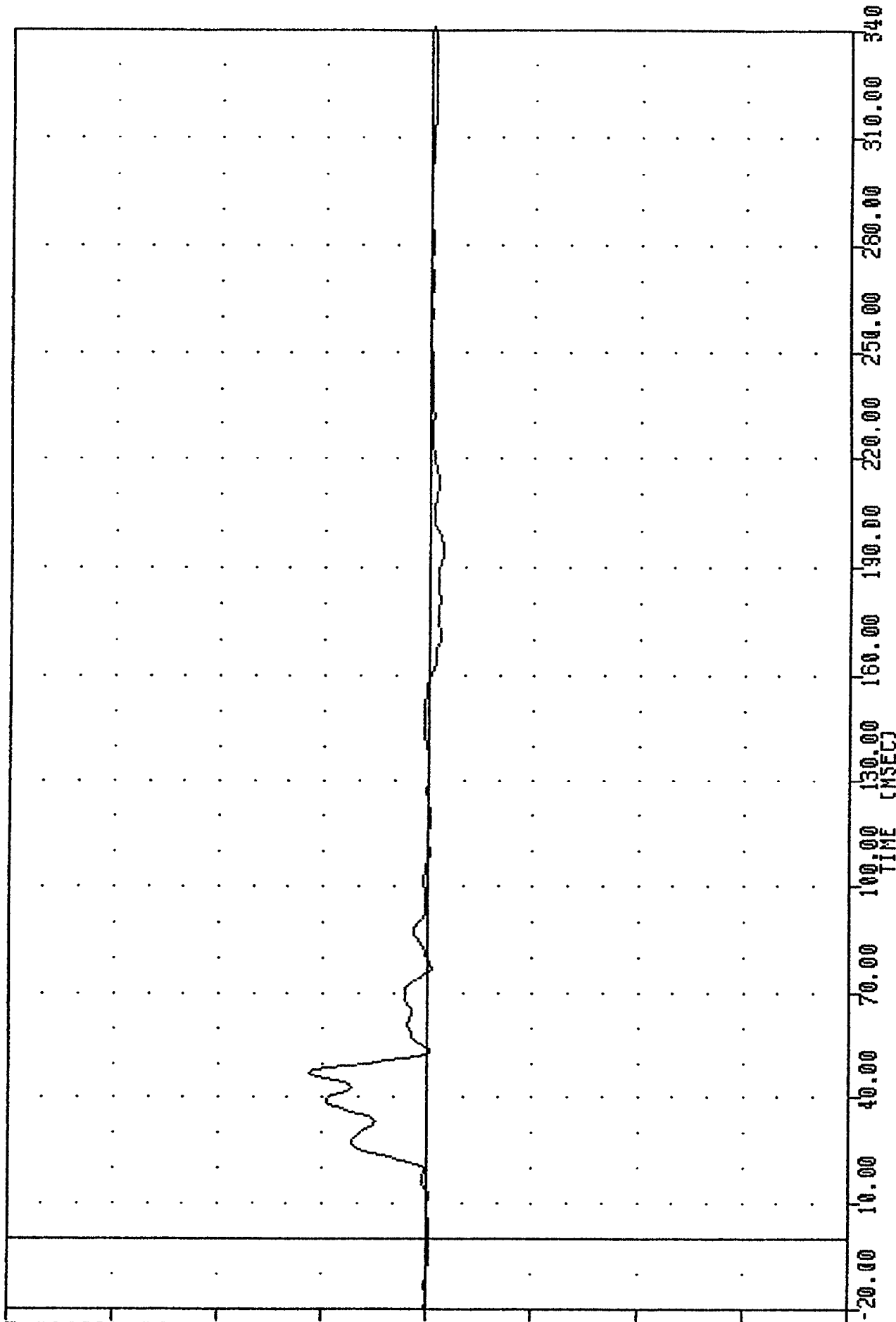
LLRYG3

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -6.31e 194.38, 56.00 e 46.25

ACCELERATION (G)

B-60



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

PASSENGER LEFT LOWER RIB ACCELERATION Y AXIS

SIDE AGGRESSIVE ATTRIBUTES

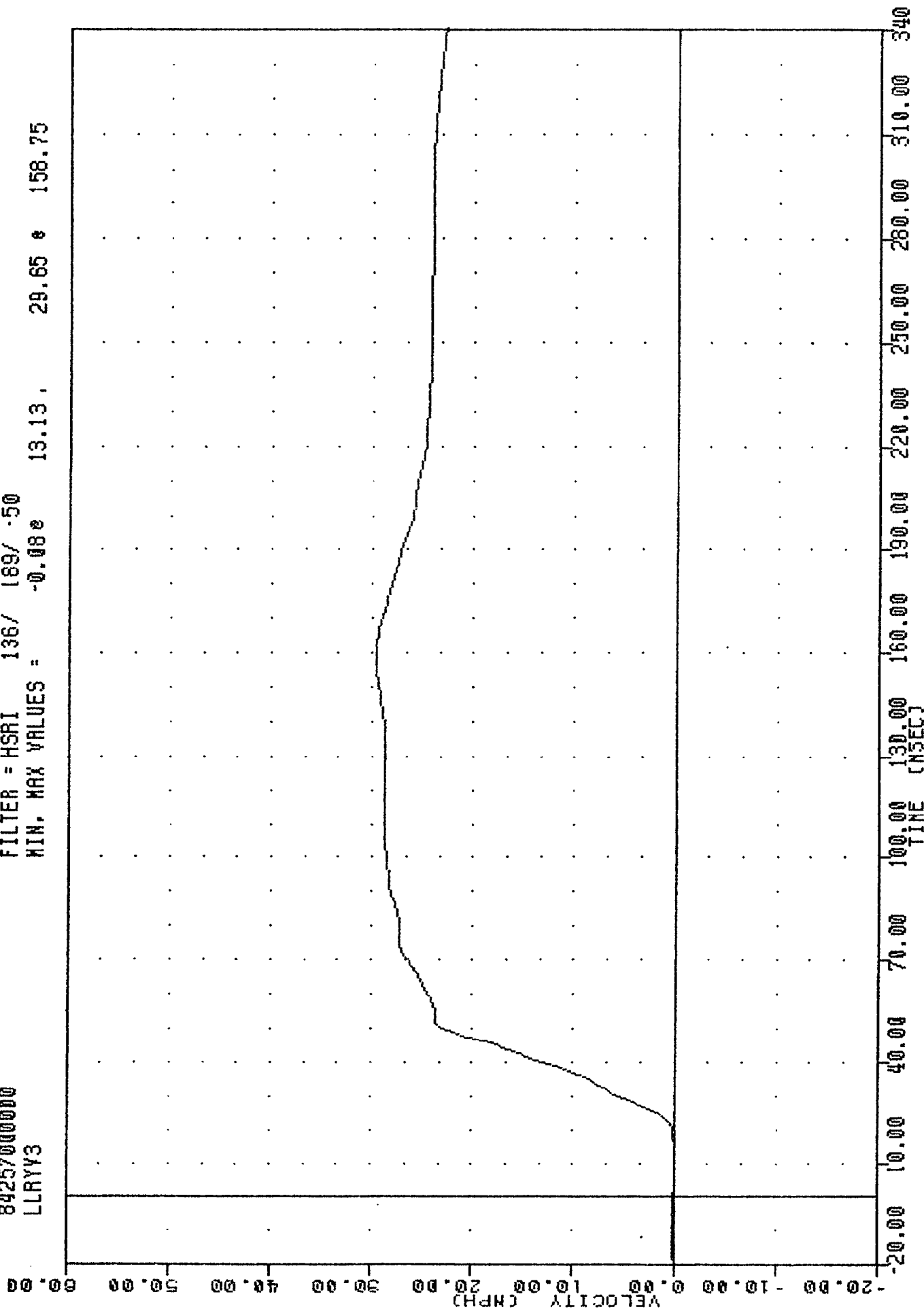
84257000000

LLRYV3

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -0.08e 13.13, 29.65 e 158.75

19-B



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING LLRYG3

SIDE IMPRESSIVE MINIMITIES

84257000000

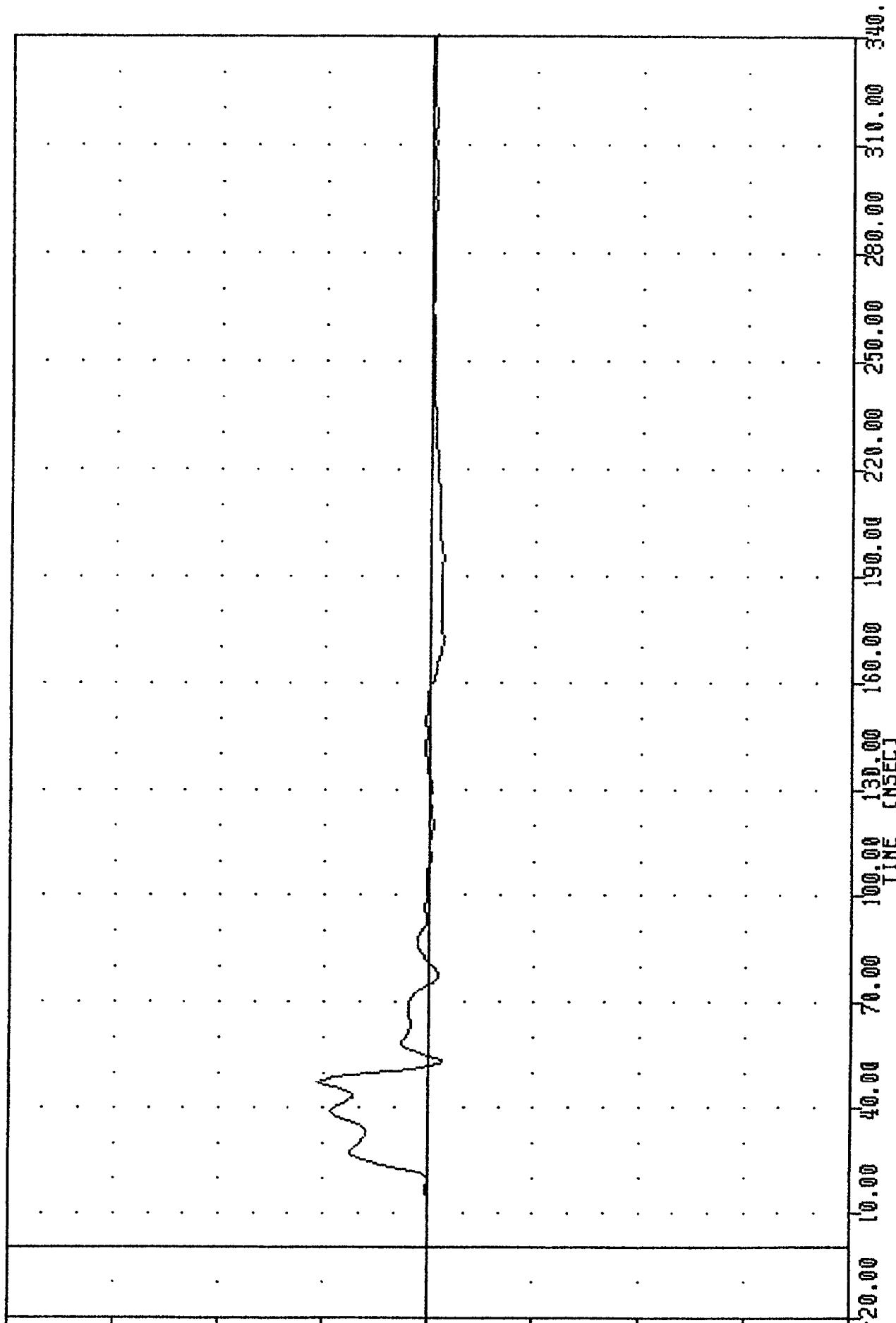
LLRY6C

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -6.49 52.50 52.79 46.88

ACCELERATION (G)

B-62



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT LOWER RIB ACCELERATION #2 Y AXIS

STATE AGGRESSIVE INITIATIVES

84257000000

LLRYVC

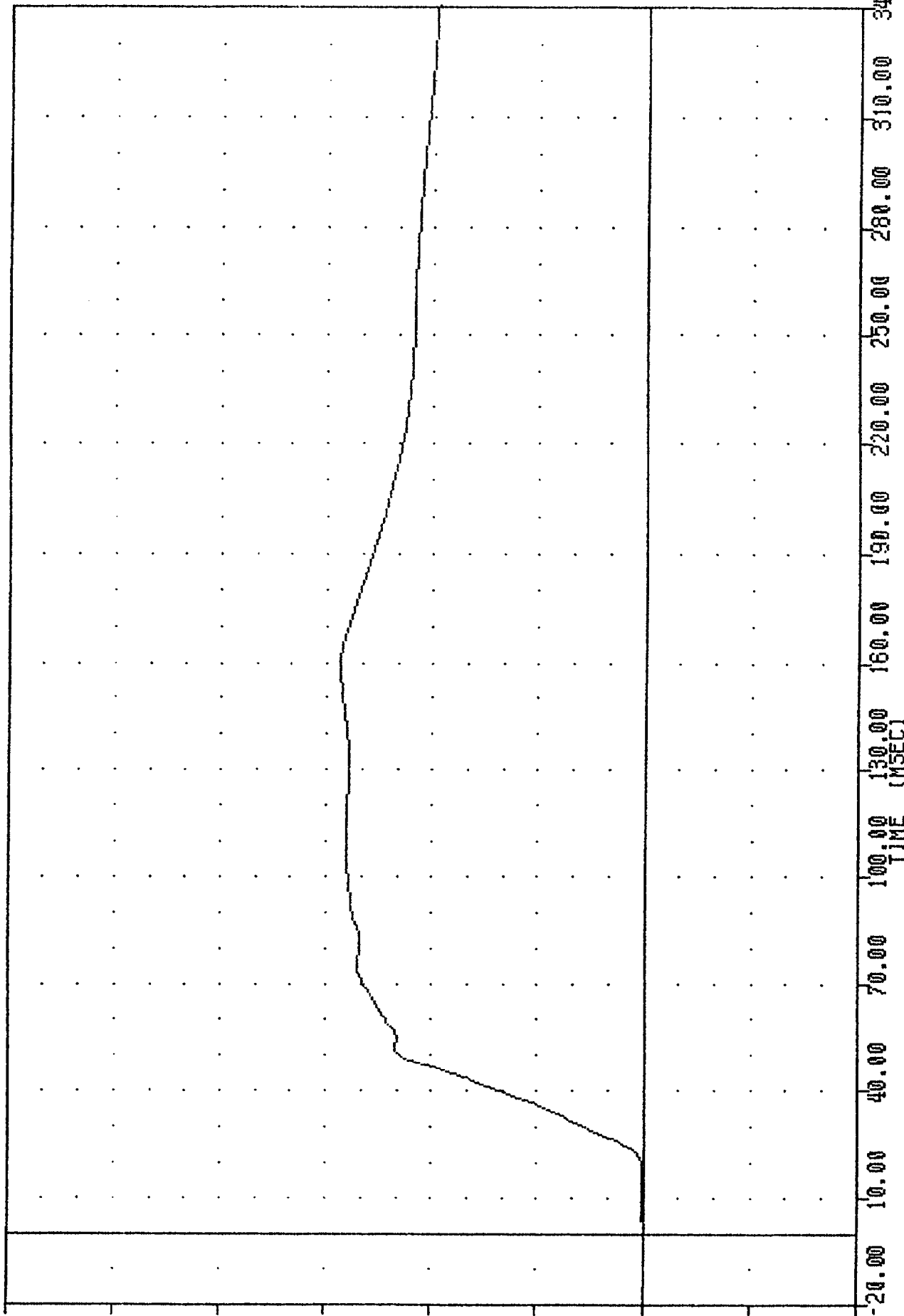
FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -0.028 -1.88 ,

28.76 @ 158.75

VELOCITY (MPH)

B-63



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LLRYGC

DATE RECORDED: 11/11/1973

84257000000

LRTYD3

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -0.028

18.63

1.78

77.13

4.00

3.00

2.00

1.00

0.00

B-64

-1.00

-2.00

-3.00

-4.00

-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)

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT RIB TO SPINE DISPLACEMENT INCHES

SIDE IMPRESSIVE HISTOGRAMS

84257000000

PEVXG3

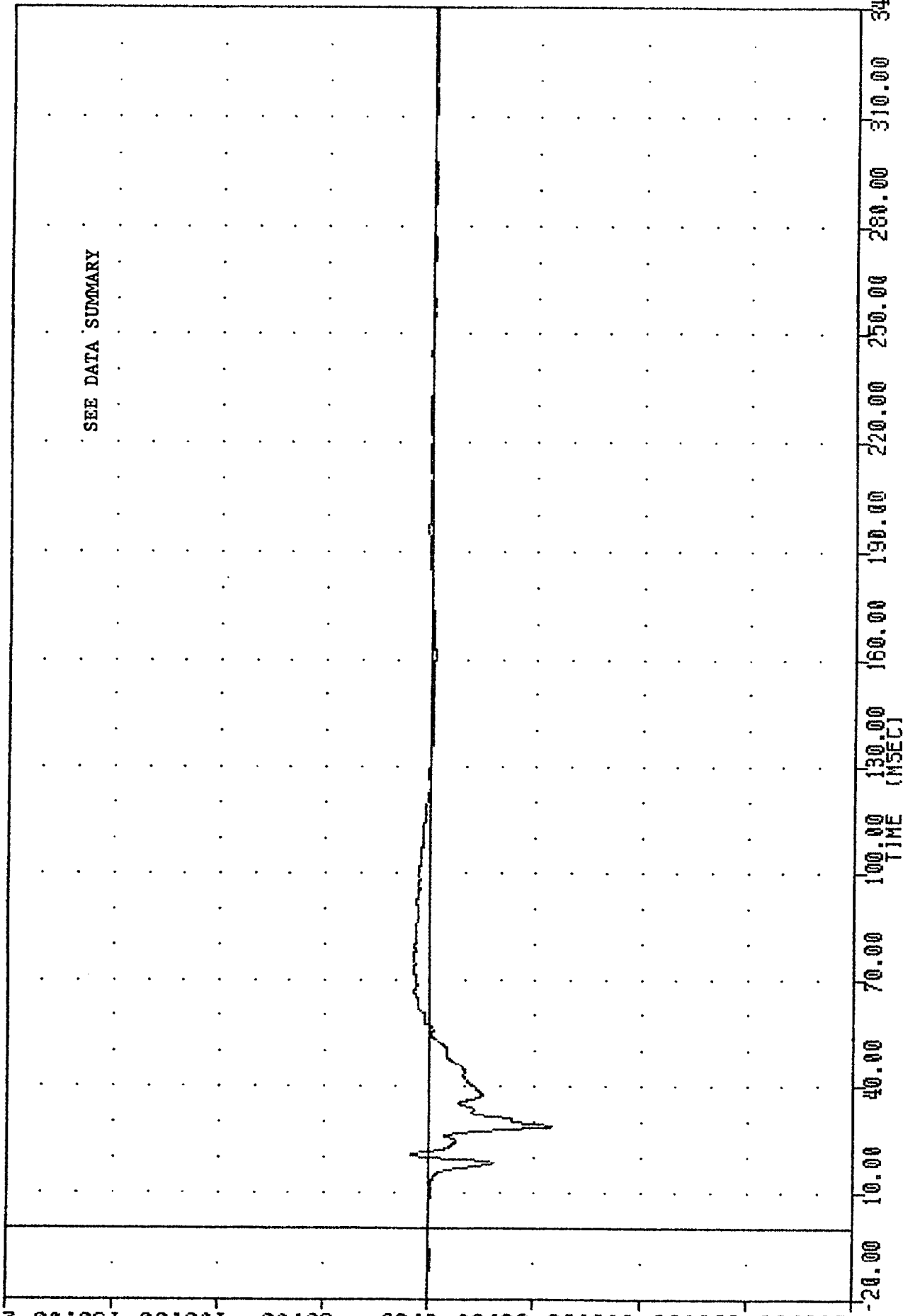
FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -57.81e

28.75 , 8.47 e 20.63

ACCELERATION (G)

B-65



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER PELVIS ACCELERATION X AXIS

SIDE IMPRESSIVE HIGHLIGHTS

84257000000

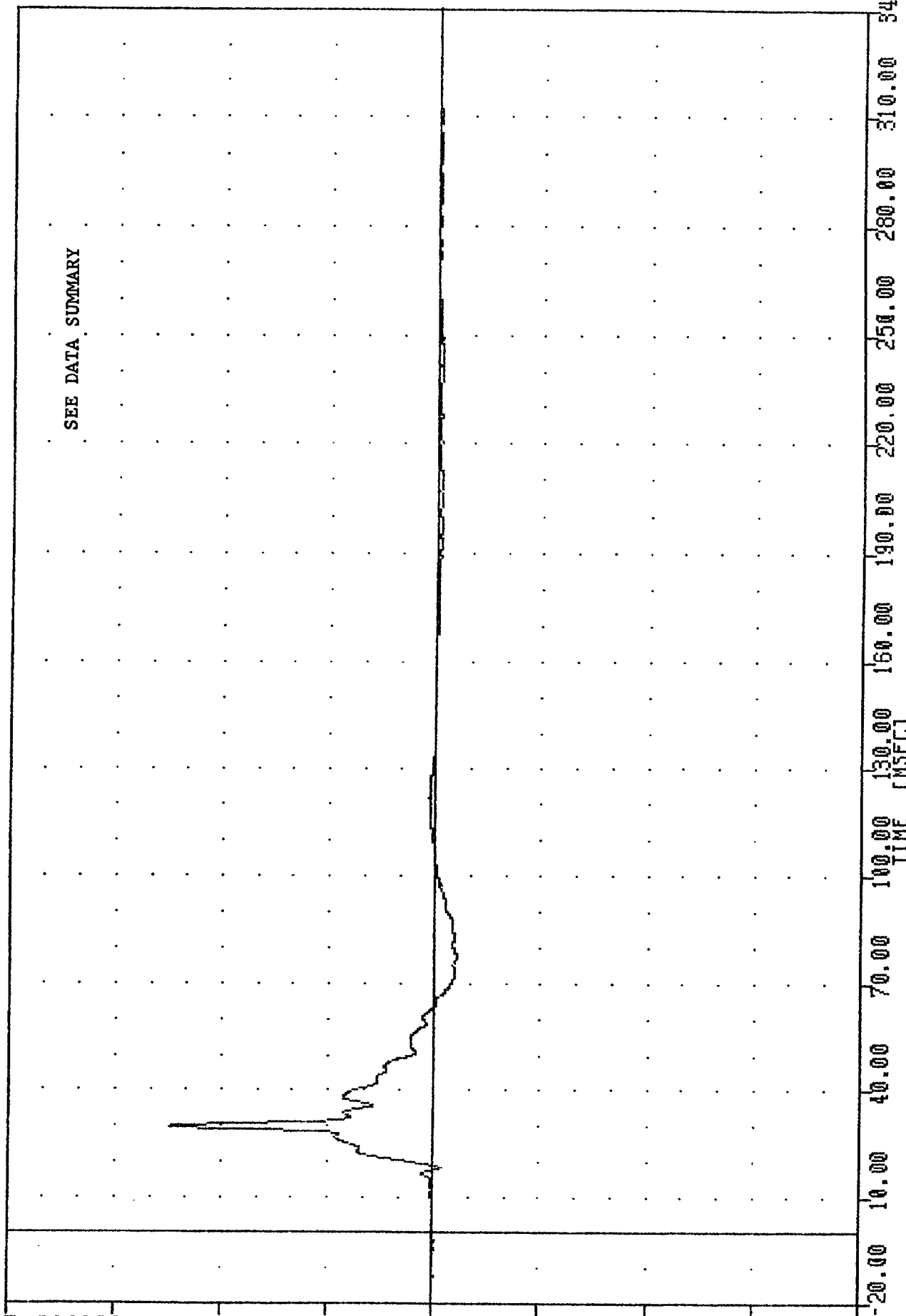
PEYGC3

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -10.178

77.25, 124.06 29.75

ACCELERATION (G)



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER PELVIS ACCELERATION Y AXIS

SLIDE IMPRESSIVE MINIBUTES

84257000000

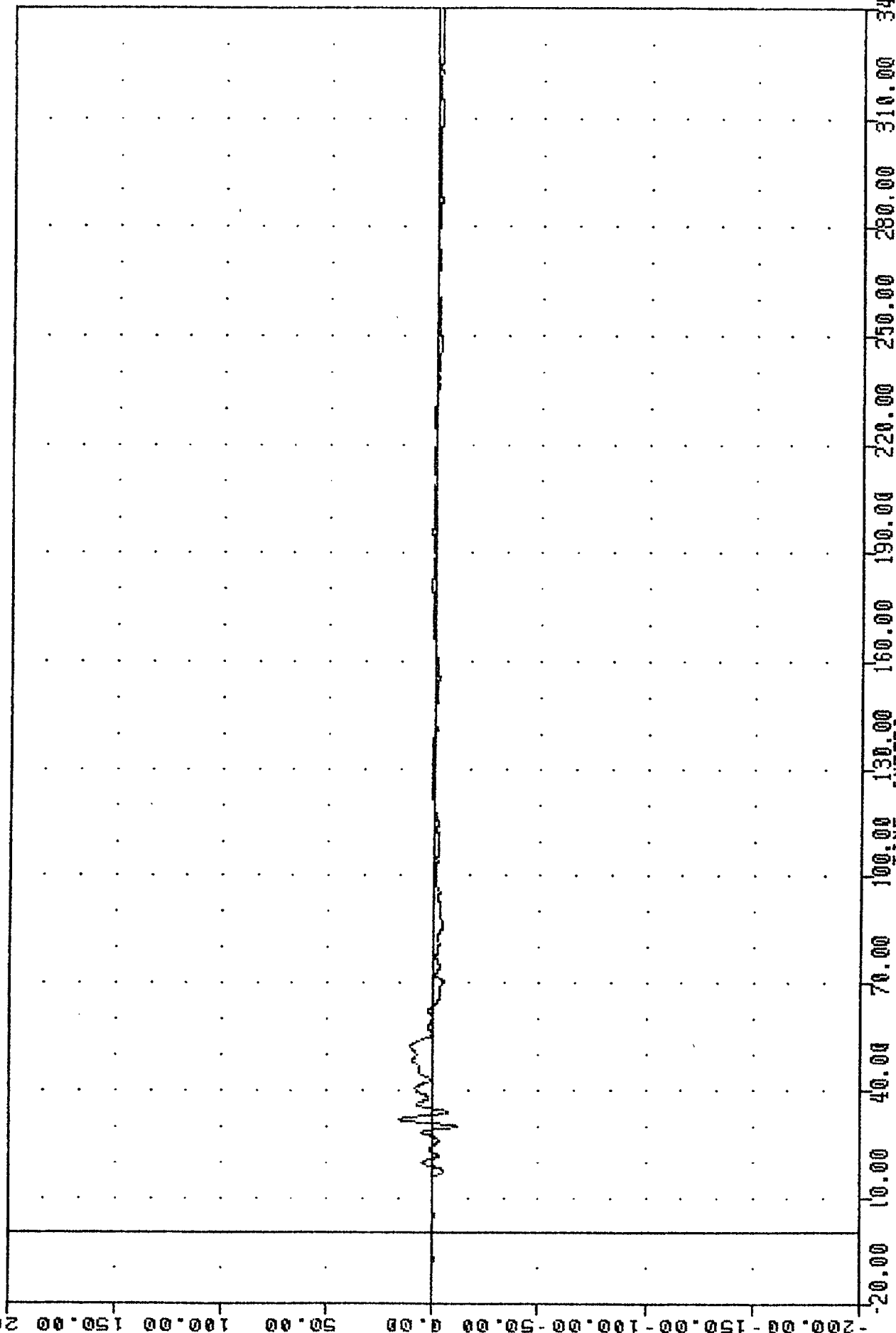
PEVZ63

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -11.28 29.88, 16.58 31.75

ACCELERATION (G)

B-67



SIDE IMPRESSIVE ATTRIBUTES

84257000000

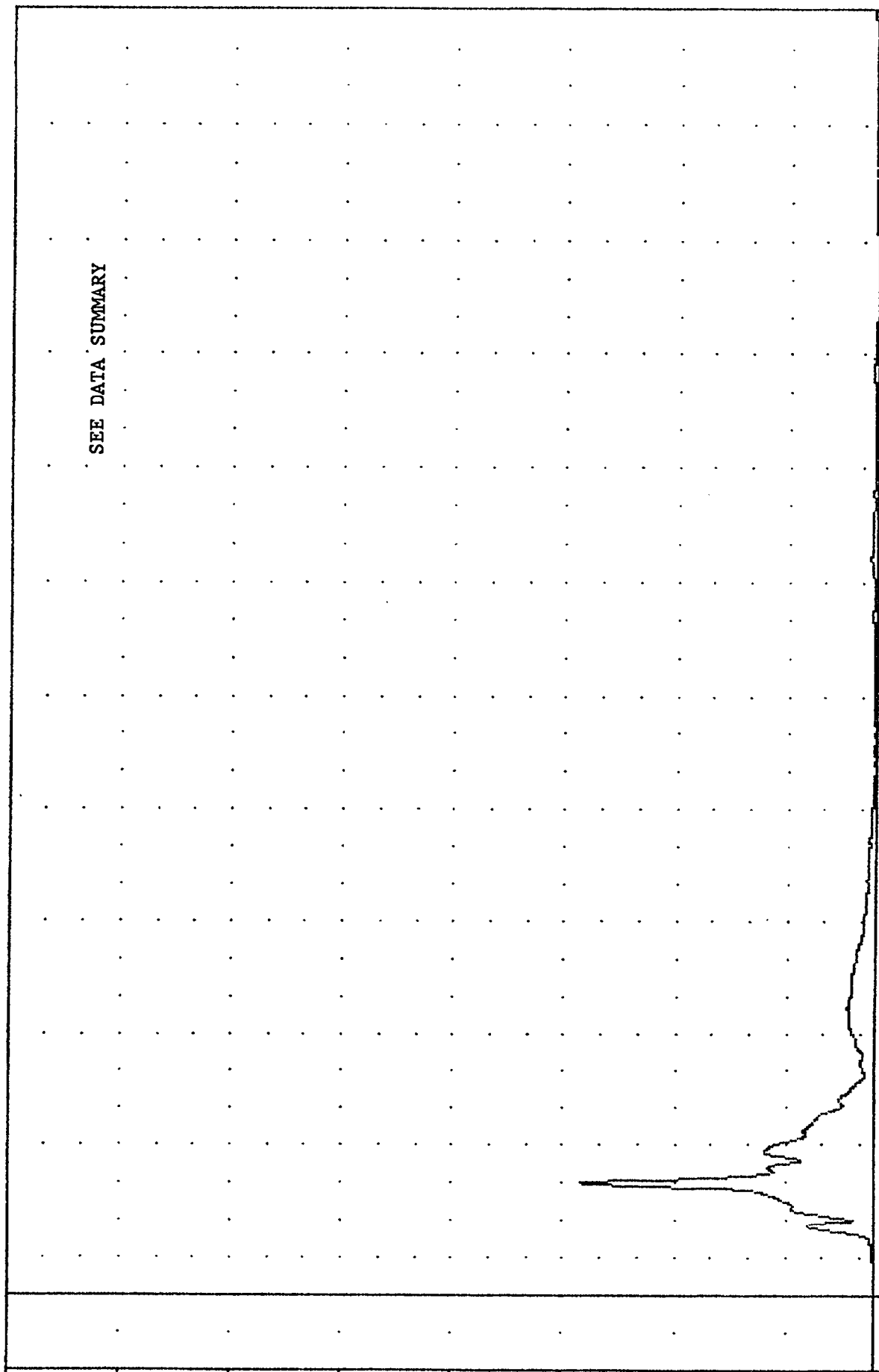
PEVRG3

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = 0.078

3.75, 131.67 29.75

ACCELERATION (G)



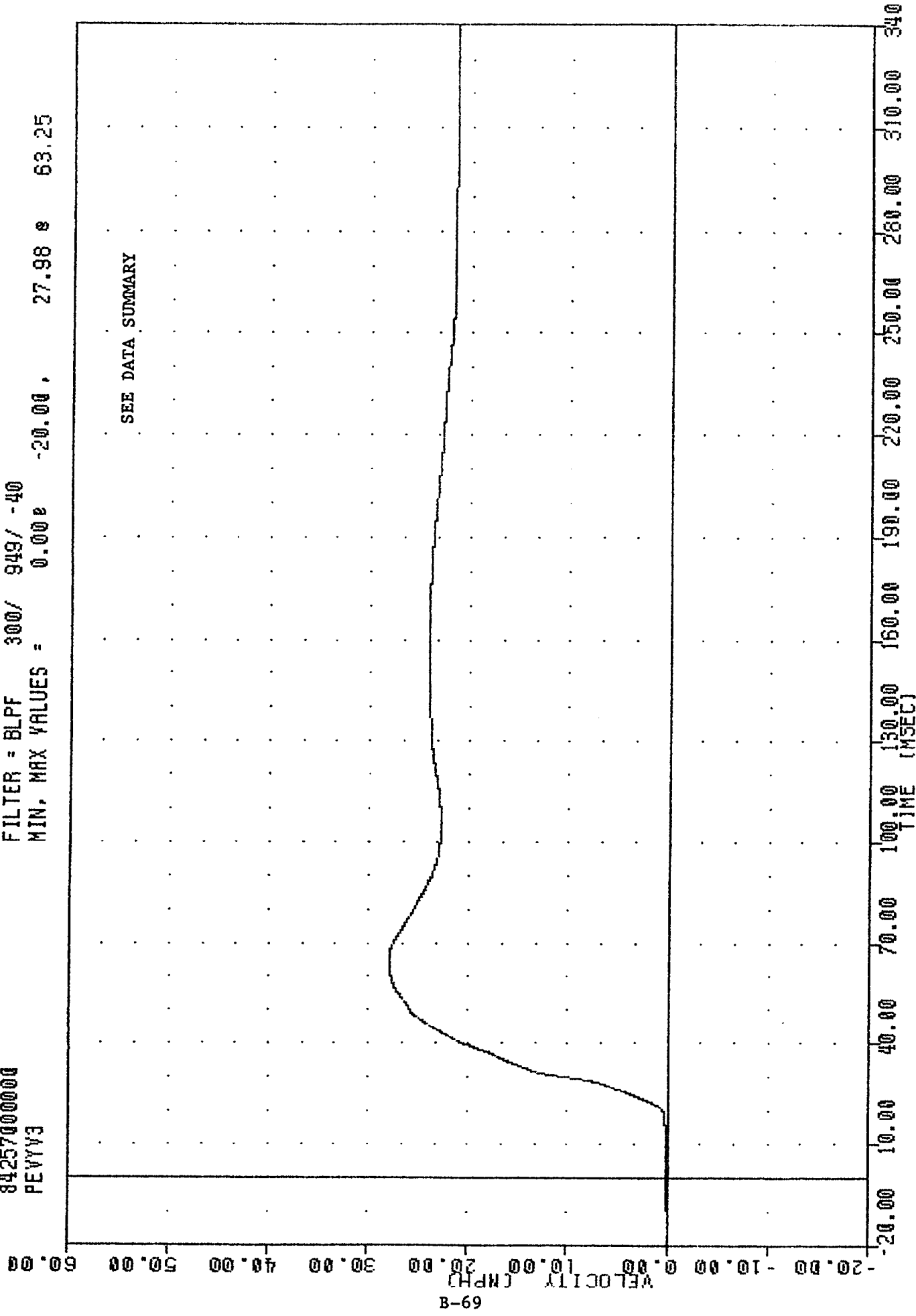
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
TIME (MSEC)

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER PELVIS RESULTANT

РЕШЕНИЕ

MIN, MAX VALUES = 0.0000

-20.00	27.98	63.25
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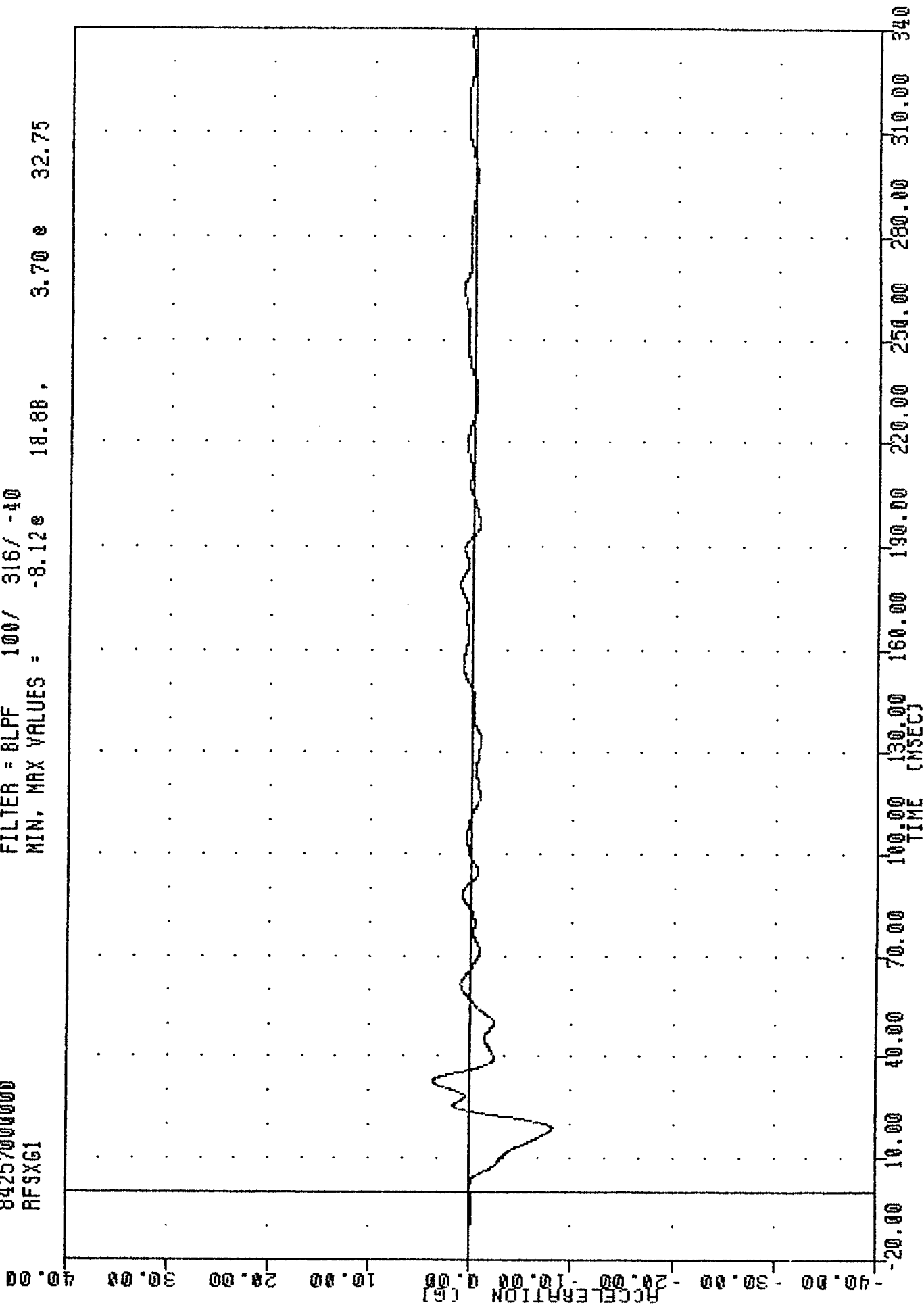
DELTA V USING PEVYGE

842570000000

RF5XG1

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -8.12e 18.88, 3.70 e 32.75



STATE RESPONSIVE MEASUREMENTS

84257000000

RFSY61

FILTER = BLPF

100/ 316/ -40

MIN, MAX VALUES =

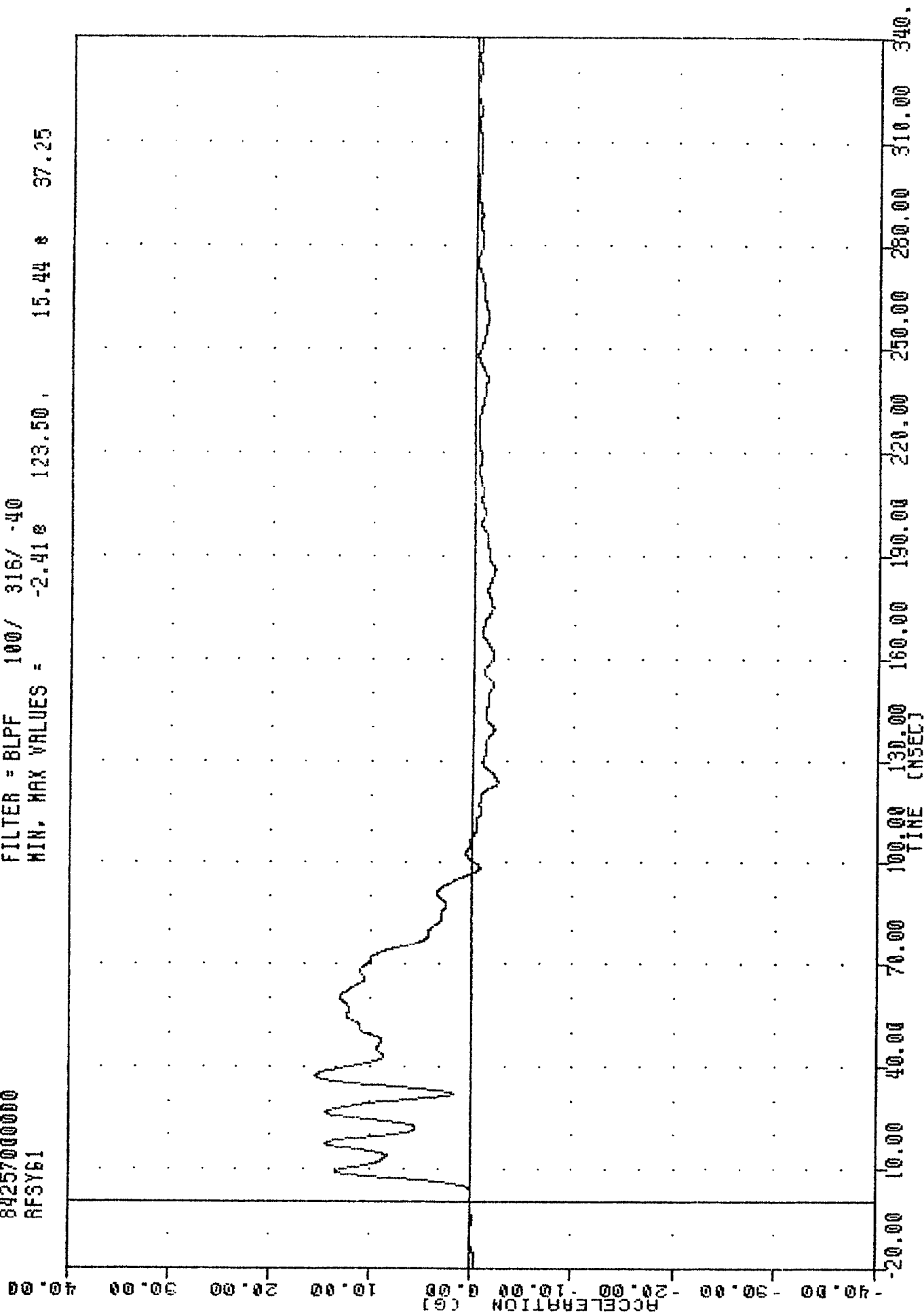
-2.41e

123.50,

15.44 e

37.25

B-71



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT FRONT SILL ACCELERATION Y AXIS

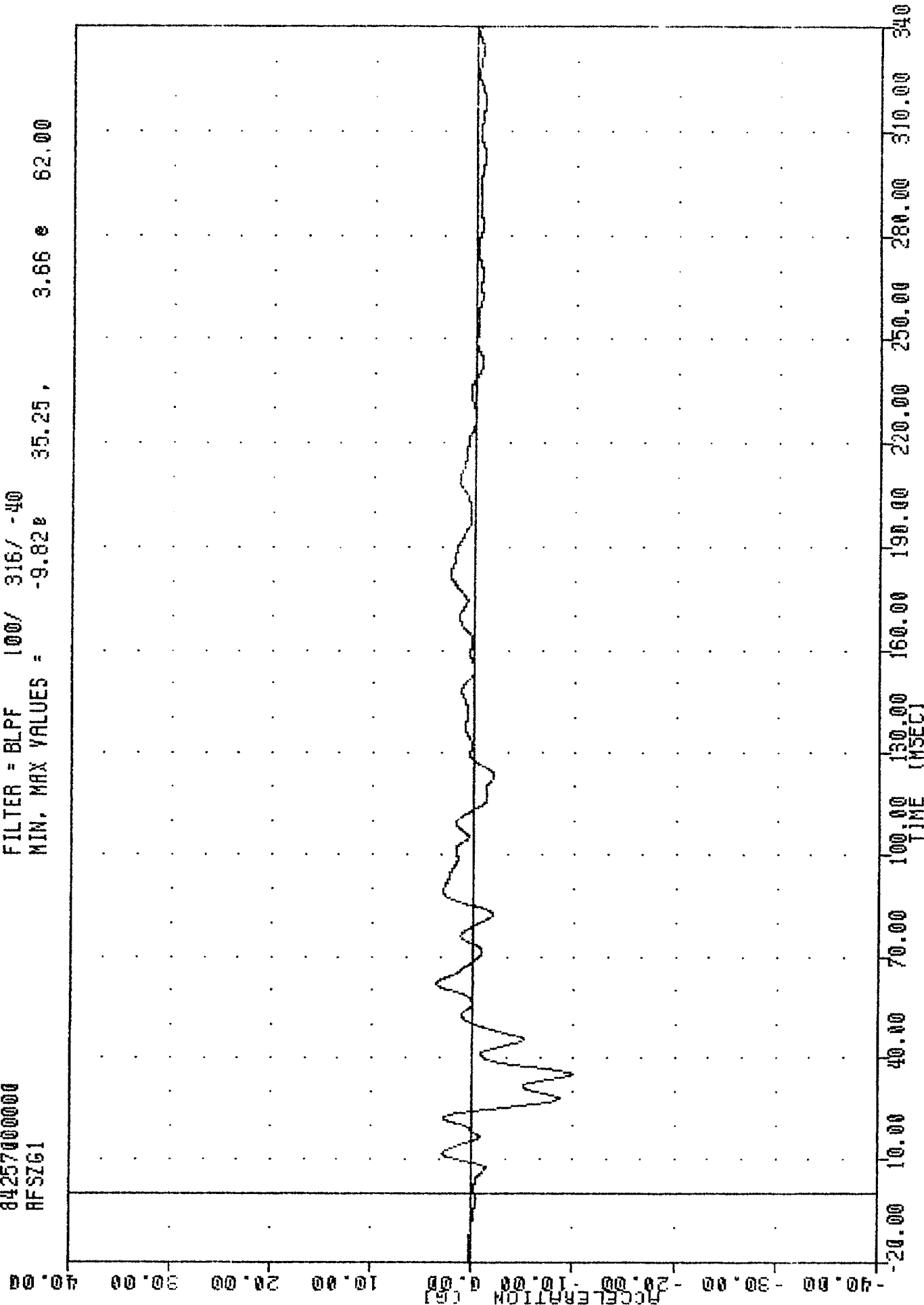
DATE: 08/08/2001 TIME: 11:00:00

84257000000

RFSZG1

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -9.82e 35.25, 3.66 e 62.00



B-72

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT FRONT SILL ACCELERATION Z AXIS

842570000000

RFSG1

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = 0.12e

-8.88 , 17.18 e 36.25

ACCELERATION (G)

70.00

60.00

50.00

40.00

30.00

20.00

10.00

0.00

-10.00

-20.00

B-73

TIME (MSEC)

20.00

40.00

60.00

80.00

100.00

120.00

140.00

160.00

180.00

200.00

220.00

240.00

260.00

280.00

300.00

320.00

340.00

360.00

380.00

400.00

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT FRONT SILL RESULTANT

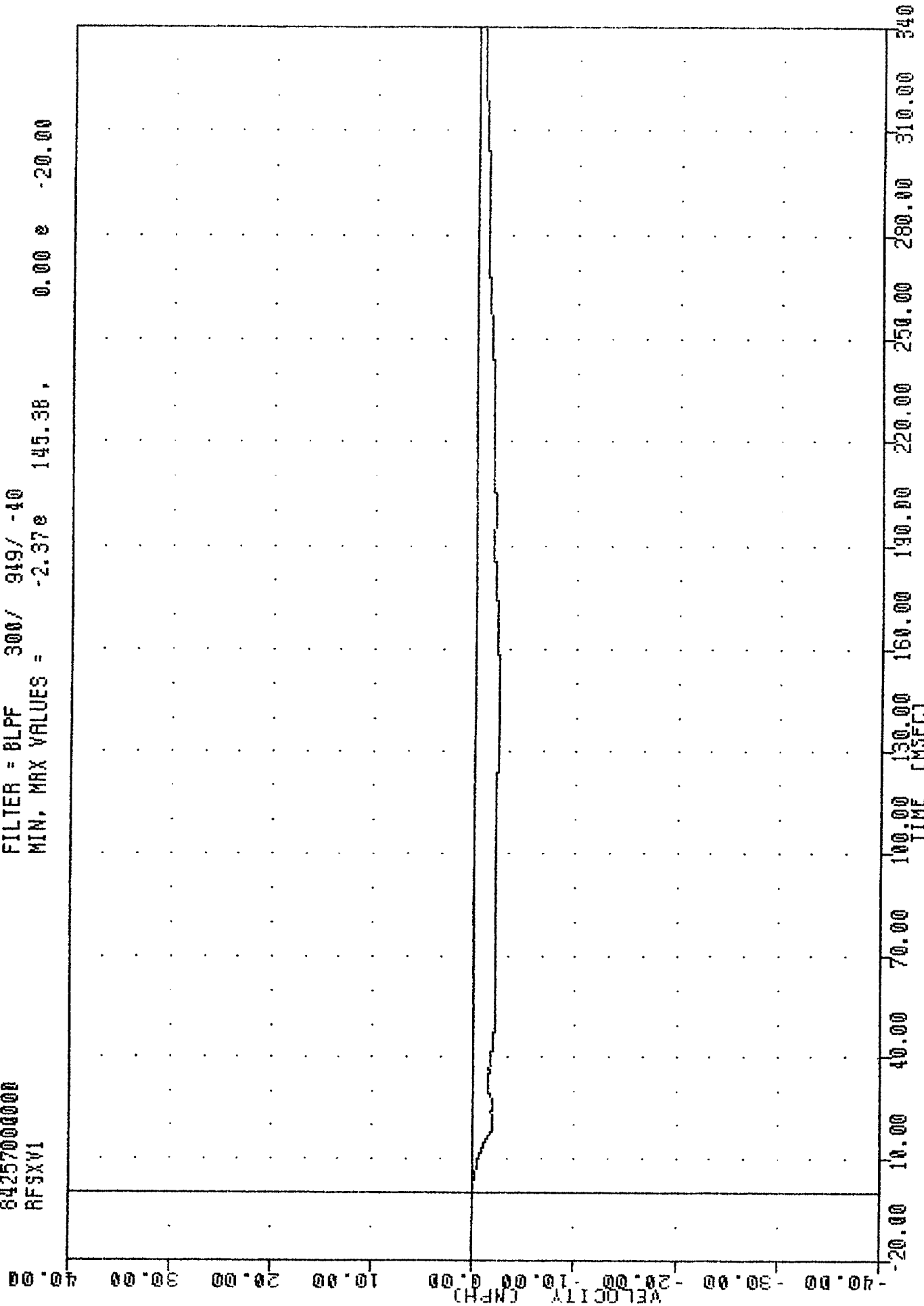
WALL PENETRATIVE MECHANISMS

84257000000

RFSXV1

FILTER = BLPF 300/ 919/ -40

MIN, MAX VALUES = -2.37e 145.38, 0.00 e -20.00



B-74

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING RFSXG1

SAVE SUBSEQUENT MINIMIZES

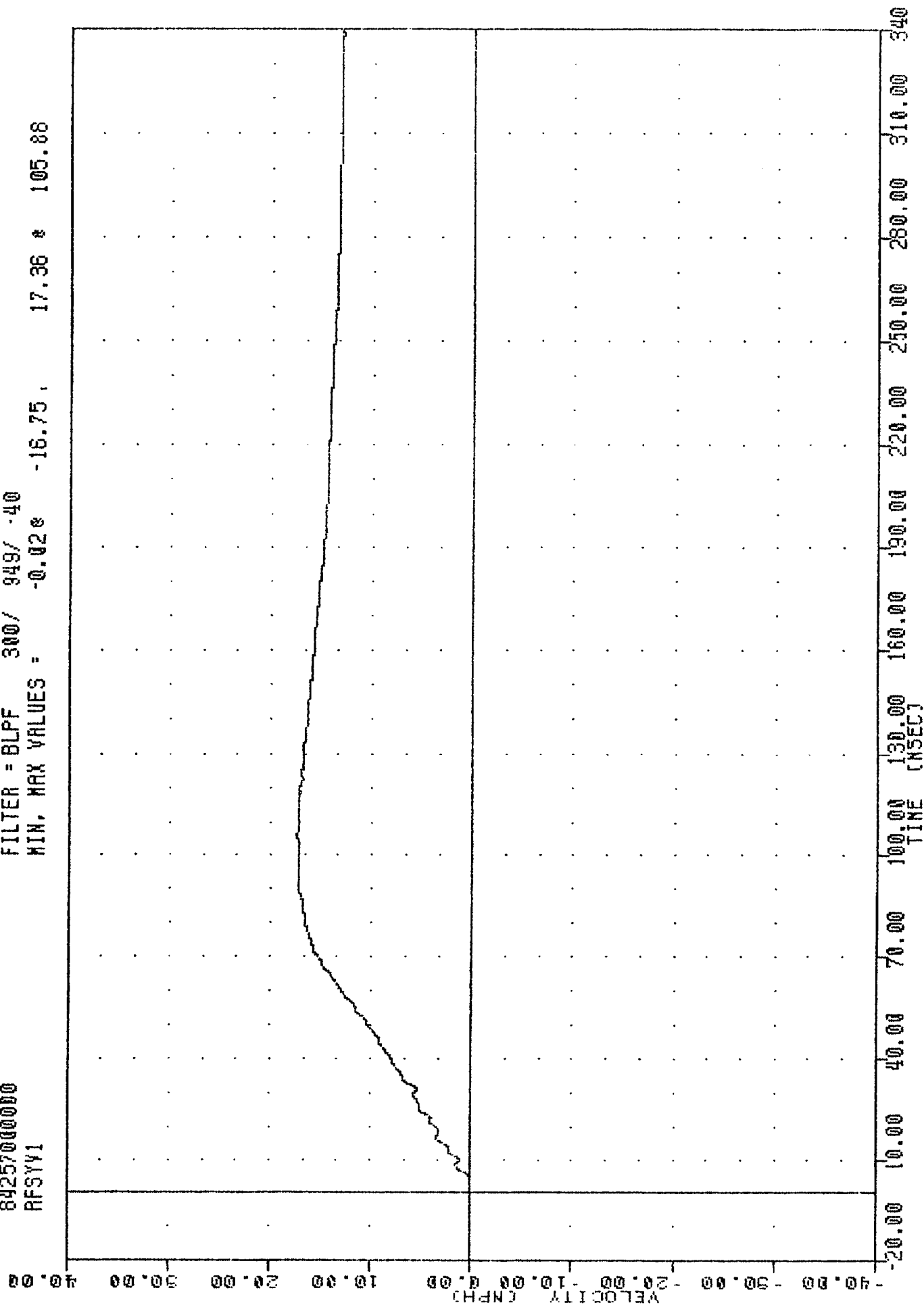
842570000000

RFSYV1

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -0.020 -16.75, 17.36 & 105.88

B-75



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING RFSYG1

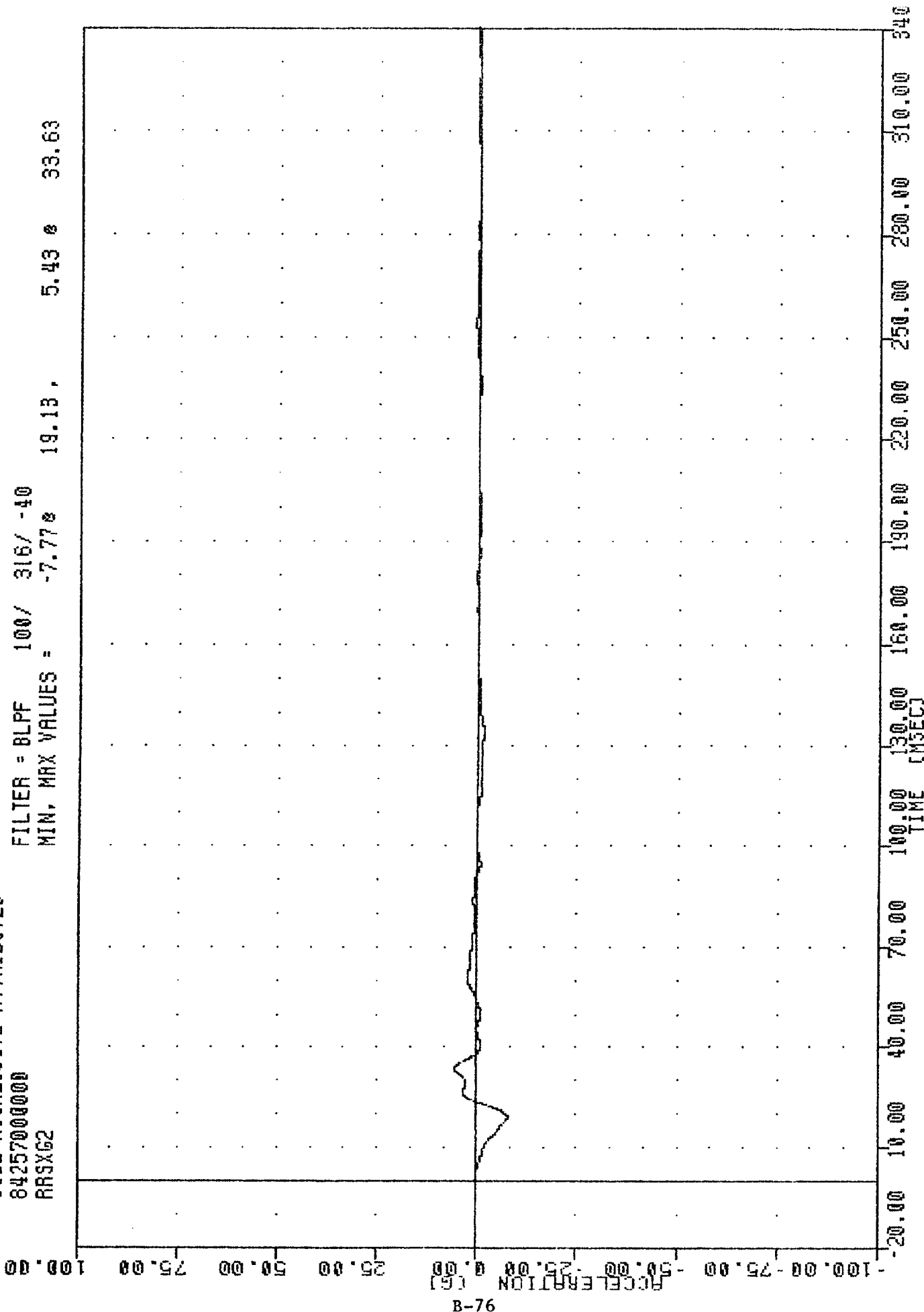
SIDE AGGRESSIVE ATTRIBUTES

842570000000

RRSX62

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -7.77 19.13, 5.43 33.63



B-76

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT REAR SILL ACCELERATION X AXIS

VALUE SUBSEQUENTIVE MINIMIBOIES

842570000000

RRSY62

FILTER = BLPF

100/ 316/ -40

MIN, MAX VALUES =

-2.97e

124.25 ,

18.82 e

58.75

100.00

75.00

50.00

25.00

0.00

-25.00

-50.00

-75.00

-100.00

B-77

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 (NSEC)

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

VEHICLE RIGHT REAR SILL ACCELERATION Y AXIS

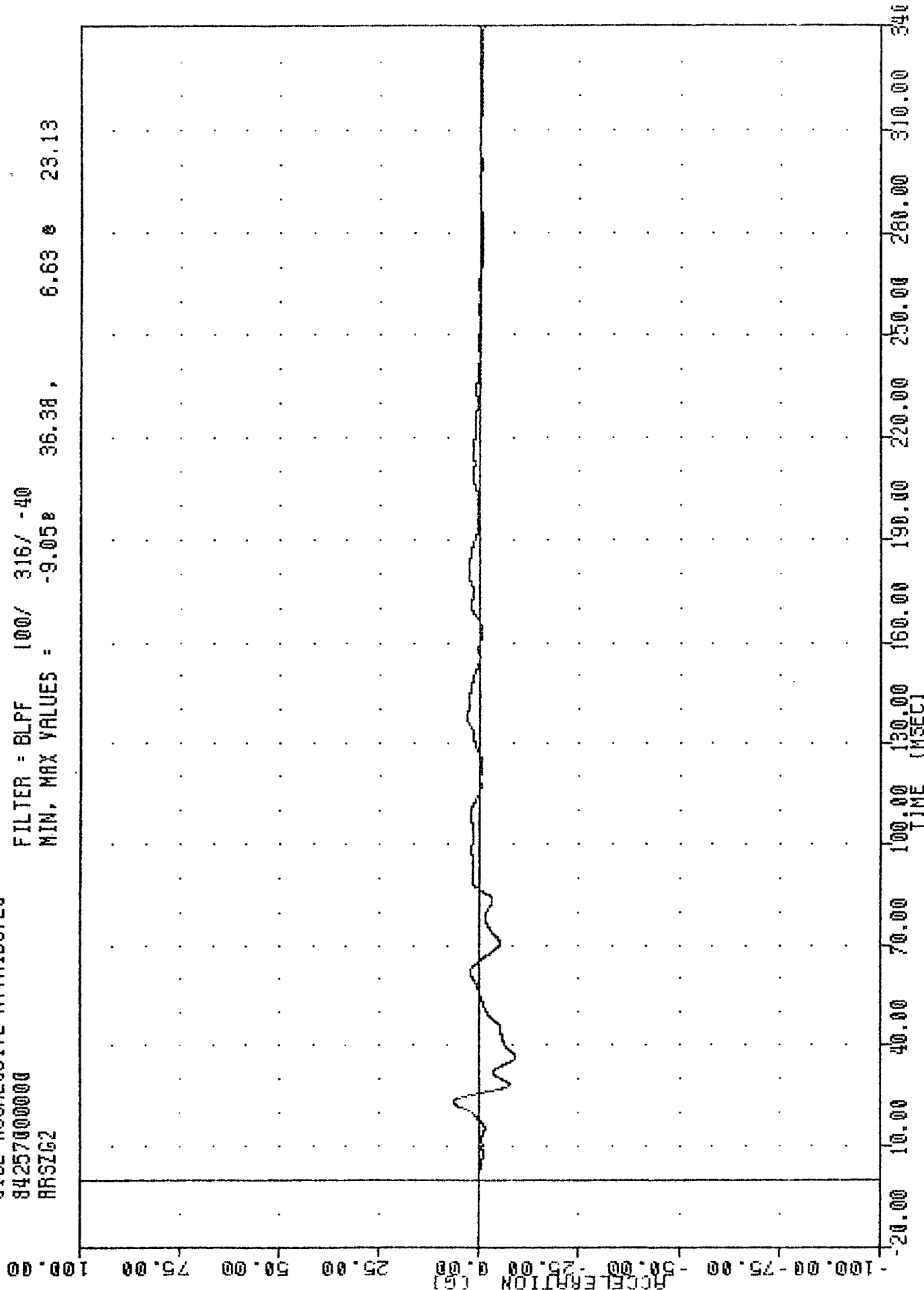
SIDE IMPRESSIVE HIGHLIGHTS

84257000000

ARSZG2

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -9.05e 36.38, 6.63 e 23.13



B-78

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT REAR SILL ACCELERATION Z AXIS

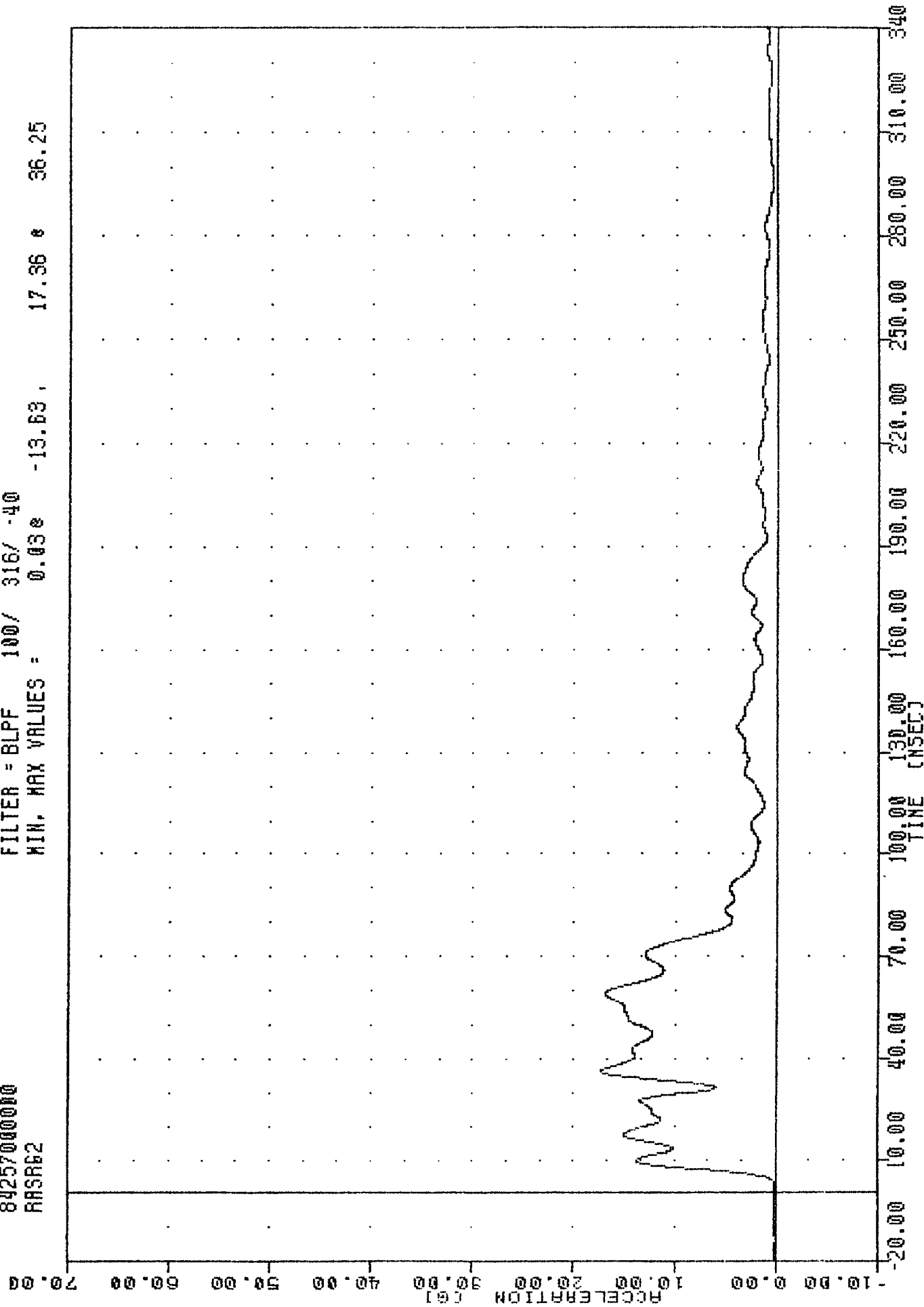
SIDE IMPRESSIVE HISTOGRAMS

84257000000

RASR62

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = 0.03e -13.63, 17.36 e 36.25



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT REAR SILL RESULTANT

SIDE AGGRESSIVE ATTRIBUTES

84257000000

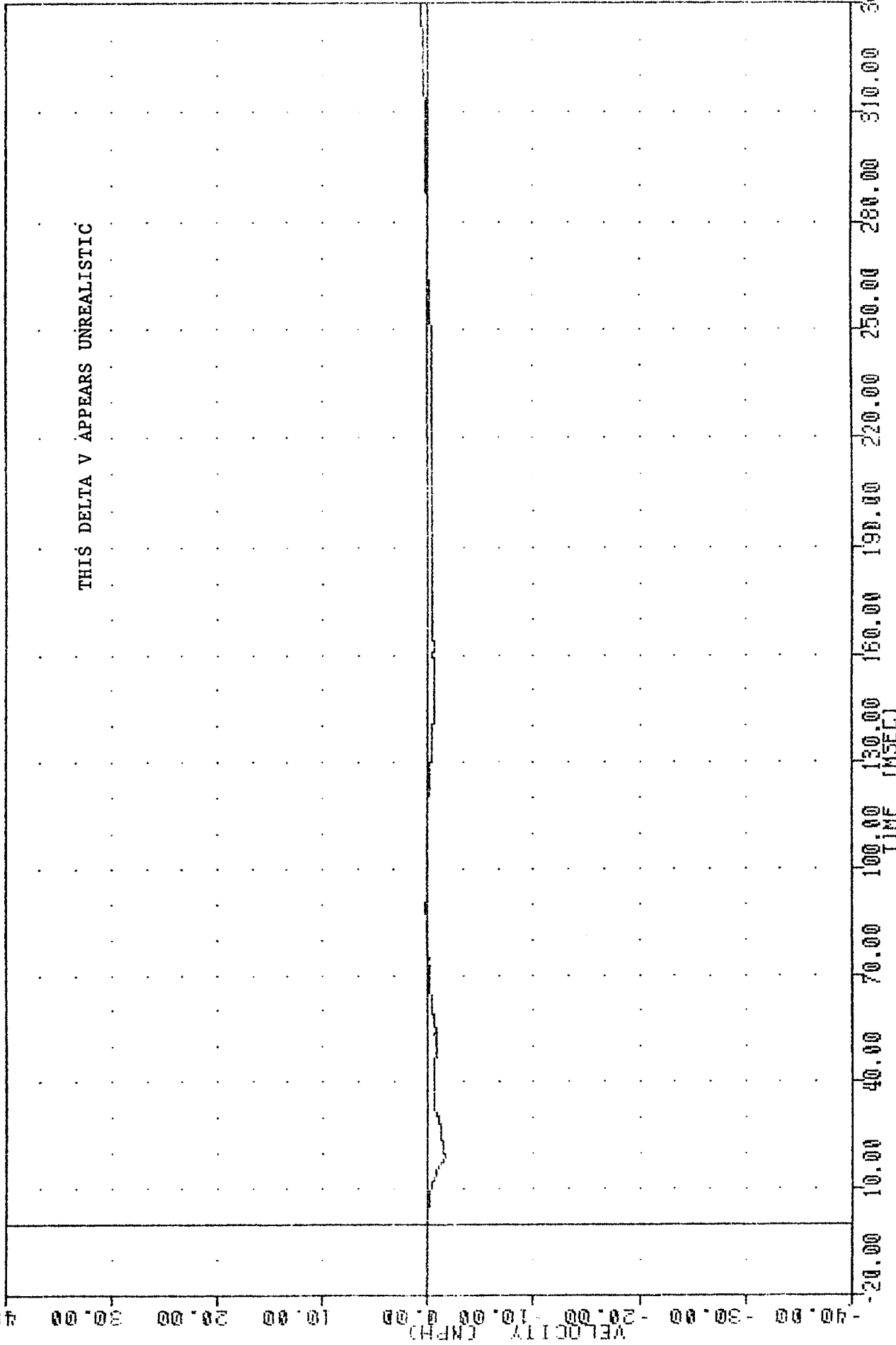
ARSXV2

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -1.57%

19.13,

0.66 e 340.00



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING ARSXG2

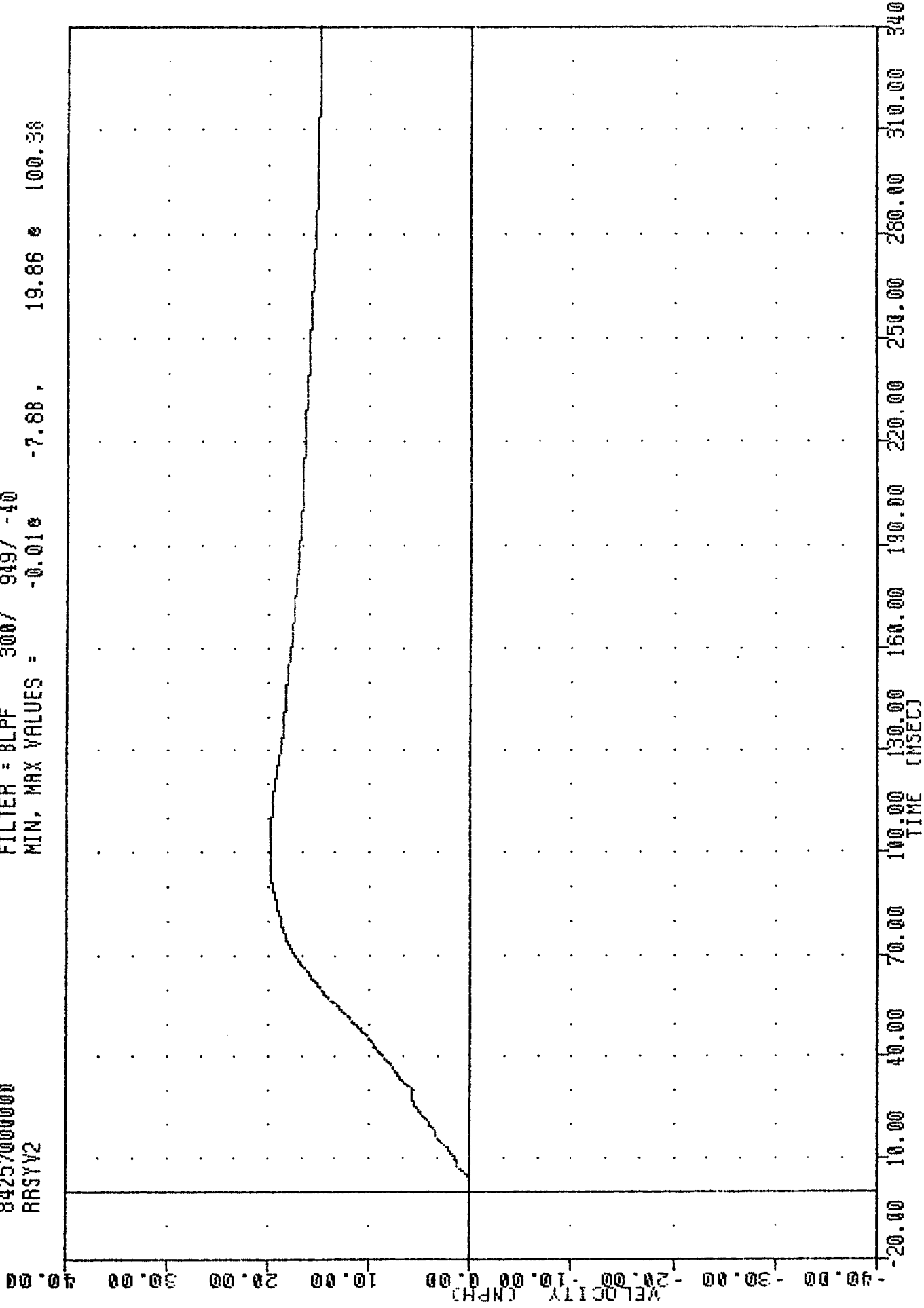
SIDE AGGRESSIVE ATTRIBUTES

84257000000

RRSYV2

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -0.018 -7.88 , 19.86 e 100.38



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING RRSYG2

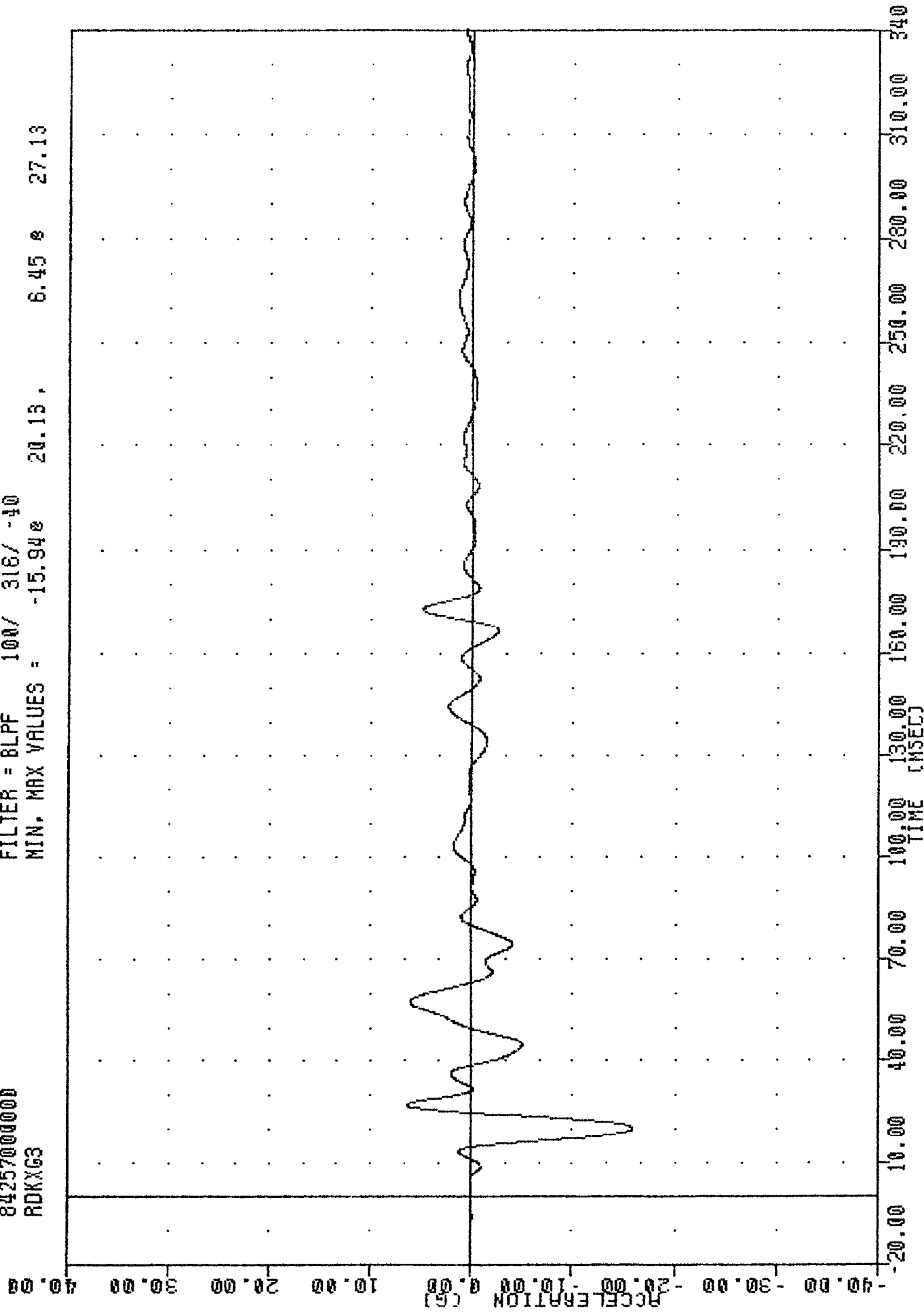
SIDE AGGRESSIVE ATTRIBUTES

84257000000

RDKXG3

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -15.94 20.13, 6.45 27.13



B-82

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE REAR DECK ACCELERATION X AXIS

SIDE IMPRESSIVE MINIMIBUES

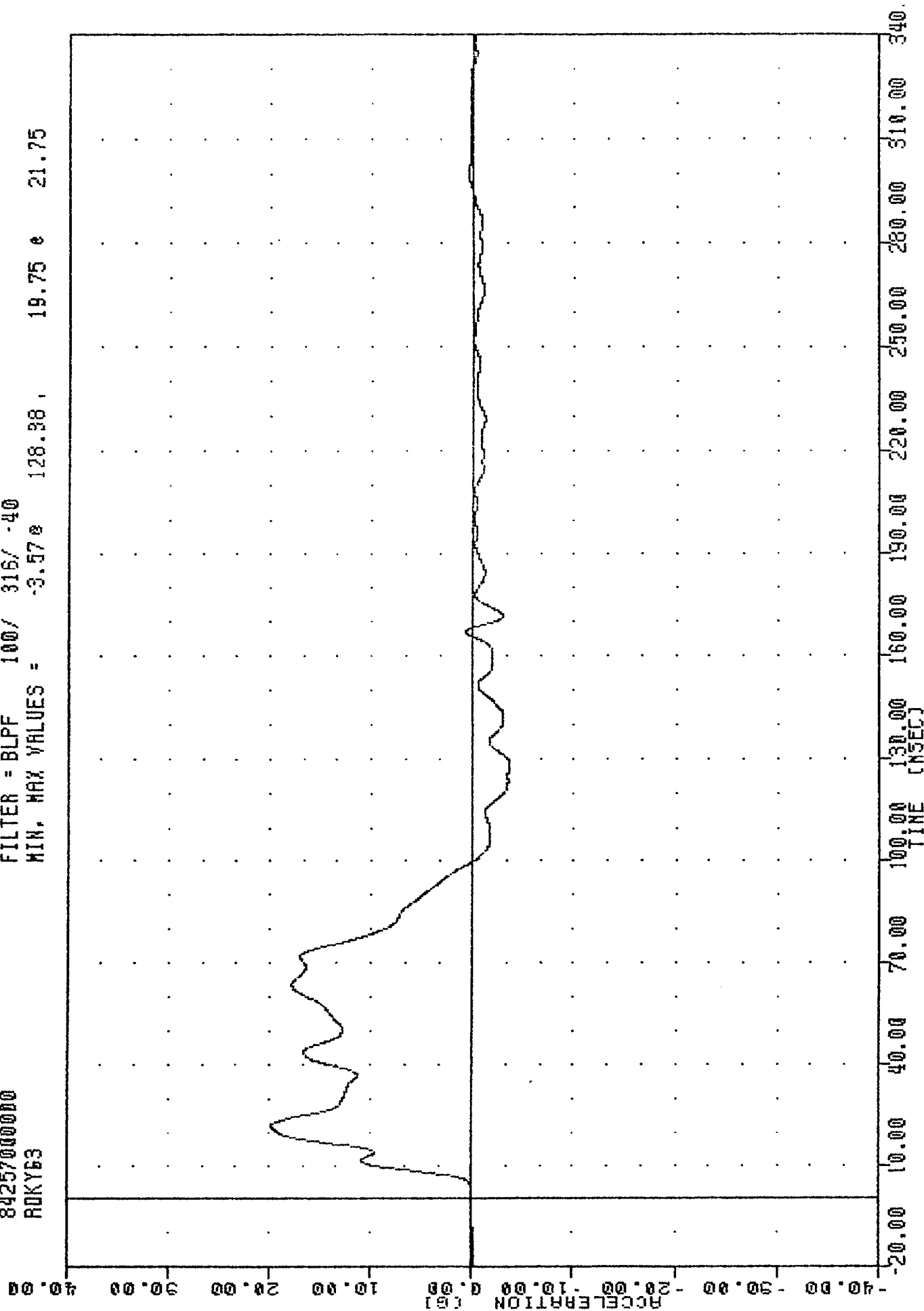
84257000000

R0KY63

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -3.57e 128.38 , 19.75 e 21.75

B-83



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE REAR DECK ACCELERATION Y AXIS

SIDE AGGRESSIVE ATTRIBUTES

84257000000

ADKZG3

FILTER = BLPF 100/ 318/ -40

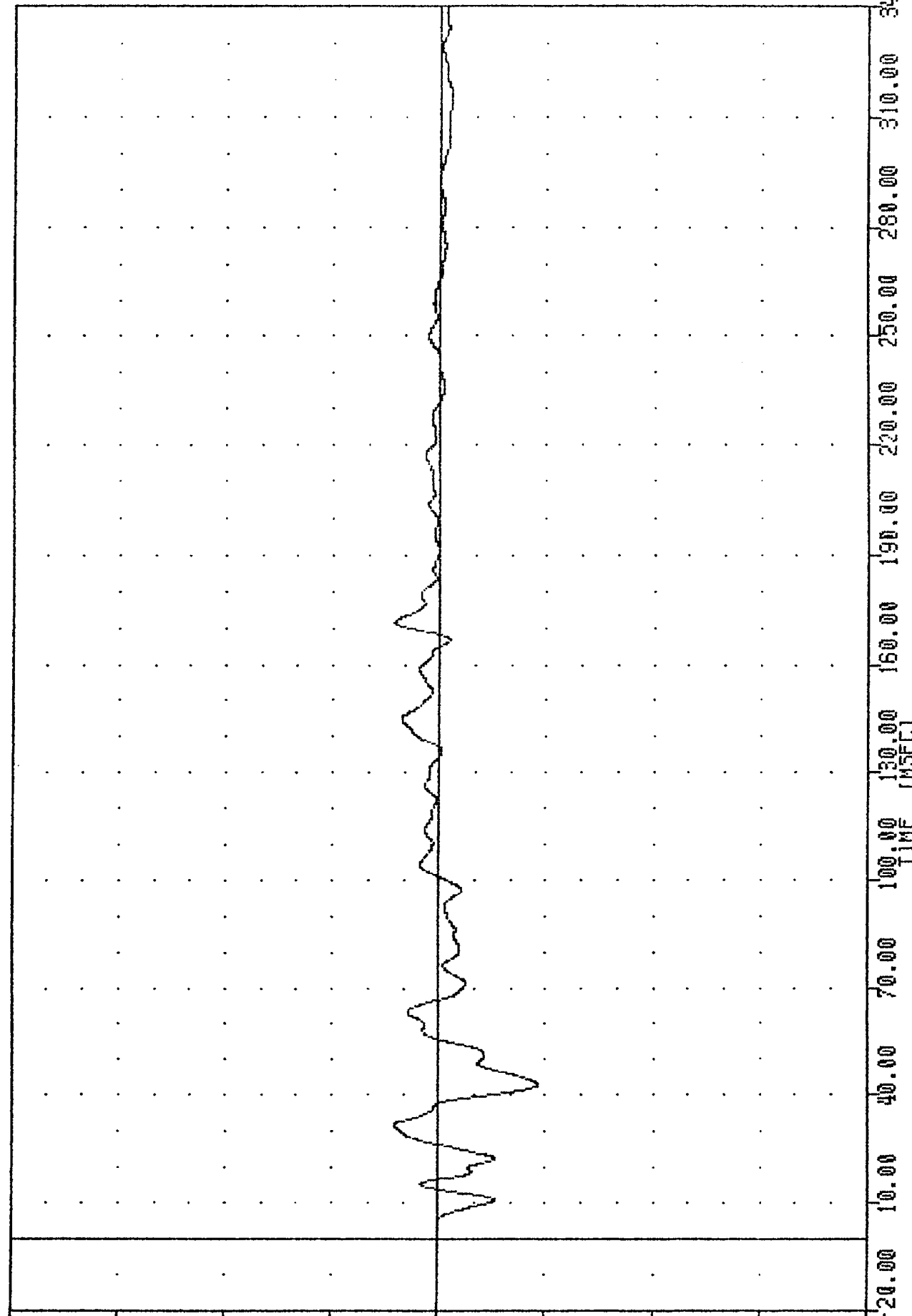
MIN. MAX VALUES =

42.75,

4.21 @ 171.38

B-84

ACCELERATION (G)



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE REAR DECK ACCELERATION Z AXIS

SIDE AGGRESSIVE ATTRIBUTES

84257000000

ADKRG3

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = 0.038 -3.25 , 25.25 @ 20.75

70.00

60.00

50.00

40.00

30.00

20.00

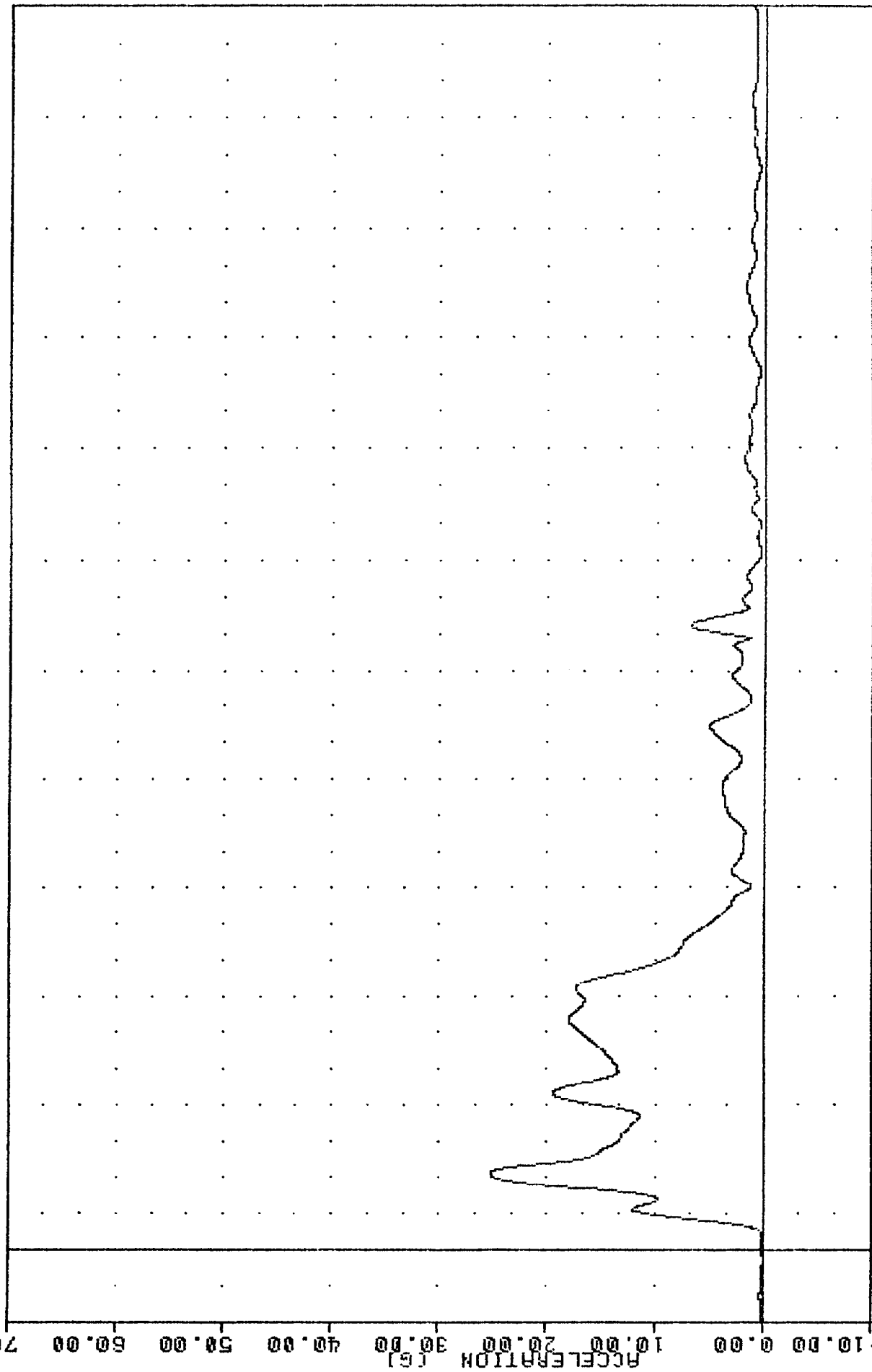
10.00

0.00

-10.00

-20.00

B-85



TIME (msec)

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE REAR DECK RESULTANT

SIDE AGGRESSIVE ATTRIBUTES

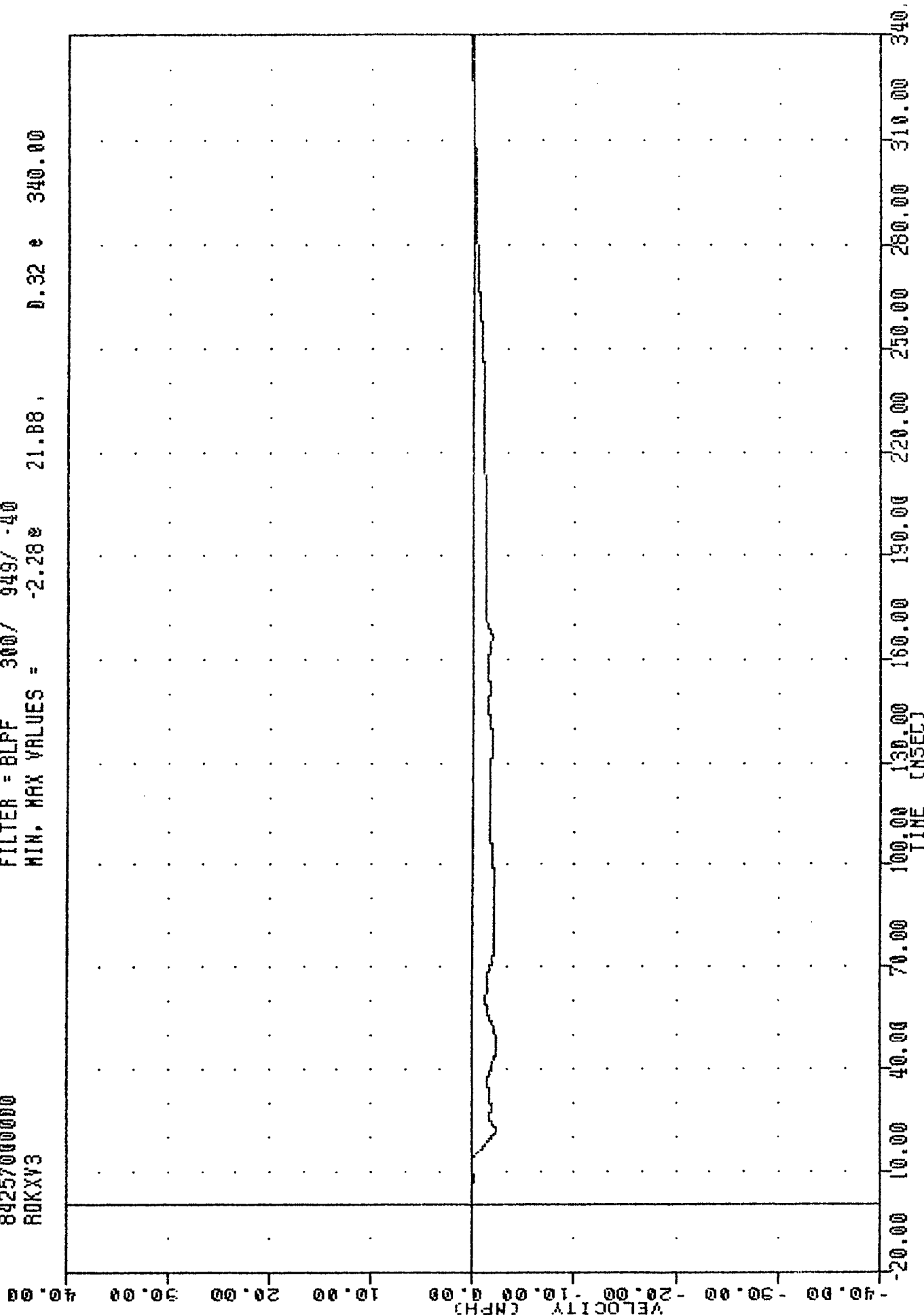
842570000000

R0KXV3

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -2.28 21.88 , 0.32 e 340.80

B-86



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING R0KXG3

SIDE IMPRESSIVE HISTOGRAMS

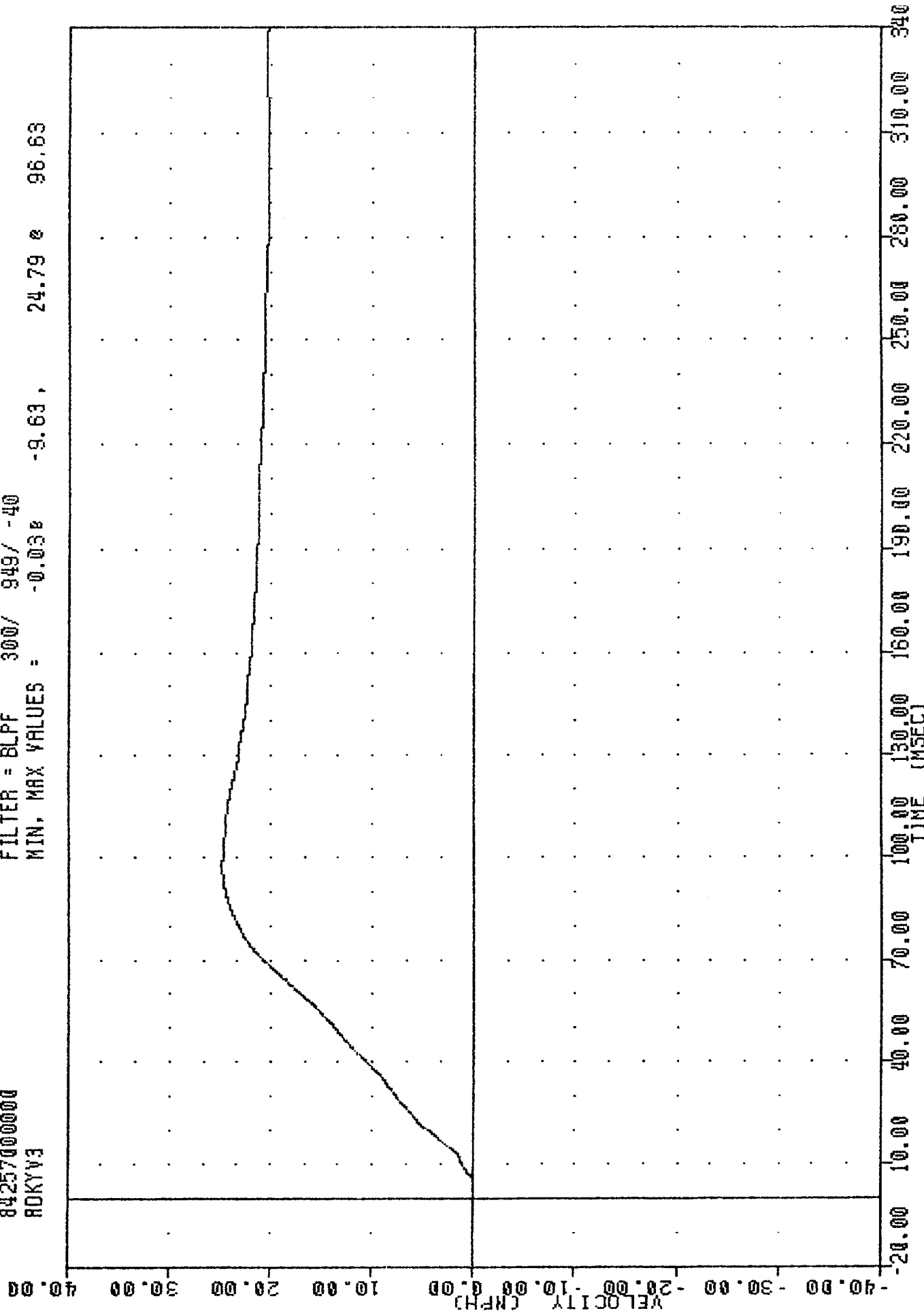
84257000000

ROKYG3

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -0.038 -9.63, 24.79 @ 96.63

B-87



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING ROKYG3

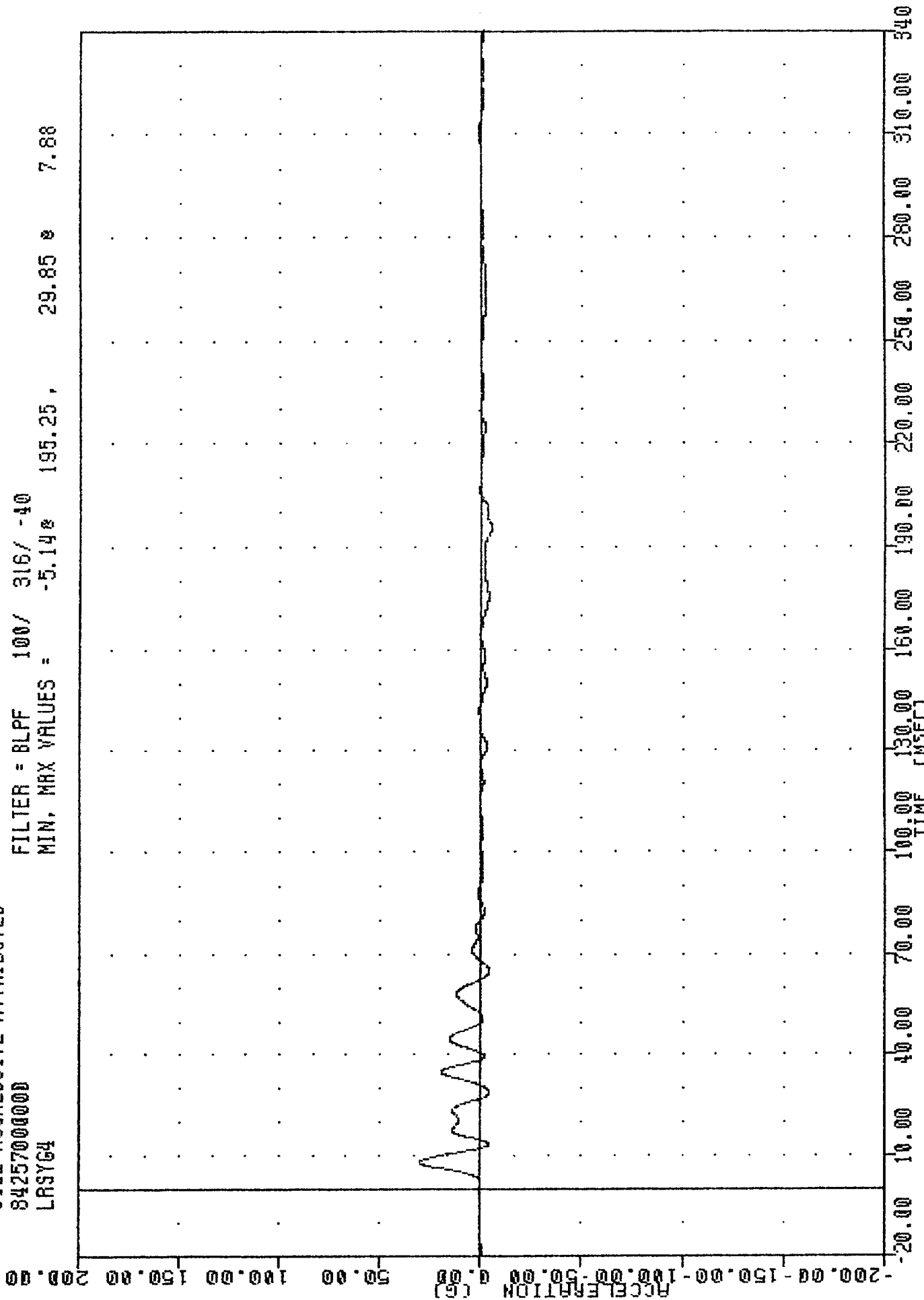
SIDE HUGGRESSIVE ATTRIBUTES

84257000000

LR3Y64

FILTER = 8LPF 100/ 316/ -40

MIN, MAX VALUES = -5.14% 195.25 , 29.85 % 7.88



B-88

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT REAR SILL ACCELERATION Y AXIS

SIDE IMPRESSIVE ATTRIBUTES

84257000000

LR3YV4

FILTER = BLPF 300/ 949/ -40

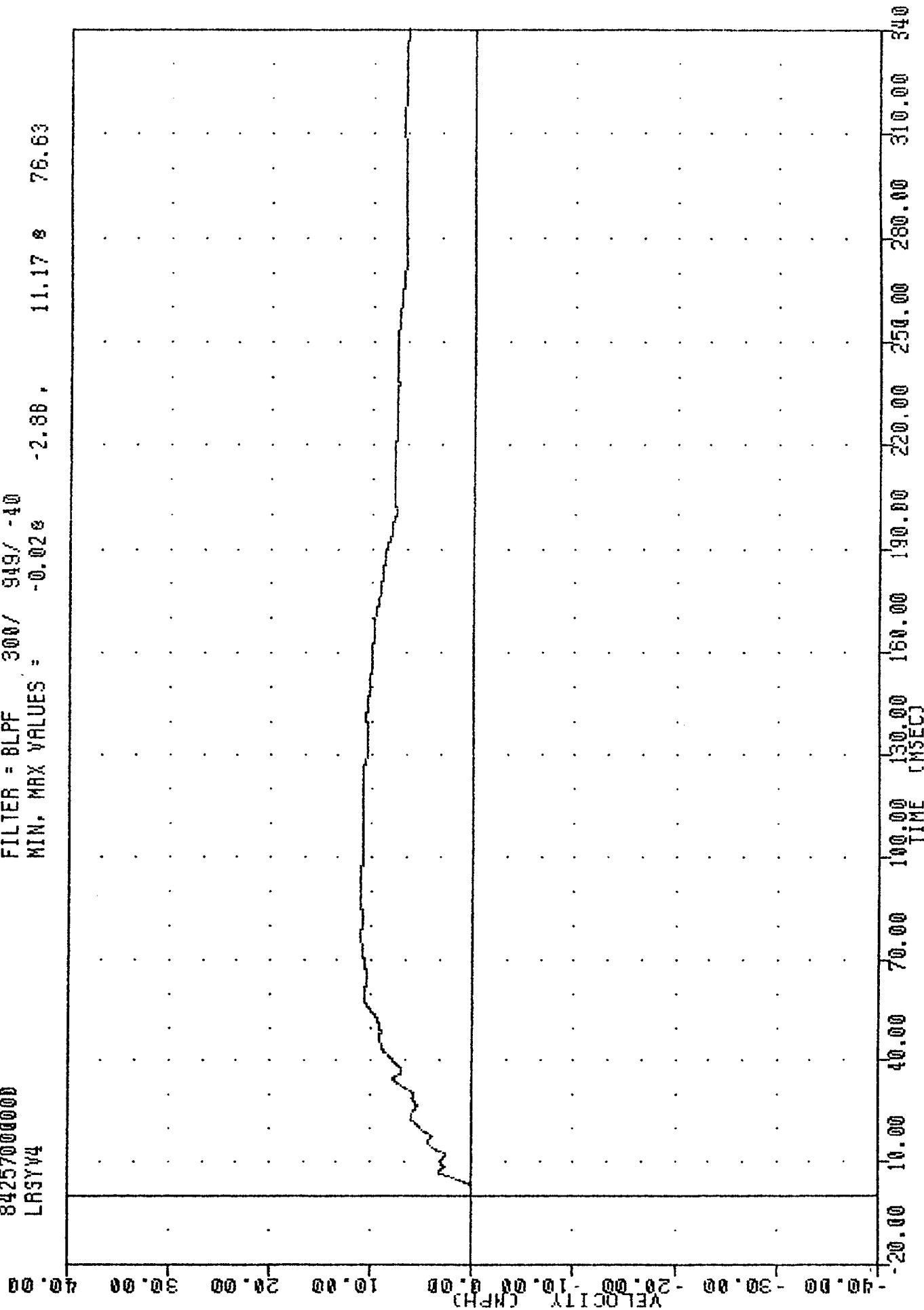
MIN. MAX VALUES = -0.028

-2.88,

11.17 8

76.63

B-89



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING LRSY64

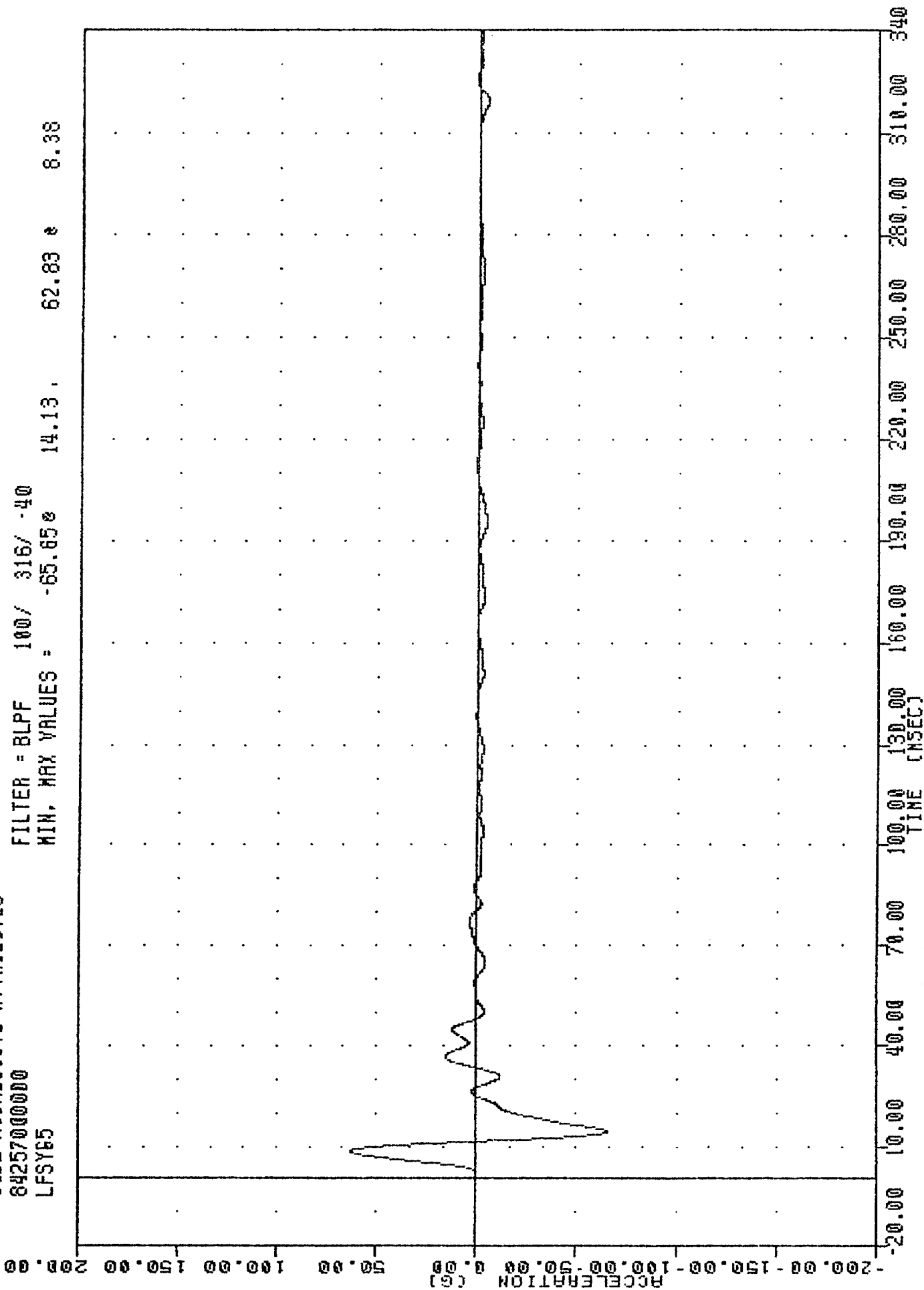
SIDE AGGRESSIVE ATTRIBUTES

84257000000

LFSY65

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -65.650 14.13, 62.83 & 8.38



B-90

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT SILL ACCELERATION Y AXIS

SIDE AGGRESSIVE ATTRIBUTES

84257000000

LFSYV5

FILTER = BLPF

300/ 949/ -40

MIN, MAX VALUES = -5.30

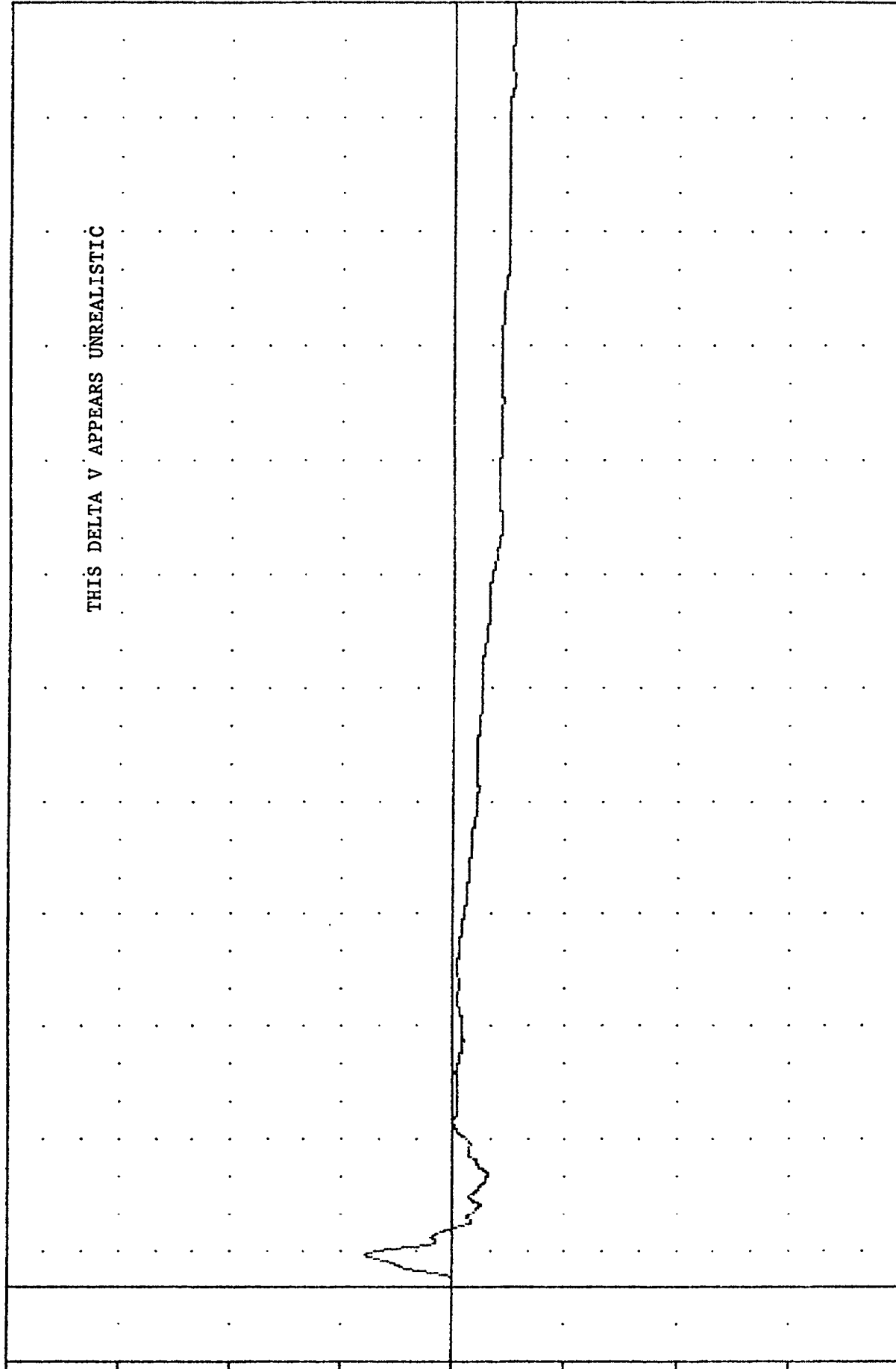
338.13 ,

7.81 *

8.75

16-B-91

VELOCITY (MPH)



TIME (NSEC)

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING LFSYG5

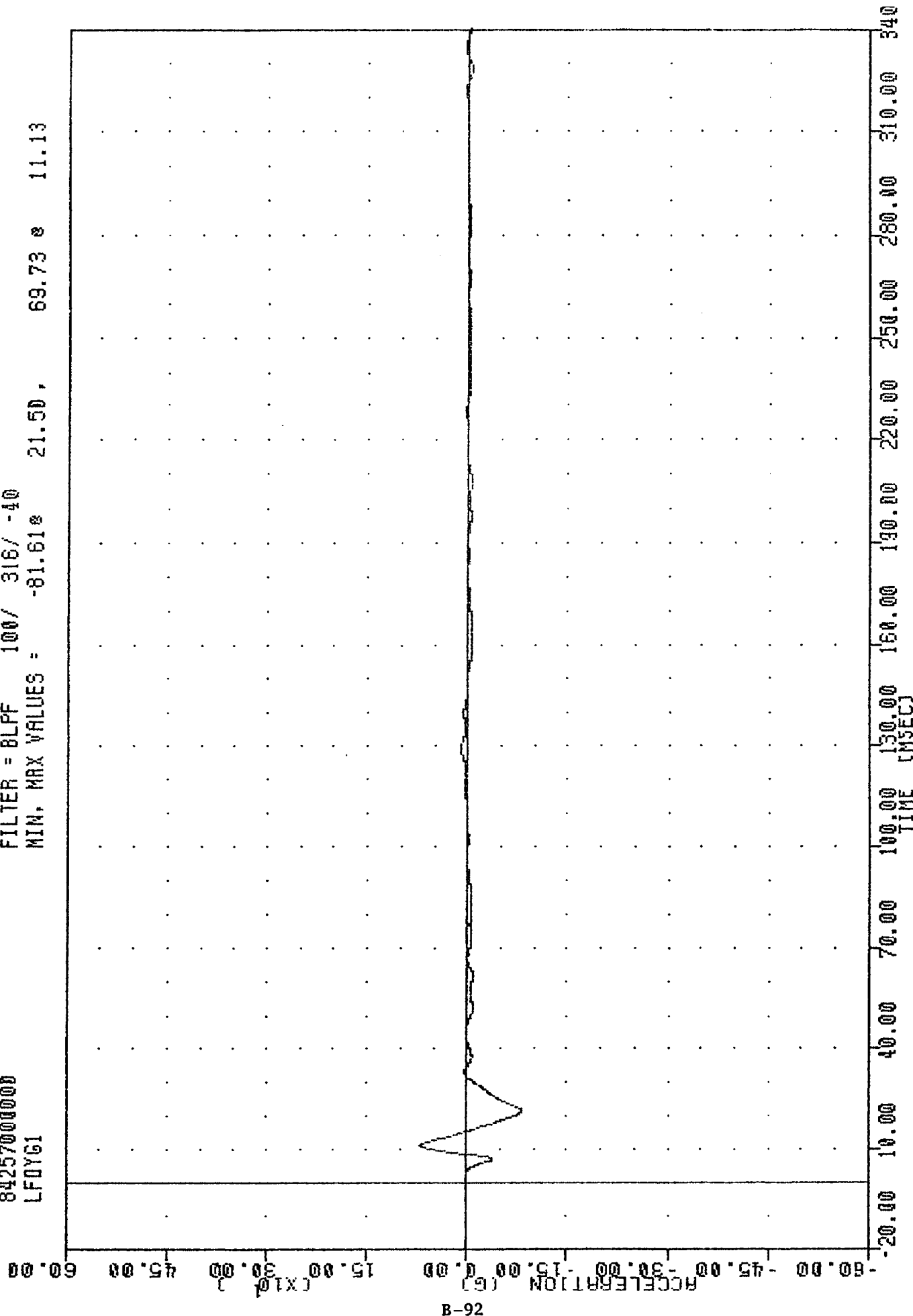
SIDE AGGRESSIVE ATTRIBUTES

84257000000

LFOYG1

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -81.61 21.50, 69.73 11.13



B-92

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT DOOR (POSITION 6) ACCELERATION Y AXIS

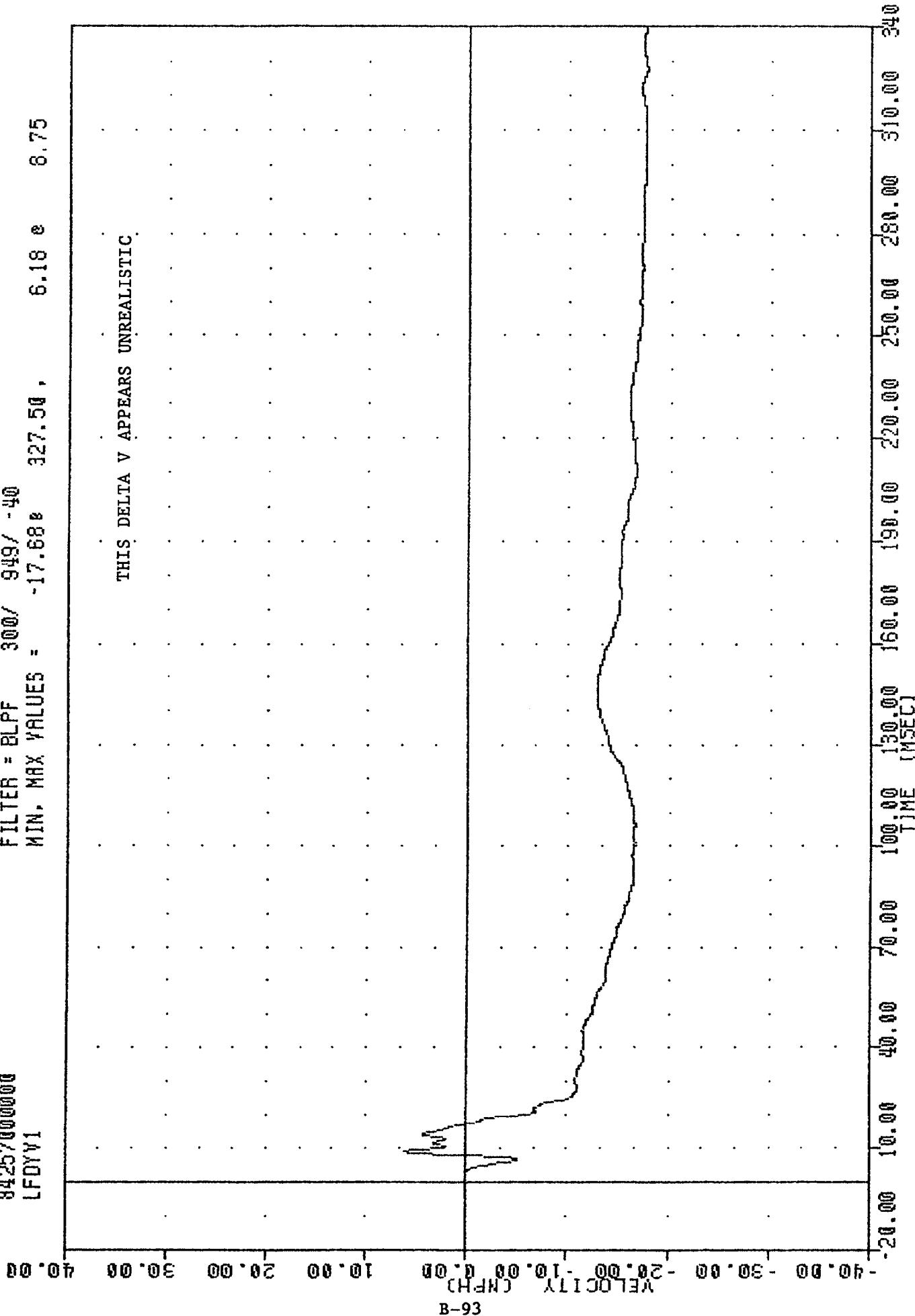
SLIDE IMPRESSIVE MINIMIZES

84257000000

LFDYV1

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -17.68 e 327.50 , 6.18 e 8.75



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFDYGI

VALUE NUMERICAL VALUE MINIMUM

84257000000

LFDY62

FILTER = BLPF

100/ 316/ -40

MIN, MAX VALUES =

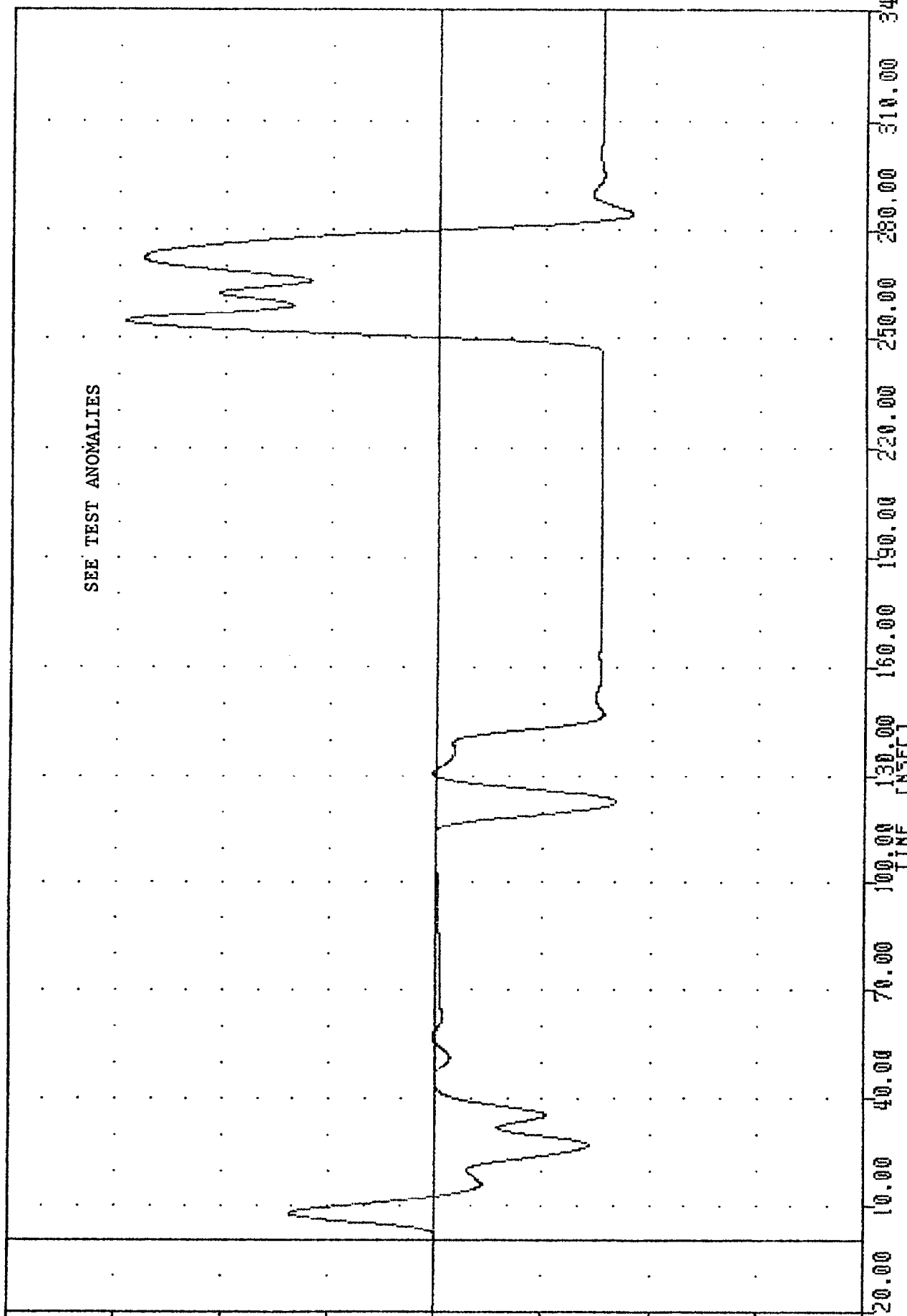
-270.348

284.38

439.87 254.50

B-94

ACCELERATION (G) (x10⁴)



SEE TEST ANOMALIES

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT DOOR (POSITION 8) ACCELERATION Y AXIS

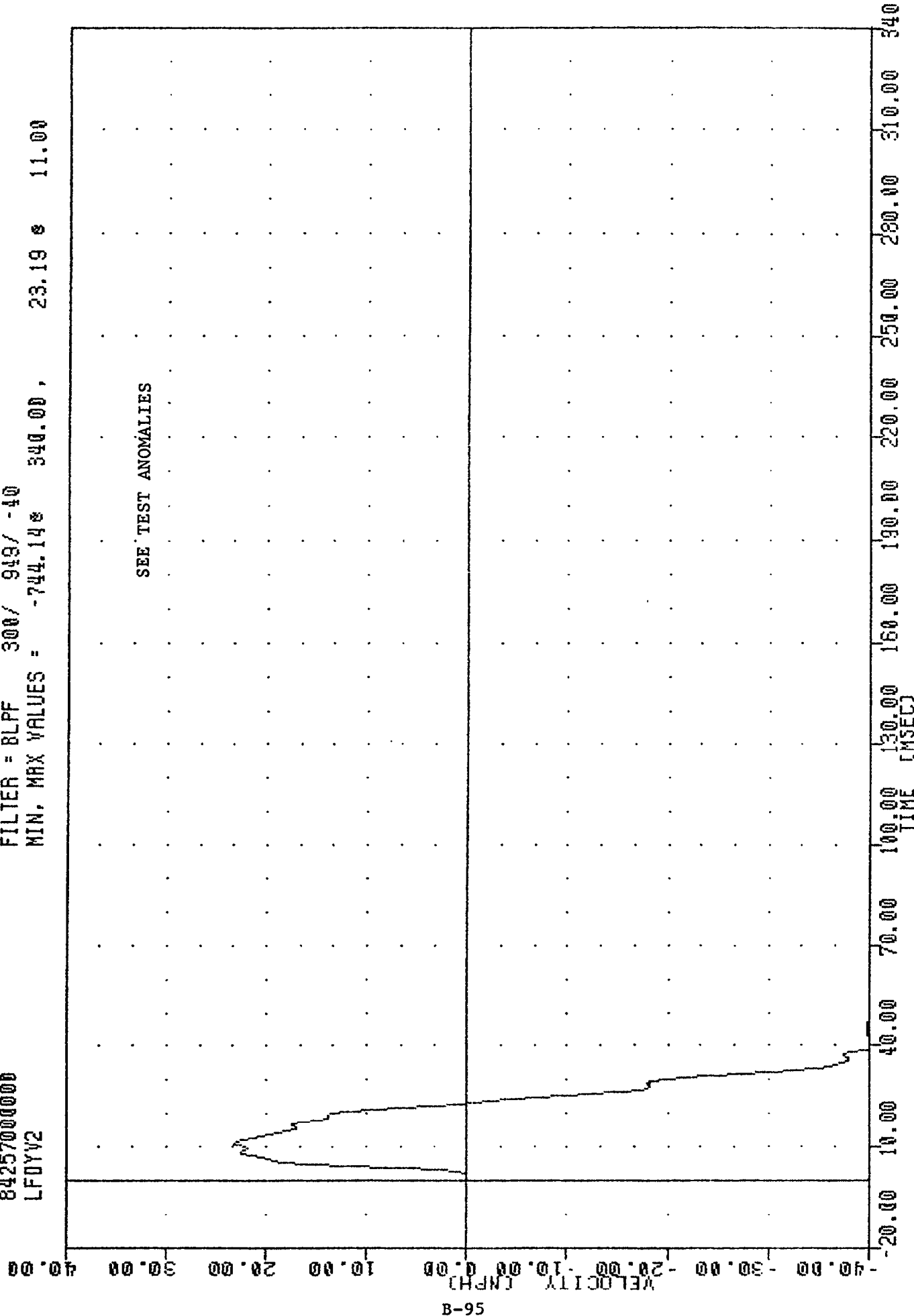
SIDE AGGRESSIVE ATTRIBUTES

84257000000

LFDYV2

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -744.14 340.00, 23.19 11.00



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING LFDY62

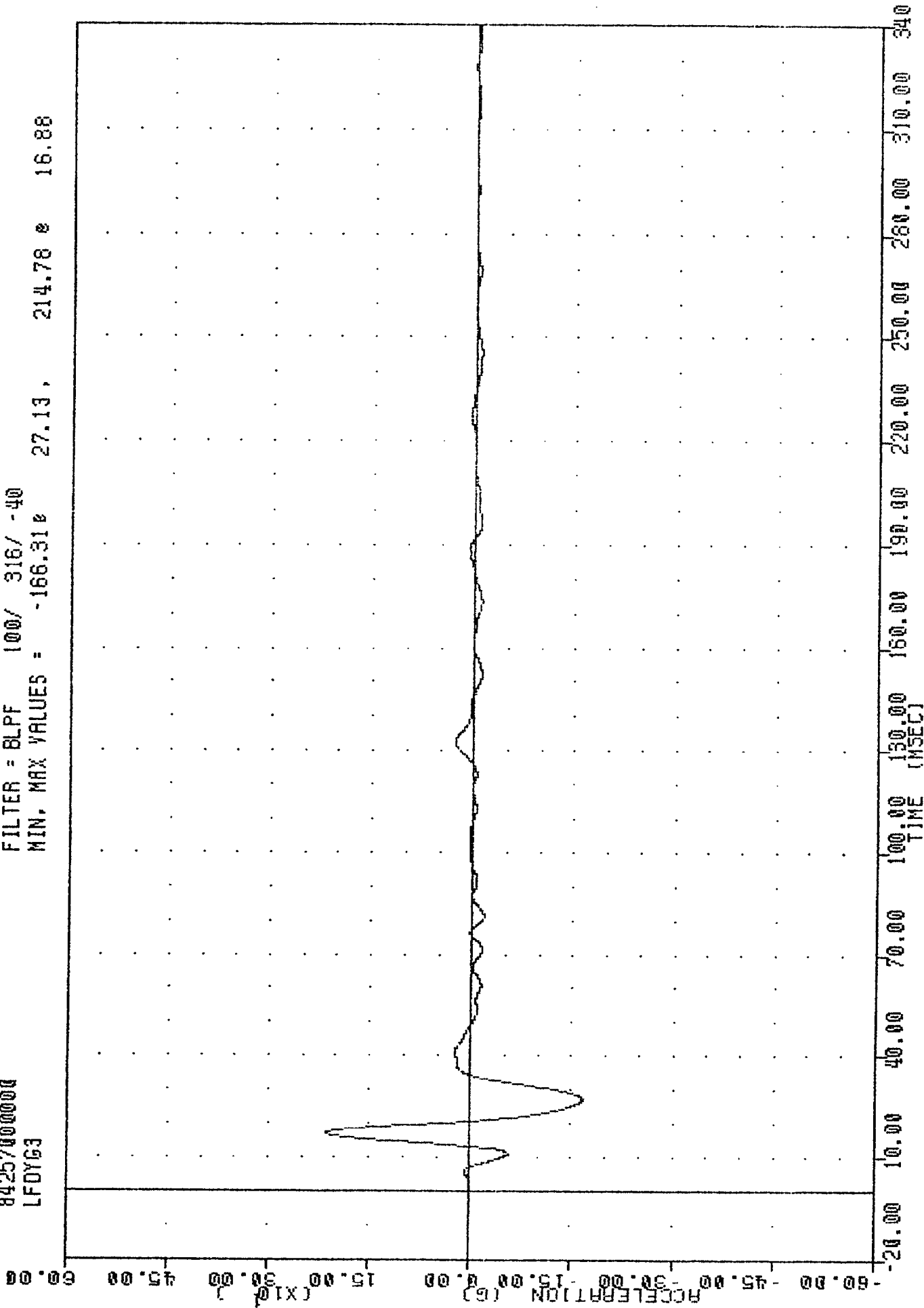
84257000000

LFDY63

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -166.31e 27.13, 214.78e 16.88

B-96



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT DOOR (POSITION 9) ACCELERATION Y AXIS

SIDE IMPRESSIVE INHIBITIVES

84257000000

LFDYV3

FILTER = BLPF

300/ 949/ -40

MIN. MAX VALUES = -17.79 339.63 ,

17.03 17.25

B-67

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

VELOCITY (MPH)

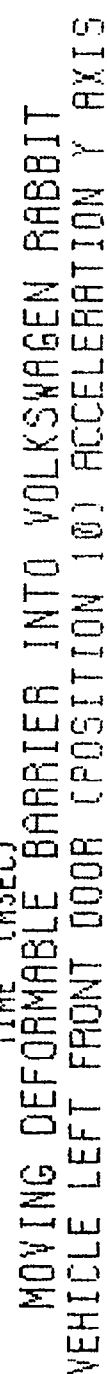
THIS DELTA V APPEARS UNREALISTIC

-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)

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFDYV3

36



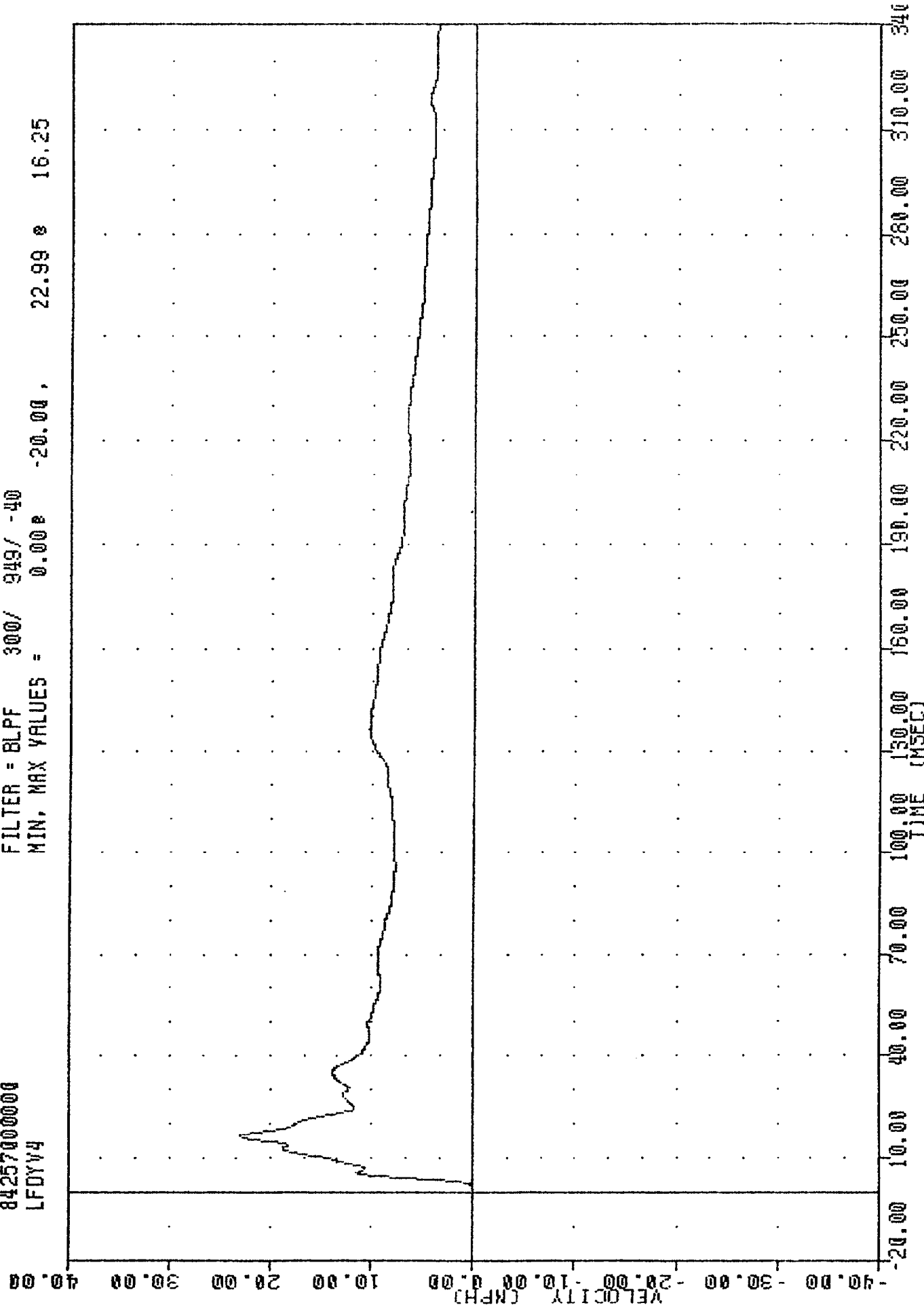
SIDE AGGRESSIVE ATTRIBUTES

84257000000

LFDYV4

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = 0.00e -20.00, 22.99 e 16.25



66-B

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFDYV4

SIDE IMPRESSIVE ATTRIBUTES

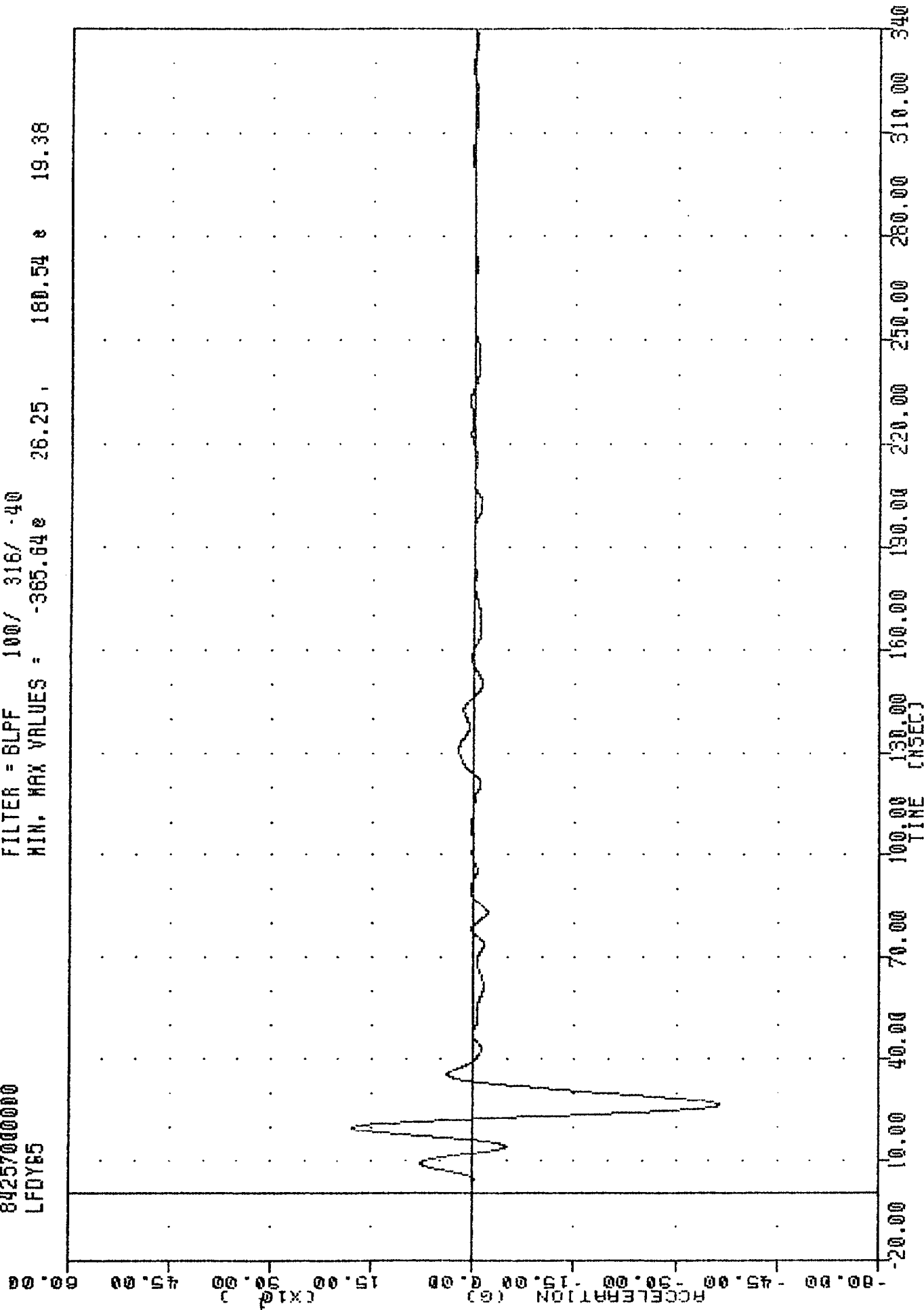
84257000000

LFDY65

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -365.64 26.25, 180.54 19.38

B-100



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT DOOR (POSITION 11) ACCELERATION Y AXIS

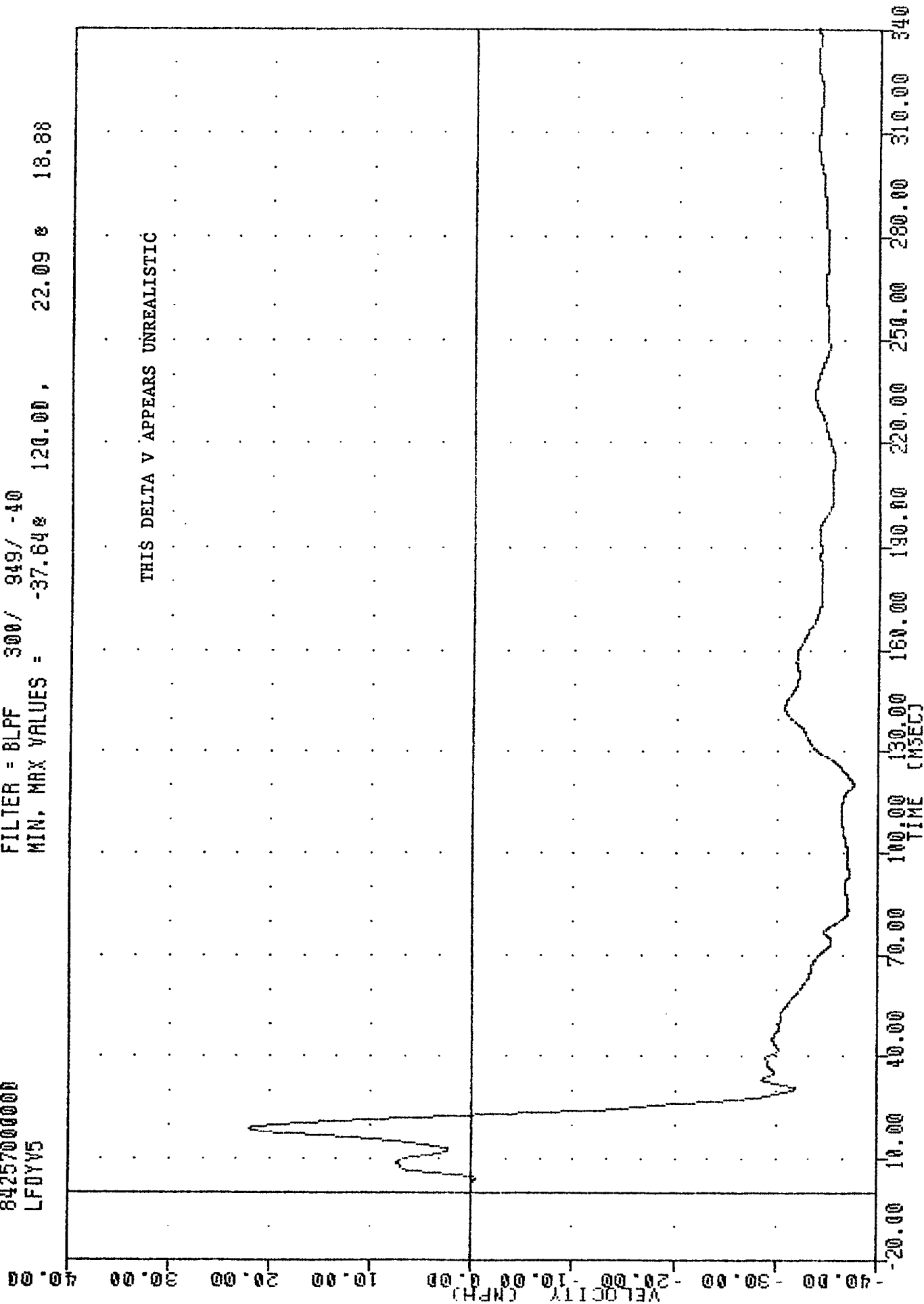
3100 IMPRESSIVE HIGHLIGHTS

84257000000

LFDYV5

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -37.64 120.00, 22.09 18.88



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING LFDYV5

SIDE INGRESSIVE ATTRIBUTES

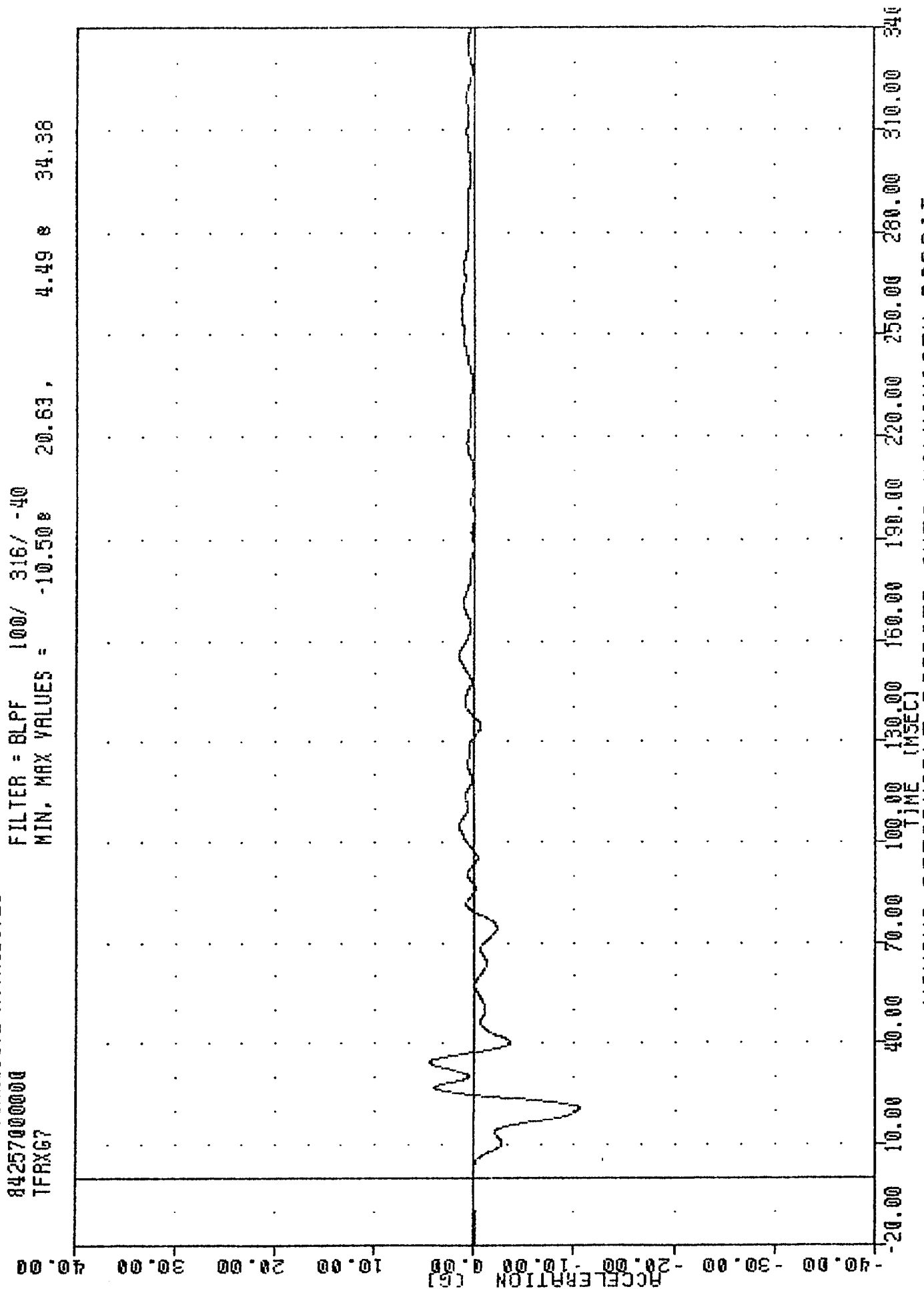
84257000000

TFRXG7

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -10.50e 20.63 ,

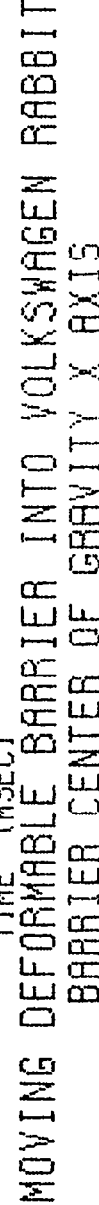
4.49 e 34.38



B-102

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE TRUNK FLOOR RIGHT ACCELERATION X AXIS

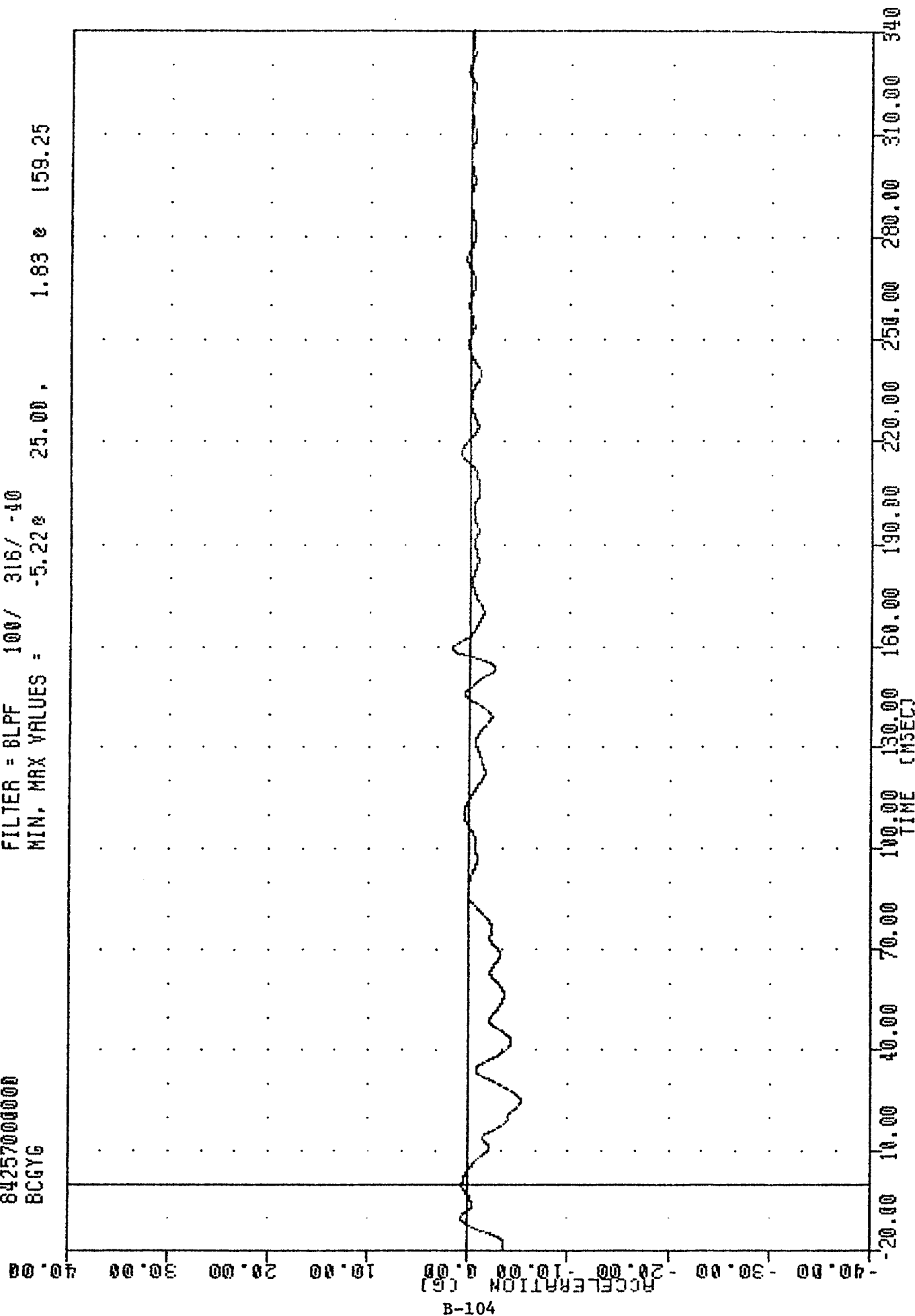
100-200000



၂၃၂

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES =	-5.228	25.00	1.838	159.25
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MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER CENTER OF GRAVITY Y AXIS

SIDE IMPRESSIVE HISTOGRAMS

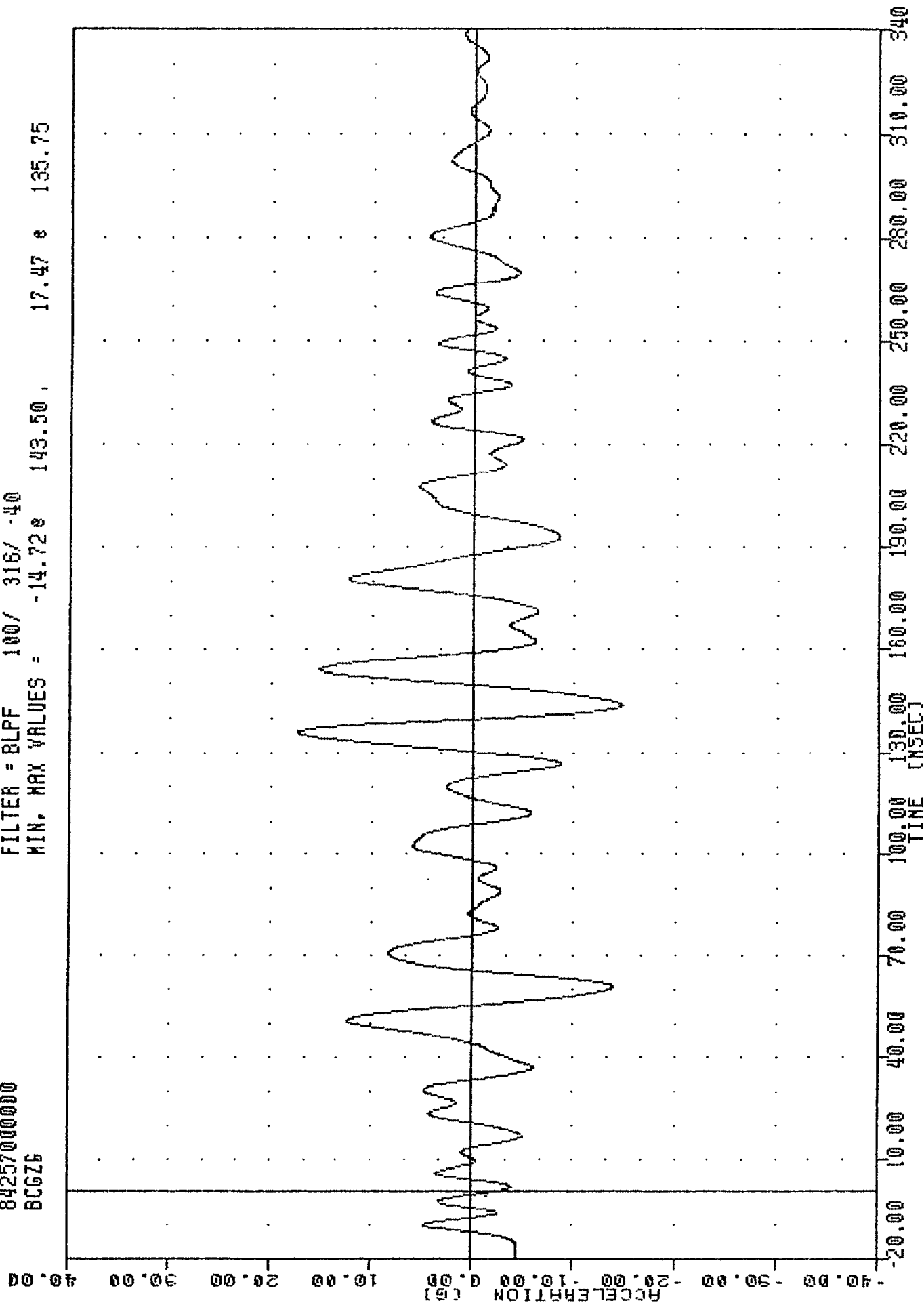
842570000000

BCGZE

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -14.72e 143.50, 17.47 e 135.75

B-105



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER CENTER OF GRAVITY Z AXIS

SIXE AGGRESSIVE MINIMQUES

84257000000

BCGRG

FILTER = BLPF

100/ 316/ -40

MIN. MAX VALUES =

0.04e

318.00.

17.53 e

135.75

70.00

60.00

50.00

40.00

30.00

20.00

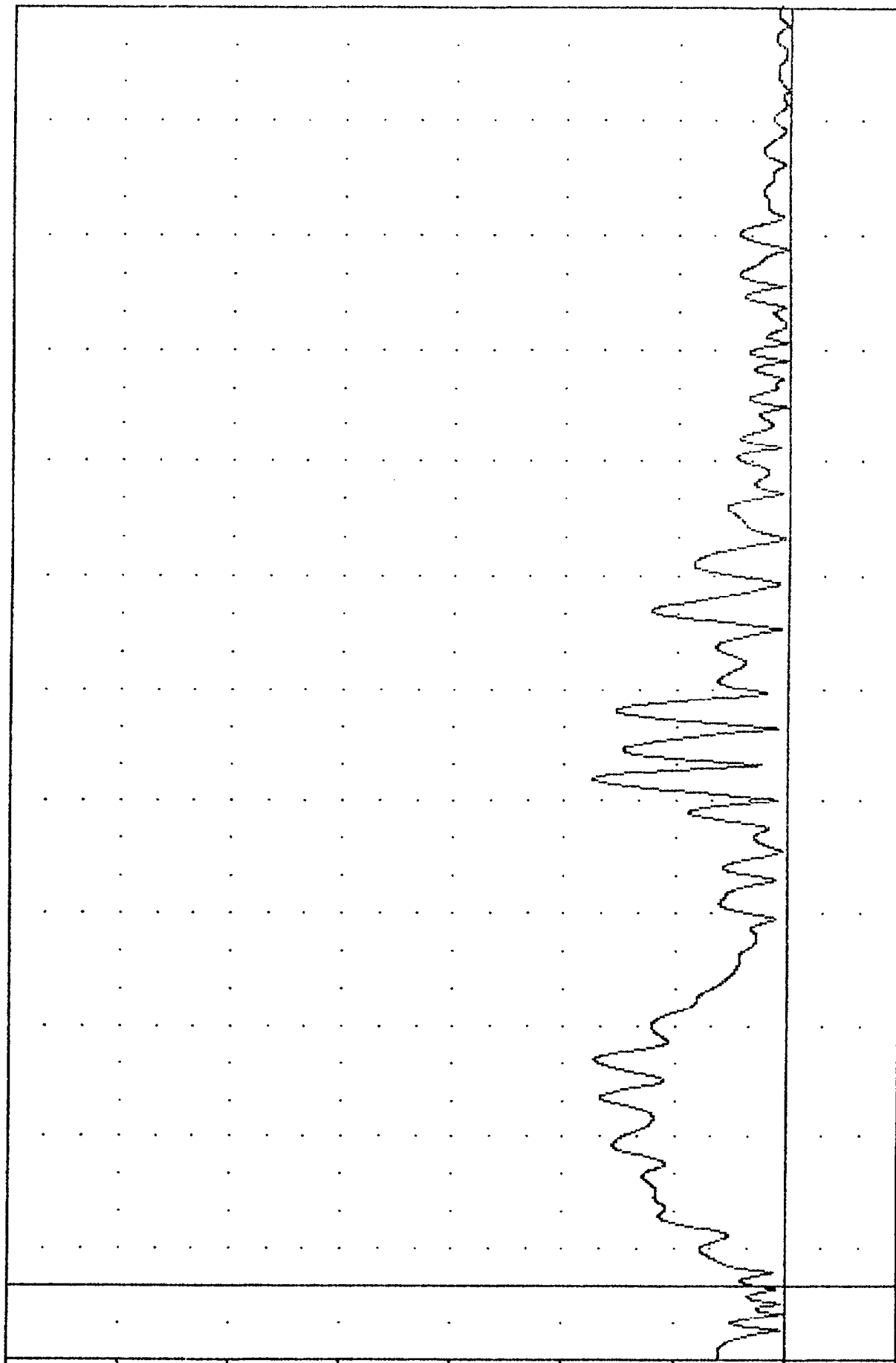
10.00

0.00

-10.00

B-106

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

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

BARRIER CG RESULTANT

DATE TIME LOCATION

842570000000

BCGXY

FILTER = BLPF

300/

949/

40

MIN. MAX VALUES =

17.50s

108.38,

35.00 s

-1.00

B-107

VELOCITY (MPH)

-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

TIME (MSEC)

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING BCGXG

SIDE AGGRESSIVE ATTRIBUTES

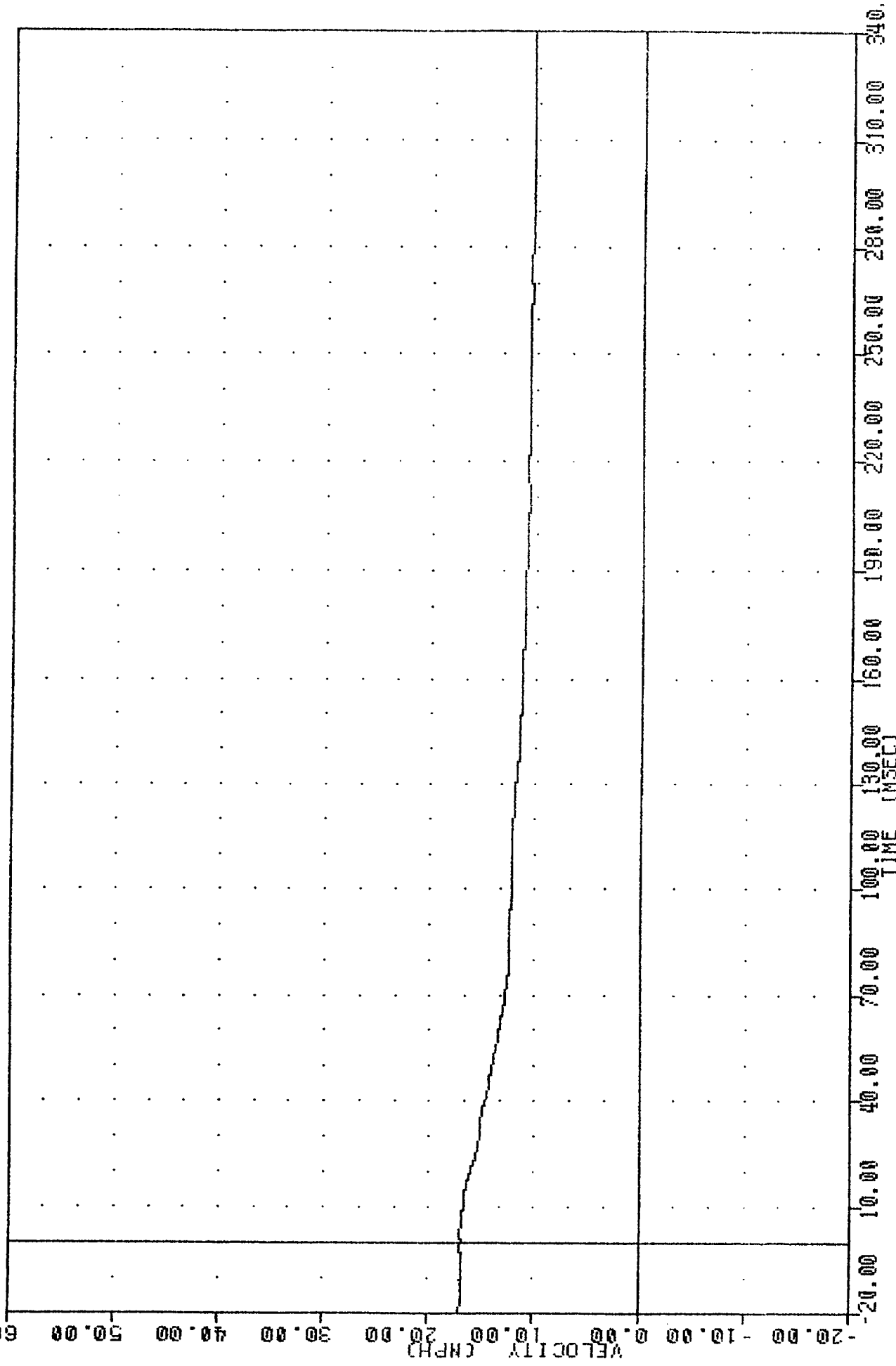
84257000000

BCGY

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = 10.44e 339.50, 17.10 e -20.00

B-108



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING BCGYG

84257000000

BFCXG

FILTER = BLPF 100/ 316/ -40

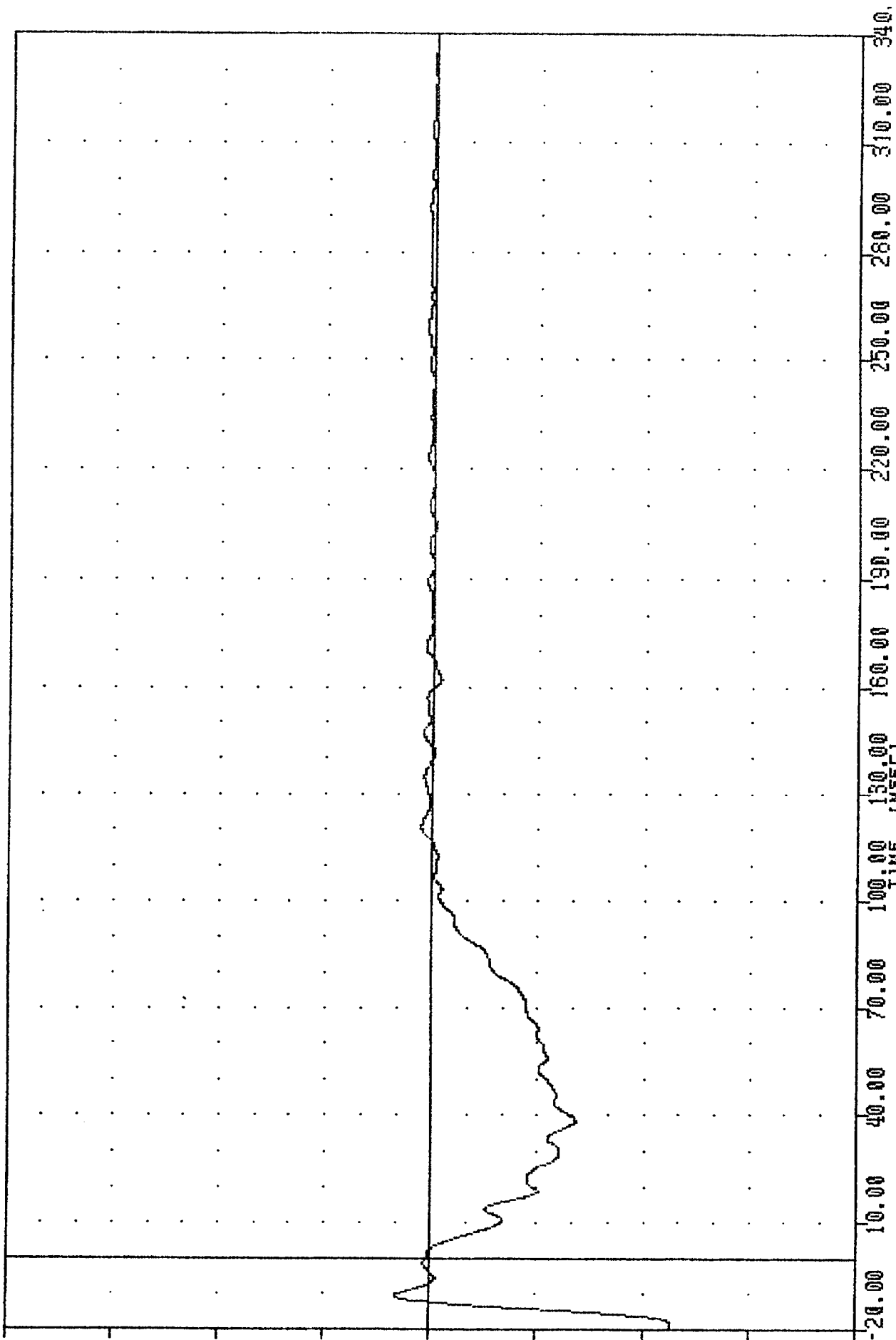
MIN, MAX VALUES = -22.59 3.28 -10.88

B-109

ACCELERATION (G)

TIME (MSEC)

MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER FRONT CROSSMEMBER ACCELERATION X AXIS



DATE RECORDED: 11/11/88

84257000000

BFCXV

FILTER = BLPF

300/ 949/ -10

MIN, MAX VALUES =

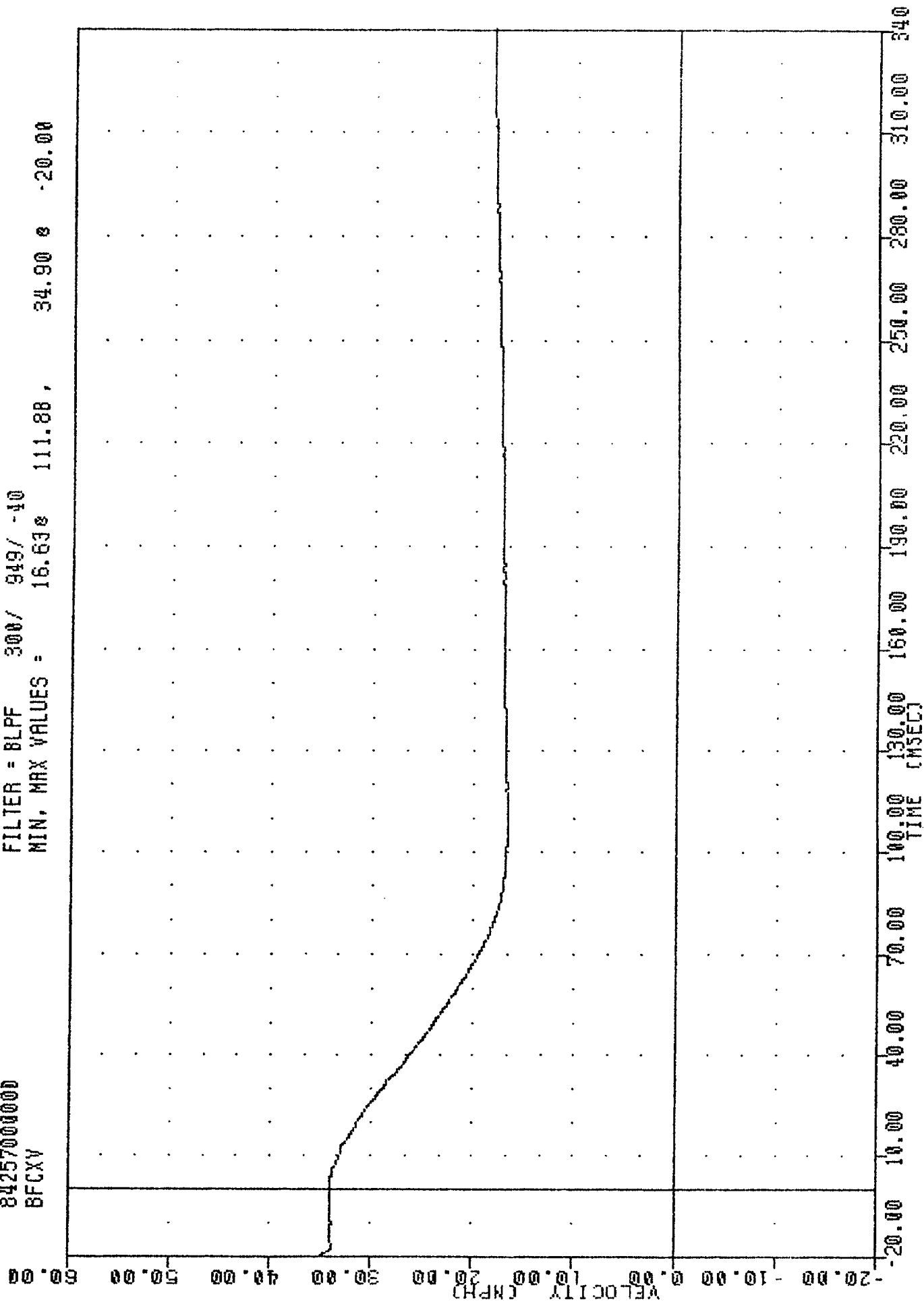
16.63e

111.88,

34.90 e

-20.00

B-110



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING BFCXG

842570000000

842570000000

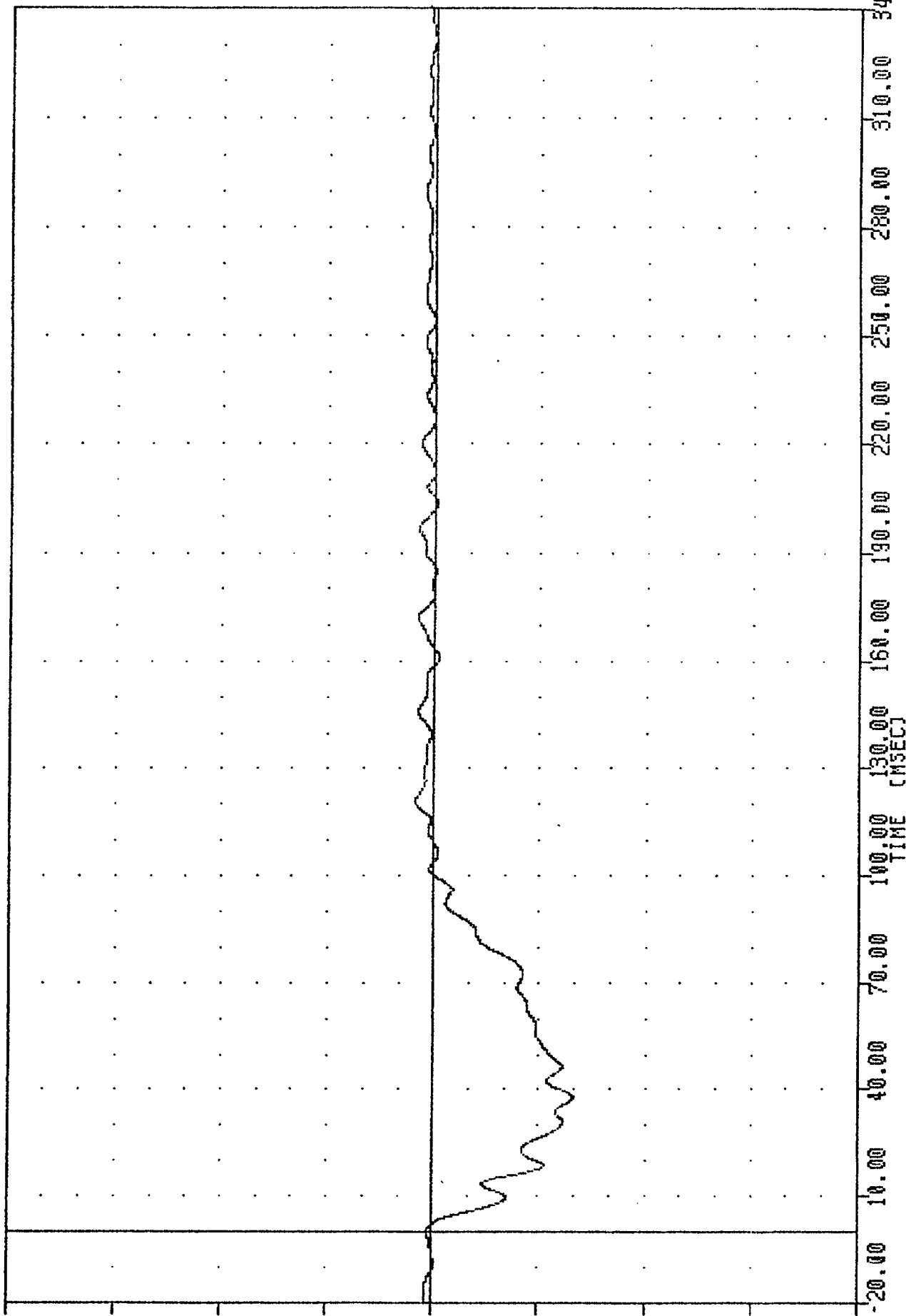
BRCXG

FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = -13.23 37.75, 1.72 120.63

ACCELERATION (G)

B-111



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER REAR CROSSMEMBER ACCELERATION X AXIS

SIDE IMPRESSIVE MINIMITIES

84257000000

BRCXY

FILTER = BLPF

300/ 949/ -40

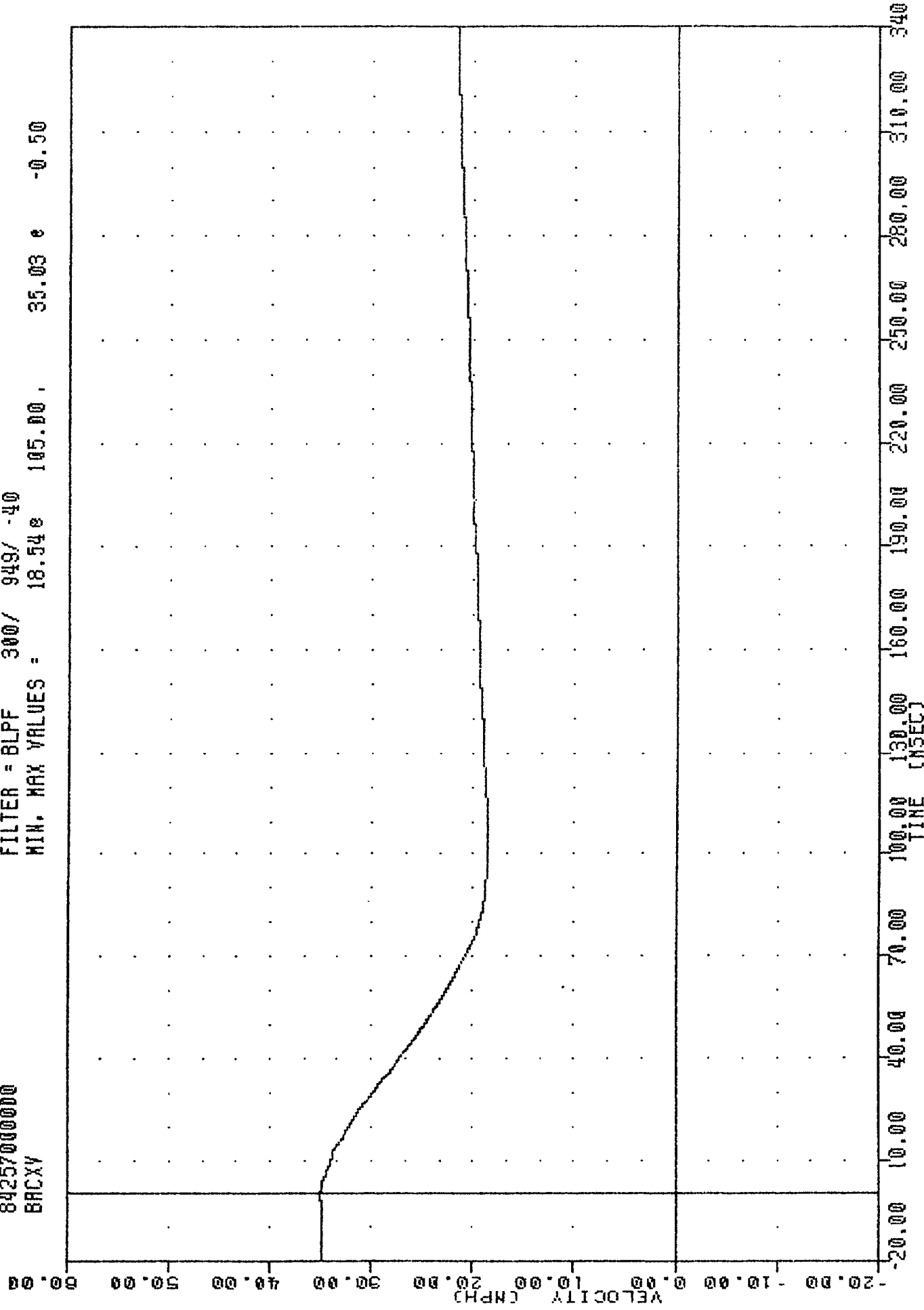
MIN. MAX VALUES =

18.54e

105.00

35.03 e -0.50

B-112

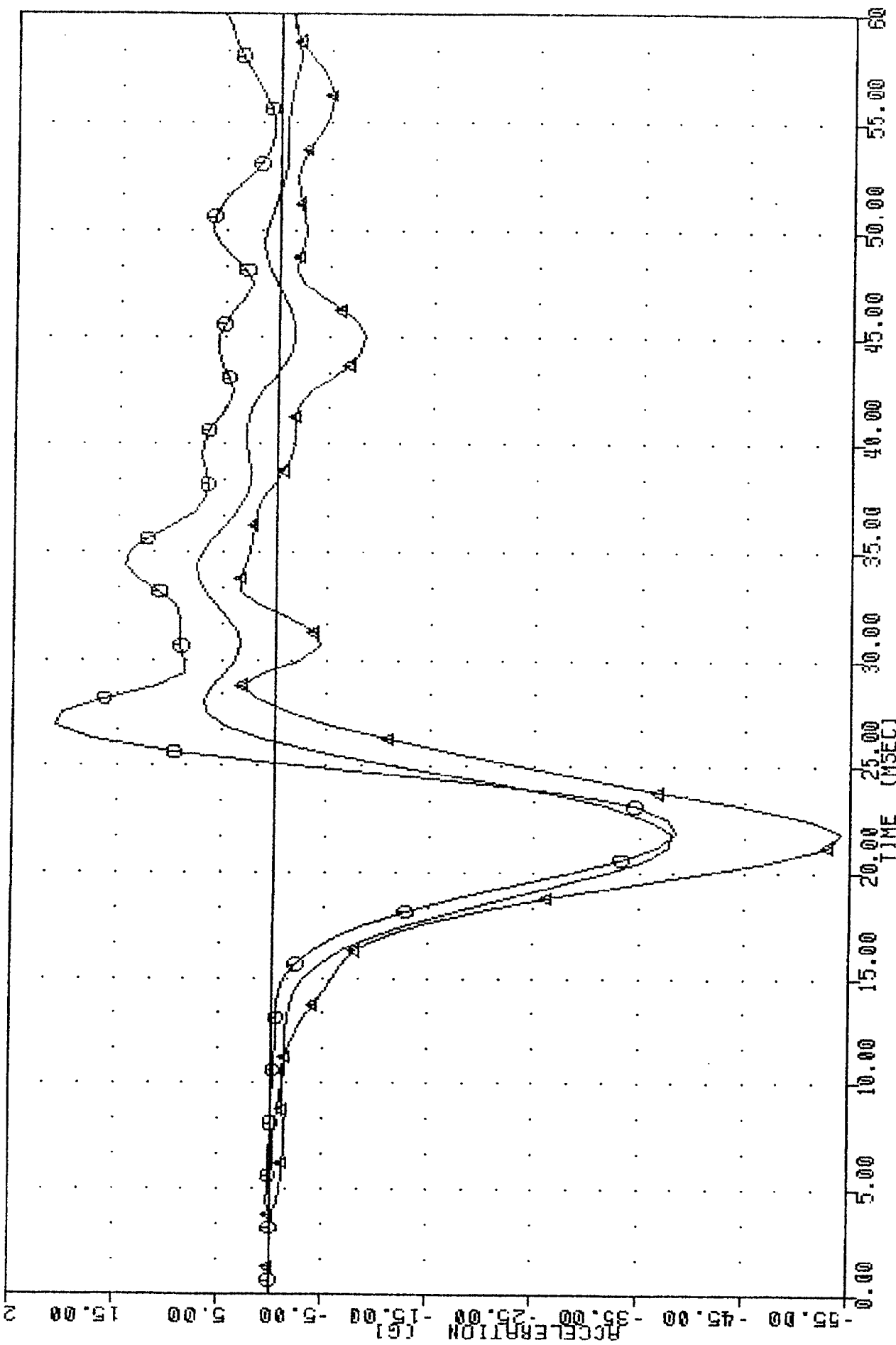


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING BRCXG

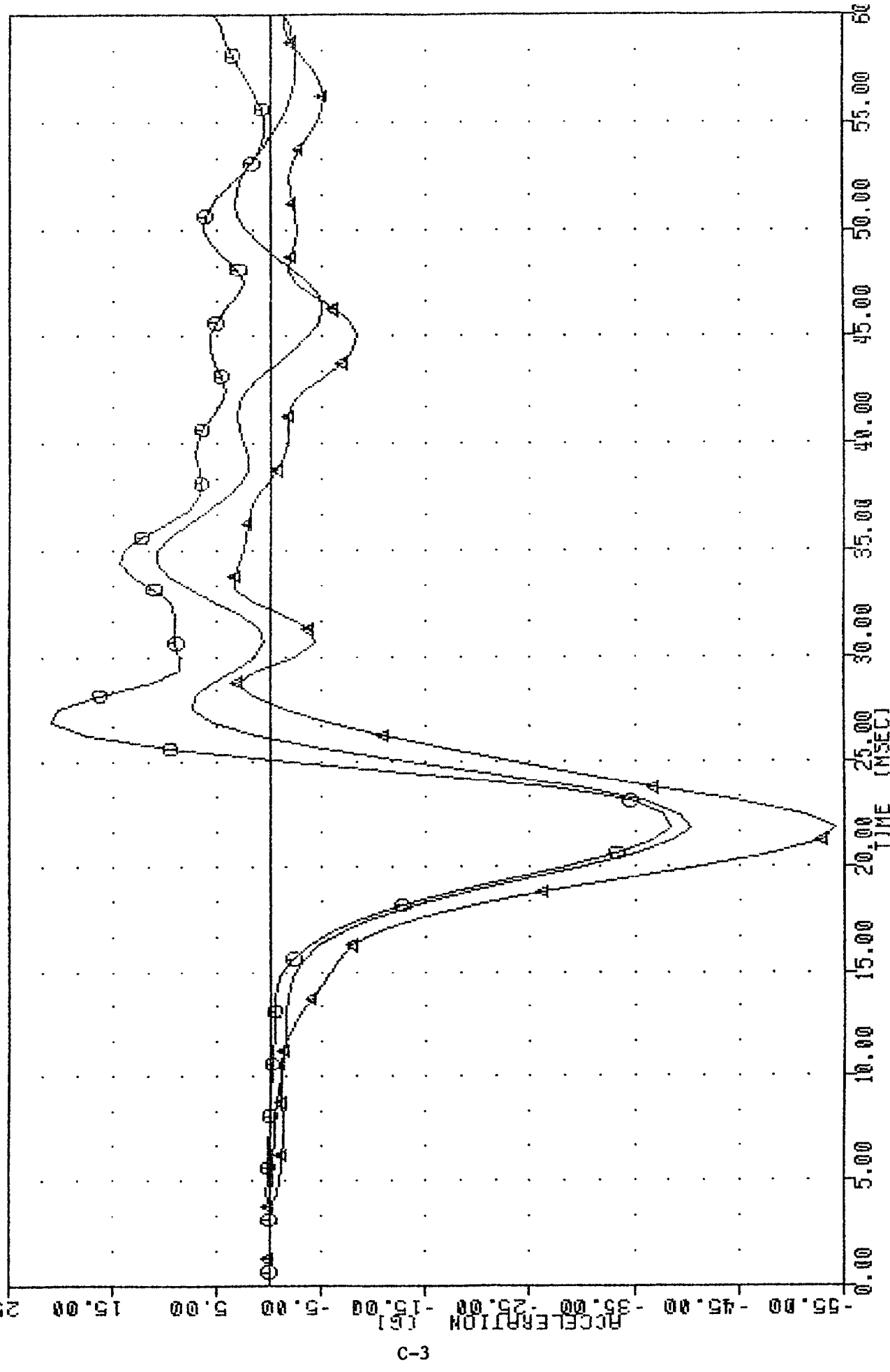
APPENDIX C
DUMMY CERTIFICATION

UNIT 161
 MN-250
 MN-250
 FILTER = HSRI
 FILTER = HSRI
 FILTER = HSRI
 136/ 189/ -50
 136/ 189/ -50
 136/ 189/ -50
 MIN, MAX =
 MIN, MAX =
 MIN, MAX =
 -38.09
 -38.44
 -54.08
 21.25
 21.25
 21.25
 7.51
 20.92
 3.31
 33.7
 26.2
 33.1



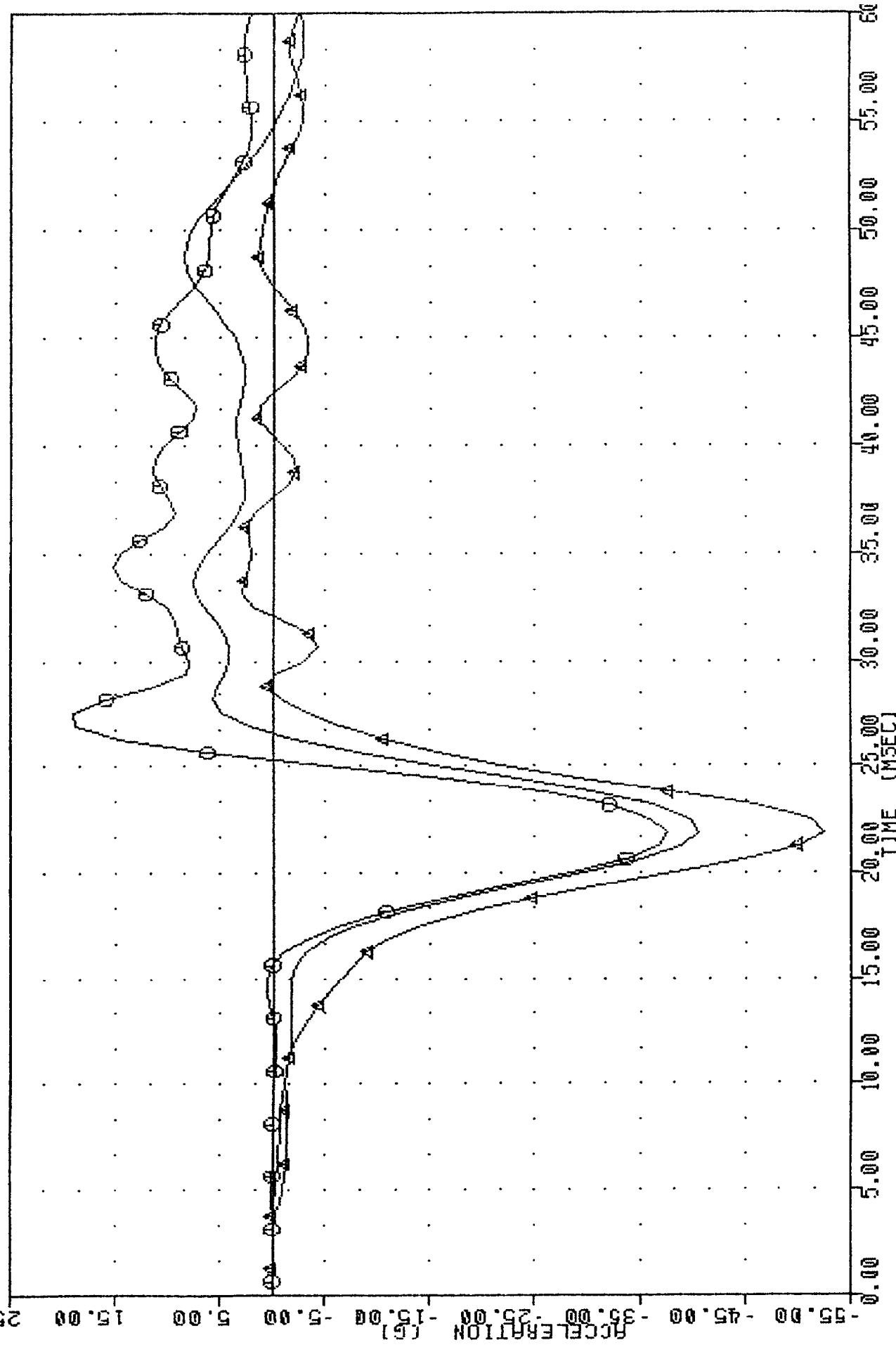
SIDE IMPACT TEST (0006)
 LEFT UPPER RIB ACCELERATION Y AXIS - 1

LURYGA	136/	189/	50	MIN, MAX =	-40.37	21.25	10.69e	33.75
MN-2SD	136/	189/	50	MIN, MAX =	-38.44	21.25	20.92e	36.25
MN-2SD	136/	189/	50	MIN, MAX =	-54.08	21.25	3.31e	33.13



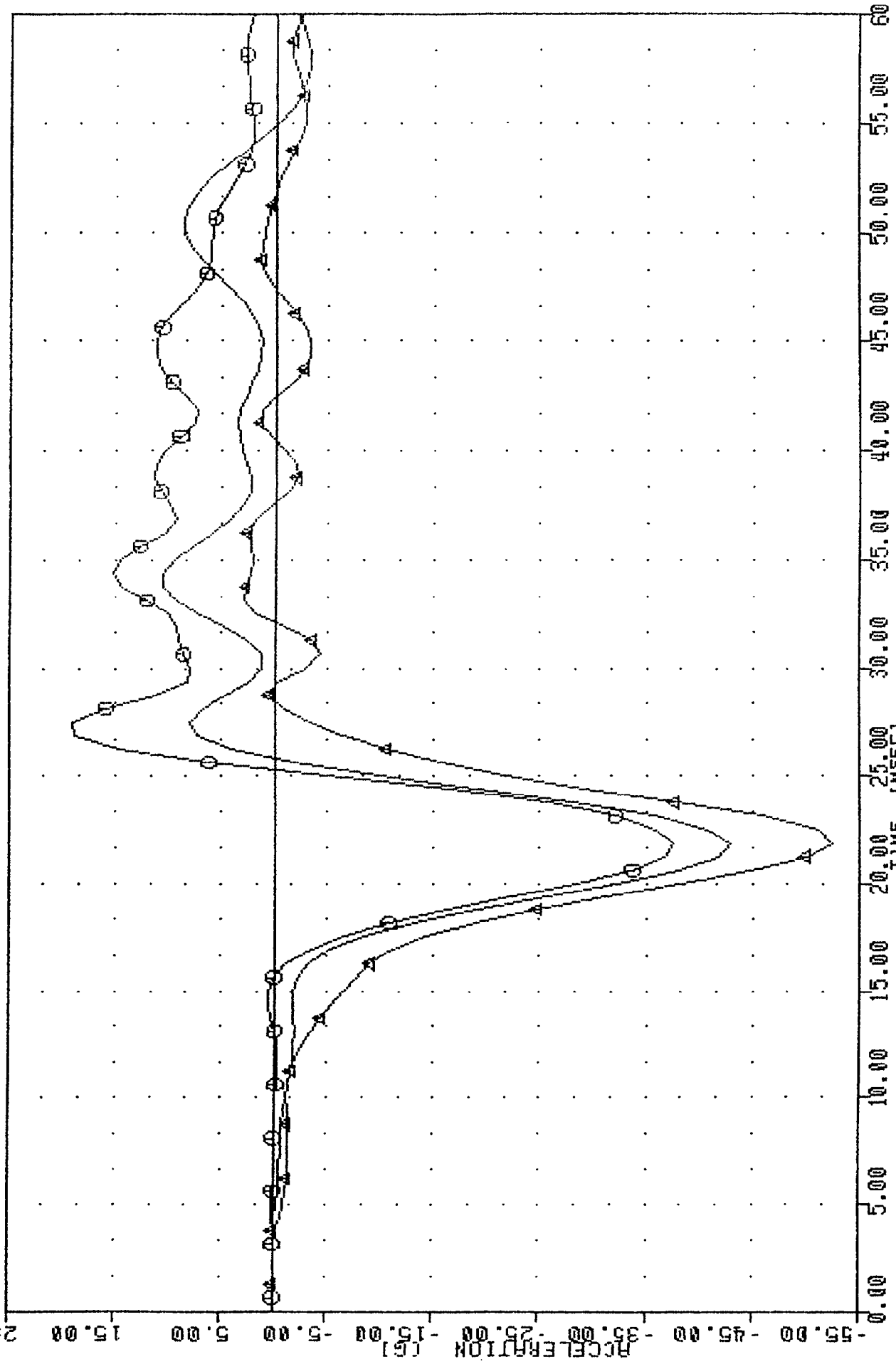
SIDE IMPACT TEST (0006)
LEFT UPPER RIB ACCELERATION Y AXIS - A

LLRYGI FILTER = HSRI 136/ 189/ -50 MIN, MAX = -40.85 8 21.25 48.13
 MN-2SD FILTER = HSRI 136/ 189/ -50 MIN, MAX = -37.68 8 21.25 28.87
 MN-2SD FILTER = HSRI 136/ 189/ -50 MIN, MAX = -52.52 8 21.25 32.50



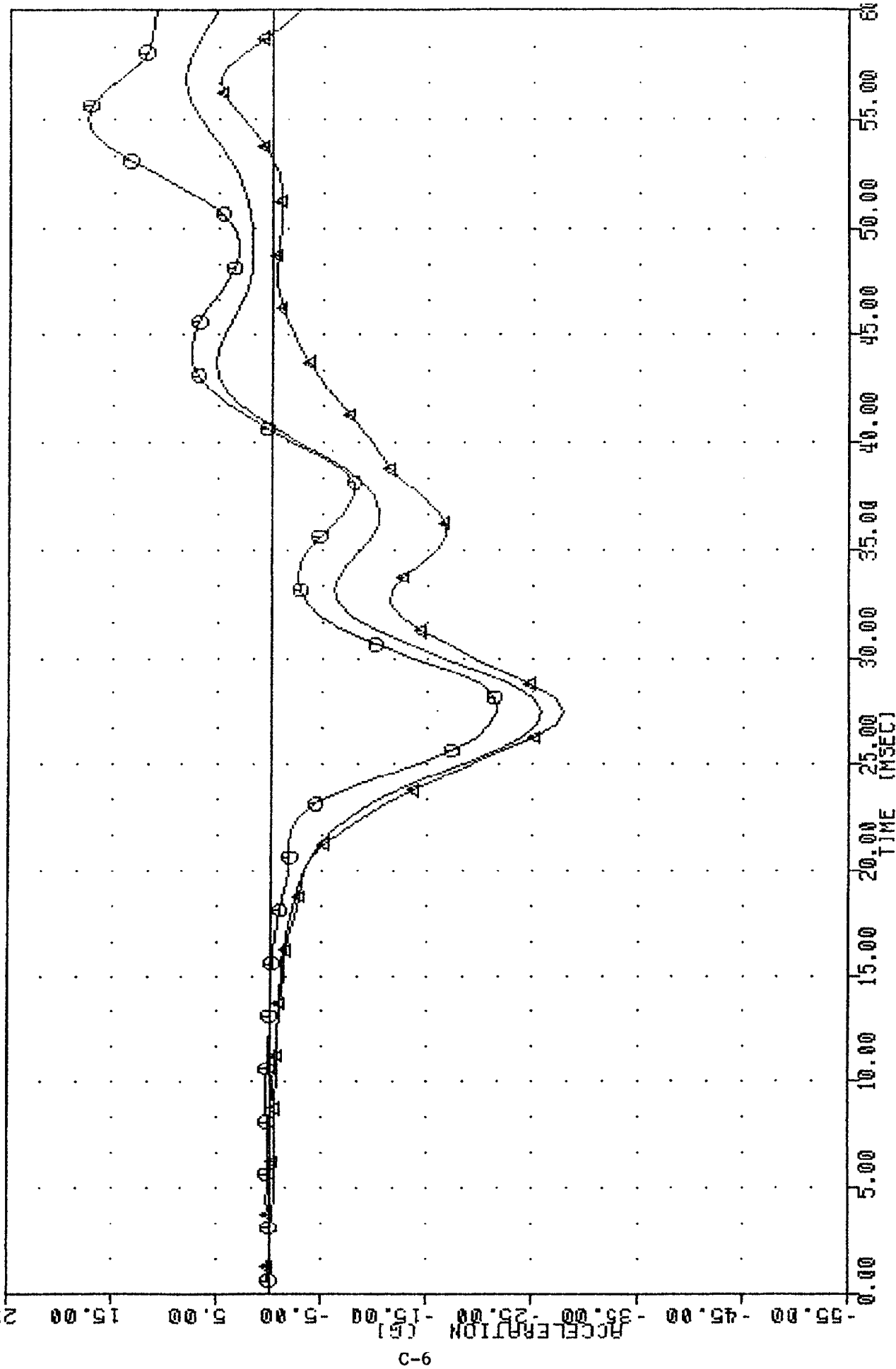
SIDE IMPACT TEST (0006)
 LEFT LOWER RIB ACCELERATION Y AXIS - 1

LLN16M	FILTER = H3RI	136/	189/	-50	MIN, MAX =	-43.01	0	21.25,	10.47	33.73
MN-2SD	FILTER = H3RI	136/	189/	-50	MIN, MAX =	-37.66	0	21.25,	10.47	26.87
MN-2SD	FILTER = H3RI	136/	189/	-50	MIN, MAX =	-52.52	0	21.25,	2.94	32.50

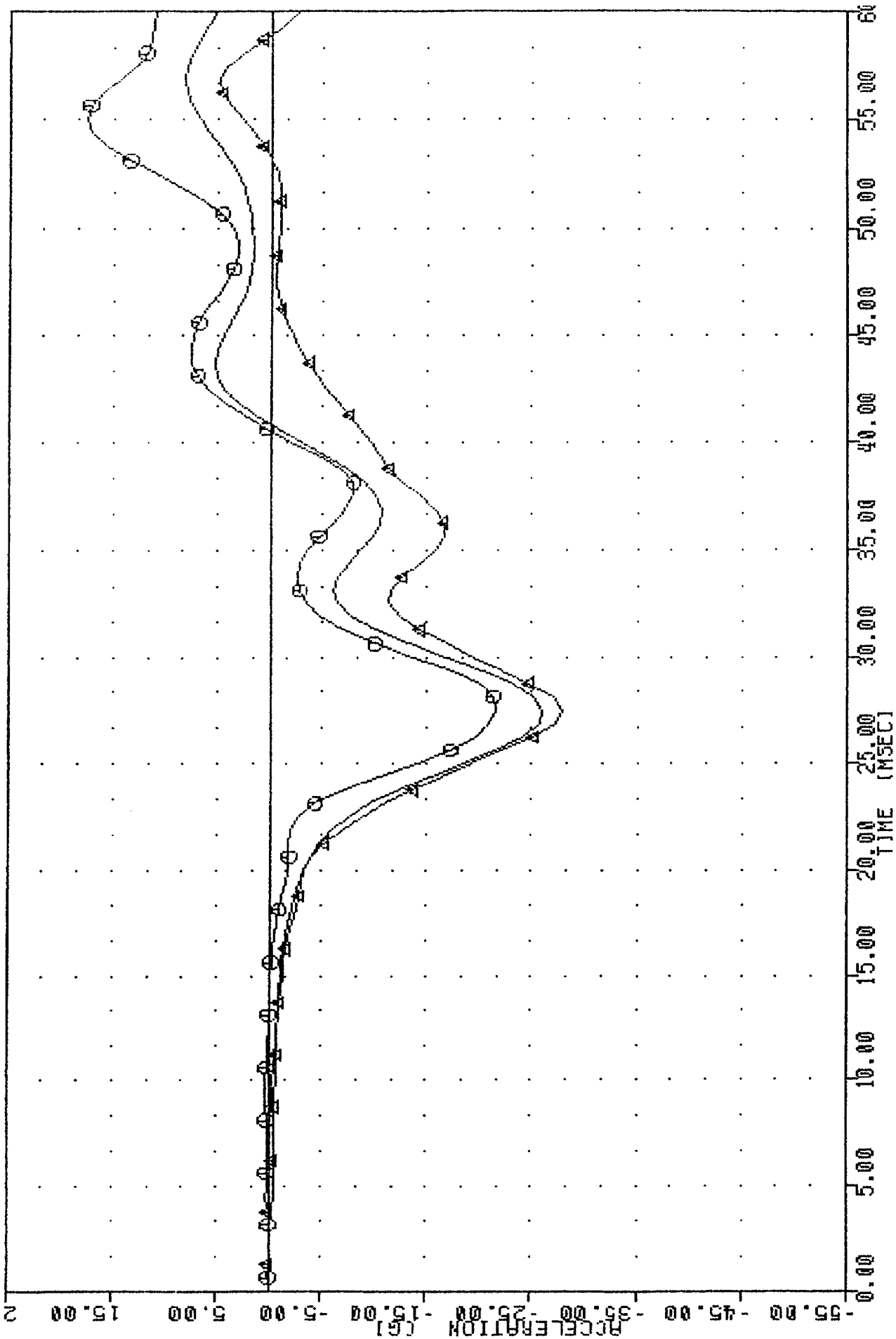


SIDE IMPACT TEST (006)
LEFT LOWER RIB ACCELERATION Y AXIS - A

TO1YGI	FILTER = HSRI	136/	189/	-50	MIN, MAX =	-25.79	26.87	8.19e	56.2
MN-2SD	FILTER = HSRI	136/	189/	-50	MIN, MAX =	-21.58	26.87	17.54e	54.3
MN-2SD	FILTER = HSRI	136/	189/	-50	MIN, MAX =	-27.91	26.87	4.78e	56.2

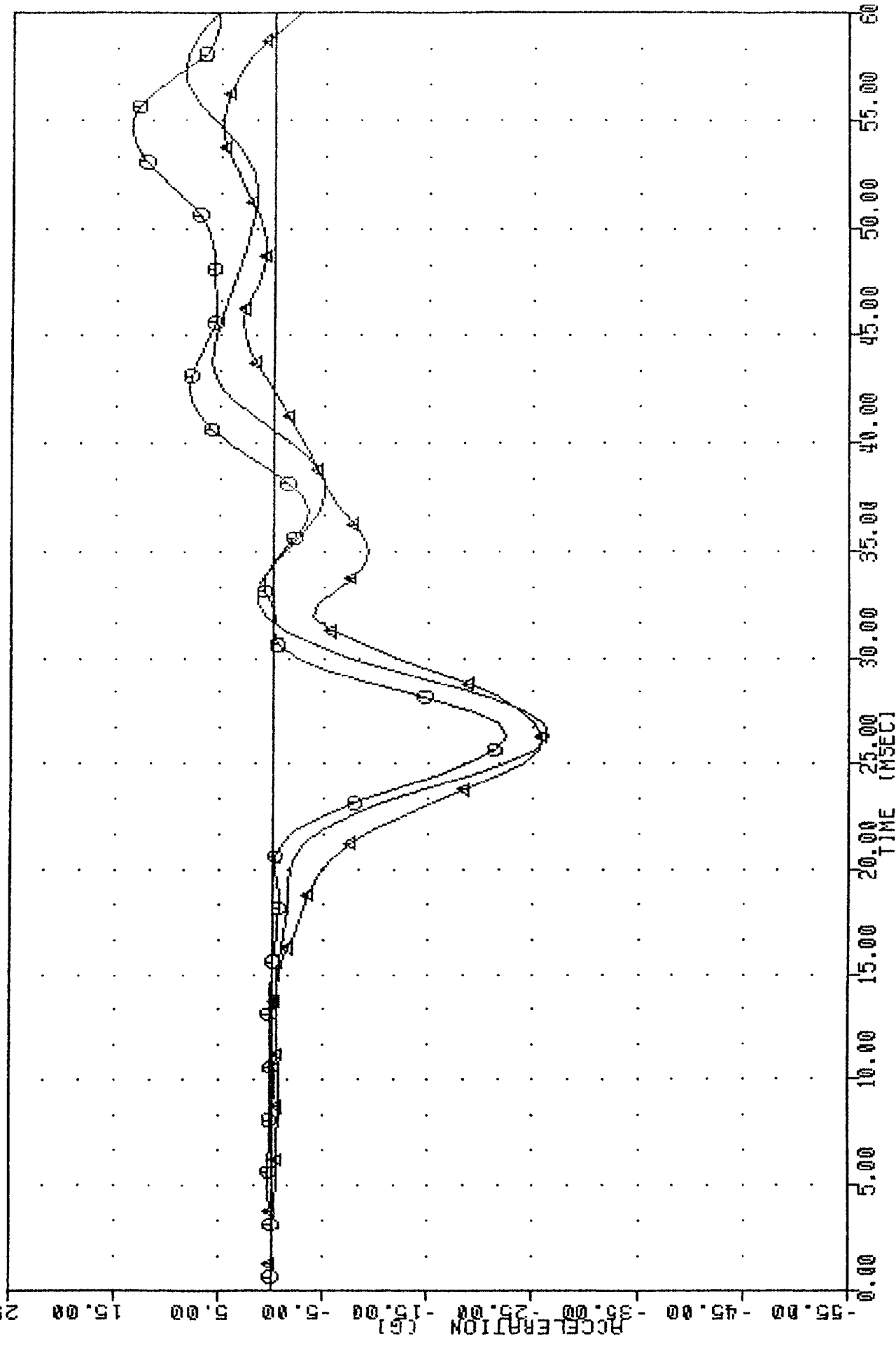


T01YGA	FILTER = HSRI	136/	189/	-50	MIN, MAX =	-26.08	8	26.87,	8.22	56.2
MN-23D	FILTER = HSRI	136/	189/	-50	MIN, MAX =	-21.58	8	26.87,	17.54	54.3
MN-25D	FILTER = HSRI	136/	189/	-50	MIN, MAX =	-27.91	8	26.87,	4.78	56.2



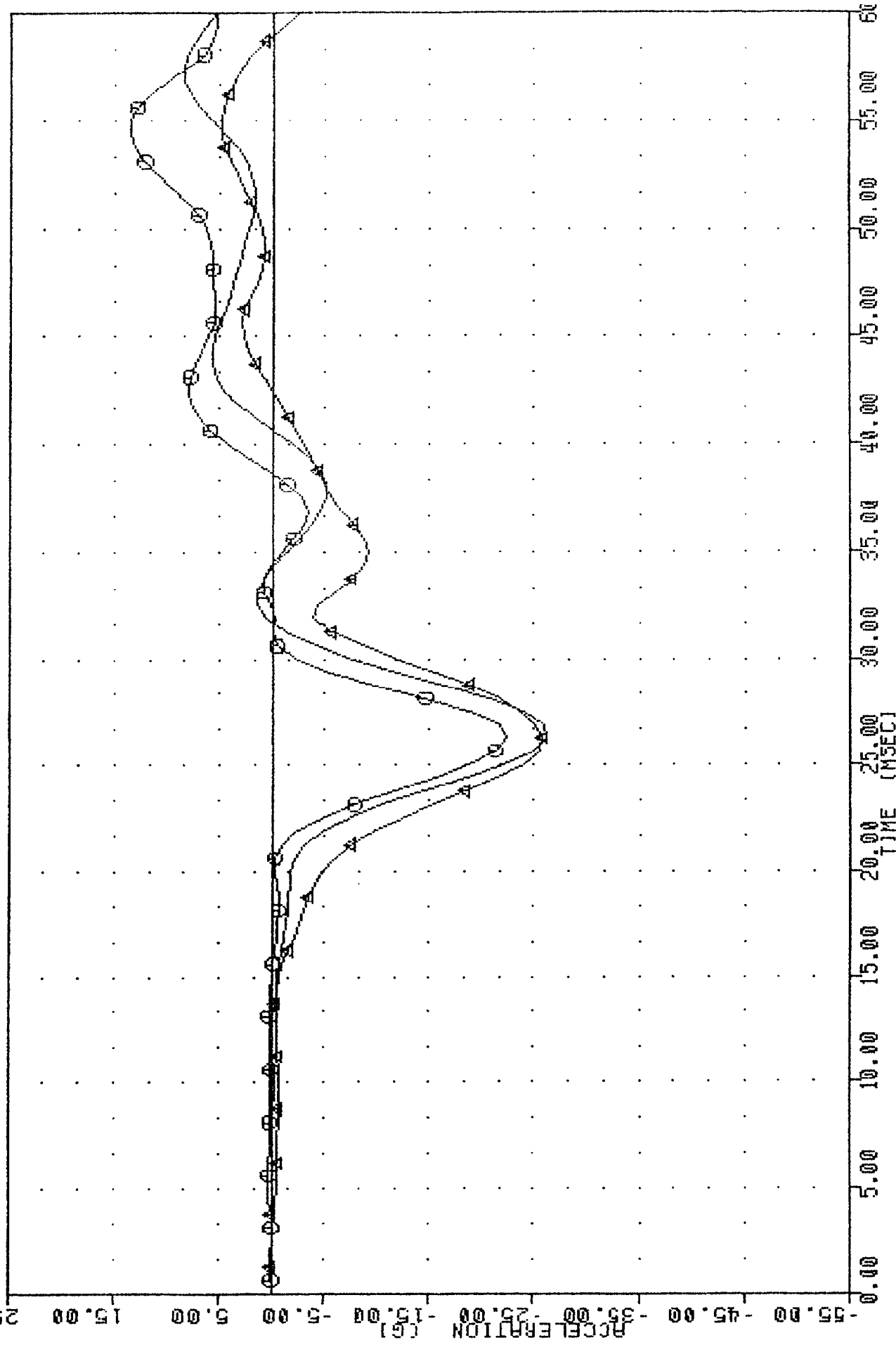
T12Y61
 MN-2SD O
 MN-2SD A

FILTER = HSRI	136/	189/	-50	MIN, MAX =	-26.37	8	25.63,	8.498	56.87
FILTER = HSRI	136/	189/	-50	MIN, MAX =	-22.37	8	25.63,	13.548	53.75
FILTER = HSRI	136/	189/	-50	MIN, MAX =	-25.84	8	25.63,	4.858	53.75



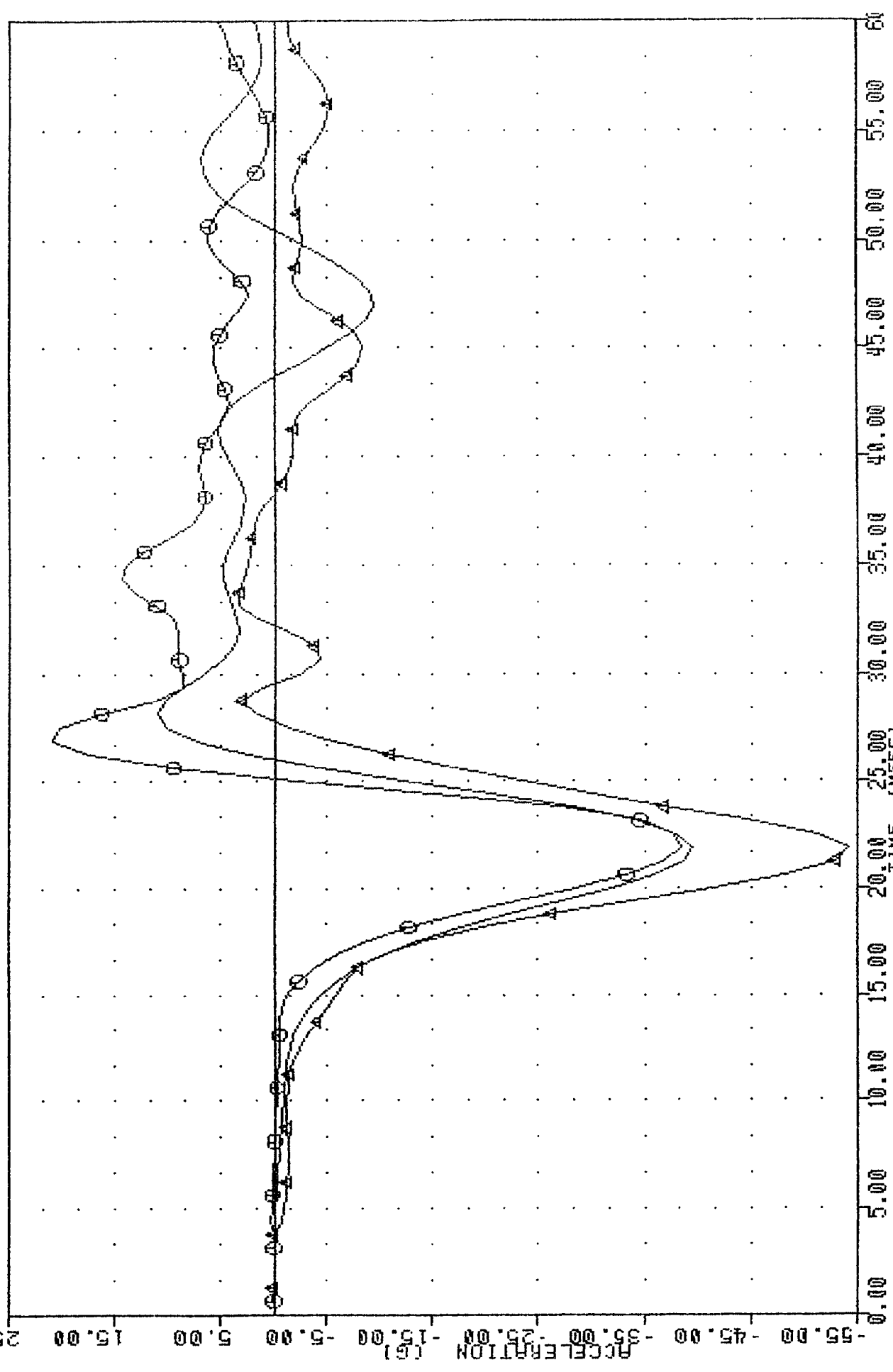
SIDE IMPACT TEST (006)
 LOWER SPINE ACCELERATION Y AXIS - 1

T12YGR	FILTER : HSRI	136/	189/	-50	MIN, MAX =	-26.19	0	8.43	56.87
MN-2SD	FILTER : HSRI	136/	189/	-50	MIN, MAX =	-22.37	0	13.54	53.75
MN-2SD	FILTER : HSRI	136/	189/	-50	MIN, MAX =	-25.84	0	4.85	53.75



SIDE IMPACT TEST (0006)
LOWER SPINE ACCELERATION Y AXIS - A

LKYG1	FILTER = HSRI	136/	189/	-50	MIN, MAX =	-39.59	8	21.25	10.96	27.50
MN-250	FILTER = HSRI	136/	189/	-50	MIN, MAX =	-38.44	8	21.25	20.92	26.25
MN-250	FILTER = HSRI	136/	189/	-50	MIN, MAX =	-54.08	8	21.25	3.31	33.13



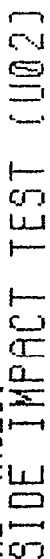
SIDE IMPACT TEST (U02)
LEFT UPPER RIB ACCELERATION Y AXIS - 1

551
599

07-1681	1961
05-1681	1961
04-1681	1961

॥ ॐ नमो भगवते वासुदेवाय ॥
 ॥ श्रीगणेशाय नमः ॥
 ॥ श्रीकृष्णाय नमः ॥
 ॥ श्रीरामाय नमः ॥

SECRET



LEFT UPPER RIB ACCELERATION Y AXIS - A

LLMY61
 MN-2SD O
 MN-2SD A

FILTER = HSRI
 FILTER = HSRI
 FILTER = HSRI

136/ 189/ -50
 136/ 189/ -50
 136/ 189/ -50

MIN. MAX =
 MIN. MAX =
 MIN. MAX =

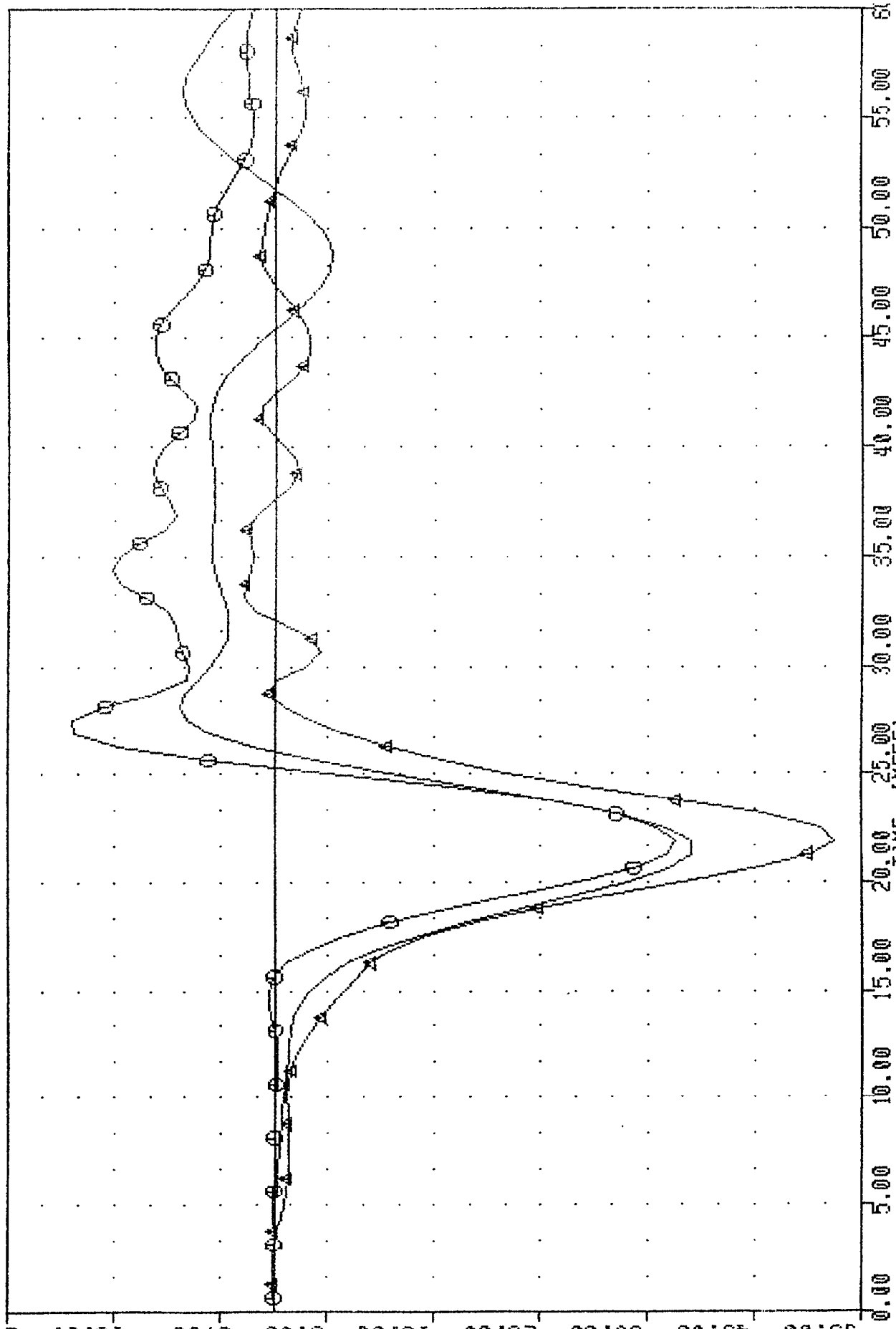
21.25,
 21.25,
 21.25,

8.798
 19.008
 2.948

27.51
 26.81
 32.51

ACCELERATION (G)
 25.00
 15.00
 5.00
 -5.00
 -15.00
 -25.00
 -35.00
 -45.00
 -55.00

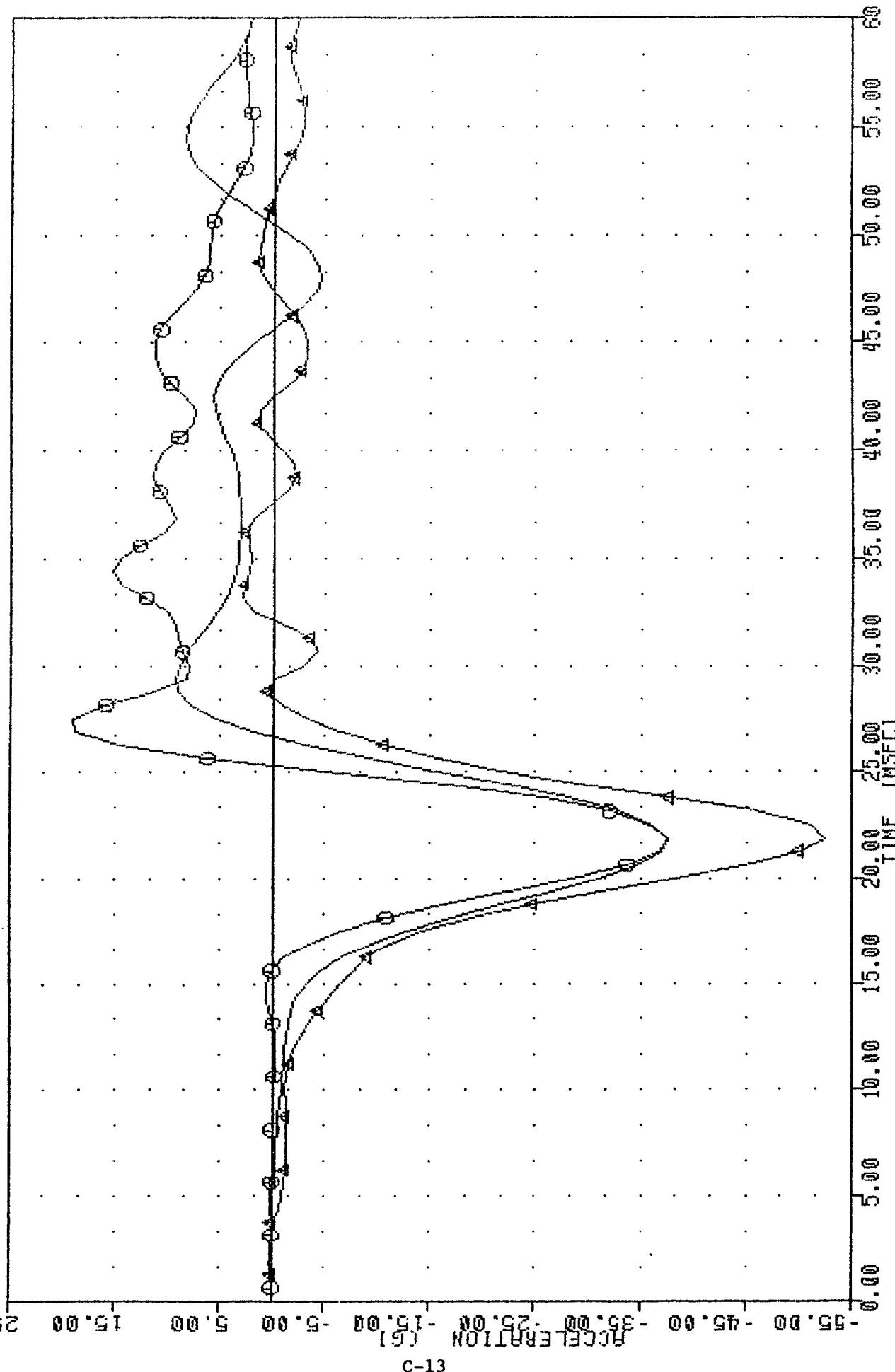
C-12



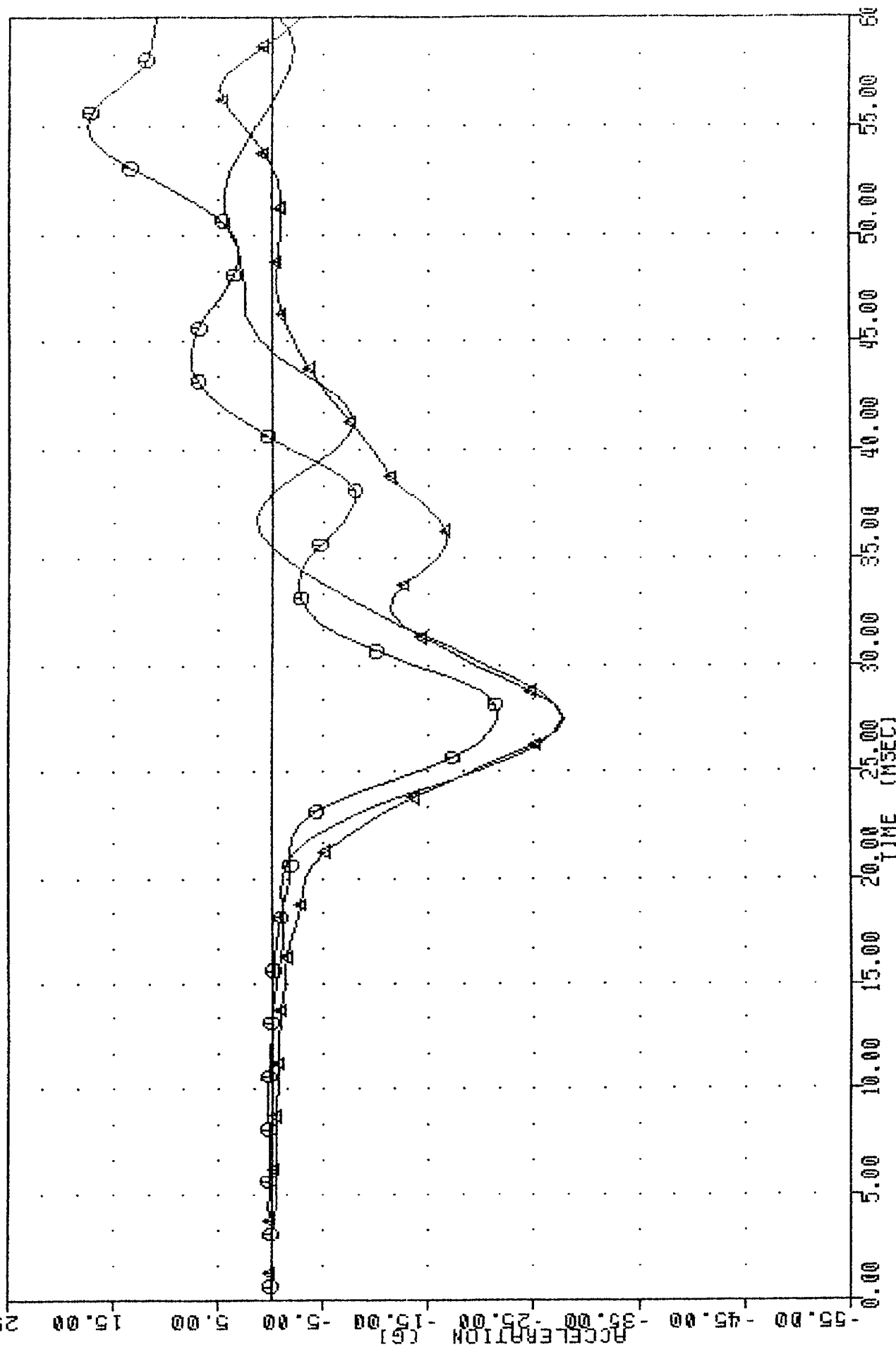
SIDE IMPACT TEST (U02)

LEFT LOWER RIB ACCELERATION Y AXIS - 1

LLN160	FILTER = NONE	130/	103/	MIN, MAX =	-37.04	8.27	28.75
MN-250	FILTER = HSRI	136/	189/	MIN, MAX =	-37.68	19.00	36.37
MN-250	FILTER = HSRI	136/	189/	MIN, MAX =	-52.52	2.94	32.50

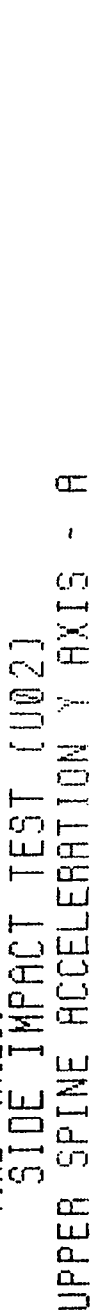


SIDE IMPACT TEST (U02)
LEFT LOWER RIB ACCELERATION Y AXIS - A

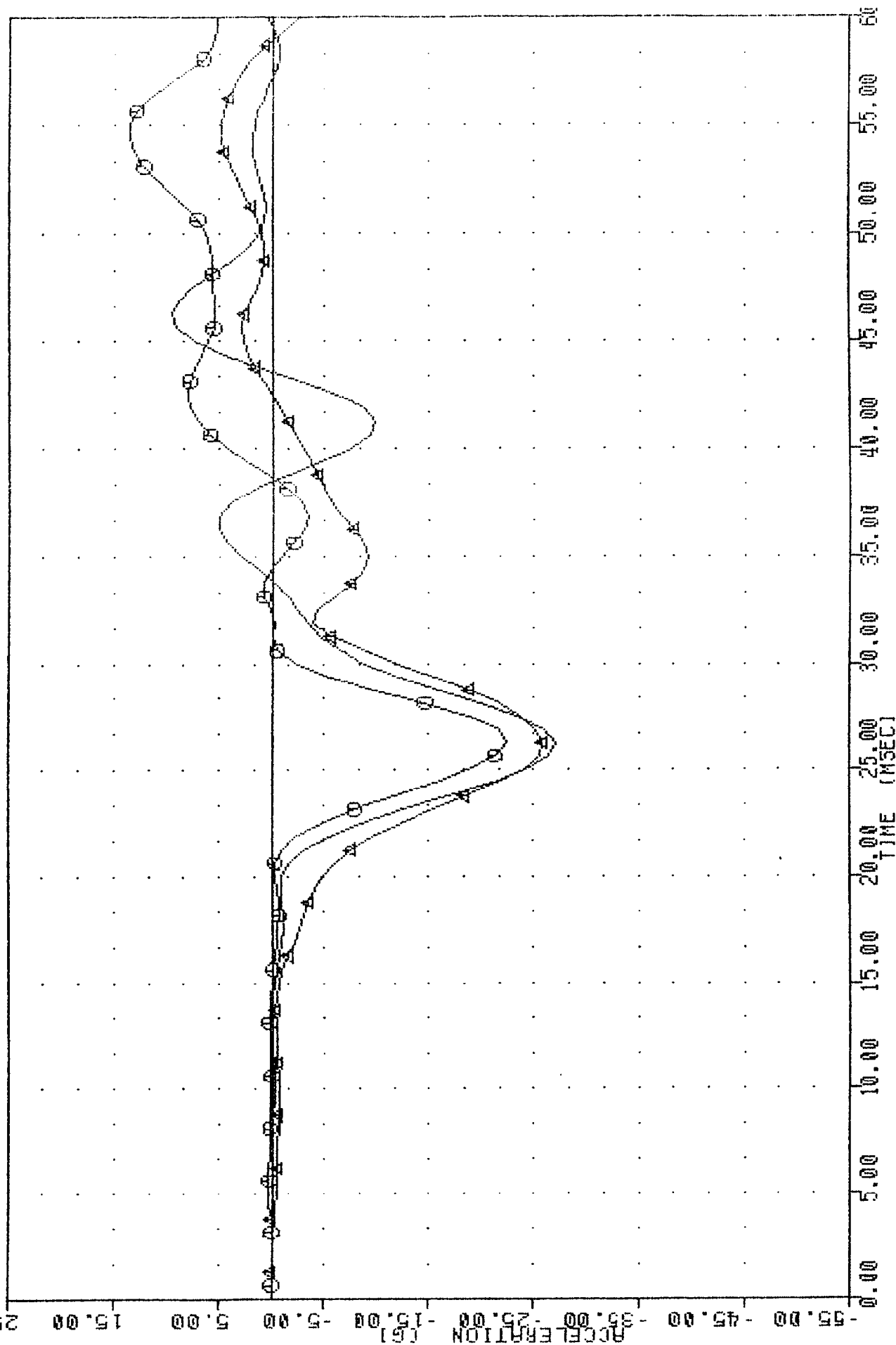
[illegible]

TIME (msec)
SIDE IMPACT TEST (U02)
UPPER SPINE ACCELERATION Y AXIS - 1

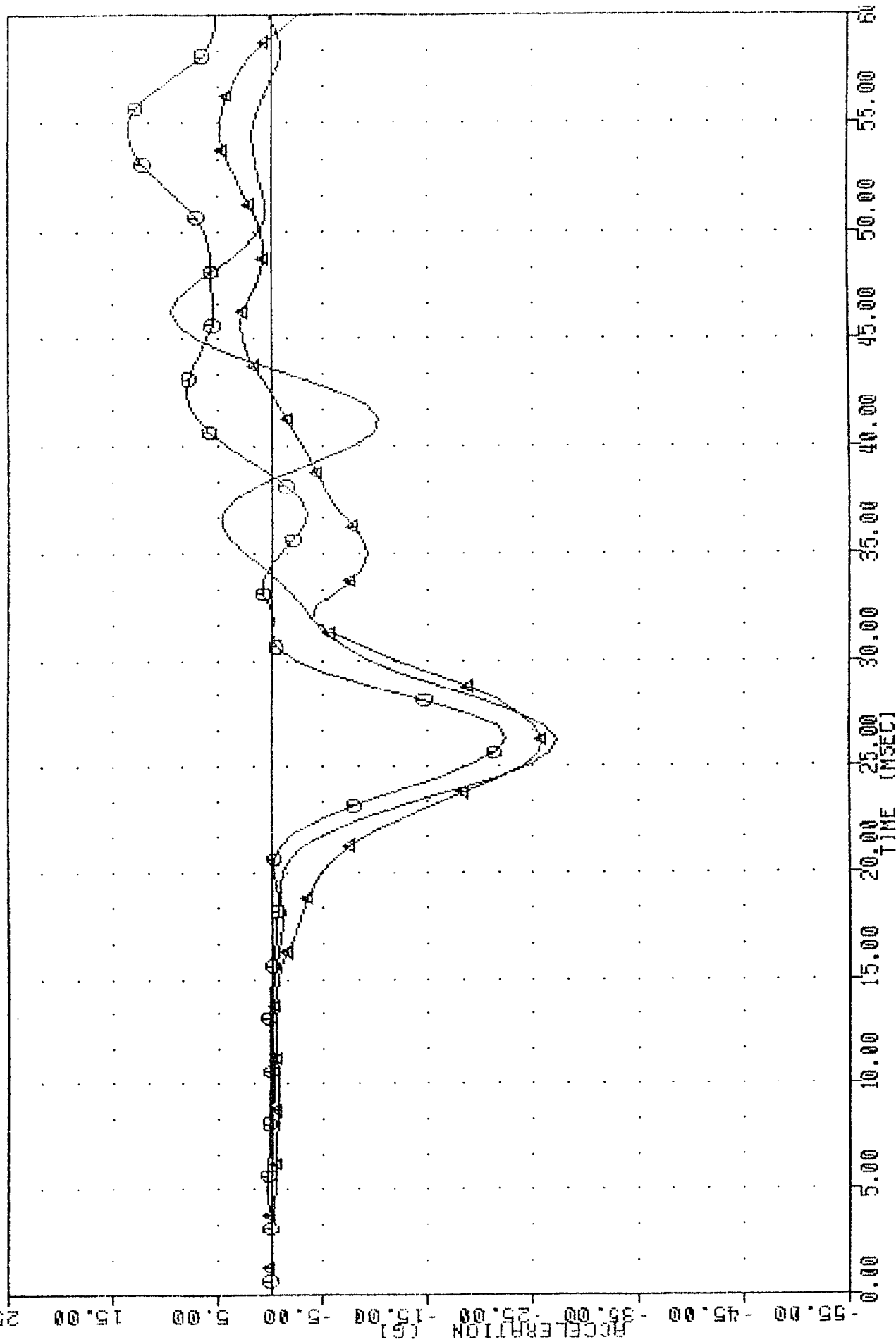
20



	FILED	NAME	136/	189/	136/	189/	MIN,	MAX,		
11-12-191	FILTER	HSRI	136/	189/	-50	-50	MIN,	MAX,	-20.30	20.03
11-12-191	FILTER	HSRI	136/	189/	-50	-50	MIN,	MAX,	-22.37	25.63
11-12-191	FILTER	HSRI	136/	189/	-50	-50	MIN,	MAX,	-25.84	25.63



112160 FILLEN : H301 130/ 103/ 100 MIN, MAX : -21.10 8 20.03 40.02
 MN+2SD 0 FILTER : HSRI 136/ 189/ -50 MIN, MAX : -22.37 8 25.63 53.75
 MN-2SD 4 FILTER : HSRI 136/ 189/ -50 MIN, MAX : -25.84 8 25.63 53.75



SIDE IMPACT TEST (U02)
 LOWER SPINE ACCELERATION Y AXIS - A