

DOT 771

SIDE IMPACT AGGRESSIVENESS
ATTRIBUTES

MDB-TO-CAR SIDE IMPACT TEST OF
A 26⁰ CRABBED MOVING DEFORMABLE BARRIER
TO A 1981 VOLKSWAGEN RABBIT
AT 38.9 MPH

PREPARED BY:
VEHICLE RESEARCH AND TEST CENTER
ST. RT. 33 LOGAN COUNTY
EAST LIBERTY, OHIO 43319



FINAL REPORT
OCTOBER 1984

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
400 SEVENTH STREET, S.W.
WASHINGTON, D.C. 20590

Prepared By: Laura Bell

L. J. Bell

Project Engineer

Transportation Research Center of Ohio

Approved By: Richard W. Runyon

R. W. Runyon

Project Manager

Transportation Research Center of Ohio

Report Accepted By: Michael Monk

M. W. Monk

Project Engineer

Vehicle Research & Test Center

Report Accepted By: _____

T. MacLaughlin

Project Manager

Vehicle Research & Test Center

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle SIDE IMPACT AGGRESSIVENESS ATTRIBUTES MDB-TO-CAR SIDE IMPACT TEST OF A 26° CRABBED MOVING DEFORMABLE BARRIER TO A 1981 VOLKSWAGEN RABBIT AT 38.9 MPH		5. Report Date OCTOBER 1984	
		6. Performing Organization Code	
7. Author(s) L. Bell, Project Engineer, TRCO		8. Performing Organization Report No. 840919	
9. Performing Organization Name and Address Vehicle Research and Test Center St. Rt. 33, Logan County East Liberty, Ohio 43319		10. Work Unit No. (TRAIS)	
		11. Contract or Grant No. DTNH22-82-A-08401	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration 400 Seventh Street, S.W. Washington, DC 20590		13. Type of Report and Period Covered FINAL REPORT September-October 1984	
		14. Sponsoring Agency Code	
15. Supplementary Notes			
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 1981 Volkswagen Rabbit 2-door hatchback at the TRCO Crash Test Facility, East Liberty, Ohio. The test vehicle was impacted on the left side by a moving deformable barrier designated as "Altered Profile" 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 19, 1984 and the ambient temperature was 73° F.			
17. Key Words Occupant Response Moving Barrier Crash Testing		18. Distribution Statement Available from: Technical Reference Division, National Highway Traffic Safety Administration Room 5108, Nassif Building 400 Seventh Street, S.W. Washington, D.C. 20590	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 159	22. Price

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons	0.9	metric ton	t
	(2000 lb)			
VOLUME				
tsp	teaspoons	5	milliliters	ml.
Tbsp	tablespoons	15	milliliters	ml.
in ³	cubic inches	16	milliliters	ml.
fl oz	fluid ounces	30	milliliters	ml.
c	cups	0.24	liters	L
pt	pints	0.47	liters	L
qt	quarts	0.95	liters	L
gal	gallons	3.8	liters	L
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³

TEMPERATURE (exact)

°F	degrees Fahrenheit	5/9 (after subtracting 32)	degrees Celsius	°C
----	--------------------	----------------------------	-----------------	----

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares	2.5	acres	
	(10 000 m ²)			
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton	1.1	short tons	
	(1000 kg)			
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
ml	milliliters	0.06	cubic inches	in ³
L	liters	2.1	pints	pt
L	liters	1.06	quarts	qt
L	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³

TEMPERATURE (exact)

°C	degrees Celsius	9/5 (then add 32)	degrees Fahrenheit	°F
----	-----------------	-------------------	--------------------	----

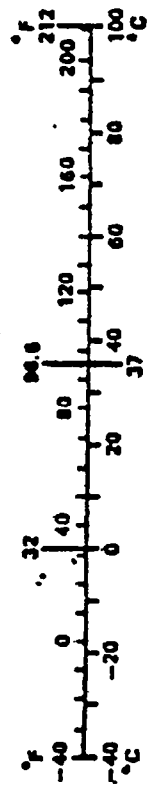


TABLE OF CONTENTS

	<u>Page</u>
1.0 PURPOSE AND INTRODUCTION	1-1
2.0 GENERAL TEST AND VEHICLE PARAMETER DATA	2-1
3.0 DATA REQUIRED BY R&D	3-1
APPENDIX A PHOTOGRAPHS	A-1
APPENDIX B DATA PLOT PRESENTATION	B-1

LIST OF PHOTOGRAPHS

<u>Figure</u>	<u>Page</u>
A-1. PRE-TEST OVERALL - VIEW 1	A-2
A-2. PRE-TEST OVERALL - VIEW 2	A-2
A-3. PRE-TEST OVERALL - VIEW 3	A-3
A-4. PRE-TEST OVERALL - VIEW 4	A-3
A-5. PRE-TEST CLOSEUP - VIEW 1	A-4
A-6. PRE-TEST CLOSEUP - VIEW 2	A-4
A-7. PRE-TEST CLOSEUP - VIEW 3	A-5
A-8. MODIFIED WINDOW - VIEW 1	A-5
A-9. MODIFIED WINDOW - VIEW 2	A-6
A-10. PRE-TEST DRIVER DUMMY - VIEW 1	A-6
A-11. PRE-TEST DRIVER DUMMY - VIEW 2	A-7
A-12. PRE-TEST PASSENGER DUMMY - VIEW 1	A-7
A-13. PRE-TEST PASSENGER DUMMY - VIEW 2	A-8
A-14. PRE-TEST DUMMIES OVERALL	A-8
A-15. CRASH EVENT PHOTOGRAPH	A-9
A-16. POST-TEST OVERALL - VIEW 1	A-9
A-17. POST-TEST OVERALL - VIEW 2	A-10
A-18. POST-TEST OVERALL - VIEW 3	A-10
A-19. POST-TEST OVERALL - VIEW 4	A-11
A-20. POST-TEST DRIVER DUMMY - VIEW 1	A-11
A-21. POST-TEST DRIVER DUMMY - VIEW 2	A-12
A-22. POST-TEST PASSENGER DUMMY - VIEW 1	A-12
A-23. POST-TEST PASSENGER DUMMY - VIEW 2	A-13
A-24. POST-TEST PASSENGER DUMMY - VIEW 3	A-13
A-25. POST-TEST DUMMIES OVERALL	A-14
A-26. POST-TEST DAMAGE	A-14
A-27. POST-TEST MODIFIED WINDOW	A-15

LIST OF PHOTOGRAPHS CONTD

<u>Figure</u>	<u>Page</u>
A-28. PRE-TEST MDB FACE - VIEW 1	A-15
A-29. PRE-TEST MDB FACE - VIEW 2	A-16
A-30. PRE-TEST MDB FACE - VIEW 3	A-16
A-31. POST-TEST MDB FACE - VIEW 1	A-17
A-32. POST-TEST MDB FACE - VIEW 2	A-17

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 "Altered Profile". 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 1981 Volkswagen Rabbit 2-door hatchback was impacted on the left side by a Moving Deformable Barrier (MDB) on September 19, 1984. The barrier face was designated as "Altered Profile". In order to obtain the desired stiffness of 45 psi, 33 holes with a nominal diameter of 3 inches were drilled into the aluminum honeycomb, equally spaced throughout the back of 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 left front window of the vehicle was structurally modified. No additional padding was added to the vehicle. *(Glass - plastic glazing, etc)*

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.

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

VIN: 1VWBB0172BV194743

BODY STYLE: 2-Door Hatchback

MODEL YEAR: 1981

NHTSA NO.: R & D

COLOR: Black

ENGINE DATA: TYPE: Transverse CYLINDERS: 4 DISPLACEMENT 97 CID

TRANSMISSION DATA: 4 Speed Manual

DATE VEHICLE RECEIVED: 9/11/84

ODOMETER READING: 60829

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	Yes	AIR CONDITIONING	Yes
RADIO	Yes	ANTI-SKID BRAKE	No
CLOCK	Yes	REAR WINDOW DEFROSTER	Yes
OTHER			

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? No *
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

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

VEHICLE MANUFACTURED BY: Volkswagen of America, Inc.

DATE OF MANUFACTURE: 7/81

GVWR: 2822 LBS.,

GAWR: FRONT 1690 LBS., REAR 1278 LBS.

*The driver window had a laminated inner surface. This window was fixed in the closed position by the use of several small bolts through the window frame.

VEHICLE TIRE DATA

RECOMMENDED COLD TIRE PRESSURE: FRONT 36 psi; REAR 35 psi

TIRES ON VEHICLE (MFGR. & LINE, SIZE): Front - Michelin 155 SR 13
Rear - Centennial P155 80 R 13

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 3

IS SPARE TIRE "SPACE SAVER"? Yes

IS SPARE TIRE STANDARD EQUIPMENT? Yes

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITHOUT FLUIDS):

RIGHT FRONT	640	LBS.	RIGHT REAR	330	LBS.
LEFT FRONT	670	LBS.	LEFT REAR	310	LBS.
TOTAL FRONT WEIGHT	1310		LBS. (67.2 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	640		LBS. (32.8 % OF TOTAL VEHICLE WEIGHT)		
TOTAL DELIVERED WEIGHT	1950		LBS.		

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 23 3/4	;LF 23 15/16	;RR 24 5/16	;LR 24 3/8
PRE-TEST ATTITUDE:	RF 23 7/16	;LF 23 5/16	;RR 21 15/16	;LR 21 7/8
POST-TEST ATTITUDE:	RF 21 7/8	;LF 22 1/4	;RR 22 1/8	;LR 21 3/8

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 135 LBS. CARGO:

RIGHT FRONT	730	LBS.	RIGHT REAR	525	LBS.
LEFT FRONT	710	LBS.	LEFT REAR	540	LBS.
TOTAL FRONT WEIGHT	1440		LBS. (57.5 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1065		LBS. (42.5 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	2505		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: 2.0 GALLONS

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

DETAILS OF FUEL SYSTEM: DNA

ELECTRIC FUEL PUMP: Yes

FUEL INJECTION: Yes

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT OPERATING? No

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: 155 80 R 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
4 TOTAL

CARGO LOAD 135 LBS.

TOTAL 735 LBS.

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

TEST CONDITIONS

TEST NUMBER: 840919

DATE OF TEST: September 19, 1984

TIME OF TEST: 14:25

WIND VELOCITY: 5-10 mph 288° W

HUMIDITY: DNA

AMBIENT TEMPERATURE AT IMPACT AREA: 73° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 78° F

SUBJECT VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
VEHICLE TEST WEIGHT (LBS.)	2505	2493
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>Left Side Glass, Window Frame, Barrier Front Plate, Roof</u>	<u>Left Side Header</u>
Chest	<u>Inner Door Panel</u>	<u>Rear Quarter Panel</u>
Abdomen	<u>Inner Door Panel</u>	<u>Rear Quarter Panel</u>
Left Knee	<u>Left Door</u>	<u>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>No</u>	<u>No</u>

GLAZING DAMAGE:

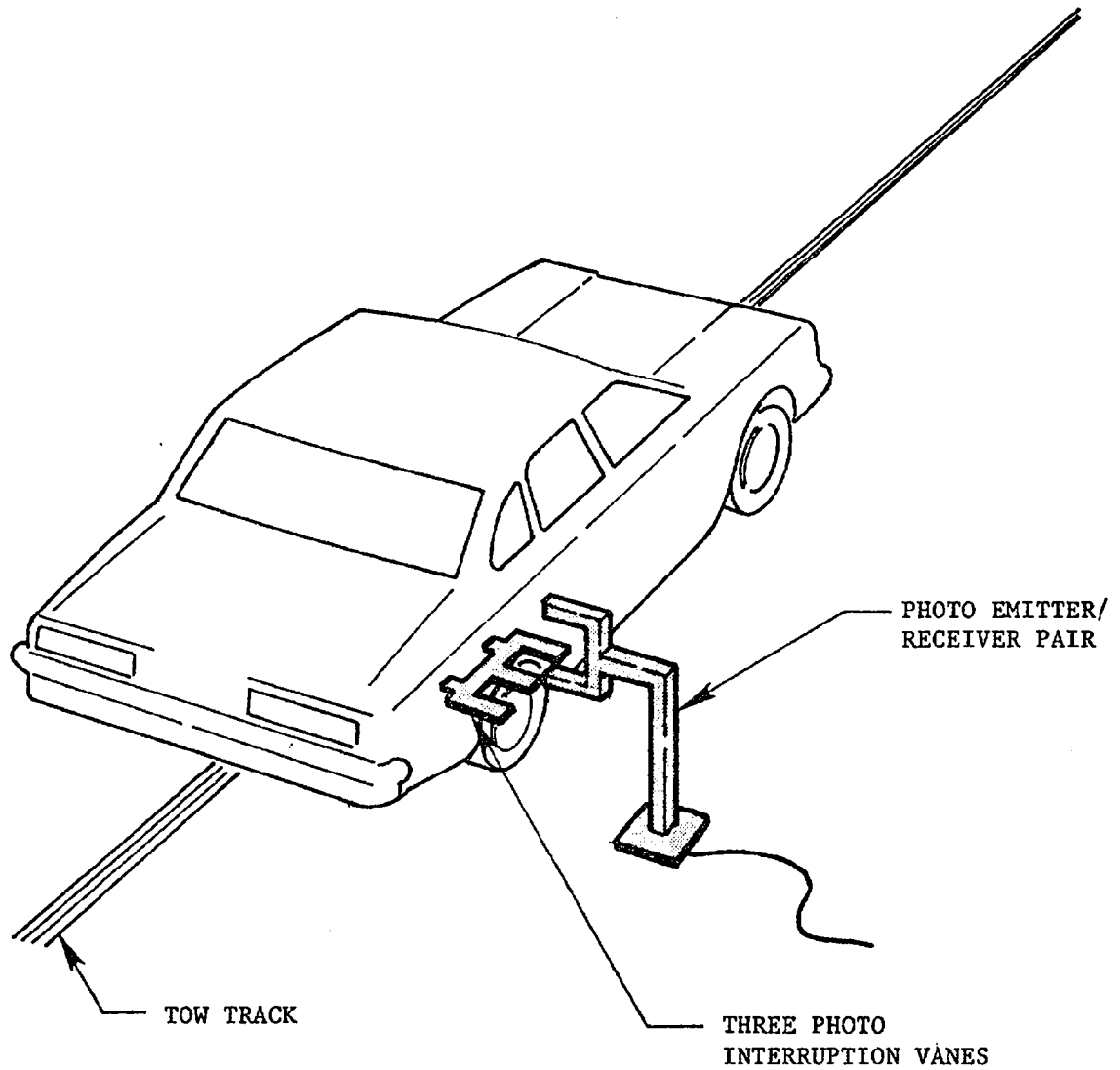
Left rear window and windshield shattered.

OTHER NOTABLE IMPACT EFFECTS:

Driver's seat rotated approximately 30° counterclockwise.

*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

$$\begin{aligned}\text{Test Weight} &= \text{Unloaded Delivered Weight*} + \\ &\quad \text{Number of Dummies X 174 lbs.} + \\ &\quad \text{Cargo Weight} \\ &= 2010 + 2 \times 174 + 135 \text{ lbs.} \\ &= 2493 \text{ lbs.}\end{aligned}$$

To achieve test weight, the exhaust system, starter and battery were removed and 2.0 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.

$$\begin{aligned}\text{*Unloaded Delivered Weight} &= \text{Measured Weight} + \text{Estimated 10 Gallons Fuel} \\ &= 1950 + 60 \\ &= 2010\end{aligned}$$

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 floorpan 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:

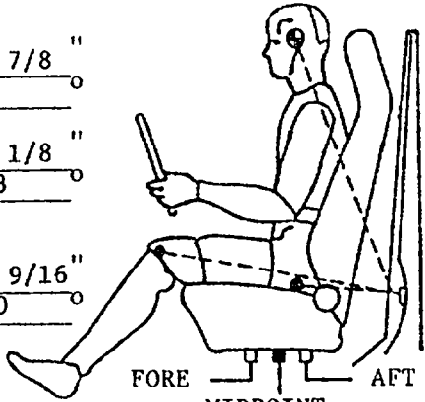
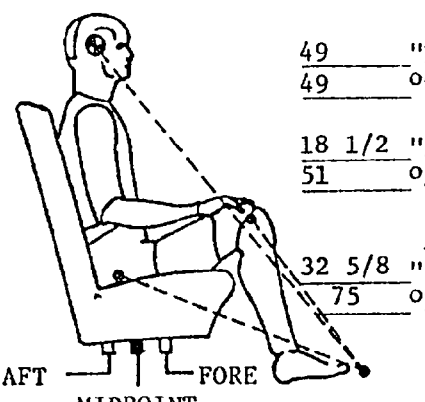
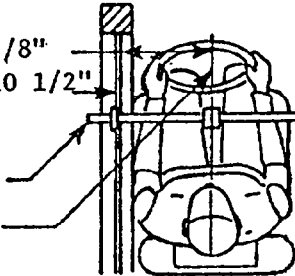
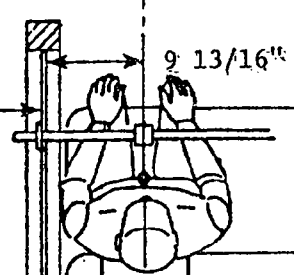
1. N. Echeverria

2. B. Miller

3. R. Benavides

POSITIONING DATE: 9/19/84

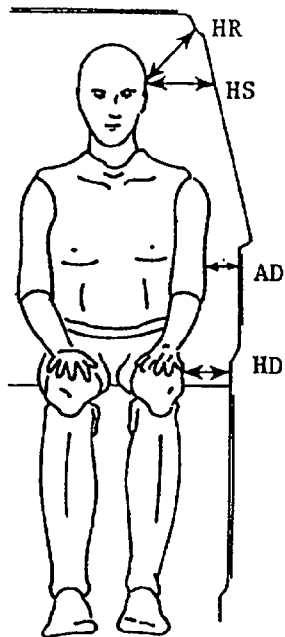
AMBIENT TEMP.: 67° F. TIME: 8:30

DRIVER DUMMY # <u>06</u>  HEAD <u>21 7/8</u> " TARGET*<u>38</u> ° KNEE <u>33 1/8</u> " JOINT <u>103</u> ° APPROX. "H" <u>19 9/16</u> " POINT <u>120</u> ° FORE MIDPOINT AFT	REAR PASSENGER DUMMY # <u>U02</u>  <u>49</u> "HEAD <u>49</u> °TARGET** <u>18 1/2</u> "KNEE <u>51</u> °JOINT APPROX. <u>32 5/8</u> " "H" <u>75</u> °POINT AFT MIDPOINT FORE
DOOR GLASS HEIGHT*** <u>10 7/8"</u> <u>10 1/2"</u>  LATERAL BAR ADJUSTABLE POINTER DRIVER DUMMY # <u>06</u>	DOOR GLASS HEIGHT <u>DNA</u>  <u>9 13/16"</u> PASSENGER DUMMY # <u>U02</u>

*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.

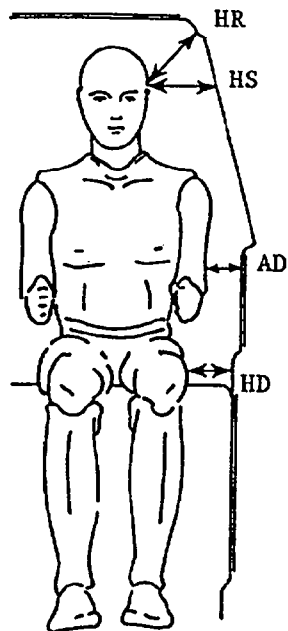
***Door glass height is equal on the right and left side of vehicle at dummy nose level.



DRIVER
06

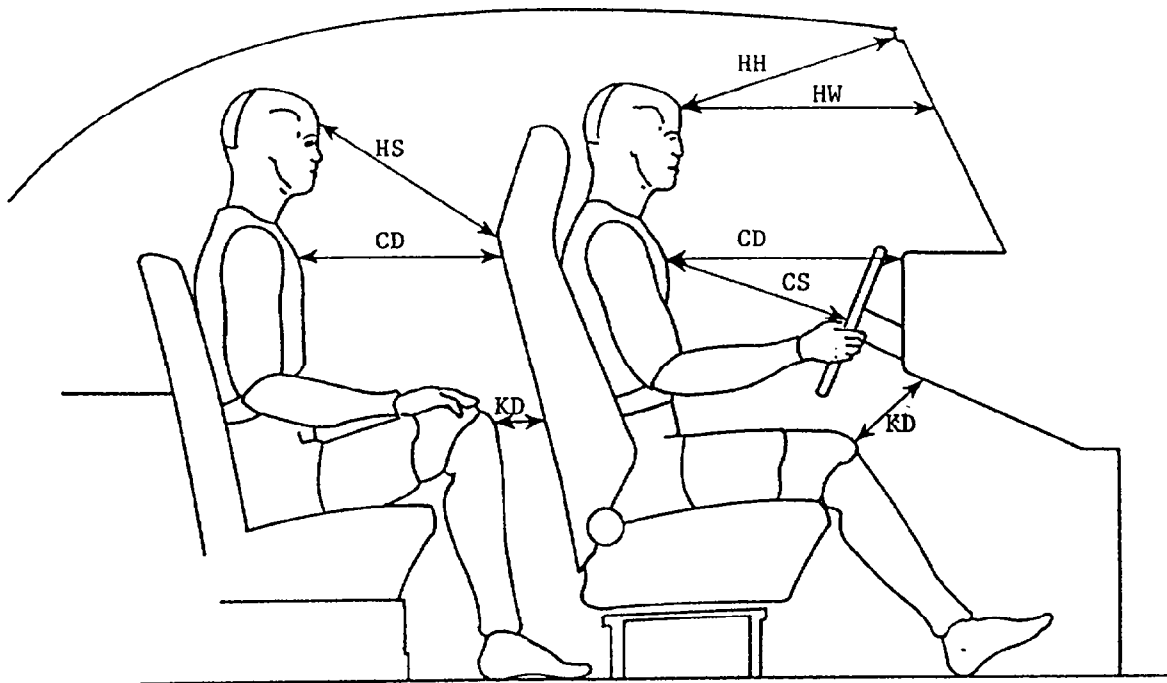
PASSENGER
U02

HR	6 1/4	5 3/8
HS	7 3/16	6 7/16
AD	3 1/4	3 3/16
HD	5 9/16	5 9/16



ALL MEASUREMENTS IN INCHES

DUMMY LATERAL CLEARANCE DIMENSIONS



DRIVER

PASSENGER

06

U02

HH	10 7/8	DNA
HW	17	DNA
HS	DNA	23 1/8
CD	17 3/4	18 7/8
CS	10	DNA
KDL	4 1/4	4 3/8
KDR	4 3/4	4 5/8

ALL MEASUREMENTS IN INCHES

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

DUMMY KINEMATIC SUMMARY

DRIVER

During impact, the dash panel below the steering column burst inward hitting the dummy's knees. The left hip of the dummy contacted the inner panel as the door caved in. As the buttocks swung to the right, the dummy's torso leaned to the left. Continuing travel outside of the vehicle boundaries, the dummy's head jammed into the upper left hand corner of the window frame. The head then hit the barrier's front plate, with the laminated window between them, slicing both the lamination and the dummy head skin. On rebound, the buttocks lifted and the dummy travelled to the front passenger area simultaneously striking the head on the roof. The buttocks then landed on the window sill, bouncing three times before settling down. Final resting position showed the dummy seated in the passenger's seat, facing left, and one leg on either side of the stick shift.

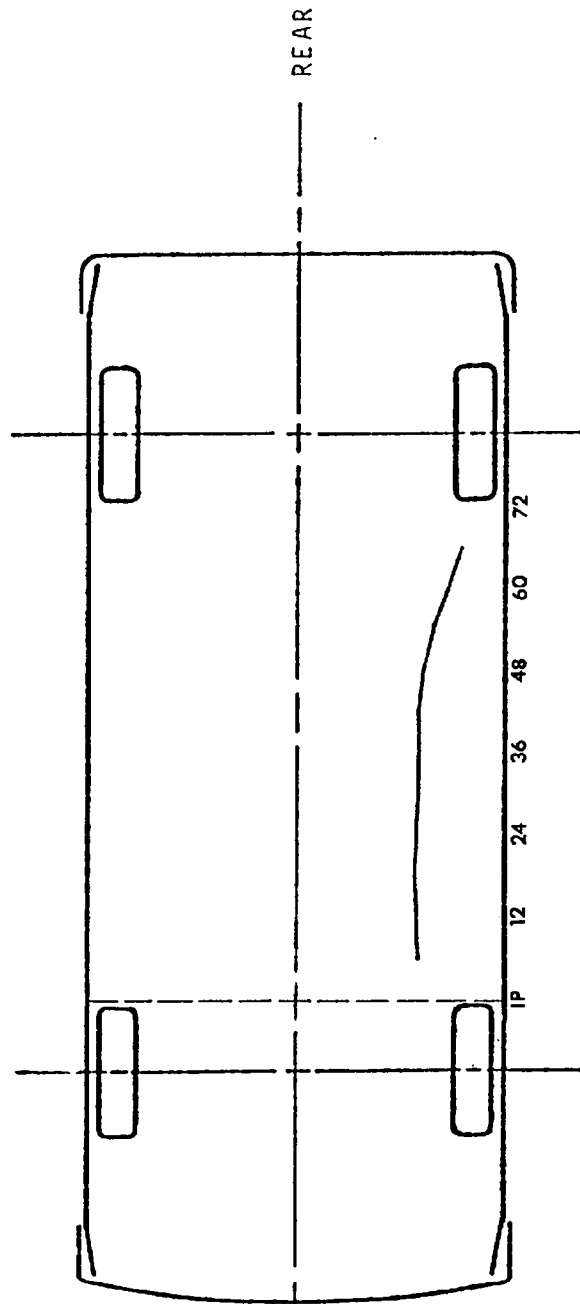
glass-plastic

PASSENGER

During impact, the dummy's left leg, hip and thorax contacted the inner quarter panel. As the left leg and hip rebounded towards the right, the dummy's torso leaned left. The passenger's head hit above the upper window frame and continued to travel out of the vehicle boundaries. The dummy came to rest in a partially upright position with the upper torso leaning left and the head outside of the vehicle.

VEHICLE EXTERIOR STATIC CRUSH PROFILE

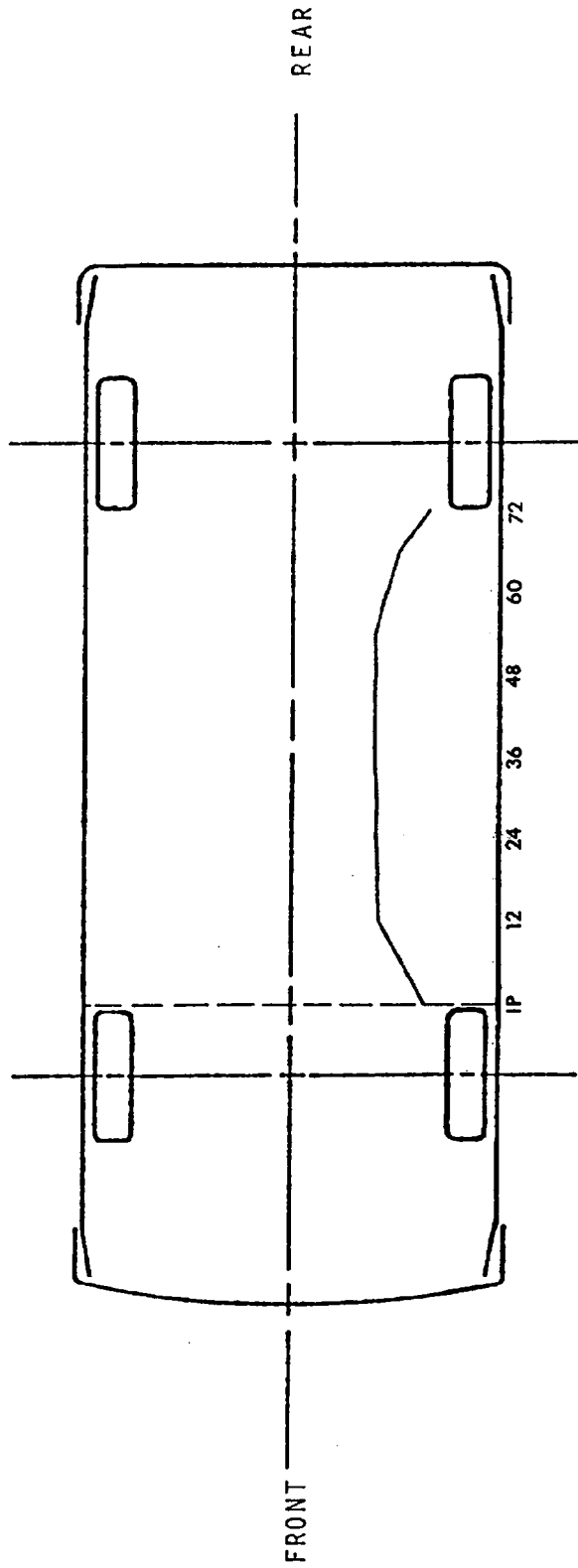
Page 3-9
 missing



PROFILE LEVEL EQUALS AXLE HEIGHT
 IP EQUALS PROJECTED IMPACT POINT

Length of Car = 130.0" Maximum Crush = 13.4"
 Width of Car = 63.0" Length of Crush = 60"

VEHICLE EXTERIOR STATIC CRUSH PROFILE



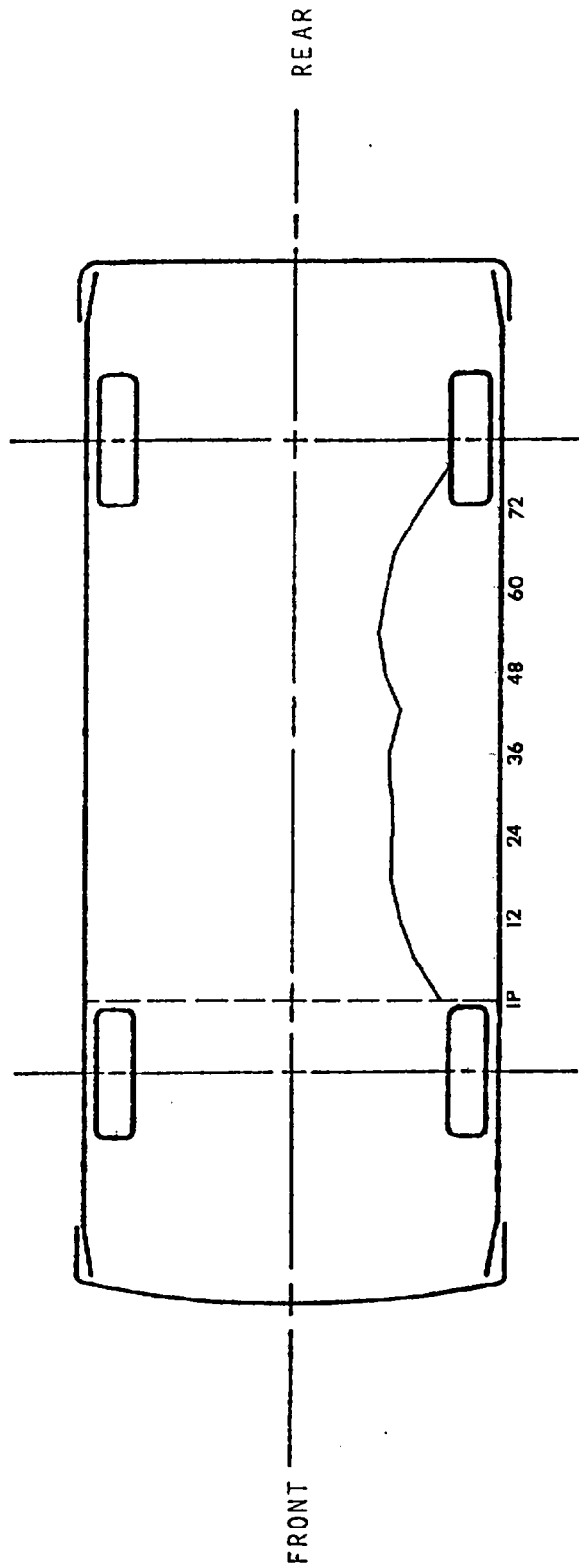
PROFILE LEVEL EQUALS H-POINT HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Maximum Crush = 18.4"
Length of Crush = 72"

Length of Car = 139.0"
Width of Car = 63.0"

*2. Mark
correct*

VEHICLE EXTERIOR STATIC CRUSH PROFILE

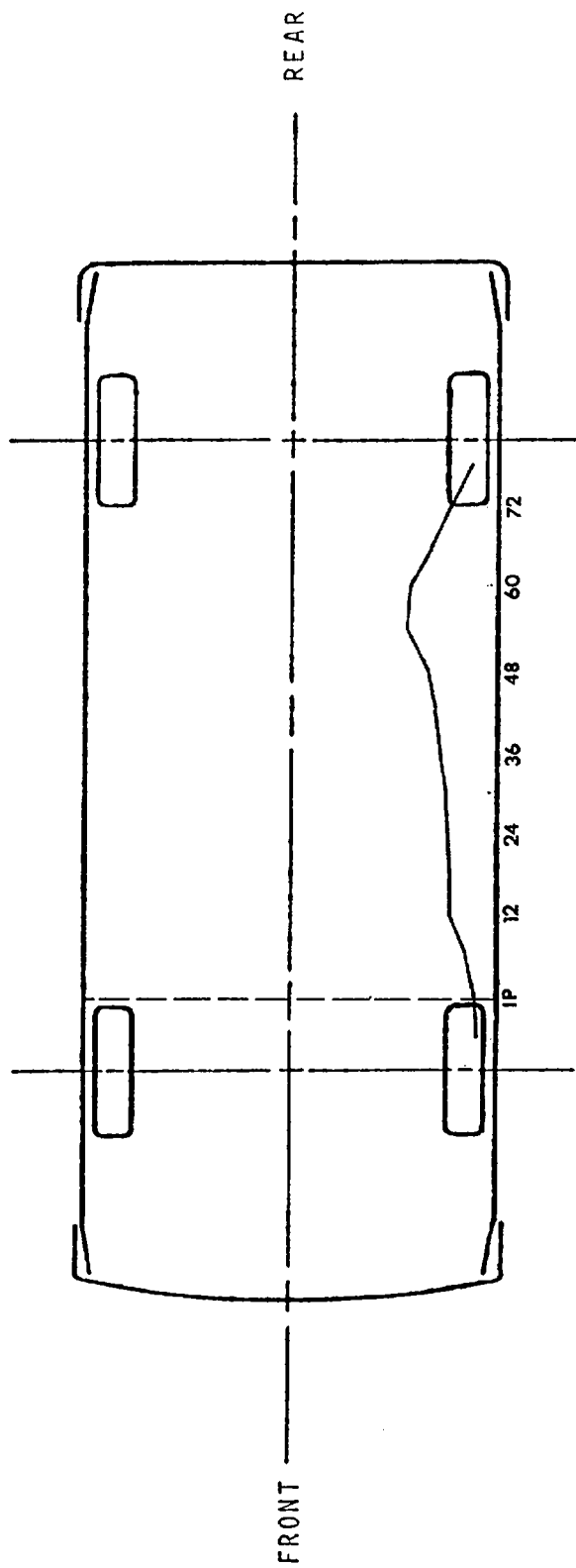


PROFILE LEVEL EQUALS MID-DOOR HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Length of Car = 130.0"
Width of Car = 63.0"

Maximum Crush = 17.7"
Length of Crush = 78"

VEHICLE EXTERIOR STATIC CRUSH PROFILE

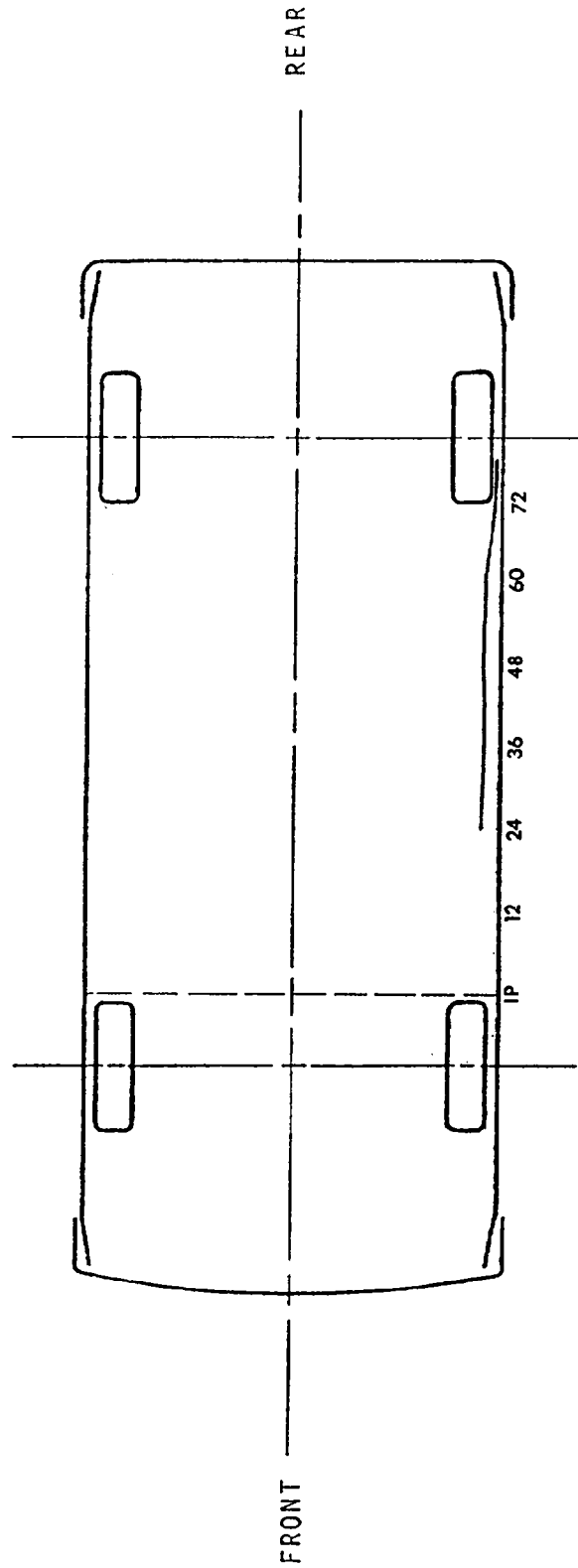


PROFILE LEVEL EQUALS WINDOW SILL HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Length of Car = 130.0"
Width of Car = 63.0"

Maximum Crush = 13.5"
Length of Crush = 84"

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Length of Car = 130.0"
Width of Car = 63.0"

Maximum Crush = 2.5"
Length of Crush = 54"

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	13.21	82.38	---	---δ	12.75	39.75	32.56	67.88
LATERAL	---	---δ	---	---δ	96.09	47.25	16.13	59.38
VERTICAL	---	---δ	---	---δ	41.75	66.00	33.52	39.25
RESULTANT		---	@	---δ	96.17	@	47.25	
HIC	---	---	---	δ	483.91 from 36.13 to 72.00			
CHEST ACCELERATION								
UPPER SPINE								
LONGITUDINAL	8.86	43.13	27.68	56.25	8.47	38.13	21.33	63.75
LATERAL (P)***	66.17	35.63	38.40	25.63	54.72	43.13	11.81	26.25
LATERAL (R)***	69.40	35.63	39.48	25.00	57.48	43.13	12.54	26.25
VERTICAL	8.88	21.25	25.93	26.25	5.54	21.25	23.86	40.63
RESULTANT (P)		71.47	@	35.00		59.94	@	43.13
RESULTANT (R)		74.38	@	35.00		62.46	@	43.13
DELTA V (MPH)****		15.9	@	60.63 (P)		23.3	@	93.75 (P)
		16.9	@	60.00 (R)		24.4	@	93.13 (R)
LOWER SPINE								
LONGITUDINAL	32.56	26.25	21.77	31.25	66.37	37.50	14.99	32.50
LATERAL (P)	69.62	30.00	7.02	55.00	50.78	41.25	11.85	61.87
LATERAL (R)	74.92	30.62	6.09	55.00	54.10	33.13	11.03	61.87
VERTICAL	23.13	28.75	3.53	57.50	51.05	37.50	15.42	32.50
RESULTANT (P)		75.20	@	30.00		93.92	@	37.50
RESULTANT (R)		81.03	@	30.62		93.45	@	37.50
DELTA V (MPH)		21.1	@	51.88 (P)		26.6	@	59.38 (P)
		18.6	@	52.50 (R)		29.1	@	60.00 (R)
LEFT UPPER RIB								
LATERAL (P)	68.59	28.75	26.18	33.75	52.89	48.75	---	--- ε
LATERAL (R)	79.42	28.75	32.53	33.75	52.74	47.50	---	--- ε
DELTA V (MPH)		25.0	@	63.75 (P)		30.3	@	96.25 (P)
		24.9	@	63.75 (R)		33.2	@	95.63 (R)
LEFT LOWER RIB								
LATERAL (P)	86.96	28.75	8.01	67.50	81.00	37.50	8.25	71.25
LATERAL (R)	100.10	28.75	8.11	67.50	83.07	38.13	5.36	65.00
DELTA V (MPH)		25.2	@	58.75 (P)		29.3	@	91.25 (P)
		26.0	@	58.75 (R)		28.7	@	92.50 (R)
PELVIS ACCELERATION								
LONGITUDINAL	15.54	32.38	32.32	21.88	11.92	22.13	70.54	30.13
LATERAL	237.13	23.50	6.43	77.50	175.24	27.63	43.24	19.63
VERTICAL	48.89	27.63	12.85	23.13	45.97	33.63	4.51	41.25
RESULTANT		238.26	@	23.50		179.96	@	27.63
DELTA V (MPH)		30.3	@	67.63		31.2	@	58.38

SIDE IMPACT DUMMY DATA SUMMARY CONTD

		DRIVER DUMMY				PASSENGER DUMMY			
		POSITIVE		NEGATIVE		POSITIVE		NEGATIVE	
		DIRECTION*		DIRECTION**		DIRECTION*		DIRECTION**	
		MAX	TIME	MAX	TIME	MAX	TIME	MAX	TIME
		(in)	(msec)	(in)	(msec)	(in)	(msec)	(in)	(msec)
RIB DEFLECTION	†	0.91	64.75	0.11	34.63	1.48	68.63	---	--- ε

* LONGITUDINAL: FORWARD
 LATERAL: RIGHTWARD
 VERTICAL: UPWARD

**LONGITUDINAL: REARWARD
 LATERAL: LEFTWARD
 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.

δ See Data Plots

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

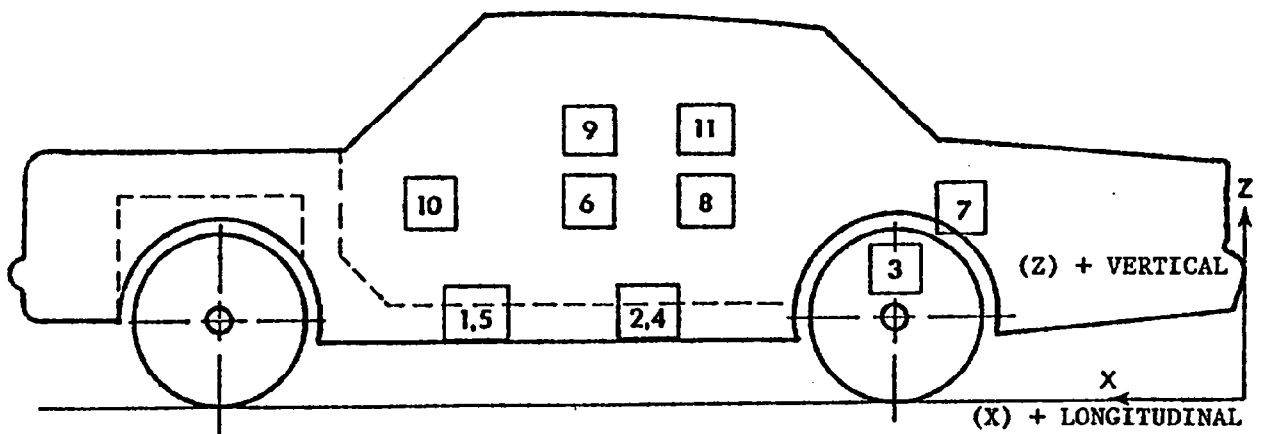
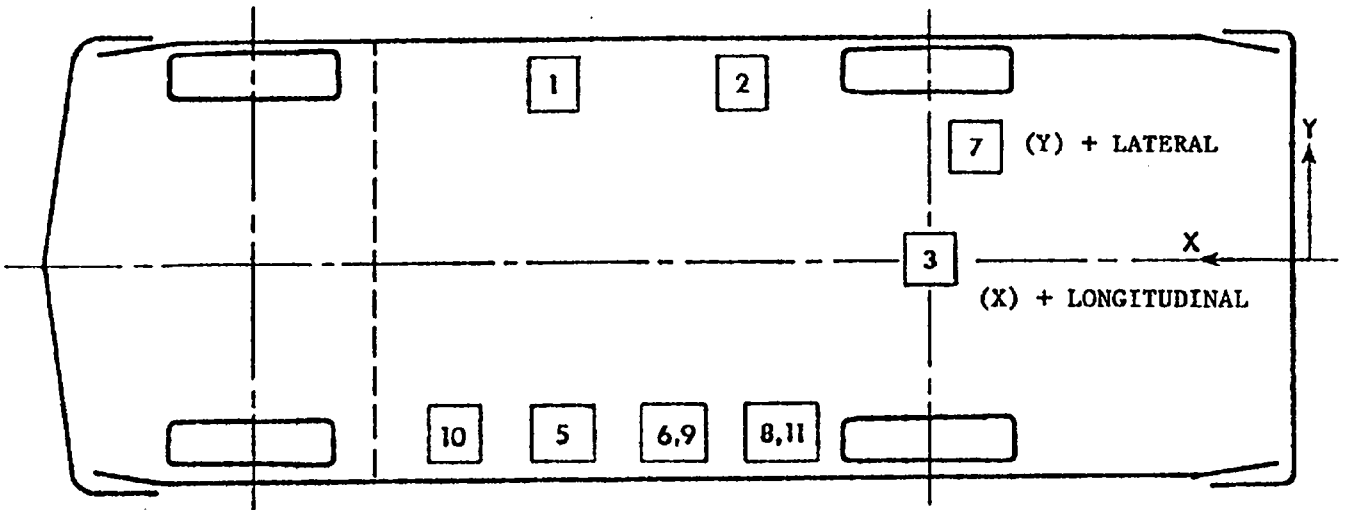
NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	RIGHT SILL AT FRONT SEAT (LONGITUDINAL)	83.6	23.6	9.4				
	(LATERAL)	$\Delta V = -1.1$ mph @ 109.50 msec			4.57	65.00	5.85	18.63
	(VERTICAL)	$\Delta V = 17.9$ mph @ 109.50 msec			18.01	53.00	2.27	102.25
	(RESULTANT)				4.26	66.25	5.35	60.75
						18.03 @ 53.00		
2	RIGHT SILL AT REAR SEAT (LONGITUDINAL)	61.5	23.3	8.6				
	(LATERAL)	$\Delta V = -0.9$ mph @ 109.50 msec			4.48	65.13	6.01	18.63
	(VERTICAL)	$\Delta V = 20.4$ mph @ 109.50 msec			19.47	46.13	2.68	104.63
	(RESULTANT)				9.34	23.13	5.61	36.25
						20.02 @ 46.13		
3	REAR DECK OVER AXLE (LONGITUDINAL)	32.0	0.0	6.8				
	(LATERAL)	$\Delta V = -4.4$ mph @ 109.50 msec			5.45	36.25	17.12	19.25
	(VERTICAL)	$\Delta V = 24.5$ mph @ 109.50 msec			20.50	23.50	3.36	106.38
	(RESULTANT)				3.34	28.25	8.43	19.13
						24.59 @ 19.63		
4	LEFT SILL AT REAR SEAT (LATERAL)	61.3	-24.0	8.6				
		$\Delta V = 17.4$ mph @ 49.63 msec			81.76	21.00	18.70	27.25
5	LEFT SILL AT FRONT SEAT (LATERAL)	83.5	-23.5	10.1				
		$\Delta V = \text{---}^{\tau}$			61.32	8.00	78.30	14.38
6	LEFT FRONT DOOR CENTERLINE (LATERAL)	80.7	-26.5	22.9				
		$\Delta V = \text{---}^{\tau}$			111.66	10.50	75.61	17.00
7	RIGHT REAR COMPARTMENT (LONGITUDINAL)	31.0	15.9	13.9				
					3.18	62.88	7.27	18.75
8	MIDREAR OF LEFT FRONT DOOR (LATERAL)	60.4	-26.5	23.4				
		$\Delta V = 16.4$ mph @ 16.25 msec			128.75	6.88	81.54	24.13
9	UPPER LEFT FRONT DOOR CENTERLINE (LATERAL)	81.8	-26.0	32.0				
		$\Delta V = 16.6$ mph @ 70.75 msec			152.56	16.75	76.96	31.88
10	MIDFRONT OF LEFT FRONT DOOR (LATERAL)	99.3	-26.1	21.8				
		$\Delta V = \text{---}^{\tau}$			93.19	8.00	69.60	15.88
11	UPPER REAR OF LEFT REAR DOOR (LATERAL)	70.9	26.1	32.1				
		$\Delta V = 21.0$ mph @ 27.88 msec			99.73	28.50	119.62	33.63

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

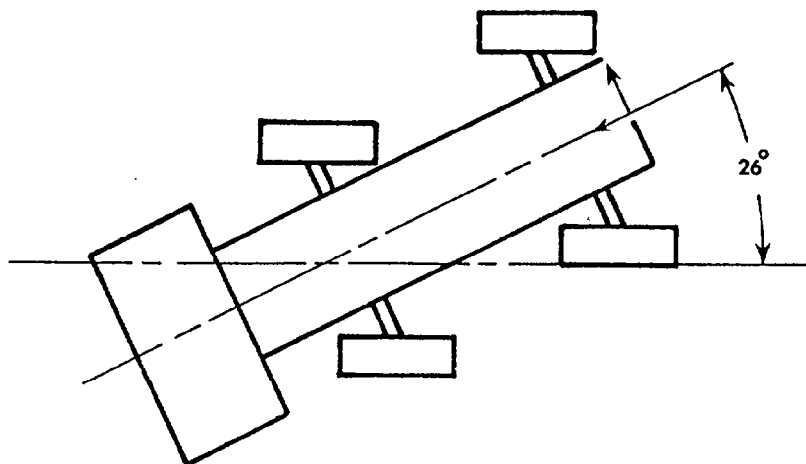
All measurements of accelerometer locations in inches.

^{\tau} 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)	$\Delta V = -17.5 \text{ mph @ } 109.50 \text{ msec}$			---	---x	13.26	39.63
	(LATERAL)	$\Delta V = -4.4 \text{ mph @ } 109.50 \text{ msec}$			0.61	3.50	6.54	26.13
	(VERTICAL)				10.48	52.38	9.69	61.75
	(RESULTANT)					15.59 @	52.13	
2	FRONT FRAME MEMBER	130.3	0.0	11.3				
	(LONGITUDINAL)	$\Delta V = -16.1 \text{ mph @ } 109.50 \text{ msec}$			7.62	14.50	13.61	39.00
3	REAR FRAME MEMBER	23.3	0.0	11.5				
	(LONGITUDINAL)	$\Delta V = -16.6 \text{ mph @ } 109.50 \text{ msec}$			0.69	109.38	12.73	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.

x 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	475	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	502	Driver kinematics
5	Ground level - right	Hycam	25	500	Overall view
6	Ground level - left	Photosonic 1B	17	727	Overall view
7	Onboard vehicle	Photosonic 1B	8	802	Driver kinematics - front view
8	Onboard vehicle	Photosonic 1B	8	805	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	MFR.	DATE OF LAST CALIBRATION	SENSITIVITY	DESIRED FULL SCALE (ENGR. UNITS)
BCGXG	Accel	4-202-0001	18845	Bell Howell	5/2/84	0.237 MV/G	50 G
BCGYG	Accel	4-202-0001	18858	Bell Howell	5/2/84	0.236 MV/G	50 G
BCGZG	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

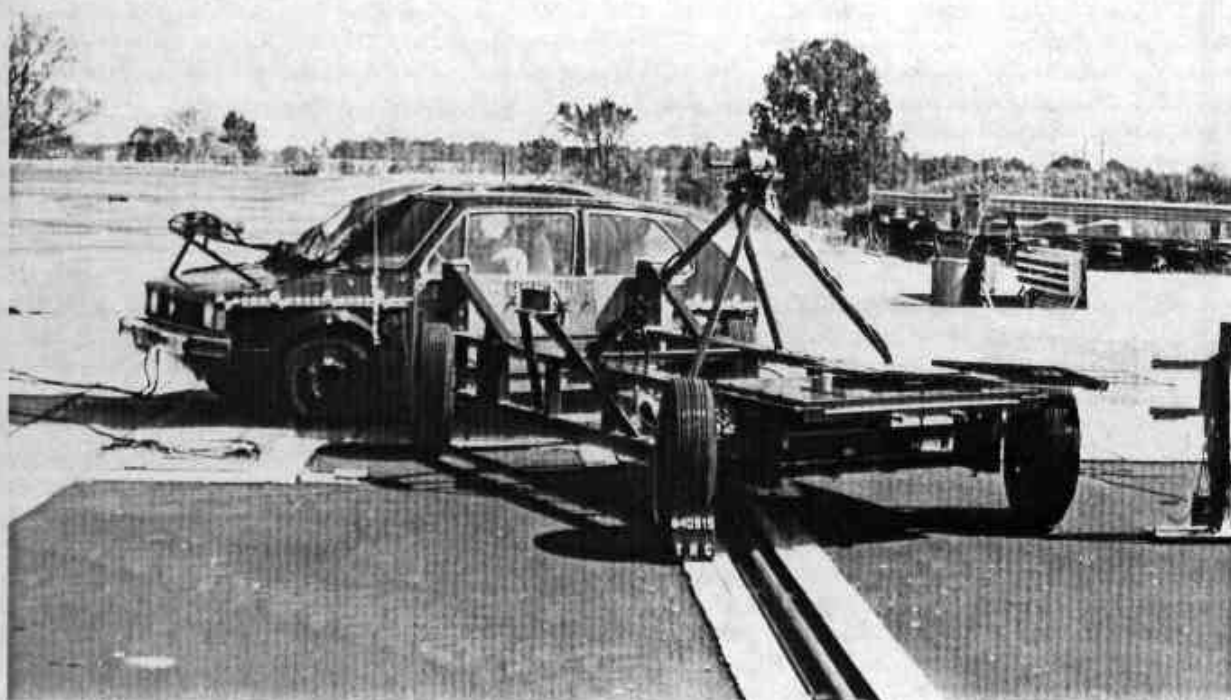


Figure A-2. PRE-TEST OVERALL - VIEW 2
A-2

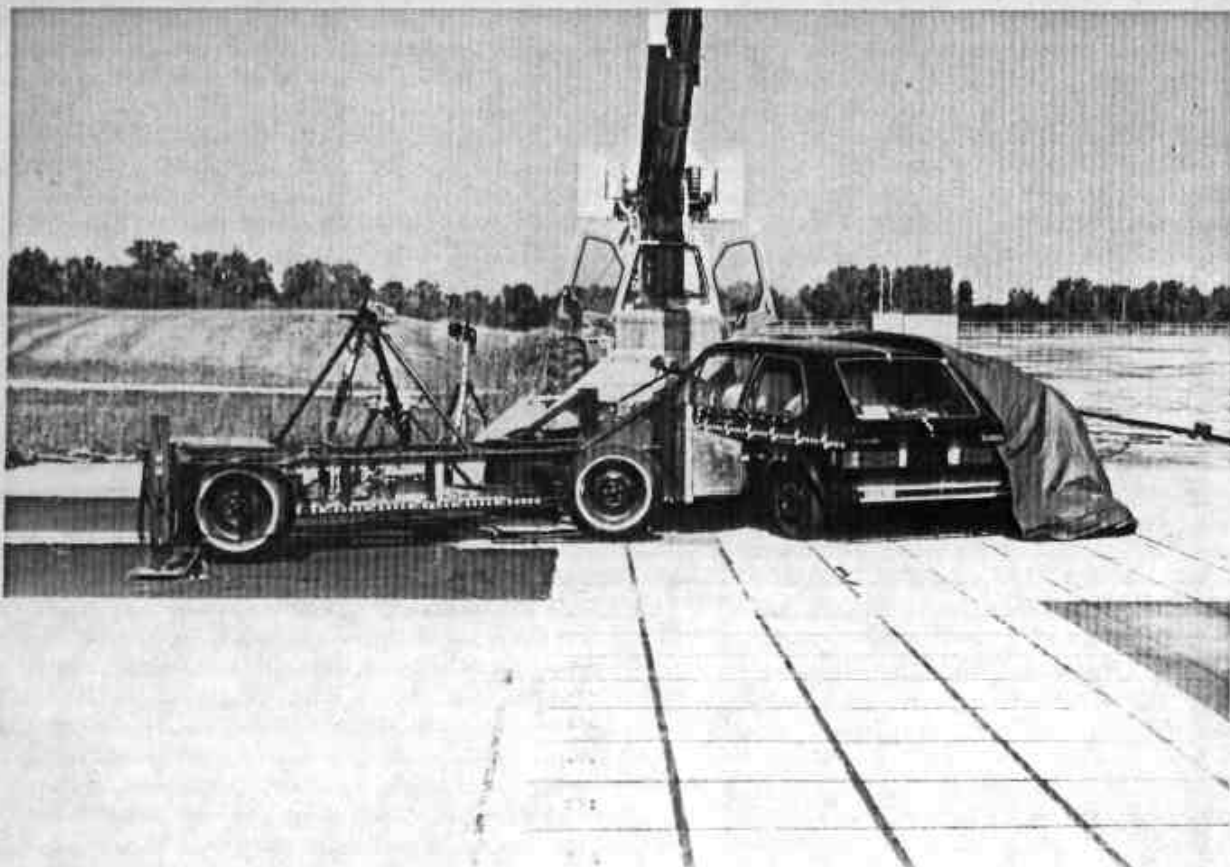


Figure A-3. PRE-TEST OVERALL - VIEW 3

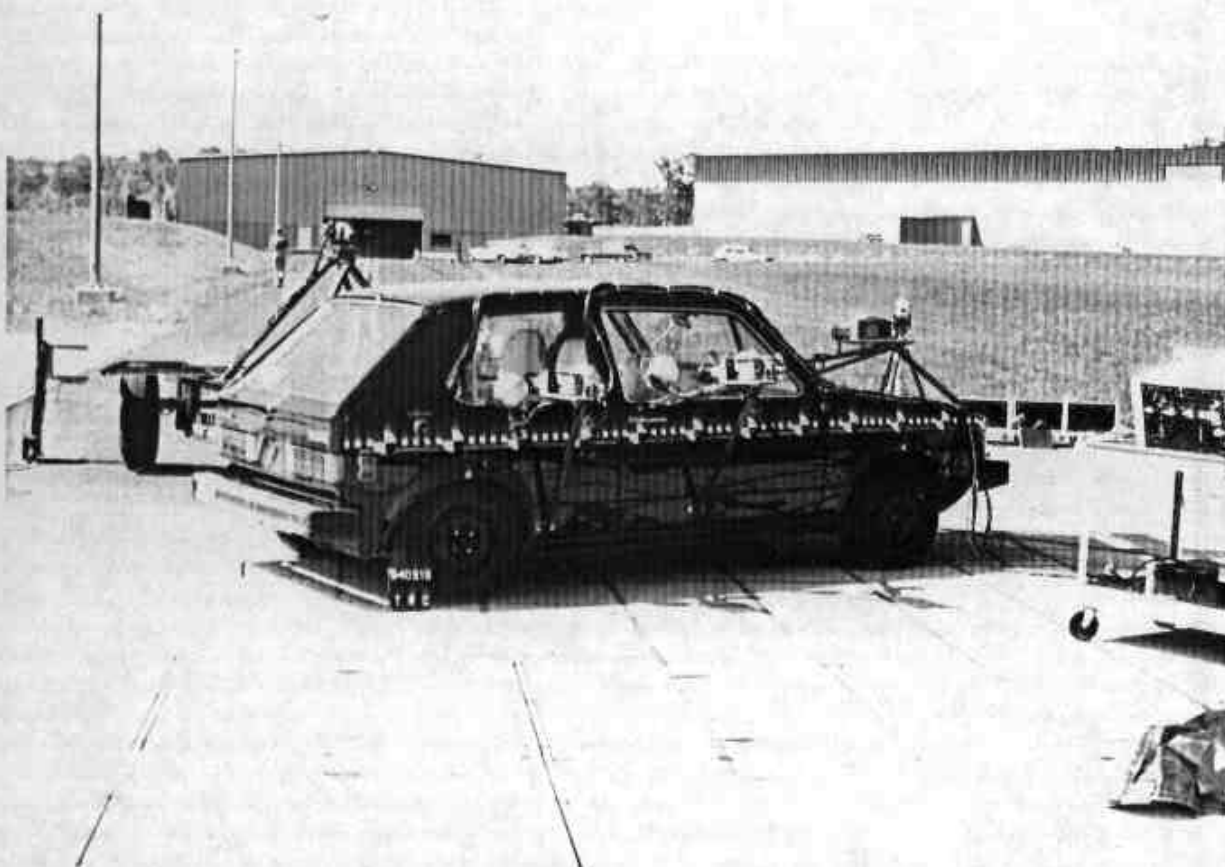


Figure A-4. PRE-TEST OVERALL - VIEW 4
A-3

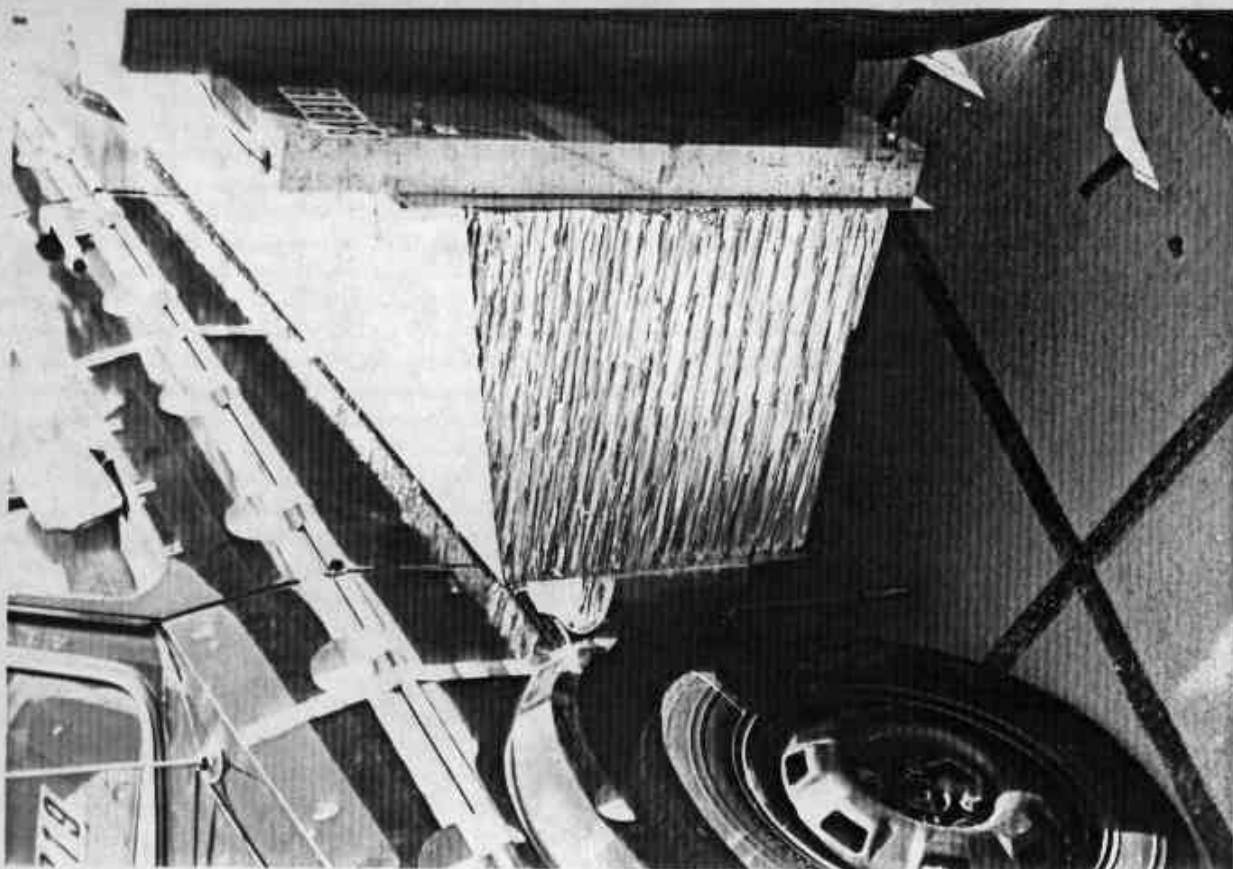


Figure A-5. PRE-TEST CLOSEUP - VIEW 1

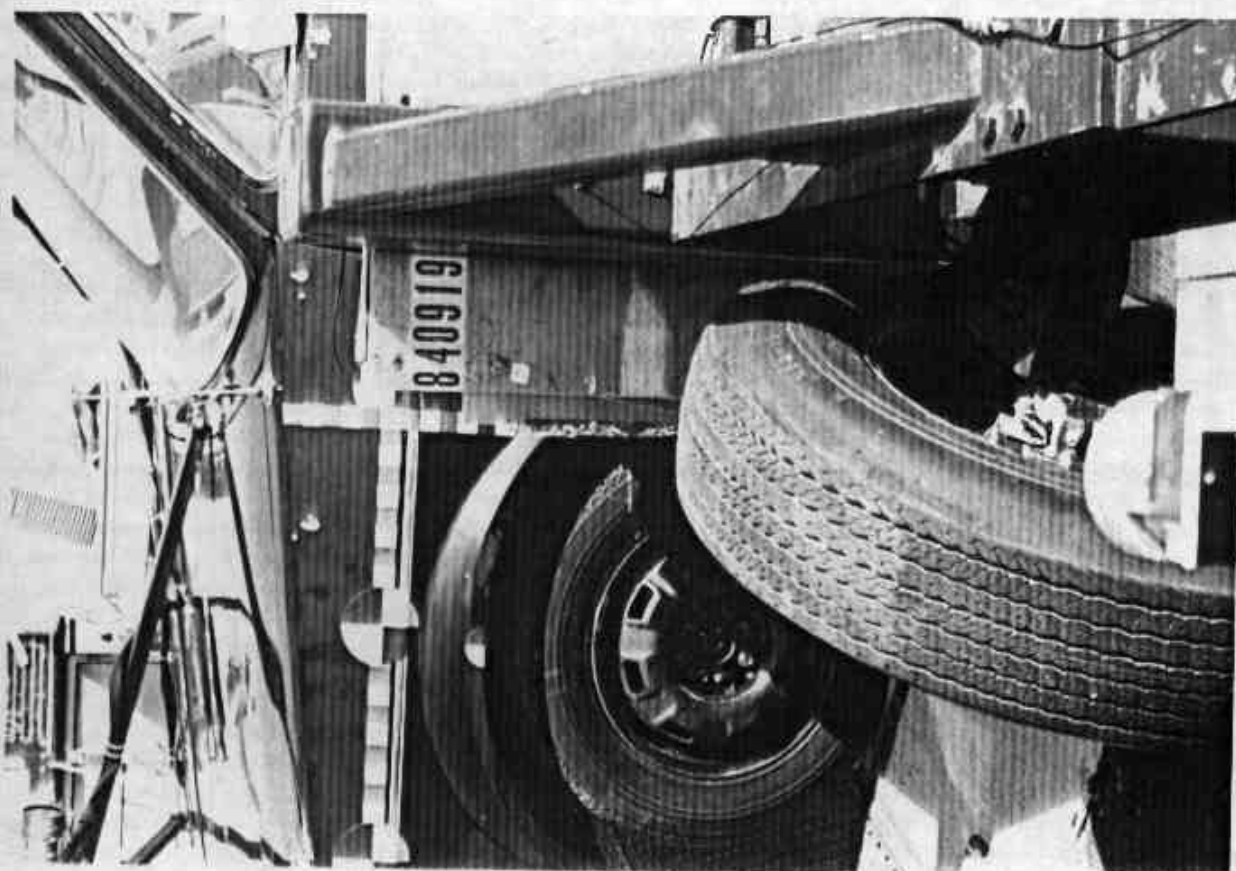


Figure A-6. PRE-TEST CLOSEUP - VIEW 2
A-4



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

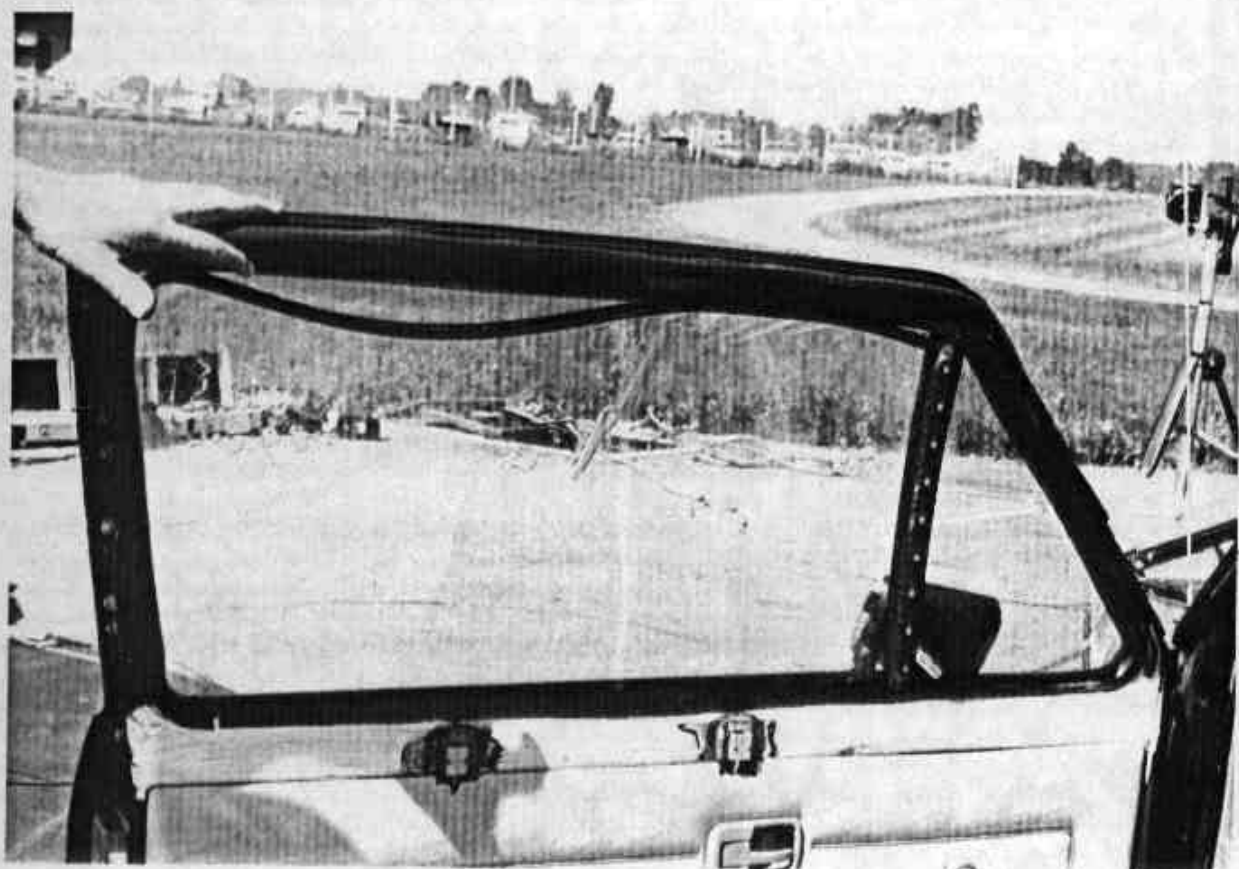


Figure A-8. MODIFIED WINDOW - VIEW 1
A-5



Figure A-9. MODIFIED WINDOW - VIEW 2

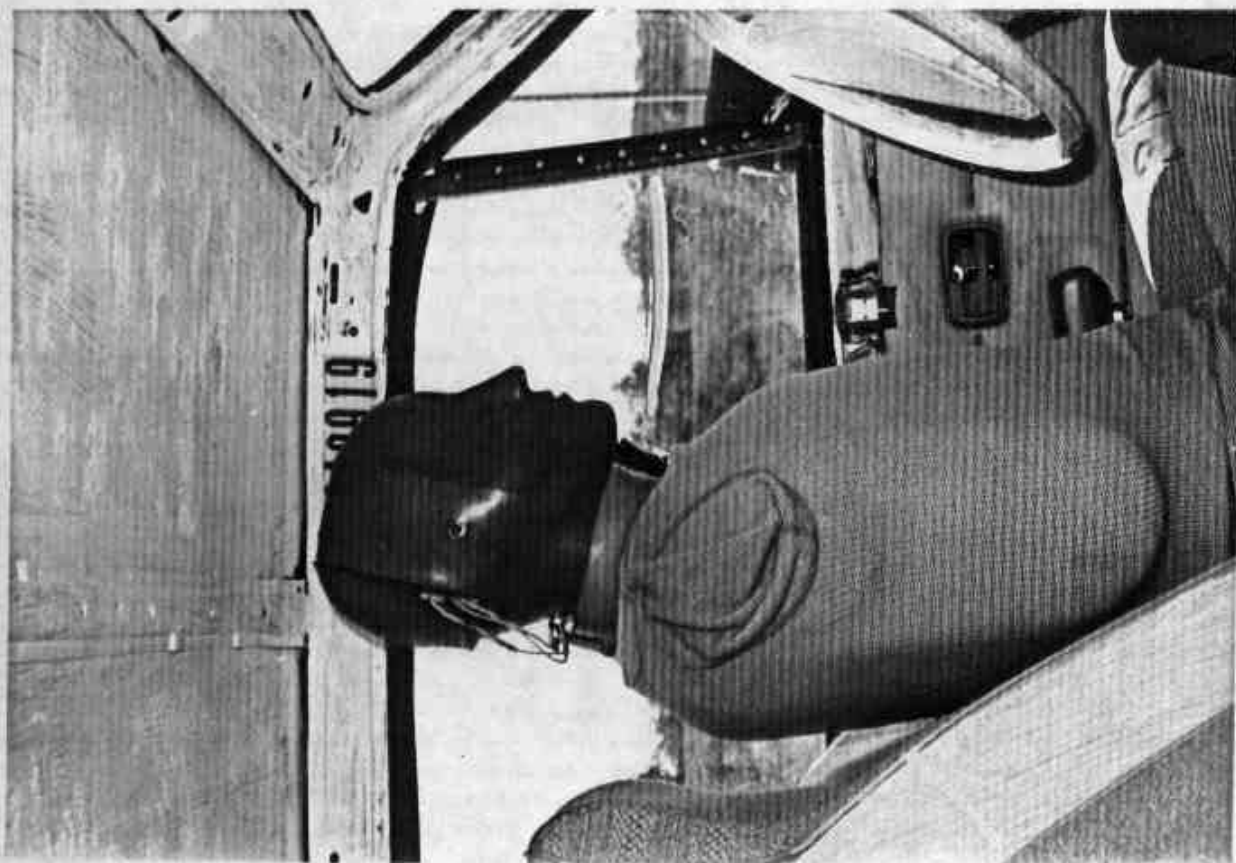


Figure A-10. PRE-TEST DRIVER DUMMY - VIEW 1
A-6

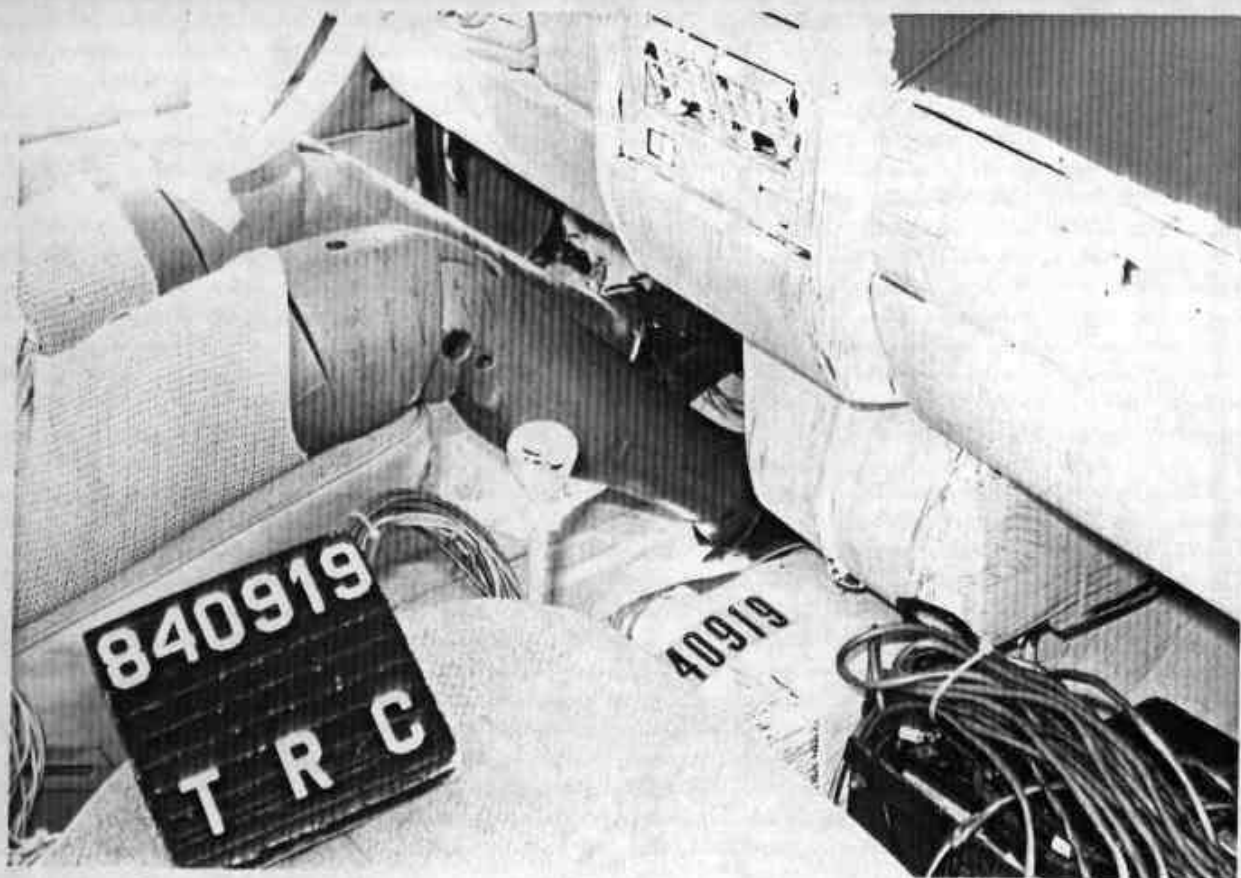


Figure A-11. PRE-TEST DRIVER DUMMY - VIEW 2



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

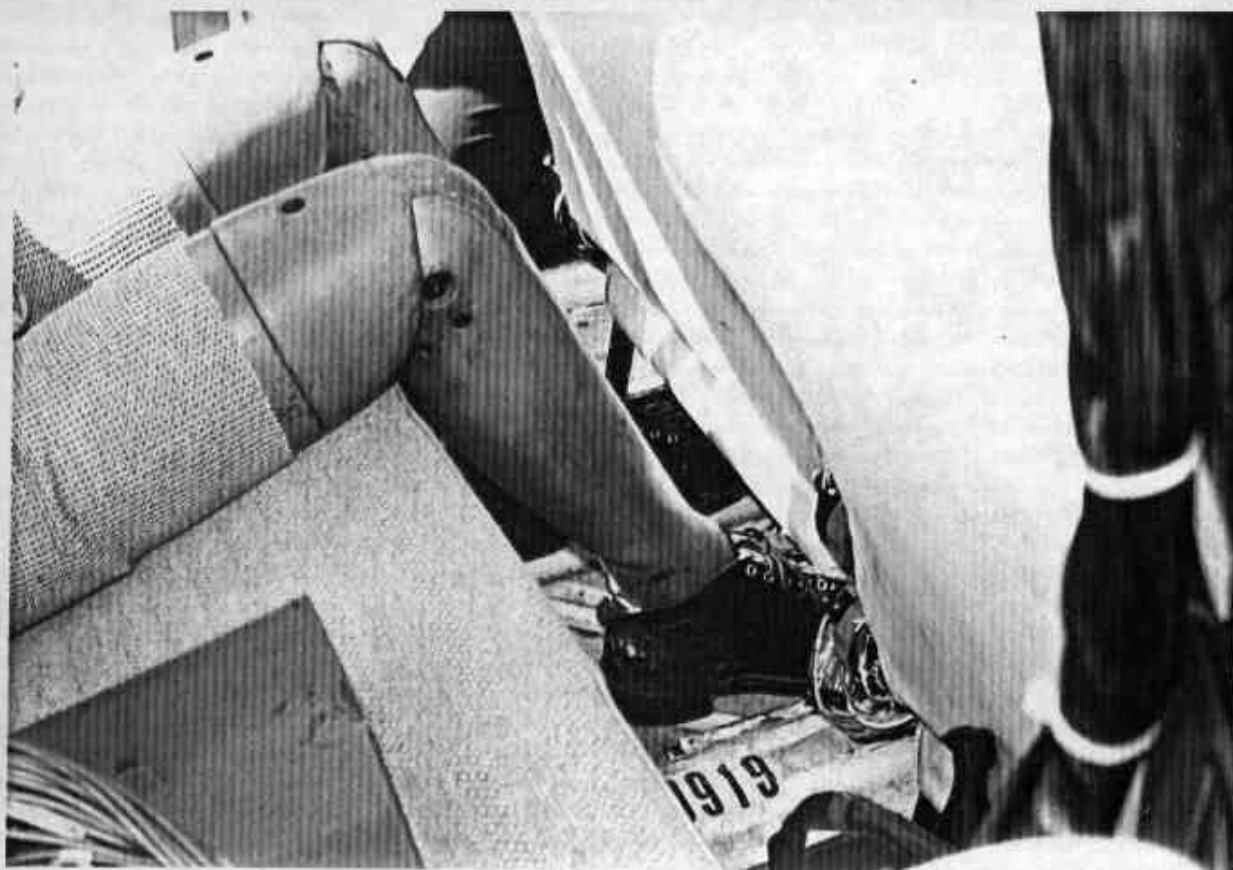


Figure A-13. PRE-TEST PASSENGER DUMMY - VIEW 2



Figure A-14. PRE-TEST DUMMIES OVERALL
A-8

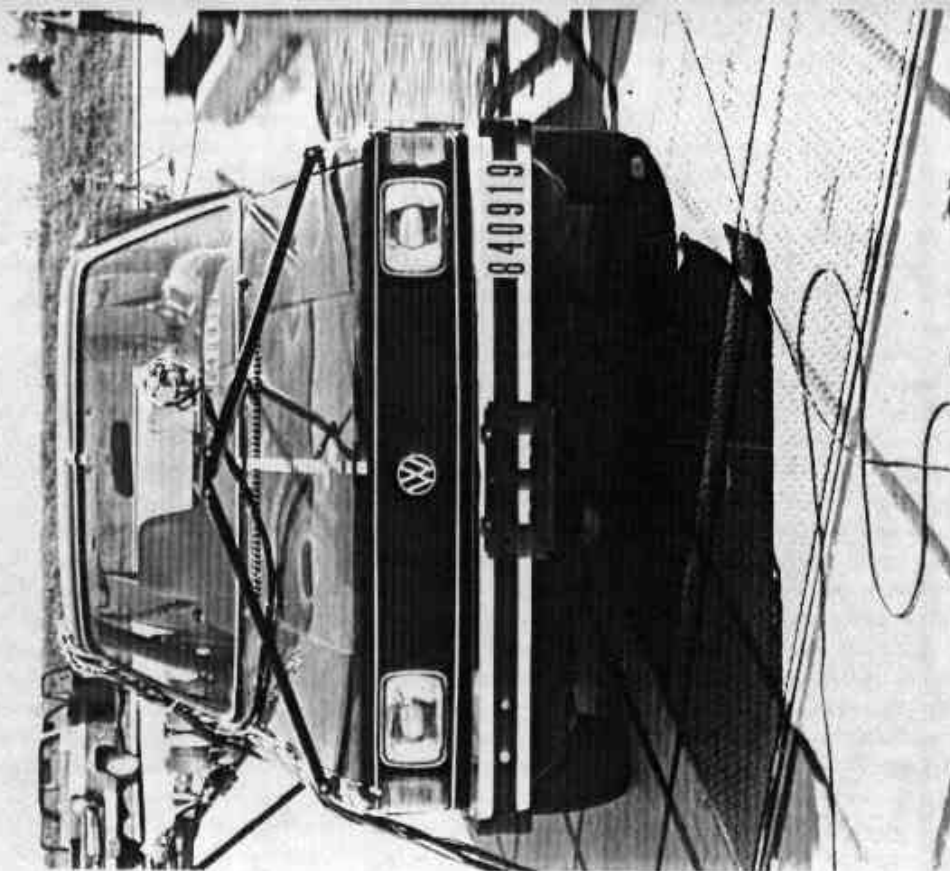


Figure A-15. CRASH EVENT PHOTOGRAPH

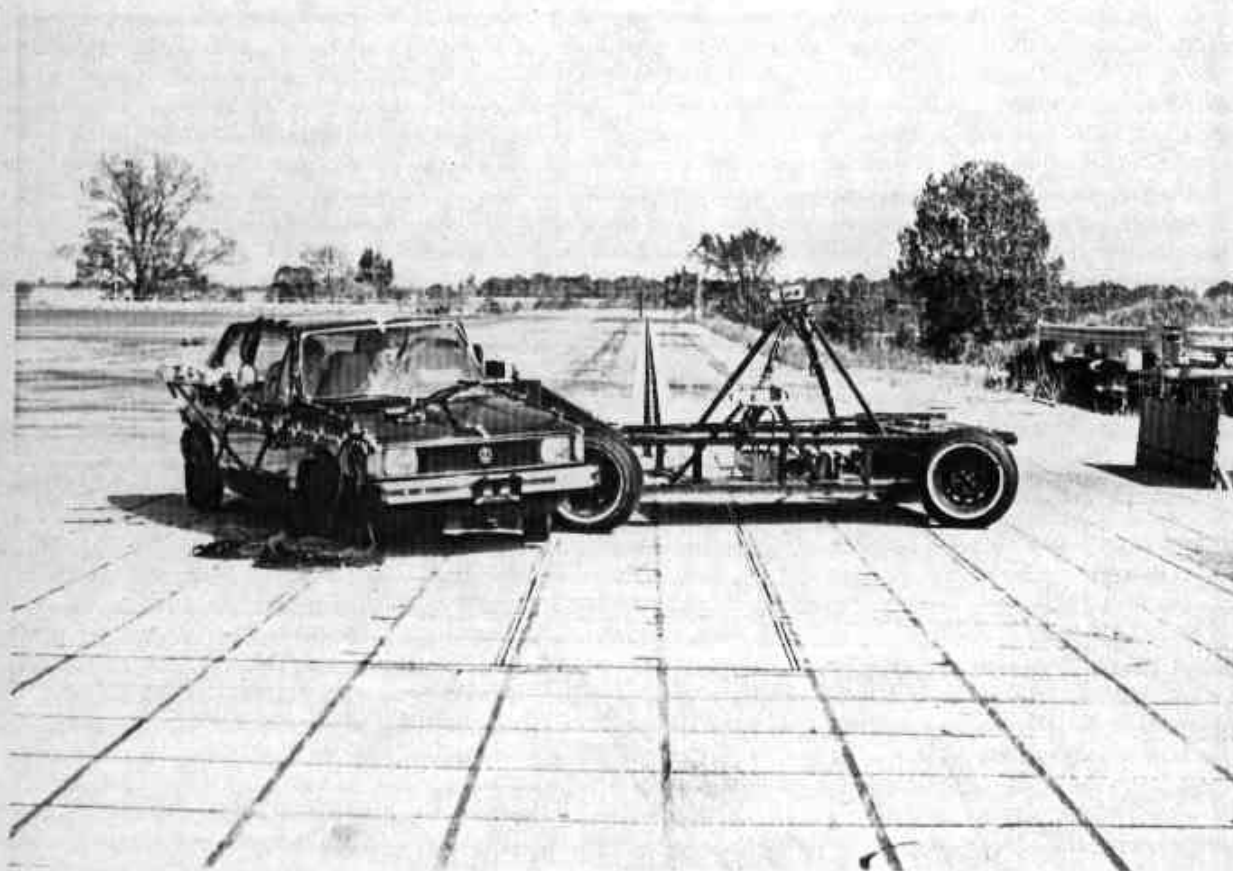


Figure A-16. POST-TEST OVERALL - VIEW 1
A-9

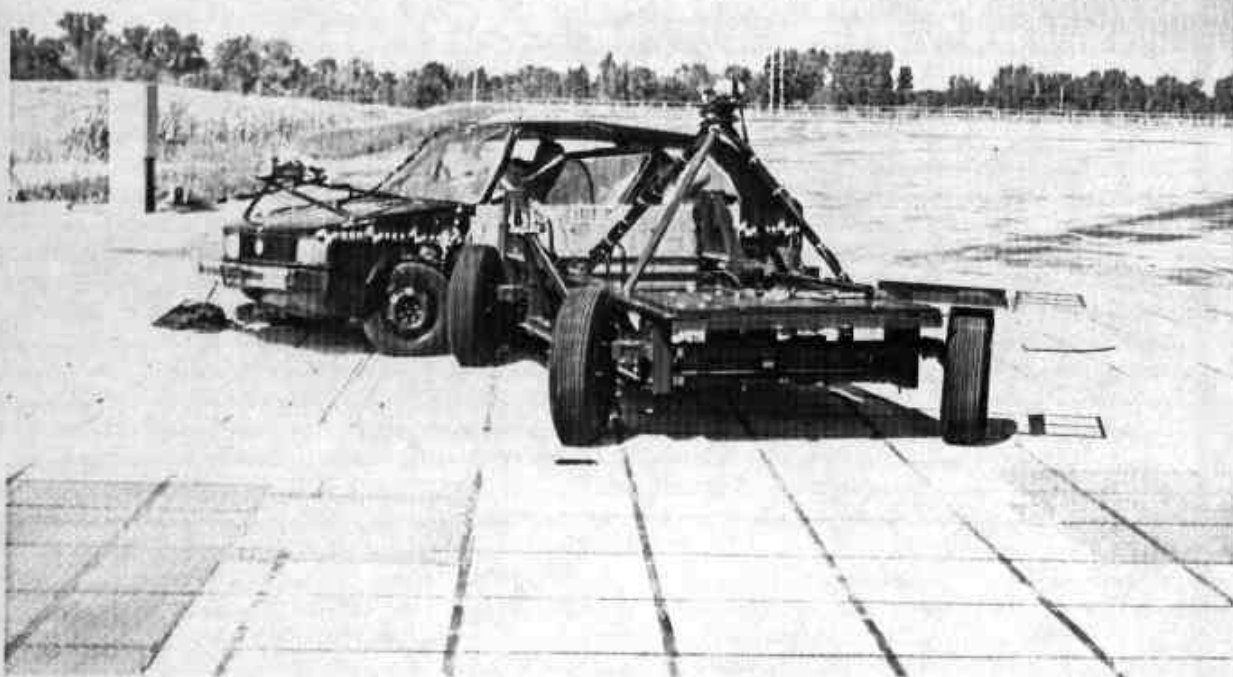


Figure A-17. POST-TEST OVERALL - VIEW 2

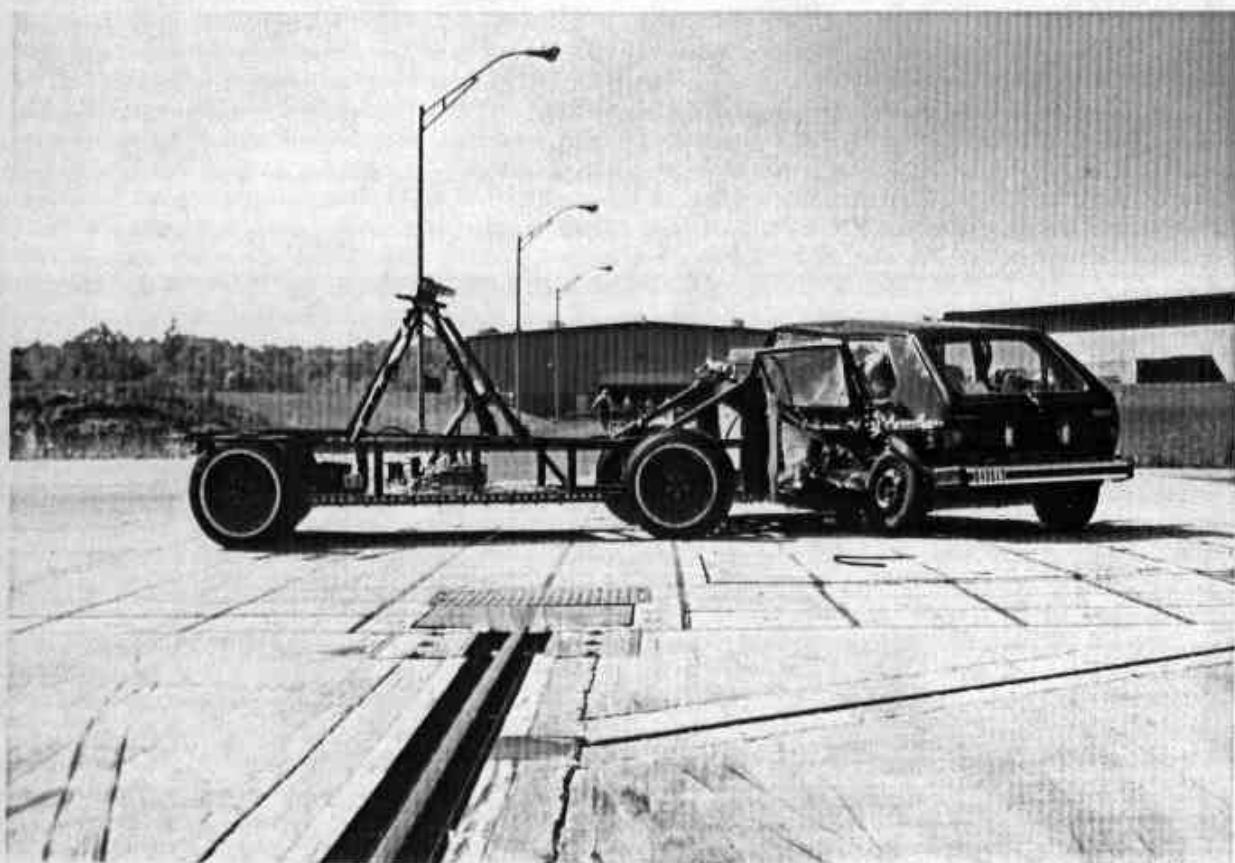


Figure A-18. POST-TEST OVERALL - VIEW 3
A-10



Figure A-19. POST-TEST OVERALL - VIEW 4

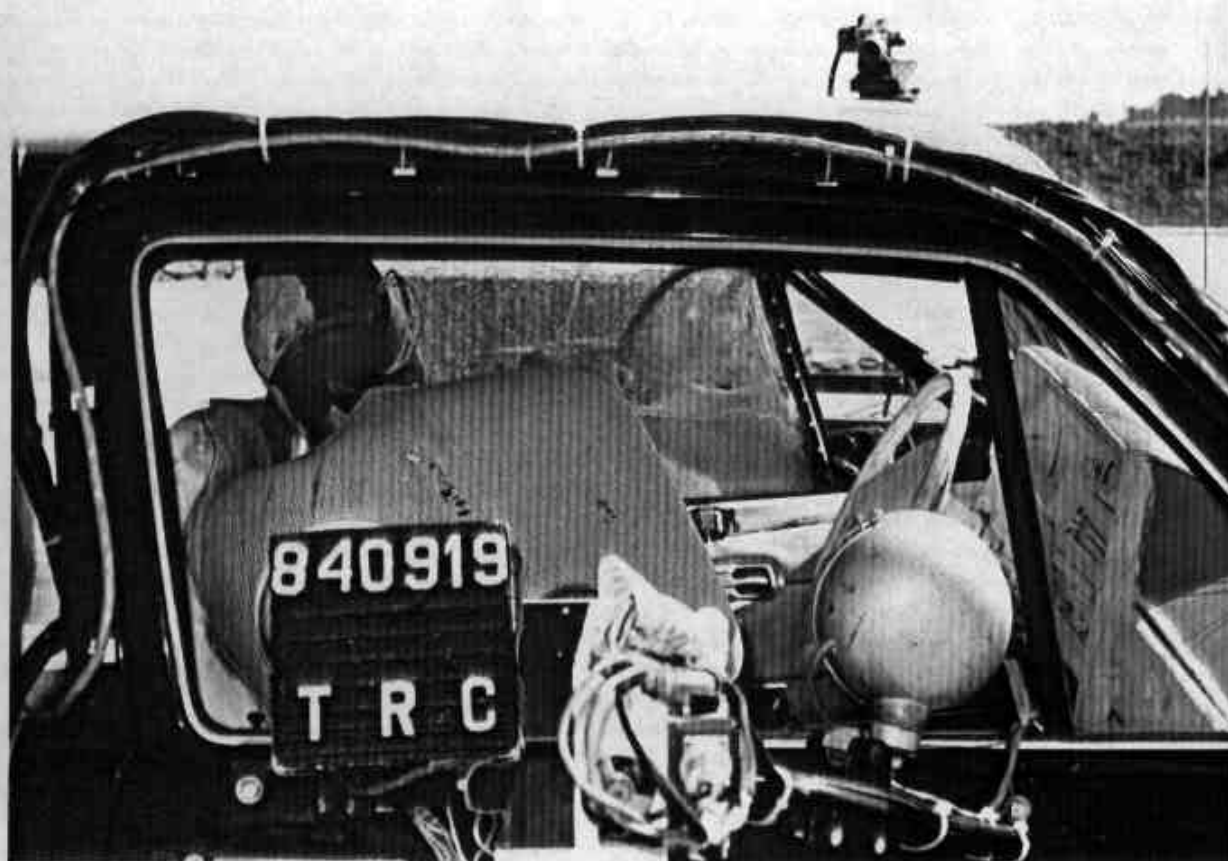


Figure A-20. POST-TEST DRIVER DUMMY - VIEW 1
A-11

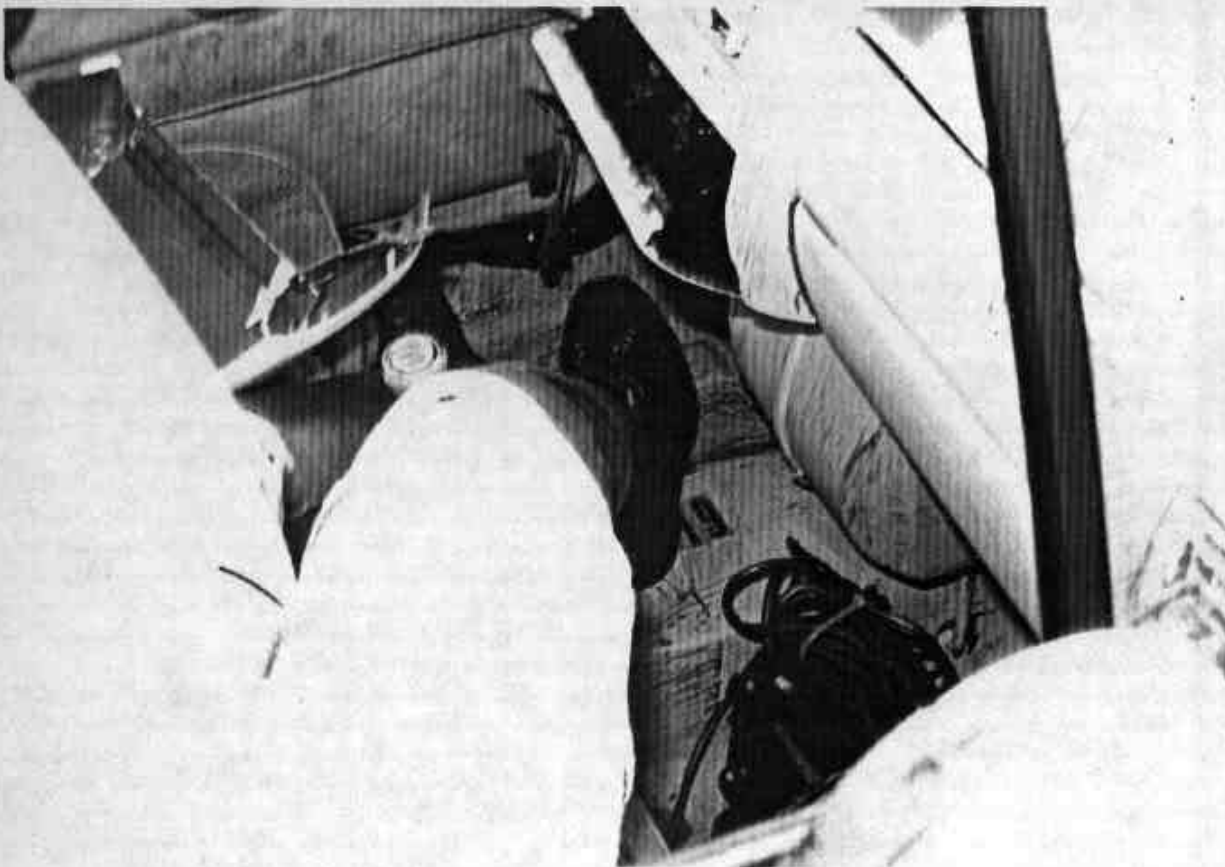


Figure A-21. POST-TEST DRIVER DUMMY - VIEW 2



Figure A-22. POST-TEST PASSENGER DUMMY - VIEW 1
A-12



Figure A-23. POST-TEST PASSENGER DUMMY - VIEW 2



Figure A-24. POST-TEST PASSENGER DUMMY - VIEW 3



Figure A-25. POST-TEST DUMMIES OVERALL

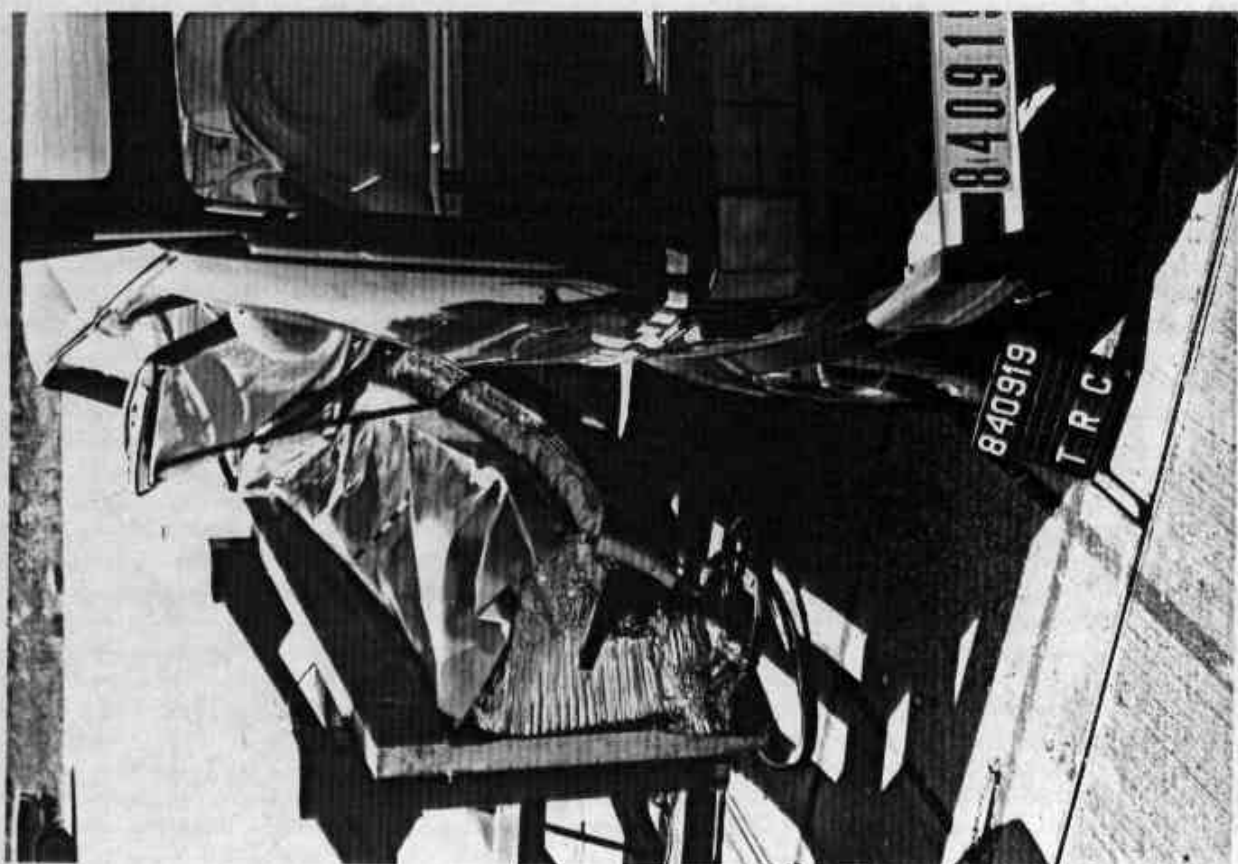


Figure A-26. POST-TEST DAMAGE
A-14



Figure A-27. POST-TEST MODIFIED WINDOW

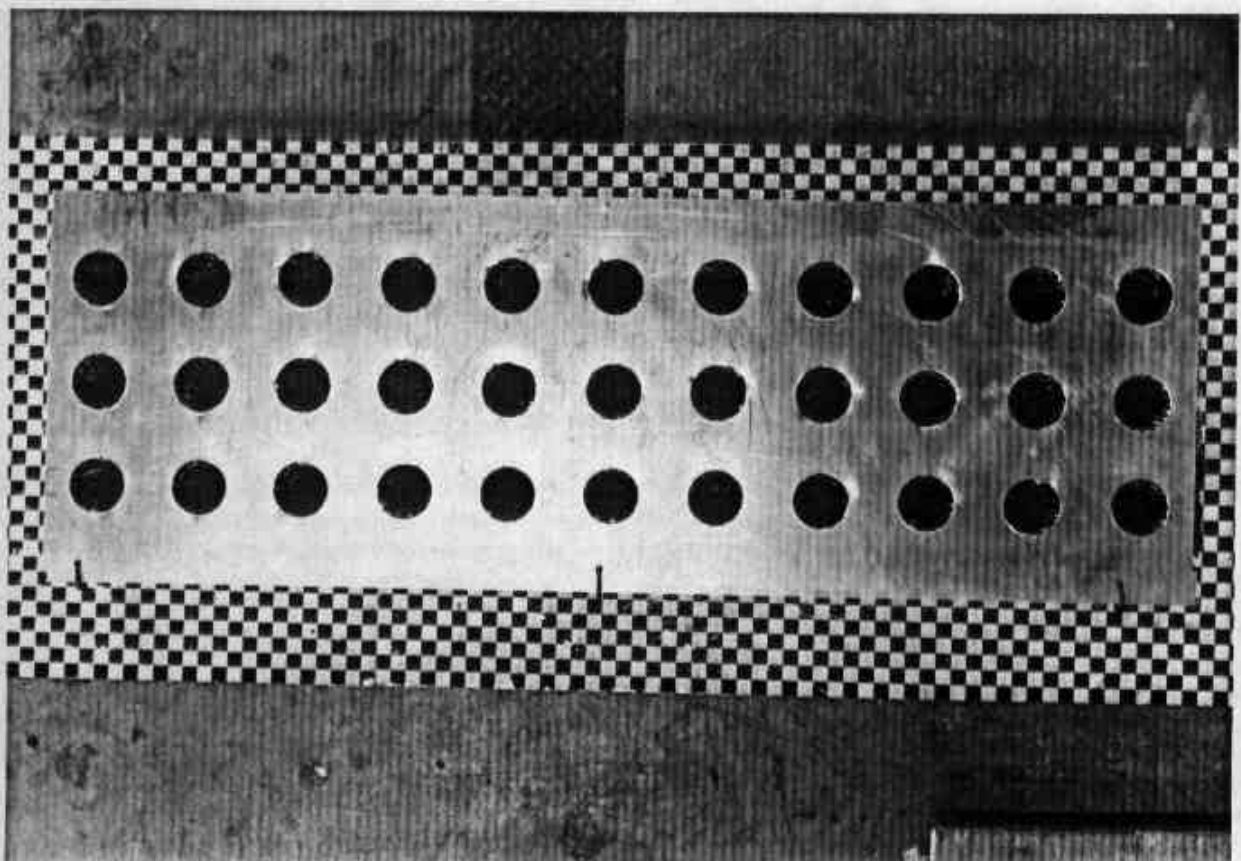


Figure A-28. PRE-TEST MDB FACE - VIEW 1
A-15

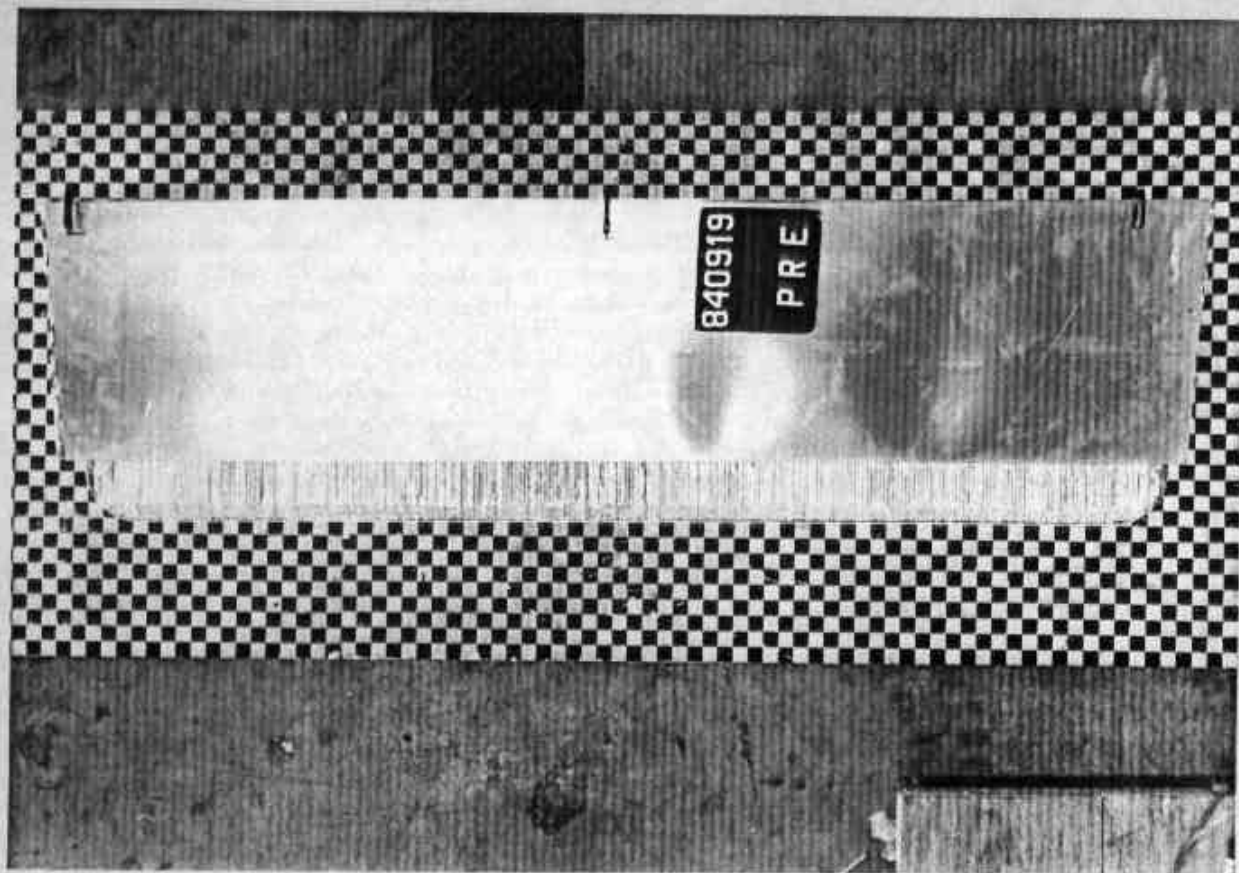


Figure A-29. PRE-TEST MDB FACE - VIEW 2

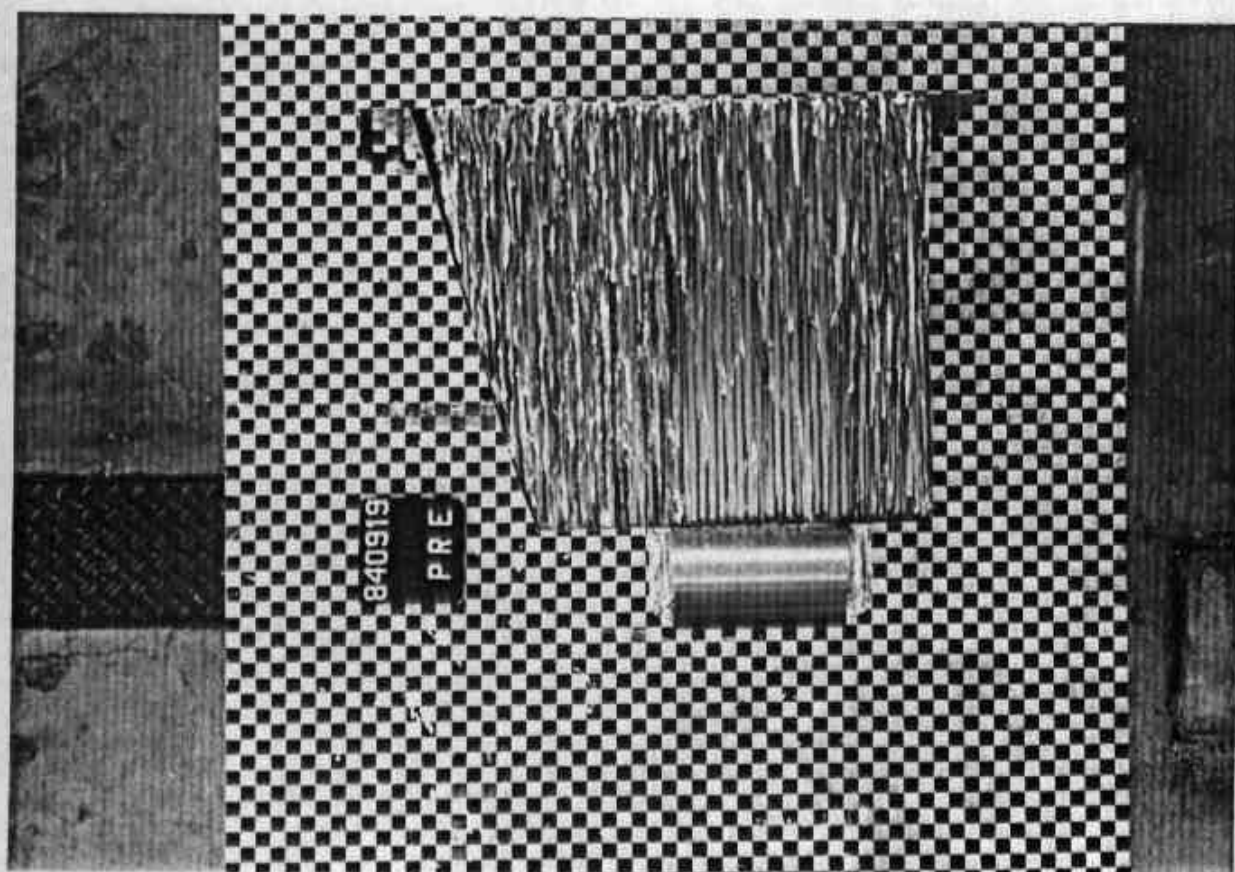


Figure A-30. PRE-TEST MDB FACE - VIEW 3
A-16

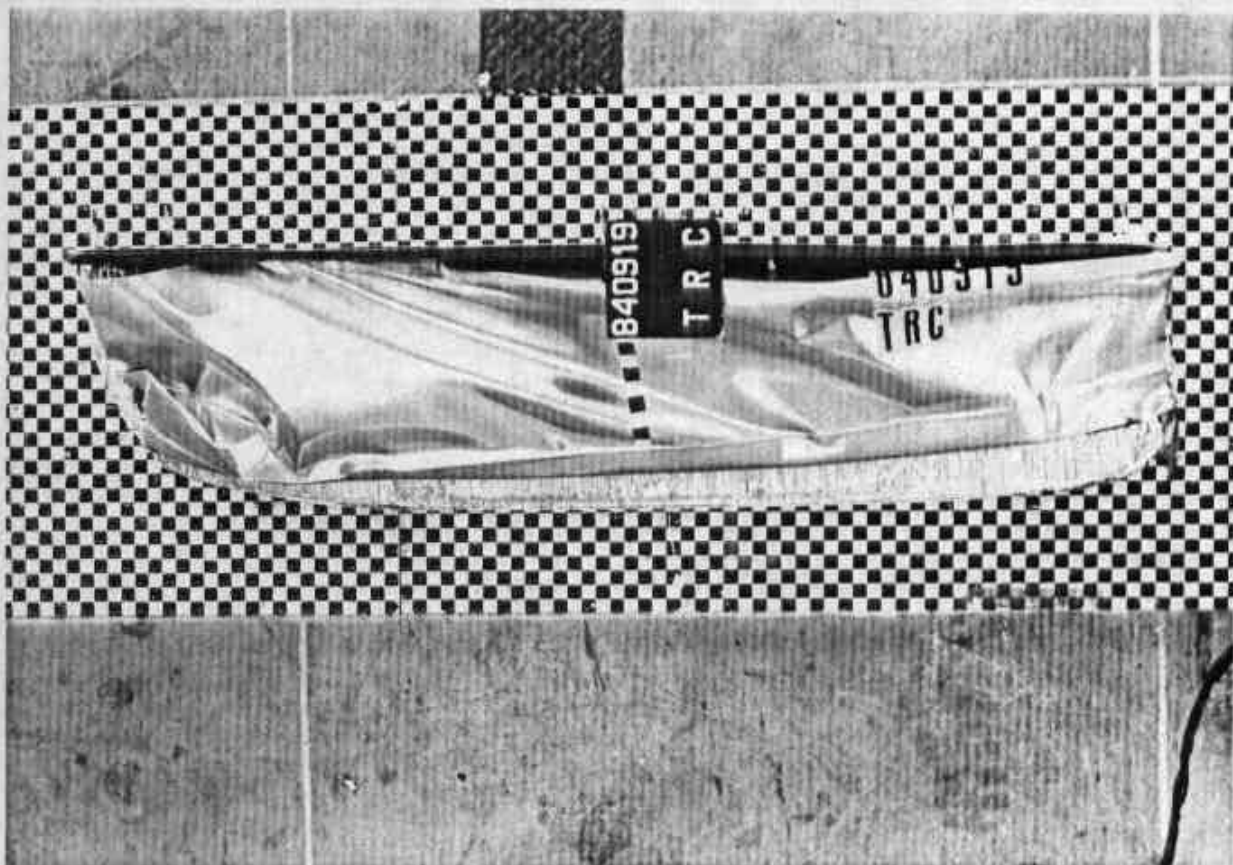


Figure A-31. POST-TEST MDB FACE - VIEW 1

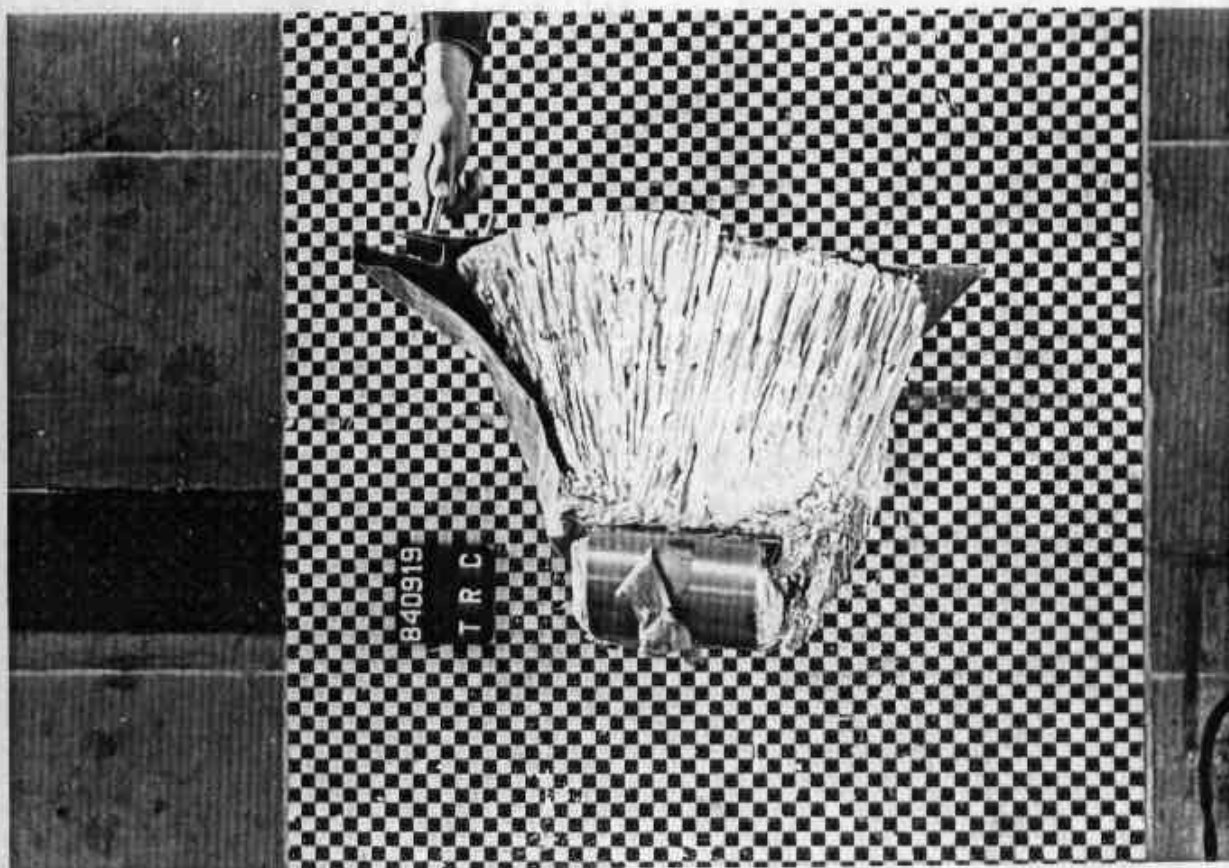
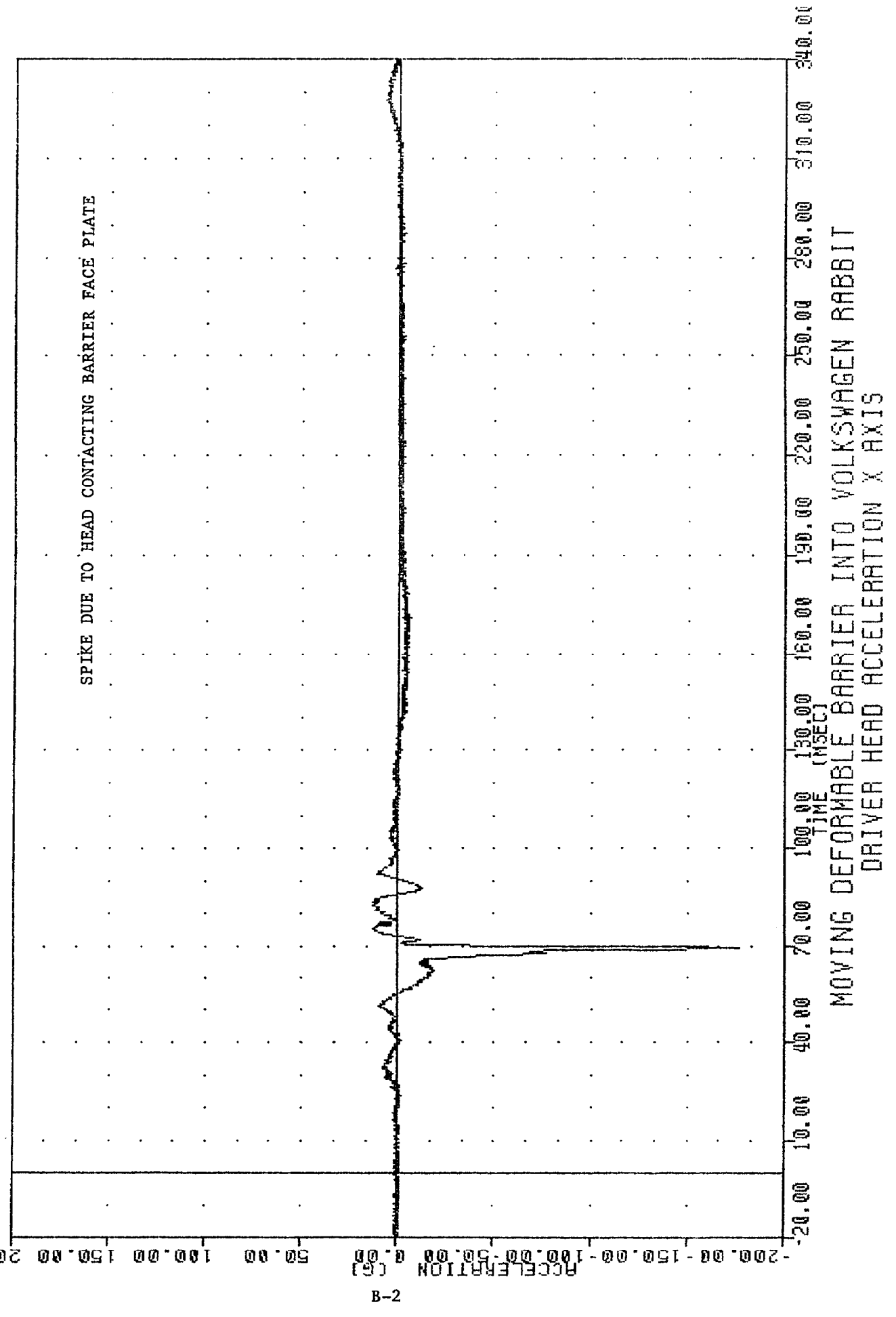


Figure A-32. POST-TEST MDB FACE - VIEW 2

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.

THE [REDACTED] 04915 [REDACTED] 28 SEP 84 11:27:00
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 HEDXG1
 FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -176.86 69.25, 13.21 82.38

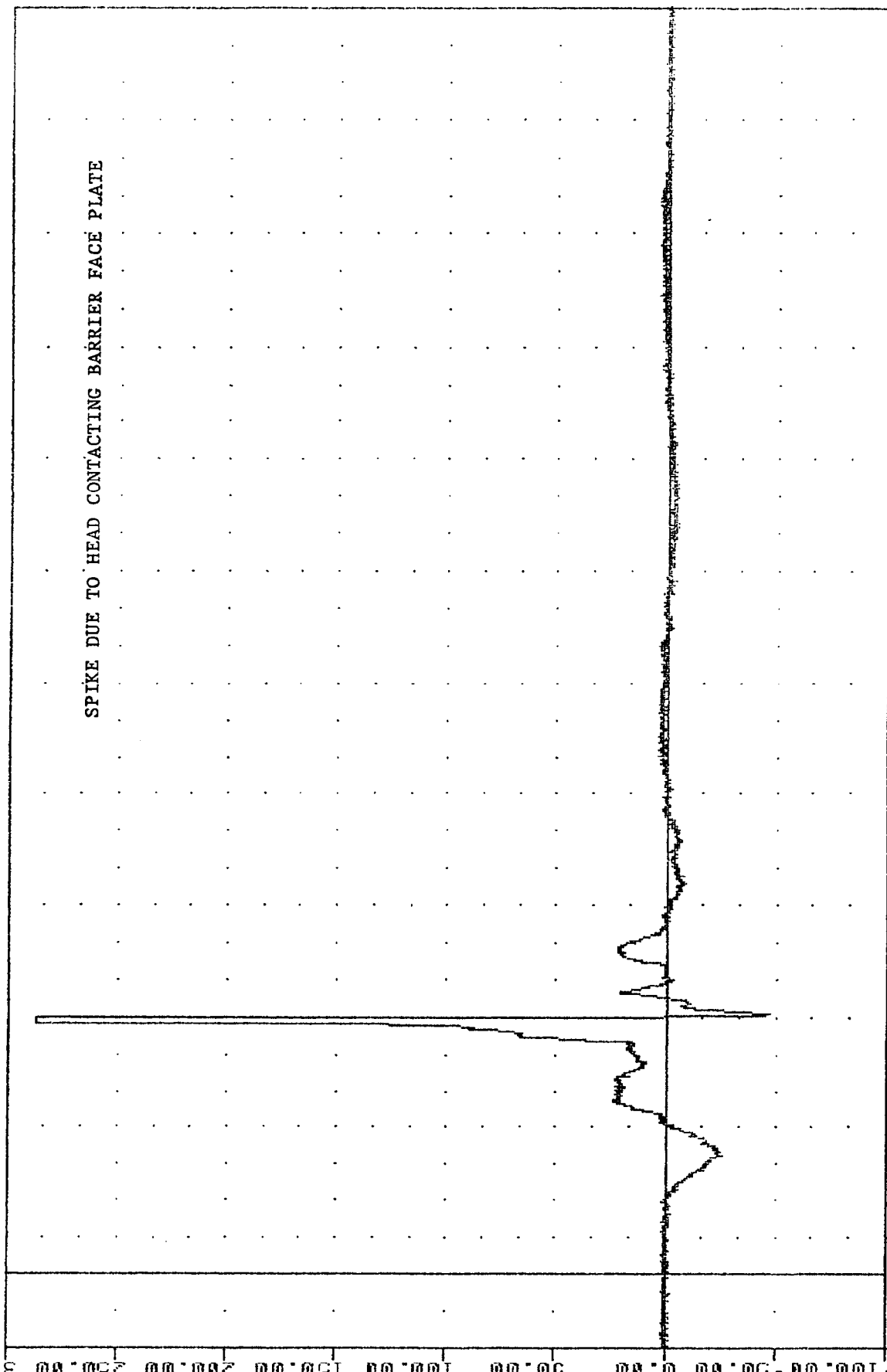


TAC 040919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 HEDY61

PLOT DATE 28 SEP 84 06:52:11

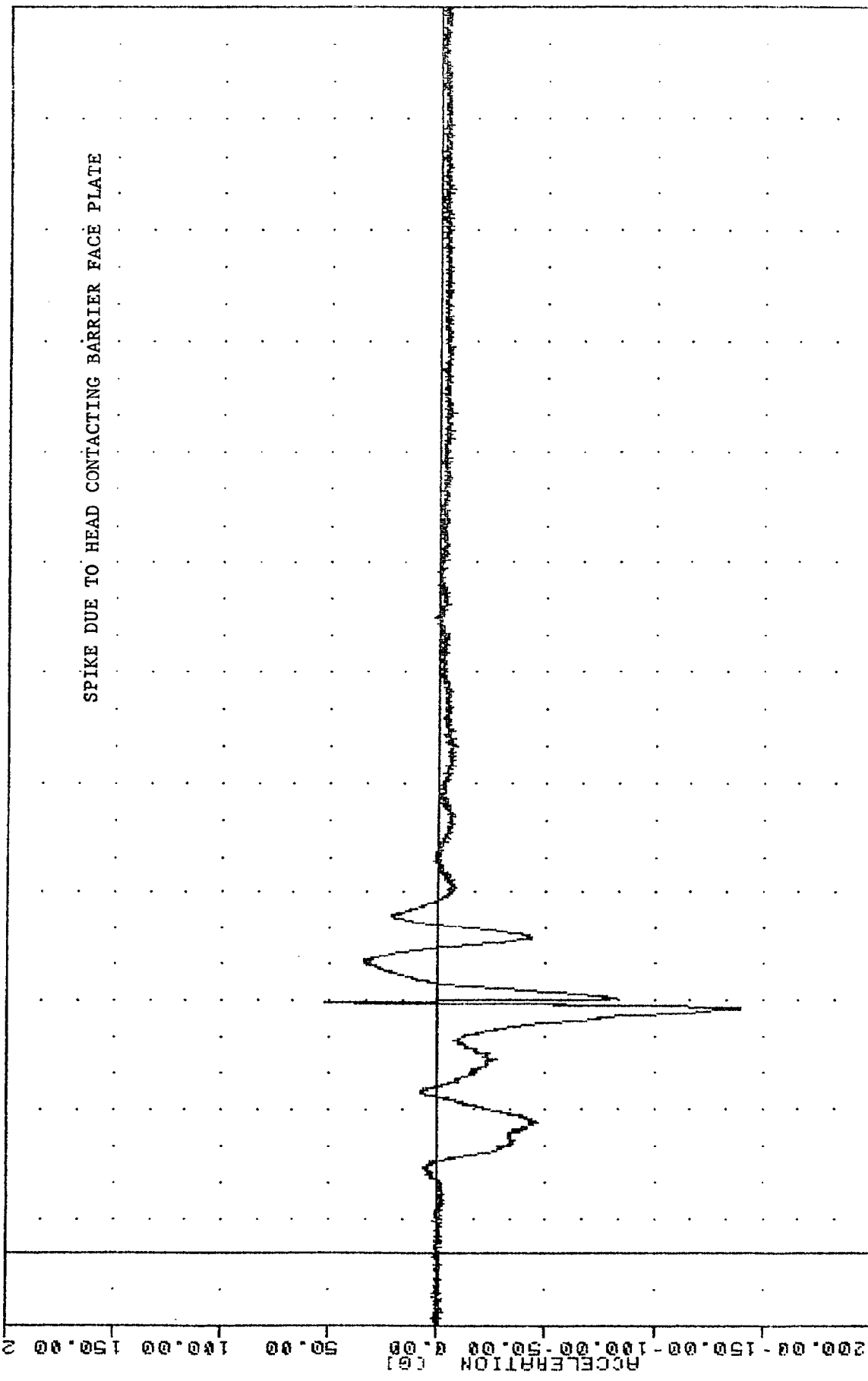
FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = -46.99% 70.63, 286.51 0 68.38

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
 DRIVER HEAD ACCELERATION Y AXIS

TAC 840819, 840819
 SIDE AGGRESSIVE ATTRIBUTES
 842830000000
 HEDZ61
 FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = -140.03 67.50, 52.66 * 69.36
 PLOT DATE 26 SEP 84 11:27:00

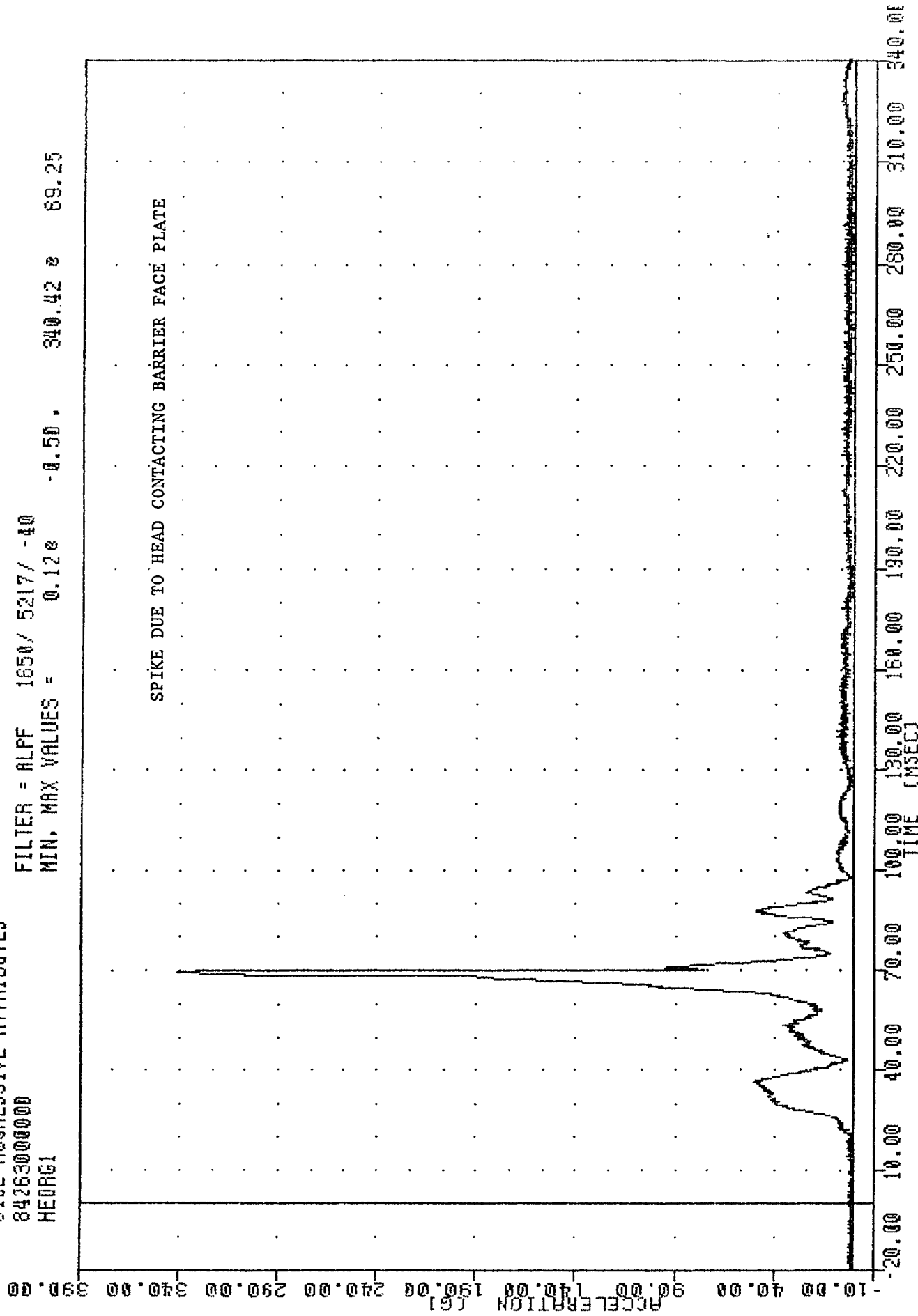


-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER HEAD ACCELERATION Z AXIS

TAG , 040915
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 HEDRG1

PLUT DATE 28 SEP-84 11:27:00

FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = 0.128 -0.50 340.42 8 69.25



TAC 040919 PLOT DATE 26-SEP-84 11:29:24

SIDE AGGRESSIVE ATTRIBUTES

84263000000

101XG1

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -27.68 56.25 , 8.86 43.13

200.00

150.00

100.00

50.00

0.00

-50.00

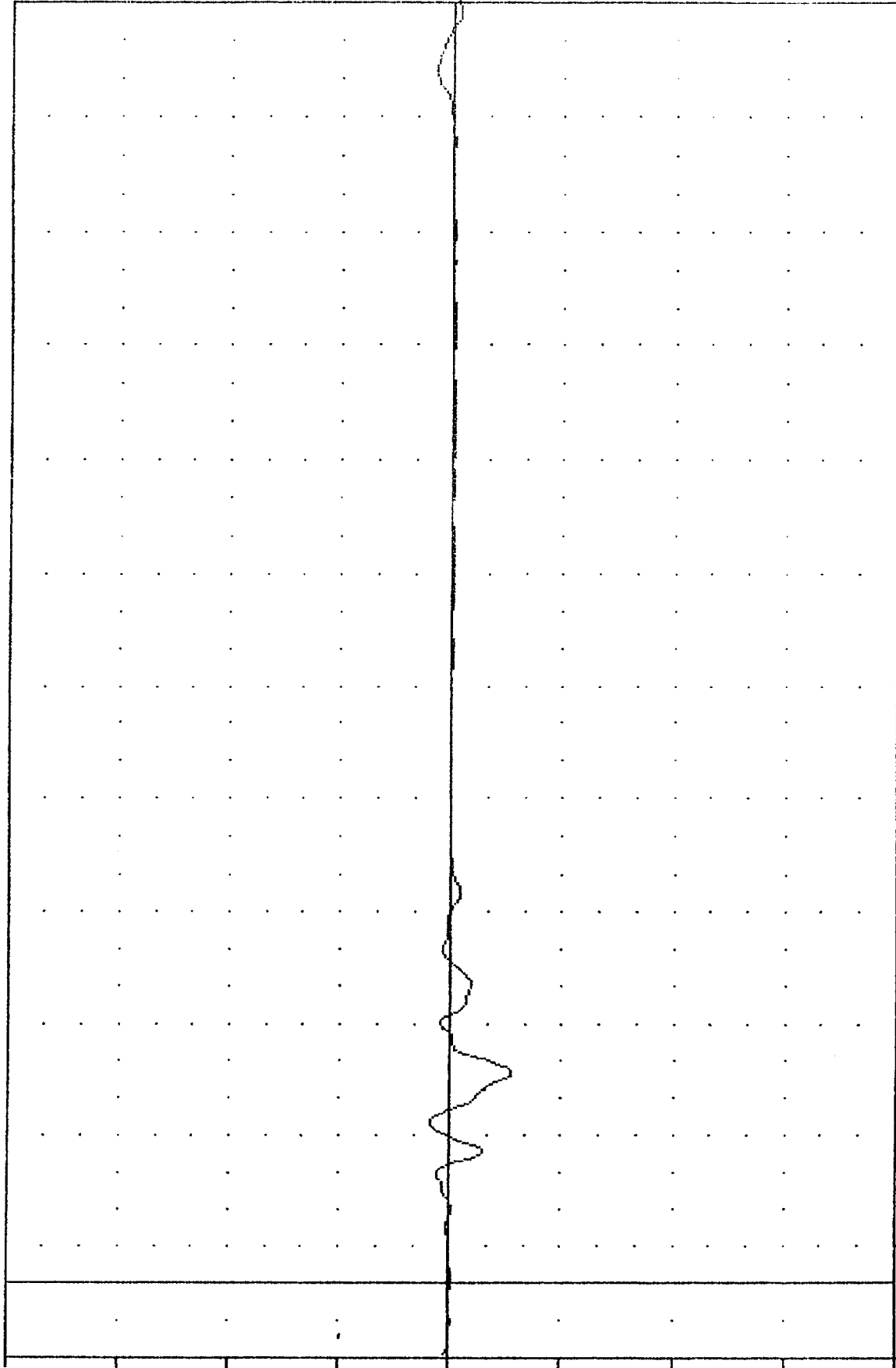
-100.00

-150.00

-200.00

ACCELERATION (G)

B-6

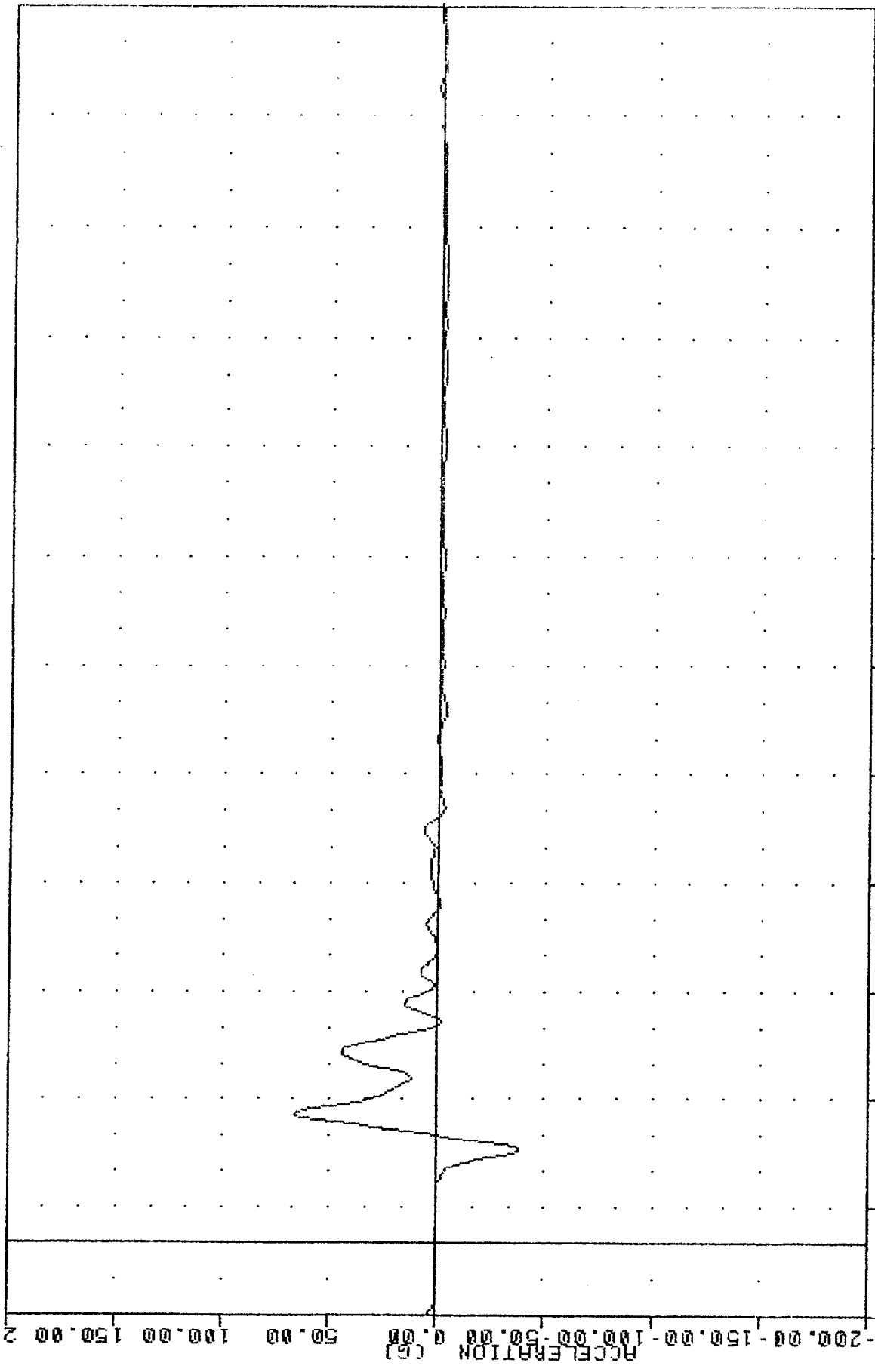


-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

TIME (MSEC)

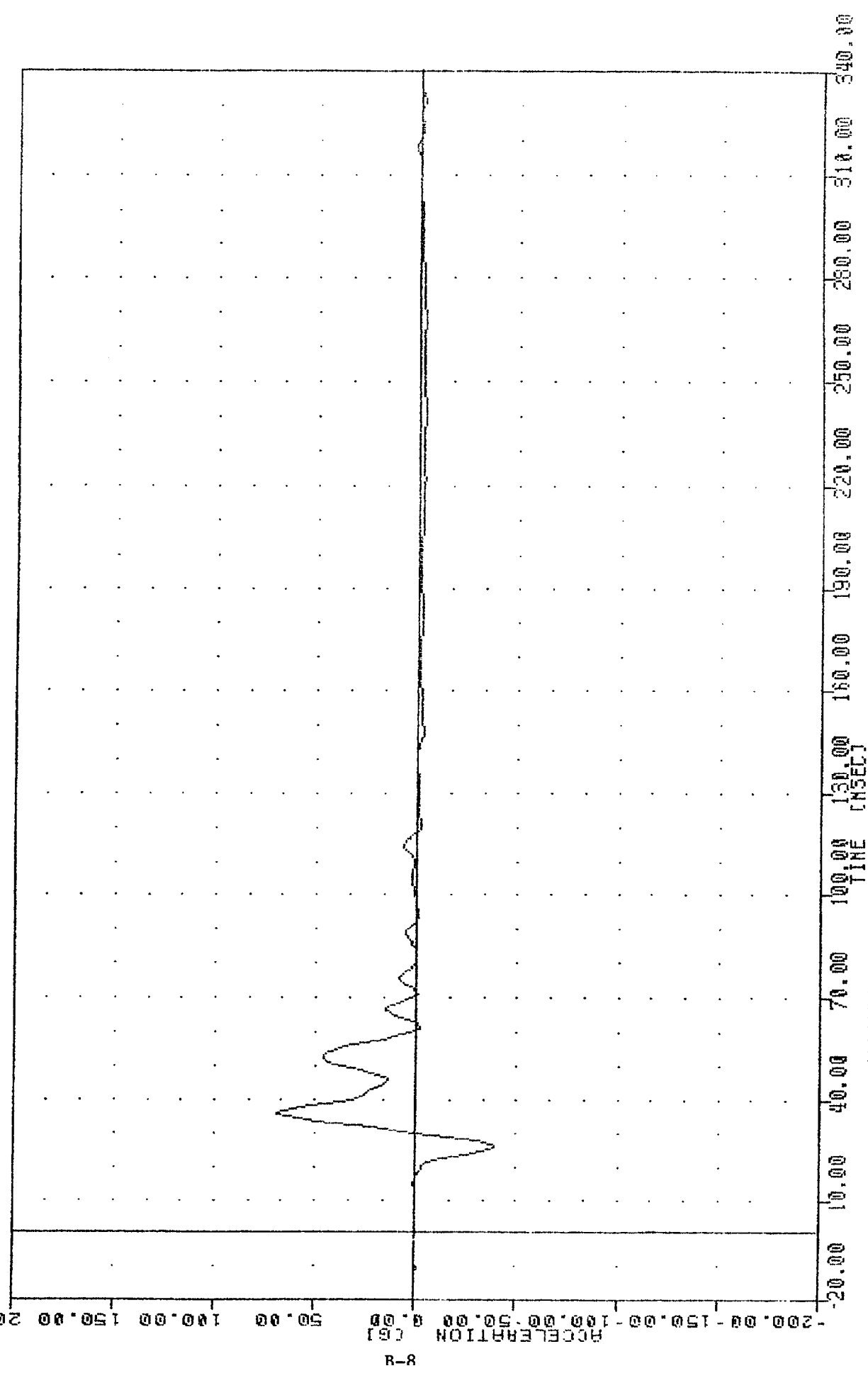
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE ACCELERATION X AXIS

TAC 040919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T01Y61
 PLOT DATE 26-SEP-84 11:29:24
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -38.40 25.63, 66.17 35.63



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

TRC 840919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T01Y6A
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -39.48 25.00 69.40 35.63
 PLOT DATE 26-SEP-84 11:29:24

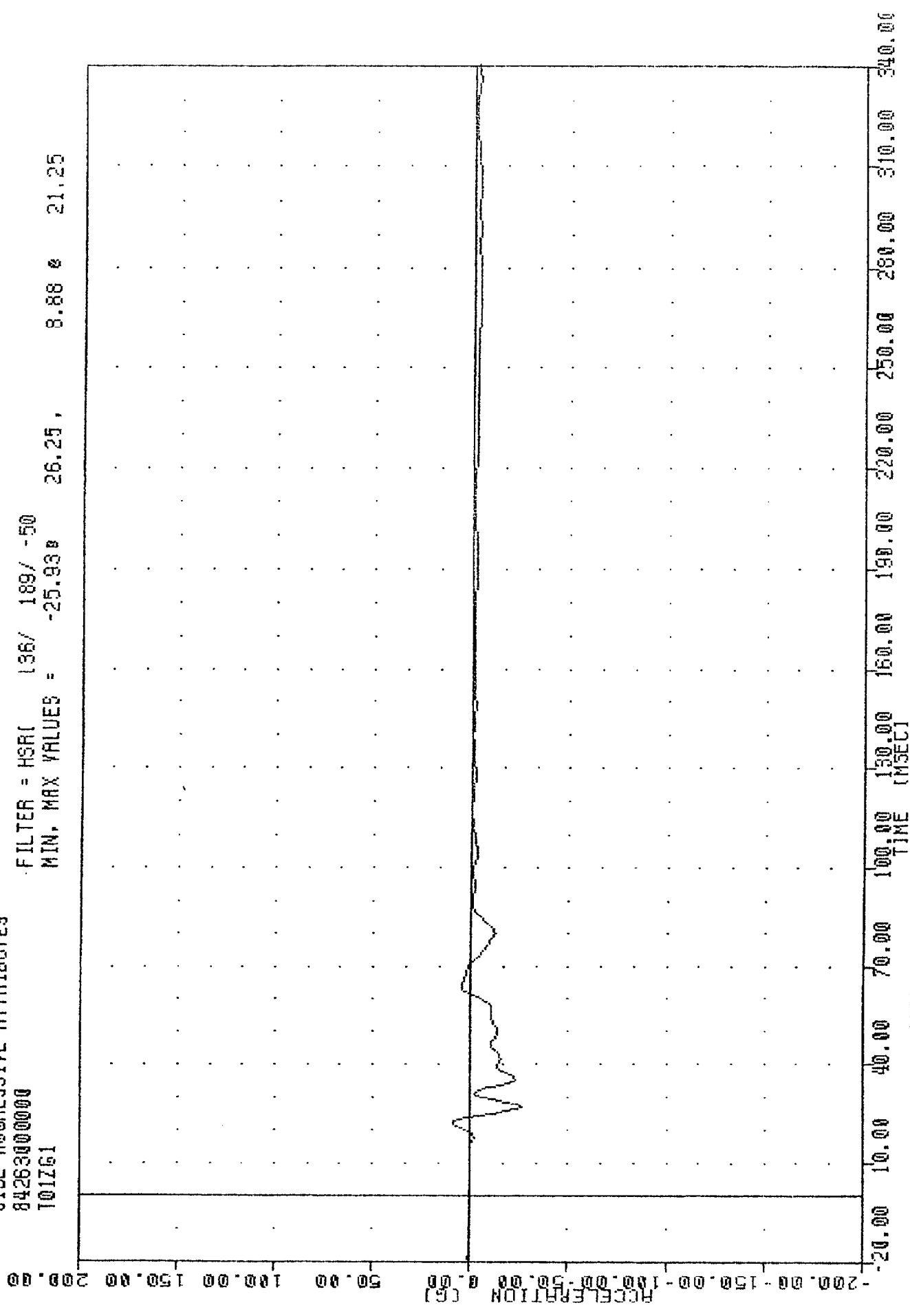


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER UPPER SPINE ACCELERATION -2 Y AXIS

TMC 040913
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T01Z61

PLOT DATE 25-SEP-84 11:29:24

FILTER = HSR(136/ 189/ -50
 MIN, MAX VALUES = -25.930 26.25, 8.88 21.25

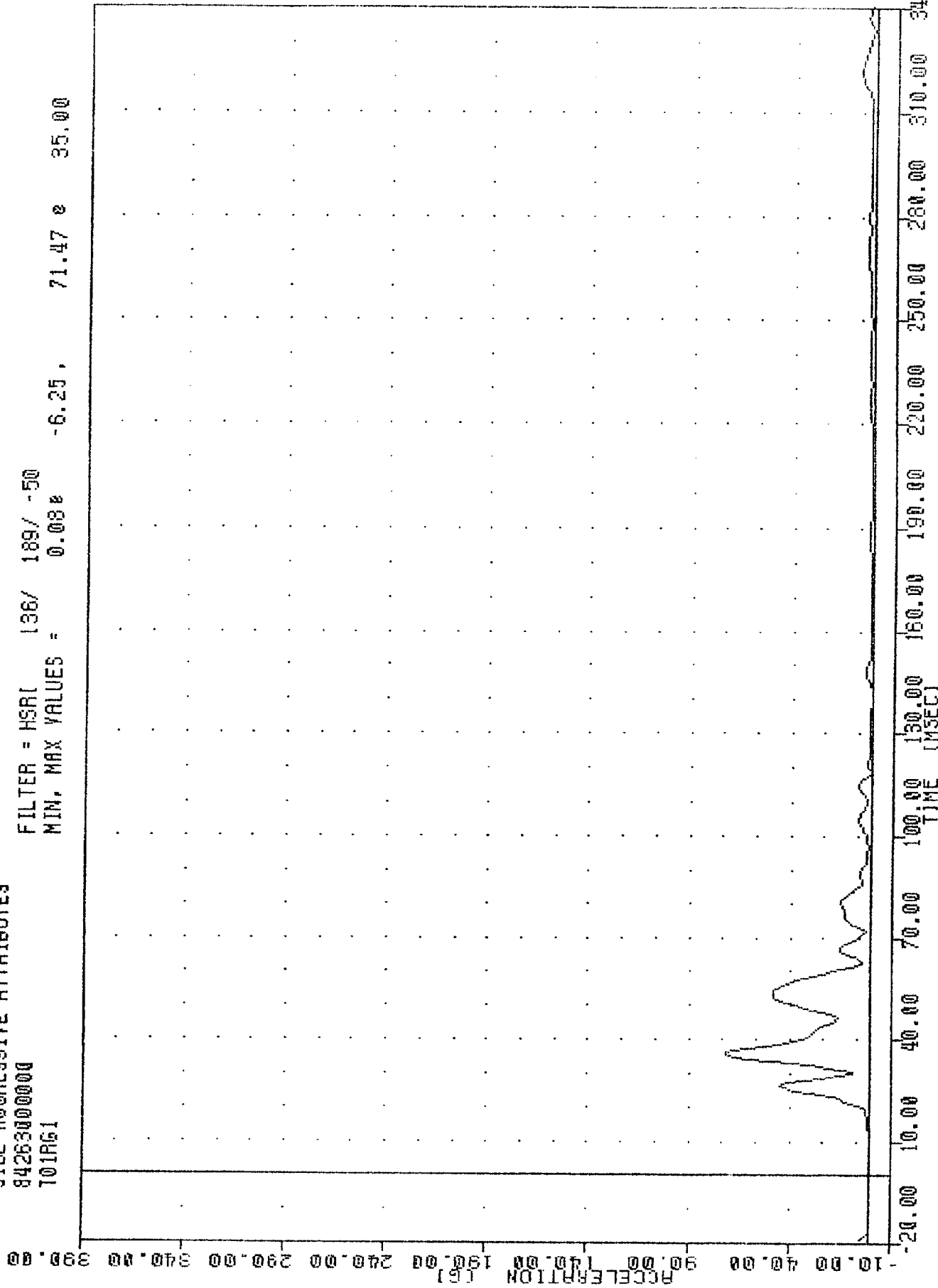


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER UPPER SPINE ACCELERATION Z AXIS

TAC 840919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T01R61

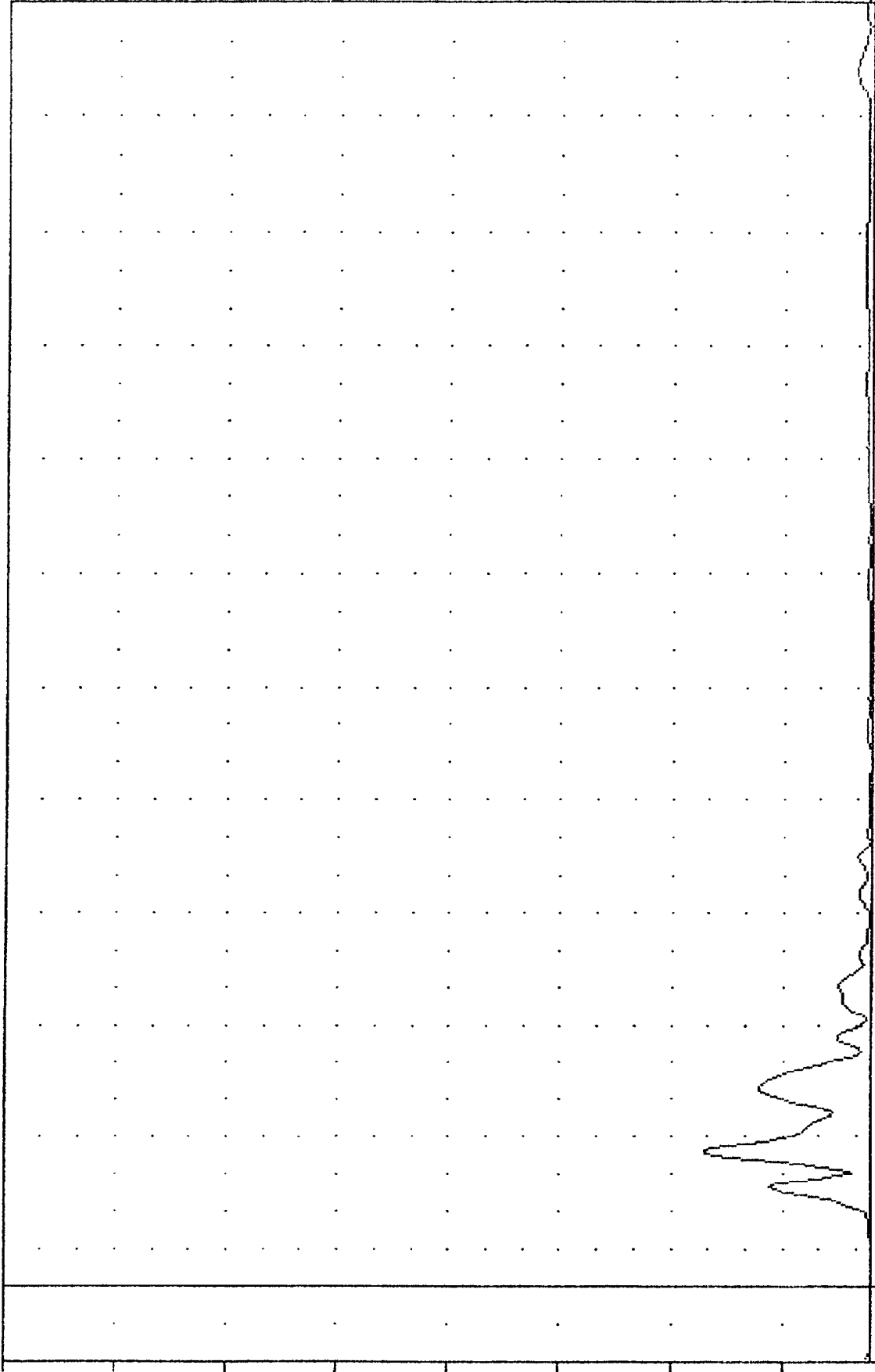
PLOT DATE 26-SEP-84 11:28:24

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.080 -6.25, 71.47 0 35.00



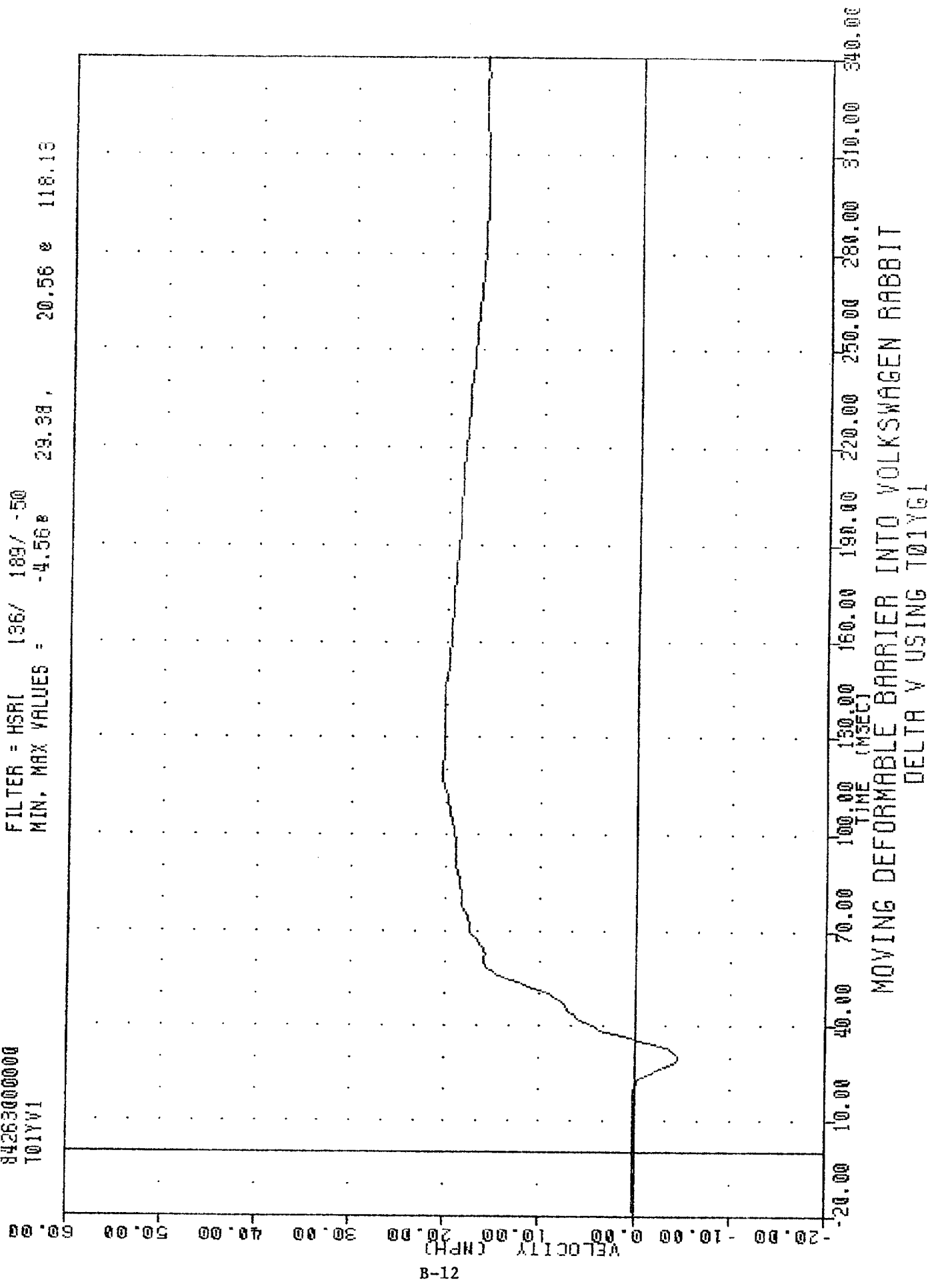
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER UPPER SPINE RESULTANT

TRC 840919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T01R6A
 PLOT DATE 26-SEP-84 11:30:57
 FILTER = HSR1 136/ 189/ -50
 MIN. MAX VALUES = 0.12e -7.50, 74.38 e 35.00



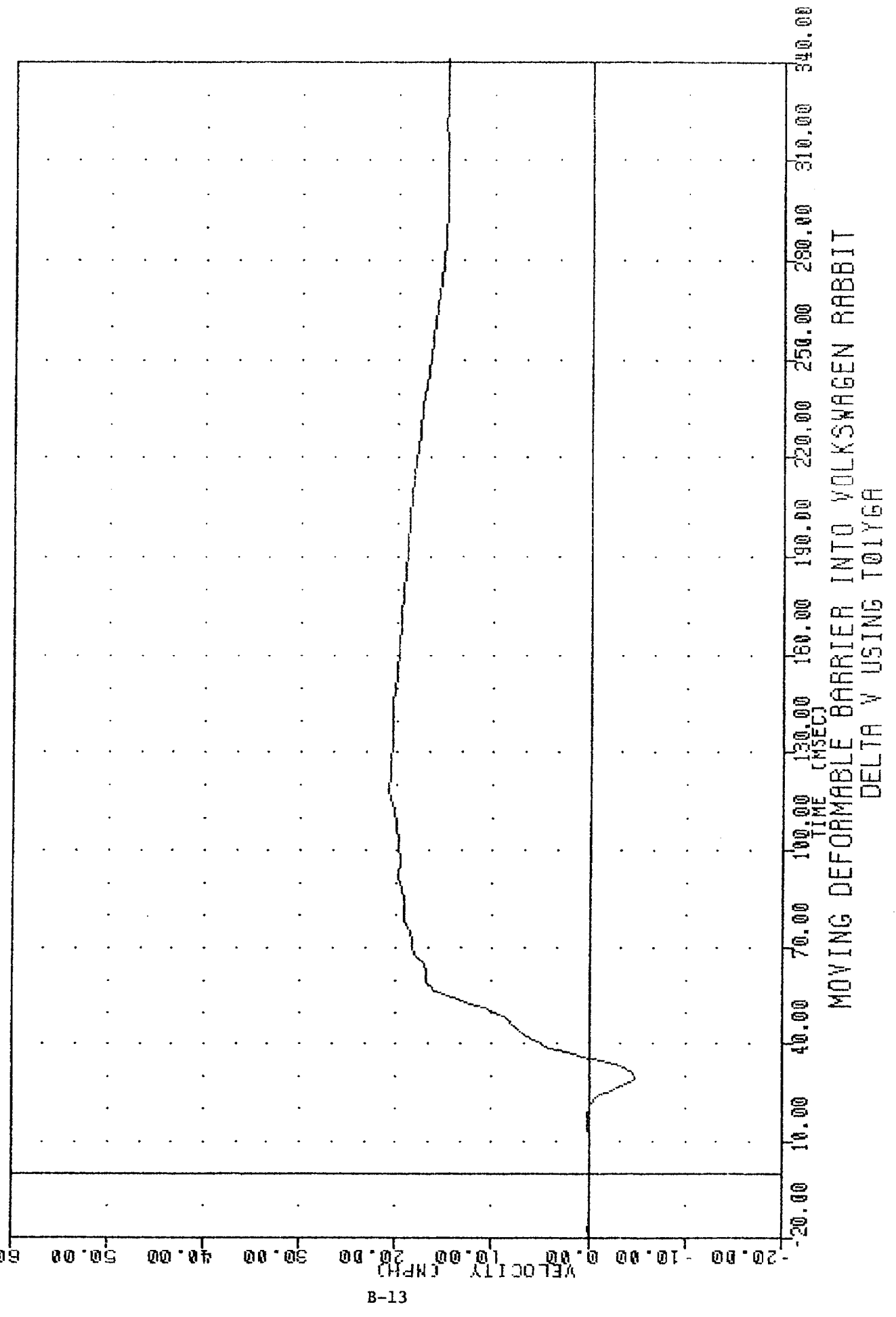
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER UPPER SPINE RESULTANT USING T01YGA

THE 040913, PLOT DATE 26 JUL 84 11:31:23
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T01YV1
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -4.568 29.38, 20.56 & 118.13

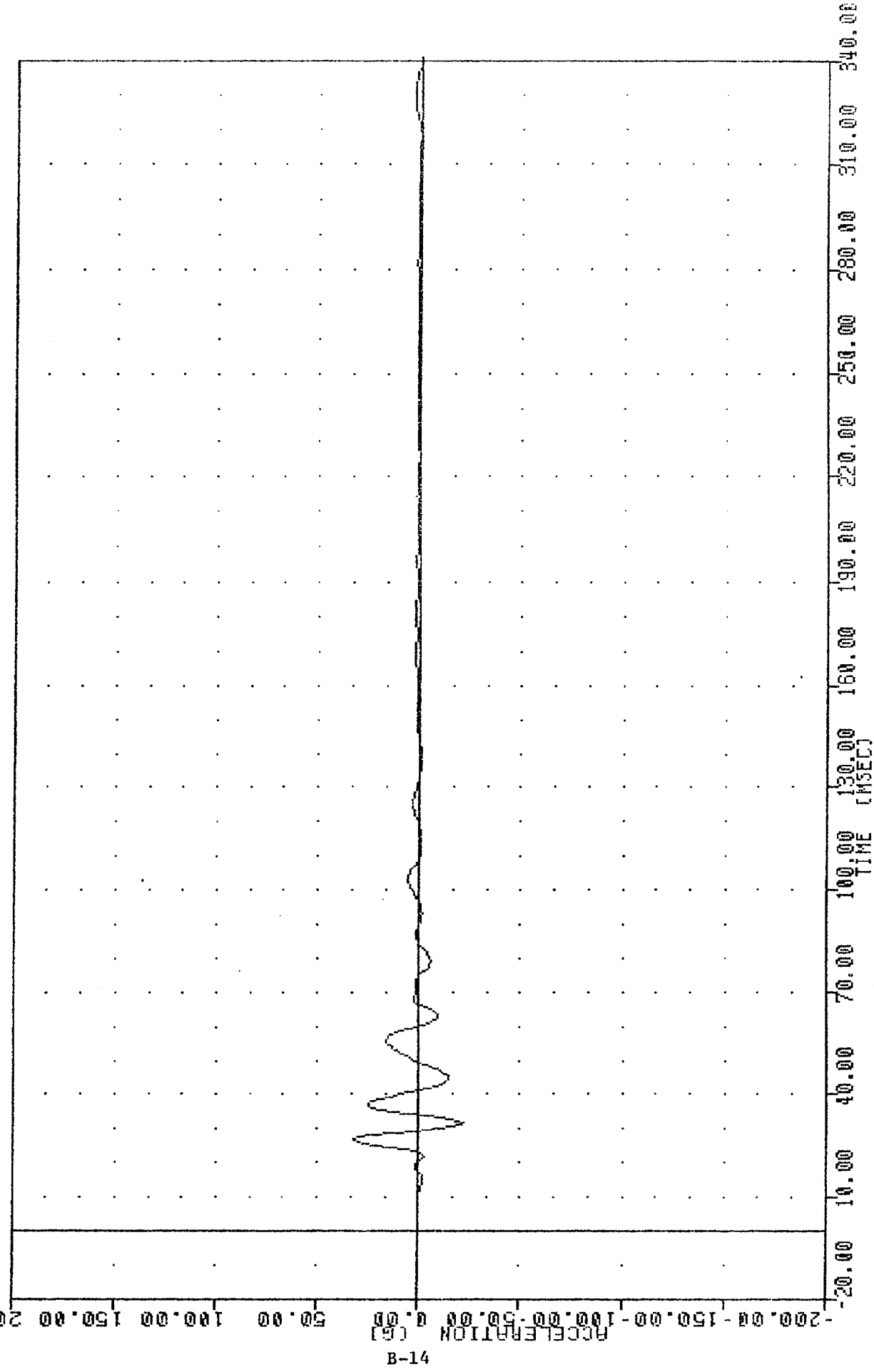


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING T01YV1

THE [REDACTED], 842630, 842630
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T01YVA
 FILTER = HSRI 136/ 109/ -50
 MIN. MAX VALUES = -4.71 29.38, 20.86 113.13
 PLOT DATE 28 SEP-84 11:31:25

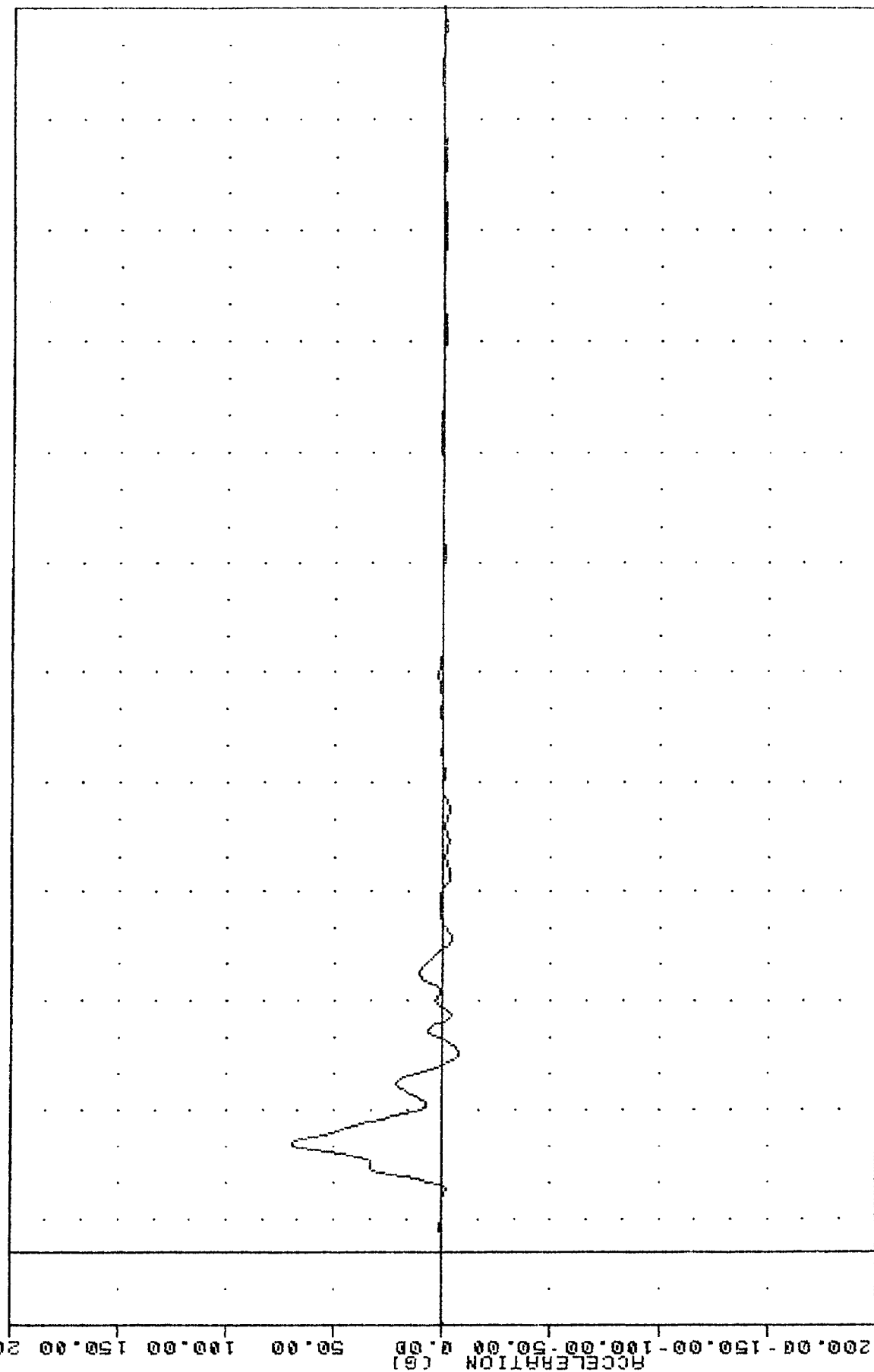


TRC 090919, 090919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T12XG1
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -21.77% 31.25, 32.56 % 26.25
 PLOT DATE 26-SEP-84 11:29:24



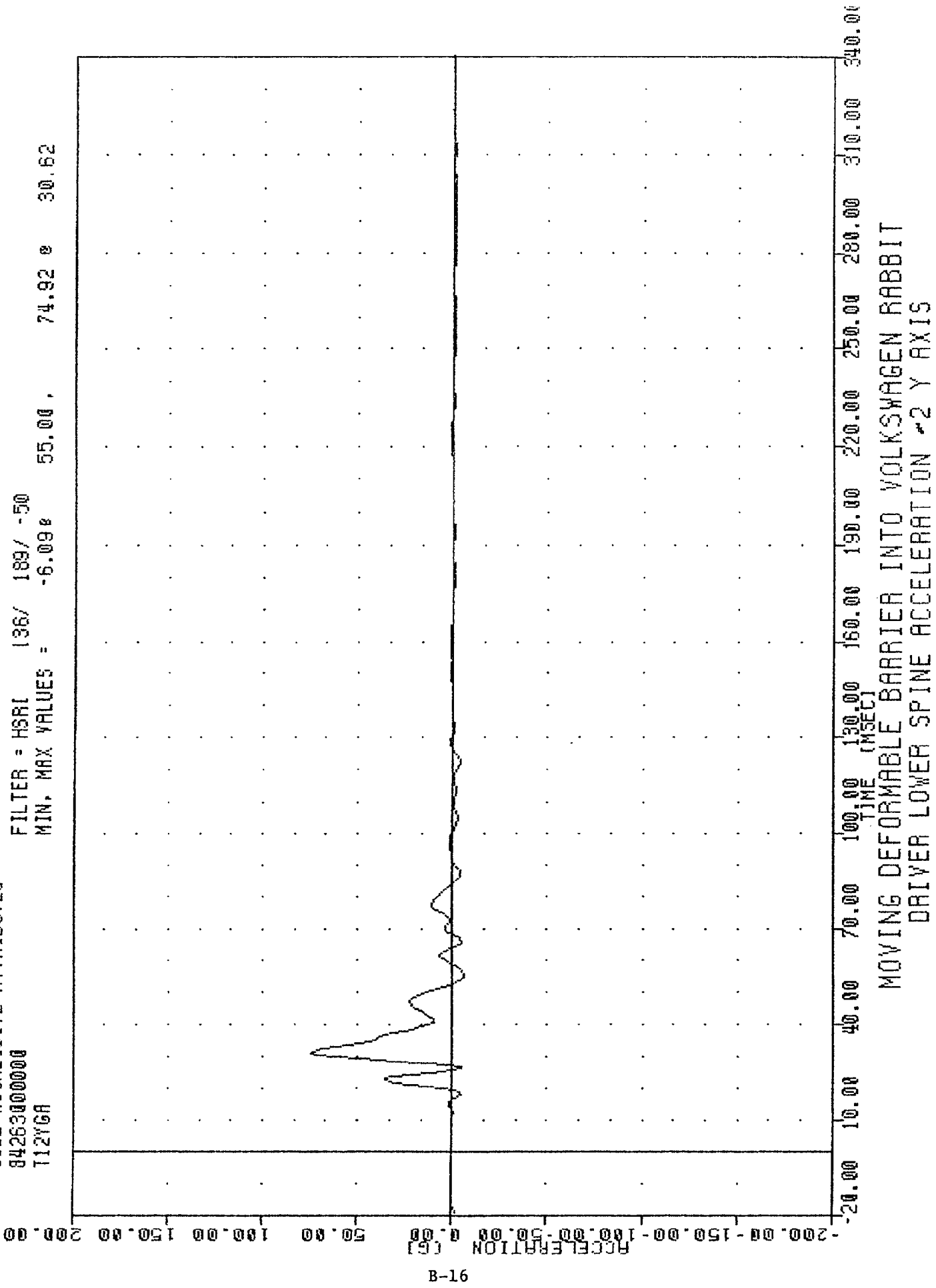
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER LOWER SPINE ACCELERATION X AXIS

TRC 840919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T12Y61
 PLOT DATE 26-SEP-84 11:29:24
 FILTER = H3R1 136/ 189/ -50
 MIN. MAX VALUES = -7.028 55.00, 69.62 30.00



-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER LOWER SPINE ACCELERATION Y AXIS

TRC 840919, 840919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T12Y6A
 PLOT DATE 26-SEP-84 11:29:24
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -6.09% 55.00, 74.92 @ 30.62

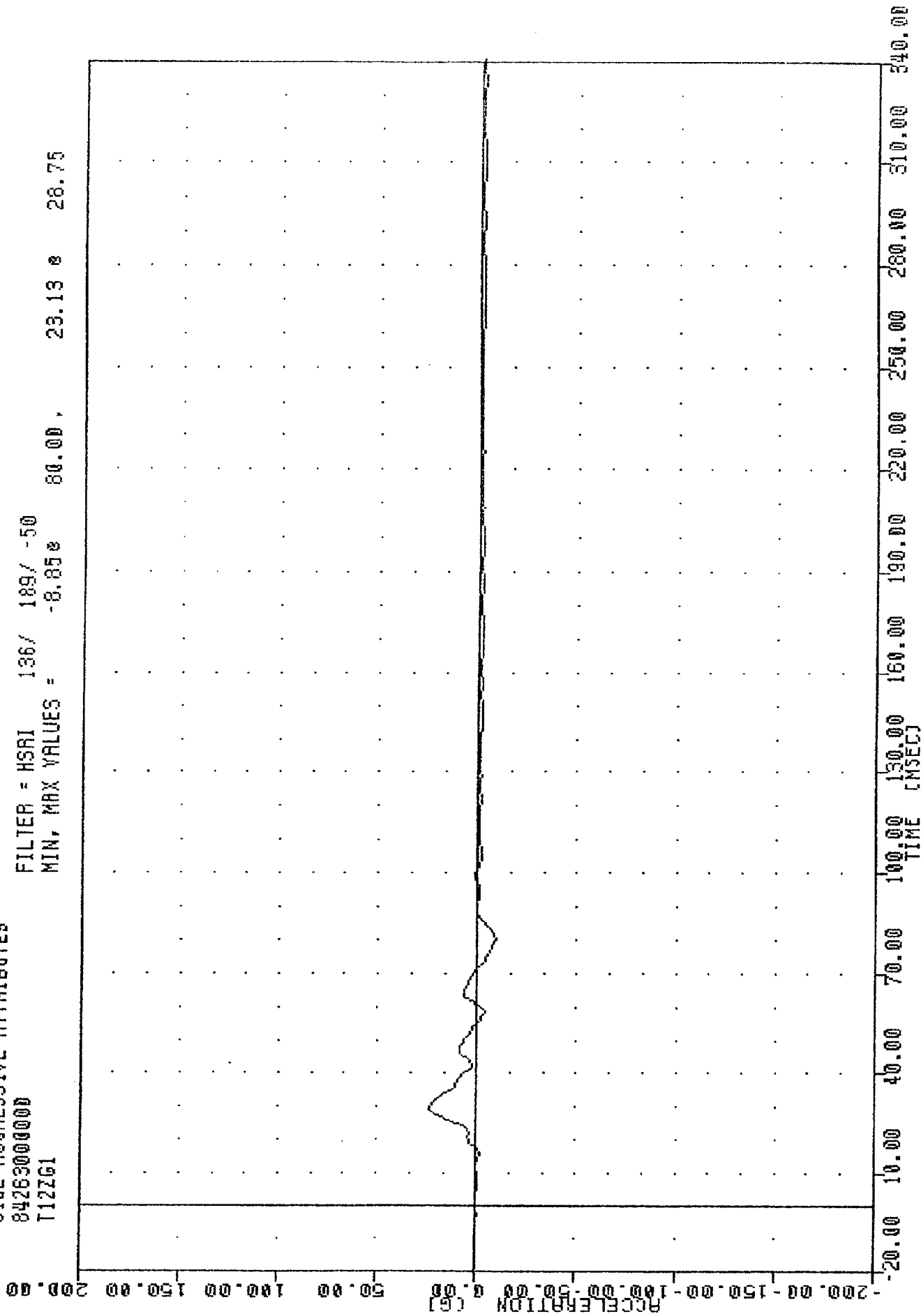


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER LOWER SPINE ACCELERATION #2 Y AXIS

TRC 090910
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T12ZG1

PLT DATE 28 SEP 84 11:23:24

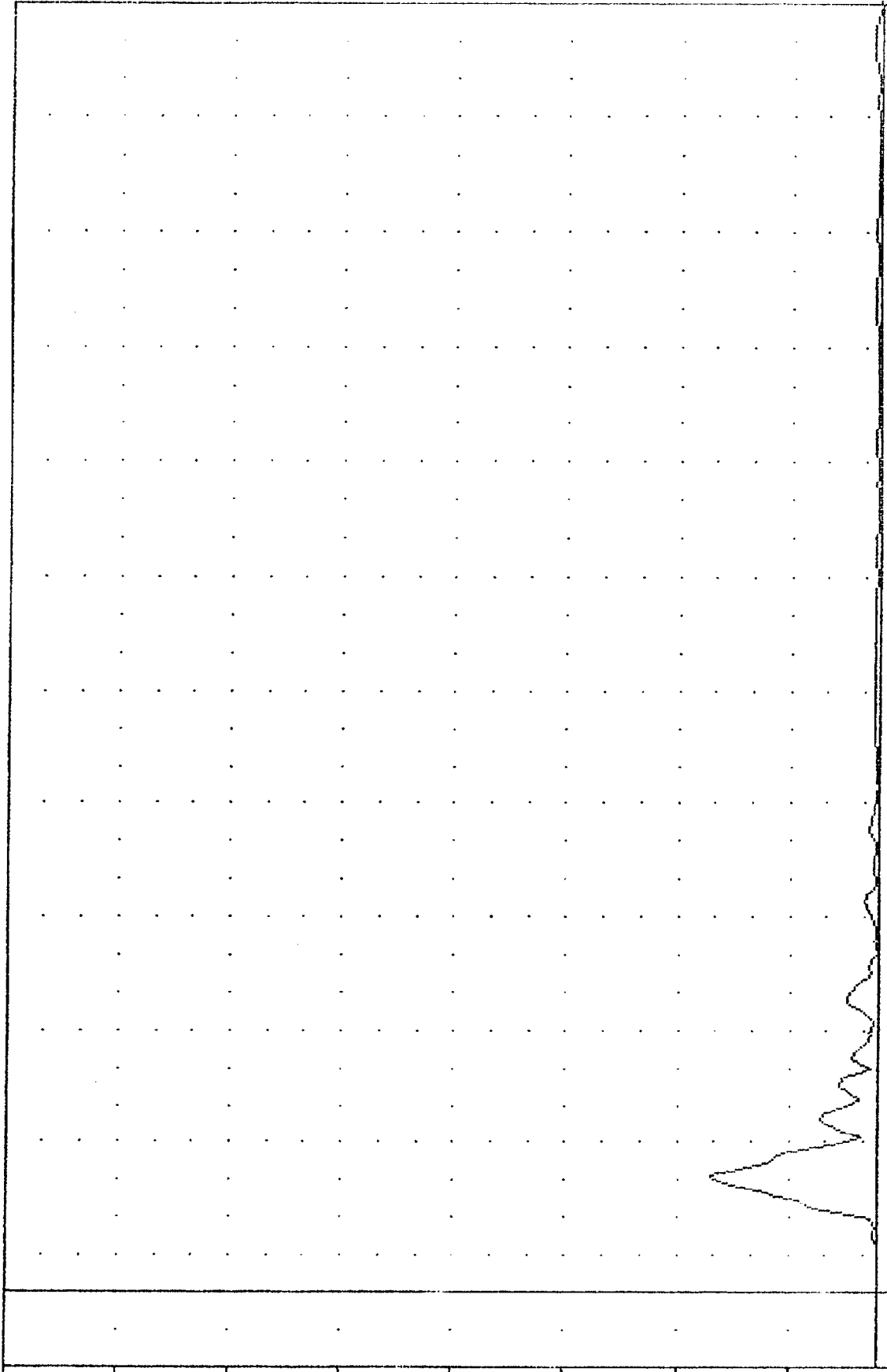
FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -8.85g 80.00, 23.13g 28.75



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

TRC 840919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T12RG1
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.048 -11.88, 75.20 e 30.00
 PLOT DATE 28-SEP-84 11:23:24

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
 DRIVER LOWER SPINE RESULTANT

TRC 842630000000 T12RGA

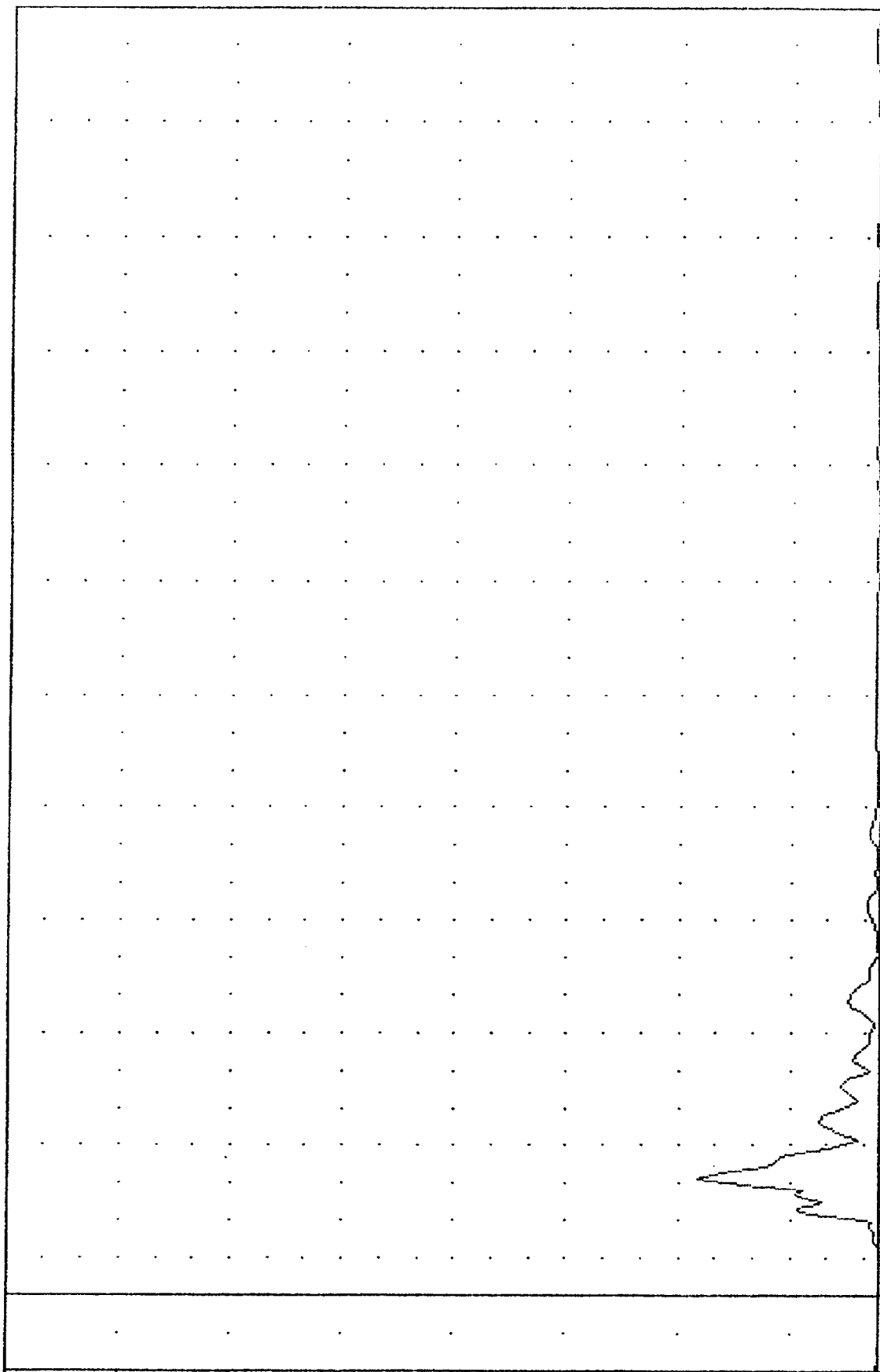
842630000000 T12RGA

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = 0.10e -11.88, 81.03 e 30.62

PLOT DATE 26 SEP 84 17:30:57

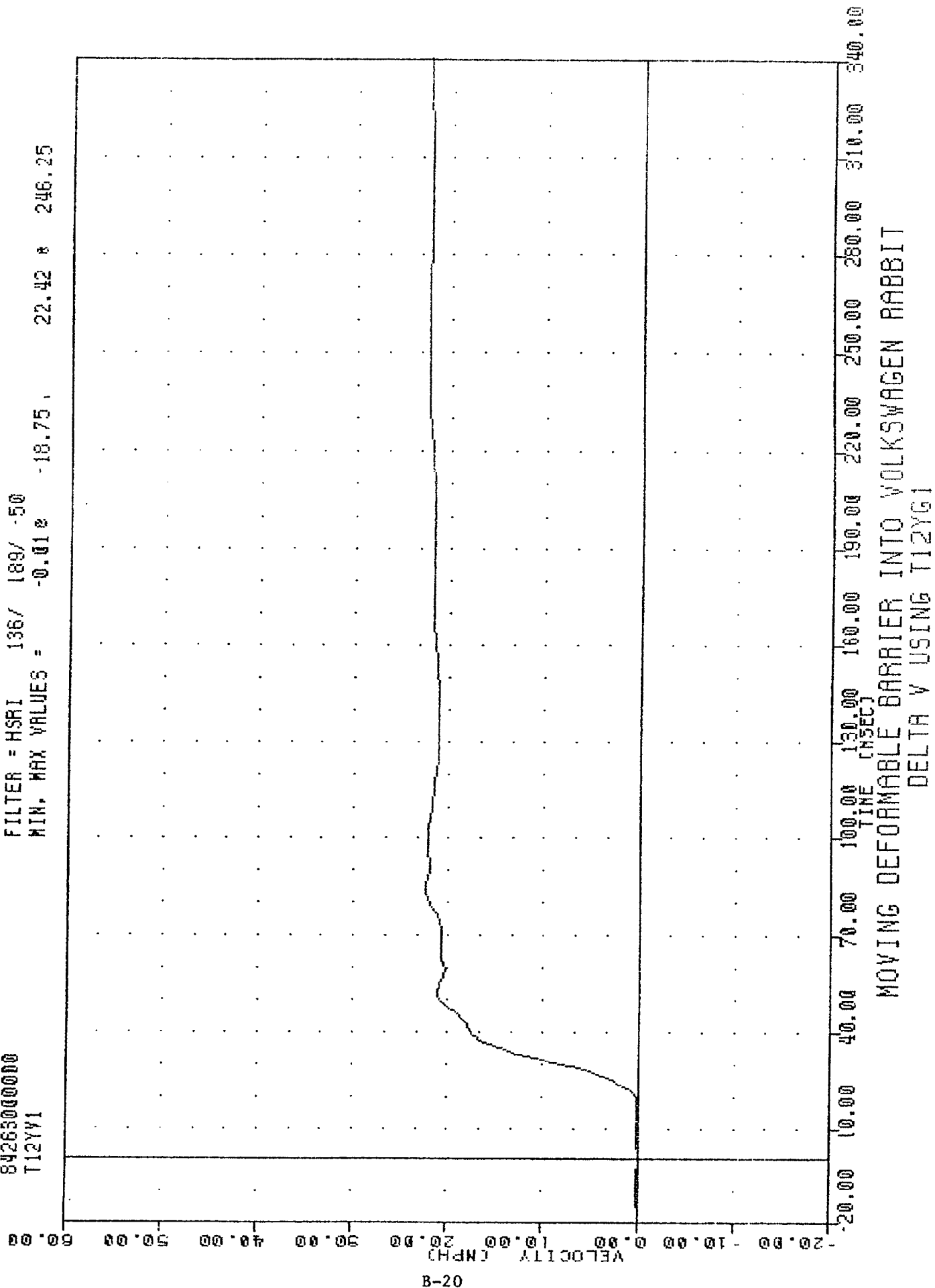
ACCELERATION (G)



-20.00 10.00 0.00 -10.00 40.00 90.00 140.00 190.00 240.00 290.00 340.00

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

TAG 040919 PLOT DATE 26 JUL 84 11:31:25
 SIDE AGGRESSIVE ATTRIBUTES
 84268000000
 T12YV1
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -0.018 -18.75 22.42 * 246.25

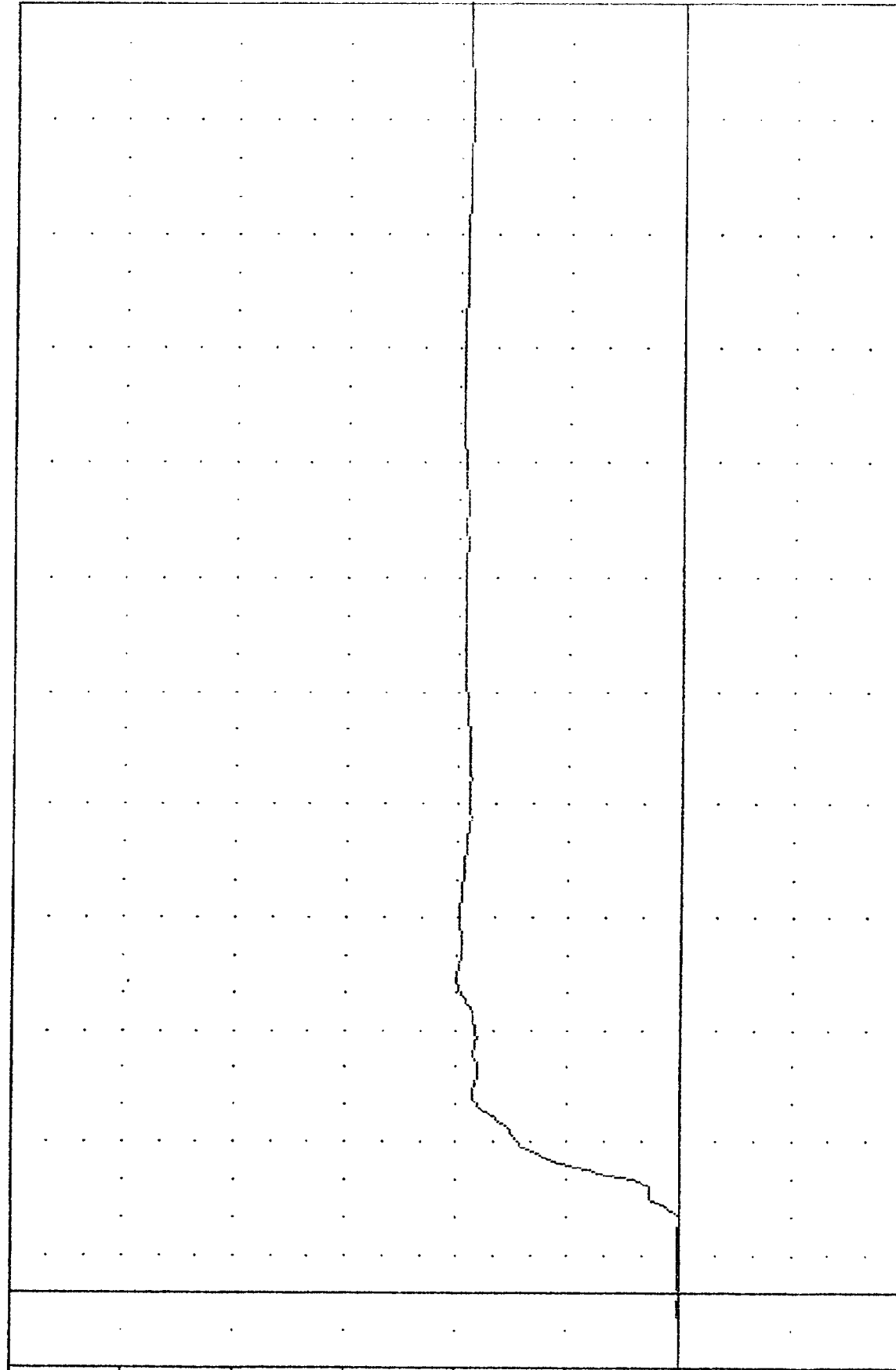


TRC 040910
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T12YVA

PLUT DATE 26 SEP 84 11:31:25

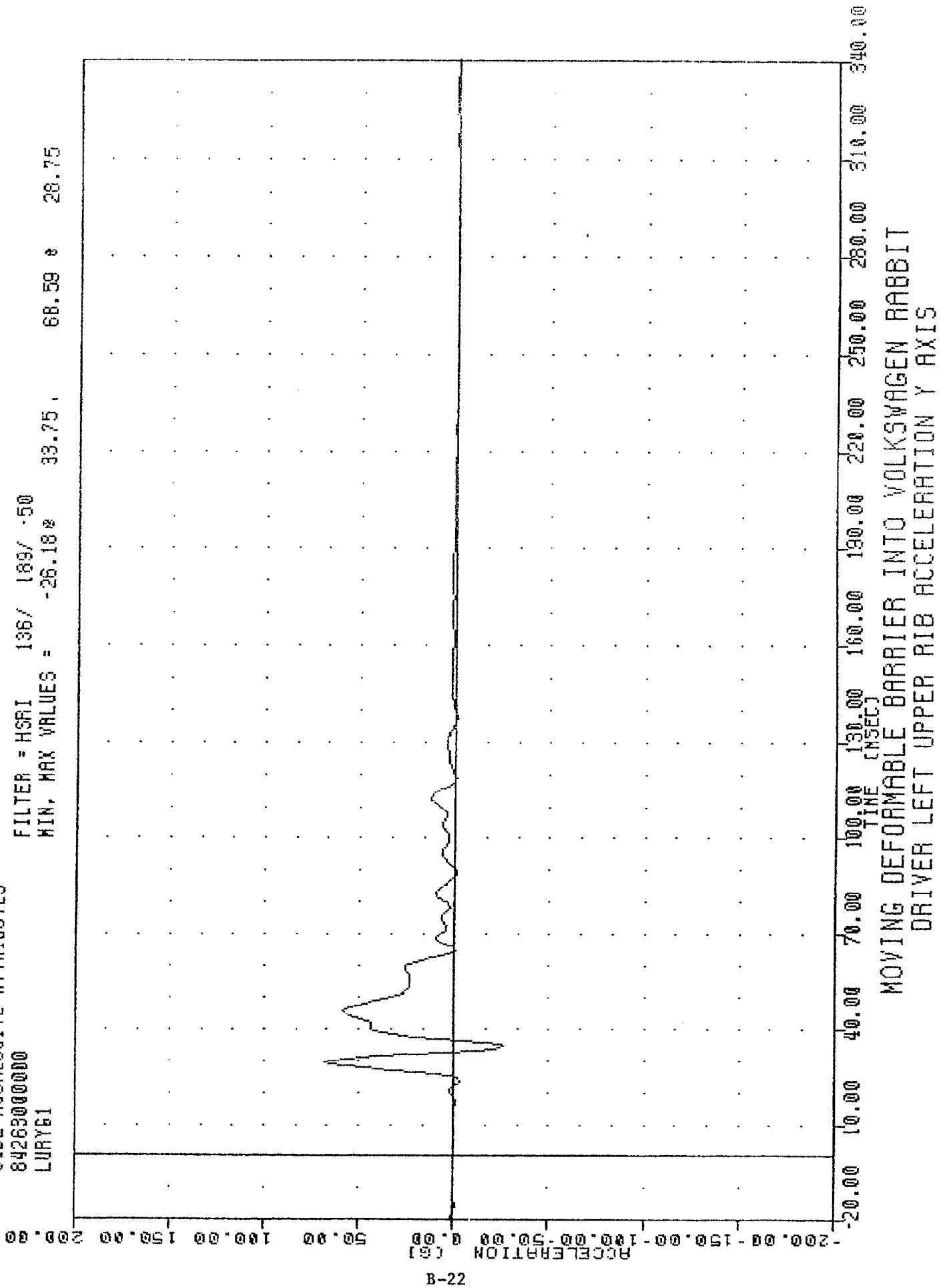
FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -0.088 18.75, 20.04 @ 83.75

VELOCITY (MPH)



-20.00 10.00 20.00 30.00 40.00 50.00 60.00
 TIME (MSEC)
 0.00 50.00 100.00 150.00 200.00 250.00 300.00 340.00
 MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING T12YGA

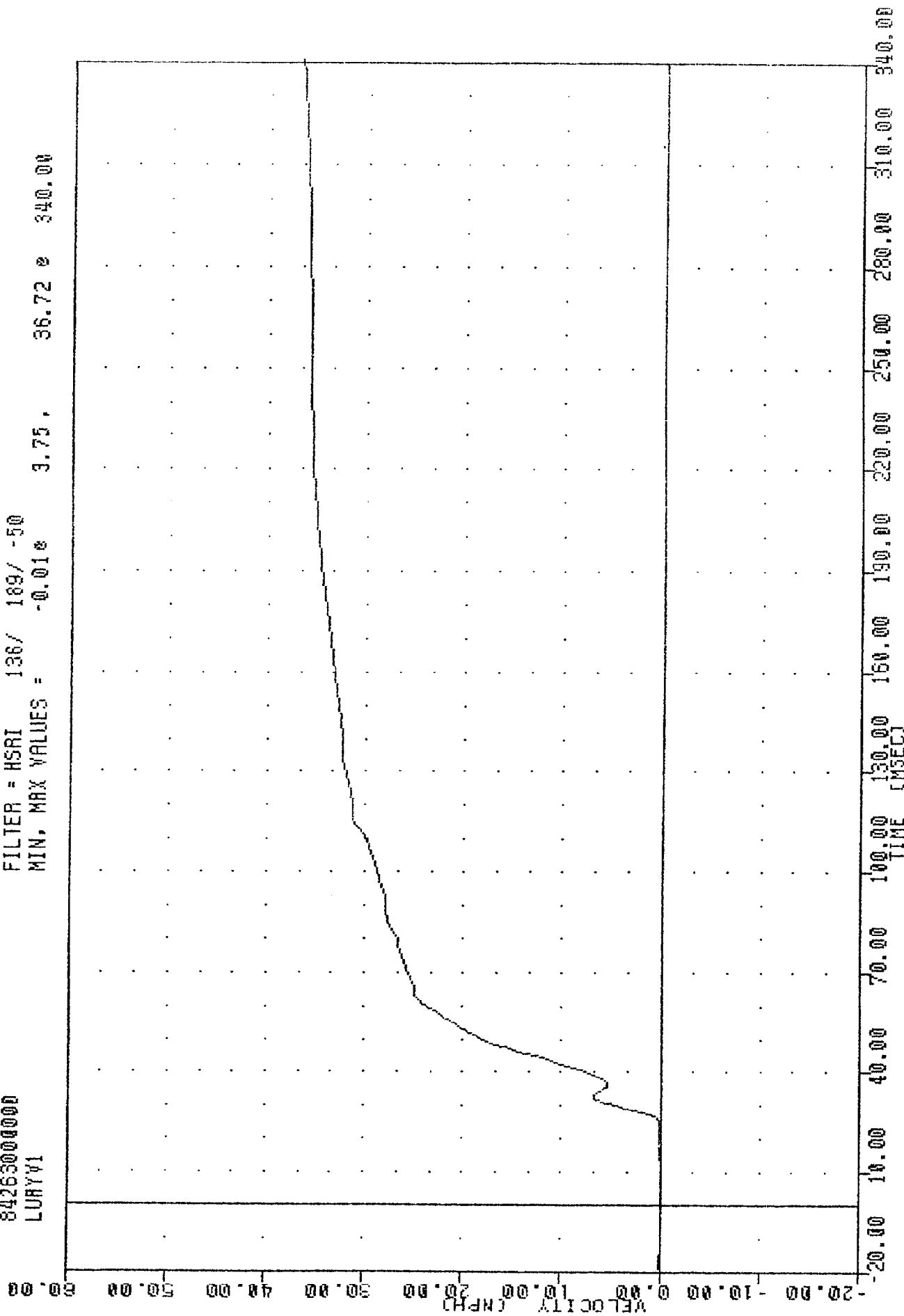
TAC 040919, 040919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LURY61
 FILTER = HSRI 136/ 189/ .50
 MIN. MAX VALUES = -26.18 33.75 68.59 28.75
 PLOT DATE 26-SEP-84 17:29:24



TAG 00915
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LURYV1

PLOT DATE 26 SEP-84 11:31:23

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -0.018 3.75, 36.72 @ 340.00



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING LURY61

TRC 840919 26-SEP-84 11:29:24

SIDE AGGRESSIVE ATTRIBUTES

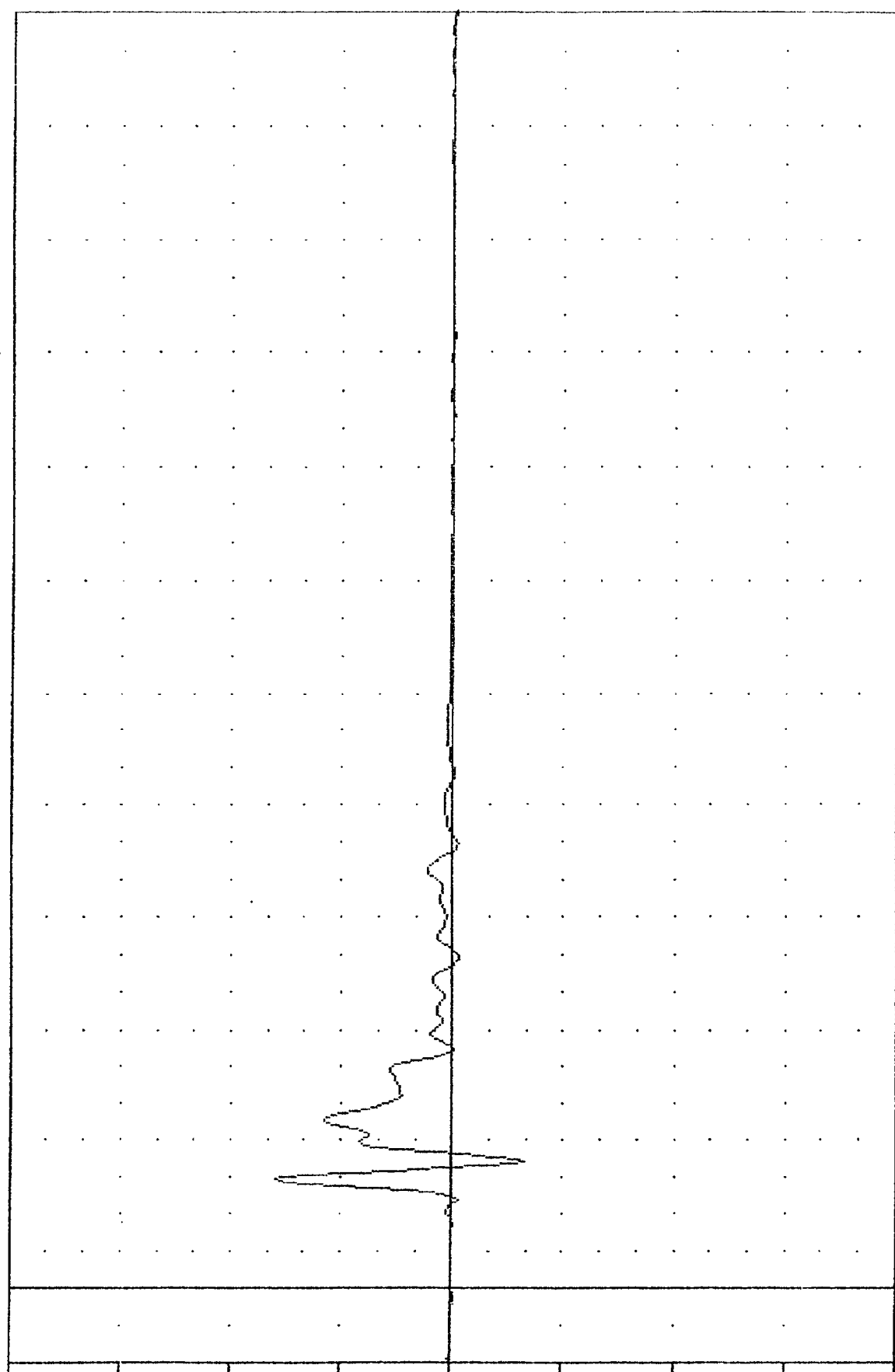
04263000000

LURYG

FILTER = HSR 136/ 189/ -50

MIN. MAX VALUES = -32.53 33.75 79.42 28.75

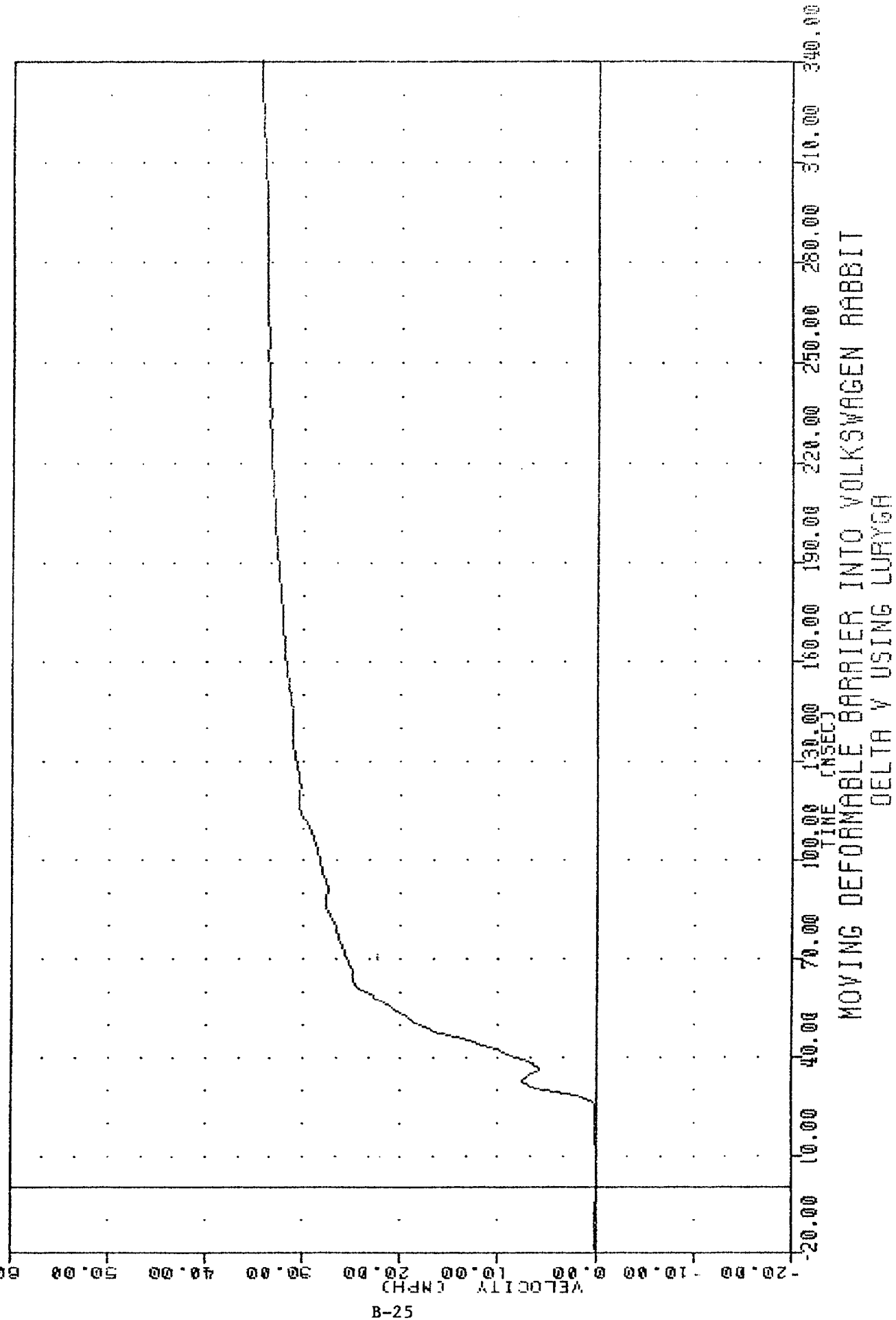
B-24
ACCELERATION (G)
-200.00 -150.00 -100.00 -50.00 0.00 50.00 100.00 150.00 200.00



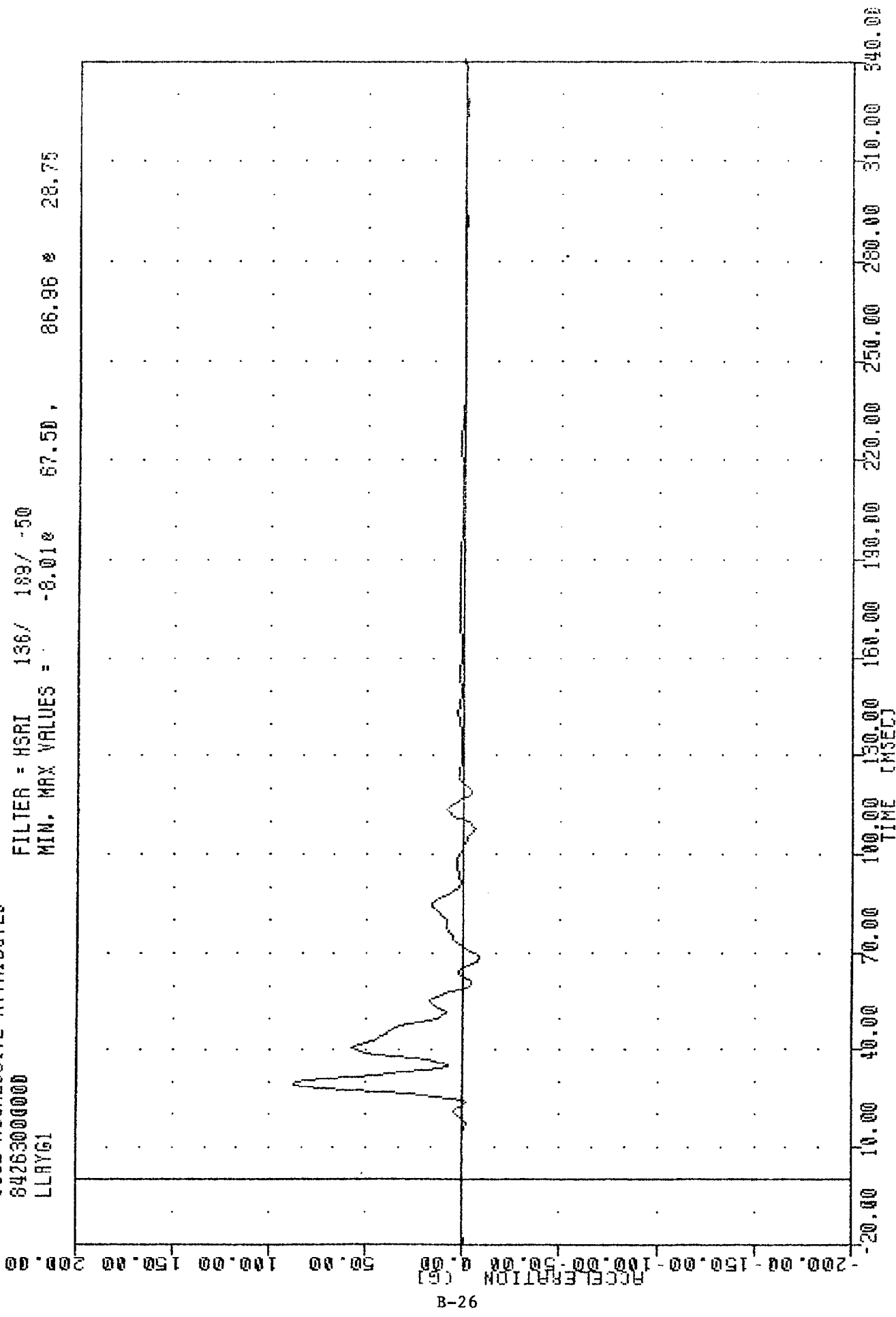
-20.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

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

TRC 050319 , DATE 26 JUN 84 11:31:25
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LURYVA
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -0.02 1.88 34.56 337.50



TRC 840919, PLOT DATE 26-SEP-84 11:29:24
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LRAY61
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -0.010 67.50, 86.96 28.75



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

TRC

, 840919

SIDE AGGRESSIVE ATTRIBUTES

84263000000

LLRYV1

PLOT DATE

26-SEP-84

11:31:25

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -0.05%

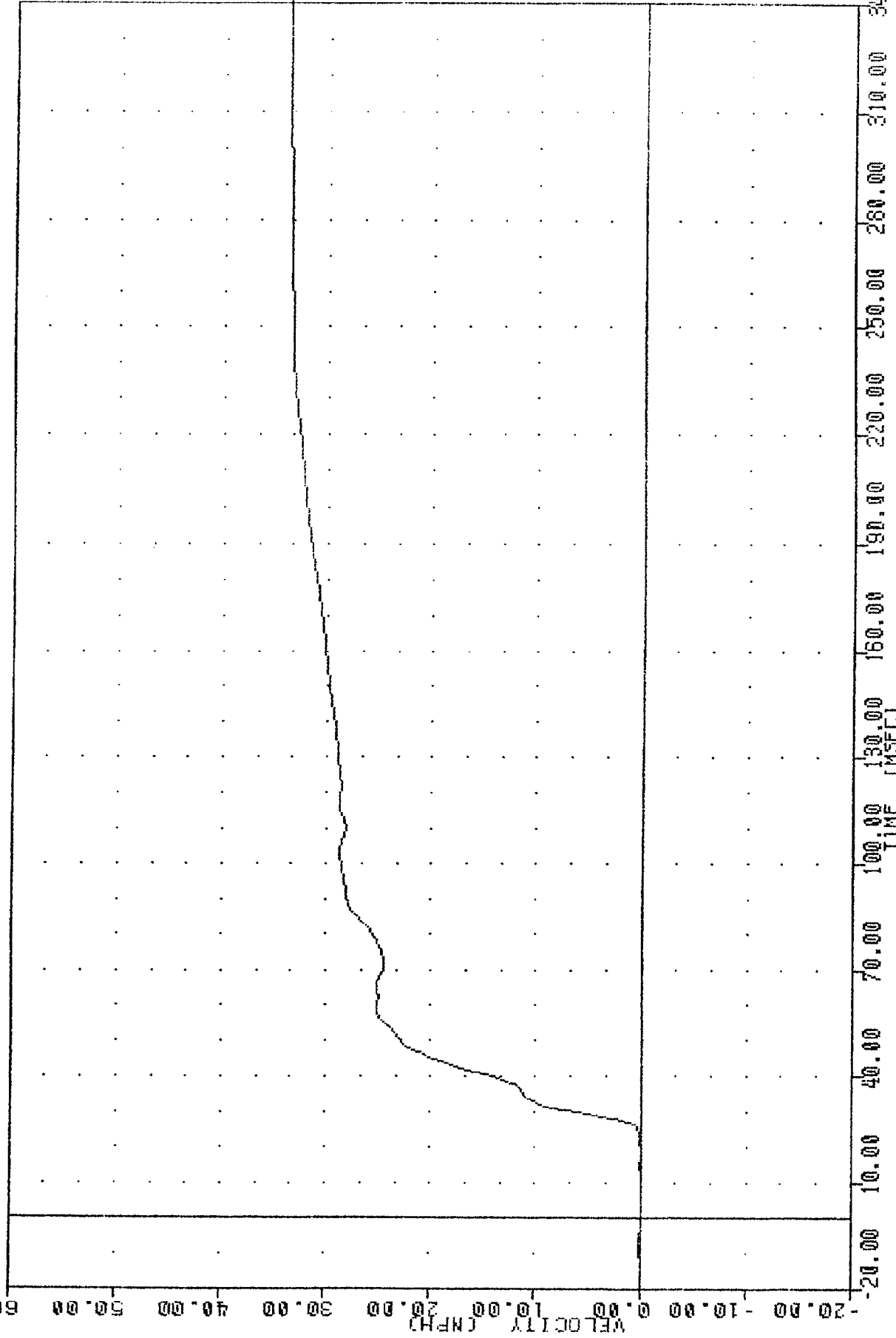
18.13,

53.85%

340.00

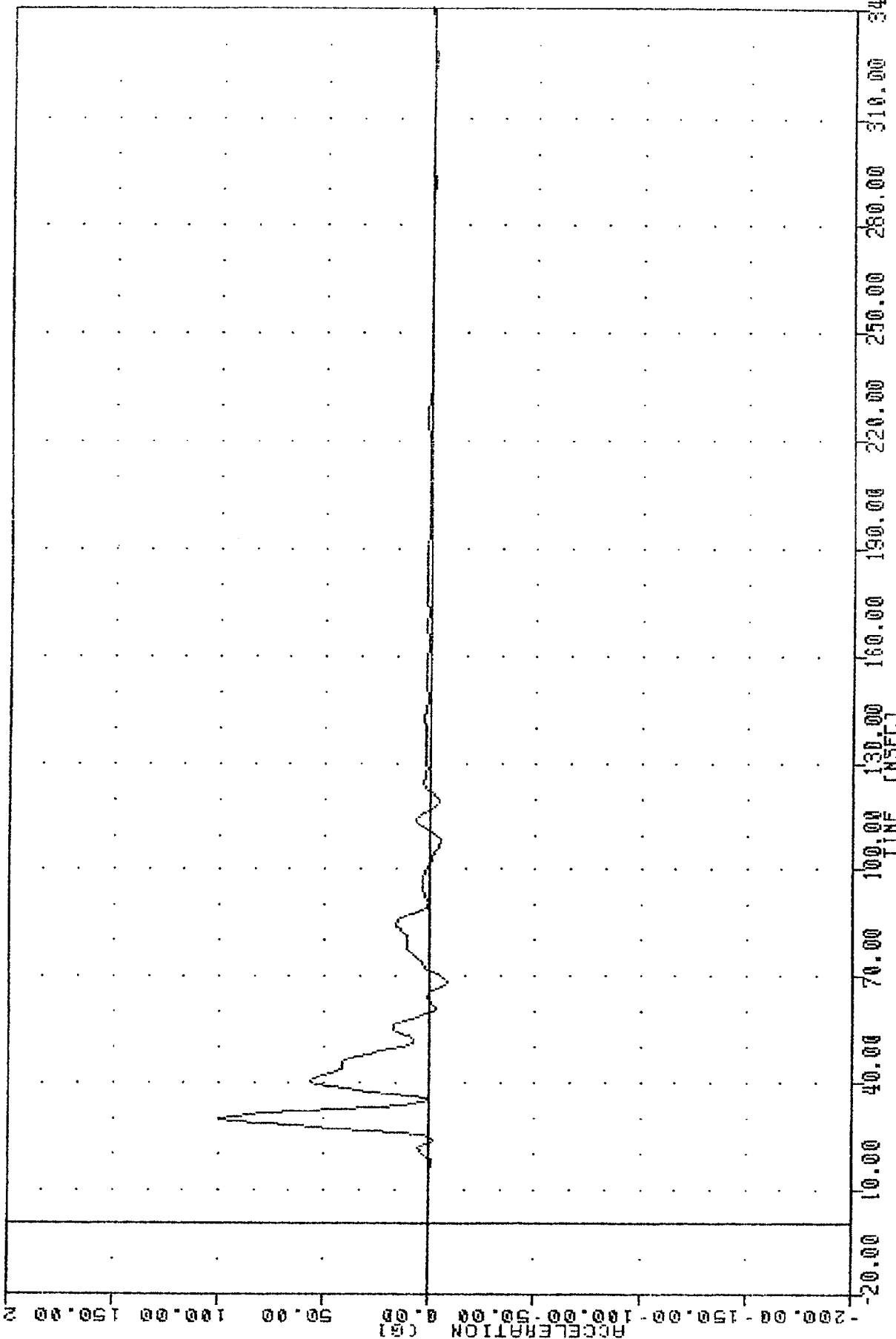
50.00
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00

B-27



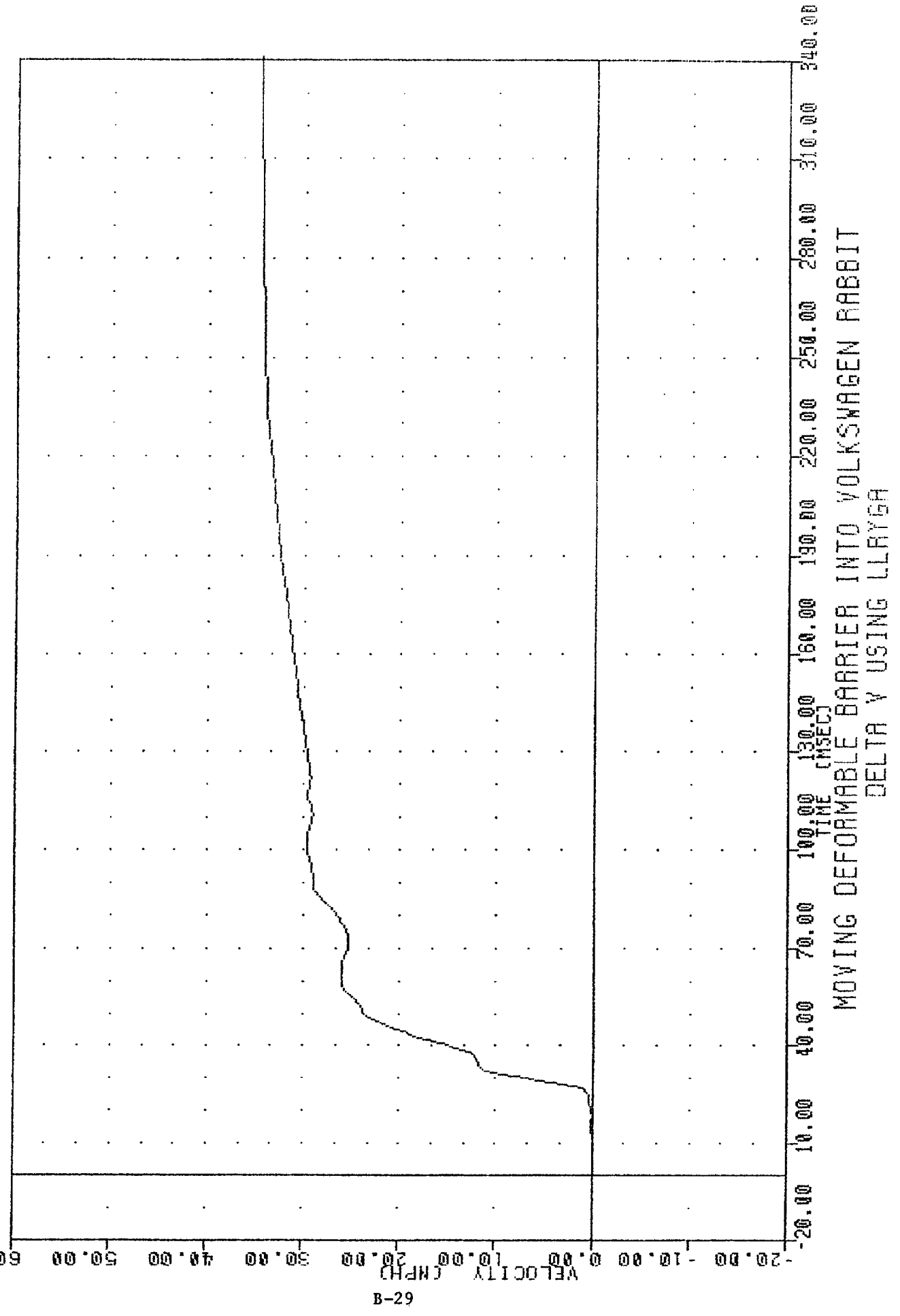
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LLRYG1

TRC 040919, 040919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LLRYBA
 FILTER = HSRI 136/ 189/ .50
 MIN, MAX VALUES = -8.118 67.50, 100.10 28.75

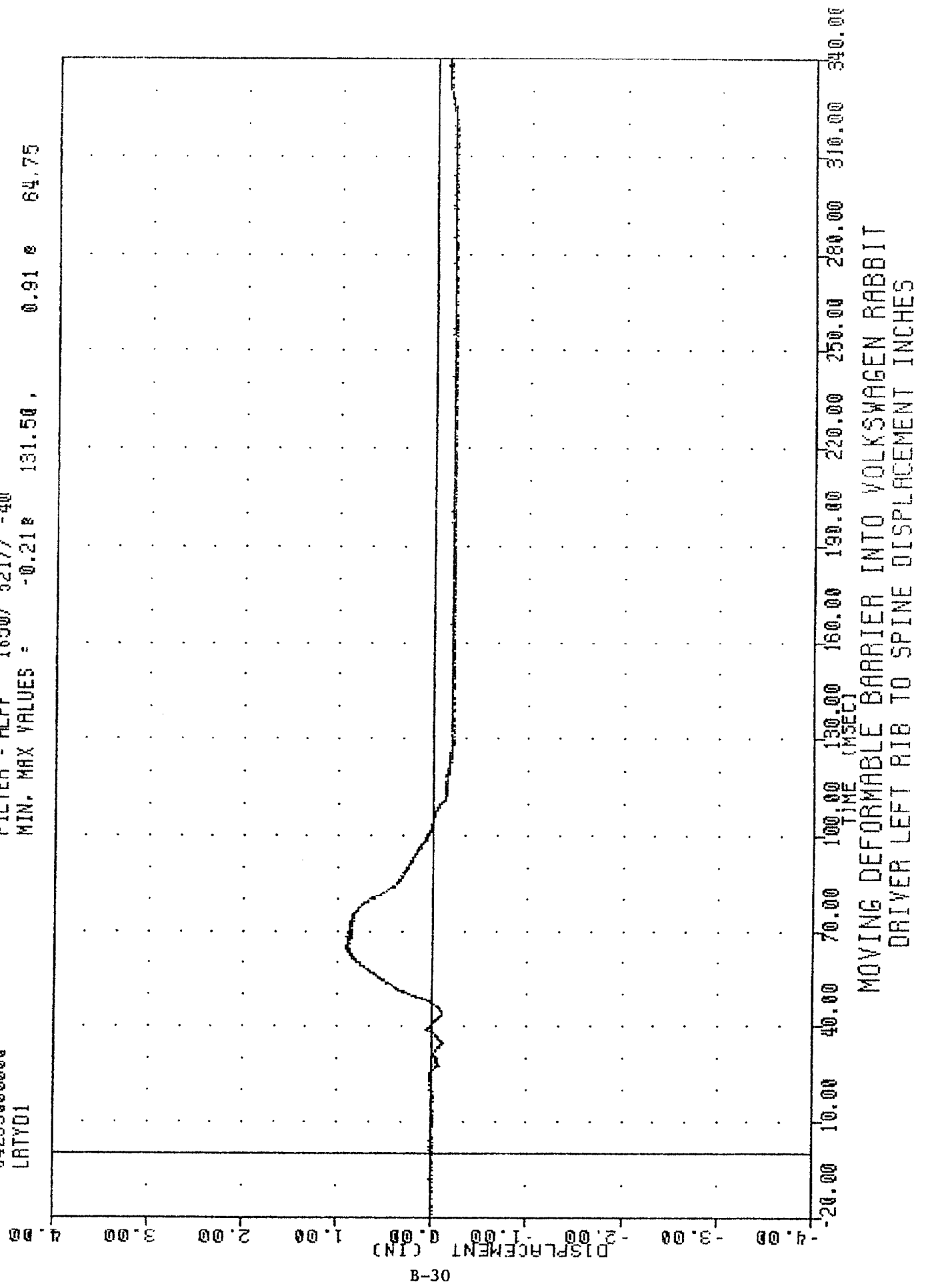


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER LEFT LOWER RIB ACCELERATION -2 Y AXIS

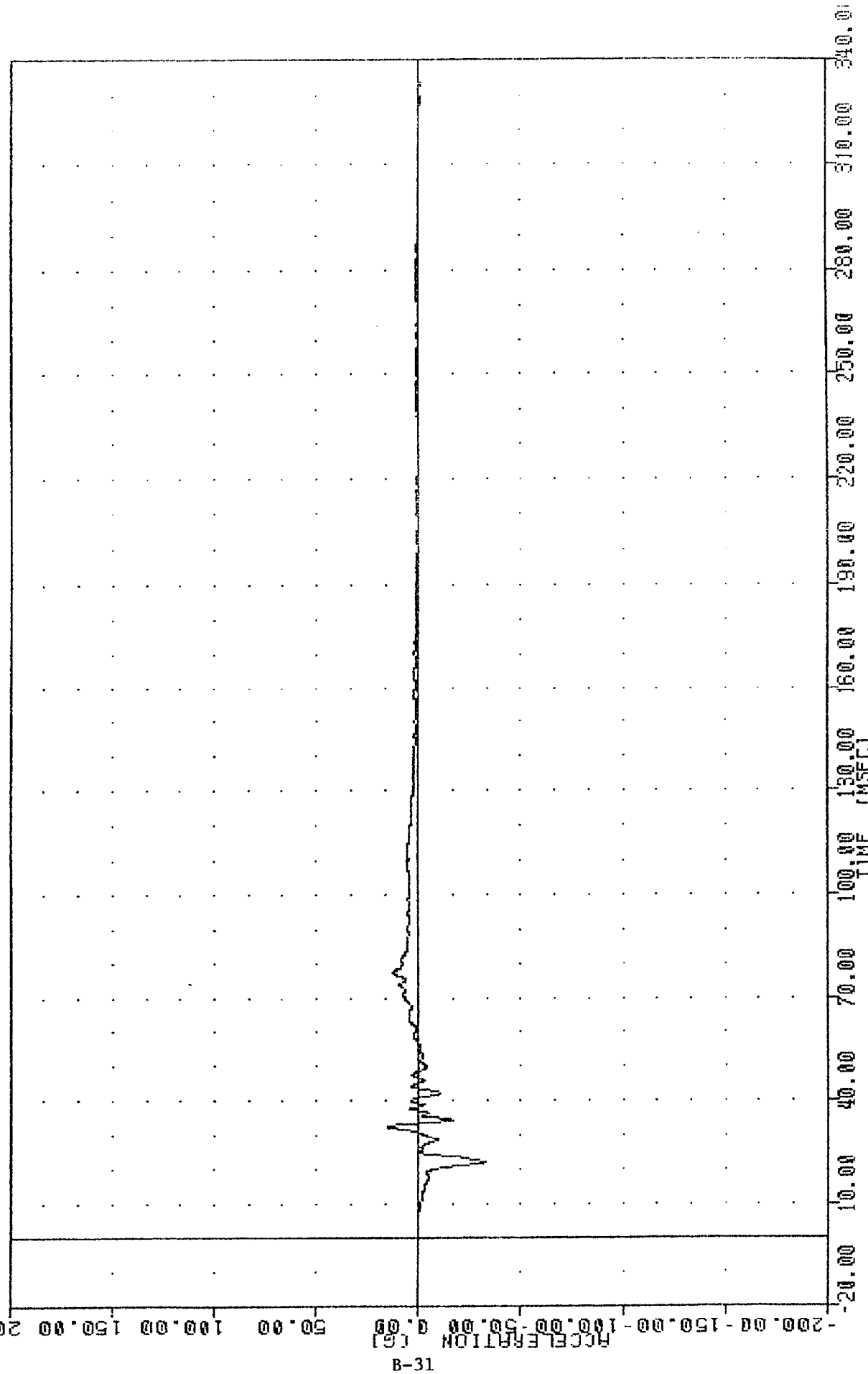
TRC 842630000000, 040919, PLOT DATE 26 SEP-84 17:51:25
 SIDE AGGRESSIVE ATTRIBUTES
 842630000000
 LLYRYR
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -0.012 -5.00, 34.74 & 340.00



THE 840913 PLOT DATE 26-SEP-84 11:27:00
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LRTYD1
 FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -0.218 131.50 0.91 8 64.75

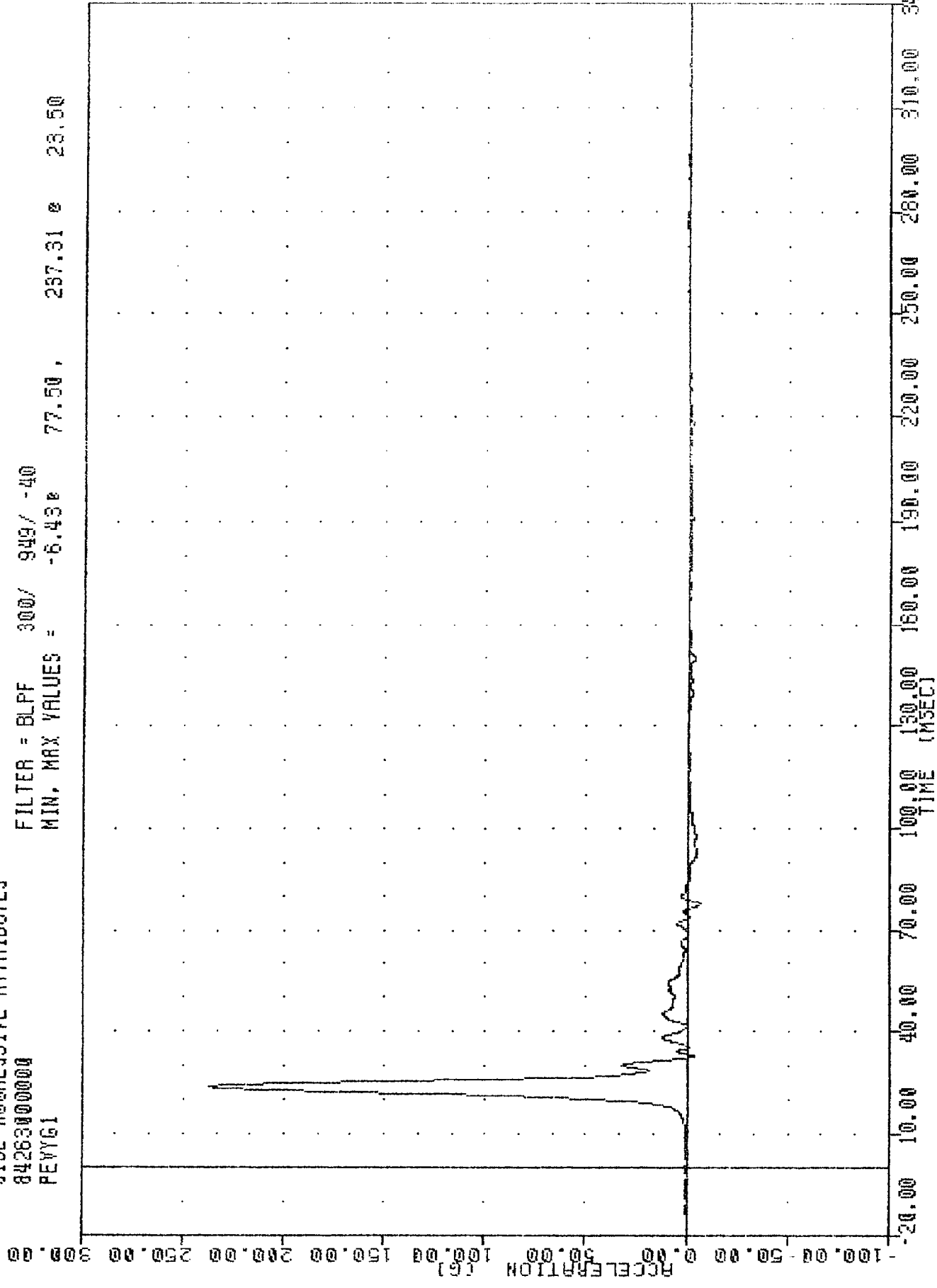


TRC 842630000000
 SIDE AGGRESSIVE ATTRIBUTES
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -32.32 21.88 15.54 32.38
 PLOT DATE 26 JUN 84 11:27:00
 PEVXG1



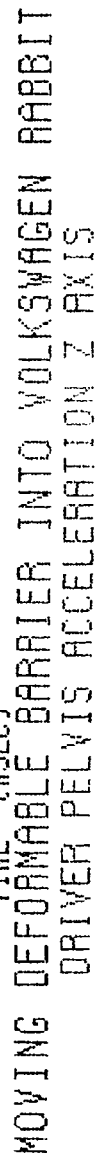
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER PELVIS ACCELERATION X AXIS

THE [REDACTED] 040815 [REDACTED] 28 SEP 84 08:32:11
 SIDE AGGRESSIVE ATTRIBUTES
 842630000000
 PEVYG1
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -6.430 77.50, 257.31 0 23.50

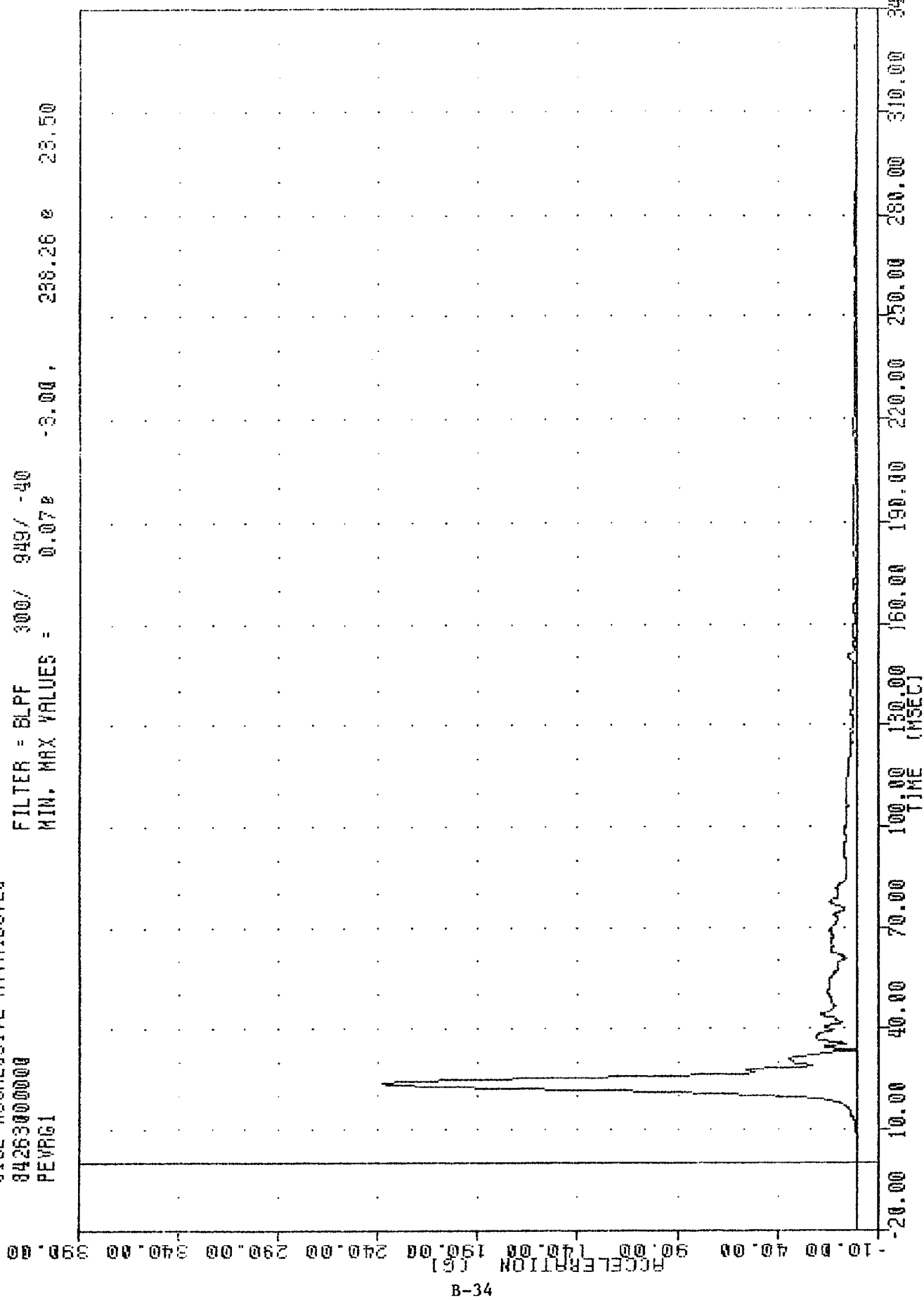


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER PELVIS ACCELERATION Y AXIS

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -12.952

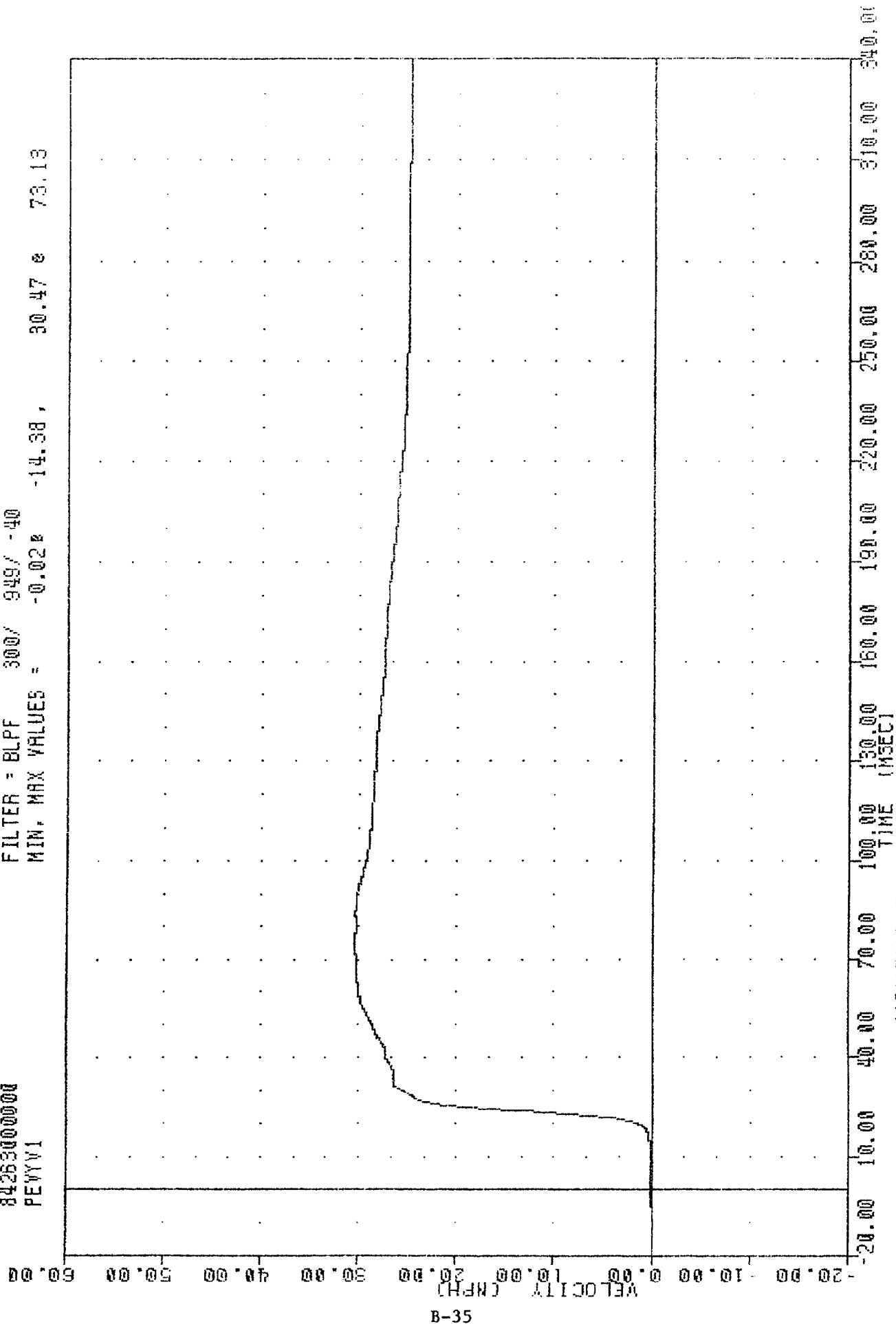


TRC 040919, 28 SEP 84 11:27:00
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 PEVRG1
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 0.078 -3.00, 238.26 23.50



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DRIVER PELVIS RESULTANT

TRC 840919, PLOT DATE 26-SEP-84 11:15:49
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 PEVYV1
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -0.028 -14.38, 30.47 e 73.13



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING PEVYGI

TRC 040919 PLOT DATE 28-SEP-84 11:27:00

SIDE AGGRESSIVE ATTRIBUTES

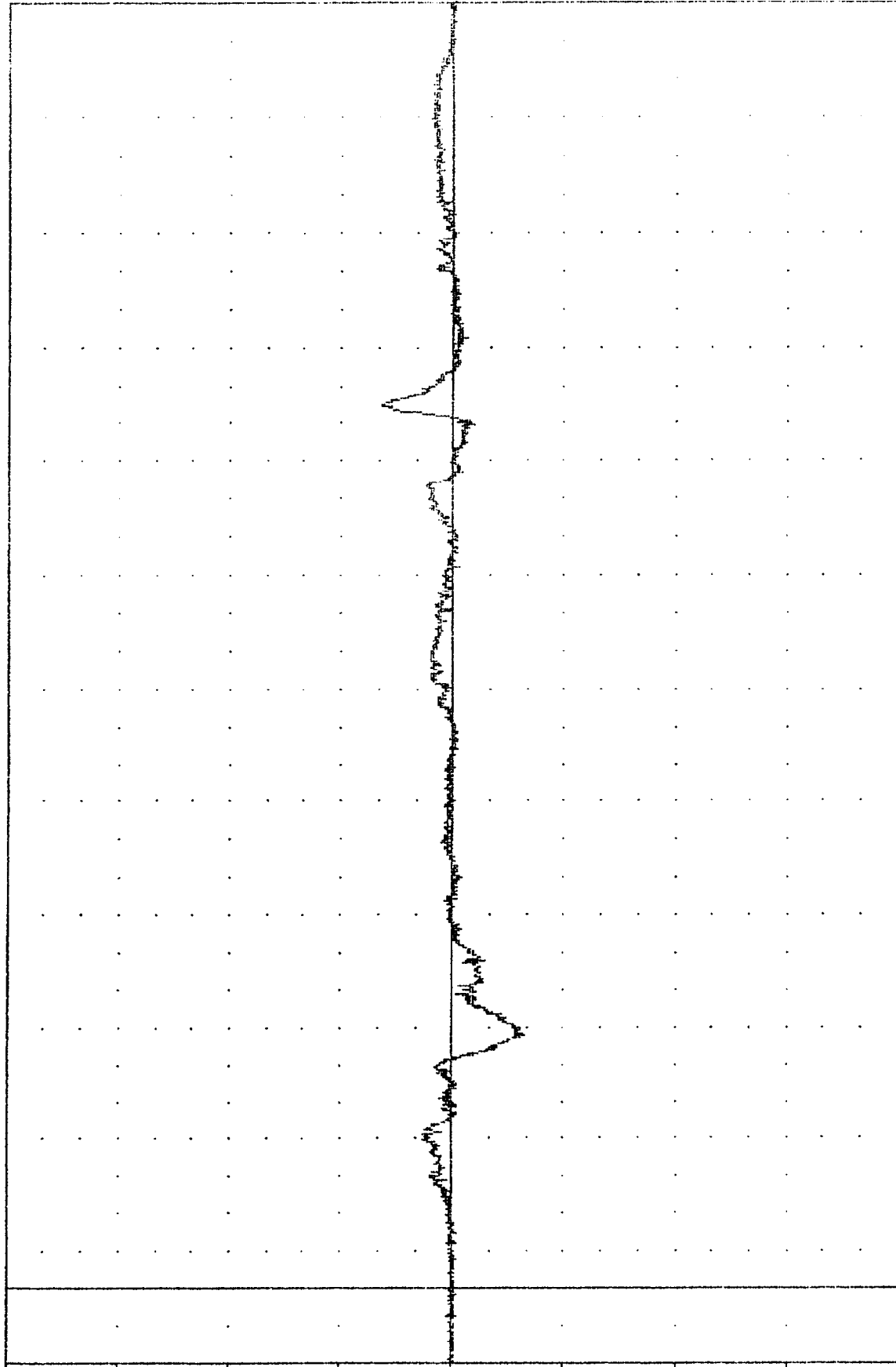
84263000000

HEDXG3

FILTER = ALPF 1650/ 5217/ -40

MIN, MAX VALUES = -32.56 67.66 32.48 234.63

ACCELERATION (G)



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

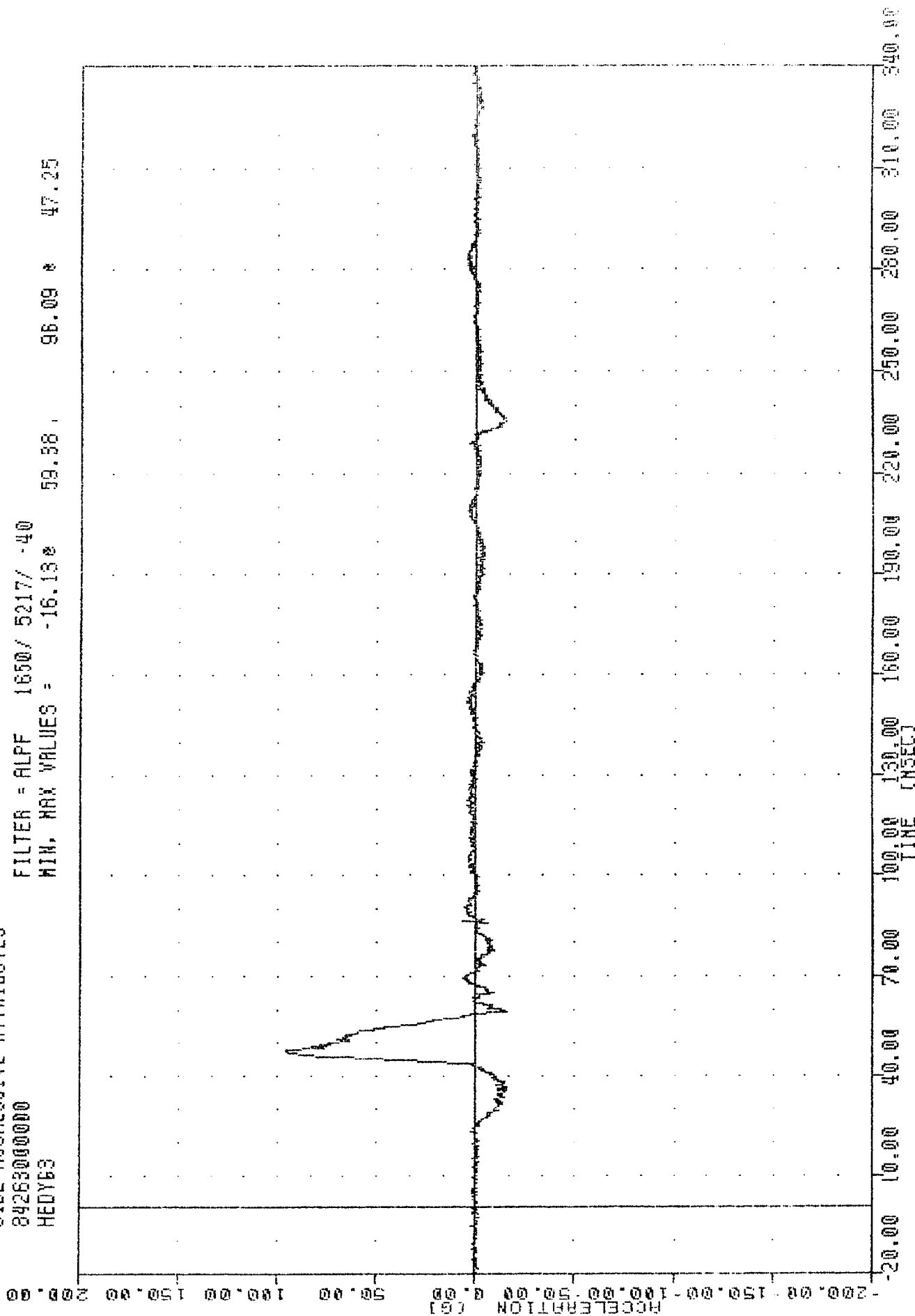
PASSENGER HEAD ACCELERATION X AXIS

TRC 040319
 SIDE AGGRESSIVE ATTRIBUTES
 04263000000
 HEDY63

PLOT DATE 26 JUL 84 11:27:00

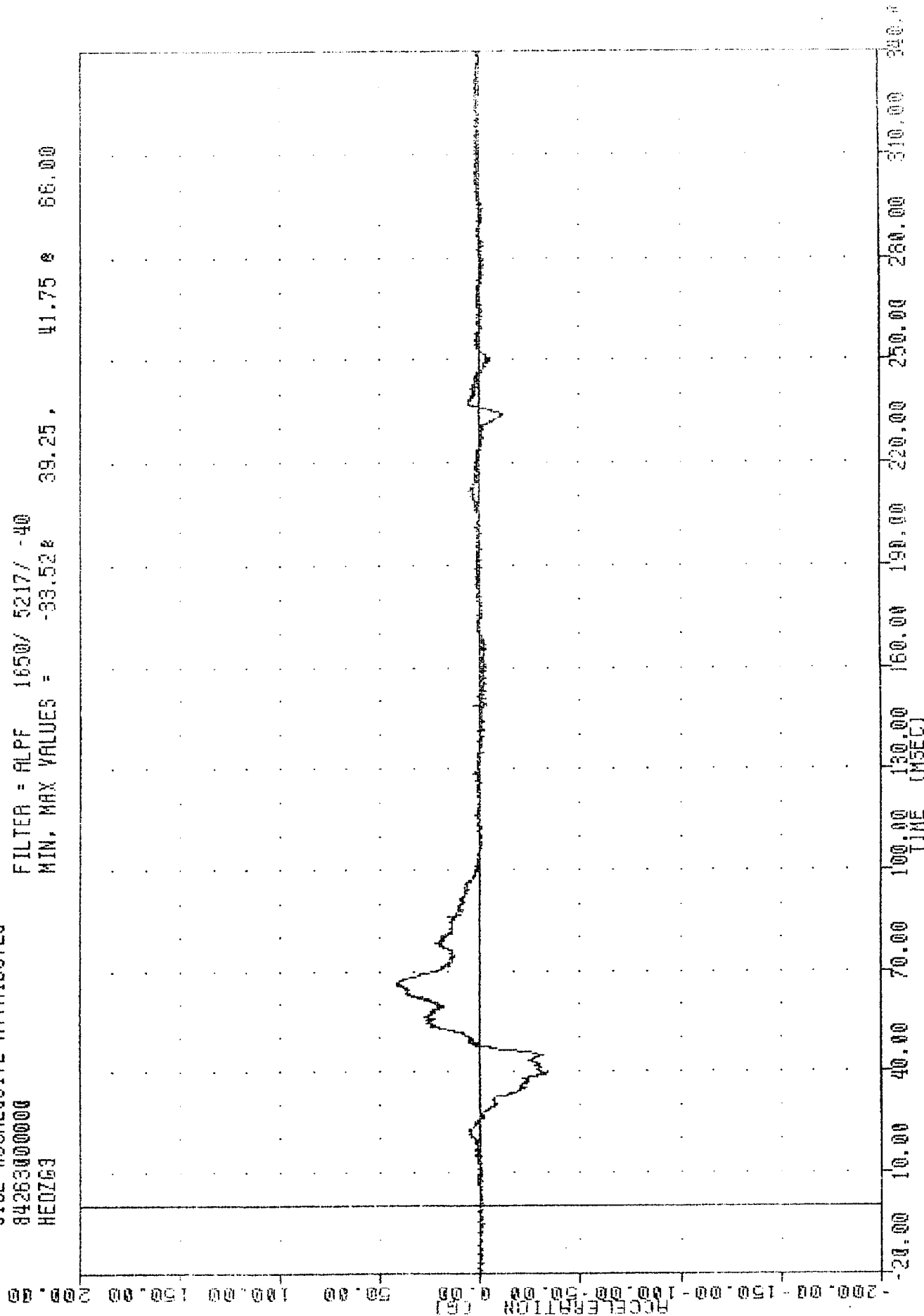
FILTER = ALPF 1650 / 5217 / -40

MIN. MAX VALUES = -16.13 96.09 47.25



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER HEAD ACCELERATION Y AXIS

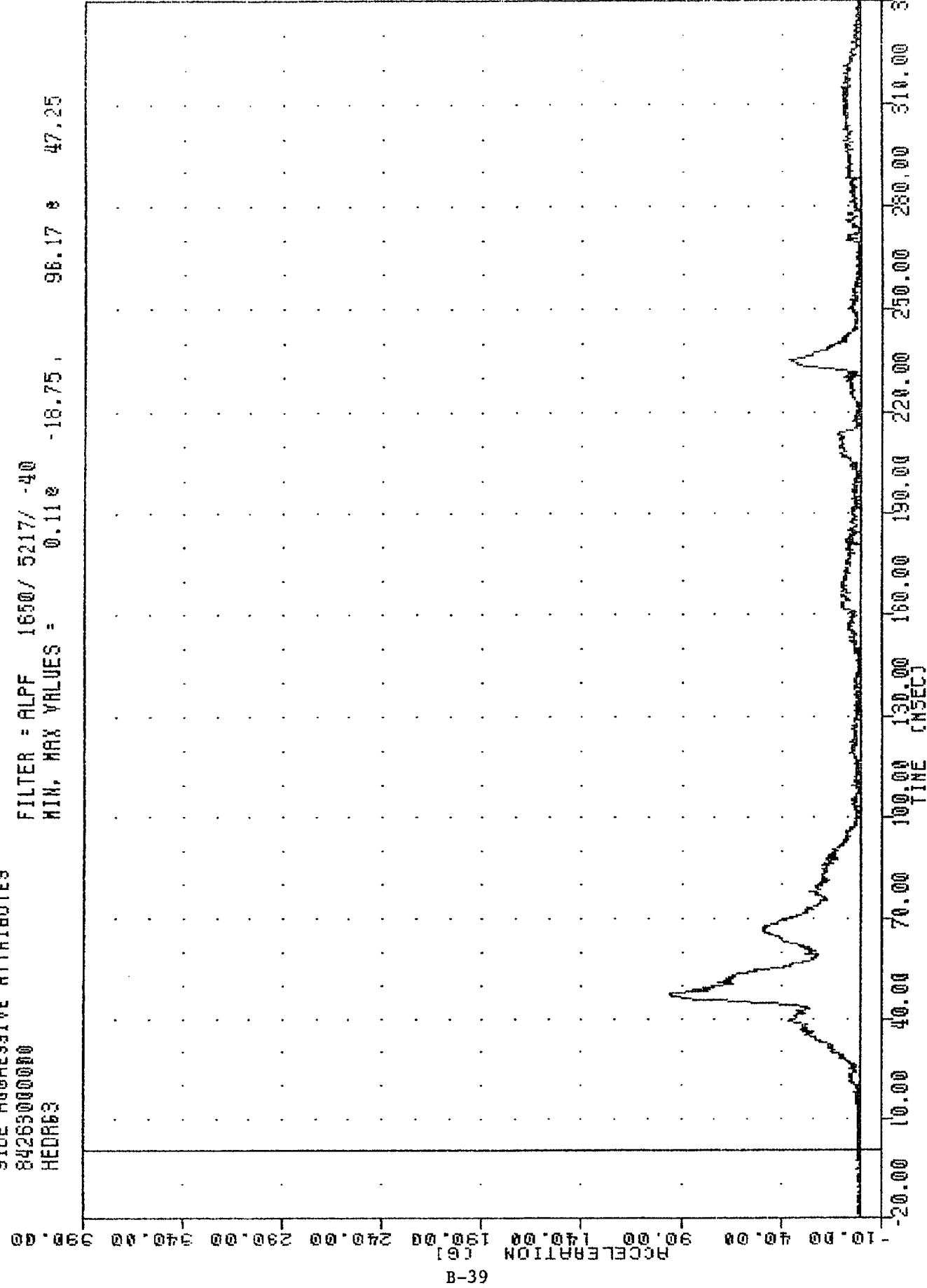
TRC 040913
 SIDE AGGRESSIVE ATTRIBUTES
 842630000000
 HEADZ63
 FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -93.52% 39.25, 41.75 % 68.00
 PLOT DATE 28 SEP-84 11:27:00



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER HEAD ACCELERATION Z AXIS

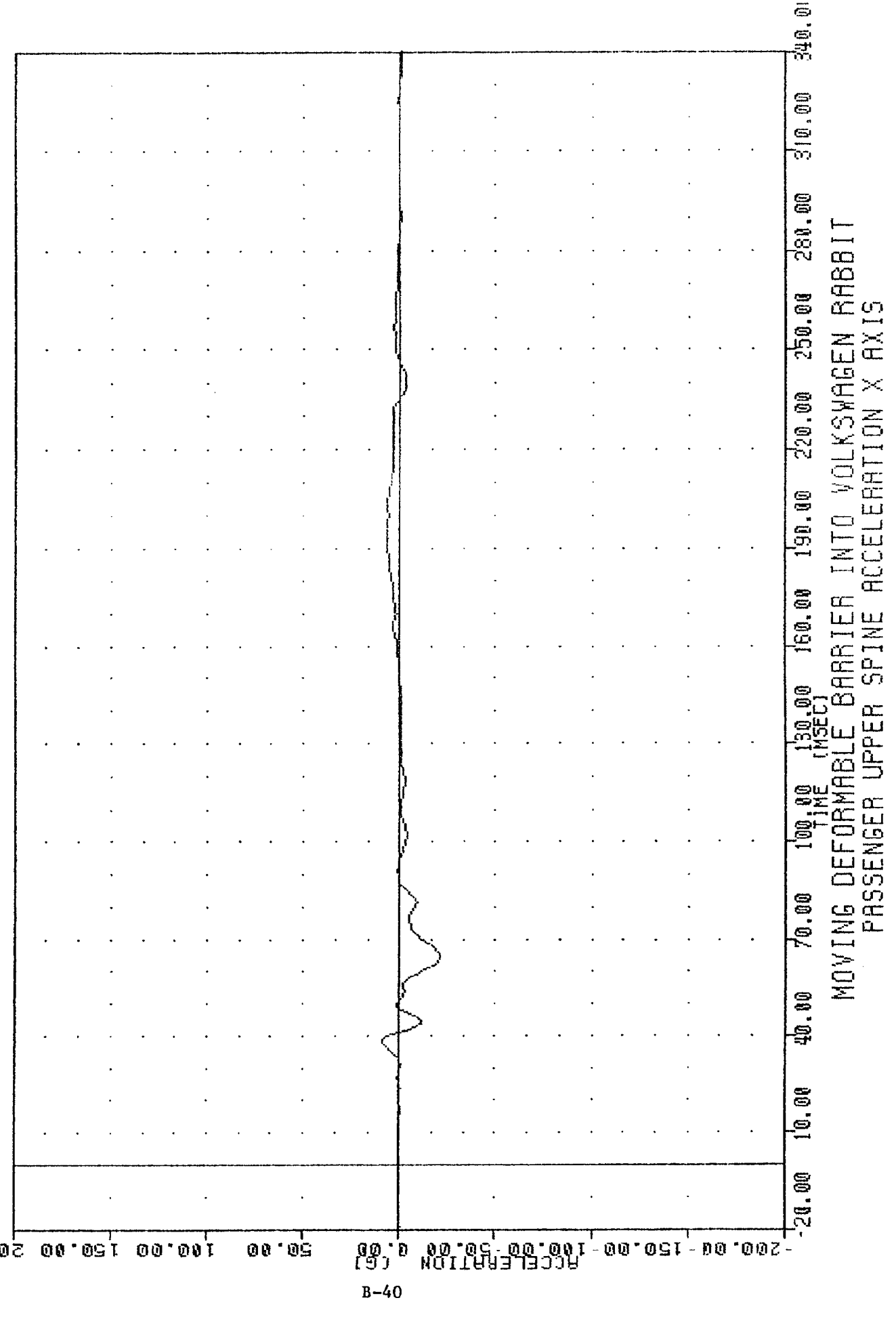
TR 0319
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 HEAD63

DATE 26-07-81 12:00
 FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = 0.11e -18.75 , 96.17 e 47.25



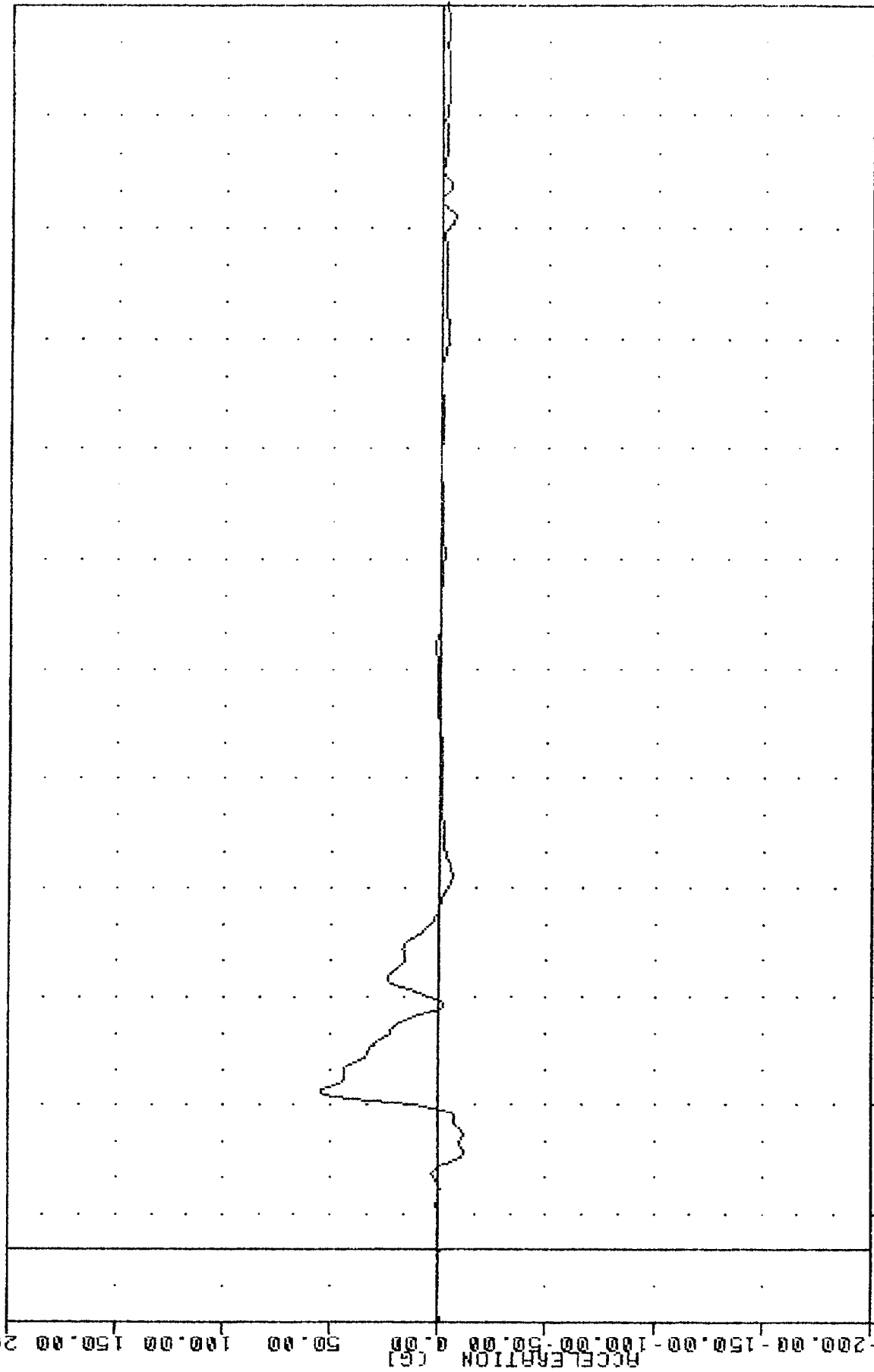
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER HEAD RESULTANT

INC 7040913
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T01XG3
 FILTER = HSR1 136/ 189/ -50
 MIN. MAX VALUES = -21.33% 63.75, 8.47 & 38.13
 PLOT DATE 20 SEP-84 11:29:24



TAC 040919, 040919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T01Y63
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -11.81e 26.25, 54.72 e 43.13
 PLOT DATE 26-SEP-84 11:29:24

200.00



B-41

-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 UPPER SPINE ACCELERATION Y AXIS

THE , 040919 , 26 SEP-84 11:29:24

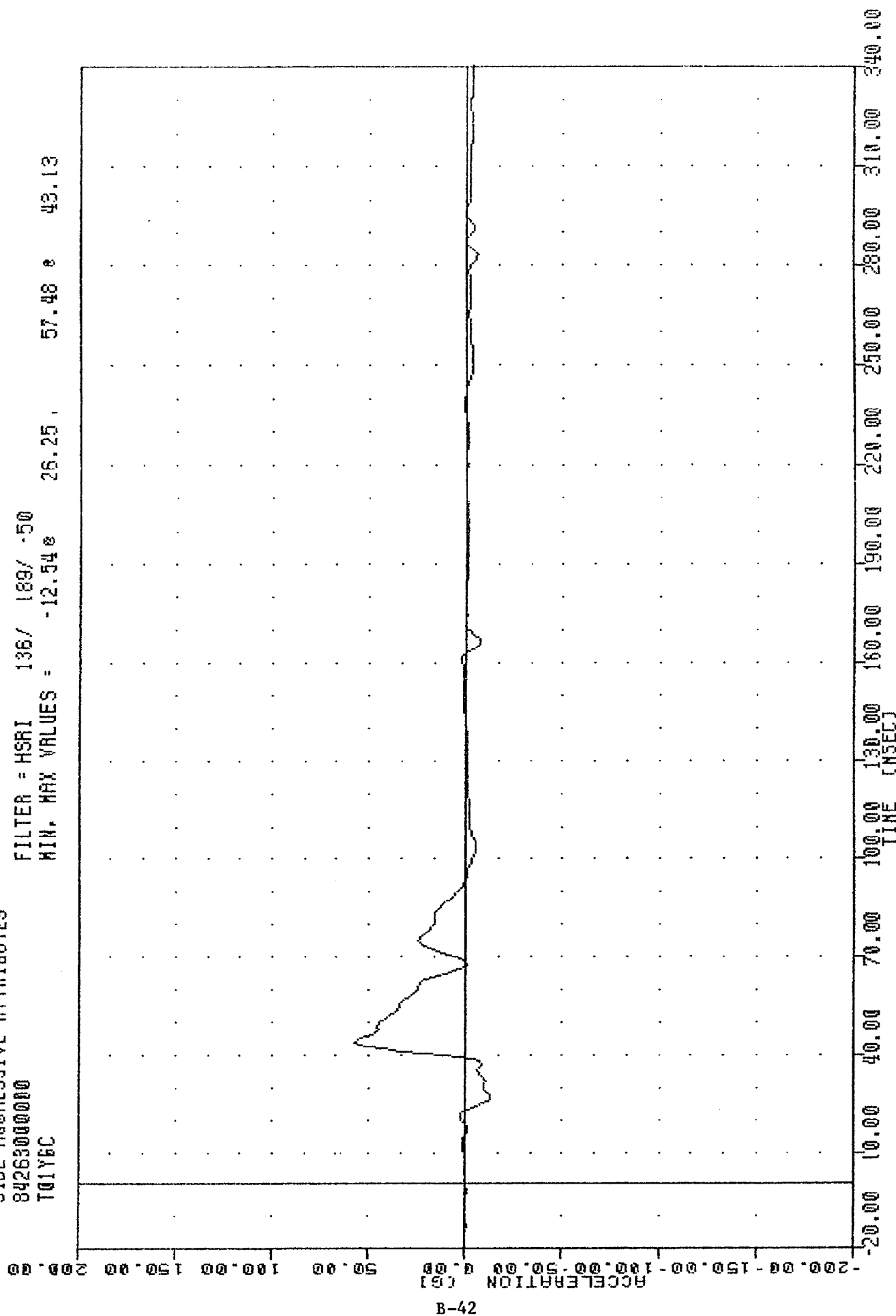
SIDE AGGRESSIVE ATTRIBUTES

84263000000

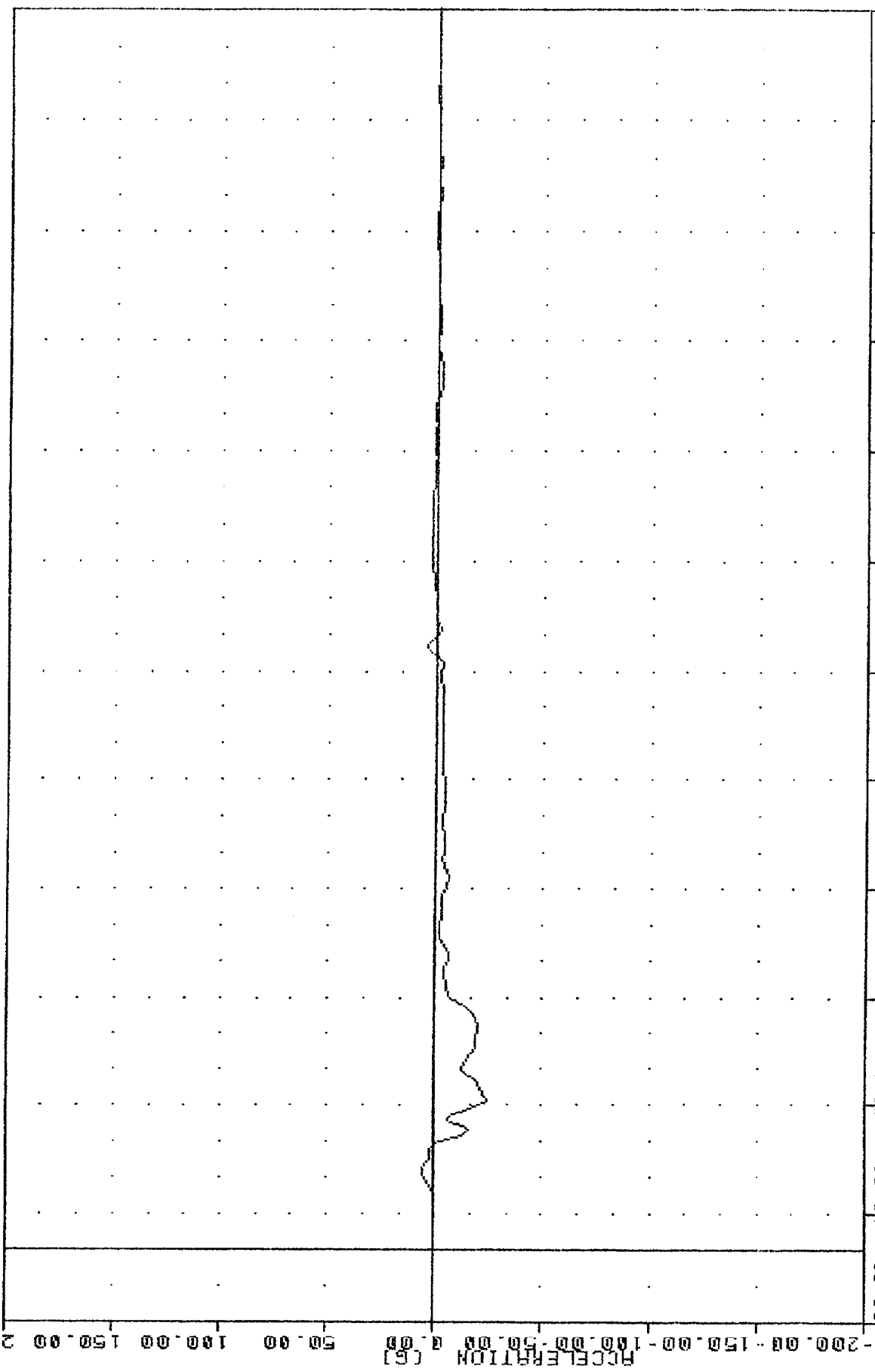
T01Y6C

FILTER = HSRI 136/ 189/ .50

MIN. MAX VALUES = -12.54 26.25 , 57.48 43.13

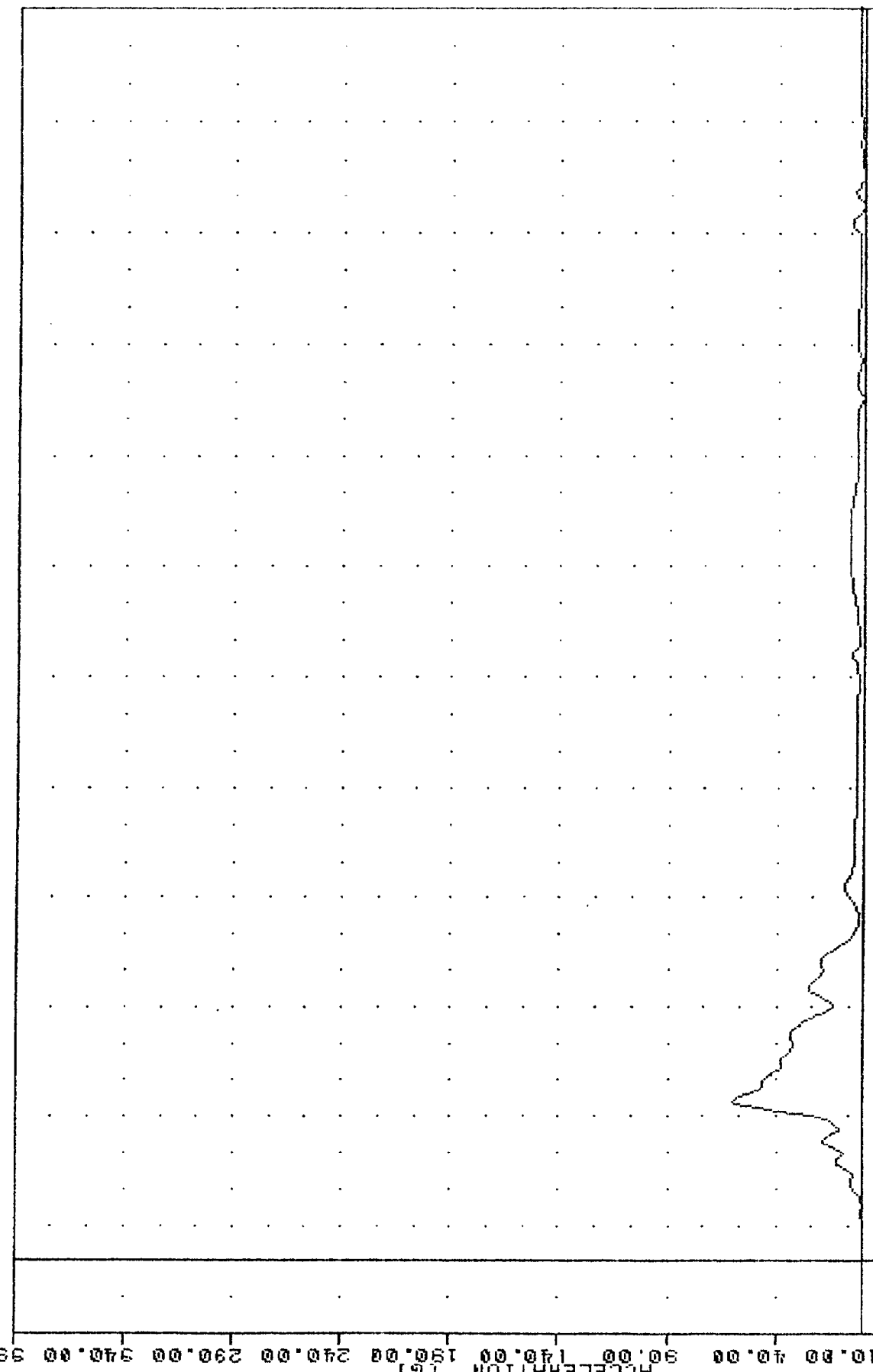


TAG 100915 PLOT DATE 26 JUL 64 11:29:24
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 701263
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -23.86 40.63, 5.54 21.25



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

TRC 090919, 090919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T01R63
 FILTER = HSRI 136/ 189/ .50
 MIN, MAX VALUES = 0.05% -10.13, 59.94 & 43.13
 PLOT DATE 26 SEP-84 11:29:24



-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 UPPER SPINE RESULTANT

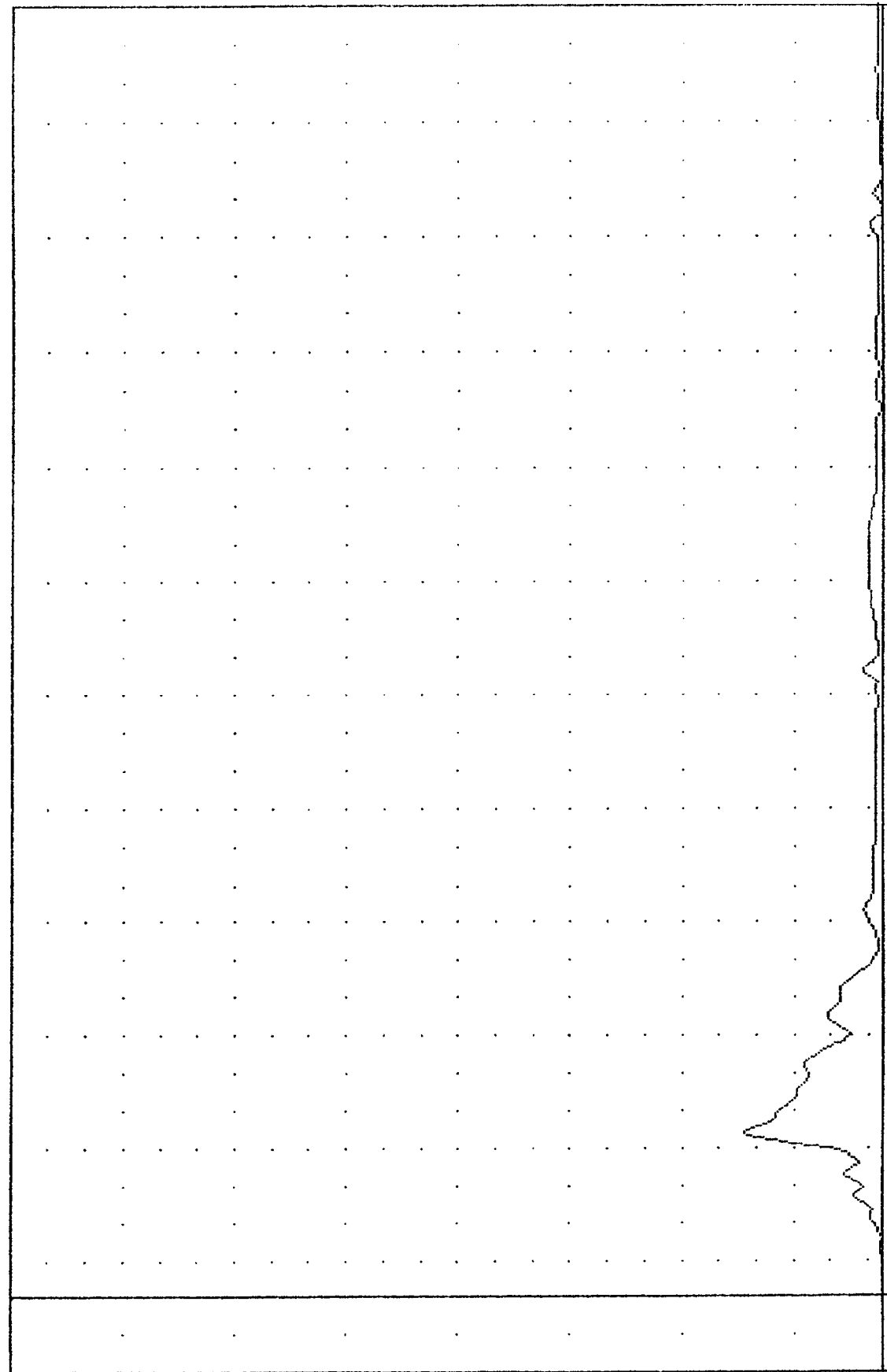
TAC 040919 PLT DATE 26 SEP 84 11:30:57

SIDE AGGRESSIVE ATTRIBUTES

84263000000 FILTER = HSRI 136/ 189/ -50

T01REC MIN, MAX VALUES = 0.030 -5.62, 62.46 # 43.13

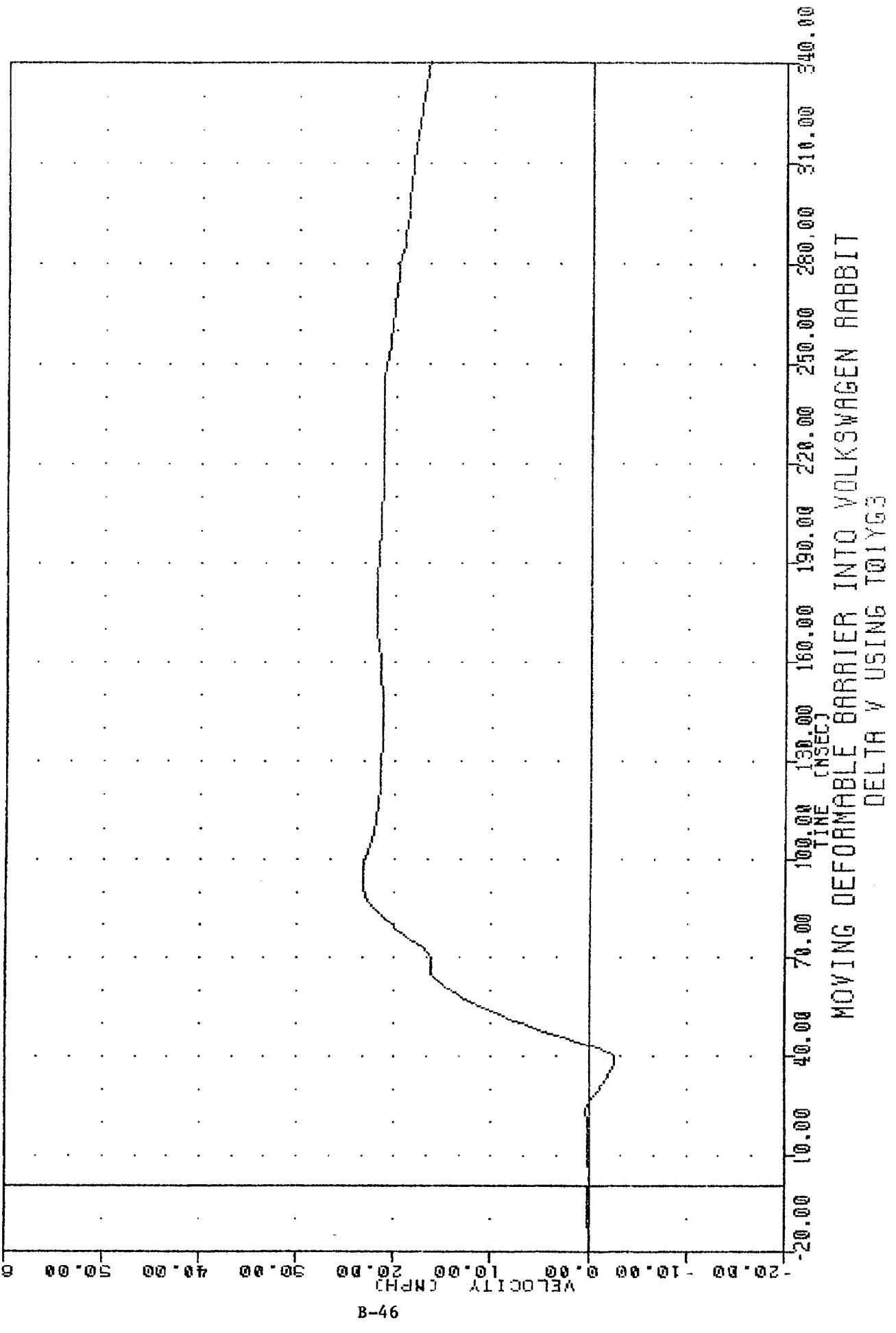
ACCELERATION (G)



-10.00 40.00 90.00 140.00 190.00 240.00 290.00 340.00

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

THE [REDACTED] 040919 [REDACTED] PLUT DATE 26-SEP-84 11:31:25
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T01Y43
 FILTER = HSRI 136/ 189/ .50
 MIN. MAX VALUES = 38.13, 23.27 * 93.75



TRC

840919

842630000000

842630000000

T01YVC

PLUT DATE 26-SEP-84

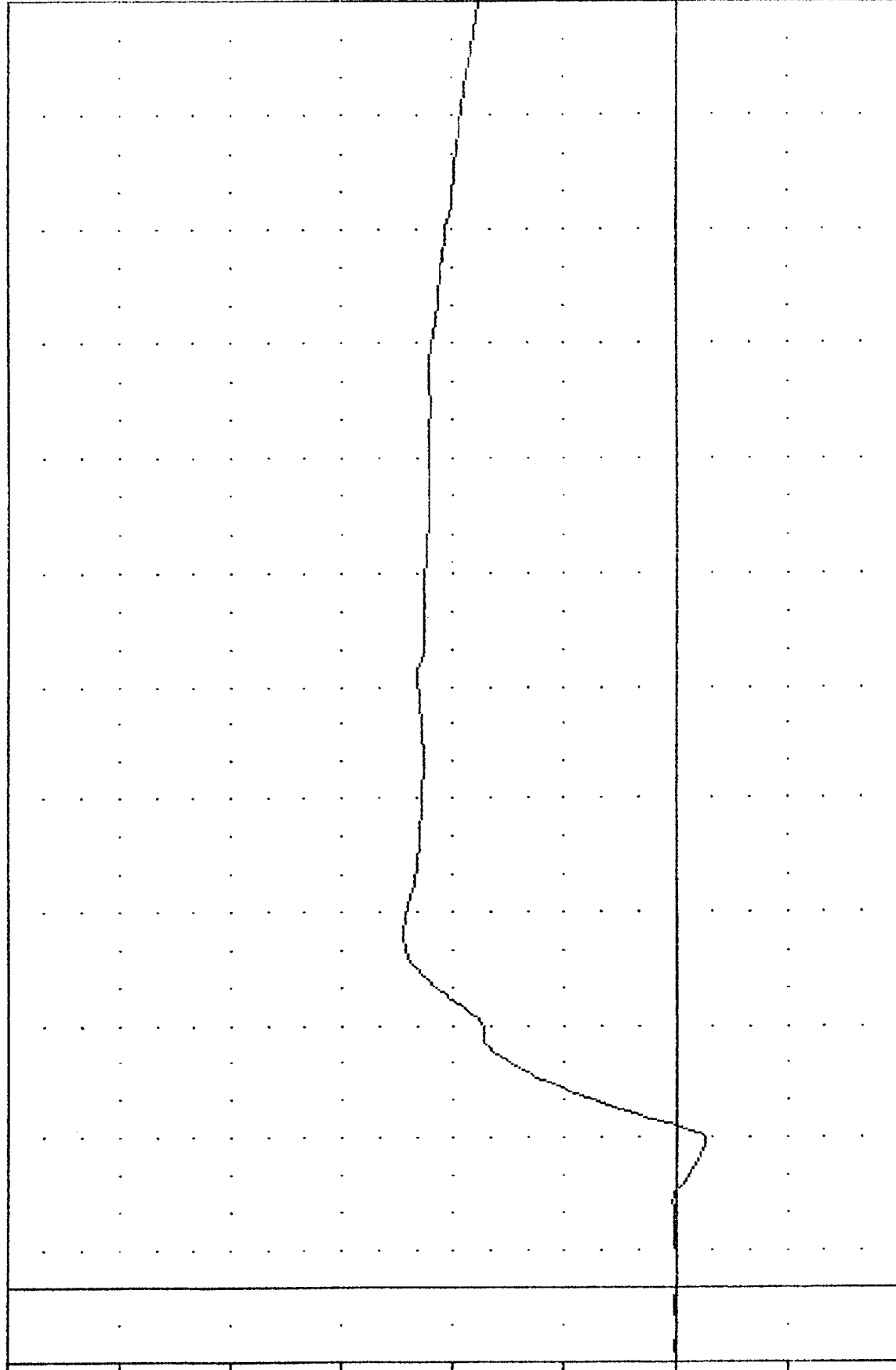
11:31:25

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -2.73 38.13, 24.44 93.13

VELOCITY (MPH)

B-47



-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)

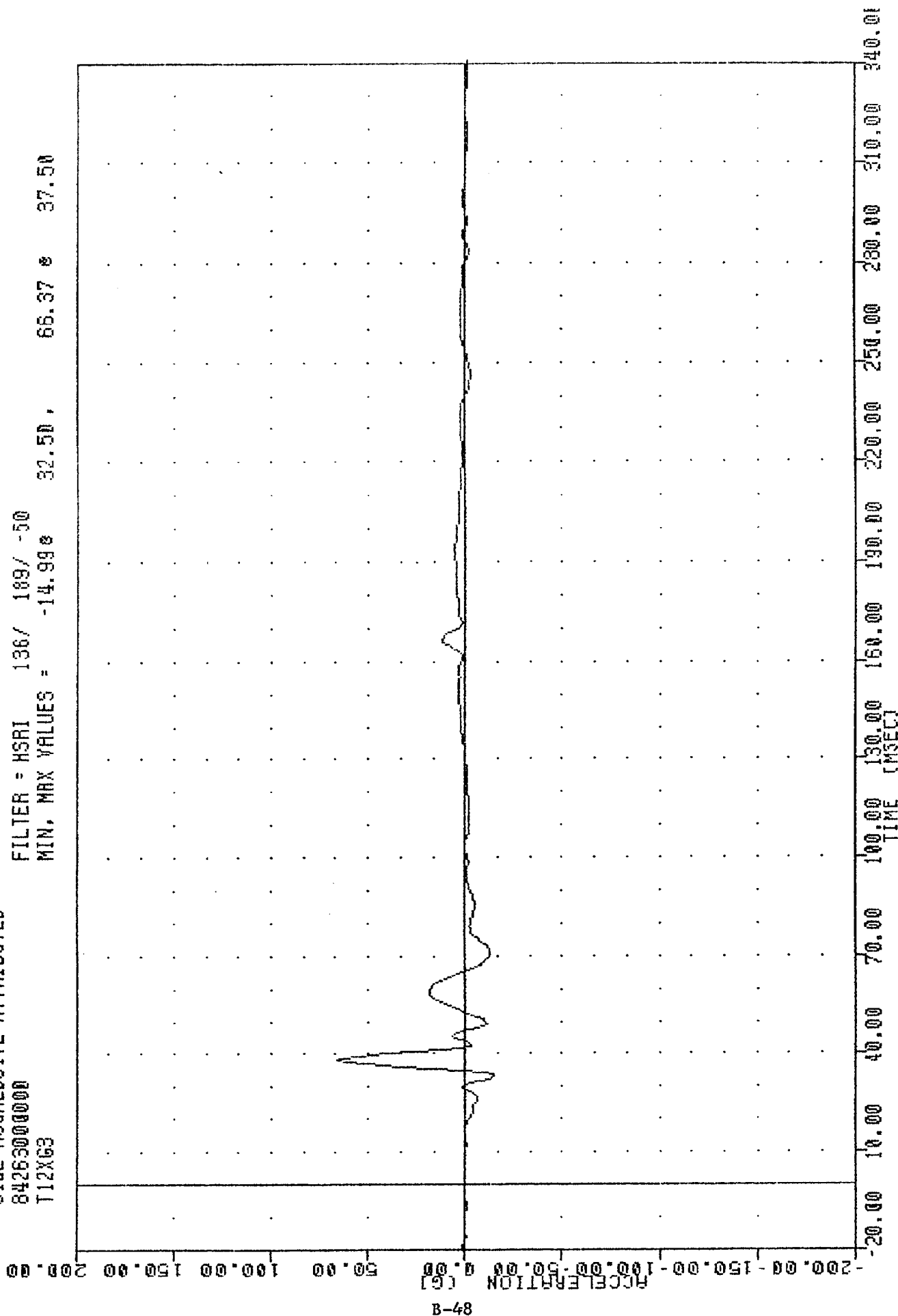
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT

DELTA V USING T01YVC

THE 0913
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T12X63

PLOT DATE 26 JEP-84 11:29:24

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -14.998 32.50 65.37 37.50

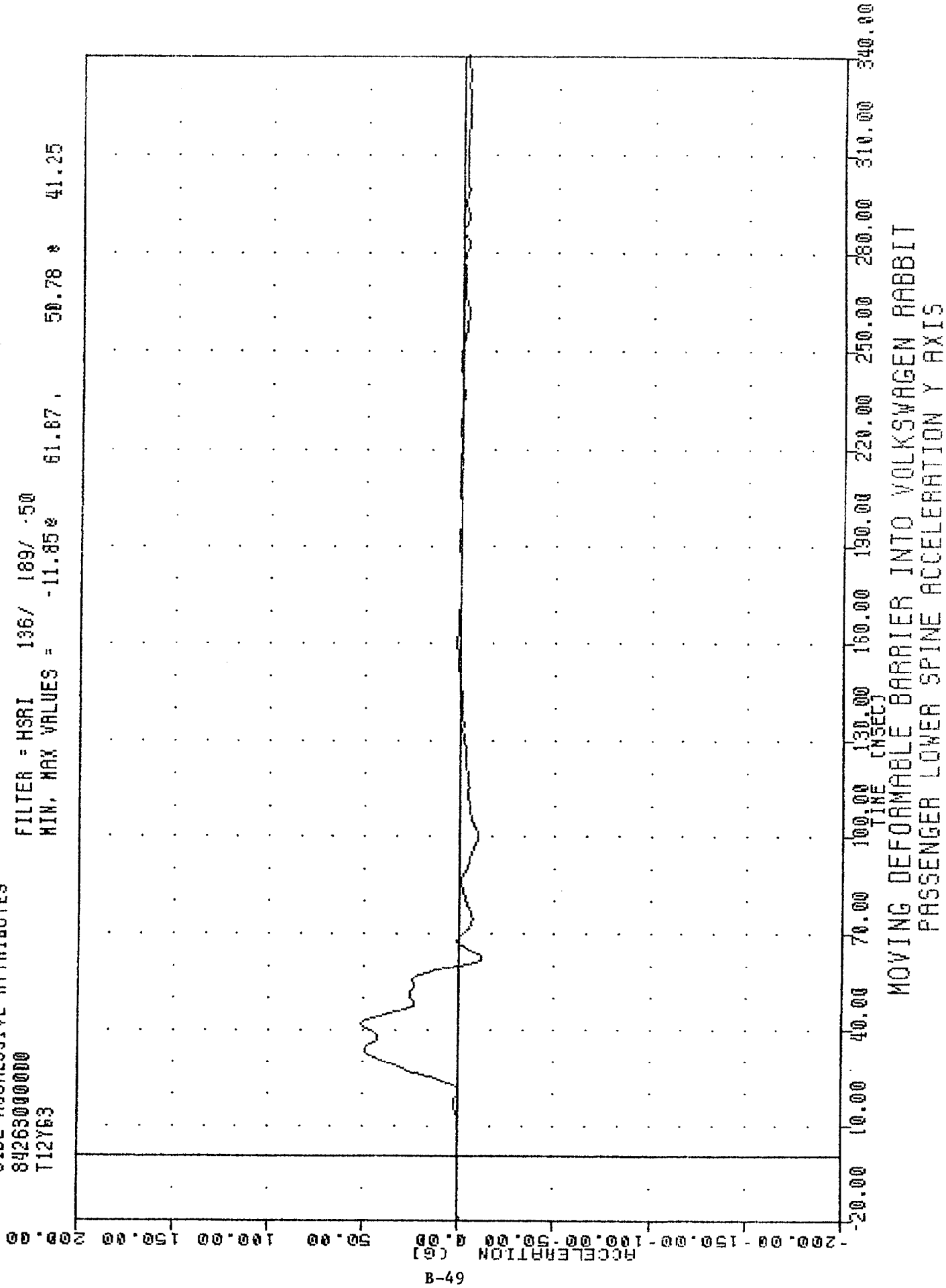


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER LOWER SPINE ACCELERATION X AXIS

TAC 040915
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T12Y63

PLT DATE 26 SEP-84 11:29:24

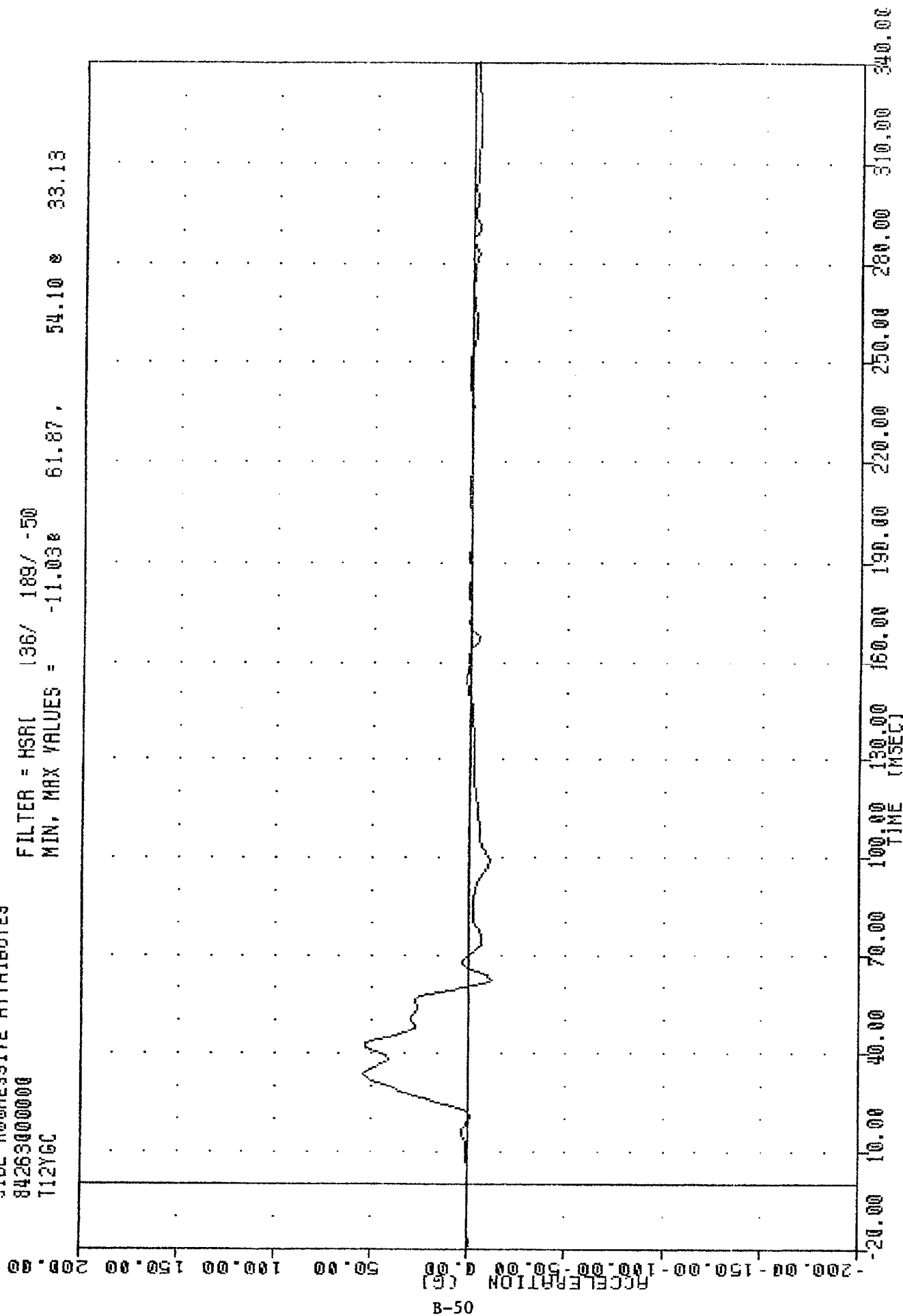
FILTER = HSRI 136/ 189/ .50
 MIN, MAX VALUES = -11.85% 61.67, 50.78 * 41.25



TIME 000000
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T12Y6C

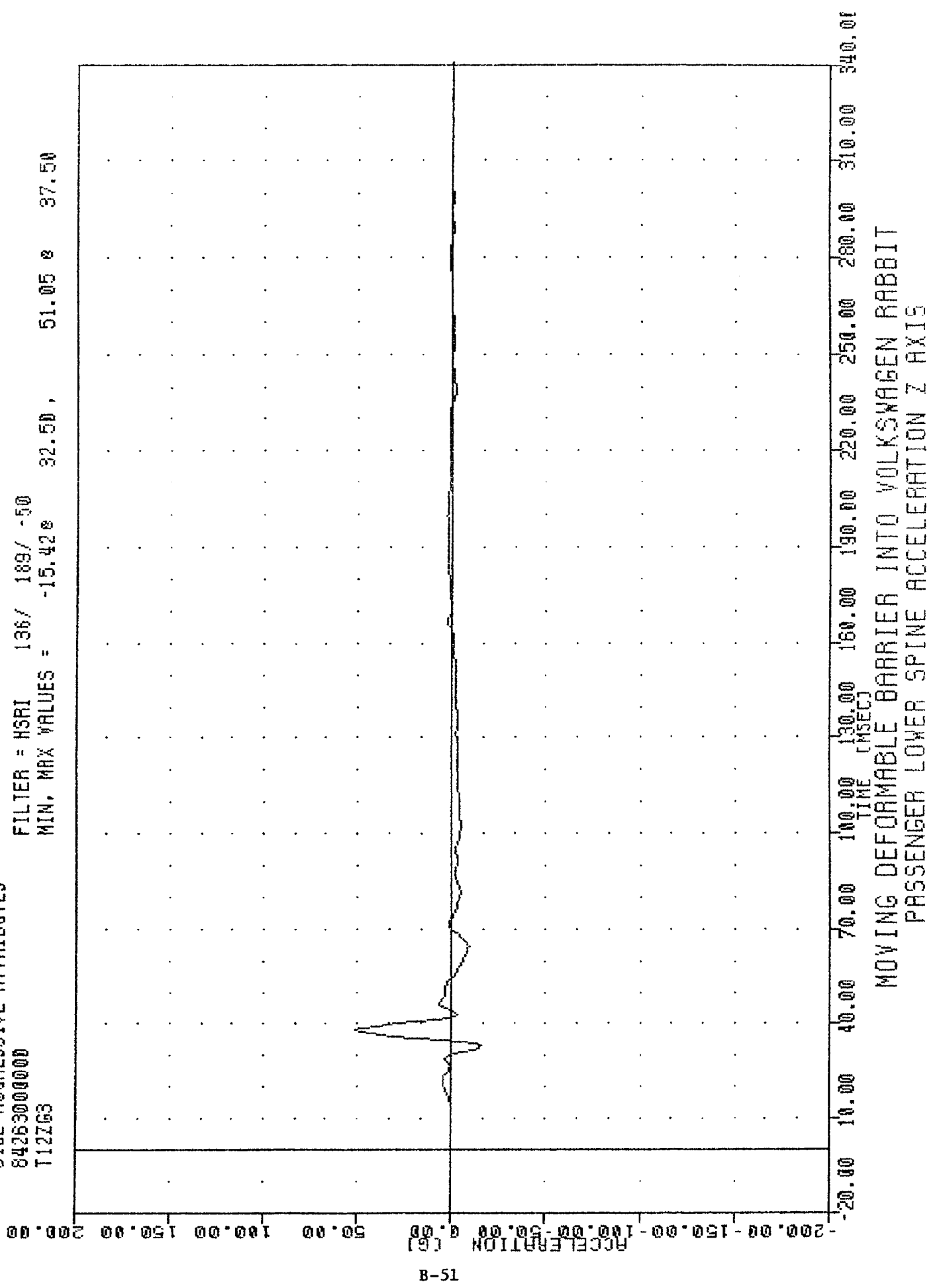
PLOT DATE 28 SEP 84 11:29:24

FILTER = HSR1 136/ 189/ -50
 MIN, MAX VALUES = -11.038 61.87, 54.10 33.13



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

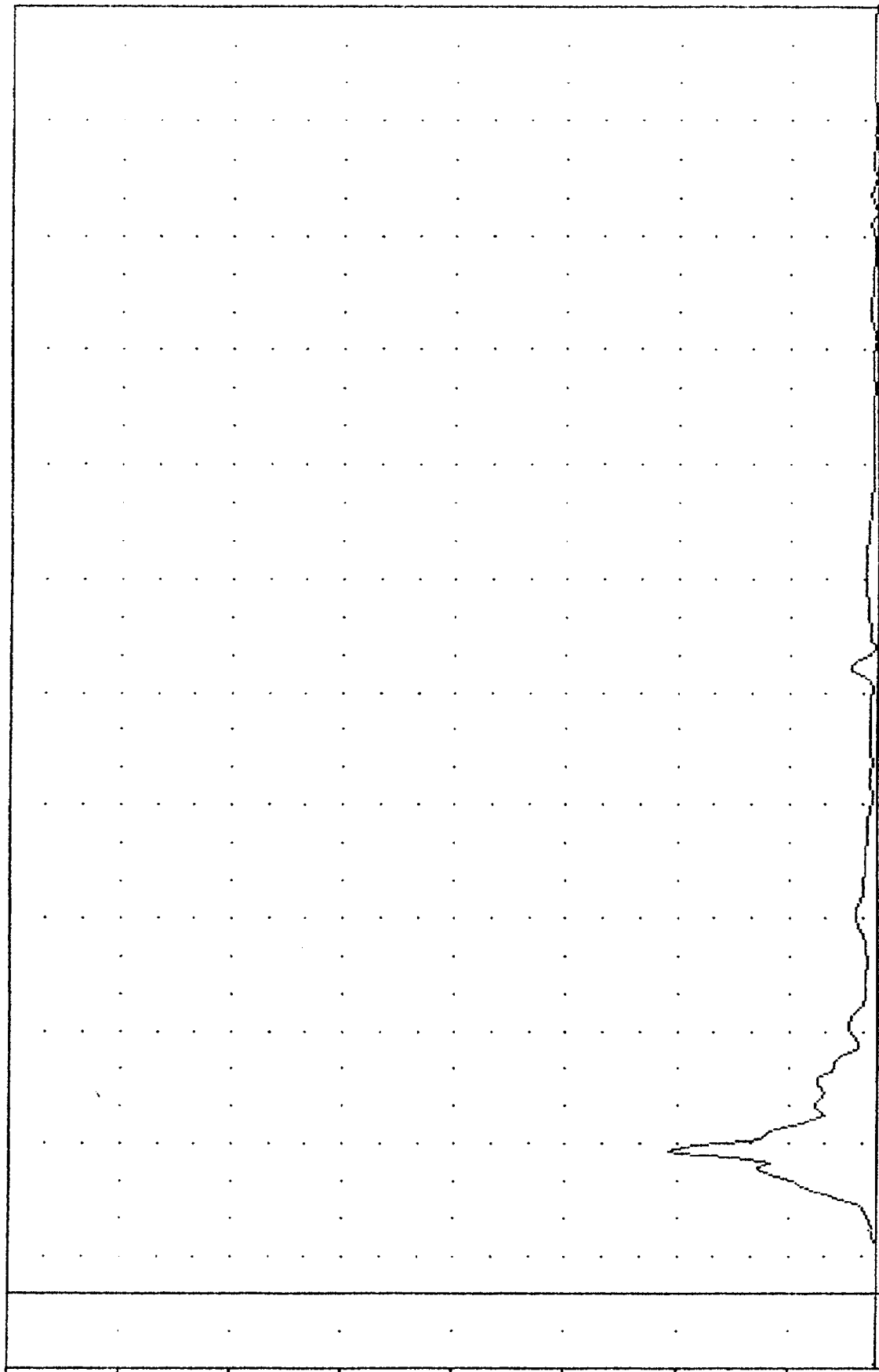
TAC 840819, 090819 PLOT DATE 28 SEP 84 11:29:24
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T12163
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -15.428 32.50, 51.05 & 37.50



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

INC 040915 PLOT DATE 20 JEP-84 11:28:24
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T12R63
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = 0.05 93.92 37.50

ACCELERATION (G)
 -10.00
 -4.00
 0.00
 4.00
 8.00
 12.00
 16.00
 20.00
 24.00
 28.00
 32.00
 36.00
 39.00

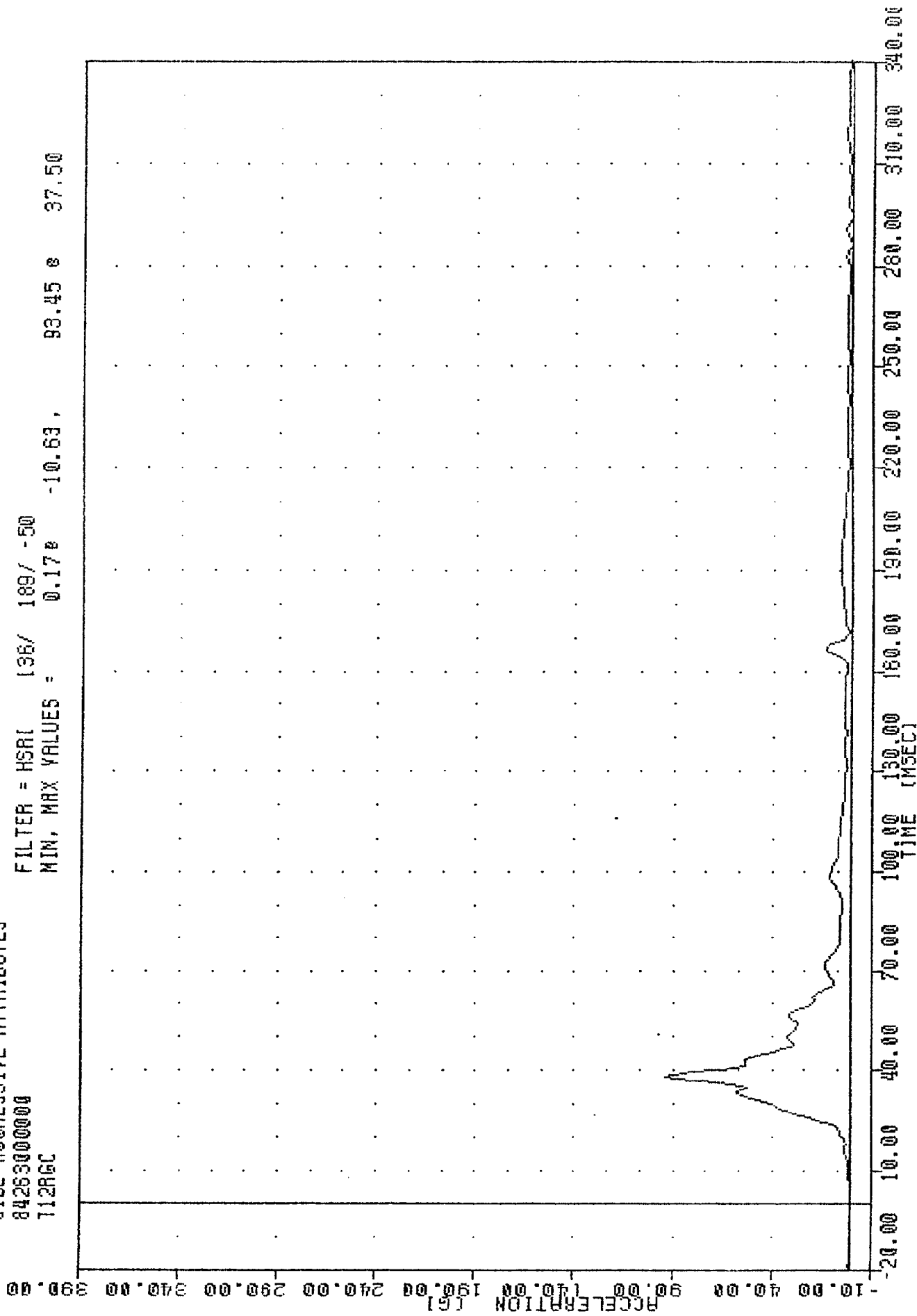


-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER LOWER SPINE RESULTANT

10091
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T12AGC

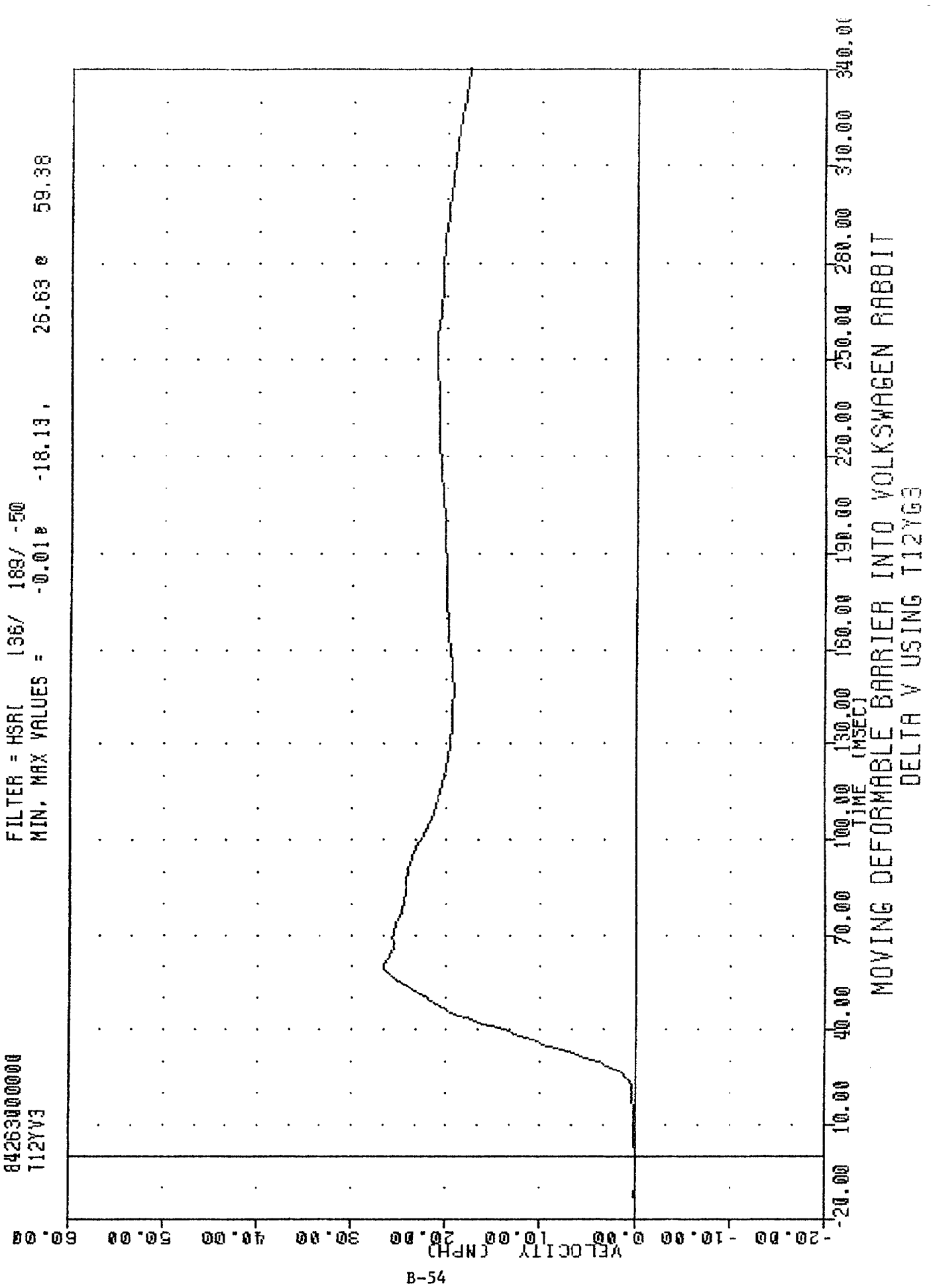
PLOT DATE 20 SEP 84 11:50:57

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.178 -10.63, 93.45 8 37.50



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER LOWER SPINE RESULTANT USING T12YGC

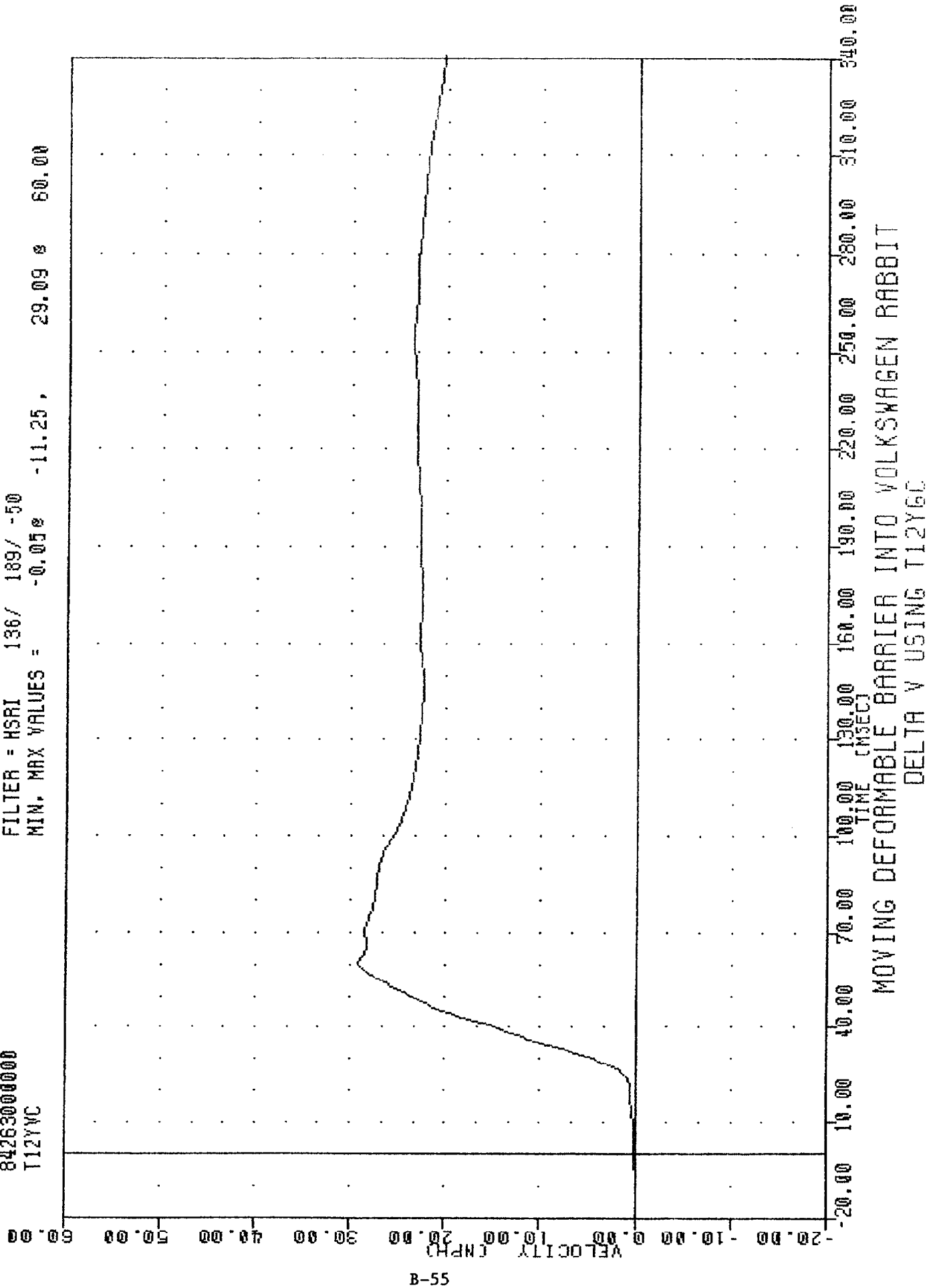
INC 040913
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T12YV3
 FILTER = HSRL 136/ 189/ -50
 MIN, MAX VALUES = -0.01e -18.13, 26.63 e 59.38
 PLOT DATE 28 SEP-84 13:06:15



TAC 040913
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 T12YVC

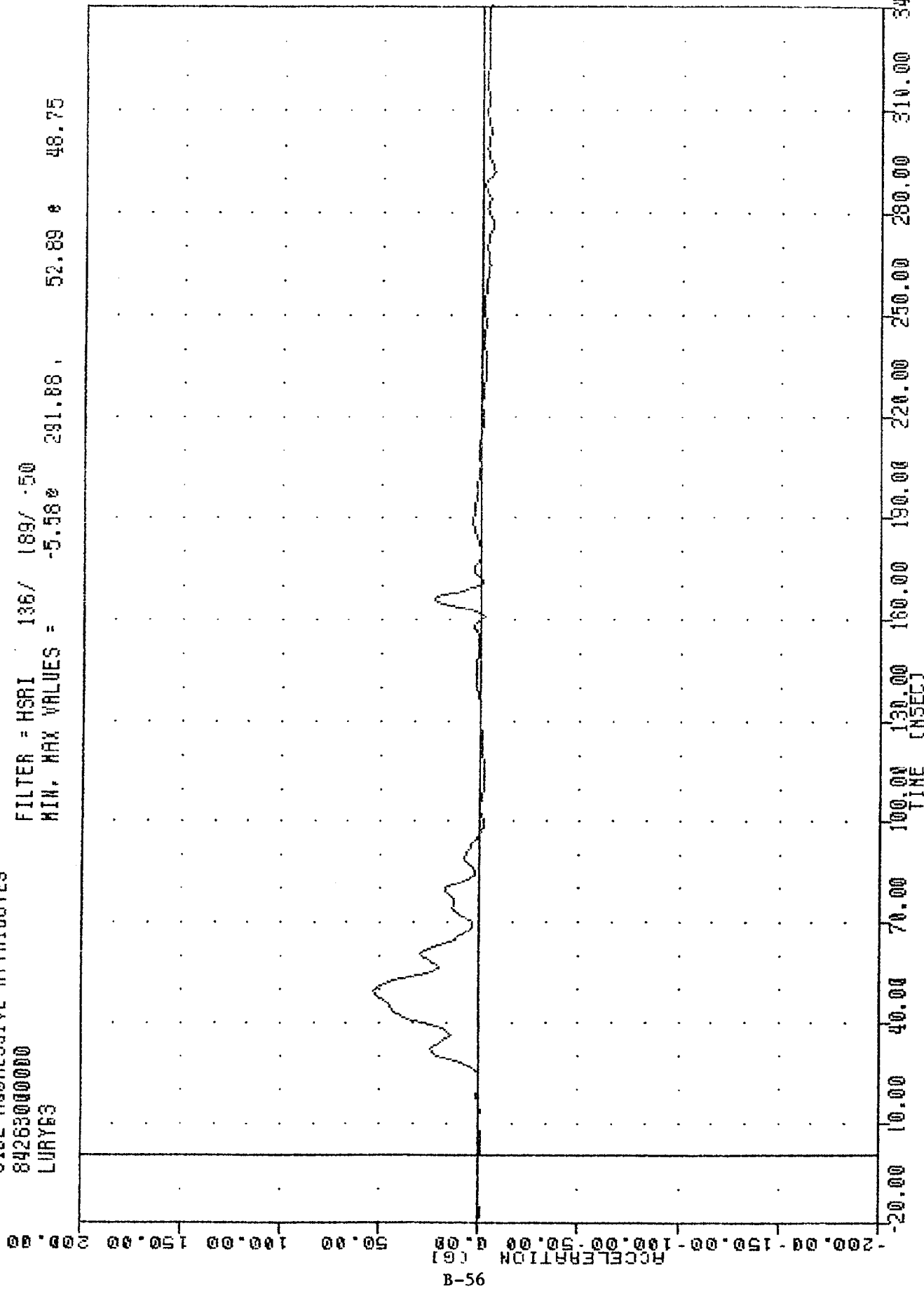
PLOT DATE 28 SEP 64 13:05:15

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -0.058 -11.25, 29.09 8 60.00



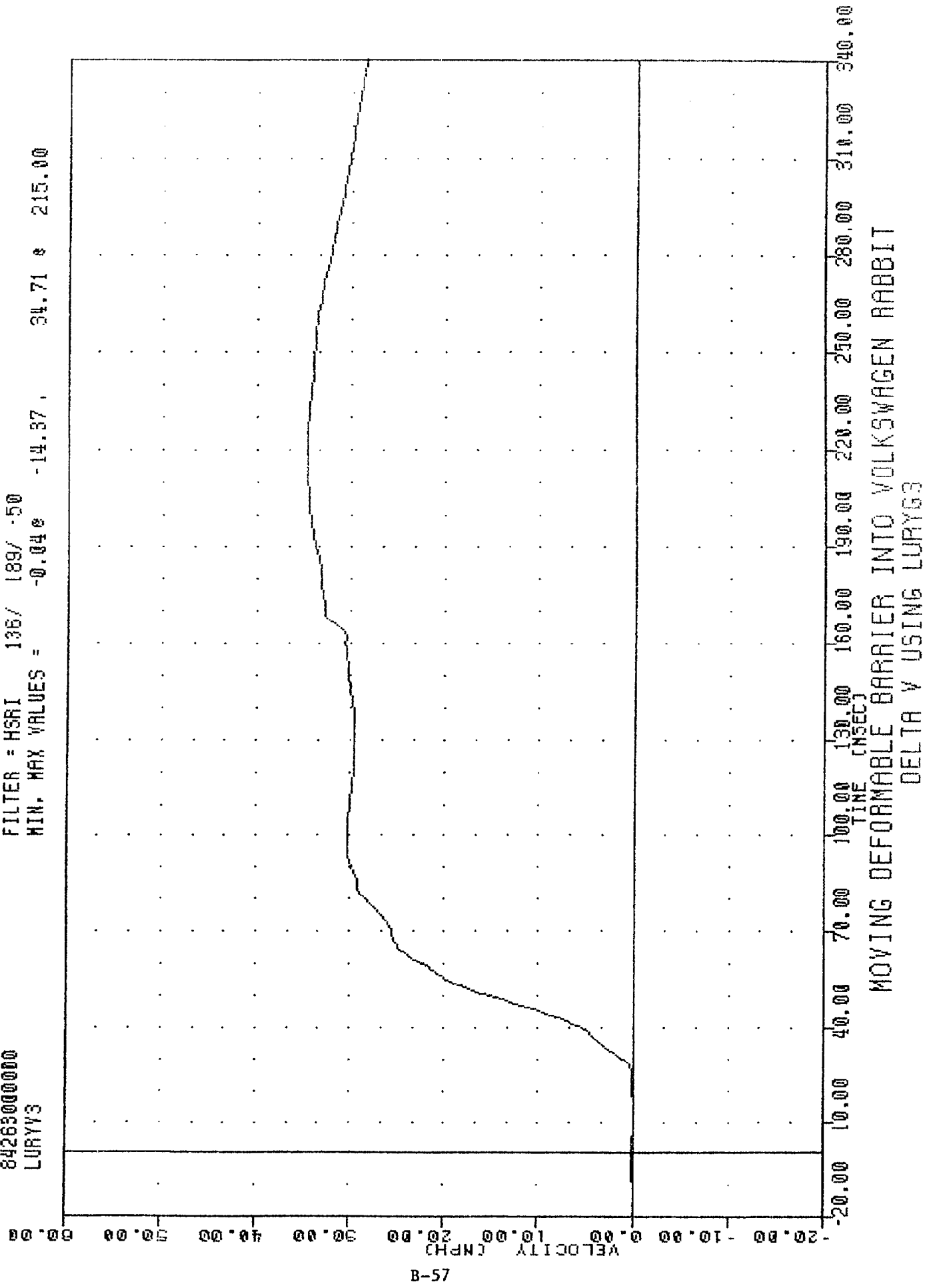
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING T12Y6C

TRC , 040919 , 26-SEP-84 11:29:24
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LURY63
 FILTER = HSRI 136/ 189/ .50
 MIN, MAX VALUES = -5.58 291.88 , 52.89 48.75



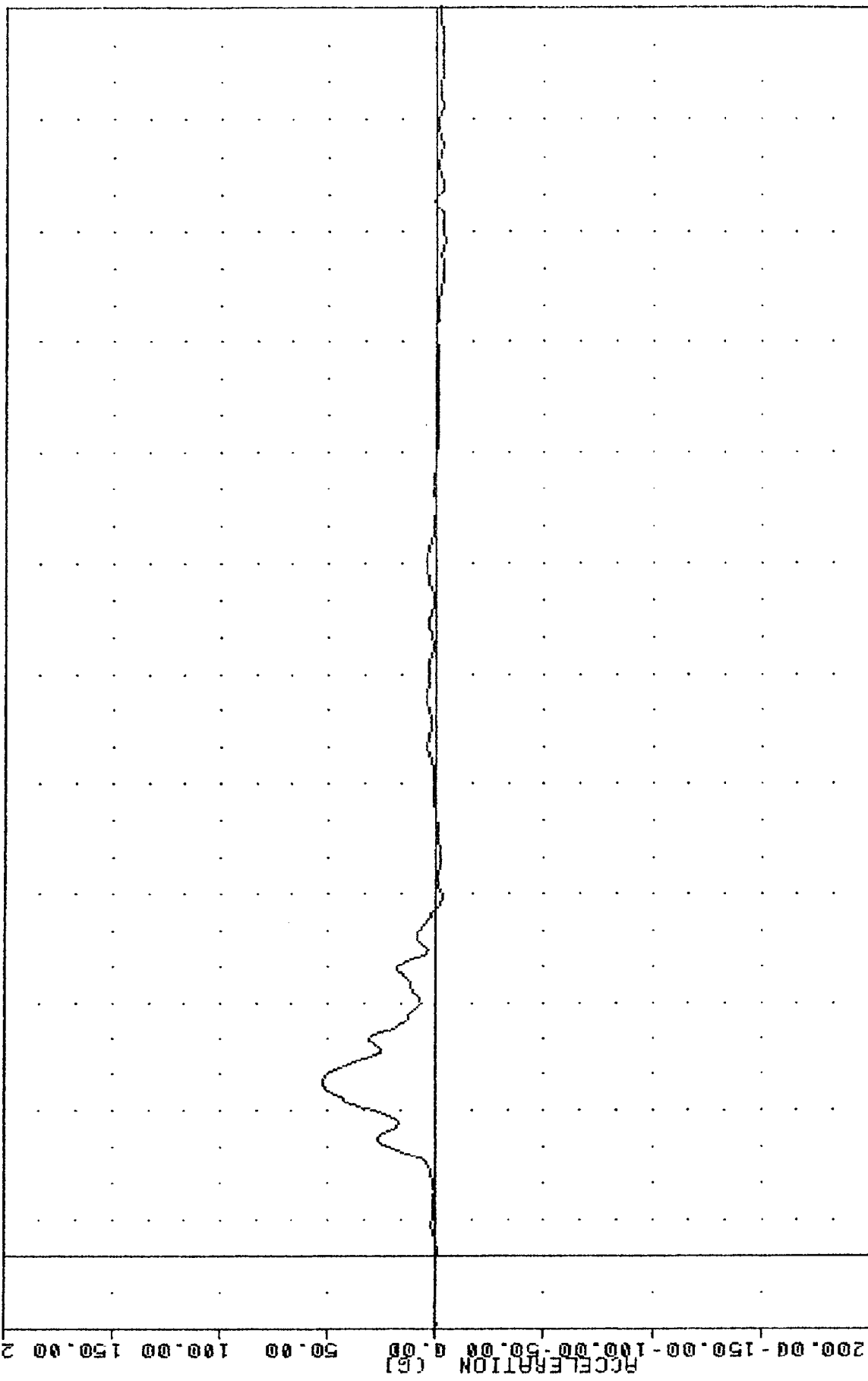
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER LEFT UPPER RIB ACCELERATION Y AXIS

TRC [REDACTED], 84V919 [REDACTED]
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LURYV3
 PLOT DATE [REDACTED] 26-SEP-84 [REDACTED] 13:06:15
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -0.048 -14.37, 34.71 & 215.00



TMC 840919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LURY6C
 PLOT DATE 26-SEP-84 11:29:24
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -3.77% 276.88, 52.74 @ 47.50

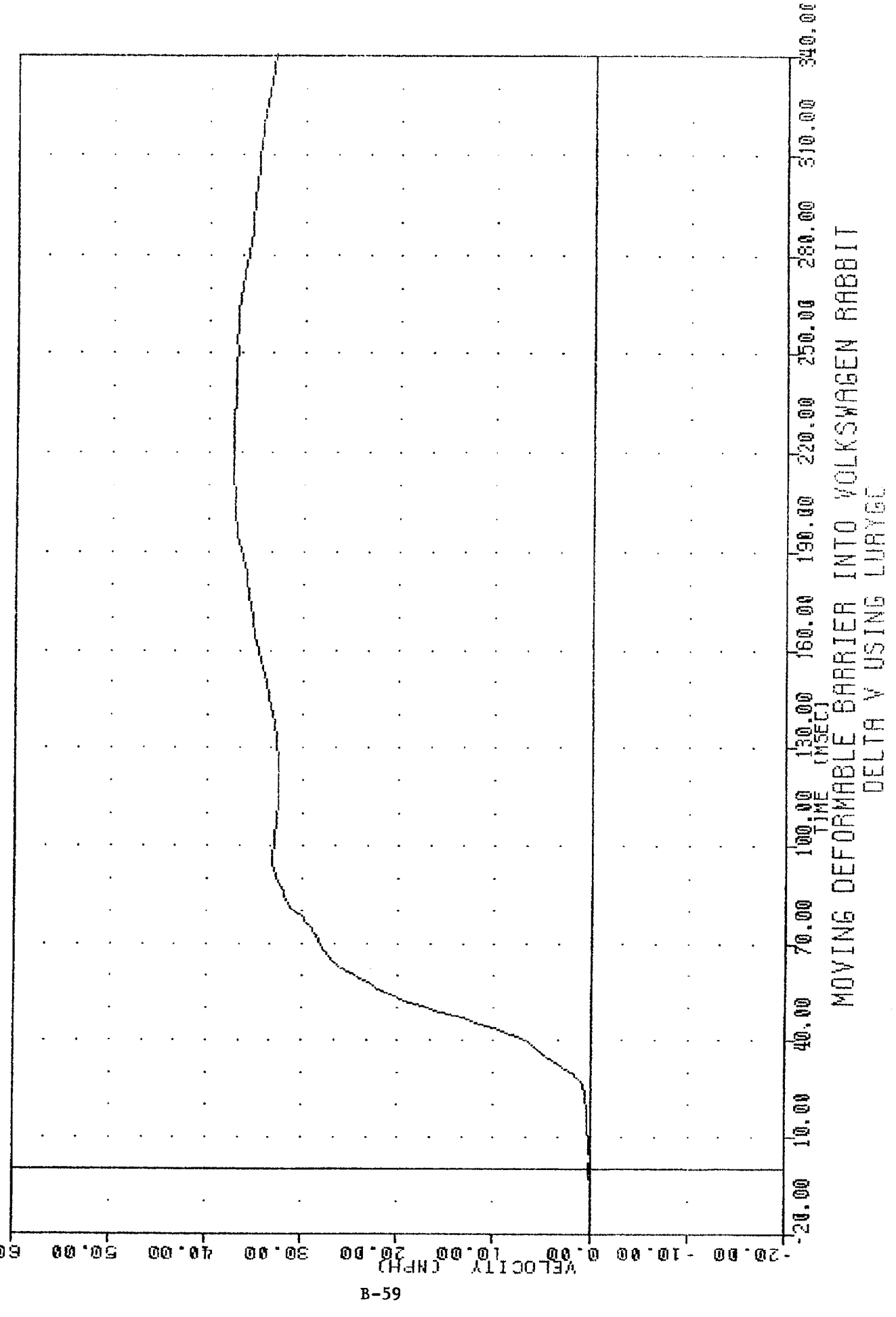
200.00



B-58

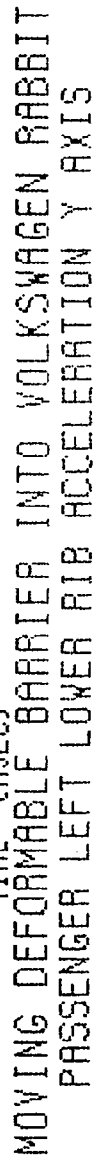
-200.00 -150.00 -100.00 -50.00 0.00 50.00 100.00 150.00 200.00
 ACCELERATION (G)
 -20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER LEFT UPPER RIB ACCELERATION #2 Y AXIS

INC 040915
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LURYVC
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -0.02e -10.00, 37.49 e 218.13
 PLOT DATE 26-SEP-84 13:06:15



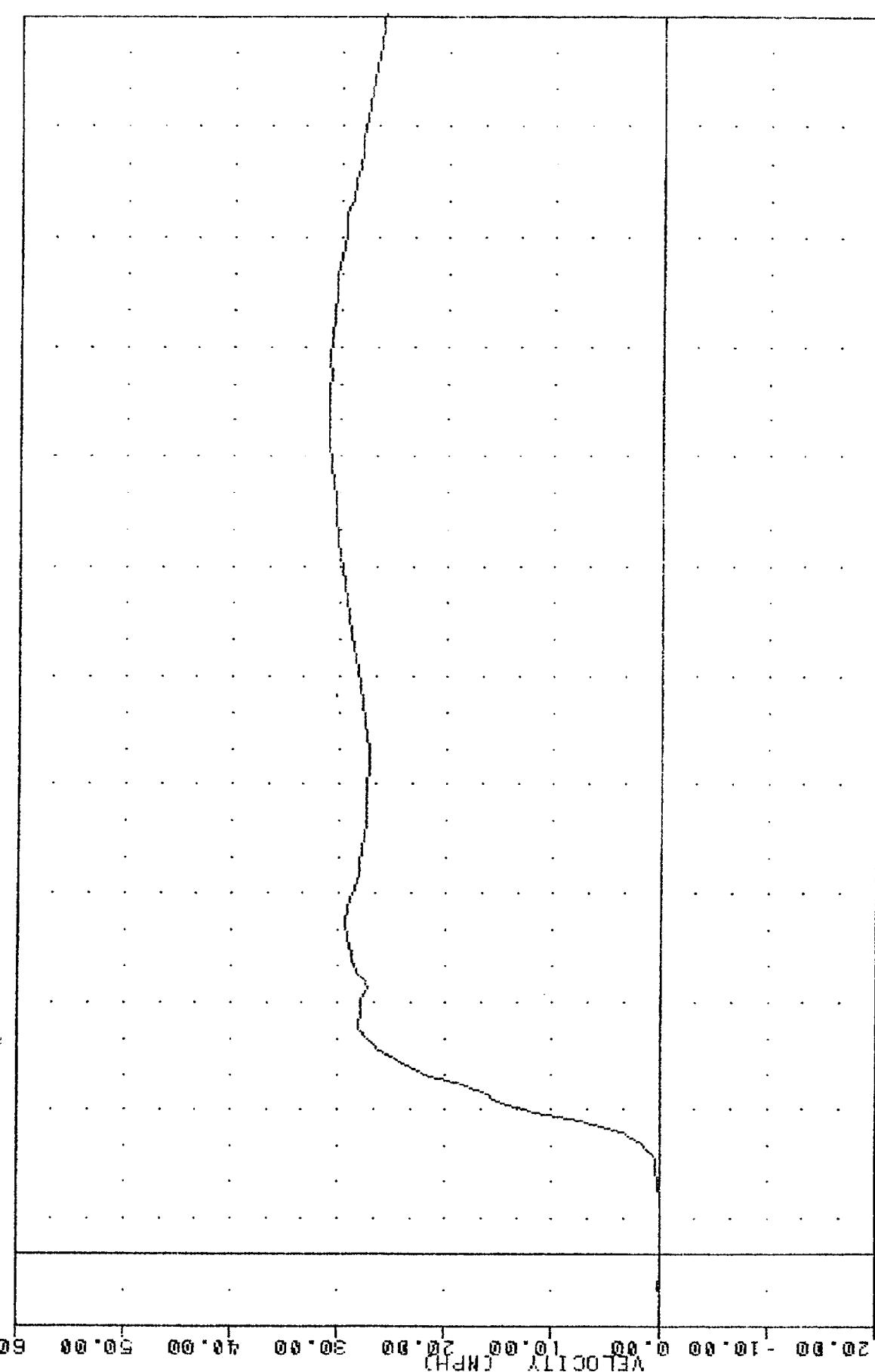
3347

25.33 80.18 52.17



TMC 0915 PLOT DATE 26-SEP-84 13:06:15
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LLAYV3
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -0.050 -1.25, 31.09 e 231.25

60.00



B-61

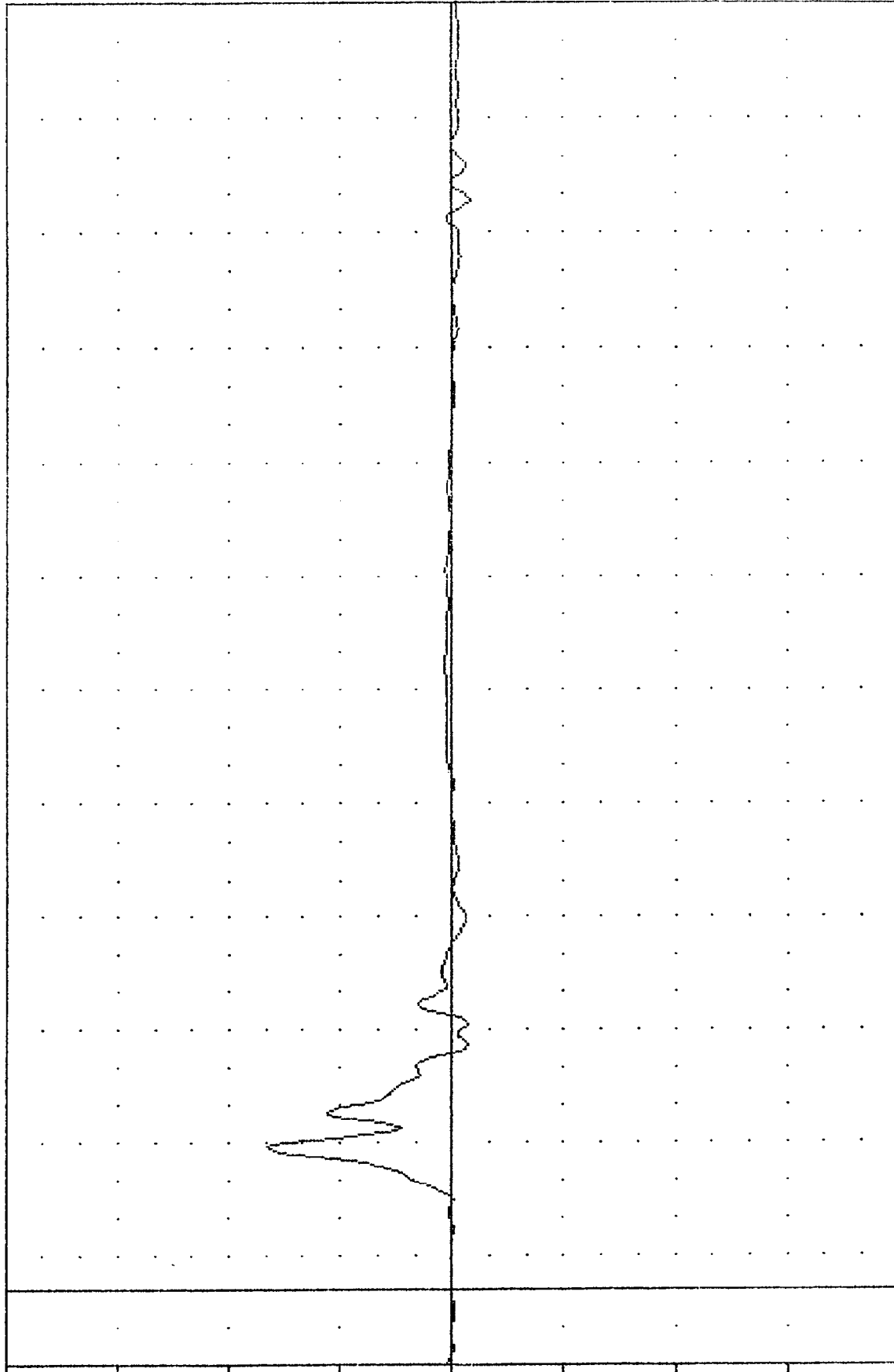
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING LLAYG3

TAC
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LLRY6C

PLOT DATE 26-SEP-84 11:29:24

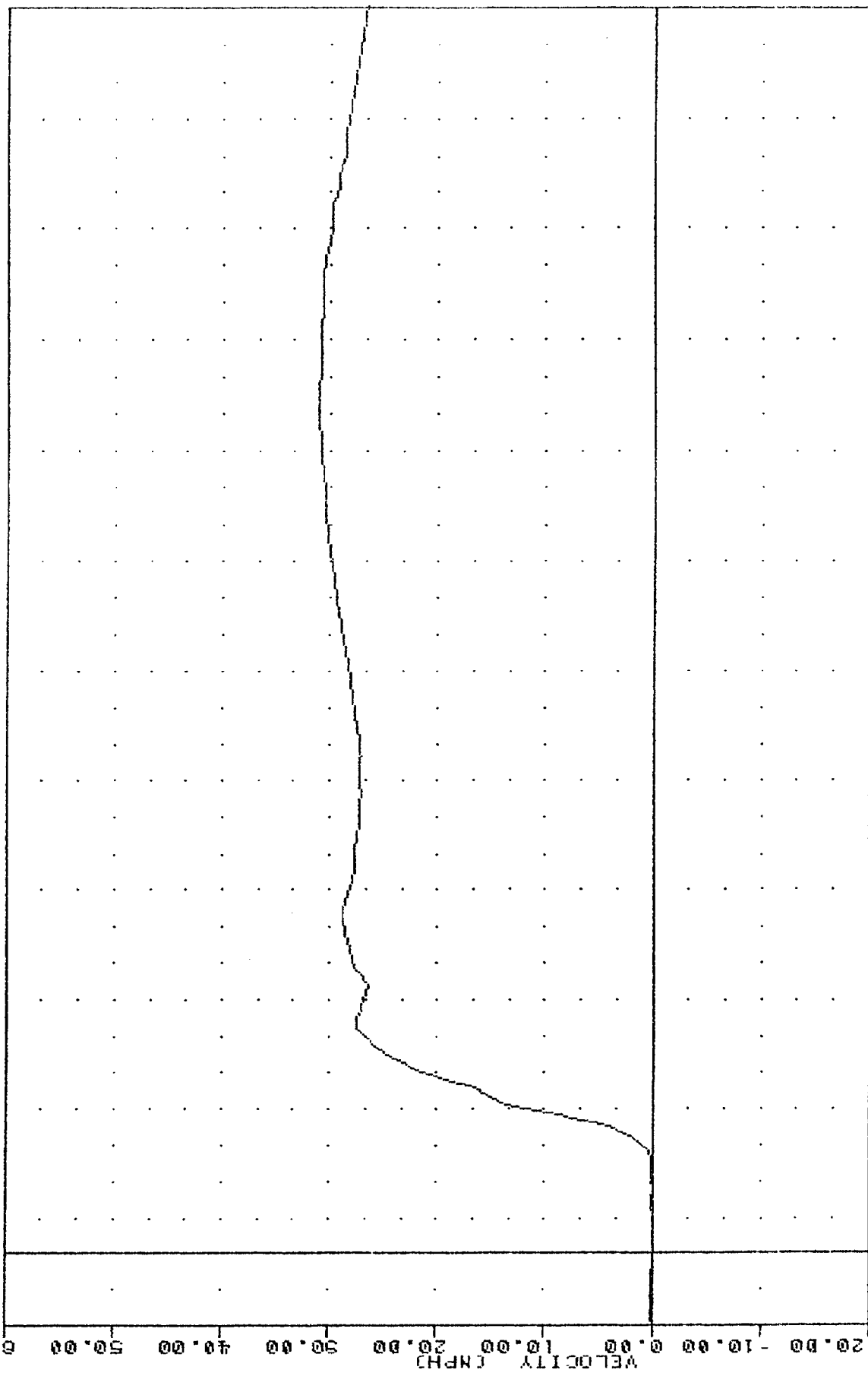
FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -8.07e 288.13, 83.07 e 38.13

B-62
 ACCELERATION (G)
 200.00
 150.00
 100.00
 50.00
 0.00
 -50.00
 -100.00
 -150.00
 -200.00



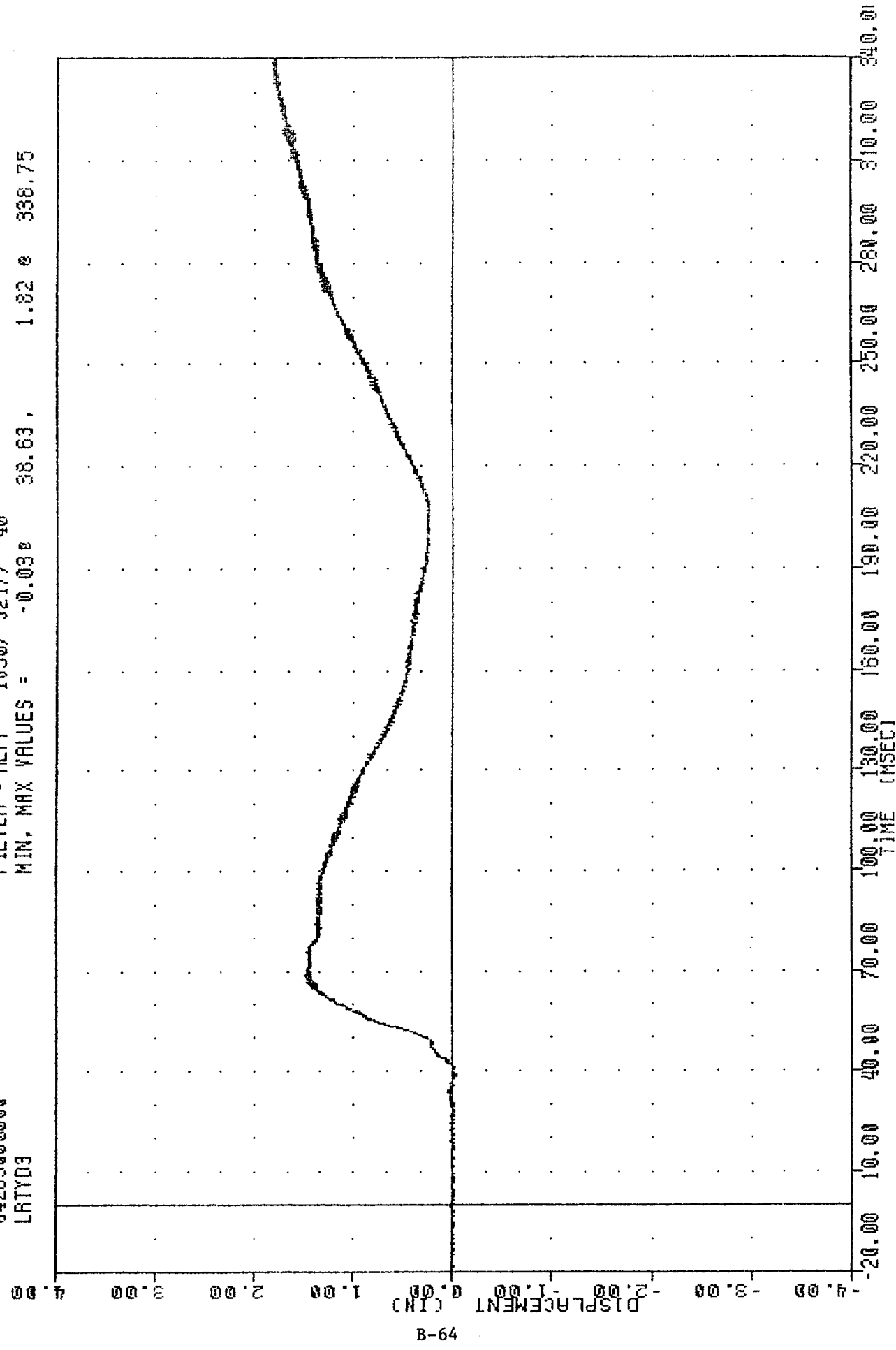
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER LEFT LOWER RIB ACCELERATION -2 Y AXIS

TAG 840919, 040919
 SIDE AGGRESSIVE ATTRIBUTES
 842630000000
 LLRYYC
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -0.012 7.50, 31.05 232.50
 PLT DATE 26 SEP-84 13:00:15



-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 LLRYGC

TAC 7840919 PLOT DATE 26-SEP-84 13:06:36
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LRTYD3
 FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = -0.038 38.63, 1.82 @ 338.75

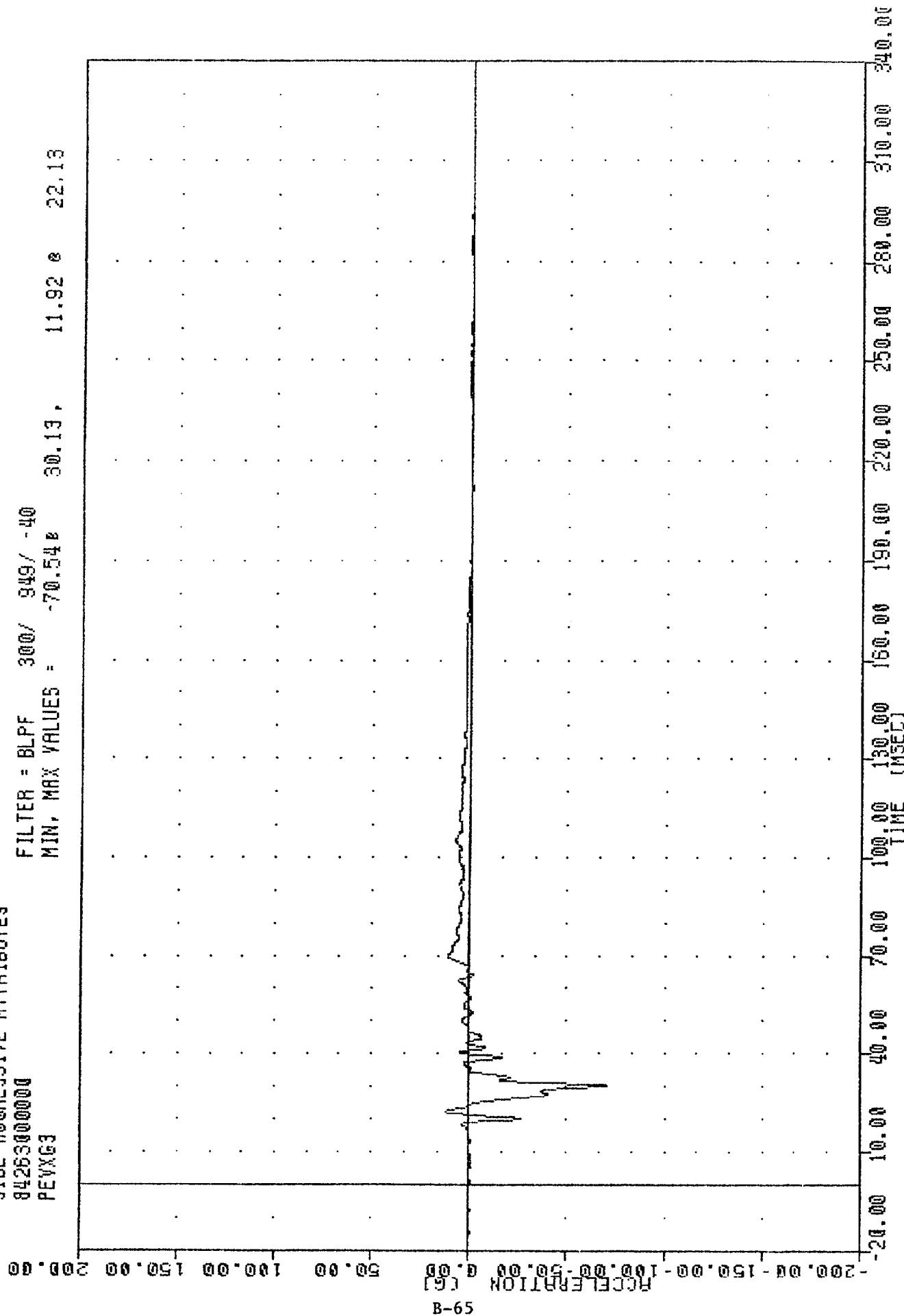


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER LEFT RIB TO SPINE DISPLACEMENT INCHES

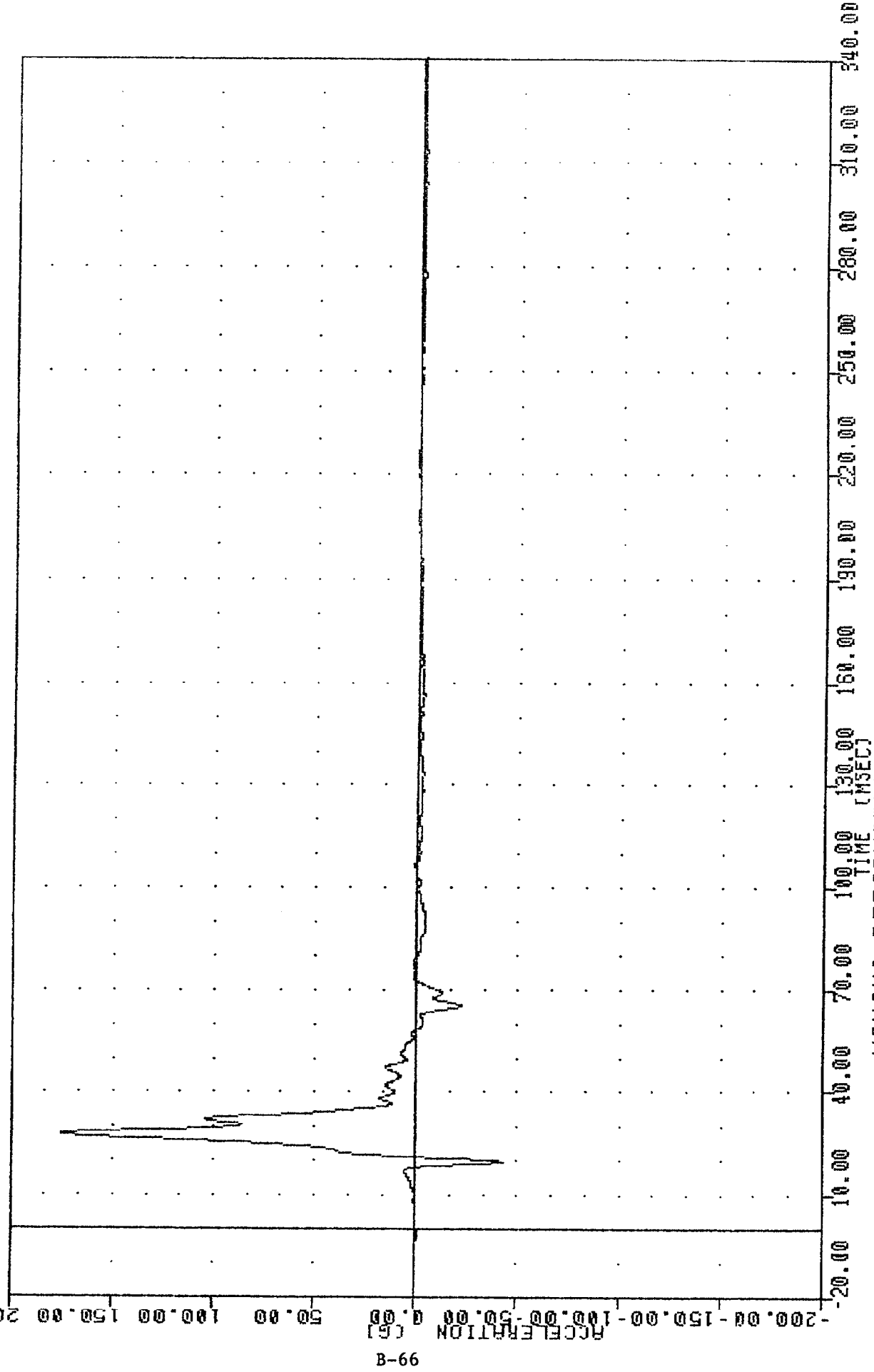
TIME 0910
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 PEVXG3

PLOT DATE 20 SEP 84 13:06:50

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -70.540 30.13, 11.92 & 22.13

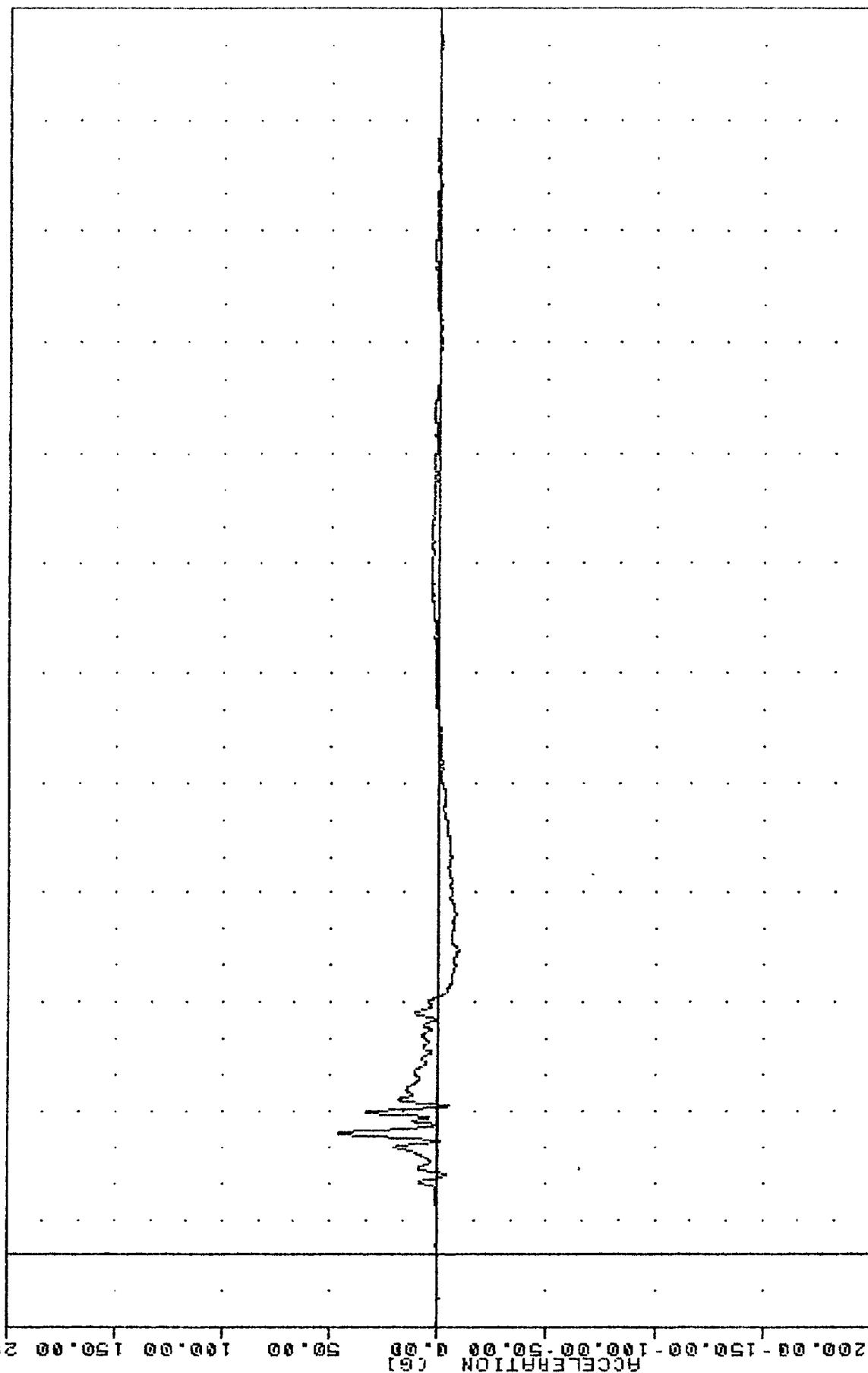


TRC 000915, 000915
 SIDE AGGRESSIVE ATTRIBUTES
 842630000000
 PEVYG3
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -43.24e 19.63, 175.24 e 27.63
 PLOT DATE 28 JEP-84 13-06:36



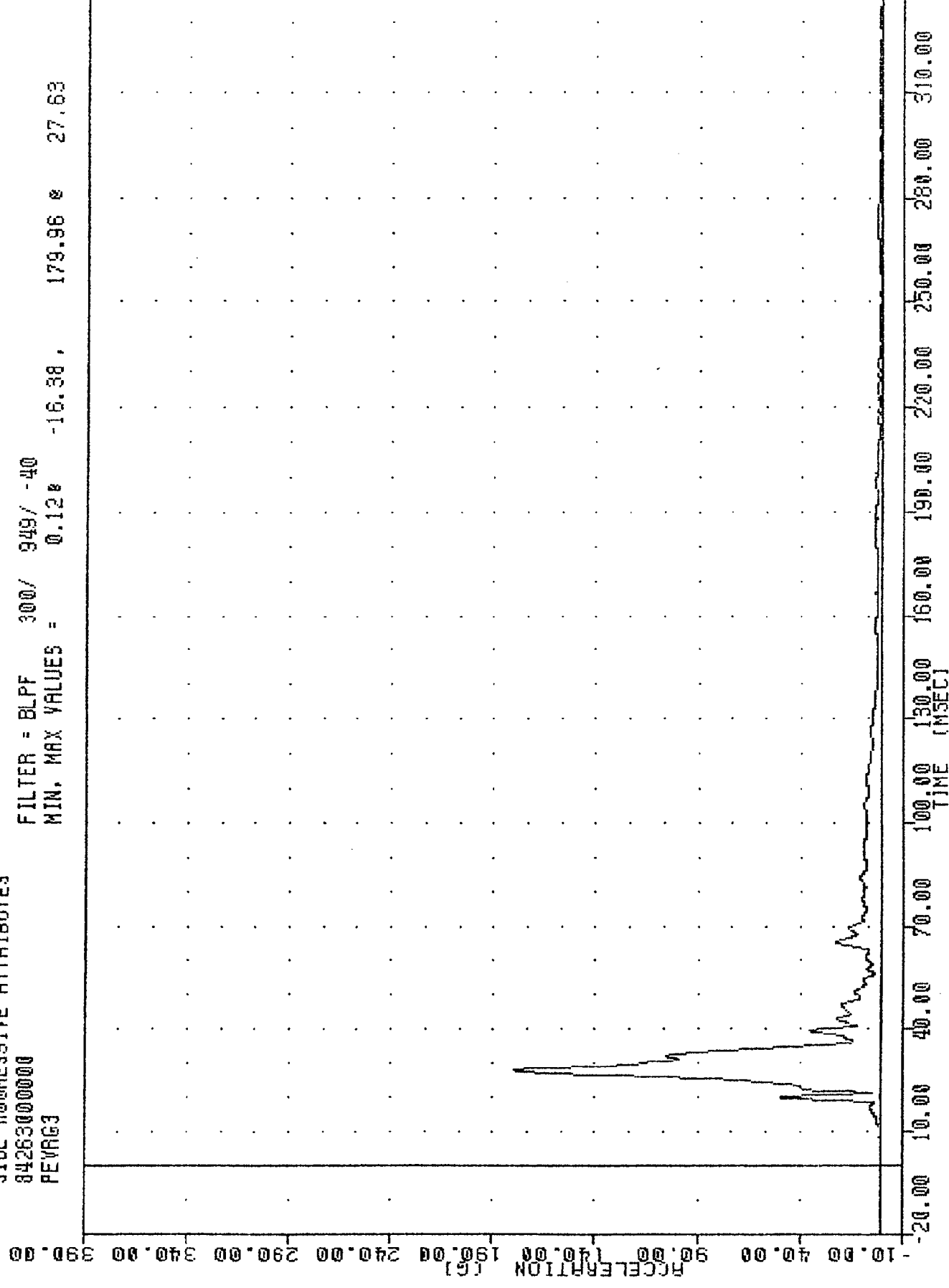
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER PELVIS ACCELERATION Y AXIS

TAG 842630000000
 SIDE AGGRESSIVE ATTRIBUTES
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -8.95e 84.13 , 45.97 e 33.63
 PLOT DATE 26 SEP-84 13:00:38



-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)
 MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER PELVIS ACCELERATION Z AXIS

THE , 040915
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 PEVRG3
 PLOT DATE 28 SEP 64 13:07:50
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 0.12% -16.38, 179.96 & 27.63

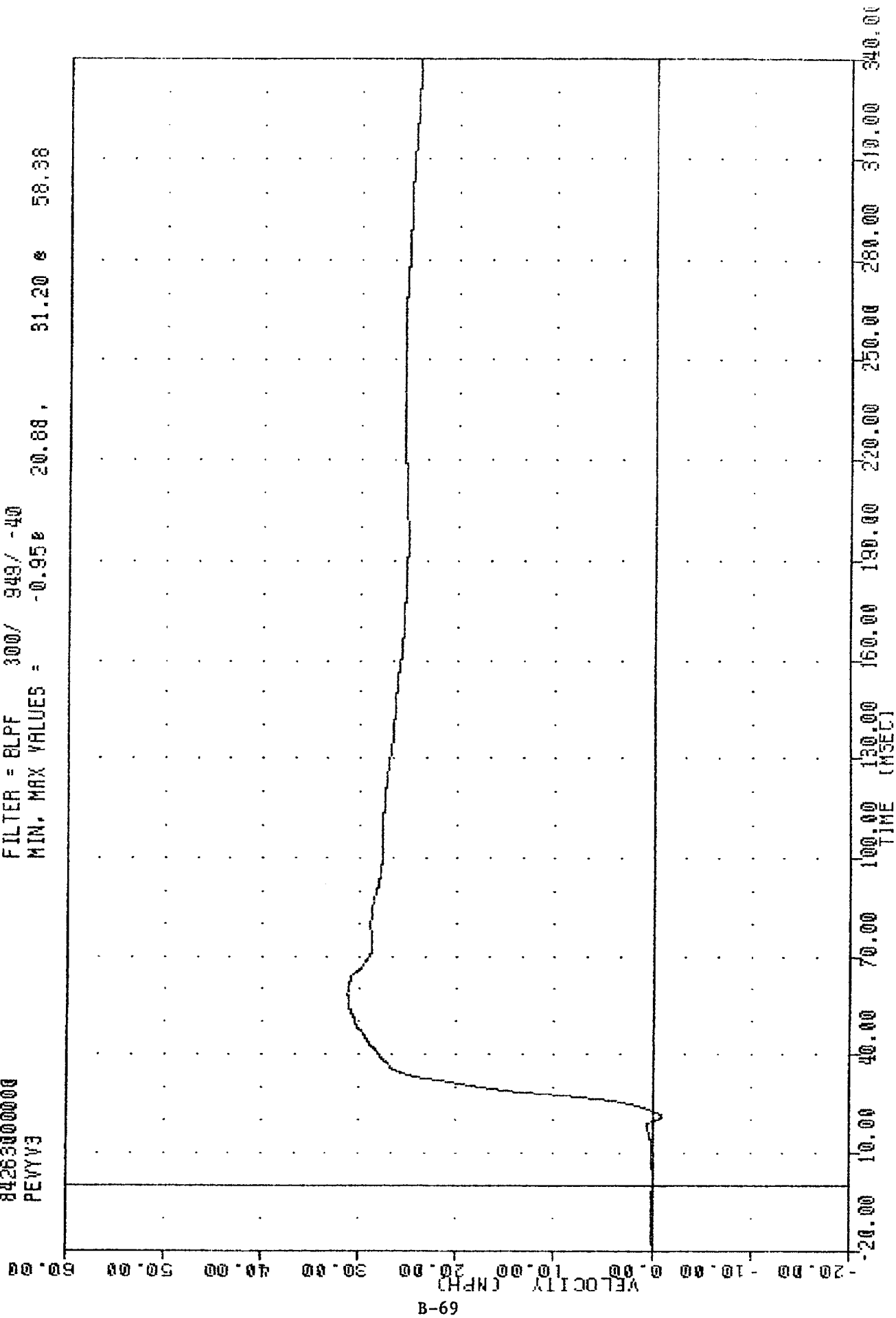


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 PASSENGER PELVIS RESULTANT

THE
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 PEVYV3

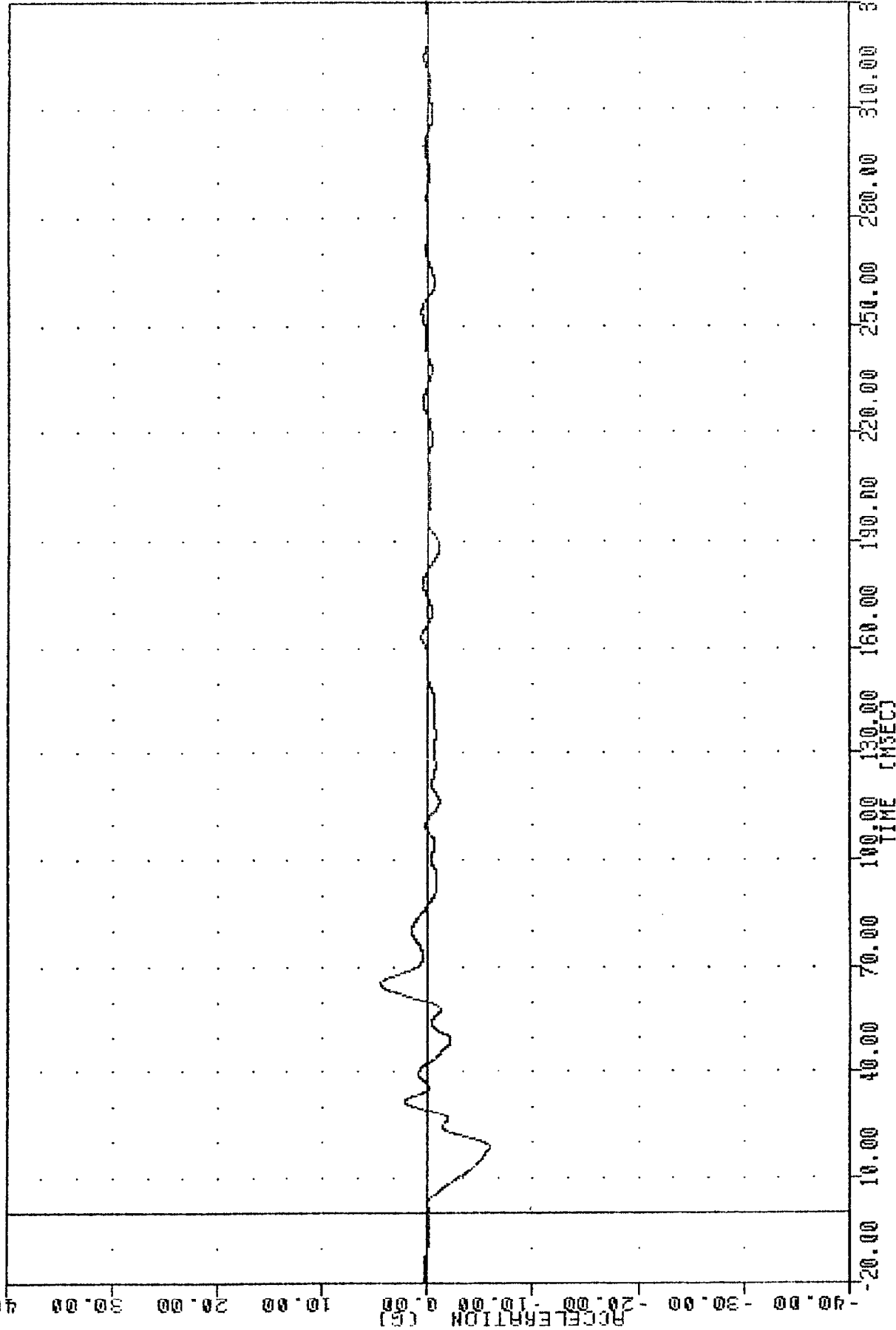
PLOT DATE 26 JEP-84 13:00:13

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -0.95e 20.88, 31.20 e 58.38



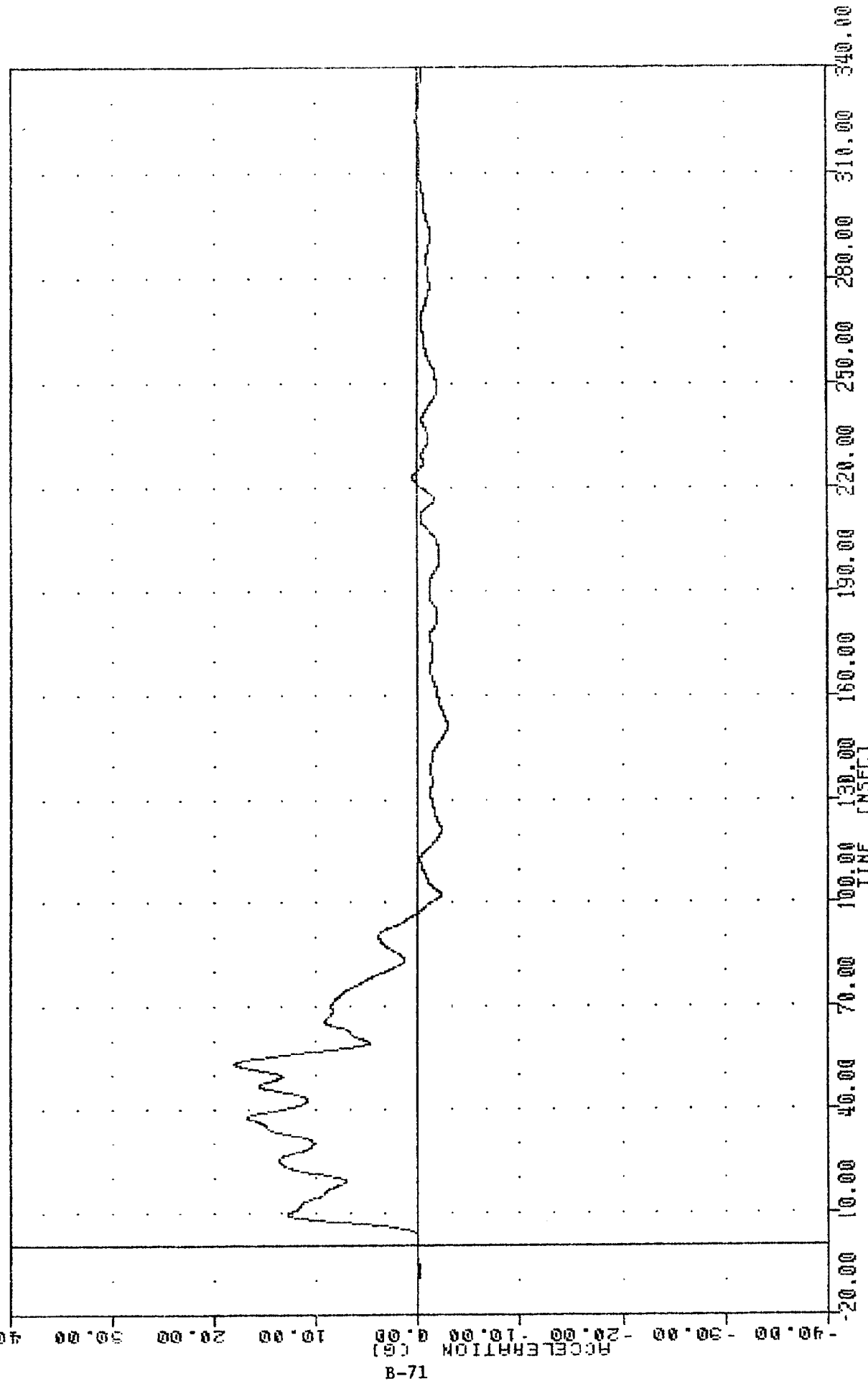
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING PEVY63

TRC 040919, PLOT DATE 26 SEP-84 18:05:36
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 RF3XG1
 FILTER = 8LPF 100/ 316/ -40
 MIN. MAX VALUES = -5.85e 18.63, 4.57 e 65.00



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

TRC 040919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 AFSY61
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -2.94e 151.13, 18.01 e 53.80
 PLOT DATE 26-SEP-84 13:06:36



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

TRC, 840918, 26-SEP-84 13:06:36

SIDE AGGRESSIVE ATTRIBUTES

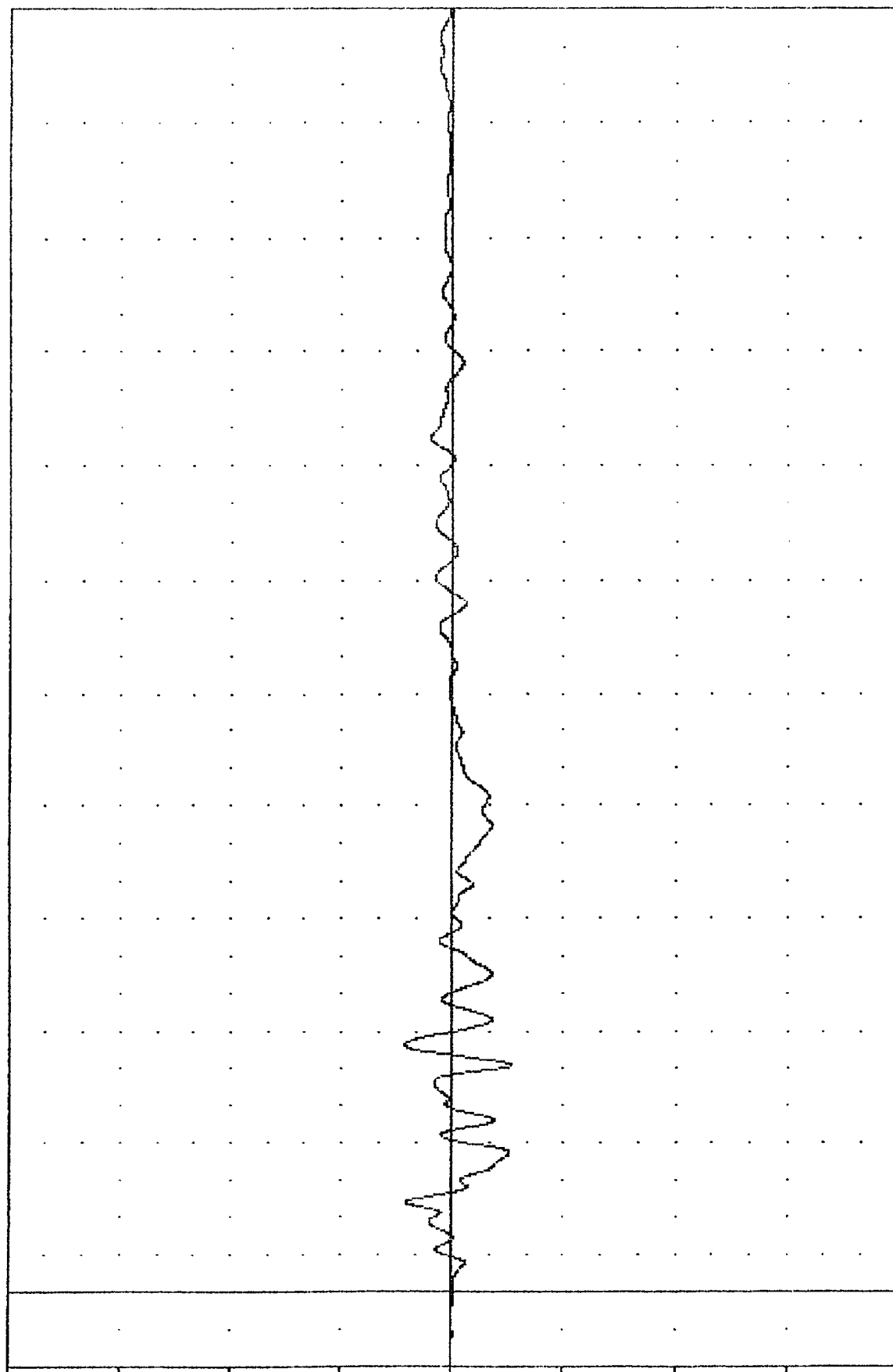
84263000000

RFSZG1

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -5.35e 60.75, 4.26 e 66.25

ACCELERATION (G)



B-72

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

THC 040919 26-SEP-84 13:07:50

SIDE AGGRESSIVE ATTRIBUTES

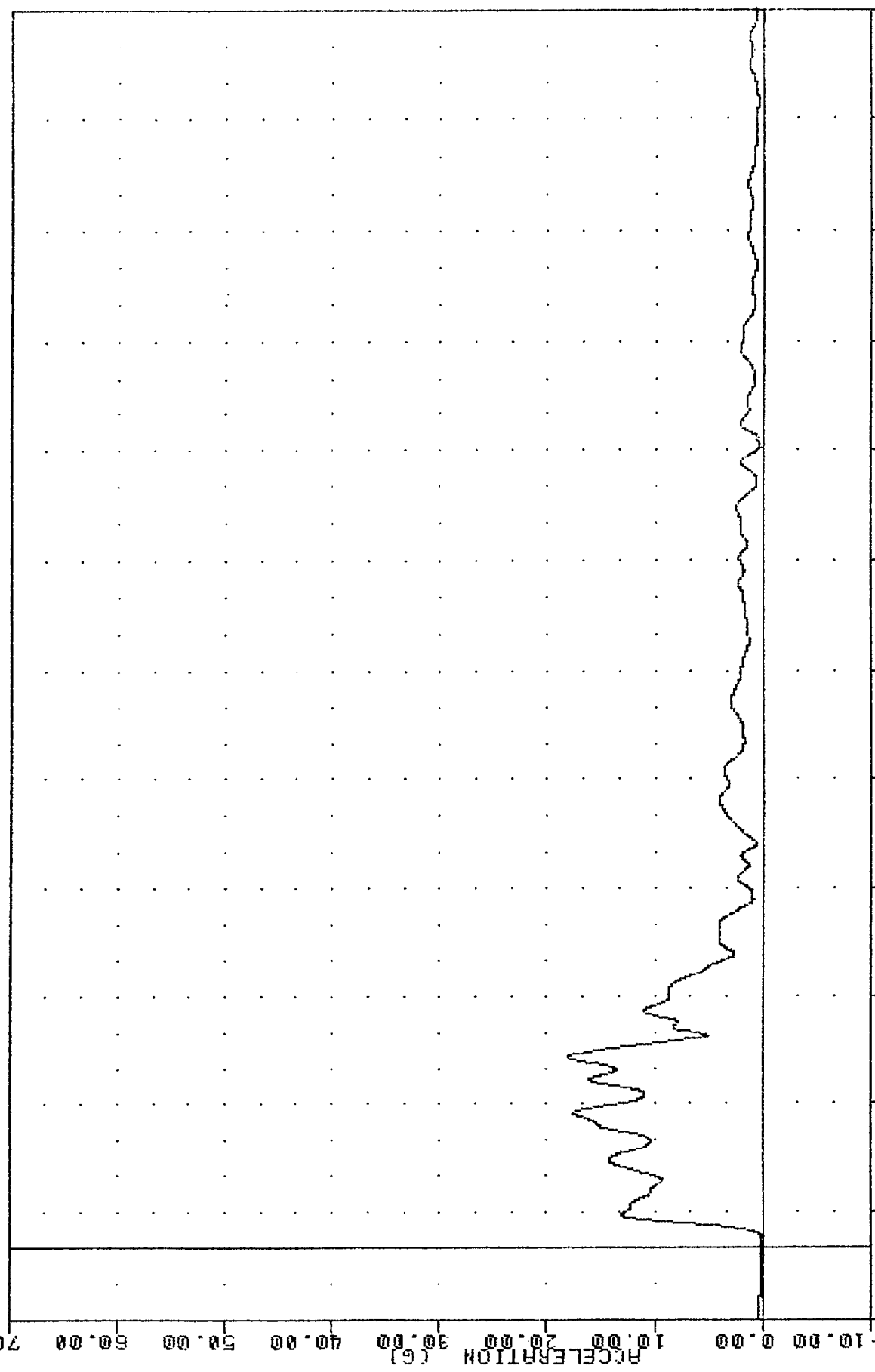
84263000000

RF5RG1

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = 0.058 -10.50, 18.03 & 53.00

70.00

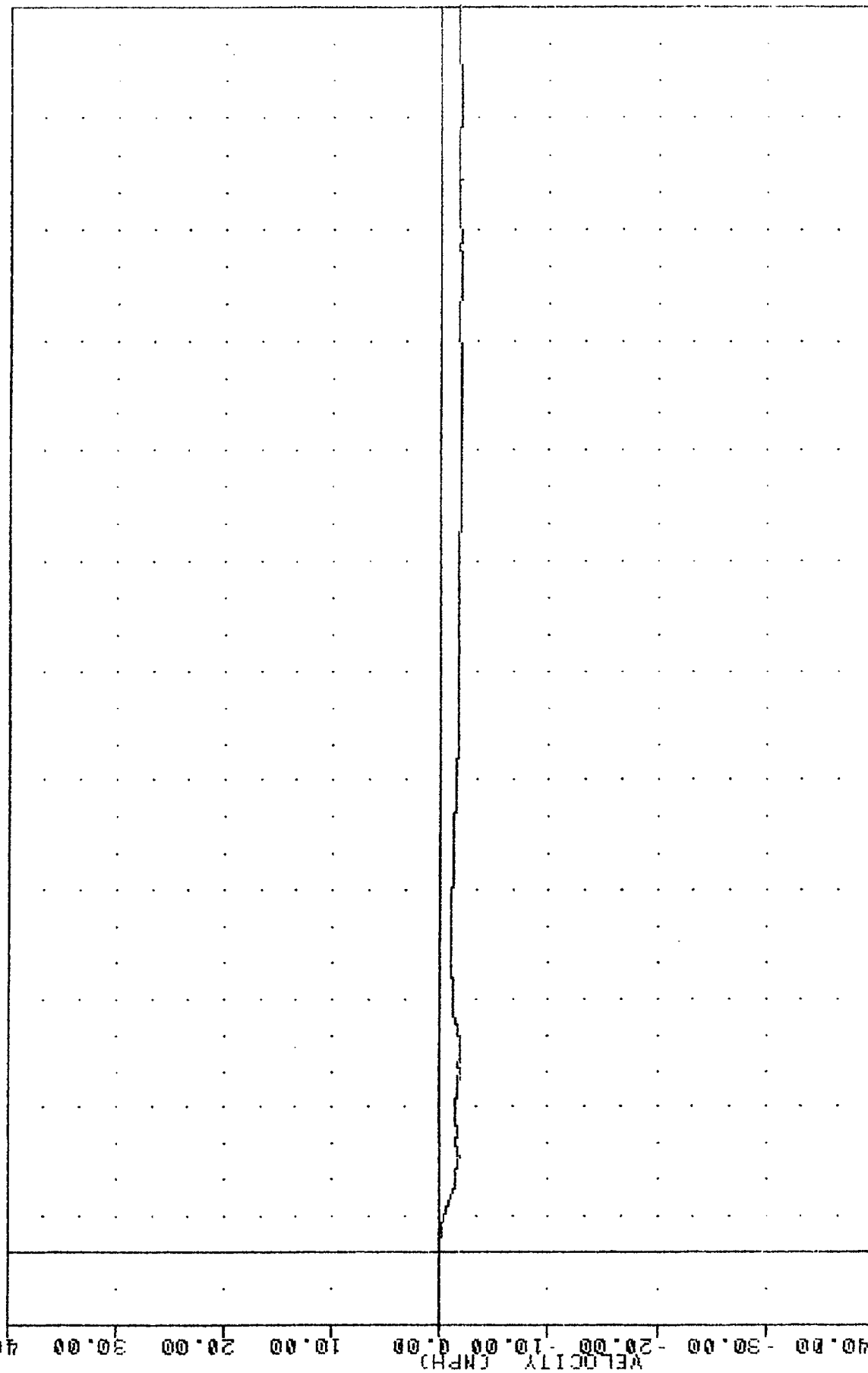


B-73

-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

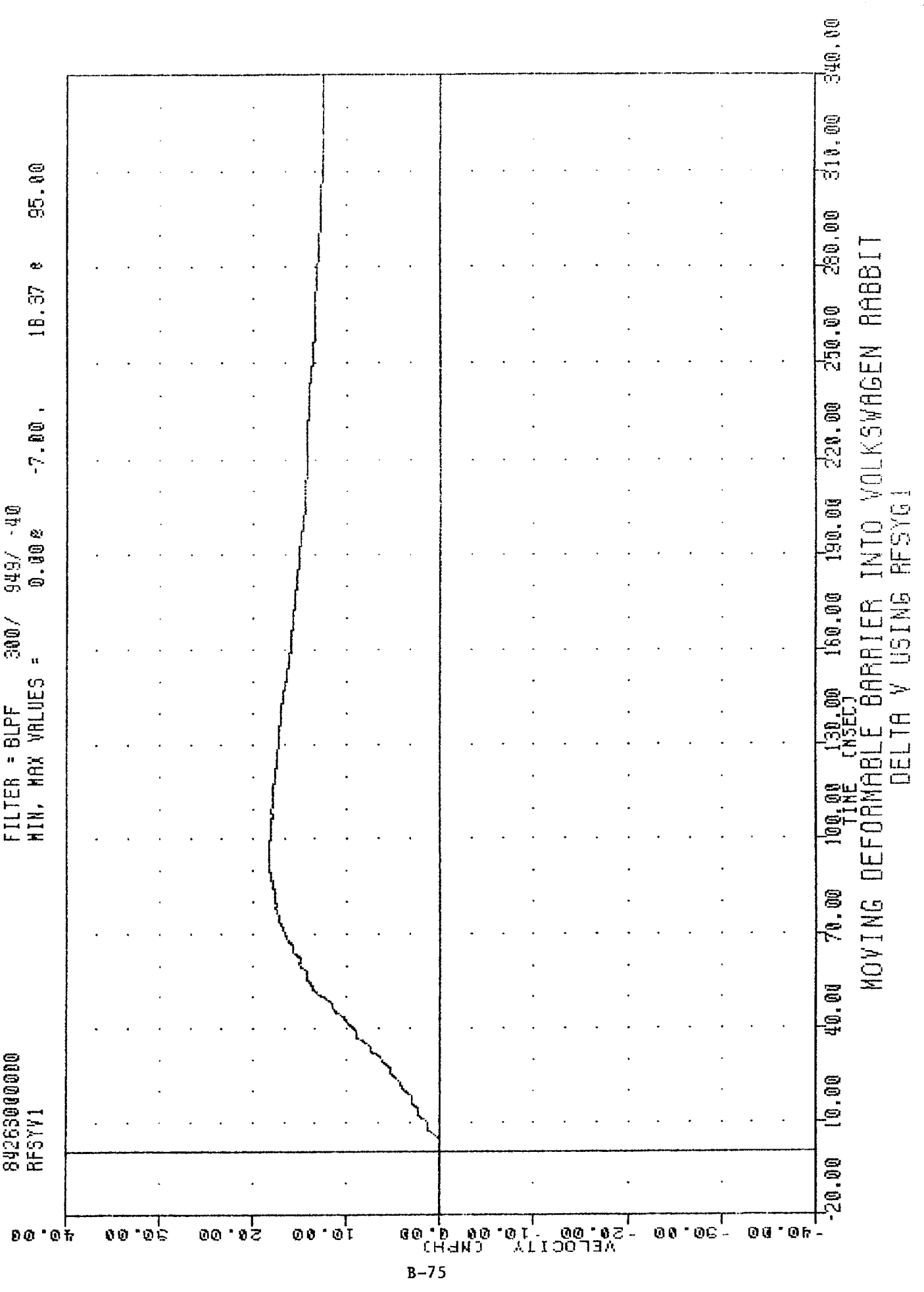
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT FRONT SILL RESULTANT

TRC 040919, 040919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 RFSXV1
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -1.96e 57.13, 0.03e -13.83
 PLOT DATE 28-SEP-84 13:03:19



-40.00 -30.00 -20.00 -10.00 0.00 10.00 20.00 30.00 40.00
 VELOCITY (CMPH)
 -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 RFSXG1

TRC 040918, 040918
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 RFSYV1
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = 0.002 -7.00, 18.37 e 95.00
 PLOT DATE 28 SEP-84 13:00:19



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING RFSYGI

TRC, 040919, PLOT DATE 28-SEP-84 13:05:35
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 RR3XC2
 FILTER = 8LFF 100/ 316/ -40
 MIN. MAX VALUES = -6.01e 18.65, 4.48 e 65.13

100.00

75.00

50.00

25.00

0.00

ACCELERATION [G]

-25.00

-50.00

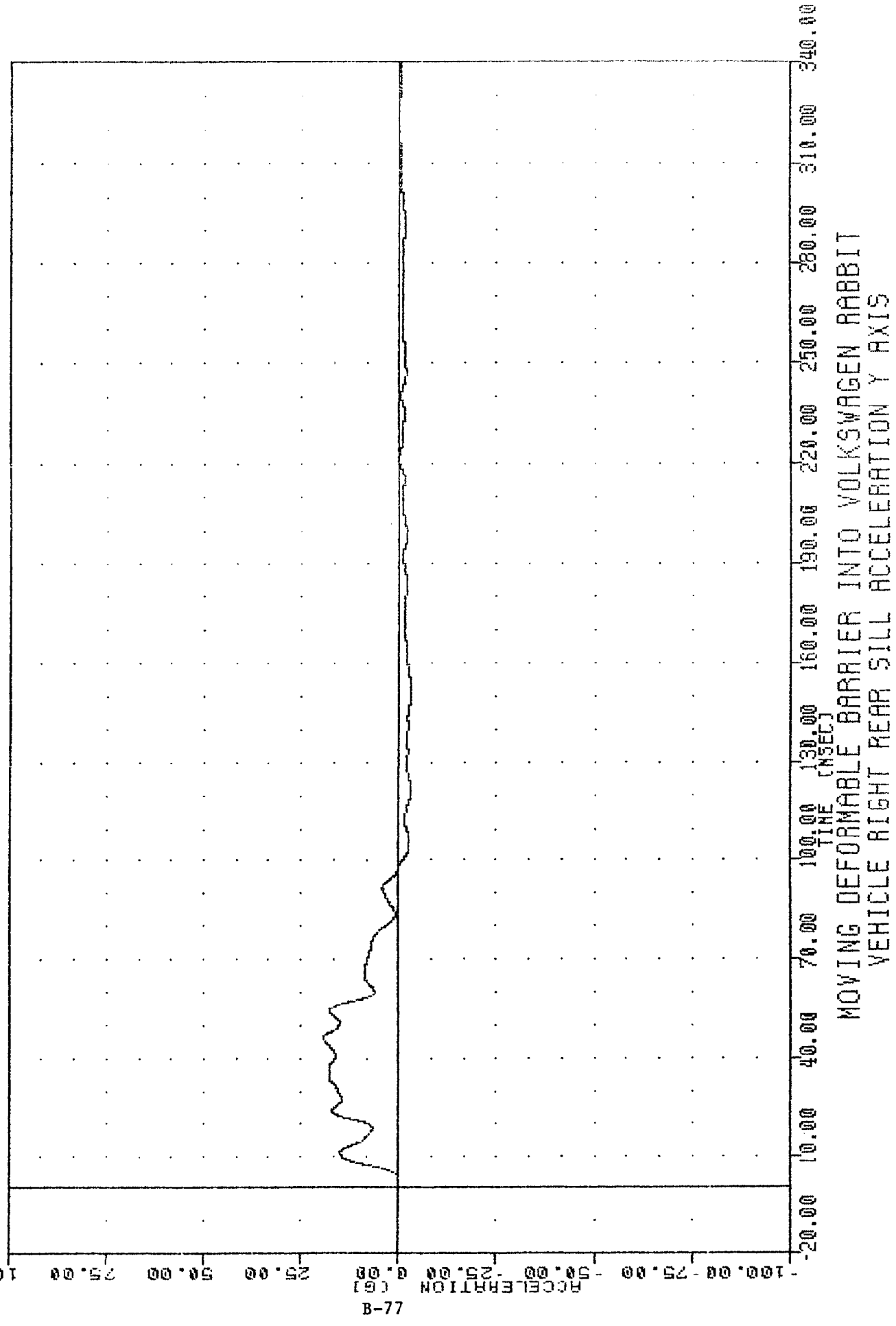
-75.00

-100.00

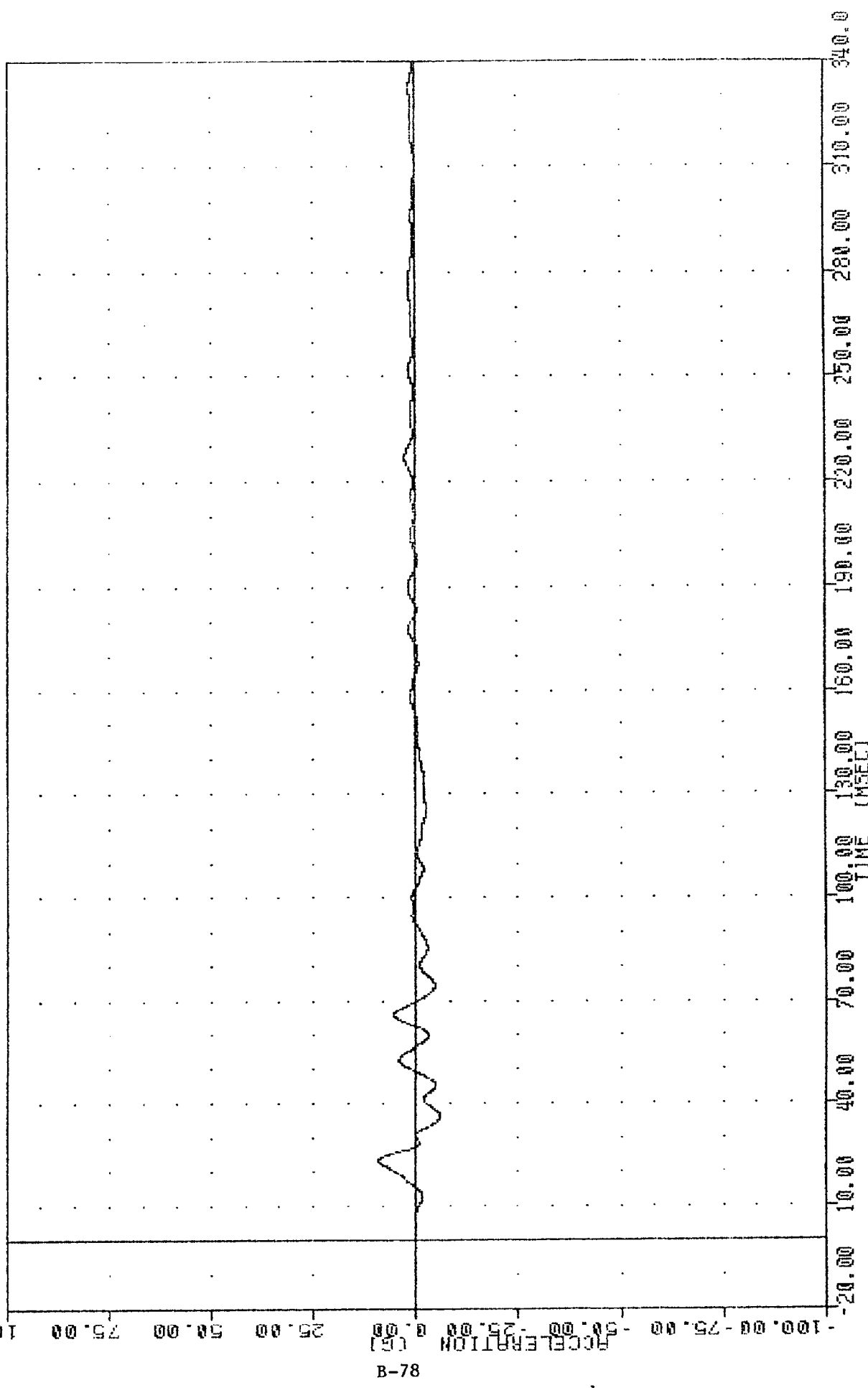
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)

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

TAC 040919, 040919, 26 SEP 84 13:00:35
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 RASYB2
 FILTER = BLPF 100/ 315/ -40
 MIN, MAX VALUES = -3.26 121.00, 19.47 46.13



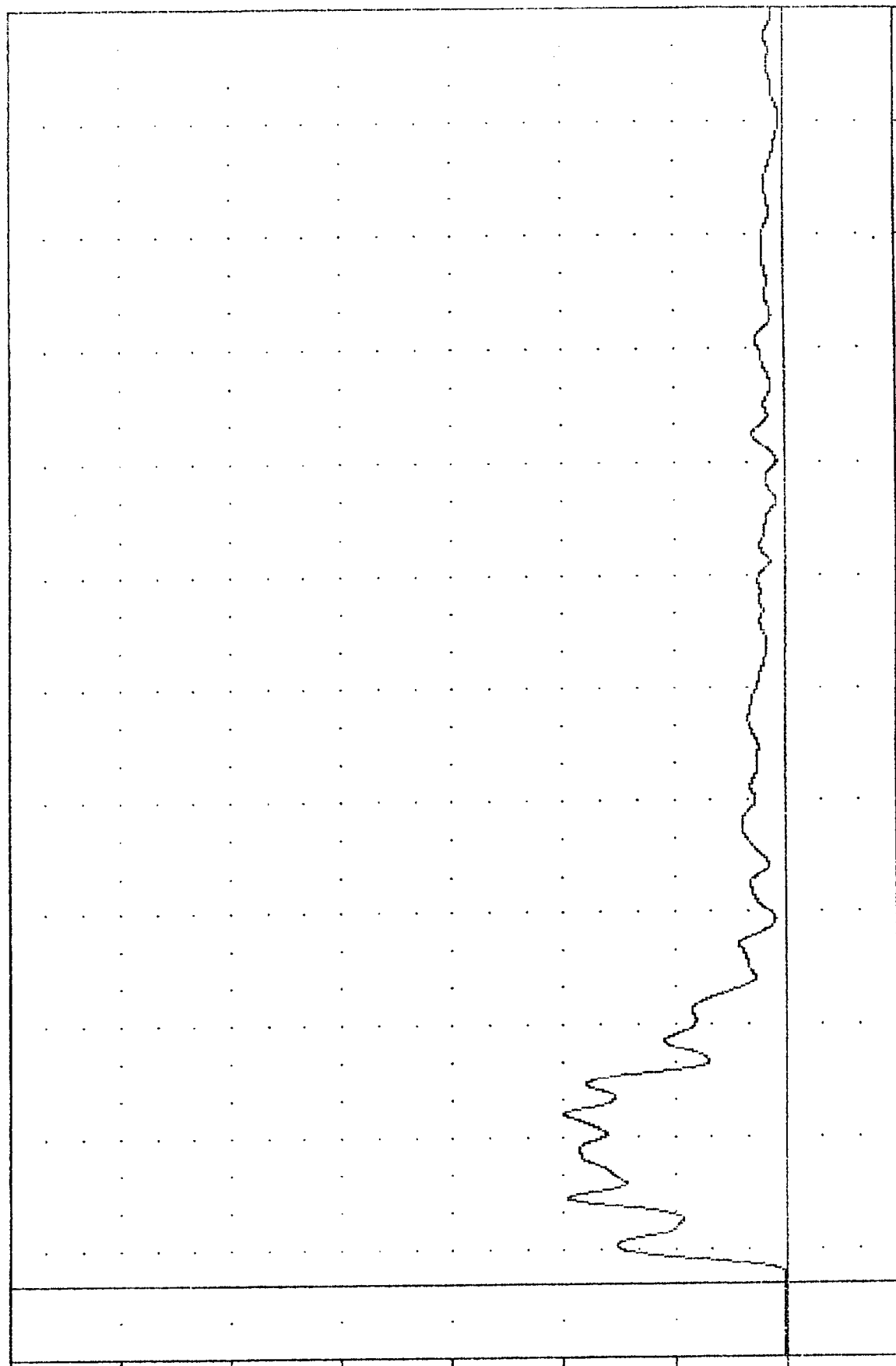
TRC 040919, 040919
 SIDE AGGRESSIVE ATTRIBUTES
 842630000000
 ARSZG2
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -5.618 36.25 9.34 23.13
 PLOT DATE 26 SEP 84 13:00:30



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

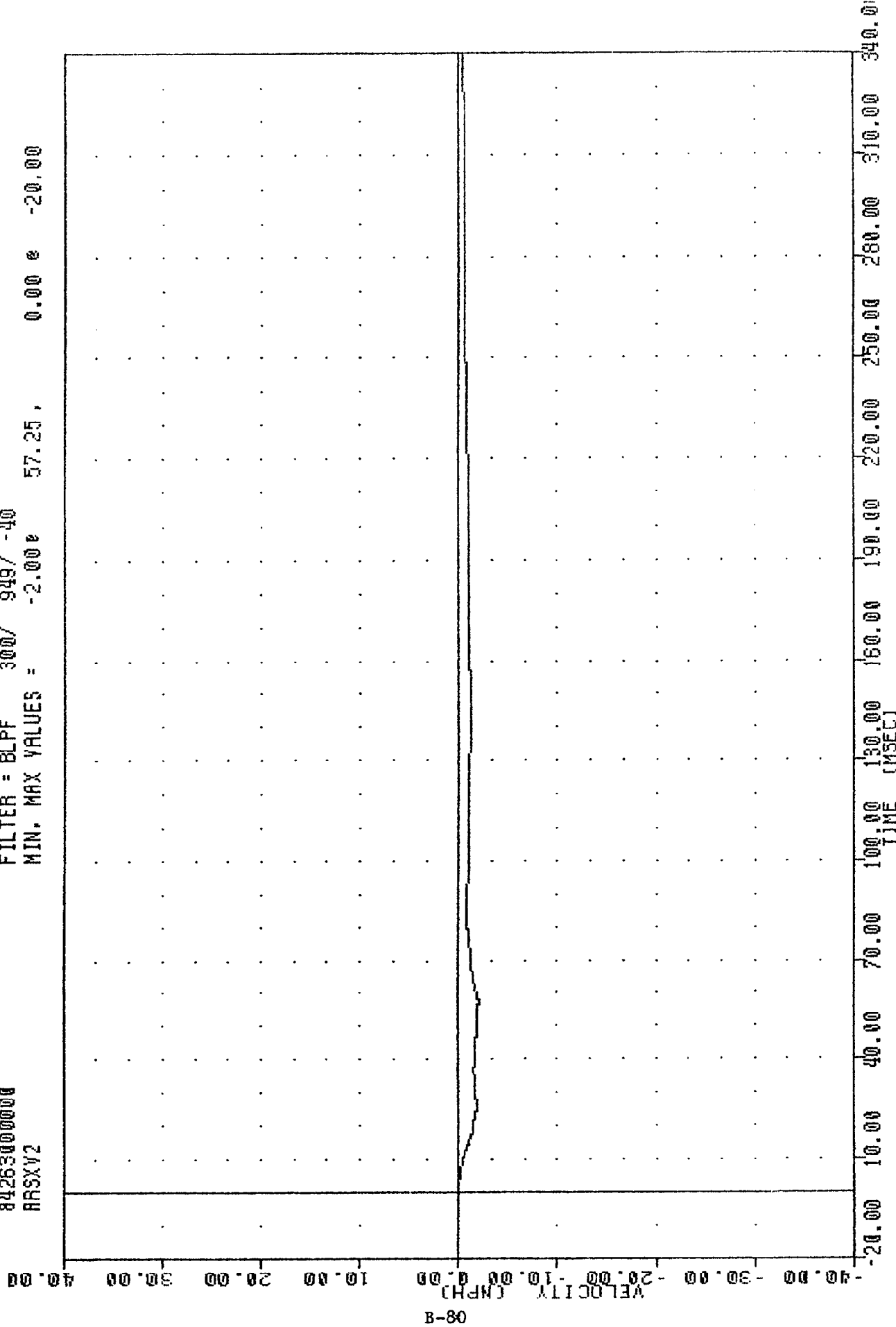
TAC 840919, 840919 PLOT DATE 26 OCT 84 13:07:50
 SIDE AGGRESSIVE ATTRIBUTES
 842630000000
 RRSR62
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = 0.03% -1.36 20.02 46.13

ACCELERATION [G]
 70.00
 60.00
 50.00
 40.00
 30.00
 20.00
 10.00
 0.00
 -10.00



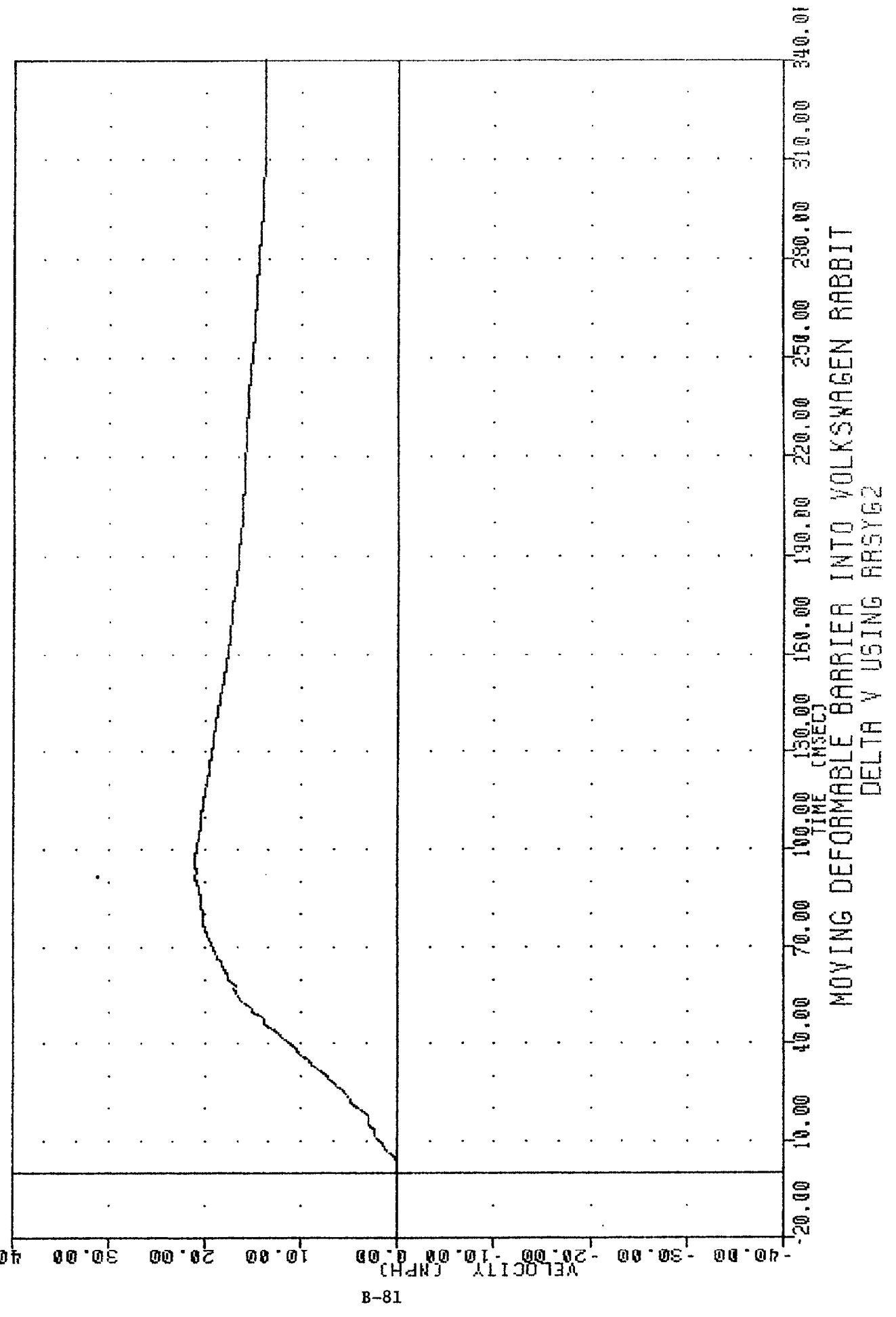
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (NSEC)
 MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE RIGHT REAR SILL RESULTANT

TRC 840919, 840919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 RRSXV2
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -2.00e 57.25, 0.00 e -20.00

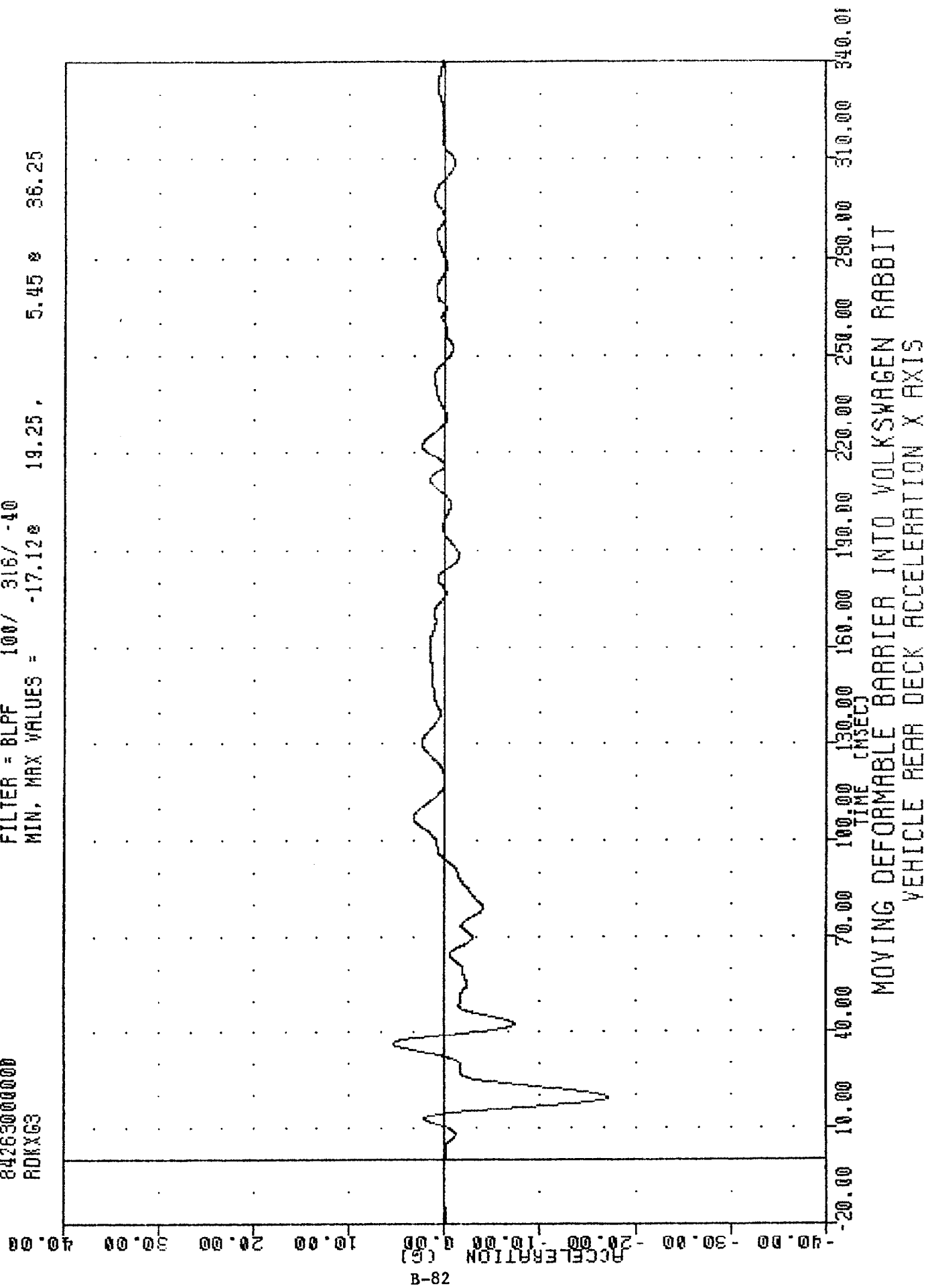


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING RRSXG2

THE [REDACTED], 040913 [REDACTED] PLOT DATE 26 SEP-84 13:03:19
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 RRSYV2
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = 0.000 2.25, 21.04 8 91.50

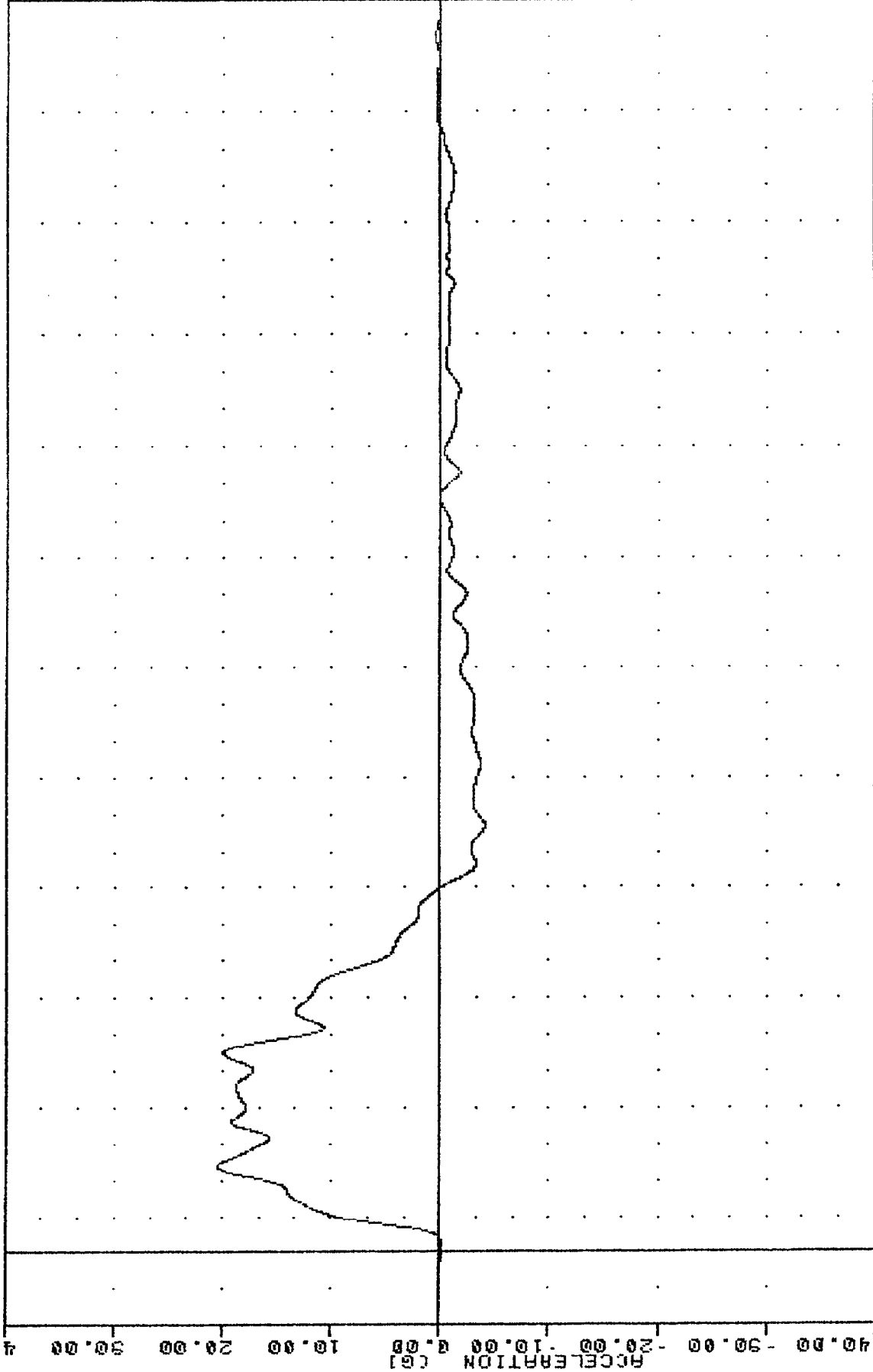


TRC 040919, 040919 PLOT DATE 26 SEP-84 13:05:38
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 ROKXG3
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -17.128 19.25, 5.45 36.25



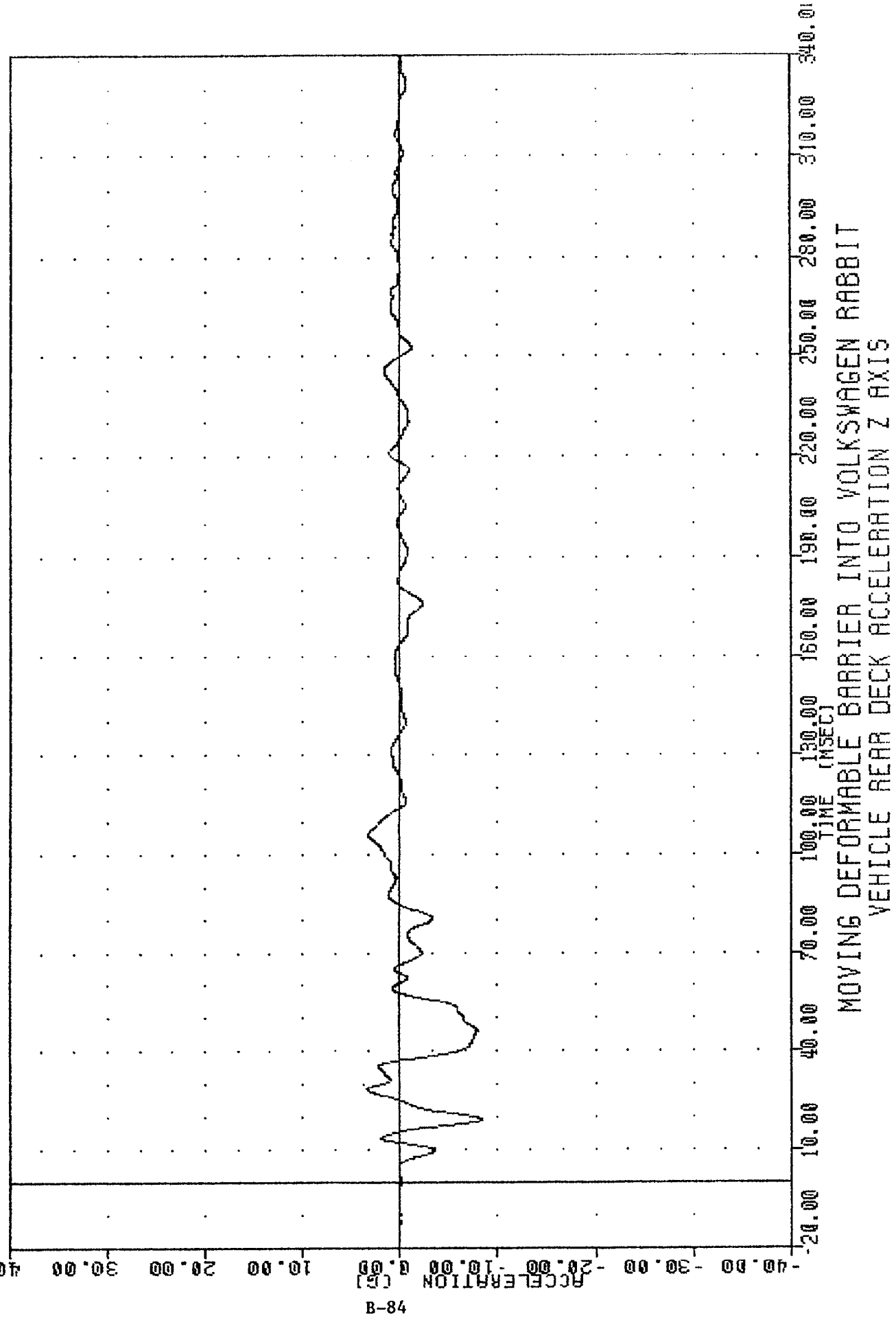
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE REAR DECK ACCELERATION X AXIS

TRC 040919, PLOT DATE 26 OCT 84 13:09:36
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 ROKY63
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -4.14 116.63, 20.50 23.50



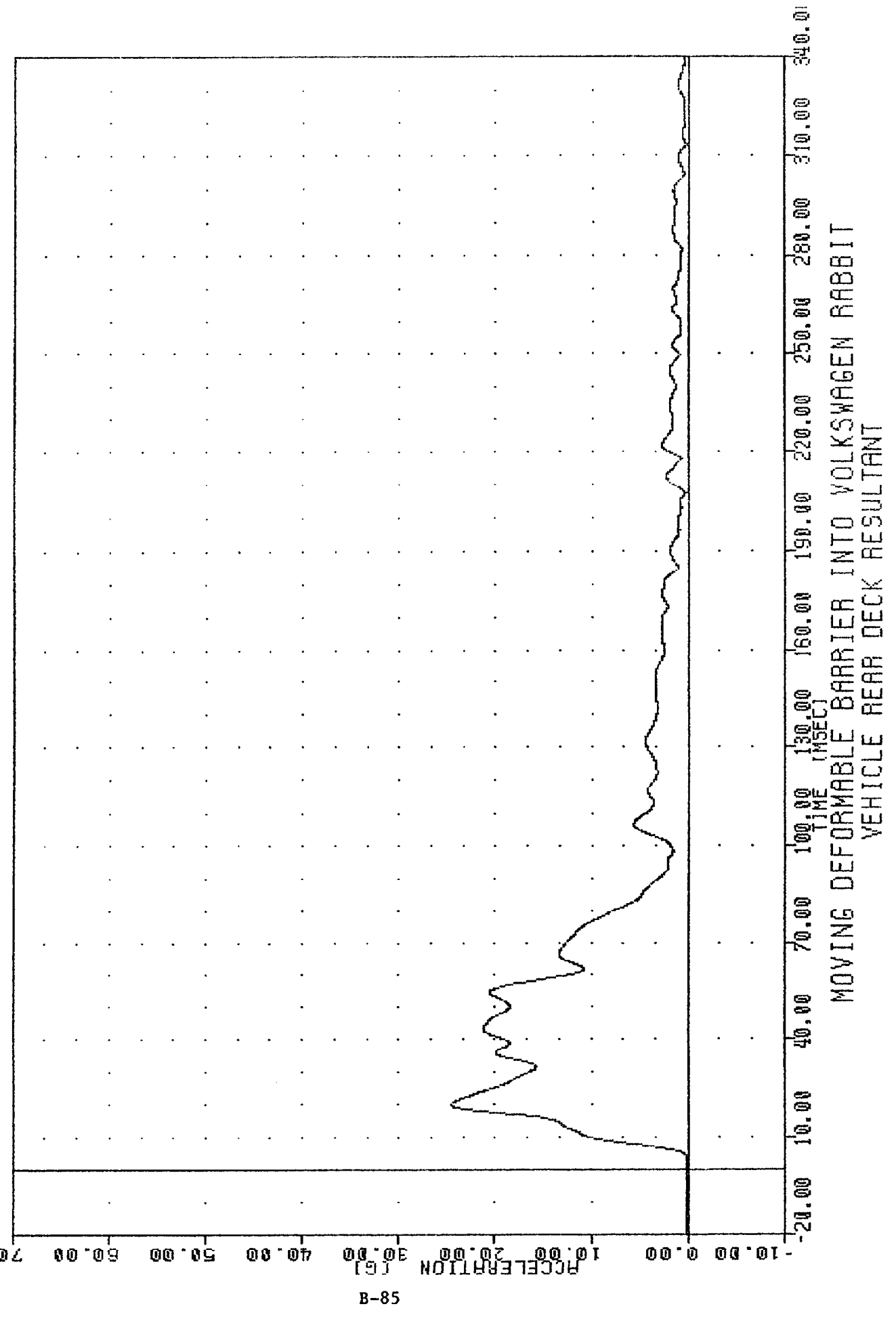
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE REAR DECK ACCELERATION Y AXIS

TRC 840919, 040919 PLOT DATE 26 SEP 84 13:00:38
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 RDKZG3
 FILTER = BLPF 100/ 318/ -40
 MIN, MAX VALUES = -8.43% 19.13, 3.34 & 28.25

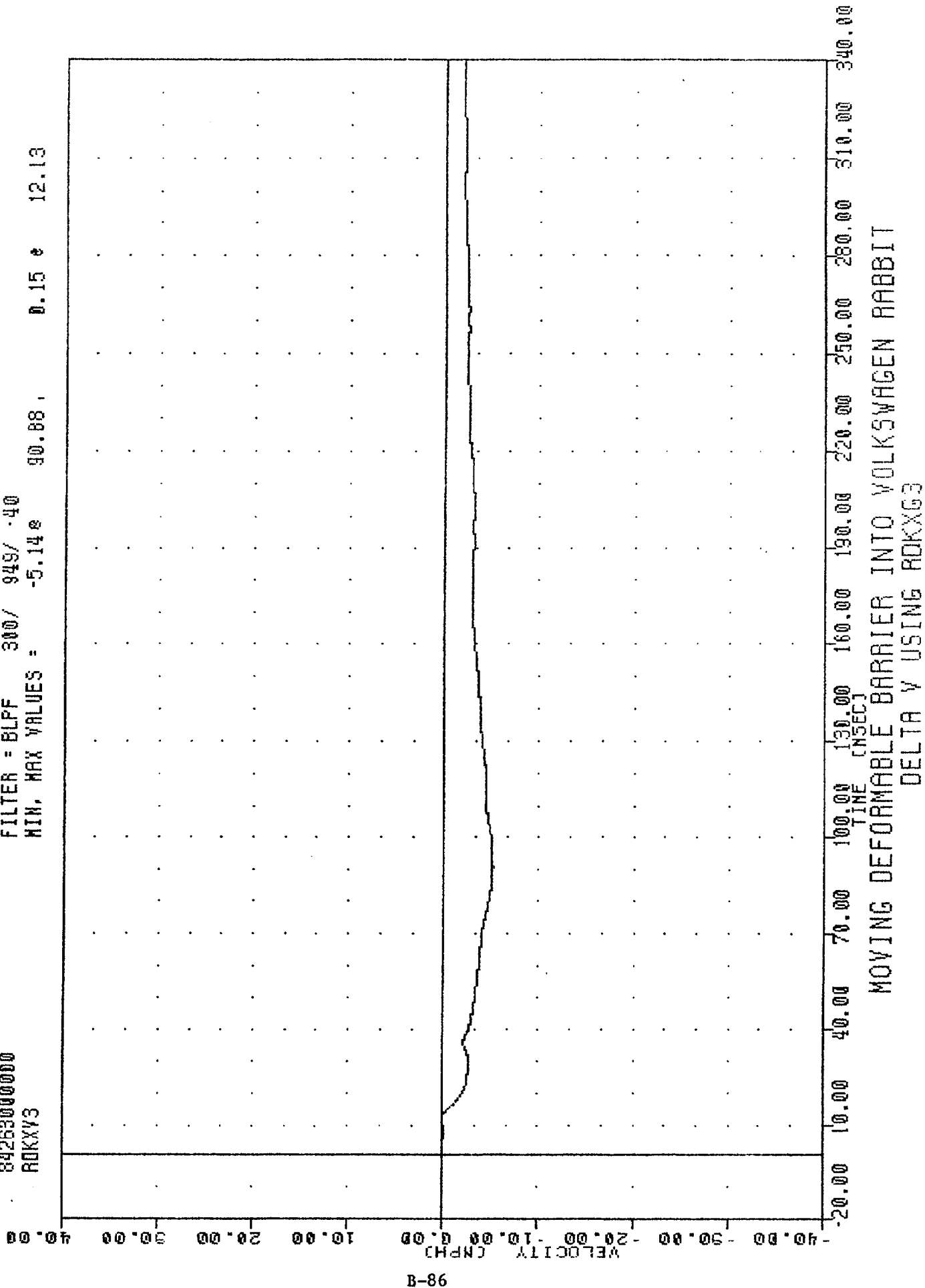


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE REAR DECK ACCELERATION Z AXIS

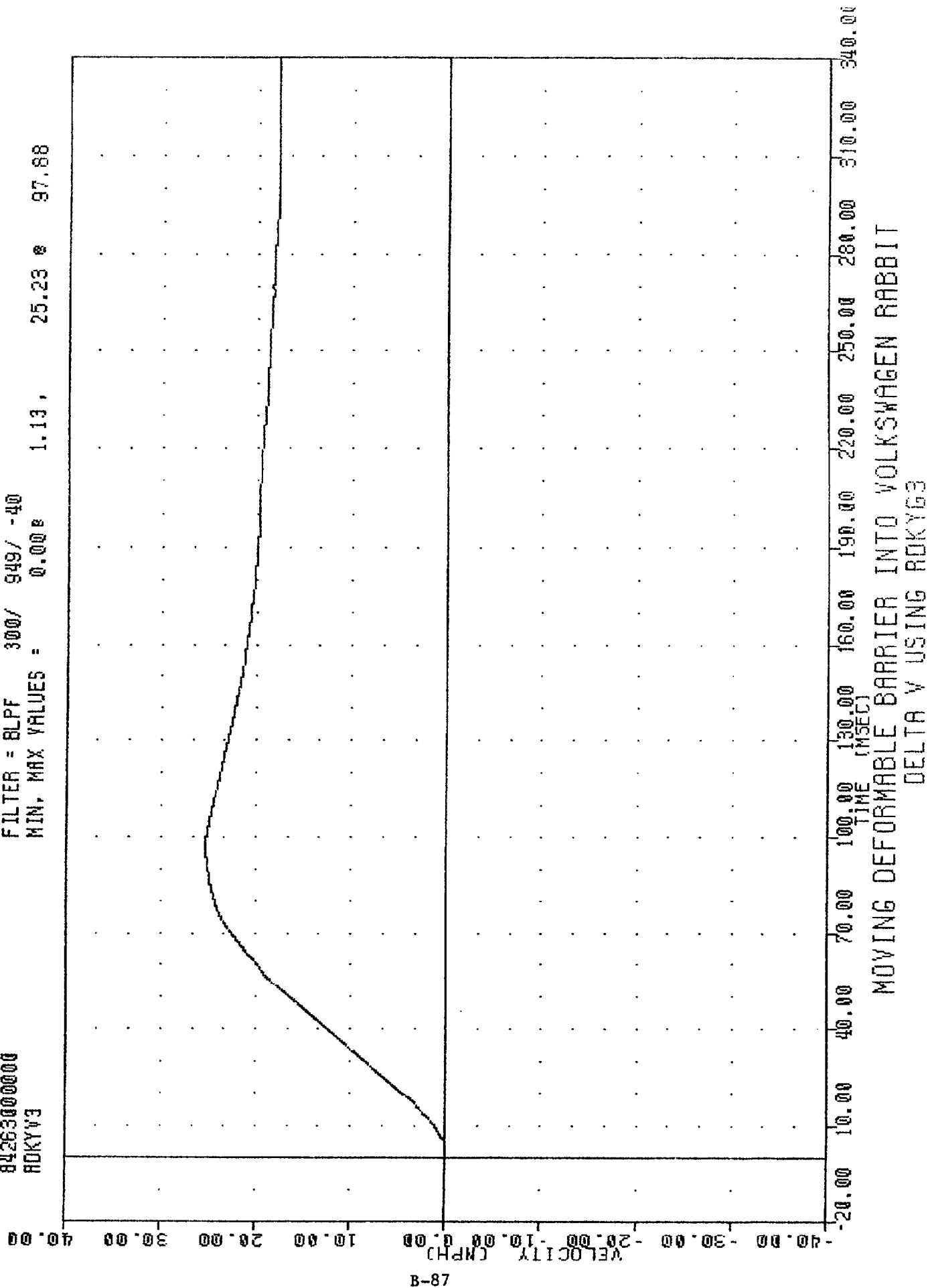
THE , 040915
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 ADKR63
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = 0.04e -14.13, 24.59 e 19.63
 PLOT DATE 28 SEP 84 15:07:50



TAC [REDACTED], 040919 [REDACTED] PLOT DATE [REDACTED] 26-SEP-84 [REDACTED] 13-08:19 [REDACTED]
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 ROKXY3
 FILTER = BLPF 300/ 949/ .40
 MIN, MAX VALUES = -5.14e 90.88, 0.15 e 12.13



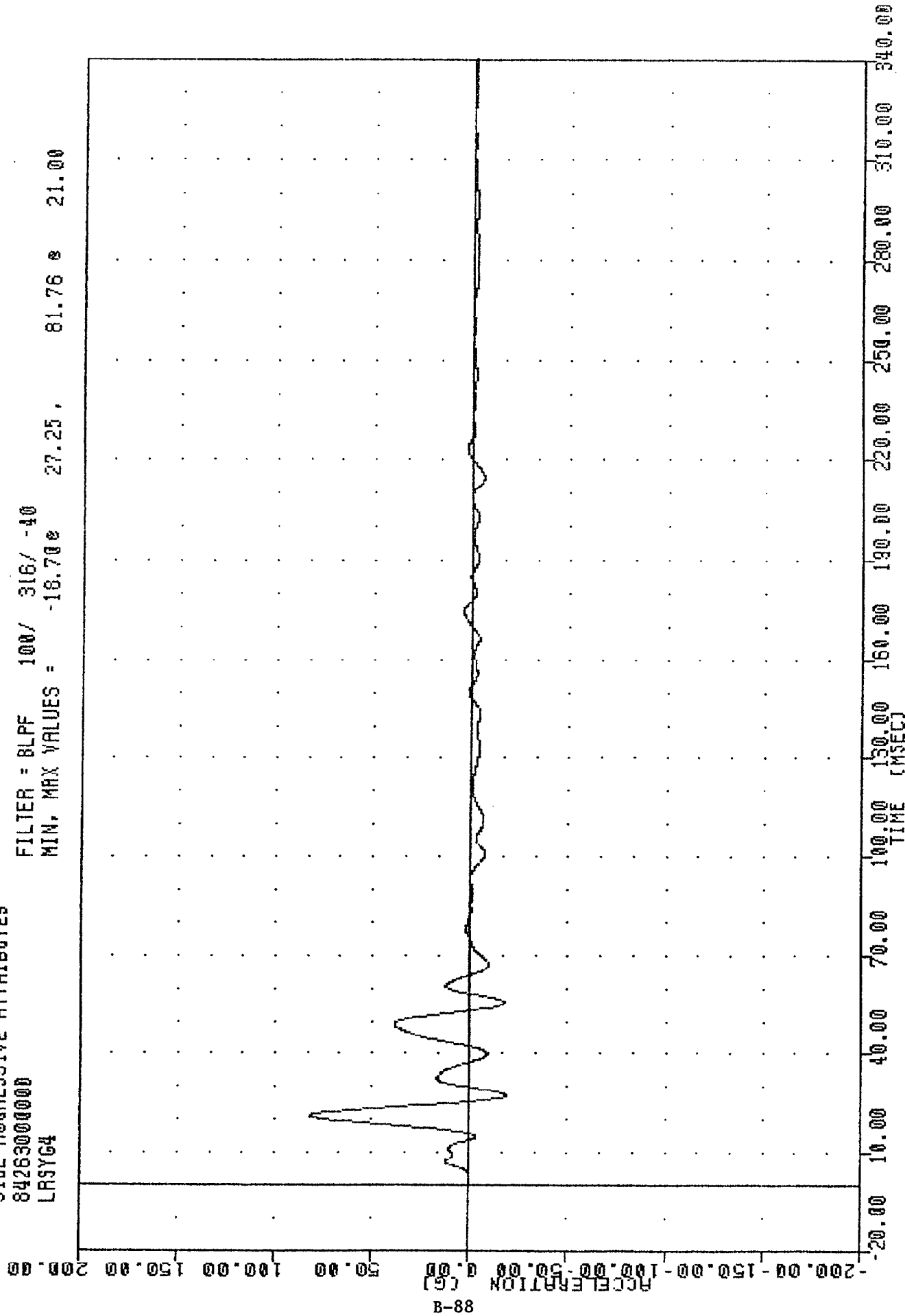
TAC 040913 PLOT DATE 28 SEP 84 15:06:18
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 RDKYV3
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = 0.00 1.13, 25.23 97.88



TR 01919
SIDE AGGRESSIVE ATTRIBUTES
84263000000
LR5Y64

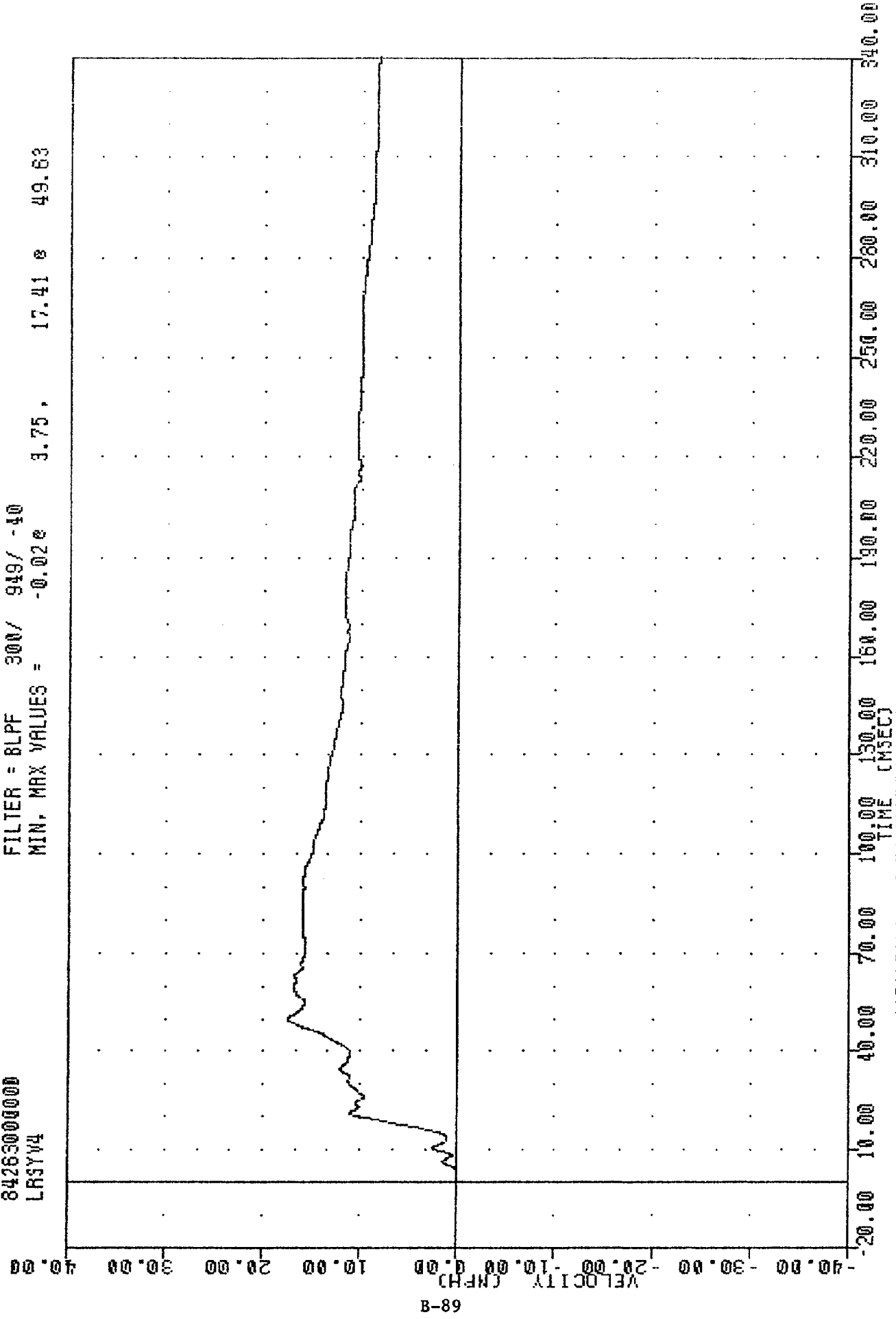
DATE 26 SEP 84 19:36:36

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -18.700 27.25, 81.76 21.00



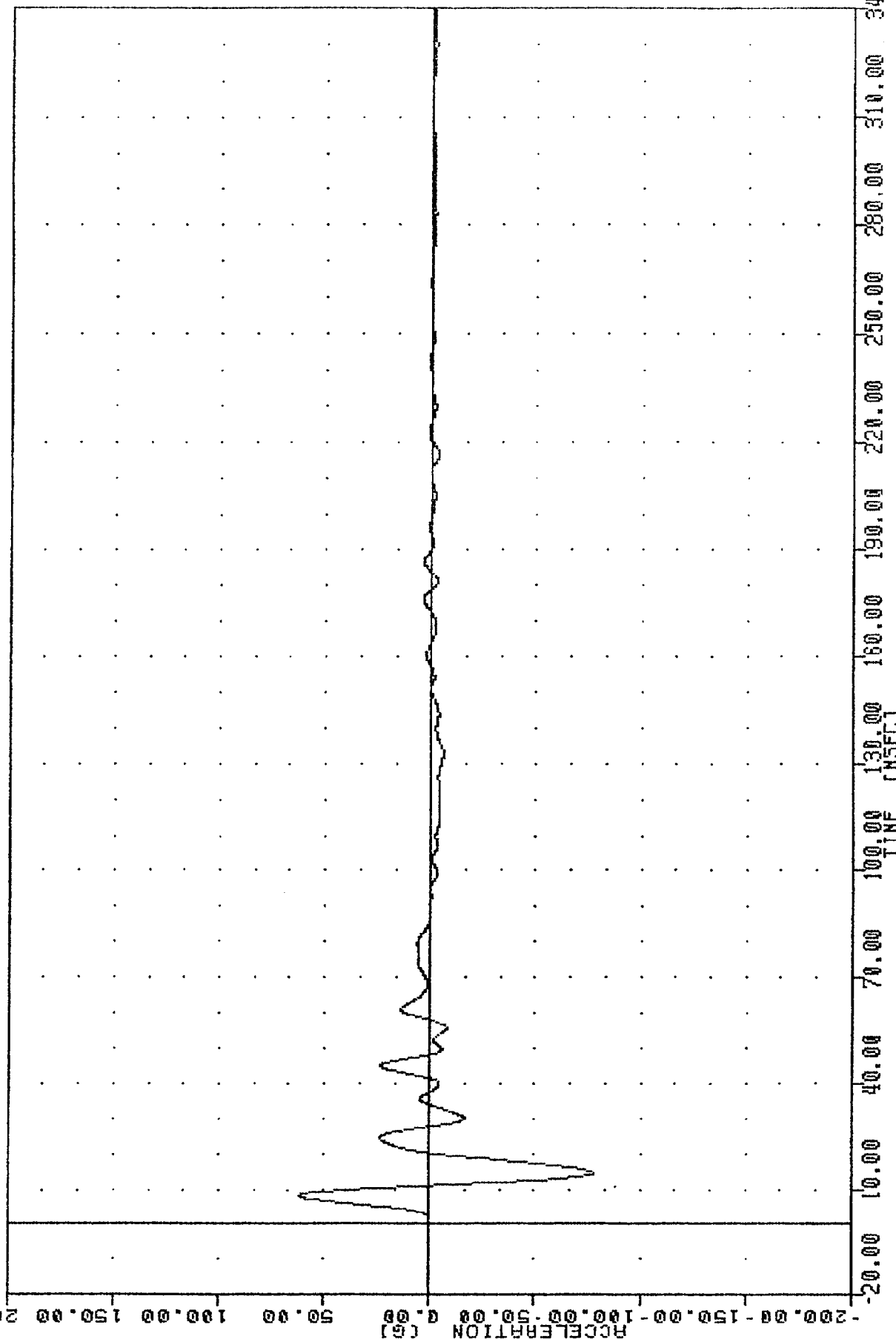
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT REAR SILL ACCELERATION Y AXIS

TRC 840919 PLOT DATE 26-SEP-84 13:08:19
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LRSYV4
 FILTER = 8LPF 300/ 949/ -40
 MIN, MAX VALUES = -0.02e 3.75, 17.41 e 49.63



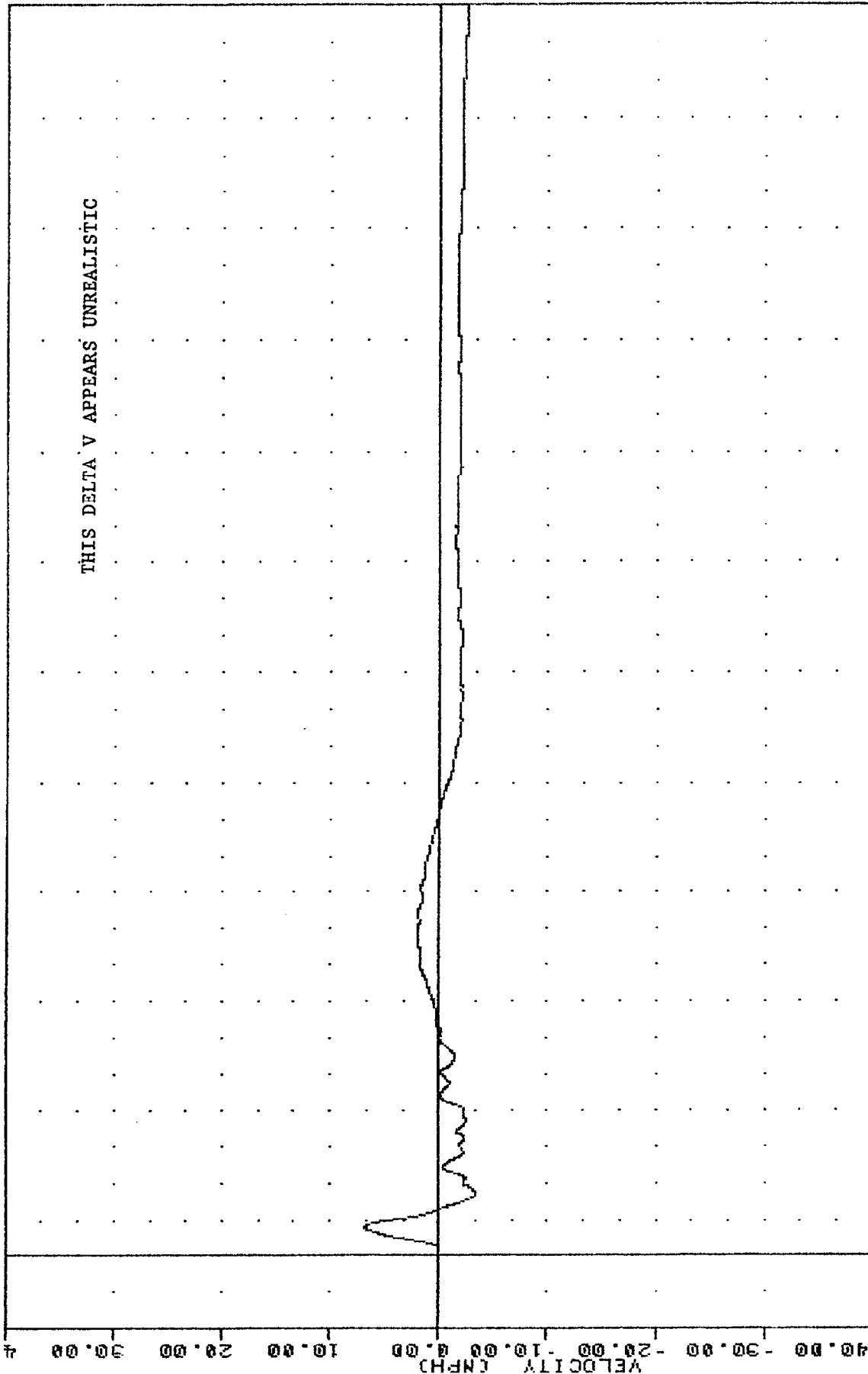
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING LRSYG4

TRC 040919, 040919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LFSY65
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -78.30e 14.38, 61.32 e 8.00
 PLOT DATE 26 SEP-84 13:00:36



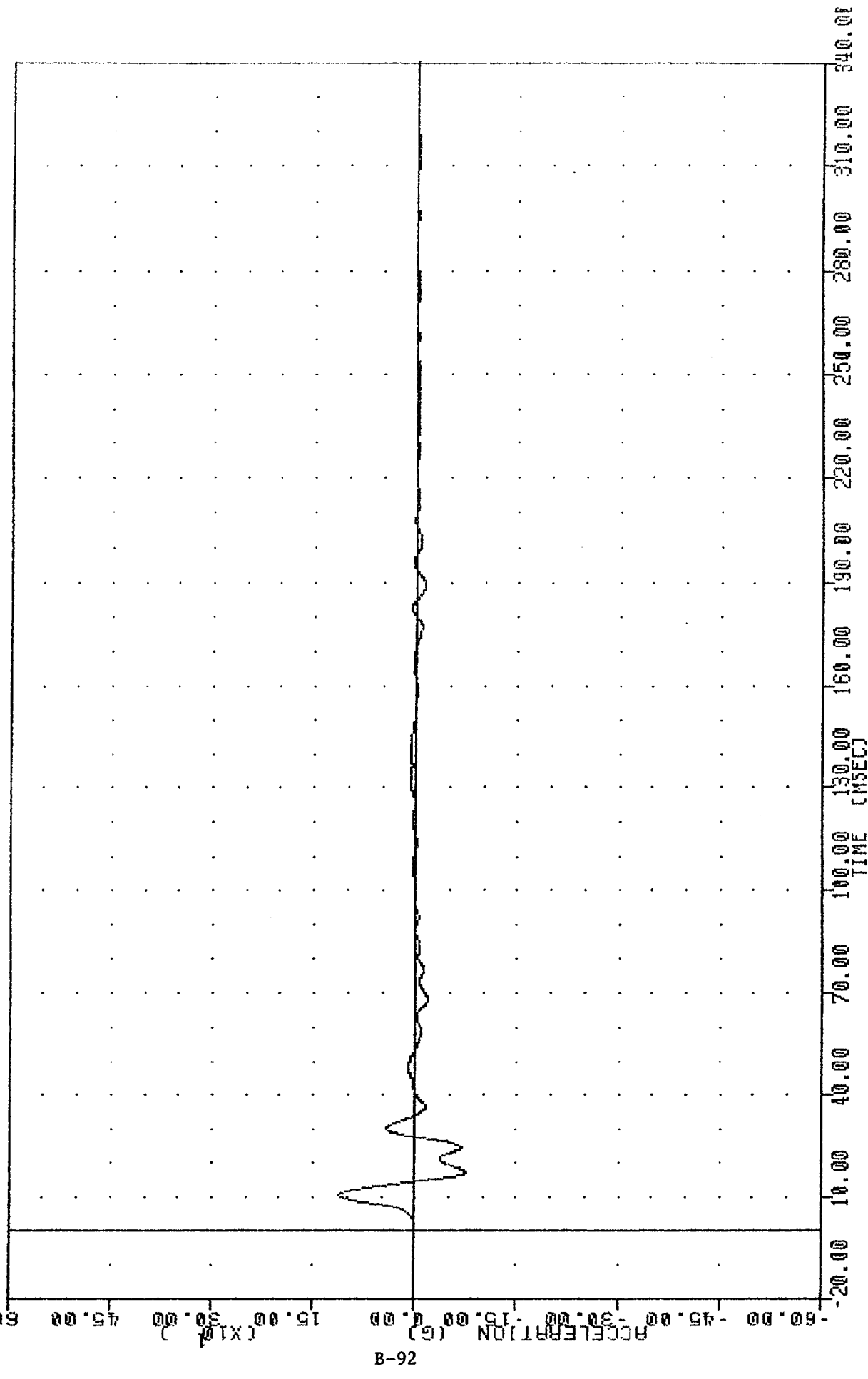
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE LEFT FRONT SILL ACCELERATION Y AXIS

TRC 840919, 840919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LFSYV5
 PLOT DATE 26-SEP-84 13:08:19
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -3.33e 16.88, 6.76 e 8.00



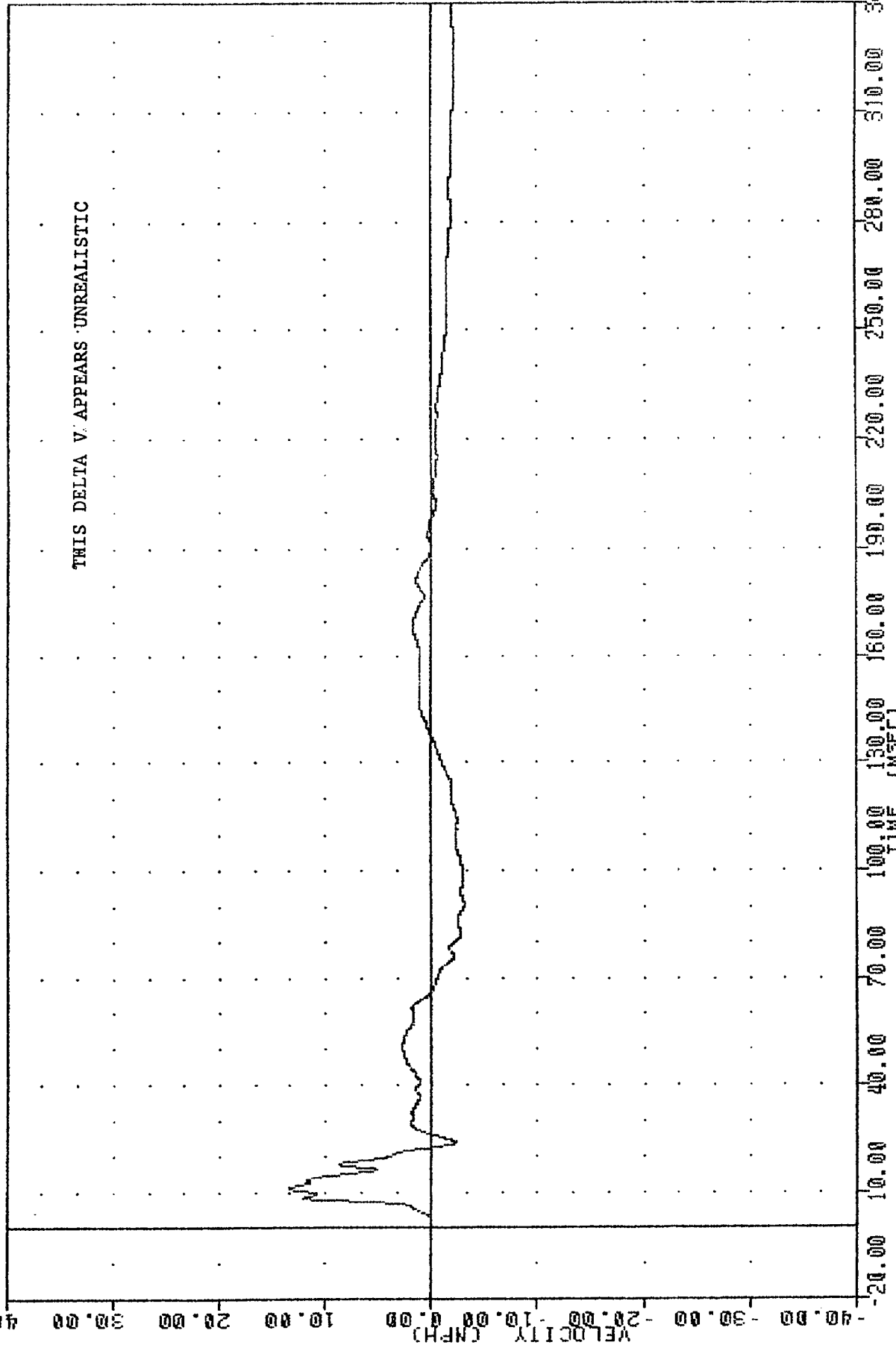
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING LFSYG5

TAC 840919
 SIDE AGGRESSIVE ATTRIBUTES
 842630000000
 LFOYGI
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -75.612 17.00 111.66 10.50
 PLOT DATE 26-SEP-84 13:06:36



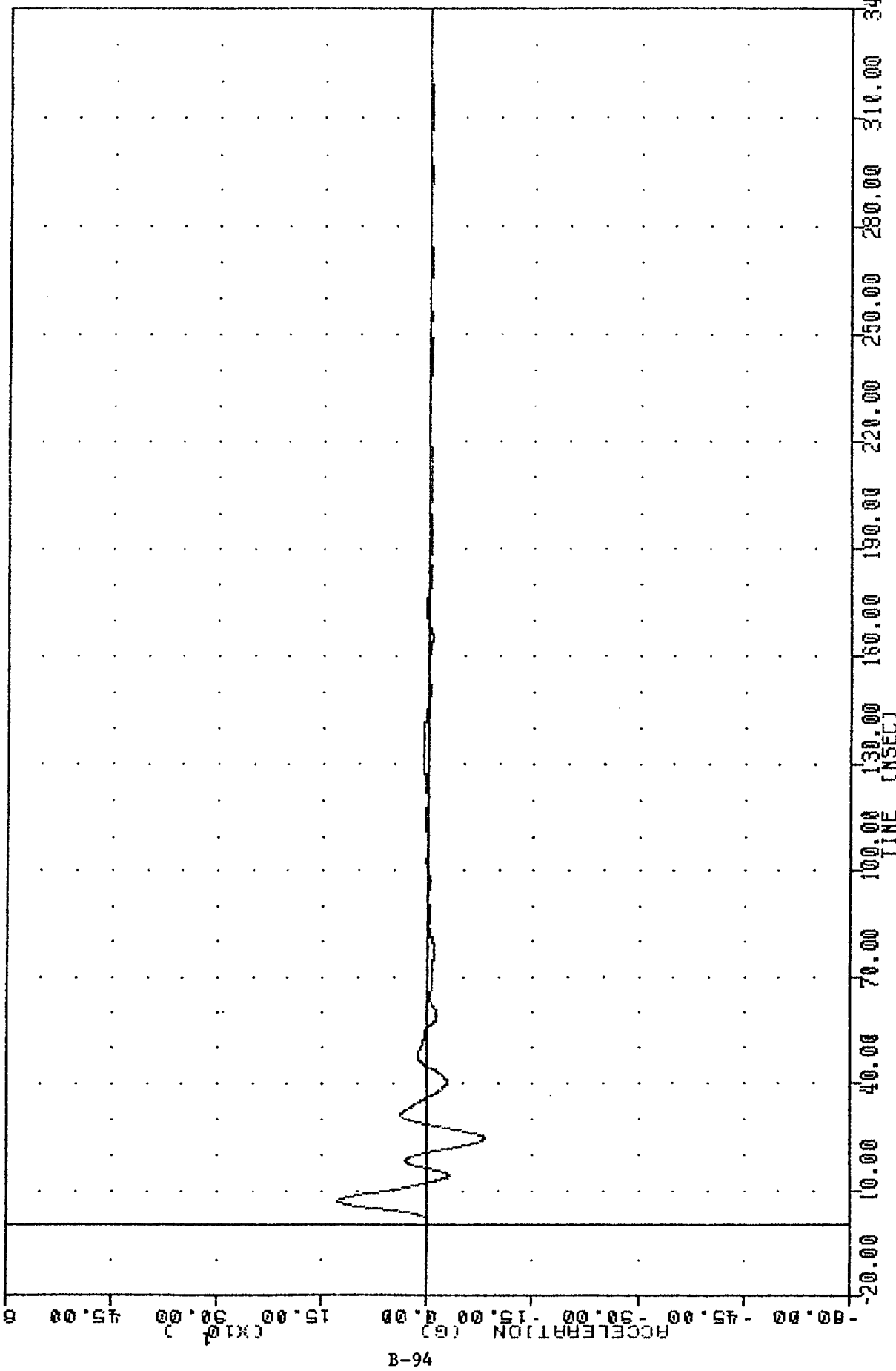
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE LEFT FRONT DOOR (POSITION 6) ACCELERATION Y AXIS

TRC 840919, PLOT DATE 26 SEP 84 15:08:19
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LFDYV1
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -3.06 90.38, 13.43 11.13



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING LFDYV1

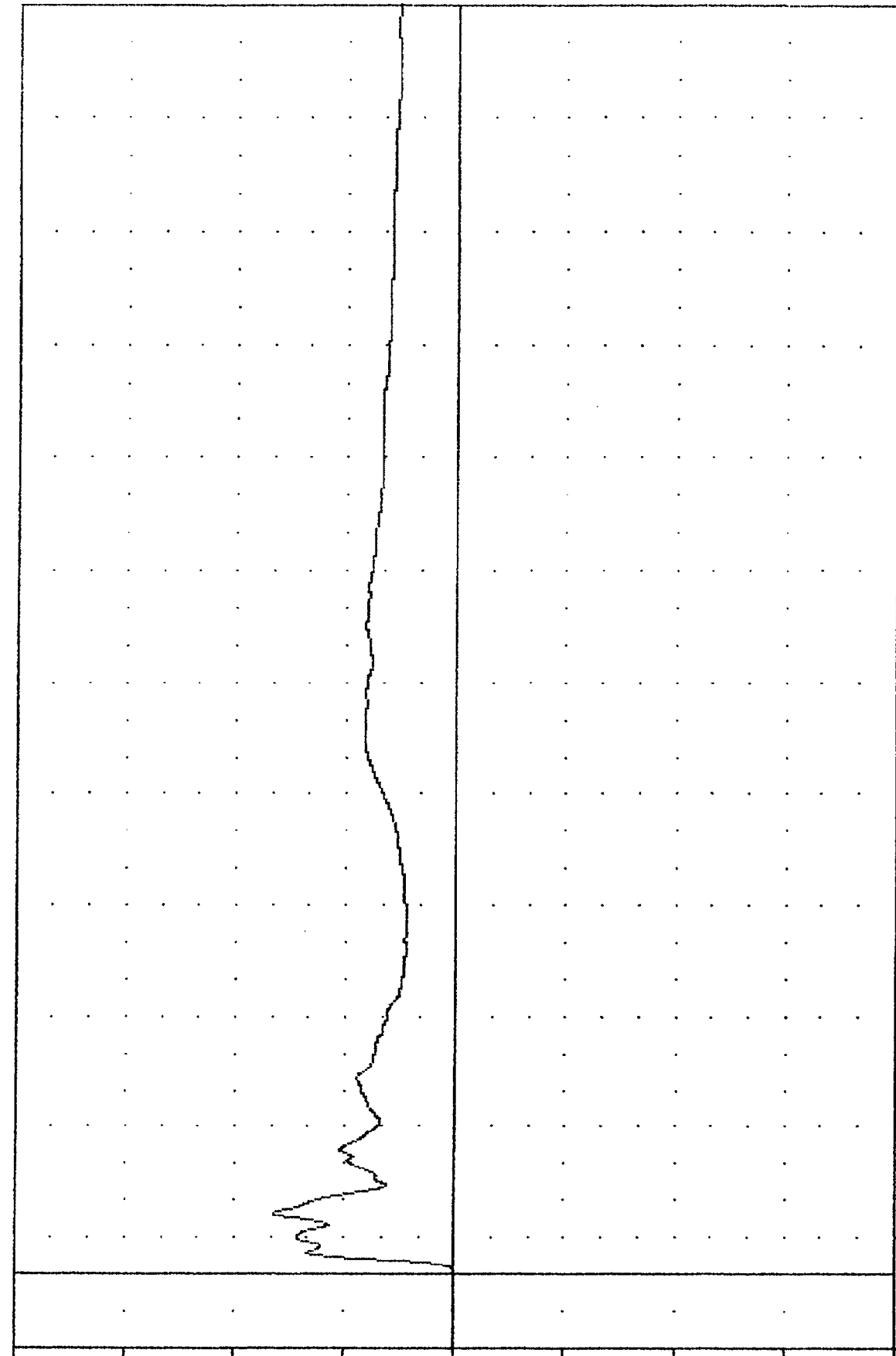
TRC 842630000000
 SIDE AGGRESSIVE ATTRIBUTES
 LFDY62
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -81.54e 24.13, 128.75 e 6.88
 PLOT DATE 28 SEP 84 13:00:38



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

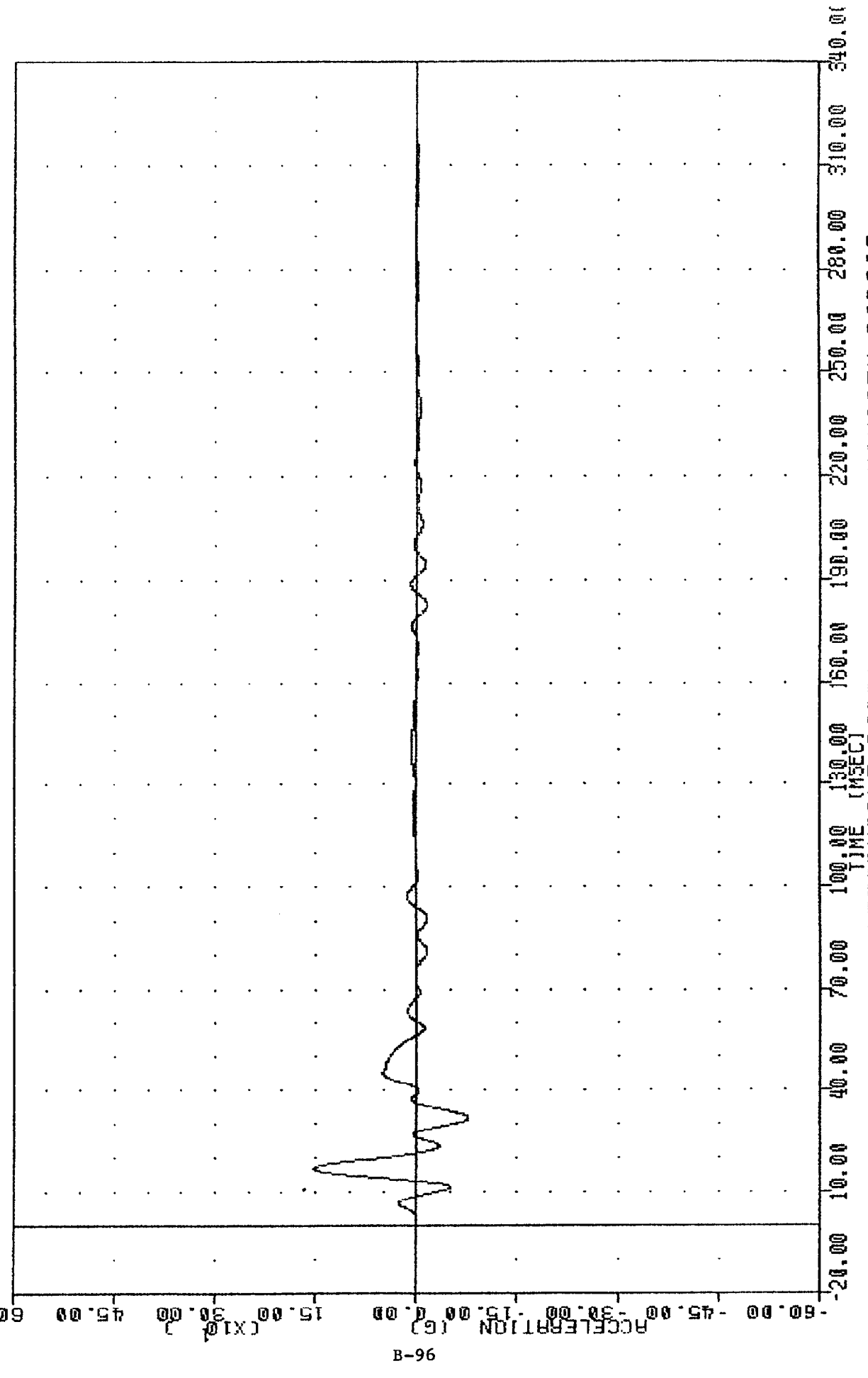
THE [REDACTED], 040919 [REDACTED] PLOT DATE 28 SEP 84 13:08:19
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LFDYV2
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -0.010 -8.88, 16.42 0 16.25

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



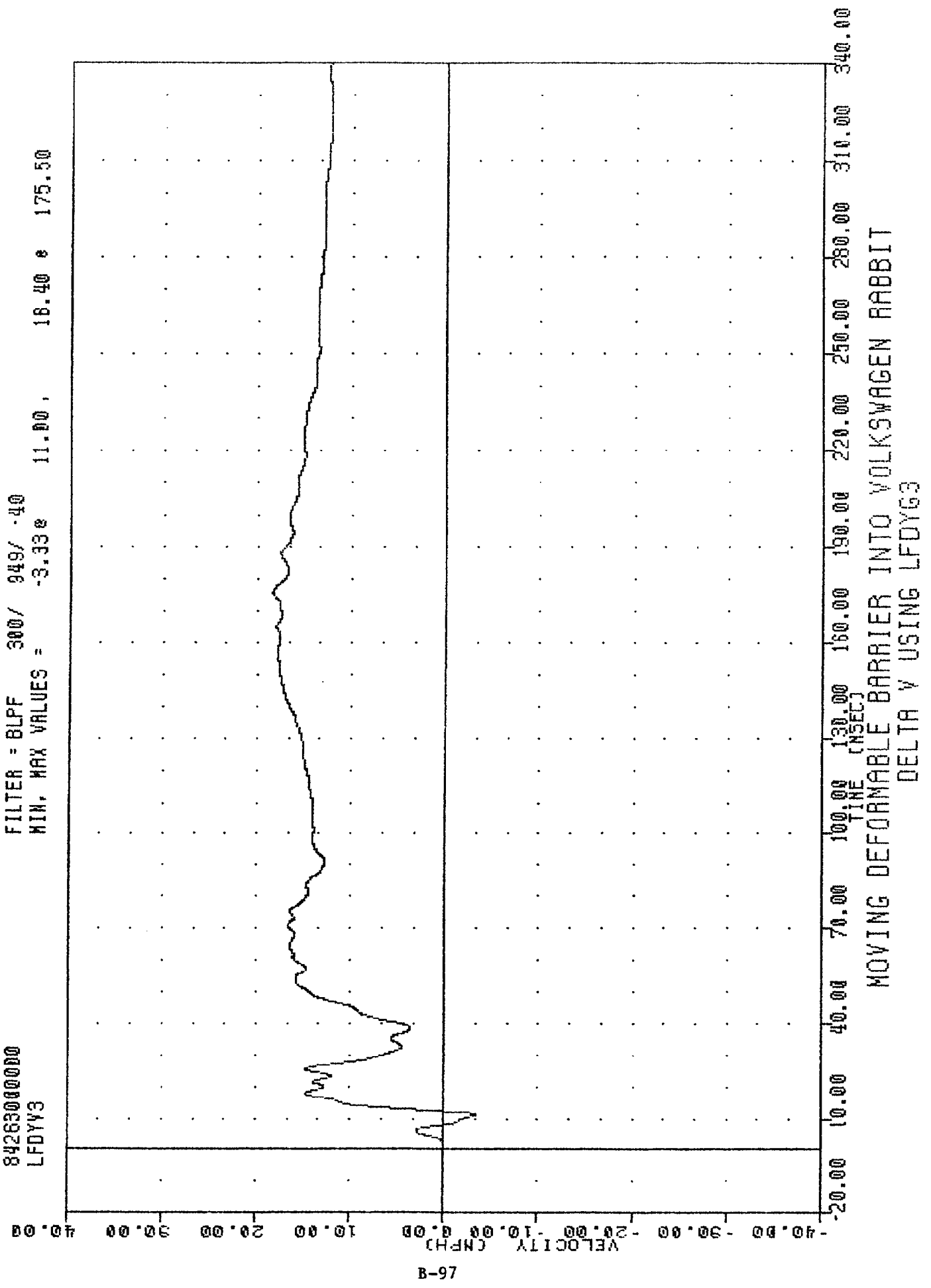
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING LFOY62

THE [REDACTED], 040919 [REDACTED] PLOT DATE 28 SEP 84 13:00:30
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LFDY63
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -76.96 31.88, 152.56 e 16.75

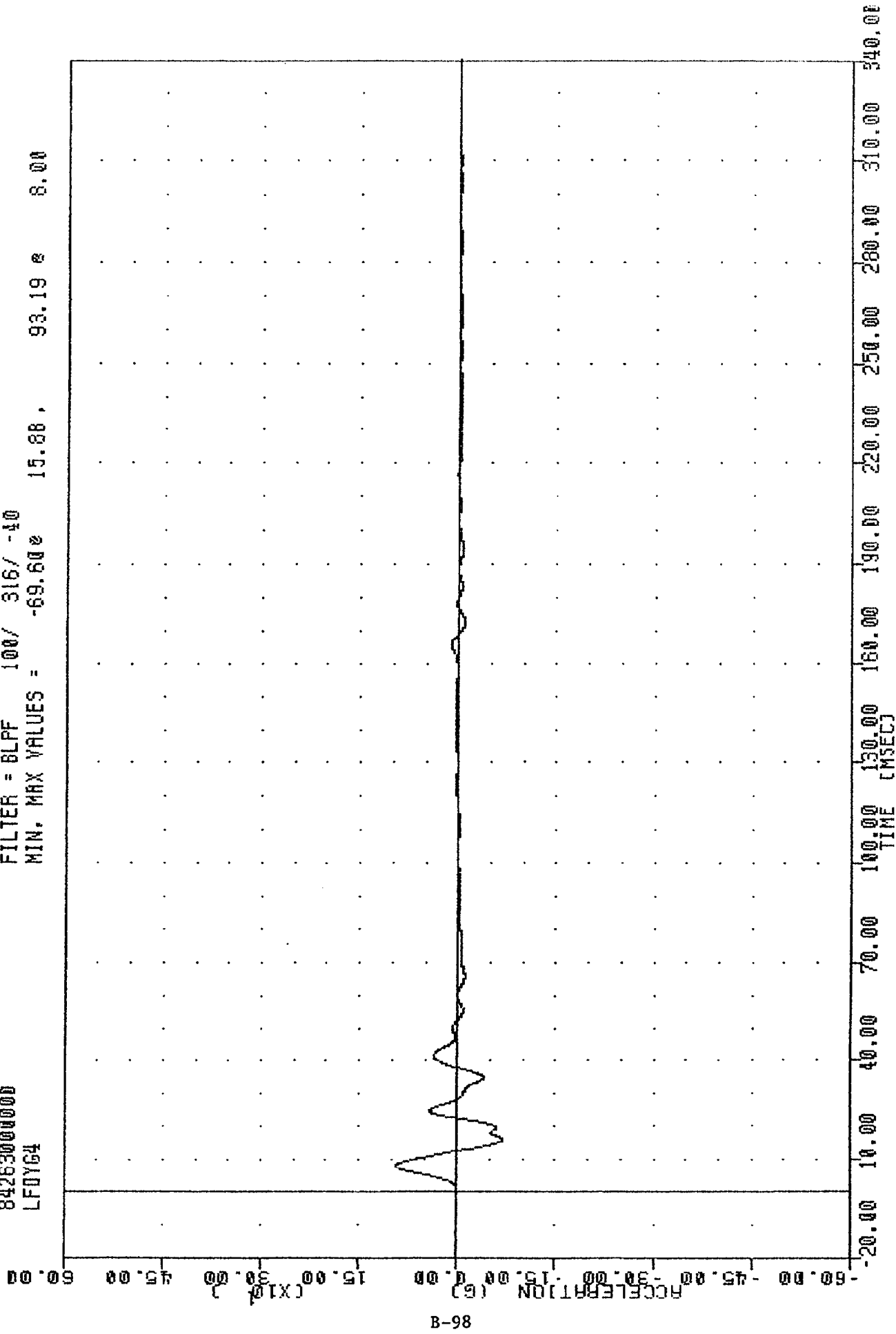


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE LEFT FRONT DOOR (POSITION 9) ACCELERATION Y AXIS

TRC 040919, 040919
 SIDE AGGRESSIVE ATTRIBUTES
 842630000000
 LFDYV3
 FILTER = BLPF 300/ 949/ .40
 MIN. MAX VALUES = -3.33e 11.00, 18.40 e 175.50
 PLOT DATE 28-SEP-84 13:08:19



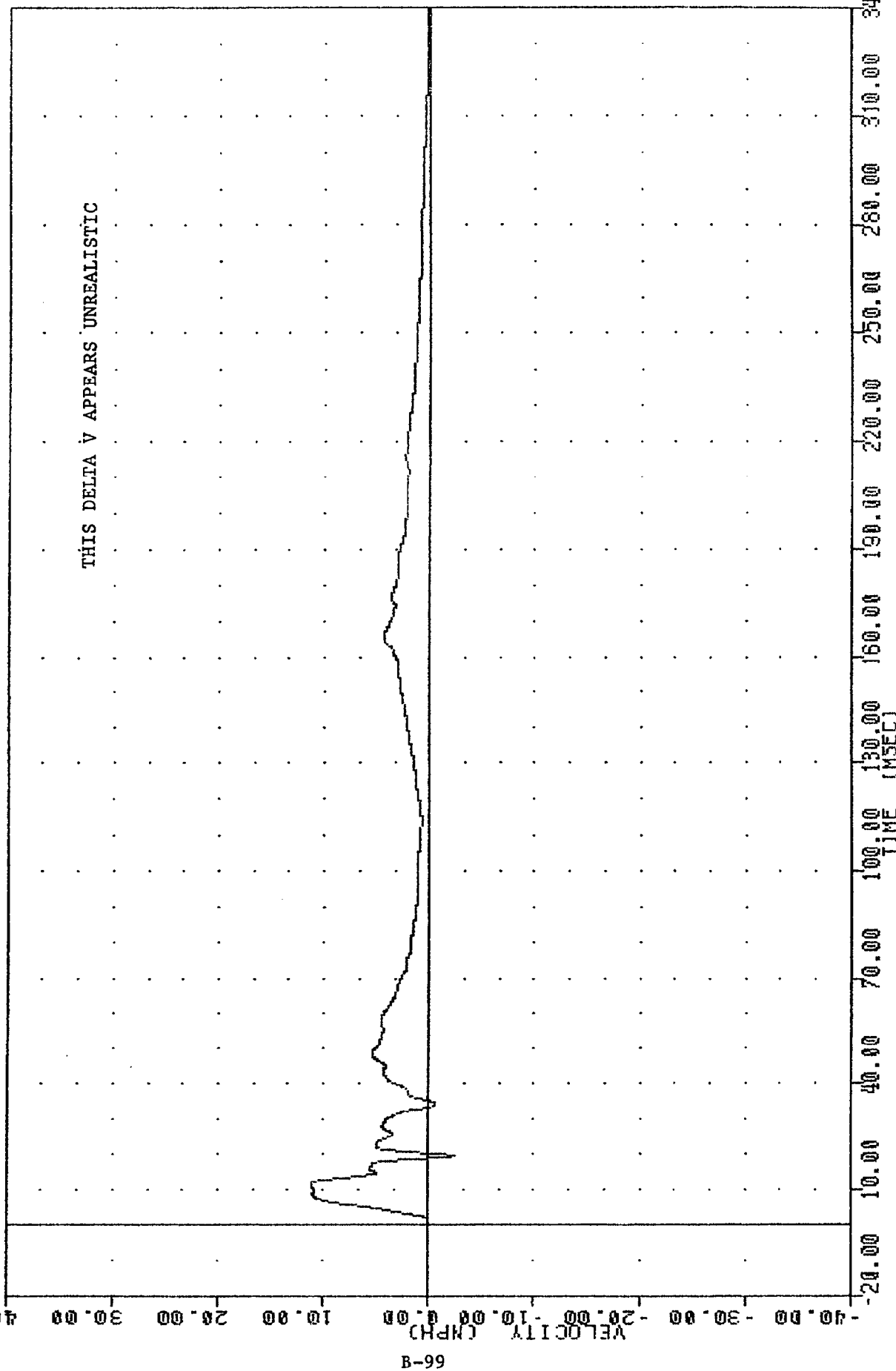
T80 040915 PLOT DATE 28 SEP 84 13:06:36
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LFDY64
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -69.60 15.88, 93.19 8.00



B-98

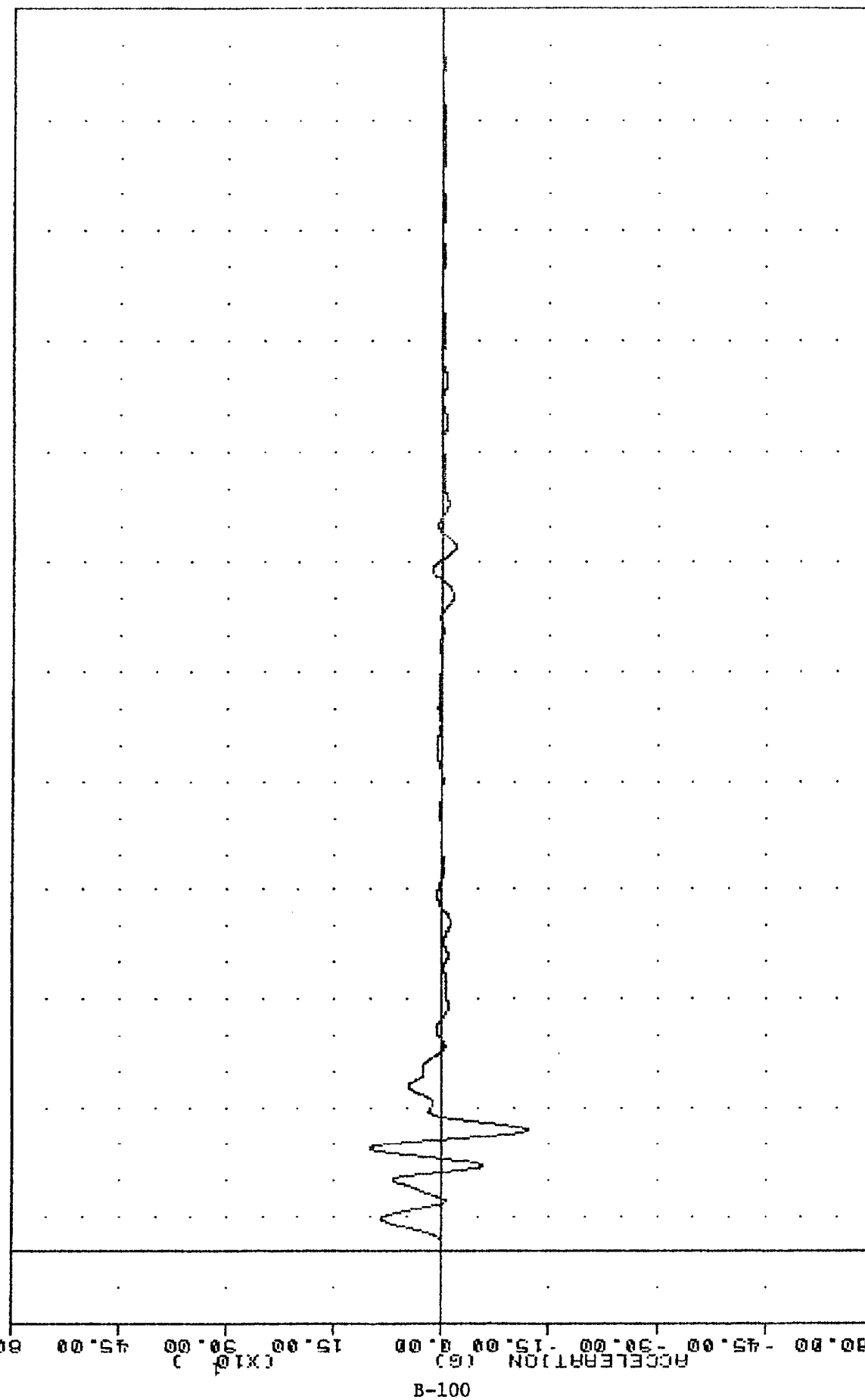
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE LEFT FRONT DOOR (POSITION 10) ACCELERATION Y AXIS

TAC 840919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LFDYV4
 PLOT DATE 26-SEP-84 13:08:19
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -2.48 19.25, 11.18 11.25



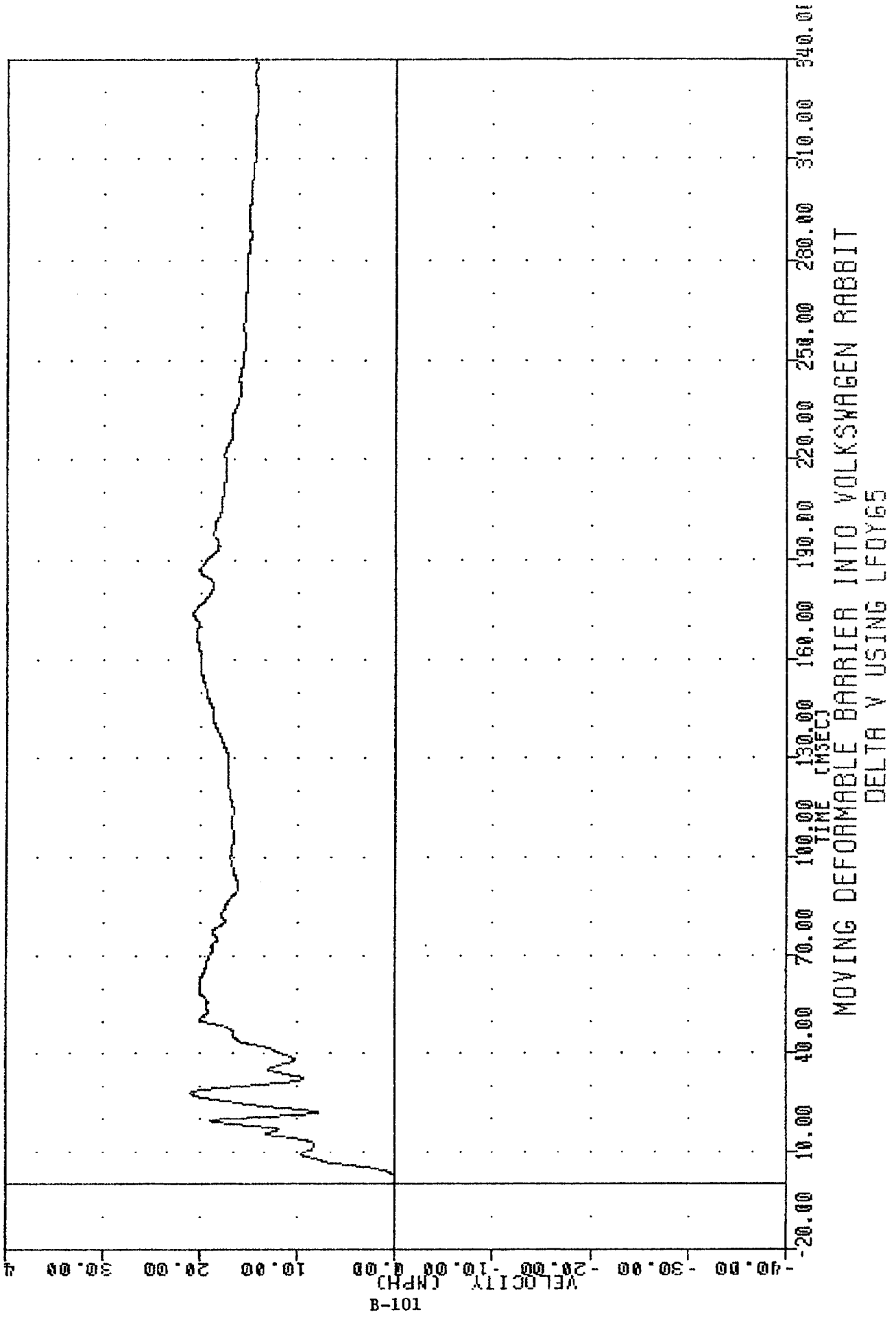
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING LFDYV4

TRC 840919, 840919 PLOT DATE 26-SEP-84 13:06:36
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LFDY65
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -119.62 33.63, 99.73 28.50

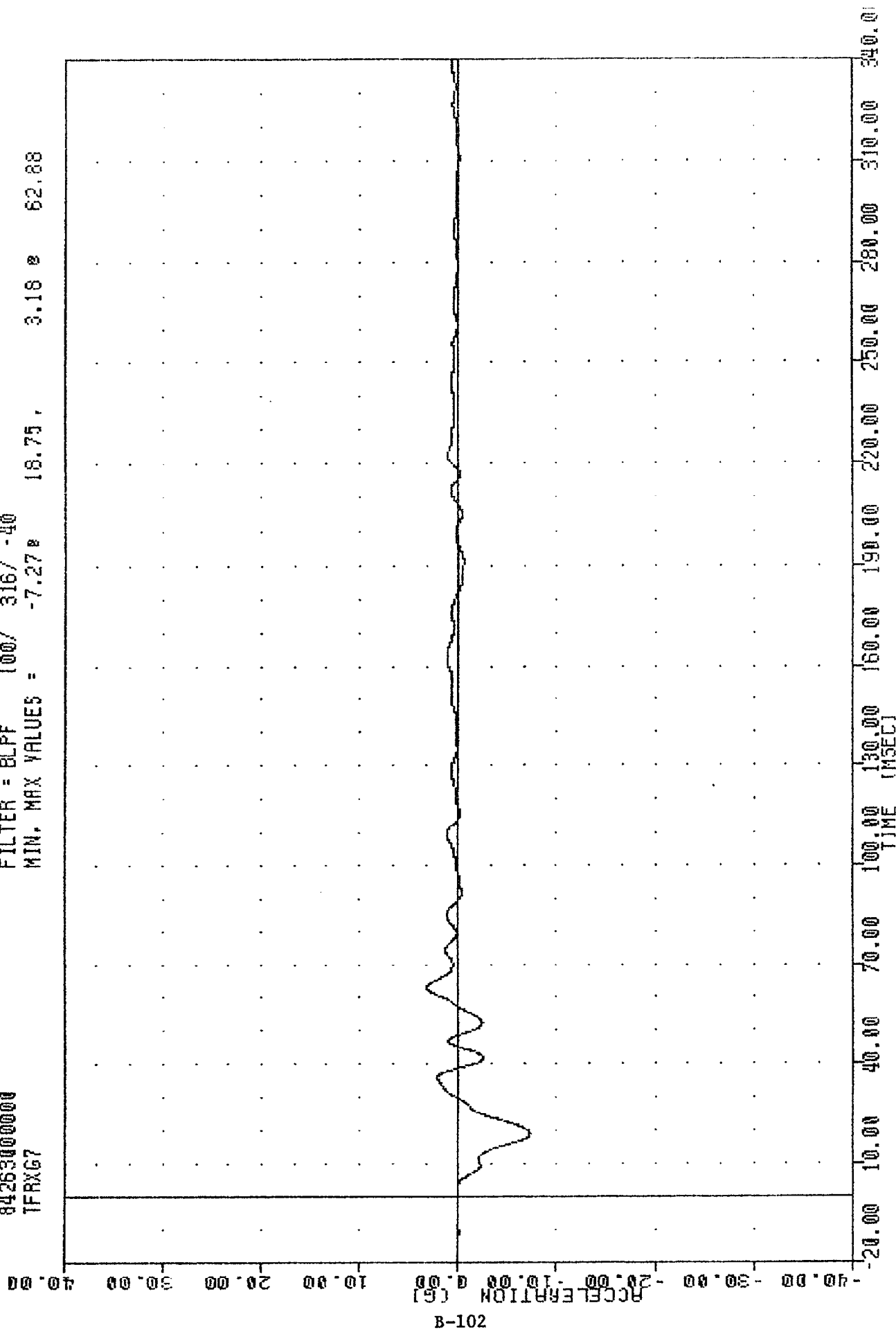


-80.00 -45.00 -30.00 -15.00 0.00 15.00 30.00 45.00 80.00
 ACCELERATION (G)
 -20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE LEFT FRONT DOOR (POSITION 11) ACCELERATION Y AXIS

TAC 840919, 090919 PLOT DATE 26 SEP 84 13:03:19
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 LFOYV5
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 0.00% -20.00, 21.01% 27.88



TRC 840919 PLOT DATE 26-SEP-84 13:06:36
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 TFRXG7
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -7.27 18.75 3.18 62.88

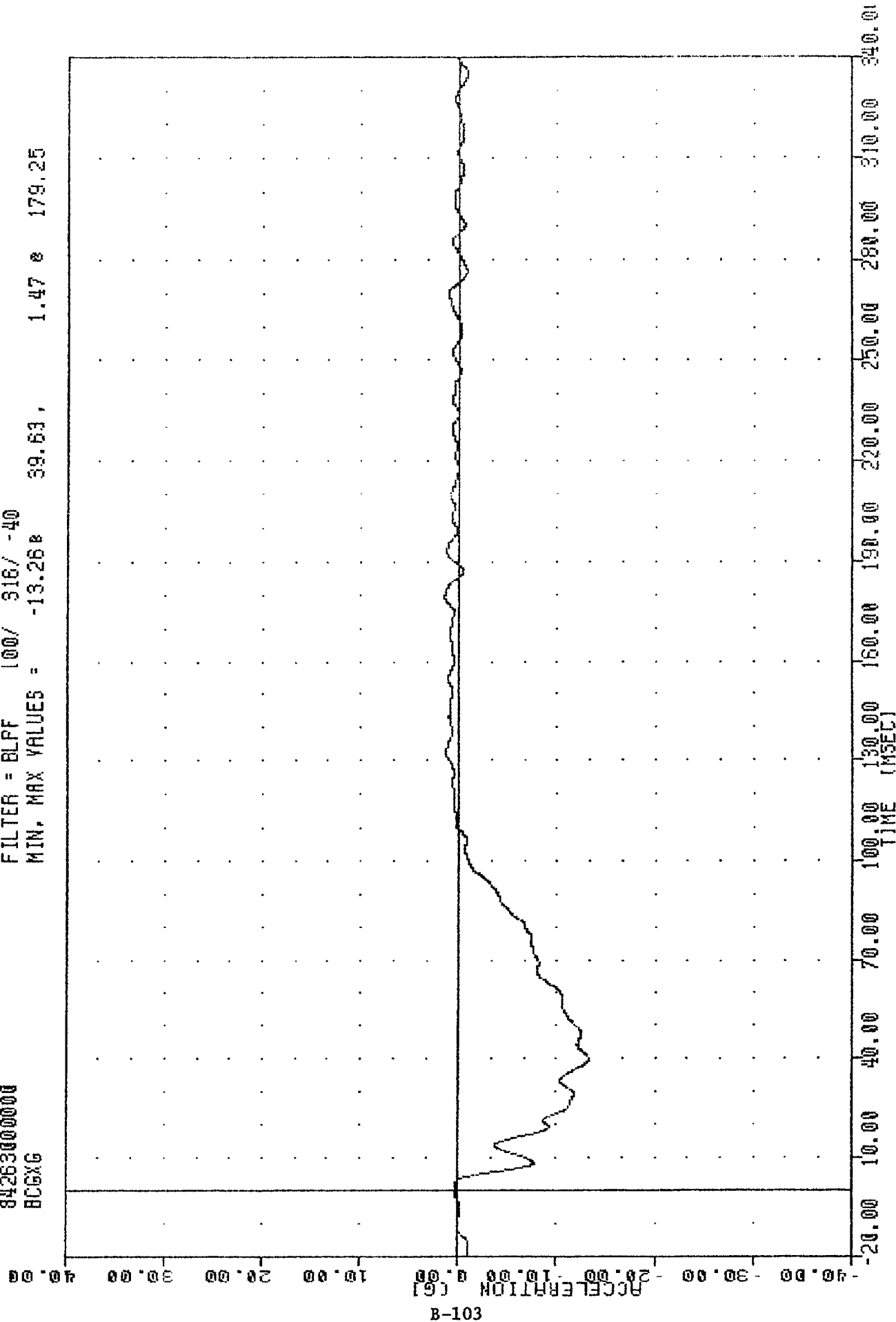


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 VEHICLE TRUNK FLOOR RIGHT ACCELERATION X AXIS

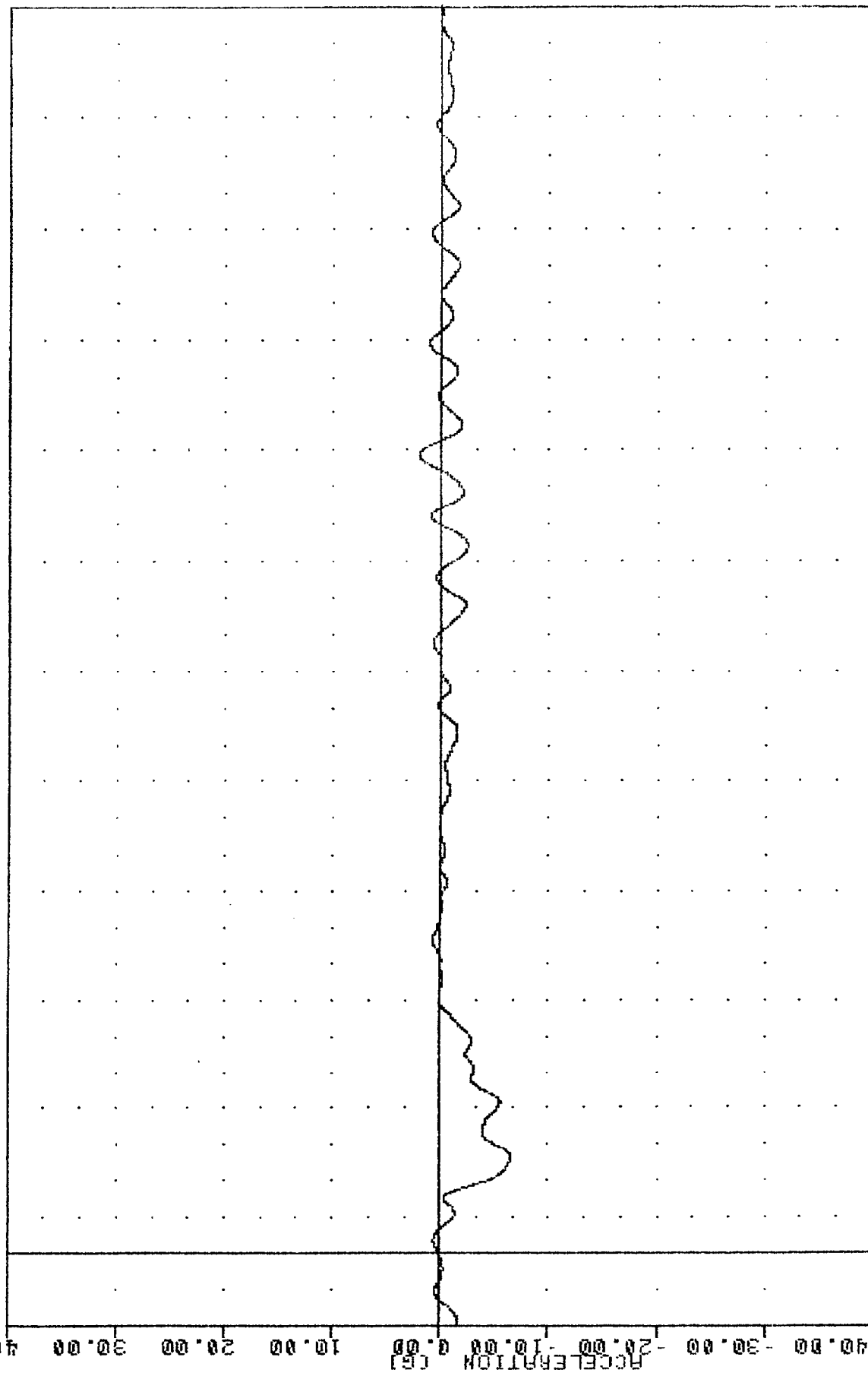
THC 040915
SIDE AGGRESSIVE ATTRIBUTES
84263000000
BCGXC

PLOT DATE 28 SEP 84 13:06:36

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -13.268 39.63, 1.47 & 179.25



TRC 040919, PLOT DATE 26 SEP 84 13:00:36
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 BCCYG
 FILTER = 8LPF 100/ 316/ -40
 MIN, MAX VALUES = -6.54e 26.13, 2.06 e 218.50

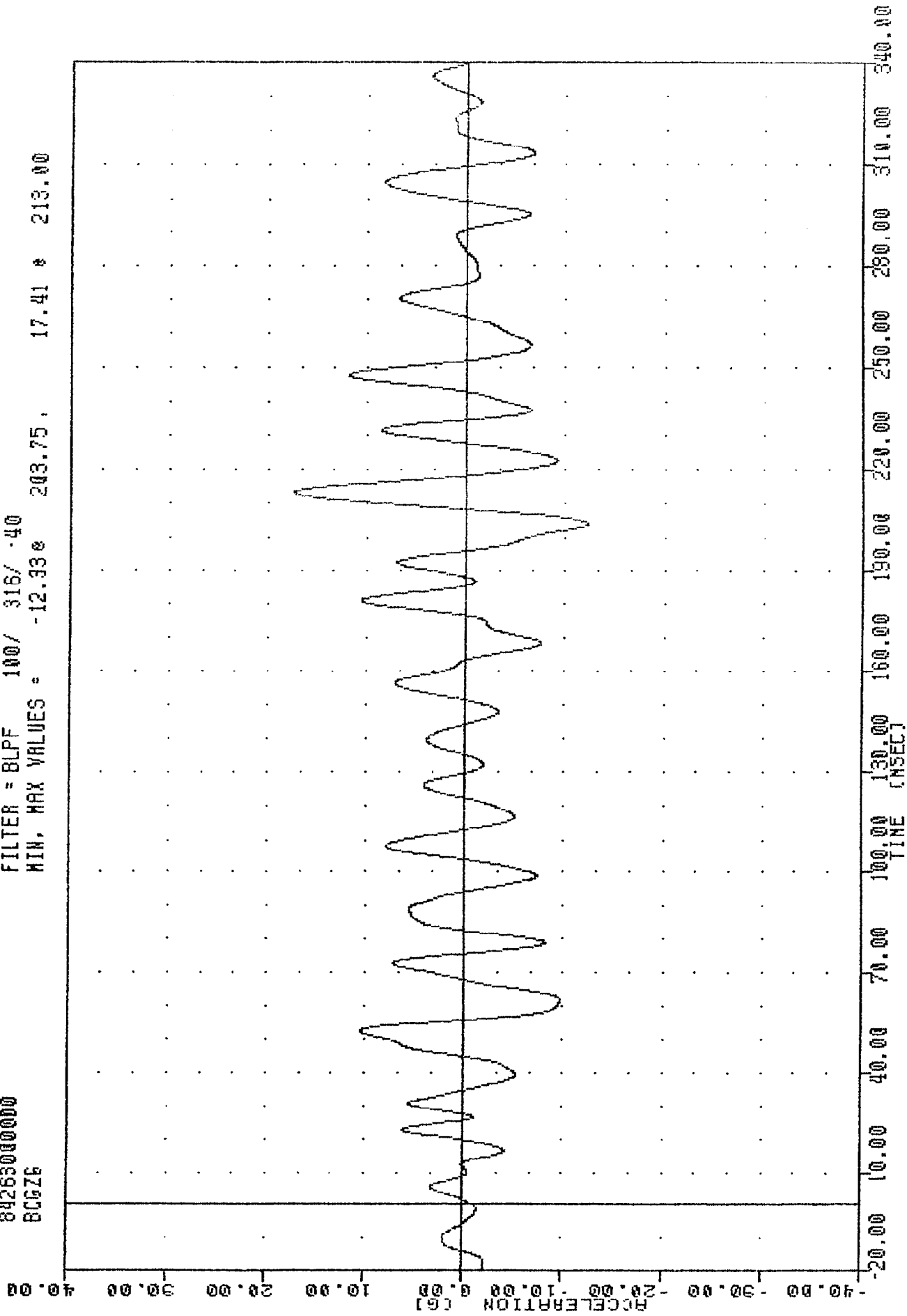


-40.00
 -30.00
 -20.00
 -10.00
 0.00
 10.00
 20.00
 30.00
 40.00
 -20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (msec)
 MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 BARRIER CENTER OF GRAVITY Y AXIS

THE , 040919
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 BCGZ6

PLOT DATE 26 SEP-84 13:00:36

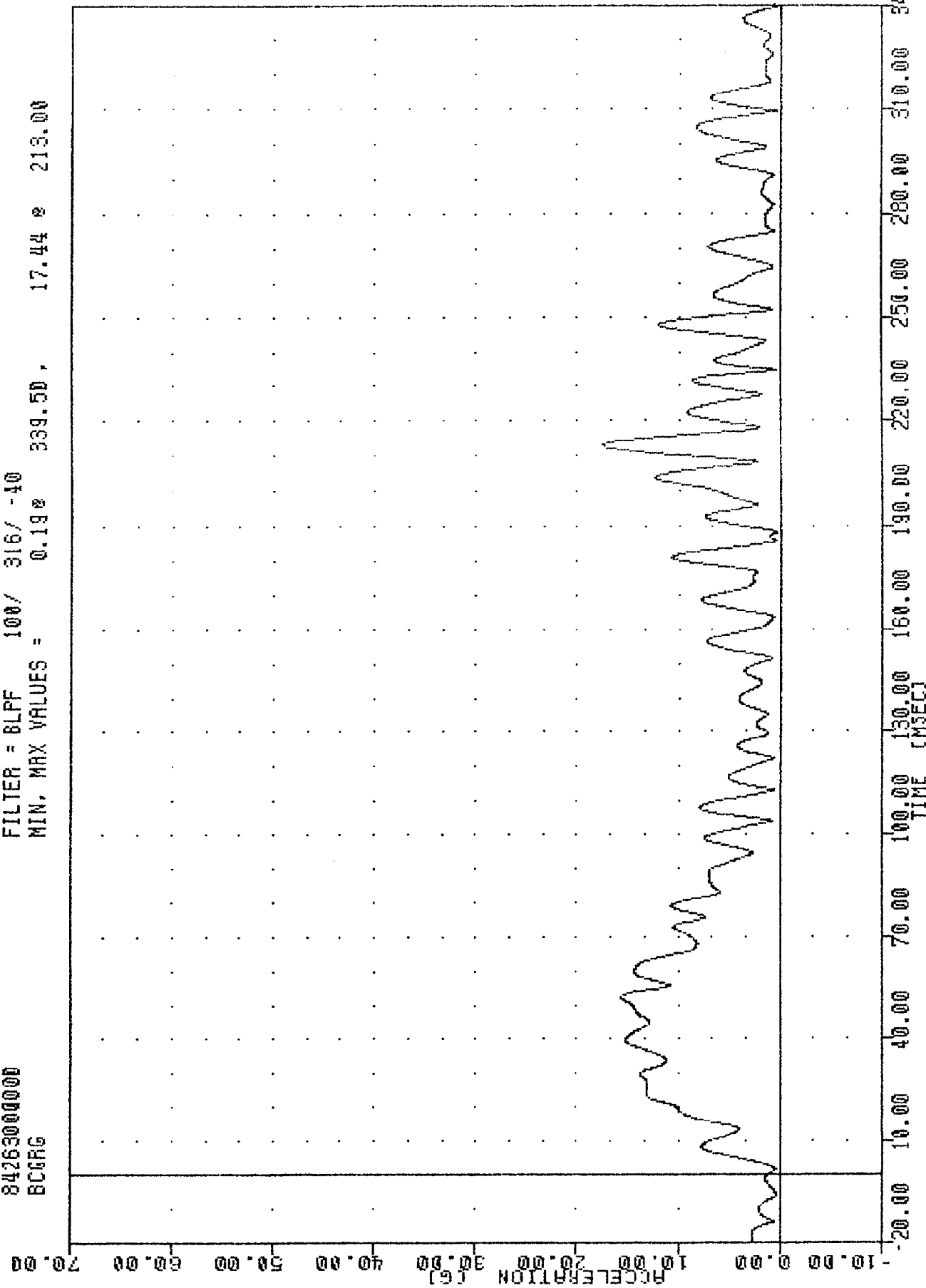
FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -12.93 203.75, 17.41 * 213.00



B-105

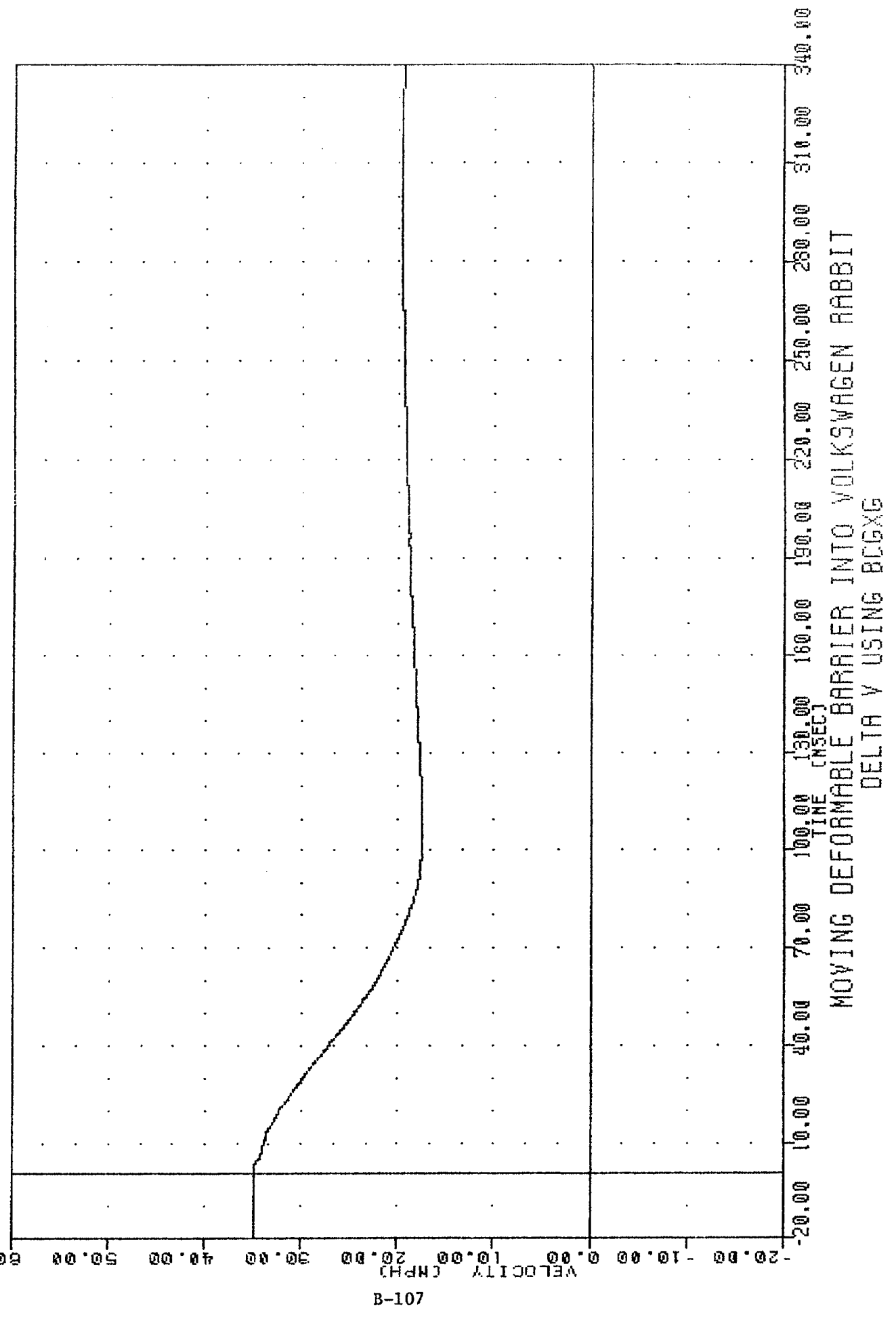
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 BARRIER CENTER OF GRAVITY Z AXIS

TRC 840919, 040919 PLOT DATE 26-SEP-84 13:07:50
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 BCGRG
 FILTER = 8LPF 100/ 316/ -40
 MIN, MAX VALUES = 0.192 339.50, 17.44 213.00

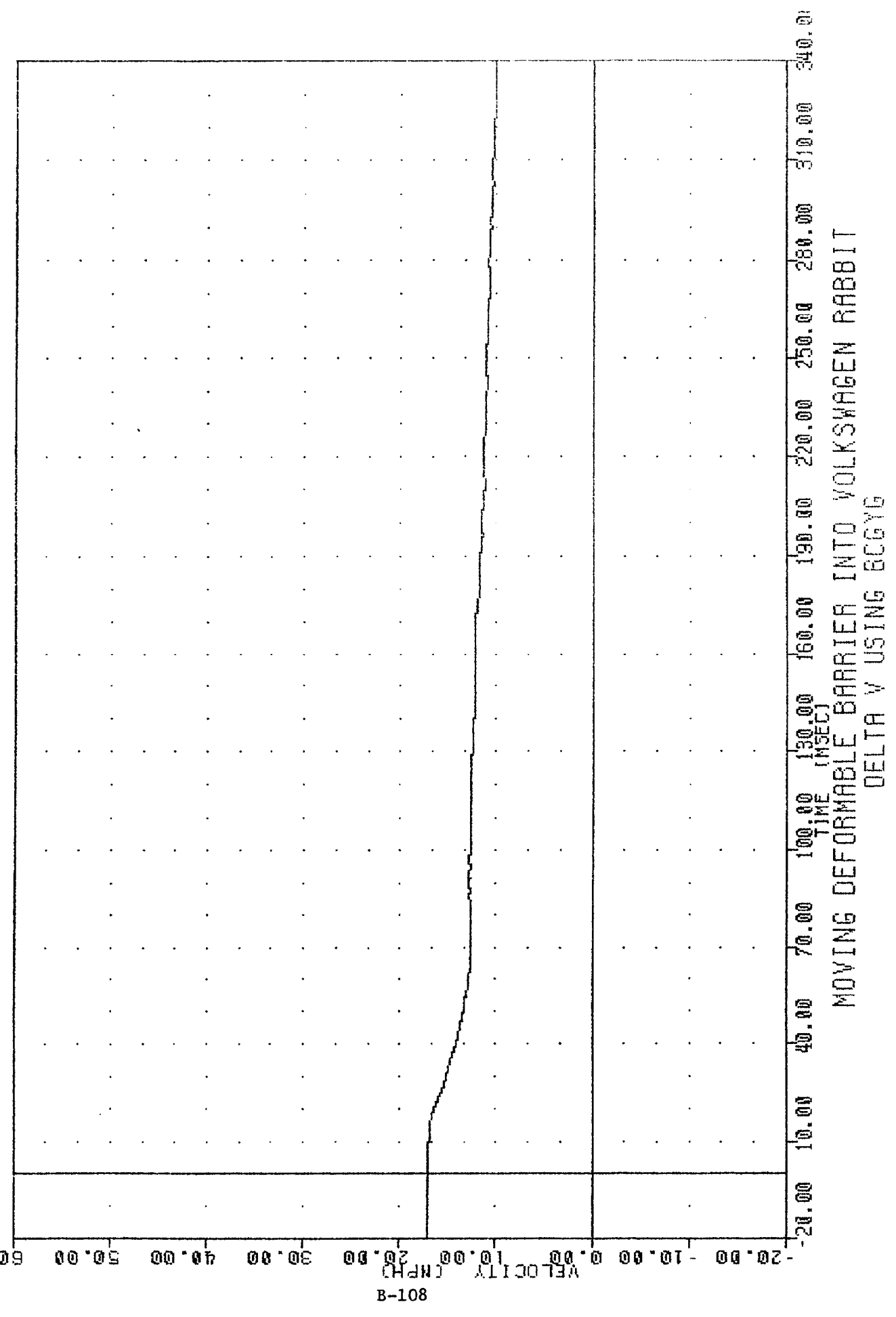


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 BARRIER CG RESULTANT

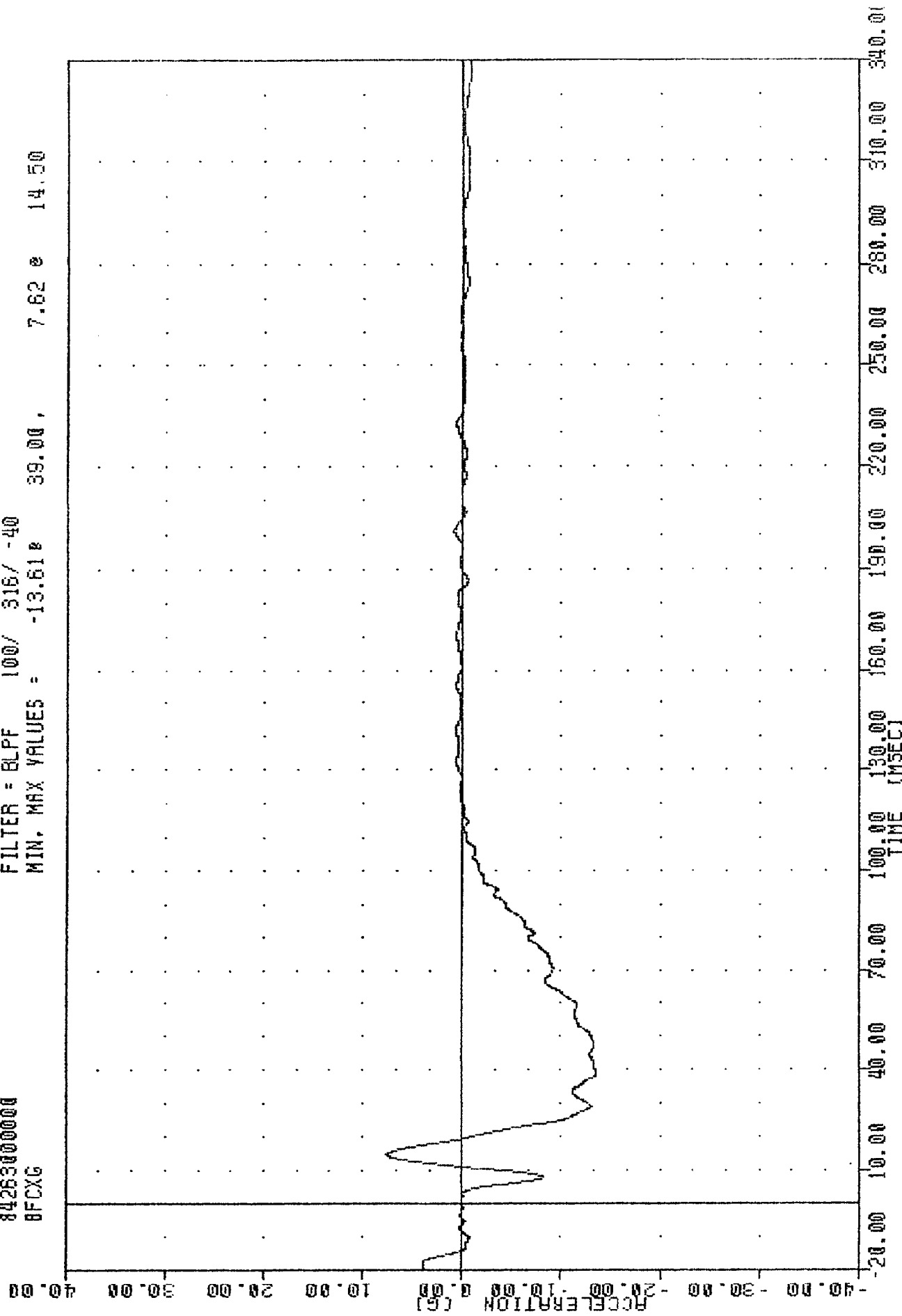
TRC 040319, 040319
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 BCGXV
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 17.44e 105.38, 34.90 e -20.00
 PLOT DATE 26 JUL -84 13:00:19



TRC 040915 PLOT DATE 28 SEP 84 13:00:13
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 BCGYV
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 10.03% 337.00, 17.12% 3.25

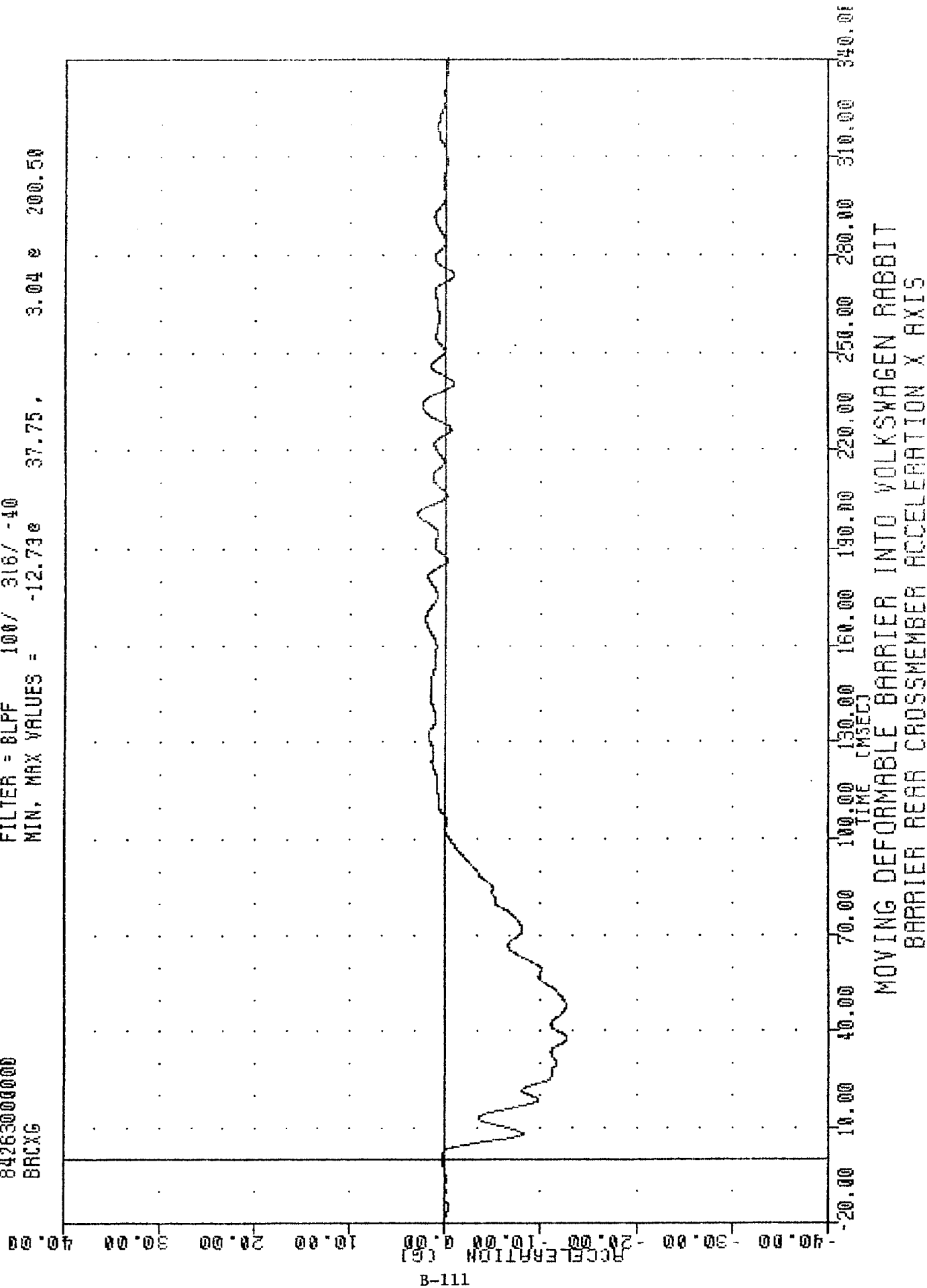


TRC 84263000000
 SIDE AGGRESSIVE ATTRIBUTES
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -13.61% 39.00, 7.62 e 14.50
 PLOT DATE 26 SEP 84 15:06:36



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

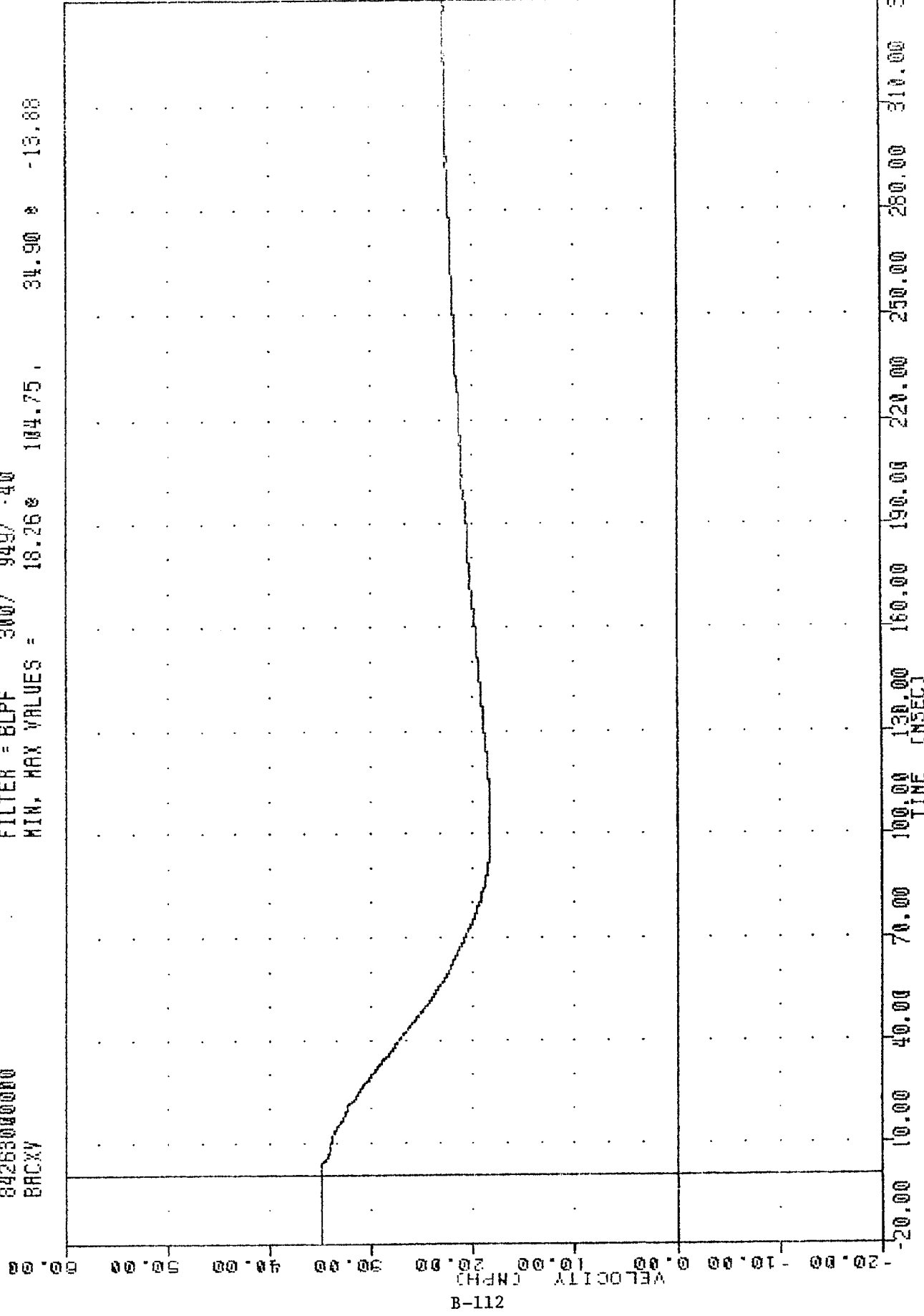
TRC 040918, 040918, 26 SEP-85 13:00:38
 SIDE AGGRESSIVE ATTRIBUTES
 84263000000
 BRXG
 FILTER = 8LPF 100/ 316/ -40
 MIN, MAX VALUES = -12.730 37.75, 3.04 @ 200.50



B-111

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

THE [REDACTED], 940319 [REDACTED] PLOT DATE [REDACTED] 26 SEP 84 [REDACTED] 130000 19
 SIDE AGGRESSIVE ATTRIBUTES
 842630000000
 BRCCXY
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 18.268 104.75 34.90 -13.88



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
 DELTA V USING BRCCXG