#765

SIDE IMPACT AGGRESSIVENESS ATTRIBUTES

MDB-TO-CAR SIDE IMPACT TEST OF A 19° CRABBED MOVING DEFORMABLE BARRIER TO A 1981 VOLKSWAGEN RABBIT AT 46.2 MPH

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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 1981 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 and the left rear quarter panel. The test vehicle was impacted on the left side by a moving deformable barrier designated as "Lowered Stiffness" crabbed to 19°, at 46.2 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 5, 1984 and the ambient temperature was 66° F.

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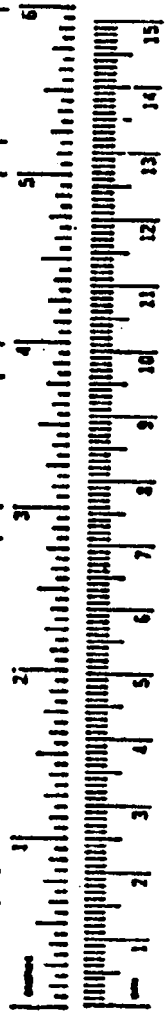
METRIC CONVERSION FACTORS

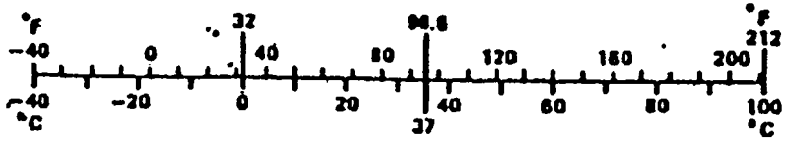
Approximate Conversions to Metric Measures

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 (2000 lb)	0.9	metric ton	t
	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 (10 000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton (1000 kg)	1.1	short tons	
	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



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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 1981 diesel Volkswagen Rabbit 2-door hatchback was impacted on the left side by a Moving Deformable Barrier (MDB) on September 5, 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 60^{o} 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 46.3 mph with the MDB's wheels crabbed clockwise to 19^{o}. The actual test speed was 46.2 mph and the actual impact point was 36.5 inches forward of the midpoint of the Volkswagen Rabbit's wheelbase.

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

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 Diesel VIN: 1VWBG0173BV162059

BODY STYLE: 2-Door Hatchback MODEL YEAR: 1981

NHTSA NO.: R & D COLOR: Light Brown

ENGINE DATA: TYPE: Inline CYLINDERS: 4 DISPLACEMENT 105 CID

TRANSMISSION DATA: 4 Speed Manual

DATE VEHICLE RECEIVED: 8/22/84 ODOMETER READING: 40062

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	No	AUTOMATIC TRANSMISSION	No
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	No	AIR CONDITIONING	Yes
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? 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: 5/81

GVWR: 2822 LBS.,

GAWR: FRONT 1609 LBS., REAR 1278 LBS.

VEHICLE TIRE DATA

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

TIRES ON VEHICLE (MFGR. & LINE, SIZE): Goodyear Tiempo P155 80 13

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 3

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	670	LBS.	RIGHT REAR	320	LBS.
LEFT FRONT	680	LBS.	LEFT REAR	310	LBS.
TOTAL FRONT WEIGHT	1350	LBS. (68.2 % OF TOTAL VEHICLE WEIGHT)			
TOTAL REAR WEIGHT	630	LBS. (31.8 % OF TOTAL VEHICLE WEIGHT)			
TOTAL DELIVERED WEIGHT	1980	LBS.			

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 23 7/8	;LF 23 13/16	;RR 24 11/16	;LR 24 11/16
PRE-TEST ATTITUDE:	RF 23 5/8	;LF 23 3/16	;RR 22 1/16	;LR 21 5/8
POST-TEST ATTITUDE:	RF 22 5/8	;LF 22 15/16	;RR 21 5/16	;LR 22 3/8

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

RIGHT FRONT	720	LBS.	RIGHT REAR	540	LBS.
LEFT FRONT	750	LBS.	LEFT REAR	560	LBS.
TOTAL FRONT WEIGHT	1470	LBS. (57.2 % OF TOTAL VEHICLE WEIGHT)			
TOTAL REAR WEIGHT	1100	LBS. (42.8 % OF TOTAL VEHICLE WEIGHT)			
TOTAL TEST WEIGHT	2570	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: 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 31 psi

RECOMMENDED TIRE SIZE: 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
4 TOTAL

CARGO LOAD 185 LBS.

TOTAL 785 LBS.

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

TEST CONDITIONS

TEST NUMBER: 840905

DATE OF TEST: September 5, 1984 TIME OF TEST: 14:15

WIND VELOCITY: 3-8 mph 10° N HUMIDITY: DNA

AMBIENT TEMPERATURE AT IMPACT AREA: 66° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 72° F

SUBJECT VEHICLE DATA

	ACTUAL	INTENDED
VEHICLE TEST WEIGHT (LBS.)	2570	2573
MDB TEST WEIGHT (LBS.)	2990	3000
MDB VELOCITY (MPH)*	46.2	46.3
IMPACT POINT (INCHES)**	36.5	37.0

DUMMIES

	DRIVER	MIDDLE PASSENGER	RT. FRONT PASSENGER	LEFT REAR PASSENGER	RT. REAR PASSENGER
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	Side Window, Barrier Face, Inside Roof	Window & Hatchback Frames
Chest	Side Door Panel	Inner Quarter Panel
Abdomen	Side Door Panel	Inner Quarter Panel
Left Knee	Side Door Panel	Inner Quarter Panel
Right Knee	Left Knee	Left Knee

DOOR OPENING:

	LEFT	RIGHT
Front	DNA*	Easy
Rear	DNA	DNA

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Front	Yes	Yes
Rear	Yes	No

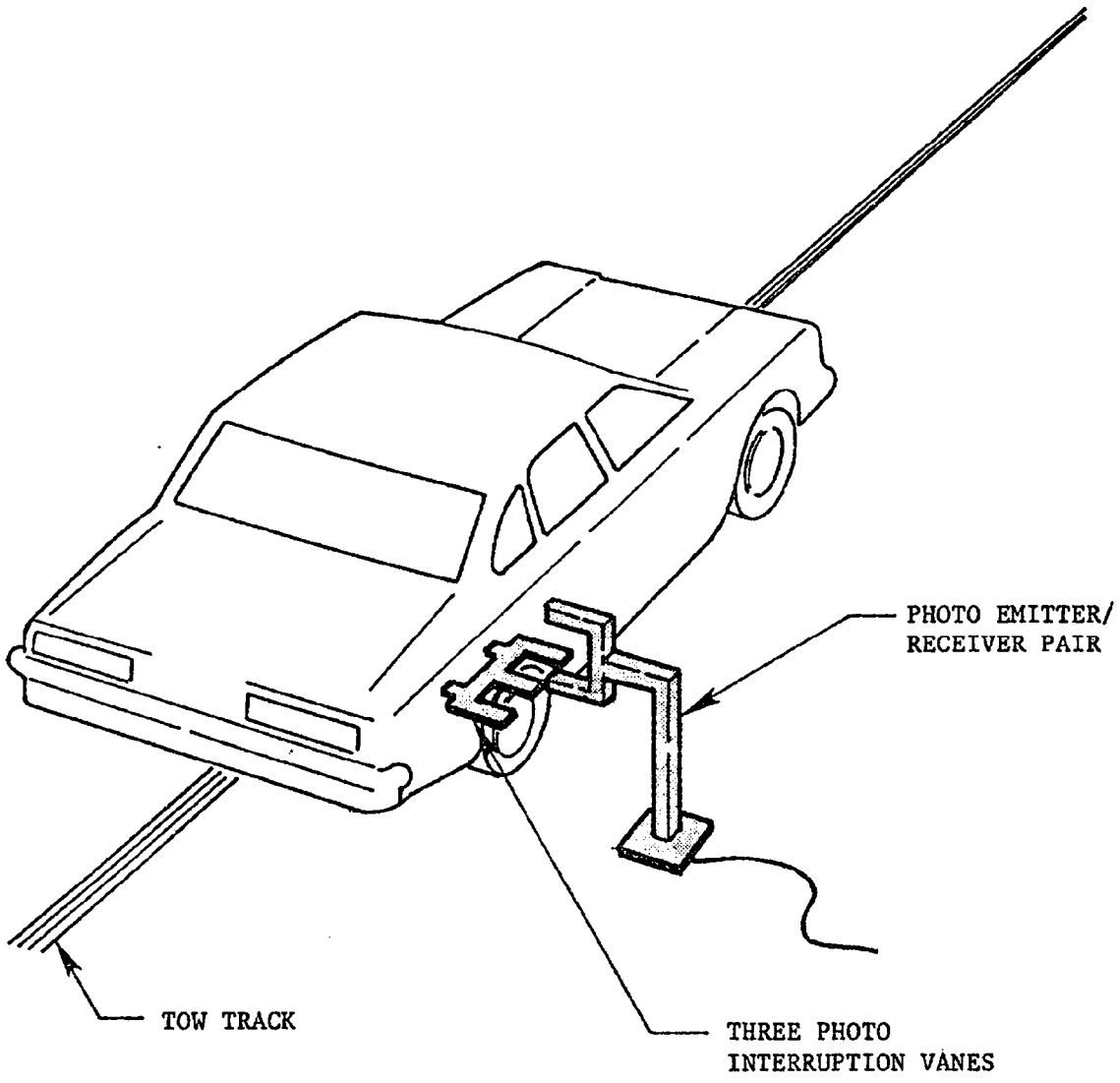
GLAZING DAMAGE: Windshield shattered, driver's door glass and rear left side shattered.

OTHER NOTABLE IMPACT EFFECTS:

Driver dummy's left foot separated.

*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

Test Weight = Unloaded Delivered Weight +
Number of Dummies X 174 lbs. +
Cargo Weight
= 2040 + 2 X 174 + 185 lbs.
= 2573 lbs.

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.

TEST ANOMALIES

The accelerometer mounted in the Left Front Door, Position 8, LFDYG2, experienced temporary shorts during impact due to the door kinematics.

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

SIDE IMPACT DUMMY	DRIVER DSP	REAR PASSENGER DSP
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. M. Garrison
2. B. Miller
3. P. Clay

POSITIONING DATE: 9/5/84

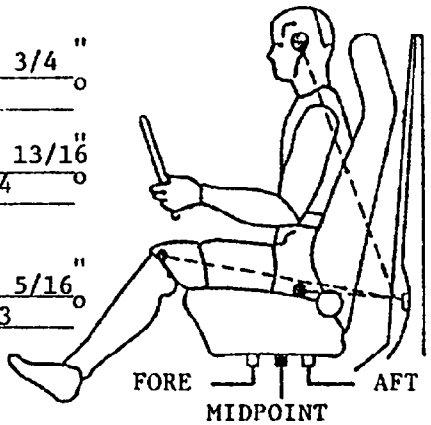
AMBIENT TEMP.: 68° F. TIME: 10:04

DRIVER DUMMY # 06

HEAD 20 3/4 "
TARGET* 53 °

KNEE 31 13/16 "
JOINT 104 °

APPROX. "H" 18 5/16 "
POINT 123 °

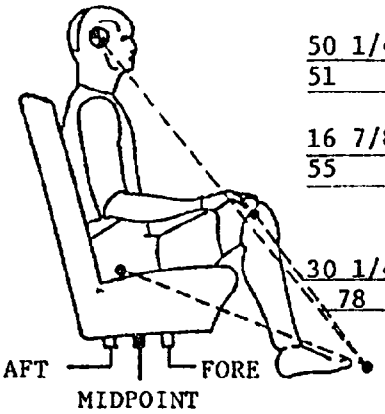


REAR PASSENGER DUMMY # U02

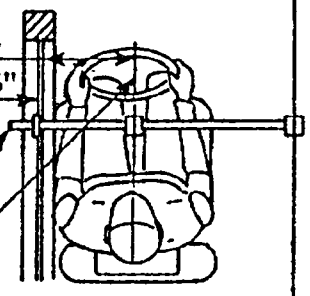
50 1/4 "HEAD
51 °TARGET**

16 7/8 "KNEE
55 °JOINT

APPROX. 30 1/4 " "H"
78 °POINT

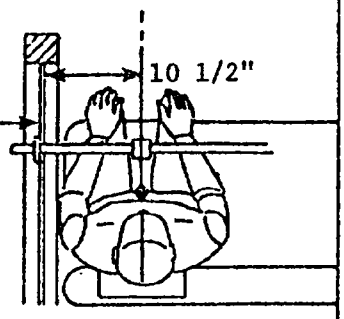


DOOR GLASS HEIGHT*** 10 5/8" 9 9/16"



DRIVER DUMMY # 06

DOOR GLASS HEIGHT ___ DNA

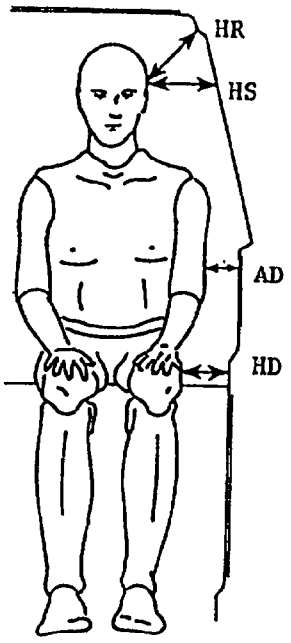


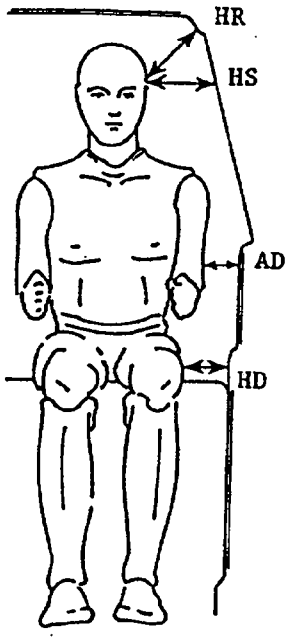
PASSENGER DUMMY # U02

*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.



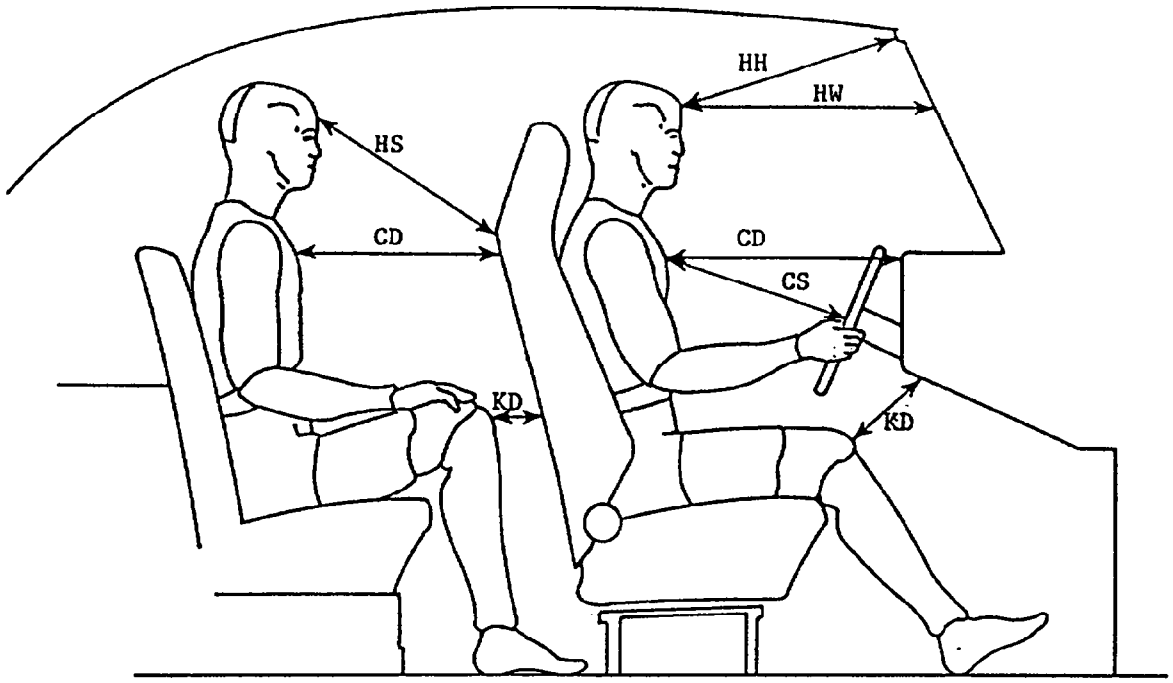


	DRIVER 06	PASSENGER U02
HR	5 5/8*	5 5/16*
HS	6 7/8	8 1/16
AD	0*	7/8*
HD	2 13/16*	2 11/16*

ALL MEASUREMENTS IN INCHES

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

DUMMY LATERAL CLEARANCE DIMENSIONS



	DRIVER 06	PASSENGER U02
HH	14 1/8	DNA
HW	17 3/4	DNA
HS	DNA	23 3/4
CD	18 11/16	16 7/8
CS	11 3/8	DNA
KDL	5 1/16	4 7/8
KDR	5 1/8	4 1/8

ALL MEASUREMENTS IN INCHES

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

DUMMY KINEMATIC SUMMARY

DRIVER

During impact the dash below the steering column burst inward, striking the driver's knees. The left hip and side of the dummy contacted the inner door panel as the door caved in. The dummy's head went through the broken side window, striking the top of the barrier face. As the dummy rebounded from the inner door panel, the body moved to the right side occupant area, lifting and striking the roof with the head as it did so. Resting position showed the dummy seated in the front passenger area in a partially upright position.

PASSENGER

During impact, the back of the driver's seat contacted the passenger's knees. At the same time, the B-Pillar crushed in, hitting the dummy's left knee and calf. The torso rotated left, striking the quarter panel while the dummy's head hit the padding along the upper window frame. As the front seat back continued to rotate backwards, the dummy's torso returned to the original frontal position. Rebound momentum pushed the dummy into the seat, causing the head to whip back and hit the upper frame of the hatchback. The final resting position showed the dummy seated upright and centered behind the driver's original position.

VEHICLE EXTERIOR PROFILES AND STATIC CRUSH

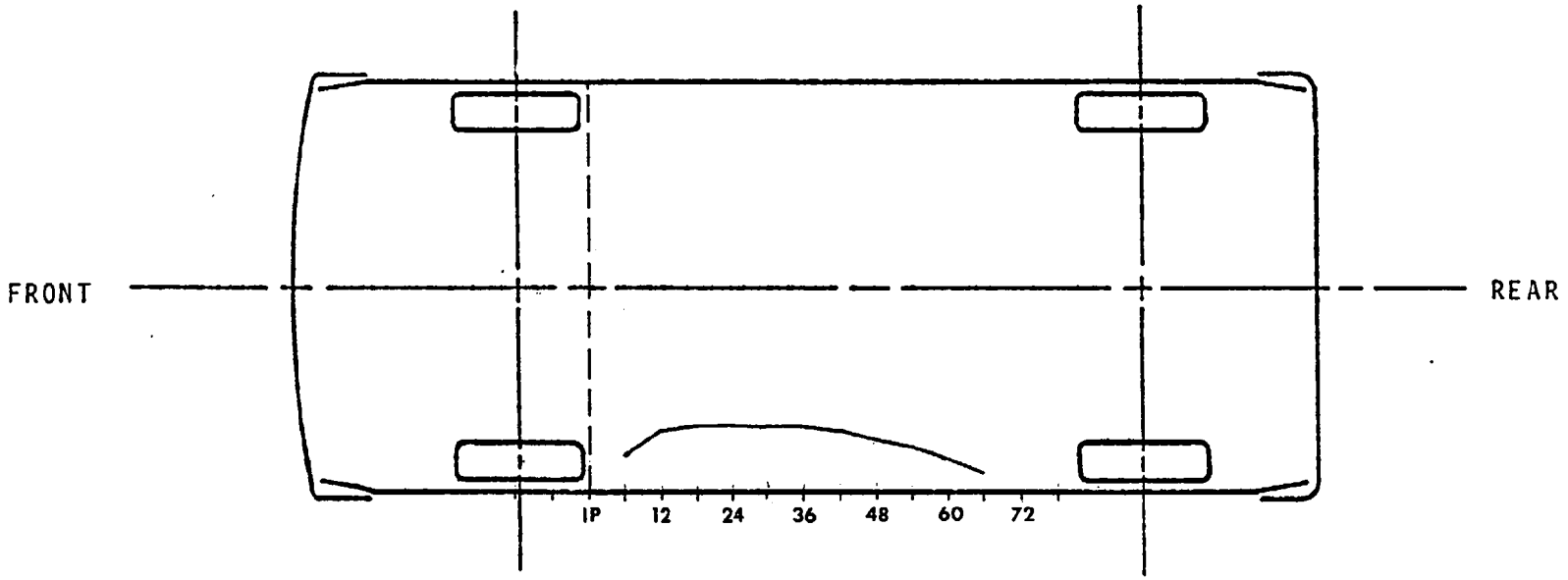
ZERO DISTANCE AT PROJECTED IMPACT POINT*

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	13.5	X	X	19.9	19.9	19.8	19.9	19.9	19.9	20.0	20.4	20.2	20.2	20.2	X	X
H-Point	21.0	X	16.9	17.8	17.8	17.8	17.8	17.7	17.8	17.8	17.9	18.0	18.1	18.2	17.1	X
Mid Door	25.1	16.9	17.7	17.5	17.5	17.4	17.4	17.3	17.3	17.4	17.4	17.5	17.6	17.8	17.9	X
Window Sill	35.6	20.4	19.6	19.4	19.5	19.4	19.1	19.2	19.1	19.1	19.0	19.0	19.1	19.1	19.2	19.2
Window Top	55.5	X	X	X	X	X	26.8	26.5	26.4	26.1	26.3	26.3	26.4	26.5	26.8	27.0
		POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)														
Axle Height	13.5	X	X	25.0	29.1	29.4	29.4	29.4	29.4	29.2	28.1	26.8	24.7	22.8	X	X
H-Point	21.0	X	22.6	26.6	49.8	46.9	43.8	40.6	37.2	33.9	30.5	33.2	30.4	27.9	25.3	X
Mid Door	25.1	21.8	22.4	24.4	52.4	46.9	47.1	44.3	41.6	38.6	36.0	34.6	32.3	29.3	26.4	X
Window Sill	35.6	20.8	20.6	21.1	47.1	46.4	44.8	43.3	41.3	39.9	37.7	37.8	34.8	31.3	28.9	25.4
Window Top	55.5	X	X	X	X	X	27.9	28.1	28.7	29.5	30.6	30.5	29.7	29.0	28.6	28.5
		STATIC CRUSH (IN)														
Axle Height	13.5	X	X	5.1	9.2	9.6	9.5	9.5	9.5	9.2	7.7	6.6	4.5	2.6	X	X
H-Point	21.0	X	5.7	8.8	32.0	29.1	26.0	22.9	19.4	16.1	12.6	15.2	12.3	9.7	8.2	X
Mid Door	25.1	4.9	4.7	6.9	34.9	29.5	29.7	27.0	24.3	21.2	18.6	17.1	14.7	11.5	8.5	X
Window Sill	35.6	0.4	1.0	1.7	27.6	27.0	25.7	24.1	22.2	20.8	18.7	18.8	15.7	12.2	9.7	6.2
Window Top	55.5	X	X	X	X	X	1.1	1.6	2.3	3.4	4.3	4.2	3.3	2.5	1.8	1.5

* 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

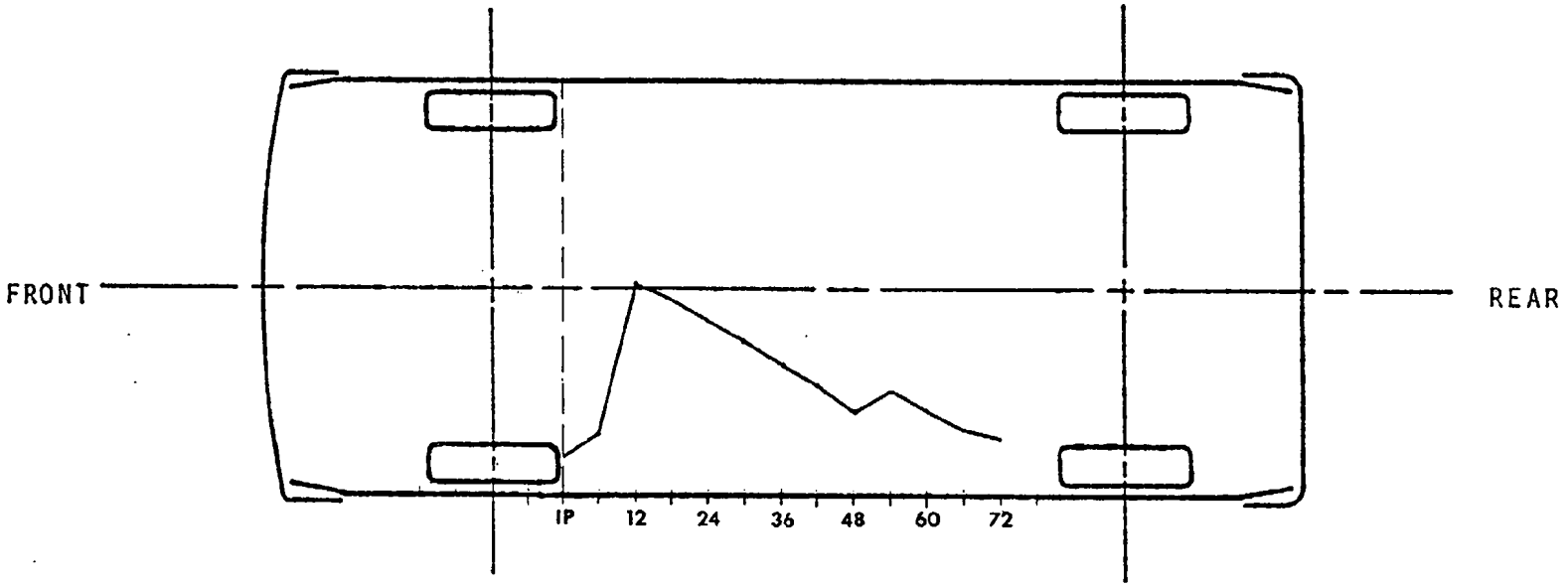


PROFILE LEVEL EQUALS AXLE HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Width of Car = 62.75"
Length of Car = 153.0"

Maximum Crush = 9.6"
Length of Crush = 60"

VEHICLE EXTERIOR STATIC CRUSH PROFILE

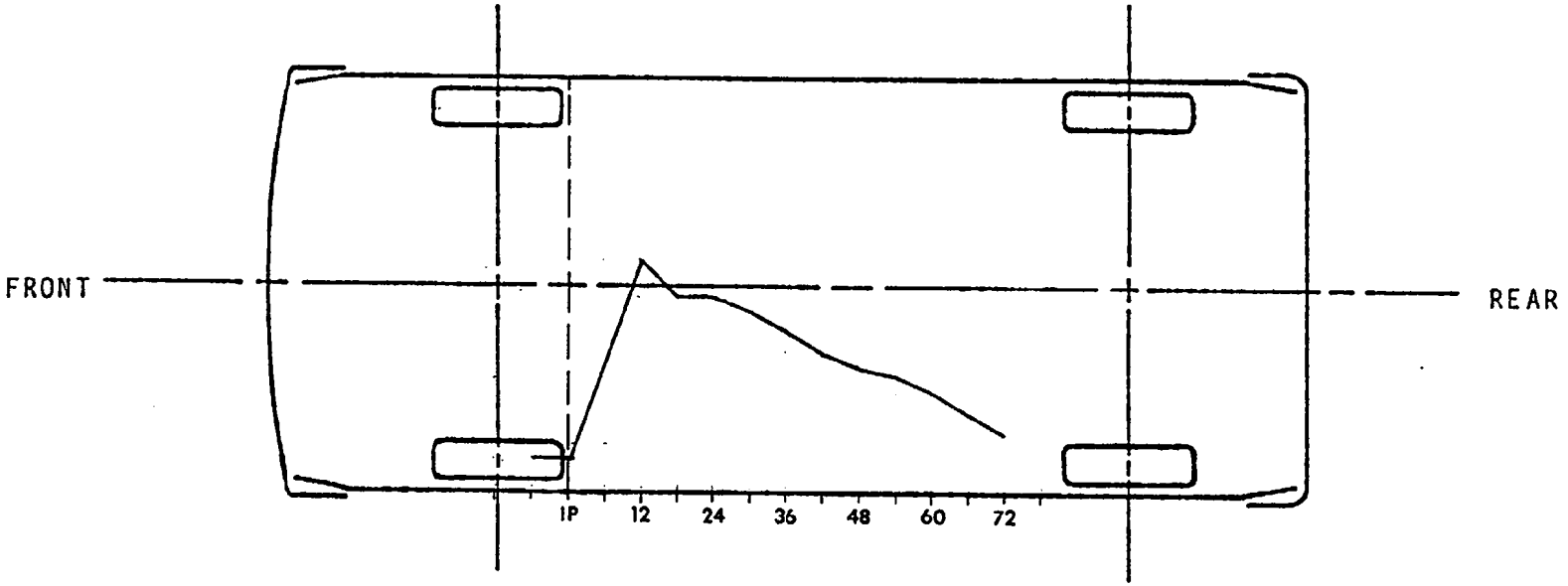


PROFILE LEVEL EQUALS H-POINT HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Width of Car = 62.75"
Length of Car = 153.0"

Maximum Crush = 32.0"
Length of Crush = 72"

VEHICLE EXTERIOR STATIC CRUSH PROFILE

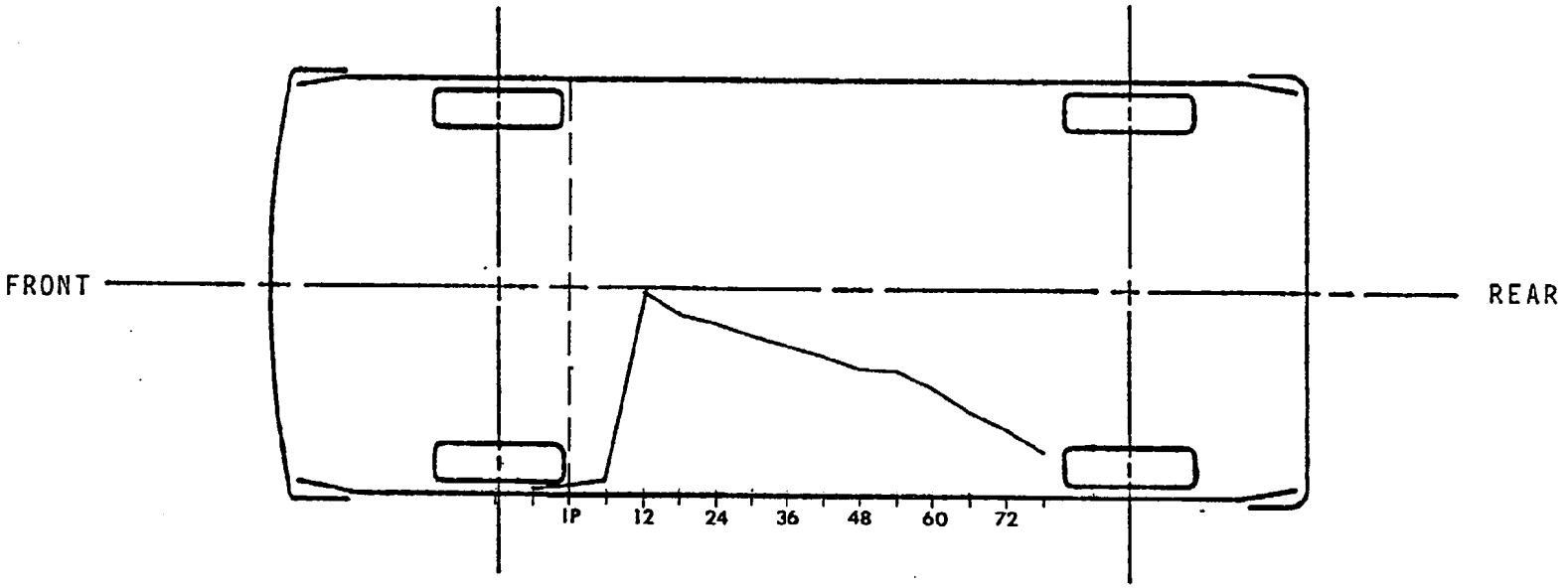


PROFILE LEVEL EQUALS MID-DOOR HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Width of Car = 62.75"
Length of Car = 153.0"

Maximum Crush = 34.9"
Length of Crush = 78"

VEHICLE EXTERIOR STATIC CRUSH PROFILE

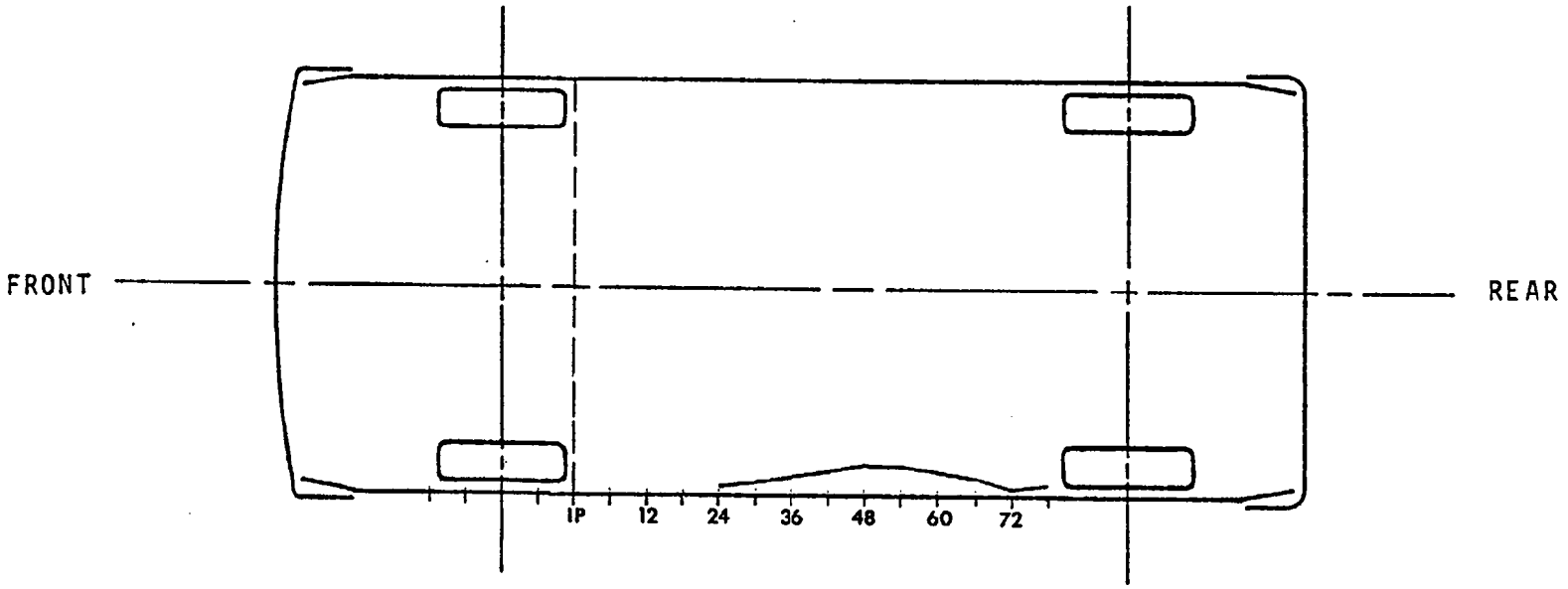


PROFILE LEVEL EQUALS WINDOW SILL HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Width of Car = 62.75"
Length of Car = 153.0"

Maximum Crush = 27.6"
Length of Crush = 84"

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Width of Car = 62.75"
Length of Car = 153.0"

Maximum Crush = 4.3"
Length of Crush = 54"

SIDE IMPACT DUMMY DATA SUMMARY

	DRIVER DUMMY				PASSENGER DUMMY			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**		POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
HEAD ACCELERATION								
LONGITUDINAL	70.37	133.50	99.45	66.25	105.62	152.00	71.30	65.75
LATERAL	249.91	60.50	20.05	34.63	91.57	63.63	26.56	175.75
VERTICAL	26.07	174.50	120.41	58.13	64.85	151.75	45.98	58.63
RESULTANT		273.87 @ 60.50				123.30 @ 152.00		
HIC	3419.22	from 46.88 to 70.38			1173.21	from 57.75 to 73.75		
CHEST ACCELERATION								
UPPER SPINE								
LONGITUDINAL	32.88	61.88	46.32	41.87	3.57	45.00	64.27	61.87
LATERAL (P)***	164.52	39.38	33.66	58.75	72.22	53.75	2.76	72.50
LATERAL (R)***	169.20	39.38	30.98	58.75	73.56	53.75	2.08	73.13
VERTICAL	17.59	50.00	37.27	33.13	12.82	50.00	14.80	73.13
RESULTANT (P)		169.61 @ 40.00				73.68 @ 53.75		
RESULTANT (R)		174.06 @ 40.00				75.00 @ 53.75		
DELTA V (MPH)****		38.6 @ 50.00 (P)				26.3 @ 95.63 (P)		
		40.6 @ 50.00 (R)				26.9 @ 95.00 (R)		
LOWER SPINE								
LONGITUDINAL	33.42	48.13	50.07	37.50	74.03	66.87	55.45	51.25
LATERAL (P)	190.36	33.13	33.75	51.25	95.21	50.63	18.49	66.87
LATERAL (R)	170.87	33.13	45.45	51.25	96.32	51.25	38.93	66.87
VERTICAL	43.02	50.63	6.13	73.75	16.36	50.63	6.81	77.50
RESULTANT (P)		190.59 @ 33.13				111.28 @ 51.25		
RESULTANT (R)		171.13 @ 33.13				112.31 @ 51.25		
DELTA V (MPH)		46.1 @ 49.37 (P)				30.9 @ 65.00 (P)		
		45.1 @ 49.37 (R)				31.9 @ 64.38 (R)		
LEFT UPPER RIB								
LATERAL (P)	132.38	30.00	11.73	24.38	67.82	57.50	2.31	35.63
LATERAL (R)	132.74	29.38	12.97	24.38	70.18	56.87	1.33	36.25
DELTA V (MPH)		40.4 @ 59.38 (P)				36.2 @ 97.50 (P)		
		40.4 @ 59.38 (R)				35.4 @ 97.50 (R)		
LEFT LOWER RIB								
LATERAL (P)	116.71	35.00	59.01	56.87	74.03	46.88	2.18	68.75
LATERAL (R)	118.12	35.63	56.80	56.87	84.63	47.50	3.37	68.75
DELTA V (MPH)		43.9 @ 53.75 (P)				33.2 @ 75.63 (P)		
		45.2 @ 53.75 (R)				32.2 @ 76.25 (R)		
PELVIS ACCELERATION								
LONGITUDINAL	17.20	69.50	60.86	35.38	18.58	92.13	70.26	54.63
LATERAL	330.41	31.88	60.53	22.75	120.55	46.63	26.42	33.75
VERTICAL	47.27	33.50	10.65	36.88	39.57	68.63	20.43	67.00
RESULTANT		333.36 @ 31.88				126.29 @ 45.63		
DELTA V (MPH)		39.5 @ 60.88				30.7 @ 82.38		

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 †	1.92	51.00	---	--- ε	1.52	62.63	---	--- 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.

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

NO.	LOCATION	X*	Y*	Z*		POSITIVE DIRECTION MAX (g)	POSITIVE DIRECTION TIME (msec)	NEGATIVE DIRECTION MAX (g)	NEGATIVE DIRECTION TIME (msec)
1	RIGHT SILL AT FRONT SEAT	83.4	23.7	10.3					
	(LONGITUDINAL)		ΔV = -5.1 mph @ 178.38 msec			3.33	36.00	6.70	44.75
	(LATERAL)		ΔV = 15.8 mph @ 178.38 msec			13.60	49.38	1.97	125.63
	(VERTICAL)					7.44	42.75	12.02	37.00
	(RESULTANT)						15.12 @ 48.75		
2	RIGHT SILL AT REAR SEAT	61.5	23.5	9.1					
	(LONGITUDINAL)		ΔV = -2.8 mph @ 178.38 msec			4.18	35.88	5.25	45.00
	(LATERAL)		ΔV = 20.1 mph @ 178.38 msec			18.87	50.25	1.54	127.13
	(VERTICAL)					4.16	41.88	7.49	36.75
	(RESULTANT)						19.67 @ 50.25		
3	REAR DECK OVER AXLE	32.0	0.0	7.1					
	(LONGITUDINAL)		ΔV = -4.8 mph @ 178.38 msec			4.28	150.75	13.96	42.50
	(LATERAL)		ΔV = 26.7 mph @ 178.38 msec			24.98	46.50	1.67	162.75
	(VERTICAL)					5.57	34.38	9.85	63.88
	(RESULTANT)						28.16 @ 46.00		
4	LEFT SILL AT REAR SEAT	61.0	-23.4	8.6					
	(LATERAL)		ΔV = 15.8 mph @ 97.25 msec			48.16	28.63	44.35	36.13
5	LEFT SILL AT FRONT SEAT	83.4	-23.2	10.4					
	(LATERAL)		ΔV = ---	---	τ	53.92	27.25	56.74	60.25
6	LEFT FRONT DOOR CENTERLINE	80.6	-23.7	23.0					
	(LATERAL)		ΔV = ---	---	τ	99.02	23.25	99.97	33.50
7	RIGHT REAR COMPARTMENT	31.0	11.1	14.4					
	(LONGITUDINAL)					3.33	100.38	9.48	44.88
8	MIDREAR OF LEFT FRONT DOOR	60.3	-26.0	23.1					
	(LATERAL)		ΔV = ---	---	τ	---	--- Y	---	--- Y
9	UPPER LEFT FRONT DOOR CENTERLINE	81.2	-25.5	32.1					
	(LATERAL)		ΔV = ---	---	τ	132.75	22.00	212.05	33.25
10	MIDFRONT OF LEFT FRONT DOOR	99.1	-26.0	21.9					
	(LATERAL)		ΔV = 31.3 mph @ 18.88 msec			147.80	8.38	86.35	38.38
11	UPPER REAR OF LEFT REAR DOOR	70.3	-25.8	32.2					
	(LATERAL)		ΔV = 27.1 mph @ 27.88 msec		τ	229.74	28.75	153.05	34.75

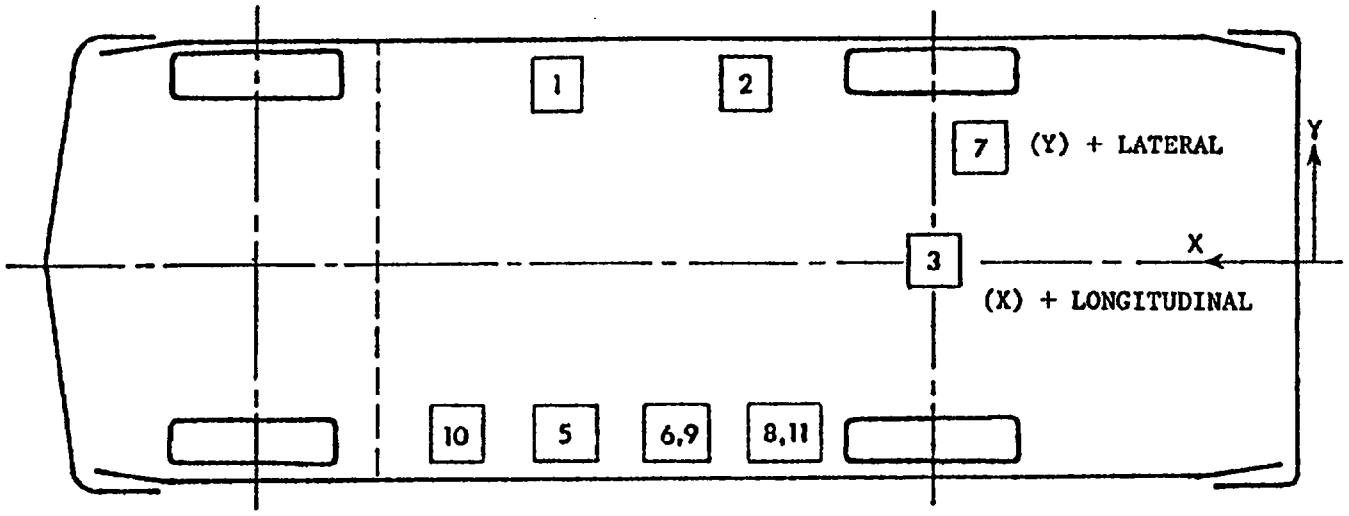
* Reference: X - Rear Bumper (+ Forward), Y - Vehicle Centerline (+ To Right), Z - Ground Level (+ Up)

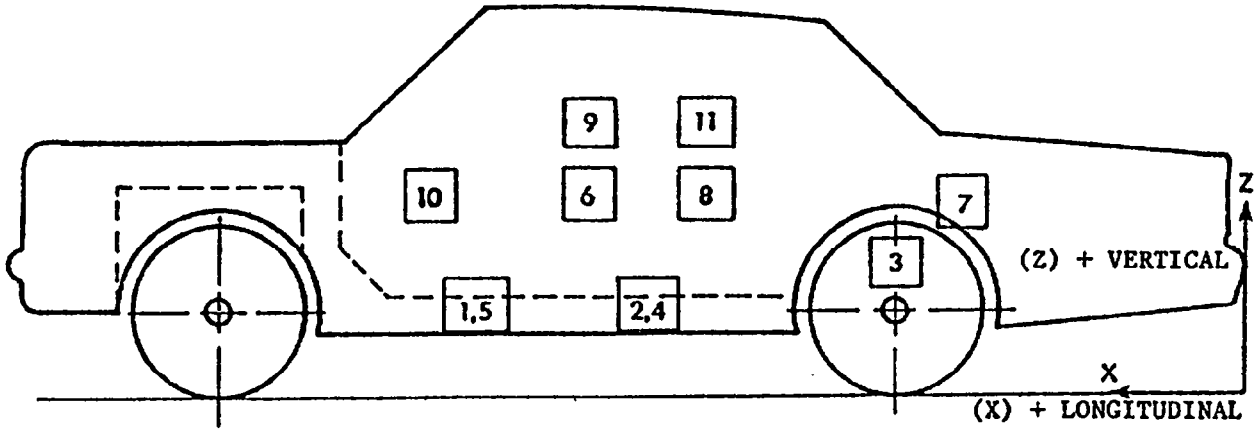
All measurements of accelerometer locations in inches.

τ Delta V appears unrealistic after initial velocity change.

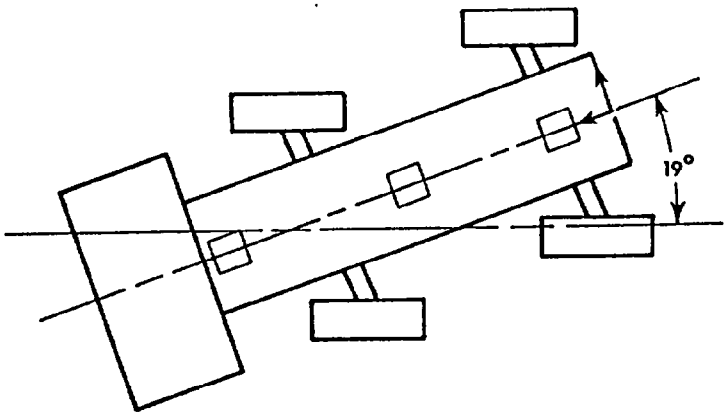
Y See TEST ANOMALIES

VEHICLE ACCELEROMETER LOCATIONS





MOVING BARRIER ACCELEROMETER LOCATIONS AND DATA SUMMARY



NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION MAX (g)	POSITIVE DIRECTION TIME (msec)	NEGATIVE DIRECTION MAX (g)	NEGATIVE DIRECTION TIME (msec)
1	CENTER OF GRAVITY	74.5	0.0	11.5				
	(LONGITUDINAL)	V = -19.9 mph @ 178.38 msec			---	---x	12.72	56.00
	(LATERAL)	V = 4.2 mph @ 178.38 msec			2.12	126.38	6.29	57.00
	(VERTICAL)				10.93	87.13	7.01	76.75
	(RESULTANT)					15.45 @	55.50	
2	FRONT FRAME MEMBER	130.3	0.0	11.3				
	(LONGITUDINAL)	V = -19.8 mph @ 178.38 msec			1.62	0.38	12.23	57.00
3	REAR FRAME MEMBER	23.3	0.0	11.5				
	(LONGITUDINAL)	V = -19.6 mph @ 178.38 msec			---	---x	12.49	54.38

* 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	470	Vehicle dynamics
2	Overhead	Photosonic 1B	25	487	Closeup of impact point
3	Onboard MDB	Photosonic 1B	25	500	Closeup of impact point
4	Onboard MDB	Photosonic 1B	13	502	Driver kinematics
5	Ground level - right	Hycam	16	482	Overall view
6	Ground level - left	Photosonic 1B	17	520	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	26'4"	60'	45"
6	-19'7"	-11'3"	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)
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

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

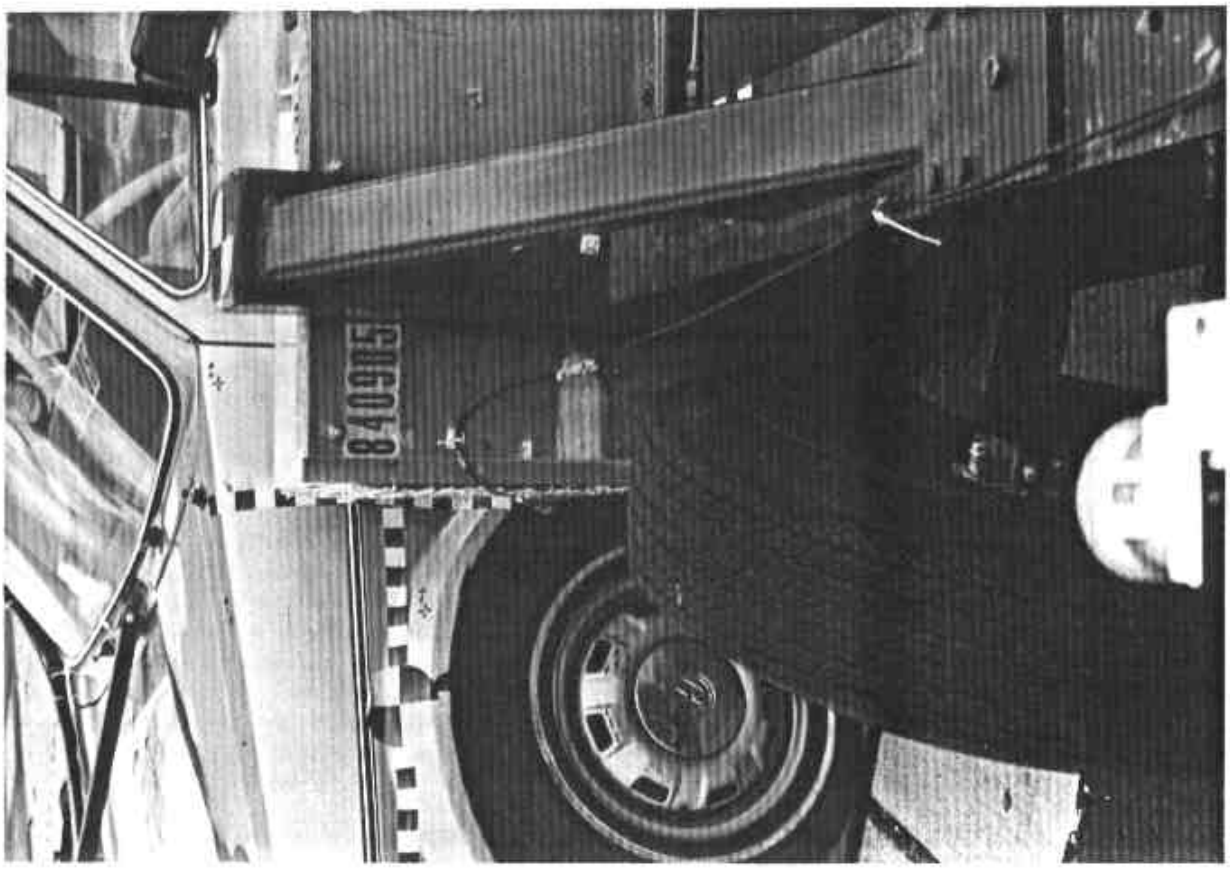


Figure A-4. PRE-TEST CLOSEUP - VIEW 1

Figure A-5. PRE-TEST CLOSEUP - VIEW 2

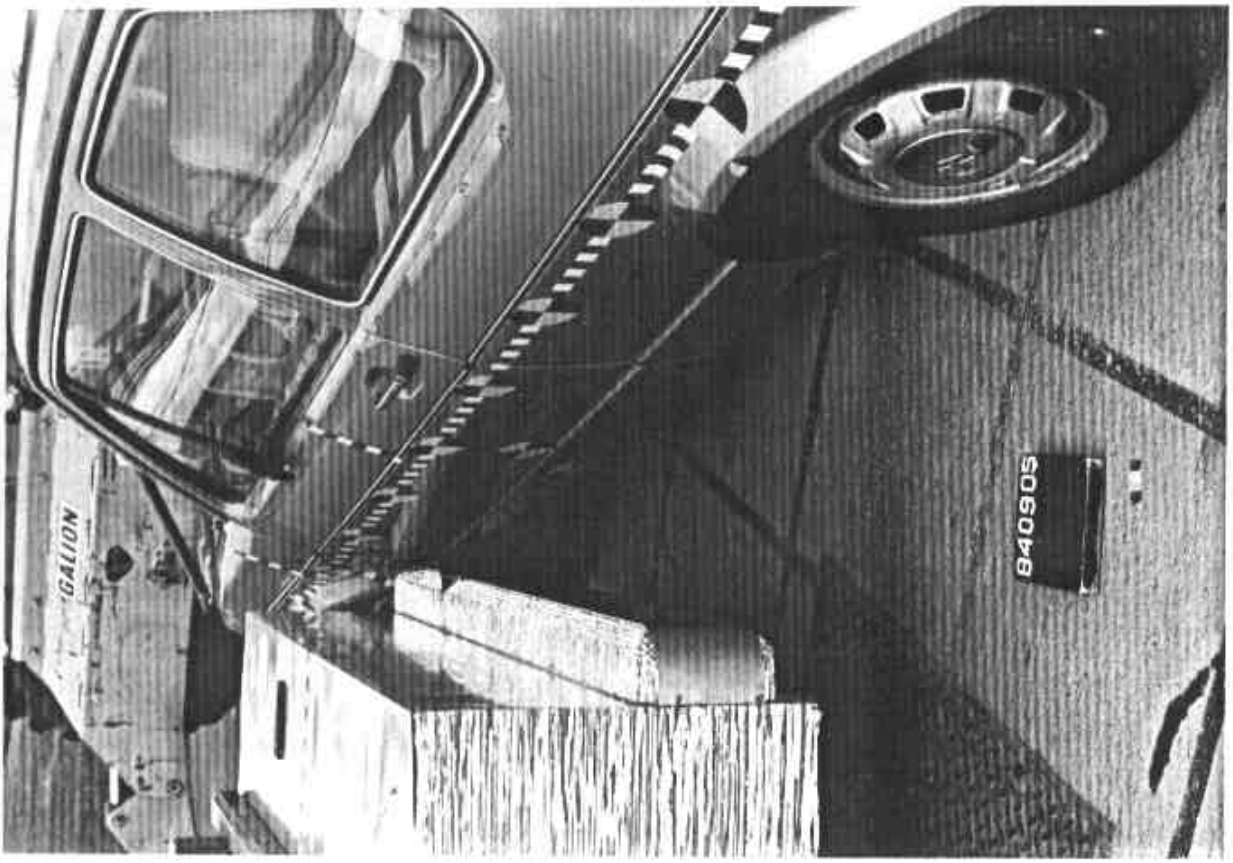


Figure A-6. PRE-TEST CLOSEUP - VIEW 3

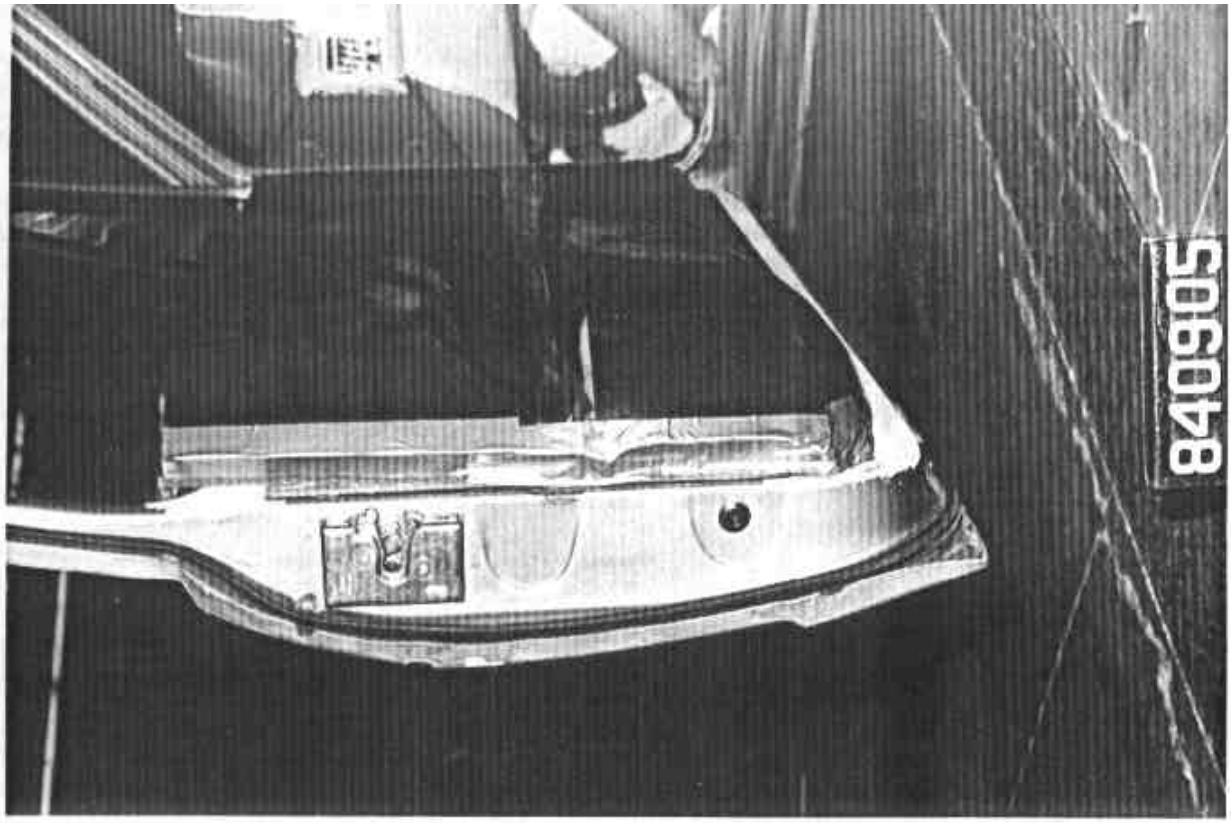


Figure A-7. PADDING MODIFICATIONS

Figure A-8. PRE-TEST DRIVER DUMMY - VIEW 1

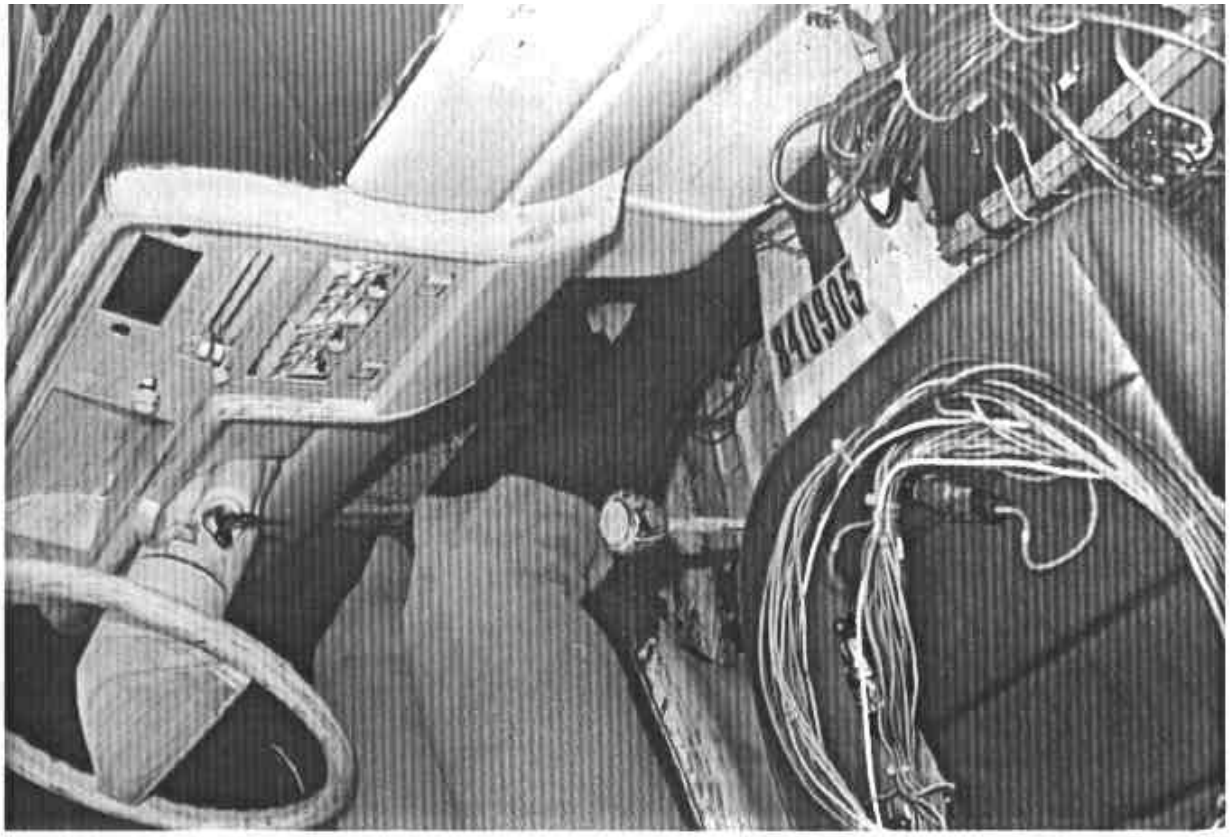


Figure A-9. PRE-TEST DRIVER DUMMY - VIEW 2

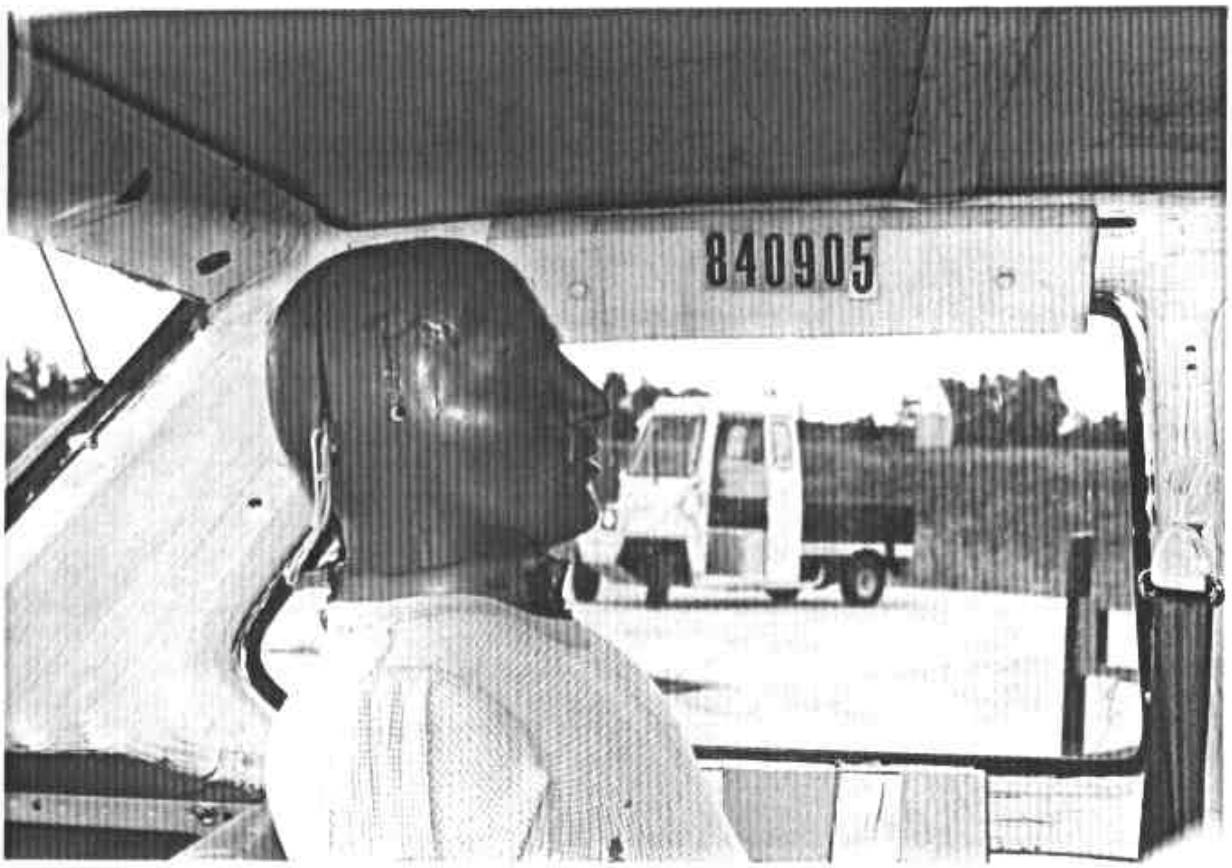


Figure A-10. PRE-TEST PASSENGER DUMMY - VIEW 1

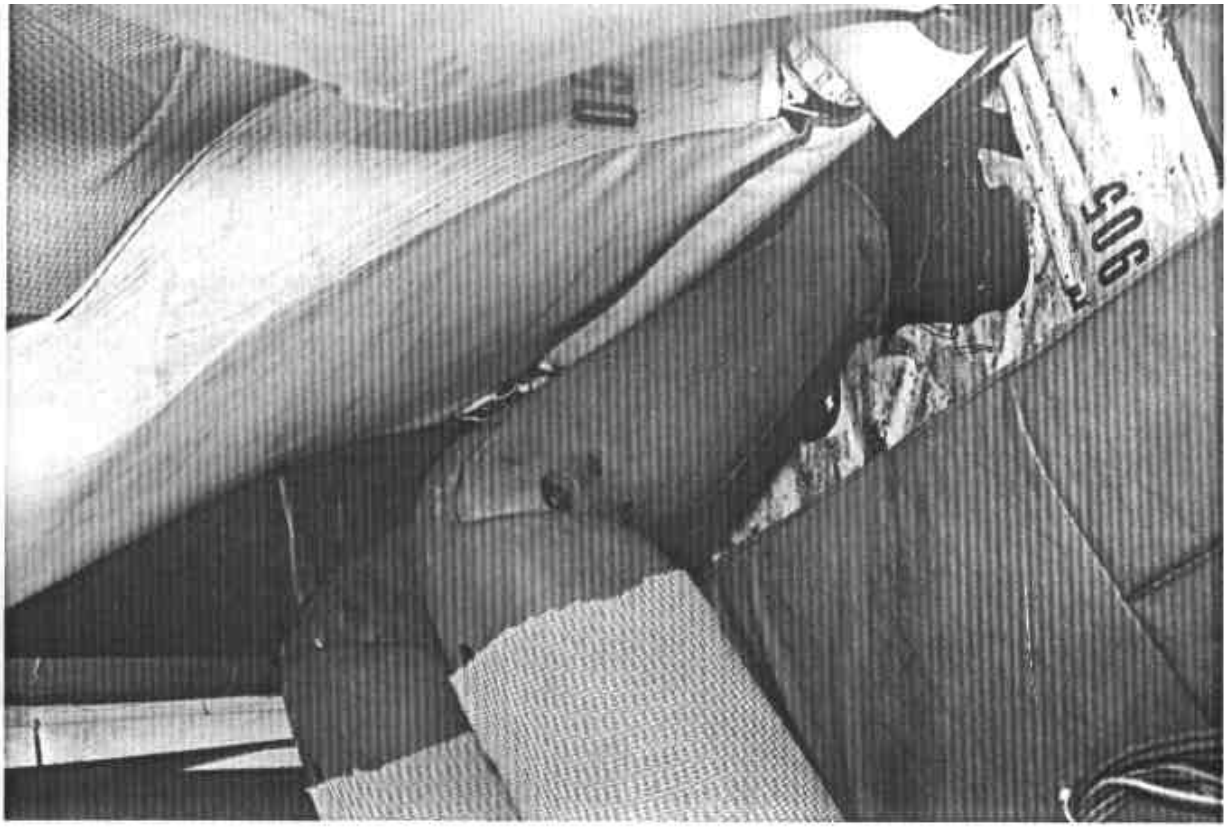


Figure A-11. PRE-TEST PASSENGER DUMMY - VIEW 2

Figure A-12. CRASH EVENT PHOTOGRAPH

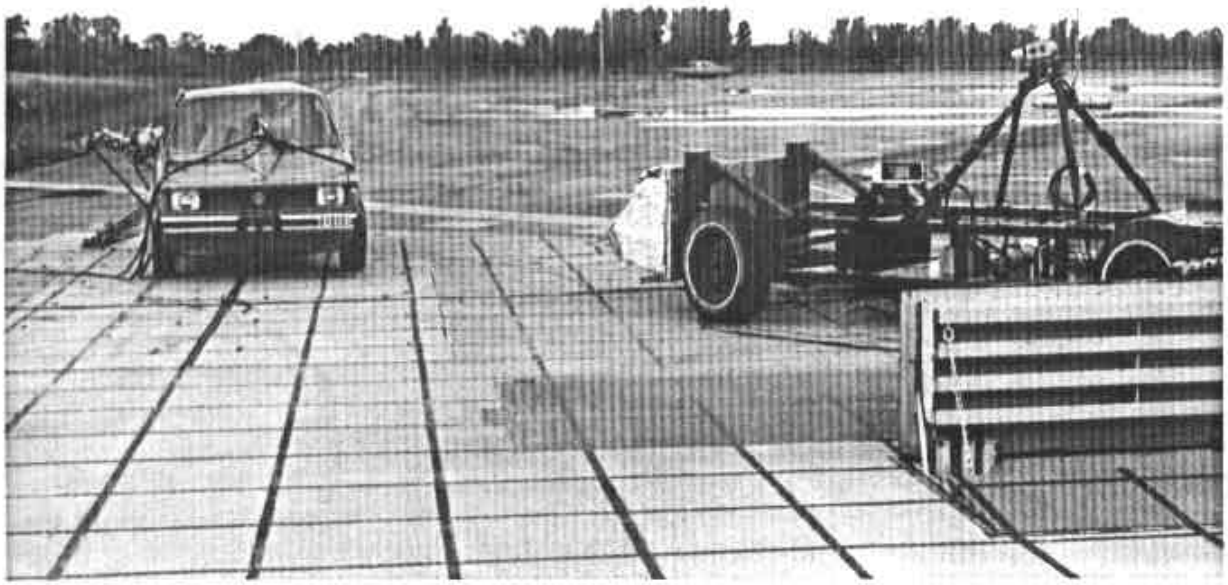


Figure A-13. POST-TEST OVERALL - VIEW 1

Figure A-14. POST-TEST OVERALL - VIEW 2

Figure A-15. POST-TEST OVERALL - VIEW 3

Figure A-16. POST-TEST OVERALL - VIEW 4

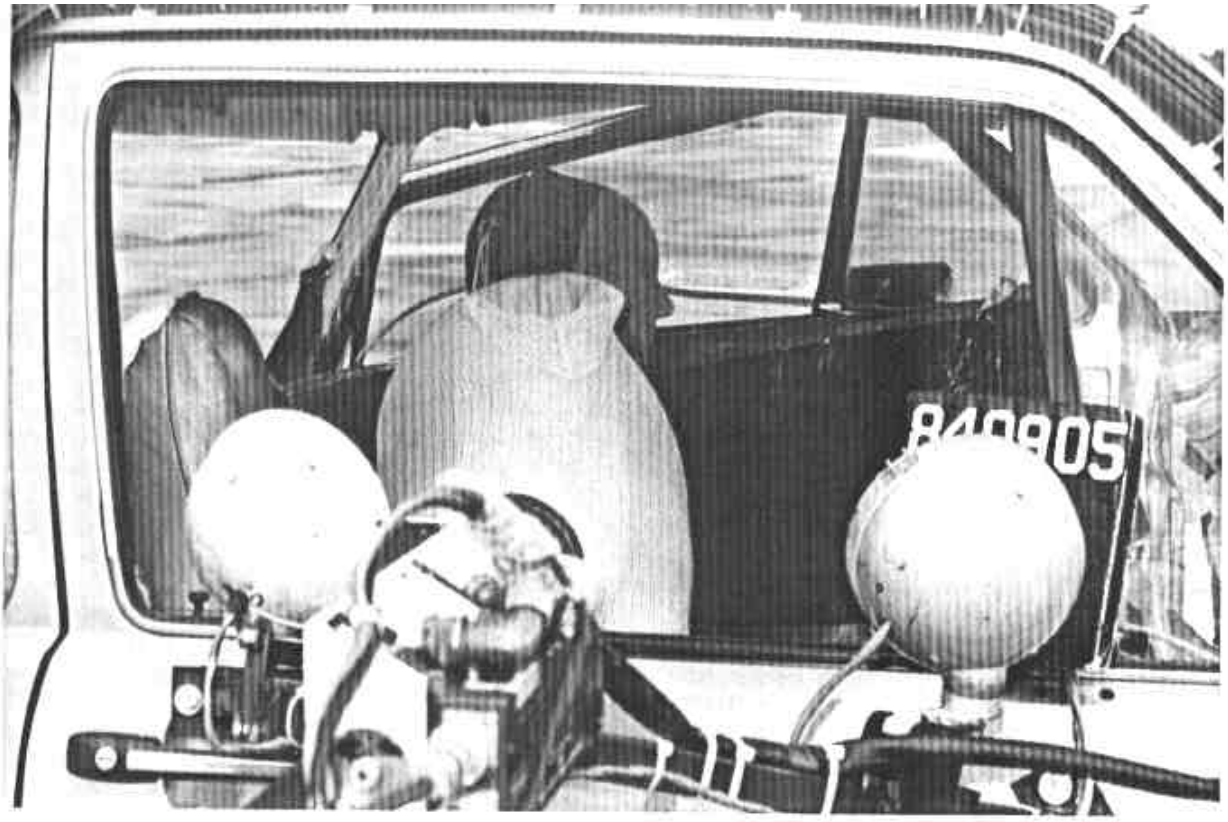


Figure A-17. POST-TEST DRIVER DUMMY - VIEW 1

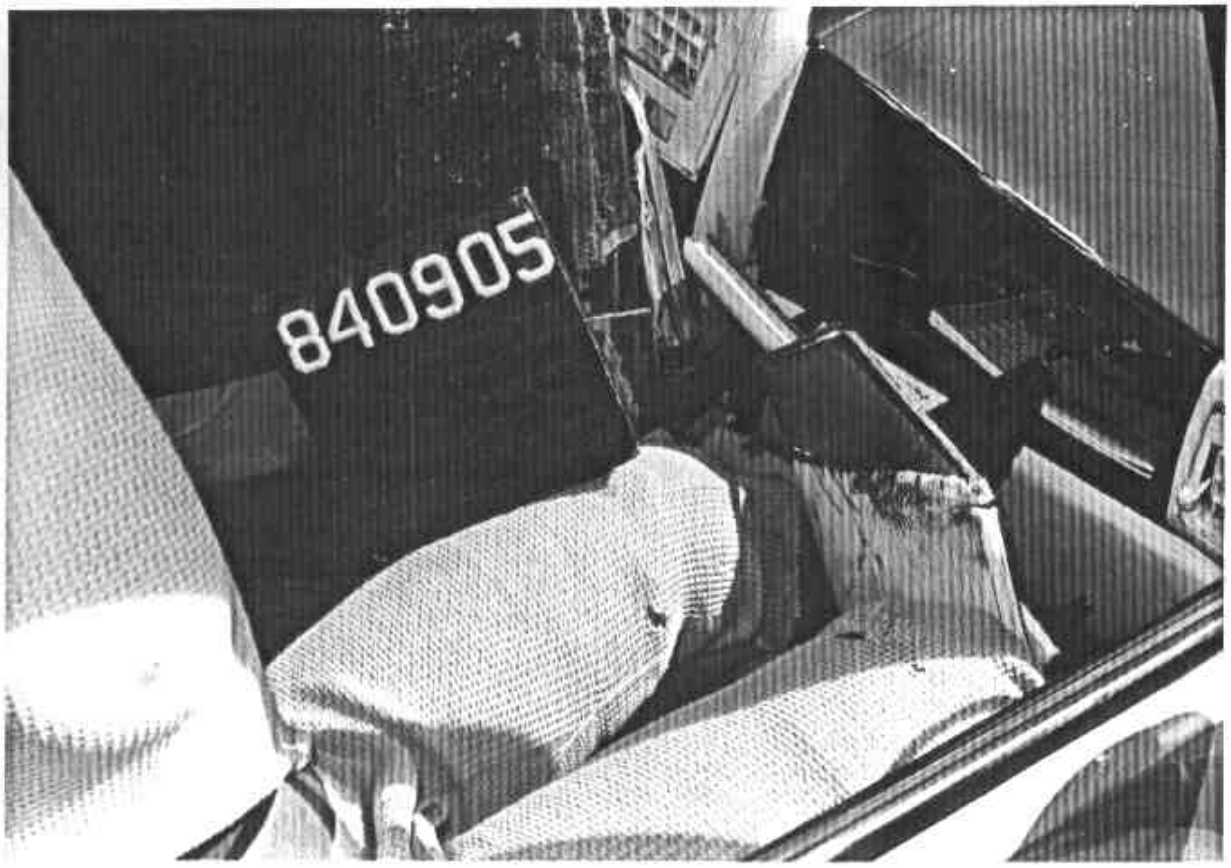


Figure A-18. POST-TEST DRIVER DUMMY - VIEW 2

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

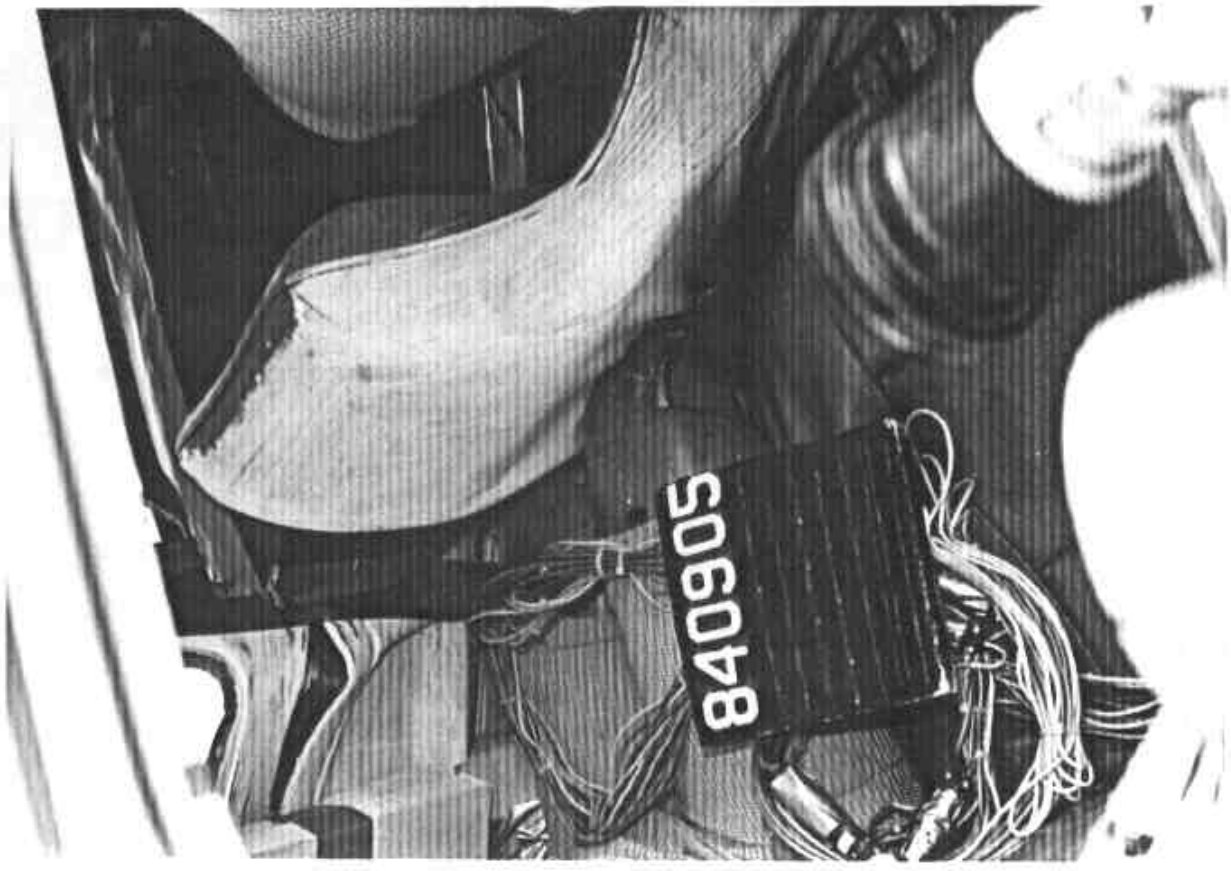


Figure A-20. POST-TEST PASSENGER DUMMY - VIEW 2

Figure A-21. POST-TEST DUMMIES OVERALL

Figure A-22. POST-TEST VEHICLE DAMAGE - VIEW 1

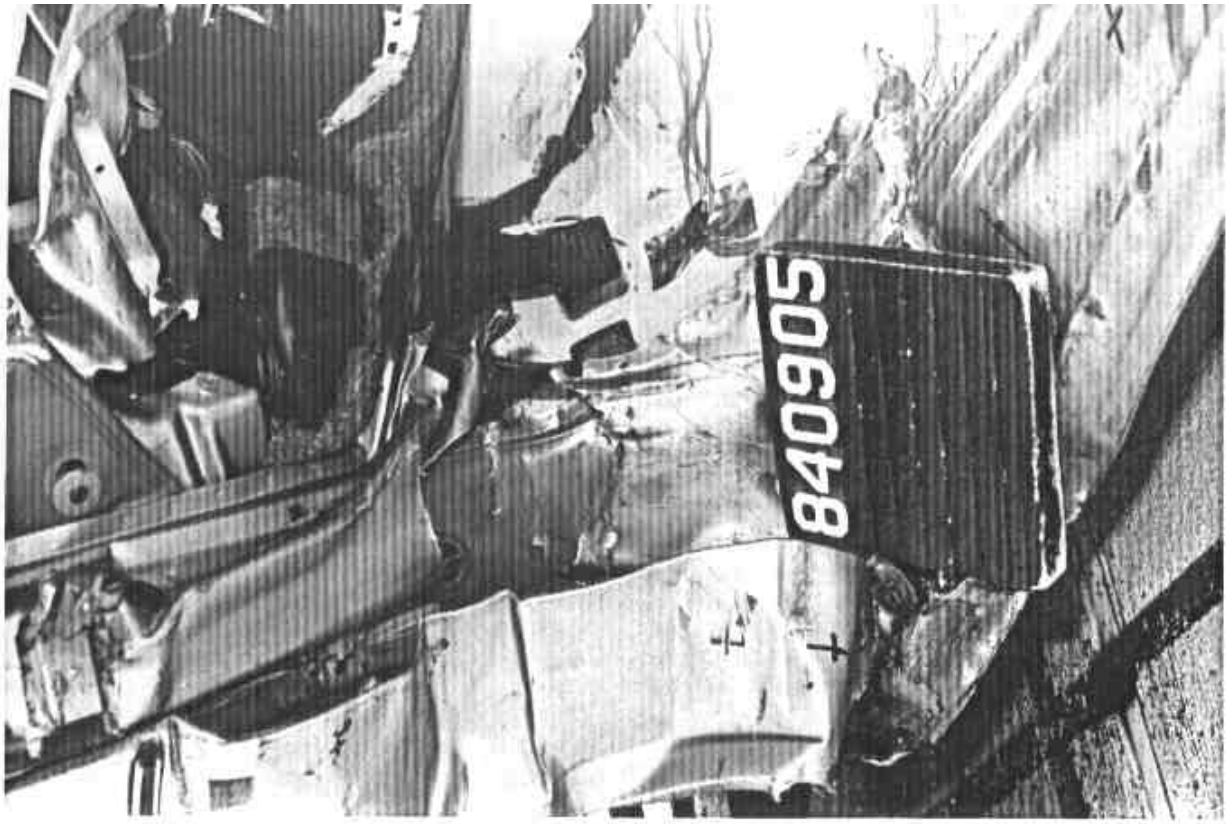


Figure A-23. POST-TEST VEHICLE DAMAGE - VIEW 2

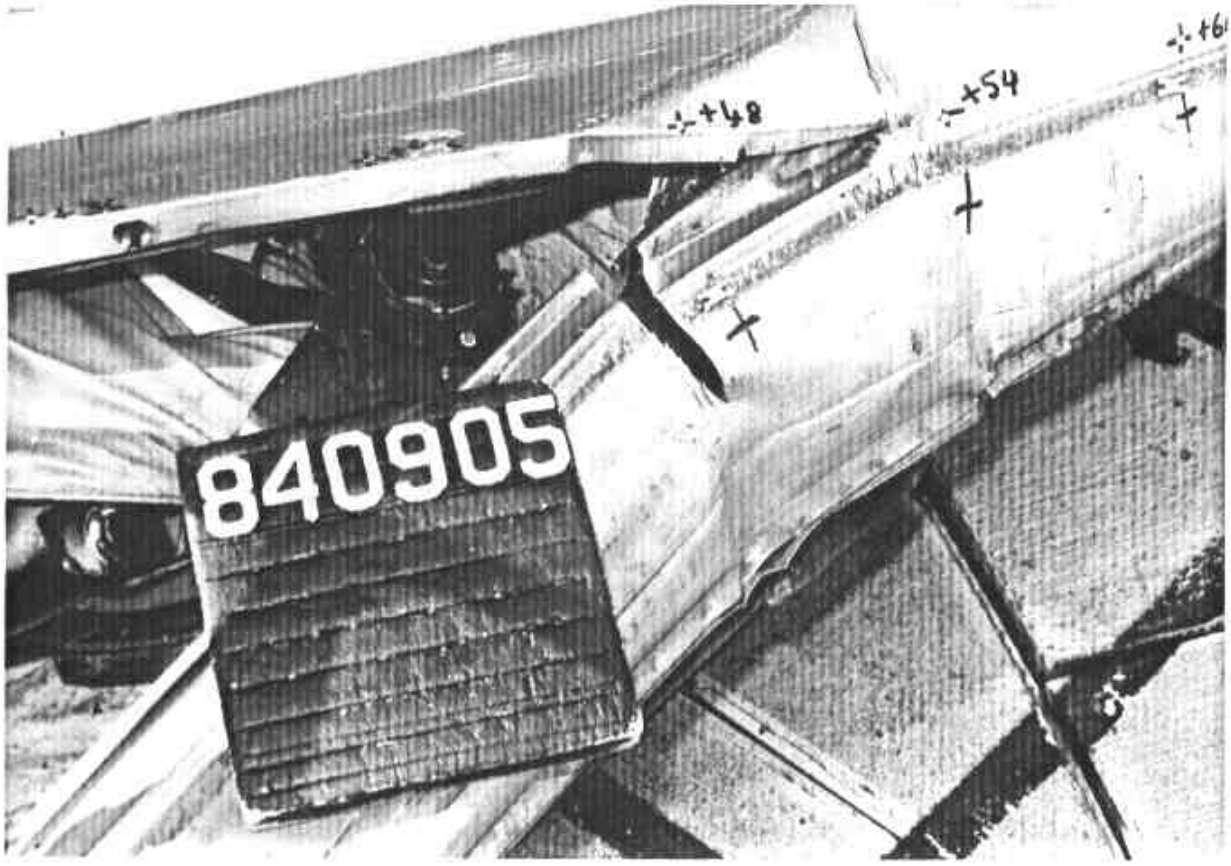


Figure A-24. POST-TEST VEHICLE DAMAGE - VIEW 3

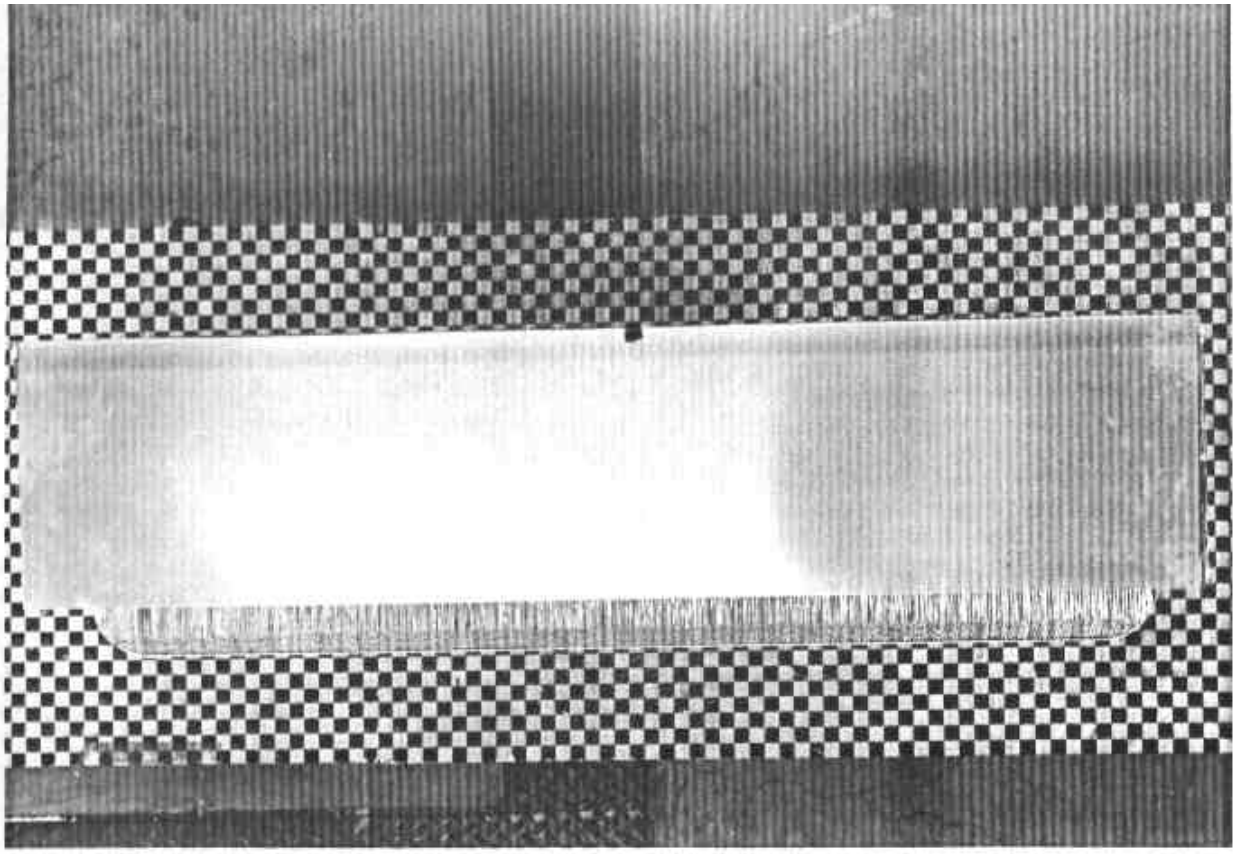


Figure A-25. PRE-TEST MDB FACE - VIEW 1

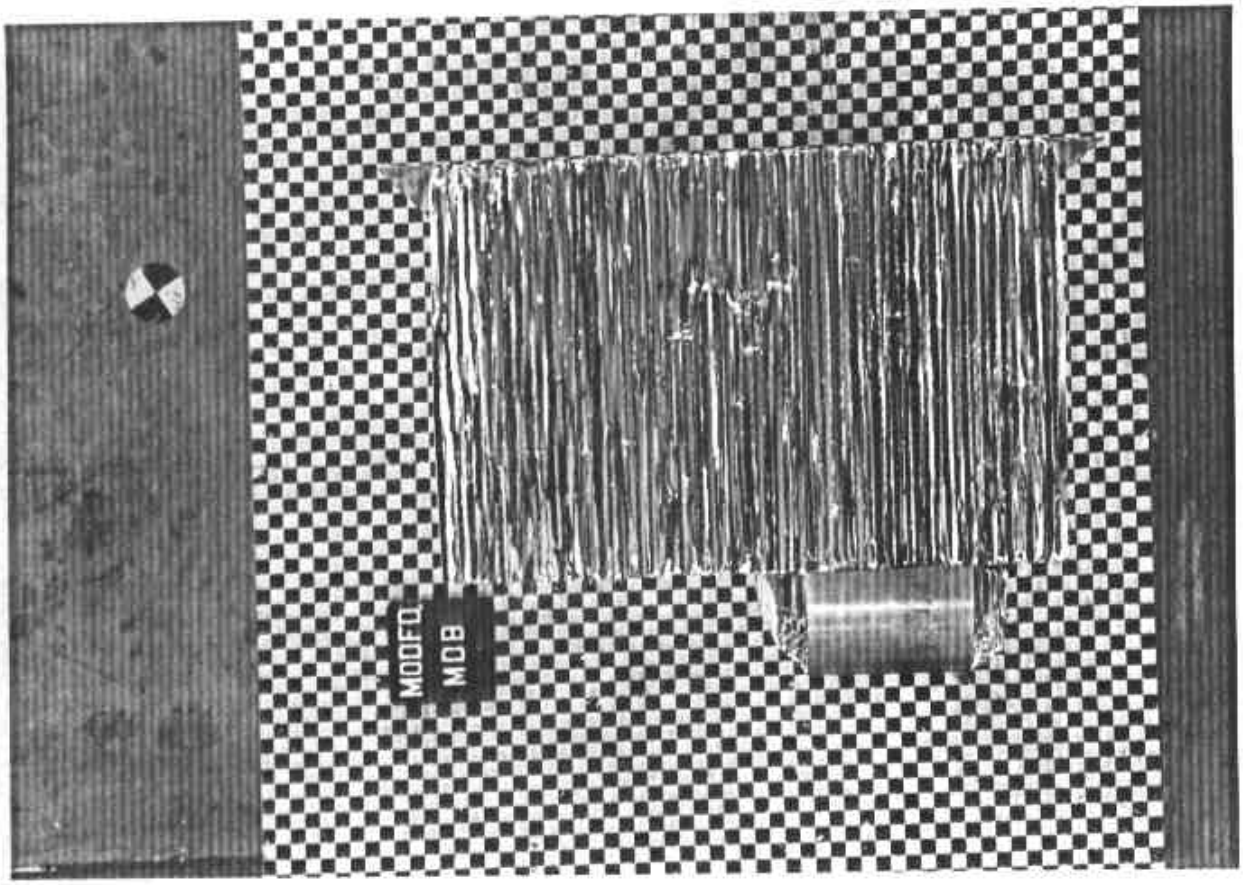


Figure A-26. PRE-TEST MDB FACE - VIEW 2

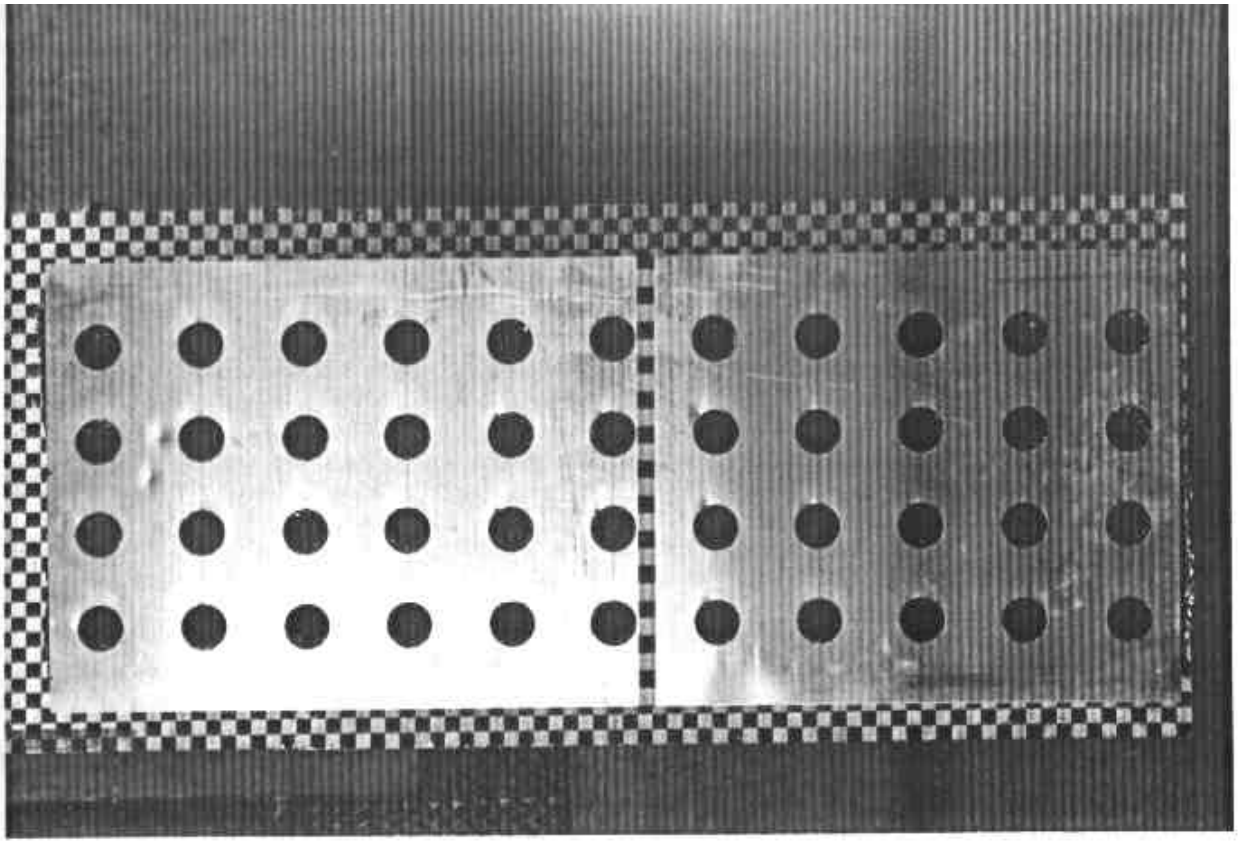


Figure A-27. PRE-TEST MDB FACE - VIEW 3

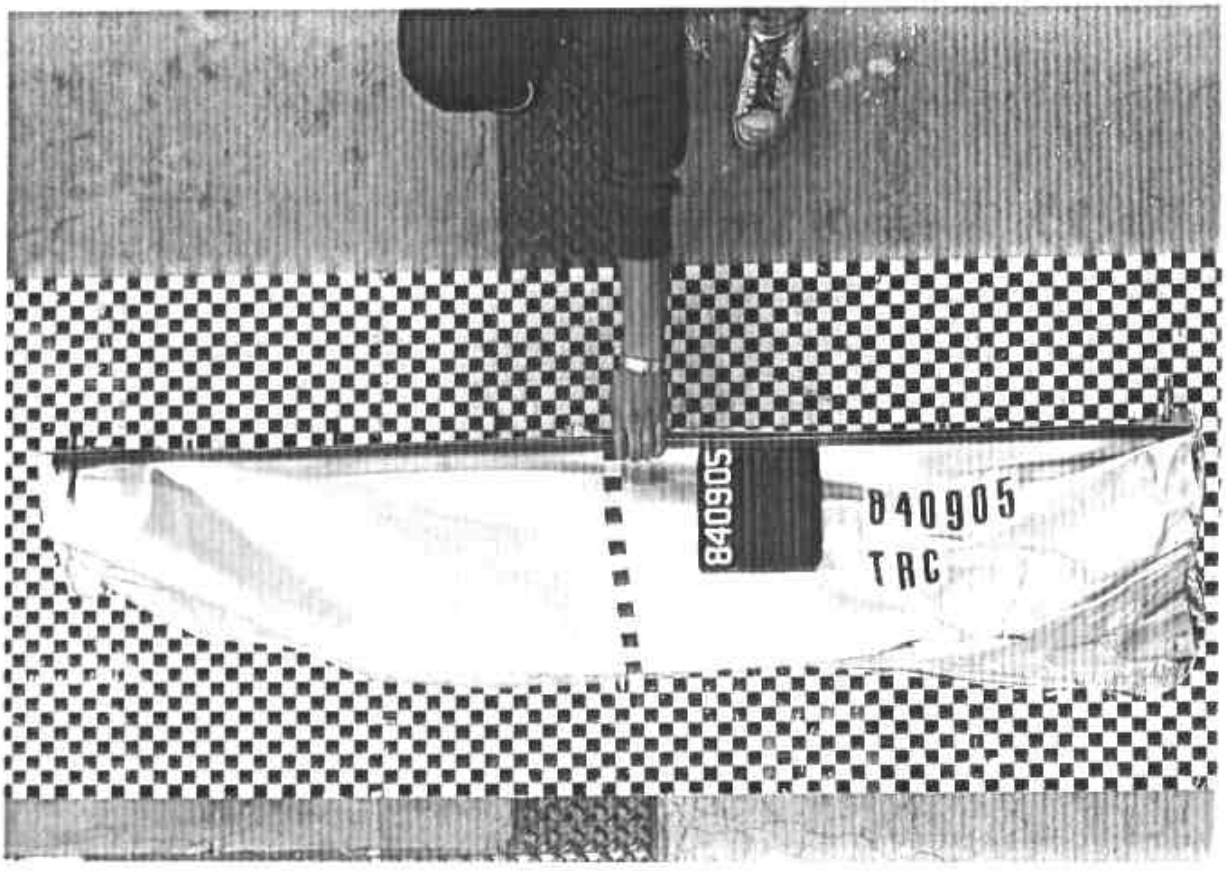


Figure A-28. POST-TEST MDB FACE - VIEW 1

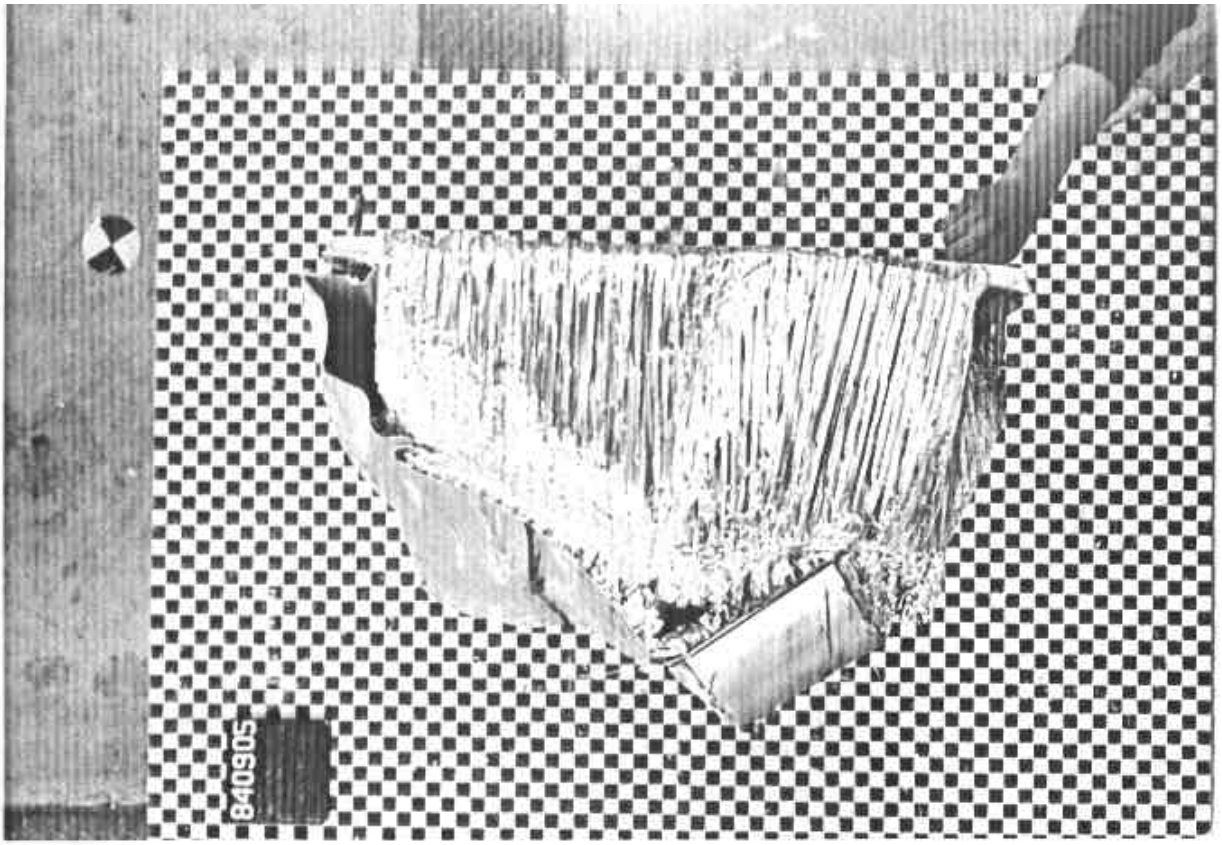
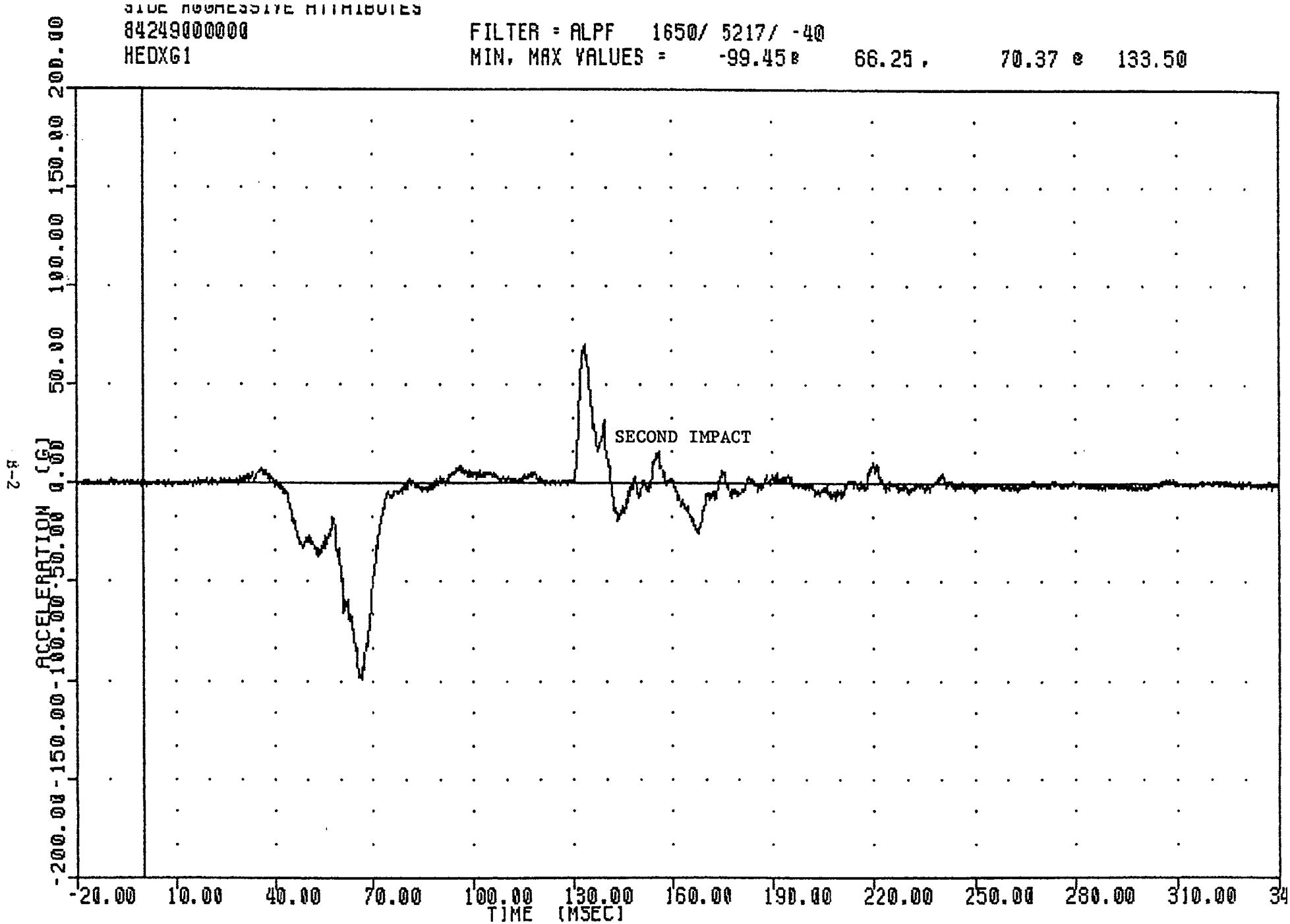


Figure A-29. POST-TEST MDB FACE - VIEW 2

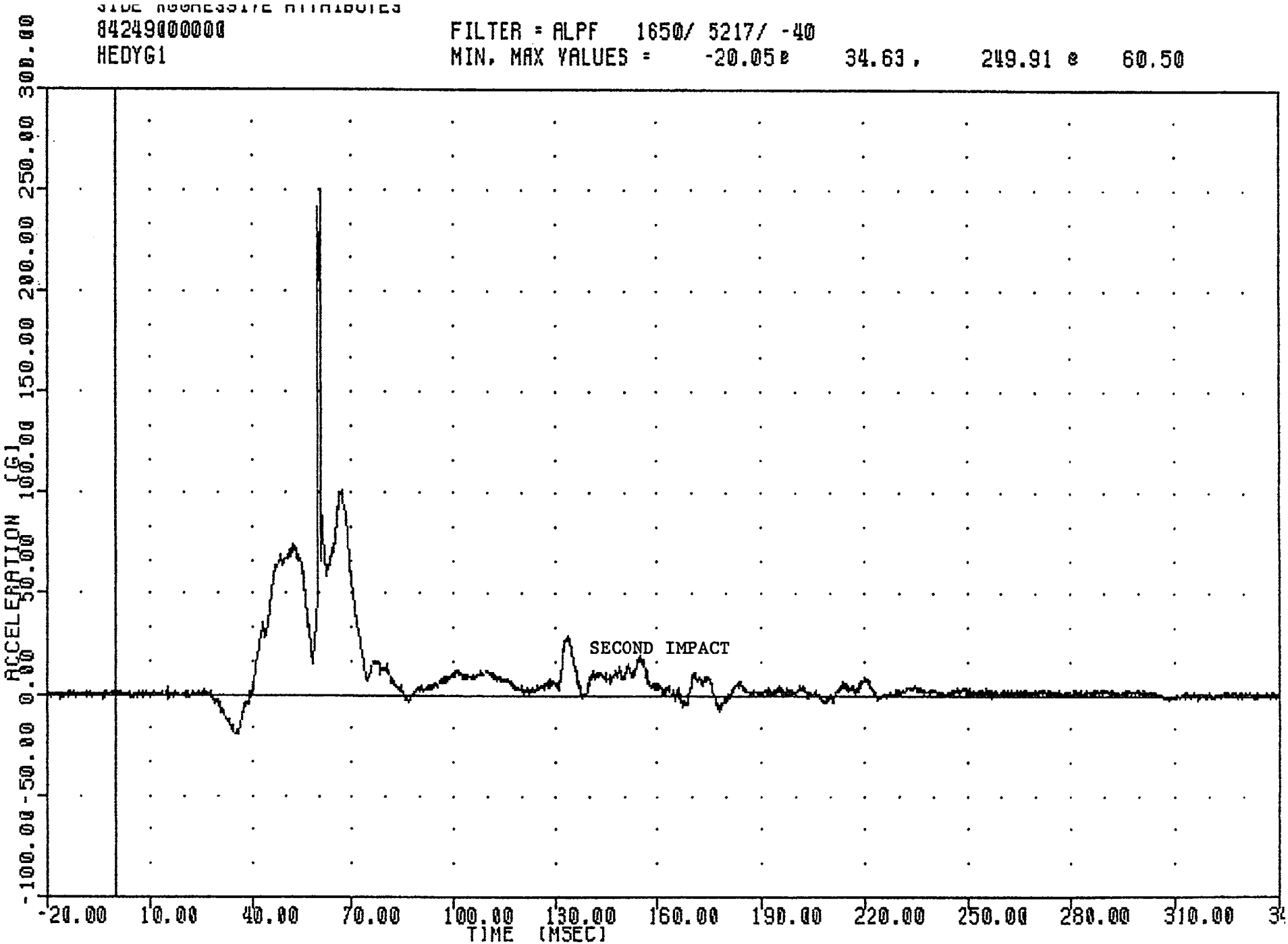
APPENDIX B

DATA PLOT PRESENTATION

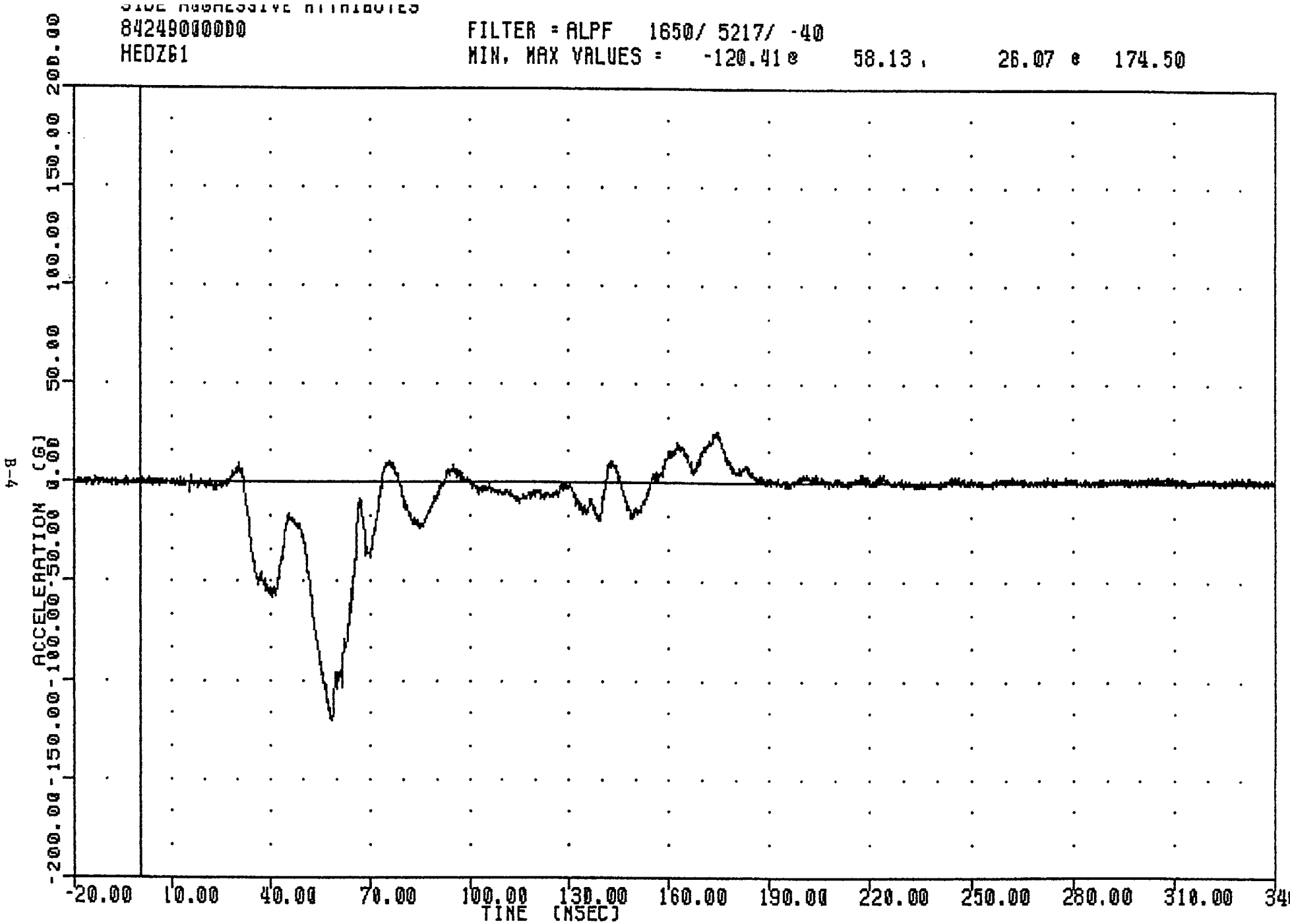
Data plots generated from the crash test data are presented on the following pages. All data are recorded on magnetic tape for inclusion in the NHTSA crash test data base system. The data was filtered according to SAE J211, except dummy thorax data which was filtered using the HSRI filter.



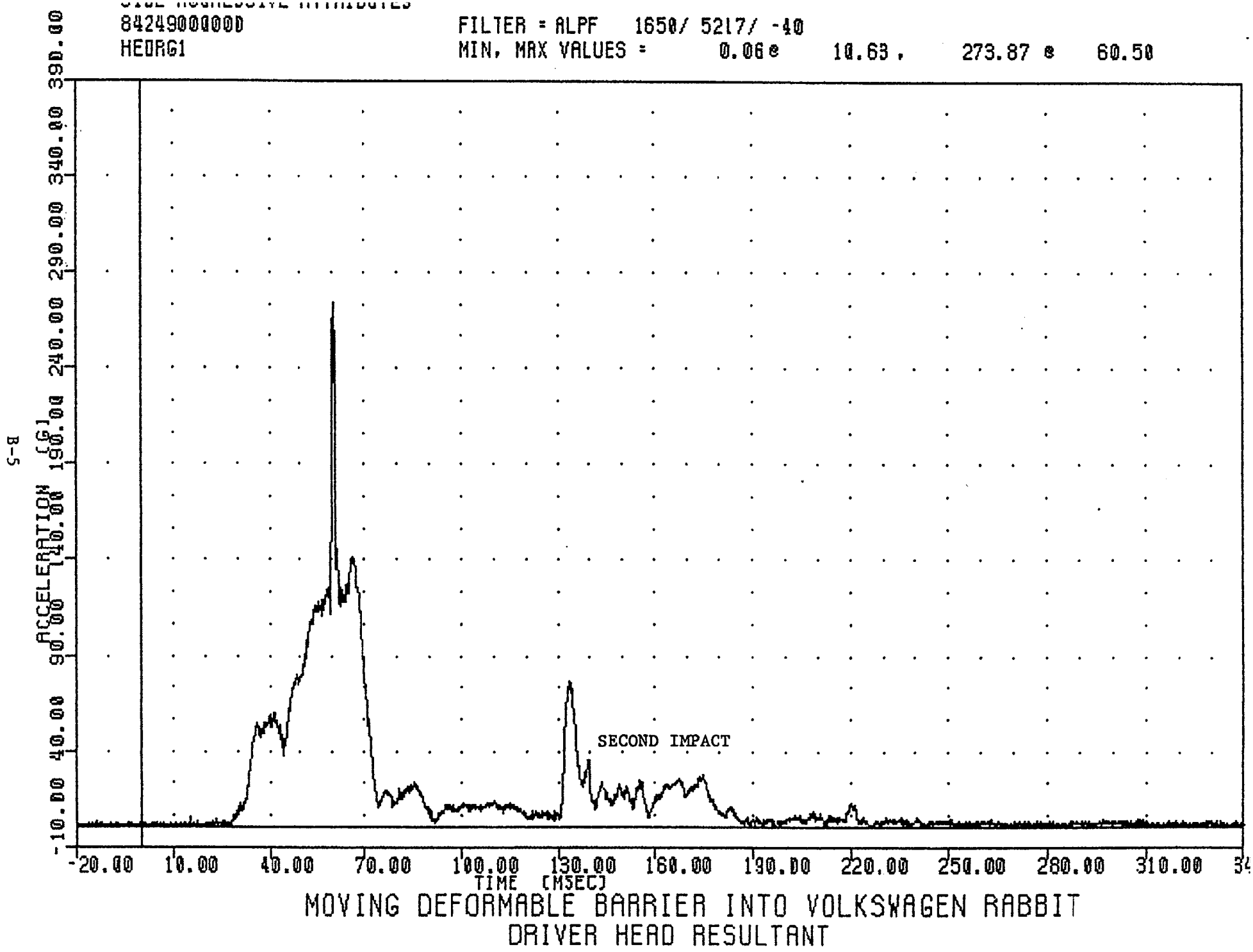
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER HEAD ACCELERATION X AXIS



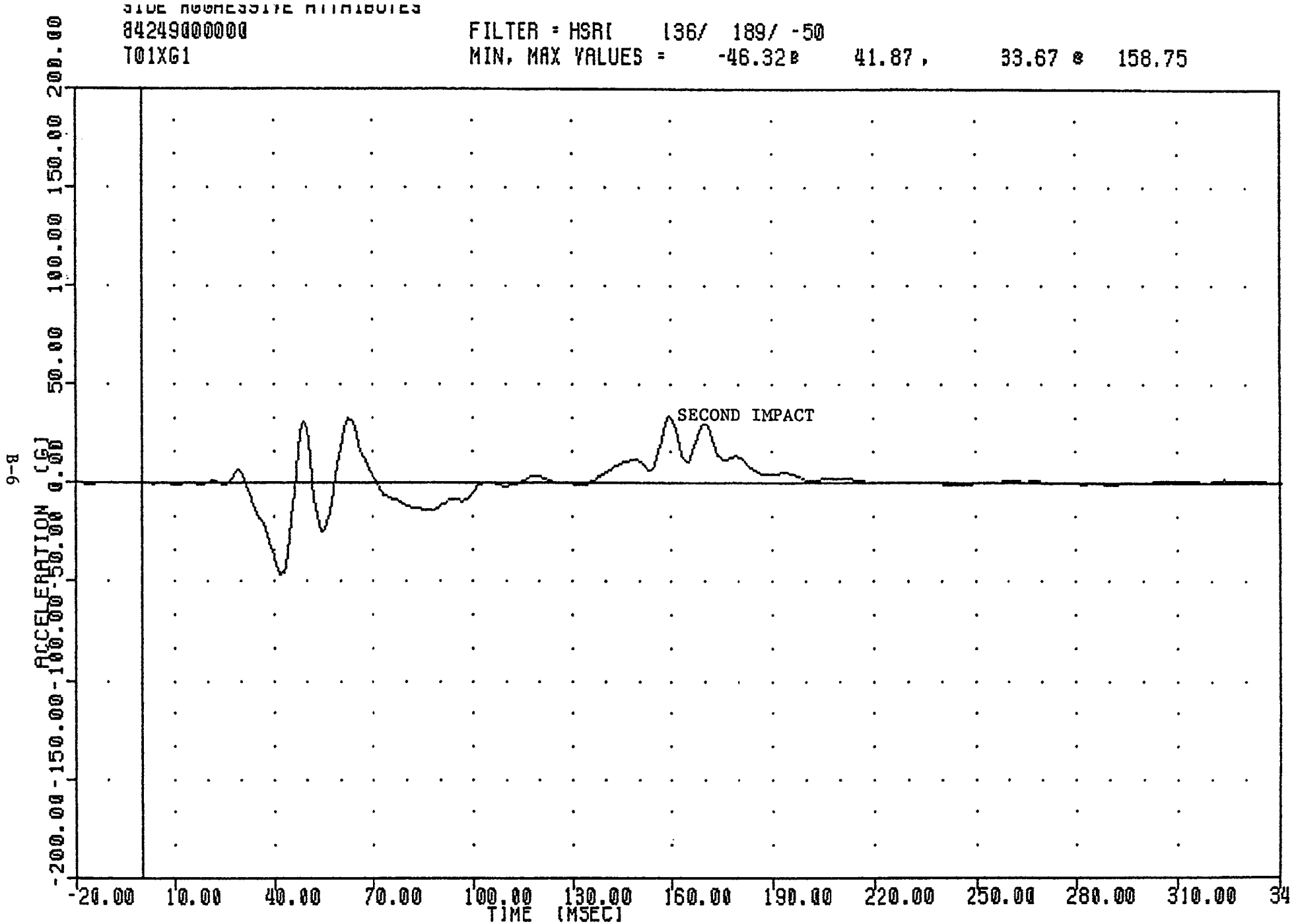
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER HEAD ACCELERATION Y AXIS



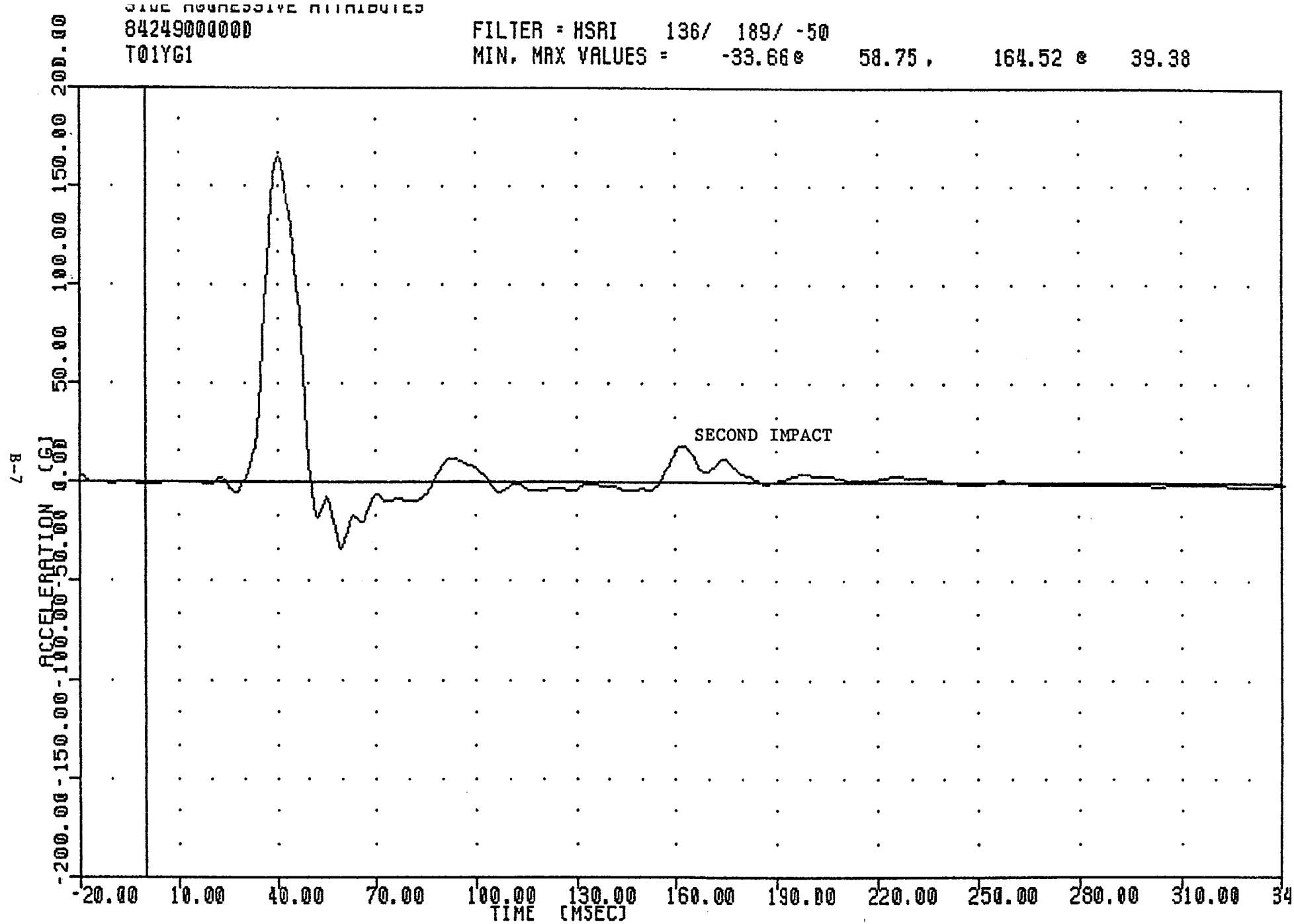
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER HEAD ACCELERATION Z AXIS



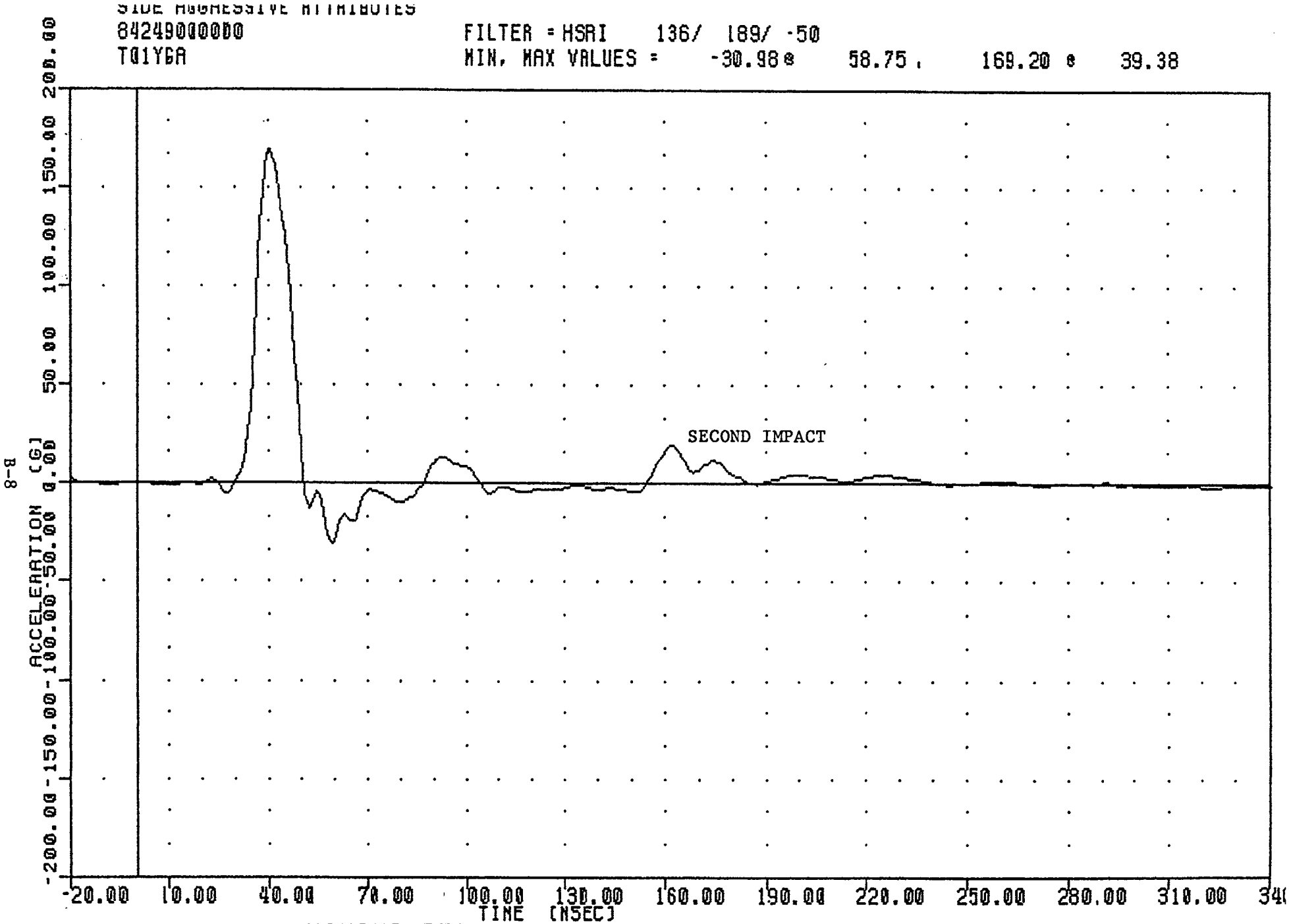
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER HEAD RESULTANT



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

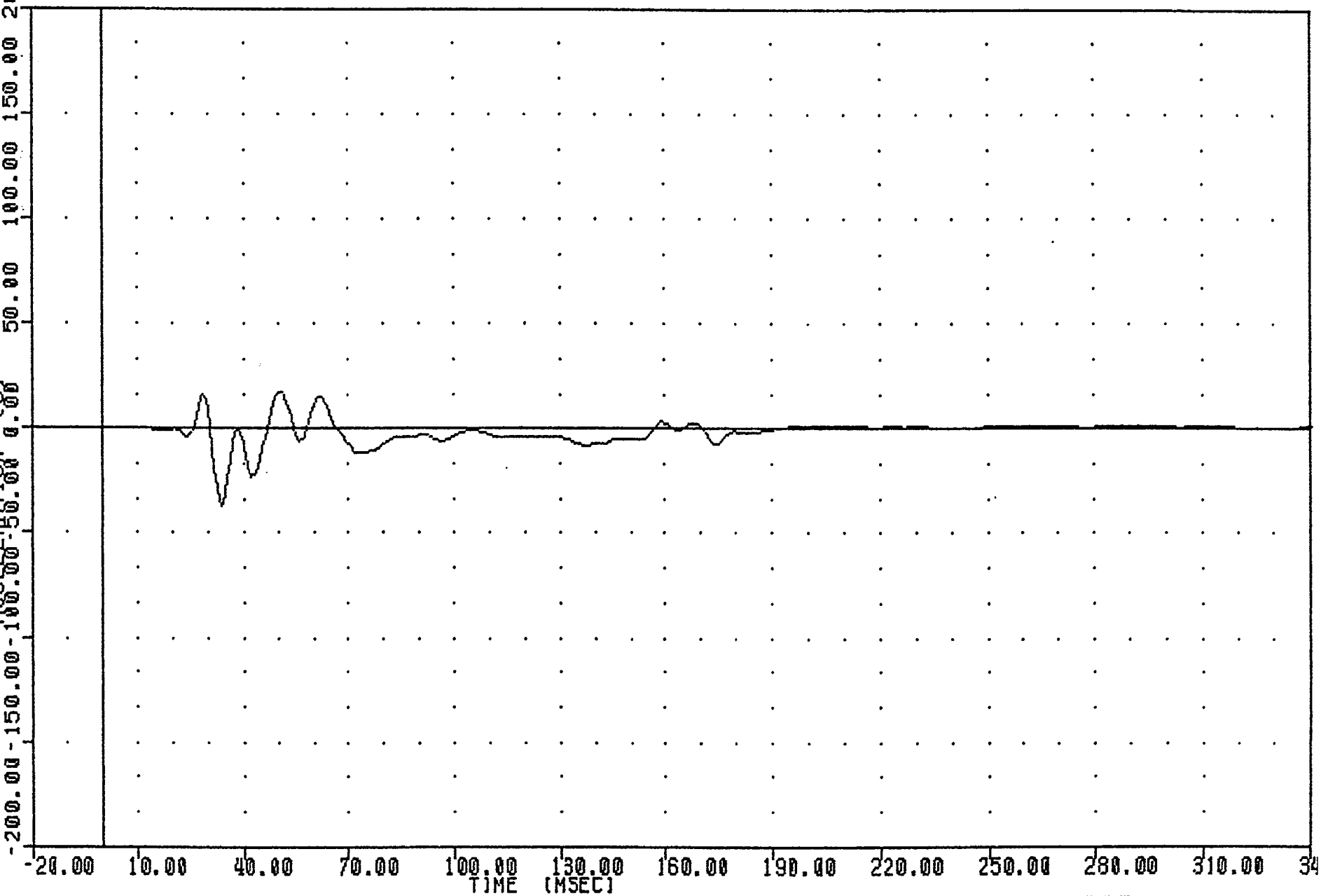


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE ACCELERATION Y AXIS

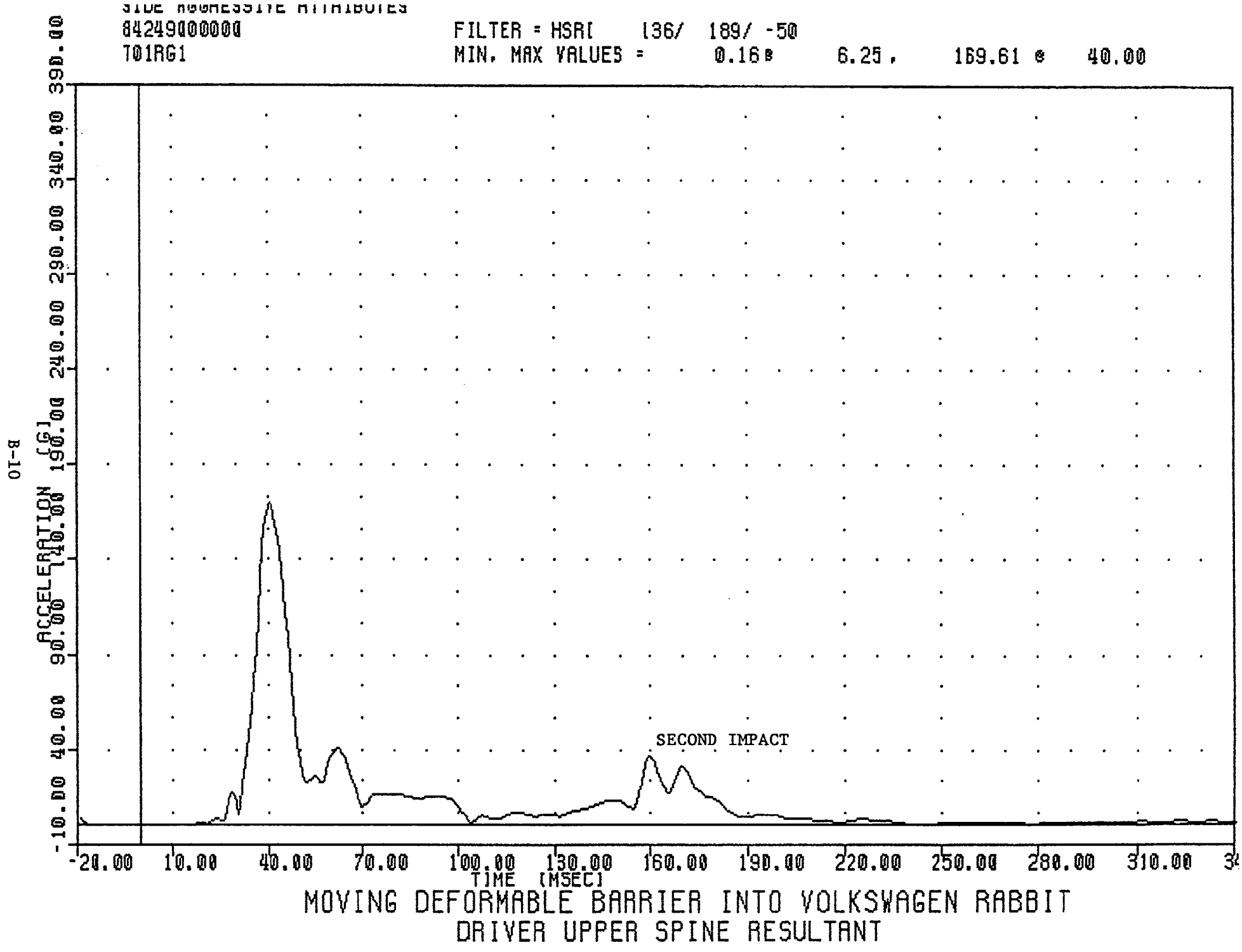


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE ACCELERATION -2 Y AXIS

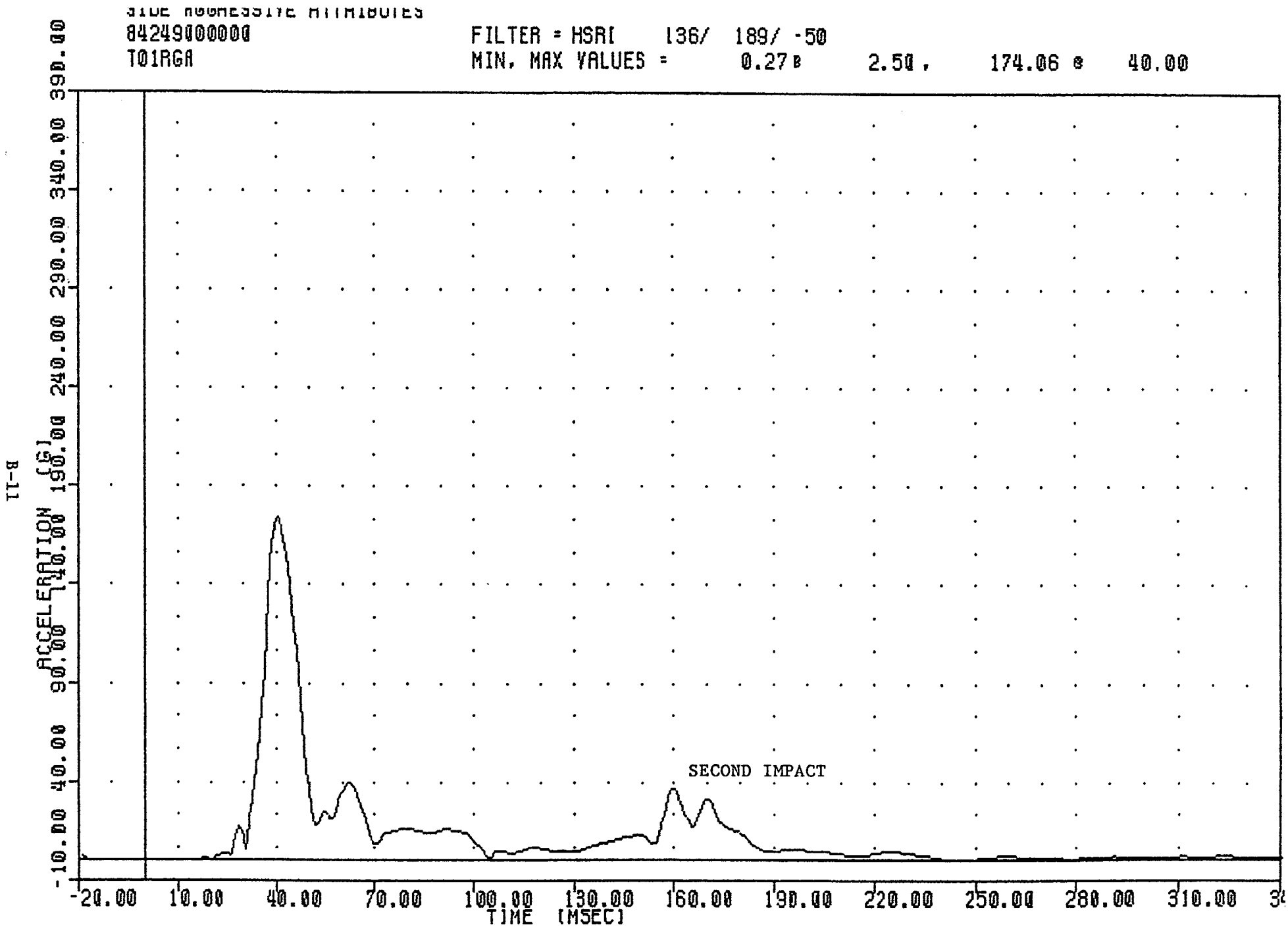
SIDE AGGRESSIVE ATTRIBUTES
84249000000
T01ZG1
FILTER = HSRI [36/ 189/ -50
MIN, MAX VALUES = -37.27 @ 33.13, 17.59 @ 50.00



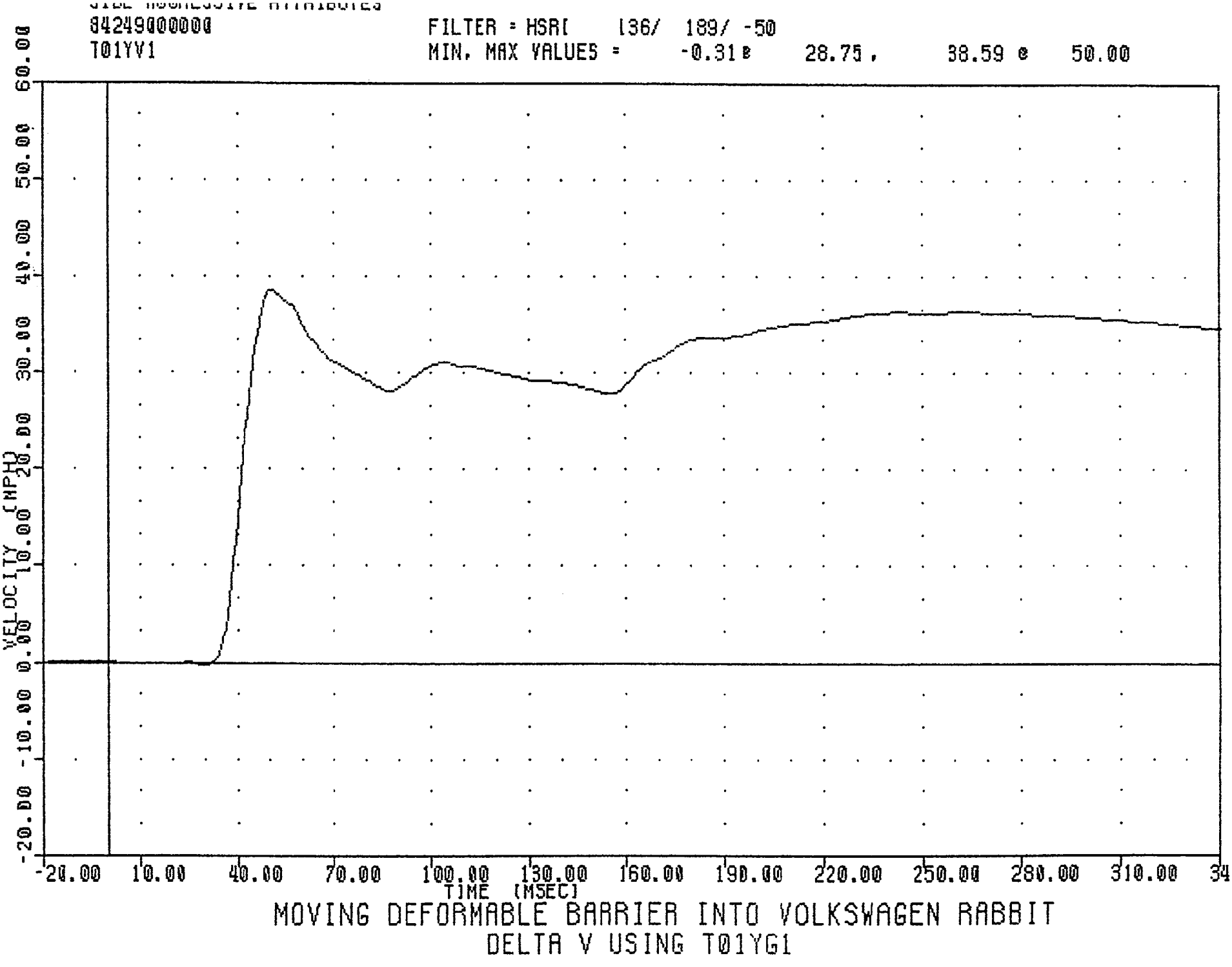
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE ACCELERATION Z AXIS



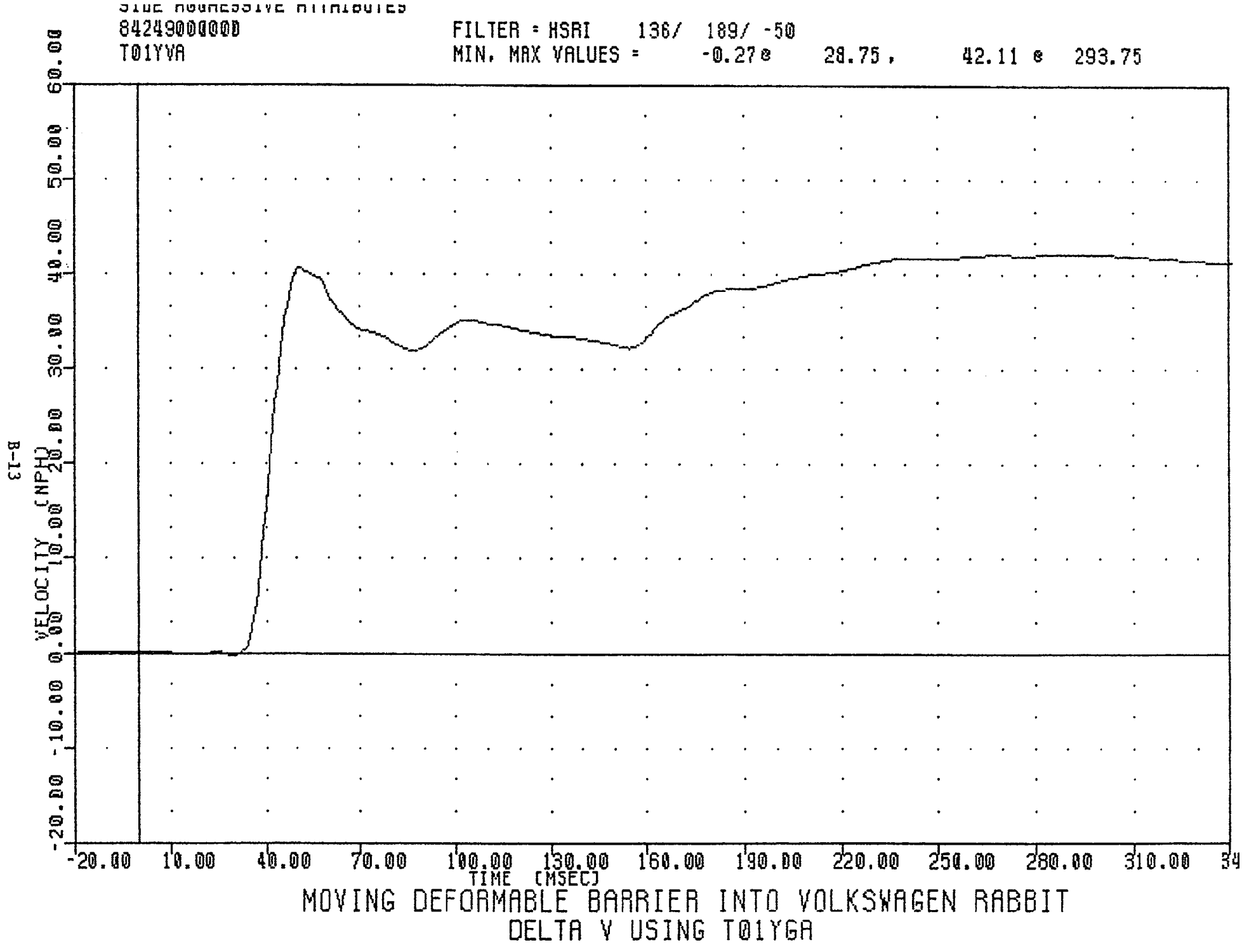
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE RESULTANT



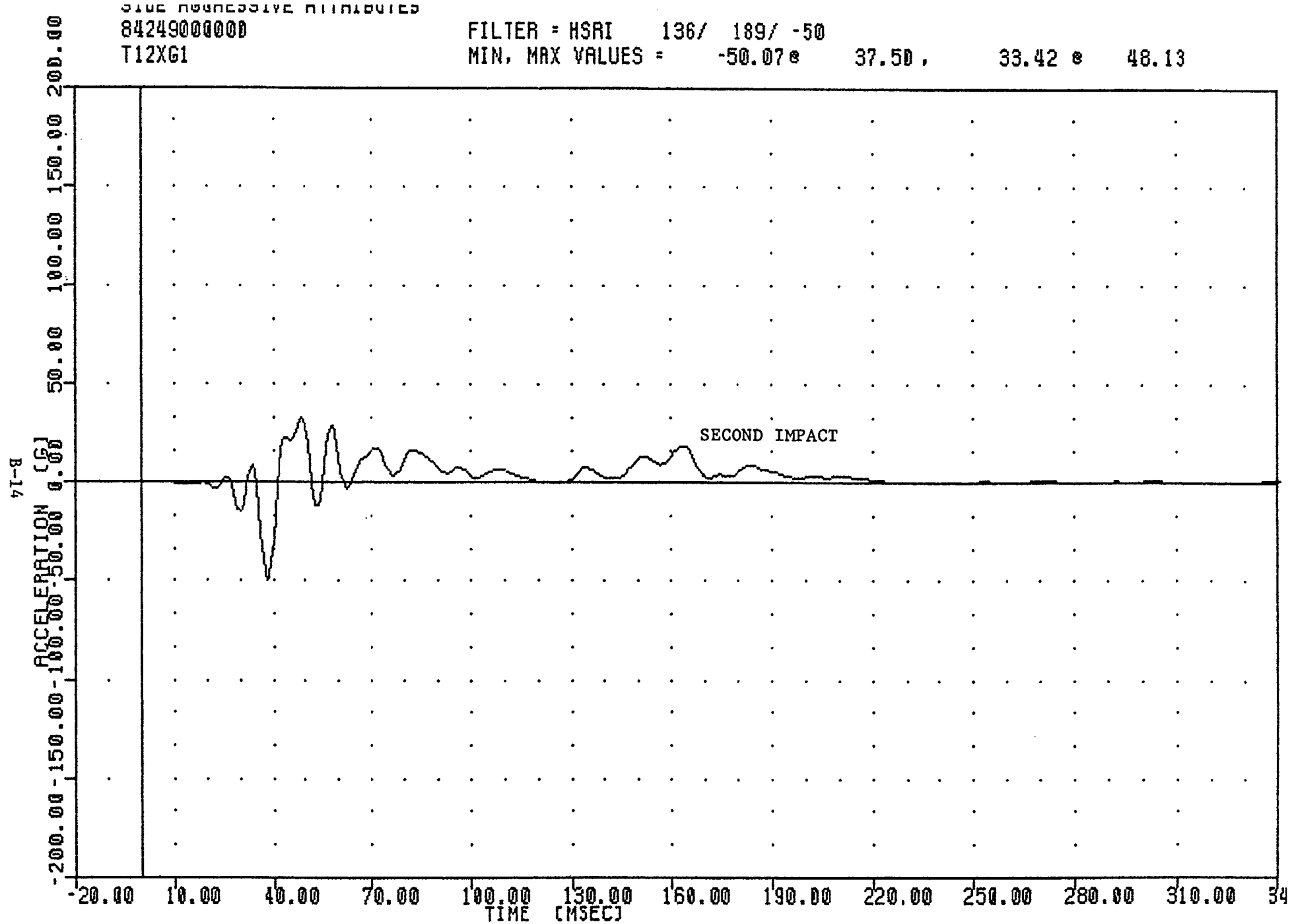
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE RESULTANT USING T01YGA



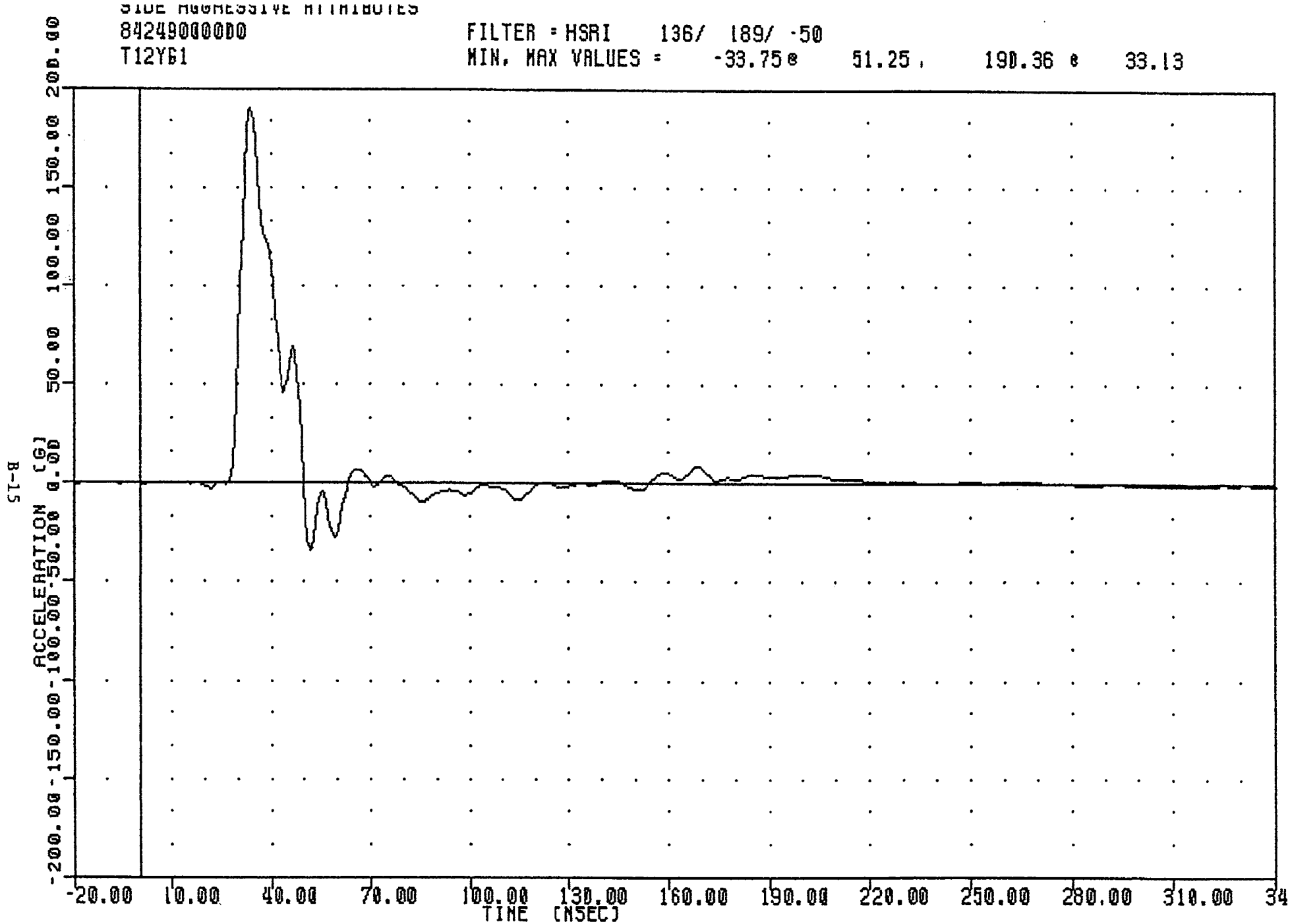
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T01YG1



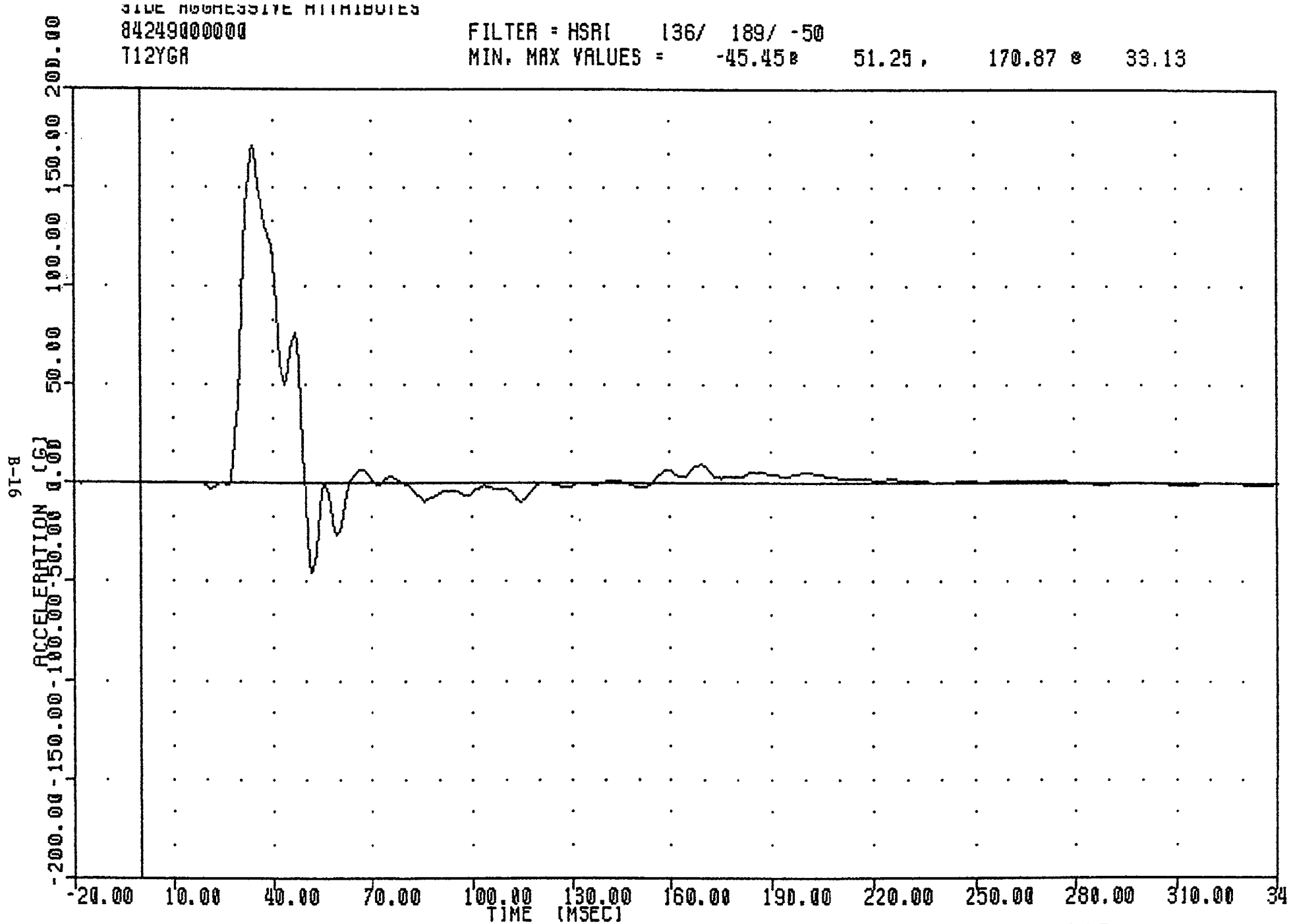
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T01YGA



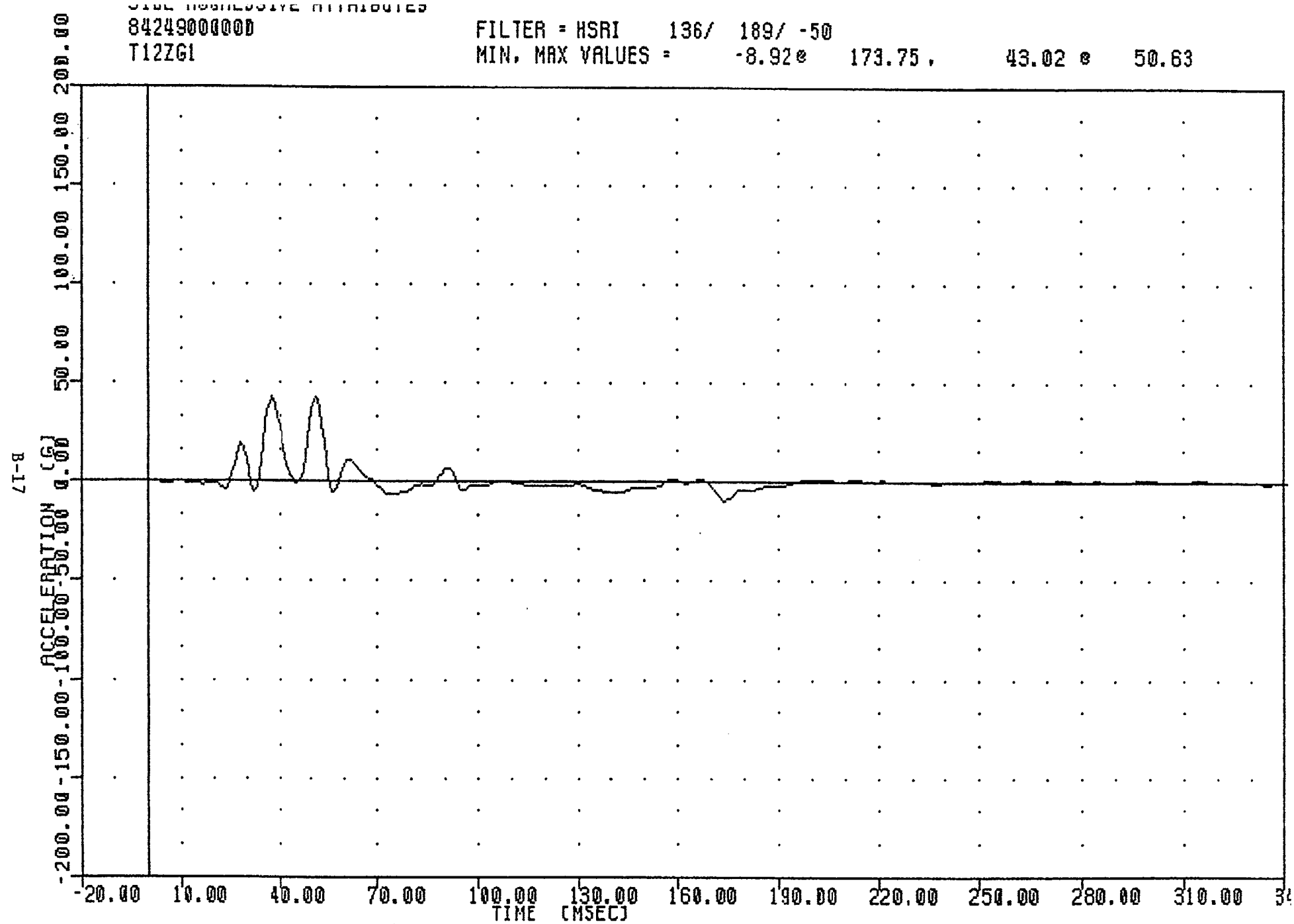
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE ACCELERATION X AXIS



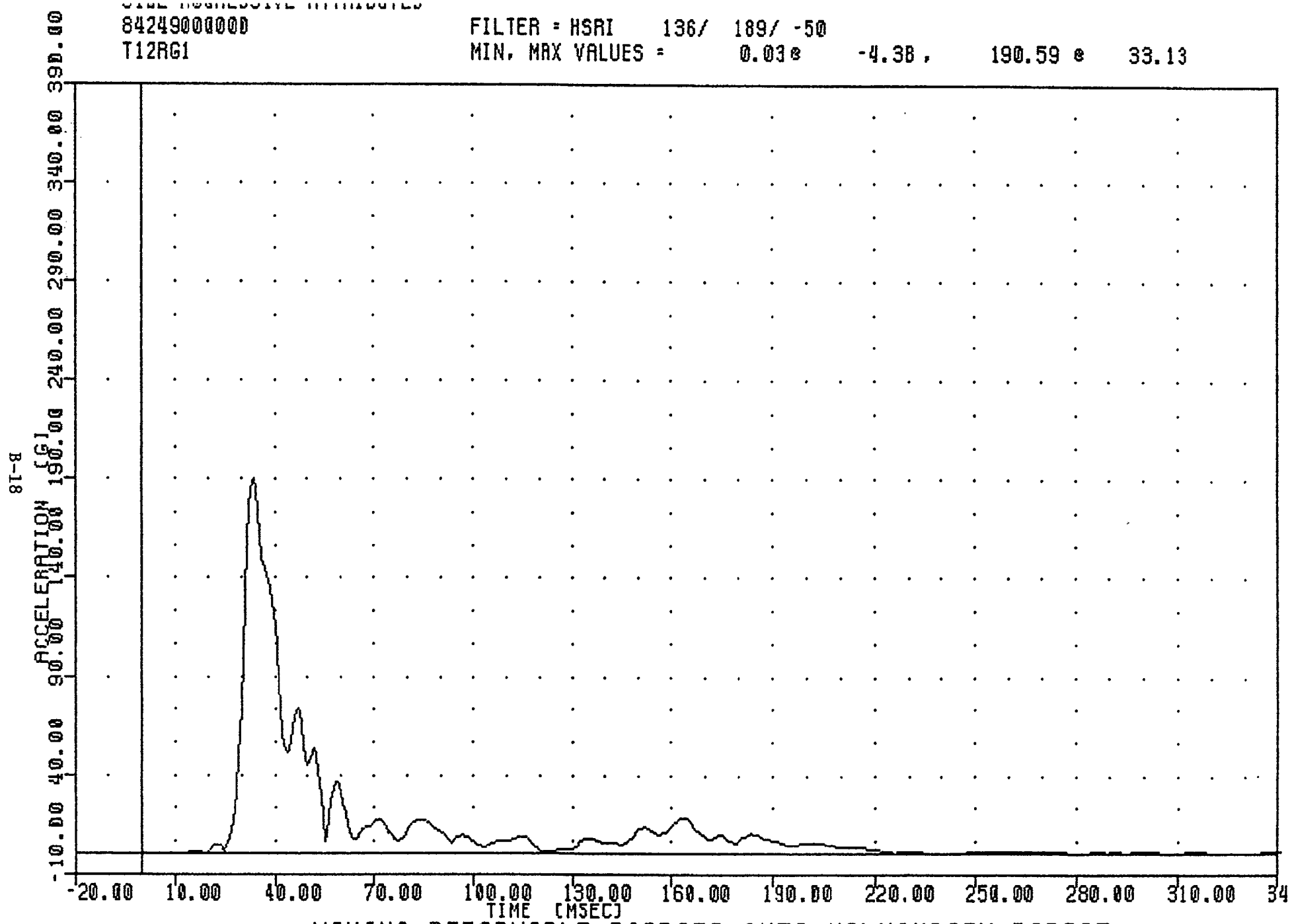
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE ACCELERATION Y AXIS



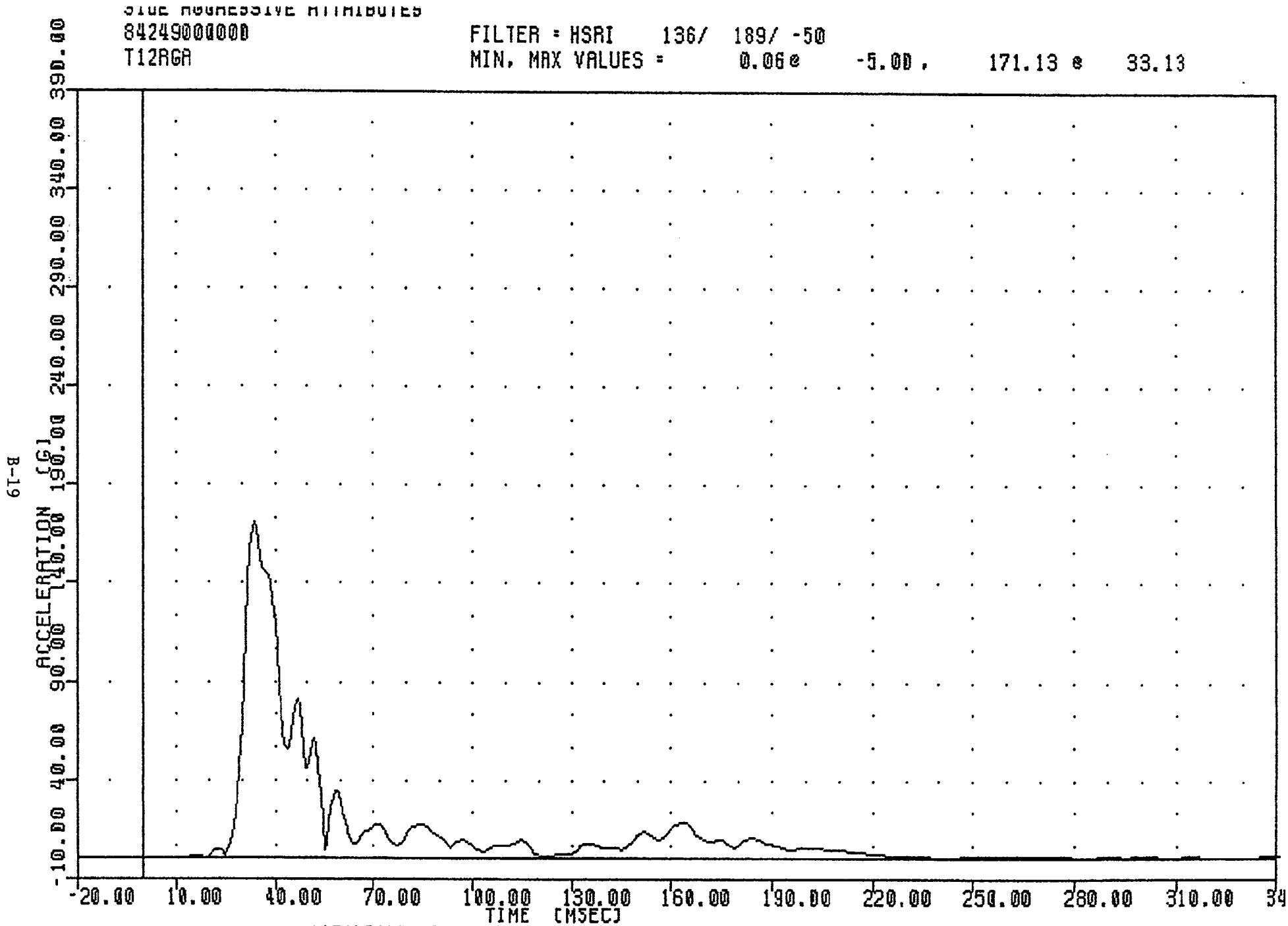
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE ACCELERATION -2 Y AXIS



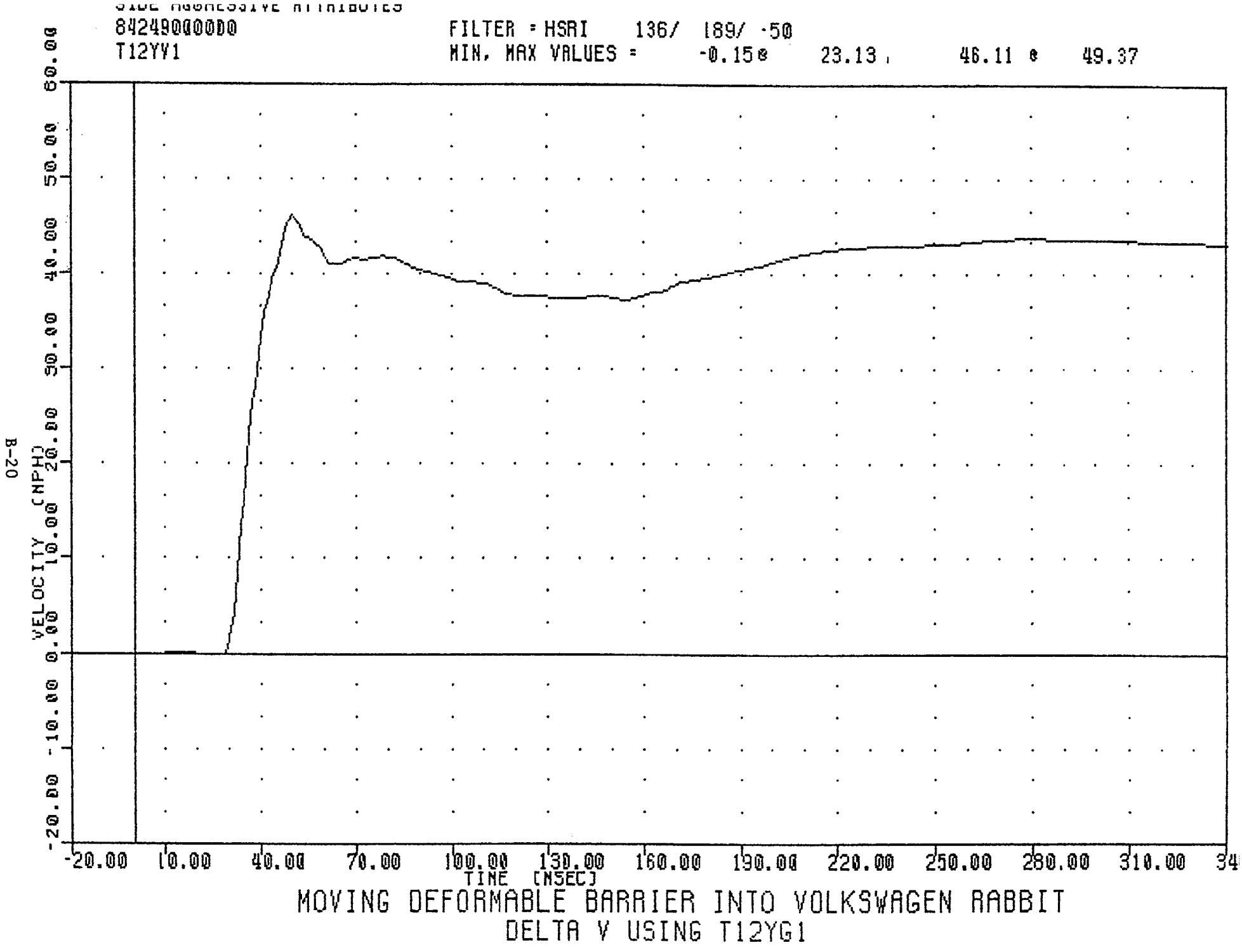
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE ACCELERATION Z AXIS



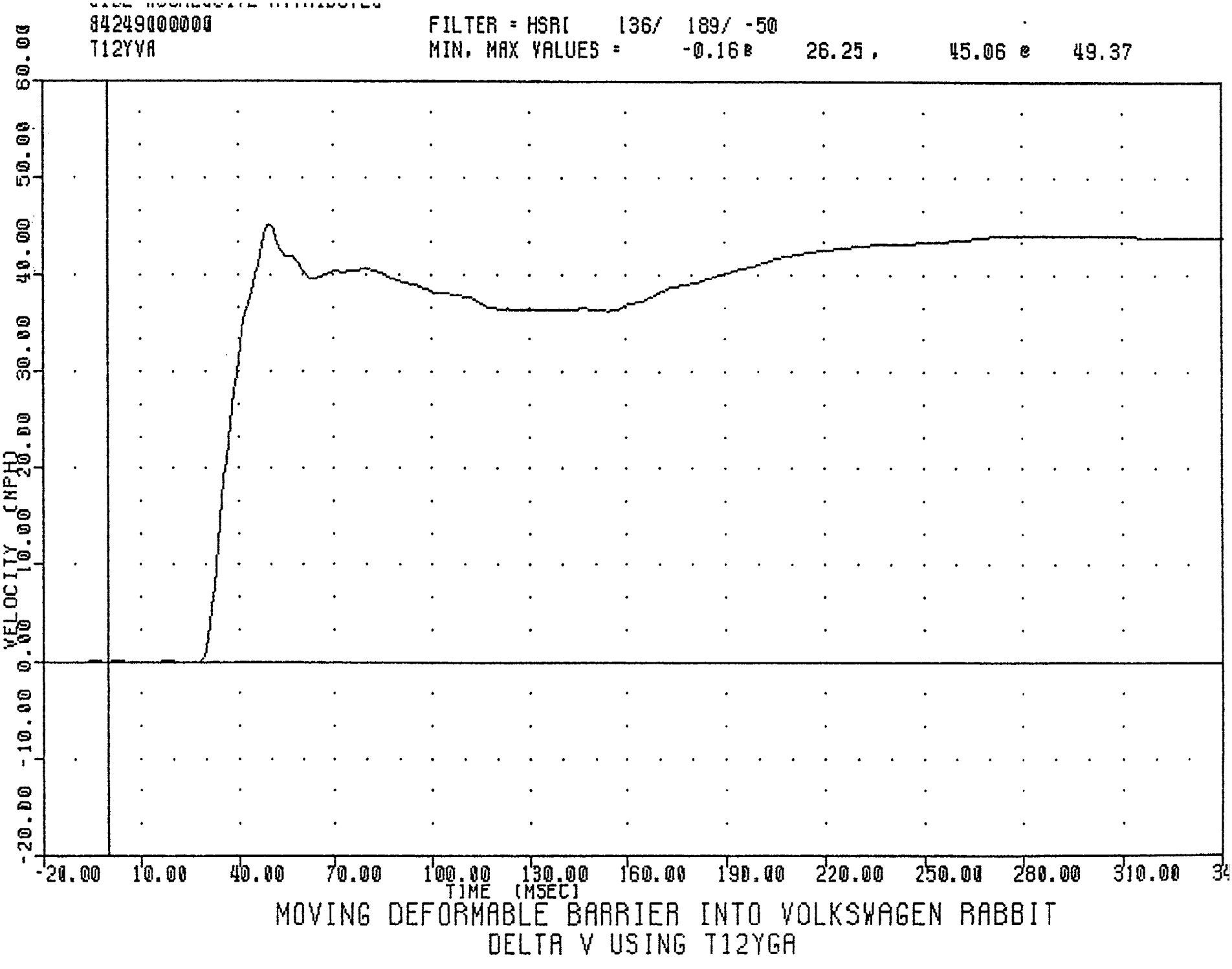
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE RESULTANT



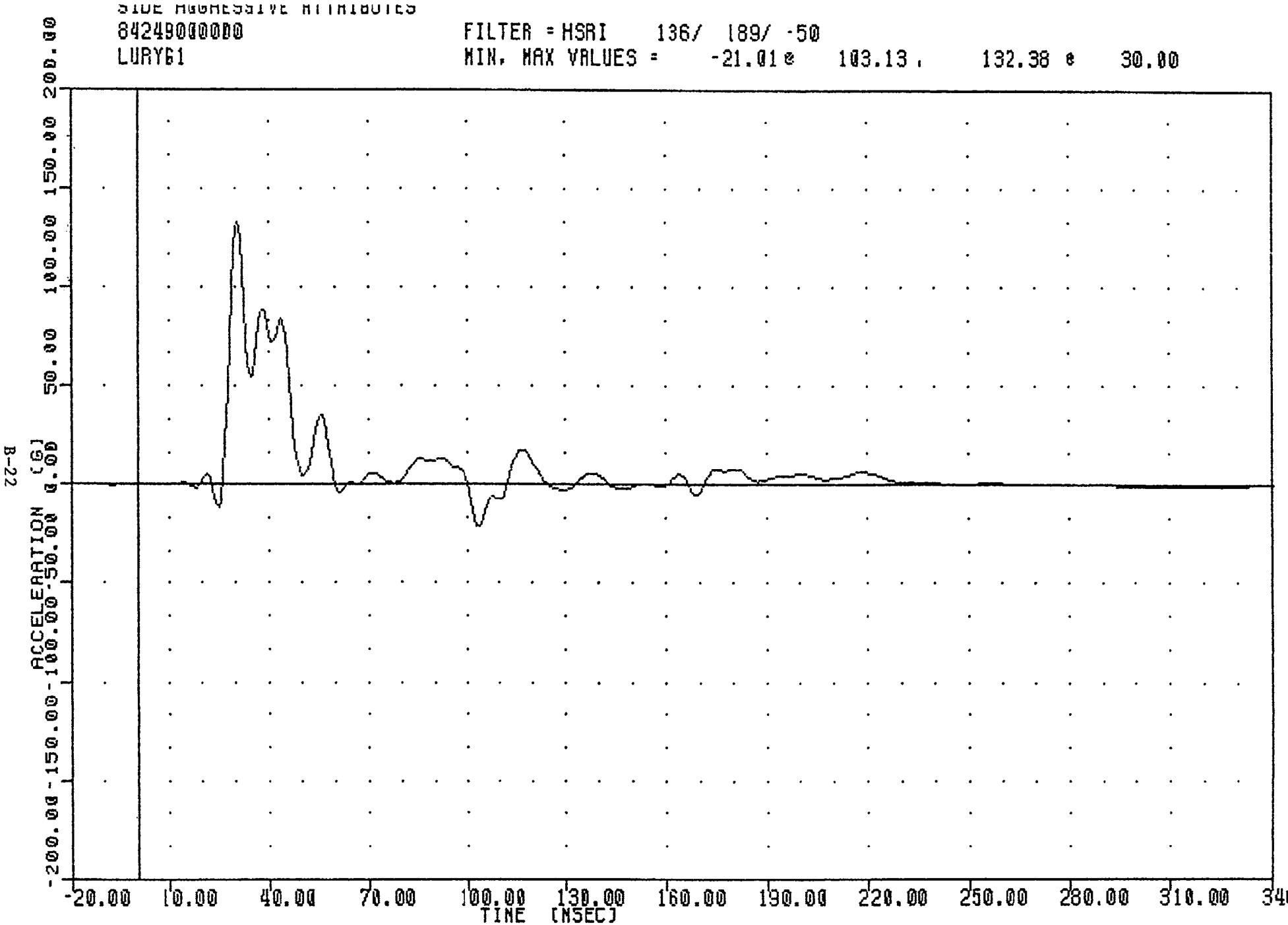
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE RESULTANT USING T12YGA



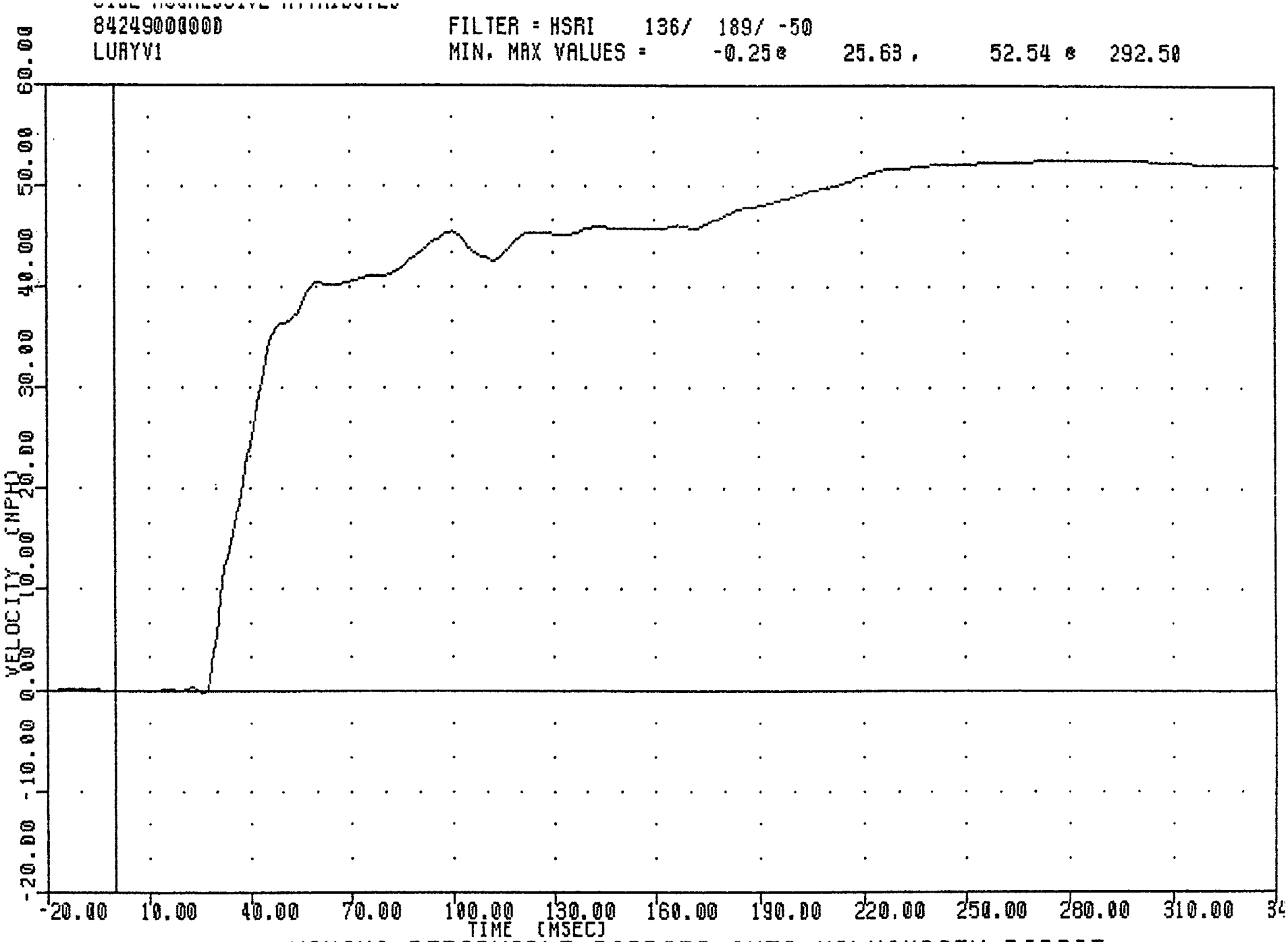
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T12YG1



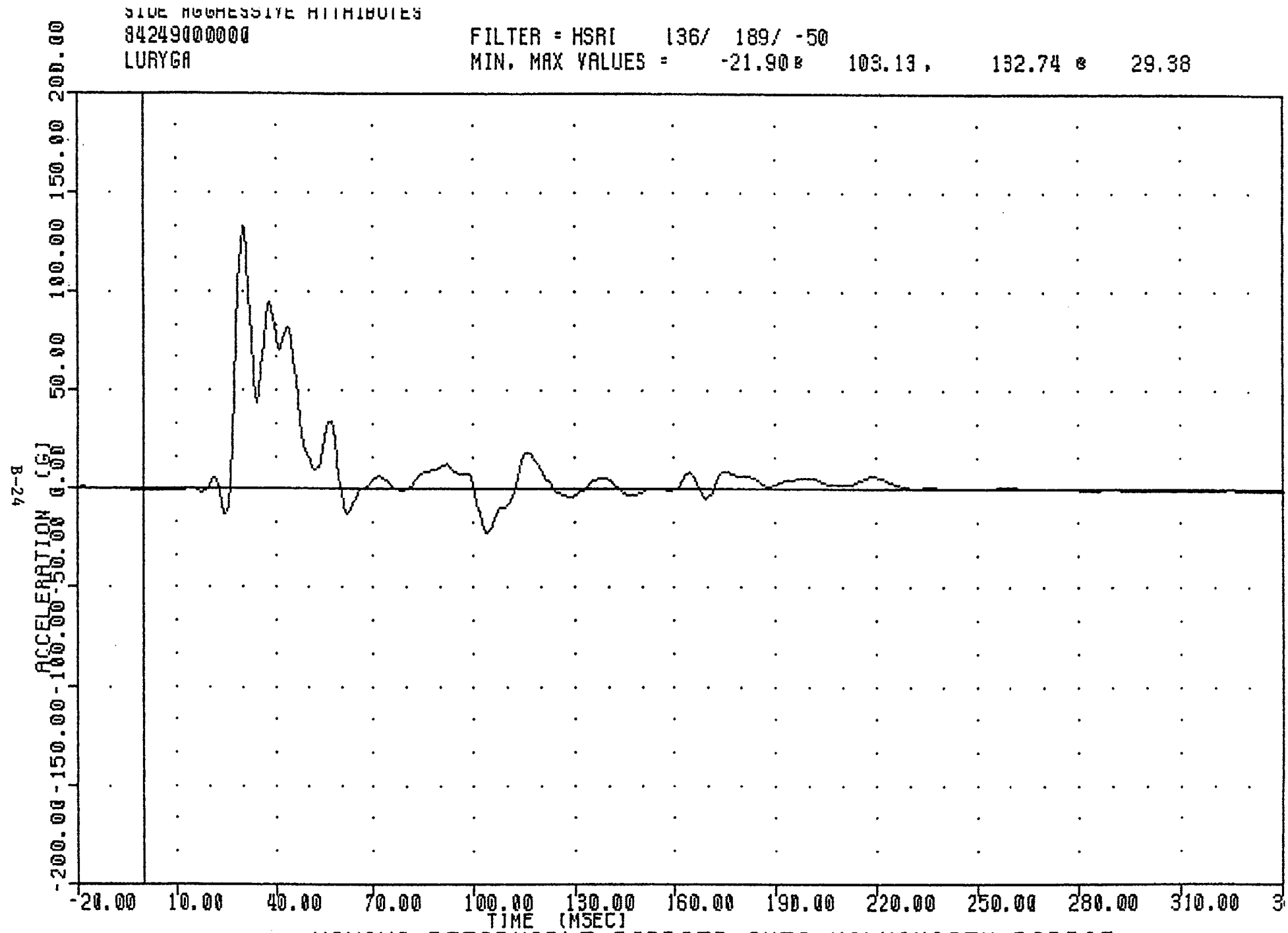
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T12YGA



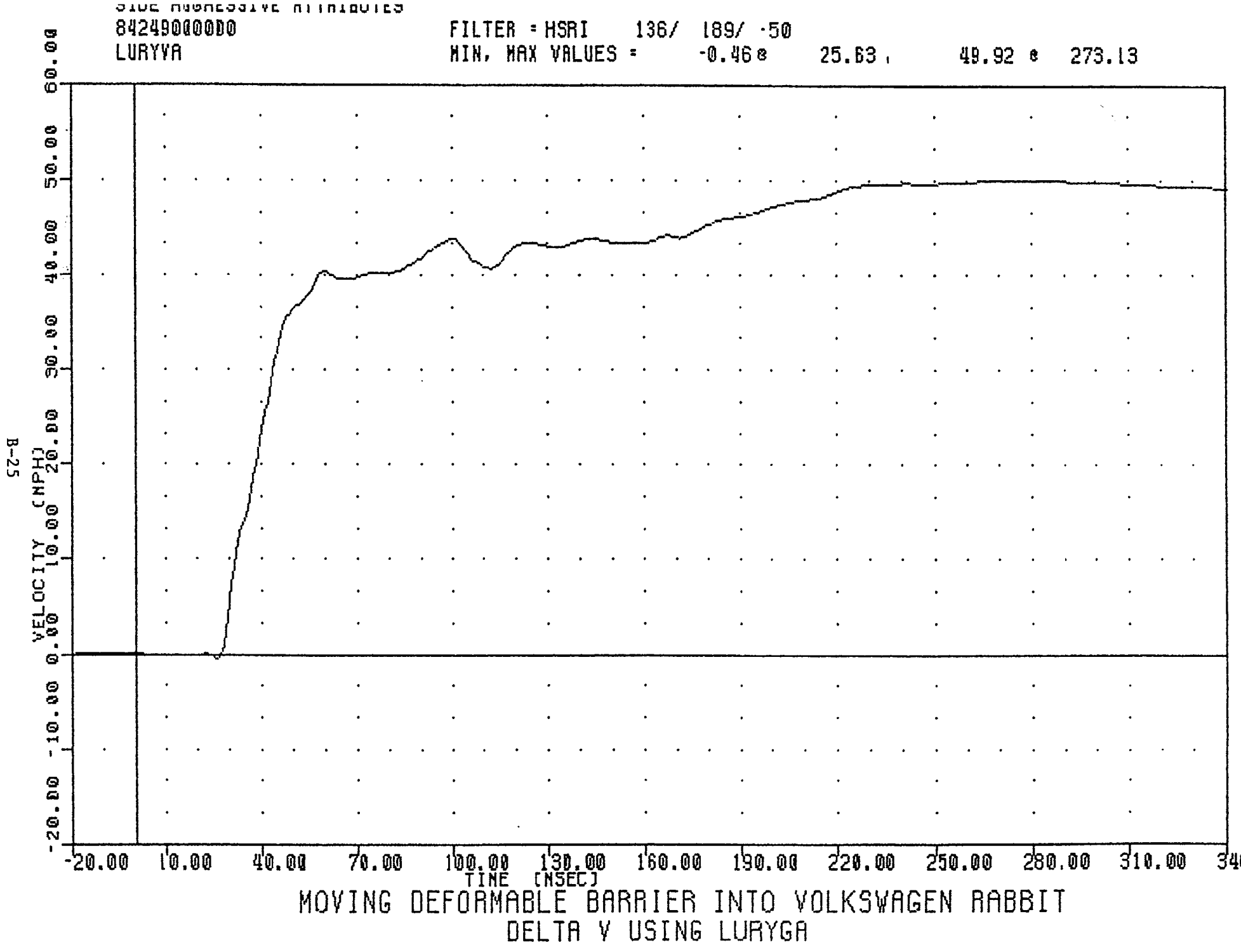
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT UPPER RIB ACCELERATION Y AXIS



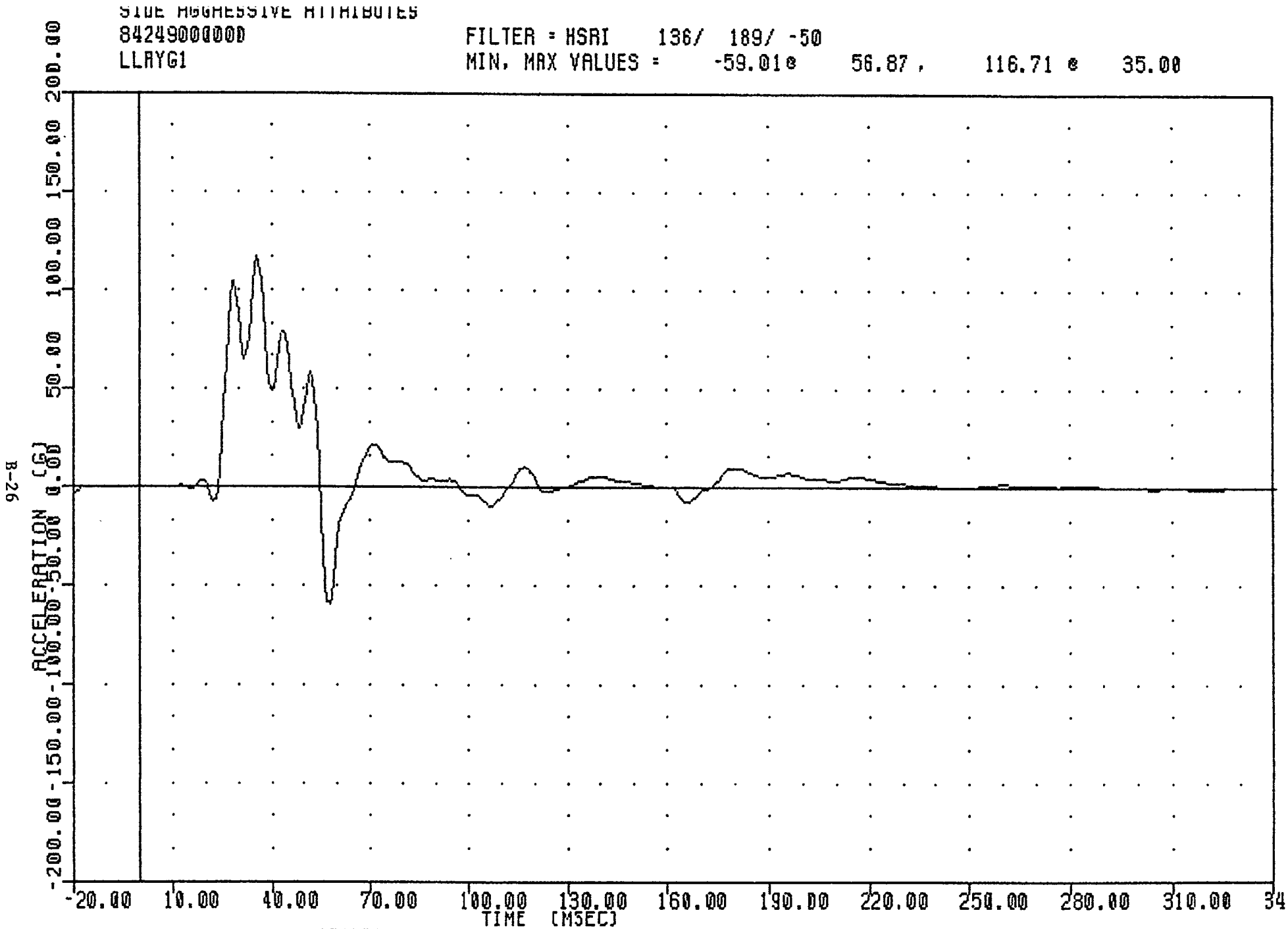
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LURYG1



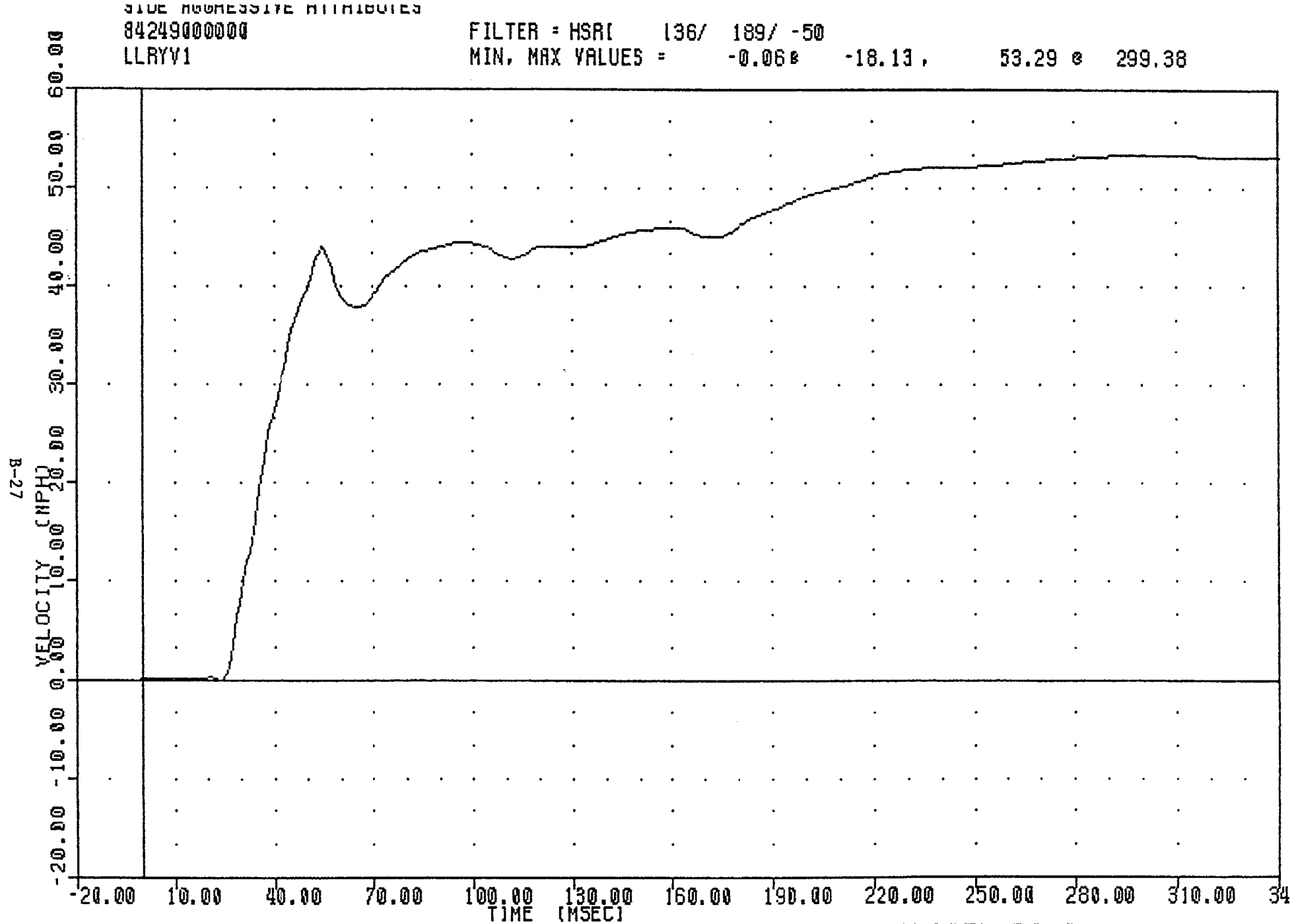
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT UPPER RIB ACCELERATION -2 Y AXIS



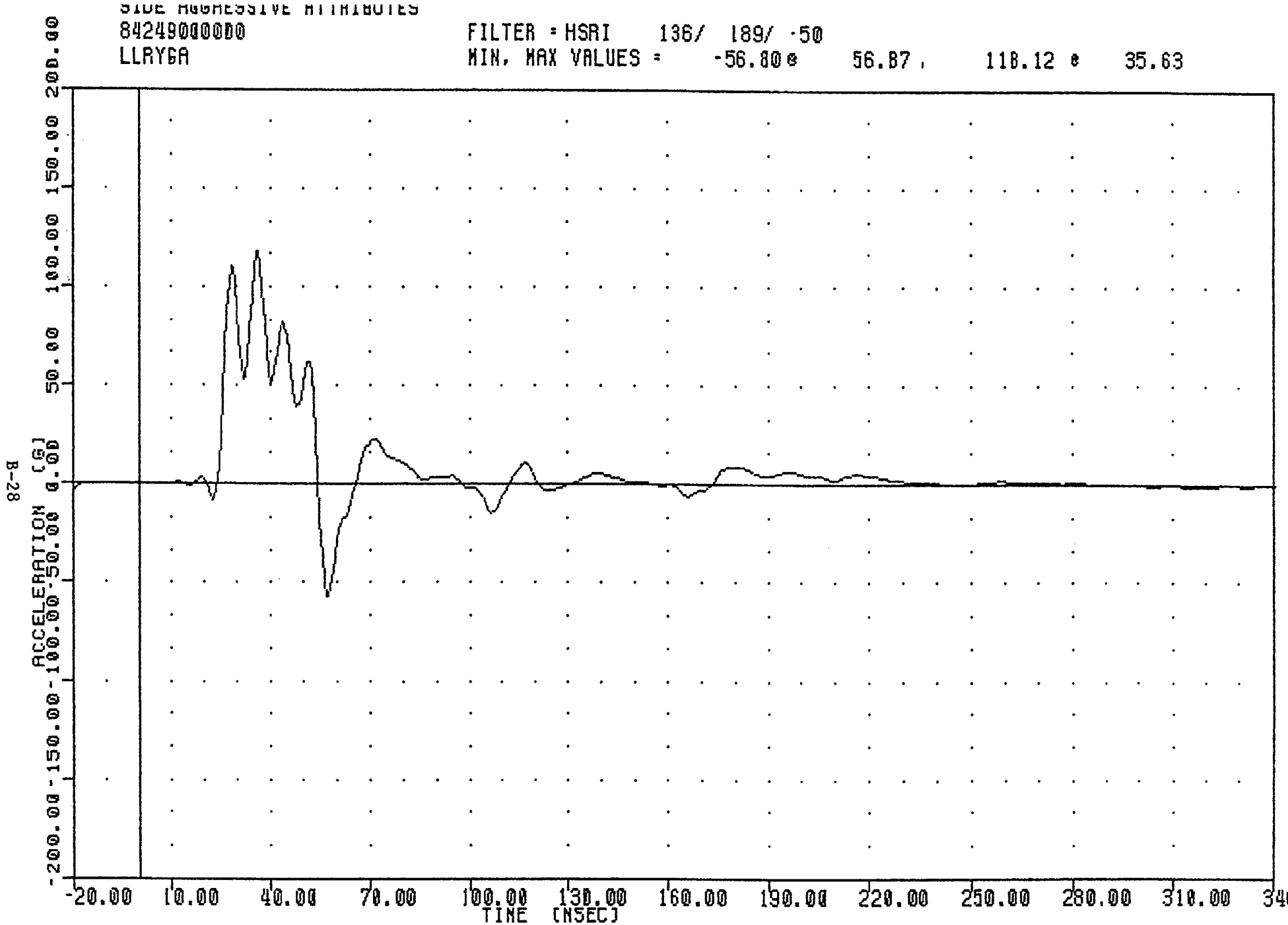
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LURYGA



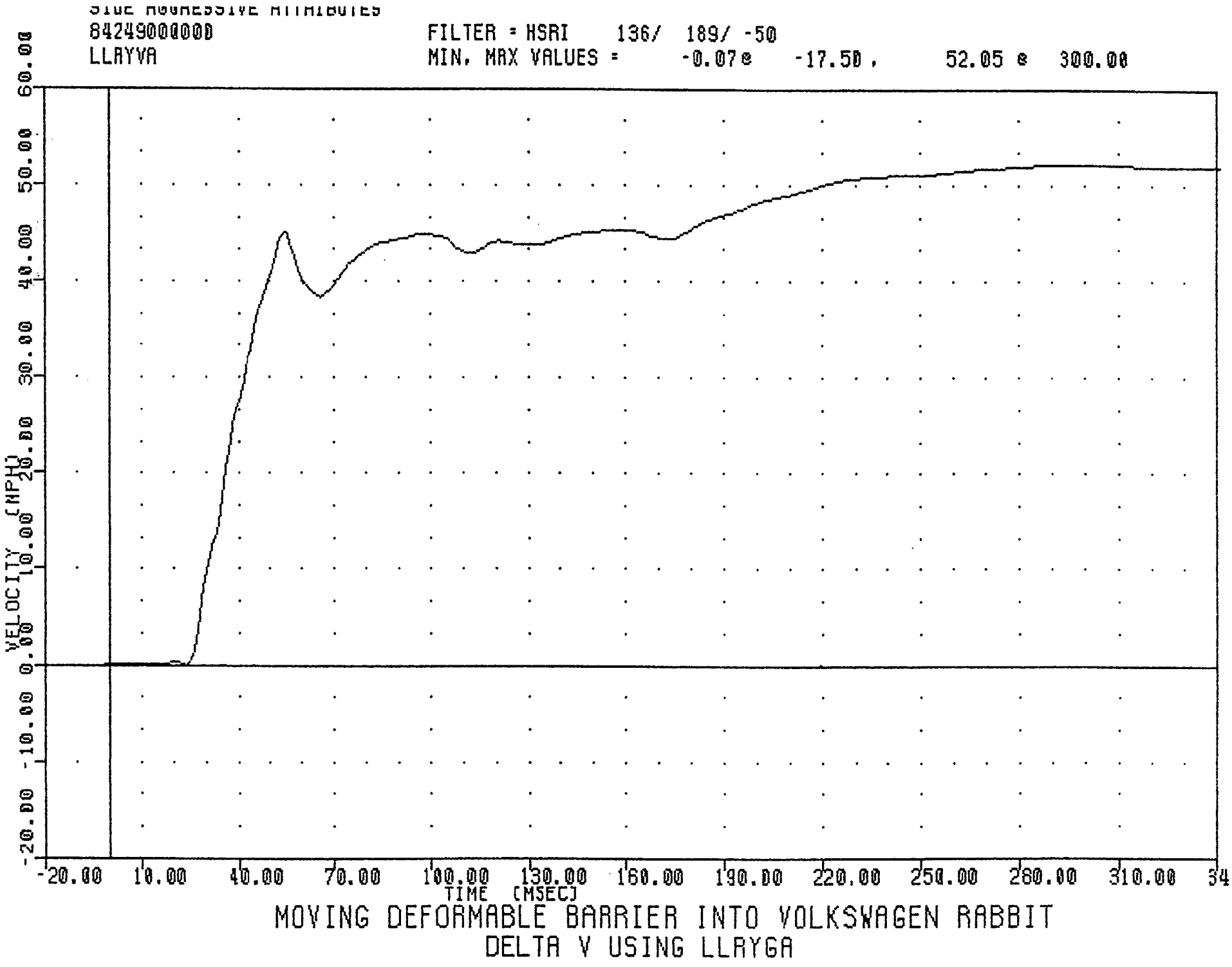
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT LOWER RIB ACCELERATION Y AXIS



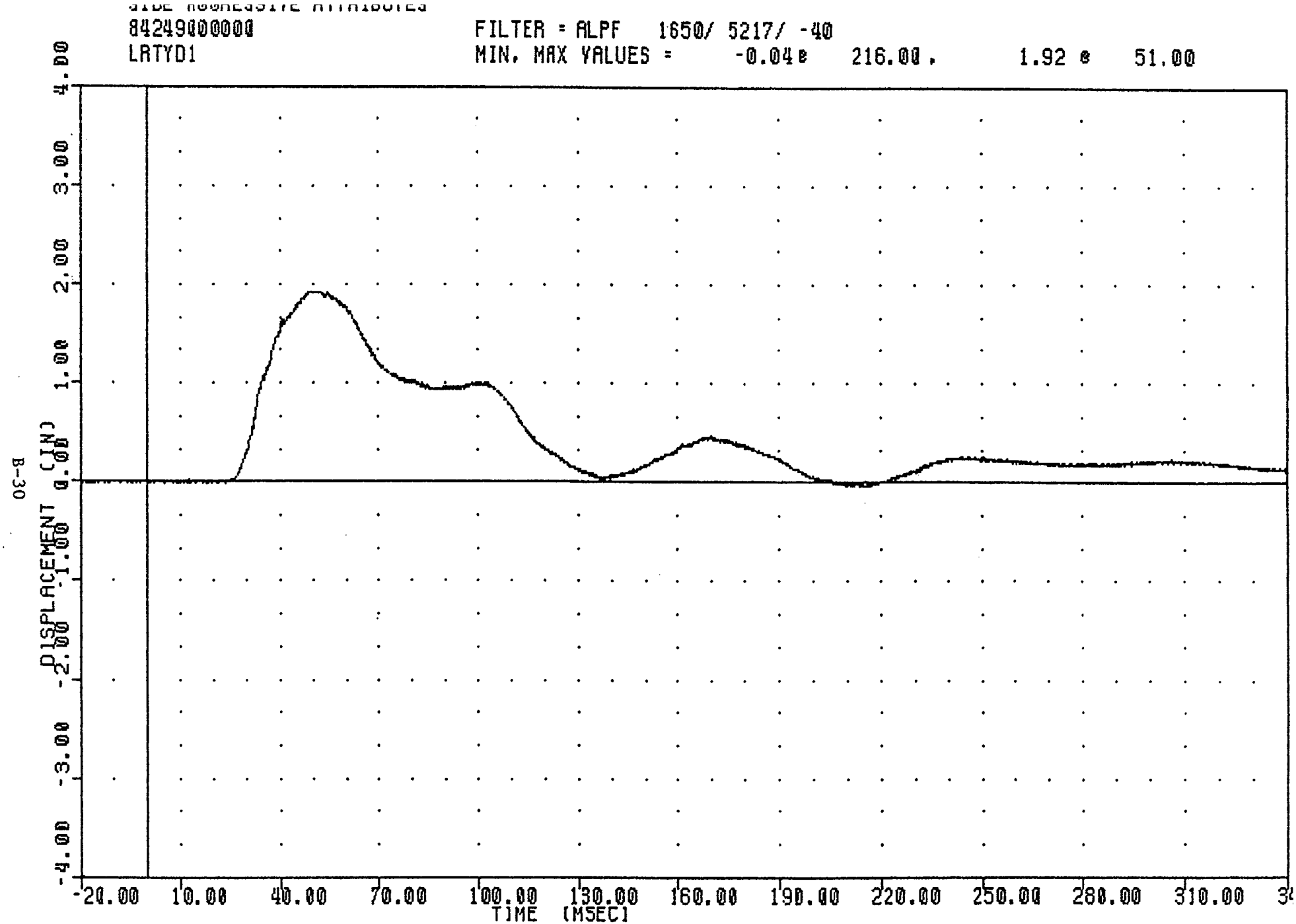
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LLRYG1



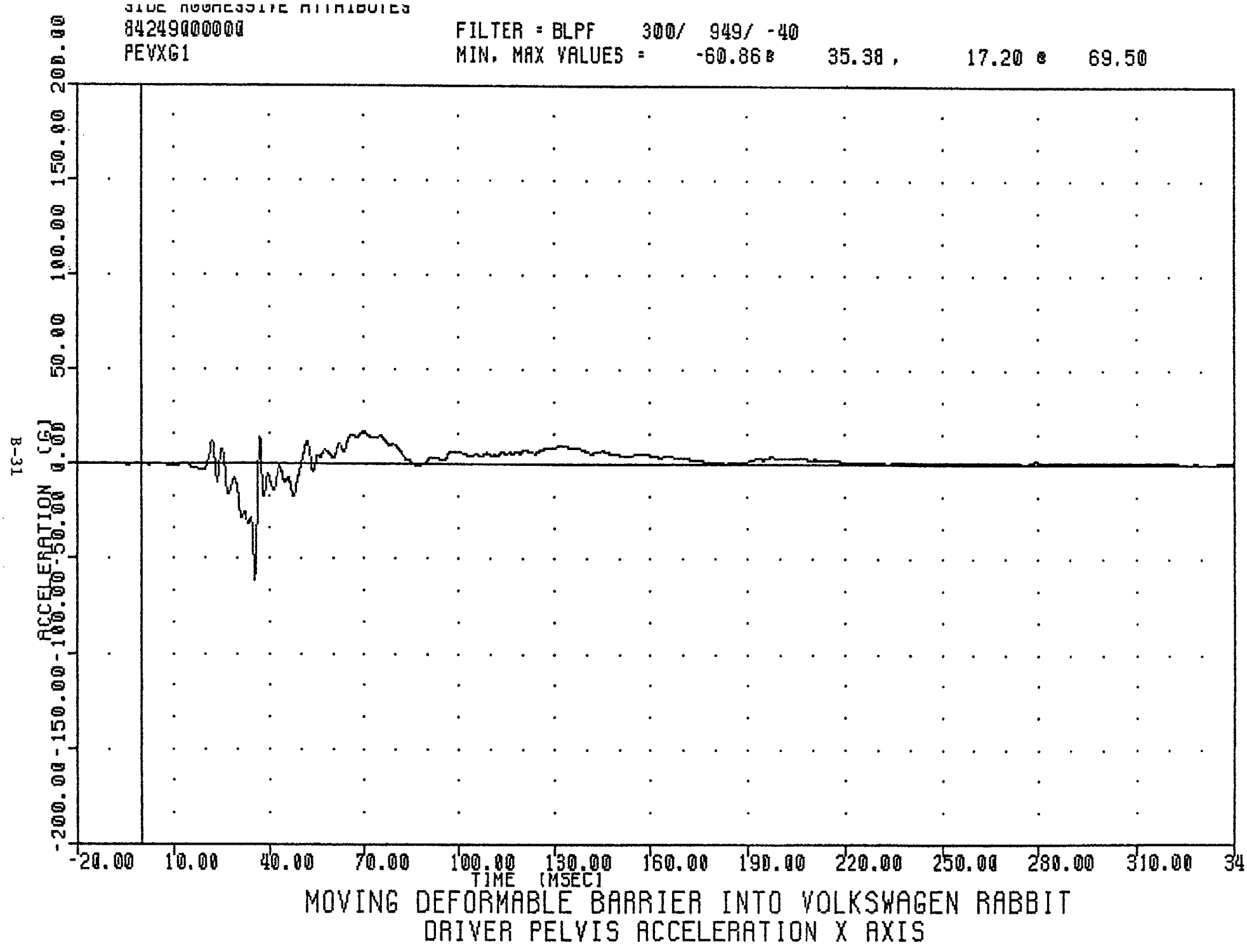
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT LOWER RIB ACCELERATION -2 Y AXIS



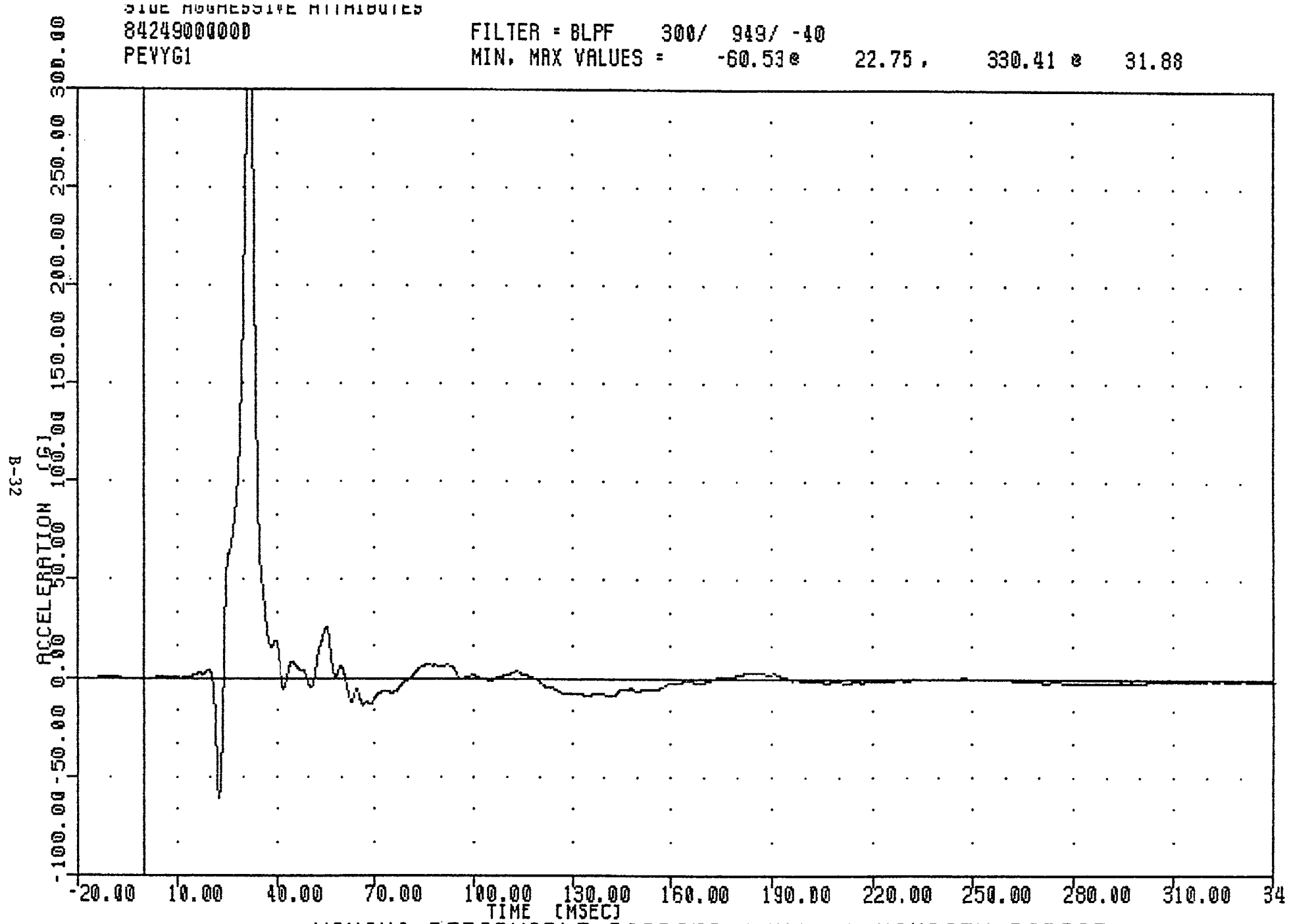
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LLRYGA



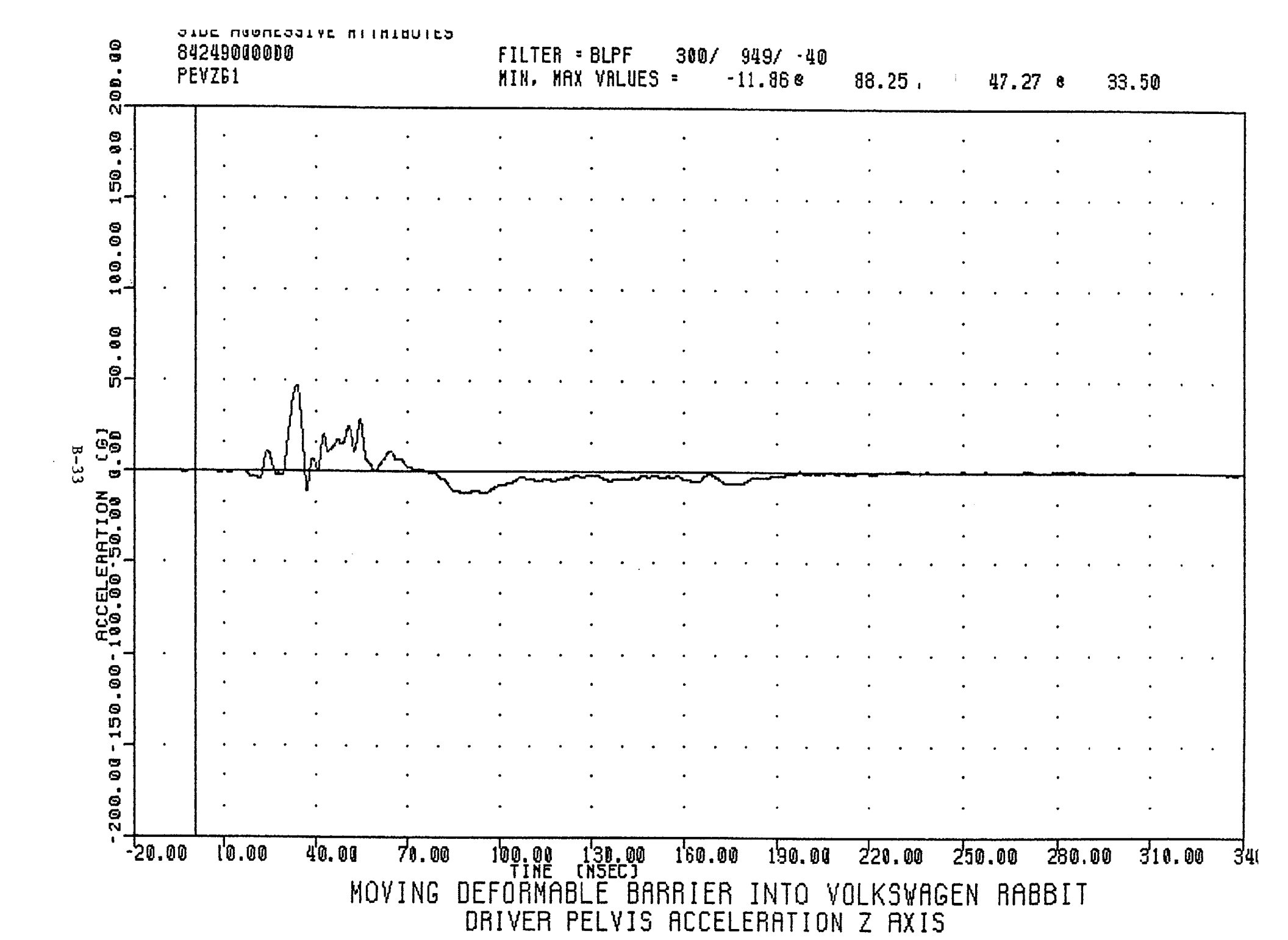
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT RIB TO SPINE DISPLACEMENT INCHES



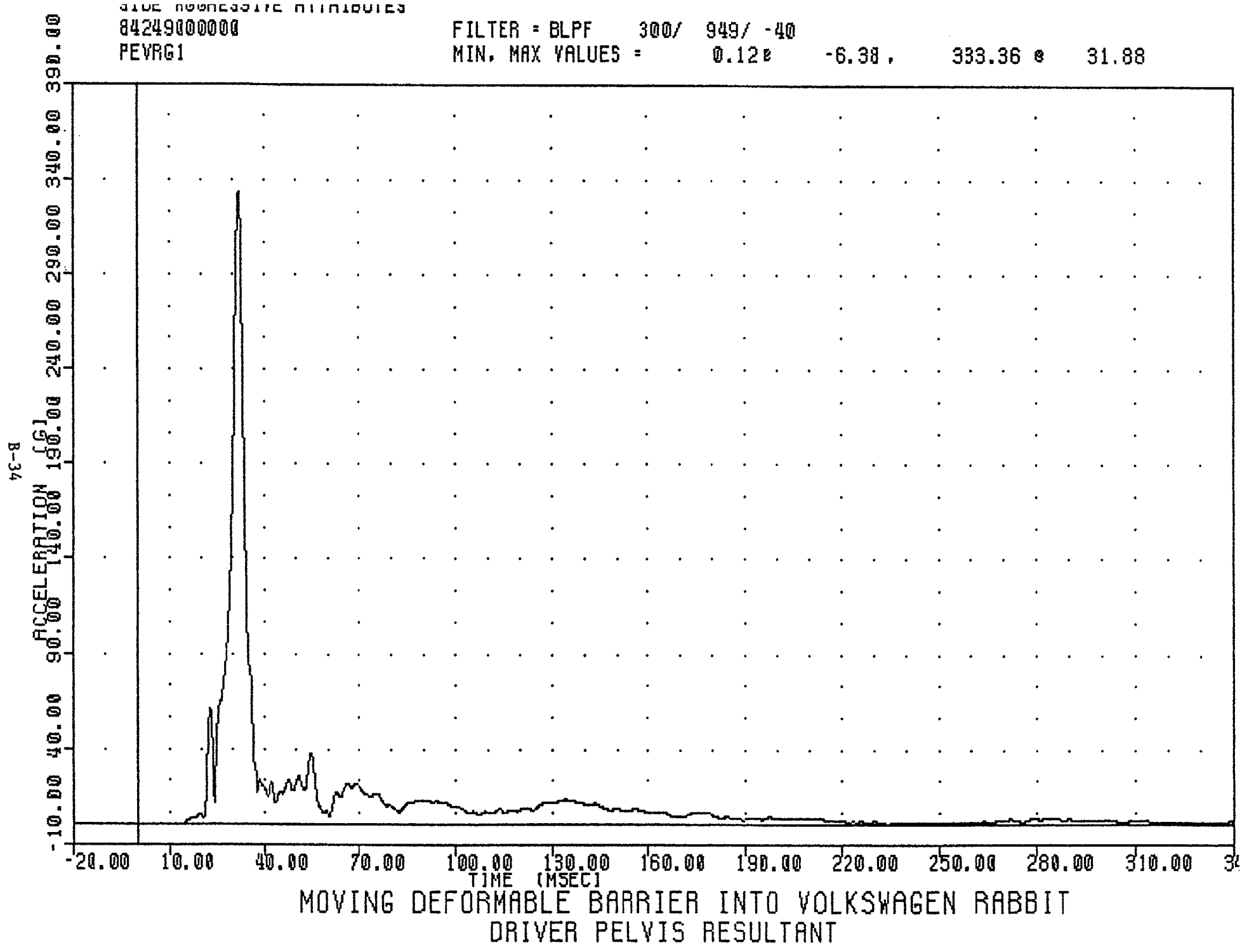
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER PELVIS ACCELERATION X AXIS



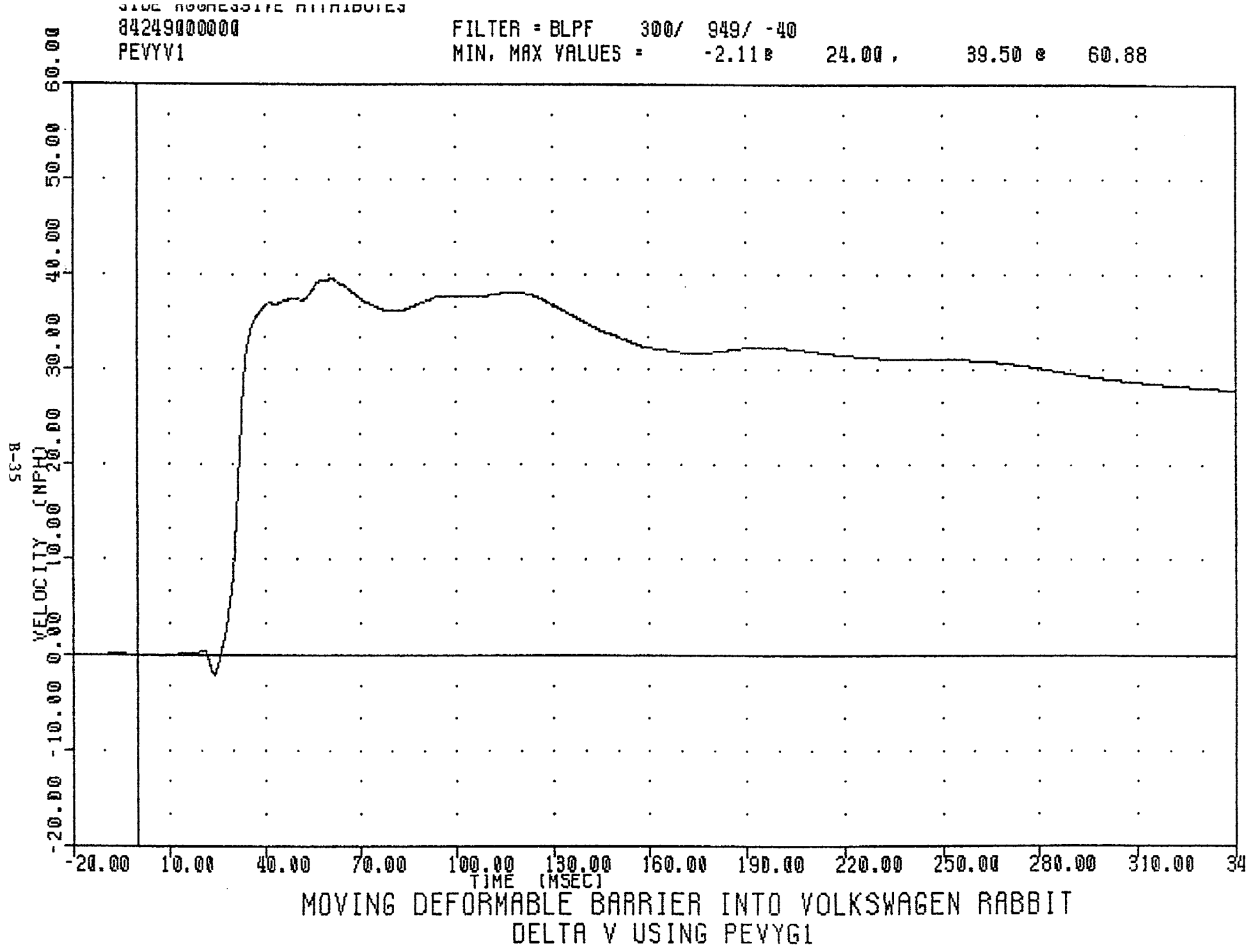
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER PELVIS ACCELERATION Y AXIS

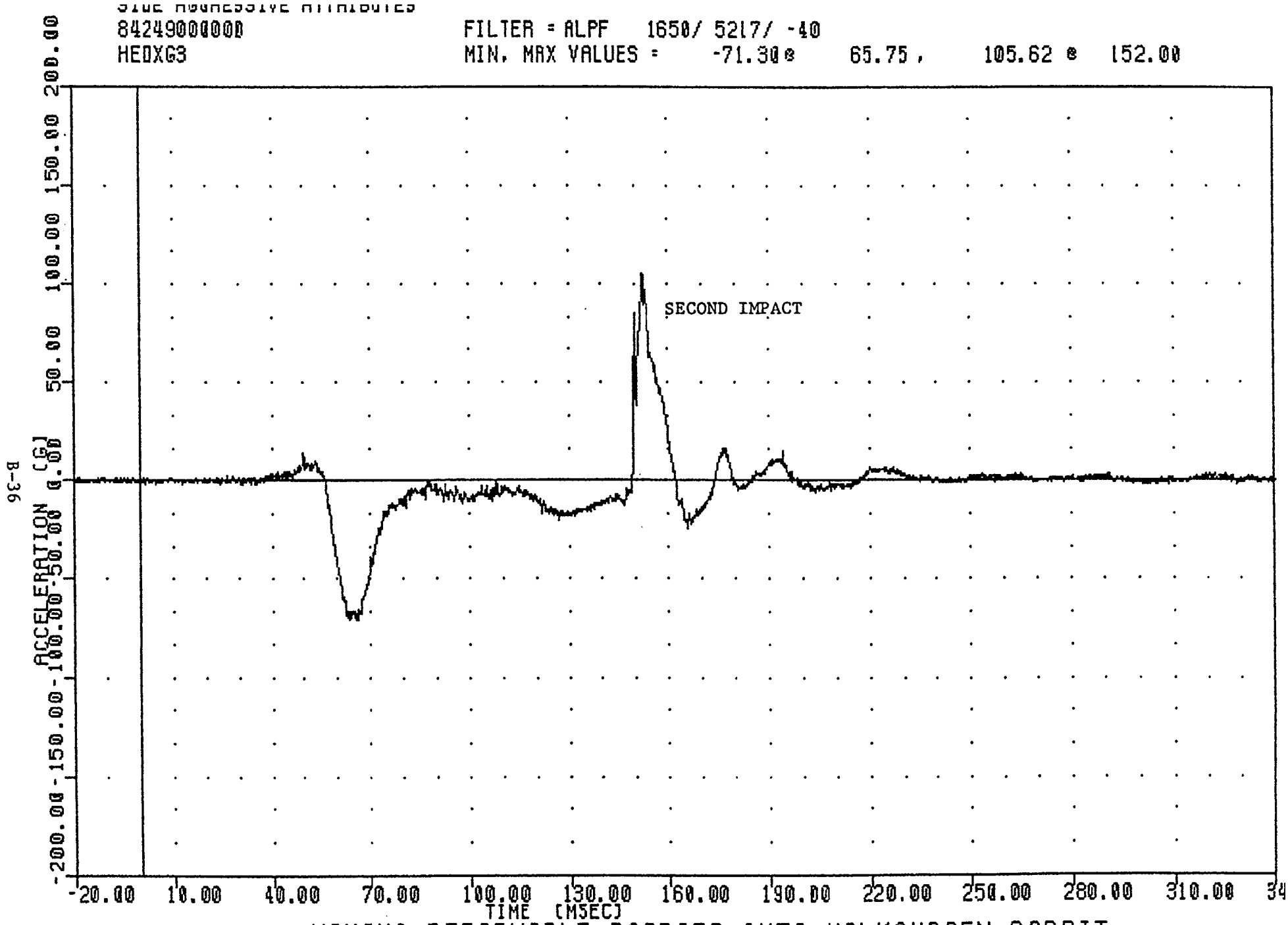


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER PELVIS ACCELERATION Z AXIS

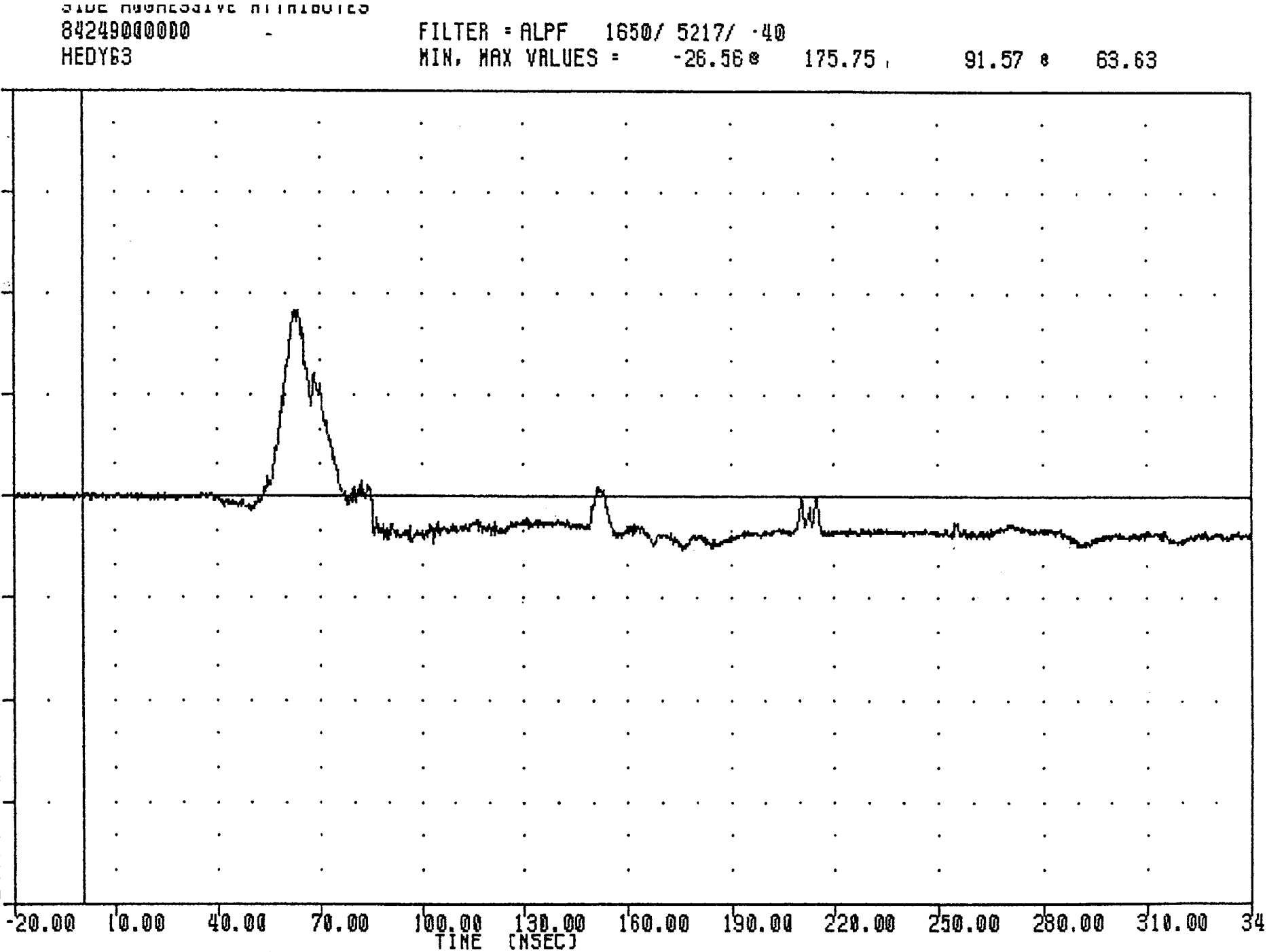


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER PELVIS RESULTANT

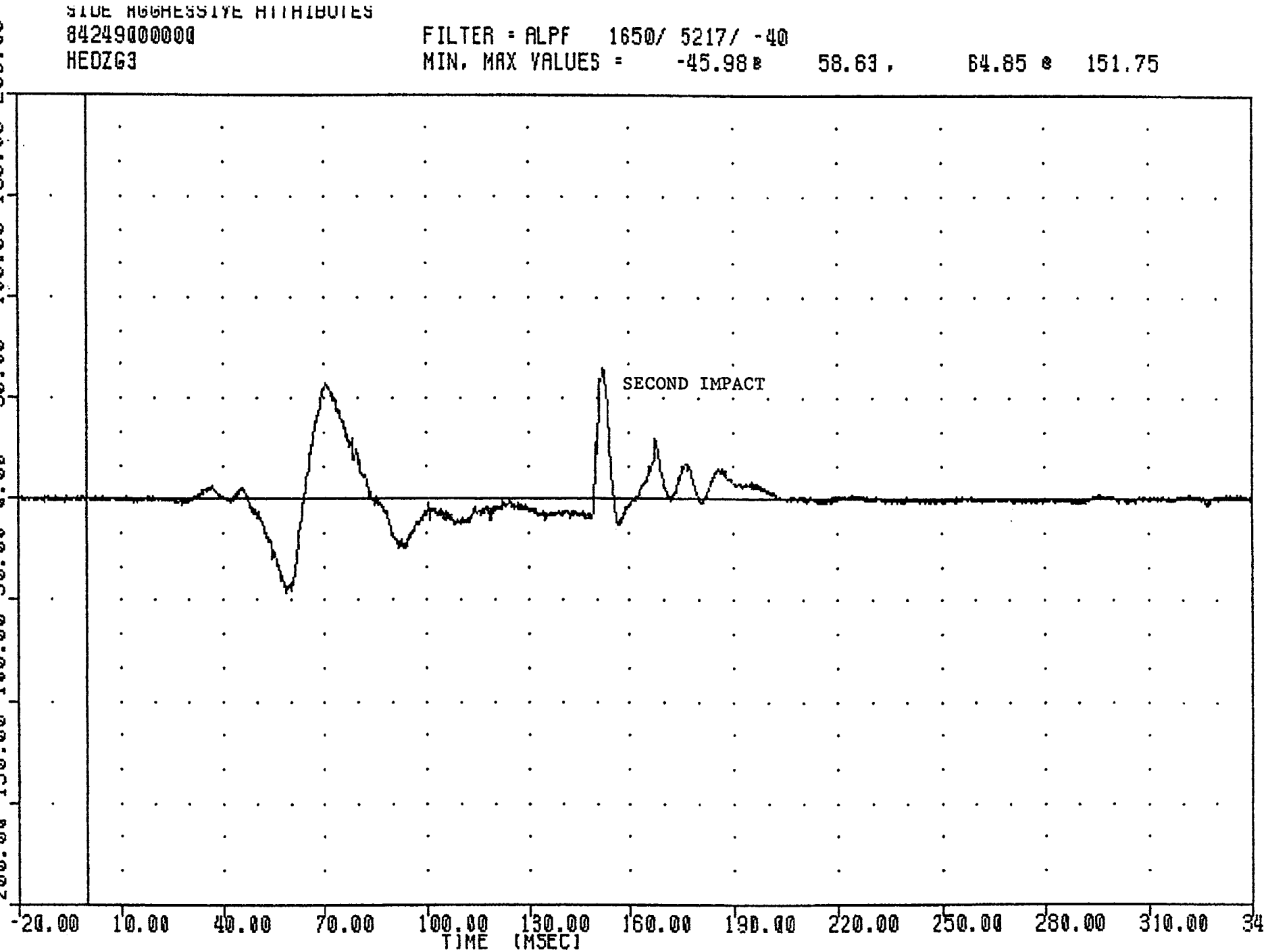

SIDE AGGRESSIVE ATTRIBUTES
84249000000
PEVYV1
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -2.11 @ 24.00 , 39.50 @ 60.88
60.00
50.00
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
VELOCITY (MPH)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
34
TIME (MSEC)
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING PEVYG1



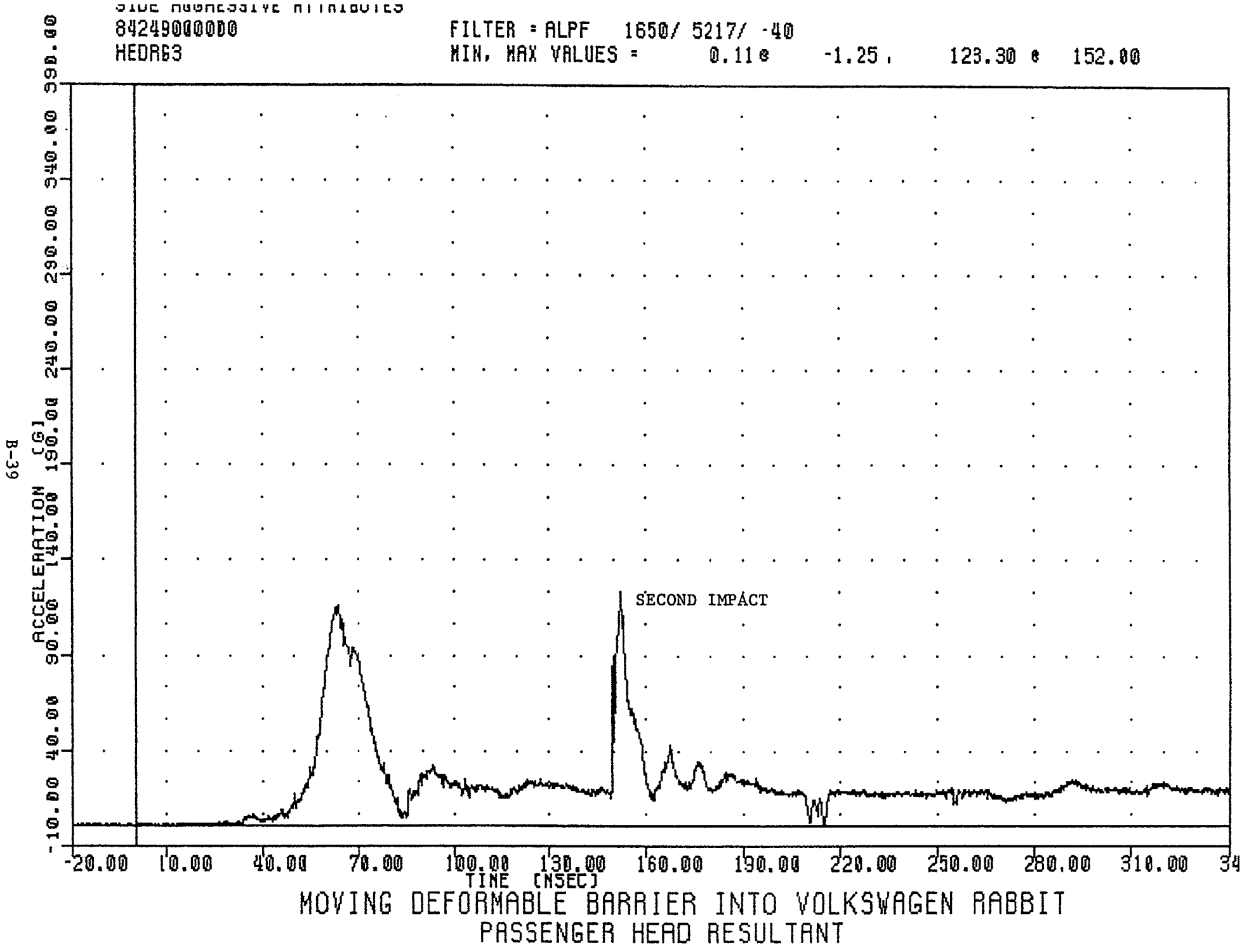
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD ACCELERATION X AXIS



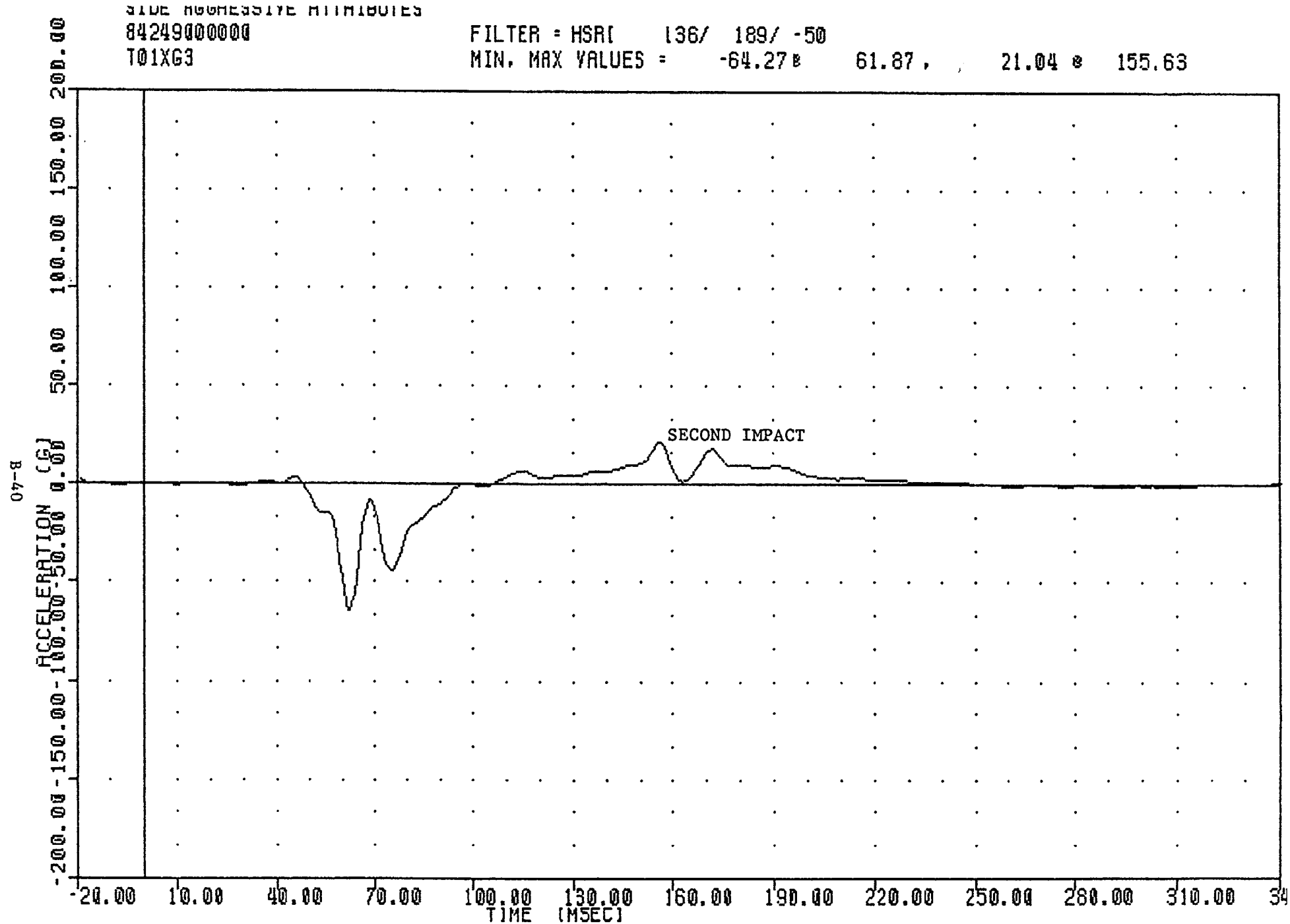
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD ACCELERATION Y AXIS



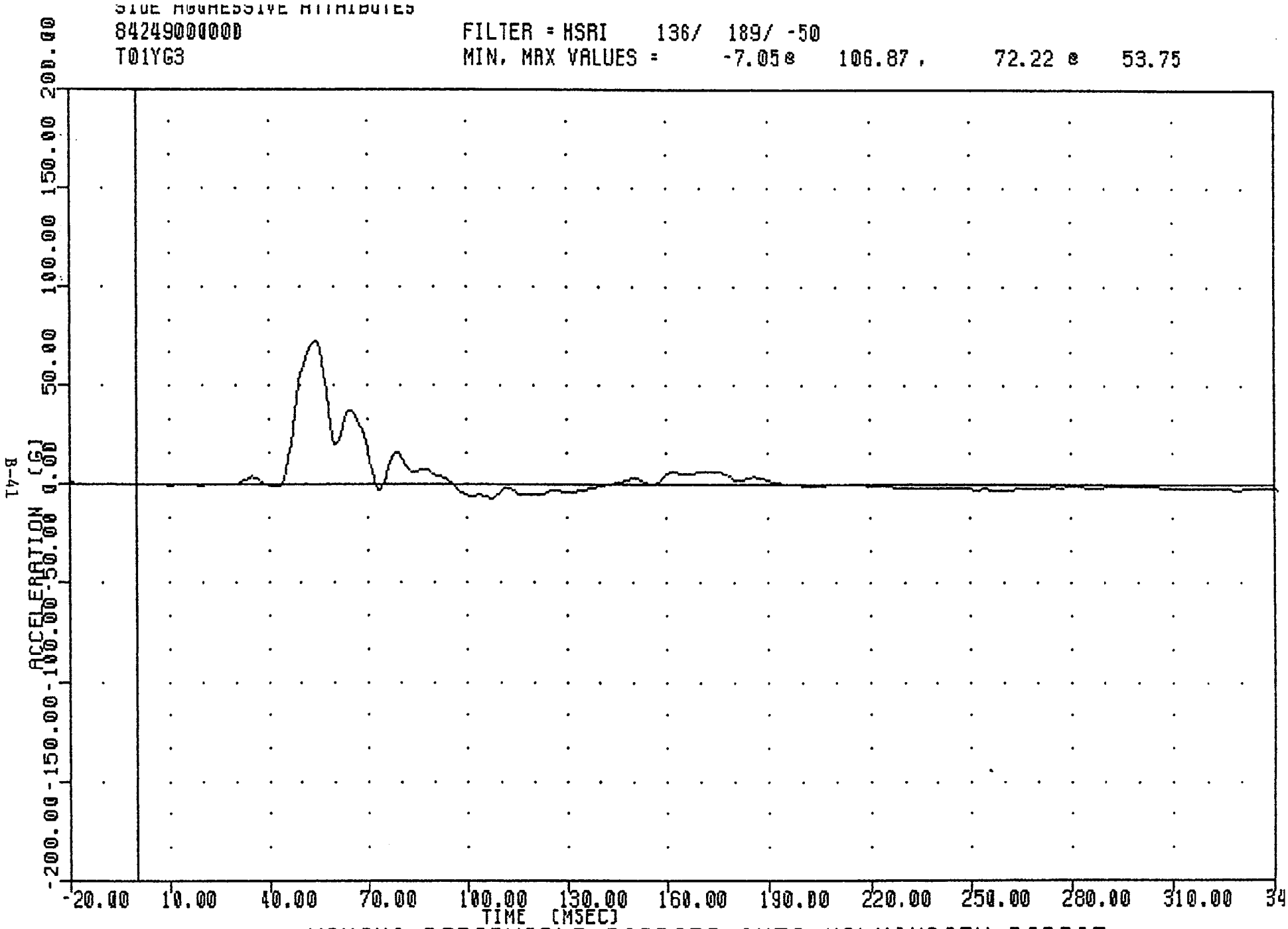
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD ACCELERATION Z AXIS



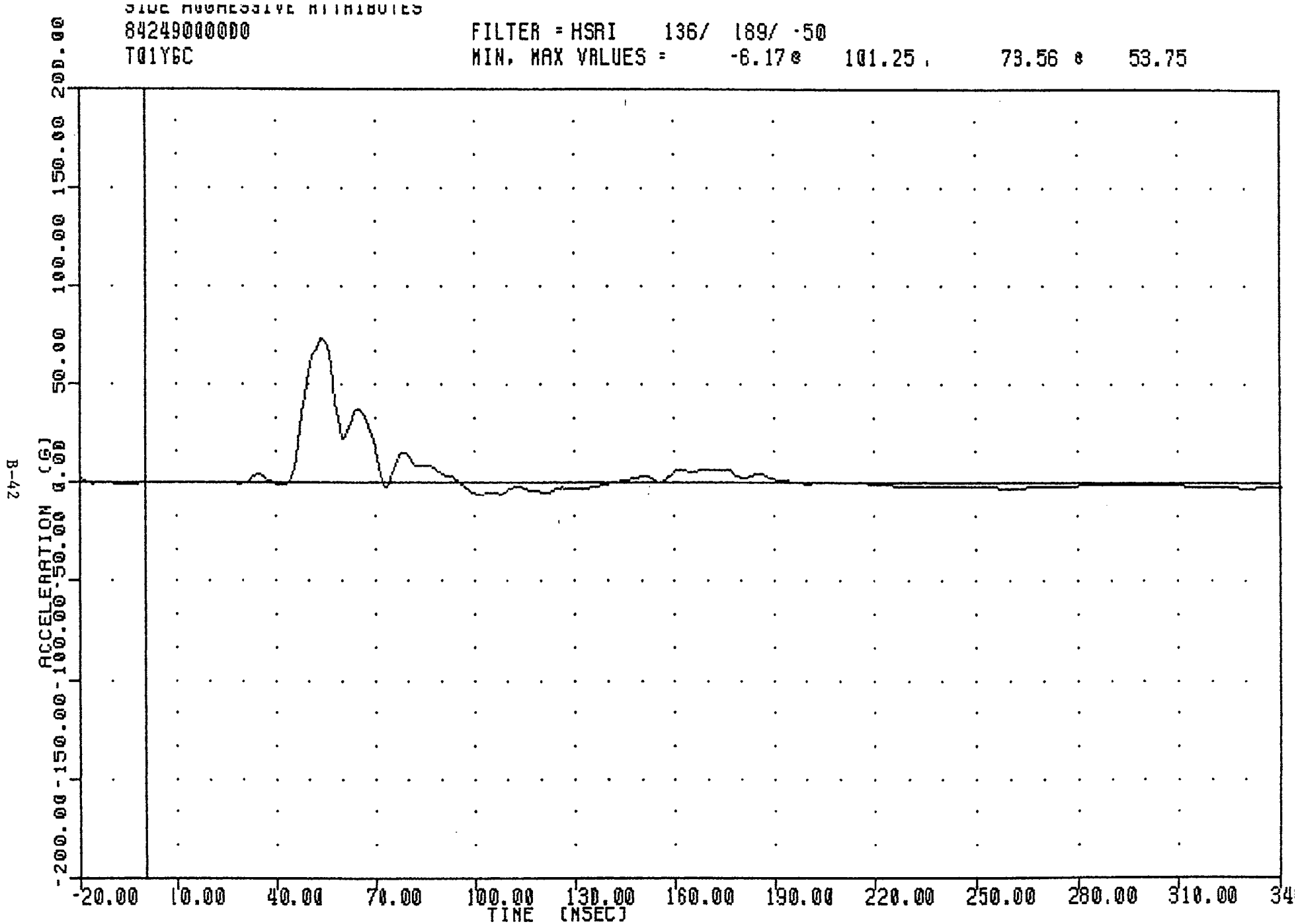
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD RESULTANT



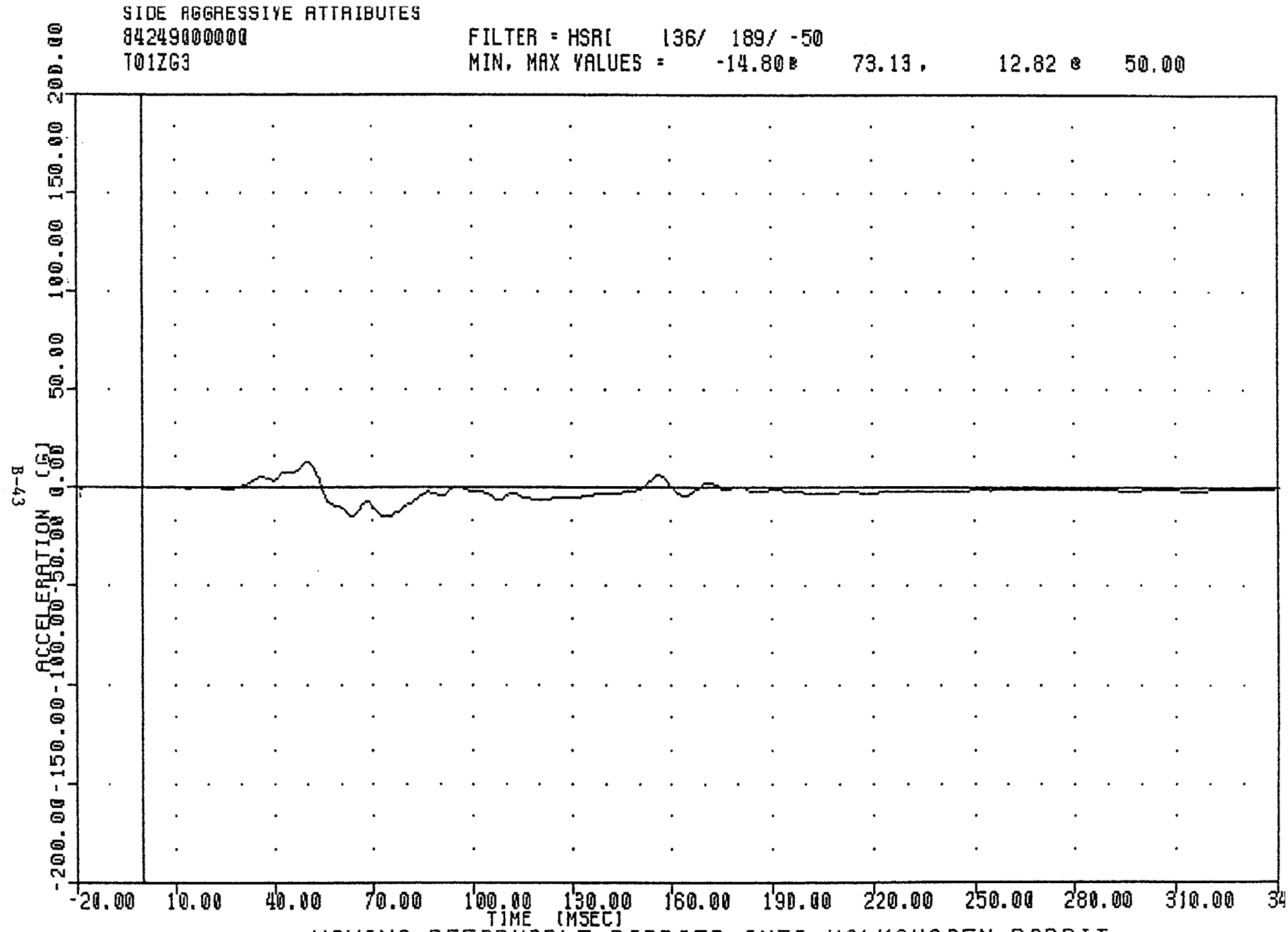
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE ACCELERATION X AXIS



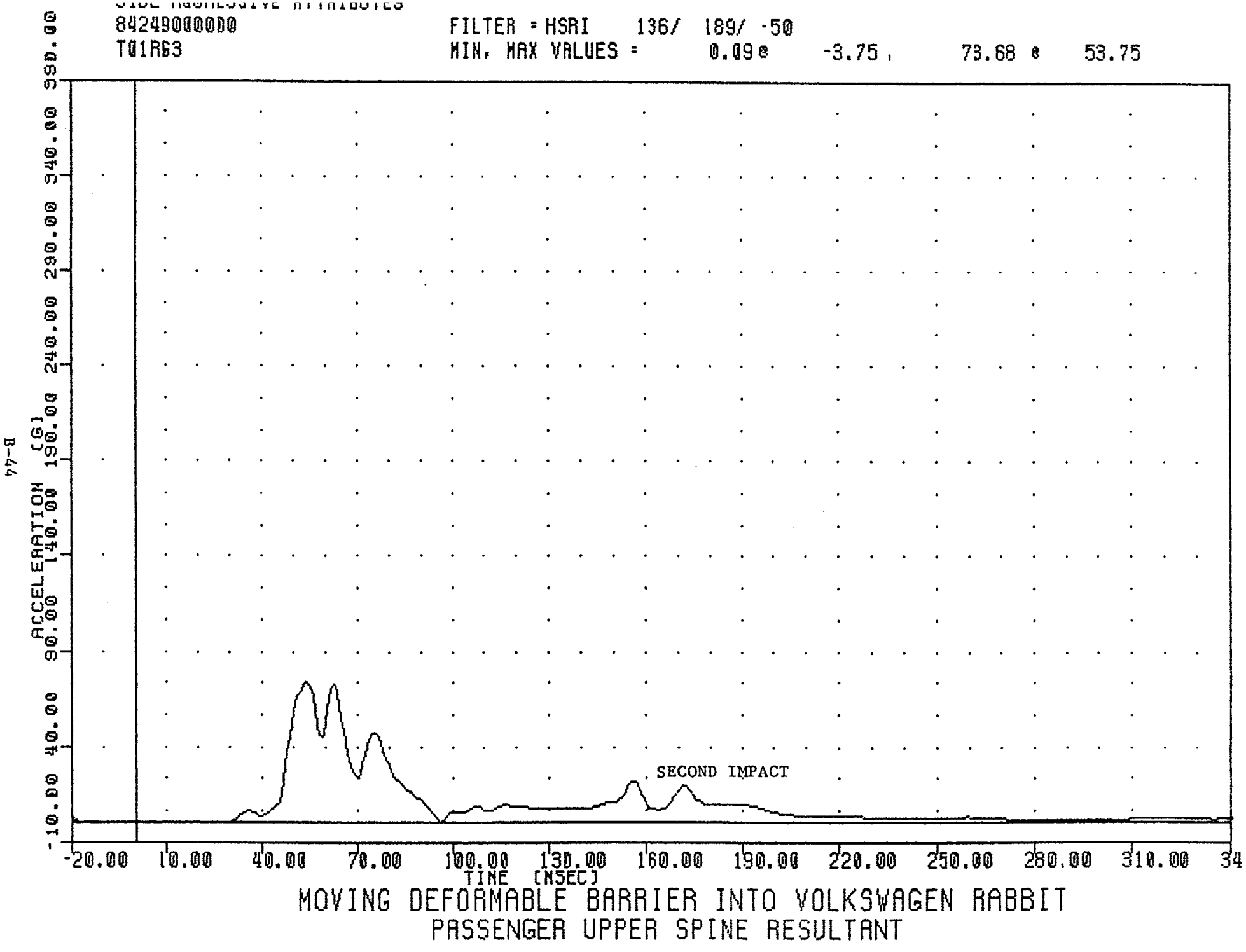
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE ACCELERATION Y AXIS



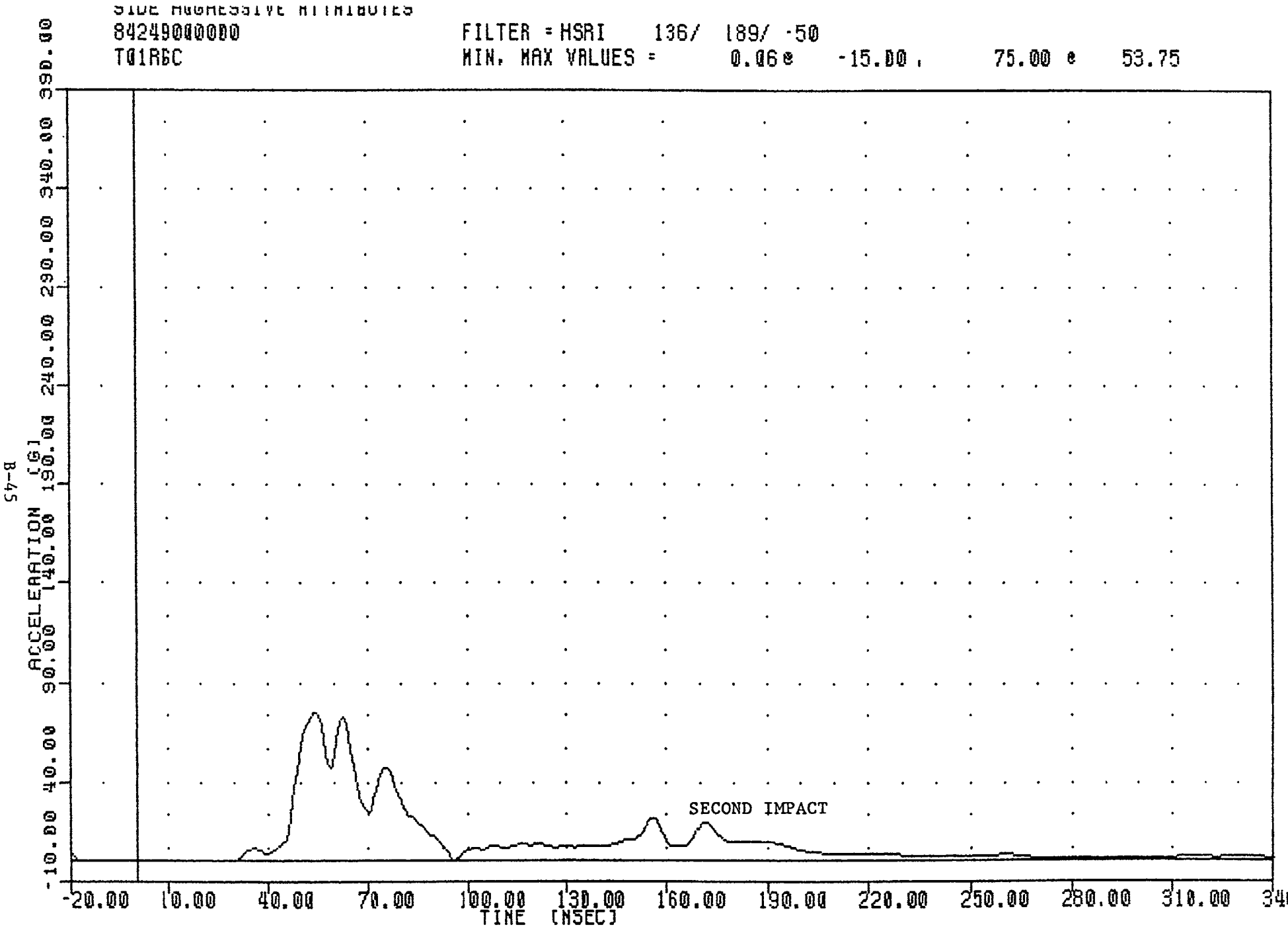
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE ACCELERATION -2 Y AXIS



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



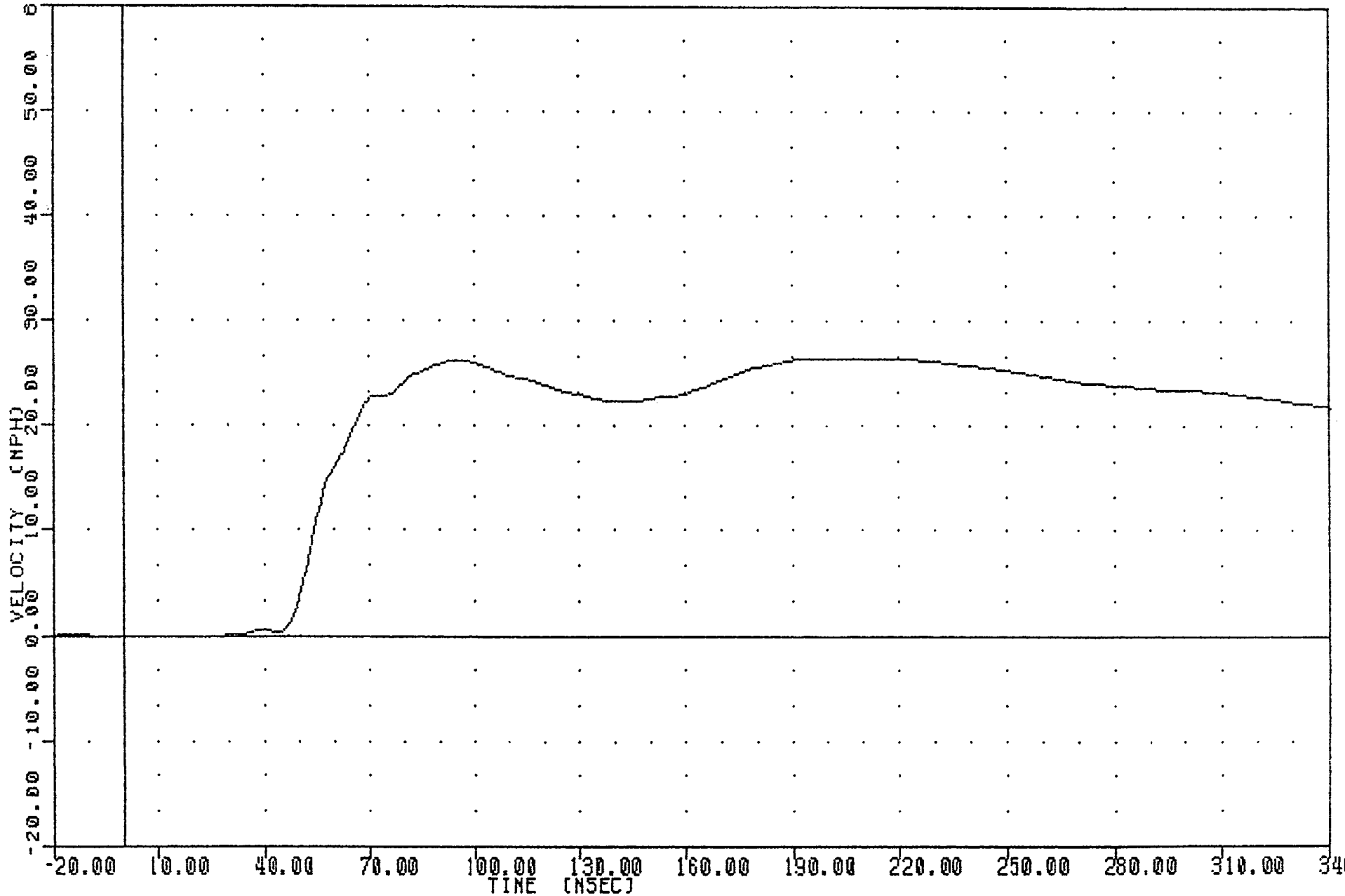
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE RESULTANT



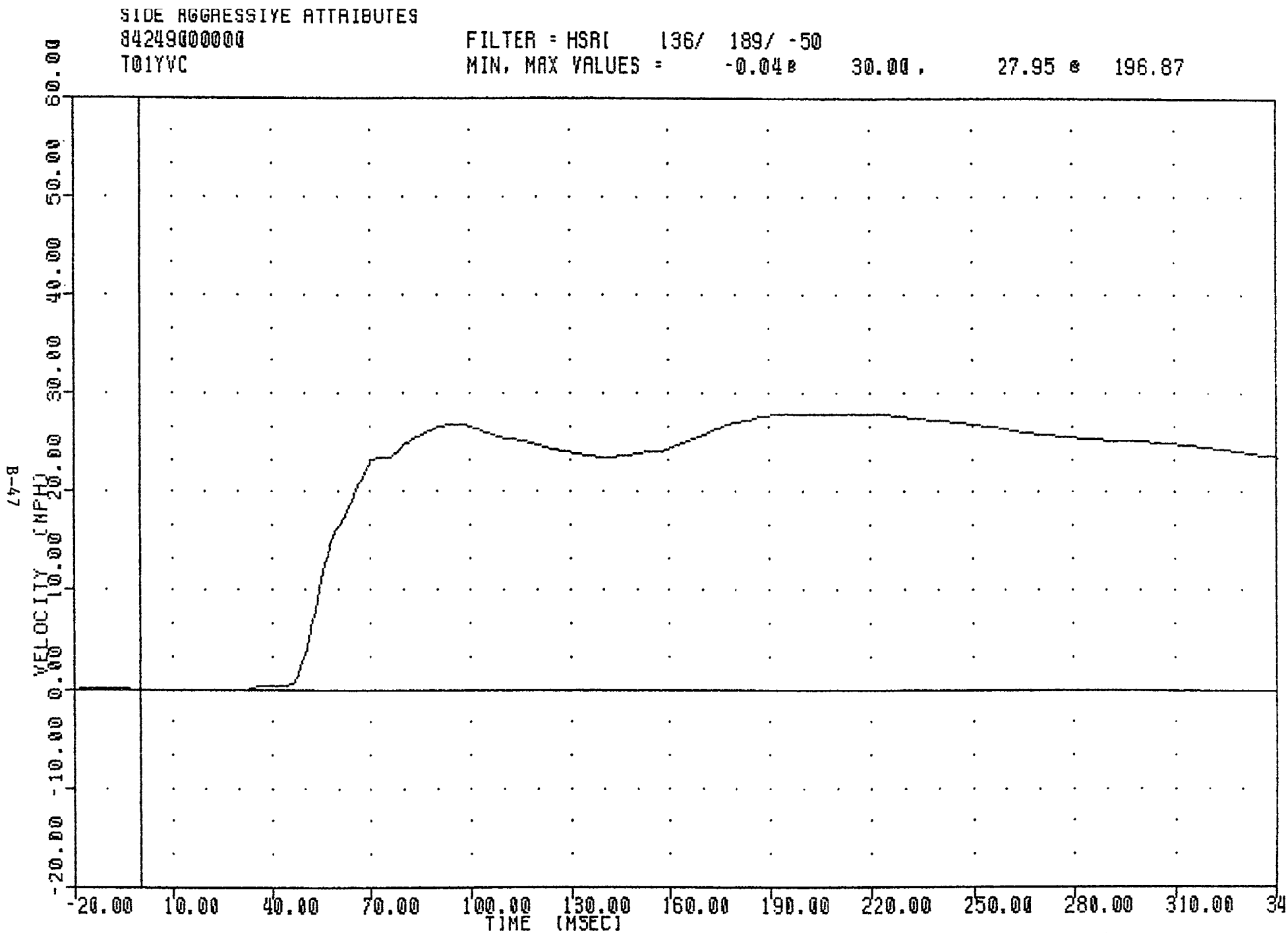
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE RESULTANT USING T01YGC

84249000000 FILTER = HSRI 136/ 189/ -50

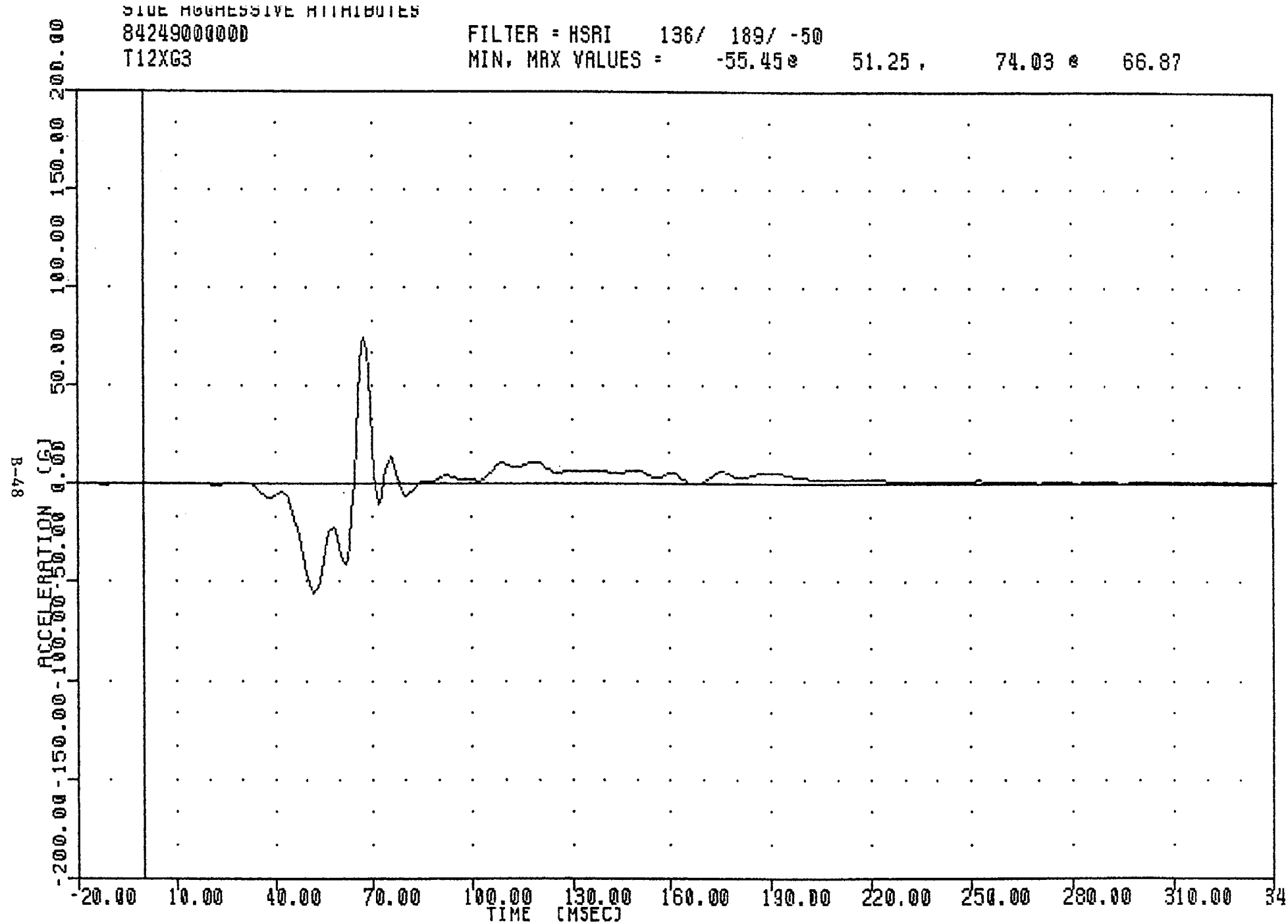
T01YV3 MIN, MAX VALUES = -0.03 @ 22.50 , 26.45 @ 197.50



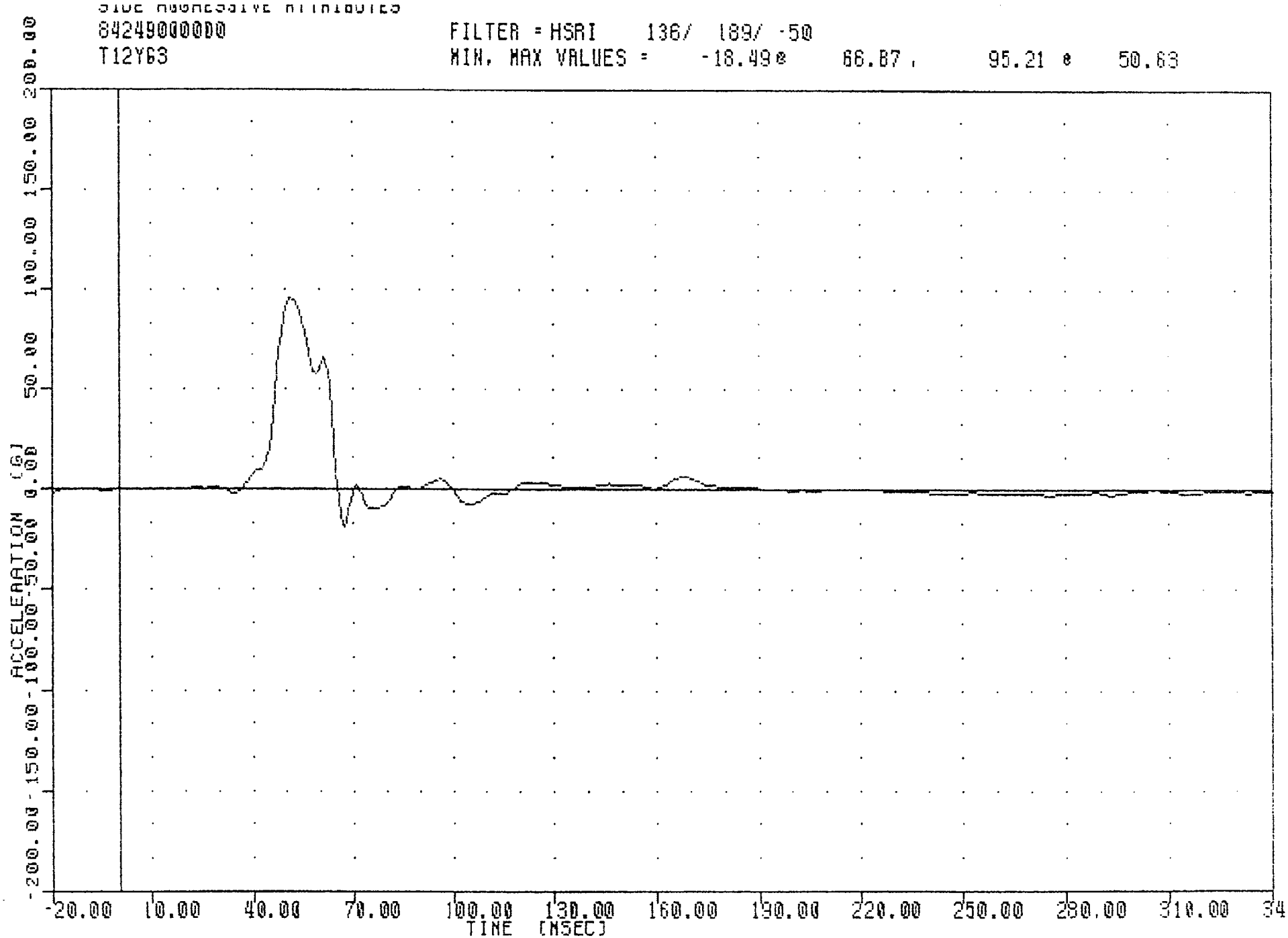
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T01YG3



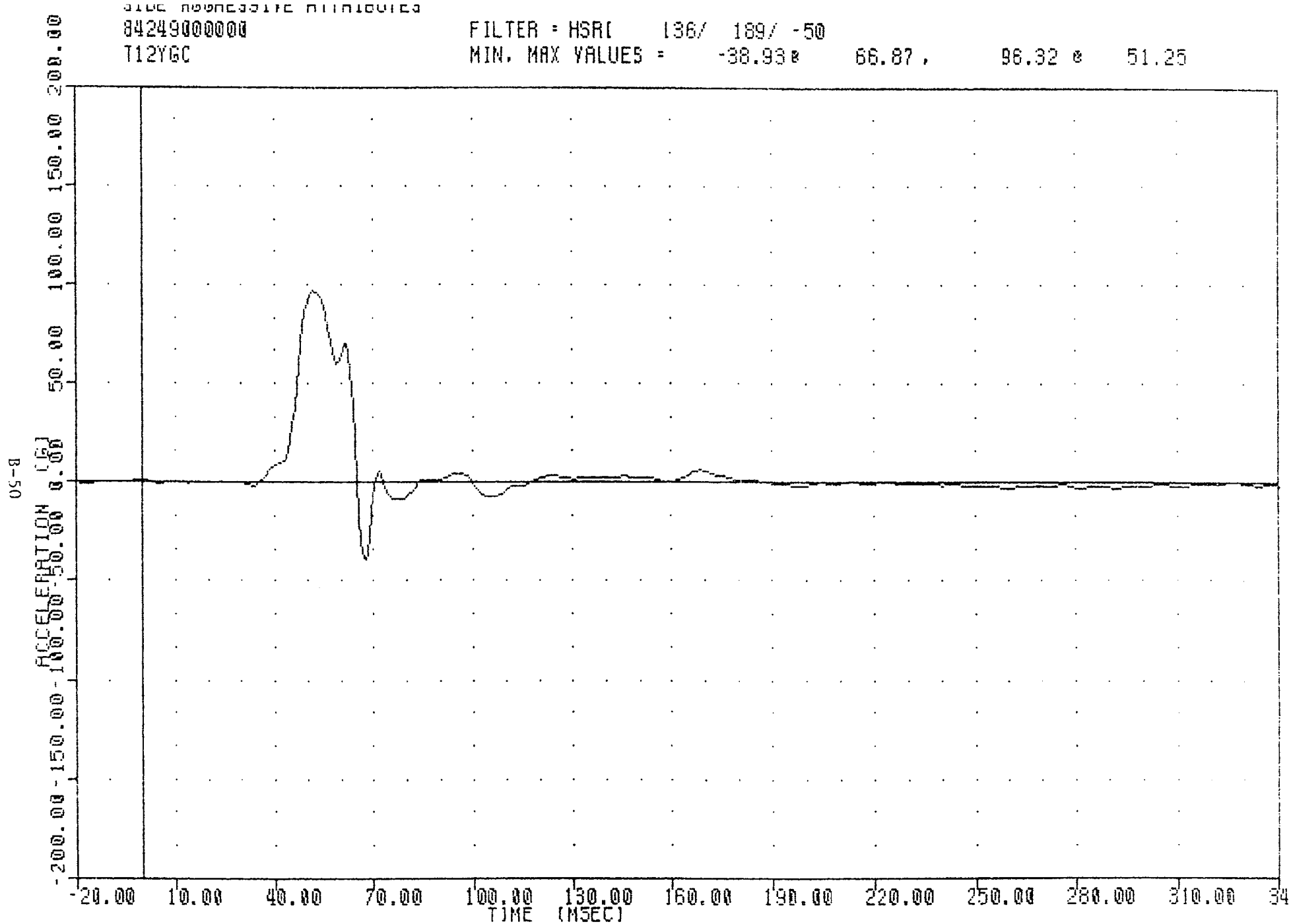
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T01YGC



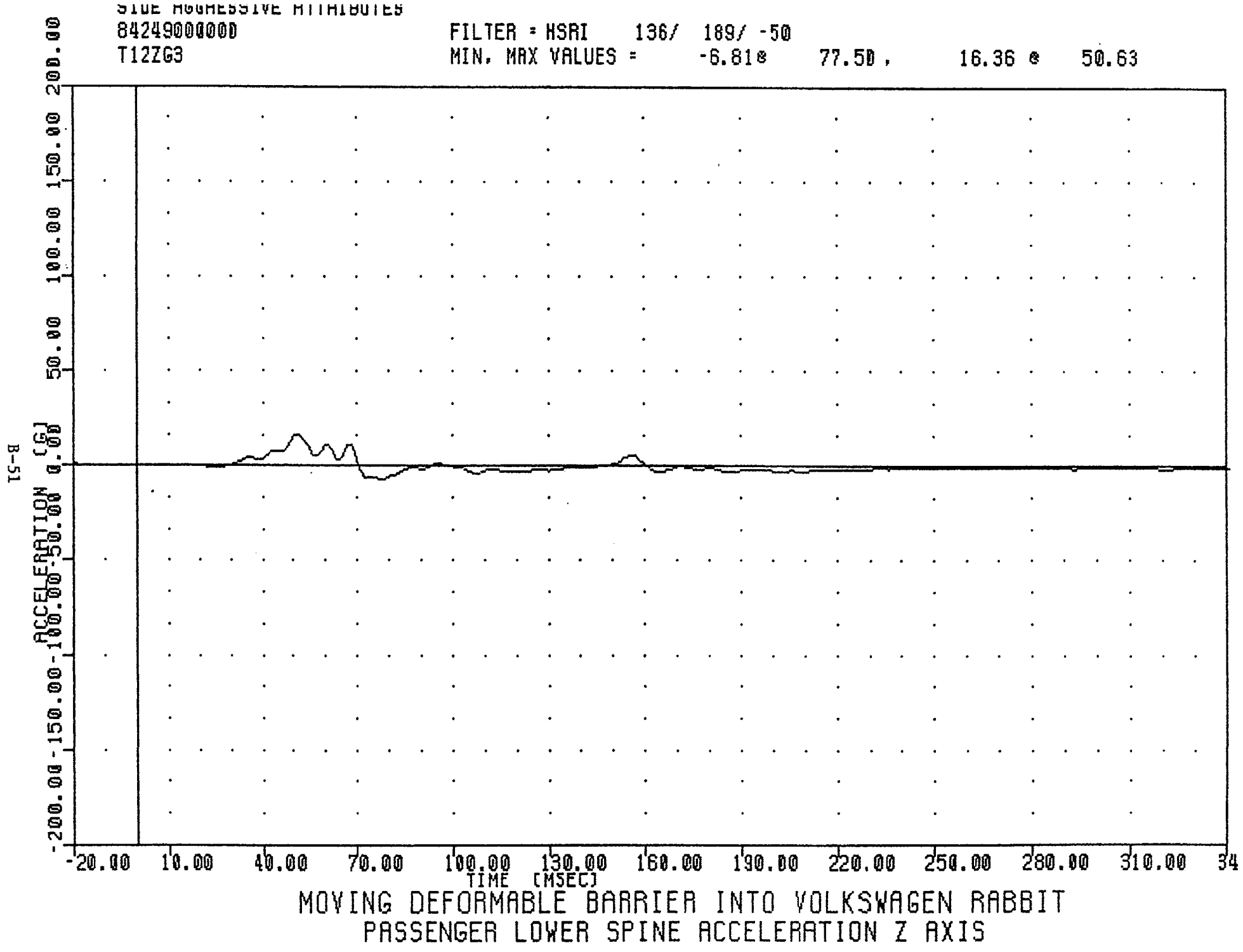
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE ACCELERATION X AXIS



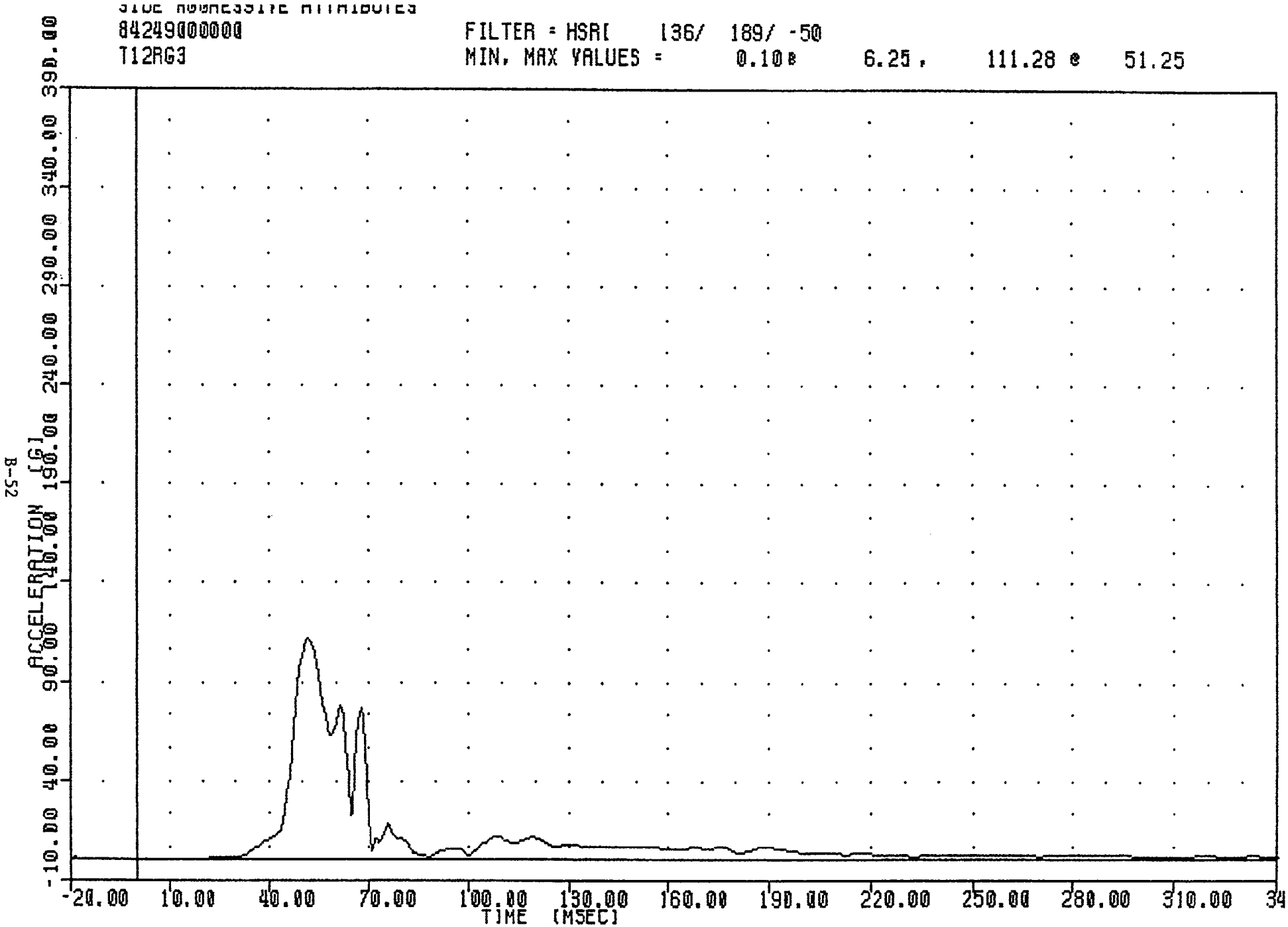
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE ACCELERATION Y AXIS



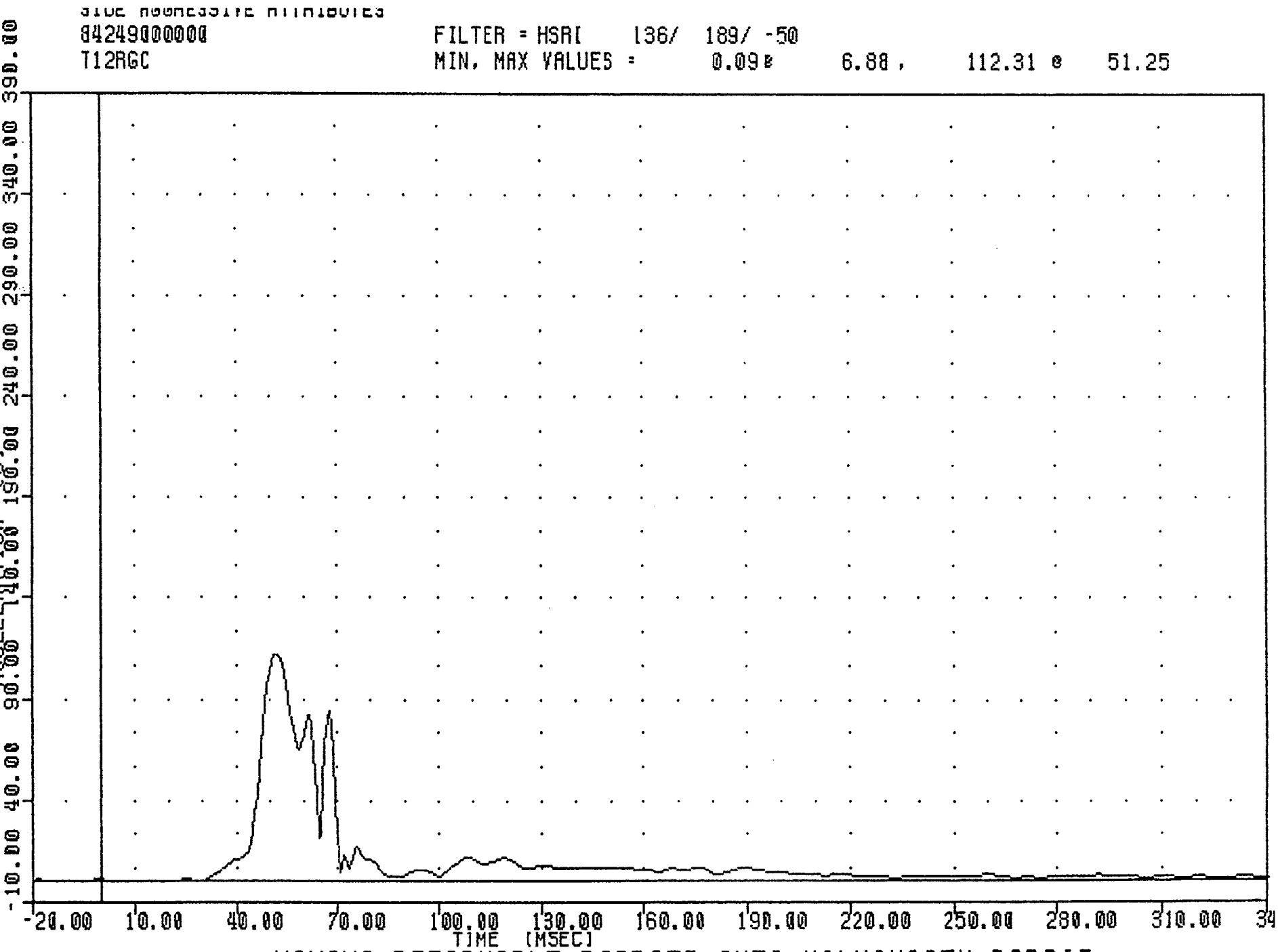
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE ACCELERATION -Z Y AXIS



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

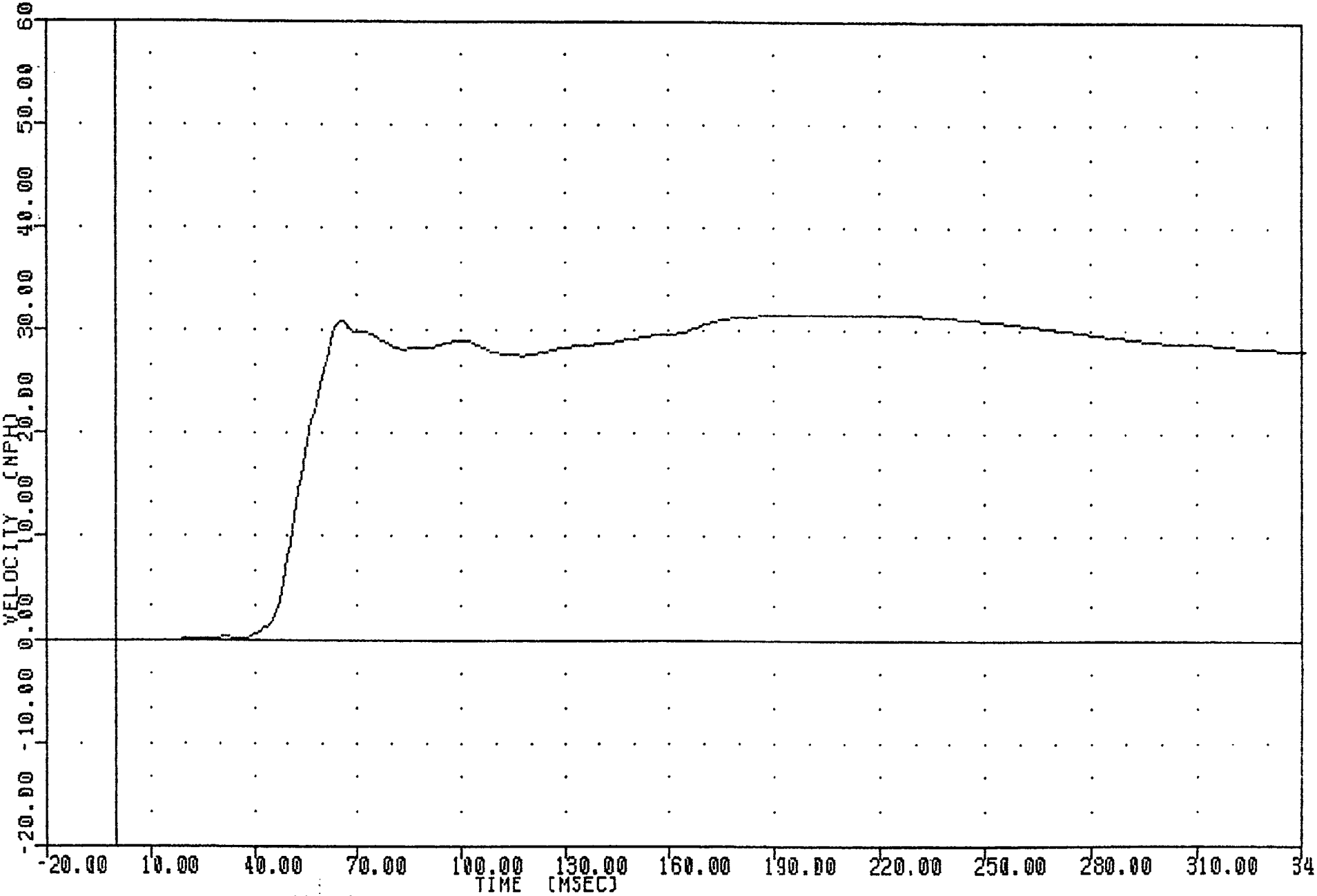


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE RESULTANT

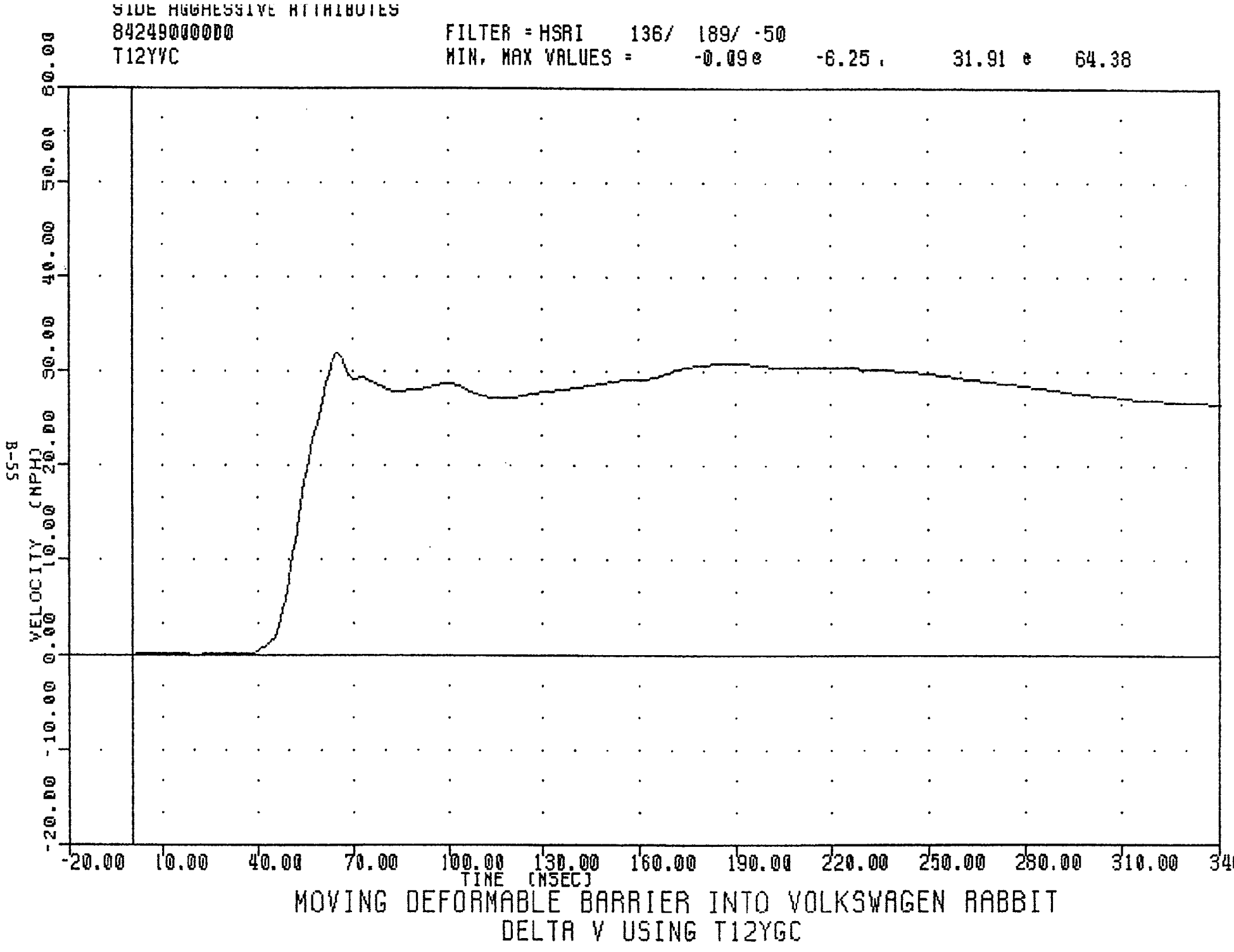


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE RESULTANT USING T12YGC

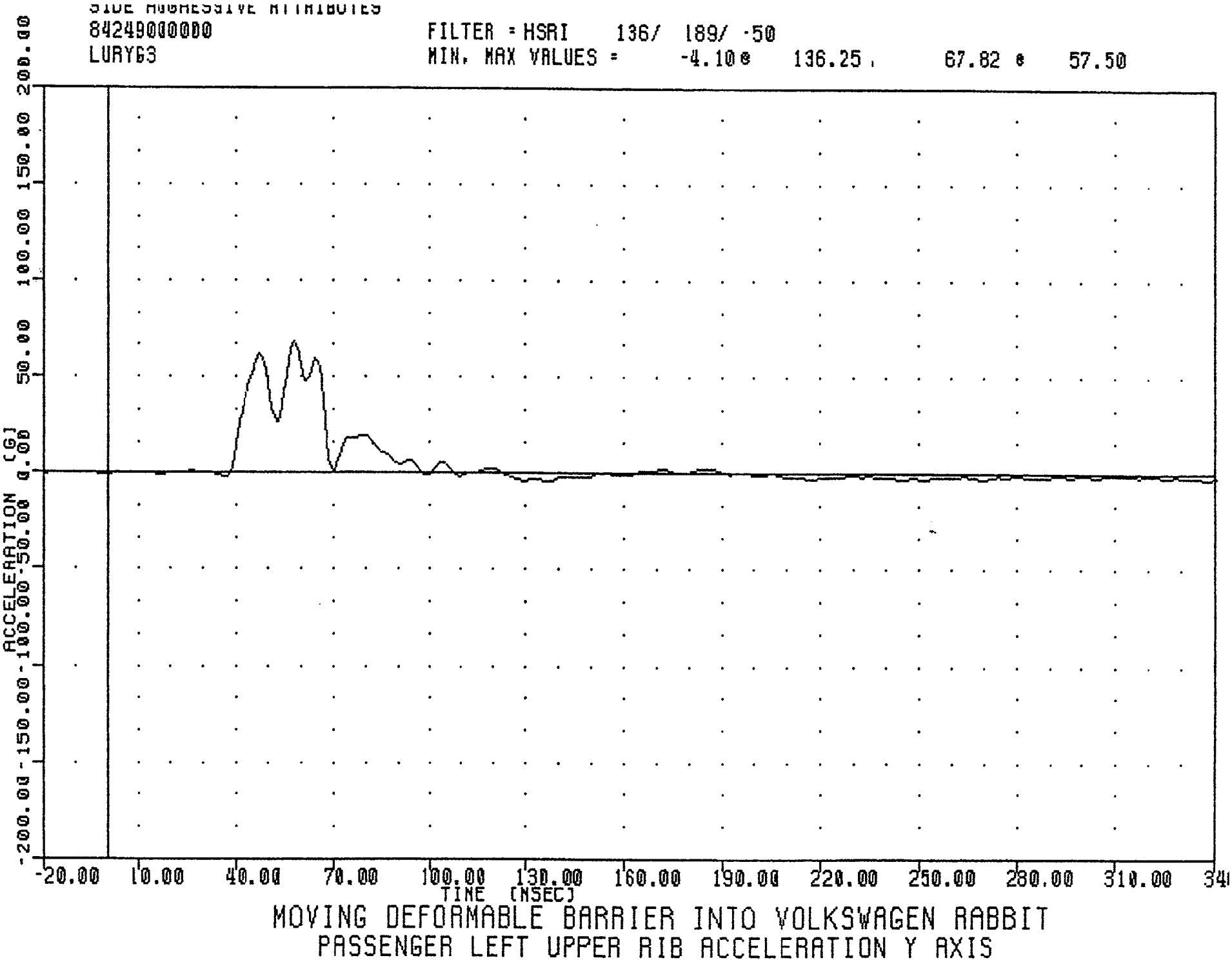
SIDE AGGRESSIVE ATTRIBUTES
84249000000
T12YV3
FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -0.06 @ 0.00 , 31.57 @ 195.62



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T12YG3

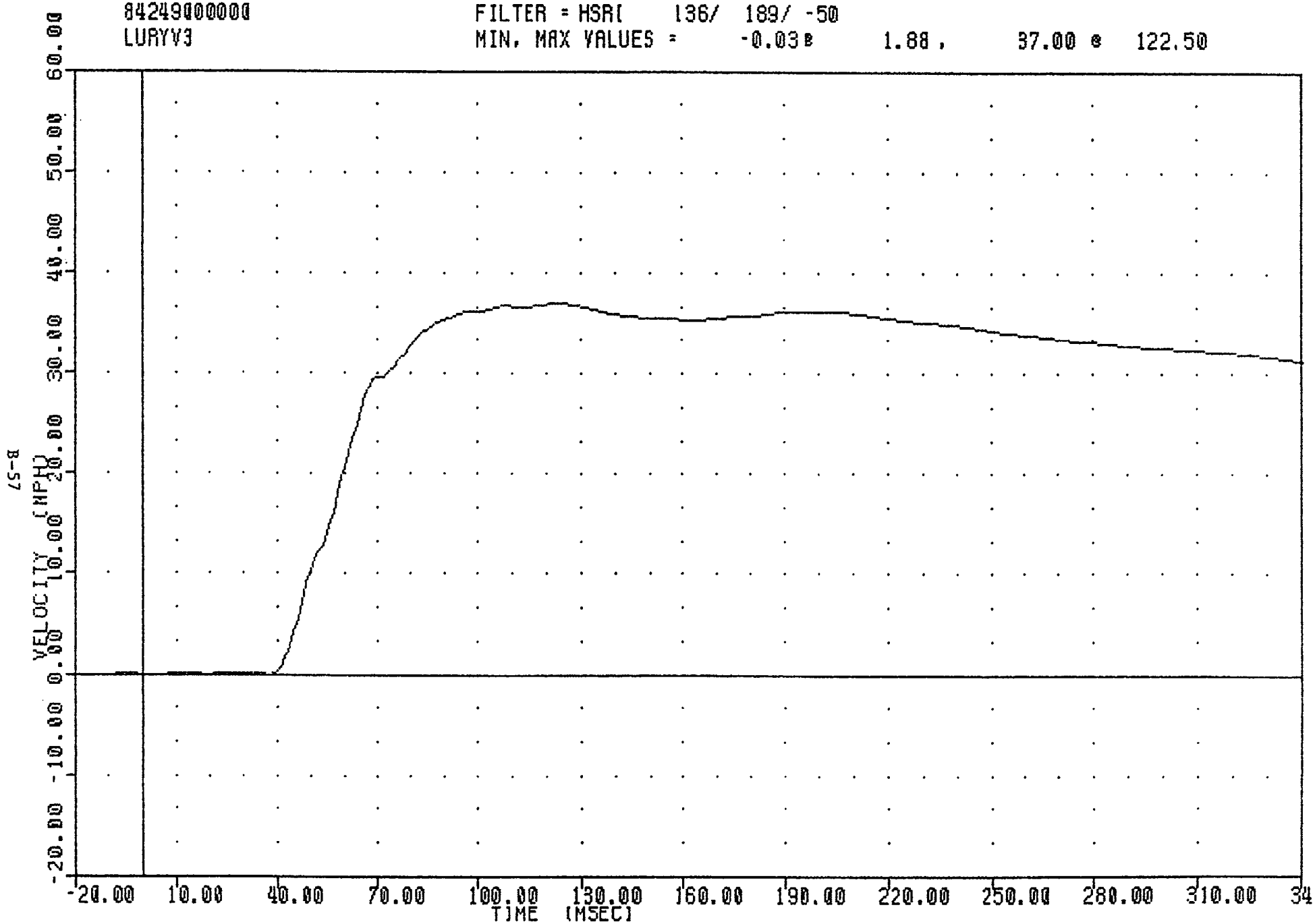


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T12YGC

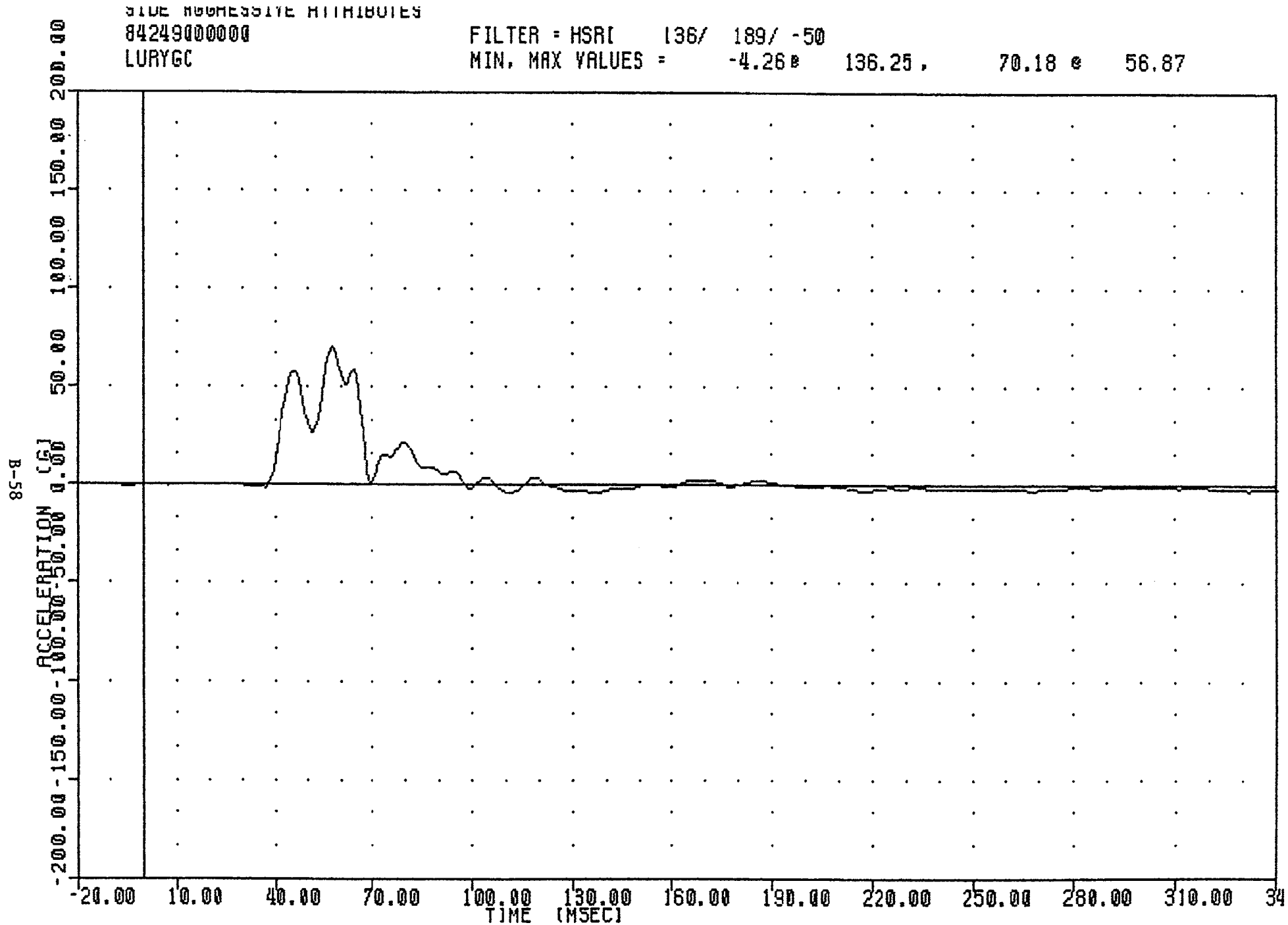


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT UPPER RIB ACCELERATION Y AXIS

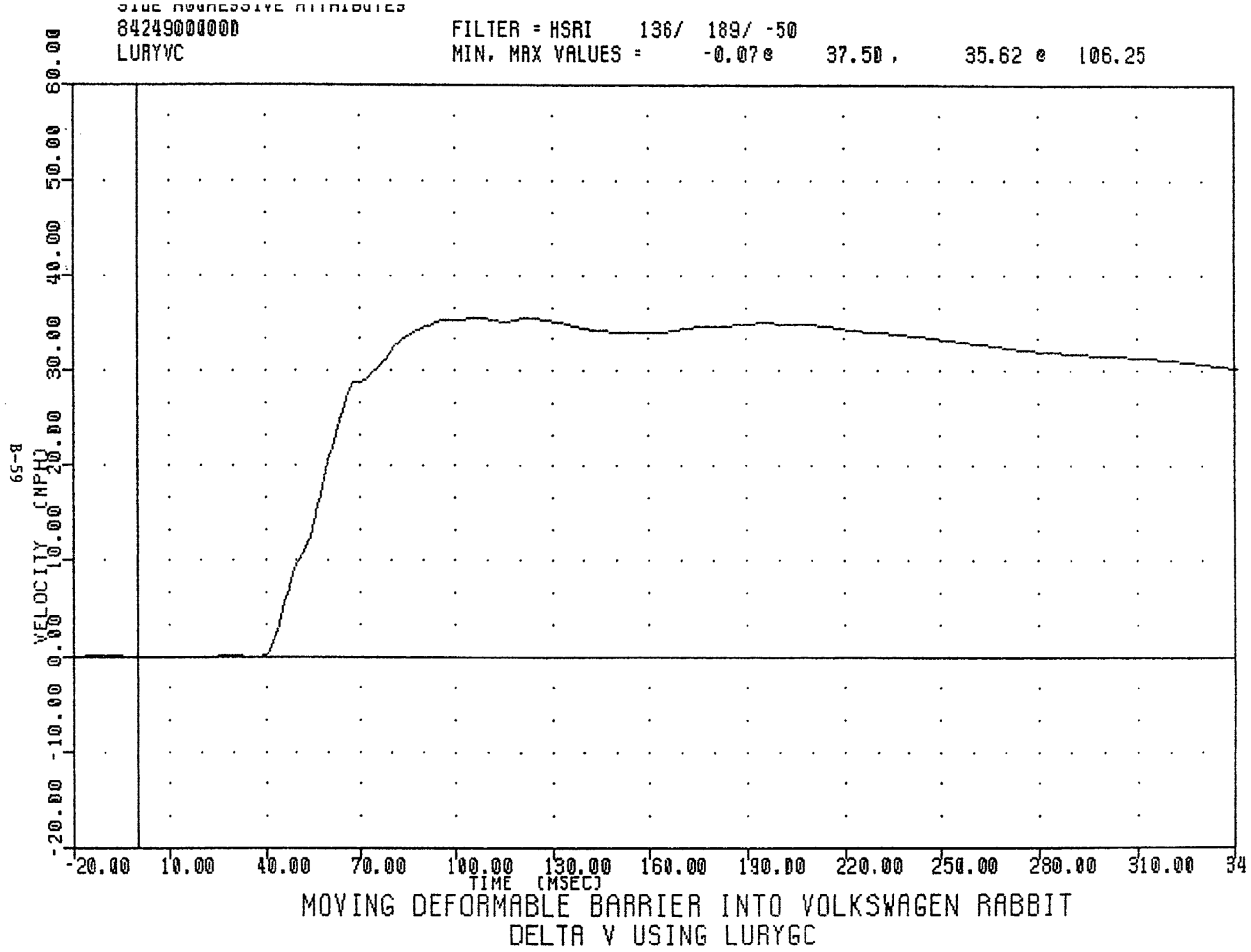
SIDE AGGRESSIVE ATTRIBUTES
842490000000
LURYV3
FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -0.03 @ 1.88 , 37.00 @ 122.50



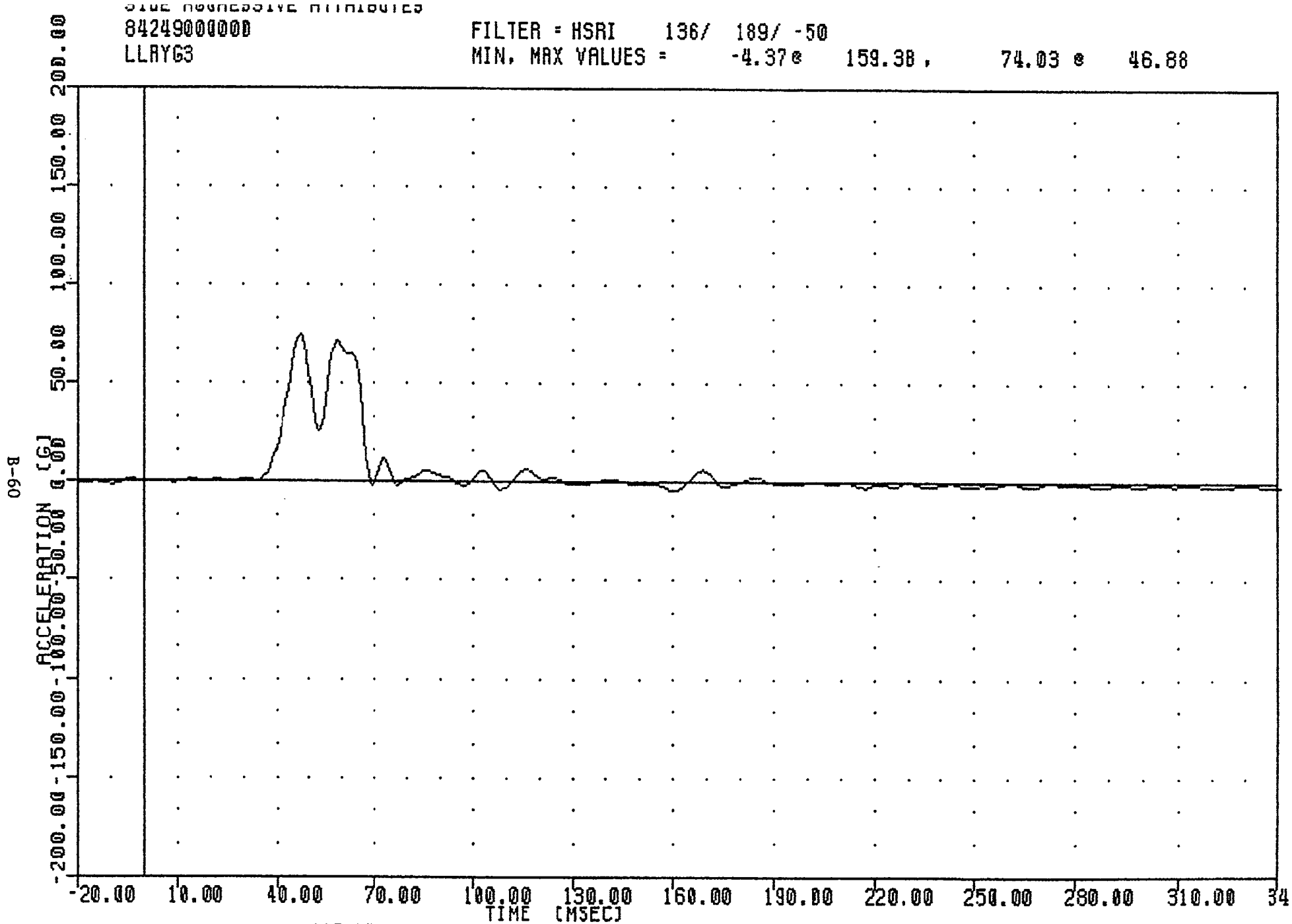
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LURYG3



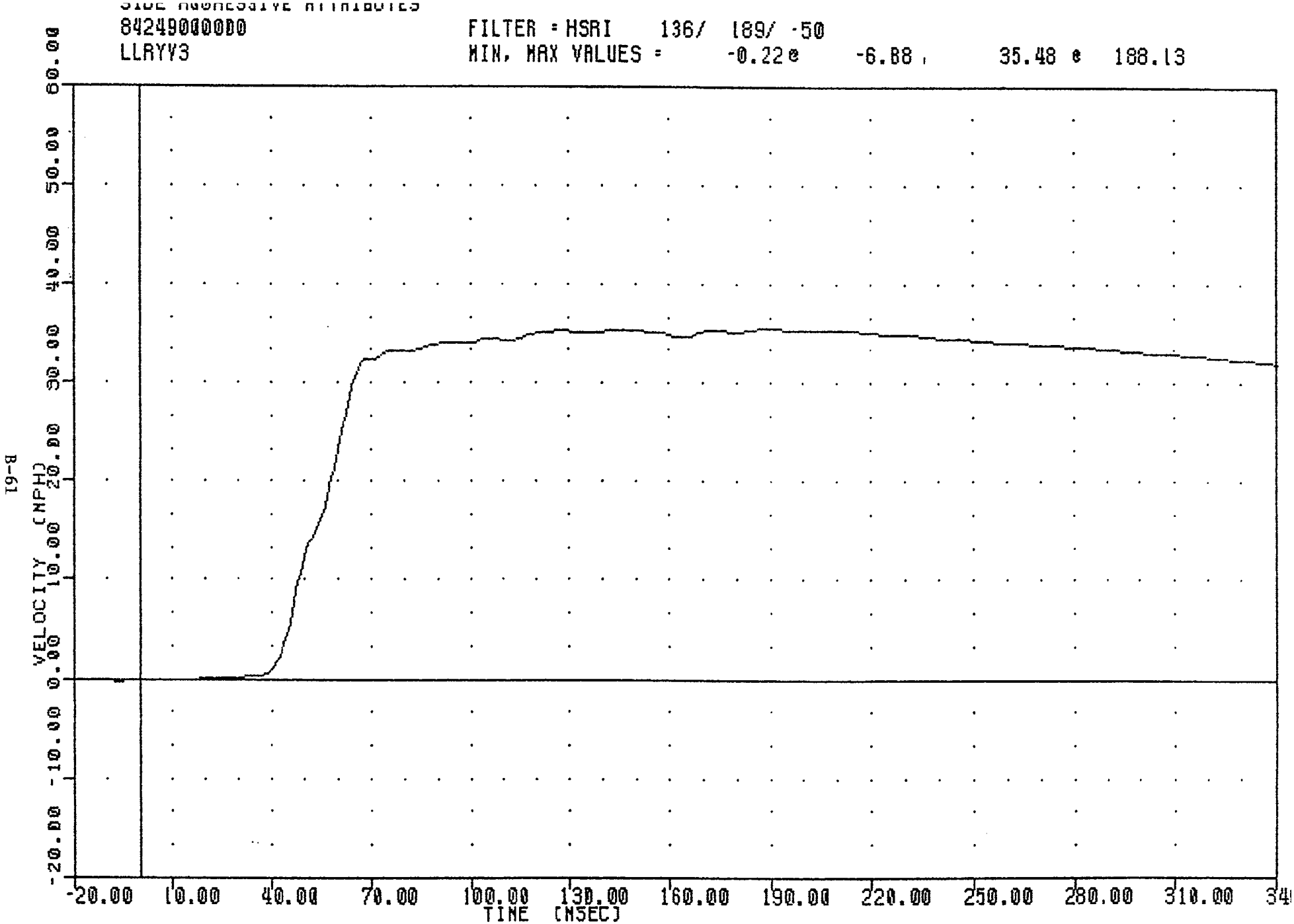
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT UPPER RIB ACCELERATION -2 Y AXIS



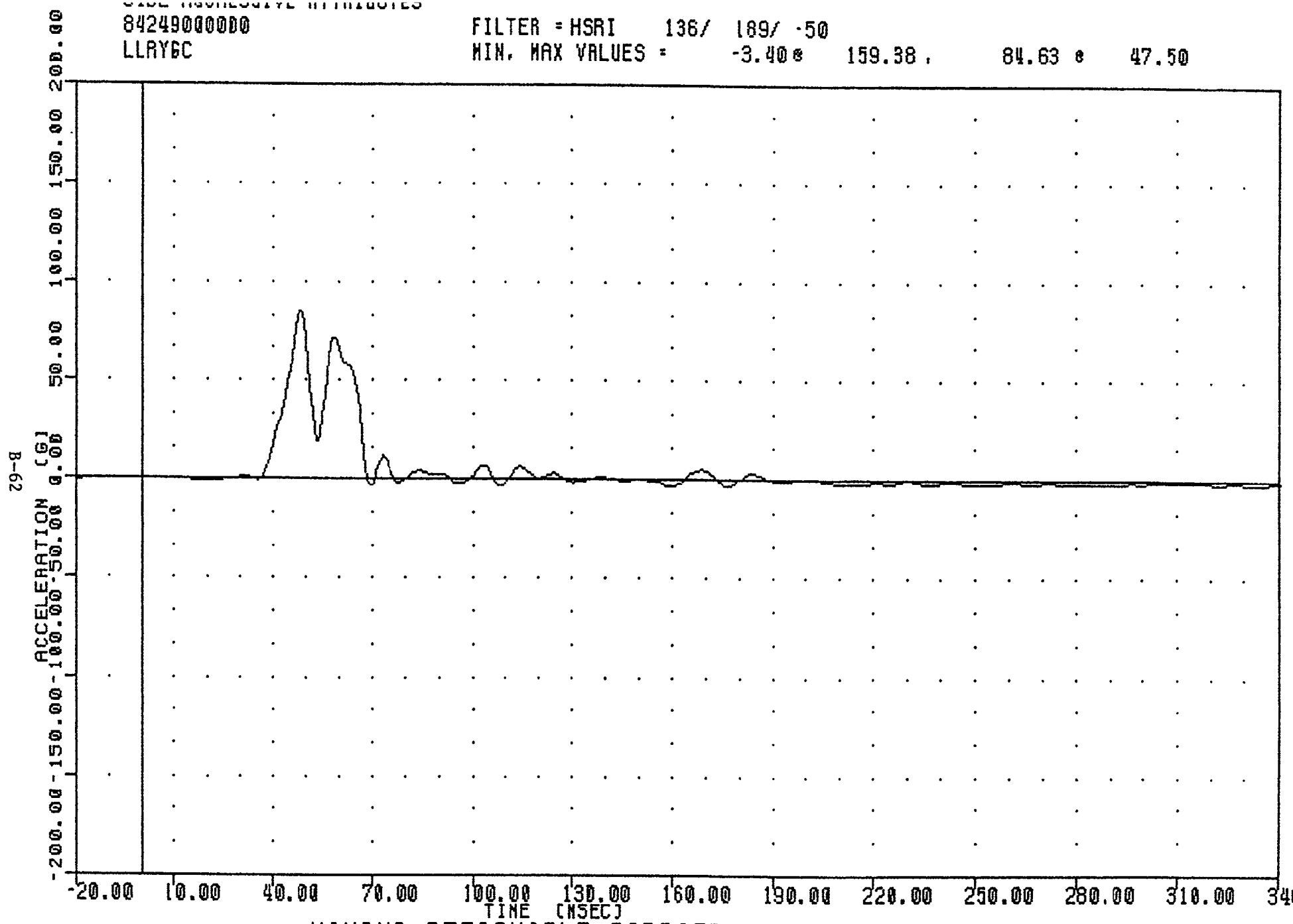
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LURYGC



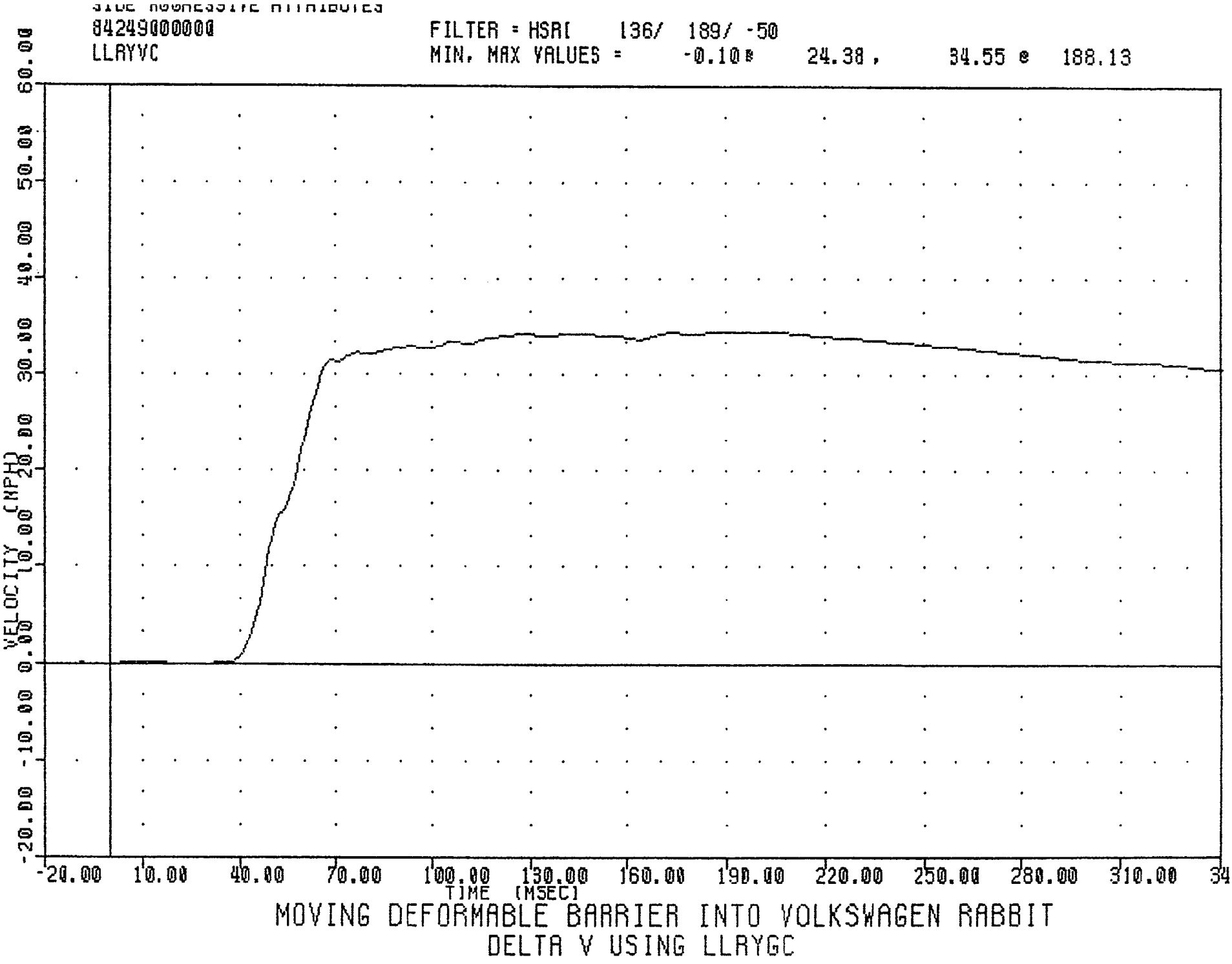
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT LOWER RIB ACCELERATION Y AXIS



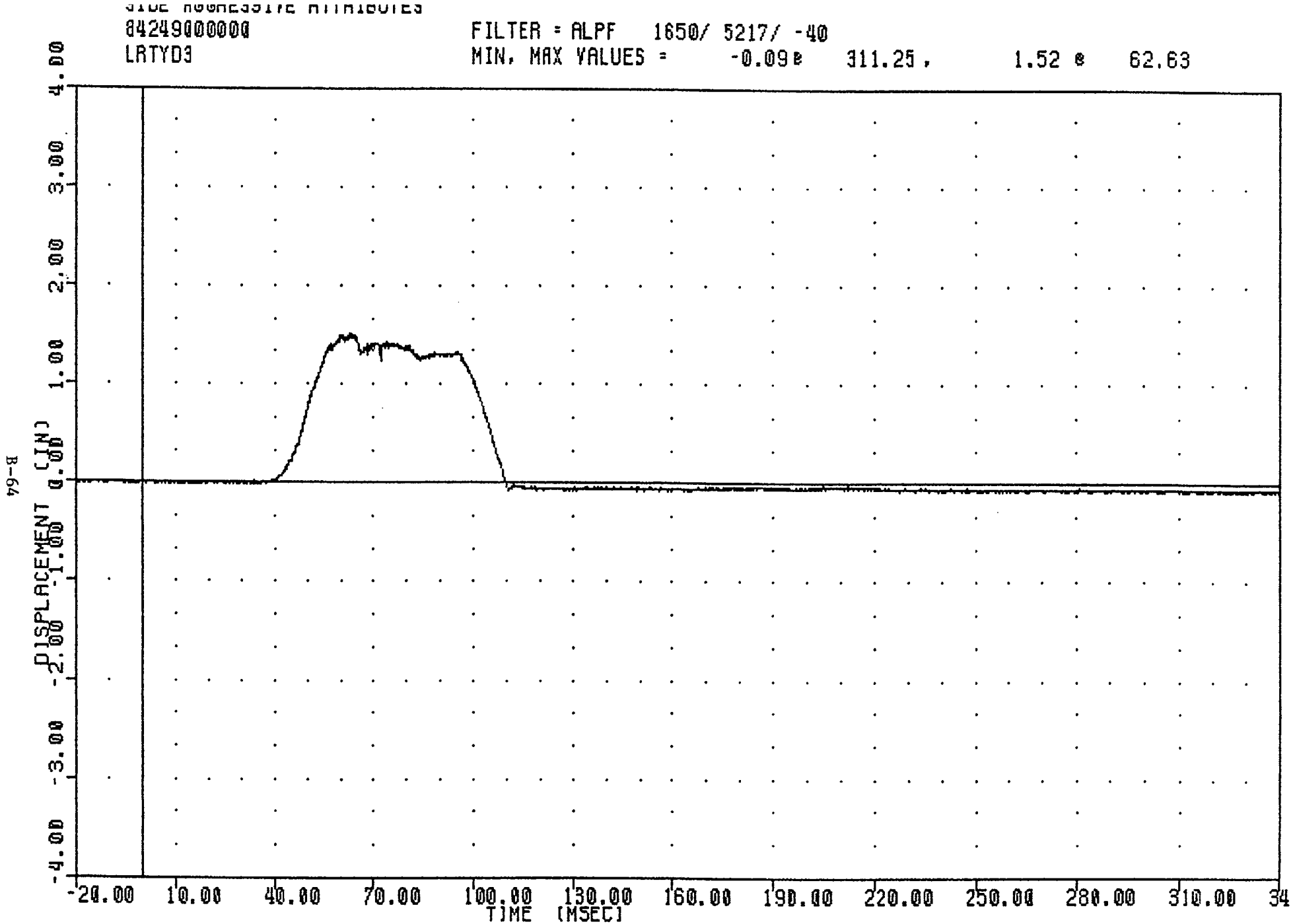
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LLRYG3



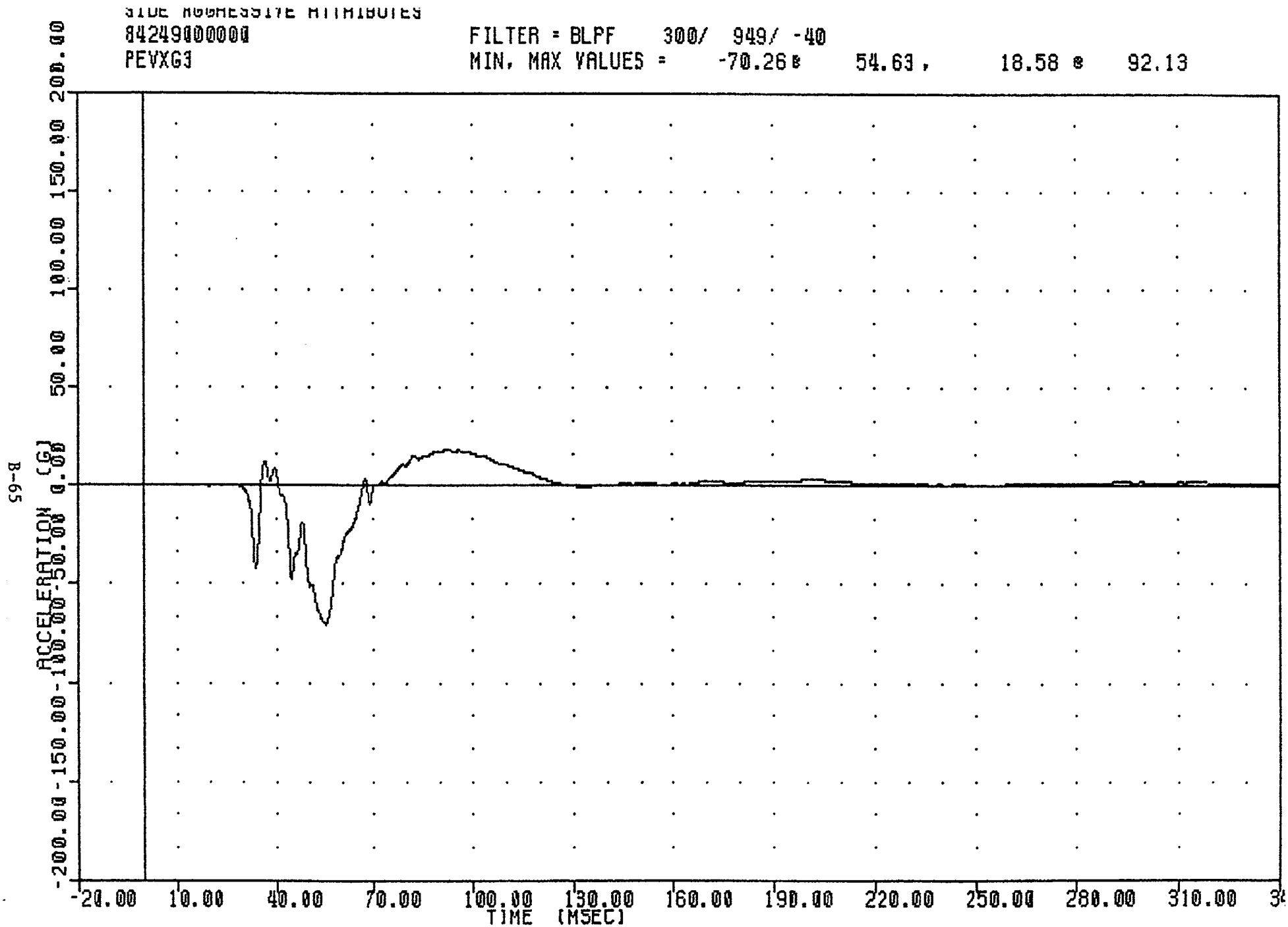
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT LOWER RIB ACCELERATION -2 Y AXIS



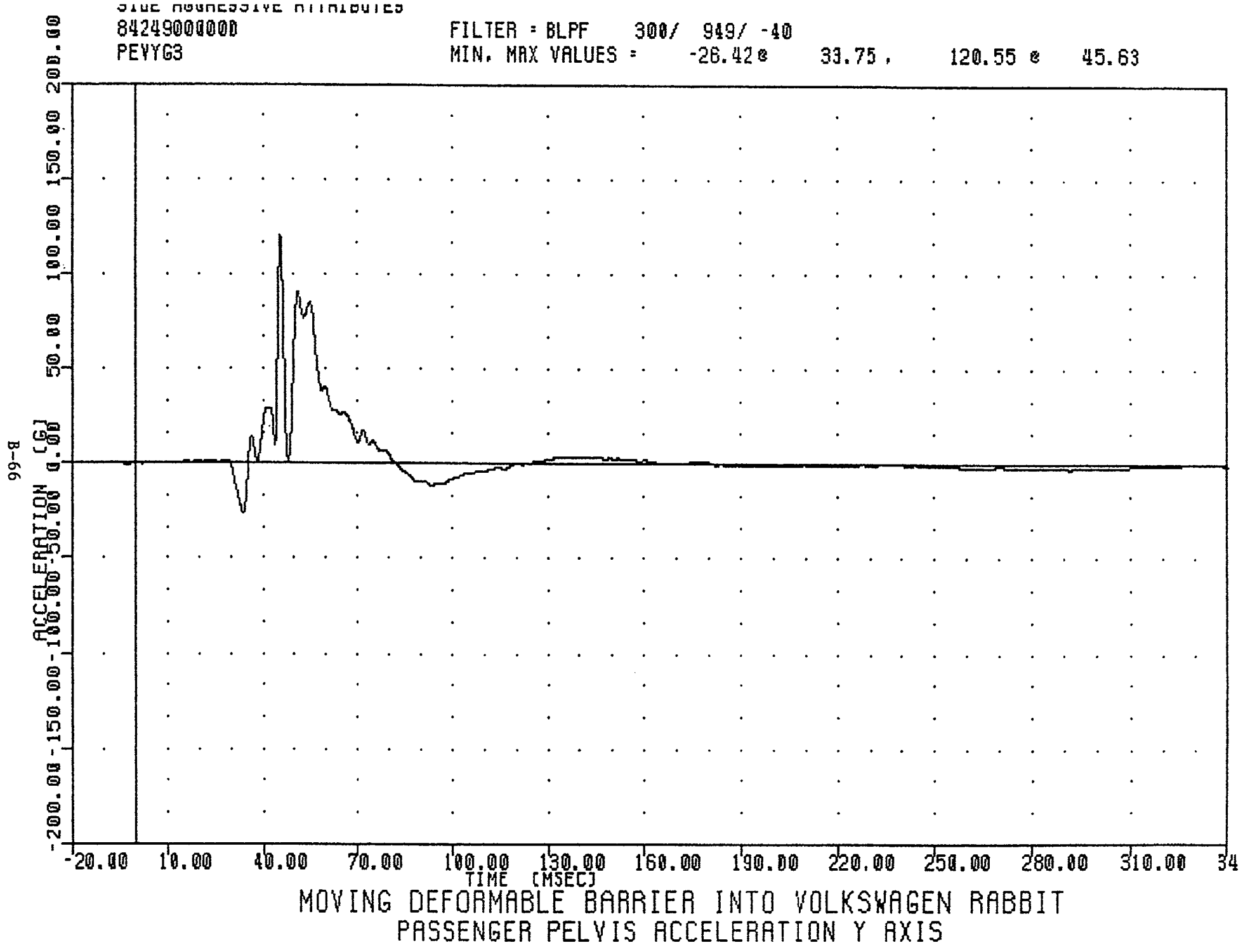
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LLRYGC



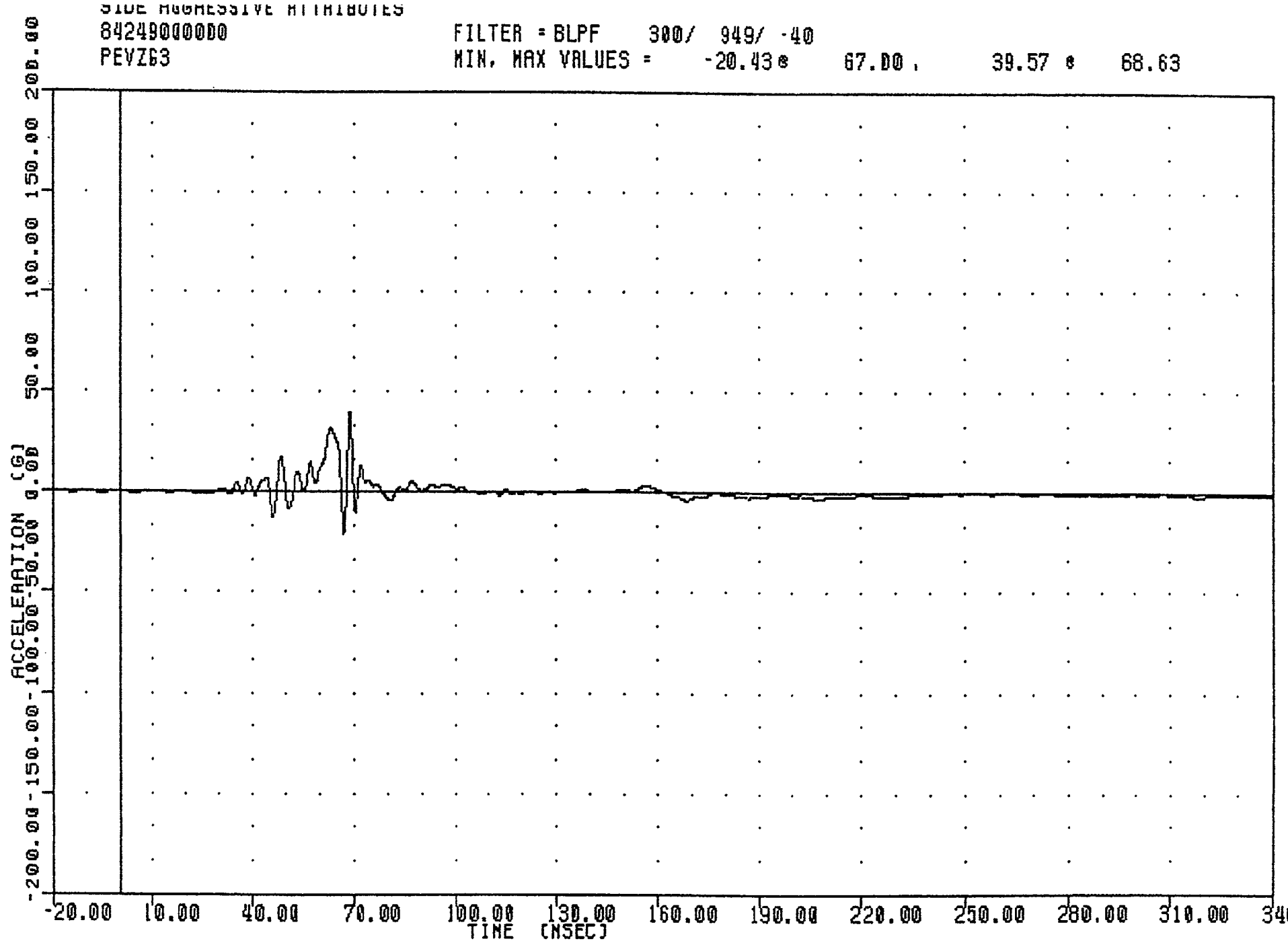
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT RIB TO SPINE DISPLACEMENT INCHES



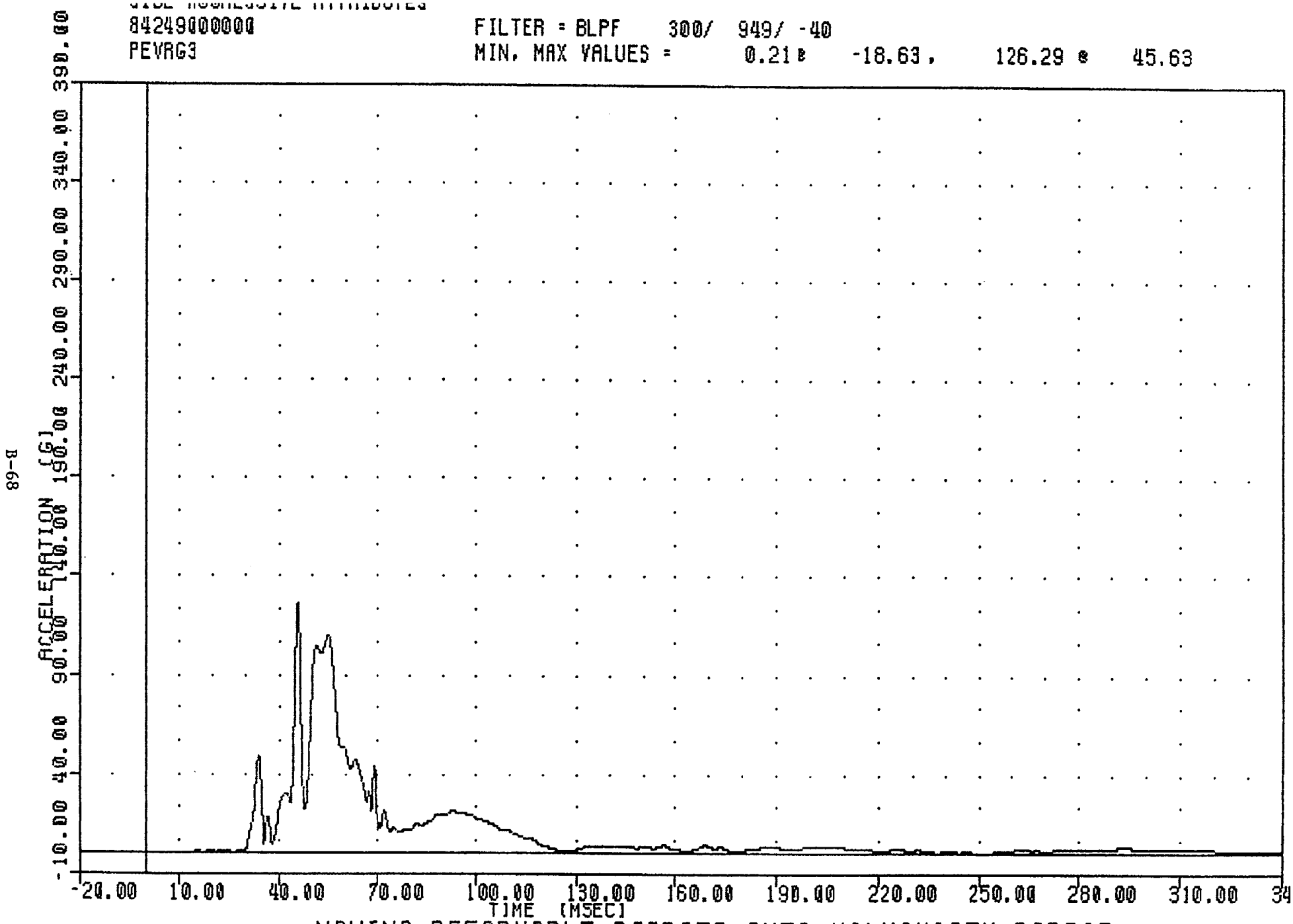
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER PELVIS ACCELERATION X AXIS



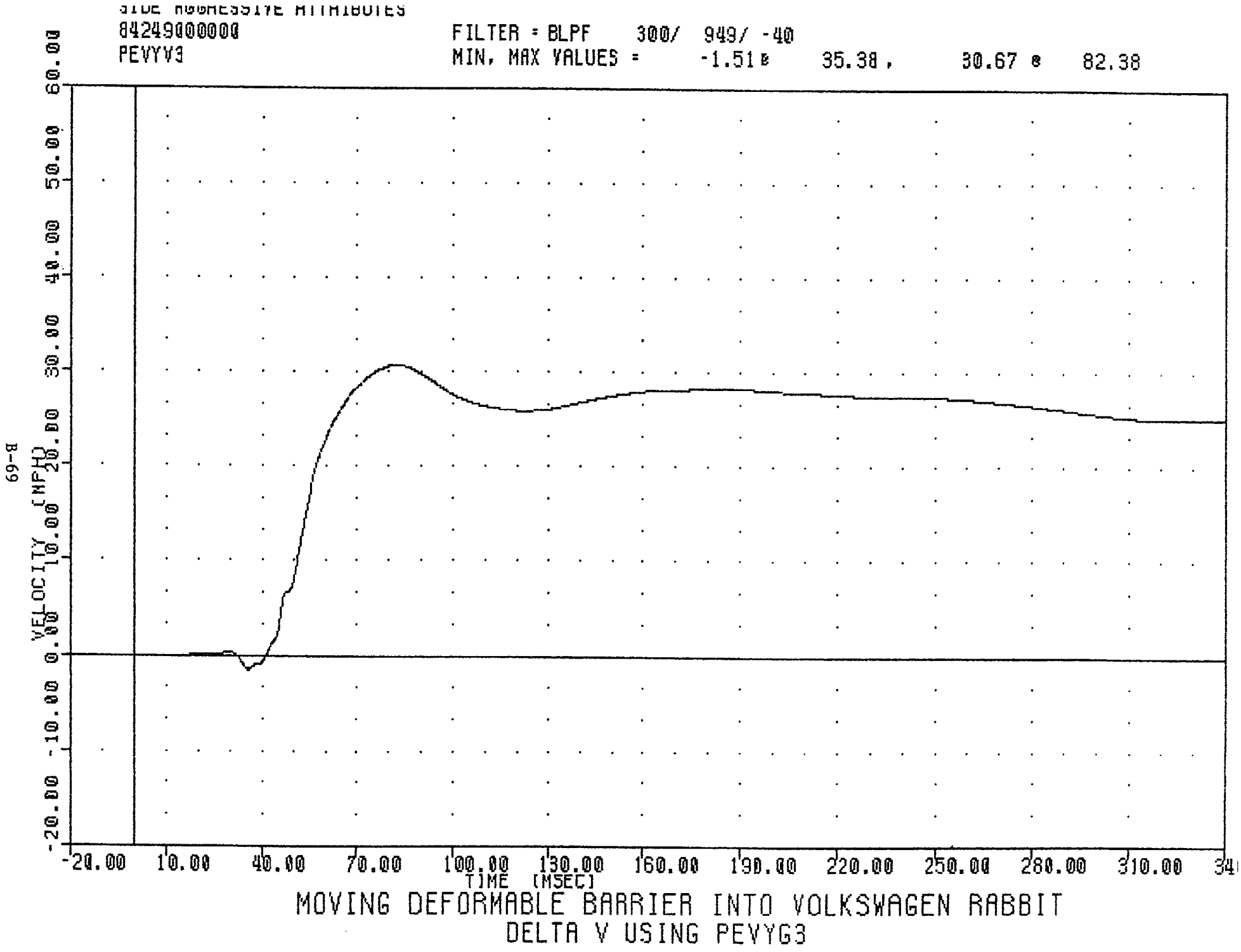
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER PELVIS ACCELERATION Y AXIS



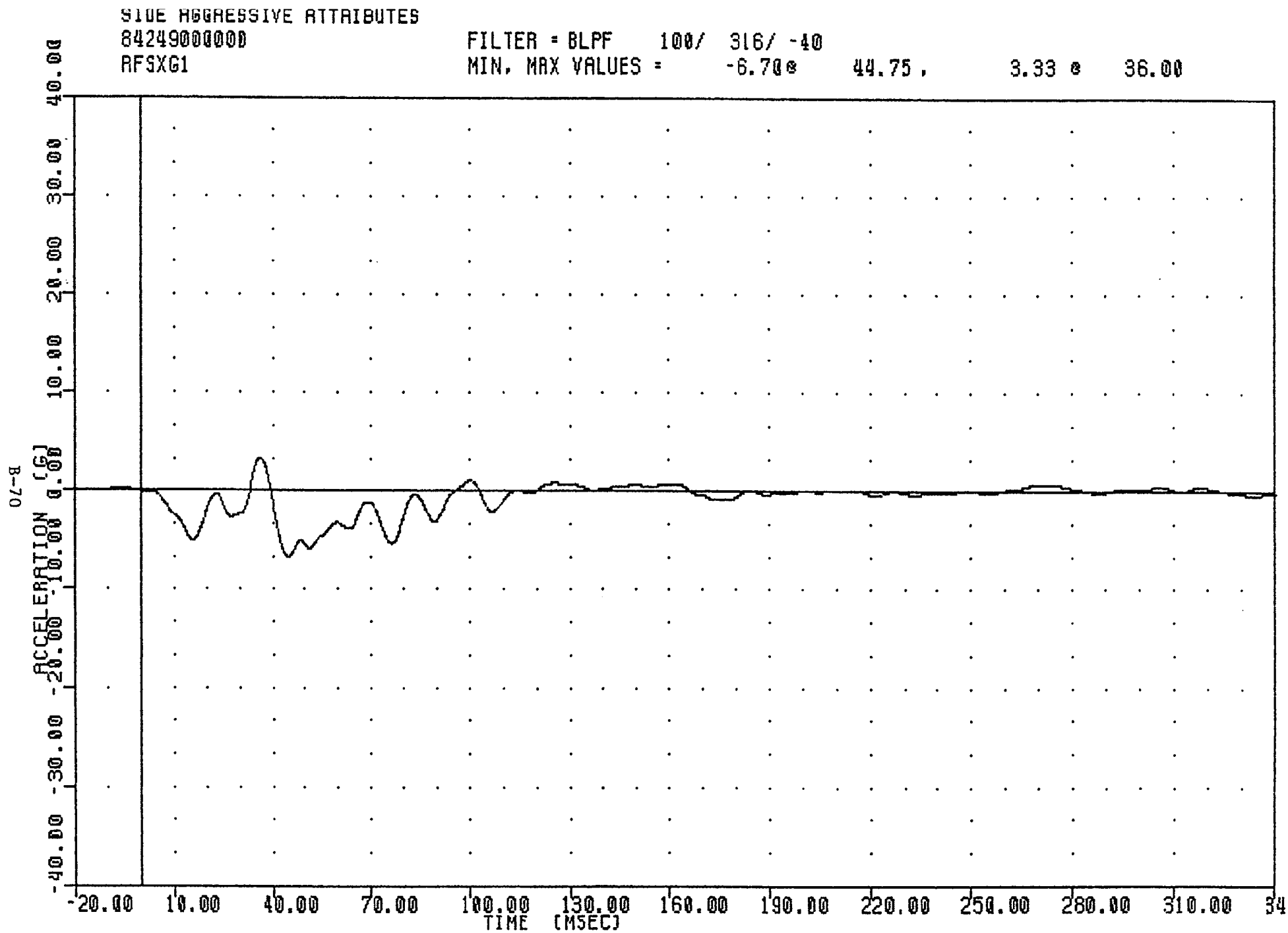
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER PELVIS ACCELERATION Z AXIS



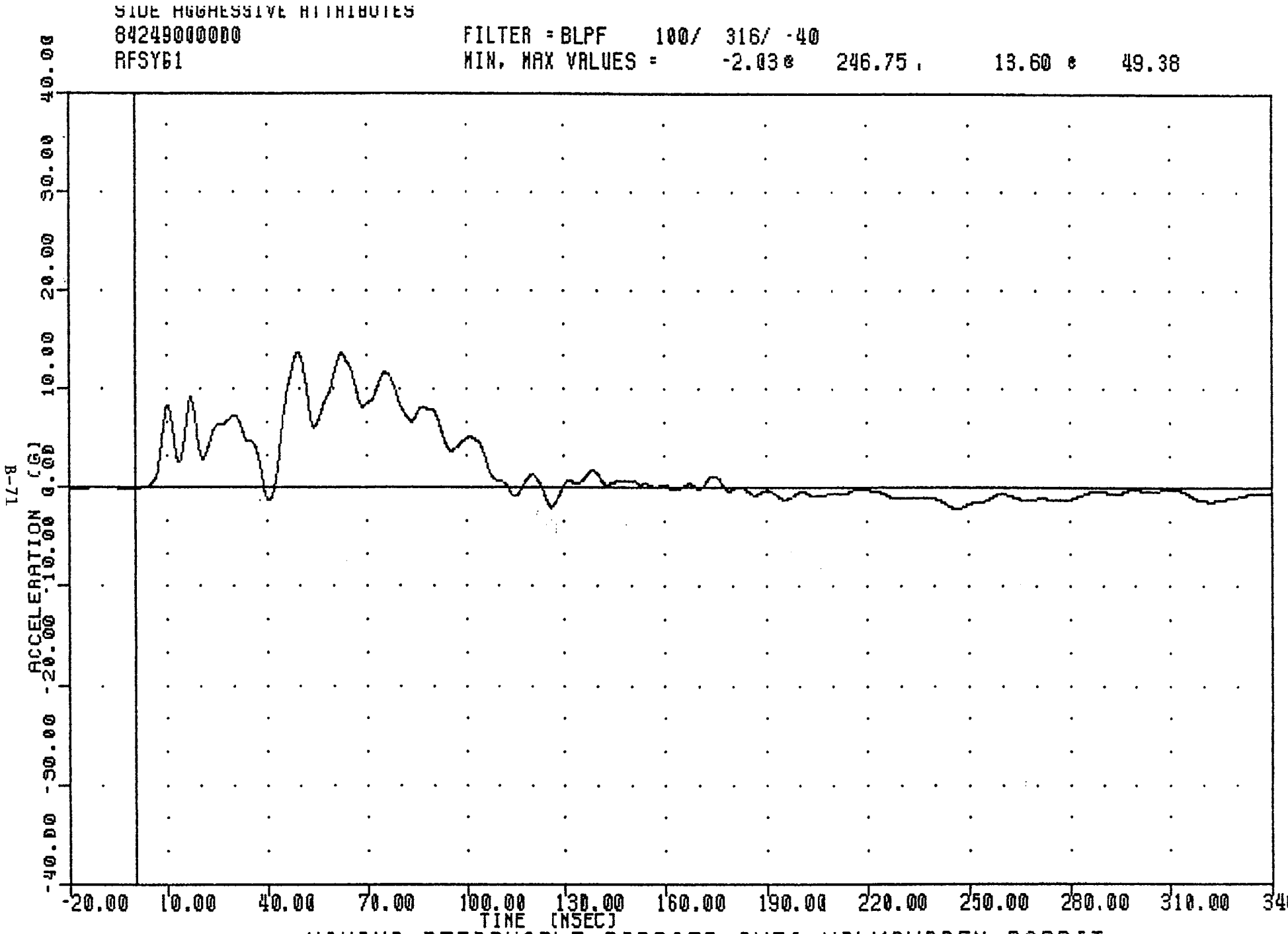
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER PELVIS RESULTANT



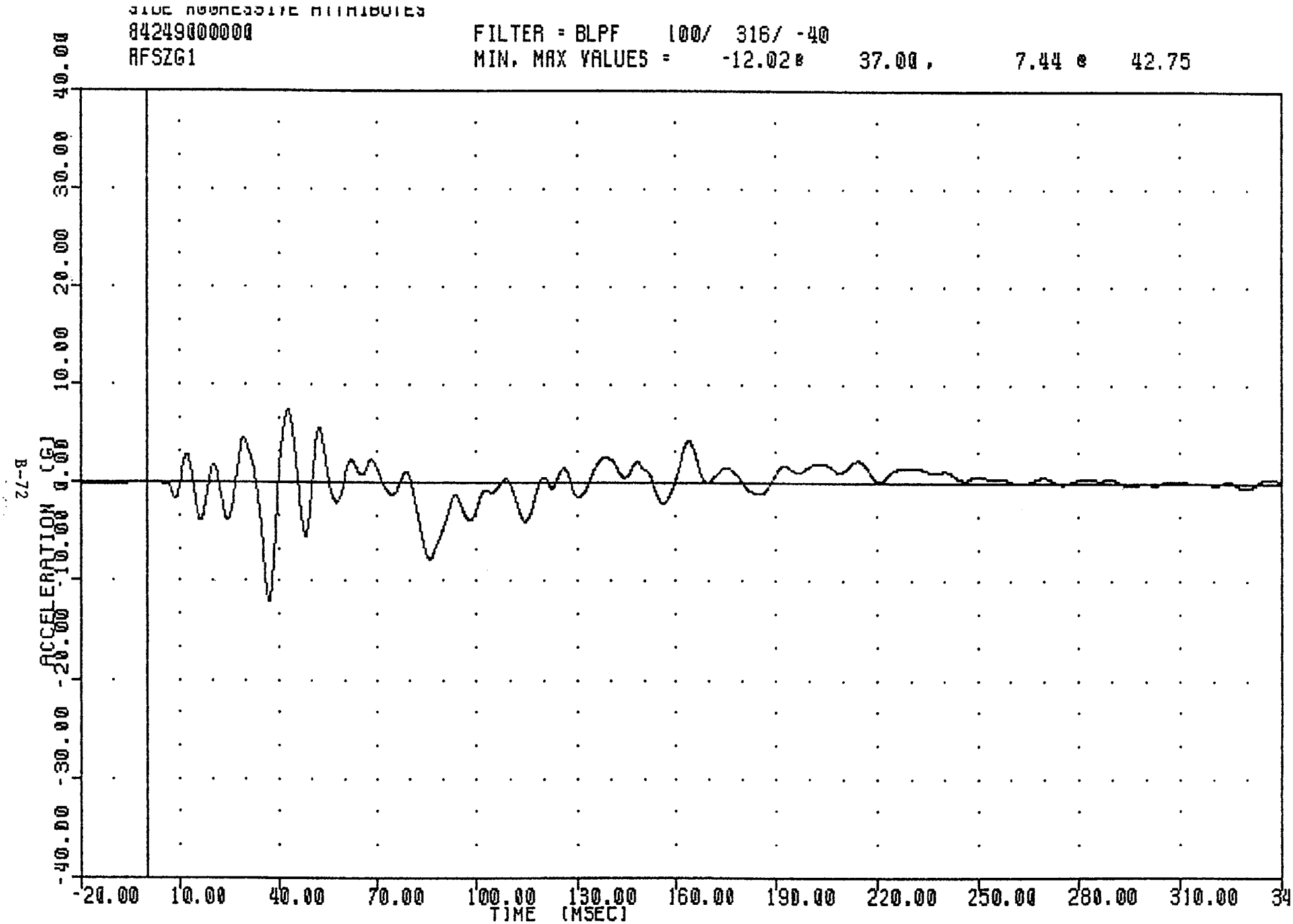
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING PEVYG3



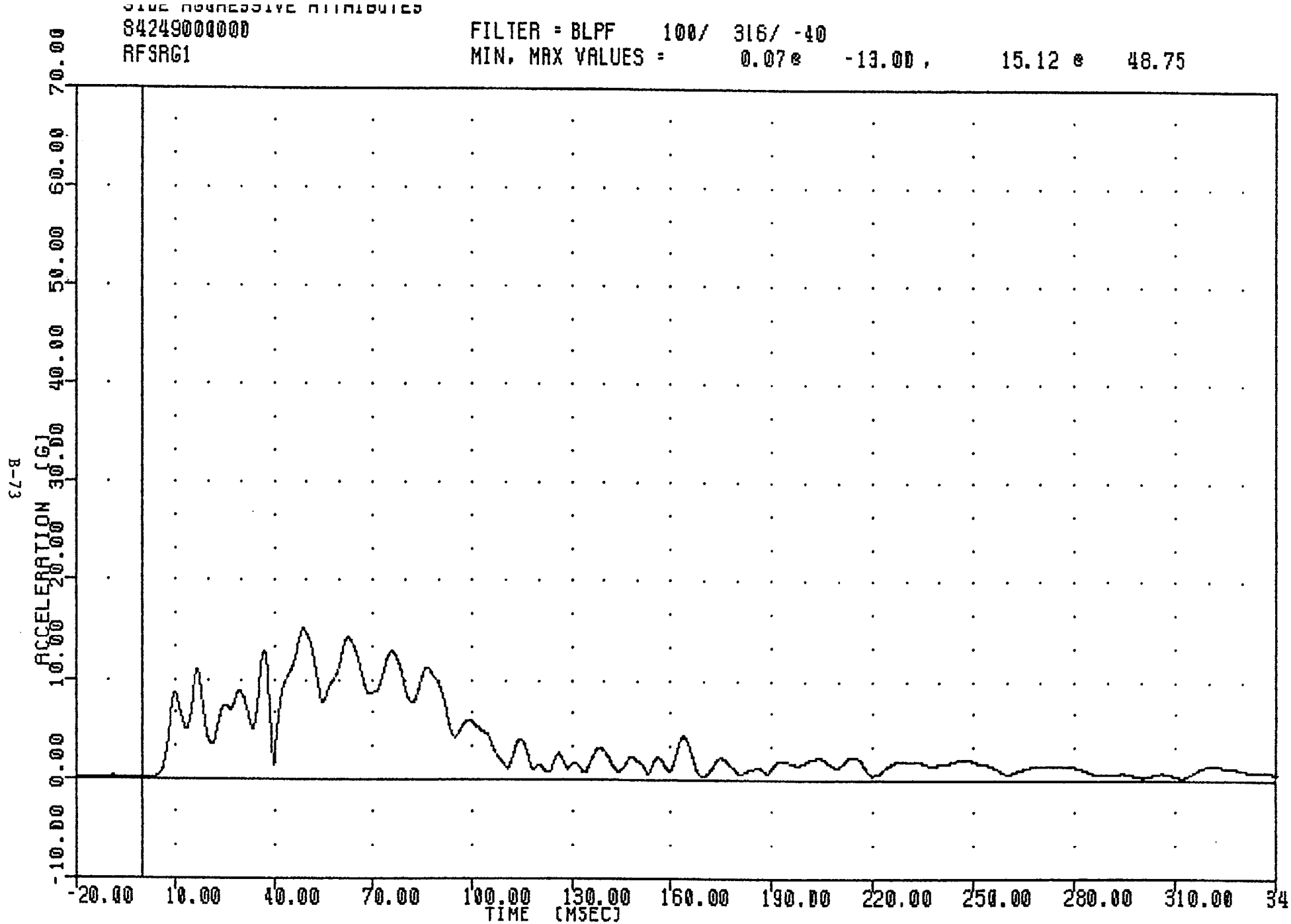
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT FRONT SILL ACCELERATION X AXIS



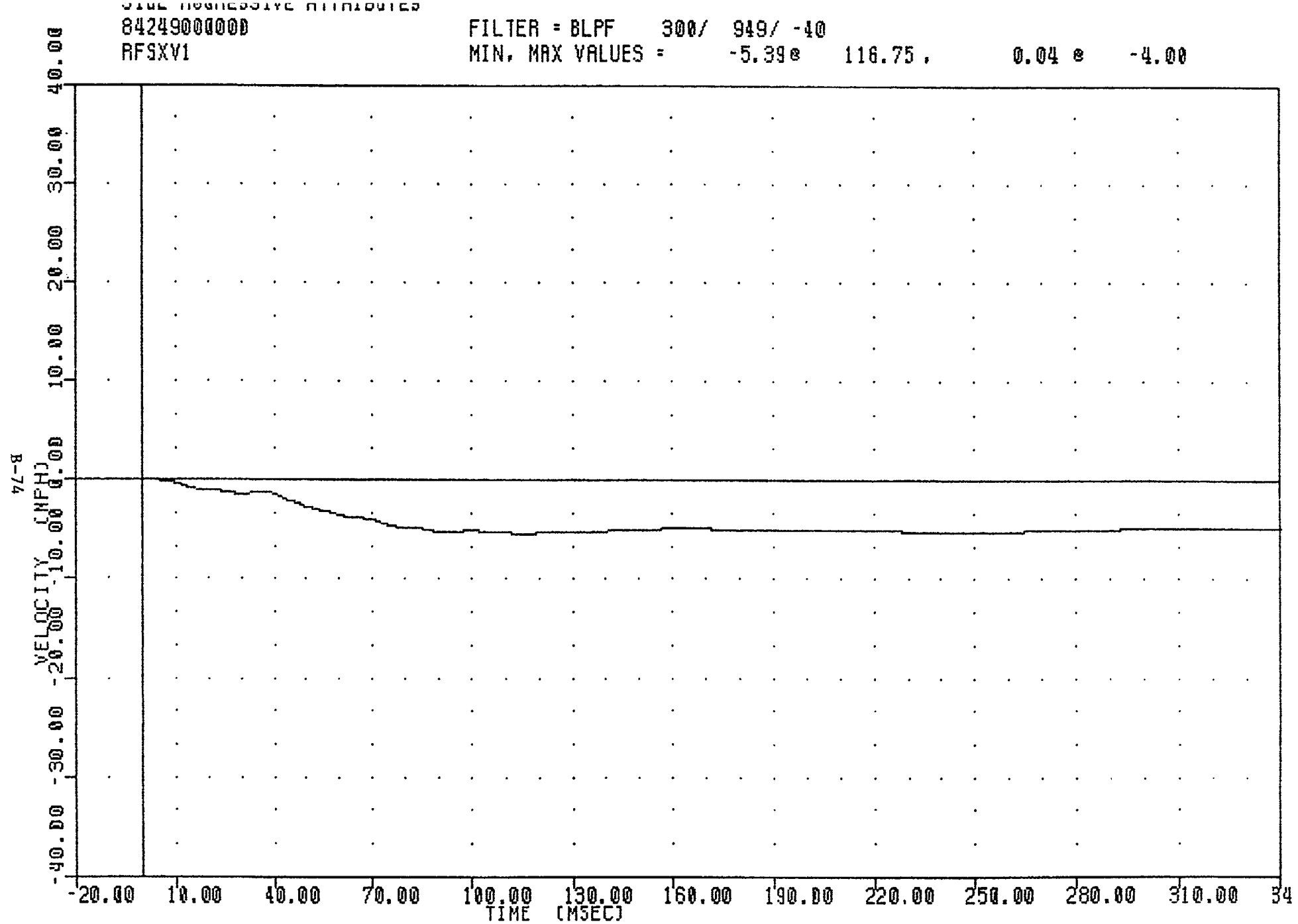
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT FRONT SILL ACCELERATION Y AXIS



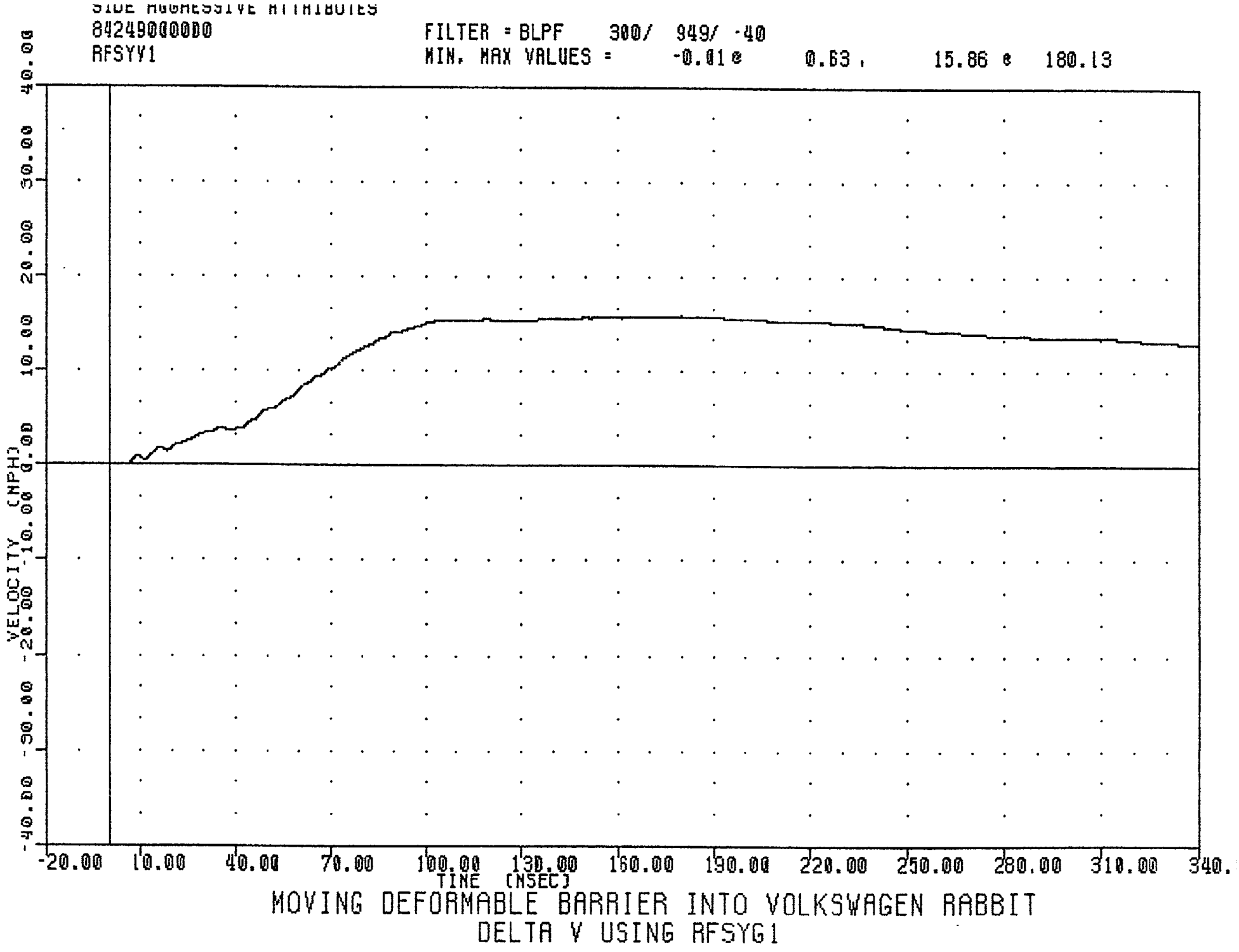
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT FRONT SILL ACCELERATION Z AXIS



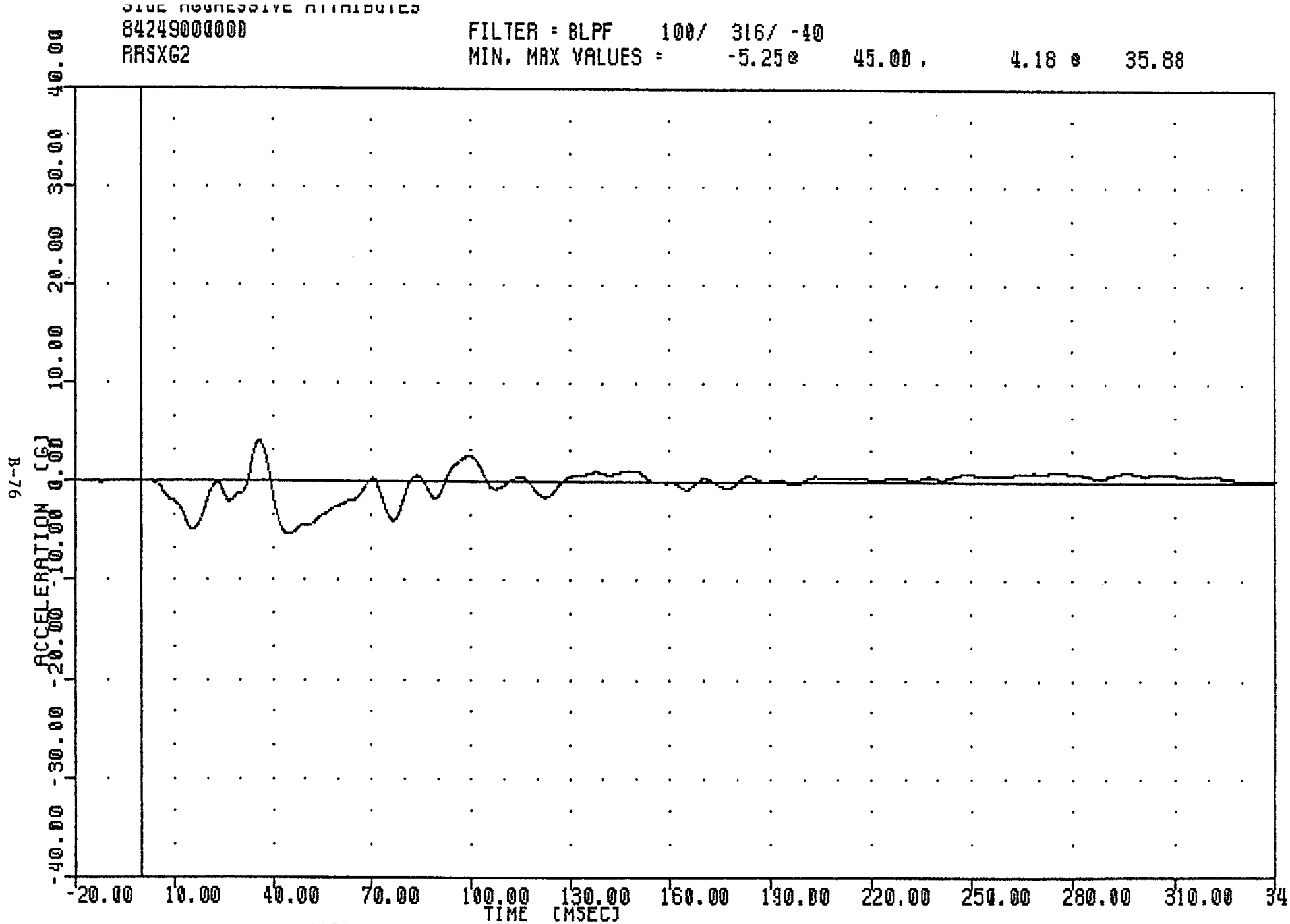
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT FRONT SILL RESULTANT



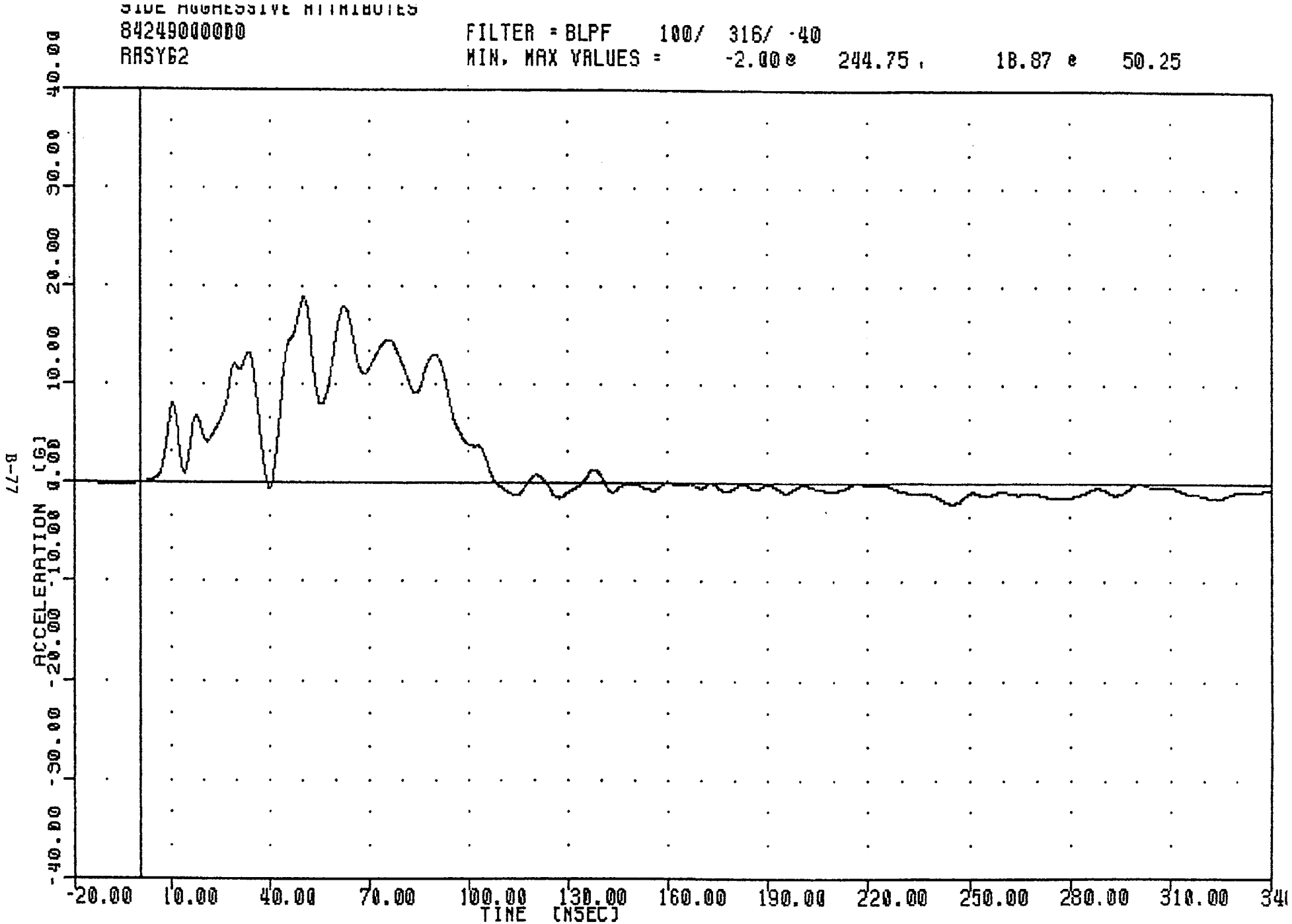
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING RFSXG1



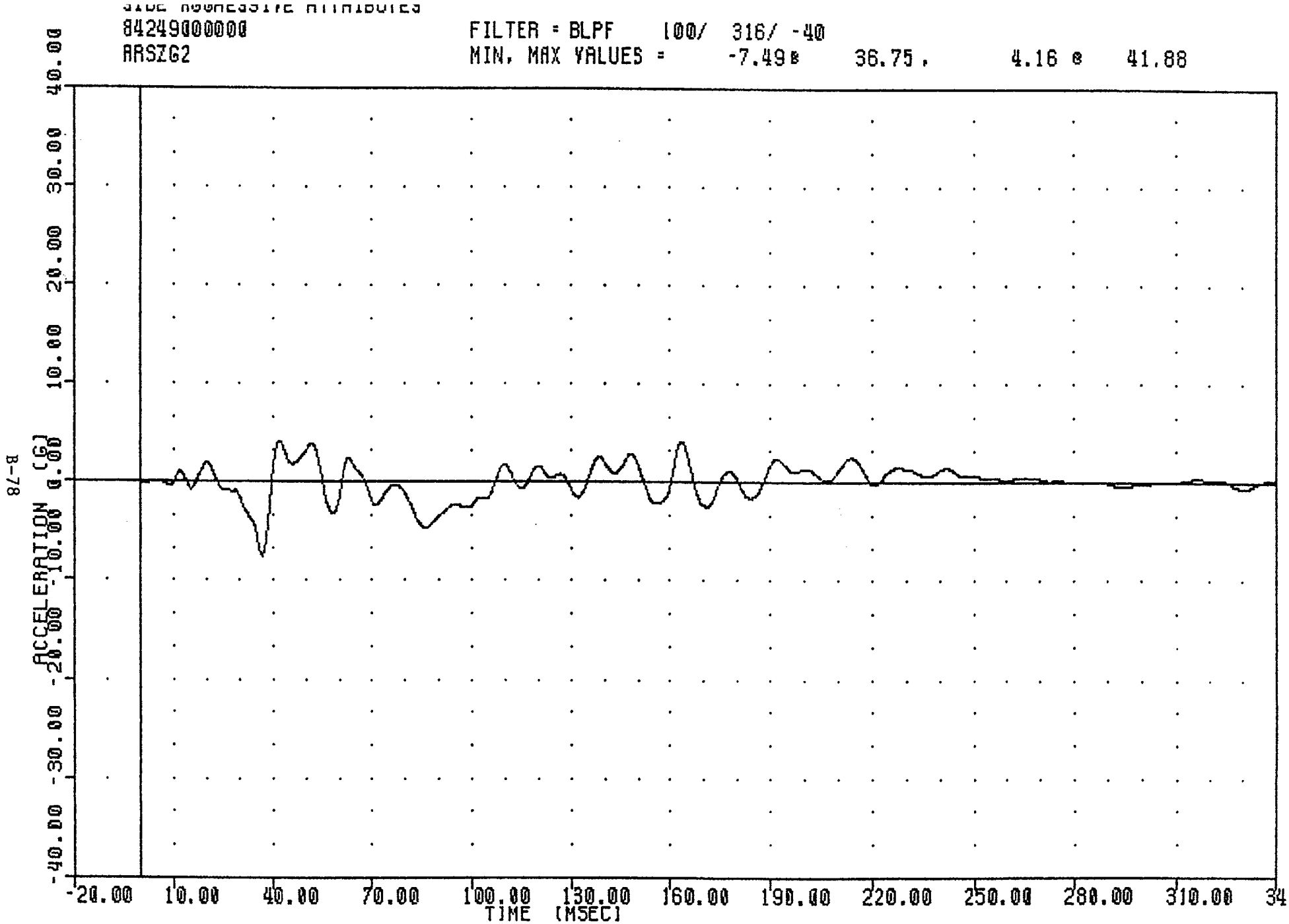
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING RFSYG1



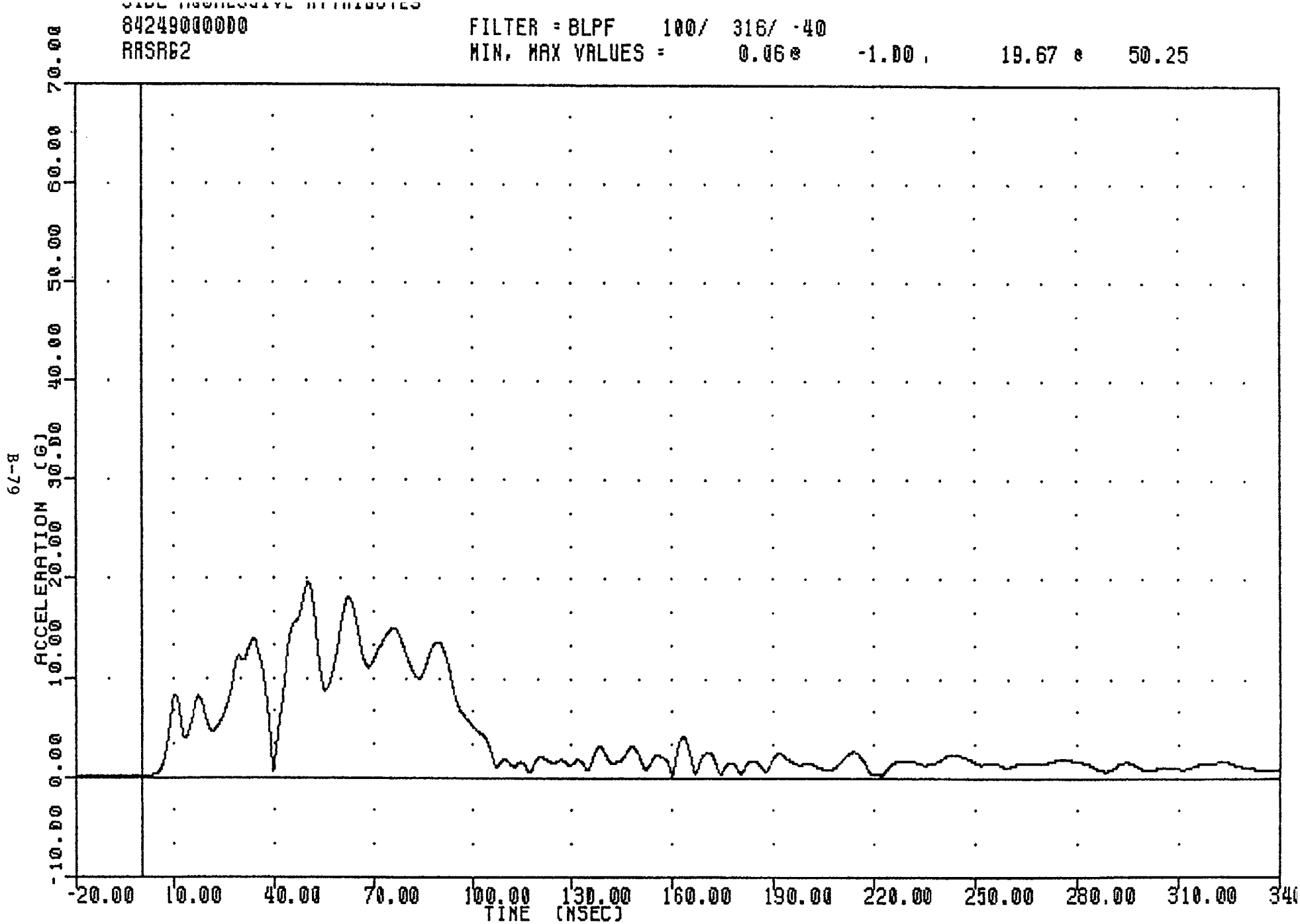
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT REAR SILL ACCELERATION X AXIS



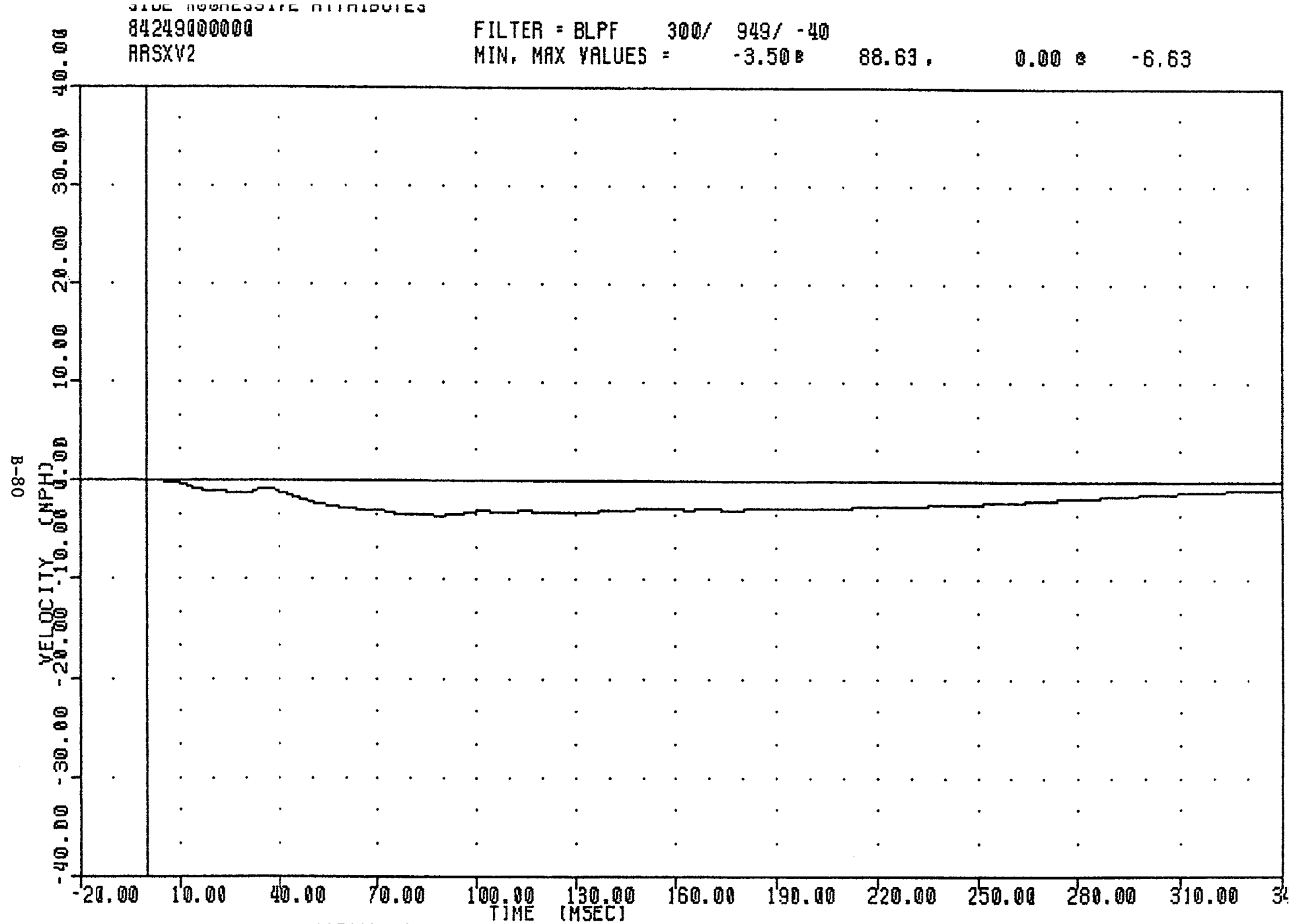
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT REAR SILL ACCELERATION Y AXIS



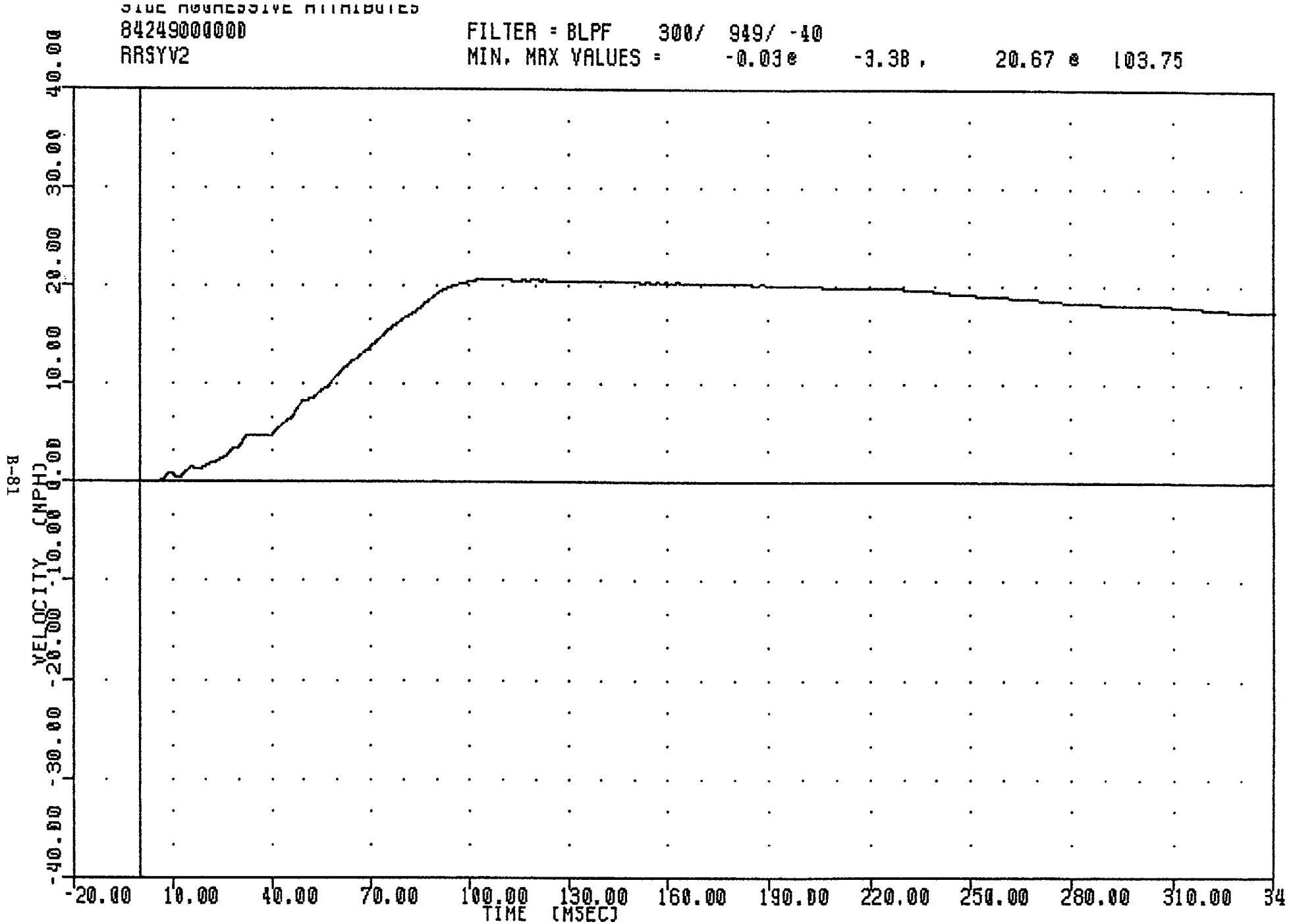
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT REAR SILL ACCELERATION Z AXIS



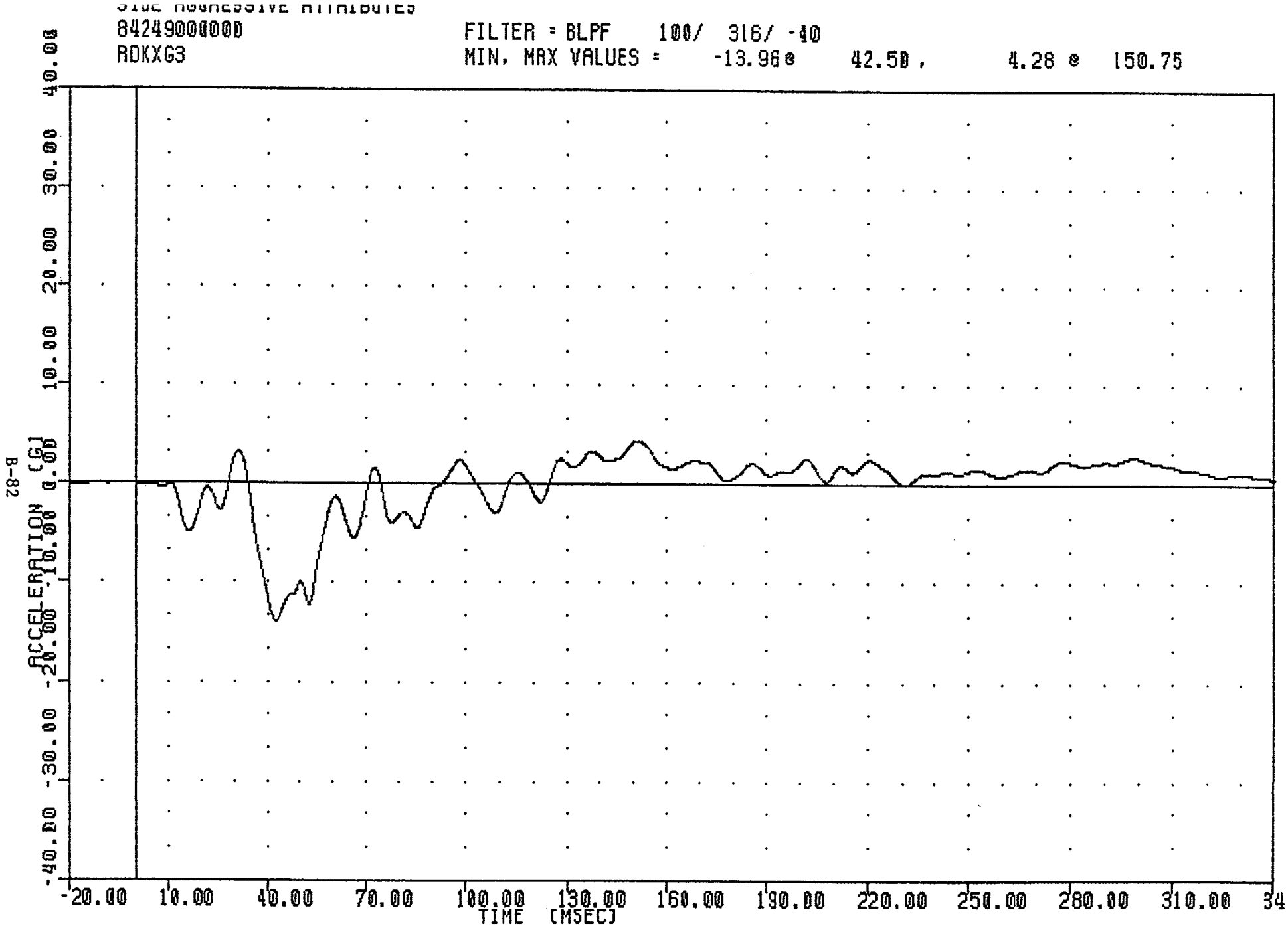
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT REAR SILL RESULTANT



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING RRSXG2



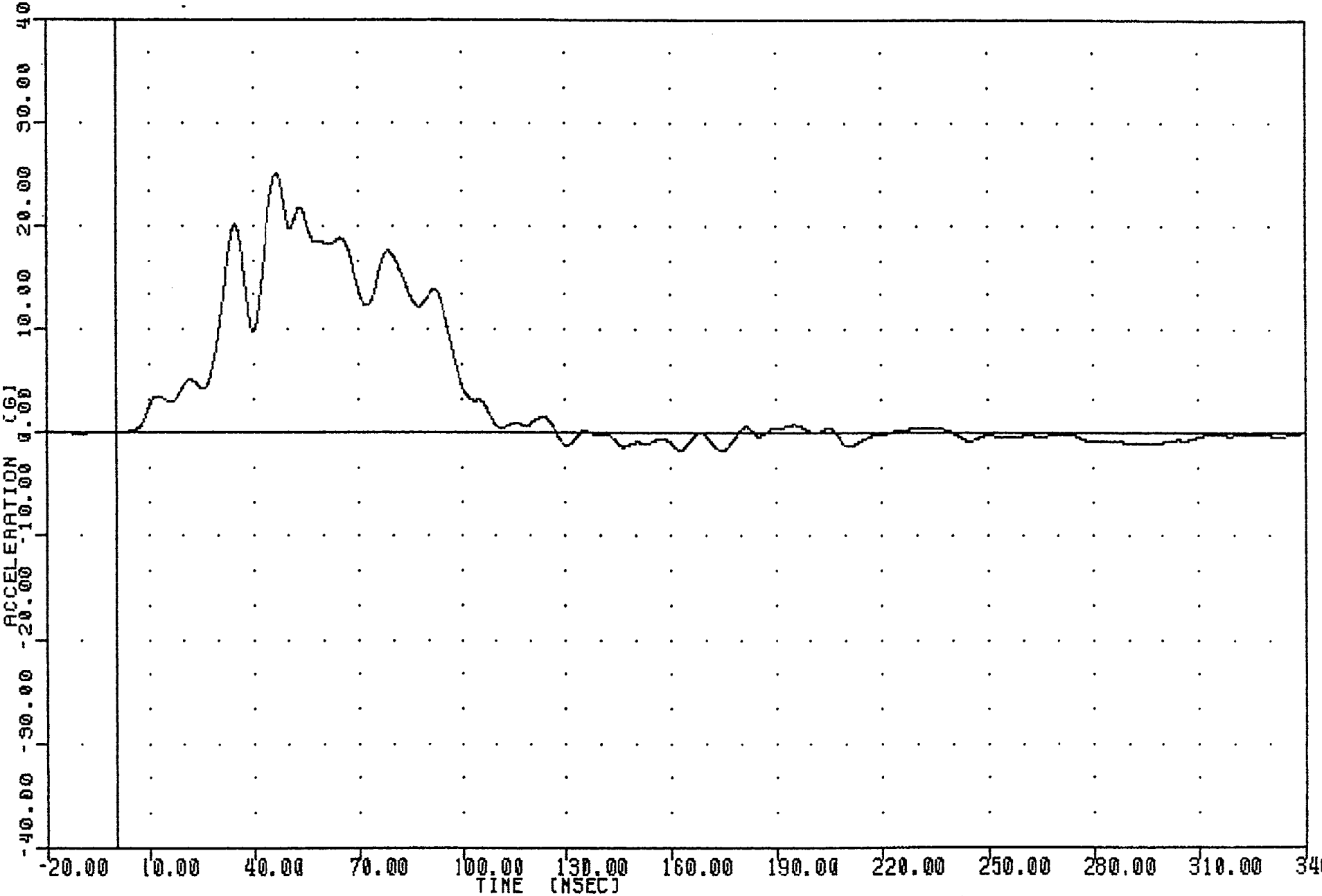
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING RRSYG2



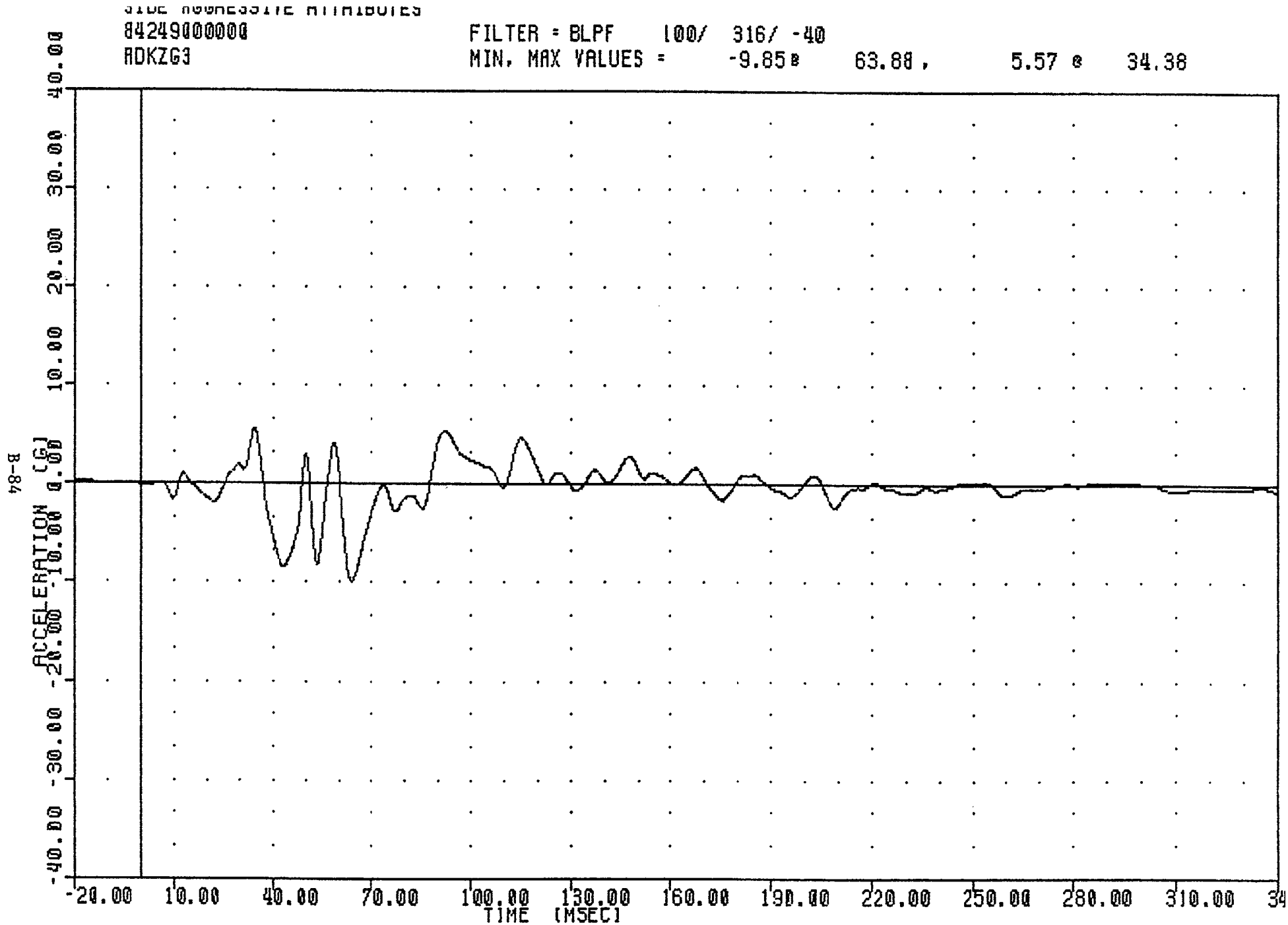
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE REAR DECK ACCELERATION X AXIS

84249000000 FILTER = BLPF 100/ 316/ -40

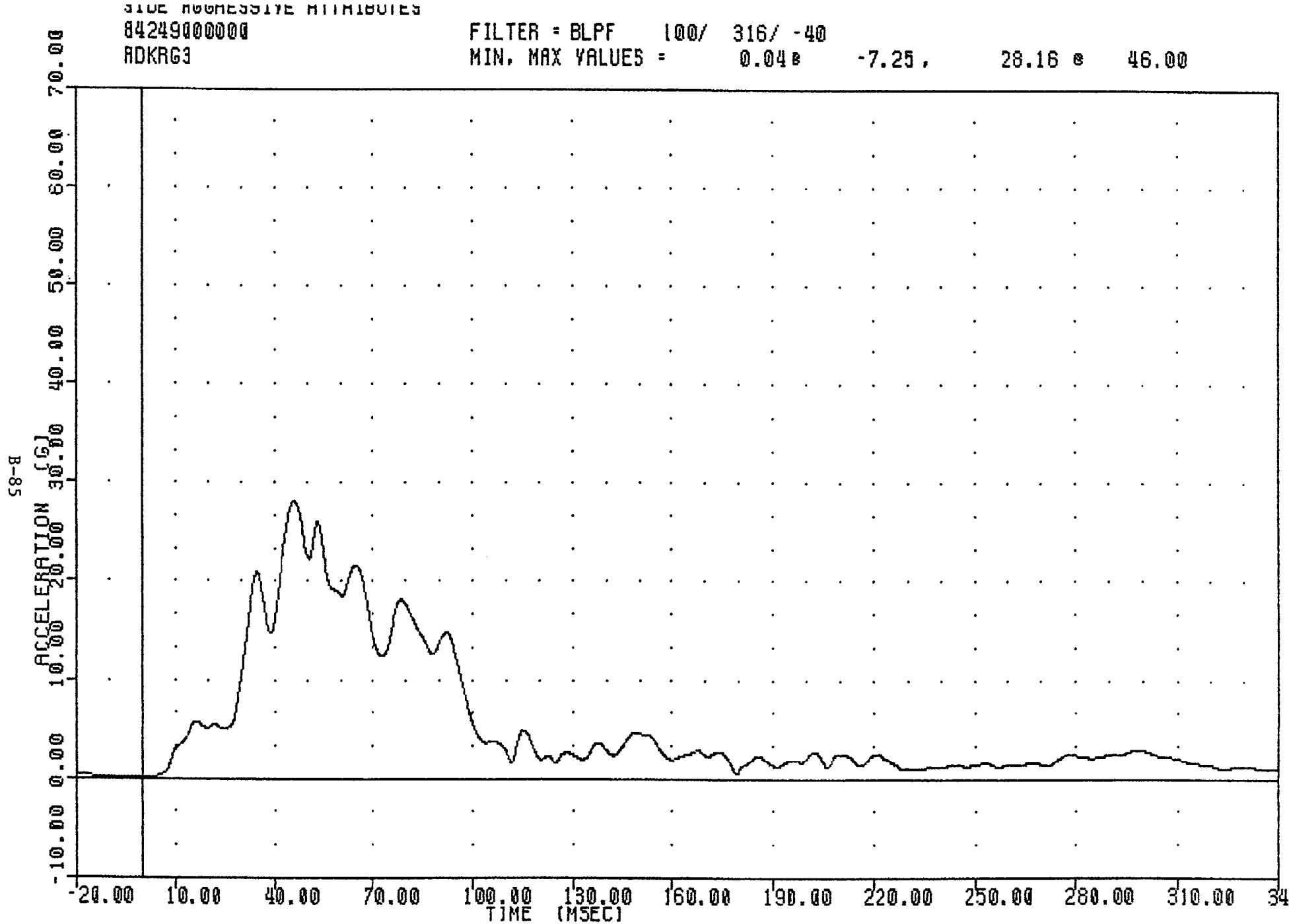
ROKY63 MIN, MAX VALUES = -1.67 @ 162.75 , 24.98 @ 46.50



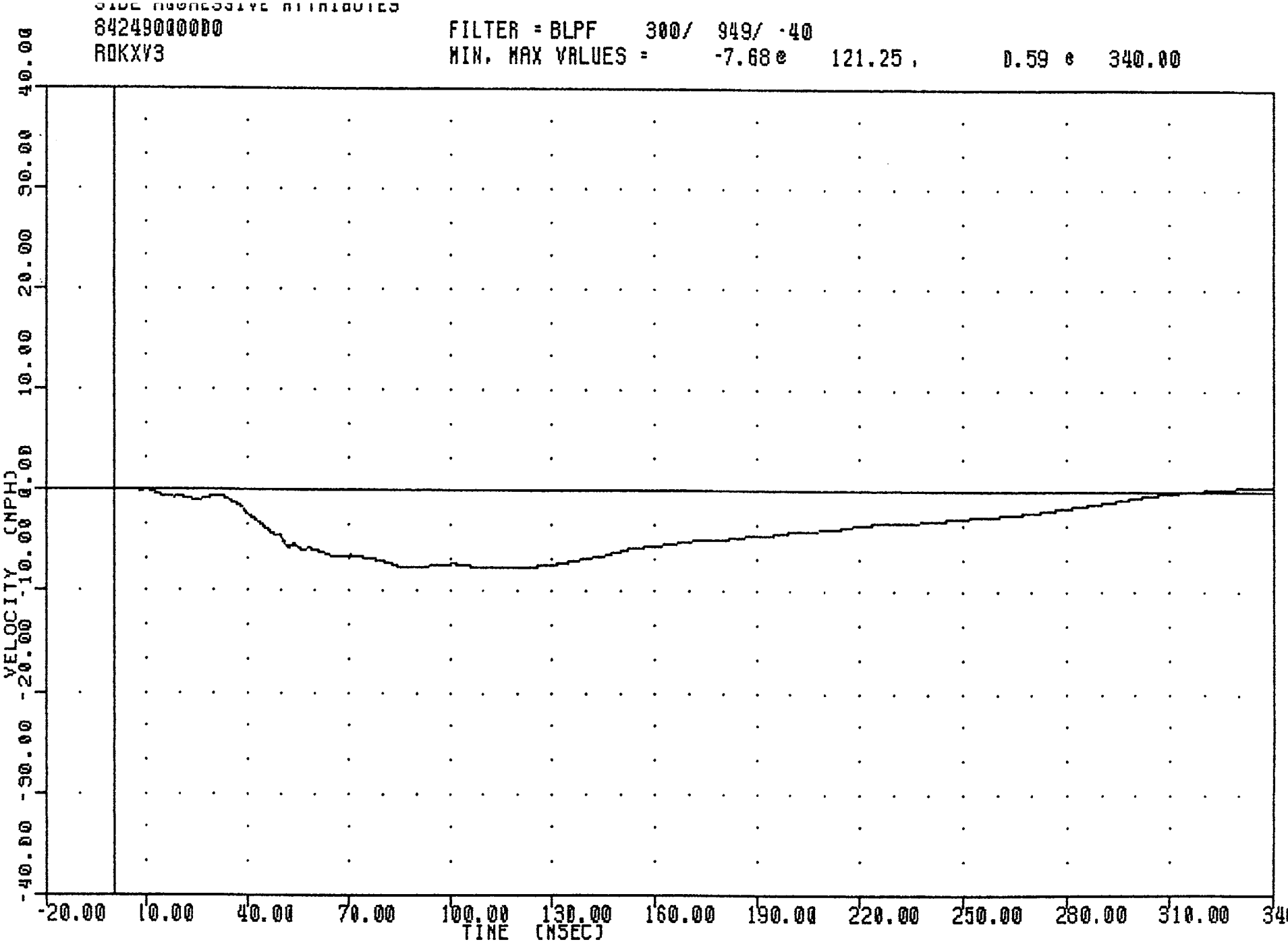
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE REAR DECK ACCELERATION Y AXIS



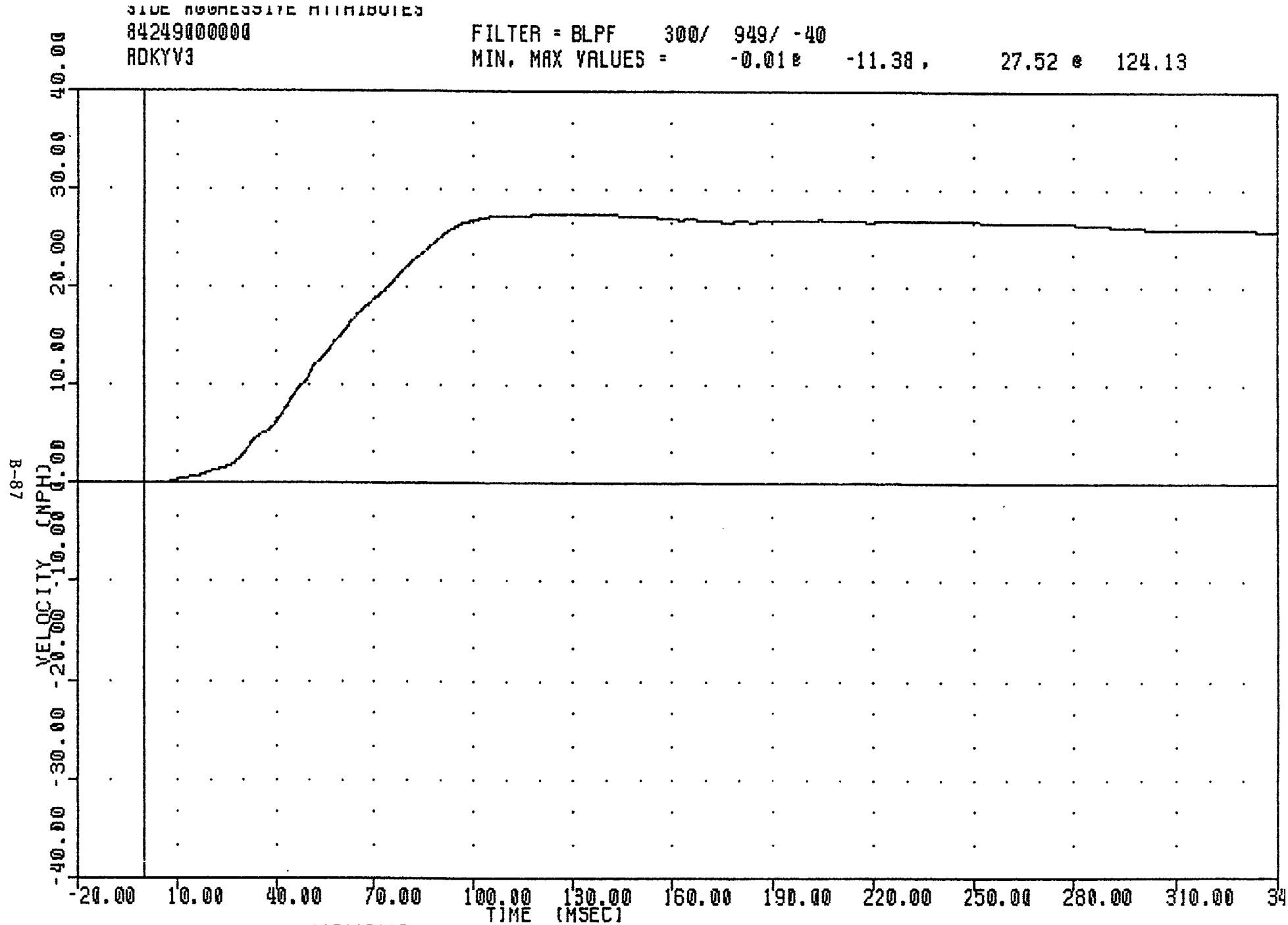
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE REAR DECK ACCELERATION Z AXIS



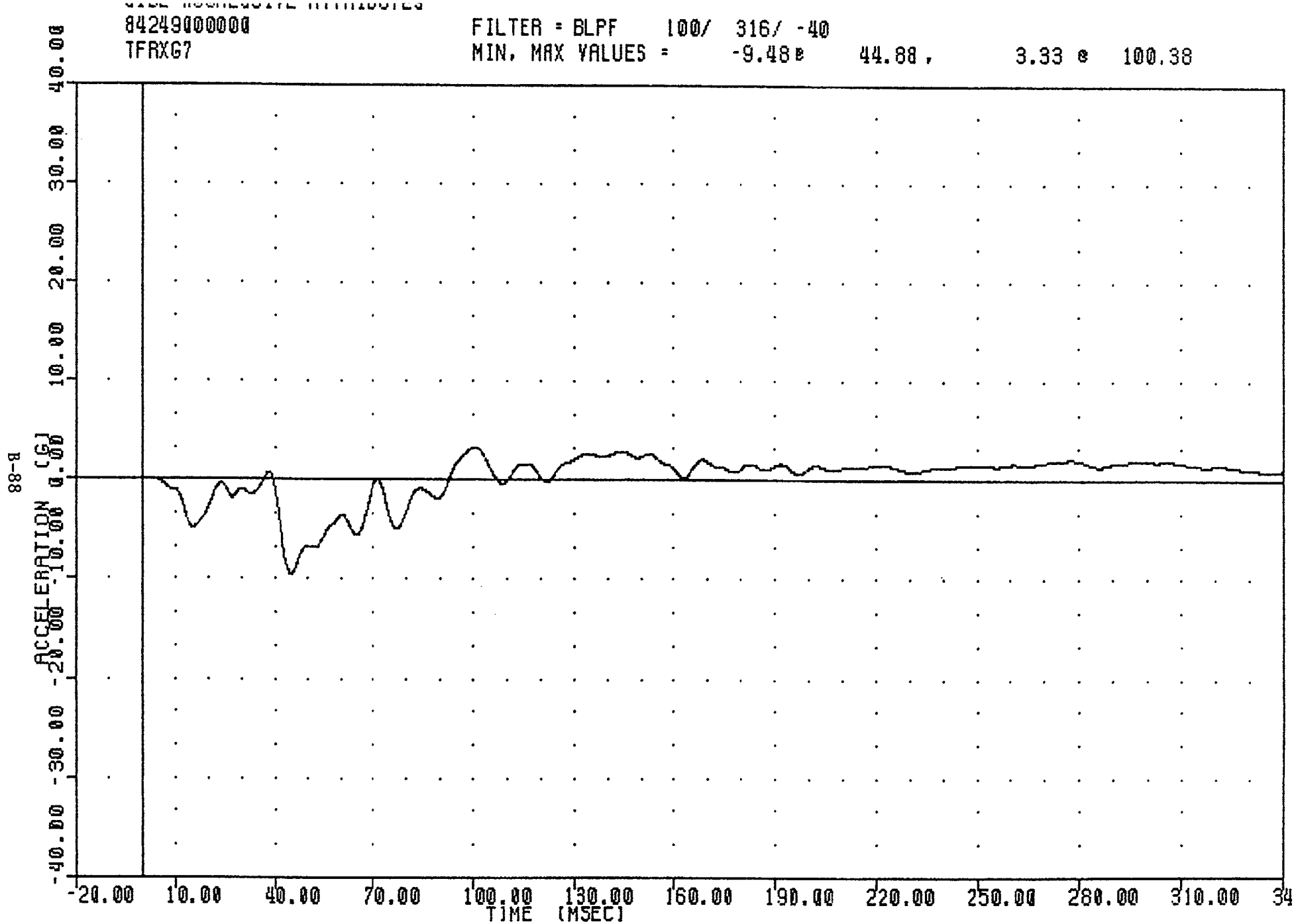
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE REAR DECK RESULTANT



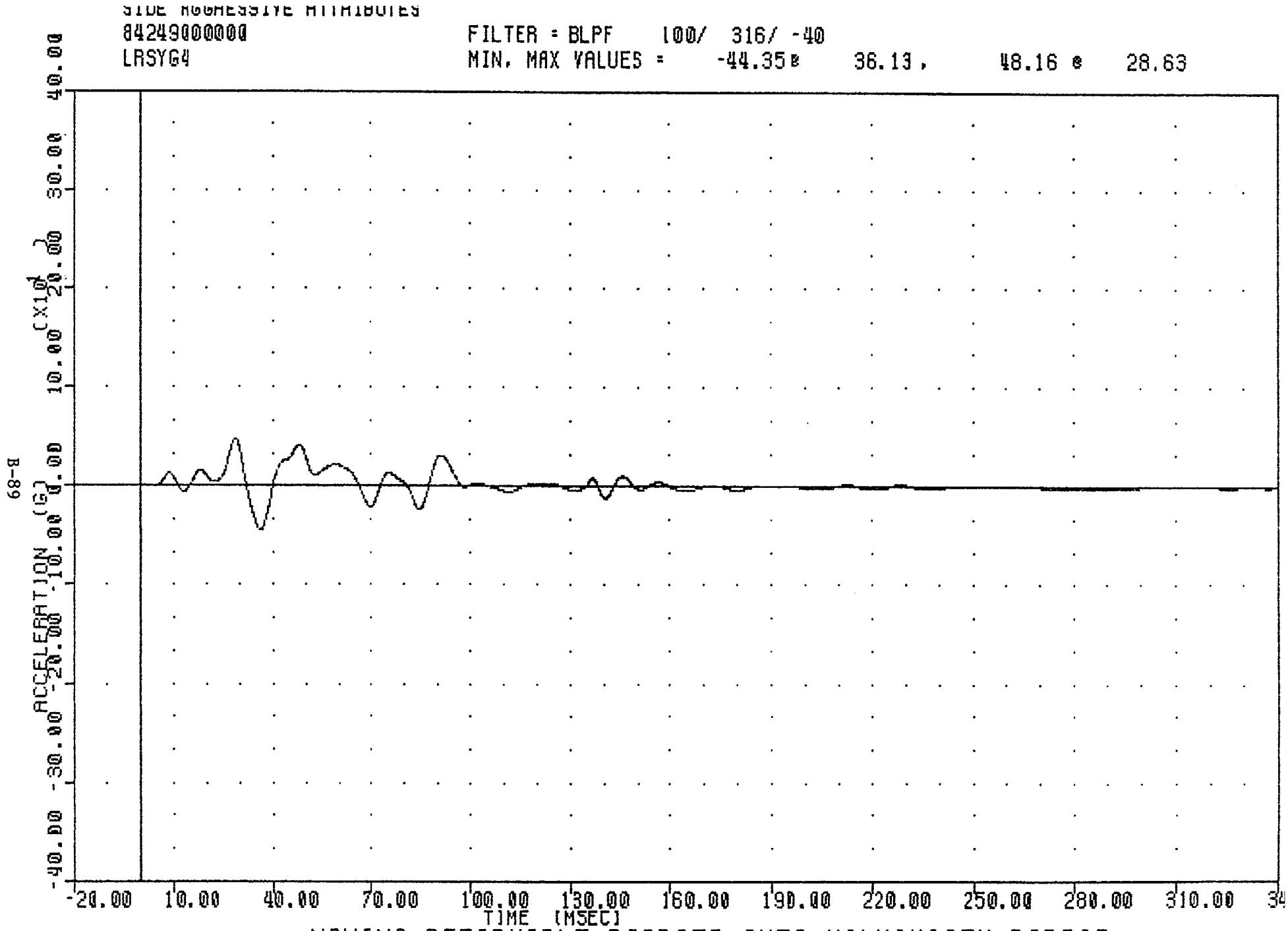
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING RDKXG3



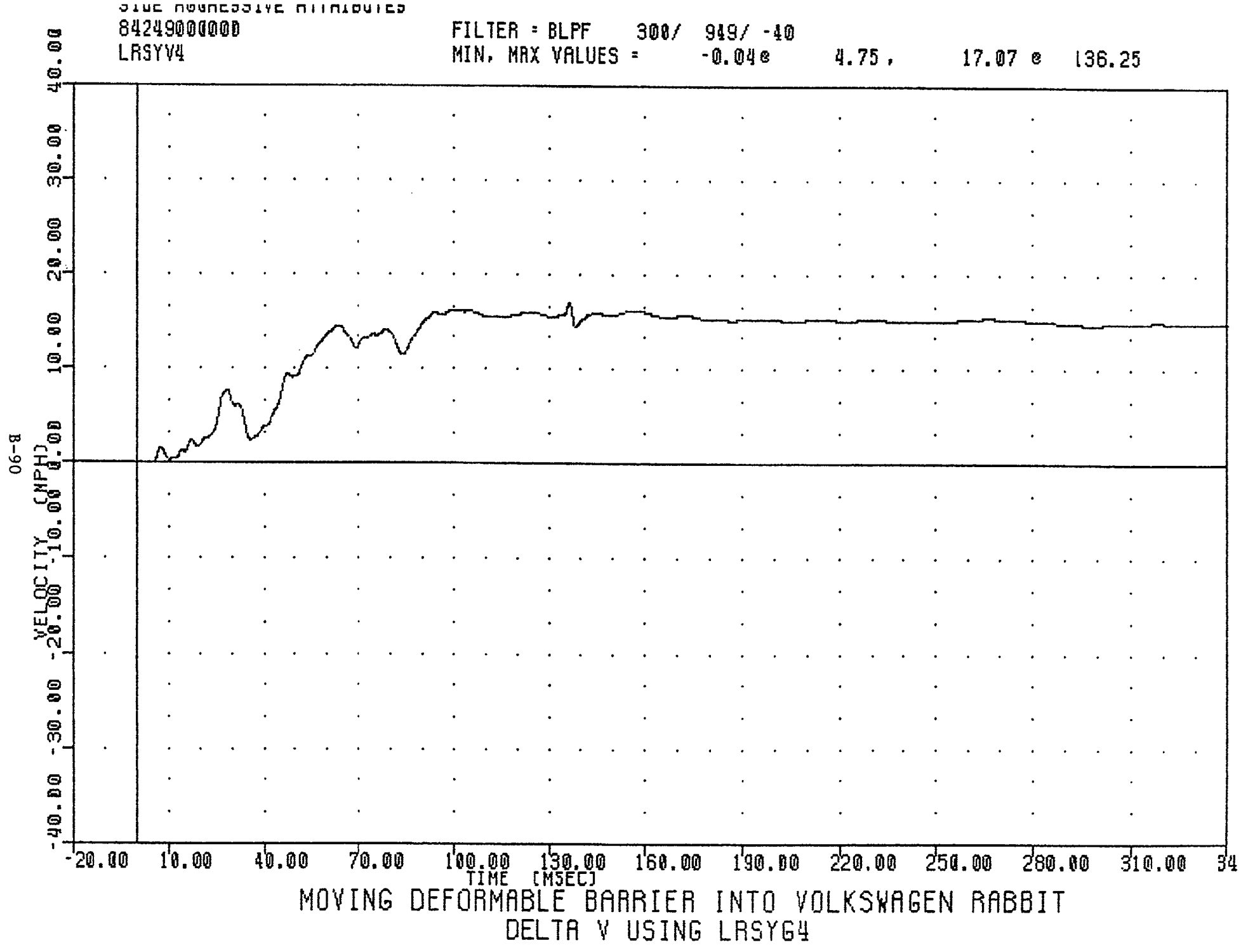
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING RDKYG3



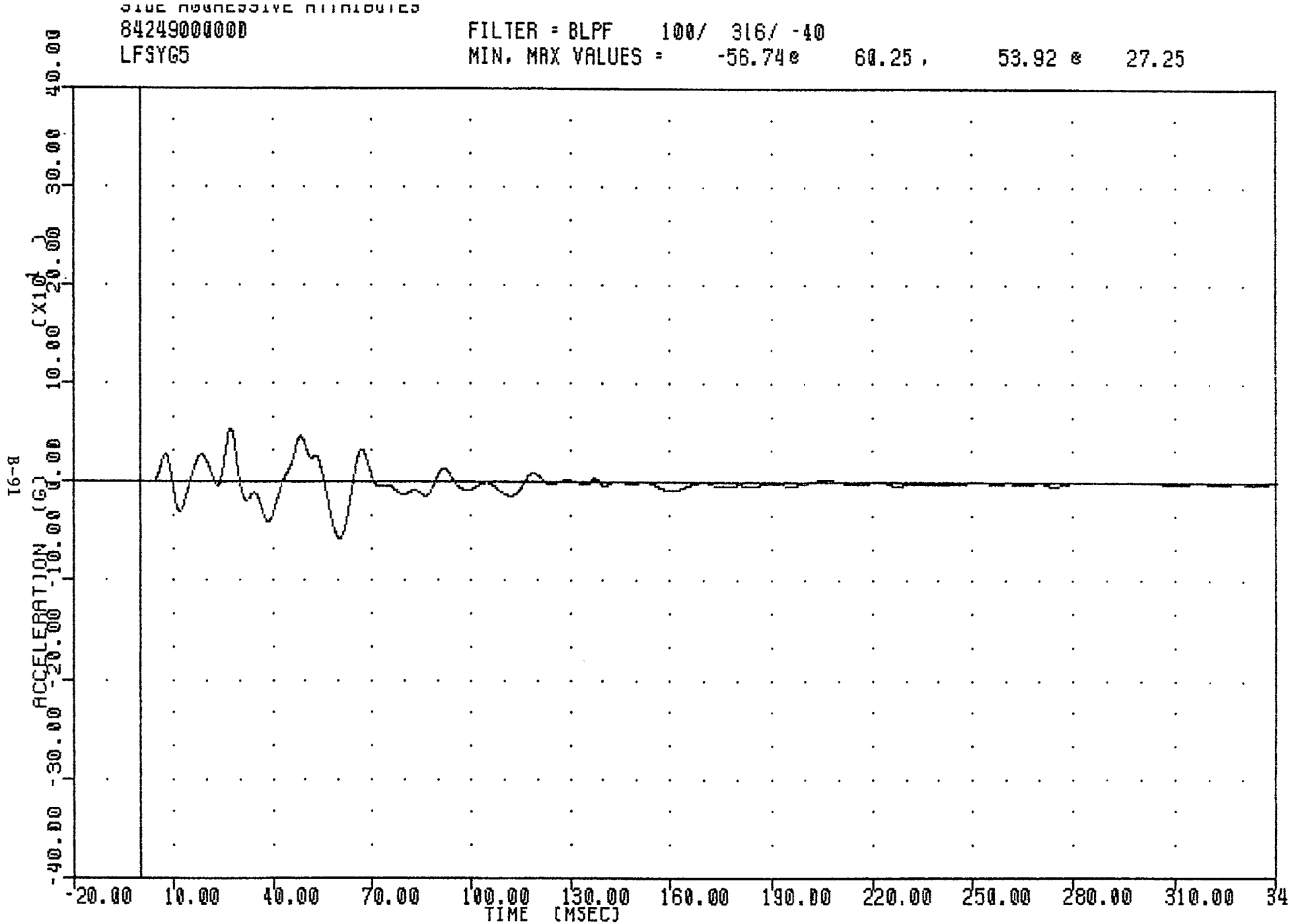
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE TRUNK FLOOR RIGHT ACCELERATION X AXIS



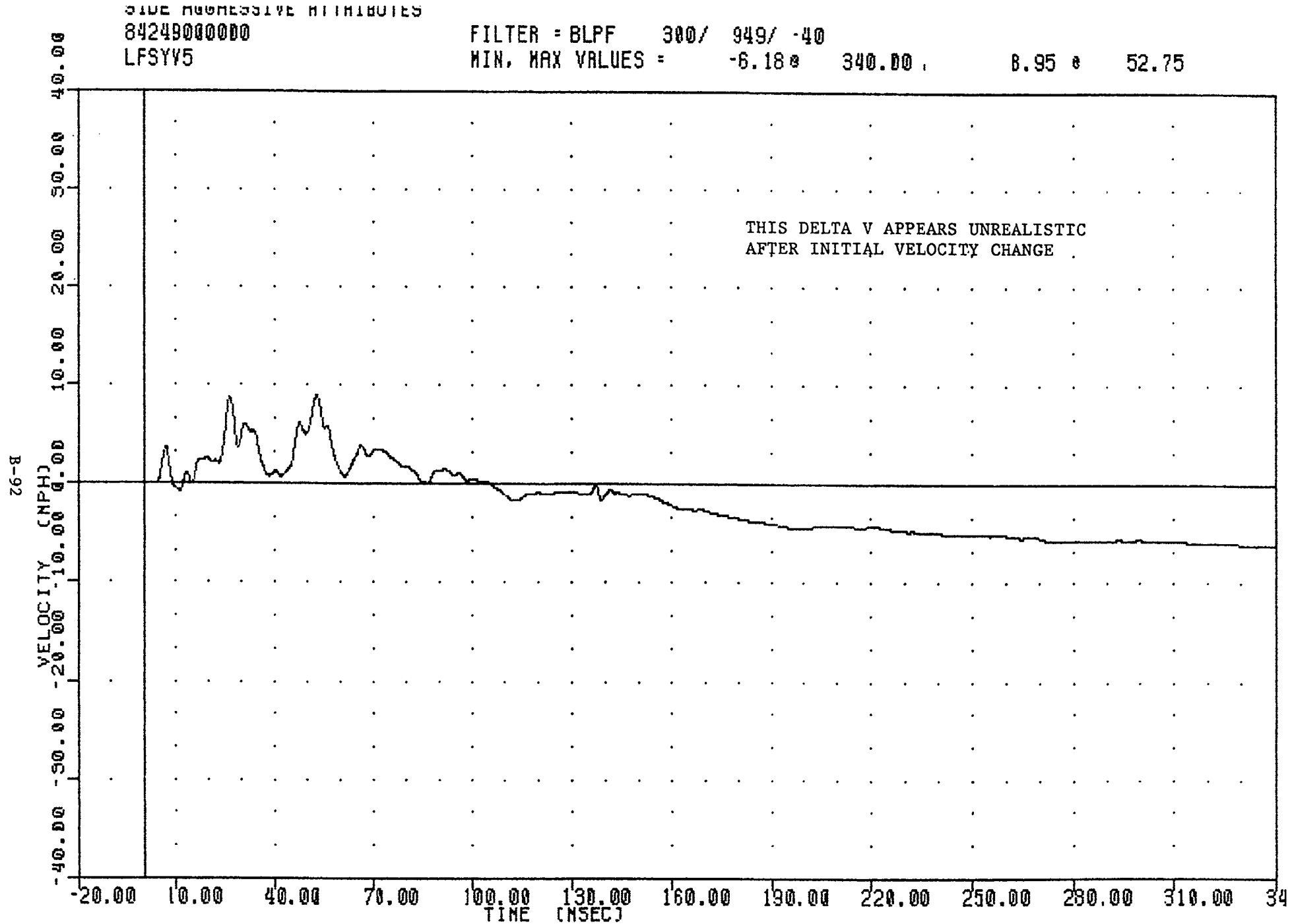
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT REAR SILL ACCELERATION Y AXIS



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LRSYG4



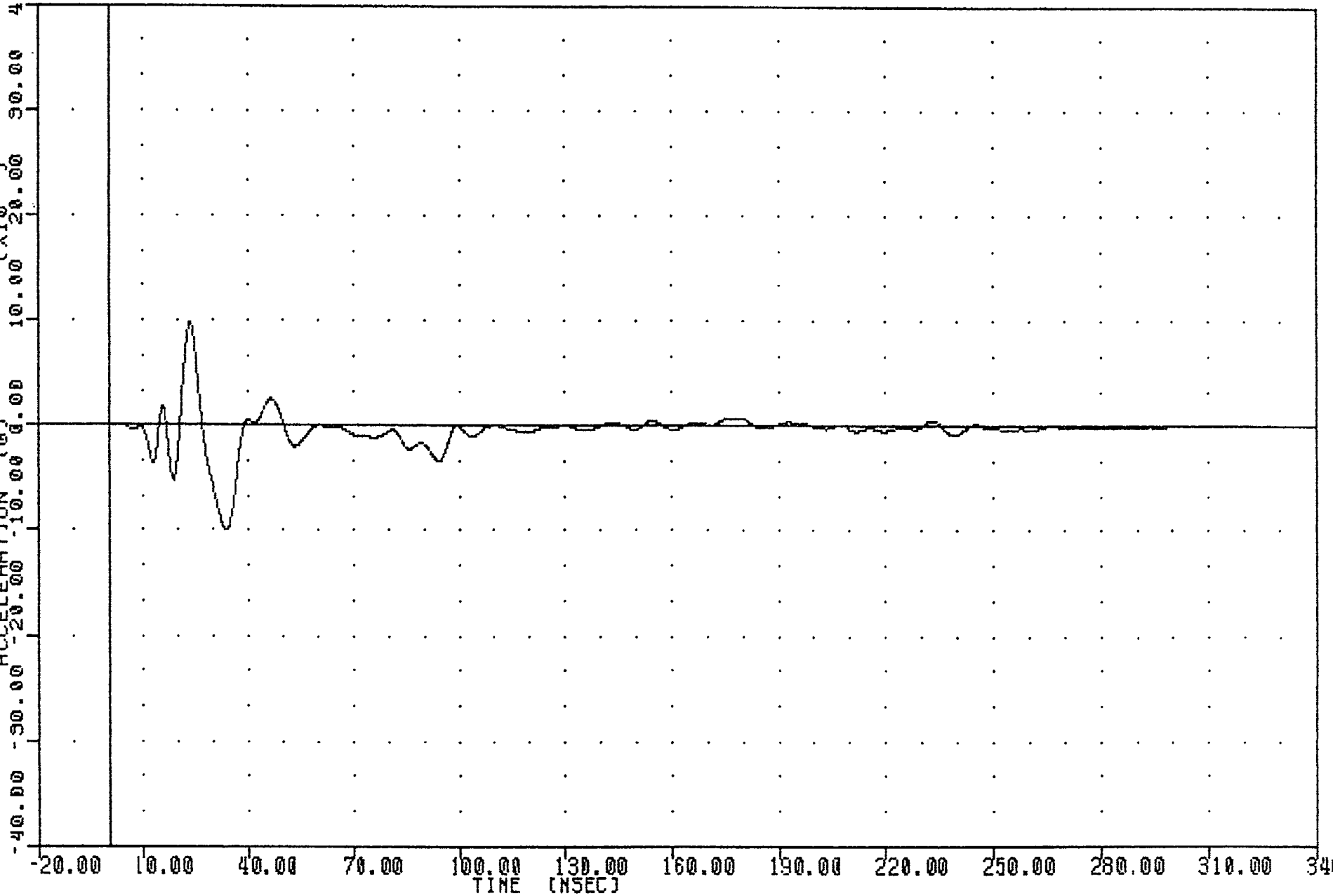
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT SILL ACCELERATION Y AXIS



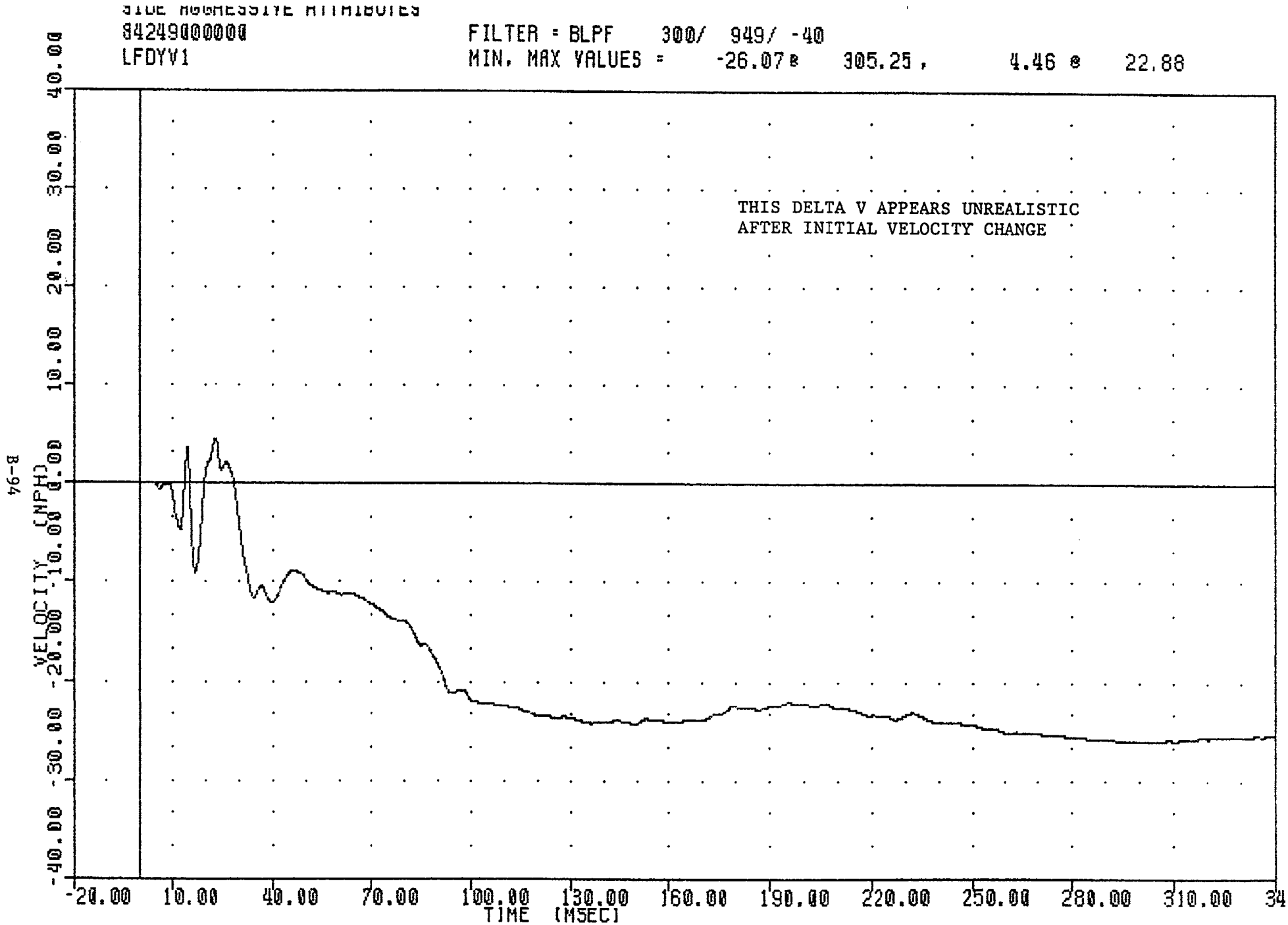
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFSYG5

84249000000
LFDYG1

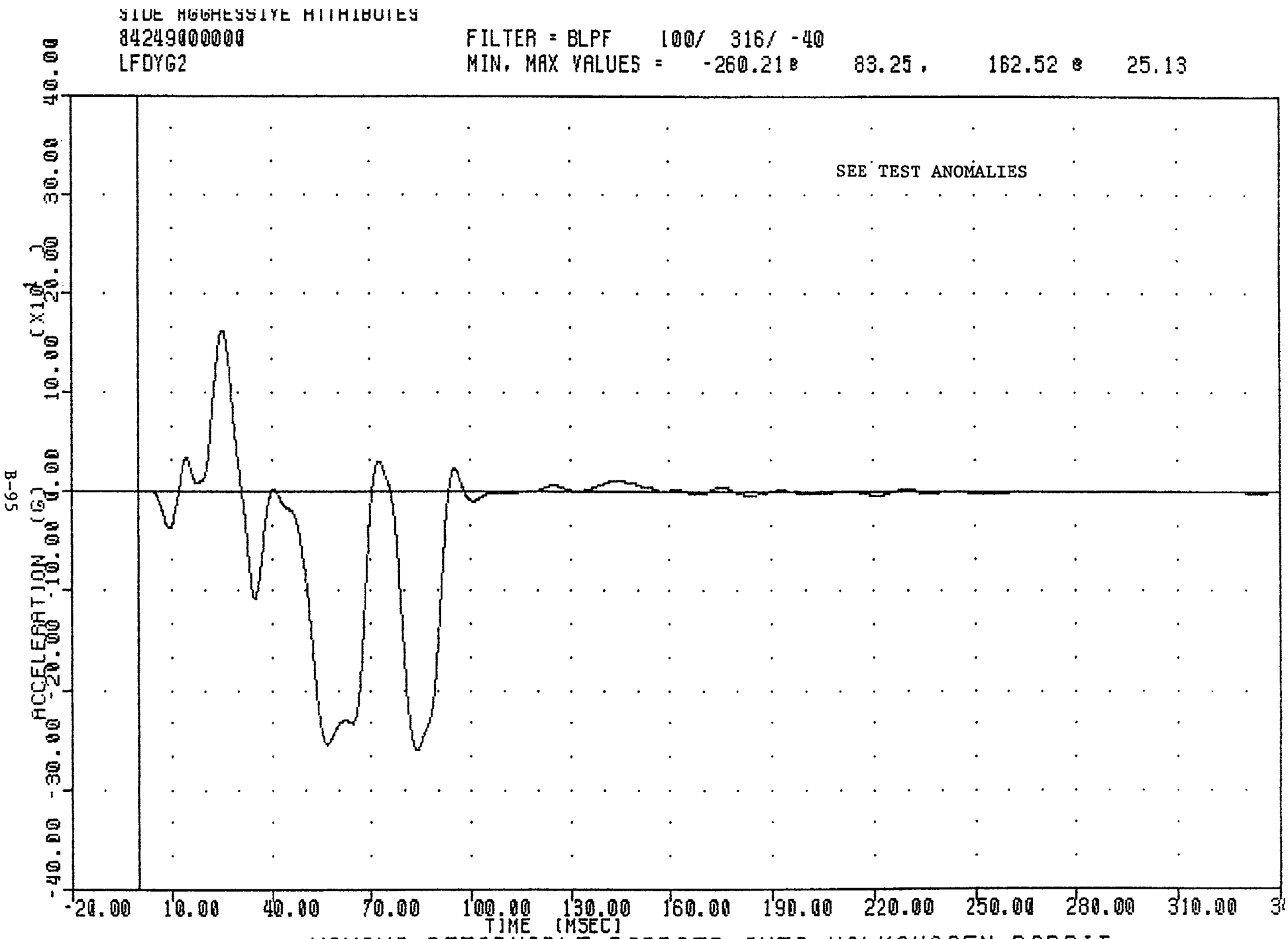
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -99.97 @ 33.50 , 99.02 @ 23.25



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



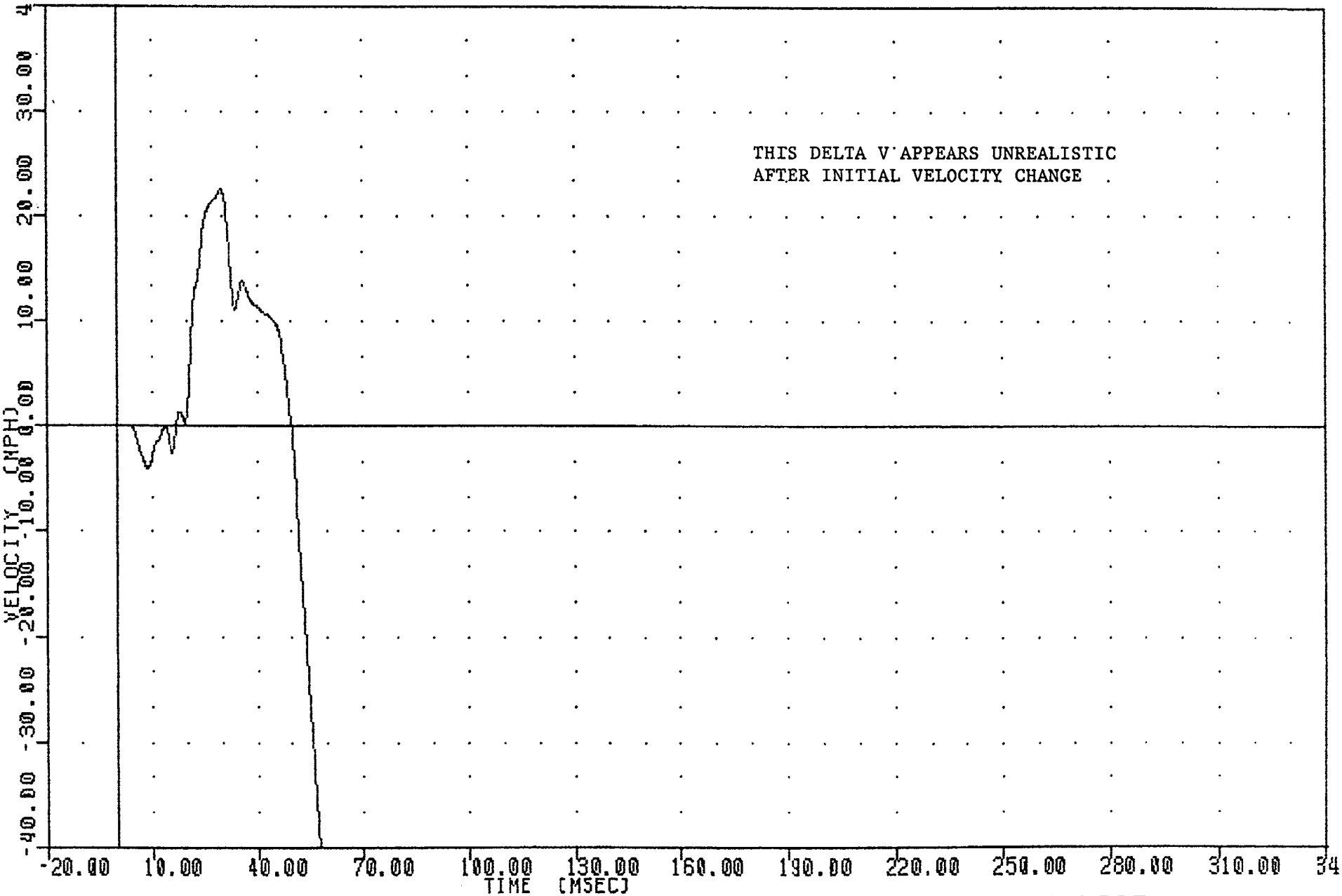
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFDYG1



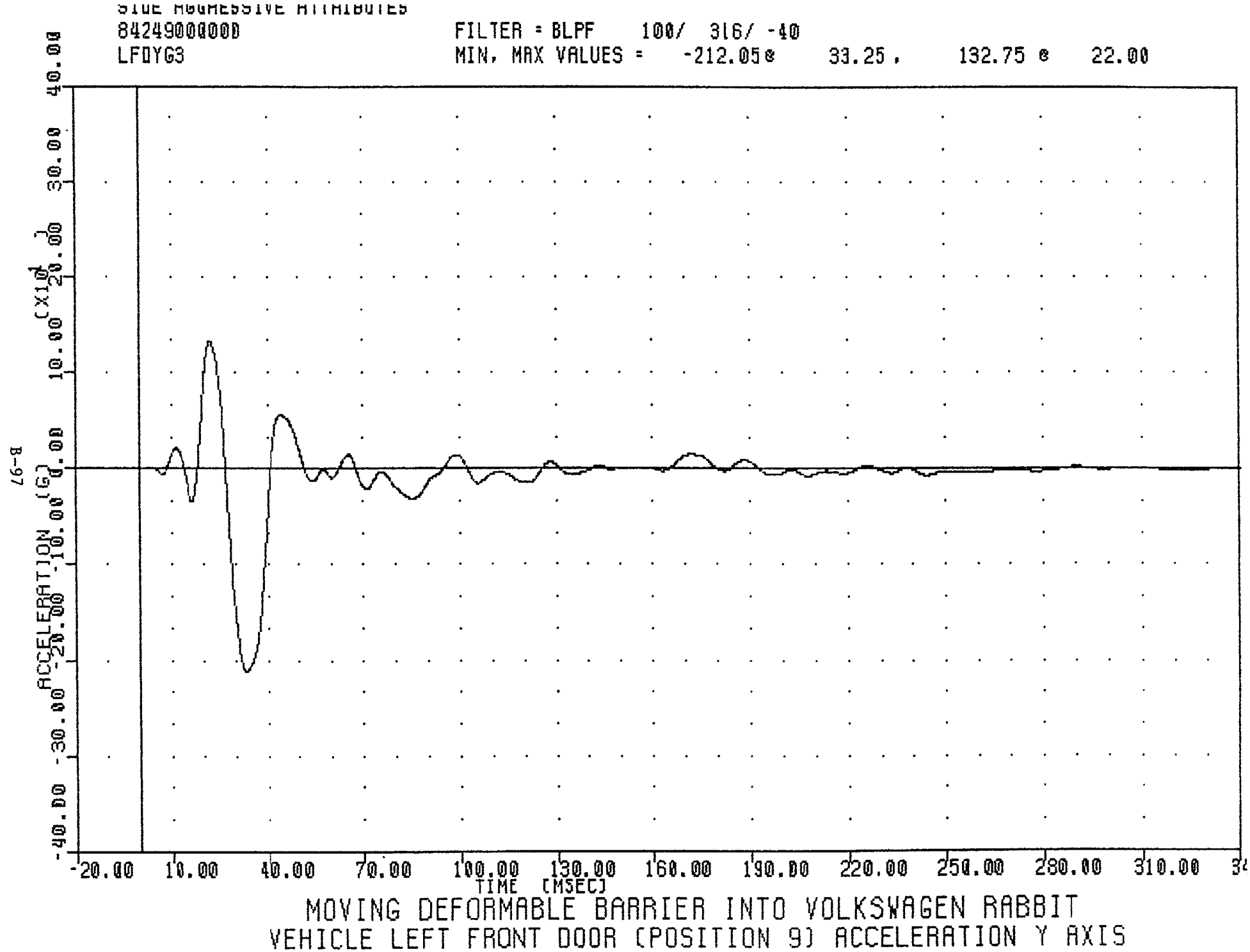
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT DOOR (POSITION 8) ACCELERATION Y AXIS

SIDE MDGMESSIVE ATTRIBUTES
84249000000
LFDYV2

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -137.43 @ 113.00 , 22.50 @ 29.63



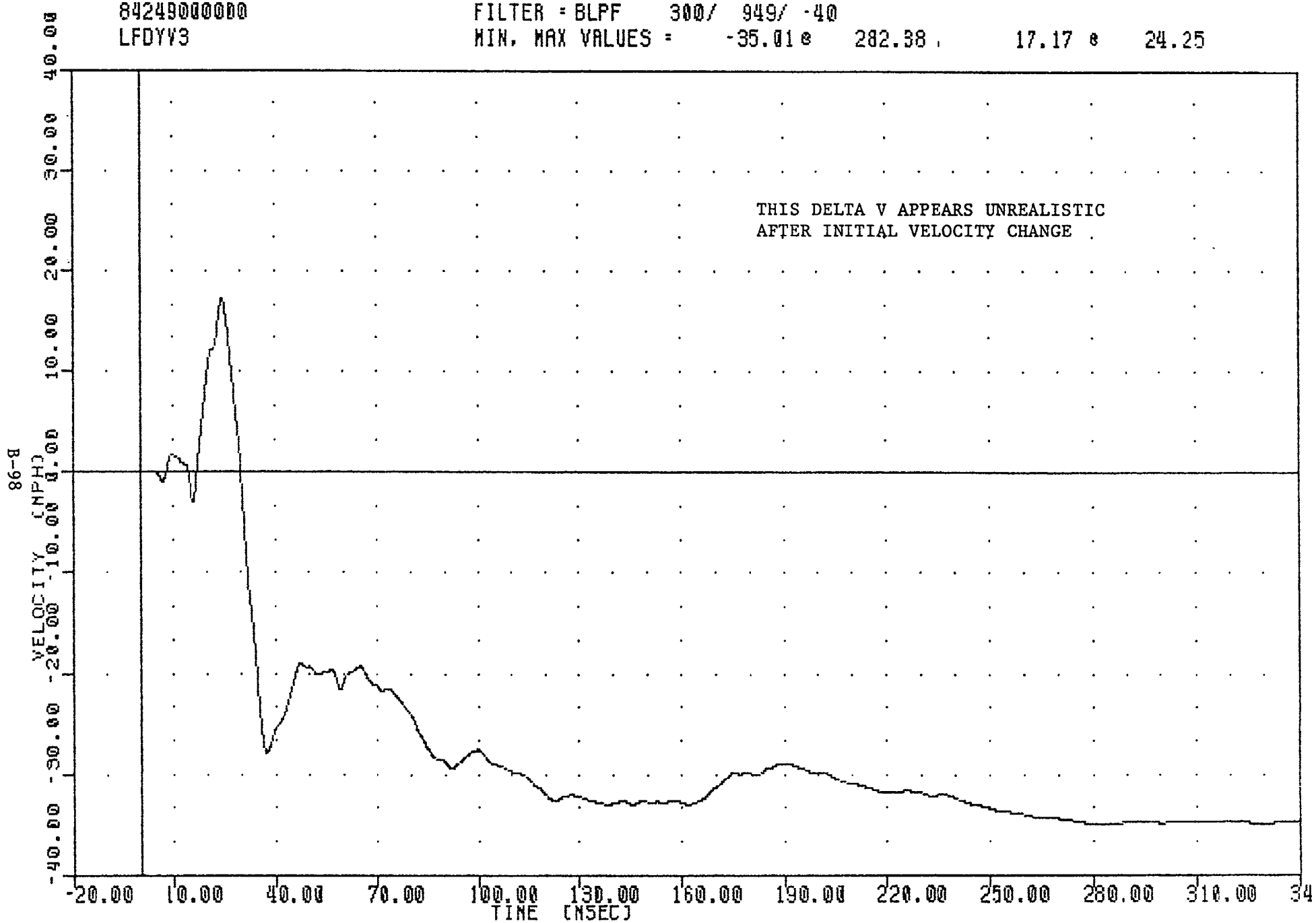
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFDYG2



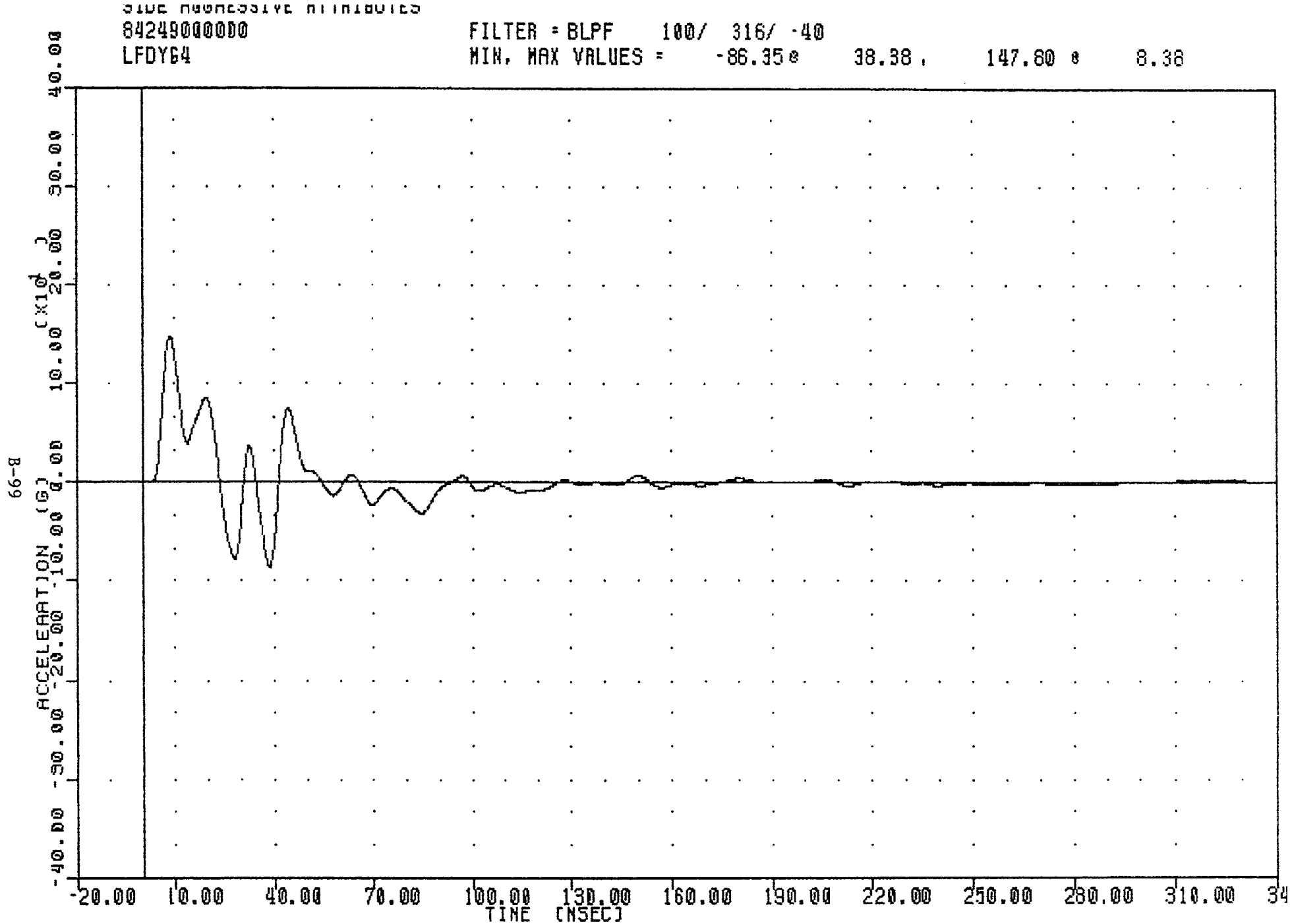
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT DOOR (POSITION 9) ACCELERATION Y AXIS

SIDE AGGRESSIVE ATTRIBUTES
84249000000
LFDYV3

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -35.01 @ 282.38 , 17.17 @ 24.25



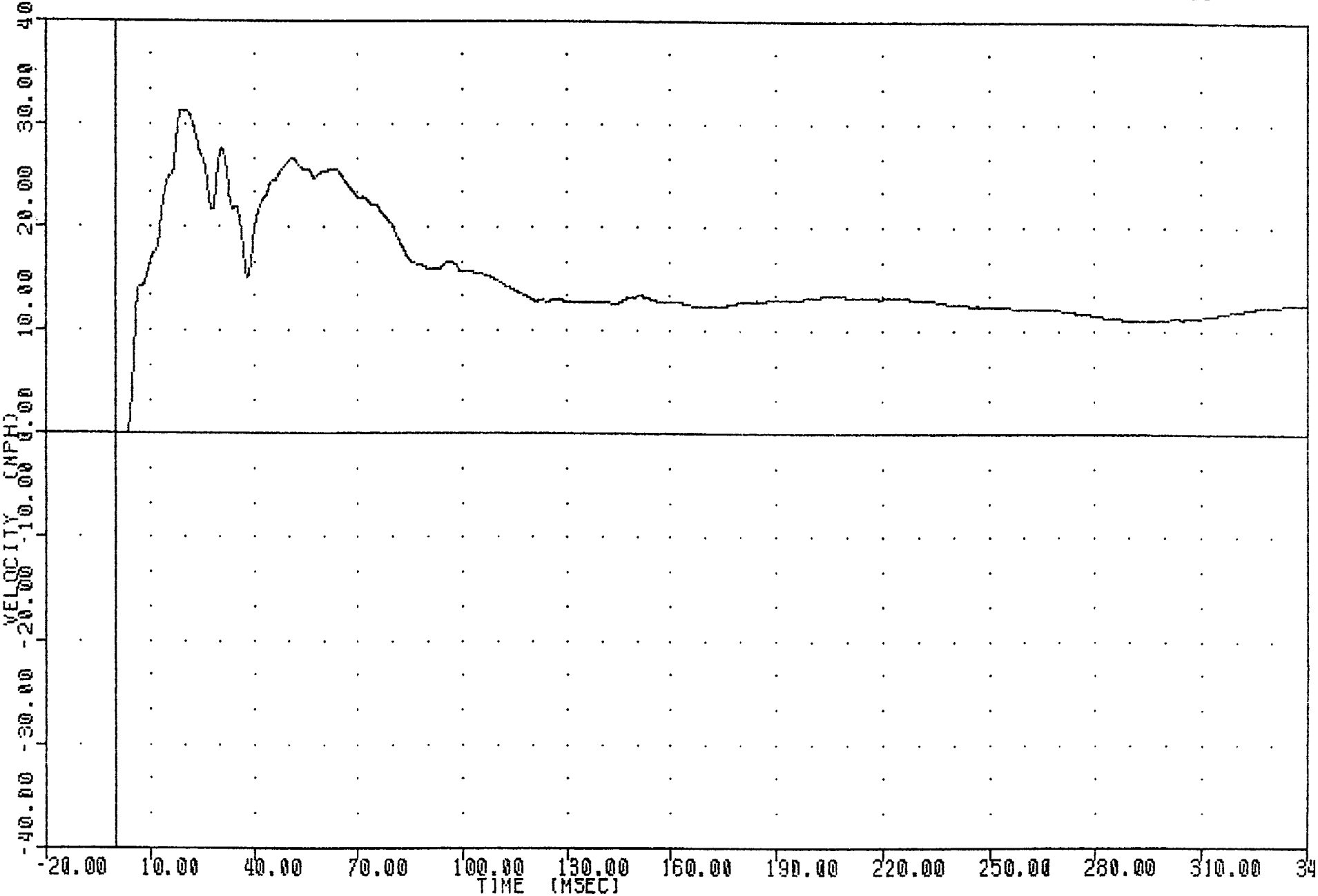
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFDYG3



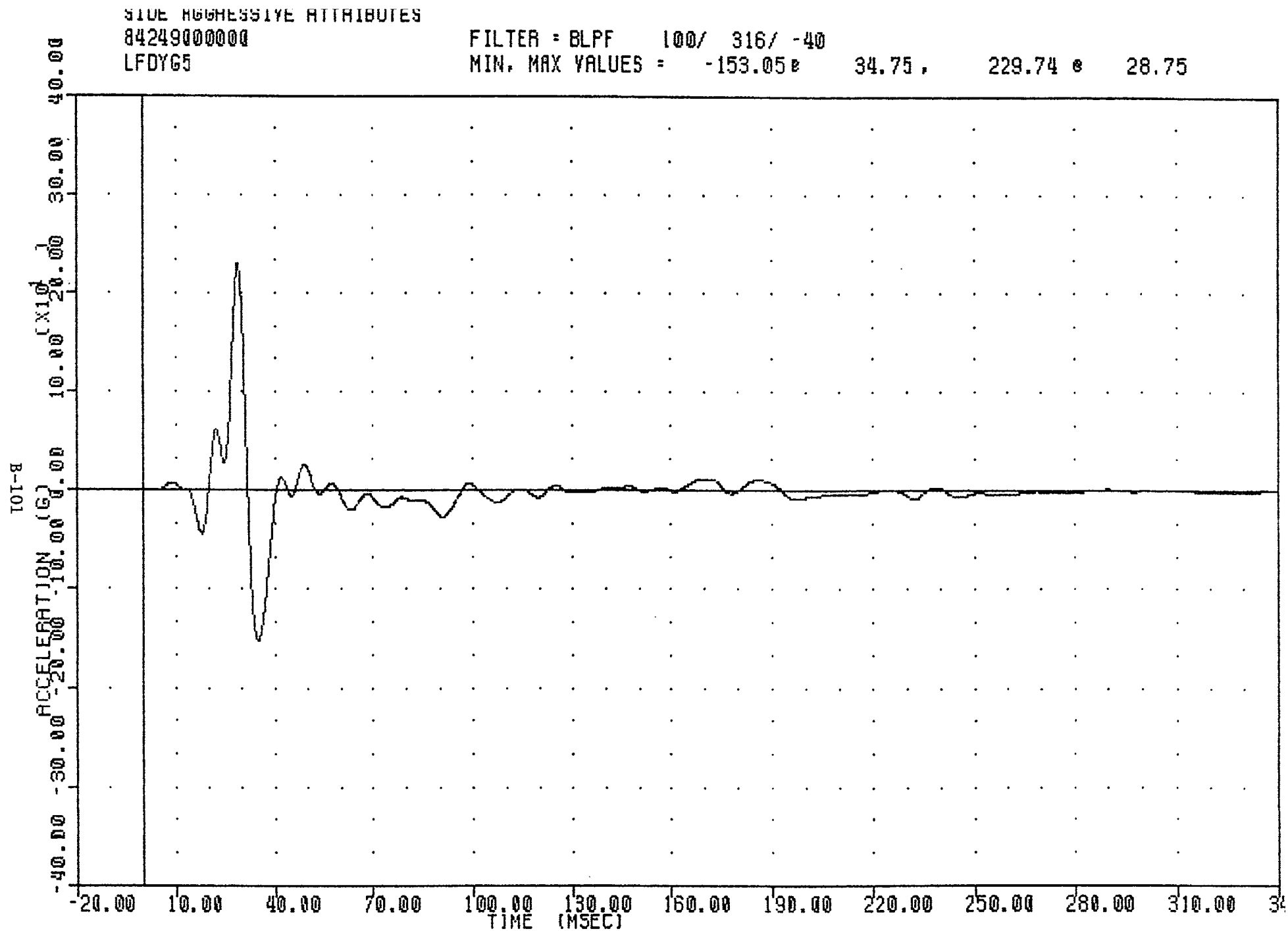
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT DOOR (POSITION 10) ACCELERATION Y AXIS

SIDE AGGRESSIVE ATTRIBUTES
84249000000
LFDYV4

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -0.04 @ -2.63 , 31.33 @ 18.88



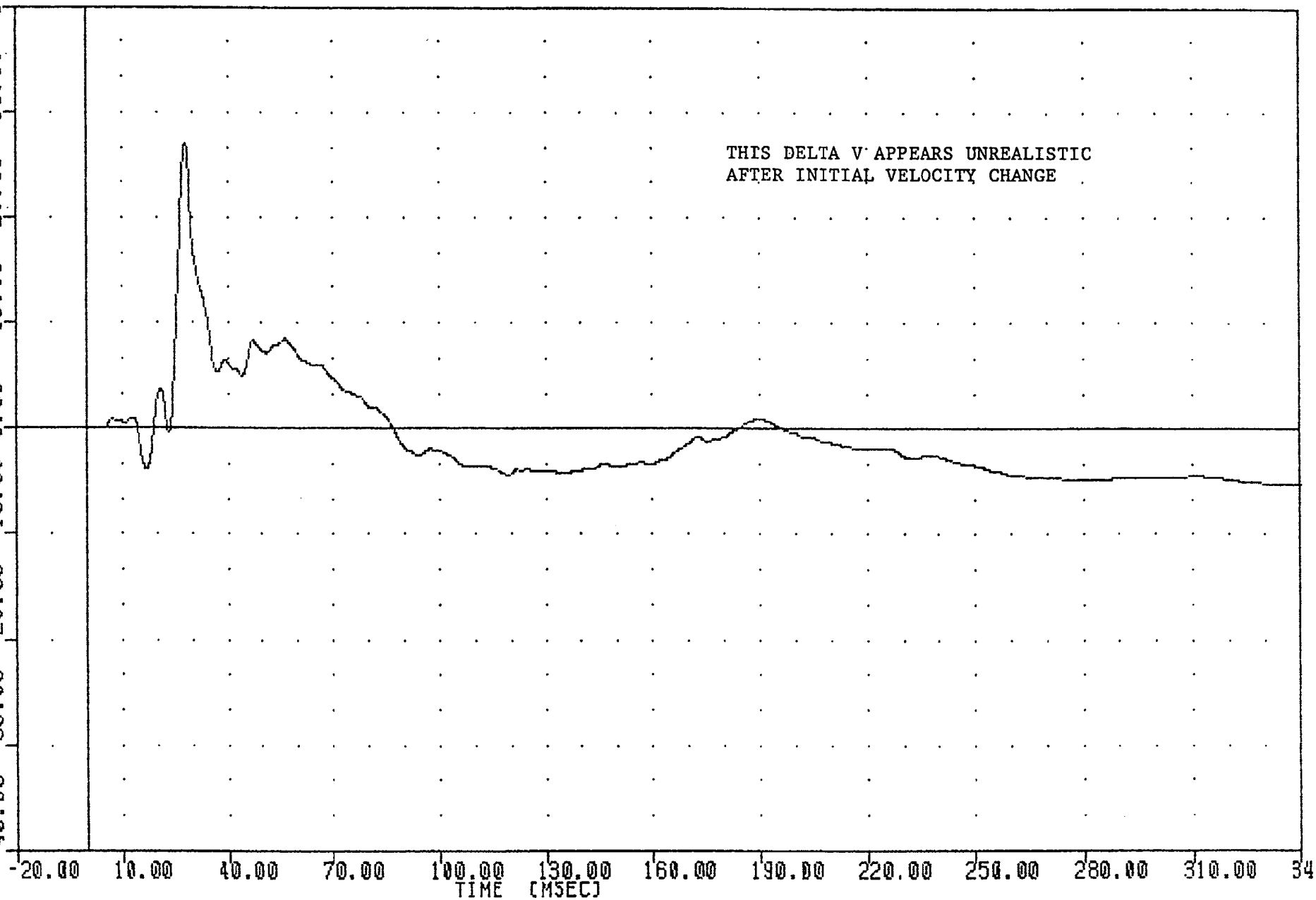
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFDYG4



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

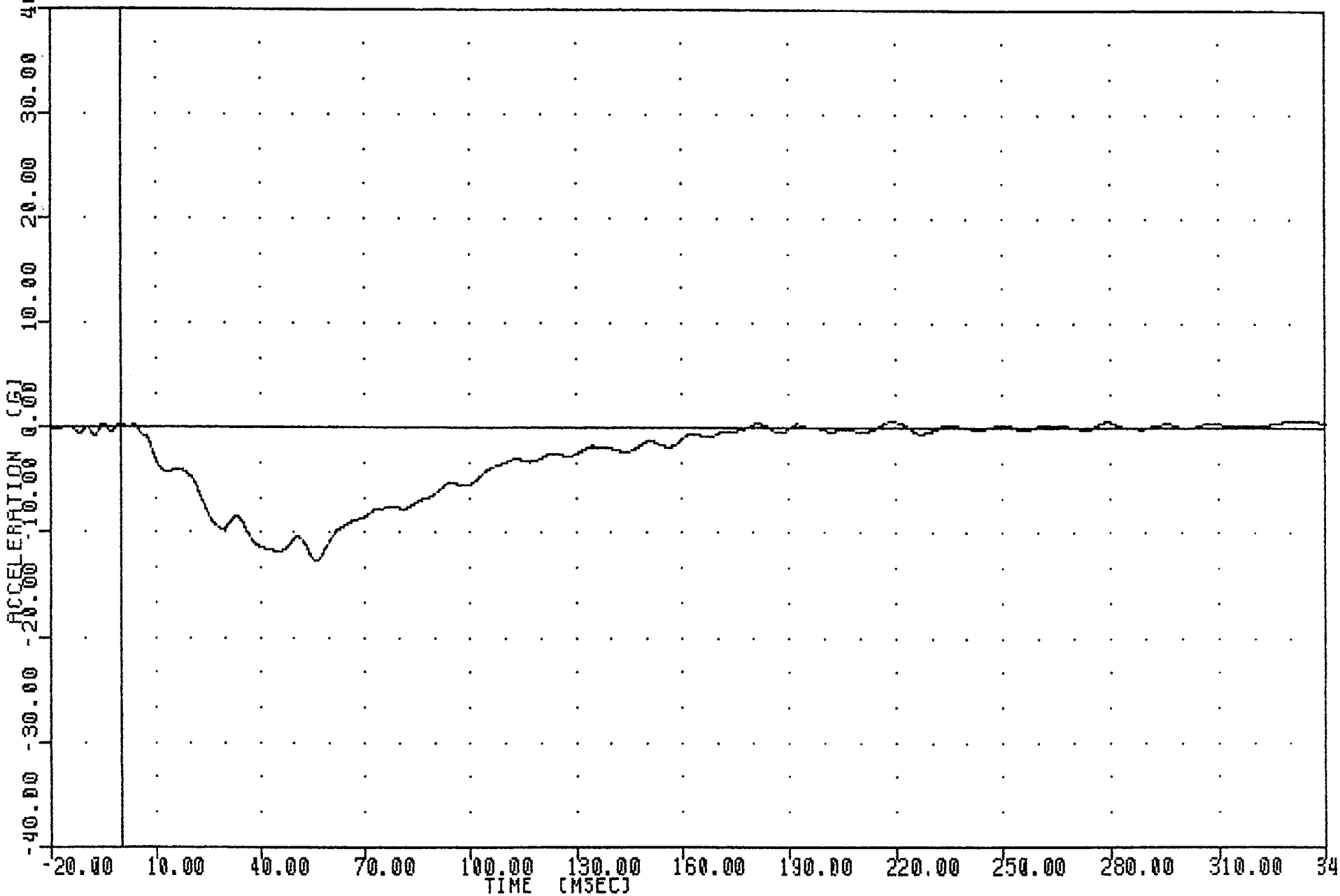
SIDE AGGRESSIVE ATTRIBUTES
84249000000
LFDYV5

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -5.25@ 340.00, 27.05 @ 27.88

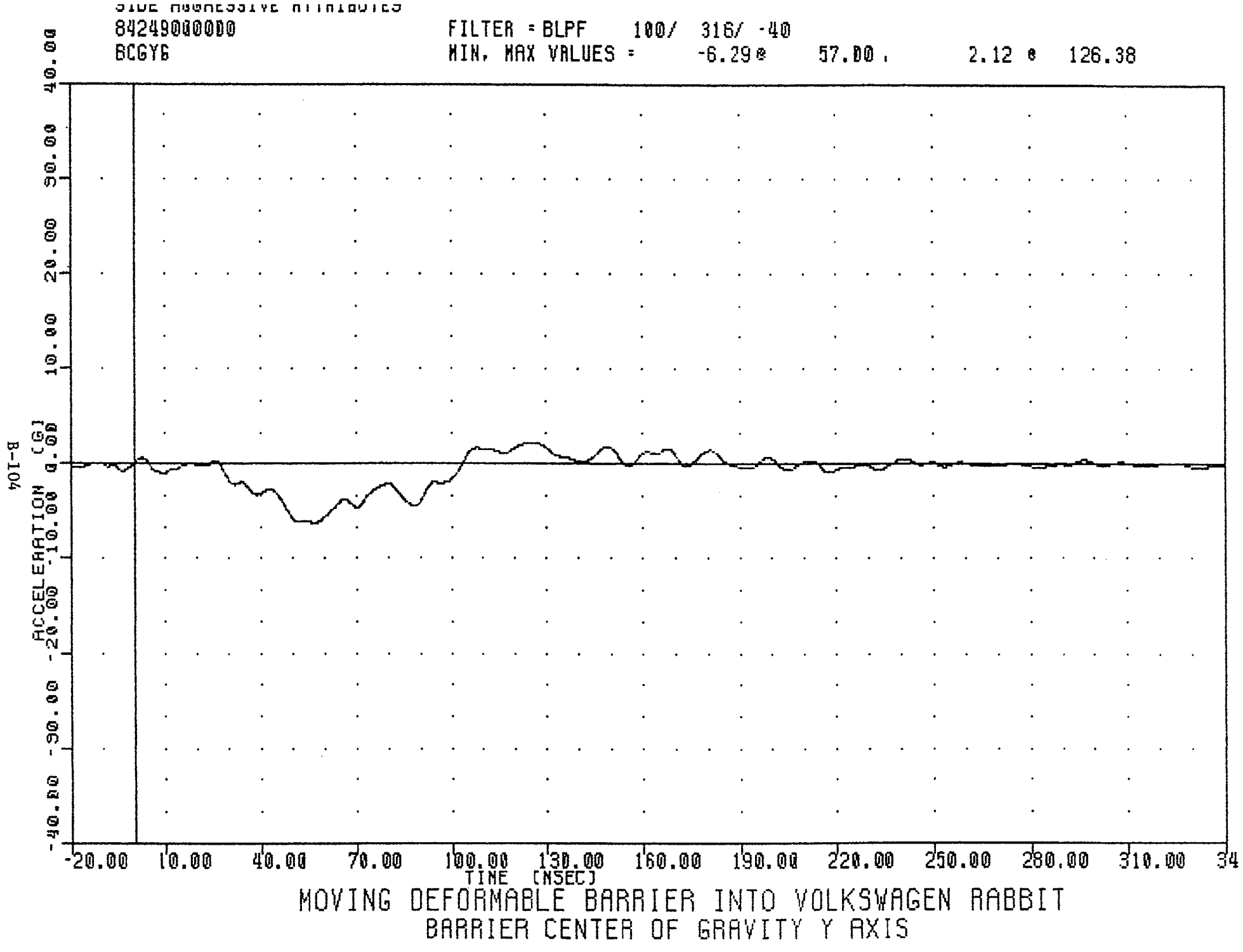


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFDYG5

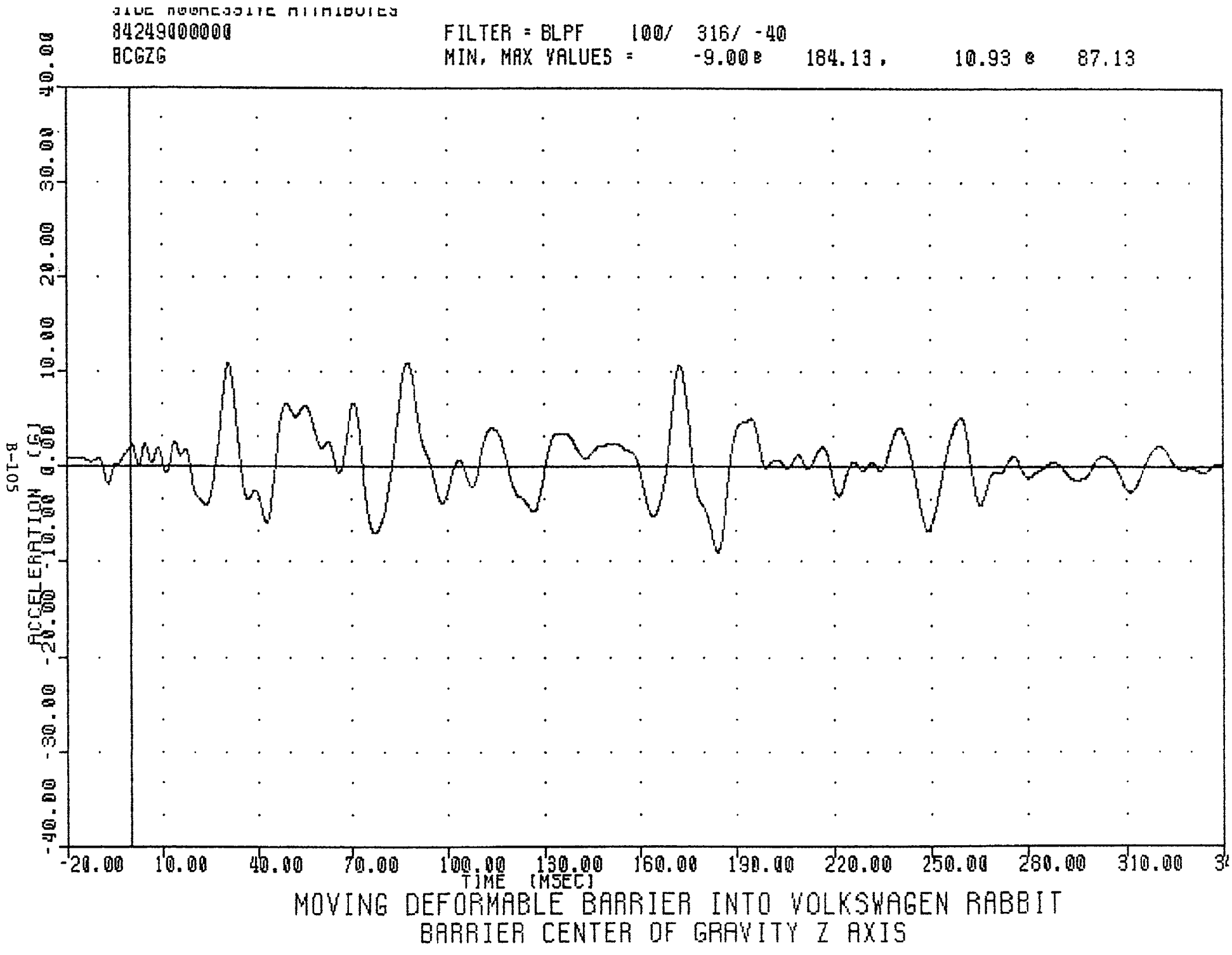
SIDE AGGRESSIVE ATTRIBUTES
84249000000
BCGXG
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -12.72 @ 56.00 , 0.75 @ 334.50



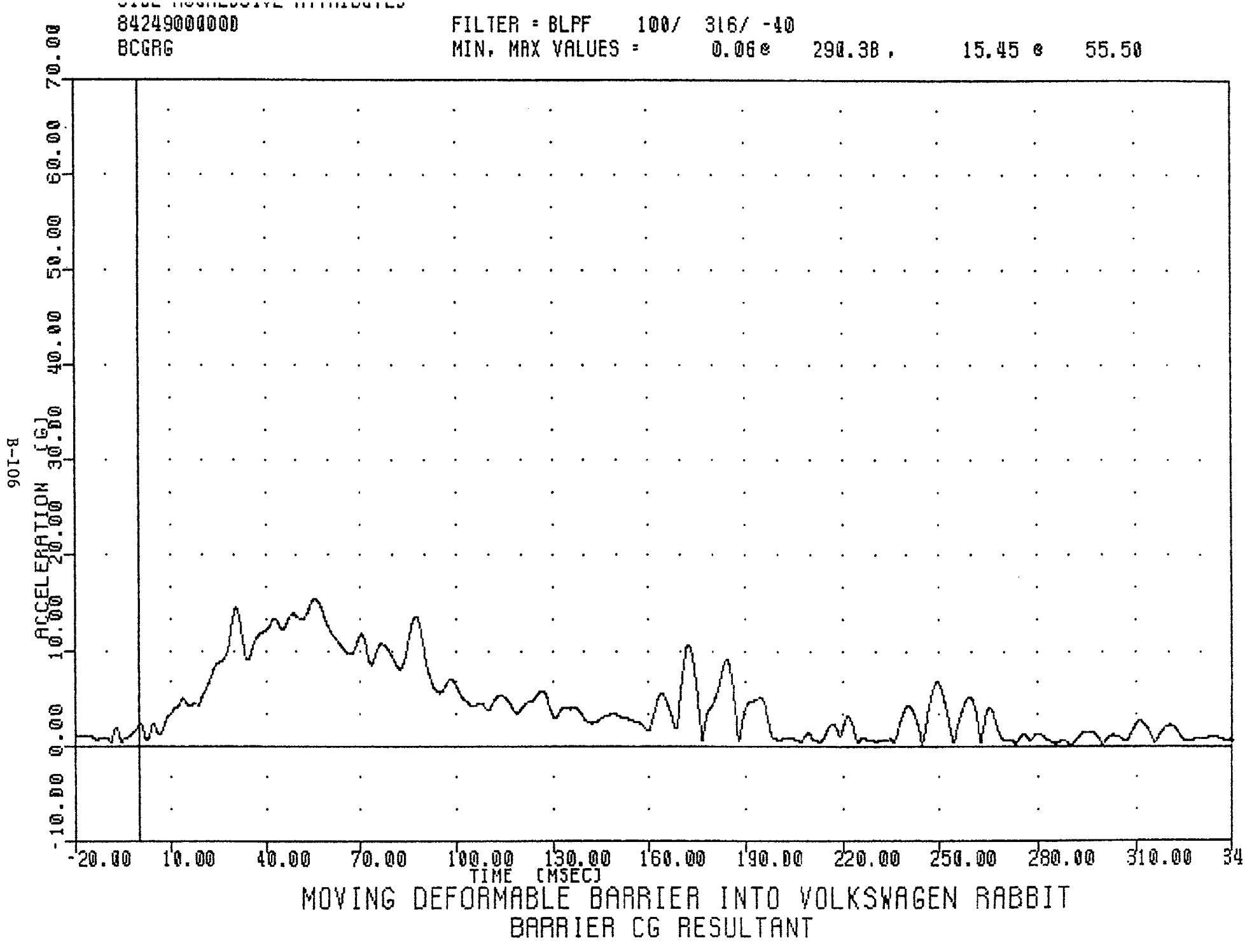
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER CENTER OF GRAVITY X AXIS



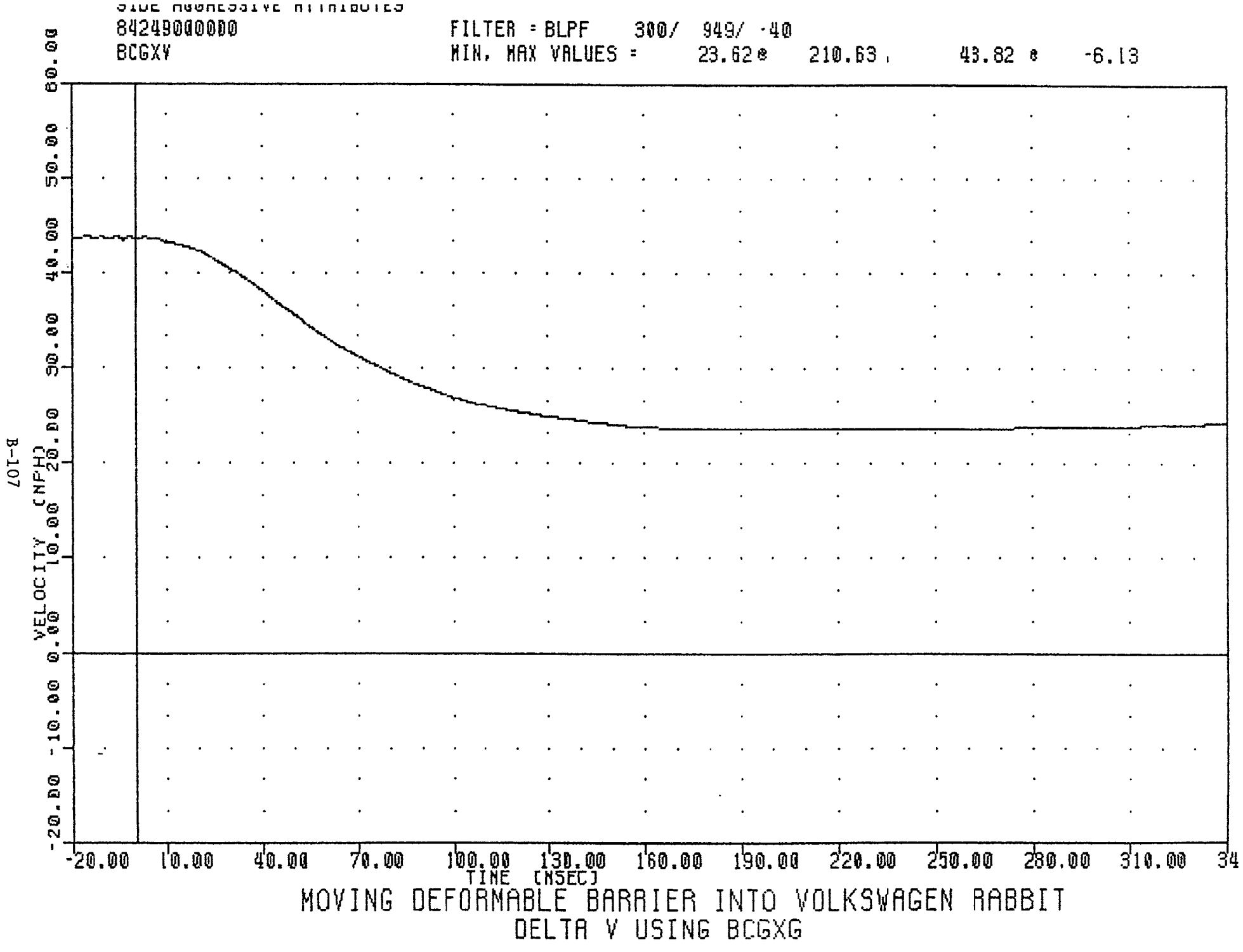
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER CENTER OF GRAVITY Y AXIS



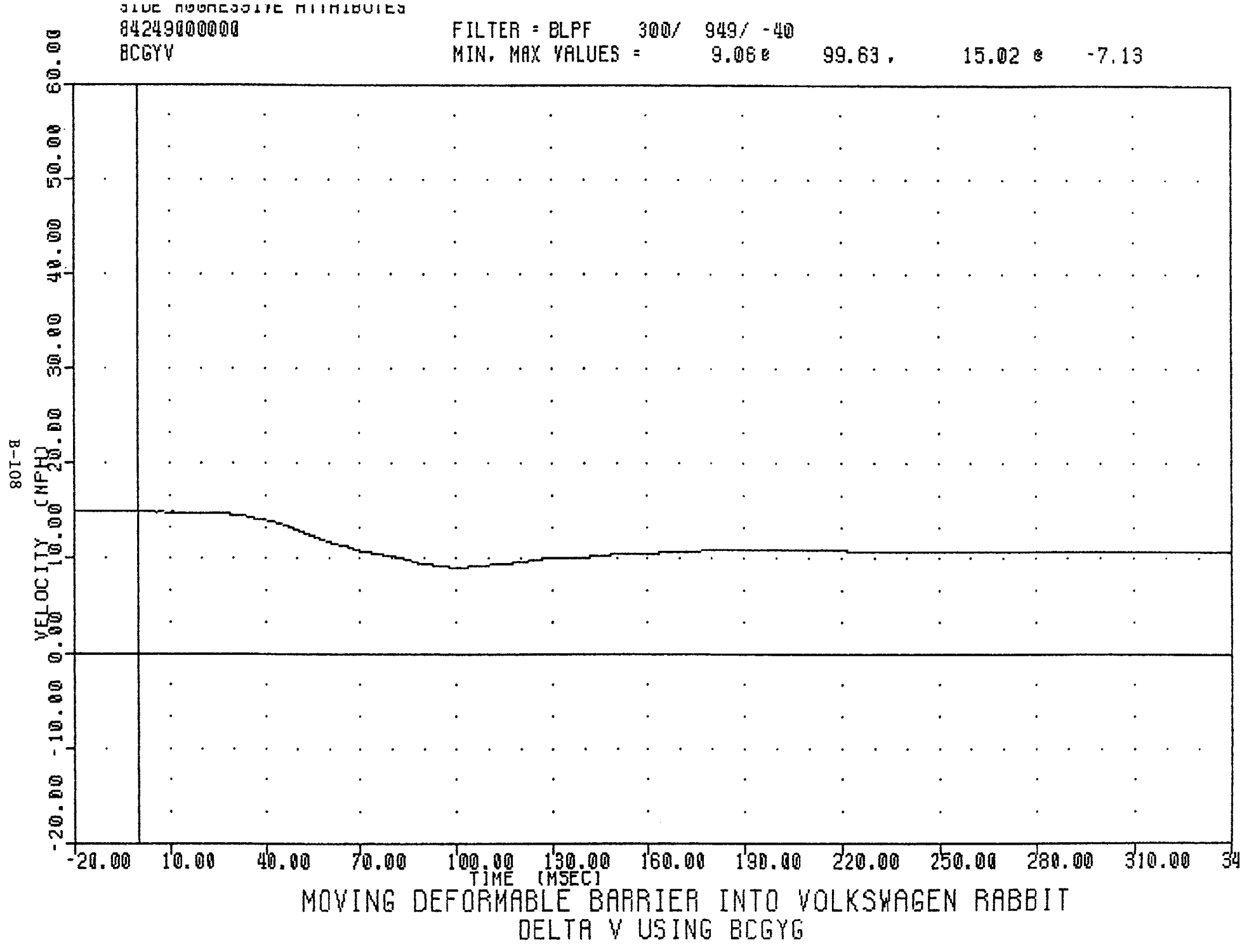
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER CENTER OF GRAVITY Z AXIS



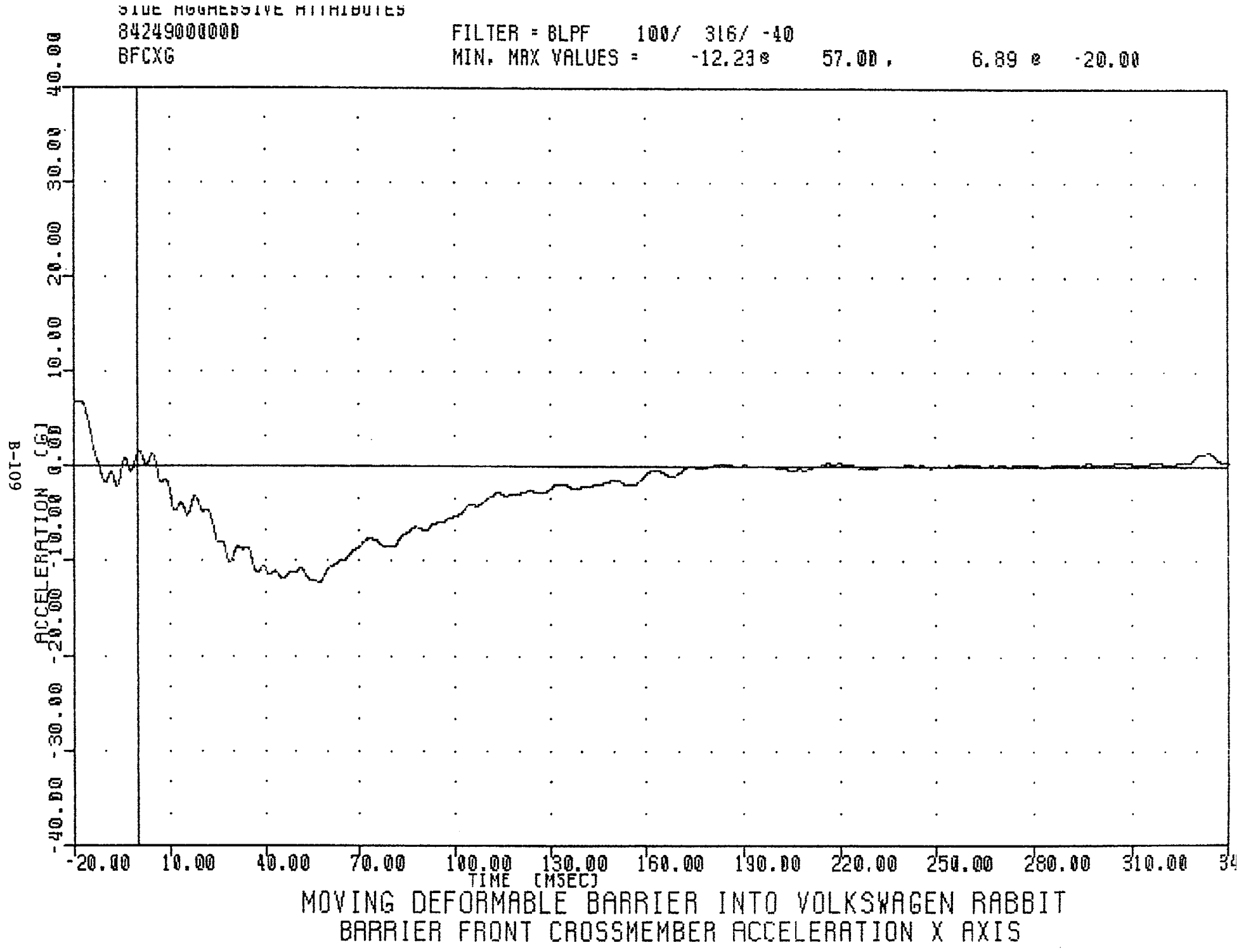
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER CG RESULTANT



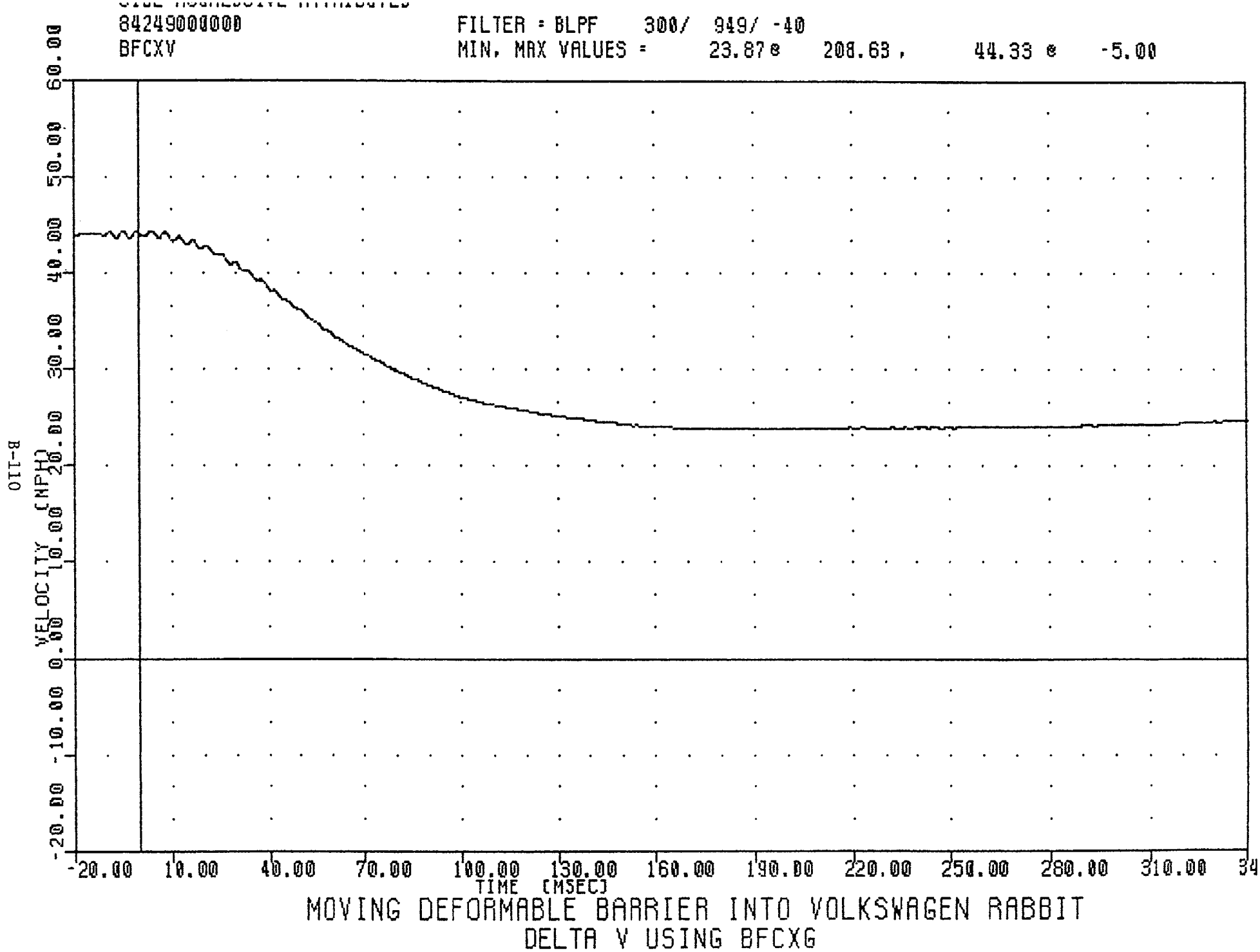
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING BCGXG



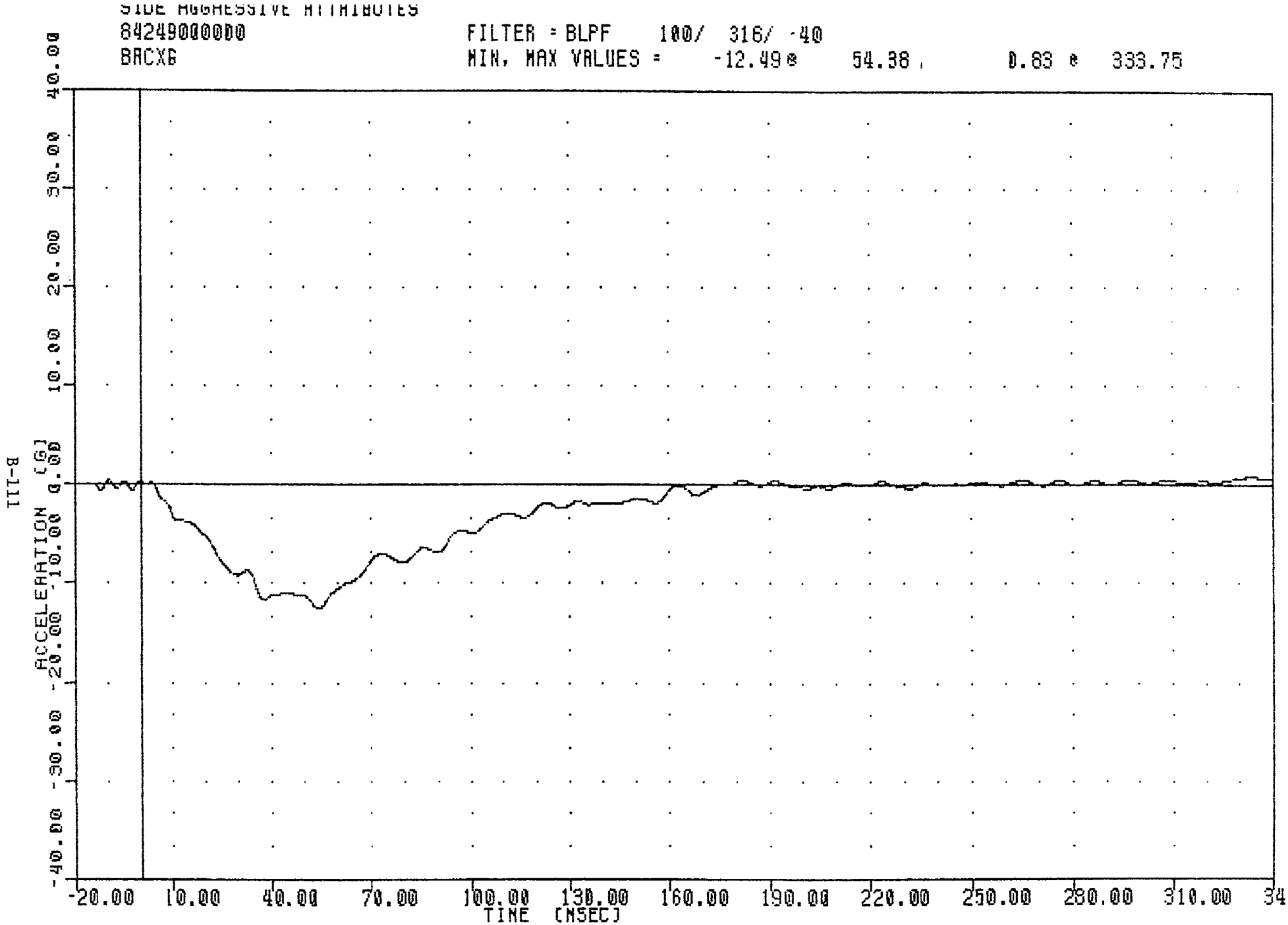
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING BCGYG



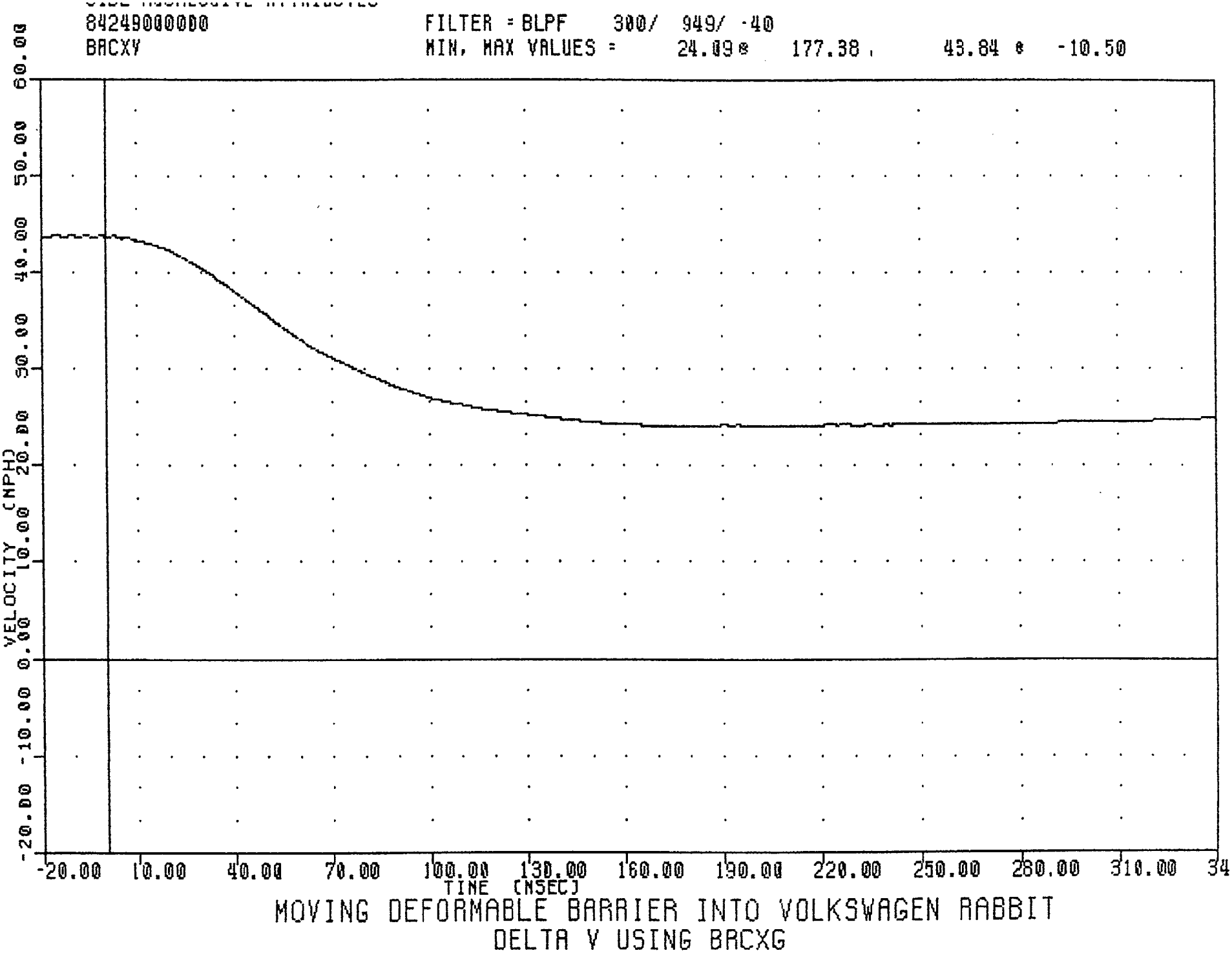
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER FRONT CROSSMEMBER ACCELERATION X AXIS



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING BFCXG



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


84249000000
BRCXV
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = 24.09 @ 177.38 , 43.84 @ -10.50
60.00
50.00
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
VELOCITY (MPH)
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
34
TIME (MSEC)
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING BRCXG