

EVALUATION OF THE BIOSID DUMMY
MDB-TO-CAR SIDE IMPACT TEST OF A 26° CRABBED
MOVING DEFORMABLE BARRIER
1987 NISSAN SENTRA
2-DOOR SEDAN
33.5 MPH

PREPARED BY:
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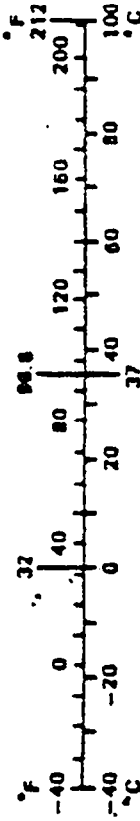
METRIC CONVERSION FACTORS

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 (10 000 m ²)	hectares	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t (1000 kg)	metric ton	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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<table border="1"> <thead> <tr> <th></th> <th>DRIVER</th> <th>PASSENGER</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC)</td> <td>393</td> <td>560</td> </tr> <tr> <td>Upper Spine Acceleration, g</td> <td>68</td> <td>49</td> </tr> <tr> <td>Left Upper Rib Acceleration, g</td> <td>95</td> <td>49</td> </tr> <tr> <td>Left Center Rib Acceleration, g</td> <td>96</td> <td>81</td> </tr> <tr> <td>Left Lower Rib Acceleration, g</td> <td>117</td> <td>109</td> </tr> <tr> <td>Lower Spine Acceleration, g</td> <td>90</td> <td>66</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td>104</td> <td>87</td> </tr> <tr> <td>Pelvis Acceleration, g</td> <td>159</td> <td>74</td> </tr> </tbody> </table>					DRIVER	PASSENGER	Head Injury Criteria (HIC)	393	560	Upper Spine Acceleration, g	68	49	Left Upper Rib Acceleration, g	95	49	Left Center Rib Acceleration, g	96	81	Left Lower Rib Acceleration, g	117	109	Lower Spine Acceleration, g	90	66	Thoracic Trauma Index (TTI)	104	87	Pelvis Acceleration, g	159	74
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SECTION 1.0
PURPOSE AND TEST SUMMARY

PURPOSE

The purpose of this test was to evaluate the response of BioSid dummies in a moving deformable barrier into stationary vehicle side impact test. The vehicle was tested using conditions not currently contained in a Federal Motor Vehicle Safety Standard.

INTRODUCTION

A stationary 1987 Nissan Sentra 2-door sedan was impacted on the left side by a Moving Deformable Barrier (MDB) on May 9, 1990. The test was to simulate an intersection collision with the striking vehicle travelling at 30 mph and the struck vehicle travelling at 15 mph. The orientation angle of the striking vehicle was 90° counterclockwise with respect to the longitudinal axis of the struck vehicle. The leading edge of contact was to be 37 inches forward of the midpoint of the wheelbase.

To simulate this collision, the MDB was to be towed into the stationary Nissan Sentra at 33.5 mph with MDB's wheels crabbed clockwise to 26°. The actual test speed was 33.5 mph and the actual leading edge of contact was 37.2 inches forward of the midpoint of the Nissan Sentra's wheelbase.

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. Appendix C contains Dummy Certification Data.

SECTION 2.0

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Nissan Motor Co. LTD.

MAKE/MODEL: Nissan/Sentra

VIN: JN1PB2217HU520083

BODY STYLE: 2-door sedan

MODEL YEAR: 1987

NHTSA NO.: NA

COLOR: Blue

ENGINE DATA: TYPE: transverse CYLINDERS: 4 DISPLACEMENT: 1648cc

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

DATE VEHICLE RECEIVED: 3/26/90

ODOMETER READING: NA

DEALER'S NAME AND ADDRESS: Quality Chevrolet
3101 Morse Road
Columbus, OH

ACCESSORIES:

POWER STEERING Yes
POWER BRAKES Yes
POWER SEATS No
POWER WINDOWS No
TINTED GLASS Yes
RADIO No
CLOCK No
OTHER None

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

REMARKS:

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

DATA FROM VEHICLE'S CERTIFICATION LABEL:

VEHICLE MANUFACTURED BY: Nissan Motor Co. LTD.

DATE OF MANUFACTURE: 8/86

VIN: JN1PB2217HU520083

GVWR: 3098 LBS

GAWR: FRONT: 1764 LBS., REAR: 1786 LBS.

TEST VEHICLE INFORMATION CONTINUED

VEHICLE TIRE DATA:

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

TIRES ON VEHICLE (MFR. & LINE, SIZE): Goodyear/Tiempo P155/80R13

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 1

IS SPARE TIRE "SPACE SAVER"? Yes

IS SPARE TIRE STANDARD EQUIPMENT? Yes

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

RIGHT FRONT	674 LBS.	RIGHT REAR	429 LBS.
LEFT FRONT	708 LBS.	LEFT REAR	384 LBS.
TOTAL FRONT WEIGHT	1382 LBS.	(63.0% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	813 LBS.	(37.0% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT	2195 LBS.		

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 25.6;	LF 25.9;	RR 25.4;	LR 25.1
PRE-TEST ATTITUDE:	RF 25.2;	LF 25.1;	RR 22.8;	LR 22.9
POST-TEST ATTITUDE:	RF 22.8;	LF 24.4;	RR 21.2;	LR 20.6

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 24 LBS. CARGO:

RIGHT FRONT	669 LBS.	RIGHT REAR	567 LBS.
LEFT FRONT	739 LBS.	LEFT REAR	574 LBS.
TOTAL FRONT WEIGHT	1408 LBS.	(55.2% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1141 LBS.	(44.8% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	2549 LBS.		

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

TEST VEHICLE INFORMATION CONTINUED

TEST FLUID TYPE

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

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

"USABLE" CAPACITY*: NA GALLONS

TEST VOLUME: 0 GALLONS

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

DETAILS OF FUEL SYSTEM: DNA

ELECTRIC FUEL PUMP: DNA

FUEL INJECTION: DNA

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

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

RECOMMENDED COLD TIRE PRESSURE: FRONT 26 psi; REAR 26 psi

RECOMMENDED TIRE SIZE: P155/80R13 LOAD RANGE X B, C

NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 2 FRONT

CARGO LOAD 0 LBS. 3 REAR

 5 TOTAL

TOTAL 750 LBS.

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

VEHICLE TEST WEIGHT CALCULATION

Test Weight = Unloaded Delivered Weight +
(Number of Dummies X 165 lbs.) +
Cargo Weight*

To achieve test weight, the exhaust system, battery alternator, front and rear bumpers, radiator, master cylinder, distributor, valve covers and air cleaner were removed. The fuel tank was empty. The weight of the test vehicle was measured by placing each wheel on a KJ Law Force Plate.

*A total test weight of 2510 pounds was used to duplicate a previous side impact test using a Nissan Sentra.

TEST CONDITIONS

TEST NUMBER: 900509

DATE OF TEST: 5/9/90

TIME OF TEST: 1430

DRIVER DUMMY TEMPERATURE: 73° F

PASSENGER DUMMY TEMPERATURE: 75° F

AMBIENT TEMPERATURE AT IMPACT AREA: 75° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 75° F

MAX. LENGTH = 168.5

MAX. WIDTH = 64.6

TOP WIDTH = 42.5

WHEELBASE = 95.5

C.G. = 42.5 REARWARD OF FRONT WHEEL CENTERLINE

LEFT FRONT DOOR: UNLOCKED WINDOW: UP

LEFT REAR DOOR: NA WINDOW: NA

RIGHT FRONT DOOR: UNLOCKED WINDOW: DOWN

RIGHT REAR DOOR: NA WINDOW: NA

EMERGENCY BRAKE: ON

TRANSMISSION: SECOND GEAR

STEERING COLUMN: NON-ADJUSTABLE

SEAT TRACKS: MID POSITION

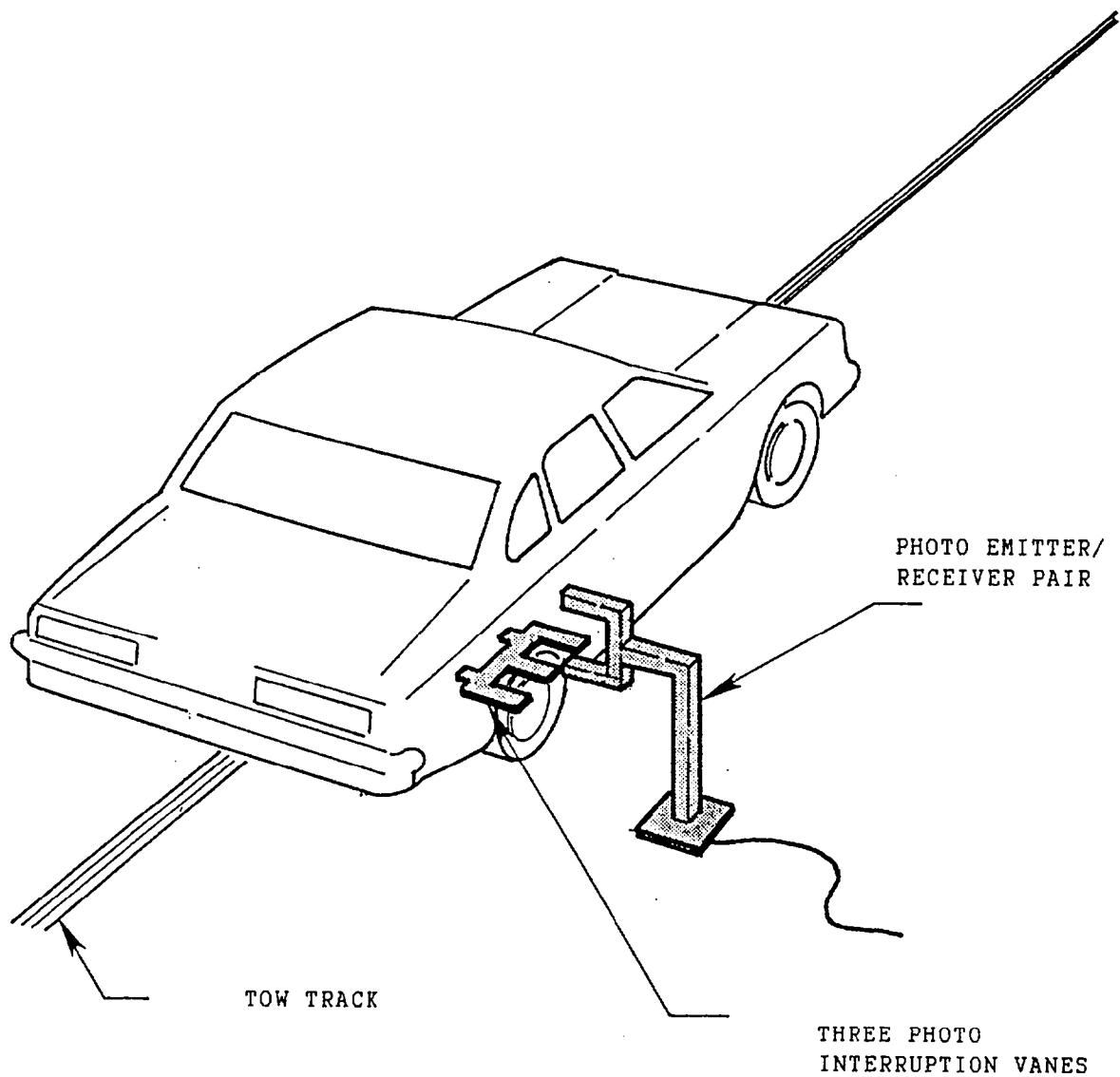
SEAT BACK ANGLE 23°

TYPES OF SEATS: FRONT - BUCKET; REAR - BENCH

TIRE PRESSURE: FRONT 29 psi; REAR 26 psi

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane clears emitter/receiver two inches before impact.

The vanes have one foot spacing.

TEST ANOMALIES

All twenty-eight data channels in one multiplexed signal group contained spikes at 9.5 and 14.2 milliseconds and lost data after 85.5 milliseconds due to a loose electric power supply module. The data is good during the time interval from 16.5 to 85.4 milliseconds. These data channels are:

HEDXG1, Driver Head X-axis Accelerometer
HEDYG1, Driver Head Y-axis Accelerometer
HEDZG1, Driver Head Z-axis Accelerometer
SHLYG1, Driver Left Shoulder Y-axis Accelerometer
SHLXF1, Driver Left Shoulder X-axis Force
SHLYF1, Driver Left Shoulder Y-axis Force
SHLZF1, Driver Left Shoulder Z-axis Force
T01XG1, Driver Left Shoulder X-axis Accelerometer
T01YG1, Driver Left Shoulder Y-axis Accelerometer
T01YGA, Driver Left Shoulder Y-axis Redundant Accelerometer
T01ZG1, Driver Left Shoulder Z-axis Accelerometer
LURYG1, Driver Left Upper Thorax Rib Y-axis Acceleration
LURYGA, Driver Left Upper Thorax Rib Y-axis Redundant Accelerometer
LCRYG1, Driver Left Center Thorax Rib Y-axis Accelerometer
LCRYGA, Driver Left Center Thorax Rib Y-axis Redundant Accelerometer
LLRYG1, Driver Left Lower Thorax Rib Y-axis Accelerometer
LLRYGA, Driver Left Lower Thorax Rib Y-axis Accelerometer
T12XG1, Driver Lower Spine X-axis Accelerometer
T12YG1, Driver Lower Spine Y-axis Accelerometer
T12YGA, Driver Lower Spine Y-axis Redundant Accelerometer
T12ZGA, Driver Lower Spine Z-axis Accelerometer
LUAYG1, Driver Left Upper Abdomen Rib Y-axis Accelerometer
LLAYG1, Driver Left Lower Abdomen Rib Y-axis Accelerometer
PEVXG1, Driver Pelvis X-axis Accelerometer
PEVYG1, Driver Pelvis Y-axis Accelerometer
PEVZG1, Driver Pelvis Z-axis Accelerometer
PPSYF1, Driver Pubic Symphysis Y-axis Force
PSAYF1, Driver Pelvis Sacrum Y-axis Force

TEST CONDITIONS. CONTINUED

SUBJECT VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
VEHICLE TEST WEIGHT (LBS.)	2549	2510
MDB TEST WEIGHT (LBS.)	3011	3010
MDB VELOCITY (MPH)*	33.5	33.5
IMPACT POINT (INCHES)**	37.2	37.0

DUMMY DATA

	<u>DRIVER</u>	<u>LEFT REAR PASSENGER</u>
TYPE:	BioSid	BioSid
SERIAL NO.:	001	002
INSTRUMENTATION:		
HEAD	3 accel.	3 accel
SHOULDER	1 accel., 3 force, & 1 displ.	1 accel. & 1 displ.
UPPER SPINE	4 accel.	3 accel.
LEFT UPPER THORAX RIB	2 accel. & 1 displ.	2 accel. & 1 displ.
LEFT CENTER THORAX RIB	2 accel. & 1 displ.	2 accel. & 1 displ.
LEFT LOWER THORAX RIB	2 accel. & 1 displ.	2 accel. & 1 displ.
LOWER SPINE	4 accel.	4 accel.
LEFT UPPER ABDOMEN	1 accel. & 1 displ.	1 accel. & 1 displ.
LEFT LOWER ABDOMEN	1 accel. & 1 displ.	1 accel. & 1 displ.
PELVIS	3 accel. & 3 force	3 accel.

RESTRAINT SYSTEM: Both dummies were unrestrained.

*As measured over final one foot of travel.

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

POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #001	PASSENGER #002
HEAD	<u>Roof</u>	<u>Left C-pillar</u>
CHEST	<u>Left front door</u>	<u>Left rear side wall</u>
ABDOMEN	<u>Left front door</u>	<u>Left rear side wall</u>
LEFT KNEE	<u>Left front door</u>	<u>Left rear side wall</u>
RIGHT KNEE	<u>Left knee</u>	<u>Left knee</u>

DOOR OPENING:

	LEFT	RIGHT
FRONT	<u>*</u>	<u>Easy</u>
REAR	<u>NA</u>	<u>NA</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	<u>NA</u>	<u>NA</u>
REAR	<u>NA</u>	<u>NA</u>

GLAZING DAMAGE:

The left side windows were shattered. The windshield
was cracked.

OTHER NOTABLE IMPACT EFFECTS:

None

*The left front door to be opened later by VRTC.

TEST ANOMALIES, CONTINUED

The following resultant acceleration calculations and velocity integrations were affected by the preceding anomalies:

HEDRG1, Driver Head Resultant Acceleration
HEDYV1, Driver Head Y-axis Velocity
SHLVG1, Driver Left Shoulder Y-axis Velocity
T01RG1, Driver Left Shoulder Resultant Acceleration
T01RGA, Driver Left Shoulder Redundant Resultant Acceleration
T01YV1, Driver Left Shoulder Y-axis Velocity
T01YVA, Driver Left Shoulder Y-axis Redundant Velocity
LURYV1, Driver Left Upper Thorax Rib Y-axis Velocity
LURYVA, Driver Left Upper Thorax Rib Y-axis Redundant Velocity
LCRYV1, Driver Left Center Thorax Rib Y-axis Velocity
LCRYVA, Driver Left Center Thorax Rib Y-axis Redundant Velocity
LLRYV1, Driver Left Lower Thorax Rib Y-axis Velocity
LLRYVA, Driver Left Lower Thorax Rib Y-axis Redundant Velocity
T12RG1, Driver Lower Spine Resultant Acceleration
T12RGA, Driver Lower Spine Redundant Resultant Acceleration
T12YV1, Driver Lower Spine Y-axis Velocity
T12YVA, Driver Lower Spine Y-axis Redundant Velocity
LUAYV1, Driver Left Upper Abdomen Rib Y-axis Velocity
LLAYV1, Driver Left Lower Abdomen Rib Y-axis Velocity
PEVRG1, Driver Pelvis Resultant Acceleration
PEVYV1, Driver Pelvis Y-axis Velocity

The driver left shoulder Y-axis accelerometer, SHLYG1, data contains three spikes at 34.5, 38.2, and 43.5 milliseconds.

The driver upper abdomen rib displacement, LUAYD1, data contains a spike at 22.5 milliseconds.

The driver pelvis sacrum Y-axis force, PSAYF1, data contains two spikes at 68.3 and 73.5 milliseconds.

TEST ANOMLAIES. CONTINUED

The left rear passenger left upper thorax rib Y-axis redundant accelerometer, LURYGD, data did not return to zero after 100 milliseconds.

The left rear passenger left upper thorax rib Y-axis velocity, LURYVD, data was affected by the above anomaly.

The left rear passenger left upper abdomen rib Y-axis accelerometer, LURYG4, data did not return to zero after 100 milliseconds.

The left rear passenger left upper abdomen rib Y-axis velocity, LURYV4, data was affected by the above anomaly.

The barrier center of gravity X-axis accelerometer, BCGXG, data contains three spikes at 226.1, 259.8, and 260.5 milliseconds.

The barrier center of gravity X-axis velocity integration, BCGXV, data was affected by the above anomalies.

The barrier center of gravity Z-axis accelerometer, BCGZG, data contains two spikes at 226.1 and 259.8 milliseconds.

The barrier center of gravity resultant acceleration, BCGRG, data was affected by the above anomalies.

SECTION 3.0

DATA REQUIRED BY R&D

The following pages are included in this section:

1. Dummy temperature control and positioning 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 by portable air conditioning units until approximately 1 minute prior to the test.

The following Side Impact Dummy Seating Procedure summarizes the steps taken to position the instrumented, calibrated dummies in the test vehicle.

SIDE IMPACT DUMMY SEATING PROCEDURE

1. Seat Positioning

- A. Place seat at the longitudinal midpoint of fore to aft adjustment (forward most locking position to rear most locking position). If no locking position is available at mid-travel, use the position immediately rearward of mid-travel.
- B. If the seat back angle is adjustable, place it in the manufacturer's stated nominal design location. If not specified, set it at the first detent rearward of 25°.
- C. Adjustable head restraints are set so that the top surface of the restraint is level with the cg of the dummy's head.
- D. If the seat is equipped with adjustable side or lumbar supports, they are set in their "released" or full back positions.
- E. All other seat adjustments are positioned to their mid-travel locations. If locking positions are not available at these mid-points, use the position immediately rearward, down, left or clockwise of mid-travel. Clockwise is defined looking rear to front or left to right relative to the vehicle. This also applies to adjustable steering columns.

2. H-point Determination

- A. The SAE three-dimensional H-point machine (SAE J826 APR80 - 50th percentile male configuration) is used to locate the H-point for each surrogate.
- B. The H-point machine is positioned on the seat as follows:
 - 1. Bucket or Contoured Seats - The H-point machine is centered on the bucket or contour such that its midsagittal plane is vertical and longitudinal.

2. Bench Seats

- a. driver position - The H-point machine is positioned such that its midsagittal plane is vertical, longitudinal, and contains the steering wheel center point.
 - b. outboard passenger positions - The H-point machine is positioned such that its midsagittal plane is vertical, longitudinal, and the same distance from the longitudinal vehicle centerline as that for the driver position.
 - c. center passenger positions - The H-point machine is positioned such that its midsagittal plane is vertical and contains the longitudinal vehicle centerline.
- C. Locate the H-point position using the steps outlined in sections 4 through 6 of SAE Standard J826 APR80, unless otherwise specified in section 1 or 2 of this document. Record the coordinates of this point, relative to the vehicle, for use in sections 4 and 5 of this document.

3. Test Dummies

- A. This side impact crash test uses the BioSid side impact dummy.
- B. The arm position is fully down and the end of the arm is 1/4" away from the left side of the dummy.
- C. All dummy joints are inspected for mobility prior to each test usage and reset to hold between 1 and 2 g's. This amount just barely restrains the weight of the individual limb when it is extended horizontally.
- D. Each test dummy is clothed in form-fitting cotton stretch underwear with short sleeves and mid-calf length pants. Each foot of the dummy is equipped with a size 11EE shoe which meets the configuration, size, sole, and heel thickness specifications of MIL-S-13192 and weighs 1.25 ± 0.2 pounds. All the above items are supplied by the contractor.

4. Initial Dummy Placement

The BioSid dummy(s) is placed in the vehicle seat with its pelvis positioned such that a lateral line passing through the dummy H-point is perpendicular to the longitudinal centerplane of the vehicle.

A. Bucket or Contoured Seats. The dummy is centered on the bucket or contoured seat such that its midsagittal plane is vertical and longitudinal. The legs are positioned as follows, keeping the femur and tibia centerlines in a plane that is as near to vertical as possible.

1. driver position placement - The right foot of the dummy is initially placed on the undepressed accelerator pedal, with the heel resting on the floorpan as far forward as possible. The knees of the dummy are initially set 8 1/2 inches apart, measured between the center surfaces of the knee.
2. passenger position placement - The knees of the dummy are initially set 8 1/2 inches apart, measured between the center surfaces of the knee. If a center tunnel prevents this, place the feet on either side of the tunnel.
3. center passenger position - The dummy is positioned in the seat as outlined in section 4.A.2 except that its midsagittal plane is vertical and contains the vehicle centerline.

5. Initial Dummy Positioning

A. H-Point Positioning

1. Determine the dummy's H-point target location which is the point .25-inch below the H-point position determined by using the SAE J826 APR80 manikin in section 2.0.
2. With the dummy laterally positioned as in section 4, insert the pelvis angle indicator bar in the hole provided above, and to the

rear of the dummy H-point. Position the longitudinal pelvis angle between 23° and 25° to the horizontal. This may be accomplished by raising the legs or flexing the upper torso forward and allowing the pelvis to rotate. The lateral pelvis angle is to be horizontal.

3. Apply sufficient force on the lower torso in a horizontal and vertical direction to place the dummy H-point at the coordinates obtained in section 5.A.1.
4. If the H-point cannot be placed at the desired coordinates, adjust the pelvis angle within the 2° band and reposition to the coordinates. After repositioning the H-point, any deviation from the desired coordinates is recorded and used to indicate actual H-point locations. This deviation is not to exceed 1/2".

6. Final Dummy Positioning

- A. Driver Position. Without inducing pelvis or torso movement, the dummy's right foot is maintained on the undepressed accelerator pedal with the heel resting as far forward as possible on the floorpan. The left foot is set perpendicular to the lower leg with the heel resting on the floorpan in the same lateral line as the right heel. If possible within these constraints, the dummy's thighs should be in contact with the seatpan.
- B. Front Passenger Positions. Without inducing pelvis or torso movement, place the dummy's feet on the vehicle's toeboard with the heels resting on the floorpan as close as possible to the intersection of the toeboard and floorpan. If the feet cannot be placed on the toeboard, they are set perpendicular to the lower legs and placed as far forward as possible such that the heels rest on the floorpan.
- C. Rear Passenger Positions. Without inducing pelvis or torso movement, the feet are placed flat on the floorpan and beneath the front seat as far forward as possible without front seat interference. If necessary, change the distance between the knees as required to place the feet beneath the seat. Record the new distance.

- D. Vehicles with wheelhouse projections in the passenger compartment. The foot (feet) in question is placed in the wheel of the floorpan/toeboard and not on the wheelhouse projection. This is done by twisting the foot at the ankle, maintaining the upper and lower leg positions outlined in section 4. If this does not resolve the situation, move the leg of the foot in question just enough to achieve the correct position, keeping the femur and tibia centerlines in a plane that is as near to vertical as possible. Record the new distance between the knees.
- E. The knee positions are to be as outlined in section 4, unless modified as in section 6. The plane containing the femur and tibia centerlines for each leg is to be as near to vertical as possible without inducing pelvis or torso movement. Record the distance between the knees for each dummy.
- F. Prior to conducting the test, the dummy position is visually checked. The dummy is to be properly positioned laterally with its midsagittal plane vertical and longitudinal, and the upper torso resting against the seat back. The H-point and pelvis angle are to be within the specified ranges and the foot, knee, and leg placements are to be as outlined. The COTR is to be satisfied with the final dummy position and any deviations from this procedure are to be approved by the COTR.
- G. The final dummy position is recorded. These measurements are to include, but not be limited to, pelvis and head angles as well as actual H-point and head cg locations relative to the vehicle. The straight-line distance from the H-point to the center of the outer ankle bolt is also recorded for one of the legs (eg. left H-point to left ankle bolt).

DUMMY IN-VEHICLE POSITION RECORDING SHEET

MFR./MAKE/MODEL: Nissan/Sentra

SEAT TYPE: X Bench - Rear
X Bucket - Front
 Split bench

ADJUSTER TYPE: X Manual
 Power
 Non-adjustable

TECHNICIANS:

BUCKET SEAT BACK TYPE: Non-adjustable
X Adjustable reclining

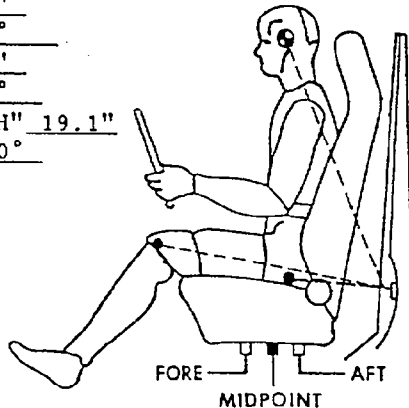
1. B. Miller
2. R. Branham
3.
4.

POSITIONING DATE: 5/9/90

AMBIENT TEMP.: 74° F TIME: 0900

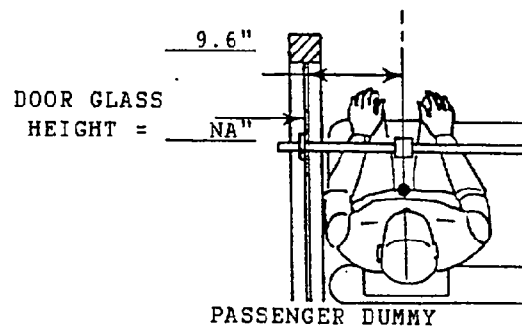
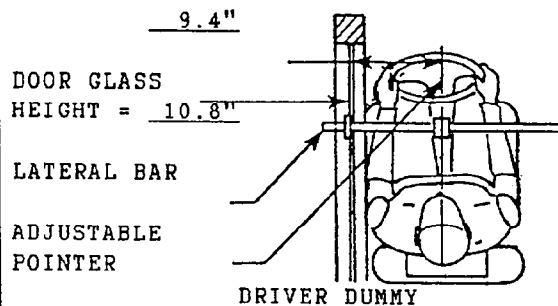
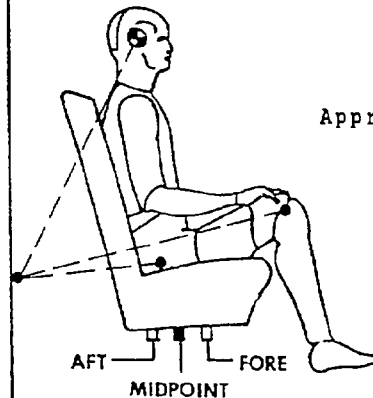
DRIVER DUMMY* # 001 TYPE: BioSid

Head 25.4"
Target 35°
Knee 33.2"
Joint 90°
Approx. "H" 19.1"
Point 110°



PASSENGER DUMMY** # 002 TYPE: BioSid

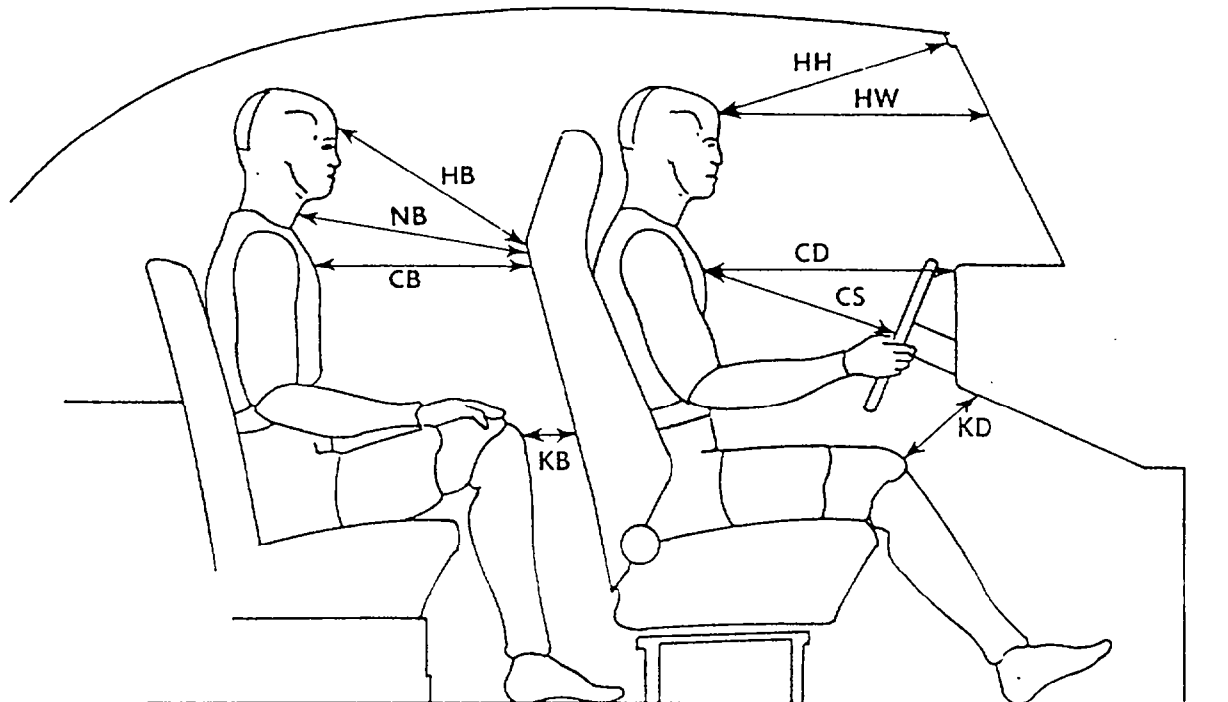
Head 40.3"
Target 50°
Knee 15.4"
Joint 55°
Approx. "H" 27.2"
Point 70°



*Driver dummy measurements are referenced to top of striker bolt and all angles referenced to vertical.

**Passenger dummy measurements are referenced to front seat back latch bolt with front seat in mid-position and all angles are referenced to vertical.

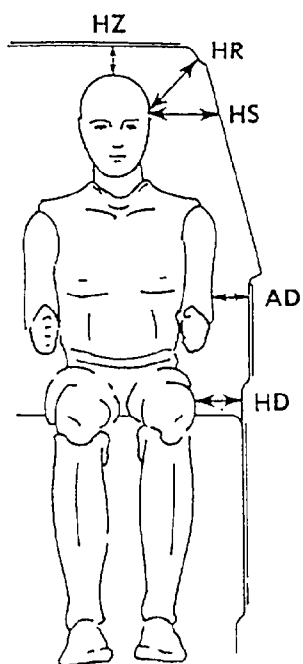
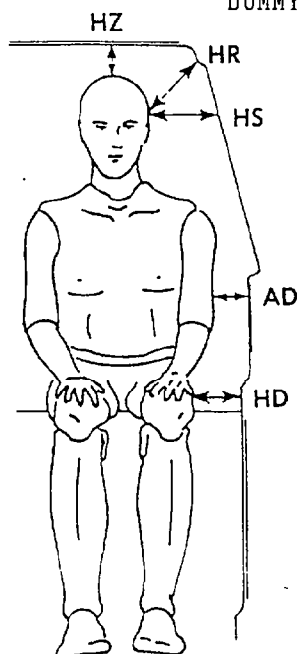
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS



	DRIVER	REAR PASSENGER
HH	11.0	NA
HW	15.1	NA
CD	19.5	NA
CS	9.8	NA
KDL	3.6	NA
KDR	3.5	NA
HB	NA	29.1
NB	NA	27.0
CB	NA	20.4
KBL	NA	5.3
KBR	NA	5.5

ALL MEASUREMENTS ARE IN INCHES.

DUMMY LATERAL CLEARANCE DIMENSIONS



	DRIVER	PASSENGER
HR	5.7	6.2
HS	8.8	6.3
AD	3.9	4.1
HD	6.9	7.8
HZ	3.1	1.6

ALL DISTANCE MEASUREMENTS ARE
IN INCHES.

SAE 3D H-POINT MACHINE LOCATION AND DUMMY LOCATION DATA

	DRIVER #001	PASSENGER #002
SAE 3D H-POINT MACHINE LOCATION:	X = -9.25	X = -41.36
	Z = 7.25	Z = 7.38
DUMMY H-POINT LOCATION:	X = -9.75	X = -42.1
	Z = 7.0	Z = 7.2
DUMMY PELVIC ANGLE:	24°	25°

*All location measurements referenced to left most front seat track bolt in two-dimensional rectangular coordinates: +X = forward, +Z = upward

All dimensions in inches except as noted.

All angles referenced to horizontal, positive is upward.

DUMMY KINEMATIC SUMMARY

DRIVER

During impact, the dummy's torso contacted the driver's door. The dummy rebounded laterally across the front occupant compartment. The upper torso rotated and the upper back contacted the right front window sill as the dummy's head contacted the roof. The left knee contacted the left front door and the right knee contacted the left knee. The dummy came to rest leaning against the right front door.

PASSENGER

During impact, the dummy's torso contacted the left rear side wall and the head contacted the left C-pillar. The dummy rebounded laterally across the rear occupant compartment. The left knee contacted the left rear side wall and the right knee contacted the left knee. The dummy came to rest seated upright in the right rear seat leaning against the right rear side wall.

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	7
PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)																
Axle Height	10.2	X	X	19.4	19.4	19.1	19.0	19.1	19.0	18.9	19.0	18.9	18.9	19.0	X	X
H-Point	19.0	X	X	16.6	16.6	16.4	16.2	16.4	16.2	16.2	16.2	16.2	16.2	16.2	16.5	X
Mid Door	23.8	X		16.6	16.5	16.2	16.2	16.2	16.1	16.0	16.1	16.0	16.2	16.2	16.4	16
Window Sill	34.0		18.8	18.2	18.2	18.1	18.1	18.0	17.9	17.8	17.8	17.5	17.7	17.8	18.0	17
Window Top	51.2	X	X	X	X	X	X	X	27.4	27.4	27.5	27.4	27.5	27.6	27.8	X

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

Axle Height	10.2	X	X	25.6	27.8	27.8	27.9	27.9	28.1	28.3	28.4	28.4	26.5	24.8	X	X
H-Point	19.0	X	X	26.7	30.0	31.1	31.4	31.7	32.1	32.3	32.4	32.4	31.8	31.2	28.9	X
Mid Door	23.8	X		22.2	25.4	27.0	28.3	28.2	29.3	29.9	30.4	30.9	31.1	32.0	31.8	24
Window Sill	34.0		20.5	20.9	22.0	24.5	26.4	27.2	27.5	27.8	28.2	28.7	29.2	29.8	30.3	23
Window Top	51.2	X	X	X	X	X	X	X	X	30.4	30.4	30.2	29.9	29.8	29.5	X

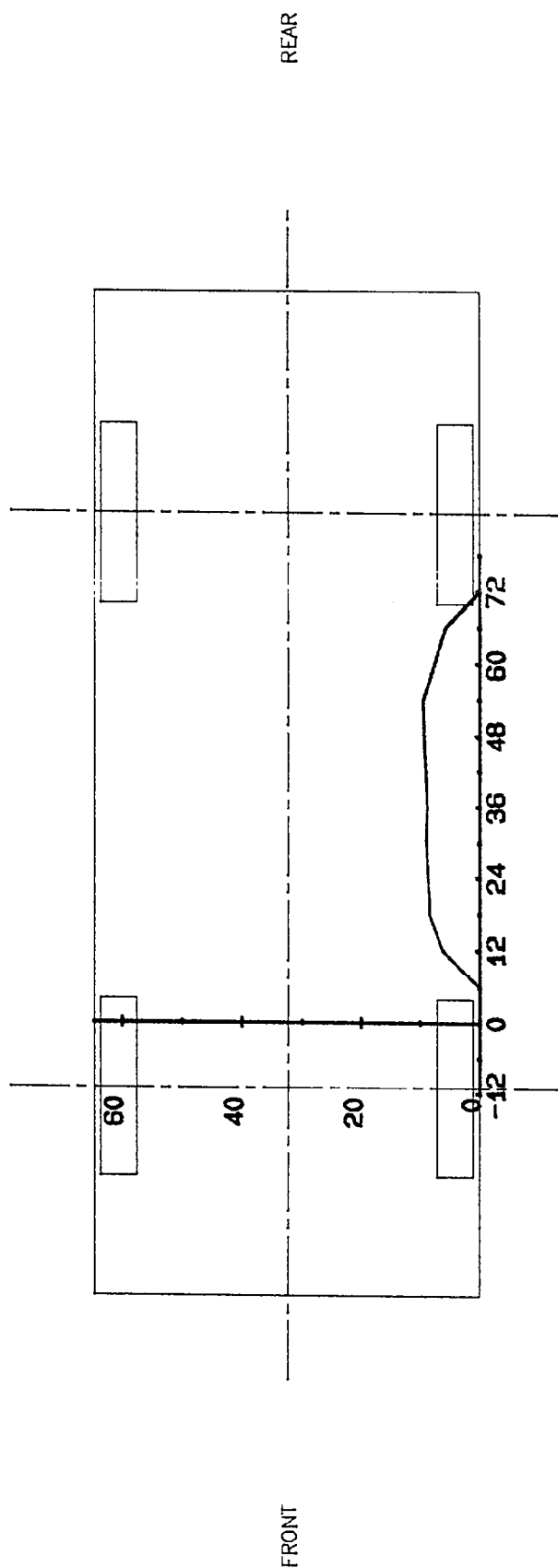
STATIC CRUSH (IN)

Axle Height	10.2	X	X	6.2	8.4	8.7	8.9	8.8	9.1	9.4	9.4	9.5	7.6	5.8	X	X
H-Point	19.0	X	X	10.1	13.4	14.7	15.2	15.3	15.9	16.1	16.2	16.2	15.6	15.0	12.4	X
Mid Door	23.8	X		5.6	8.9	10.5	12.1	12.0	13.1	13.8	14.4	14.8	15.1	15.8	13.1	8
Window Sill	34.0		1.7	2.7	3.8	6.4	8.3	9.1	9.5	9.9	10.4	10.9	11.7	12.1	12.5	6
Window Top	51.2	X	X	X	X	X	X	X	3.0	3.0	2.7	2.9	2.4	2.2	1.7	X

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

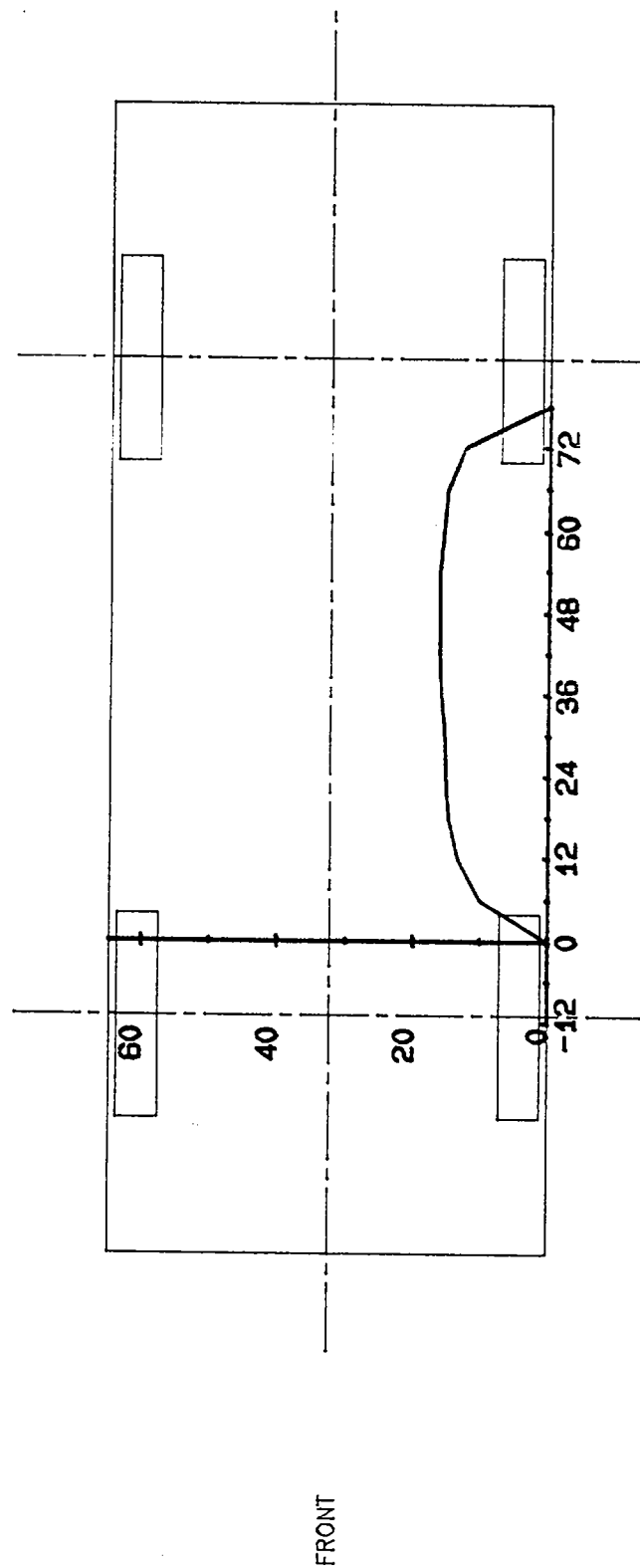
** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

VEHICLE EXTERIOR STATIC CRUSH PROFILE



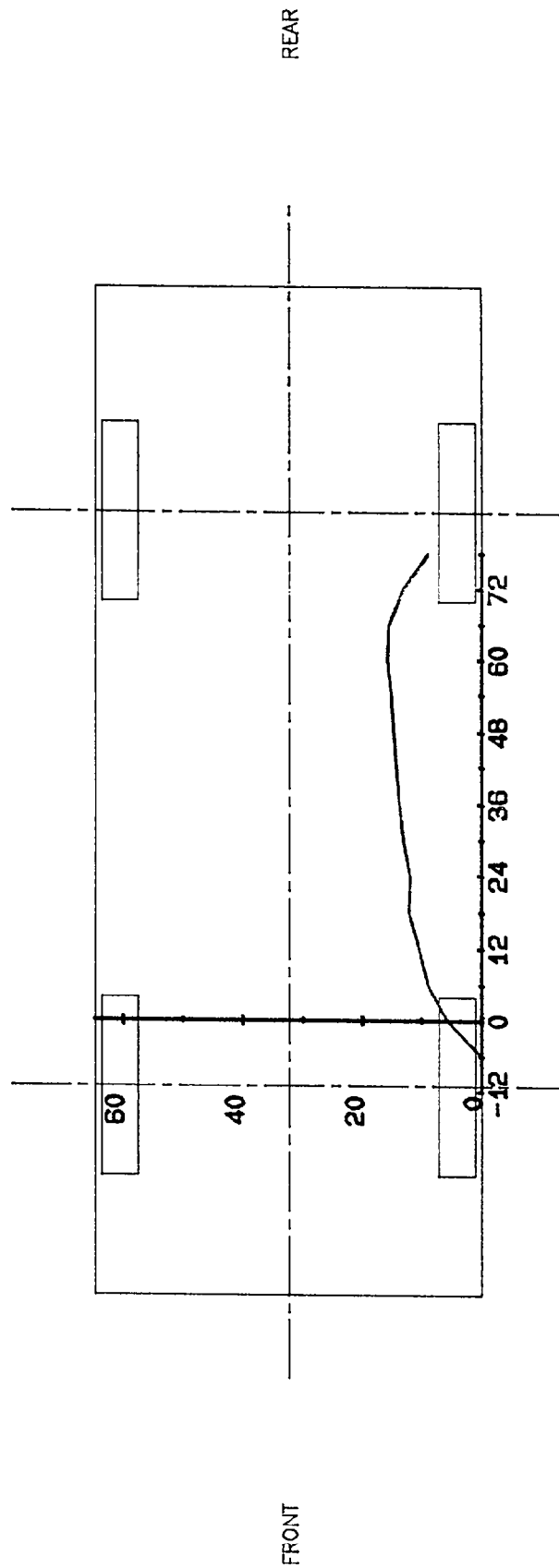
PROFILE LEVEL EQUALS AXLE HEIGHT WHICH IS 10.2 " ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.036

VEHICLE EXTERIOR STATIC CRUSH PROFILE



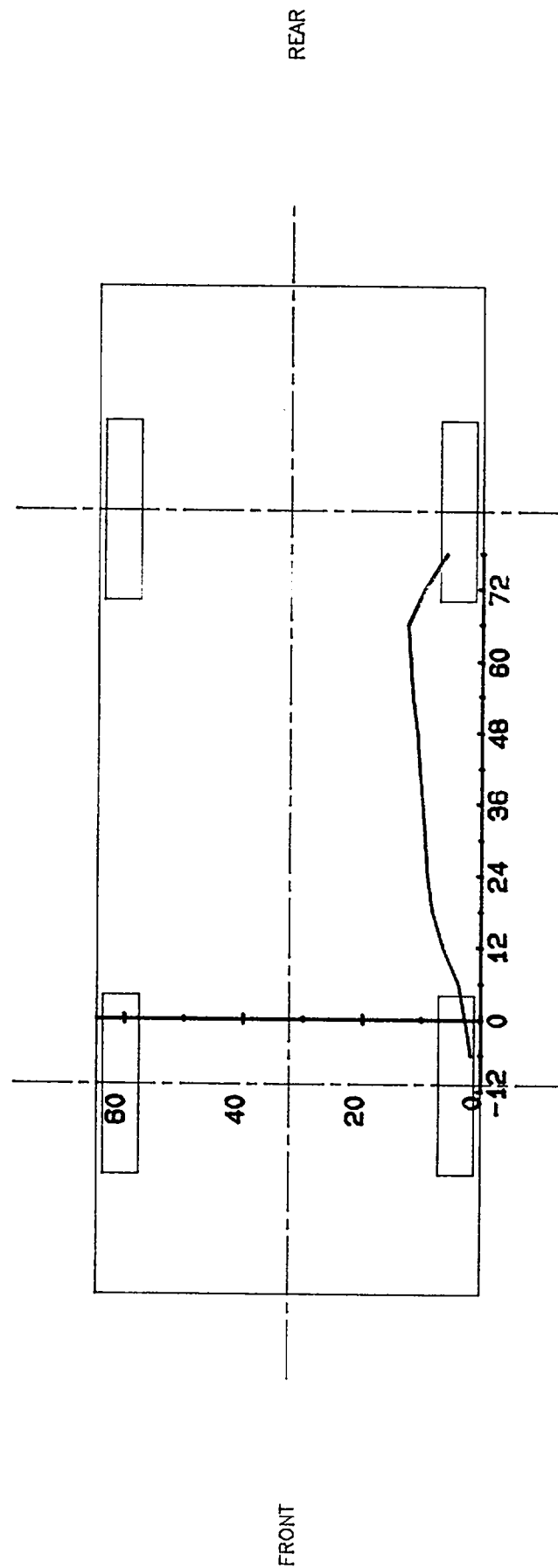
PROFILE LEVEL EQUALS H-POINT HEIGHT WHICH IS 19.0" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.036

VEHICLE EXTERIOR STATIC CRUSH PROFILE



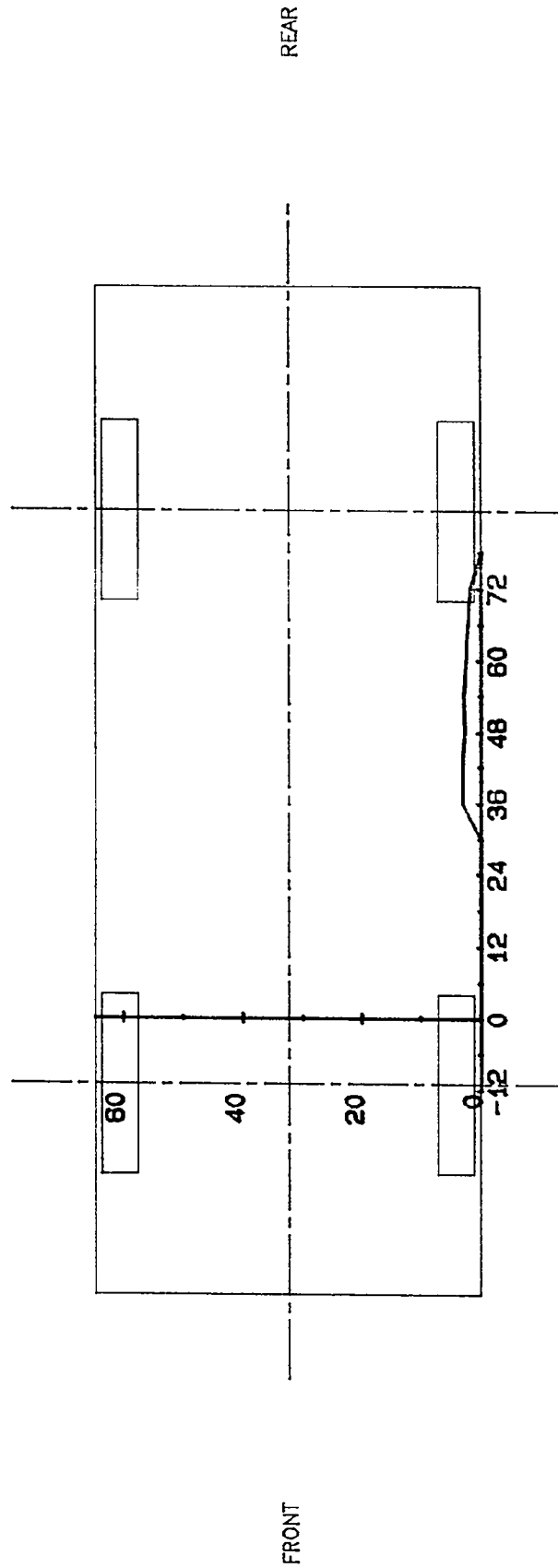
PROFILE LEVEL EQUALS MID DOOR HEIGHT WHICH IS 23.8" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.036

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW SILL HEIGHT WHICH IS 34.0 " ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.036

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT WHICH IS 51.2" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.036

DUMMY DATA SUMMARY

TEST NUMBER 900509

DRIVER DUMMY

SN: 001

POSITIVE DIRECTION		NEGATIVE DIRECTION	
MAX	MSEC	MAX	MSEC

HEAD

LONGITUDINAL ACCEL. (g)	5.1	16.6 Y	15.2	56.0 Y
LATERAL ACCEL. (g)	31.3	75.6 Y	3.2	26.0 Y
DELTA V (MPH)	18.5	90.8 Y		
VERTICAL ACCEL. (g)	22.7	36.4 Y	65.0	55.0 Y
RESULTANT ACCEL. (g)	69.1	51.8 Y		
HIC	392.8 FROM 43.4 TO 61.1 MSEC Y			

LEFT SHOULDER

LATERAL ACCEL. (g)	329.2	36.2 Y	17.1	20.0 Y
DELTA V (MPH)	40.4	67.5 Y		
LONGITUDINAL FORCE (N)	49.5	17.9 Y	409.5	38.1 Y
LATERAL FORCE (N)	4460.9	40.8 Y	174.7	24.9 Y
VERTICAL FORCE (N)	204.5	60.4 Y	381.9	37.9 Y
LATERAL DISPL. (mm)	66.9	45.3	0.5	25.1

UPPER SPINE

LONGITUDINAL ACCEL. (g)	15.4	54.4 Y	11.4	32.5 Y
LATERAL (P) ACCEL. (g)	68.3	41.2 Y	20.1	61.9 Y
DELTA V (MPH)	27.1	55.5 Y		
LATERAL (R) ACCEL. (g)	67.3	41.2 Y	20.4	61.2 Y
DELTA V (MPH)	30.2	55.5 Y		
VERTICAL ACCEL. (g)	9.8	38.1 Y	6.2	75.0 Y
RESULTANT (P) ACCEL. (g)	68.6	41.2 Y		
RESULTANT (R) ACCEL. (g)	67.6	41.2 Y		

LEFT UPPER THORAX RIB

LATERAL (P) ACCEL. (g)	95.2	25.6 Y	33.4	41.9 Y
DELTA V (MPH)	20.6	40.2 Y		
LATERAL (R) ACCEL. (g)	96.5	25.6 Y	30.7	42.5 Y
DELTA V (MPH)	21.4	40.2 Y		
LATERAL DISPL. (mm)	46.7	44.1	0.4	64.4

DUMMY DATA SUMMARY CONTINUED

TEST NUMBER 900509

DRIVER DUMMY					
SN: 001					
	POSITIVE		NEGATIVE		
	DIRECTION		DIRECTION		
	MAX	MSEC	MAX	MSEC	
LEFT CENTER THORAX RIB					
LATERAL (P) ACCEL. (g)	95.9	25.6 Y	36.6	41.9 Y	
DELTA V (MPH)	21.5	40.0 Y			
LATERAL (R) ACCEL. (g)	96.9	25.6 Y	34.1	41.9 Y	
DELTA V (MPH)	22.1	40.0 Y			
LATERAL DISPL. (mm)	44.3	43.4	0.6	64.6	
LEFT LOWER THORAX RIB					
LATERAL (P) ACCEL. (g)	117.2	25.0 Y	36.7	41.9 Y	
DELTA V (MPH)	22.9	40.0 Y			
LATERAL (R) ACCEL. (g)	118.2	25.0 Y	34.7	41.9 Y	
DELTA V (MPH)	19.2	40.0 Y			
LATERAL DISPL. (mm)	42.1	42.5	0.1	20.1	
THORACIC TRAUMA INDEX					
TTI (P)	103.5				
TTI (R)	104.3				
LOWER SPINE					
LONGITUDINAL ACCEL. (g)	32.2	33.1 Y	8.2	52.5 Y	
LATERAL (P) ACCEL. (g)	89.8	34.4 Y	9.3	80.6 Y	
DELTA V (MPH)	27.9	52.5 Y			
LATERAL (R) ACCEL. (g)	90.3	34.4 Y	17.2	84.4 Y	
DELTA V (MPH)	30.0	52.5 Y			
VERTICAL ACCEL. (g)	30.8	35.6 Y	9.6	48.1 Y	
RESULTANT (P) ACCEL. (g)	99.3	33.7 Y			
RESULTANT (R) ACCEL. (g)	99.7	33.7 Y			
LEFT UPPER ABDOMEN					
LATERAL ACCEL. (g)	133.1	35.6 Y	38.0	30.6 Y	
DELTA V (MPH)	23.2	39.0 Y			
LATERAL DISPL. (mm)	51.2	40.8	1.4	65.0	
LEFT LOWER ABDOMEN					
LATERAL ACCEL. (g)	109.7	22.5 Y	56.8	40.0 Y	
DELTA V (MPH)	18.0	38.2 Y			
LATERAL DISPL. (mm)	57.5	40.4	0.7	85.5	

DUMMY DATA SUMMARY CONTINUED

TEST NUMBER 900509

DRIVER DUMMY

SN: 001

	POSITIVE DIRECTION		NEGATIVE DIRECTION	
	MAX	MSEC	MAX	MSEC
PELVIS				
LONGITUDINAL ACCEL. (g)	9.6	45.6 Y	15.8	40.0 Y
LATERAL ACCEL. (g)	159.4	29.4 Y	0.3	16.3 Y
DELTA V (MPH)	29.7	58.5 Y		
VERTICAL ACCEL. (g)	23.8	33.1 Y	14.7	24.4 Y
RESULTANT ACCEL. (g)	159.4	29.4 Y		
PELVIS PUBIC SYMPHYSIS				
LATERAL FORCE (N)	3703.9	31.5 Y	182.1	17.9 Y
PELVIS SACRUM				
LATERAL FORCE (N)	1409.1	16.5 Y	4604.1	30.9 Y
PELVIS ILIAC				
LATERAL FORCE (N)	5145.3	32.0	232.3	53.0

POSITIVE DIRECTION

LONGITUDINAL: FORWARD
 LATERAL: RIGHTWARD
 VERTICAL: UPWARD
 FORCE: COMPRESSION

NEGATIVE DIRECTION

LONGITUDINAL: REARWARD
 LATERAL: LEFTWARD
 VERTICAL: DOWNWARD
 FORCE: EXTENSION

NOTES:

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

(P) Primary Sensor

(R) Redundant Sensor

Y See TEST ANOMALIES

DUMMY DATA SUMMARY

TEST NUMBER 900509

PASSENGER DUMMY

SN: 002

POSITIVE DIRECTION		NEGATIVE DIRECTION	
MAX	MSEC	MAX	MSEC

HEAD

LONGITUDINAL ACCEL. (g)	9.5	51.5	27.4	65.8
LATERAL ACCEL. (g)	111.1	55.1	10.4	143.5
DELTA V (MPH)	23.3	76.2		
VERTICAL ACCEL. (g)	26.5	61.8	22.1	53.0
RESULTANT ACCEL. (g)	112.3	53.6		
HIC	559.9 FROM 52.1 TO 58.5 MSEC			

LEFT SHOULDER

LATERAL ACCEL. (g)	54.8	42.3	27.2	64.4
DELTA V (MPH)	20.2	62.2		
LATERAL DISPL. (mm)	22.8	54.4	0.6	92.3

UPPER SPINE

LONGITUDINAL ACCEL. (g)	4.0	72.5	16.7	50.0
LATERAL (P) ACCEL. (g)	49.1	53.1	3.9	122.5
DELTA V (MPH)	28.0	85.8		
VERTICAL ACCEL. (g)	3.1	33.7	8.2	59.4
RESULTANT (P) ACCEL. (g)	50.4	52.5		

LEFT UPPER THORAX RIB

LATERAL (P) ACCEL. (g)	49.1	31.3	22.1	65.0
DELTA V (MPH)	21.5	62.8		
LATERAL (R) ACCEL. (g)	57.0	48.1 Y	10.6	64.4 Y
DELTA V (MPH)	24.2	62.8 Y		
LATERAL DISPL. (mm)	24.6	47.3	0.1	29.8

LEFT CENTER THORAX RIB

LATERAL (P) ACCEL. (g)	80.8	38.1	9.5	44.4
DELTA V (MPH)	14.0	43.2		
LATERAL (R) ACCEL. (g)	79.0	38.8	8.2	45.0
DELTA V (MPH)	14.5	43.2		
LATERAL DISPL. (mm)	35.9	46.8	0.1	3.4

LEFT LOWER THORAX RIB

LATERAL (P) ACCEL. (g)	108.9	38.1	22.0	45.0
DELTA V (MPH)	17.1	42.5		
LATERAL (R) ACCEL. (g)	106.2	38.1	21.5	45.0
DELTA V (MPH)	17.1	42.5		
LATERAL DISPL. (mm)	42.2	46.3	0.1	13.1

THORACIC TRAUMA INDEX

TTI (P)	87.4
TTI (R)	84.9

DUMMY DATA SUMMARY CONTINUED

TEST NUMBER 900509

PASSENGER DUMMY

SN: 002

POSITIVE DIRECTION		NEGATIVE DIRECTION	
MAX	MSEC	MAX	MSEC

LOWER SPINE

LONGITUDINAL ACCEL. (g)	4.0	33.7	7.7	55.0
LATERAL (P) ACCEL. (g)	65.9	44.4	4.8	71.3
DELTA V (MPH)	26.0	66.0		
LATERAL (R) ACCEL. (g)	63.5	44.4	4.9	70.6
DELTA V (MPH)	24.9	66.0		
VERTICAL ACCEL. (g)	24.0	45.0	14.6	62.5
RESULTANT (P) ACCEL. (g)	70.0	44.4		
RESULTANT (R) ACCEL. (g)	67.8	44.4		

LEFT UPPER ABDOMEN

LATERAL ACCEL. (g)	96.7	36.3 Y	24.4	56.9 Y
DELTA V (MPH)	21.2	54.0 Y		
LATERAL DISPL. (mm)	38.3	51.1	0.1	3.4

LEFT LOWER ABDOMEN

LATERAL ACCEL. (g)	117.5	33.7	13.6	81.9
DELTA V (MPH)	21.2	54.8		
LATERAL DISPL. (mm)	51.3	48.9	2.7	133.4

PELVIS

LONGITUDINAL ACCEL. (g)	6.7	29.4	33.9	35.0
LATERAL ACCEL. (g)	74.5	35.0	11.4	66.9
DELTA V (MPH)	25.3	62.2		
VERTICAL ACCEL. (g)	5.0	30.6	7.1	47.5
RESULTANT ACCEL. (g)	81.9	35.0		

POSITIVE DIRECTION

LONGITUDINAL: FORWARD
LATERAL: RIGHTWARD
VERTICAL: UPWARD
FORCE: COMPRESSION

NEGATIVE DIRECTION

LONGITUDINAL: REARWARD
LATERAL: LEFTWARD
VERTICAL: DOWNWARD
FORCE: EXTENSION

NOTES:

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

(P) Primary Sensor
(R) Redundant Sensor

Y See TEST ANOMALIES

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 900509

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX G MSEC		MAX G MSEC	
1	RIGHT SILL AT FRONT SEAT	109.0	25.2	10.5				
	LONGITUDINAL				3.6	69.6	6.5	24.9
	LATERAL				20.9	20.4	2.7	186.5
	VERTICAL				6.9	68.4	6.0	51.0
	RESULTANT				21.1	20.4		
	Delta VY is 15.2 MPH @ 83.0 MSEC							
2	RIGHT SILL AT REAR SEAT	76.5	25.5	10.8				
	LONGITUDINAL				2.4	83.0	8.5	25.1
	LATERAL				20.0	20.6	3.6	316.8
	VERTICAL				6.0	79.4	3.9	38.9
	RESULTANT				20.4	20.6		
	Delta VY is 16.8 MPH @ 96.2 MSEC							
3	REAR DECK OVER AXLE	30.0	-1.0	10.3				
	LONGITUDINAL				4.9	43.3	6.6	50.8
	LATERAL				24.2	51.5	4.1	312.9
	VERTICAL				8.8	37.3	10.1	44.9
	RESULTANT				25.9	51.5		
	Delta VY is 21.3 MPH @ 94.0 MSEC							
4	LEFT SILL AT REAR SEAT	75.5	-25.6	11.0				
	LATERAL				78.3	15.0	37.6	20.0
	Delta VY is 16.0 MPH @ 26.0 MSEC							
5	LEFT SILL AT FRONT SEAT	108.2	-25.0	11.2				
	LATERAL				103.3	8.8	26.9	32.8
	Delta VY is 14.5 MPH @ 22.9 MSEC							
6	LEFT FRONT DOOR CENTERLINE	92.9	-26.2	23.1				
	LATERAL				240.9	12.3	128.0	23.4
	Delta VY is 26.7 MPH @ 17.5 MSEC							
7	RIGHT TRUNK FLOOR	39.0	15.1	15.9				
	LONGITUDINAL				3.5	66.1	5.7	50.0
8	MIDREAR OF LEFT FRONT DOOR	94.4	-26.2	23.6				
	LATERAL				171.8	11.4	116.2	21.0
	Delta VY is 25.6 MPH @ 15.8 MSEC							

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY CONTINUED

TEST NUMBER 900509

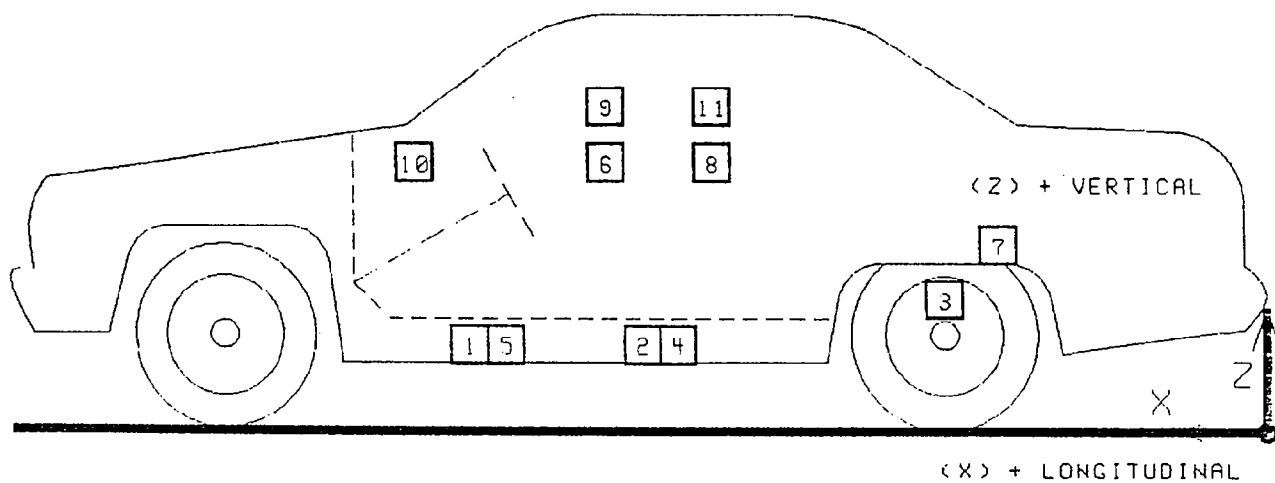
No.	LOCATION	X*	Y*	Z*	POSITIVE		NEGATIVE	
					DIRECTION		DIRECTION	
					MAX @ MSEC		MAX @ MSEC	
9	UPPER LEFT FRONT DOOR CENTERLINE LATERAL	92.8	-26.9	28.2				
					103.2	14.5	228.9	34.6
					Delta VY is 17.8 MPH @ 22.9 MSEC			
10	MIDFRONT OF LEFT FRONT DOOR LATERAL	101.1	-26.2	23.5				
					214.6	13.0	82.4	26.1
					Delta VY is 25.8 MPH @ 19.9 MSEC			
11	UPPER REAR OF LEFT FRONT DOOR LATERAL	83.2	-27.3	31.8				
					145.3	24.1	187.3	29.0
					Delta VY is 32.9 MPH @ 23.4 MSEC			

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

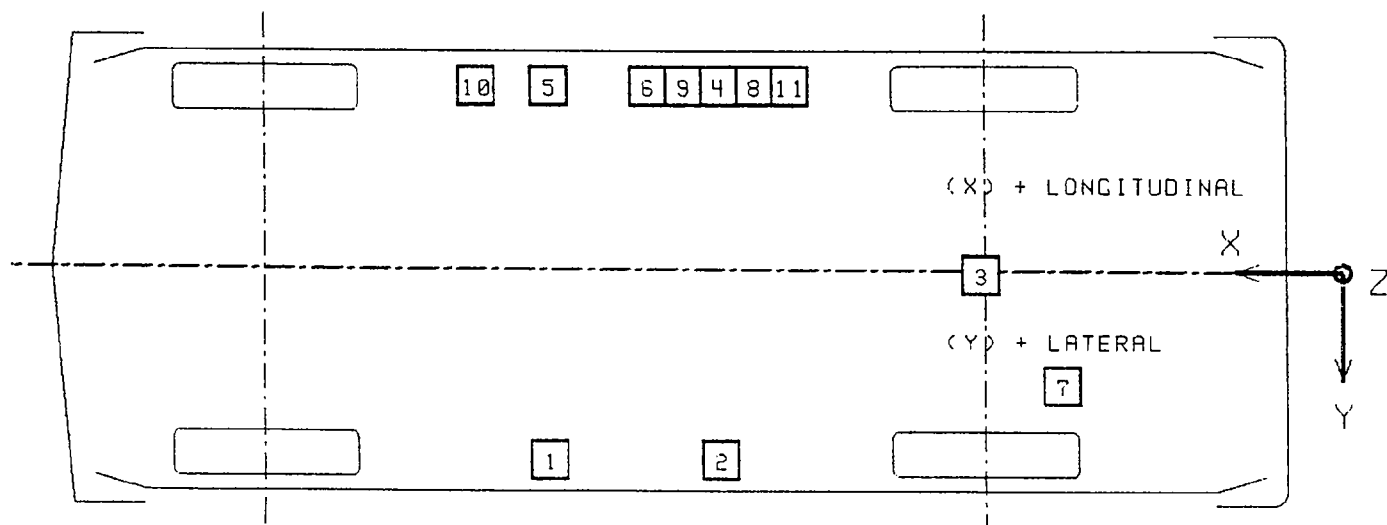
REFERENCE: X: + FORWARD FROM REAR BUMPER
Y: + RIGHTWARD FROM VEHICLE CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

All measurements of accelerometer locations in inches.

VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

BARRIER ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 900509

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX	G MSEC	MAX	G MSEC
1	CENTER OF GRAVITY	78.8	0.3	12.1				
	LONGITUDINAL				13.2	264.3 Y	15.9	38.3 Y
	LATERAL				2.2	230.6	6.5	39.5
	VERTICAL				15.2	230.6 Y	6.7	38.1 Y
	RESULTANT				18.2	38.5 Y		
					Delta VX is 15.8 MPH @ 95.2 MSEC Y			
					Delta VY is 3.6 MPH @ 95.2 MSEC			
2	REAR FRAME MEMBER	22.1	-17.5	13.2				
	LONGITUDINAL				1.7	112.1	16.1	37.5
	LATERAL				8.0	19.8	1.9	172.8
					Delta VX is 15.8 MPH @ 93.8 MSEC			
					Delta VY is -1.8 MPH @ 93.8 MSEC			

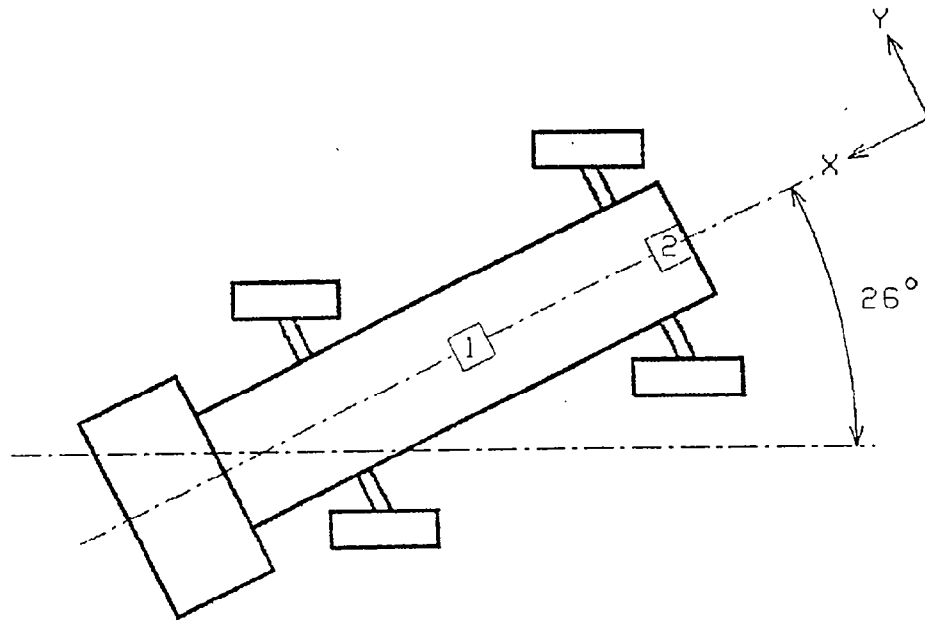
* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM REAR POINT OF FRAME
Y: + RIGHTWARD FROM BARRIER CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

All measurements of accelerometer locations in inches.

γ See TEST ANOMALIES

MOVING BARRIER ACCELEROMETER PLACEMENT

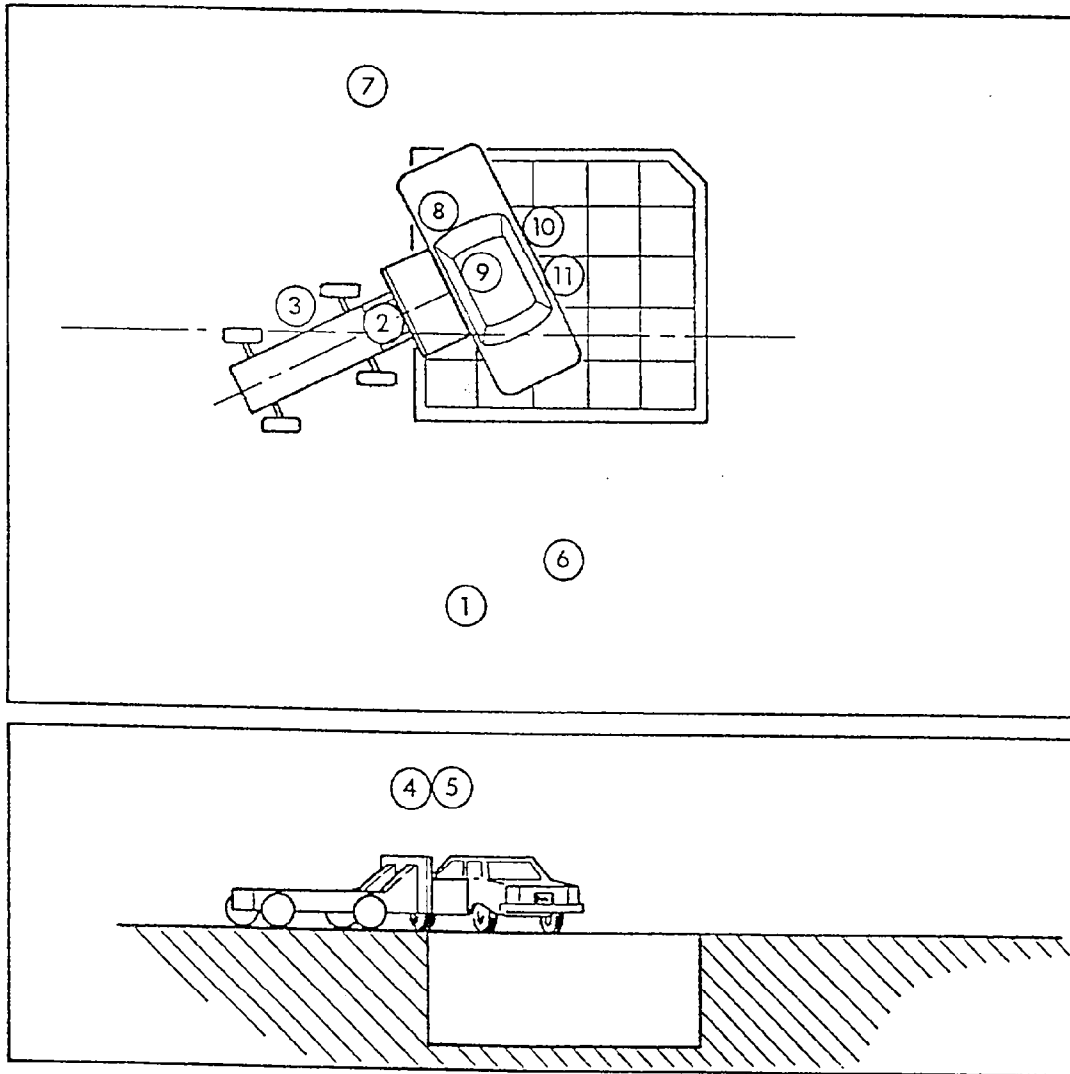


TOP VIEW

CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Right side panning	Kodak	25	24	Real time documentation
2	Onboard MDB - wide	Photosonic 1B	13	1000	Dummy kinematics
3	Onboard MDB - tight	Photosonic 1B	25	1005	Close-up of impact point
4	Overhead - wide	Photosonic 1B	8.5	920	Vehicle dynamics
5	Overhead - tight	Photosonic 1B	25	998	Close-up vehicle dynamics
6	Ground level - right	Photosonic 1B	25	1000	Overall view
7	Ground level - left	Photosonic 1B	25	1000	Overall view
8	Onboard windshield	Photosonic 1B	8	998	Driver kinematics - Frt
9	Onboard roof	Photosonic 1B	8	998	Driver contact velocity
10	Onboard driver	Photosonic 1B	8	1000	Driver kinematics
11	Onboard passenger	Photosonic 1B	8	1002	Passenger kinematics

CAMERA LOCATION



APPENDIX A

PHOTOGRAPHS



Figure A-1. PRE-TEST VEHICLE FRONT AND BARRIER VIEW

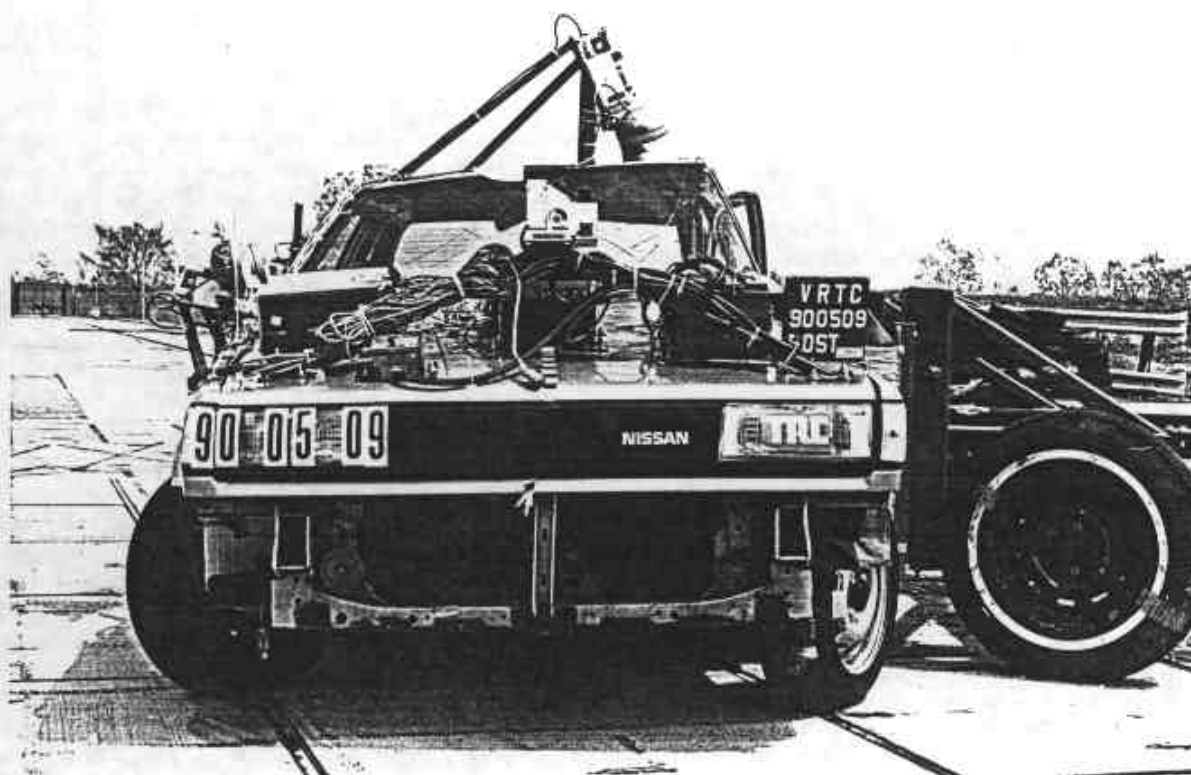


Figure A-2. POST-TEST VEHICLE FRONT AND BARRIER - VIEW 1

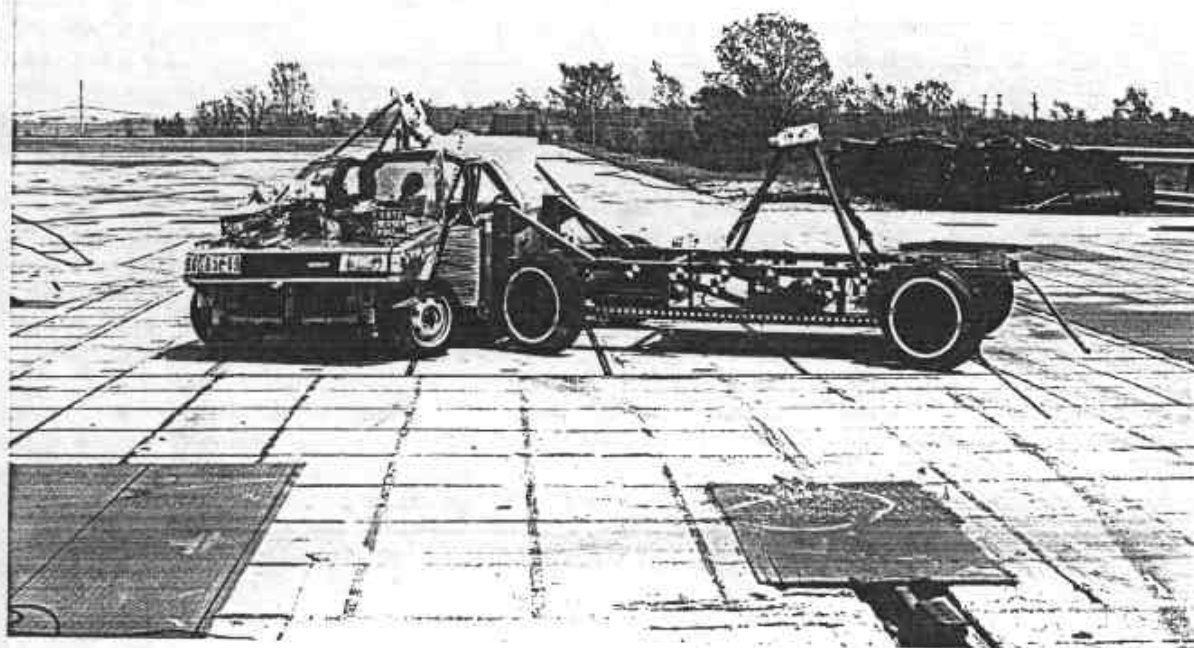


Figure A-3. POST-TEST VEHICLE FRONT AND BARRIER - VIEW 2



Figure A-4. PRE-TEST VEHICLE RIGHT SIDE VIEW



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



Figure A-6. PRE-TEST VEHICLE REAR AND BARRIER VIEW



Figure A-7. POST-TEST VEHICLE REAR AND BARRIER VIEW

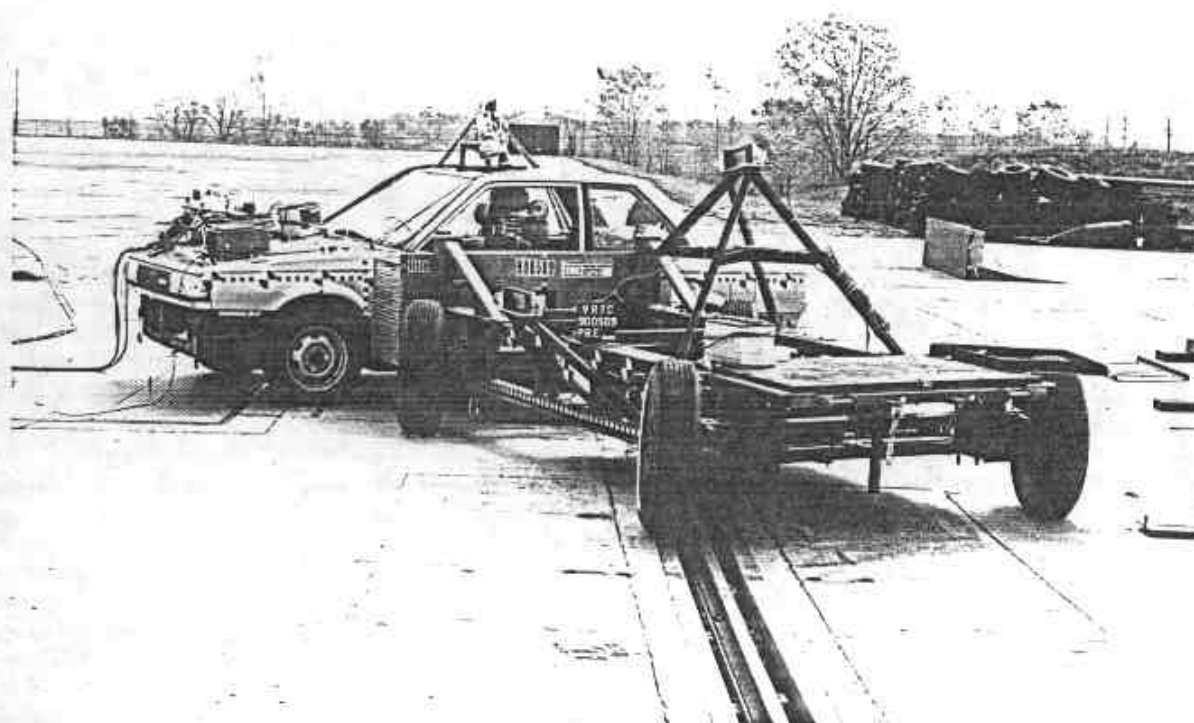


Figure A-8. PRE-TEST VEHICLE LEFT AND BARRIER VIEW



Figure A-9. PRE-TEST VEHICLE LEFT SIDE VIEW

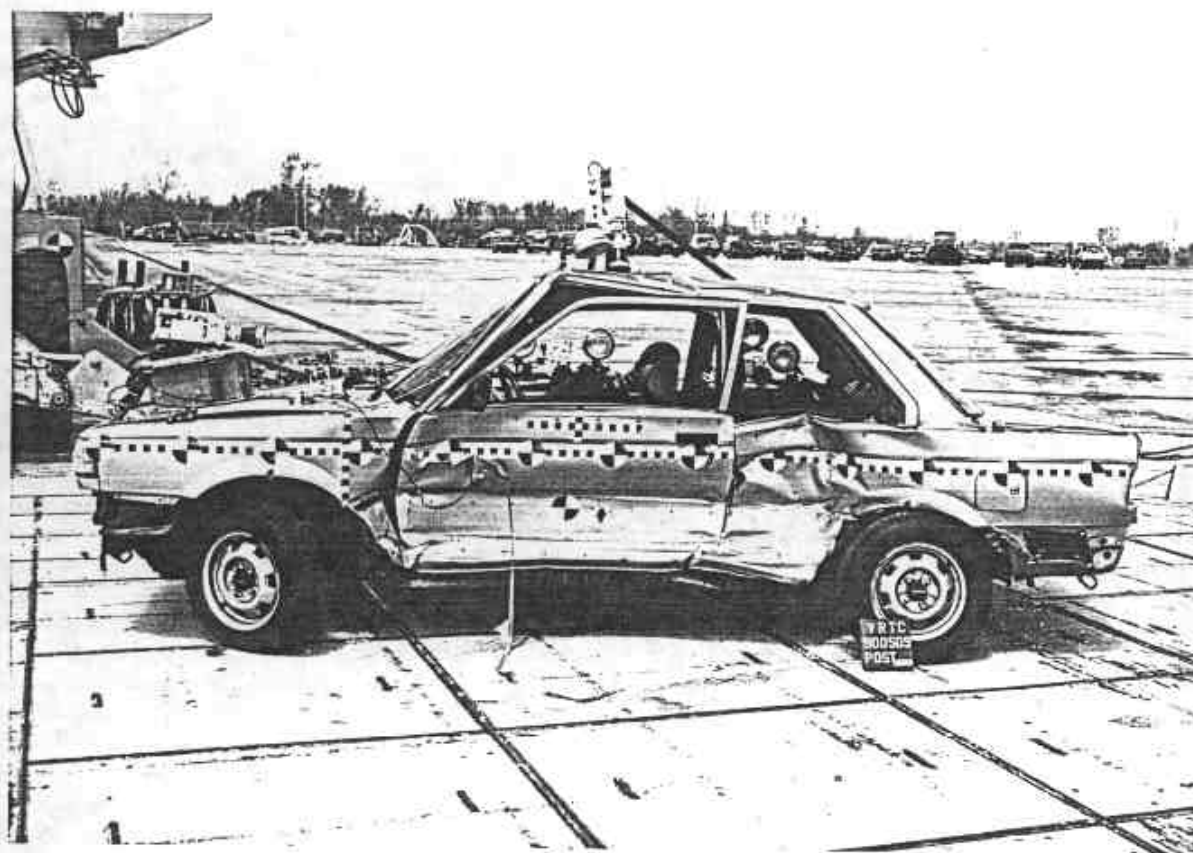


Figure A-10. POST-TEST VEHICLE LEFT SIDE - VIEW 1



Figure A-11. POST-TEST VEHICLE LEFT SIDE - VIEW 2

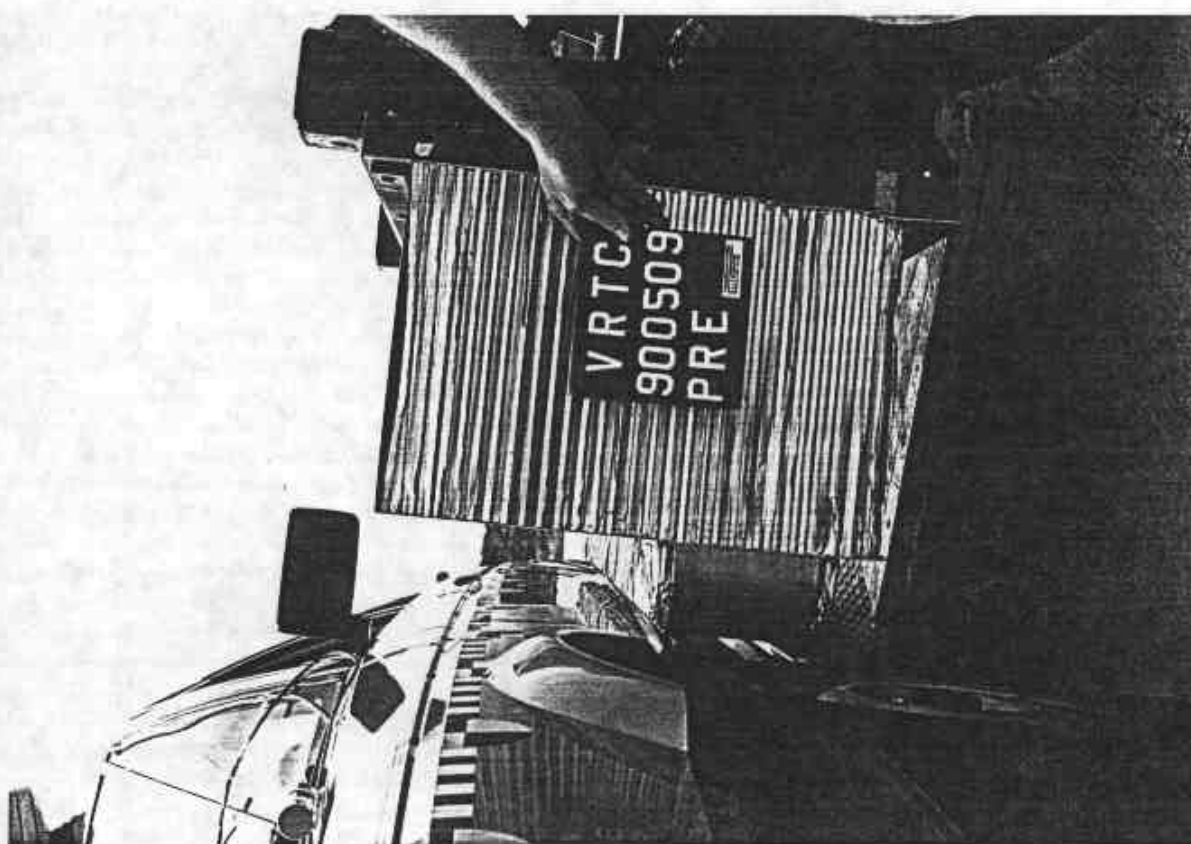


Figure A-12. PRE-TEST VEHICLE LEFT FRONT CLOSE-UP VIEW

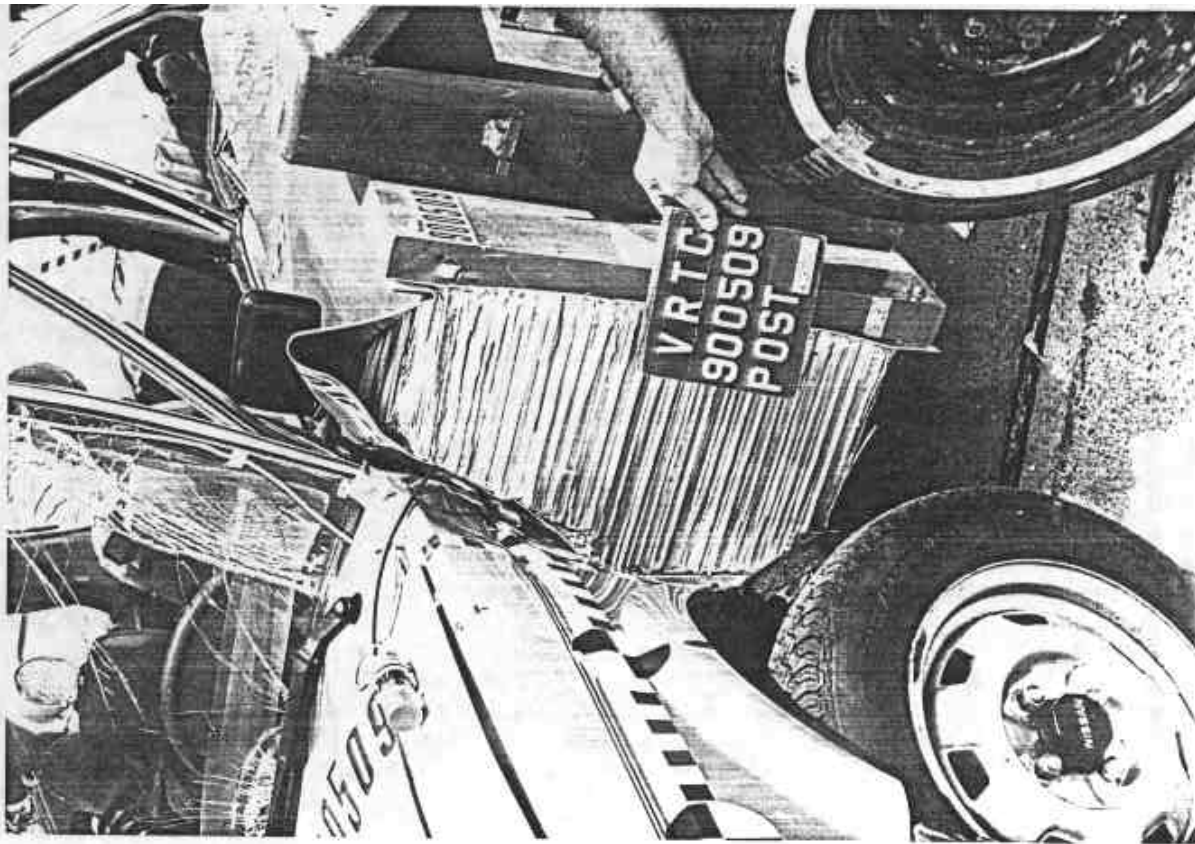


Figure A-13. POST-TEST VEHICLE LEFT FRONT CLOSE-UP VIEW

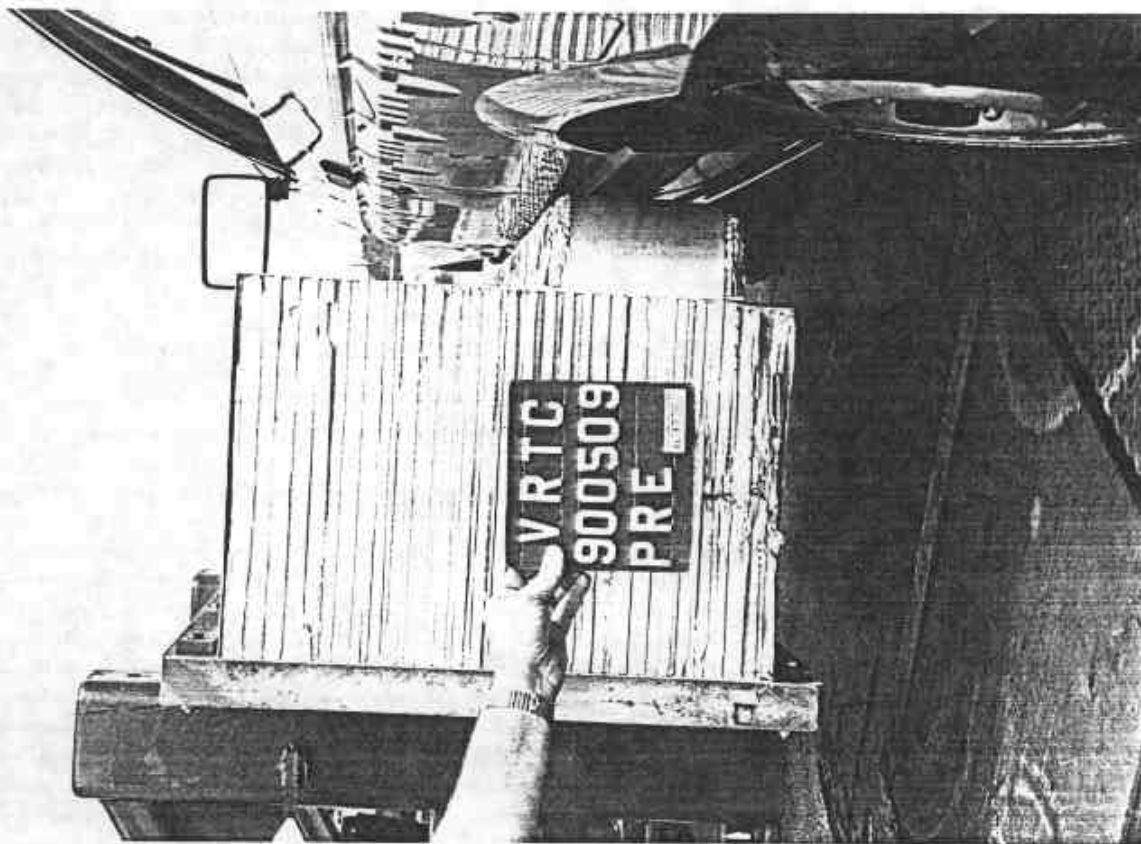


Figure A-14. PRE-TEST VEHICLE LEFT REAR CLOSE-UP VIEW

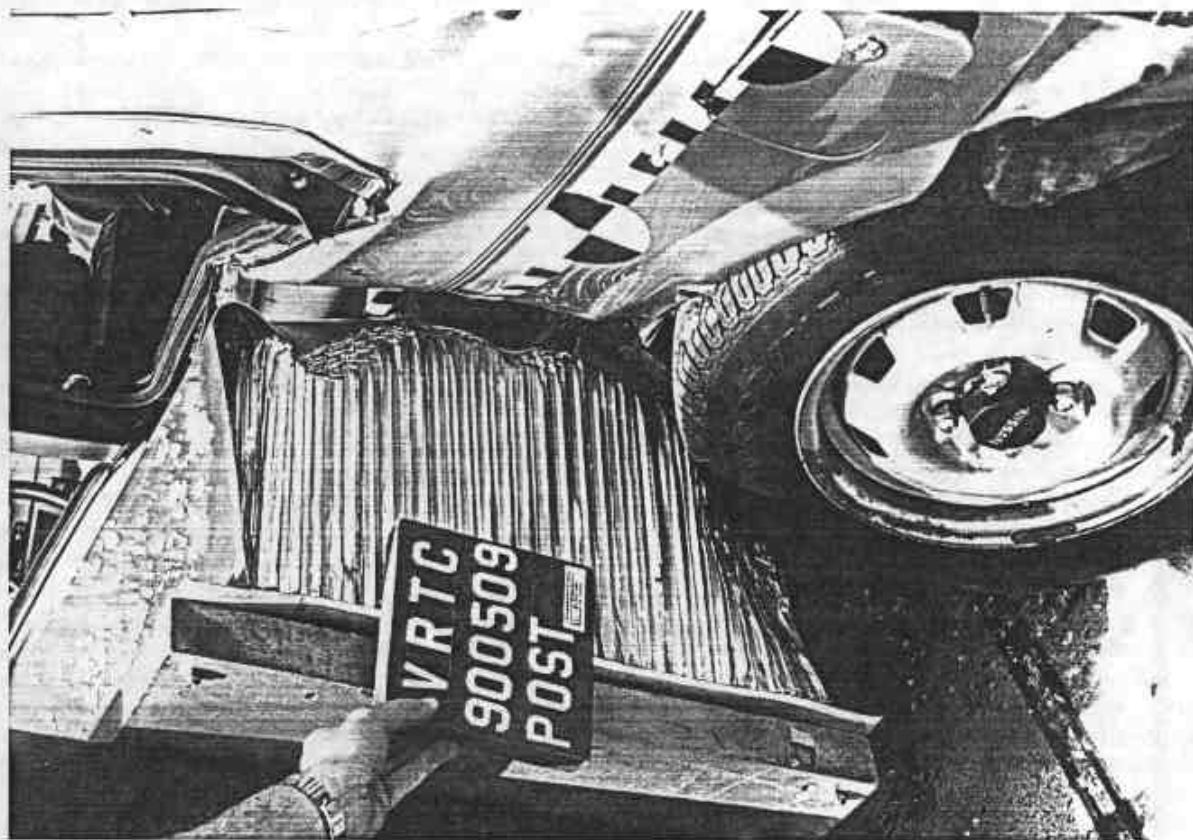


Figure A-15. POST-TEST LEFT REAR CLOSE-UP VIEW

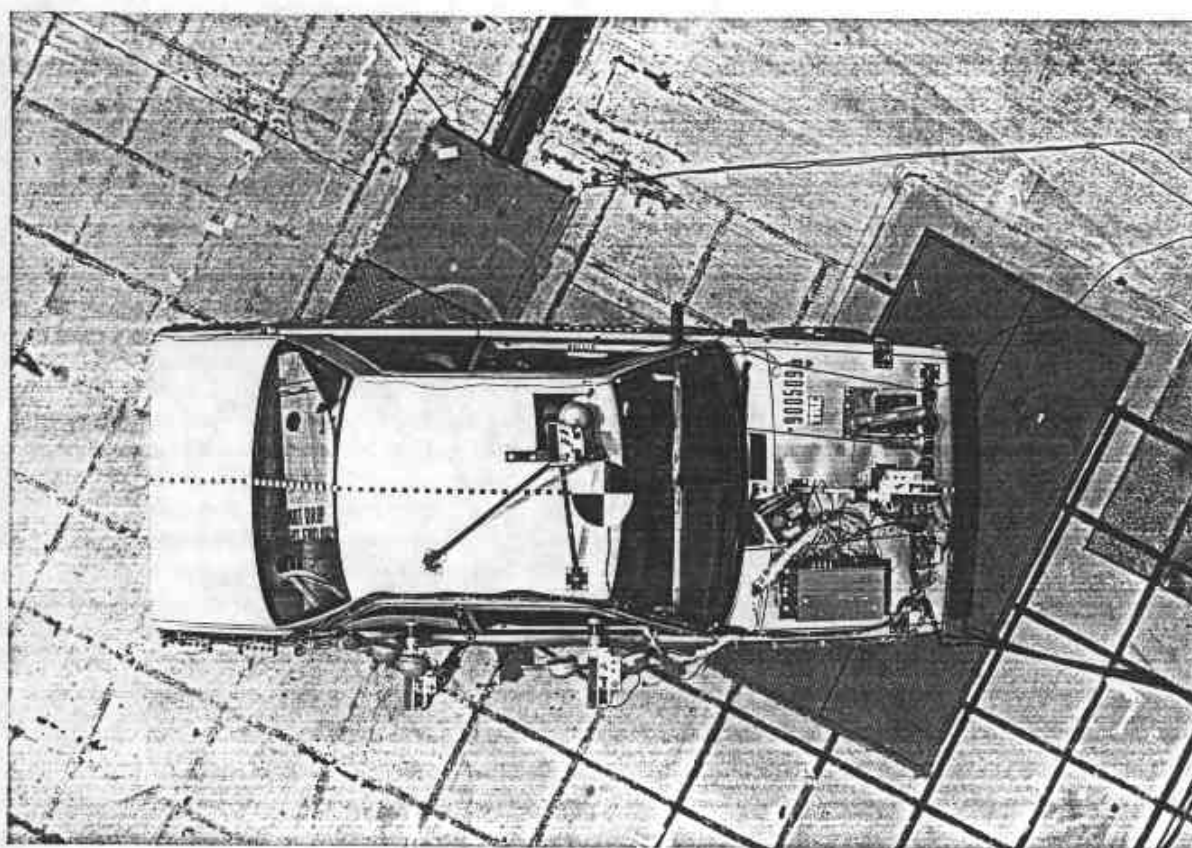


Figure A-16. PRE-TEST VEHICLE TOP VIEW

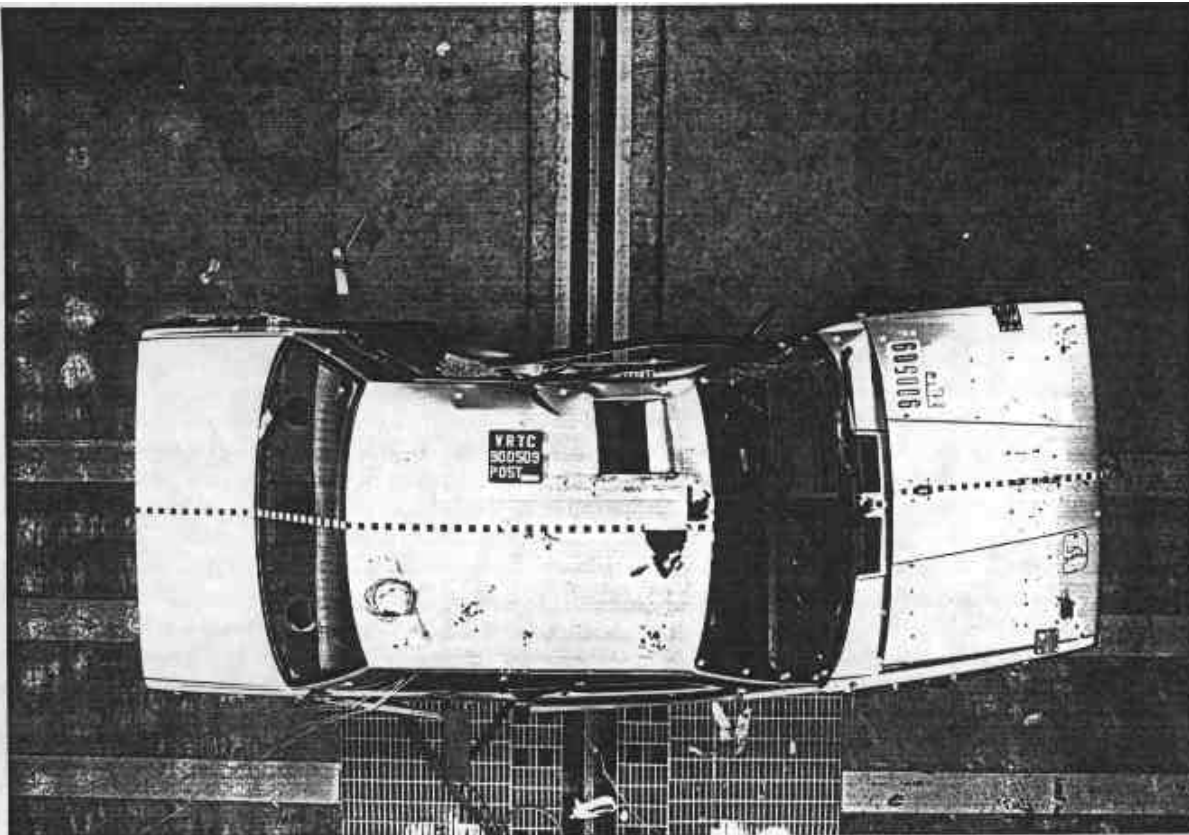


Figure A-17. POST-TEST VEHICLE TOP - VIEW 1

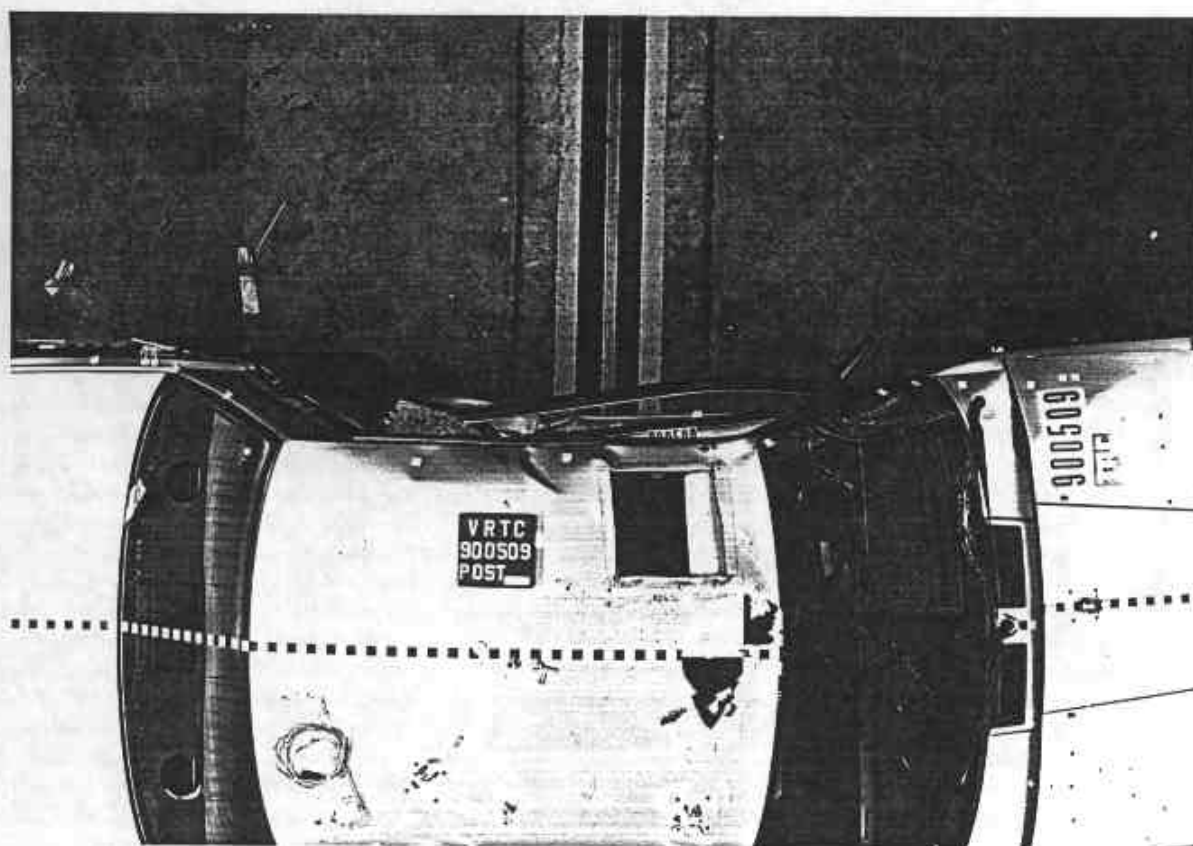


Figure A-18. POST-TEST VEHICLE TOP - VIEW 2

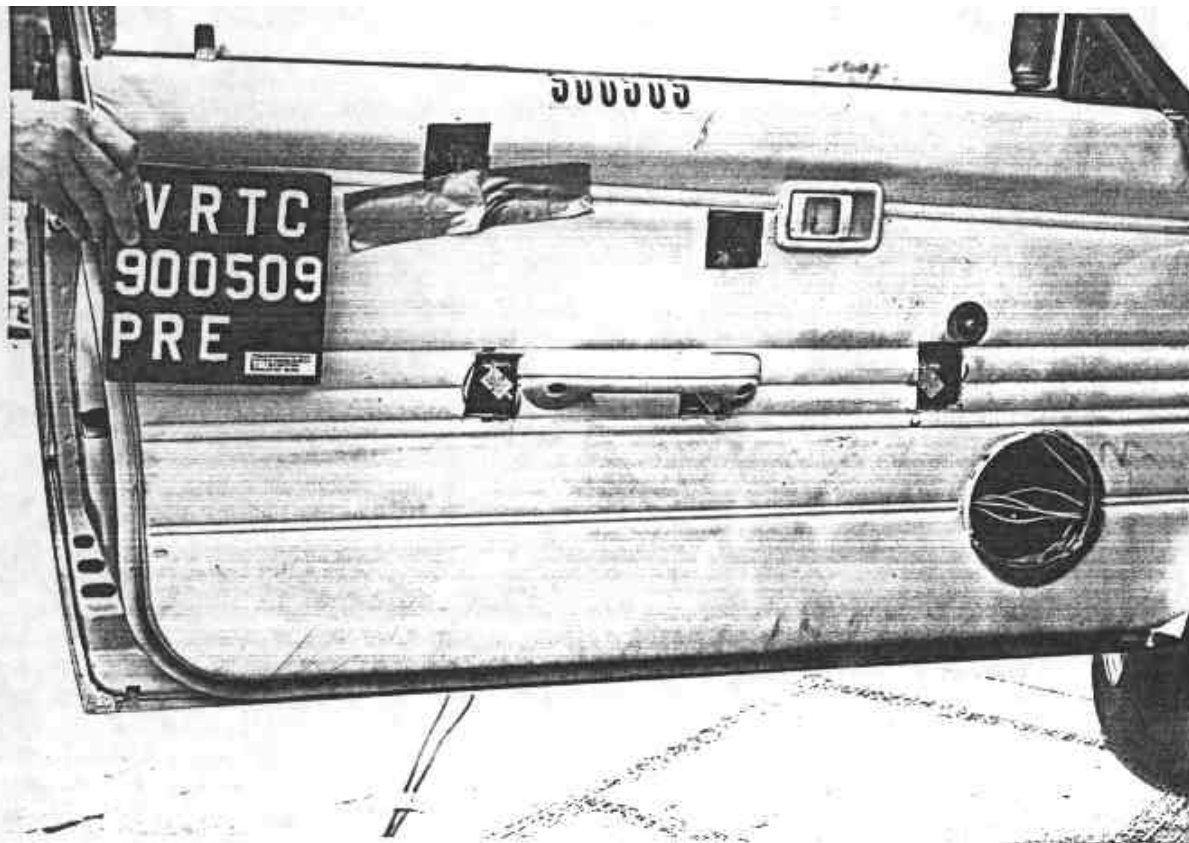


Figure A-19. PRE-TEST LEFT FRONT DOOR ACCELEROMETERS VIEW



Figure A-20. PRE-TEST LEFT FRONT SILL ACCELEROMETER VIEW



Figure A-21. PRE-TEST LEFT REAR SILL ACCELEROMETER VIEW

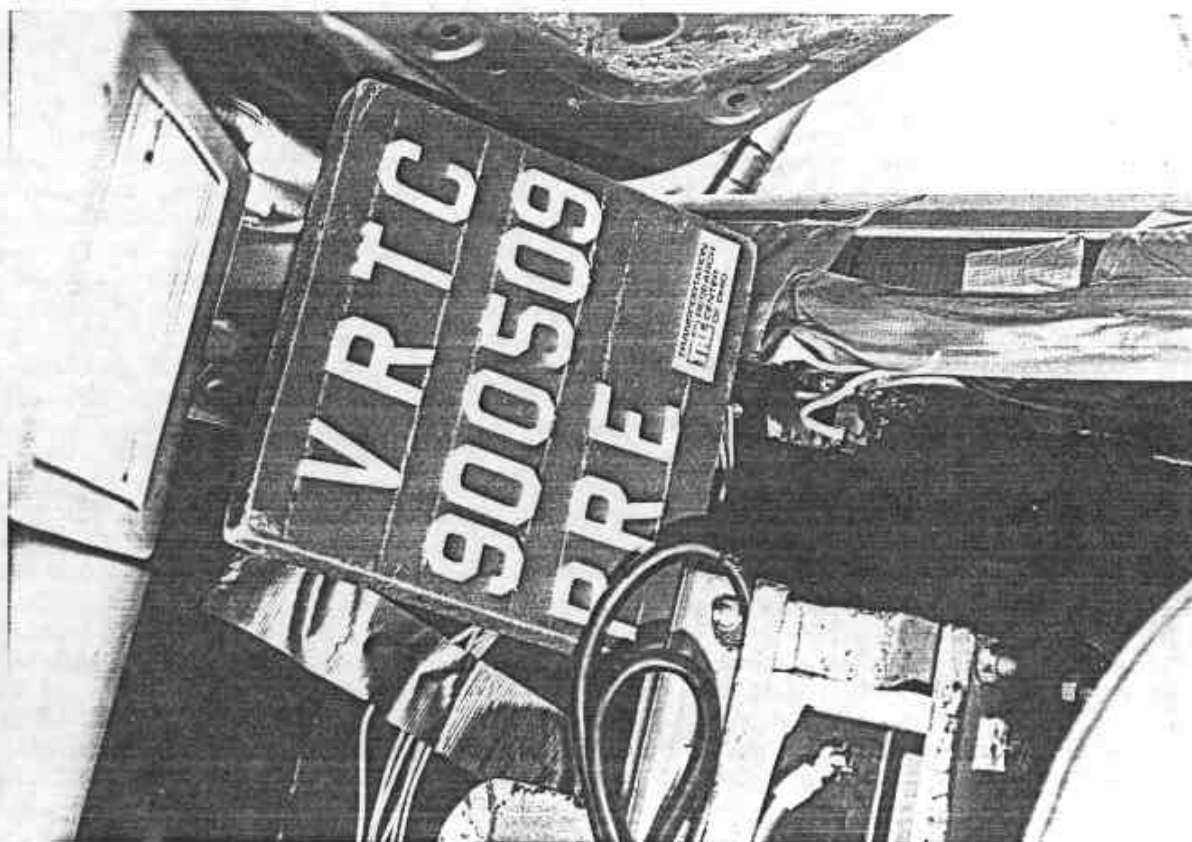


Figure A-22. PRE-TEST RIGHT FRONT SILL ACCELEROMETER VIEW

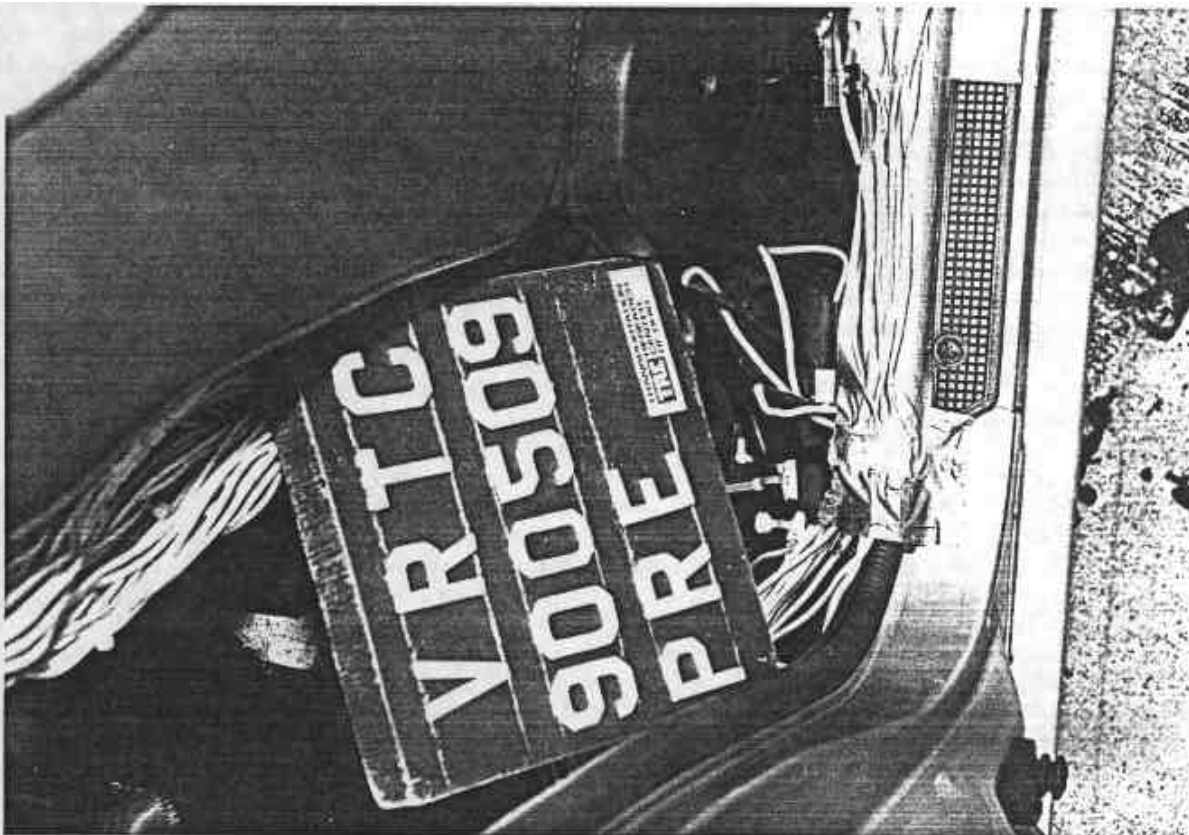


Figure A-23. PRE-TEST RIGHT REAR SILL ACCELEROMETER VIEW

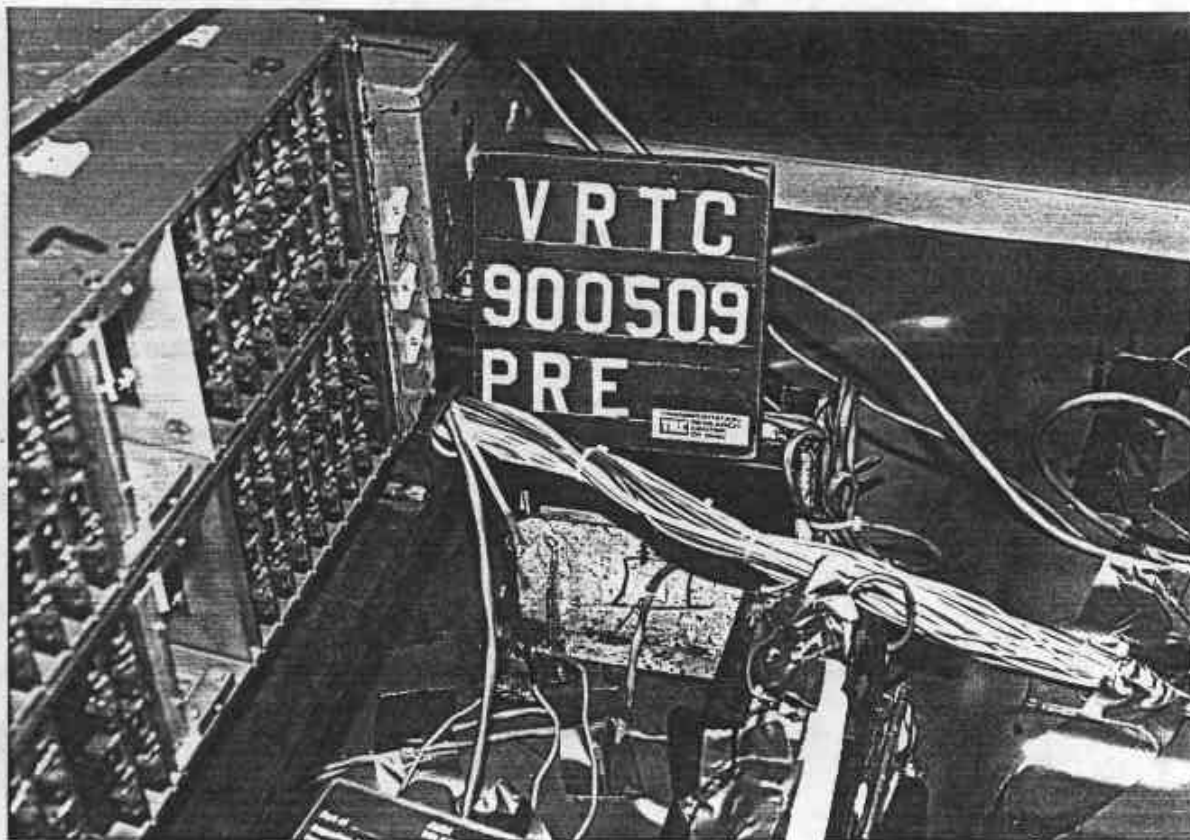


Figure A-24. PRE-TEST TRUNK AREA ACCELEROMETER - VIEW 1

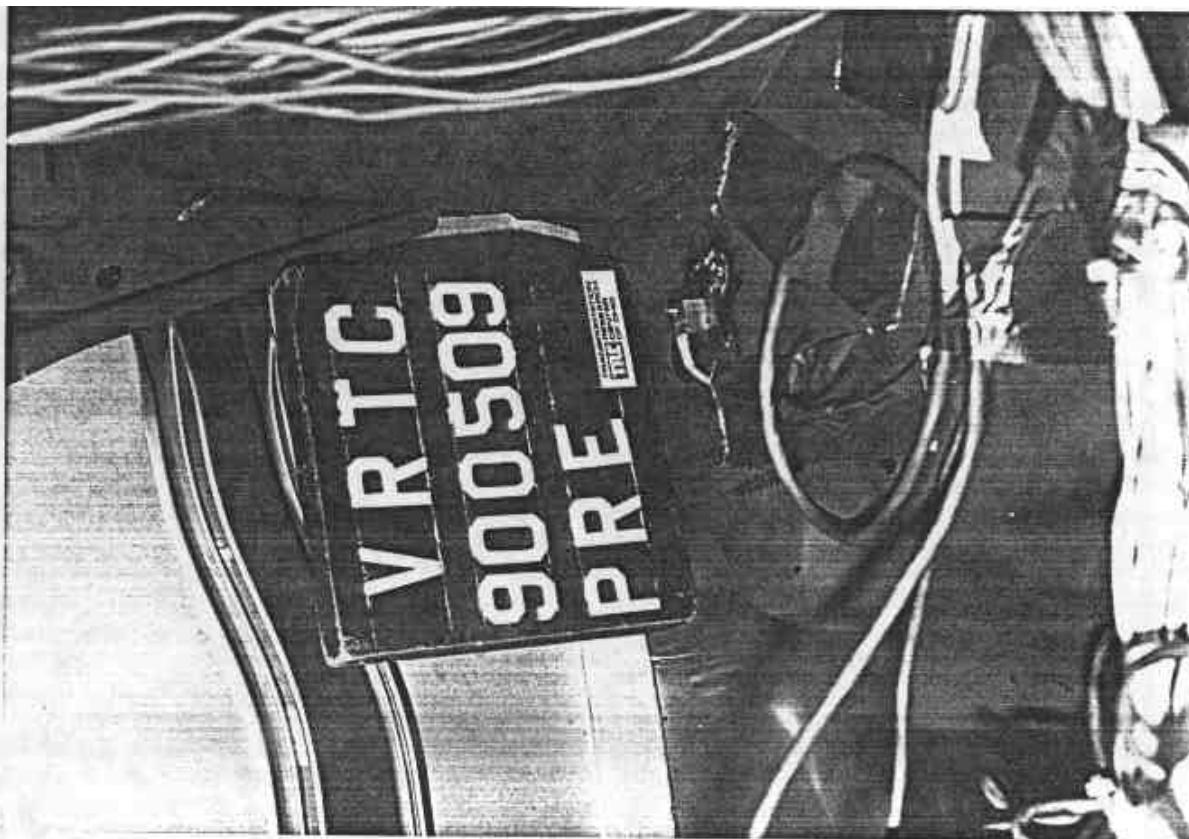


Figure A-25. PRE-TEST TRUNK AREA ACCELEROMETER - VIEW 2



Figure A-26. PRE-TEST DRIVER AND PASSENGER DUMMIES LEFT SIDE VIEW

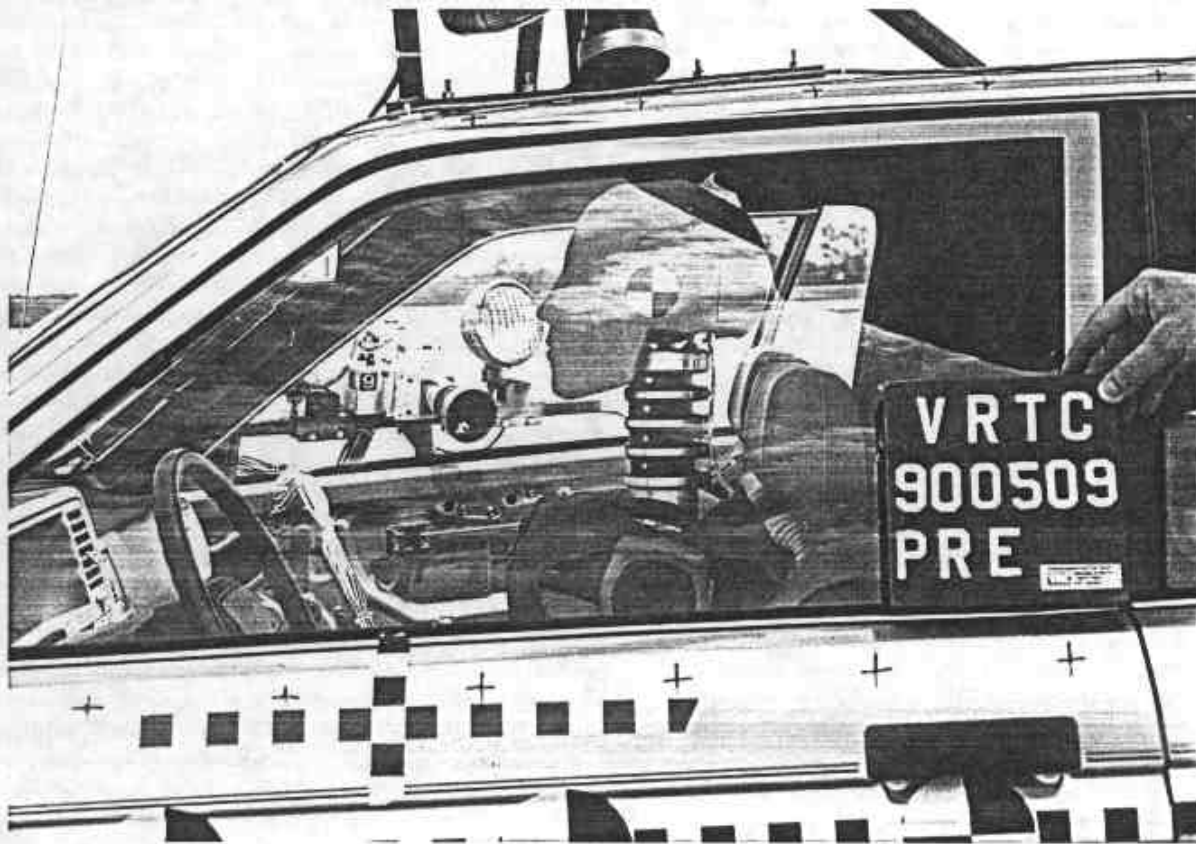


Figure A-27. PRE-TEST DRIVER DUMMY - VIEW 1



Figure A-28. PRE-TEST DRIVER DUMMY - VIEW 2



Figure A-29. PRE-TEST DRIVER DUMMY - VIEW 3

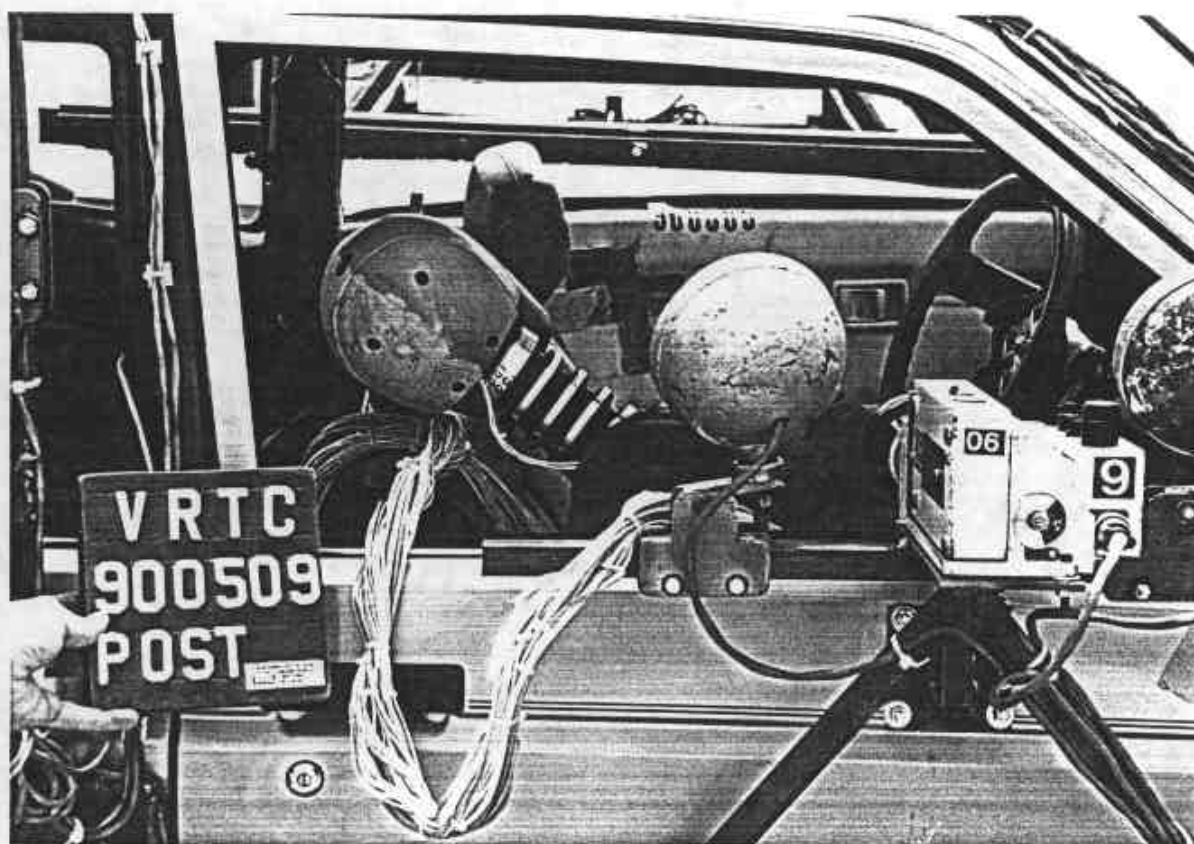


Figure A-30. POST-TEST DRIVER DUMMY - VIEW 1



Figure A-31. POST-DRIVER DUMMY - VIEW 2



Figure A-32. PRE-TEST PASSENGER DUMMY - VIEW 1

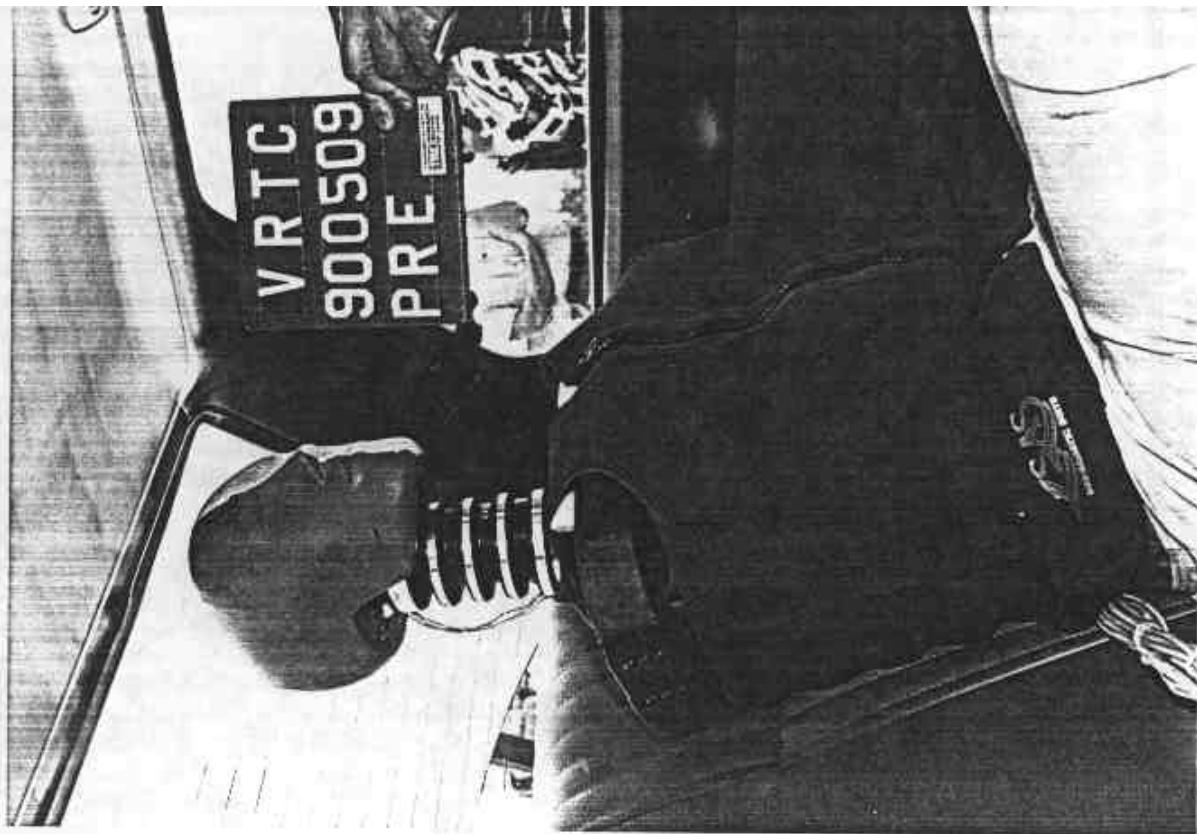


Figure A-33. PRE-TEST PASSENGER DUMMY - VIEW 2

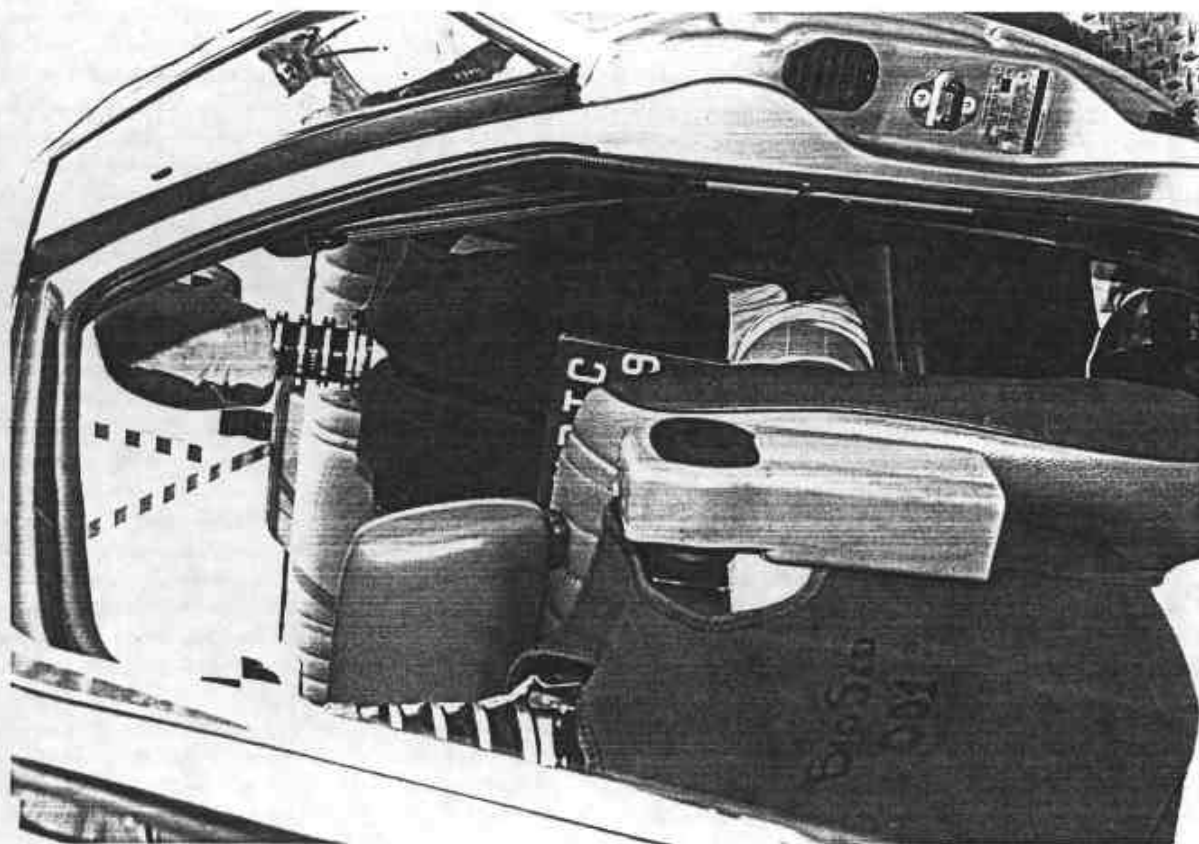


Figure A-34. PRE-TEST PASSENGER DUMMY - VIEW 3



Figure A-35. POST-TEST PASSENGER DUMMY VIEW

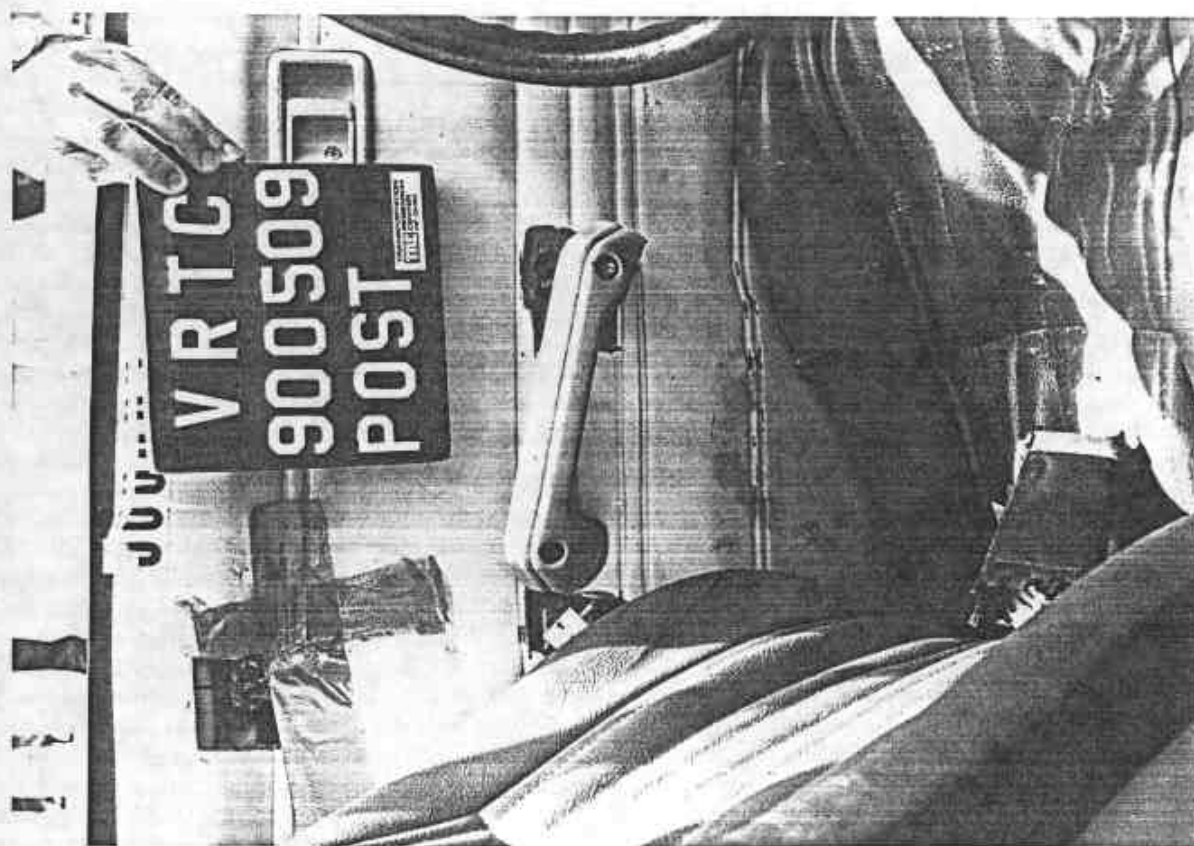


Figure A-36. POST-TEST DRIVER DUMMY CONTACT - VIEW 1



Figure A-37. POST-TEST DRIVER DUMMY CONTACT - VIEW 2



Figure A-38. POST-TEST PASSENGER DUMMY CONTACT - VIEW 1



Figure A-39. POST-TEST PASSENGER DUMMY CONTACT - VIEW 2

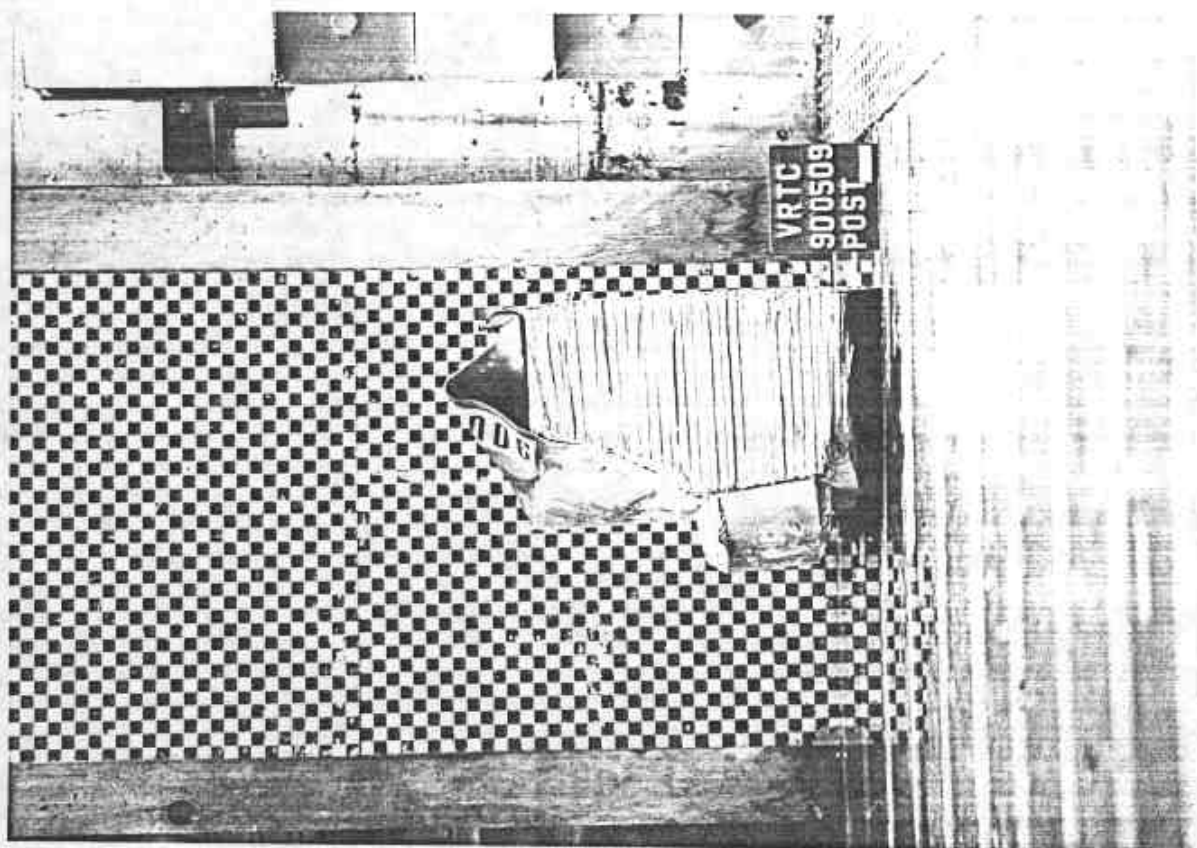


Figure A-40. POST-TEST BARRIER FACE - VIEW 1

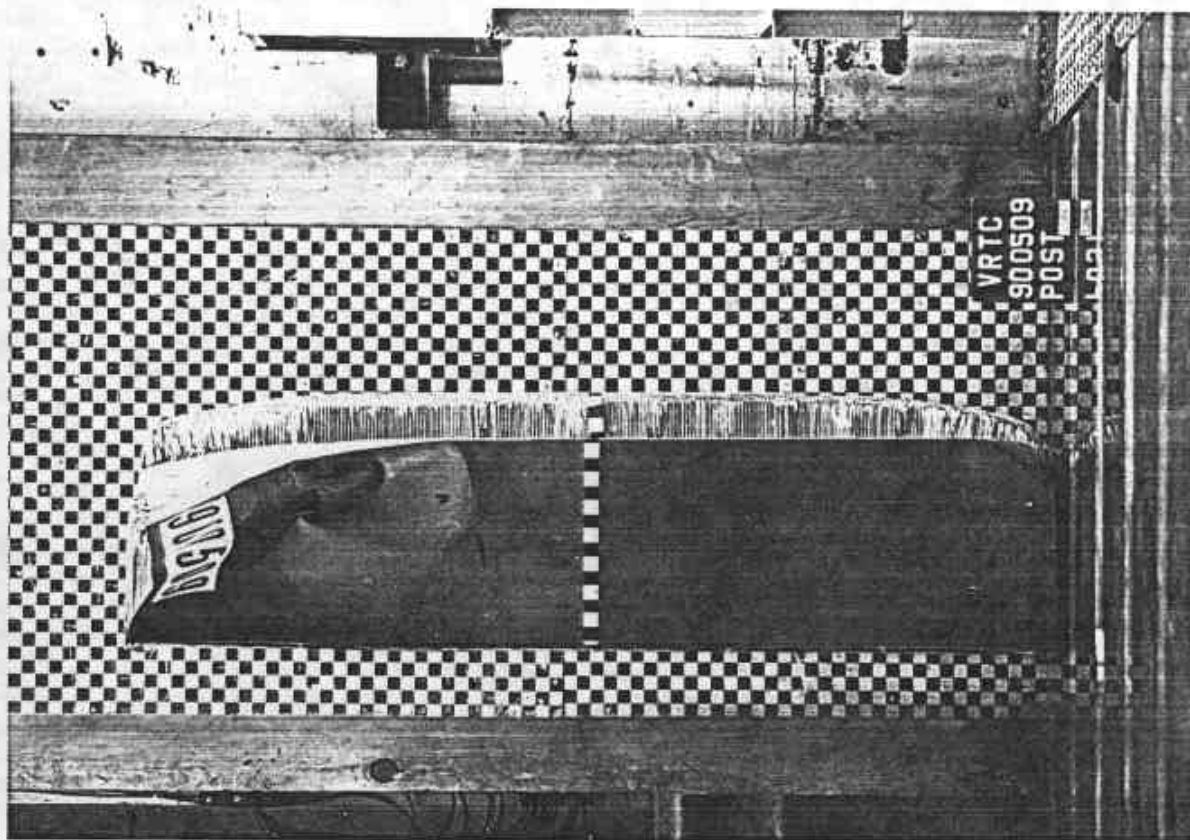


Figure A-41. POST-TEST BARRIER FACE - VIEW 2

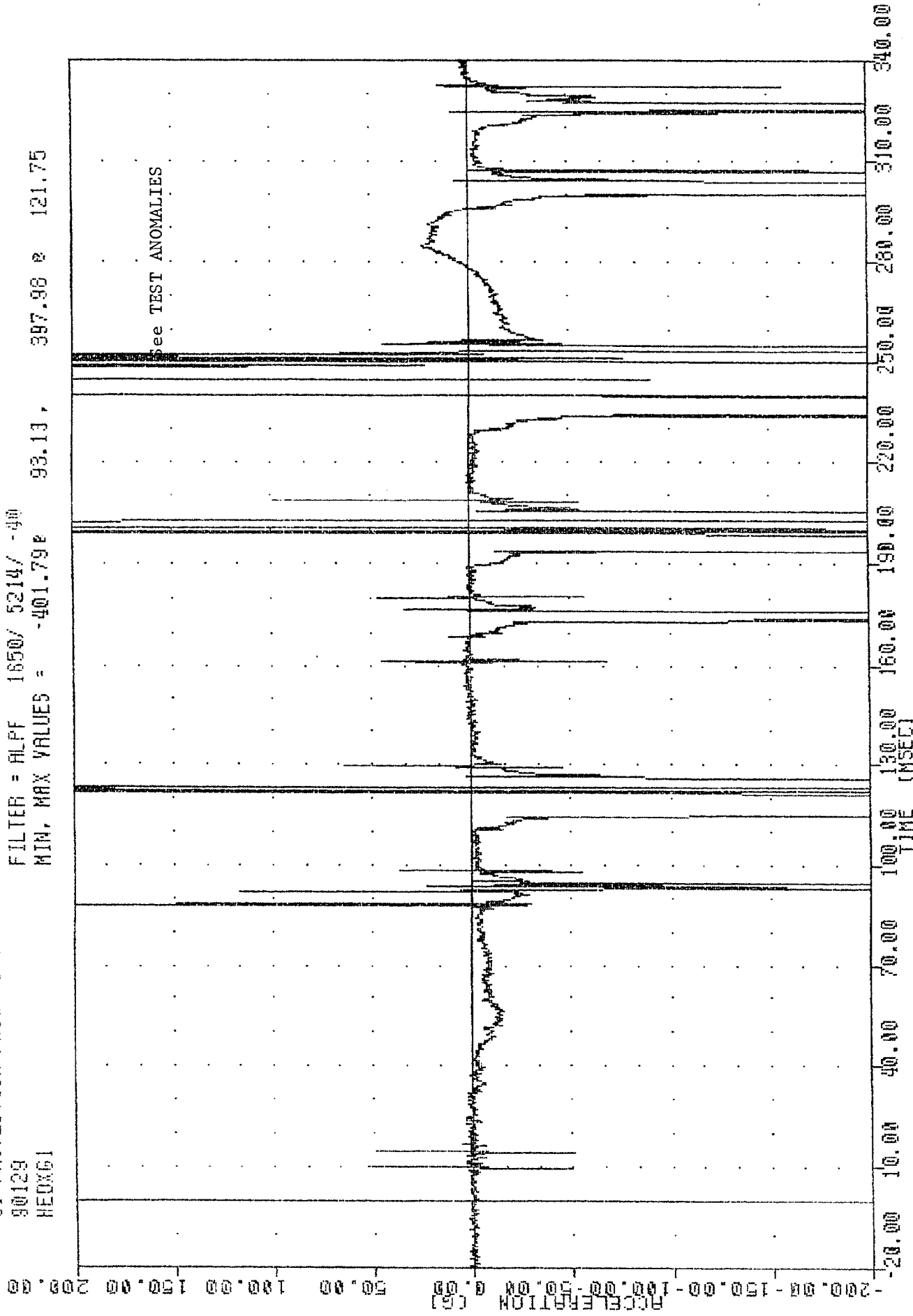
APPENDIX B

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. All data were filtered according to SAE J211b, except that dummy thorax and pelvis data were filtered using the HSRI filter.

SI PROTECTION PHOD VEHICLE
90129
HEOX61

FILTER = ALPF 1850/ 5214/ -40
MIN, MAX VALUES = -401.79e 93.13, 397.98 e 121.75



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER HEAD X AXIS ACCELERATION

31 PMVICCUM FROM VEHICLE

90128

HEDY61

FILTER = ALPF 1650/ 5214/ -40

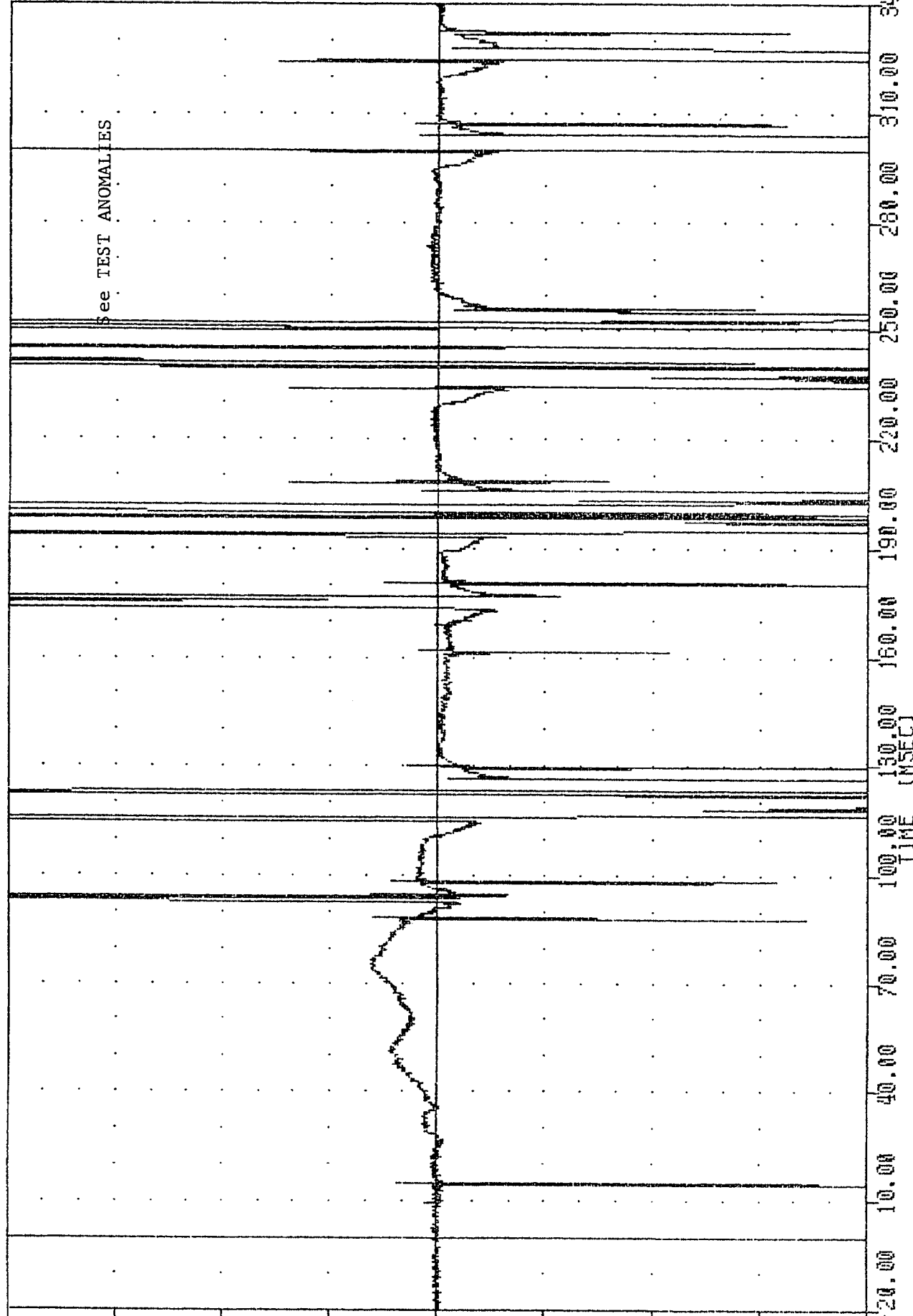
MIN, MAX VALUES = -403.480

116.63.

396.29 @

122.38

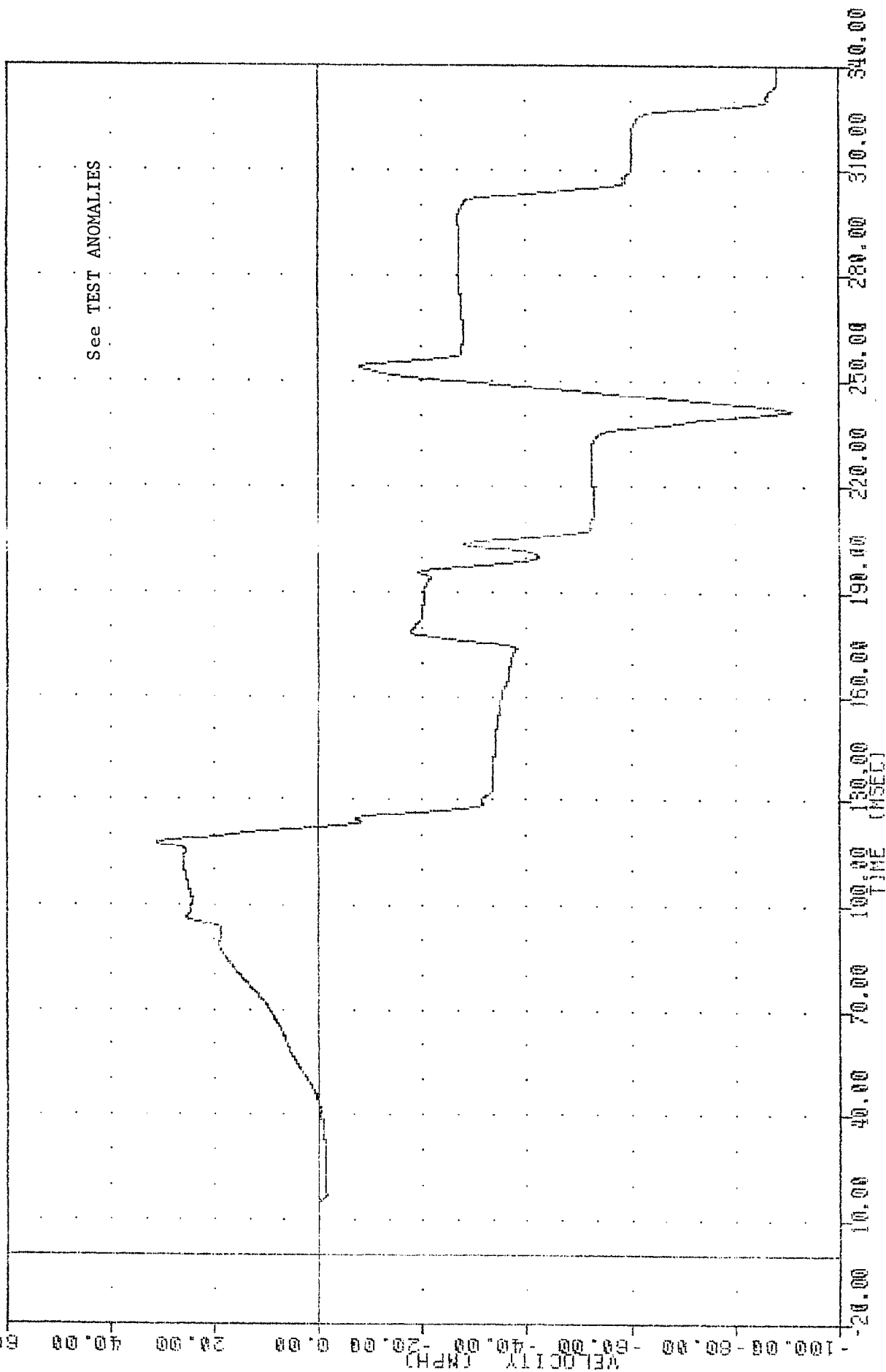
ACCELERATION (G)



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER HEAD Y AXIS ACCELERATION

90129
 SI PROTECTION PASO VEHICLE
 HEDYV1

FILTER = BLFF 300/ 949/ -40
 MIN. MAX VALUES = -91.00 241.63 30.97 0 117.63



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 DRIVER HEAD Y AXIS VELOCITY

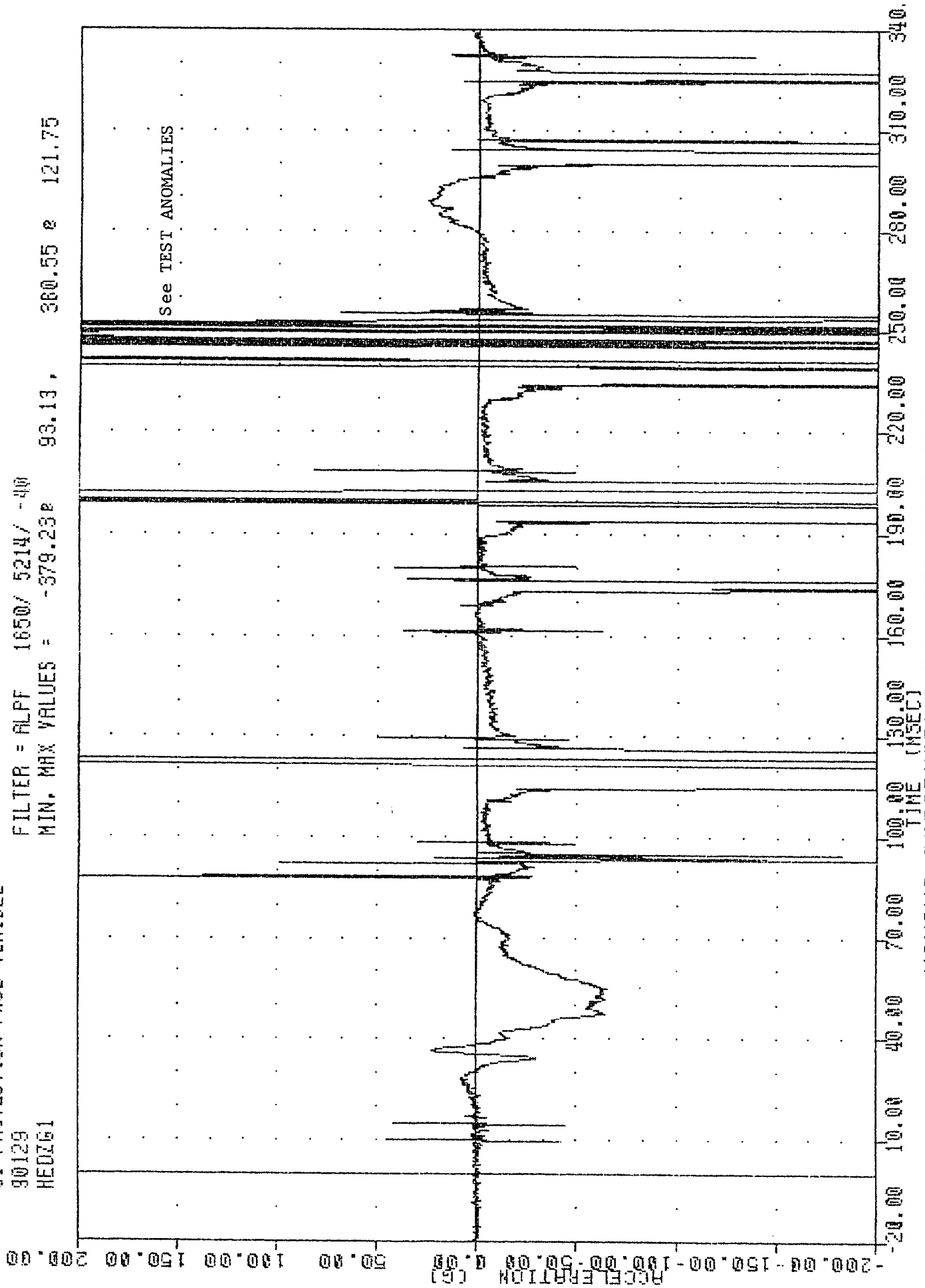
31 PROTECTION FROM VEHICLE

90129

HE0261

FILTER = ALPF 1650/ 5214/ -40

MIN. MAX VALUES = -379.23 93.13 , 360.55 2 121.75



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER HEAD Z AXIS ACCELERATION

SI PROTECTION PROD VEHICLE

90129

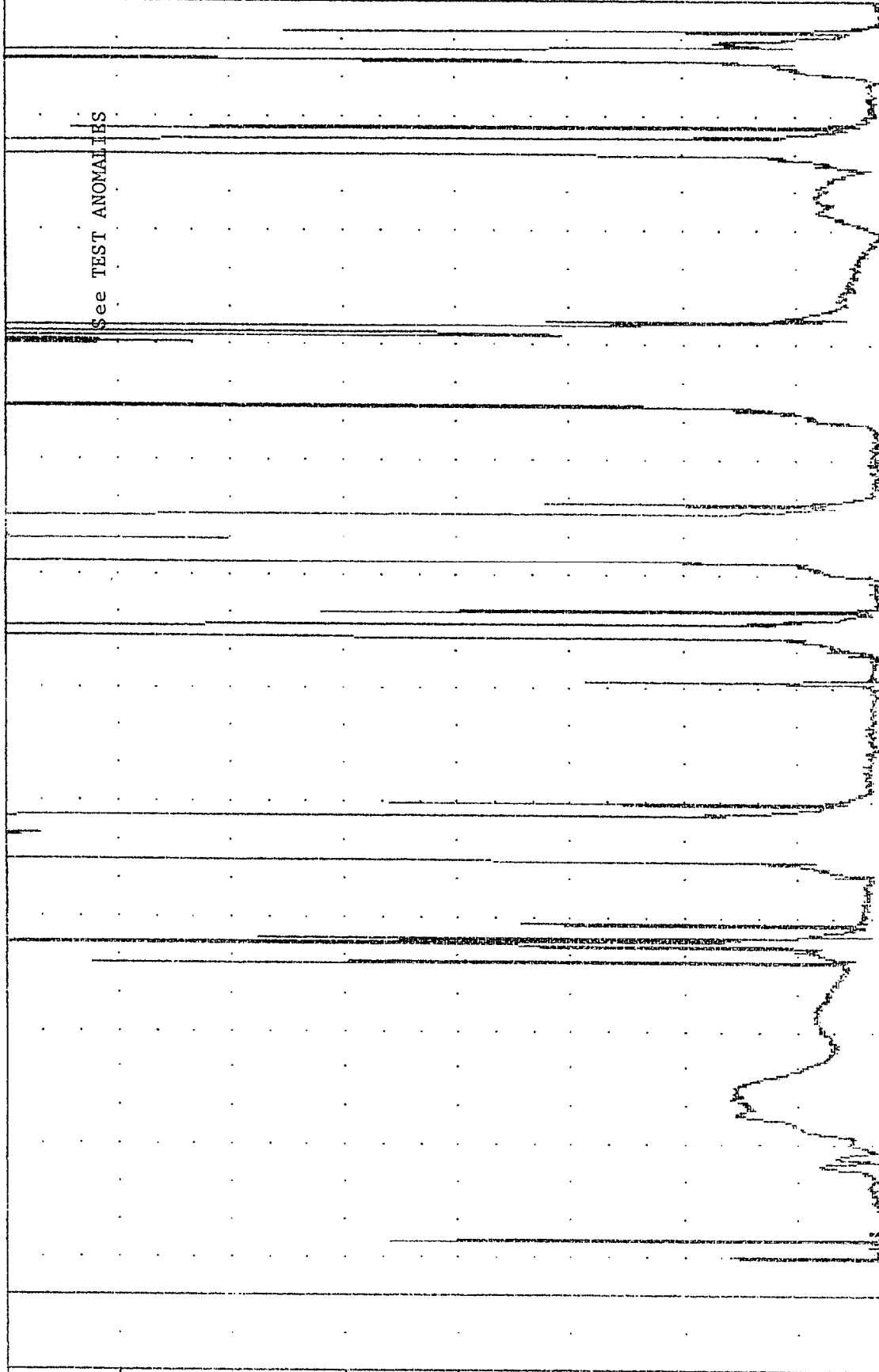
HEAD1

FILTER = ALPF 1650/ 5214/ -90

MIN. MAX VALUES = 0.10e

684.87 e 239.88

ACCELERATION (G)



20.00 40.00 60.00 80.00 100.00 120.00 140.00 160.00 180.00 200.00 220.00 240.00 260.00 280.00 300.00 320.00 340.00

TIME (MSEC)

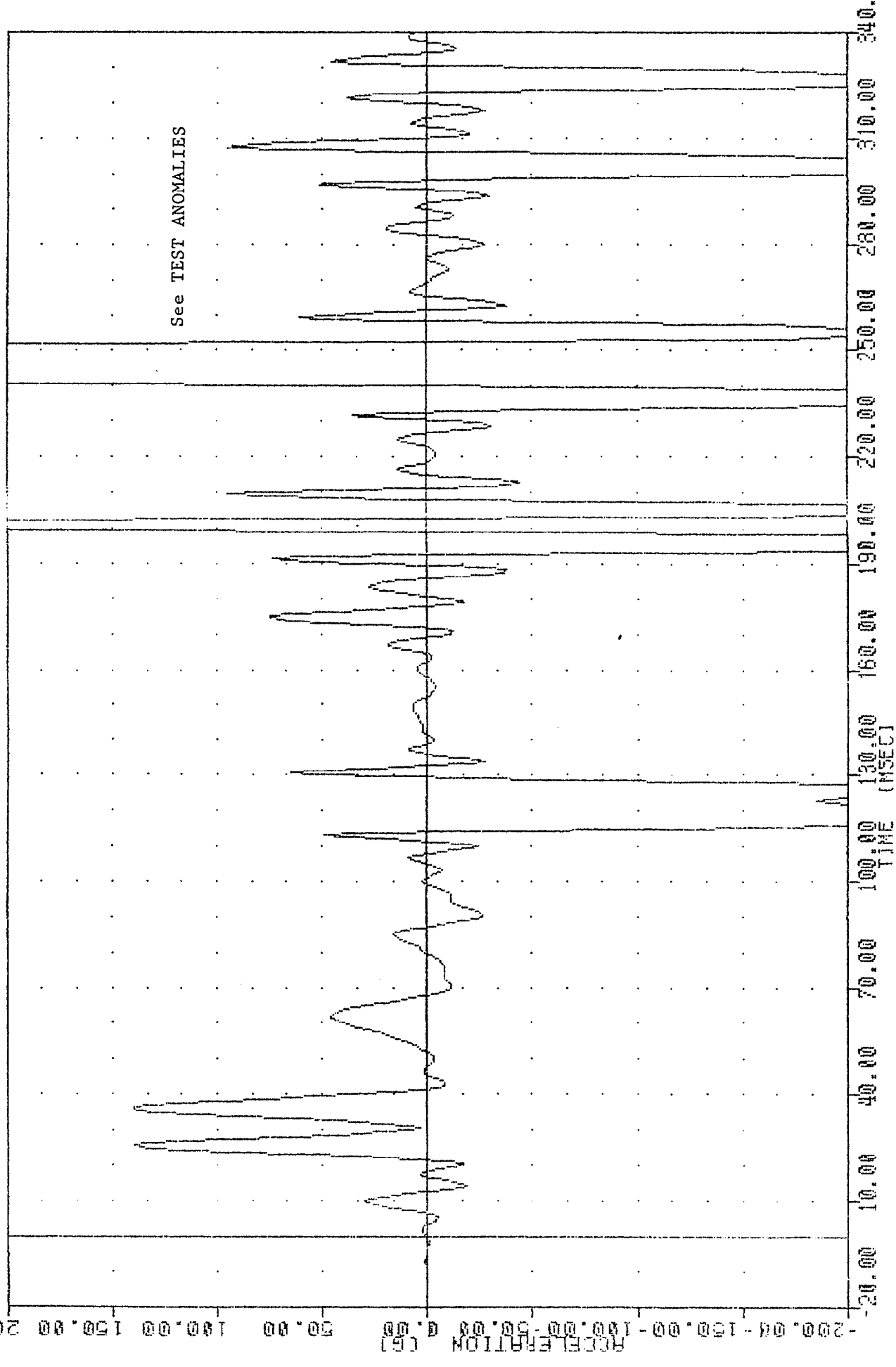
MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER HEAD RESULTANT ACCELERATION

SI PROTECTION PROD VEHICLE

90129
SHLY61

FILTER = HSRI 136/ 109/ -5%
MIN, MAX VALUES = -804.07% 236.88 ,

807.76 % 249.38

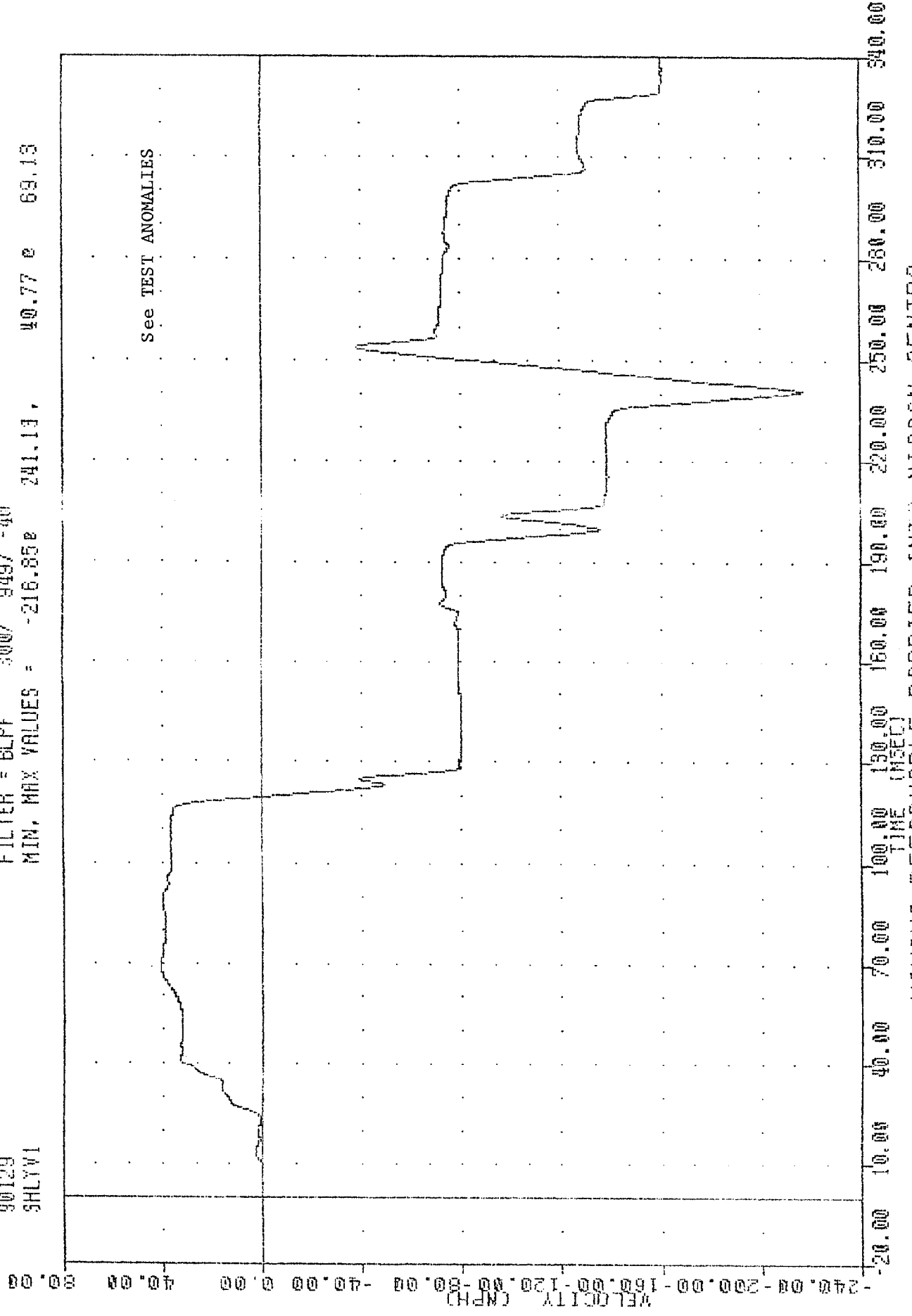


MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT SHOULDER Y AXIS ACCELERATION

90129
SHLYV1
SI PROTECTION PROD VEHICLE

RECORDED

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -216.85 241.13, 40.77 69.13



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT SHOULDER Y AXIS VELOCITY

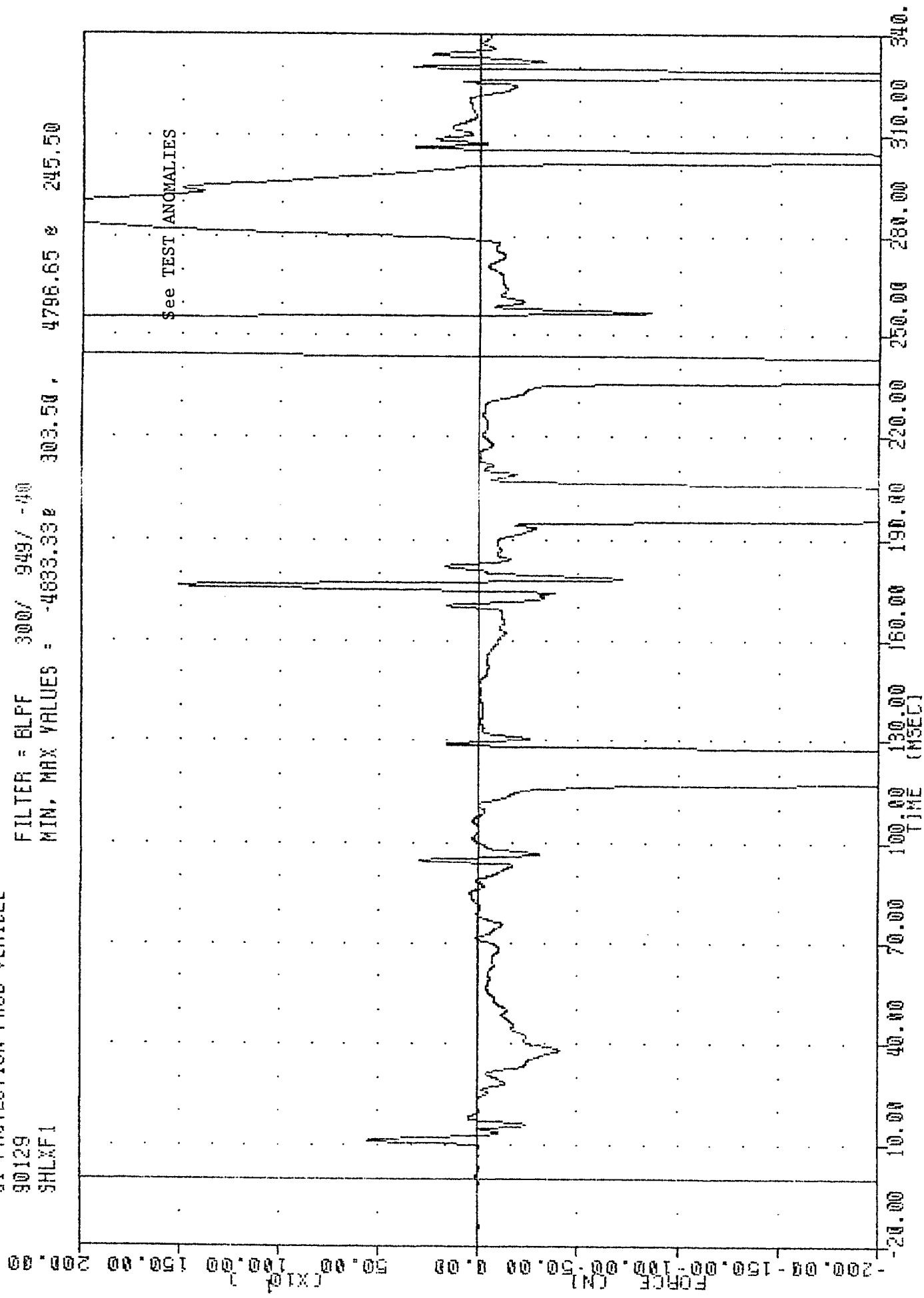
31 CONTINUATION FROM VEHICLE

90129

SHLXF1

FILTER = BLPF 300/ 949/ -40

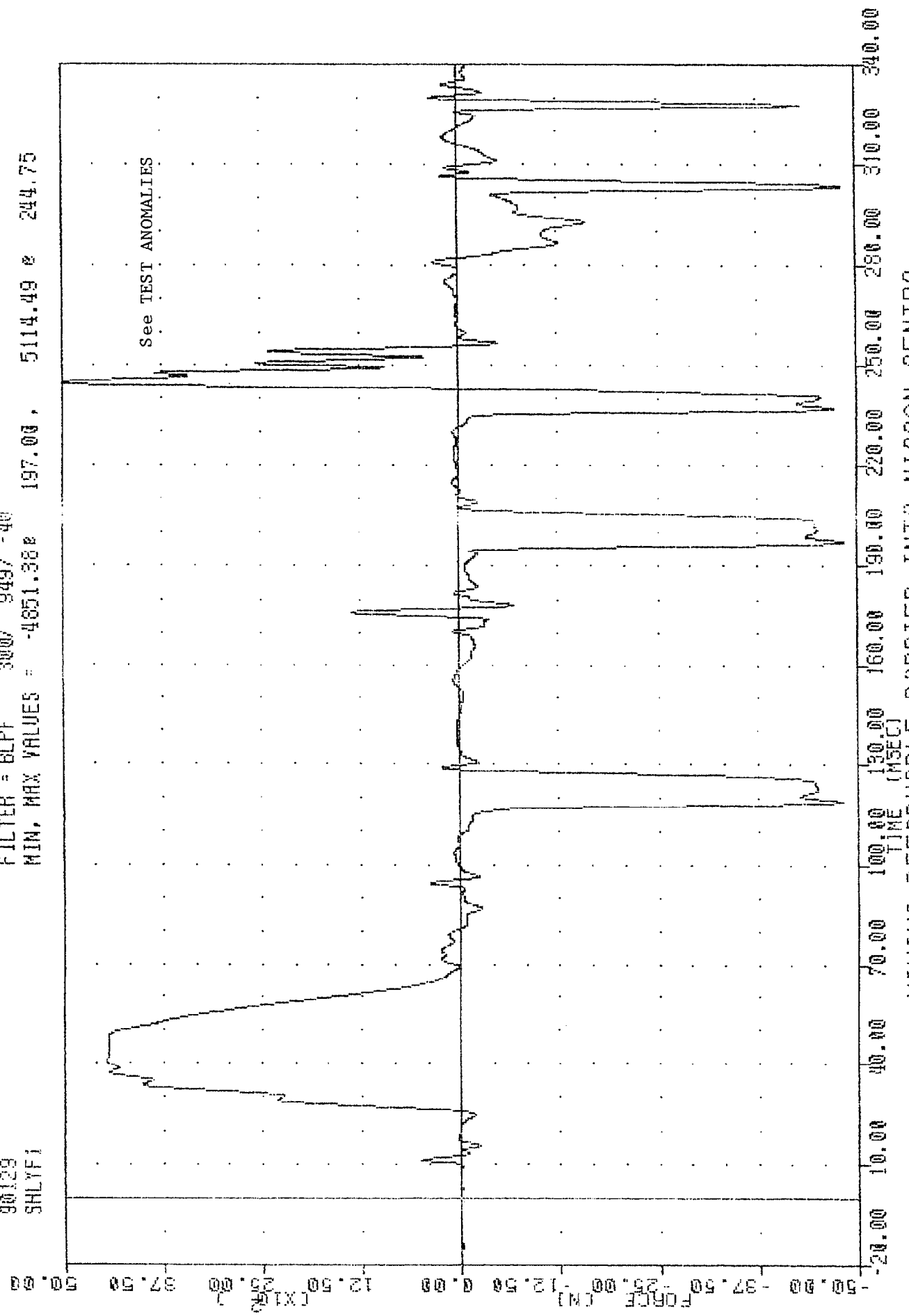
MIN, MAX VALUES = -4833.33 303.50 , 4796.65 245.50



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT SHOULDER X AXIS FORCE

VR10 , 980509
 S1 PROTECTION PROD VEHICLE
 980129
 SHLYF1

FILTER = 6LFF 300/ 949/ -40
 MIN. MAX VALUES = -4851.38e 197.00 , 5114.49 e 244.75

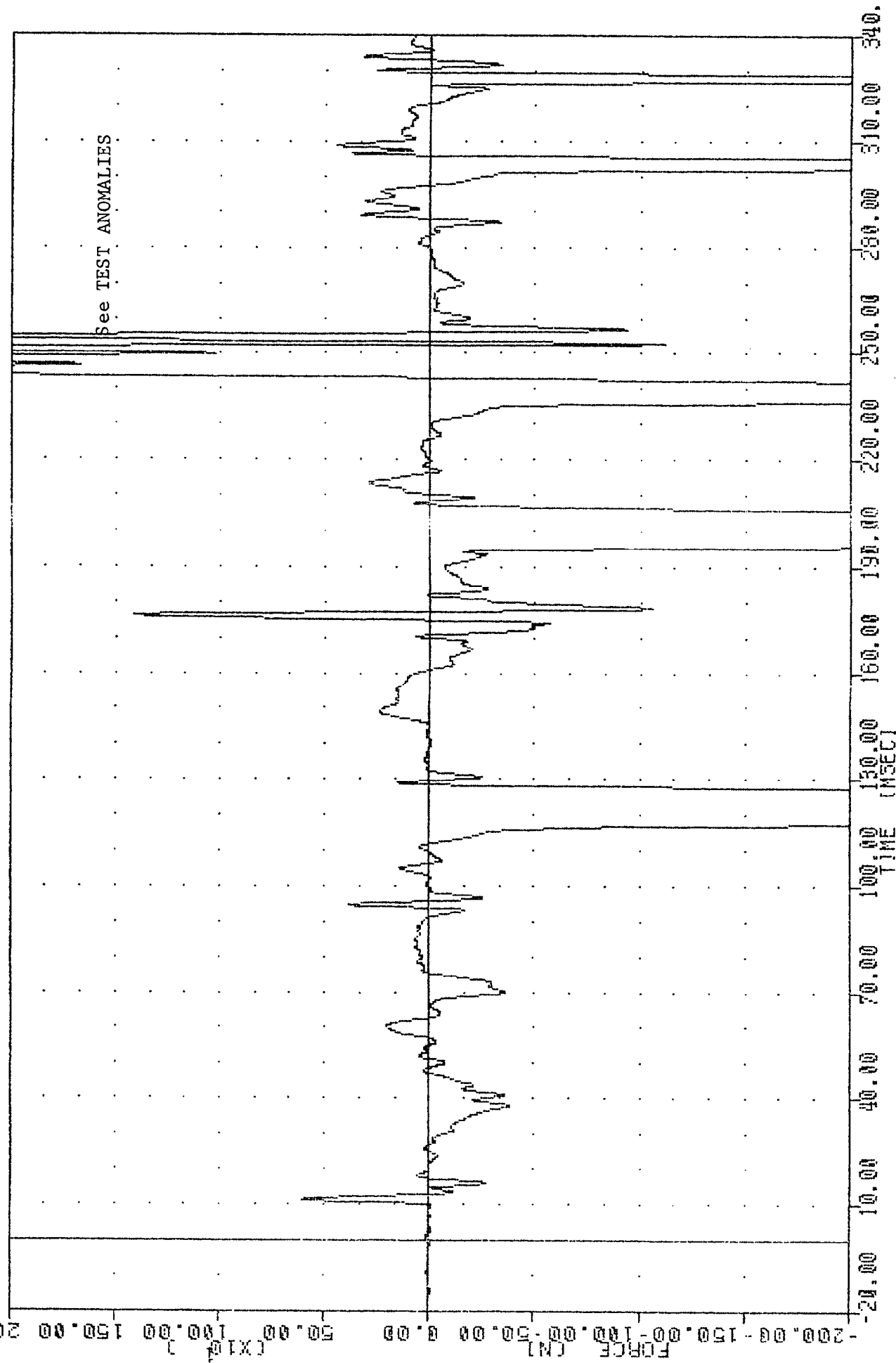


MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 DRIVER LEFT SHOULDER Y AXIS FORCE

SI PROTECTION PROO VEHICLE

90129
SHLZF1

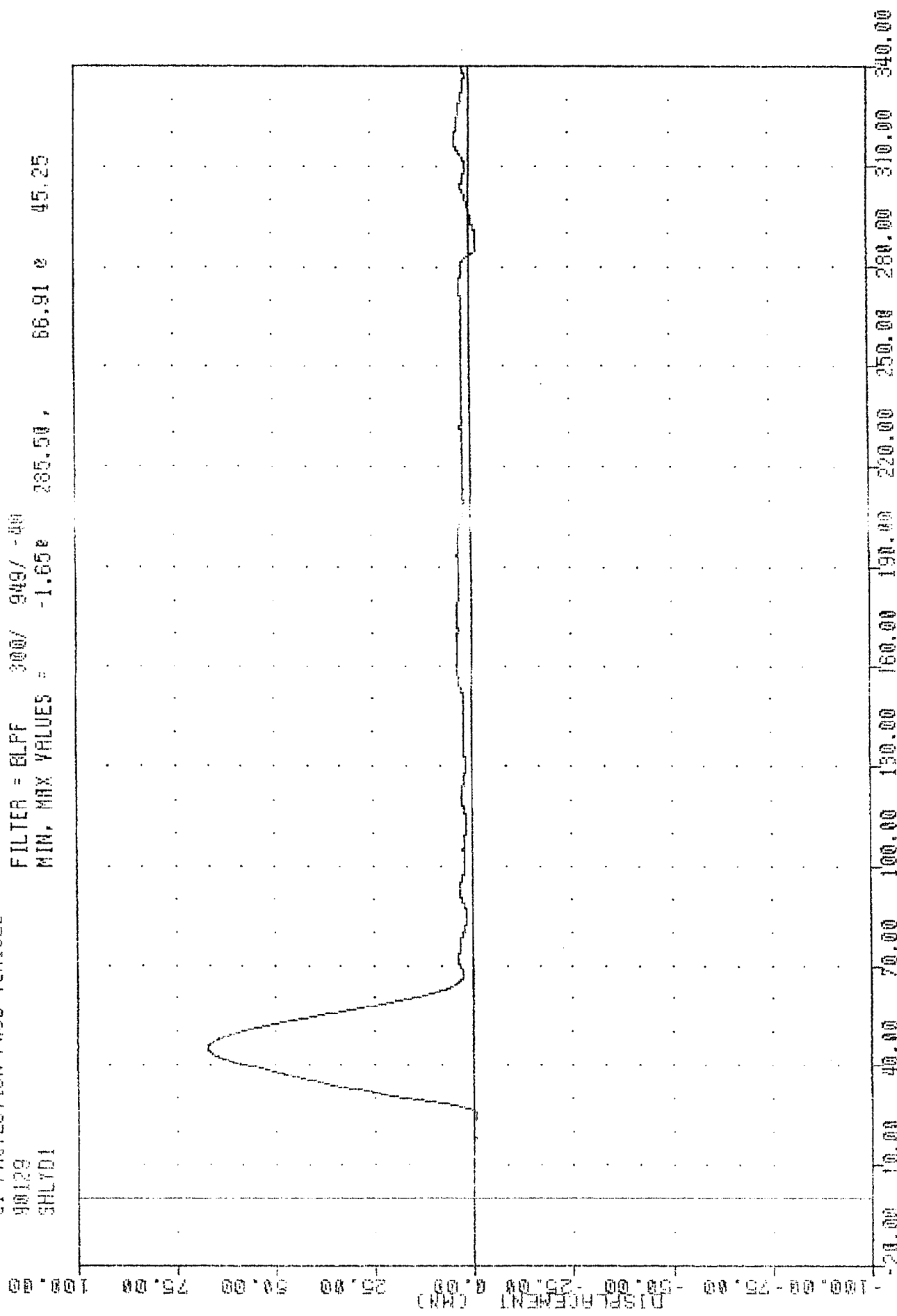
FILTER = BLFF 300/ 949/ -40
MIN, MAX VALUES = -4858.31e 303.50 , 4796.94 e 245.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT SHOULDER Z AXIS FORCE

90129
 SHLTD1
 SI PROTECTION PROD VEHICLE
 90129

FILTER = BLPF 3000/ 949/ -40
 MIN, MAX VALUES = -1.65E 285.50, 66.91 E 45.25



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 DRIVER LEFT SHOULDER TO SPIN- DISPLACEMENT

51 PROTECTION PHUD VEHICLE

90129

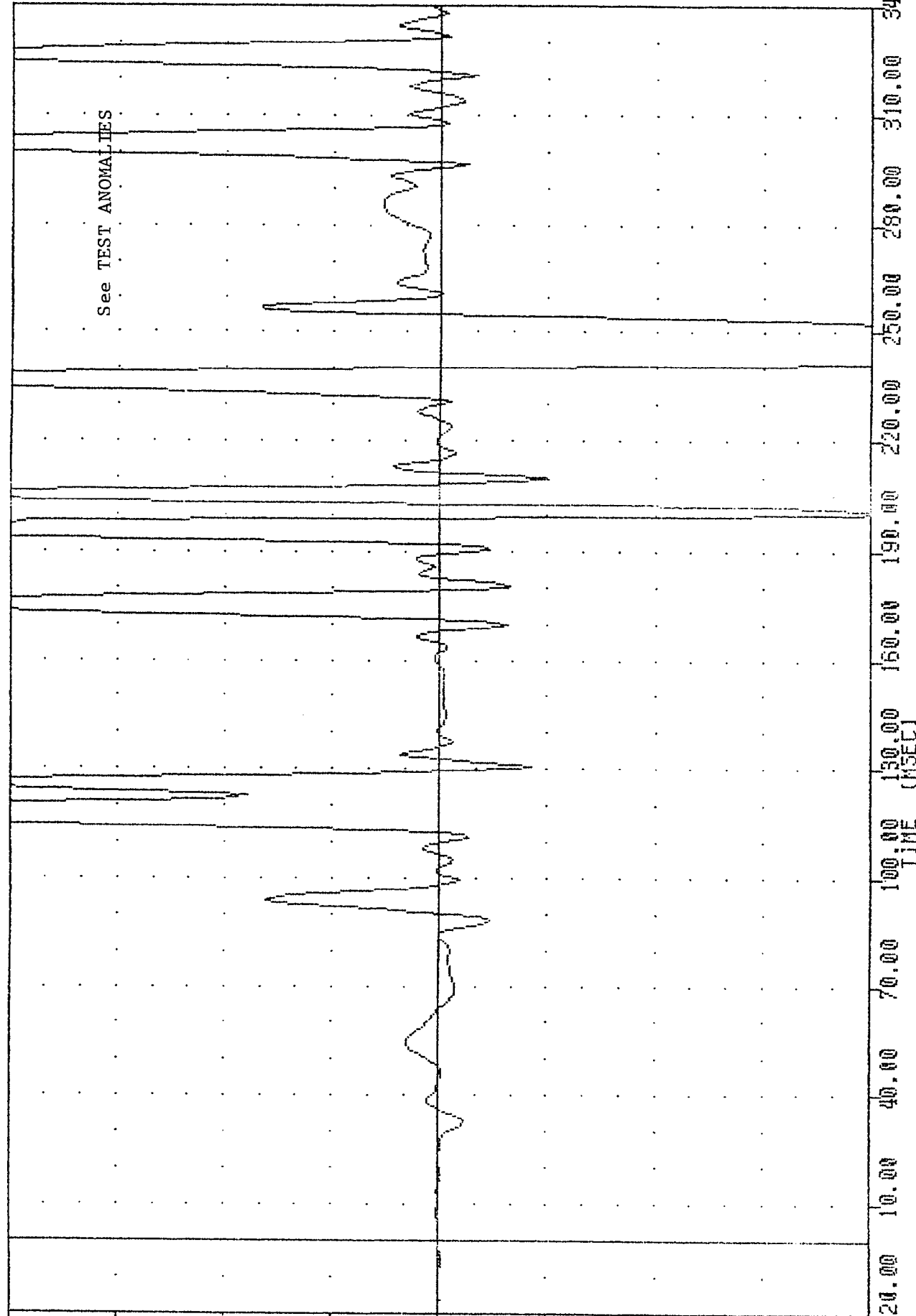
101X61

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -392.20 243.12 ,

478.32 118.13

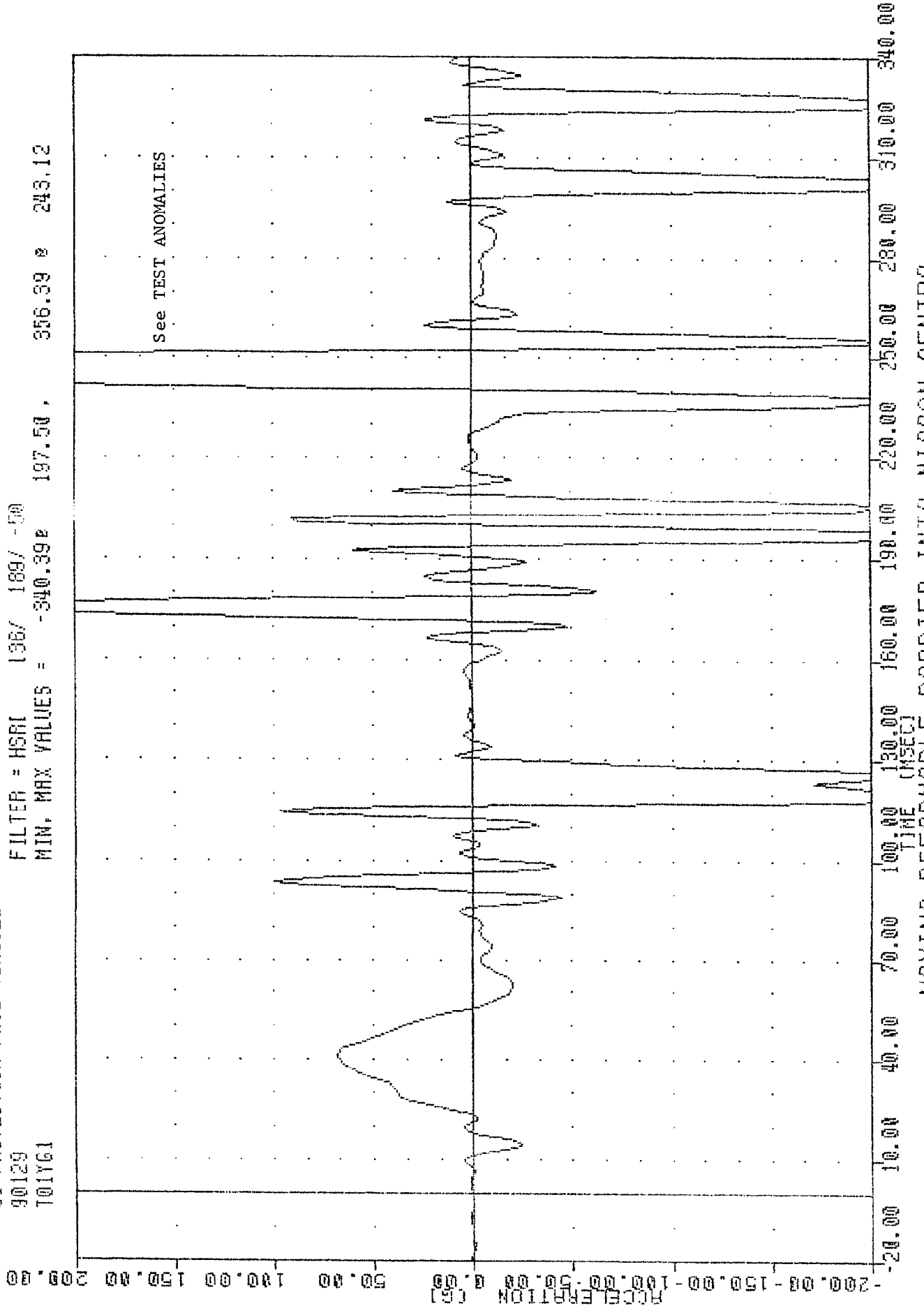
ACCELERATION (G)



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER UPPER SPINE X AXIS ACCELERATION

CHIC 800009
SI PROTECTION PROD VEHICLE
90129
T01Y61

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -340.39E 197.50 , 356.39 E 243.12



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER UPPER SPINE Y AXIS ACCELERATION

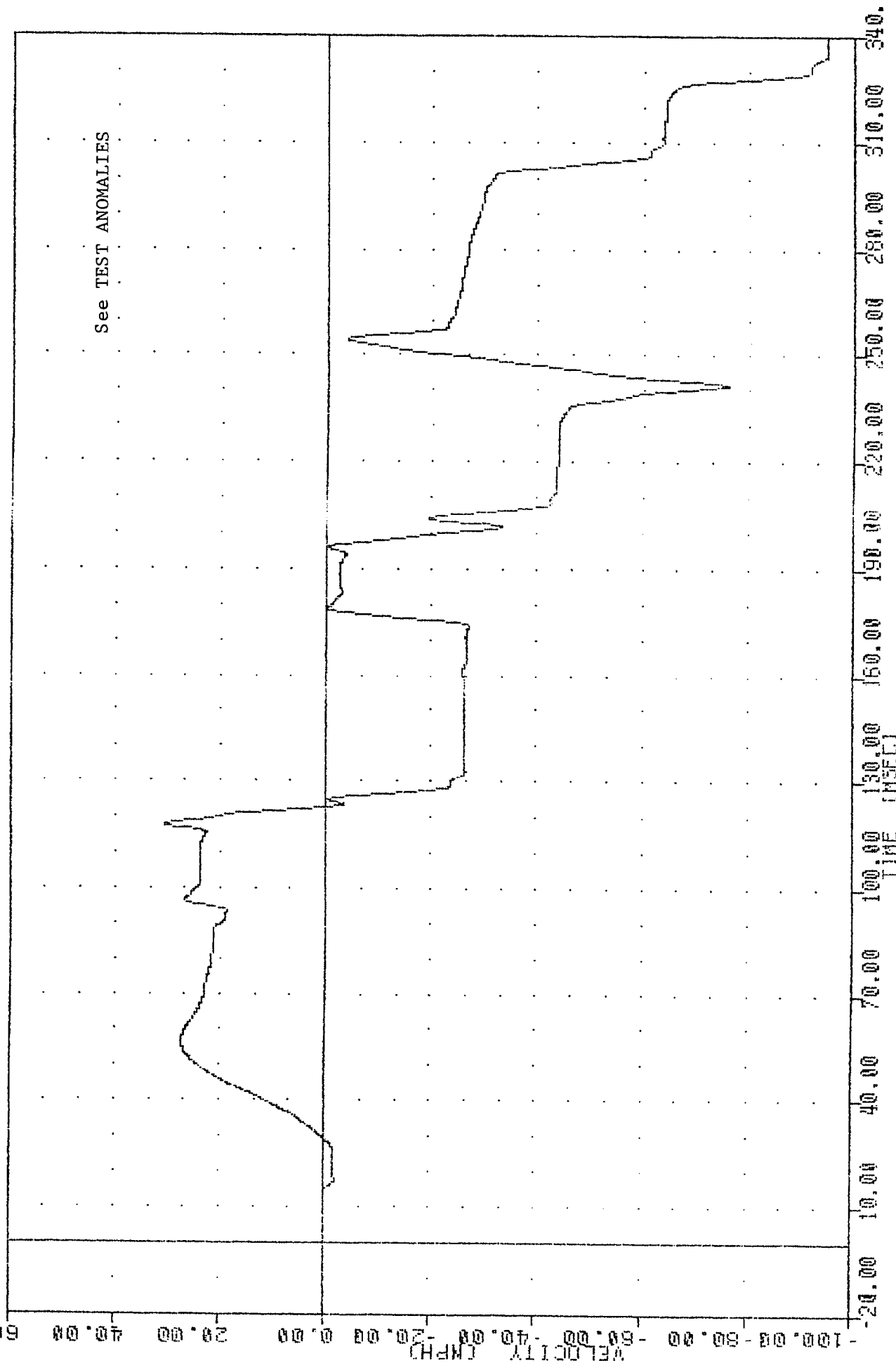
ST PROTECTION FROM VEHICLE

90129

101YV1

FILTER = BLPF 300/ 949/ -10

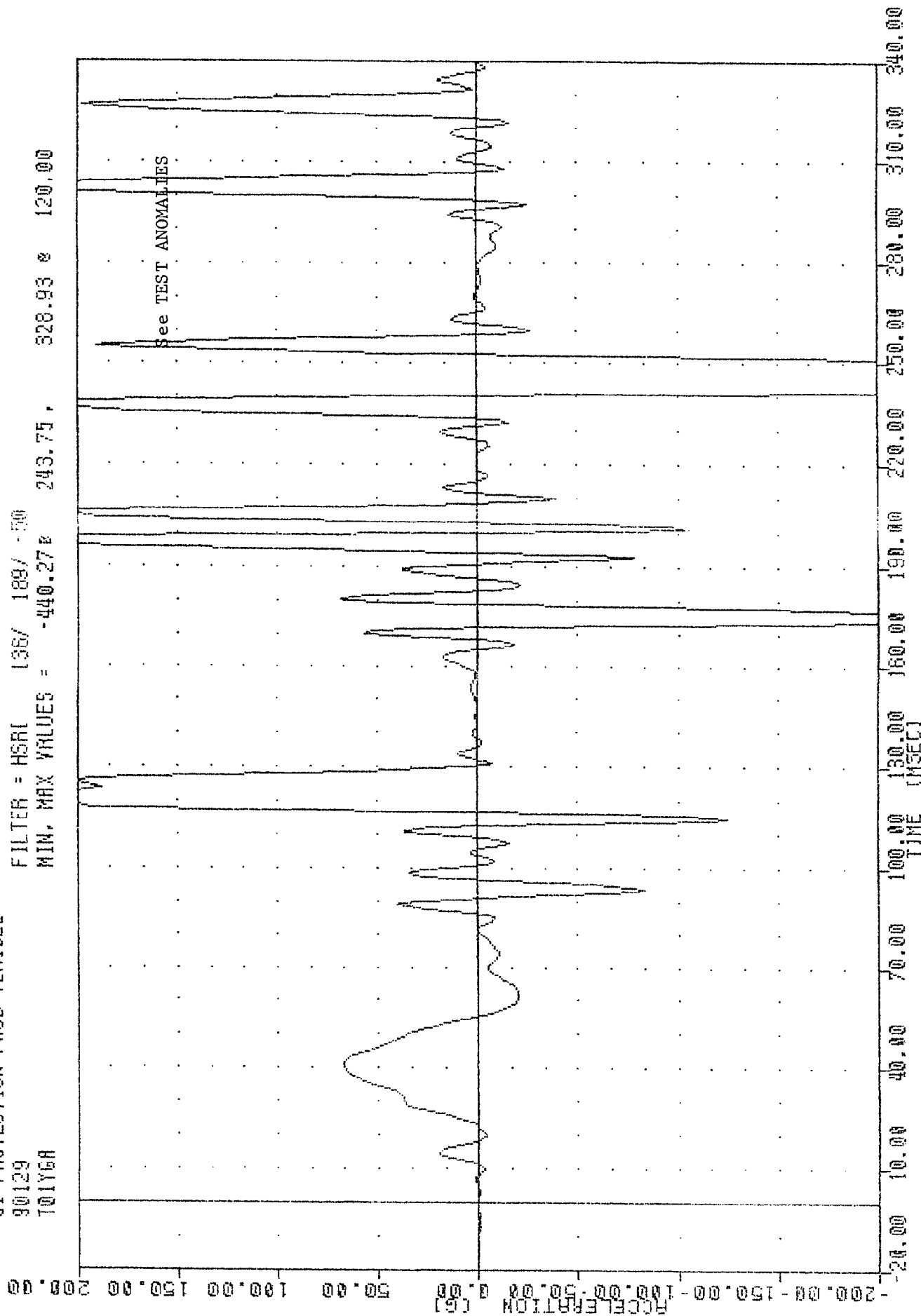
MIN. MAX VALUES = -95.09e 339.75, 30.50 e 117.75



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER UPPER SPINE Y AXIS VELOCITY

VEHICLE : 9000009
SI PROTECTION PROD VEHICLE
90129
T01Y6A

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -440.27 243.75 328.93 120.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER UPPER SPINE Y AXIS REDUNDANT ACCELERATION

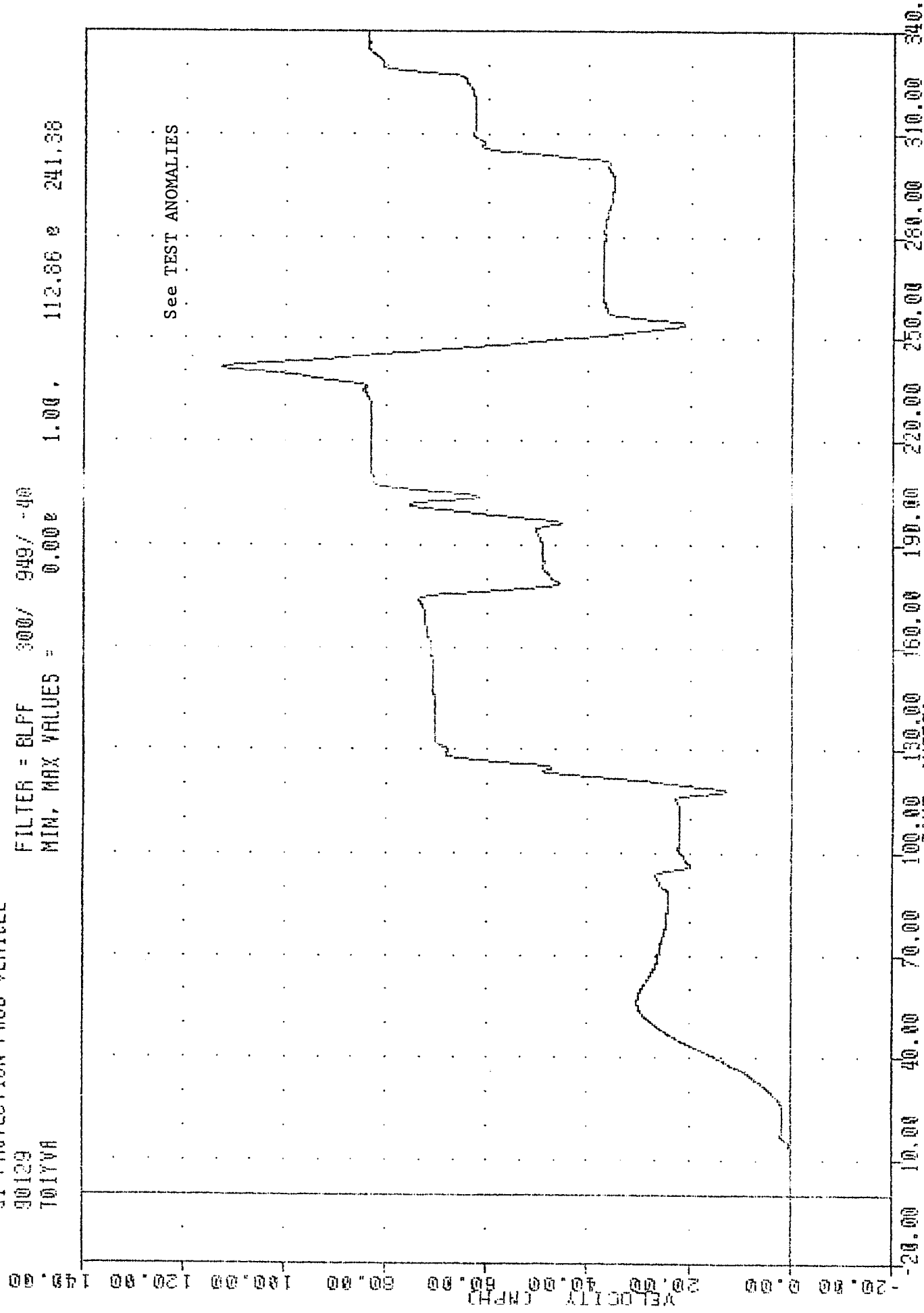
AT COLLISION FROM VEHICLE

90129

TOIYVA

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = 0.00e 1.00, 112.86 e 241.38



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER UPPER SPINE Y AXIS REDUNDANT VELOCITY

10110 800503

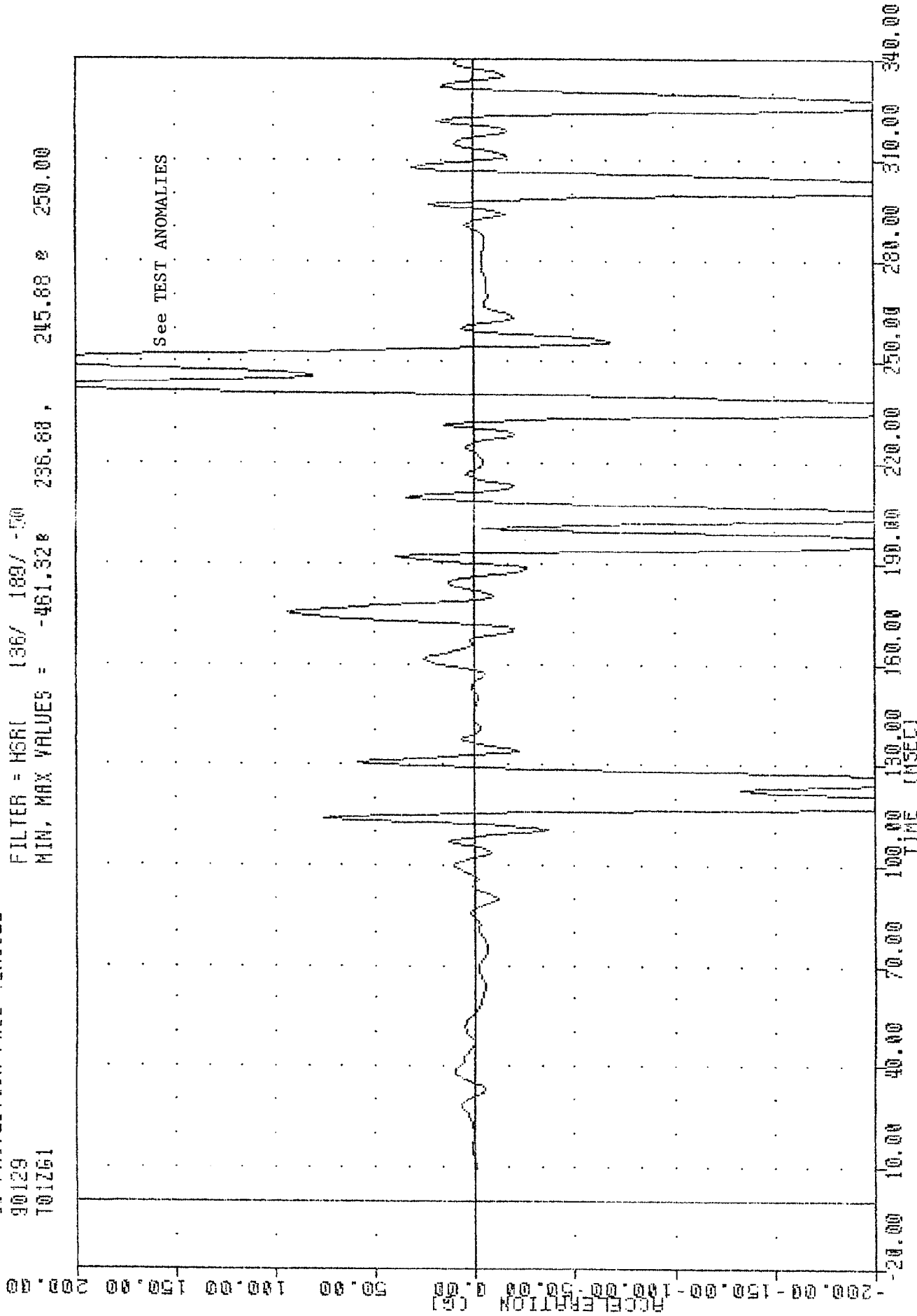
SI PROTECTION PROO VEHICLE

90129

101261

FILTER = HSR1 136/ 189/ -50

MIN, MAX VALUES = -461.32 236.88, 245.88 250.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER UPPER SPINE Z AXIS ACCELERATION

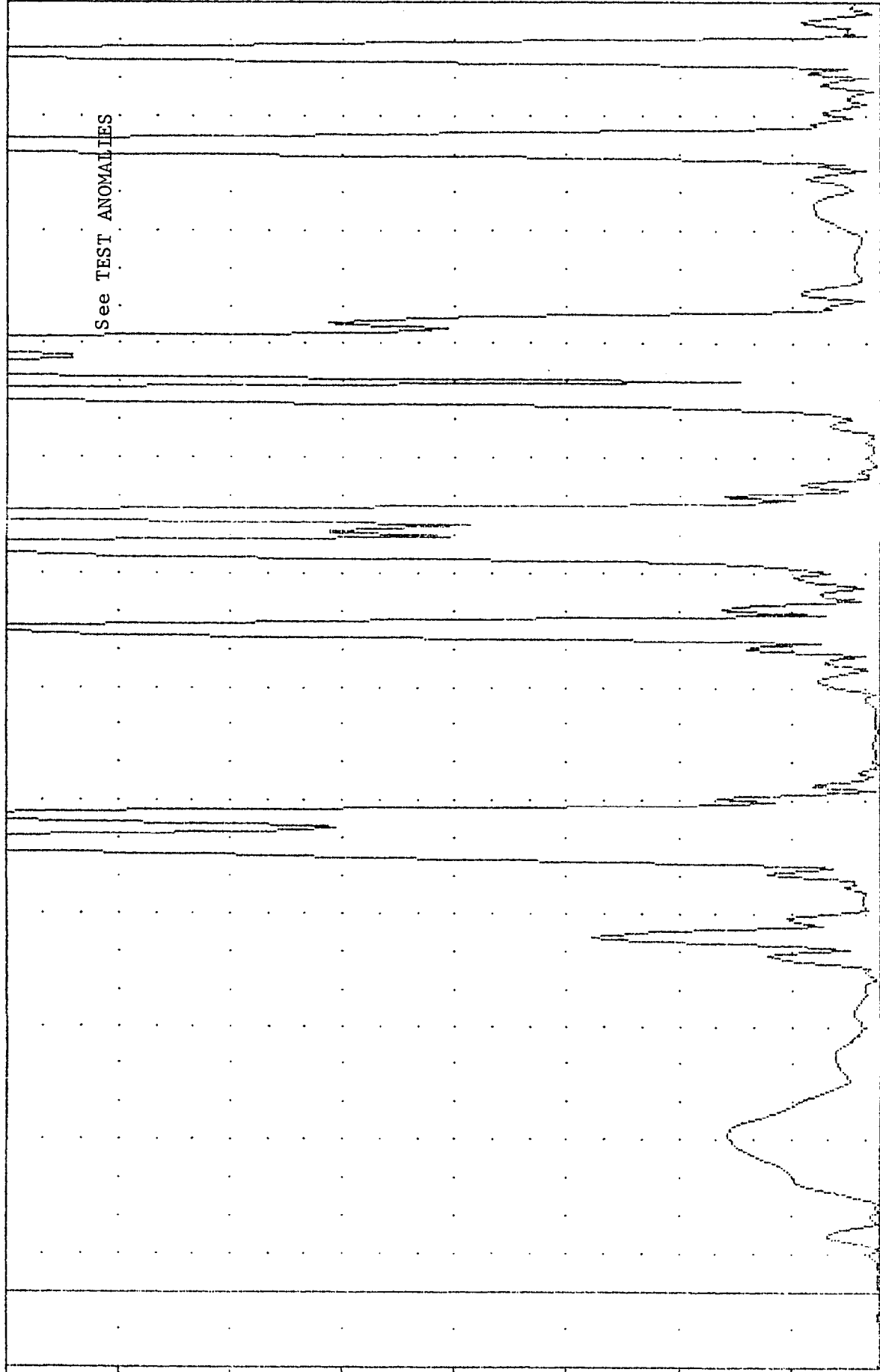
SI PROTECTION PROD VEHICLE

90129
T01R61

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = 0.182

-18.13 , 715.99 2 236.88

ACCELERATION (G)

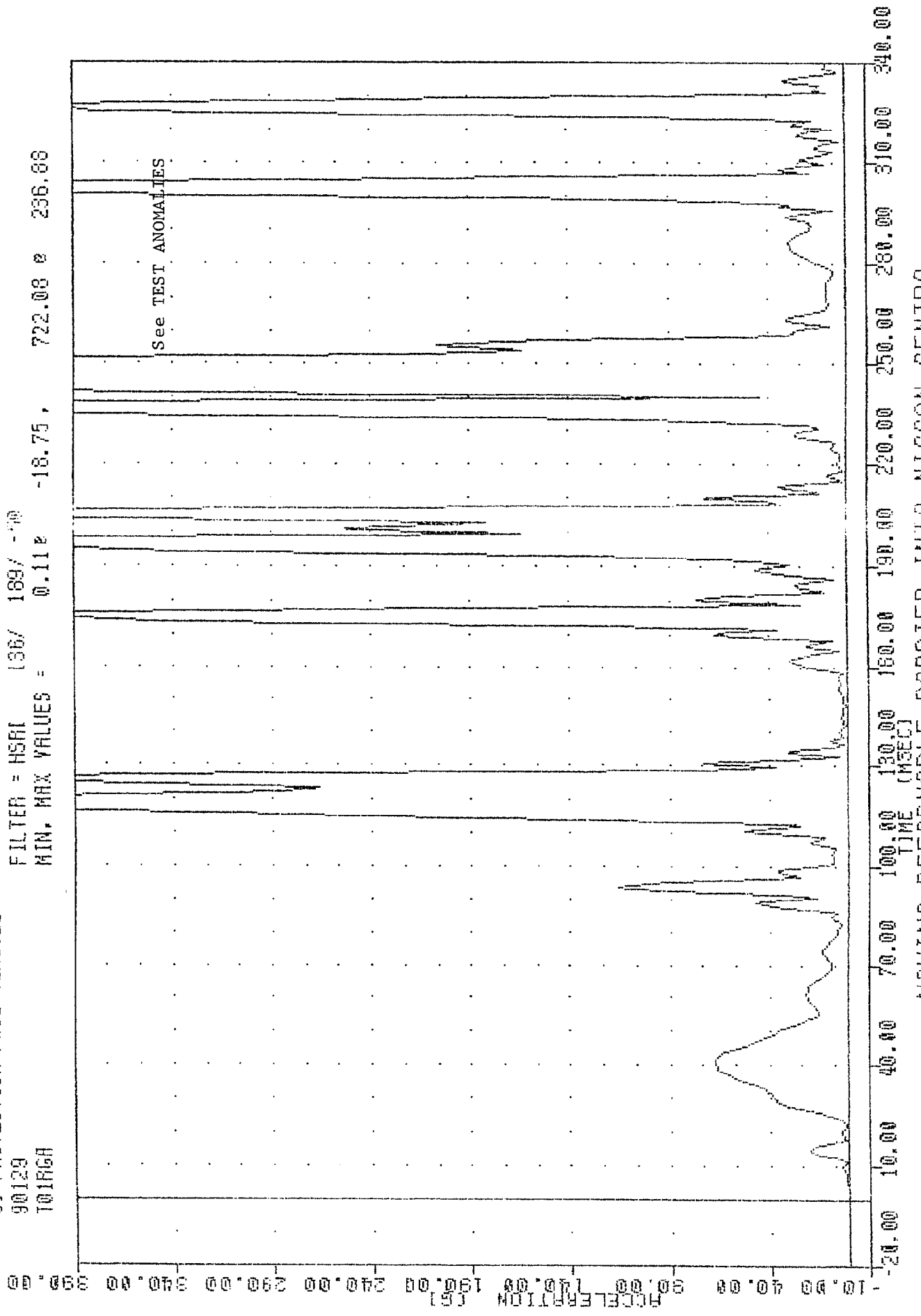


TIME (msec)

MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER UPPER SPINE RESULTANT ACCELERATION

7816
 SI PROTECTION PROD VEHICLE
 90129
 T01RGA

FILTER = HSRI 136/ 189/ -10
 MIN. MAX VALUES = 0.112 -18.75, 722.08 236.88



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 DRIVER UPPER SPINE REDUNDANT RESULTANT ACCELERATION

SI PROTECTION FROM VEHICLE

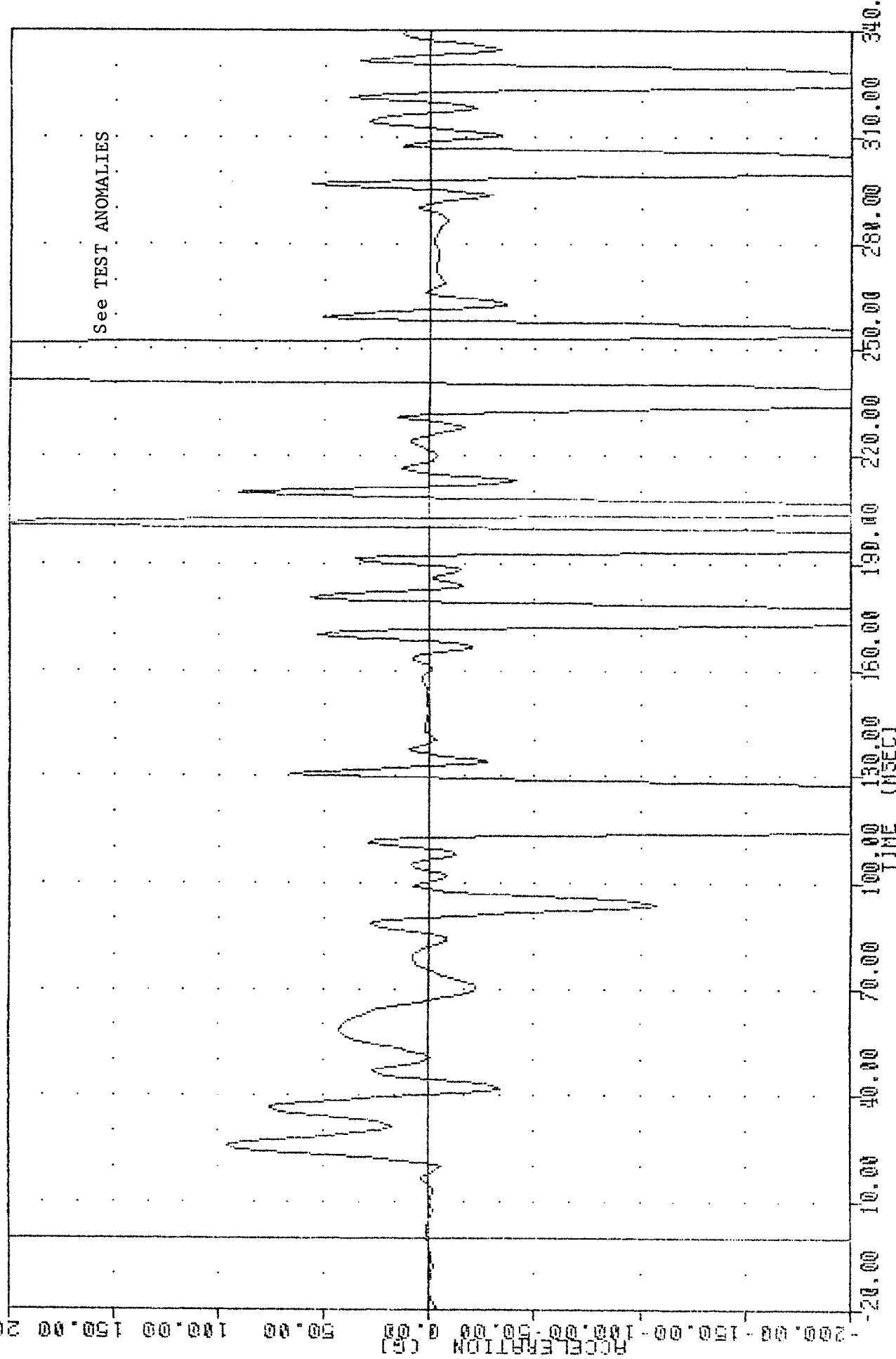
90129

LURY61

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -846.81e 236.88 , 782.46 e 249.38

ACCELERATION (G)



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT UPPER THORAX RIB Y AXIS ACCELERATION

DATE: 12/06/03

SI PROTECTION PHOD VEHICLE

90129

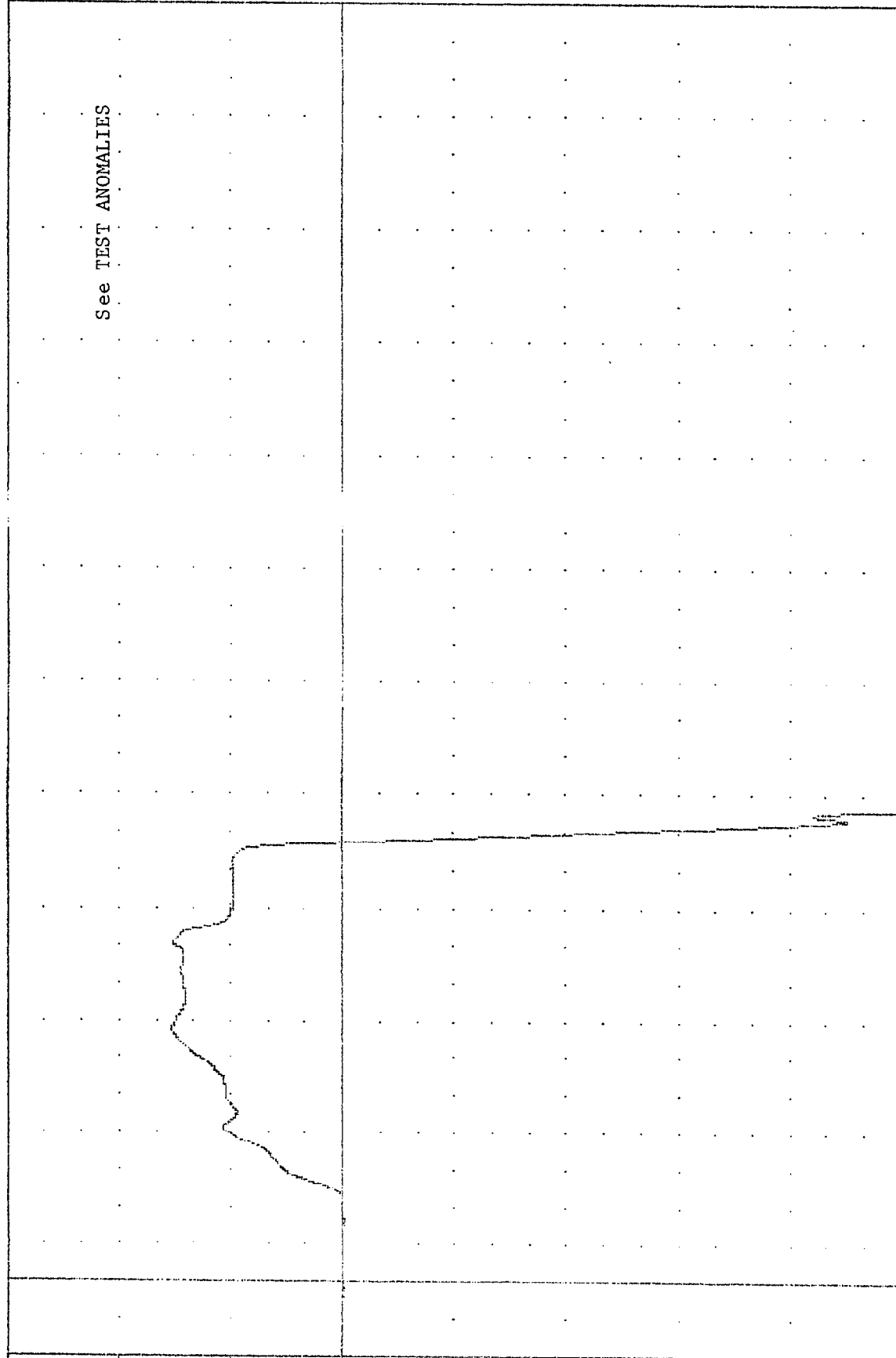
LURYV1

FILTER = BLFF 300/ 949/ -40

MIN. MAX VALUES = -361.200 241.50

30.46 0 67.50

VELOCITY (MPH)



TIME (msec)

MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT UPPER THORAX RIB : AXIS VELOCITY

SI PROTECTION PROD VEHICLE

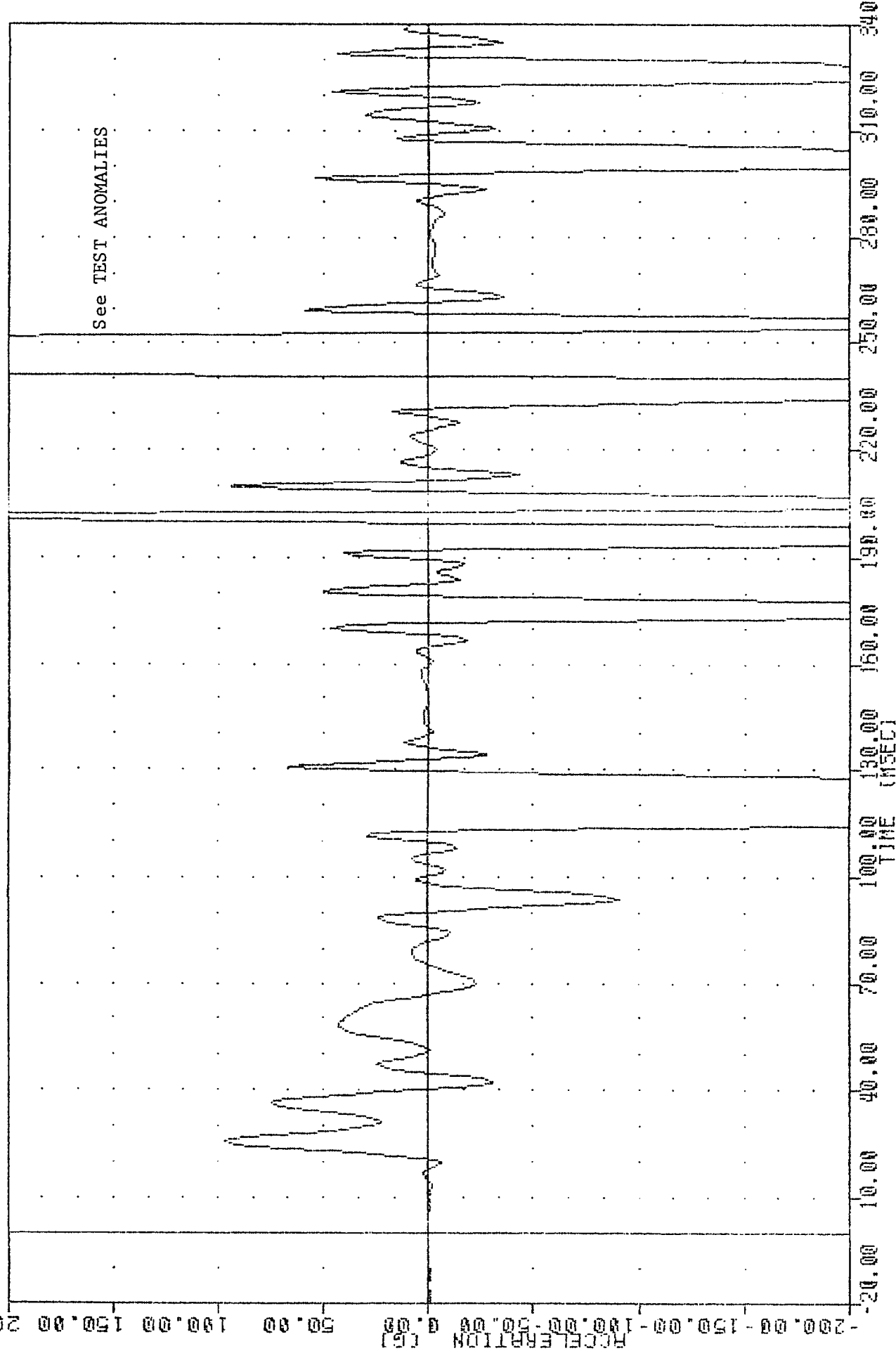
90129

LURY68

FILTER = HSR1 136/ 189/ -50

MIN. MAX VALUES = -838.98 237.50

779.84 243.75

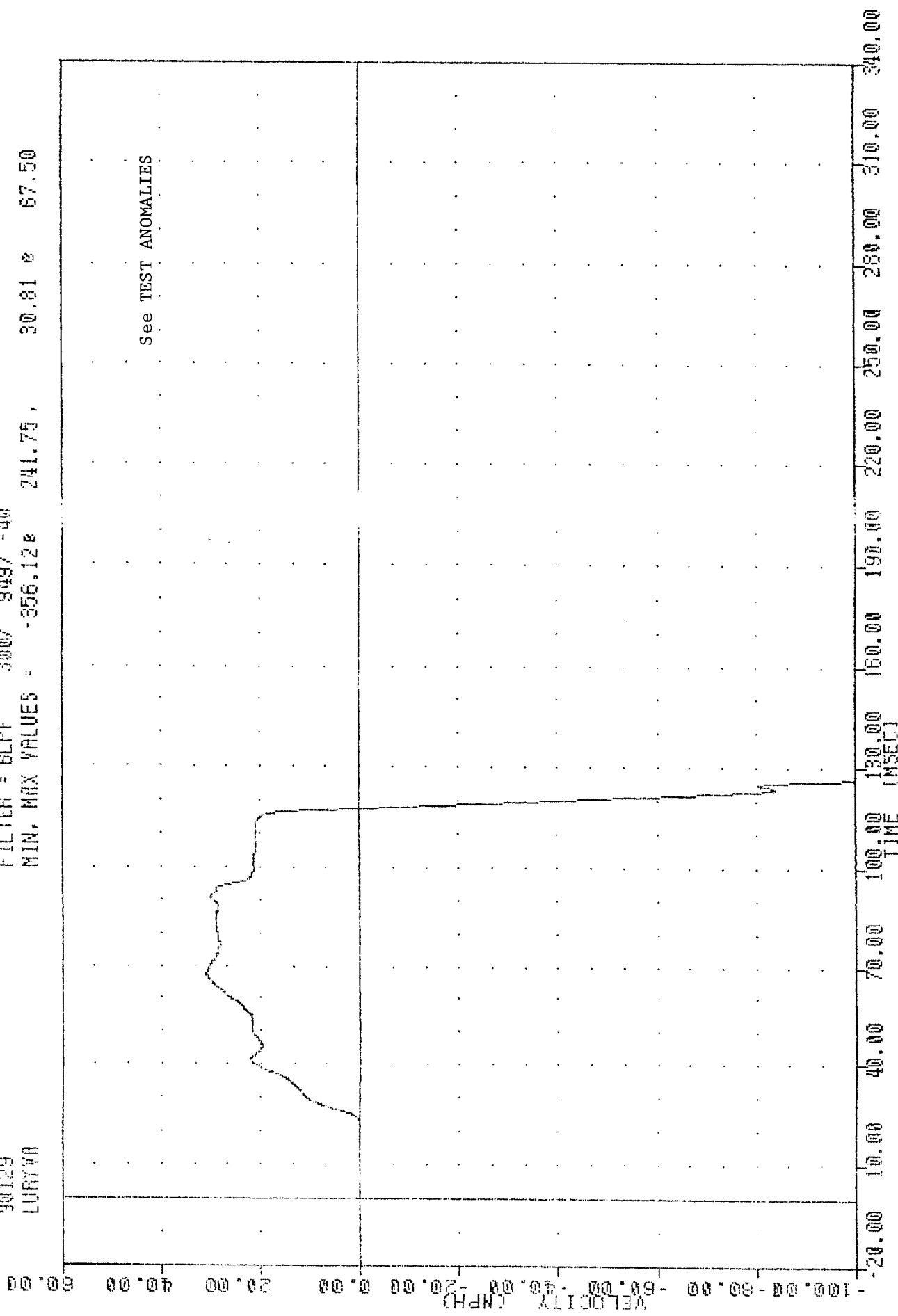


MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA

DRIVER LEFT UPPER THORAX A18 Y AXIS REDUNDANT ACCELERATION

90129
 SI PROTECTION PROO VEHICLE
 LURYVA

FILTER = 6LPP 3000/ 949/ -40
 MIN. MAX VALUES = -356.12e 241.75, 30.81 e 67.50



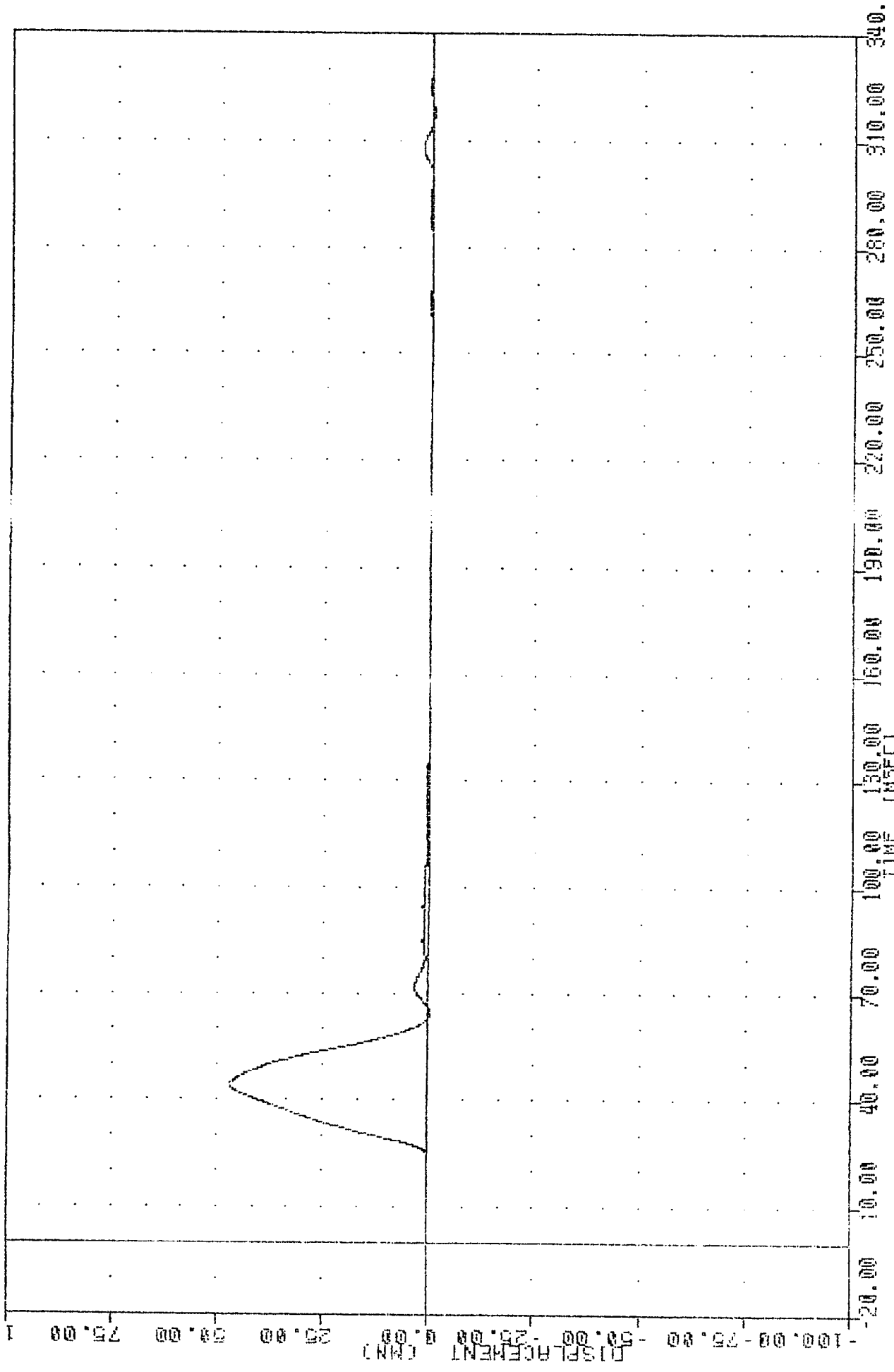
MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 DRIVER LEFT UPPER THORAX RIB Y AXIS REDUNDANT VELOCITY

SI PROTECTION PROD VEHICLE

90129
LURYD1

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -0.420

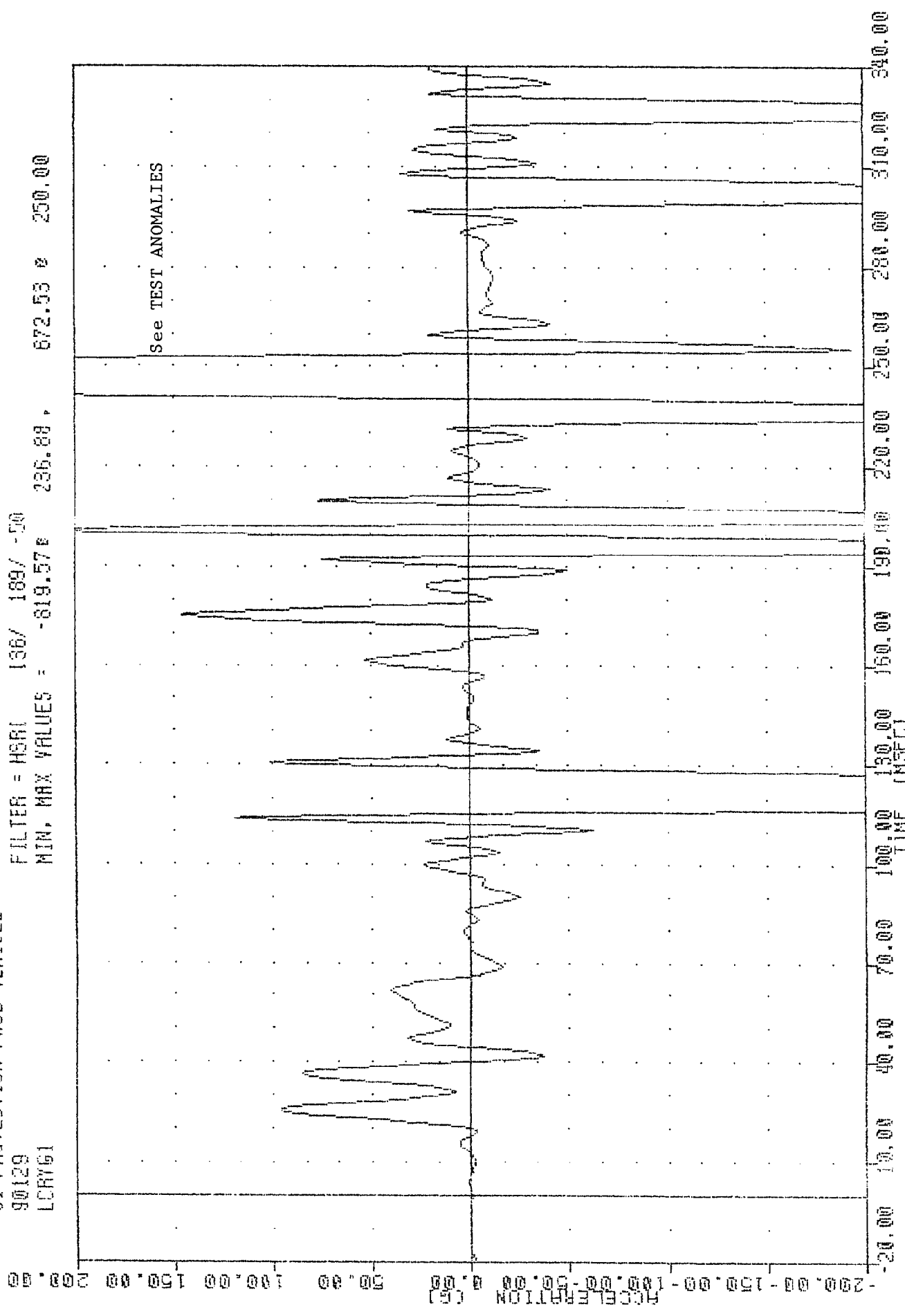
64.38. 46.71 0 44.13



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT UPPER THORAX AIR DISPLACEMENT

900509
 SI PROTECTION PROD VEHICLE
 90129
 LCRY61

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -819.57 236.88 672.53 250.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 DRIVER LEFT CENTER THORAX RIB Y AXIS ACCELERATION

31 PROTECTION PASS VEHICLE

30129

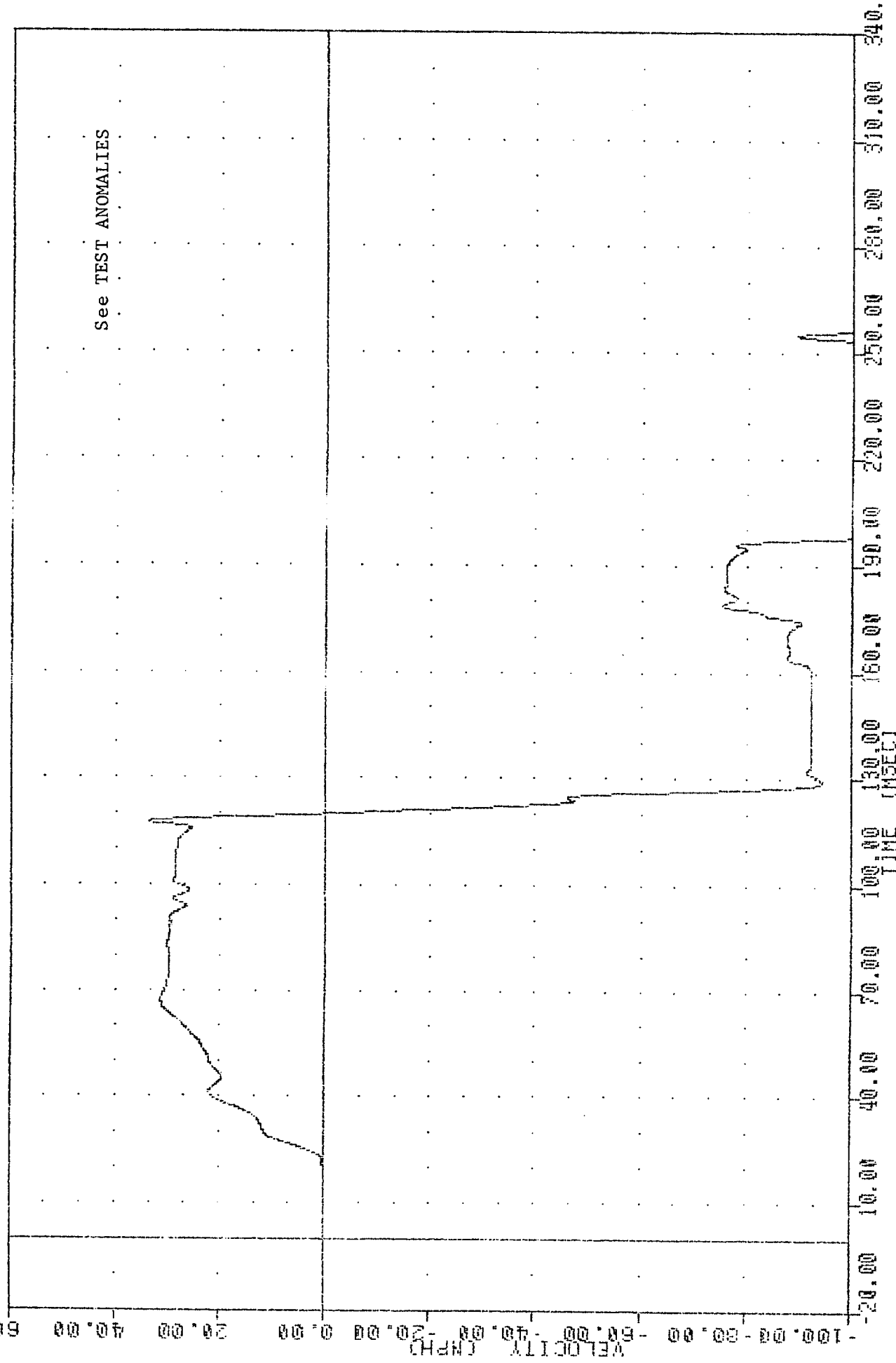
LCRYV1

FILTER = BLPF

300/ 949/ -40

MIN. MAX VALUES = -246.58 241.25

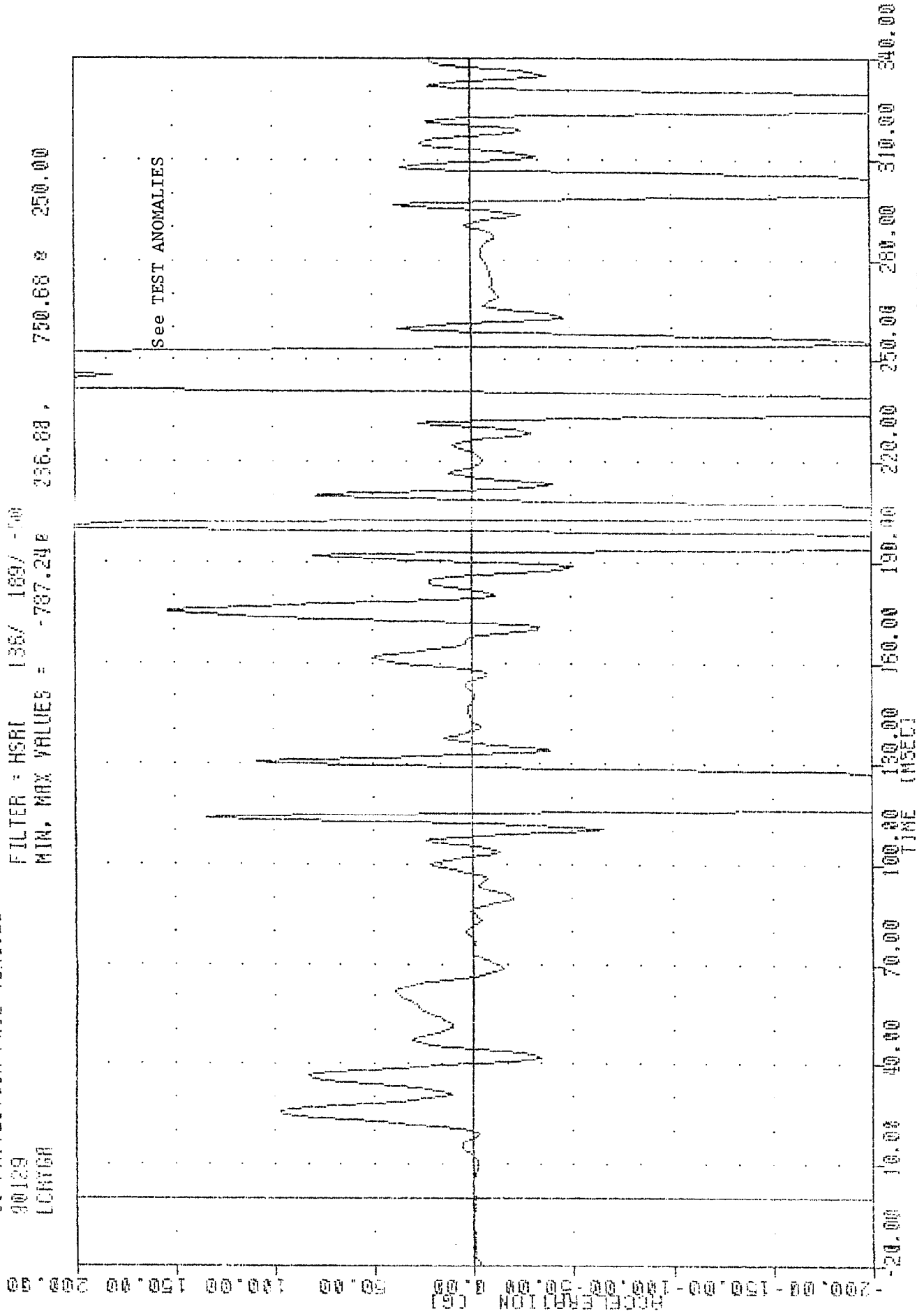
33.60 117.50



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT CENTER THORAX RIB Y AXIS VELOCITY

31 PROTECTION PROD VEHICLE
 00129
 LCHYGR

FILTER = HSRI 138/ 189/ -100
 MIN. MAX VALUES = -787.248 256.88 750.68 250.00



31 PROTECTION FROM VEHICLE

90129

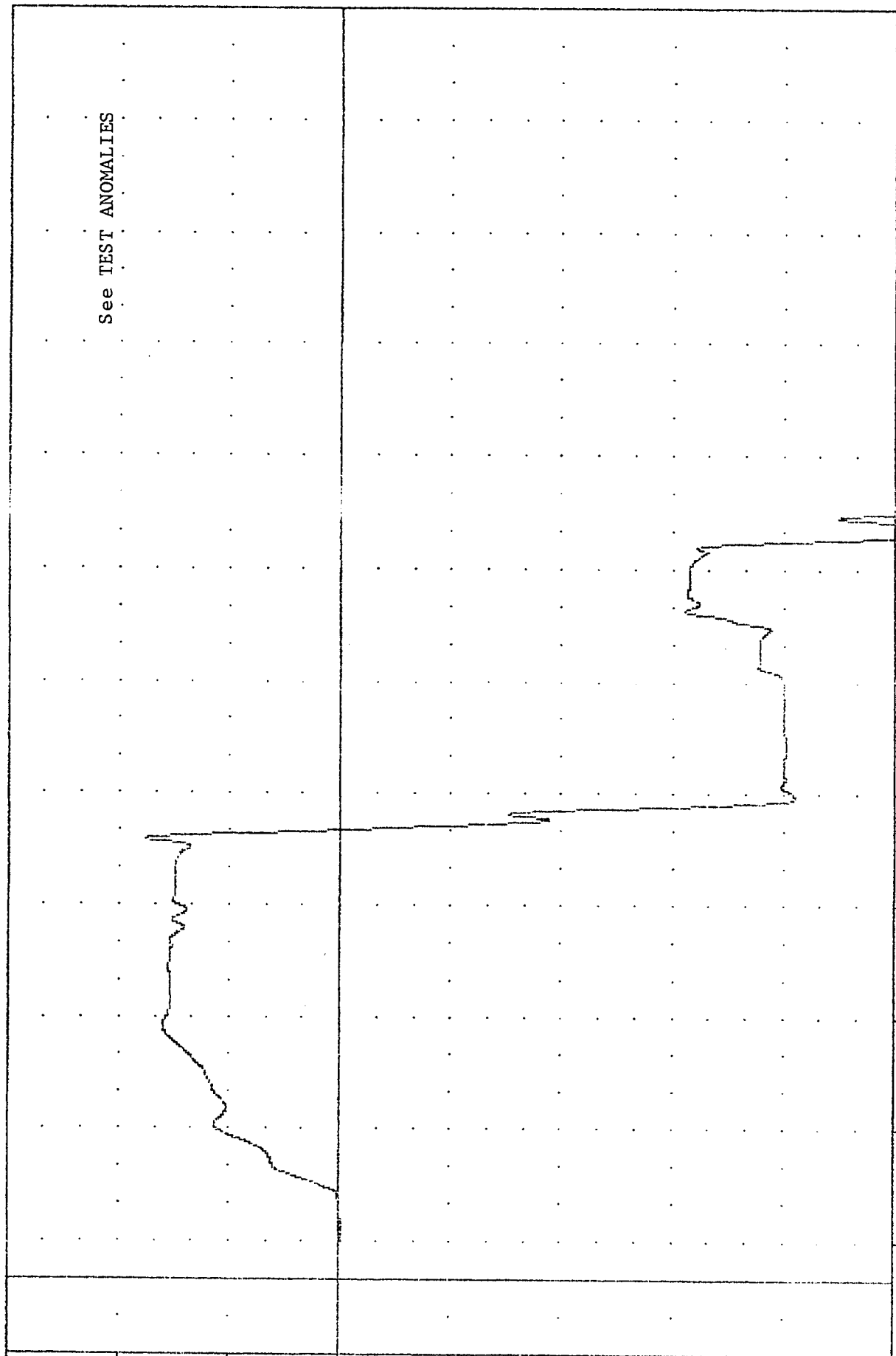
LCRYA

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -254.97 139.63

35.27 2 117.50

VELOCITY (MPH)

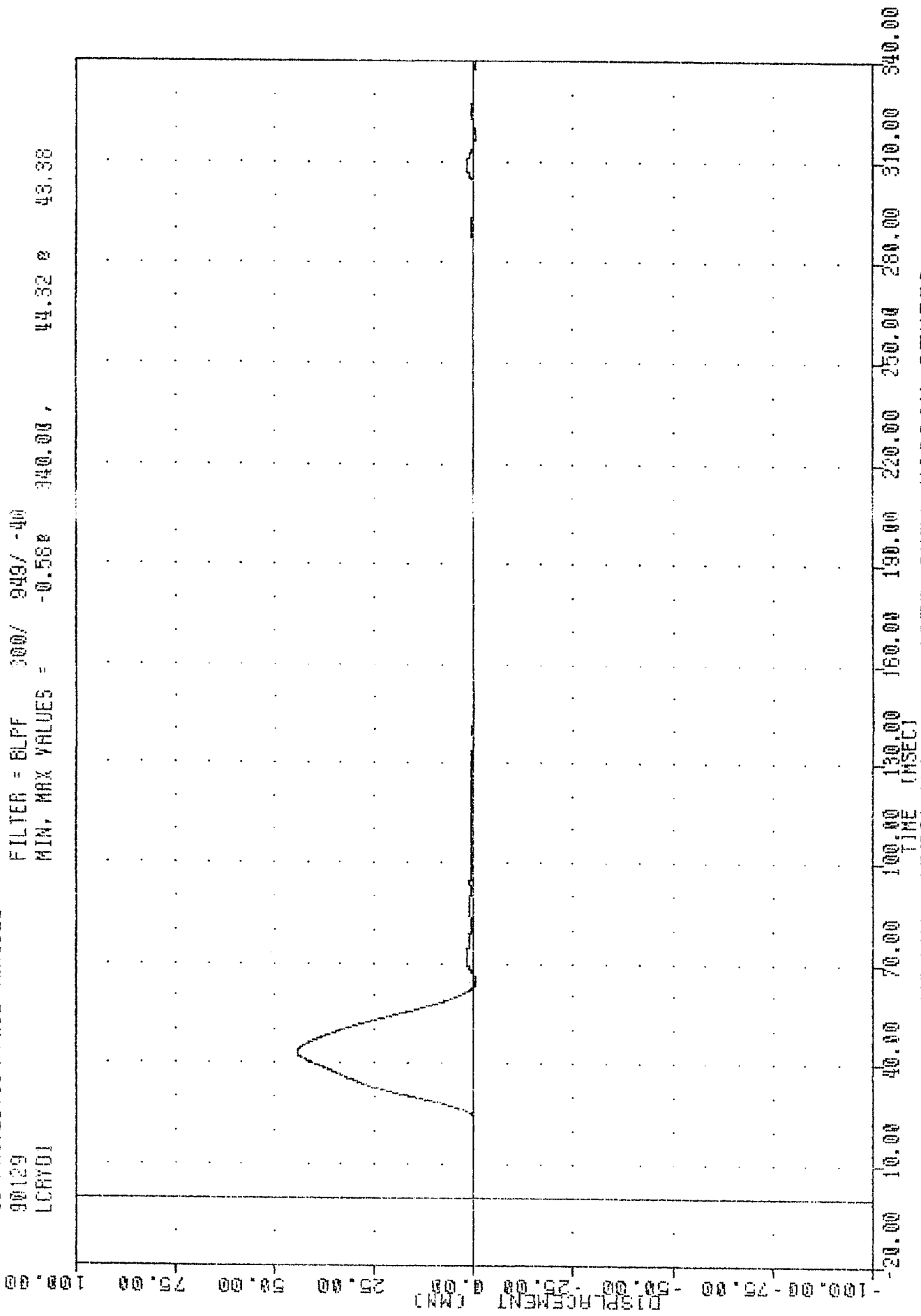


TIME (MSEC)

MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT CENTER THORAX RIB Y AXIS REDUNDANT VELOCITY

3010 , 900503
 SI PROTECTION PROD VEHICLE
 90129
 LCRY01

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -0.562 340.00 , 44.32 2 43.38



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 DRIVER LEFT CENTER THORAX AIB DISPLACEMENT

31 PROTECTION FROM VEHICLE

80129

LL8Y61

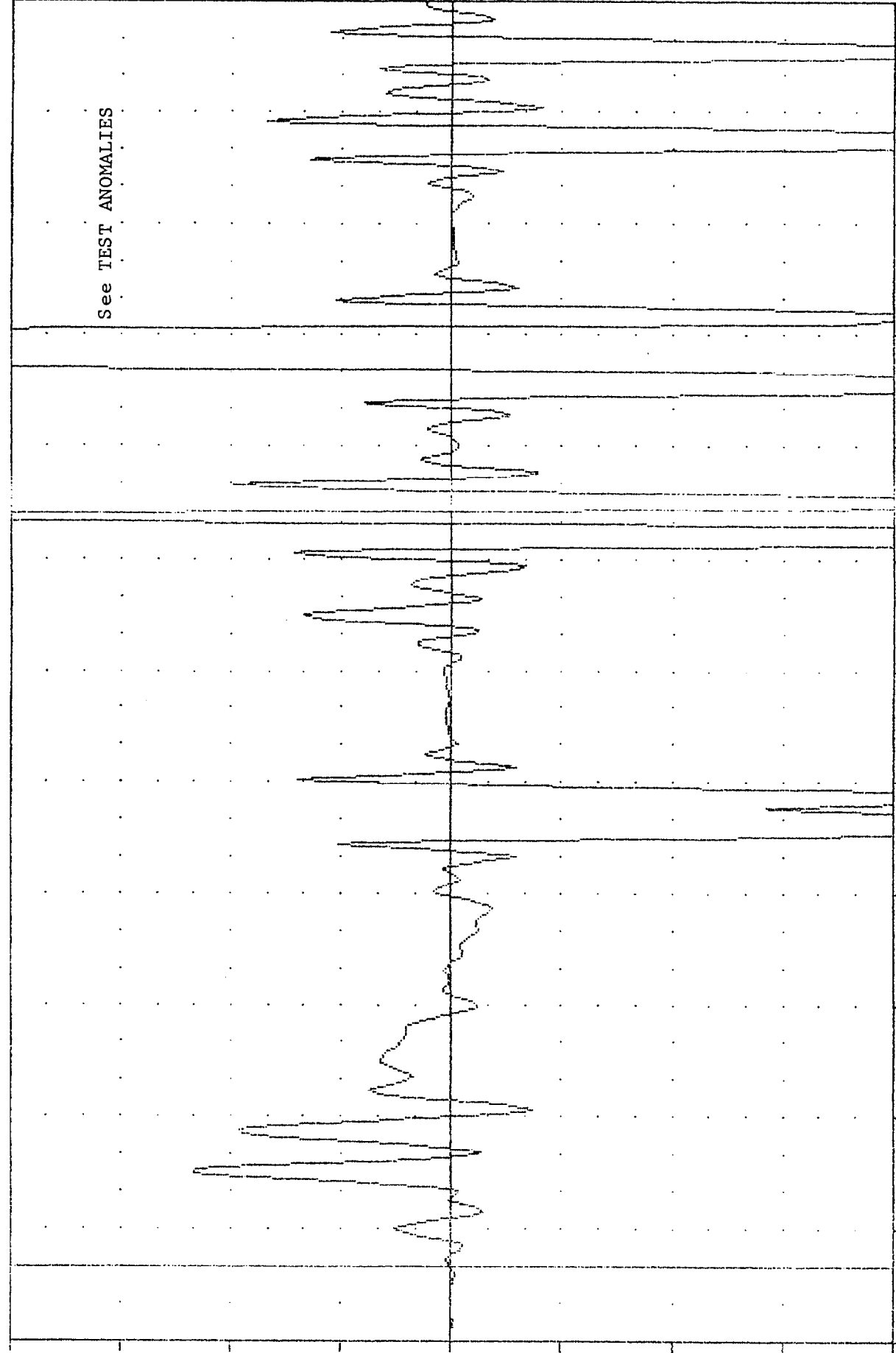
FILTER = HSRC

136/ 189/ -50

MIN. MAX VALUES = -799.38 237.50

775.05 248.75

ACCELERATION (G)



200.00 150.00 100.00 50.00 0.00 -50.00 -100.00 -150.00 -200.00

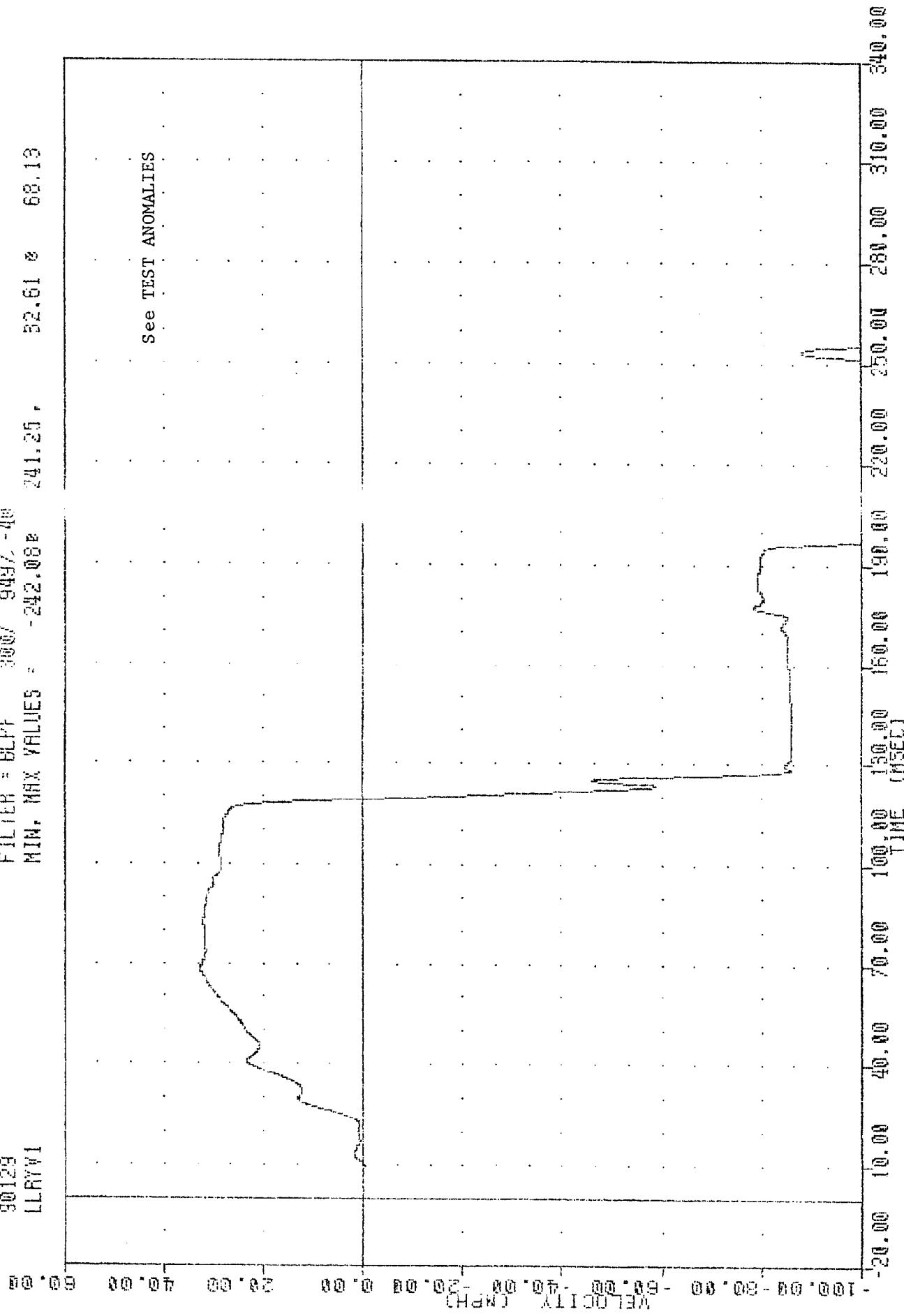
TIME (INSEC)

-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 NISSAN SENTRA
DRIVER LEFT LOWER THORAX RIB Y AXIS ACCELERATION

FILE # 3000003
SI PROTECTION PROO VEHICLE
90129
LLRYV1

FILTER = BLPF 300/ 949/-40
MIN. MAX VALUES = -242.000 241.25, 32.61 68.13



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT LOWER THORAX RIB Y AXIS VELOCITY

SI PROTECTION FROM VEHICLE

30129

LLRYGA

FILTER = HSRL

136/ 189/ -50

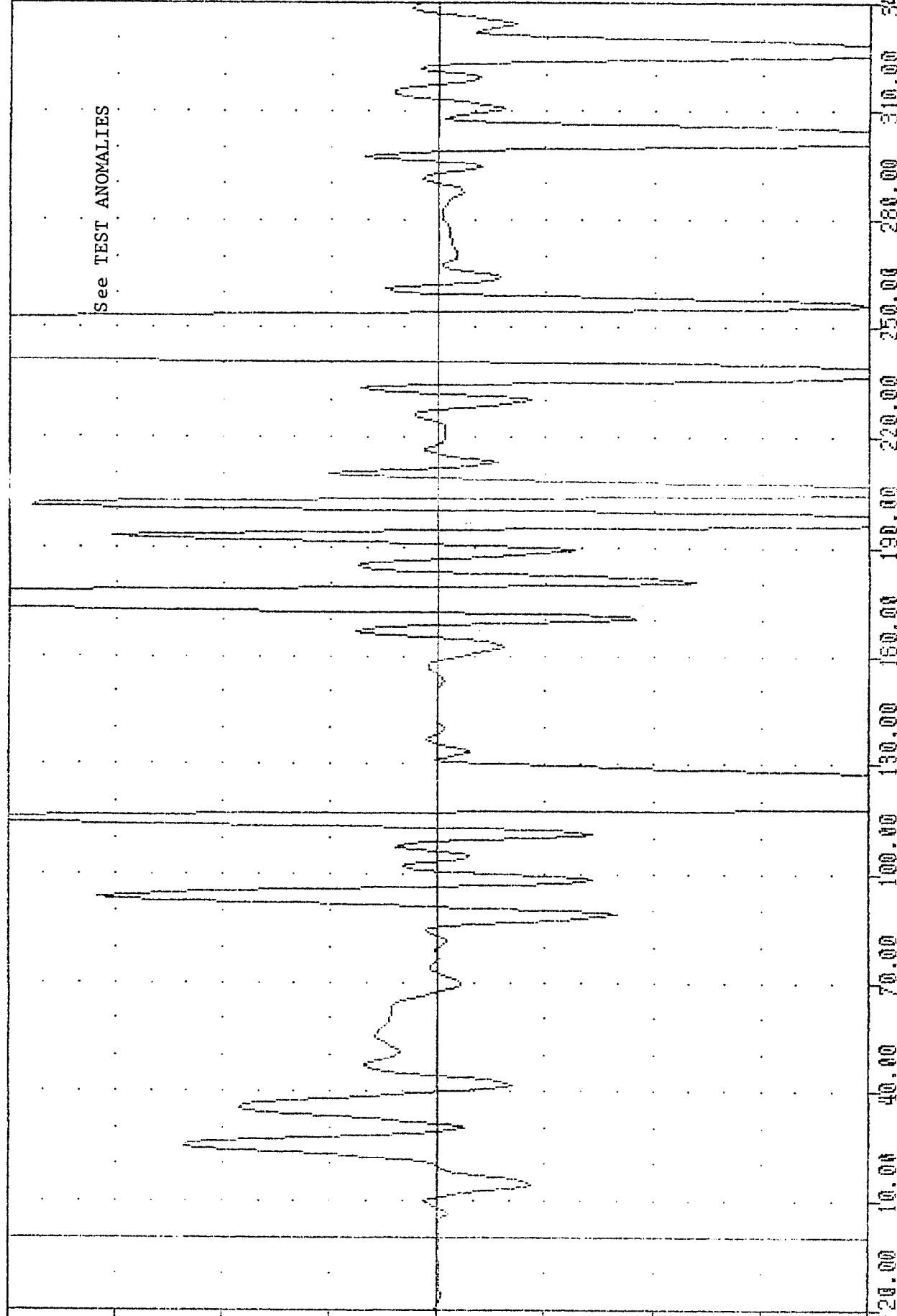
MIN, MAX VALUES =

-453.87%

120.00,

559.92 @ 250.00

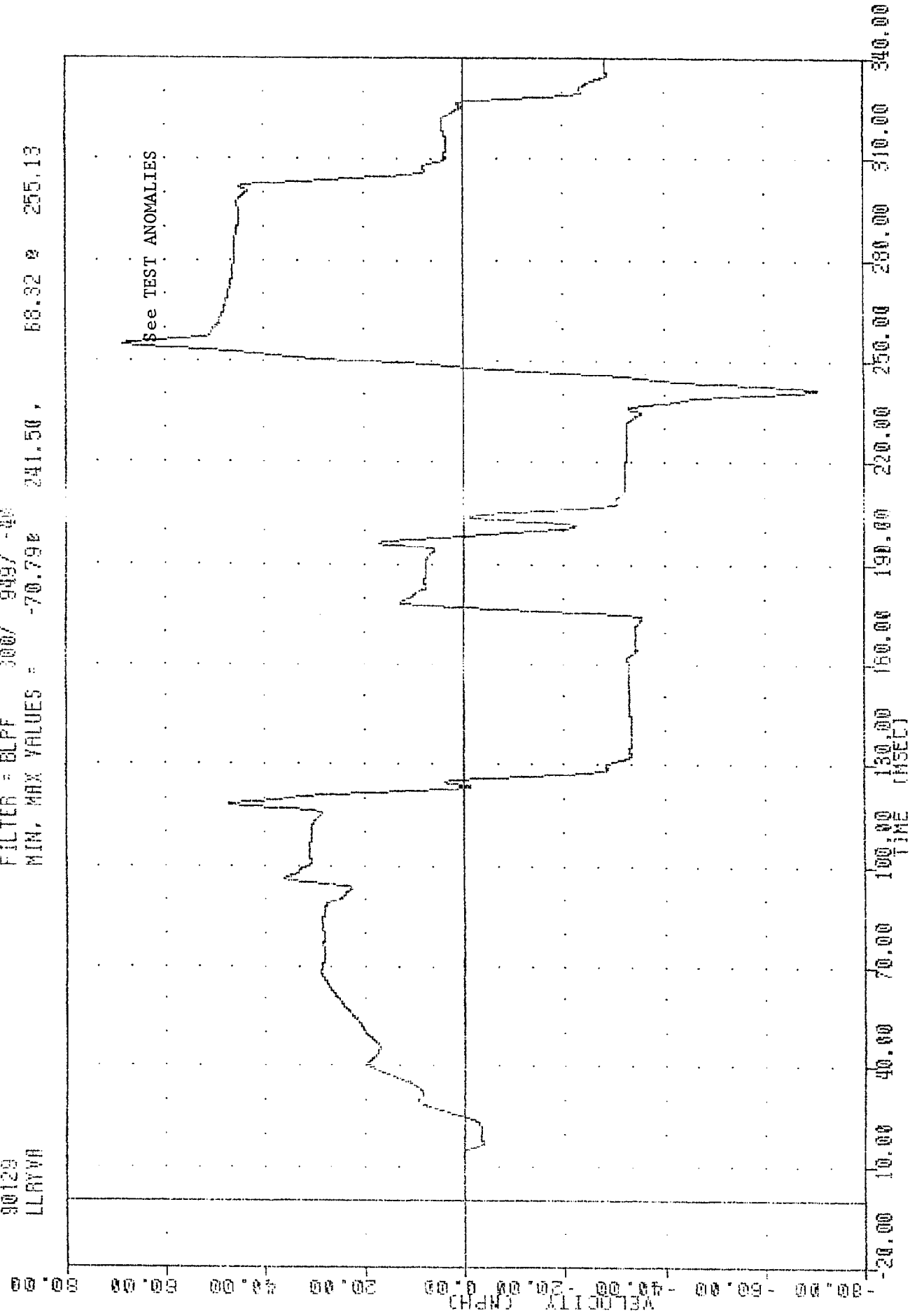
ACCELERATION (G)



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT LOWER THORAX RIB Y AXIS REDUNDANT ACCELERATION

3800003
 SI PROTECTION PROD VEHICLE
 90129
 LLRYV0

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -70.790 241.50, 58.32 255.13

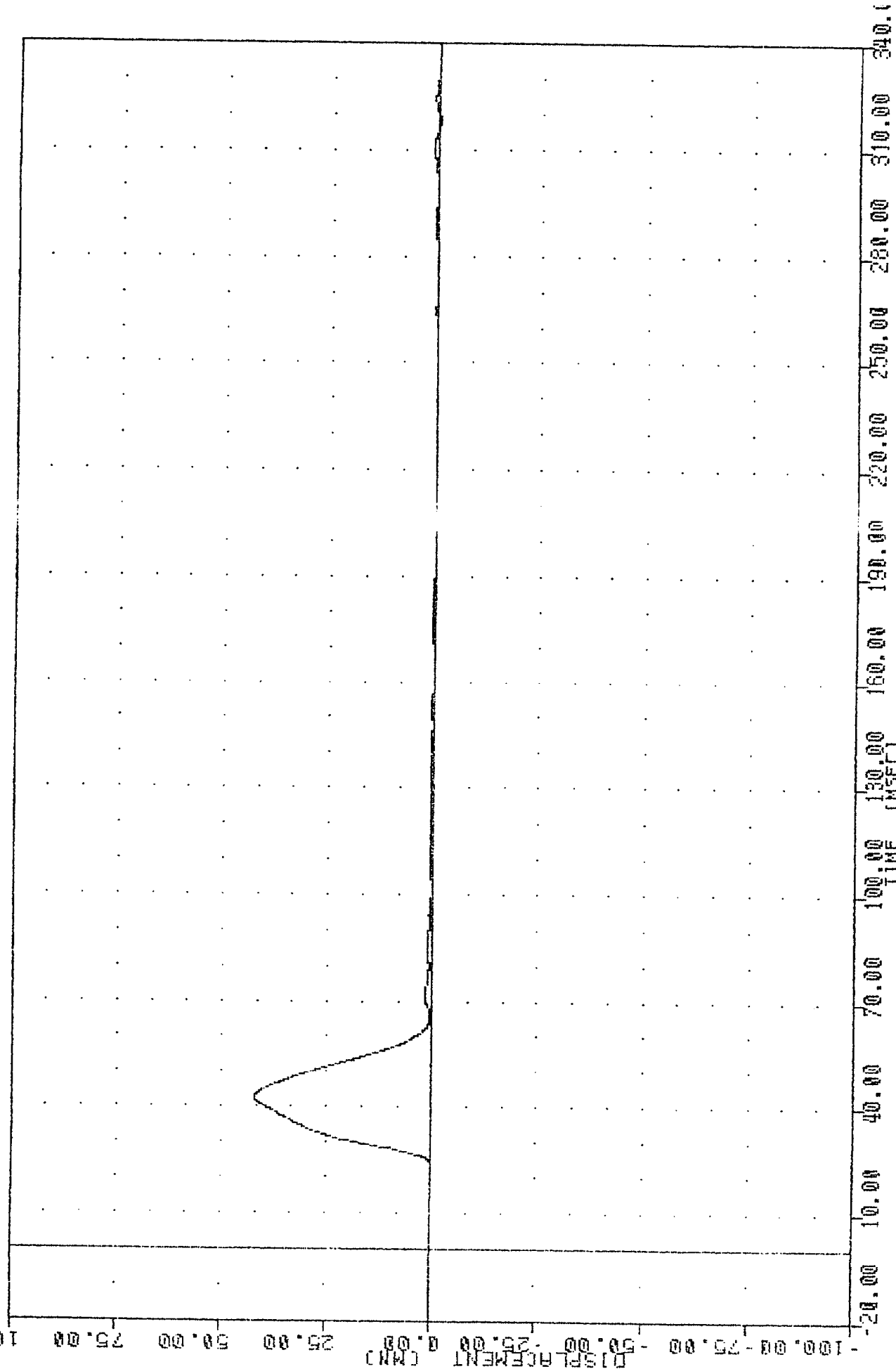


MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 DRIVER LEFT LOWER THORAX RIB Y AXIS REDUNDANT VELOCITY

SI PROTECTION PASS VEHICLE

90129
LLRYD1

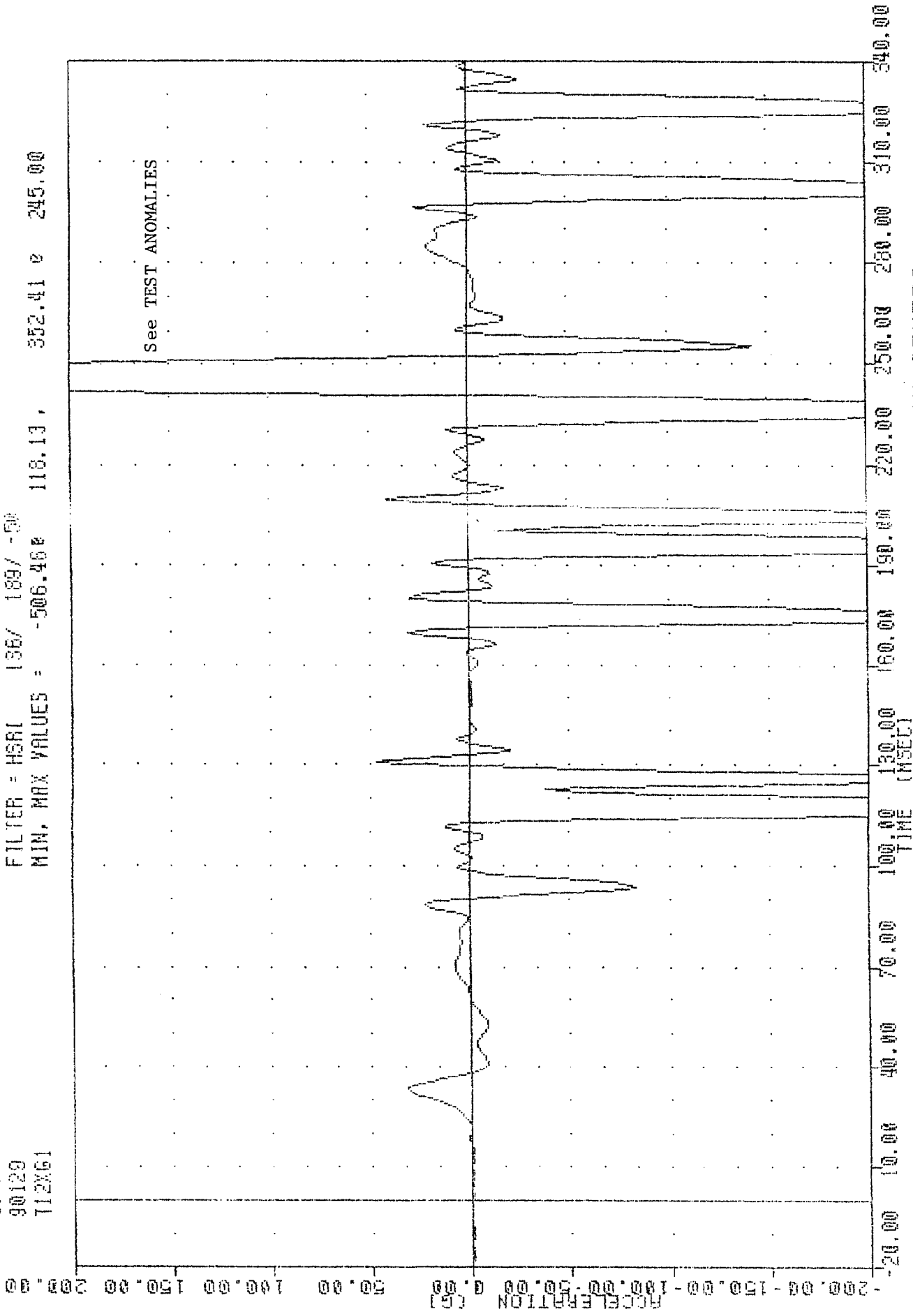
FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -0.228 318.75, 42.08 42.50



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT LOWER THORAX RIB DISPLACEMENT

3810 * 500008
SI PROTECTION PROO VEHICLE
90129
T12XG1

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -506.460 118.13 , 352.41 0 245.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LOWER SPINE X AXIS ACCELERATION

31 PROJECTION FROM VEHICLE

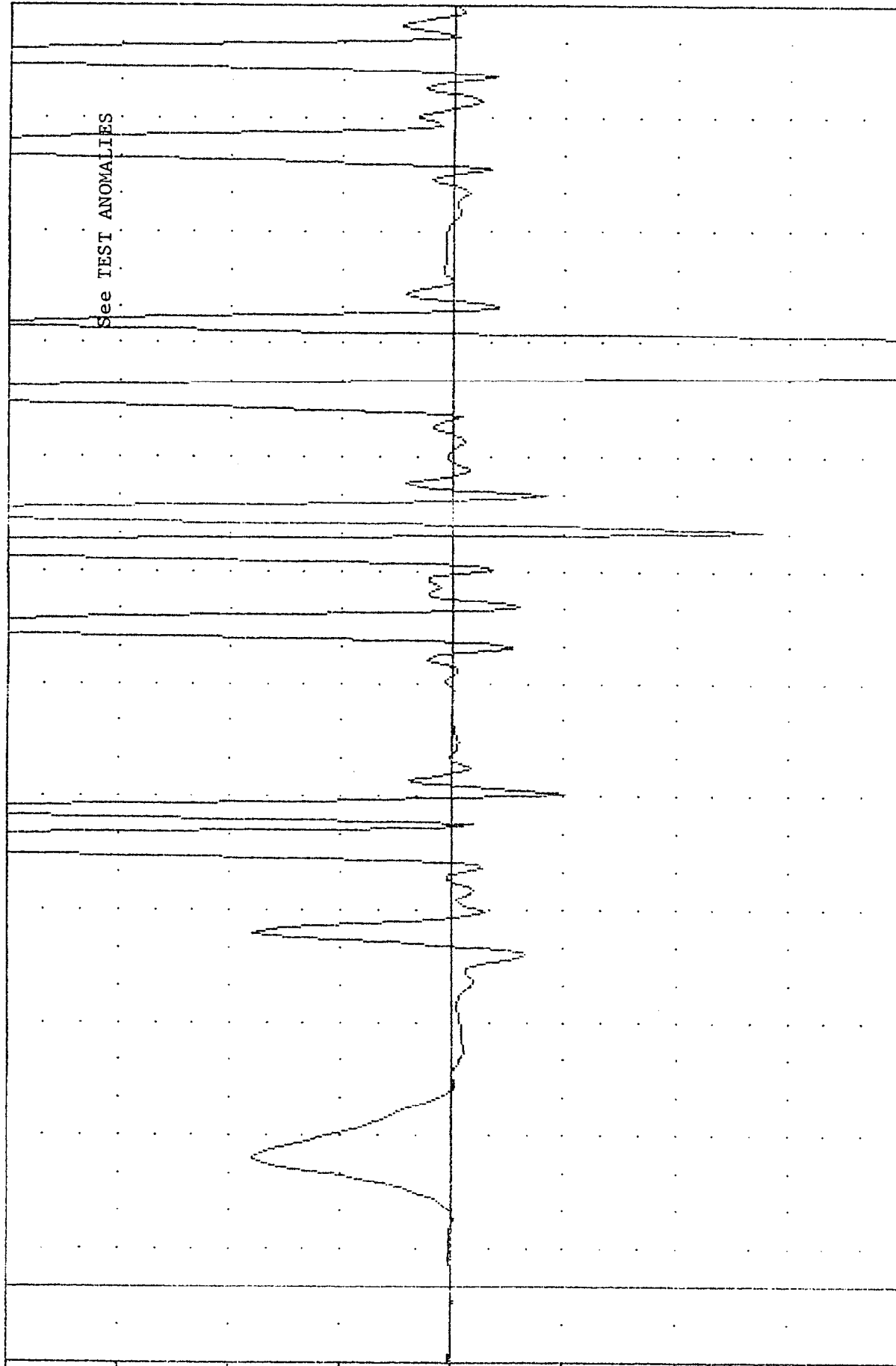
90129

T127G1

FILTER = H3R1 136/ 189/ -50

MIN, MAX VALUES = -456.42e 249.38, 500.02 e 117.50

ACCELERATION (G)



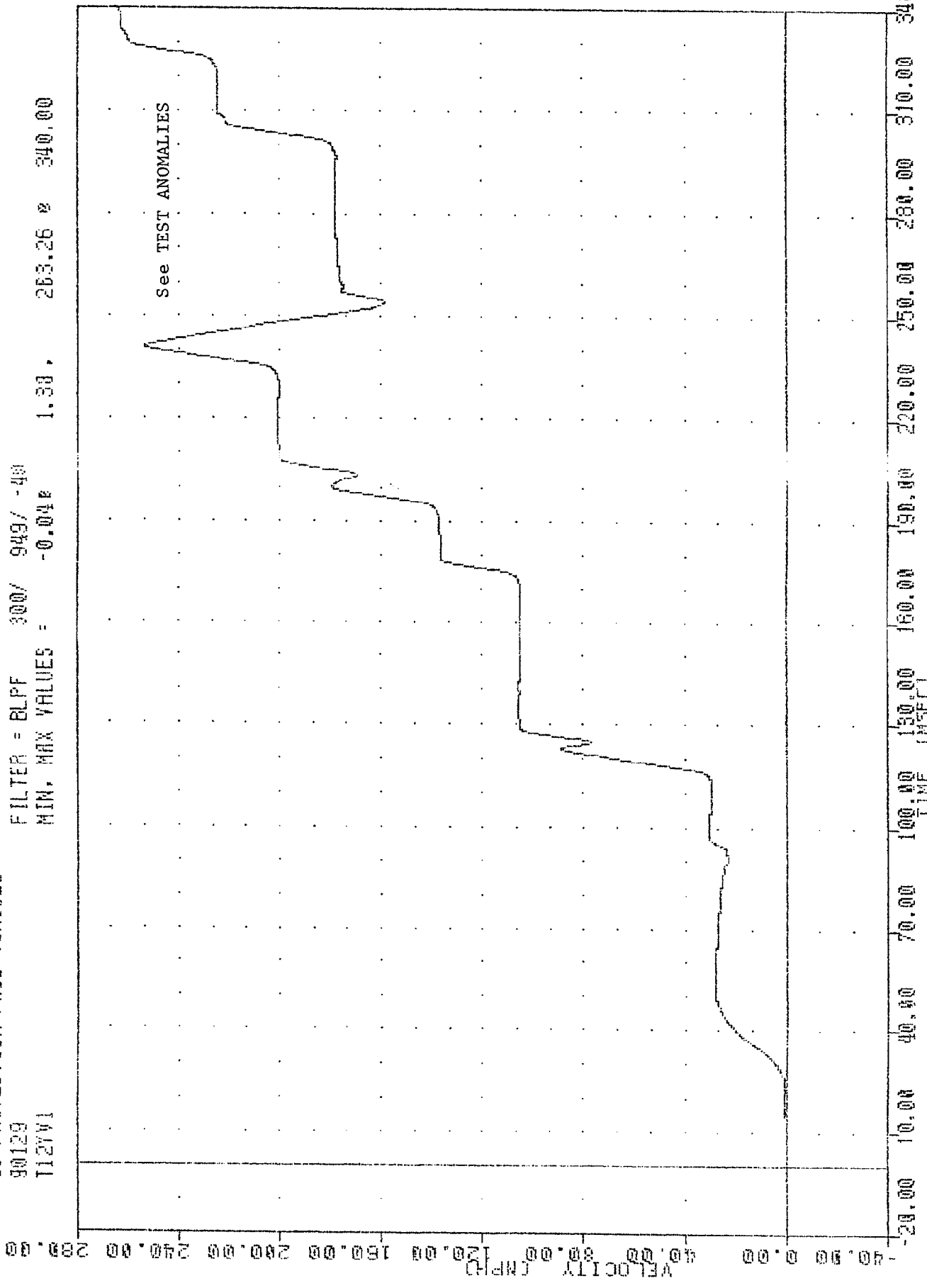
TIME (MSEC)

MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LOWER SPINE Y AXIS ACCELERATION

90129
 SI PROTECTION PROD VEHICLE
 90129
 T12YV1

900509

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -0.04 1.38 253.26 340.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 DRIVER LOWER SPINE Y AXIS VELOCITY

31 PROTECTION FROM VEHICLE

90129

T12YGA

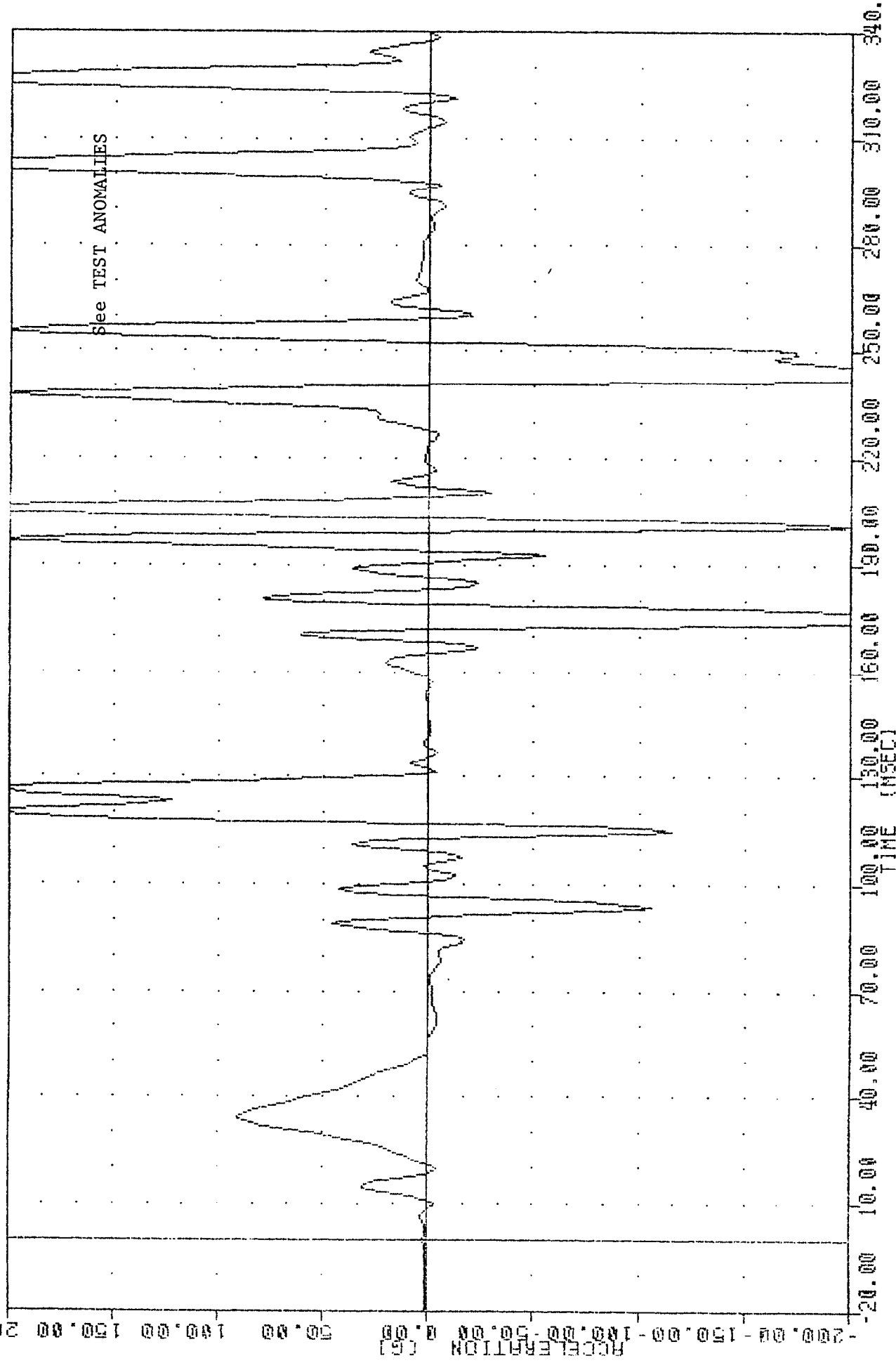
FILTER = HSRI

136/ 189/ -5m

MIN. MAX VALUES = -330.20

175.00

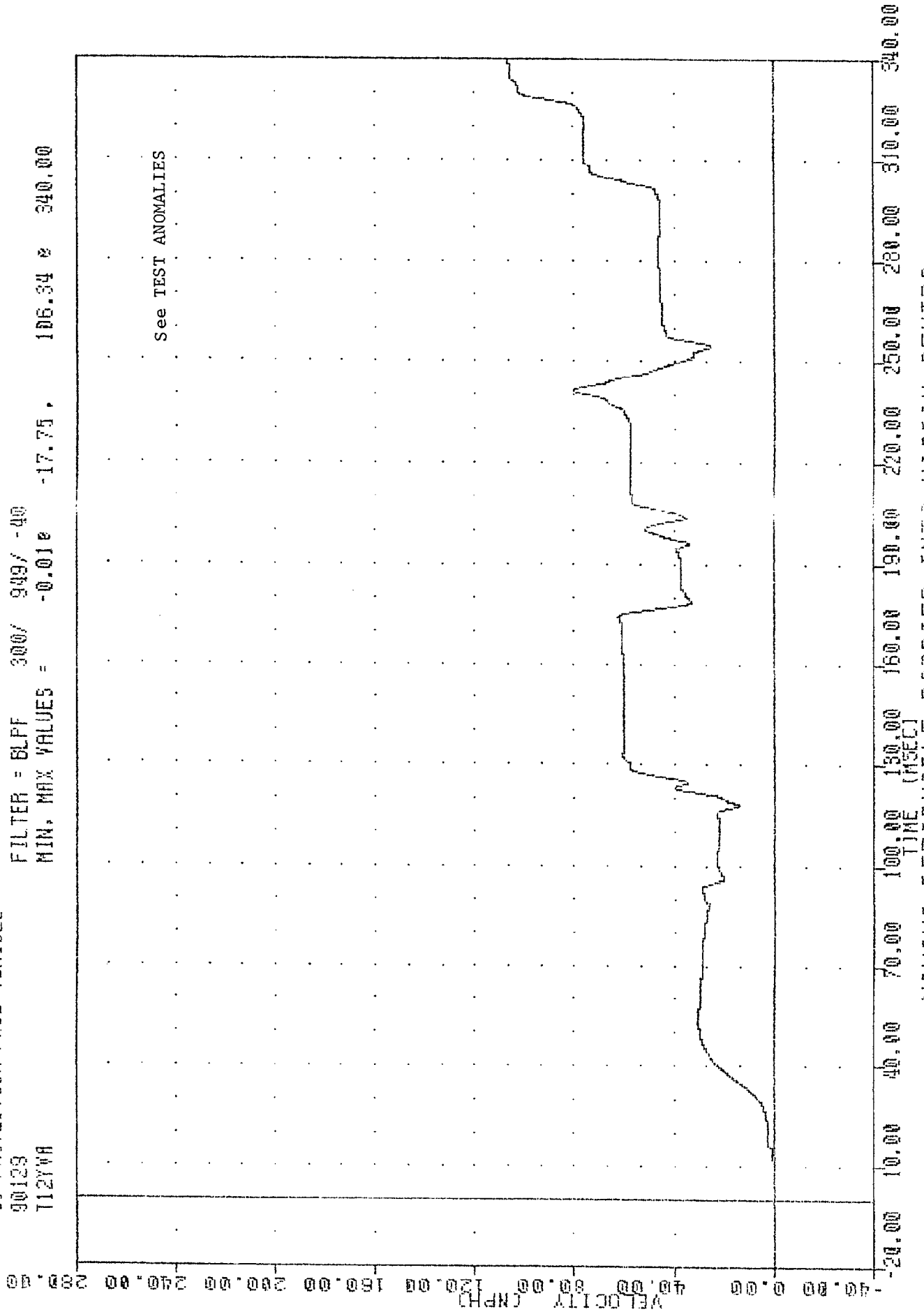
268.43 @ 326.68



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LOWER SPINE Y AXIS REDUNDANT ACCELERATION

WHIC , 500509
 SI PROTECTION PROD VEHICLE
 90123
 T12YVA

FILTER = 5LFF 300/ 949/ -40
 MIN. MAX VALUES = -0.01e -17.75 , 106.34 e 340.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 DRIVER LOWER SPINE Y AXIS REDUNDANT VELOCITY

31 PROJECTION FROM VEHICLE

90129

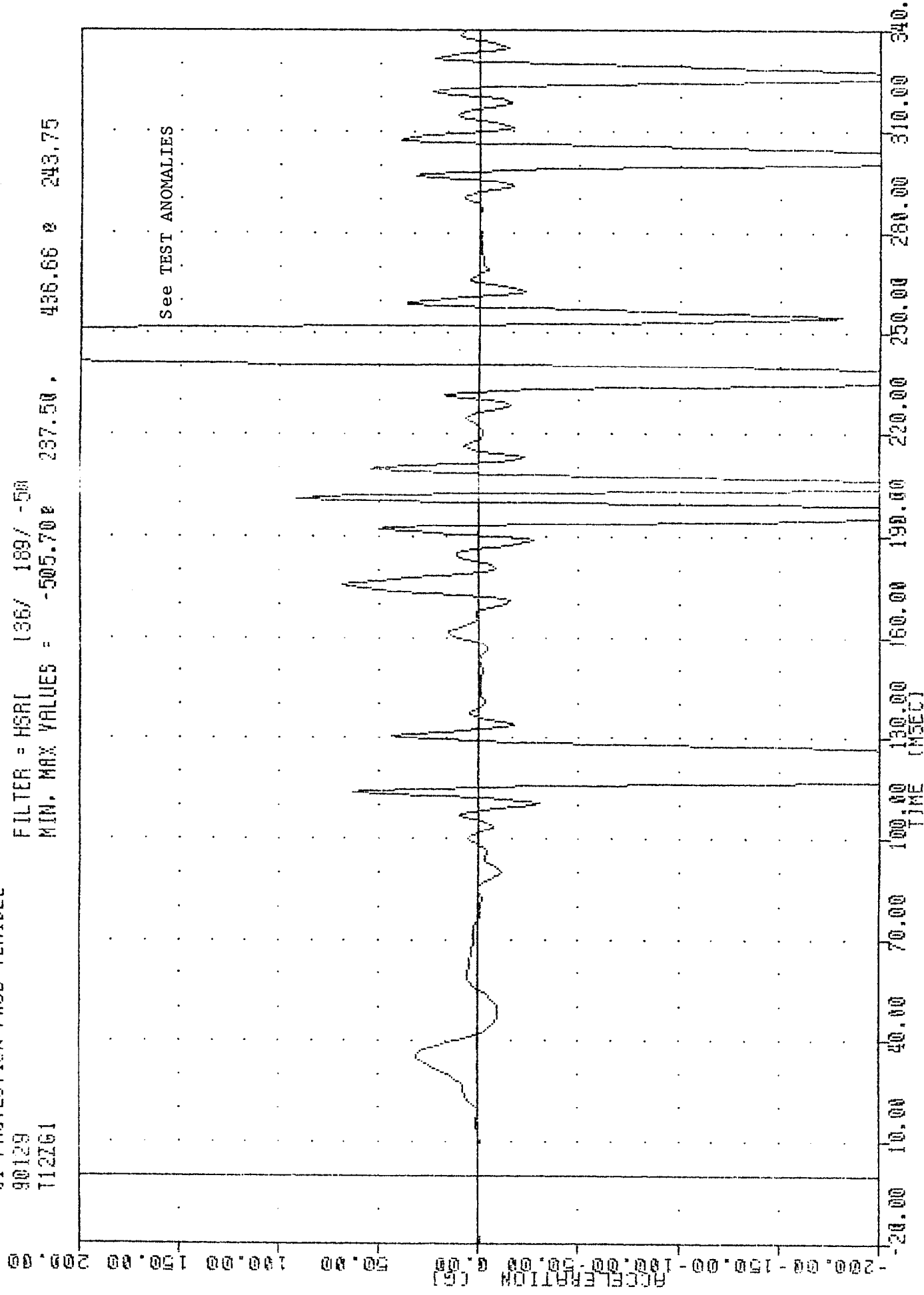
112261

FILTER = HSRI

136/ 189/ -50

MIN. MAX VALUES = -505.70 237.50

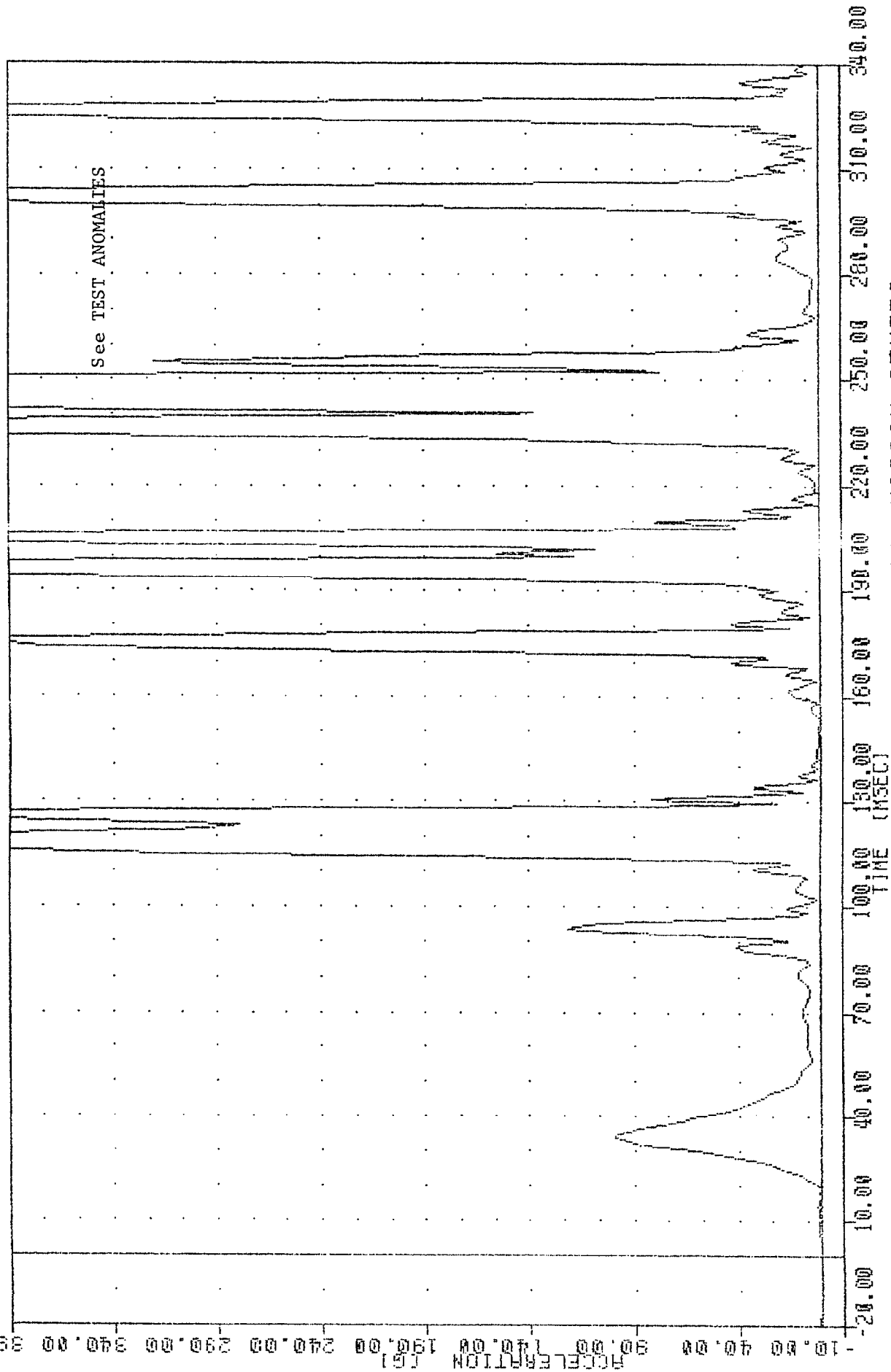
436.66 243.75



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LOWER SPINE Z AXIS ACCELERATION

SI PROTECTION PROD VEHICLE
90129
712561

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -1.88, 841.30 g 238.68



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LOWER SPINE RESULTANT ACCELERATION

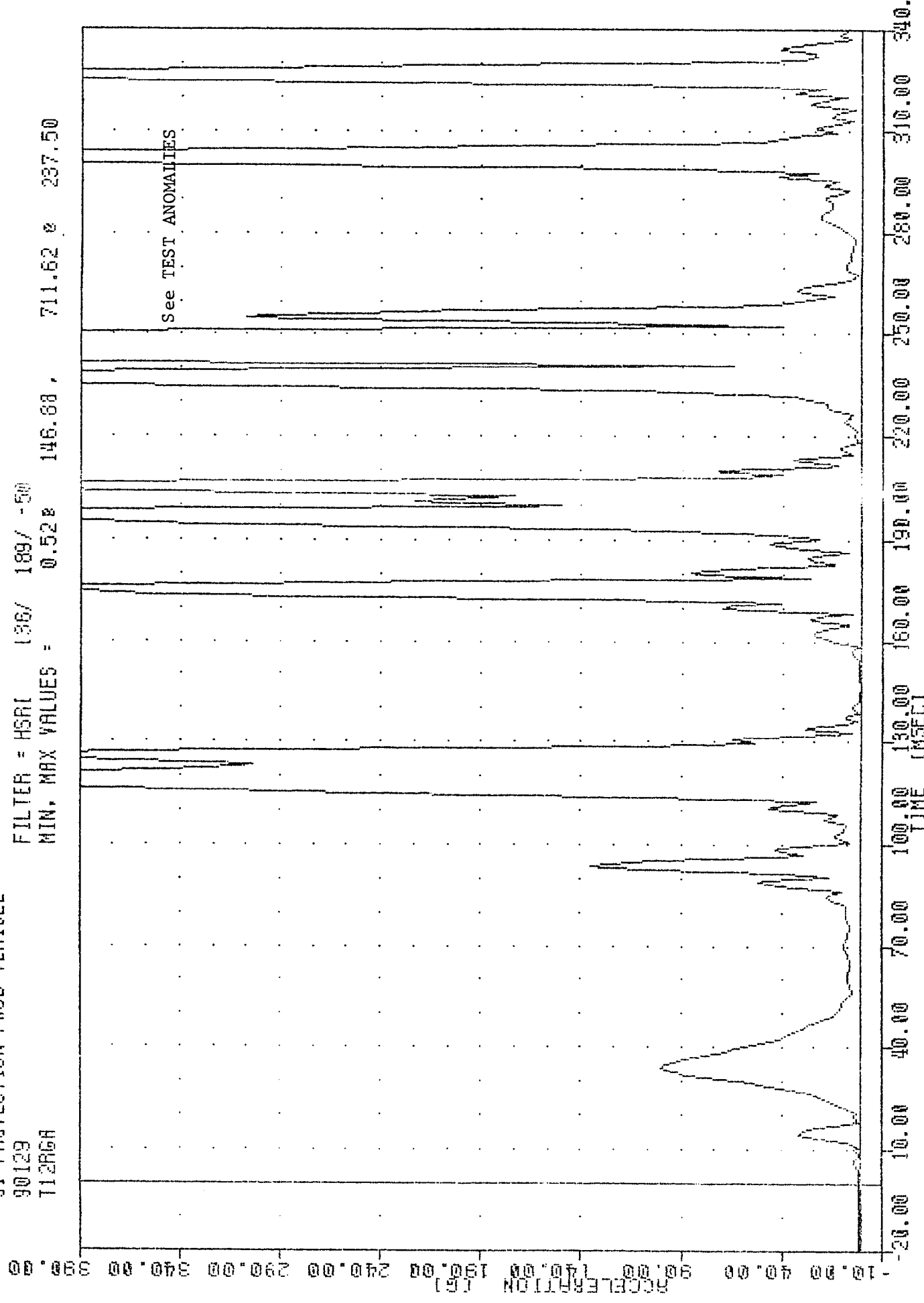
SI PROJECTION FROM VEHICLE

90129

T12RGA

FILTER = HSRI 136/ 189/ -50

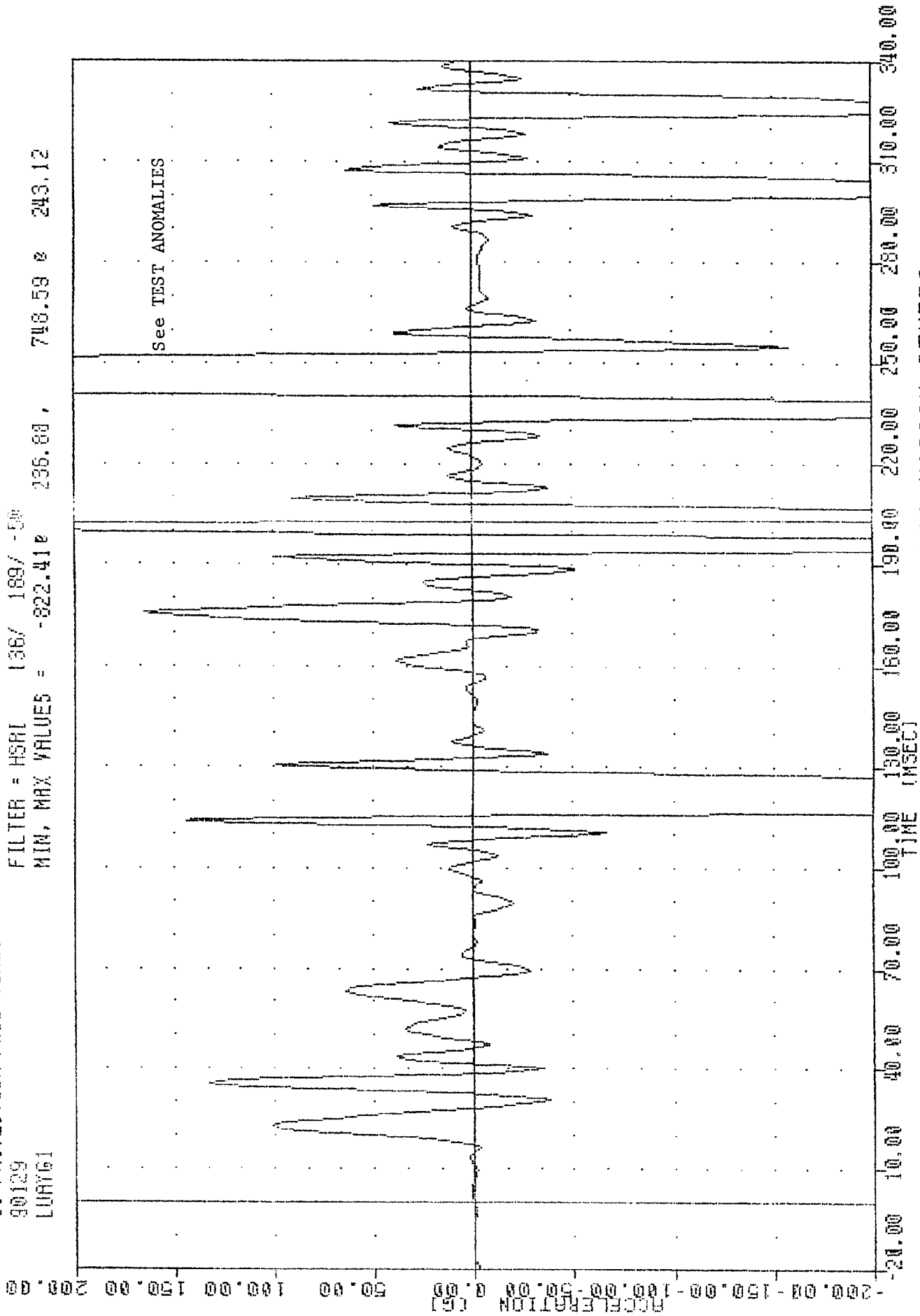
MIN. MAX VALUES = 0.528 146.88, 711.62 e 237.50



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LOWER SPINE REDUNDANT RESULTANT ACCELERATION

00000000
 SI PROTECTION PROD VEHICLE
 90129
 LUAY61

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -822.41e 236.80, 748.58 @ 243.12



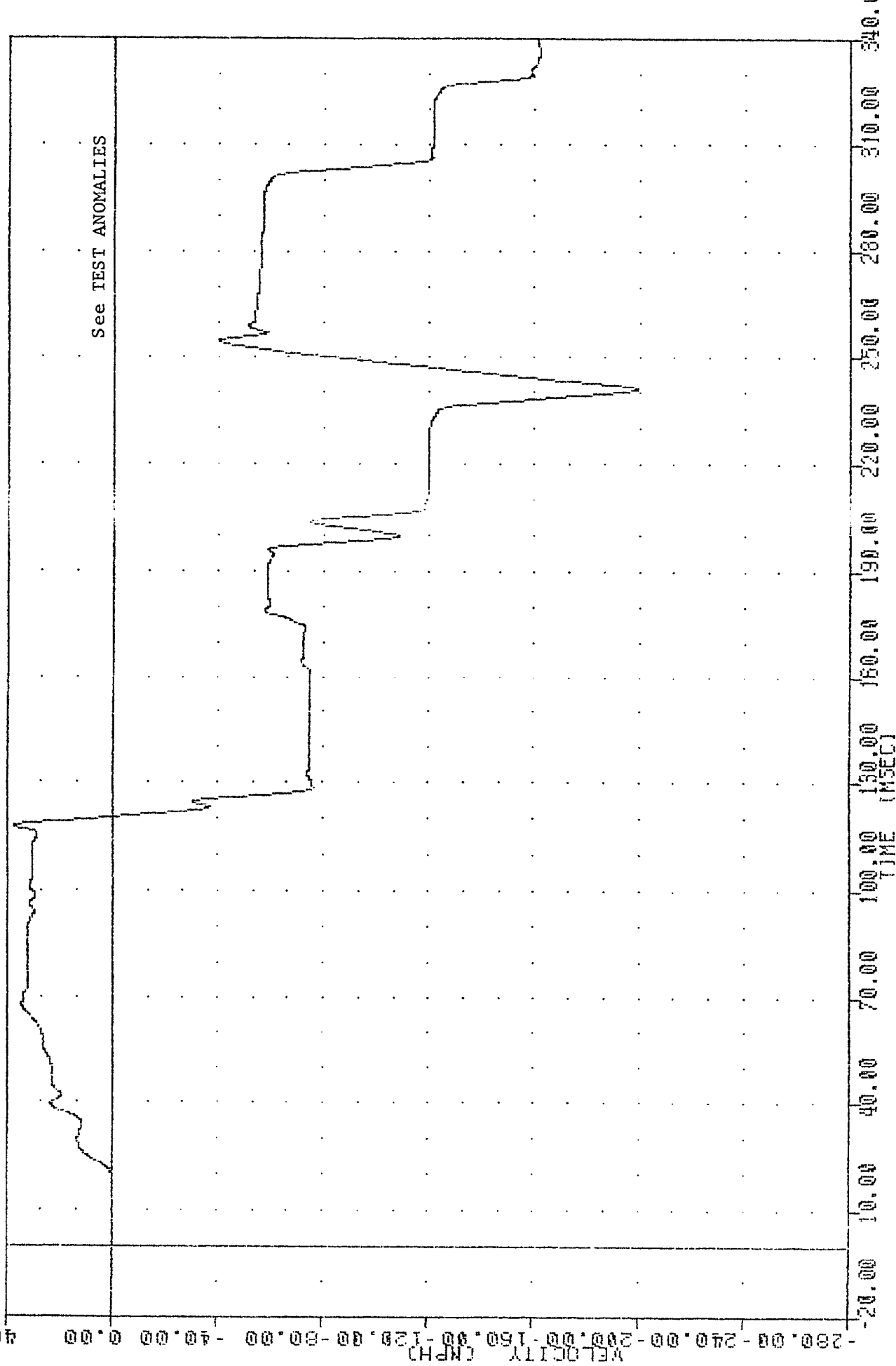
MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 DRIVER LEFT UPPER ABDOMEN RIB Y AXIS ACCELERATION

31 PROTECTION FROM VEHICLE

90129
LWAYV1

FILTER = BLPF 300/ 943/ -40

MIN, MAX VALUES = -199.92 241.13, 37.04 117.63

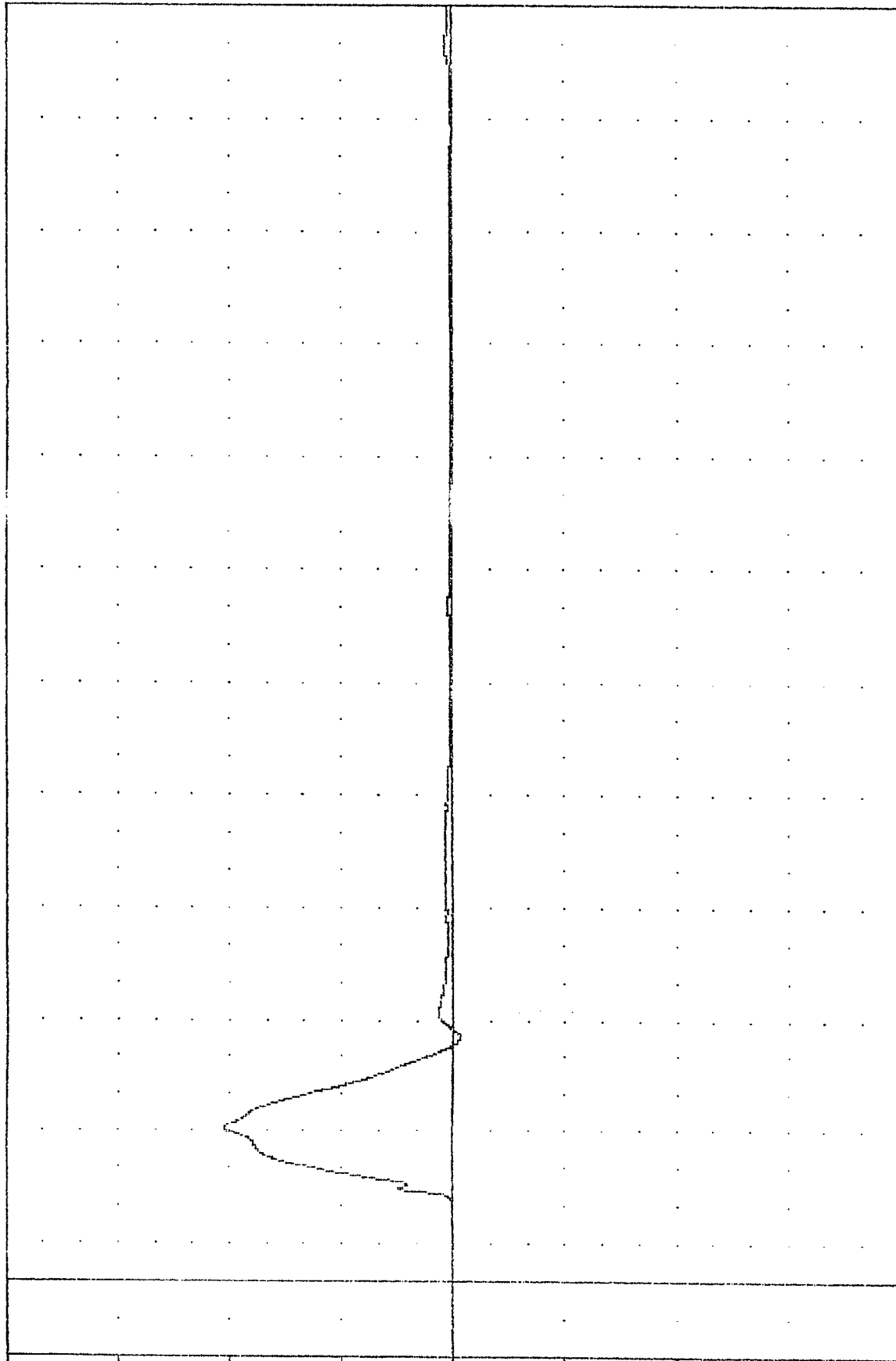


MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT UPPER ABDOMEN RIB Y AXIS VELOCITY

VR11, 800509
 SI PROTECTION PROO VEHICLE
 90129
 LUAYOI

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -1.40E 65.00, 51.15 E 40.75

DISPLACEMENT (MM)
 -100.00 -75.00 -50.00 -25.00 0.00 25.00 50.00 75.00 100.00



TIME (MSEC)

MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 DRIVER LEFT UPPER ABDOMEN RIG DISPLACEMENT

20.00 10.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

SI PROTECTION PROD VEHICLE

90129

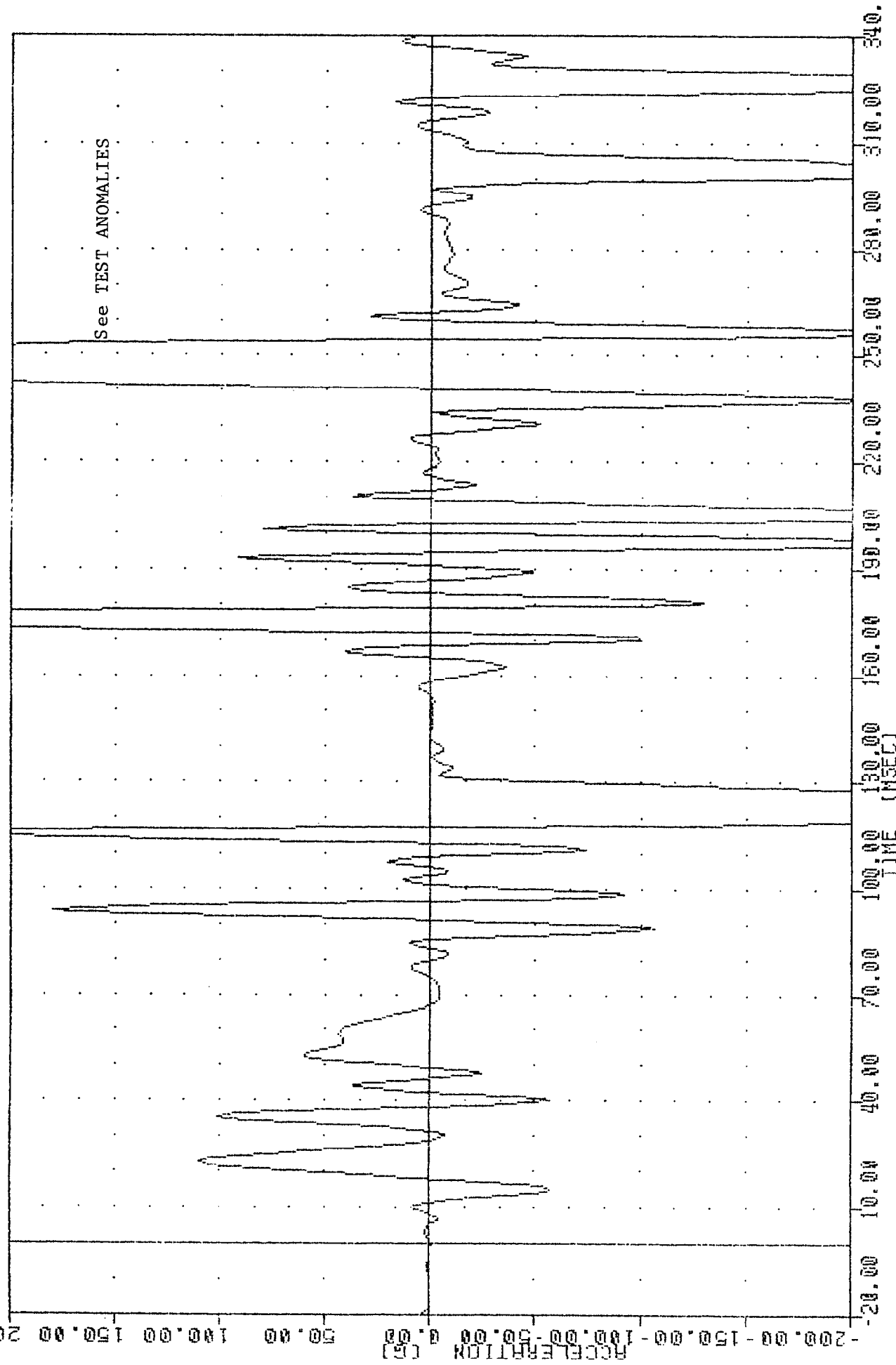
LLAY61

FILTER = HSRI

136/ 189/ -50

MIN. MAX VALUES = -406.87 554.21

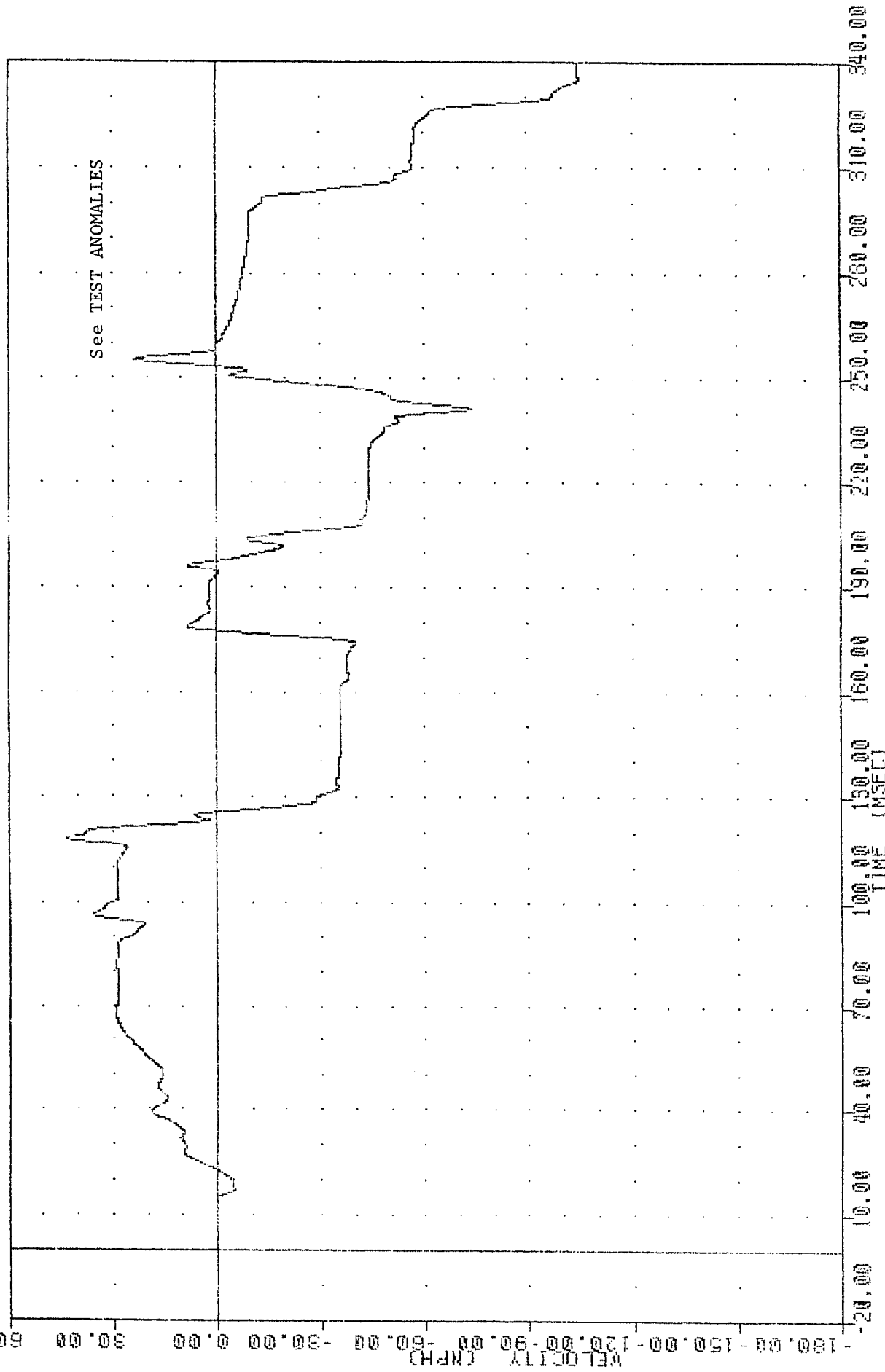
120.63 175.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT LOWER ABDOMEN RIB Y AXIS ACCELERATION

FILE 7 JVGJ00
SI PROTECTION PROD VEHICLE
90129
LLAYV1

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -104.81% 335.30, 43.10% 118.00



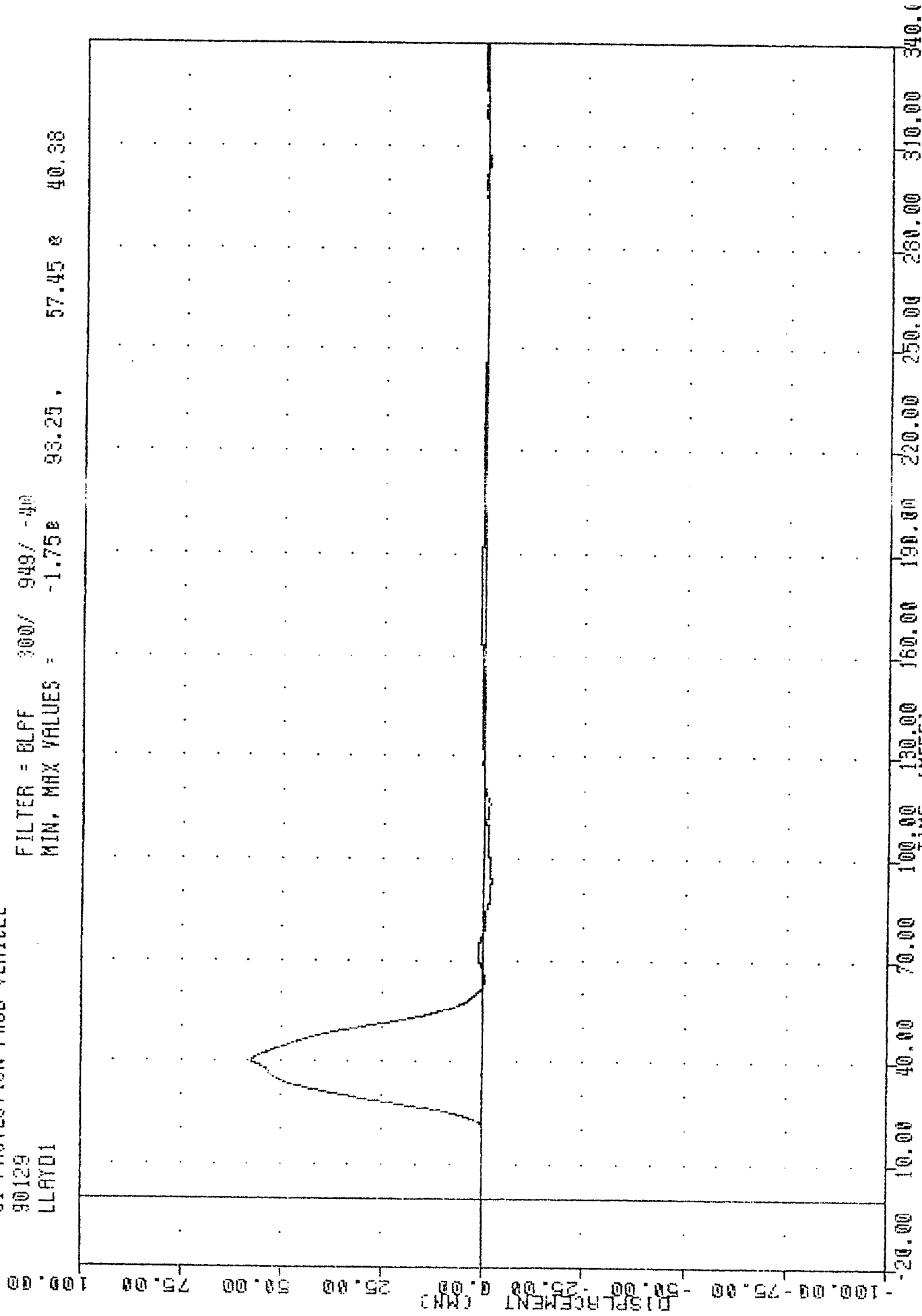
MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT LOWER ABDOMEN RIB Y AXIS VELOCITY

SI PROTECTION PROD VEHICLE

90129
LLAYD1

FILTER = BLPF 300/ 949/ -40

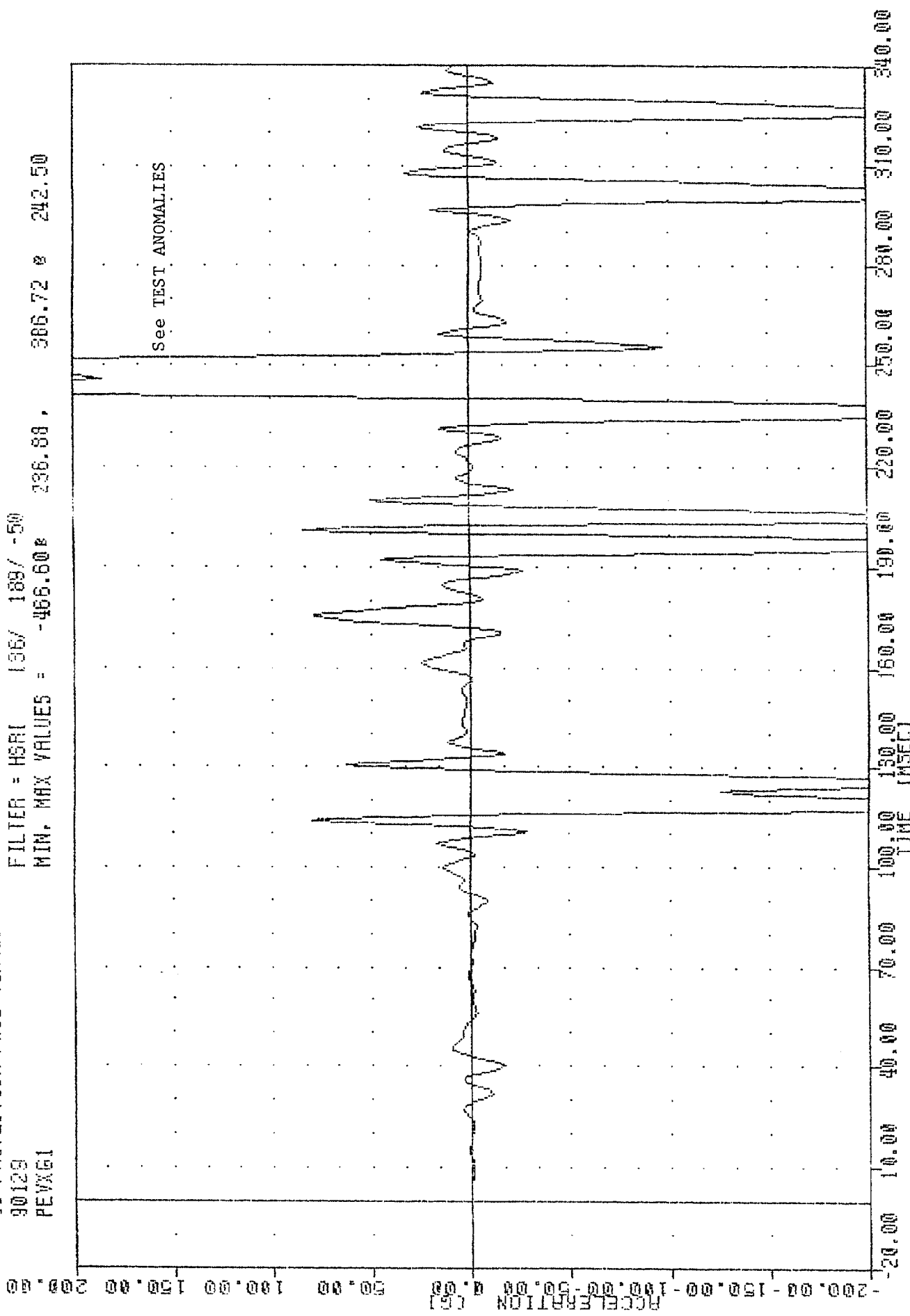
MIN, MAX VALUES = -1.75e 93.25, 57.45 e 40.38



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER LEFT LOWER ABDOMEN RIB DISPLACEMENT

TIME 030508
SI PROTECTION PROD VEHICLE
90129
PEVXG1

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -466.608 236.88 386.72 242.50



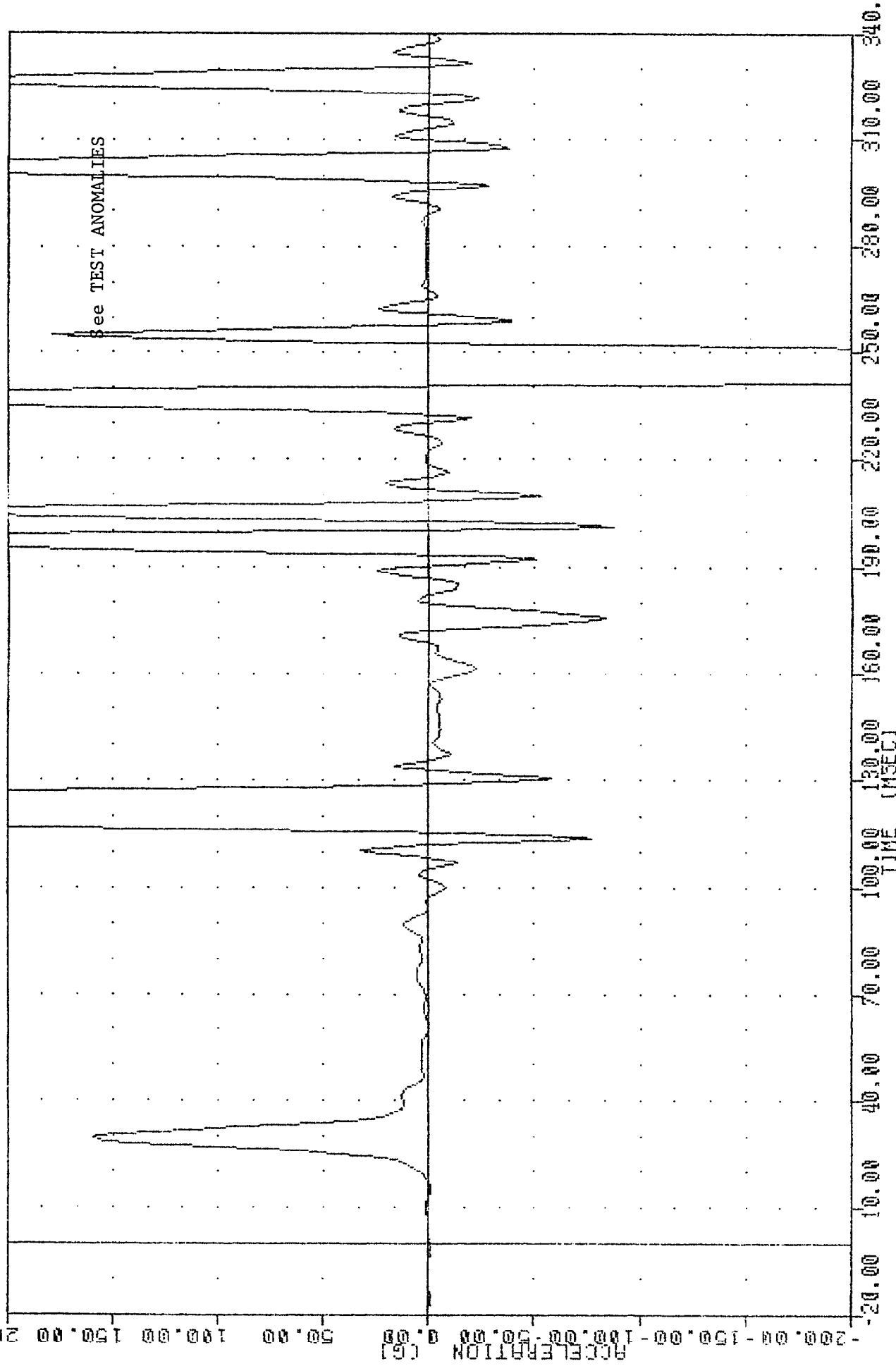
MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER PELVIS X AXIS ACCELERATION

SI PROTECTION PROD VEHICLE

90129
PEVYG1

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -452.60 243.12

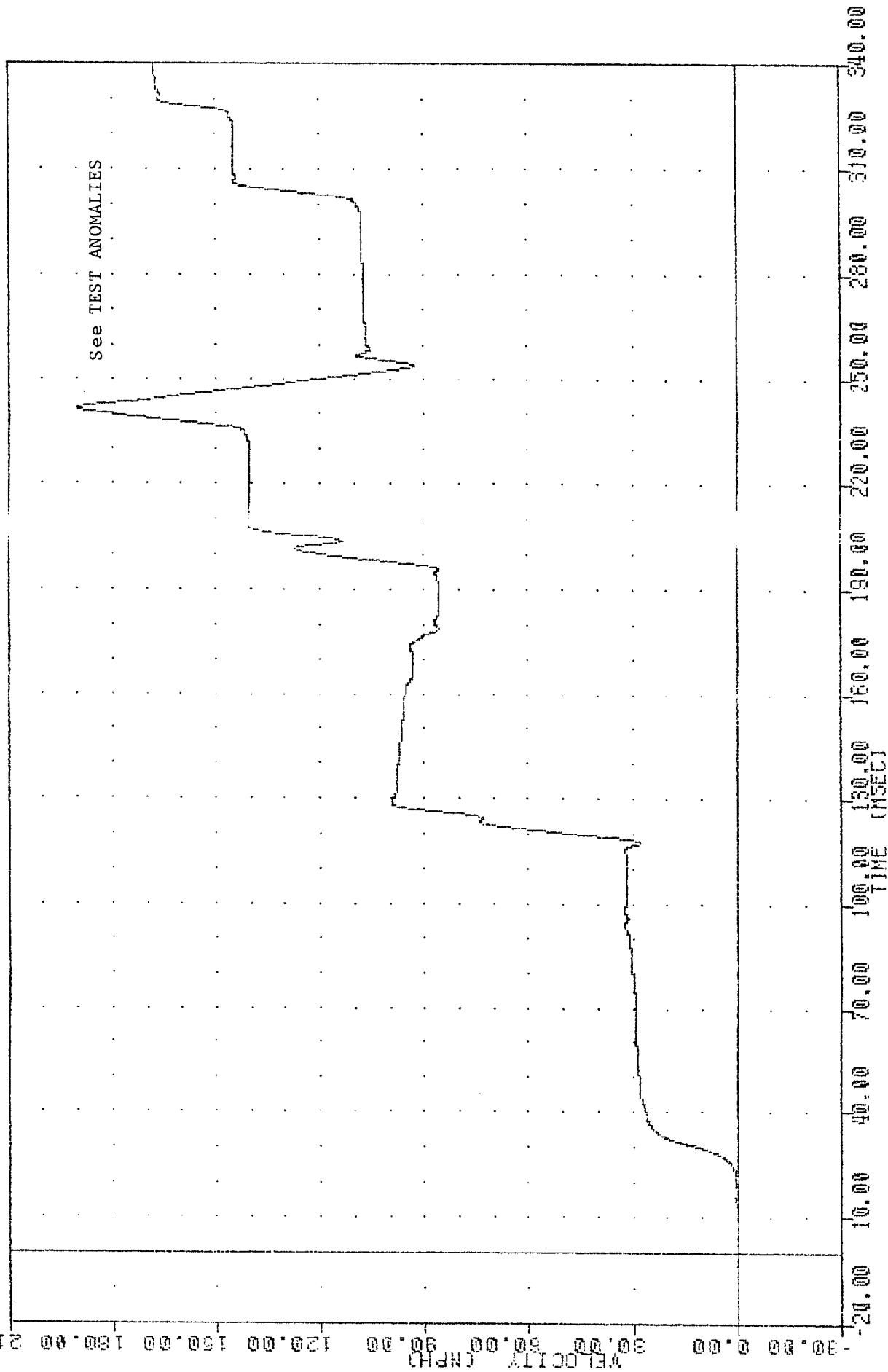
493.34 237.50



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER PELVIS Y AXIS ACCELERATION

DATE 7-00-0003
 SI PROTECTION PROD VEHICLE
 90129
 PEVTV1

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -0.080 2.25, 190.18 8 241.50



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 DRIVER PELVIS Y AXIS VELOCITY

SI PROTECTION PROD VEHICLE

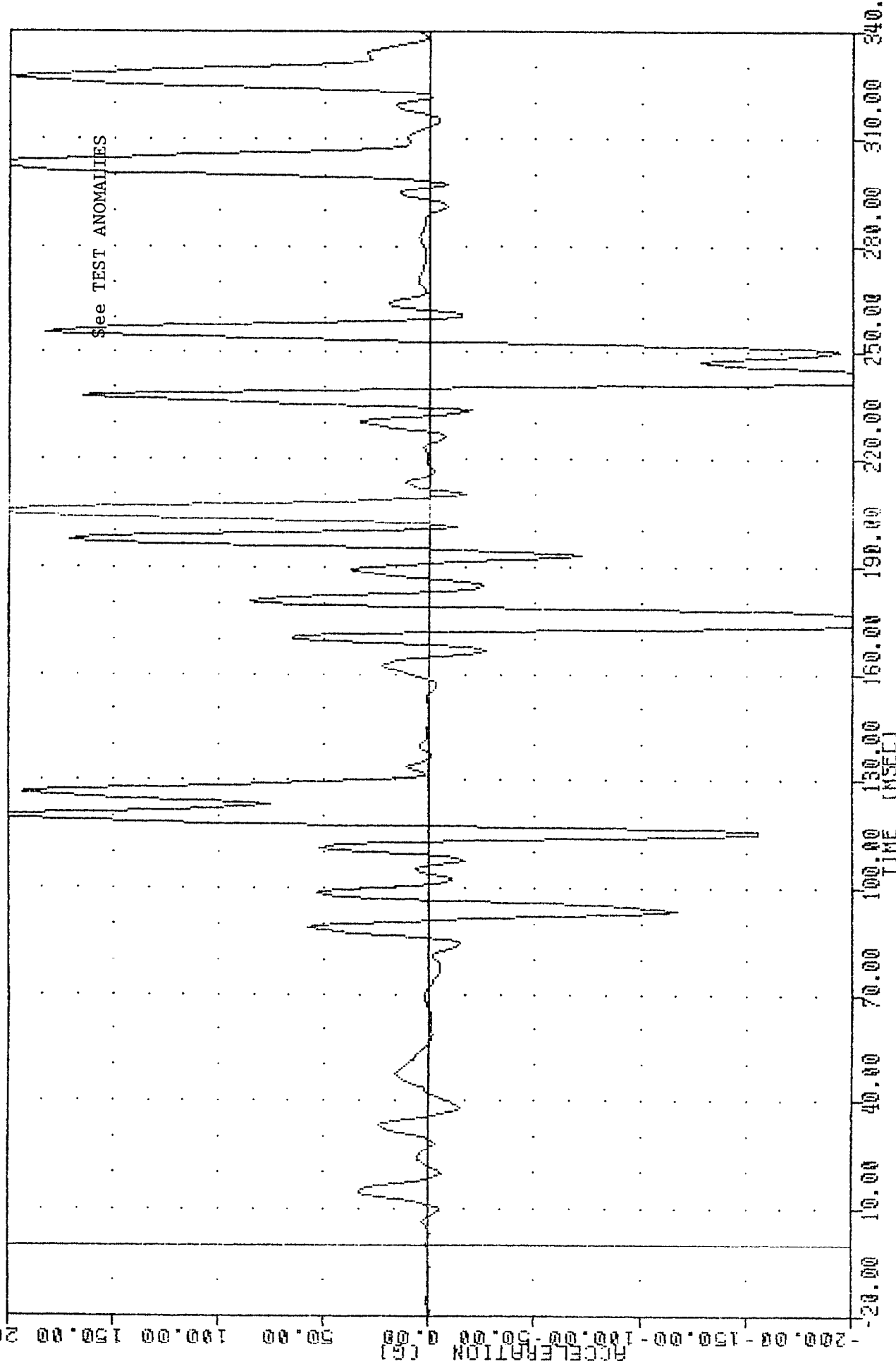
90129

PEVZG1

FILTER = HSR1 136/ 189/ -50

MIN. MAX VALUES = -361.26 175.00

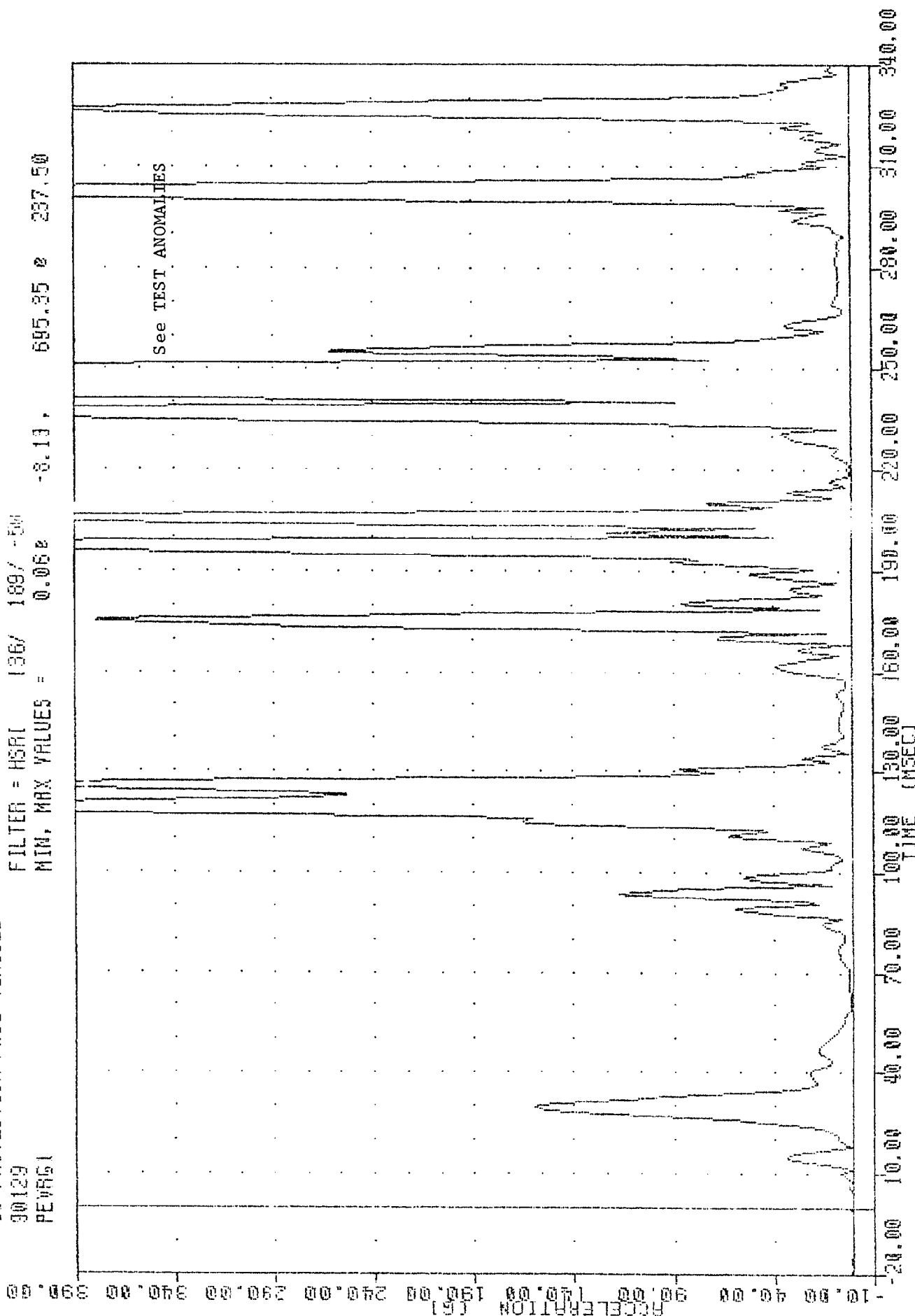
239.38 303.13



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER PELVIS Z AXIS ACCELERATION

VEHICLE # 9005003
 S1 PROTECTION PROD VEHICLE
 30129
 PEVRS1

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.06e -8.13, 695.35 e 237.50



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 DRIVER PELVIS RESULTANT ACCELERATION

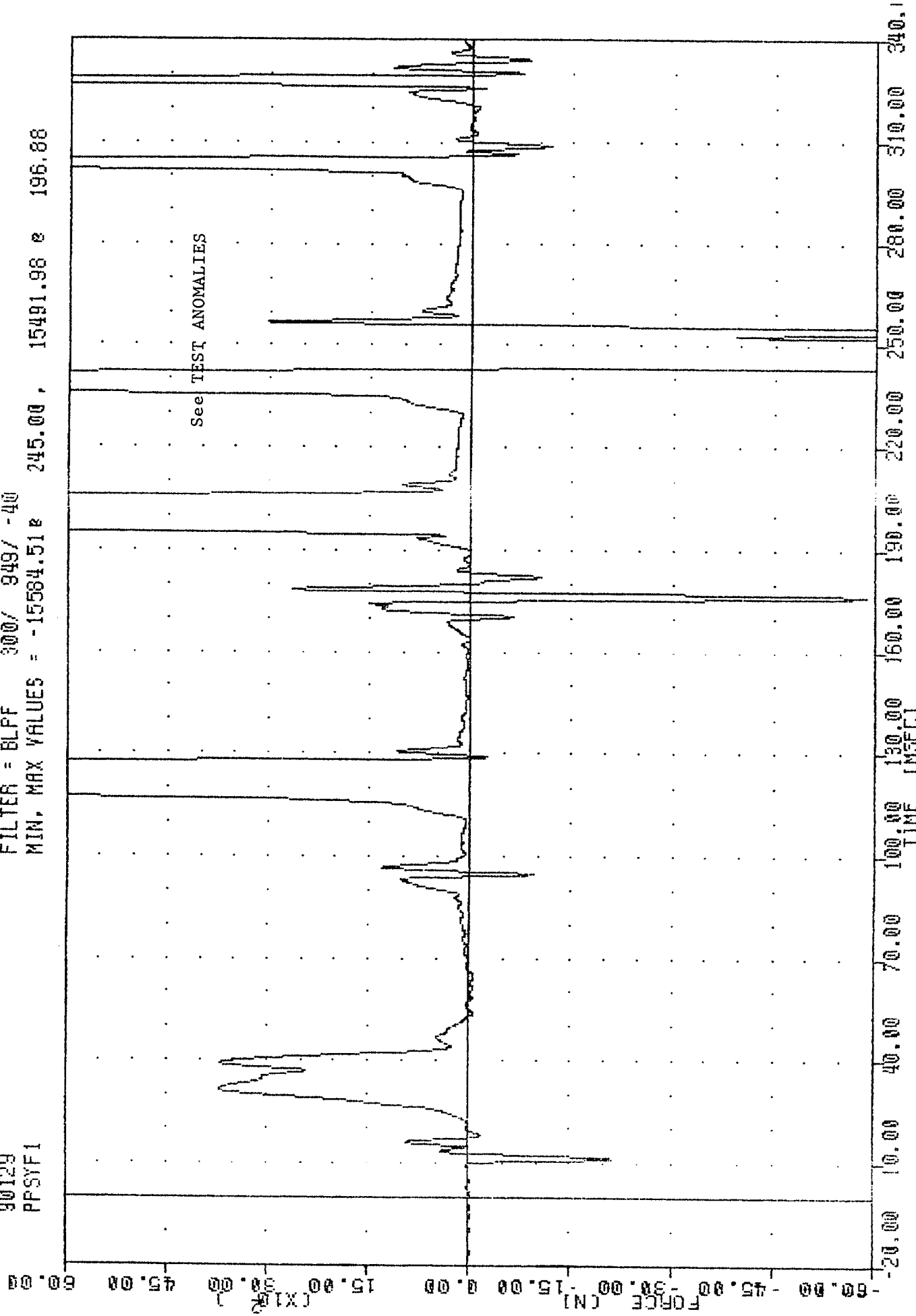
SAFETY INFORMATION FROM MANUFACTURER

90129

PPSYF1

FILTER = BLPF 300/ 949/ -40

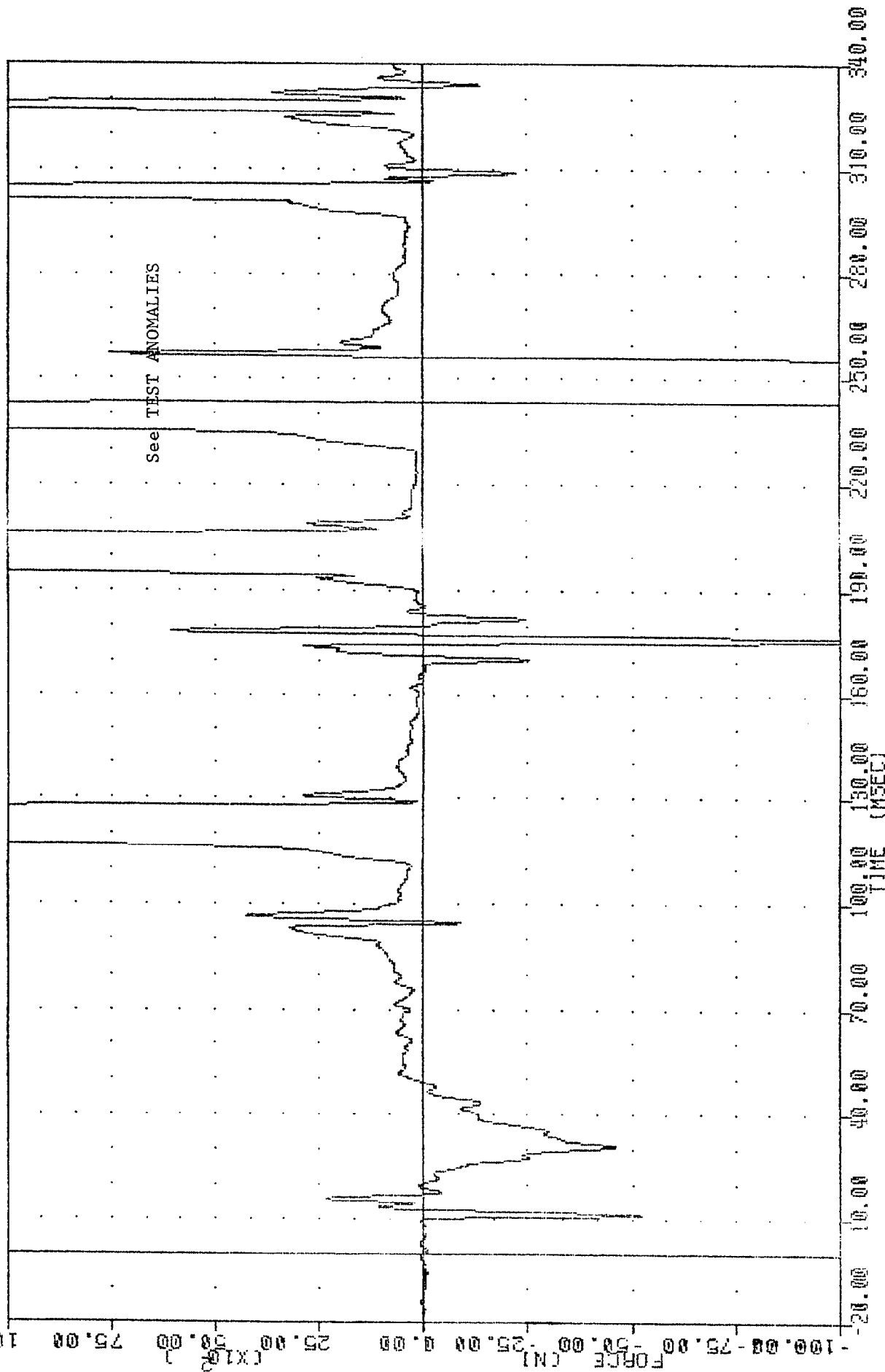
MIN. MAX VALUES = -15584.518 245.00 , 15491.98 2 196.88



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER PUBIC SYMPHYSIS Y AXIS FORCE

SI PROTECTION PROO VEHICLE
90129
PSHYF1

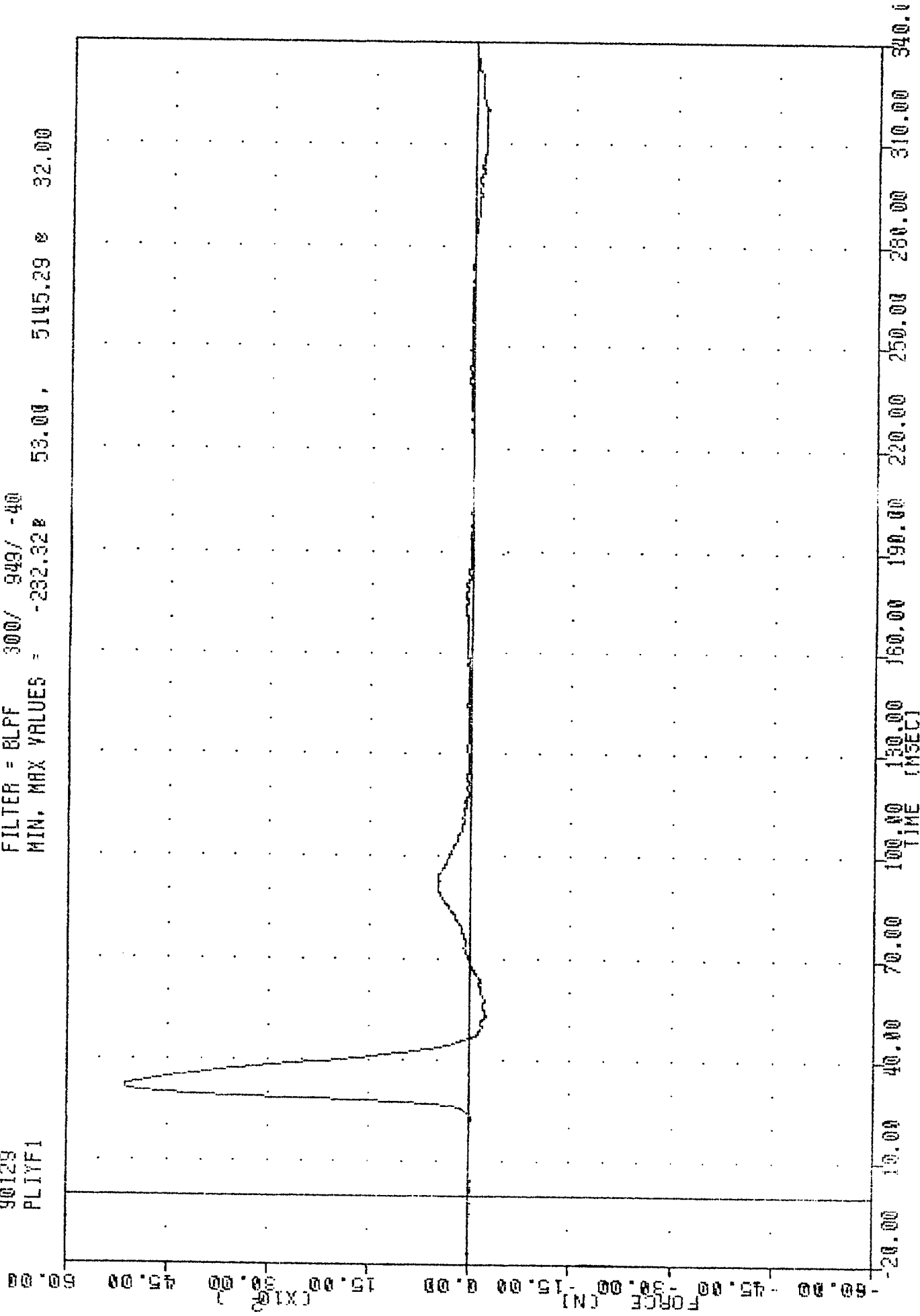
FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -35982.97 244.75 33133.57 196.86



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER PELVIS SACRUM Y AXIS FORCE

90129
PLIYF1

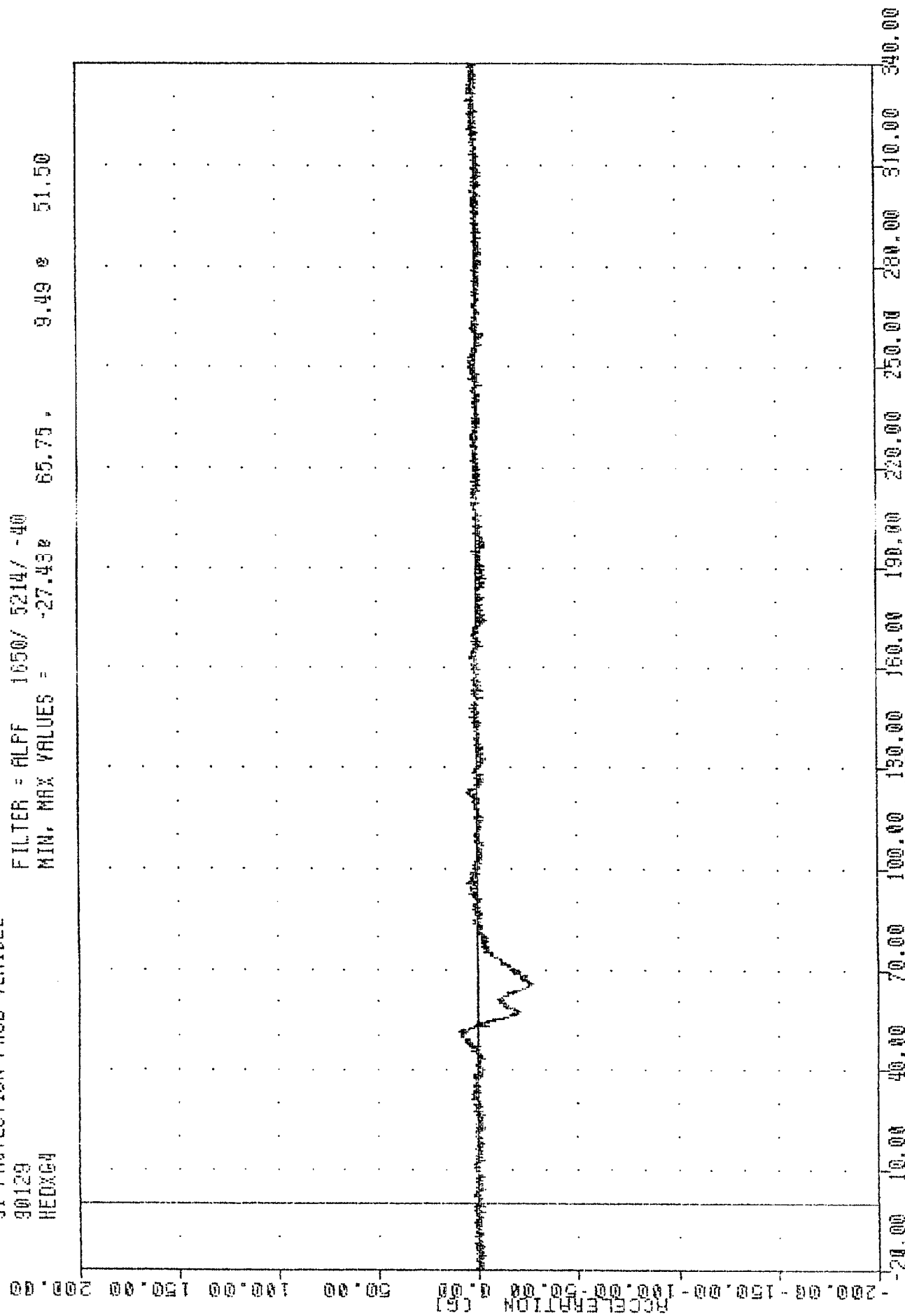
FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -232.32 53.00 , 5145.29 32.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
DRIVER PELVIS ILIAC Y AXIS FORCE

FILED 3000003
SI PROTECTION PHOD VEHICLE
90129
HEDXG4

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -27.430 65.75 9.49 51.50



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER HEAD X AXIS ACCELERATION

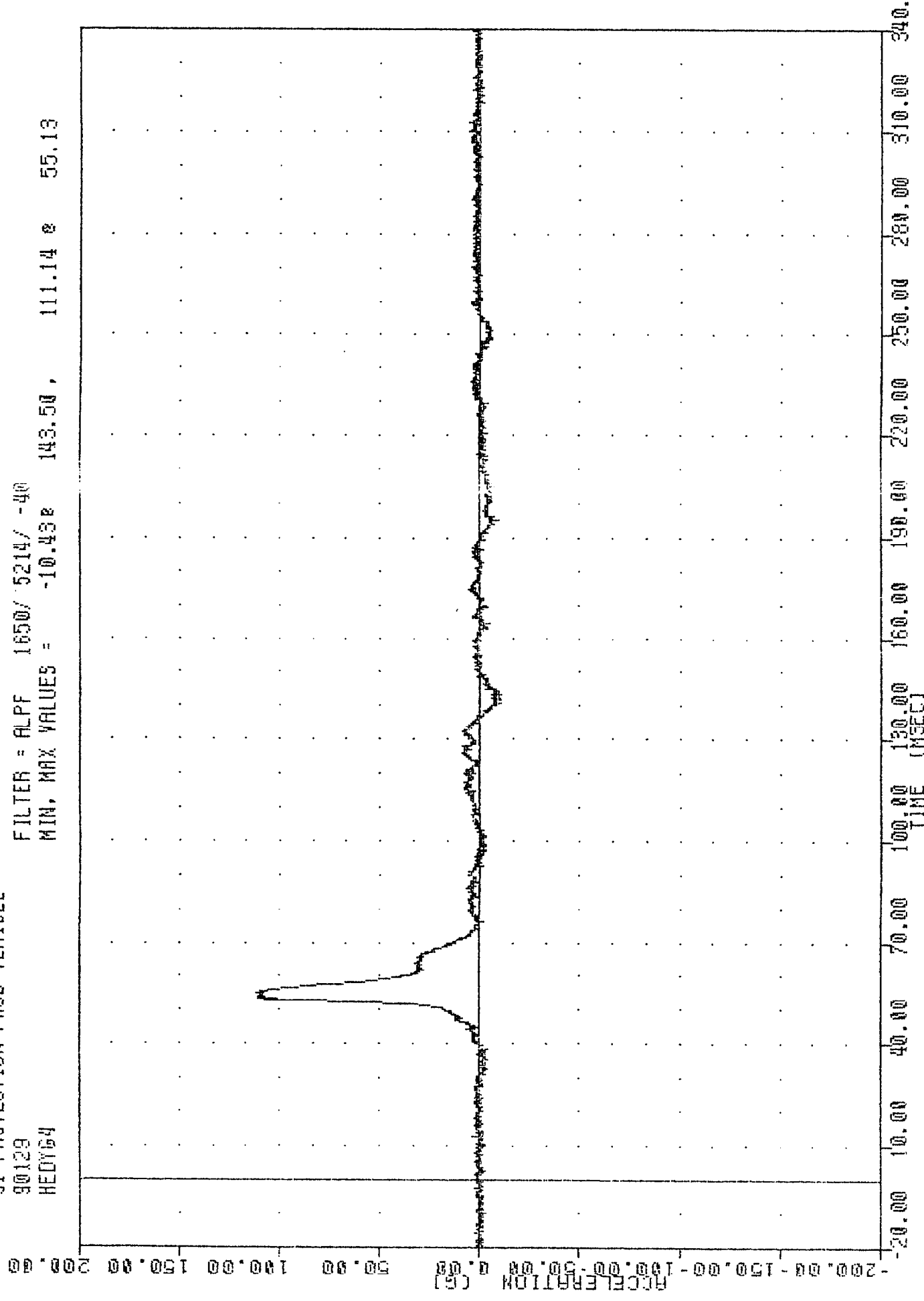
31 PROJECTION FROM VEHICLE

90129

HEDY64

FILTER = ALPF 1650/ 5214/ -40

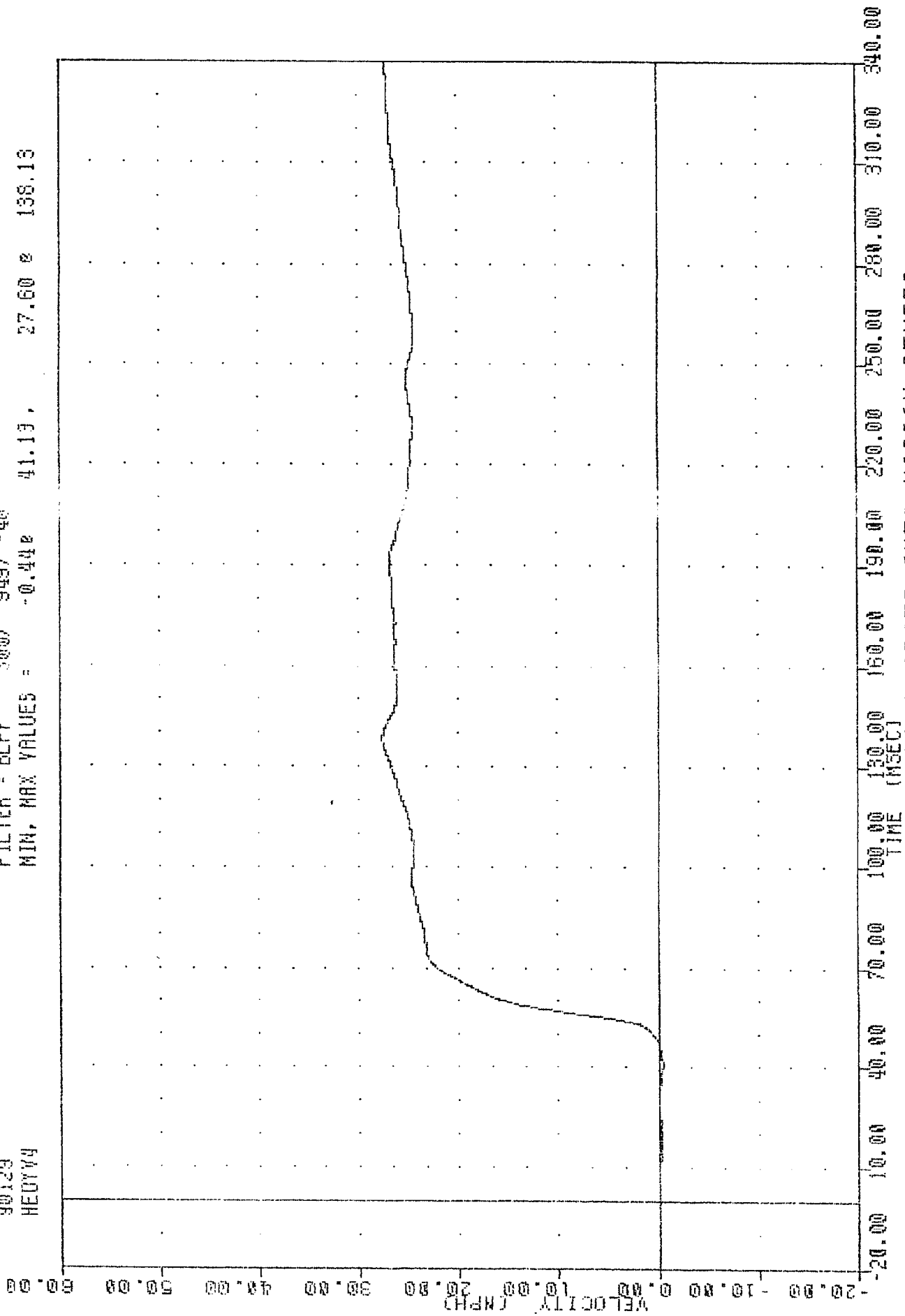
MIN, MAX VALUES = -10.430 143.50, 111.14 & 55.13



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER HEAD Y AXIS ACCELERATION

SI PROTECTION PASS VEHICLE
90129
HEUYV4

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = 41.13, 27.60 2 138.13



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER HEAD Y AXIS VELOCITY

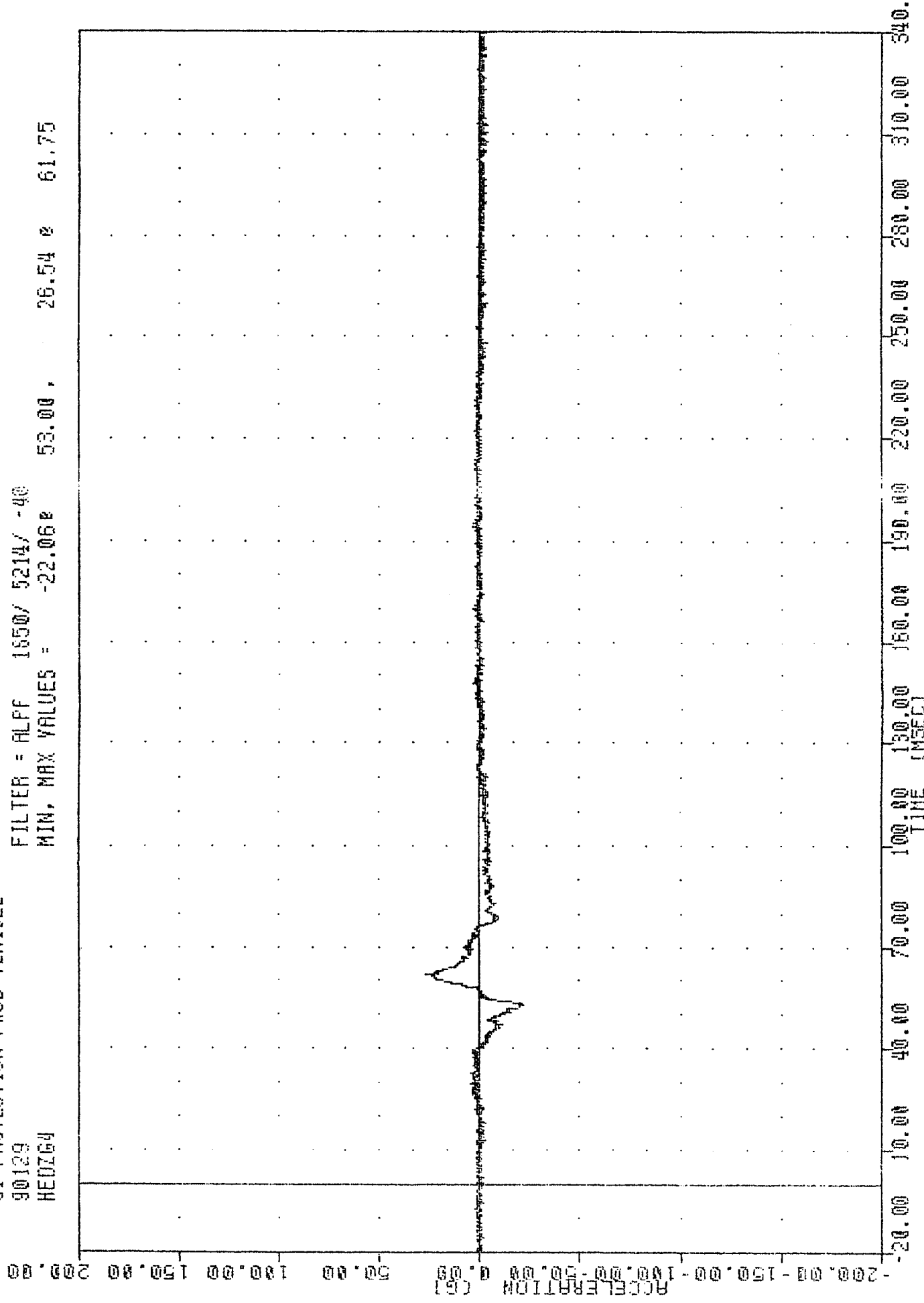
31 PROJECTION FROM VEHICLE

90129

HE0264

FILTER = ALPF 1850/ 5214/ -40

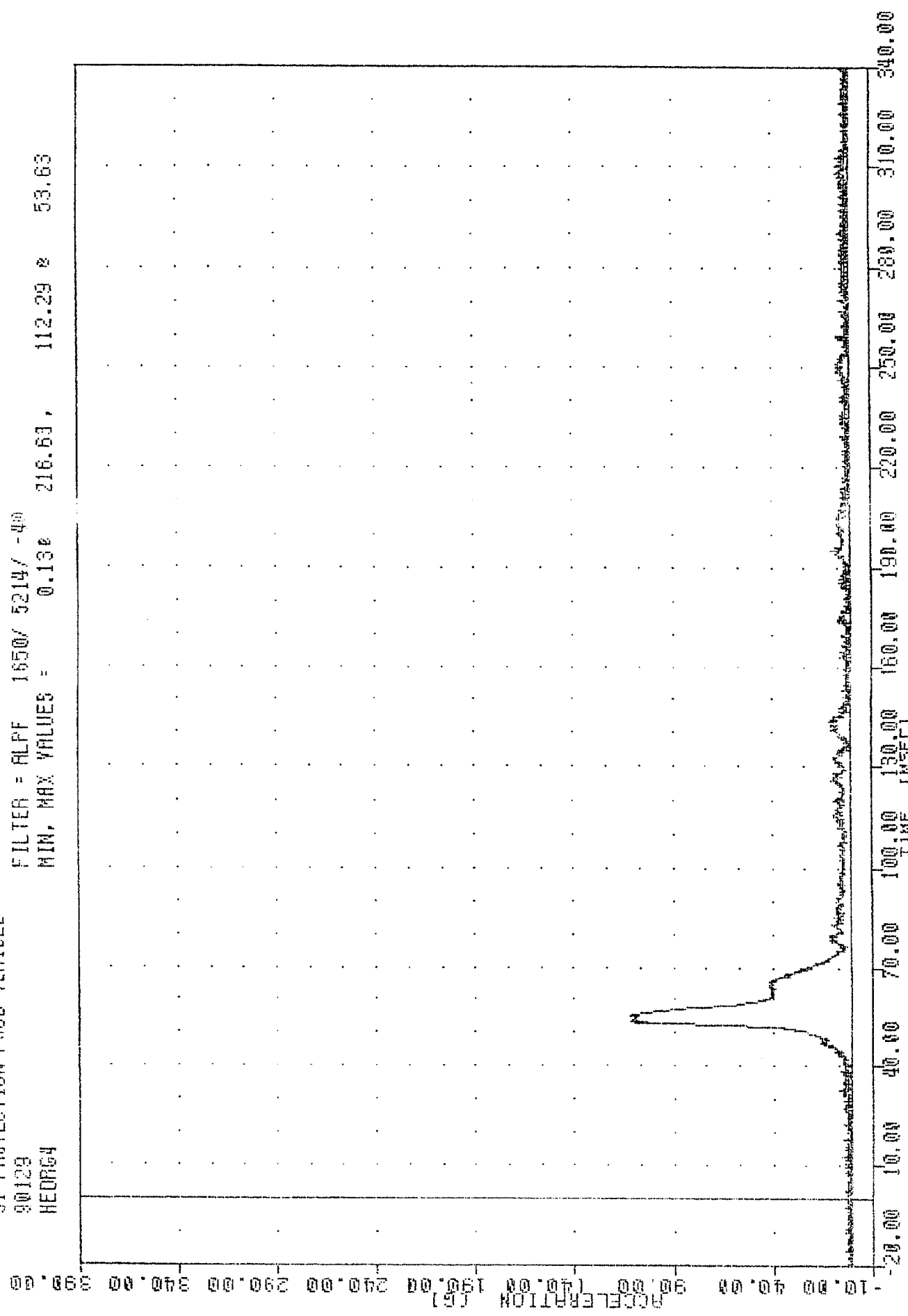
MIN, MAX VALUES = -22.06 53.00 , 26.54 61.75



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER HEAD Z AXIS ACCELERATION

SI PROTECTION FOOD VEHICLE
 90129
 HEOR64

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.130 216.63, 112.29 2 53.63



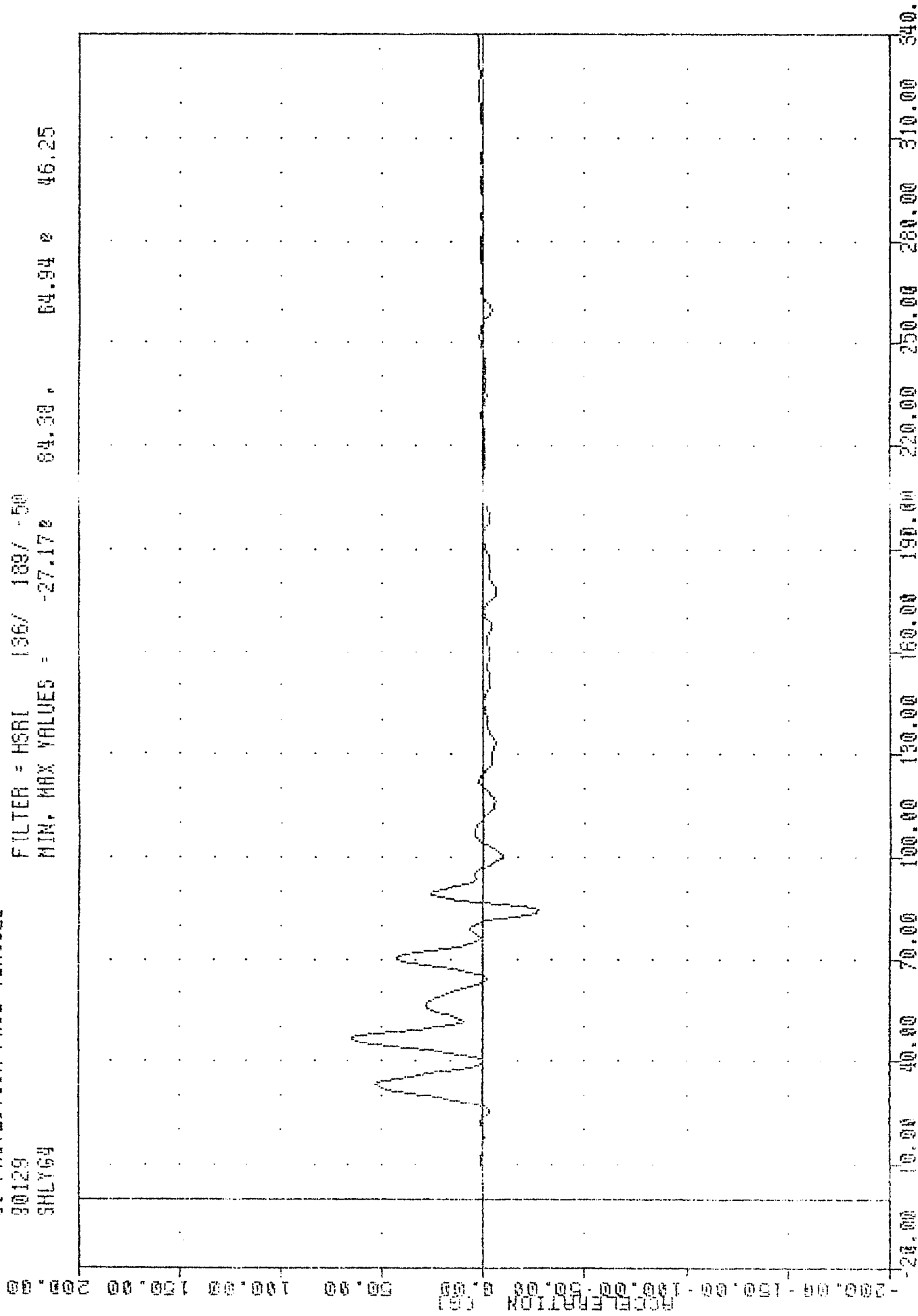
MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 LEFT REAR PASSENGER HEAD RESULTANT ACCELERATION

31 PROTECTION PROD VEHICLE

90129
SHLY64

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -27.170 84.38 ,

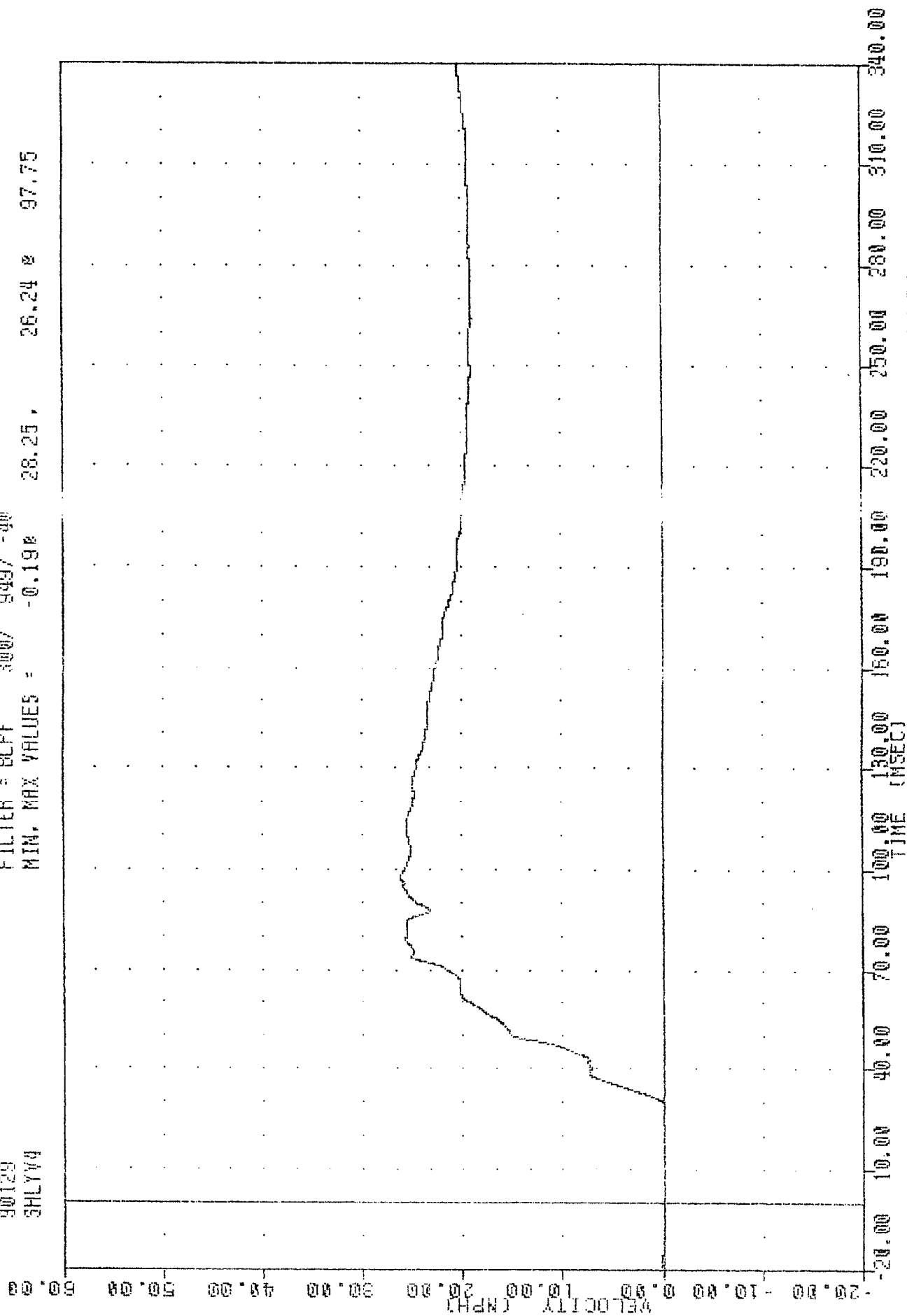
64.94 0 46.25



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LEFT SHOULDER / AXIS ACCELERATION

FILE 360000
 SI PROTECTION PROD VEHICLE
 90129
 SHLYV4

FILTER = BLFF 300/ 949/ -40
 MIN. MAX VALUES = -0.198 26.25 26.24 97.75

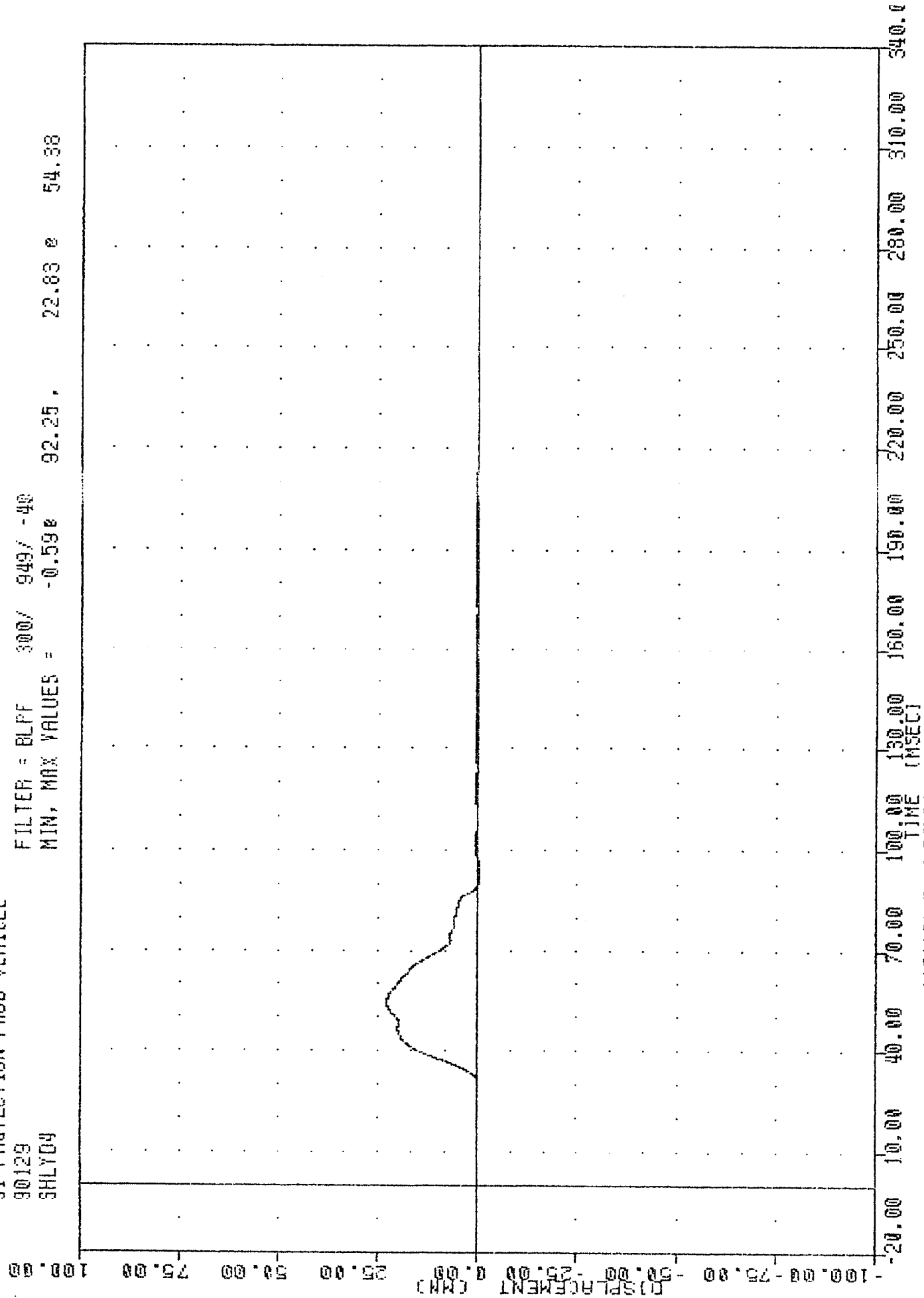


MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 LEFT REAR PASSENGER LEFT SHOULDER Y AXIS VELOCITY

SI PROTECTION PHOD VEHICLE

90129
3HLY04

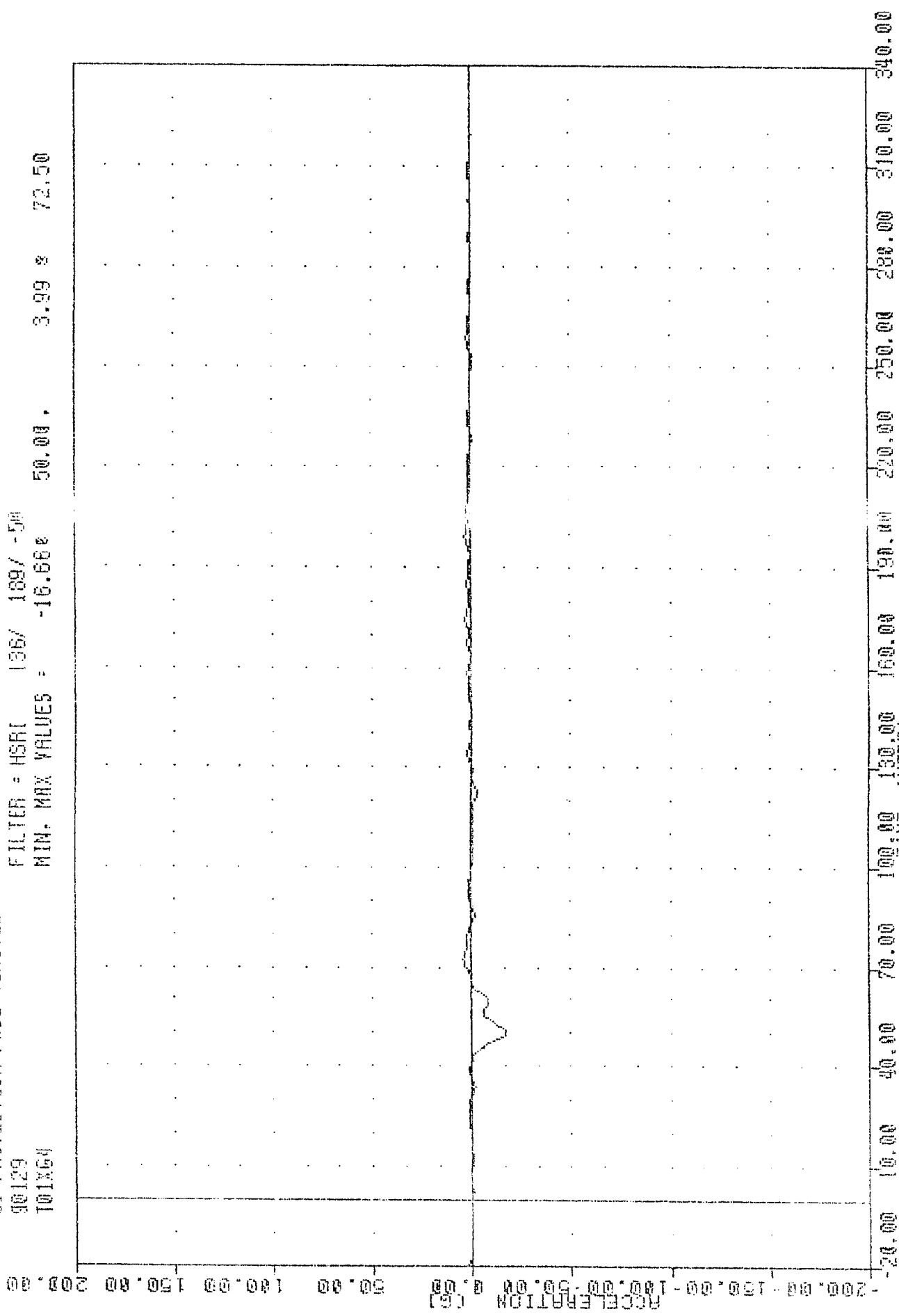
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -0.590 92.25 , 22.83 0 54.38



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LEFT SHOULDER TO SPINE DISPLACEMENT

1011
 SI PROTECTION PROD VEHICLE
 90129
 101X64

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -16.66 50.00 3.99 72.50



MOVING DEFORMABLE BARRIER IN W NISSAN SENTRA
 LEFT REAR PASSENGER UPPER SPINE 3 AXIS ACCELERATION

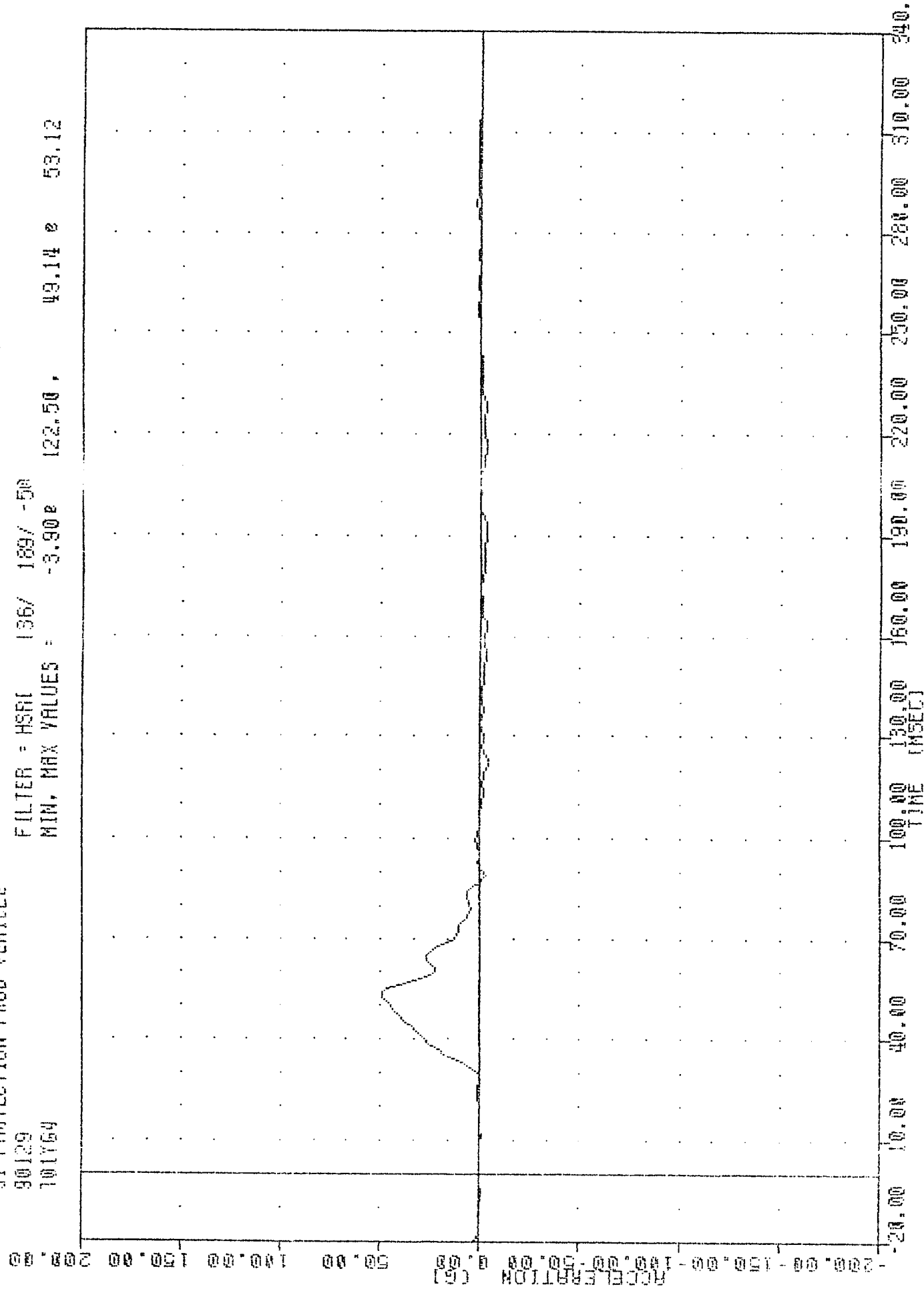
31 CONTINUATION FROM VEHICLE

90129

101764

FILTER = HSRI 136/ 189/ -50

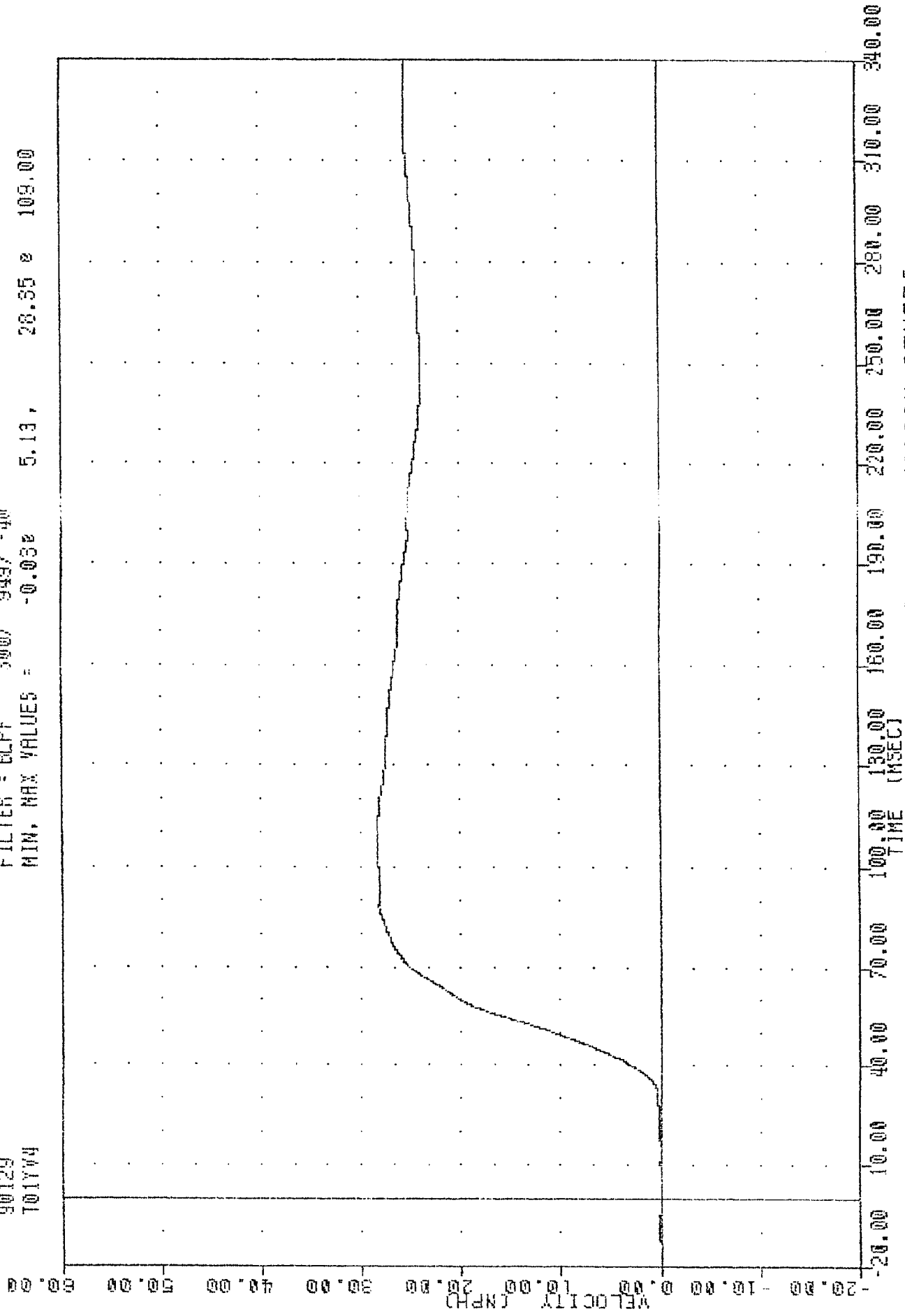
MIN, MAX VALUES = -3.90e 122.50 , 43.14 e 53.12



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER UPPER SPINE Y AXIS ACCELERATION

11.0
 SI PROTECTION PROD VEHICLE
 90129
 701YV4

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -0.030 5.13, 28.35 0 109.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 LEFT REAR PASSENGER UPPER SPINE Y AXIS VELOCITY

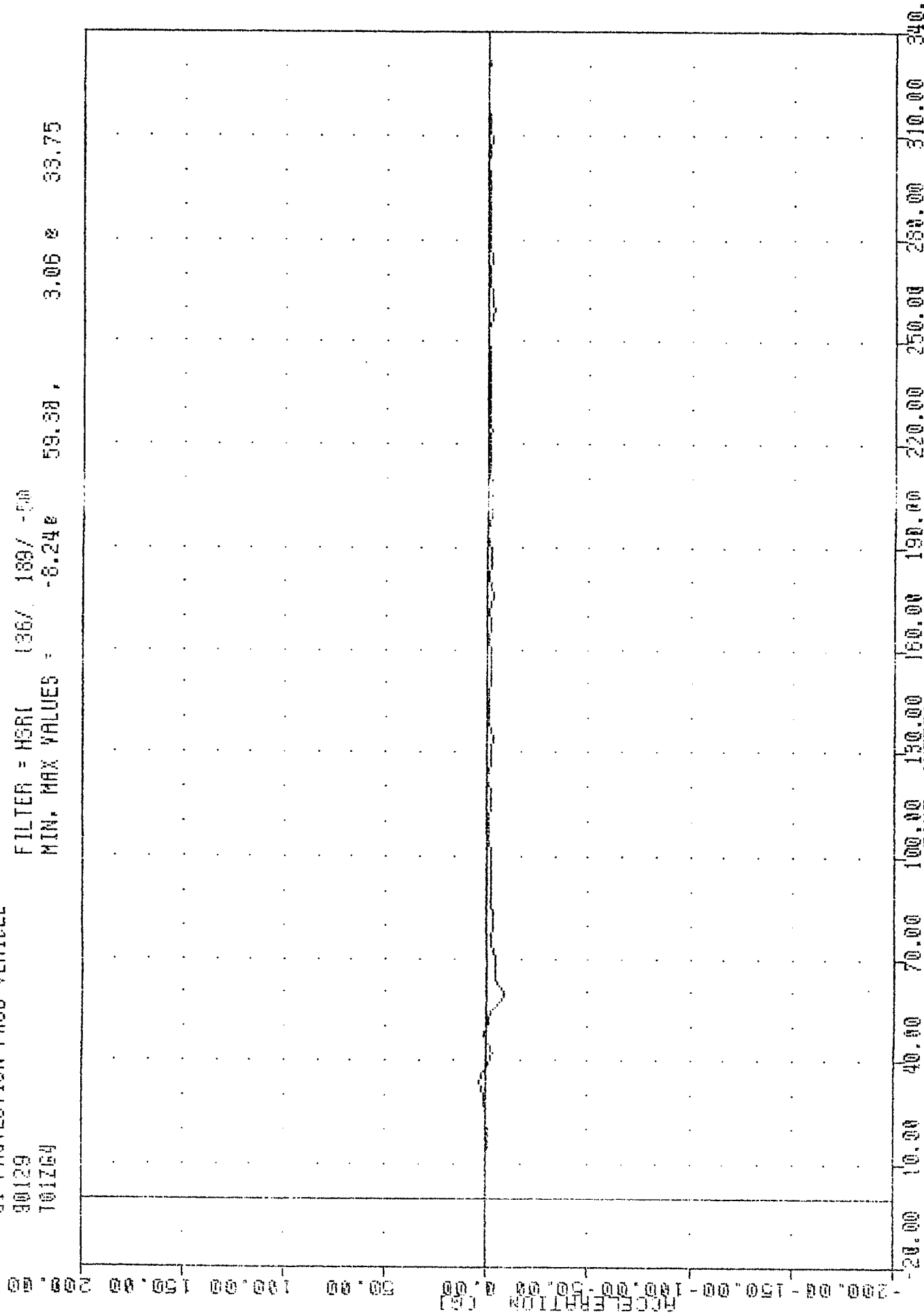
34 IMPULSION FROM VEHICLE

90129

FILTER = HGRI 136/ 189/ -50

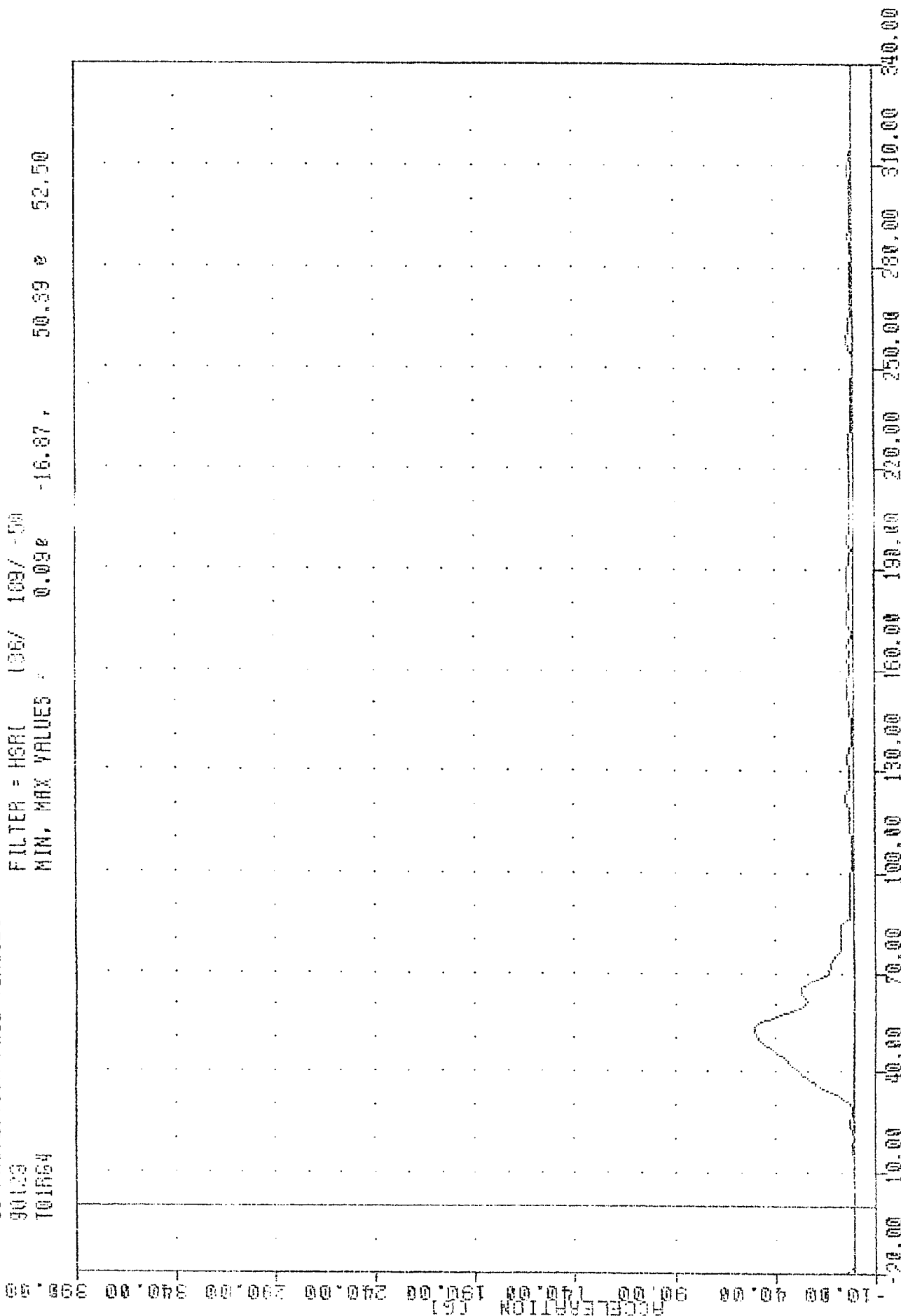
701Z64

MIN. MAX VALUES = -8.240 59.50 , 3.06 0 33.75



91 PROTECTION PROB VEHICLE
 90123
 101854

FILTER = HSRI 136/ 139/ -50
 MIN, MAX VALUES - 0.090 -16.87, 50.39 e 52.50



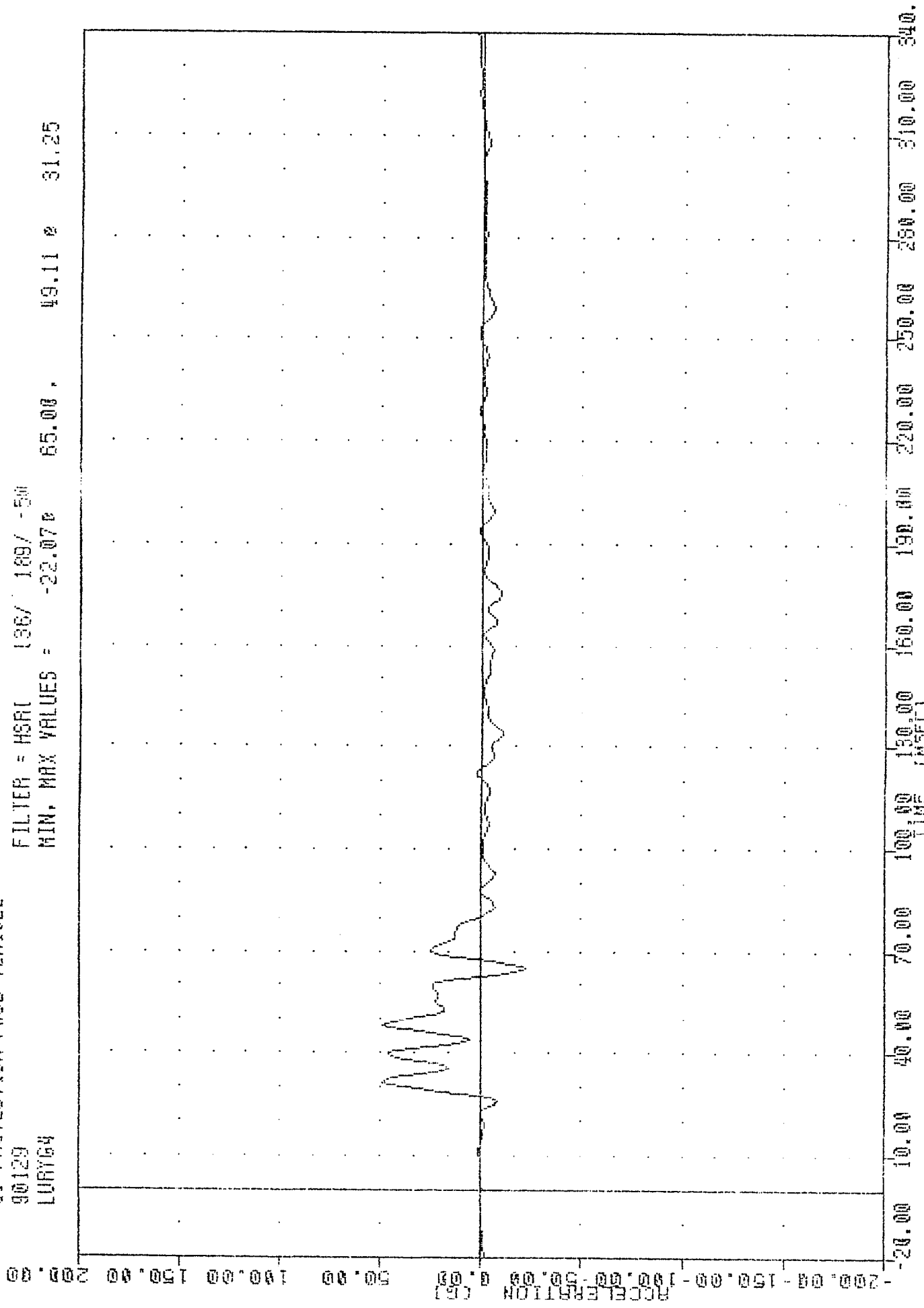
MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 LEFT REAR PASSENGER UPPER SPINE RESULTANT ACCELERATION

31 CONNECTION FROM VEHICLE

90129
LURY64

FILTER = HSRL 136/ 189/ -50

MIN. MAX VALUES = -22.070 65.000 49.110 31.25



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LEFT UPPER THORAX RIB Y AXIS ACCELERATION

DATE: 05/05/03

SI PROTECTION PROD VEHICLE

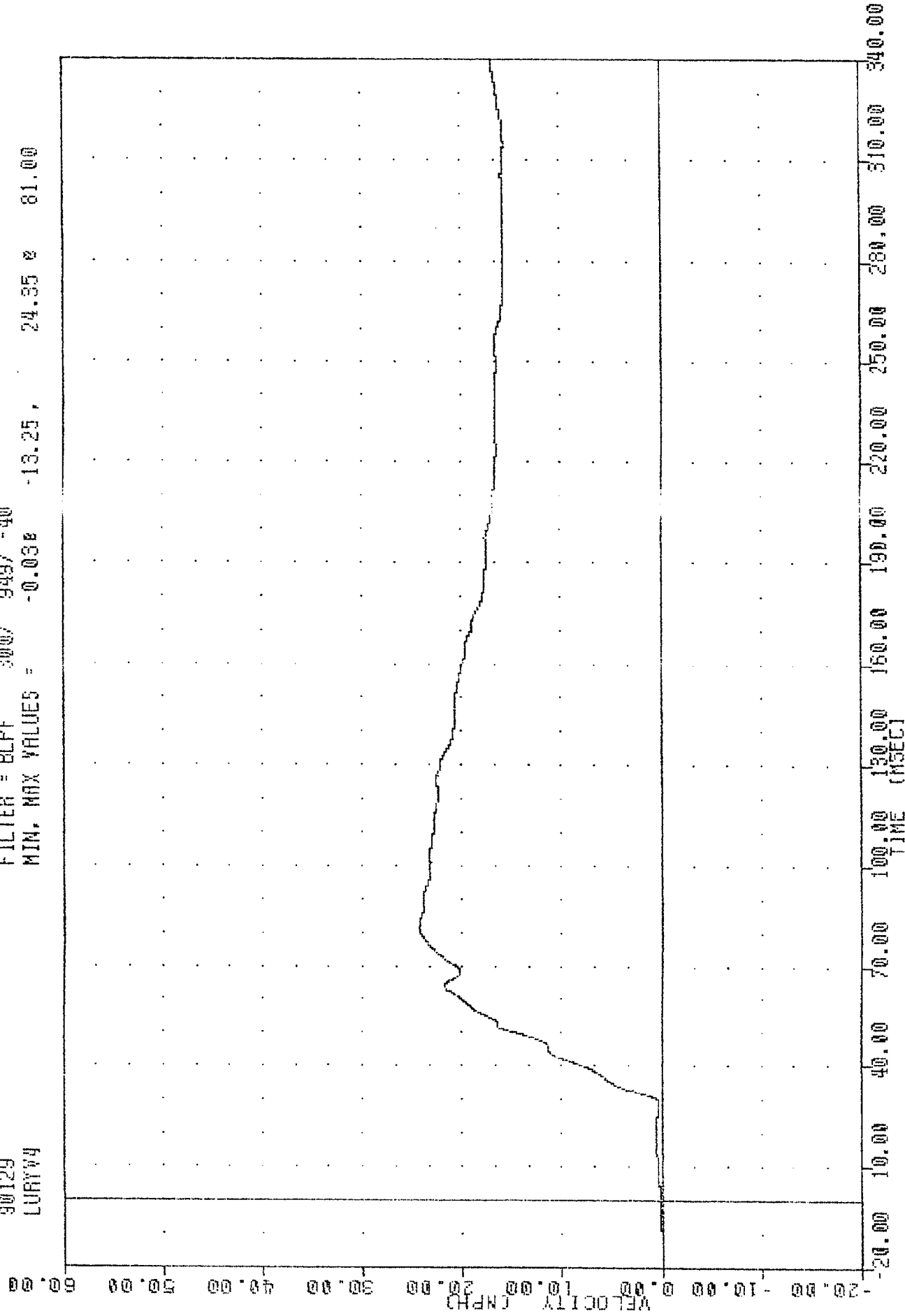
90129

LURYV4

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -0.038

-13.25, 24.35 @ 81.00



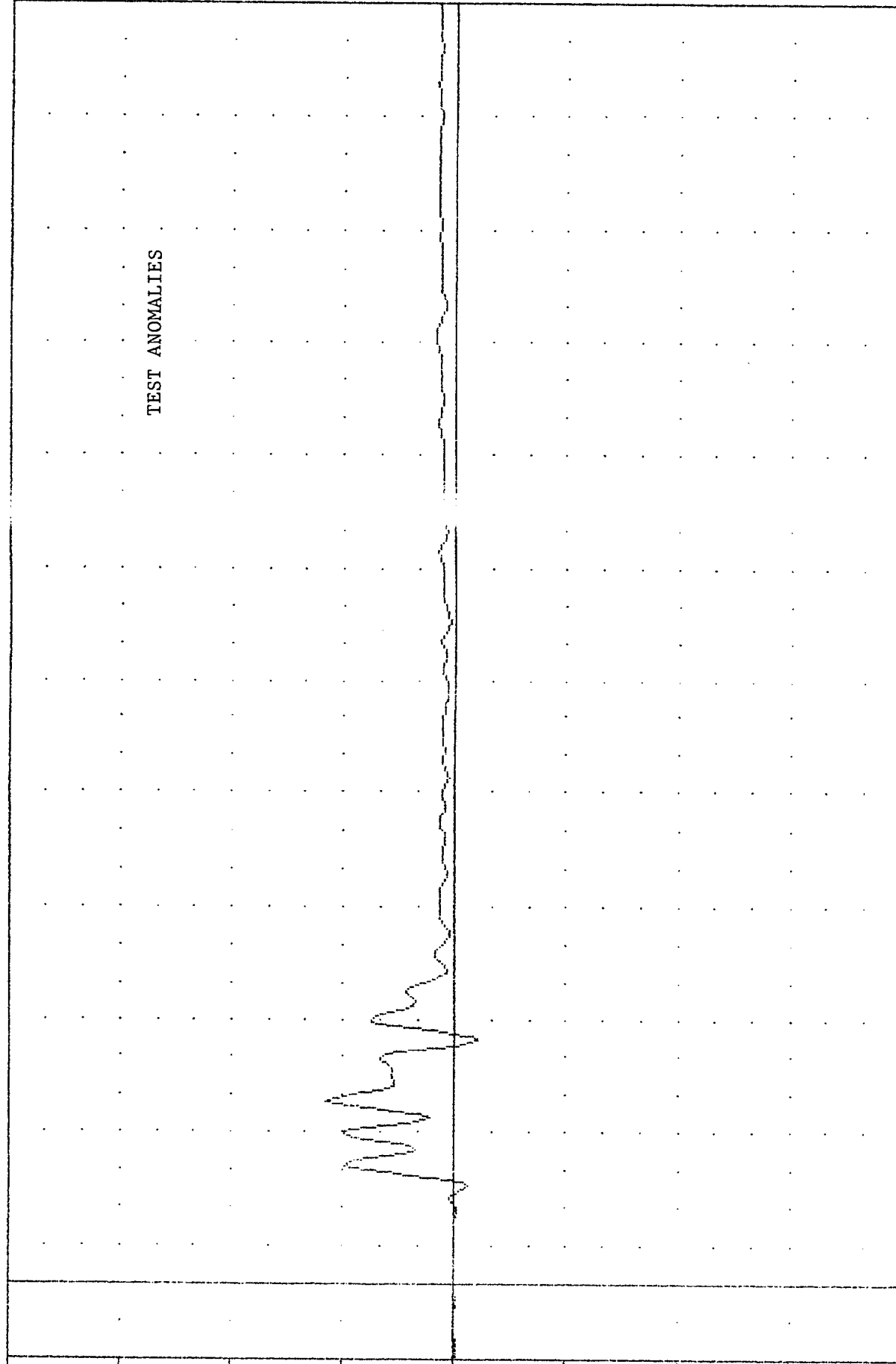
MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LEFT UPPER THORAX RIB Y AXIS VELOCITY

31 PROTECTION FROM VEHICLE

90129
LURY60

FILTER = HSRL 136/ 189/ -50
MIN, MAX VALUES = -10.57e 64.38 , 57.03 e 48.13

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

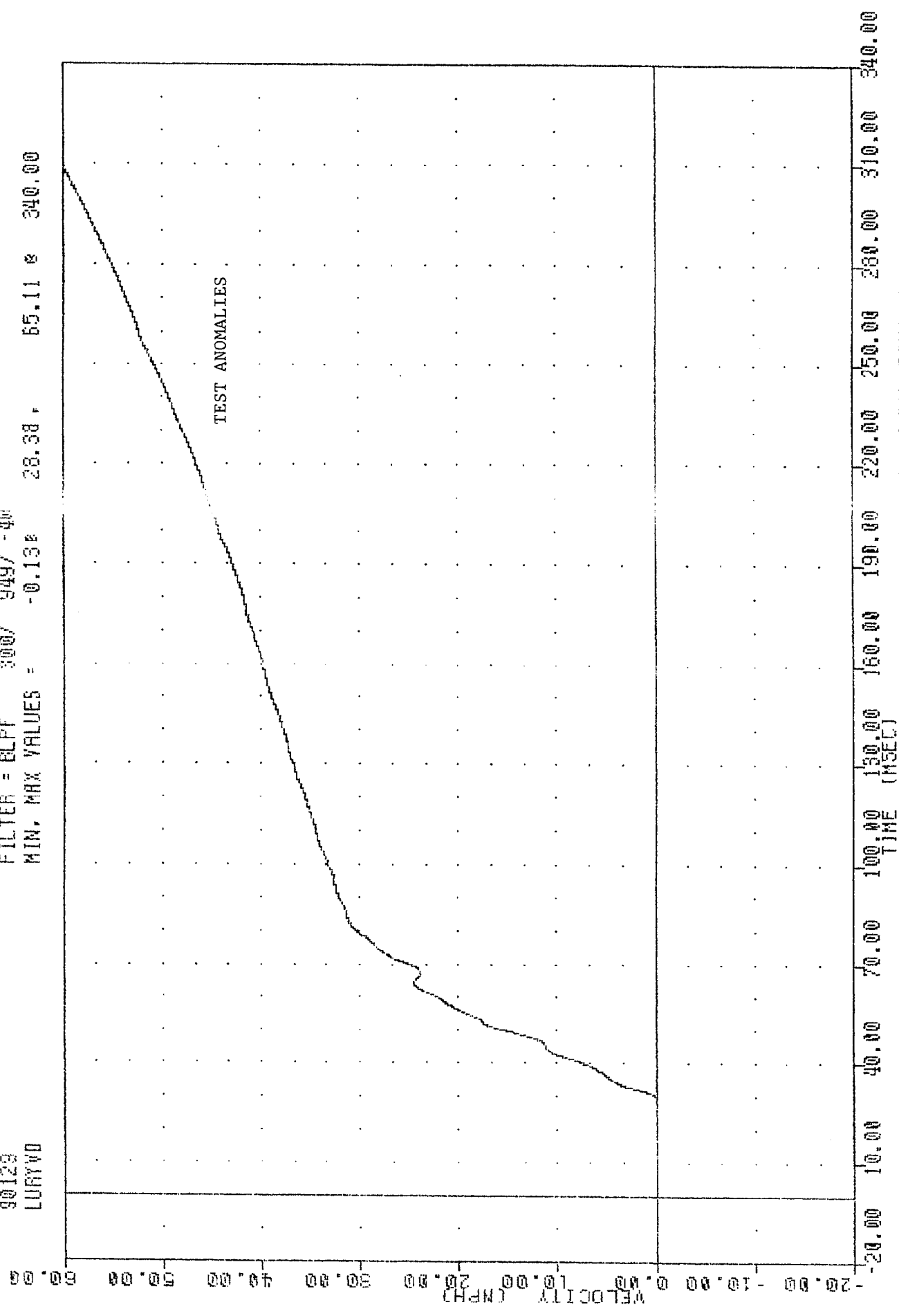


0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LEFT UPPER THORAX RIB 7 AXIS REDUNDANT ACCELERATION

SI PROTECTION FACO VEHICLE
90129
LURYVO

FILTER = BLFF 300/ 949/ -40
MIN. MAX VALUES = -0.13% 28.38% 65.11% 340.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LEFT UPPER THORAX AIR Y AXIS REDUNDANT VELOCITY

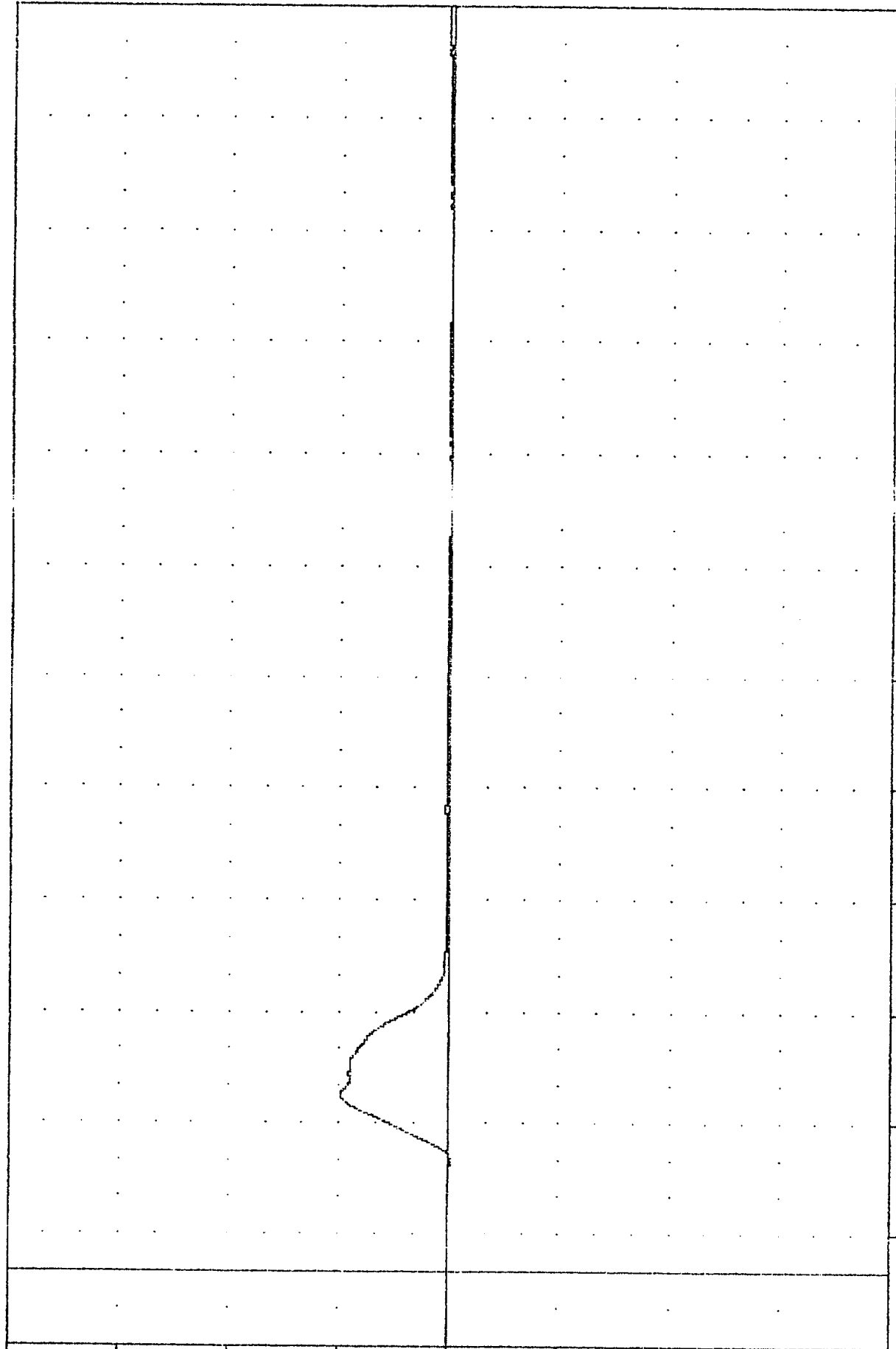
SI PROTECTION PROD VEHICLE

90129
LURY04

FILTER = BLFF 300/ 949/ -40

MIN, MAX VALUES = -0.15e 29.75, 24.56 e 47.25

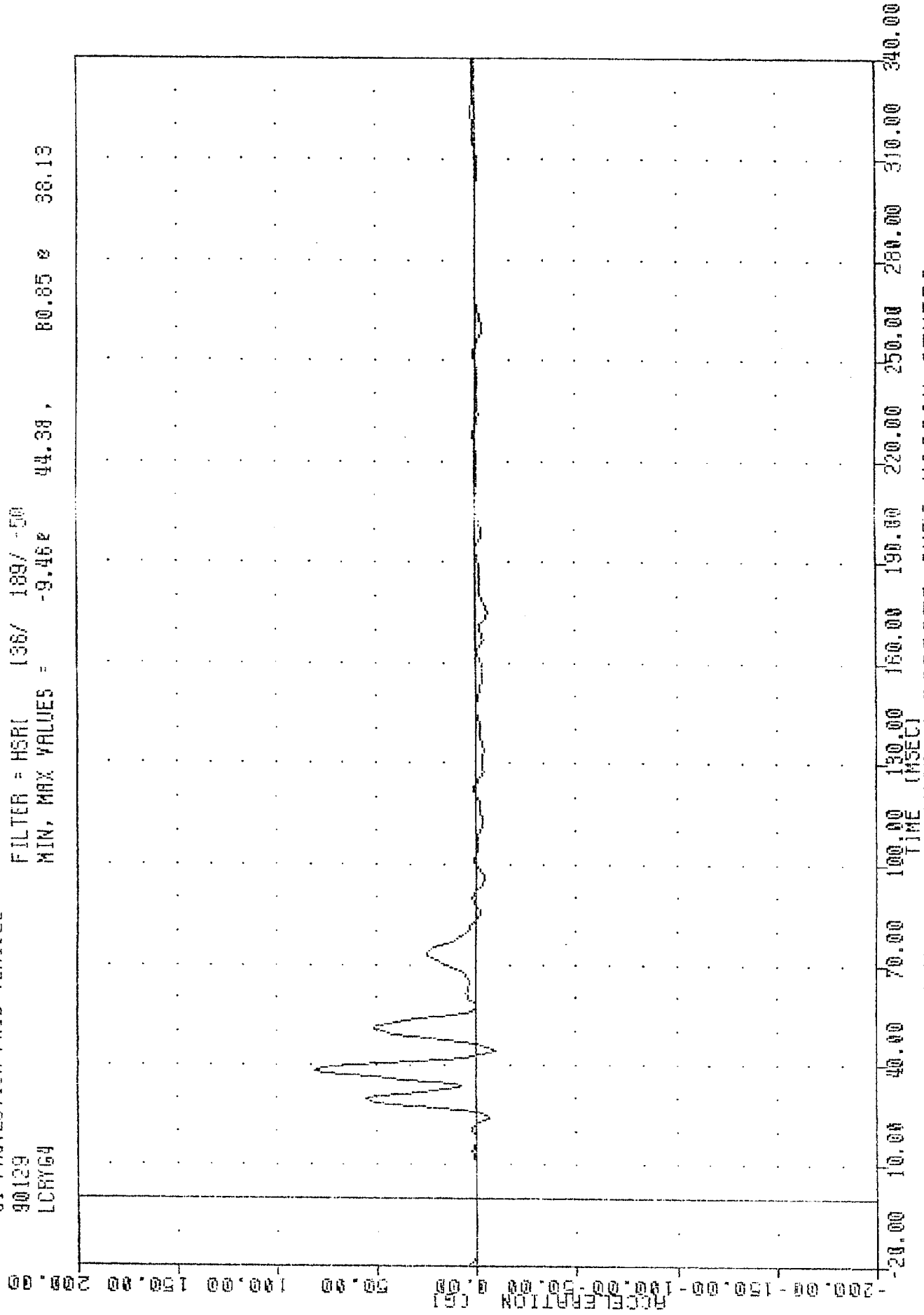
DISPLACEMENT (CM)



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LEFT UPPER THORIX RIB DISPLACEMENT

VEHICLE
 81 PROTECTION PROO VEHICLE
 90129
 LCRY64

FILTER = HSR1 136/ 189/ -50
 MIN, MAX VALUES = 44.38 , 80.85 38.13



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 LEFT REAR PASSENGER LEFT CENTER THORAX RIB Y AXIS ACCELERATION

31 PMUVECTION FROM VEHICLE

90129

LCRYV4

FILTER = BLPF

300/

949/ -40

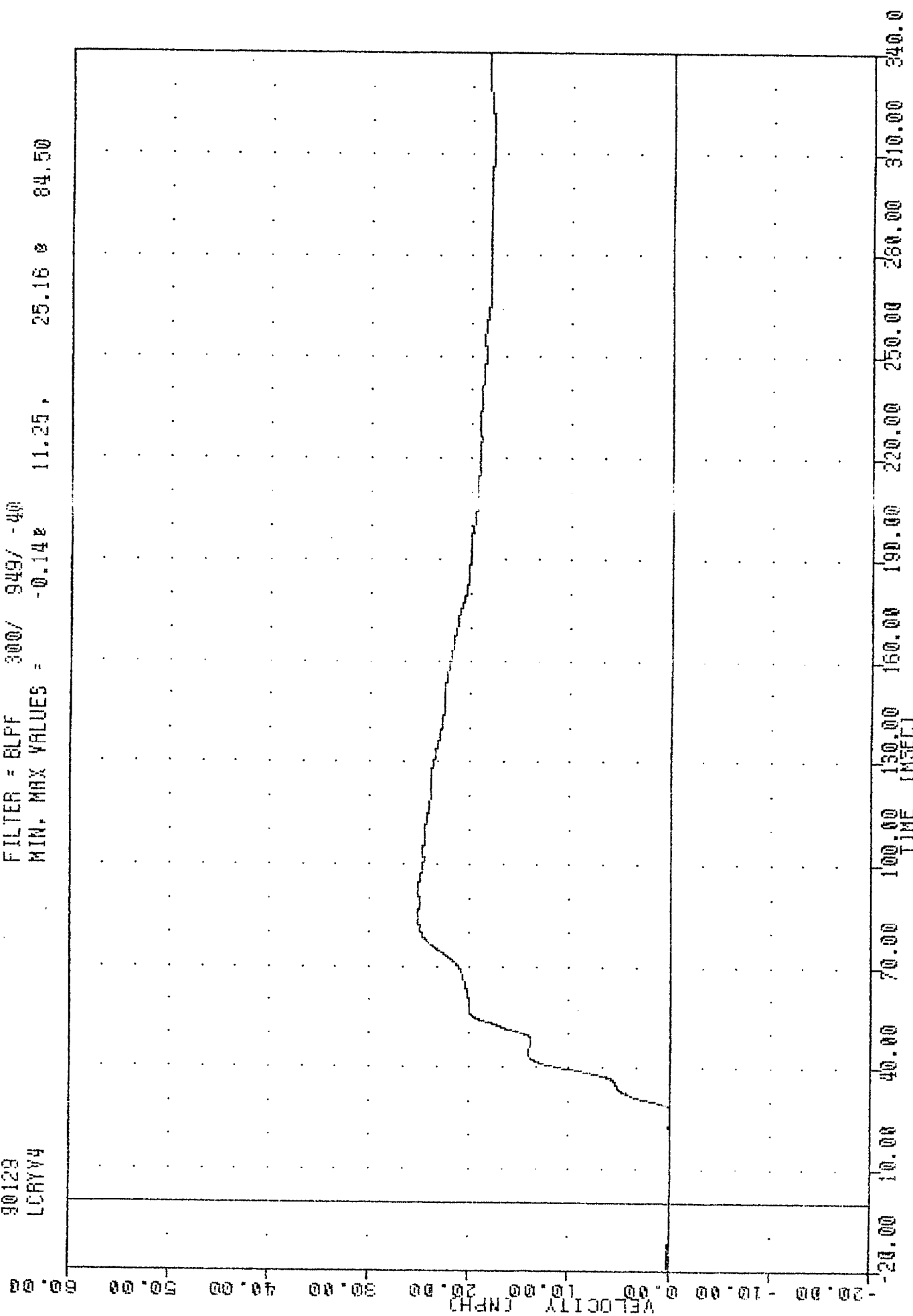
MIN. MAX VALUES =

-0.14e

11.25,

25.16 e

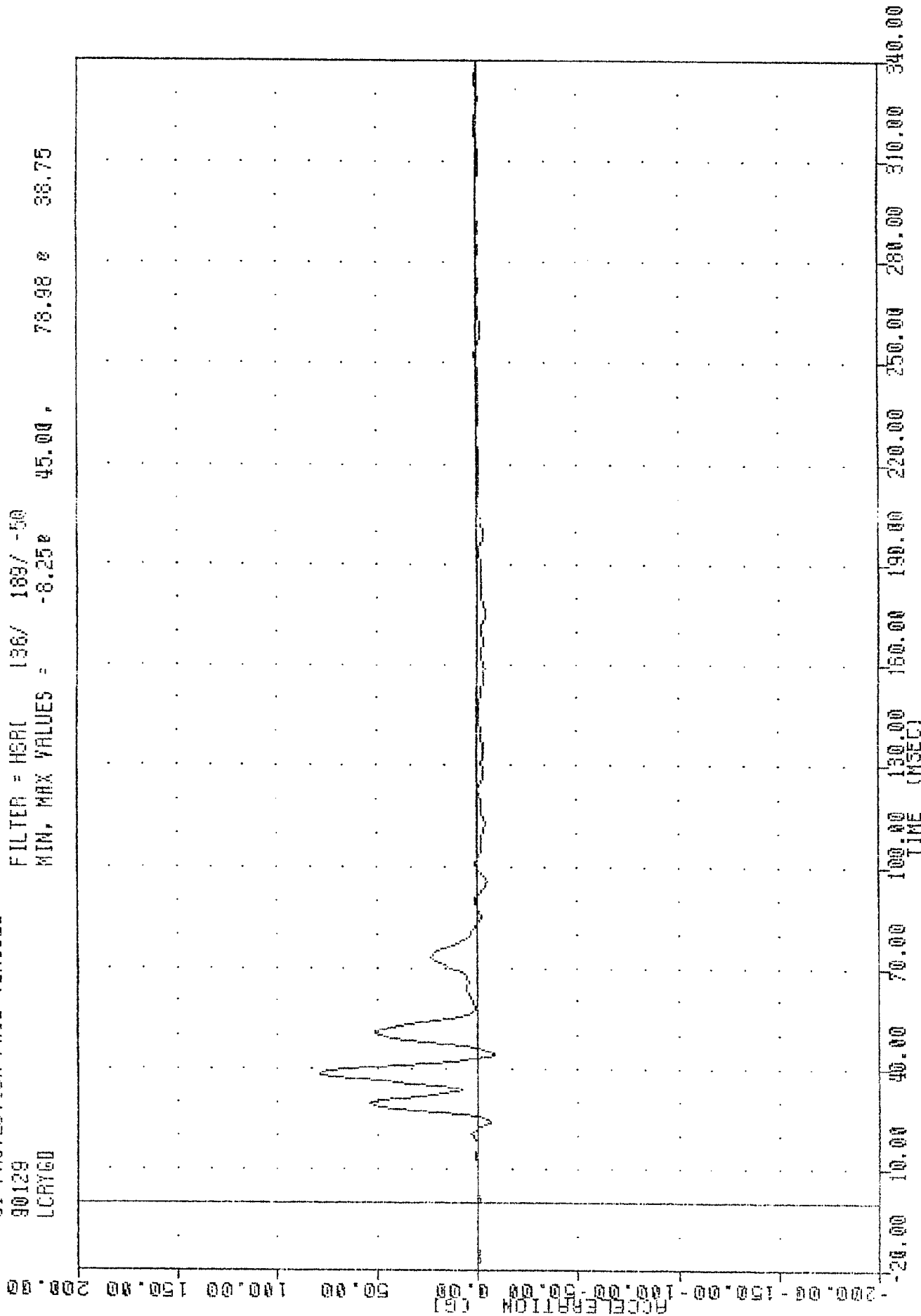
84.50



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LEFT CENTER THORAX RIB Y AXIS VELOCITY

VEHICLE : 3000-003
 SI PROTECTION PROD VEHICLE
 90129
 LCY60

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -8.25% 45.00 , 78.98 % 38.75



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 LEFT REAR PASSENGER LEFT CENTER THORAX RIB Y AXIS REDUNDANT ACCEL

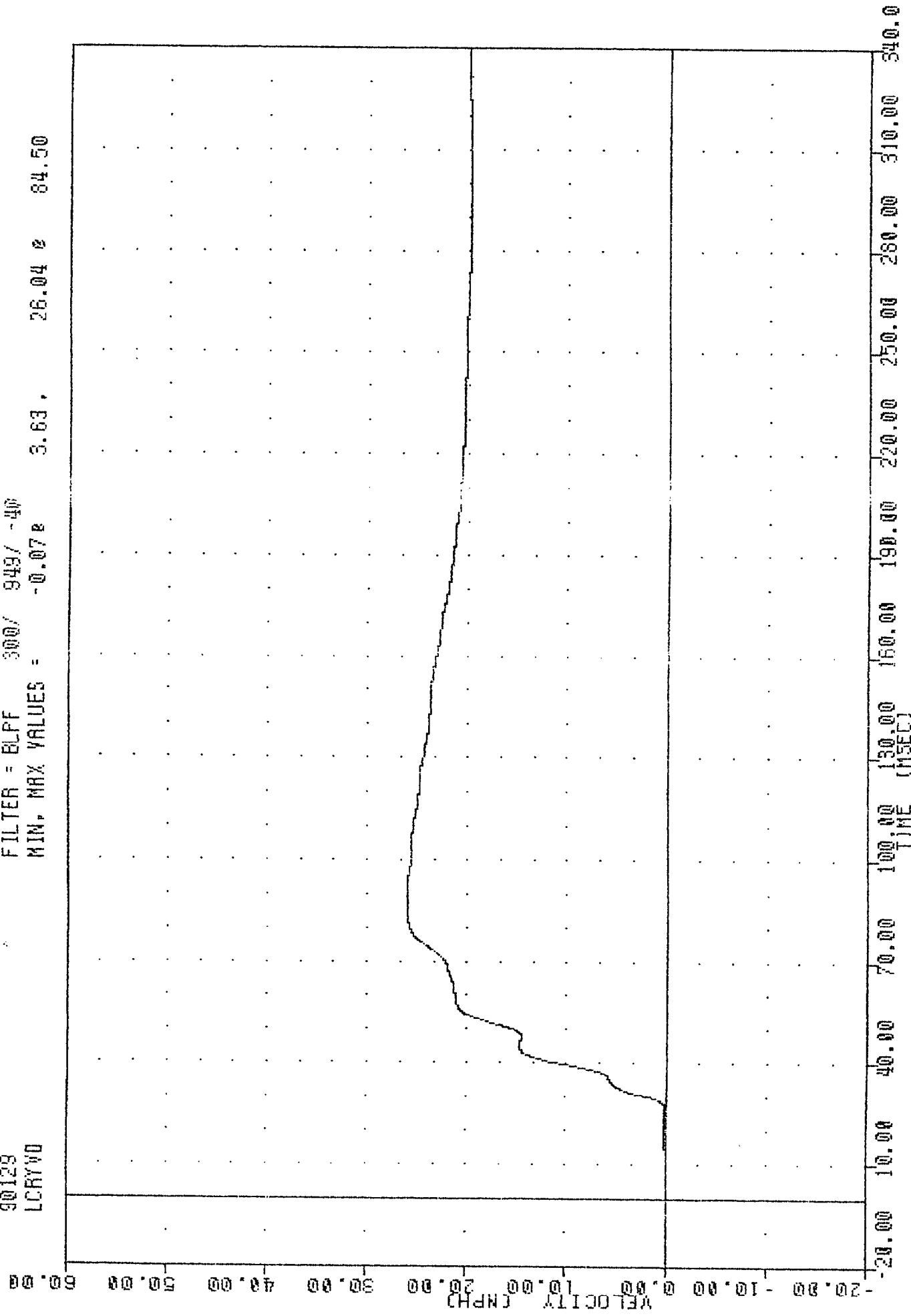
34. SIMULATION FROM VEHICLE

90129

LCRYWD

FILTER = BLPF 300/ 949/ -40

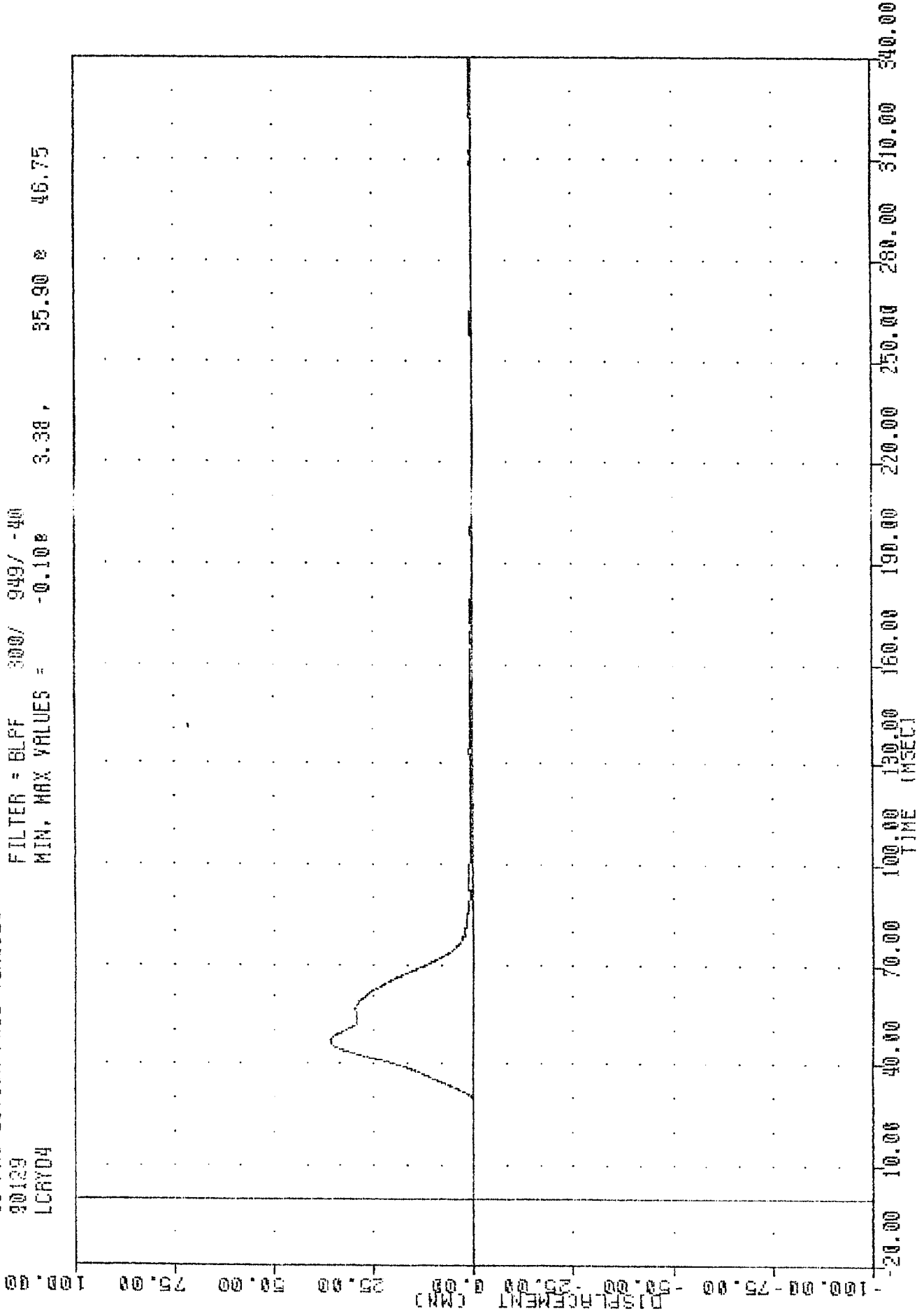
MIN. MAX VALUES = -0.078 3.63, 26.04 8 84.50



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LEFT CENTER THORAX RIB Y AXIS REDUNDANT VELOCITY

VRIC . 900503
SI PROTECTION PROD VEHICLE
90129
LCRYD4

FILTER = BLFF 300/ 949/ -40
MIN, MAX VALUES = -0.100 3.38 , 35.90 0 46.75



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LEFT CENTER THORAX RIB DISPLACEMENT

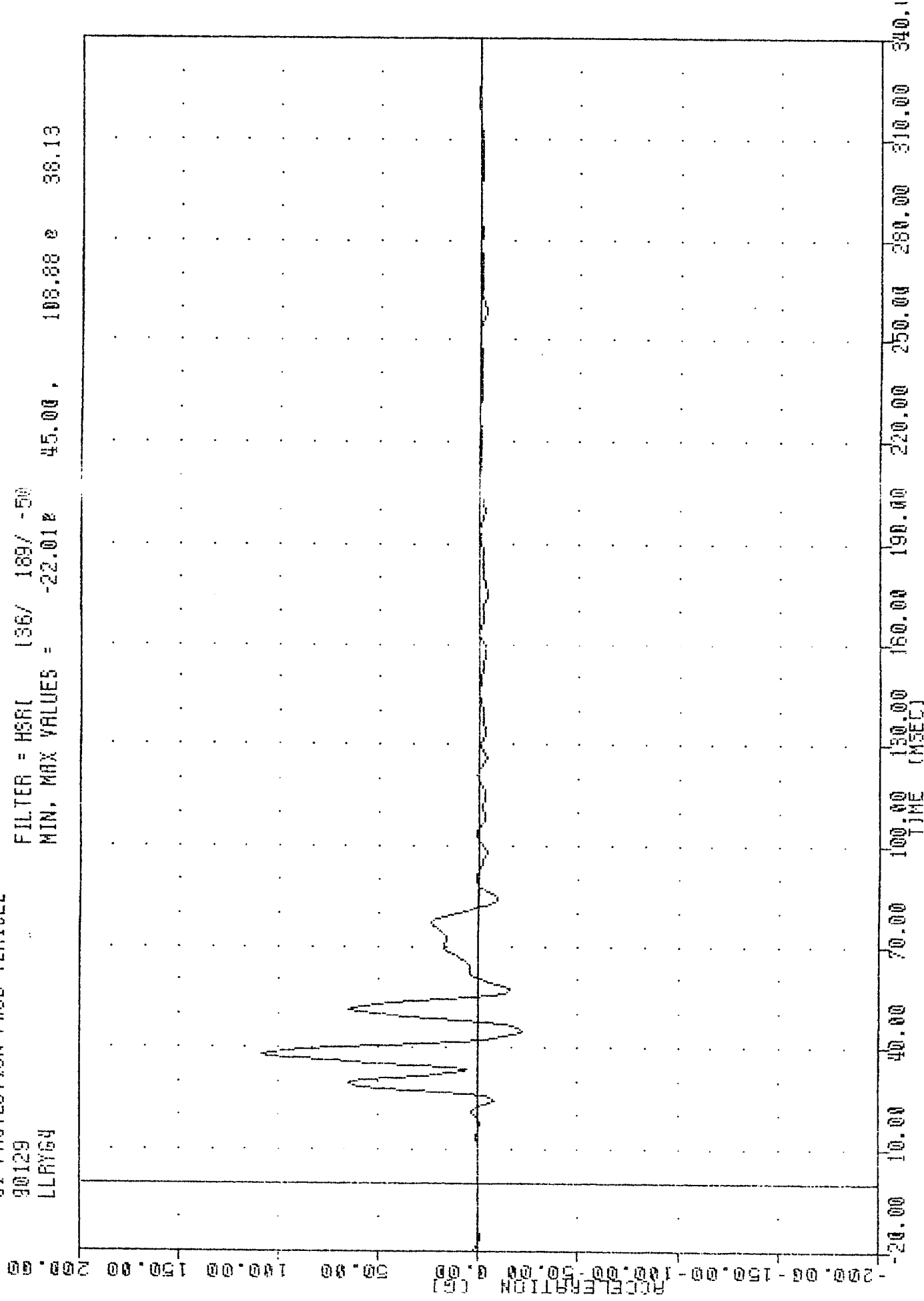
31 PROJECTION FROM VEHICLE

90129

LLRY64

FILTER = HSR(136/ 189/ -50

MIN. MAX VALUES = -22.01% 45.00 , 108.88 % 38.13

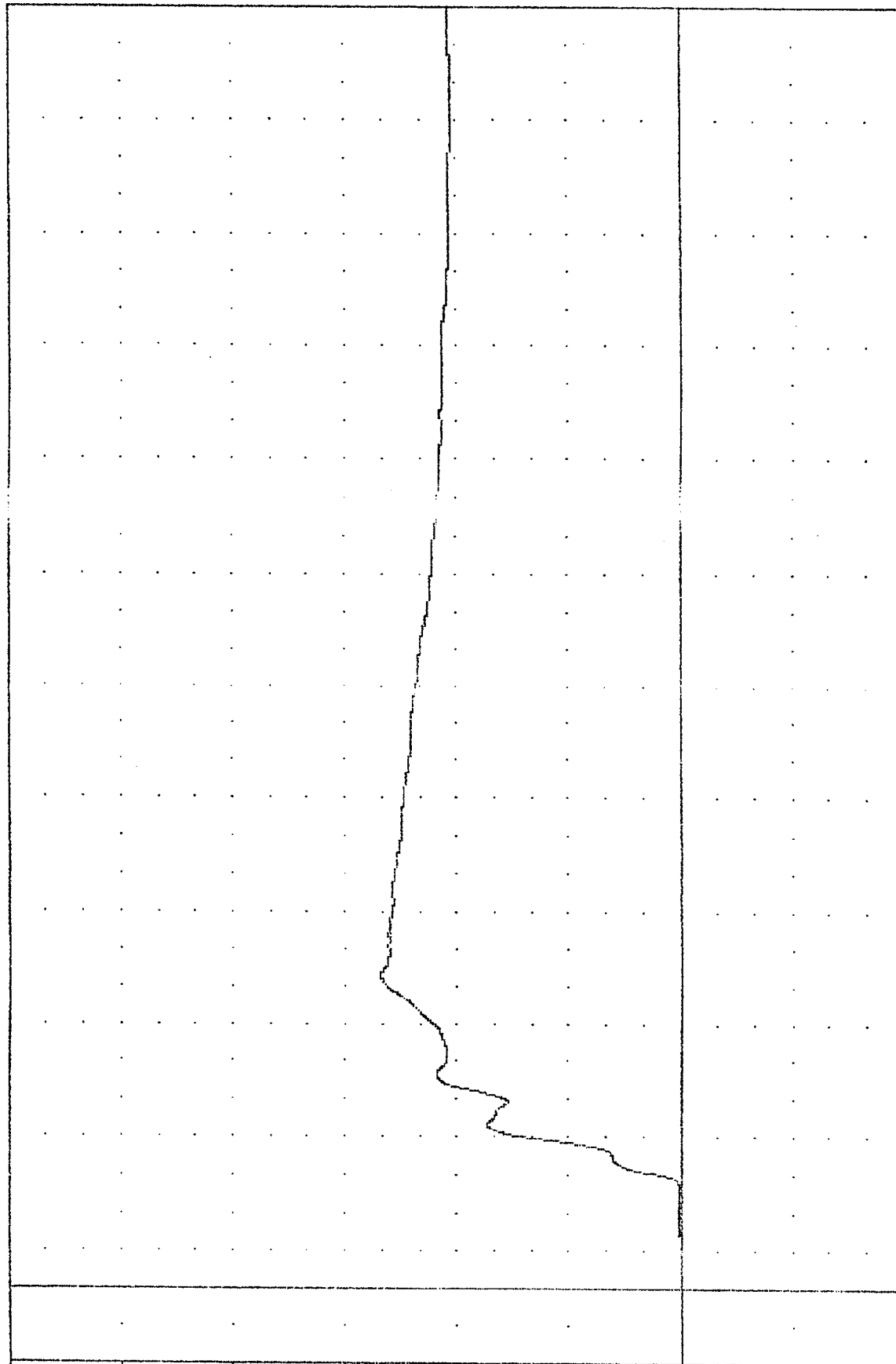


MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LEFT LOWER THORAX RIB Y AXIS ACCELERATION

FILE 7 400503
SI PROTECTION PROD VEHICLE
90129
LLRYV4

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -0.08e 3.58, 26.79 e 82.75

VELOCITY (MPH)



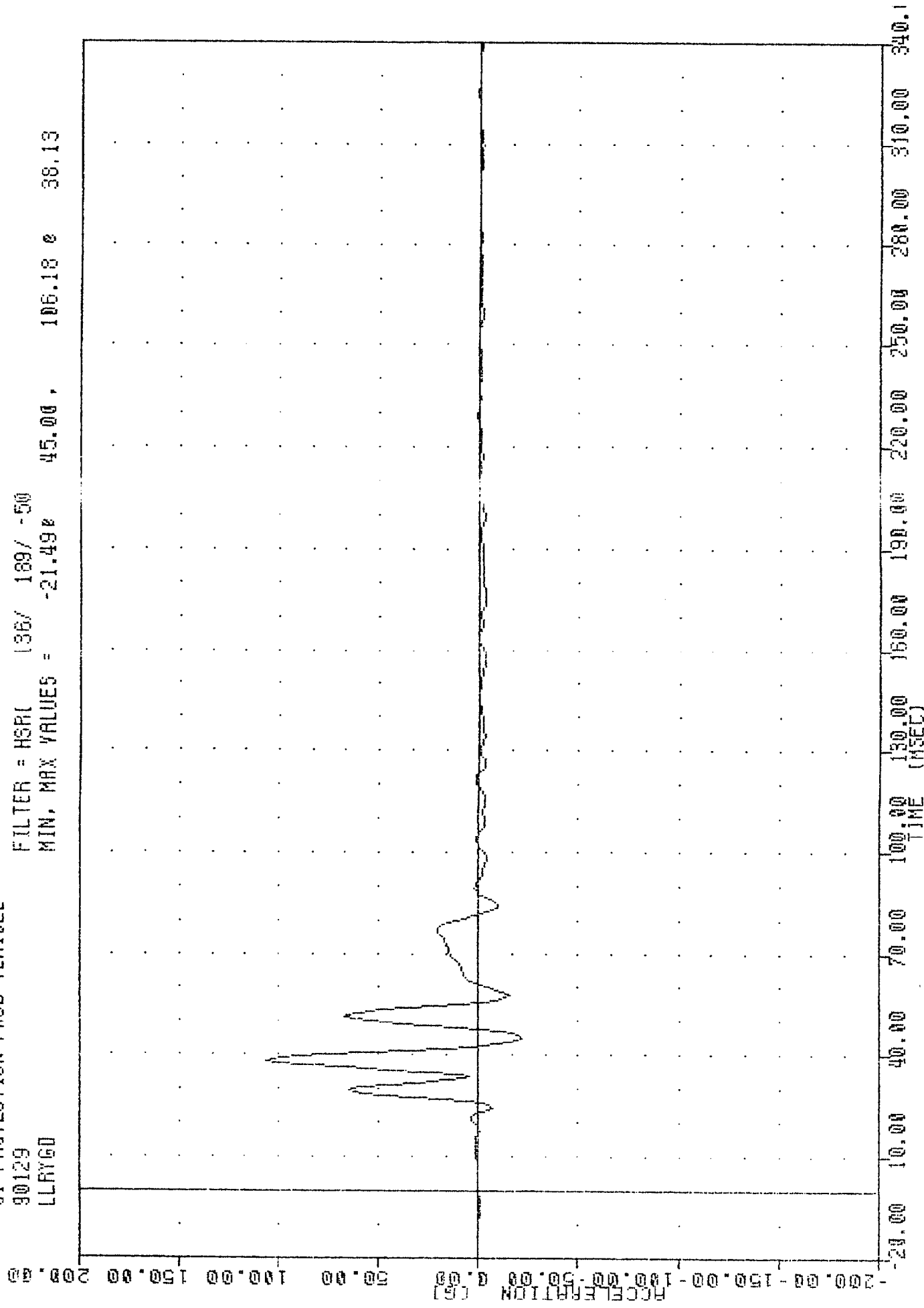
MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LEFT LOWER THORAX RIB Y AXIS VELOCITY

31 CONTINUATION FROM VEHICLE

90129
LLRY60

FILTER = HSR(136/ 189/ -50

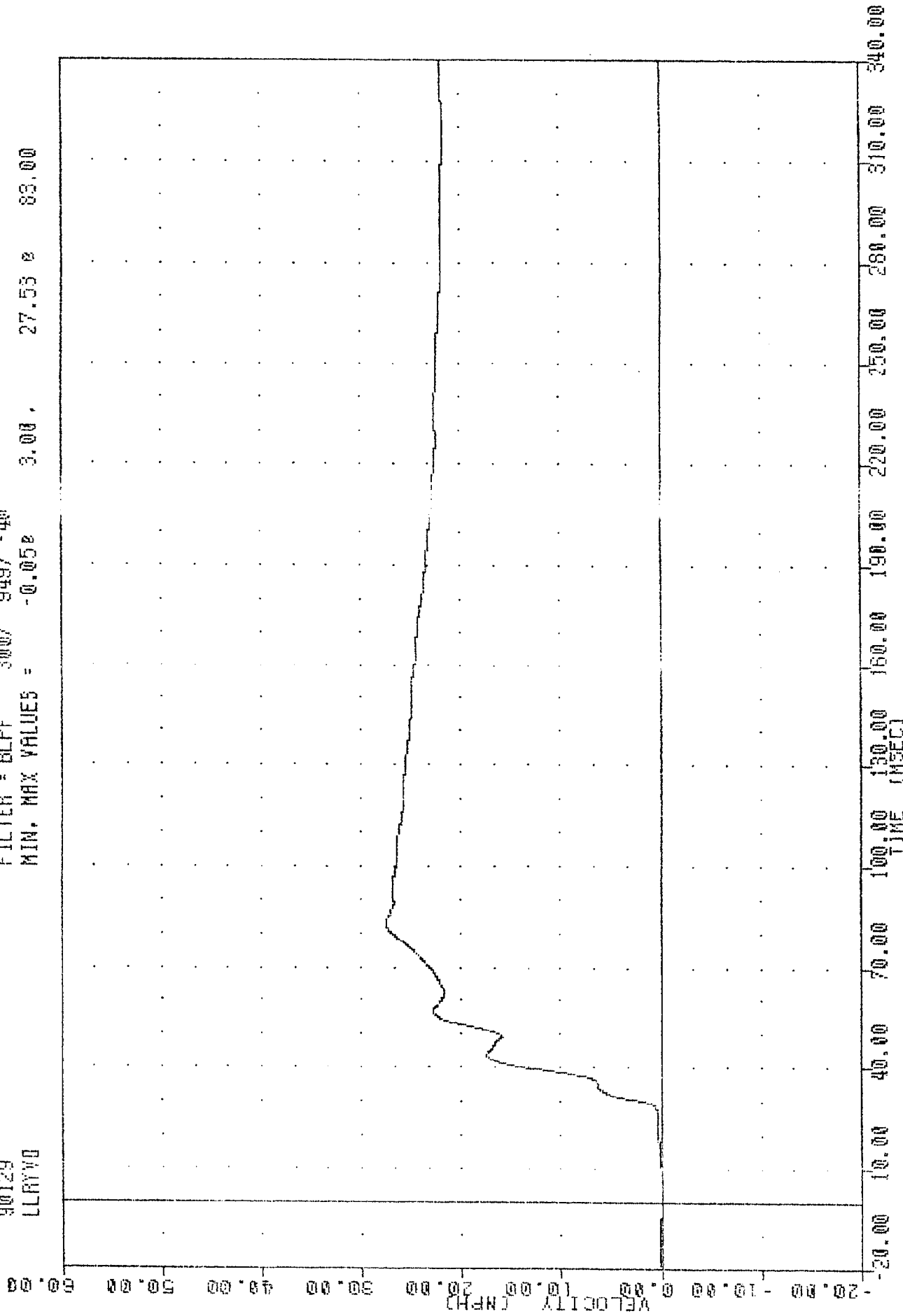
MIN, MAX VALUES = -21.498 45.00 , 106.18 0 38.13



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA

LEFT REAR PASSENGER LEFT LOWER THORAX RIB Y AXIS REDUNDANT ACCELERATION

90129
 LLRYVQ
 SI PROTECTION PROD VEHICLE
 FILTER = BLPF 3000/ 949/ -40
 MIN. MAX VALUES = -0.050 3.00 27.53 83.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 LEFT REAR PASSENGER LEFT LOWER THORAX AIR Y AXIS REDUNDANT VELOCITY

SI PROTECTION PROO VEHICLE

90129

LLRY04

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -0.13e 13.13, 42.23 e 46.25

100.00

75.00

50.00

25.00

0.00

-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

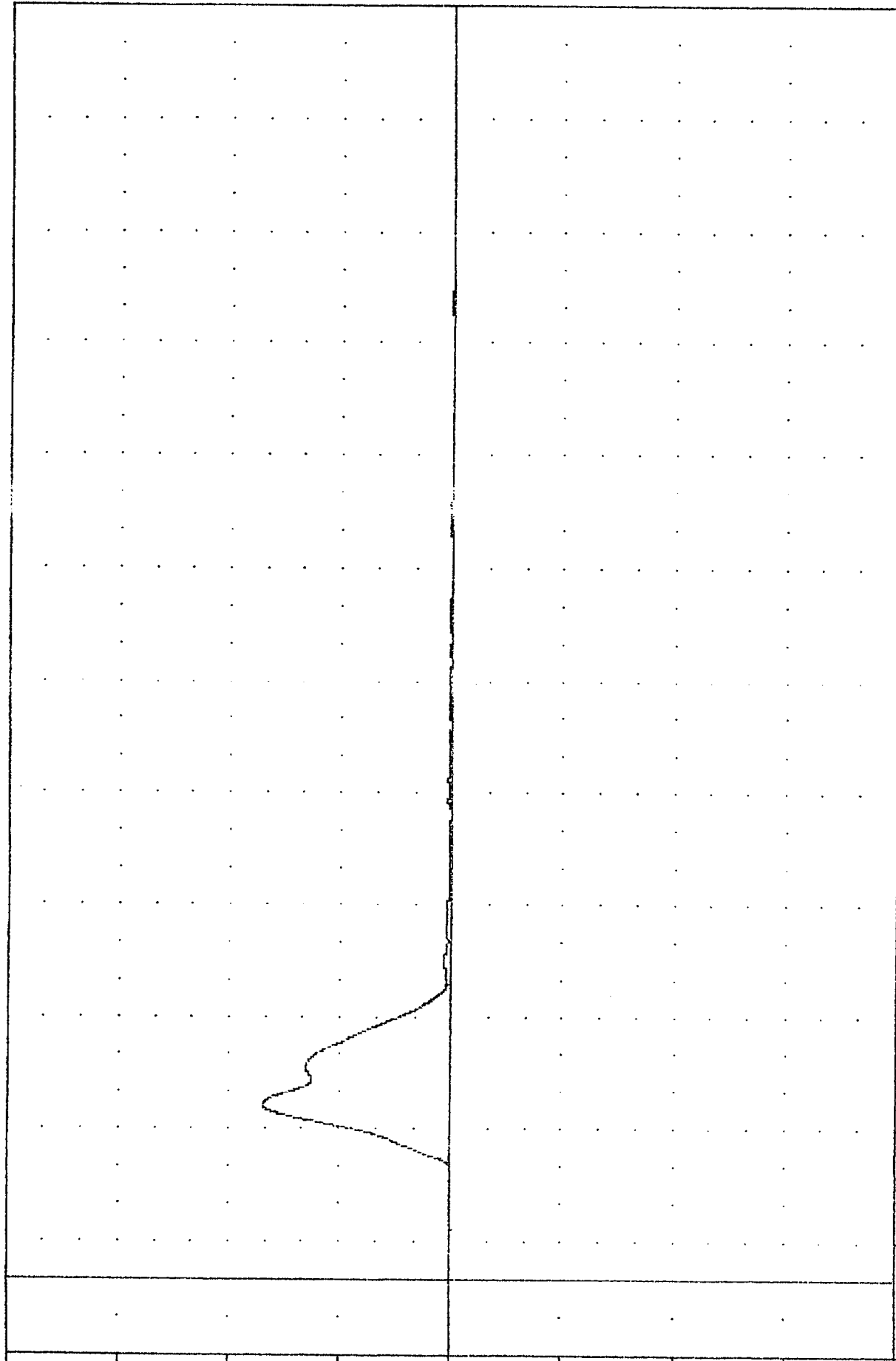
310.00

340.00

TIME (MSEC)

MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA

LEFT REAR PASSENGER LEFT LOWER THORAX RIB DISPLACEMENT

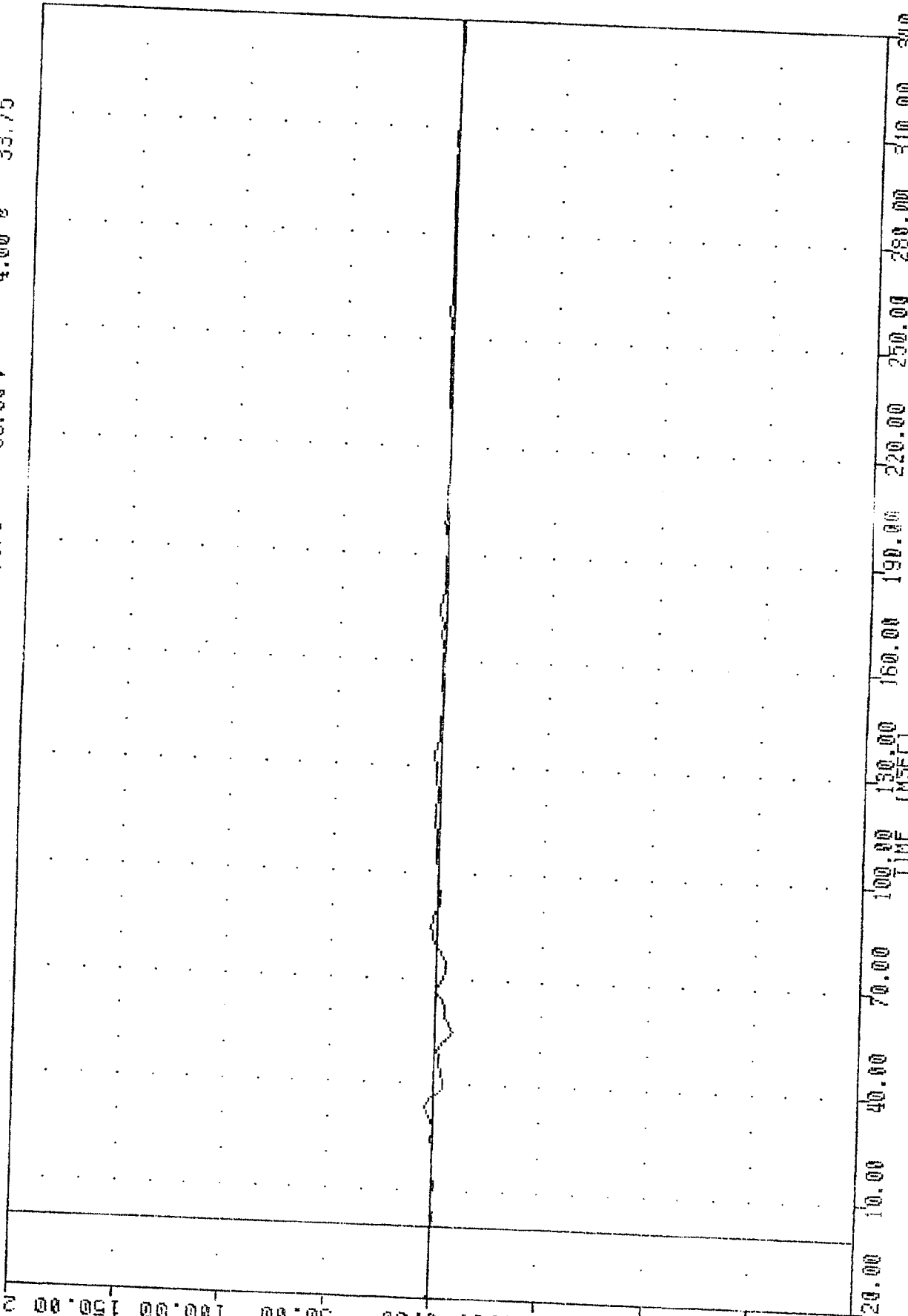


IN FLOW VEHICLE

30123
T12XG4

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -7.74 55.00 , 4.00 33.75

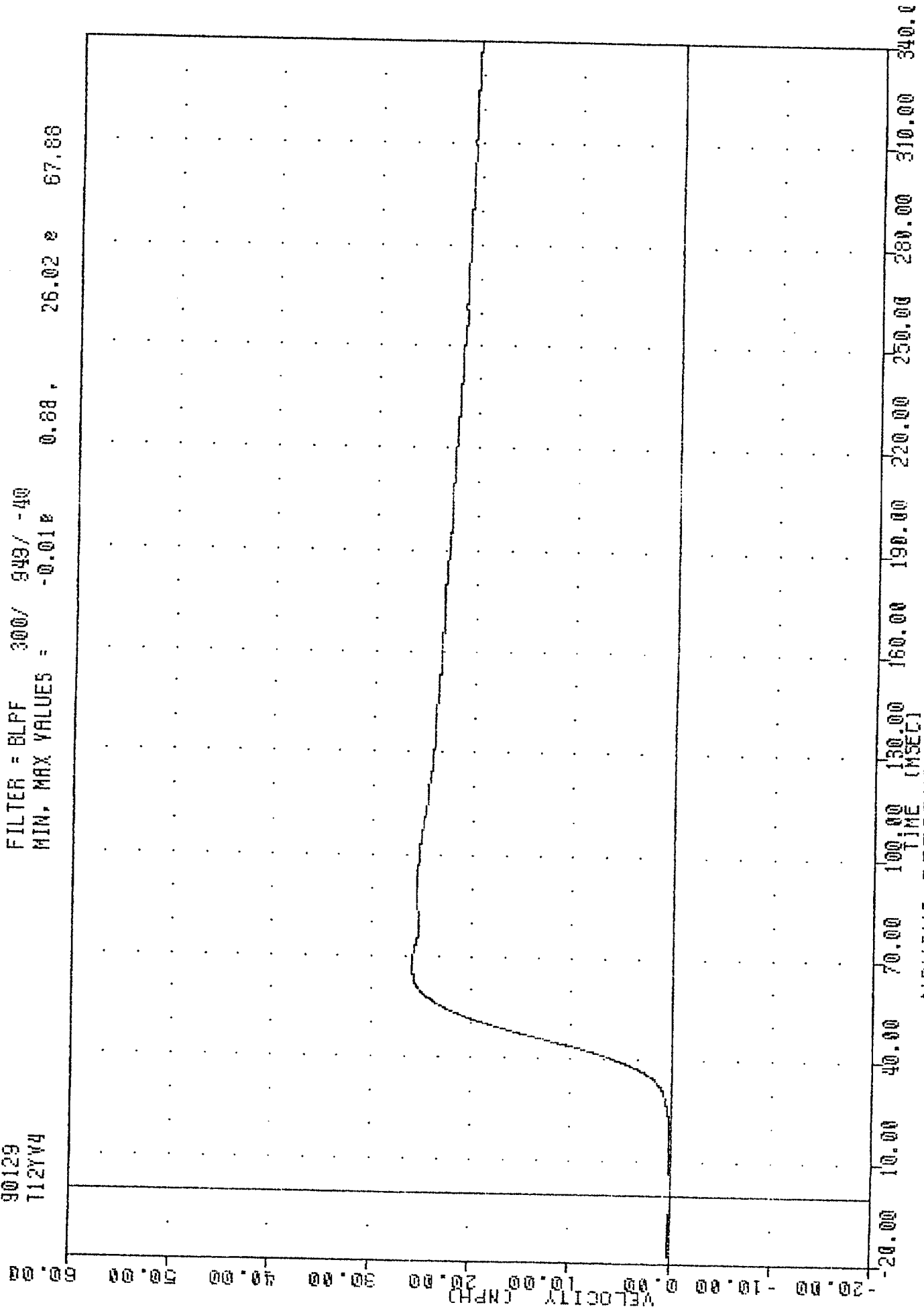
ACCELERATION (G)



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LOWER SPINE X AXIS ACCELERATION

90129
T12YV4

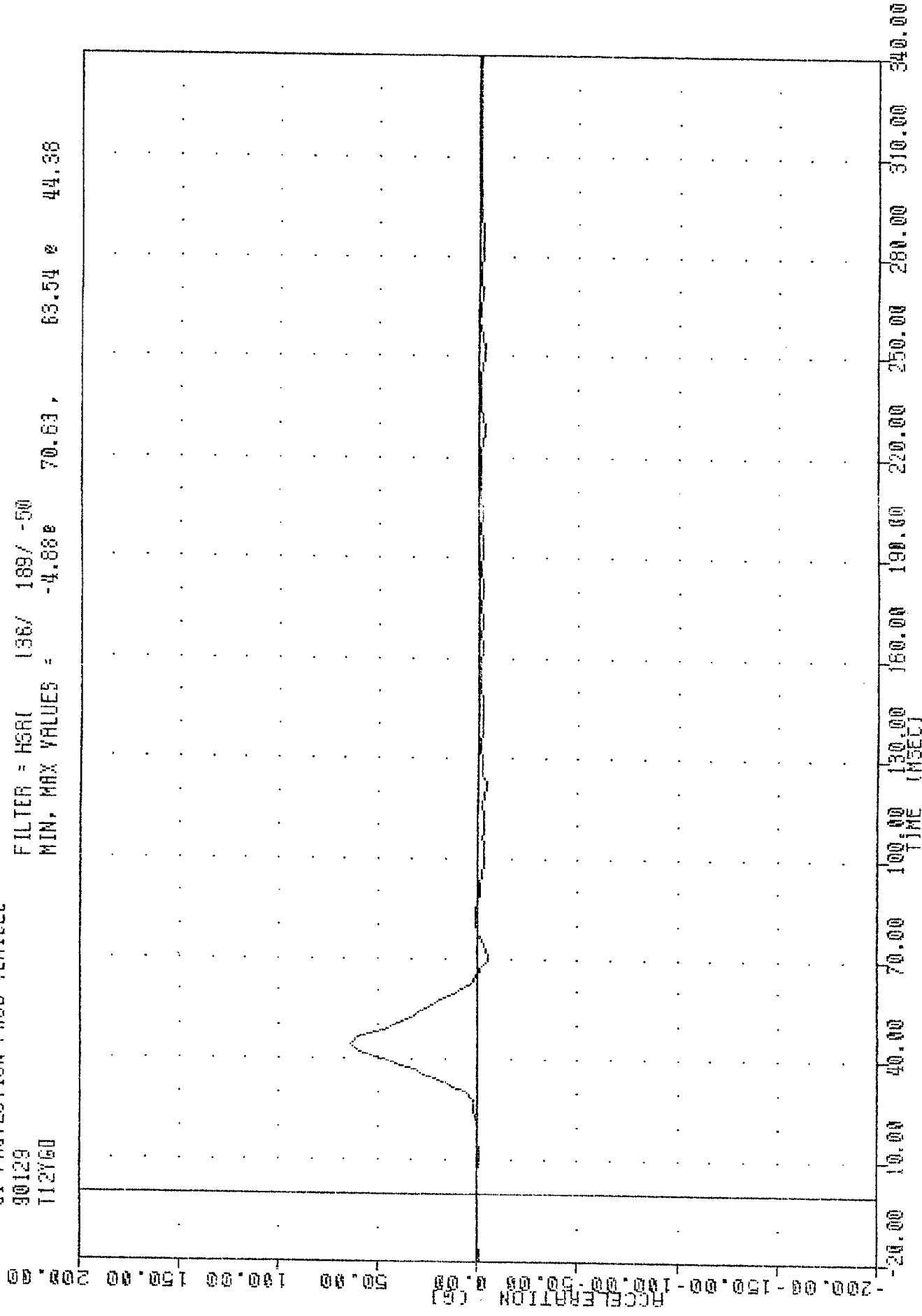
FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -0.01e 0.88, 26.02 e 67.88



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LOWER SPINE Y AXIS VELOCITY

SI PROTECTION PROD VEHICLE
90129
T12Y60

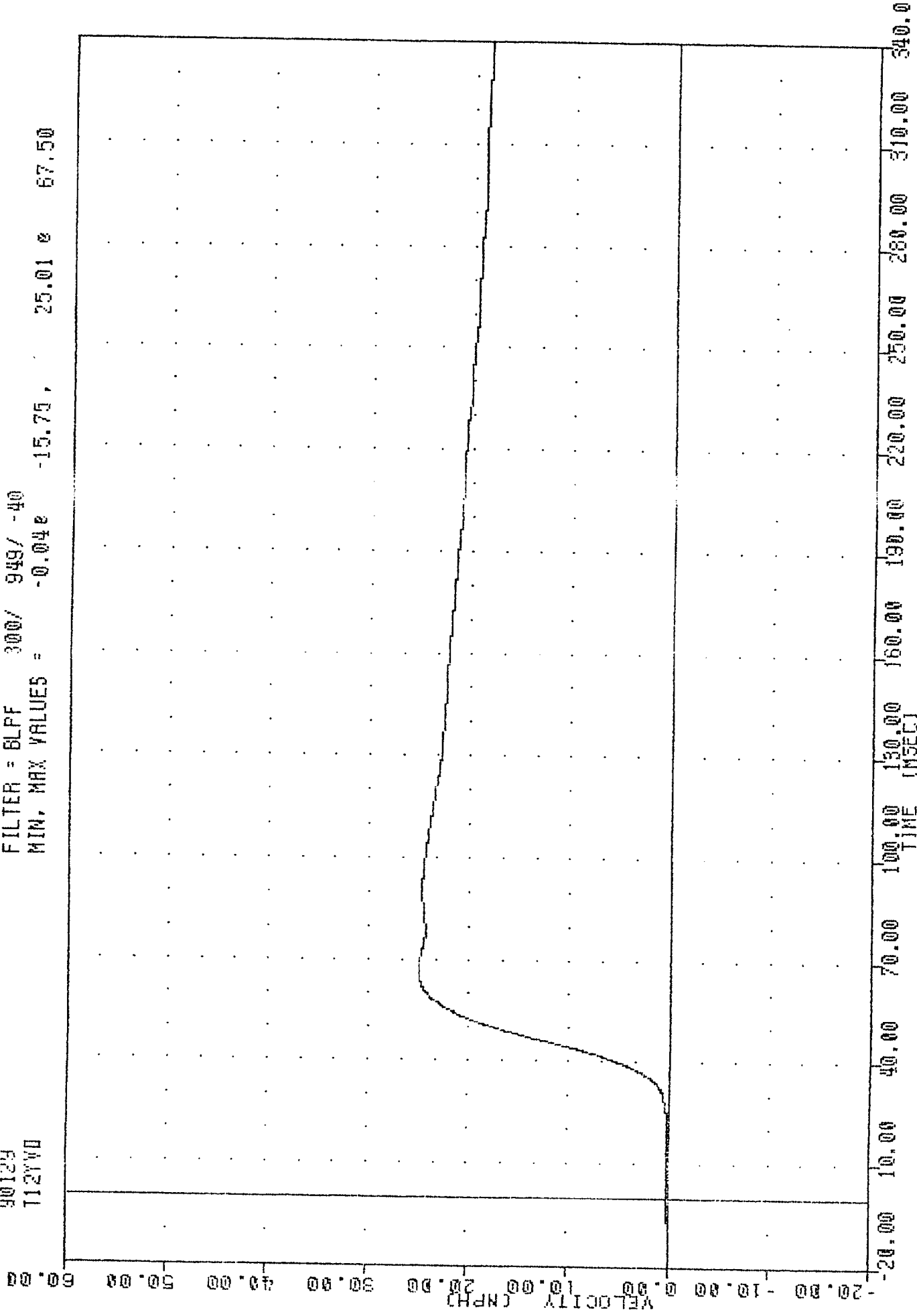
FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -4.88e 70.63, 63.54 e 44.38



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LOWER SPINE Y AXIS REDUNDANT ACCELERATION

90129
T12YV0

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -0.04e -15.75, 25.01 e 67.50



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LOWER SPINE Y AXIS REDUNDANT VELOCITY

SI PROTECTION PROD VEHICLE

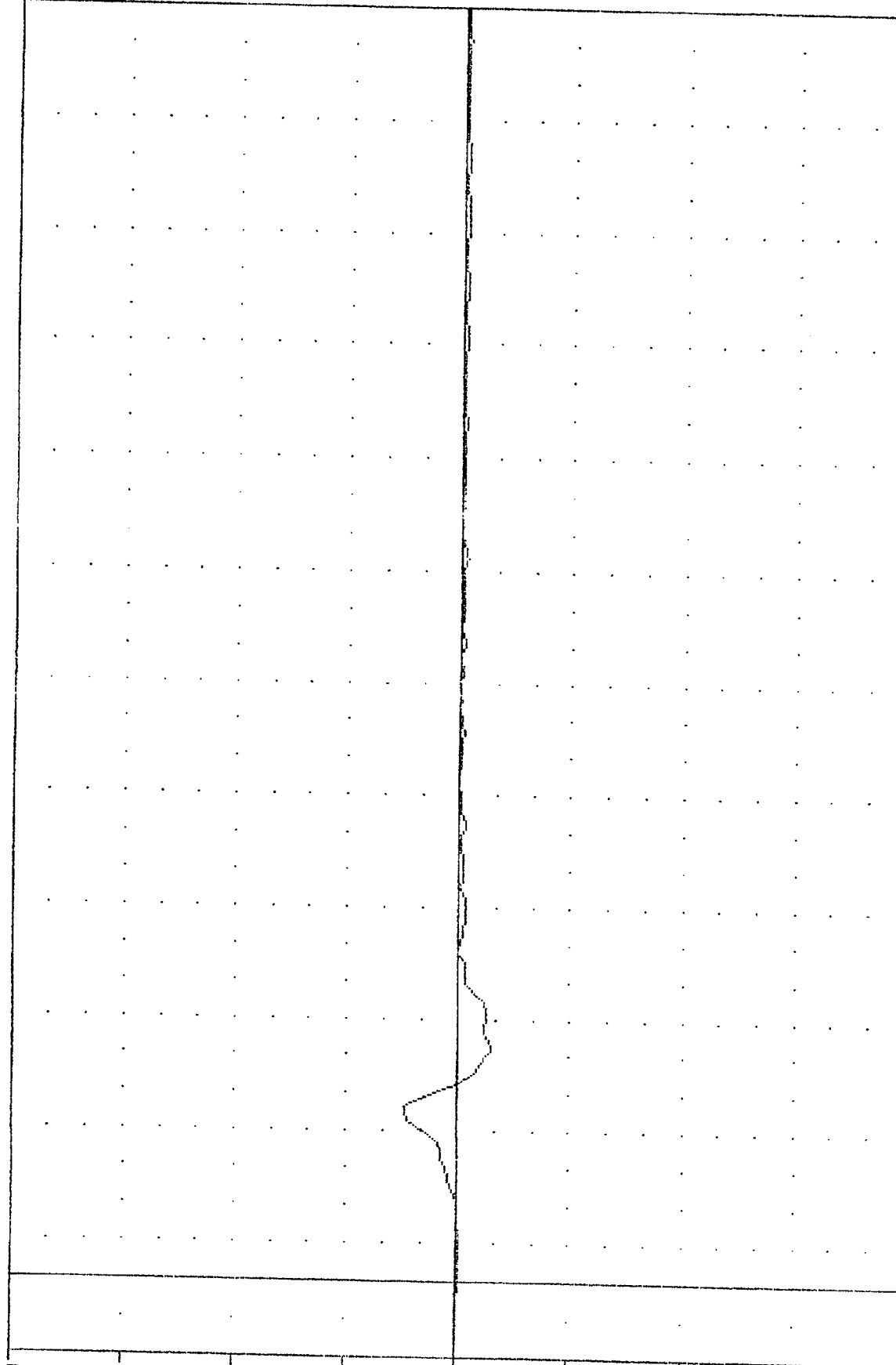
90129

712764

FILTER = HSR1 136/ 189/ -50

MIN, MAX VALUES = -14.62% 62.50, 23.97% 45.00

ACCELERATION [G]



0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LOWER SPINE 7 AXIS ACCELERATION

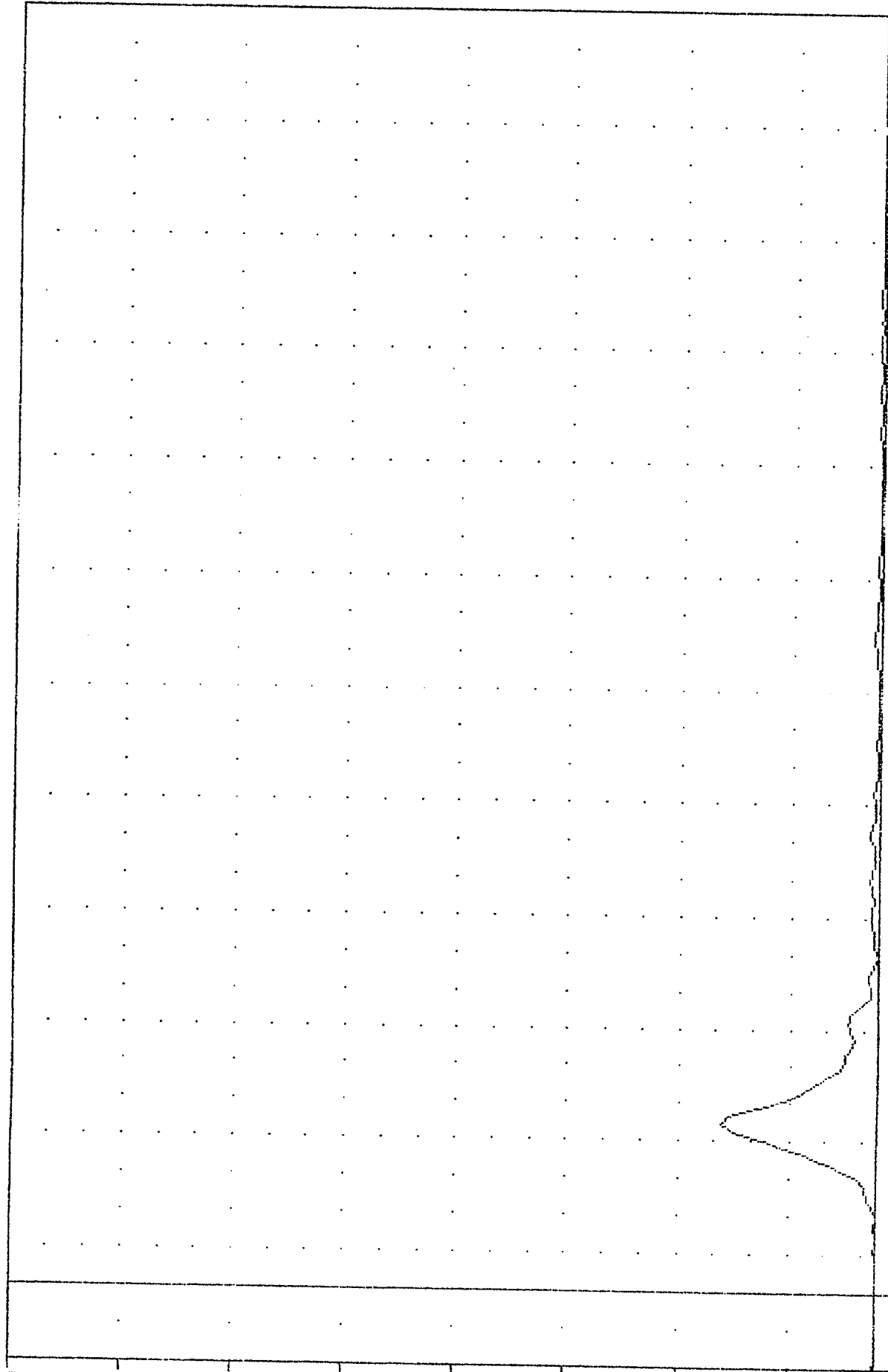
90129 T12RC4

FILTER = HSR 136/ 189/ -50

MIN. MAX VALUES = 0.228 -17.50 , 70.04 e 44.38

90129
T12RC4

ACCELERATION (G)



-10.00 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LOWER SPINE RESULTANT ACCELERATION

SI PROTECTION PROD VEHICLE

90129

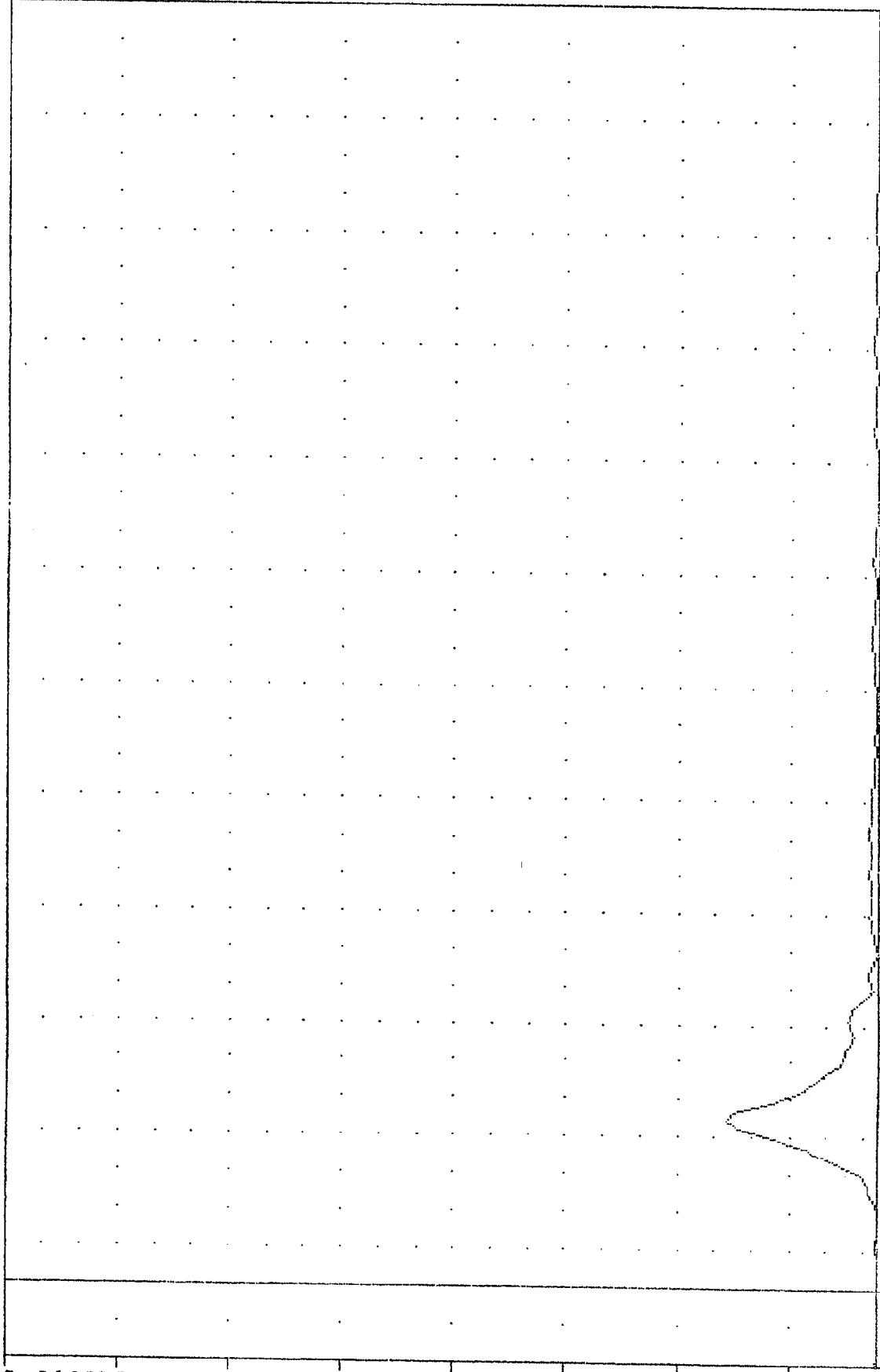
T1286U

FILTER = HSR1 136/ 189/ -50

MIN, MAX VALUES = 0.07g -4.38g

67.84 g 44.38

ACCELERATION (g)

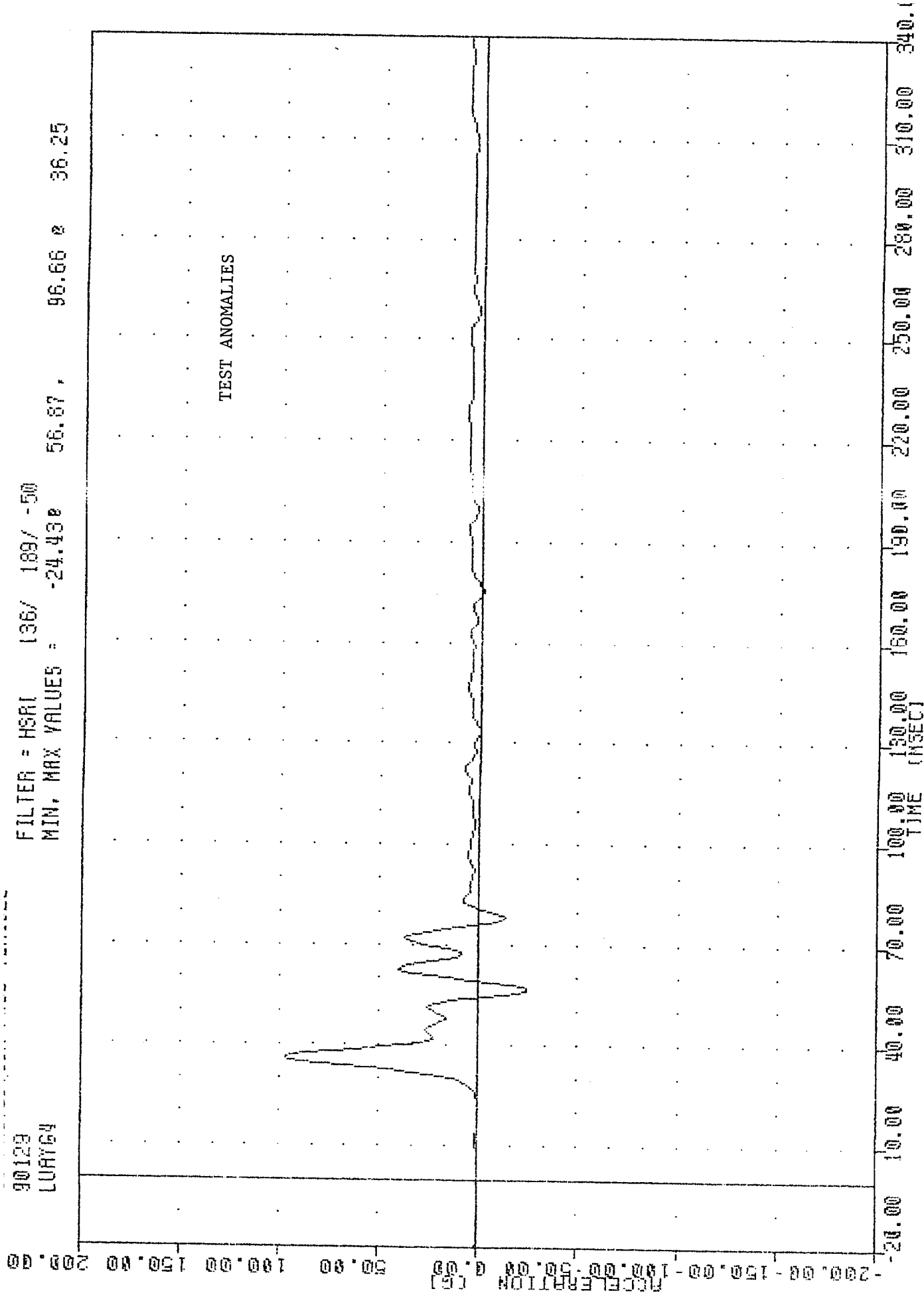


TIME (MSEC)

MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LOWER SPINE REDUNDANT RESULTANT ACCELERATION

90129
LURY64

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -24.430 56.87 , 96.66 0 36.25



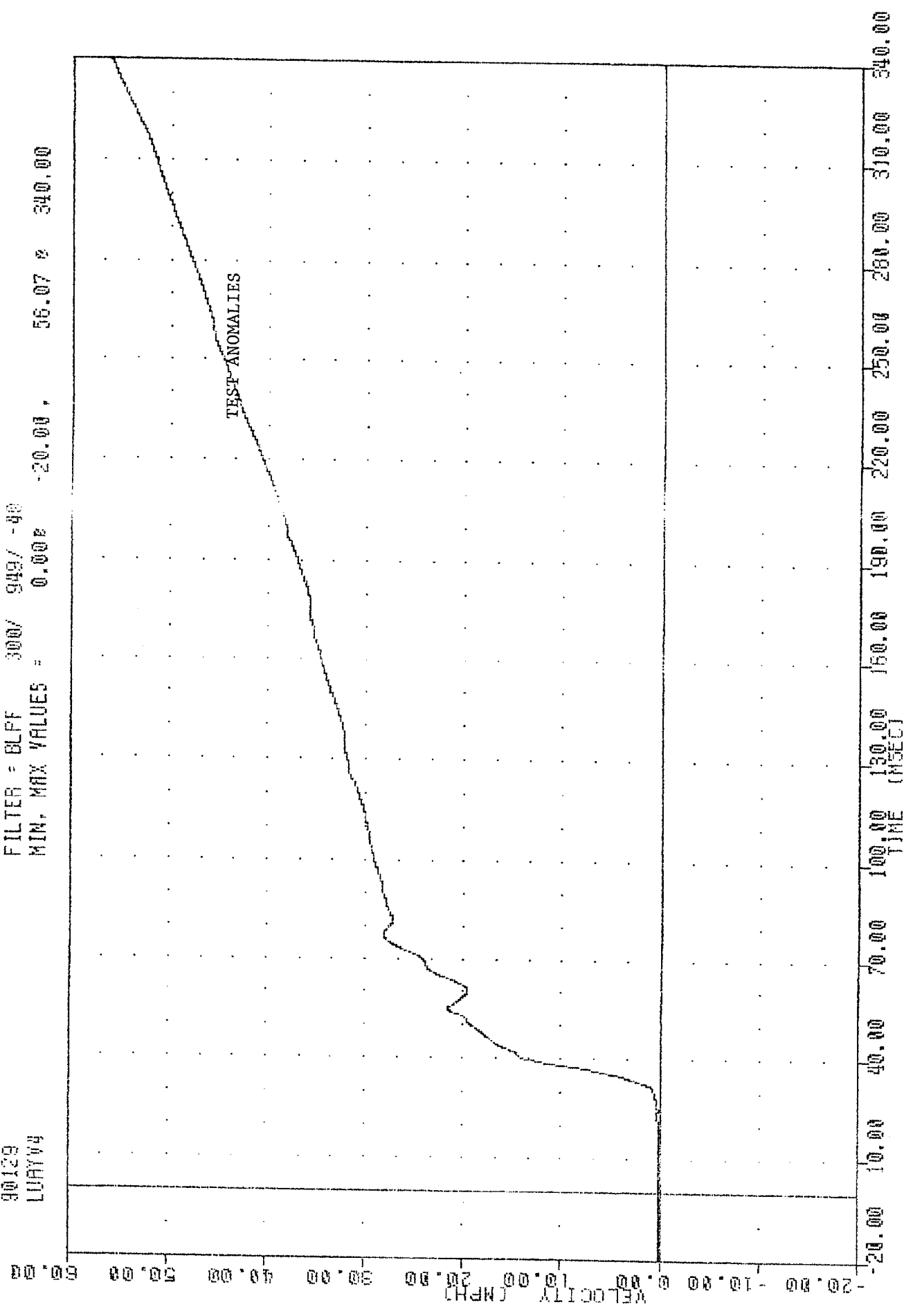
MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA

LEFT REAR PASSENGER LEFT UPPER ABDOMEN RIB Y AXIS ACCELERATION

SI COLLECTION PROD VEHICLE

90129
LURYV4

FILTER = BLFF 300/ 949/ -40
MIN. MAX VALUES = 0.000 -20.00 56.07 0 340.00



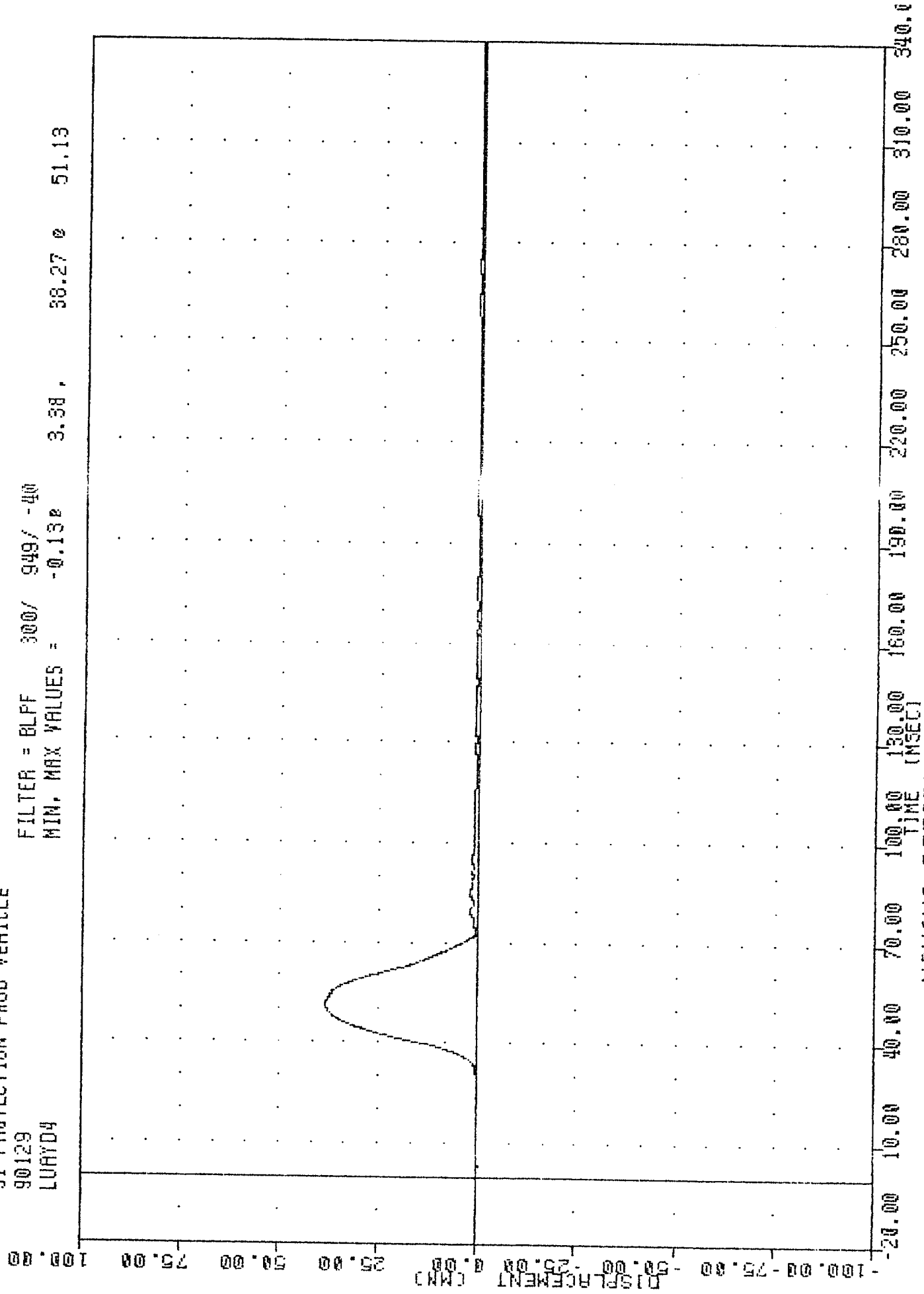
MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LEFT UPPER ABDOMEN RIB Y AXIS VELOCITY

SI PROTECTION PROD VEHICLE

90129
LUAYD4

FILTER = BLPF 300/ 949/ -40

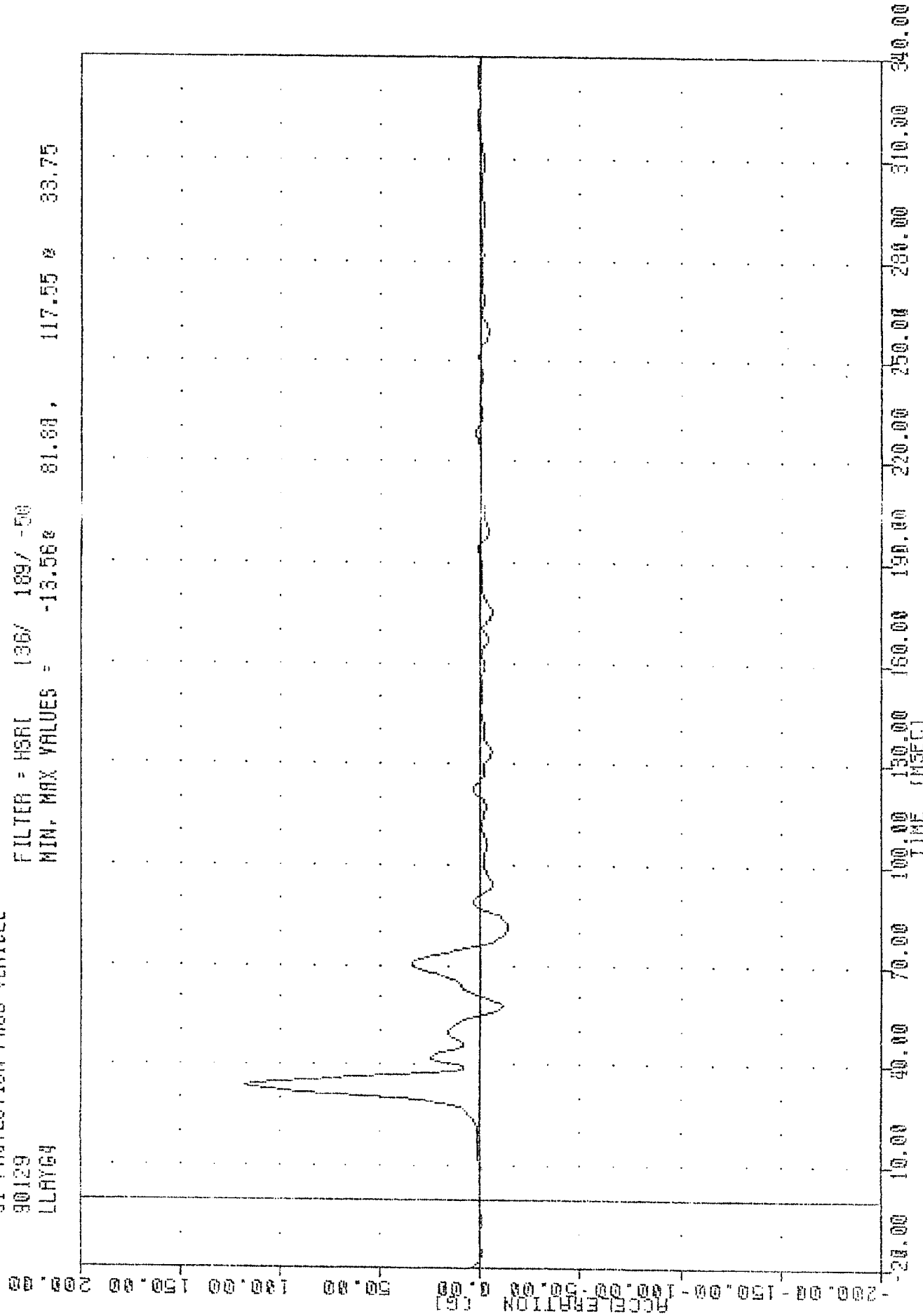
MIN. MAX VALUES = -0.13e 3.38. 38.27 e 51.13



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LEFT UPPER ABDOMEN RIB DISPLACEMENT

SI PROTECTION PASO VEHICLE
 90129
 LLA164

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -13.56% 81.81, 117.55% 33.75

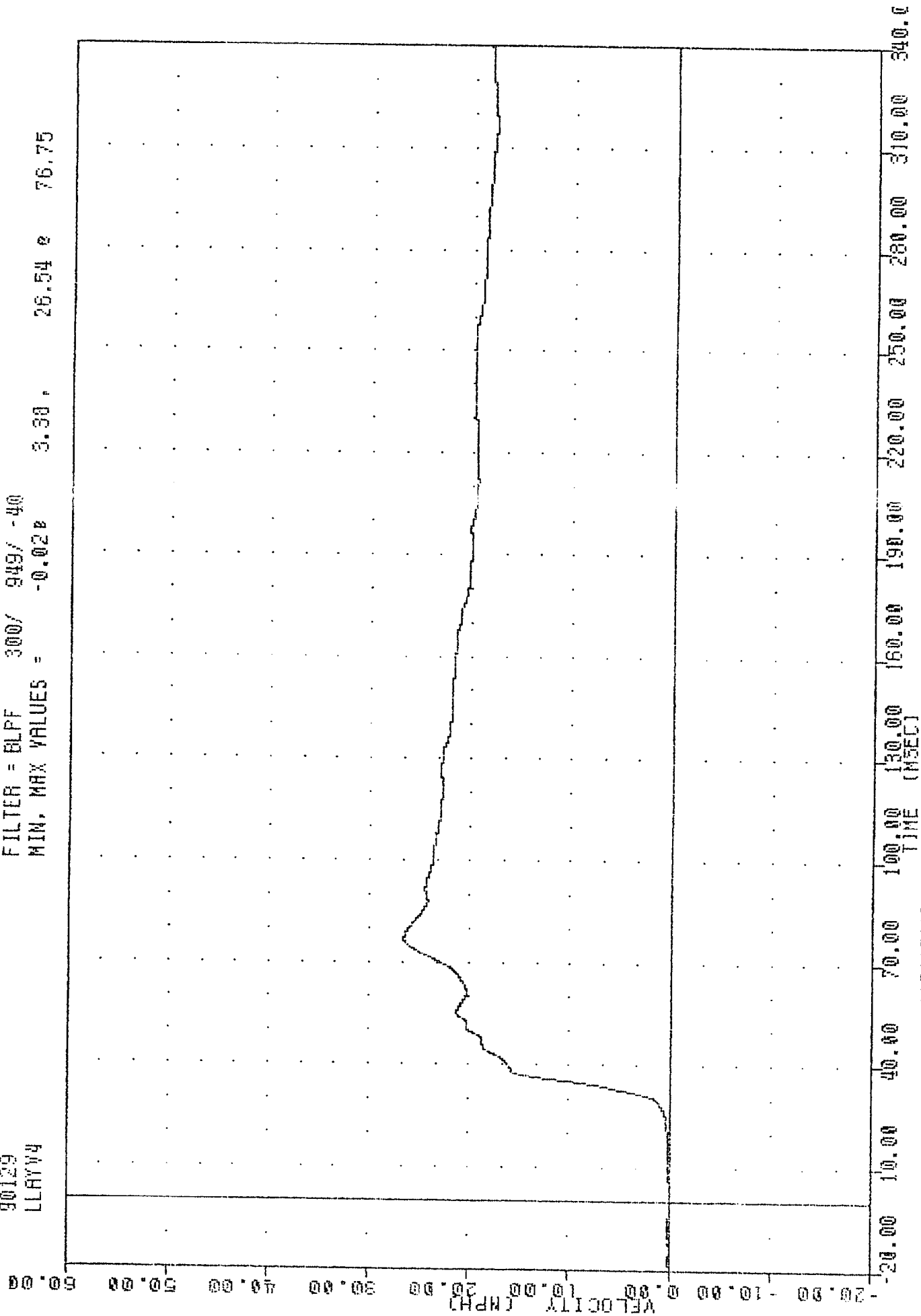


MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 LEFT REAR PASSENGER LEFT LOWER ABDOMEN RIB Y AXIS ACCELERATION

90129
LLAYV4

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -0.028

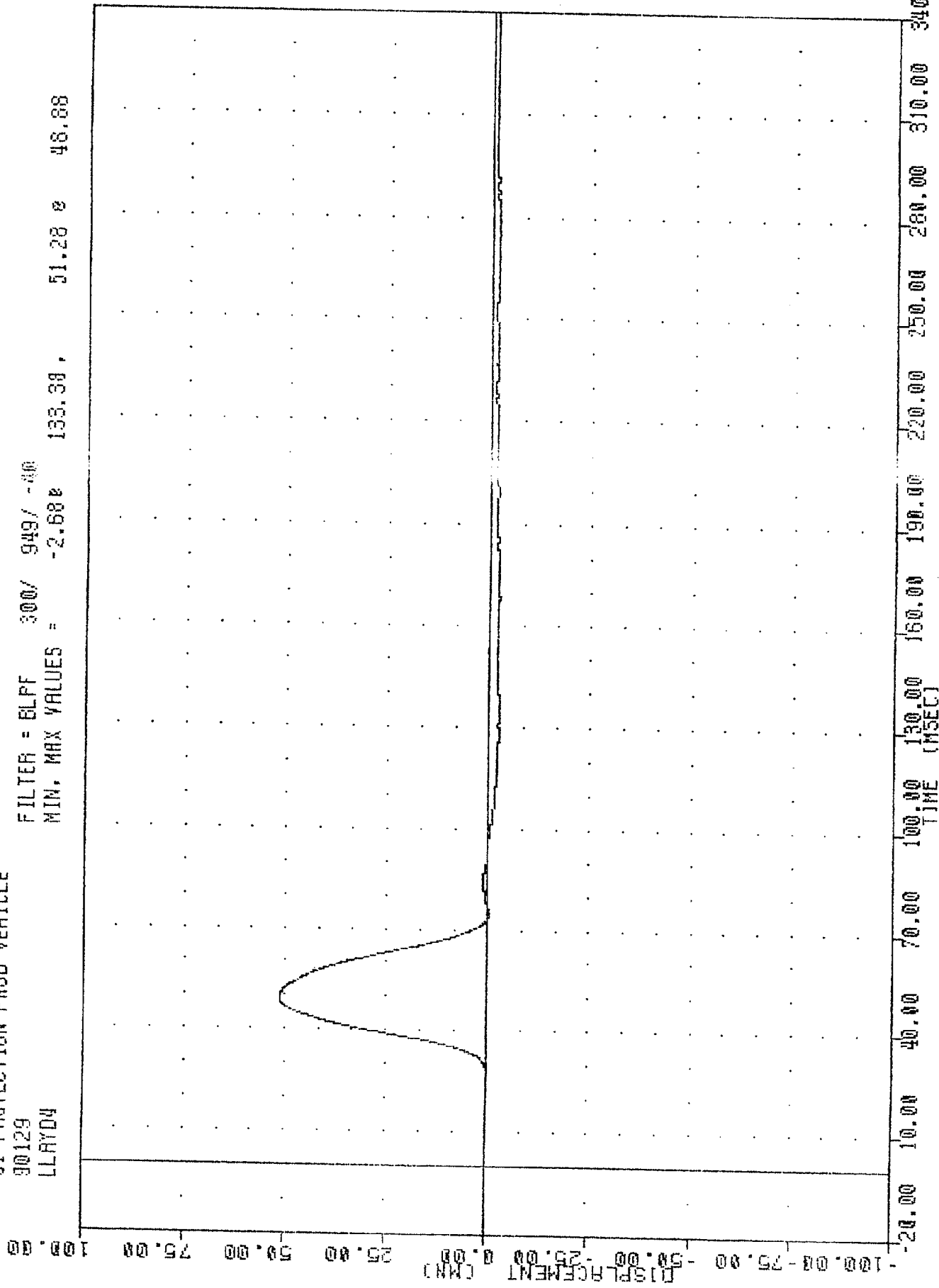
3.38 , 26.54 e 76.75



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER LEFT LOWER ABDOMEN RIB Y AXIS VELOCITY

FILE , 900509
 SI PROTECTION PROD VEHICLE
 90129
 LLOYD4

FILTER = BLPF 300/ 949/ -00
 MIN. MAX VALUES = -2.680 133.38, 51.28 0 48.88



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 LEFT REAR PASSENGER LEFT LOWER ABDOMEN RIB DISPLACEMENT

31 PROJECTION FROM VEHICLE

90129

PEVX64

FILTER = HSBT

136/ 169/ -50

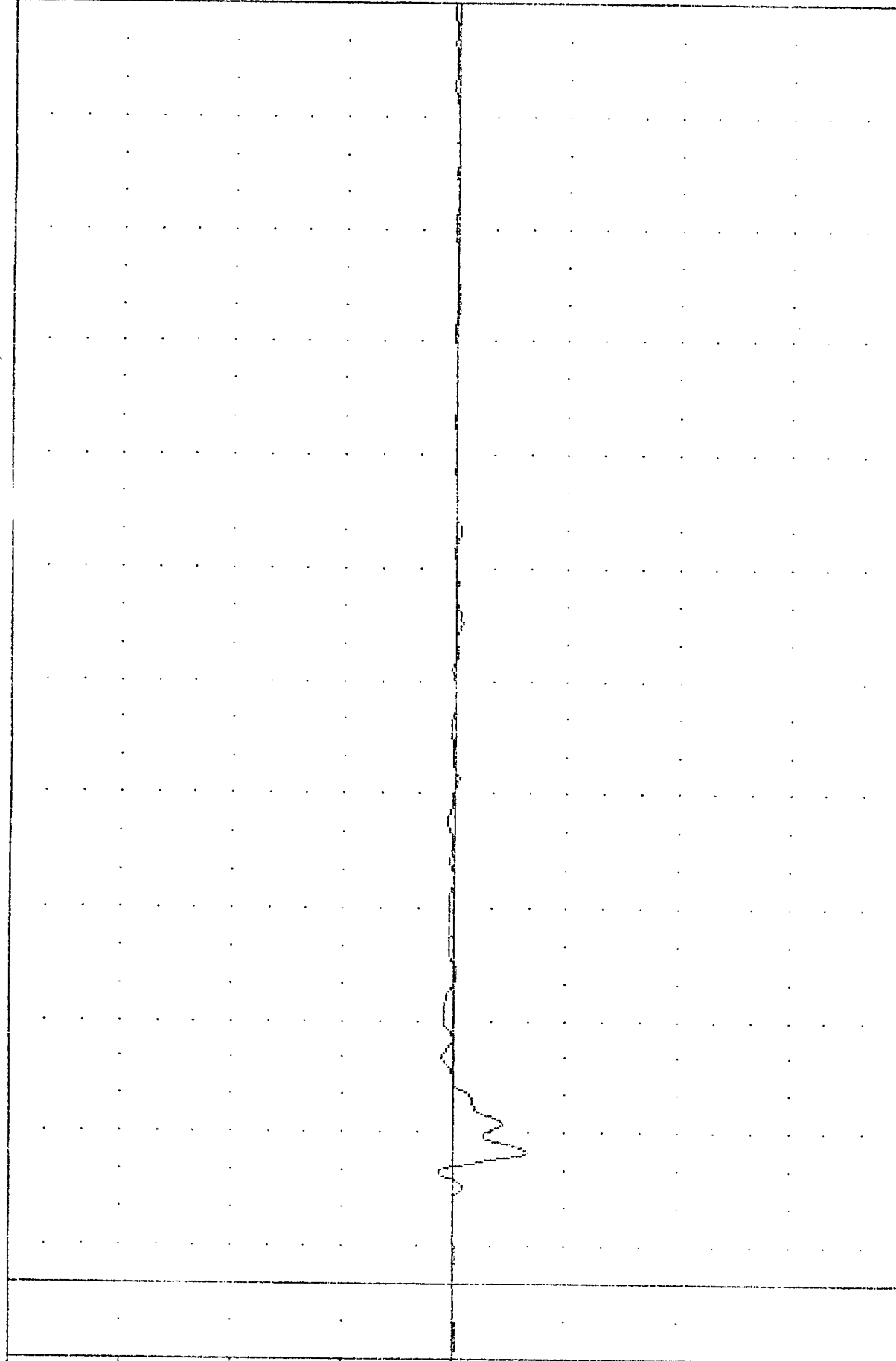
MIN. MAX VALUES =

-33.940

35.000

0.66 0 29.38

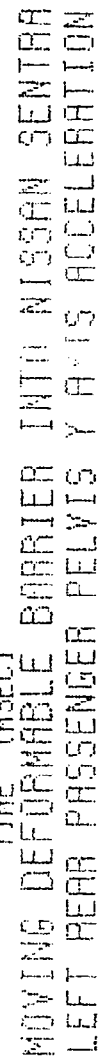
ACCELERATION G



-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 NISSAN SENTRA
LEFT REAR PASSENGER PELVIS X AXIS ACCELERATION

200.55
200.55
200.55



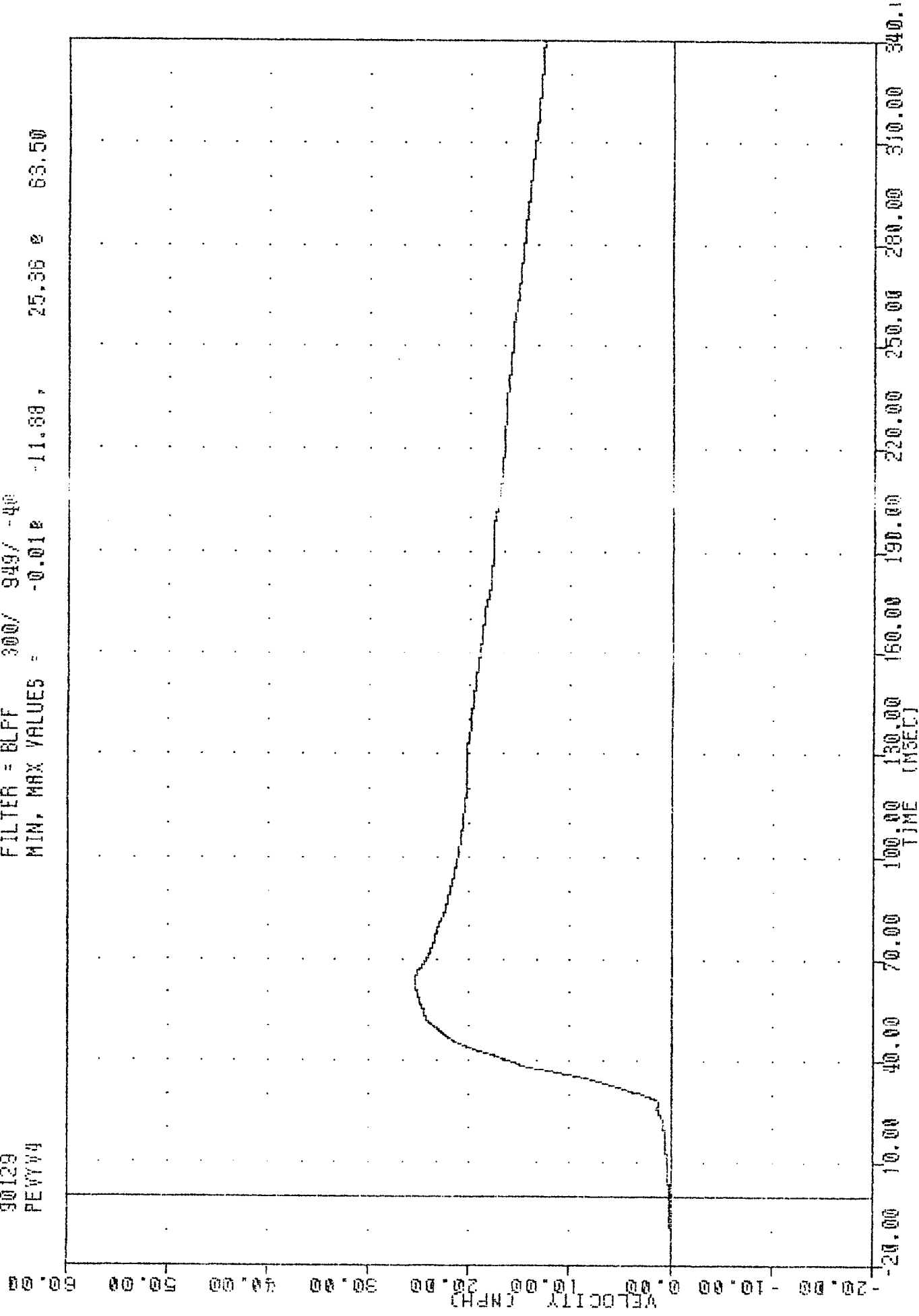
31 INFLATION FROM VEHICLE

90129

PEVY44

FILTER = BLFF 300/ 949/ -40

MIN, MAX VALUES = -0.010 -11.80, 25.36 0 63.50



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER PELVIS Y AXIS VELOCITY

00129 380003

SI PROTECTION PHOD VEHICLE

FILTER = HSRI 136/ 189/ -50

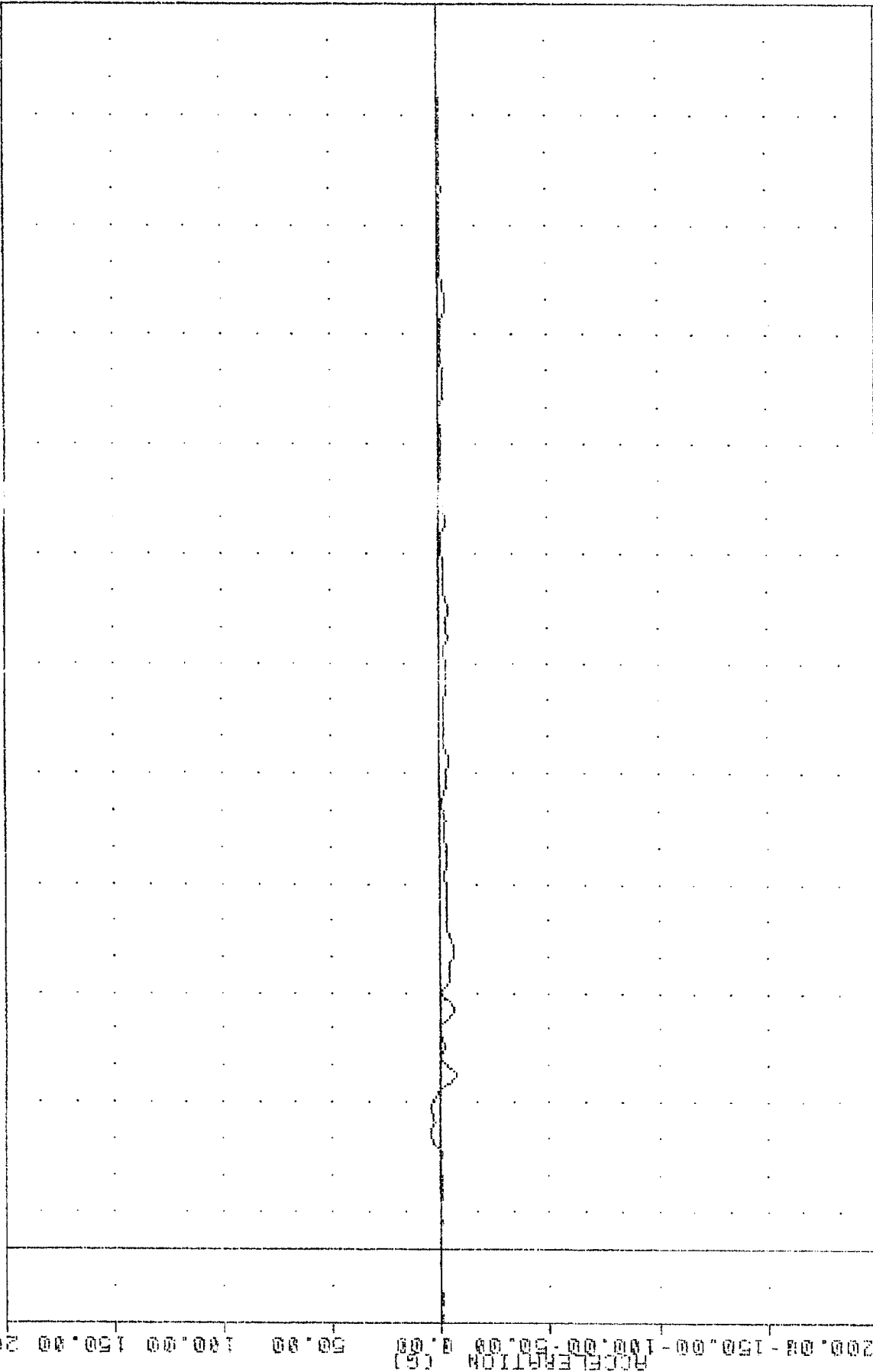
00129

MIN. MAX VALUES =

47.50 ,

4.96 e

30.62



200.00 150.00 100.00 50.00 0.00 -50.00 -100.00 -150.00 -200.00

TIME (msec)

0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00

MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER PELVIS Z AXIS ACCELERATION

SI PROTECTION PASS VEHICLE

30129

PEVR64

FILTER = HSRI

136/ 188/ -50

MIN. MAX VALUES =

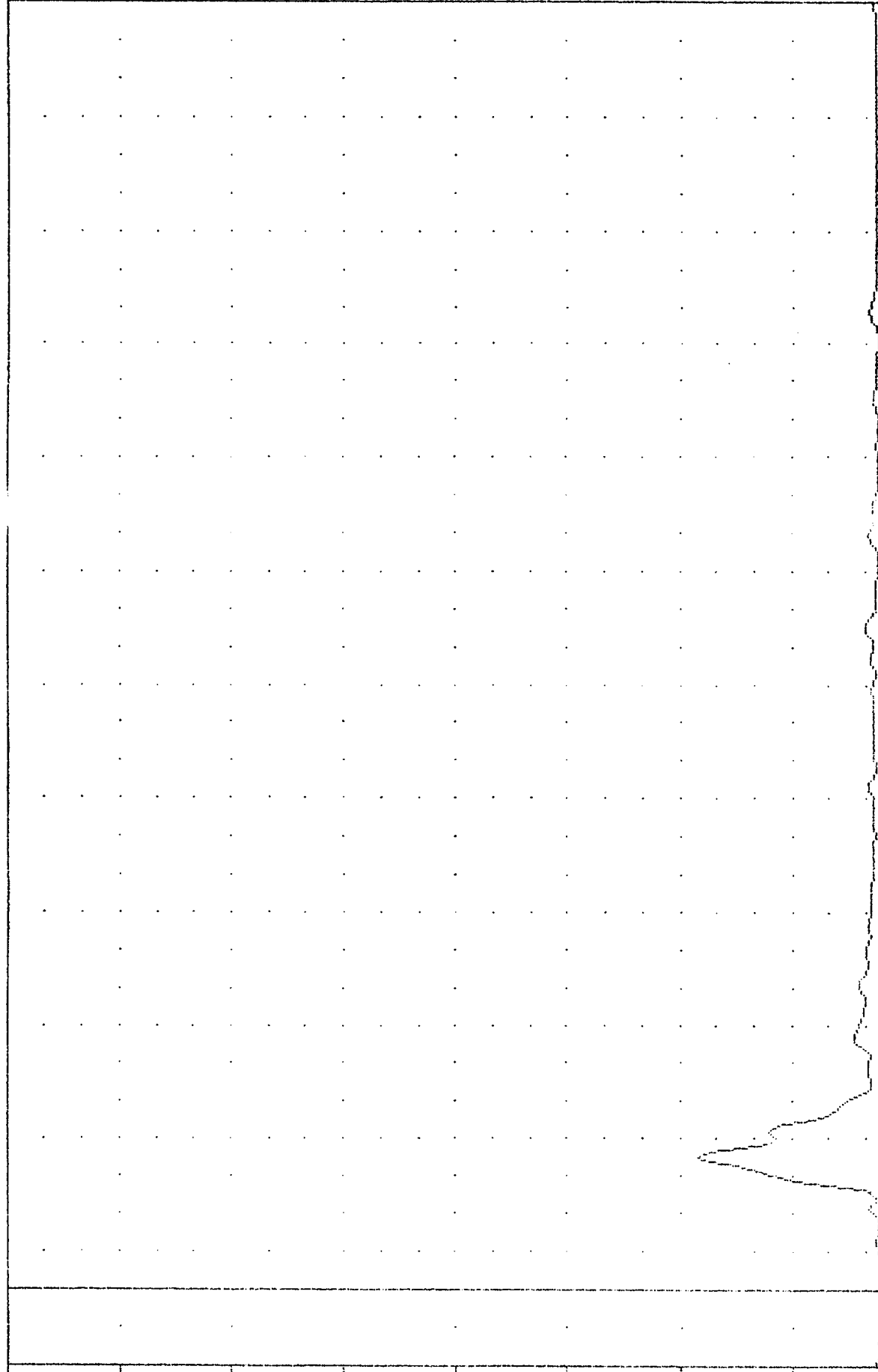
0.02

0.00

81.91

35.00

ACCELERATION (G)

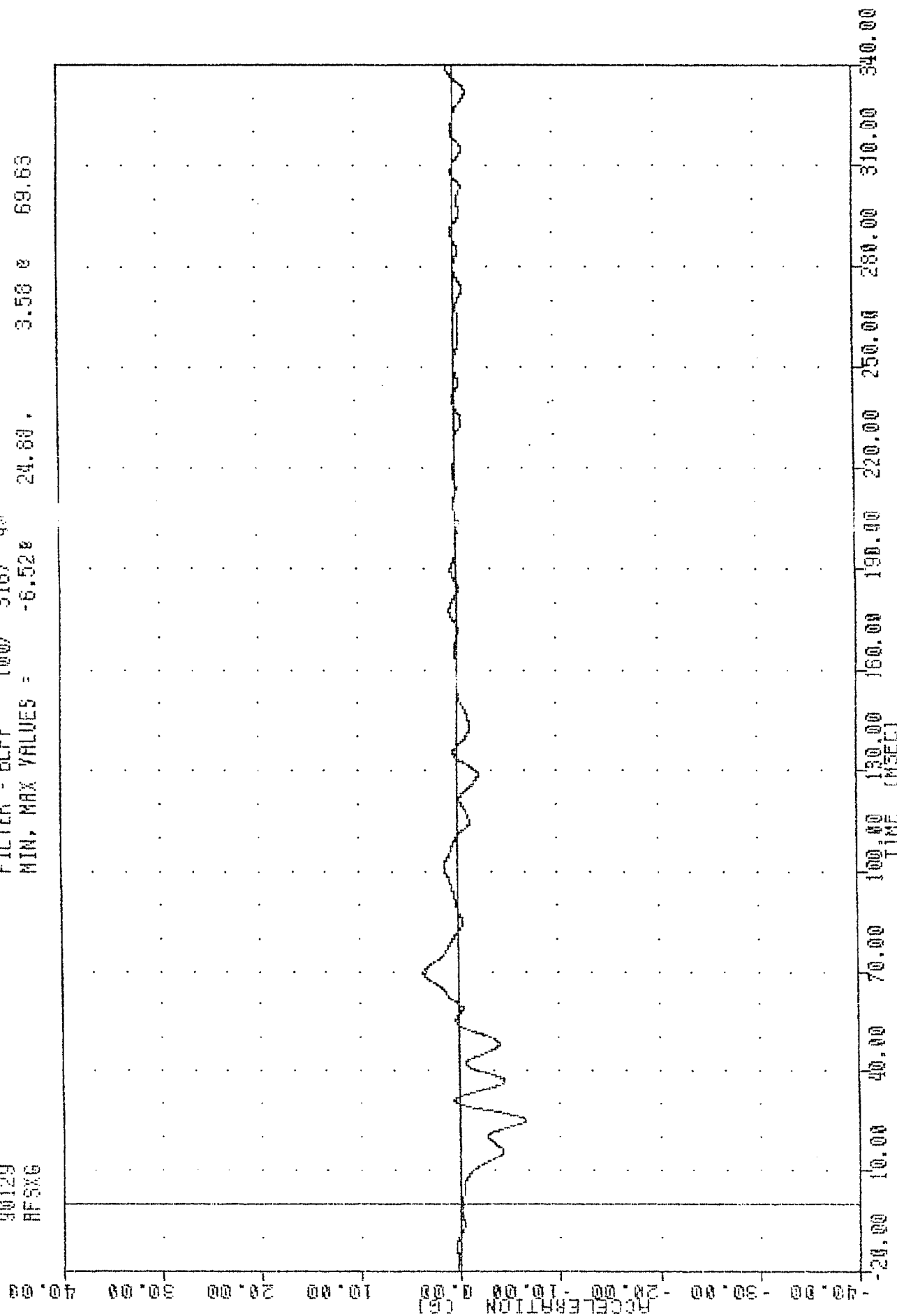


TIME (MSEC)

MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
LEFT REAR PASSENGER PELVIS RESULTANT ACCELERATION

VRIC , 880503
SI PROTECTION PROD VEHICLE
90129
RFSXG

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = 24.80 , 59.65



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE RIGHT FRONT SILL X AXIS ACCELERATION

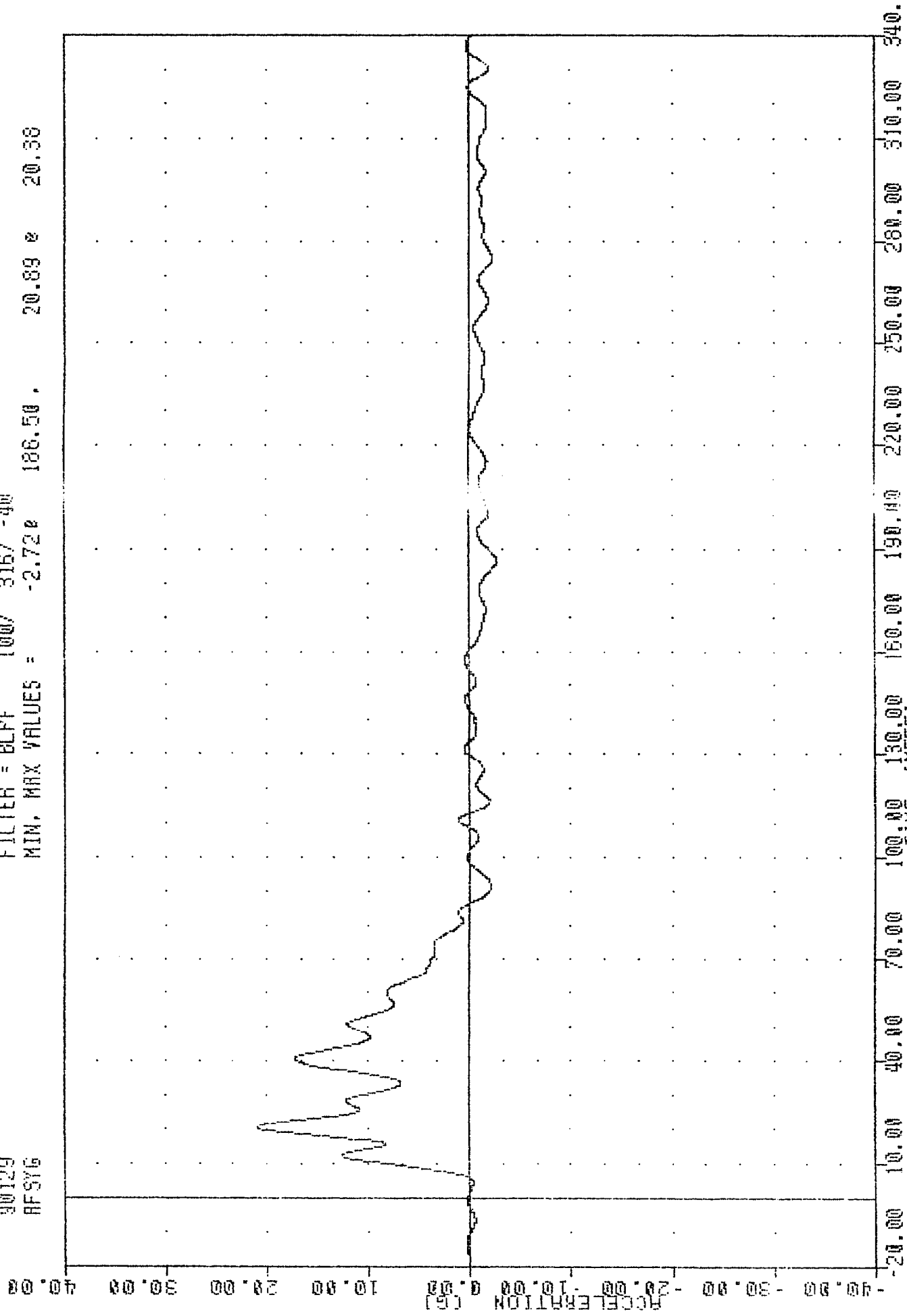
SI PROTECTION PROD VEHICLE

90129

AFSYG

FILTER = BLFF 100/ 315/ -40

MIN. MAX VALUES = -2.720 186.50 20.89 20.38



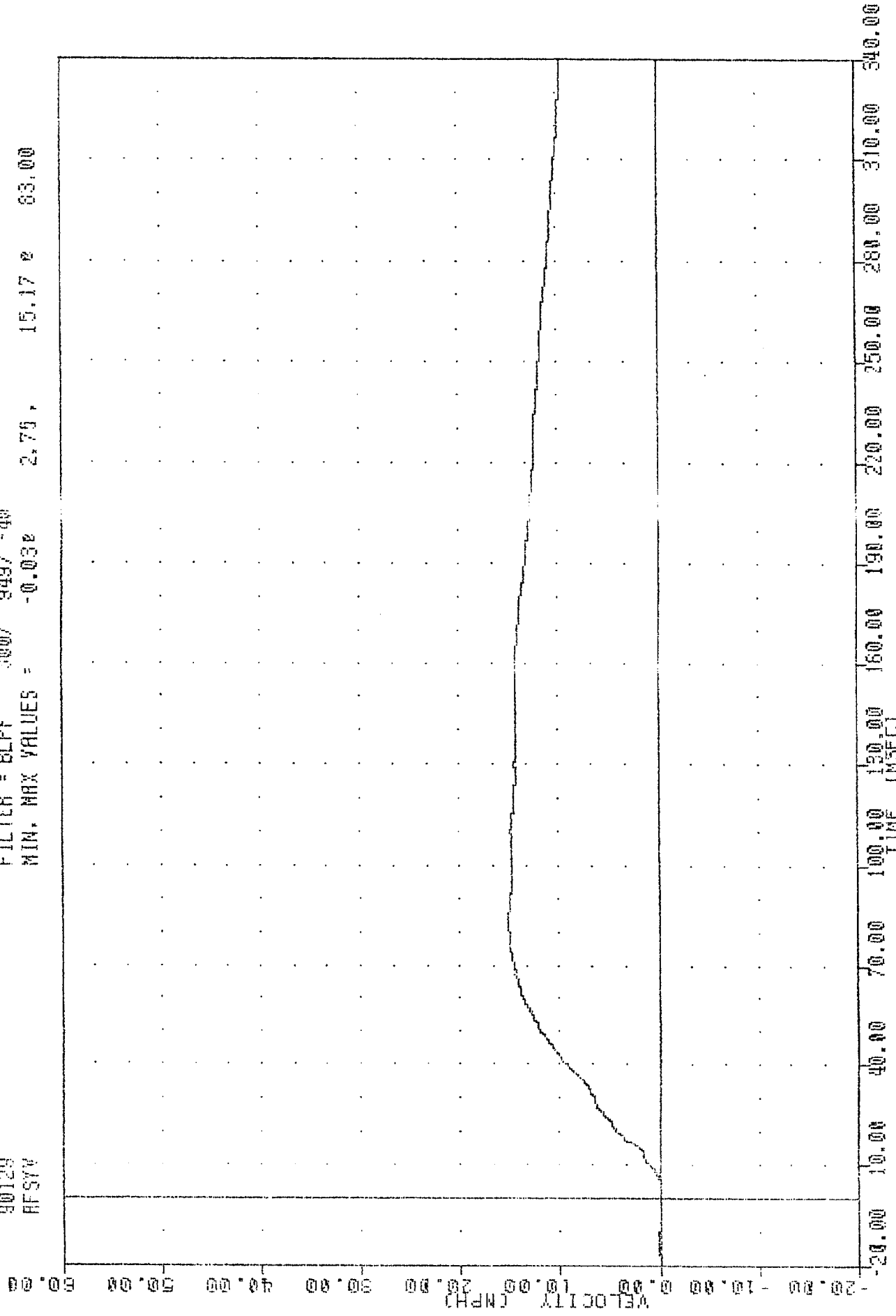
MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE RIGHT FRONT SILL Y AXIS ACCELERATION

90129
RFSYV

SI PROTECTION PROD VEHICLE

FILTER = BLPF 300/ 849/ -40

MIN. MAX VALUES = -0.03% 2.75, 15.17 2 63.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE RIGHT FRONT SILL Y AXIS VELOCITY

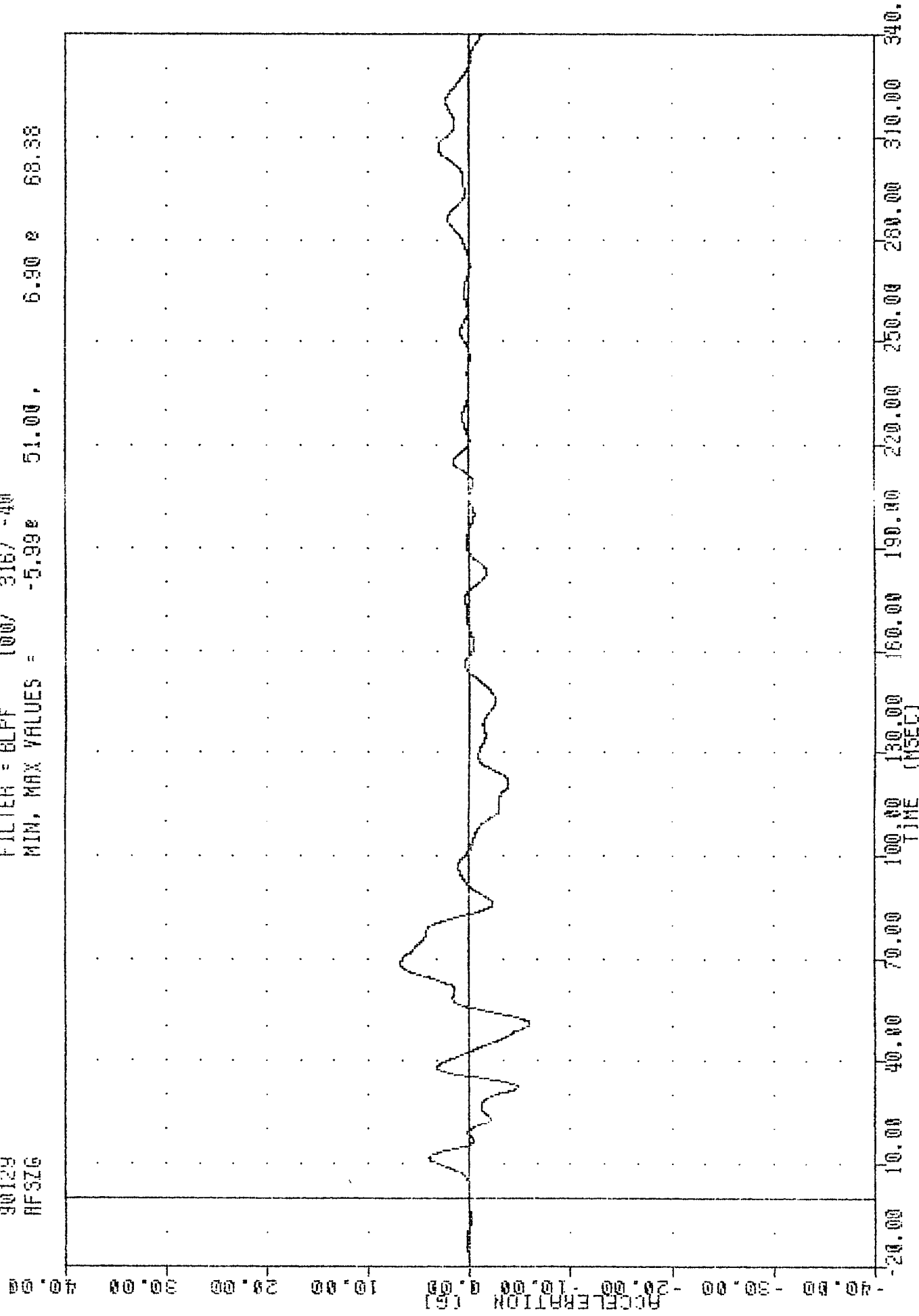
SI PROTECTION PROD VEHICLE

90129

AFS2G

FILTER = BLPF 100/ 316/ -40

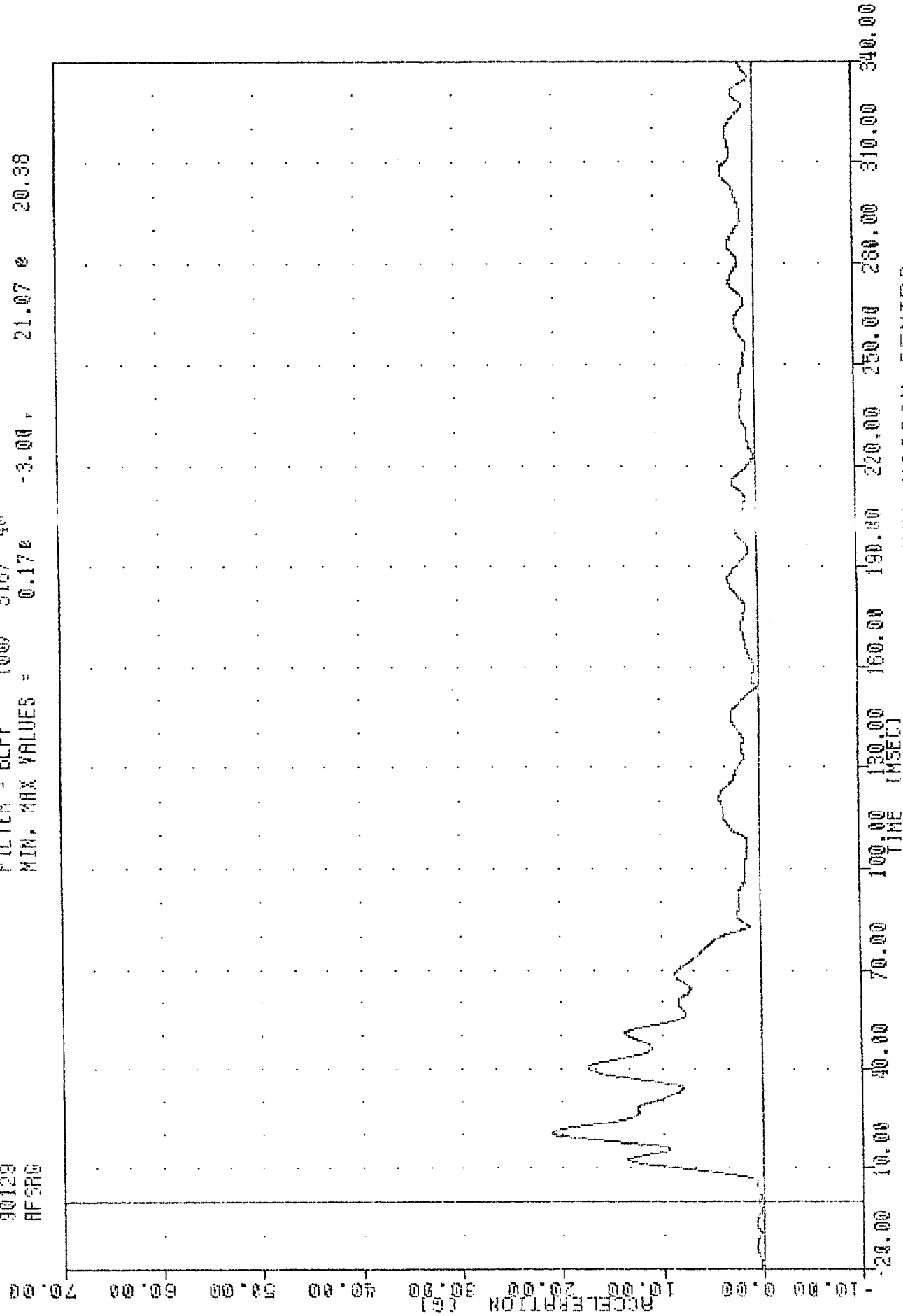
MIN. MAX VALUES = -5.99 51.00 6.90 68.38



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE RIGHT FRONT SILL Z AXIS ACCELERATION

VEHICLE, 500003
 SI PROTECTION PROD VEHICLE
 90129
 AF3RG

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = 0.170 -3.00, 21.07 e 20.38



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 VEHICLE RIGHT FRONT SILL RESULTANT ACCELERATION

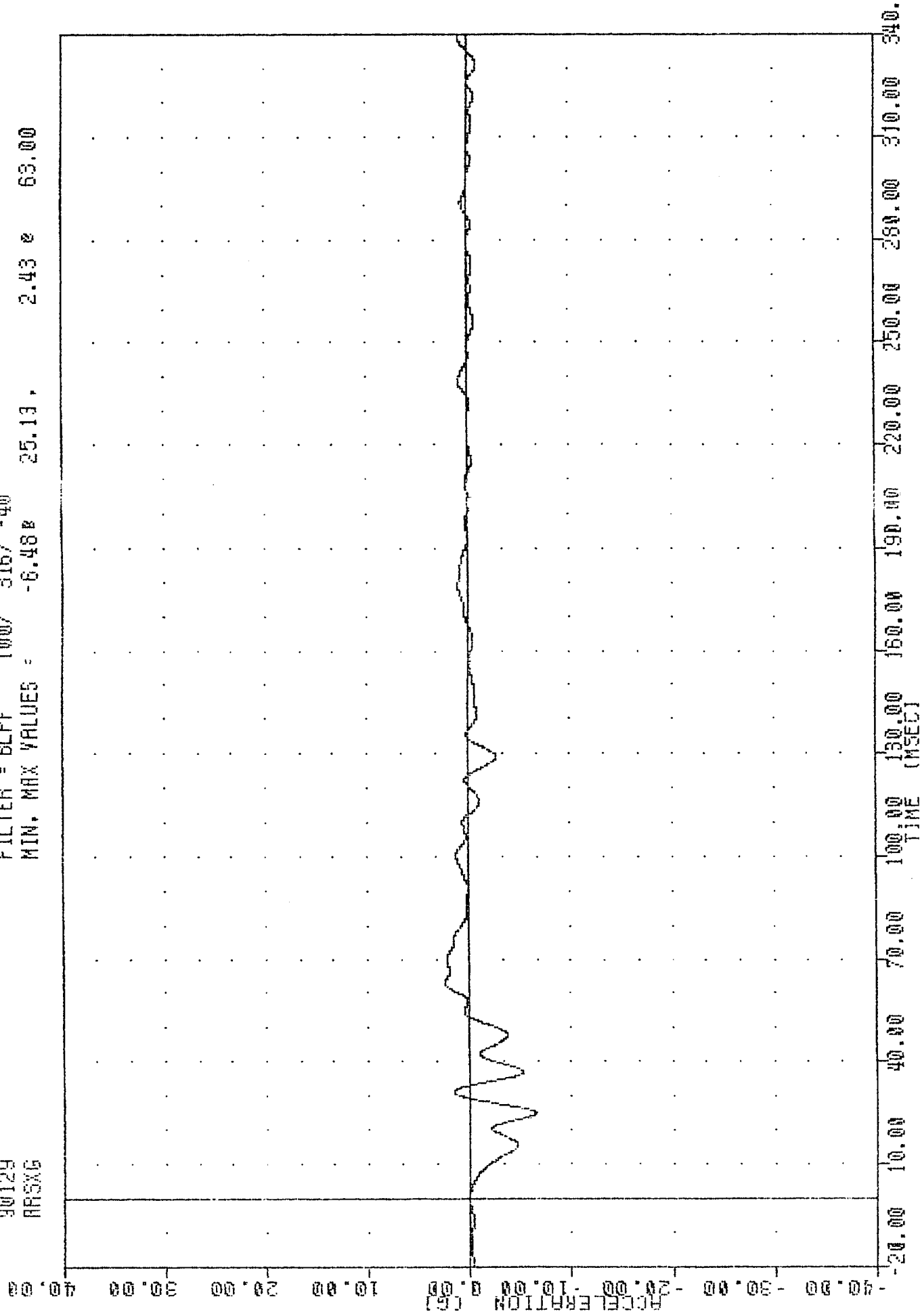
SI PROTECTION PHOD VEHICLE

90129

RRSXG

FILTER = BLPF 100/ 316/ -40

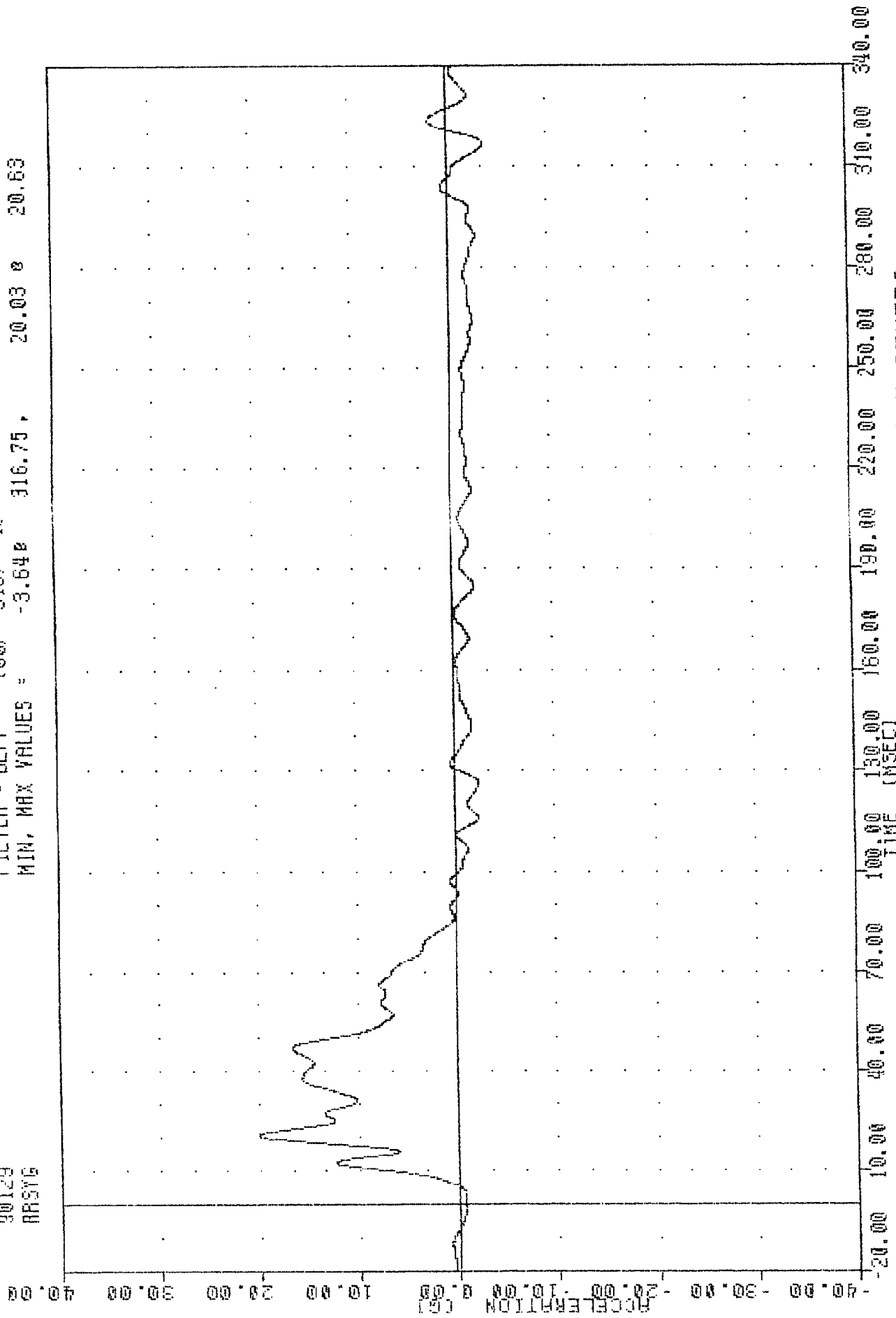
MIN. MAX VALUES = -6.48 2.43 25.13 63.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE RIGHT REAR SILL X AXIS ACCELERATION

VRIC , 580509
S1 PROTECTION FROM VEHICLE
90129
AR5YG

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -3.640 316.75 , 20.03 0 20.63



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE RIGHT REAR SILL Y AXIS ACCELERATION

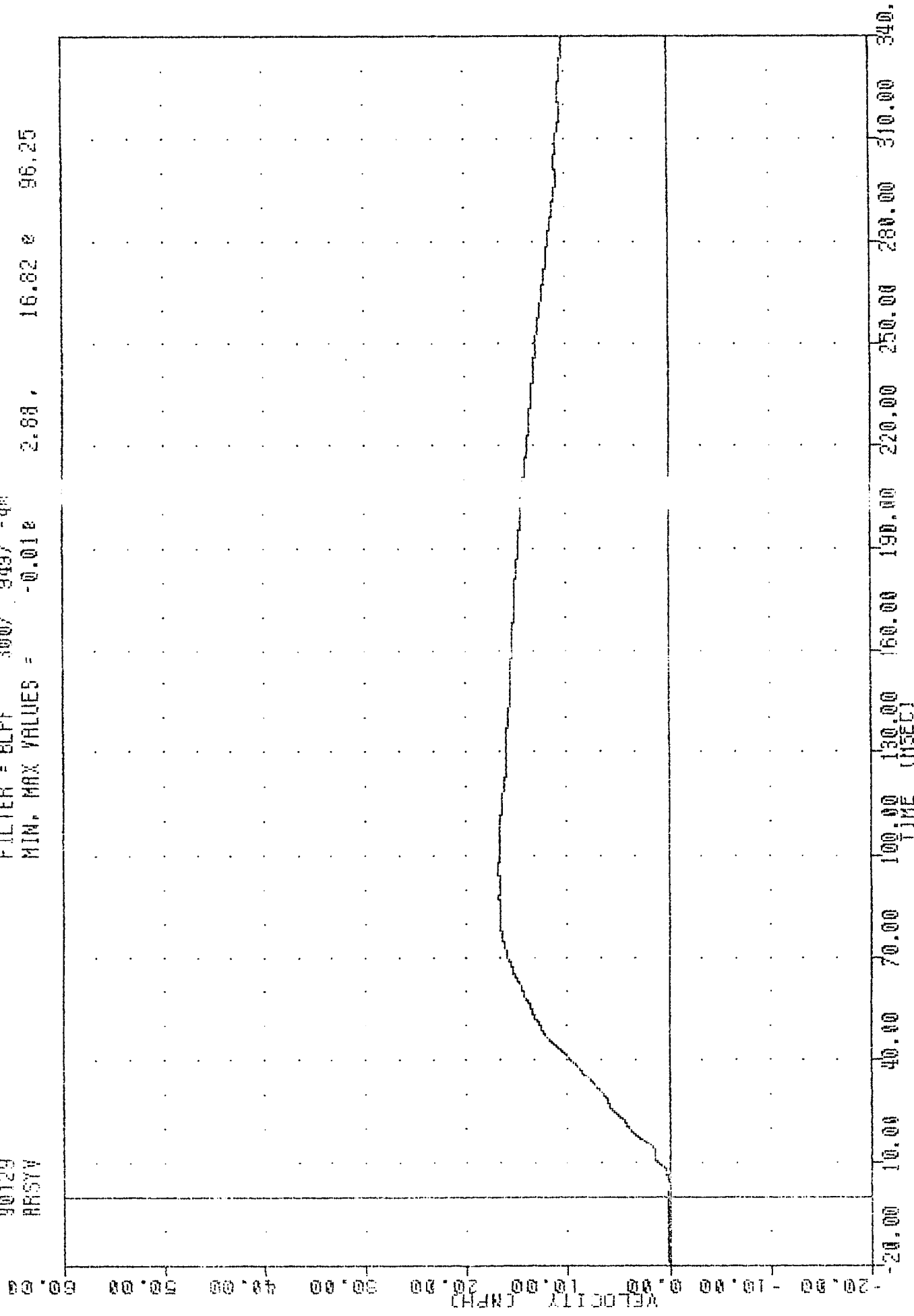
SI PROTECTION PHOD VEHICLE

90129

AR5V

FILTER = BLPF 300/ 943/ -4*

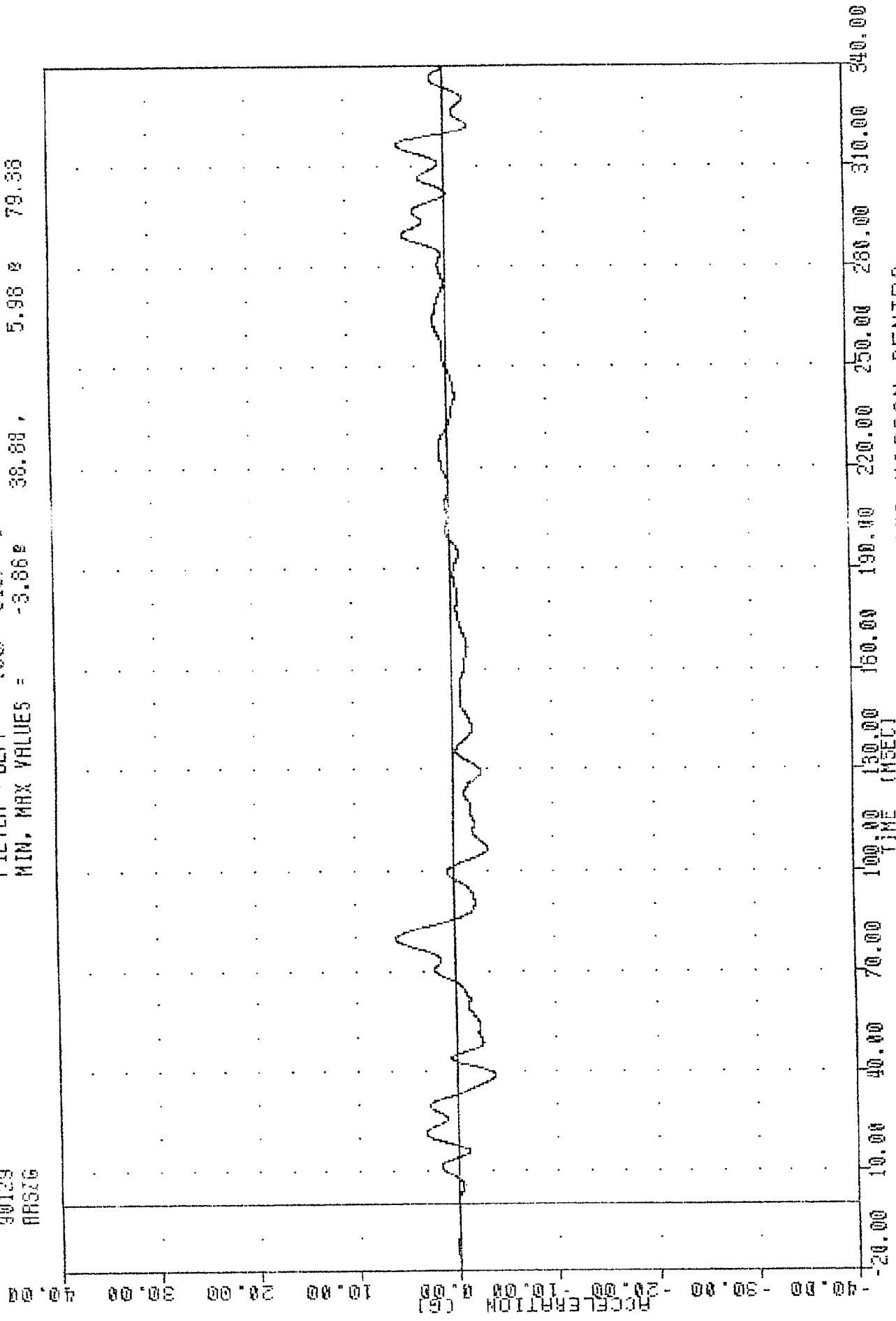
MIN. MAX VALUES = -0.01e 2.88, 16.82 e 96.25



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE RIGHT REAR SILL Y AXIS VELOCITY

VRTC , 900509
SI PROTECTION PROD VEHICLE
90129
ARS26

FILTER = BLFF 100/ 316/ -40
MIN. MAX VALUES = 38.88 , 5.98 0 79.38



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE RIGHT REAR SILL Z AXIS ACCELERATION

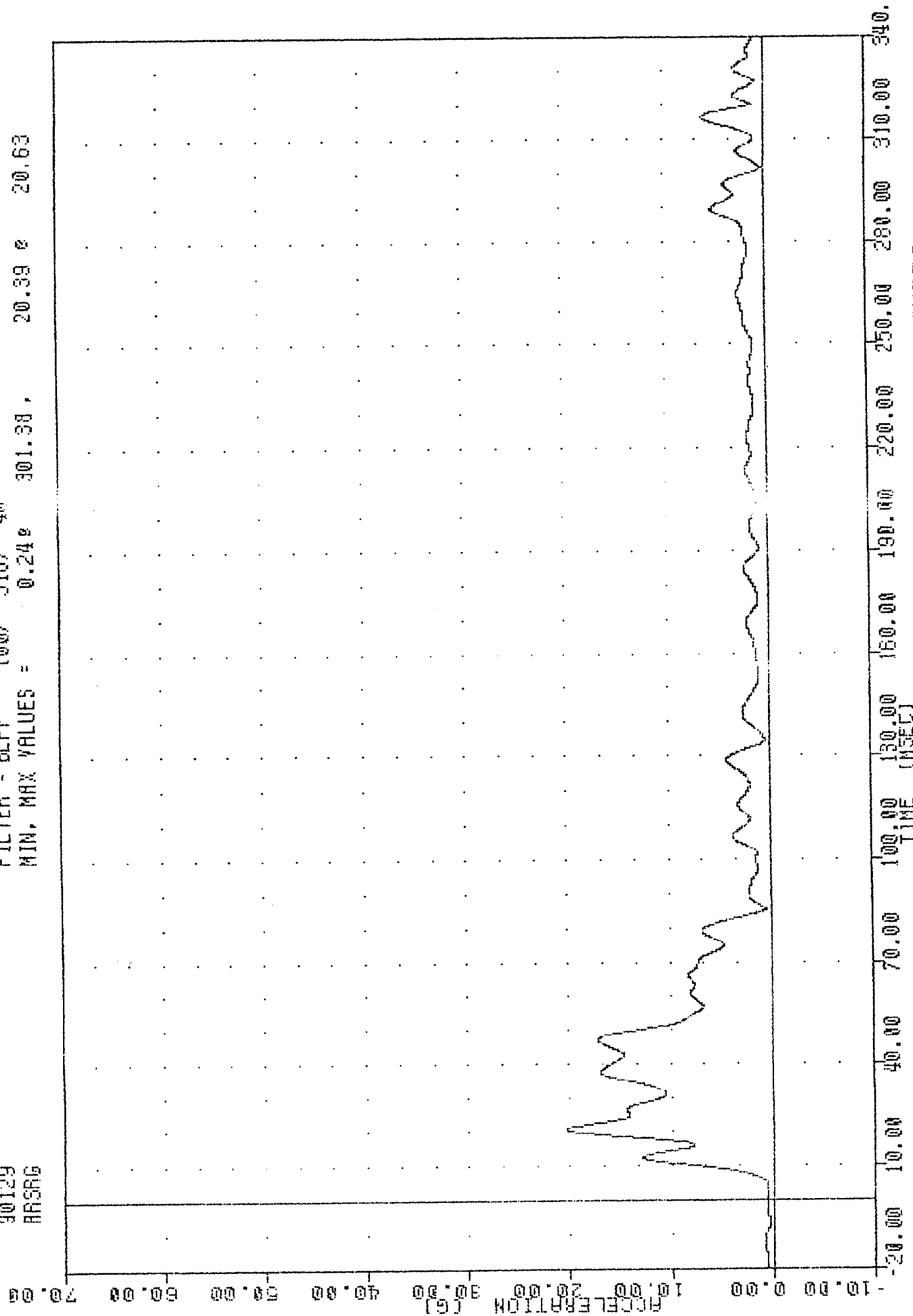
31 PROTECTION PROD VEHICLE

90129

RRSRG

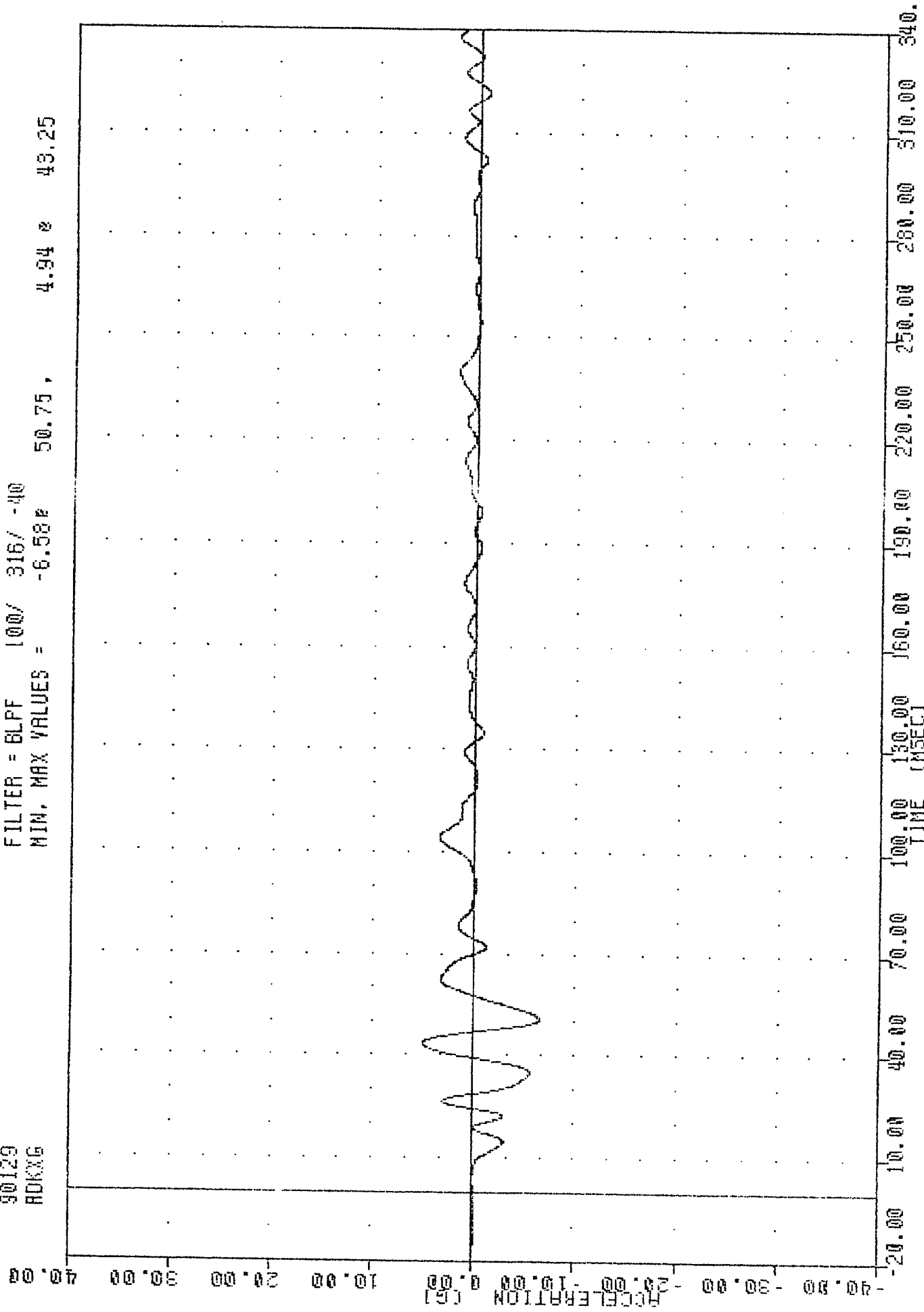
FILTER = BLPF 100/ 316/ -40

MIN, MAX VALUES = 0.24g 301.38, 20.39 g 20.63



90129
ADKXG

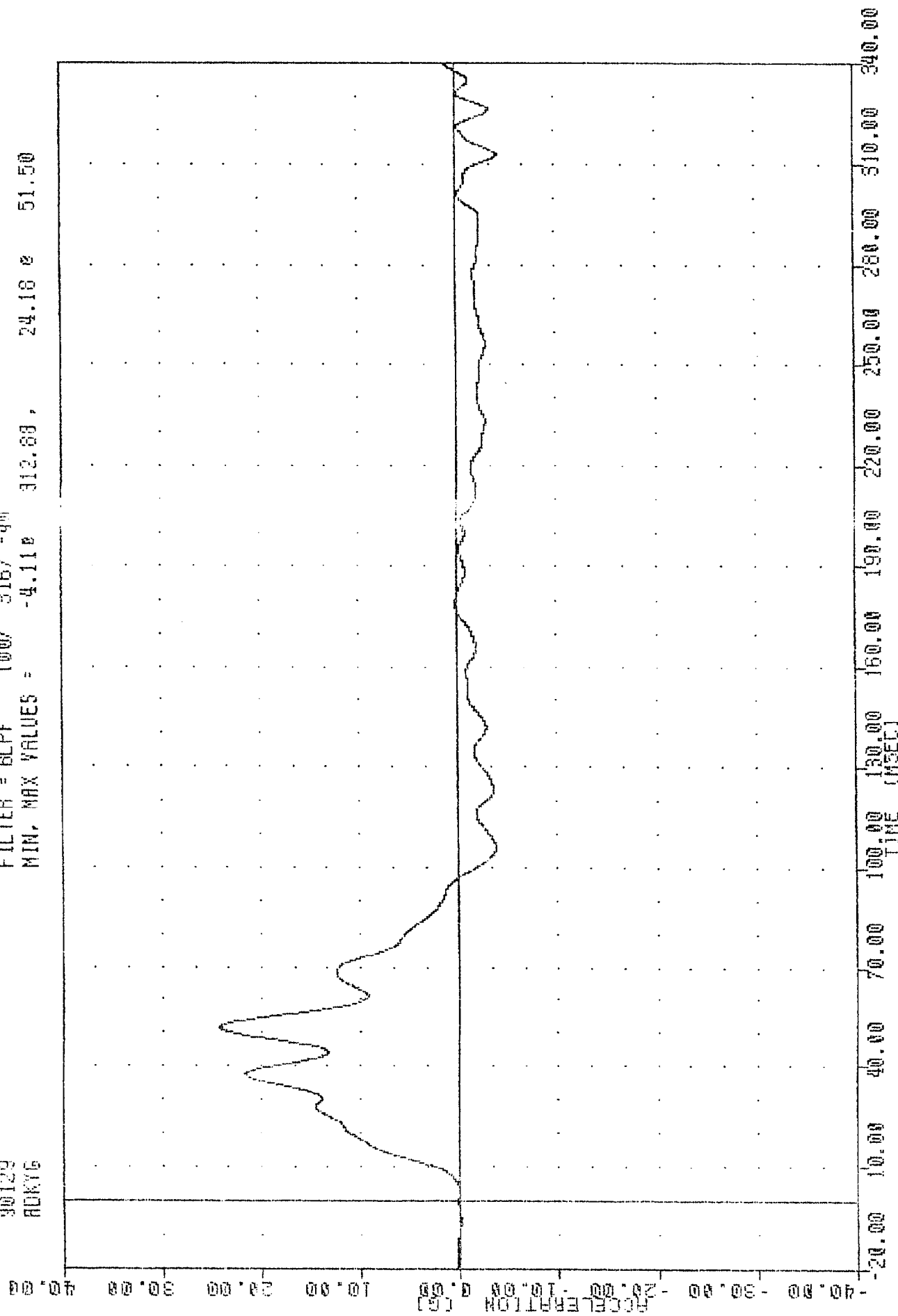
FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -6.58 50.75 , 4.94 43.25



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE REAR DECK X AXIS ACCELERATION

CHIC, 300500
 SI PROTECTION FROM VEHICLE
 30129
 ROKY6

FILTER = 6LPI 100/ 316/ -40
 MIN. MAX VALUES = -4.11e 312.88, 24.18 e 51.50



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 VEHICLE REAR DECK Y AXIS ACCELERATION

31 IMPULSION FROM HISS VEHICLE

90129

FILTER = BLPF 300/ 949/ -40

ADKYY

MIN, MAX VALUES =

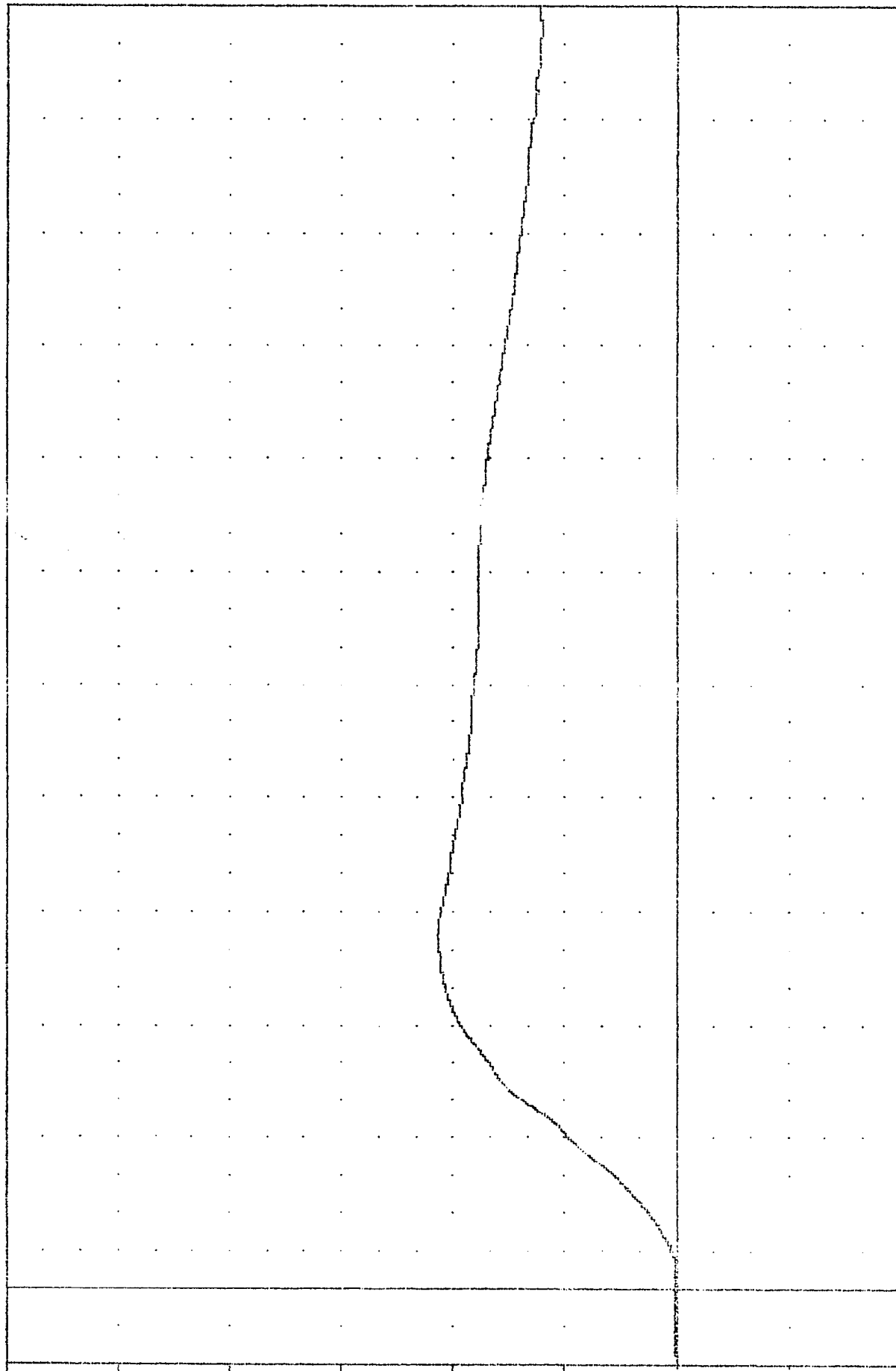
0.00e

-20.00,

21.33 e

94.00

VELOCITY (MPH)

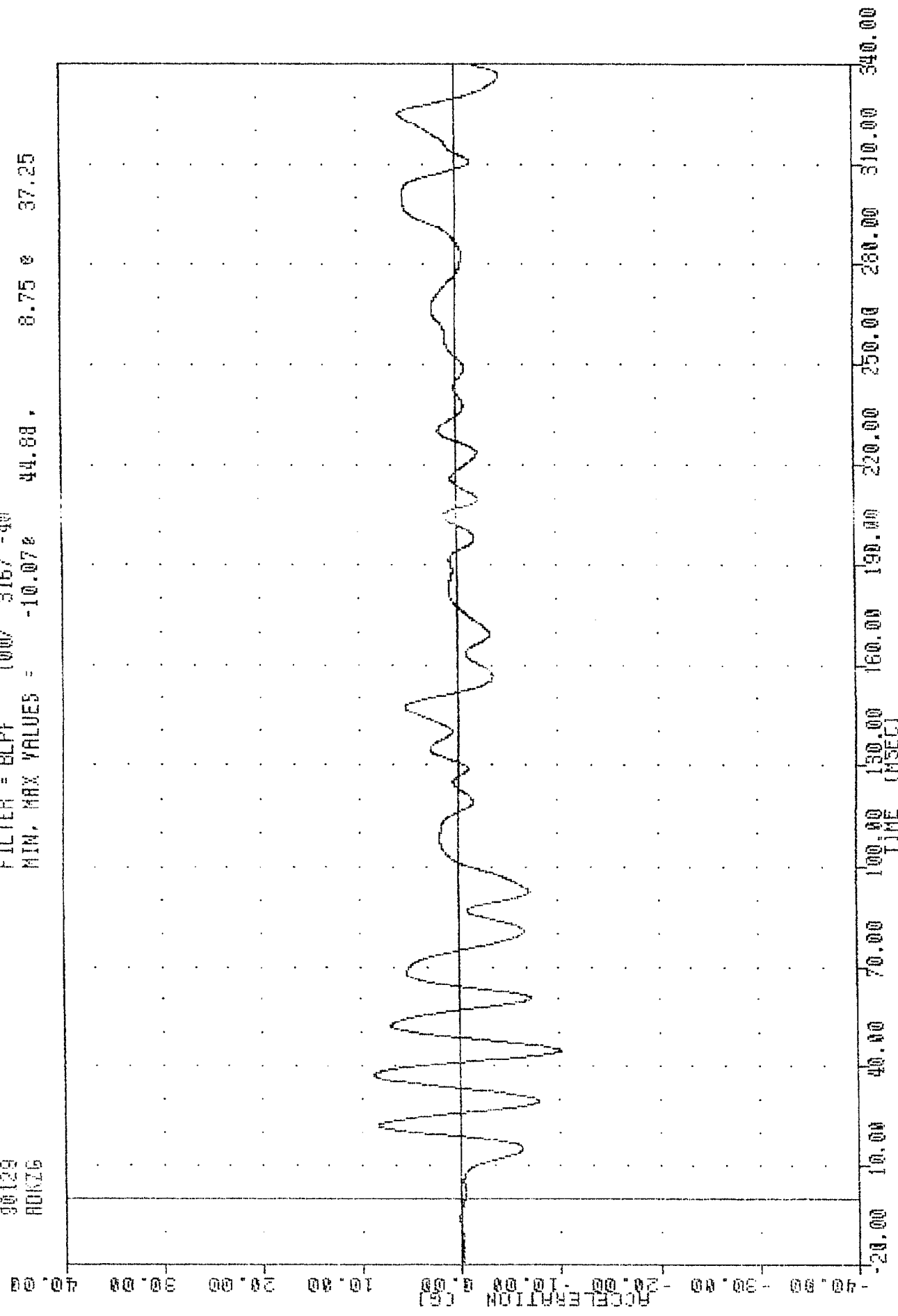


-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE REAR DECK Y AXIS VELOCITY

VAIL , 990509
 S1 PROTECTION PROO VEHICLE
 99129
 ADK16

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -10.07% 44.88, 8.75 & 37.25



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 VEHICLE REAR DECK Z AXIS ACCELERATION

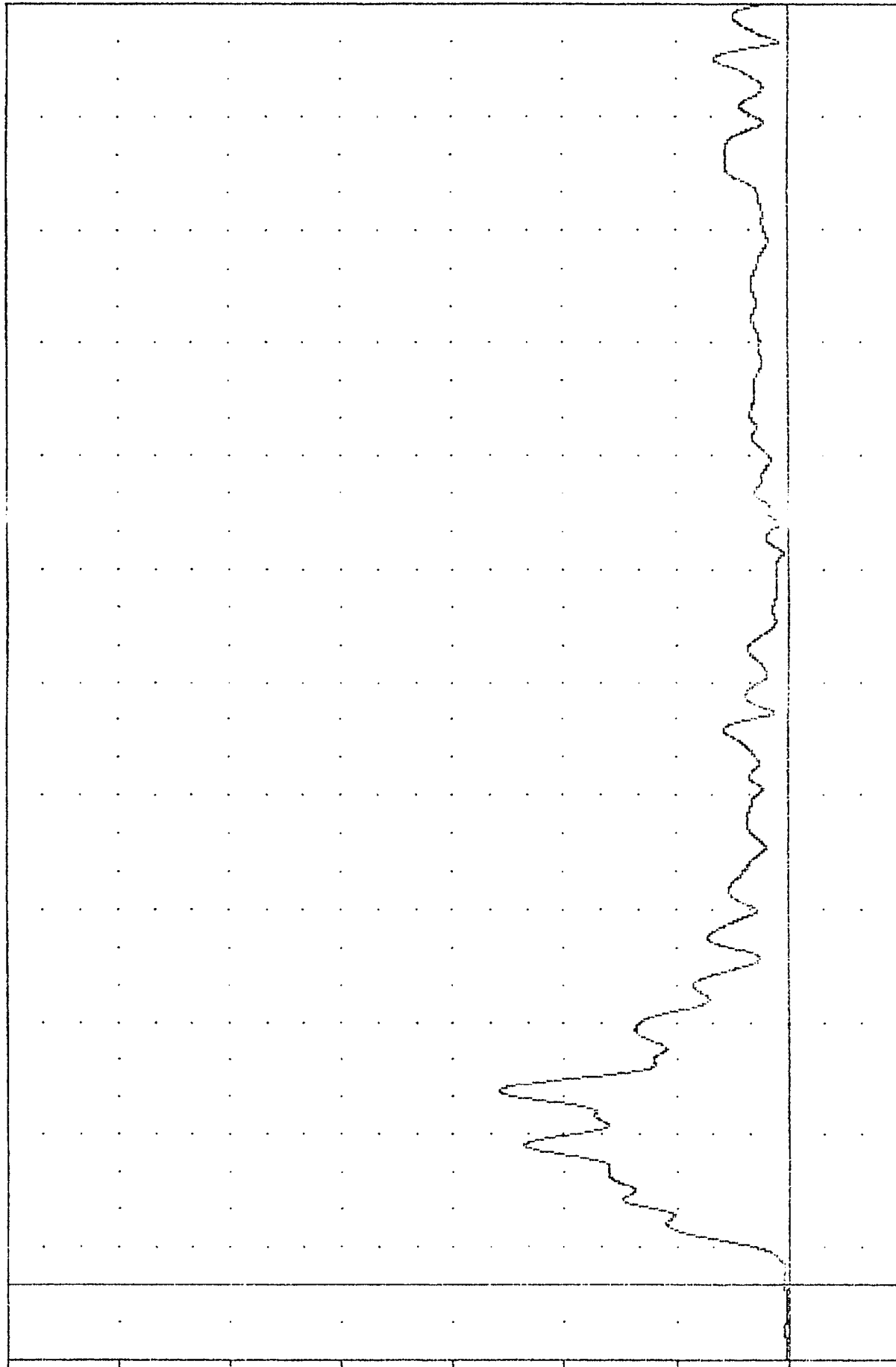
SI PROTECTION PROO VEHICLE

90129
ADKRG

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = 0.098 -3.25 ,

25.90 2 51.50

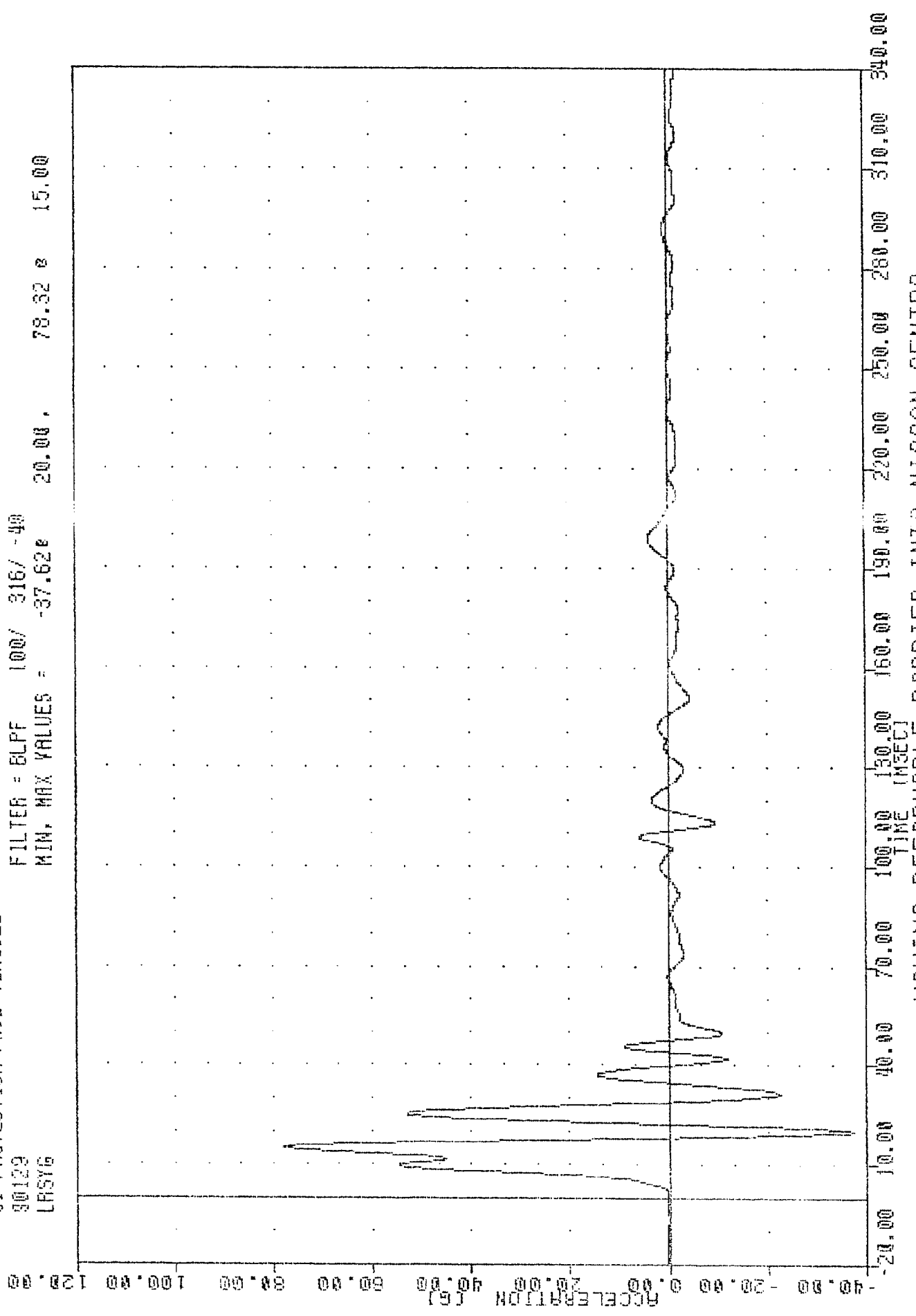
ACCELERATION (G)



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE REAR DECK RESULTANT ACCELERATION

VEHICLE, 3405003
SI PROTECTION PROD VEHICLE
80129
LRSY6

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -37.62e 20.00. 78.32 e 15.00

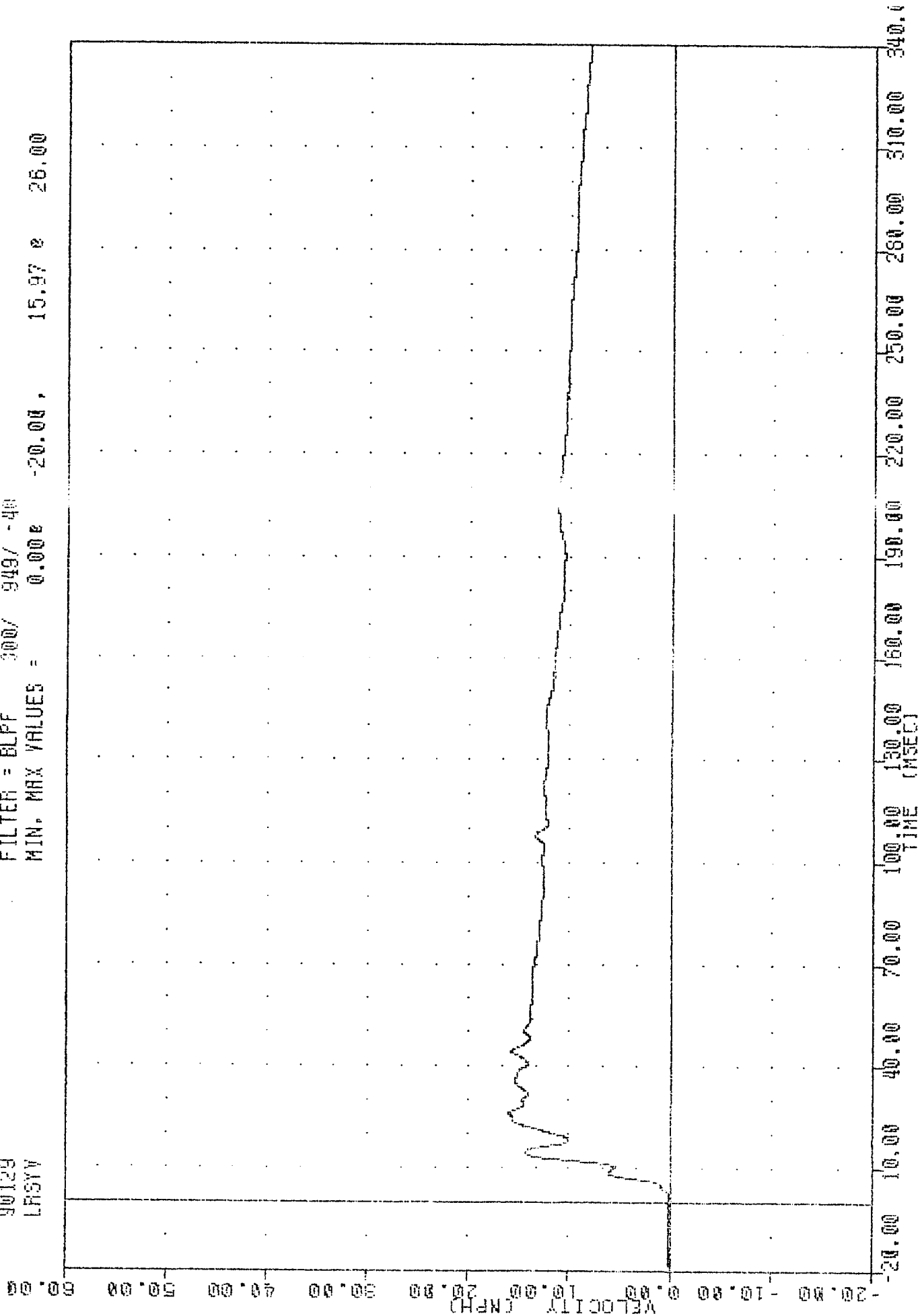


CRASH TEST REPORT

90129
LRSYV

FILTER = BLPF 300/ 949/ -40

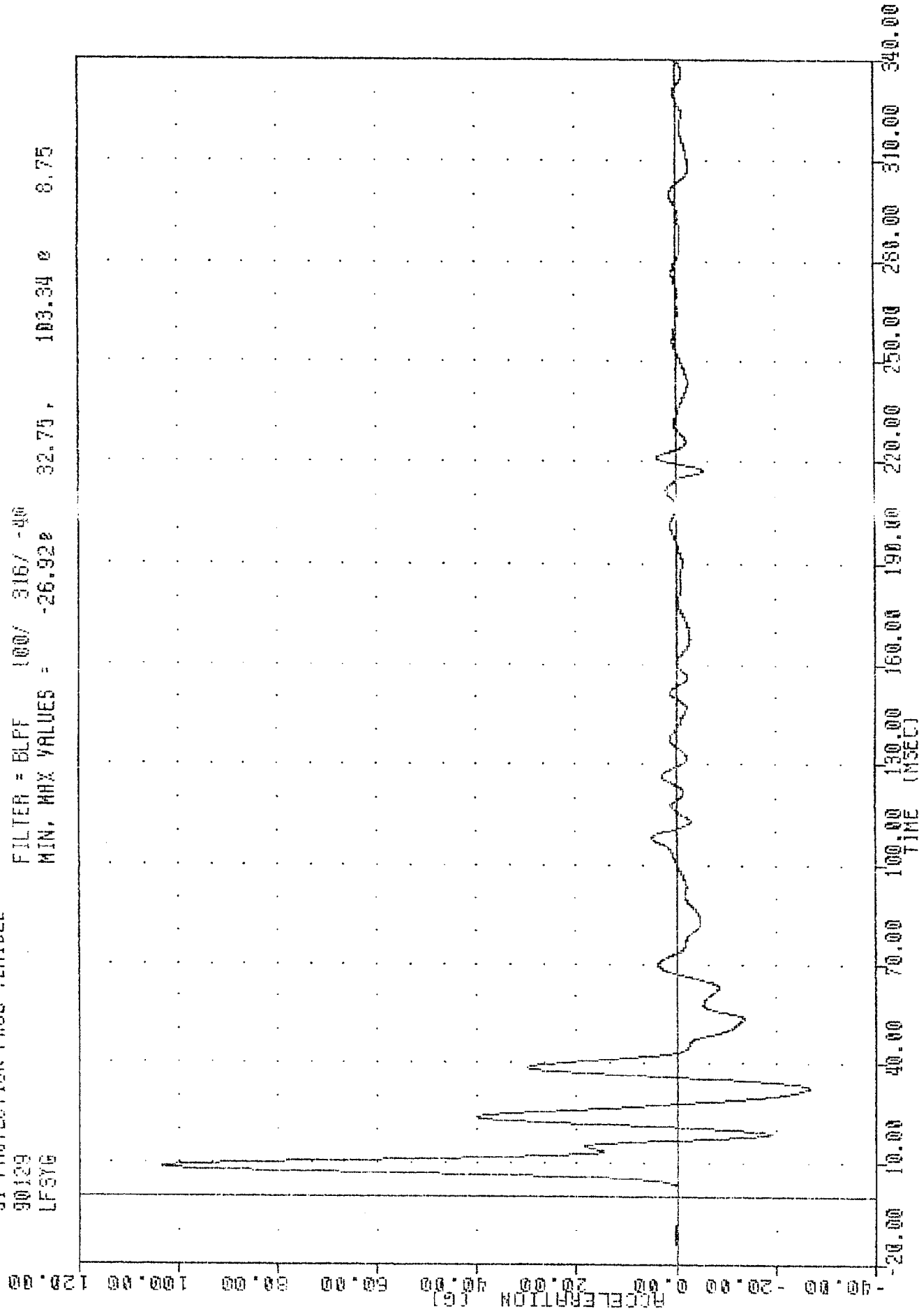
MIN. MAX VALUES = 0.00e -20.00, 15.97 e 26.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE LEFT REAR SILL Y AXIS VELOCITY

Y81C , 800503
SI PROTECTION FROM VEHICLE
90129
LF5YG

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -26.920 103.34 0 8.75



31 PROTECTION FROM VEHICLE

90129

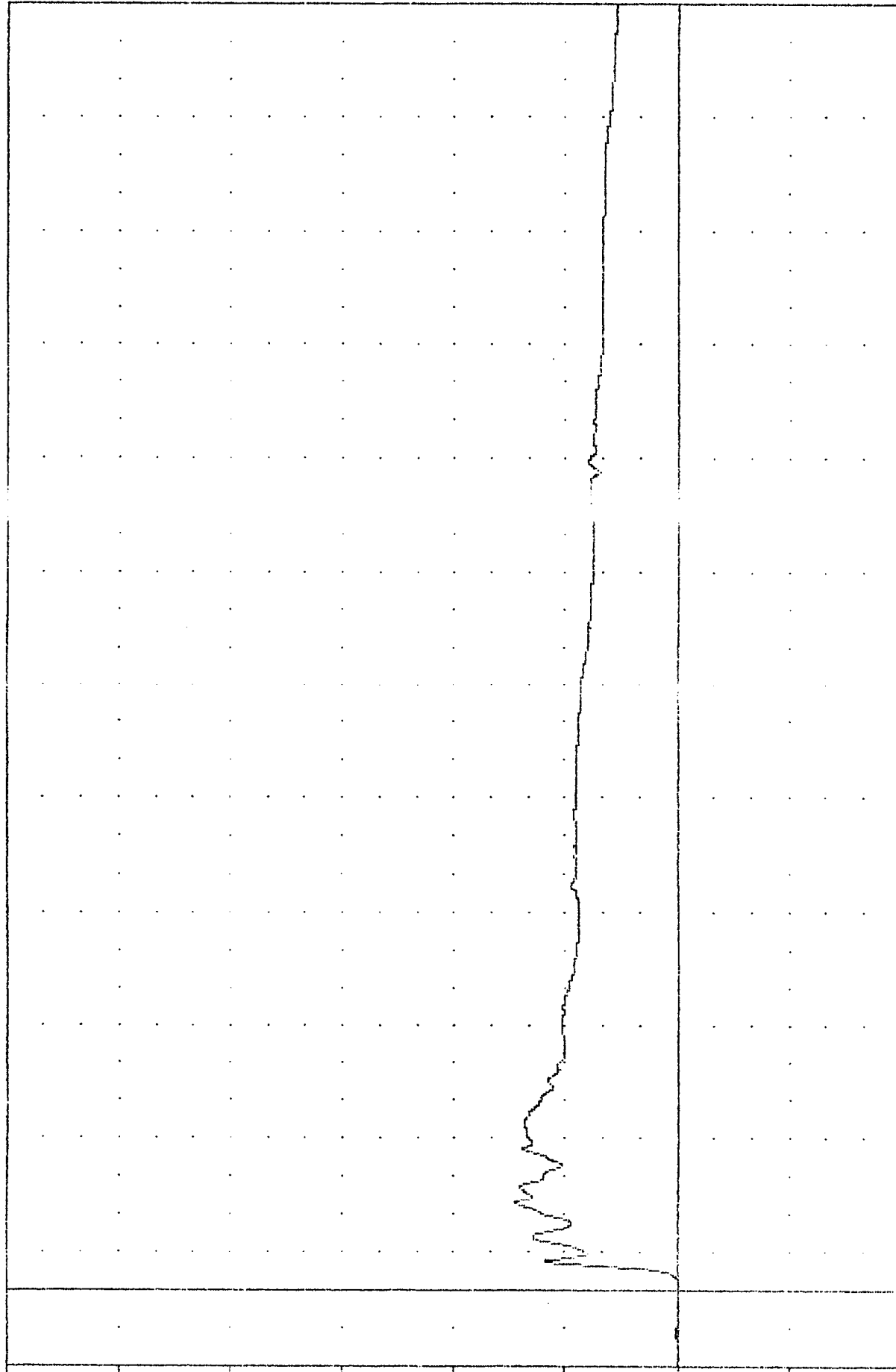
FILTER = BLPF 300/ 949/ -40

LFSTV

MIN, MAX VALUES = -0.030

0.25, 14.51 0 22.88

VELOCITY (MPH)

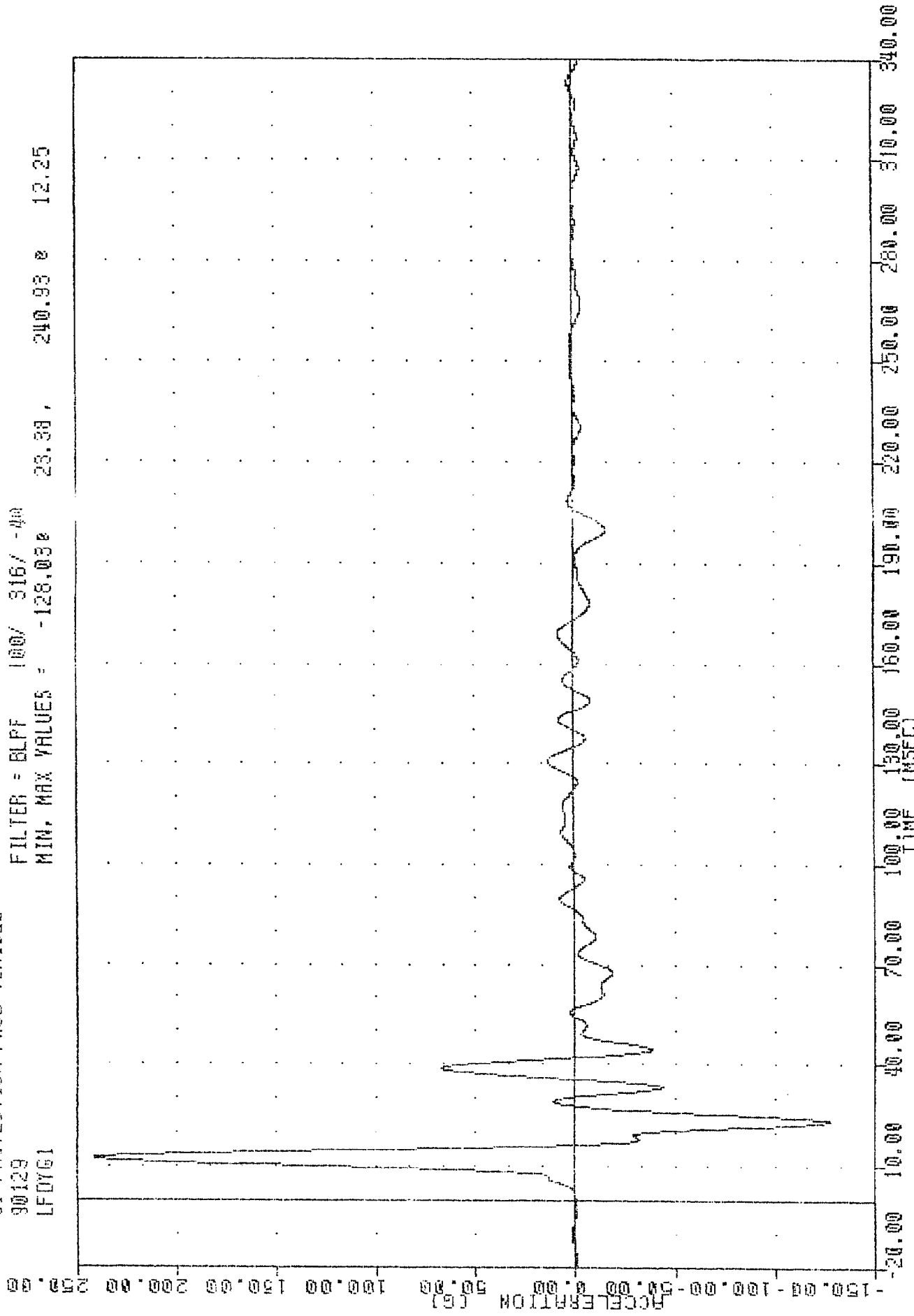


-20.00 10.00 20.00 30.00 40.00 50.00 60.00

MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE LEFT FRONT SILL Y AXIS VELOCITY

VEHICLE, 900509
SI PROTECTION PROD VEHICLE
90129
LFDY61

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -128.03e 23.38, 240.93 e 12.25



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE LEFT FRONT DOOR (POSITION 6) Y AXIS ACCELERATION

VEHICLE POSITION 1000 VELOCITY

90129
LFOYV1

FILTER = BLPF 300/ 349/ -40

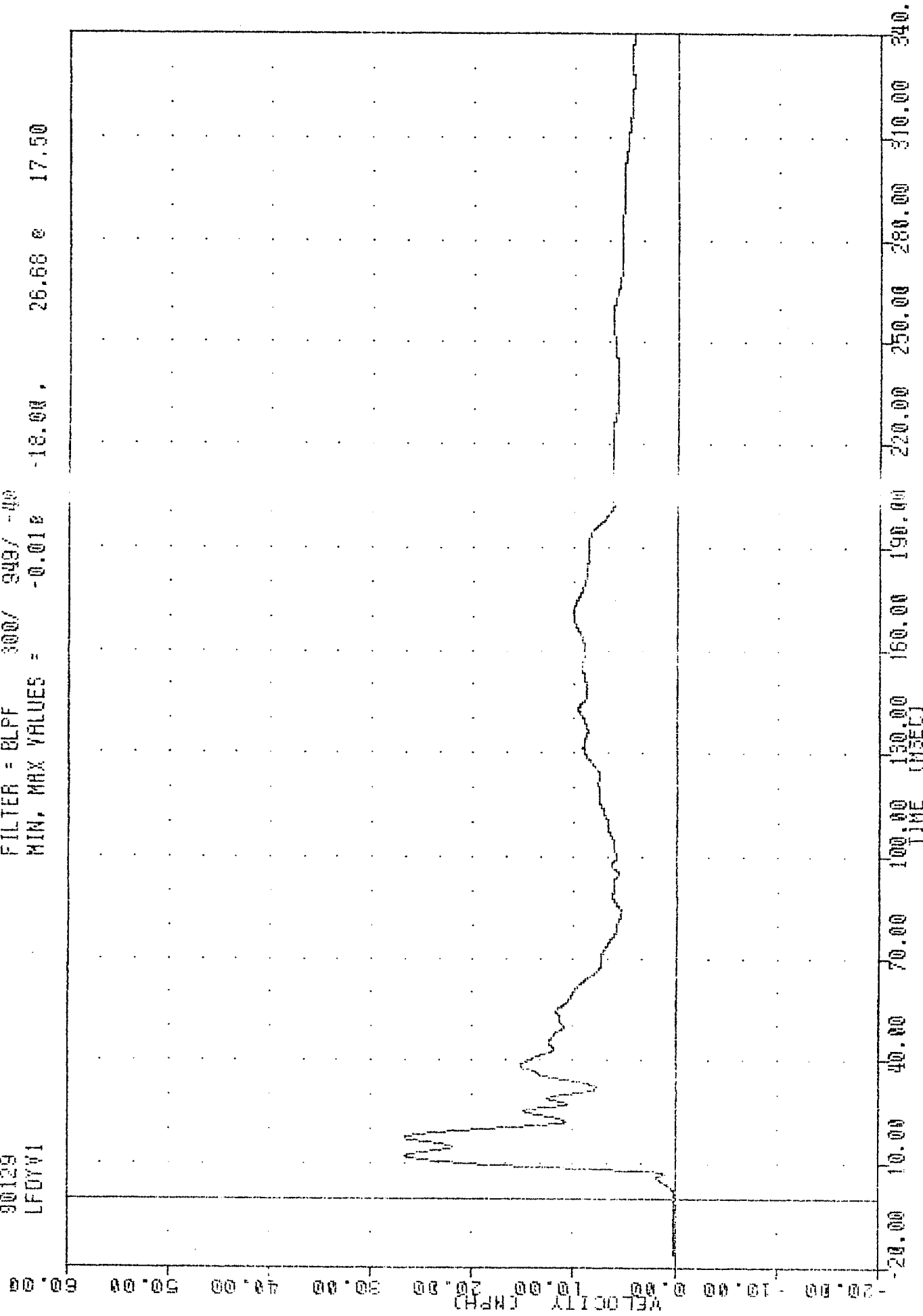
MIN, MAX VALUES =

-0.012

-18.00,

26.68 @

17.50

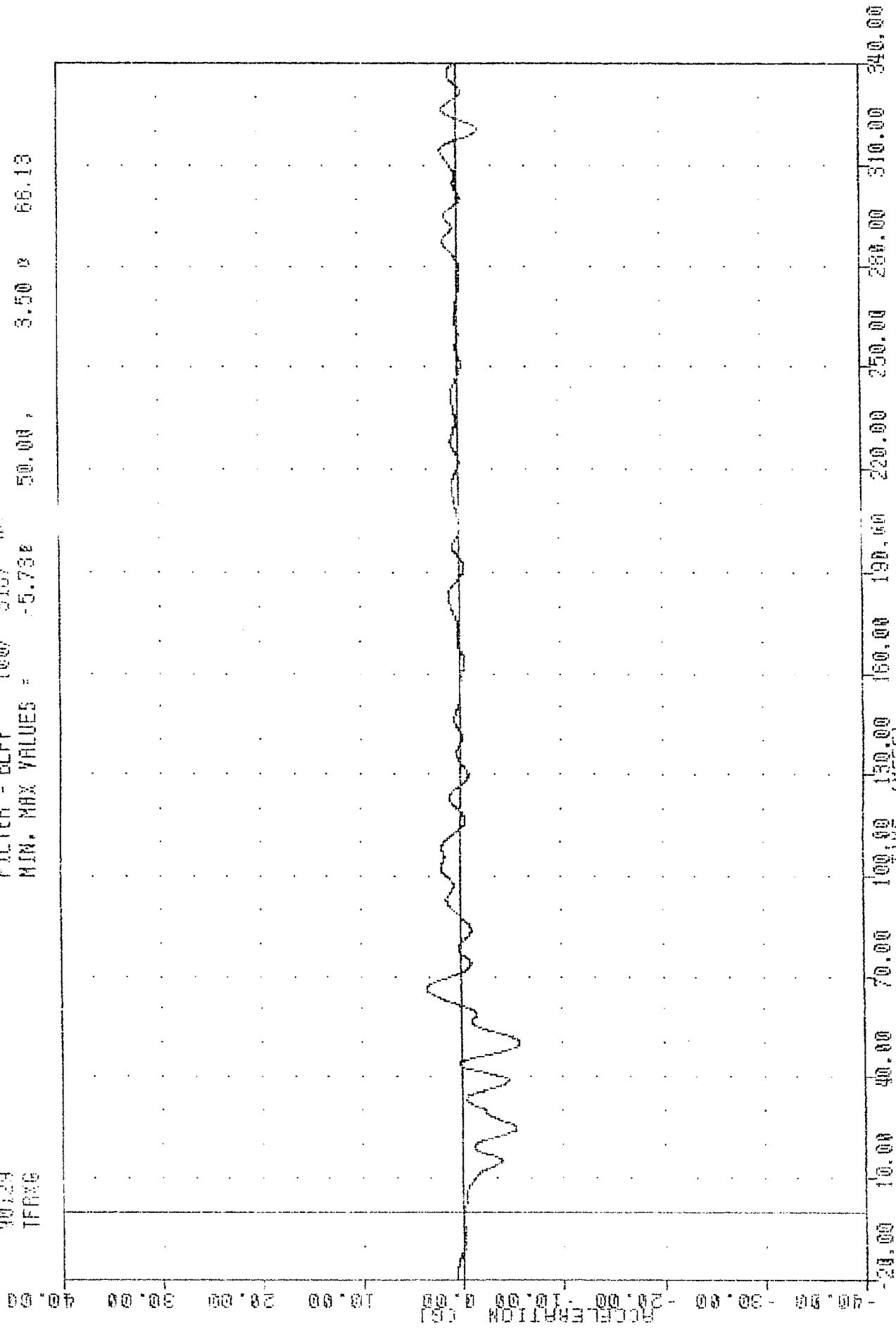


MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA

VEHICLE LEFT FRONT DOOR (POSITION 6) Y AXIS VELOCITY

00129
 91 PROTECTION PAD0 VEHICLE
 TFRXG

FILTER = BLFF 100/ 315/ -00
 MIN. MAX VALUES = -5.732 50.00 3.50 66.13



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 VEHICLE TRUNK FLOOR RIGHT X AXIS ACCELERATION

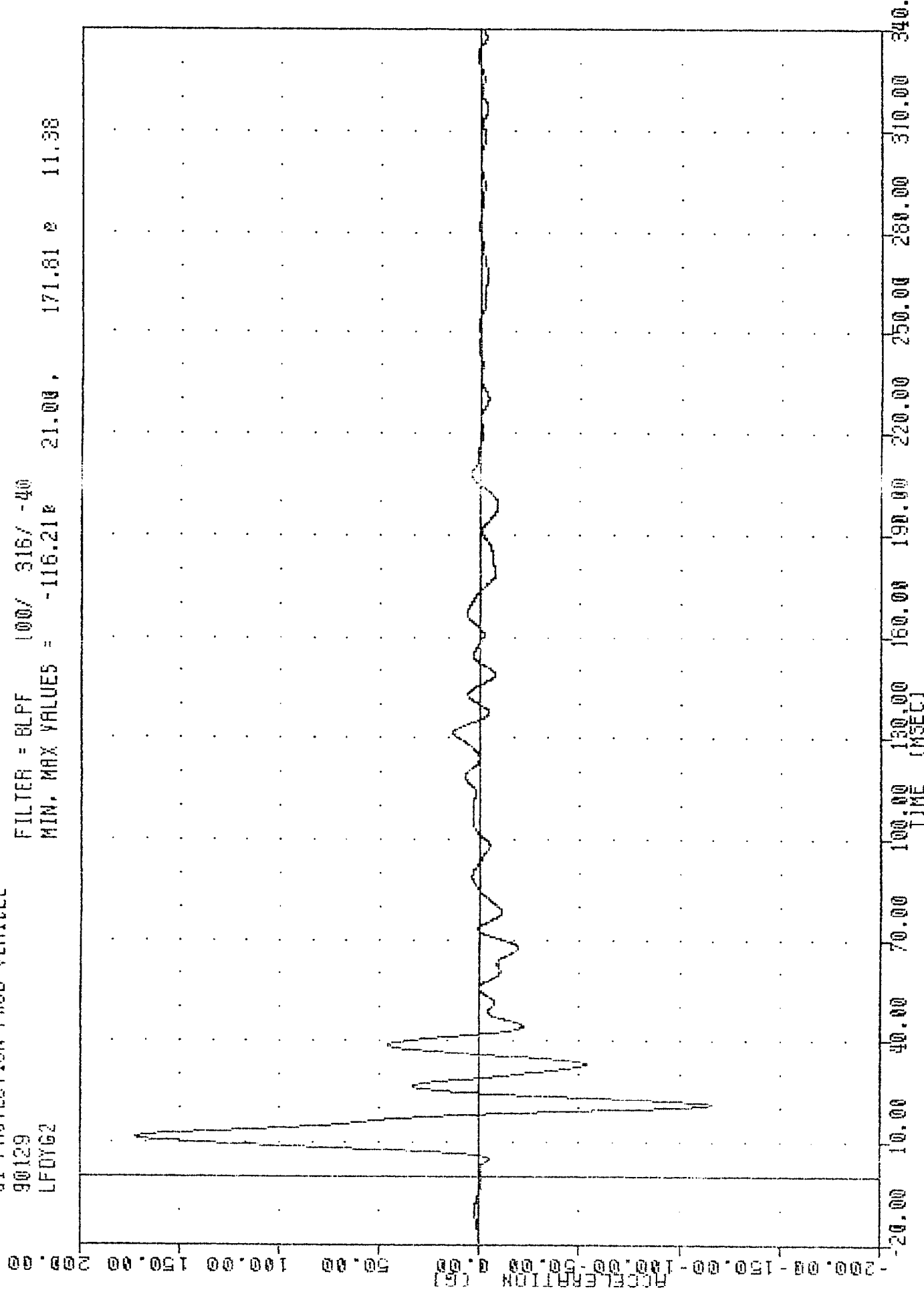
SI PROTECTION PROD VEHICLE

90129

LFDY62

FILTER = BLPF 100/ 316/ -40

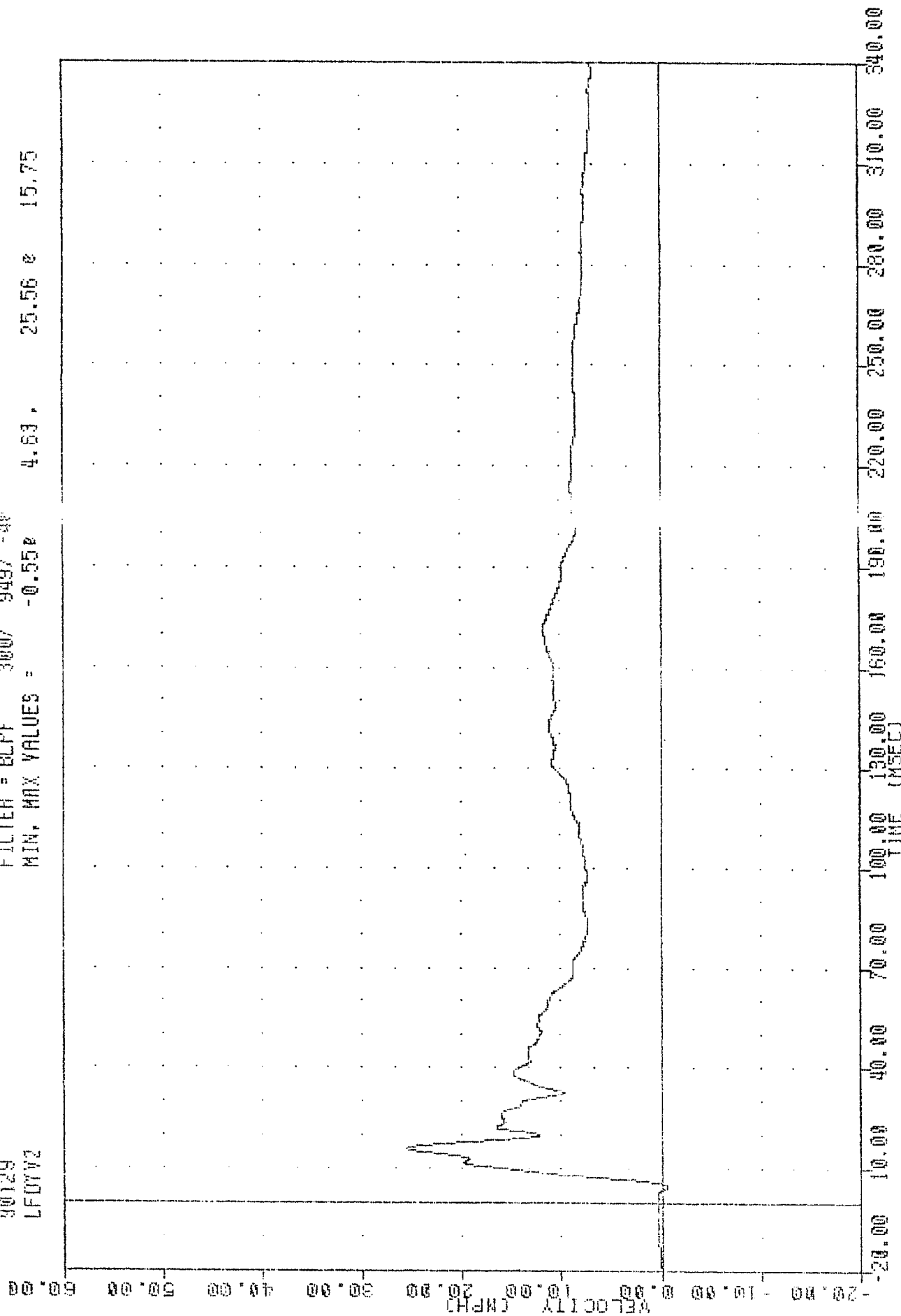
MIN. MAX VALUES = -116.21 21.00, 171.81 2 11.38



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE LEFT FRONT DOOR (POSITION 8) Y AXIS ACCELERATION

300129
LFDTW2
SI PROTECTION PROD VEHICLE

FILTER = BLPF 300/ 949/ -48
MIN, MAX VALUES = -0.55e 4.63, 25.56 e 15.75



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE LEFT FRONT DOOR (POSITION 8) Y AXIS VELOCITY

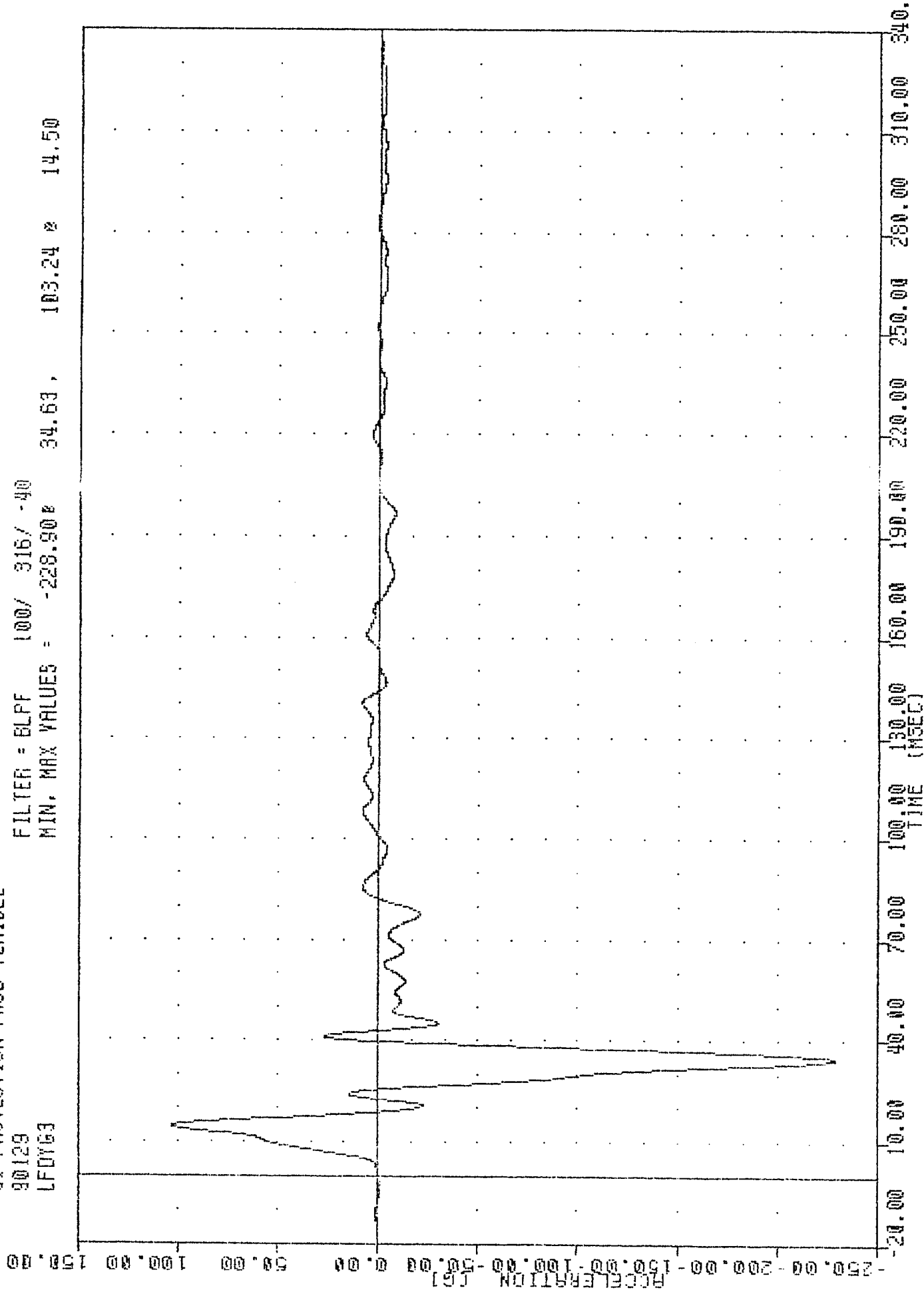
SI PROTECTION FROM VEHICLE

90129

LF0Y63

FILTER = BLPF 100/ 316/ -40

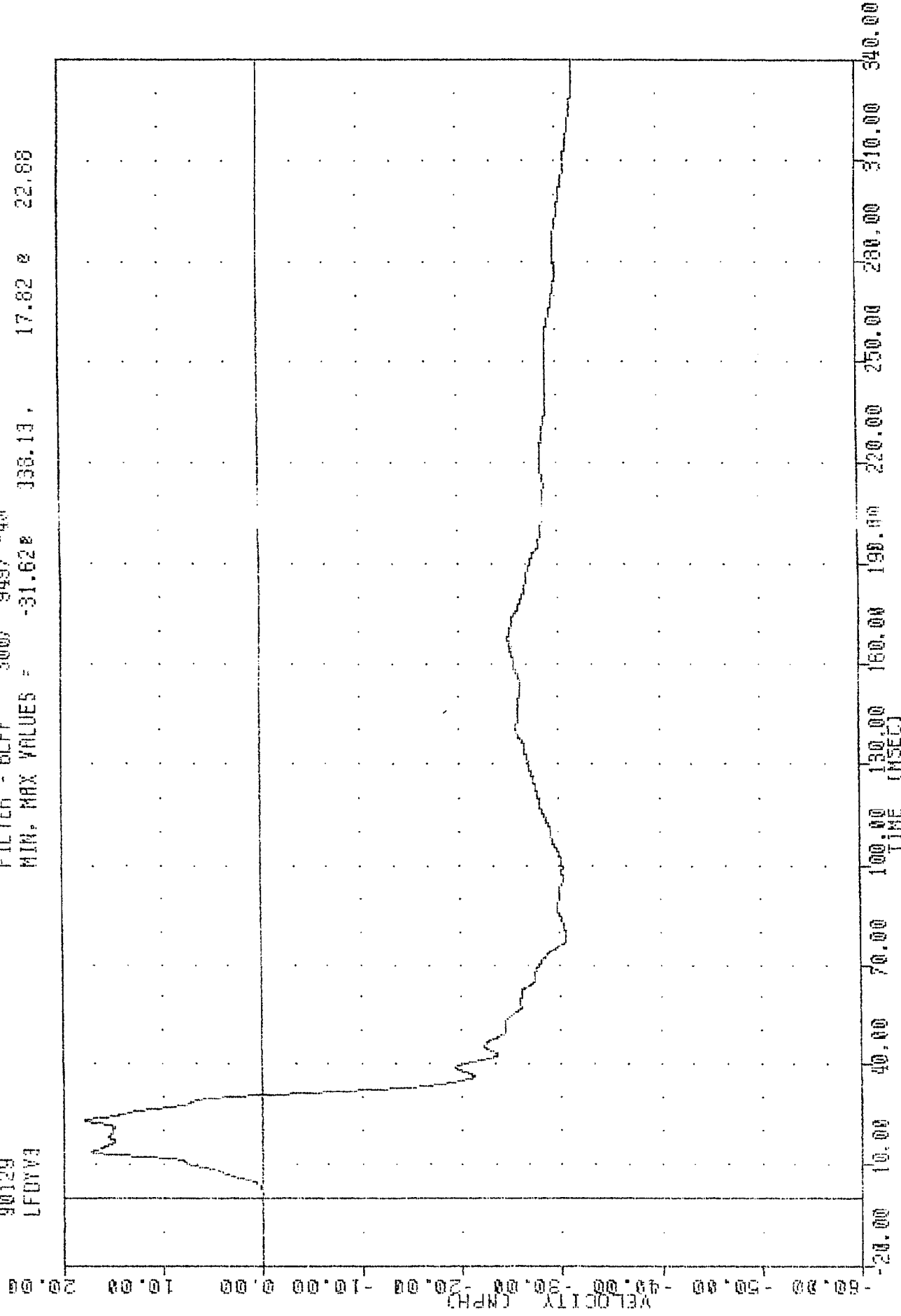
MIN. MAX VALUES = -228.90 34.63, 103.24 14.50



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE LEFT FRONT DOOR (POSITION 9) Y AXIS ACCELERATION

VEHICLE, 9805008
 SI PROTECTION PROO VEHICLE
 90129
 LFDYV3

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -31.62 338.13, 17.82 22.88

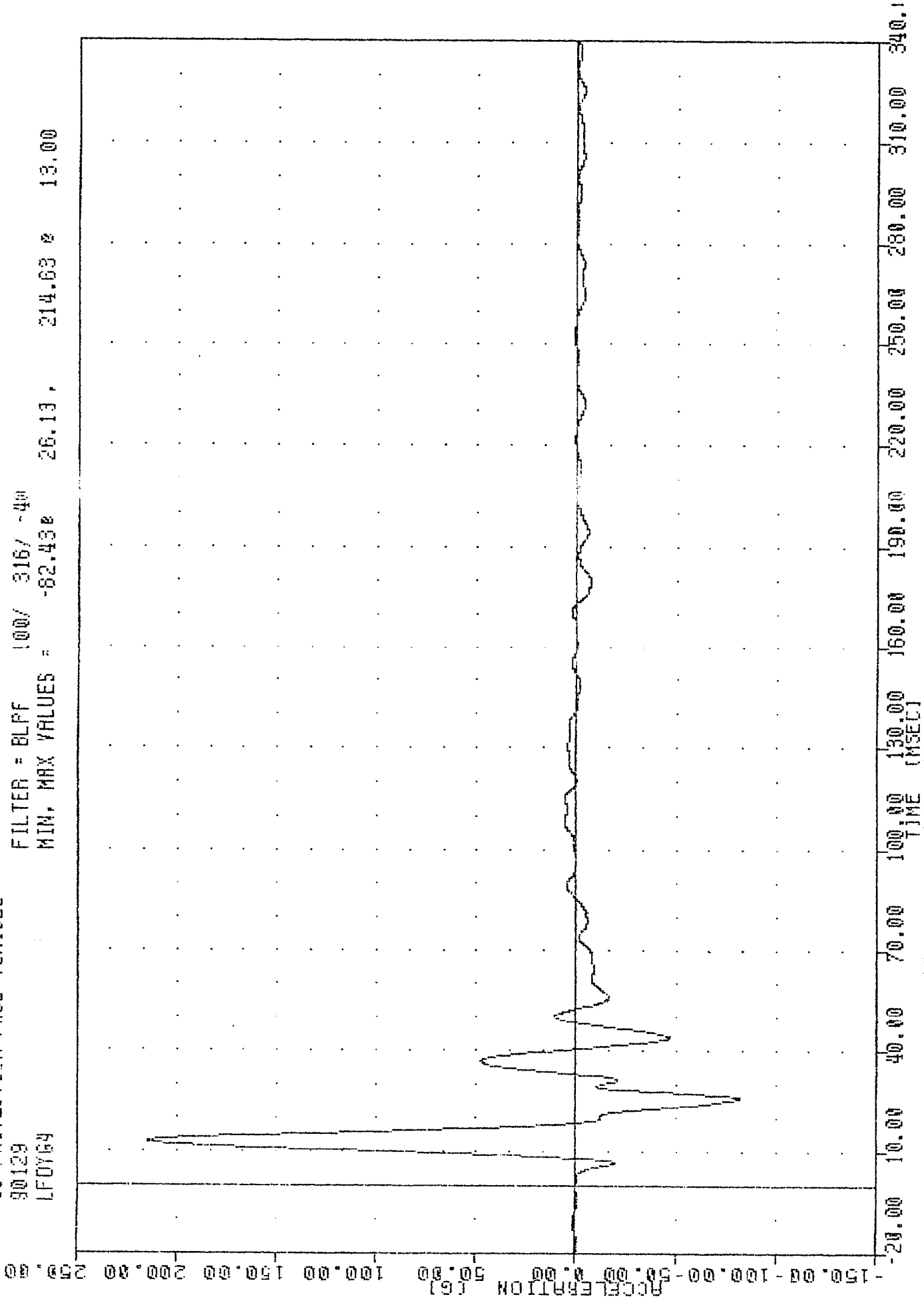


MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 VEHICLE LEFT FRONT DOOR (POSITION 9) Y AXIS VELOCITY

SI PROTECTION PROD VEHICLE

90129
LFOY64

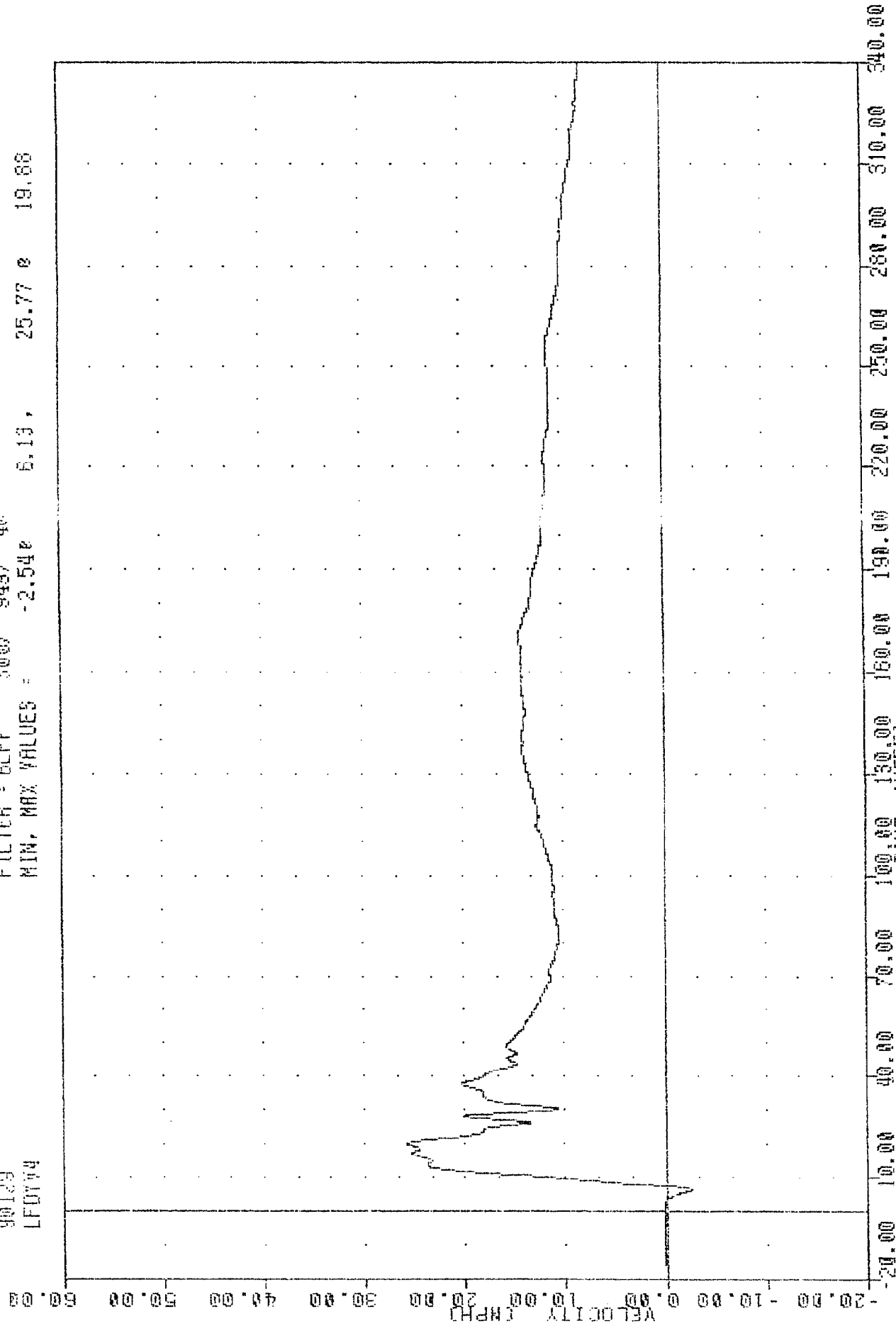
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -82.43e 26.13, 214.63 e 13.00



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE LEFT FRONT DOOR (POSITION 10) Y AXIS ACCELERATION

SI PROTECTION PASS VEHICLE
90123
LFDY74

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -2.54e 6.13, 25.77 e 19.88

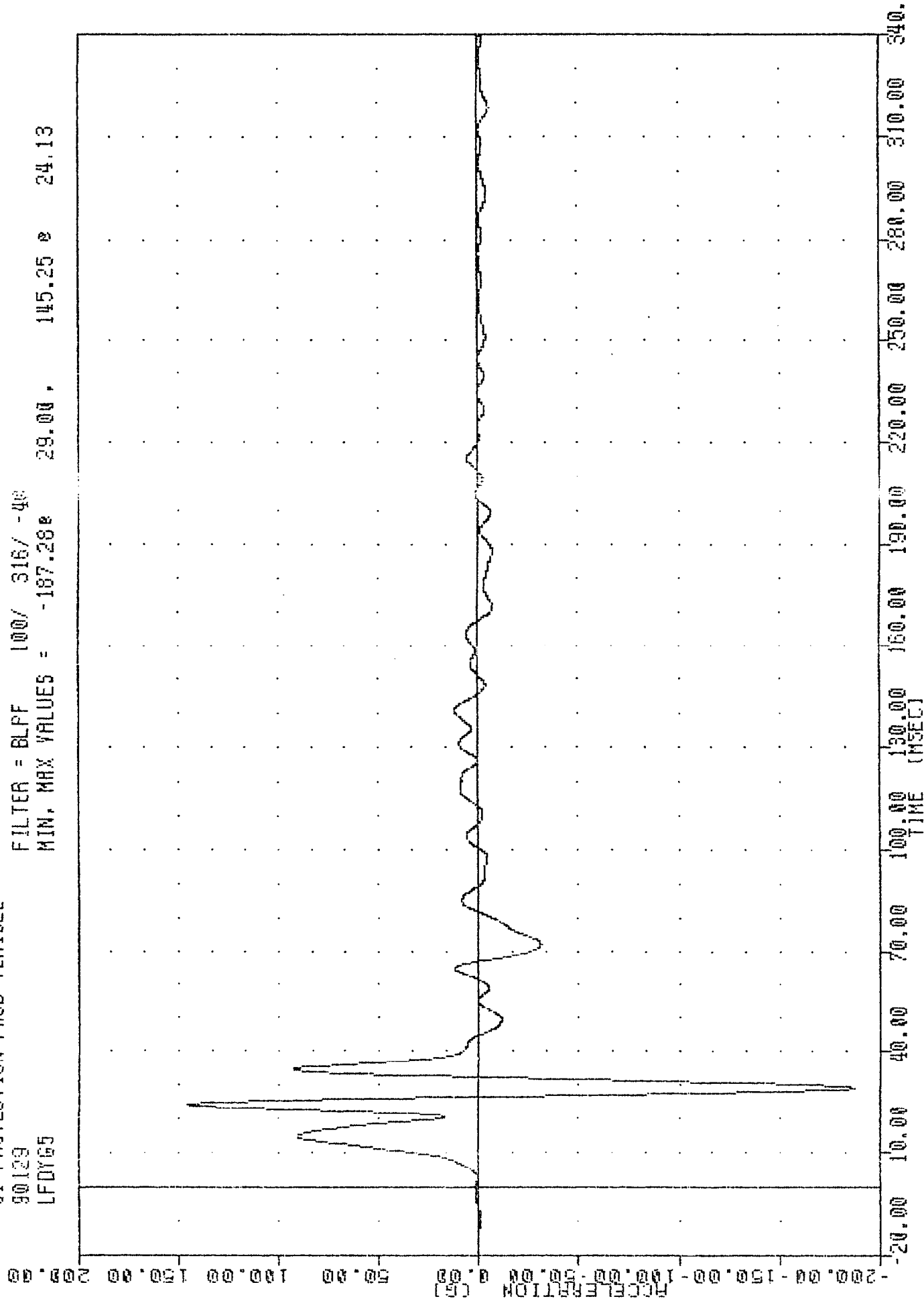


MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE LEFT FRONT DOOR (POSITION 10) Y AXIS VELOCITY

SI PROTECTION PROD VEHICLE

90129
LFDY65

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -187.28 29.00, 145.25 24.13



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE LEFT FRONT DOOR (POSITION 1) Y AXIS ACCELERATION

3701HAY 0008F NO1103109F 15

44-1616-1000-1373-33113

MIN. MAX. VALUES = -0.002 0.002

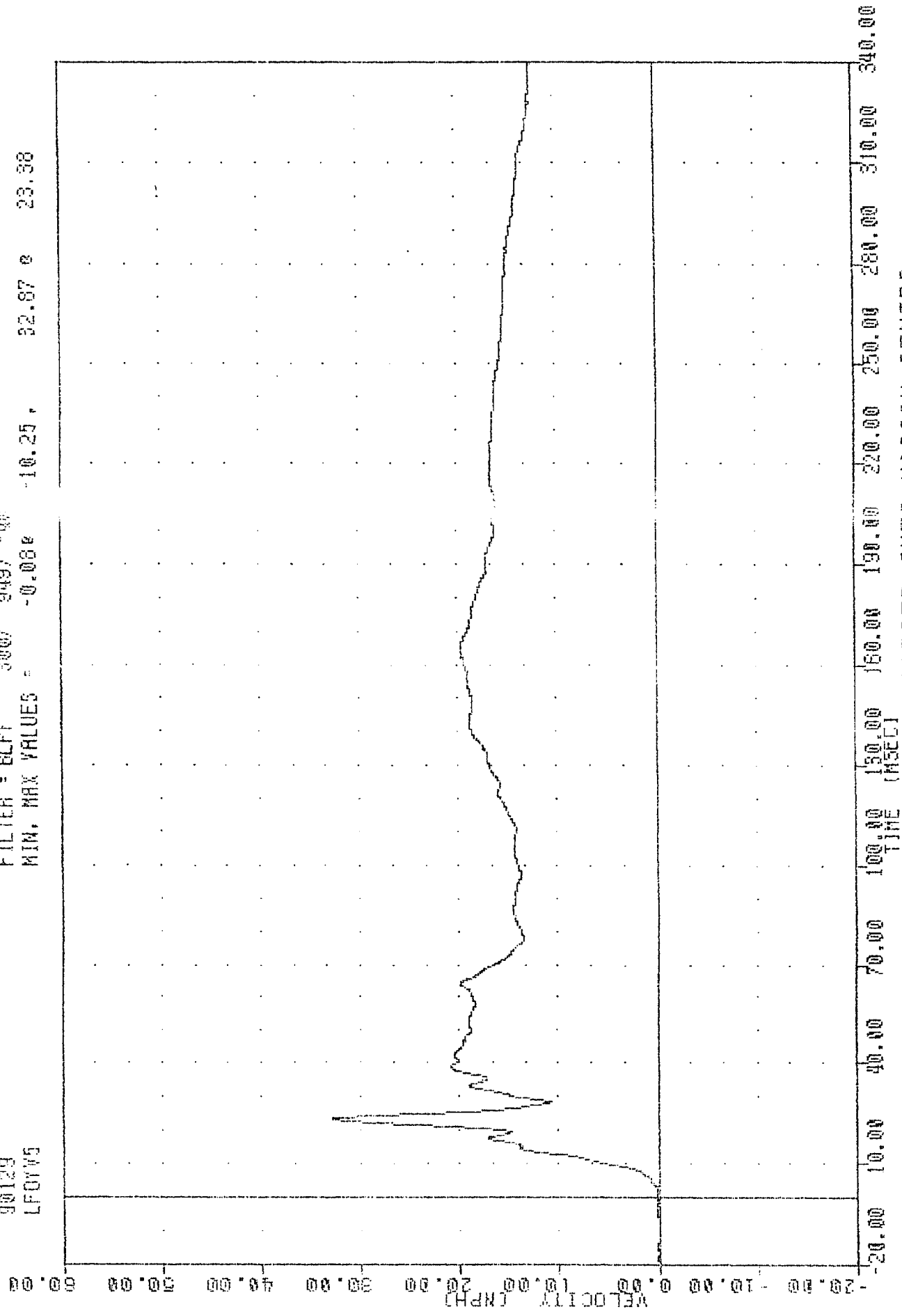
08
09
-
03
04

(2)

7-
03
*
04
05

2.

67
02
①
②
③



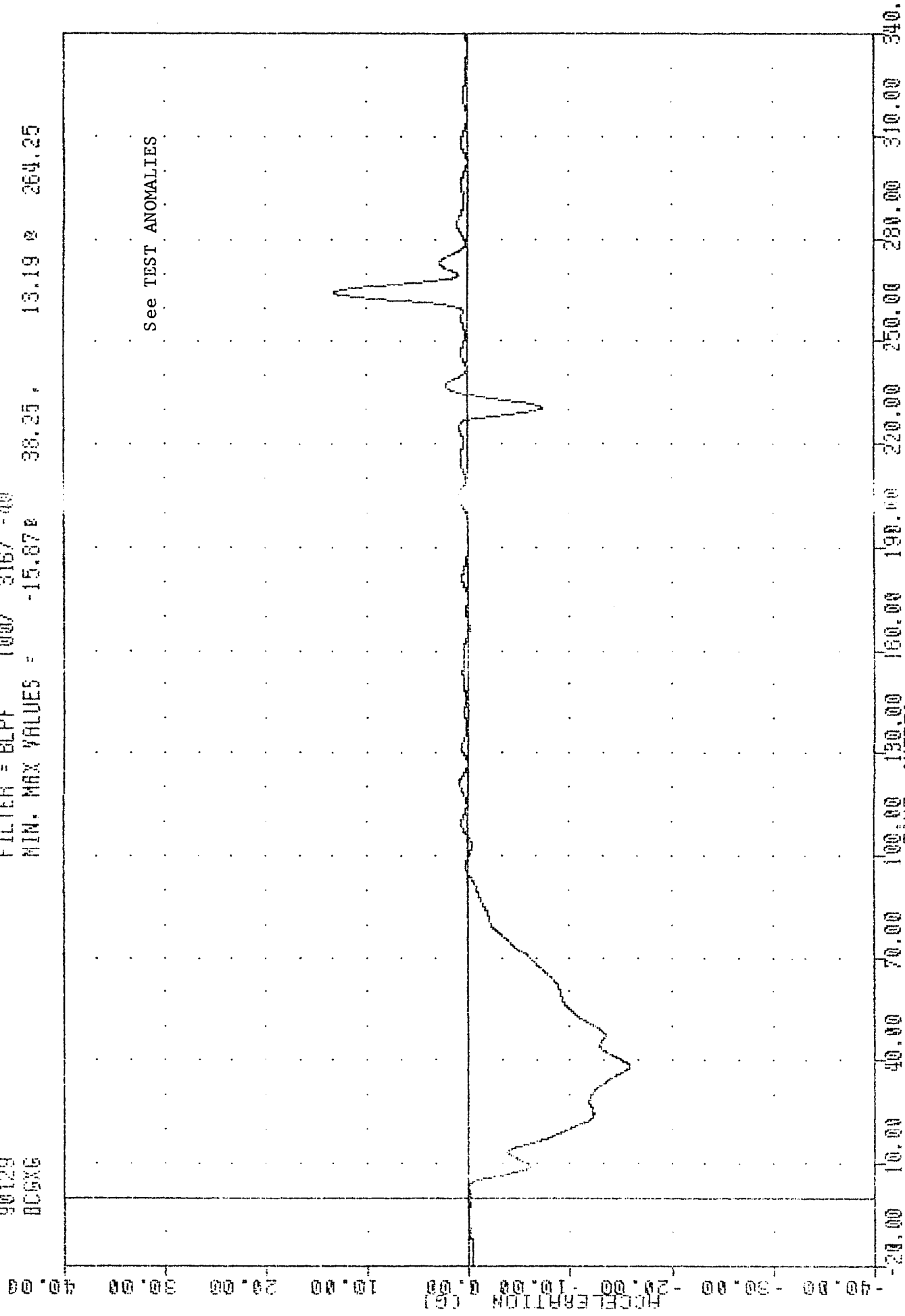
MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
VEHICLE LEFT FRONT DOOR (POSITION 1) Y AXIS VELOCITY

SI PROTECTION PROD VEHICLE

90129
BCGXB

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -15.87 38.25

13.19 264.25



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
BARRIER CENTER OF GRAVITY X AXIS ACCELERATION

10.11.2000 09:00:00

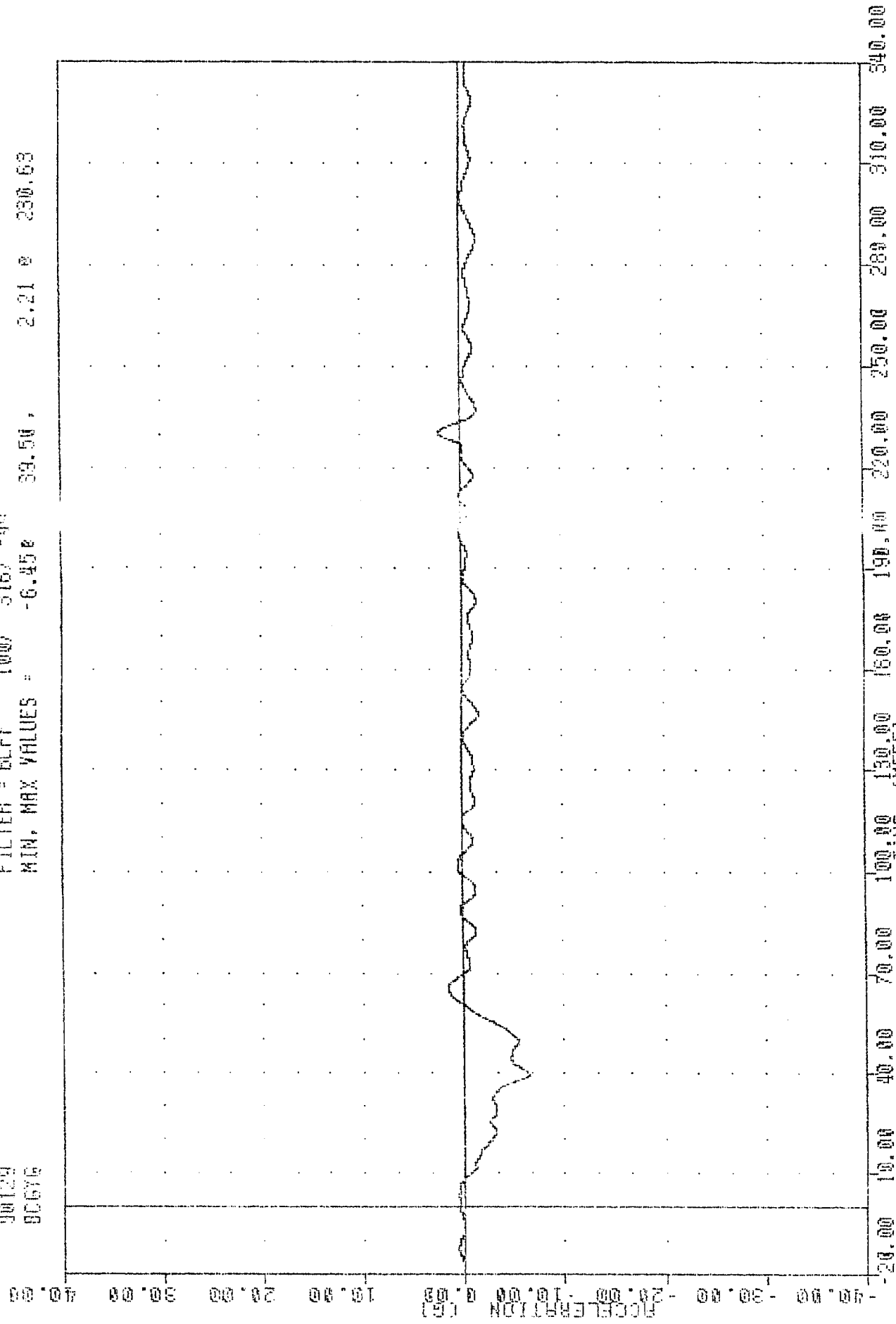
SI PROTECTION PHOD VEHICLE

00129

BC676

FILTER = BLFF 100/ 316/ -40

MIN. MAX VALUES = -6.450 39.50 , 2.21 0 230.63



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
BARRIER CENTER OF GRAVITY Y AXIS ACCELERATION

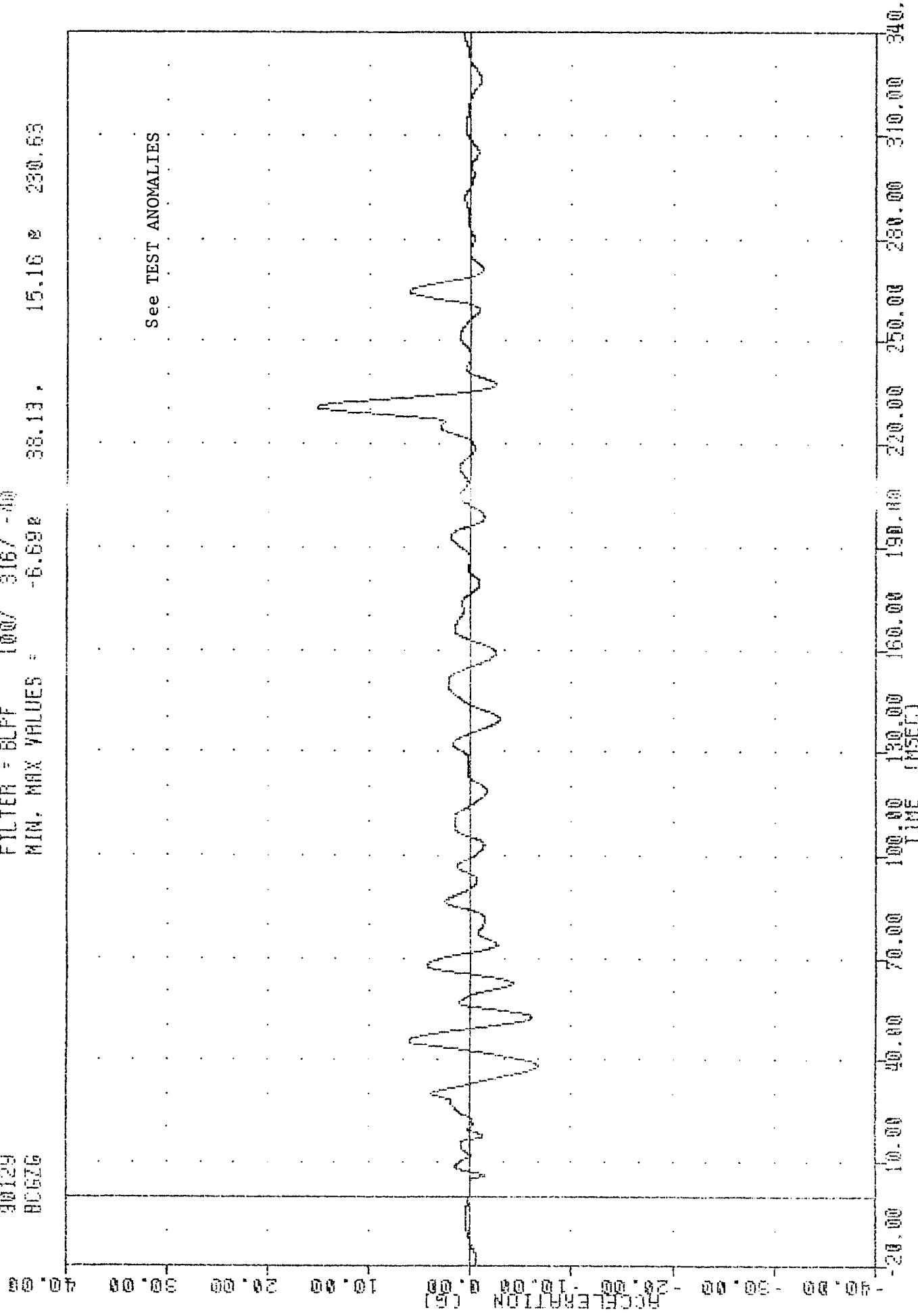
31 PROJECTION FROM VEHICLE

90129

BC6ZG

FILTER = BLPF 100/ 316/ -40

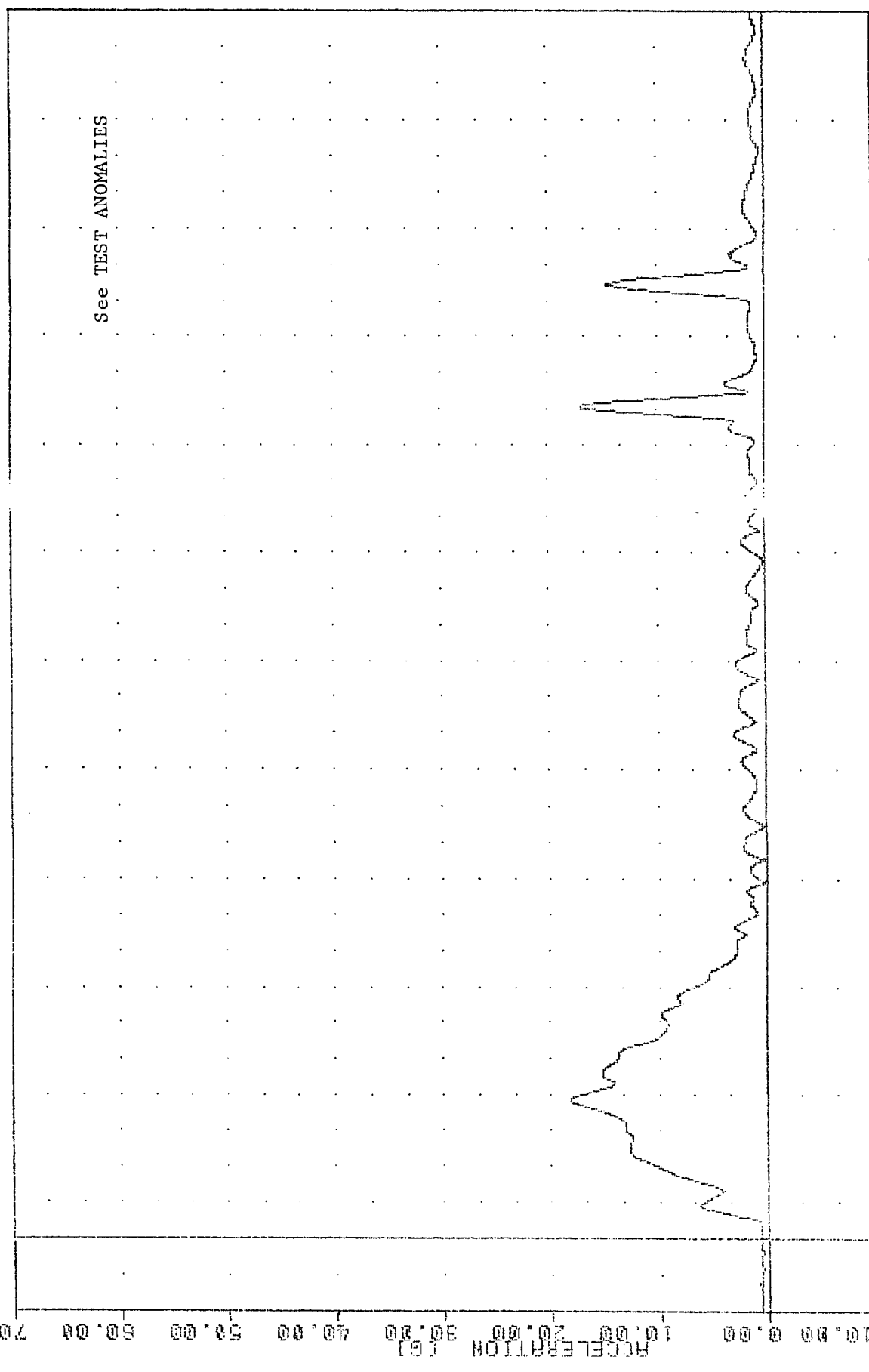
MIN, MAX VALUES = -6.690 38.13, 15.16 @ 230.63



MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
BARRIER CENTER OF GRAVITY Z AXIS ACCELERATION

0016
 SI PROTECTION PROD VEHICLE
 90129
 BCGRS

FILTER = BLPF 100/ 3167 -40
 MIN. MAX VALUES = 0.07e 98.13, 10.25 e 30.50



-20.00 10.00 0.00
 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 BARRIER CENTER OF GRAVITY RESULTANT ACCELERATION

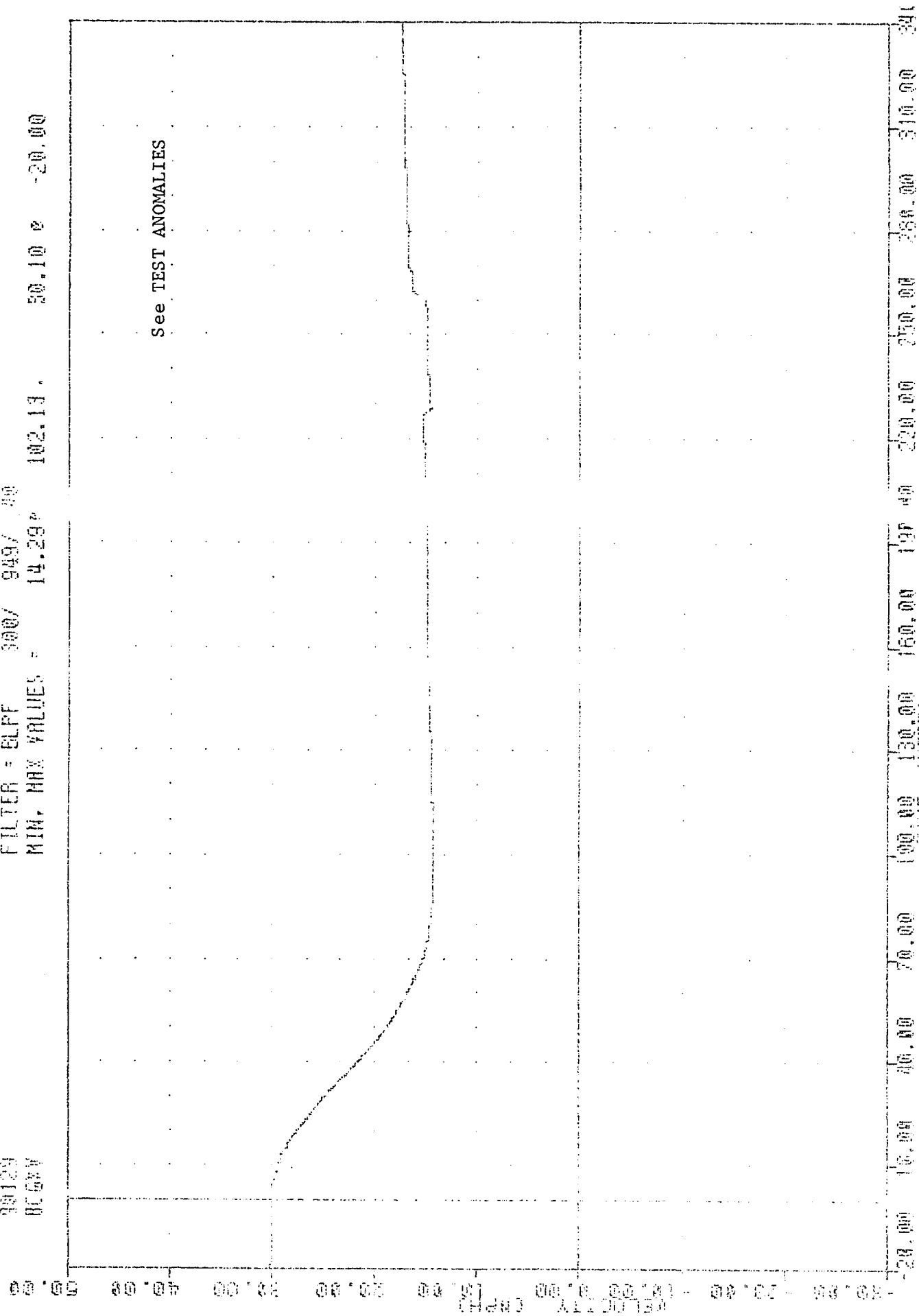
SI PROTECTION PROD VEHICLE

39129
01644

FILTER = BLFF 300/ 949/ 40
MIN, MAX VALUES = 14.29 102.13

50.10 2 -20.00

See TEST ANOMALIES

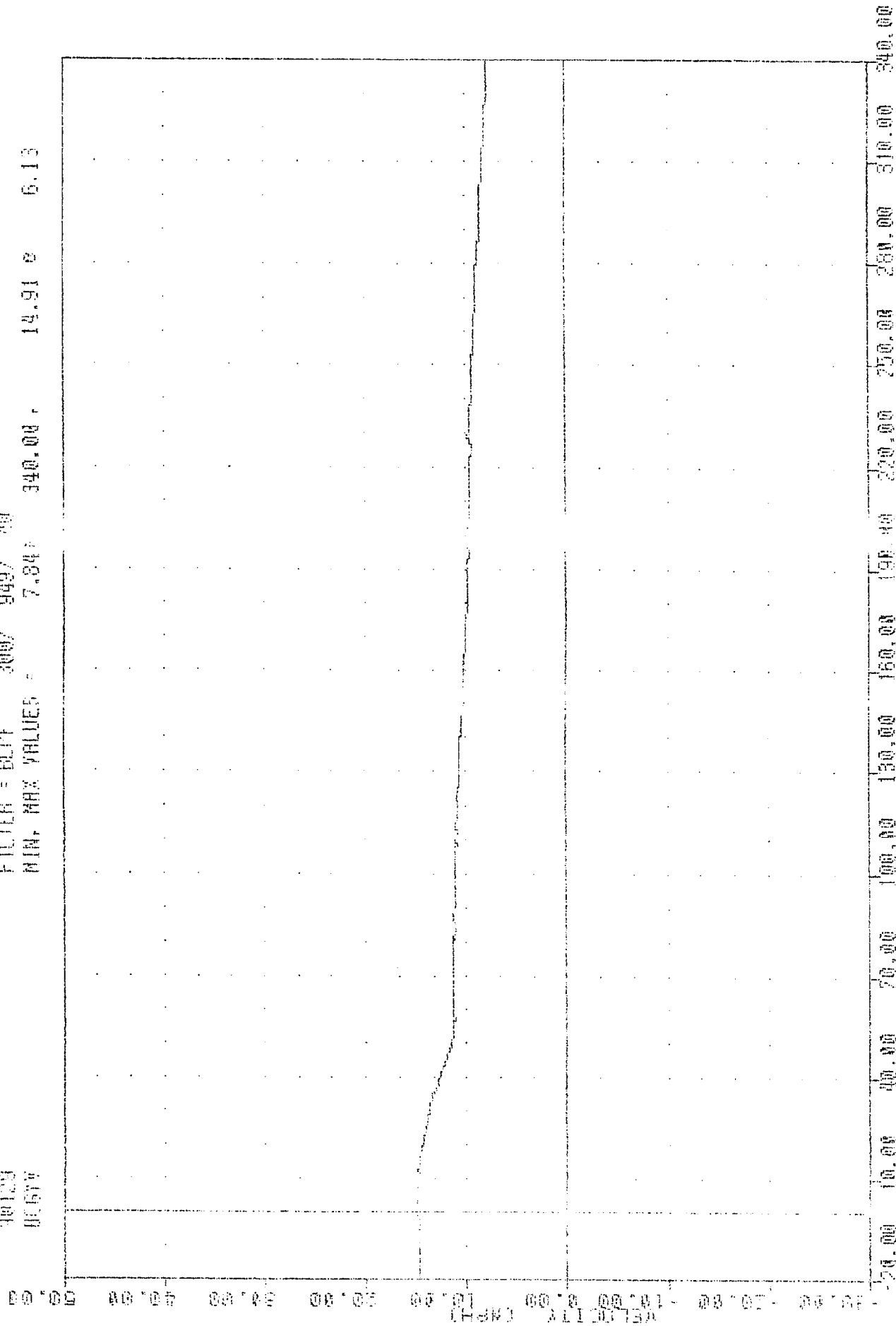


MOVING DEFORMABLE BARRIER (10 M/SEC)
BARRIER CENTER OF GRAVITY AXIS VELOCITY

31 PROTECTION PROO VEHICLE

FILTER = BLPF 300/ 949/ 00
 MIN. MAX VALUES = 7.84 14.91 e 6.13

00129
 HCBY



MOVING DEFORMABLE BARRIER 1010 NISSAN SENTRA
 BARRIER CENTER OF GRAVITY AXIS VELOCITY

ST PROTECTION FROM VEHICLE

90129

BRXG

FILTER = BLPF

100% 316/-90

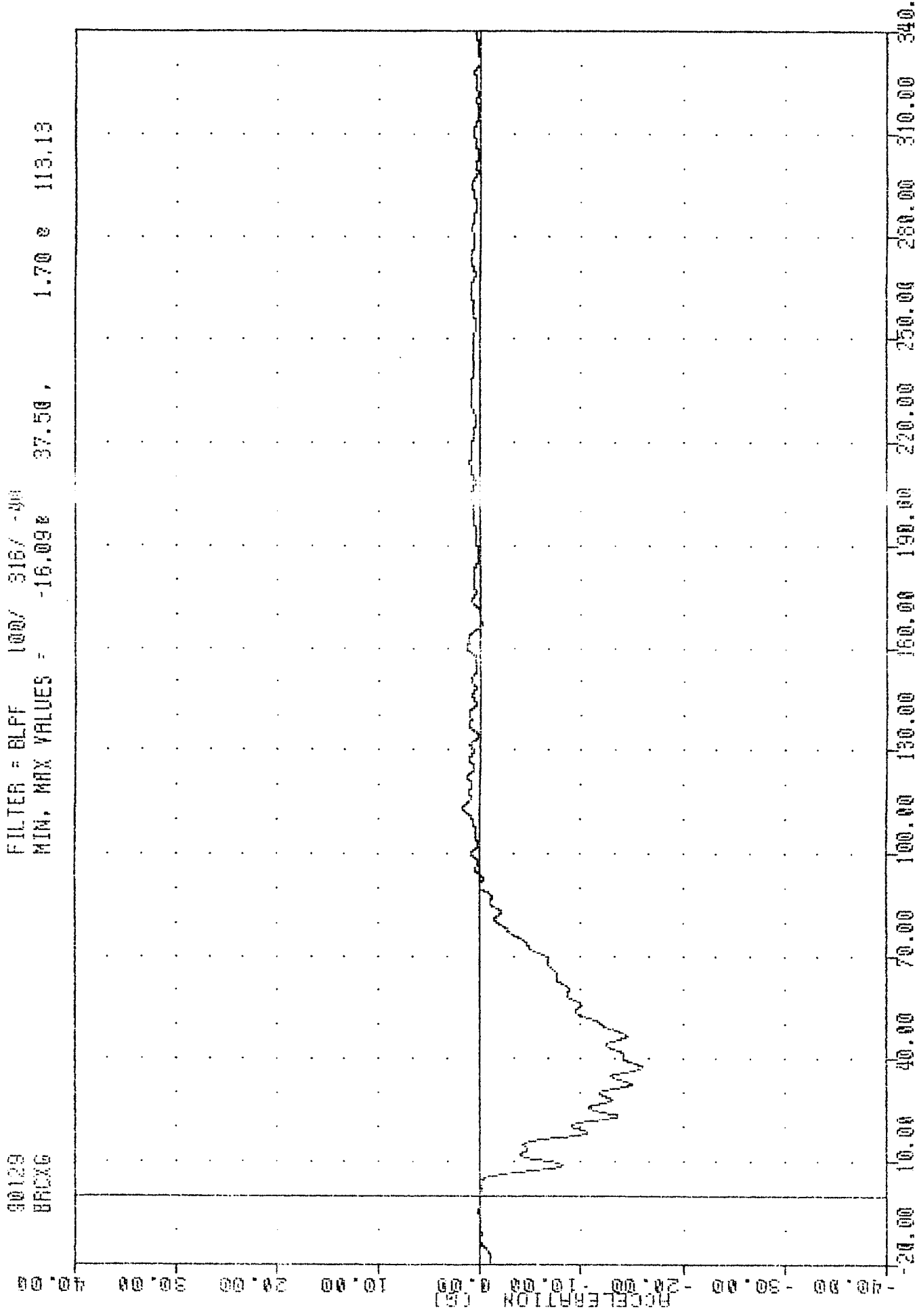
MIN. MAX VALUES =

-16.09%

37.50,

1.70%

113.13

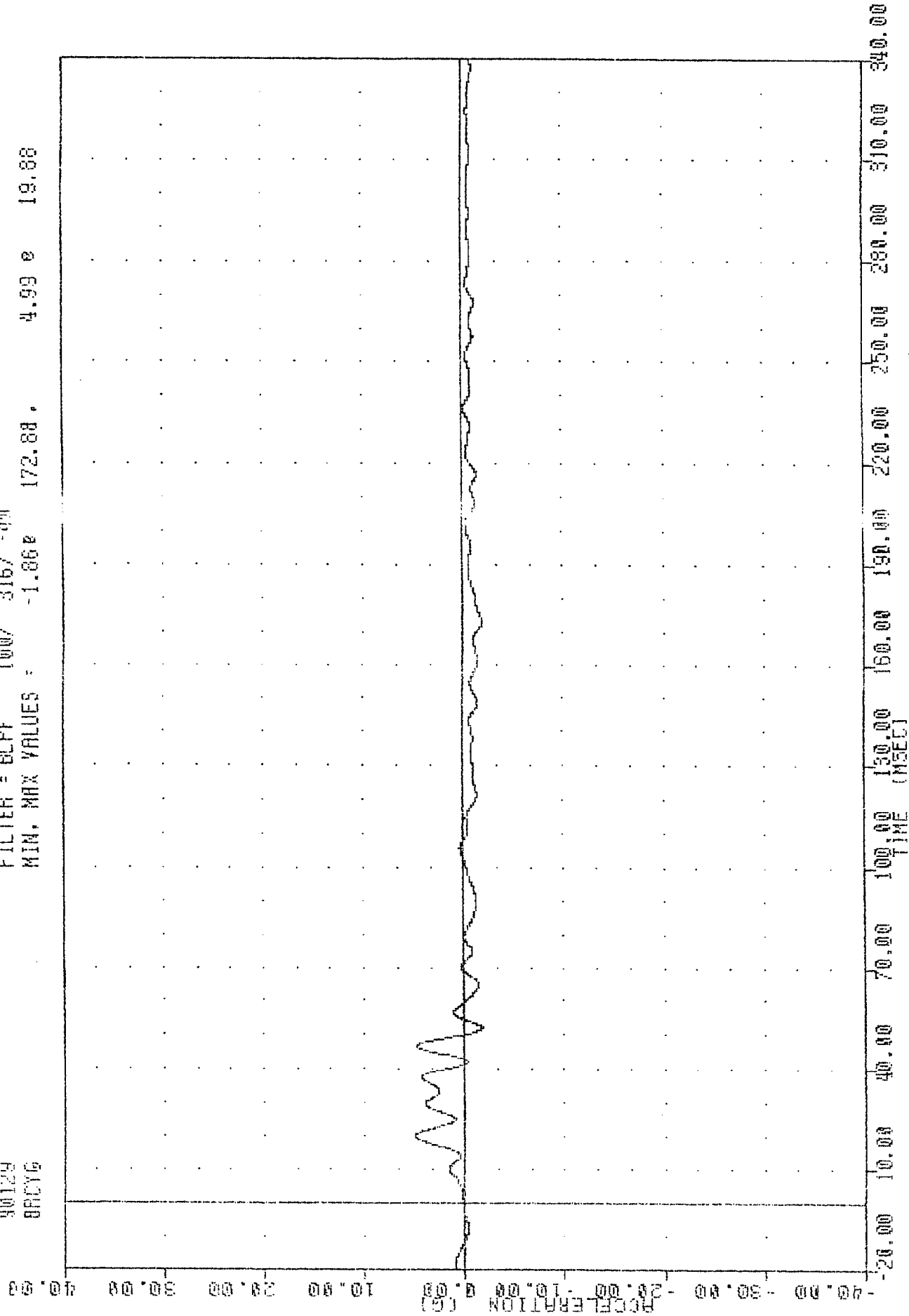


MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
BARRIER REAR CROSSMEMBER X AXIS ACCELERATION

741
 SI PROTECTION PROD VEHICLE
 90129
 8RCYC6

741 , 300005

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES : -1.860 172.88 4.99 19.88

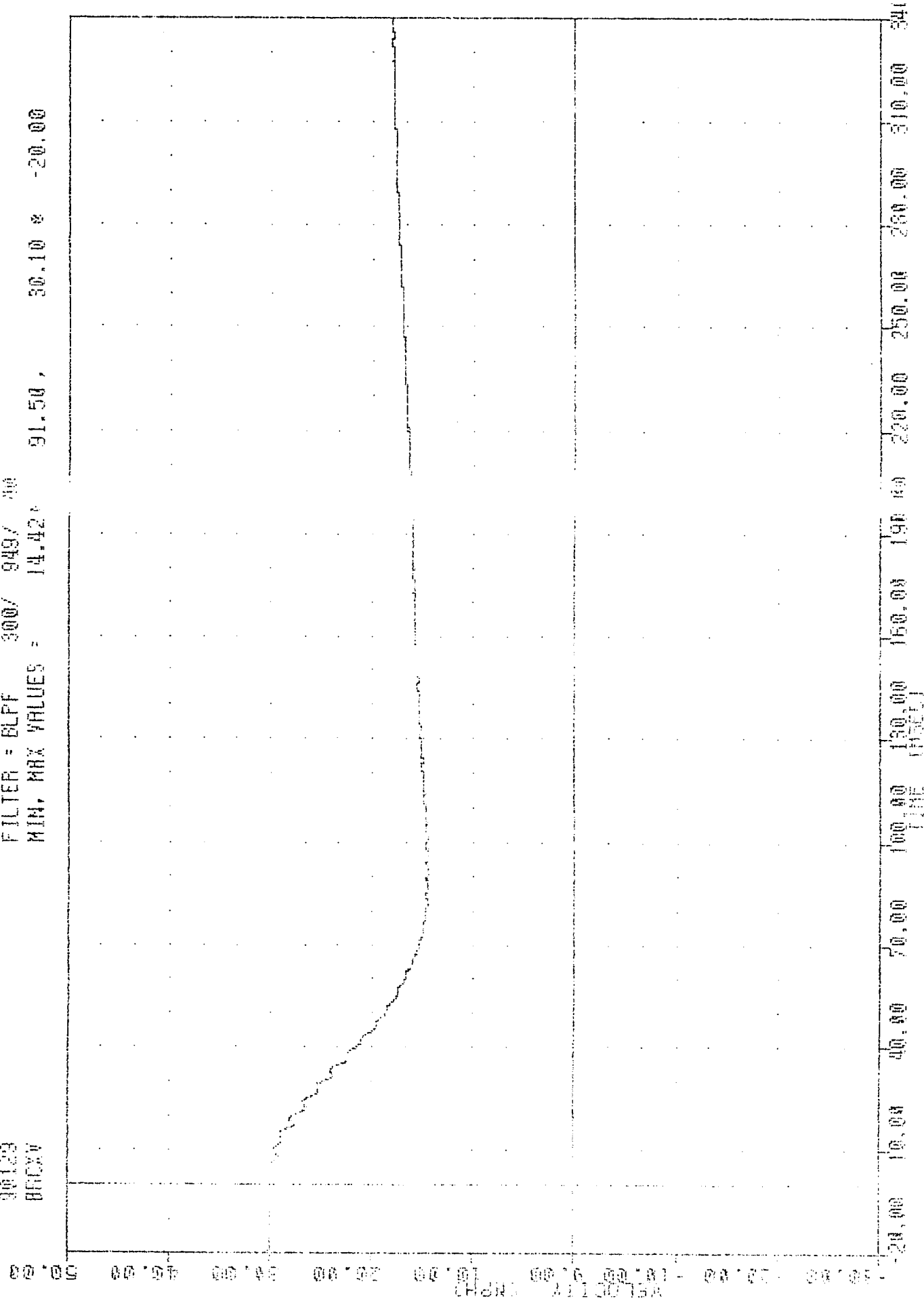


MOVING DEFORMABLE BARRIER INTO NISSAN SENTRA
 BARRIER REAR CROSSMEMBER Y AXIS ACCELERATION

SI PROTECTION PASS VEHICLE

00123
BRCXV

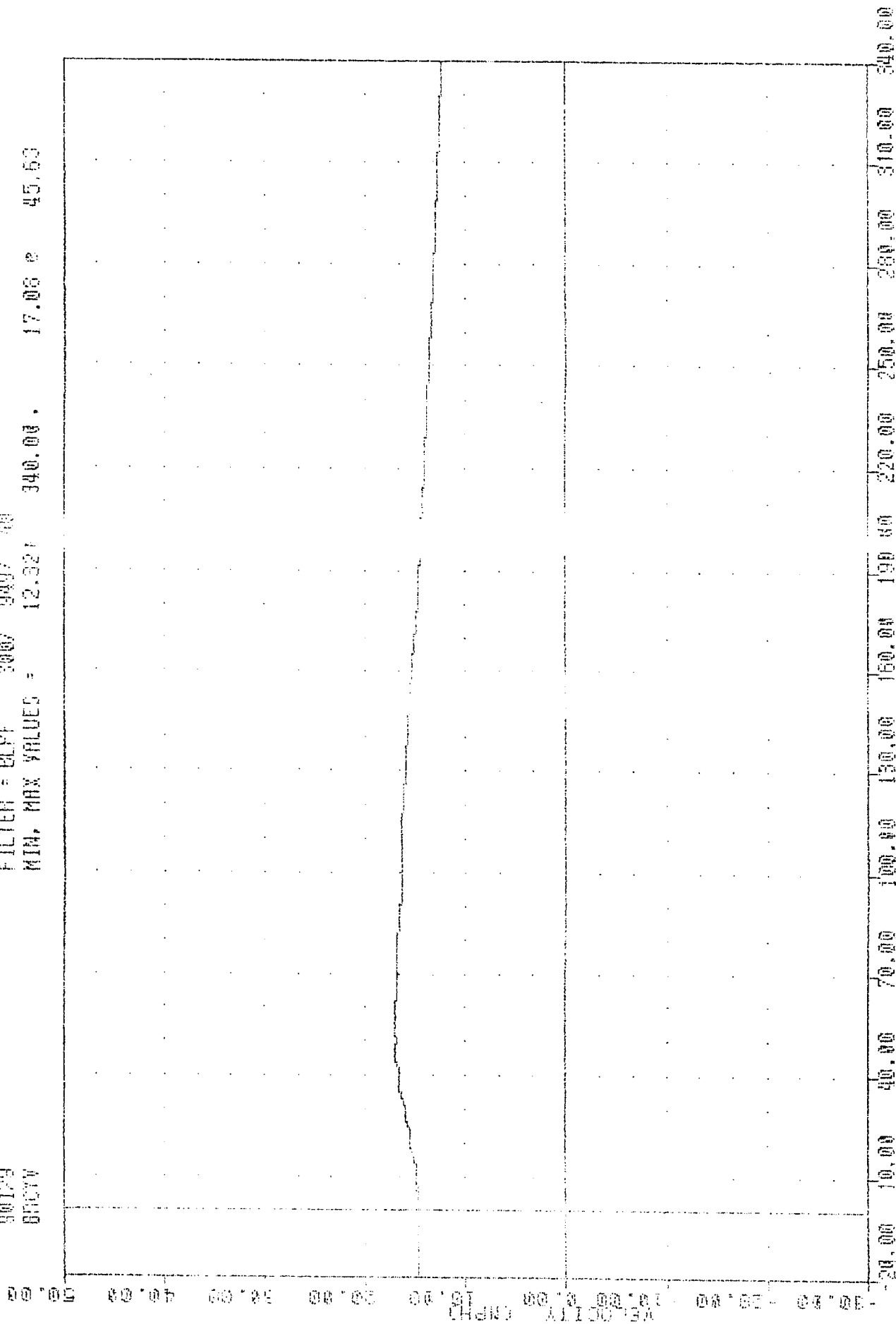
FILTER = BLPF 300/ 949/ 40
MIN, MAX VALUES = 14.42 91.50, 30.10 * -20.00



MOVING DEFORMABLE BARRIER TEST WITH 3000 SENTRA
BARRIER REAR CROSS MEMBER X AXIS VELOCITY

1011 200000
 ST PROTECTION PAD VEHICLE
 90129
 BRCTV

FILTER = BLFF 300/ 949/ 00
 MIN, MAX VALUES = 12.321 340.00. 17.06 2 45.53



MOVING DEFORMABLE BARRIER 1010 NISSAN SENTRA
 BARRIER REAR CROSSMEMBER Y AXIS VELOCITY

APPENDIX C

DUMMY CERTIFICATION

BIOSID CALIBRATION RESULTS

PRE-TEST CALIBRATION FOR TEST #900509

DUMMY NO. 01 SERIES NO. VRTC-CAL 6 DATE 05/04/90

CALIBRATION TEST	SAE* CORRIDOR	RESULTS
SHOULDER		
IMPACT FORCE (kN)	3.7 - 4.6	4.21
SHOULDER ACCEL. (g)	NA	81.2
SHOULDER DISPL. (mm)	21 - 31	24.2
THORAX - NO ARM		
IMPACT FORCE (kN)	5.4 - 6.7	6.15
UPPER RIB ACCEL. (g)	120 - 180	155.9
CENTER RIB ACCEL. (g)	120 - 180	149.2
LOWER RIB ACCEL. (g)	120 - 180	152.2
UPPER RIB DISPL. (mm)	50 - 70	63.7
CENTER RIB DISPL. (mm)	50 - 70	65.2
LOWER RIB DISPL. (mm)	50 - 70	63.4
UPPER SPINE ACCEL. (g)	16 - 24	21.1
LOWER SPINE ACCEL. (g)	11 - 17	15.1
THORAX - ARM DOWN		
IMPACT FORCE (kN)	6.2 - 7.9	7.57
SHOULDER ACCEL. (g)	NA	91.4
UPPER RIB ACCEL. (g)	52 - 78	73.6
CENTER RIB ACCEL. (g)	66 - 99	91.0
LOWER RIB ACCEL. (g)	85 - 128	117.4
SHOULDER DISPL. (mm)	17 - 27	26.0
UPPER RIB DISPL. (mm)	20 - 30	26.2
CENTER RIB DISPL. (mm)	30 - 44	34.5
LOWER RIB DISPL. (mm)	40 - 55	44.3
UPPER SPINE ACCEL. (g)	34 - 46	40.4
LOWER SPINE ACCEL. (g)	14 - 21	17.2
ABDOMEN		
IMPACT FORCE (kN)	2.9 - 3.6	3.34
UPPER ABDOMEN ACCEL. (g)	52 - 80	60.5
LOWER ABDOMEN ACCEL. (g)	55 - 87	62.0
UPPER ABDOMEN DISPL. (mm)	40 - 55	49.4
LOWER ABDOMEN DISPL. (mm)	38 - 52	45.3
UPPER SPINE ACCEL. (g)	5.4 - 8.1	6.7
LOWER SPINE ACCEL. (g)	8 - 12	10.3
PELVIS		
IMPACT FORCE (kN)	7.5 - 9.5	8.81
PELVIS ACCEL. (g)	45 - 63	56.2

*PROPOSED SAE CORRIDORS; DRAFT BIOSID USER'S MANUAL, MAY 1990.

RIGHT REAR PASSENGER DUMMY

DUMMY NO.: 02

BIOSID CALIBRATION RESULTS

PRE-TEST CALIBRATION FOR TEST #900509

DUMMY NO. 02 SERIES NO. VRTC-CAL 6 DATE 05/04/90

CALIBRATION TEST	SAE* CORRIDOR	RESULTS
SHOULDER		
IMPACT FORCE (kN)	3.7 - 4.6	4.23
SHOULDER ACCEL. (g)	NA	---
SHOULDER DISPL. (mm)	21 - 31	24.7
THORAX - NO ARM		
IMPACT FORCE (kN)	5.4 - 6.7	5.97
UPPER RIB ACCEL. (g)	120 - 180	148.7
CENTER RIB ACCEL. (g)	120 - 180	133.7
LOWER RIB ACCEL. (g)	120 - 180	149.1
UPPER RIB DISPL. (mm)	50 - 70	61.2
CENTER RIB DISPL. (mm)	50 - 70	65.9
LOWER RIB DISPL. (mm)	50 - 70	63.5
UPPER SPINE ACCEL. (g)	16 - 24	20.7
LOWER SPINE ACCEL. (g)	11 - 17	15.8
THORAX - ARM DOWN		
IMPACT FORCE (kN)	6.2 - 7.9	7.27
SHOULDER ACCEL. (g)	NA	---
UPPER RIB ACCEL. (g)	52 - 78	75.9
CENTER RIB ACCEL. (g)	66 - 99	91.6
LOWER RIB ACCEL. (g)	85 - 128	109.9
SHOULDER DISPL. (mm)	17 - 27	23.3
UPPER RIB DISPL. (mm)	20 - 30	25.2
CENTER RIB DISPL. (mm)	30 - 44	38.8
LOWER RIB DISPL. (mm)	40 - 55	48.4
UPPER SPINE ACCEL. (g)	34 - 46	38.9
LOWER SPINE ACCEL. (g)	14 - 21	17.3
ABDOMEN		
IMPACT FORCE (kN)	2.9 - 3.6	3.45
UPPER ABDOMEN ACCEL. (g)	52 - 80	55.1
LOWER ABDOMEN ACCEL. (g)	55 - 87	67.5
UPPER ABDOMEN DISPL. (mm)	40 - 55	49.1
LOWER ABDOMEN DISPL. (mm)	38 - 52	43.6
UPPER SPINE ACCEL. (g)	5.4 - 8.1	6.7
LOWER SPINE ACCEL. (g)	8 - 12	9.8
PELVIS		
IMPACT FORCE (kN)	7.5 - 9.5	9.32
PELVIS ACCEL. (g)	45 - 63	54.3

*PROPOSED SAE CORRIDORS; DRAFT BIOSID USER'S MANUAL, MAY 1990.