

DOT 684

SIDE PROTECTION IN 2-DOOR
AND 4-DOOR PRODUCTION VEHICLES

MDB-TO-CAR SIDE IMPACT TEST OF
A 26° CRABBED MOVING DEFORMABLE BARRIER
TO A 1981 FORD GRANADA
AT 33.5 MPH

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



FINAL REPORT
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PREPARED FOR:
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Prepared By: John C. Stultz
J. C. Stultz
Project Engineer
Transportation Research Center of Ohio

Approved By: Richard W. Runyon
R. W. Runyon
Project Manager
Transportation Research Center of Ohio

Report Accepted By: M. W. Monk
M. W. Monk
Project Engineer
Vehicle Research & Test Center

Report Accepted By: _____
T. MacLaughlin
Project Manager
Vehicle Research & Test Center

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16. Abstract This test report documents one of a series of thirteen crash tests to evaluate side impact protection in various vehicle models. Testing was conducted on a 1981 Ford Granada 4-door Sedan at the TRCO Crash Test Facility, East Liberty, Ohio. The test vehicle was impacted on the left side by a moving deformable barrier, crabbled to 26°, at 33.5 mph. Occupant responses of two side impact dummies were measured. One dummy was located in the driver's designated seating position and one was located in the left rear seating position. The test date was January 18, 1984 and the ambient temperature was 15°F.			
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

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

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares	2.5	acres	acres
	(10 000 m ²)			
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton	1.1	short tons	
	(1000 kg)			
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
ml	milliliters	0.06	cubic inches	in ³
L	liters	2.1	pints	pt
L	liters	1.06	quarts	qt
L	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	degrees Celsius	9/5 (then add 32)	degrees Fahrenheit	°F

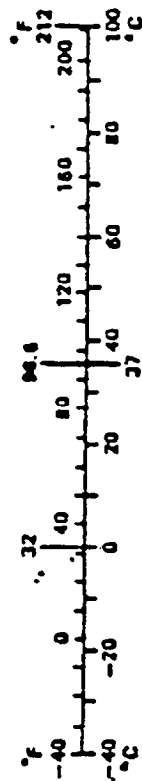


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SECTION 1.0
PURPOSE AND INTRODUCTION

PURPOSE

The main purpose of this test was to evaluate side impact protection in one of a fleet of 2-door and 4-door vehicles. The vehicle was tested using conditions not currently contained in a Federal Motor Vehicle Safety Standard.

INTRODUCTION

A stationary 1981 Ford Granada 4-door Sedan was impacted on the left side by a Moving Deformable Barrier (MDB) on January 18, 1984. The test was to simulate an intersection collision with the striking vehicle traveling at 30 mph and the struck vehicle traveling 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 vehicle center of gravity which is defined by accident investigation to be the midpoint of the wheelbase.

To simulate this collision, the MDB was to be towed into the stationary Ford Granada at 33.5 mph with the MDB's wheels crabbed clockwise to 26°. The actual test speed was 33.5 mph and the actual leading edge of contact was 37.5 inches forward of the midpoint of the Ford Granada's wheelbase.

The vehicle was a baseline model with no structural modification. The driver door and left rear door wall were unpadded.

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

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

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Ford Motor Company

MAKE/MODEL: Ford Granada

VIN: 1FABP27B0BG117746

BODY STYLE: 4-Door Sedan

MODEL YEAR: 1981

NHTSA NO.: R & D

COLOR: Gray

ENGINE DATA: TYPE: Inline CYLINDERS: 6 DISPLACEMENT 200 CID

TRANSMISSION DATA: 3 Speed Automatic

DATE VEHICLE RECEIVED: 1/3/84

ODOMETER READING: 58158

DEALER'S NAME AND ADDRESS: Bob Keim Ford, Inc.
5300 N. High Street
Columbus, Ohio 43214

ACCESSORIES:

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

REMARKS:

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

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

VEHICLE MANUFACTURED BY: Ford Motor Company

DATE OF MANUFACTURE: 10/80

GVWR: 4184 LBS.,

GAWR: FRONT 2077 LBS., REAR 2125 LBS.

VEHICLE TIRE DATA

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

TIRES ON VEHICLE (MFGR. & LINE, SIZE): Hercules P185/75 R 14

BIAS PLY, BELTED, OR RADIAL: Belted

PLY RATING: 4

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	NA	LBS.	RIGHT REAR	NA	LBS.
LEFT FRONT	NA	LBS.	LEFT REAR	NA	LBS.
TOTAL FRONT WEIGHT	1634*		LBS.	(55.4 % OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1315*		LBS.	(44.6 % OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT	2949*		LBS.		

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 25 5/16	;LF 26	;RR 24	;LR 24 1/4
PRE-TEST ATTITUDE:	RF 24 5/8	;LF 25 1/2	;RR 21 15/16	;LR 22 9/16
POST-TEST ATTITUDE:	RF 23 1/2	;LF 25 5/16	;RR 21 1/4	;LR 22 1/4

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 118 LBS. CARGO:

RIGHT FRONT	915	LBS.	RIGHT REAR	800	LBS.
LEFT FRONT	915	LBS.	LEFT REAR	785	LBS.
TOTAL FRONT WEIGHT	1830		LBS.	(53.6 % OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1585		LBS.	(46.4 % OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	3415		LBS.		

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

*Due to a wheel weight measurement error, the front and rear weights were assumed from the Motor Vehicle Manufacturers Association specifications.

TEST FLUID DATA

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

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

"USEABLE" CAPACITY*: NA GALLONS

TEST VOLUME: 1.0 GALLONS

FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): 16.0 GALLONS

DETAILS OF FUEL SYSTEM: DNA

ELECTRIC FUEL PUMP: No

FUEL INJECTION: No

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

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

VEHICLE LOAD (UP TO CAPACITY): FRONT 35 psi; REAR 35 psi

RECOMMENDED TIRE SIZE: P175/75 R 14 LOAD RANGE X B, C,

VEHICLE CAPACITY: TYPES OF SEATS: Bench

NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 2 FRONT

3 REAR

CARGO LOAD 100 LBS.

5 TOTAL

TOTAL 850 LBS.

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

TEST CONDITIONS

TEST NUMBER: 840118

DATE OF TEST: January 18, 1984

TIME OF TEST: 12:25

WIND VELOCITY: 3-5 mph 330° NNW

HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA: 15° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 78° F

SUBJECT VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
VEHICLE TEST WEIGHT (LBS.)	3415	3397
MDB TEST WEIGHT (LBS.)	2990	3000
MDB VELOCITY (MPH)*	33.5	33.5
IMPACT POINT (INCHES)**	37.5	37

DUMMIES

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

RESTRAINT SYSTEM: Both dummies were unrestrained

* As measured over final one foot of travel.

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

VISIBLE DUMMY CONTACT POINTS:

	DRIVER 06	PASSENGER U02
Head	<u>Window Sill, Side Header</u>	<u>C-Pillar</u>
Chest	<u>Driver's Door Panel</u>	<u>Left Rear Door Panel</u>
Abdomen	<u>Driver's Door Panel</u>	<u>Left Rear Door Panel</u>
Left Knee	<u>Driver's Door Panel</u>	<u>Left Rear Door Panel</u>
Right Knee	<u>Left Knee</u>	<u>Left Knee</u>

DOOR OPENING:

	LEFT	RIGHT
Front	<u>Tools Required</u>	<u>Easy</u>
Rear	<u>Tools Required</u>	<u>Easy</u>

SEAT MOVEMENT:

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

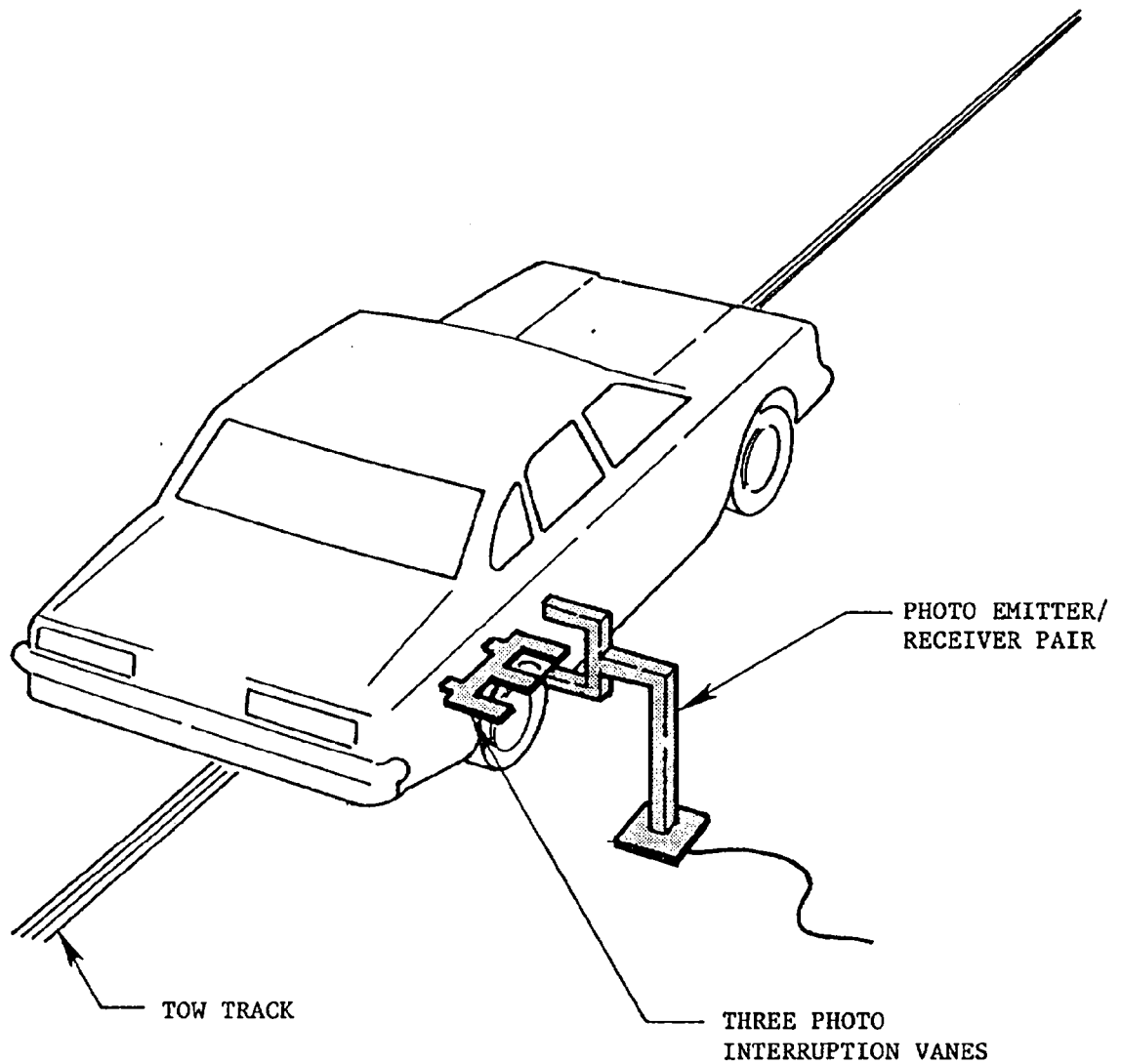
GLAZING DAMAGE:

Left side of windshield cracked, all left side windows
shattered, no backlight damage.

OTHER NOTABLE IMPACT EFFECTS:

B-Pillar/Sill improperly welded - separated on impact.

IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane is located two inches before impact.
The vanes have one foot spacing.

VEHICLE TEST WEIGHT CALCULATION

Test Weight = Unloaded Delivered Weight +
 Number of Dummies X 174 lbs. +
 Cargo Weight
 = 2949 + 2 X 174 + 100 lbs.
 = 3397 lbs.

To achieve test weight, the air conditioner and brackets, pollution control pump, power steering pump, alternator, battery, exhaust system and air cleaner were removed and 1 gallon of Stoddard Solvent was added in the fuel tank. The weight of the test vehicle was measured by placing each wheel on a Loadmeter Corporation Hiway Loadmeter.

TEST ANOMALIES

1) The film in high speed camera #3, located onboard the Moving Deformable Barrier broke on camera start-up. The film breakage could not be attributed to a camera fault and is believed to be due to weak film.

2) Cable separation occurred in data channel LRDYG5 - Vehicle Left Rear Door (Position 11) Acceleration Y Axis at approximately 240 msec. The separation did not affect the peak levels or delta velocity.

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 portably until approximately 1 minute prior to the test.

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

DUMMY PLACEMENT AND POSITIONING

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

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

DUMMY IN-VEHICLE POSITION RECORDING SHEET

VEHICLE NHTSA NO. R & D

MFR./MAKE/MODEL: Ford Granada

FRONT SEAT TYPE: ☒ BENCH
☐ BUCKET
☐ SPLIT BENCH

ADJUSTER TYPE: ☒ MANUAL
☐ POWER

BUCKET SEAT BACK TYPE: ☐ FIXED
☐ ADJUSTABLE

TECHNICIANS:

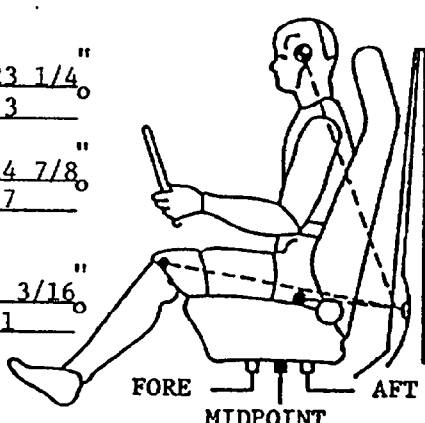
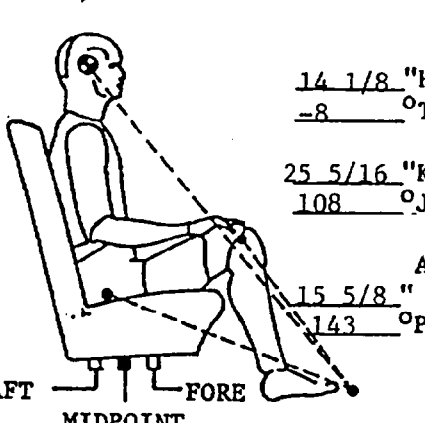
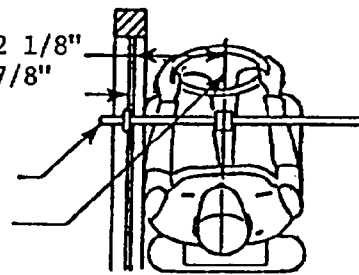
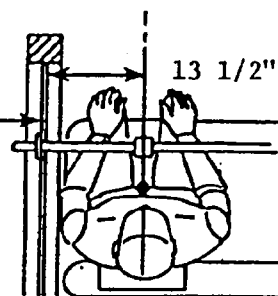
1. M. Garrison

2. D. LeVally

3. B. Miller

POSITIONING DATE: 1/18/84

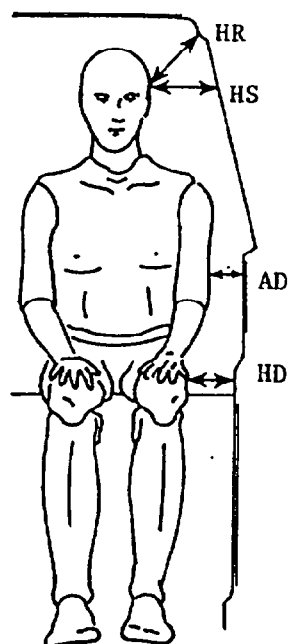
AMBIENT TEMP.: 72° F. TIME: 07:30

DRIVER DUMMY # 06  HEAD <u>23 1/4"</u> TARGET* <u>3</u> KNEE <u>24 7/8"</u> JOINT <u>97</u> APPROX. <u>10 3/16"</u> "H" POINT <u>131</u>	REAR PASSENGER DUMMY # U02  <u>14 1/8"</u> HEAD <u>-8</u> ° TARGET** <u>25 5/16"</u> KNEE <u>108</u> ° JOINT APPROX. <u>15 5/8"</u> "H" <u>143</u> ° POINT
DOOR GLASS HEIGHT*** <u>12 1/8"</u> <u>11 7/8"</u>  LATERAL BAR ADJUSTABLE POINTER DRIVER DUMMY # 06	DOOR GLASS HEIGHT <u>10"</u>  13 1/2" PASSENGER DUMMY # U02

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

**All passenger dummy dimensions referenced to top of rear seat striker bolt (not as shown) and all angles referenced to vertical.

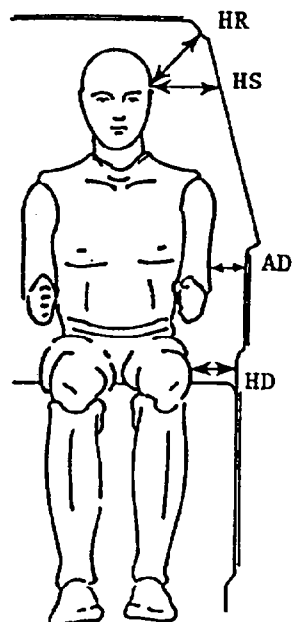
***Door glass height is set equal to the dummy nose level.



DRIVER
06

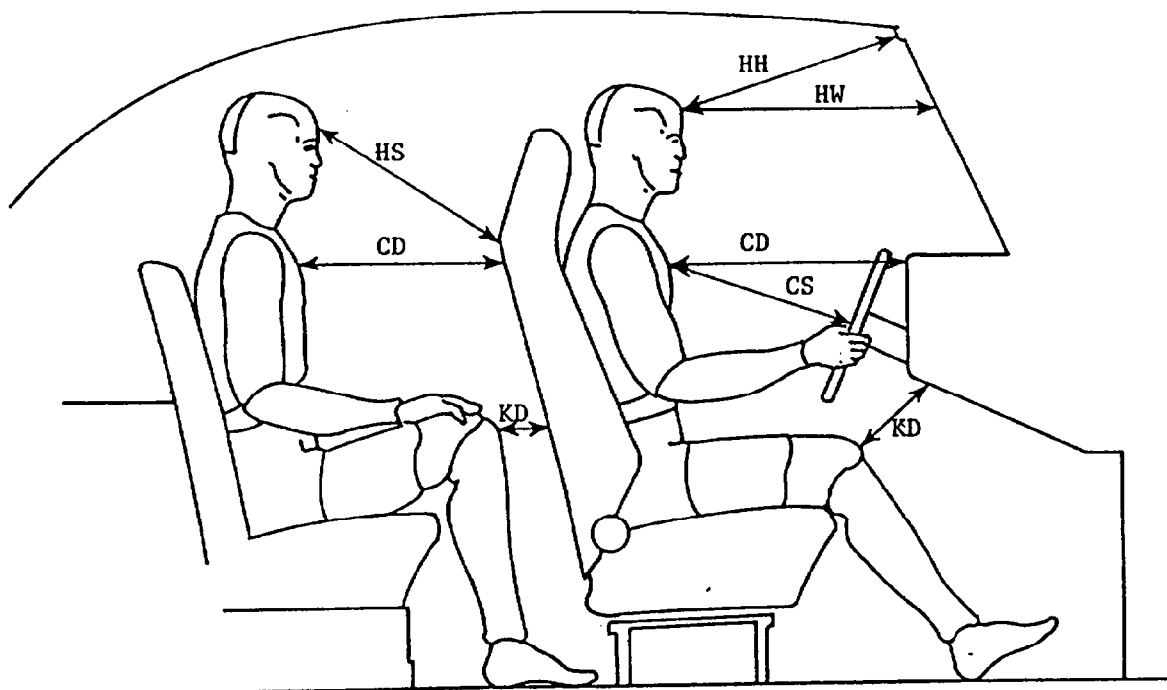
PASSENGER
U02

HR	7 1/8	7 5/8
HS	9 1/8	7 1/8
AD	4 15/16	5 1/8
HD	7 1/4	8



ALL MEASUREMENTS IN INCHES

DUMMY LATERAL CLEARANCE DIMENSIONS



DRIVER
06

PASSENGER
U02

HH	11 1/2	DNA
HW	17 3/4	DNA
HS	DNA	21 1/2
CD	19 1/4	18 3/8
CS	12 3/8	DNA
KDL	5 1/2	5 13/16
KDR	4 7/8	5 1/2

ALL MEASUREMENTS IN INCHES

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

DUMMY KINEMATIC SUMMARY

DRIVER

During impact, the dummy's torso contacted the driver's door and the head contacted the driver's side window sill, rebounded and then struck the side header. The dummy rebounded across the vehicle until it's buttocks struck the central armrest which had been inadvertently left in it's down position. During interaction with the armrest, the dummy sat upright. The dummy's torso then fell forward and leftward until the head re-contacted the driver's side window sill at which point the dummy came to rest.

PASSENGER

During impact, the dummy's torso contacted the left rear passenger door and the head contacted the left C-pillar. The dummy rebounded laterally across the rear compartment and struck the right rear passenger door and the head struck the right side C-pillar. The dummy remained in contact with the right rear door and came to rest sitting upright and facing forward.

VEHICLE EXTERIOR PROFILES AND STATIC CRUSH

ZERO DISTANCE AT PROJECTED IMPACT POINT*

LOCATION	HEIGHT (in)	6	0	6	12	18	24	30	36	42	48	54	60	66	72	78
PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)																
Axle Height	10.5	X	X	16.5	16.5	16.5	16.6	16.7	16.6	16.8	16.8	16.8	16.9	17.1	17.4	X
H-Point	19.5	X	13.4	13.1	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.1	13.1	13.2	13.1	X
Mid Door	22.9	12.5	13.6	13.4	13.3	13.1	13.1	13.0	13.0	13.0	12.9	12.9	12.9	12.9	12.9	12.4
Window Sill	34.5	15.6	15.5	15.5	15.4	15.4	15.4	15.4	15.4	15.3	15.3	15.3	15.2	15.1	15.1	15.0
Window Top	54.6	X	X	X	X	X	X	23.9	23.8	23.6	23.5	23.5	23.4	23.4	23.4	23.6

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

Axle Height	10.5	X	X	26.7	29.9	29.3	28.8	28.0	27.4	26.9	26.3	25.4	23.0	22.1	21.8	X
H-Point	19.5	X	23.2	27.0	28.1	29.1	29.6	30.2	30.9	31.6	33.9	34.1	34.6	34.6	30.0	X
Mid Door	22.9	19.6	22.9	25.6	26.0	26.7	27.1	27.8	28.4	29.1	32.4	32.1	32.3	32.1	29.5	16.8
Window Sill	34.5	19.1	19.4	20.4	23.8	24.8	25.8	26.5	27.4	28.0	30.1	30.8	31.8	31.6	26.7	21.8
Window Top	54.6	X	X	X	X	X	X	28.0	27.5	27.5	27.3	27.0	26.7	26.4	26.3	26.1

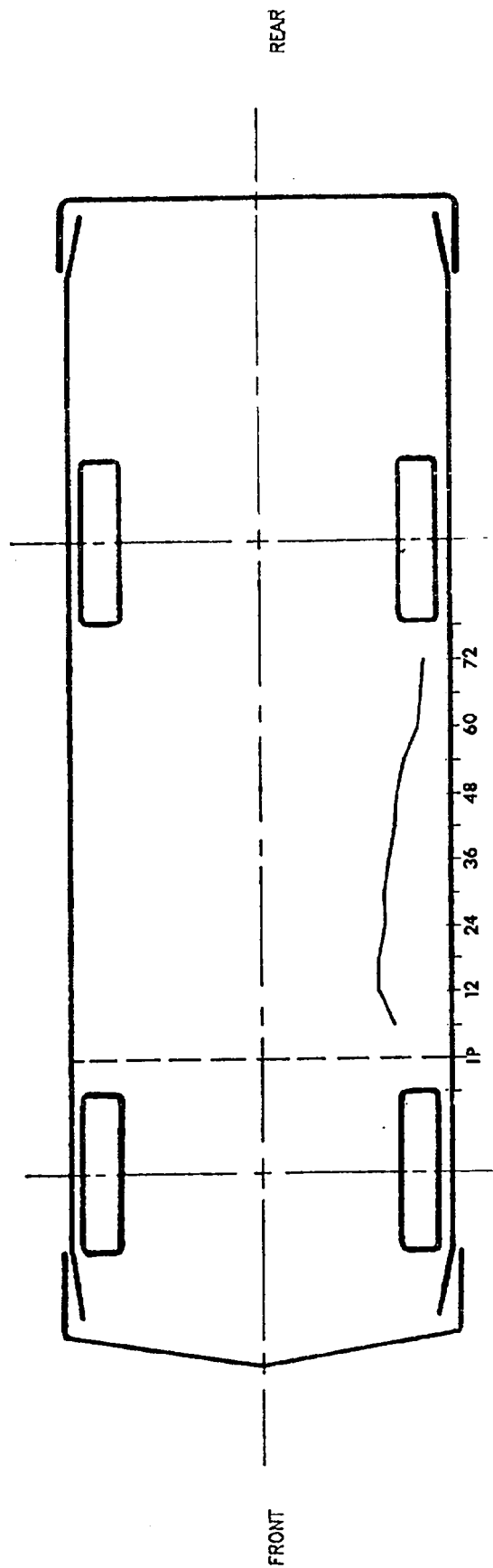
STATIC CRUSH (IN)

Axle Height	10.5	X	X	10.2	13.4	12.8	12.2	11.3	10.8	10.1	9.5	8.6	6.1	5.0	4.4	X
H-Point	19.5	X	9.8	13.9	15.1	16.1	16.6	17.2	17.9	18.6	20.9	21.0	21.5	21.4	16.9	X
Mid Door	22.9	7.1	9.3	12.2	12.7	13.6	14.0	14.8	15.4	16.1	19.5	19.2	19.4	19.2	16.6	4.4
Window Sill	34.5	3.5	3.9	4.9	8.4	9.4	10.4	11.1	12.0	12.7	14.8	15.5	16.6	16.5	11.6	6.8
Window Top	54.6	X	X	X	X	X	X	4.1	3.7	3.9	3.8	3.5	3.3	3.0	2.9	2.5

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

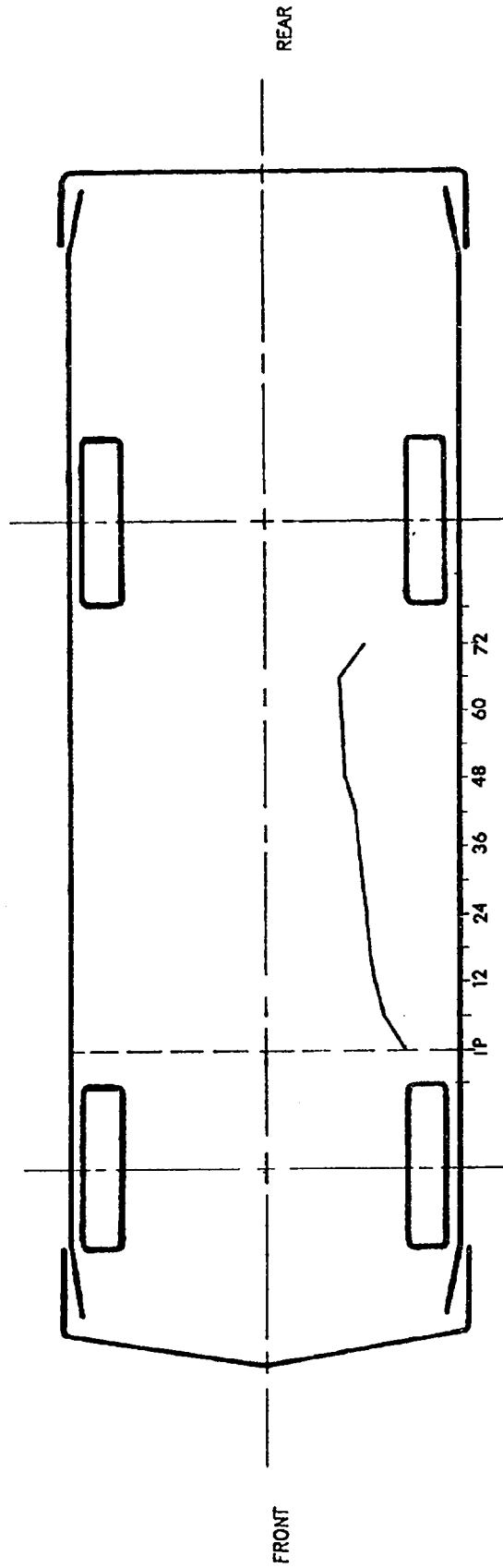
** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

VEHICLE EXTERIOR STATIC CRUSH PROFILE



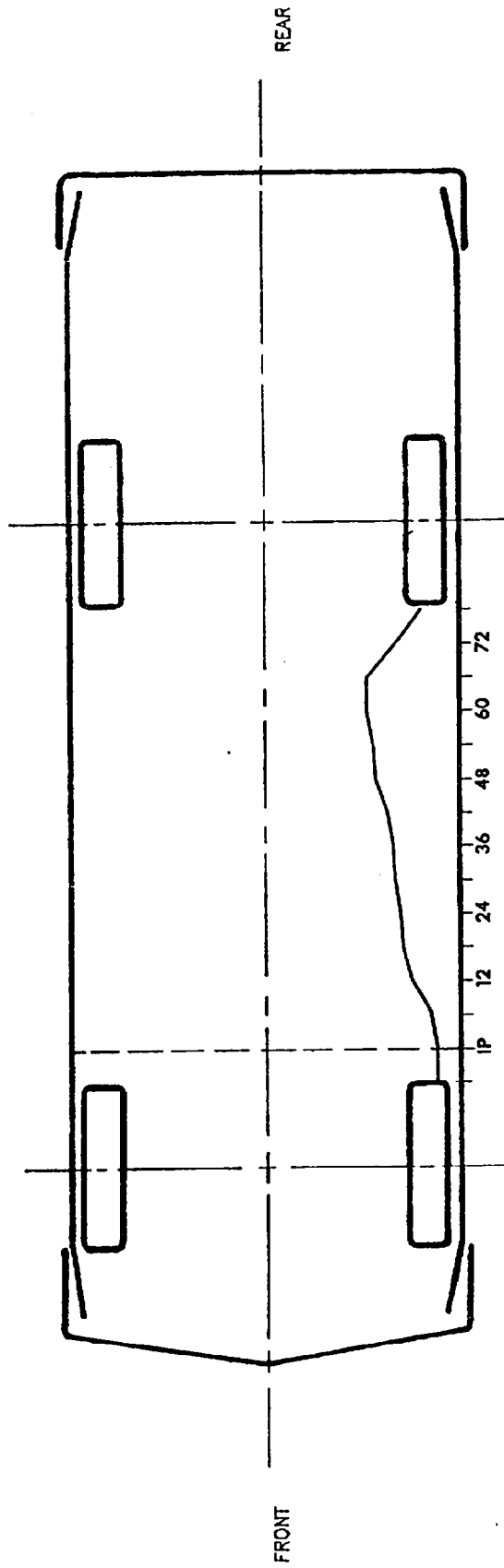
PROFILE LEVEL EQUALS AXLE HEIGHT
IP EQUALS PROJECTED IMPACT POINT

VEHICLE EXTERIOR STATIC CRUSH PROFILE



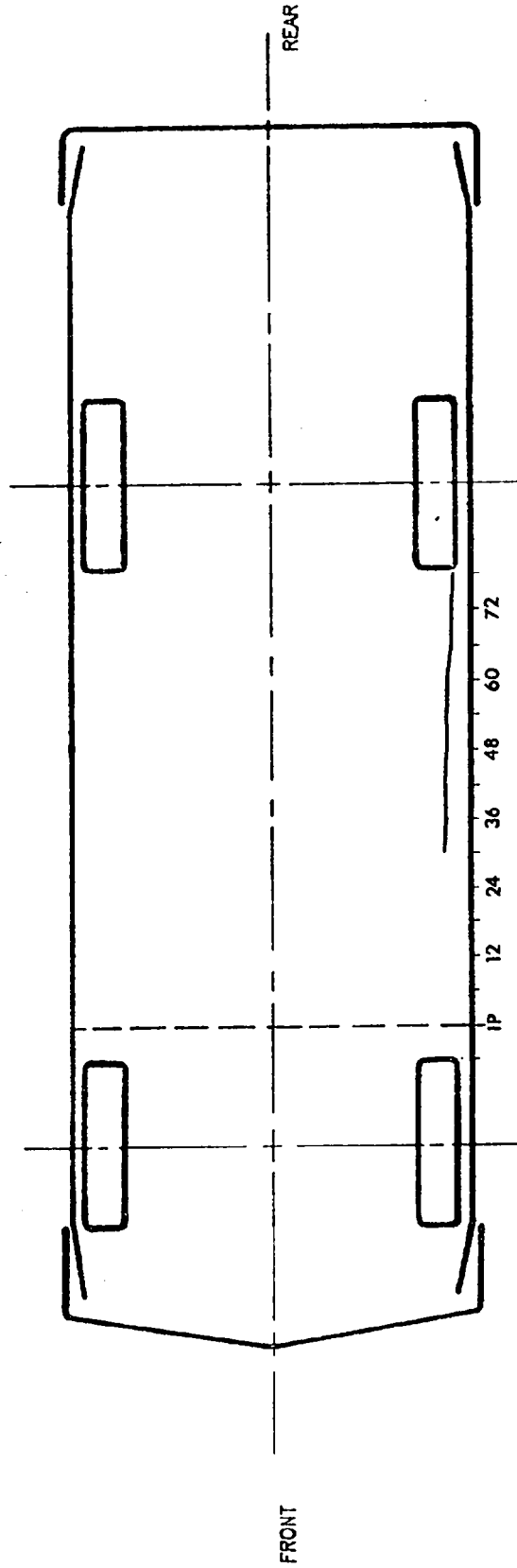
PROFILE LEVEL EQUALS H-POINT HEIGHT
IP EQUALS PROJECTED IMPACT POINT

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW SILL HEIGHT
 IP EQUALS PROJECTED IMPACT POINT

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT
IP EQUALS PROJECTED IMPACT POINT

SIDE IMPACT DUMMY DATA SUMMARY

	DRIVER DUMMY				PASSENGER DUMMY			
	POSITIVE		NEGATIVE		POSITIVE		NEGATIVE	
	DIRECTION*		DIRECTION**		DIRECTION*		DIRECTION**	
	MAX	TIME	MAX	TIME	MAX	TIME	MAX	TIME
	(g)	(msec)	(g)	(msec)	(g)	(msec)	(g)	(msec)
HEAD ACCELERATION								
LONGITUDINAL	39.87	200.63	15.02	79.88	16.83	191.63	14.46	75.50
LATERAL	33.68	53.50	33.40	201.25	131.50	65.13	19.02	192.38
VERTICAL	17.20	206.00	51.31	73.00	35.47	72.25	22.71	48.13
RESULTANT		51.86 @	201.00			131.83 @	65.13	
HIC	185.22	from 40.75 to 80.13			613.95	from 62.63 to 68.13		
CHEST ACCELERATION								
UPPER SPINE								
LONGITUDINAL	23.04	55.00	34.04	68.75	9.32	81.25	17.14	73.13
LATERAL (P)***	87.84	42.50	51.06	68.13	44.53	51.25	22.97	40.00
LATERAL (R)***	90.68	42.50	52.19	68.13	46.96	51.25	22.48	40.00
VERTICAL	12.91	67.50	10.28	85.00	6.49	29.38	24.48	75.00
RESULTANT (P)		91.90 @	42.50			48.45 @	51.88	
RESULTANT (R)		94.61 @	42.50			50.62 @	51.88	
DELTA V (MPH)****		22.6 @	64.38 (P)			17.4 @	131.25 (P)	
		24.3 @	64.38 (R)			19.0 @	158.75 (R)	
LOWER SPINE								
LONGITUDINAL	38.96	51.25	37.45	39.38	15.31	60.62	26.05	71.25
LATERAL (P)	103.83	40.00	34.98	67.50	60.63	41.87	11.94	65.00
LATERAL (R)	104.38	40.00	77.27	68.13	61.86	41.87	11.85	65.00
VERTICAL	20.61	40.00	6.20	85.00	10.53	48.13	15.20	75.00
RESULTANT (P)		112.19 @	40.00			63.99 @	41.87	
RESULTANT (R)		112.70 @	40.00			65.15 @	41.87	
DELTA V (MPH)		29.7 @	55.63 (P)			20.1 @	62.50 (P)	
		30.2 @	56.25 (R)			21.4 @	62.50 (R)	
LEFT UPPER RIB								
LATERAL (P)	95.71	38.75	15.19	81.88	36.80	42.50	6.17	71.25
LATERAL (R)	91.27	38.75	14.14	81.88	39.57	42.50	6.77	71.25
DELTA V (MPH)		21.5 @	75.62 (P)			21.3 @	108.13 (P)	
		22.3 @	76.88 (R)			22.0 @	119.38 (R)	
LEFT LOWER RIB								
LATERAL (P)	136.01	37.50	28.53	73.13	70.11	45.00	8.73	93.75
LATERAL (R)	134.30	37.50	24.26	73.13	70.74	45.00	9.54	75.62
DELTA V (MPH)		22.8 @	83.12 (P)			23.2 @	90.62 (P)	
		23.1 @	83.75 (R)			22.6 @	89.38 (R)	
PELVIS ACCELERATION								
LONGITUDINAL	12.32	39.75	30.37	34.13	13.54	70.00	82.99	34.75
LATERAL	167.07	33.88	49.58	42.75	216.83	35.88	38.16	26.38
VERTICAL	21.67	36.00	29.47	98.50	36.19	41.50	10.61	36.13
RESULTANT		169.75 @	34.00			221.32 @	35.75	
DELTA V (MPH)		27.4 @	67.75			26.6 @	49.75	

SIDE IMPACT DUMMY DATA SUMMARY CONTD

	DRIVER DUMMY				PASSENGER DUMMY			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**		POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX (in)	TIME (msec)	MAX (in)	TIME (msec)	MAX (in)	TIME (msec)	MAX (in)	TIME (msec)
RIB DEFLECTION †	0.01	1.38	1.70	66.25	0.03	323.50	0.91	71.50

* LONGITUDINAL: FORWARD
 LATERAL: RIGHTWARD
 VERTICAL: UPWARD

**LONGITUDINAL: REARWARD
 LATERAL: LEFTWARD
 VERTICAL: DOWNWARD

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

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

† Compression: Negative

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

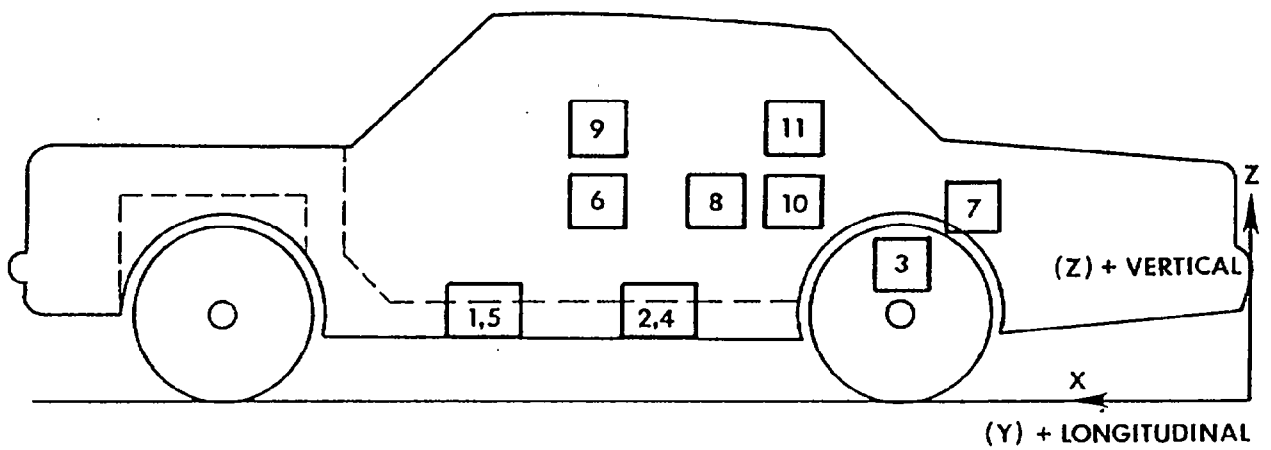
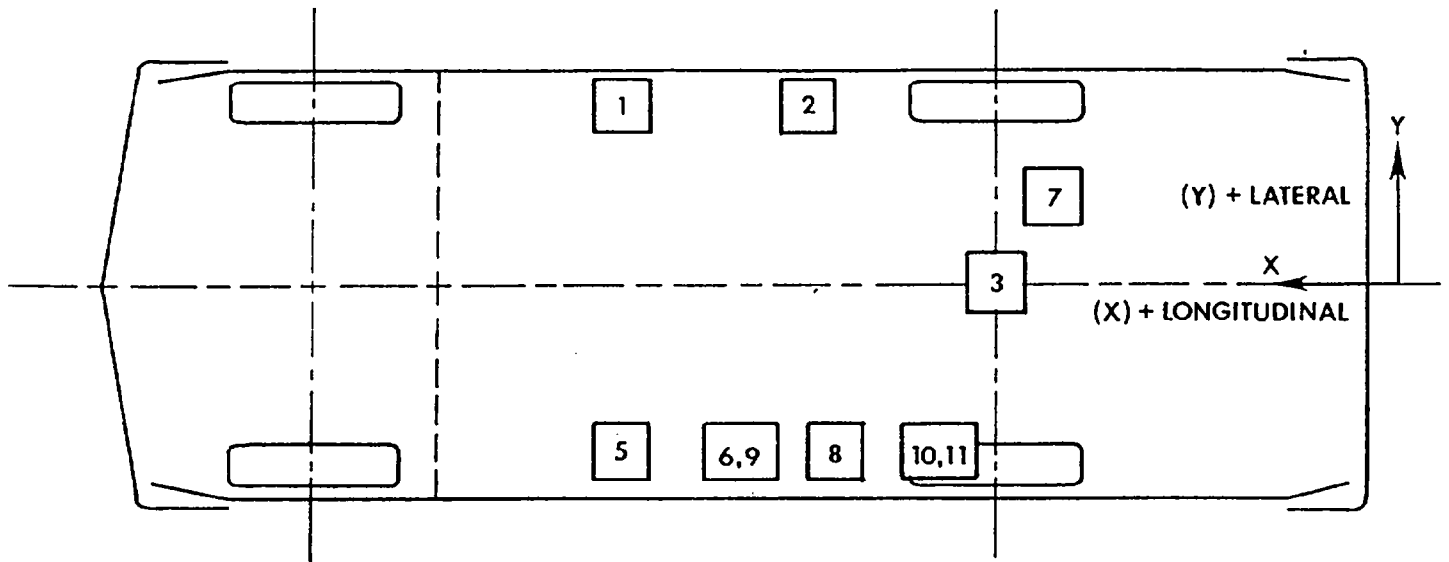
NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	RIGHT SILL AT FRONT SEAT (LONGITUDINAL) (LATERAL) (VERTICAL) (RESULTANT)	119.3	25.8	10.4				
		$\Delta V = 1.6 \text{ mph @ } 150.00 \text{ msec}$			28.49	39.00	5.44	26.00
		$\Delta V = 9.5 \text{ mph @ } 150.00 \text{ msec}$			21.33	25.88	33.55	41.00
					23.13	42.88	5.85	34.88
					42.76 @ 40.88			
2	RIGHT SILL AT REAR SEAT (LONGITUDINAL) (LATERAL) (VERTICAL) (RESULTANT)	84.6	25.6	9.4				
		$\Delta V = -1.7 \text{ mph @ } 150.00 \text{ msec}$			4.27	63.63	4.72	25.50
		$\Delta V = 19.4 \text{ mph @ } 150.00 \text{ msec}$			20.00	27.63	1.09	92.63
					6.32	26.13	5.76	57.88
					21.09 @ 27.38			
3	REAR DECK OVER AXLE (LONGITUDINAL) (LATERAL) (VERTICAL) (RESULTANT)	50.3	-0.0	20.7				
		$\Delta V = -0.3 \text{ mph @ } 150.00 \text{ msec}$			12.14	38.50	6.88	90.13
		$\Delta V = 18.5 \text{ mph @ } 150.00 \text{ msec}$			13.72	38.63	1.88	260.75
					22.84	49.00	27.38	42.88
					29.41 @ 42.88			
4	LEFT SILL AT REAR SEAT (LATERAL)	85.3	-26.6	10.7				
		$\Delta V = 3.6 \text{ mph @ } 22.00 \text{ msec}$			26.05	14.75	36.09	69.38
5	LEFT SILL AT FRONT SEAT (LATERAL)	119.4	-26.5	10.5				
		$\Delta V = 6.1 \text{ mph @ } 26.50 \text{ msec}$			41.15	22.88	52.08	11.75
6	LEFT FRONT DOOR CENTERLINE (LATERAL)	114.1	-28.8	21.4				
		$\Delta V = 21.8 \text{ mph @ } 11.88 \text{ msec}$			203.18	12.25	97.11	19.13
7	RIGHT REAR COMPARTMENT (LONGITUDINAL)	35.0	20.0	19.8				
					4.26	63.50	3.83	90.50
8	MIDREAR OF LEFT FRONT DOOR (LATERAL)	105.8	-28.7	24.4				
		$\Delta V = 24.1 \text{ mph @ } 15.00 \text{ msec}$			152.48	12.13	72.69	20.63
9	UPPER LEFT FRONT DOOR CENTERLINE (LATERAL)	114.1	-28.7	29.8				
		$\Delta V = 23.3 \text{ mph @ } 22.25 \text{ msec}$			80.05	22.25	60.58	38.63
10	MIDREAR OF LEFT REAR DOOR (LATERAL)	78.8	-28.8	18.9				
		$\Delta V = 25.3 \text{ mph @ } 15.75 \text{ msec}$			191.53	12.50	72.20	38.75
11	UPPER LEFT REAR DOOR CENTERLINE (LATERAL)	78.8	-28.5	29.6				
		$\Delta V = 30.7 \text{ mph @ } 29.63 \text{ msec}$			169.07	14.38 ^Y	167.40	45.88

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

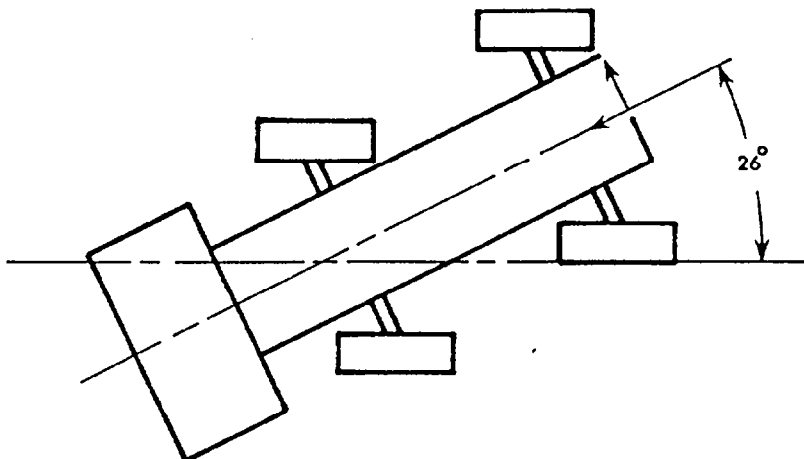
All measurements of accelerometer locations in inches.

^Y SEE TEST ANOMALIES

VEHICLE ACCELEROMETER LOCATIONS



MOVING BARRIER ACCELEROMETER LOCATIONS AND DATA SUMMARY



NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
1	CENTER OF GRAVITY	74.5	0.0	11.5				
	(LONGITUDINAL)	$\Delta V = -17.4 \text{ mph @ } 150.00 \text{ msec}$			0.93	236.50	13.97	41.88
	(LATERAL)	$\Delta V = -4.6 \text{ mph @ } 150.00 \text{ msec}$			1.93	59.00	7.31	33.50
	(VERTICAL)				17.45	36.00	14.77	49.00
	(RESULTANT)					21.98 @ 35.75		
2	FRONT FRAME MEMBER	130.3	0.0	11.3				
	(LONGITUDINAL)	$\Delta V = -18.5 \text{ mph @ } 150.00 \text{ msec}$			0.47	217.38	14.53	41.63
3	REAR FRAME MEMBER	23.3	0.0	11.5				
	(LONGITUDINAL)	$\Delta V = -16.0 \text{ mph @ } 150.00 \text{ msec}$			1.26	237.13	14.10	41.63

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

All measurements of accelerometer locations in inches.

HIGH SPEED CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Overhead	Photosonics 1B	8	490	Vehicle Dynamics
2	Overhead	Photosonics 1B	25	515	Close-up of impact point
3	Onboard MDB	Photosonics 1B	25	---*	Close-up of impact point
4	Onboard MDB	Stalex	13	507	Driver kinematics
5	Ground level - right	Photosonics 1B	25	590	Overall view
6	Ground level - left	Photosonics 1B	17	525	Overall view
7	Onboard vehicle	Photosonics 1B	8	810	Driver kinematics - front view
8	Onboard vehicle	Photosonics 1B	8	805	Driver kinematics
9	Onboard vehicle	Photosonics 1B	8	805	Passenger kinematics

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

*SEE TEST ANOMALIES

LOCATIONS OF OFFBOARD HIGH SPEED CAMERAS

CAMERA NO.	X	Y	Z
1	0	0	25'
2	0	0	25'
5	24'10"	58'8"	45"
6	-20'11"	-13'3"	45"

Origin of Coordinate System is Point of Impact

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

NON-GOVERNMENT FURNISHED TRANSDUCER INFORMATION

PARAMETER BEING MEASURED	TYPE OF TRANSDUCER	MODEL NUMBER	SERIAL NUMBER	MFR.	DATE OF LAST CALIBRATION	SENSITIVITY	DESIRED FULL SCALE (ENGR. UNITS)
BOGXG	Accel	4-202-0001	18845	Bell Howell	12/7/83	.237 MV/G	50 G
BOGYG	Accel	4-202-0001	18858	Bell Howell	12/7/83	.240 MV/G	50 G
BOGZG	Accel	4-202-0001	18857	Bell Howell	12/7/83	.240 MV/G	50 G
BFCXG	Accel	4-202-0001	18240	Bell Howell	12/7/83	.240 MV/G	50 G
BRCXG	Accel	4-202-0001	19022	Bell Howell	12/7/83	.222 MV/G	50 G

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

APPENDIX A
PHOTOGRAPHS



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



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



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

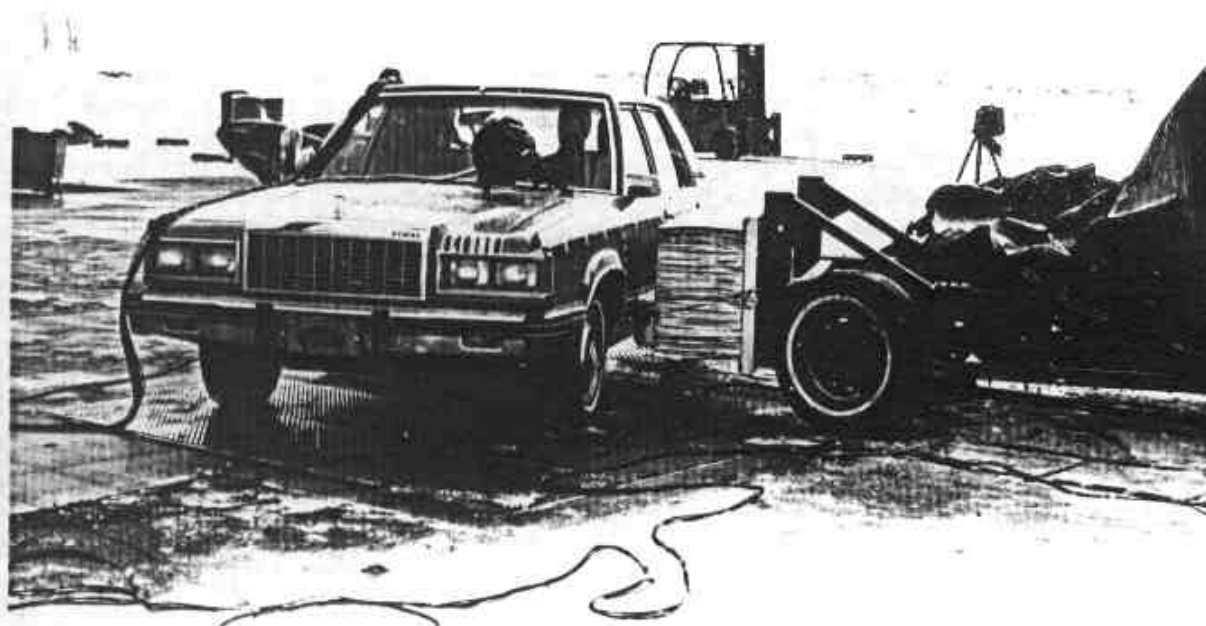


Figure A-4. PRE-TEST OVERALL - VIEW 4

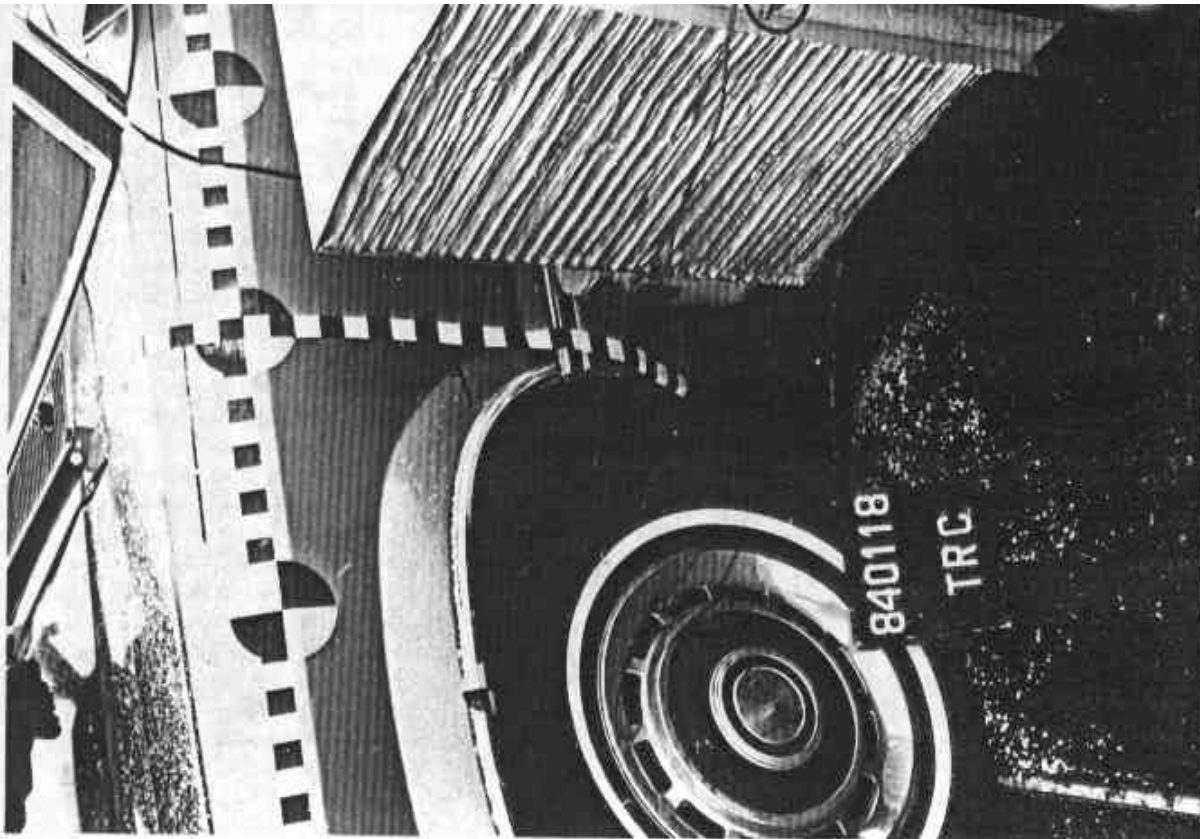


Figure A-5. PRE-TEST CLOSEUP - VIEW 1

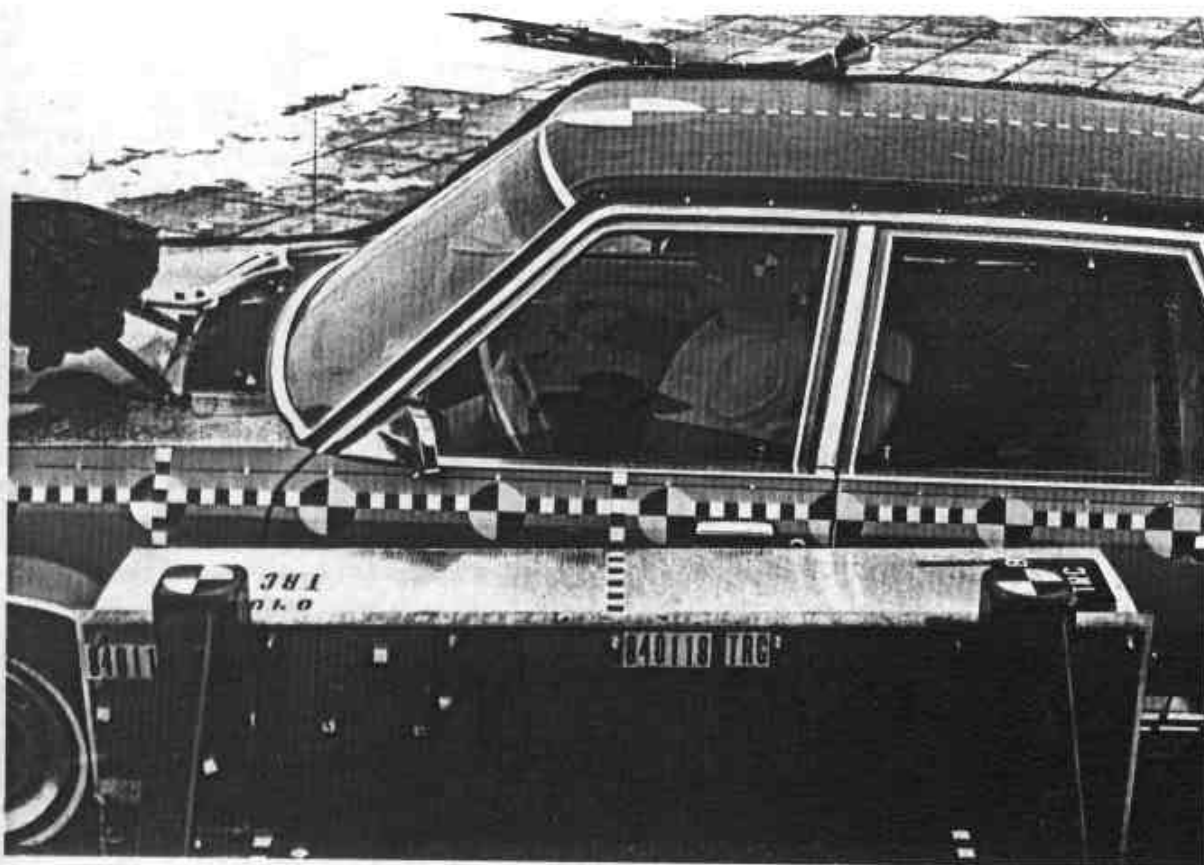


Figure A-6. PRE-TEST CLOSEUP - VIEW 2

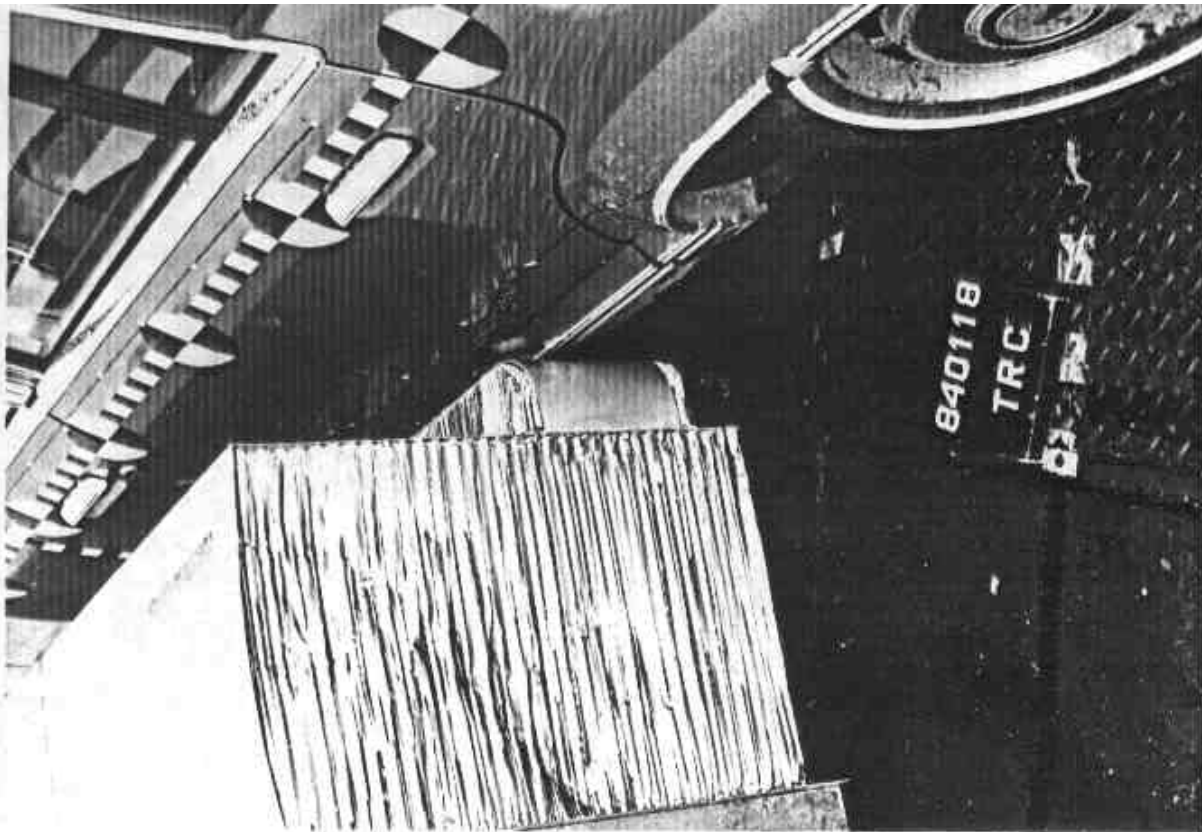


Figure A-7. PRE-TEST CLOSEUP - VIEW 3

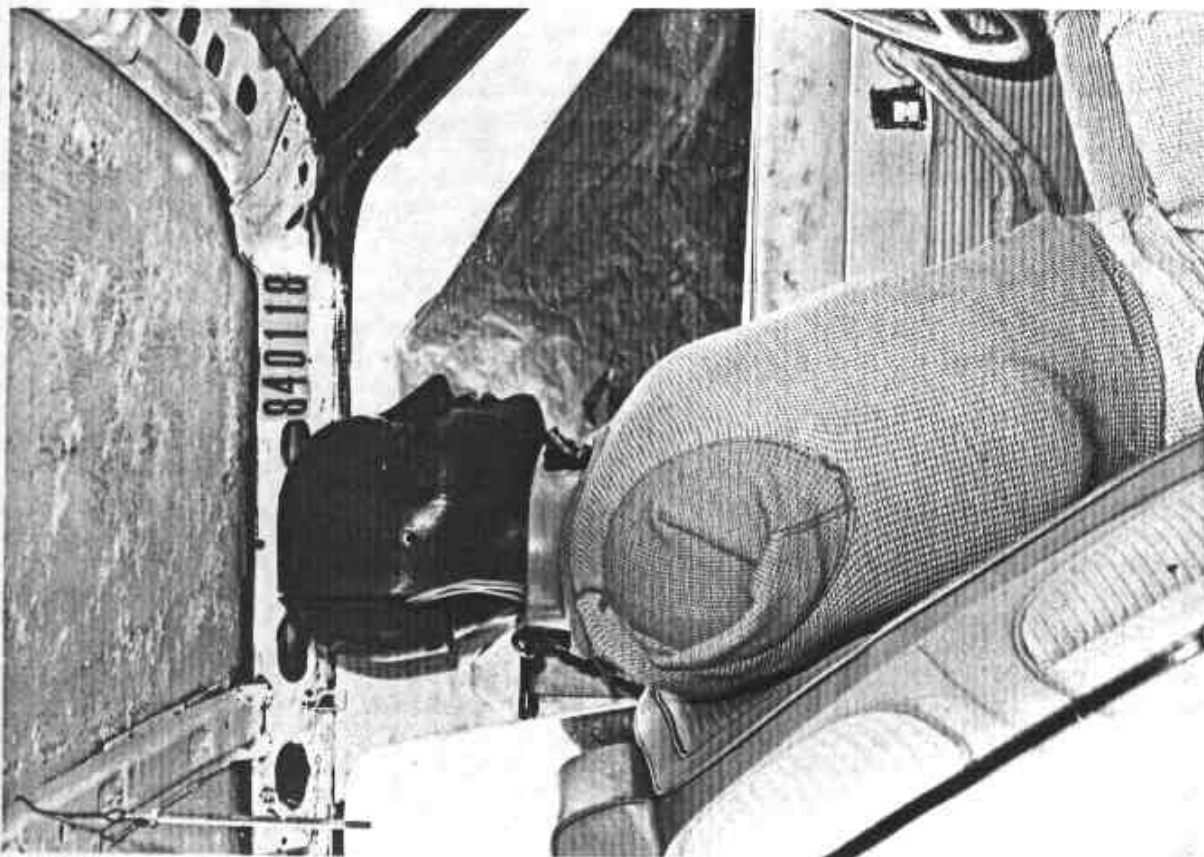


Figure A-8. PRE-TEST DRIVER DUMMY - VIEW 1

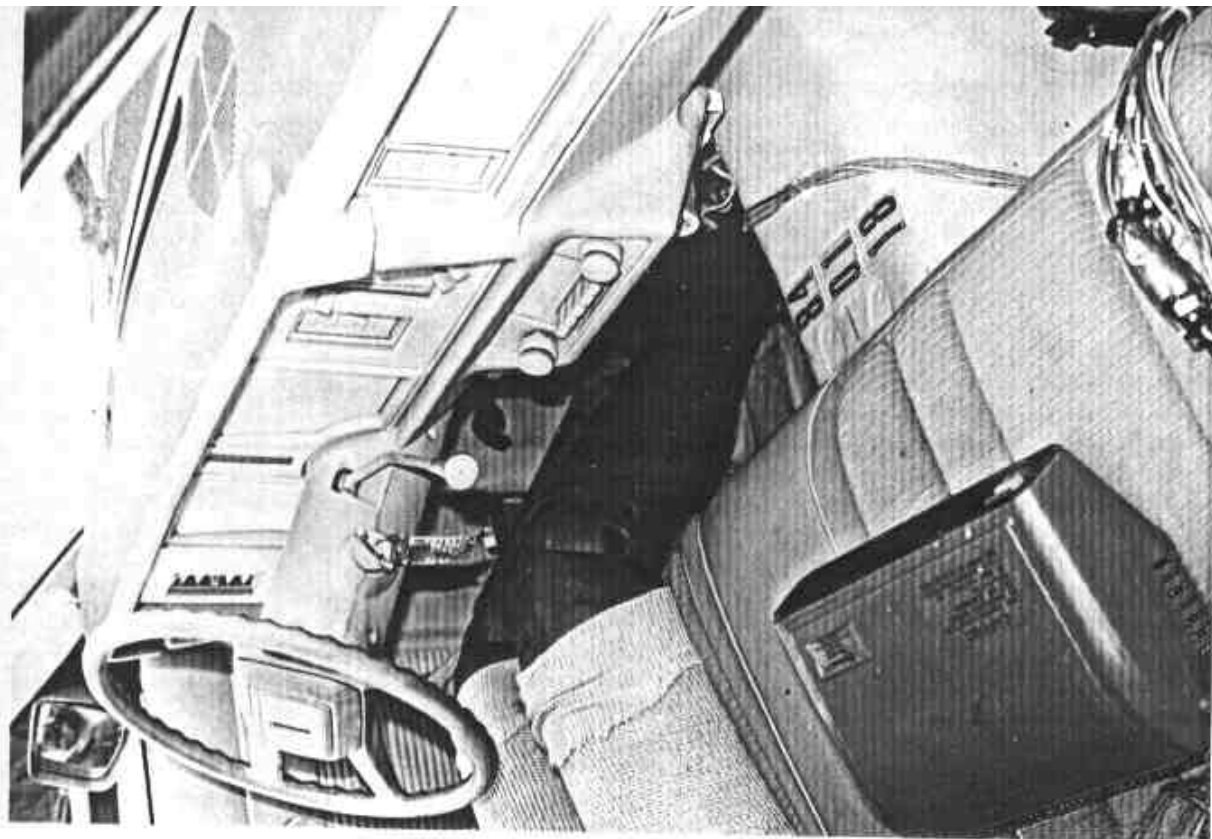


Figure A-9. PRE-TEST DRIVER DUMMY - VIEW 2

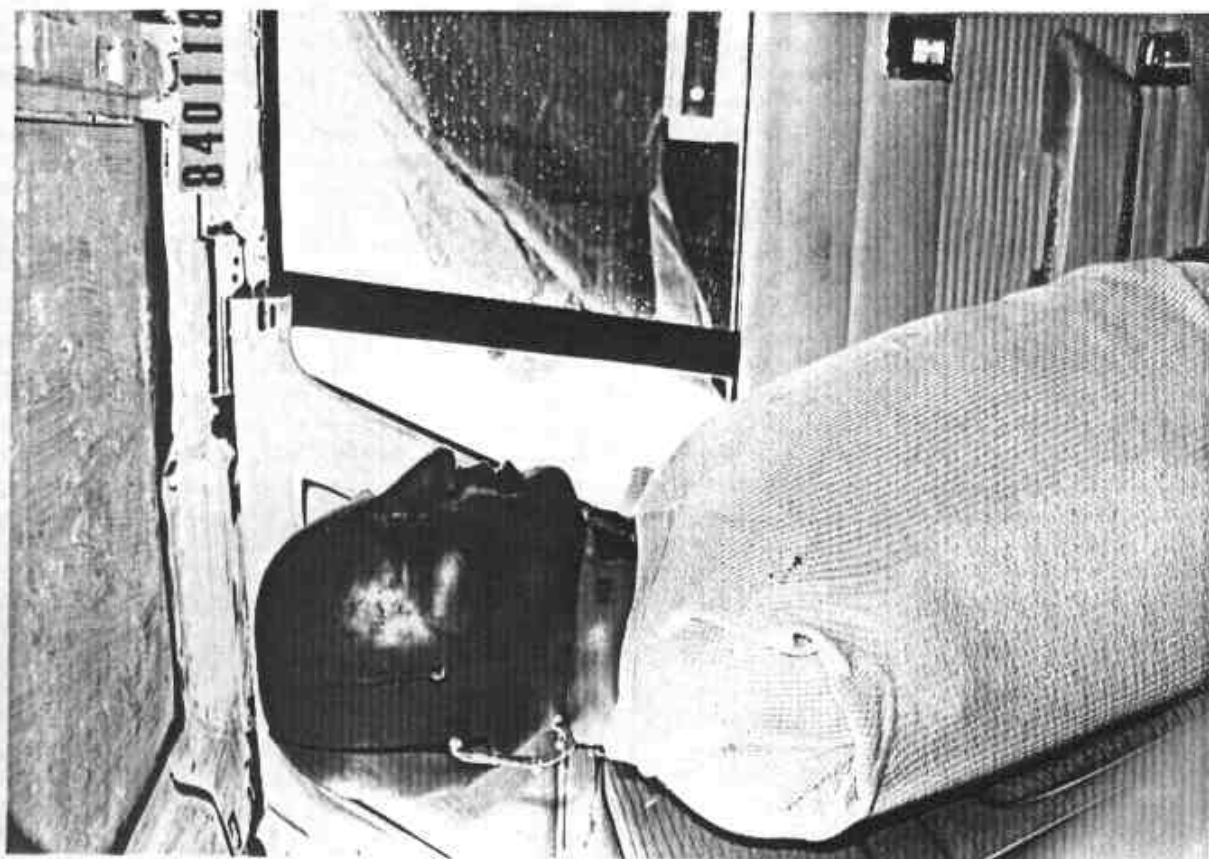


Figure A-10. PRE-TEST PASSENGER DUMMY - VIEW 1

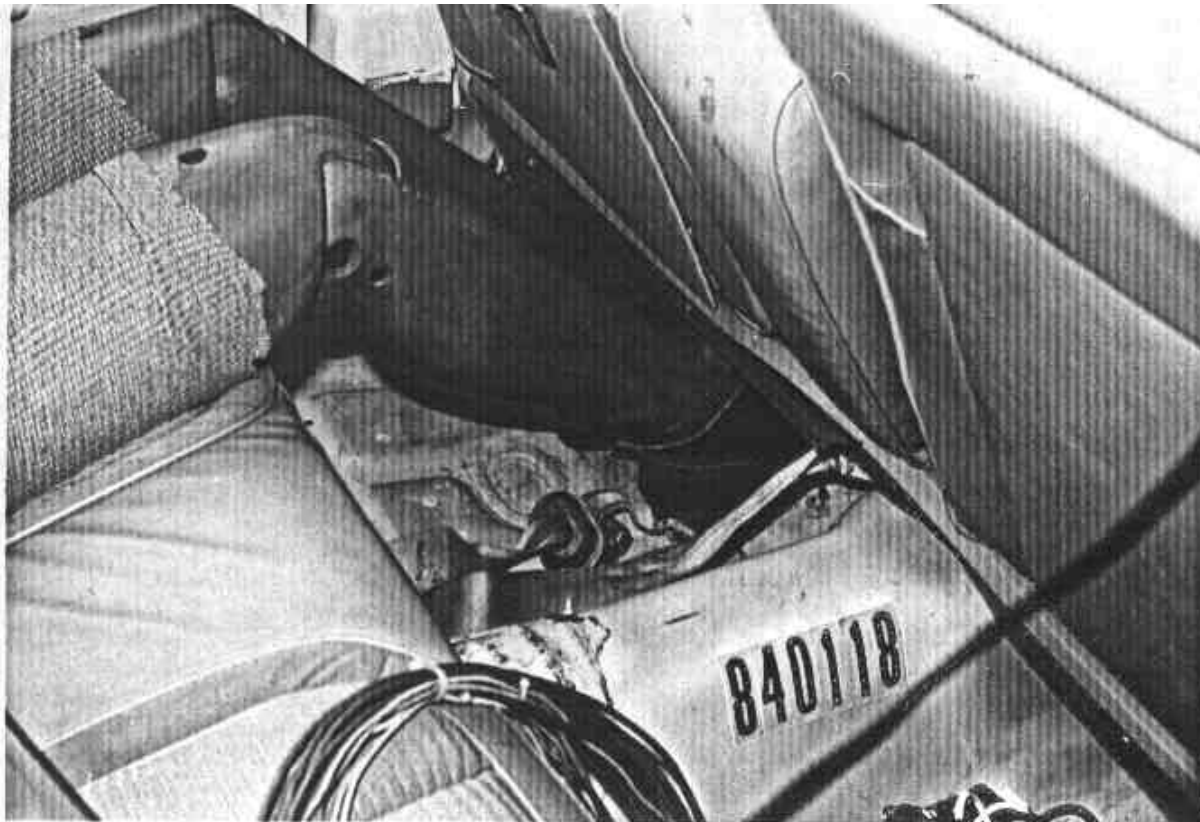


Figure A-11. PRE-TEST PASSENGER DUMMY - VIEW 2



Figure A-12. POST-TEST OVERALL - VIEW 1



Figure A-13. POST-TEST OVERALL - VIEW 2

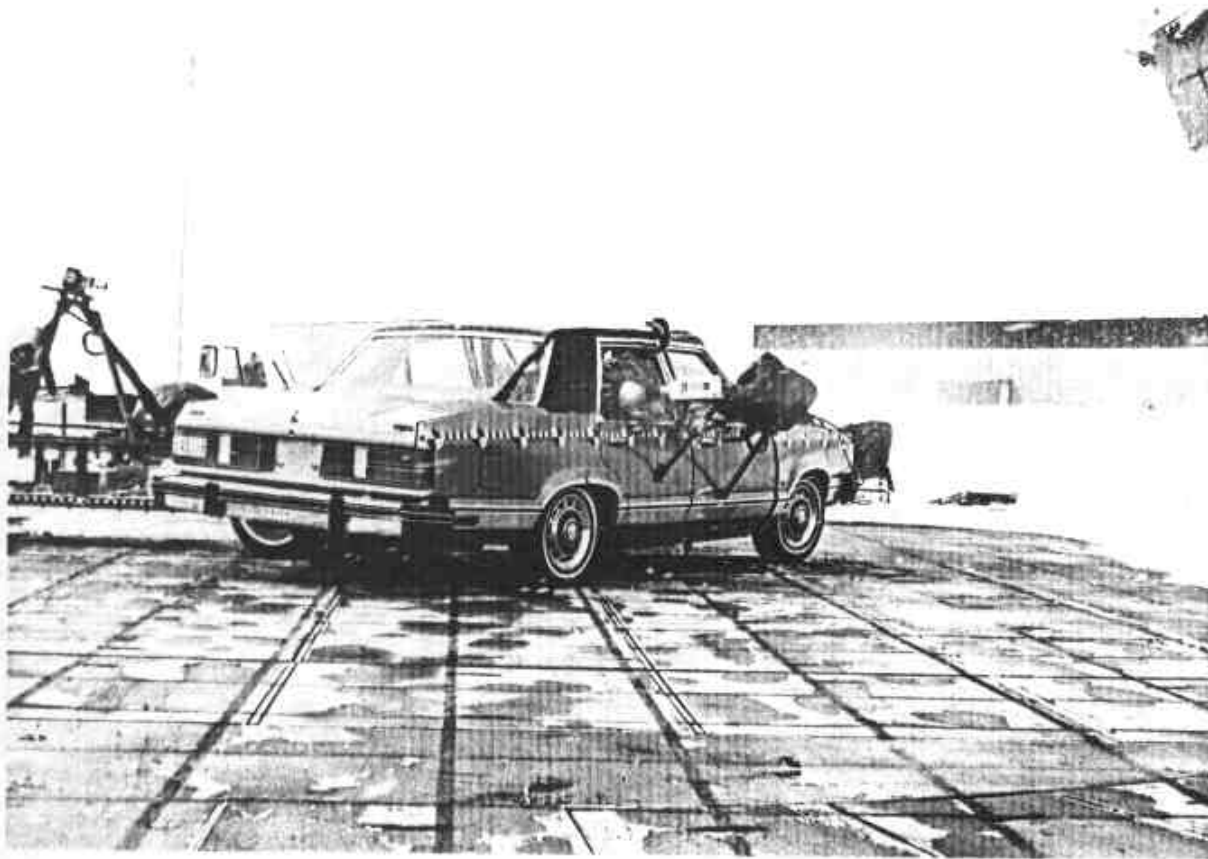


Figure A-14. POST-TEST OVERALL - VIEW 3



Figure A-15. POST-TEST OVERALL - VIEW 4



Figure A-16. POST-TEST CLOSEUP - VIEW 1

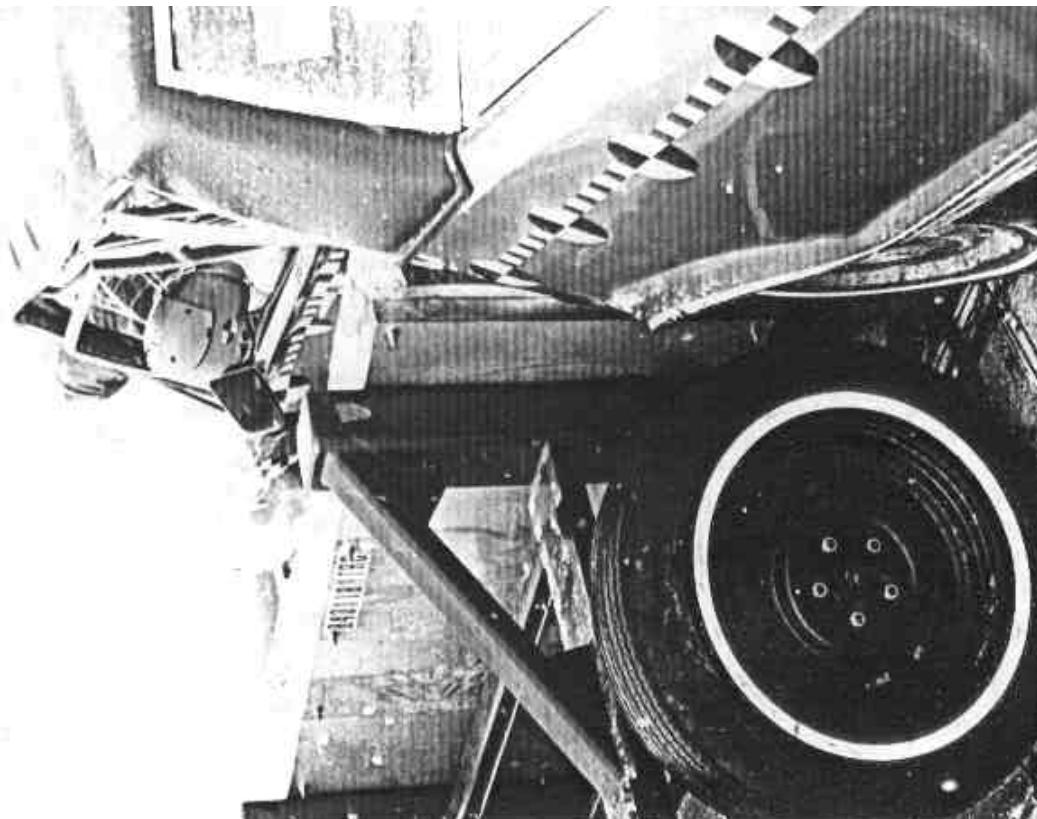


Figure A-17. POST-TEST CLOSEUP - VIEW 2



Figure A-18. POST-TEST CLOSEUP - VIEW 3

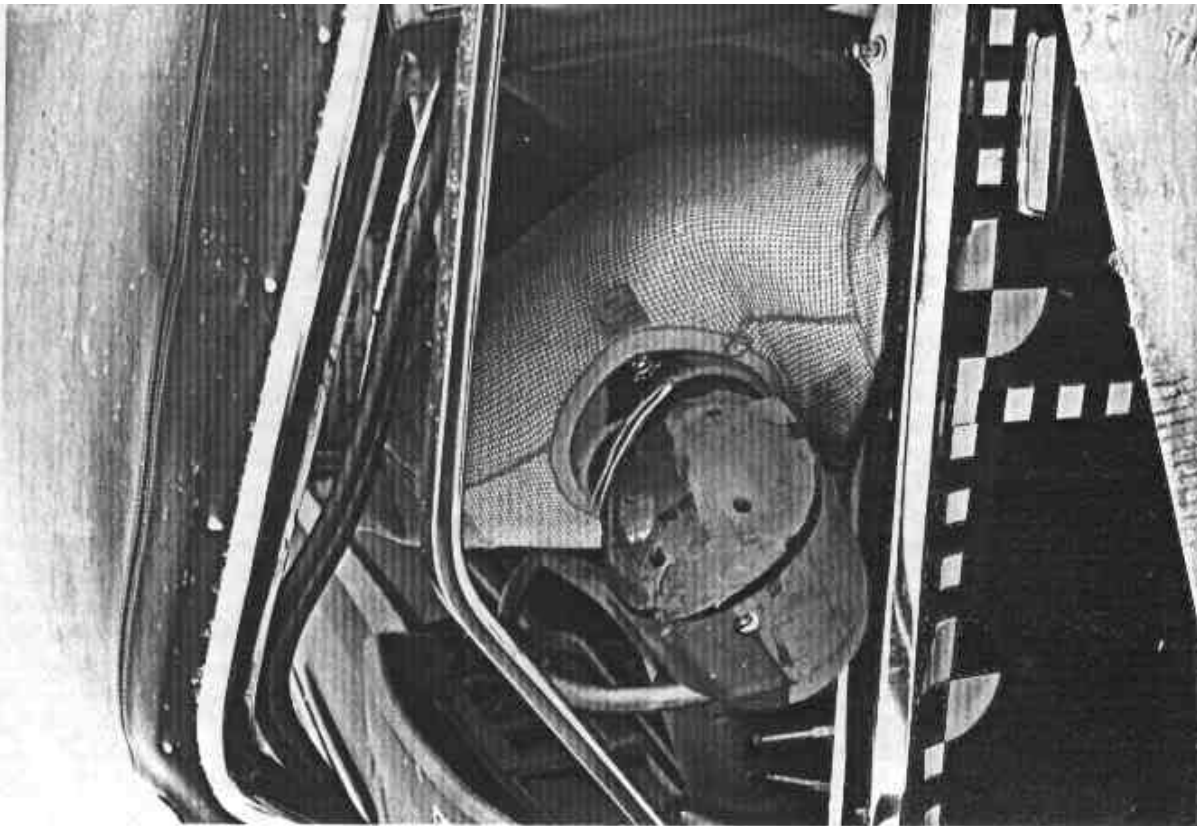


Figure A-19. POST-TEST DRIVER DUMMY - VIEW 1

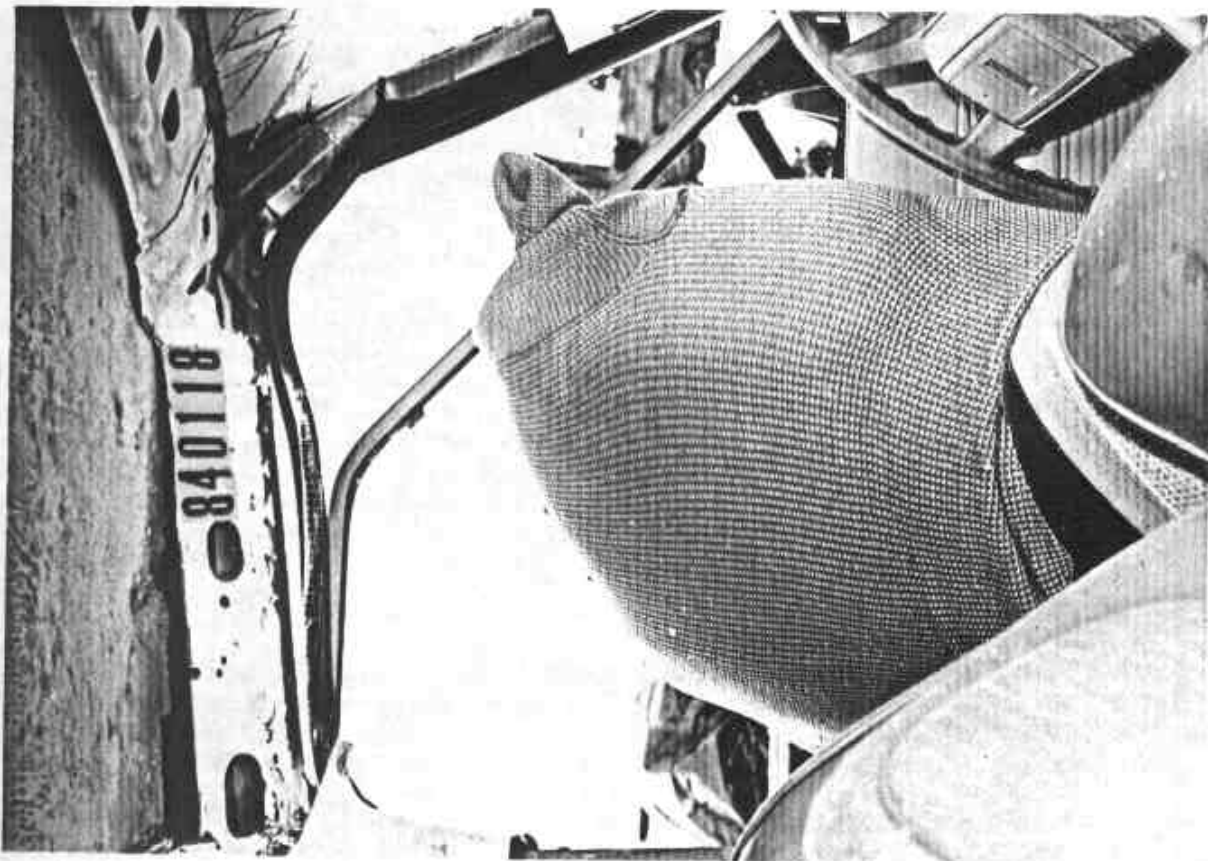


Figure A-20. POST-TEST DRIVER DUMMY - VIEW 2



Figure A-21. POST-TEST DRIVER DUMMY - VIEW 3



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



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



Figure A-24. B-PILLAR/SILL SEPARATION - VIEW 1

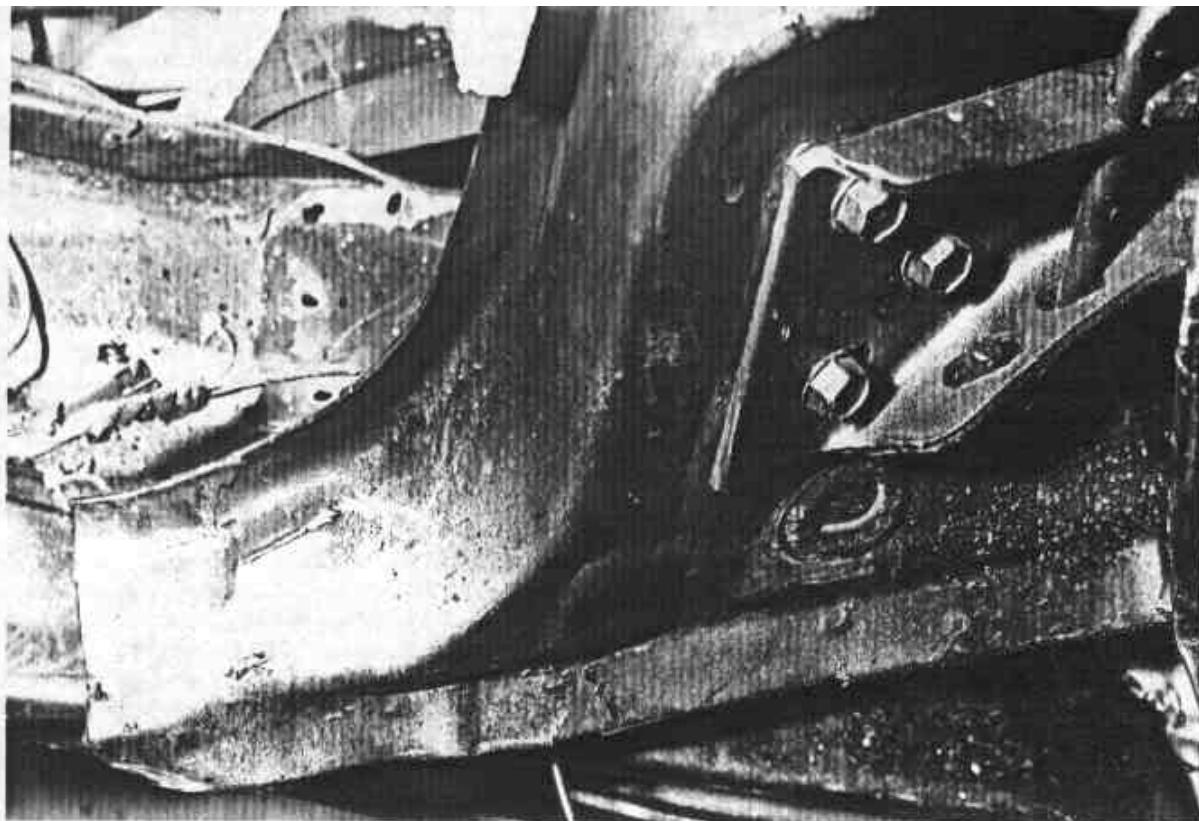


Figure A-25. B-PILLAR/SILL SEPARATION - VIEW 2

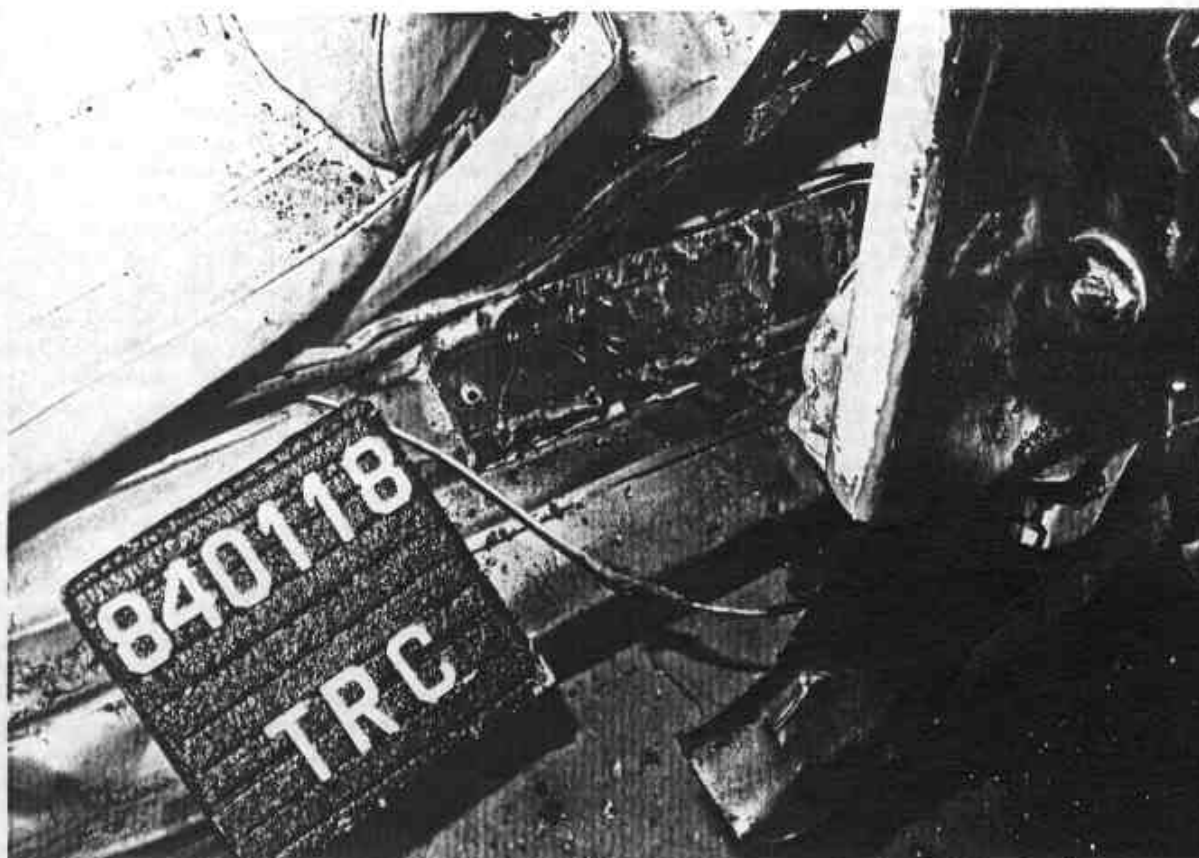


Figure A-26. B-PILLAR/SILL SEPARATION - VIEW 3

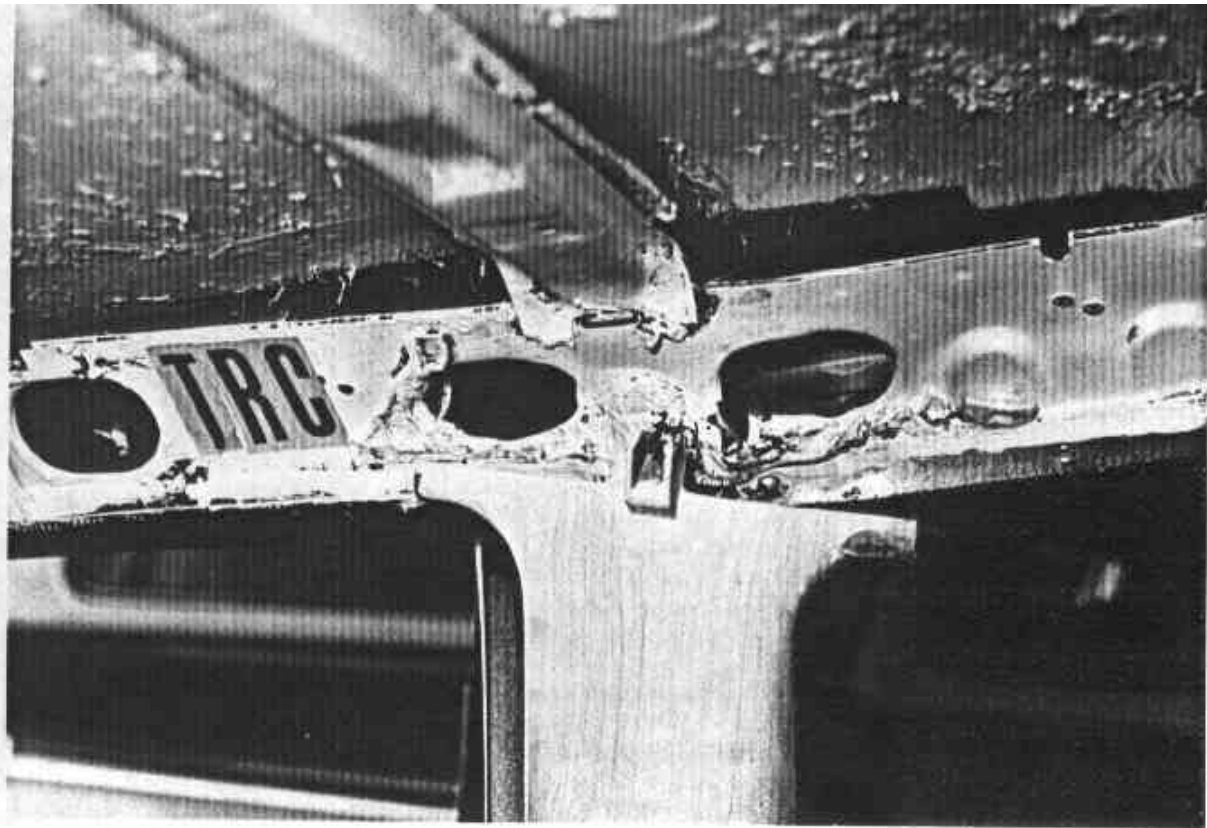


Figure A-27. PARTIAL B-PILLAR/HEADER SEPARATION - VIEW 1

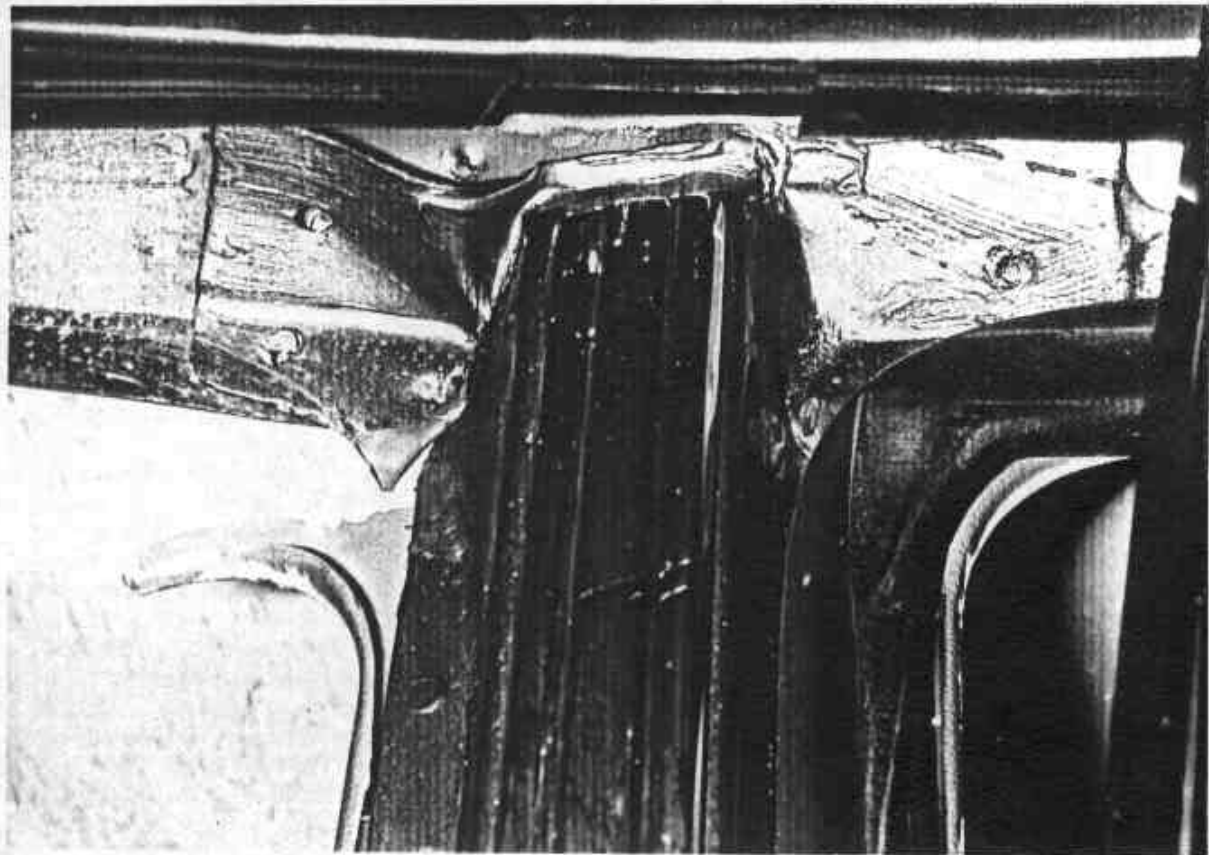


Figure A-28. PARTIAL B-PILLAR/HEADER SEPARATION - VIEW 2

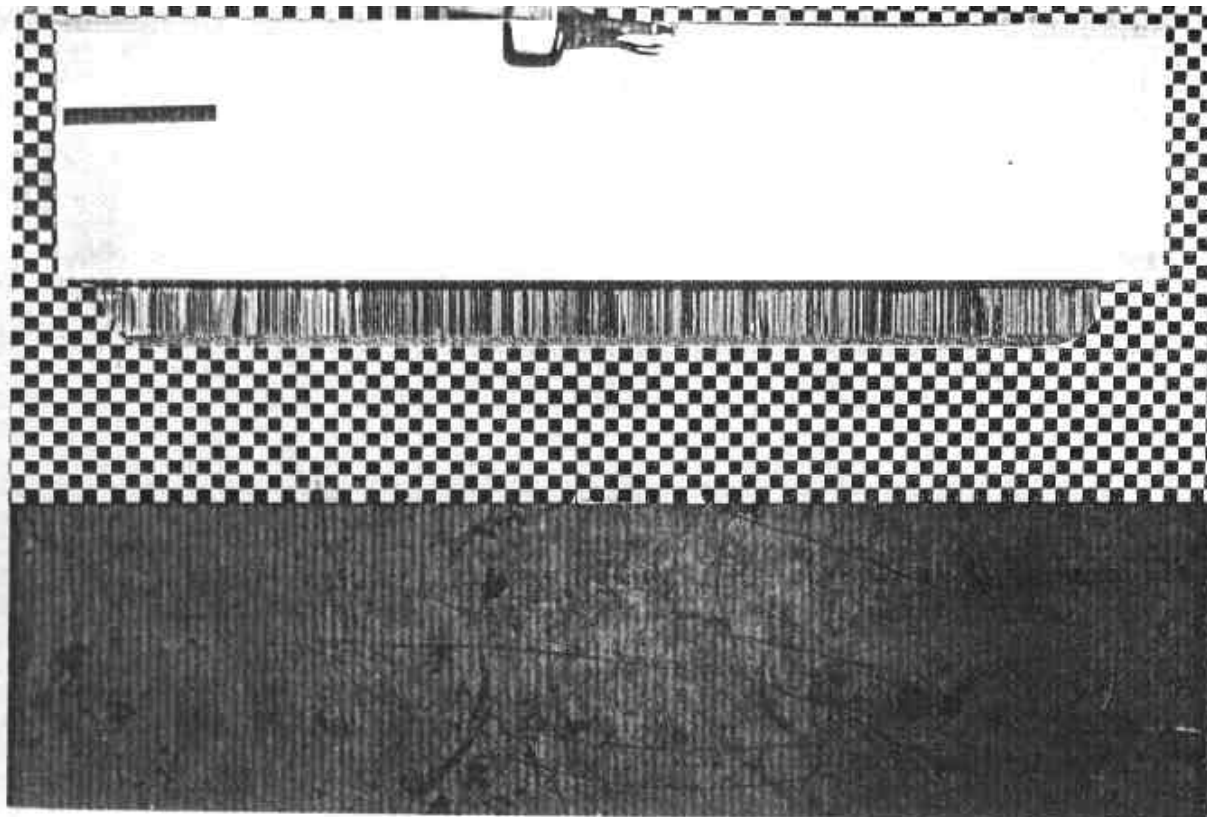


Figure A-29. PRE-TEST MDB FACE - VIEW 1

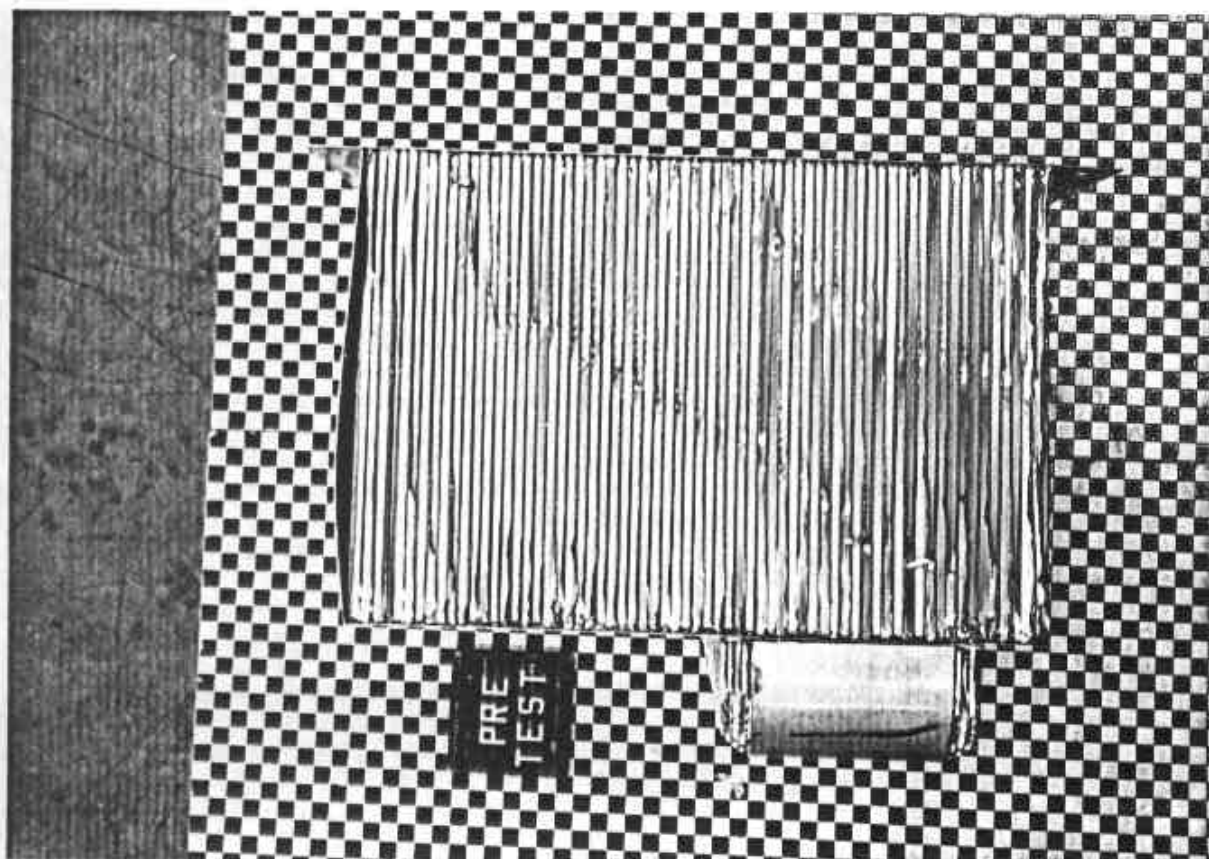


Figure A-30. PRE-TEST MDB FACE - VIEW 2

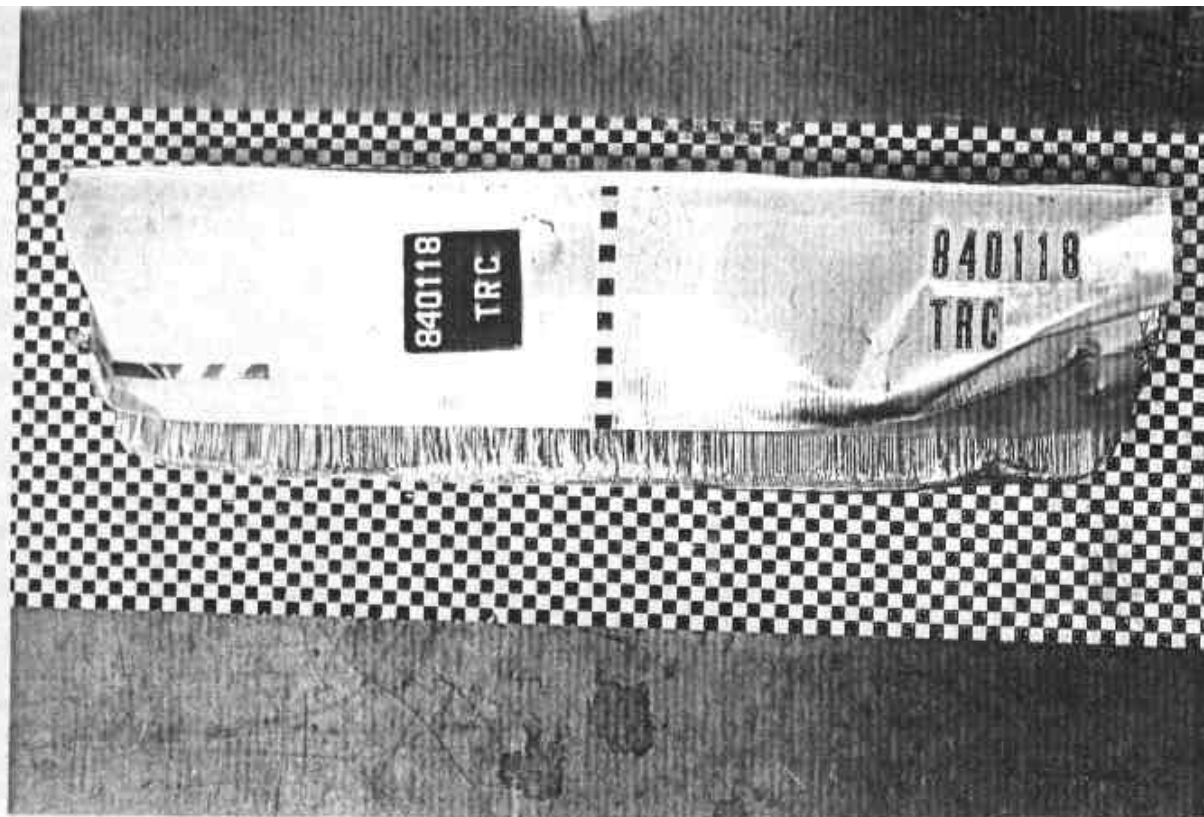


Figure A-31. POST-TEST MDB FACE - VIEW 1

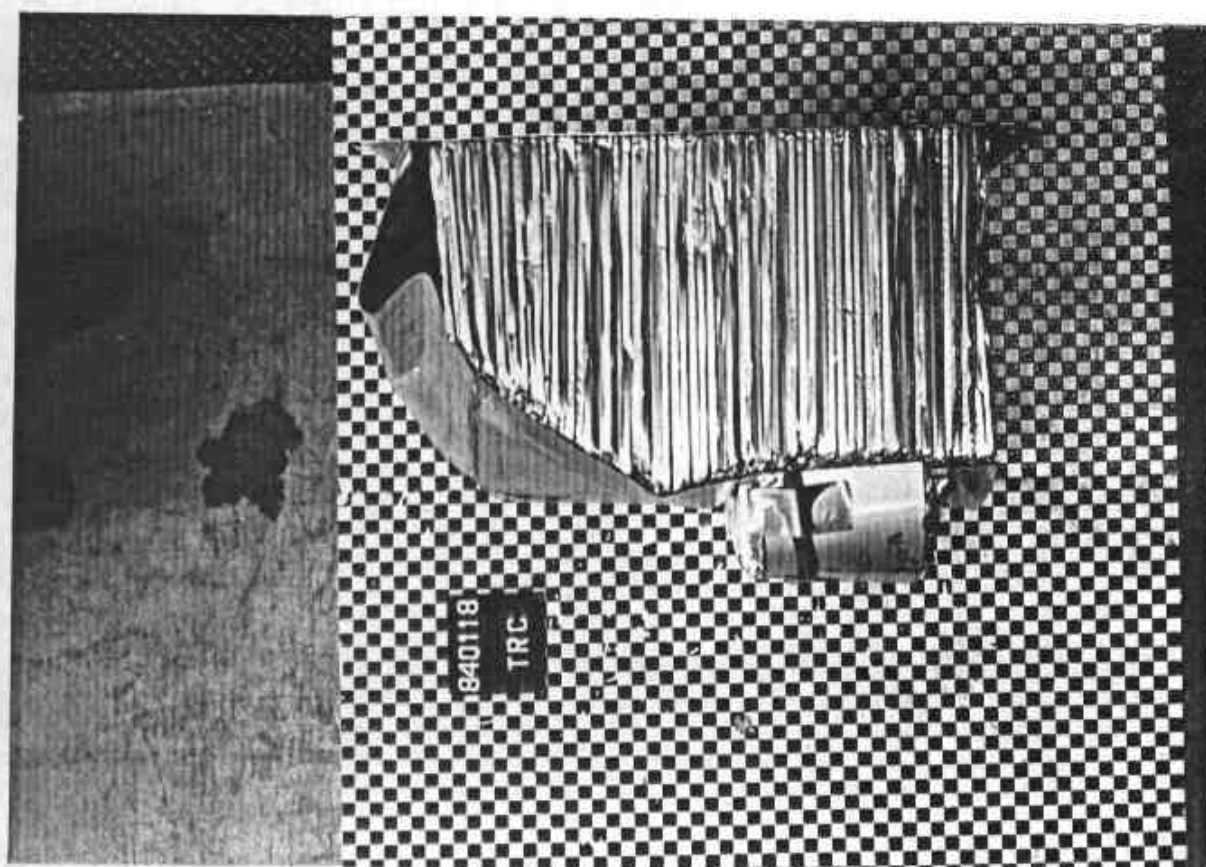


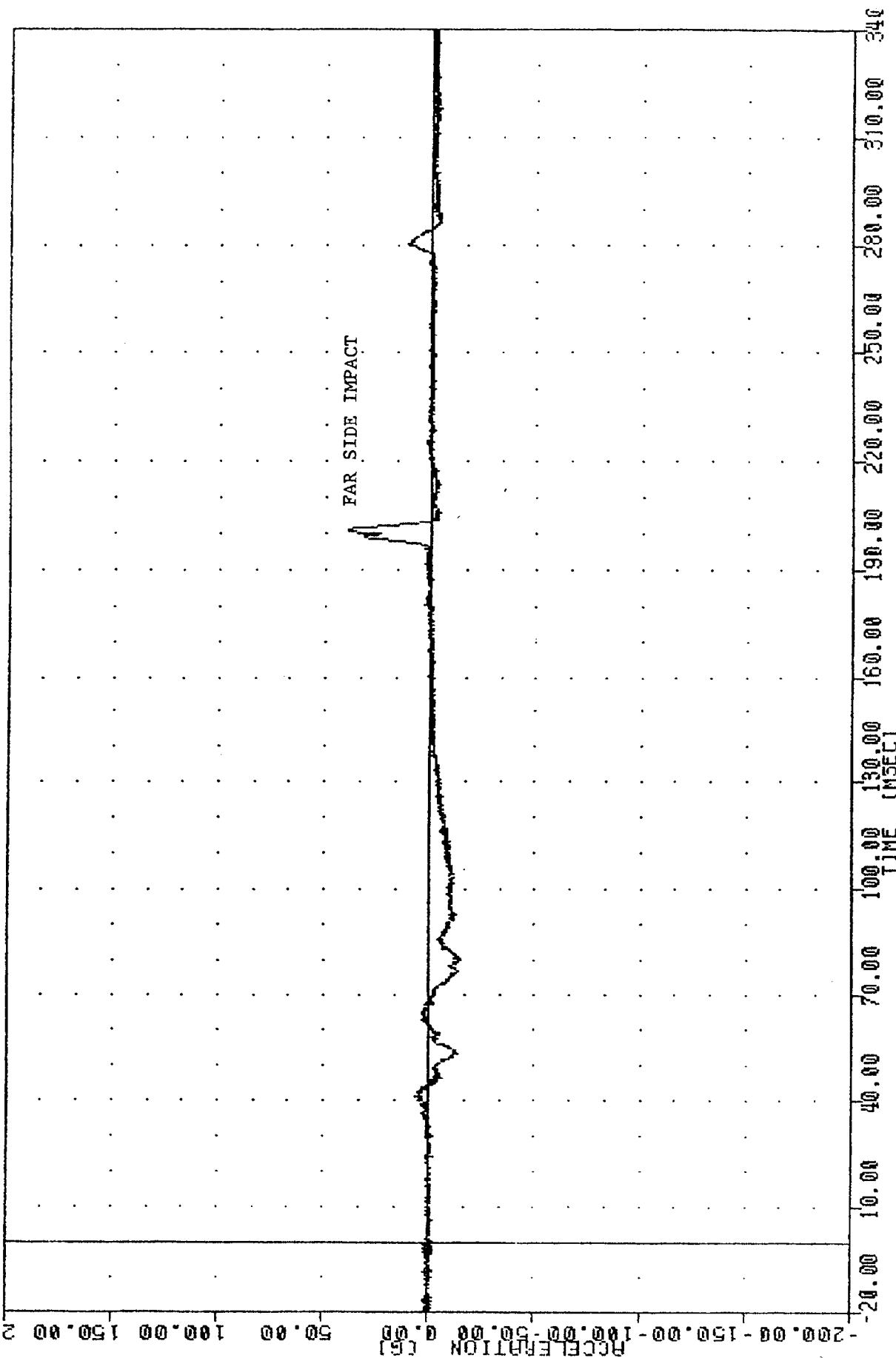
Figure A-32. POST-TEST MDB FACE - VIEW 2

APPENDIX B
DATA PLOT PRESENTATION

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

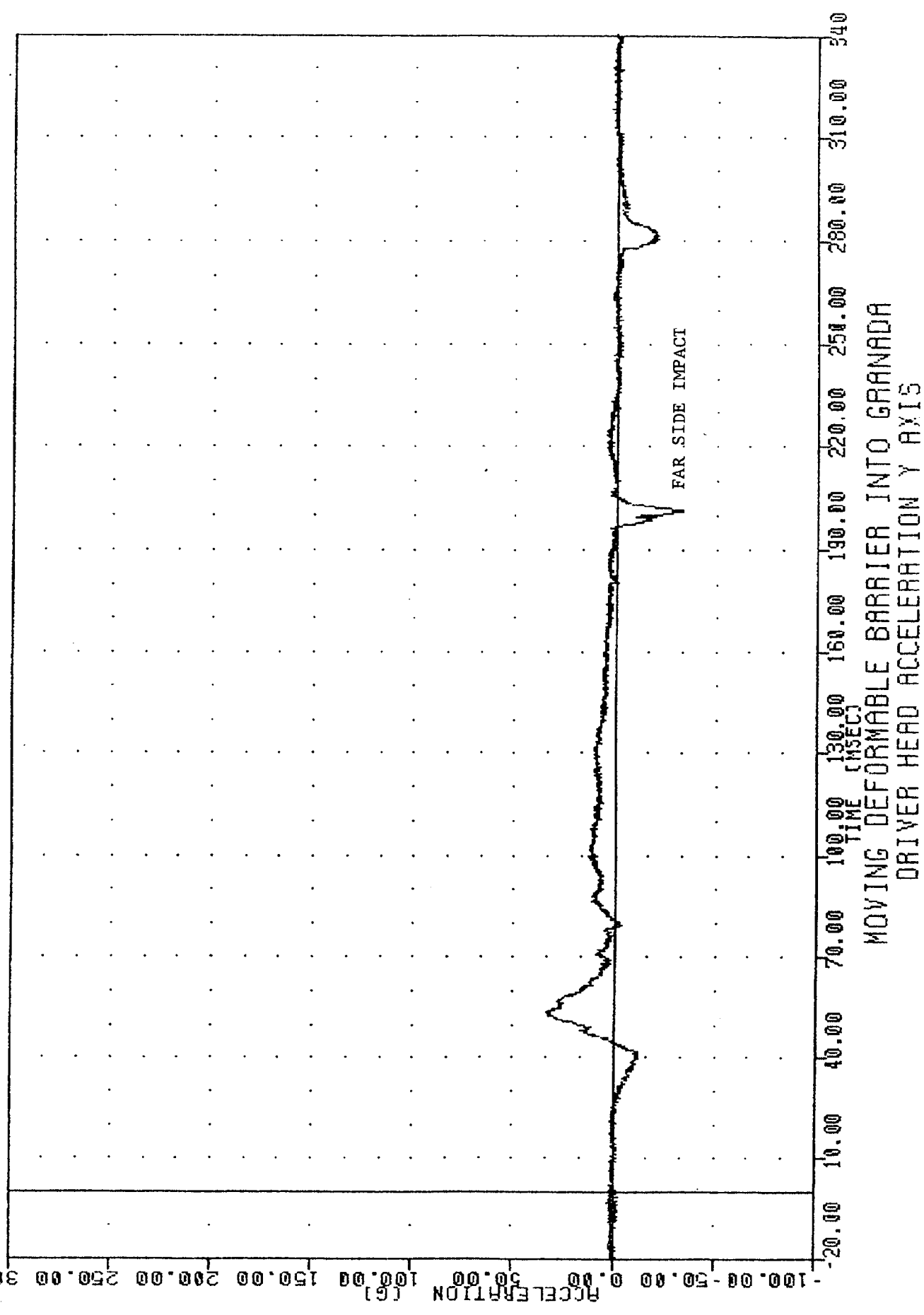
PLOT DATE 20-JAN-84 08:46:17
 FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = -15.028 79.88, 39.87 200.63
 SIDE PROTECTION - 2DR/40R
 84018000000
 HEDXG1

ACCELERATION (G)

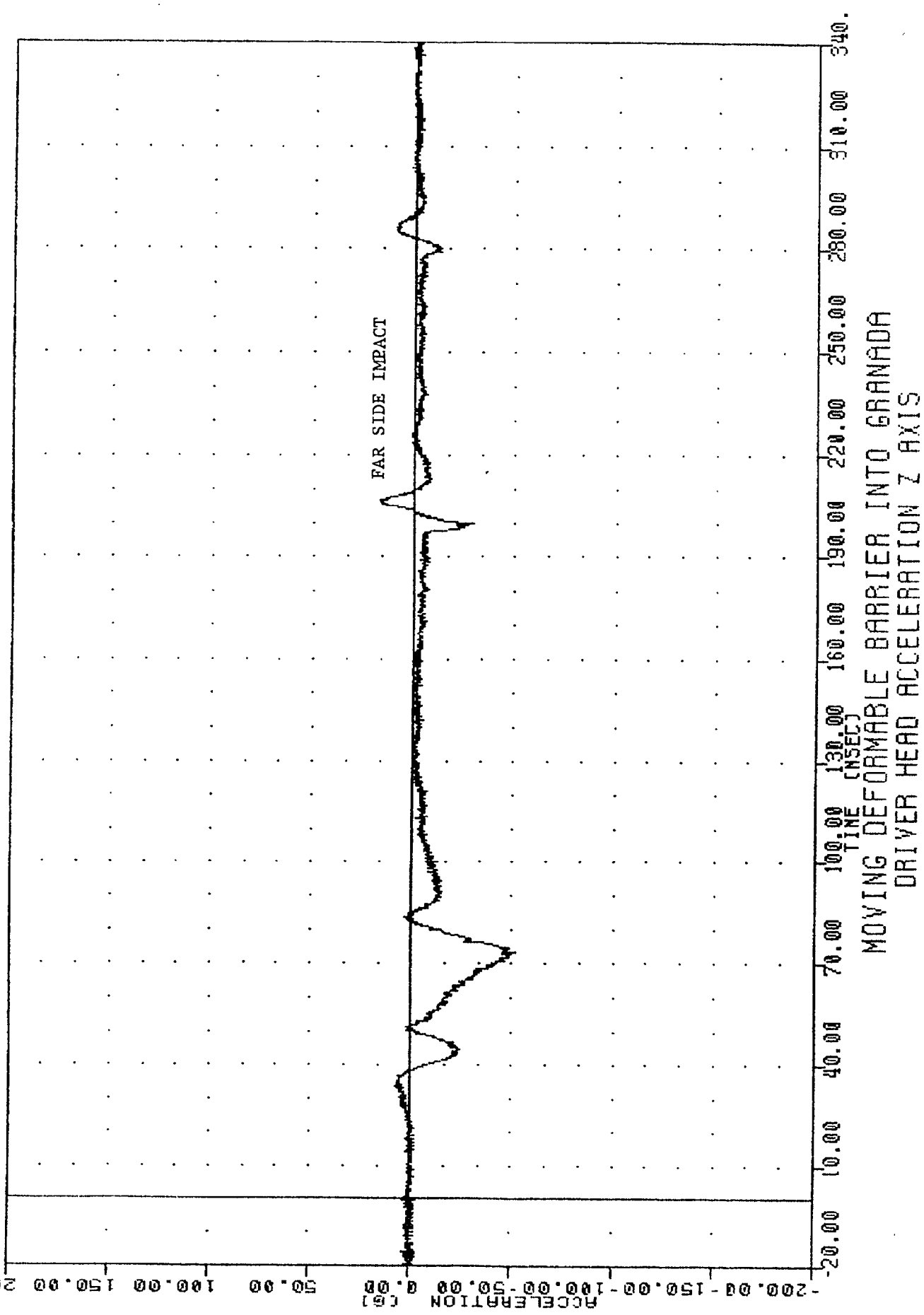


MOVING DEFORMABLE BARRIER INTO GRANADA
DRIVER HEAD ACCELERATION X AXIS

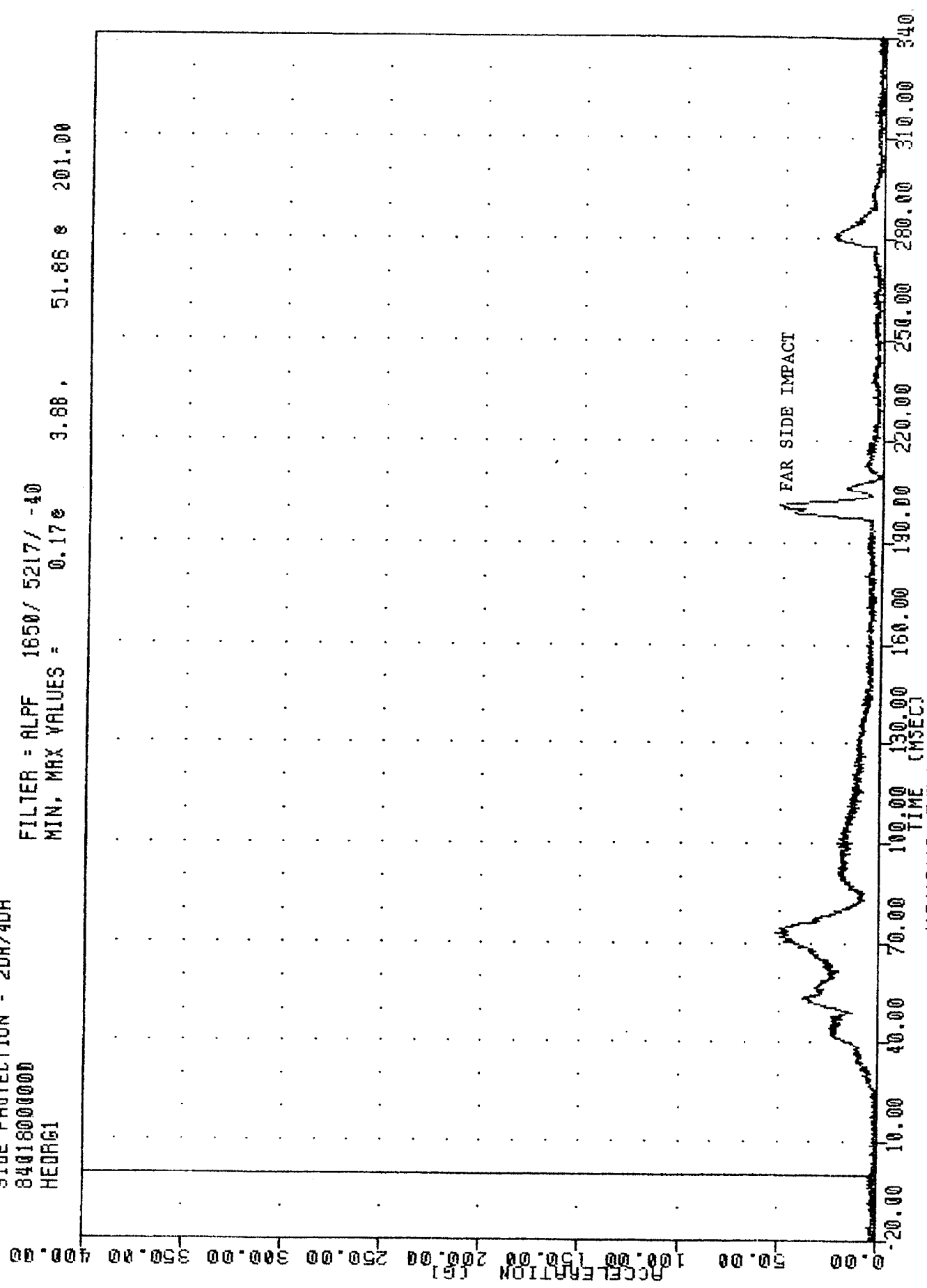
INC 840118
 SIDE PROTECTION - 20R/40R
 840180000000
 HE0Y61
 FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -33.400 201.25. 33.68 e 53.50
 PLOT DATE 28-JAN-84 08:46:17



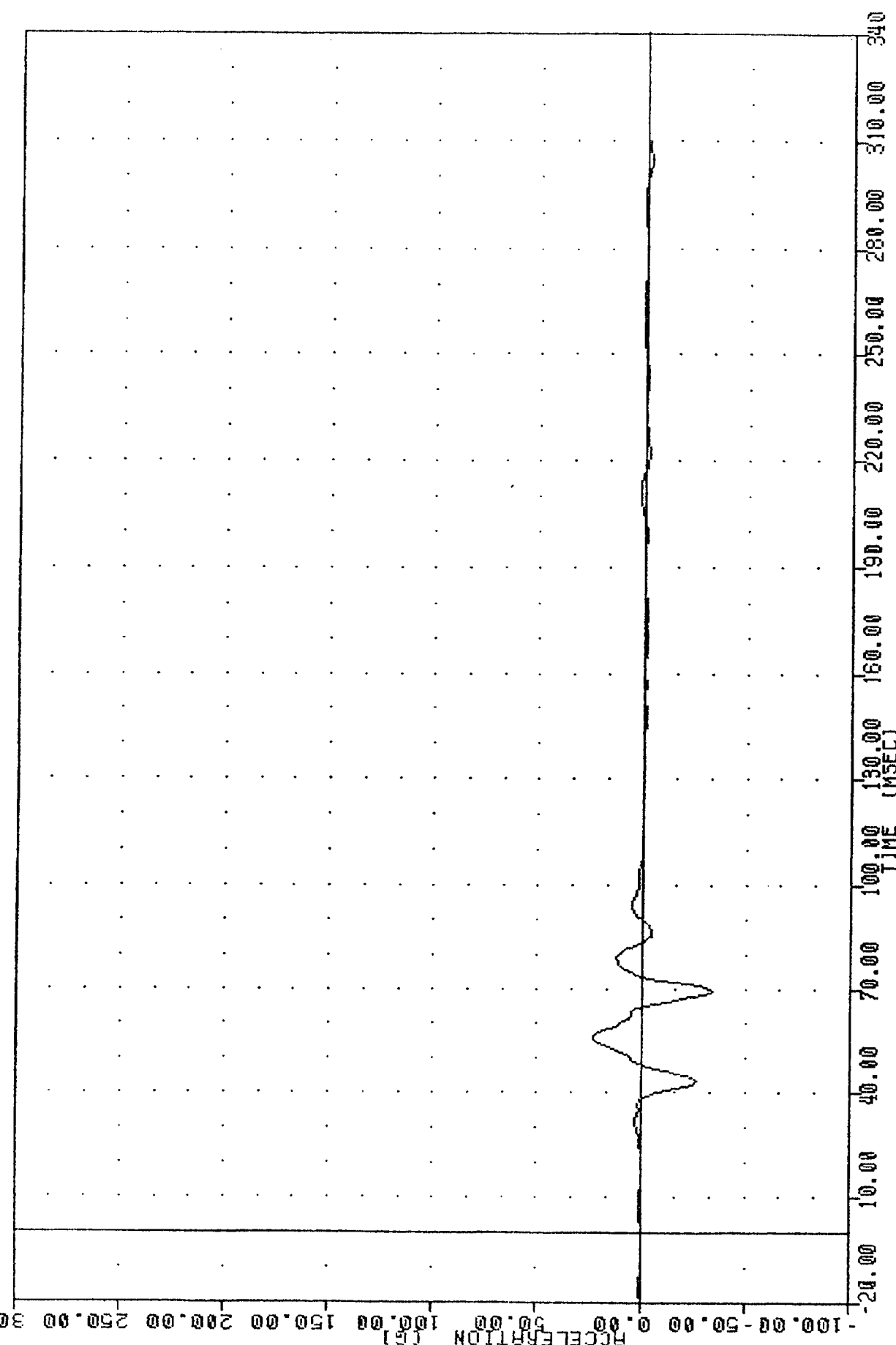
TAC 840118
 SIDE PROTECTION - 20R/4DR
 84018000000
 HEDZ61
 PLUT DATE 28-JAN-84 08:46:17
 FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -51.31 73.00 , 17.20 206.00



TMC 840118 26 JAN 84 08:46:17
 SIDE PROTECTION - 2DR/4DR
 84018000000
 HEDRG1
 FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = 0.17e 3.88, 51.86 s 201.00

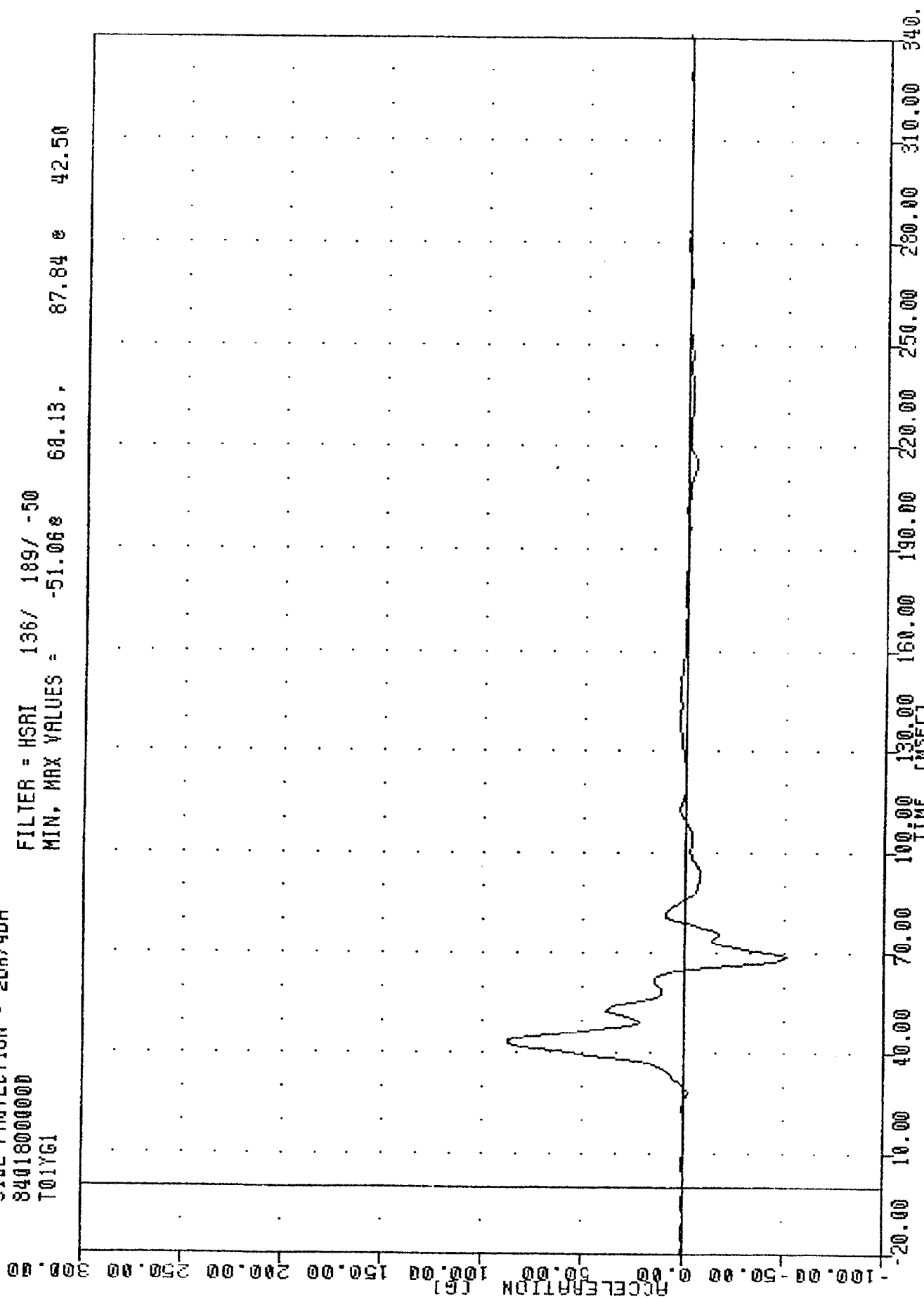


INC 840118
 SIDE PROTECTION - 20R/40R
 8401800000
 T01XG1
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -34.04 68.75, 23.04 55.00
 PLOT DATE 28-JUN-84 08:47:44



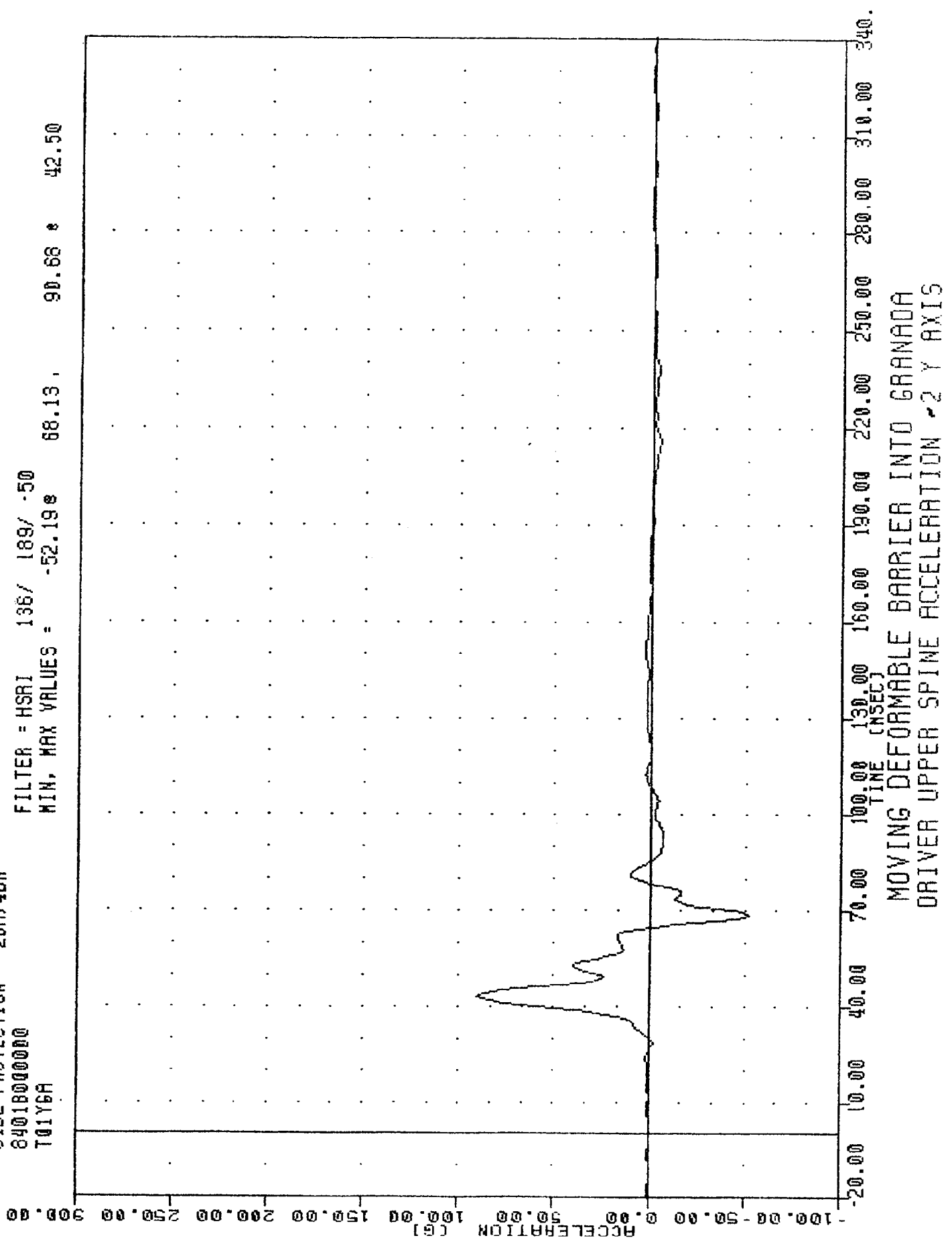
MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER UPPER SPINE ACCELERATION X AXIS

INC 840118
 SIDE PROTECTION - 2DR/4DR
 84018000000
 T01Y61
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -51.068 68.13, 87.84 @ 42.50
 PLOT DATE 26-JAN-84 08:47:14

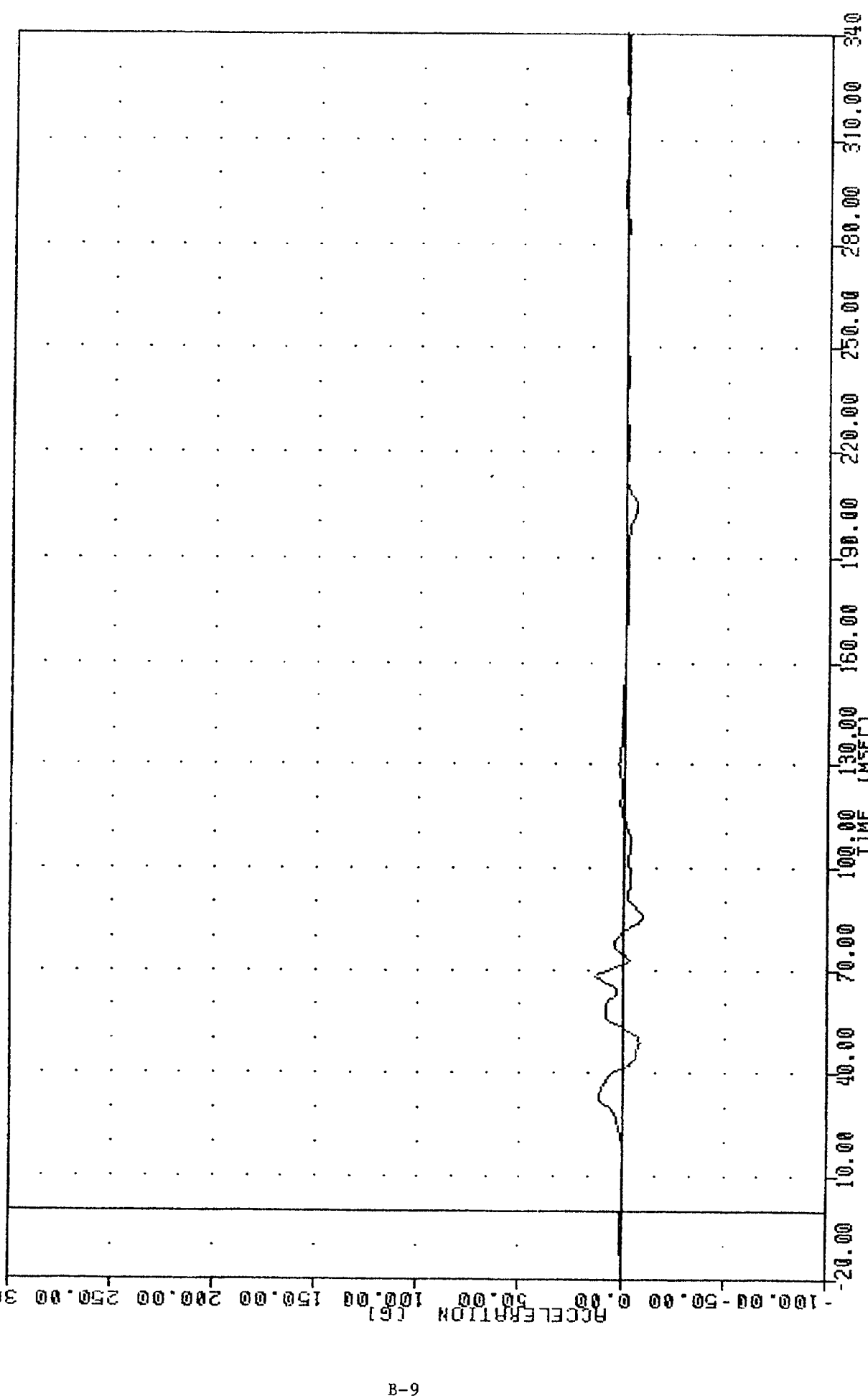


MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER UPPER SPINE ACCELERATION Y AXIS

INC 840110
 SIDE PROTECTION - 20R/4DR
 84018000000
 T01Y6H
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -52.19g 68.13 90.63 42.50
 PLUT DATE 26-JAN-84 08:47:44

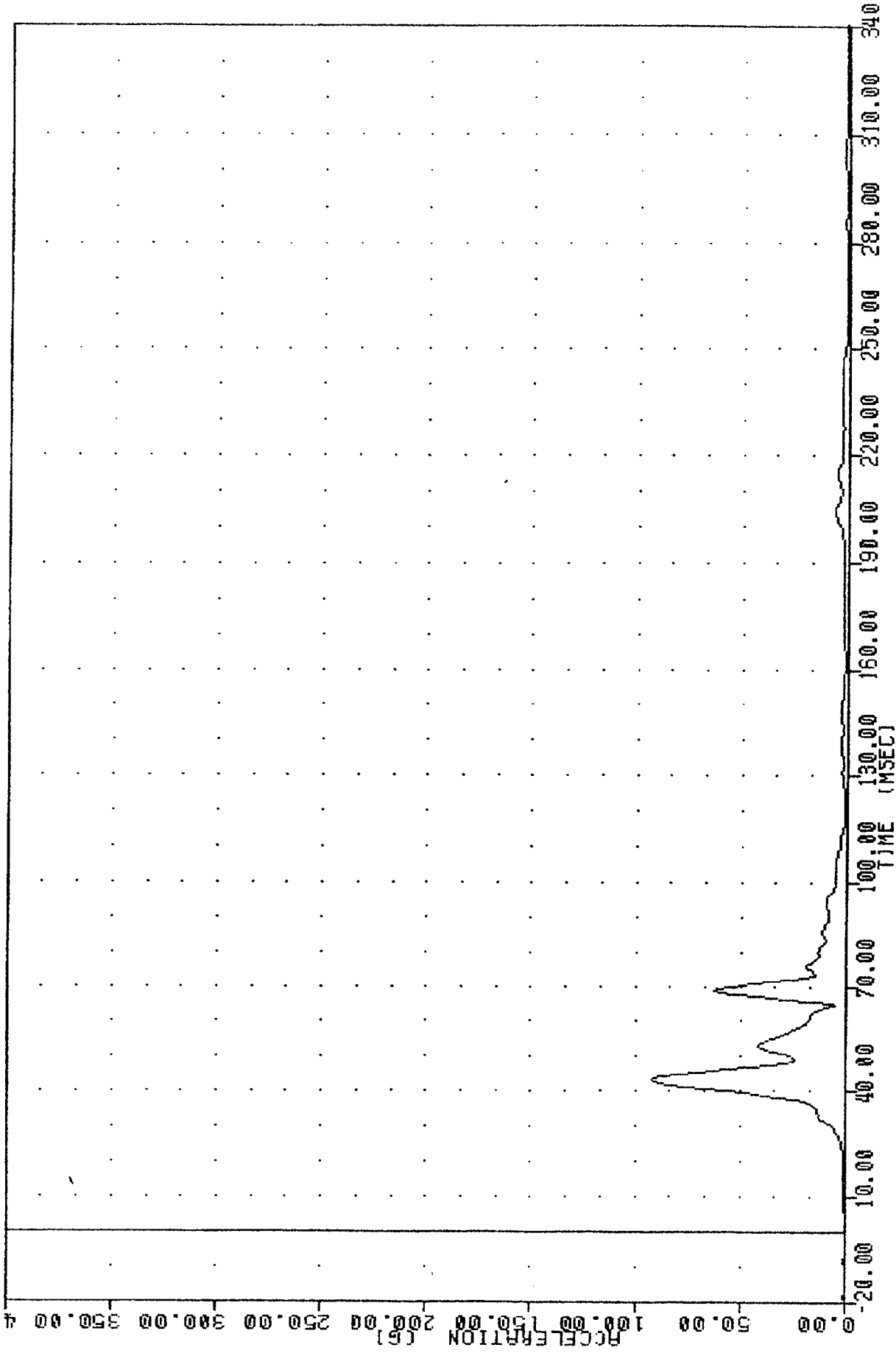


HC 840118
 SIDE PROTECTION - 2DR/40R
 84018000000
 701ZG1
 PLOT DATE 26-JAN-84 08:47:44
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -10.28 85.00, 12.91 67.50



MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER UPPER SPINE ACCELERATION Z AXIS

INC 84018
 SIDE PROTECTION - 2DR/4DR
 8401800000
 701RG1
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.128 -12.50, 91.90 s 42.50
 PLOT DATE 26-JAN-84 08:47:49



MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER UPPER SPINE RESULTANT

IRC 840118 PLOT DATE 26-JAN-84 08:48:54

SIDE PROTECTION - 20R/40R

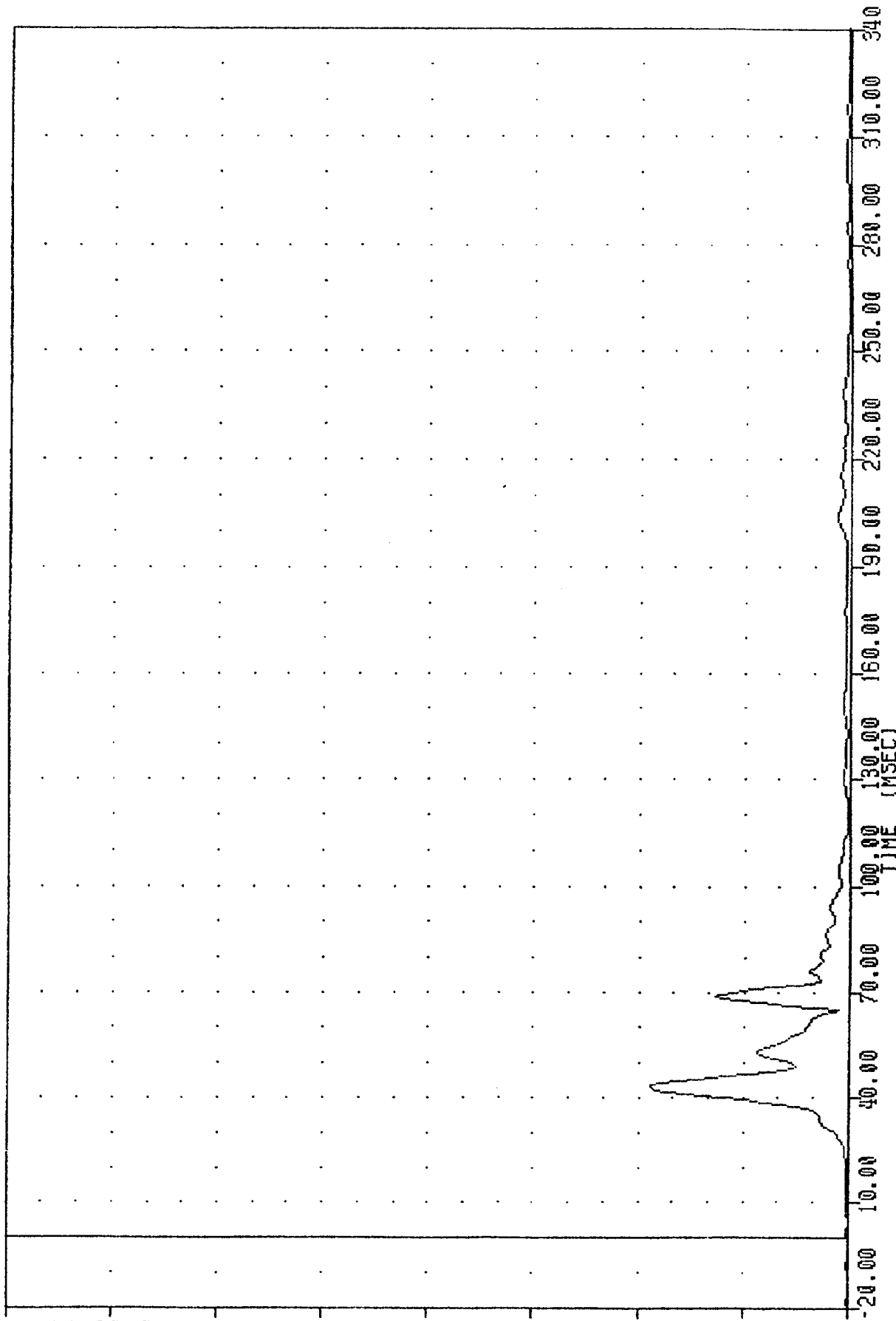
84018000000

T01RG1

FILTER = HSR1 136/ 189/ -50

MIN. MAX VALUES = 0.09% -13.13, 94.61 @ 42.50

ACCELERATION (G)



MOVING DEFORMABLE BARRIER INTO GRANADA
DRIVER UPPER SPINE RESULTANT USING TQ1YGA

MC 840118 26-JUN-84 08:54:30

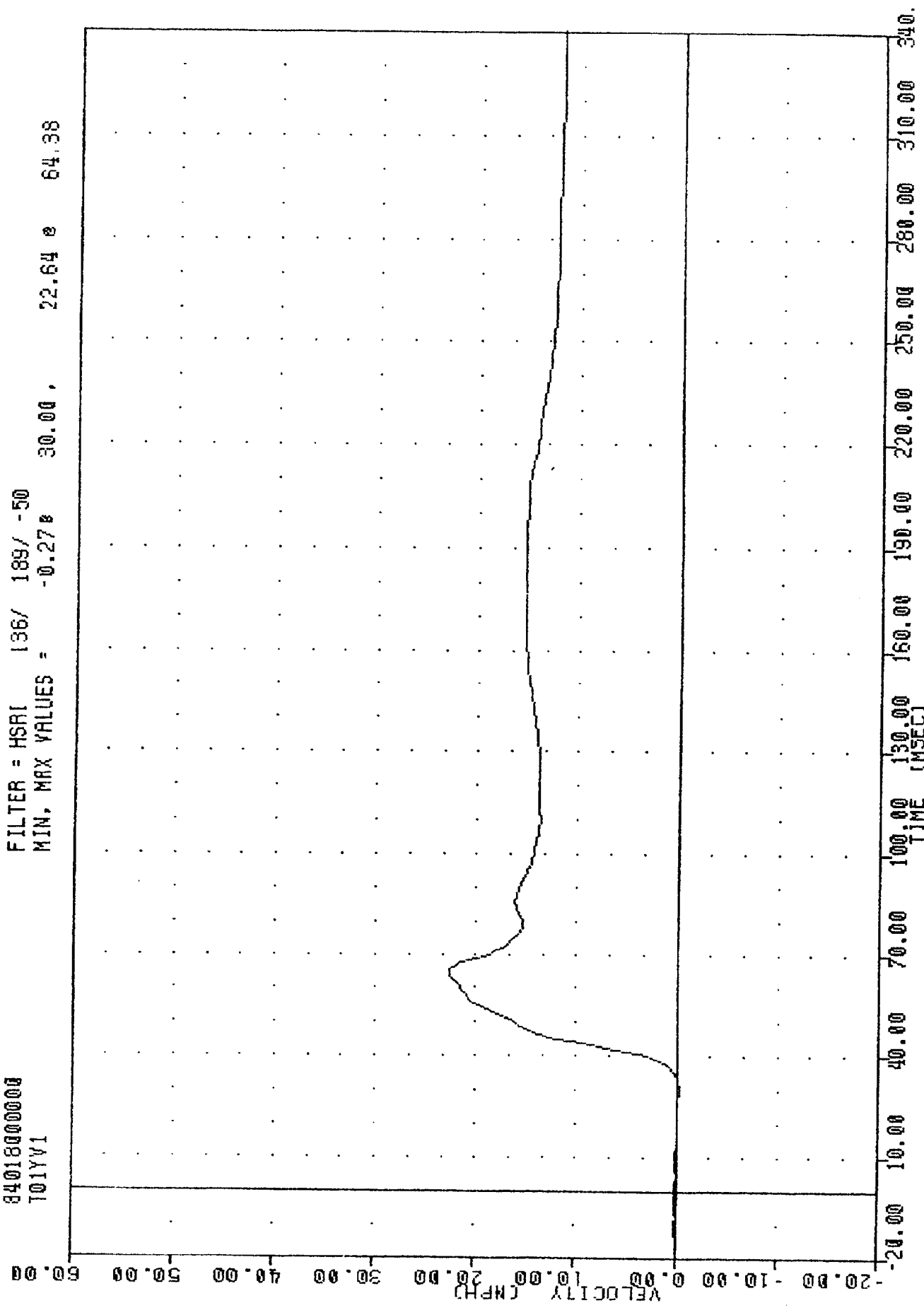
840118
SIDE PROTECTION - 2DR/4DR

84018000000

T01YV1

FILTER = HSRI 136/ 189/ -50

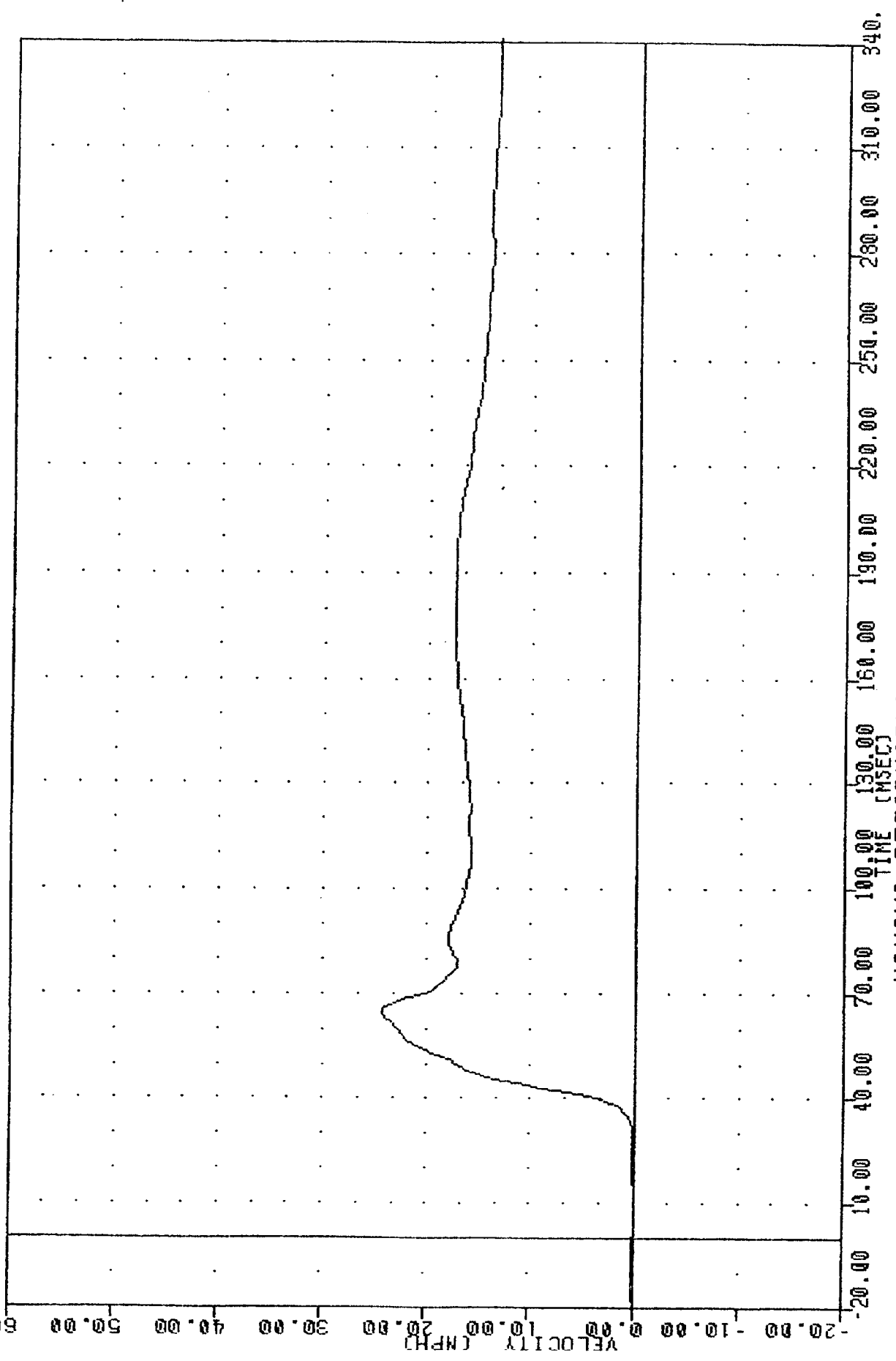
MIN, MAX VALUES = -0.27 30.00 , 22.64 64.38



MOVING DEFORMABLE BARRIER INTO GRANADA
DELTA V USING T01YV1

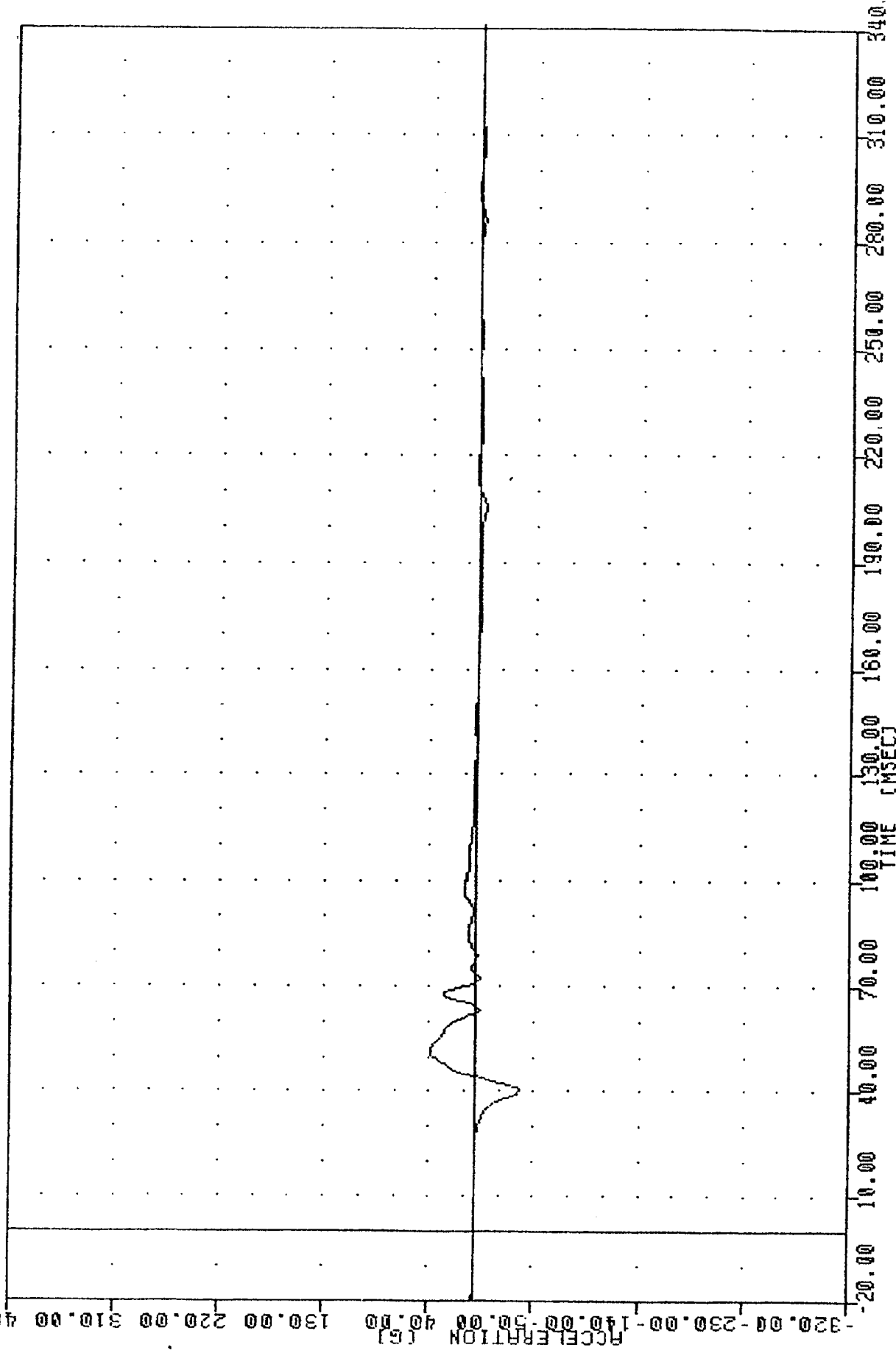
TRC 840118
 SIDE PROTECTION - 2DR/4DR
 840180000000
 T01YVA

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -0.028 4.38, 24.31 8 54.38



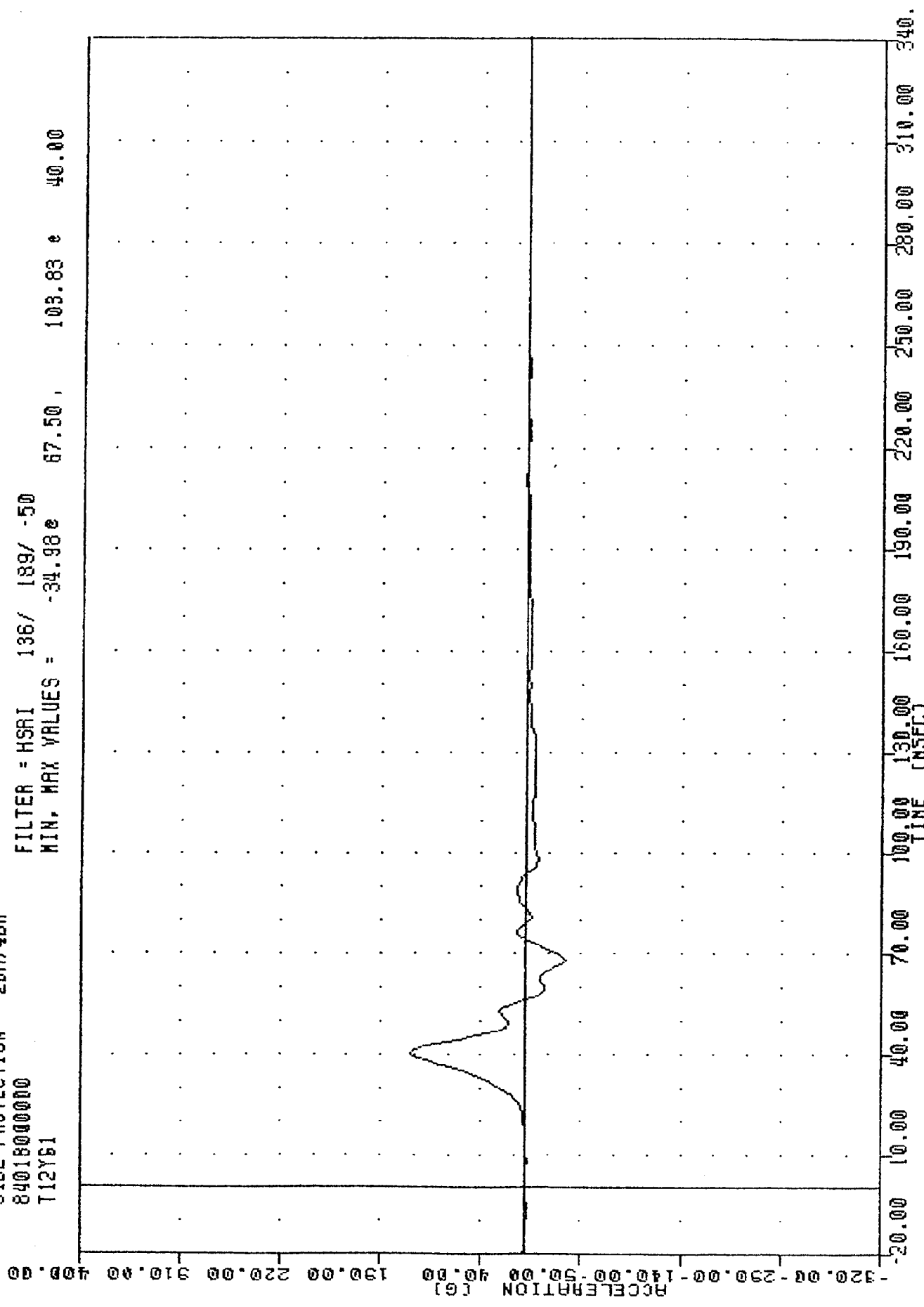
MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING T01YGA

TMC 7 846718
 SIDE PROTECTION - 2DR/4DR
 84018000000
 T12XG1
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -37.45e 39.38. 38.96 e 51.25
 28-JAN-84 08:47:14



MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER LOWER SPINE ACCELERATION X AXIS

INC 840110
 SIDE PROTECTION - 20R/4DR
 84018000000
 T12Y61
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -34.98e 103.83 e 40.00
 26-JAN-84 08:47:44



MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER LOWER SPINE ACCELERATION Y AXIS

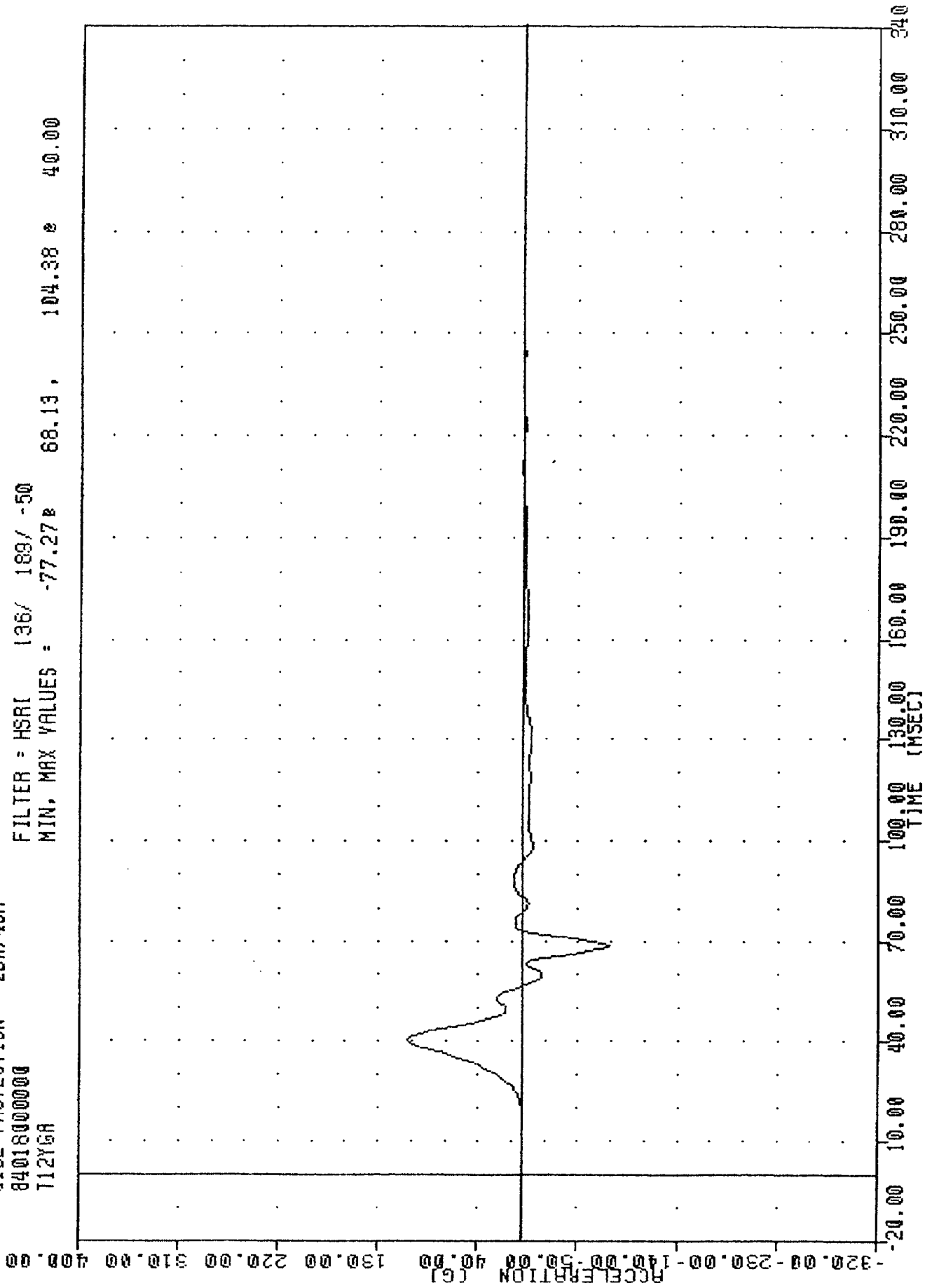
IRC 840118
SIDE PROTECTION - 20R/40R
84018000000
T12YGR

PLOT DATE

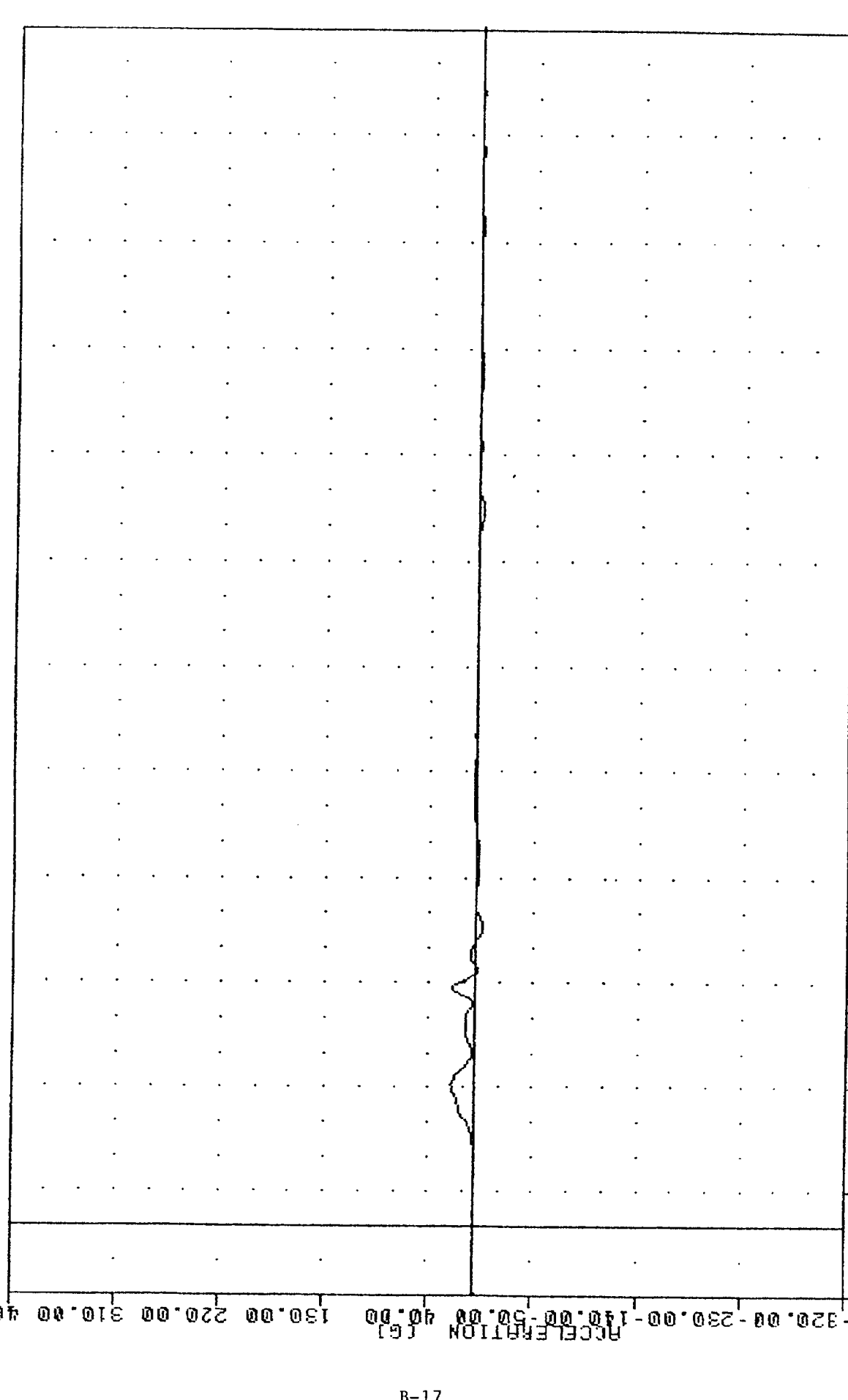
26-JAN-84

08:47:44

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -77.27 68.13, 104.38 e 40.00

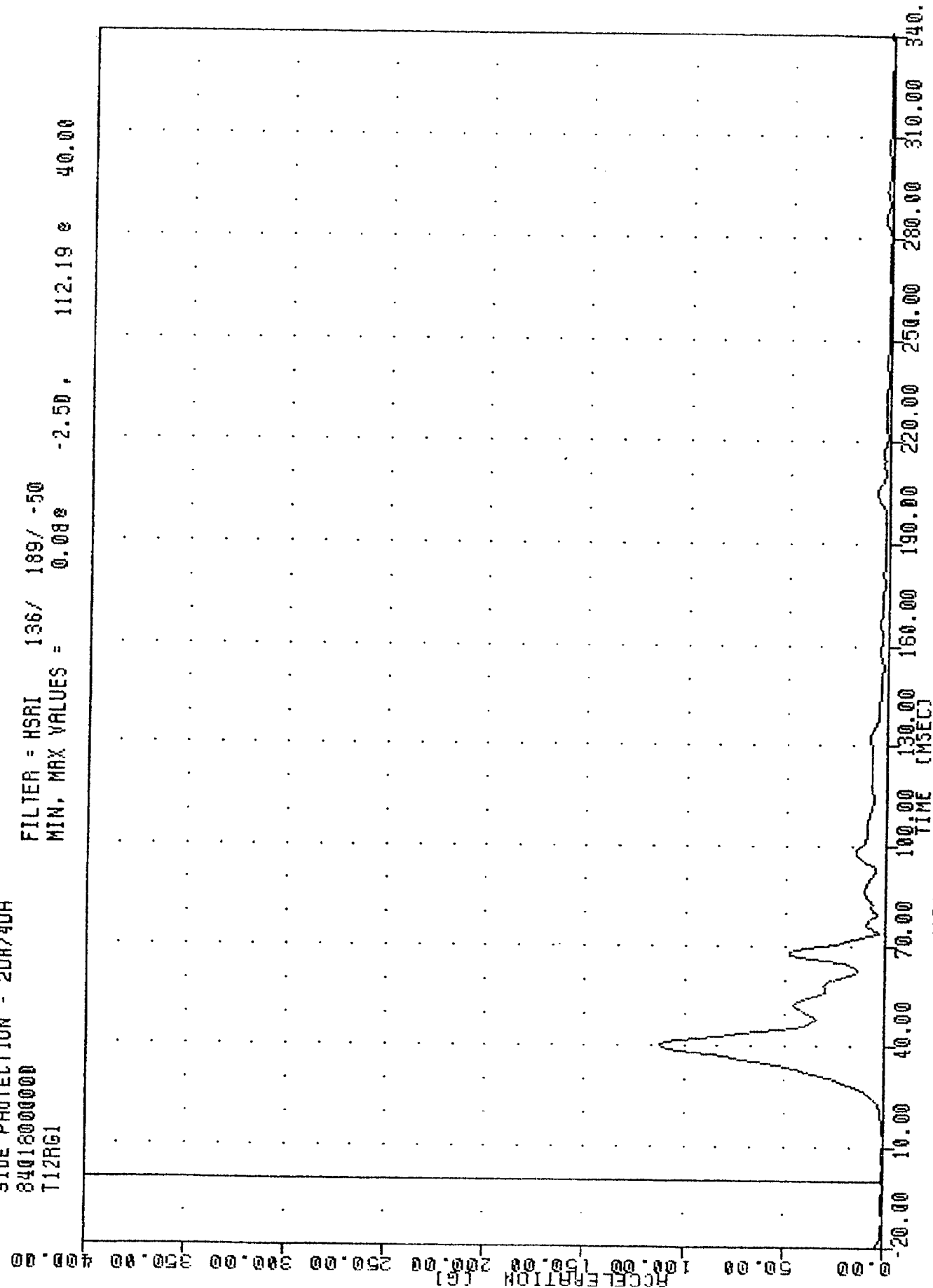


840180000000
 T12ZG1
 SIDE PROTECTION - 2DR/4DR
 840180000000
 T12ZG1
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -6.20e 85.00, 20.61 s 40.00
 1207 GMT 20-JAN-84 08:47:14



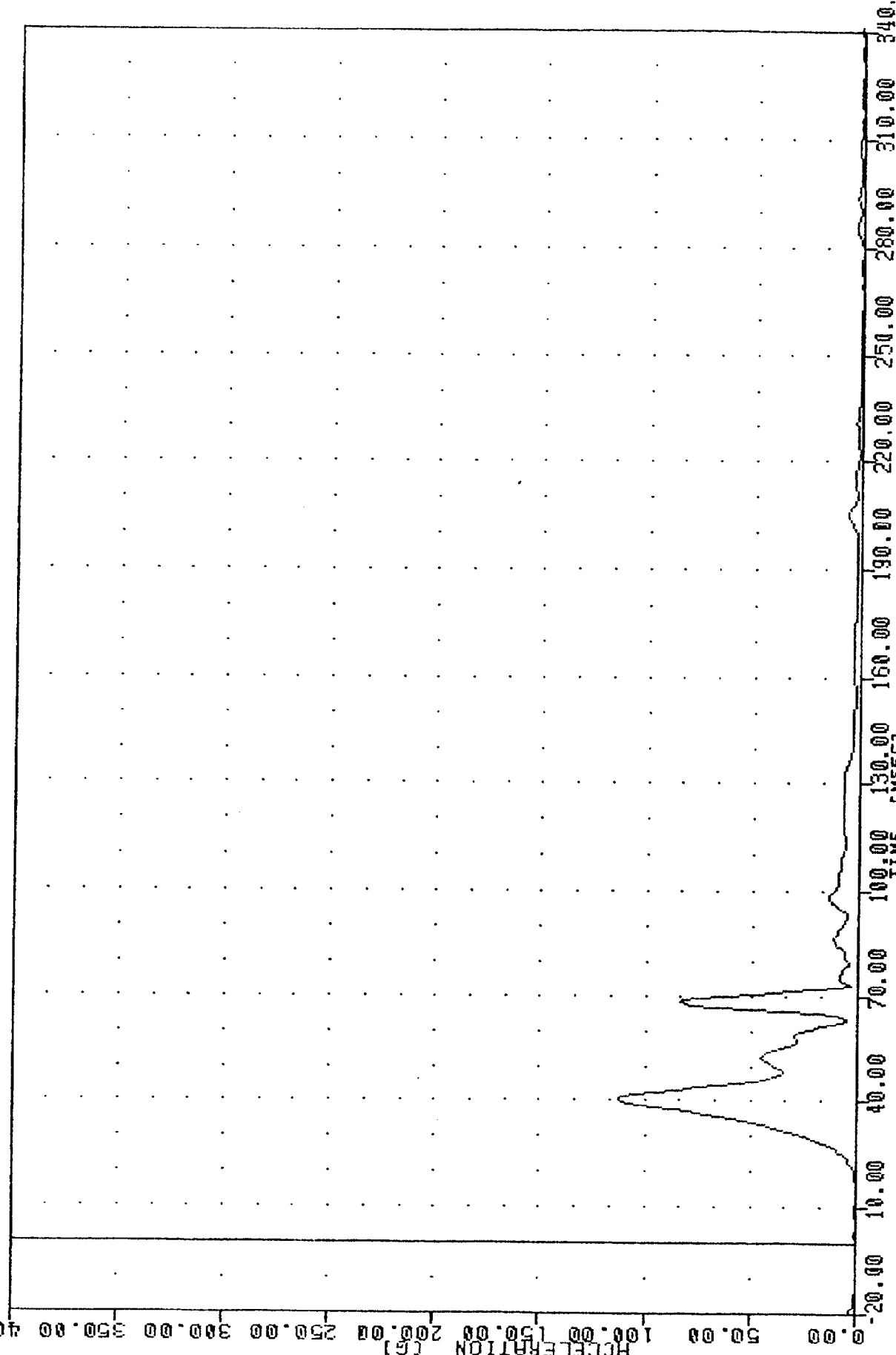
MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER LOWER SPINE ACCELERATION Z AXIS

840010
 SIDE PROTECTION - 2DR/4DR
 84018000000
 T12RG1
 TEST DATE 20-JAN-84 08:47:49
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = 0.00g -2.50, 112.19 g 40.00



MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER LOWER SPINE RESULTANT

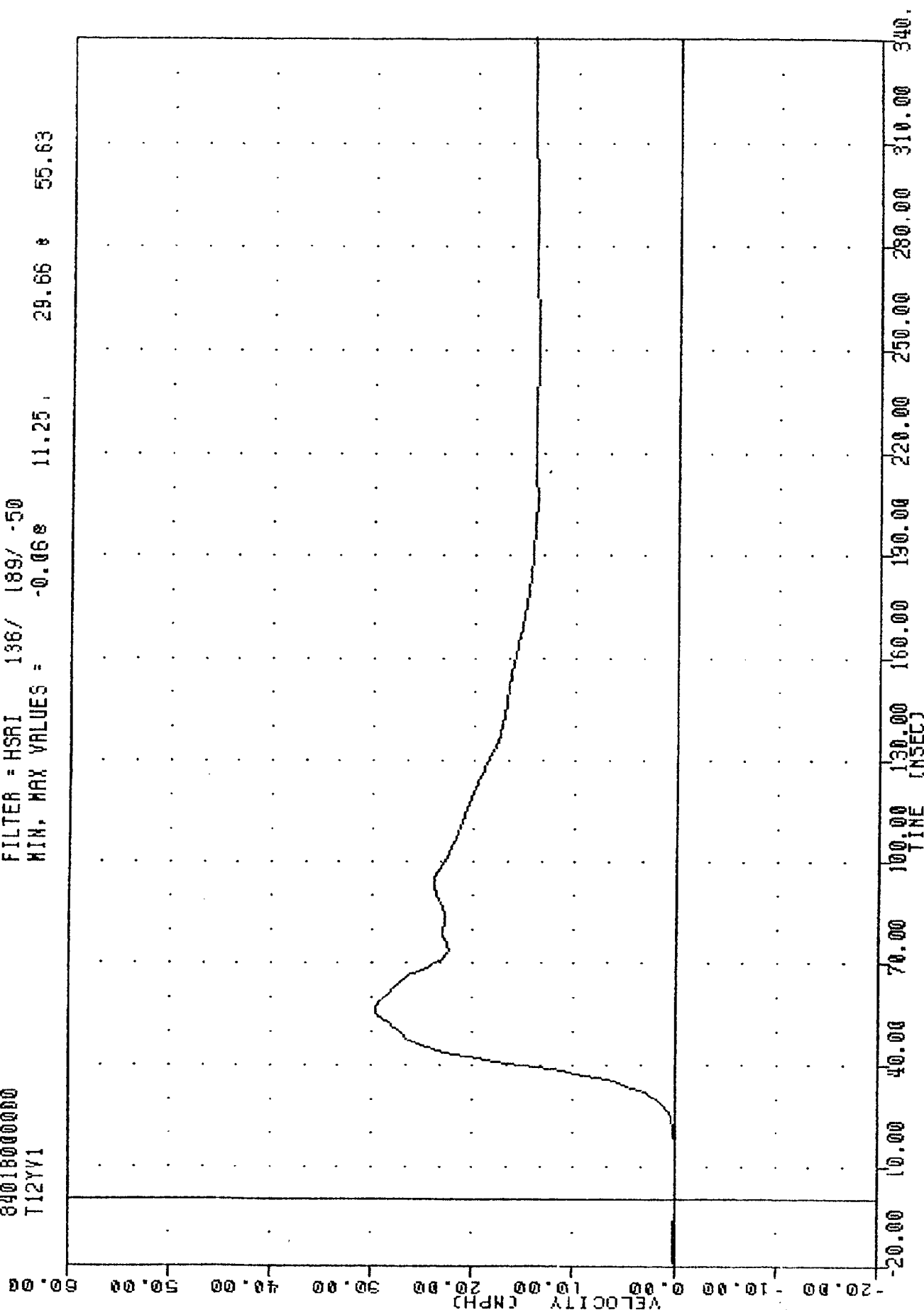
840180000000
 T12RG1
 SIDE PROTECTION - 2DR/4DR
 840180000000
 T12RG1
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = 0.03e -7.50, 112.70 e 40.00
 20-JAN-84 08:45:34



MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER LOWER SPINE RESULTANT USING T12YGA

NOV 5 1962

FILTER = HSRI	136/	189/	-50
MIN. MAX VALUES =	-0.068	11.25	29.66 *
			55.63

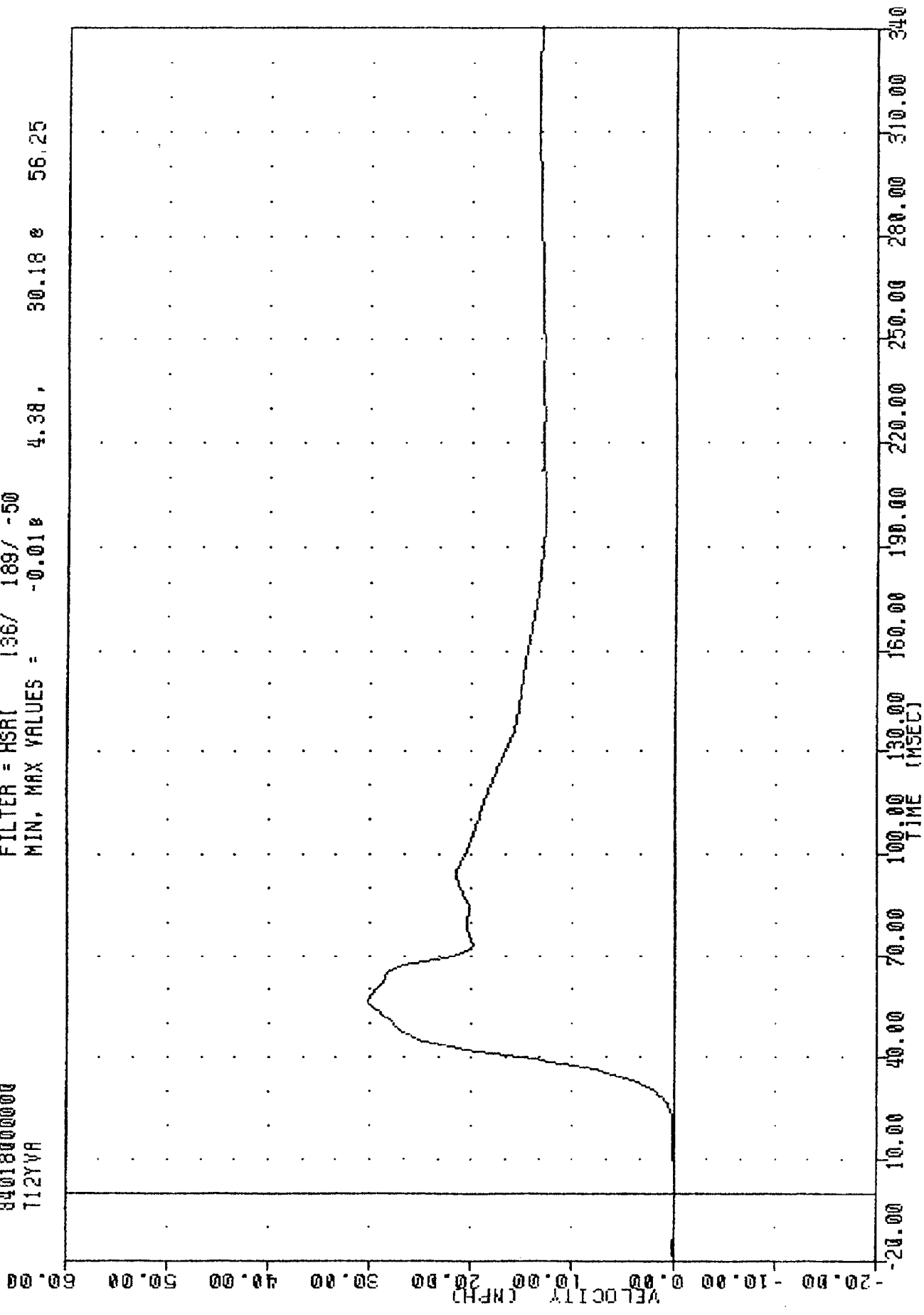


MOVING DEFORMABLE BARRIER INTO GRANADA
DELTA V USING T12Y61

TRC
 SIDE PROTECTION - 2DR/4DR
 84018000000
 T12YVR

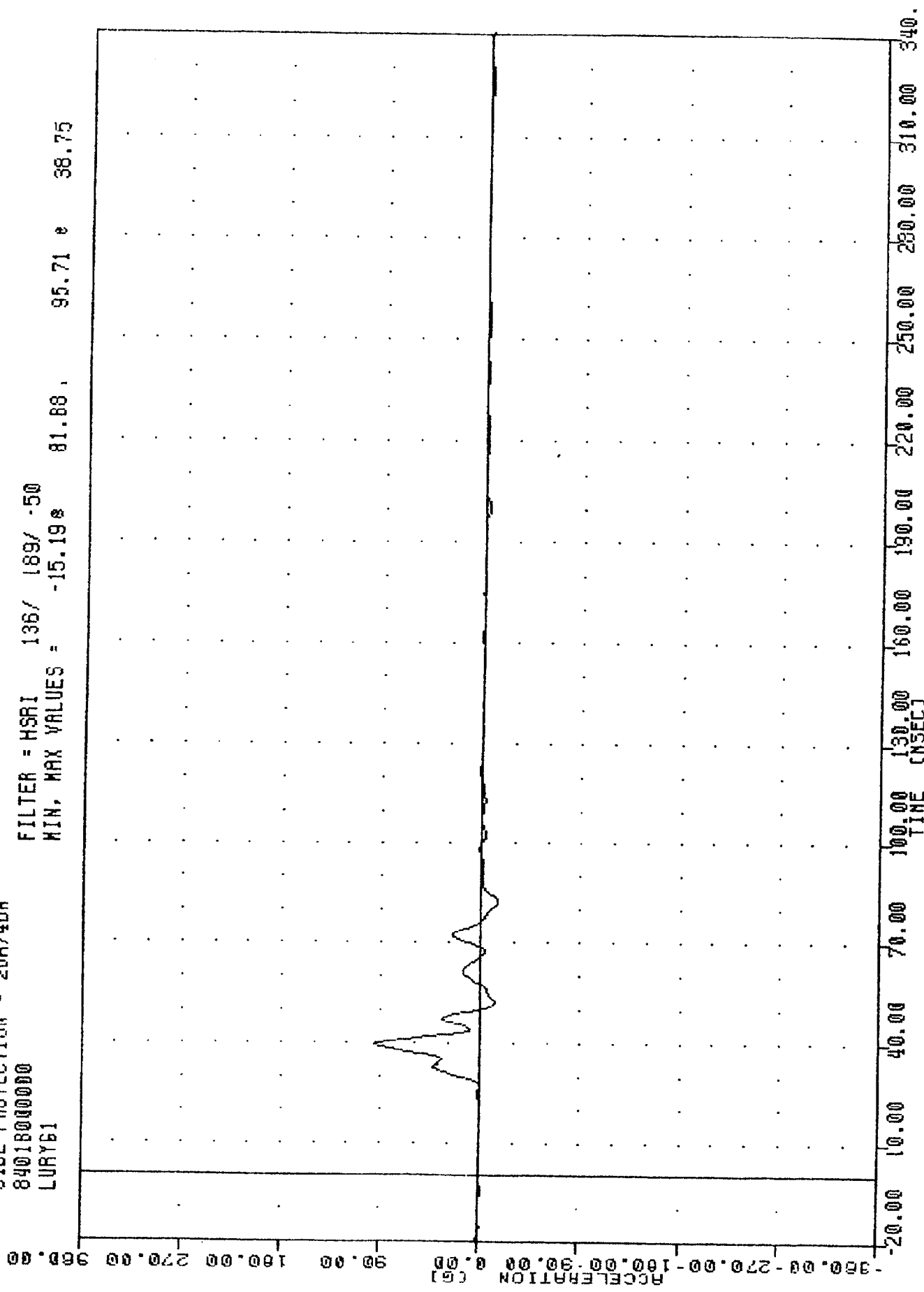
PLOT DATE 26-JAN-84 08:54:50

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -0.018 4.38, 30.18 56.25



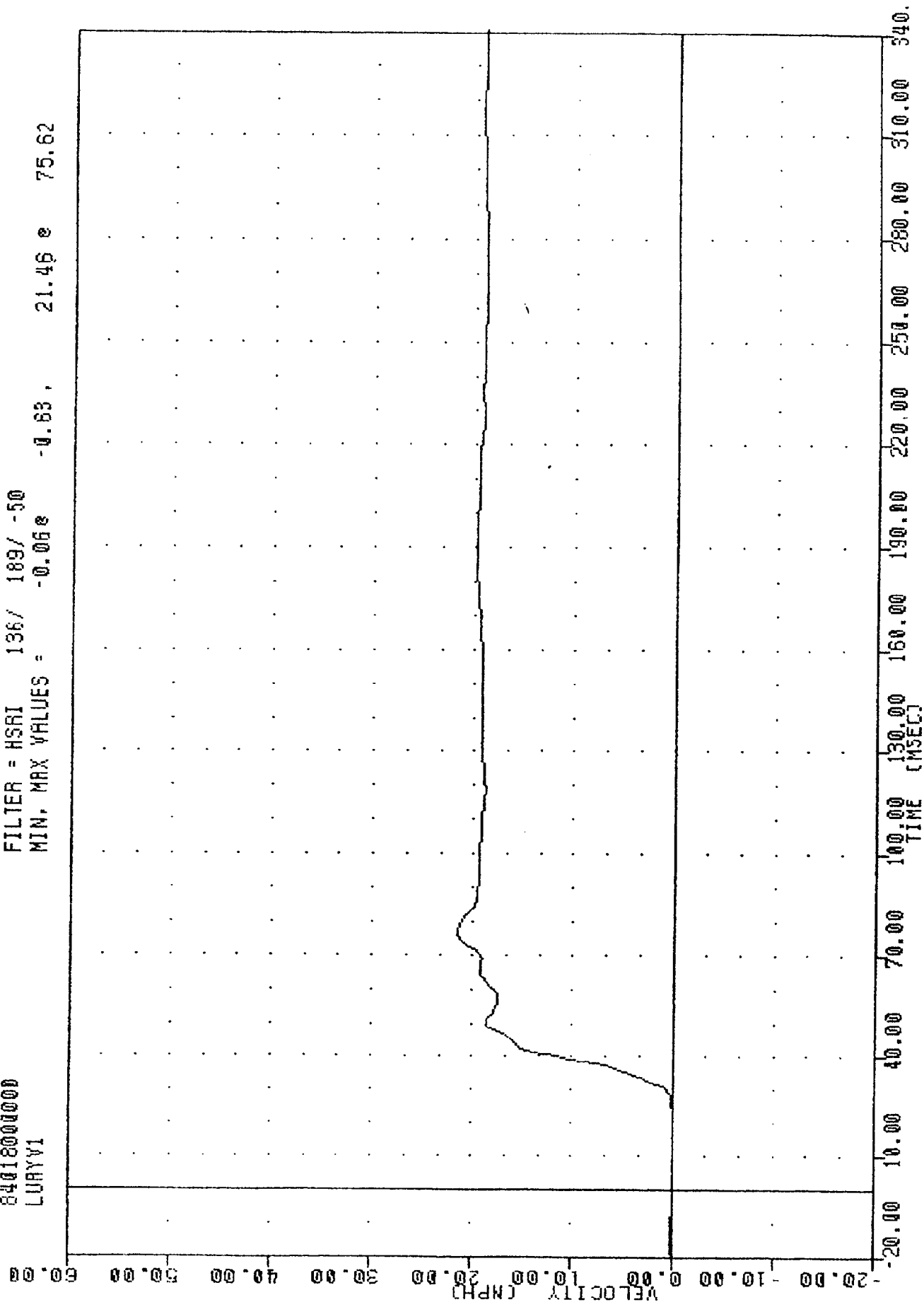
MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING T12YGA

C 840110
 SIDE PROTECTION - 20R/4DR
 84018000000
 LURY61
 TEST DATE 20 JAN 84 08:47:44
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -15.19s 81.88, 95.71 e 38.75



MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER LEFT UPPER RIB ACCELERATION Y AXIS

INC 840118
 SIDE PROTECTION - 20R/40R
 84018000000
 LURYV1
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -0.06 e 21.46 e 75.62
 FCOT DATE 26-JAN-84 08:54:50

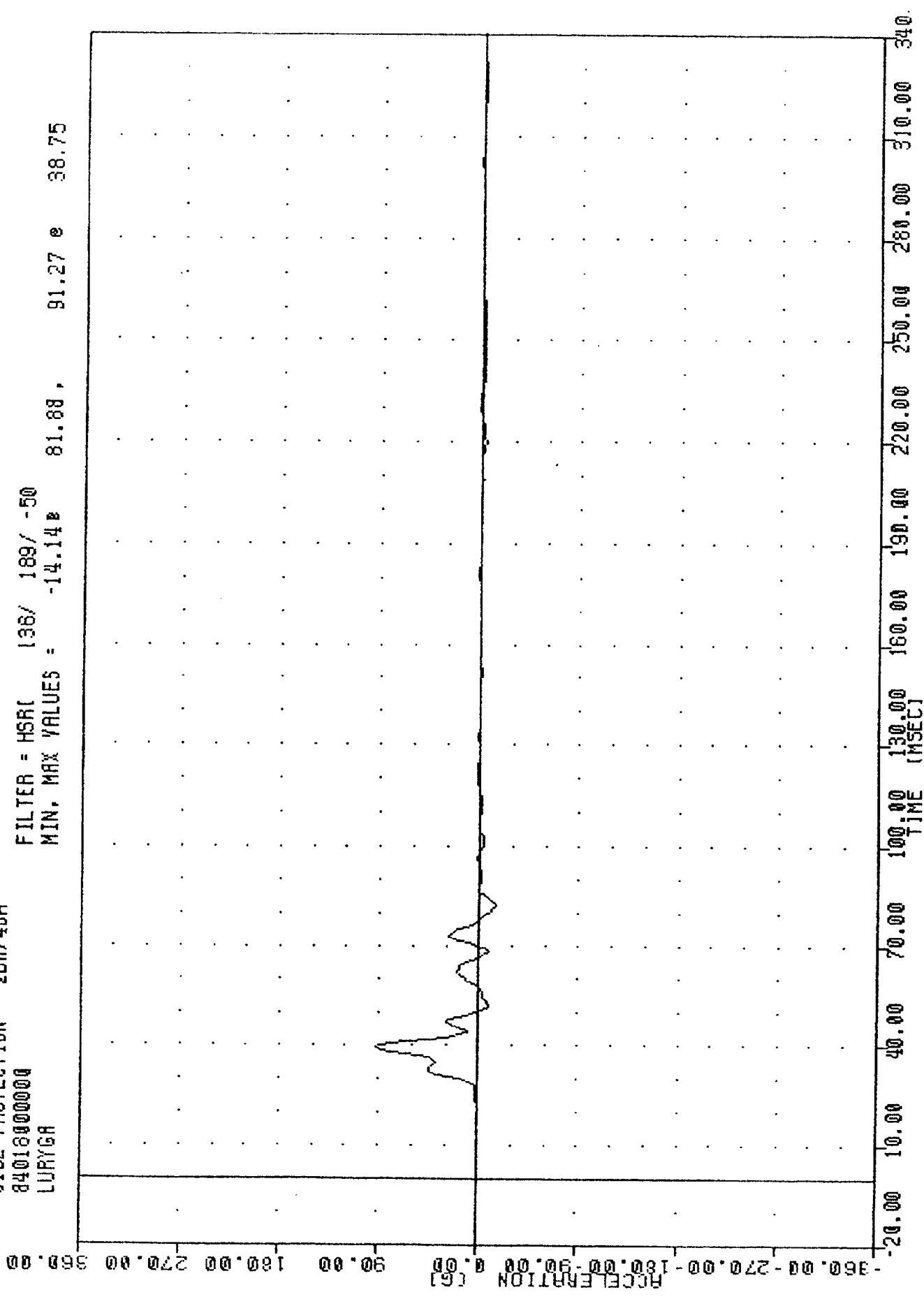


MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING LURYGI

C 840113
 SIDE PROTECTION - 20R/40R
 84018000000
 LURYGA

FLUT UNIT 20-JUN-04 08:47:44

FILTER = HSR 138/ 189/ -50
 MIN. MAX VALUES = -14.14 81.88, 91.27 e 38.75



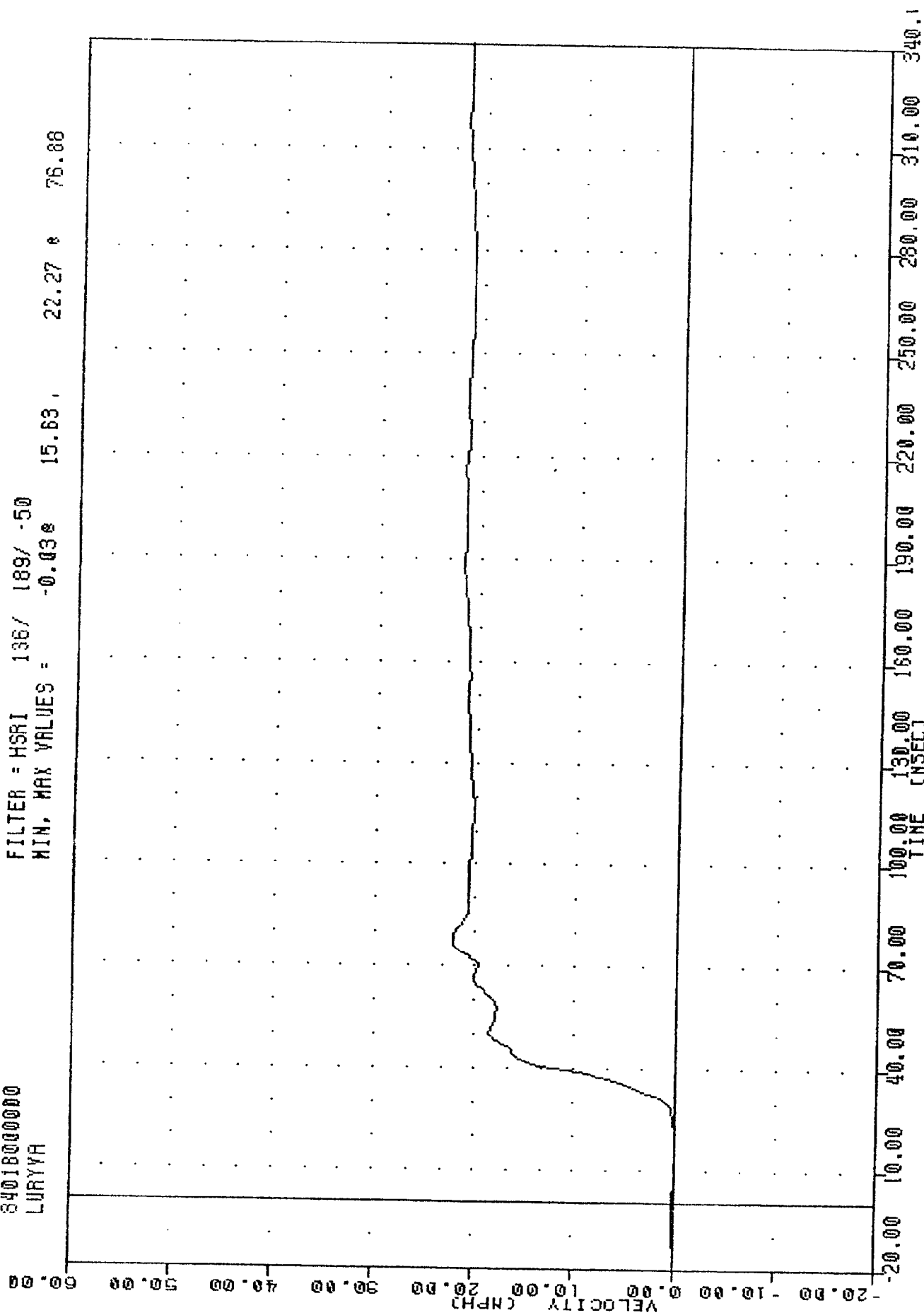
MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER LEFT UPPER RIB ACCELERATION -2 Y AXIS

7840110
 26 JAN 84 08:54:50
 TEST DATE

SIDE PROTECTION - 20R/4DR

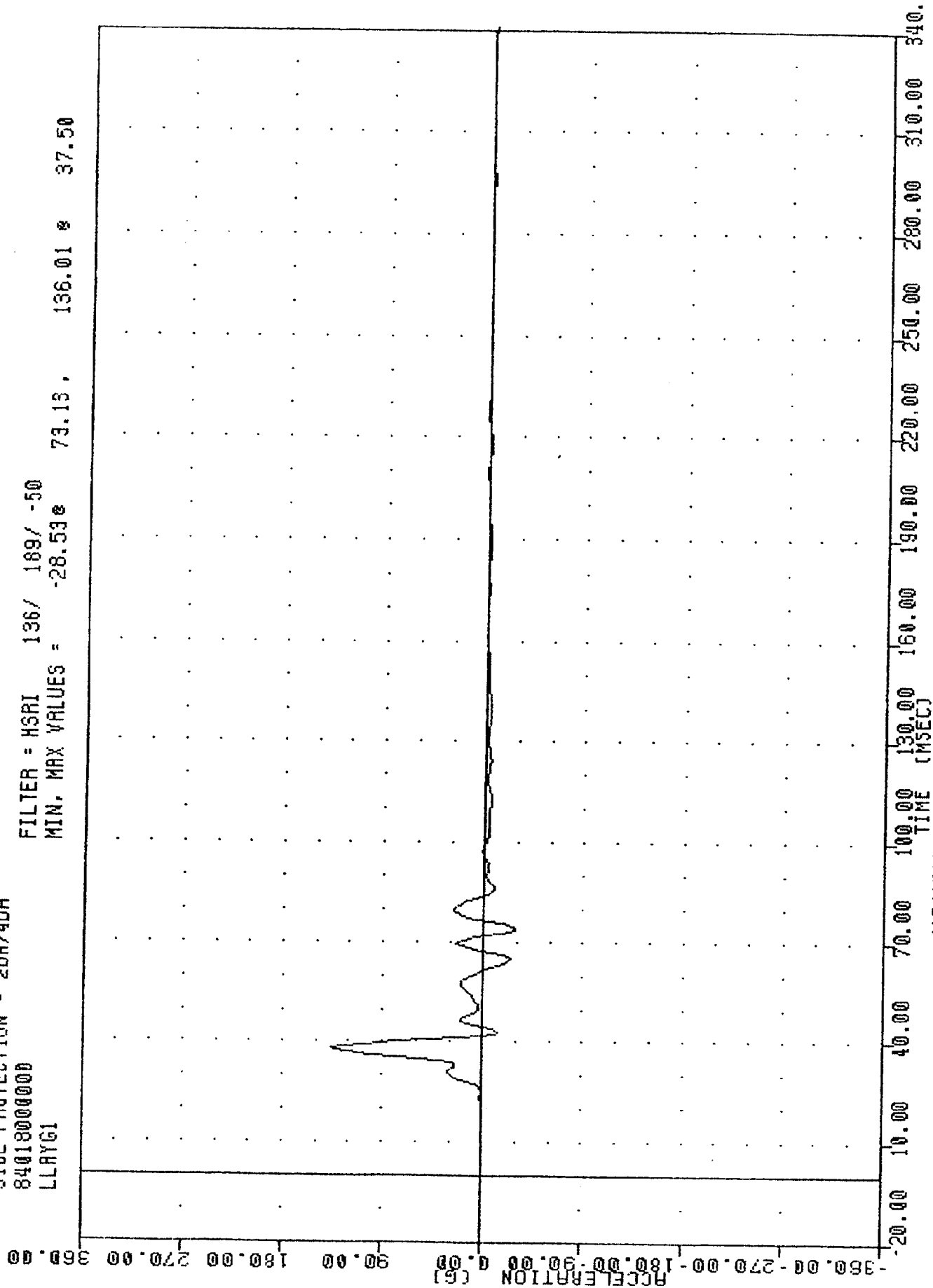
84018000000
 LURYVA

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -0.03 15.83 22.27 76.88



MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING LURYGA

INC 840718
 SIDE PROTECTION - 2DR/4DR
 84018000000
 LLAGI
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -28.53e 73.13, 136.01 e 37.50
 PLOT DATE 26-JAN-84 08:47:44

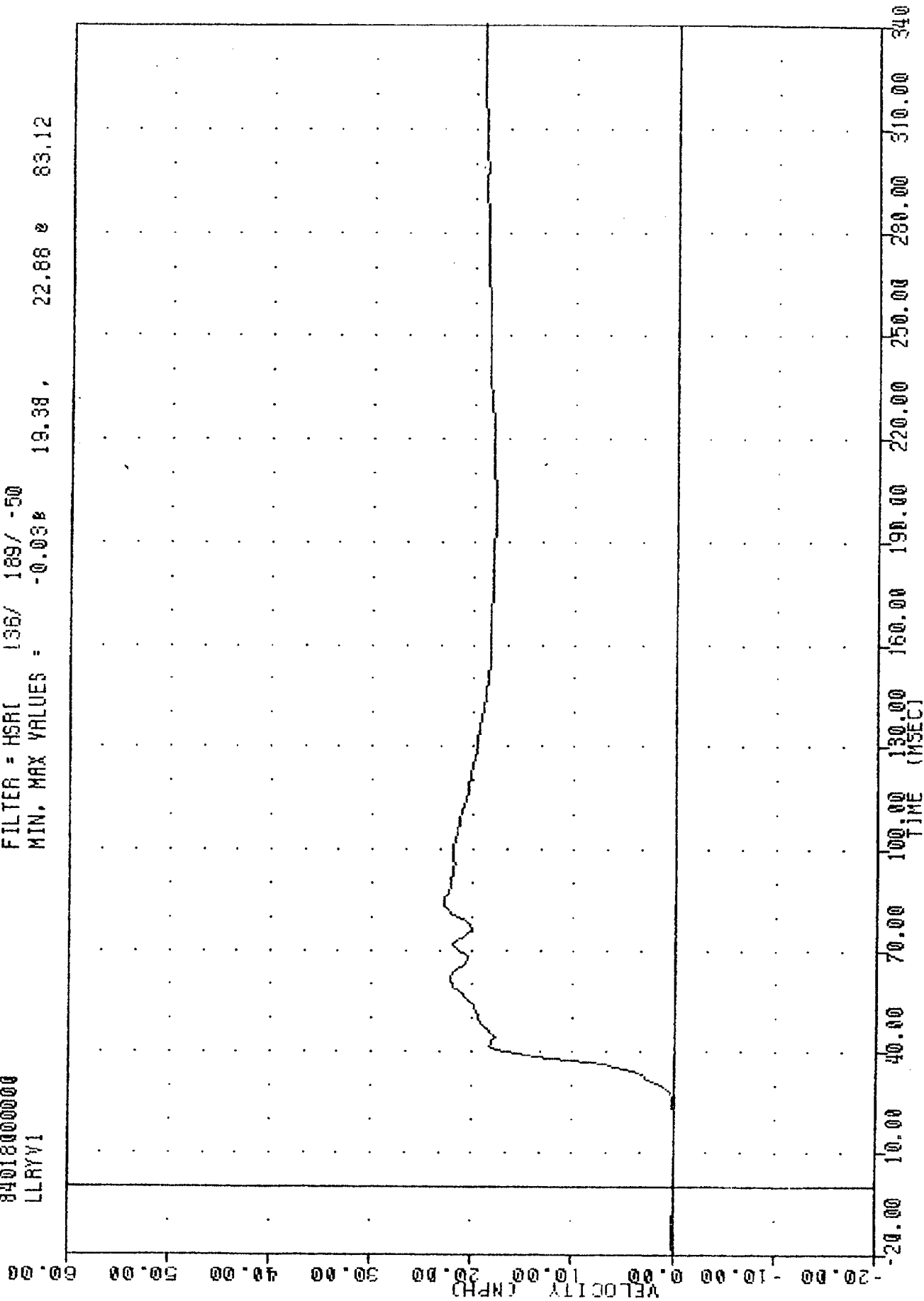


MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER LEFT LOWER RIB ACCELERATION Y AXIS

IRC 840118
SIDE PROTECTION - 2DR/4DR
84018000000
LLRYV1

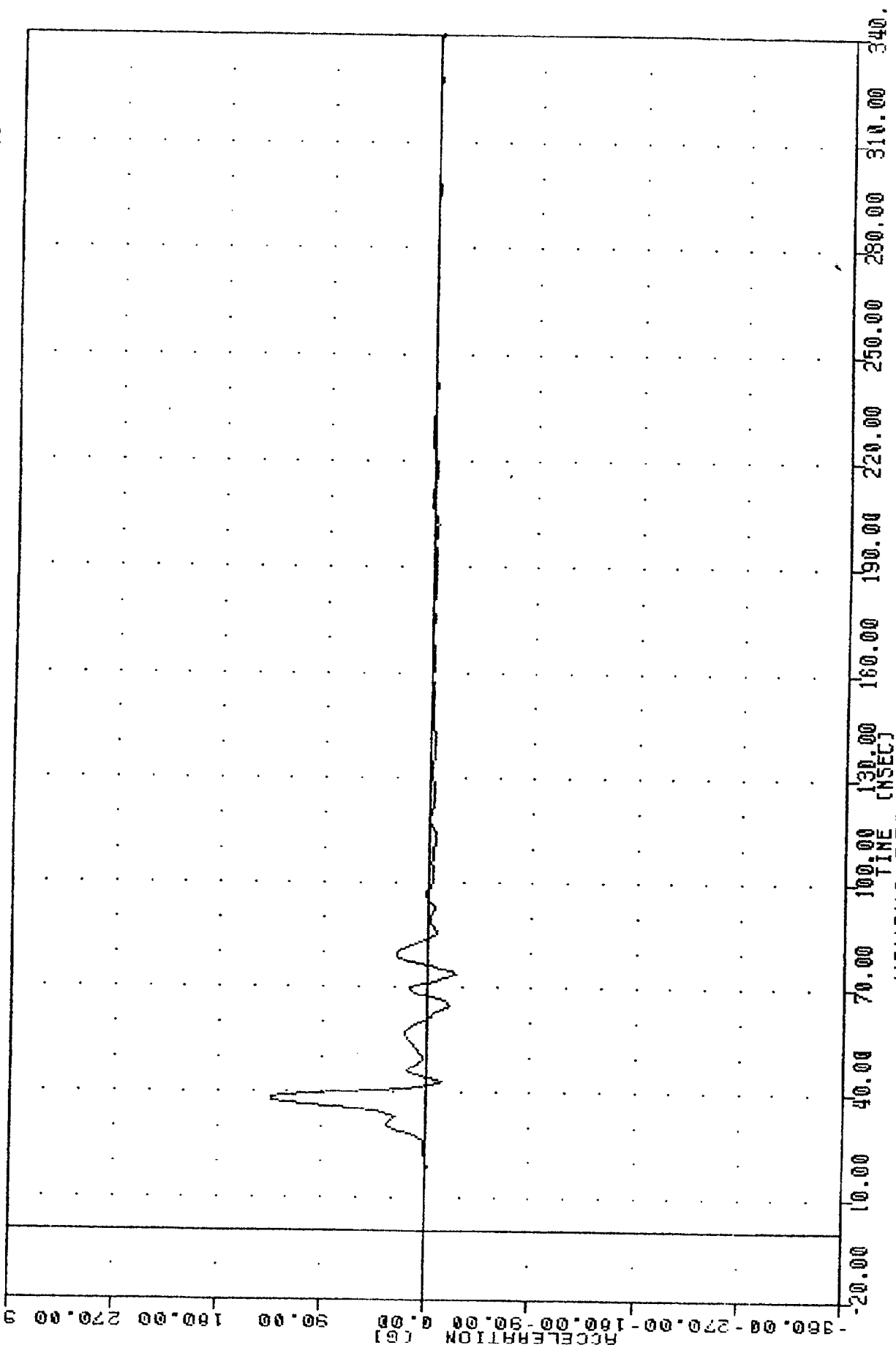
PLOT DATE 26-JAN-84 08:51:50

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -0.038 19.38, 22.88 @ 83.12



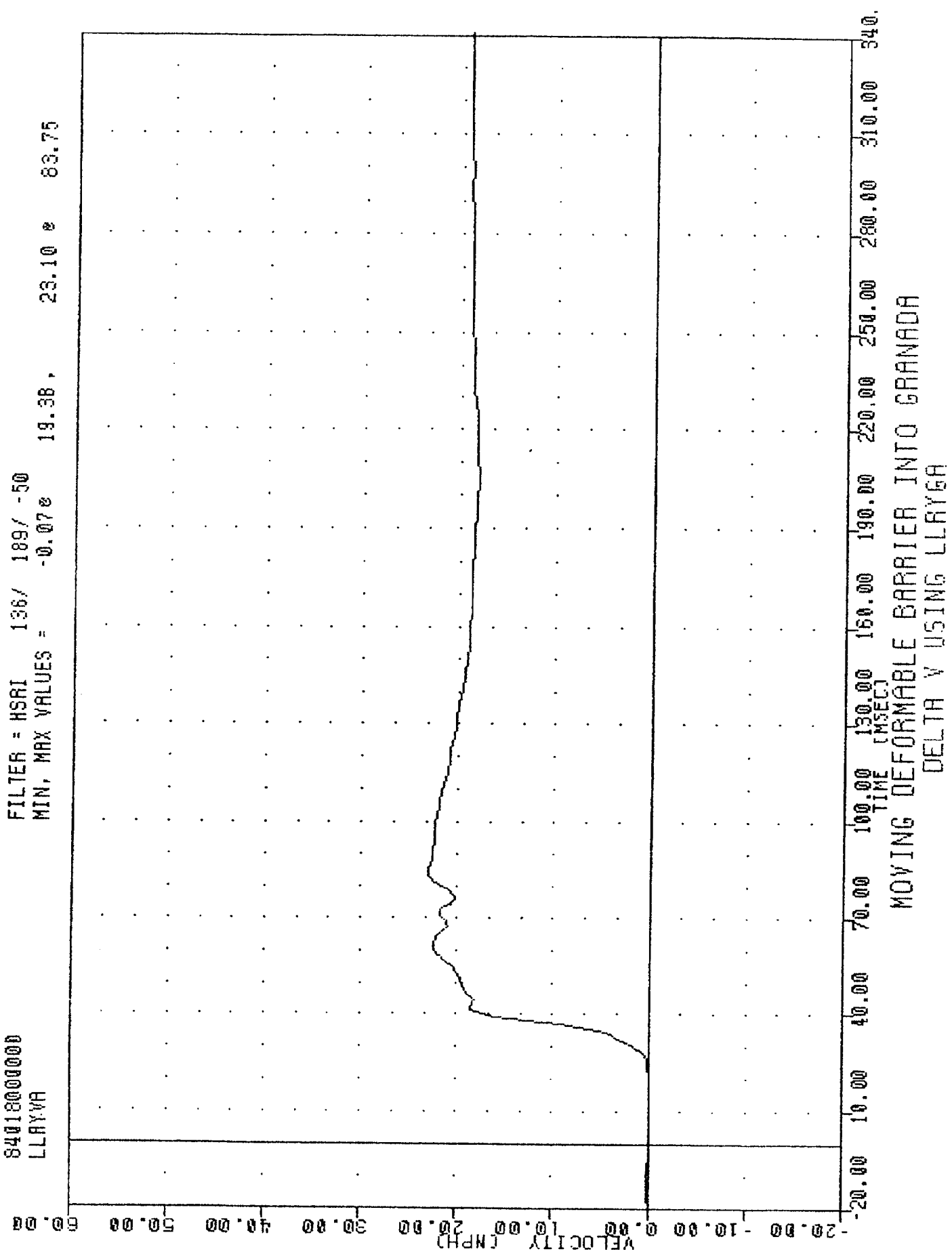
MOVING DEFORMABLE BARRIER INTO GRANADA
DELTA V USING LLRYG1

C 840000
 SIDE PROTECTION - 2DR/4DR
 84018000000
 LLYER
 TEST DATE 20 JAN 04 06:47:44
 FILTER = HSRI 136/ 189/ .50
 MIN. MAX VALUES = -24.26 73.13 134.30 37.50



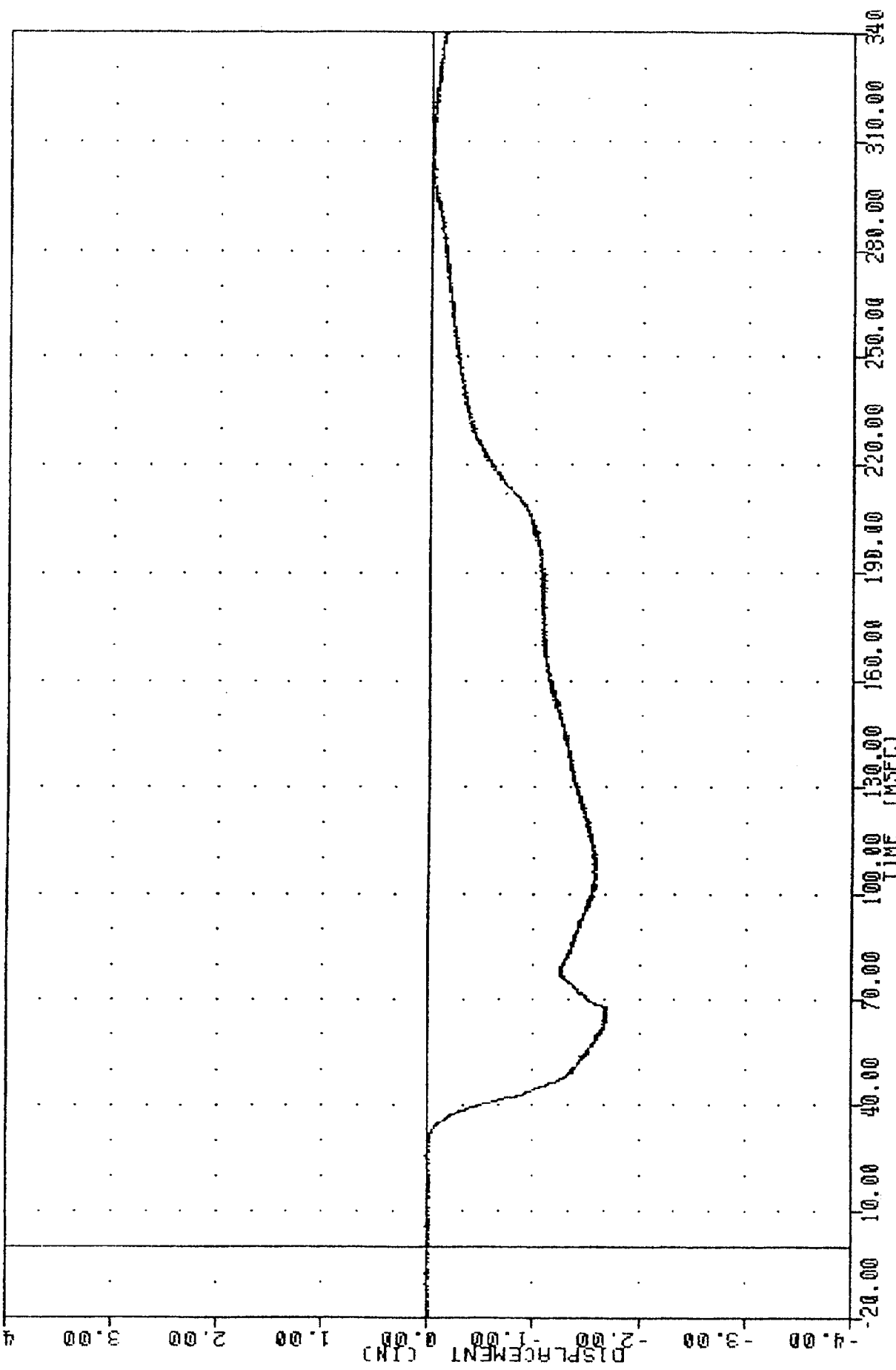
MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER LEFT LOWER RIB ACCELERATION -2 Y AXIS

INC 840118
 SIDE PROTECTION - 2DR/4DR
 84018000000
 LLAYVA
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -0.07e 19.38, 23.10 e 83.75
 PLOT DATE 26-JAN-84 08:54:30



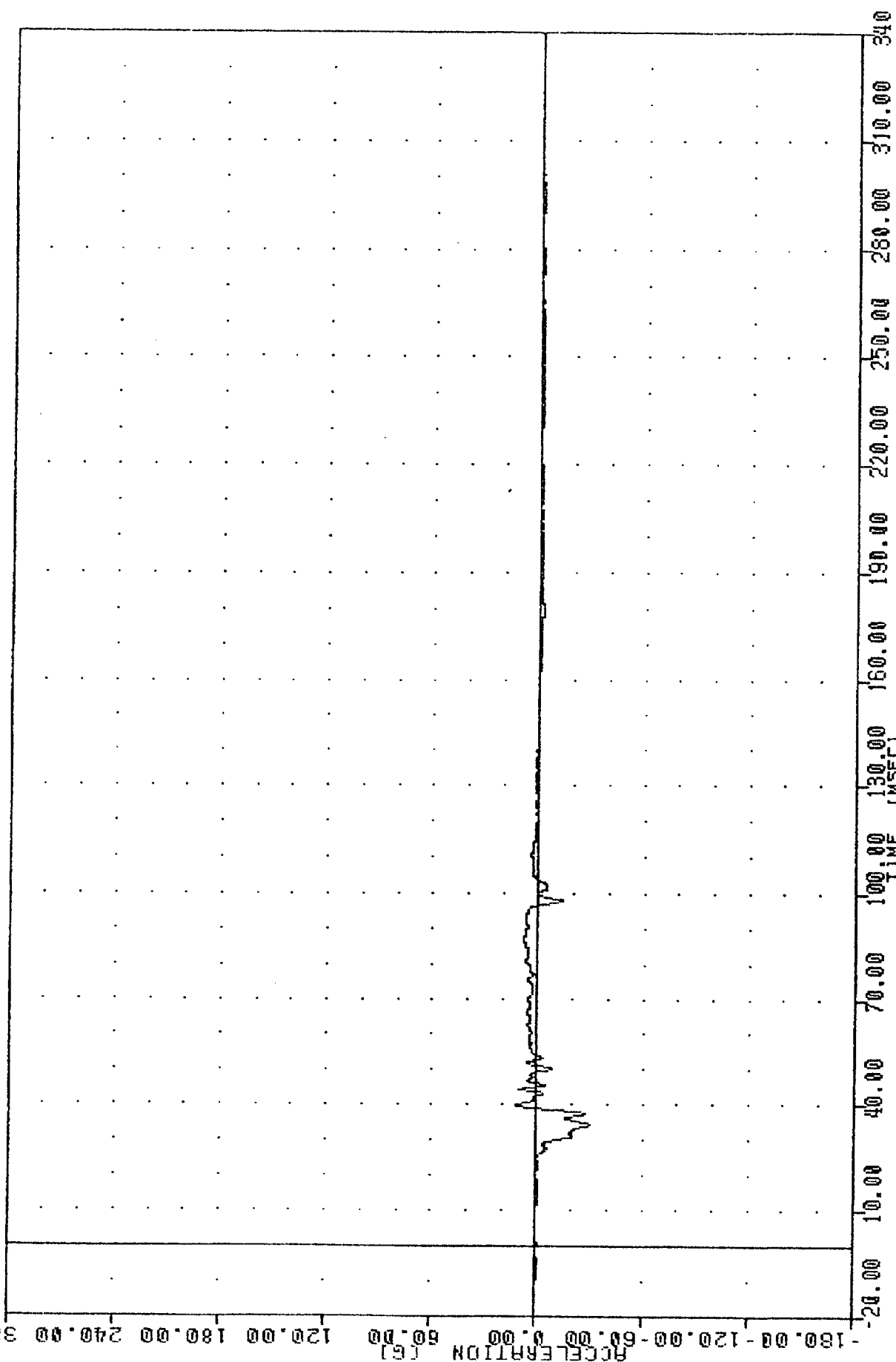
MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING LLAYVA

INC 840118
 SIDE PROTECTION - 20R/40R
 84018000000
 LRTYD1
 FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -1.70 66.25 0.02 e -7.38
 TEST DATE 28-JUN-84 08:46:17



MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER LEFT RIB TO SPINE DISPLACEMENT INCHES

TAC 840118
 SIDE PROTECTION - 20R/40R
 84018000000
 PEVXG1
 PLOT DATE 26-JAN-84 08:48:17
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -30.37 34.13, 12.32 39.75



MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER PELVIS ACCELERATION X AXIS

THC 840118 26-JAN-84 08:46:17

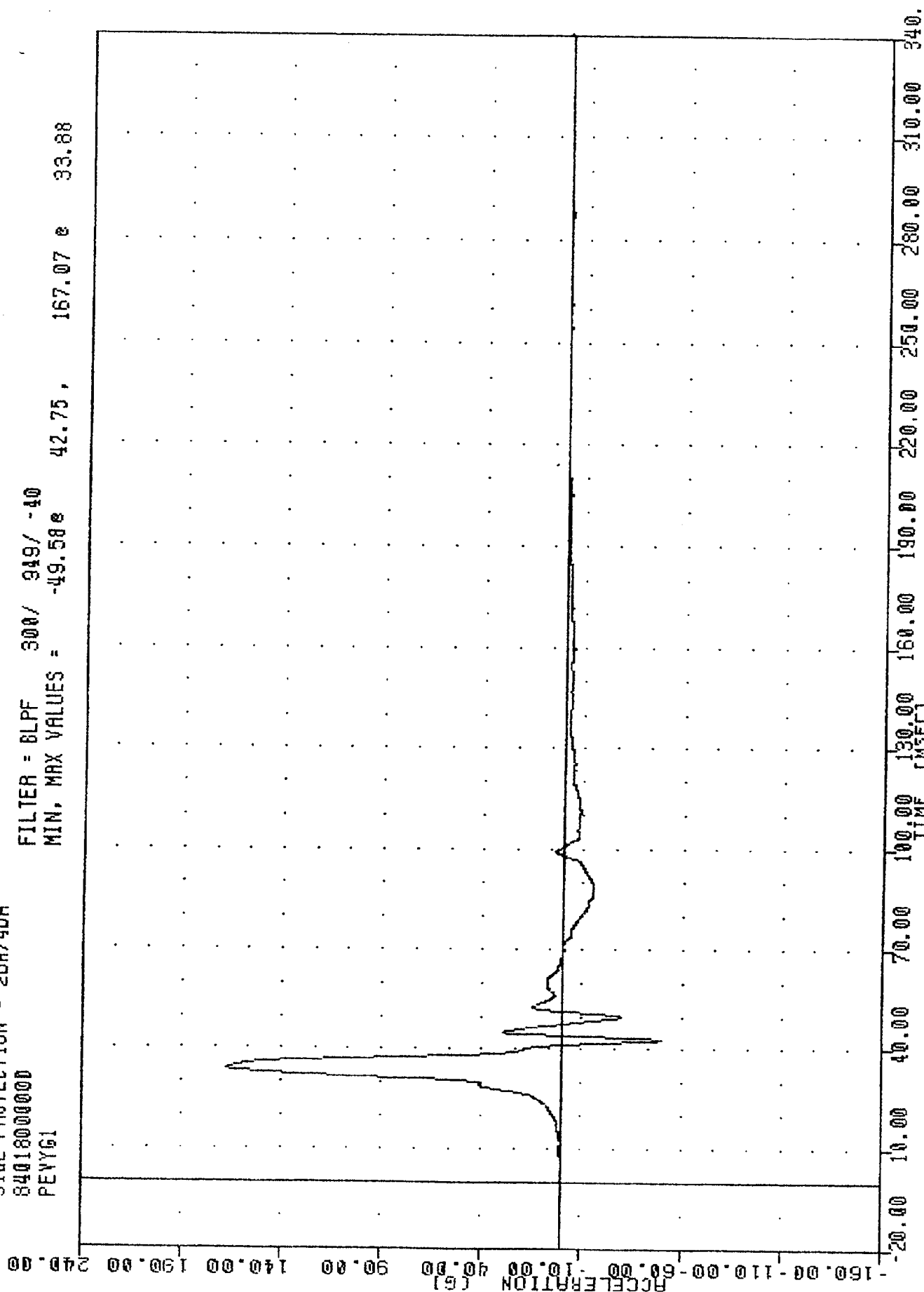
SIDE PROTECTION - 2DR/4DR

84018000000

PEY61

FILTER = 6LPF 300/ 949/ -40

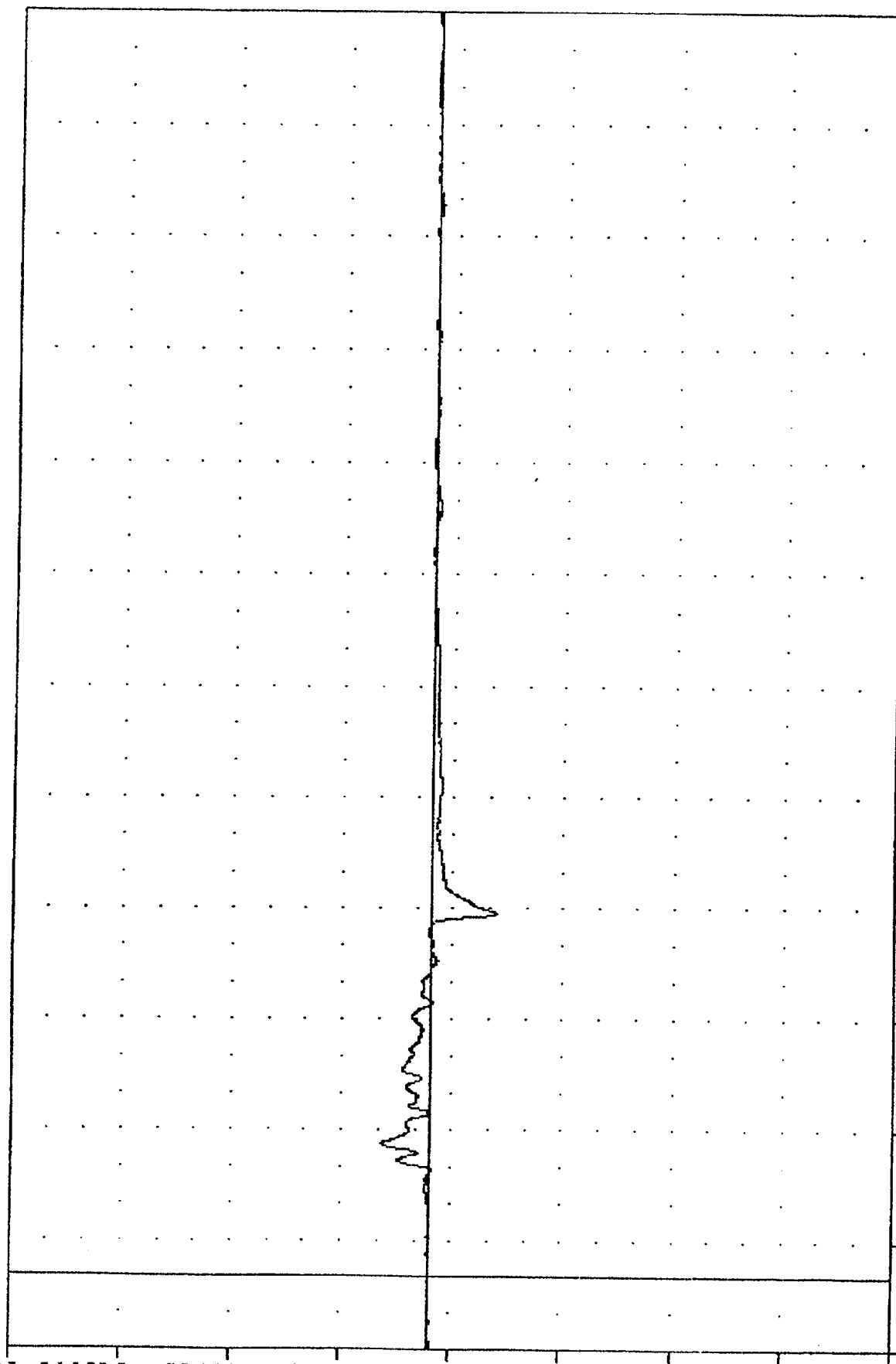
MIN, MAX VALUES = -49.58g 42.75, 167.07 g 33.88



MOVING DEFORMABLE BARRIER INTO GRANADA
DRIVER PELVIS ACCELERATION Y AXIS

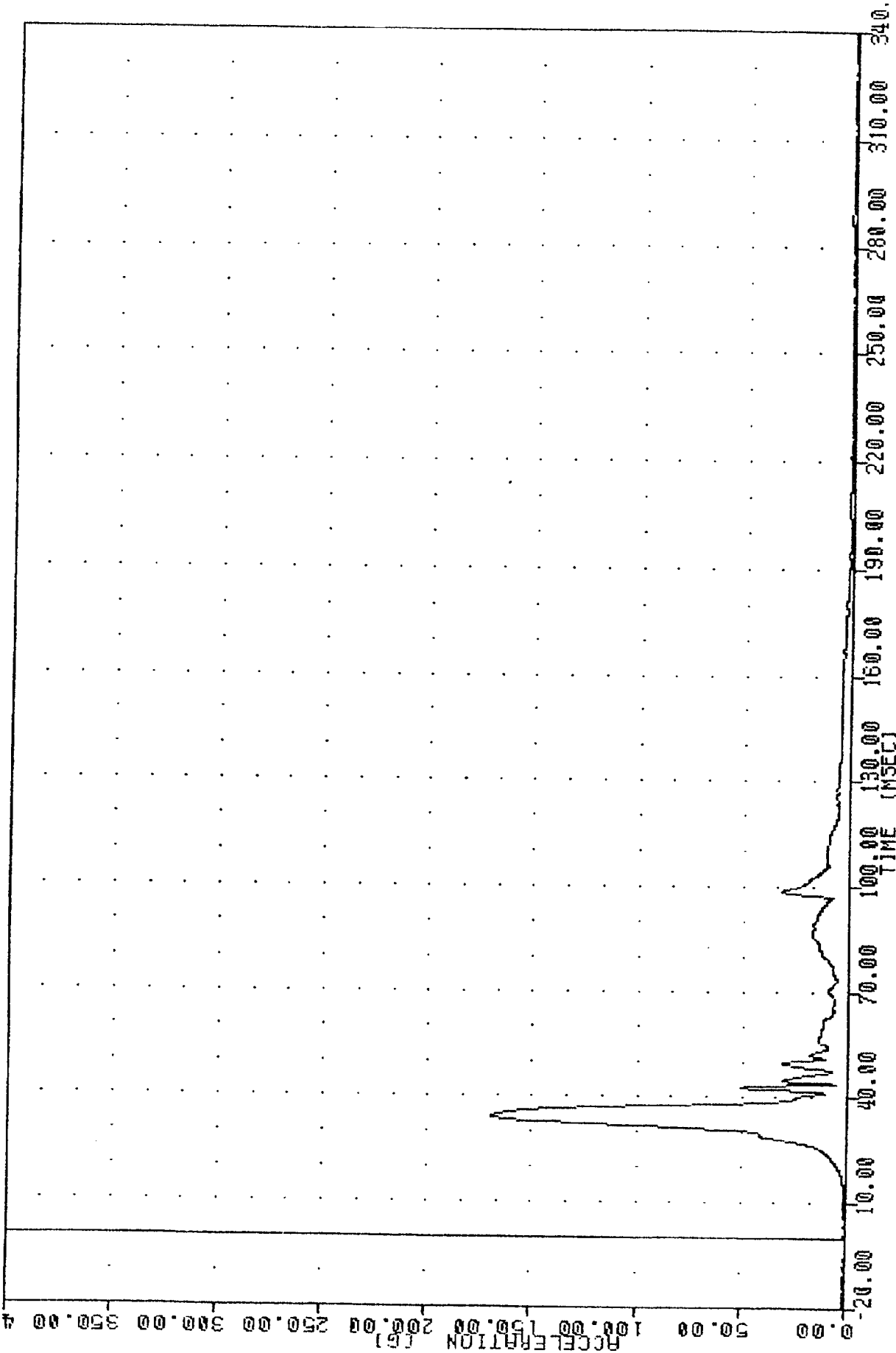
TMC 840110 700 DATE 26 JAN 84 08:46:17
 SIDE PROTECTION - 20R/4DR
 84018000000
 PEVZ61
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -29.47 98.50 21.67 36.00

ACCELERATION (G)
 -210.00 -190.00 -170.00 -150.00 -130.00 -110.00 -90.00 -70.00 -50.00 -30.00 -10.00 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00



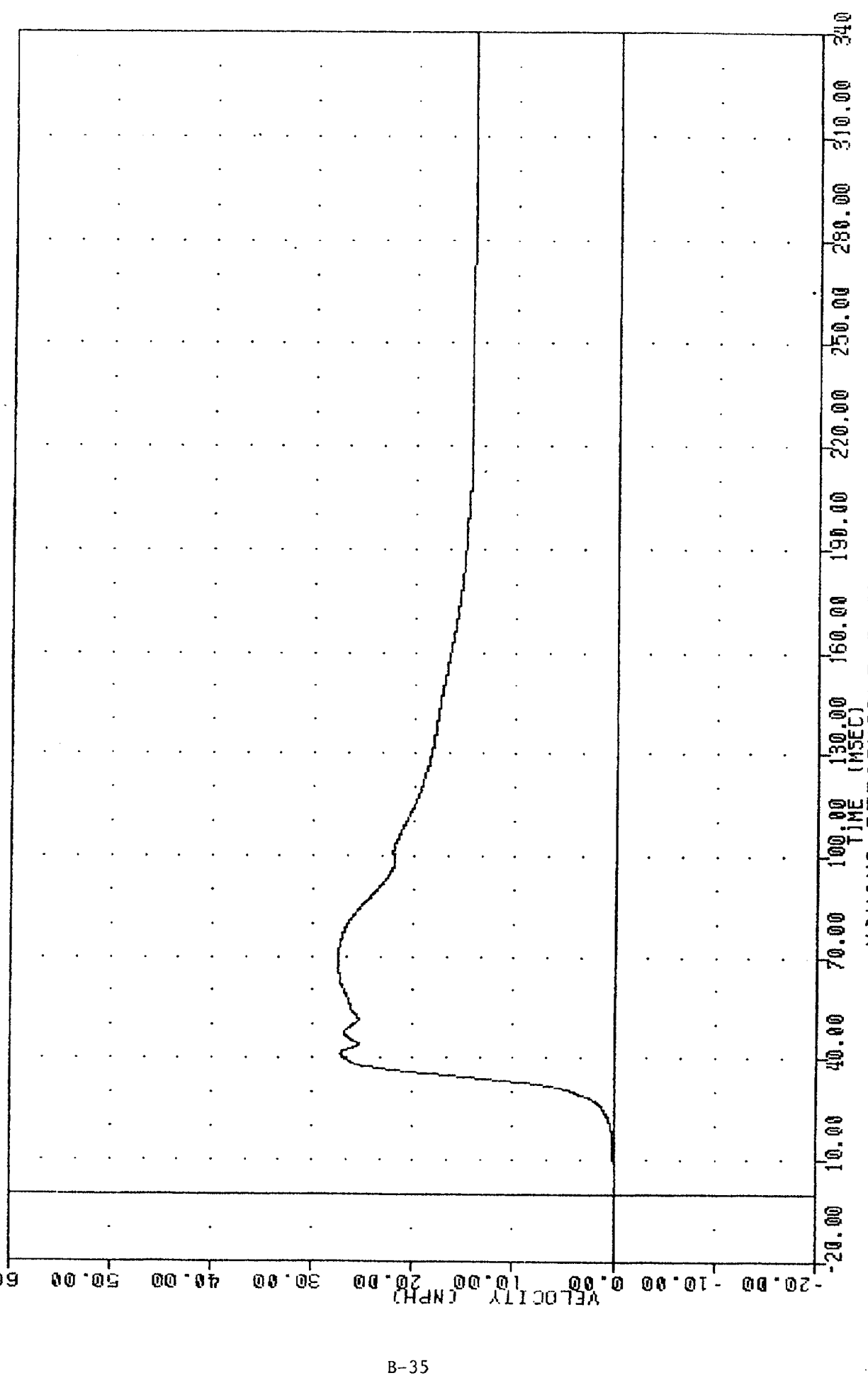
MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER PELVIS ACCELERATION Z AXIS

MC 840110
 SIDE PROTECTION - 2DR/4DR
 84018000000
 PEVRG1
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 0.05 266.88, 169.75 s 34.00
 TLOT DATE 26-JUN-84 08:46:17



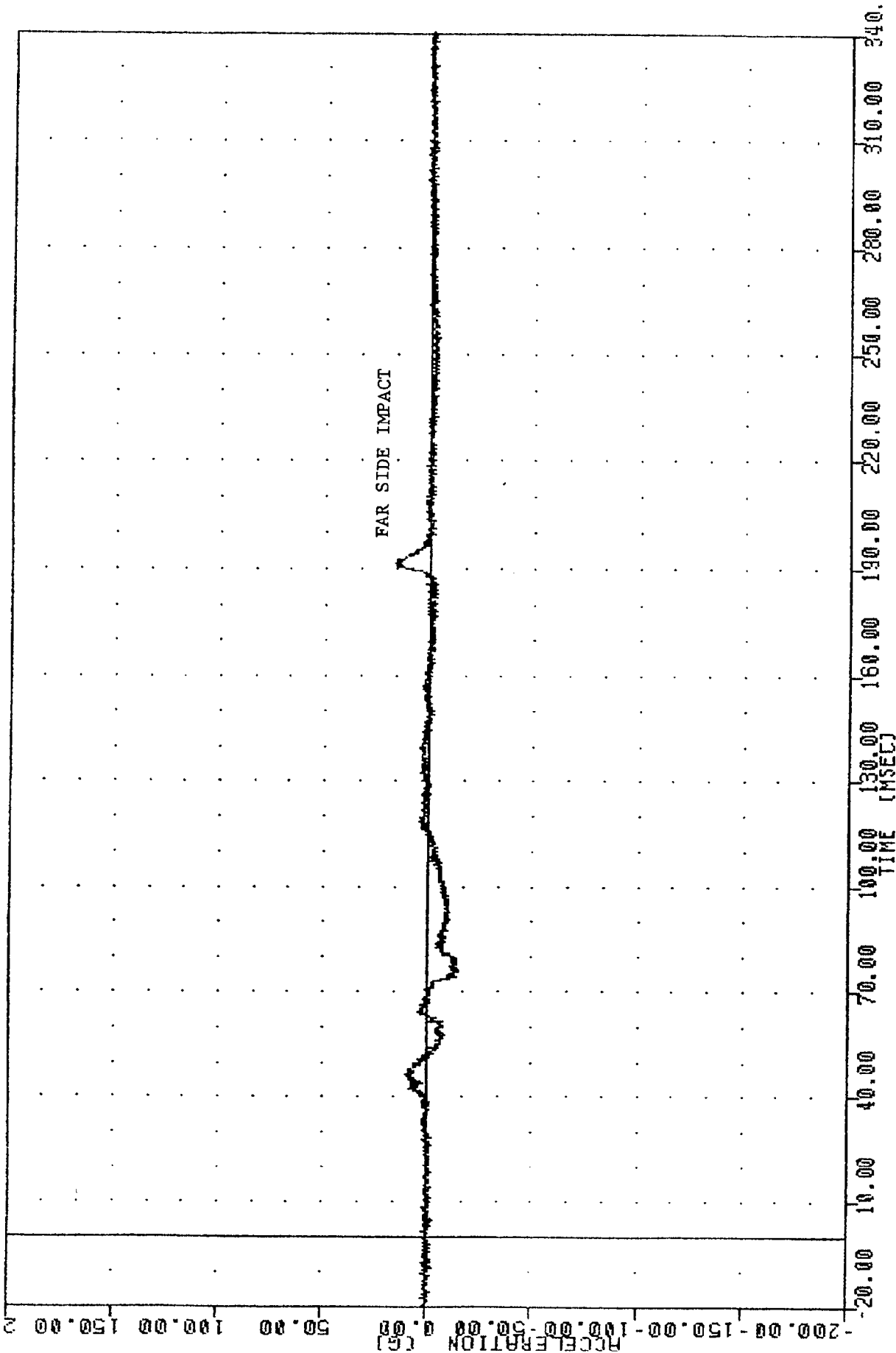
MOVING DEFORMABLE BARRIER INTO GRANADA
 DRIVER PELVIS RESULTANT

IRC 840118
 SIDE PROTECTION - 20R/40R
 8401800000
 PEVYV1
 PLOT DATE 26-JAN-84 08:55:36
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -0.03 5.13, 27.44 e 67.75



MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING PEVYGI

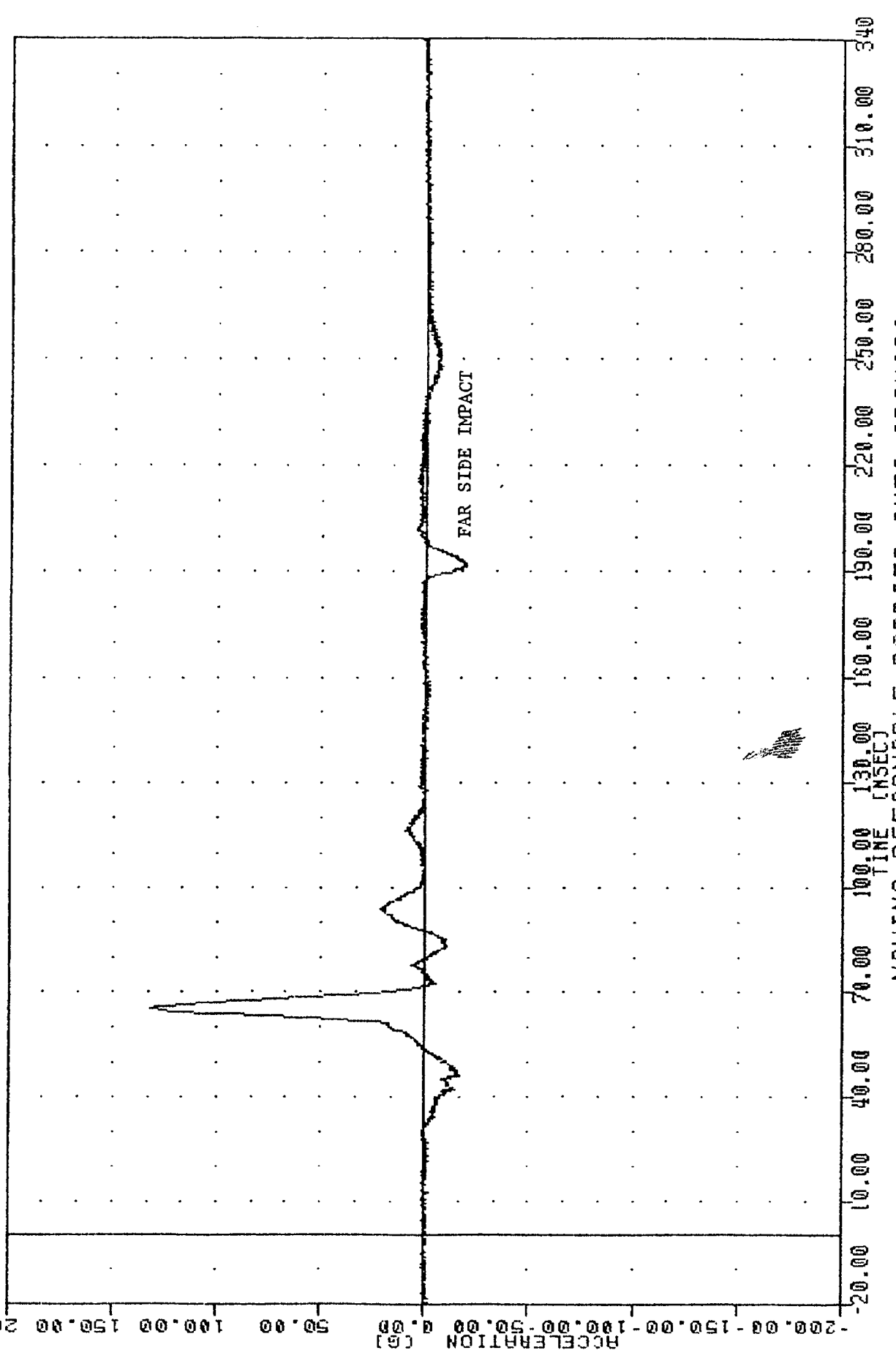
INC 840718
 SIDE PROTECTION - 20R/HDR
 84018000000
 HEDXG3
 FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = -14.46 75.50, 16.83 191.63
 PLOT DATE 26-JAN-84 08:46:17



MOVING DEFORMABLE BARRIER INTO GRANADA
 PASSENGER HEAD ACCELERATION X AXIS

TRC 840118
 SIDE PROTECTION - 20R/4DR
 84018000000
 HEDY63

FILTER = ALPF 1650 / 5217 / -40
 MIN, MAX VALUES = -19.02 192.38 131.50 65.13

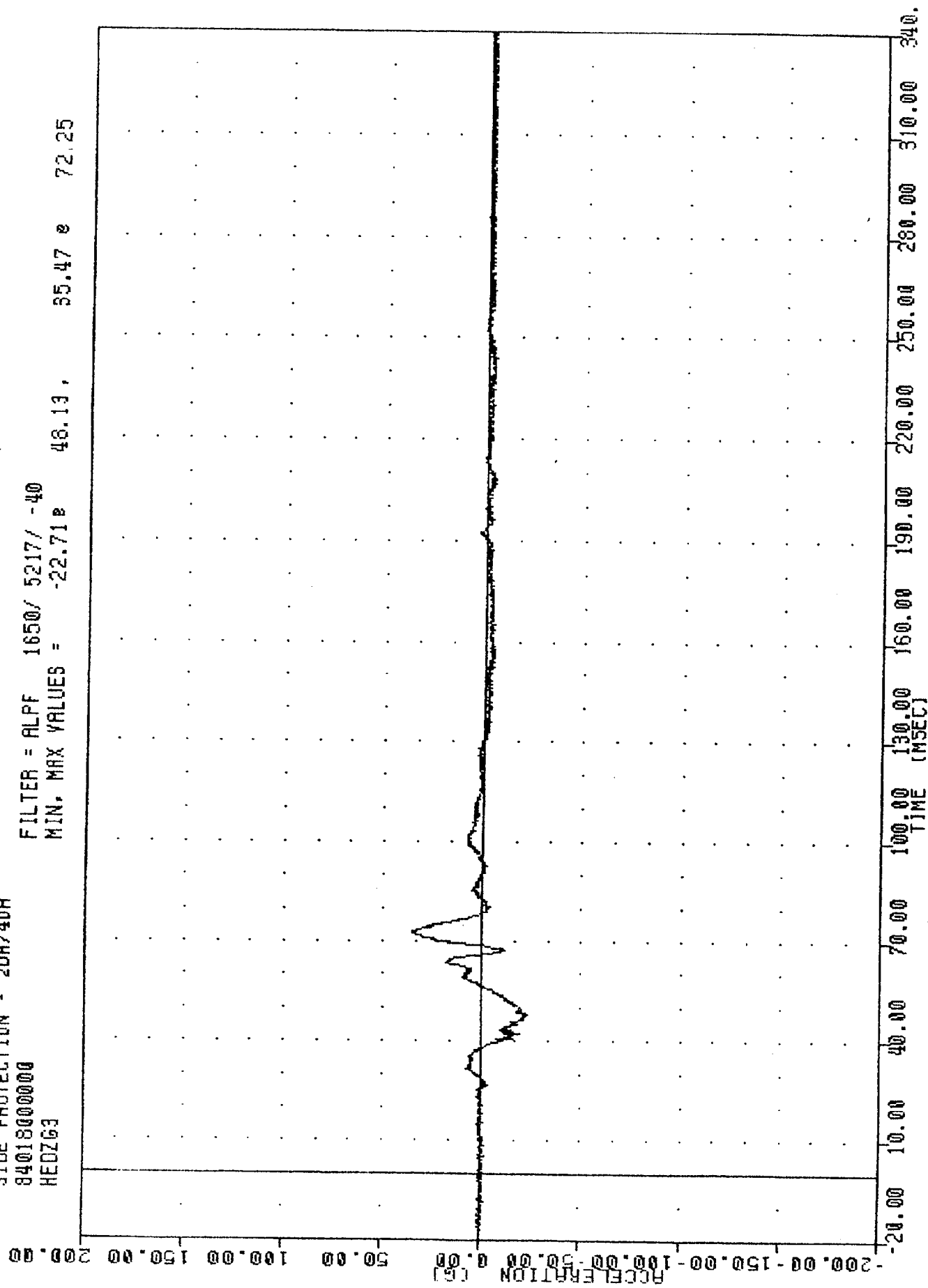


MOVING DEFORMABLE BARRIER INTO GRANADA
 PASSENGER HEAD ACCELERATION Y AXIS

MC 840118
 SIDE PROTECTION - 2DR/4DR
 84018000000
 HEDZ63

TEST DATE 26-JUN-84 08:46:17

FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = -22.71e 48.13, 35.47 e 72.25

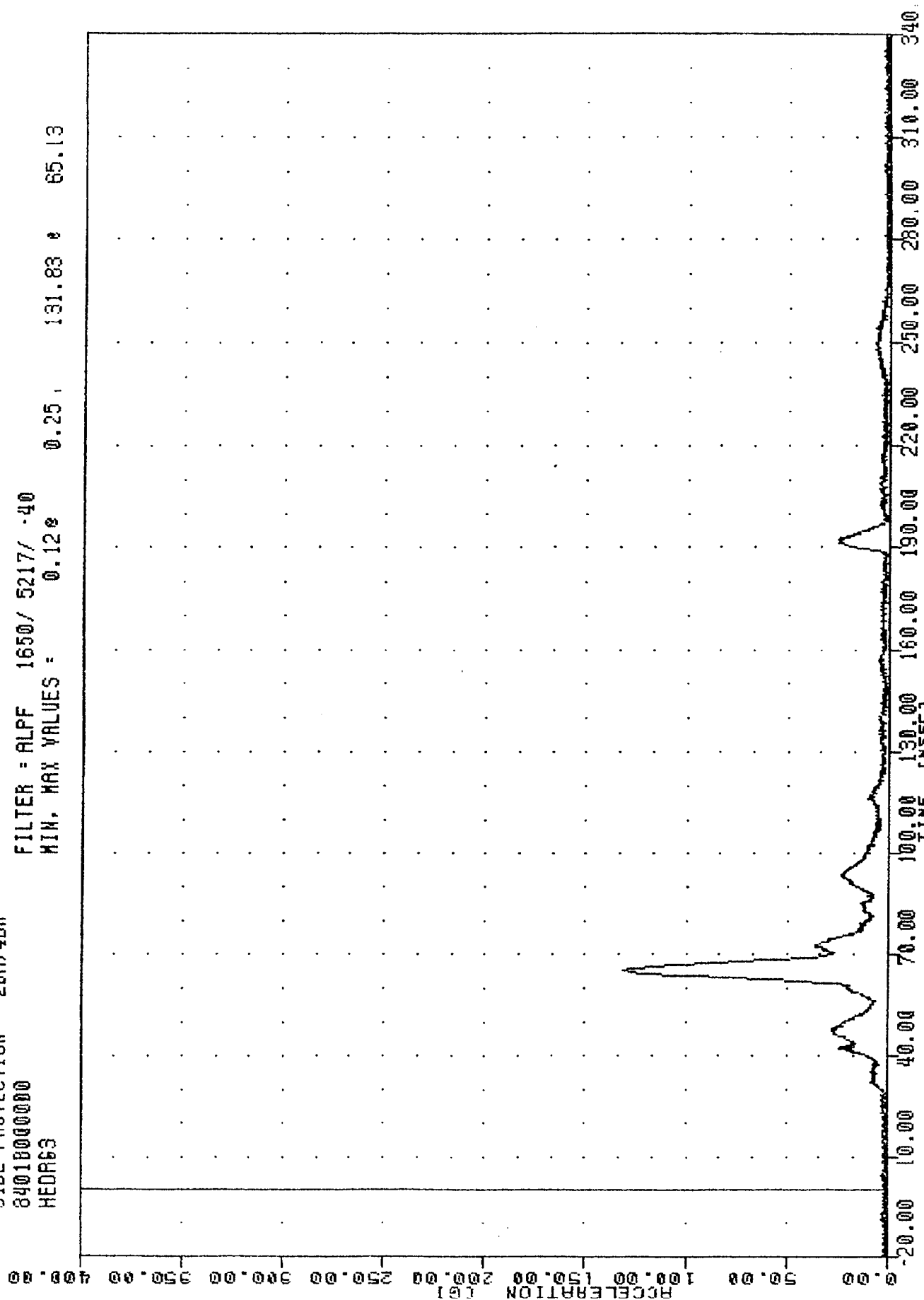


MOVING DEFORMABLE BARRIER INTO GRANADA
 PASSENGER HEAD ACCELERATION Z AXIS

THC 840118
 SIDE PROTECTION - 20R/4DR
 84010000000
 HEDR63

PLOT DATE 26-JAN-84 08:46:17

FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = 0.128 0.25 131.83 65.13

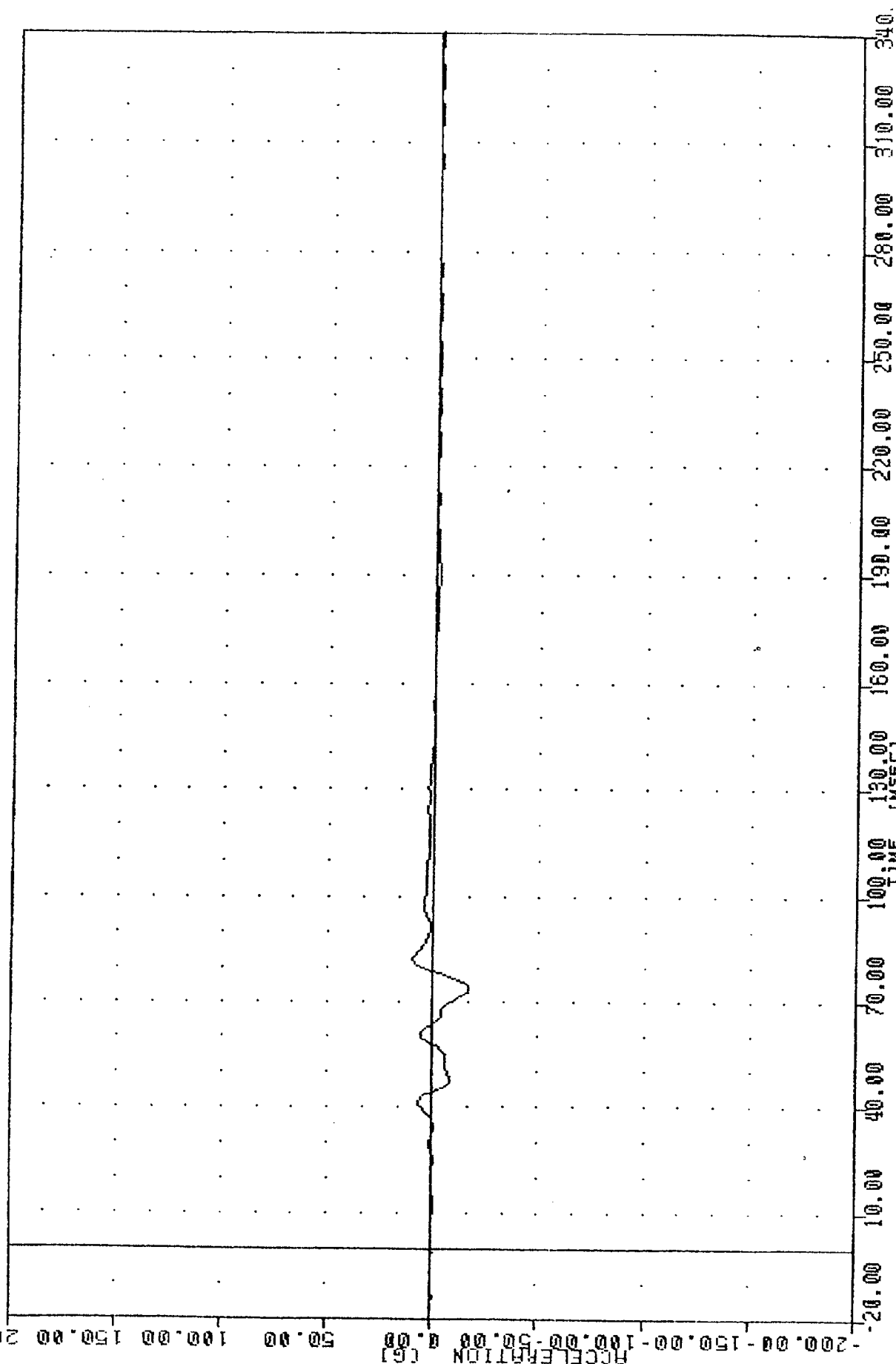


MOVING DEFORMABLE BARRIER INTO GRANADA
 PASSENGER HEAD RESULTANT

IRC 840118
 SIDE PROTECTION - 2DR/4DR
 84018000000
 T01XG3

PLOT DATE 28-JAN-84 08:47:44

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -17.148 73.13, 9.32 e 81.25

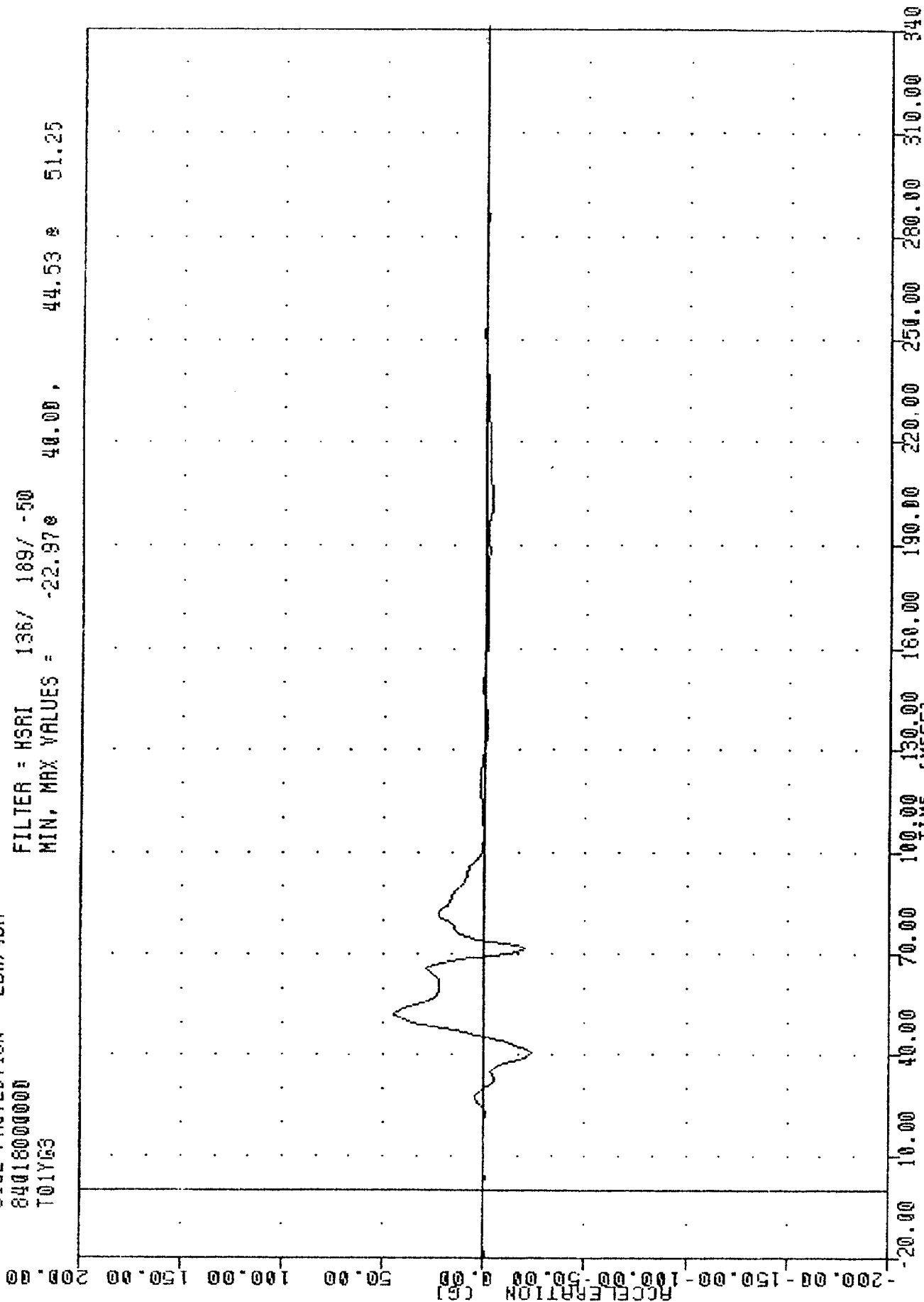


MOVING DEFORMABLE BARRIER INTO GRANADA
 PASSENGER UPPER SPINE ACCELERATION X AXIS

TRC
 SIDE PROTECTION - 20R/40R
 84018000000
 T01Y63

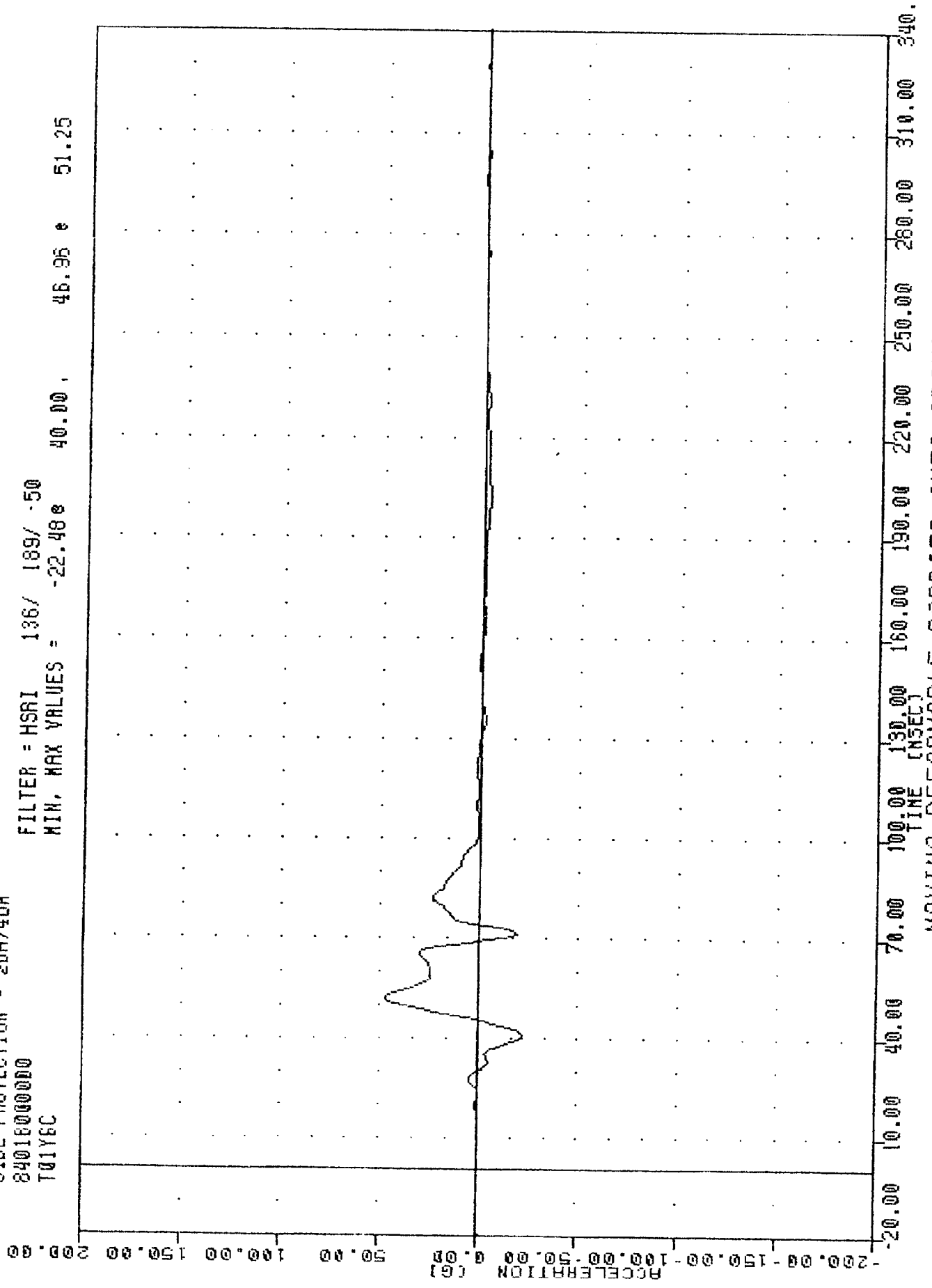
PLOT DATE 26-JAN-84 08:47:44

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -22.97e 40.00, 44.53 e 51.25



MOVING DEFORMABLE BARRIER INTO GRANADA
 PASSENGER UPPER SPINE ACCELERATION Y AXIS

FILE 840110
 SIDE PROTECTION - 20R/40R
 84018000000
 T01YEC
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -22.48e 40.00, 46.96 e 51.25
 PLT DATE 25-JAN-84 08:47:44

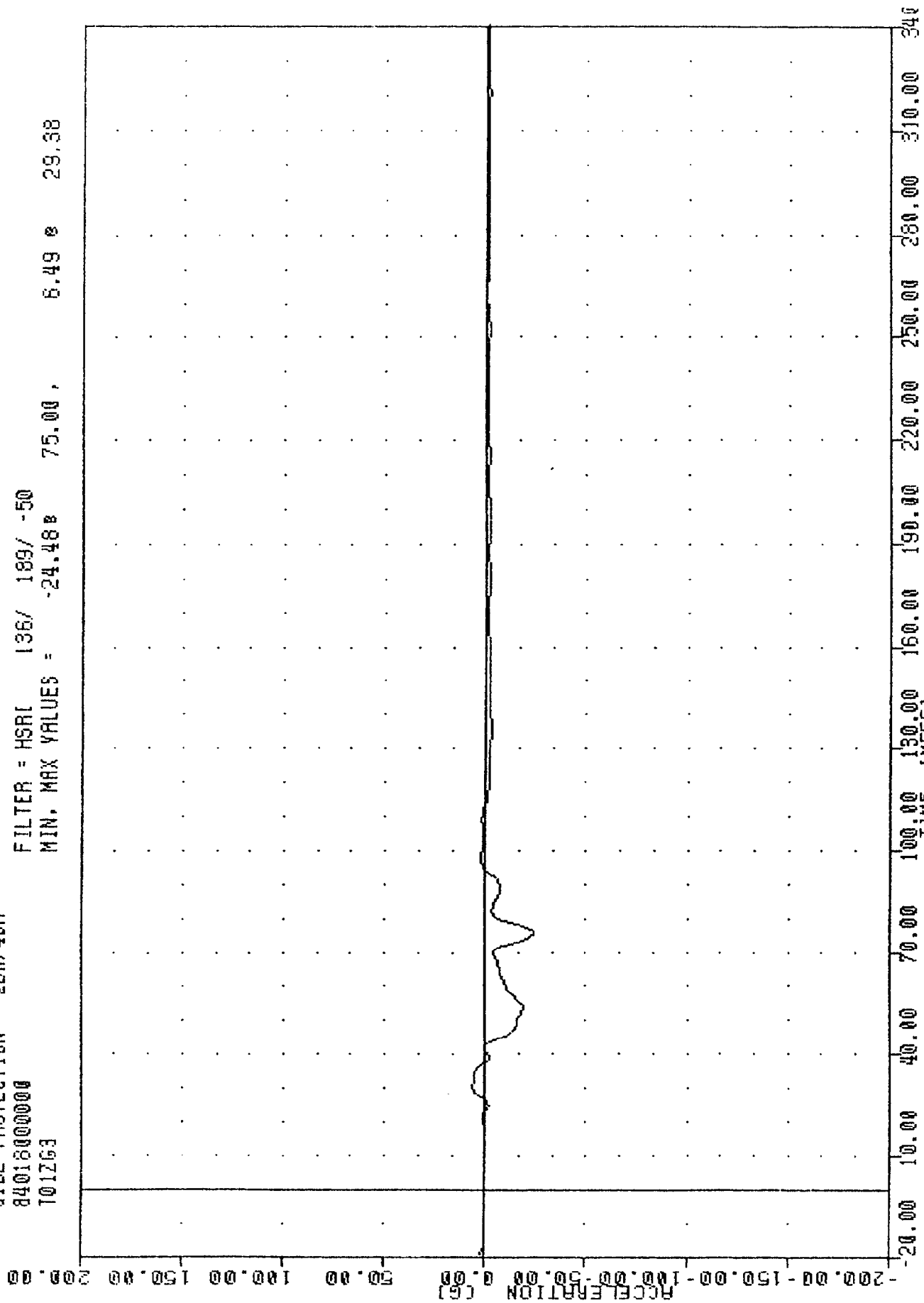


MOVING DEFORMABLE BARRIER INTO GRANADA
 PASSENGER UPPER SPINE ACCELERATION -2 Y AXIS

TRC
 SIDE PROTECTION - 2DR/4DR
 840180000000
 T01263

PLOT DATE 26-JAN-84 08:47:44

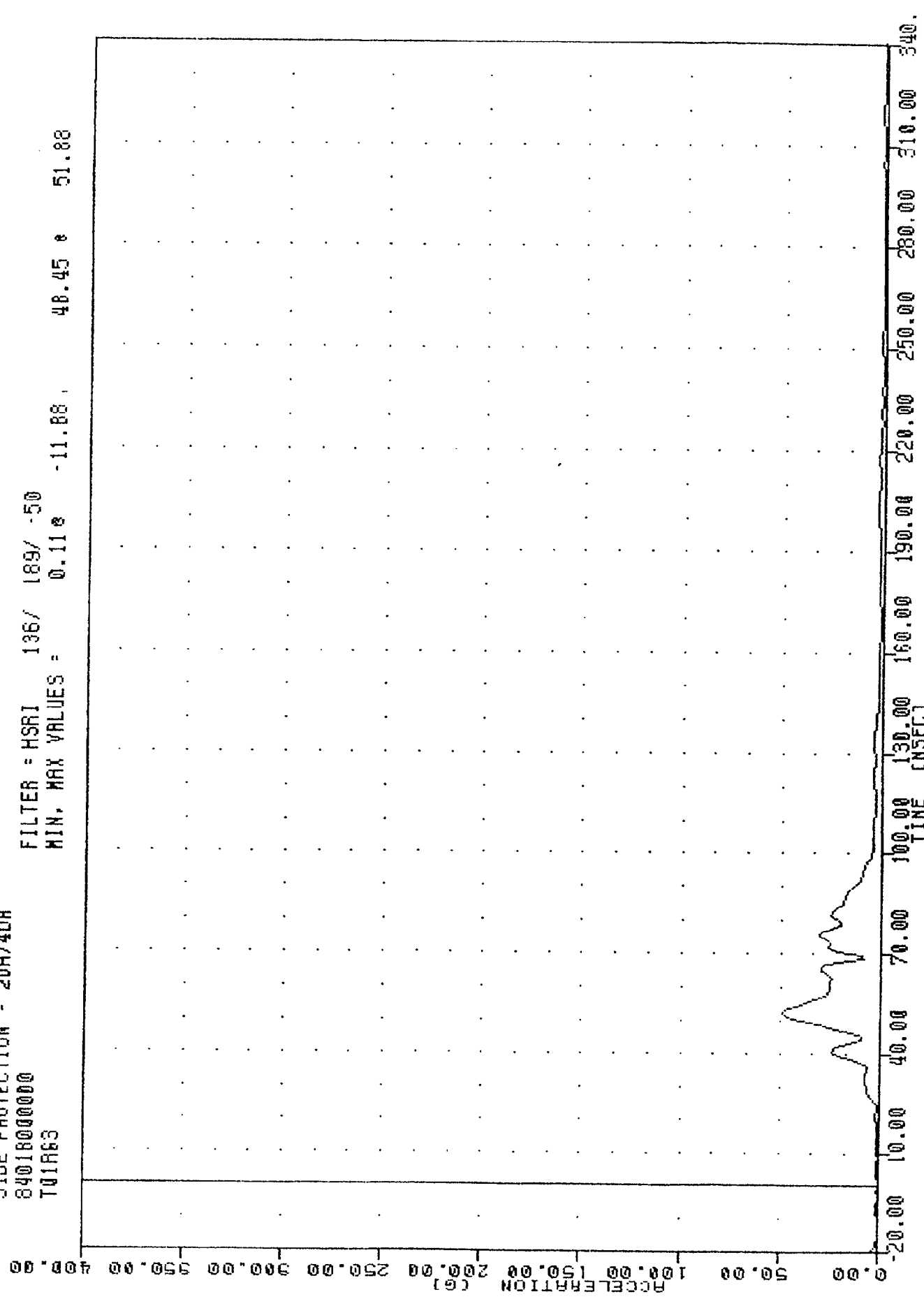
FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -24.48 75.00, 6.49 29.38



MOVING DEFORMABLE BARRIER INTO GRANADA
 PASSENGER UPPER SPINE ACCELERATION Z AXIS

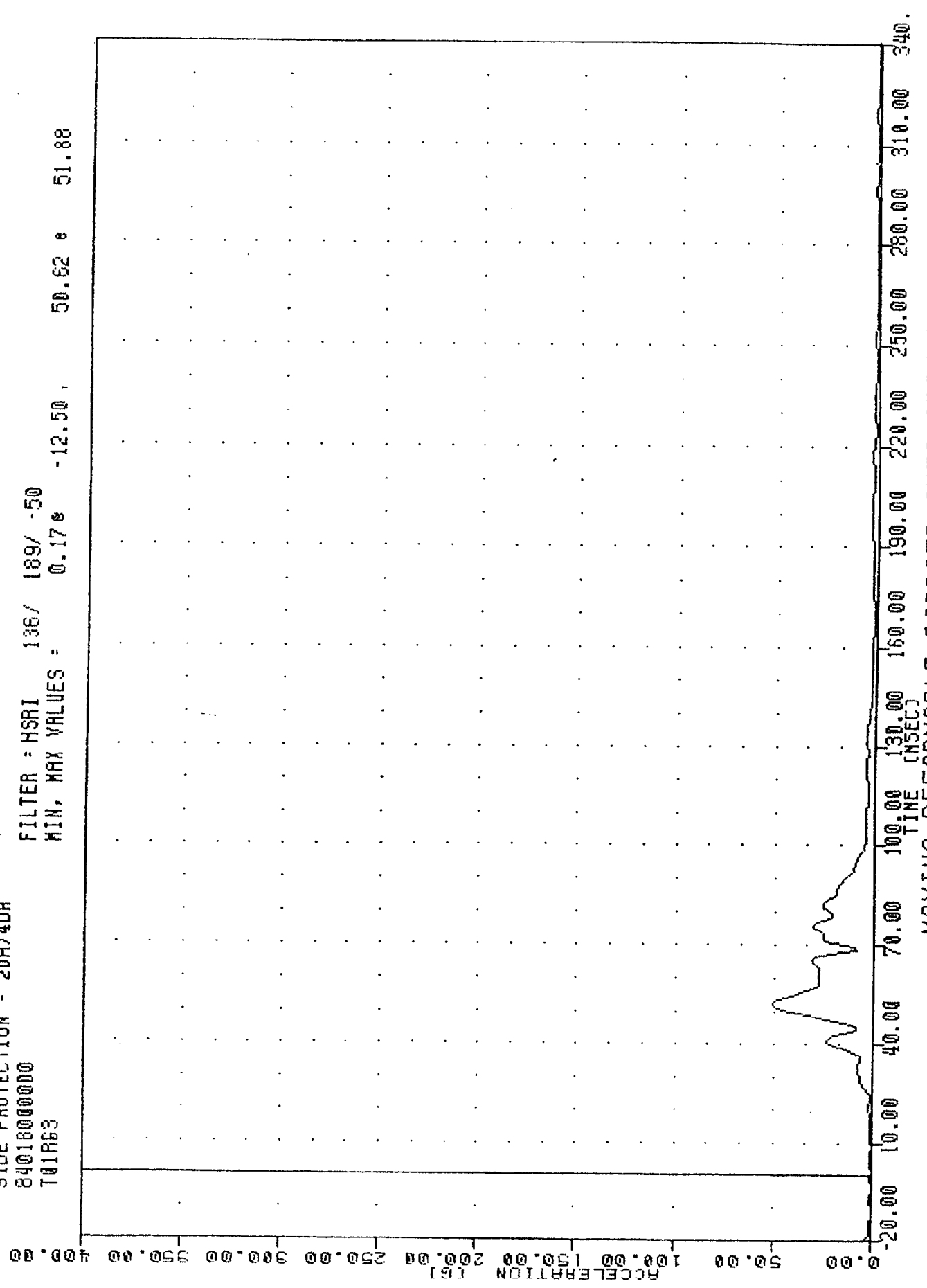
TMC 840110 26-JAN-84 08:47:44
 SIDE PROTECTION - 20R/4DR
 84018000000
 T01R63

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.11e -11.88 , 48.45 e 51.88



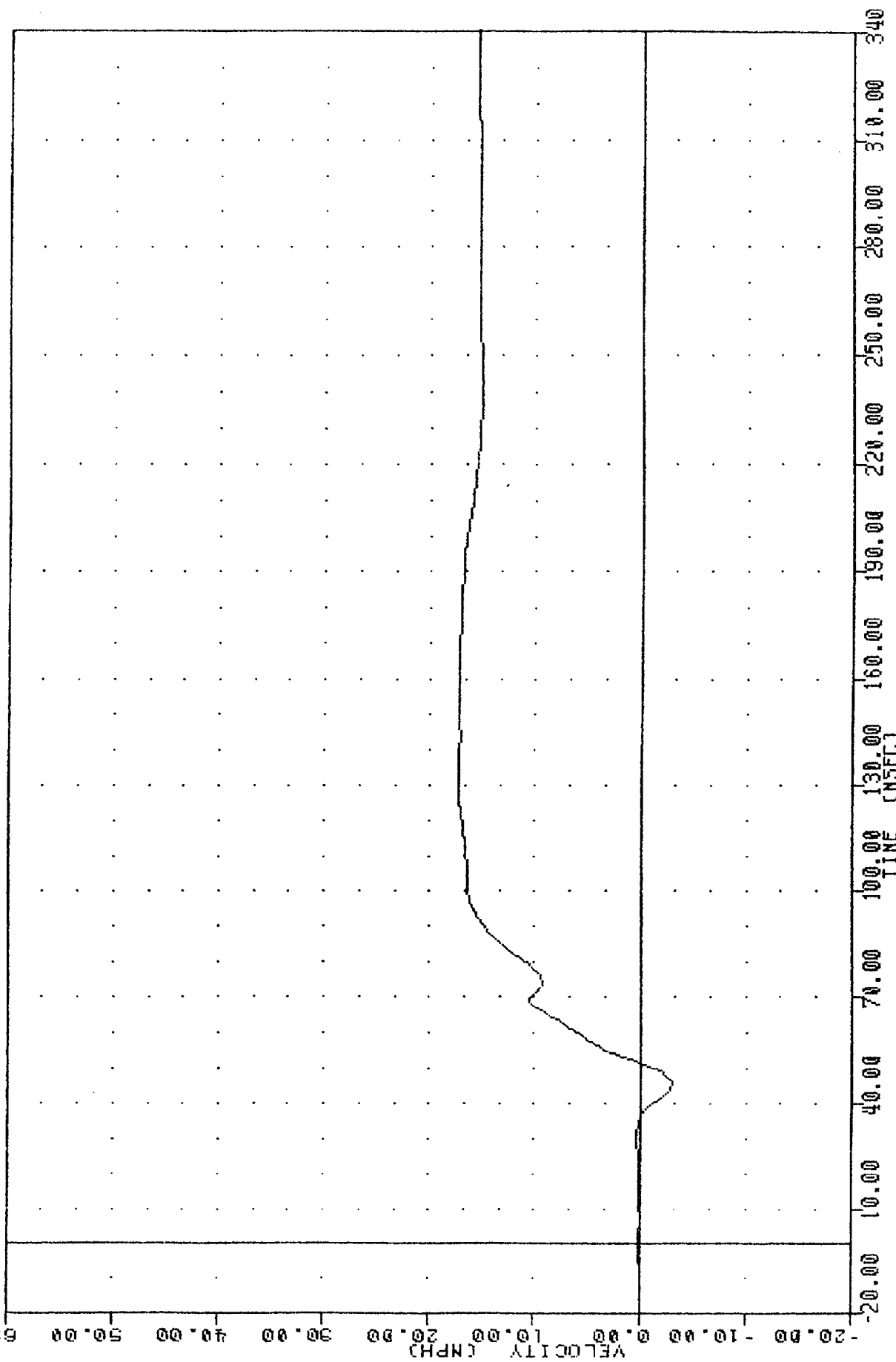
MOVING DEFORMABLE BARRIER INTO GRANADA
 PASSENGER UPPER SPINE RESULTANT

TPC 840110 26 JAN 84 08:48:54
 SIDE PROTECTION - 20R/4DR
 84018000000
 T01R63
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.17e -12.50, 50.62 e 51.88



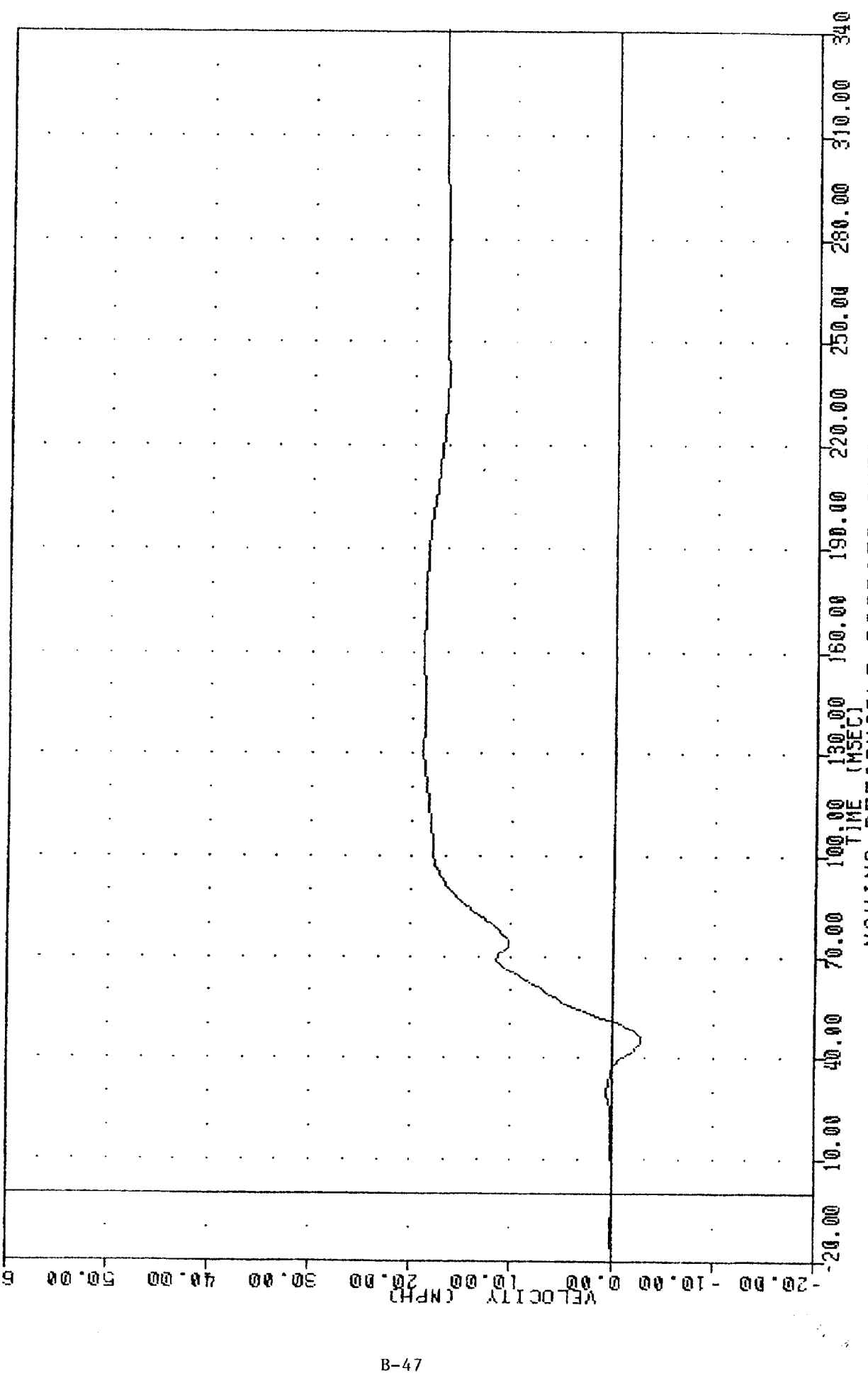
MOVING DEFORMABLE BARRIER INTO GRANADA
 PASSENGER UPPER SPINE RESULTANT USING T01Y6C

INC 840110 840110
 SIDE PROTECTION - 20R/40R
 84018000000
 T01YV3
 PLUT DATE 26-JAN-84 08:54:50
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -3.02e 45.00 17.37 e 131.25



MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING T01YV3

TRC 840118 26-JAN-84 08:54:50
 SIDE PROTECTION - 2DR/4DR
 84018000000
 T01YVC
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -2.81e 44.38 , 18.96 e 158.75

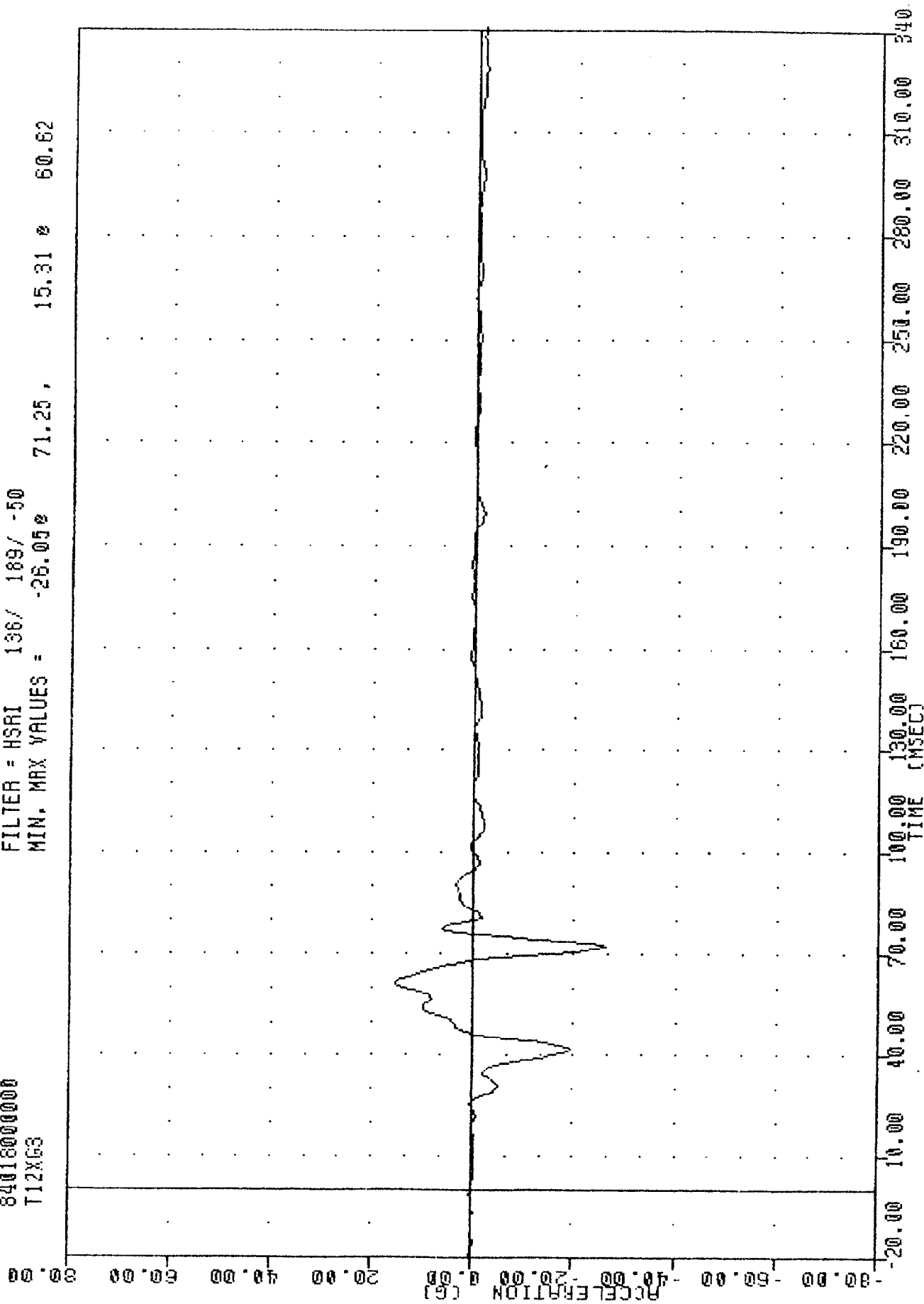


MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING T01YGC

TRC 840118
SIDE PROTECTION - 20R/40R
84018000000
T12X63

PLOT DATE 28-JAN-84 08:47:14

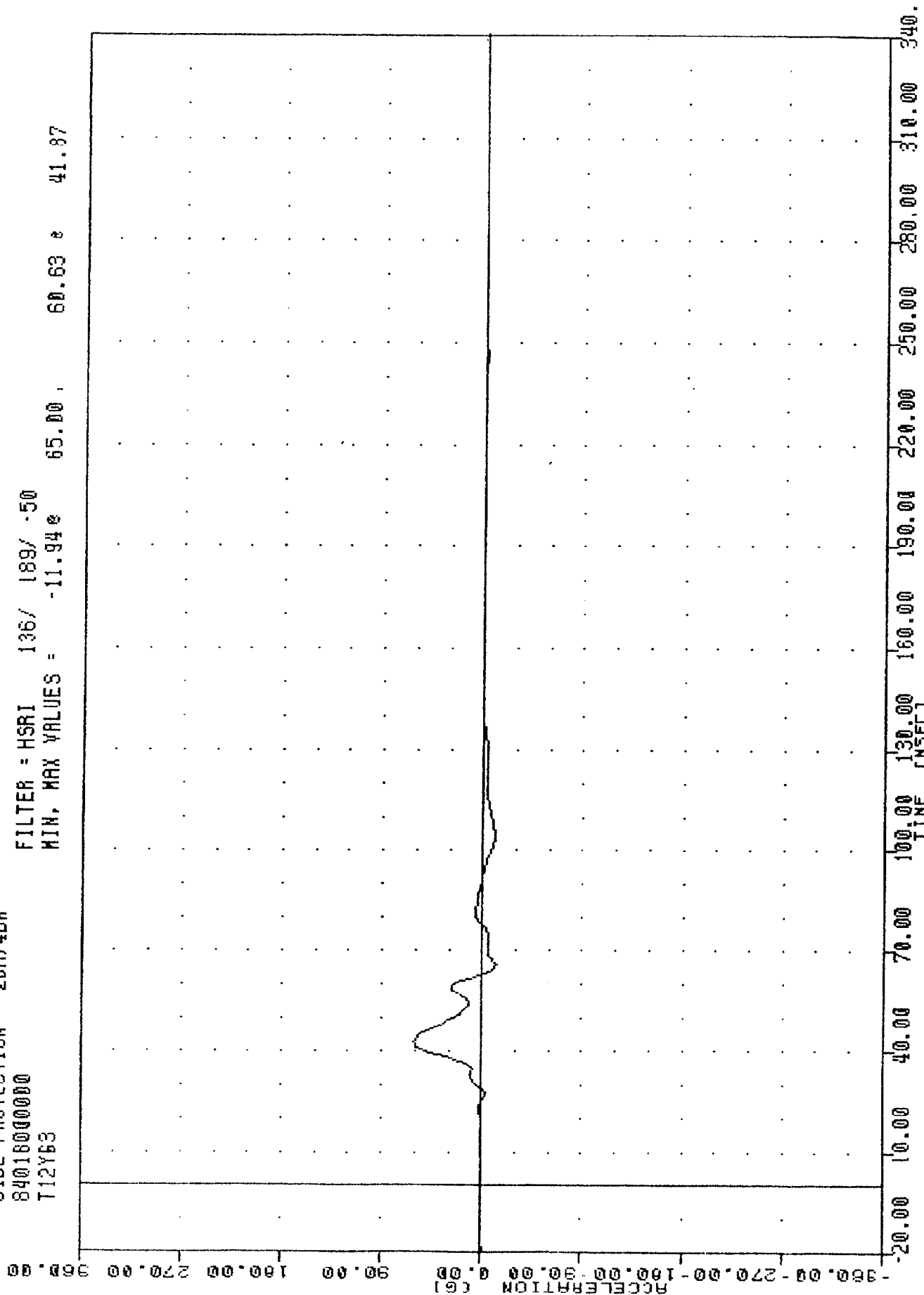
FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -25.05% 71.25, 15.31 % 60.62



THC 840118
 SIDE PROTECTION - 20R/4DR
 84018000000
 712Y63

PLOT DATE 26-JAN-84 08:47:44

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -11.94e 65.00, 60.63 e 41.87

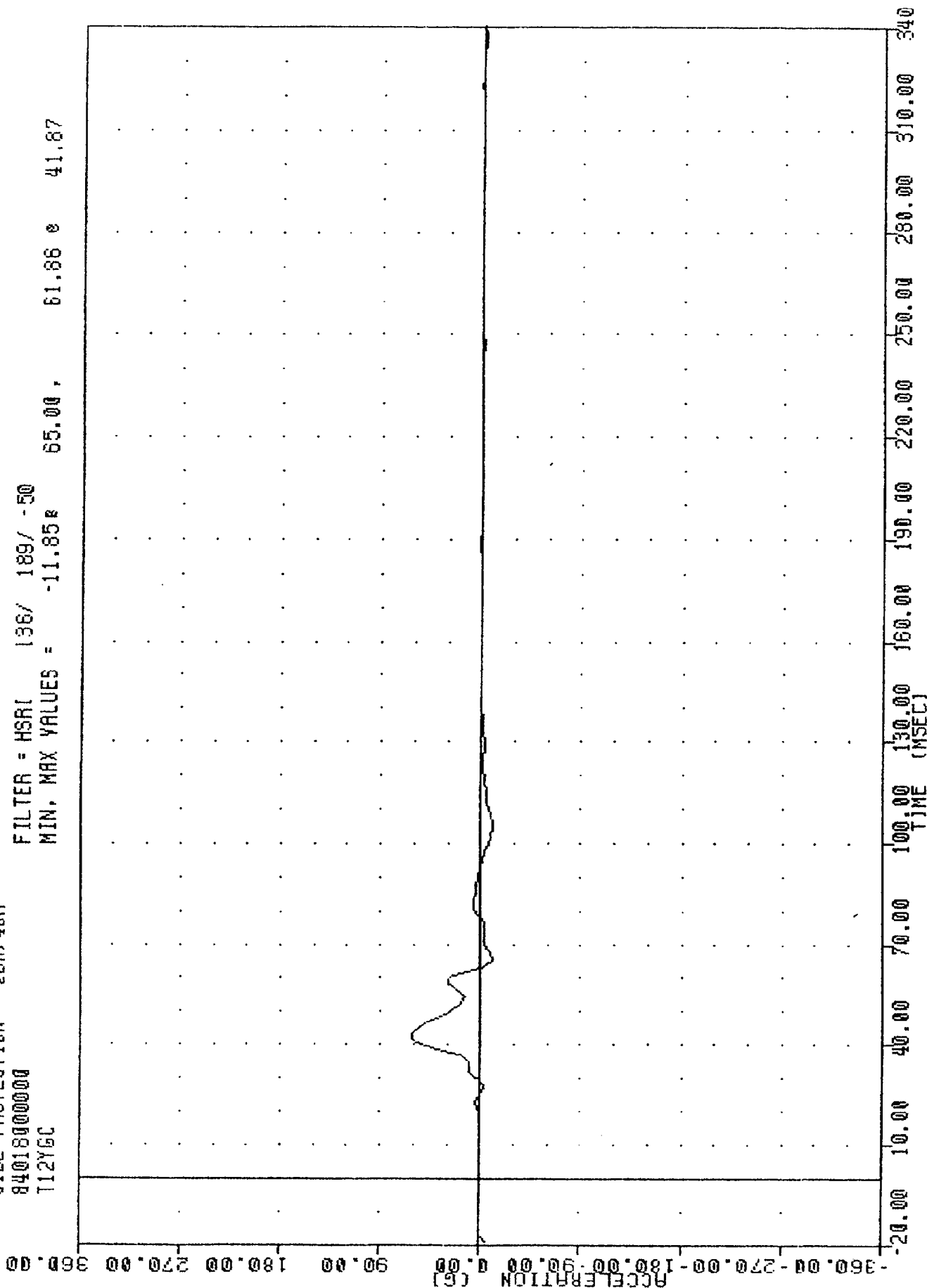


MOVING DEFORMABLE BARRIER INTO GRANADA
 PASSENGER LOWER SPINE ACCELERATION Y AXIS

TRC
 SIDE PROTECTION - 20R/40R
 84018000000
 T12YGC

PLOT DATE 26-JAN-84 08:47:44

FILTER = HSRL 136/ 189/ -50
 MIN. MAX VALUES = -11.85 65.00 61.86 41.87

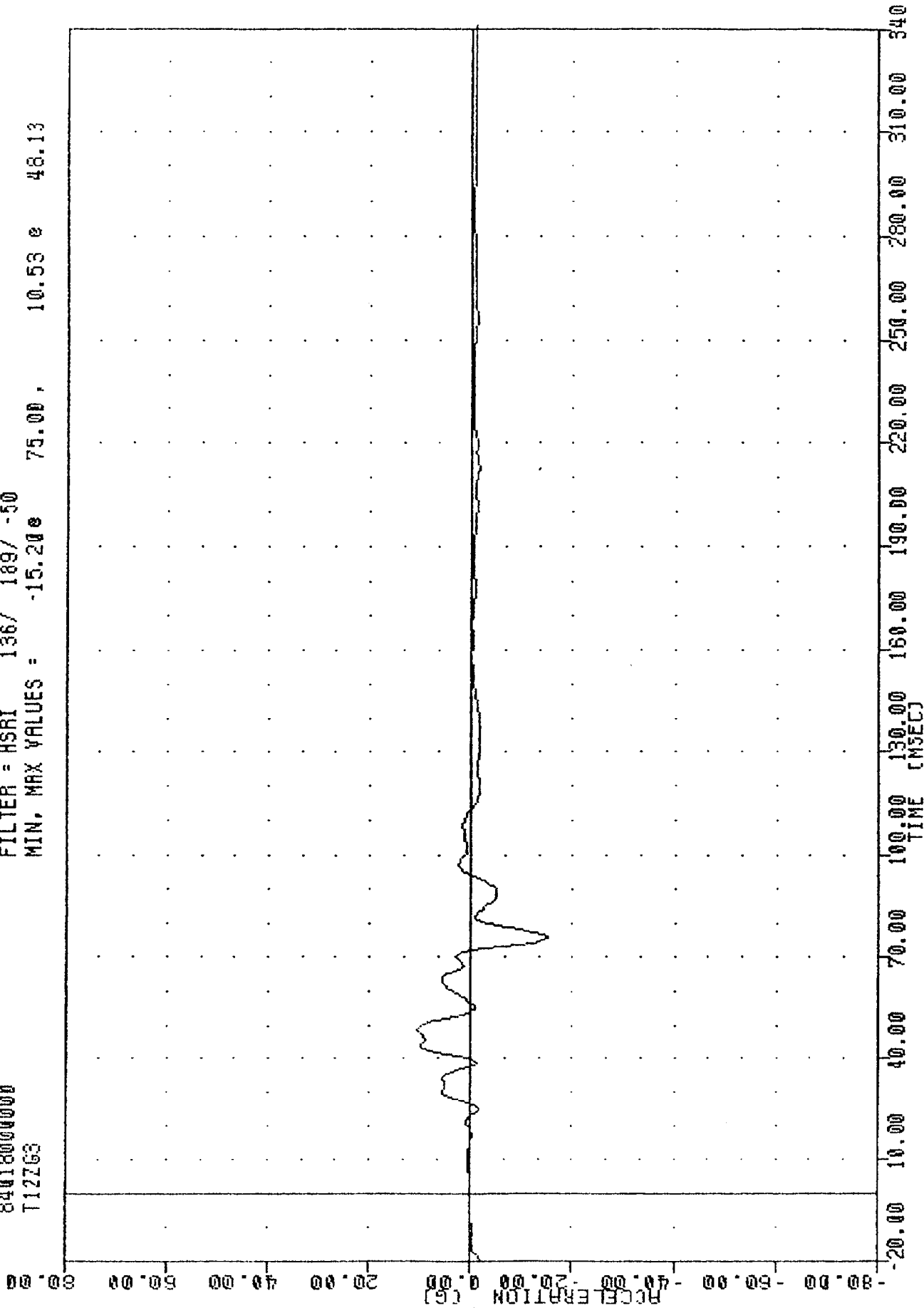


MOVING DEFORMABLE BARRIER INTO GRANADA
 PASSENGER LOWER SPINE ACCELERATION -2 Y AXIS

TRC
 SIDE PROTECTION - 2DR/40R
 840180000000
 T12763

PLOT DATE 26-JAN-84 08:47:14

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -15.200 75.00, 10.53 48.13

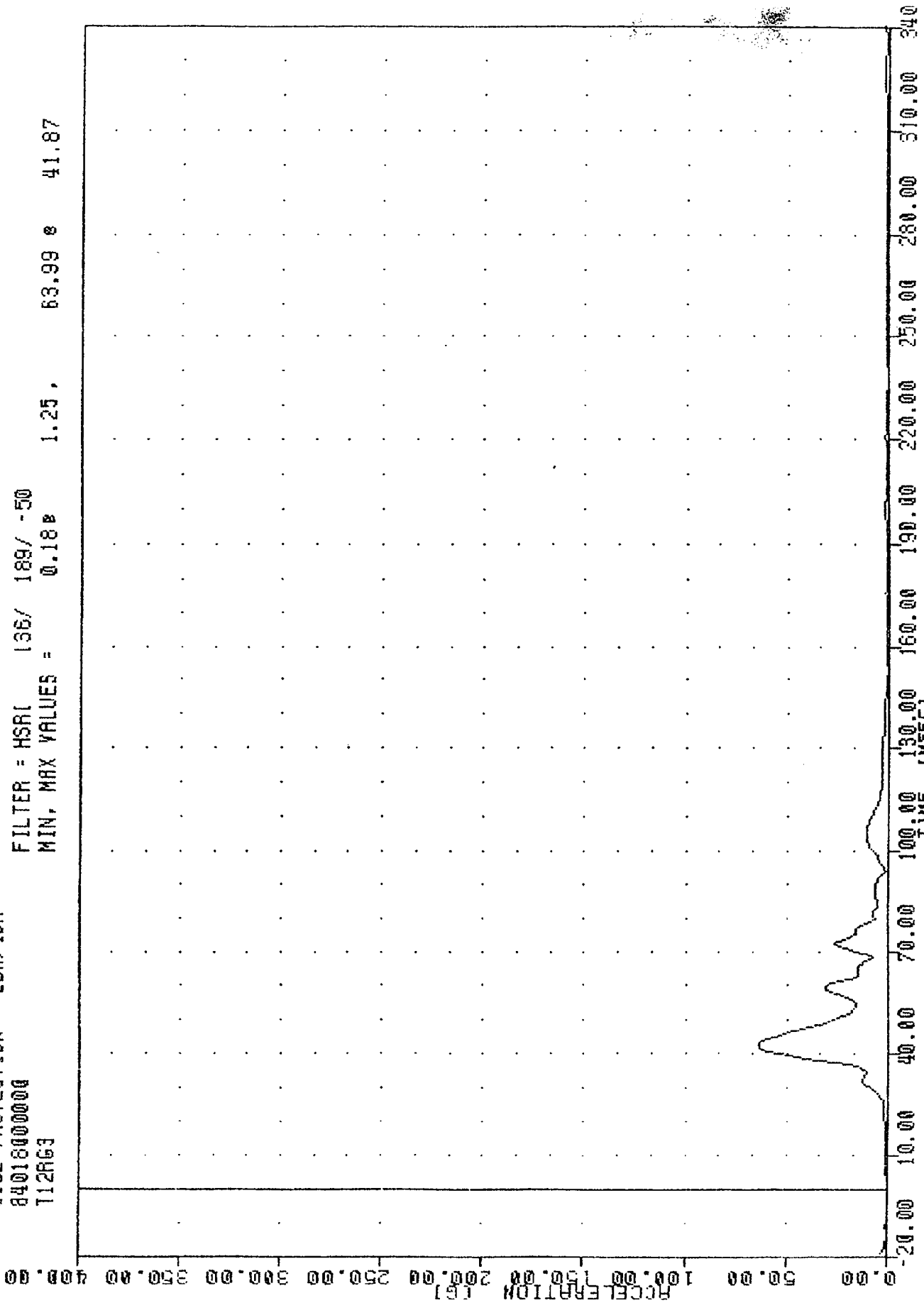


MOVING DEFORMABLE BARRIER INTO GRANADA
 PASSENGER LOWER SPINE ACCELERATION Z AXIS

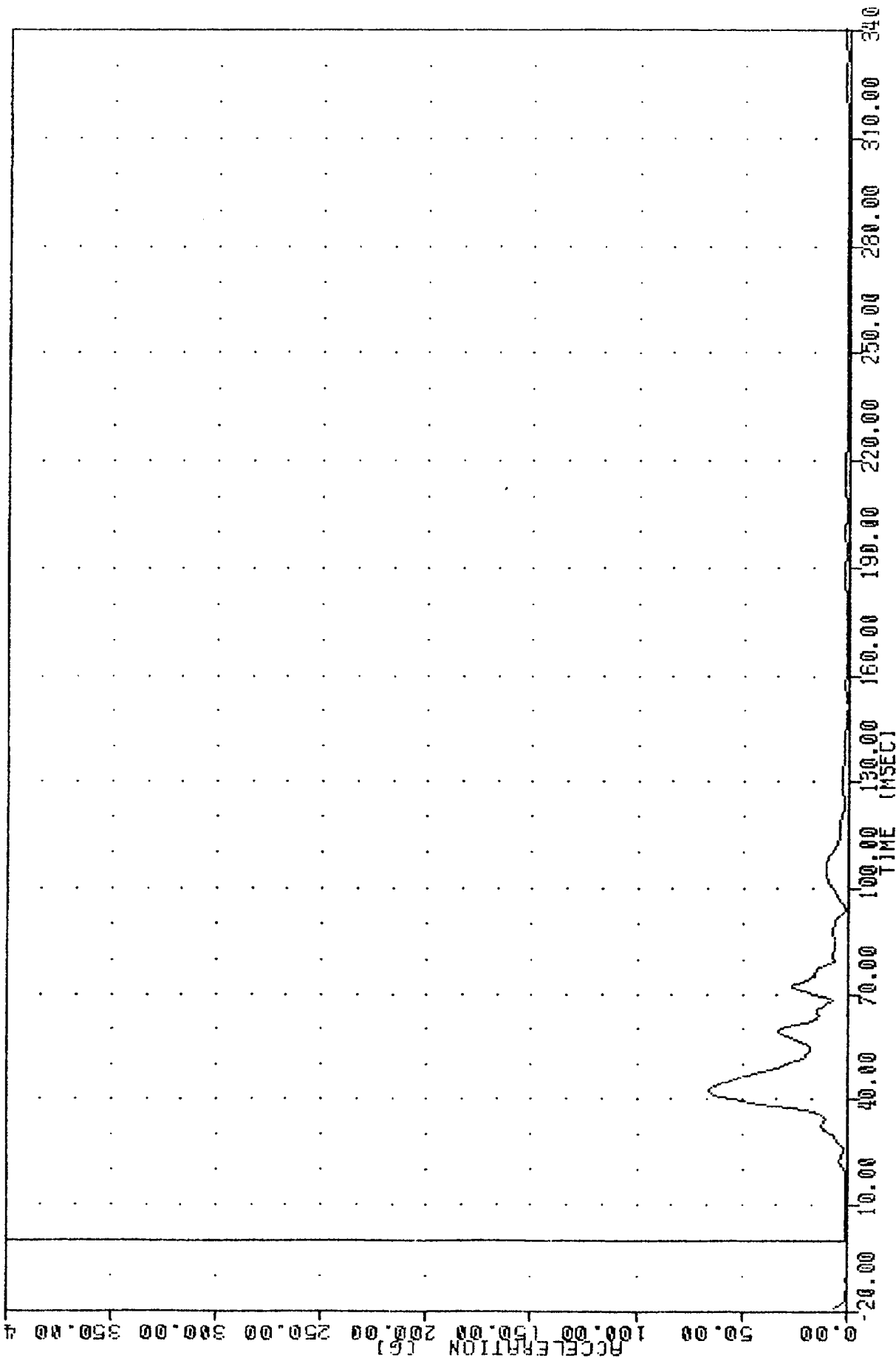
IRC 840118
 SIDE PROTECTION - 20R/40R
 84018000000
 T12R63

PLOT DATE 26-JAN-84 08:47:44

FILTER = HSR1 136/ 189/ -50
 MIN, MAX VALUES = 0.188 1.25, 63.99 8 41.87

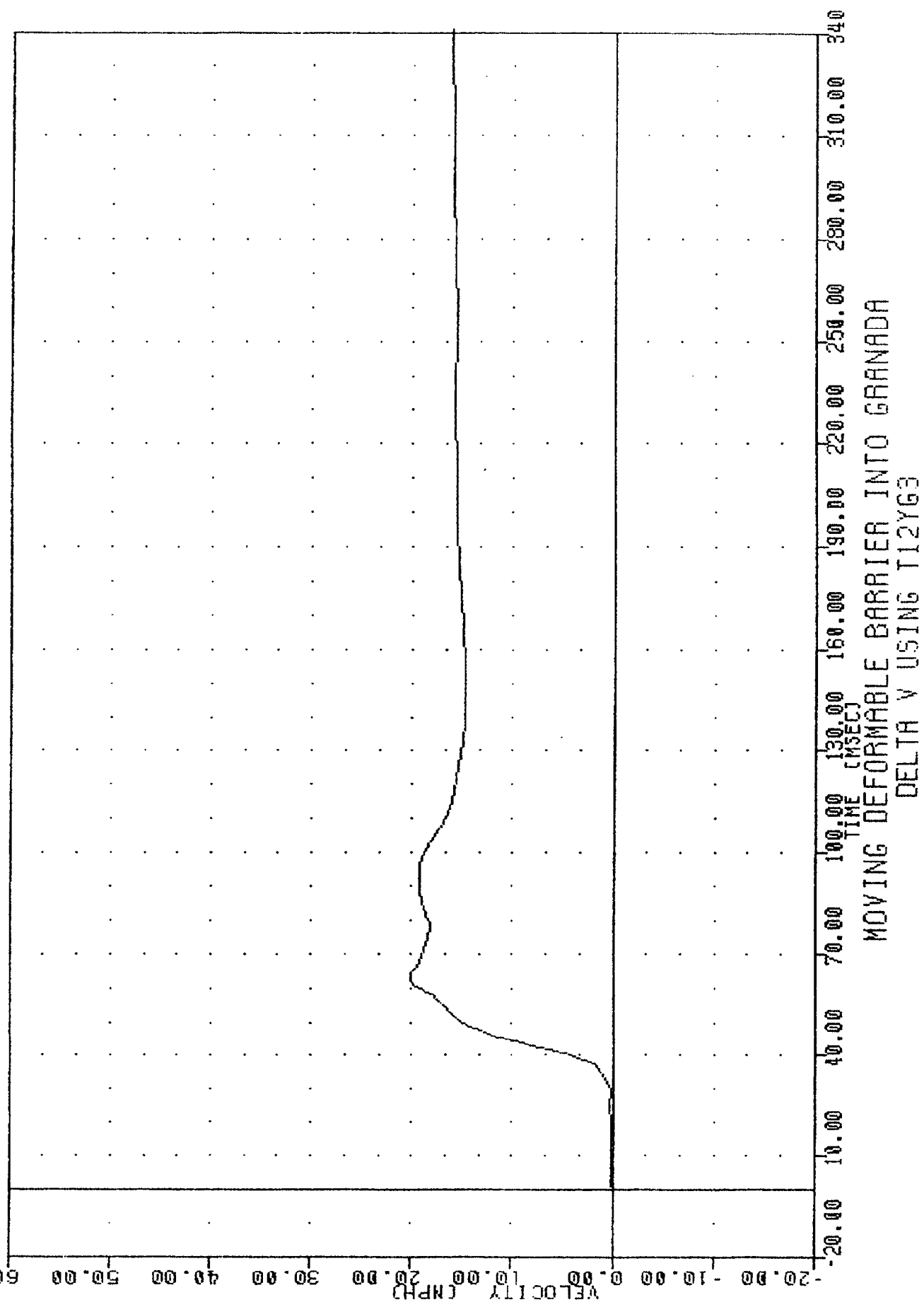


IRC 840116
 SIDE PROTECTION - 2DR/40R
 84018000000
 T12R63
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = 0.06g -5.00g 65.15g 41.87
 PLOT DATE 26-JAN-84 08:48:54



MOVING DEFORMABLE BARRIER INTO GRANADA
 PASSENGER LOWER SPINE RESULTANT USING T12YGC

TRC
 840118
 SIDE PROTECTION - 2DR/4DR
 84018000000
 T12YV3
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -0.05e -17.50, 20.14 e 62.50
 PLOT DATE 26-JAN-84 08:54:50

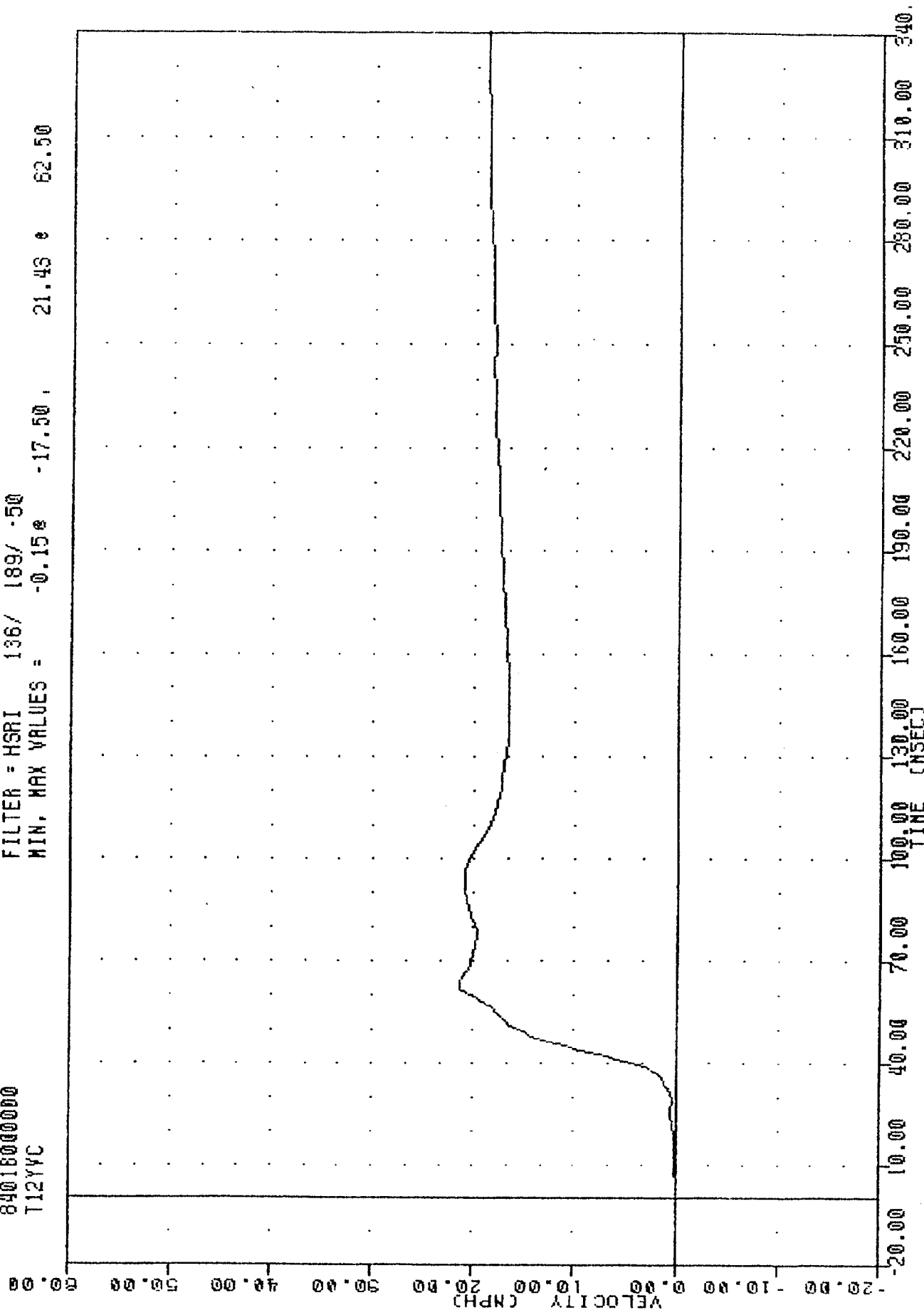


MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING T12YV3

T12YC
 84018000000
 SIDE PROTECTION - 20R/40R
 , 840118

PLUT DATE 26-JAN-84 08:54:50

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -0.15* -17.50 , 21.43 * 62.50



MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING T12YGC

THC 840118 26-JAN-84 08:47:44

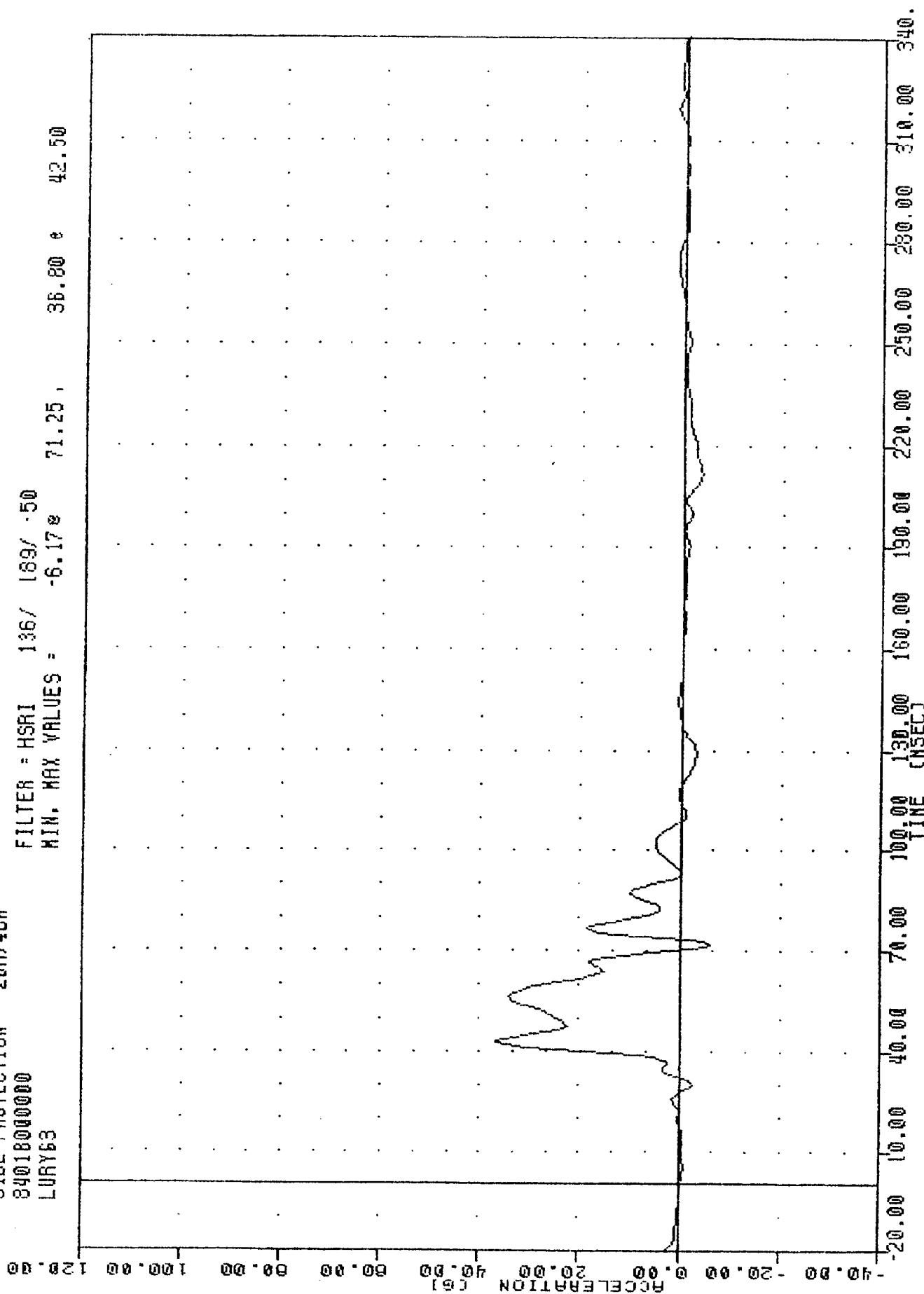
SIDE PROTECTION - 20R/4DR

84018000000

LURY63

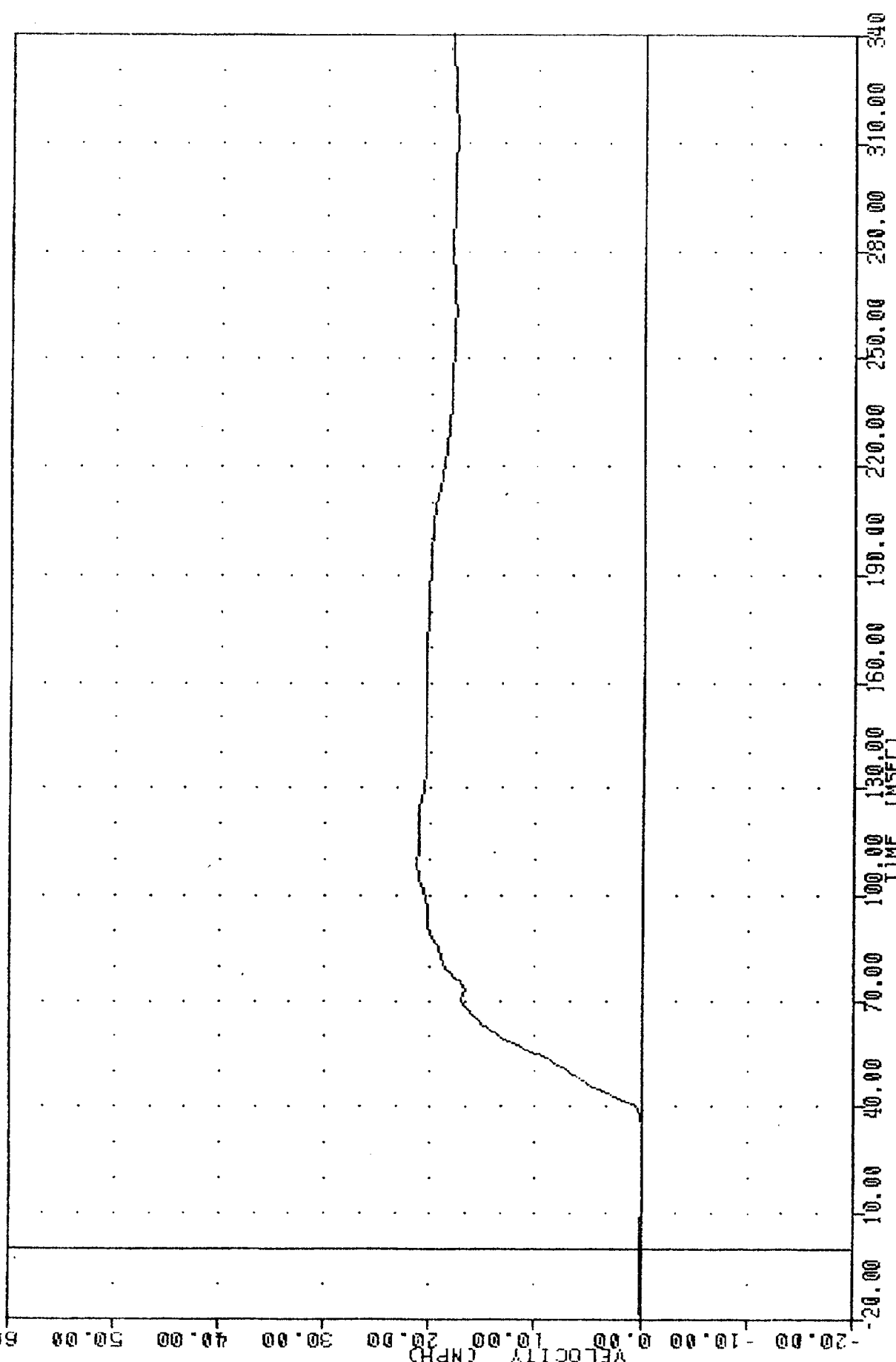
FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -6.17e 71.25 , 36.80 e 42.50



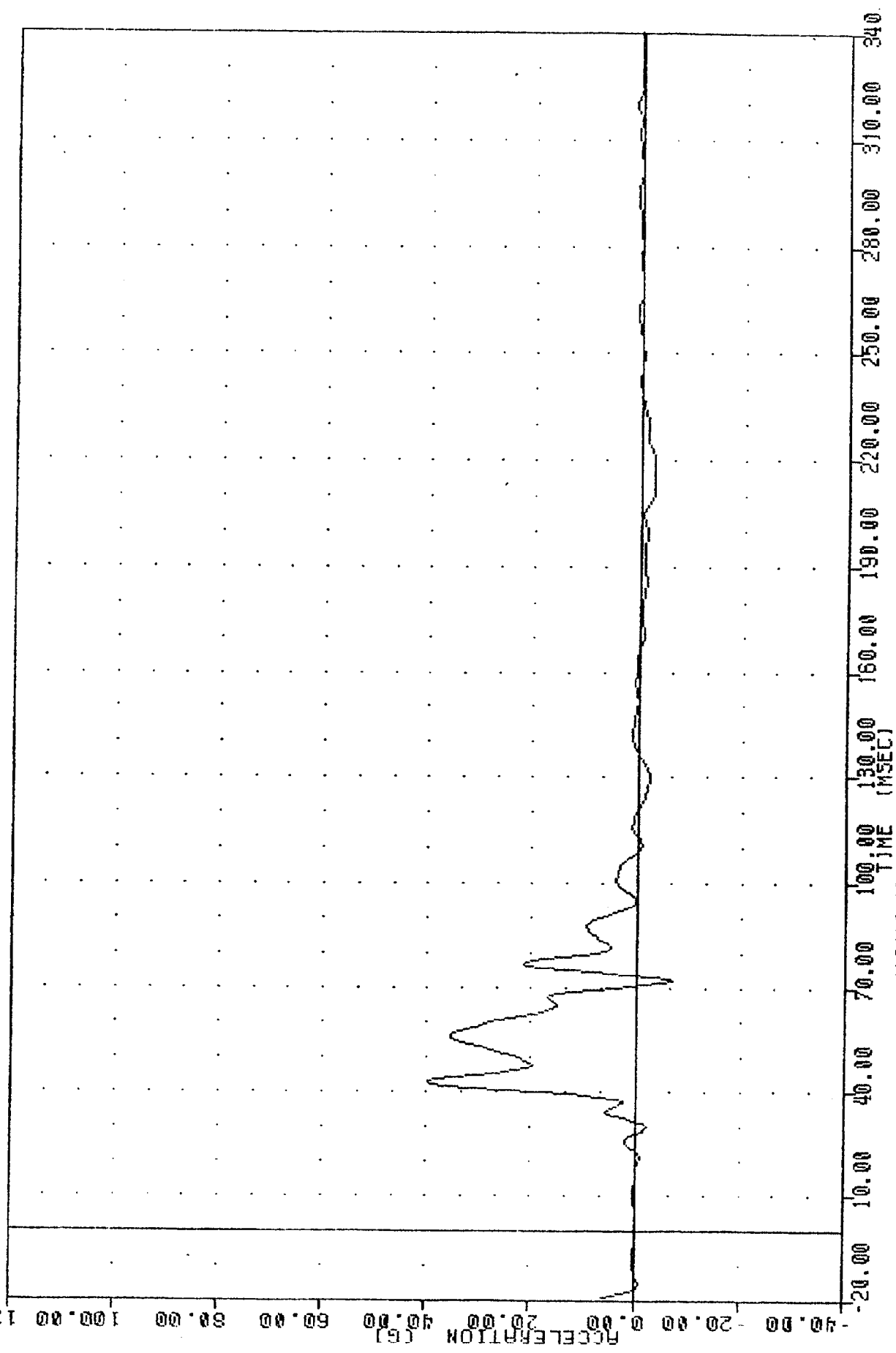
MOVING DEFORMABLE BARRIER INTO GRANADA
PASSENGER LEFT UPPER RIB ACCELERATION Y AXIS

IHC
 SIDE PROTECTION - 20R/40R
 84018000000
 LURYV3
 PLUT DATE 26-JAN-84 08:54:50
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -0.18e 31.25, 21.26 e 108.13



MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING LURYG3

MC 840110
 SIDE PROTECTION - 20R/40R
 84018000000
 LURYGC
 FILTER = HSR(136/ 189/ -50
 MIN, MAX VALUES = -6.77e 71.25, 39.57 e 42.50
 PLOT DATE 26-JAN-84 08:47:44



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

PLUT DATE 28-JAN-84 08:54:50

840118
SIDE PROTECTION - 20R/4DR

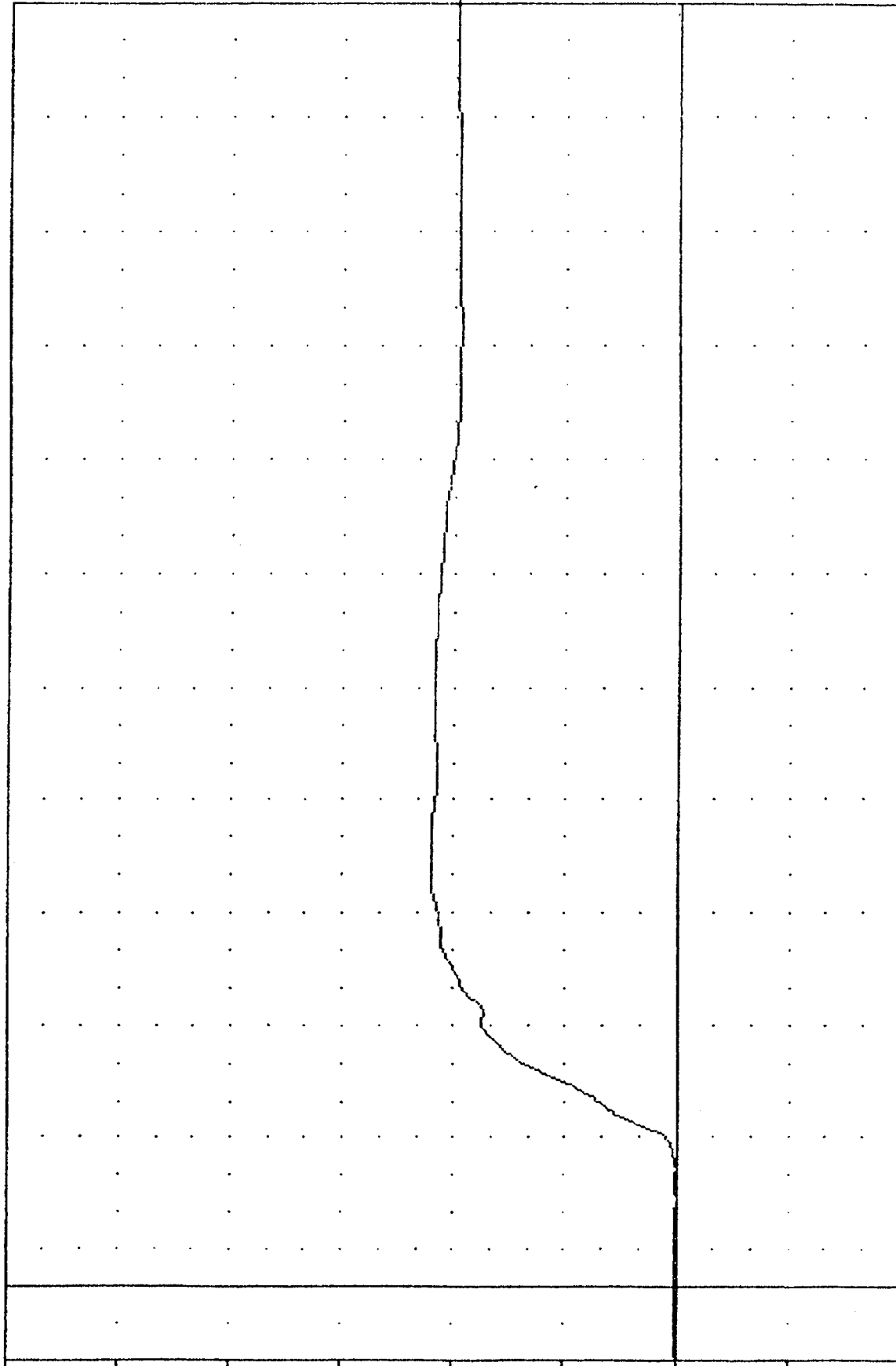
840180000000

LURYVC

FILTER = HSRI 136/ 189/ -50

MIN. MAX VALUES = -0.012 22.50 22.00 119.36

VELOCITY (MPH)



TIME (MSEC)

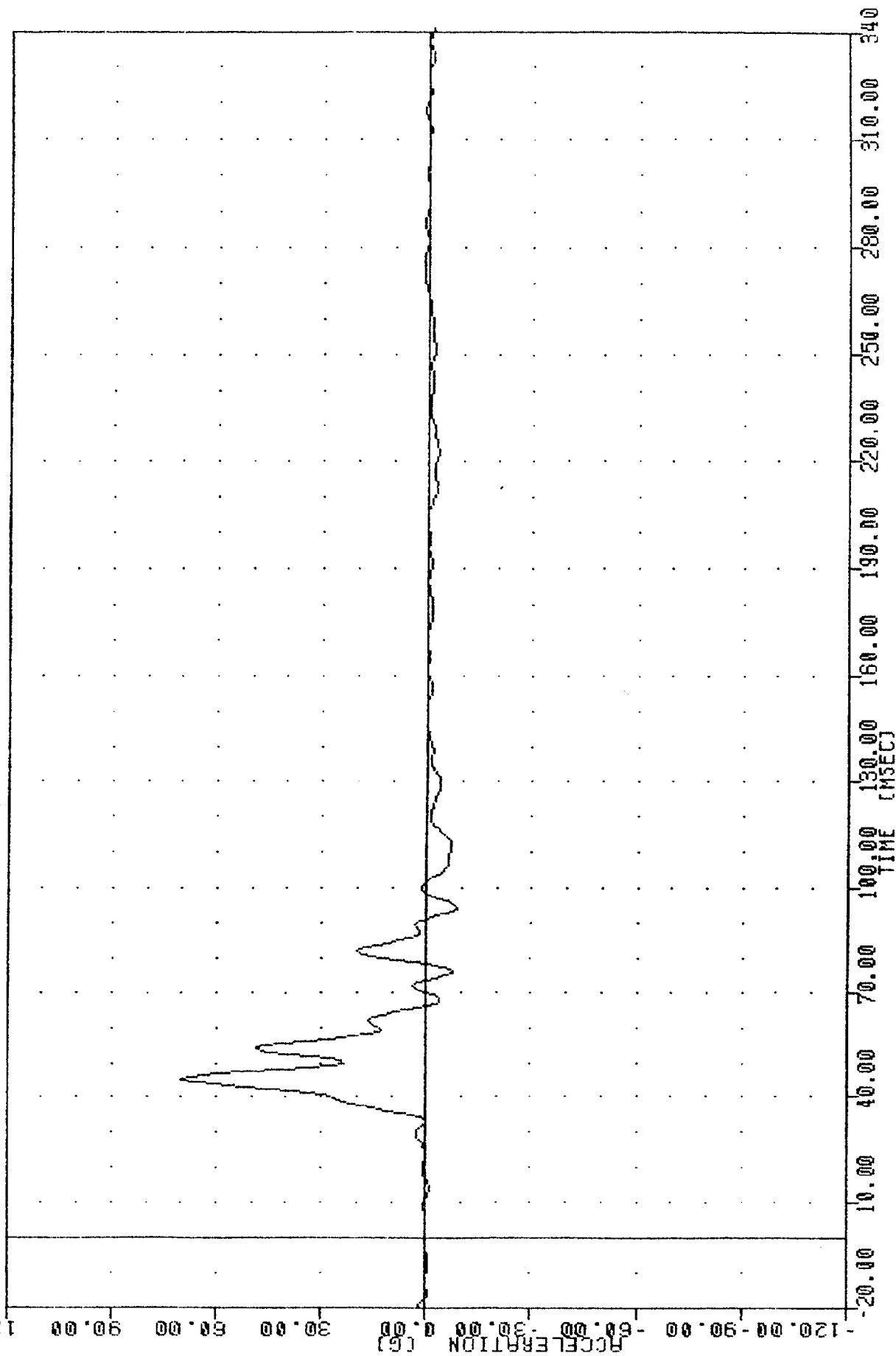
MOVING DEFORMABLE BARRIER INTO GRANADA

DELTA V USING LURY6C

TRC 840118
 SIDE PROTECTION - 2DA/4DA
 84018000000
 LLRYG3

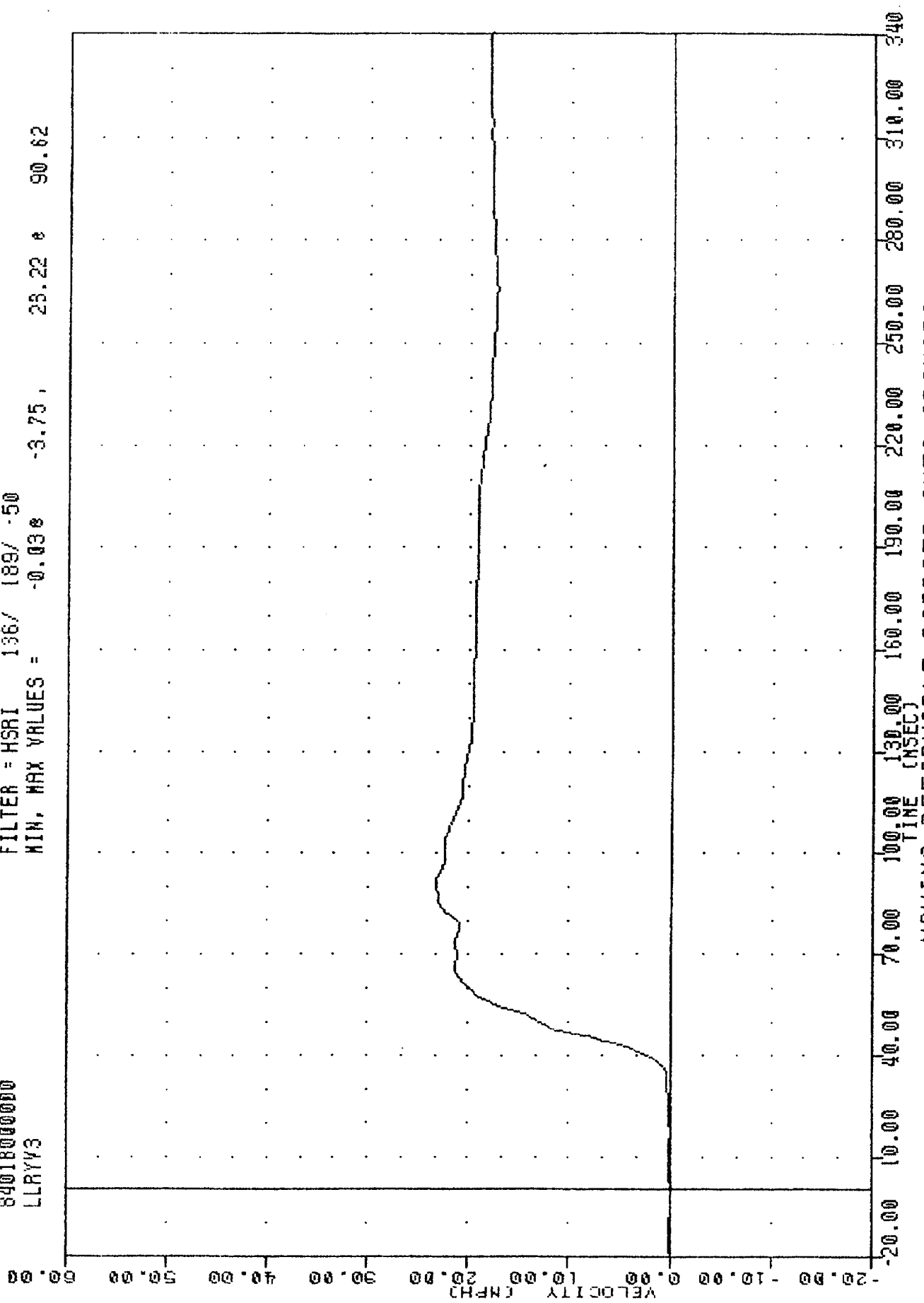
PLOT DATE 26-JAN-84 08:47:14

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -8.738 93.75, 70.11 45.00



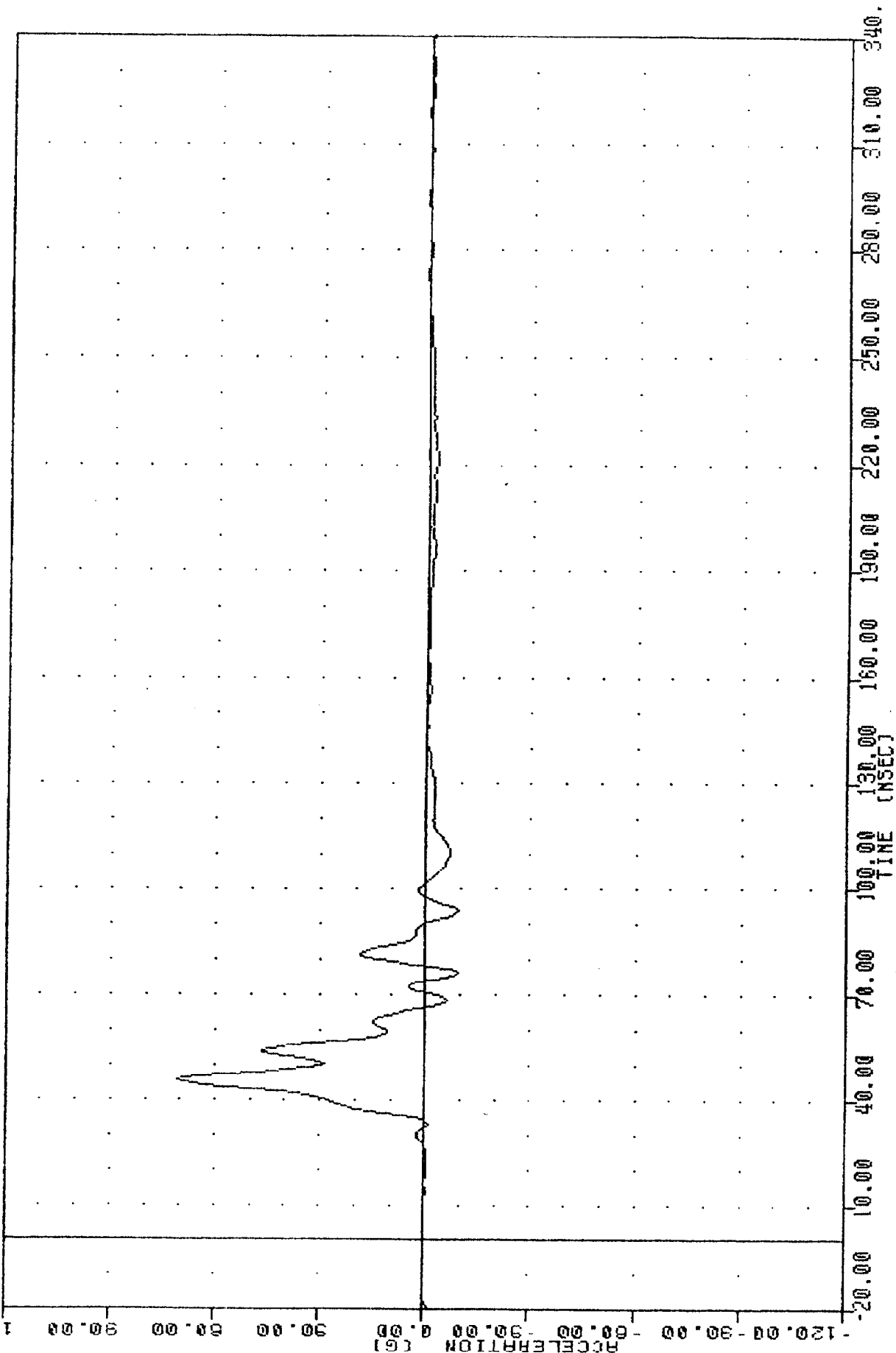
MOVING DEFORMABLE BARRIER INTO GRANADA
 PASSENGER LEFT LOWER RIB ACCELERATION Y AXIS

THE 840116
 SIDE PROTECTION - 20R/4DR
 84018000000
 LLRYV3
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -0.03 23.22 90.62
 PLOT DATE 26-JAN-84 08:54:50



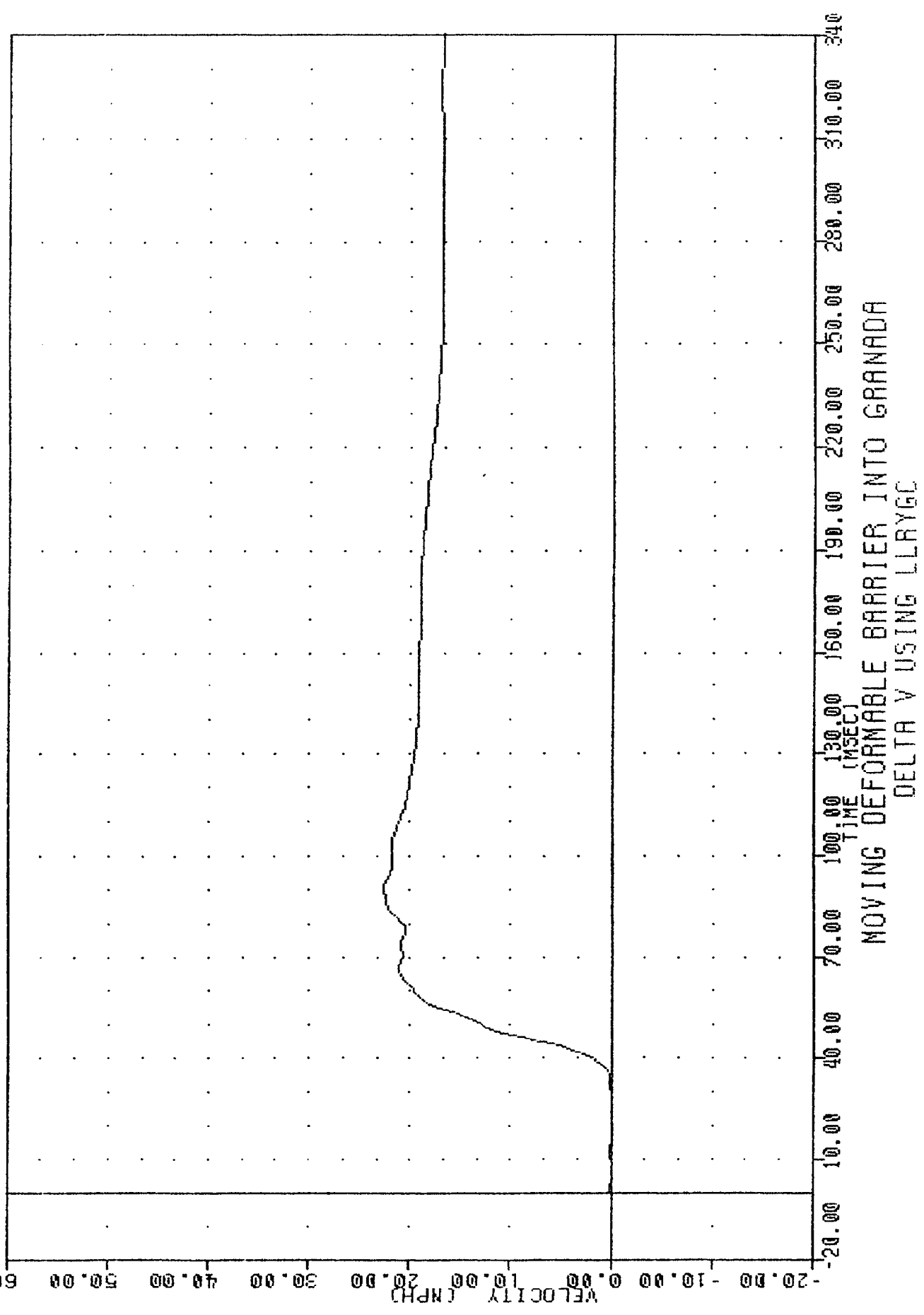
MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING LLRYG3

INC 840110
 SIDE PROTECTION - 20R/4DR
 84010000000
 LLRY6C
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -9.548 75.62 70.74 45.00
 PLOT DATE 26-JAN-84 08:47:44



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

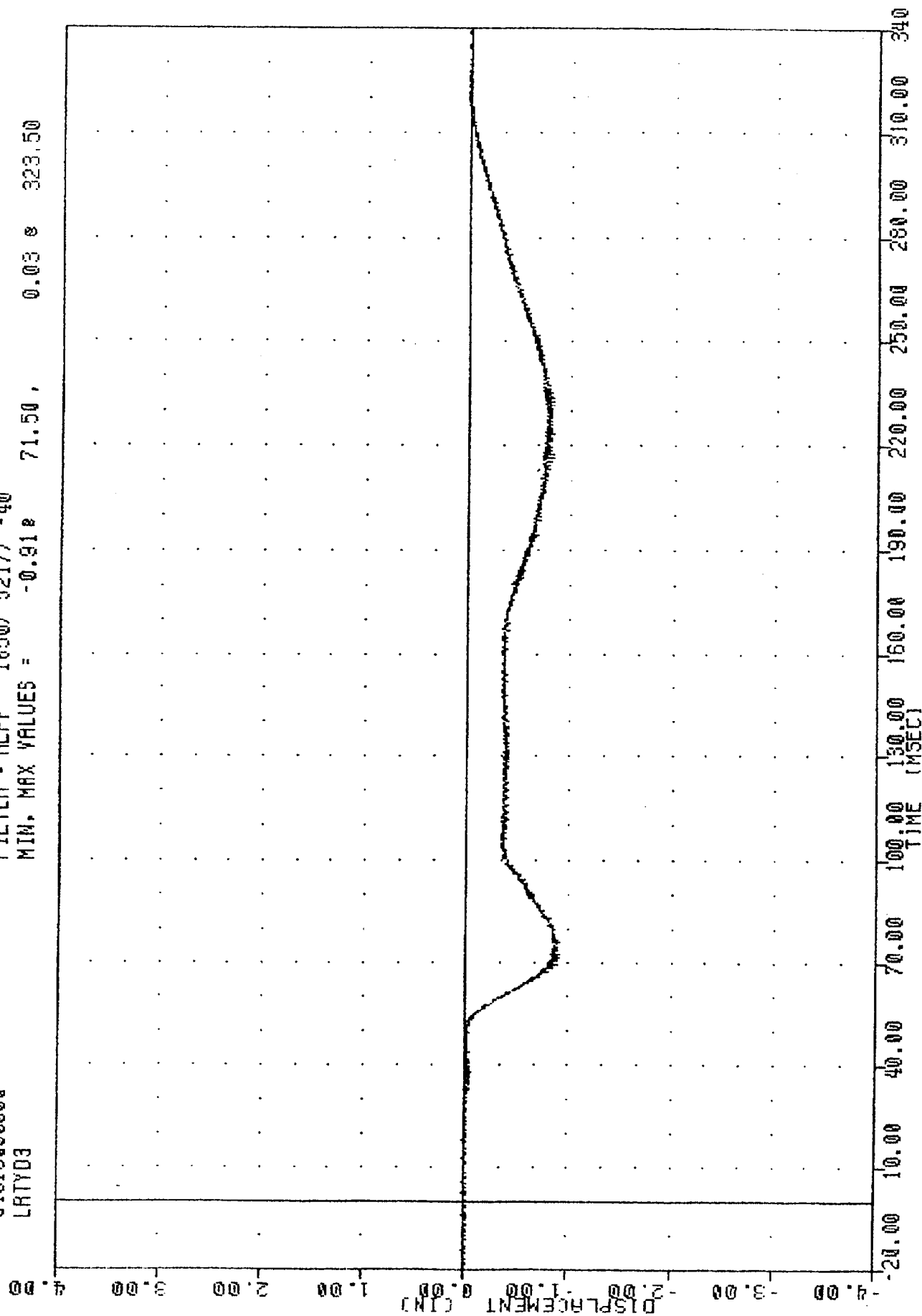
TRC 840118
 SIDE PROTECTION - 20R/40R
 84018000000
 LLYVC
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -0.09e 26.25, 22.56 e 89.38
 PLOT DATE 26-JAN-84 08:54:50



IRC 840118
SIDE PROTECTION - 20R/40R
84018000000
LRTYD3

PLOT DATE 26-JAN-84 08:49:17

FILTER = ALPF 1650/ 5217/ -40
MIN. MAX VALUES = -0.918 71.50, 0.03 323.50

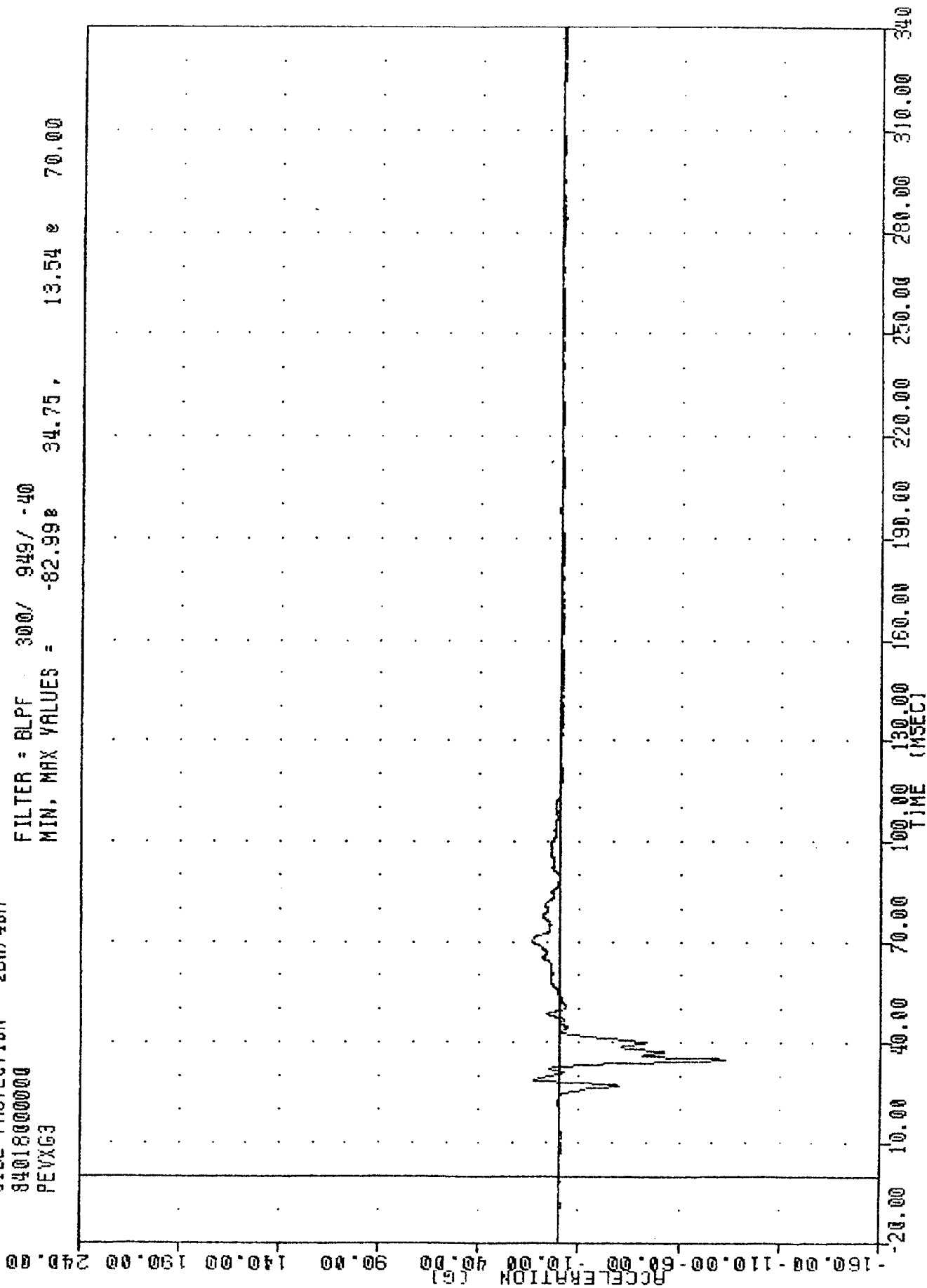


MOVING DEFORMABLE BARRIER INTO GRANADA
PASSENGER LEFT RIB TO SPINE DISPLACEMENT INCHES

IRC 840118
SIDE PROTECTION - 2DR/4DR
840180000000
PEVXG3

PLOT DATE 26-JAN-84 08:49:17

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -82.998 34.75, 13.54 70.00



MOVING DEFORMABLE BARRIER INTO GRANADA
PASSENGER PELVIS ACCELERATION X AXIS

TRC 840118

SIDE PROTECTION - 2DR/4DR

840180000000

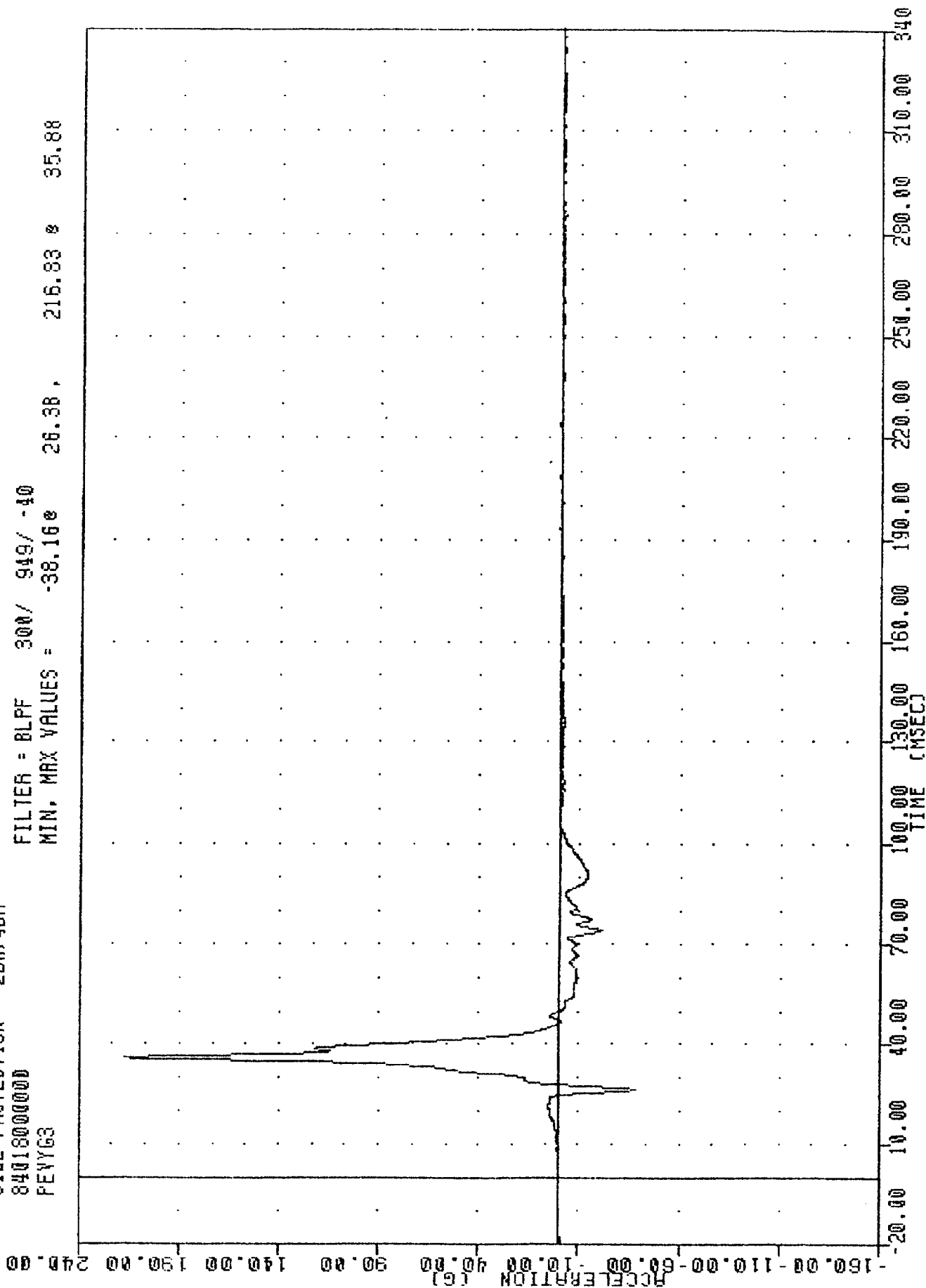
PEVY63

PLUT DATE 26-JAN-84

08:49:17

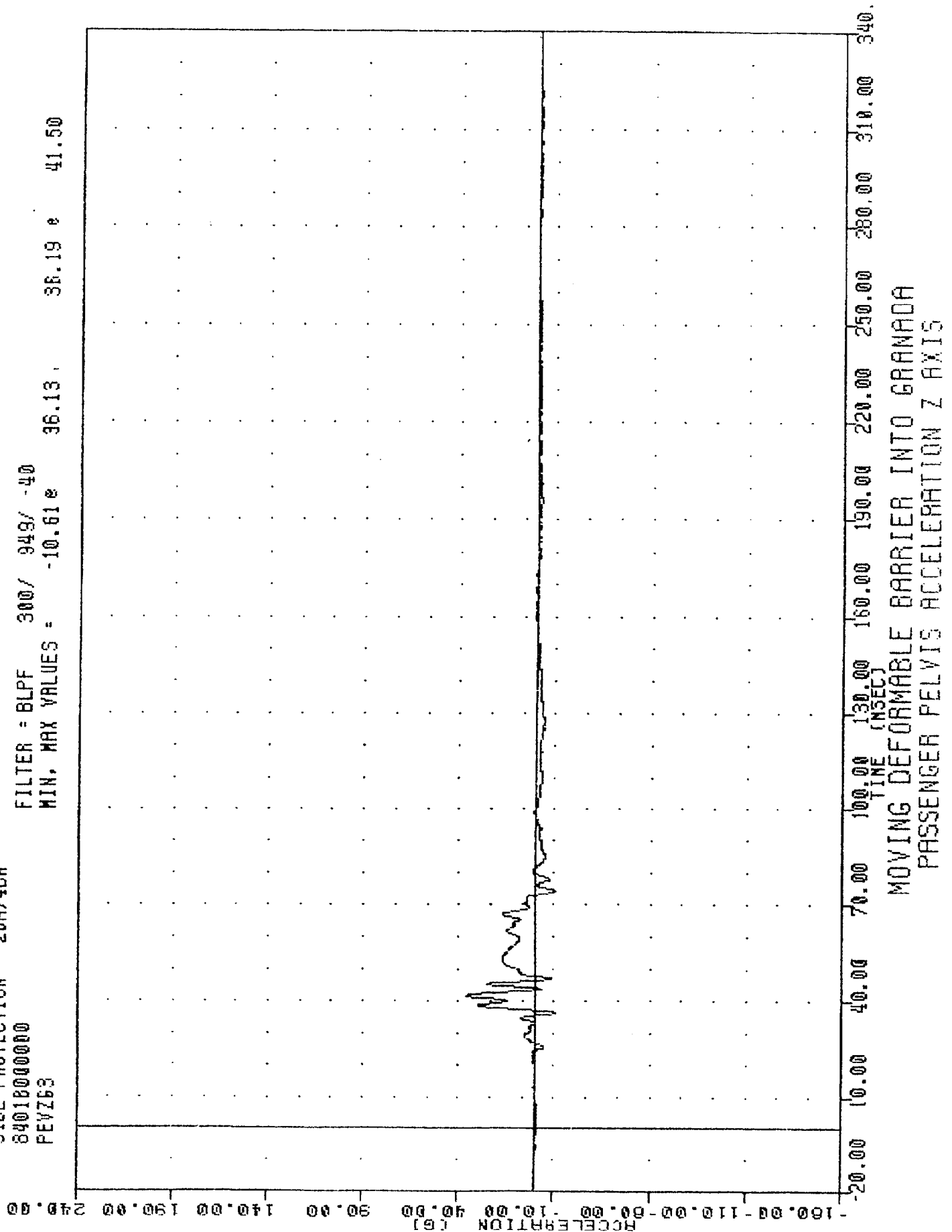
FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -38.16 26.38 216.83 35.88



MOVING DEFORMABLE BARRIER INTO GRANADA
PASSENGER PELVIS ACCELERATION Y AXIS

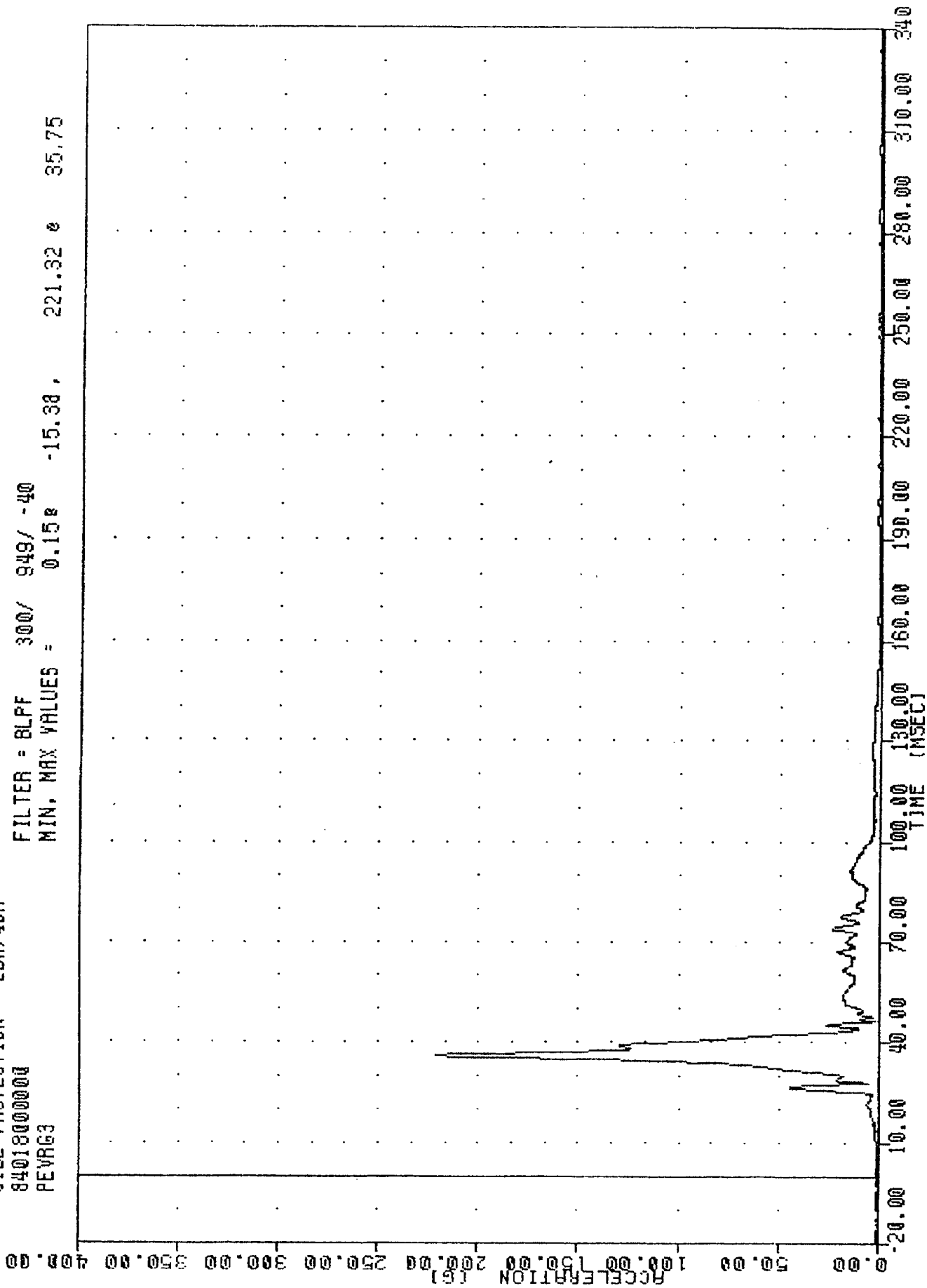
TRC 840118
 SIDE PROTECTION - 20R/40R
 84018000000
 FEVZ63
 PLUT DATE 28-JAN-84 08:49:17
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -10.61e 36.13 e 41.50



IRC 840118
SIDE PROTECTION - 20R/40R
84018000000
PEVRG3

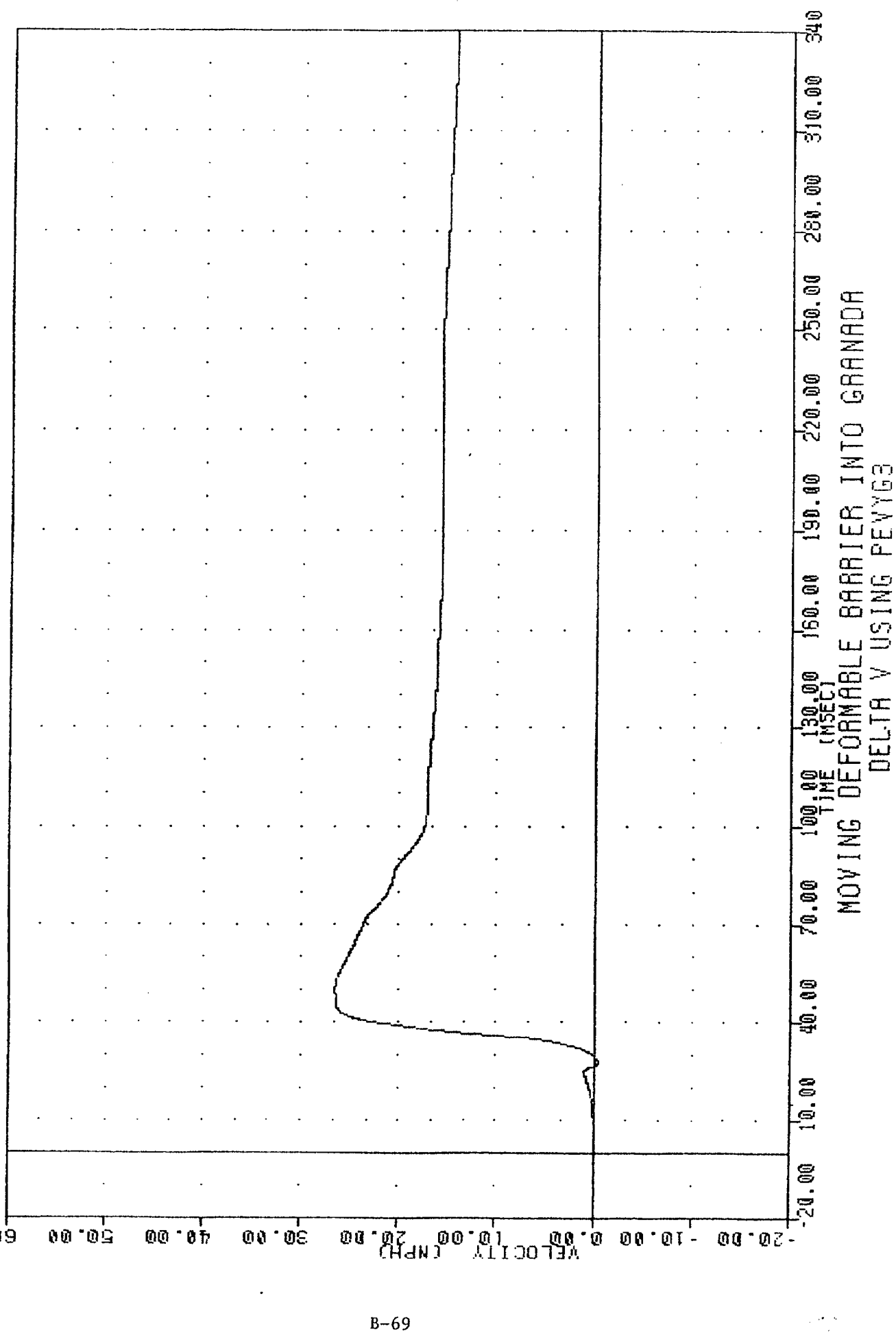
PLUT DATE 25-JAN-84 08:50:33

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = 0.158 -15.38, 221.32 35.75



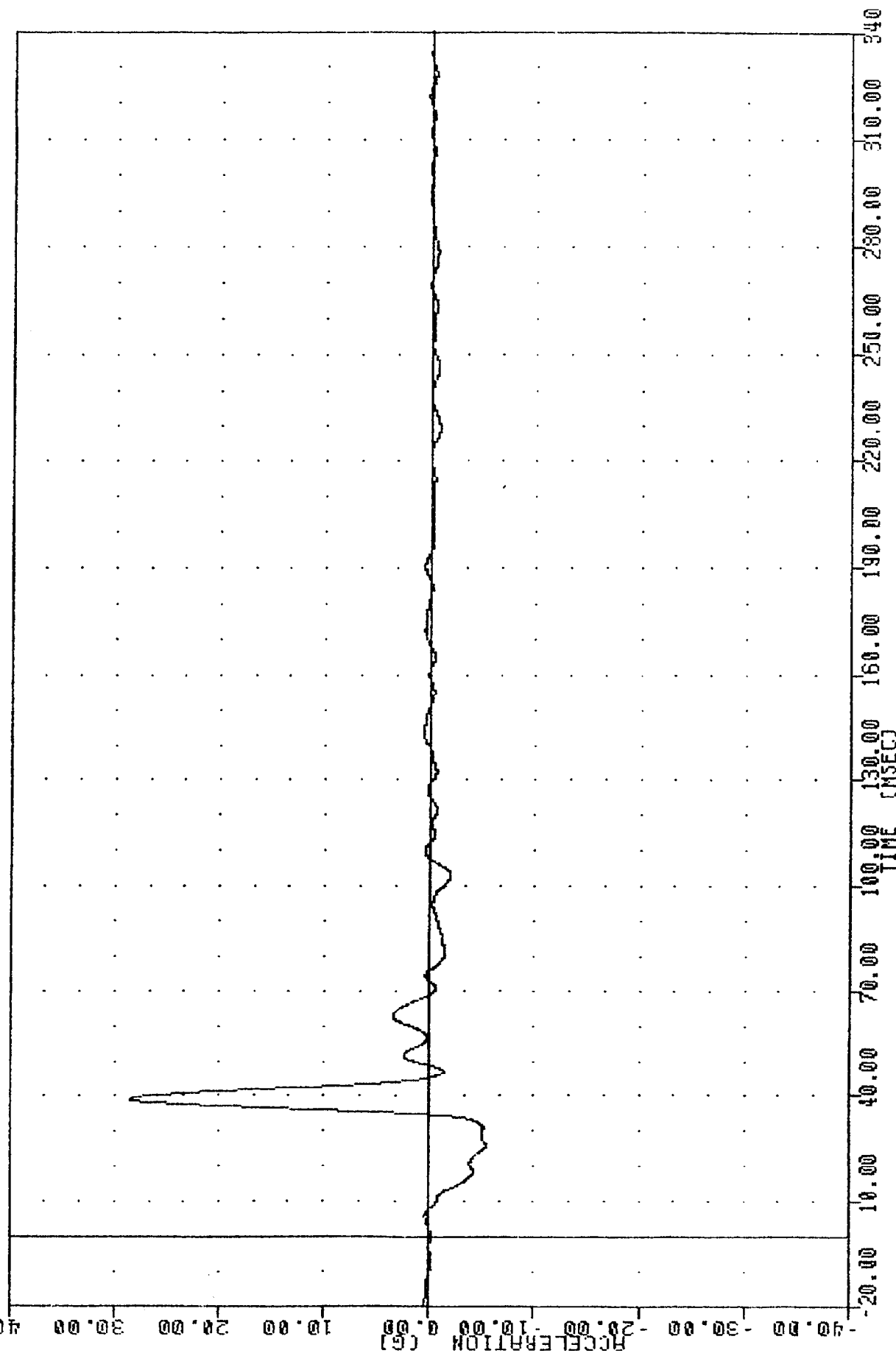
MOVING DEFORMABLE BARRIER INTO GRANADA
PASSENGER PELVIS RESULTANT

TRC 840118 26-JAN-84 08:55:52
 SIDE PROTECTION - 20R/40R
 84018000000
 PEVYV3
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -0.54e 27.88, 26.56 e 49.75



MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING PEVYG3

TRC 840718 26-JAN-84 08:49:17
 SIDE PROTECTION - 20A/40A
 84018000000
 RFXSG1
 FILTER = BLPF 100/ 318/ -40
 MIN. MAX VALUES = -5.44s 26.00s 28.49s 39.00s

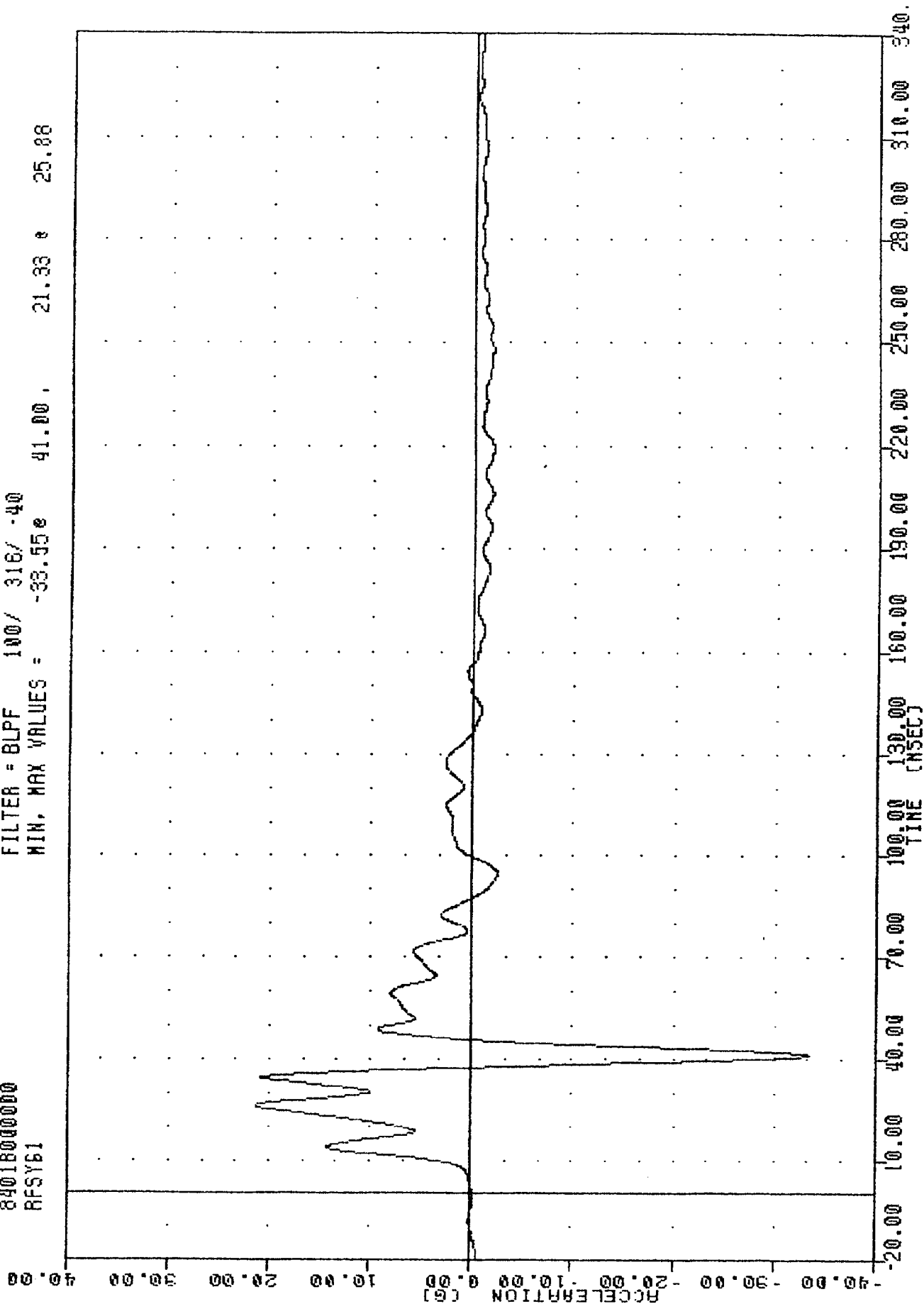


MOVING DEFORMABLE BARRIER INTO GRANADA
 VEHICLE RIGHT FRONT SILL ACCELERATION X AXIS

THC 840118
SIDE PROTECTION - 20A/4DA
84018000000
RFSY61

PLUT DATE 26-JAN-84 08:49:17

FILTER = BLPF 100/ 318/ -40
MIN, MAX VALUES = -33.55e 41.00, 21.33 e 25.88

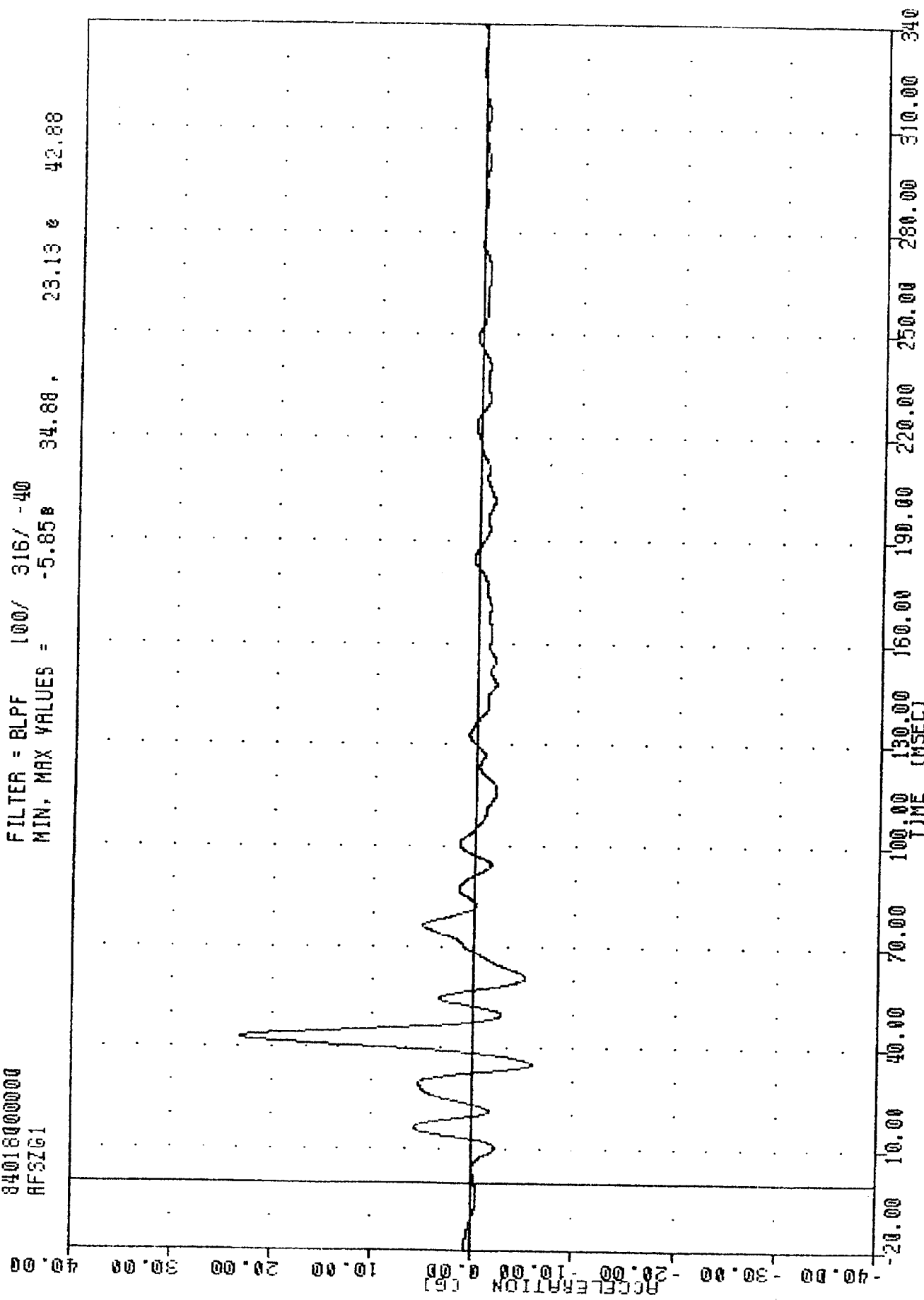


MOVING DEFORMABLE BARRIER INTO GRANADA
VEHICLE RIGHT FRONT SILL ACCELERATION Y AXIS

IRC 840118
SIDE PROTECTION - 20R/40R
84018000000
AFS2G1

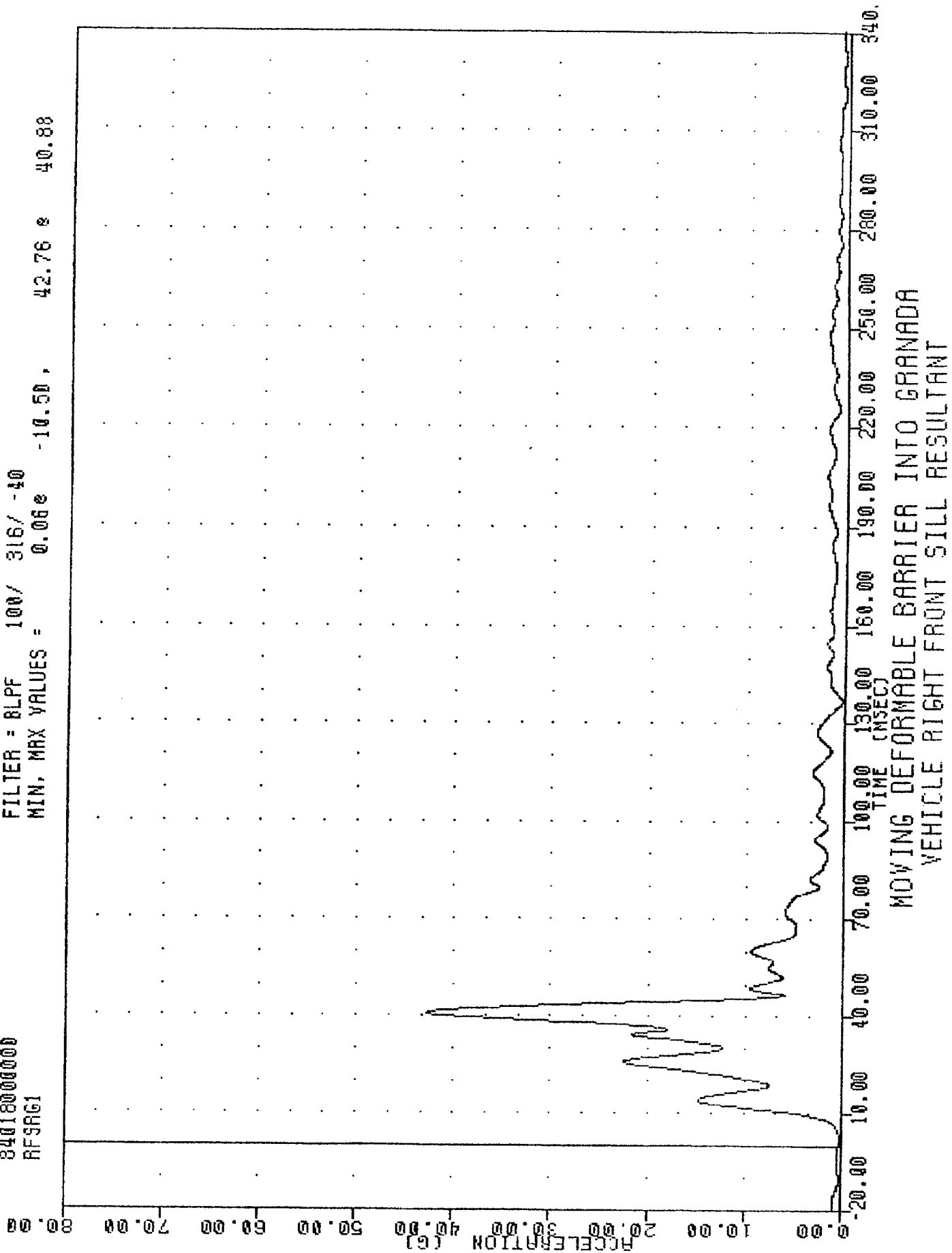
PLUT DATE 26-JAN-84 08:49:17

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -5.85 34.88 23.13 42.88



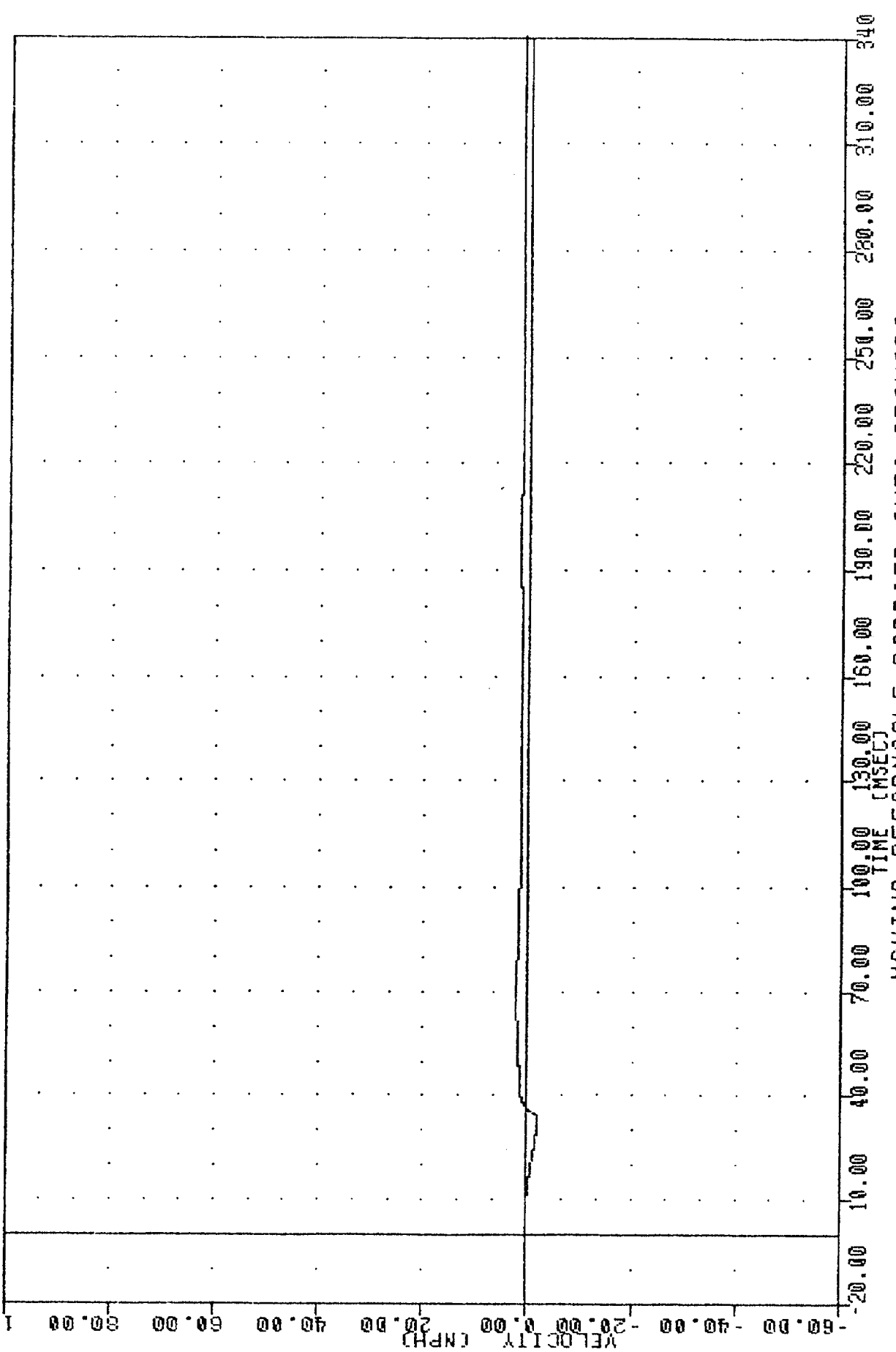
MOVING DEFORMABLE BARRIER INTO GRANADA
VEHICLE RIGHT FRONT SILL ACCELERATION Z AXIS

INC 840118
 SIDE PROTECTION - 2DR/4DR
 34018000000
 RFSRG1
 FILTER = 8LPF 100/ 316/ -10
 MIN, MAX VALUES = 0.06e -10.50, 42.76 e 40.88
 PLOT DATE 26-JAN-84 08:50:33



MOVING DEFORMABLE BARRIER INTO GRANADA
 VEHICLE RIGHT FRONT SILL RESULTANT

INC 840118 25-JAN-84 08:55:52
 SIDE PROTECTION - 2DR/4DR
 84018000000
 RFSXV1
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = 33.25, 2.23 8 72.75

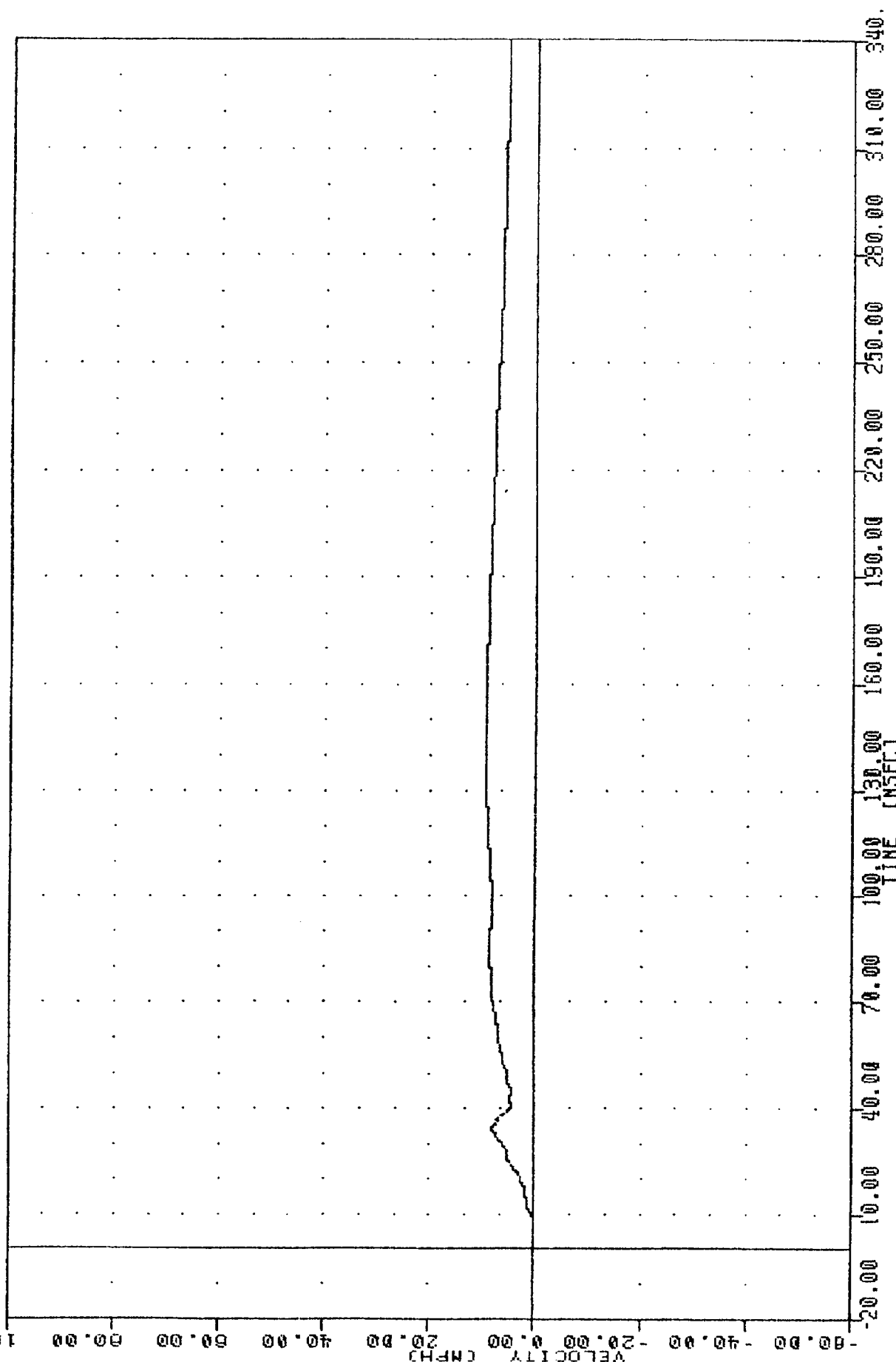


MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING RFSXG1

PLUT DATE 28-JAN-84 08:55:52

TRC 840118
SIDE PROTECTION - 20R/4DR
84018000000
RFSYV1

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -0.048 -0.88 , 9.58 e 134.38

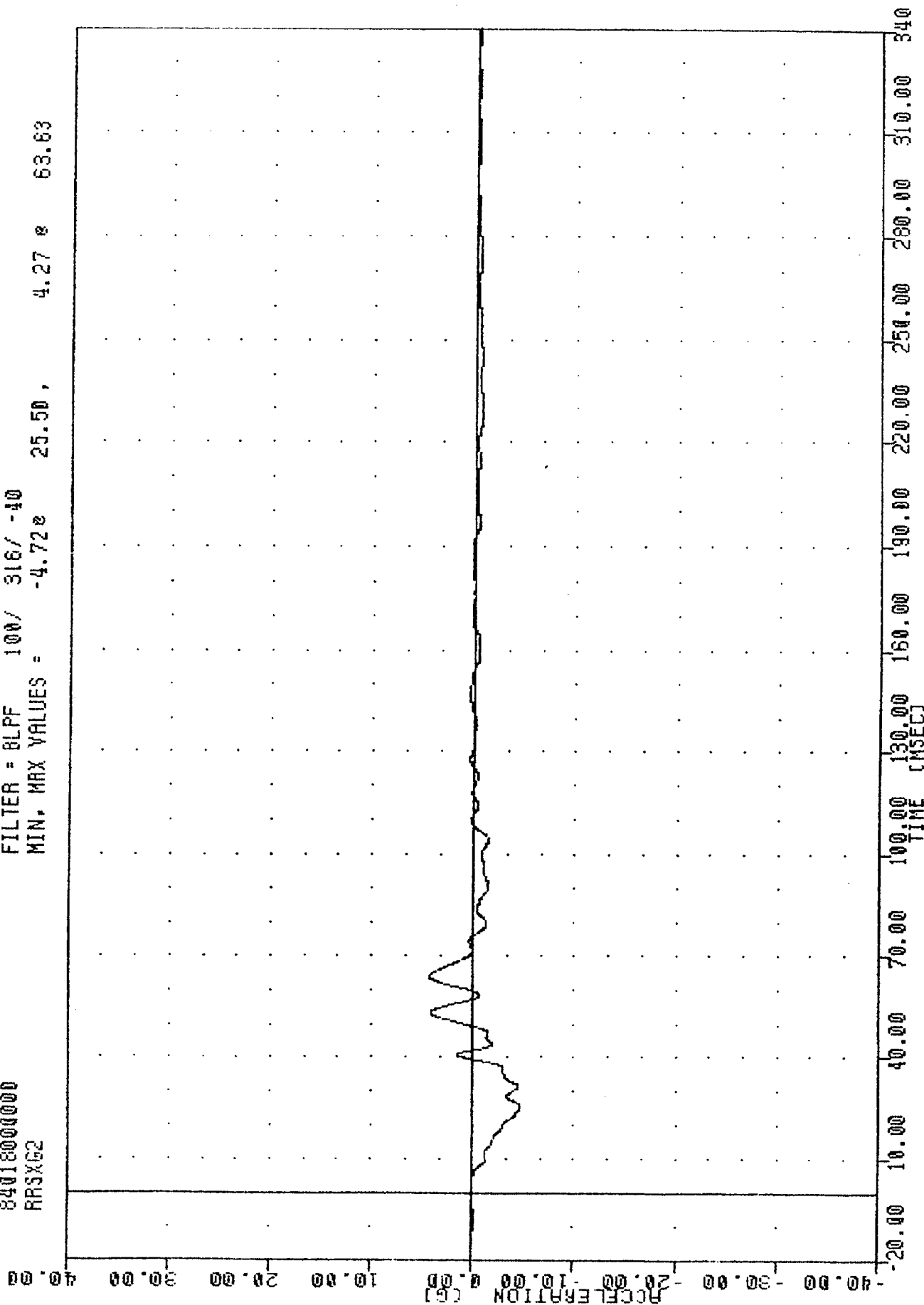


MOVING DEFORMABLE BARRIER INTO GRANADA
DELTA V USING RFSYG1

TRC
SIDE PROTECTION - 20R/40R
840180000000
RRSXG2

PLUT DATE 26-JAN-84 08:49:17

FILTER = 8LPF 100/ 316/ -40
MIN. MAX VALUES = -4.72e 25.50, 4.27 e 63.63



MOVING DEFORMABLE BARRIER INTO GRANADA
VEHICLE RIGHT REAR SILL ACCELERATION X AXIS

THC 840118 26-JAN-84 08:49:17

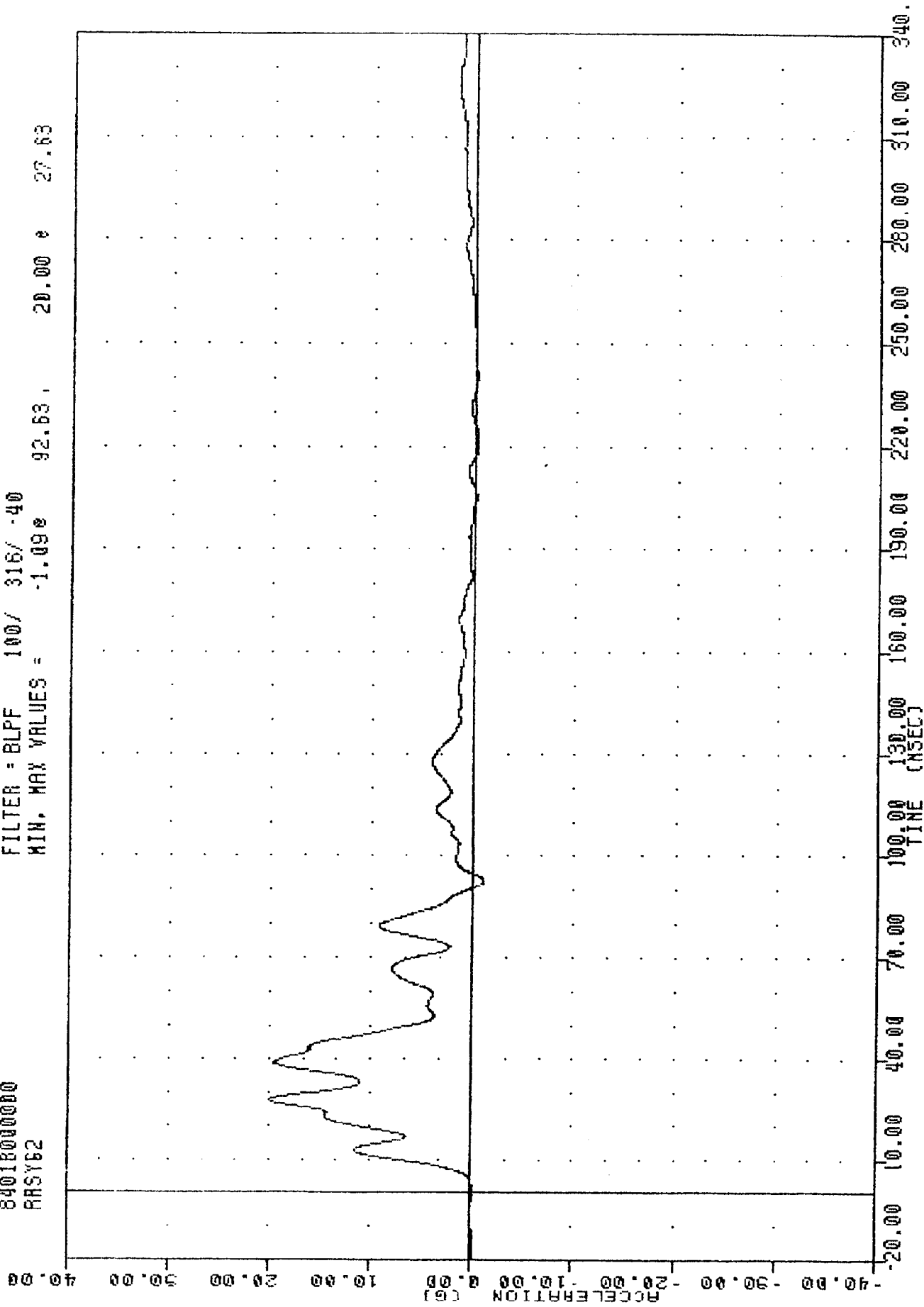
SIDE PROTECTION - 20R/4DR

8401800000

PRSY62

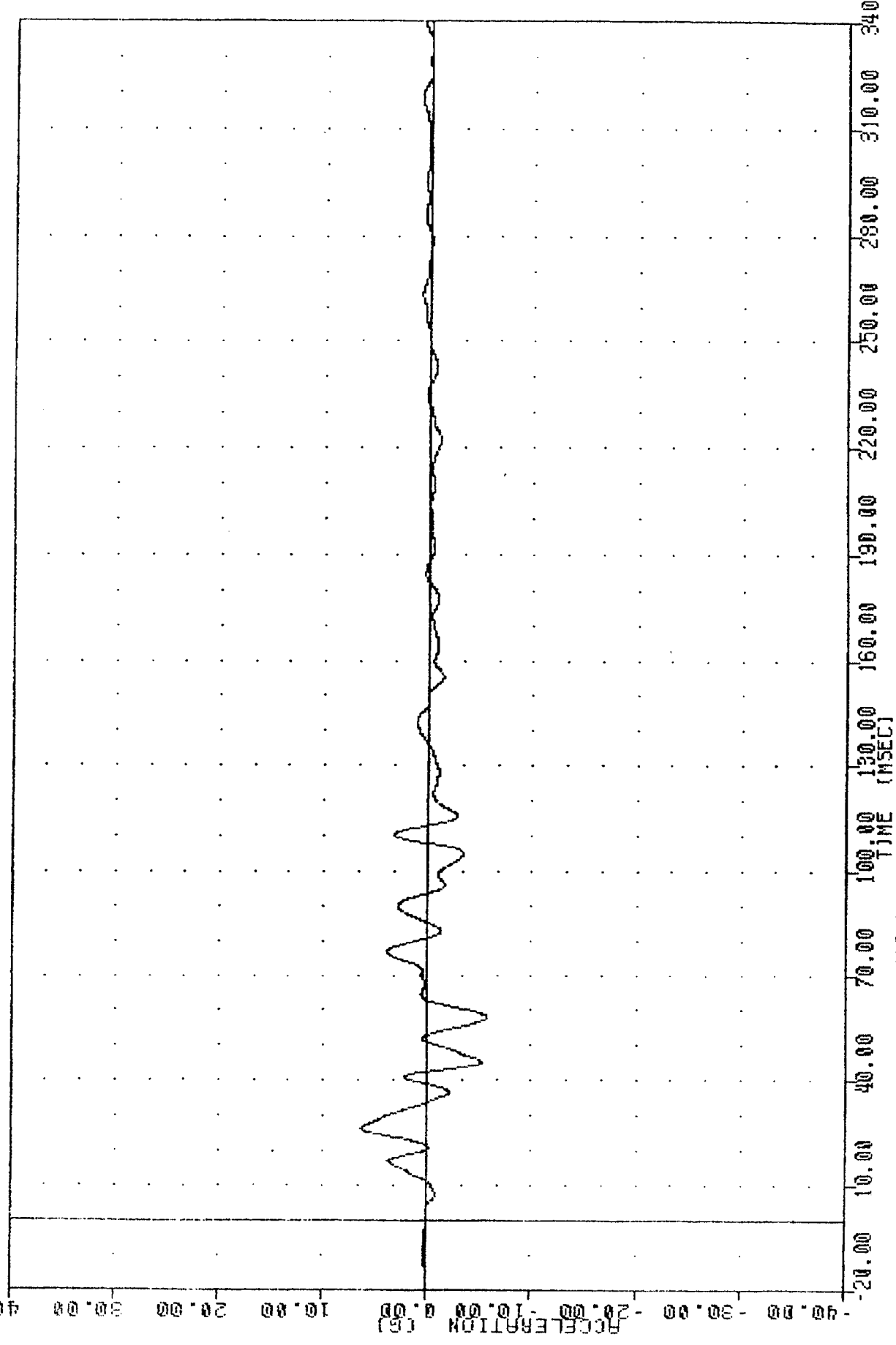
FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -1.09e 92.63, 20.00 e 27.63



MOVING DEFORMABLE BARRIER INTO GRANADA
VEHICLE RIGHT REAR SILL ACCELERATION Y AXIS

TRC 840118
 SIDE PROTECTION - 20R/40R
 84018000000
 ARSIG2
 FILTER = BLPF 100/ 315/ -40
 MIN, MAX VALUES = -5.76g 57.88g 6.32g 26.13
 PLOT DATE 26-JAN-84 08:49:17

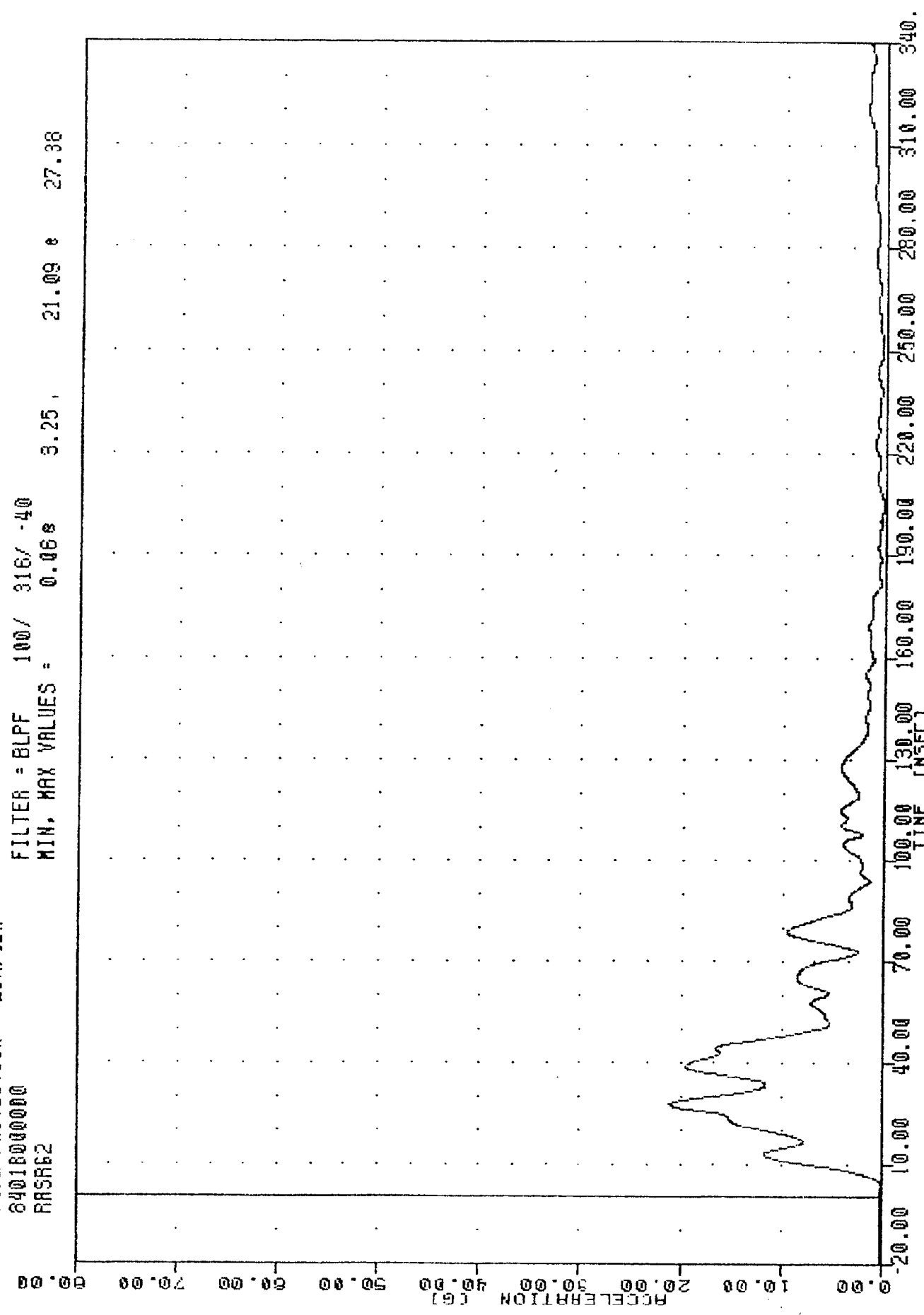


MOVING DEFORMABLE BARRIER INTO GRANADA
 VEHICLE RIGHT REAR SILL ACCELERATION Z AXIS

TRC
 840118
 SIDE PROTECTION - 20R/4DR
 84018000000
 RASR62

PLUT DATE 28-JAN-84 08:50:33

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = 0.06s 3.25, 21.09 s 27.38

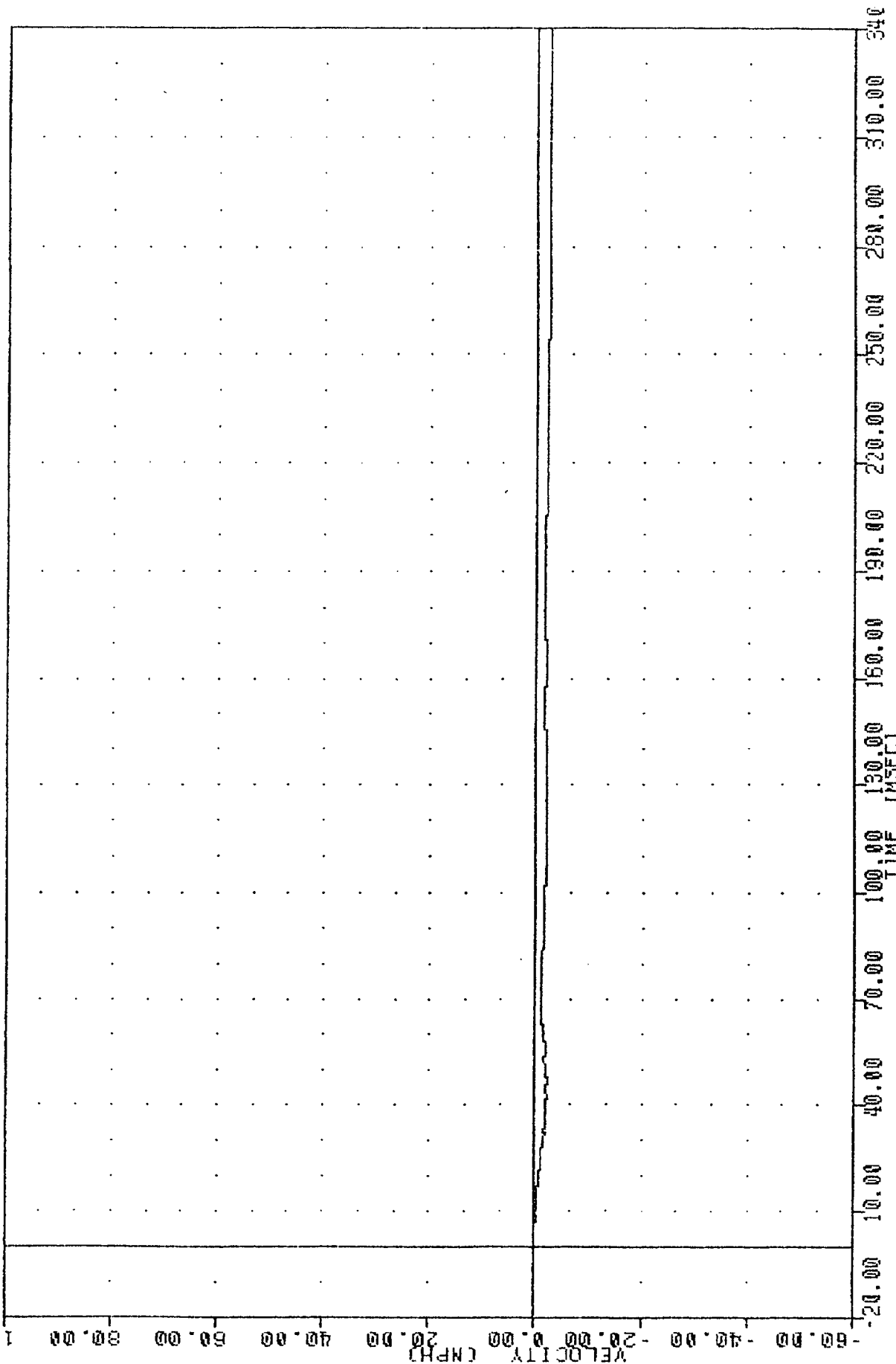


MOVING DEFORMABLE BARRIER INTO GRANADA
 VEHICLE RIGHT REAR SILL RESULTANT

IRC
 SIDE PROTECTION - 2DR/4DR
 84018000000
 ARSXV2

PLUT DATE 26-JAN-84 08:55:52

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -2.41E 340.00, 0.00E -14.88

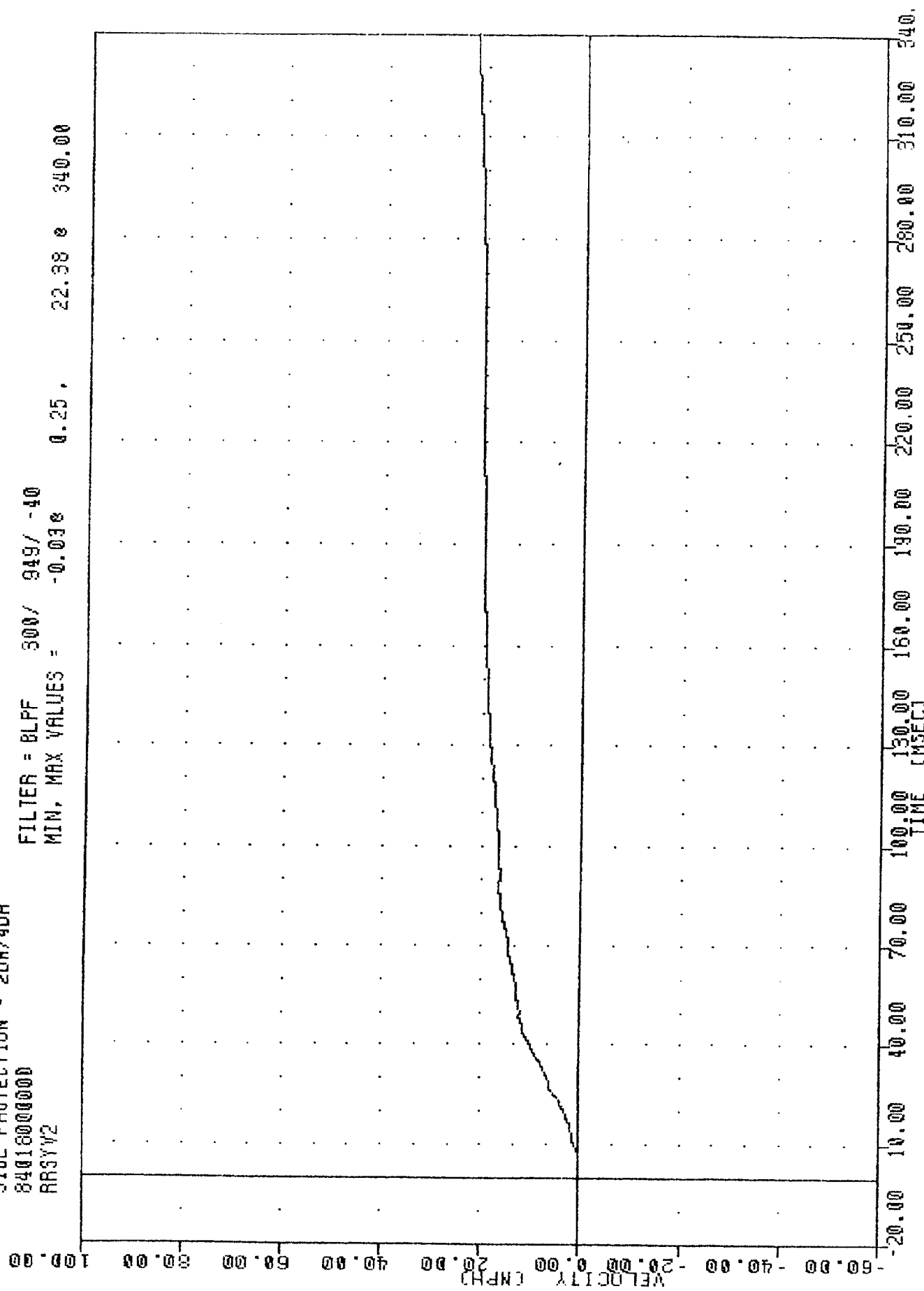


MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING ARSXG2

MC 8400110
 SIDE PROTECTION - 20R/4DR
 840180000000
 RRSYV2

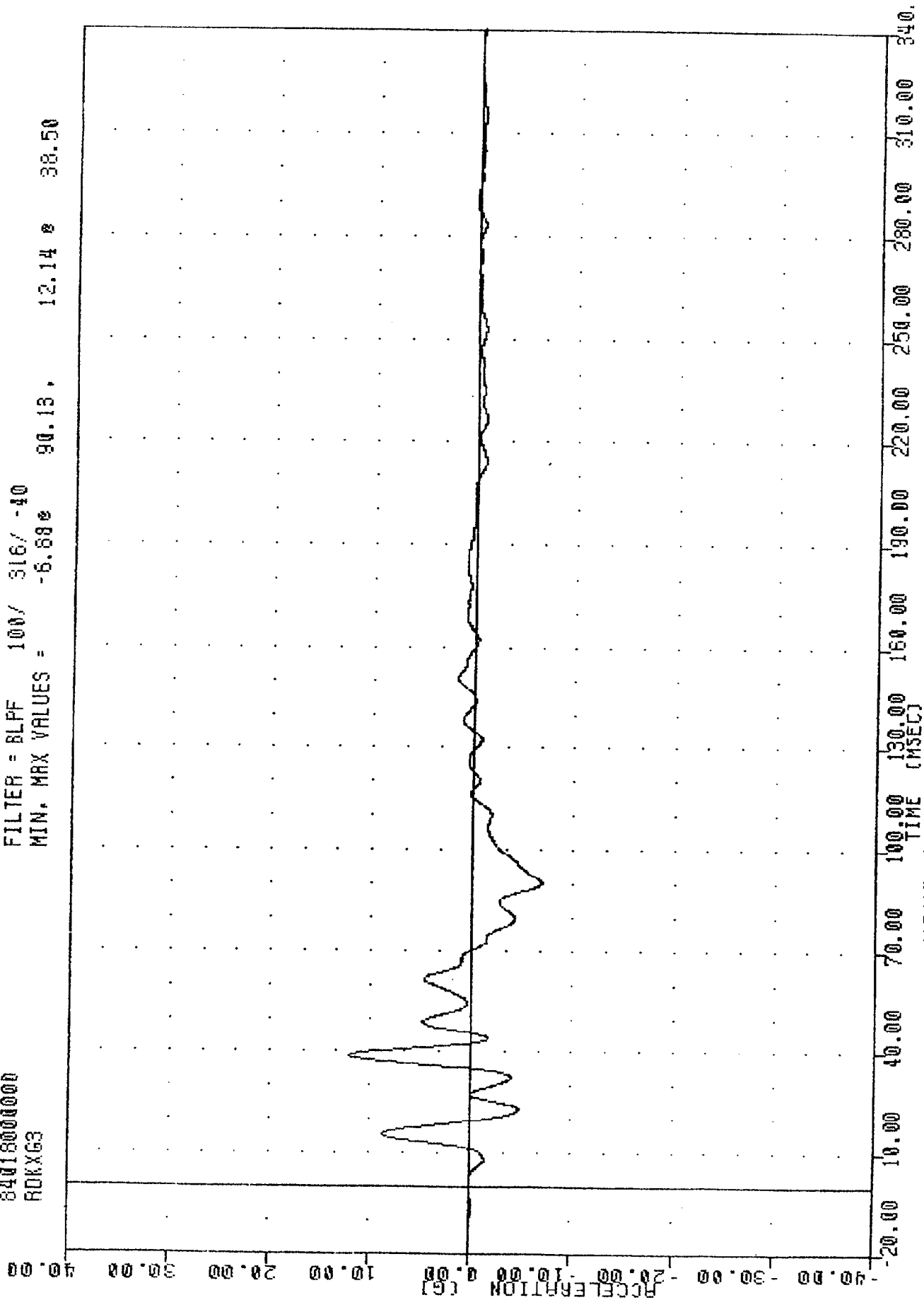
TEST DATE 20-JAN-84 06:55:32

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -0.038 0.25, 22.38 340.00



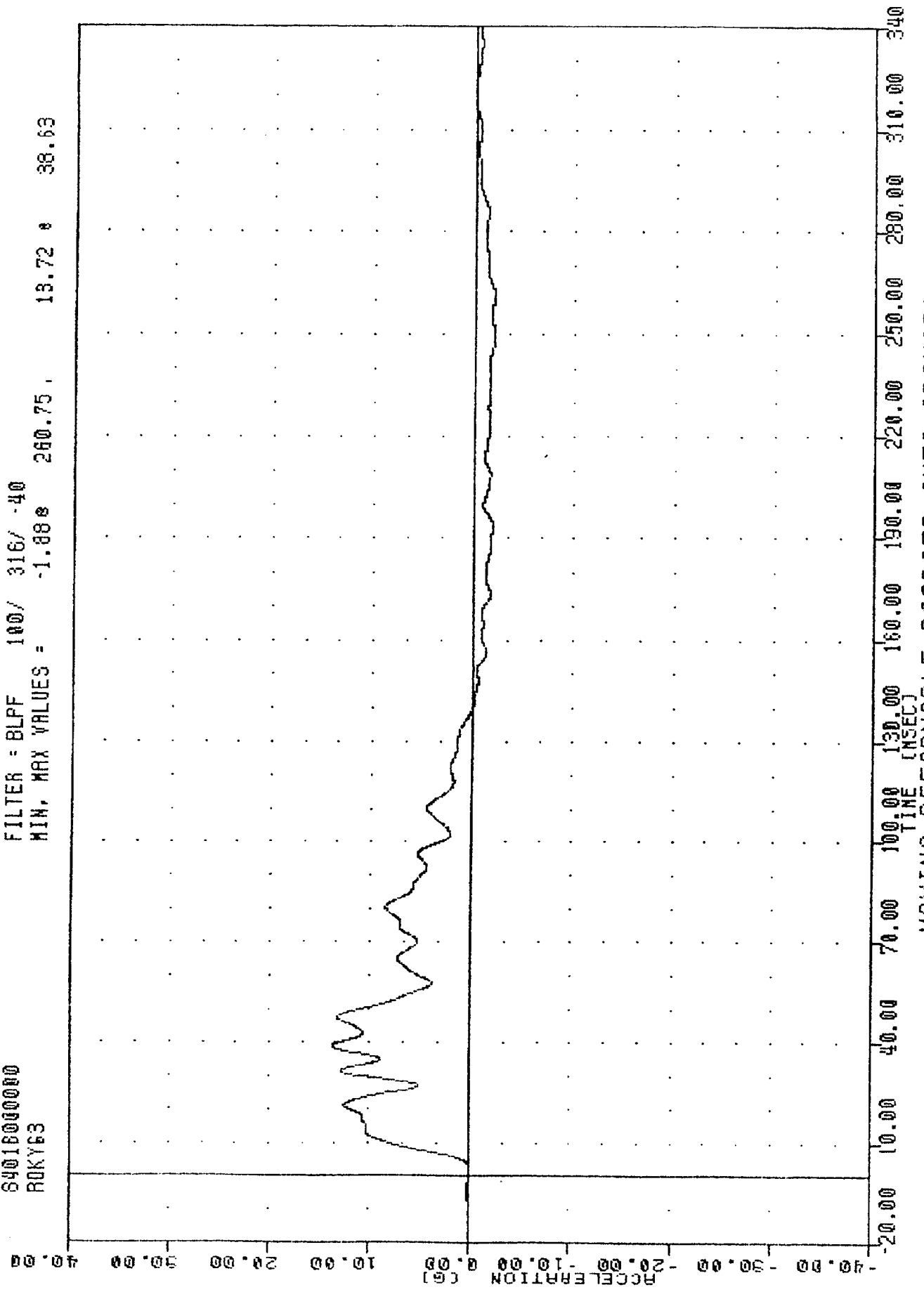
MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING ARSYG2

INC 840718
 SIDE PROTECTION - 20R/40R
 84018000000
 RDKX63
 PLOT DATE 28-JAN-84 08:49:17
 FILTER = 8LFF 100/ 316/ -40
 MIN. MAX VALUES = 90.13, 12.14 @ 38.50



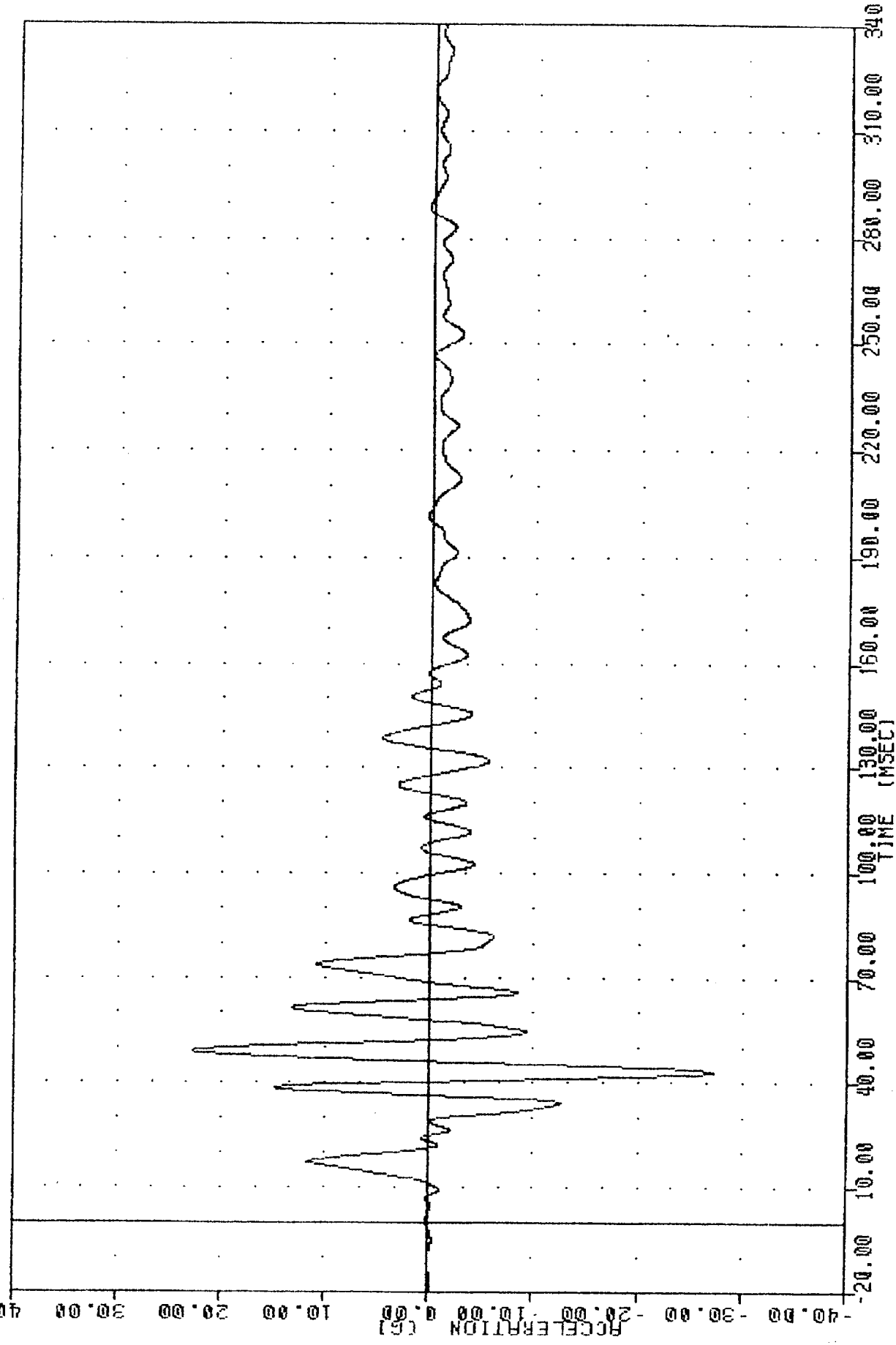
MOVING DEFORMABLE BARRIER INTO GRANADA
 VEHICLE REAR DECK ACCELERATION X AXIS

THE 840118
 SIDE PROTECTION - 20R/4DR
 84016000000
 ROKY63
 PLOT DATE 26-JAN-84 08:49:17
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -1.88e 260.75 , 13.72 e 38.63



MOVING DEFORMABLE BARRIER INTO GRANADA
 VEHICLE REAR DECK ACCELERATION Y AXIS

PC 840110
 SIDE PROTECTION - 2DR/4DR
 84018000000
 RDKZG3
 TEST DATE 28-JAN-84 08:43.17
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -27.38e 42.88, 22.84 e 49.00

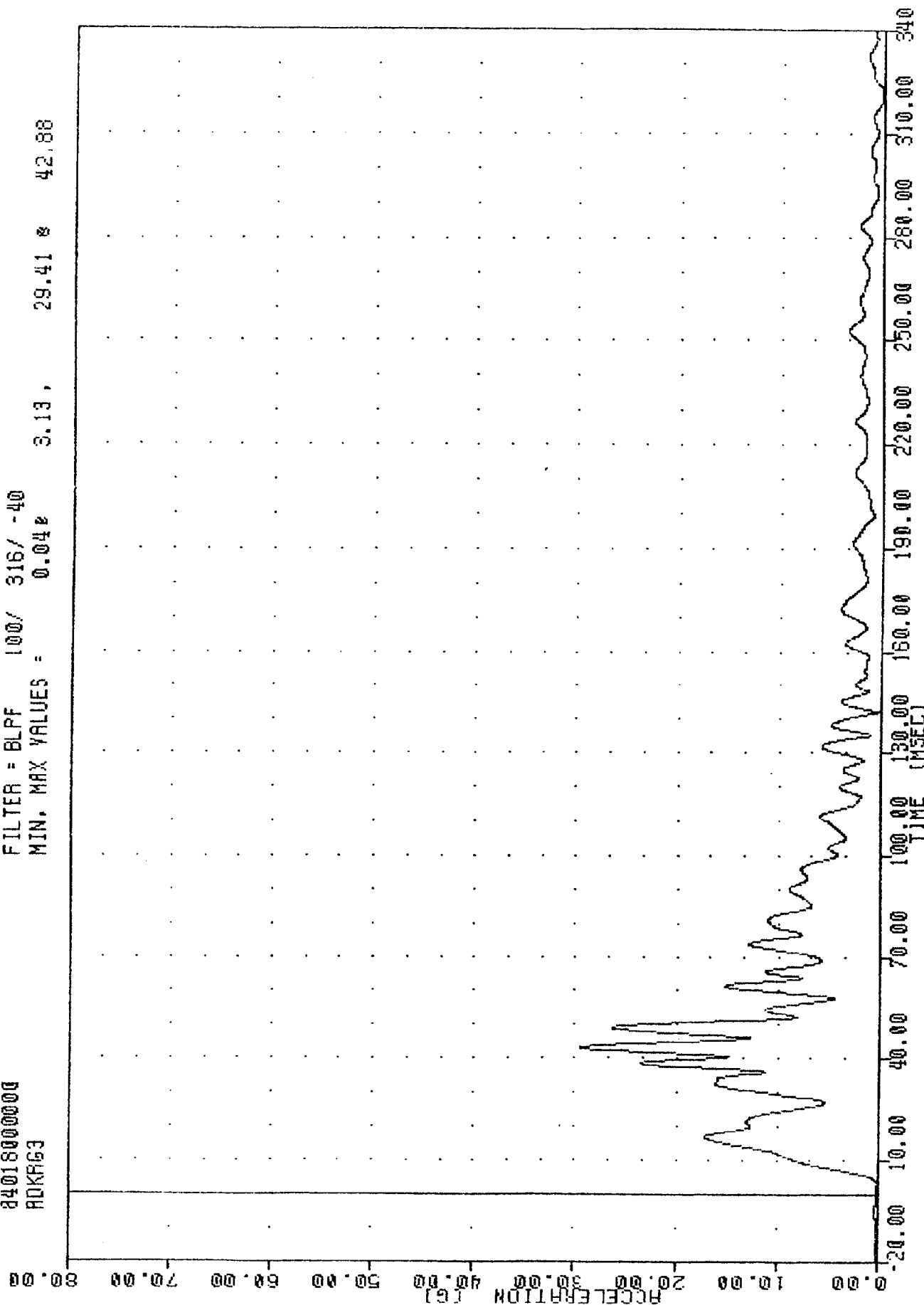


MOVING DEFORMABLE BARRIER INTO GRANADA
 VEHICLE REAR DECK ACCELERATION Z AXIS

IRC 840118
 SIDE PROTECTION - 2DR/4DR
 84018000000
 RDKRG3

PLOT DATE 26-JAN-84 08:50:33

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = 0.042 3.13, 29.41 42.88



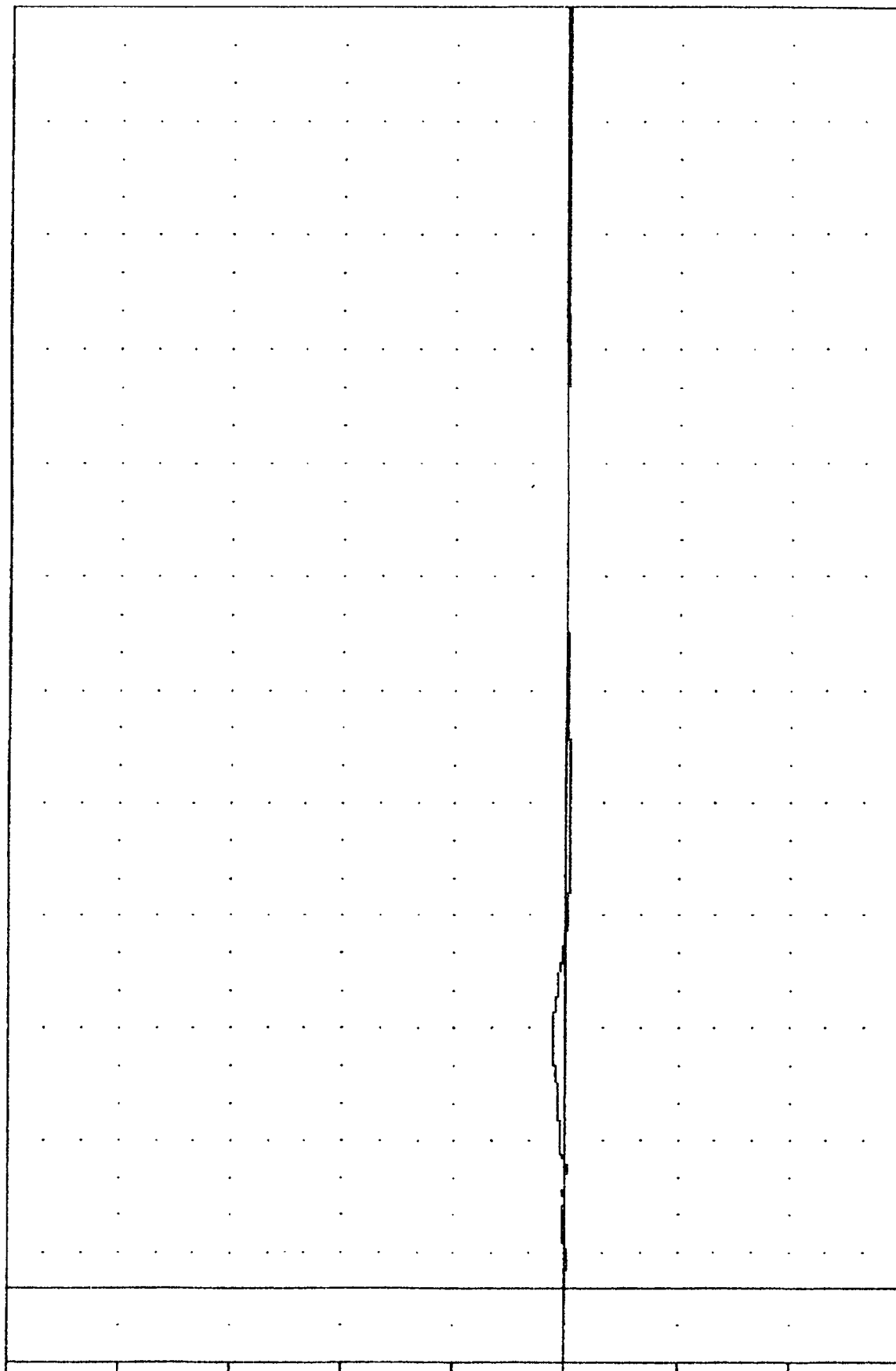
MOVING DEFORMABLE BARRIER INTO GRANADA
 VEHICLE REAR DECK RESULTANT

TAC 840118
 SIDE PROTECTION - 20R/40R
 84015000000
 RDKXV3

PLOT DATE 26-JAN-84 08:55:52

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -0.67 119.00 2.33 66.38

100.00
 80.00
 60.00
 40.00
 20.00
 0.00
 -20.00
 -40.00
 -60.00
 -80.00
 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
 TIME (MSEC)

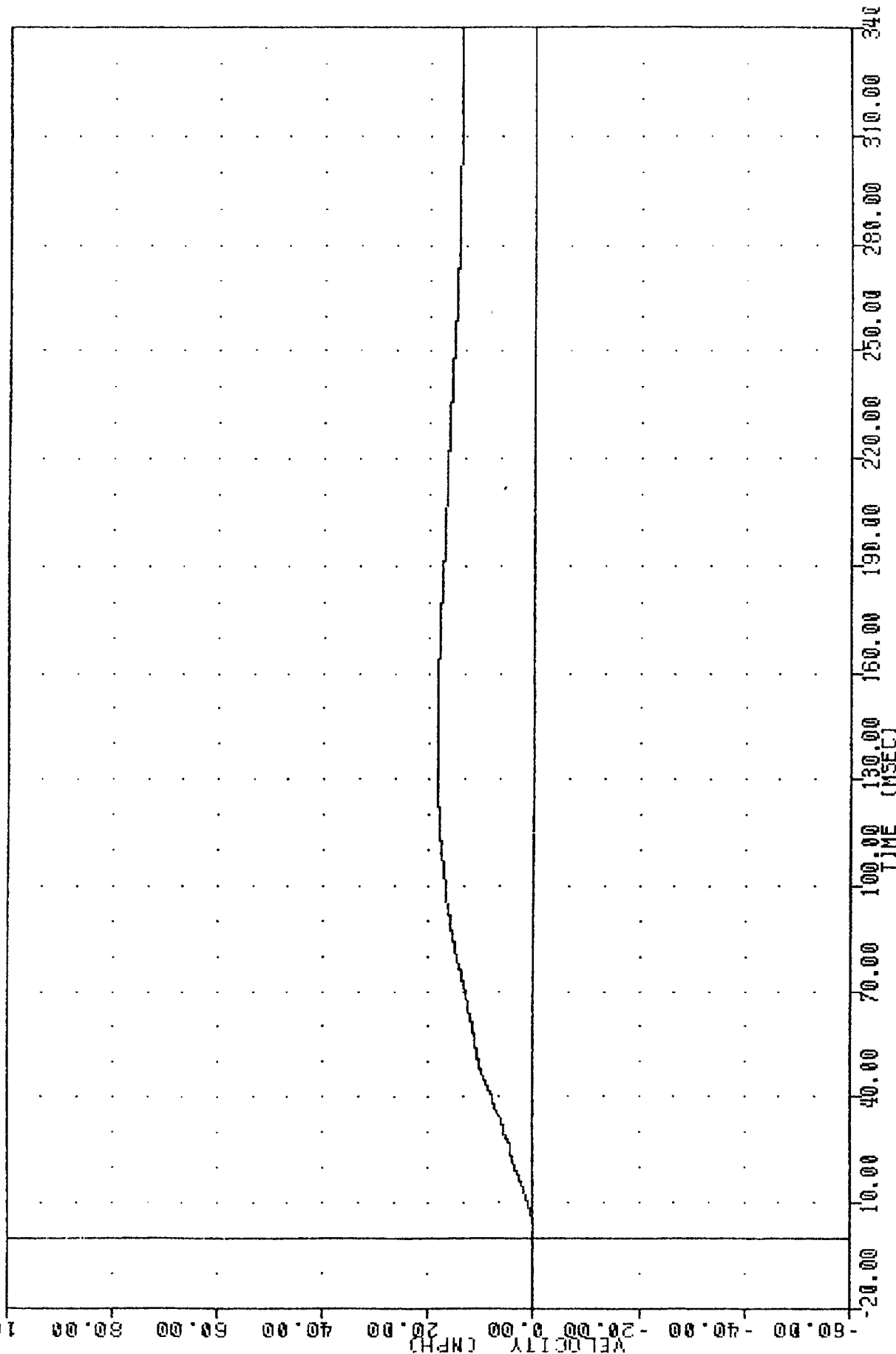
MOVING DEFORMABLE BARRIER INTO GRANADA

DELTA V USING RDKXG3

TAC 840118
 SIDE PROTECTION - 2DR/4DR
 84018000000
 ROKYV3

PLOT DATE 26-JAN-84 08:55:52

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 0.00 18.58 136.25

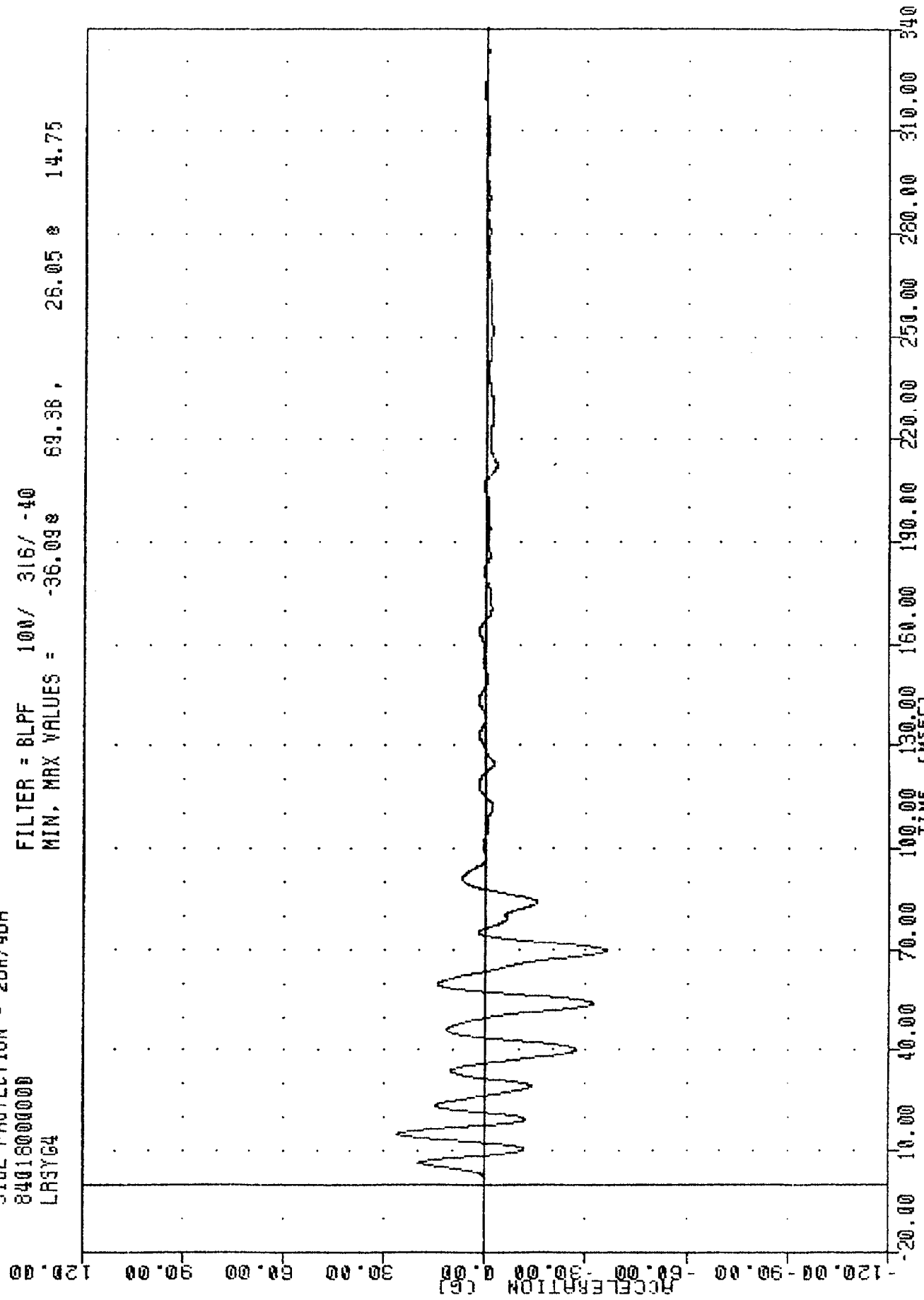


MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING ROKYV3

TRC 840118
SIDE PROTECTION - 2DR/4DR
84018000000
LR5Y64

PLOT DATE 26-JAN-84 08:49:17

FILTER = 8LPF 100/ 316/ -40
MIN, MAX VALUES = -36.09g 69.36, 26.05 g 14.75

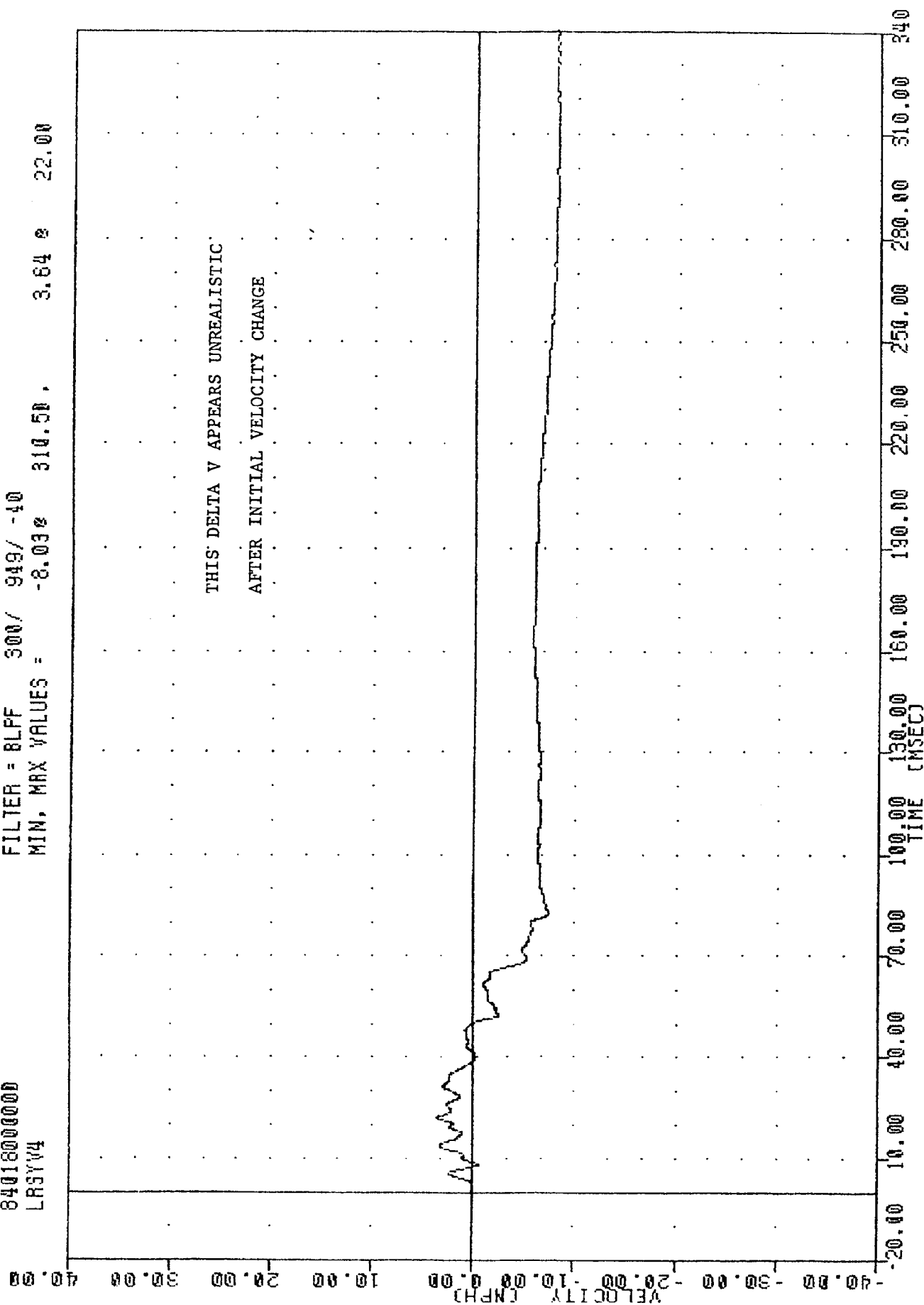


MOVING DEFORMABLE BARRIER INTO GRANADA
VEHICLE LEFT REAR STILL ACCELERATION Y AXIS

TRC 840118
SIDE PROTECTION - 2DR/4DR
84018000000
LRSYV4

PLOT DATE 26-JAN-84 08:55:52

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -8.03% 310.50, 3.64% 22.00

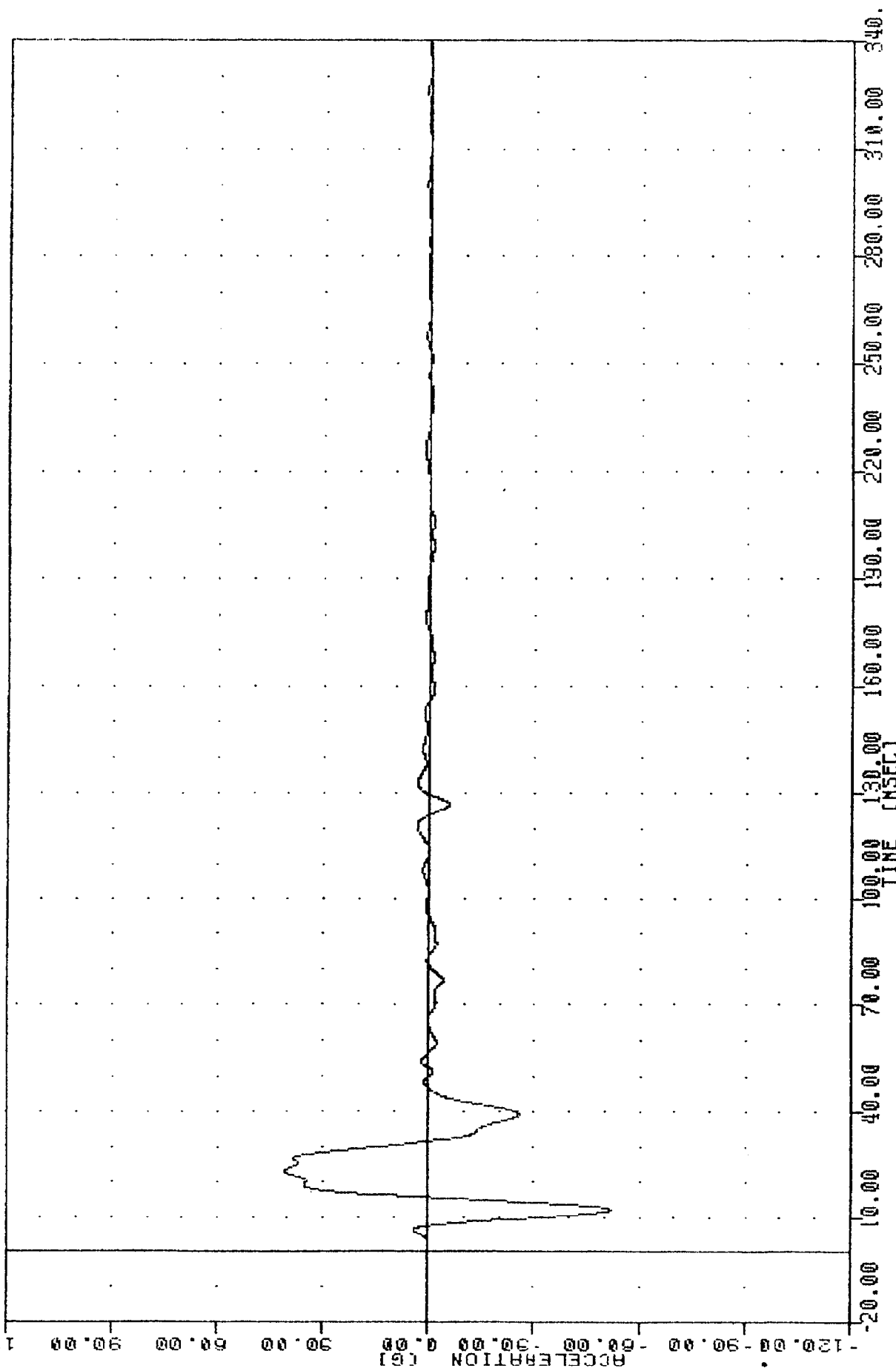


MOVING DEFORMABLE BARRIER INTO GRANADA
DELTA V USING LRSY64

THC 840118
SIDE PROTECTION - 20R/40R
84018000000
LFSY65

PLOT DATE 26-JAN-84 08:49:17

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -52.088 11.75 41.15 22.88

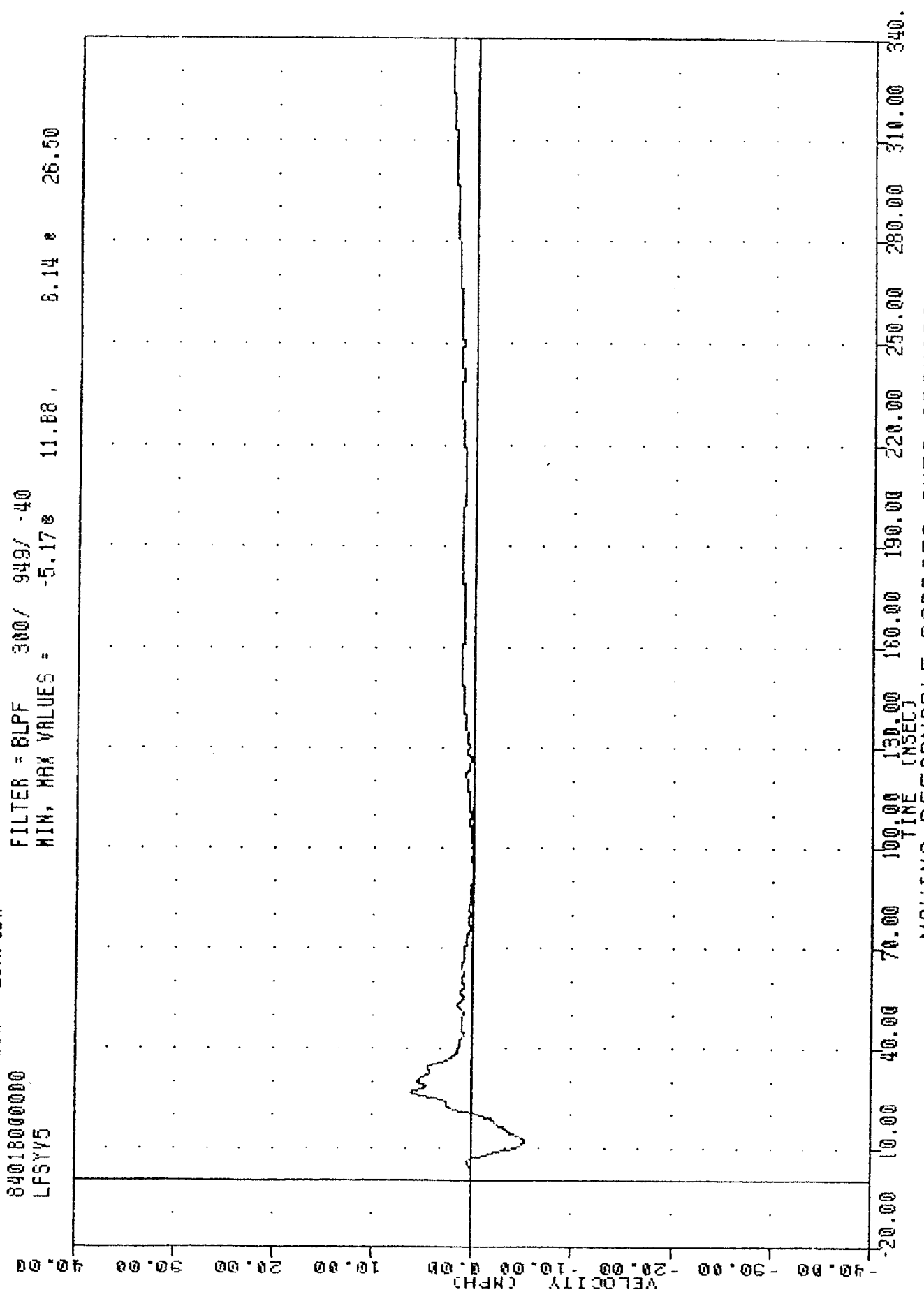


MOVING DEFORMABLE BARRIER INTO GRANADA
VEHICLE LEFT FRONT SILL ACCELERATION Y AXIS

THC 840118 26-JAN-84 08:55:52

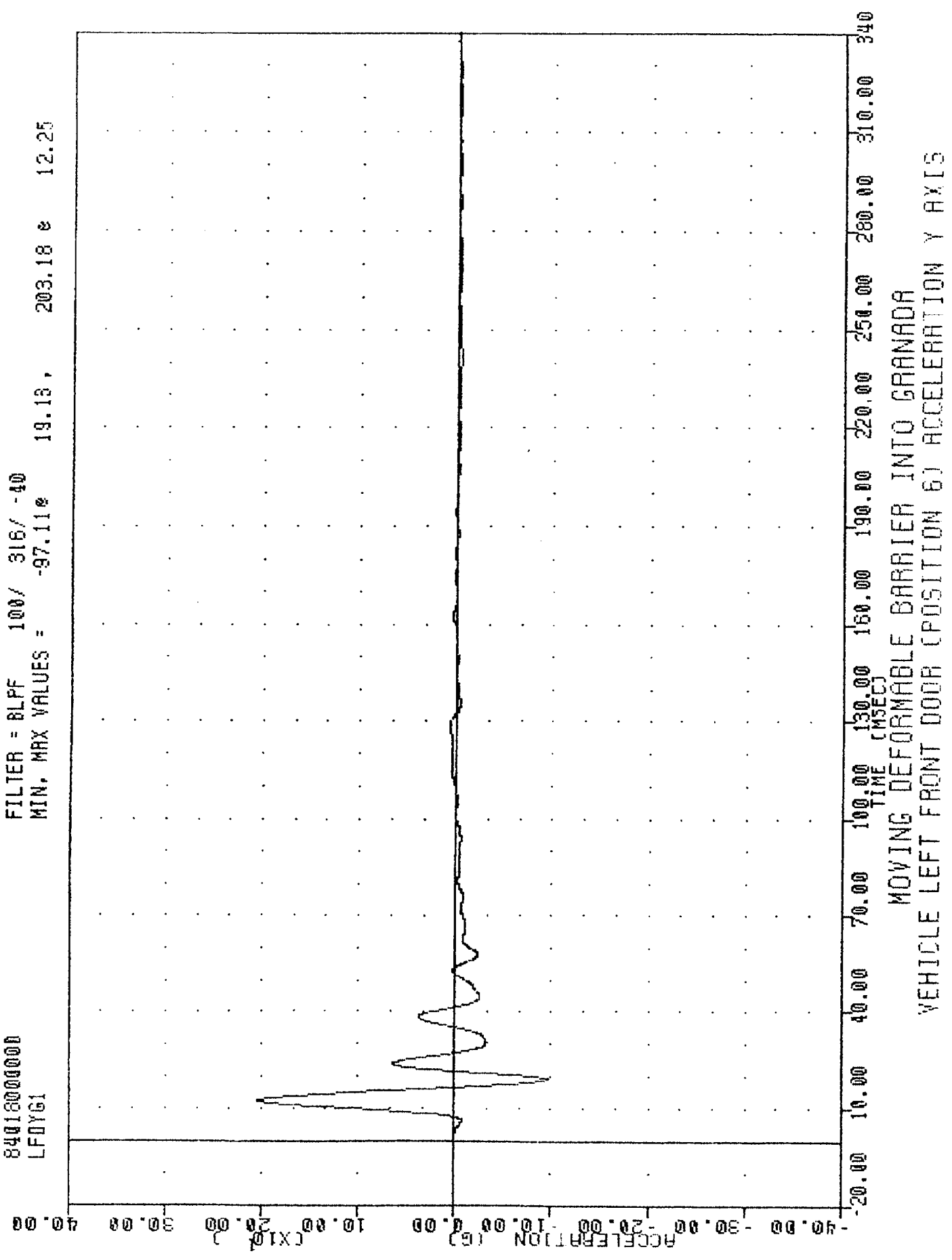
840118
SIDE PROTECTION - 20R/4DR
84018000000
LFSYV5

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -5.178 11.88 8.14 26.50



MOVING DEFORMABLE BARRIER INTO GRANADA
DELTA V USING LFSYG5

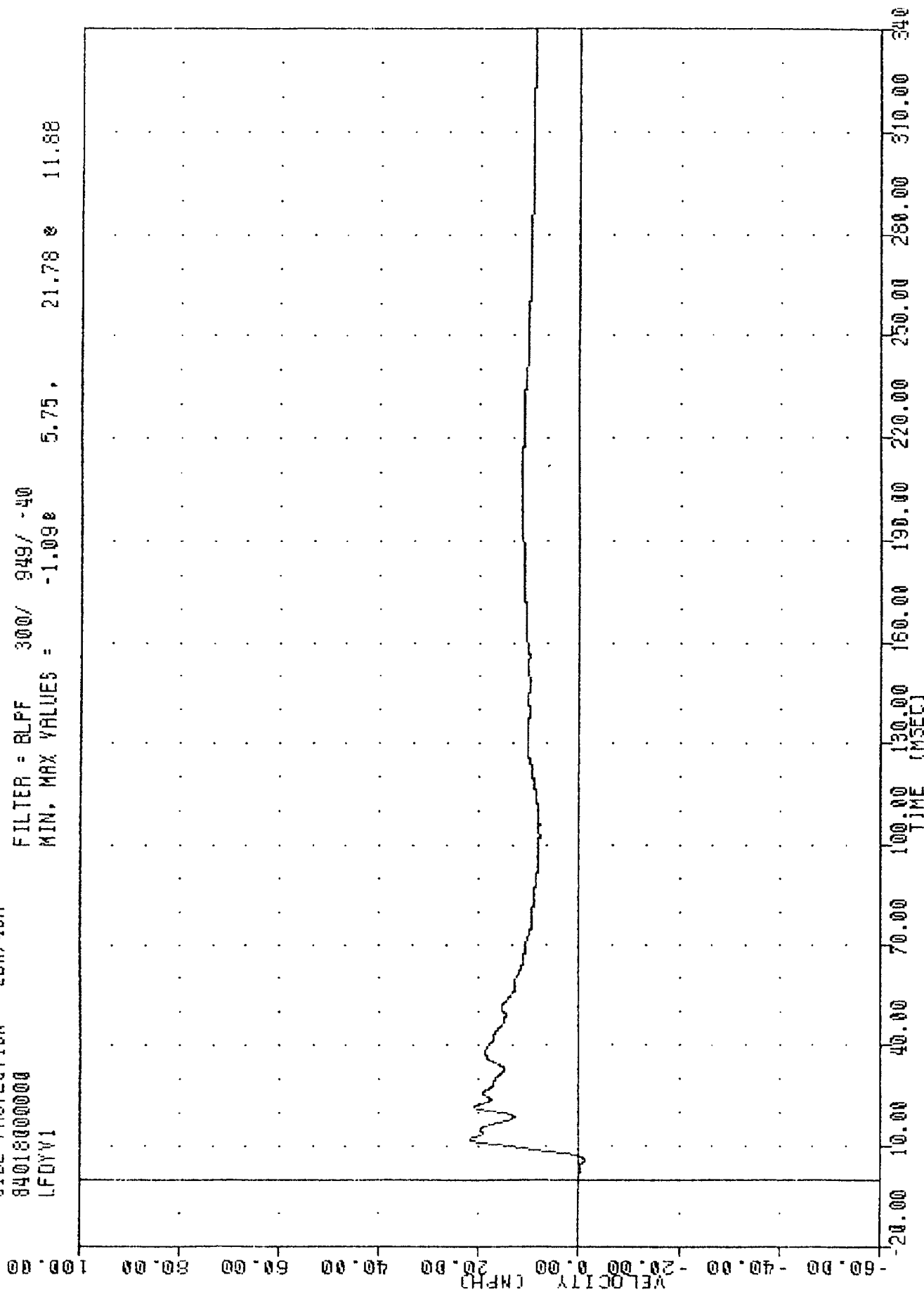
INC 840110
 SIDE PROTECTION - 2DR/4DR
 84018000000
 LFOY61
 FILTER = 8LPF 100/ 316/ -40
 MIN. MAX VALUES = -97.11e 19.13, 203.18 e 12.25
 PLOT DATE 20-JAN-84 08:49:17



TRC
 SIDE PROTECTION - 2DR/4DR
 840180000000
 LFDYV1

PLOT DATE 26-JAN-84 08:55:52

FILTER = BLFF 300/ 949/ -40
 MIN. MAX VALUES = -1.09e 5.75, 21.78 e 11.88

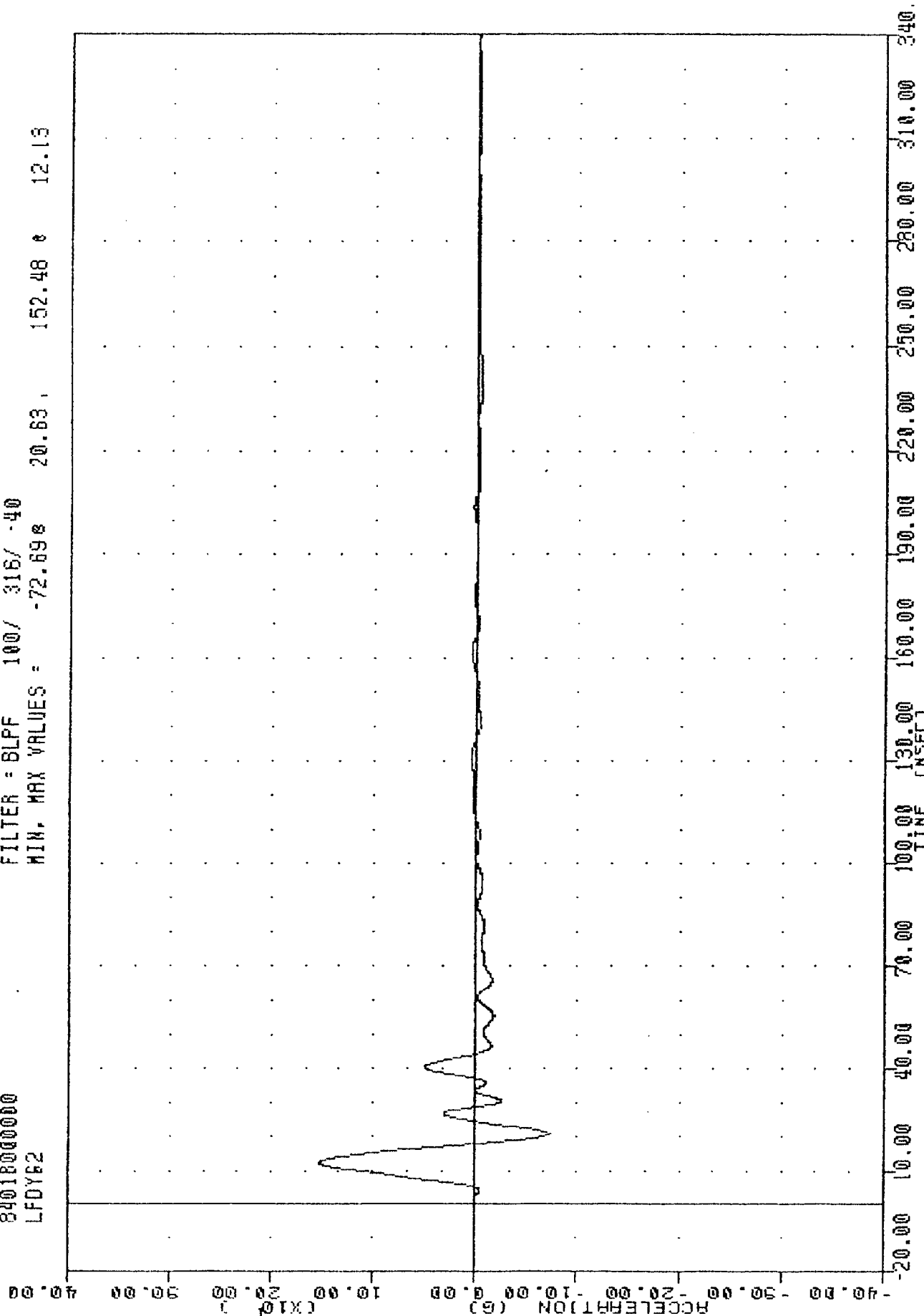


MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING LFDYGI

TSC 840118
 SIDE PROTECTION - 20R/40R
 84018000000
 LFDY62

PLOT DATE 26-JAN-84 08:49:17

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -72.698 20.63, 152.48 & 12.13

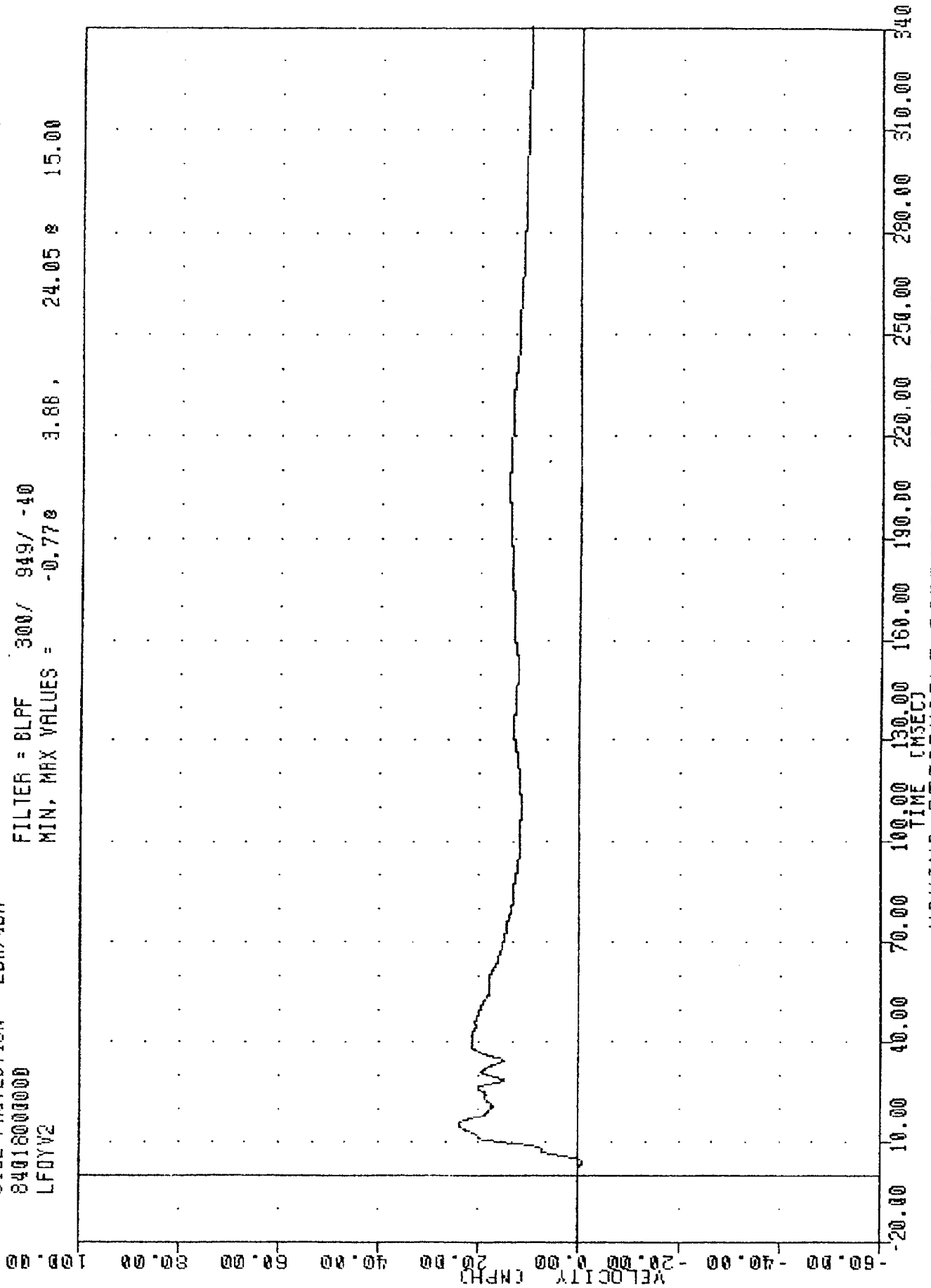


MOVING DEFORMABLE BARRIER INTO GRANADA
 VEHICLE LEFT FRONT DOOR (POSITION 8) ACCELERATION Y AXIS

TAC
SIDE PROTECTION - 20R/40R
84018000000
LFOYV2

PLOT DATE 26-JAN-84 08:55:52

FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -0.778 3.88, 24.05 8 15.00

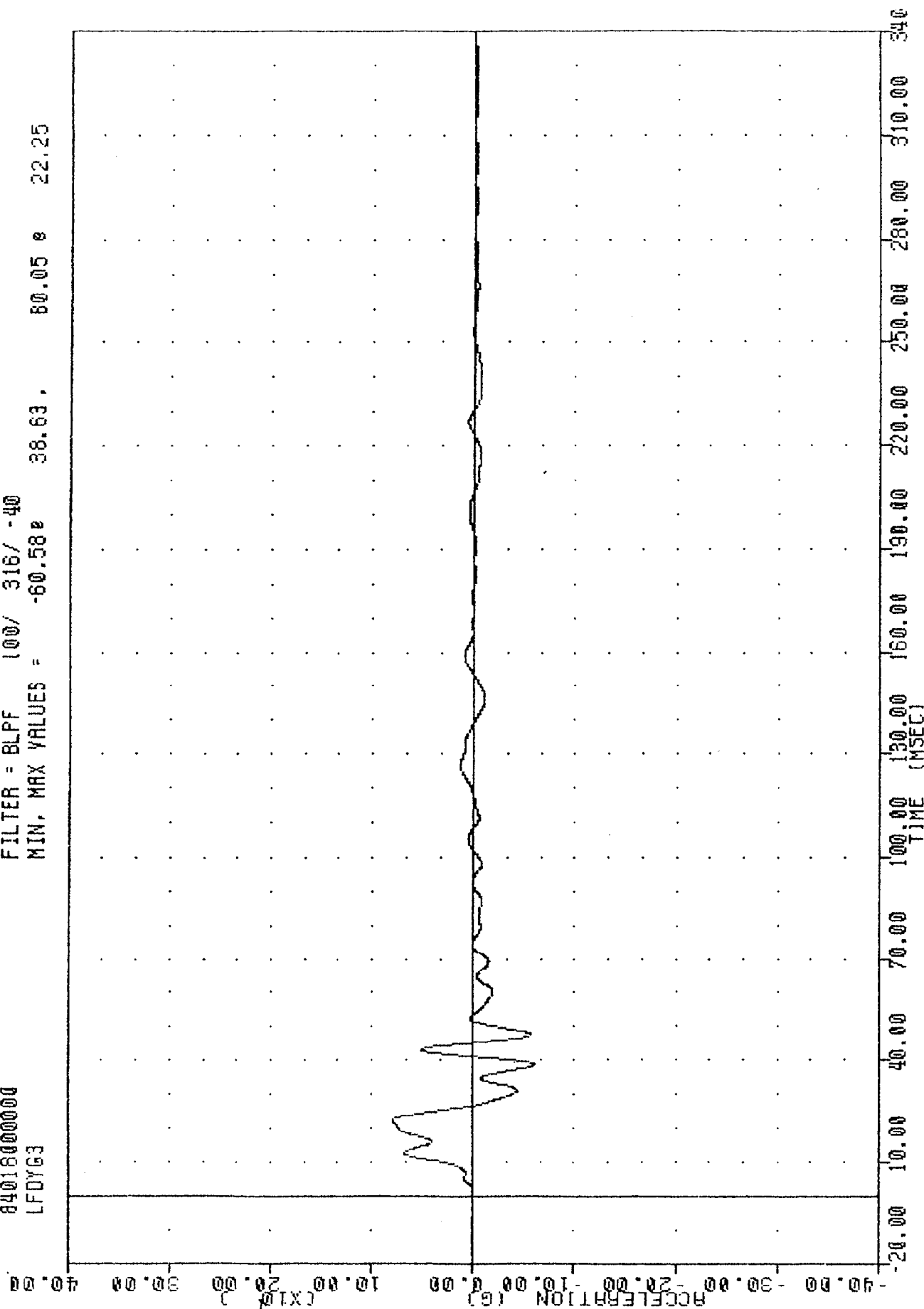


MOVING DEFORMABLE BARRIER INTO GRANADA
DELTA V USING LFOY62

IRC 840118
 SIDE PROTECTION - 2DR/40R
 840180000000
 LFDY63

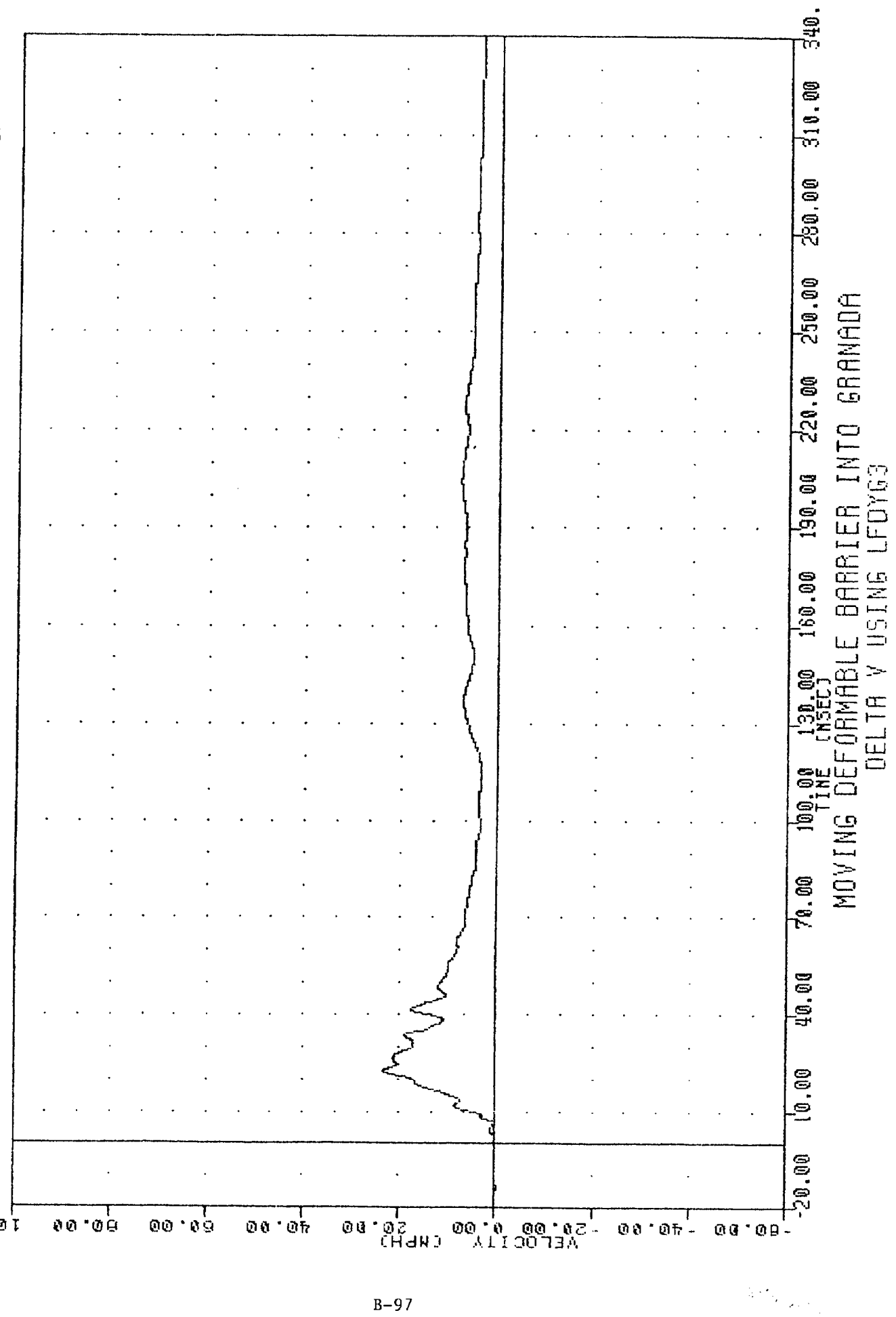
PLOT DATE 26-JAN-84 08:49:17

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -60.58e 38.63, 80.05 e 22.25



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

MC 840110 7840110 TEST DATE 28-JAN-84 08:55:52
 SIDE PROTECTION - 20R/4DR
 840180000000
 LFDYV3
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -0.058 -13.88 23.30 22.25



MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING LFDYV3

TRC 840118 25-JAN-84 08:49:17

SIDE PROTECTION - 20R/40R

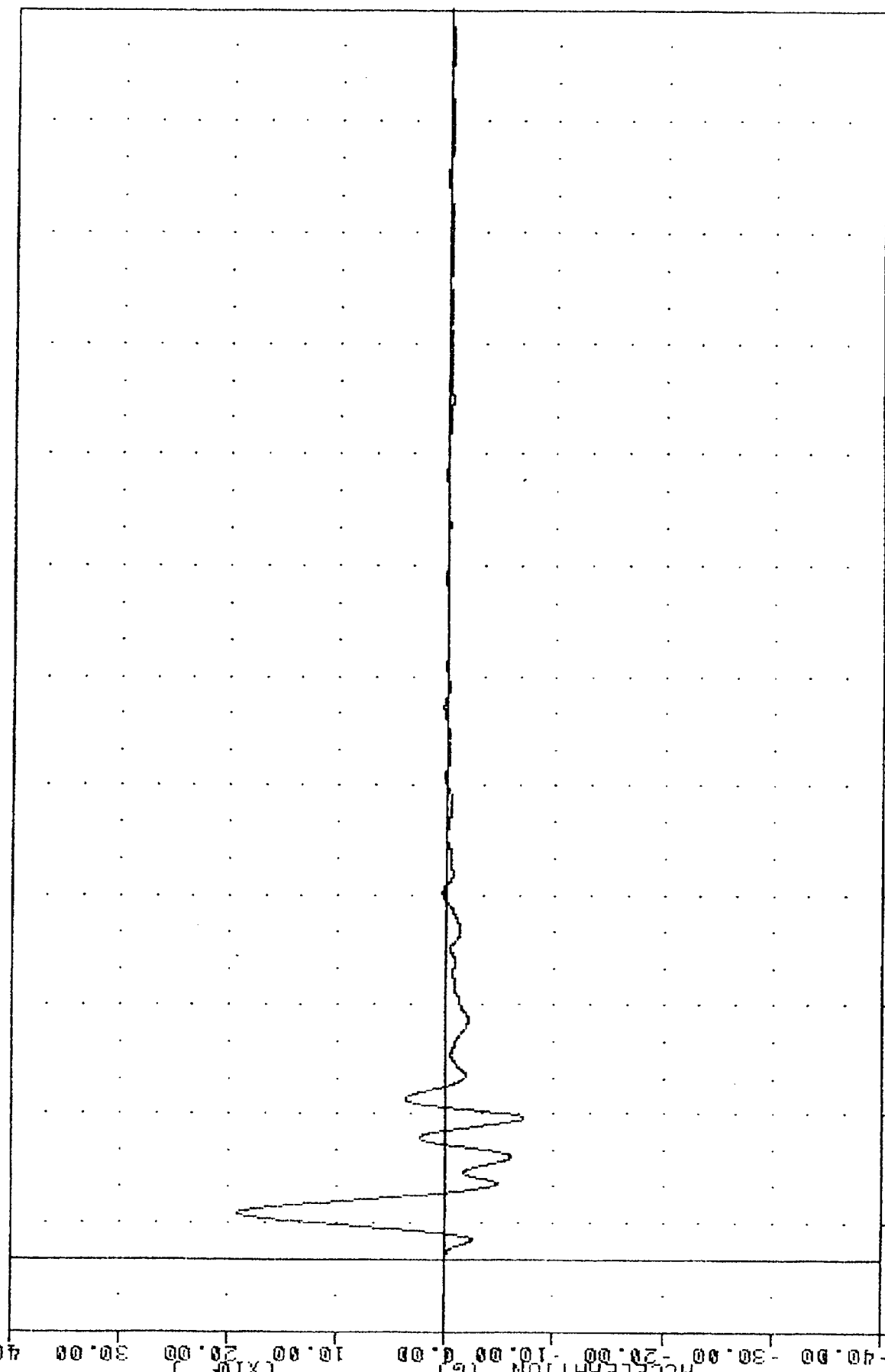
84018000000

LR0Y64

FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -72.20e 38.75, 191.53 e 12.50

ACCELERATION (G) (X10²)



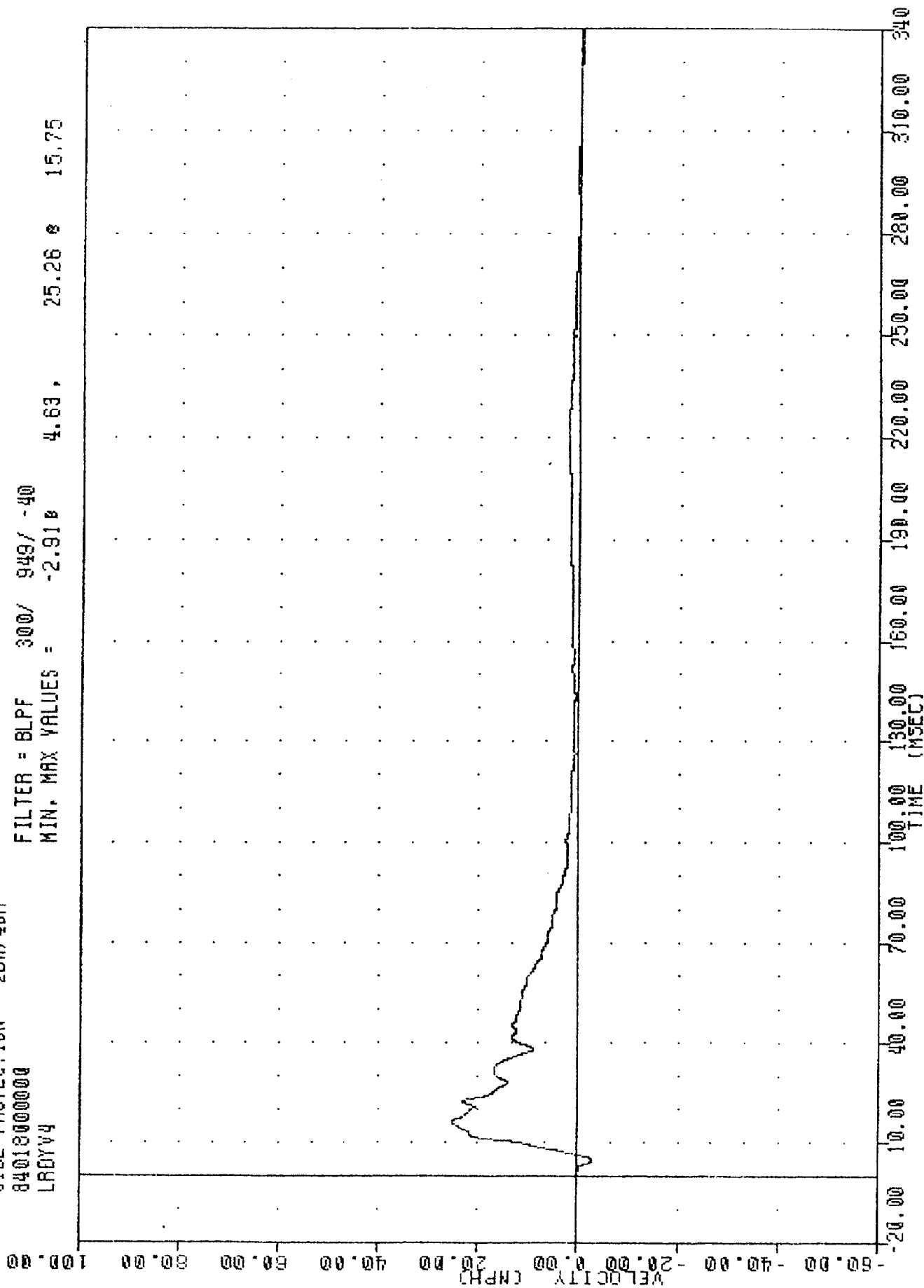
TIME (MSEC)

MOVING DEFORMABLE BARRIER INTO GRANADA
VEHICLE LEFT REAR DOOR (POSITION 10) ACCELERATION Y AXIS

TRC
 SIDE PROTECTION - 2DR/40R
 840180000000
 LRDYV4

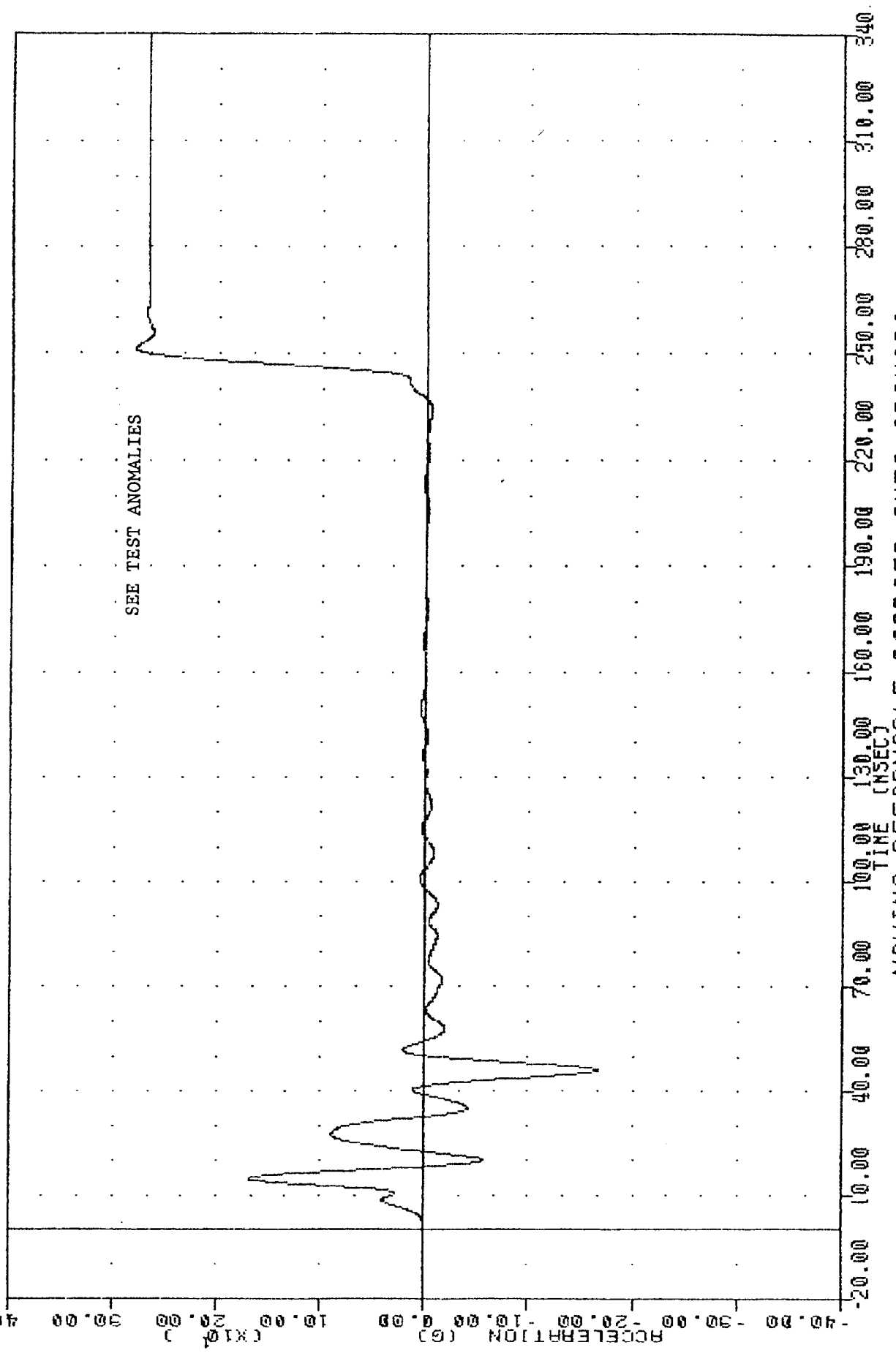
PLOT DATE 26-JAN-84 08:55:52

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -2.918 4.63, 25.26 15.75



MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING LRDYV4

TAC 7840118
 SIDE PROTECTION - 20R/4DR
 84018000000
 LADY65
 PLUT DATE 26-JAN-84 08:49:17
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -167.400 45.88 280.76 & 251.13



SEE TEST ANOMALIES

MOVING DEFORMABLE BARRIER INTO GRANADA
 VEHICLE LEFT REAR DOOR (POSITION 11) ACCELERATION Y AXIS

TRC

840118

SIDE PROTECTION - 20R/40R

840180000000

LADYV5

PLUT DATE

26-JAN-84

08:55:52

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -0.208 129.25, 568.86 @ 340.00

100.00

80.00

60.00

40.00

20.00

0.00

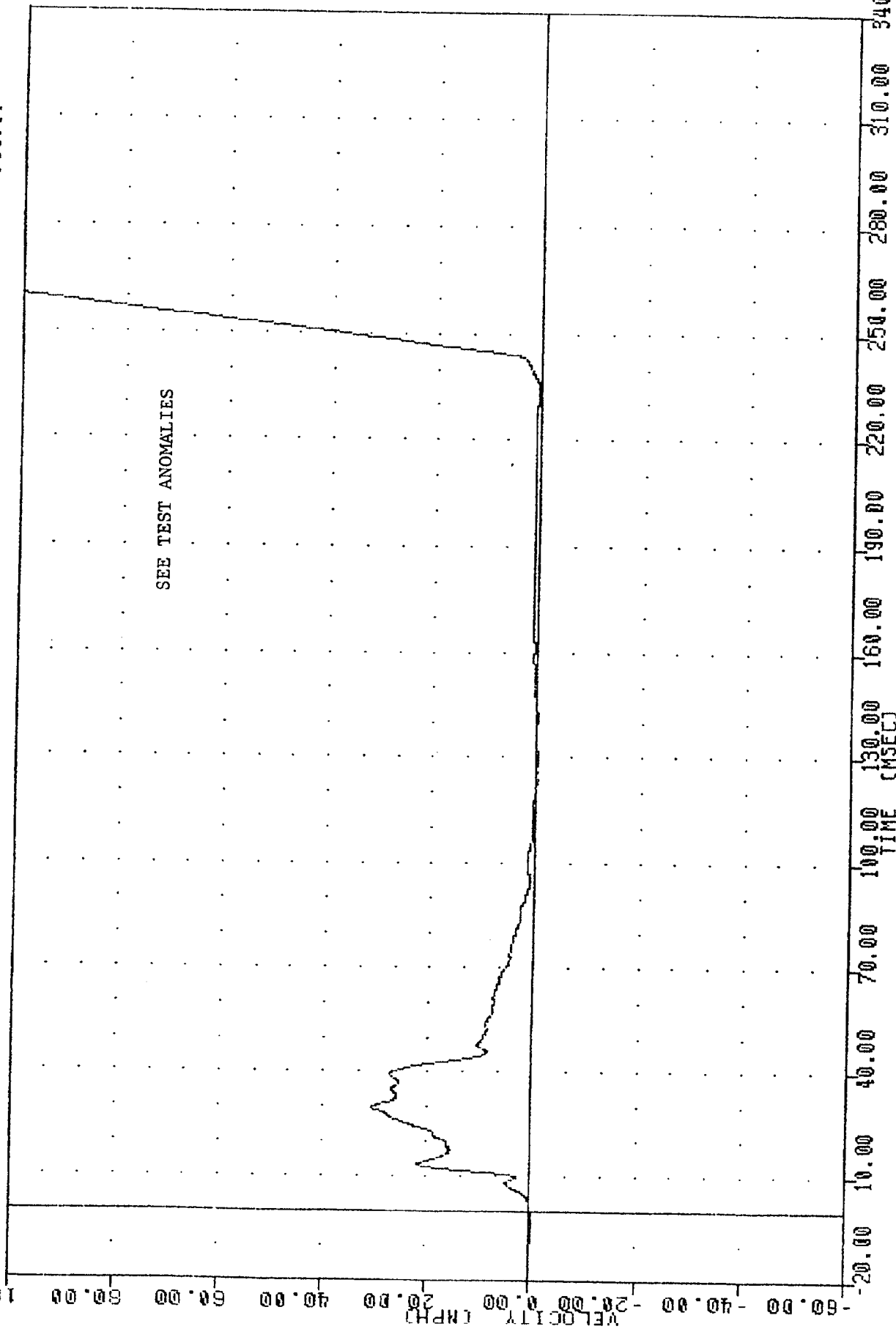
-20.00

-40.00

-60.00

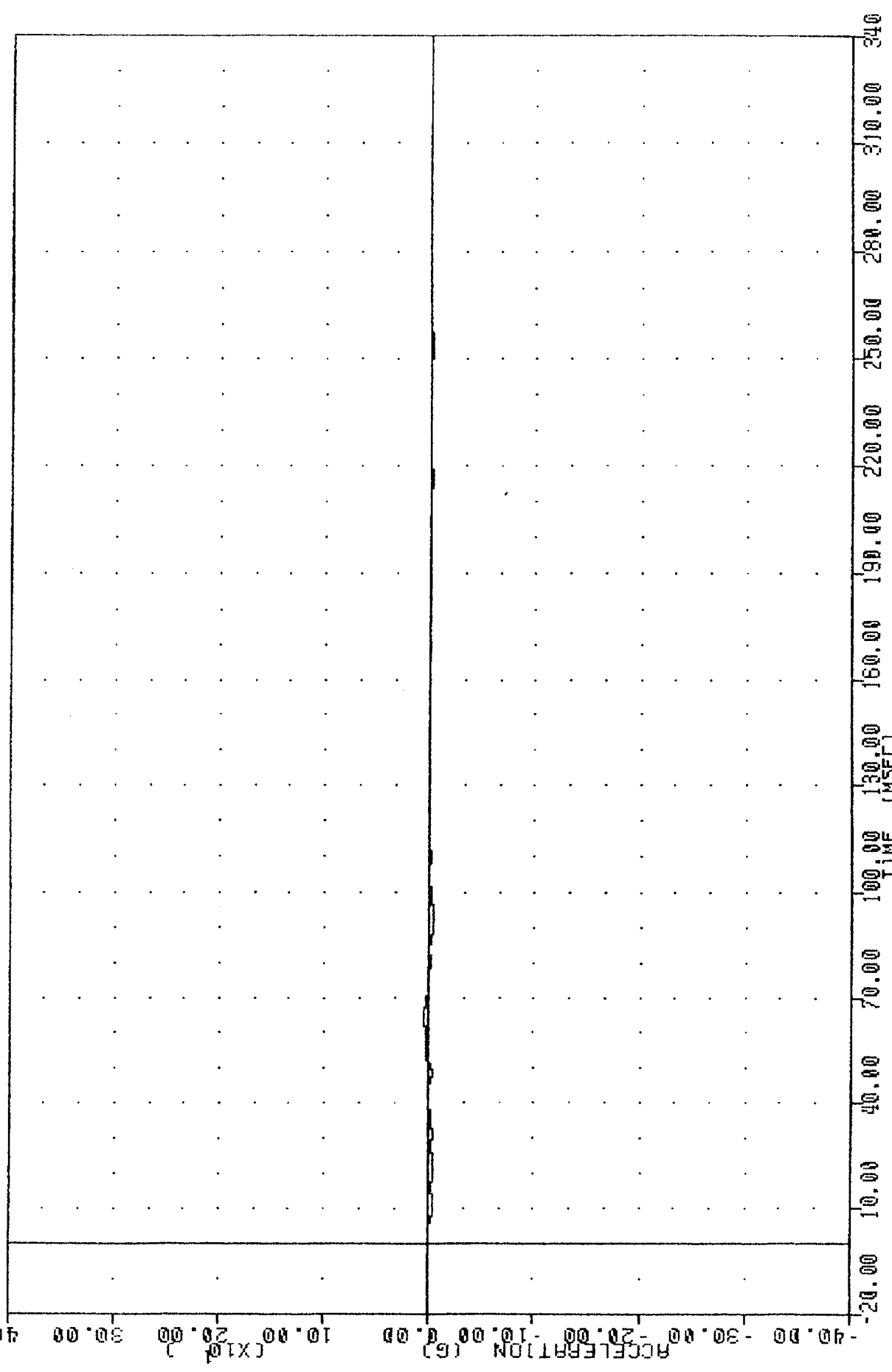
-80.00

B-101



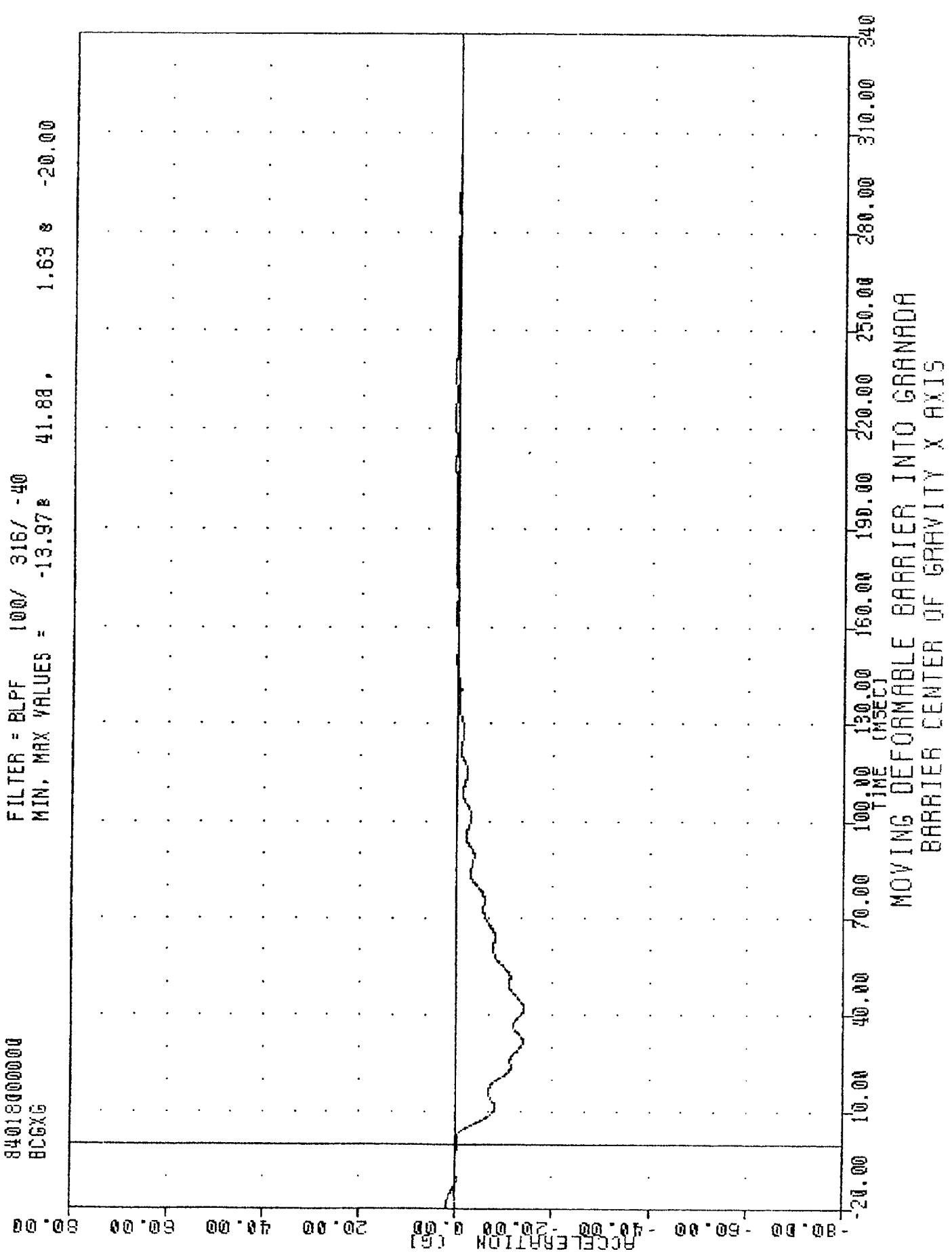
MOVING DEFORMABLE BARRIER INTO GRANADA
DELTA V USING LADYV5

IRC 840118
 SIDE PROTECTION - 2DR/4DR
 84018000000
 TFRXG7
 PLOT DATE 26-JAN-84 08:49:17
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -3.83s 90.50, 4.26 s 63.50



MOVING DEFORMABLE BARRIER INTO GRANADA
 VEHICLE TRUNK FLOOR RIGHT ACCELERATION X AXIS

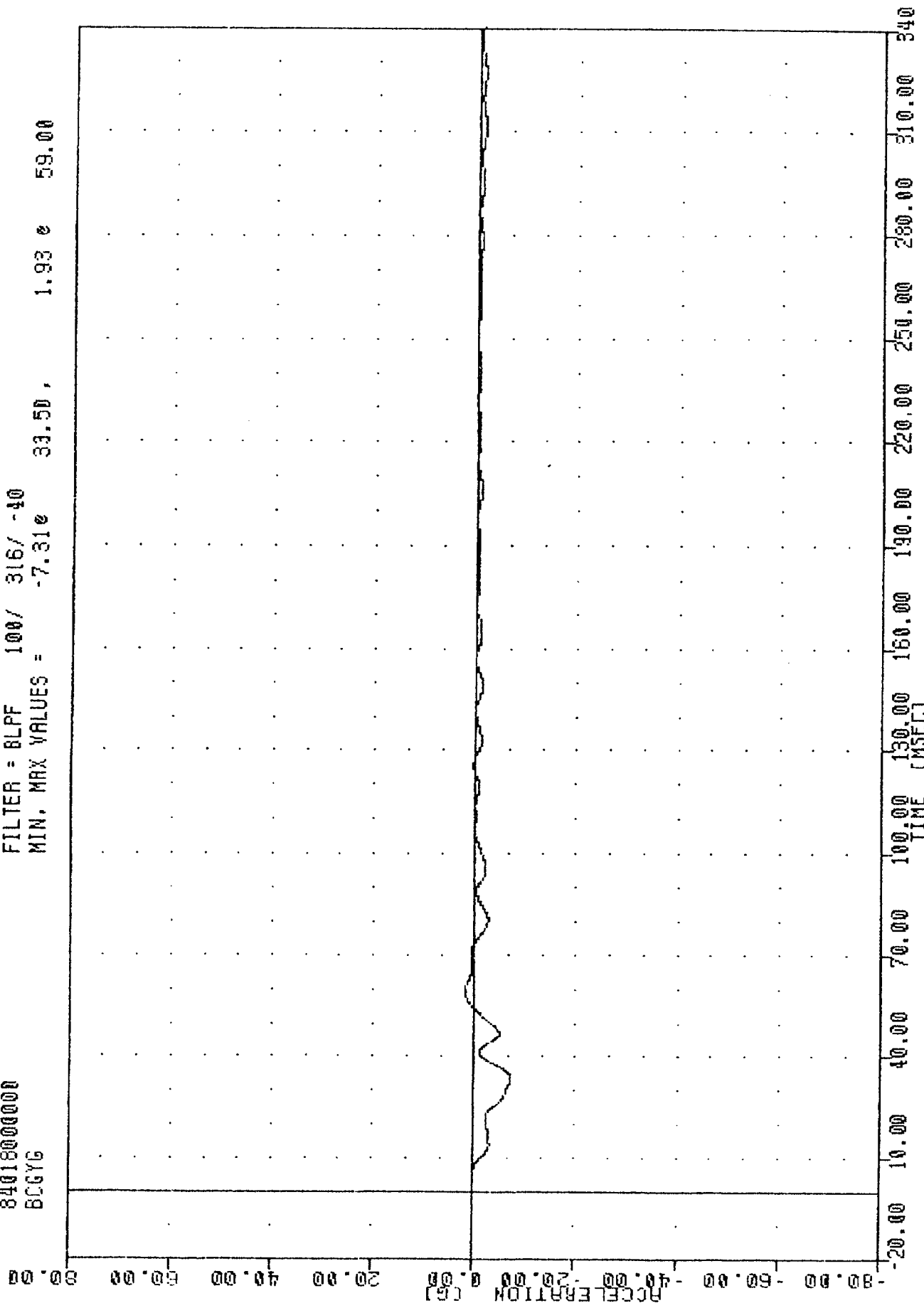
MC 840113
 SIDE PROTECTION - 2DR/4DR
 84018000000
 BCGXG
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -13.97 41.88 1.63 8 -20.00
 25-JAN-84 08:48:17



TRC 840118
 SIDE PROTECTION - 20A/40A
 840180000000
 BCCYG

PLOT DATE 26-JAN-84 08:49:17

FILTER = 8LPF 100/ 316/ -40
 MIN. MAX VALUES = -7.31e 33.50, 1.93 e 59.00



MOVING DEFORMABLE BARRIER INTO GRANADA
 BARRIER CENTER OF GRAVITY Y AXIS

THC 840118 25-JAN-84 08:49:17

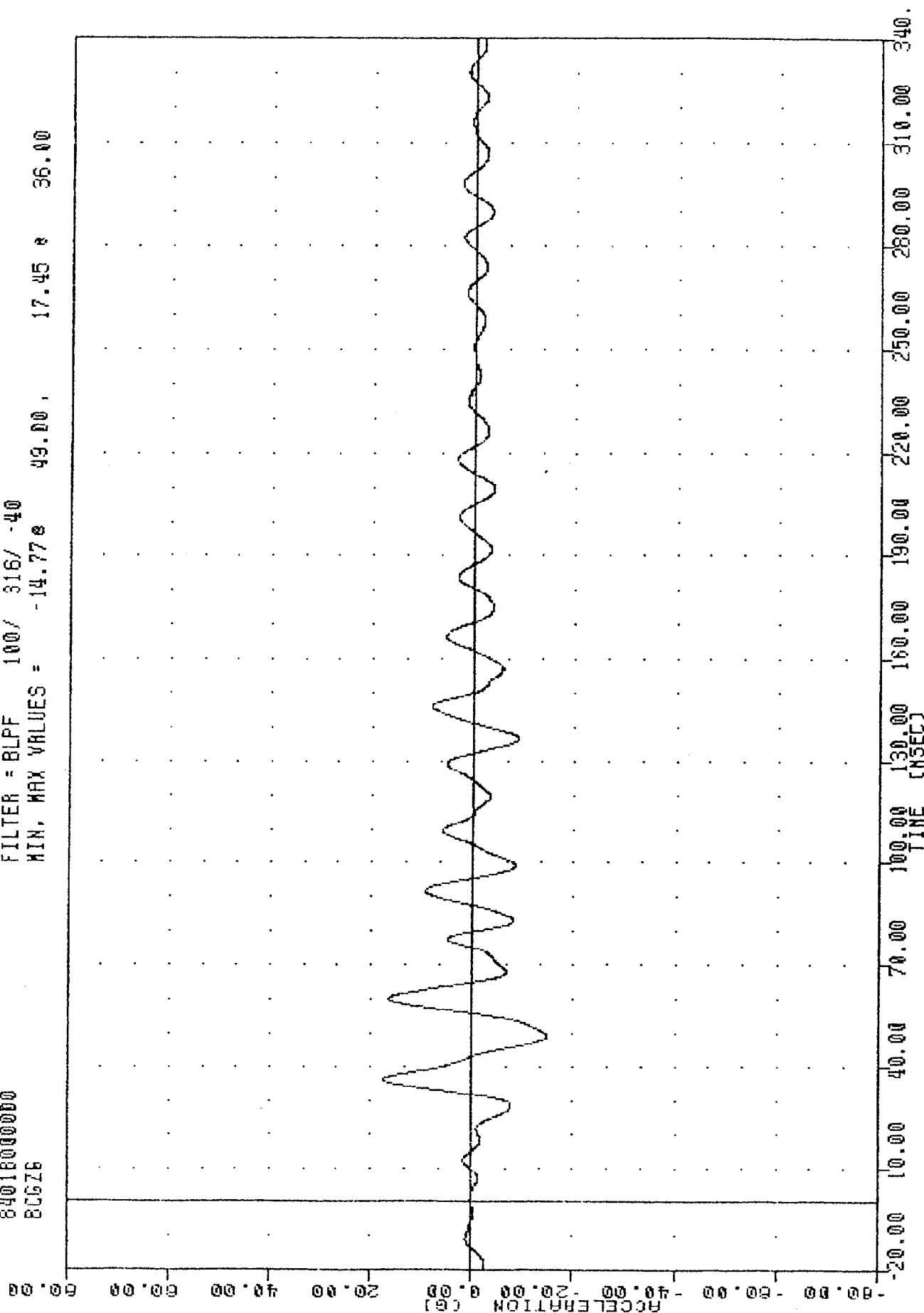
SIDE PROTECTION - 20A/40A

84018000000

BCGZ6

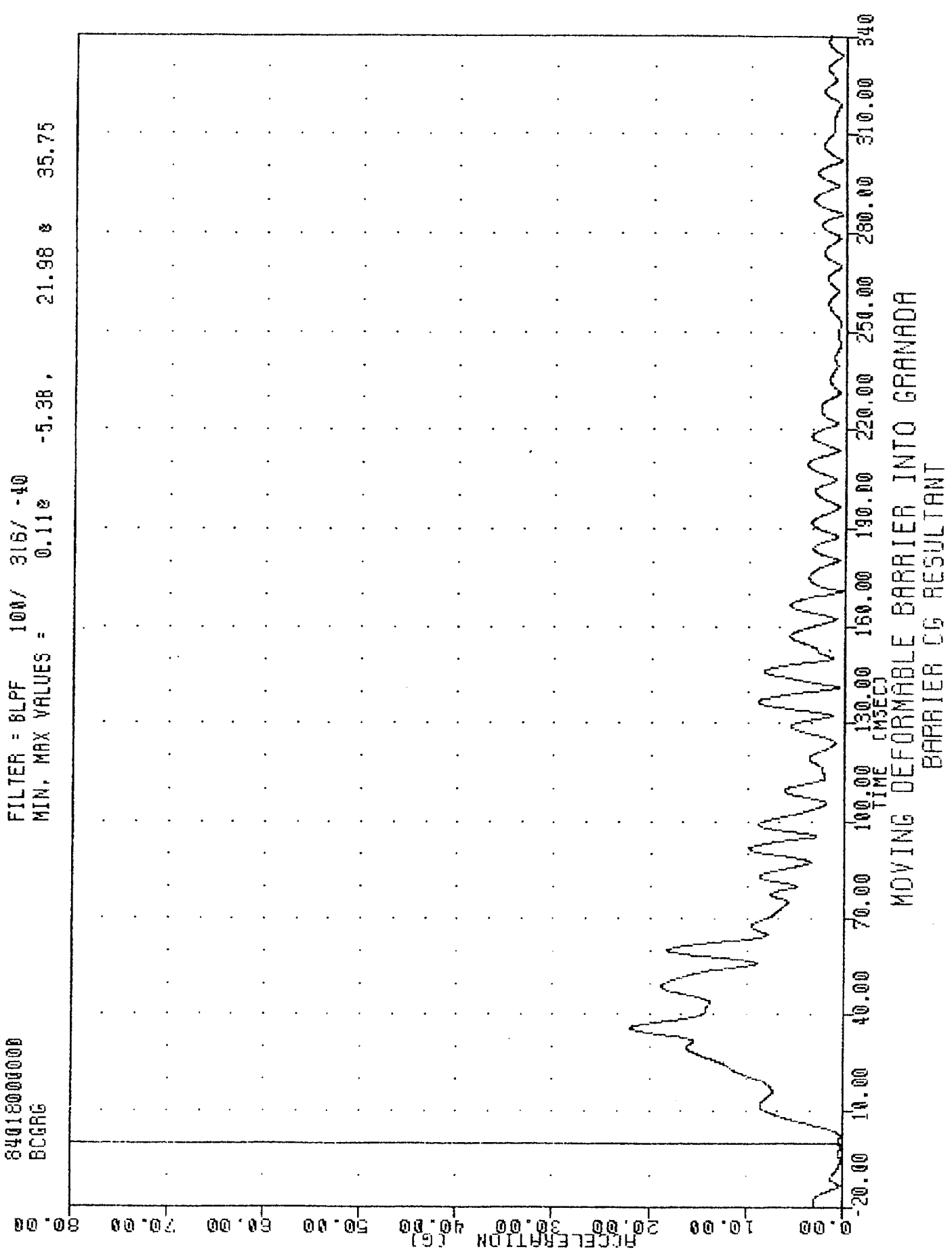
FILTER = BLPF 100/ 316/ -40

MIN. MAX VALUES = -14.77s 49.00, 17.45 s 36.00



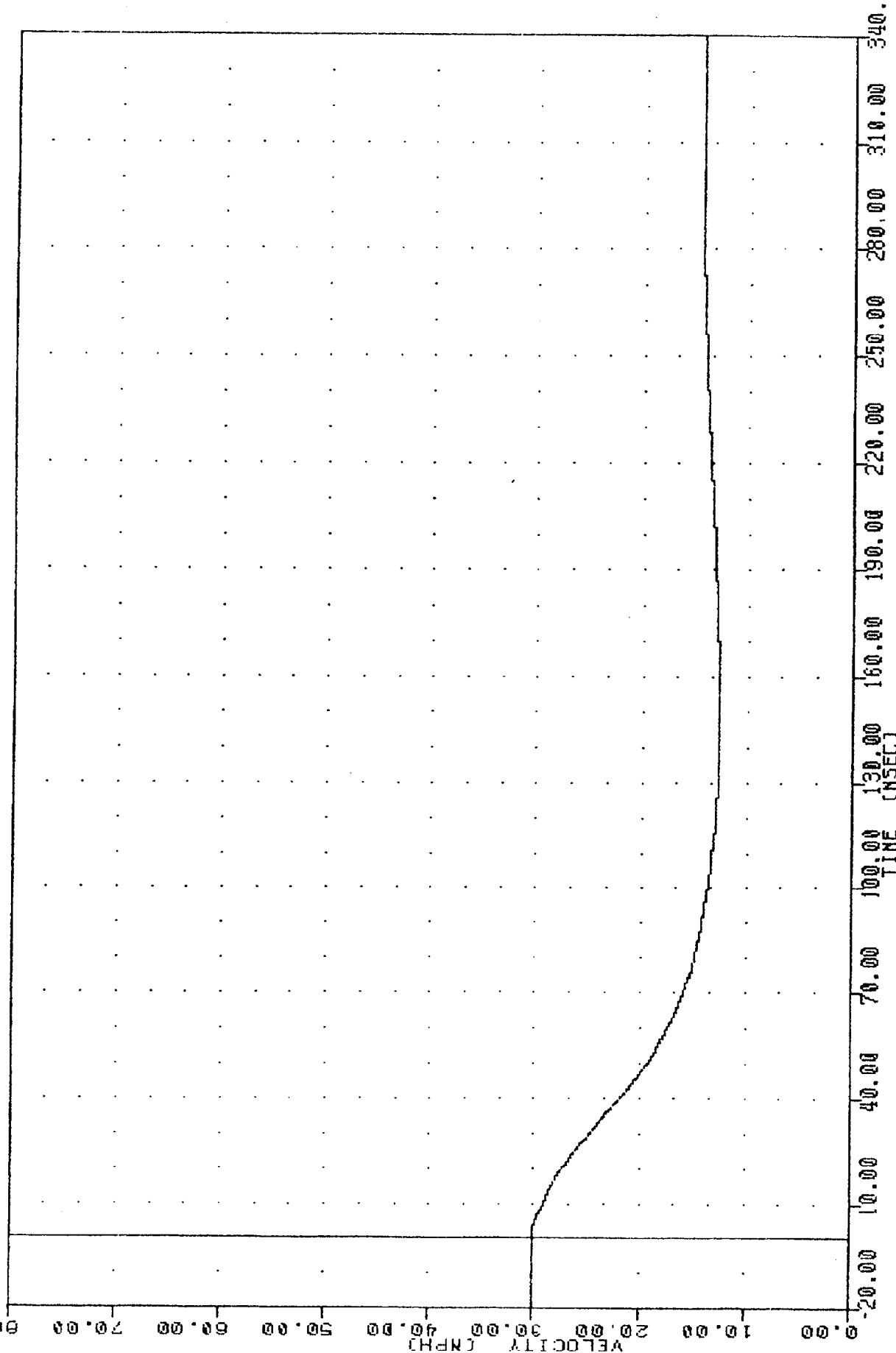
MOVING DEFORMABLE BARRIER INTO GRANADA
BARRIER CENTER OF GRAVITY Z AXIS

INC 840710
 SIDE PROTECTION - 20R/40R
 84018000000
 BCGRG
 FILTER = 8LPP 100/ 315/ -40
 MIN, MAX VALUES = 0.112 -5.38, 21.98 & 35.75
 PLOT DATE 26 JAN 84 08:50:33



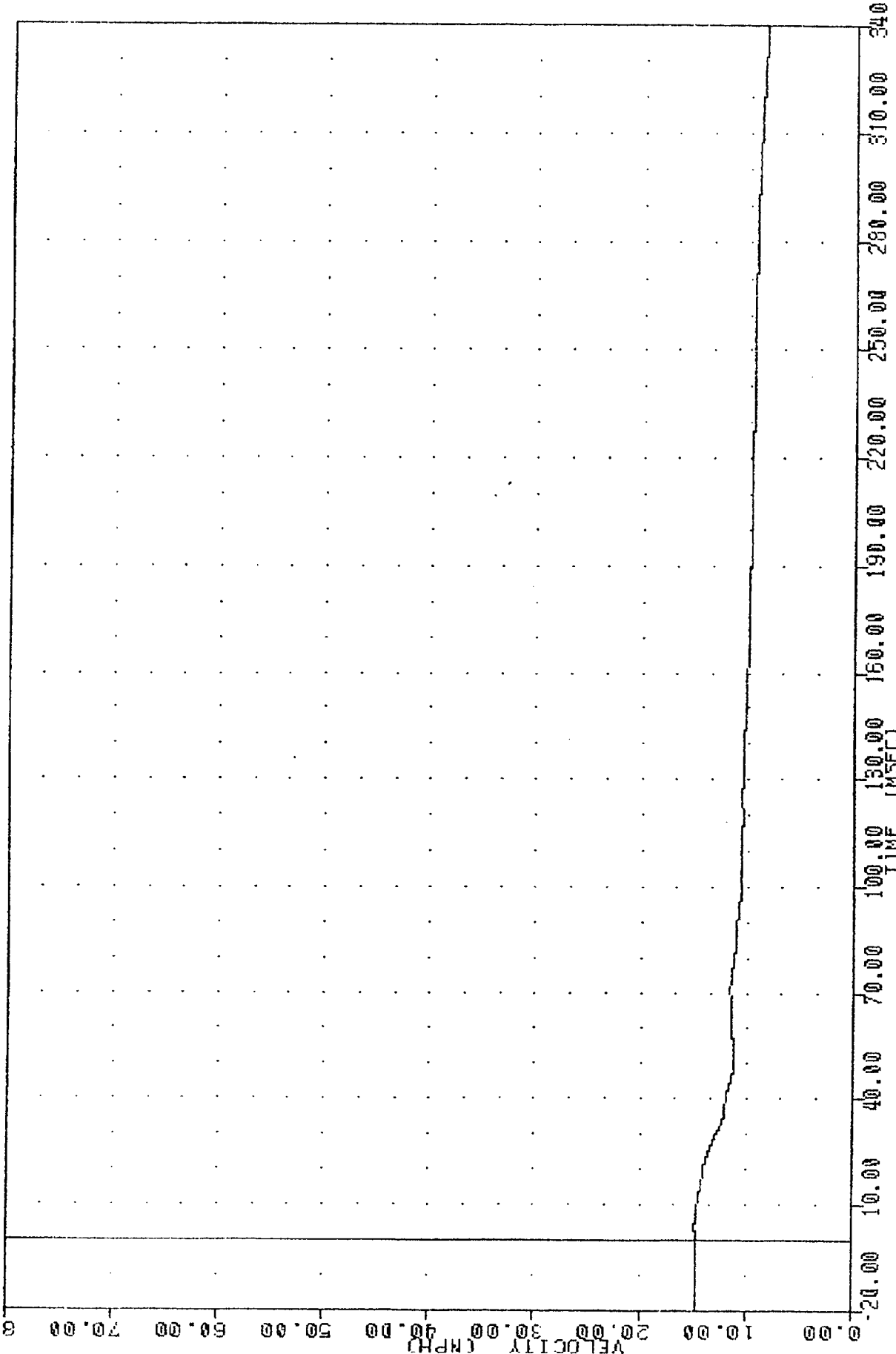
MOVING DEFORMABLE BARRIER INTO GRANADA
 BARRIER CG RESULTANT

TMC 7840110 7840110 25 JAN 84 08:55:52
 SIDE PROTECTION - 2DR/4DR
 84018000000
 BCGXY
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = 12.63 144.25 30.19 -5.25



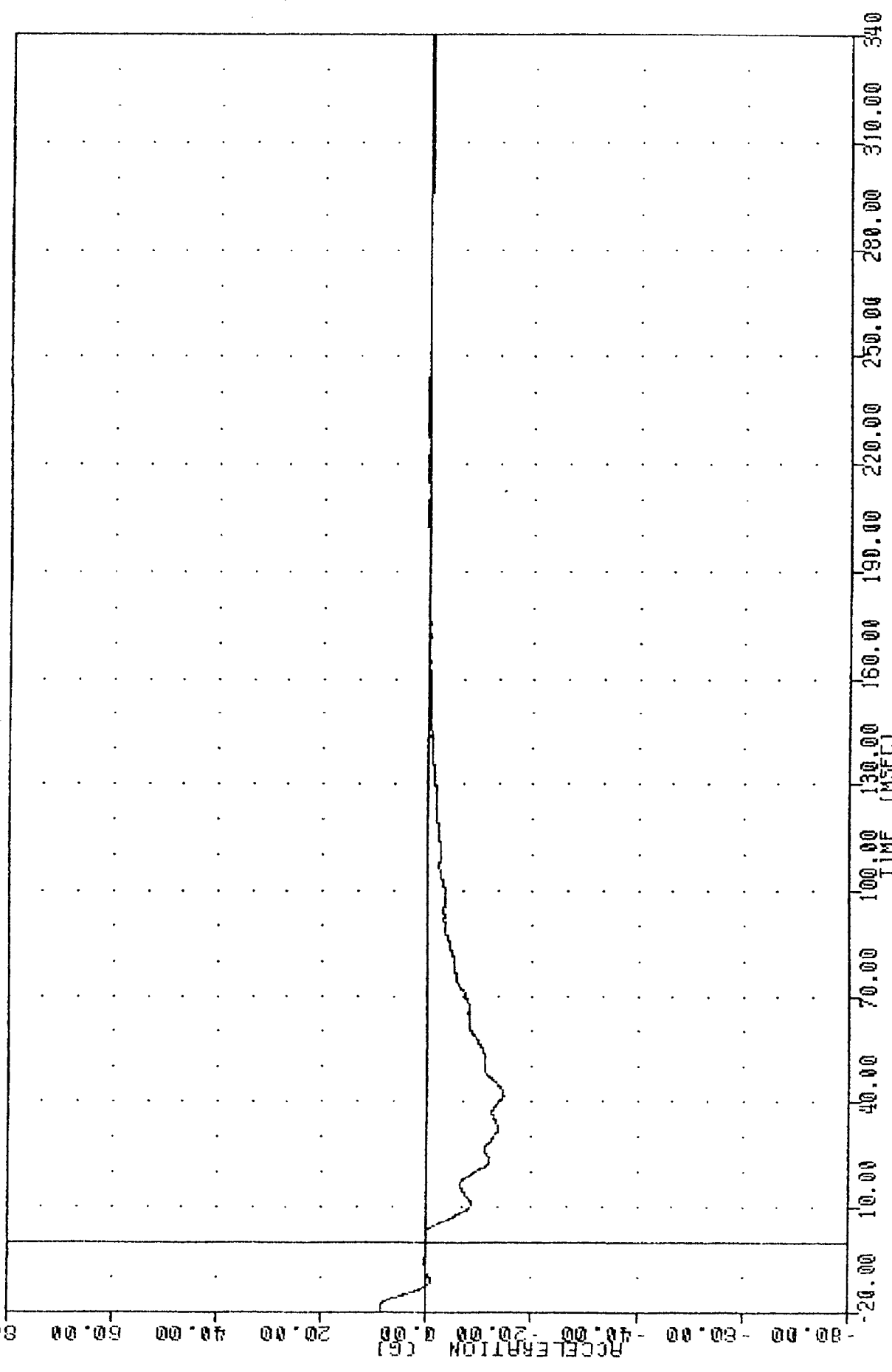
MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING BCGXG

INC 840113
 SIDE PROTECTION - 20A/40A
 84018000000
 BCGYV
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = 8.46 340.00, 14.72 3.38
 PLOT DATE 25-JAN-84 08:55:52



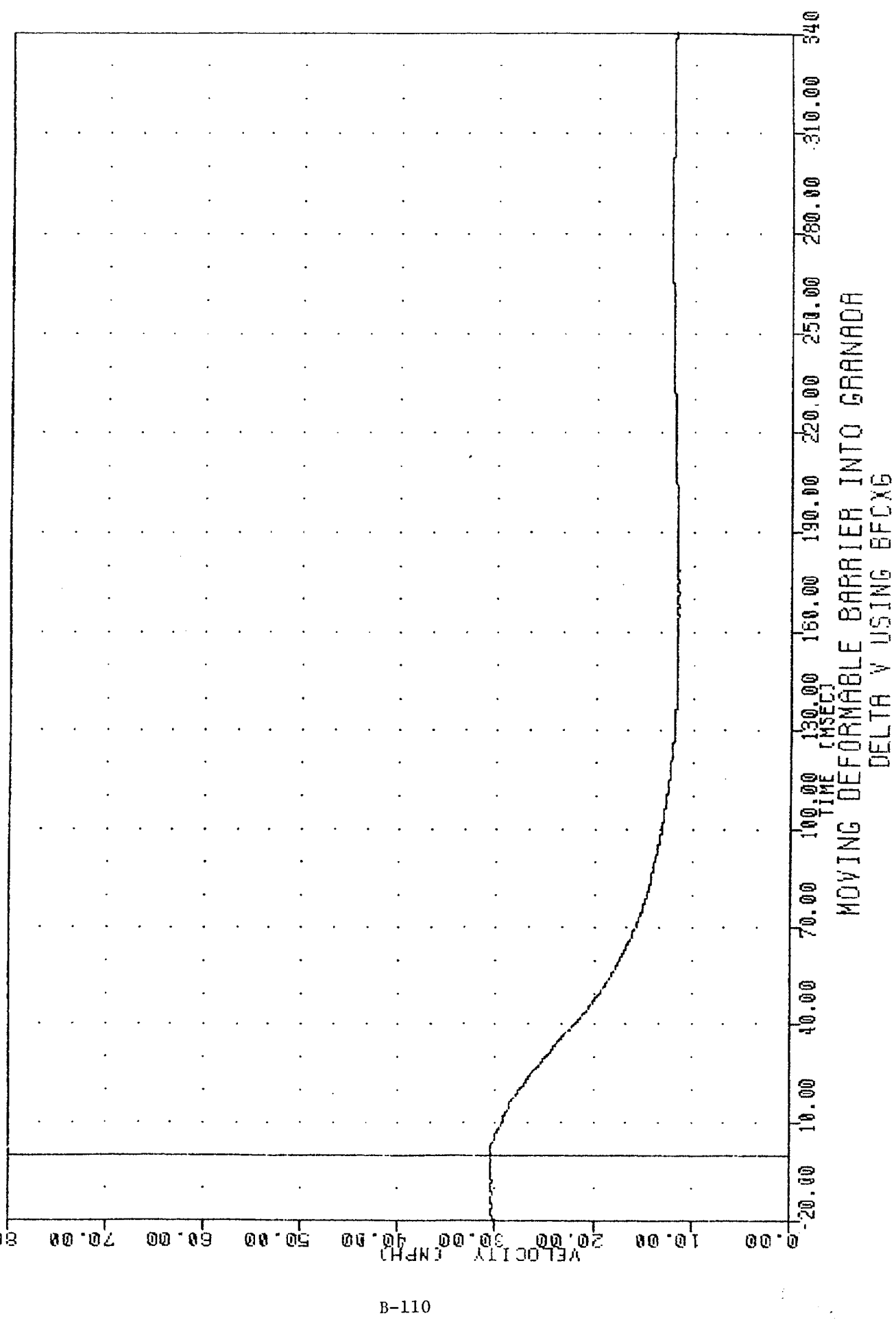
MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING BCGYV

MC 840118
 SIDE PROTECTION - 20R/40R
 84018000000
 BFCXG
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -14.53 41.63, 8.56 -20.00
 PLOT DATE 26-JAN-84 08:49:17



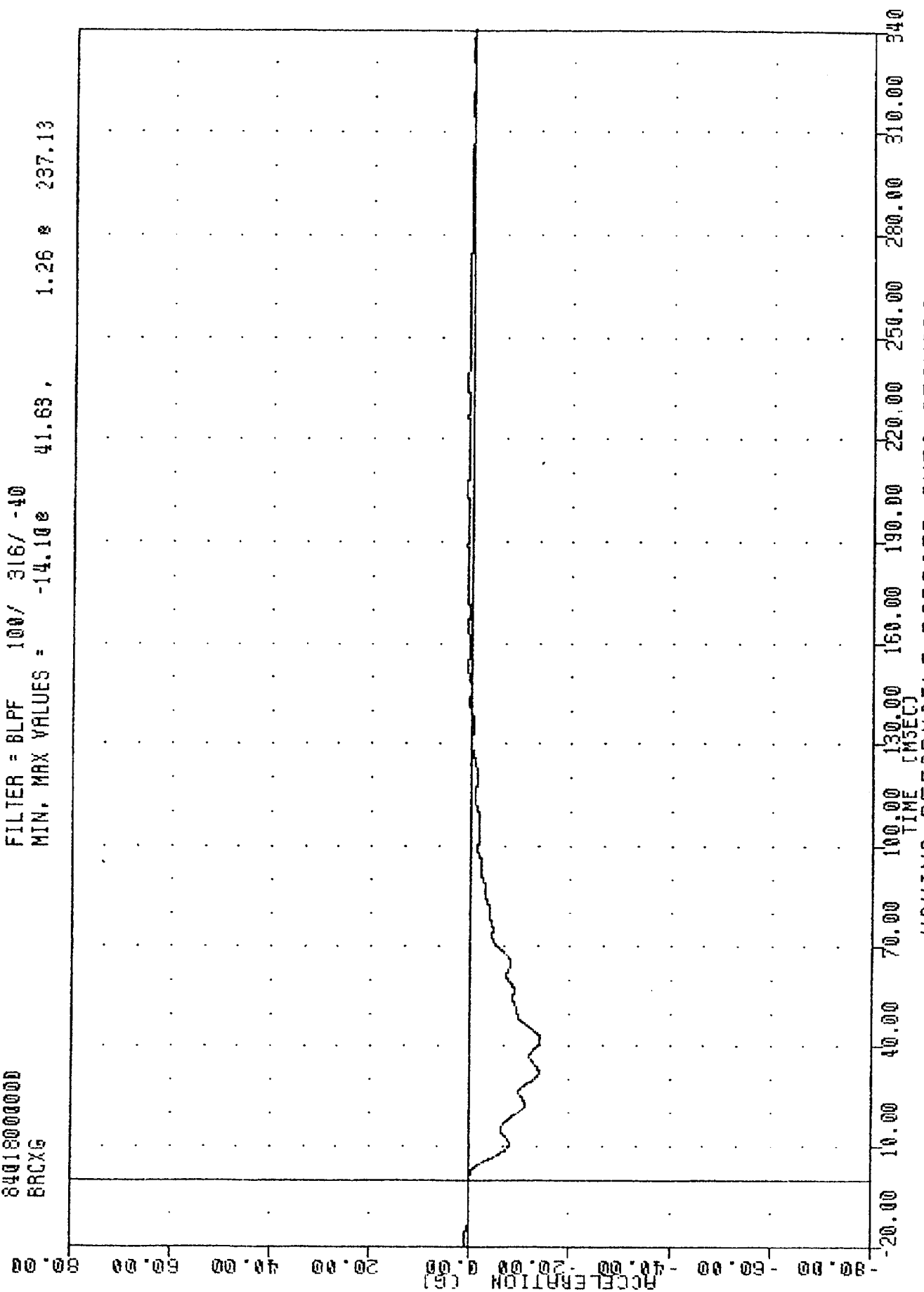
MOVING DEFORMABLE BARRIER INTO GRANADA
 BARRIER FRONT CROSSMEMBER ACCELERATION X AXIS

INC 240118
 SIDE PROTECTION - 20R/40R
 84018000000
 BFCXV
 FILTER = 8LPF 300/ 949/ -40
 MIN. MAX VALUES = 11.48 171.38 30.54 10.13
 PLOT DATE 26-JAN-84 08:55:52



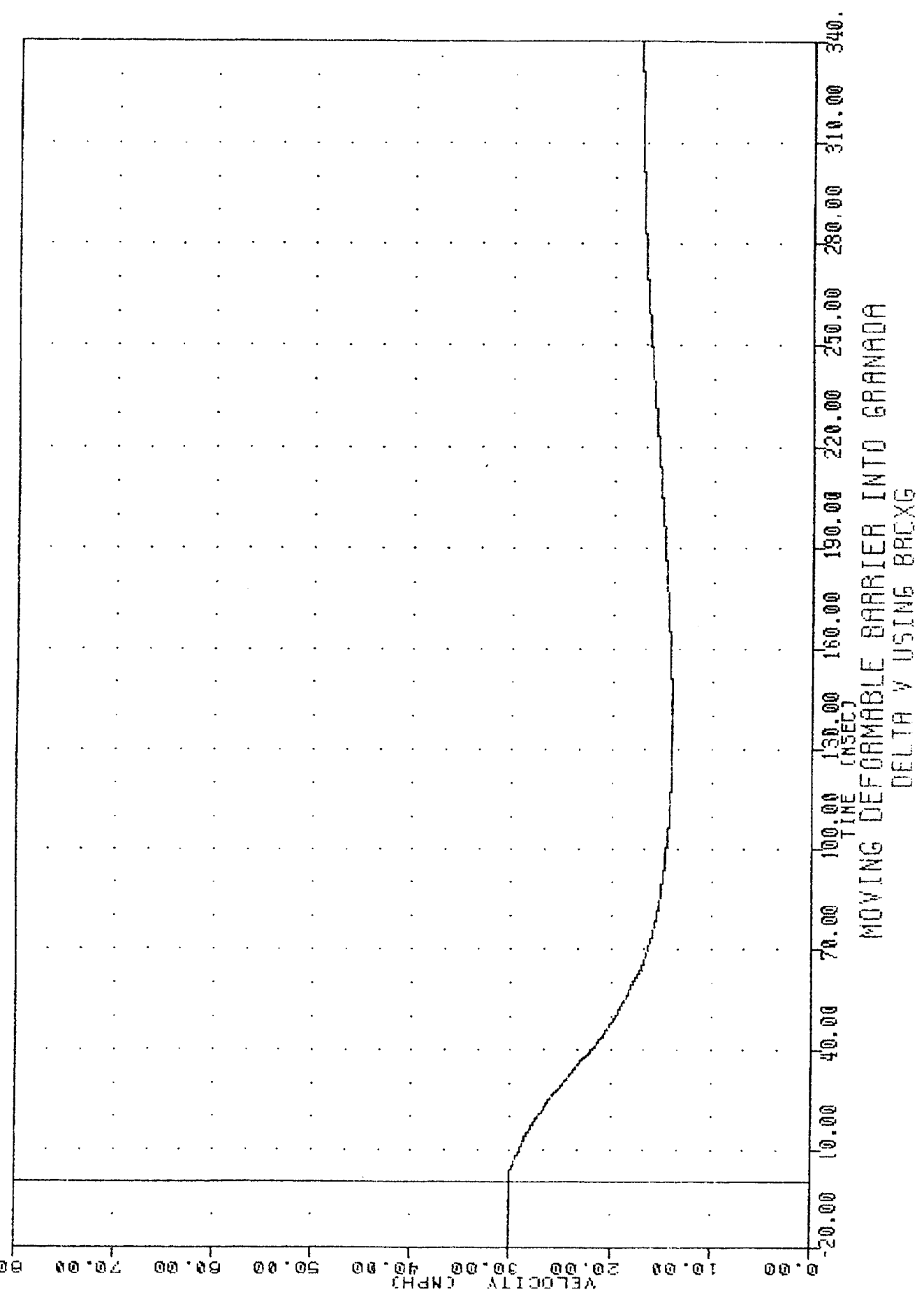
MOVING DEFORMABLE BARRIER INTO GRANADA
 DELTA V USING BFCXG

INC 840118
 SIDE PROTECTION - 2DR/4DR
 84018000000
 BRXG
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -14.10e 41.63, 1.26 s 237.13
 PLOT DATE 26-JAN-84 08:49:17



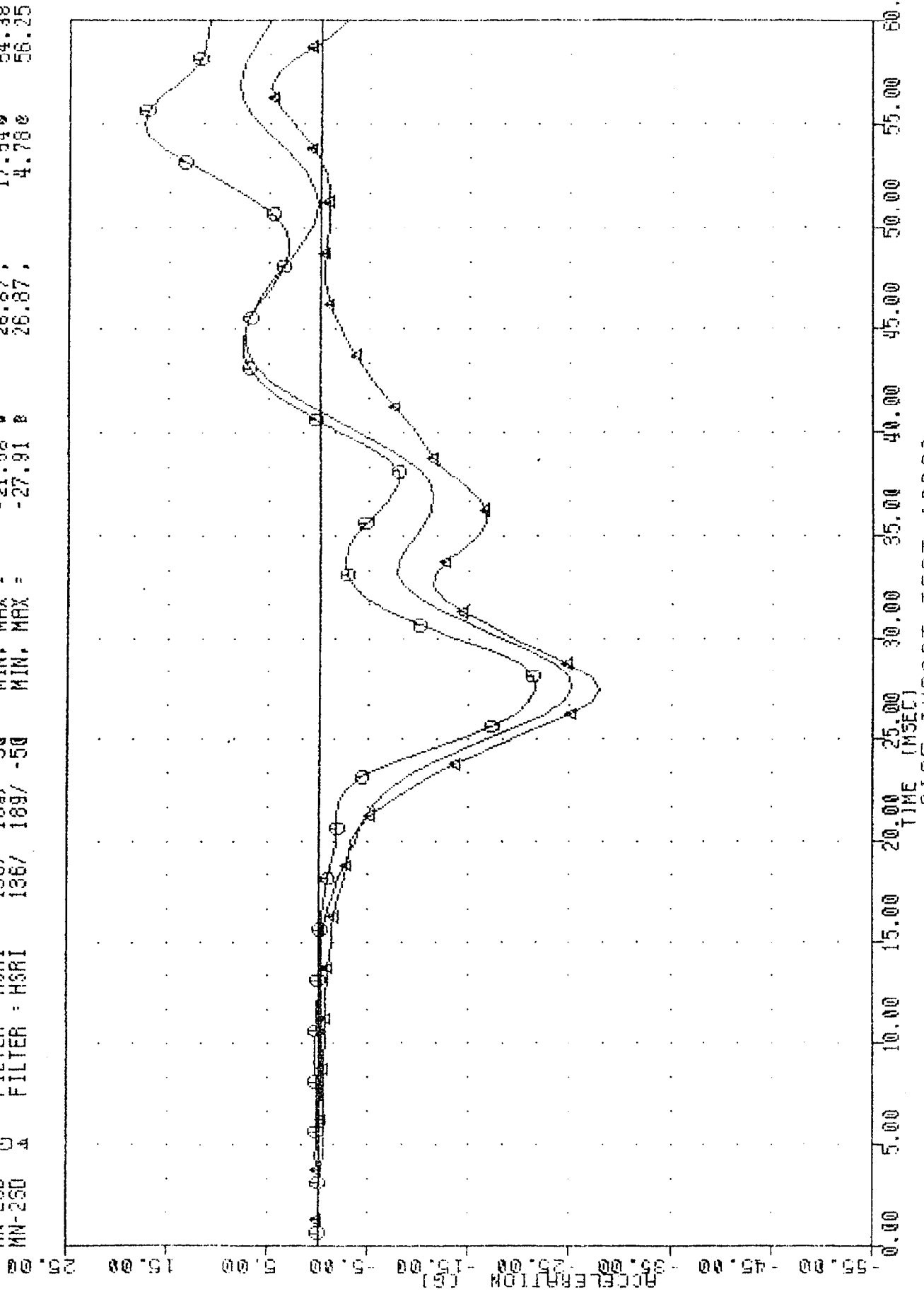
MOVING DEFORMABLE BARRIER INTO GRANADA
 BARRIER REAR CROSSMEMBER ACCELERATION X AXIS

TMC 840110 26-JAN-84 08:55:52
 SIDE PROTECTION - 20R/40R
 84018000000
 BACXY
 FILTER = BLPF 300/ 349/ -40
 MIN. MAX VALUES = 13.92e 136.38 , 30.17 e -11.63



APPENDIX C
DUMMY CERTIFICATION

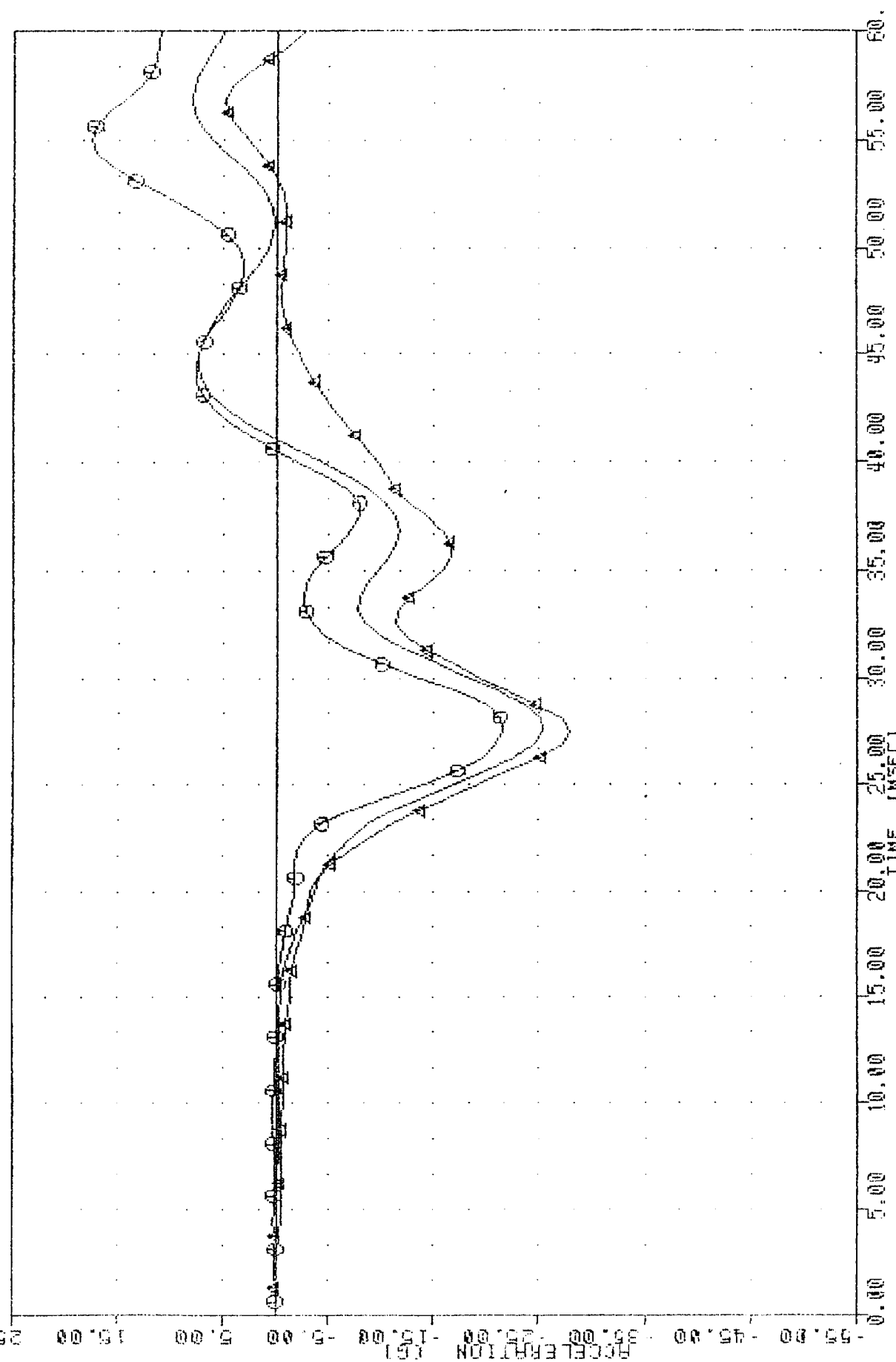
VRTC S8L91, S100687 S10 THORAX 6 BODY 318 CRL 87 84016 PLOT DATE 17-JAN-84 09:32:19
 T01Y61 FILTER = H3RI 136/ 189/ -50 MIN, MAX = -25.21 26.87 7.97 56.25
 MN-250 0 FILTER = H3RI 136/ 189/ -50 MIN, MAX = -21.52 26.87 17.54 54.38
 MN-250 4 FILTER = H3RI 136/ 189/ -50 MIN, MAX = -27.91 26.87 4.78 56.25



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

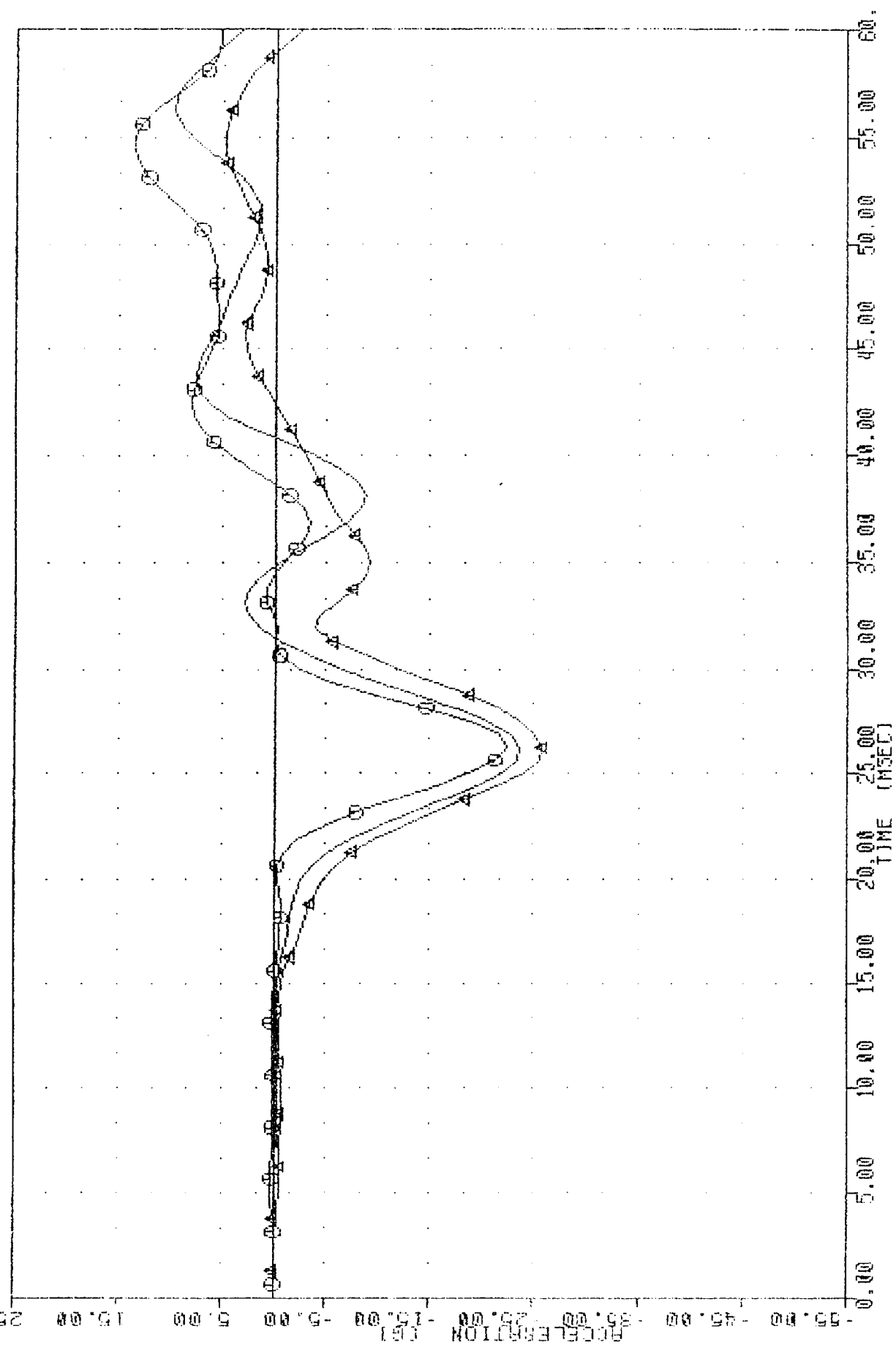
WRIC SALBI, SINO887 SID THORAX 6 BODY 318 CAL 87 84016
 TOIYGA FILTER : HSRI 136/ 189/ -50 MIN. MAX = -25.41
 MN-2SD 0 FILTER : HSRI 136/ 189/ -50 MIN. MAX = -21.58
 MN-2SD 4 FILTER : HSRI 136/ 189/ -50 MIN. MAX = -27.91

17-JUN-84 09:34:21
 26.87 8.012 56.25
 26.87 17.542 54.38
 26.87 4.782 56.25



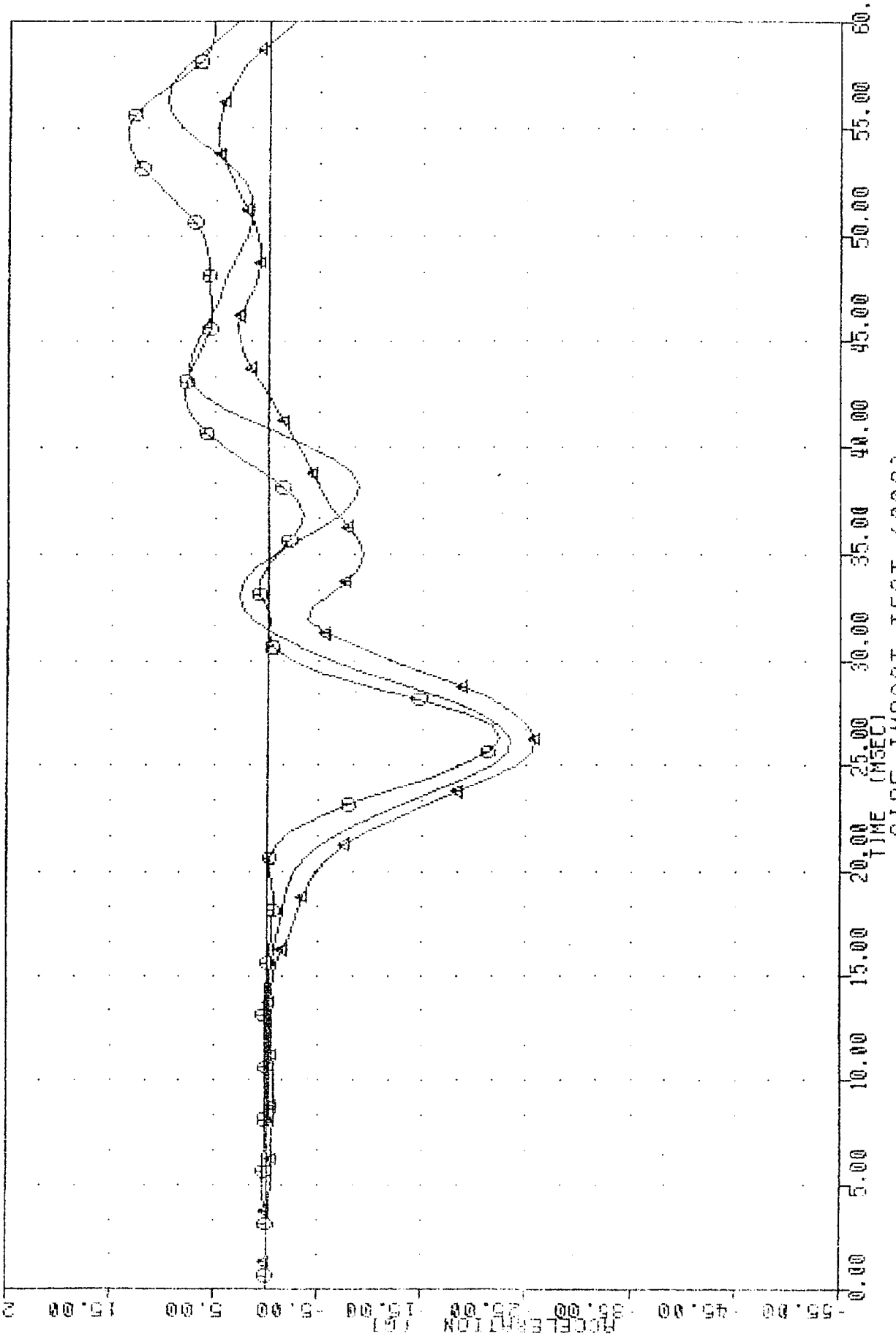
SIDE IMPACT TEST (006)
 UPPER SPINE ACCELERATION Y AXIS -A

WRIC SRL91, S100887 SID THORAX 6 BODY 318 CAL 87 84016 PLOT DATE 17-JAN-84 09:36:04
 T12Y61 FILTER: HSRI 136/ 129/ -50 MIN, MAX = -23.69 9.64 55.63
 MN-250 0 FILTER: HSRI 136/ 129/ -50 MIN, MAX = -22.37 13.54 53.75
 MN-250 4 FILTER: HSRI 136/ 129/ -50 MIN, MAX = -25.84 4.85 53.75



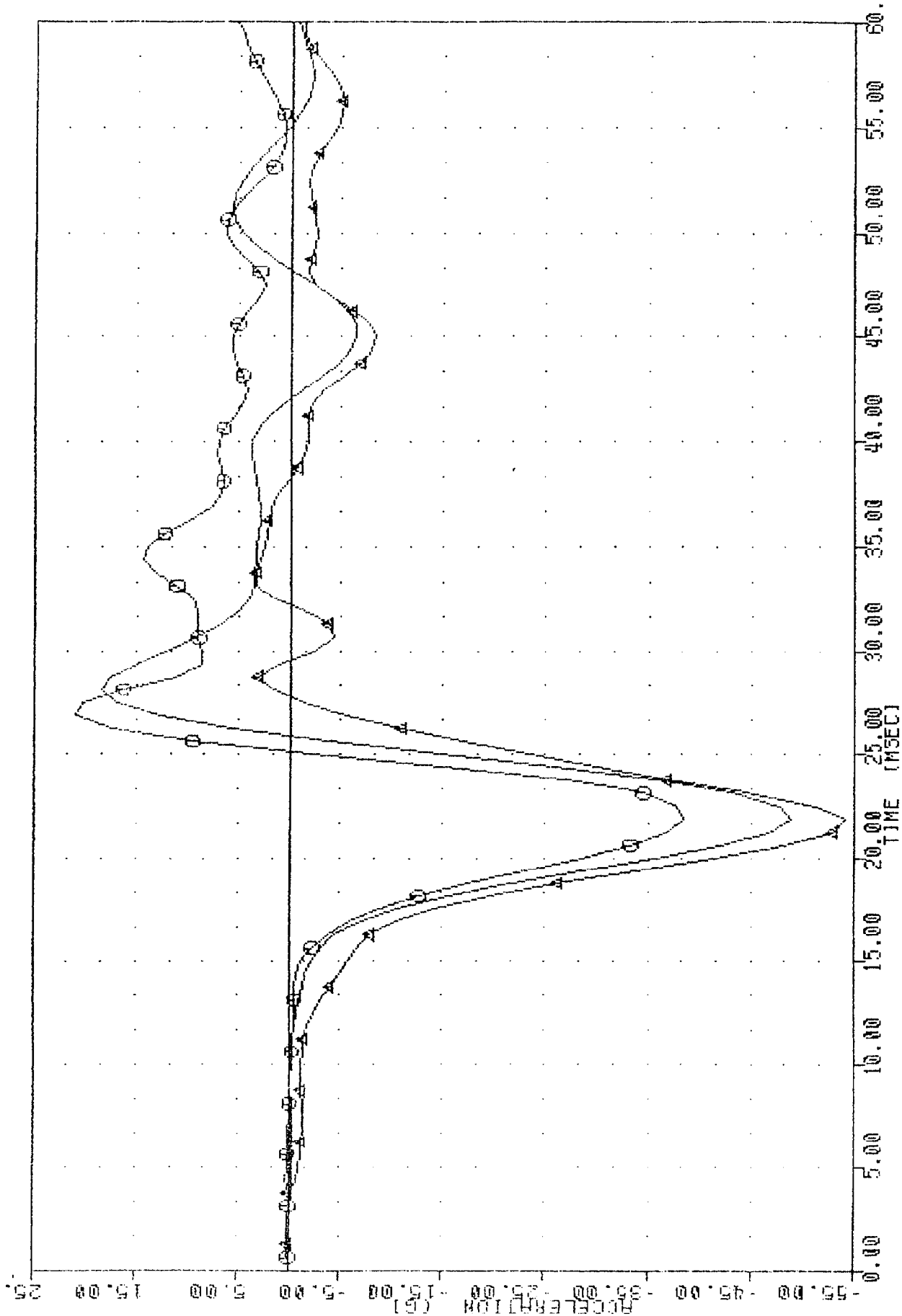
SIDE IMPACT TEST (006)
 LOWER SPINE ACCELERATION Y AXIS -1

VRLC SRL31, SINO687, SID THORAX BODY 318 CHL 87, 84016, PLOT DATE 17-JAN-84, 09:38:14
 1127GH, FILTER: HSRI, 136/ 189/ -50, MIN, MAX = -23.43, 25.63, 55.63
 MN-250, 0, FILTER: HSRI, 136/ 189/ -50, MIN, MAX = -22.37, 25.63, 53.25
 MN-250, 4, FILTER: HSRI, 136/ 189/ -50, MIN, MAX = -25.84, 25.63, 53.75



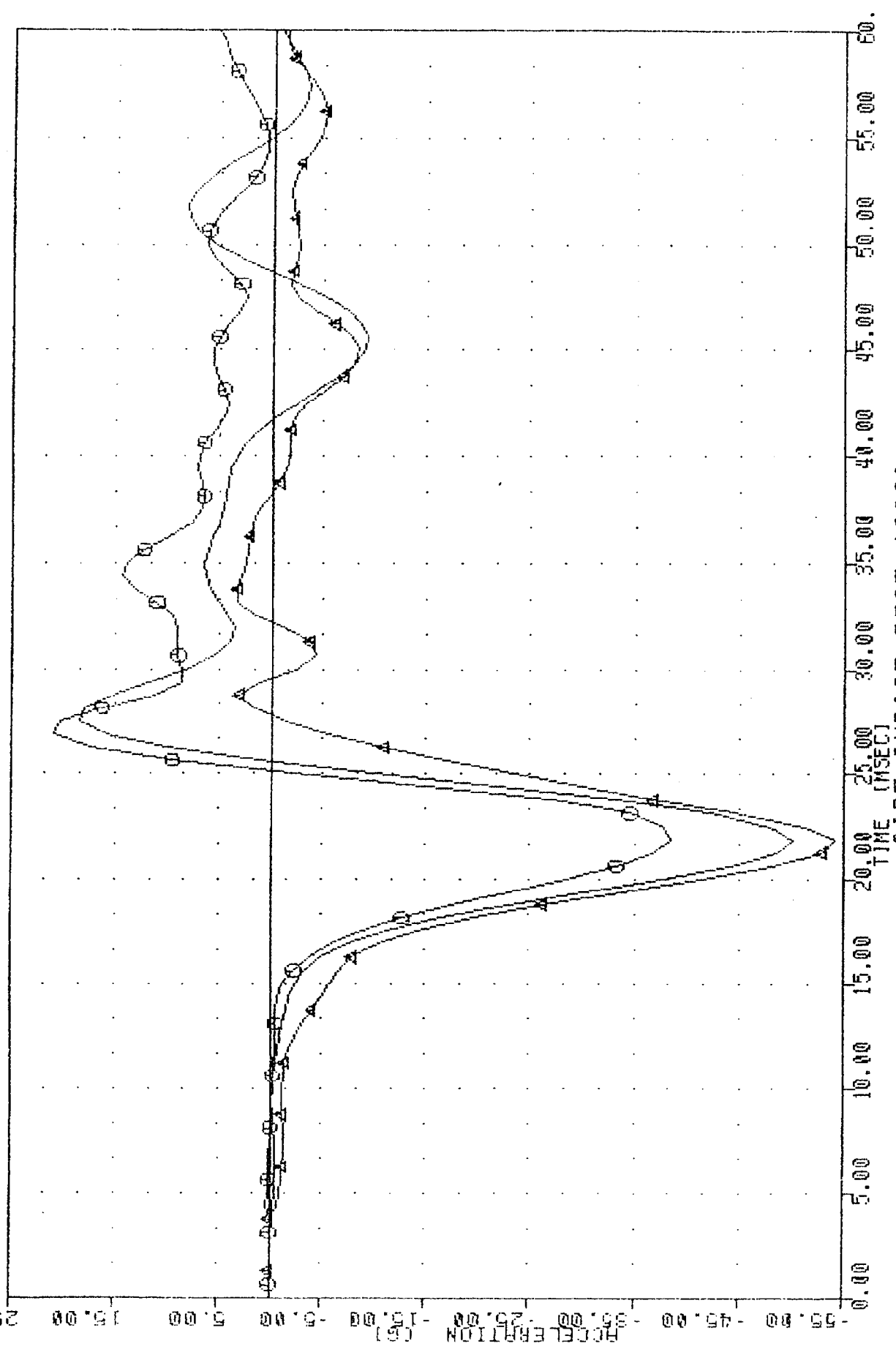
SIDE IMPACT TEST (006)
 LOWER SPINE ACCELERATION Y AXIS -A

VRIC SRL91, S100587 SID THORAX 6 BODY 318 CAL 87 84016 PLOT DATE 17-JAN-84 09:41:32
 LURY61 FILTER: HSRI 136/ 189/ -50 MIN, MAX = -48.83 18.26 27.50
 MN-250 0 FILTER: HSRI 136/ 189/ -50 MIN, MAX = -38.44 20.92 26.25
 MN-250 A FILTER: HSRI 136/ 189/ -50 MIN, MAX = -54.08 3.31 33.13



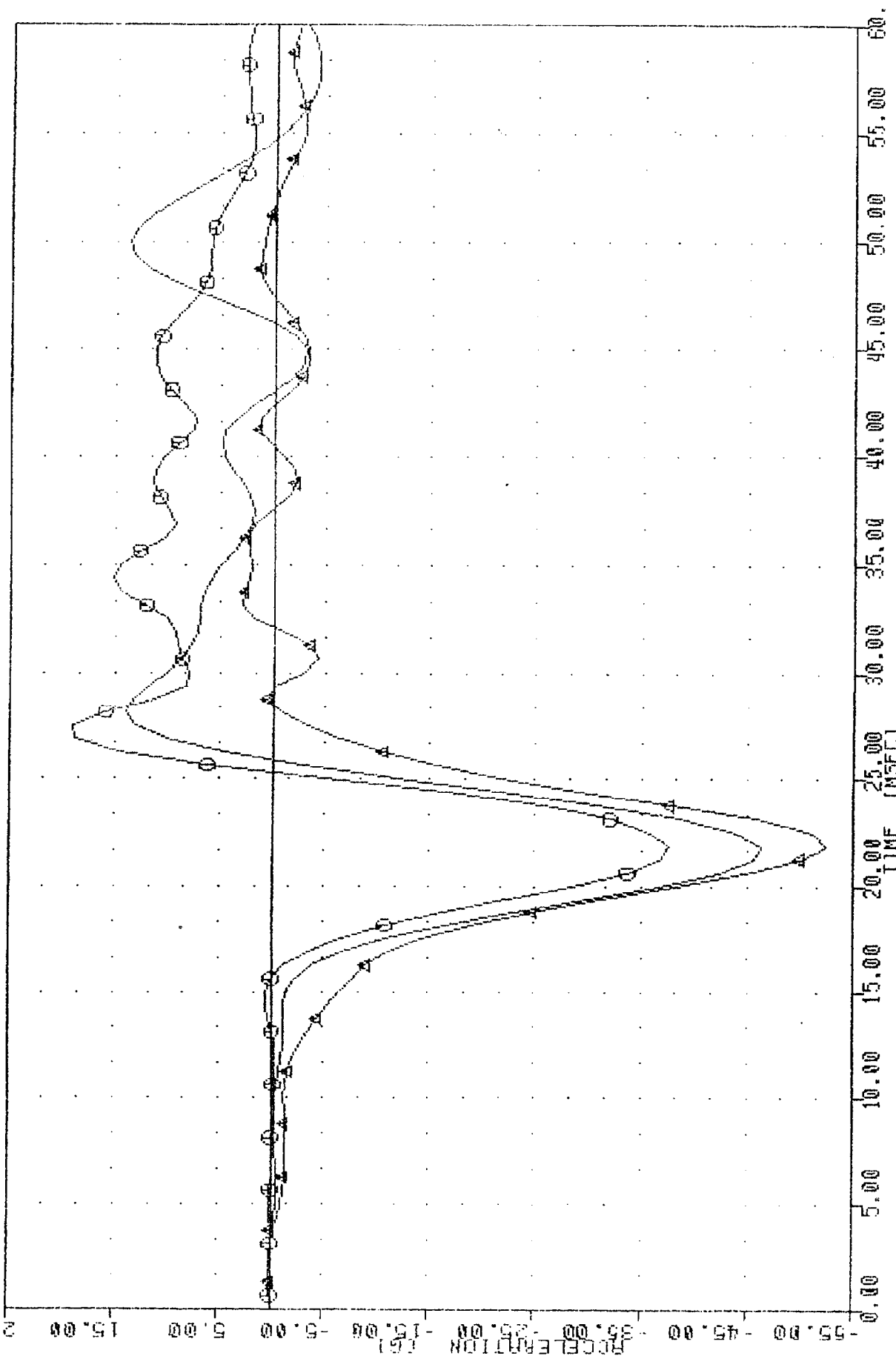
SIDE IMPACT TEST (0008)
 LEFT UPPER RIB ACCELERATION Y AXIS -1

VRLC 3RL91, 2100837 SID THORAX 6 BODY 318 CHL 87 84016 17-JAN-84 09:43:05
 LURY6R FILTER = HSRI 136/ 189/ -50 MIN, MAX = -50.22 21.25 18.36 26.87
 MN-2SD Q FILTER = HSRI 136/ 189/ -50 MIN, MAX = -38.44 21.25 20.82 26.25
 MN-2SD A FILTER = HSRI 136/ 189/ -50 MIN, MAX = -54.08 21.25 5.31 33.13



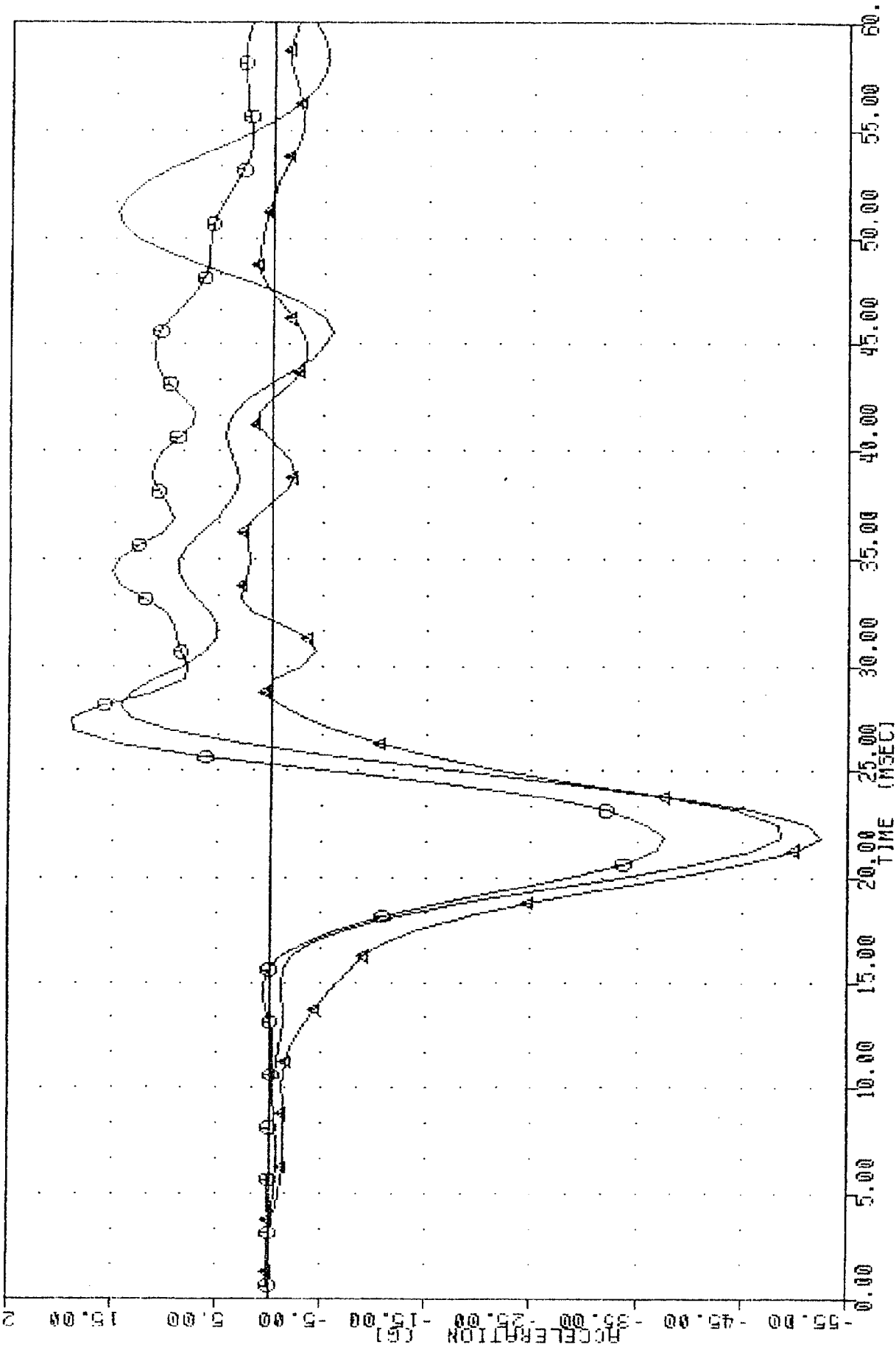
SIDE IMPACT TEST (008)
 LEFT UPPER RIB ACCELERATION Y AXIS - A

VRIC 3RL91, S100007, S10 THORAX B BODY 318 CHL 87, 84018, 17-JAN-84, 09:39:26
 LLAYG1, FILTER = H3RI, 136/ 189/ -50, MIN, MAX = -46.32, 21.25, 13.95, 27.50
 MN-250, FILTER = H3RI, 136/ 189/ -50, MIN, MAX = -37.68, 21.25, 19.00, 26.87
 MN-250, FILTER = H3RI, 136/ 189/ -50, MIN, MAX = -52.52, 21.25, 2.94, 32.50



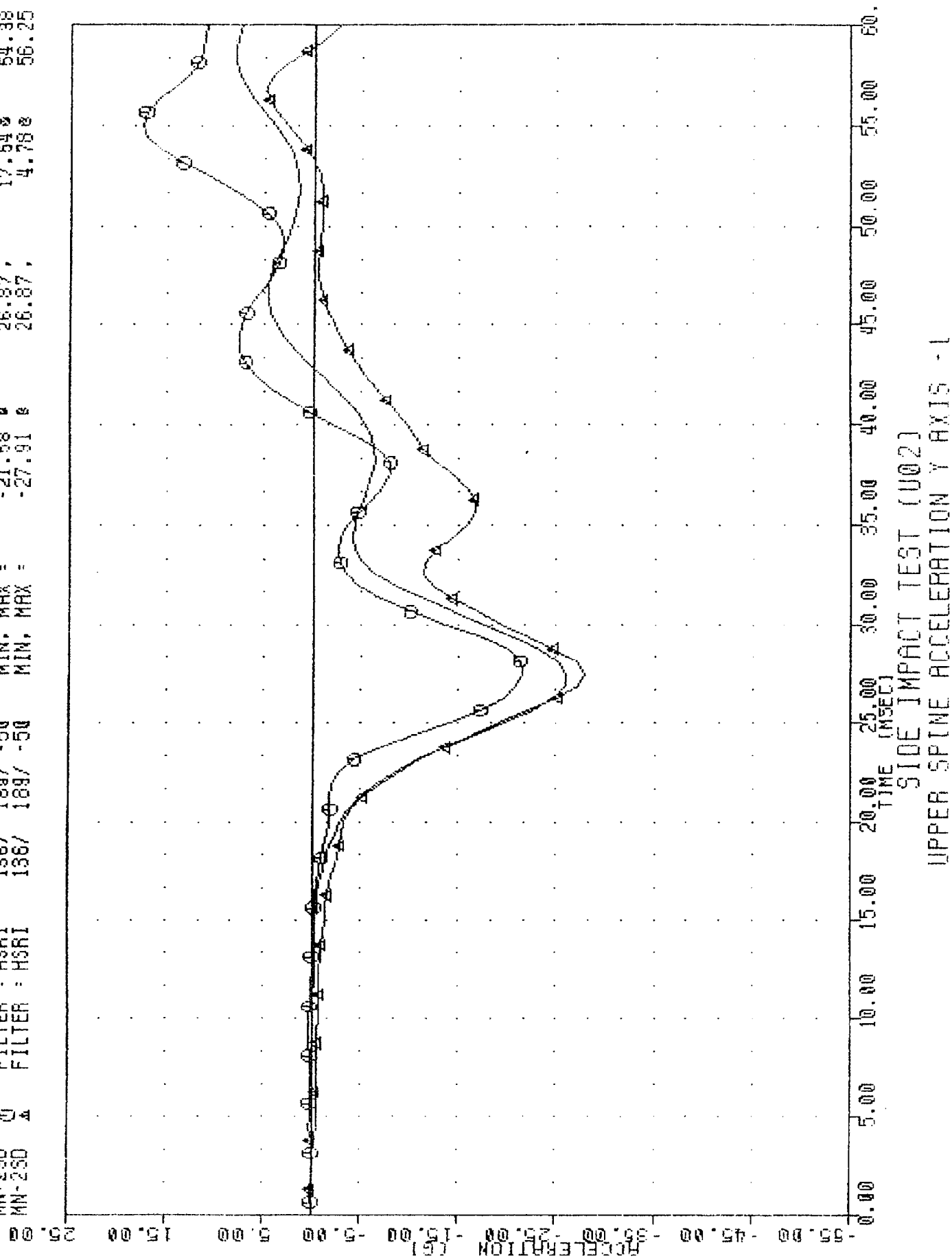
SIDE IMPACT TEST (006)
 LEFT LOWER RIB ACCELERATION Y AXIS (1)

VRIU CARLS, S100087, S10 H08X 6 BODY 318 CAL BY 84016 PLOT DATE 17-JAN-84 09:45:54
 LLRYGA FILTER = HSRI 136/ 189/ -50 MIN, MAX = -48.74 21.25, 14.65 50.63
 MN-250 0 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -37.86 21.25, 19.00 26.87
 MN-250 A FILTER = HSRI 136/ 189/ -50 MIN, MAX = -52.52 21.25, 2.94 32.50

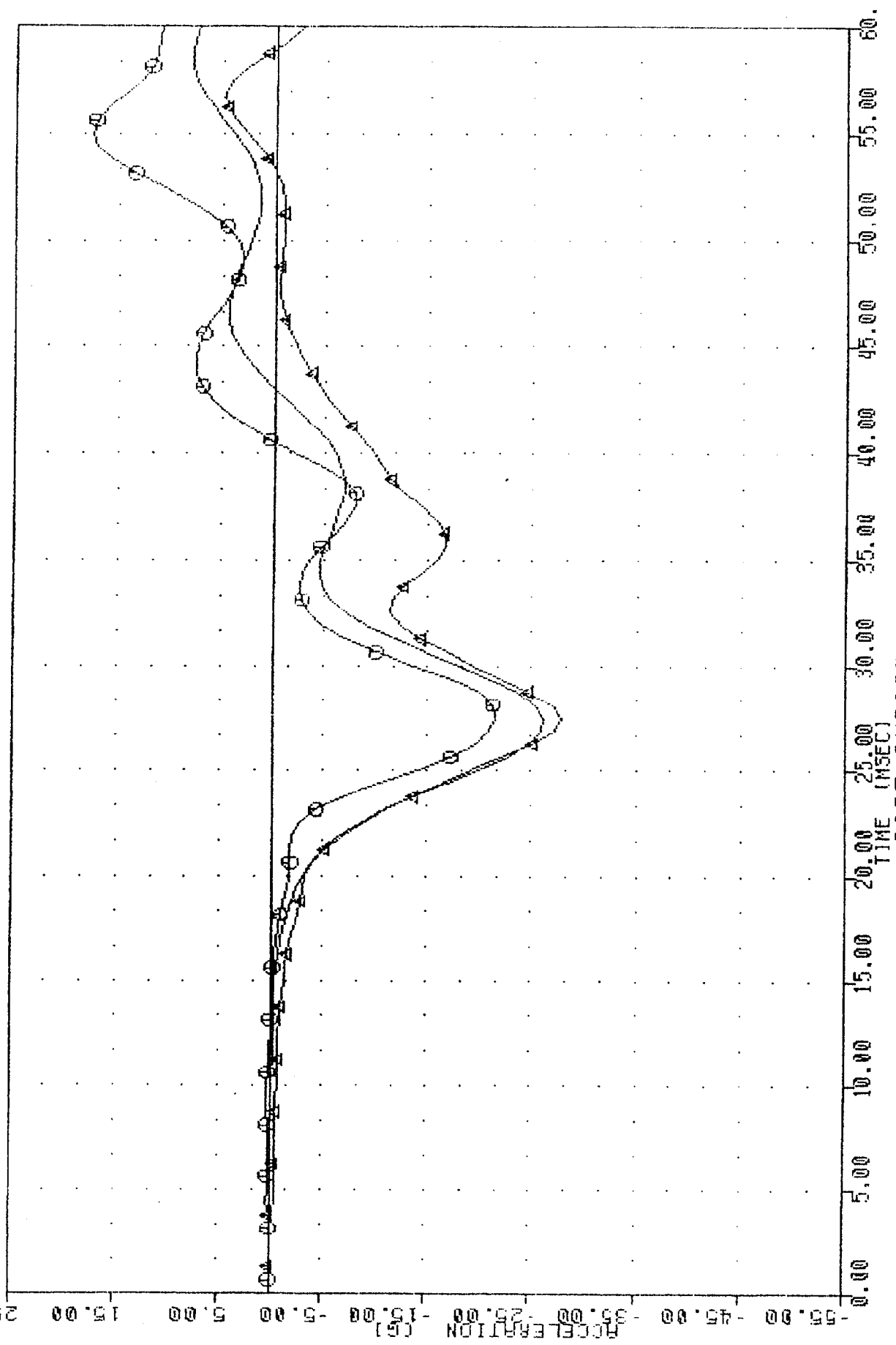


SIDE IMPACT TEST (006)
 LEFT LOWER RIB ACCELERATION Y AXIS - A

VRIC SRL91, SIU0286 SID THORAX U02 BODY 830 CAL 86 84016 PLOT DATE 17-JAN-84 11:26:28
 TOIYGI FILTER: HSRI 136/ 189/ -50 MIN, MAX = -26.04 0 0.030 58.13
 MN-280 0 FILTER: HSRI 136/ 189/ -50 MIN, MAX = -21.58 0 17.540 54.38
 MN-280 A FILTER: HSRI 136/ 189/ -50 MIN, MAX = -27.91 0 4.760 56.25

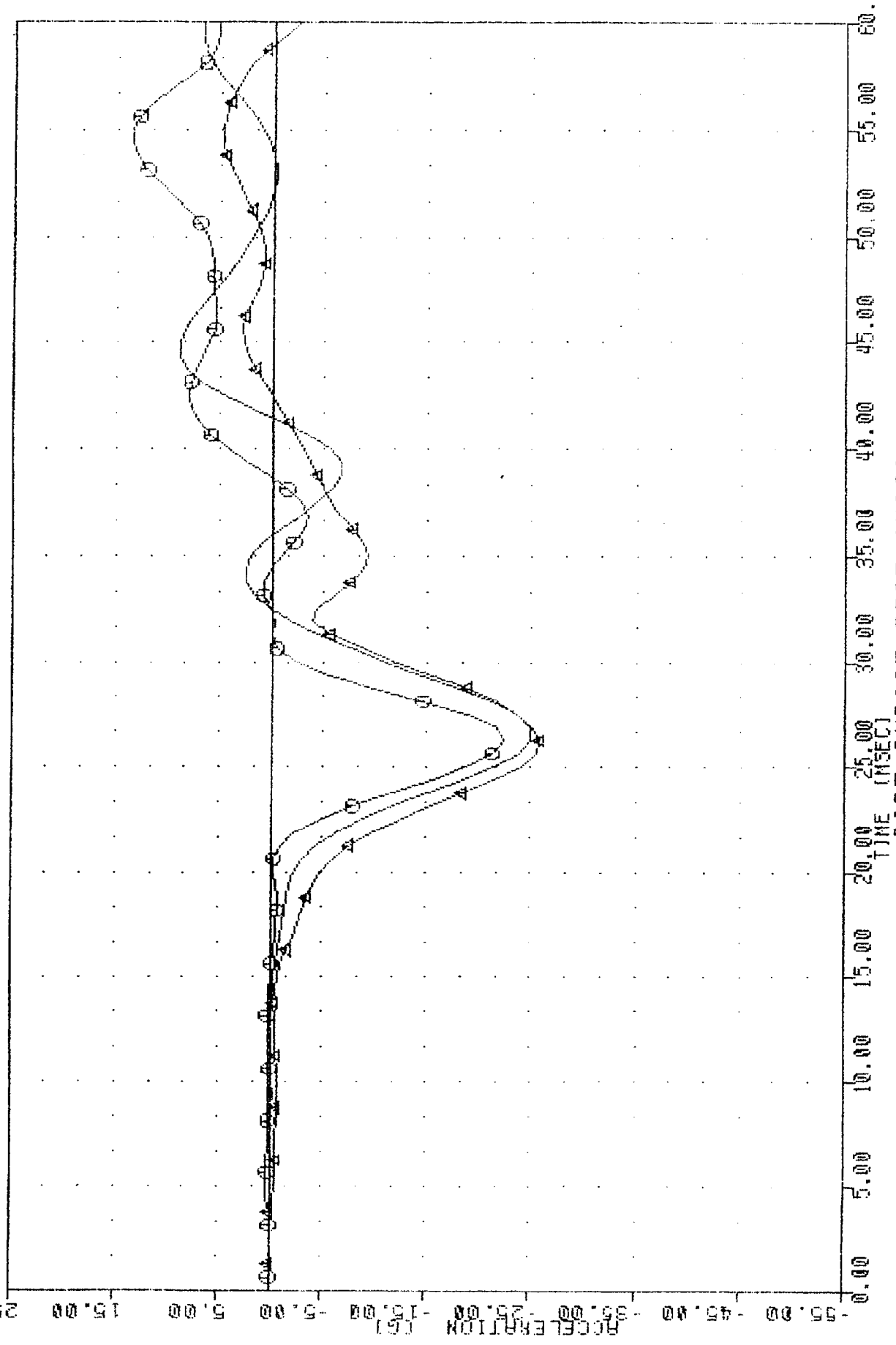


VRI 2AL91, SIUW206 S10 H08Mx U02 BODY 83W CAL 86 84016 PLUT DATE 17-JAN-84 11:27:47
 T01YGR FILTER : HSRI 136/ 189/ -50 MIN, MAX = -26.25 26.87, 7.982 58.13
 MN-2SD 0 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -21.58 26.87, 17.542 54.38
 MN-2SD 1 FILTER : HSRI 136/ 189/ -50 MIN, MAX = -27.91 26.87, 4.782 56.25



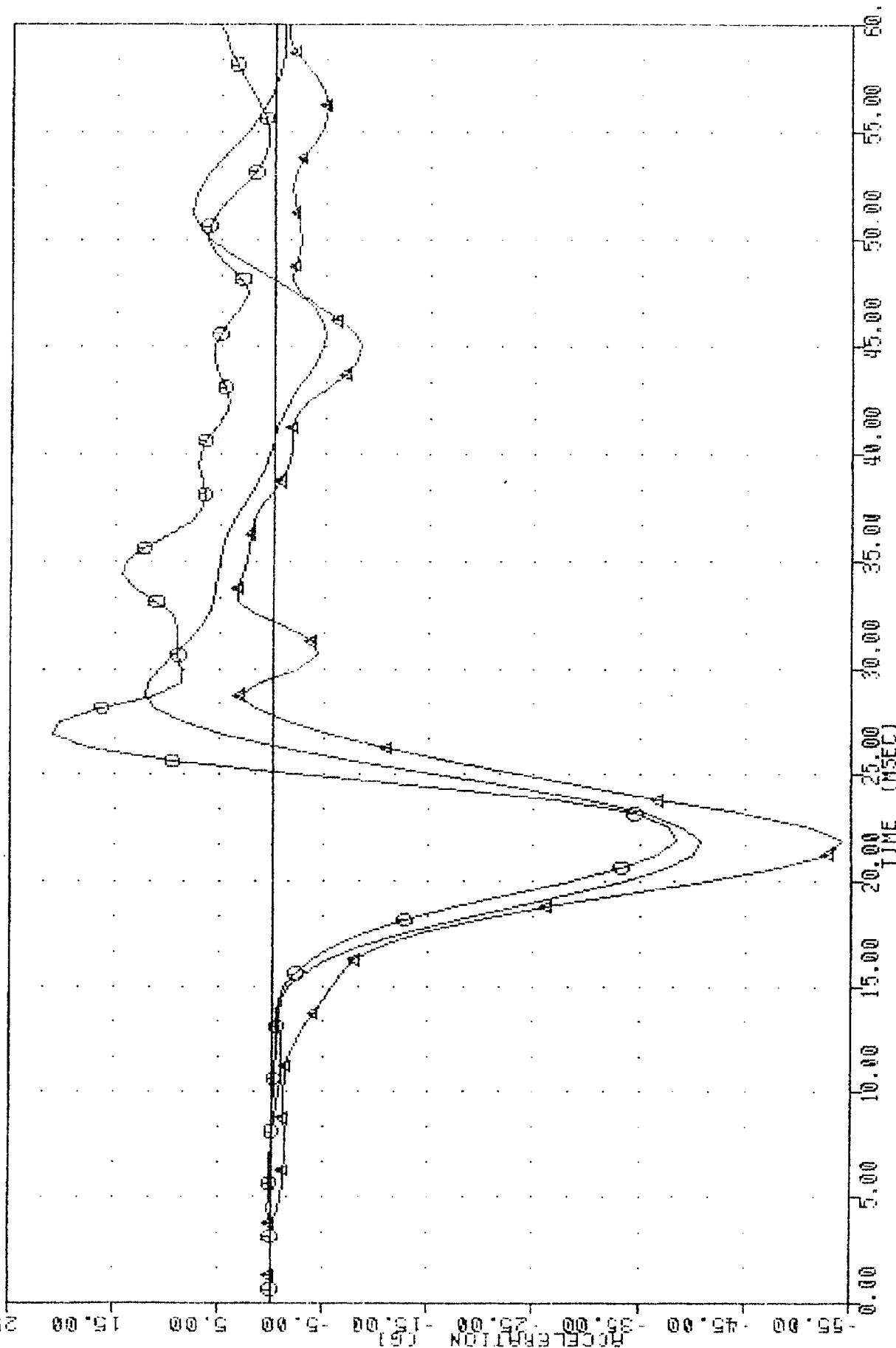
SIDE IMPACT TEST (U02)
 UPPER SPINE ACCELERATION Y AXIS -R

VRTL 5RL91, SLOW286 SID THORAX UN2 BODY 83W CAL 85 84016 PLUT DATE 17-JAN-84 13:21:28
 T12Y61 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -24.98 8.88
 MN-2SD 0 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -22.37 13.54
 MN-2SD A FILTER = HSRI 136/ 189/ -50 MIN, MAX = -25.84 4.85



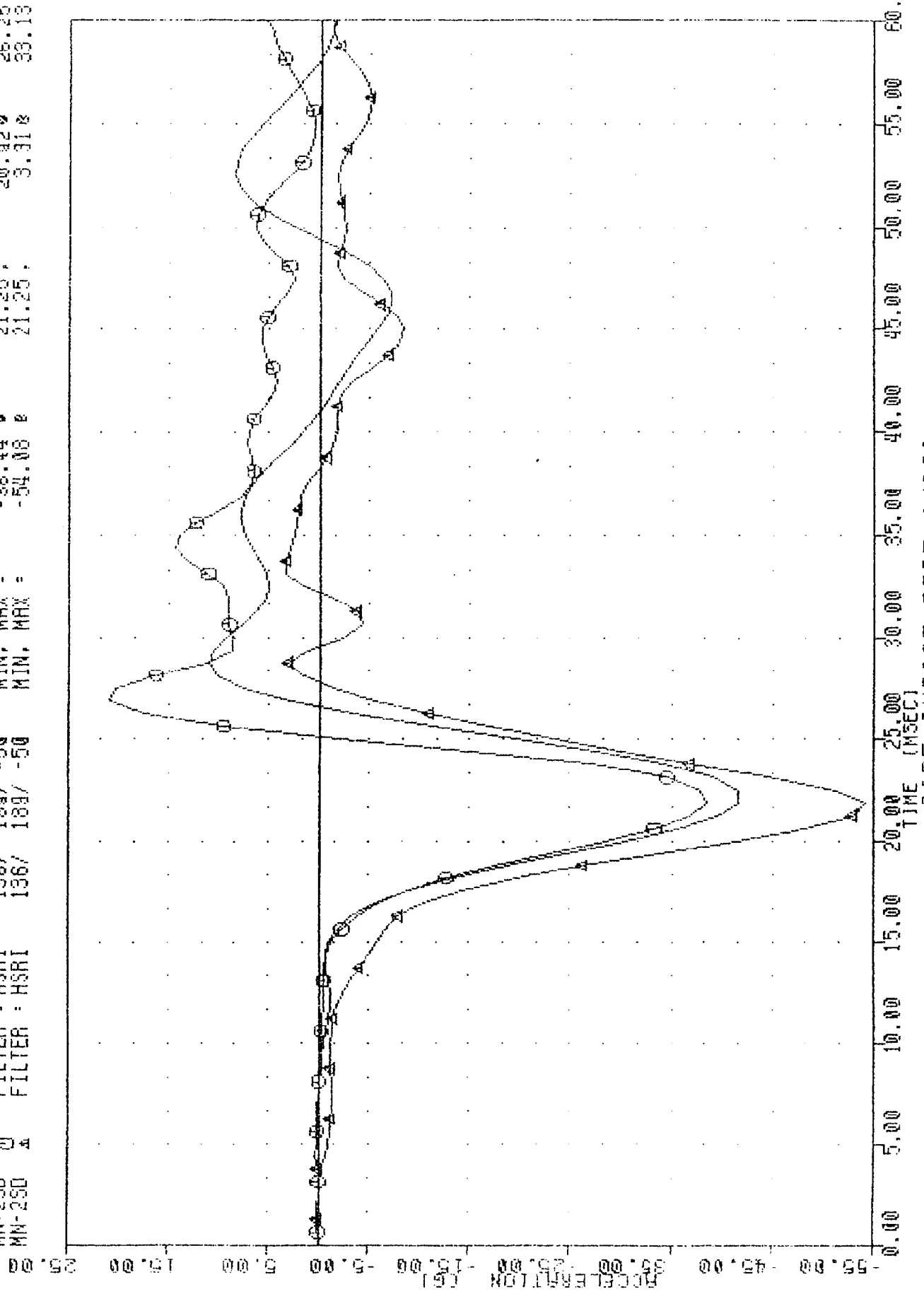
SIDE IMPACT TEST (U02)
 LOWER SPINE ACCELERATION Y AXIS -1

VRIC JALSI, SIMU286 SID THORAX UN2 BODY 83W CAL 86 84016 17-JAN-84 13:18:36
 LURYGI FILTER: HSRI 136/ 189/ -50 MIN, MAX = -40.76 21.25 11.94 28.13
 MN-250 0 FILTER: HSRI 136/ 189/ -50 MIN, MAX = -38.44 21.25 20.82 28.26
 MN-250 A FILTER: HSRI 136/ 189/ -50 MIN, MAX = -54.08 21.25 3.31 33.13



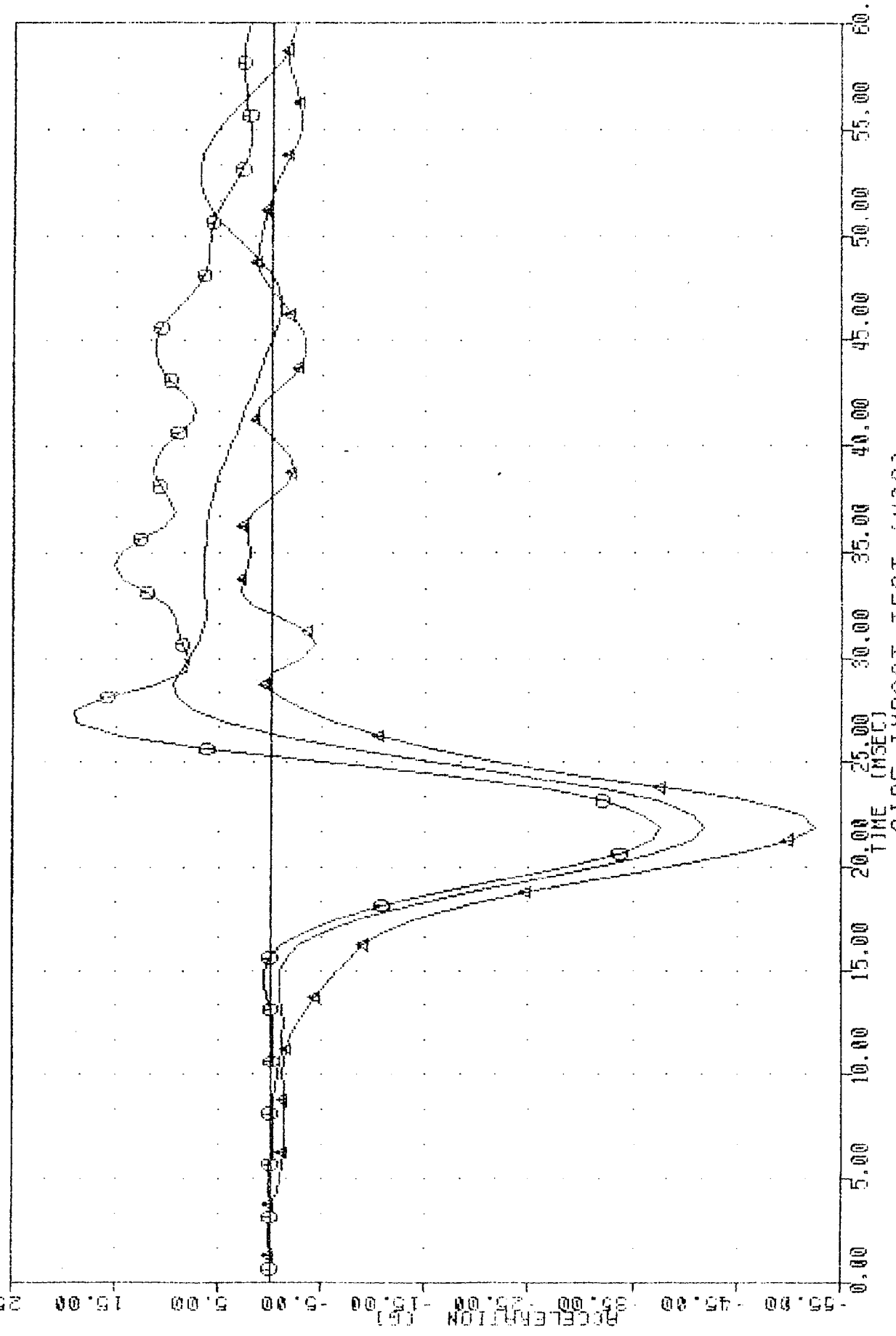
SIDE IMPACT TEST (U02)
 LEFT UPPER RIB ACCELERATION Y AXIS - I

WRIC 3RL91, S1U0286 SID THORAX U02 BODY 830 CHL 86 84016 PLOT DATE 17-JAN-84 13:26:16
 LURYGA FILTER = HSRI 136/ 189/ -50 MIN, MAX = -41.77 10.99 26.13
 MN-280 0 FILTER = HSRI 136/ 189/ -50 MIN, MAX = -38.44 20.92 26.26
 MN-280 A FILTER = HSRI 136/ 189/ -50 MIN, MAX = -54.08 3.31 33.13



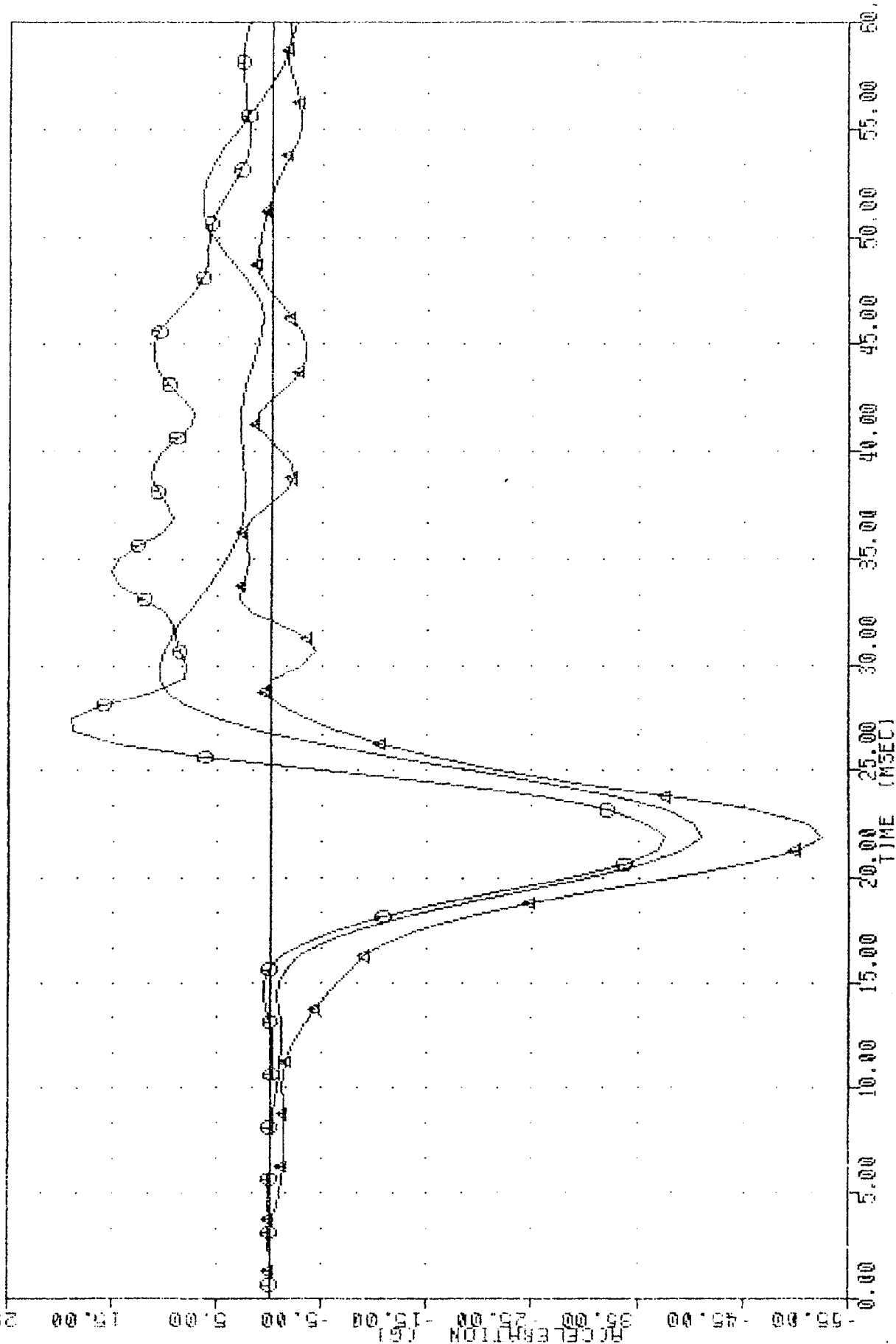
SIDE IMPACT TEST (U02)
 LEFT UPPER RIB ACCELERATION Y AXIS -A

WRIC 38191, SIU0286 SID THORAX U02 BODY 830 CAL 86 84016 PLOT DATE 17-JAN-84 13:23:33
 LCRY61 FILTER: HSRI 136/ 189/ -50 MIN, MAX = -41.97 21.25 9.41 28.13
 MN-250 0 FILTER: HSRI 136/ 189/ -50 MIN, MAX = -37.66 21.25 19.00 28.87
 MN-250 4 FILTER: HSRI 136/ 189/ -50 MIN, MAX = -52.52 21.25 2.94 32.50



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

VR15 CALSI . S100206 S10 THORAX UN2 BODY 65V CAL 00 17-JAN-84 13:24:58
 LLRYGR FILTER : HSRI 136/ 189/ -50 MIN, MAX : -40.95 8 21.25 29.36
 MN-290 0 FILTER : HSRI 136/ 189/ -50 MIN, MAX : -37.68 0 21.25 26.87
 MN-290 A FILTER : HSRI 136/ 189/ -50 MIN, MAX : -52.52 0 21.25 32.50



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