

HS-806 941

DOT 4884

MVMA SIDE IMPACT TESTING

MDB-TO-CAR SIDE IMPACT TEST OF
A 26° CRABBED MOVING DEFORMABLE BARRIER
TO A 1985 FORD LTD
AT 33.5 MPH

PREPARED BY:
TRANSPORTATION RESEARCH CENTER OF OHIO
ST. RT. 33 LOGAN COUNTY
EAST LIBERTY, OHIO 43319

TEST REPORT
TEST NO.: 851002
TEST DATE: OCTOBER 2, 1985
TEST CONDITIONS: MODIFIED STRUCTURE, DUMMY
SEATED 5 INCHES FROM PADDED DOOR PANEL

PREPARED FOR:
MGA RESEARCH CORPORATION
12790 MAIN ROAD
AKRON, NEW YORK 14001-0071

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J. F. Shultis

Manager, Impact Laboratory

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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	0.9	metric ton	t

		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
in ³	cubic inches	16	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	L
pt	pints	0.47	liters	L
qt	quarts	0.95	liters	L
gal	gallons	3.8	liters	L
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³

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

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		

mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi

		AREA		
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares	2.5	acres	

		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	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

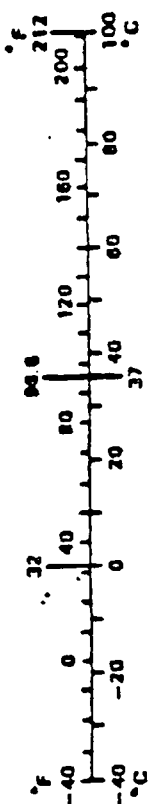


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SECTION 1.0

PURPOSE AND INTRODUCTION

PURPOSE

The main purpose of this test was to evaluate occupant responses in a vehicle with a modified A-post and B-post structure and a padded door panel in a 90° side impact crash test.

INTRODUCTION

A stationary 1985 Ford LTD 4-door sedan was impacted on the right side by a Moving Deformable Barrier (MDB) on October 2, 1985. 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° clockwise 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 LTD at 33.5 mph with the MDB's wheels crabbed counterclockwise to 26°. The actual test speed was 33.5 mph and the actual leading edge of contact was 38.0 inches forward of the midpoint of the Ford LTD's wheelbase.

The vehicle contained structural modifications in the A-post and B-post areas. The front passenger inner door panel was replaced with a padded panel. A side impact dummy (SID) was seated in the right front passenger seat with its shoulder 5 inches from the padded door panel. Section 2 contains test parameter data. Section 3 contains crash test data. Appendix A contains Data Plots. Appendix B contains Dummy Certification Data.

SECTION 2.0
TEST PARAMETER DATA

This section includes the following information:

1. General Test Vehicle Information
2. Dummy Temperature Control and Positioning Data
3. High Speed Camera Information
4. Transducer Information

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Ford Motor Company

MAKE/MODEL: Ford LTD

VIN: 1FABP39A5FG215185

BODY STYLE: 4-Door sedan

MODEL YEAR: 1985

NHTSA NO.: DNA

COLOR: Blue

ENGINE DATA: TYPE: Inline CYLINDERS: 4 DISPLACEMENT 2300 cc.

TRANSMISSION DATA: 3 speed Automatic

DATE VEHICLE RECEIVED: NA

ODOMETER READING: 387

DEALER'S NAME AND ADDRESS: NA

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

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? NO (Test Modifications)
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: 4/85

GVWR: 4225 LBS.,

GAWR: FRONT 2103 LBS., REAR 2255 LBS.

VEHICLE TIRE DATA

RECOMMENDED COLD TIRE PRESSURE: FRONT 32 psi; REAR 32 psi

TIRES ON VEHICLE (MFGR. & LINE, SIZE): General Ameriway Radial P195/75R-14

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 3

IS SPARE TIRE "SPACE SAVER"? Yes

IS SPARE TIRE STANDARD EQUIPMENT? Yes

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

RIGHT FRONT	790	LBS.	RIGHT REAR	643	LBS.
LEFT FRONT	797	LBS.	LEFT REAR	679	LBS.
TOTAL FRONT WEIGHT	1587		LBS. (54.6 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1322		LBS. (45.4 % OF TOTAL VEHICLE WEIGHT)		
TOTAL DELIVERED WEIGHT	2909		LBS.		

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 26 1/2	;LF 26 1/2	;RR 24 3/8	;LR 24 1/8
PRE-TEST ATTITUDE:	RF 25 13/16	;LF 26 1/16	;RR 22 9/16	;LR 23 1/16
POST-TEST ATTITUDE:	RF 26 1/4	;LF 25 1/4	;RR 22 3/8	;LR 22 3/4

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 121 LBS. CARGO:

RIGHT FRONT	842	LBS.	RIGHT REAR	825	LBS.
LEFT FRONT	772	LBS.	LEFT REAR	765	LBS.
TOTAL FRONT WEIGHT	1614		LBS. (50.4% OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1590		LBS. (49.6 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	3204		LBS.		

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

TEST FLUID DATA

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

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

"USEABLE" CAPACITY*: NA GALLONS ACTUAL

TEST VOLUME: 14.9 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? DNA

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

VEHICLE LOAD (UP TO CAPACITY): FRONT 32 psi; REAR 32 psi

RECOMMENDED TIRE SIZE: P195/75R-14 LOAD RANGE X B, C,

VEHICLE CAPACITY: TYPES OF SEATS: Bench

NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 3 FRONT

CARGO LOAD 100 LBS. 3 REAR

TOTAL 1000 LBS. 6 TOTAL

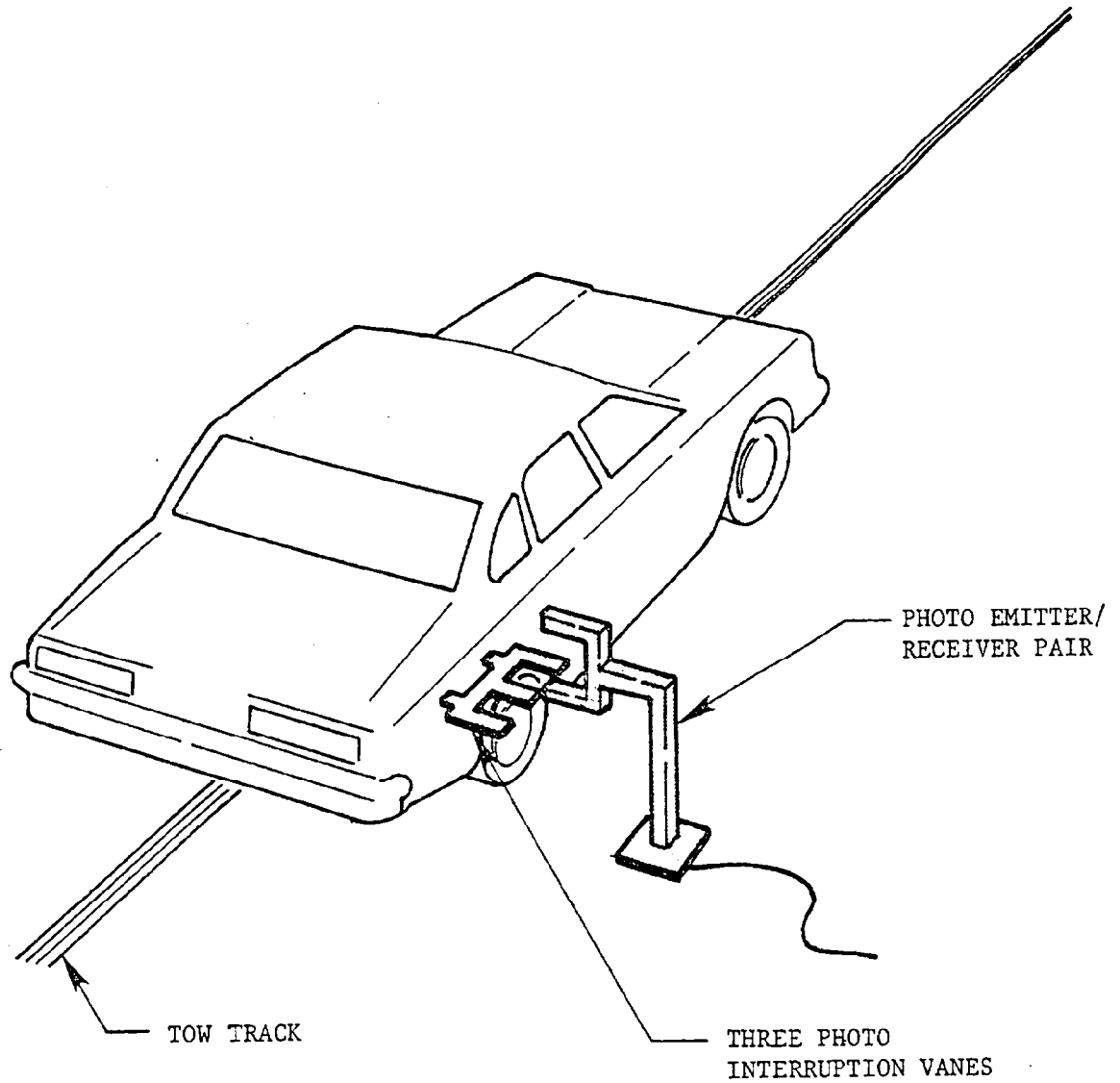
*WITH ENTIRE FUEL SYSTEM FILLED WITH FUEL TANK THROUGH CARBURETOR BOWL.

VEHICLE TEST WEIGHT CALCULATION

$$\begin{aligned}\text{Test Weight} &= \text{Unloaded Delivered Weight} + \\ &\quad \text{Number of Dummies X 174 lbs.} + \\ &\quad \text{Cargo Weight} \\ &= 2909 + 1 \text{ X } 174 + 100 \text{ lbs.} \\ &= 3183 \text{ lbs.}\end{aligned}$$

To achieve test weight, the battery and the exhaust system were removed and 14.9 gallons of Stoddard Solvent were added in the fuel tank. The weight of the test vehicle was measured by placing each wheel on a Force Plate manufactured by K.J. Law Engineers, Inc., Detroit, Michigan.

IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane is located two inches before impact.

The vanes have one foot spacing.

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.

SIDE IMPACT DUMMY SEATING PROCEDURE

The following is an outline of the Side Impact Dummy Seating Procedure which is currently being developed.

1. The seat is placed in the midpoint of the fore to aft adjustment.
2. The H-point location of the NHTSA Side Impact Dummy (SID) is located by using the SAE three-dimensional H-point machine (SAE J826 APR80 - 50TH Percentile Male Configuration). The H-point machine is positioned in the right front outboard designated seating position such that the midsagittal plane is vertical and longitudinal. The H-point is located and documented using Sections 4 through 6 of SAE Standard J826 APR80.
3. The H-point machine is removed and the SID is positioned in the right front passenger seat such that its right shoulder is either five inches from or against the hardboard or padded inner door panel. The knees are initially set 11 1/2 inches apart, measured between the outer surfaces of the knee pivot bolt heads, if possible. The H-point is then positioned to within 1/2 inch of the coordinates of the H-point machine H-point location found in Step 2 by applying force in the appropriate direction to the dummy's lower torso. If the dummy's upper torso does not rest against the seatback, position the torso without moving the H-point so the upper torso does rest against the seatback. The dummy's feet are then positioned such that the heels rest on the floorpan and the feet are on the toeboard. If the dummy's feet will not reach the toeboard, the feet are positioned such that the feet are at right angles to the lower legs. If wheelhouse projections interfere with the above positioning of the feet, the heel is placed on the floorpan with the foot perpendicular to the lower leg by twisting the foot about the ankle.
4. Prior to the crash test the dummy's longitudinal and lateral head locations are rechecked. The dummy is then visually checked.

DUMMY IN-VEHICLE POSITION RECORDING SHEET

MFR./MAKE/MODEL: Ford LTD

FRONT SEAT TYPE: X BENCH
 BUCKET
 SPLIT BENCH

ADJUSTER TYPE: X MANUAL
 POWER

BUCKET SEAT BACK TYPE: X FIXED
 ADJUSTABLE

TECHNICIANS:
 1. B. Miller

POSITIONING DATE: 10/02/85

2. R. Benavides

AMBIENT TEMP: 66 °F

TIME: 9:00a.m.

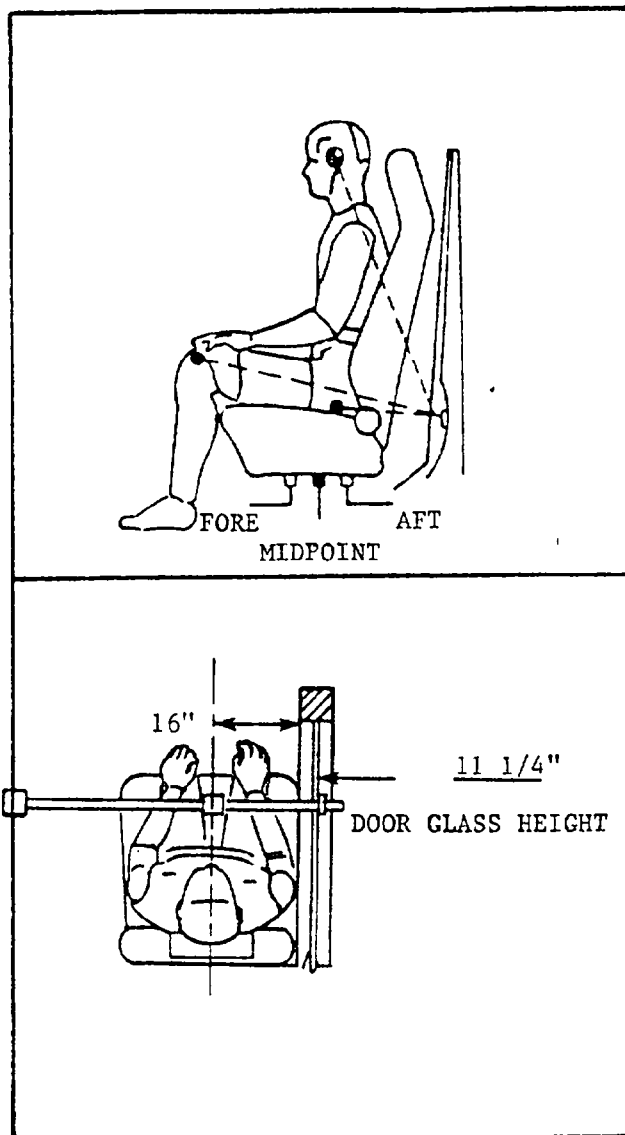
3. C. Middleton

FRONT PASSENGER DUMMY

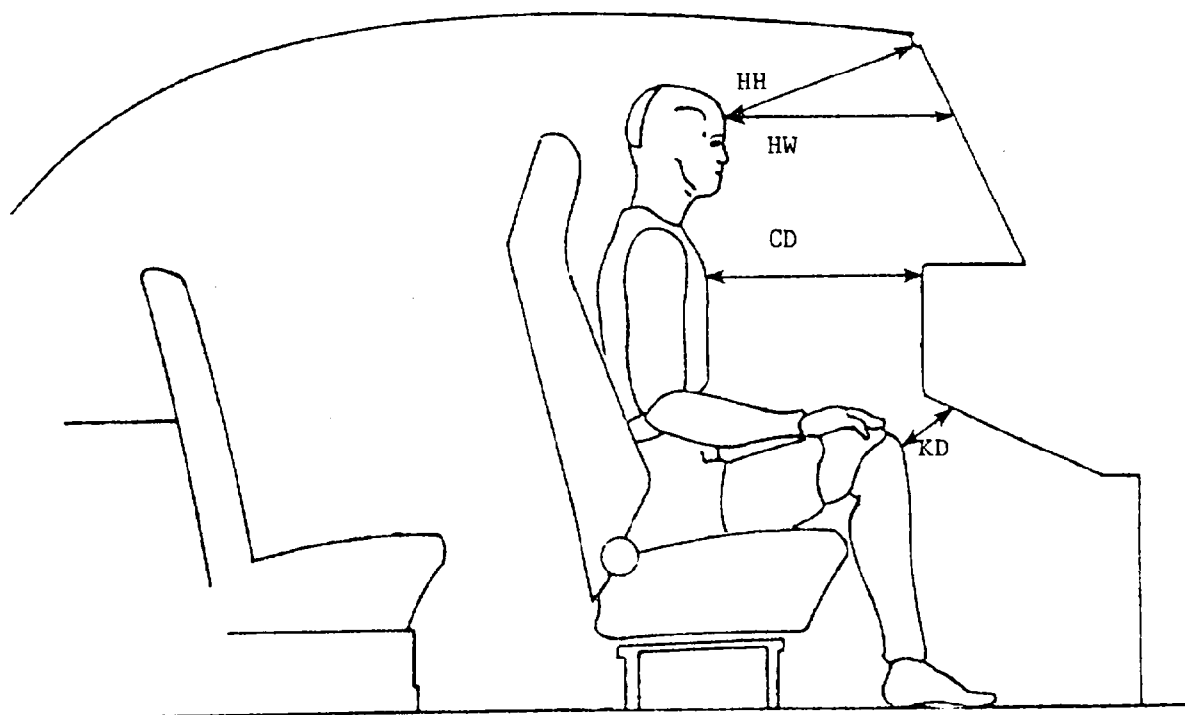
20 3/4" HEAD
2 TARGET*

26 1/4" KNEE
90 JOINT

APPROX.
13 1/4" "H"
117 POINT



*All passenger dummy dimensions referenced to top of front door striker bolt and all angles referenced to vertical.

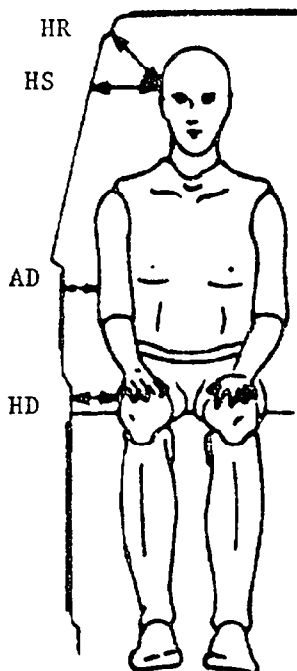


PASSENGER

HH	13 11/16
HW	19 3/16
CD	19 5/16
KDL	3 3/4
KDR	4 1/16

ALL MEASUREMENTS IN INCHES

DUMMY LONGITUDINAL CLEARANCE DIMENSION



PASSENGER

HR	10 5/8
HS	14 1/2
AD	5
HD	6 1/4

ALL MEASUREMENTS IN INCHES

DUMMY LATERAL CLEARANCE DIMENSIONS

LOCATIONS OF OFFBOARD HIGH SPEED CAMERAS

CAMERA NO.	X	Y	Z
7	-6'11 1/2"	-25'10 1/2"	+ 3'3"
6	-23'4 3/4"	+41'6 1/2"	+ 3'1"
5	+1'	0	+40'
4	0	0	+40'

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

CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Documentary	Beaulieu	12-120	24	Documentary
2	R. Panning	Kodak	16	24	Real Time
3	Onboard MDB	Photosonic 1B	13	993	View Impact
4	Overhead Tight	Photosonic 1B	25	808	View Impact
5	Overhead Wide	Photosonic 1B	8	925	Vehicle Crush
6	Right	Photosonic 1B	25	998	Vehicle Crush
7	Left	Photosonic 1B	13	998	Vehicle Crush
8	Onboard Windshield	Photosonic 1B	8	998	Dummy Kinematics
9	Onboard Roof	Photosonic 1B	8	998	Dummy Kinematics
10	Onboard Door	Photosonic 1B	8	1000	Dummy Kinematics

TRANSDUCER INFORMATION

PARAMETER BEING MEASURED	LOCATION	TYPE OF TRANSDUCER	MFGR	MODEL NUMBER	SERIAL NUMBER
HEDXG2	HEAD CENTER OF GRAVITY	ACCEL.	ENDEVCO	2264	AY95
HEDYG2	HEAD CENTER OF GRAVITY	ACCEL.	ENDEVCO	2264	BA26
HEDZG2	HEAD CENTER OF GRAVITY	ACCEL.	ENDEVCO	7264	AY90
T01XG2	UPPER SPINE	ACCEL.	ENDEVCO	2264	AR93
T01YG2	UPPER SPINE	ACCEL.	ENDEVCO	2264	AN61
T01YGB	UPPER SPINE	ACCEL.	ENDEVCO	2264	AZ77
T01ZG2	UPPER SPINE	ACCEL.	ENDEVCO	2264	AN37
T12XG2	LOWER SPINE	ACCEL.	ENDEVCO	2264	AZ55
T12YG2	LOWER SPINE	ACCEL.	ENDEVCO	2264	BA64
T12YGB	LOWER SPINE	ACCEL.	ENDEVCO	2264	AZ74
T12ZG2	LOWER SPINE	ACCEL.	ENDEVCO	2264	BA30
RURYG2	RIGHT UPPER RIB	ACCEL.	ENDEVCO	2264	AR82
RURYGB	RIGHT UPPER RIB	ACCEL.	ENDEVCO	2264	AZ24
RLRYG2	RIGHT LOWER RIB	ACCEL.	ENDEVCO	2264	AN60
RLRYGB	RIGHT LOWER RIB	ACCEL.	ENDEVCO	2264	AY78
PEVXG2	PELVIS	ACCEL.	ENDEVCO	2264	AR78
PEVYG2	PELVIS	ACCEL.	ENDEVCO	2264	AN01
PEVZG2	PELVIS	ACCEL.	ENDEVCO	2264	AJ35
RRTYD2	RIGHT RIB TO SPINE DISPLACEMENT	LINEAR POT.	BOURNS	5184	4081-191
RFDYG1	RIGHT FRONT DOOR-POSITION 1	ACCEL.	ENDEVCO	2264	AT26
RFDYG2	RIGHT FRONT DOOR-POSITION 2	ACCEL.	ENDEVCO	2264	AS36
RFDYG3	RIGHT FRONT DOOR-POSITION 3	ACCEL.	ENDEVCO	2264	BC29
RFDYG4	RIGHT FRONT DOOR-POSITION 4	ACCEL.	ENDEVCO	7264	AN86
LFSXG	LEFT FRONT SILL	ACCEL.	B & H*	4-202-0001	18840
LFSYG	LEFT FRONT SILL	ACCEL.	B & H	4-202-0001	18236
LFSZG	LEFT FRONT SILL	ACCEL.	B & H	4-202-0001	18837
BCGXG	BARRIER CENTER OF GRAVITY	ACCEL.	B & H	4-202-0001	18851
BCGYG	BARRIER CENTER OF GRAVITY	ACCEL.	B & H	4-202-0001	18859
BCGZG	BARRIER CENTER OF GRAVITY	ACCEL.	B & H	4-202-0001	18836
BRCXG	BARRIER REAR CROSS MEMBER	ACCEL.	B & H	4-202-0001	19022
BRCYG	BARRIER REAR CROSS MEMBER	ACCEL.	B & H	4-202-0001	18237

*Bell & Howell

SECTION 3.0
CRASH TEST DATA

The following pages are included in this section:

1. Test conditions
2. Dummy accelerometer data summary
3. Dummy contact points and kinematic summary
4. Vehicle accelerometer locations and data summary
5. Vehicle static crush table and profiles
6. Deformable moving barrier accelerometer locations and data
summary
7. Test anomalies

TEST CONDITIONS

TEST NUMBER: 851002

DATE OF TEST: October 2, 1985

TIME OF TEST: 12:05

WIND VELOCITY: 2-4 mph 94°

HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA: 54° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 70° F

DUMMY TEMPERATURE: 68° F

SUBJECT VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
VEHICLE TEST WEIGHT (LBS.)	3204	3183
MDB TEST WEIGHT (LBS.)	2991	2992
MDB VELOCITY (MPH)*	33.5	33.5
IMPACT POINT (INCHES)**	38.0	37.0

DUMMIES

	<u>DRIVER</u>	<u>MIDDLE PASSENGER</u>	<u>RT. FRONT PASSENGER</u>	<u>LEFT REAR PASSENGER</u>	<u>RT. REAR PASSENGER</u>
TYPE:			SID		
SERIAL NO.:			016		
INSTRUMENTATION:					
HEAD ACCEL.:			3		
CHEST ACCEL.:			12		
FEMUR L.C.'S:			0		
OTHER:			3 Pelvis		
			1 Rib Disp.		

RESTRAINT SYSTEM: Dummy was unrestrained.

* As measured over final one foot of travel.

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

SIDE IMPACT DUMMY DATA SUMMARY

	PASSENGER DUMMY			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
HEAD ACCELERATION				
LONGITUDINAL	6.83	41.63	17.22	68.25
LATERAL	8.23	42.63	23.88	55.00
VERTICAL	36.77	73.75	6.53	227.13
RESULTANT	38.51 @ 71.38			
HIC	93.11 from 53.00 to 81.00			
DELTA V (MPH)***	-7.6 @ 146.88			
CHEST ACCELERATION				
UPPER SPINE				
LONGITUDINAL	9.32	60.00	9.03	75.62
LATERAL (P)****	14.82	68.75	53.41	48.13
LATERAL (R)****	15.64	68.75	50.63	48.13
VERTICAL	4.99	105.00	8.40	75.00
RESULTANT (P)****	53.68 @ 48.13			
RESULTANT (R)****	50.92 @ 48.13			
DELTA V (MPH)***	-22.7 @ 68.13 (P)			
	-20.1 @ 67.50 (R)			
LOWER SPINE				
LONGITUDINAL	9.38	58.38	17.34	40.00
LATERAL (P)****	6.13	68.13	63.14	40.00
LATERAL (R)****	7.26	68.13	63.70	40.00
VERTICAL	3.14	206.25	8.42	66.87
RESULTANT (P)****	65.55 @ 40.00			
RESULTANT (R)****	66.08 @ 40.00			
DELTA V (MPH)***	-24.0 @ 61.63 (P)			
	-23.9 @ 61.00 (R)			
RIGHT UPPER RIB				
LATERAL (P)****	4.81	81.88	45.75	34.38
LATERAL (R)****	5.69	40.00	51.54	34.38
DELTA V (MPH)***	-18.7 @ 72.63 (P)			
	-19.3 @ 73.00 (R)			
RIGHT LOWER RIB				
LATERAL (P)****	11.70	71.25	47.10	34.38
LATERAL (R)****	12.17	71.25	51.59	34.38
DELTA V (MPH)***	-20.8 @ 70.75 (P)			
	-21.3 @ 70.75 (R)			
PELVIS ACCELERATION				
LONGITUDINAL	4.97	214.75	10.82	51.88
LATERAL	5.15	186.50	43.63	47.38
VERTICAL	8.50	41.63	9.47	71.00
RESULTANT	43.87 @ 47.38			
DELTA V (MPH)***	-23.9 @ 83.25			

SIDE IMPACT DUMMY DATA SUMMARY CONTD

PASSENGER DUMMY

	<u>POSITIVE</u> <u>DIRECTION*</u>		<u>NEGATIVE</u> <u>DIRECTION**</u>	
	<u>MAX</u>	<u>TIME</u>	<u>MAX</u>	<u>TIME</u>
	<u>(in)</u>	<u>(msec)</u>	<u>(in)</u>	<u>(msec)</u>
RIB DEFLECTION	0.17	208.38	1.69	69.25

* LONGITUDINAL: FORWARD
LATERAL: RIGHTWARD
VERTICAL: DOWNWARD

**LONGITUDINAL: REARWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD

*** 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

VISIBLE DUMMY CONTACT POINTS:

	DRIVER	PASSENGER
Head	<u>DNA</u>	<u>Top of door padding</u>
Chest	<u>DNA</u>	<u>Door padding</u>
Abdomen	<u>DNA</u>	<u>Door padding</u>
Left Knee	<u>DNA</u>	<u>Right knee</u>
Right Knee	<u>DNA</u>	<u>Door padding</u>

DOOR OPENING:

	LEFT	RIGHT
Front	<u>Normal</u>	<u>Tools required</u>
Rear	<u>Normal</u>	<u>N/A</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Front	<u>None</u>	<u>None</u>
Rear	<u>None</u>	<u>None</u>

GLAZING DAMAGE:

All right side door glass was shattered.

Right side of windshield was cracked.

OTHER NOTABLE IMPACT EFFECTS:

DUMMY KINEMATIC SUMMARY

During impact, the dummy's right hip and the right side of its torso contacted the door padding. The dummy's head then rotated to the right and down and struck the top of the door padding as the dummy's pelvis translated to the left, across the occupant compartment. The dummy came to rest sitting on the seat, facing the right side of the car, with its pelvis wedged between the steering wheel and the seat back.

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

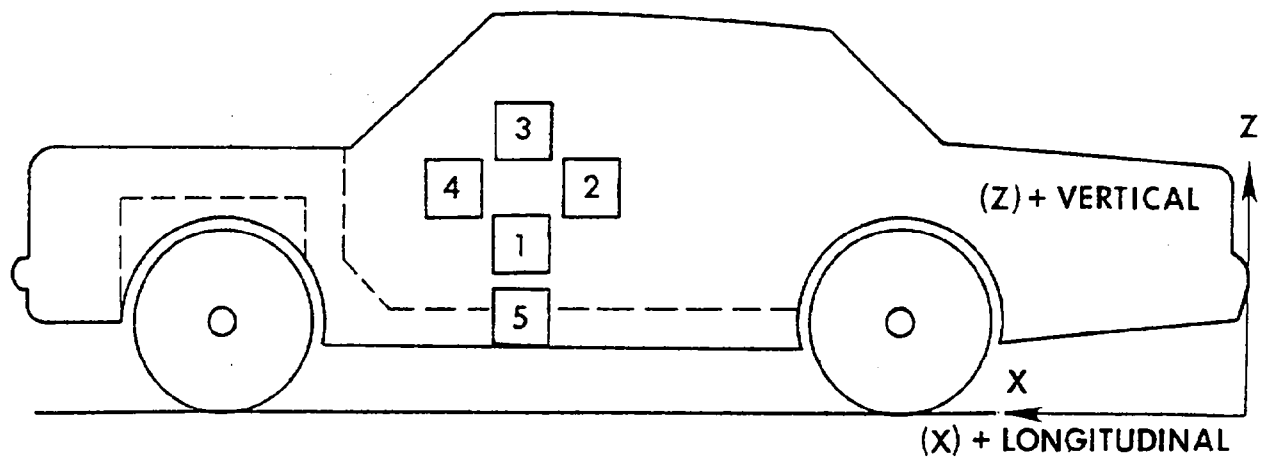
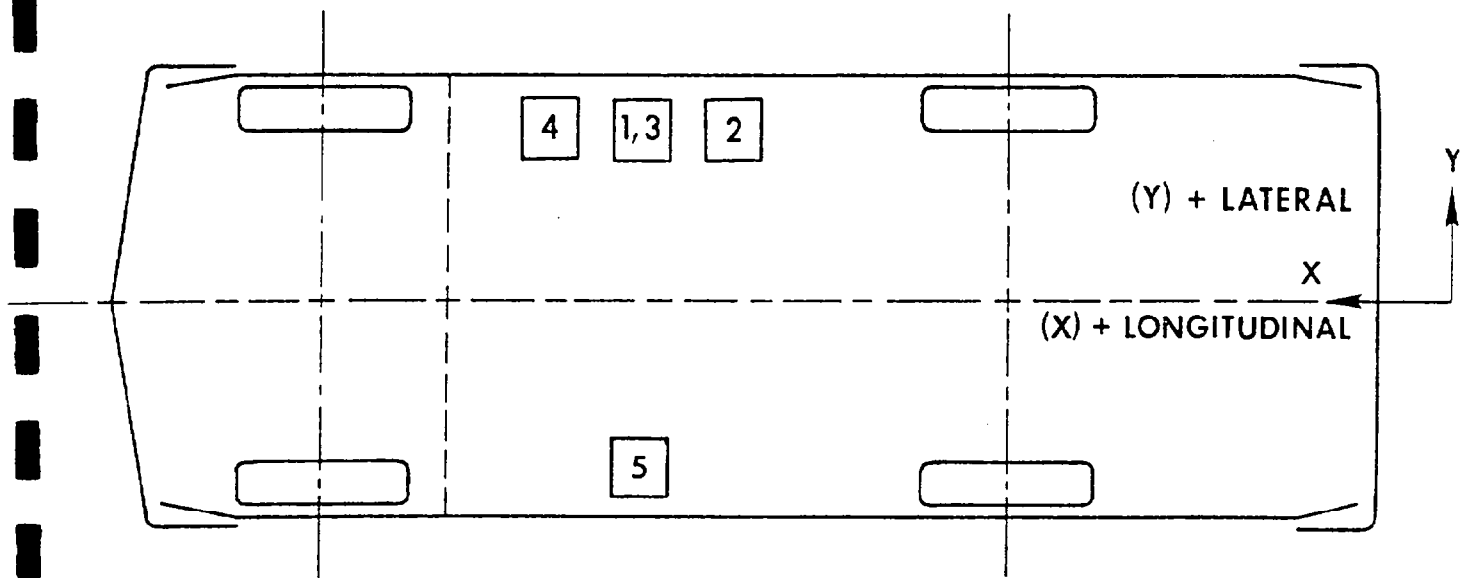
NO.	LOCATION	X*	Y*	Z*	POSITIVE**		NEGATIVE***	
					DIRECTION MAX (g)	TIME (msec)	DIRECTION MAX (g)	TIME (msec)
1	RIGHT FRONT DOOR CENTERLINE (LATERAL) $\Delta V = -32.5$ mph @ 18.63 msec	112.9	28.8	22.8	89.60	31.13	165.35	12.63
2	MIDREAR OF RIGHT FRONT DOOR (LATERAL) $\Delta V = 23.0$ mph @ 24.00 msec	101.9	29.0	24.3	96.38	16.75	132.09	10.50
3	UPPER RIGHT FRONT DOOR CENTERLINE (LATERAL) $\Delta V = -25.9$ mph @ 22.00 msec	113.1	28.6	29.2	105.19	38.13	121.03	23.00
4	MIDFRONT OF RIGHT FRONT DOOR (LATERAL) $\Delta V = -27.6$ mph @ 25.75 msec	122.3	28.8	22.9	134.10	31.63	121.02	10.88
5	LEFT SILL AT FRONT SEAT (LONGITUDINAL) (LATERAL) $\Delta V = -14.6$ mph @ 127.88 msec (VERTICAL) (RESULTANT)	119.5	-25.9	12.3	3.92 4.35 16.66	42.50 62.00 37.00 34.77 @ 37.25	8.79 30.14 10.31	27.13 37.63 17.38

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

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

All measurements of accelerometer locations in inches.

VEHICLE ACCELEROMETER PLACEMENT



VEHICLE EXTERIOR PROFILES AND STATIC CRUSH
ZERO DISTANCE AT PROJECTED IMPACT POINT*

LOCATION	HEIGHT (in)	78	72	66	60	54	48	42	36	30	24	18	12	6	0	6
		PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)														
Axle Height	11.2	X	17.7	17.6	17.4	17.4	17.4	17.3	17.2	17.2	17.1	17.1	17.1	17.3	17.2	X
H-Point	21.8		12.8	13.6	13.5	13.4	13.4	13.4	13.5	13.6	13.8	13.8	13.9	13.8	13.8	X
Window Sill	35.2		15.8	15.8	15.8	15.8	15.8	15.9	16.0	16.1	16.1	16.2	16.2	16.2	16.4	16.6
Window Top	54.0		23.8	23.8	23.8	23.9	23.9	24.0	24.0	24.2	X	X	X	X	X	X

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

Axle Height	11.2	X	22.2	22.2	22.6	23.5	23.6	23.6	24.2	24.9	24.9	25.6	26.4	23.2	21.9	X
H-Point	21.8		16.8	24.4	27.3	26.6	25.5	22.5	24.8	26.0	26.0	25.8	25.4	25.0	23.6	19.6
Window Sill	35.2		19.1	22.9	25.6	26.1	26.5	24.9	23.9	23.6	23.4	23.1	22.8	21.8	19.8	19.2
Window Top	54.0		26.2	26.2	26.5	26.6	27.0	27.2	27.3	27.6	27.7	X	X	X	X	X

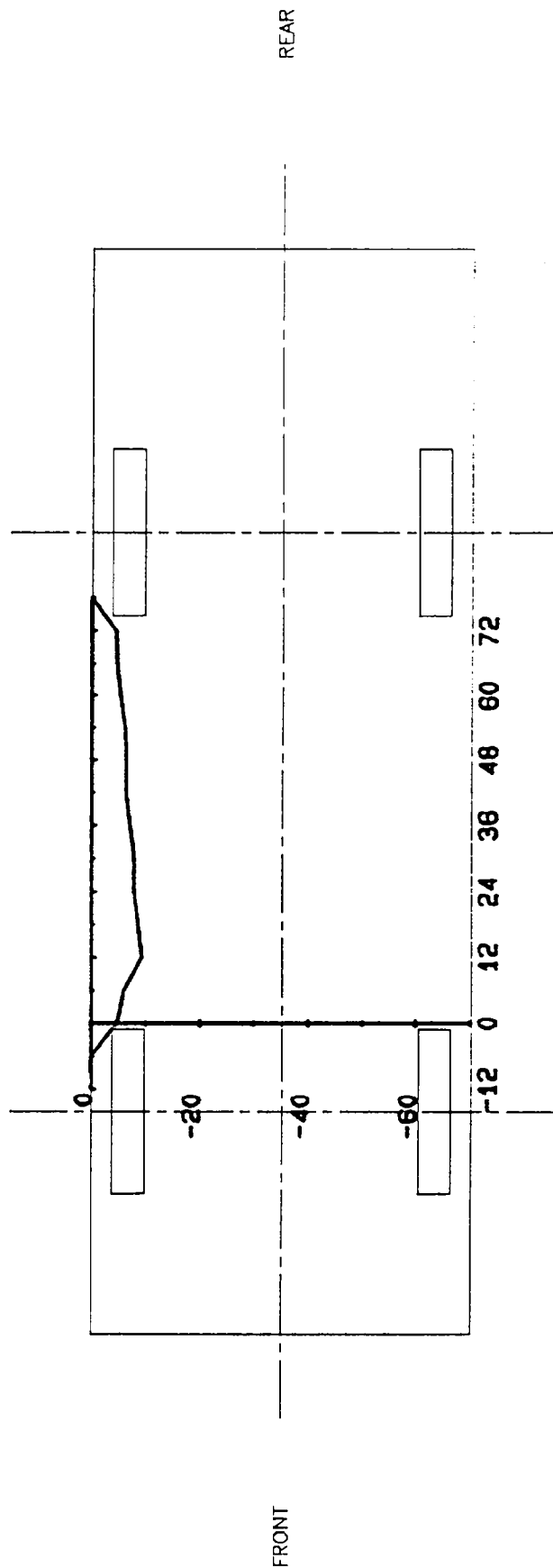
STATIC CRUSH (IN)

Axle Height	11.2	X	4.5	4.6	5.2	6.1	6.2	6.3	7.0	7.7	7.8	8.5	9.3	5.9	4.7	X
H-Point	21.8		4.0	10.8	13.8	13.2	12.1	9.1	11.4	12.5	12.4	12.0	11.6	11.1	9.8	5.8
Window Sill	35.2		3.3	7.1	9.8	10.3	10.7	9.1	8.0	7.6	7.3	7.0	6.6	5.6	3.6	3.1
Window Top	54.0		2.4	2.4	2.7	2.8	3.1	3.3	3.3	3.6	3.5	X	X	X	X	X

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

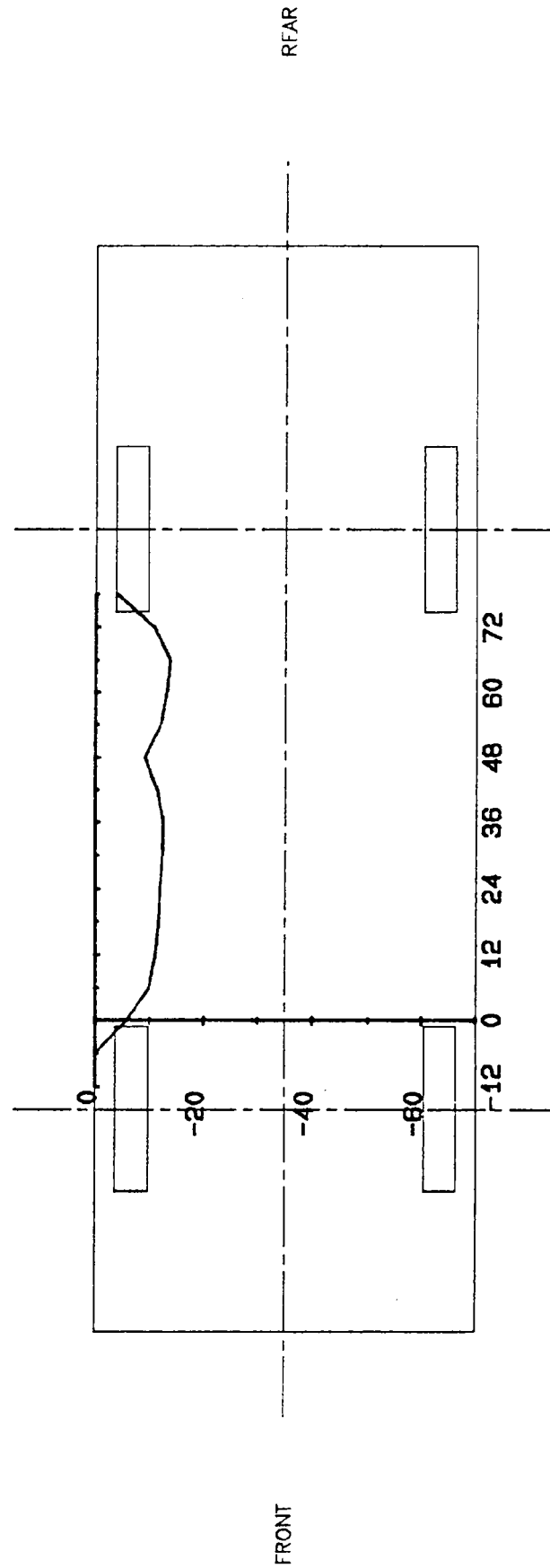
** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

VEHICLE EXTERIOR STATIC CRUSH PROFILE



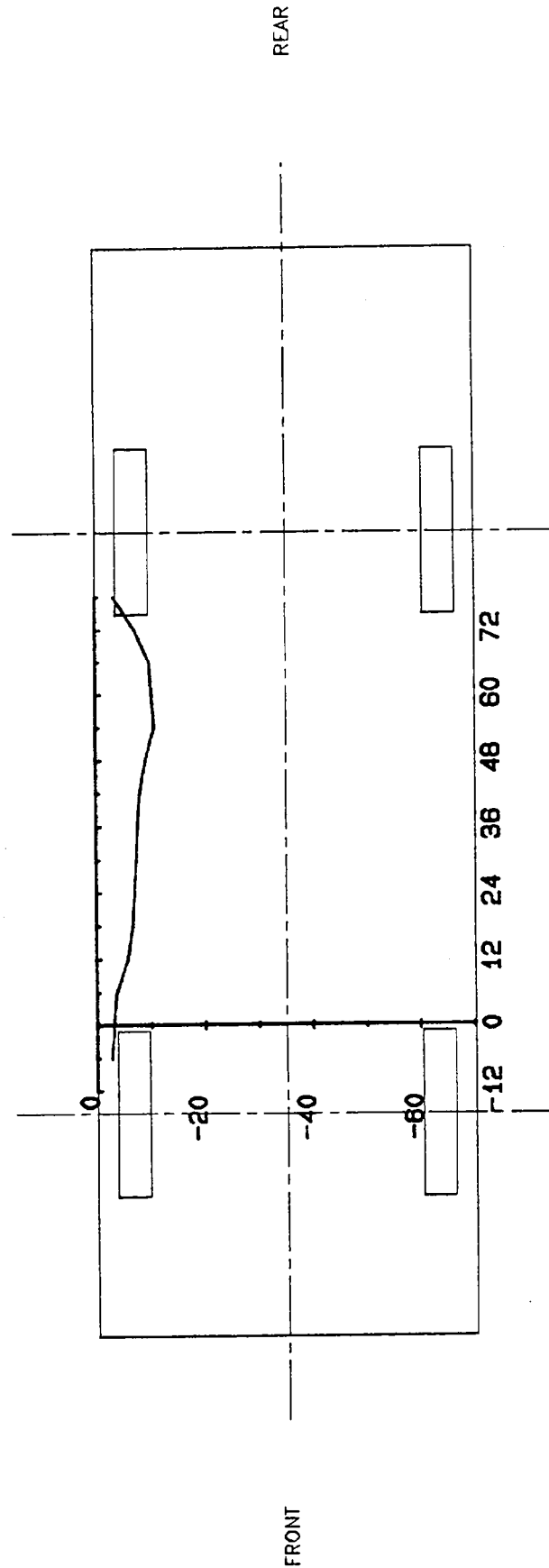
PROFILE LEVEL EQUALS AXLE HEIGHT WHICH IS 11.2" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



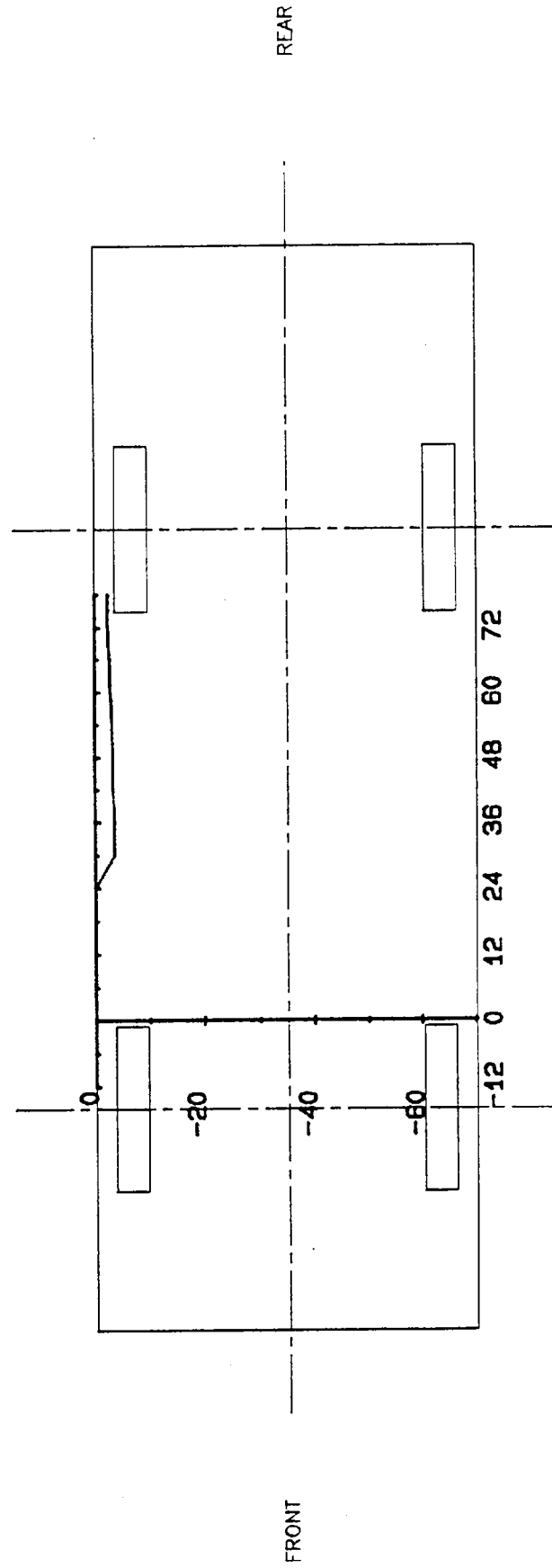
PROFILE LEVEL EQUALS H-POINT HEIGHT WHICH IS 21.8" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



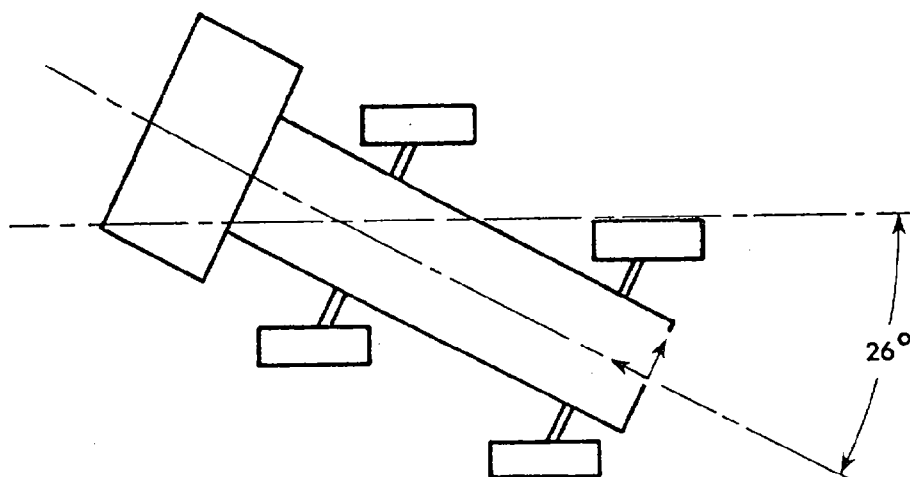
PROFILE LEVEL EQUALS WINDOW SILL HEIGHT WHICH IS 35.2" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.033

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT WHICH IS 54.0" ABOVE GROUND LEVEL
 (0,0) EQUALS PROJECTED IMPACT POINT
 SCALE FACTOR EQUALS 0.033

MOVING BARRIER ACCELEROMETER LOCATIONS AND DATA SUMMARY



NO.	LOCATION	X*	Y*	Z*	POSITIVE**		NEGATIVE***	
					MAX	TIME	MAX	TIME
					(g)	(msec)	(g)	(msec)
1	CENTER OF GRAVITY	73.0	0.9	11.9				
	(LONGITUDINAL)	$\Delta V = \text{--- mph @ --- msec}$			---	---	---	---
	(LATERAL)	$\Delta V = 4.2 \text{ mph @ } 104.63 \text{ msec}$			8.81	29.00	1.51	54.88
	(VERTICAL)				5.47	45.63	7.18	121.25
	(RESULTANT)				18.34 @ 44.88Y			
2	REAR FRAME MEMBER	18.5	-19.2	11.9				
	(LONGITUDINAL)	$\Delta V = -15.1 \text{ mph @ } 104.63 \text{ msec}$			1.16	121.75	13.76	43.75
	(LATERAL)	$\Delta V = 1.0 \text{ mph @ } 104.63 \text{ msec}$			3.19	103.00	4.91	22.50

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

**LONGITUDINAL: FORWARD
LATERAL: RIGHTWARD
VERTICAL: DOWNWARD

***LONGITUDINAL: REARWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD

Y SEE TEST ANOMALIES

TEST ANOMALIES

The moving barrier center of gravity X axis accelerometer, BCGXG, did not record accurate data due to a failed accelerometer. As a result, neither an accurate resultant or velocity could be calculated.

APPENDIX A

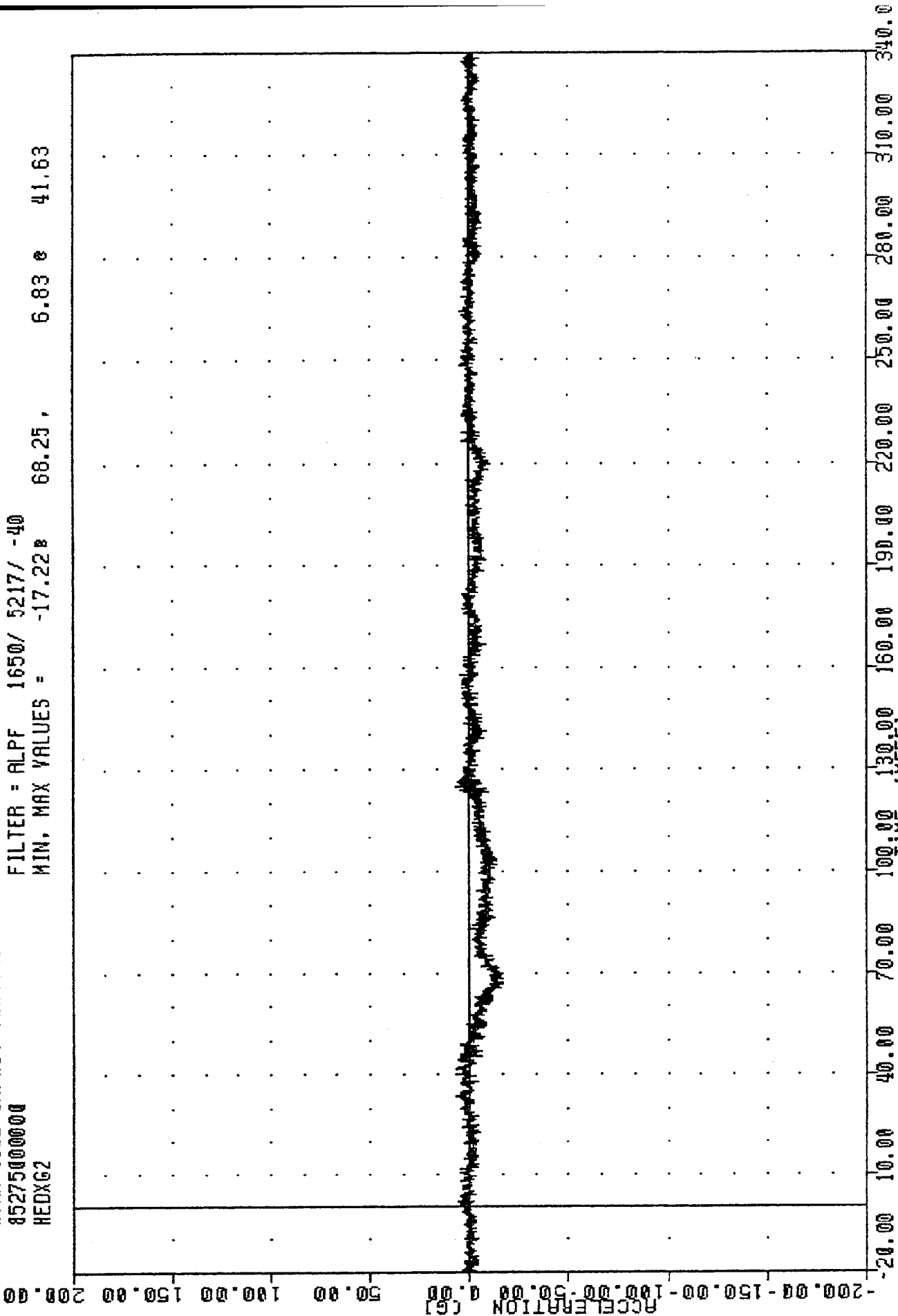
DATA PLOTS

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.

NVMA SIDE IMPACT TESTING
 85275000000
 HEDXG2

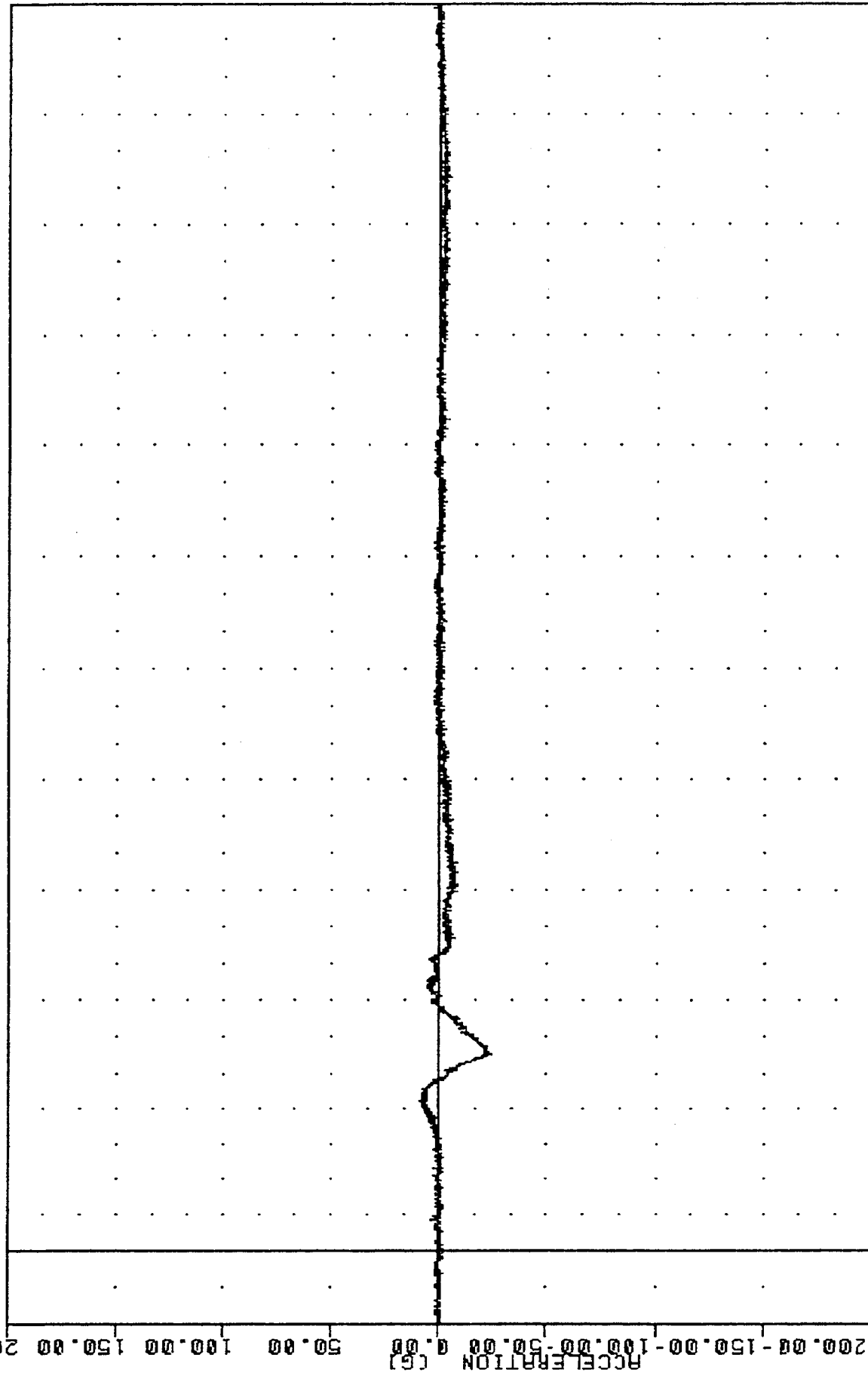
TEST DATE 08-01-05 09:21:20

FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -17.22 68.25, 6.83 41.63



NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER HEAD ACCELERATION X AXIS

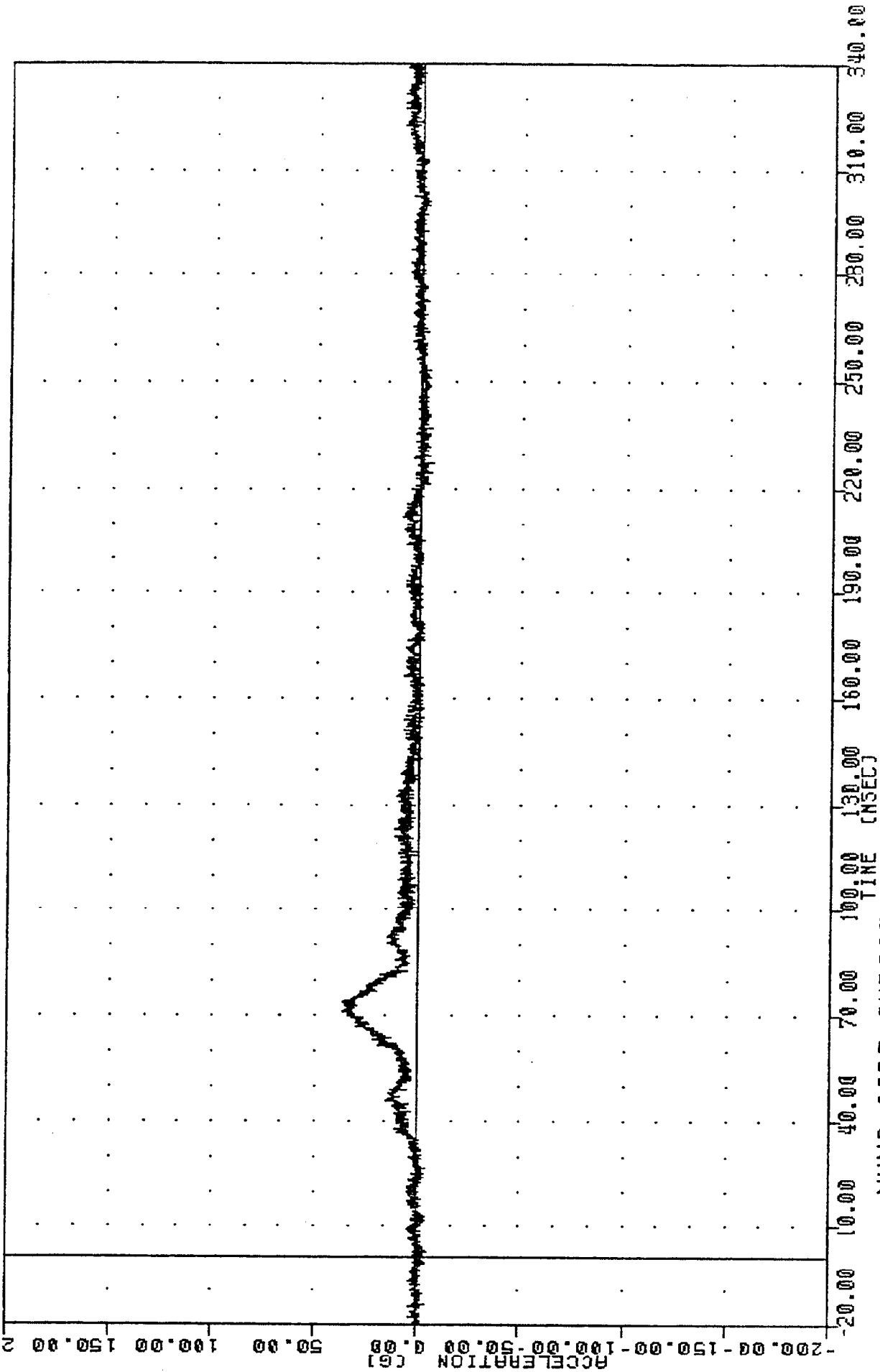
85110000
 MYNA SIDE IMPACT TESTING
 85275000000
 HEDY62
 TEST DATE 03:21:20
 FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -23.88e 55.00, 8.23 e 42.63



-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)
 MYNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER HEAD ACCELERATION Y AXIS

3510
 MYMA SIDE IMPACT TESTING
 85275000000
 HEDZ62

FILTER = ALPF 1650/ 5217/ -40
 MIN, MAX VALUES = -6.530 227.13, 36.77 73.75



MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER HEAD ACCELERATION Z AXIS

[illegible][illegible][illegible]

TEST DATE 851009 09:21Z

THC 851002 PLOT DATE 8-OCT-83 09:20:22

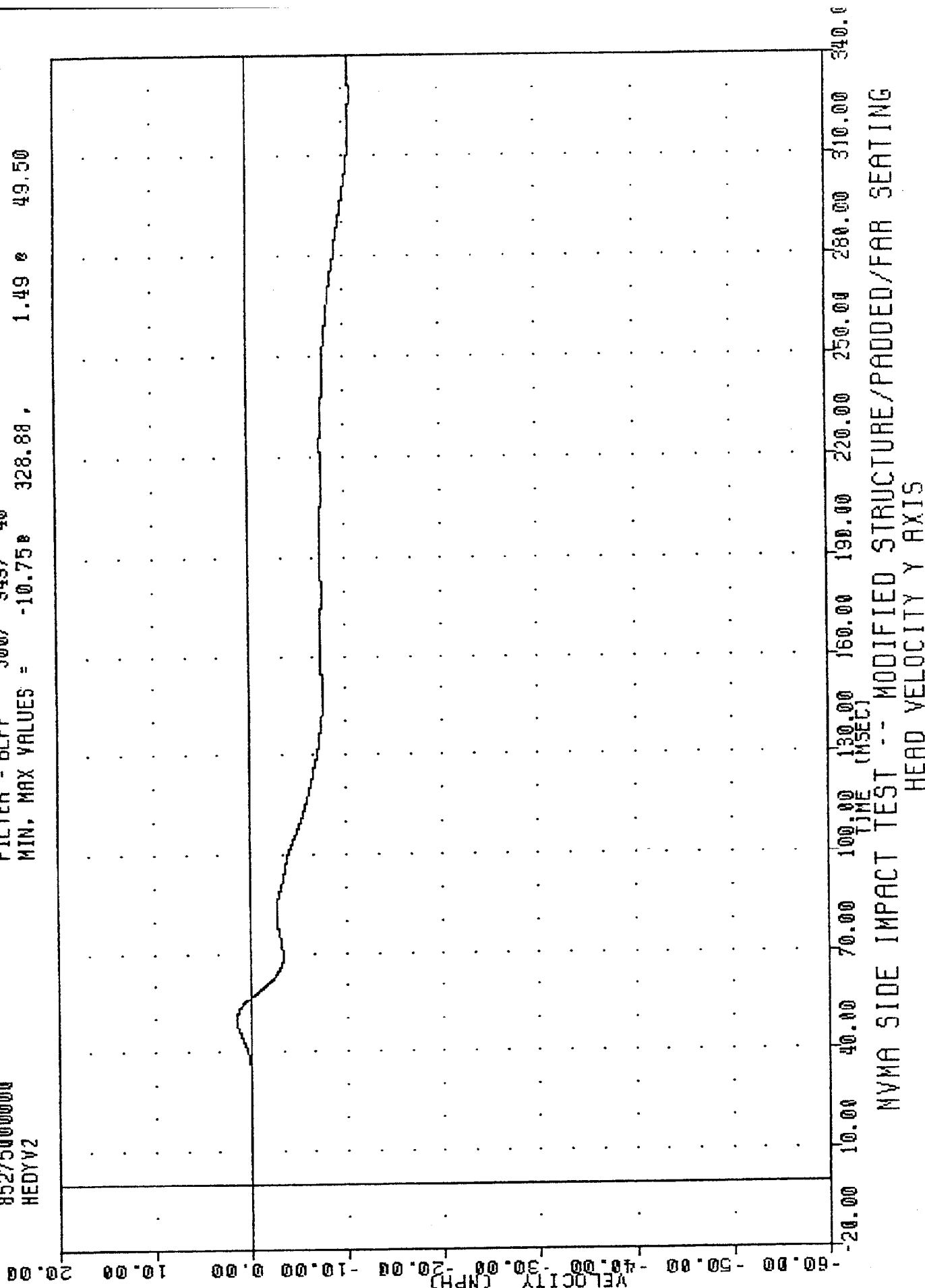
NVMA SIDE IMPACT TESTING

85275000000

HEDYV2

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -10.75 328.88, 1.49 49.50



INC 851002 PLOT DATE 08 OCT 83 09:19.28

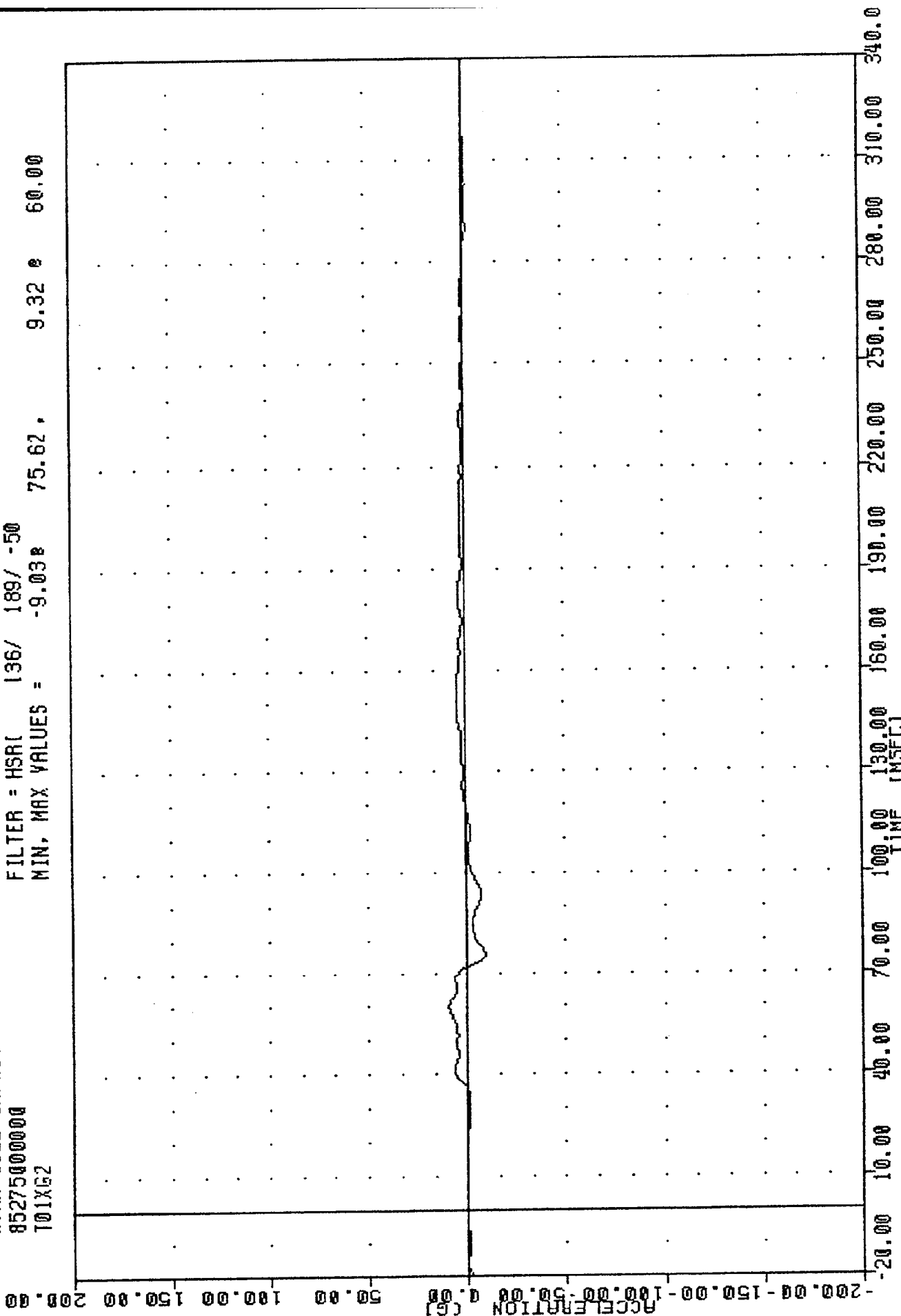
NVMA SIDE IMPACT TESTING

85275000000

T01XG2

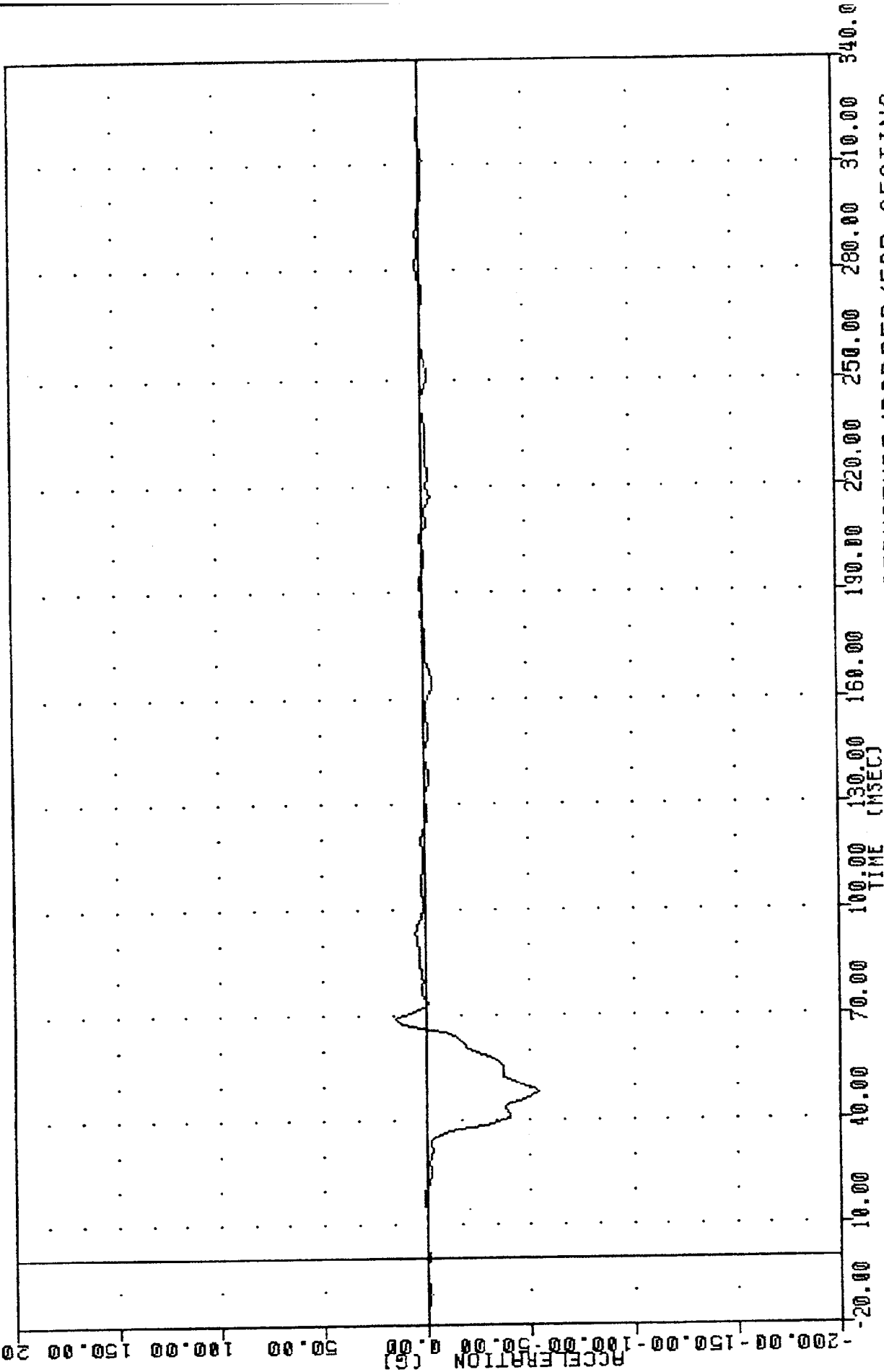
FILTER = HSR(136/ 189/ -50

MIN, MAX VALUES = -9.038 75.62, 9.32 60.00



NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
PASSENGER UPPER SPINE ACCELERATION X AXIS

TRC 851002
 MVMA SIDE IMPACT TESTING
 85275000000
 T01YG2
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -53.41e 48.13, 14.82 e 68.75
 PLOT DATE 8-OCT-83 09:19.28

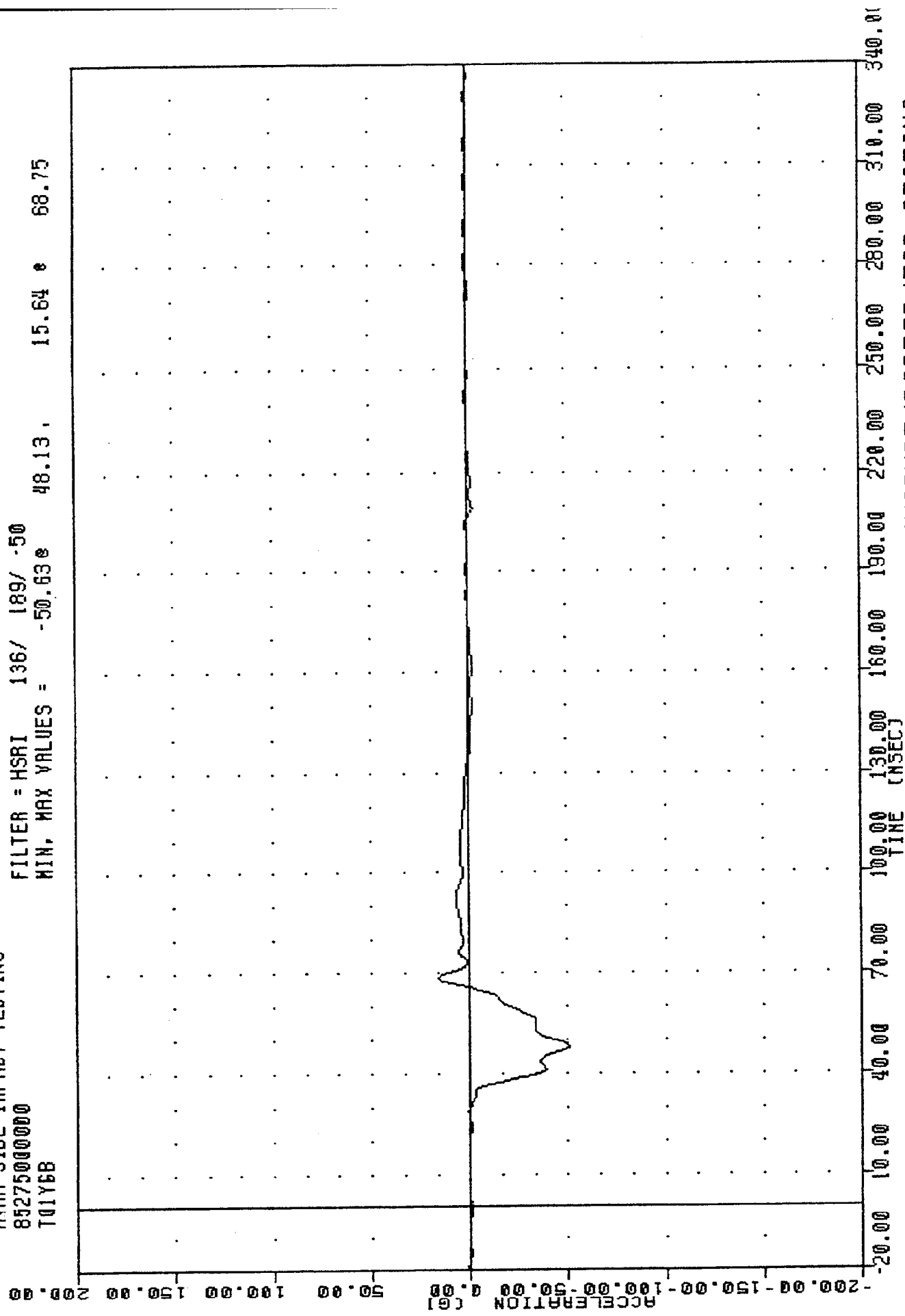


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER UPPER SPINE ACCELERATION Y AXIS

TMC
 MYMA SIDE IMPACT TESTING
 85275000000
 T01Y6B

FLUT DATE 0 OCT 83 09:19:28

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -50.63 48.13 15.64 68.75



MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADOED/FAR SEATING
 PASSENGER UPPER SPINE ACCELERATION #2 Y AXIS

TIME 851002 09:19:28 08 OCT 83

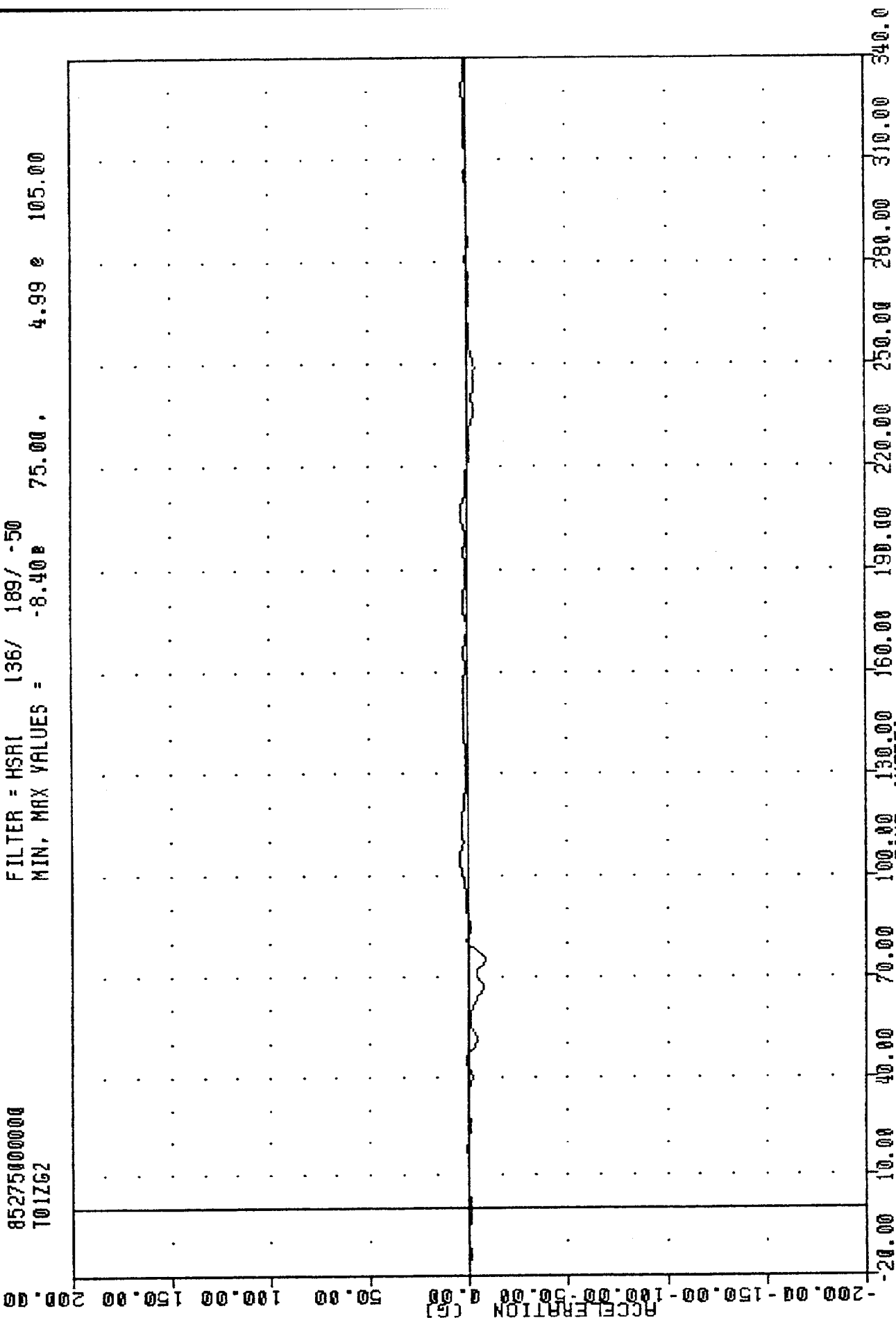
NYMR SIDE IMPACT TESTING

85275000000

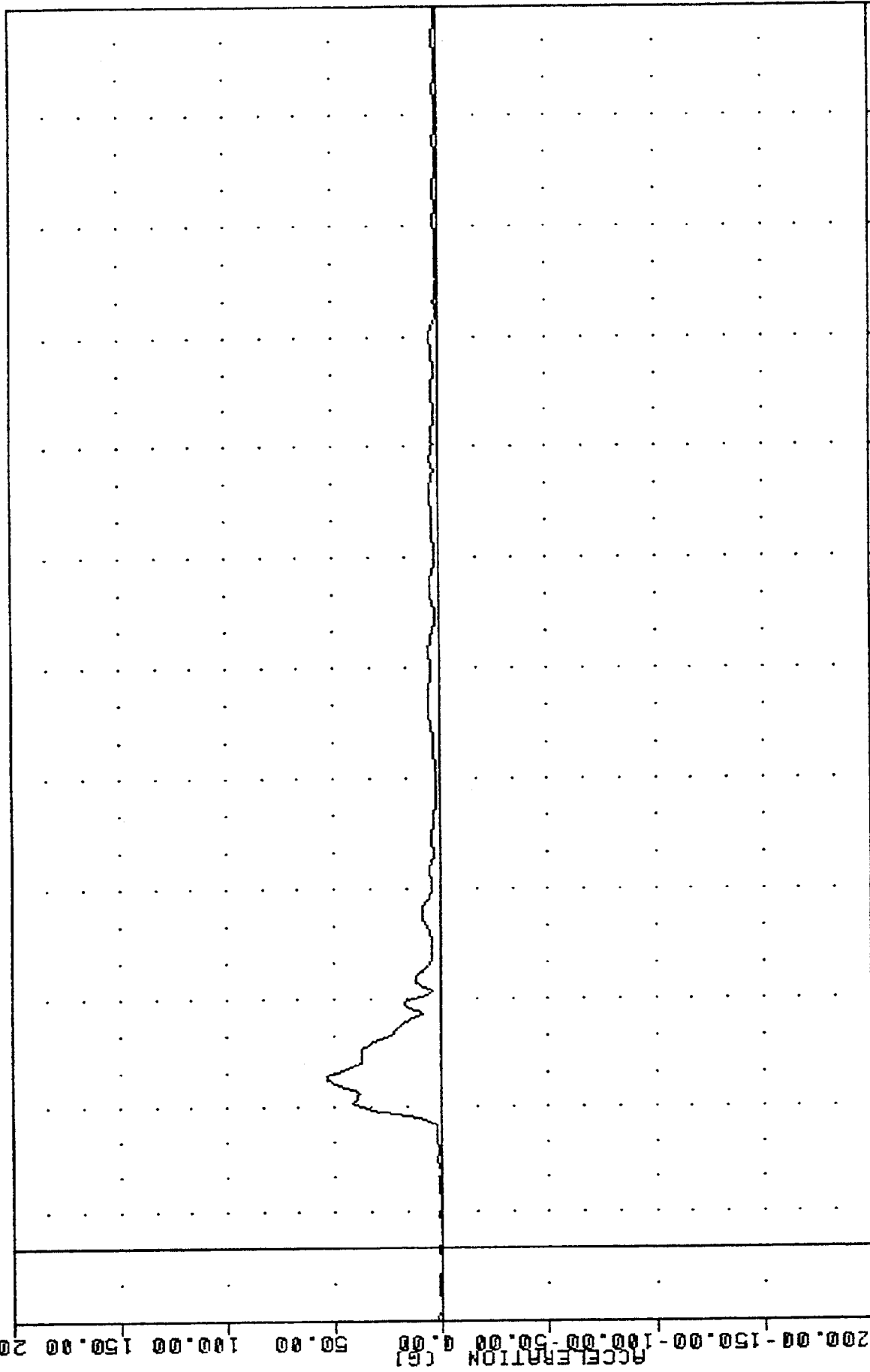
101ZG2

FILTER = HSR1 136/ 189/ -50

MIN, MAX VALUES = -8.40 75.00 4.99 105.00



INC 851002
 NYNA SIDE IMPACT TESTING
 85275000000
 T01R62
 FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.31e 21.88, 53.68 e 48.13
 PLOT DATE 03.19.28



-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
 TIME (MSEC)
 MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER UPPER SPINE RESULTANT ACCELERATION

MVMA SIDE IMPACT TESTING

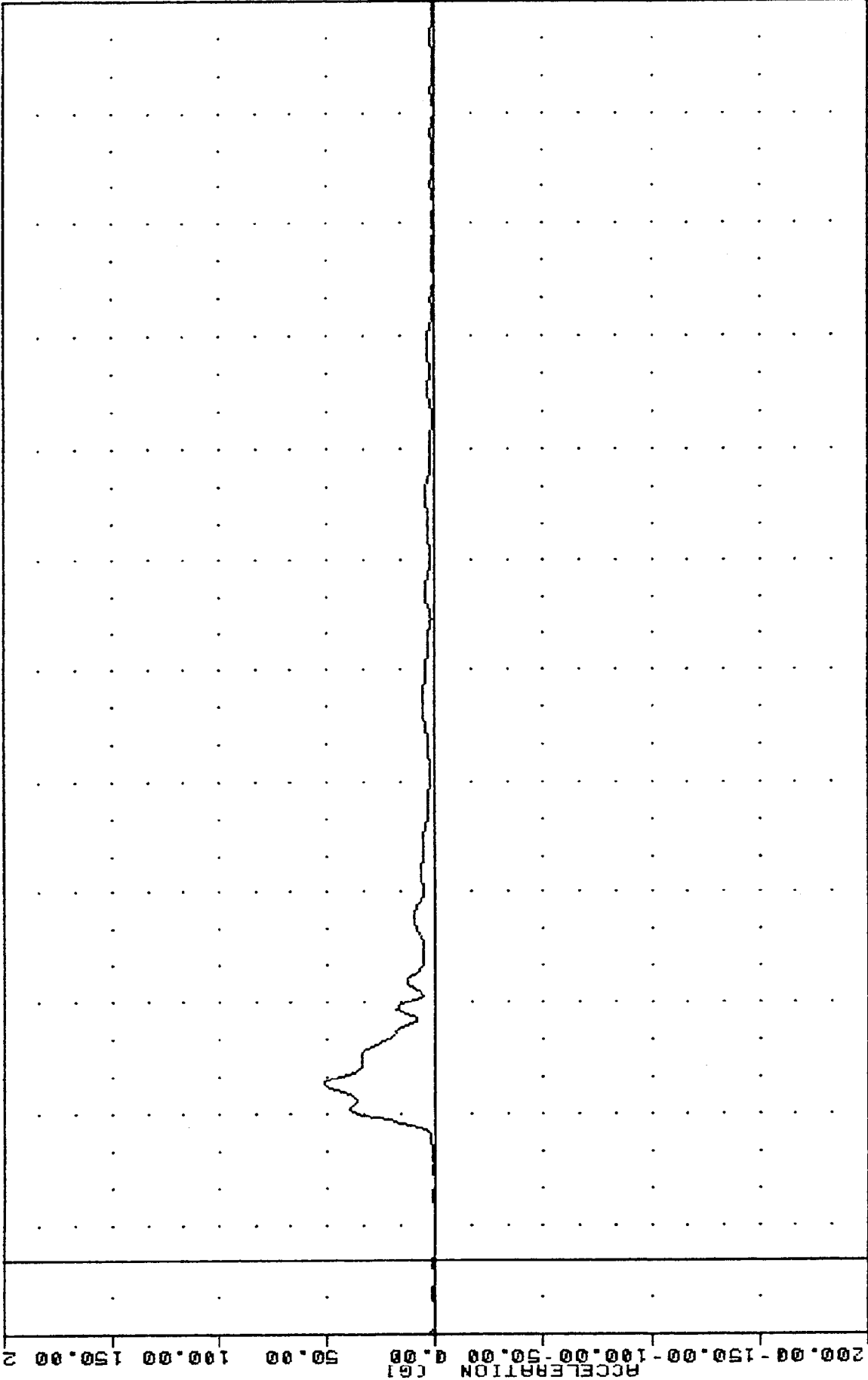
85275000000

T01R6B

FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = 0.128 -16.87, 50.92 48.13

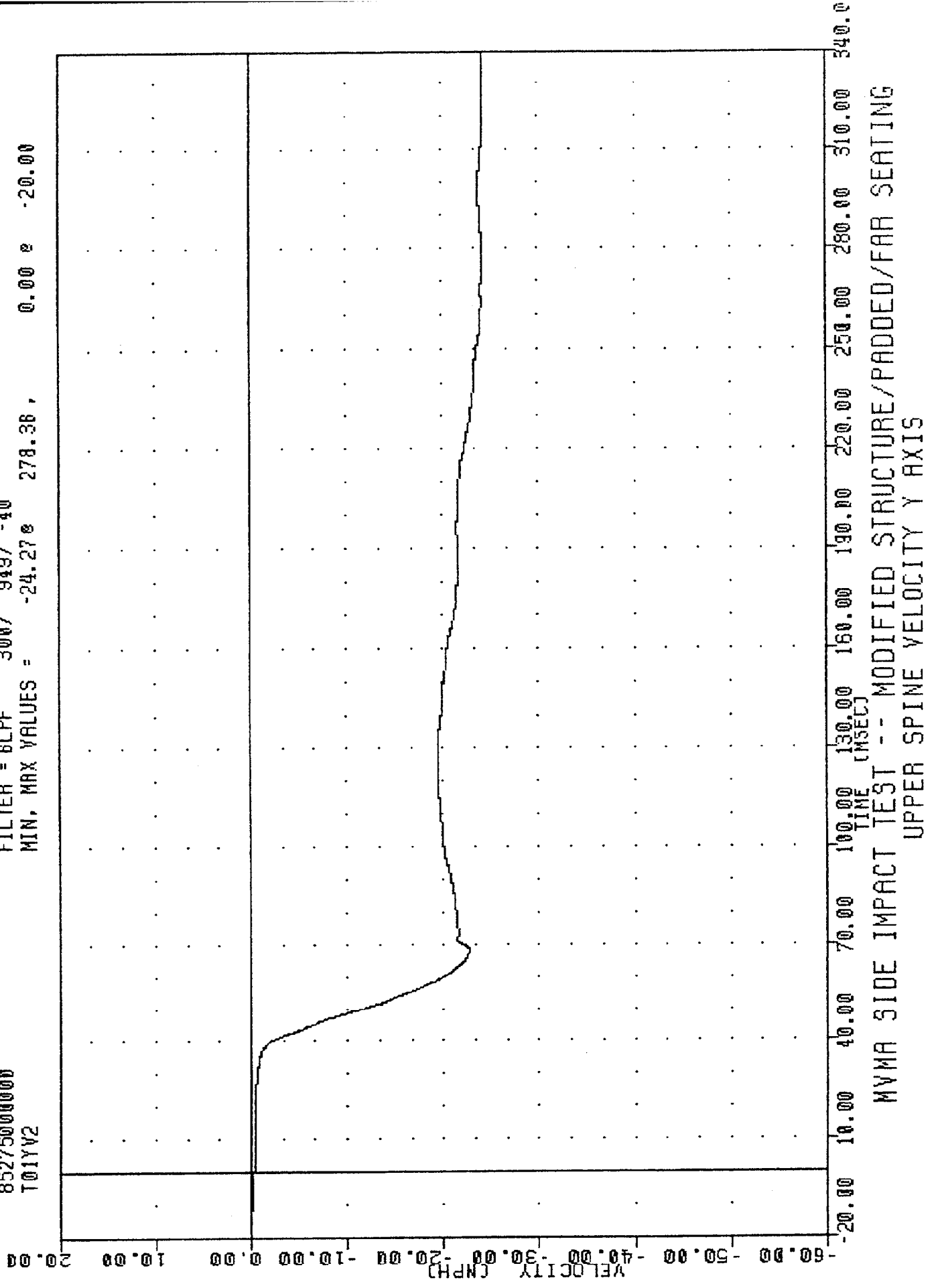
TEST DATE 08.19.20



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
PASSENGER UPPER SPINE RESULTANT ACCELERATION -2

MVNA SIDE IMPACT TESTING
 85275000000
 T01YV2

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -24.27e 278.36, 0.00 e -20.00



MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 UPPER SPINE VELOCITY Y AXIS

7051002 05 OCT 65 03:20:22

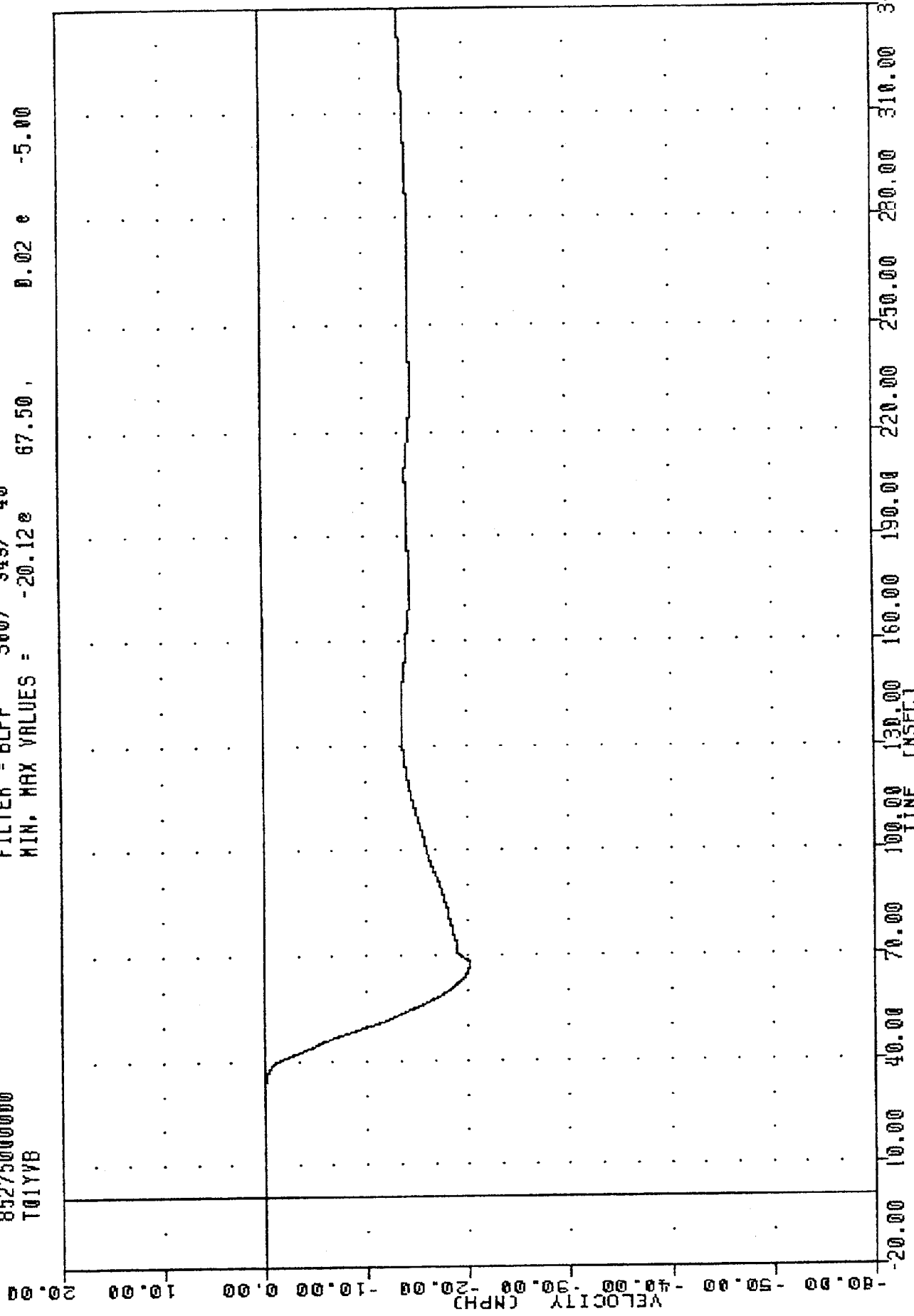
MYMA SIDE IMPACT TESTING

85275000000

T01YVB

FILTER = BLPF 300/ 949/ -40

MIN. MAX VALUES = -20.12e 67.50, 0.02 e -5.00

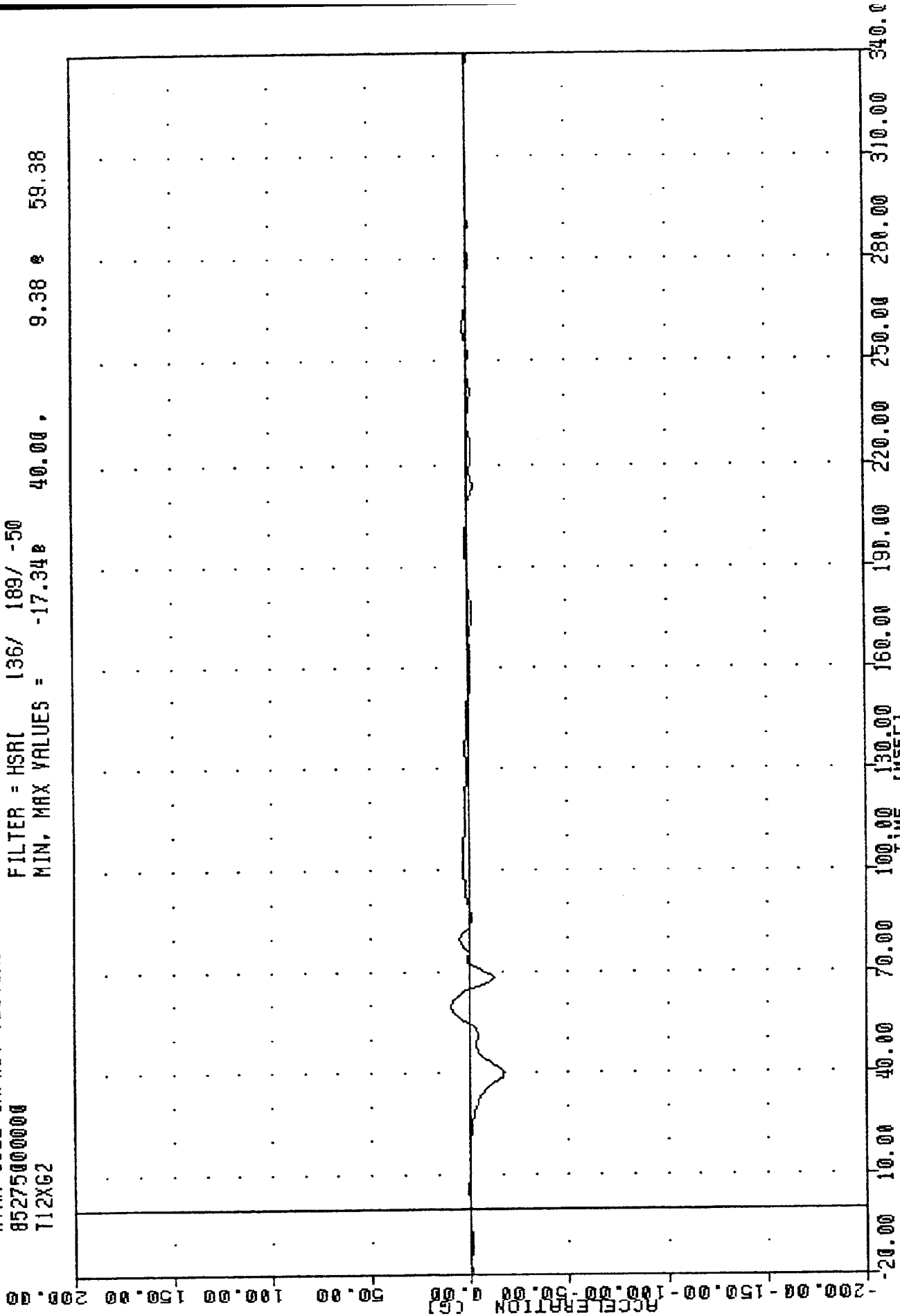


MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
UPPER SPINE VELOCITY -2 Y AXIS

NVMA SIDE IMPACT TESTING
 852750000000
 T12XG2

TEST DATE 001183 08:19:20

FILTER = HSRL 136/ 189/ -50
 MIN. MAX VALUES = -17.34 40.00 9.38 59.38

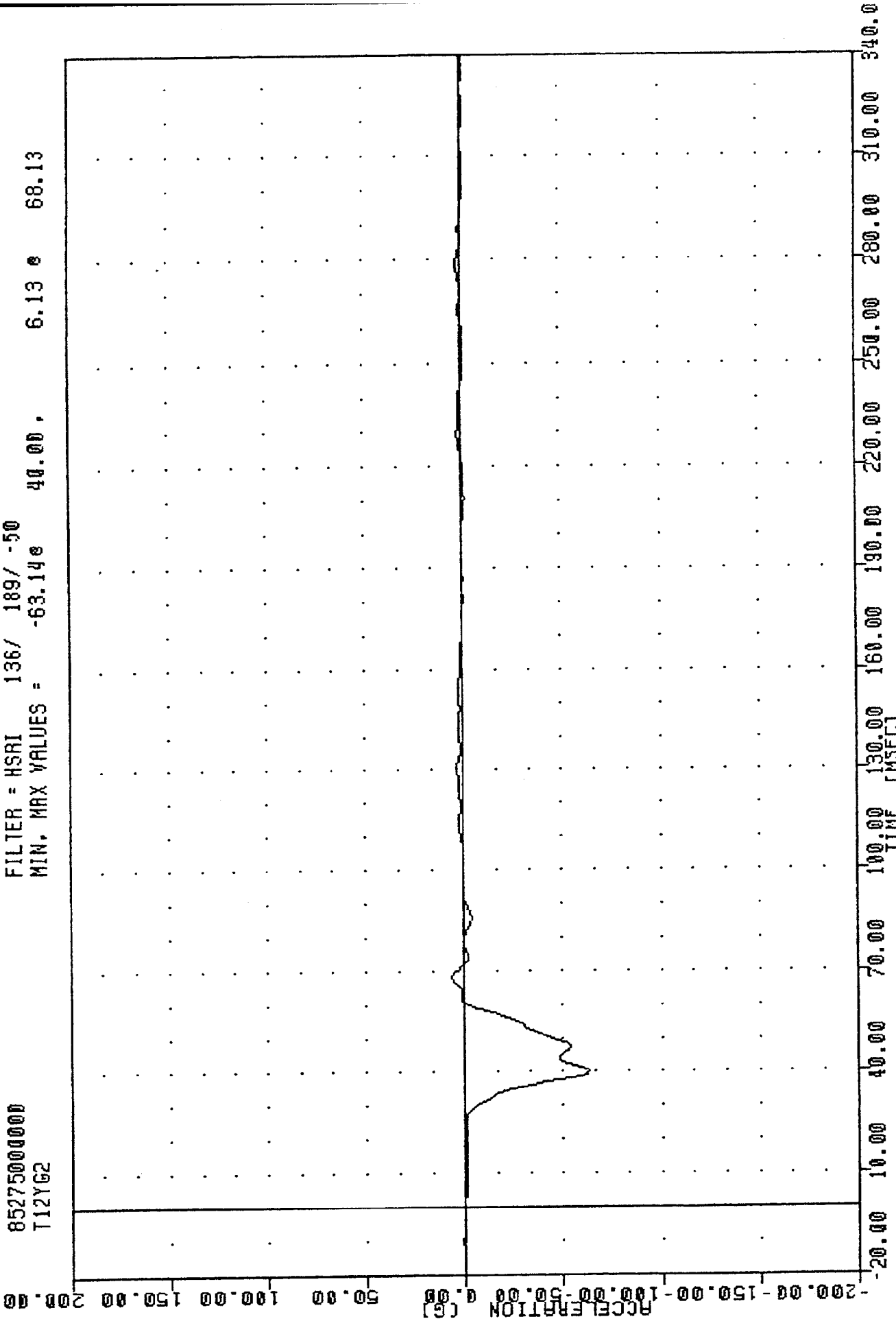


NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER LOWER SPINE ACCELERATION X AXIS

MVNA SIDE IMPACT TESTING
 85275000000
 T12YG2

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -63.14s 40.00, 6.13 s 68.13

PLOT DATE 0 OCT 03 03:19:23

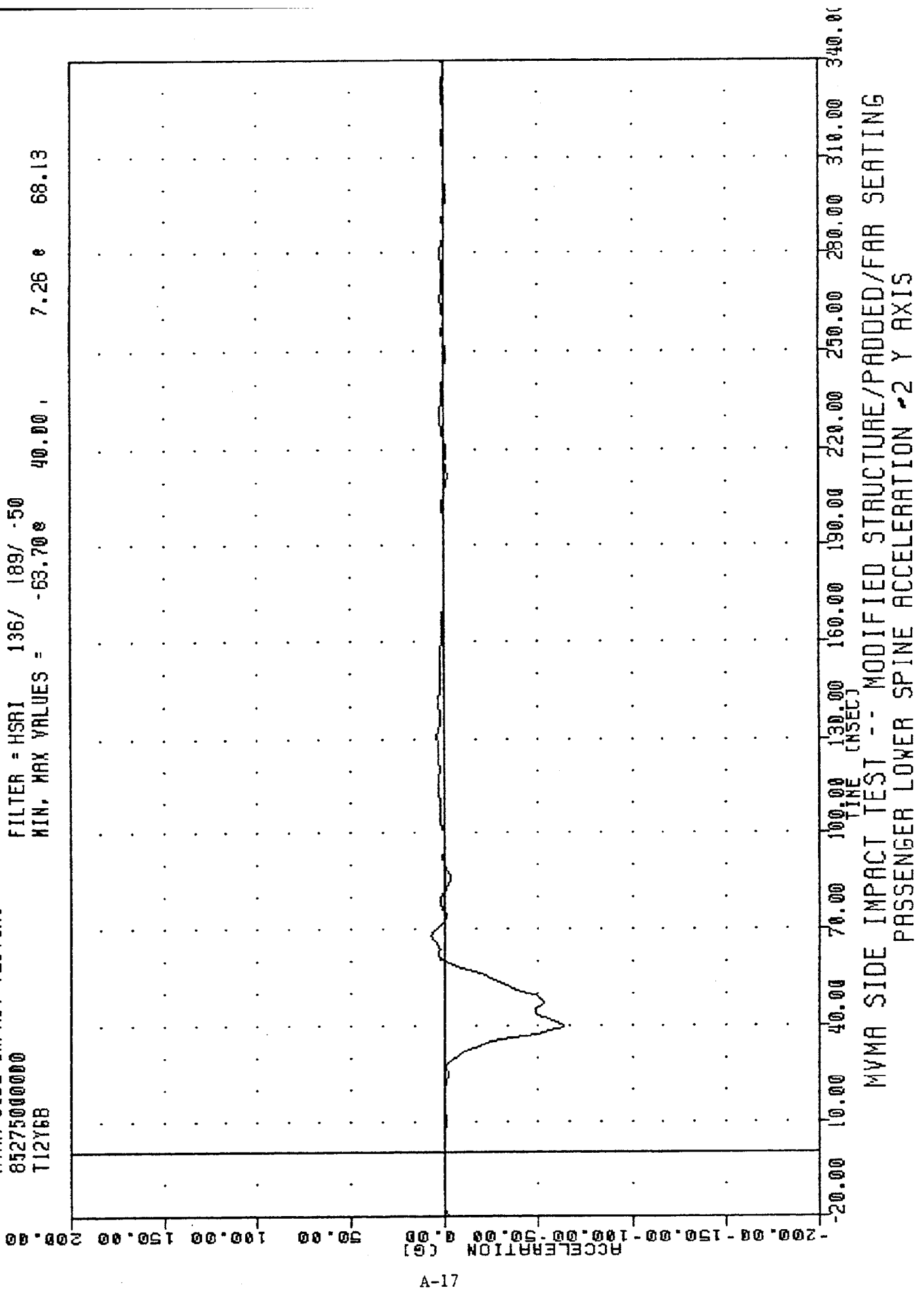


MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER LOWER SPINE ACCELERATION Y AXIS

MVMA SIDE IMPACT TESTING
 85275000000
 T12Y6B

TEST DATE 06 OCT 68 08:19:28

FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -63.70e 40.00 7.26 e 68.13



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER LOWER SPINE ACCELERATION -2 Y AXIS

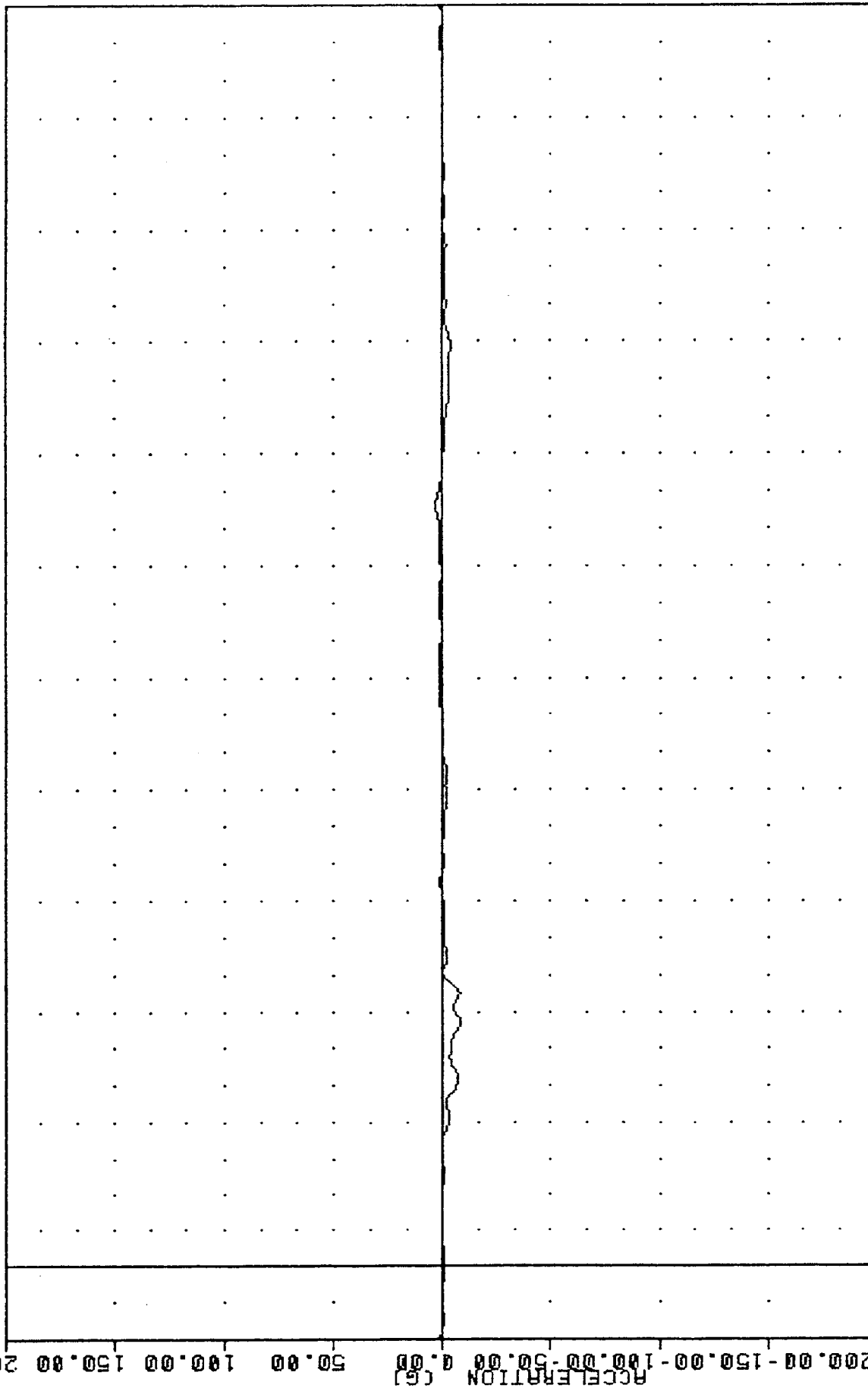
85275000000

112162

85275000000

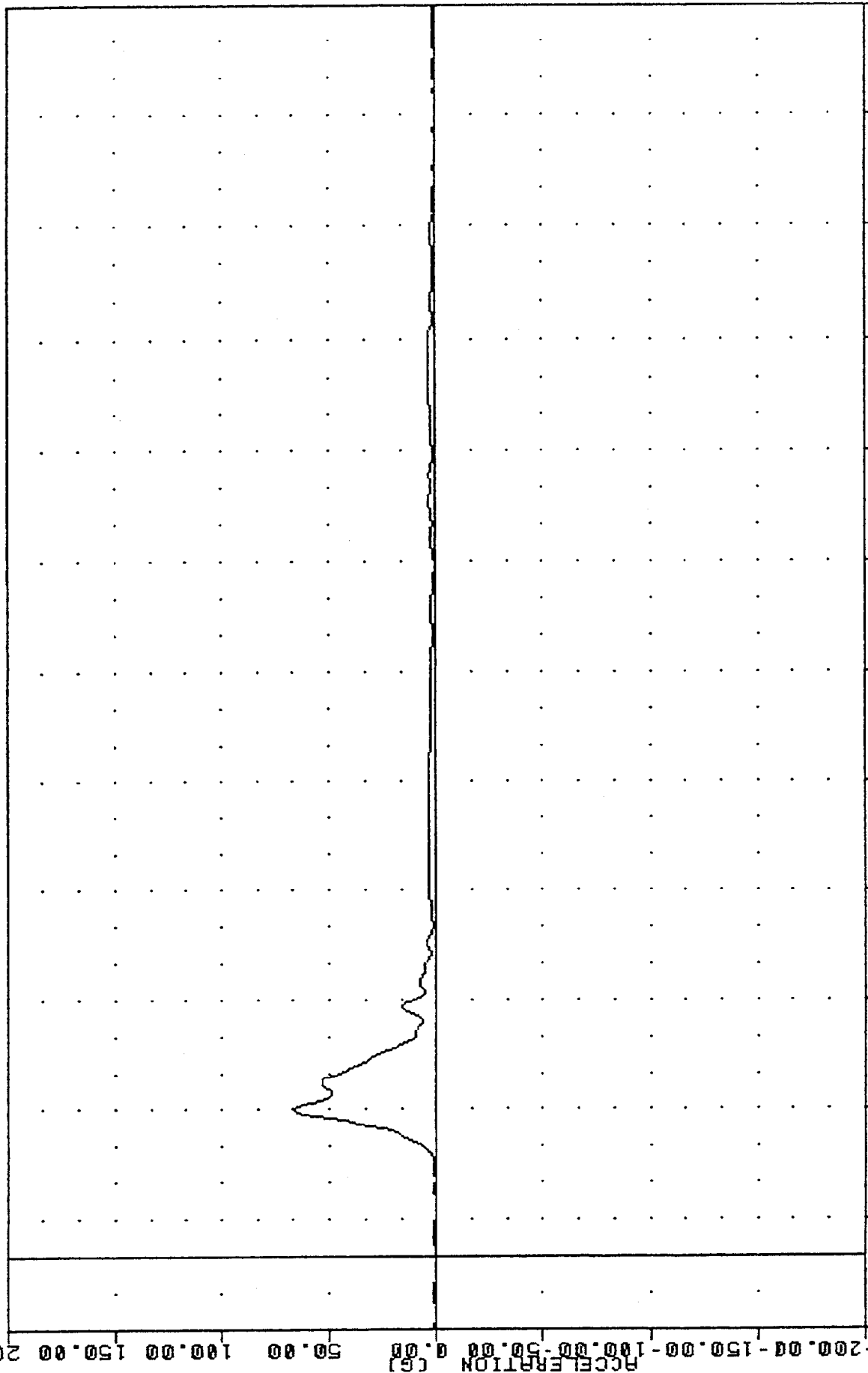
FILTER = HSRI 136/ 189/ -50

MIN, MAX VALUES = -8.42e 66.87, 3.14 e 206.25



MODIFIED STRUCTURE/PADDED/FAR SEATING
PASSENGER LOWER SPINE ACCELERATION Z AXIS

851002
 MVNA SIDE IMPACT TESTING
 85275000000
 T12RG2
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = 0.17e 312.50, 65.55 e 40.00
 TEST DATE 0 OCT 83 09:19:20



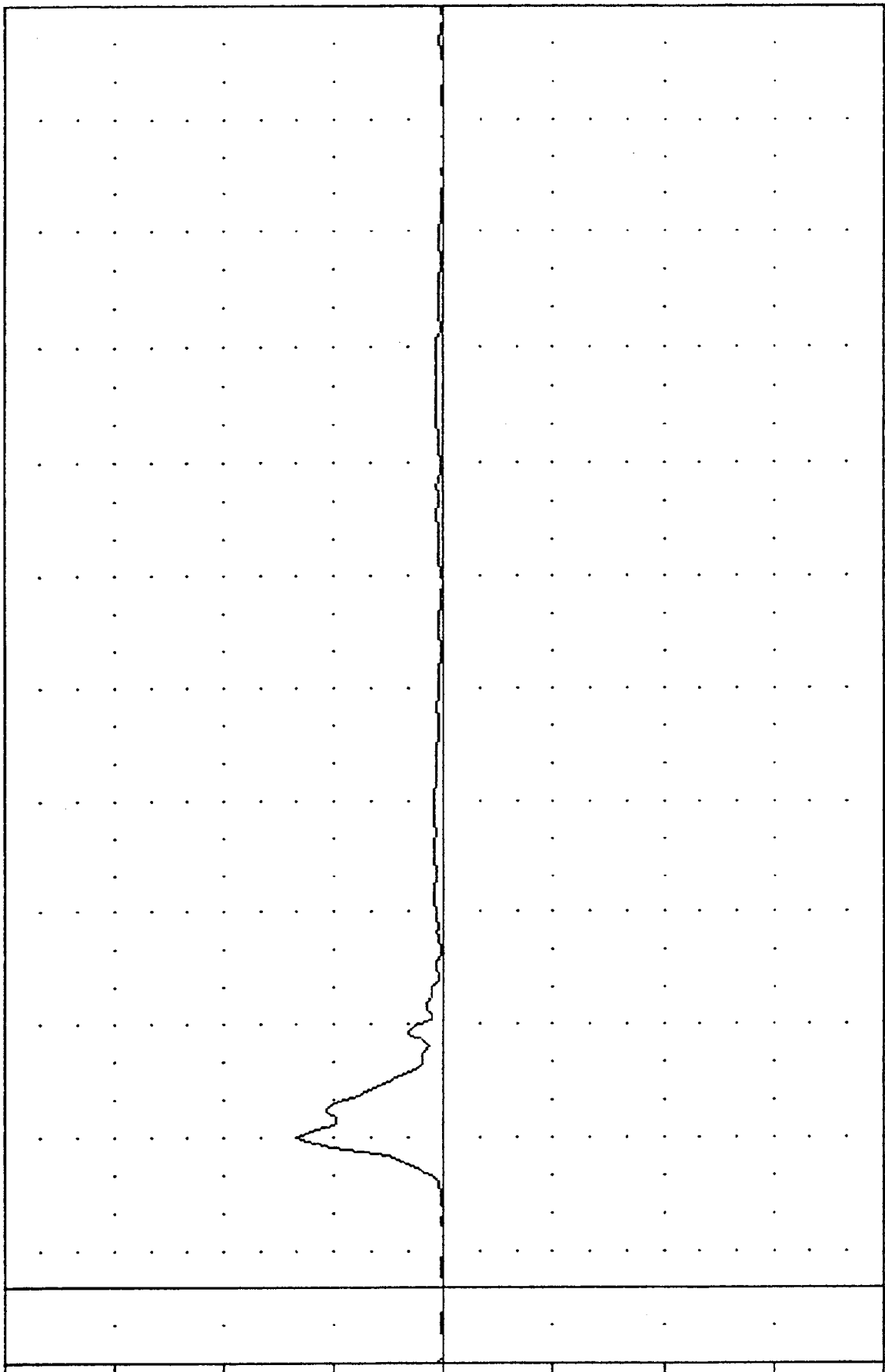
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER LOWER SPINE RESULTANT ACCELERATION

MVMA SIDE IMPACT TESTING
 852750000000
 T12R68

TEST DATE 03.19.20

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = 0.06 301.88, 65.08 40.00

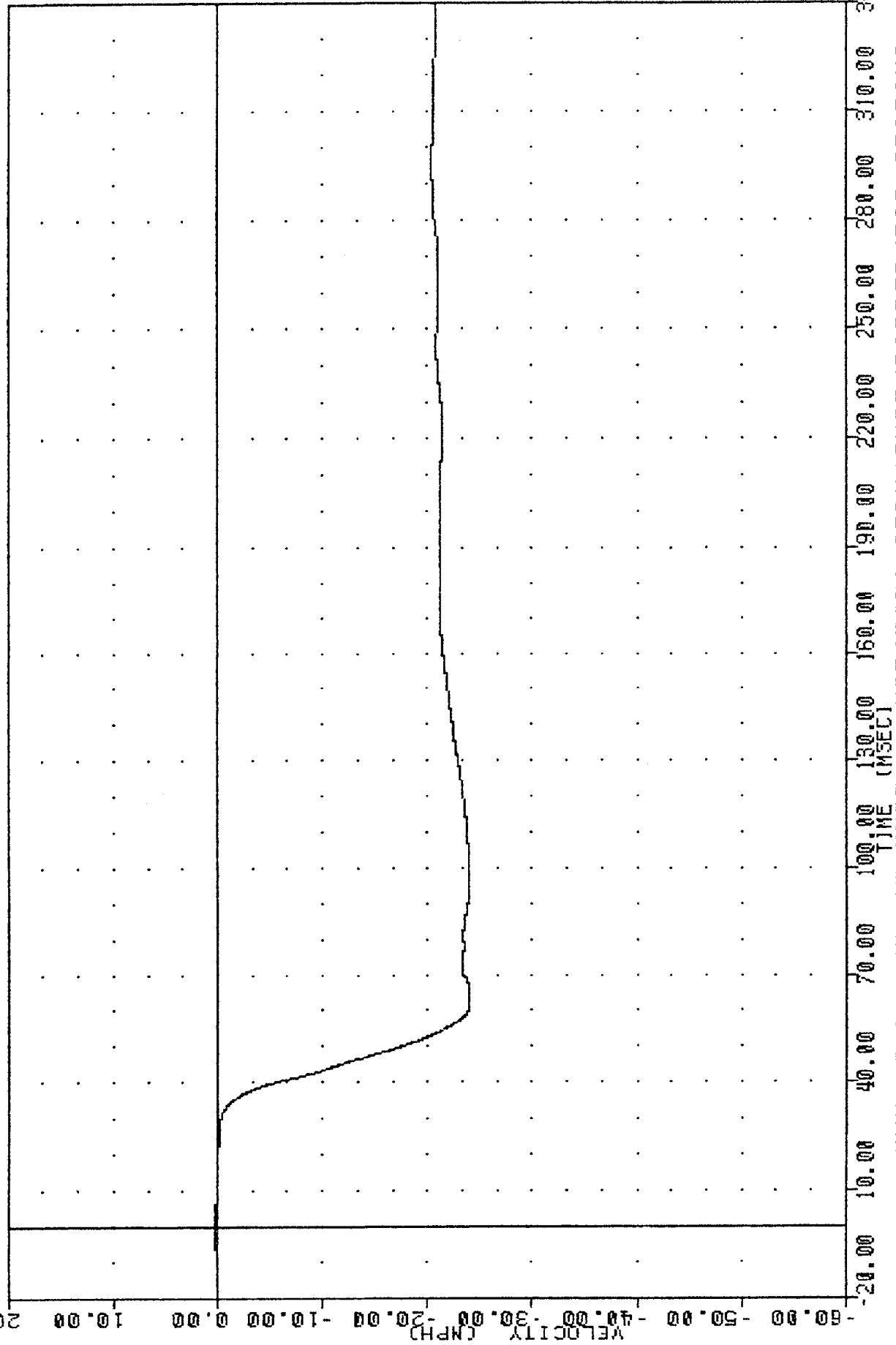
-200.00 -150.00 -100.00 -50.00 0.00 50.00 100.00 150.00 200.00



-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)

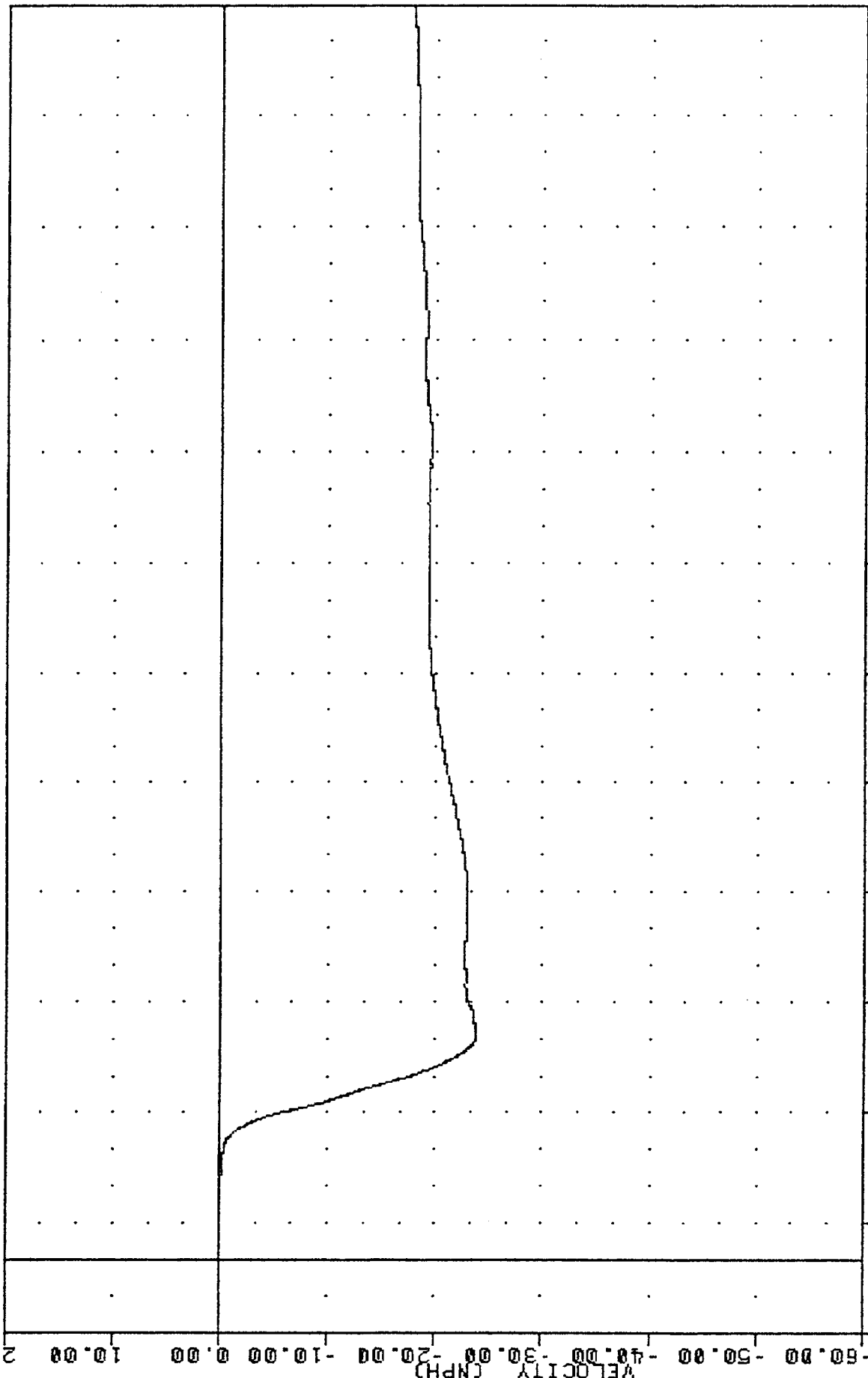
MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER LOWER SPINE RESULTANT ACCELERATION #2

851002 17 OCT 83 09:20:22
 NVMA SIDE IMPACT TESTING
 85275000000
 T12YV2
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -24.02e 61.63. 0.12 e -0.88



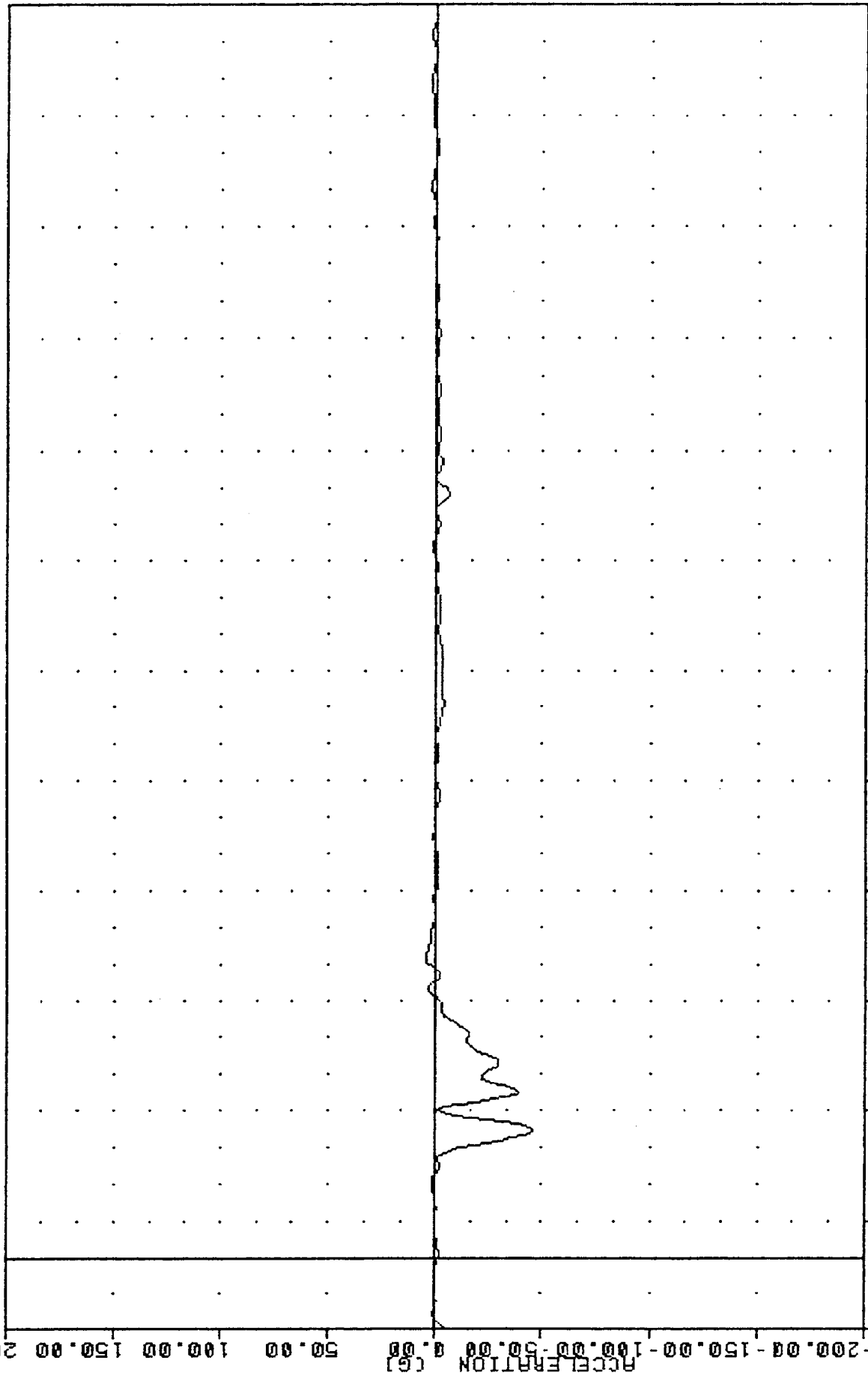
NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 LOWER SPINE VELOCITY Y AXIS

851000
 MVNA SIDE IMPACT TESTING
 85275000000
 T12YVB
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -23.85 61.00 0.00 0.00
 93:20.22



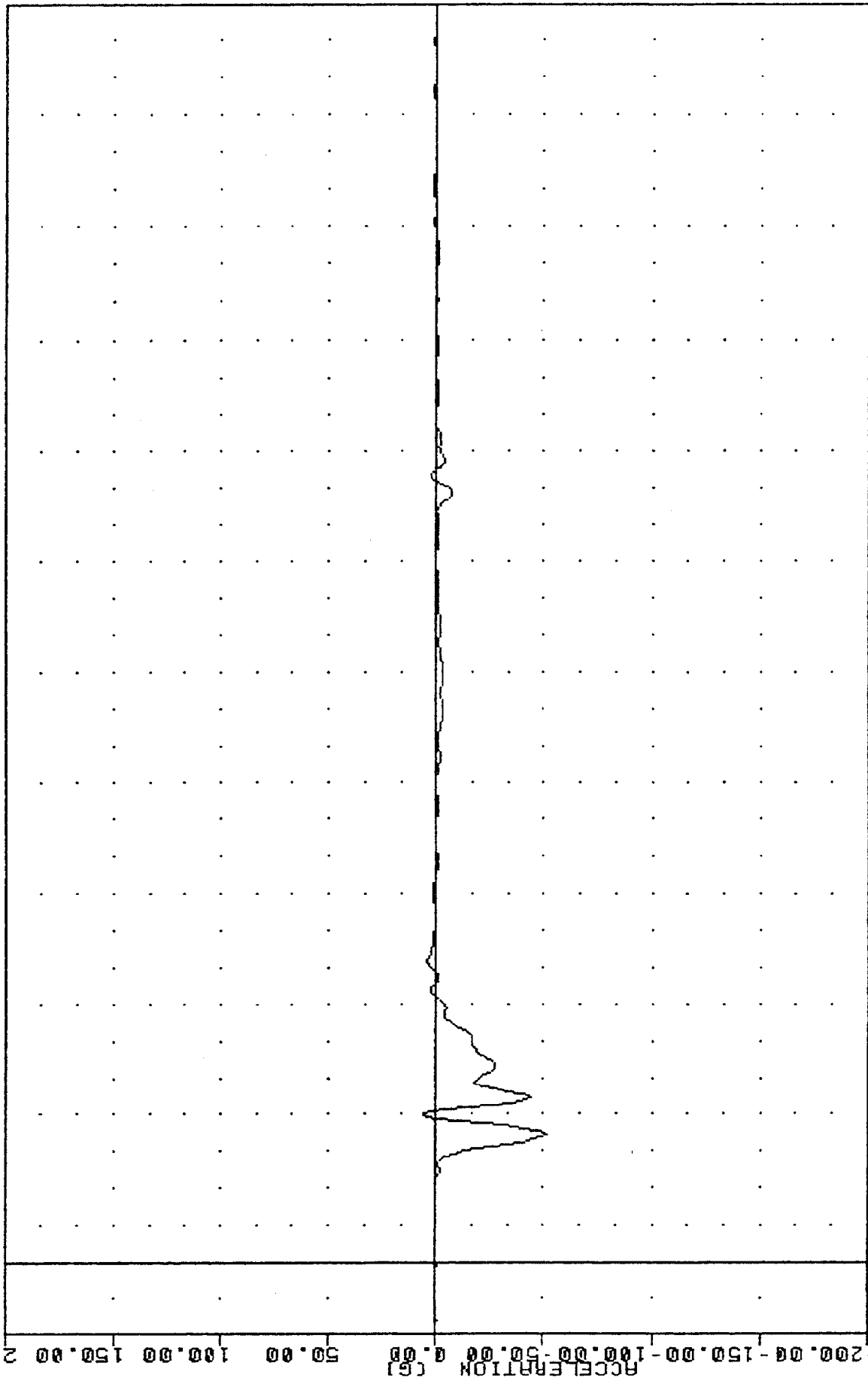
MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 LOWER SPINE VELOCITY #2 Y AXIS

851002
 NVMA SIDE IMPACT TESTING
 85275000000
 RURY62
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -45.758 34.38 , 4.81 e 81.88
 93:19.28



-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)
 NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER RIGHT UPPER RIB ACCELERATION Y AXIS

851602
 MVNA SIDE IMPACT TESTING
 85275000000
 RURYGB
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -51.54e 34.38 , 5.69 e 40.00
 TEST DATE OCT 03 03:19:20

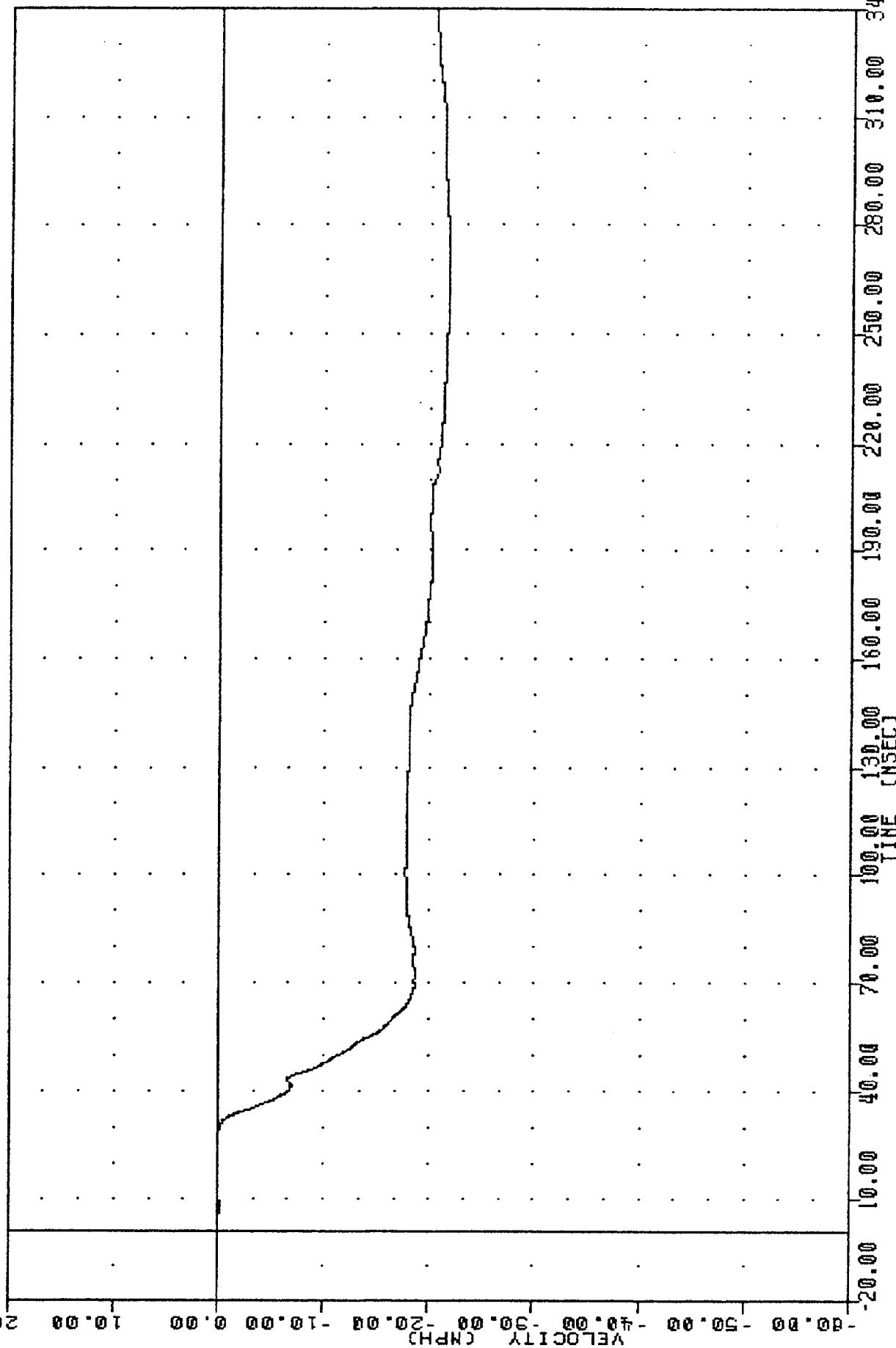


MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER RIGHT UPPER RIB ACCELERATION -2 Y AXIS

RURYY2

FILTER = BLPF 300 / 676 000 / 1000

MIN, MAX VALUES =	-21.718	266.68	0.06 e	24.13
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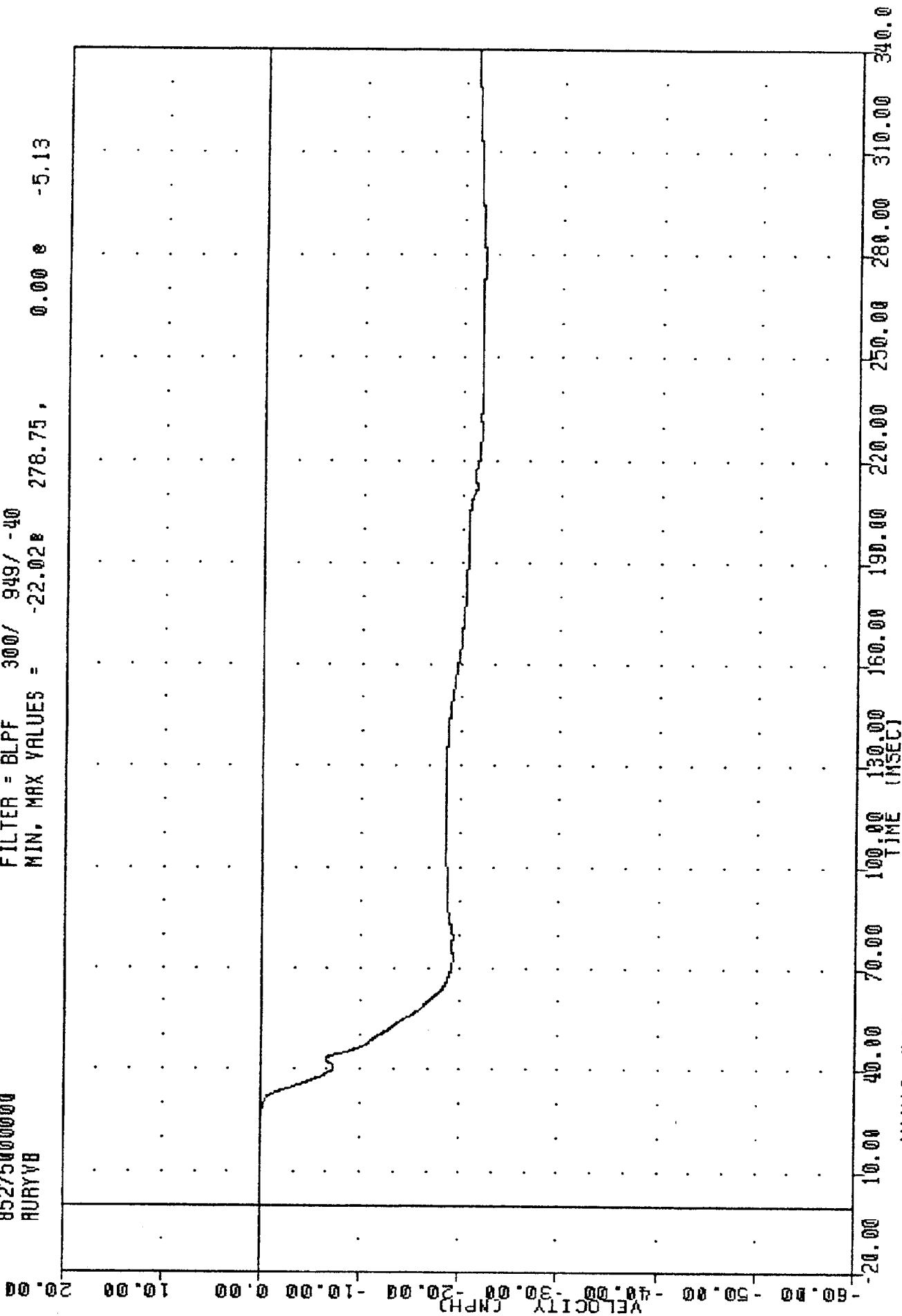


(LINE INSEC)
 NMVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 RIGHT UPPER RIB VELOCITY Y AXIS

851602
 NVMA SIDE IMPACT TESTING
 85275000000
 RURYVB

TEST DATE 001 00 03:20:22

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -22.028 278.75, 0.00 8 -5.13

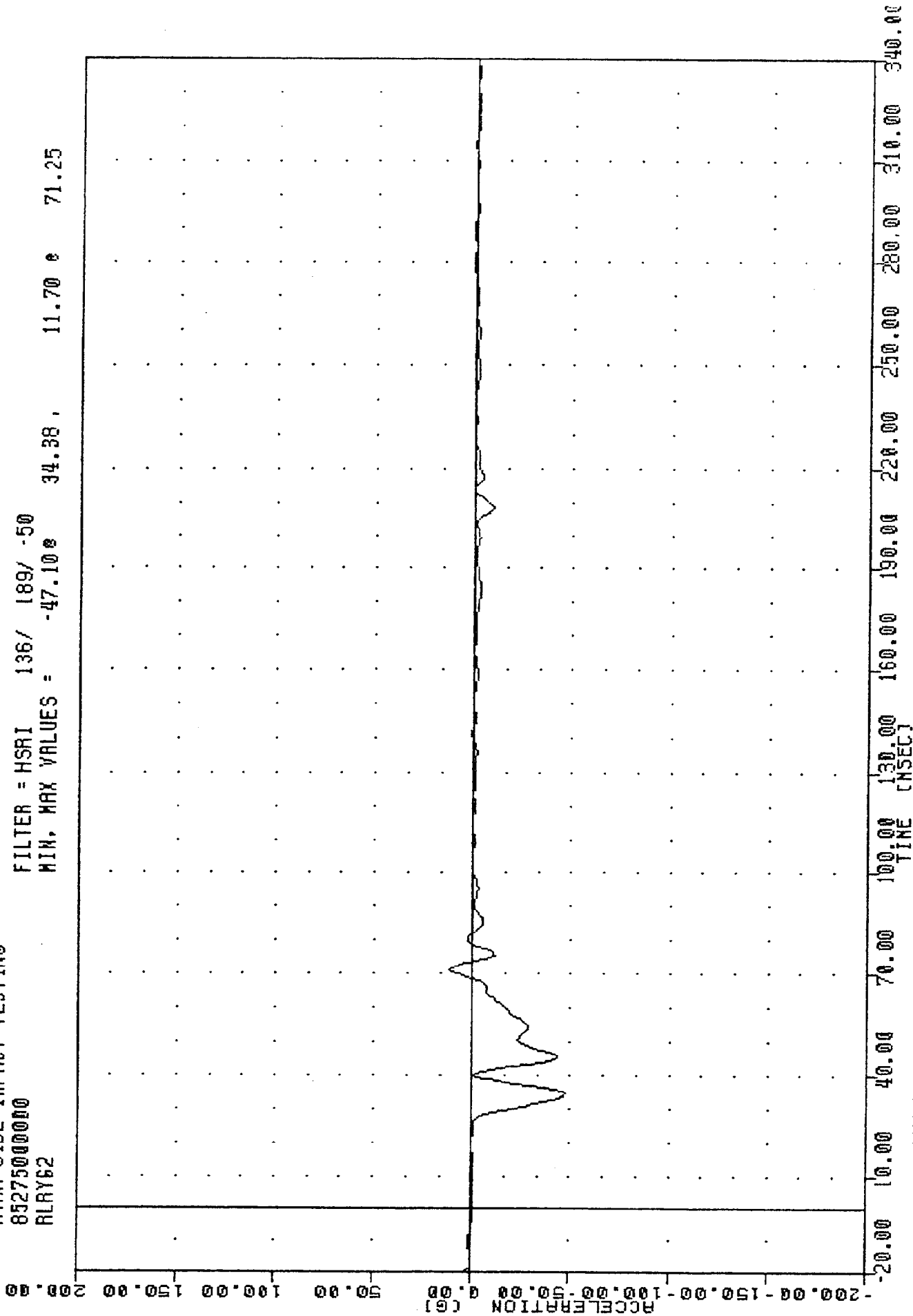


NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING

MVMA SIDE IMPACT TESTING
 852750000000
 RLRY62

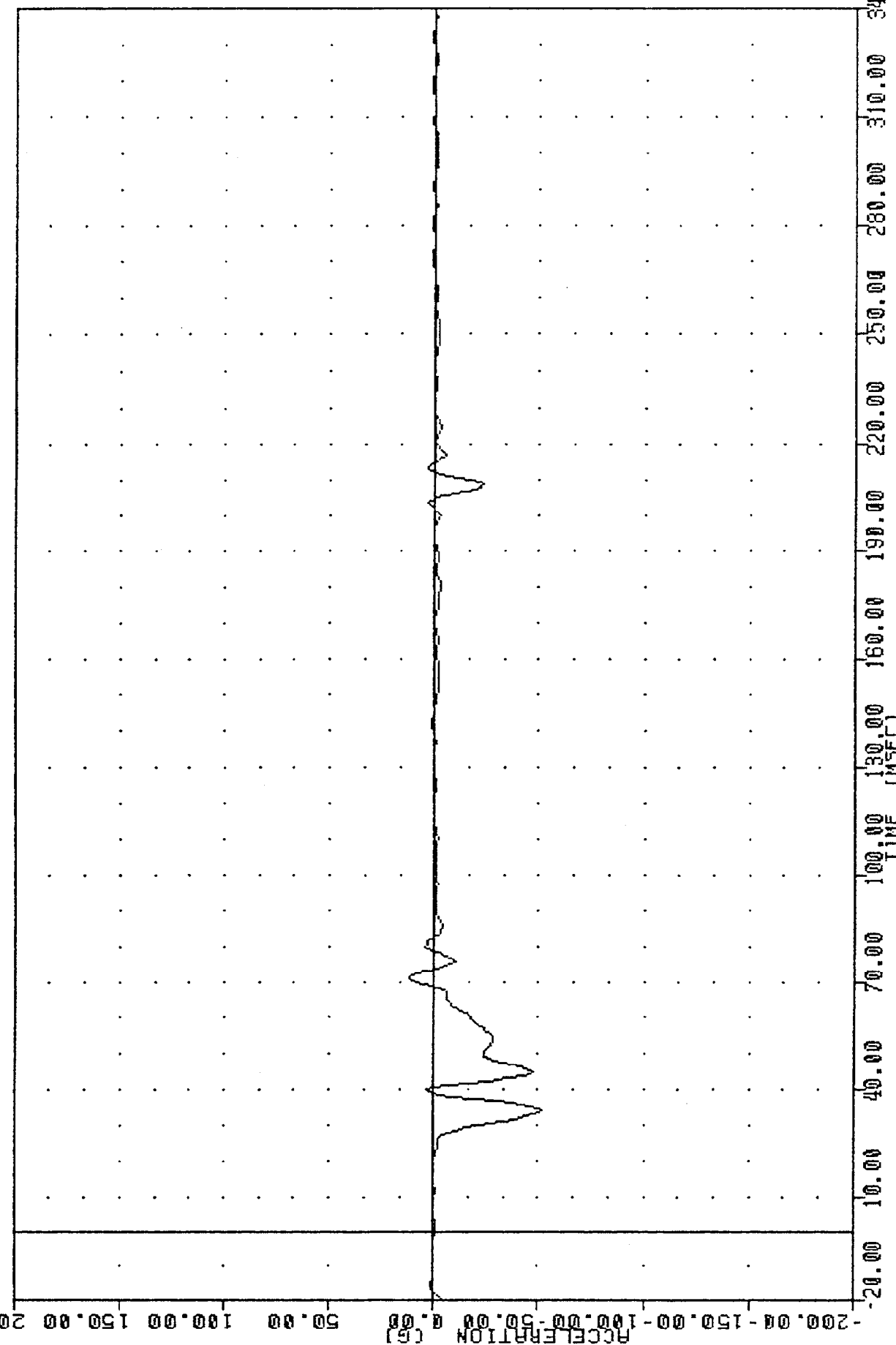
TEST DATE 0 OCT 83 13:19:20

FILTER = HSRI 136/ 189/ -50
 MIN, MAX VALUES = -47.10 34.38 11.70 71.25



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER RIGHT LOWER RIB ACCELERATION Y AXIS

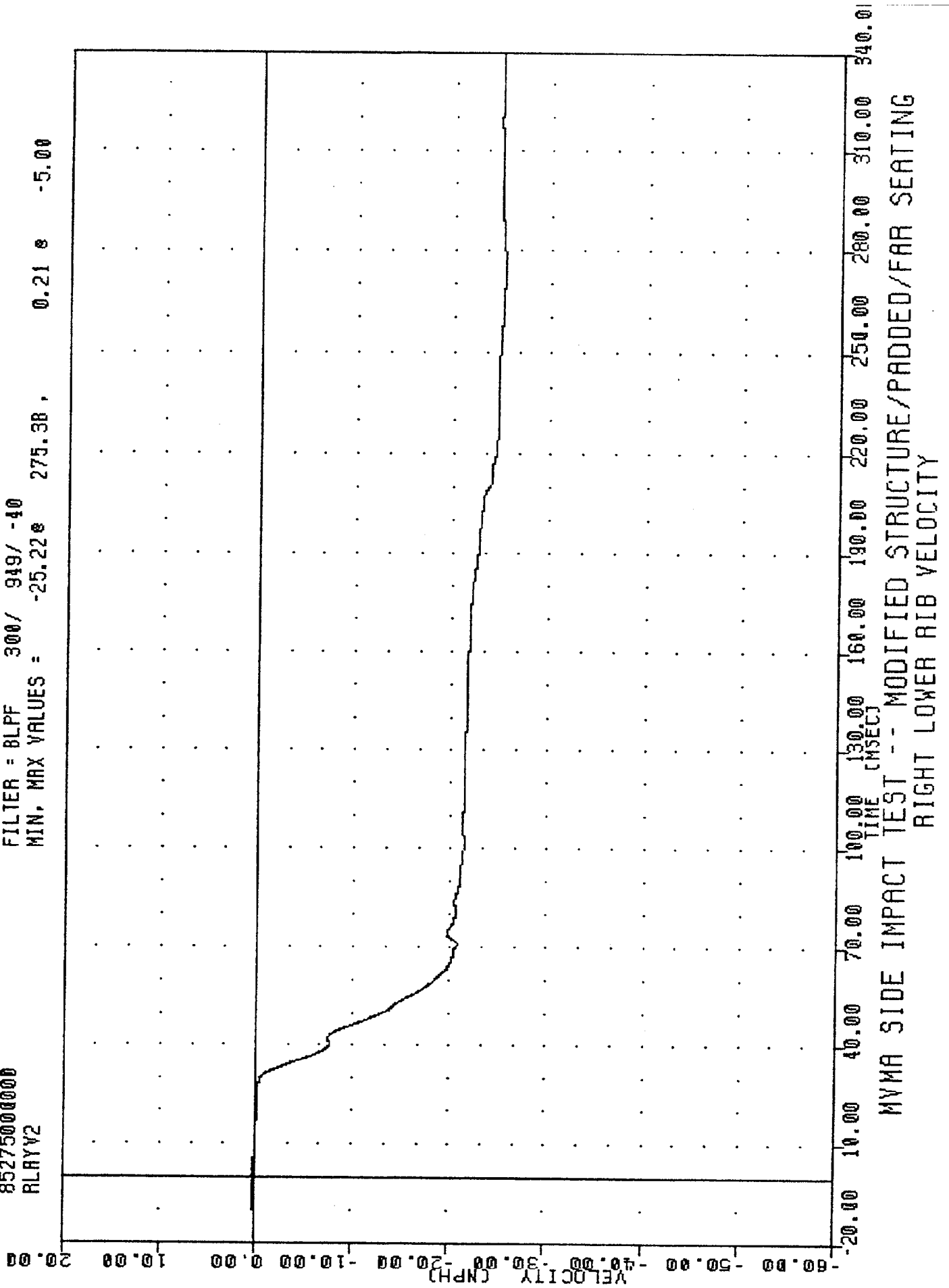
NVMA SIDE IMPACT TESTING
 852750000000
 ALRYGB
 FILTER = HSRI 136/ 189/ -50
 MIN. MAX VALUES = -51.59 34.38 , 12.17 71.25
 TEST DATE 00/00/00 09:19:26



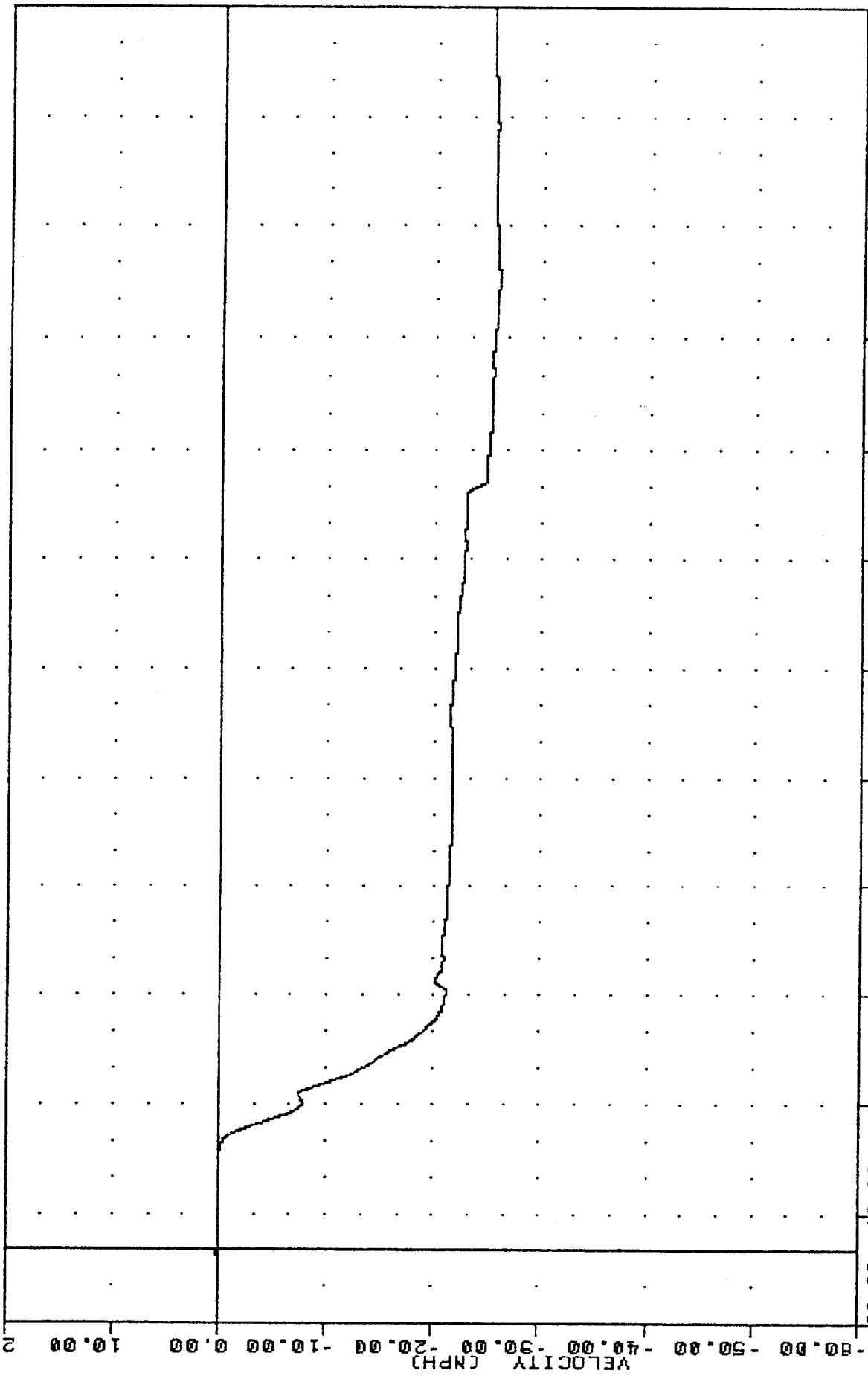
NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER RIGHT LOWER RIB ACCELERATION -2 Y AXIS

851
 MVNA SIDE IMPACT TESTING
 85275000000
 RLAYV2

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -25.22 275.38 0.21 -5.00



3510
 MVMA SIDE IMPACT TESTING
 85275000000
 RLRYVB
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -25.800 264.25 , 0.10 s -0.88

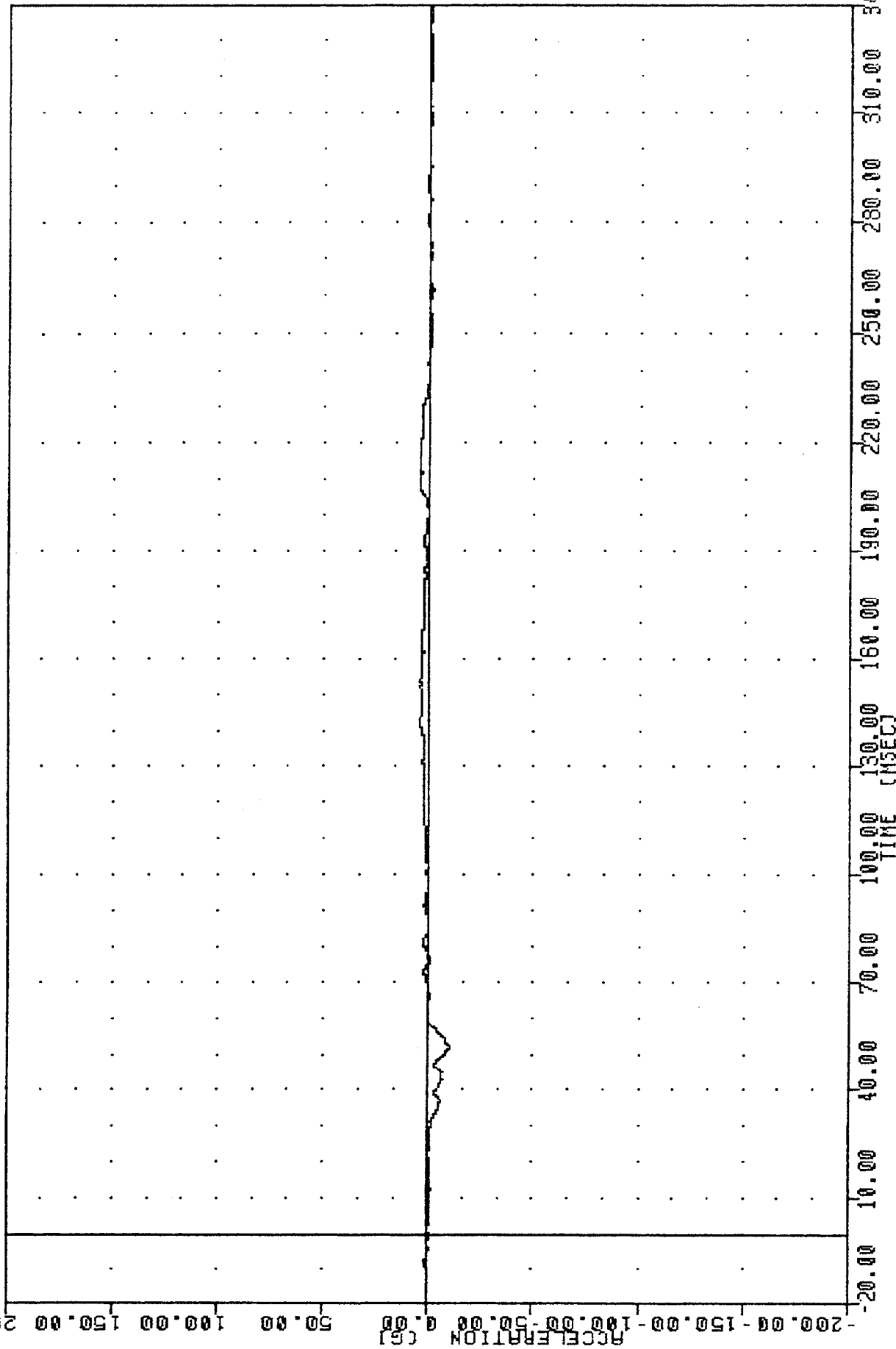


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 RIGHT LOWER RIB VELOCITY #2 Y AXIS

ID# 851000
 MVMA SIDE IMPACT TESTING
 85275000000
 PEYXG2

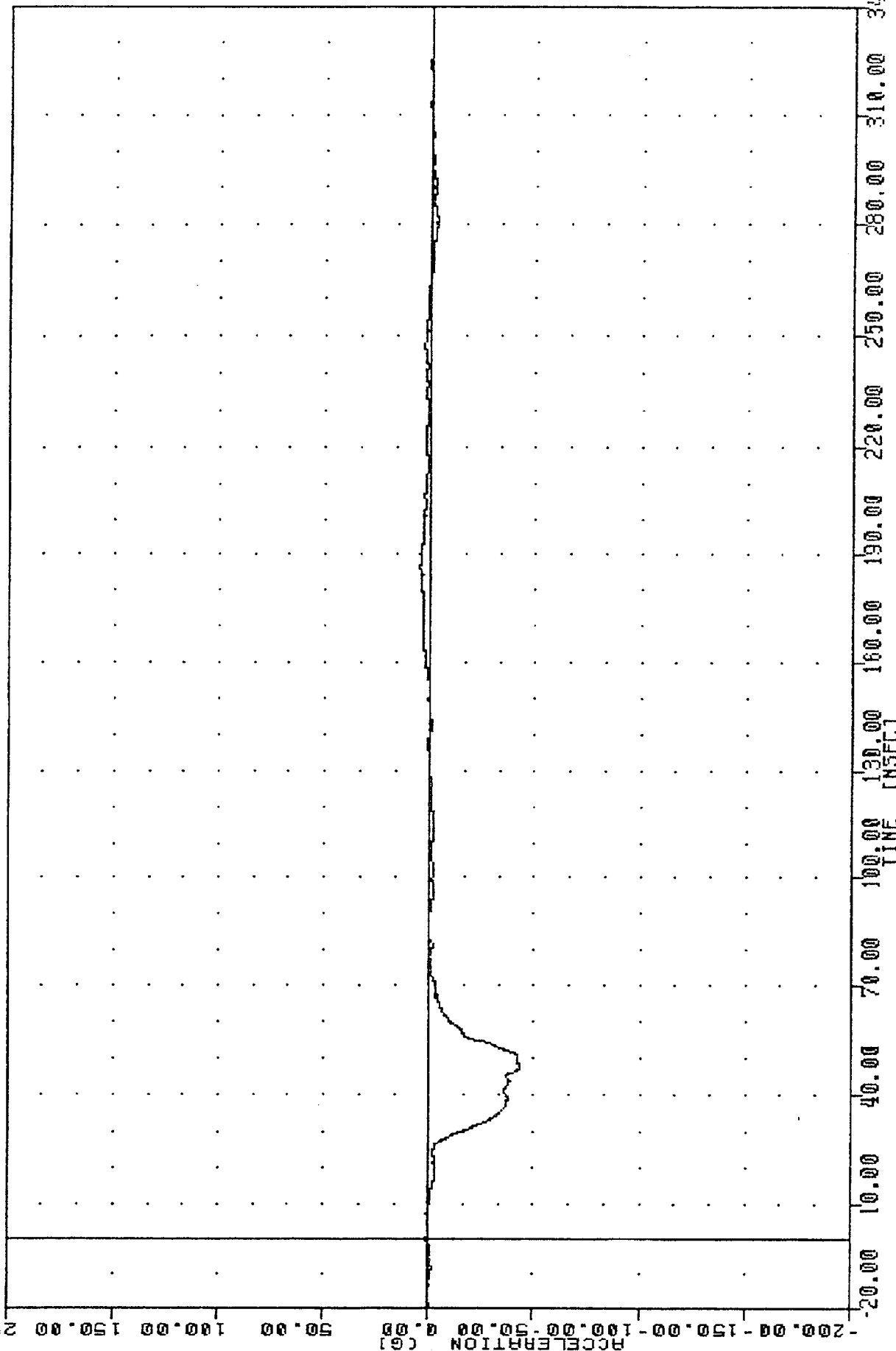
TEST DATE 0C 2:

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -10.820 51.88, 4.97 214.75



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER PELVIS ACCELERATION X AXIS

TBS 351000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 MVMA SIDE IMPACT TESTING
 852750000000
 PEVY62
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -43.638 47.38 5.15 186.50



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER PELVIS ACCELERATION Y AXIS

IRC

851

851

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NVMA SIDE IMPACT TESTING

852750000000

FEVZG2

FILTER = BLPF 300/ 949/ -40

MIN, MAX VALUES = -9.47e 71.00, 8.50 e 41.63

200.00

150.00

100.00

50.00

0.00

-50.00

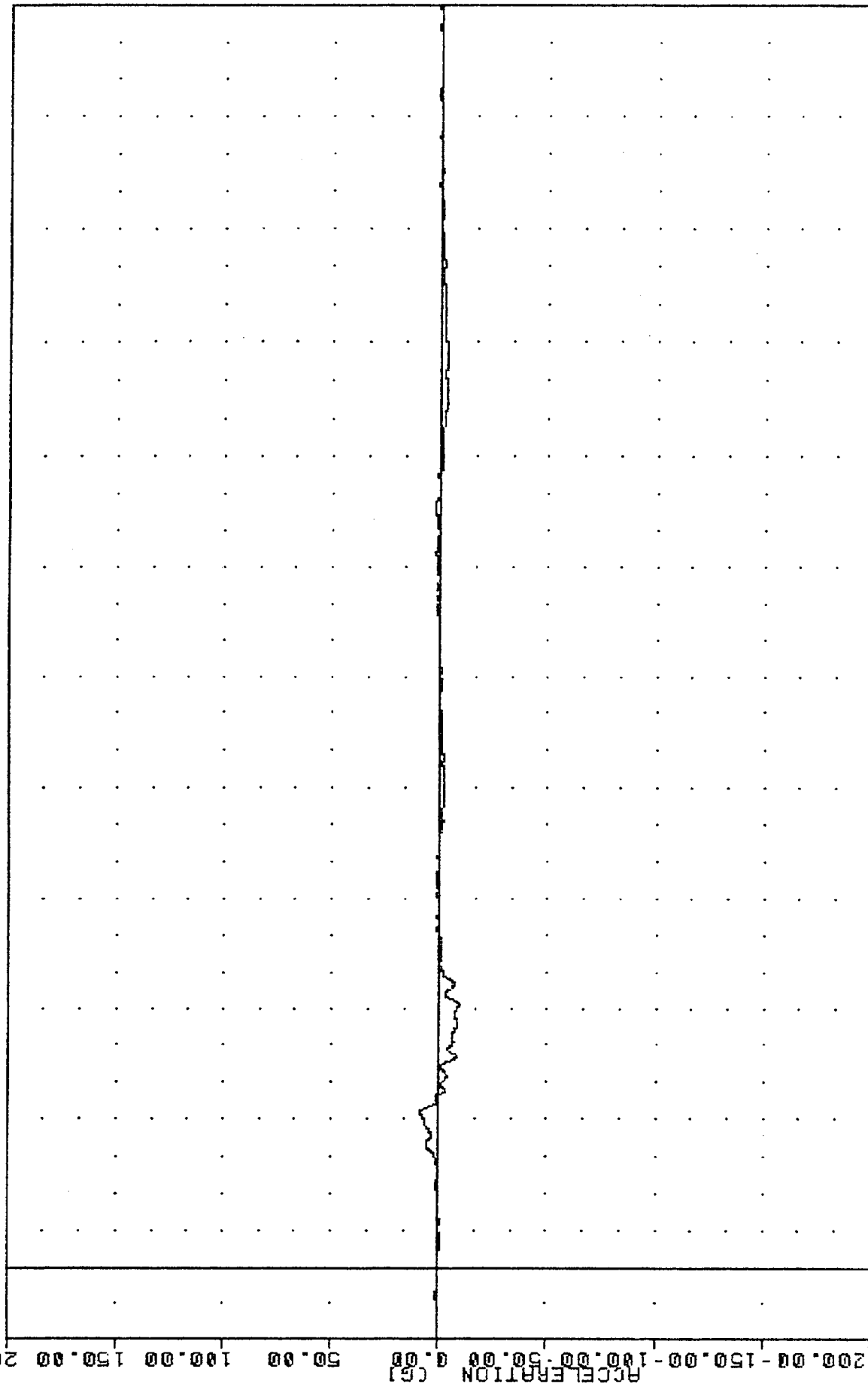
-100.00

-150.00

-200.00

-

A-33



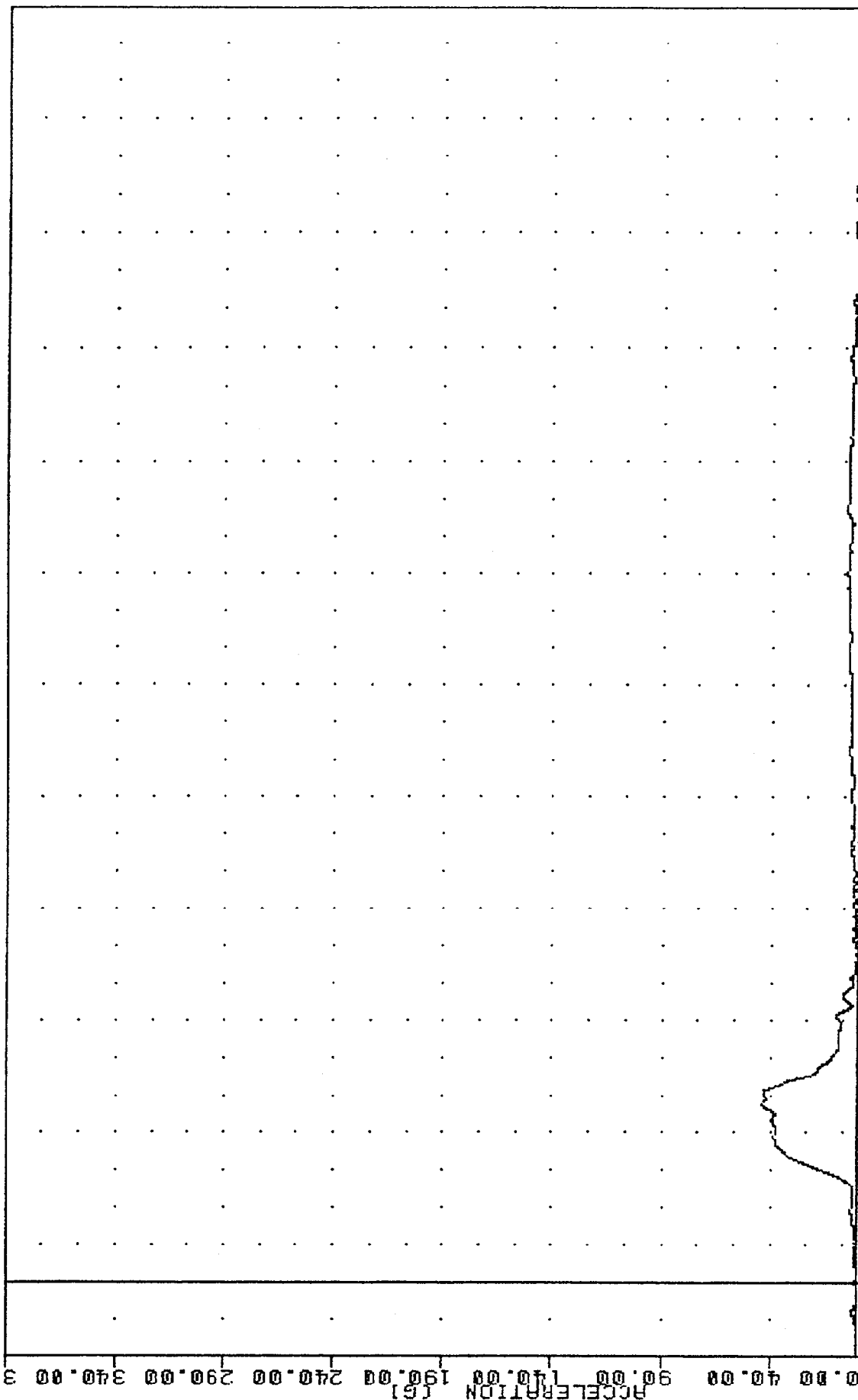
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

TIME (MSEC)

NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
PASSENGER PELVIS ACCELERATION Z AXIS

851
 MVMA SIDE IMPACT TESTING
 85275000000
 PEVR62

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = 0.132 -17.50, 43.87 e 47.38



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

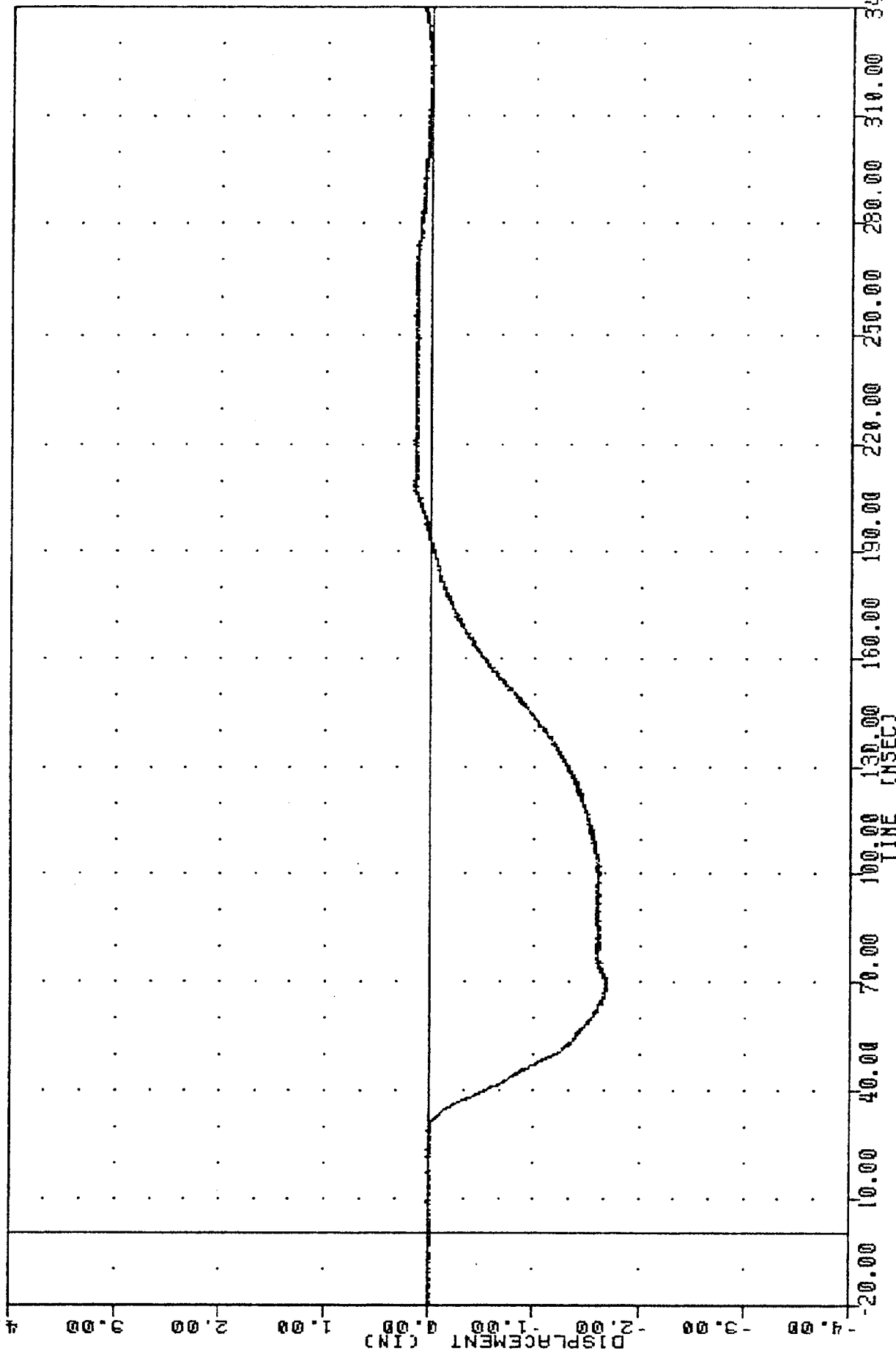
MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER PELVIS RESULTANT ACCELERATION

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -24.96 129.00 , 0.00 0 -14.25



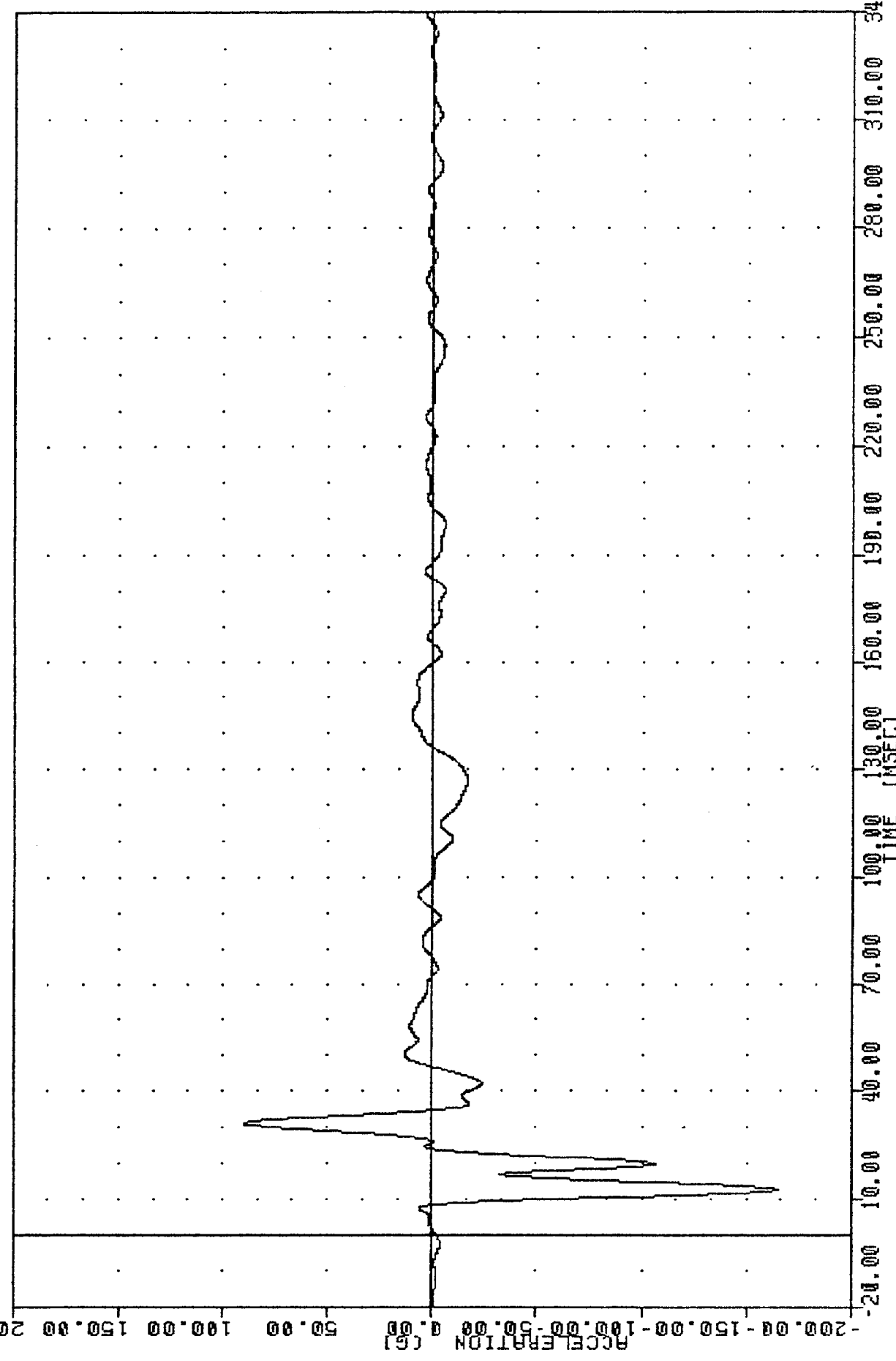
MVMA SIDE IMPACT TESTING
 85275000000
 RRTYD2

FILTER = ALPF 1650/ 5217/ -40
 MIN. MAX VALUES = -1.69 69.25 0.17 208.38



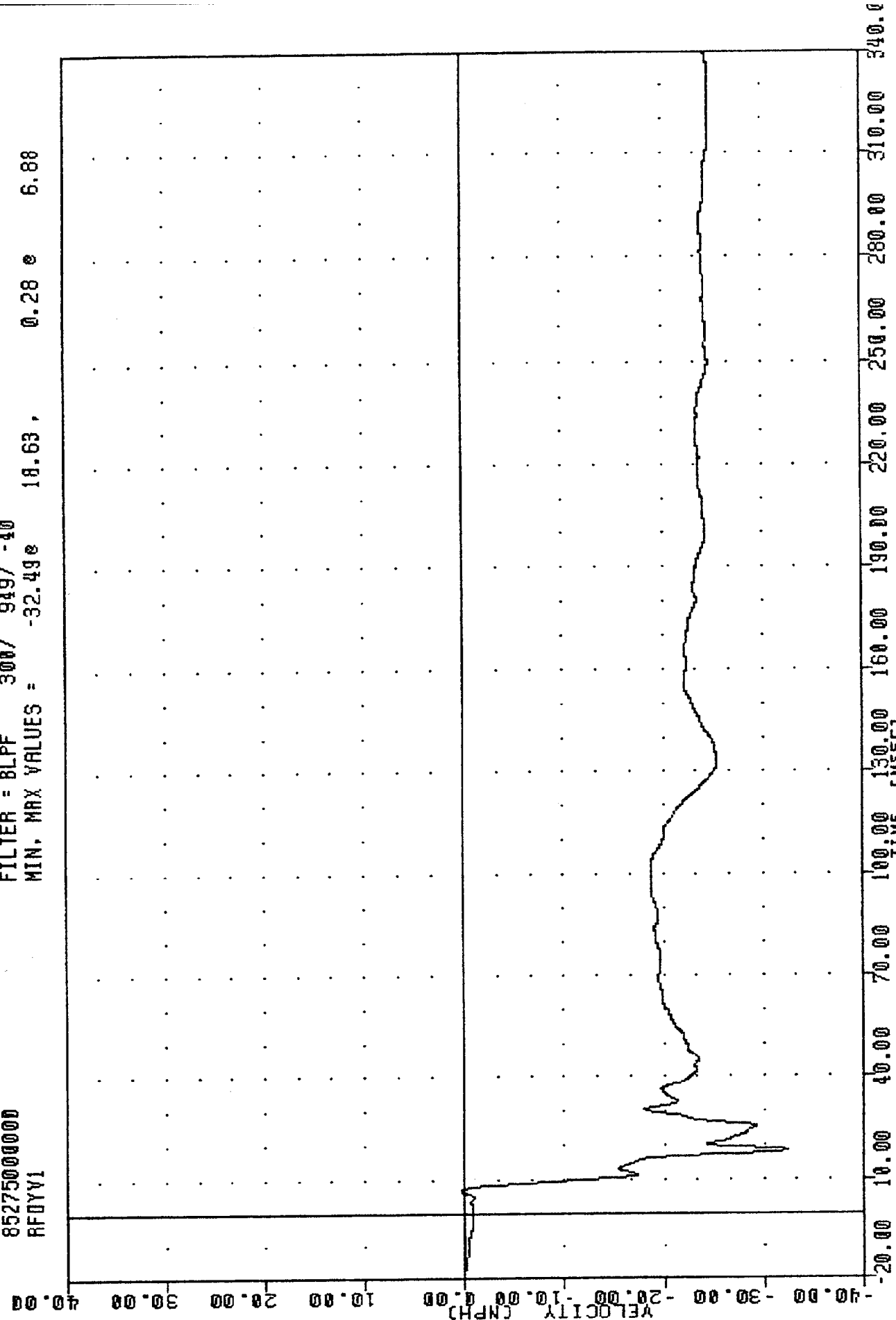
MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 PASSENGER RIGHT RIB TO SPINE DISPLACEMENT INCHES

851000
 NVMA SIDE IMPACT TESTING
 85275000000
 RFDY61
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -165.358 12.63 89.60 31.13
 03:21:20



NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 VEHICLE RIGHT FRONT DOOR (POSITION 1) ACCELERATION Y AXIS

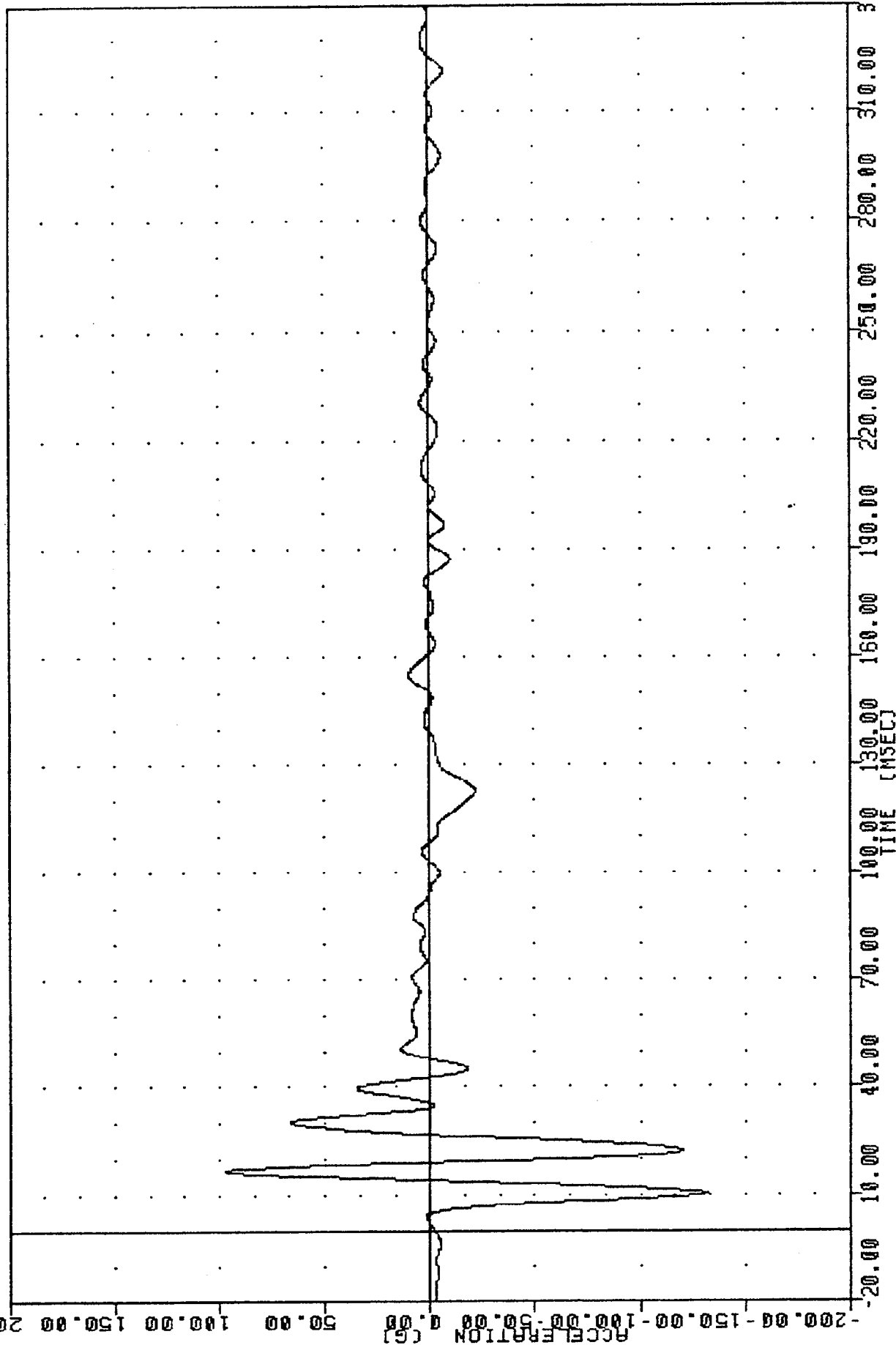
TRC 851002 8 OCT 83 09:20:22
 MYMA SIDE IMPACT TESTING
 85275000000
 RFOYV1
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -32.49e 18.63, 0.28 e 6.88



MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 RIGHT FRONT DOOR (POSITION 1) VELOCITY Y AXIS

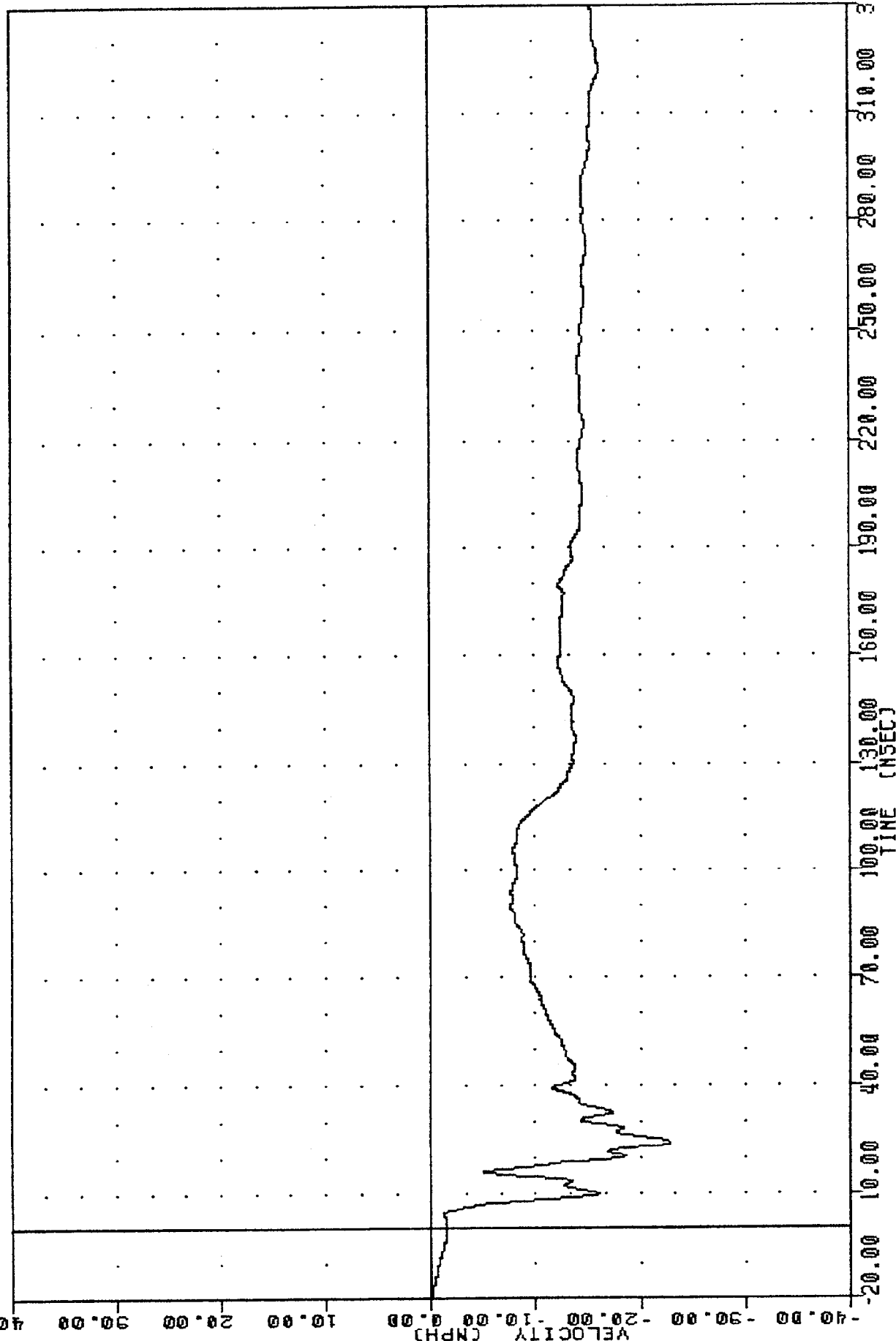
851002 0 OCT 03 03:21:20
 MVNA SIDE IMPACT TESTING
 85275000000
 RFOYG2

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -132.09 10.50 96.38 16.75



MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 VEHICLE RIGHT FRONT DOOR (POSITION 2) ACCELERATION Y AXIS

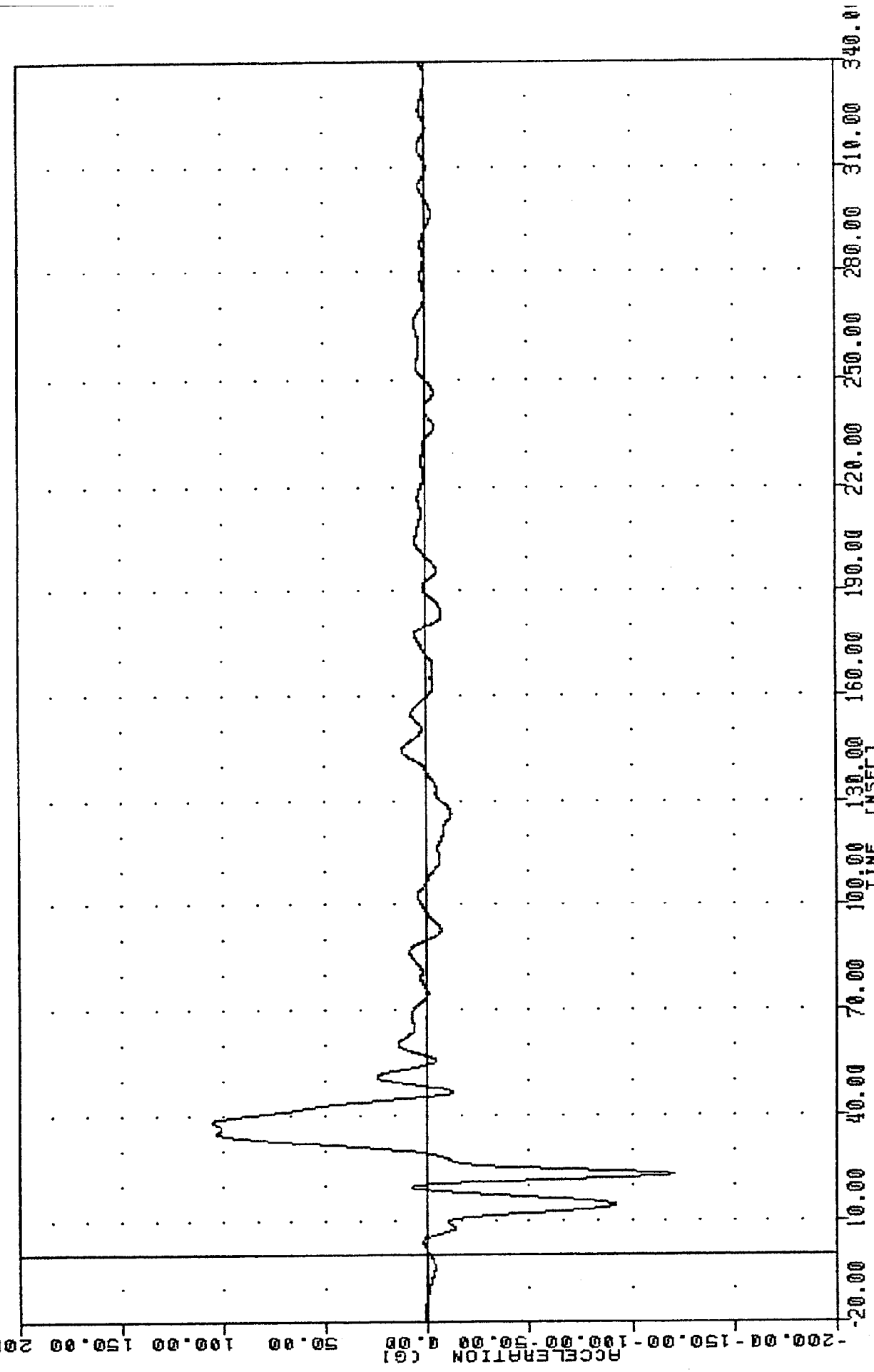
MVMA SIDE IMPACT TESTING
 85275000000
 RFDYV2
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -22.95e 24.00, 0.00 e -20.00
 PLOT DATE 08 OCT 03 09:20:22



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 RIGHT FRONT DOOR (POSITION 2) VELOCITY Y AXIS

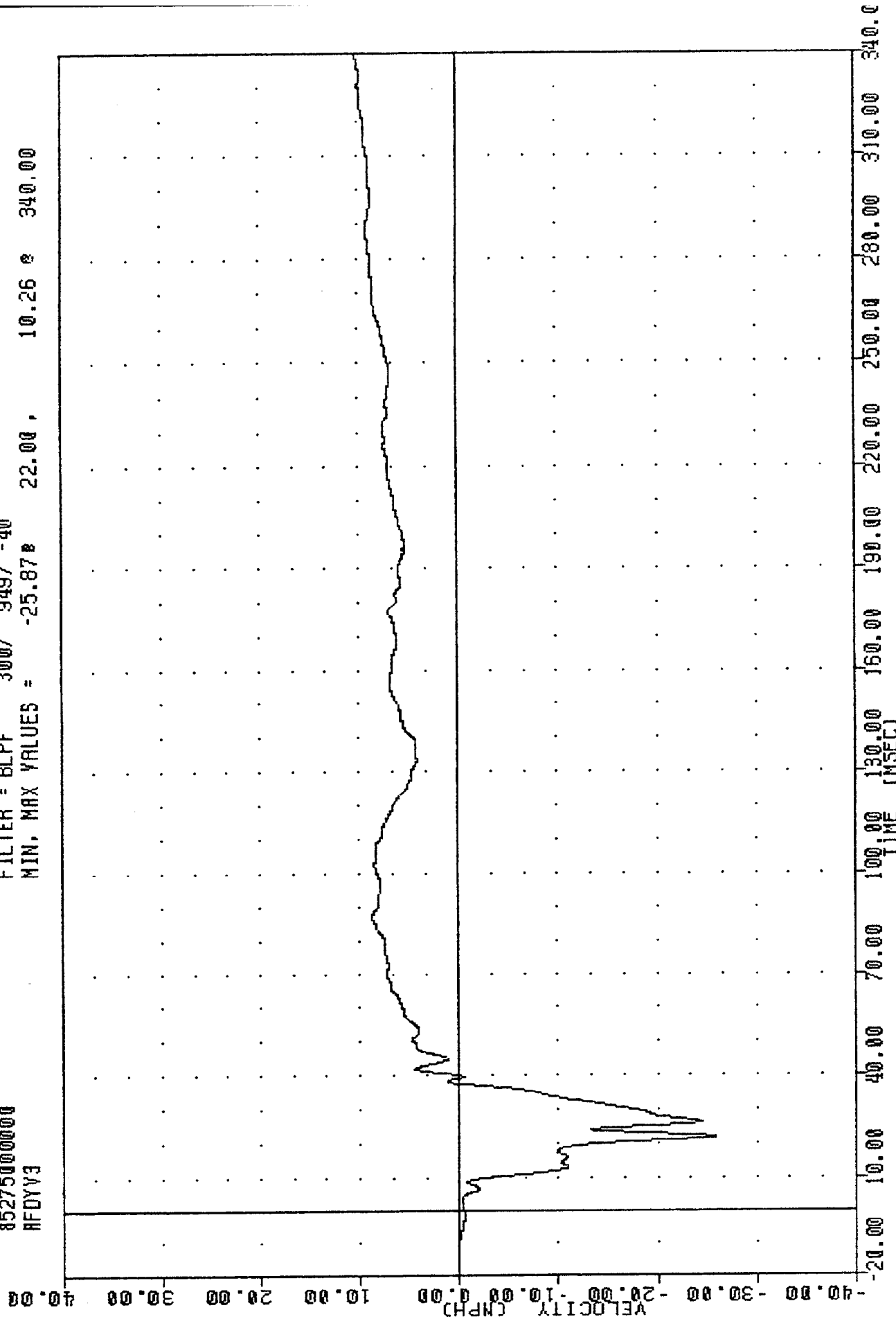
INC 85100Z 05 OCT 83 09:21:20
 MVMA SIDE IMPACT TESTING
 85275000000
 RFDYB3

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -121.03 23.00, 105.19 38.13



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 VEHICLE RIGHT FRONT DOOR (POSITION 3) ACCELERATION Y AXIS

851002 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000
 NVMA SIDE IMPACT TESTING
 852750000000
 RFDYV3
 FILTER = BLPF 300/ 349/ -40
 MIN. MAX VALUES = -25.87 22.00 , 10.26 340.00
 03:20:22



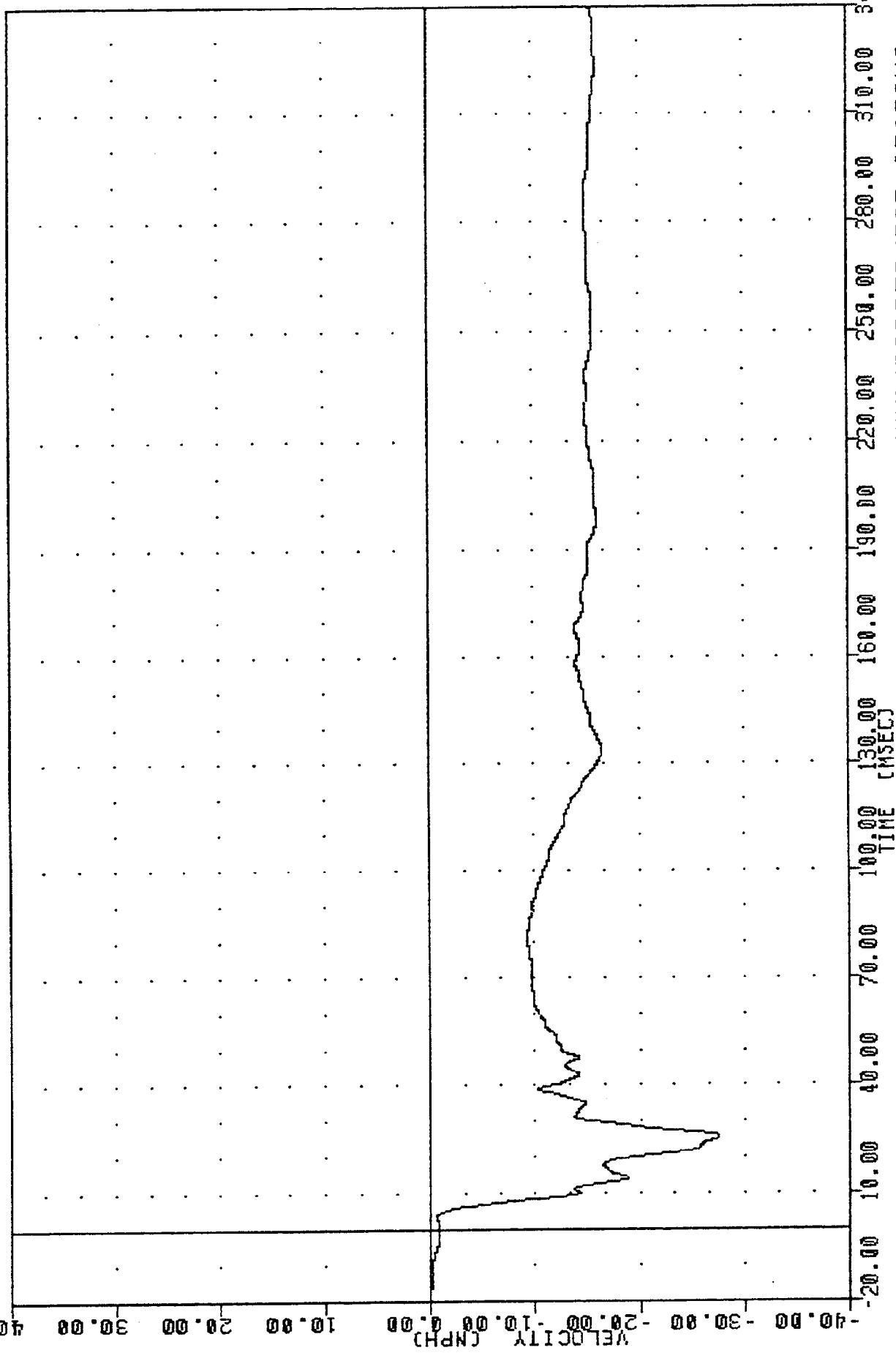
NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 RIGHT FRONT DOOR (POSITION 3) VELOCITY Y AXIS

2012-08-10 03:10

1. **THE**
 2. **THE**
 3. **THE**

[illegible]

851002
 MVNA SIDE IMPACT TESTING
 85275000000
 RFOYV4
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -27.612 25.75, 0.00 2 -20.00
 OCT 03 03:20:22

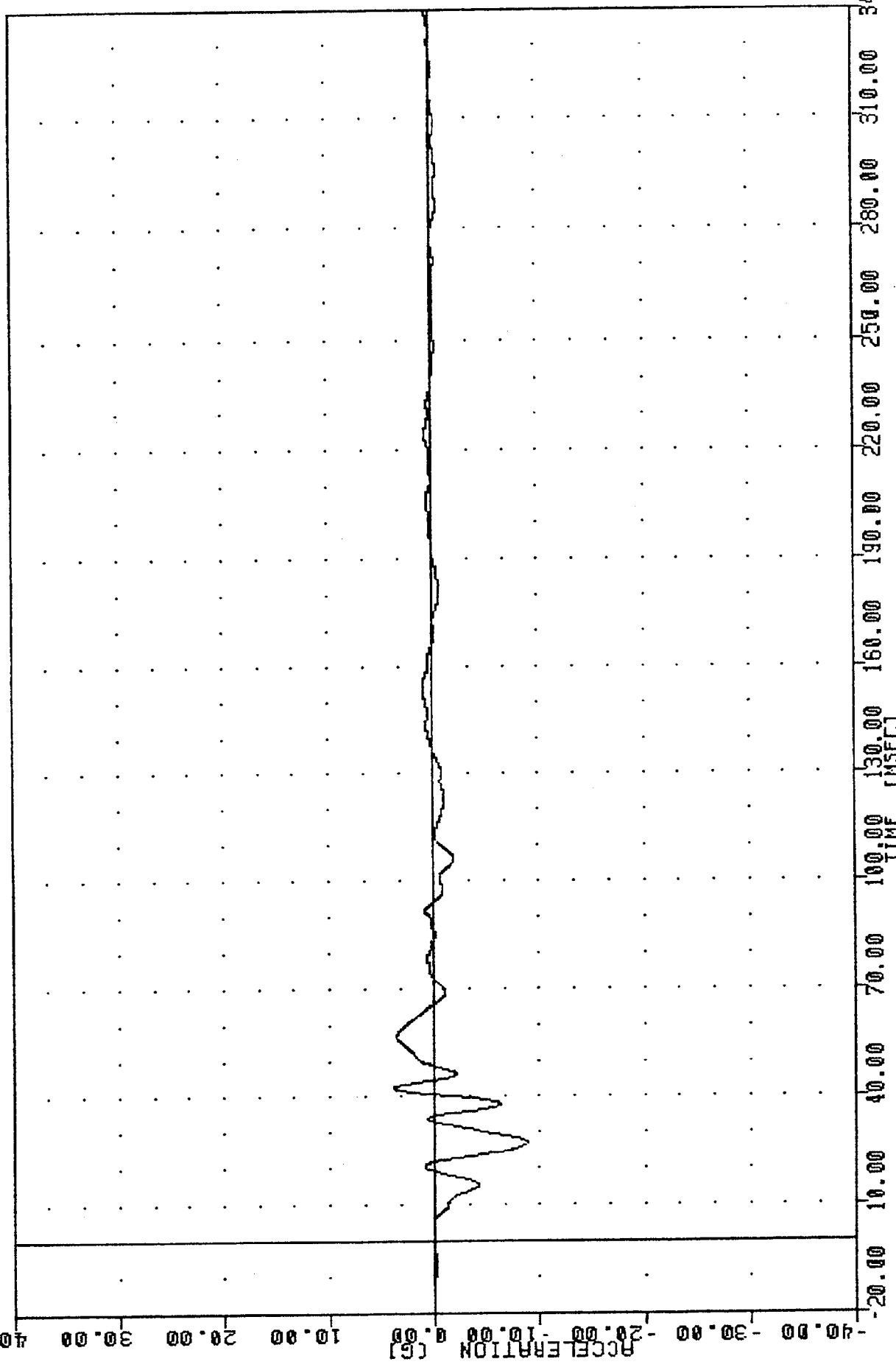


MVNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 RIGHT FRONT DOOR (POSITION 4) VELOCITY Y AXIS

MVMA SIDE IMPACT TESTING
 85275000000
 LFSXG

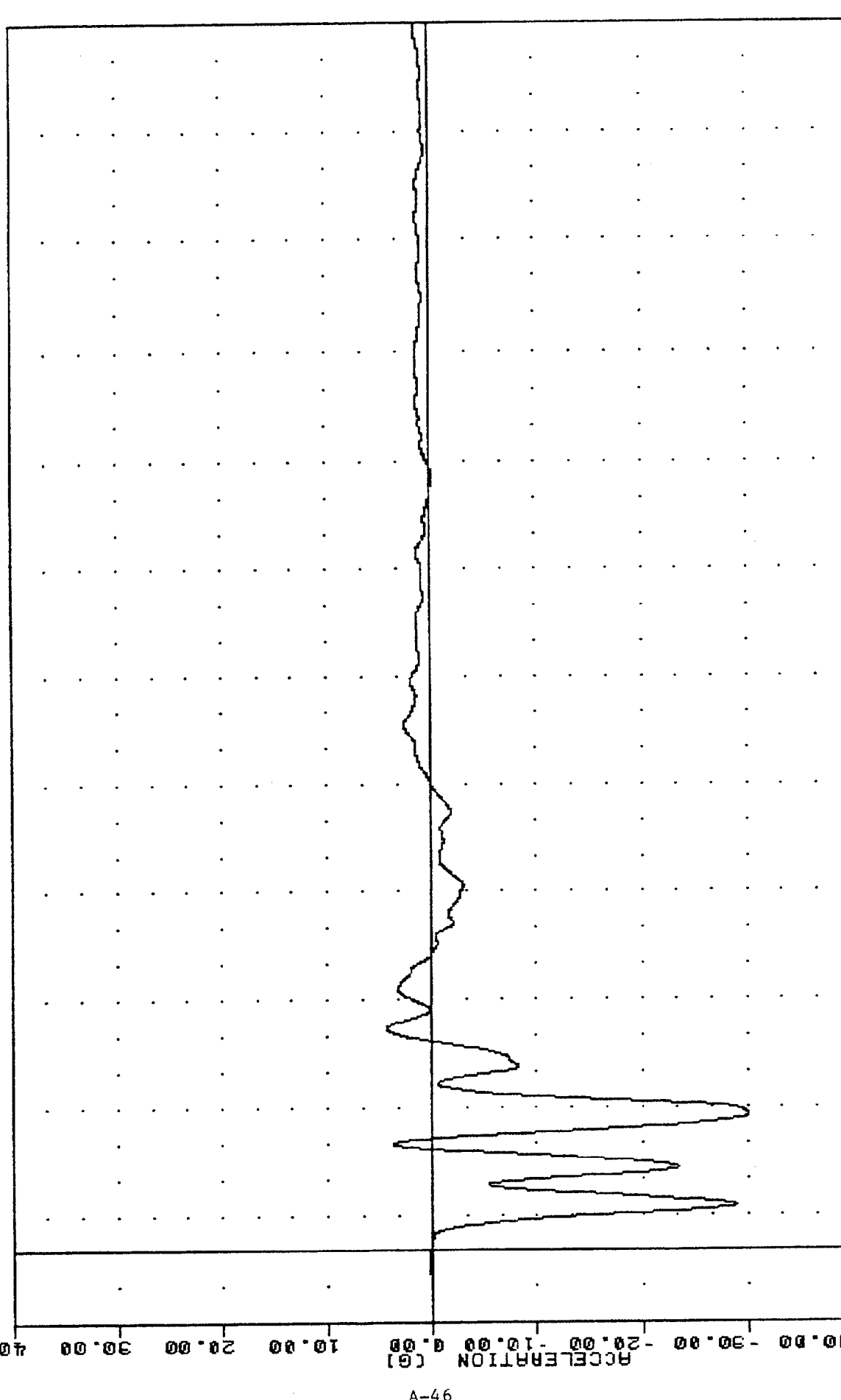
PLOT DATE 03:21:20

FILTER = 8LPF 100/ 316/ -40
 MIN, MAX VALUES = -8.790 27.13, 3.92 42.50



MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 VEHICLE LEFT FRONT SILL ACCELERATION X AXIS

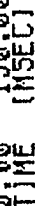
85275000000
 LFSY6
 FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -30.14 37.63, 4.35 62.00
 03:21:20
 0 OCT 88
 03:21:20



-40.00
 -30.00
 -20.00
 -10.00
 0.00
 10.00
 20.00
 30.00
 40.00
 -20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (MSEC)
 MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 VEHICLE LEFT FRONT SILL ACCELERATION Y AXIS

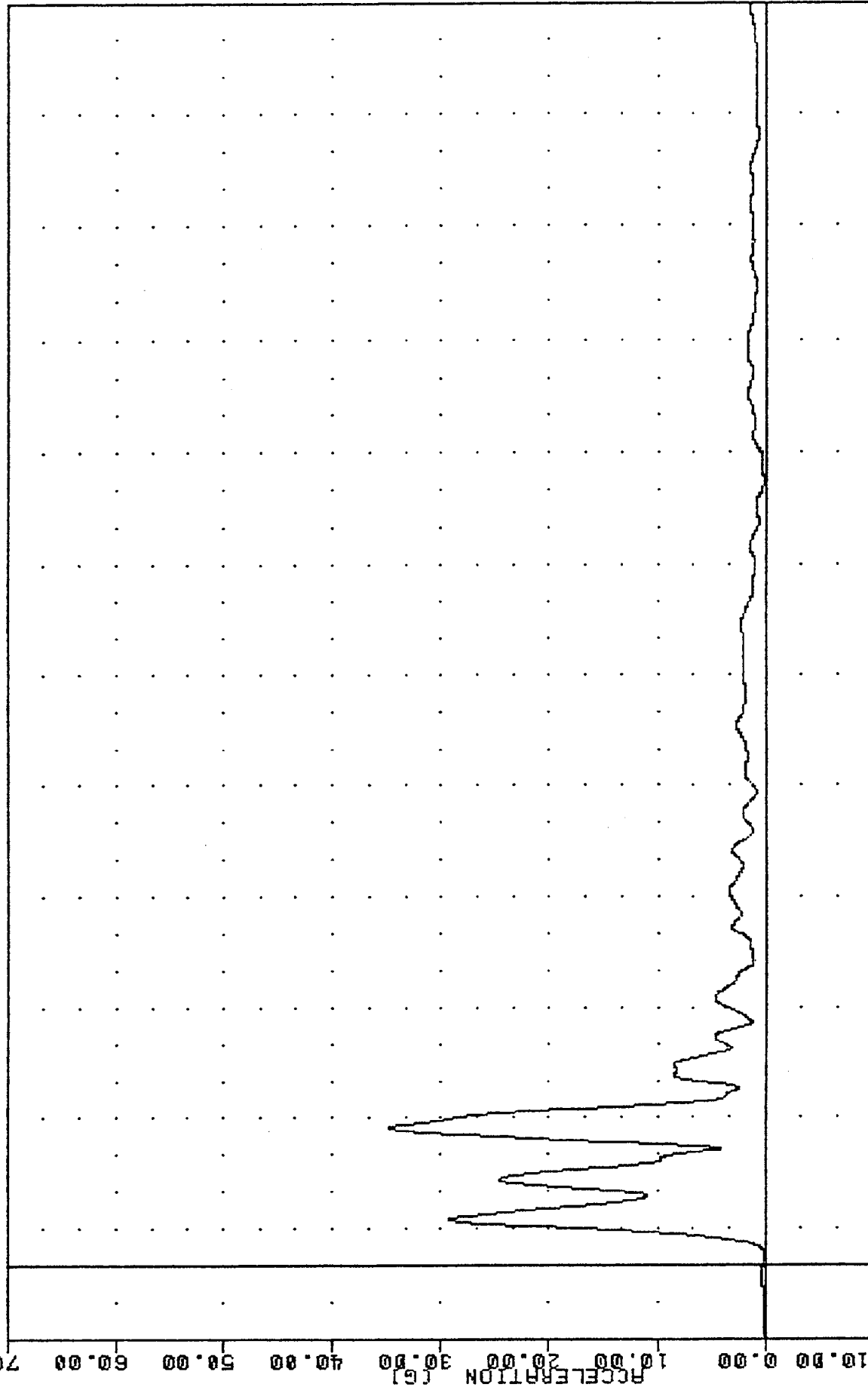
925 F1

MIN, MAX VALUES =	-10.31	17.38,	16.66	37.00
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TIME (MSEC)
 MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 VEHICLE LEFT FRONT SILL ACCELERATION Z AXIS

851002
 85275000000
 LF5RG
 MYNA SIDE IMPACT TESTING
 FILTER = 8LPF 100/ 316/ -40
 MIN. MAX VALUES = 0.090 1.75, 34.77 37.25
 TEST DATE 03:21:20

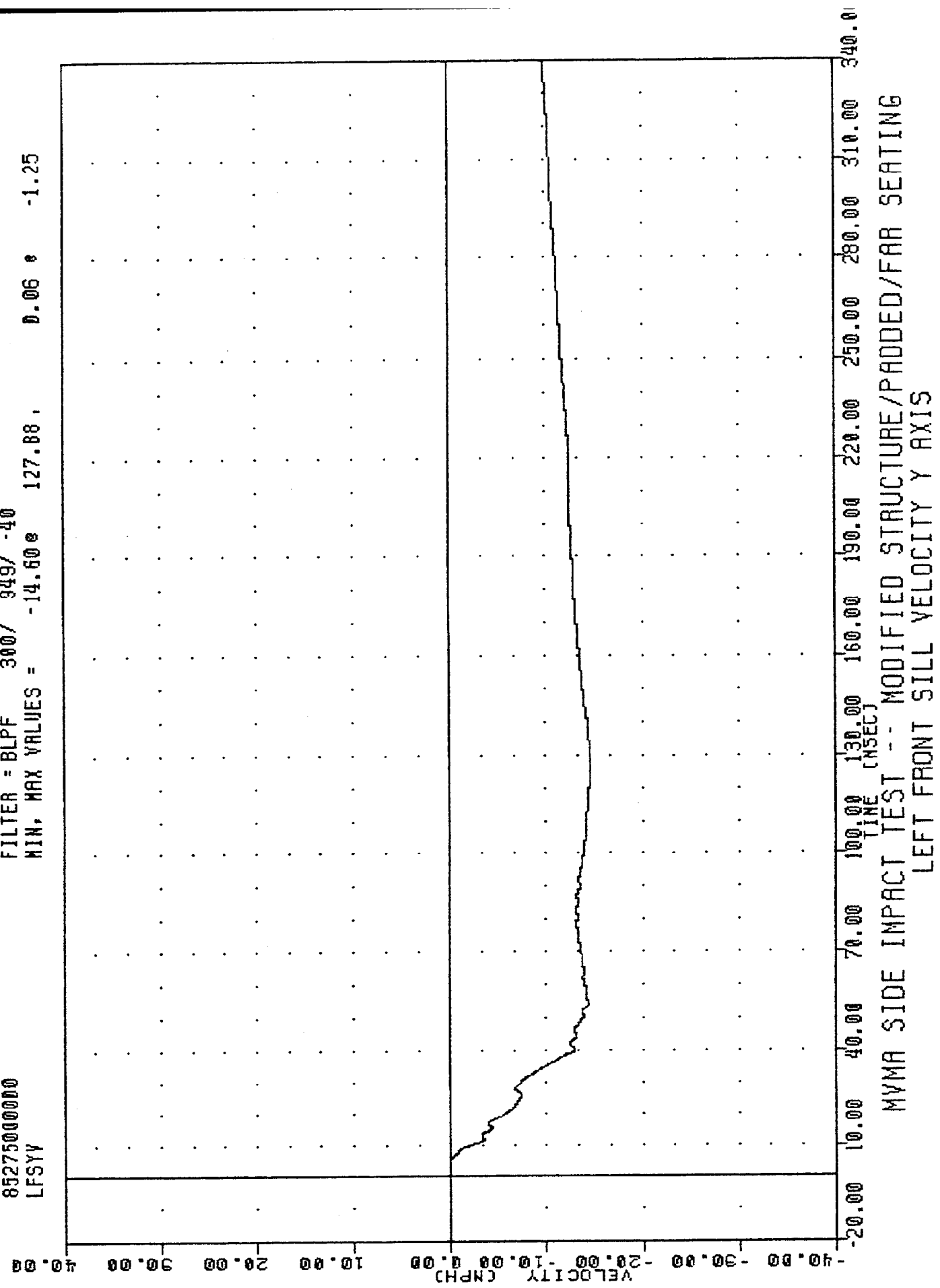


-20.00 10.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00 270.00 280.00 290.00 300.00 310.00 320.00 330.00 340.00
 MYNA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 VEHICLE LEFT FRONT SILL RESULTANT

351000
 MYMA SIDE IMPACT TESTING
 85275000000
 LFSYV

TEST DATE 00:20:00

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -14.60e 127.88, 0.06 e -1.25

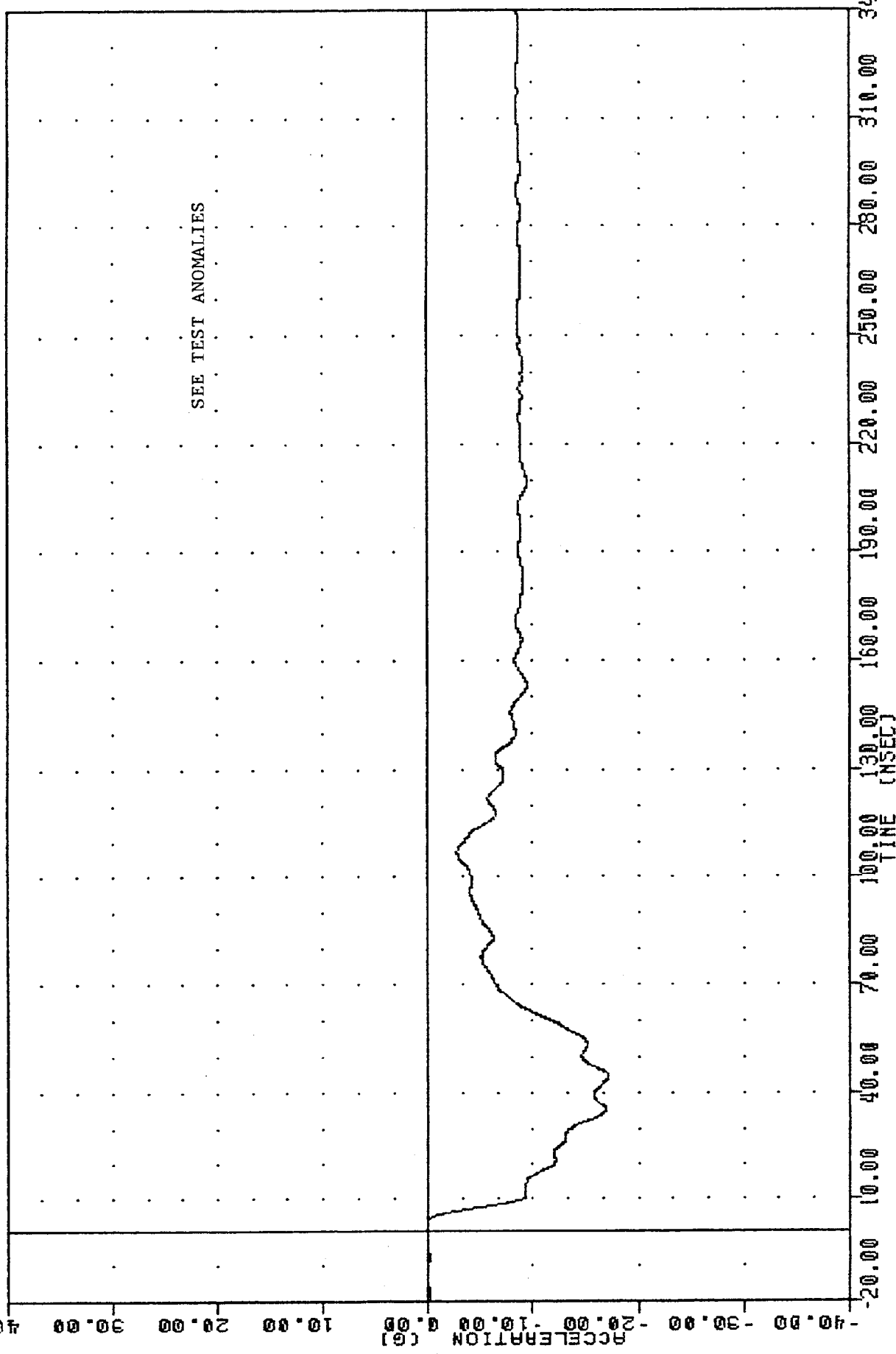


MYMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 LEFT FRONT SILL VELOCITY Y AXIS

MVMA SIDE IMPACT TESTING
 85275000000
 BCGX6

DATE 00:00:00

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -17.18e 44.50, 0.15 e -12.75

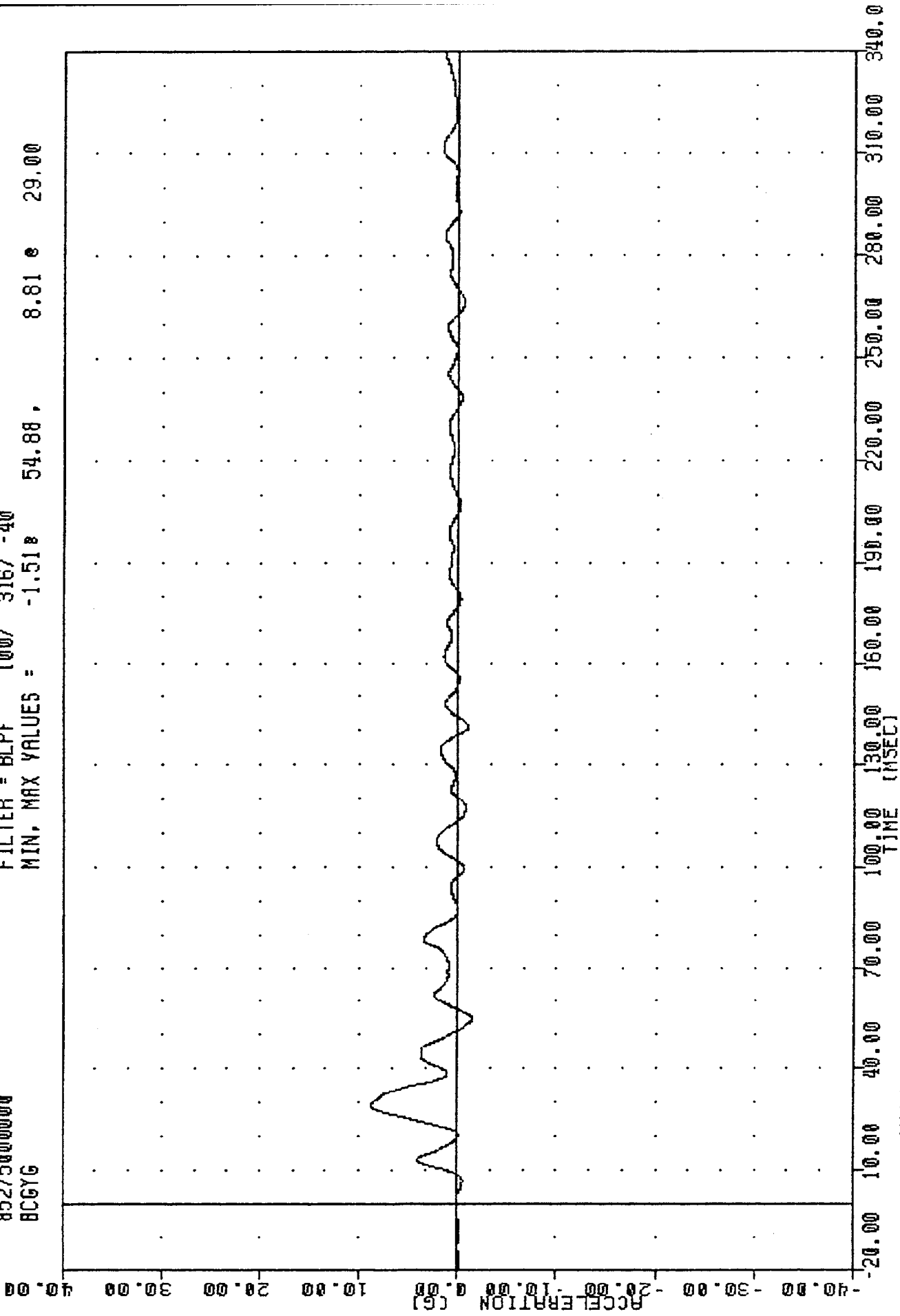


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 BARRIER CENTER OF GRAVITY X AXIS

851
 NVMA SIDE IMPACT TESTING
 85275000000
 BCGYG

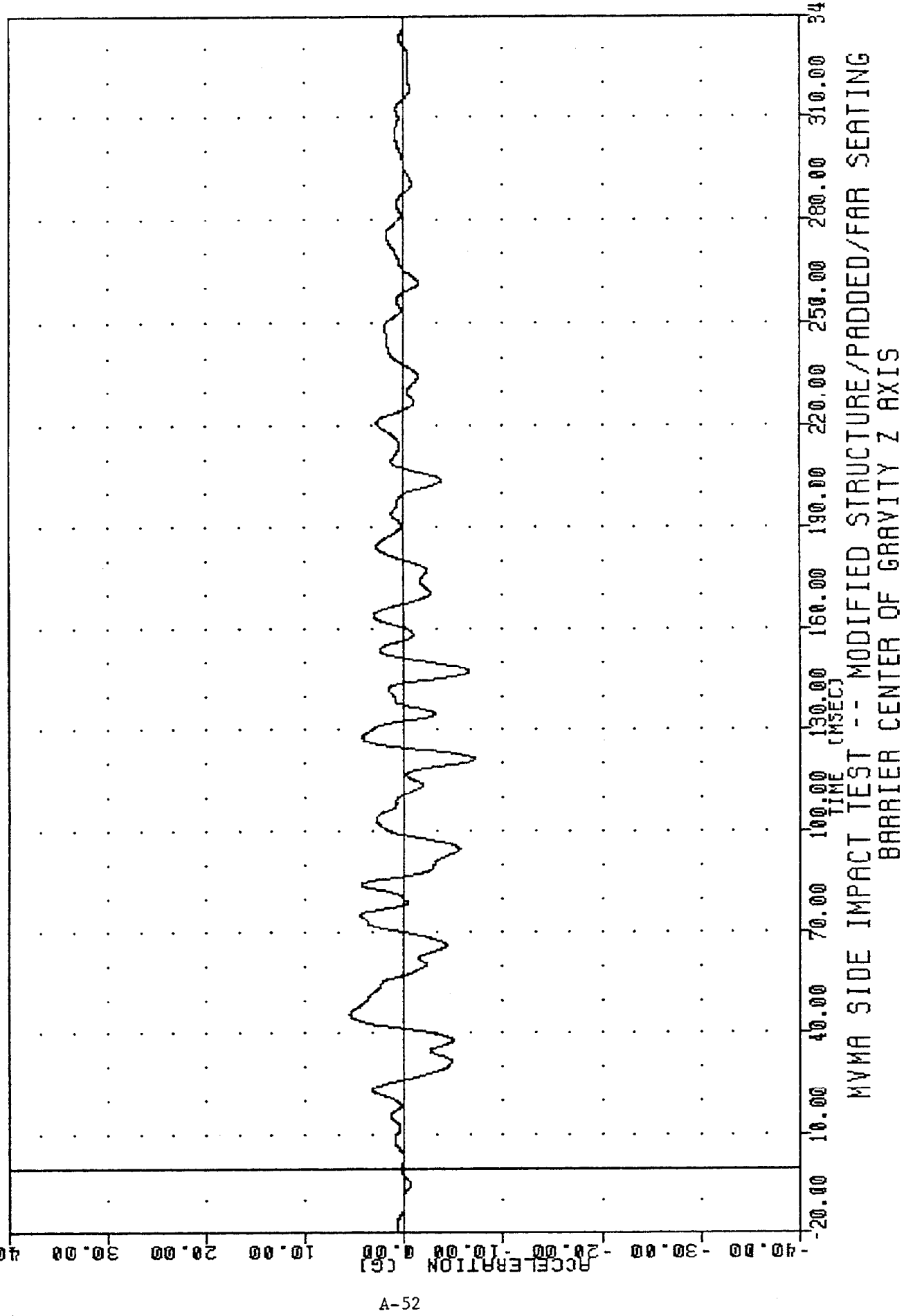
TEST DATE 00-00-00 00:20:00

FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -1.518 54.88, 8.81 e 29.00



NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 BARRIER CENTER OF GRAVITY Y AXIS

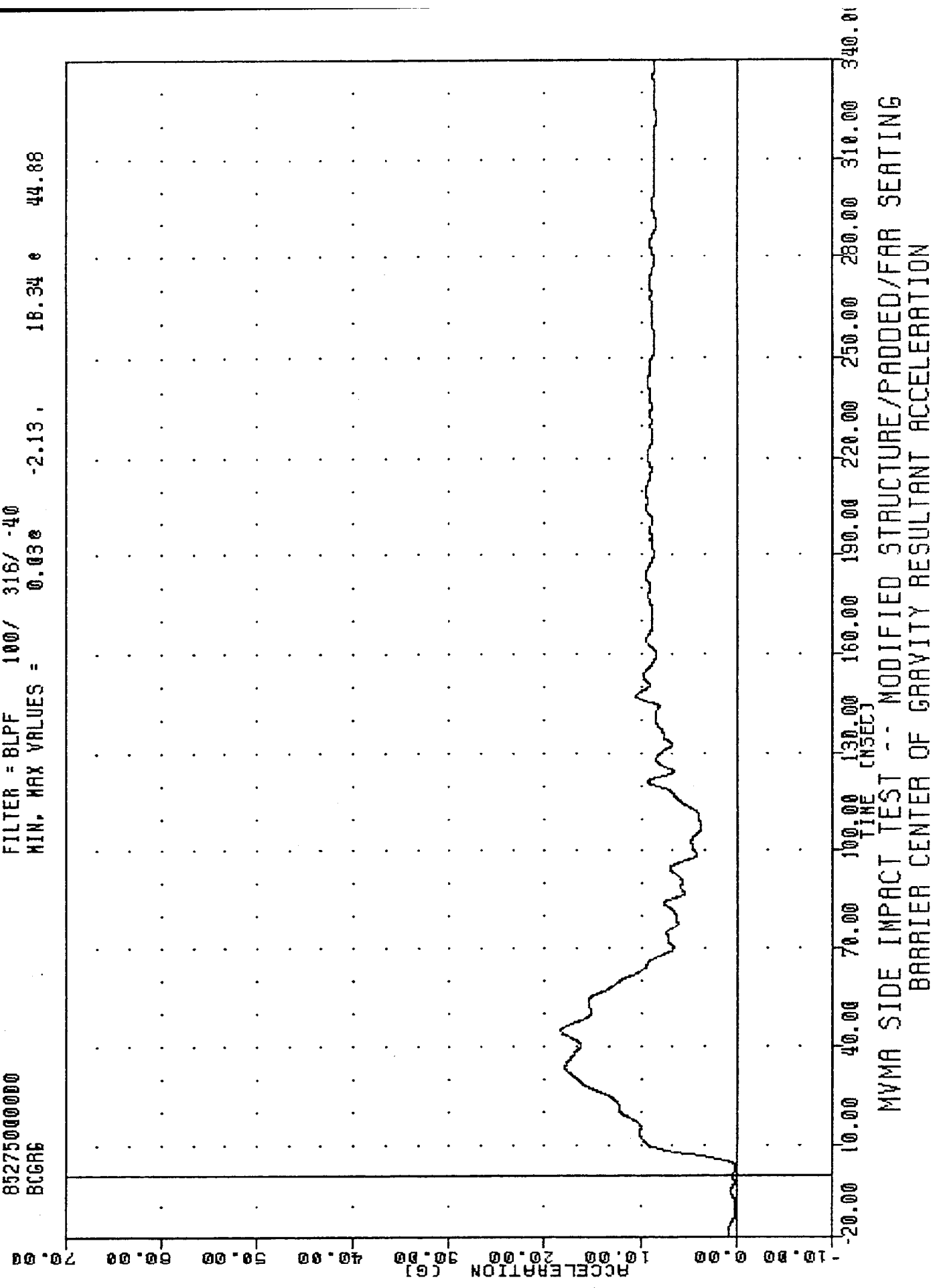
851000
 MVMA SIDE IMPACT TESTING
 85275000000
 BCGZG
 TEST DATE 09:21:20
 FILTER = BLPF 100/ 316/ -40
 MIN, MAX VALUES = -7.18e 121.25, 5.47 e 45.63



851662
 MVMA SIDE IMPACT TESTING
 85275000000
 BCGR6

TEST DATE 0 OCT 63 03:21:20

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = 0.03e -2.13, 18.34 e 44.88



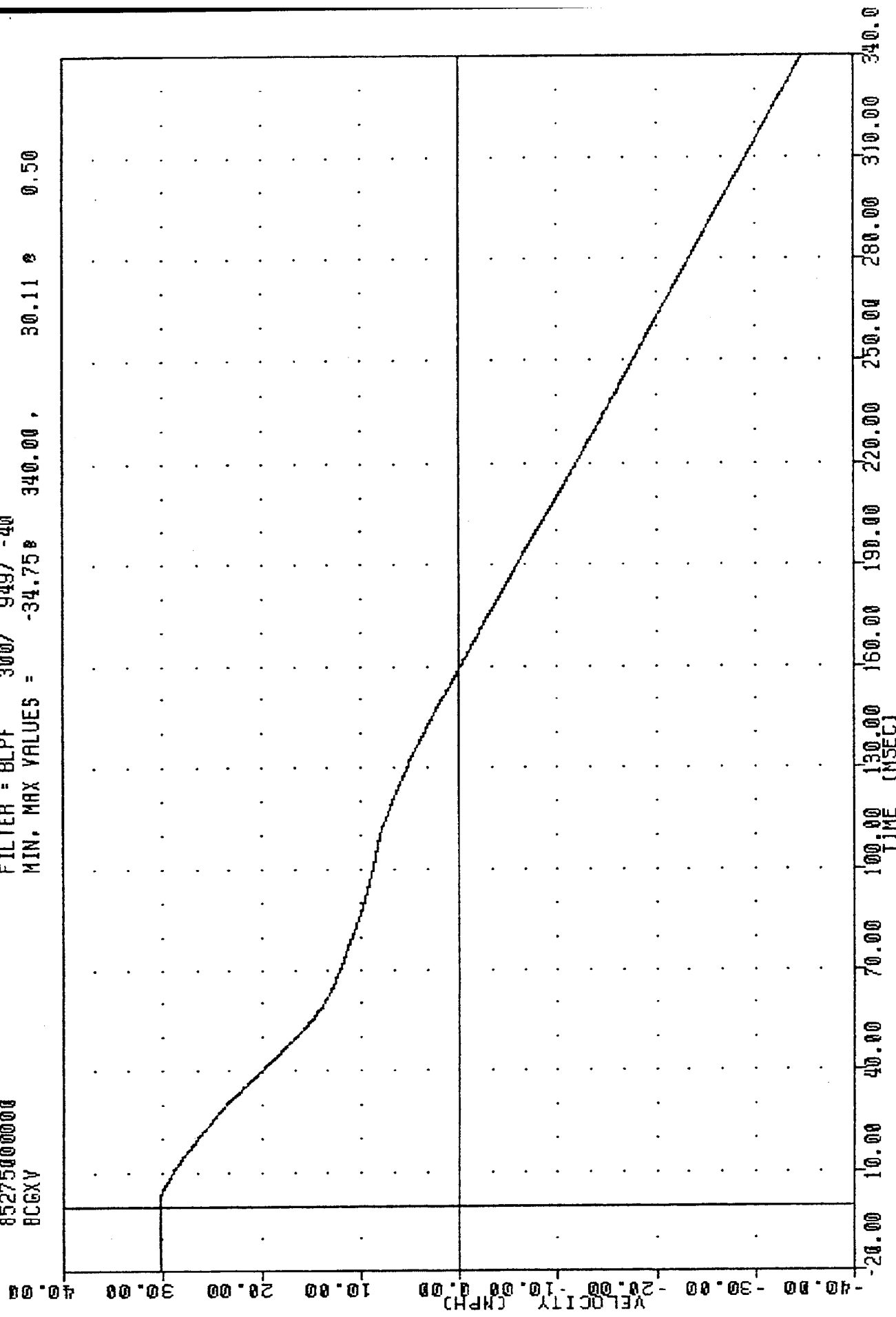
MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 BARRIER CENTER OF GRAVITY RESULTANT ACCELERATION

TEST DATE 09:20:22

851000

NVMA SIDE IMPACT TESTING
85275000000
BCGXV

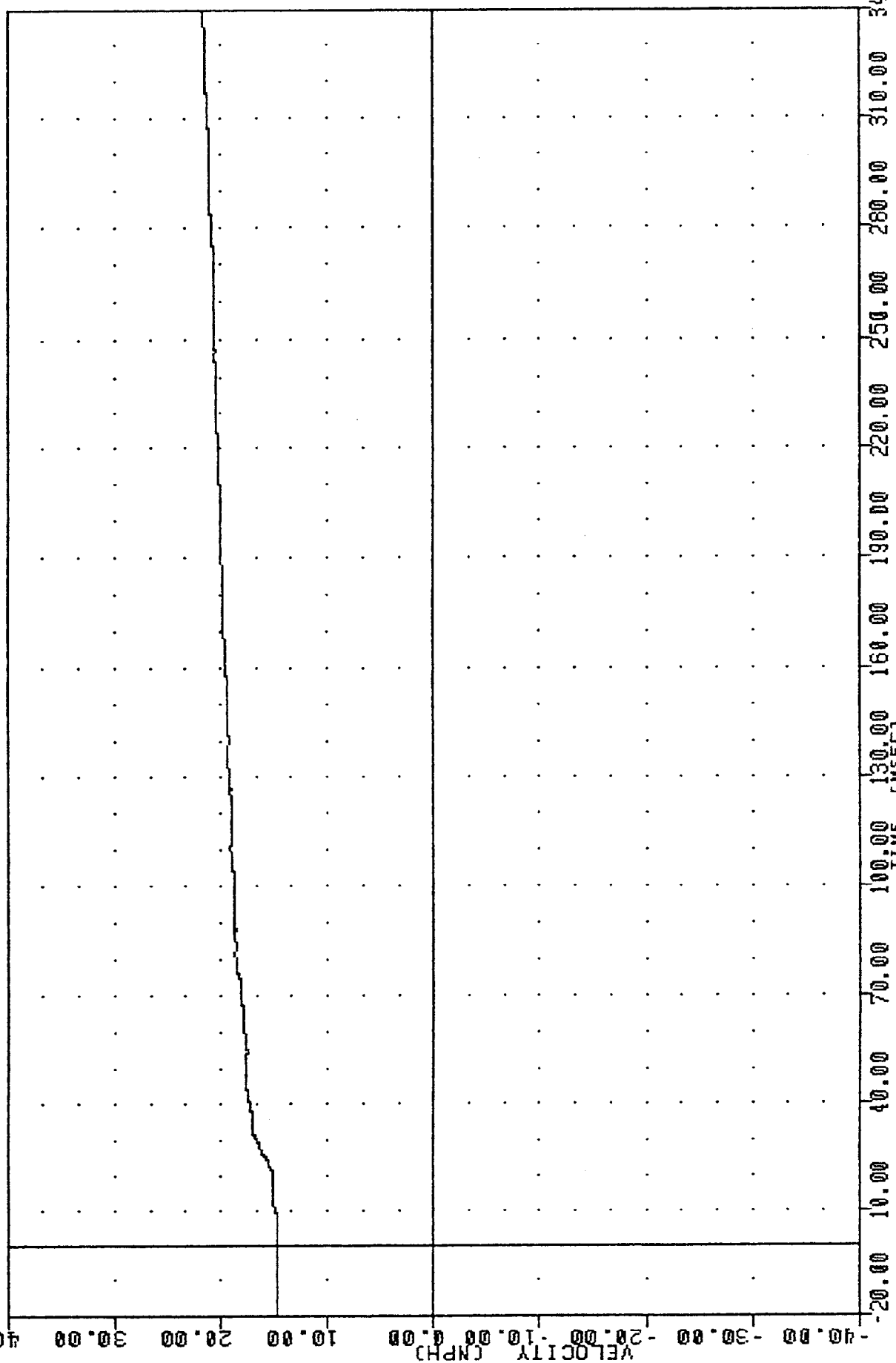
FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -34.75 340.00, 30.11 0.50



NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
BARRIER CENTER OF GRAVITY VELOCITY X AXIS

851
 MVMA SIDE IMPACT TESTING
 85275000000
 BCGYV

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = 14.62e 7.00, 21.71 e 340.00

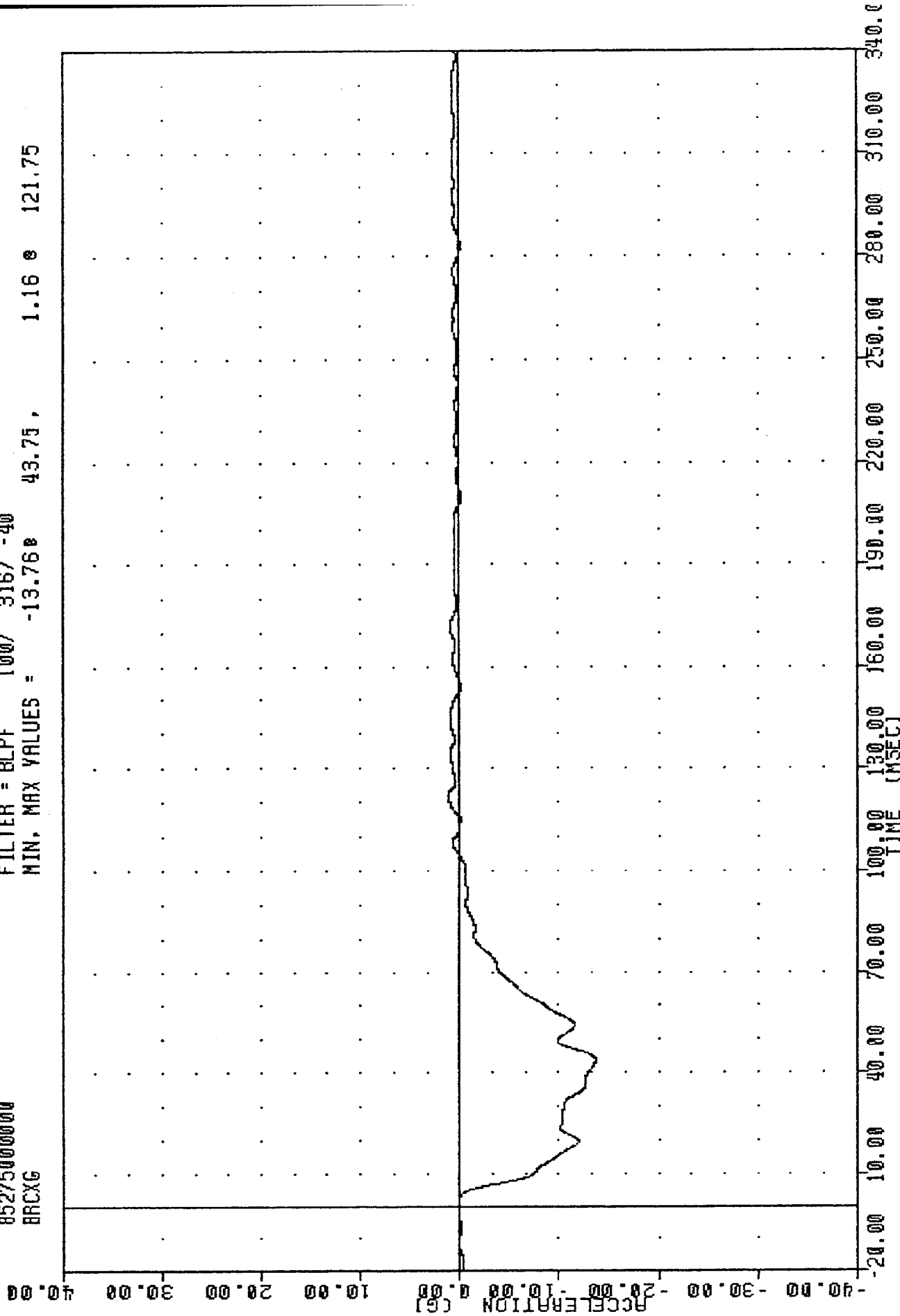


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 BARRIER CENTER OF GRAVITY VELOCITY Y AXIS

8510000
 NVMA SIDE IMPACT TESTING
 85275000000
 BRXG

TEST DATE 09:21:20

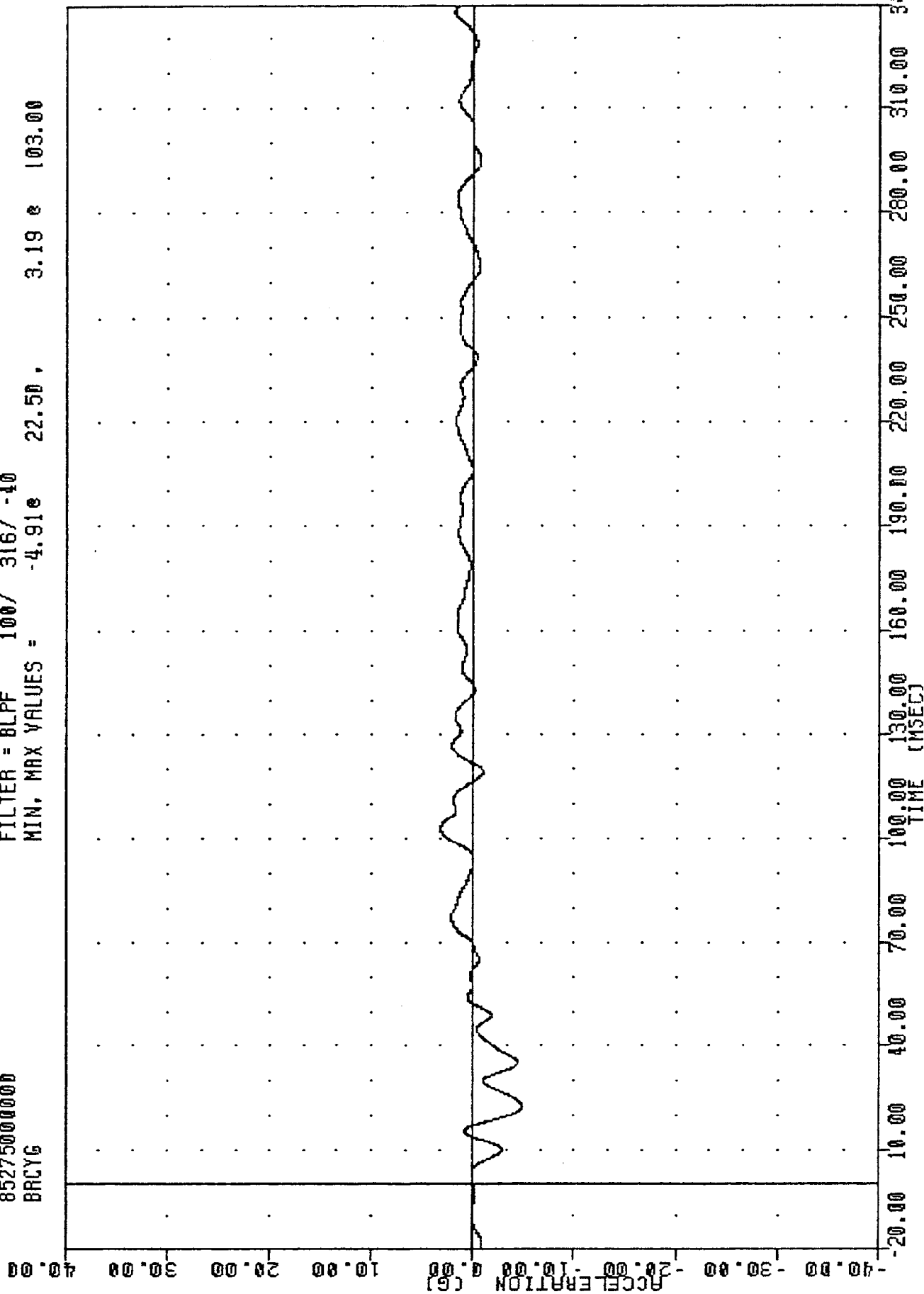
FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -13.768 43.75, 1.16 121.75



NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 BARRIER REAR CROSSMEMBER ACCELERATION X AXIS

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -4.91e 22.5D, 3.19 e 103.00

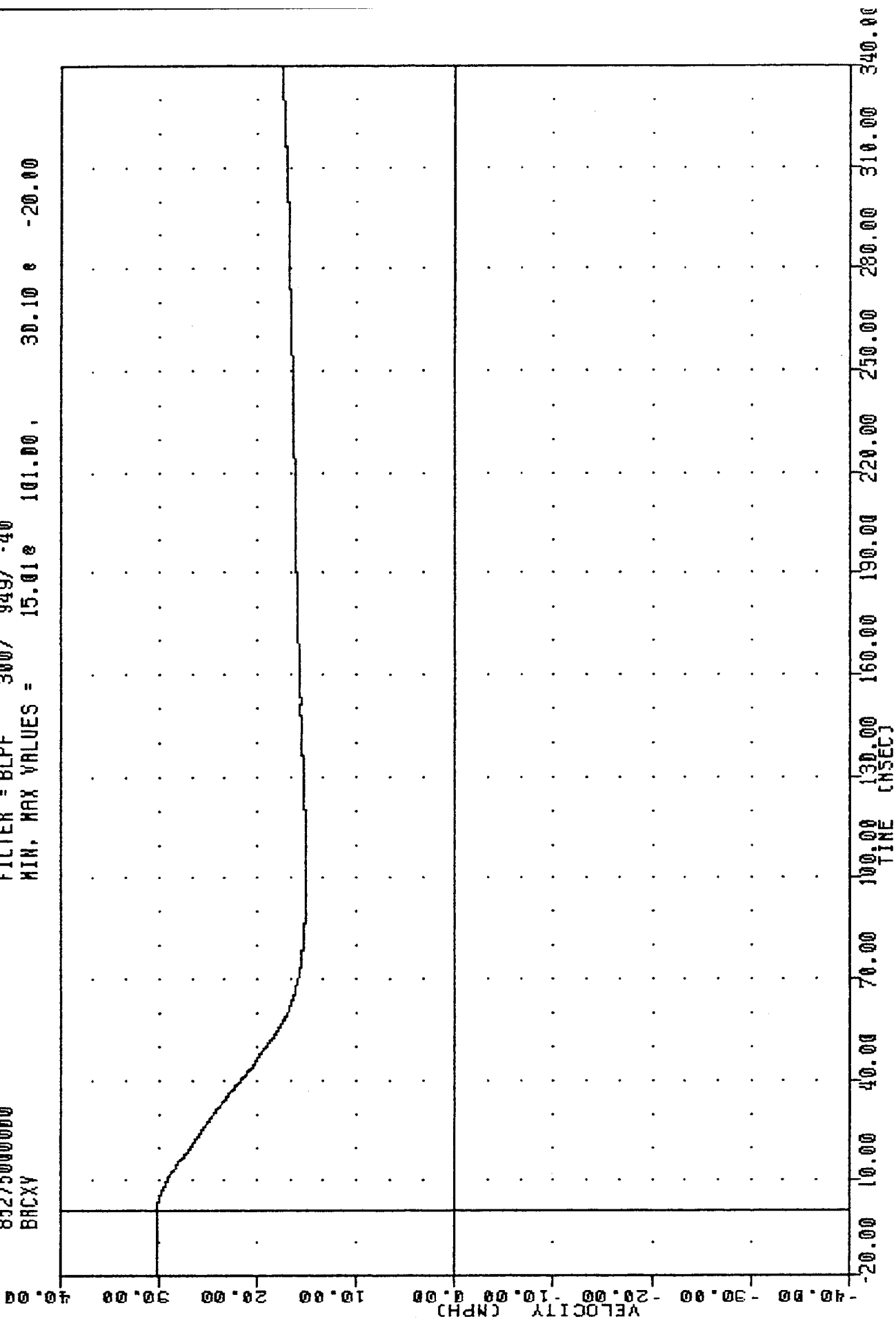
FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -4.910



NMVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 BARRIER REAR CROSSMEMBER ACCELERATION Y AXIS

155 510
 MVMA SIDE IMPACT TESTING
 85275000000
 BRXY

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = 15.01e 101.00, 30.10 e -20.00

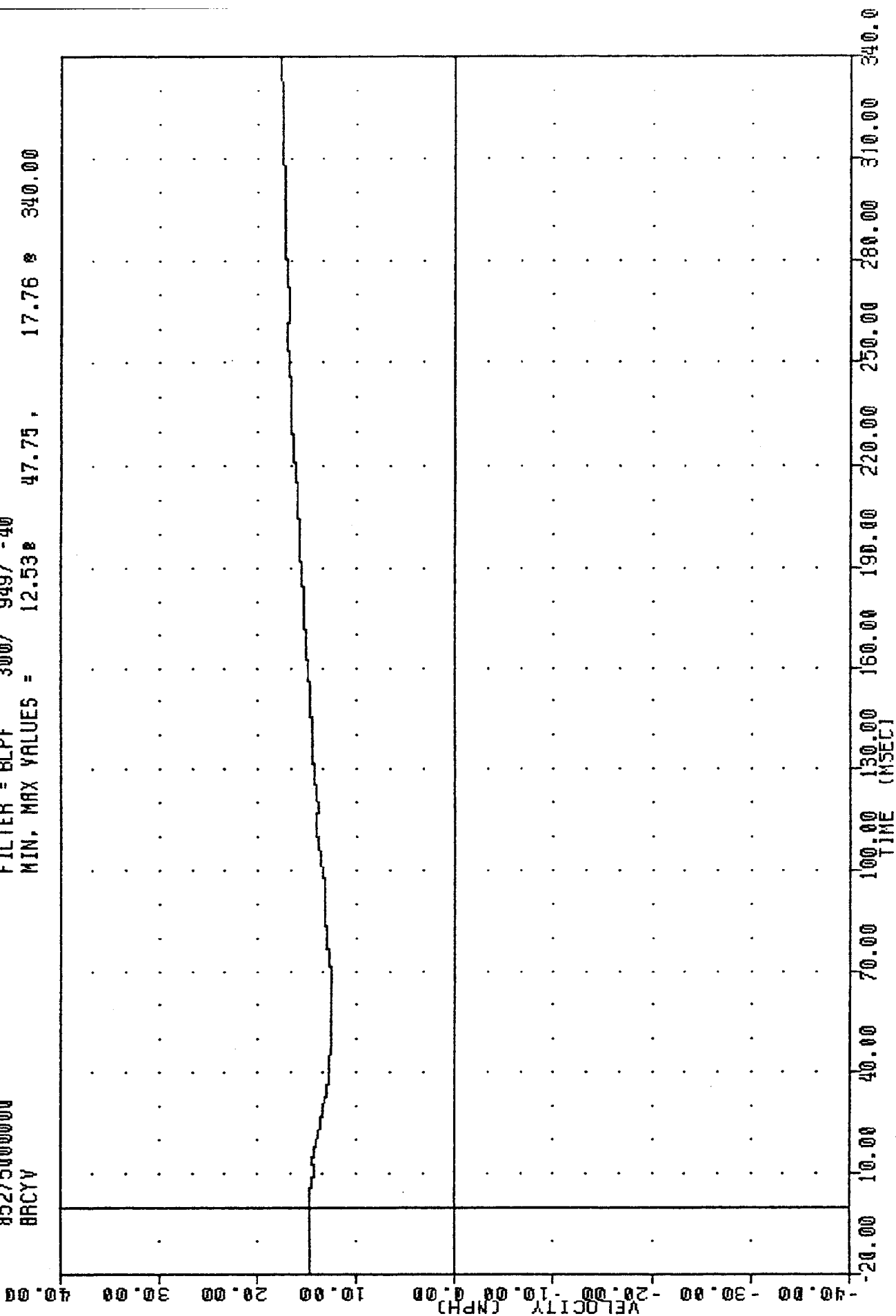


MVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 BARRIER REAR CROSSMEMBER VELOCITY X AXIS

TPC 851
 NVMA SIDE IMPACT TESTING
 85275000000
 BRCYV

T DATE 00:20:22

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = 12.53 47.75, 17.76 340.00



NVMA SIDE IMPACT TEST -- MODIFIED STRUCTURE/PADDED/FAR SEATING
 BARRIER REAR CROSSMEMBER VELOCITY Y AXIS

APPENDIX B
DUMMY CERTIFICATION

PRE-TEST

SIDE IMPACT DUMMY CALIBRATION

SIDE IMPACT DUMMY CALIBRATION
DUMMY SERIAL NUMBER 016
CALIBRATION 06

TEST/ DATE	CHANNEL	FILTER CLASS	PEAK ACCELERATION (g)	
			SPECIFICATION*	TEST RESULT
HEAD 9/20/85	HEAD Y-AXIS	1000	150-175	159.97
THORAX 9/23/85	UPPER SPINE Y-AXIS			
	PRIMARY	180	16-24.6	22.96
	REDUNDANT	180	16-24.6	22.69
	LOWER SPINE Y-AXIS			
	PRIMARY	180	17.6-26.4	21.16
	REDUNDANT	180	17.6-26.4	21.38
	RIGHT UPPER RIB Y-AXIS			
	PRIMARY	180	36-50	42.56
	REDUNDANT	180	36-50	43.20
	RIGHT LOWER RIB Y-AXIS			
	PRIMARY	180	36-50	42.03
	REDUNDANT	180	36-50	41.25
PELVIS 9/20/85	PELVIS Y-AXIS	180	50-65	42.14

*Side impact test specifications currently in use by VRTC-NHTSA.

Note: Spine ballast has been resecured.

Side Impact Dummy
Damage Checklist

Dummy S/N 016

<u>OK</u>	<u>Damaged</u>	
<u>X</u>	<u> </u>	Outer skin on entire dummy (gashes, rips, etc.)
<u>X</u>	<u> </u>	Head - Gashes, rips, general appearance, etc.
<u>X</u>	<u> </u>	Neck - broken or cracks in rubber
<u>X</u>	<u> </u>	Spine - broken or cracks in rubber
<u>X</u>	<u> </u>	Ribs - check all ribs for damage (bent or broken), damping material separation.
<u>X</u>	<u> </u>	Rib Attach Leather - breaks in leather at ribs
<u>X</u>	<u> </u>	Bourns Pot. - bent shaft - electrical discontinuity
<u>X</u>	<u> </u>	Accelerometer Leads - torn cables
<u>X</u>	<u> </u>	Accelerometer Mountings (Head, Thorax, Pelvis) - check for secure mounting
<u> </u>	<u> </u>	Retrofit Kit (Calspan) - check for bent brackets, sagging rib cage
<u> </u>	<u> </u>	Thorax support wire and springs - check for damage
<u> </u>	<u> </u>	Overall smooth stroking of thorax left to right (no interference)
<u> </u>	<u> </u>	Other

If upon visual examination, damage is apparent in any of these areas, a VRTC representative is to be consulted for a decision on repair or replacement of parts.

Repair or Replacement Approved By:

Signature

Date

Comments on repair or replacement of parts:

Bourns pot has broken internal wires. Replaced with pot S/N 3481-108.

TRC Personnel
Checked By:

Greg Wells
Signature

13 Sept. 85
Date

VRTC Personnel
Checked and Approved for Testing By:

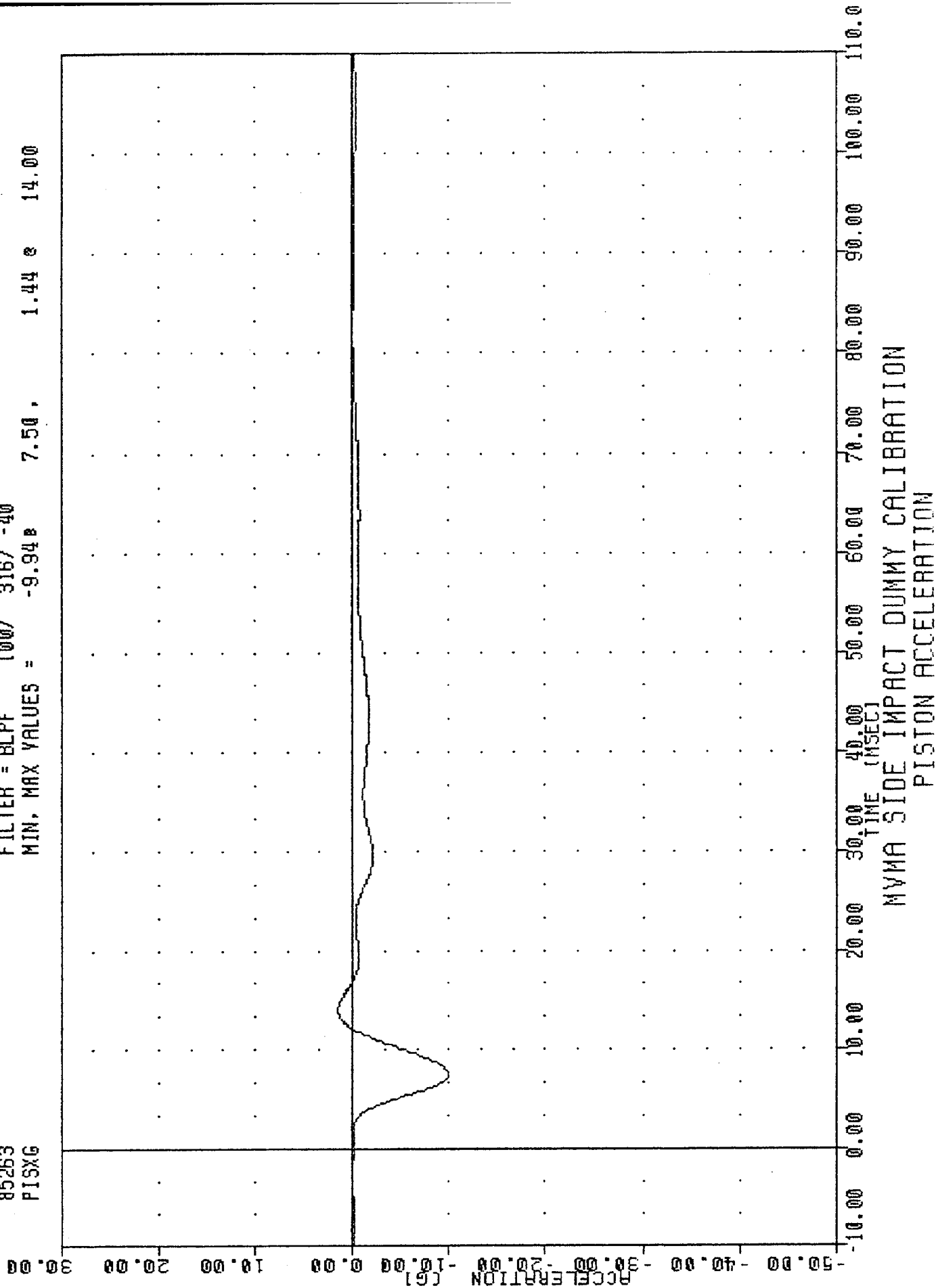
Signature

Date
B-4

NVMA
 SID 016 HEAD IMPACT CAL 06
 85263
 PISXG

PLOT DATE 20-SEP-85 16:20:25

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -9.94 7.50 1.44 14.00



SHOT 1606
20-SEP-85 16:20:25

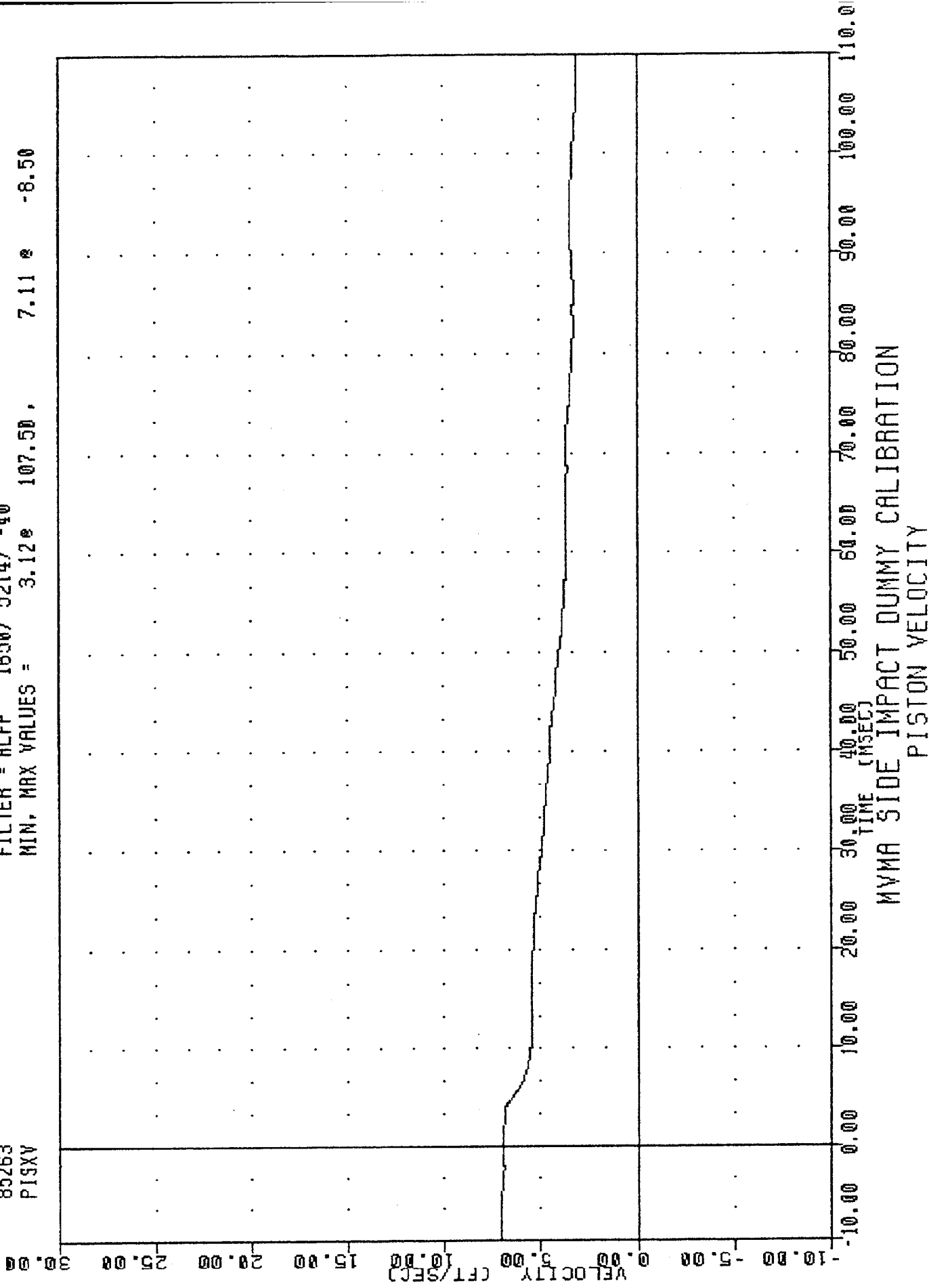
SID 016 HEAD IMPACT CAL 08

85263

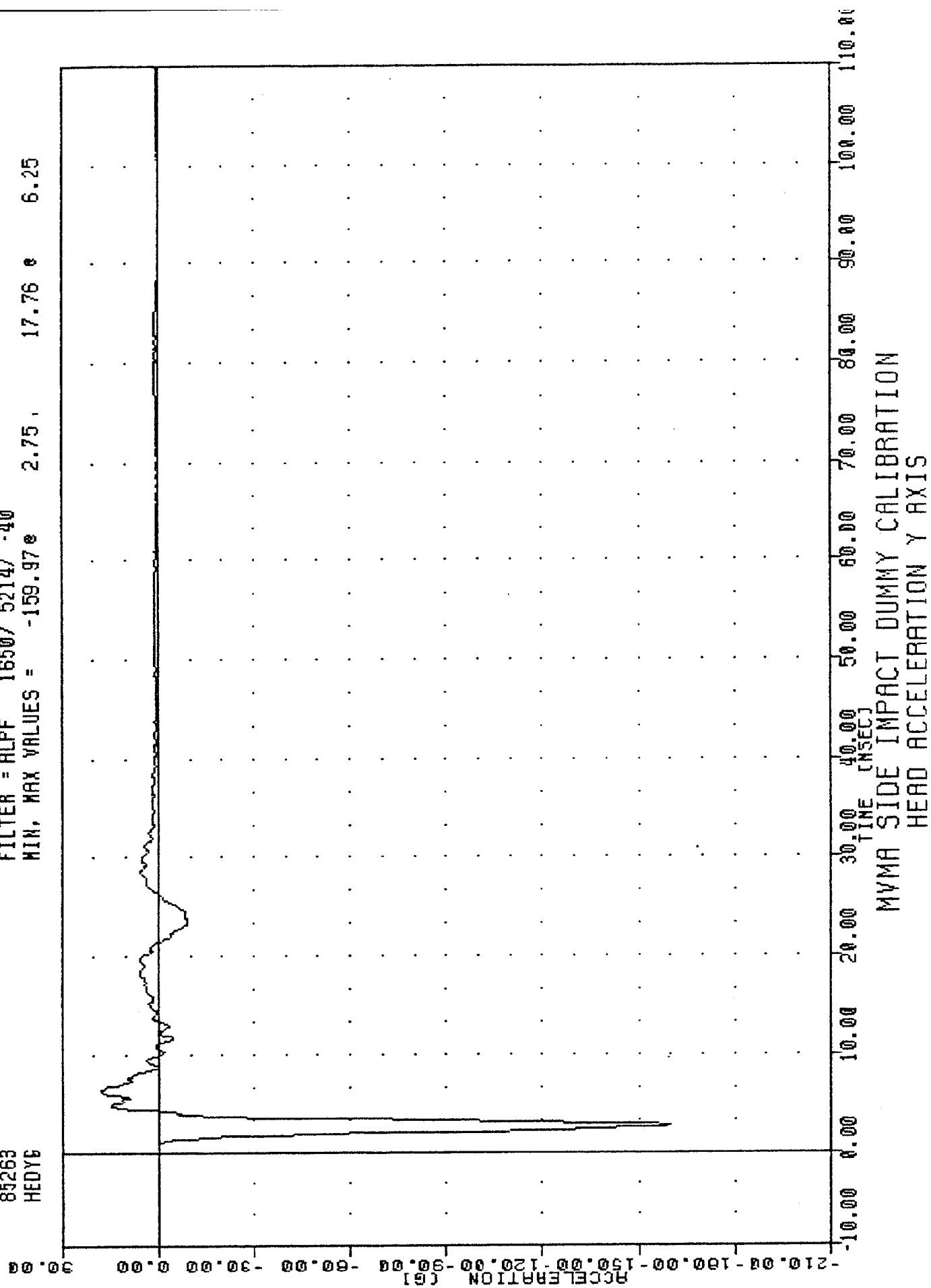
PISXV

FILTER = ALPF 1650/ 5214/ -40

MIN. MAX VALUES = 3.12e 107.50, 7.11e -8.50



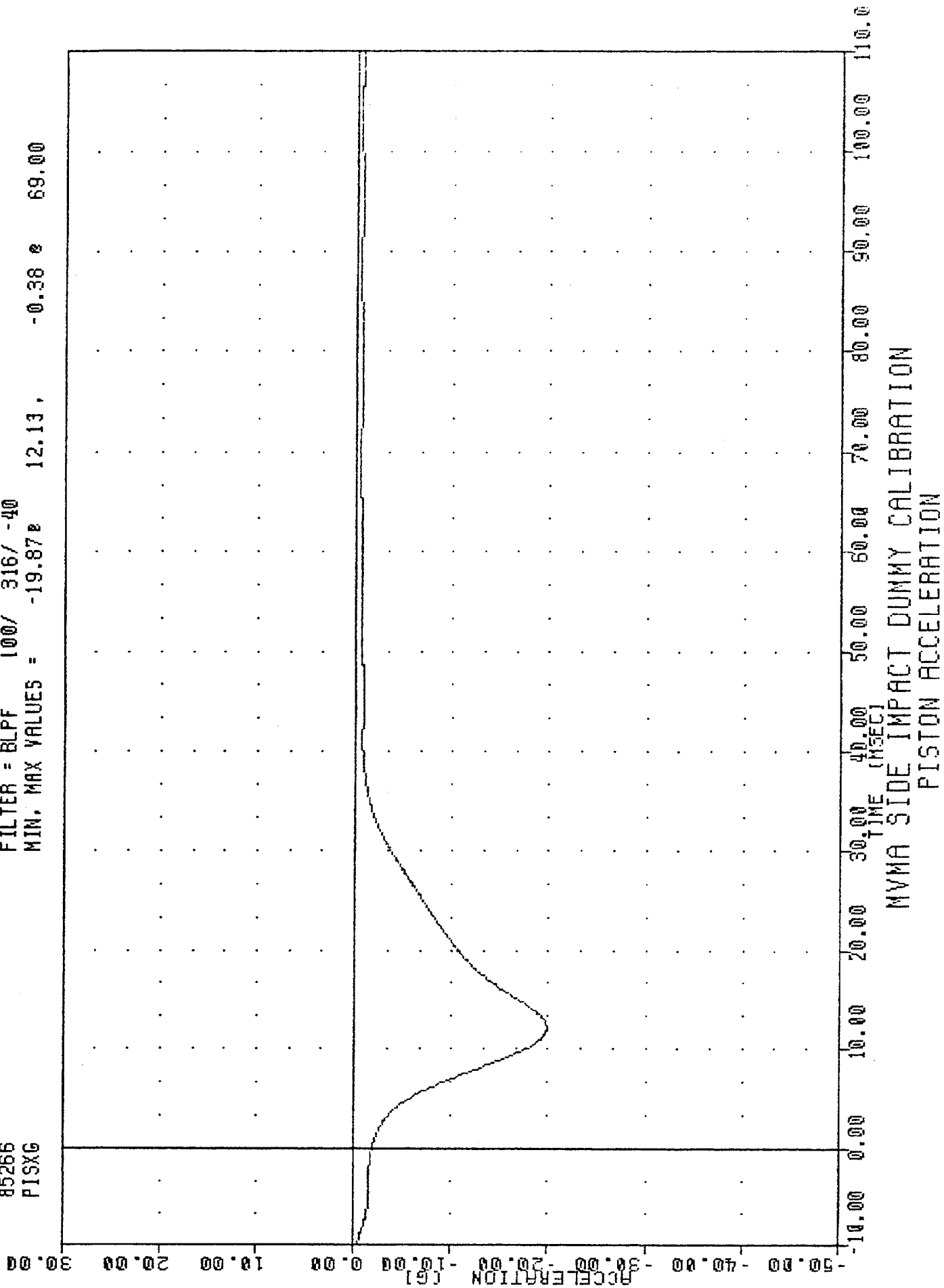
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -159.97°



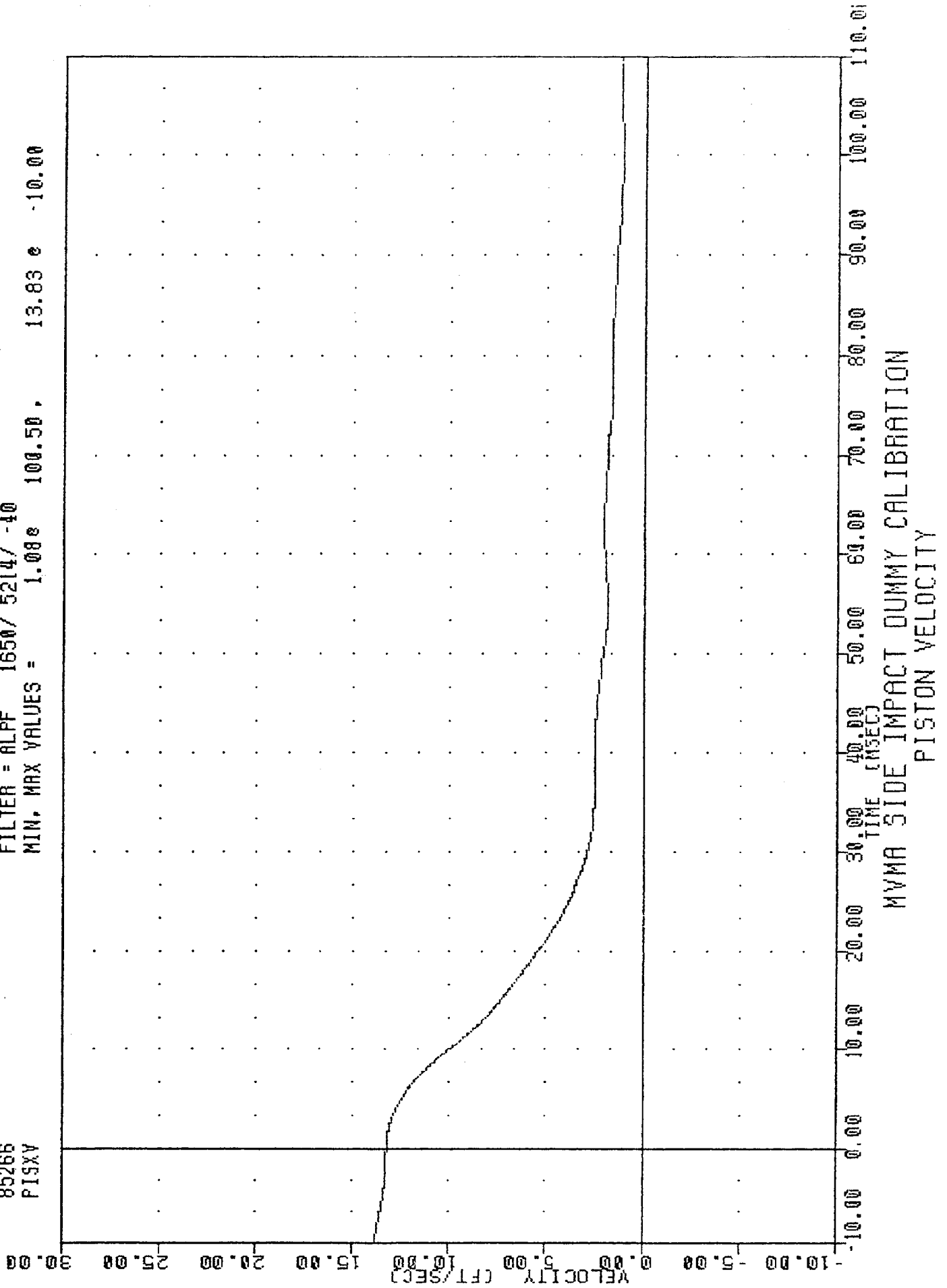
MVMA
 SID 016 THORAX IMPACT CAL 06
 85266
 PISXC

FILTER = BLPF 100/ 316/ -40
 MIN. MAX VALUES = -19.87 12.13, -0.38 69.00

PLOT DATE 23-SEP-85 09:30:36



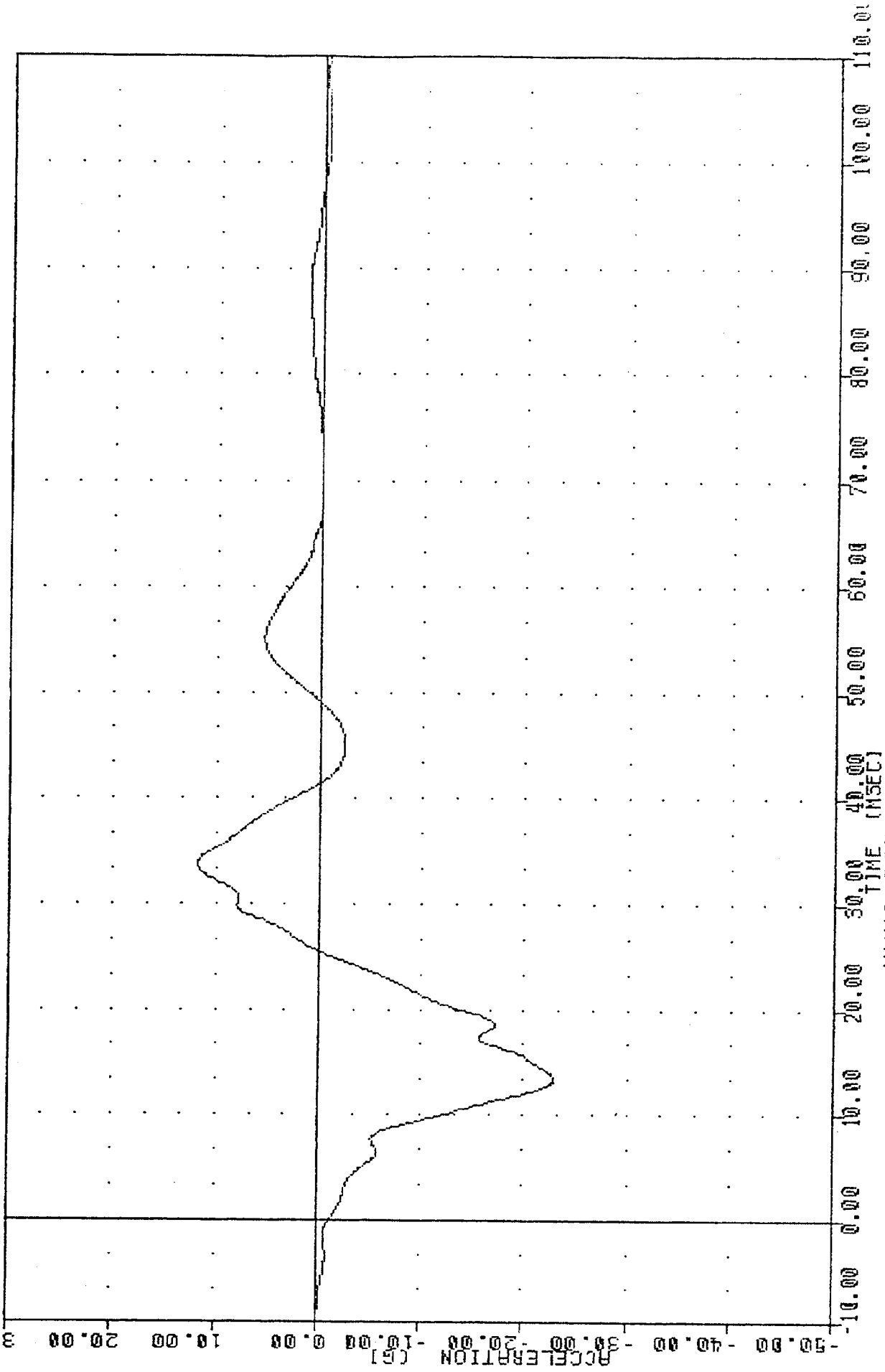
MVMA ST01506
 SID 016 THDRAX IMPACT CAL 06
 85266
 PISXY
 FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 1.08e 100.50 , 13.83 e -10.00
 PLUT DATE 23-SEP-85 09:30:36



MVMA 61000006
 SID 018 THORAX IMPACT CRL 08
 85266
 T01Y62

TEST DATE 23 SEP 66 03:36:30

FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -22.968 13.38, 11.85 e 33.75

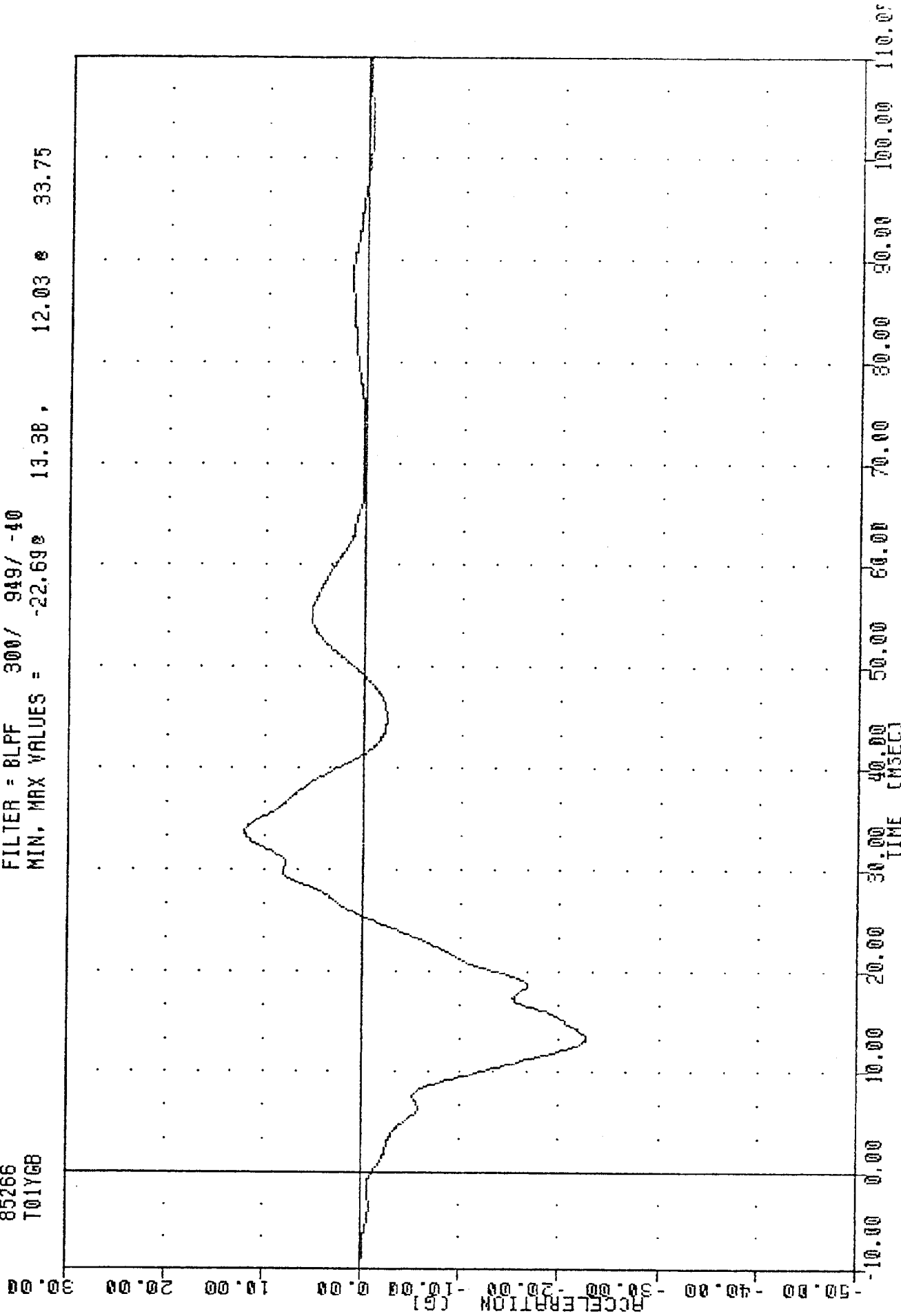


MVMA SIDE IMPACT DUMMY CALIBRATION
 UPPER SPINE ACCELERATION Y AXIS -PRIMARY

SID 016 THORAX IMPACT CAL 06
 85266
 T01YGB

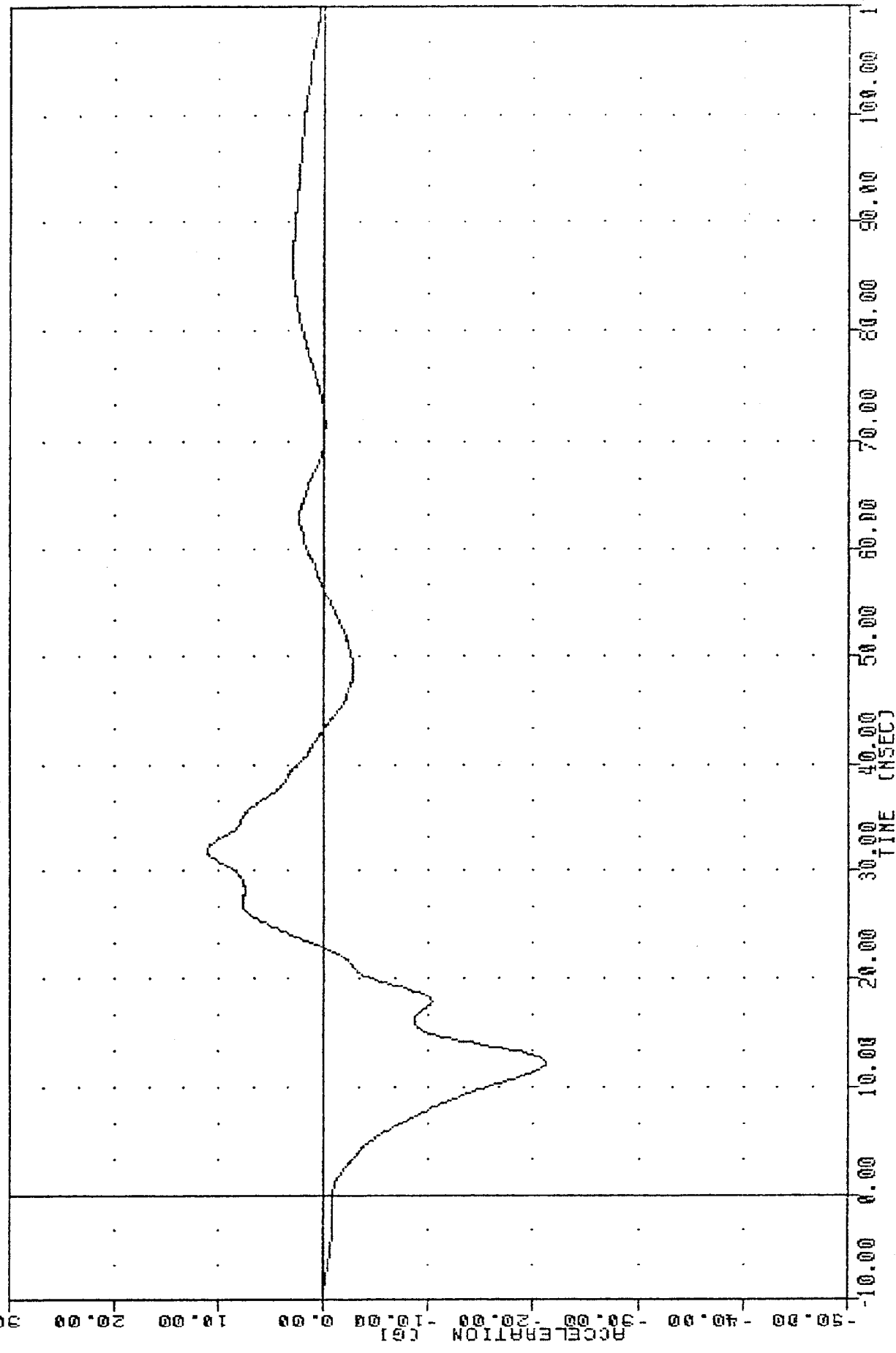
DATE 20 SEP 63 09:30:30

FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -22.698 13.38, 12.03 33.75



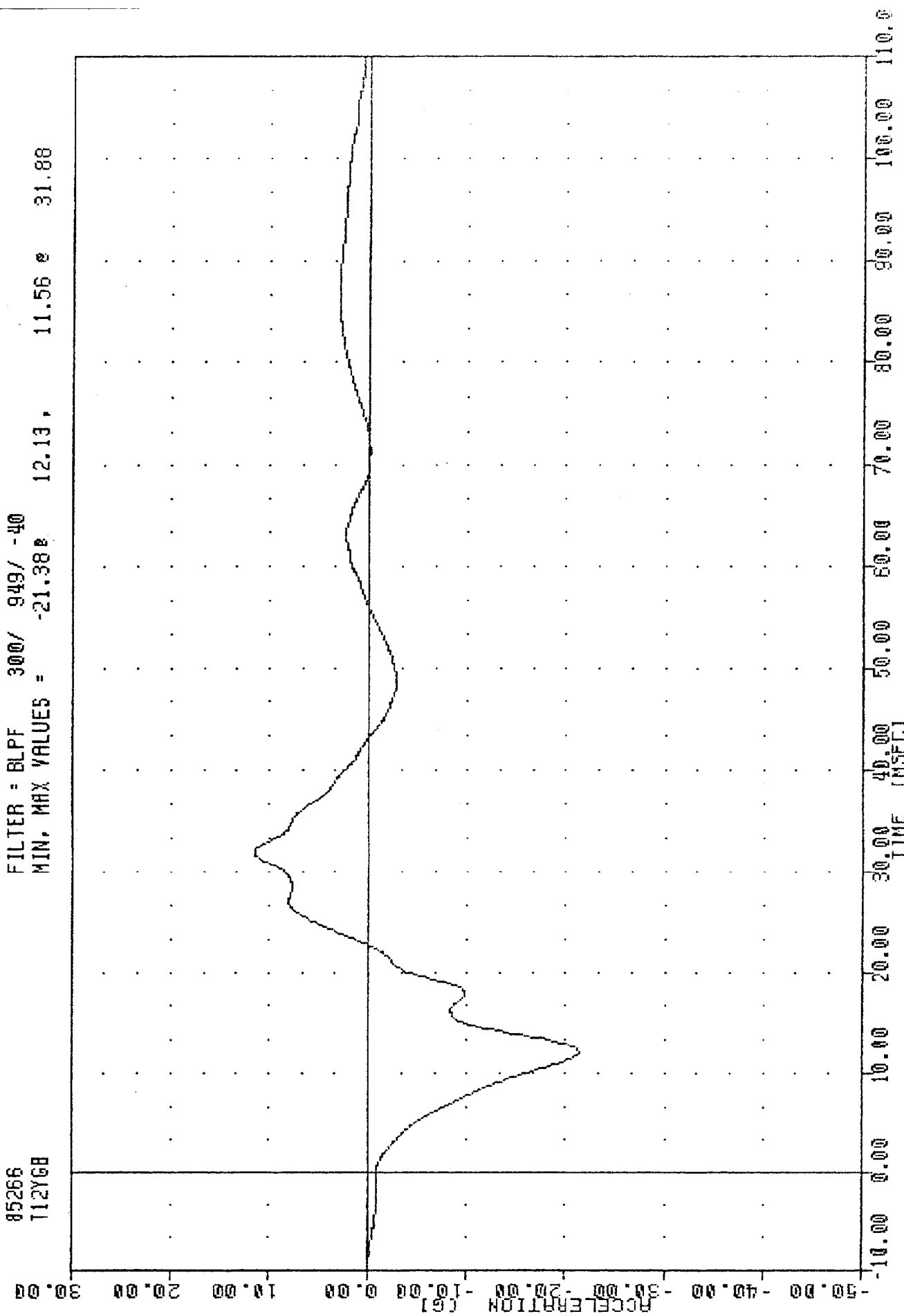
MVMA SIDE IMPACT DUMMY CALIBRATION
 UPPER SPINE ACCELERATION Y AXIS -REDUNDANT

SID 016 THORAX IMPACT CAL 06
 85266
 T12Y62
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -21.16 12.13, 11.11 32.00
 PLUT DATE 23-SEP-63 09:30:36



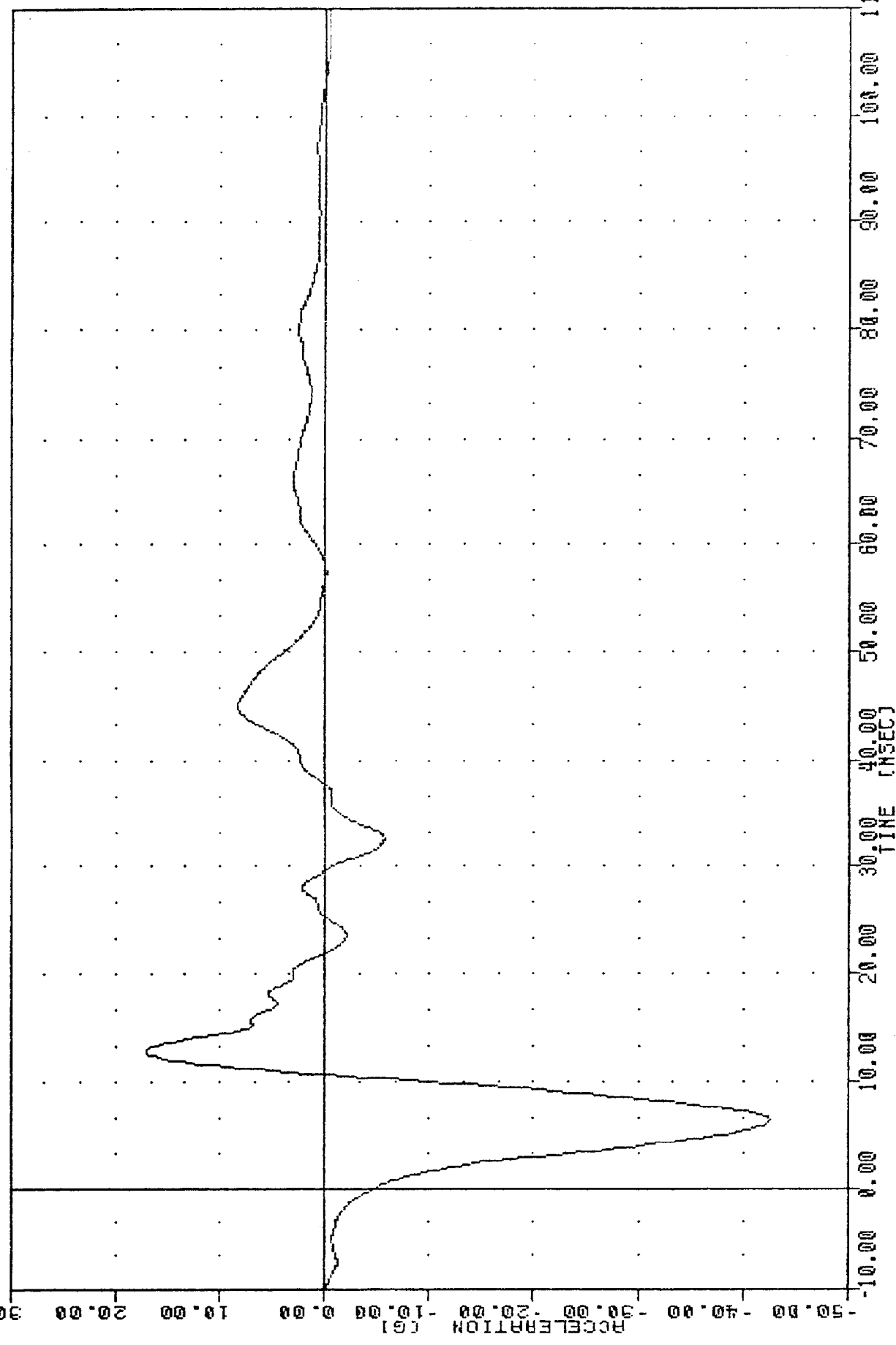
MVMA SIDE IMPACT DUMMY CALIBRATION
 LOWER SPINE ACCELERATION Y AXIS -PRIMARY

MYMA 85266
 SID 016 THORAX IMPACT CAL 06
 112YGB
 FILTER = BLPF 300/ 949/ -40
 MIN. MAX VALUES = -21.38 12.13, 11.56 31.88
 PLOT DATE 23-SEP-85 09:30:36



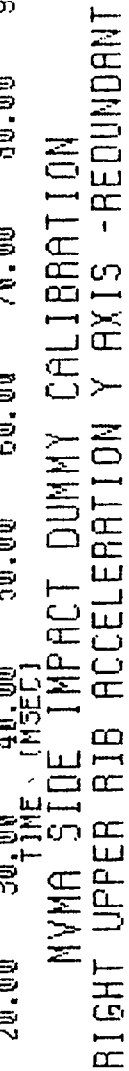
MYMA SIDE IMPACT DUMMY CALIBRATION
 LOWER SPINE ACCELERATION Y AXIS -REDUNDANT

SID 016 THORAX IMPACT CAL 06
 85266
 RURY62
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -42.56e 6.50, 17.01 e 12.88
 TEST DATE 22 SEP 83 13:30:00



MWMA SIDE IMPACT DUMMY CALIBRATION
 RIGHT UPPER RIB ACCELERATION Y AXIS -PRIMARY

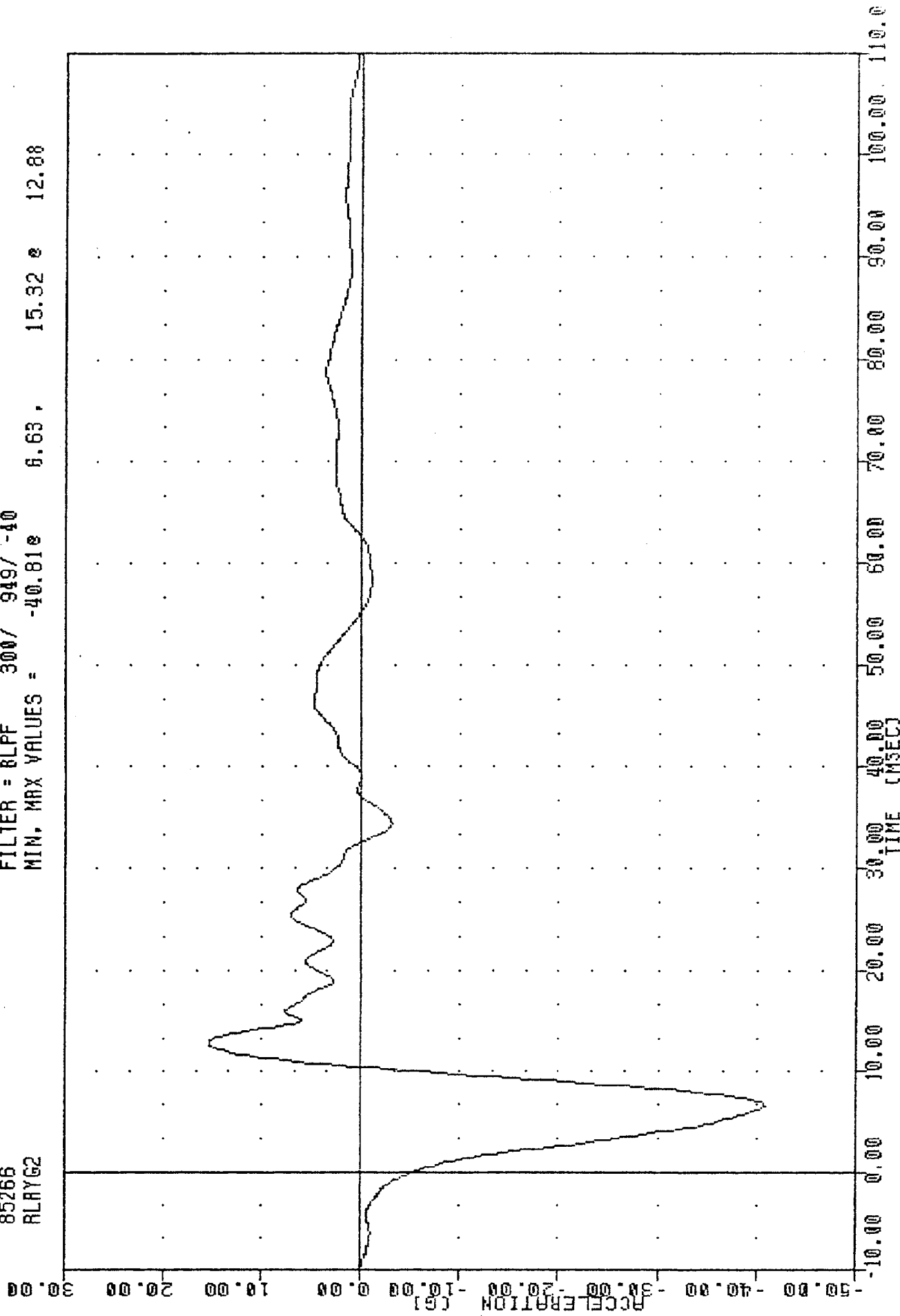
FILTER = BLPF 300/ 949/ -40
MIN, MAX VALUES = -43.20E 6.38 , 21.95 E 12.75



MVMA
 SID 016 THORAX IMPACT CAL 06
 85266
 RLYG2

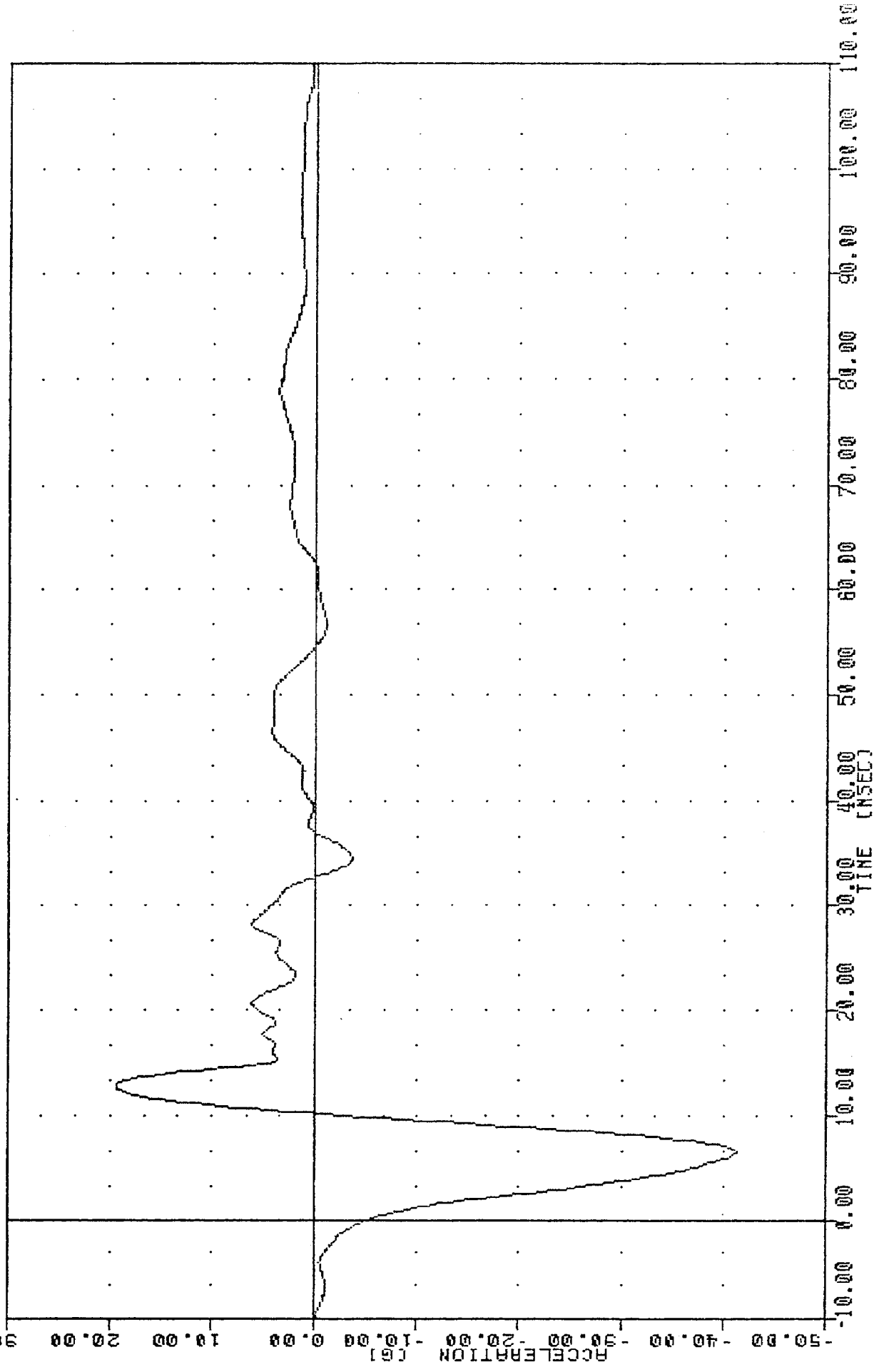
FLU1 DATE 23 SEP 89 09:30:36

FILTER = RLPF 300/ 949/ -40
 MIN. MAX VALUES = -40.818 6.63 15.32 12.88



MVMA SIDE IMPACT DUMMY CALIBRATION
 RIGHT LOWER RIB ACCELERATION Y AXIS -PRIMARY

REPORT DATE 23 SEP 83
 FILTER = BLPF 300/ 949/ -40
 MIN, MAX VALUES = -41.25 6.50 19.40 12.75
 SID 016 THORAX IMPACT CAL 06
 85266
 RLRY68

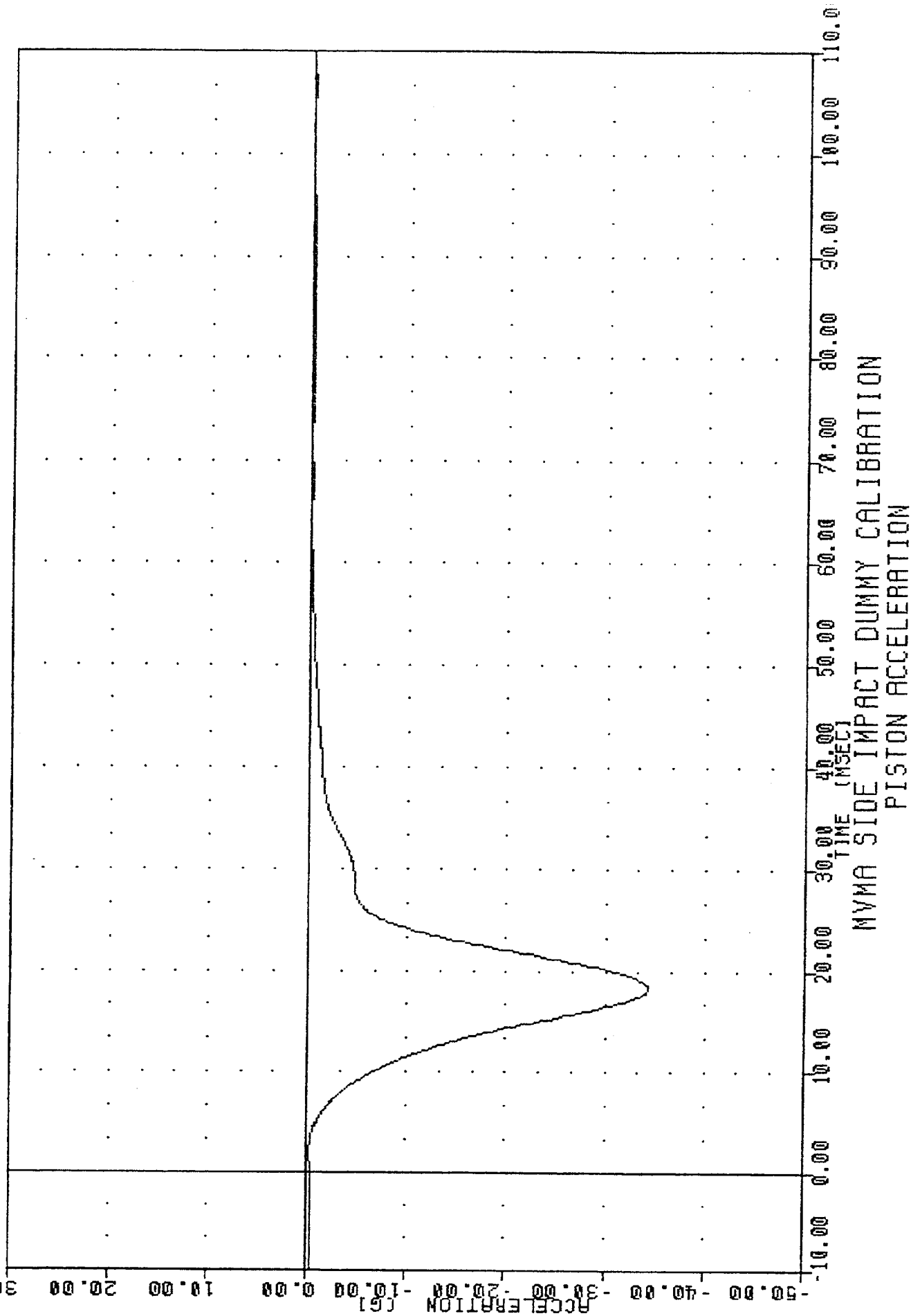


MVMA SIDE IMPACT DUMMY CALIBRATION
 RIGHT LOWER RIB ACCELERATION Y AXIS -REDUNDANT

SP01006
SID 016 PELVIC IMPACT CAL 06
85263
PISXG

PLUT DATE 20-SEP-85 16:22:23

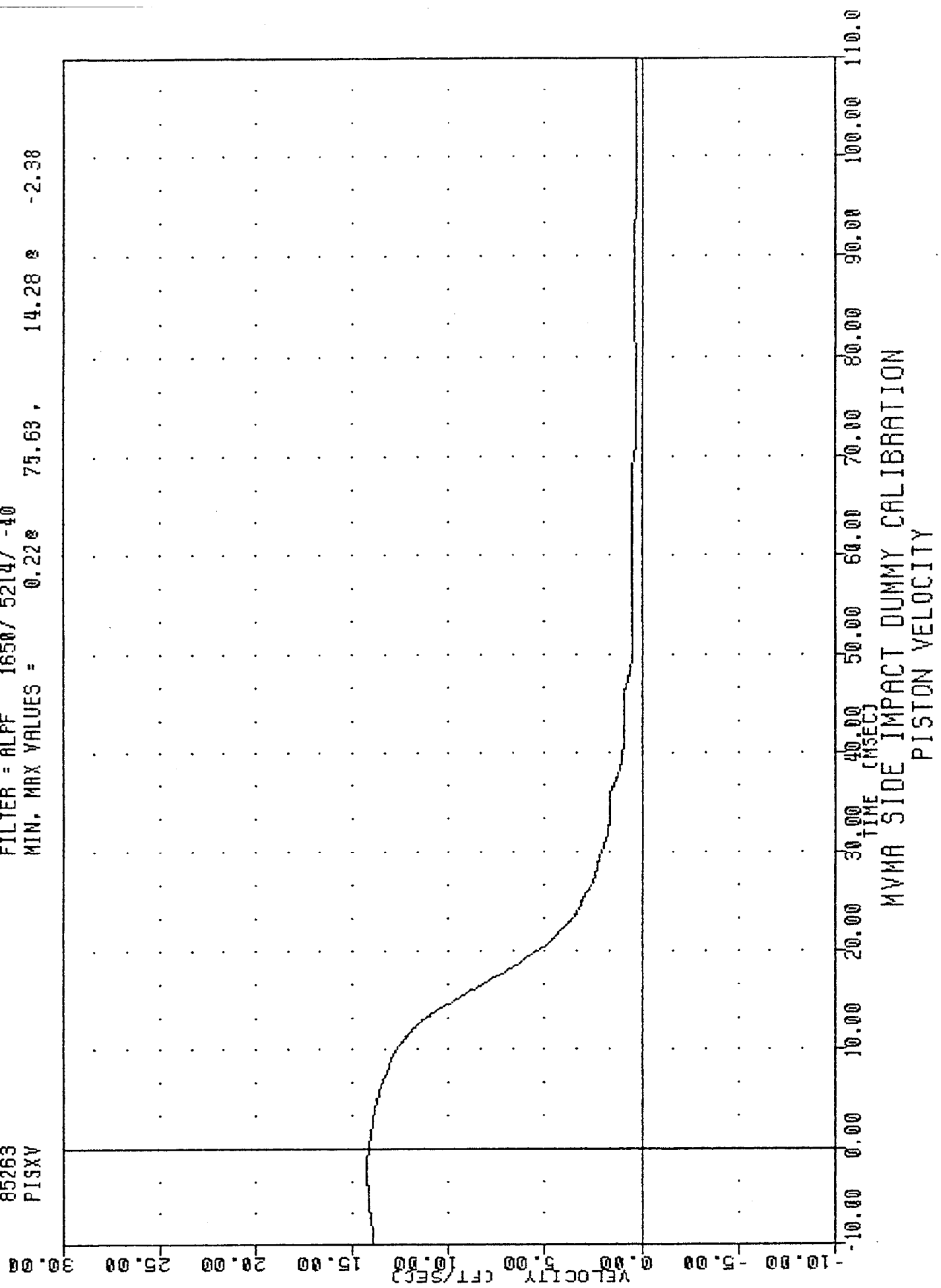
FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -34.36 18.38 -0.03 99.25



MVMA
 SID 016 PELVIC IMPACT CAL 06
 85263
 PISXV

FLU1 DATE 20-SEP-85 16:22:23

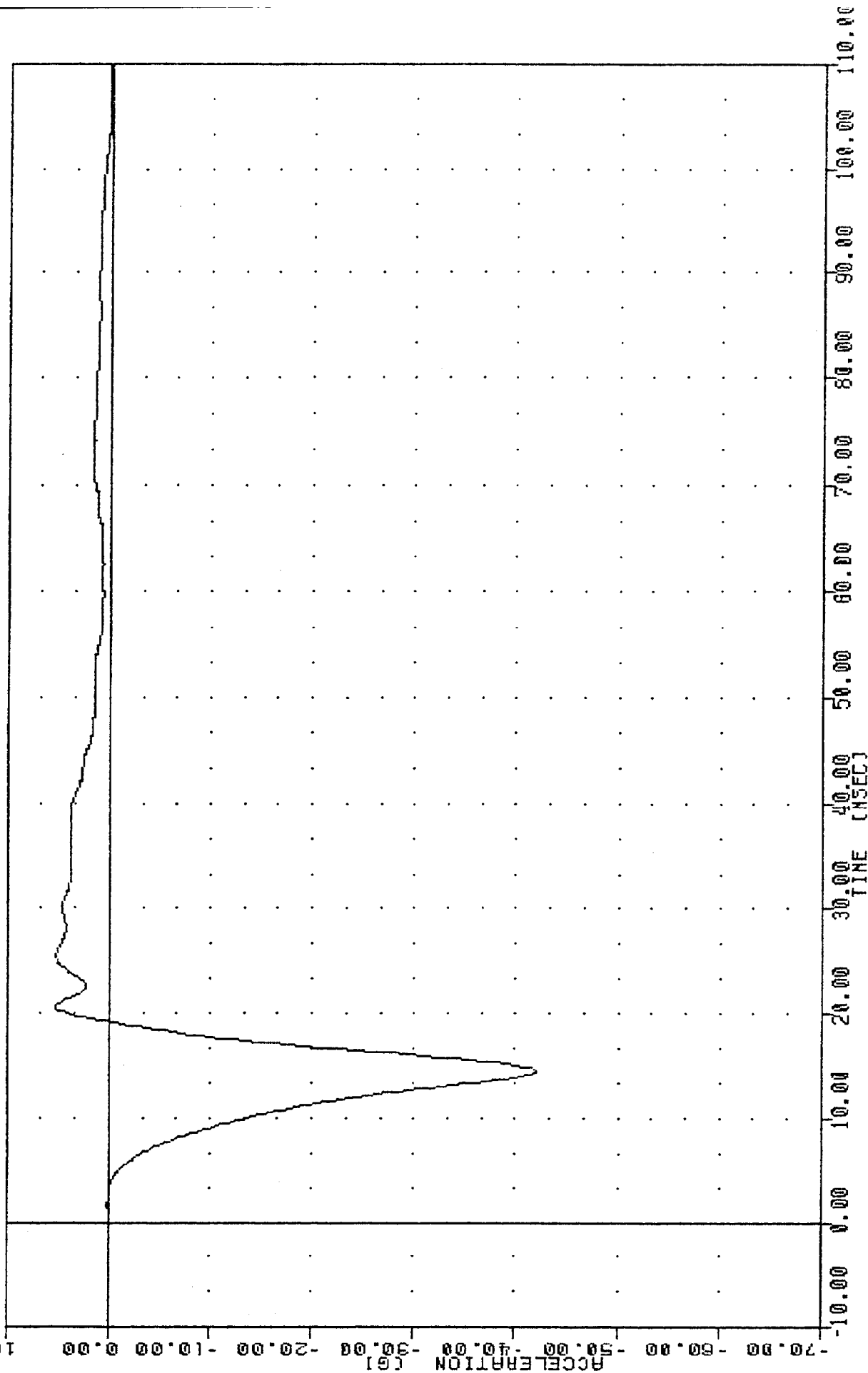
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 0.228 75.63 , 14.28 8 -2.38



85263
PEVY6
MVMA SIDE IMPACT CAL 06
PEVY6

PLT DATE 05:20

FILTER = BLPF 300/ 949/ -40
MIN. MAX VALUES = -42.138 14.50 5.35 20.63



MVMA SIDE IMPACT DUMMY CALIBRATION
PELVIS ACCELERATION Y AXIS