

REPORT NO. 6851-V-3

NEW CAR ASSESSMENT AND STANDARDS
ENFORCEMENT INDICANT TESTING
FMVSS NOS. 212, 219 and 301-75

AMERICAN MOTOR CORPORATION
1981 SPIRIT 2-DOOR LIFTBACK

NHTSA 703-2-523

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FINAL REPORT

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Prepared For

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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
Enforcement
Office of Vehicle Safety Compliance
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Washington, DC 20590

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Contract Technical Manager

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16. Abstract A frontal barrier impact of a 1981 AMC Spirit 2-door liftback was performed at Calspan Advanced Technology Center, Buffalo, New York, for the New Car Assessment and Standards Enforcement Indicant testing of FMVSS 212 - Windshield Mounting; FMVSS 219 - Windshield Zone Intrusion; and FMVSS 301-75 - Fuel System Integrity. Test date was August 13, 1981. Ambient temperature was 79°F. Impact speed was 35.04 mph. Maximum Vehicle Crush was 22.6 inches. Maximum Firewall Intrusion was 4.1 inches. The vehicle complied with: FMVSS 212 Windshield retention FMVSS 219 Windshield intrusion FMVSS 301-75 Fuel system integrity Both the driver and right front passenger complied with FMVSS 208, Injury criteria for head, chest, and femurs.					
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SECTION 1

PURPOSE AND TEST PROCEDURE

This barrier test of a 1981 AMC Spirit is part of the New Car Assessment Program B.O.A., Task 1, sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract DTNH22-81-C-87088. The purpose of this test was to obtain structural information and dummy Injury Criteria Values with belted dummies in both driver and passenger seating positions at a nominal impact velocity of 35 mph.

The Calspan Corporation, Advanced Technology Center, Transportation Research Department Test Procedure for the New Car Assessment crash test submitted to, and approved by, the Contract Technical Manager (CTM) contains the specific procedures used to perform this test.

SECTION 2

SUMMARY OF TEST NO. 703-2-523

A frontal barrier crash test was performed August 13, 1981, on a 1981 AMC Spirit 2-door liftback at an impact velocity of 35.04 mph. Pre- and post-test photographs of the vehicle and occupants can be found in Appendix A. Table 1 presents pertinent crash test information.

Two 50th percentile Part 572 anthropomorphic test devices (ATDs) were placed in the driver and right front passenger positions, and restrained with the production three-point belt system.

Both ATDs were fully instrumented with femur load cells and triaxial accelerometers in the head and chest areas. These ATDs had been certified prior to the test and certification details, along with instrumentation-calibration data, are found in Appendix C.

Injury criteria values are presented in Table 4-4. Appendix B contains dummy data traces along with vehicle acceleration data traces.

GENERAL COMMENTS

Vehicle

The 1981 American Motors Spirit underwent a maximum dynamic crush of approximately 25 inches with a peak deceleration of 35 g's and an average deceleration of 19.5 g's. The maximum residual (static) crush was 22.6 inches at the centerline and the maximum rebound velocity was 3.5 mph. The maximum firewall intrusion was 4.1 inches on the vehicle left side and the average firewall intrusion was 3.9 inches. The vehicle did not pitch.

The windshield was severely cracked after impact, but very little windshield retention loss occurred. There was no windshield zone intrusion.

No fuel leakage occurred during or after impact or during the rollover cycle.

Driver

The driver occupant kinematics are very good with the driver moving straight forward and the belt remaining in good position on the occupant shoulder. The driver head struck the upper wheel rim, but this did not appear to be a severe impact. The steering column moves rearward only slightly before impact. The driver occupant complied with all FMVSS 208 Injury Criteria with an HIC number of 702, a maximum chest resultant over a 3 msec. interval of 43 g's, and a right femur load of 1300. The driver left femur data was lost due to a cut signal wire, however, as evident by the chalk marks and interior dash panel damage, the left femur load was well within the limits of FMVSS 208 Injury Criteria. The driver side retractor spool-off as read from the high-speed film was 3 inches.

Passenger

The passenger occupant kinematics were also very good with the occupant moving straight forward and rolling slightly outboard on rebound. No contacts were evident in the film or the data, and no chalk marks from the head were observed on the vehicle interior. The passenger occupant complied with all FMVSS Injury Criteria with an HIC number of 652, a maximum chest resultant acceleration over a 3 msec. interval of 33 and femur loads of 560 and 280 lbs. The passenger side retractor spool-off as read from the high-speed film was 2 3/4 inches.

Summary

Although the AMC Spirit is more stiff than most vehicles, as evidenced by the small amount of vehicle crush and the rather high vehicle deceleration, the occupant injury results were very good. This is due to a well designed restraint system, a steering column that does not intrude into the compartment, the lack of any aggressive dash panel features, and the low degree of firewall intrusion.

Table 2-2

VEHICLE TEST WEIGHTS AS TESTED

Left Front	860	lbs	Left Rear	760	lbs
Right Front	810	lbs	Right Rear	760	lbs
TOTAL FRONT	<u>1670</u>	lbs	TOTAL REAR	<u>1520</u>	lbs

Total Weight = $\frac{1670 + 1520}{\quad} = 3190$ lbs

Wheel Base = $\frac{\quad}{\quad} = 96$ inches

$Cg_{F.W.} = \frac{1520 \text{ lbs} \times 96 \text{ inches}}{3190 \text{ lbs}} = 45.7$ inches

CALCULATION FOR TEST WEIGHT

- RCLW = Rated Cargo and Luggage Weight
- UDW = Unloaded Delivered Weight (2700 lbs)
- VCW = Vehicle Capacity Weight (925 lbs)
- DSC = Designated Seating Capacity (5)

RCLW = VCW - 150 (DSC)

RCLW = $\frac{925}{\quad} - 150 (5) = 175$ lbs

TEST WEIGHT = UDW + RCLW + (No. Dummies x 164 lbs)

TEST WEIGHT = $\frac{2700}{\quad} \text{ lbs} + \frac{175}{\quad} \text{ lbs} + 2 (164 \text{ lbs})$

TEST WEIGHT = $\frac{3203}{\quad} \text{ lbs}$

SUMMARY OF TEST CONDITIONSTEST VEHICLE INFORMATION

Vehicle Manufacturer American Motors Corporation
 Make/Model AMC Spirit
 Body Style 2-door liftback Model Year 1981
 VIN 1AMBM4308BK213327 Build Date 5/81
 NHTSA No. 703-2-523 Color white
 Engine Data: 4 cylinders 151 cu. in.
 Transmission Data: 4 speed (X) Manual () Automatic
 Date Rec'd 7/22/81 Air Cond. PW. STR. X PW. BR. NO
 Dealer's Name & Address Amherst Motor Sales, Buffalo, NY 14226

DATA FROM CERTIFICATION LABEL ON LEFT DOOR REAR FACE OR 'B' POST

Vehicle Manufactured by American Motors Corporation
 Date of Manufacture 5/81 VIN 1AMBM4308BK213327
 GVRW 3852 lbs GAWR: Front 1876 lbs Rear 2005 lbs

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

Vehicle Load (up to capacity) - Front 28 psi
 Rear 28 psi
 Recommended Tire Size P185/75 R 14 Load Range: X B C D
 Vehicle Capacity: Types of Seats Bench X Bucket Split Bench
 Number of Occupants (Designated Seating Capacity): 2 Front
 3 Rear
 5 TOTAL
 Cargo Load = 925 lbs
 TOTAL = 175 lbs

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

Right Front 730 lbs Right Rear = 620 lbs
 Left Front = 760 lbs Left Rear = 590 lbs
 TOTAL FRONT WEIGHT = 1490 lbs (55.2 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1210 lbs (44.8 % of Total Vehicle Weight)
 TOTAL DELV. WEIGHT = 2700 lbs

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND lbs CARGO

Right Front = 810 lbs Right Rear = 760 lbs
 Left Front = 860 lbs Left Rear = 760 lbs
 TOTAL FRONT WEIGHT = 1670 lbs (52.4 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1520 lbs (47.6 % of Total Vehicle Weight)
 TOTAL TEST WEIGHT = 3190 lbs
 Weight of ballast secured in vehicle trunk area = 0 lbs

Table 2-3
SUMMARY OF TEST CONDITIONS (Cont'd)

TEST CONDITIONS

Date of Test 8/13/81 Time of Test 1205 xam/pm
Ambient Temperature 81 °F at impact area
Temperature in Occupant Compartment 75 °F
Windshield Molding Temperature 87 °F

VEHICLE ATTITUDE (all dimensions in inches)

Delivered Attitude: RF 28 LF 28.5 RR 27.25 LR 28
Test Attitude: RF 27.1 LF 27.7 RR 25.5 LR 26.1

VEHICLE TIRE DATA

Recommended Cold Tire Pressure: Front = 28 psi Rear = 28 psi
Recommended Tire Size P185/75R14 Load Range B
Tires on Vehicle P185/75R14 Goodyear
Is Spare Tire a "Space Saver" X yes no
Is Spare Tire Standard Equipment X yes no

TEST FLUID DATA

Test Fluid Type: Red Stoddard Solvent #2 Spec. Grav.: 0.764
Kinematic Viscosity 0.96 Centistokes
EPA Capacity* 21 gal
Test Volume 19.53 gal (93% of EPA Capacity)
Fuel System Capacity (data from Owner's Manual) 21 gal
Details of fuel system The tank is located aft of the rear axle and held in place by two tank straps. The fuel tube is at rear center of vehicle and sealed by a twist type cap which is concealed by the hinged license plate door.

Electric Fuel Pump Yes X No Fuel Injection Yes X No
Does electric fuel pump operate with ignition switch "on" and the engine not operating Yes No

VEHICLE REBOUND AND CRUSH

Overall Length of Test Vehicle: Pre-Test = R166.0 /L 166.0 inches
Post-Test = R143.5 /L 143.7 inches
Crush = R 22.5 /L 22.3

FOR FRONTAL IMPACTS, distance from front of test vehicle to the barrier after impact = 20.5 inches

*With entire fuel system filled from fuel tank through carburetor bowl.

SECTION 3

SUMMARY OF FMVSS NOS. 212, 219 AND 301-75

- Post Impact Data
- Windshield Zone Intrusion FMVSS 219
- Protected Zone
- Summary of FMVSS 212 Data
- Fuel System Integrity FMVSS 301-75

Table 3-1
POST-IMPACT DATA - STANDARDS 219 AND 301

DATA SHEET

TYPE OF TEST X Frontal (90°) Impact
 Oblique (°) Impact on Left (Driver's) Side
 Right Side
 Lateral or Side Impact on Left (Driver's) Side
 Right Side
 Rear Impact

DATE OF TEST 8/13/81 TIME 1405 ~ TEMP 79 °F

VEHICLE NHTSA NO. 703-2-523 VIN 1AMBW4308BK213327

REQUIRED VEHICLE VELOCITY RANGE 34.5 to 35.5 mph

IMPACT VELOCITY (traps within 5 feet of impact event)

Trap No. 1 = 35.03 mph Trap No. 2 = 35.06 mph

Distance from the vehicle's front bumper to the barrier face entering
the vehicle velocity measurement device = 58

exiting the vehicle velocity measurement device = 18

VEHICLE STATIC CRUSH (for frontal and rear impacts only)

Driver's Side = 22.3 in Passenger's Side = 22.5 in

Average = 22.4 in

Crush Details:

Static crush at centerline of vehicle = 22.6

Maximum firewall intrusion = 4.1 inches left side

VEHICLE STATIC CRUSH (for side impacts only)

Amount of Crush = inches on side

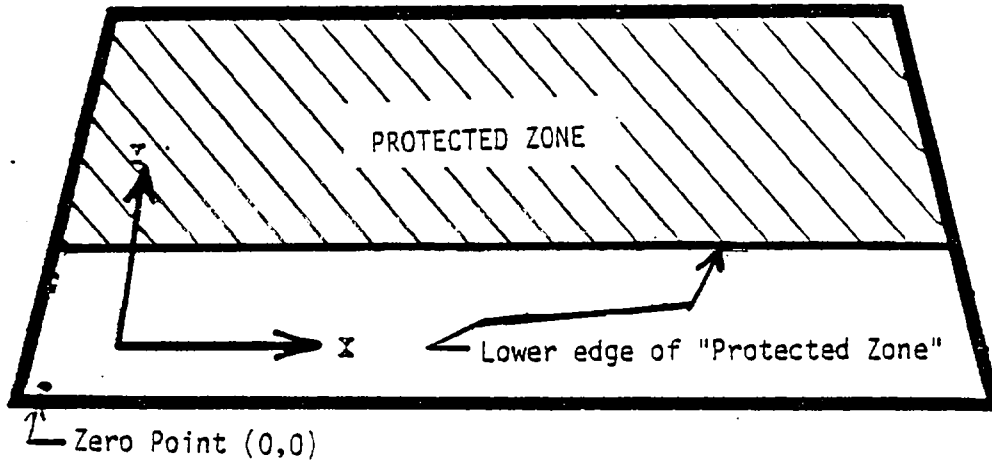
Crush Details:

VEHICLE REBOUND (from rigid barrier only)

Driver's Side = 22.5 in Passenger's Side = 18.5 in

Average = 20.5 in

REMARKS



FRONT VIEW

With the zero coordinate for the X-Y grid located at the lower right corner (passenger side) of the windshield, record the following positions:

- (1) The area that the "Protected Zone" template was penetrated more than .25 inches by a vehicle component other than one which is normally in contact with the windshield.

NONE

Coordinates	
X	Y

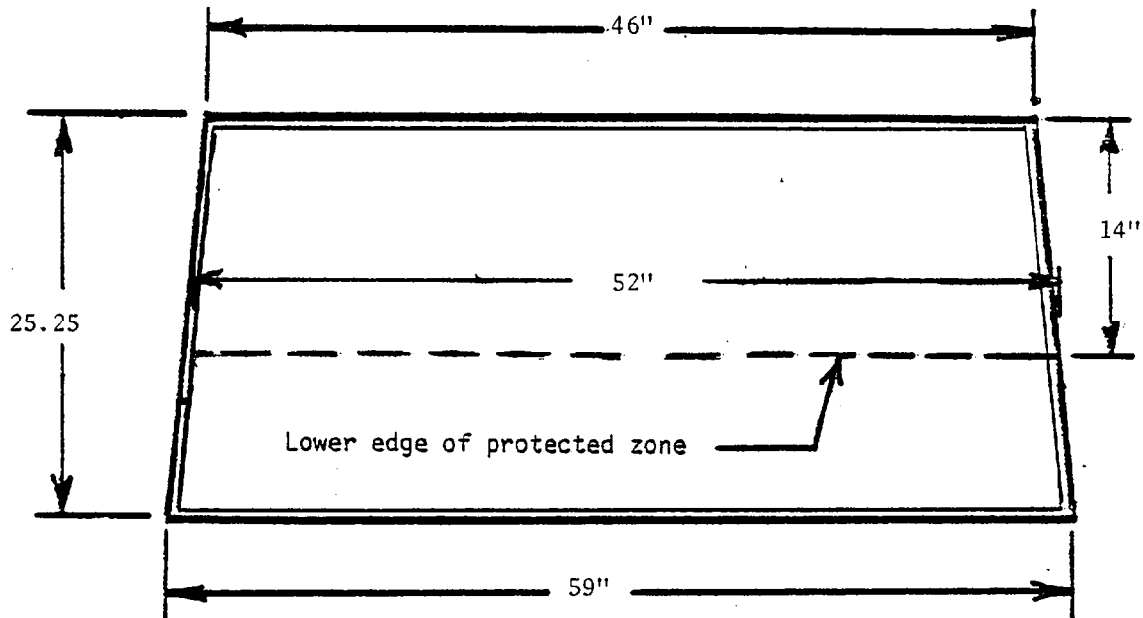
- (2) The area beneath the "Protected Zone" that the inner surface of the windshield was penetrated by a vehicle component.

NONE

Coordinates	
X	Y

- (3) Record any windshield retention clips or brackets used to insure that the windshield would not disengage from the body.

Figure 3-1 WINDSHIELD ZONE INTRUSION, FMVSS 219 - DATA SHEET



FRONT VIEW OF WINDSHIELD

Provide all dimensions necessary to reproduce the protected zone.

Method of adhering styrofoam to the windshield:

Silicone rubber sealant adhesive applied to windshield surface
and to backside of styrofoam which was then clamped in place
until dry.

Figure 3-2 PROTECTED ZONE

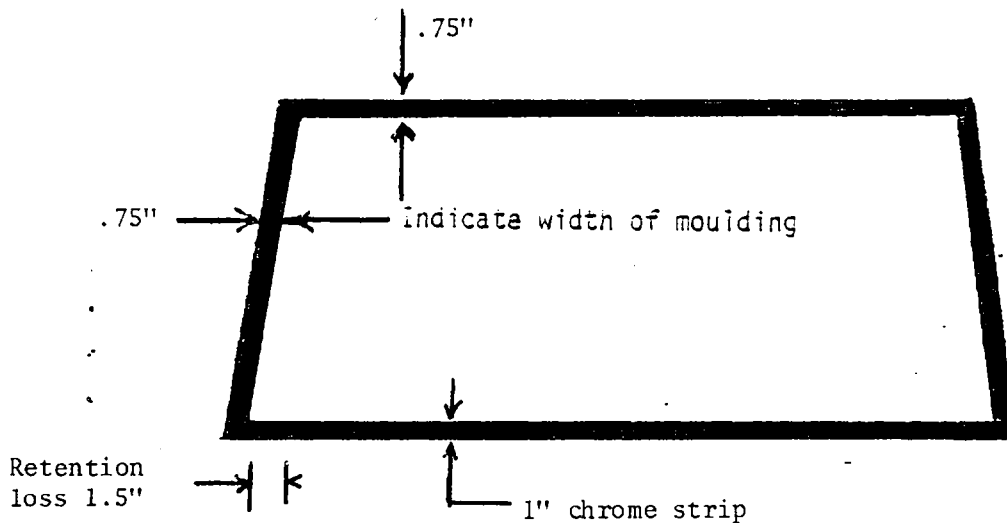
Details of windshield mounting (method of retention, type of trim, etc.):

Windshield is bonded in place and has a .75 inch chrome strip along the top and sides, and a 1 inch chrome strip on the bottom.

	Windshield Periphery		Retention %
	Pre-Test	Post-Test	
Right Side	77.75	77.75	100%
Left Side	77.75	76.25	98%
TOTAL	155.5	154.0	99%

The standard requires that Post-Test be a minimum of 75 percent of the Pre-Test total periphery measurement for vehicle not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles which are equipped with occupant passive restraints.

AREA OF RETENTION FAILURE

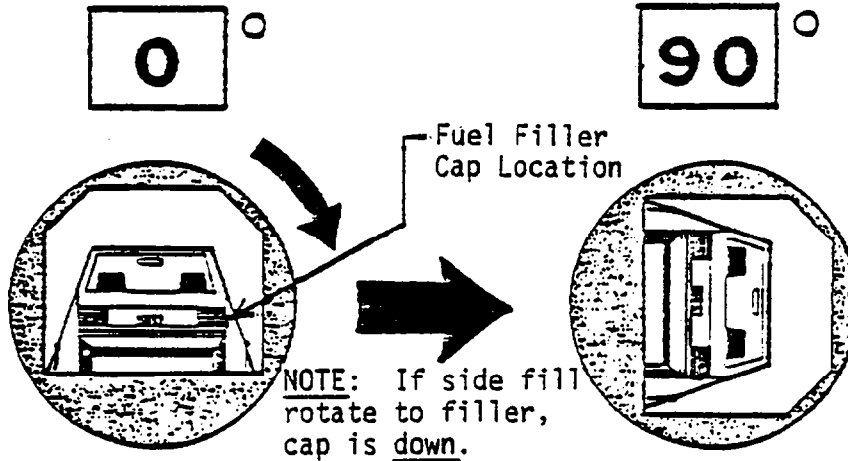


FRONT VIEW

Figure 3-3 SUMMARY OF FMVSS 212 DATA

Table 3-3A
FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time	=	<u>2</u> minutes	<u>57</u> seconds
(Spec. Range = 1 to 3 min.)			
FMVSS 301-75 Position Hold Time	=	<u>5</u> minutes	<u>00</u> seconds
TOTAL	=	<u>7</u> minutes	<u>57</u> seconds
Next Whole Minute Interval	=	<u>8</u> minutes	

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. <u>from</u> onset of rotation	6th min.	7th min.	8th min. if reqd.
--	----------	----------	-------------------

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0	0	0	0
---	---	---	---

NOTE: Record spillage for whole minute intervals only as determined above.

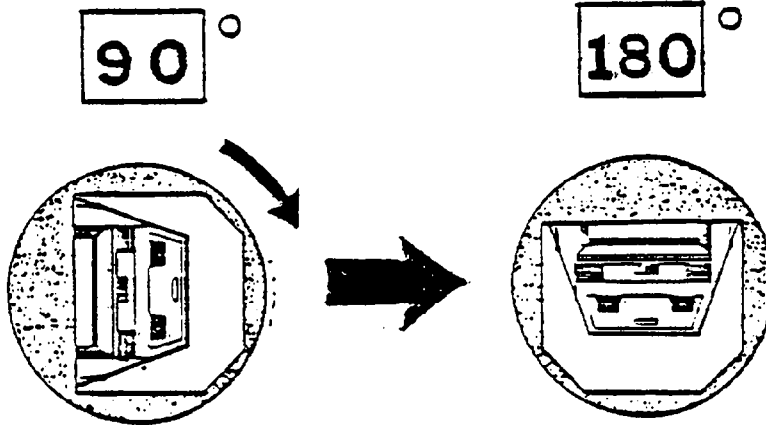
SOLVENT SPILLAGE LOCATION(S)

None

VEHICLE NHTSA ID NO. 703-2-523

Table 3-3B
FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 55 seconds
(Spec. Range = 1 to 3 min.)
FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
TOTAL = 7 minutes 55 seconds
Next Whole Minute Interval = 8 minutes

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. <u>from</u> onset of rotation	6th min.	7th min.	8th min. if reqd.
--	----------	----------	-------------------

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0	0	0	0
---	---	---	---

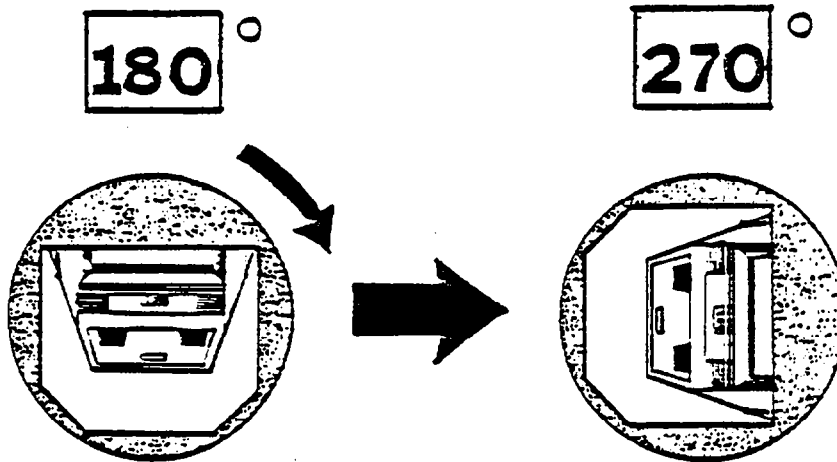
NOTE: Record spillage for whole minute intervals only as determined above.

SOLVENT SPILLAGE LOCATION(S)

None

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 56 seconds
 (Spec. Range = 1 to 3 min.)
 FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
 TOTAL = 7 minutes 56 seconds
 Next Whole Minute Interval = 8 minutes

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. <u>from</u> onset of rotation	6th min.	7th min.	8th min. if reqd.
--	----------	----------	-------------------

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0	0	0	0
---	---	---	---

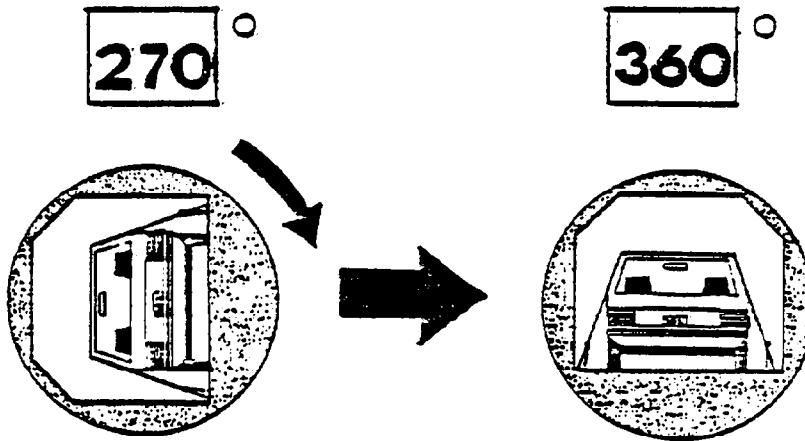
NOTE: Record spillage for whole minute intervals only as determined above.

SOLVENT SPILLAGE LOCATION(S)

None

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 56 seconds
 (Spec. Range = 1 to 3 min.)
 FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
 TOTAL = 7 minutes 56 seconds
 Next Whole Minute Interval = 8 minutes

FMVSS 301-75 REQUIREMENTS

Time Period

First 5 min. <u>from</u> onset of rotation	6th min.	7th min.	8th min. if reqd.
--	----------	----------	-------------------

Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce
----------	---------	---------	---------

ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0	0	0	0
---	---	---	---

NOTE: Record spillage for whole minute intervals only as determined above.

SOLVENT SPILLAGE LOCATION(S)

None

SECTION 4

OCCUPANT AND VEHICLE INFORMATION

- Vehicle Measurements
- Vehicle Accelerometer Locations
- Camera Positions and Locations
- Owners Manual Restraint System Instructions
- Dummy In-Vehicle Position
- Dummy Injury Criteria Values

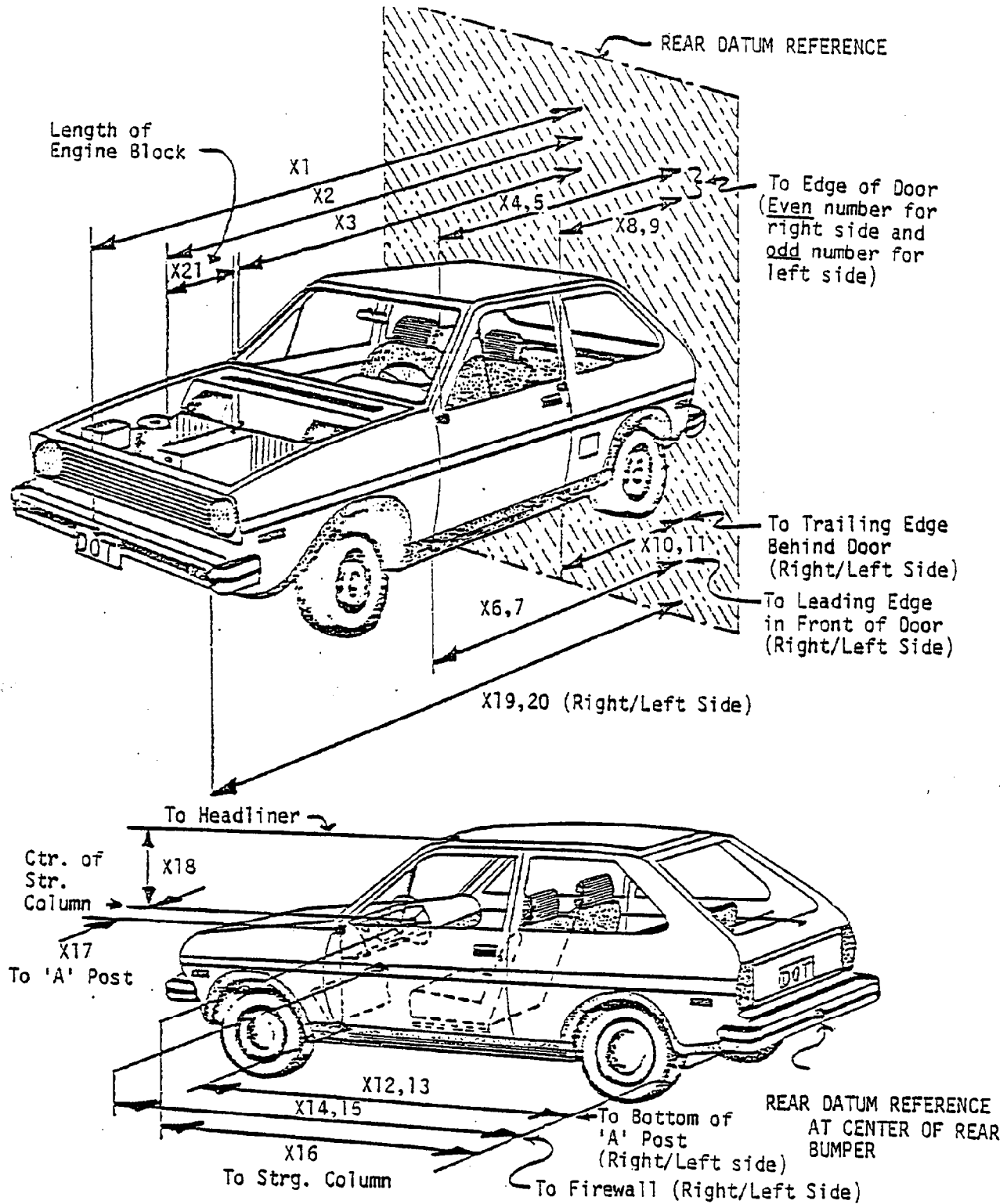


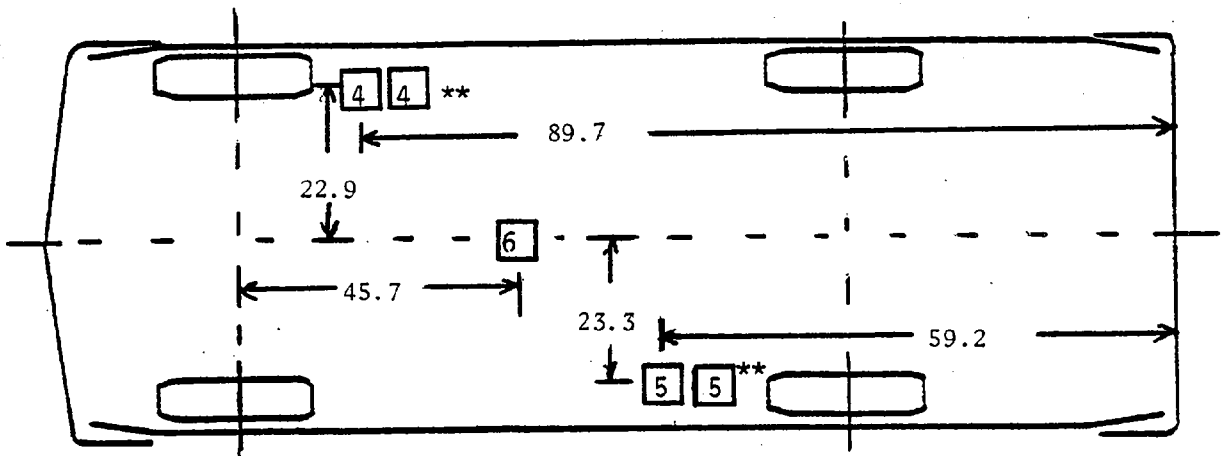
Figure 4-1 PRE-TEST AND POST-TEST MEASUREMENT POINTS

Table 4-1

VEHICLE MEASUREMENTS

1981 AMC SPIRIT

		All Dimensions in Inches		
No.		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	167.6	145.0	22.6
X2	Rear Surface of Vehicle to Front of Engine	141.2	136.3	4.9
X3	Rear Surface of Vehicle to Firewall	118.3	114.7	3.6
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	111.2	110.8	.4
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	111.1	110.5	.6
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	110.5	110.0	.5
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	110.4	109.8	.6
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	60.4	60.2	.2
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	60.3	60.0	.3
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	60.5	60.1	.4
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	60.5	60.0	.5
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	107.9	107.5	.4
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	107.9	107.4	.5
X14	Rear Surface of Vehicle to Firewall, Right Side	118.3	114.4	3.9
X15	Rear Surface of Vehicle to Firewall, Left Side	118.3	114.2	4.1
X16	Rear Surface of Vehicle to Steering Column	91.0	89.4	1.6
X17	Center of Steering Column to "A" Post	15.0	14.2	.8
X18	Center of Steering Column to Headliner	16.4	18.1	-1.7
X19	Rear Surface of Vehicle to Right Side of Front Bumper	166.0	143.5	22.5
X20	Rear Surface of Vehicle to Left Side of Front Bumper	166.0	143.7	22.3
X21	Length of Engine Block	22.0	22.0	0.0



1981 AMC Spirit 2-Door Liftback

ACCELEROMETER NUMBER *		ACCELEROMETER LOCATION	DIRECTION		
			X	Y	Z
4		Front Seat Crossmember	X		X
4	**	Redundant Front Seat Crossmember	X		
5		Rear Seat Crossmember	X		X
5	**	Redundant Rear Seat Crossmember	X		
6		Center of Gravity	X	X	X

* The accelerometer pack number can be correlated with the vehicle response data traces found in Appendix B.

** Redundant Accelerometers #4 (XR) and #5 (XR).

FIGURE 4-2 VEHICLE ACCELEROMETER LOCATIONS

NOTE: Camera Information Shown on Tables 4-2 and 4-3

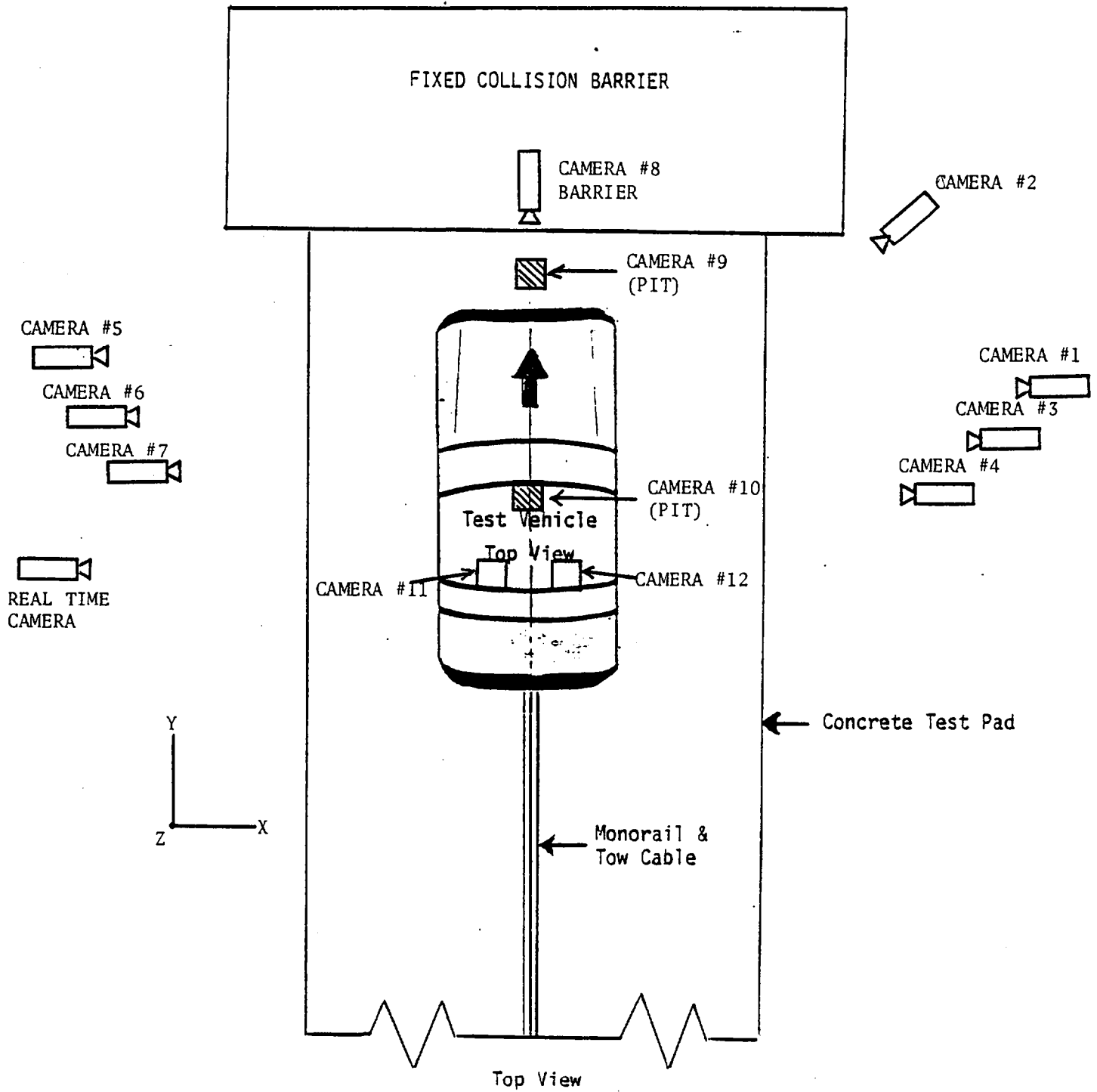


Figure 4-3 CAMERA POSITION FOR FRONTAL IMPACTS

Table 4-2

HIGH SPEED CAMERA LOCATIONSTest No.: 703-2-523Vehicle No. 1981 AMC Spirit

CAMERA NUMBER	VIEW	CAMERA POSITIONS (IN)*			CAMERA ANGLE (DEG)**	FILM PLANE TO HEAD TARGET (IN) X
		X	Y	Z		
1	Impact event	344	60	47		---
2	Right side of windshield	118	5	50	0	---
3	Right front passenger	331	89	44	-1	312
4	Redundant for Camera #3	250	111	42	-2	231
5	Impact event (left side)	289	56	41	-3.5	---
6	Driver	270	82	47	-4	251
7	Redundant for Camera #6	204	118	42	-2	185
8	Vehicle front (barrier)	0	0	120	-64	---
9	Front underbody (pit)	0	32	120	+90	---
10	Rear underbody (pit)	0	116	120	+90	---
11	Left belt retractor	---	---	---	---	---
12	Right belt retractor	---	---	---	---	---

* X = film plane to monorail centerline
 Y = film plane to impact location
 Z = film plane to ground

** Referenced to Horizontal Plane

Table 4-3

HIGH SPEED CAMERA INFORMATION(Test 703-2-523)

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)
1	Impact event	Photosonic	13 mm	900
2	Windshield (right side)	Photosonic	13 mm	900
3	Right front passenger	Photosonic	35 mm	900
4	Redundant for Camera #3	Photosonic	25 mm	900
5	Impact event	Photosonic	13 mm	1000
6	Driver	Photosonic	35 mm	900
7	Redundant for Camera #6	Photosonic	25 mm	900
8	Vehicle front (barrier)	Photosonic	8 mm	900
9	Front underbody	Photosonic	13 mm	900
10	Rear underbody	Photosonic	13 mm	1000
11	Left belt retractor	Stalex	8 mm	800
12	Right belt retractor	Stalex	8 mm	900

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 of film.

Seat Belts

The National Highway Traffic Safety Administration has determined that wearing seat belts greatly improves the chances of avoiding or reducing injury of vehicle occupants in accidents and abrupt stops and has mandated that your vehicle be equipped with seat belts. Please wear them, properly adjusted, and see that your passengers follow your example.

AMC cars are equipped with a lap/shoulder belt system for the front seat outboard position and a lap belt for the center front seat position.

The system used employs a one-piece combination lap/shoulder belt with a connector that slides up and down the belt for proper fit. **This continuous loop system has a single retractor reel which locks upon deceleration of the car.** Follow the directions under "To Buckle-Up" for proper belt adjustment.

The rear seat center position on Concord Sedan and Wagon models are equipped with a manual adjusting lap belt. The rear seat outboard positions are equipped with automatic-locking lap belt retractors.

Seat Belt Warning System

A red, fasten seat belt indicator light and a buzzer alert the driver to buckle the seat belt. The **light** operates when the ignition switch is first turned to the On position, whether or not the belts are buckled. It stops automatically after several seconds. The **buzzer** will sound only if the driver fails to buckle up before turning the ignition switch to the On position. In any case, it will stop automatically after several seconds. The indicator light and buzzer work independently of each other.

To "Buckle-Up"

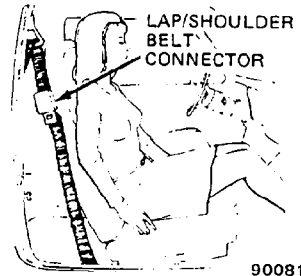
- Sit up straight and well back in the seat. If your car has bench-type seats, adjust front seat to satisfaction of driver.

WARNING: Do not adjust seat while driver or front seat passengers are wearing seat belts. For proper belt fit, fasten seat belts after adjusting front seat.

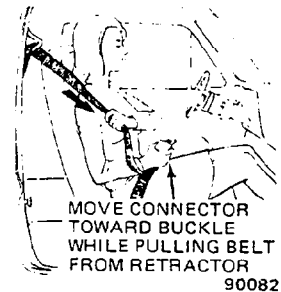
- Be sure connector for outboard seat belts is not inserted into buckle for center passenger restraint.
- For center seat positions, insert the metal connector into the buckle latch until a "click" is heard. **Position the belt low across hips and pull free end of webbing at the latch side of belt to provide a snug fit.**

Front Seat—Spirit and Concord Models

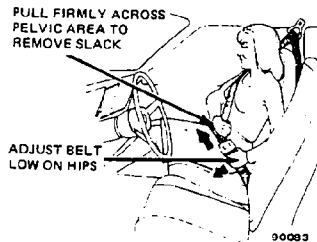
- Grasp the connector and slide it as far up or down as necessary for the belt to go around your lap. Move the connector toward the buckle, pulling the belt from the retractor as you go. The retractor will not lockup if you stop or hesitate when pulling the belt. Insert the connector into the buckle until you hear a "click" and feel it latch. Position the lap portion of the belt across the hips **as low as possible.** Grasp the shoulder portion of the belt near the connector and pull firmly across the pelvic area. **This will ensure a snug fit on the lap portion of the belt.**



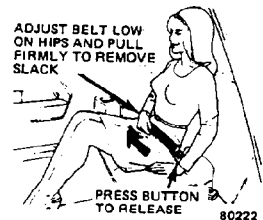
Location of Lap/Shoulder Belt Connector (Spirit, Concord)



Connecting Lap/Shoulder Belt (Spirit, Concord)



Adjusting Correct Belt Fit (Spirit, Concord)



Adjusting Rear Seat Lap Belts (All Models)

- If the shoulder belt feels tight, pull out about six inches of belt from the retractor and release it, allowing it to return to your chest. Now move your shoulder forward slightly, so that you will withdraw an inch or so of slack on the belt. **This minimum amount of slack allows the upper body unrestricted movement in normal situations.** The belt will lock if the car stops abruptly.

Figure 4-4 OWNERS MANUAL RESTRAINT SYSTEM INSTRUCTIONS

FIGURE 4-5
PART 572 DUMMY IN-VEHICLE POSITION

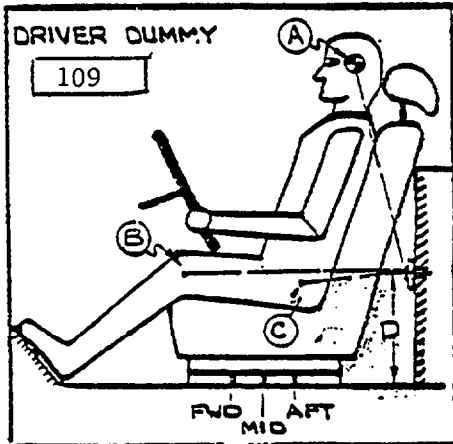
Test No. 703-2-523

Vehicle 1981 AMC SPIRIT

SEAT TYPE:
 Bench
 Bucket
 Split Bench

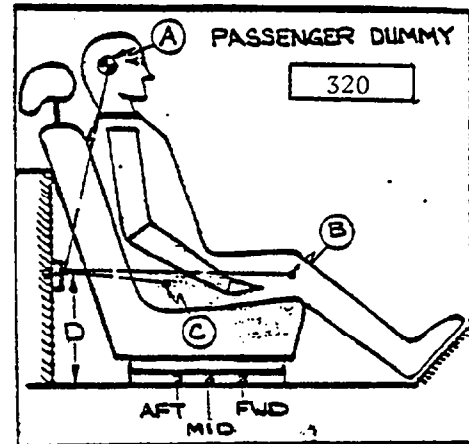
ADJUSTER TYPE:
 Manual
 Power

BUCKET SEAT BACK TYPE:
 Fixed
 Adjustable Reclining



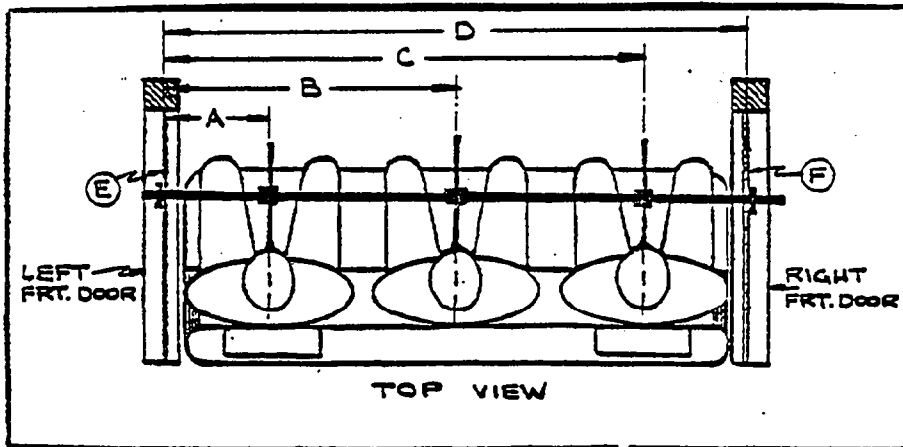
MEASUREMENT LOCATION

- A - Head Target
- B - Knee Joint
- C - Approximate 'H' Point
- D - Sill to Reference Point



A = 23.5 in. 20 Degrees
 B = 31.5 in. 90 Degrees
 C = 16.5 in. 10.5 Degrees
 D = 11.3 in.

A = 23.5 in. 20 Degrees
 B = 32.25 in. 92 Degrees
 C = 17 in. 102 Degrees
 D = 11.3 in.



DUMMY ID

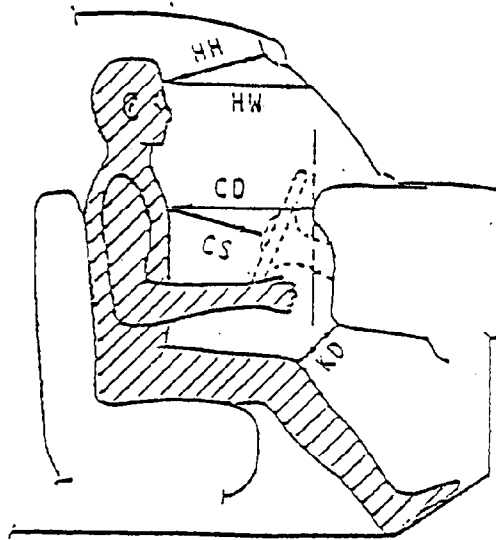
109

320

A =	Left Door to Driver Centerline	<u>13.5</u> in.
B =	Left Door to Center Passenger Centerline	<u>---</u> in.
C =	Left Door to Right Passenger Centerline	<u>41.0</u> in.
D =	Left Door to Right Door	<u>53.25</u> in.
E, F =	Window Glass Height (Right and Left Must be Equal)	<u>9.75</u> in.

1981 AMC SPIRIT

	<u>DRIVER</u>	<u>PASS</u>
HH	13.3	13
HW	18.0	17.7
CD	23.1	23
CS	15	--
KDL	11.0	10.7
KDR	11.0	11



HR	5.5	5.0
HS	8.2	8.0
AD	4.0	4.0
HD	6.2	6.2

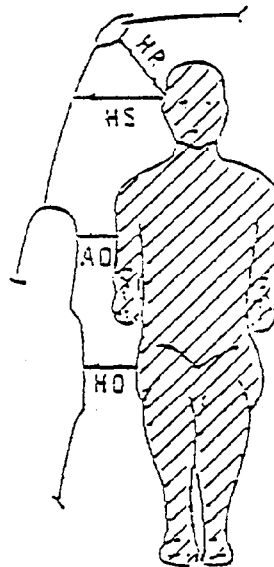


Figure 4-6 OCCUPANT CLEARANCE DIMENSIONS

DUMMY INJURY CRITERIA VALUES

TABLE 4-4

	MAXIMUM ACCELERATION ("G") *							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R
DUMMY (1)	-58	10	46	64.2	-42	10	17	43.2
DUMMY (2)	-14	24	60	62.0	-32	22	12	33.0
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE-FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	1300	No data (cut wire)
DUMMY (2)	560	280
DUMMY (3)		
DUMMY (4)		

	MAXIMUM FORCE-SEAT BELTS LOADS (LBS)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
DUMMY (1)	1625	1625	1040
DUMMY (2)	1775	1275	1650
DUMMY (3)			
DUMMY (4)			

	HEAD INJURY CRITERIA**				SEVERITY INDEX
	HIC	t ₁ (SEC)	t ₂ (SEC)	AVE. ACC. (g) t ₁ TO t ₂	HEAD
DUMMY (1)	702.4	.0618	.0927	55.3	929.5
DUMMY (2)	652.3	.0537	.1284	37.7	876.6
DUMMY (3)					
DUMMY (4)					

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

APPENDIX A

PHOTOGRAPHS



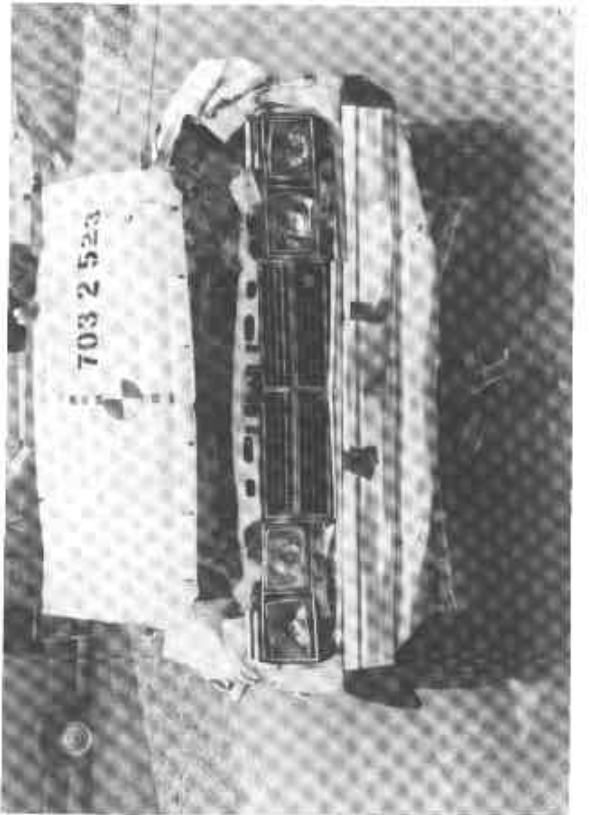
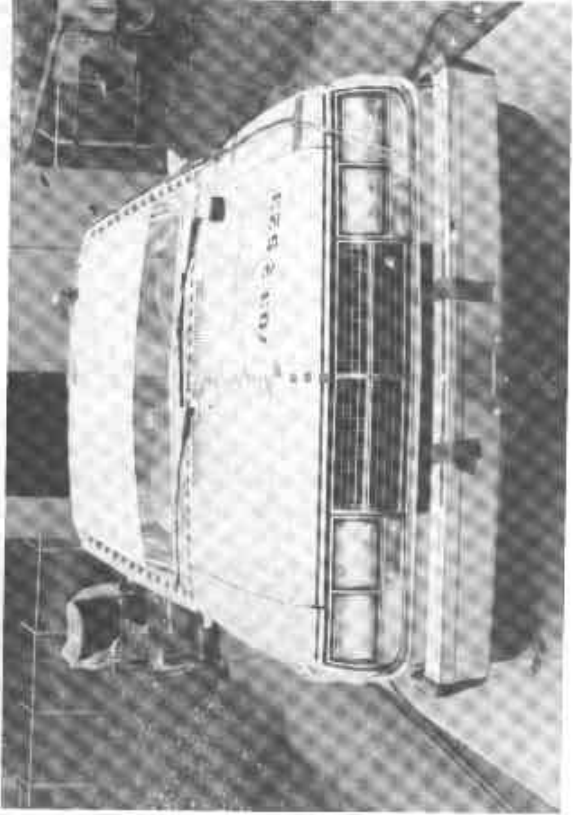
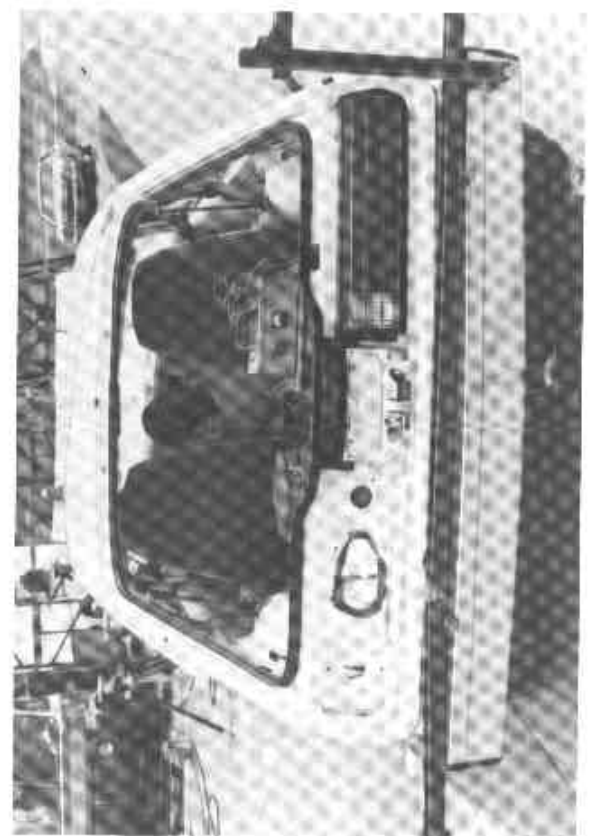


Figure A-1 Pre- and Post-Test Front and Rear Views

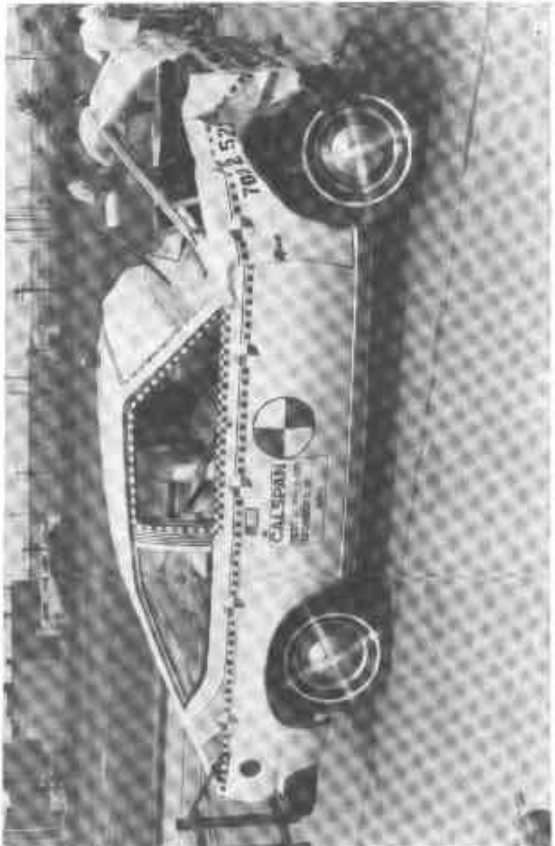
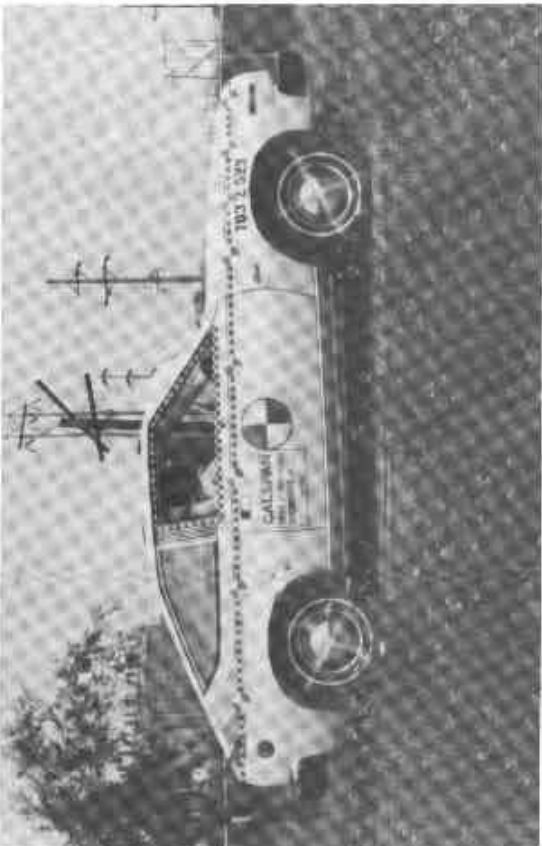
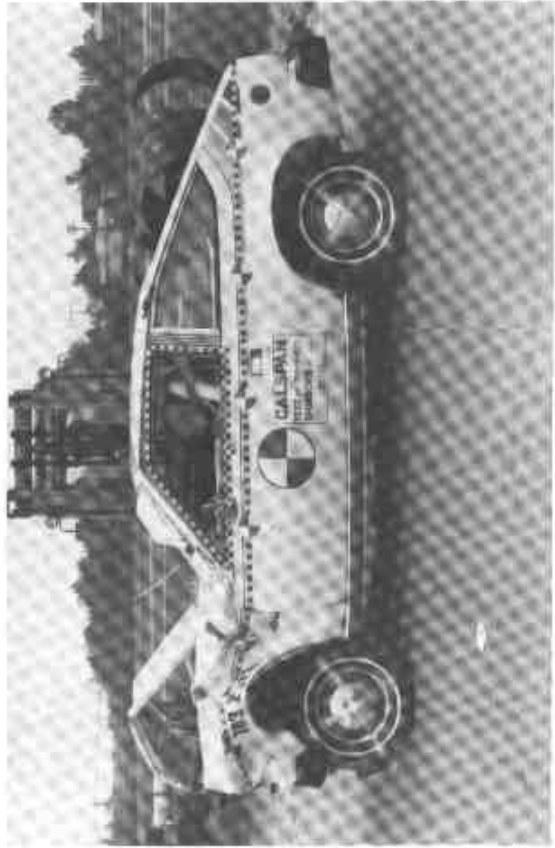
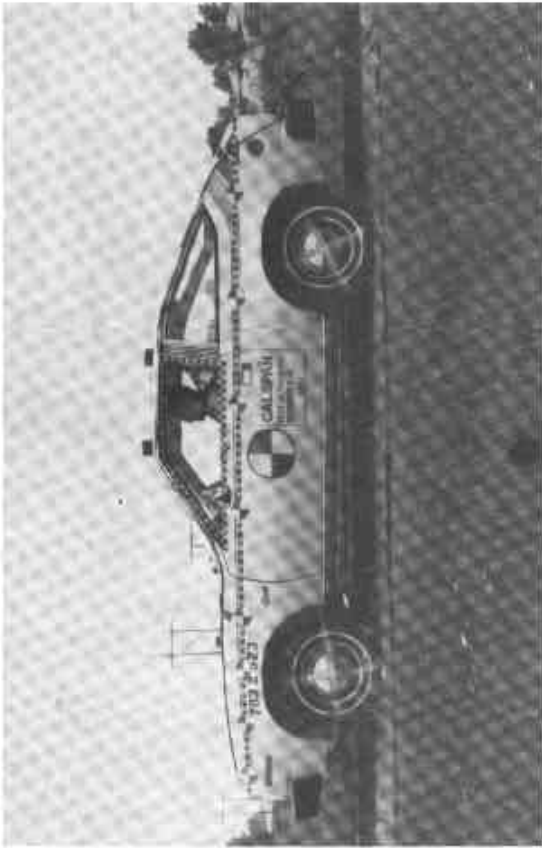


Figure A-2 Pre- and Post-Test Right and Left Side Views

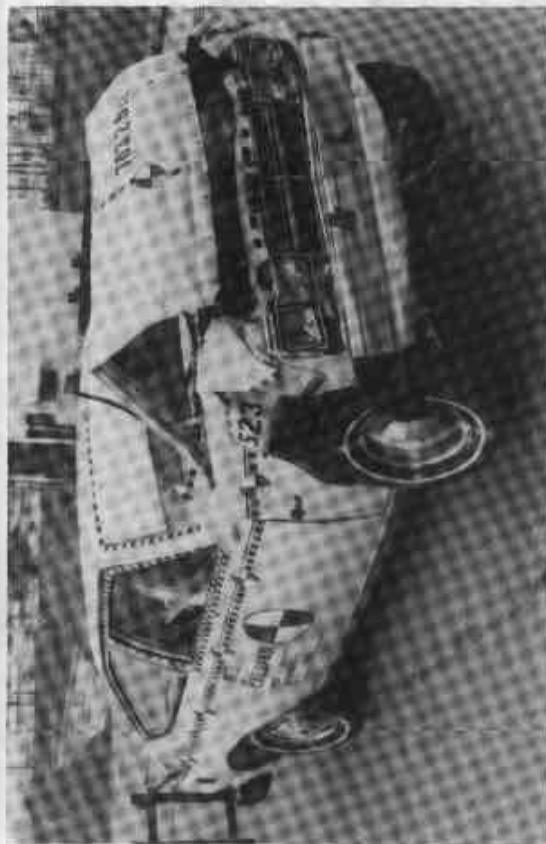
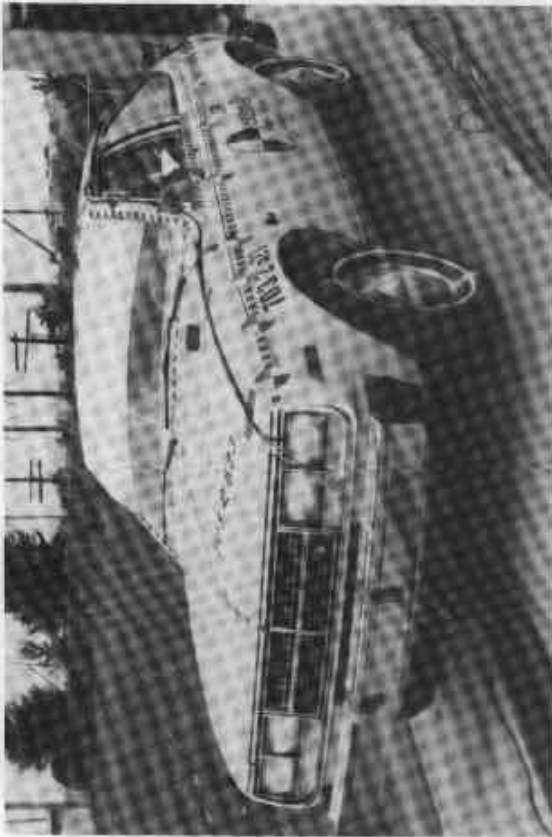
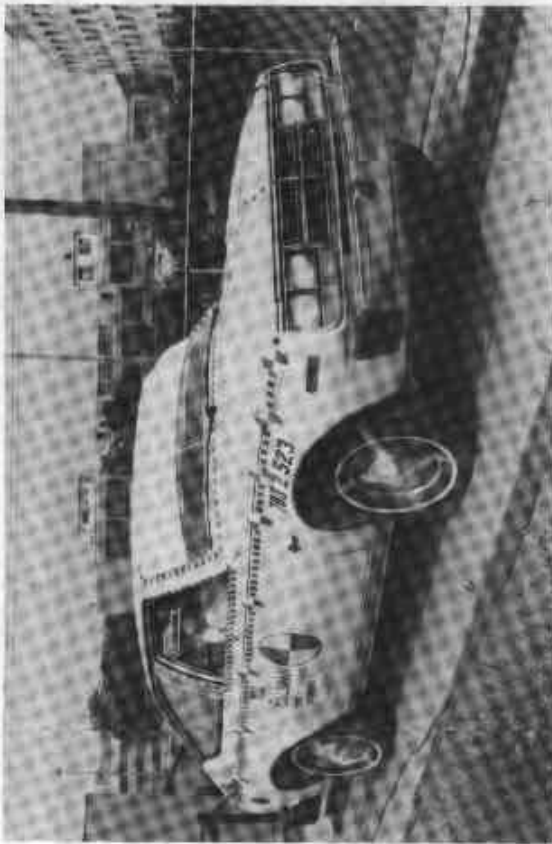


Figure A-3 Pre- and Post-Test Right and Left Three-Quarter Views

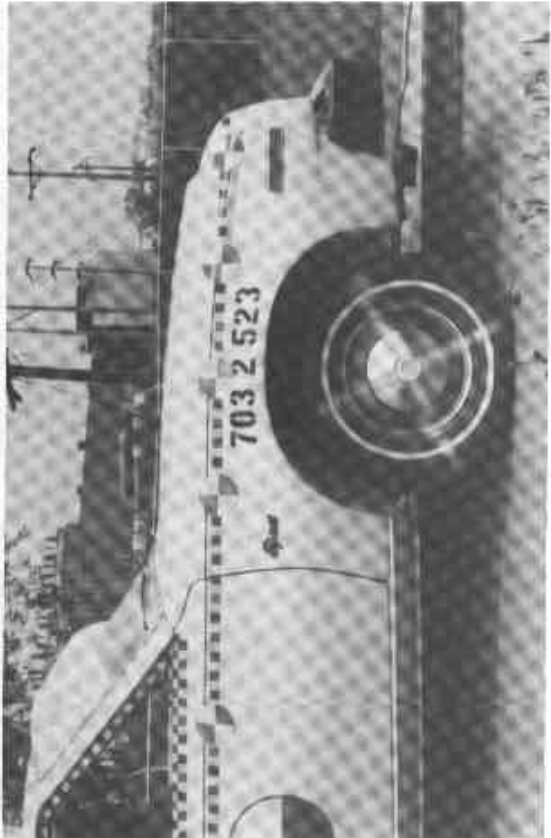
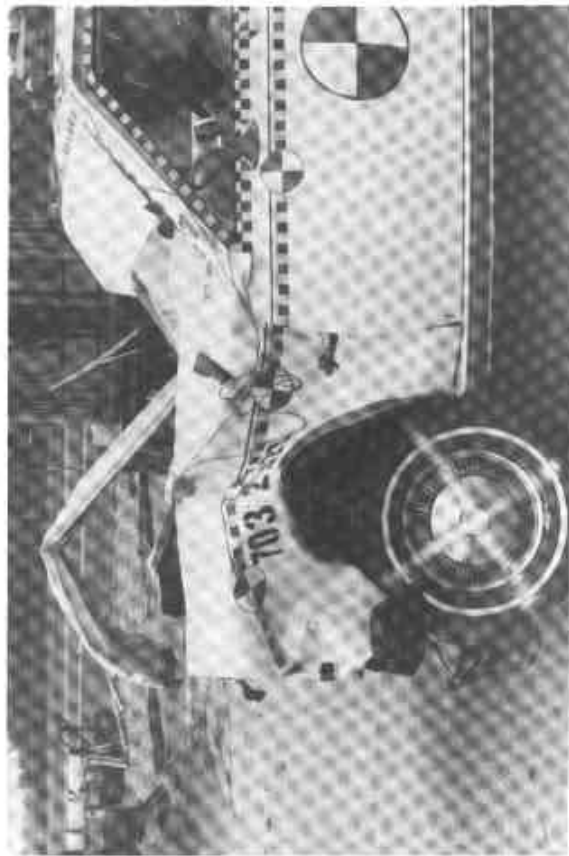
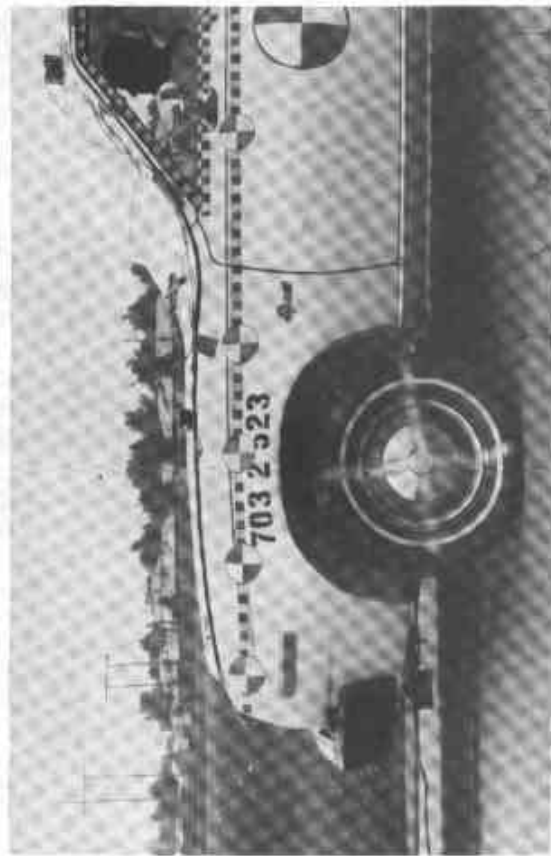


Figure A-4 Pre- and Post-Test Right and Left Front Quarter Views

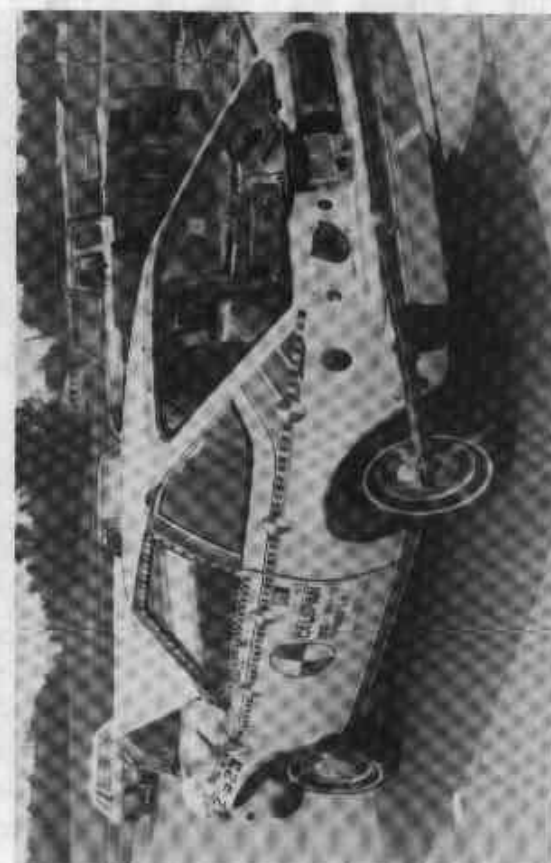
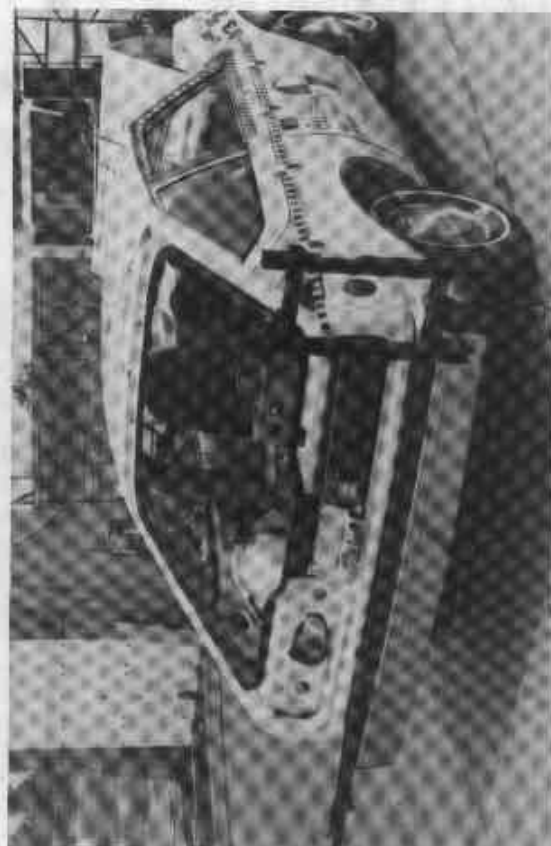


Figure A-5 Pre- and Post-Test Right and Left Rear Three-Quarter Views

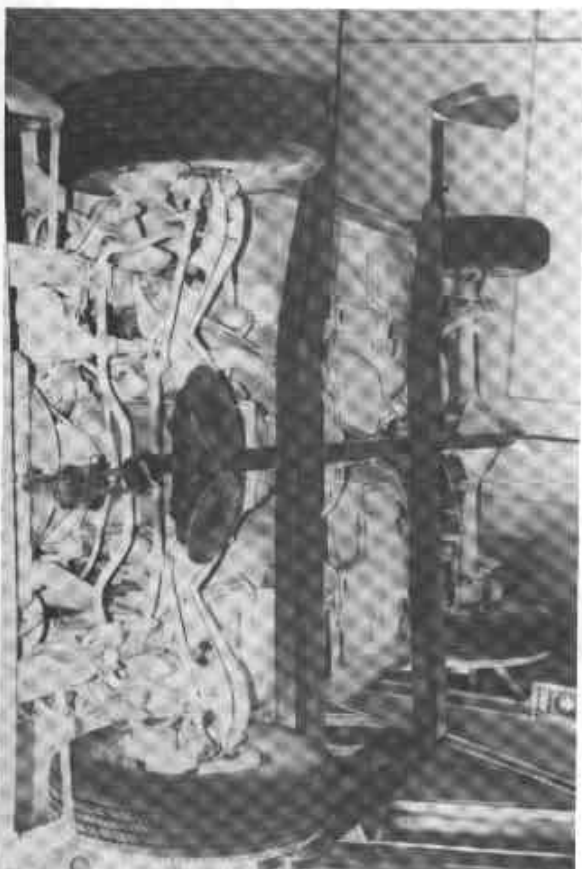
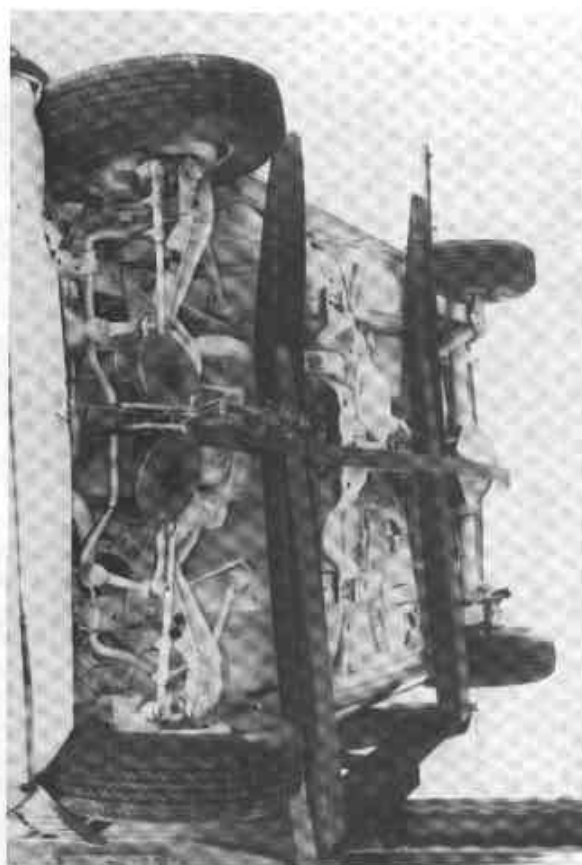


Figure A-6 Pre- and Post-Test Front and Rear Underbody Views



Figure A-7 Pre- and Post Front Underbody Views.

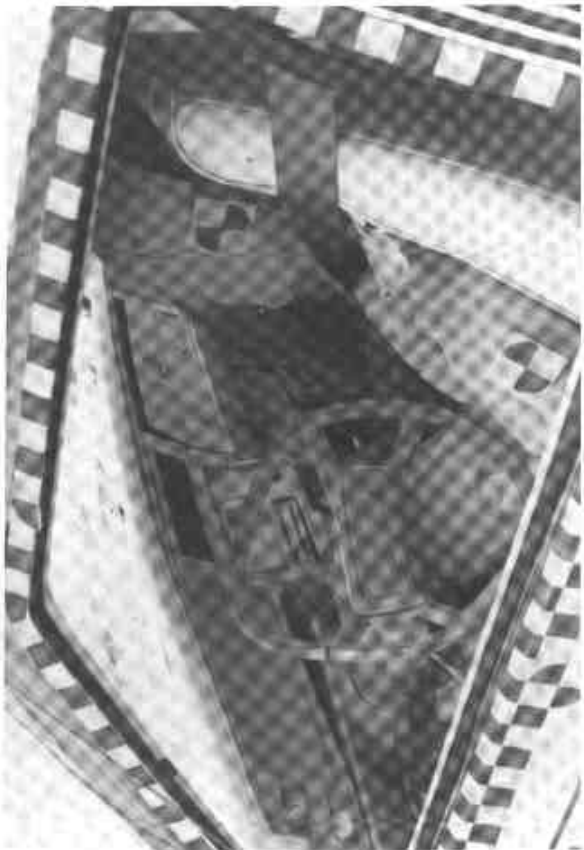


Figure A-8 Pre- and Post-Test Driver Positions



Figure A-9 Pre- and Post-Test Right Front Passenger Views

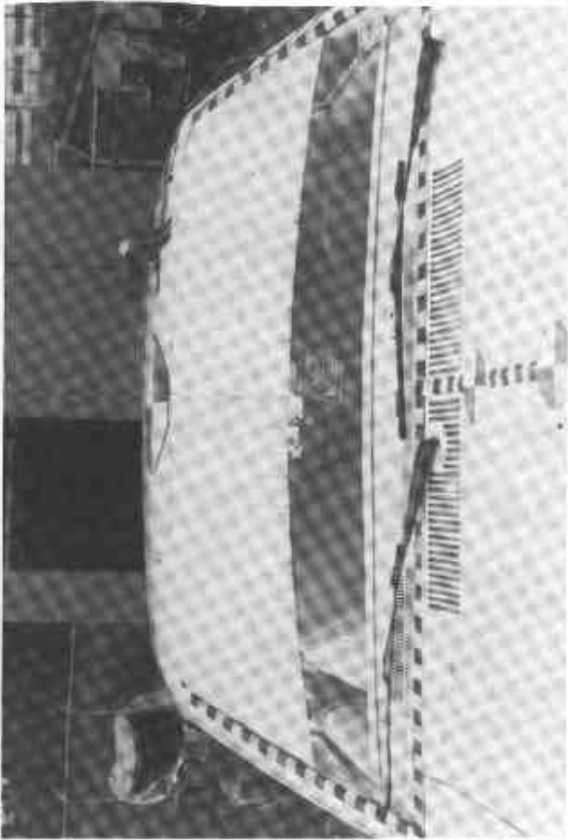


Figure A-10 Pre- and Post-Test Windshield and Styrofoam Views



Figure A-11 Post-Test Interior Views



Figure A-12 Pre- and Post-Test Engine Compartment Views

A-12



Figure A-13 Filler Tube Cap

6851-V-3

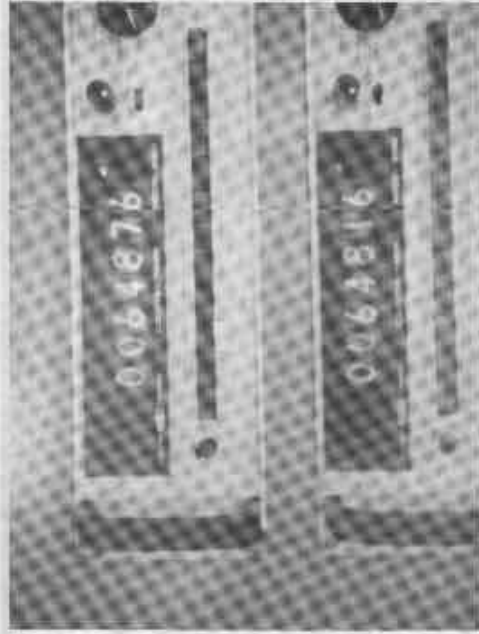


Figure A-14 Velocity Trap Counter

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA

Test No. 703-2-523

1981 AMERICAN MOTORS SPIRIT

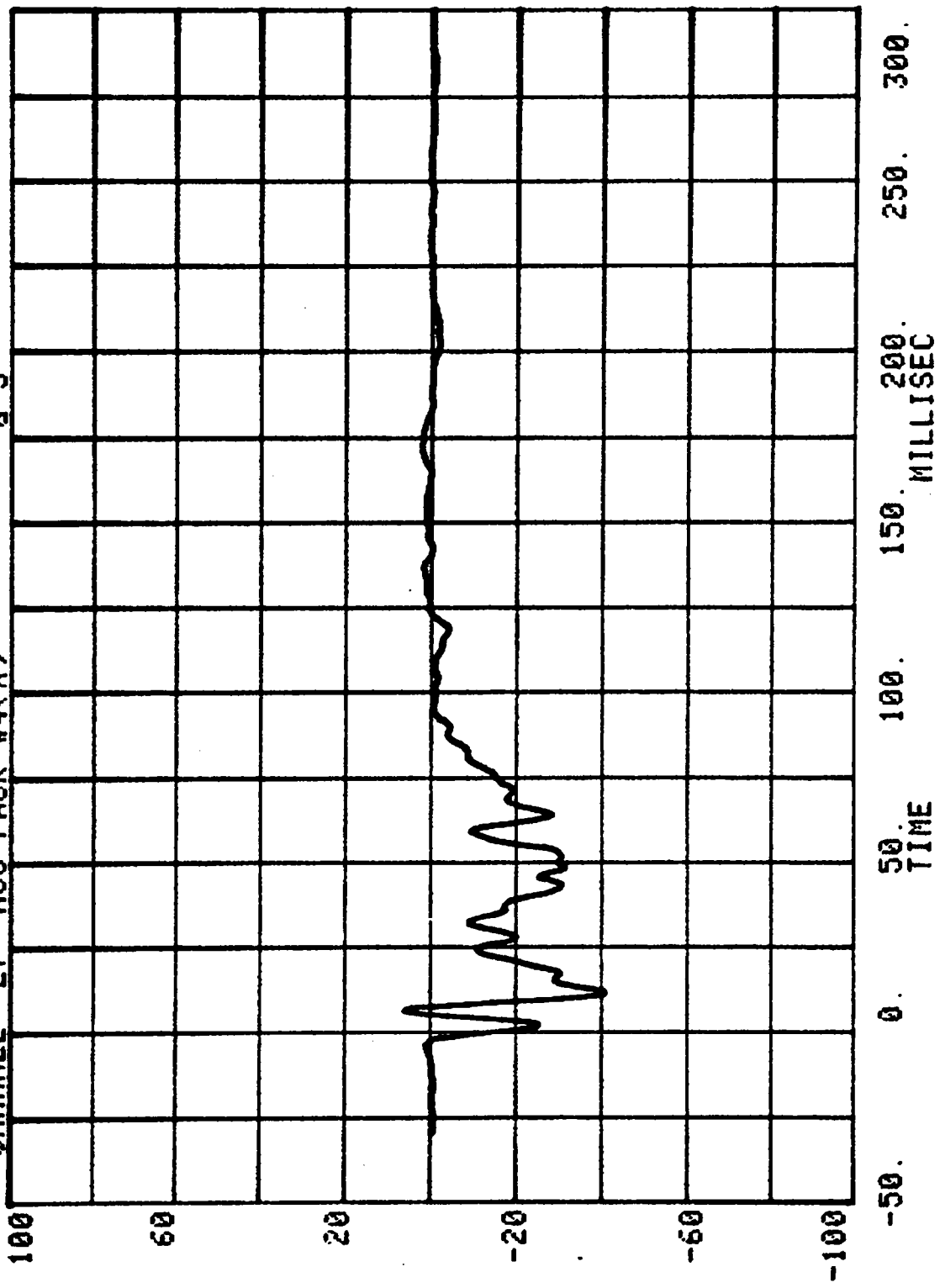
VEHICLE NO. 1 DATA

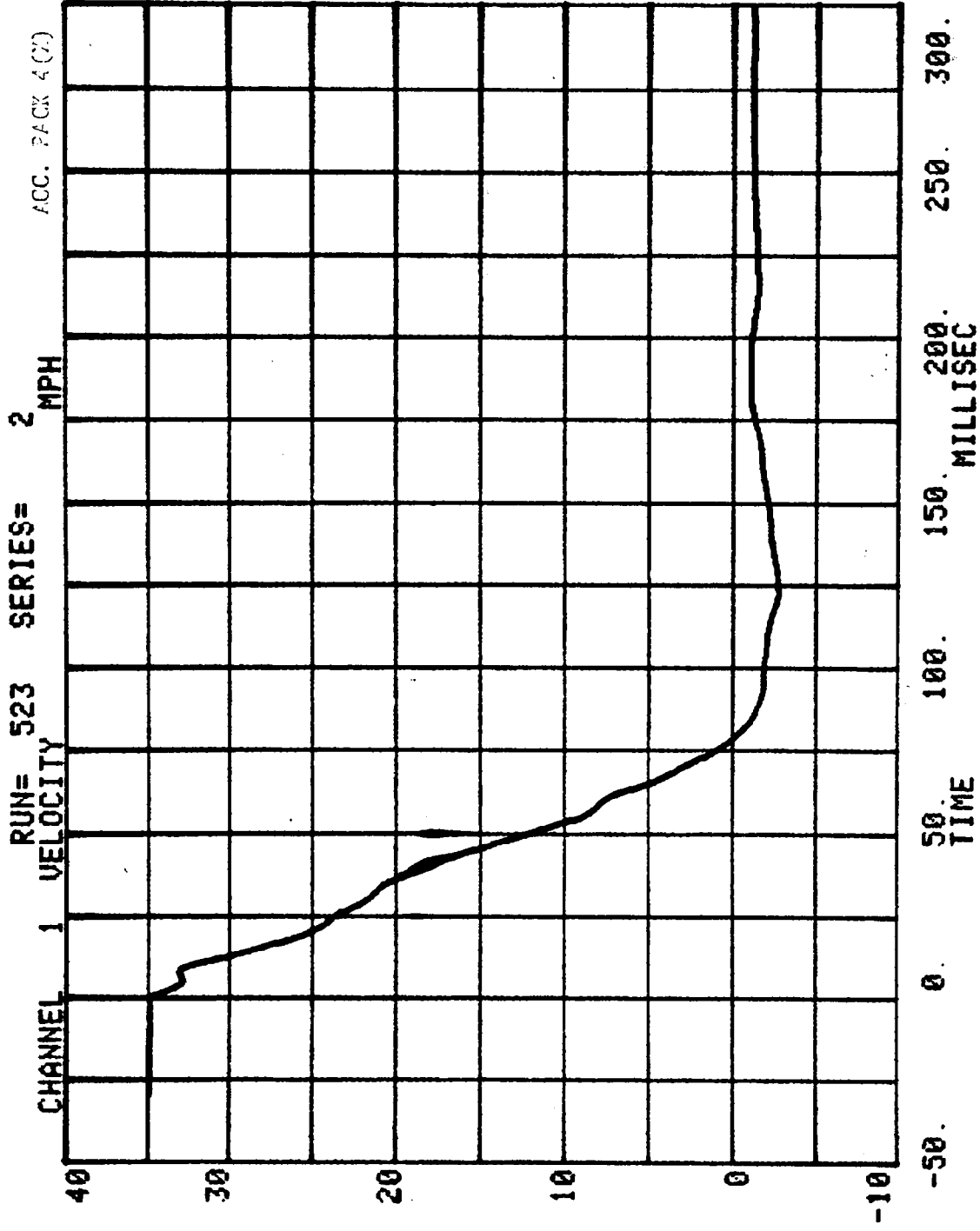
VEHICLE DATA

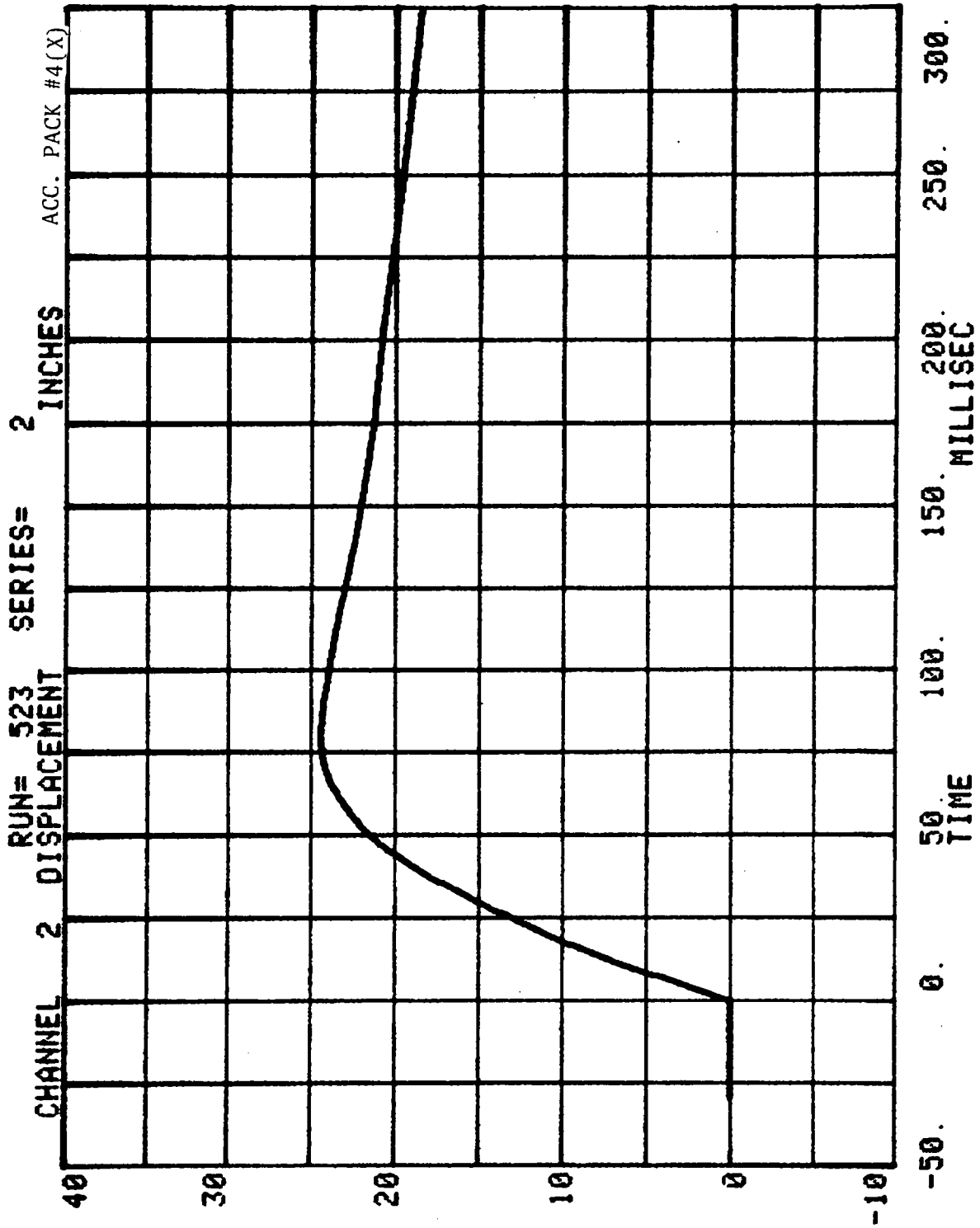
FILTER CHANNEL CLASS

60

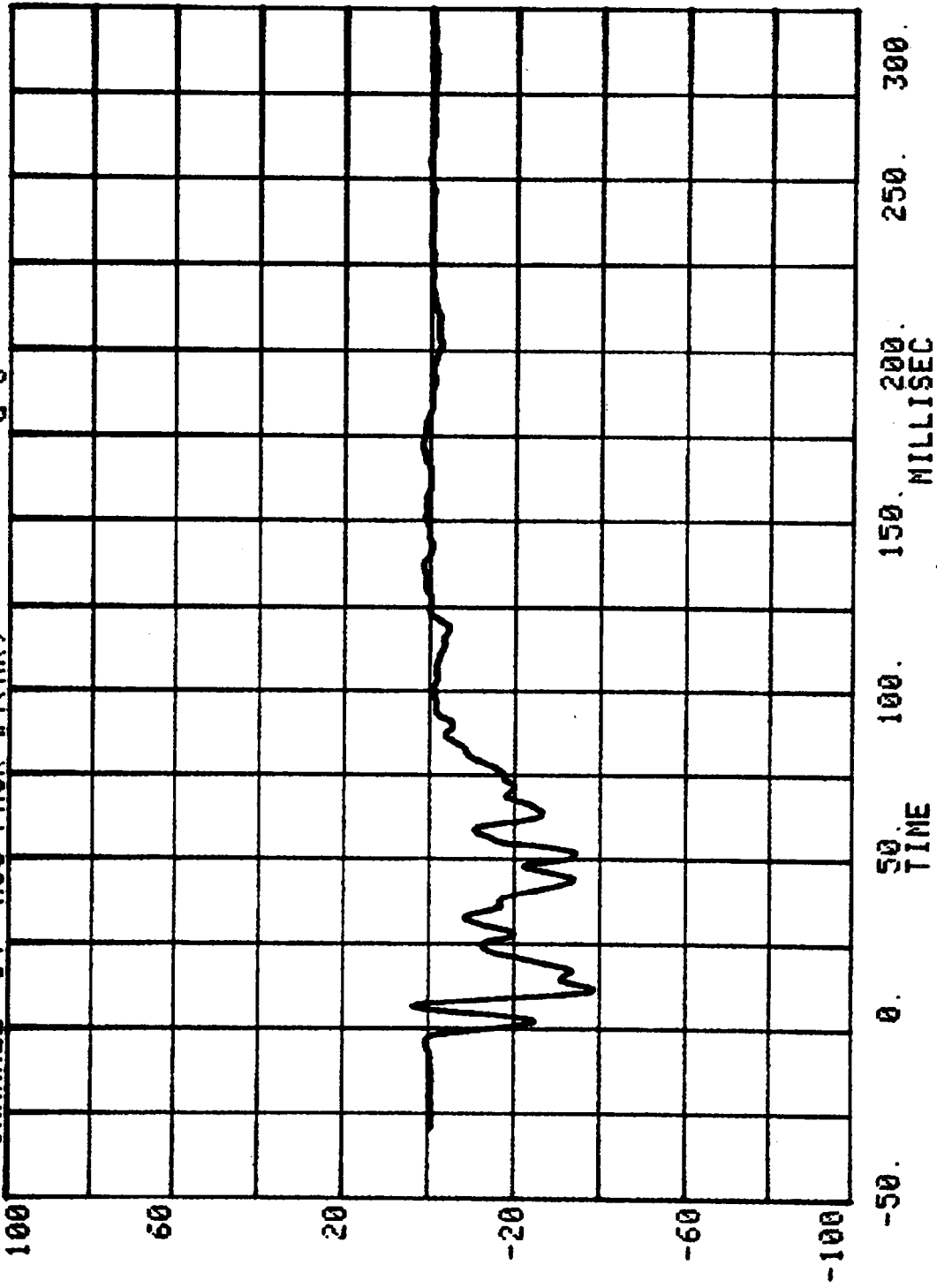
CHANNEL 27 ACC PACK #4(X) RUN= 523 SERIES= 2 G'S

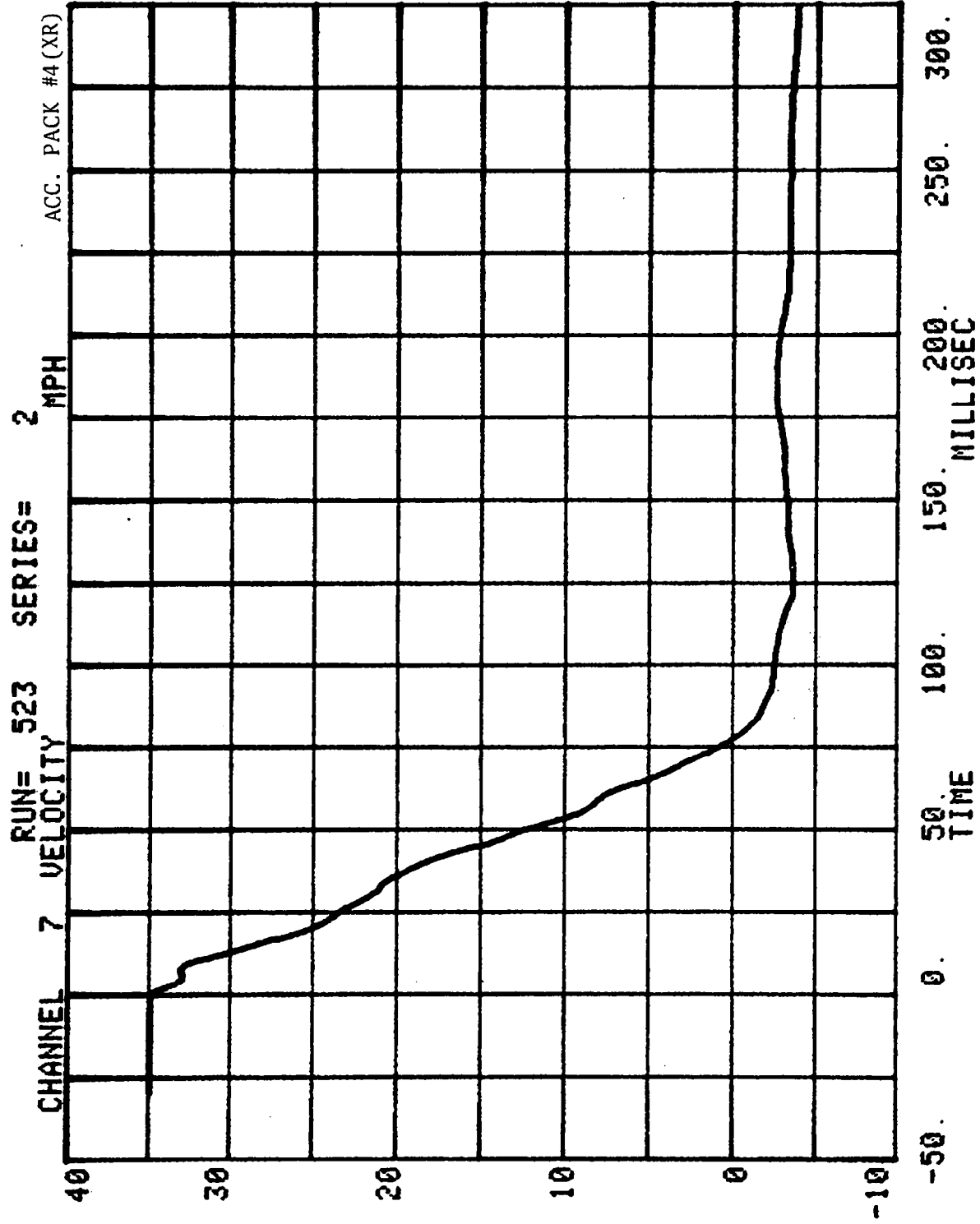


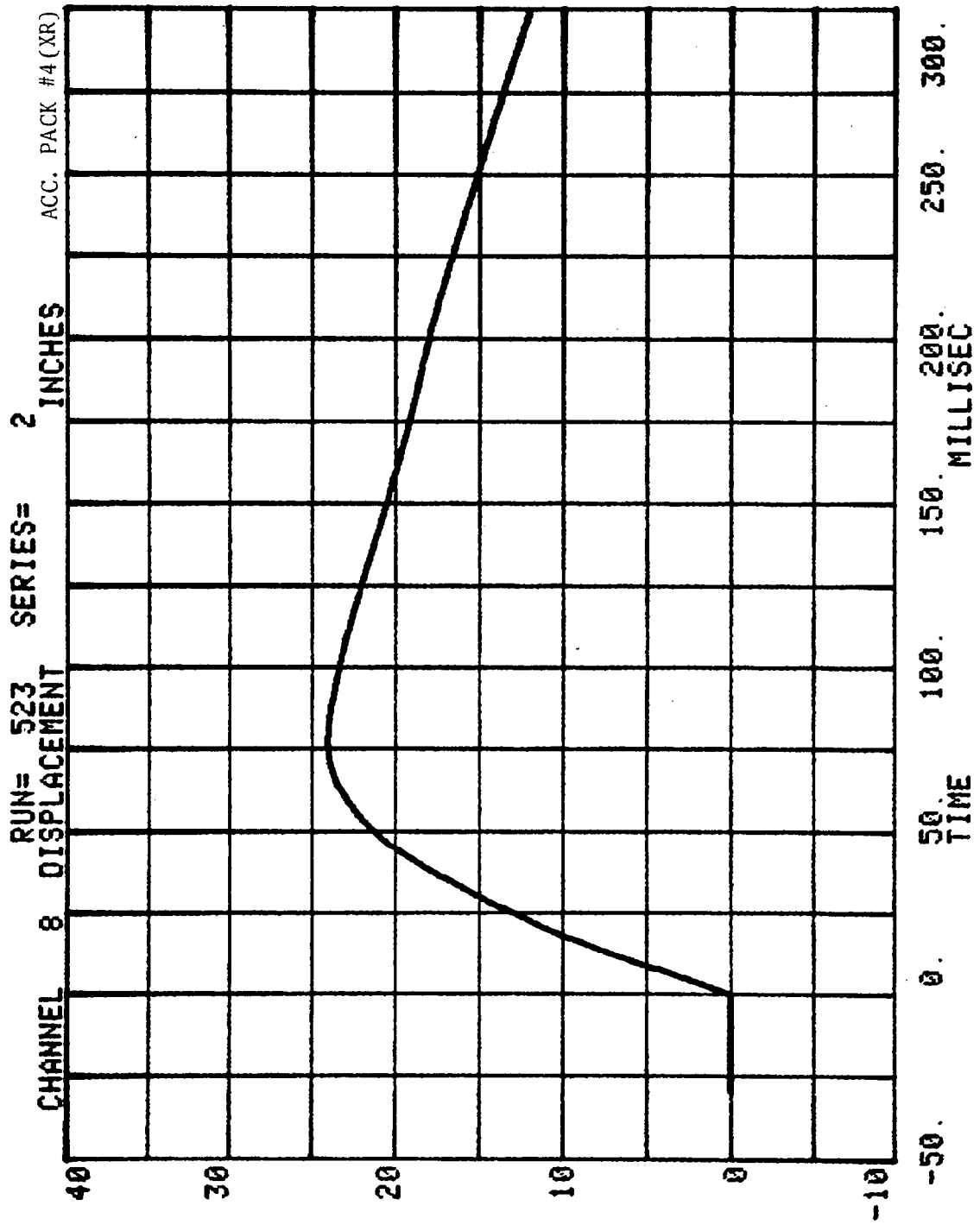




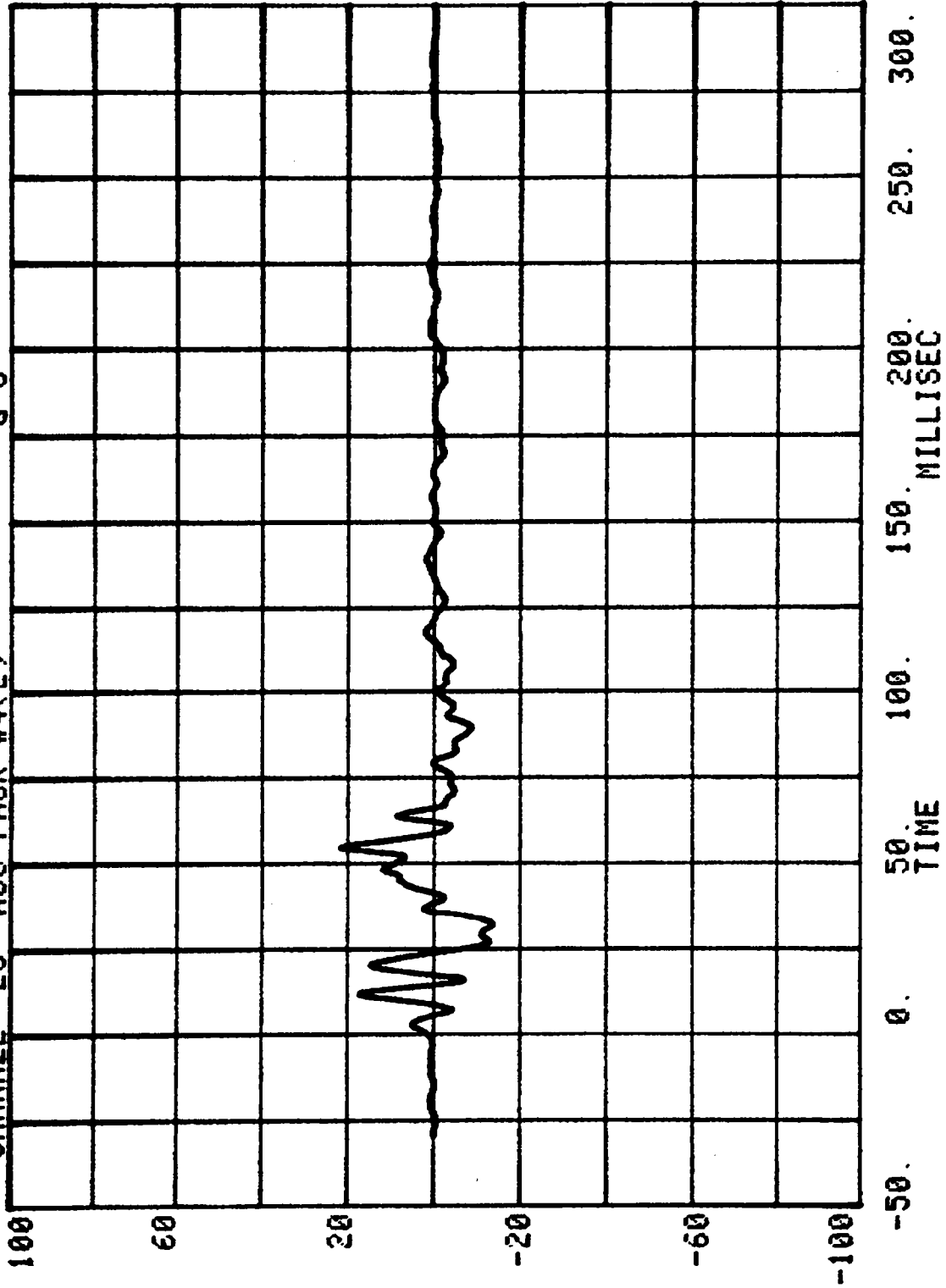
CHANNEL 34 ACC PACK #4(XR) RUN= 523 SERIES= 2 G'S

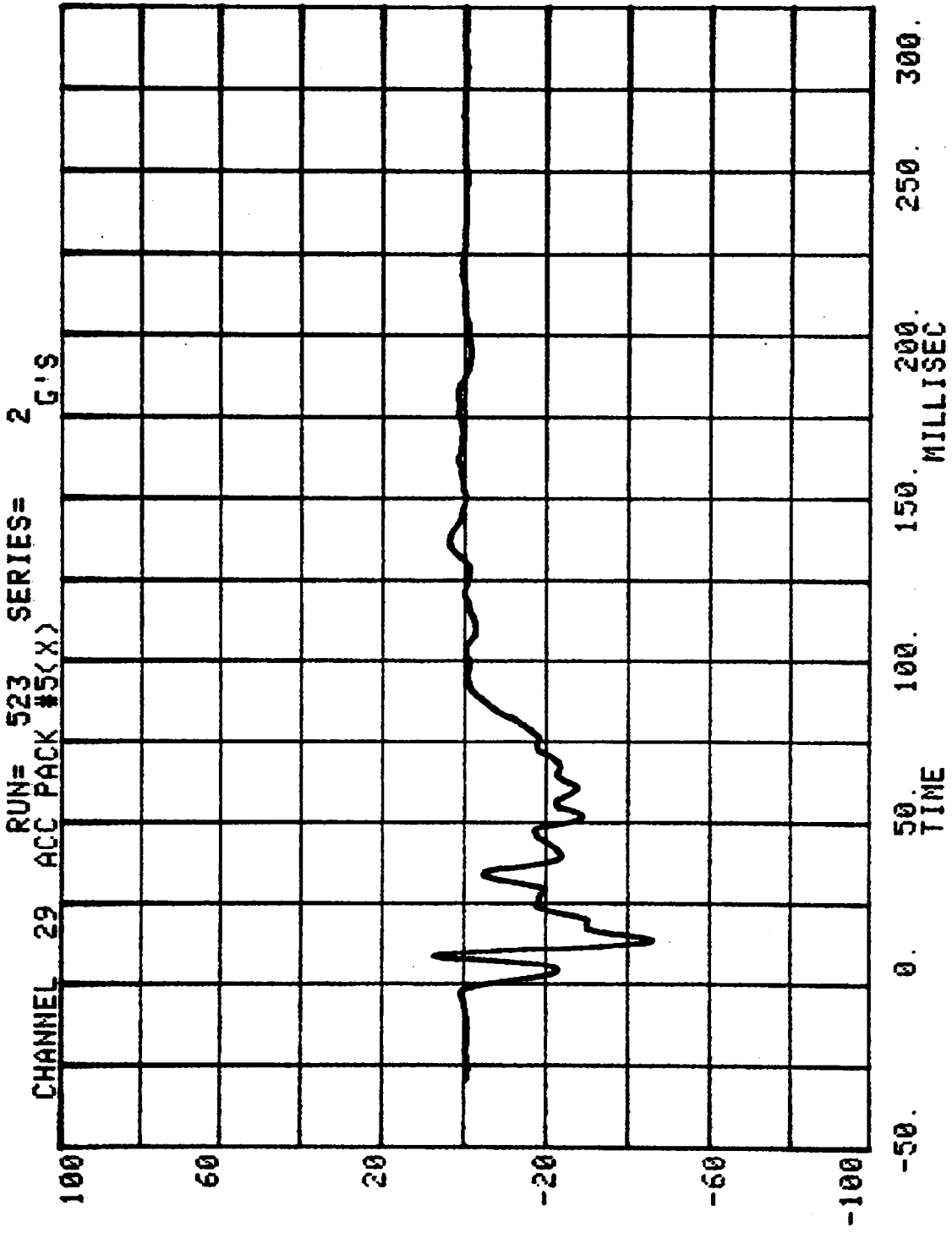


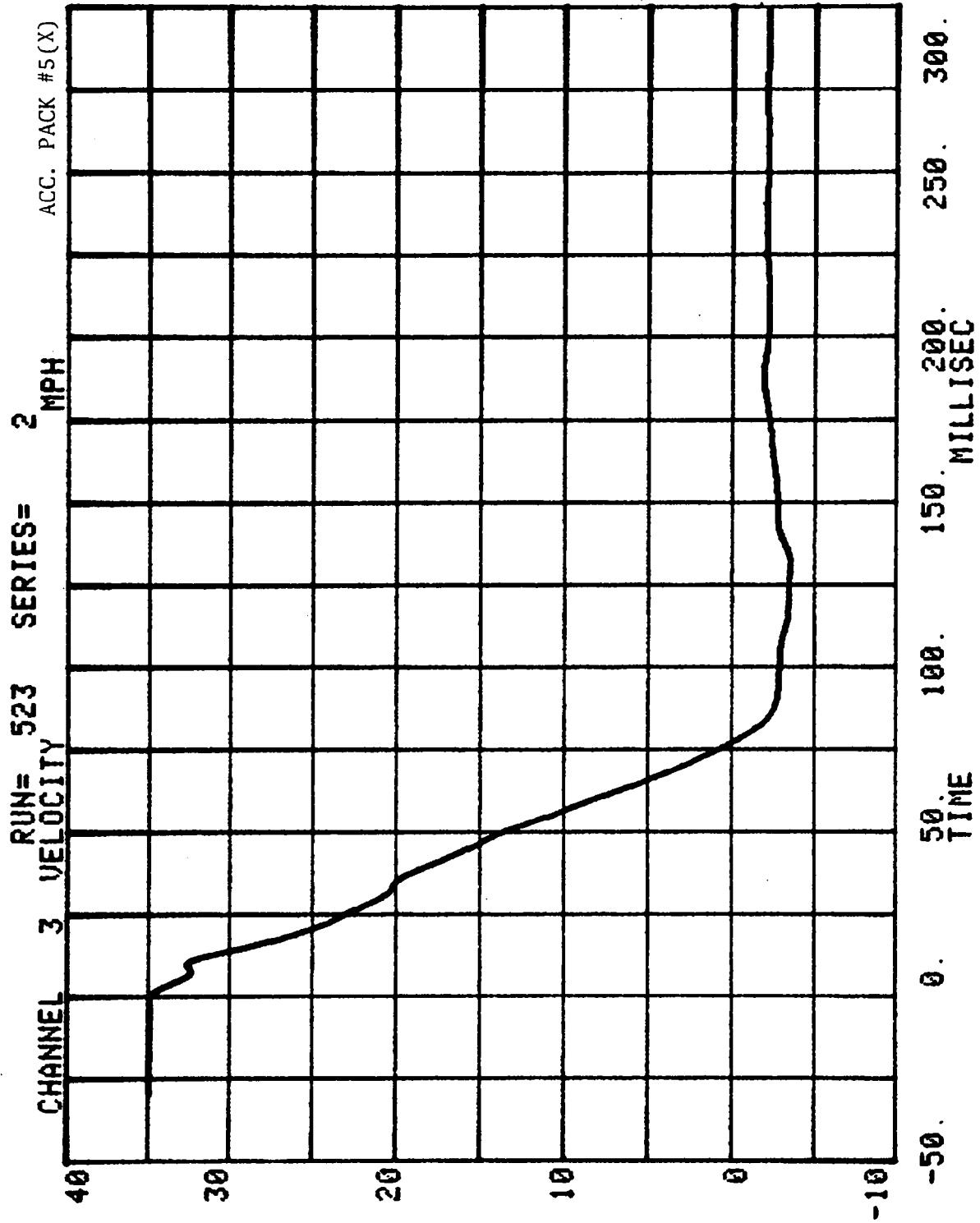


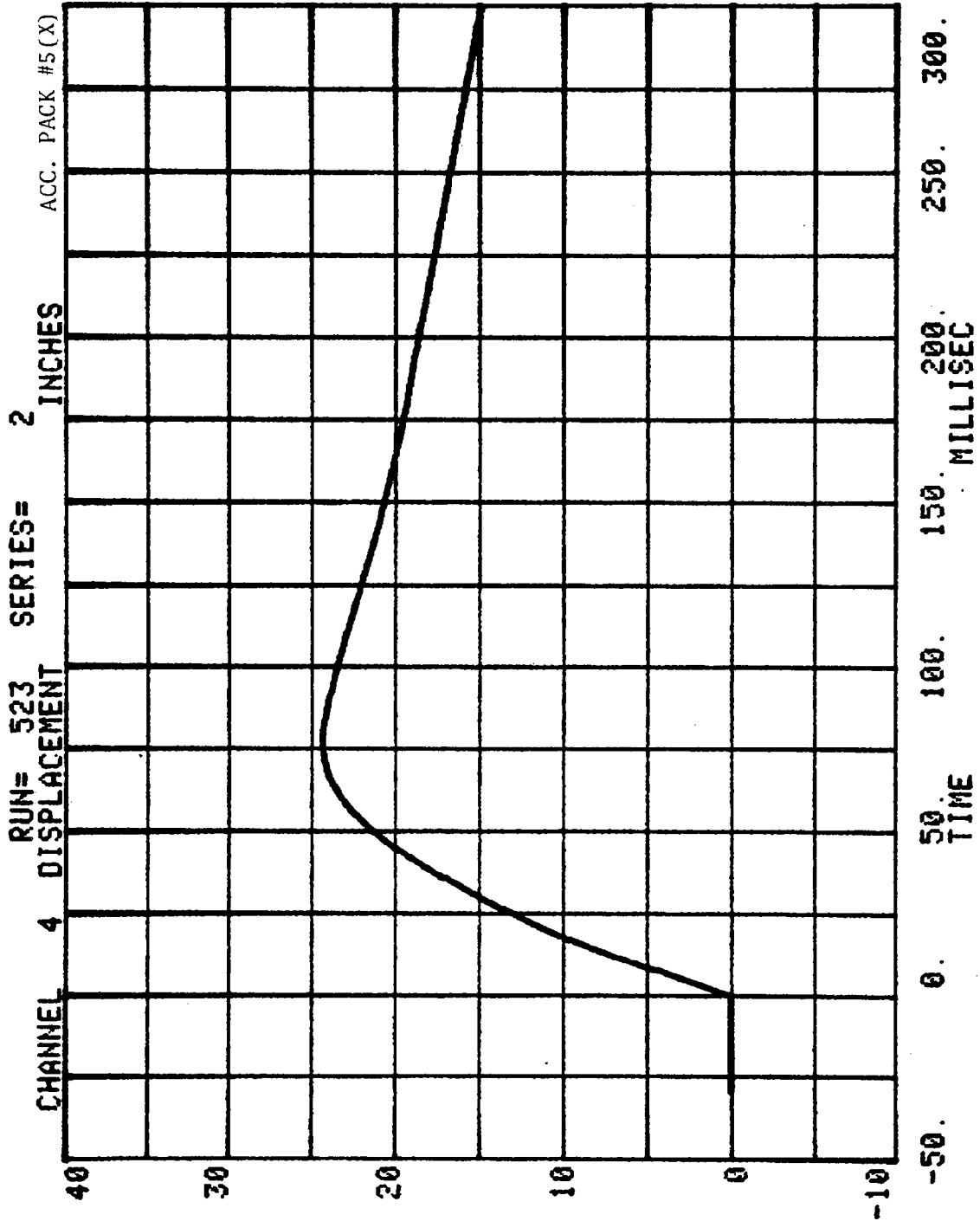


CHANNEL 28 ACC PACK #4(2) RUN= 523 SERIES= 2 G'S

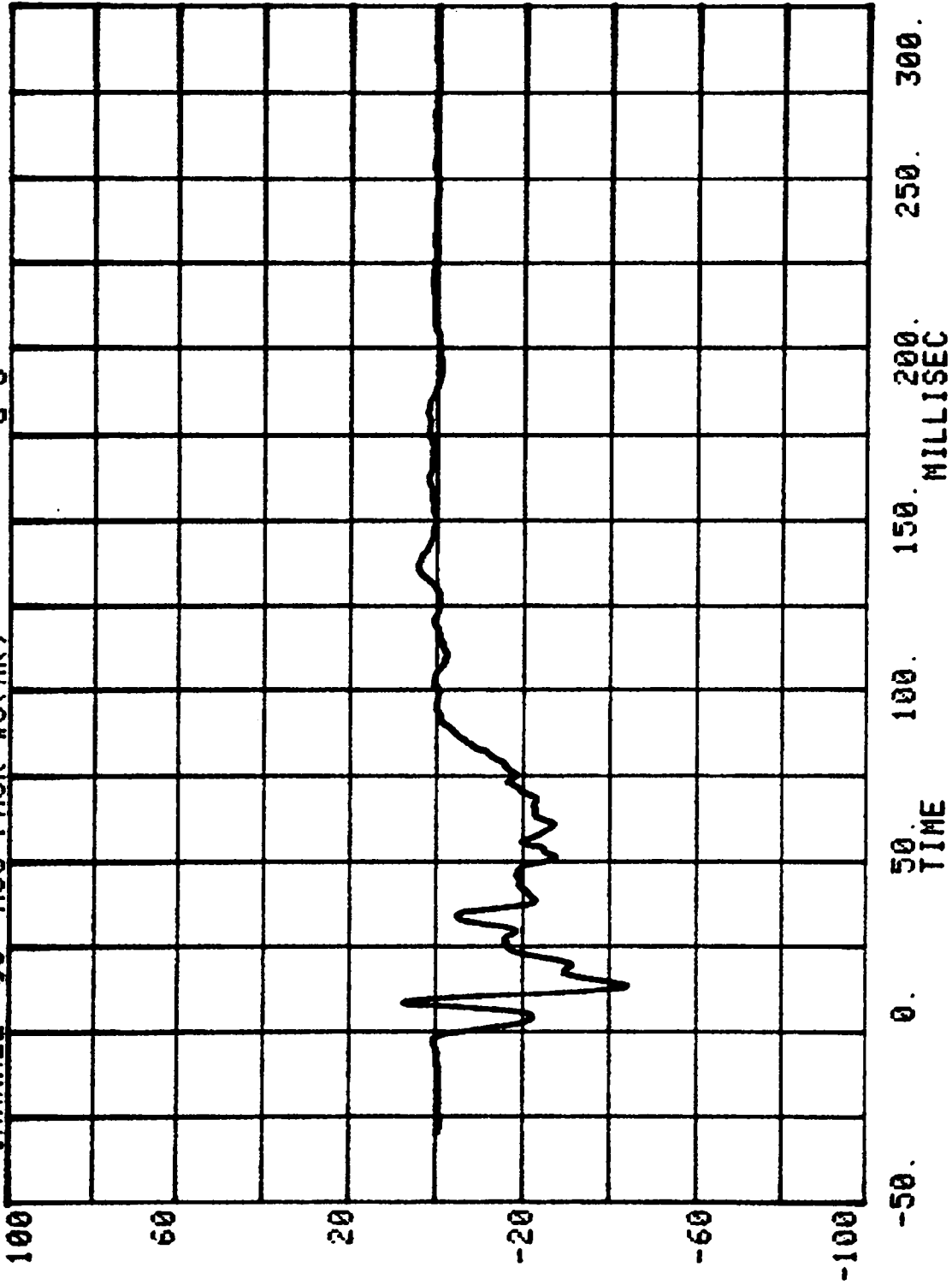


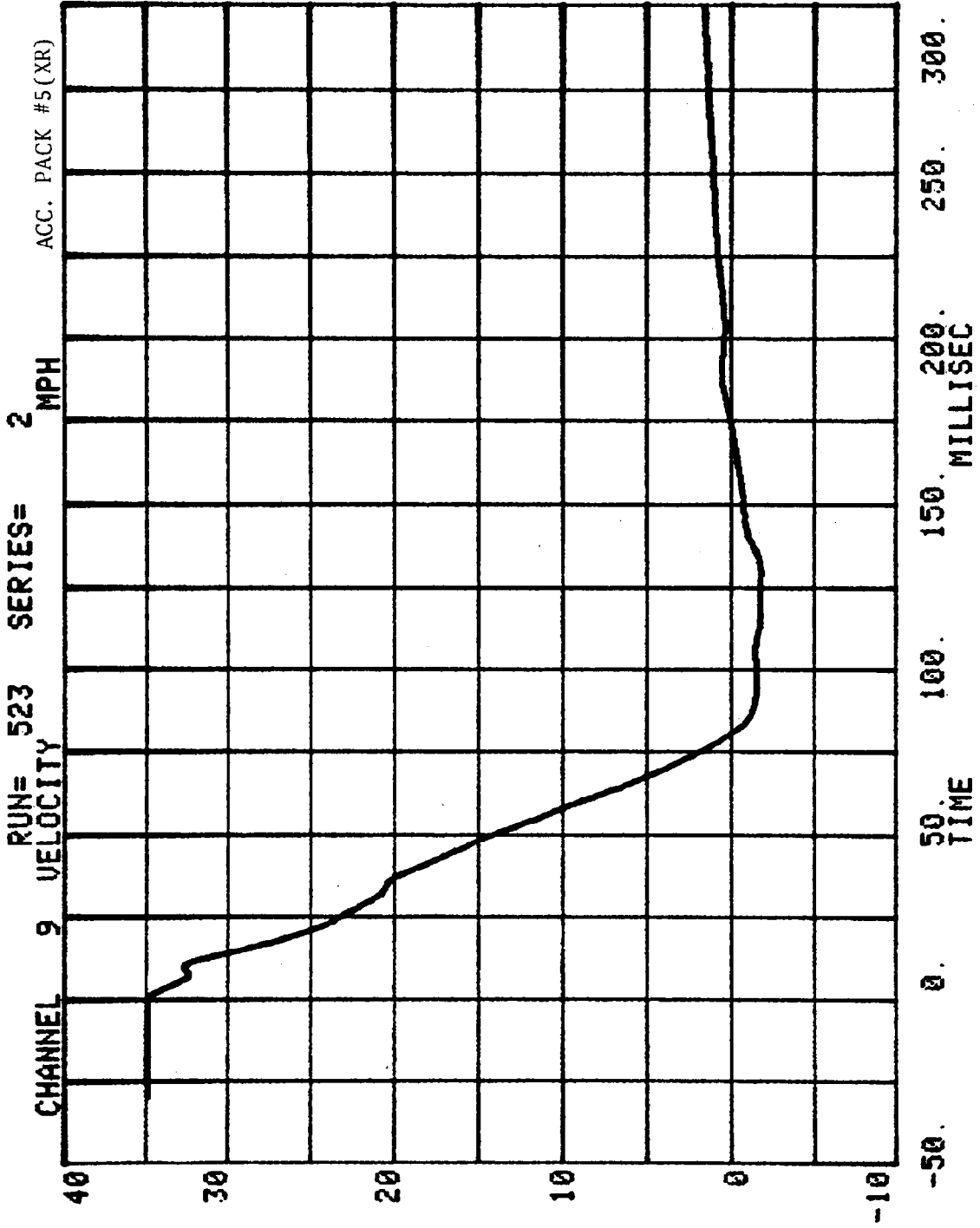


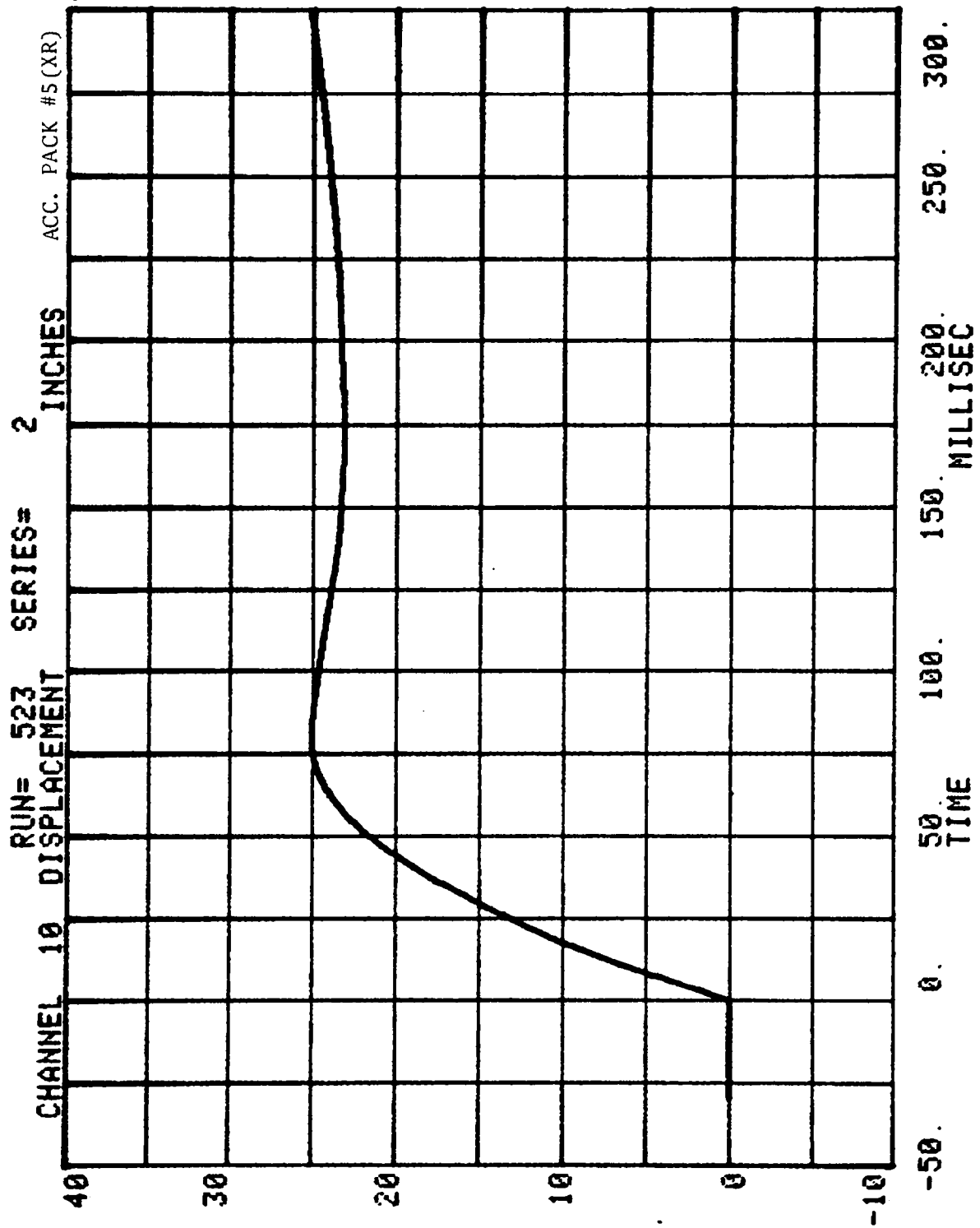




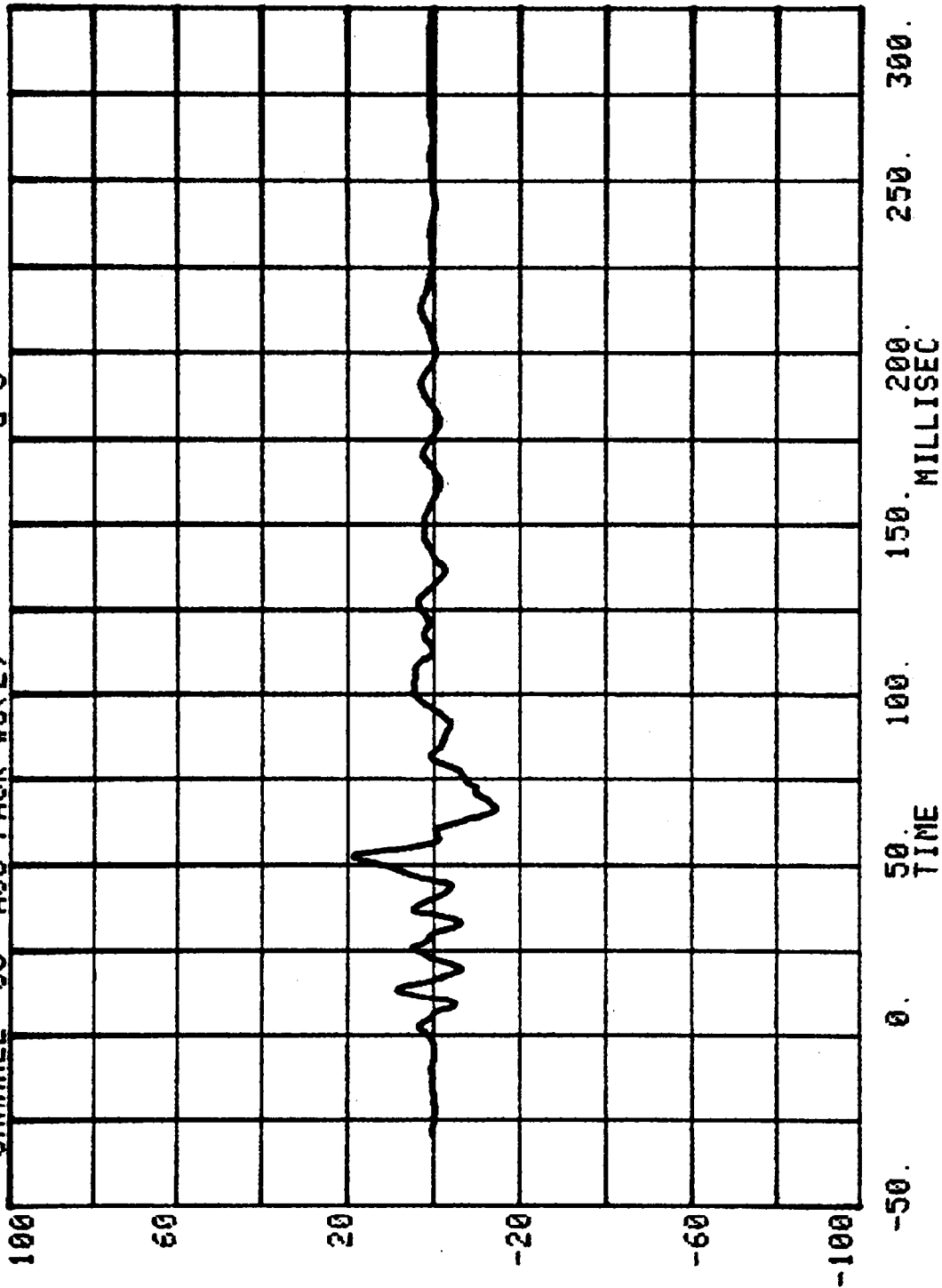
CHANNEL 35 ACC PACK #5(XR) RUN= 523 SERIES= 2 G'S



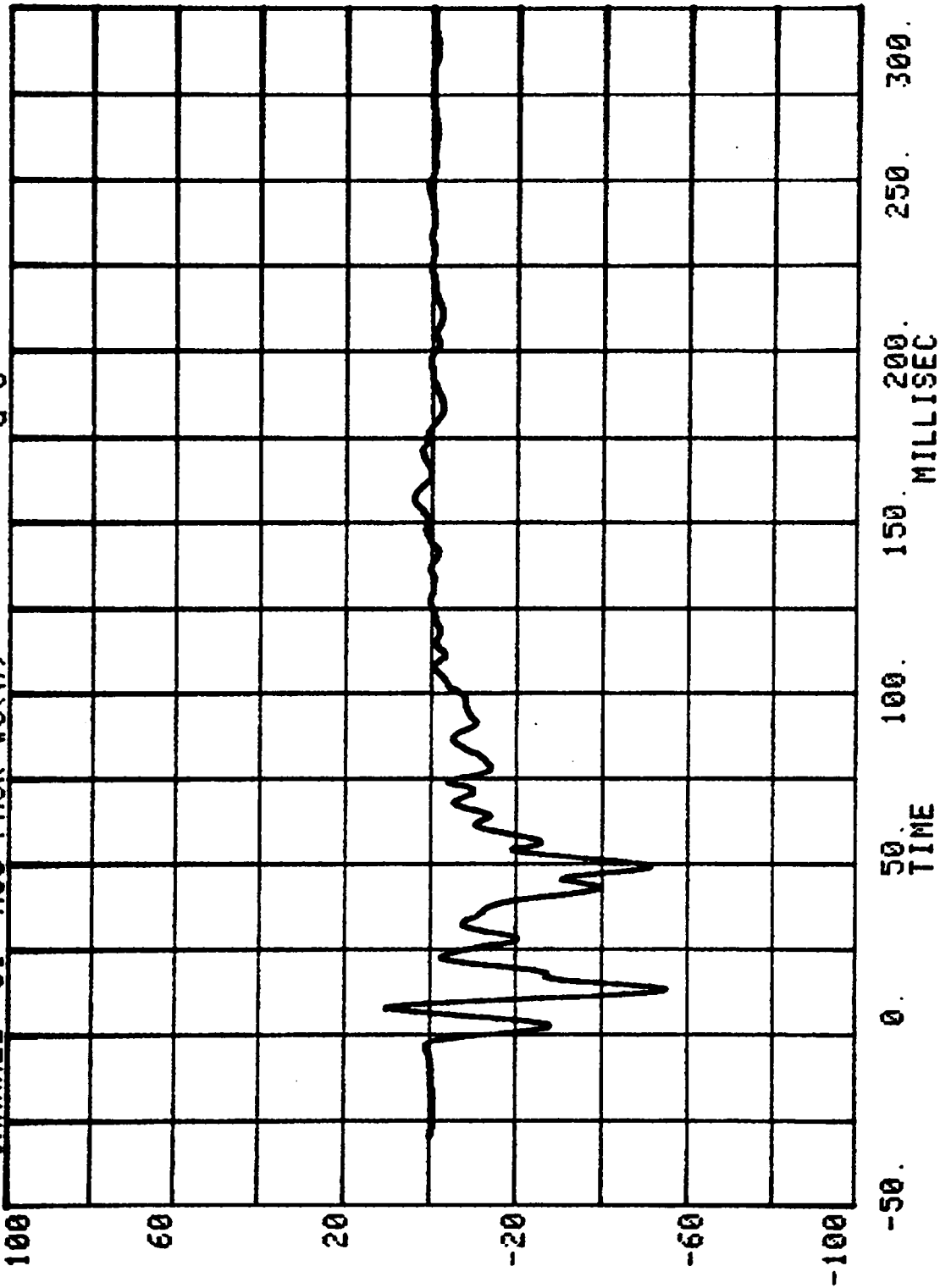


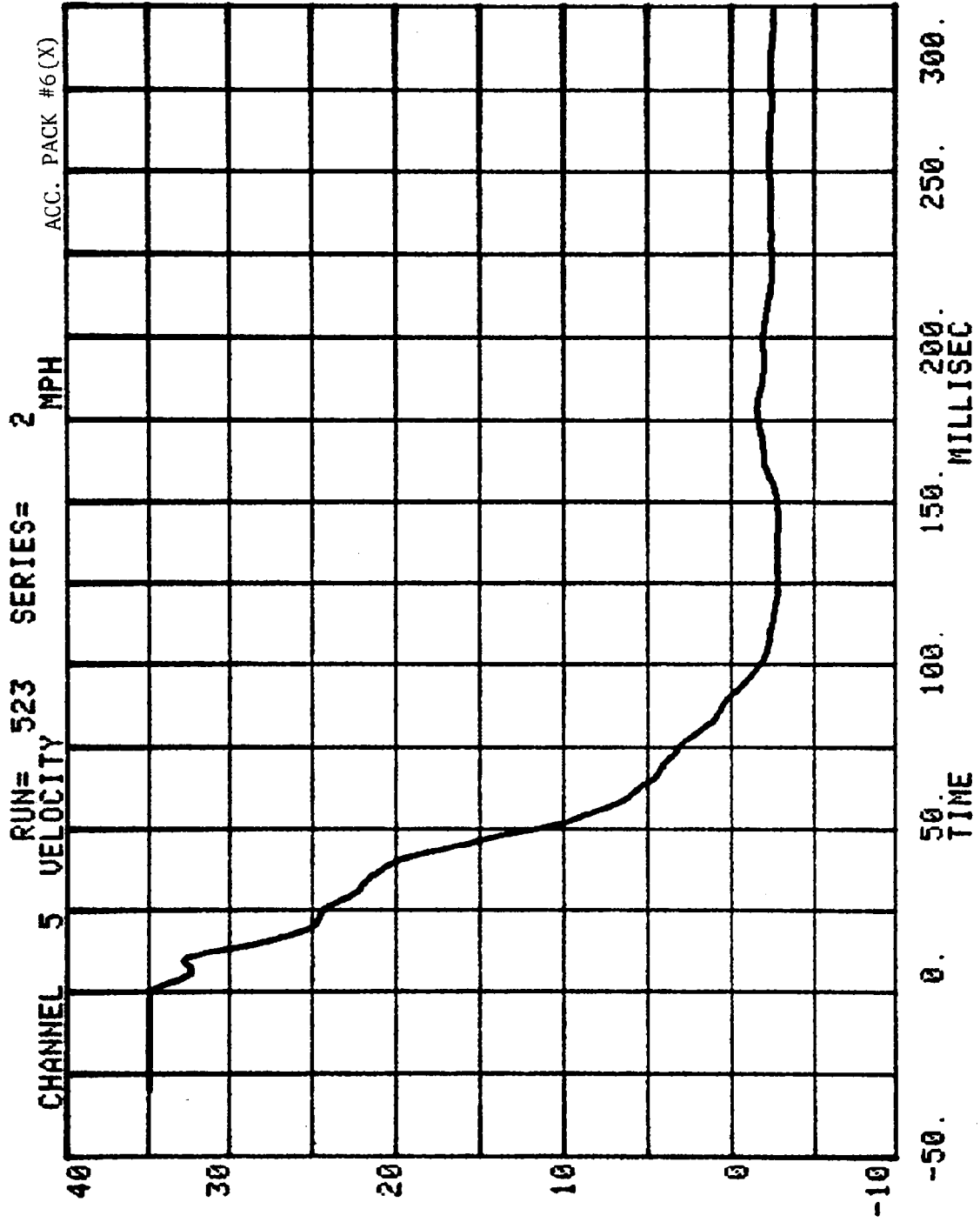


CHANNEL 30 ACC PACK #5(Z) RUN= 523 SERIES= 2 G'S

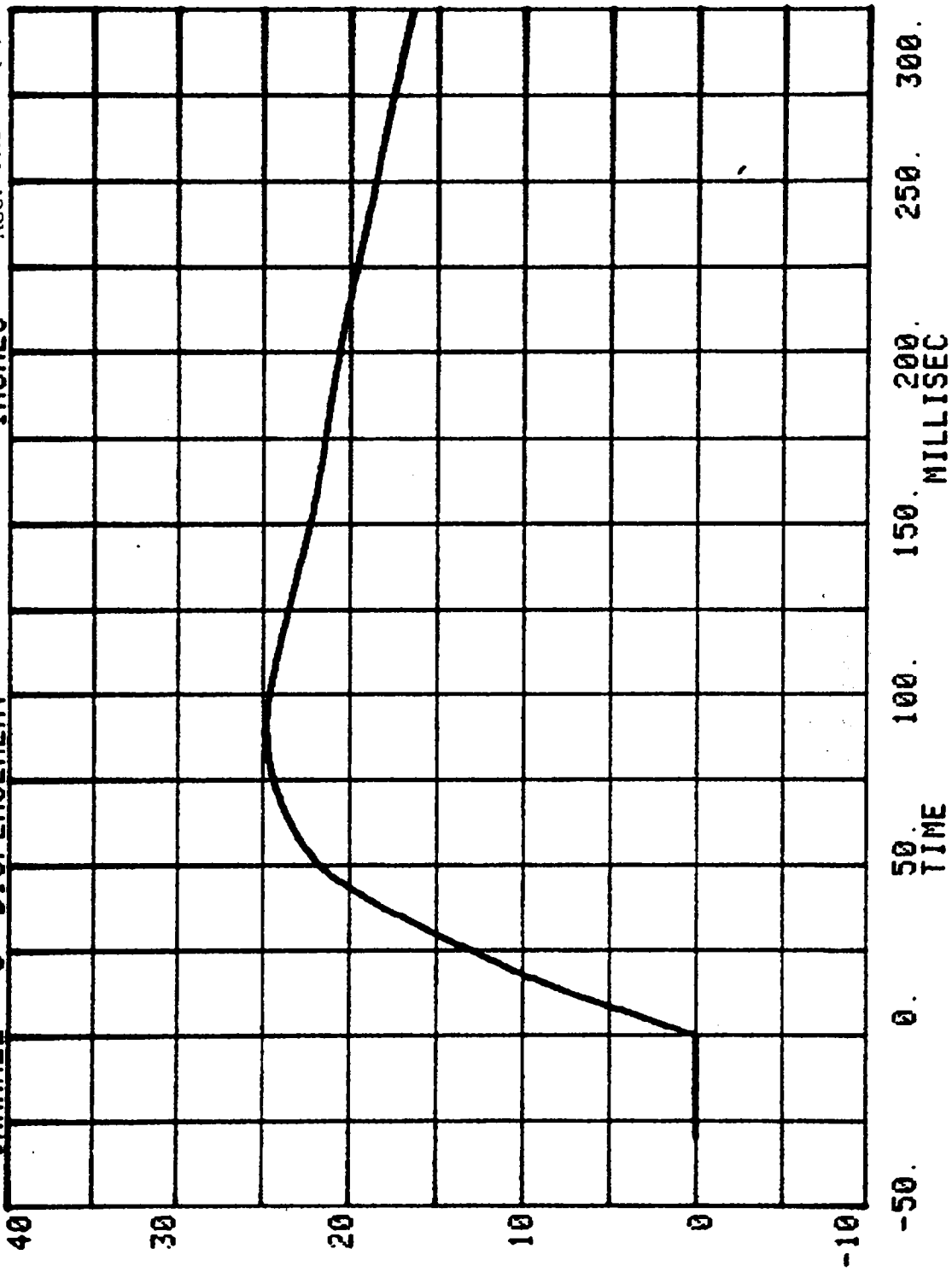


CHANNEL 31 ACC PACK #6(X) RUN= 523 SERIES= 2 G'S

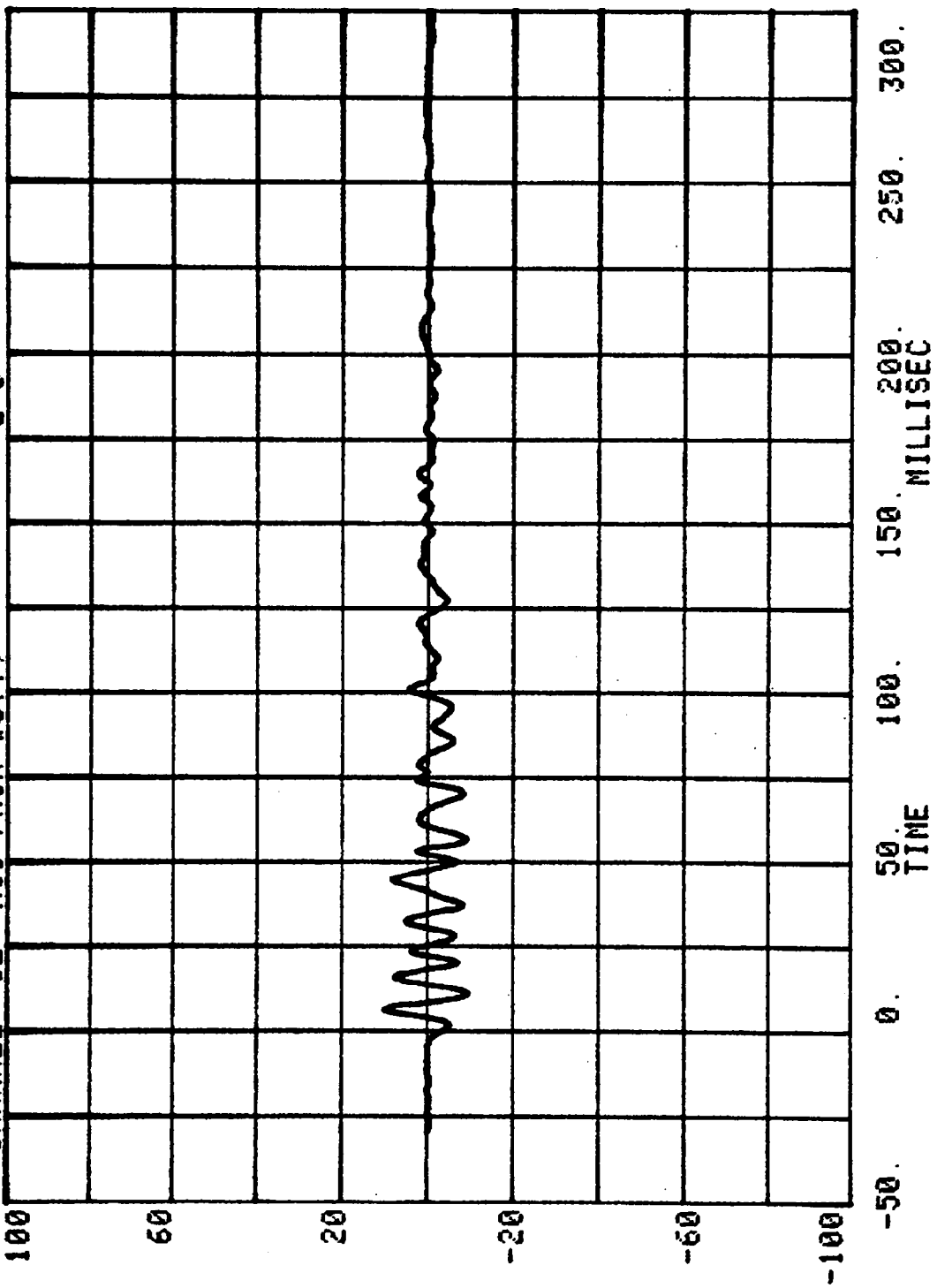




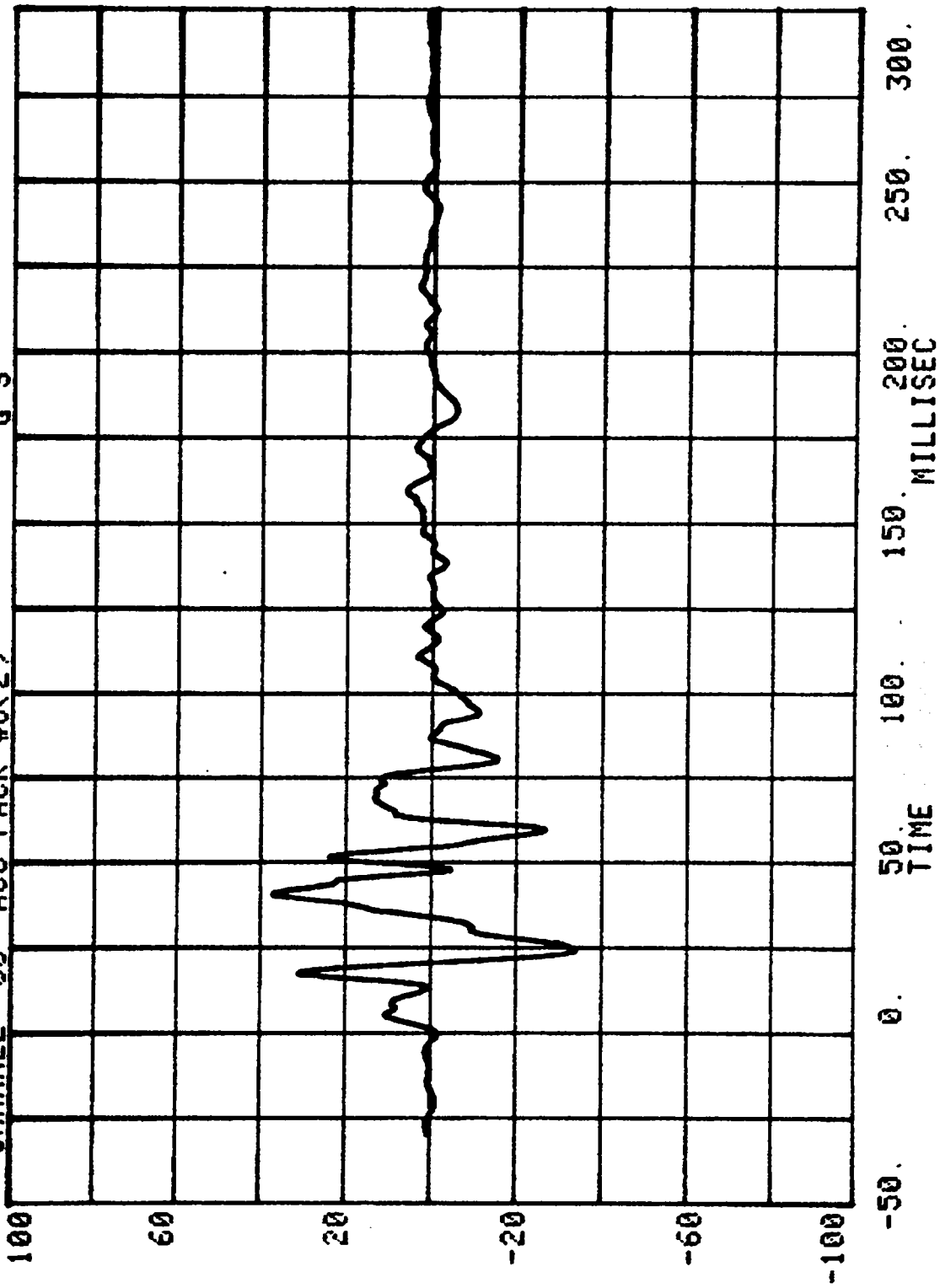
CHANNEL 6 DISPLACEMENT RUN= 523 SERIES= 2 INCHES ACC. PACK #6(X)



CHANNEL 32 ACC PACK #6(Y) RUN= 523 SERIES= 2 G'S



CHANNEL 33 ACC PACK #6(2) RUN= 523 SERIES= 2 G'S



Test No. 703-2-523

1981 AMERICAN MOTORS SPIRIT

DUMMY DATA

	FILTER CHANNEL CLASS
HEAD ACCELERATIONS	1000
CHEST ACCELERATIONS	180
FEMUR FORCES	600
BELT LOADS	60

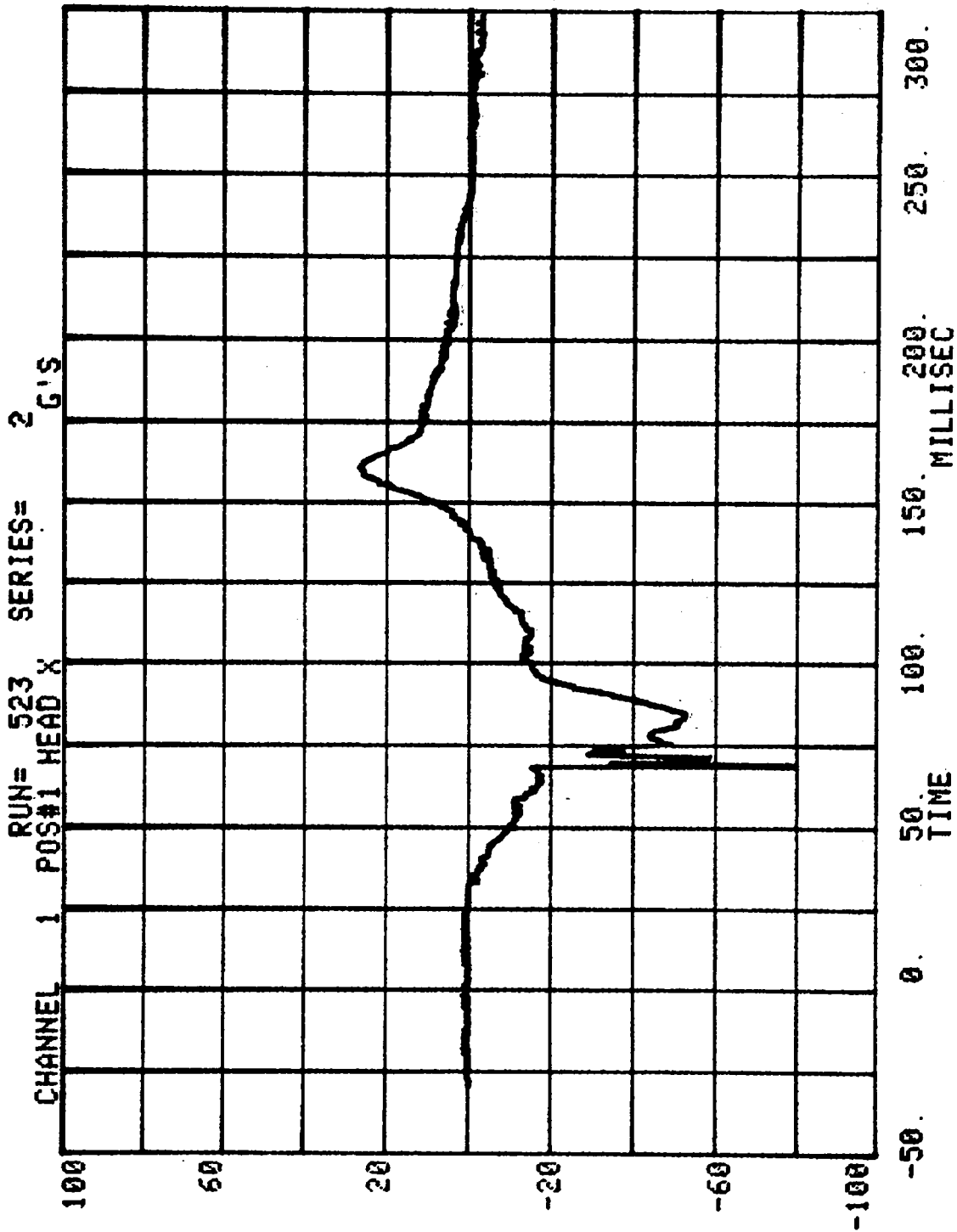
HEAD INJURY CRITERION
HEAD SEVERITY INDEX

NCA FRONTAL BARRIER TEST

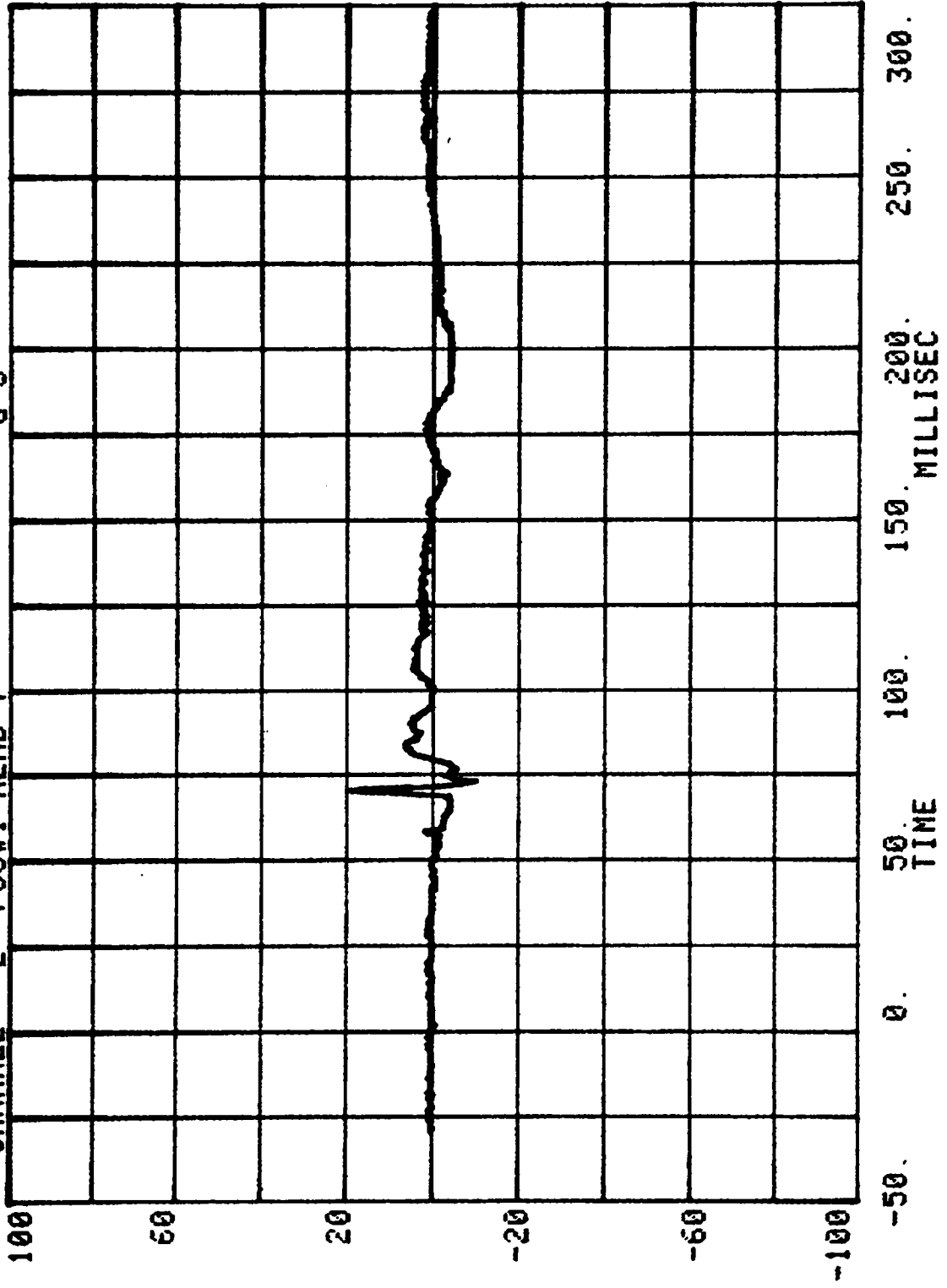
RUN= 523

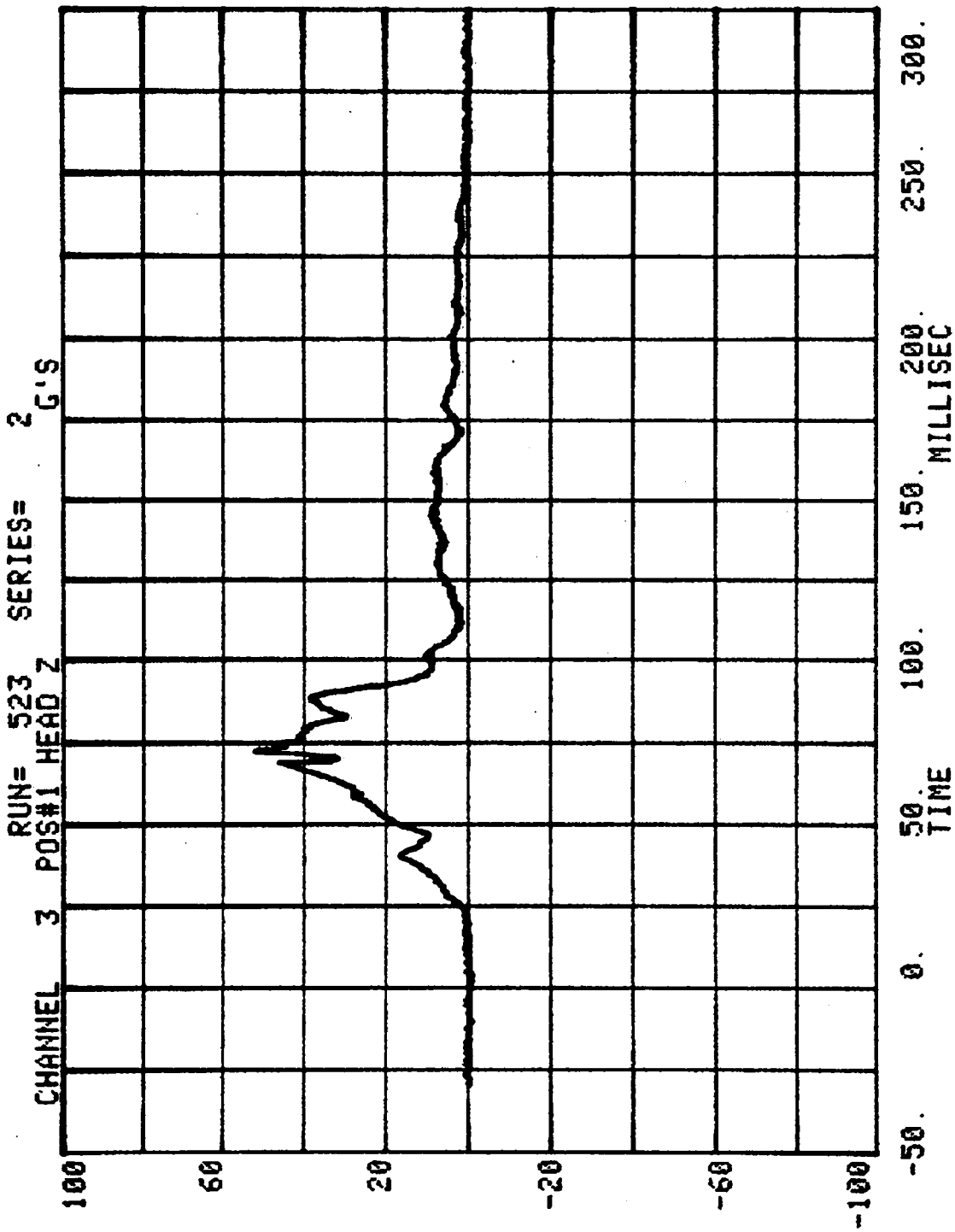
POS#1 HEAD RESULTANT

HIC= 702.4 FROM T1= .06180 TO T2= .09270
AVERAGE ACCELERATION BETWEEN T1 AND T2= 55.3G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX= 929.5



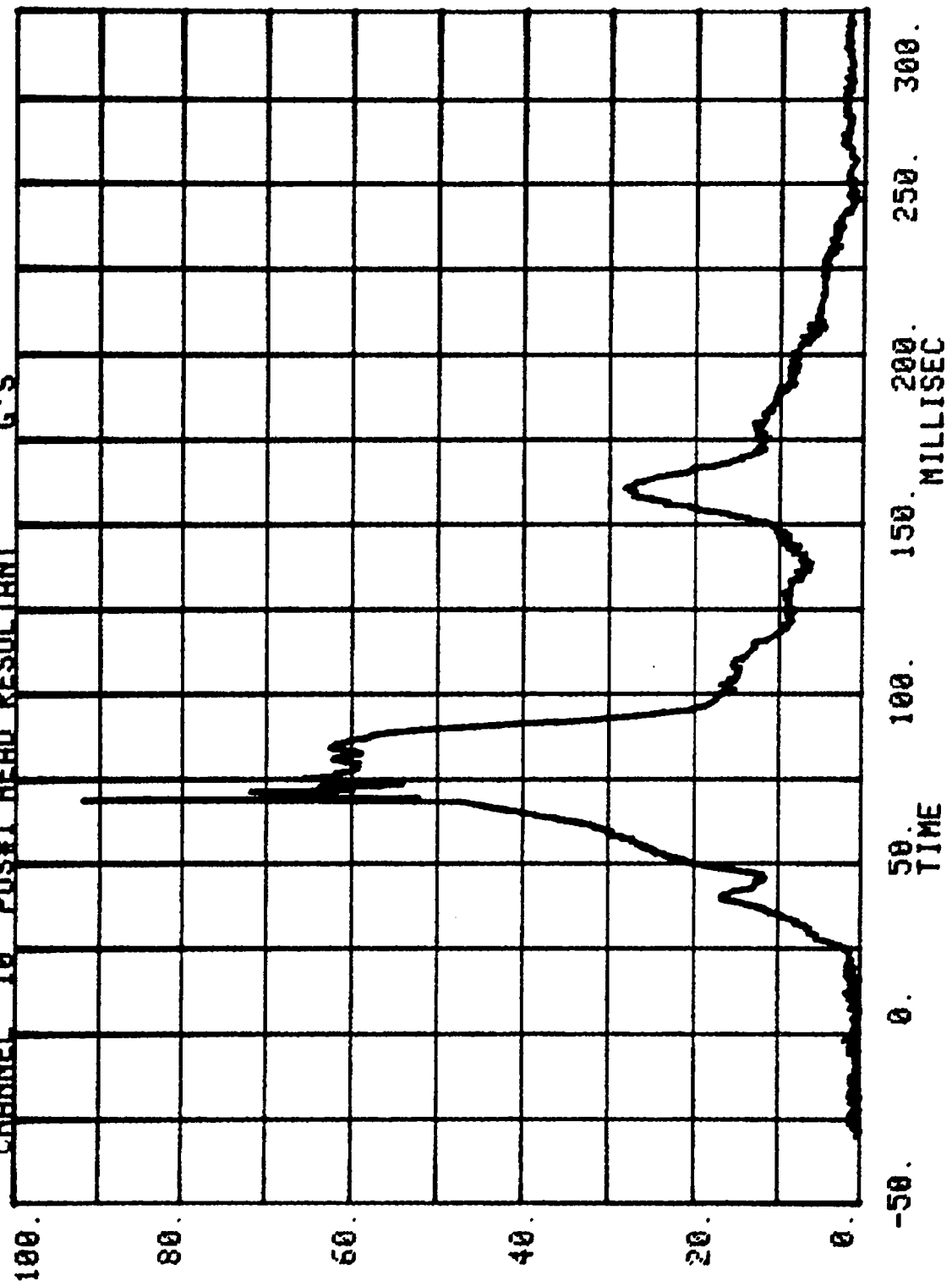
CHANNEL 2 POS#1 HEAD Y
RUN= 523 SERIES= 2 G'S

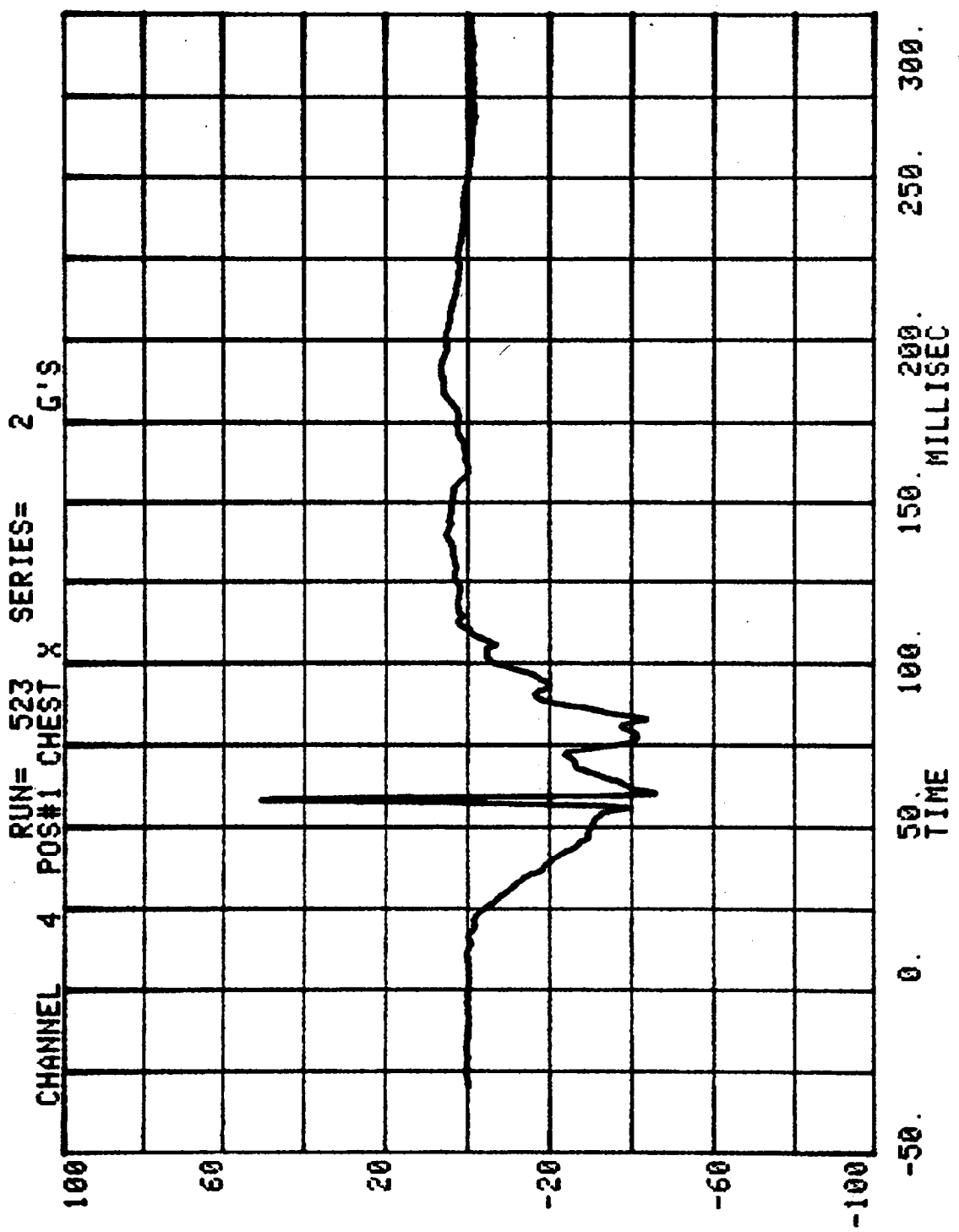




CHANNEL 10 POS#1 HEAD RESULTANT 2 G'S

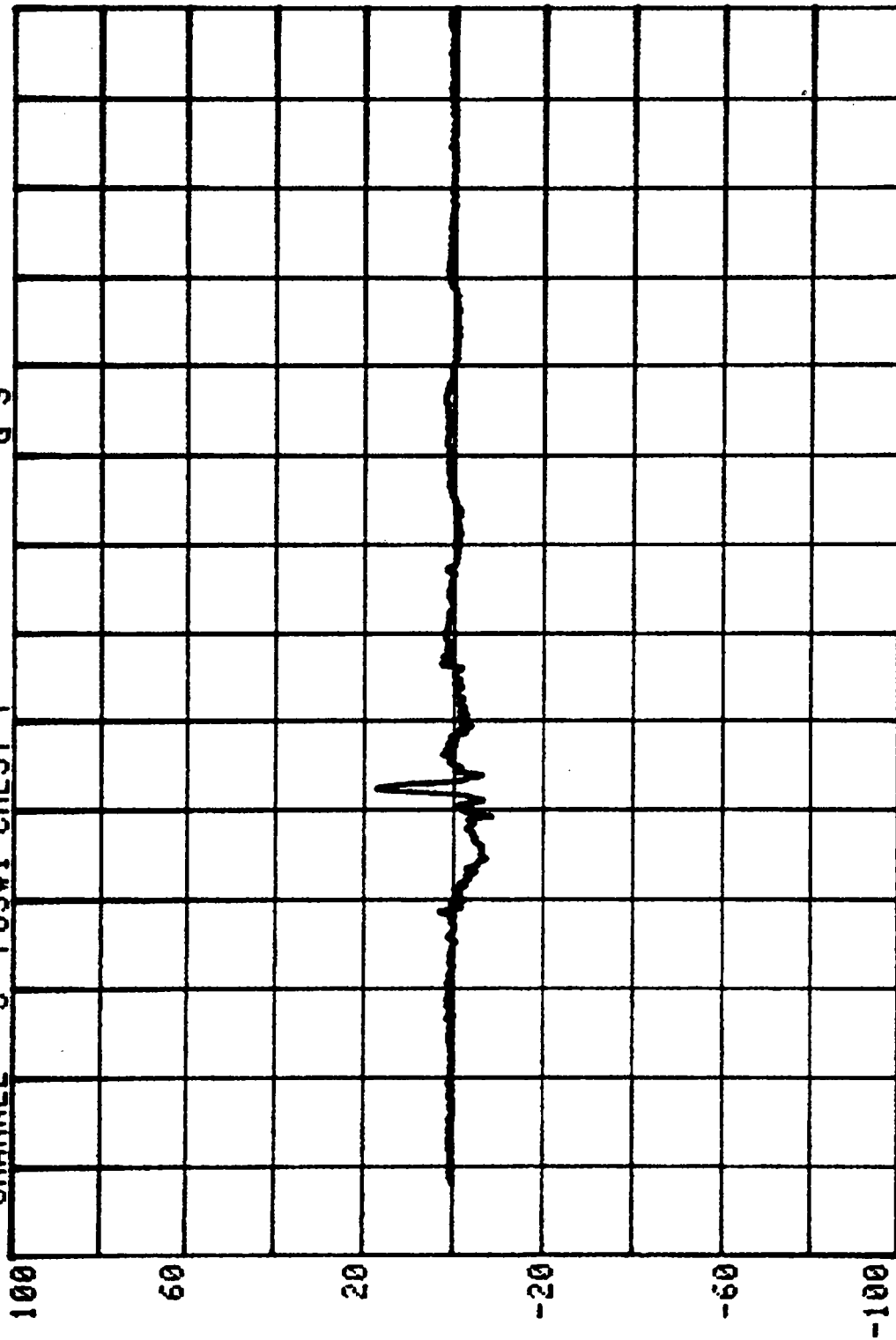
RUN= 523 SERIES=





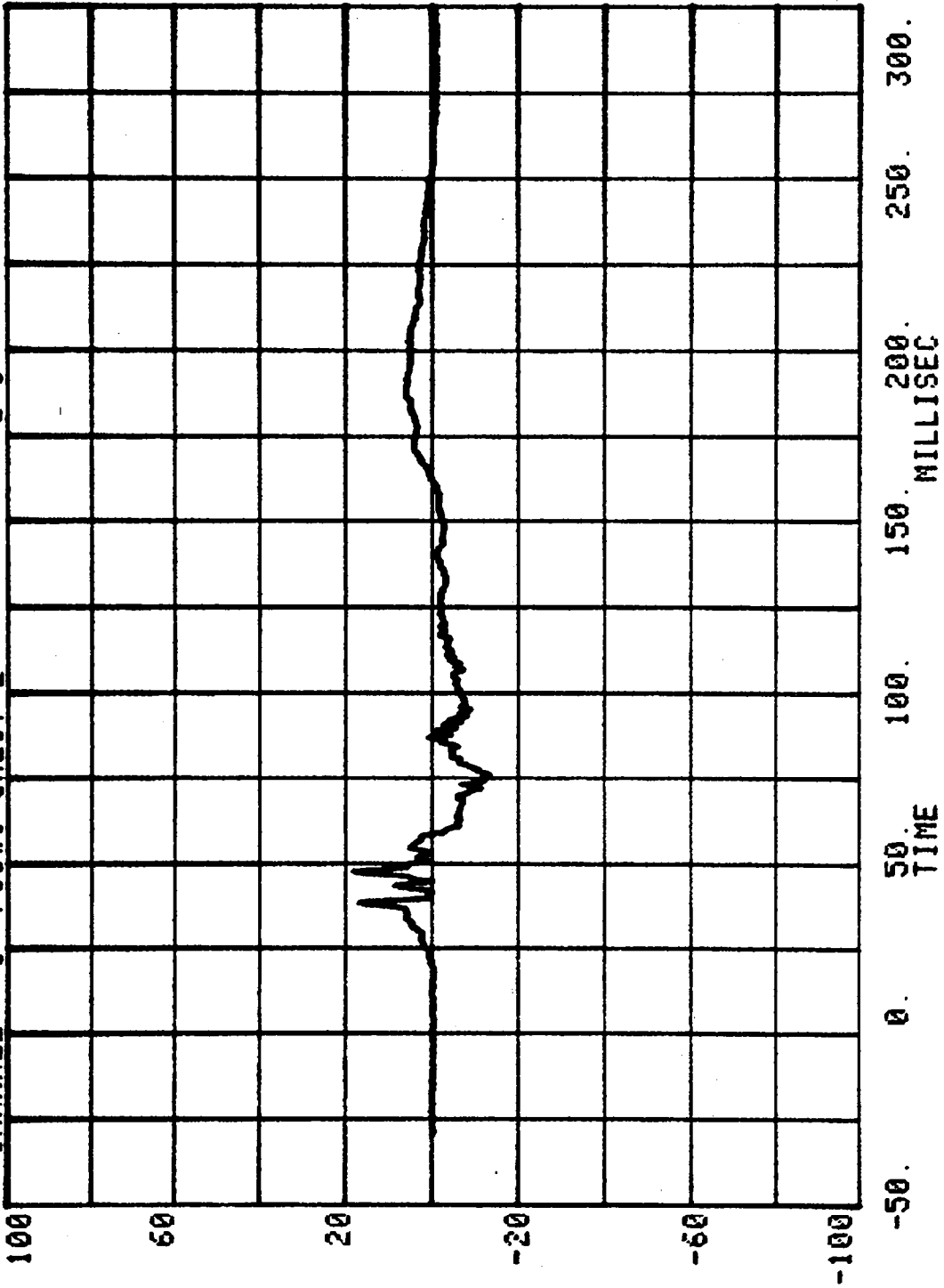
CHANNEL 5 POS#1 CHEST Y SERIES= 2 G'S

RUN= 523



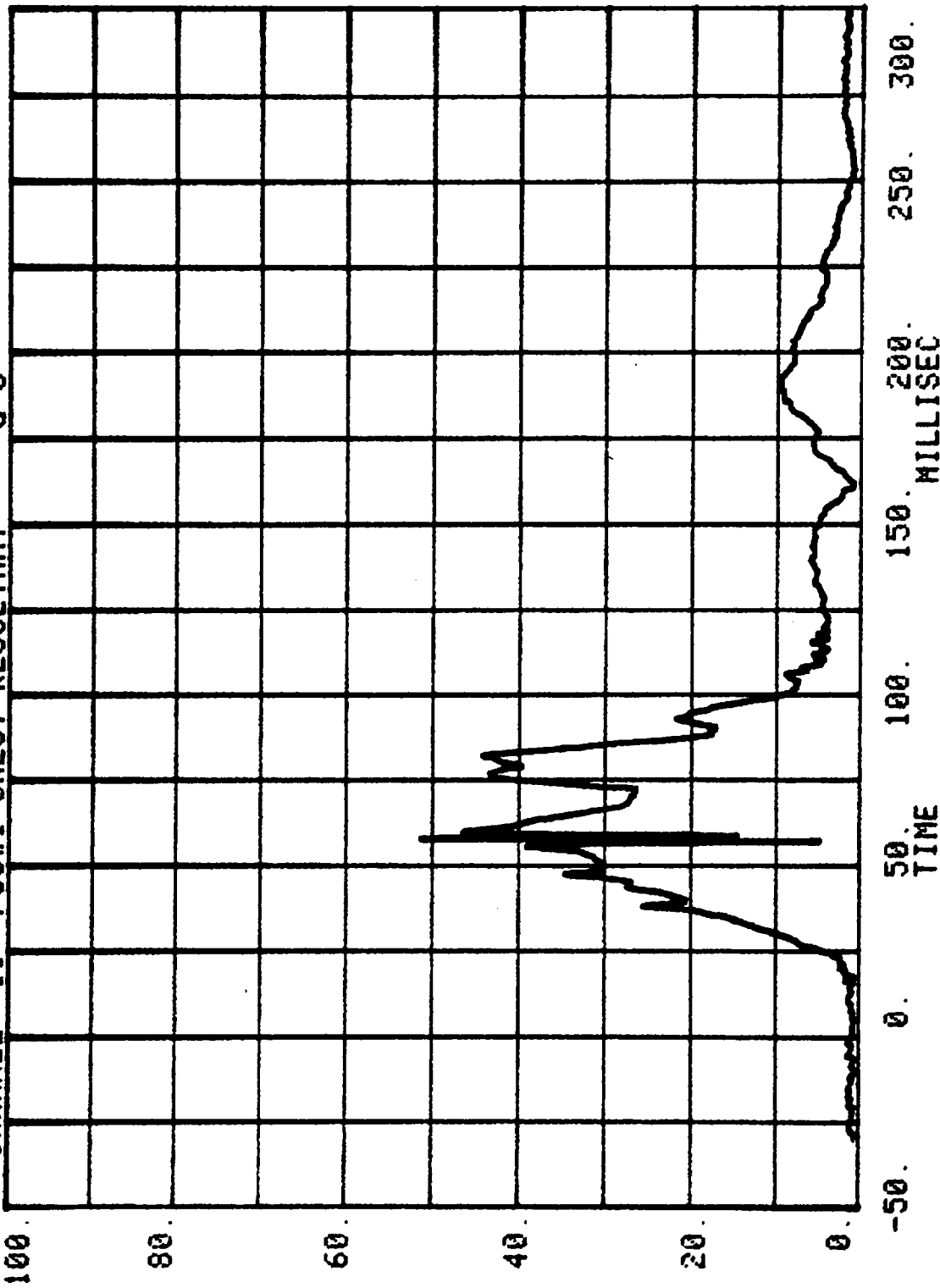
100
60
20
-20
-60
-100
-50. 0. 50. 100. 150. 200. 250. 300.
TIME

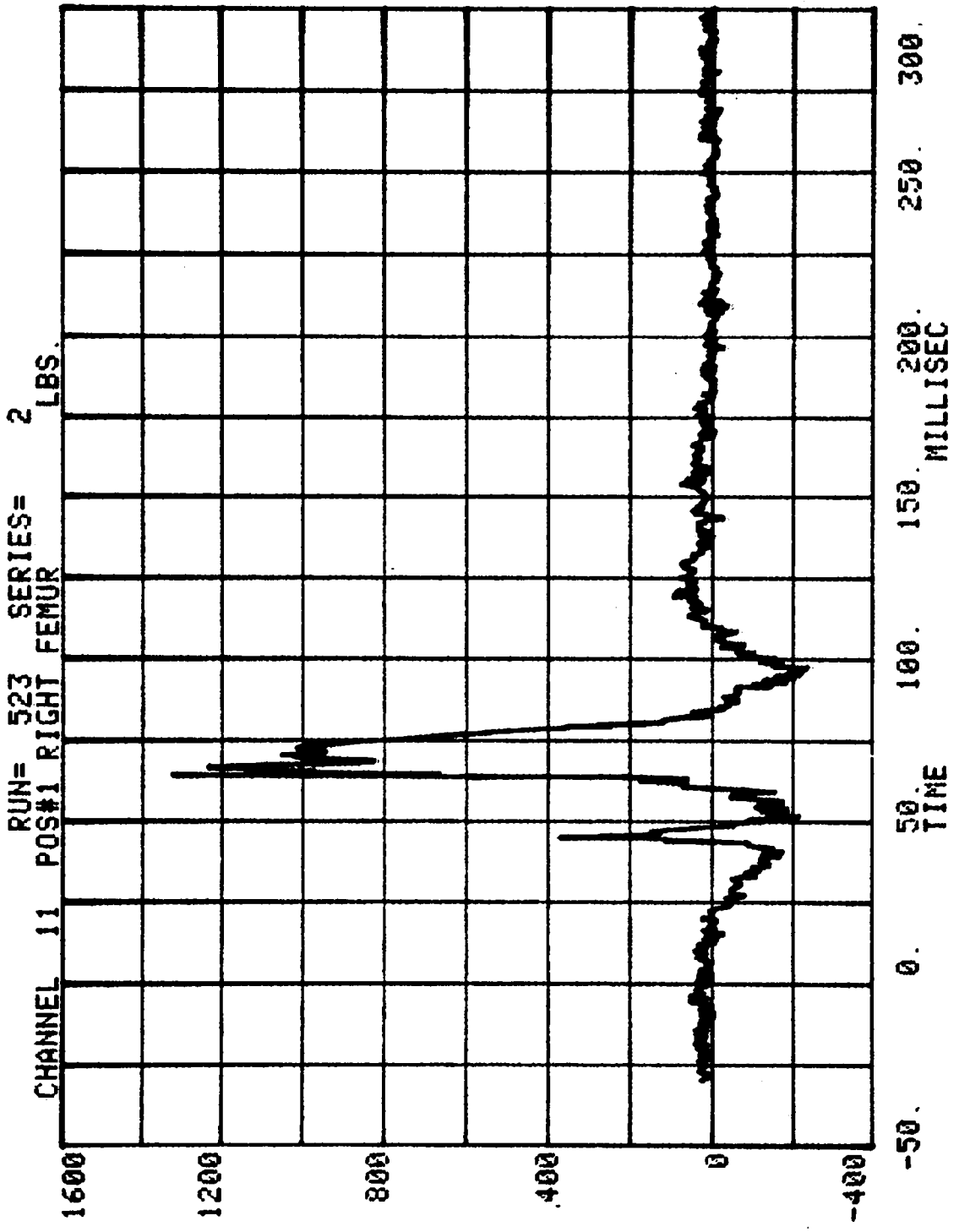
CHANNEL 6 POS#1 CHEST Z
RUN= 523 SERIES= 2 G'S



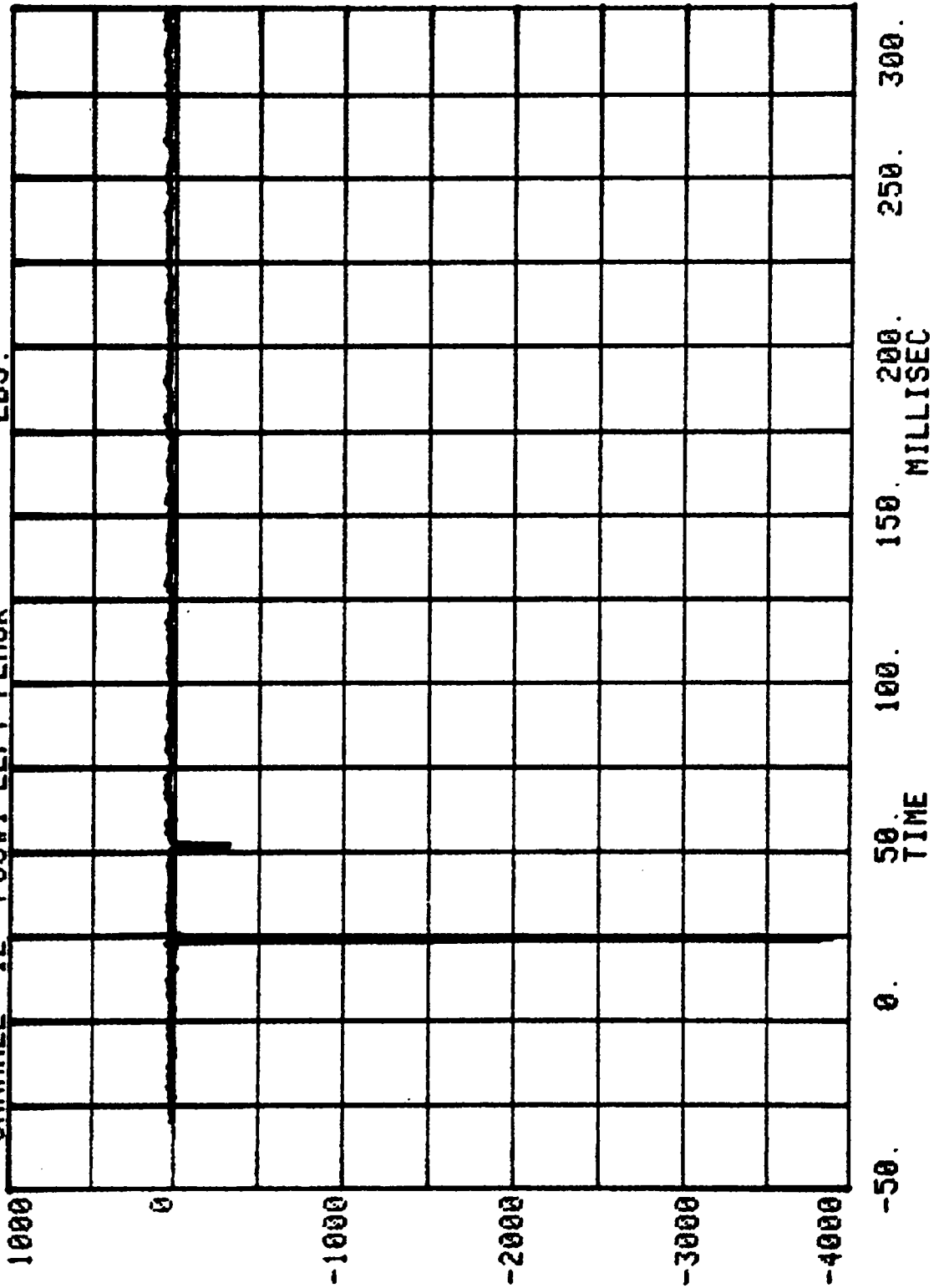
CHANNEL 11 POS#1 CHEST RESULTANT 2 G'S

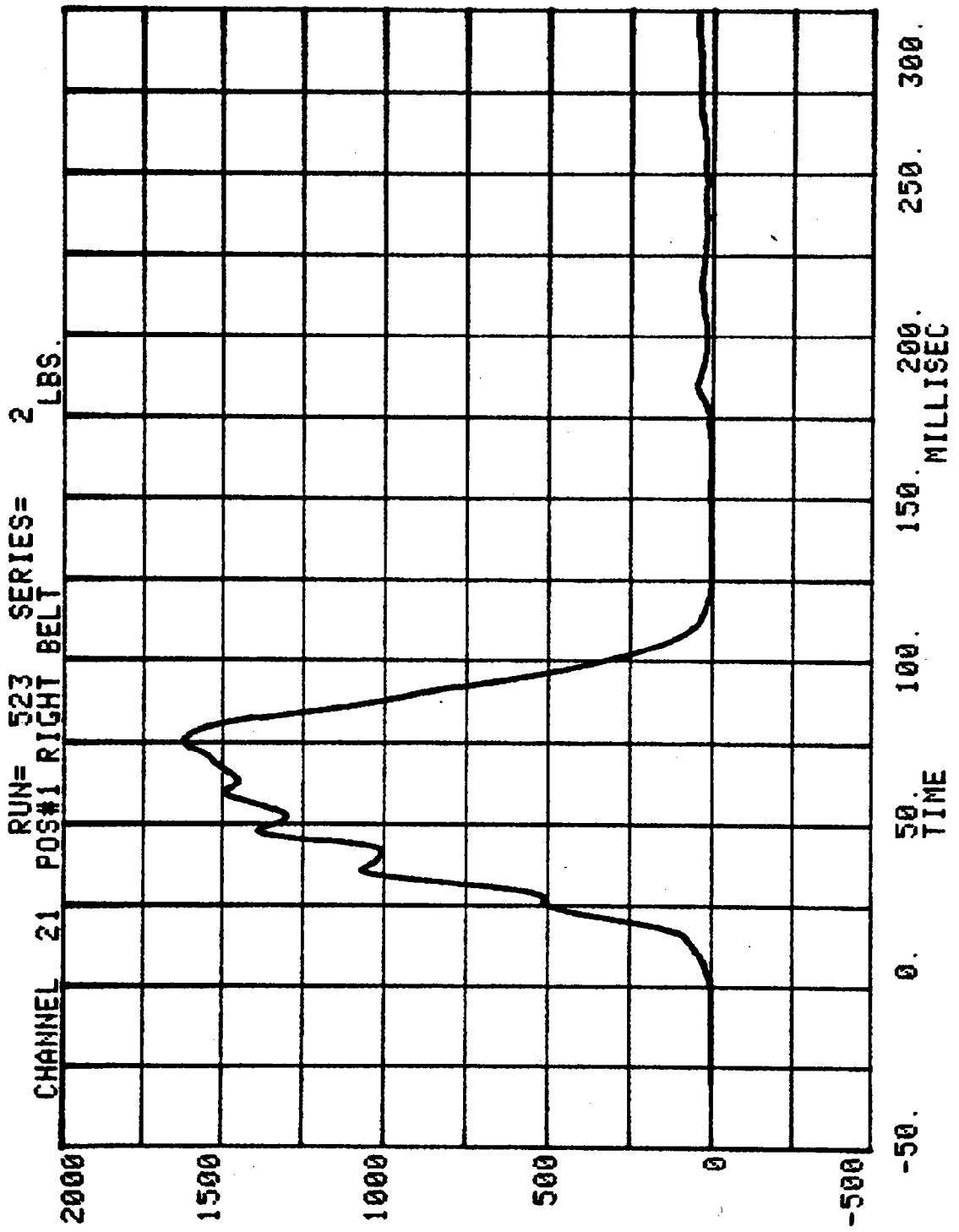
RUN= 523 SERIES=





CHANNEL 12 POS#1 LEFT FEMUR SERIES= 2 LBS.





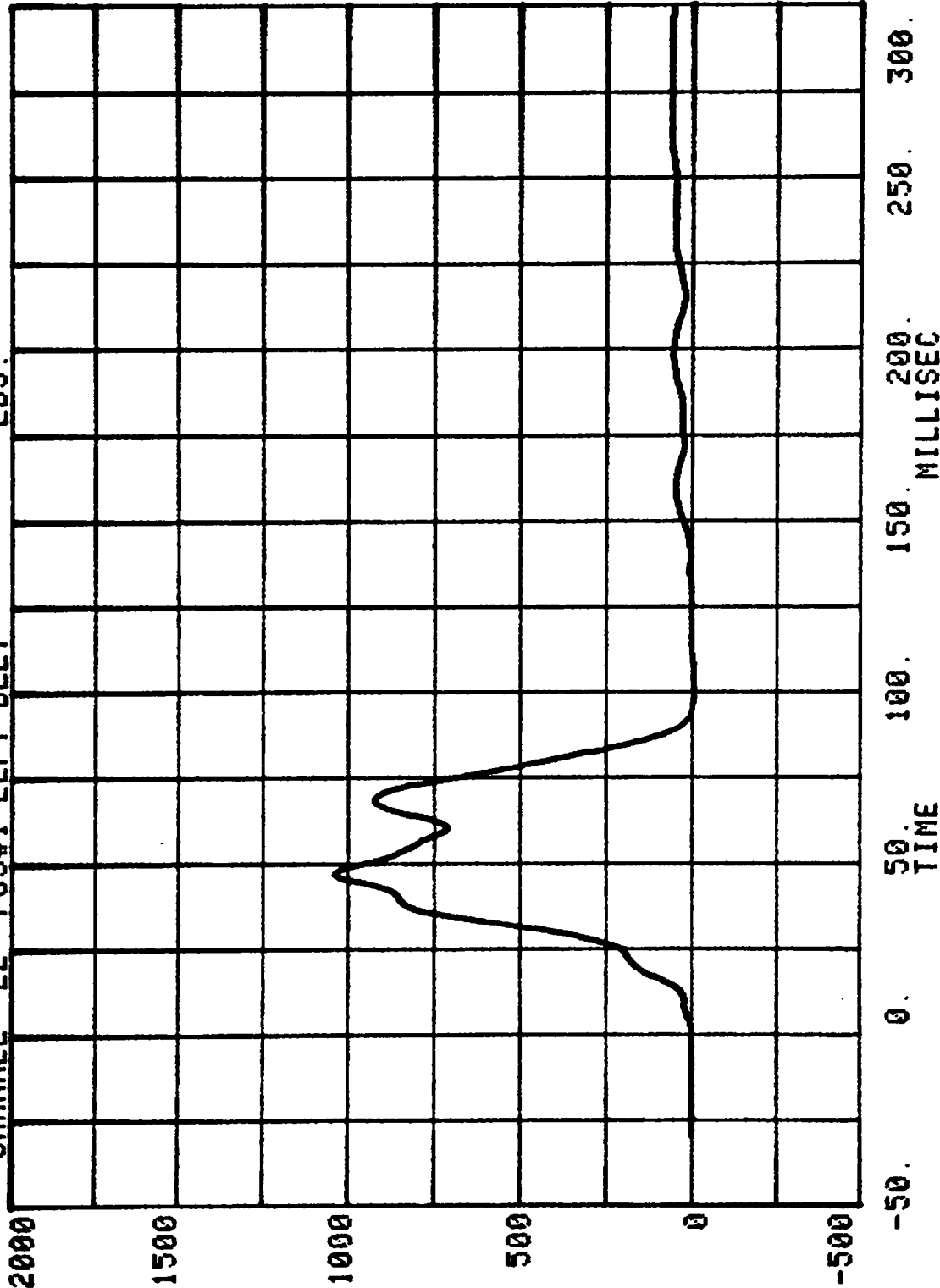
CHANNEL 22 POS#1 LEFT BELT

RUN= 523

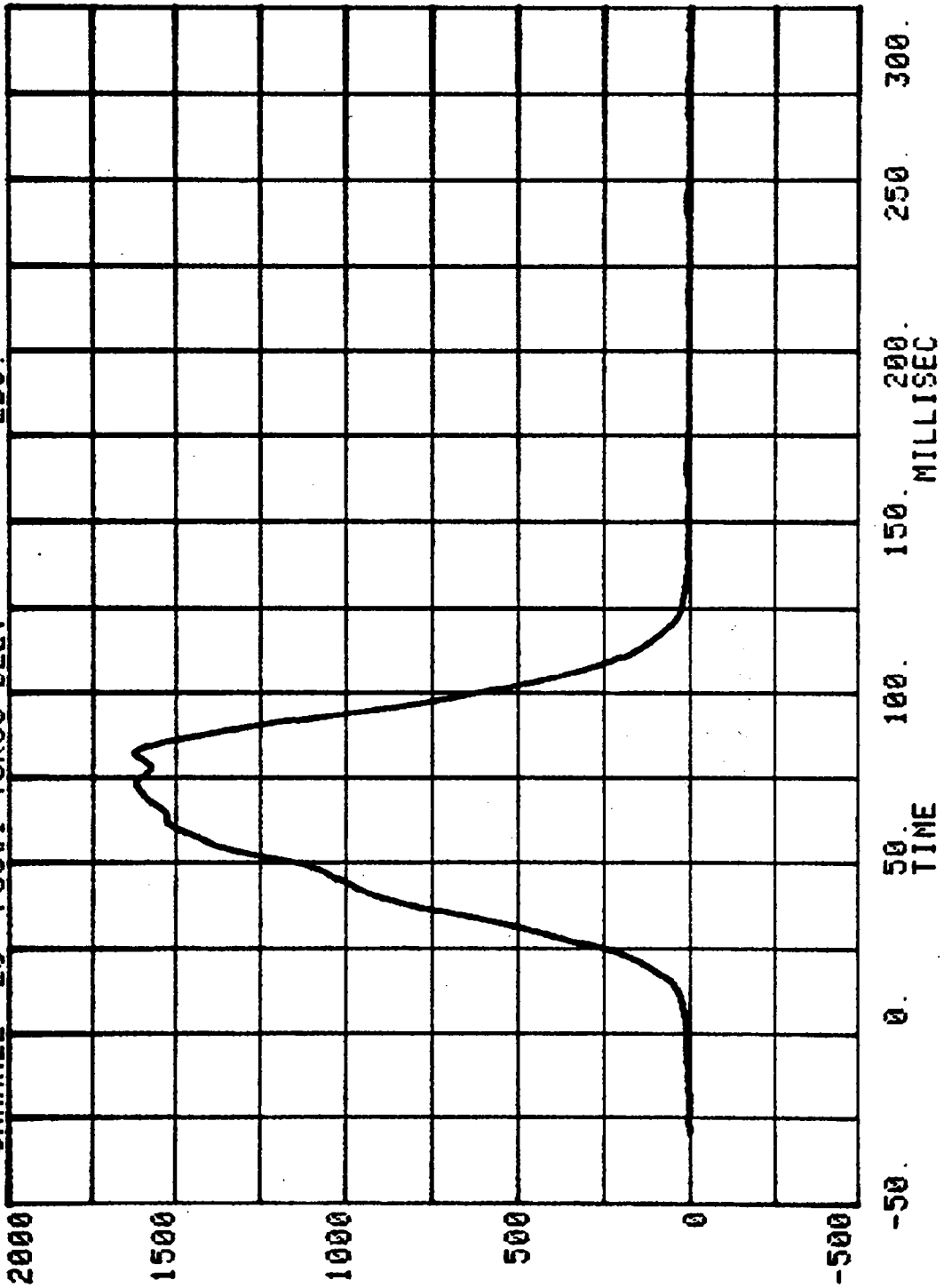
SERIES=

2

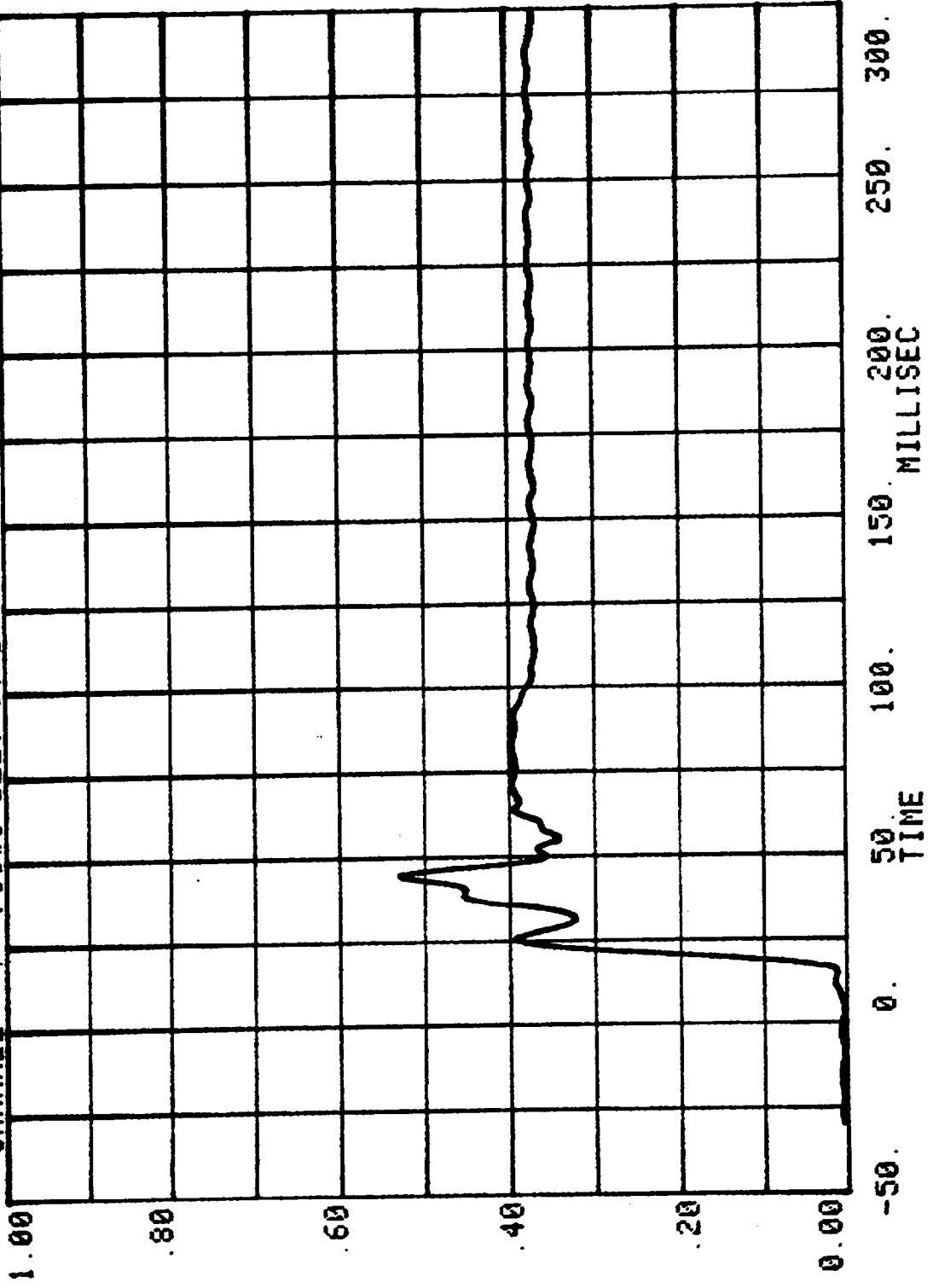
LBS.



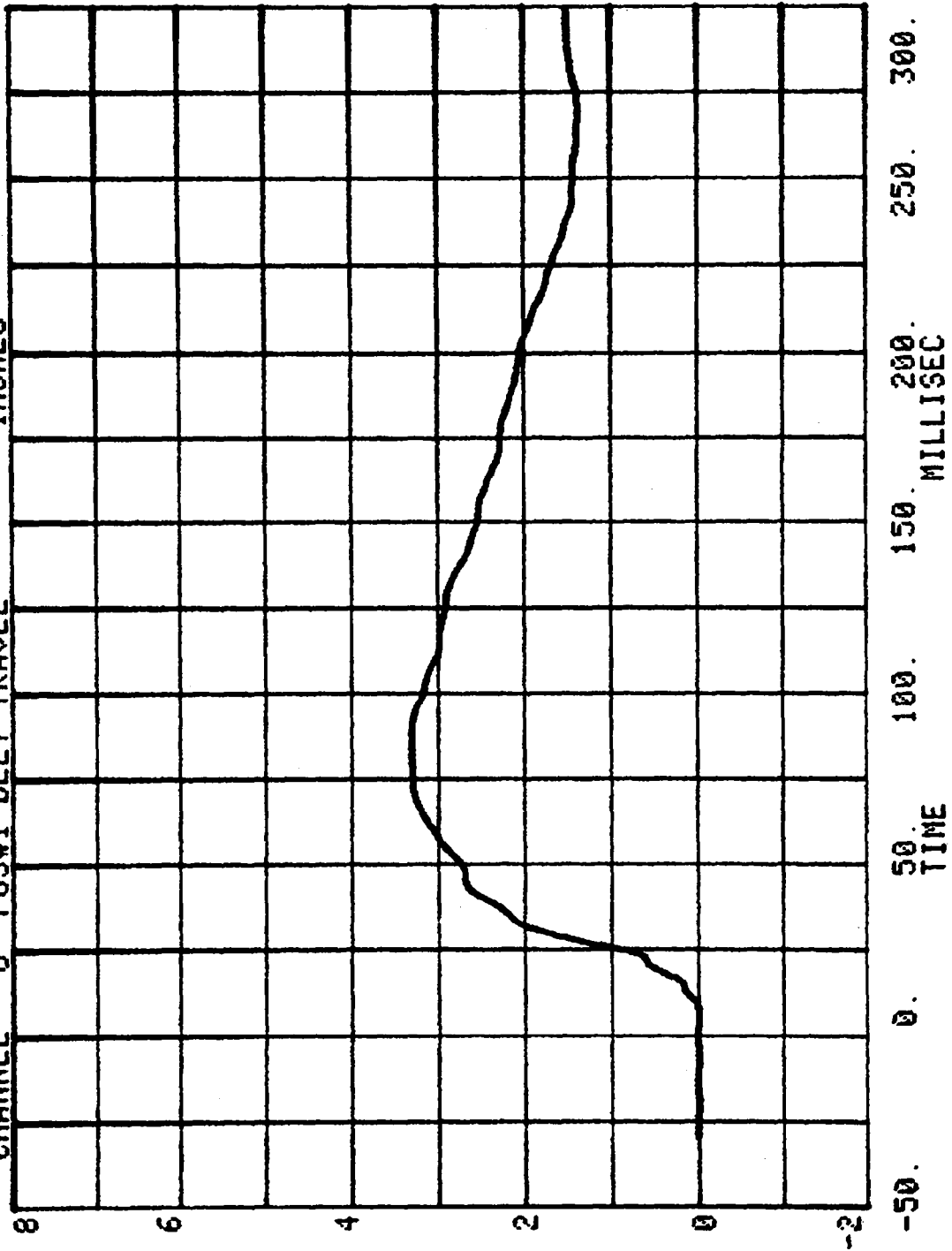
CHANNEL 23 POS#1 TORSO BELT SERIES= 2 LBS.



CHANNEL 7 POS#1 BELT STRETCH SERIES= 2 INCHES MEASURED OVER 3 INCHES
RUN= 523



CHANNEL 8 POS#1 BELT TRAVEL SERIES= 2 INCHES



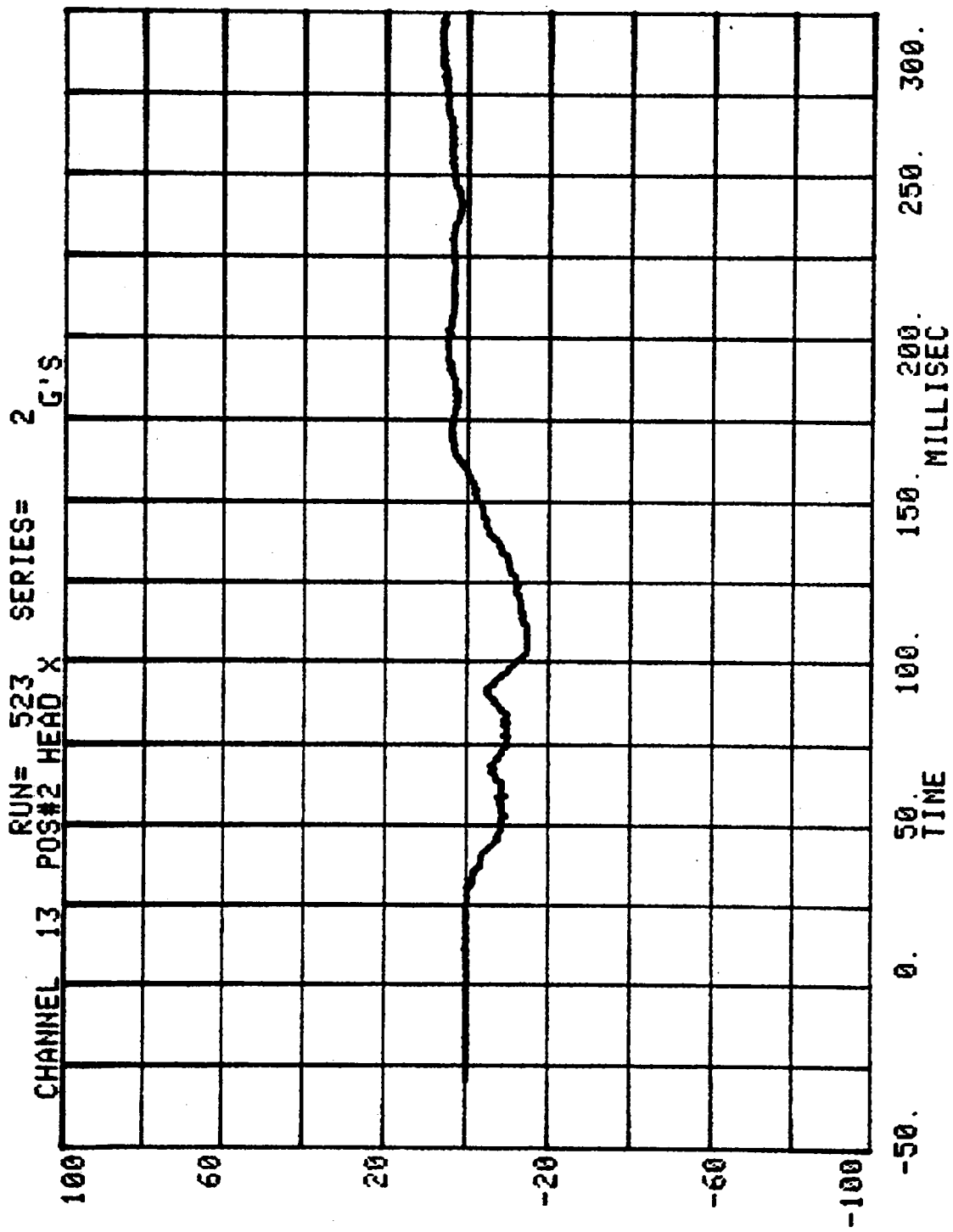
HEAD INJURY CRITERION
HEAD SEVERITY INDEX

NCA FRONTAL BARRIER TEST

RUN= 523

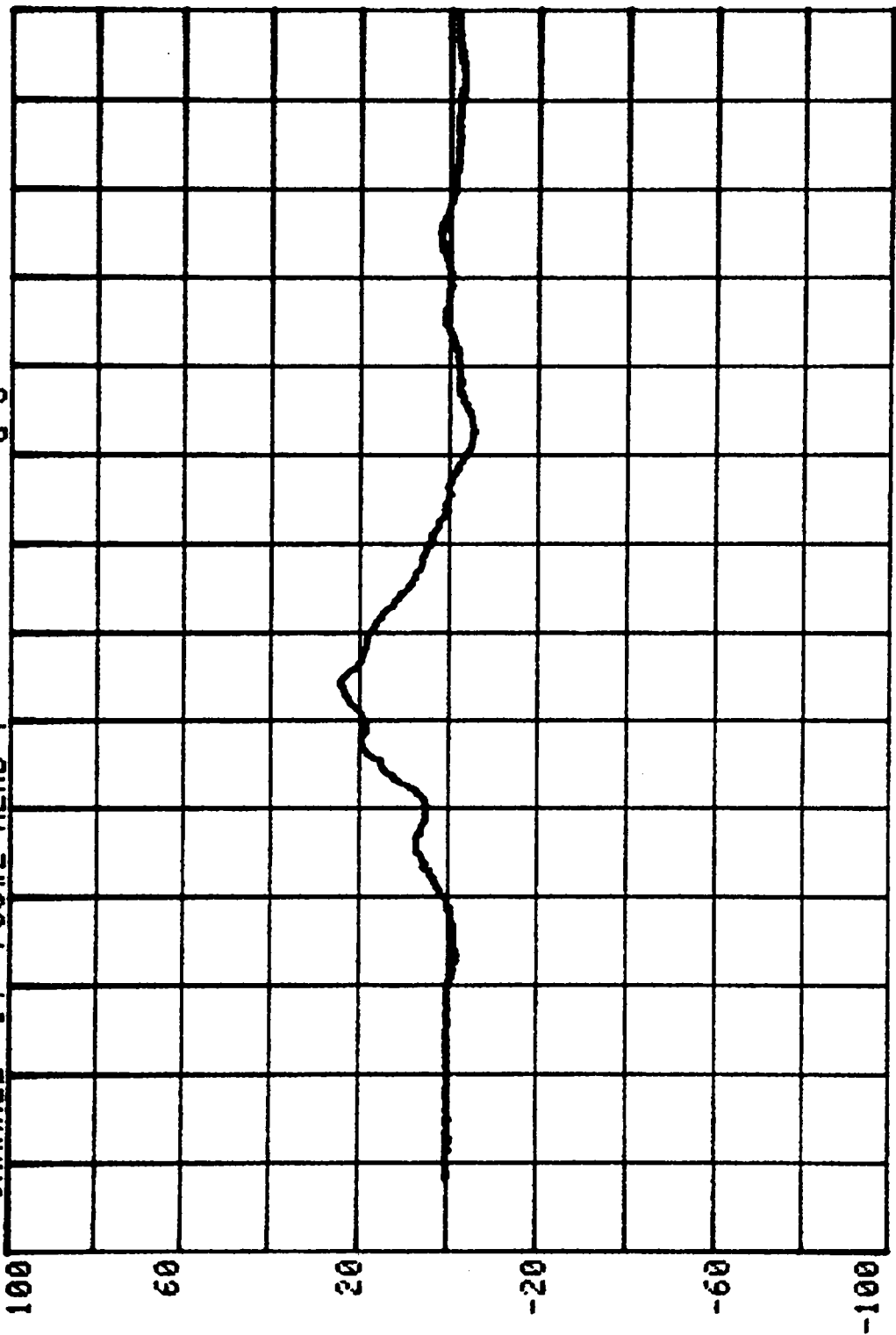
POS#2 HEAD RESULTANT

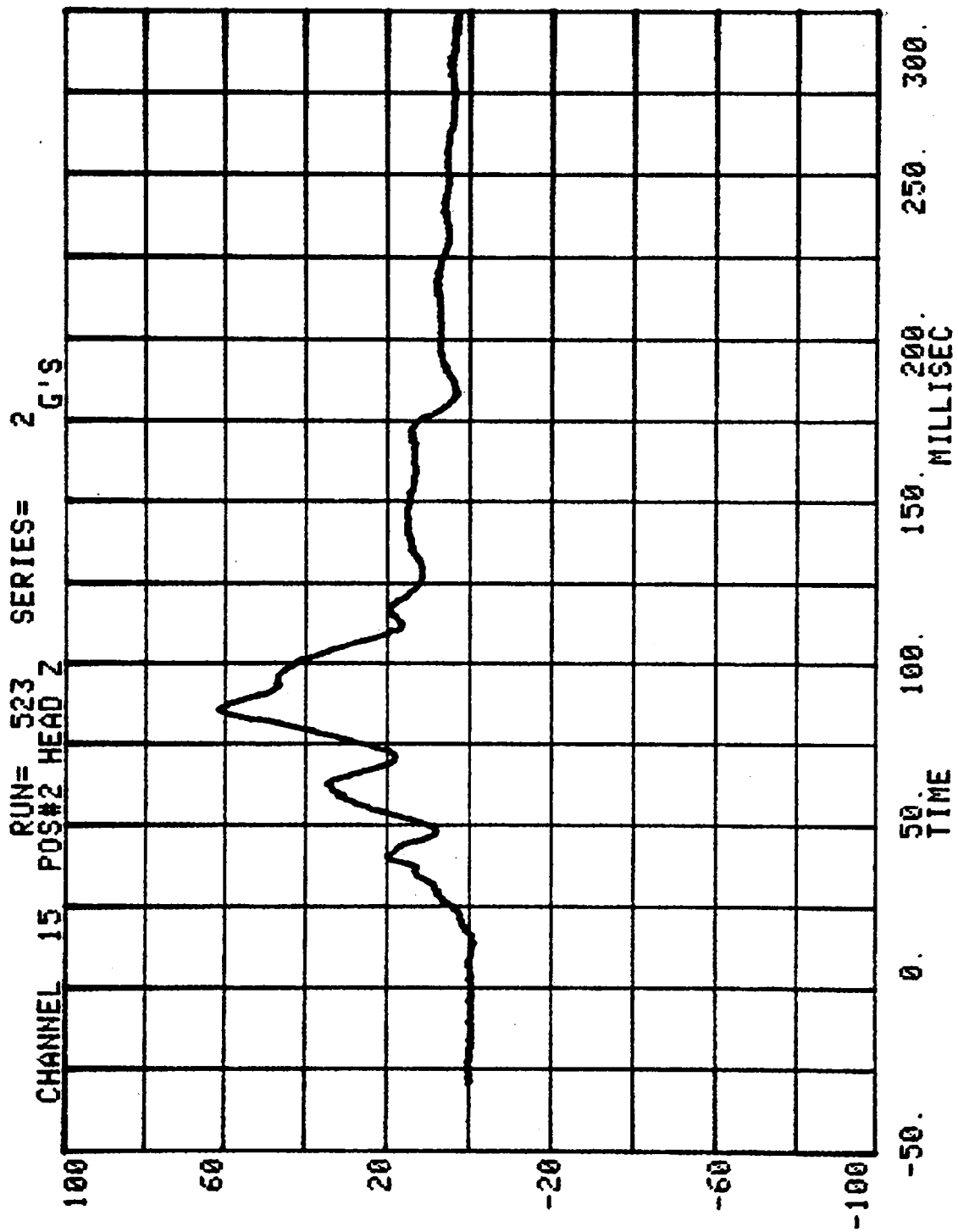
HIC= 652.3 FROM T1= .05370 TO T2= .12840
AVERAGE ACCELERATION BETWEEN T1 AND T2= 37.7G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX= 876.6



CHANNEL 14 POS#2 HEAD Y SERIES= 2 G'S

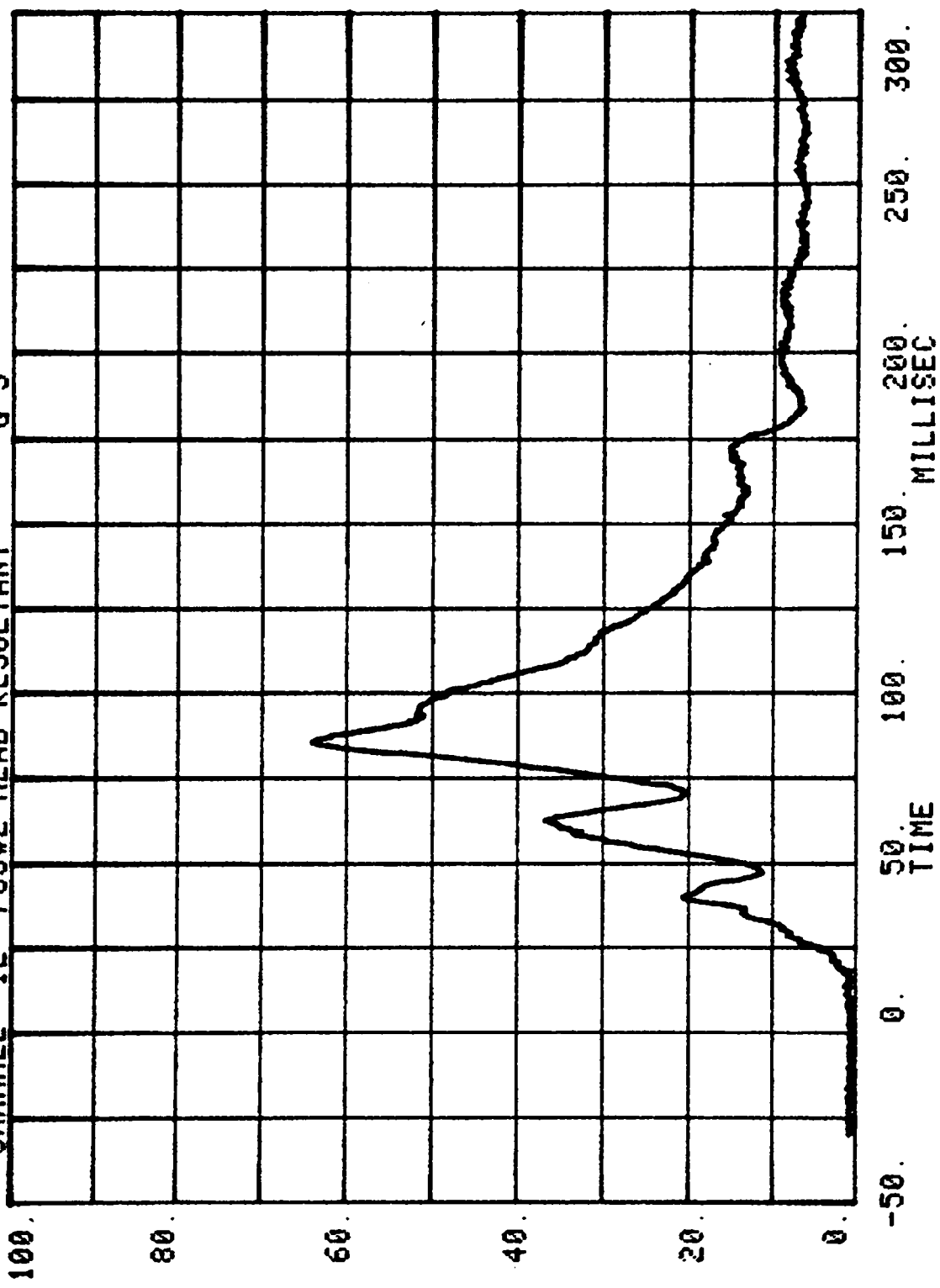
RUN= 523

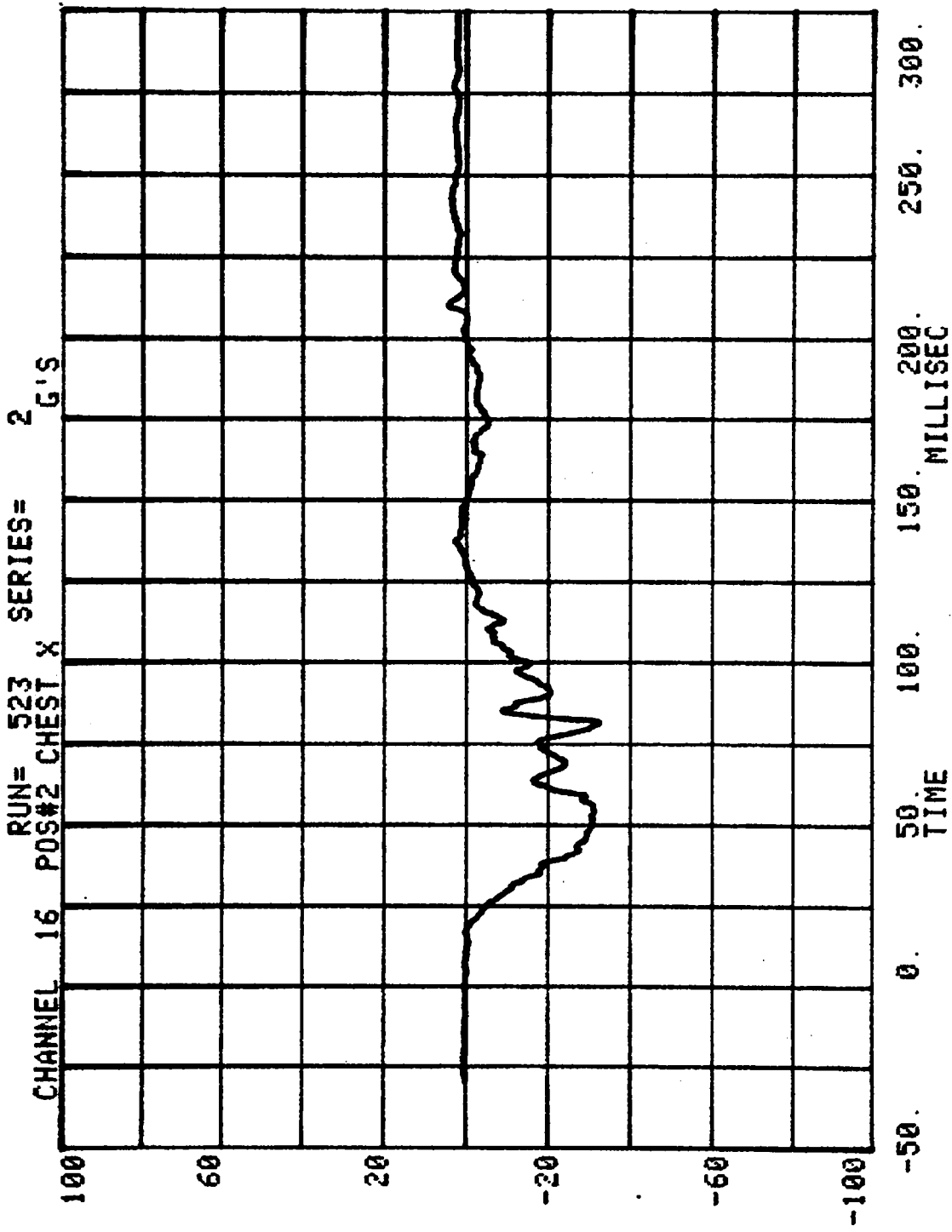




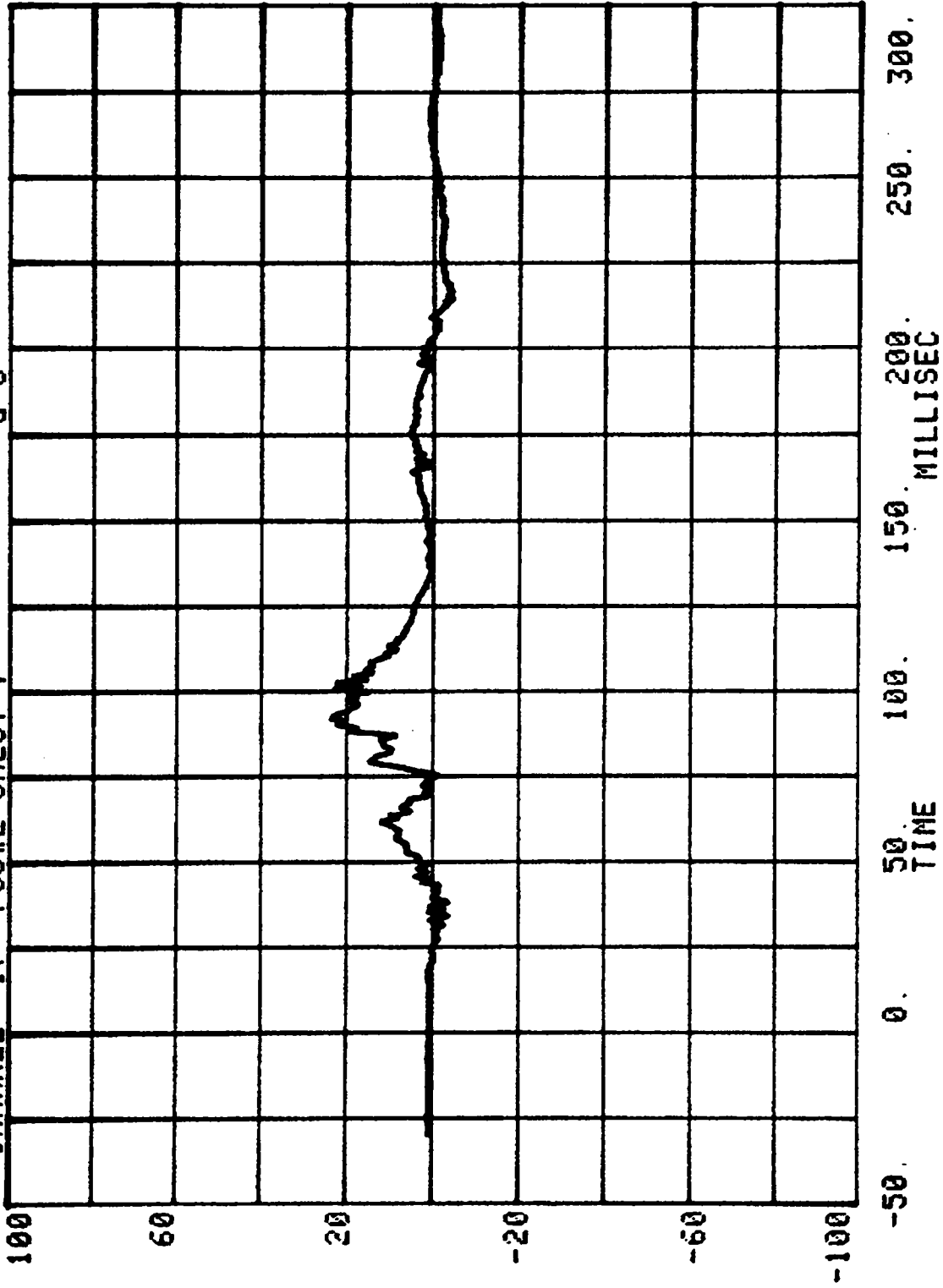
CHANNEL 12 POS#2 HEAD RESULTANT 2 G'S

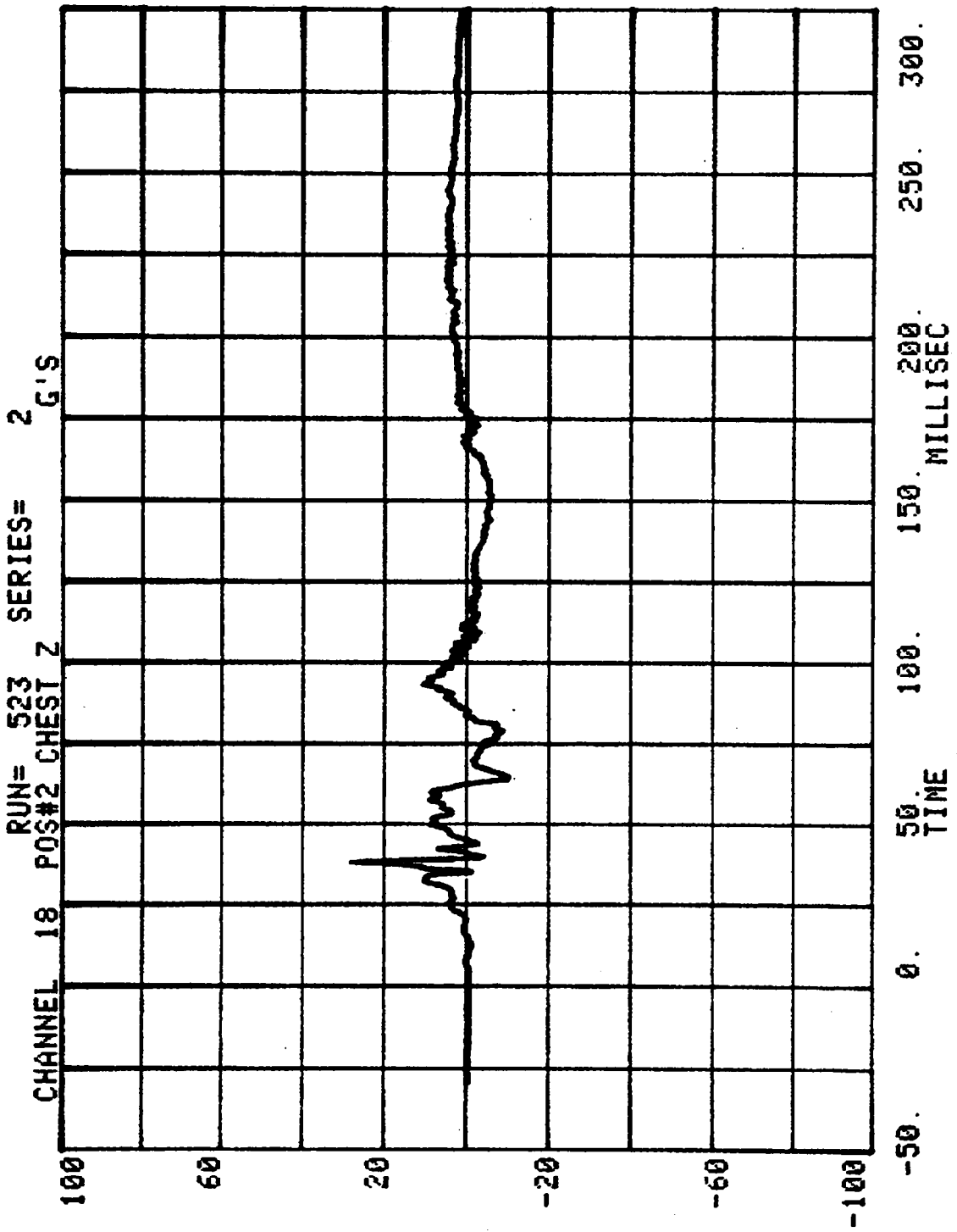
RUN= 523 SERIES=





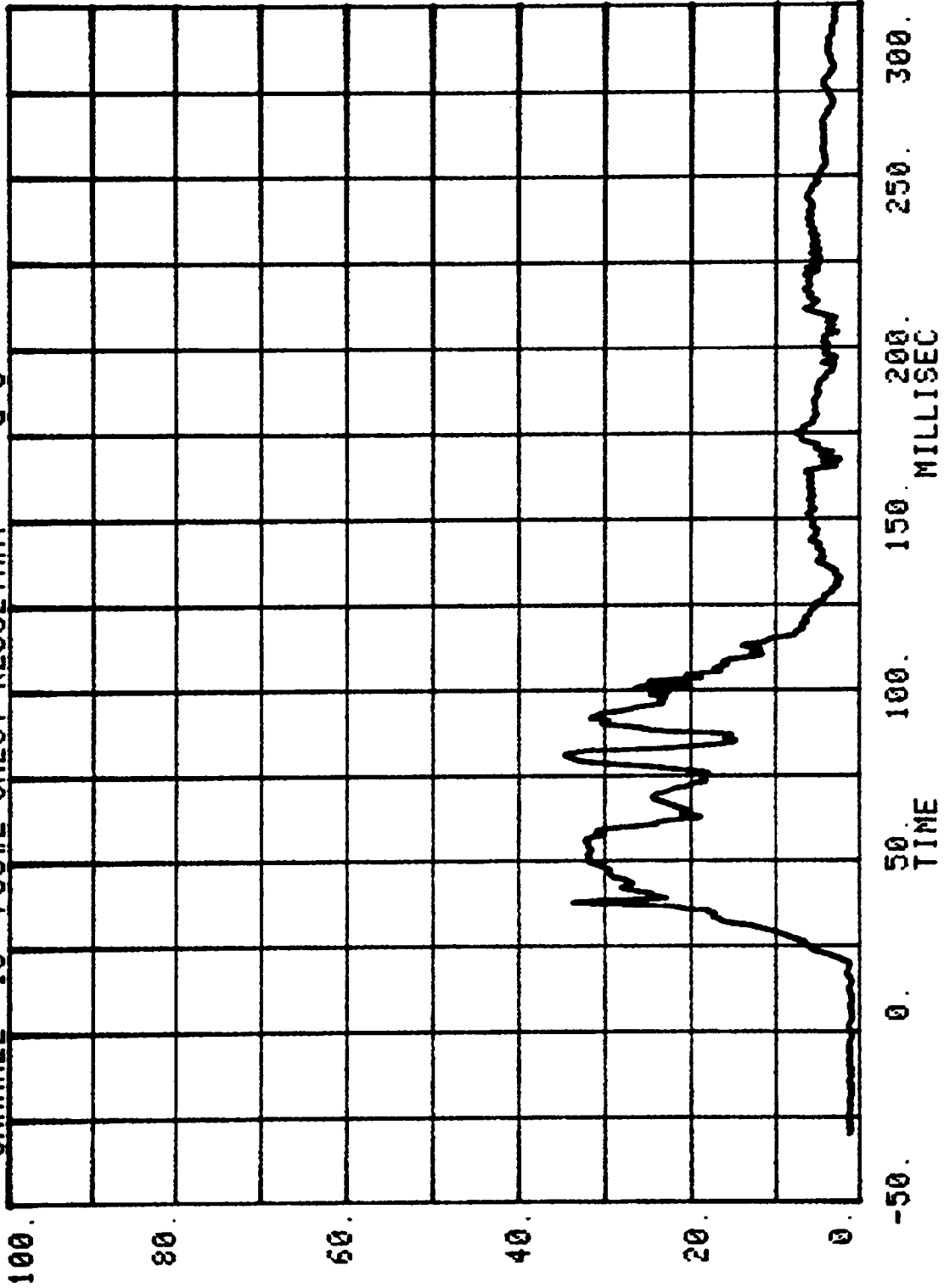
CHANNEL 17 POS#2 CHEST Y
RUN= 523 SERIES= 2 G'S



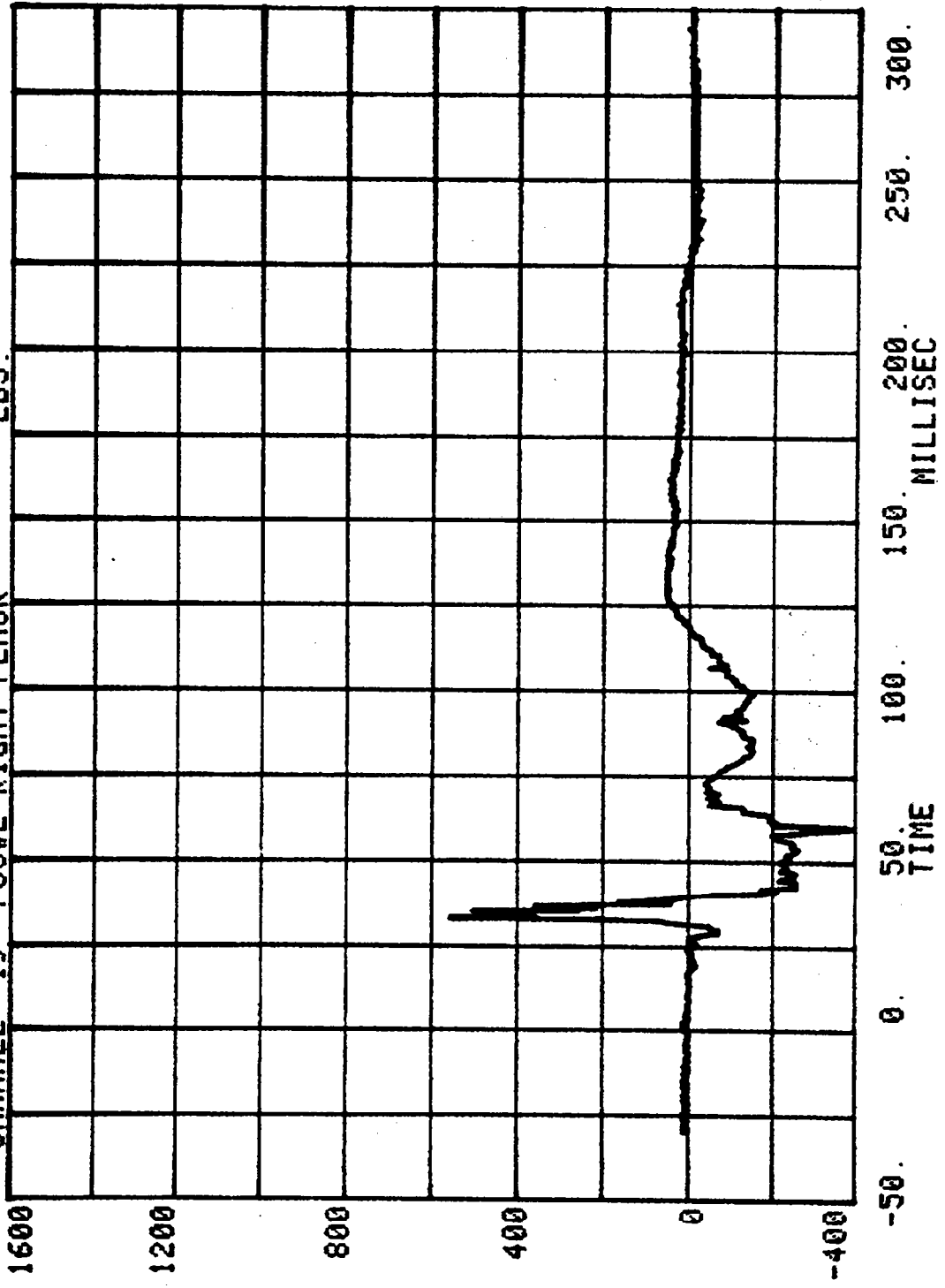


CHANNEL 13 POS#2 CHEST RESULTANT 2 G'S

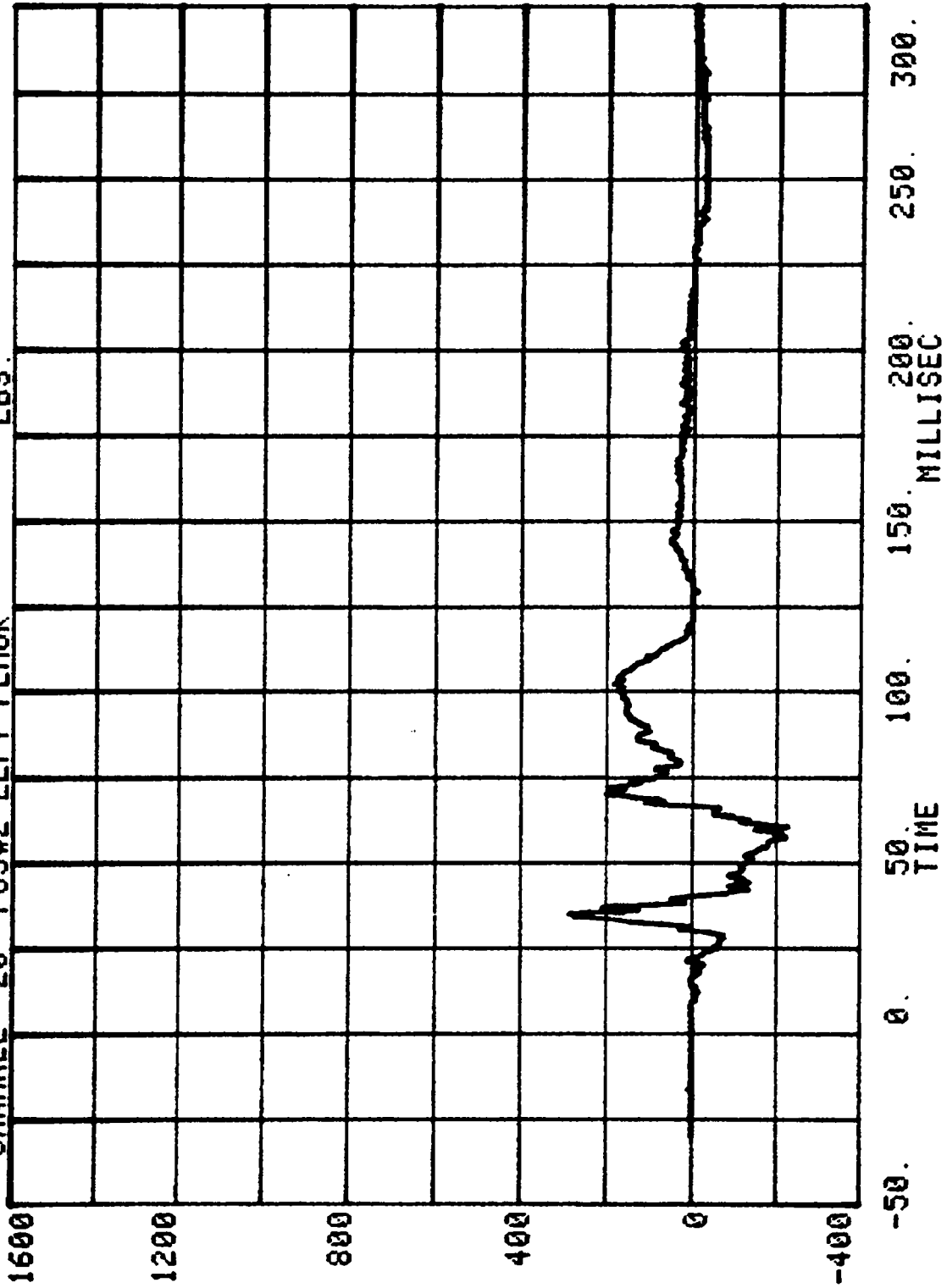
RUN= 523 SERIES=



CHANNEL 19 POS#2 RIGHT FEMUR
RUN= 523 SERIES= 2 LBS.



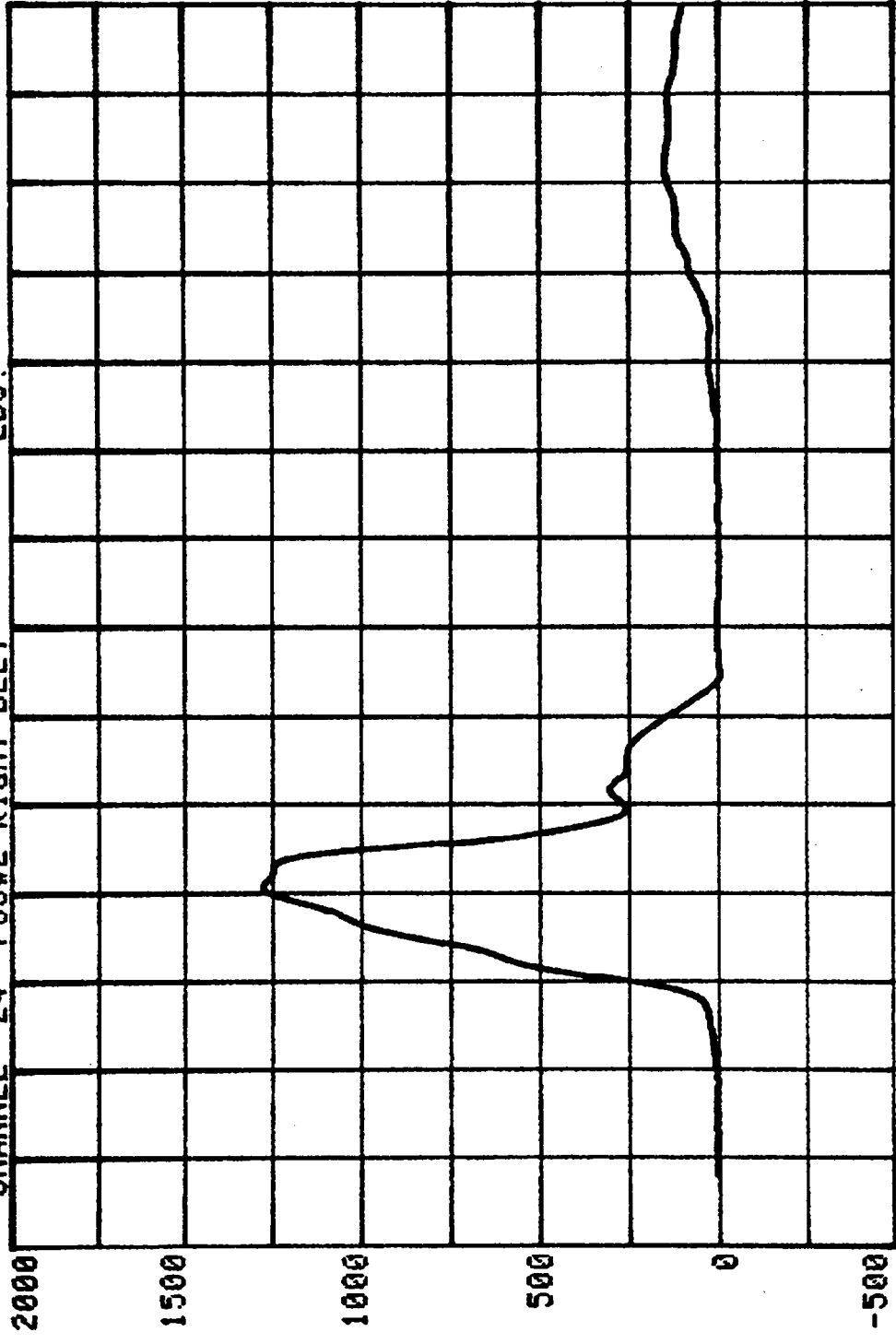
RUN= 523 SERIES= 2 LBS.
CHANNEL 20 POS#2 LEFT FEMUR



CHANNEL 24 POS#2 RIGHT BELT

RUN= 523 SERIES= 2

LBS.

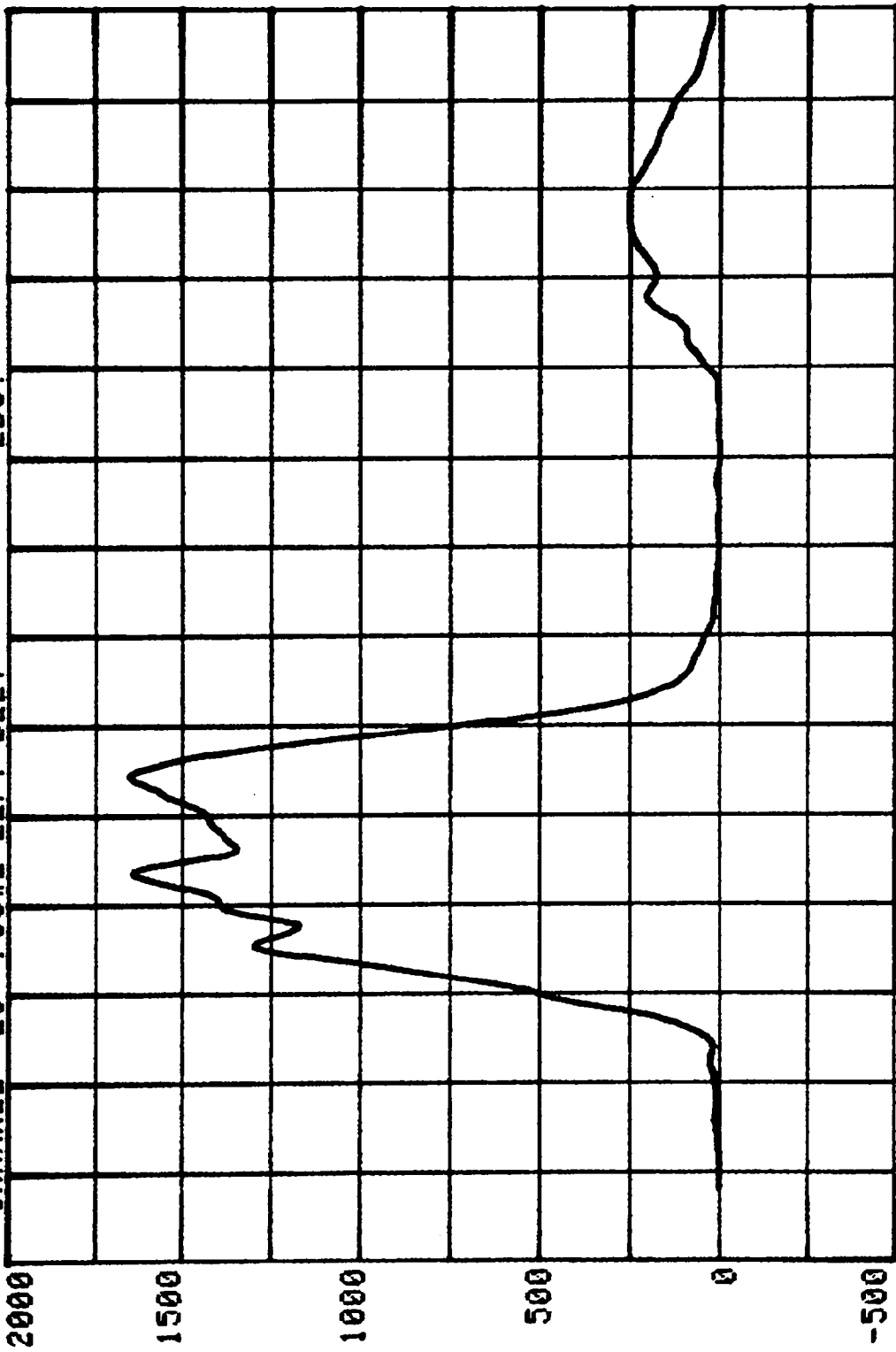


-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 25 POS#2 LEFT BELT

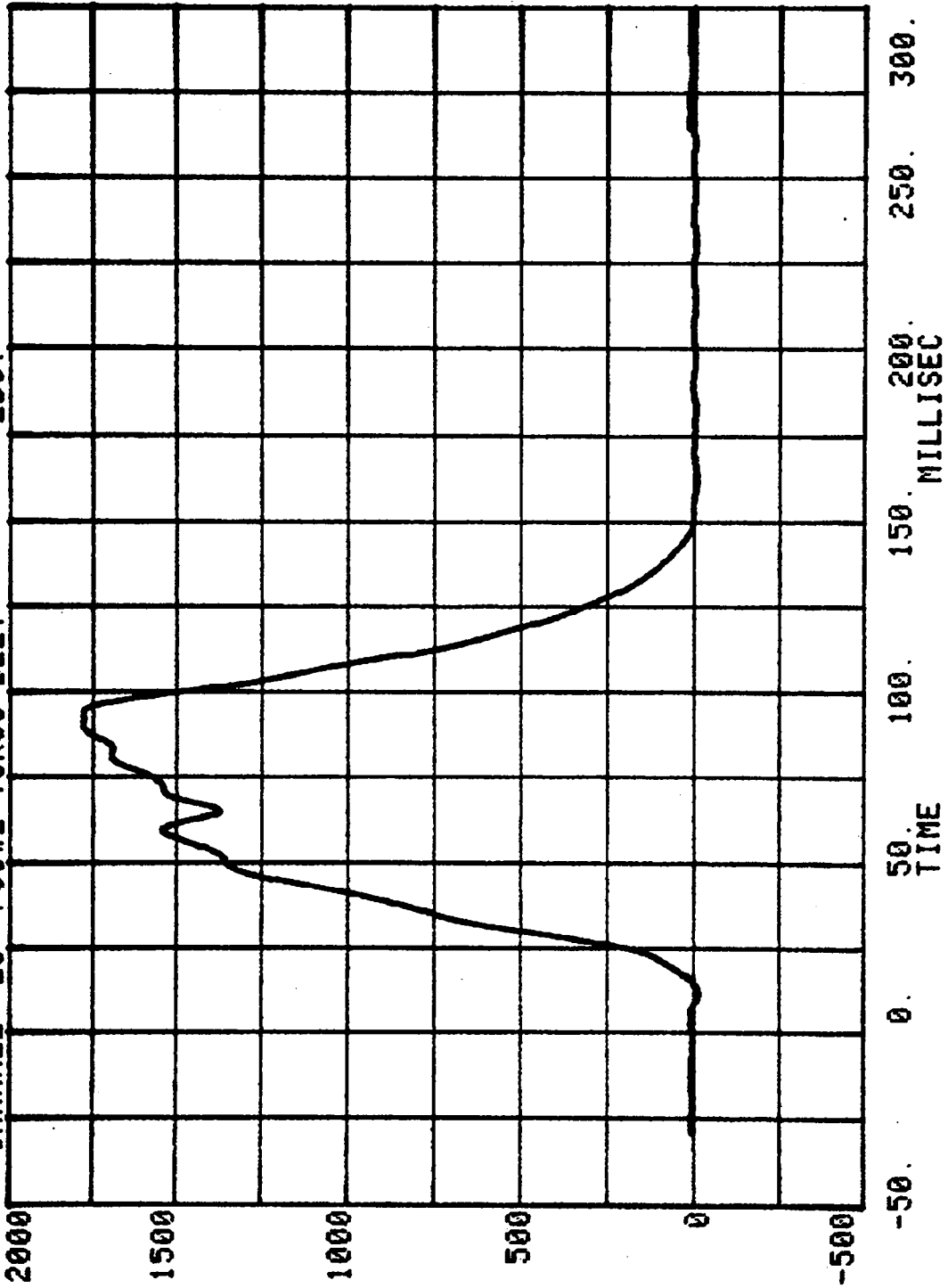
RUN= 523 SERIES= 2

LBS.



-50. 0. 50. 100. 150. 200. 250. 300.
TIME MILLISEC

CHANNEL 26 POS#2 TORSO BELT RUN= 523 SERIES= 2 LBS.

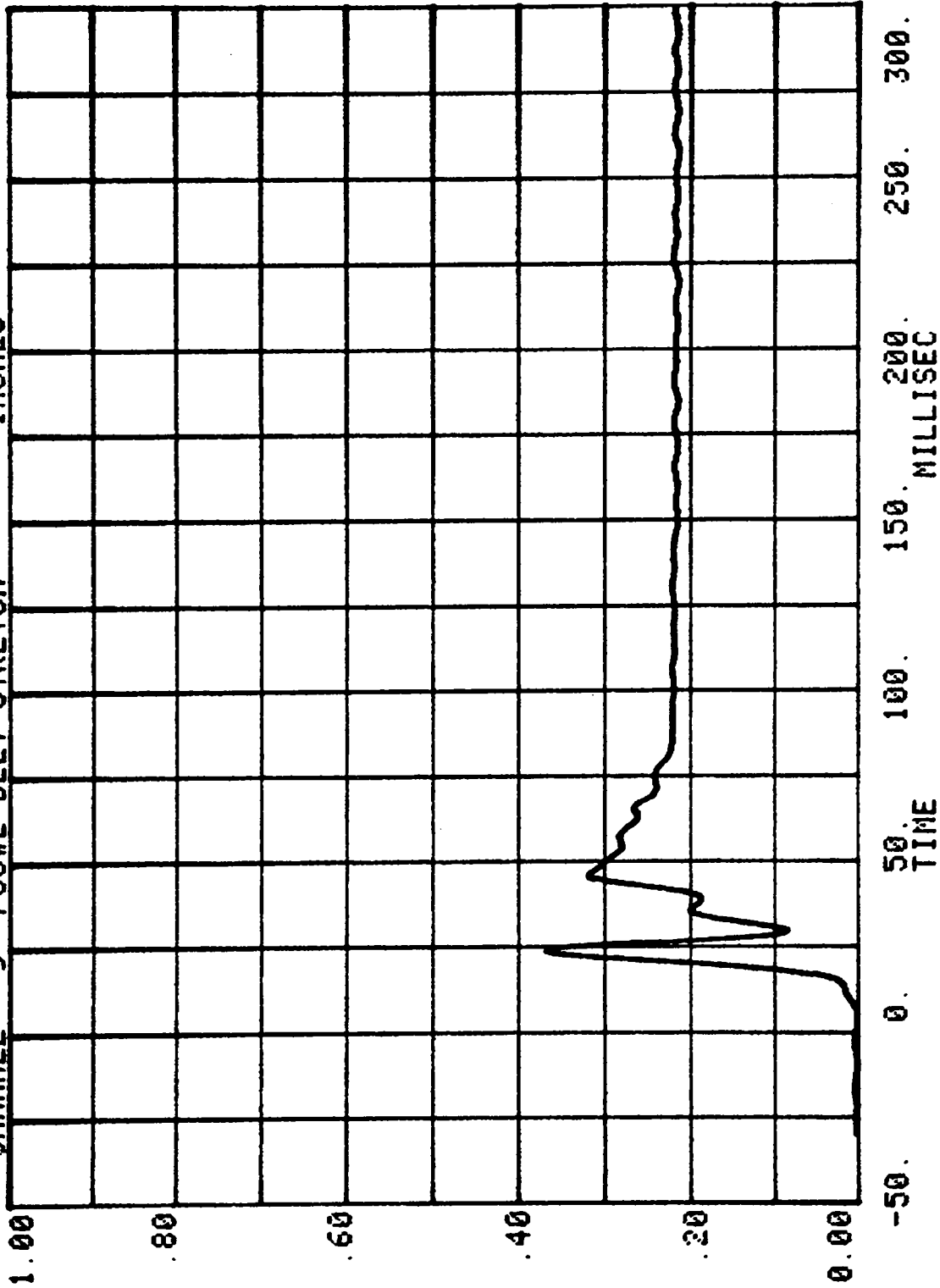


CHANNEL 9 POS#2 BELT STRETCH

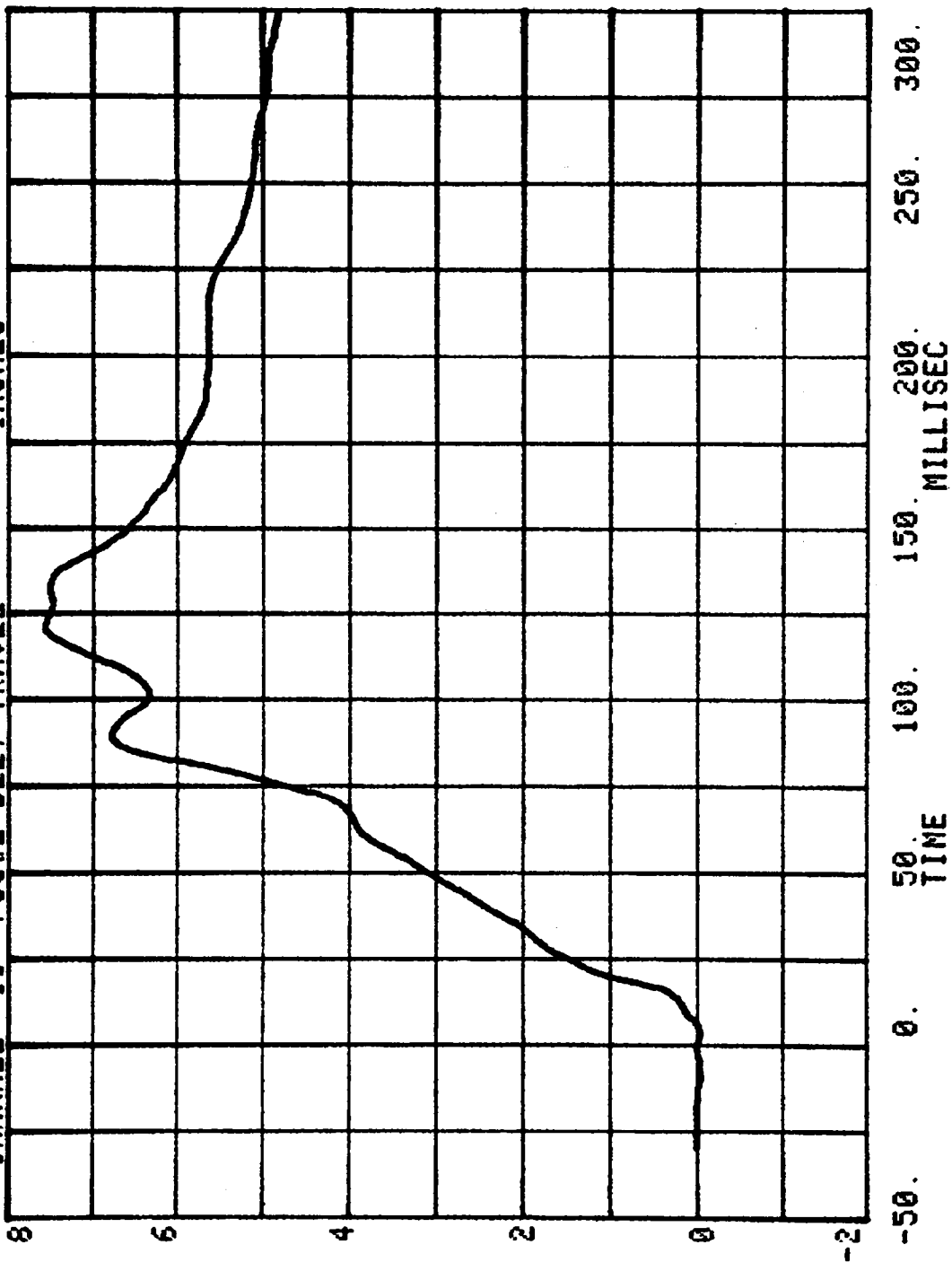
RUN= 523 SERIES=

2

INCHES



CHANNEL 10 POS#2 BELT TRAVEL SERIES= 2 INCHES



APPENDIX C

DUMMY CERTIFICATION TESTS

Appendix C contains the results from certification tests performed on the Alderson Research Laboratories Model ATD 30034, 50th percentile male anthropometric test devices utilized for this crash test. The results indicate that the dummies meet all of the performance requirements of the six standard tests as specified in 49 CRF Part 572, Federal Register, Vol. 42, No. 25, dated February 7, 1977.

The tests were conducted at the Dummy Certification Test Facility of Calspan Corporation, Advanced Technology Center. A summary of the test results, Part 572 specifications and instrument calibration information is included in this Appendix.

Dummy serial numbers and certification dates are:

<u>Serial No.</u>	<u>Completion Date</u>
109	8/10/81
320	8/10/81

Electronic Test Equipment

The complement of signal conditioning recording and display equipment in conjunction with dummy certification testing can be found in New Car Assessment and Standards Indicant Testing Final Report, Report No. 6525-V-1.

P.572 DUMMY CALIBRATION TEST DATA

NHTSA DUMMY ID NO. 109

LABORATORY TECHNICIAN: Gary Gestwick

APPROVED BY: _____

		Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - -		8/1/81-8/10/81	
Calibration Sequential Number for Dummy - - - -		13	
Temperature in Lab. (Spec. = 66 to 78°F)- - - -		67°-76°	
Relative Humidity in Lab. (Spec. = 10 to 70%) -		60%-67%	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST:			
a. Peak Resultant Accel. -	210 to 260G	245G	
b. Peak Lateral Accel. - -	≤10G	10G	
c. Time above 100G - - - -	0.9 to 1.5 ms	1.1 ms	
2. NECK BENDING TEST:			
a. Pendulum Speed - - - -	21.5 to 25.5 fps	23.4 fps	
b. Pendulum Avg. Decel. (over t ₃ - t ₂) - - - -	20 to 24G	23G	
c. Peak Resultant Head Acceleration - - - -	26G maximum	26G	
d. Pendulum Decel. (t ₂ -t ₁)	≤3 ms	2 ms	
e. Pendulum Decel. (t ₃ -t ₂)	25 to 30 ms	28 ms	
f. Pendulum Decel. (t ₄ -t ₃)	≤10 ms	6 ms	
g. Pendulum Direction Reversal Time - - - -		104 ms	
h. Max. Head Rotation - -	63 to 73°	68°	
i. Chordal Displacement:			
Head Rotation Angle - -			
0°	Time	-2 to 2 ms	0.0 ms
	Displ.	-.5 to .5 in	0.0 in.
30°	Time	25.6 to 34.4 ms	29 ms
	Displ.	2.1 to 3.1 in.	2.8 in.
60°	Time	40.3 to 51.7 ms	45 ms
	Displ.	4.3 to 5.3 in.	5.0 in.
Maximum (°)	Time	53.2 to 66.8 ms	57.5 ms
	Displ.	5.0 to 6.0 in.	5.5 in.

Continued

TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
2. NECK BENDING TEST			
<u>Continued</u>			
i. Chordal Displacement:			
Head Rotation Angle --			
60°	Time	67.0 to 83.0 ms	69 ms
	Displ.	4.3 to 5.3 in.	5.0 in.
30°	Time	85.4 to 104.6 ms	87 ms
	Displ.	2.1 to 3.1 in.	2.6 in.
0°	Time	101.0 to 123.0 ms	102 ms
	Displ.	-.5 to 0.5 in.	0.1 in.
3. ABDOMINAL COMPRESSION TEST:			
(Preload = 10 pounds)			
a. Force @ 1" - - - - -	50 to 63 lbs.	55 lbs.	
b. Force @ 1.3" - - - - -	73 to 80 lbs.	80 lbs.	
4. LUMBAR FLEXION TEST:			
a. Force @ 20° - - - - -	22 to 34 lbs.	25.0 lbs.	
b. Force @ 30° - - - - -	34 to 46 lbs.	35.0 lbs.	
c. Force @ 40° - - - - -	46 to 58 lbs.	48.0 lbs.	
d. Return Angle - - - - -	12° maximum		
5. CHEST IMPACT TESTS:			
a. High Speed			
(1) Probe Speed - - - - -	21.78-22.22 fps	21.90 fps	
(2) Peak Deflection - - - - -	1.7" maximum	1.5 in.	
(3) Peak Resistive Force - - - - -	2250 lbs. maximum	1787 lbs.	
(4) Internal Hysteresis - - - - -	50 to 70%	60.02%	
b. Low Speed			
(1) Probe Speed - - - - -	13.86-14.14 fps	13.90 fps	
(2) Peak Deflection - - - - -	1.1" maximum	.92 in.	
(3) Peak Resistive Force - - - - -	1450 lbs. maximum	1166 lbs.	
(4) Internal Hysteresis - - - - -	50 to 7%	51.91%	

P.572 DUMMY CALIBRATION TEST DATAContinued:

NHTSA DUMMY ID NO. _____

TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
6. KNEE IMPACT TESTS:			
a. Right Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	7.01 fps	
(2) Maximum Force - -	1850 to 2500 lbs	2300 lbs.	
(3) Time Above 1000#	1.7 ms minimum	1.85 ms	
b. Left Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.99 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2250 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.15 ms	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. _____ CALIB. SEQ. NOS. FOR DUMMY: _____ & _____

A. DUMMY INSTRUMENTS:

1. Head Accelerometers--

- a. Triaxial unit - - - - -
- b. Uniaxial units
 - (1) Longitudinal (A_x) -
 - (2) Lateral (A_y) - - -
 - (3) Vertical (A_z) - - -

**2. Chest Accelerometers--
(Vehicle Crash Test Usage)**

- a. Triaxial unit - - - - -
- b. Uniaxial units
 - (1) Longitudinal (A_x) -
 - (2) Lateral (A_y) - - -
 - (3) Vertical (A_z) - - -

3. Chest Potentiometer - - - - -

4. Femur Load Cells--

- a. Right Side - - - - -
- b. Left Side

B. CALIB. LAB. INSTRUMENTS:

- 1. Pendulum Accelerometer - -
- 2. Test Probe Accelerometer -
- 3. Lumbar Flexion Test Push
Force Gauge - - - - -
- 4. Abdominal Compression Test
Force Gauge - - - - -
- 5. Abdominal Compression Test
Displacement Gauge - - - -

MANUFACTURER	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
ENDEVCO	CS75	7/81	1/82
ENDEVCO	C462	7/81	1/82
ENDEVCO	CE18	7/81	1/82
GSE	312	7/81	1/82
GSE	311	7/81	1/82
CEC	22958	7/81	1/82
CEC	16929	7/81	1/82
TRANSDUCER INC.	20051	7/81	1/82
BLH	72952	7/81	1/82
CIC	567-11	7/81	1/82

P. 572 DUMMY CALIBRATION TEST DATA

NHTSA DUMMY ID NO. 320

LABORATORY TECHNICIAN: Gary Gestwick

APPROVED BY: _____

	Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - -	8/1/81-8/10/81	
Calibration Sequential Number for Dummy - - - -	14	
Temperature in Lab. (Spec. = 66 to 78°F)- - - -	67°-76°	
Relative Humidity in Lab. (Spec. = 10 to 70%) -	60%-67%	

TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST:			
a. Peak Resultant Accel. -	210 to 260G	235G	
b. Peak Lateral Accel. - -	≤10G	2G	
c. Time above 100G - - - -	0.9 to 1.5 ms	1.15 ms	
2. NECK BENDING TEST:			
a. Pendulum Speed - - - -	21.5 to 25.5 fps	25.0 fps	
b. Pendulum Avg. Decel. (over t ₃ - t ₂) - - - -	20 to 24G	24G	
c. Peak Resultant Head Acceleration - - - -	26G maximum	26G	
d. Pendulum Decel. (t ₂ -t ₁)	≤3 ms	2 ms	
e. Pendulum Decel. (t ₃ -t ₂)	25 to 30 ms	27 ms	
f. Pendulum Decel. (t ₄ -t ₃)	≤10 ms	4.5 ms	
g. Pendulum Direction Reversal Time - - - -		111.5 ms	
h. Max. Head Rotation - -	63 to 73°	71°	
i. Chordal Displacement:			
Head Rotation Angle - -			
0°	Time	-2 to 2 ms	0.0 ms
	Displ.	-.5 to .5 in	0.0 in.
30°	Time	25.6 to 34.4 ms	29.5 ms
	Displ.	2.1 to 3.1 in.	3.0 in.
60°	Time	40.3 to 51.7 ms	42.0 ms
	Displ.	4.3 to 5.3 in.	4.9 in.
Maximum (°)	Time	53.2 to 66.8 ms	59 ms
	Displ.	5.0 to 6.0 in.	5.7 in.

Continued

TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
2. NECK BENDING TEST			
<u>Continued</u>			
i. Chordal Displacement:			
Head Rotation Angle --			
60°	Time	67.0 to 83.0 ms	74.5 ms
	Displ.	4.3 to 5.3 in.	4.9 in.
30°	Time	85.4 to 104.6 ms	93 ms
	Displ.	2.1 to 3.1 in.	2.6 in.
0°	Time	101.0 to 123.0 ms	109 ms
	Displ.	-.5 to 0.5 in.	0.1 in.
3. ABDOMINAL COMPRESSION TEST:			
(Preload = 10 pounds)			
a. Force @ 1" - - - - -	50 to 63 lbs.	60 lbs.	
b. Force @ 1.3" - - - - -	73 to 80 lbs.	82 lbs.	
4. LUMBAR FLEXION TEST:			
a. Force @ 20° - - - - -	22 to 34 lbs.	26 lbs.	
b. Force @ 30° - - - - -	34 to 46 lbs.	35 lbs.	
c. Force @ 40° - - - - -	46 to 58 lbs.	49 lbs.	
d. Return Angle - - - - -	12° maximum	3°	
5. CHEST IMPACT TESTS:			
a. High Speed			
(1) Probe Speed - - -	21.78-22.22 fps	21.85 fps	
(2) Peak Deflection -	1.7" maximum	1.55 in.	
(3) Peak Resistive Force - - - - -	2250 lbs. maximum	1917 lbs.	
(4) Internal Hysteresis - - - - -	50 to 70%	52.95%	
b. Low Speed			
(1) Probe Speed - - -	13.86-14.14 fps	13.91 fps	
(2) Peak Deflection -	1.1" maximum	1.05 in.	
(3) Peak Resistive Force - - - - -	1450 lbs. maximum	1217 lbs.	
(4) Internal Hysteresis - - - - -	50 to 7%	51.12%	

TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
6. KNEE IMPACT TESTS:			
a. Right Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	7.01 fps	
(2) Maximum Force - -	1850 to 2500 lbs	2200 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.0 ms	
b. Left Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	7.02 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2200 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.25 ms	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. _____

CALIB. SEQ. NOS. FOR DUMMY: _____ & _____

A. DUMMY INSTRUMENTS:

1. Head Accelerometers--

a. Triaxial unit - - - - -

b. Uniaxial units

(1) Longitudinal (A_x) -

(2) Lateral (A_y) - - -

(3) Vertical (A_z) - - -

2. Chest Accelerometers--
(Vehicle Crash Test Usage)

a. Triaxial unit - - - - -

b. Uniaxial units

(1) Longitudinal (A_x) -

(2) Lateral (A_y) - - -

(3) Vertical (A_z) - - -

3. Chest Potentiometer - - -

4. Femur Load Cells--

a. Right Side - - - - -

b. Left Side

B. CALIB. LAB. INSTRUMENTS:

1. Pendulum Accelerometer - -

2. Test Probe Accelerometer -

3. Lumbar Flexion Test Push
Force Gauge - - - - -

4. Abdominal Compression Test
Force Gauge - - - - -

5. Abdominal Compression Test
Displacement Gauge - - - -

MANUFACTURER	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
ENDEVCO	CS75	7/81	1/82
ENDEVCO	C462	7/81	1/82
ENDEVCO	CE18	7/81	1/82
GSE	312	7/81	1/82
GSE	311	7/81	1/82
CEC	22958	7/81	1/82
CEC	16929	7/81	1/82
TRANSDUCER INC.	20051	7/81	1/82
BLH	72952	7/81	1/82
CIC	567-11	7/81	1/82