

DOT 1379

REPORT NUMBER: CAL-90-N04

**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

**NISSAN MOTOR CO., LTD
1990 STANZA XE
4-DOOR SEDAN**

NHTSA NUMBER: ML5203

CALSPAN TEST NUMBER: 7776-4

CALSPAN CORPORATION
ADVANCED TECHNOLOGY CENTER
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December 14, 1989



FINAL REPORT

PREPARED FOR:

U. S. Department of Transportation
National Highway Traffic Safety Administration
Office of Market Incentives
400 Seventh Street, S.W.
Room No. 5313 (NRM-20)
Washington, DC 20590

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-87-D-02012. This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

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FEB 13 1990

Date of Report Acceptance

7776-4

1. Report No. CAL-90-N04		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle NHTSA New Car Assessment Program (NCAP) Frontal Barrier Impact Test of a 1990 Nissan Stanza XE 4-Door Sedan				5. Report Date December 14, 1989	
				6. Performing Organization Code CAL	
7. Author(s) Michael J. Kilgallon, Project Engineer Walter E. Levan, Program Manager				8. Performing Organization Report No. 7776-4	
9. Performing Organization Name and Address Calspan Advanced Technology Center P.O. Box 400 Buffalo, New York 14225				10. Work Unit No. 948-3-947	
				11. Contract or Grant No. DTNH22-87-D-02012	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Market Incentives (NRM-20) 400 Seventh Street, S.W., Washington, DC 20590				13. Type of Report and Period Covered Final Report December-January	
				14. Sponsoring Agency Code DOT/NHTSA/RM/OMI	
15. Supplementary Notes					
16. Abstract A frontal barrier impact test of a 1990 Nissan Stanza XE 4-Door Sedan was performed as Calspan Advanced Technology Center crash test facility in Buffalo, New York on December 14, 1989. The impact speed was 35.0 mph and the ambient temperature at the barrier face at the time of impact was 21°F. The maximum post-test vehicle crush was 22.2 inches. The test vehicle was equipped with an automatic shoulder belt and a manual lap belt at each of the front outboard seating positions. With regard to FMVSS 208-"Occupant Crash Protection," injury criteria, the driver appears to have exceeded the maximum HIC value. The driver appears to satisfy the chest and femur requirement. The passenger appears to satisfy the head, chest and femur requirements.					
17. Key Words 35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP)			18. Distribution Statement <u>Copies of this report are available from:</u> Technical Reference Division National Highway Traffic Safety Admin. Nassif Building, Room 5108 400 Seventh St., S.W., Washington, DC 20590		
19. Security Classif. (of this report) UNCLASSIFIED		20. Security Classif. (of this page) UNCLASSIFIED		21. No. of Pages 22. Price	

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Section I

PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY 90 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-87-D-02012. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 30 mph requirements.

The 35 mph frontal barrier impact test was conducted in accordance with the Office of Market Incentives (OMI) Laboratory Indicant Test procedure.

Section 2

SUMMARY OF TEST NUMBER ML5203

A load cell barrier consisting of 36 load cells was impacted by a 1990 Nissan Stanza XE 4-Door Sedan at a velocity of 35.0 mph. The test was performed at the Calspan Corporation Advanced Technology Center on December 14, 1989. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 14 high-speed cameras. Camera locations and other pertinent camera information can be found in this report.

Two Part 572, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head and chest triaxial accelerometers and right/left femur load cells. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver ATD (Serial No. 1021) and the right-front passenger ATD (Serial No. 1022) were used in one previous test (ML5102) and the Injury Criteria Values were not exceeded in this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 65 channels of data were recorded on six 14-channel FM tape recorders. Appendix B contains the vehicle, load cell barrier and dummy response data traces. Vehicle accelerometer #4 was disengaged from the oil pan during impact.

The driver's HIC was 1105.2. The maximum chest deceleration over 3 milliseconds was 59.0 g's and femur loads were 1404.0 and 1204.9 pounds.

The right front passenger's HIC was 629.2 and maximum chest deceleration over 3 milliseconds was 46.7 g's. Femur loads were 812.7 and 744.4 pounds.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Year/Make/Model/Body Style: 1990 Nissan Stanza XE 4-Door SedanNHTSA No.: ML5203 VIN.: JN1FU21PXLT201142Body Color: Blue Date Of Manufacture: 7-89Engine: 4 Cylinders; - C.I.D.; 2.4 Liters; - CCX Gas; - Diesel; - Turbocharged- Longitudinal; - TransverseTransmission: 5 Speed; X Manual; - Automatic; - OverdriveFinal Drive: X Front Wheel; - Rear Wheel; - Four WheelDate Received: 10-2-89 Odometer Reading: 19X A/C; X P/S; X P/B; - P/wdo.; X Tilt Wheel- P/seats; - Cruise Control

Type of Occupant Restraint:

Automatic torso belt, Manual lap belt.DATA RECORDED FROM VEHICLE'S TIRE PLACARD:Tire Pressure (at capacity): Front 29 psi, Rear 26 psiRecommended Tire Size: 195/65R14 89HTires on Vehicle: 195/65R14 89H ; Manufacturer: BridgestoneNumber of Occupants: 2 Front; 3 Rear; - 3rd Seat; 5 TOTALType of Front Seats: X Bucket; - Bench; - Split BenchType of Front Seat Back: - Fixed; X Adj. With - Lever X Rot. KnobVehicle Capacity Weight (VCW) = 900 lbs. (A)No. of Occupants x 150 lbs. = 750 lbs. (B)

Rated Cargo and Luggage

Weight (RCLW) A-B = 150 lbs.GVWR 3902 lbs. GAWR: Front 2140 lbs. Rear 1819 lbs.

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

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

Right Front = 920 lbs. Right Rear = 510 lbs.
 Left Front = 870 lbs. Left Rear = 490 lbs.
 TOTAL FRONT WEIGHT = 1790 lbs. (64 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1000 lbs. (36 % of Total Vehicle Weight)
 TOTAL DELIVERY WEIGHT = 2790 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight (2790 lbs.)
 VCW = Vehicle Capacity Weight (900 lbs.)
 DSC = Designated Seating Capacity (5)
 RCLW = VCW - 150 (DSC) = 150 lbs.
 Target Test Weight = UDW + RCLW + (2 dummies x 164 lbs./dummy)
 Target Test Weight = 3268 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 152 POUNDS CARGO:

Right Front = 930 lbs. Right Rear = 700 lbs.
 Left Front = 950 lbs. Left Rear = 690 lbs.
 TOTAL FRONT WEIGHT = 1880 lbs. (57 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1390 lbs. (43 % of Total Vehicle Weight)
 TOTAL TEST WEIGHT = 3270 lbs.
 Weight of ballast secured in vehicle trunk area = 0 lbs.

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 27.1" LF 27.3" RR 25.7" LR 25.9"
 Test Attitude: RF 26.7" LF 26.7" RR 24.4" LR 24.5"
 Wheel Base: 100.6 in.; C.G. = 42.8 in. rearward of front wheel C/L

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

POST-IMPACT DATA:

Type of Test: Frontal Barrier Impact Angle: 0°
 Date of Test: December 14, 1989 Time of Test: 12:20
 Ambient Temperature: 21 °F at impact area
 Temperature in Occupant Compartment: 72 °F
 Windshield Molding Temperature: 70 °F
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: primary = 35.0 mph, secondary = 35.0 mph
 Distance From Front Bumper to Barrier Face When
 Entering Speed Trap: 52 inches
 Exiting Speed Trap: 12 inches

VEHICLE REBOUND AND CRUSH (inches):

Vehicle Length: Pre-test = R 177.2 L 180.2 L 177.2
 Post-test = R 158.2 L 158.0 L 158.9
 Crush = R 19.0 L 22.2 L 18.3

Distance from front of test vehicle to point of impact:

R 16.1" C_L 16.3" L 16.8"

VISIBLE DUMMY CONTACT POINTS:

	<u>Driver</u>	<u>Passenger</u>
Head	<u>No Contact</u>	<u>No Contact</u>
Chest	<u>No Contact</u>	<u>No Contact</u>
Abdomen	<u>No Contact</u>	<u>No Contact</u>
Left Knee	<u>Dash Panel</u>	<u>Dash Panel</u>
Right Knee	<u>Dash Panel</u>	<u>Dash Panel</u>

Table 1
GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

	<u>Front</u>		<u>Rear</u>	
	<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Door Opening	<u>operable</u>	<u>operable</u>	<u>operable</u>	<u>operable</u>

	<u>Front</u>	
<u>Seat Movement</u>	<u>Left</u>	<u>Right</u>
Seat Back Failure	<u>none</u>	<u>none</u>
Seat Shift (in.)	<u>0.0</u>	<u>0.0</u>

Glazing Damage

Backlight/Windshield: Windshield sustained stress fractures but
remained intact.

Section 3
OMI FINAL DATA

Occupant and Vehicle Information

I. OMI DATA

1. Dummy Injury Criteria Data Summary
2. Dummy Positioning Data
3. Seat Belt Positioning Data
4. Seat Belt Performance Assessment Data
5. Driver Dummy to Steering Column Dimensions
6. Camera Locations
7. Vehicle Target Locations

II. OVR DATA

1. Load Cell Barrier Data
2. Vehicle Accelerometer Data
3. Test Vehicle Measurements

Table 2
DUMMY INJURY CRITERIA VALUES

NHTSA No.: ML5203 Vehicle: 1990 Nissan Stanza XE 4-Door Sedan

	MAXIMUM HEAD ACCELERATION (g's)			
	X	Y	Z	R
Position #1 - Driver	63.1	-27.5	75.0	75.4
Position #2 - Passenger	-19.0	40.4	56.4	56.9

	MAXIMUM CHEST ACCELERATION (g's)			
	X	Y	Z	R
Position #1 - Driver	-67.1	-10.0	-13.1	59.0
Position #2 - Passenger	-51.9	16.8	40.9	46.7

The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

	MAXIMUM FORCE - FEMUR LOAD (lbs.)	
	LEFT FEMUR	RIGHT FEMUR
Position #1 - Driver	1404.0	1204.9
Position #2 - Passenger	812.7	744.4

	MAXIMUM FORCE - SEAT BELT LOADS (lbs.)		
	SHOULDER STRAP UPPER BELT LOAD	LAP STRAP RIGHT BELT LOAD	LAP STRAP LEFT BELT LOAD
Position #1 - Driver	2414.2	-	600.5
Position #2 - Passenger	2061.0	1143.5	-

	HEAD INJURY CRITERIA (HIC)			
	HIC	t ₁ (SEC)	t ₂ (SEC)	Average Acceleration t ₁ TO t ₂
Position #1 - Driver	1105.2	.06390	.09990	62.4
Position #2 - Passenger	629.2	.06442	.10042	49.8

HIC is as defined in FMVSS 208. The maximum time interval from t₁ to t₂ is 36 milliseconds.

Figure 1

PART 572 DUMMY IN-VEHICLE POSITION

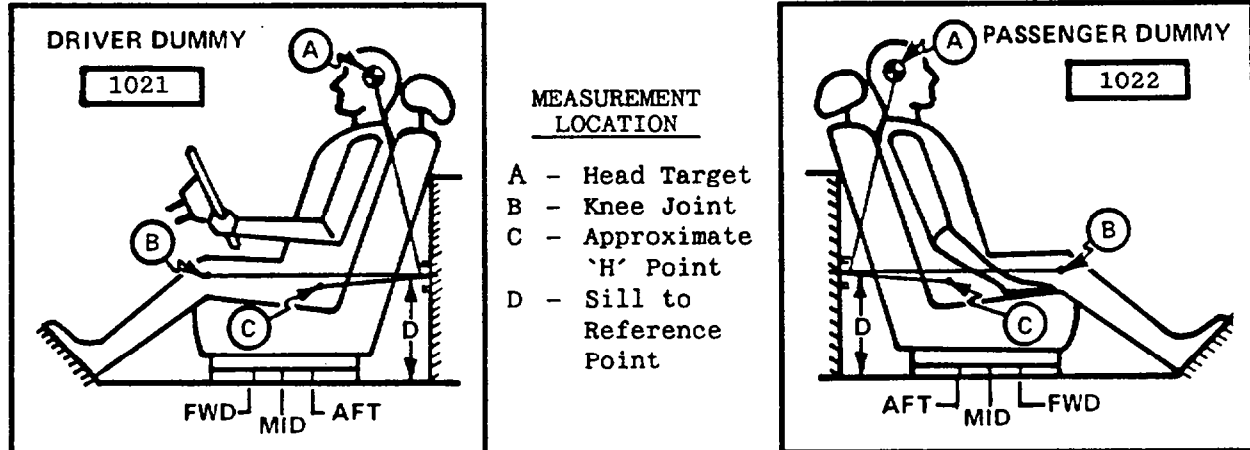
Test No.: ML5203 Vehicle: 1990 Nissan Stanza 4-Door Sedan

SEAT TYPE: ADJUSTER TYPE: BUCKET SEAT BACK TYPE:

 Bench X Manual Fixed

 X Bucket Power X Adjustable Reclining

 Split Bench



A = 21.0 in. 1 Degrees

B = 21.5 in. 98 Degrees

C = 7.5 in. 134 Degrees

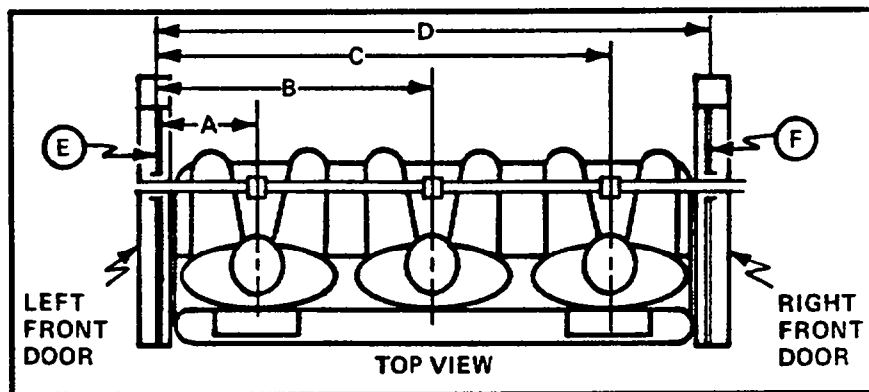
D = 12.9 in.

A = 22.4 in. 1 Degrees

B = 21.5 in. 98 Degrees

C = 7.6 in. 138 Degrees

D = 12.9 in.



1021 DUMMY ID 1022

A = Left Door to Driver Centerline 12.4 in.

B = Left Door to Center Passenger Centerline in.

C = Left Door to Right Passenger Centerline 39.3 in.

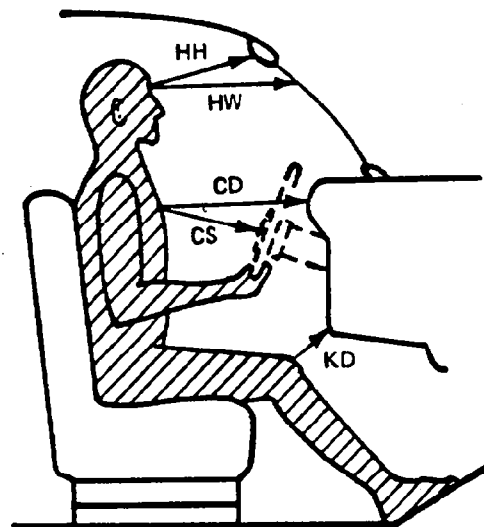
D = Left Door to Right Door 51.5 in.

E, F = Window Glass Height (Right and Left Must Be Equal) 11.0 in.

Figure 2

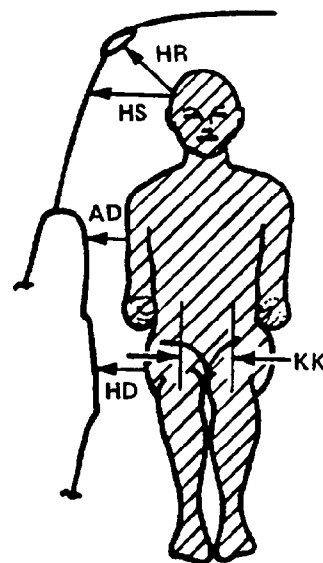
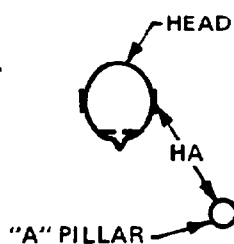
OCCUPANT CLEARANCE DIMENSIONS

	DRIVER	PASSENGER
HH	15.6	16.0
HW	21.6	21.2
CD	23.0	24.6
CS	16.3	-
KDL	7.3	6.4
KDR	6.5	6.4
SA	See note	See note
TA	22°	21°



HH = Head to Windshield Header
 HW = Head to Windshield
 CD = Chest to Dash
 CS = Chest to Steering Wheel
 KD(L/R) = Knee to Dash (Left/Right)
 SA = Seat Back Angle
 TA = Torso Angle

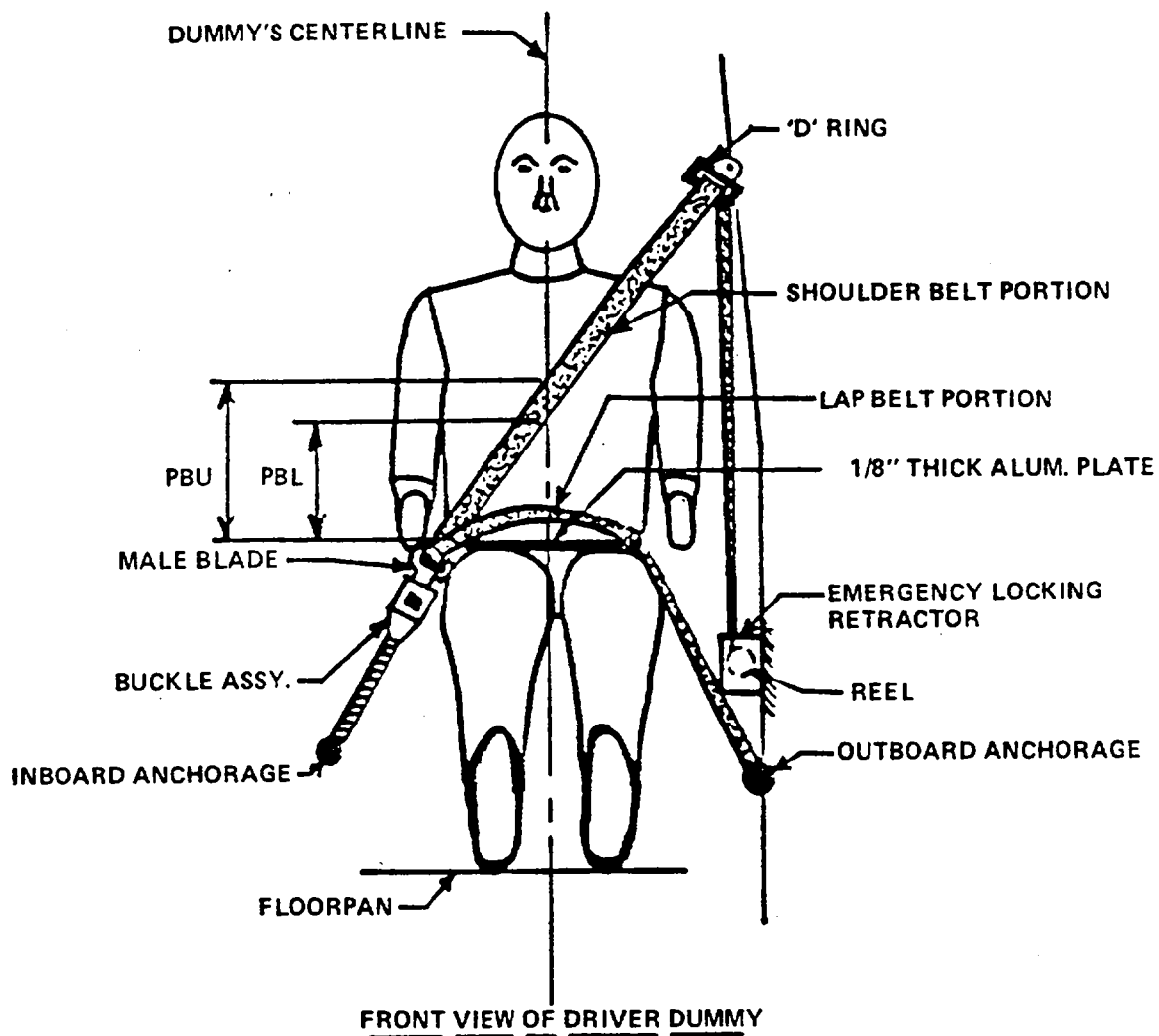
HA = Head Target to "A" Pillar
 HR = Head to Side Roof
 HS = Head to Side Window
 AD = Arm to Door
 HD = Hip to Door
 KK = Knee to Knee



	DRIVER	PASSENGER
HR	5.2	4.8
HS	9.4	9.1
AD	4.2	4.6
HD	7.1	7.1
KK	9.4	9.2
HA	19.2	18.6

Note: Seat angle was positioned at the 14th detent as specified by manufacturer.

Figure 3
SEAT BELT POSITIONING DATA



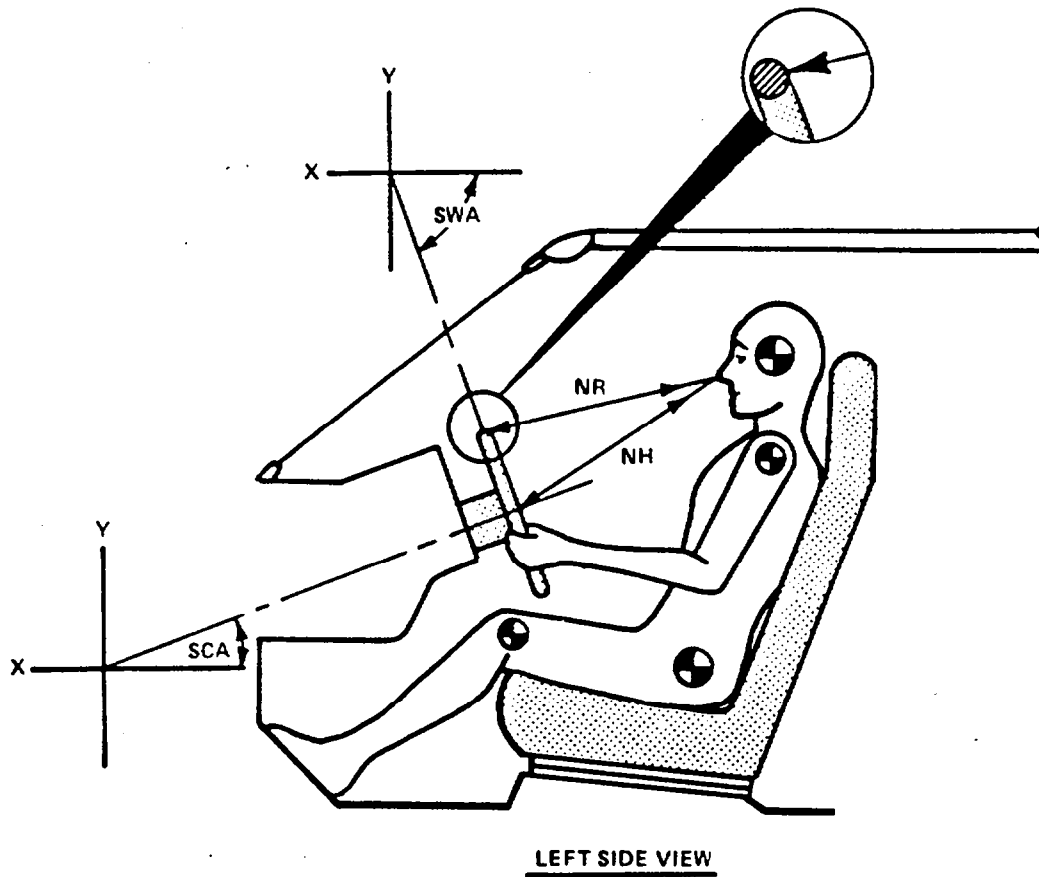
	DRIVER DUMMY (inches)	PASSENGER DUMMY (inches)
<u>PBU</u> -- Top surface of alum. plate to upper edge	12.0	12.0
<u>PBL</u> -- Top surface of alum. plate to belt lower edge	9.5	9.5

Table 3
SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

<u>BELT LENGTH DATA:</u>	<u>Driver</u>	<u>Passenger</u>
Shoulder belt length as measured on Part 572 Dummy.	<u>35.0"</u>	<u>35.0"</u>
Lap belt length as measured on Part 572 Dummy.	<u>31.0"</u>	<u>31.0"</u>
<u>LAP BELT SPOOL-OFF DATA:</u>		
As determined mechanically.	<u>3.2"</u>	<u>3.0"</u>
<u>BELT STRETCH DATA:</u>		
Measured electronically between shoulder belt load cell and the "D" ring.	<u>.9 in/ft</u>	<u>1.0 in/ft</u>
Measured mechanically	<u>.0 in/ft</u>	<u>.5 in/ft</u>

Figure 4

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS



		MEASUREMENTS	
<u>NR</u>	-- Distance from tip of dummy's nose to Top Rear surface of steering wheel rim	20.8	Inches
<u>NH</u>	-- Distance from tip of dummy's nose to center of steering column hub	20.7	Inches
<u>SCA</u>	-- Angle of steering column relative to the horizontal X axis	-63.0	Degrees
<u>SWA</u>	-- Angle of steering wheel relative to the horizontal X axis	27.0	Degrees

Figure 5
CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

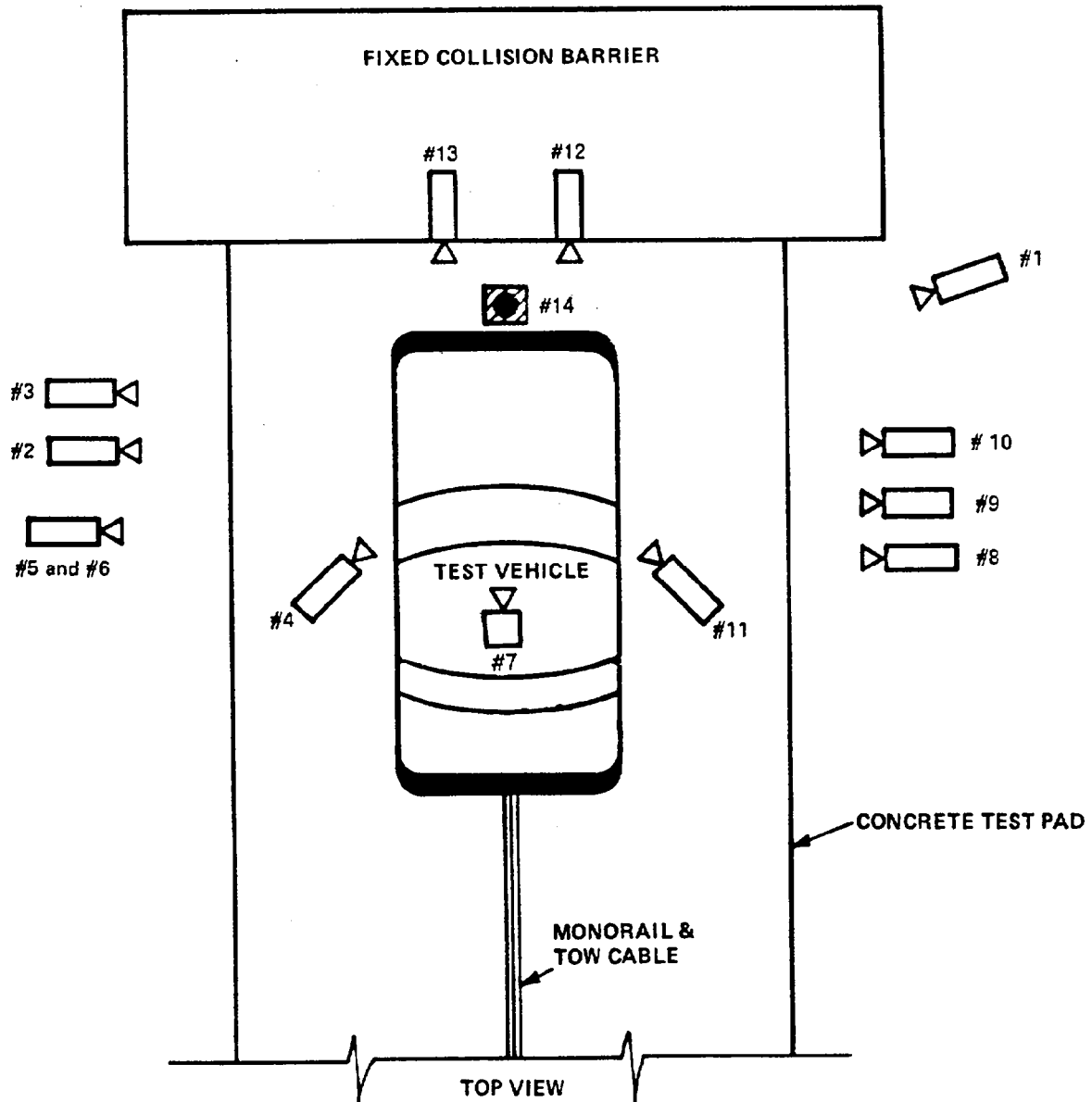


Table 4

HIGH-SPEED CAMERA LOCATIONS

Test No. ML5203

Vehicle: 1990 Nissan Stanza XE 4-Door Sedan

CAMERA NO.	VIEW	CAMERA POSITIONS (in)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Camera	-	-	-	-	-	-	24
2	Overall Left Side	229	63	41	-4	213	13	See Note
3	Left Side View	308	18	40 ¹ / ₂	-4	292	25	See Note
4	Driver and Interior View	93	113	69	-21	77	13	850
5	Steering Column (Bottom)	289	95	46	-3	273	25	570
6	Steering Column (Top)	289	95	70	-12	273	25	550
7	Belt View	-	-	-	-	-	8	See Note
8	Overall Right Side	228	70	42	-5	212	13	See Note
9	Right Side View	265	54	42	-2	249	25	780
10	Right Passenger View	284	72	55	-3	268	35	650
11	Passenger and Interior View	97	101	74	-25	81	25	590
12	Passenger Front View	24	-5	73	-40	-	13	560
13	Driver Front View	24	-5	73	-33	-	13	540
14	Windshield View	0	0	126	-45	-	13	530

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

Note: Film speed is not available for this camera.

Figure 6
VEHICLE TARGET LOCATIONS

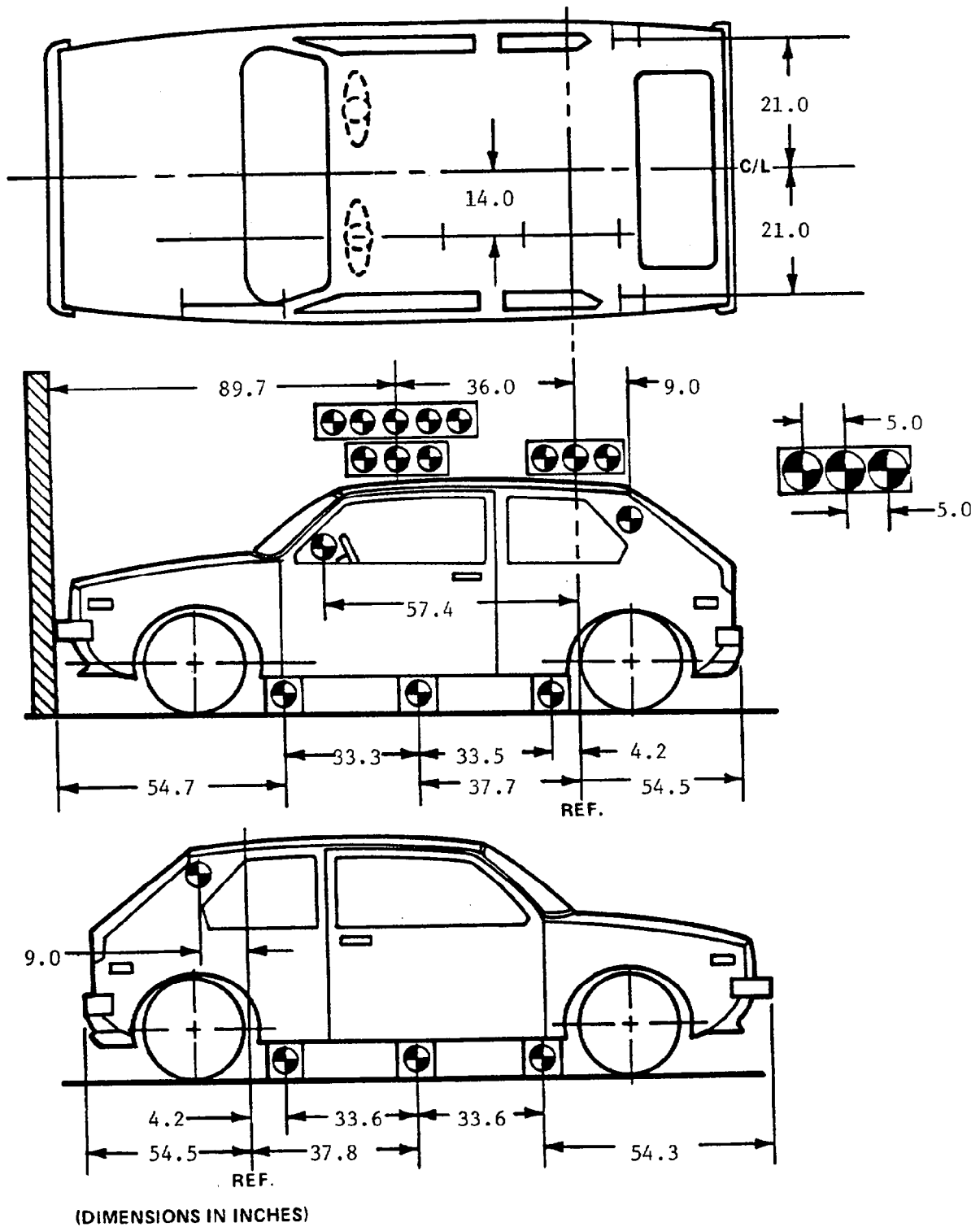
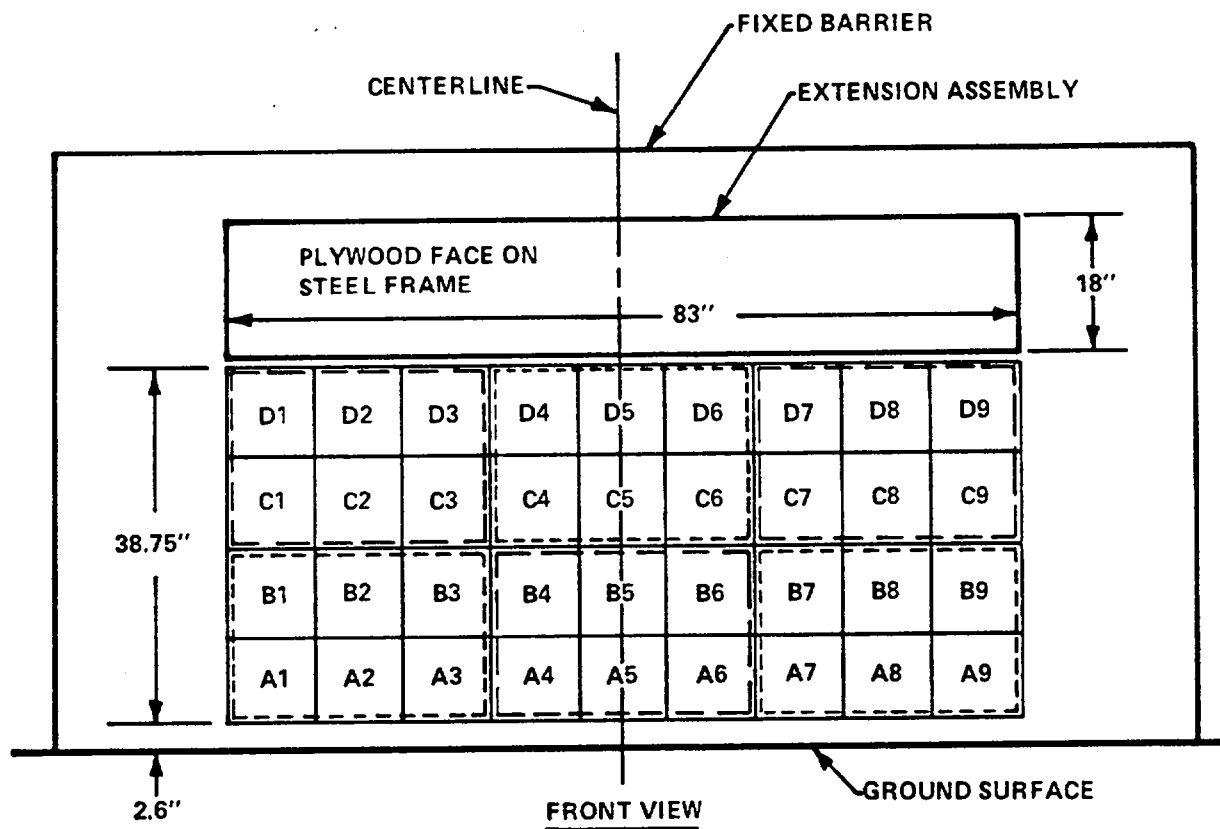


Figure 7

LOAD CELL LOCATIONS ON FIXED BARRIER

- 36 Load Cells
- 4 Rows
- 9 Columns
- 6 Groupings (6 cells/group)



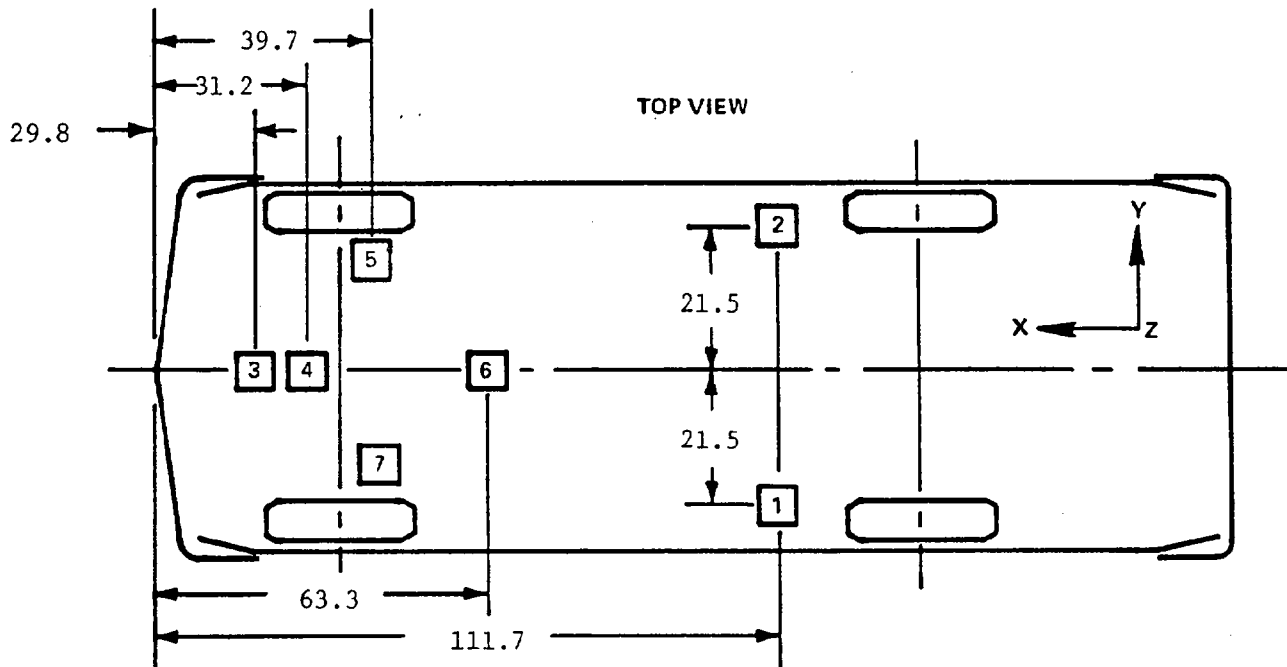
6 GROUPS OF 6 LOAD CELLS EACH

Group 4	Group 5	Group 6
C1 thru D3	C4 thru D6	C7 thru D9
Group 1	Group 2	Group 3
A1 thru B3	A4 thru B6	A7 thru B9

The following data is presented in Appendix B:

- (1) Data from 36 individual load cells
- (2) Total or Sum of 36 individual load cells
- (3) Data from 6 Groupings shown above (6 cells/group)

Figure 8
VEHICLE ACCELEROMETER LOCATIONS



ACCELEROMETER NUMBER*	ACCELEROMETER LOCATION	DIRECTION		
		X	Y	Z
1	Left Rear Seat Crossmember	X		
2	Right Rear Seat Crossmember	X		
3	Top of Engine	X		
4**	Bottom of Engine	X		
5	Right Disc Brake Caliper	X		
6	Instrument Panel	X		
7	Left Disc Brake Caliper	X		

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

**Accelerometer was disengaged from the oil pan during impact.

Figure 9
TEST VEHICLE MEASUREMENTS

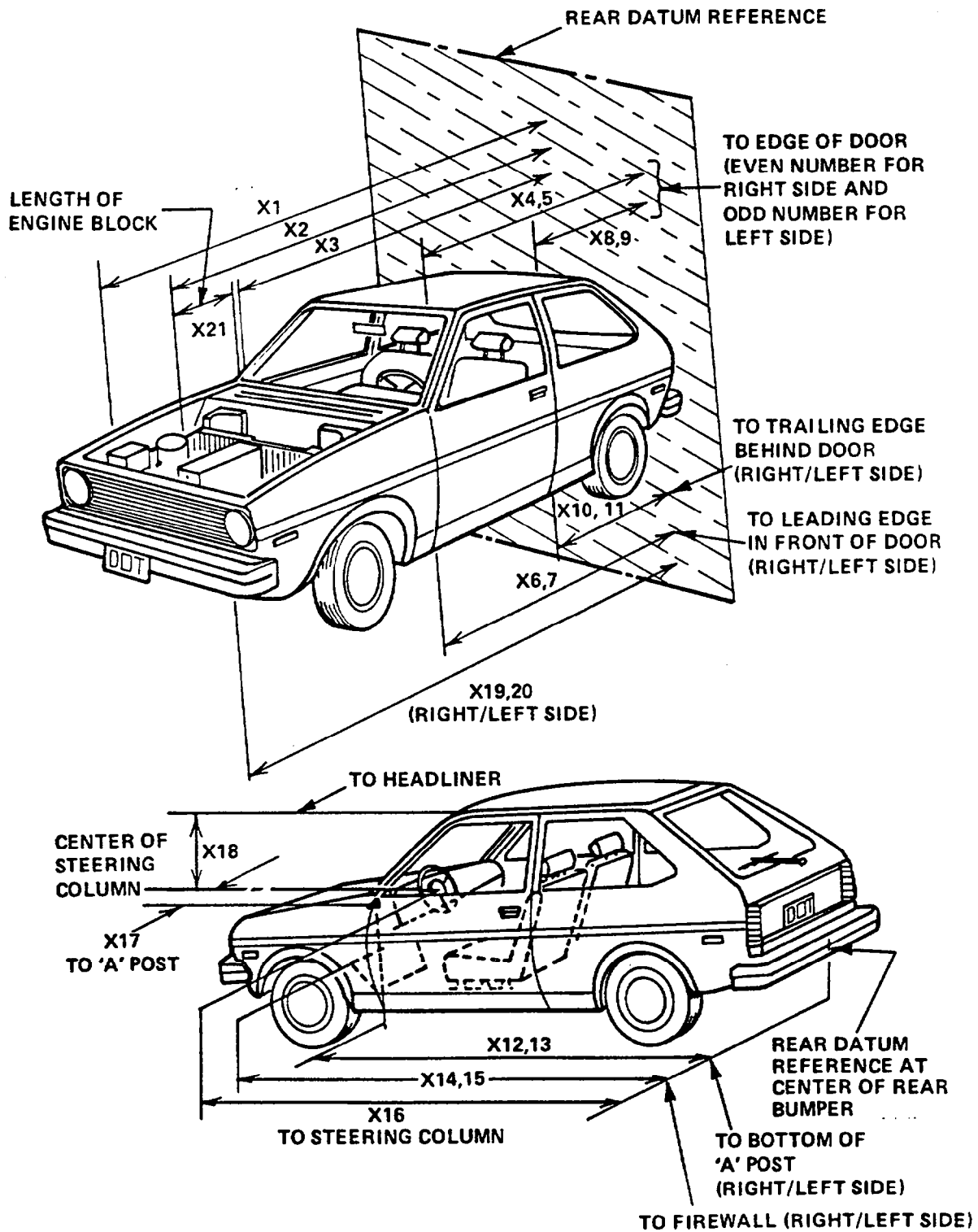


Table 5
VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Differences
X1	Total Length of Vehicle at Centerline	180.2	158.0	22.2
X2	Rear Surface of Vehicle to Front of Engine	153.8	145.6	8.2
X3	Rear Surface of Vehicle to Firewall	132.9	131.2	1.7
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	122.4	122.1	0.3
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	122.3	122.2	0.1
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	121.8	121.6	0.2
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	121.6	121.9	-0.3
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	82.0	81.3	0.7
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	81.8	82.0	-0.2
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	81.0	81.0	0.0
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	80.9	81.1	-0.2
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	121.8	122.0	-0.2
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	121.5	122.1	-0.6
X14	Rear Surface of Vehicle to Firewall, Right Side	131.8	131.3	0.5
X15	Rear Surface of Vehicle to Firewall, Left Side	131.9	130.7	1.2
X16	Rear Surface of Vehicle to Steering Column	106.0	105.5	0.5
X17	Center of Steering Column to "A" Post	17.0	15.7	1.3
X18	Center of Steering Column to Headliner	16.2	16.5	-0.3
X19	Rear Surface of Vehicle to Right Side of Front Bumper	177.2	158.2	19.0
X20	Rear Surface of Vehicle to Left Side of Front Bumper	177.2	158.9	18.3
X21	Length of Engine Block	18.0	18.0	0.0
RD	Rear Surface of Vehicle to Right Side of Dash Panel	114.4	113.5	0.9
CD	Rear Surface of Vehicle to Center of Dash Panel	113.0	113.5	-0.5
LD	Rear Surface of Vehicle to Left Side of Dash Panel	113.8	113.0	0.8

Appendix A

PHOTOGRAPHS

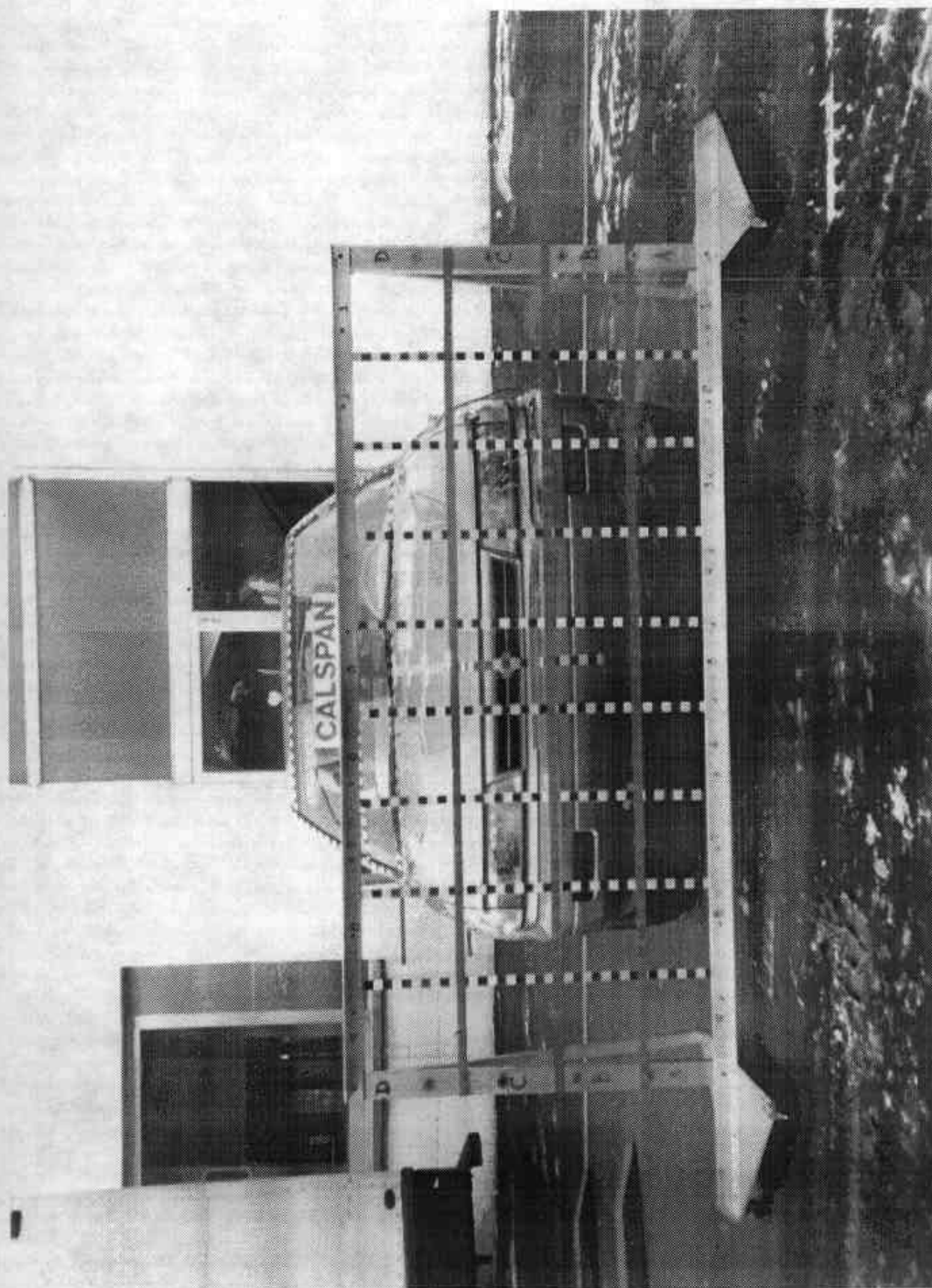


Figure A-1 PRE-TEST LOAD CELL LOCATIONS

A-2

7776-4



Figure A-2 PRE-TEST FRONT VIEW

A-3

7776-4

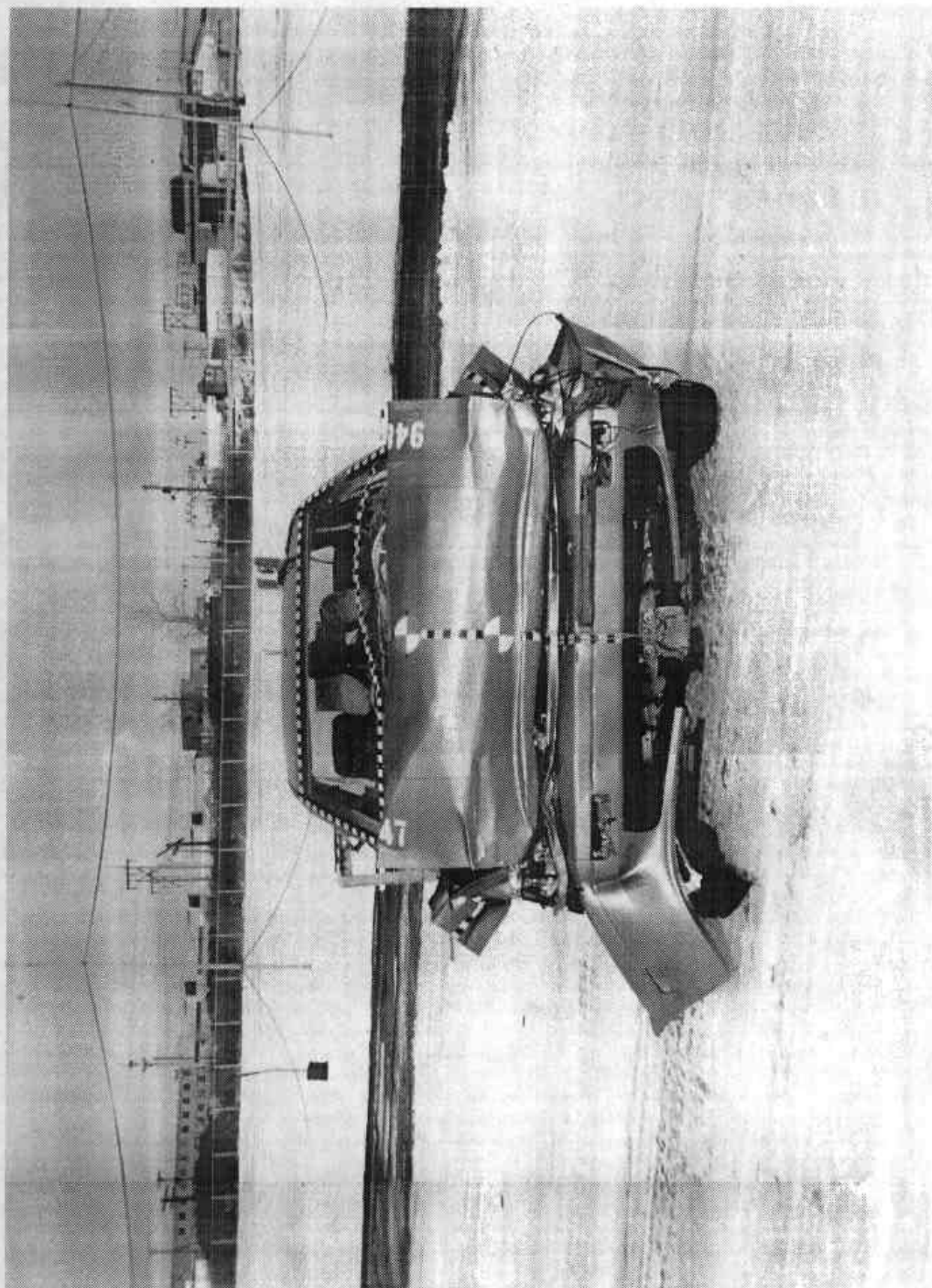


Figure A-3 POST TEST FRONT VIEW

A-4

7776-4



Figure A-4 PRE-TEST LEFT SIDE VIEW

A-5

7776-4

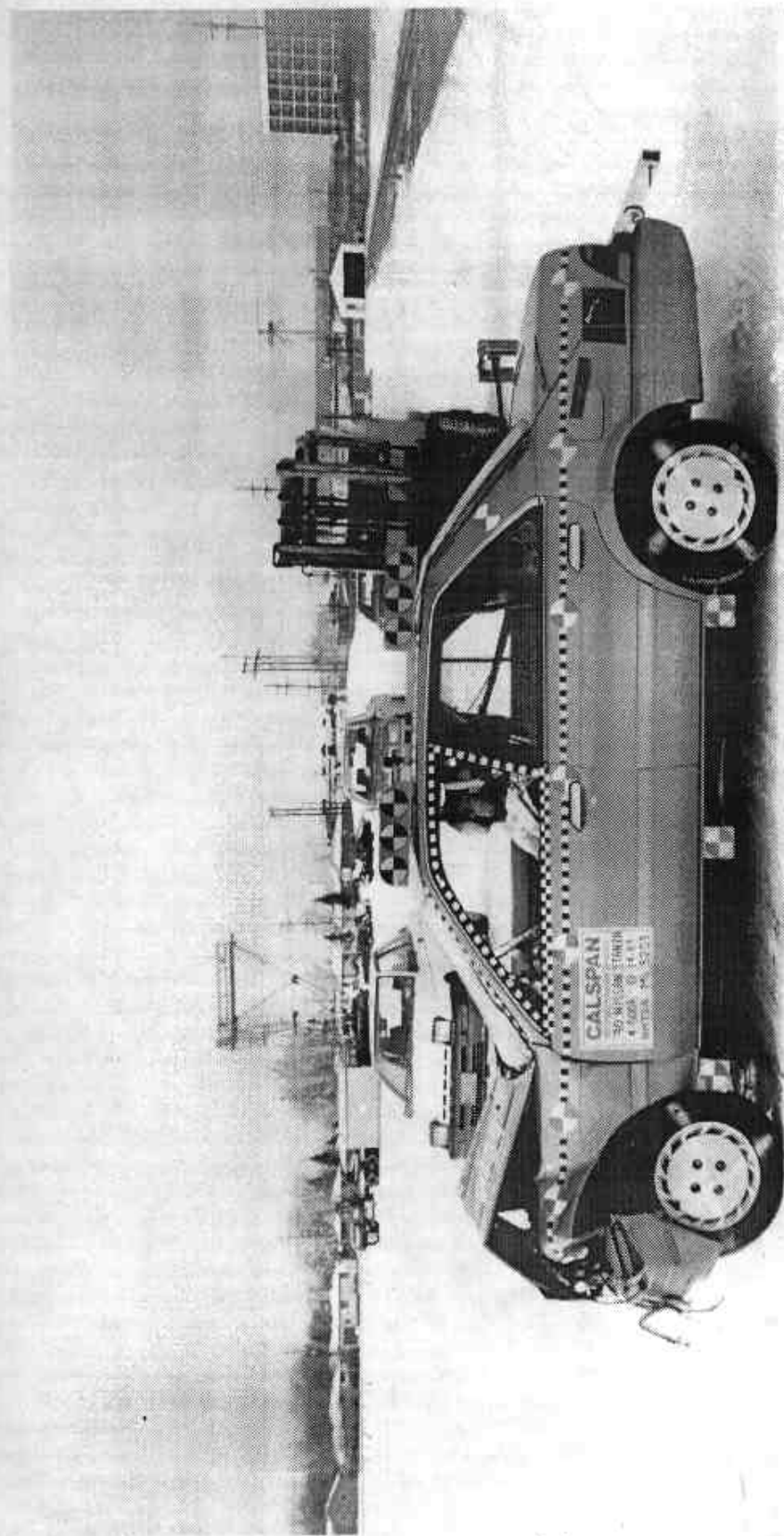


Figure A-5 POST TEST LEFT SIDE VIEW

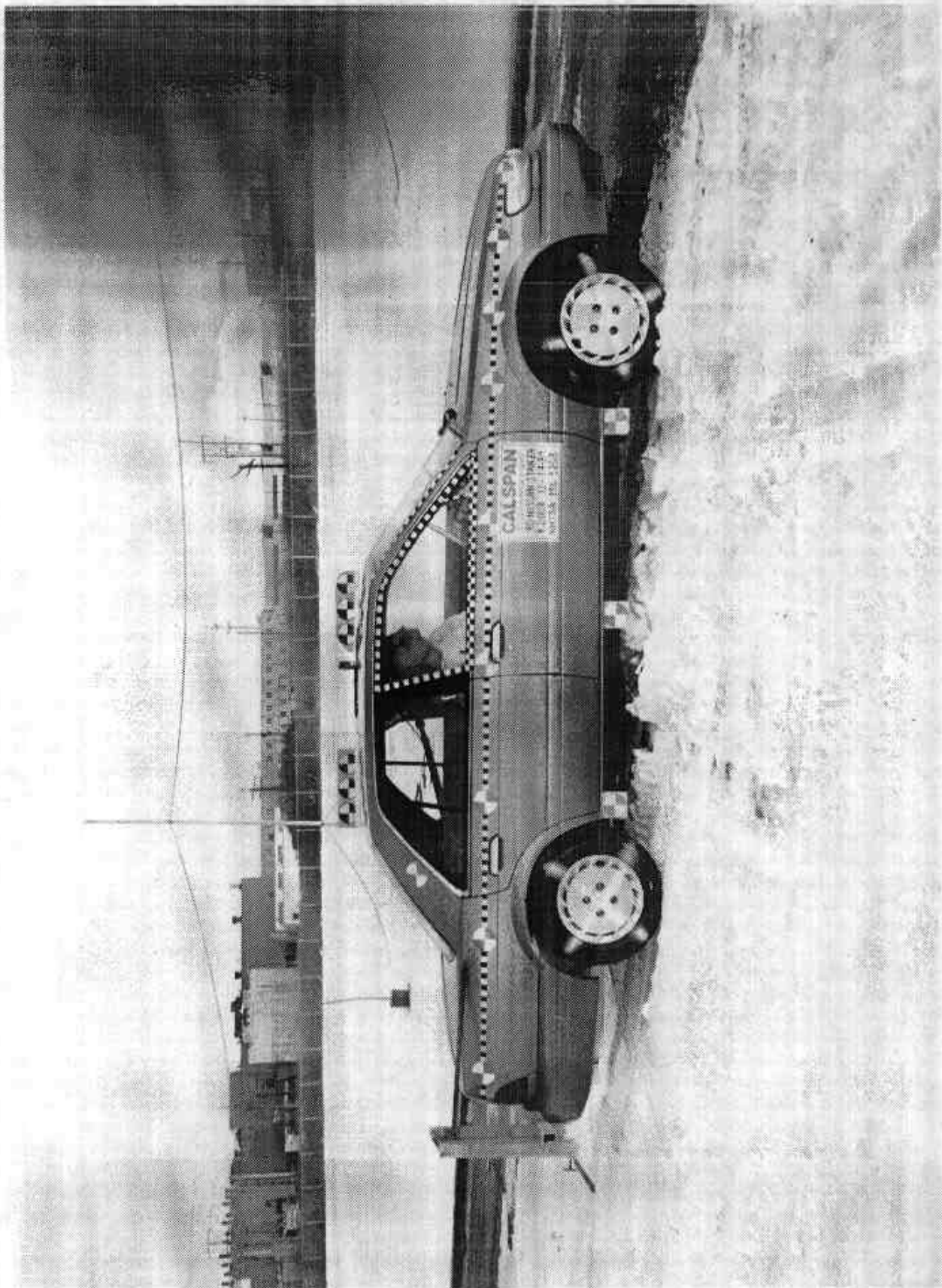


Figure A-6 PRE-TEST RIGHT SIDE VIEW

A-7

7776-4

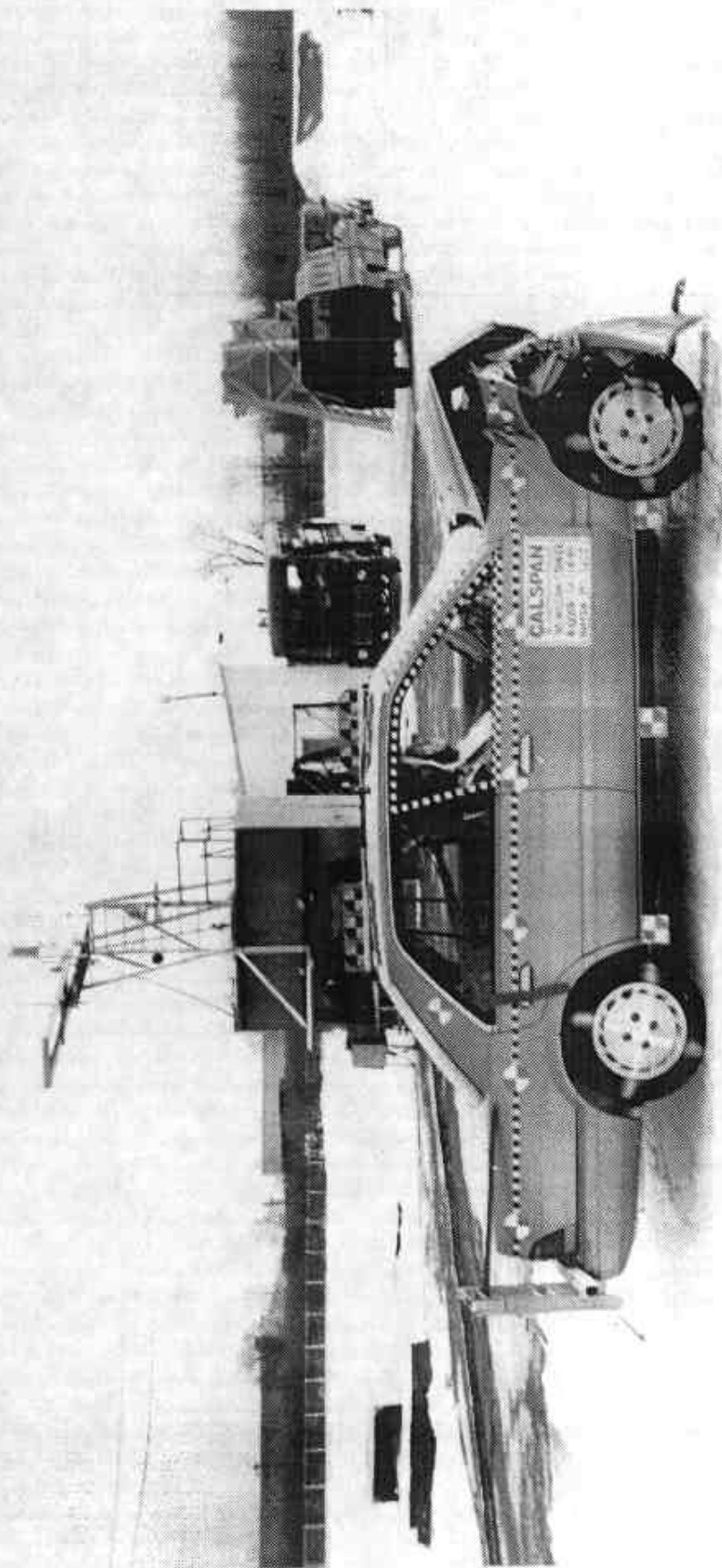


Figure A-7 POST-TEST RIGHT SIDE VIEW

A-8

7776-4



FIGURE A-8 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

A-9

7776-4

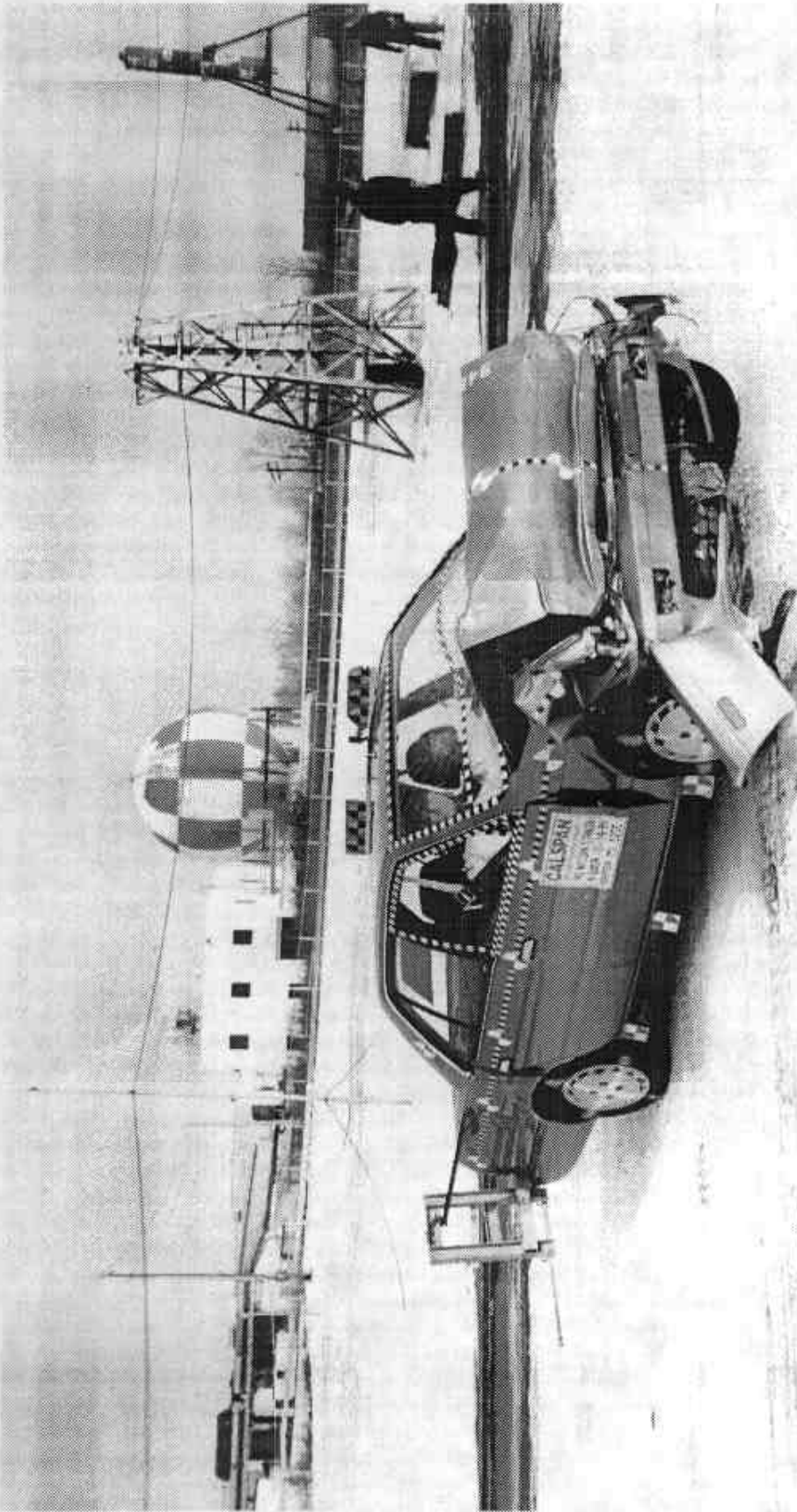


Figure A-9 POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-10

7776-4



FIGURE A-10 PRE-TEST LEFT REAR THREE-QUARTER VIEW

A-11

7776-4

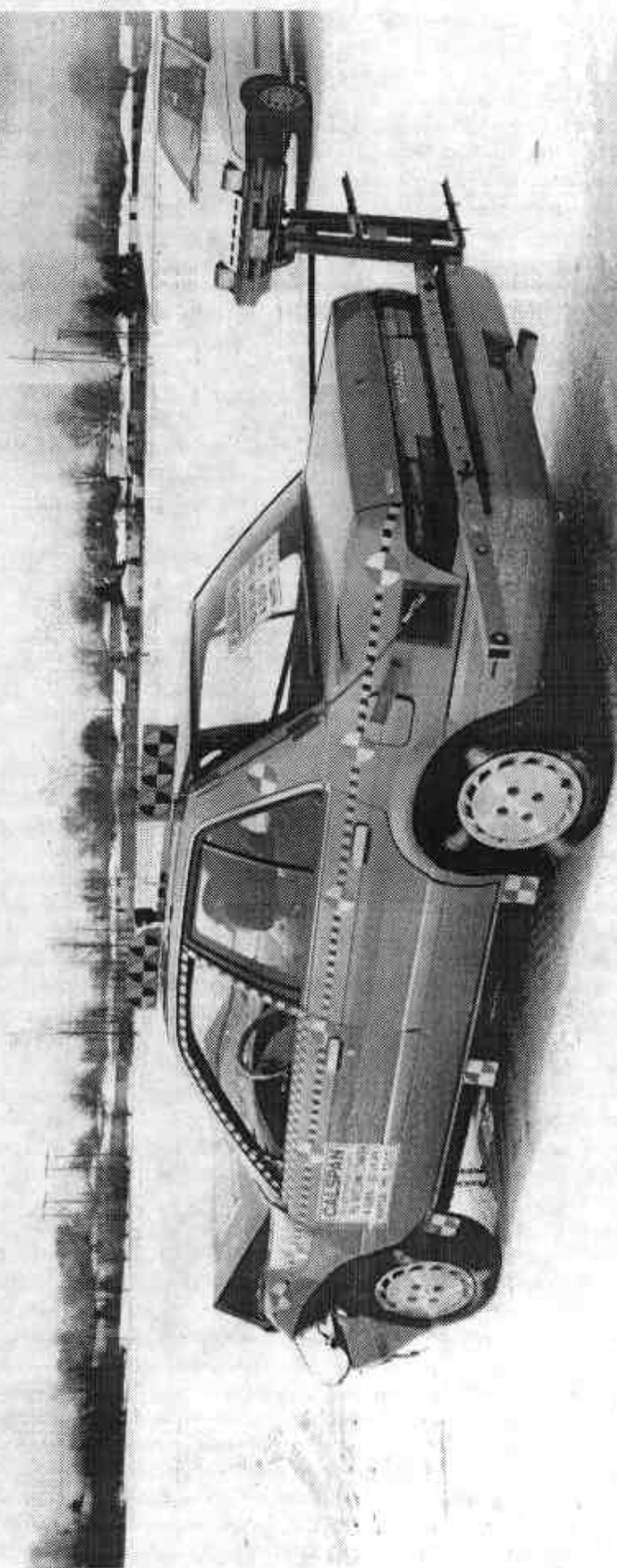


Figure A-11 POST-TEST LEFT REAR THREE-QUARTER VIEW

A-12

7776-4

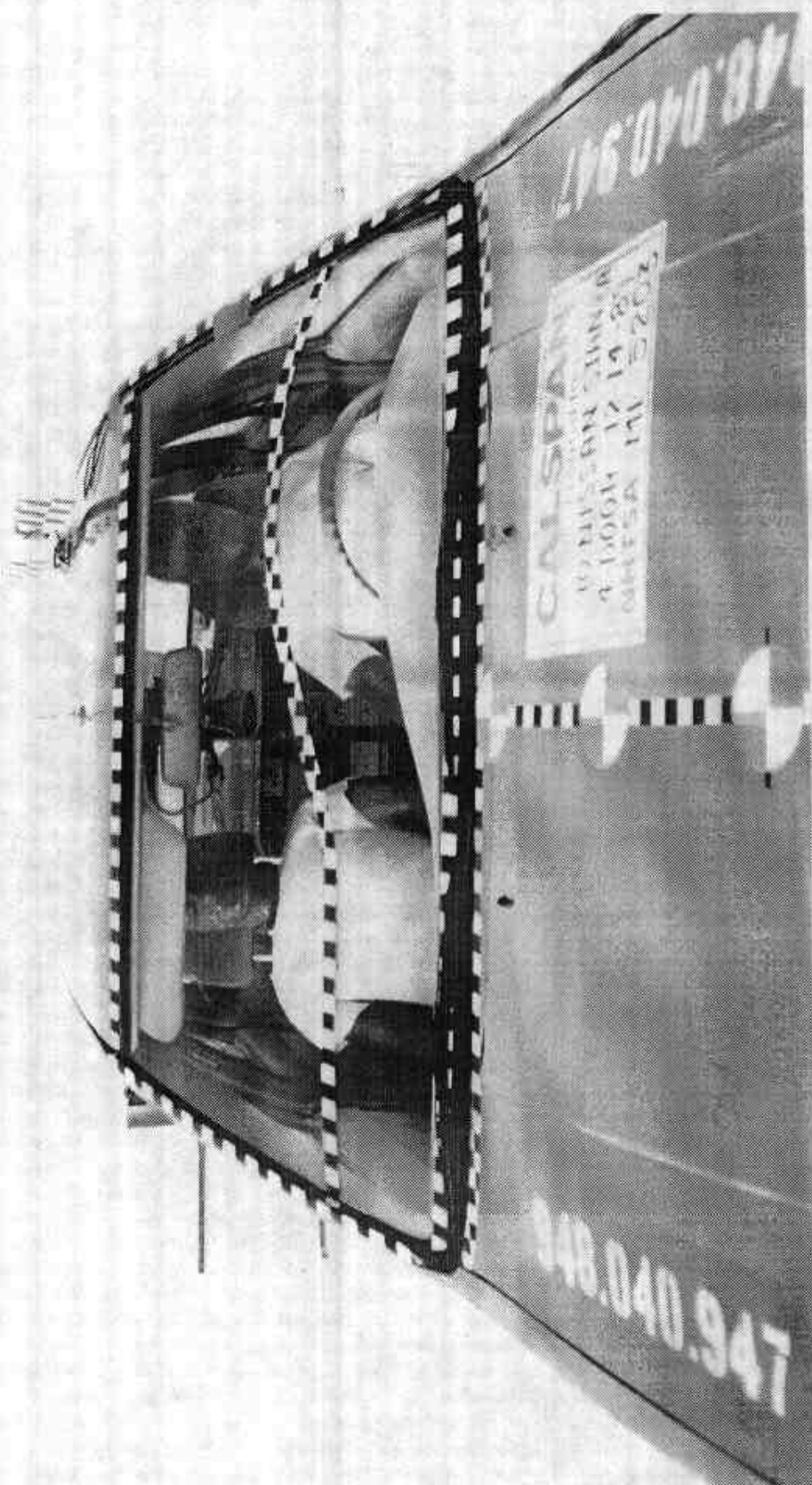


Figure A-12 PRE-TEST WINDSHIELD VIEW

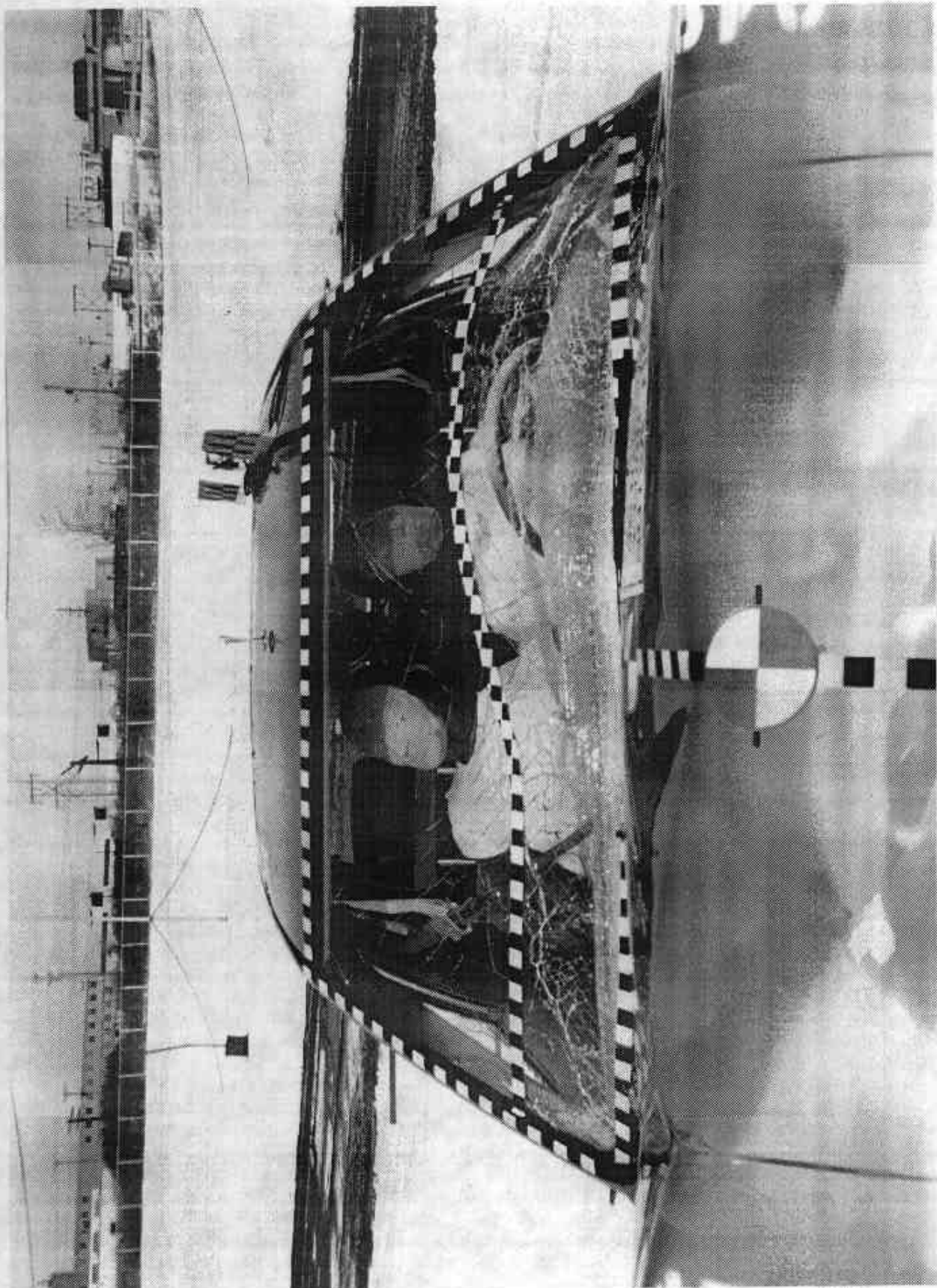


Figure A-13 POST-TEST WINDSHIELD VIEW

A-14

7776-4

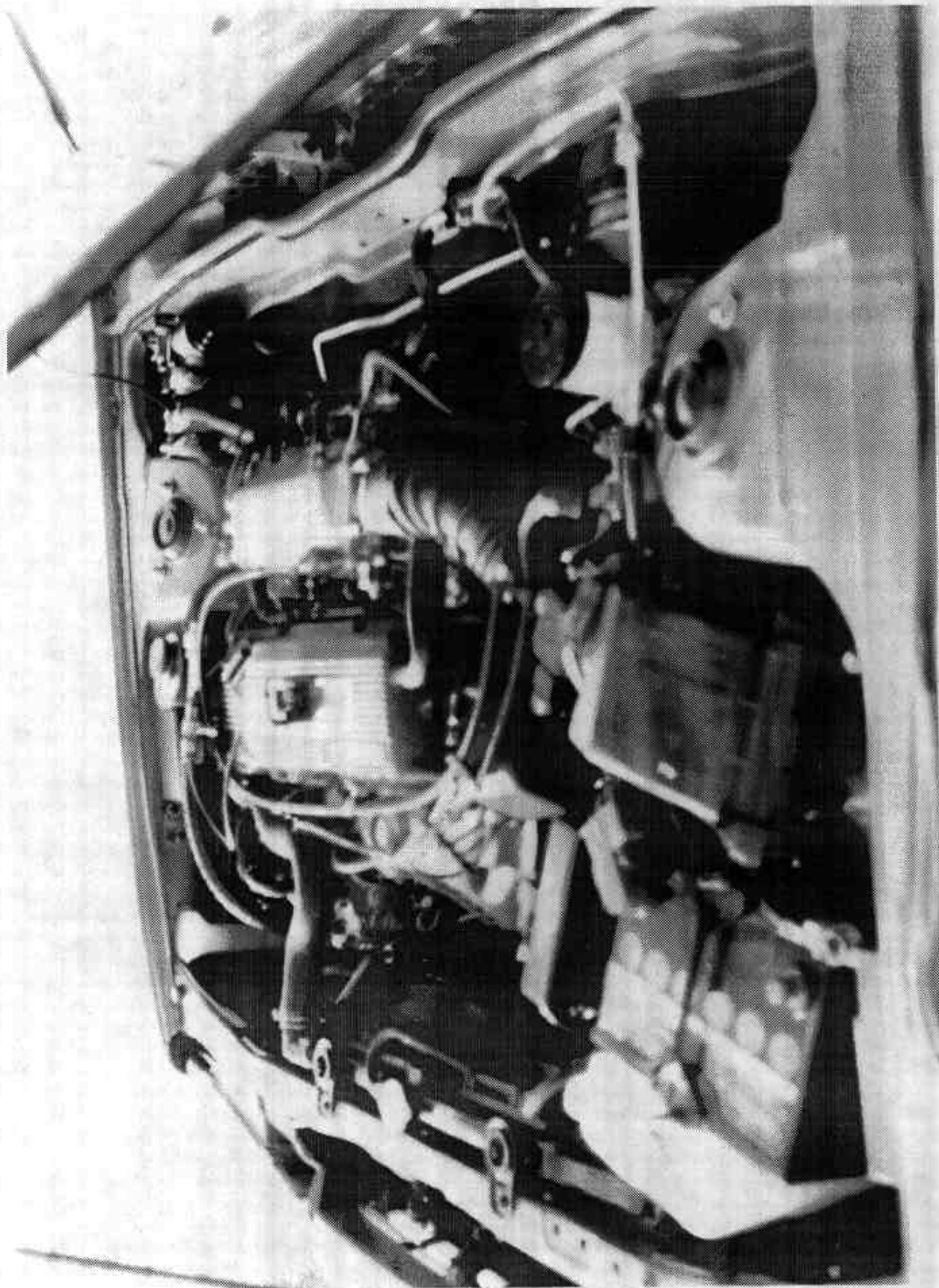


Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

A-15

7776-4

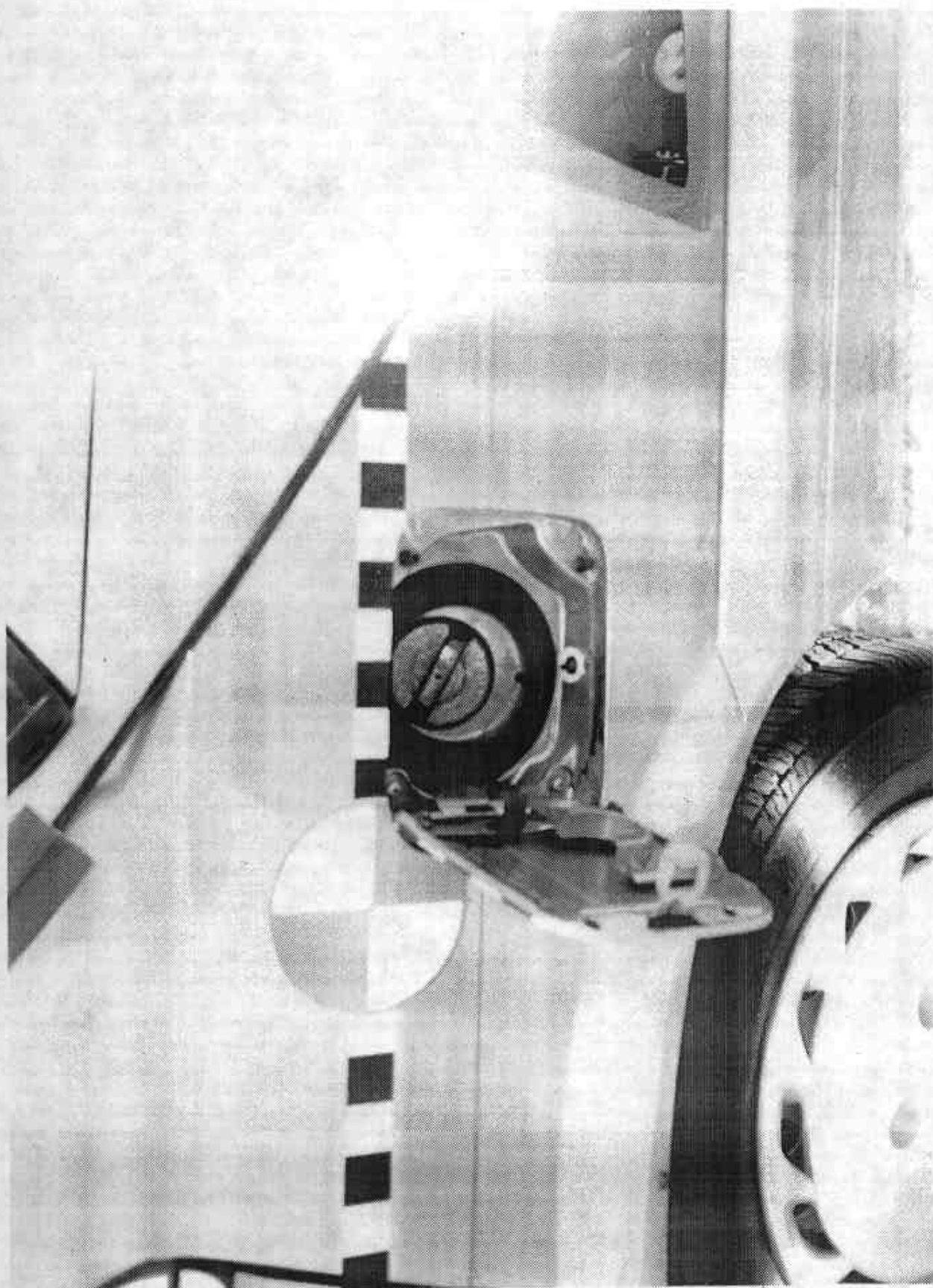


Figure A-16 PRE-TEST FUEL CAP VIEW

A-16

7776-4

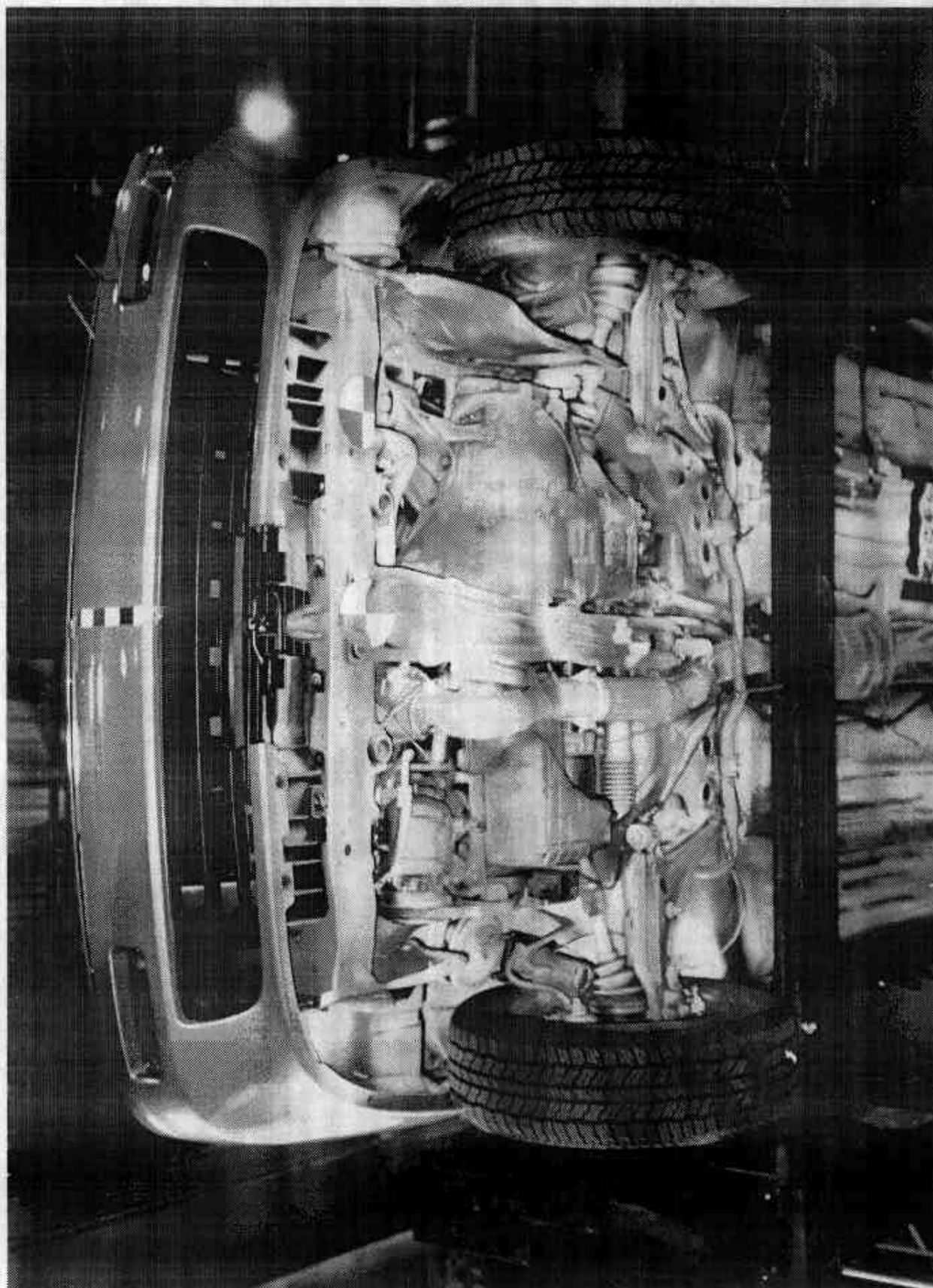


Figure A-16 PRE-TEST FRONT UNDERBODY VIEW

A-17

7776-4

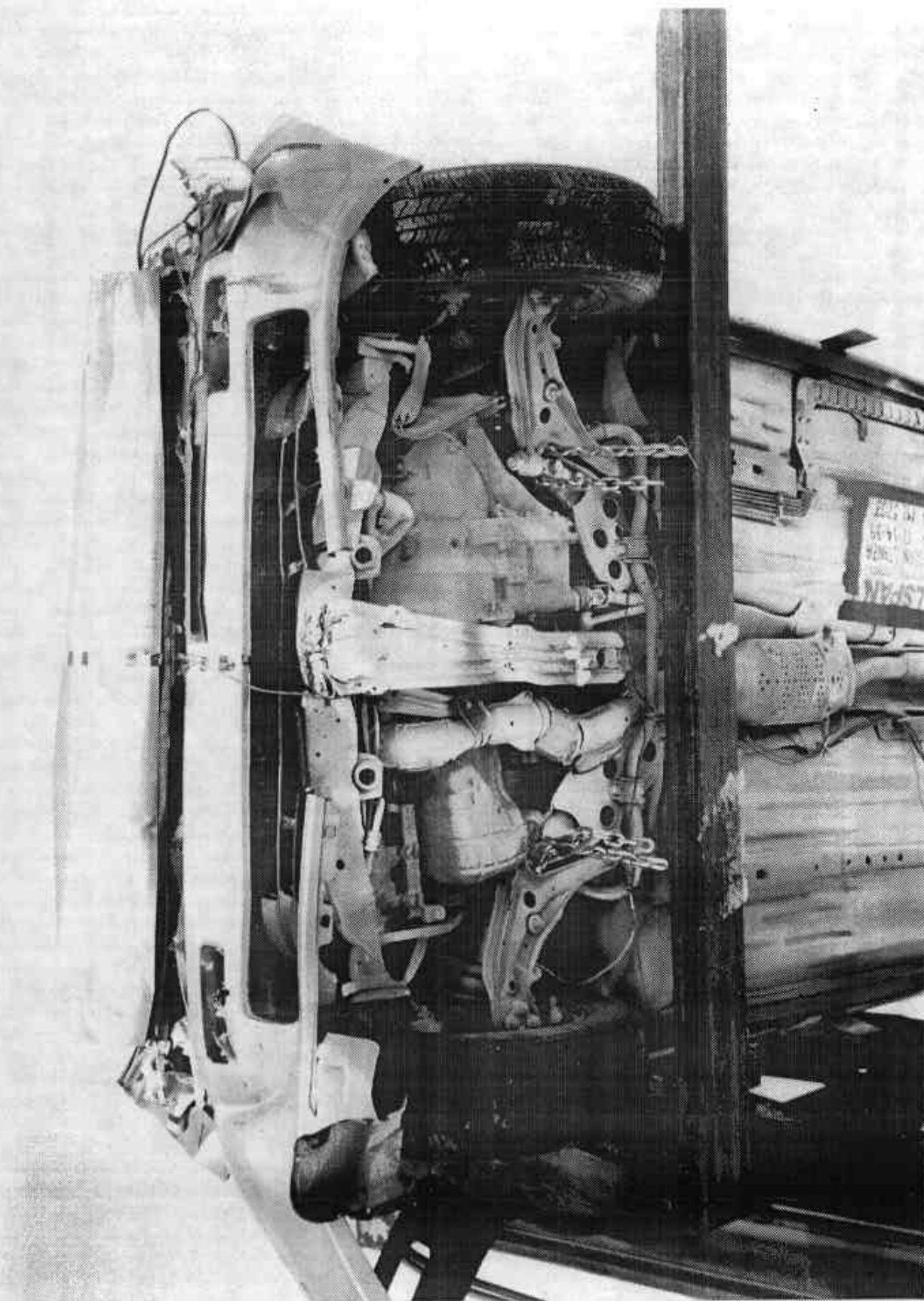


Figure A-17 POST-TEST FRONT UNDERBODY VIEW

A-18

7776-4

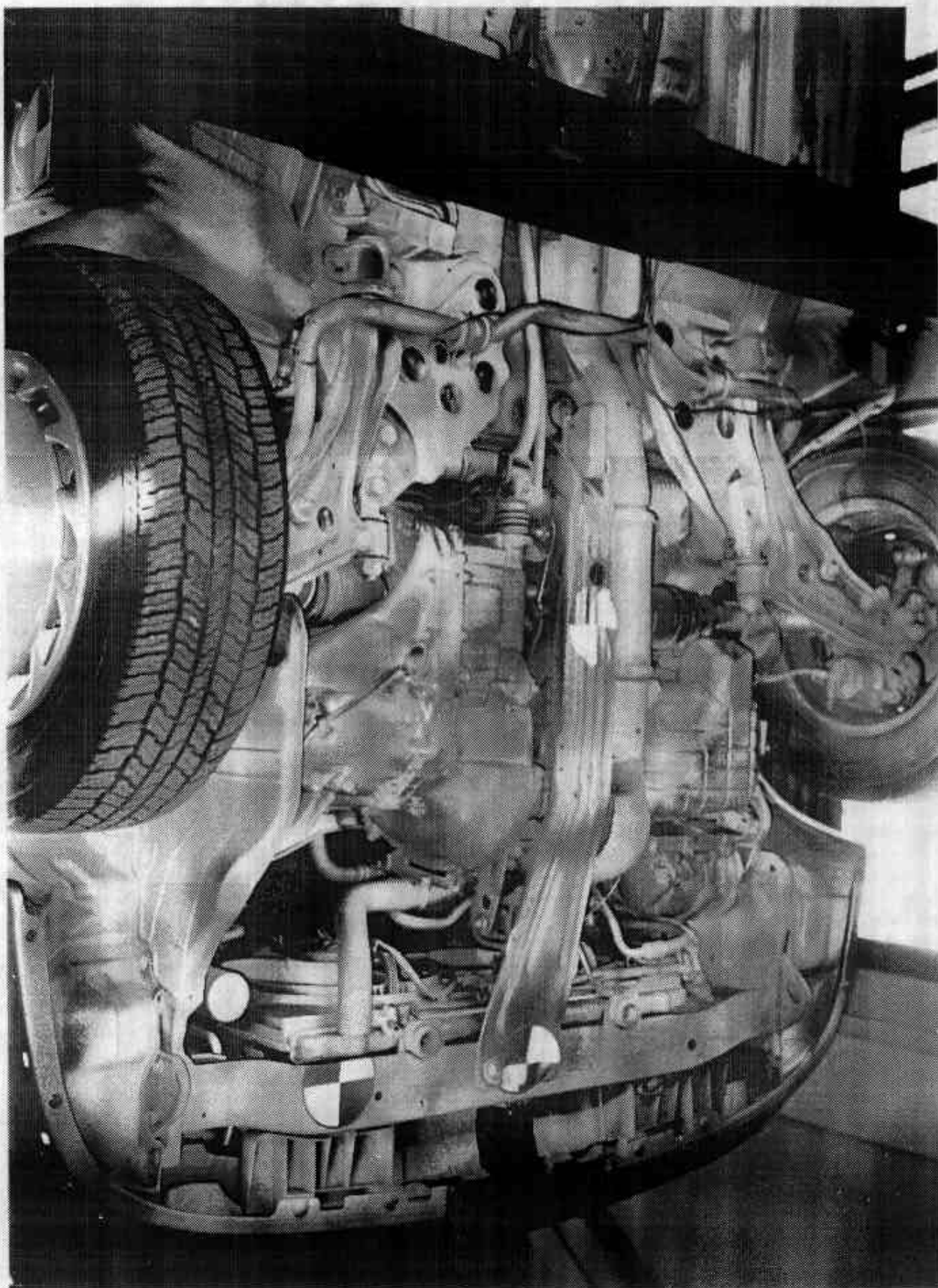


Figure A-18 PRE-TEST FRONT SIDE UNDERBODY VIEW

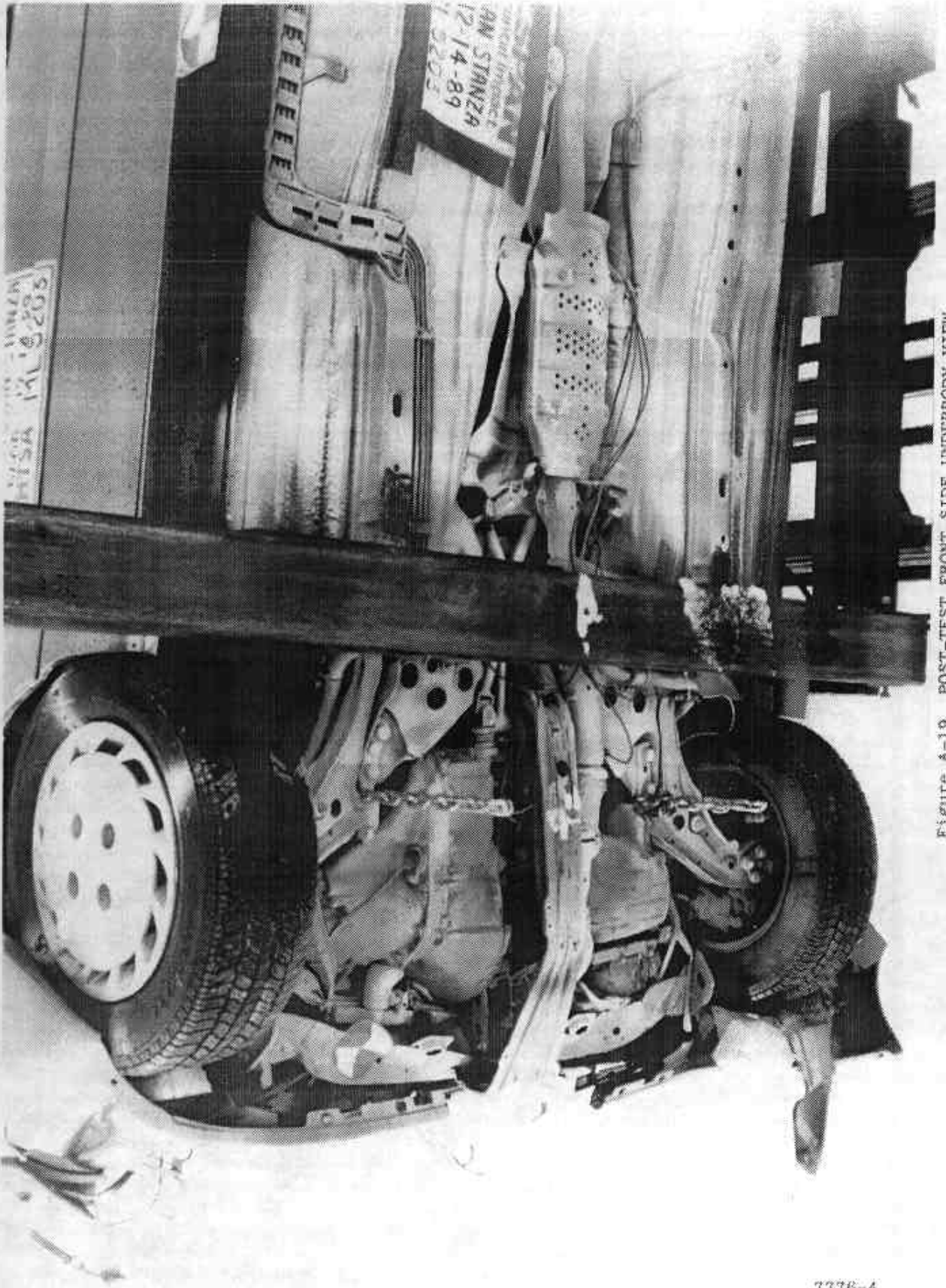


Figure A-19 POST-TEST FRONT SIDE UNDERBODY VIEW

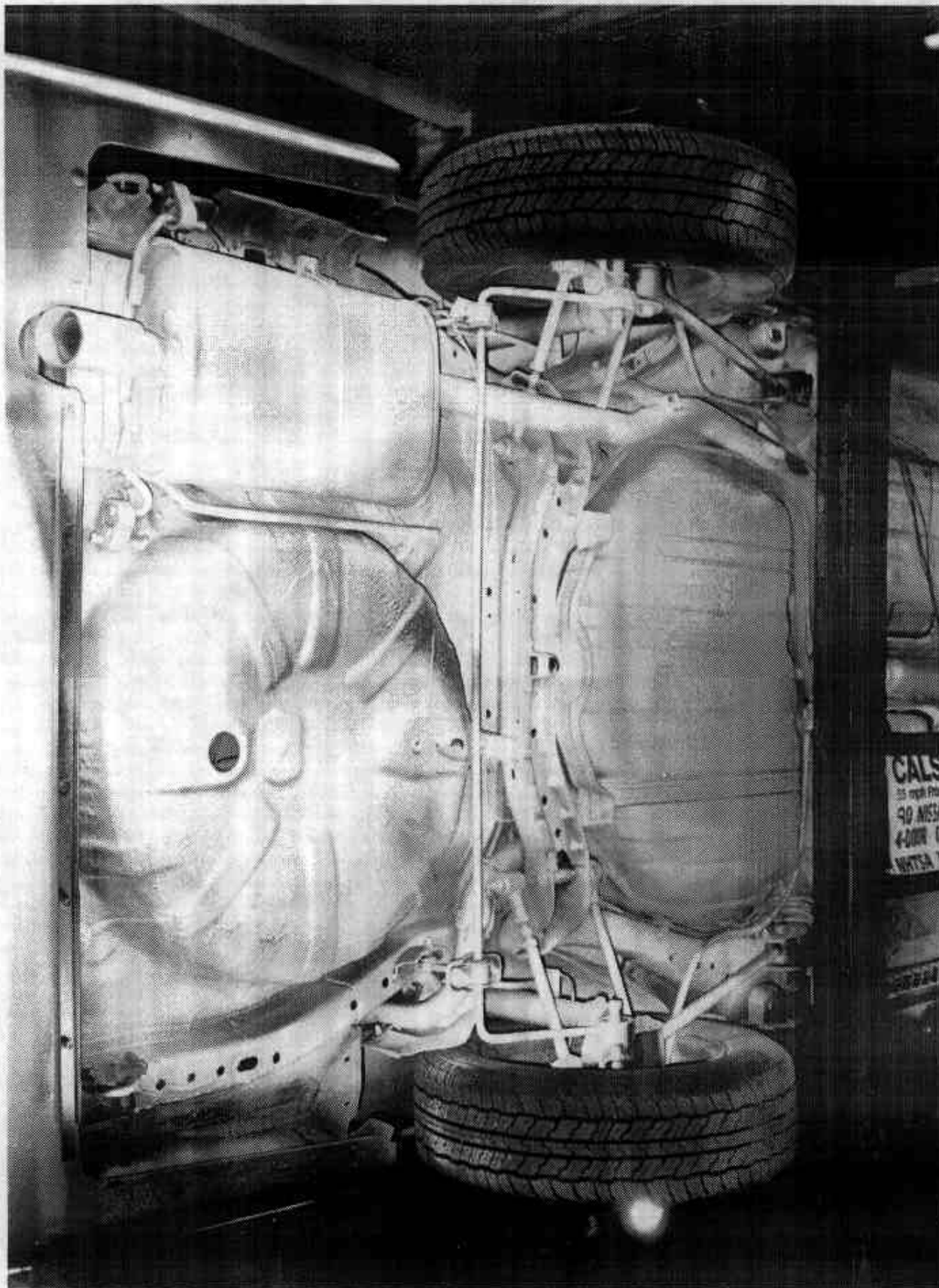


Figure A-20 PRE-TEST REAR UNDERBODY VIEW

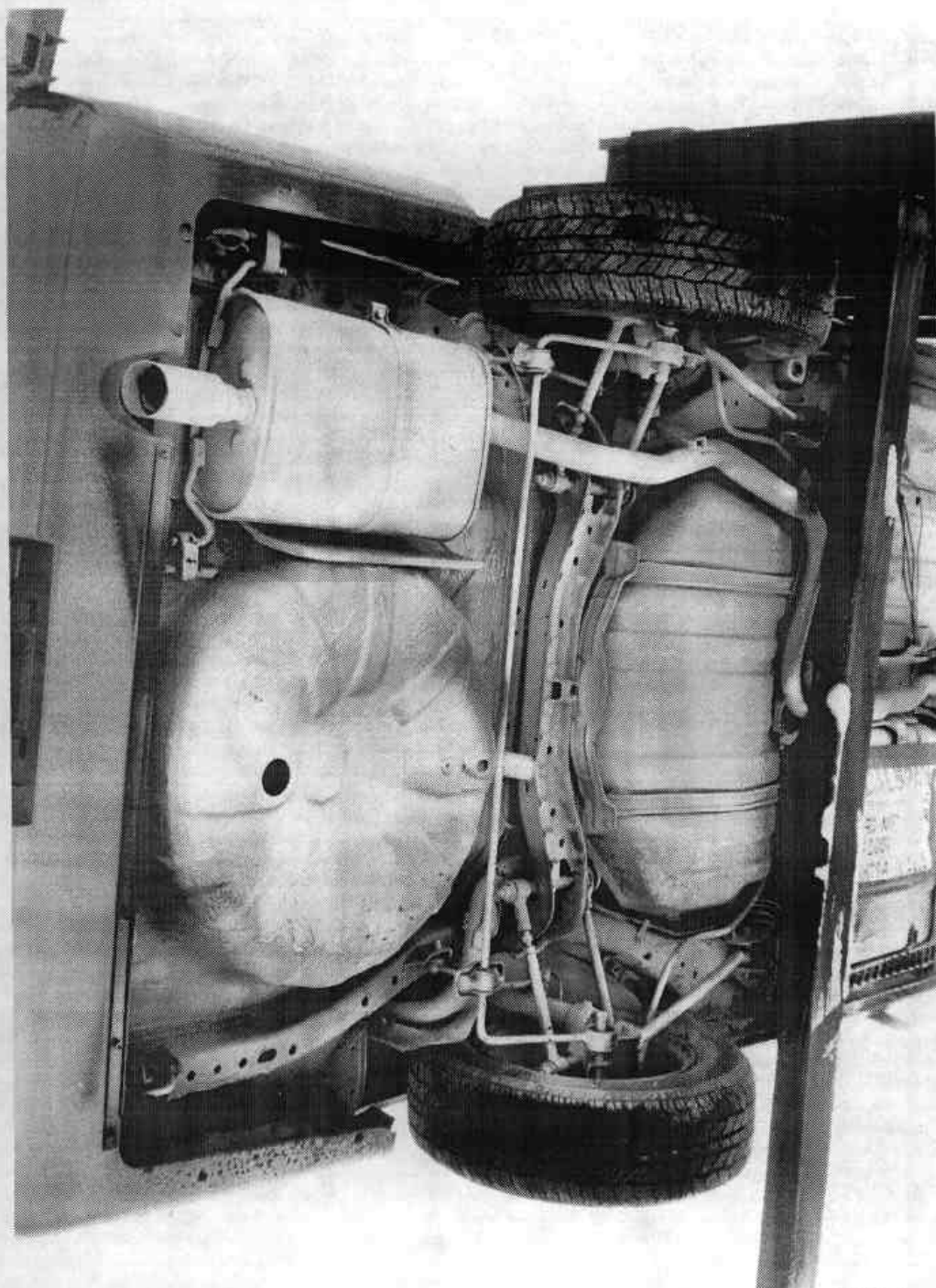


Figure A-21 POST-TEST REAR UNDERBODY VIEW

A-22

7776-4

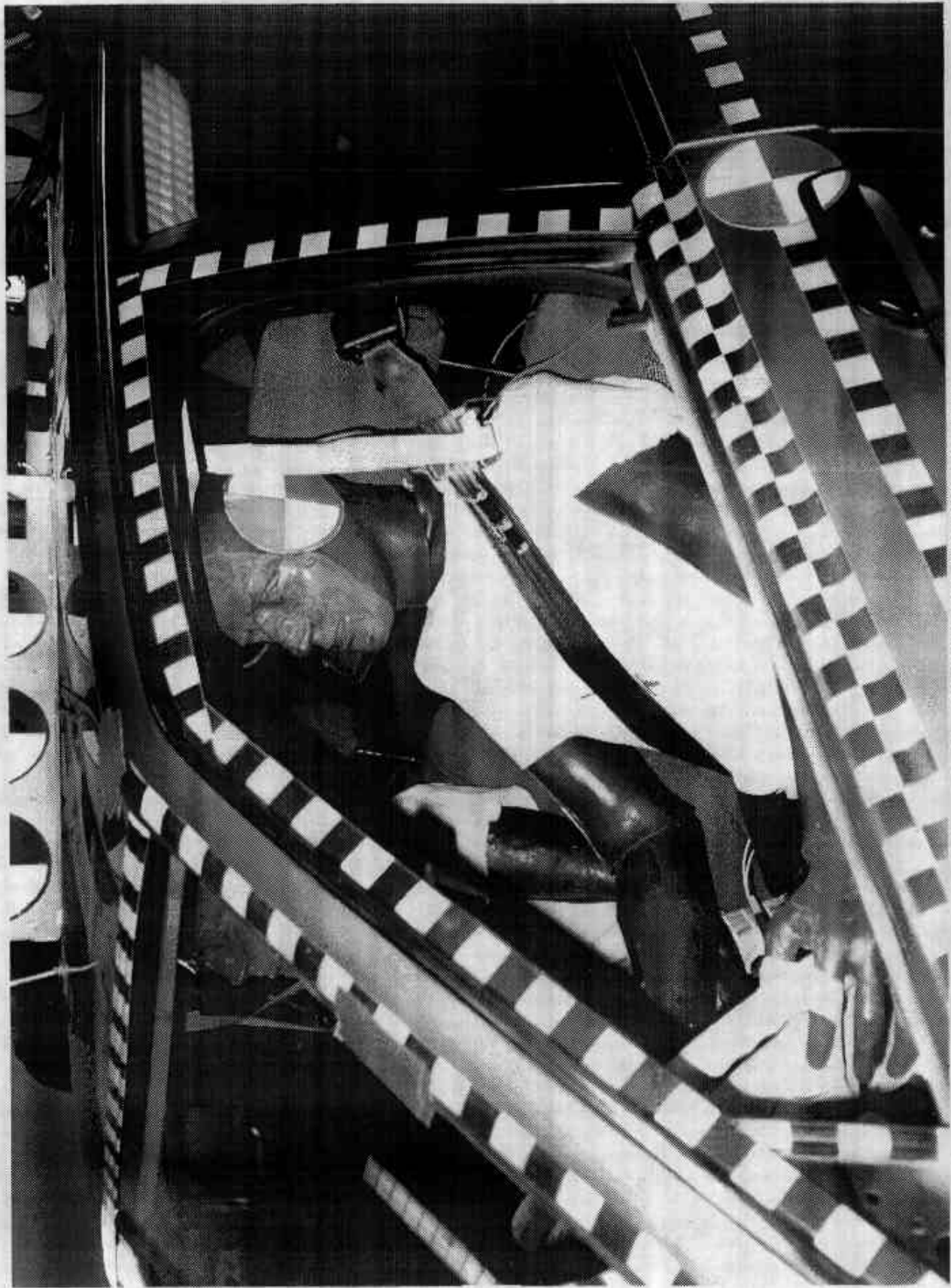


Figure A-22 PRE-TEST DRIVER POSITION VIEW

A-23

7776-4

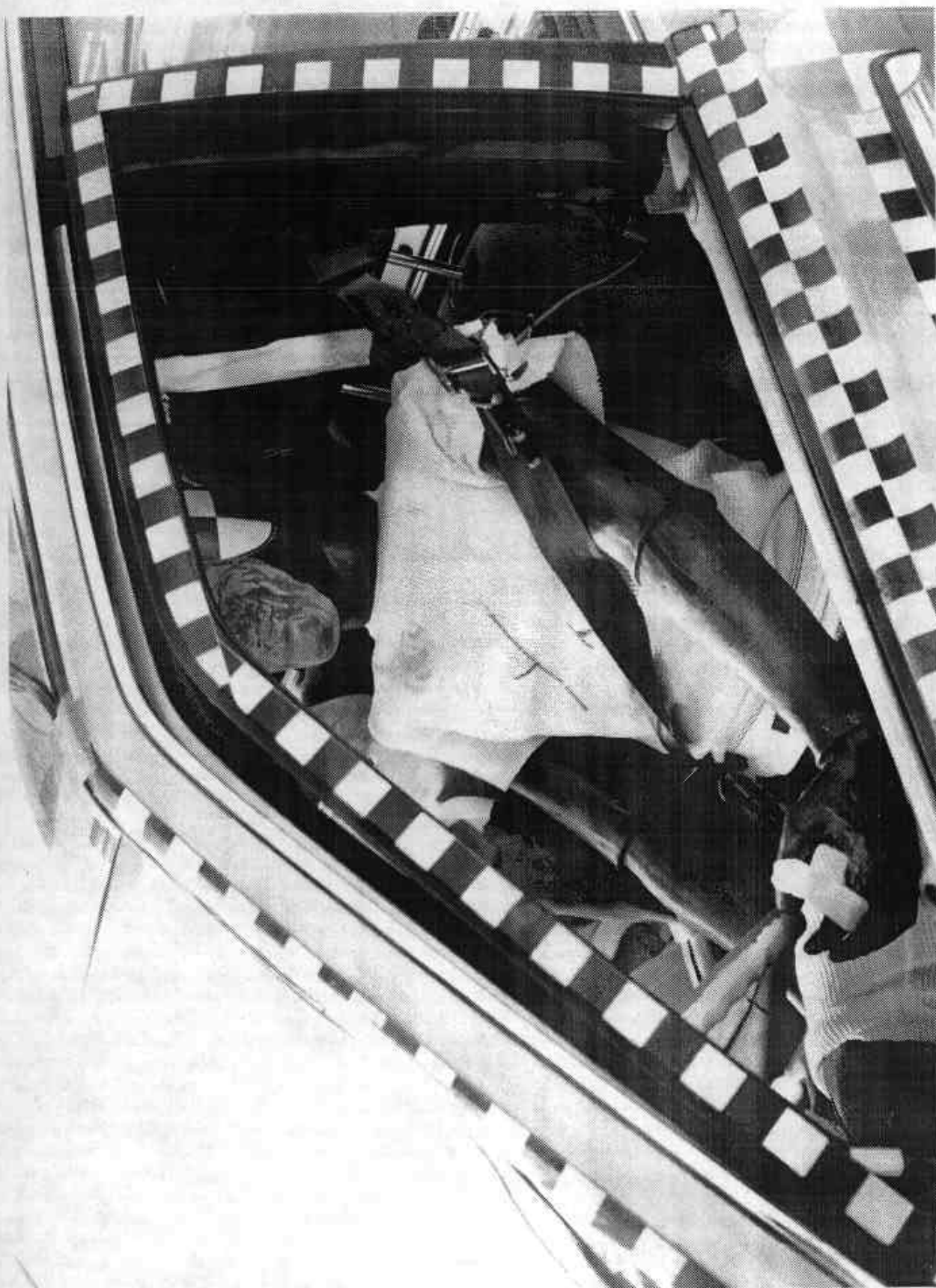


Figure A-23 POST-TEST DRIVER POSITION VIEW



Figure A-24 PRE-TEST PASSENGER POSITION VIEW

A-25

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FIGURE A-25 POST-TEST PASSENGER POSITION VIEW

A-26

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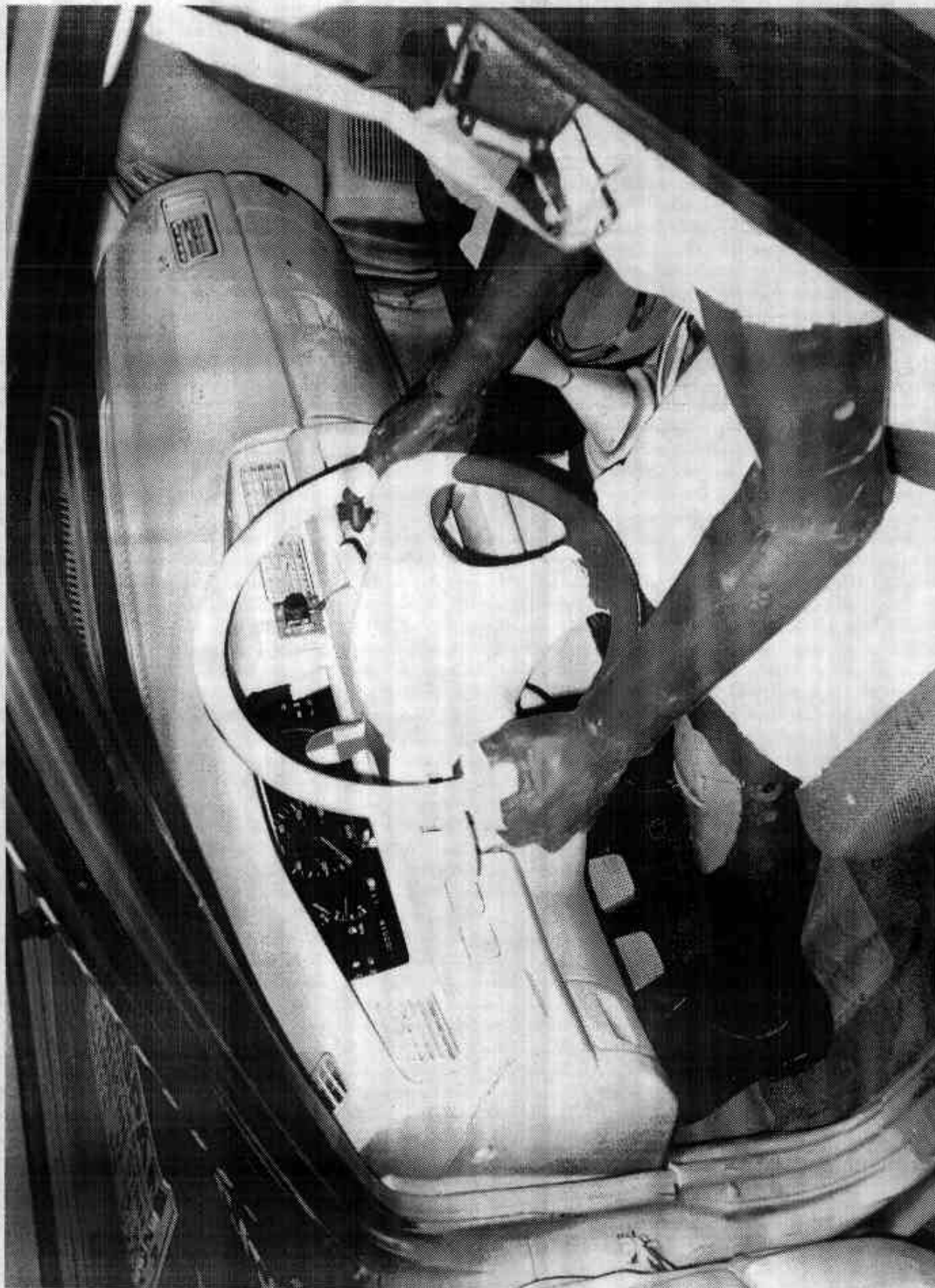


Figure A-26 PRE-TEST DRIVER AND INTERIOR VIEW

A-27

7776-4

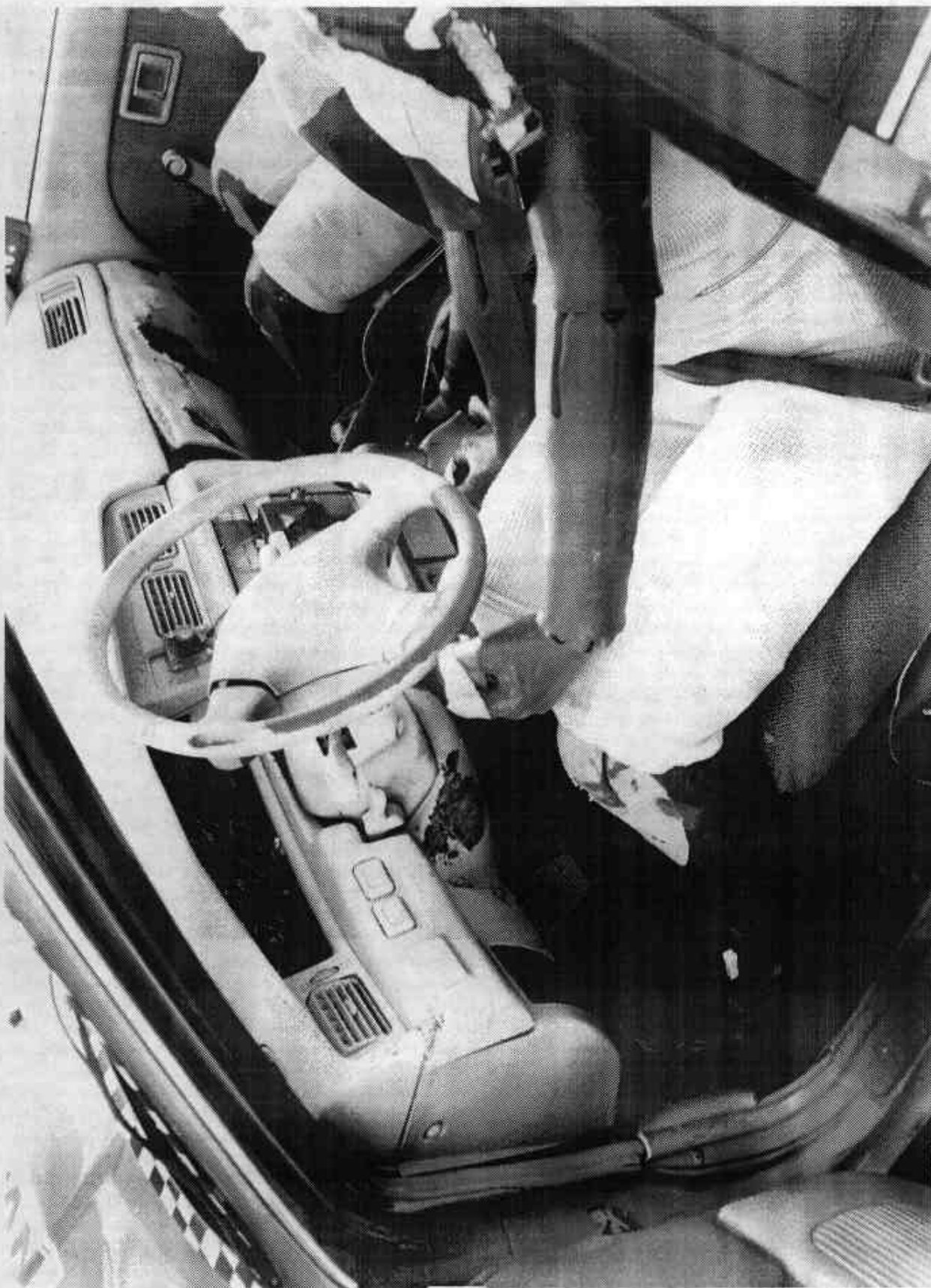


Figure A-27 POST-TEST DRIVER AND INTERIOR VIEW

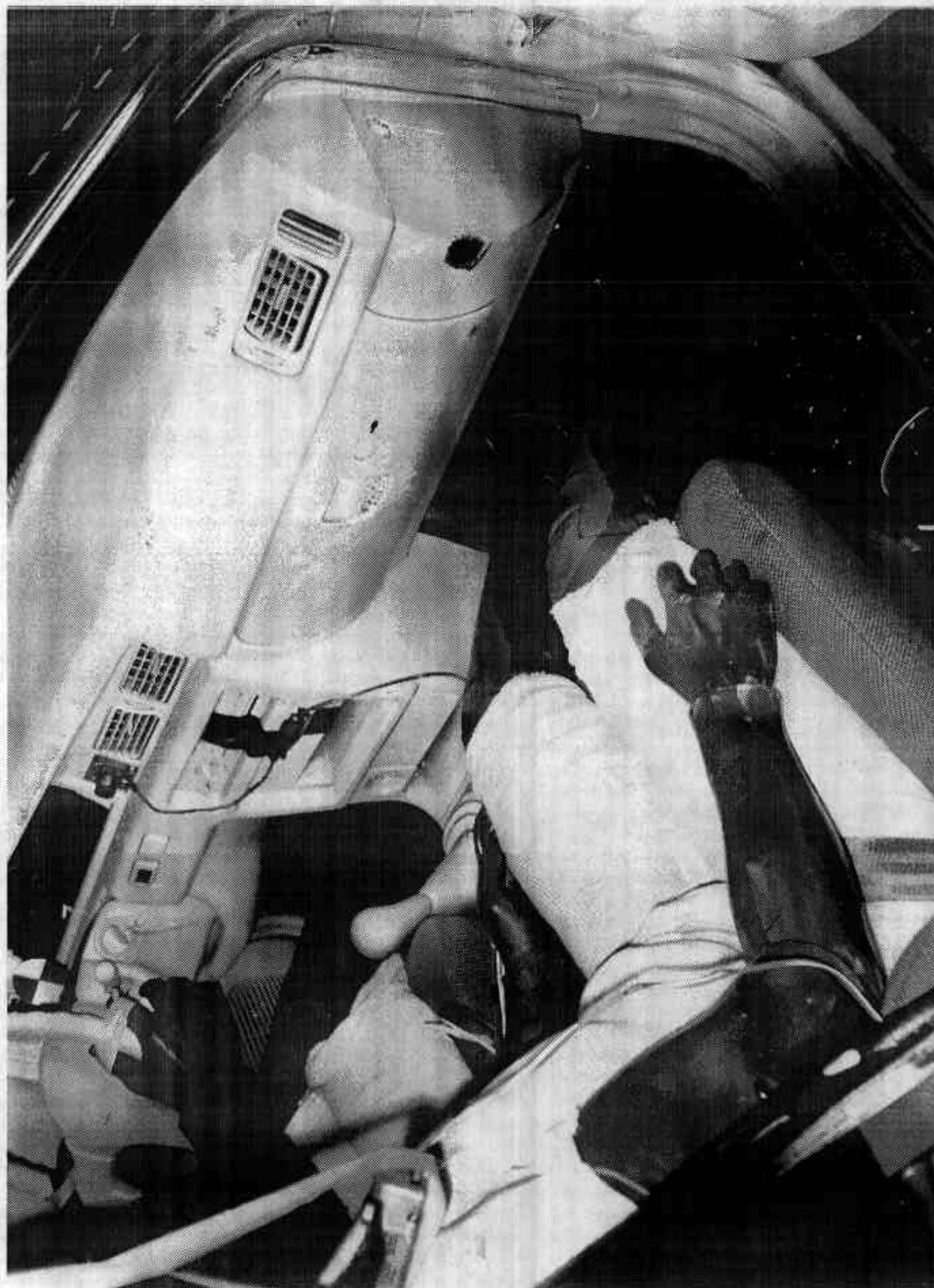


FIGURE A-28 PRE-TEST PASSENGER AND INTERIOR VIEW

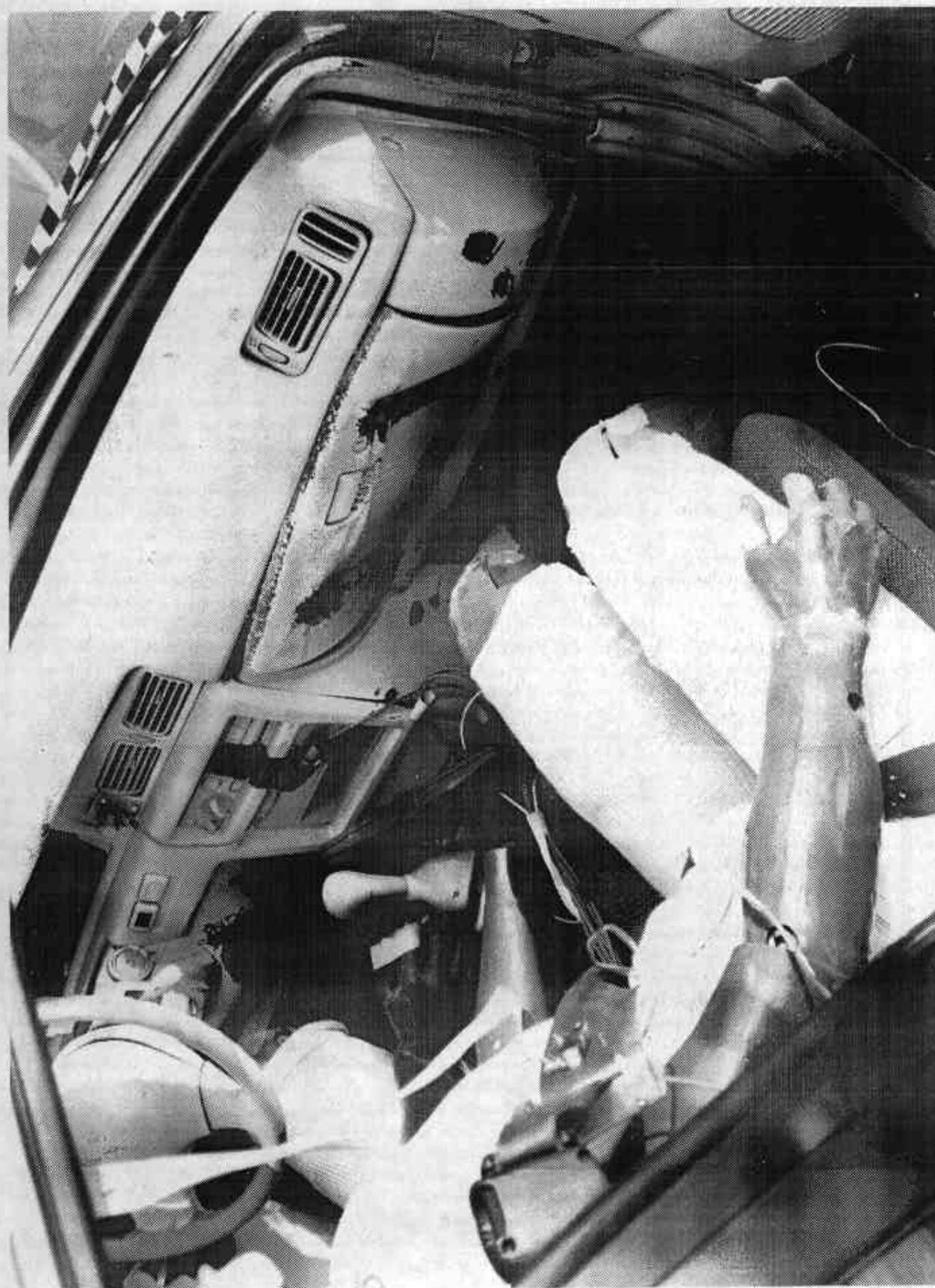


Figure A-29 POST-TEST PASSENGER AND INTERIOR VIEW



Figure A-30 IMPACT VIEW

A-31

7776-4

Appendix B

VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA

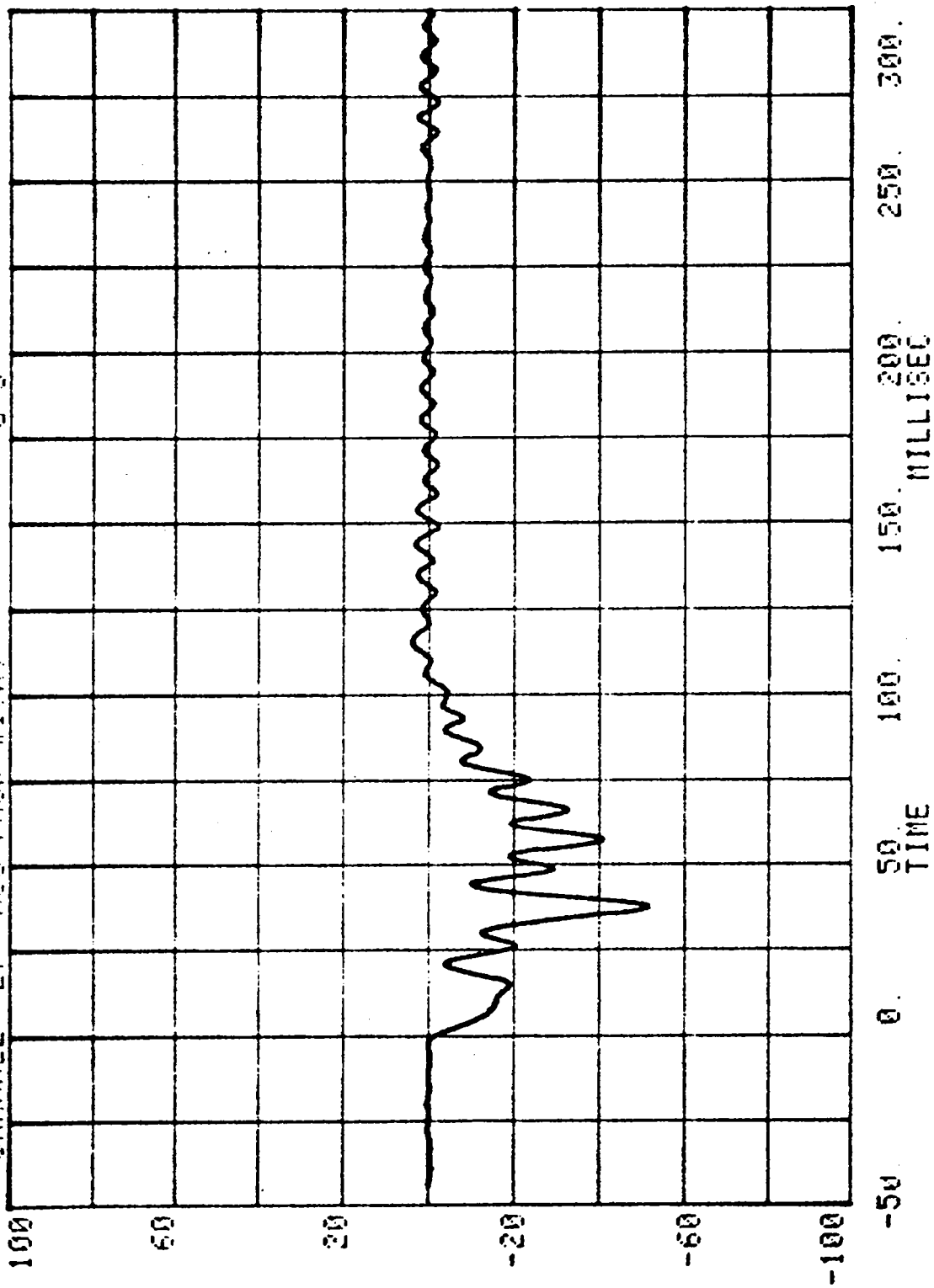
TEST NO. ML5203

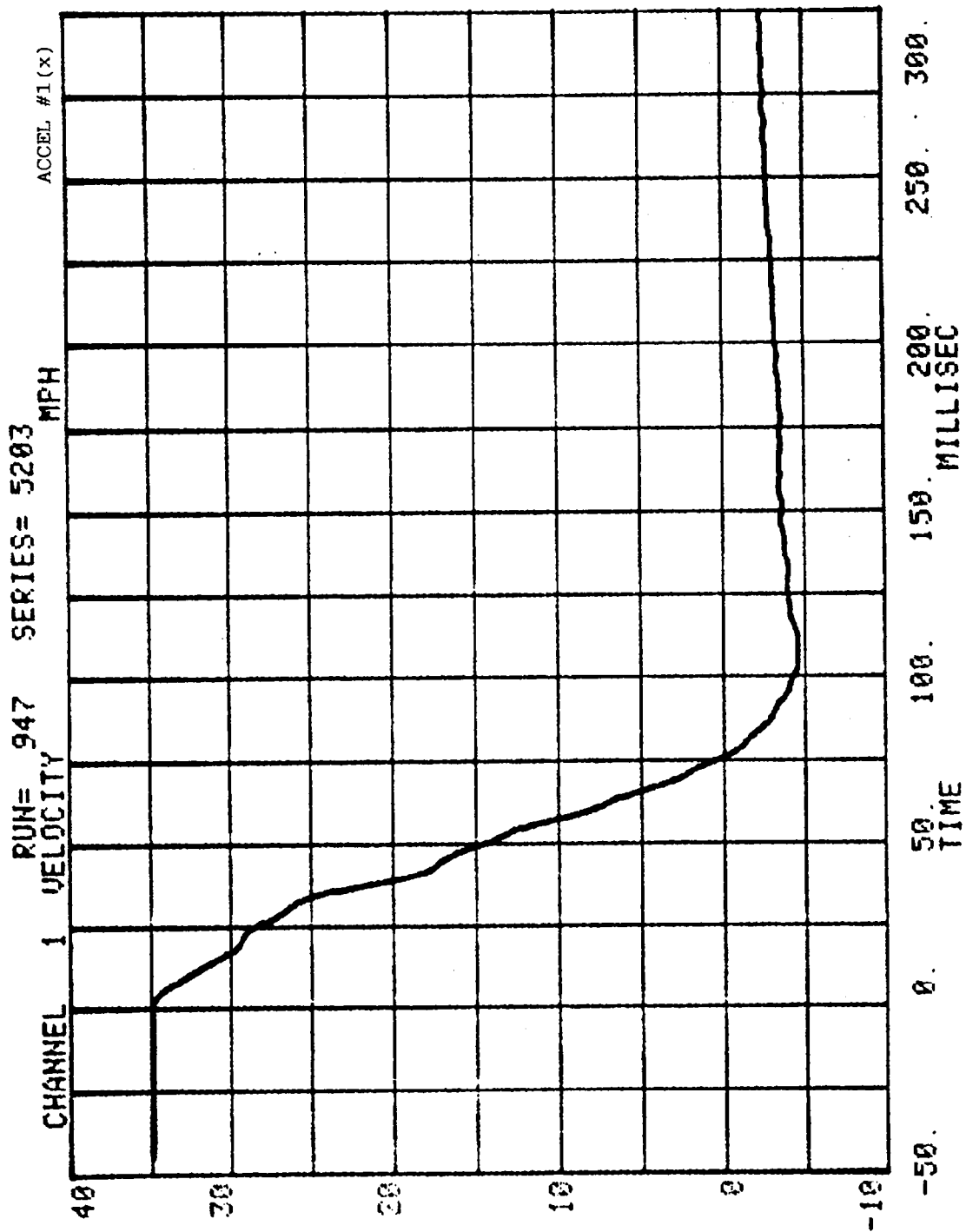
VEHICLE DATA

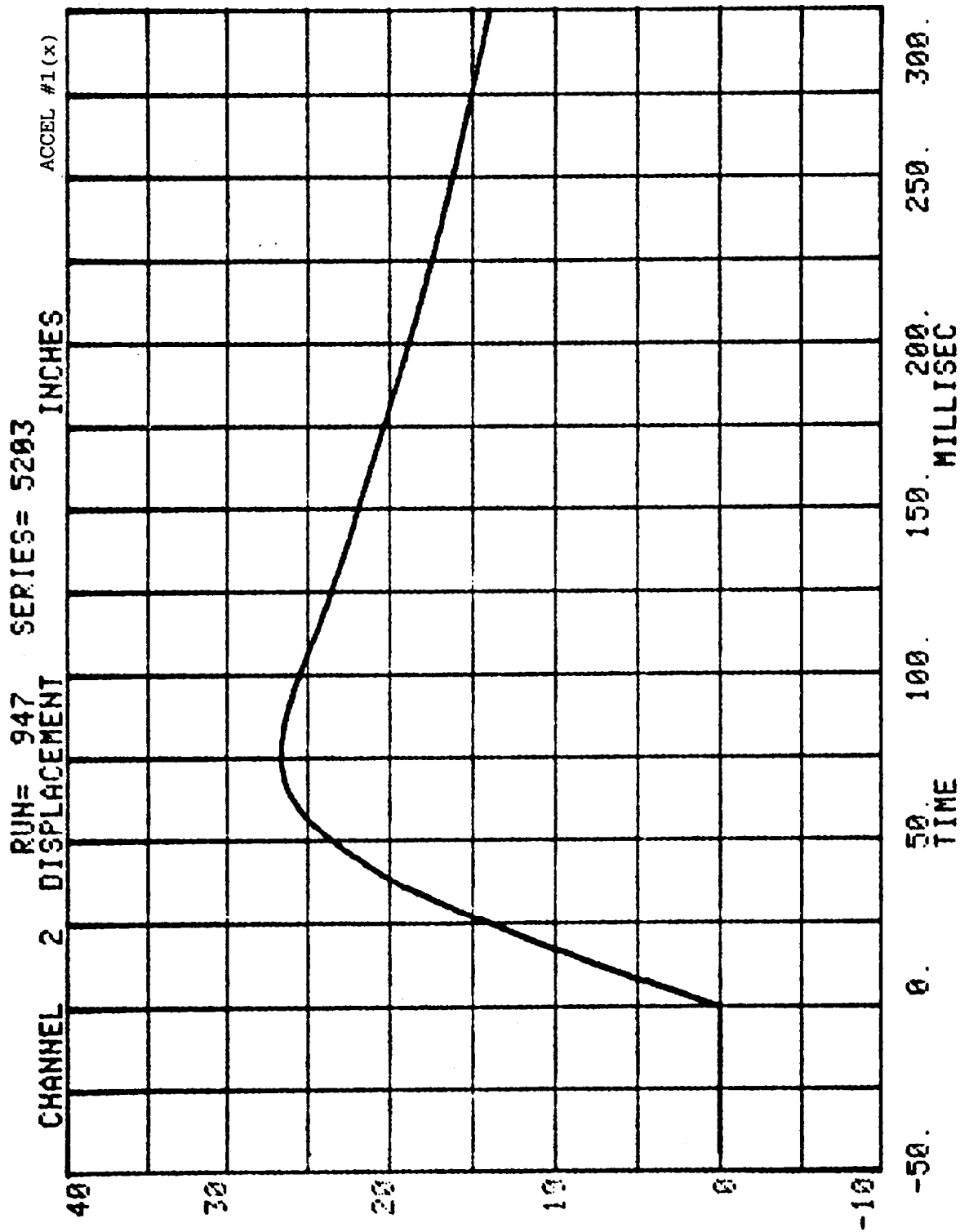
FILTER CHANNEL CLASS

60

CHANNEL 27 ACC PACK #1000
RUN= 947 SERIES= 5203 G'S

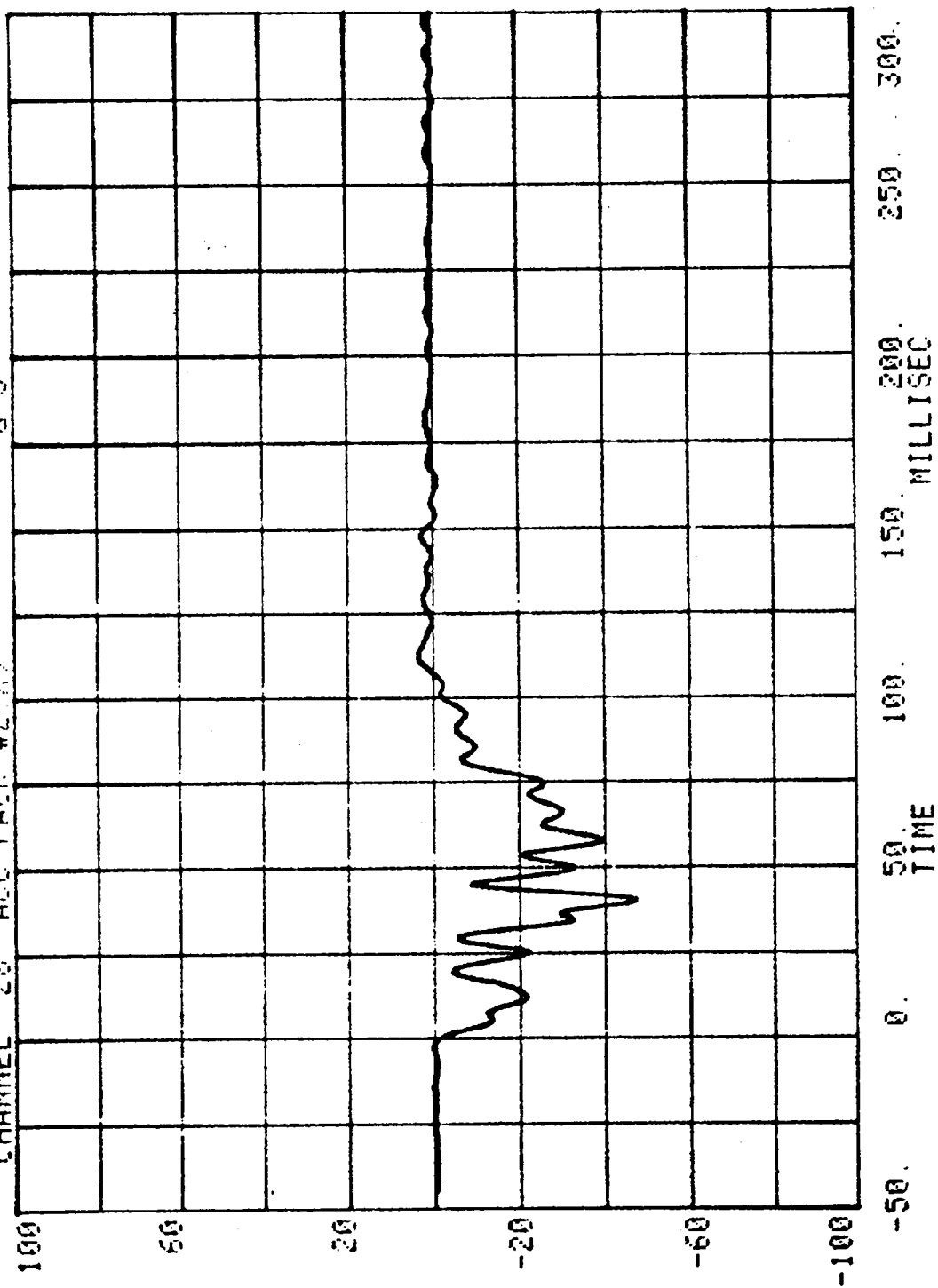


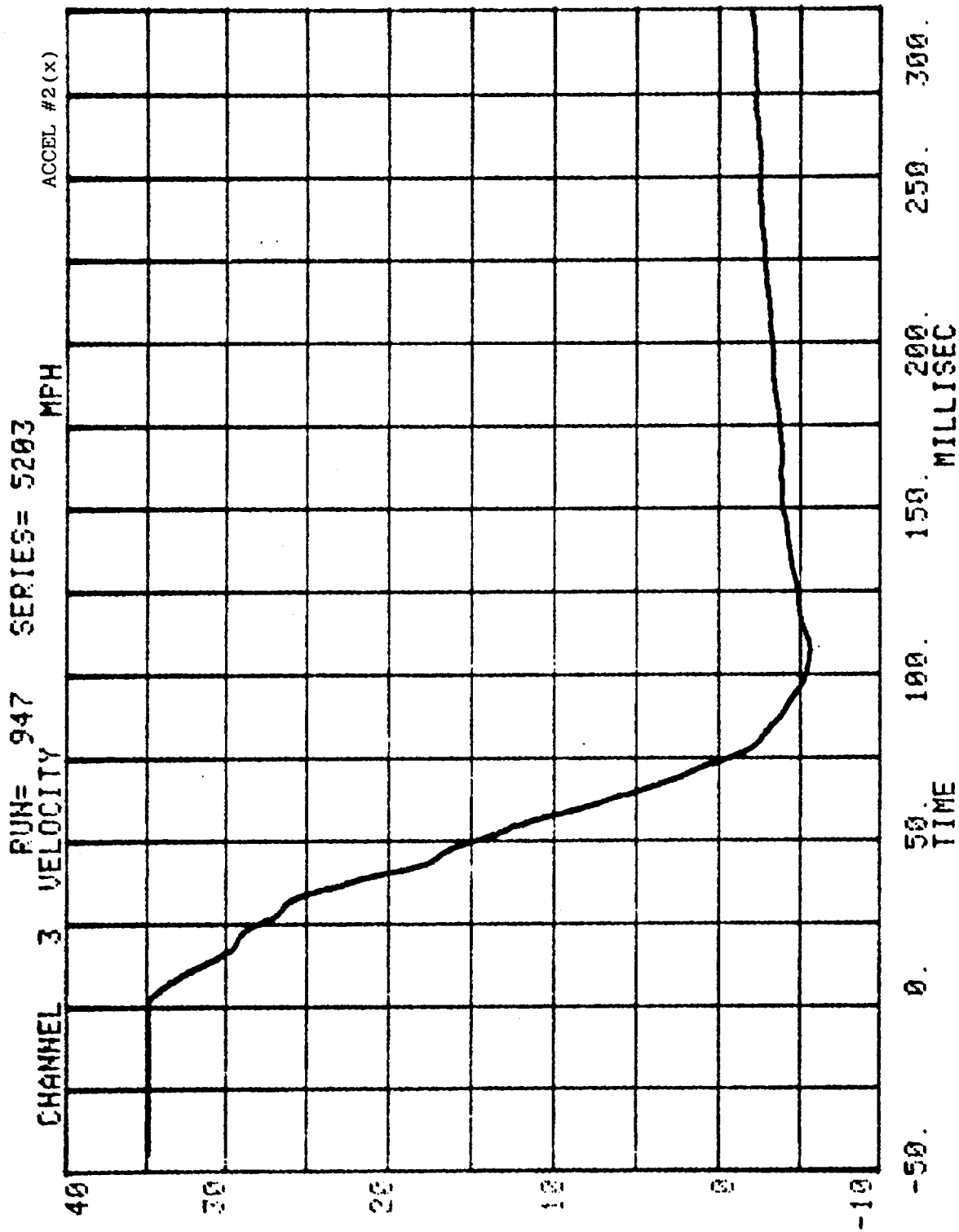


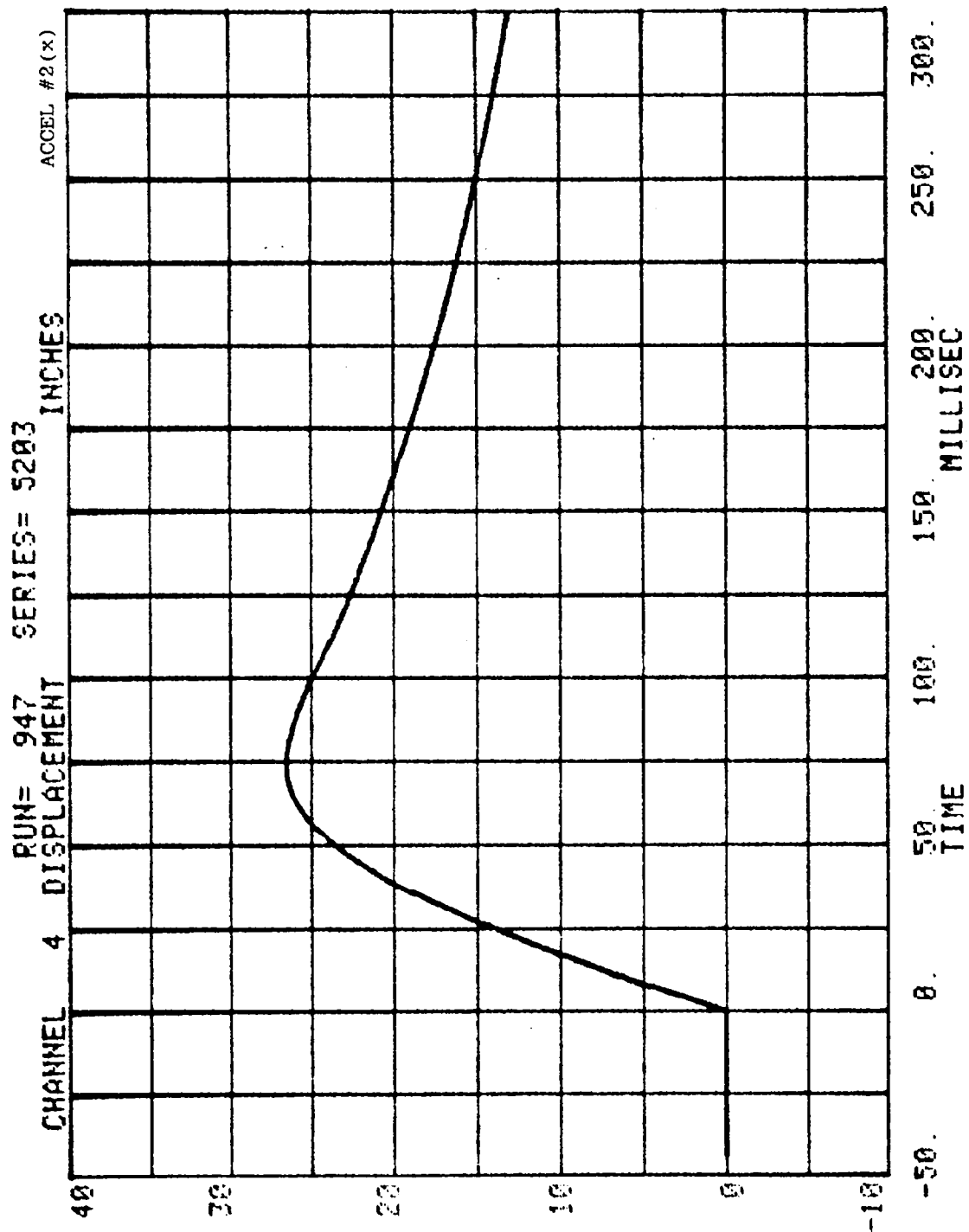


CHANNEL 28 ACC PACK #2 (V) G'S

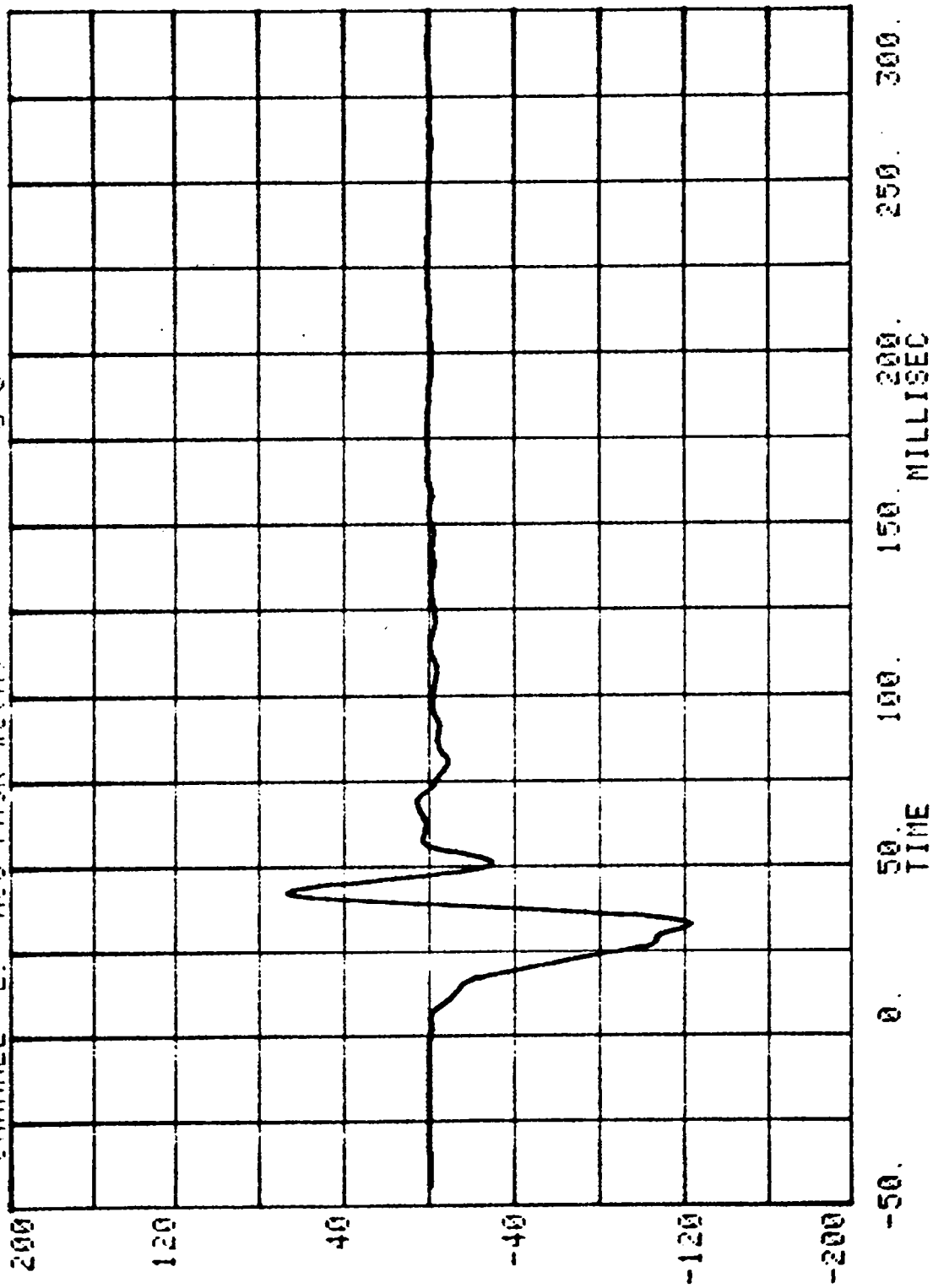
PUN= 947 SERIES= 5203

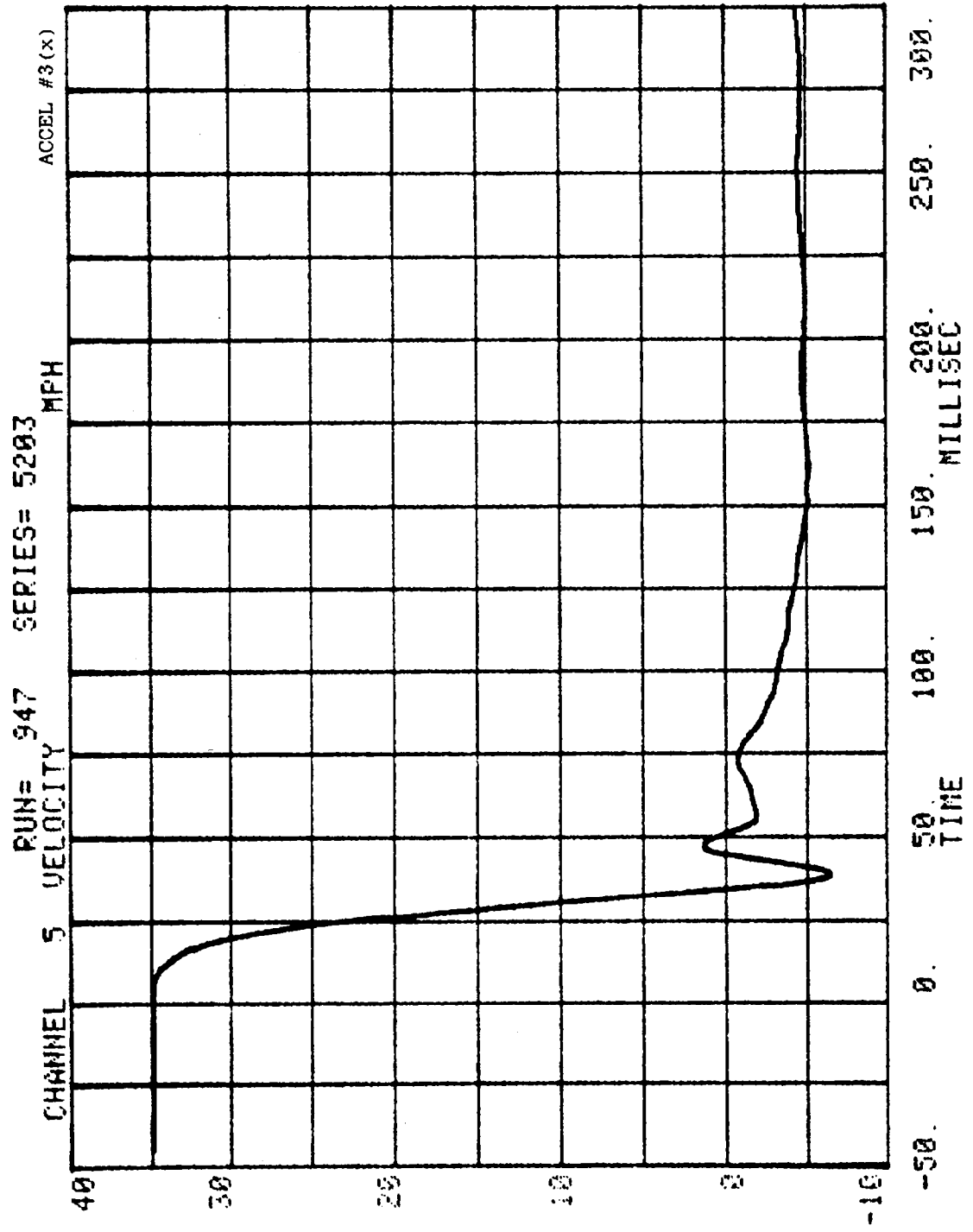


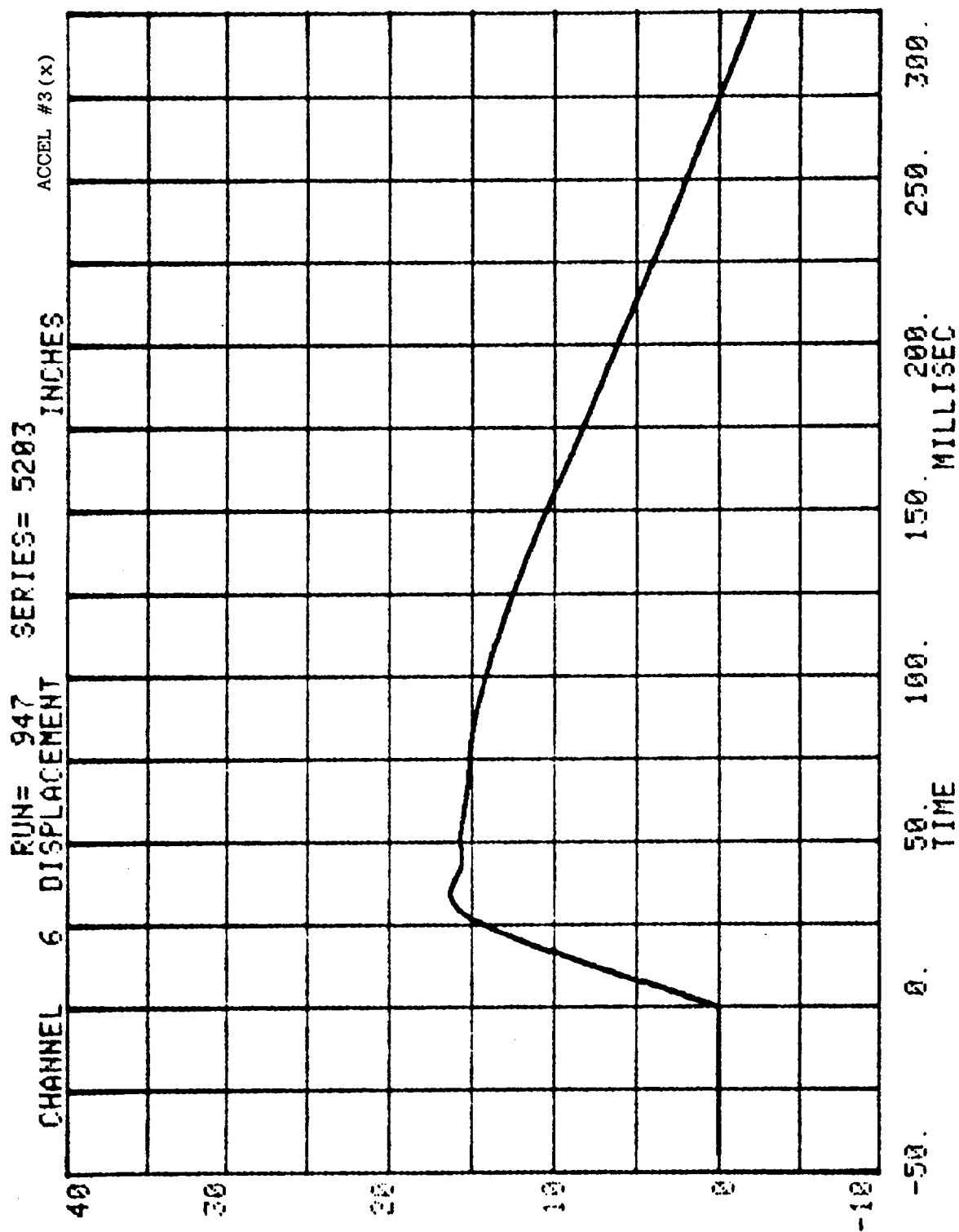




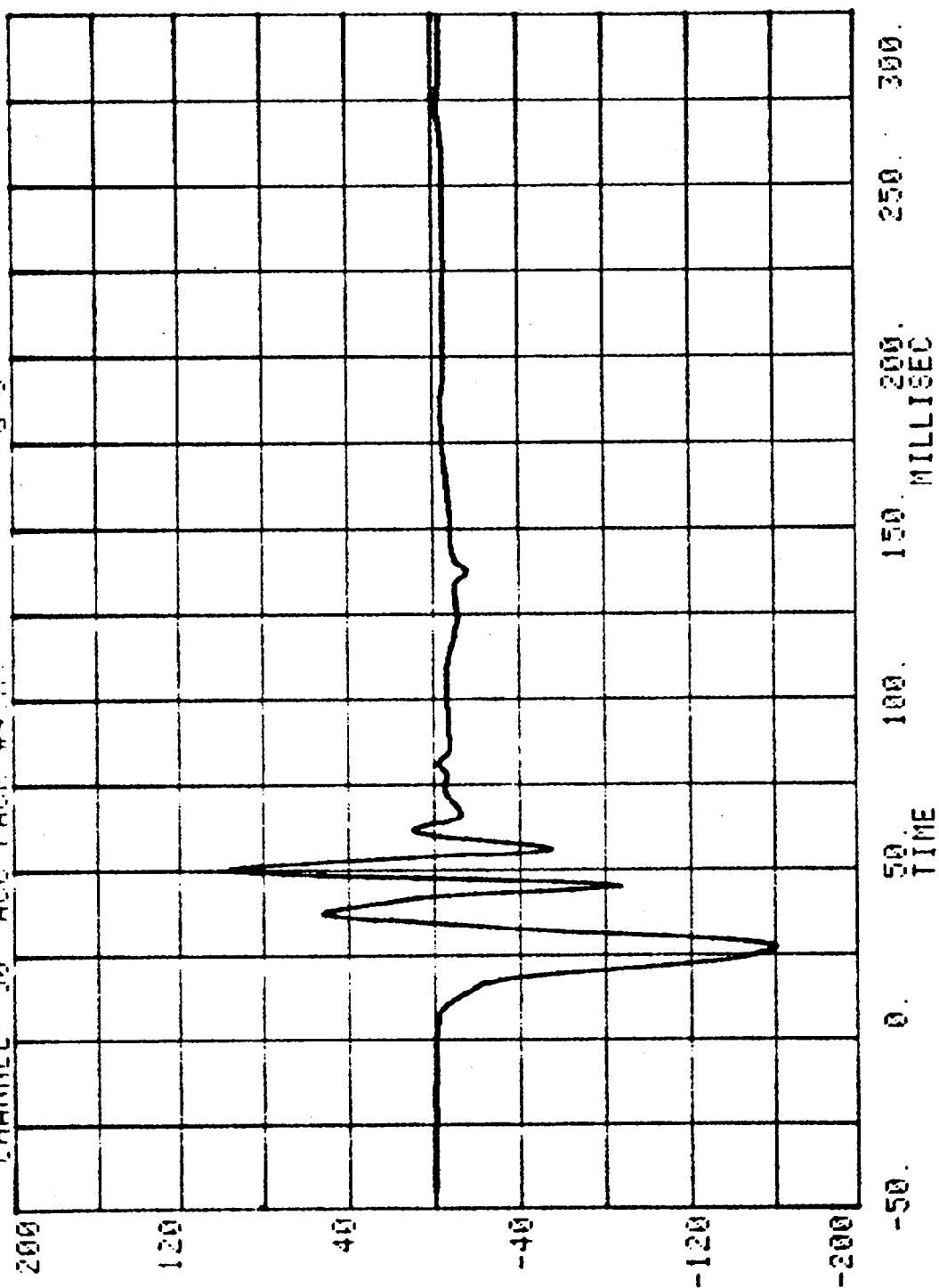
CHANNEL 29 ACC PACK #3(X) RUN= 947 SERIES= 5203 G'S

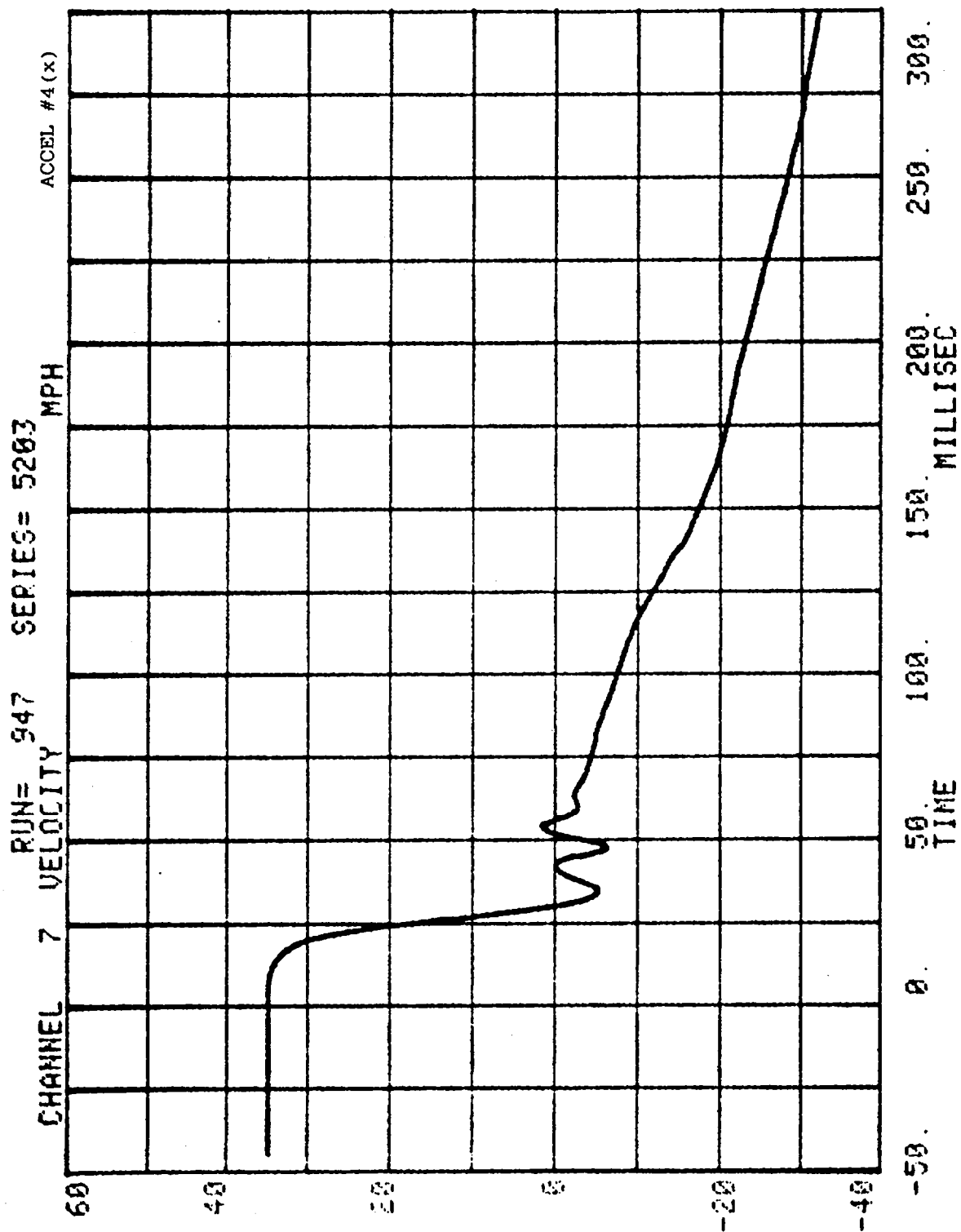


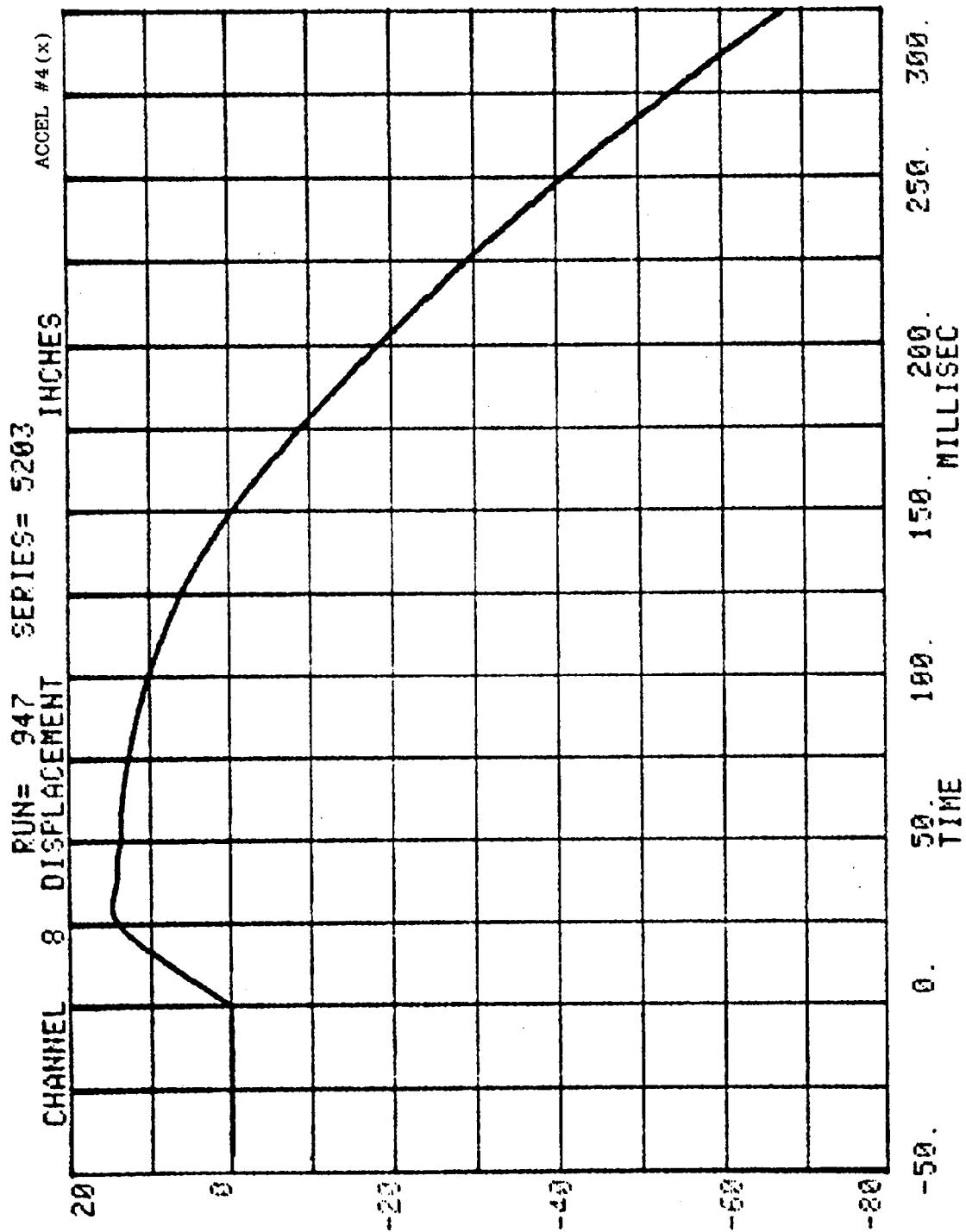




CHANNEL 30 HCC PACK #40(X) RUN= 947 SERIES= 5203 G'S

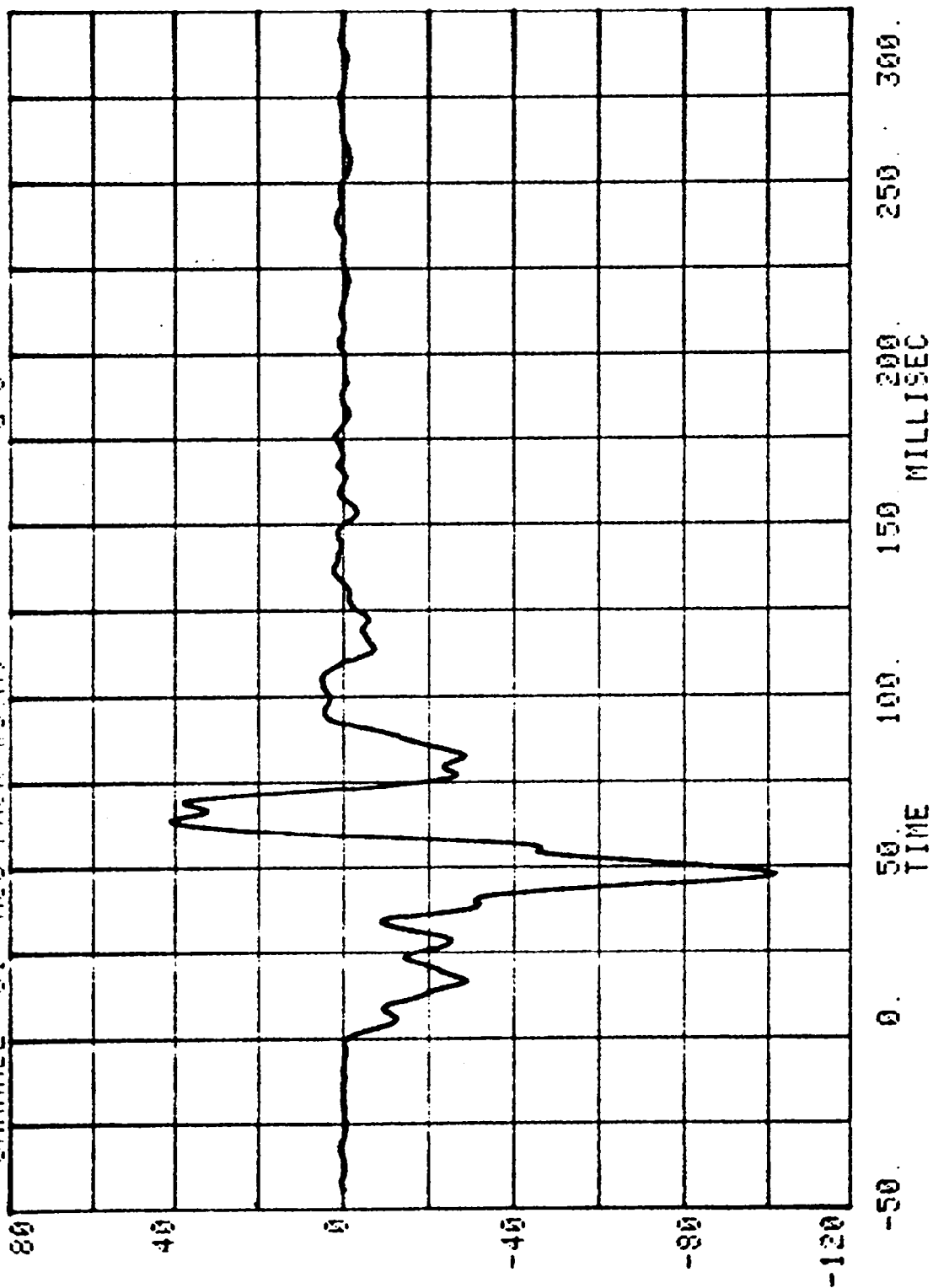


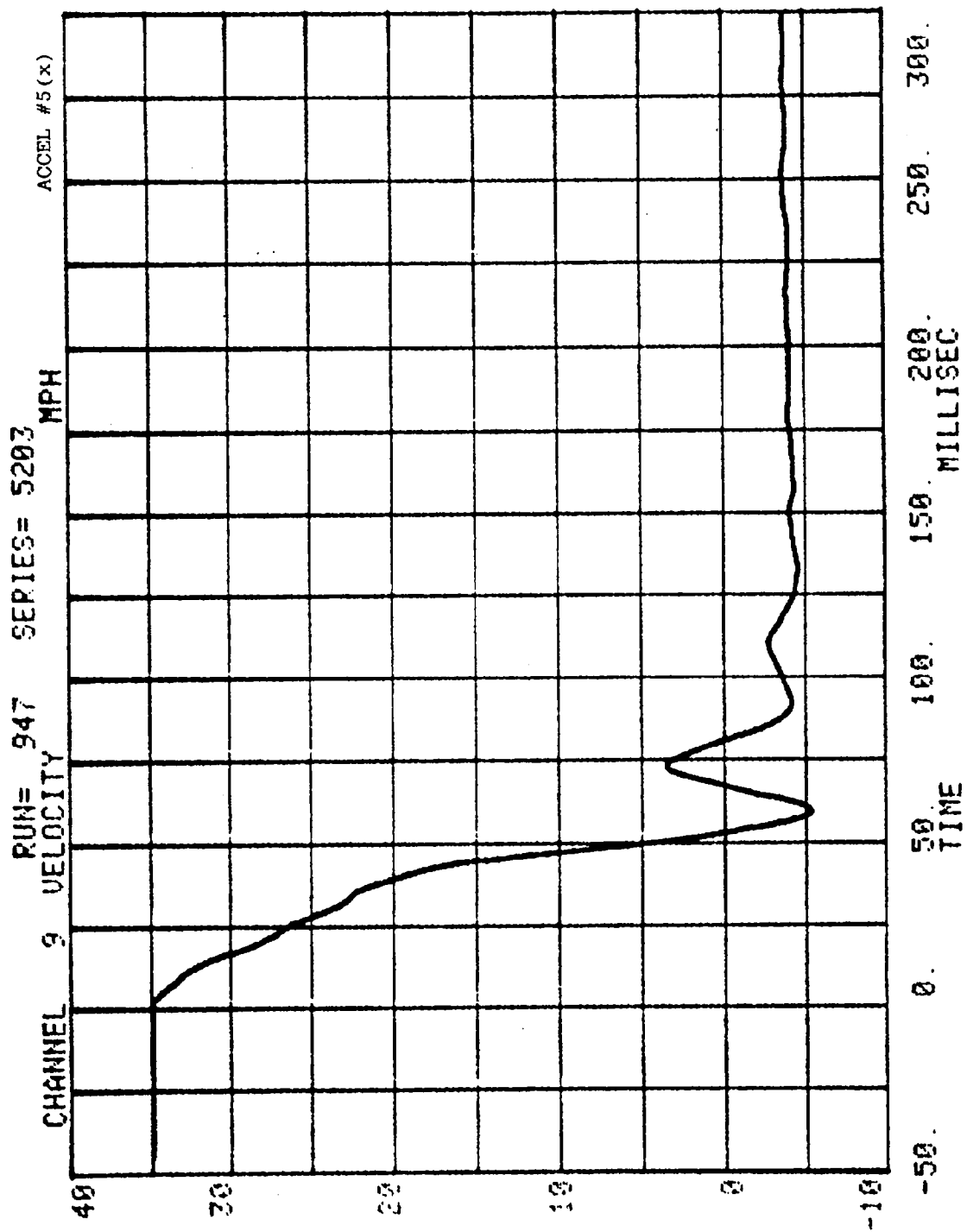




CHANNEL 31 ACC PACK #5(K) G'S

RUN= 947 SERIES= 5203



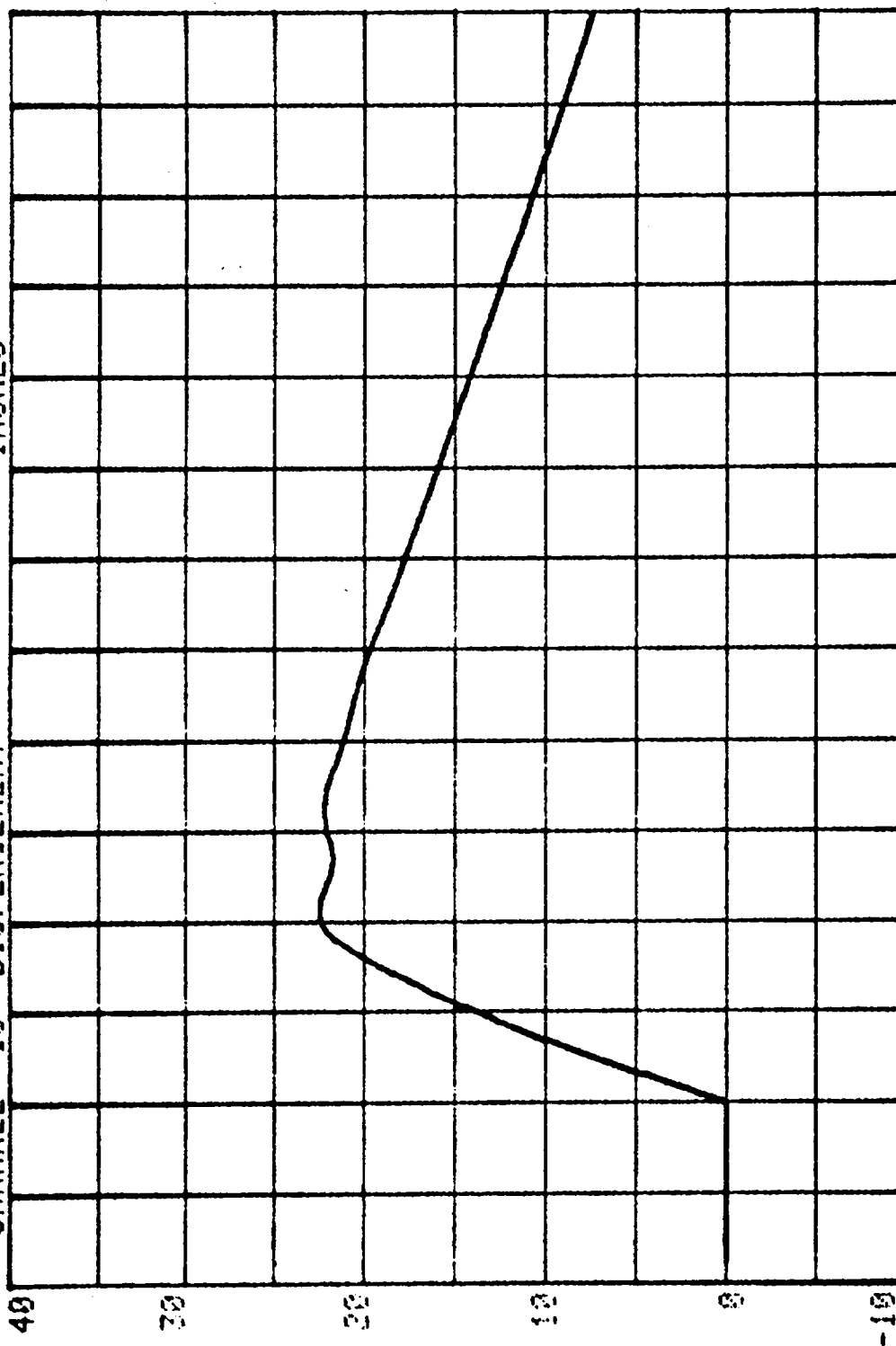


RUN= 947 SERIES= 5203

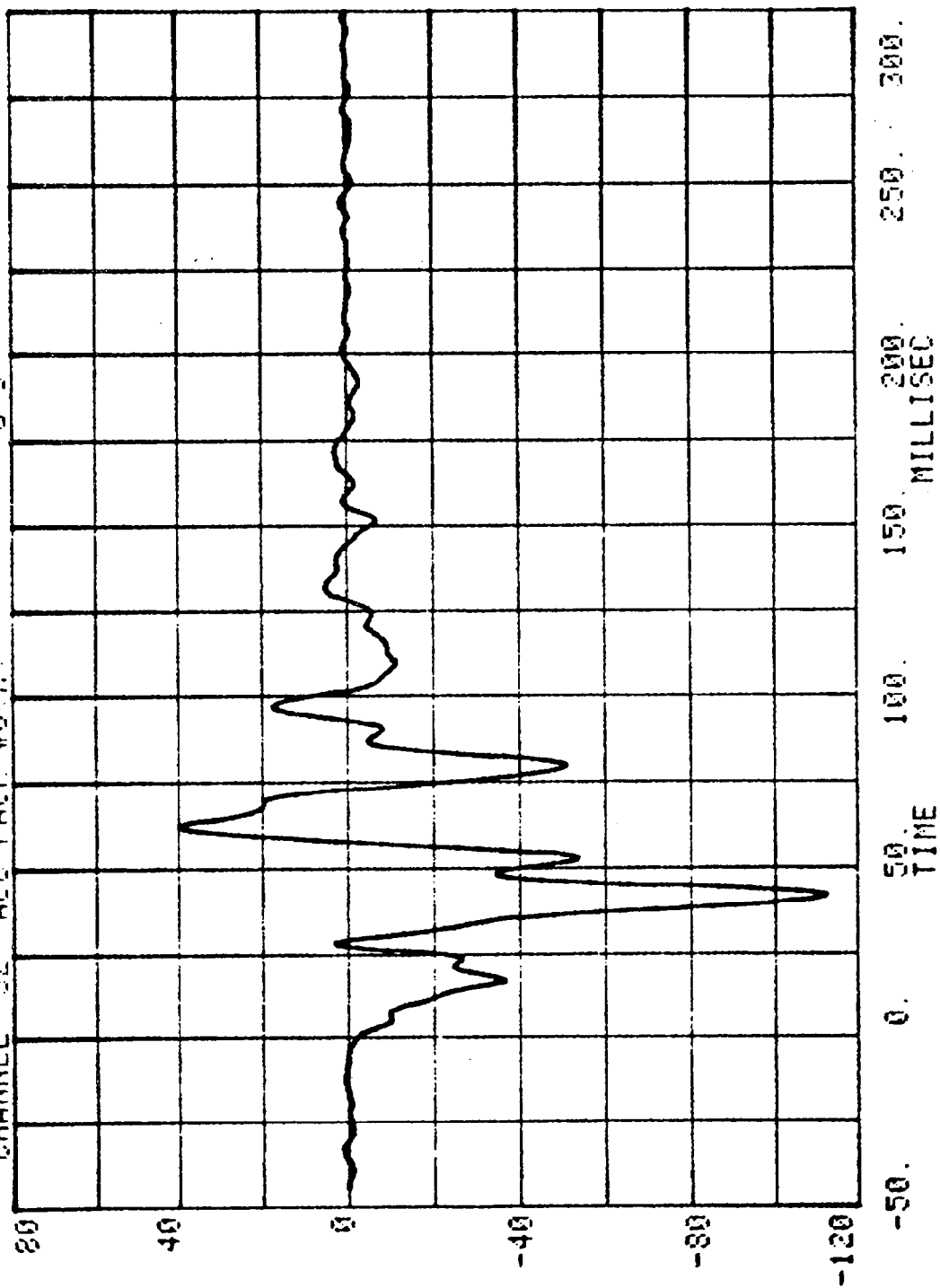
INCHES

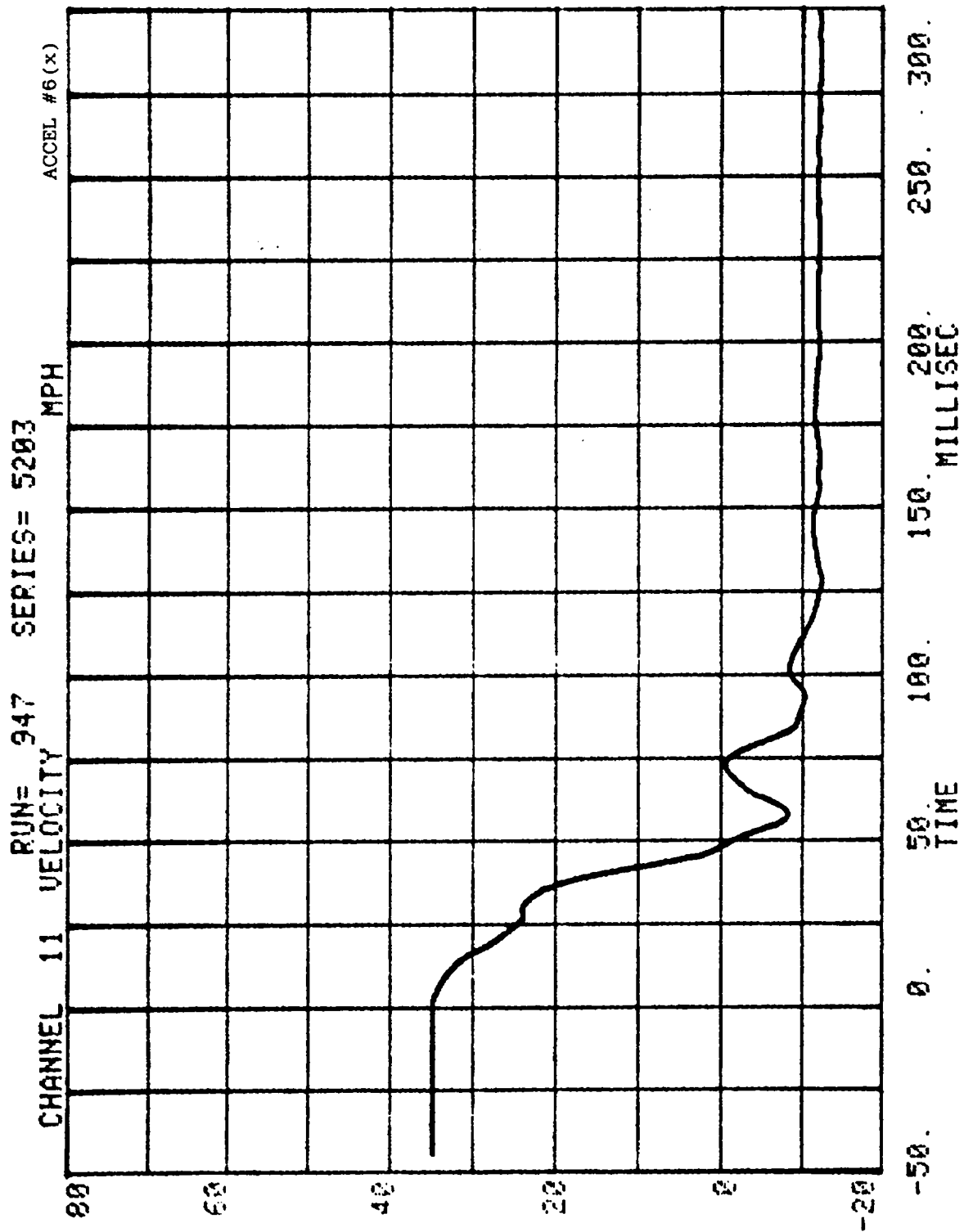
ACCEL #5 (x)

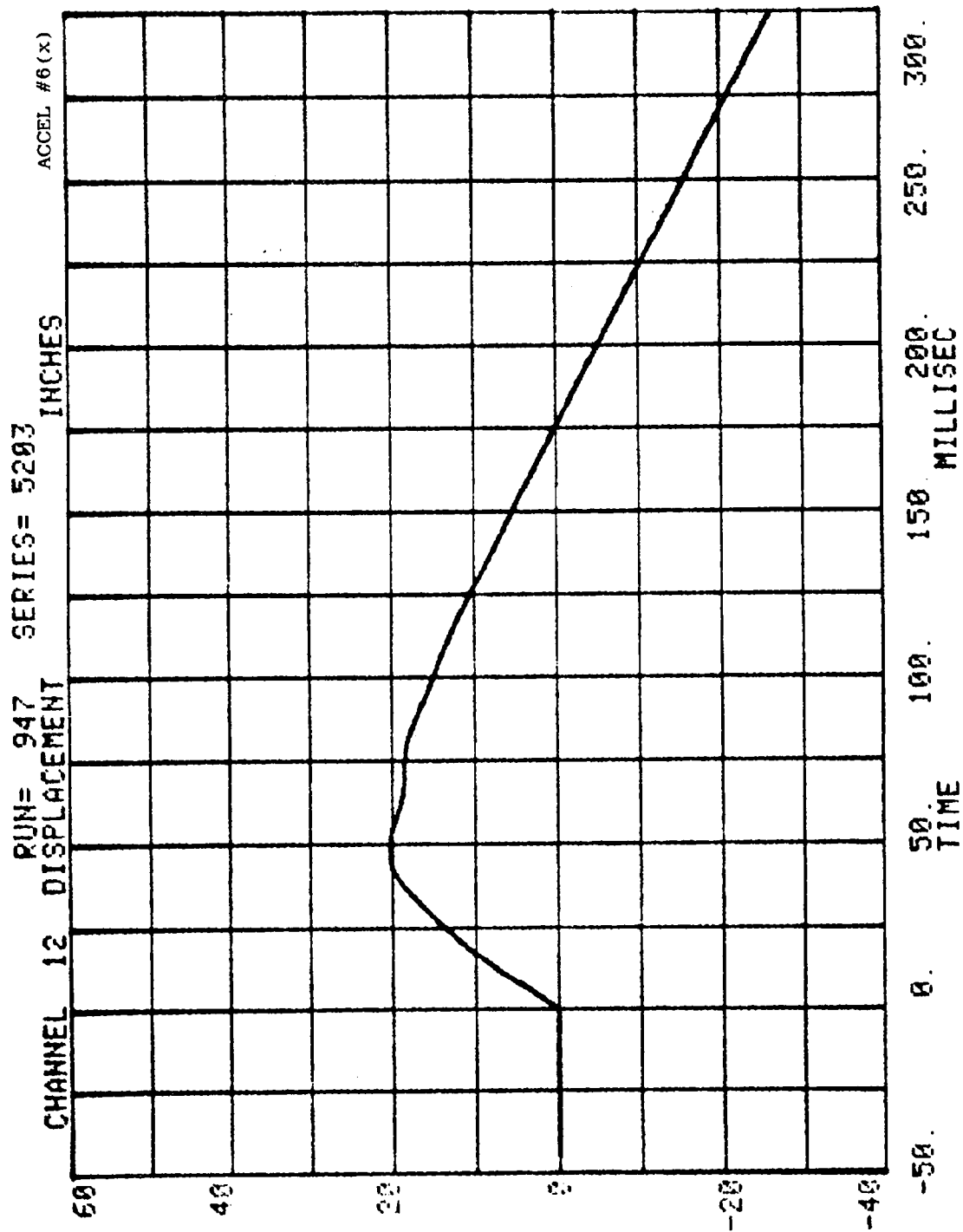
CHANNEL 10 DISPLACEMENT



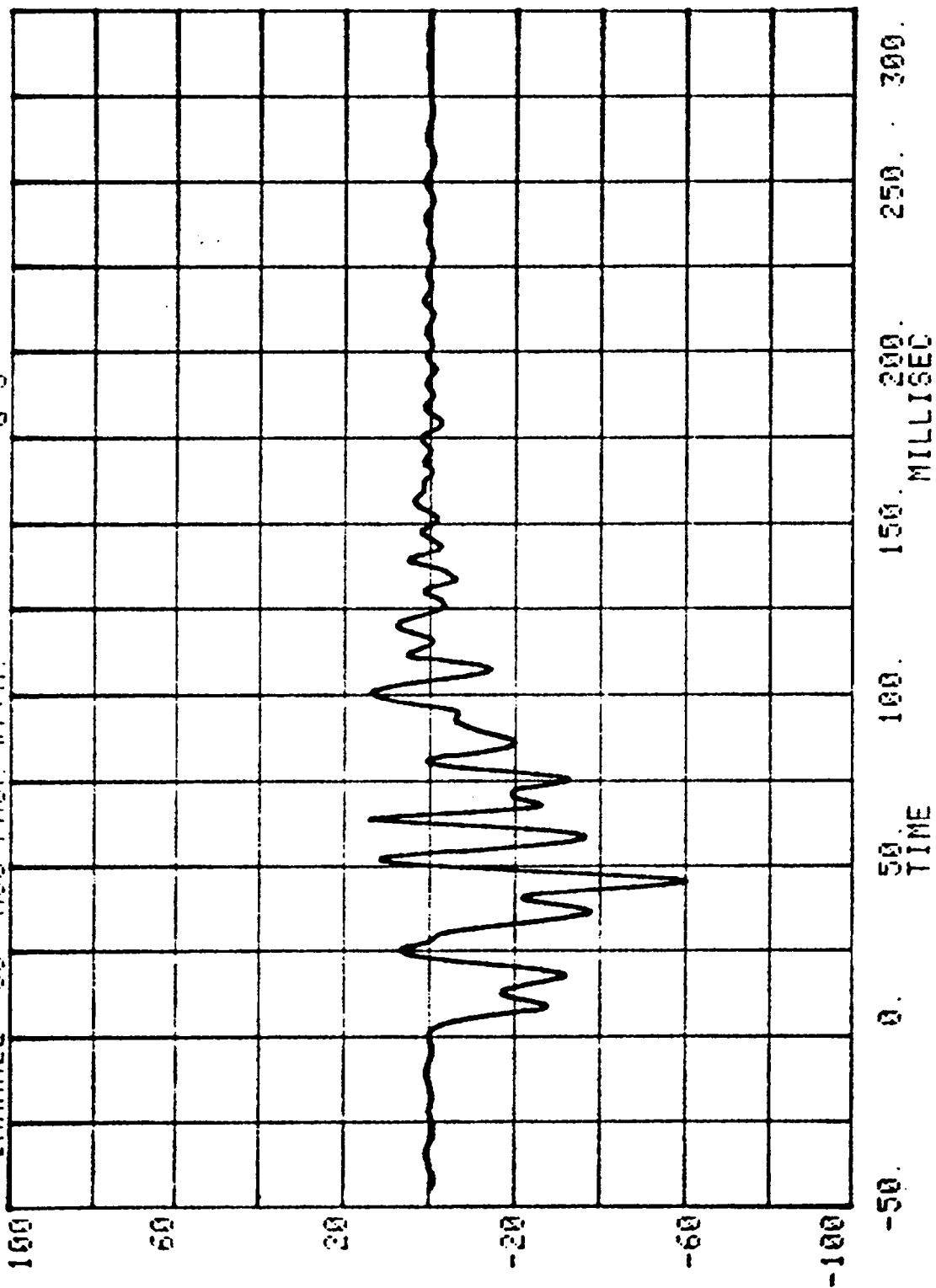
CHANNEL 32 ACC PACK #6(X) RUN= 947 SERIES= 5203 G'S

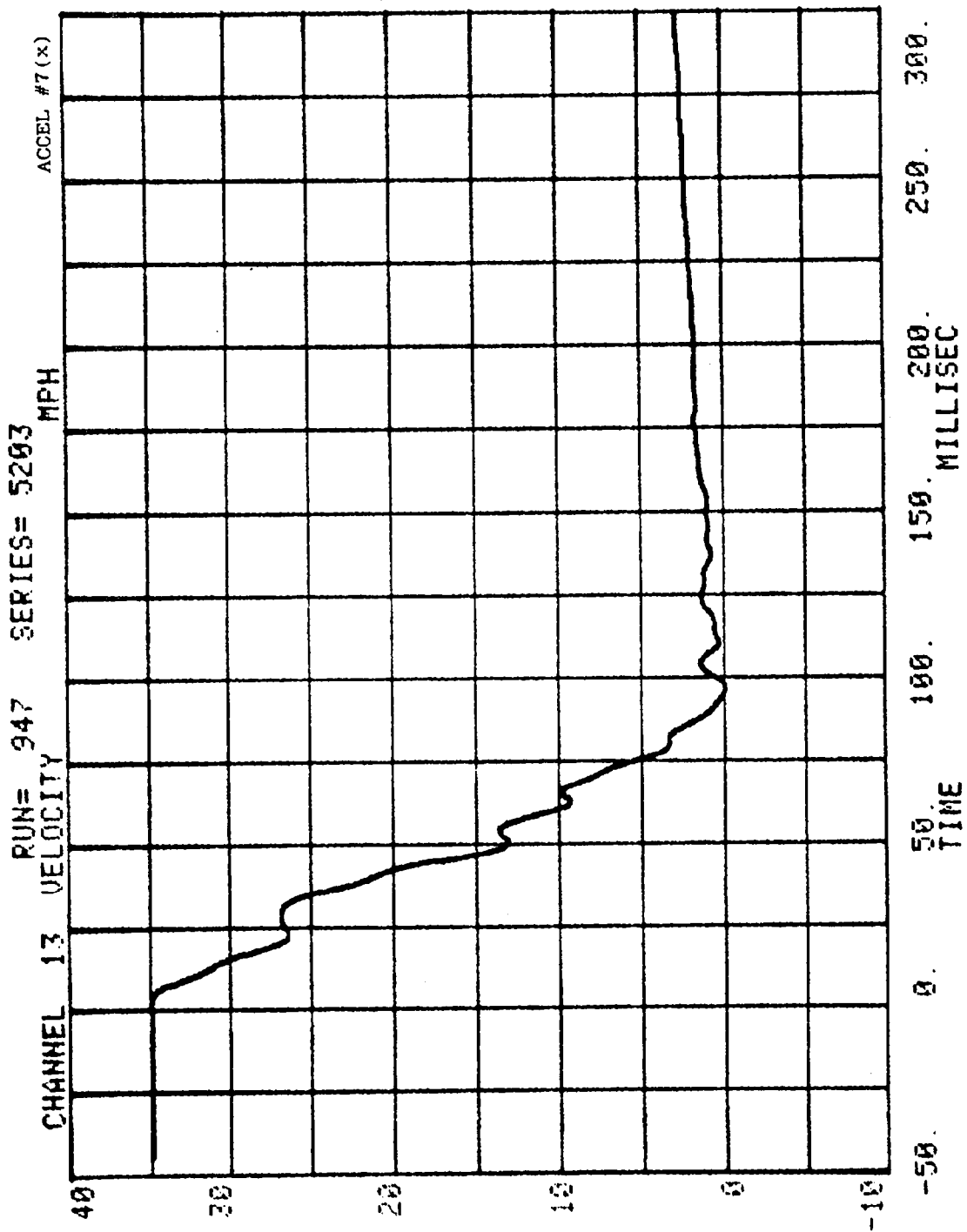


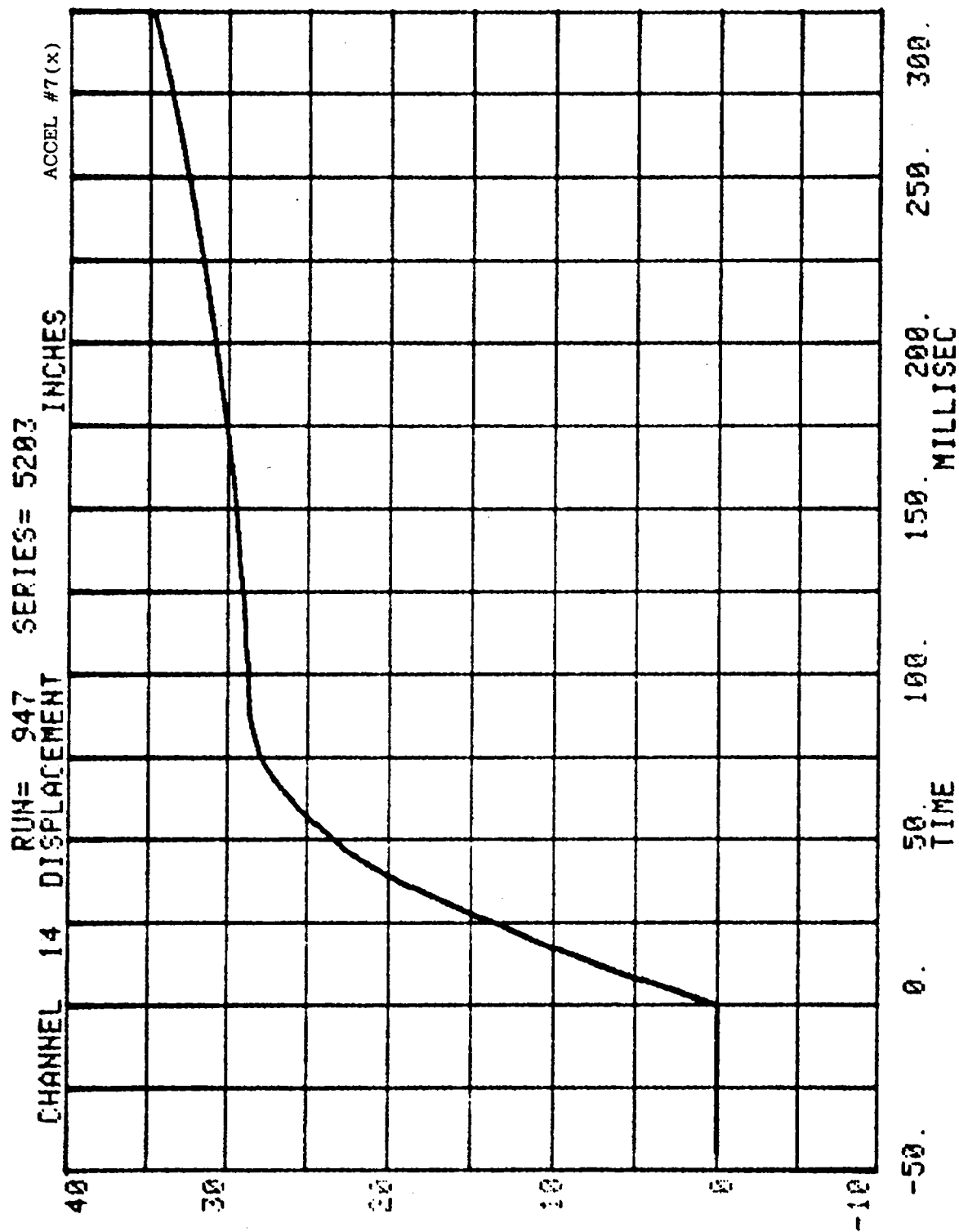




CHANNEL 33 ACC PACK #7080 FUH= 947 SERIES= 5203 G'S







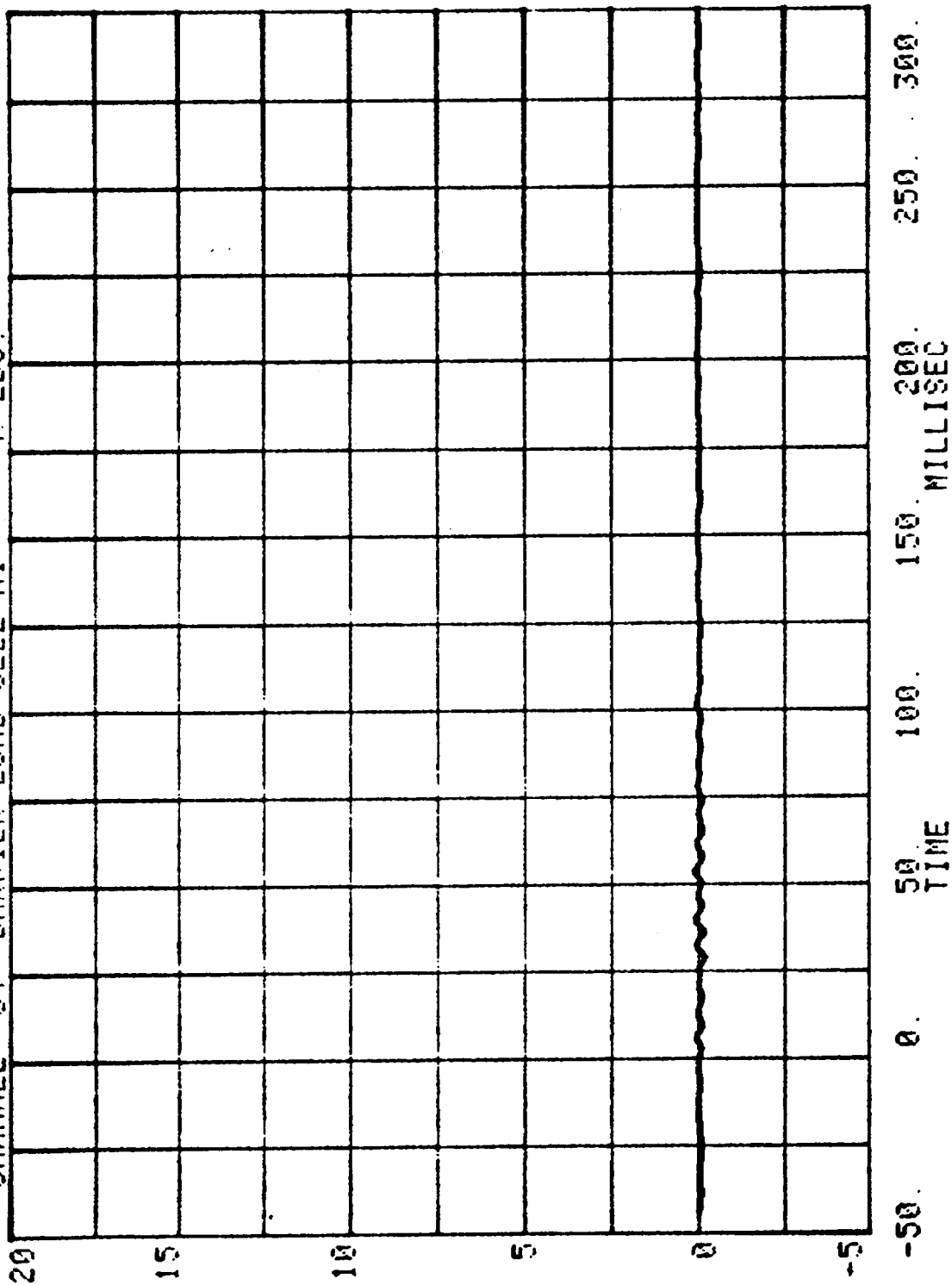
TEST NO. ML5203

LOAD CELL BARRIER DATA

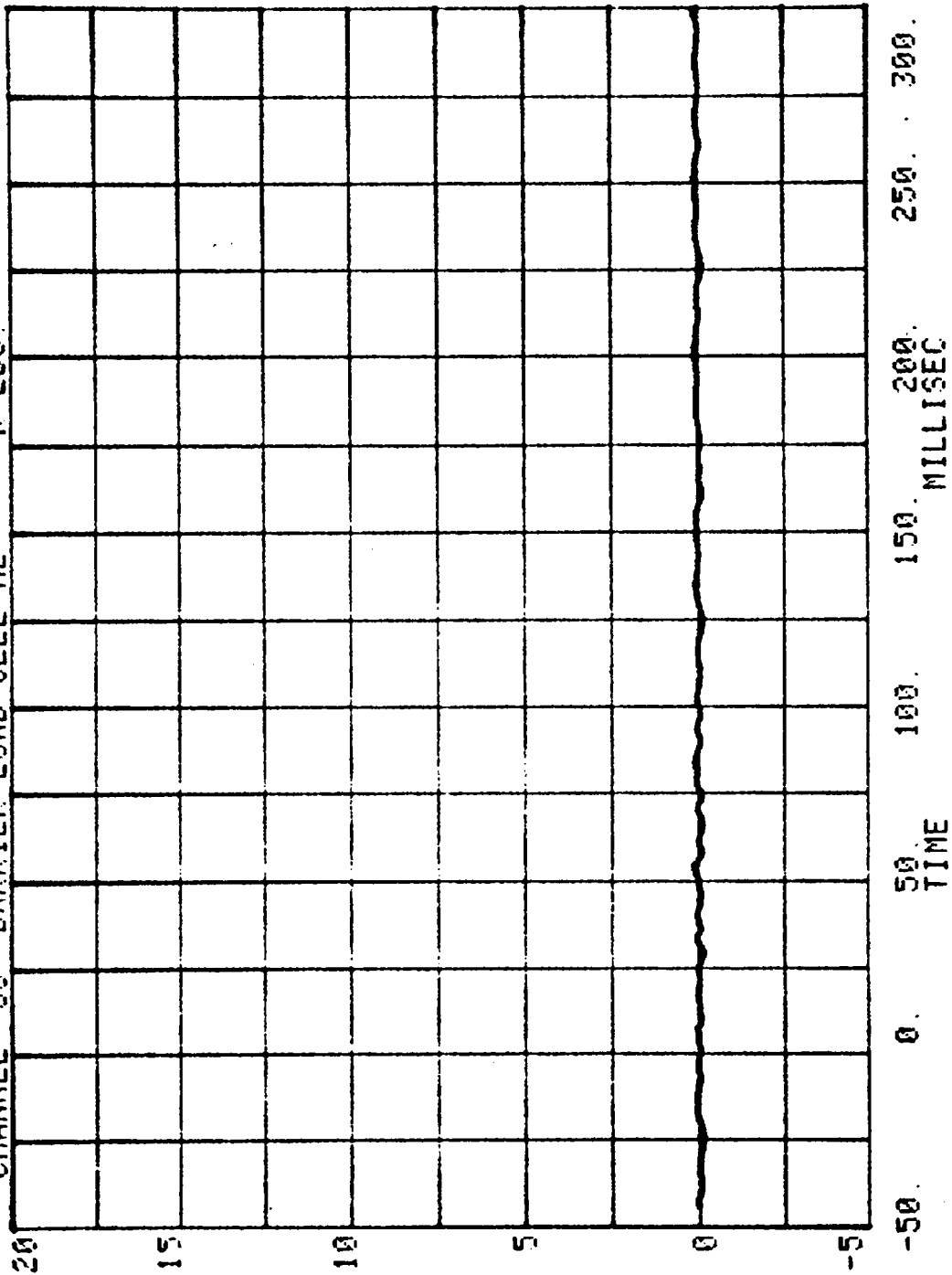
FILTER CHANNEL CLASS

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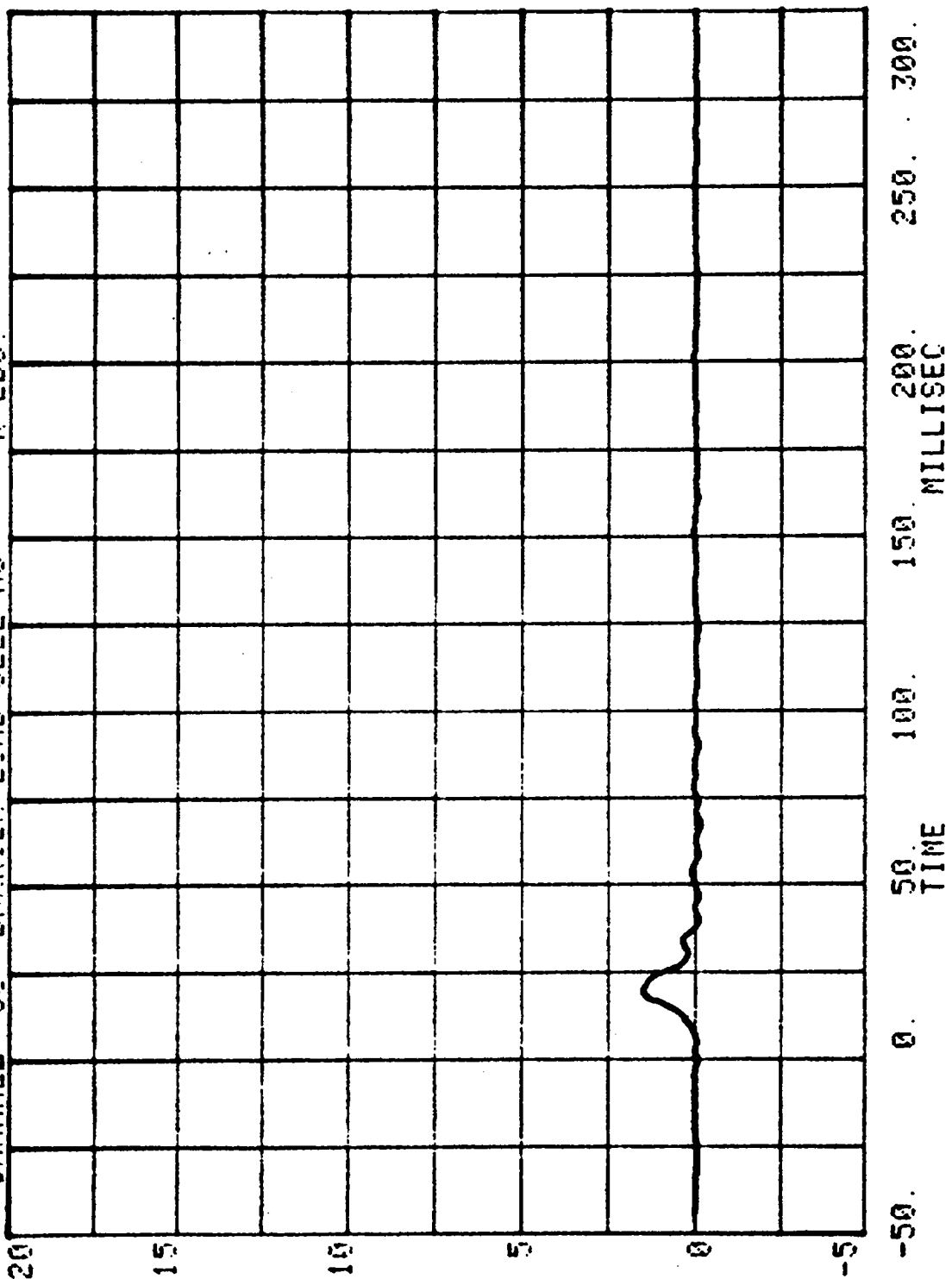
CHANNEL 34 BARRIER LOAD CELL A1
RUN= 947 SERIES= 5203 K LBS.



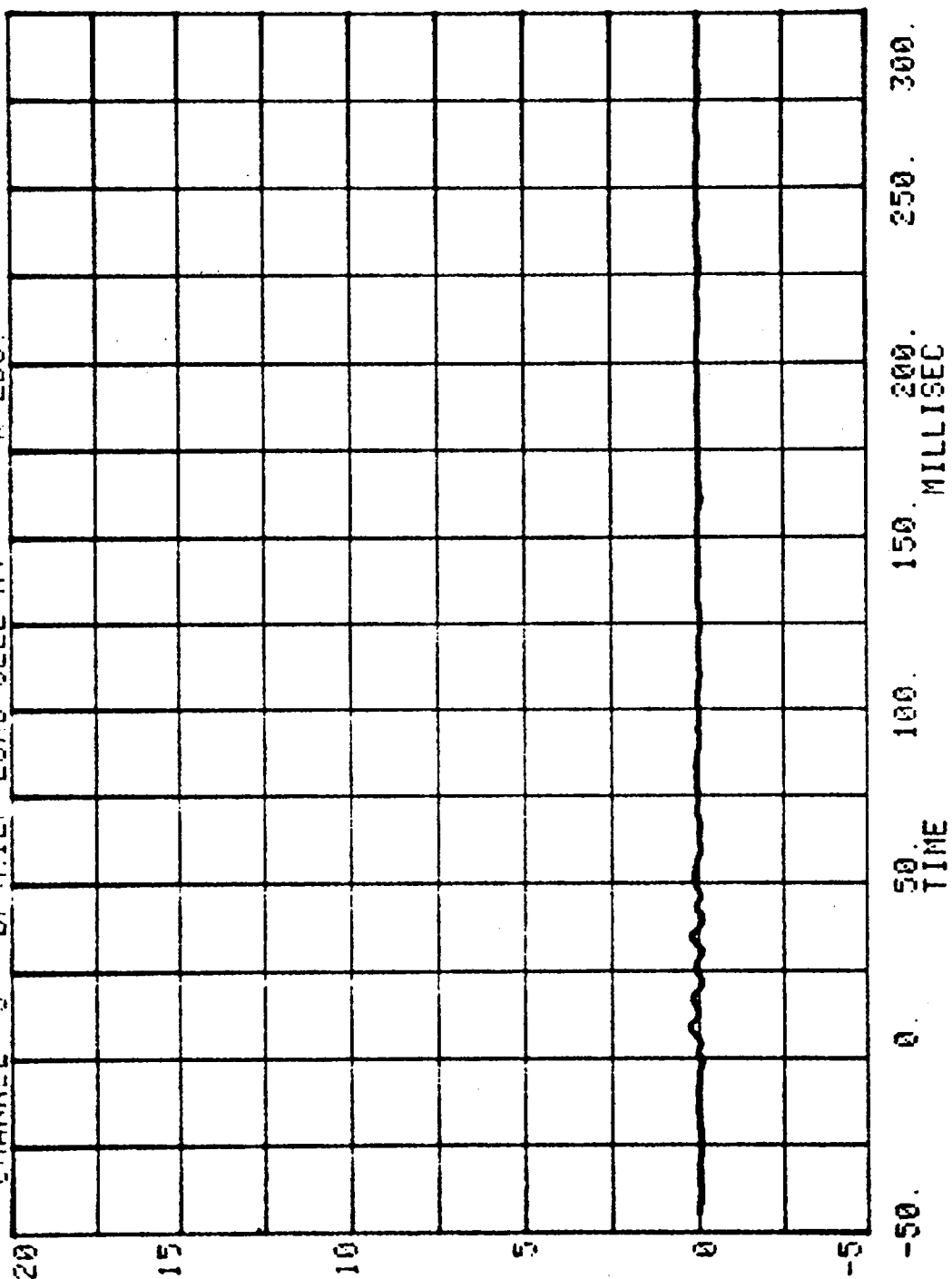
RUN= 947 SERIES= 5203
CHANNEL 35 BARRIER LOAD CELL A2 K LBS.



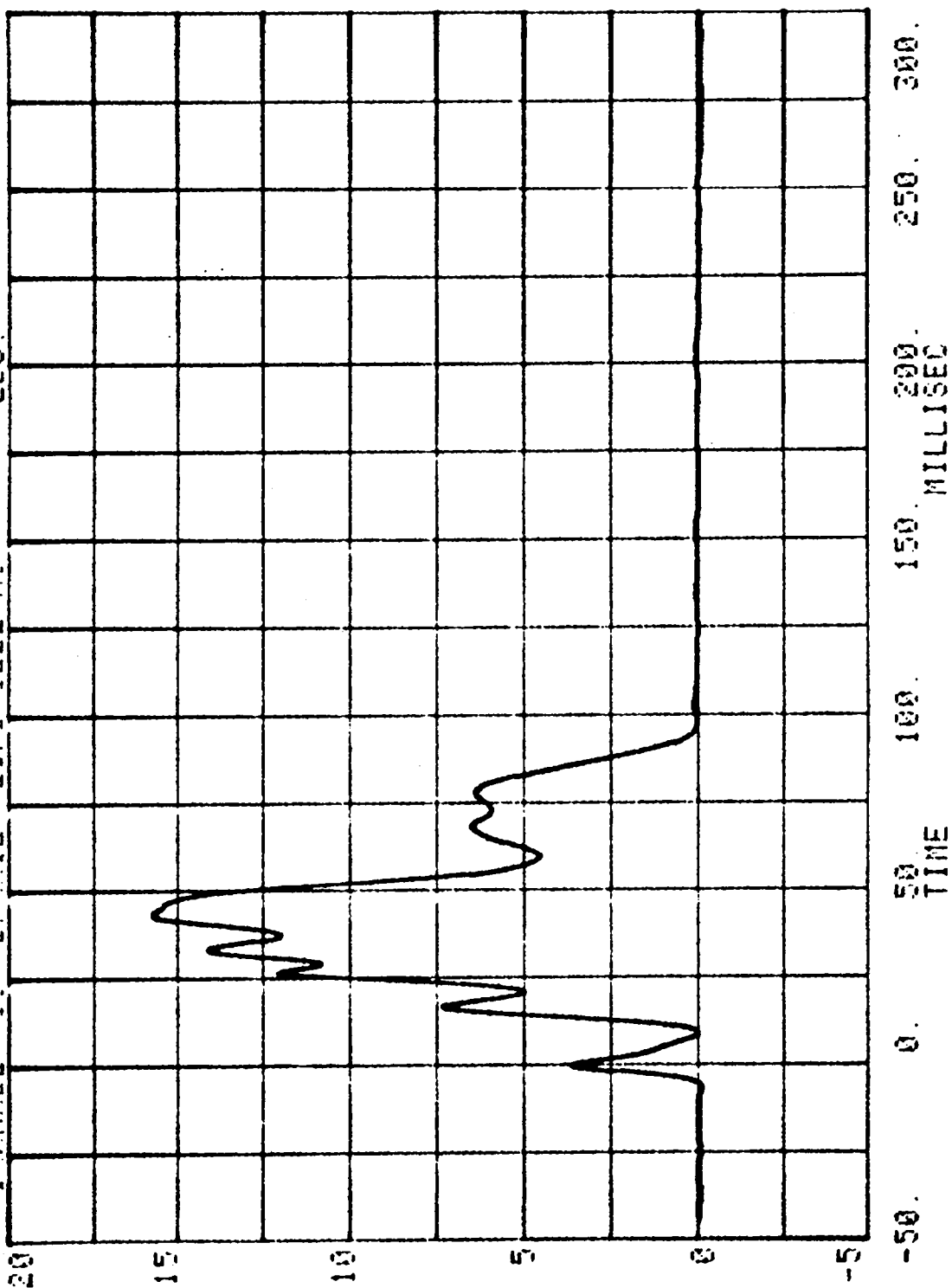
CHANNEL 36 BARRIER LOAD CELL A3 K LBS.
RUN= 947 SERIES= 5203



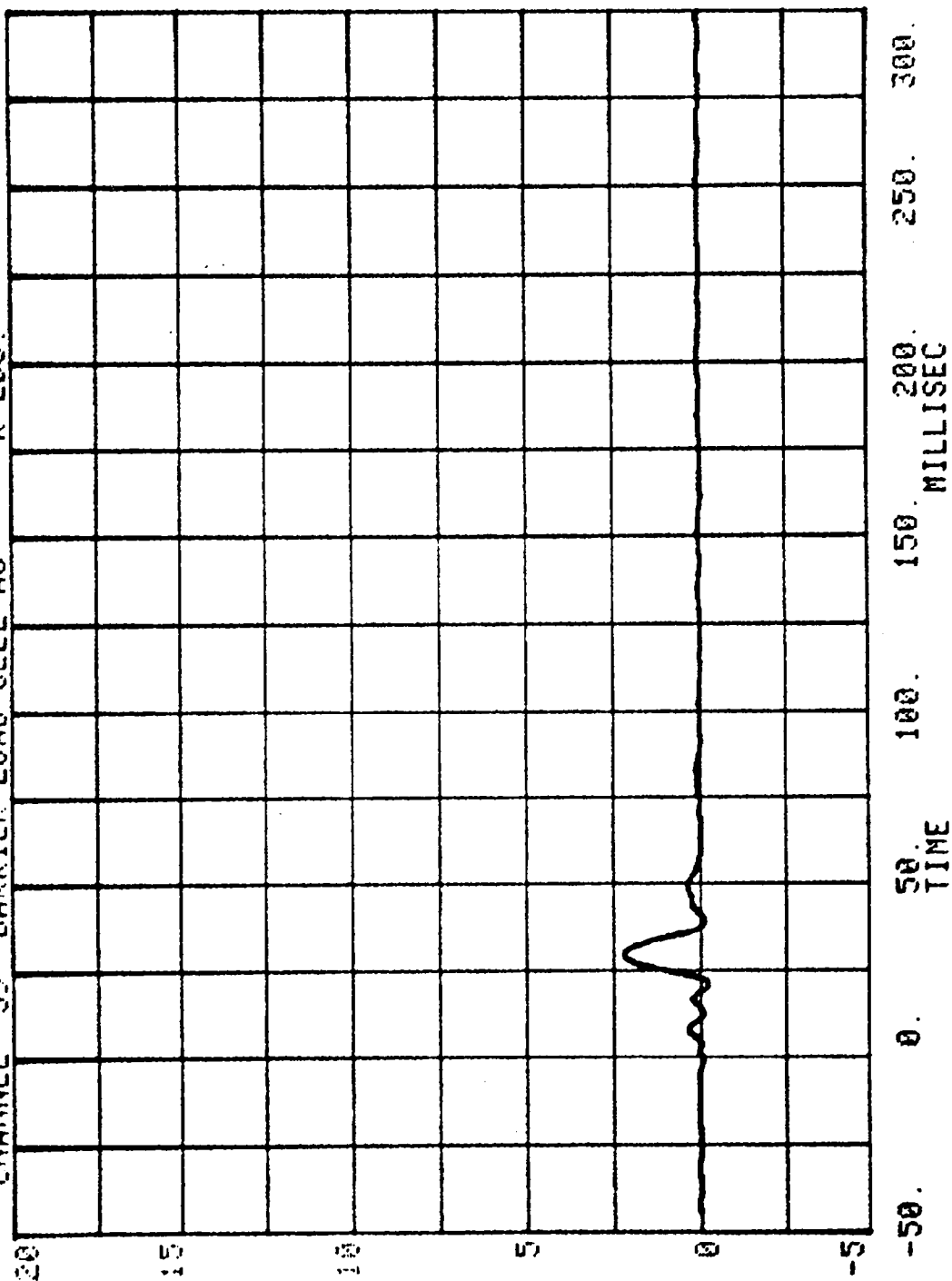
CHANNEL 37 BARRIER LOAD CELL A4 RUN= 947 SERIES= 5203 K LBS.



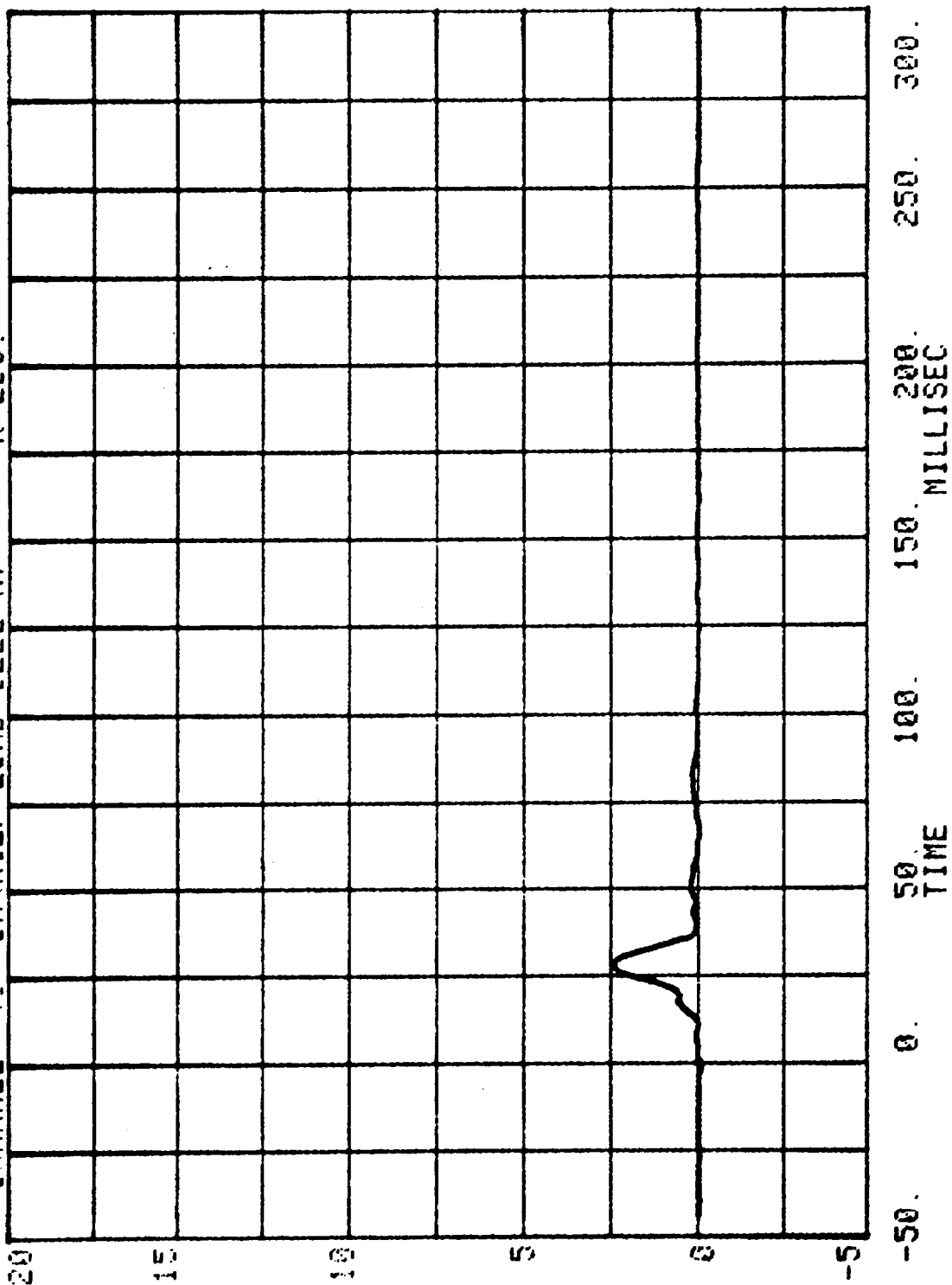
CHANNEL 33 BARRIES LOAD CELL A5 RUN= 947 SERIES= 5203 K LBS.



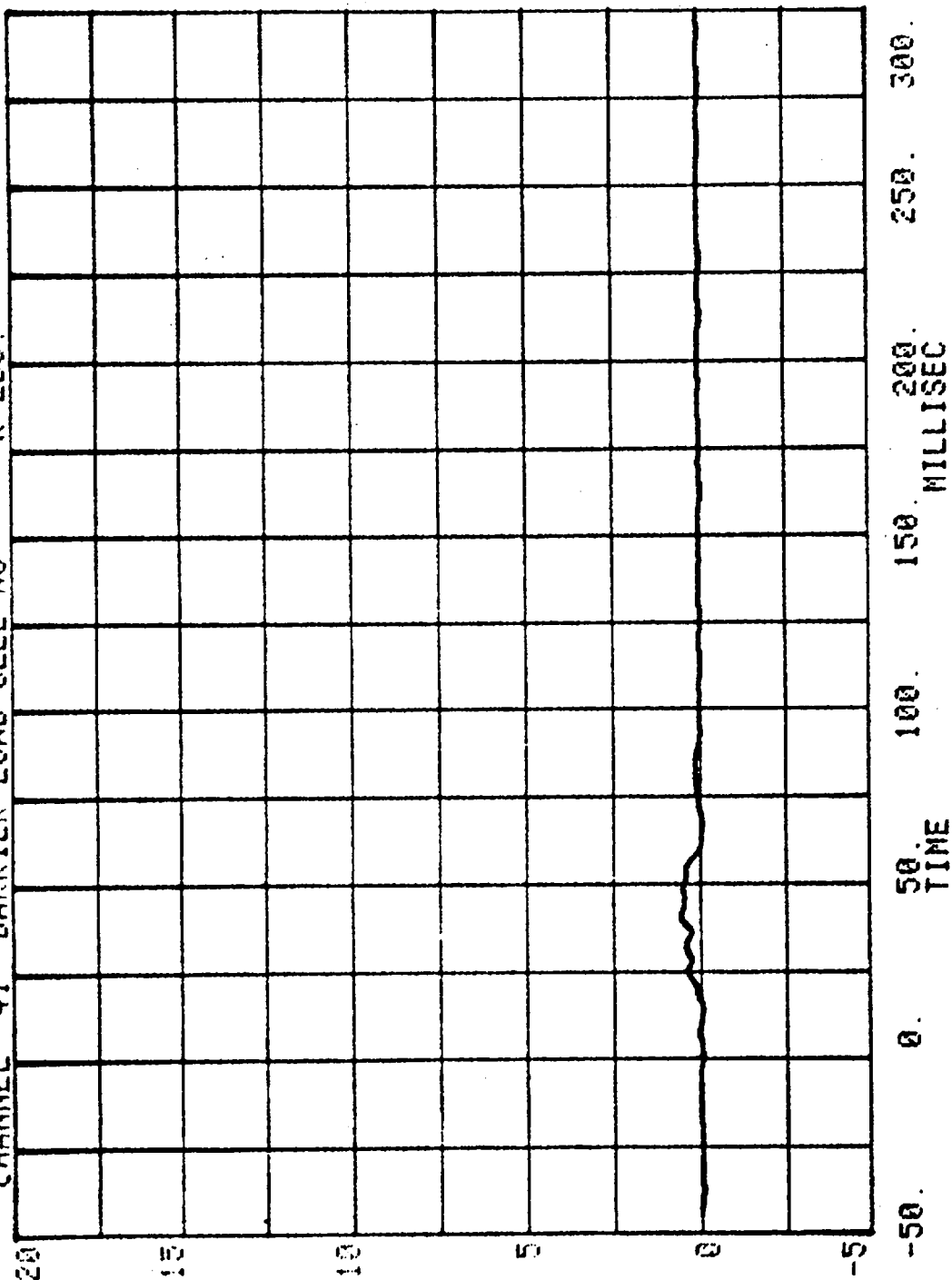
RUN= 947 SERIES= 5203
CHANNEL 39 BARRIER LOAD CELL A6 K LBS.



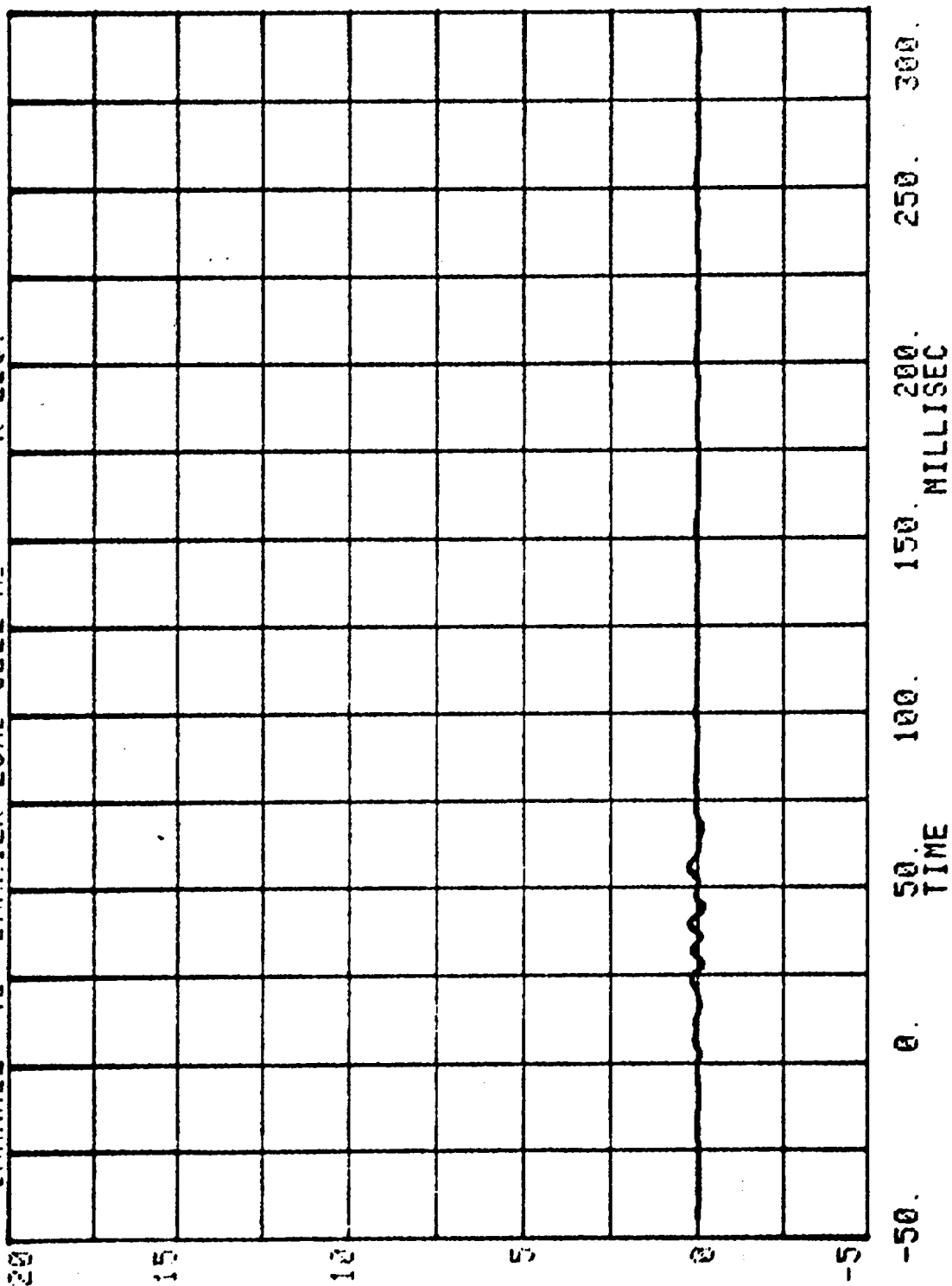
CHANNEL 40 BARRIER LOAD CELL A7 RUN= 947 SERIES= 5203 K LBS.



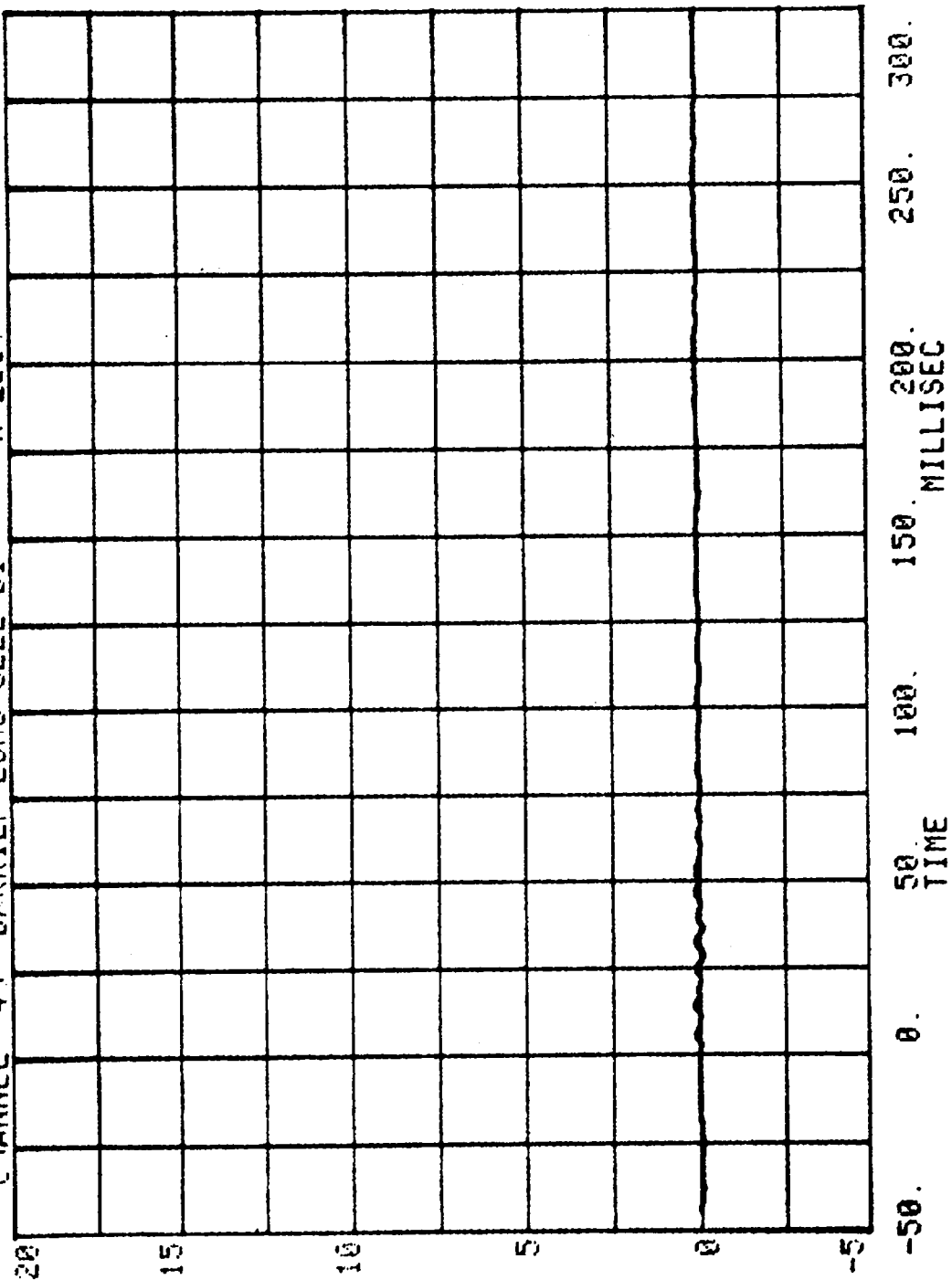
CHANNEL 41 BARRIER LOAD CELL A8 RUN= 947 SERIES= 5203 K LBS.



CHANNEL 42 BARRIER LOAD CELL A9 RUN= 947 SERIES= 5203 K LBS.

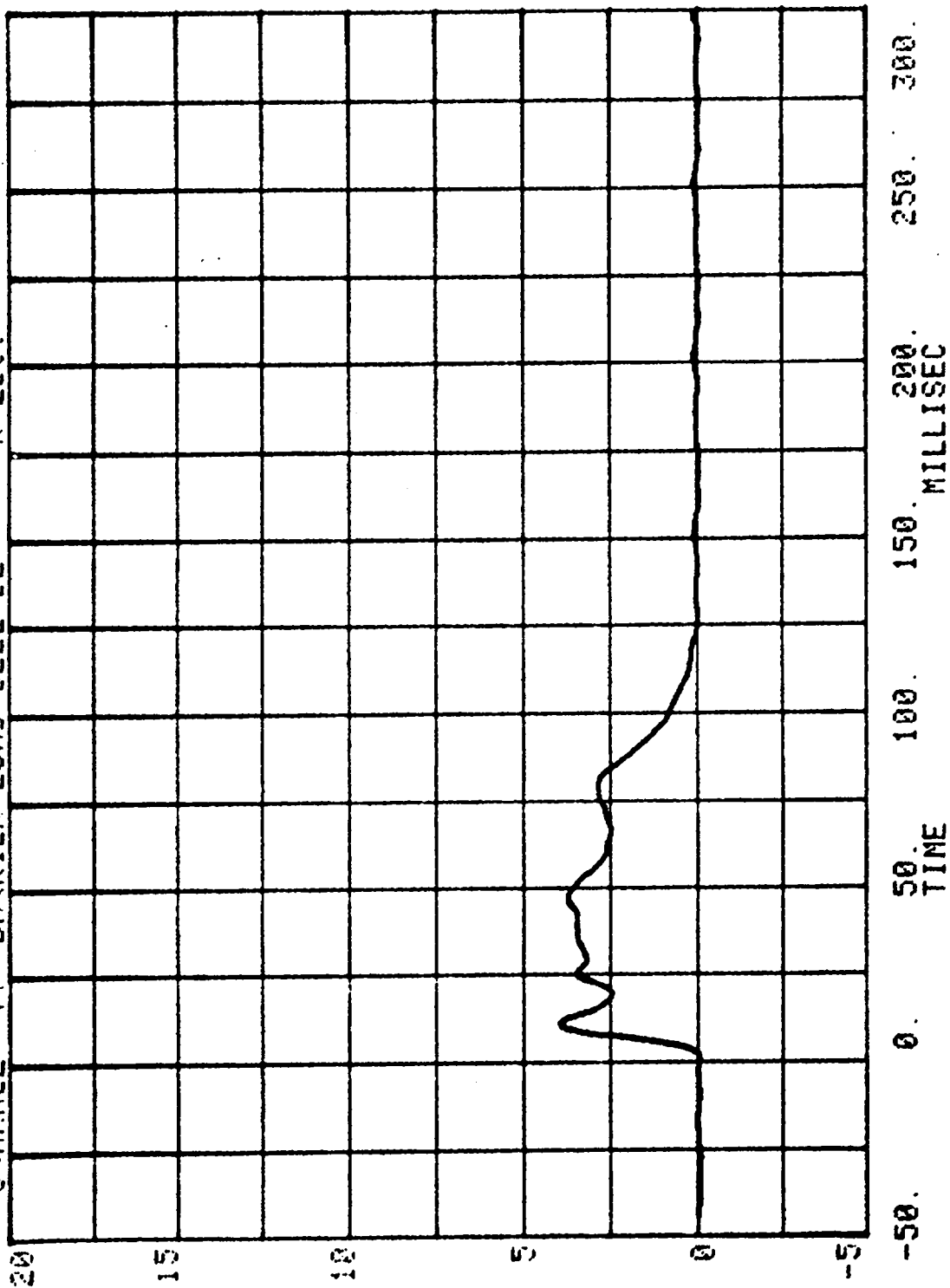


CHANNEL 43 BARRIER LOAD CELL B1
RUN= 947 SERIES= 5203 K LBS.

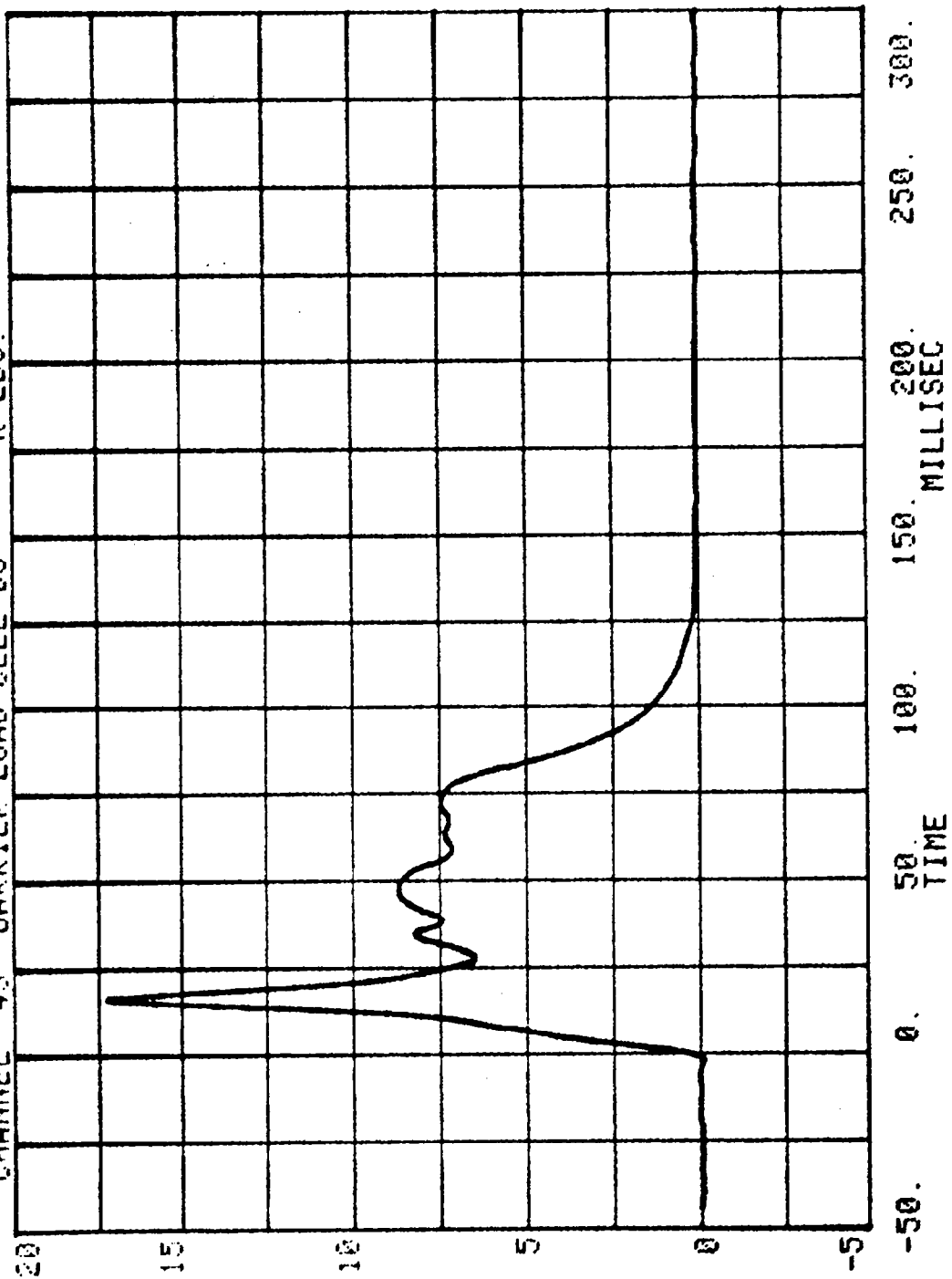


CHANNEL 44 BARRIER LOAD CELL B2 K LBS.

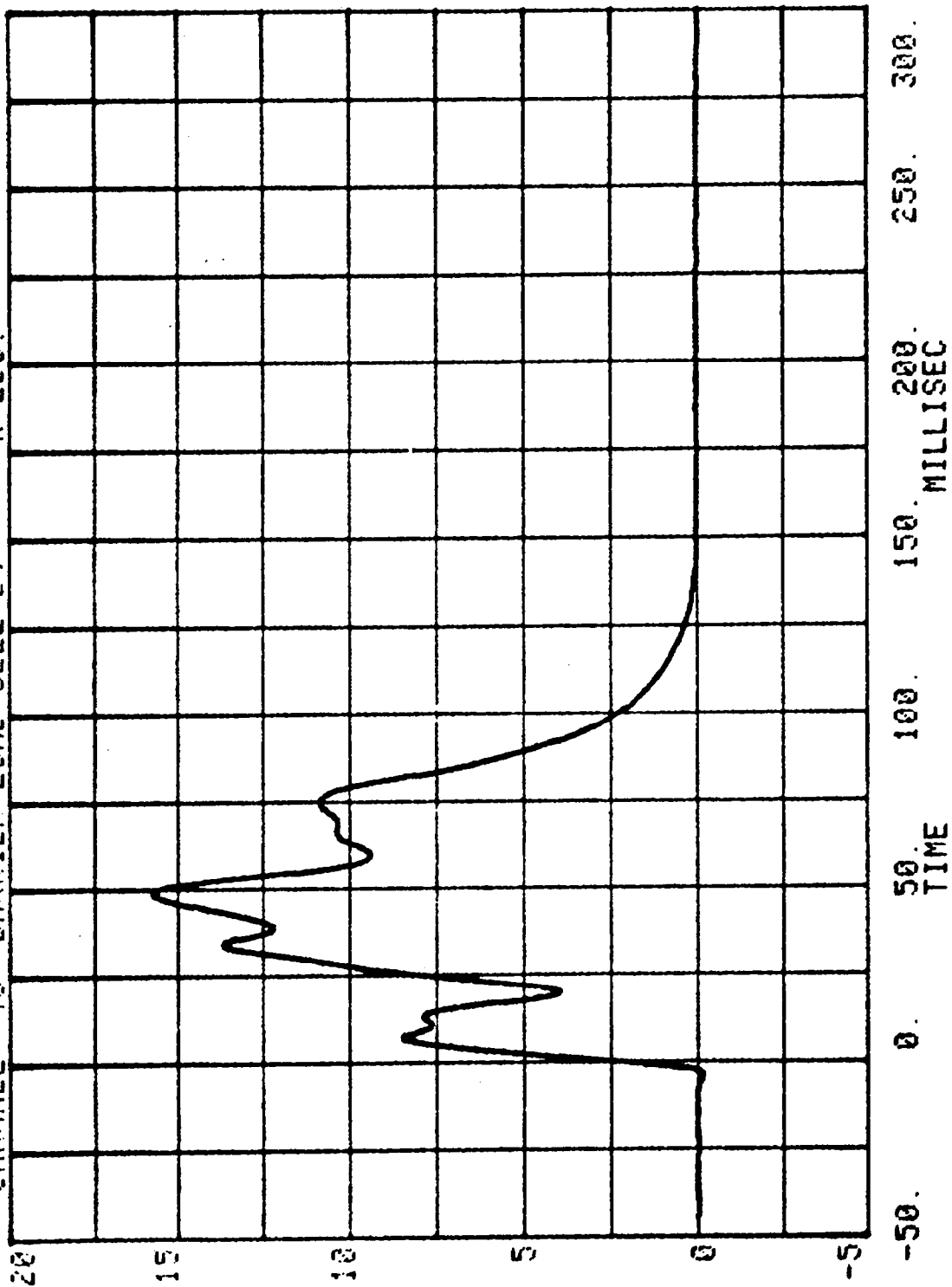
RUN= 947 SERIES= 5203



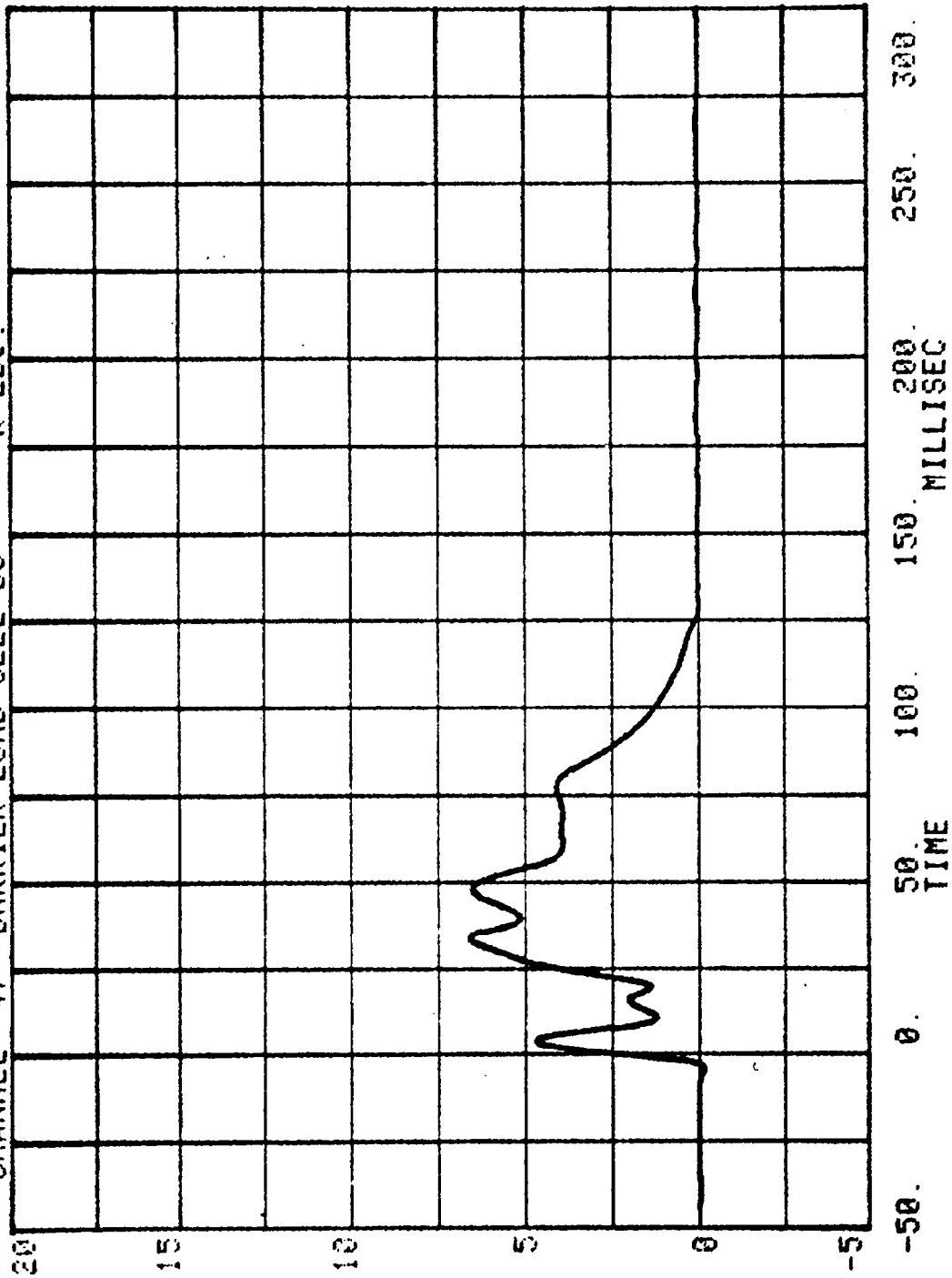
CHANNEL 45 RUN= 947 SERIES= 5203 K LBS.
BARRIER LOAD CELL B3



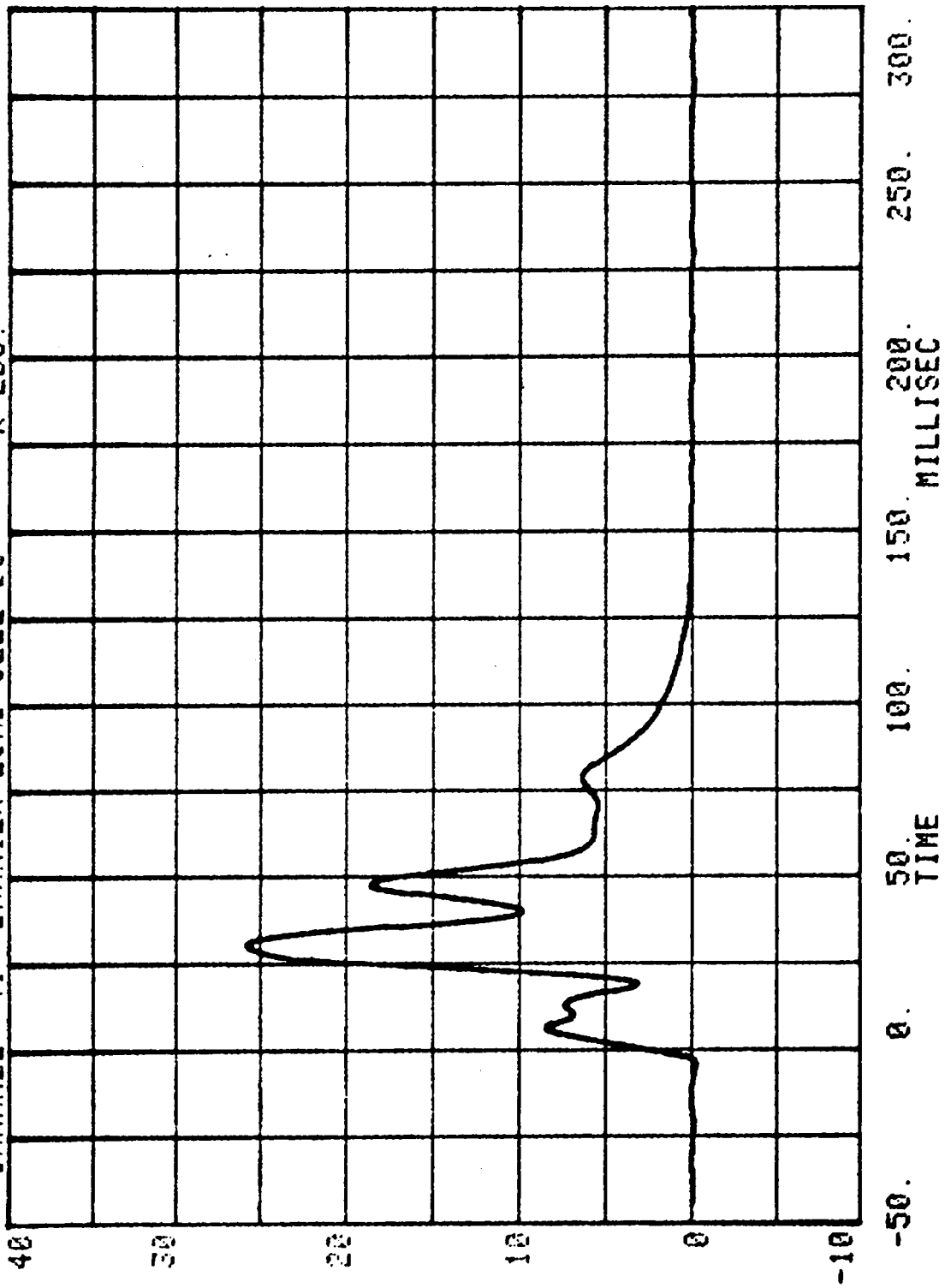
RUN= 947 SERIES= 5203
CHANNEL 46 BARRIER LOAD CELL B4 K LBS.



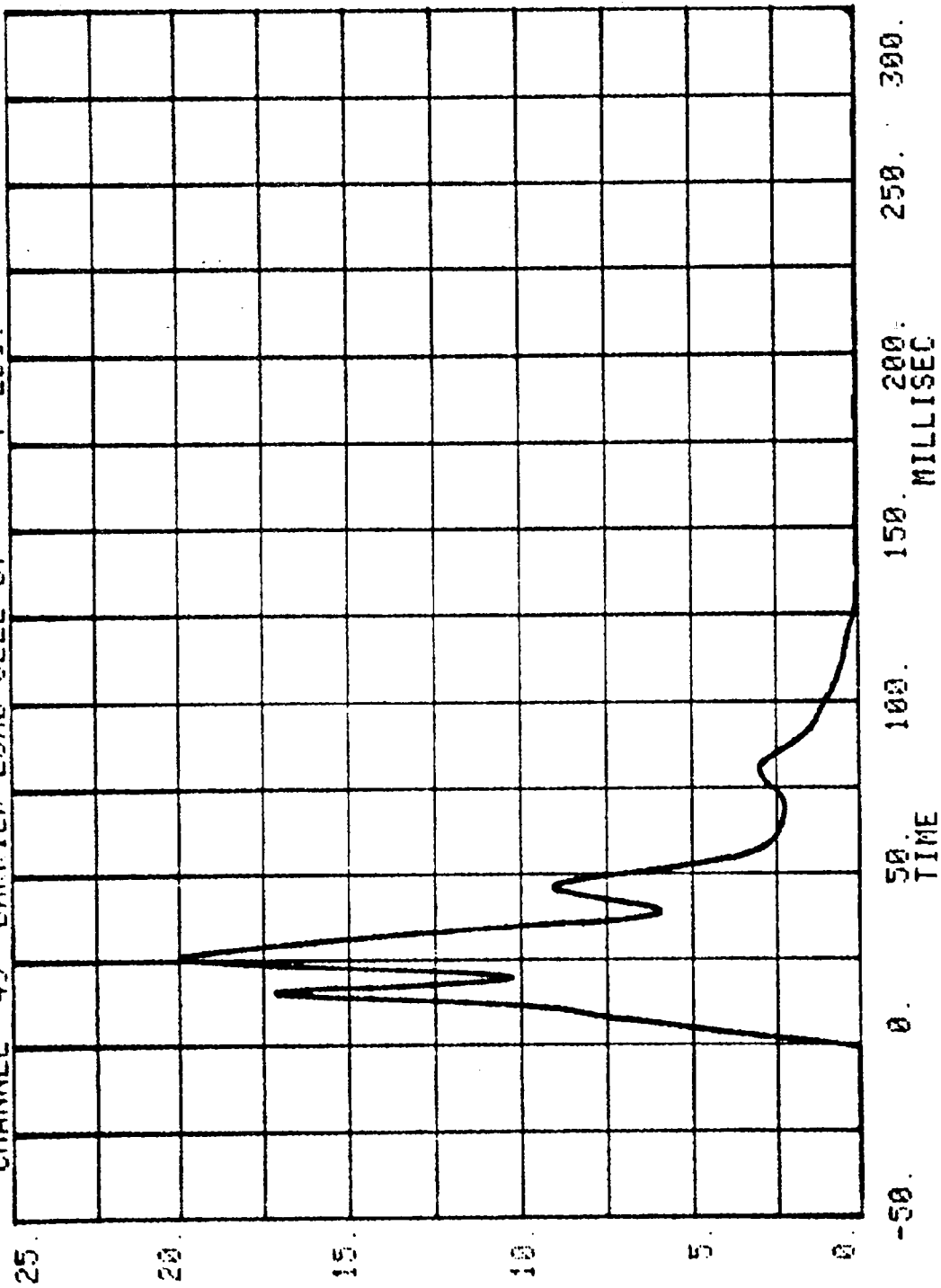
CHANNEL 47 BARRIER LOAD CELL 85 K LBS.
RUN= 947 SERIES= 5203



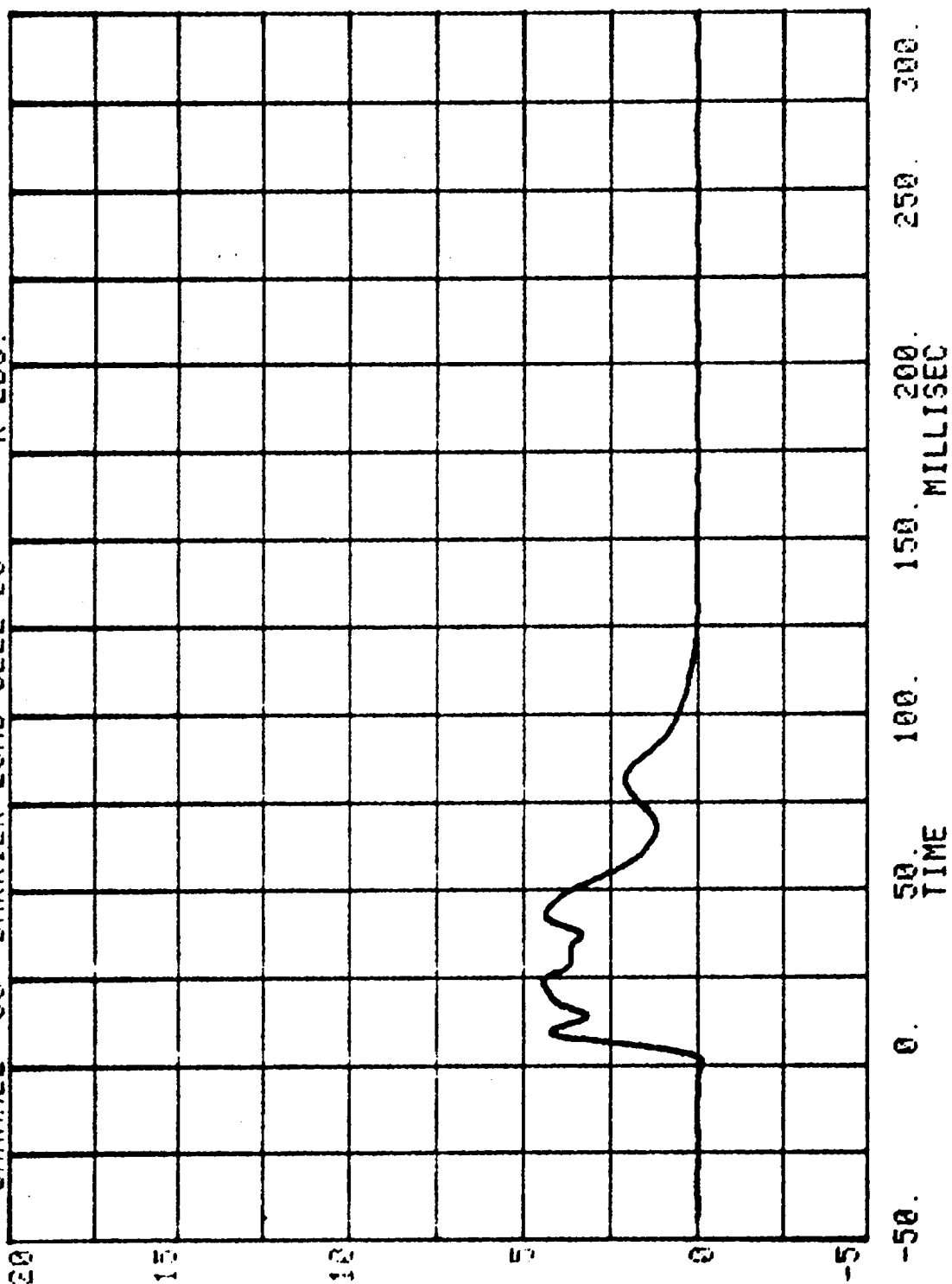
RUN= 947 SERIES= 5203
CHANNEL 48 BARRIER LOAD CELL B6 K LBS.



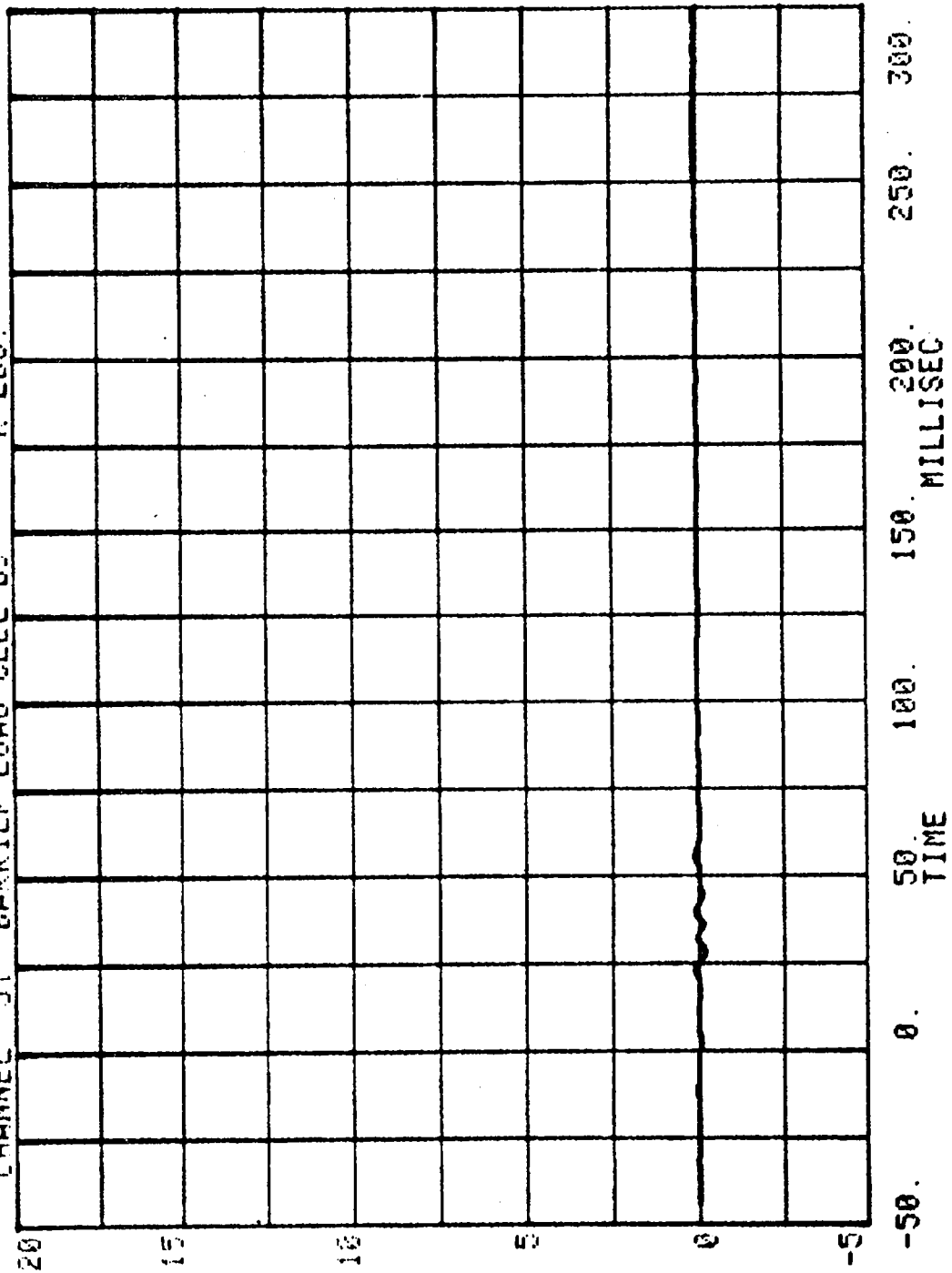
CHANNEL 49 BARRIER LOAD CELL 87 K LBS.
RUN= 947 SERIES= 5203



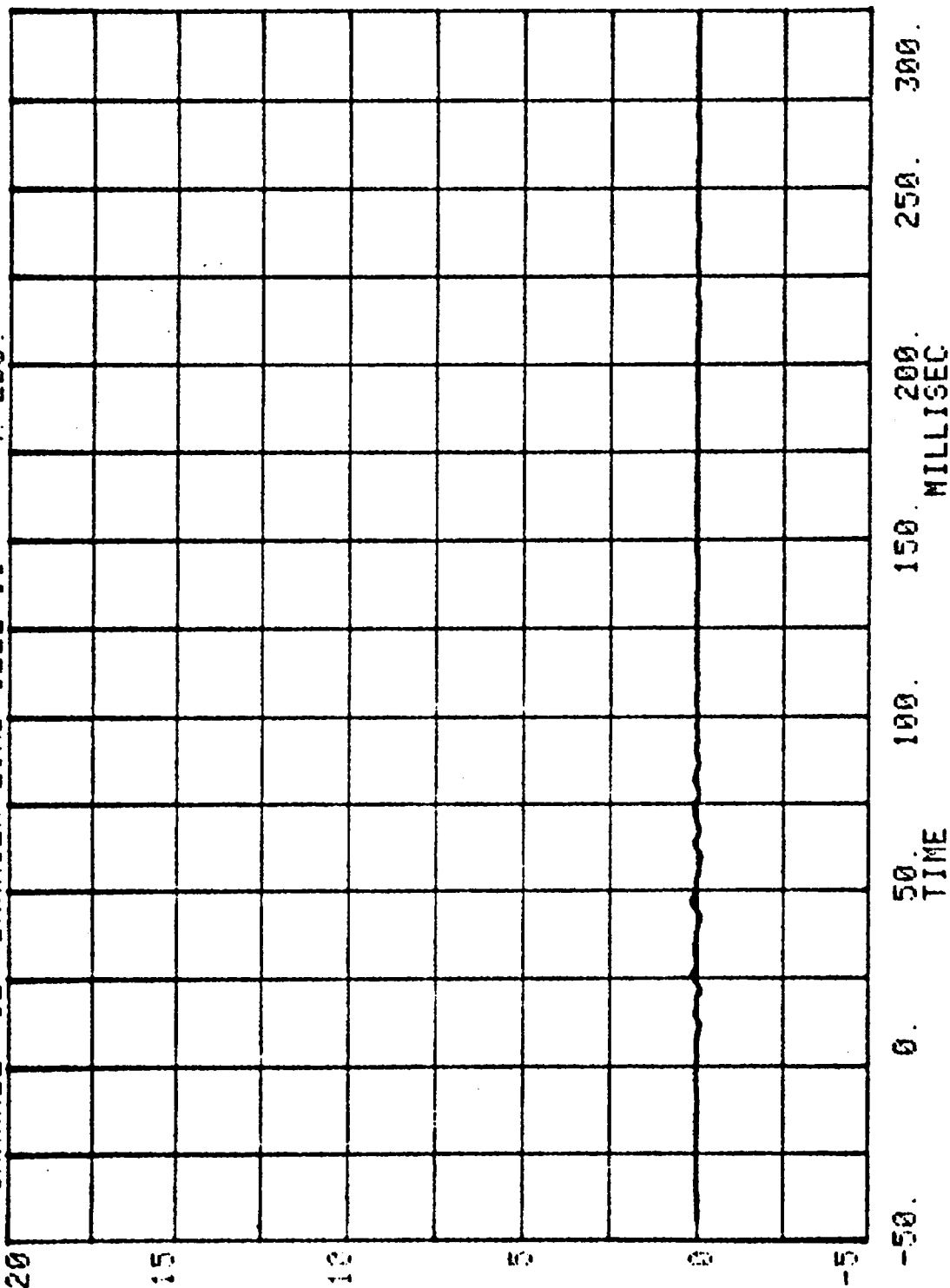
RUN= 947 SERIES= 5203
CHANNEL 50 BARRIER LOAD CELL B3 K LBS.



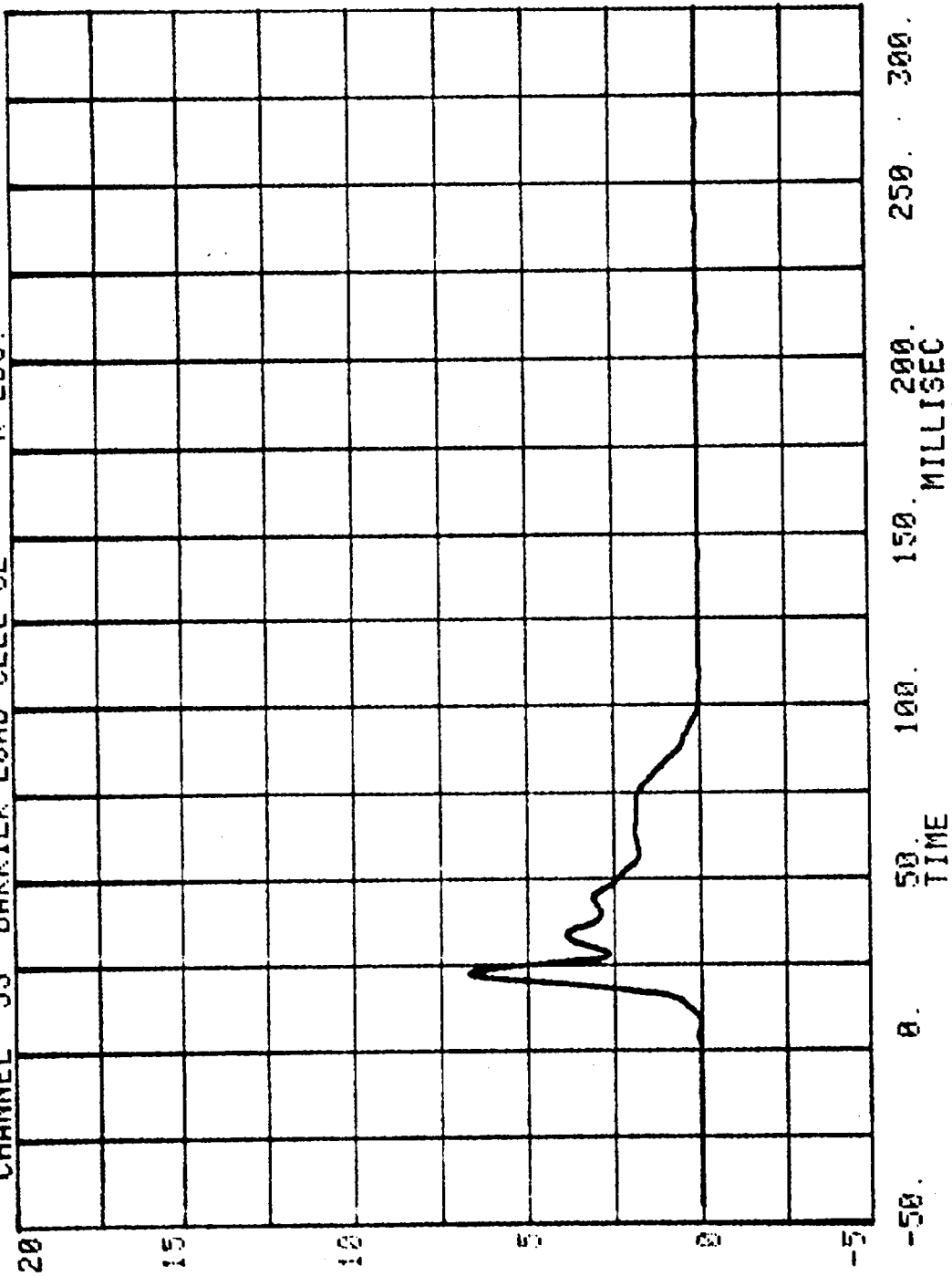
CHANNEL 51 BARRIER LOAD CELL B9
RUN= 947 SERIES= 5203 K LBS.



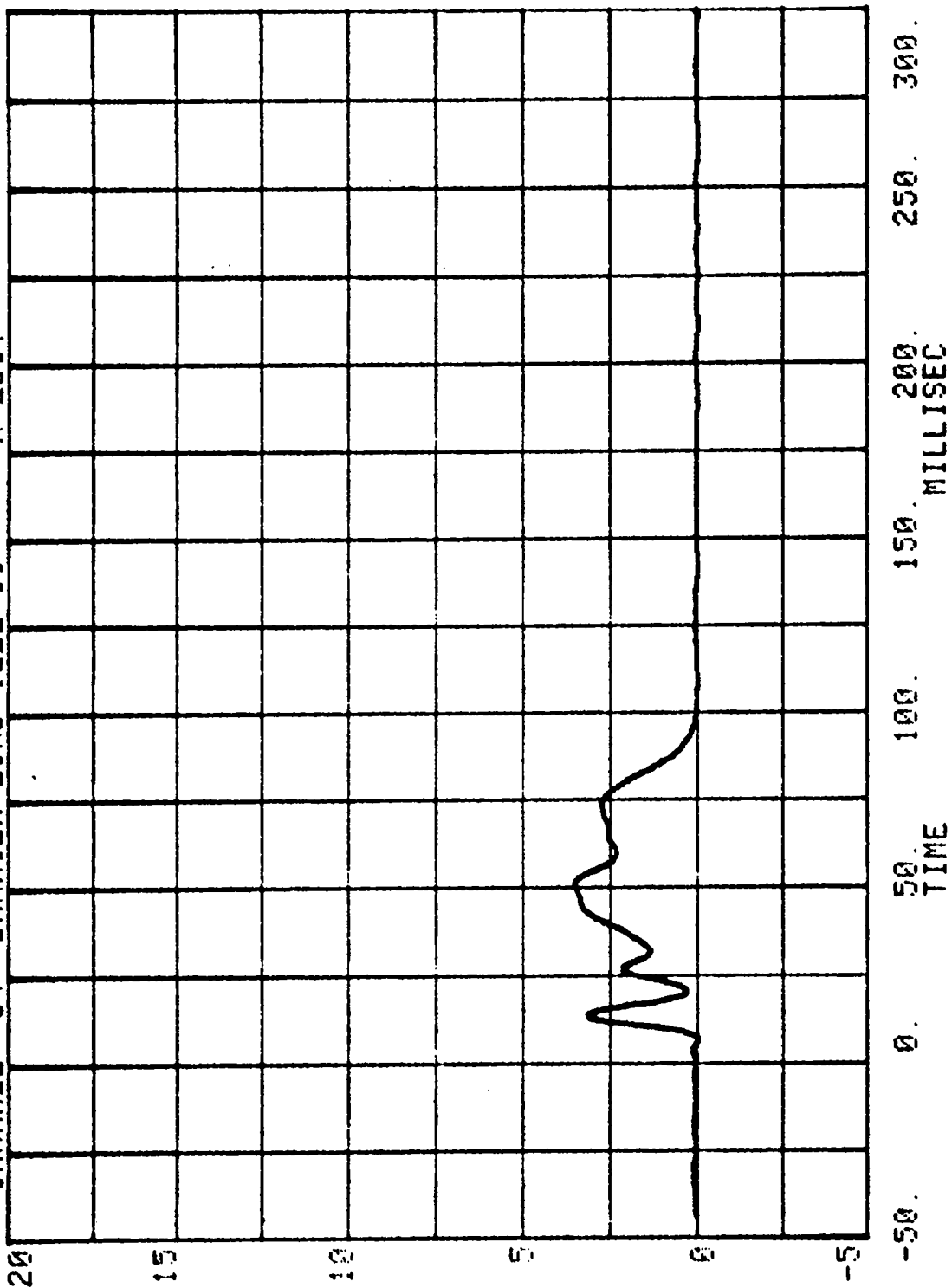
CHANNEL 52 BARRIER LOAD CELL C1
 RUN= 947 SERIES= 5203 K LBS.



CHANNEL 53 BARRIER LOAD CELL C2 RUN= 947 SERIES= 5203 K LBS.

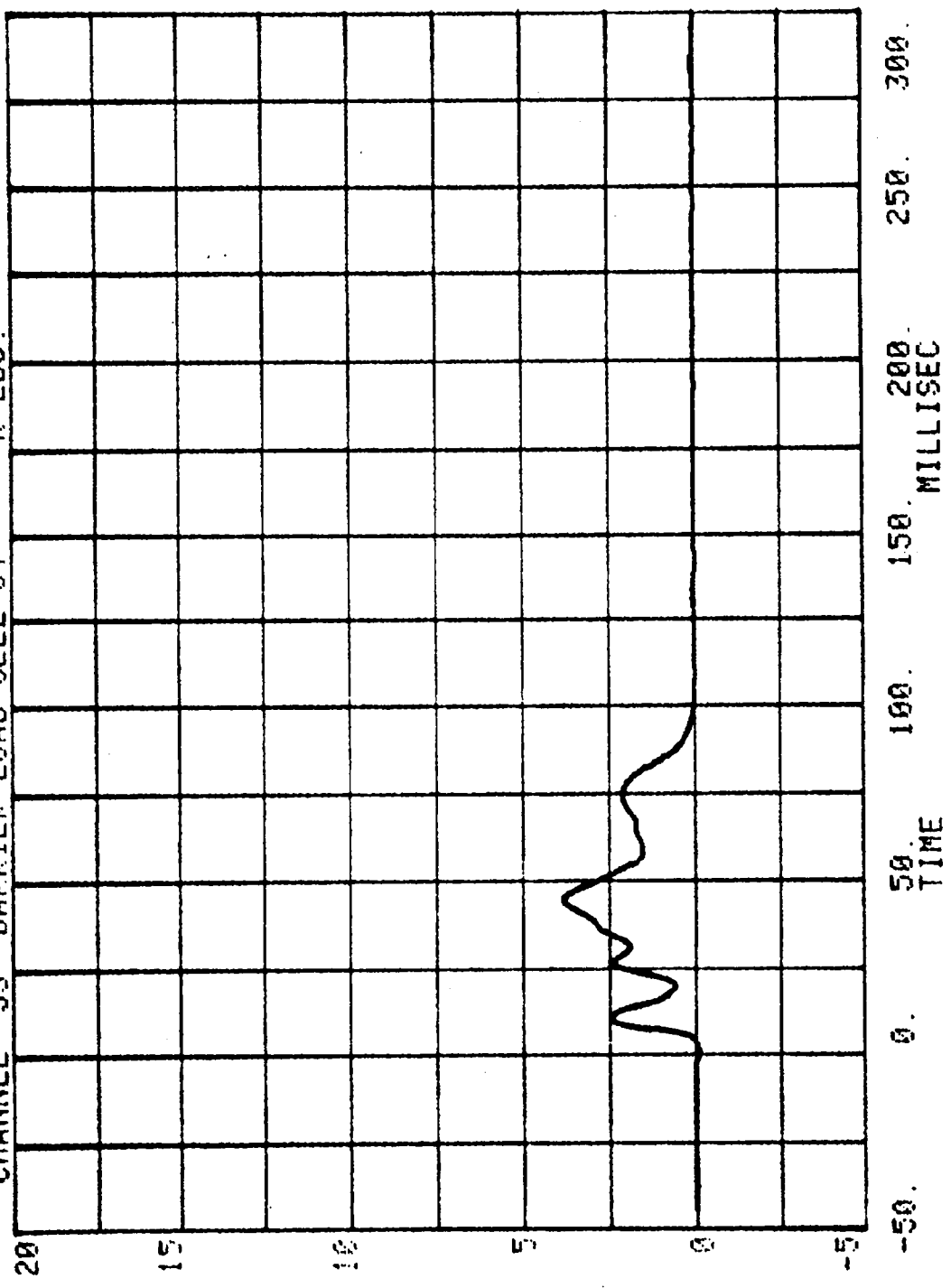


RUN= 947 SERIES= 5203 K LBS.
CHANNEL 54 BARRIER LOAD CELL C3

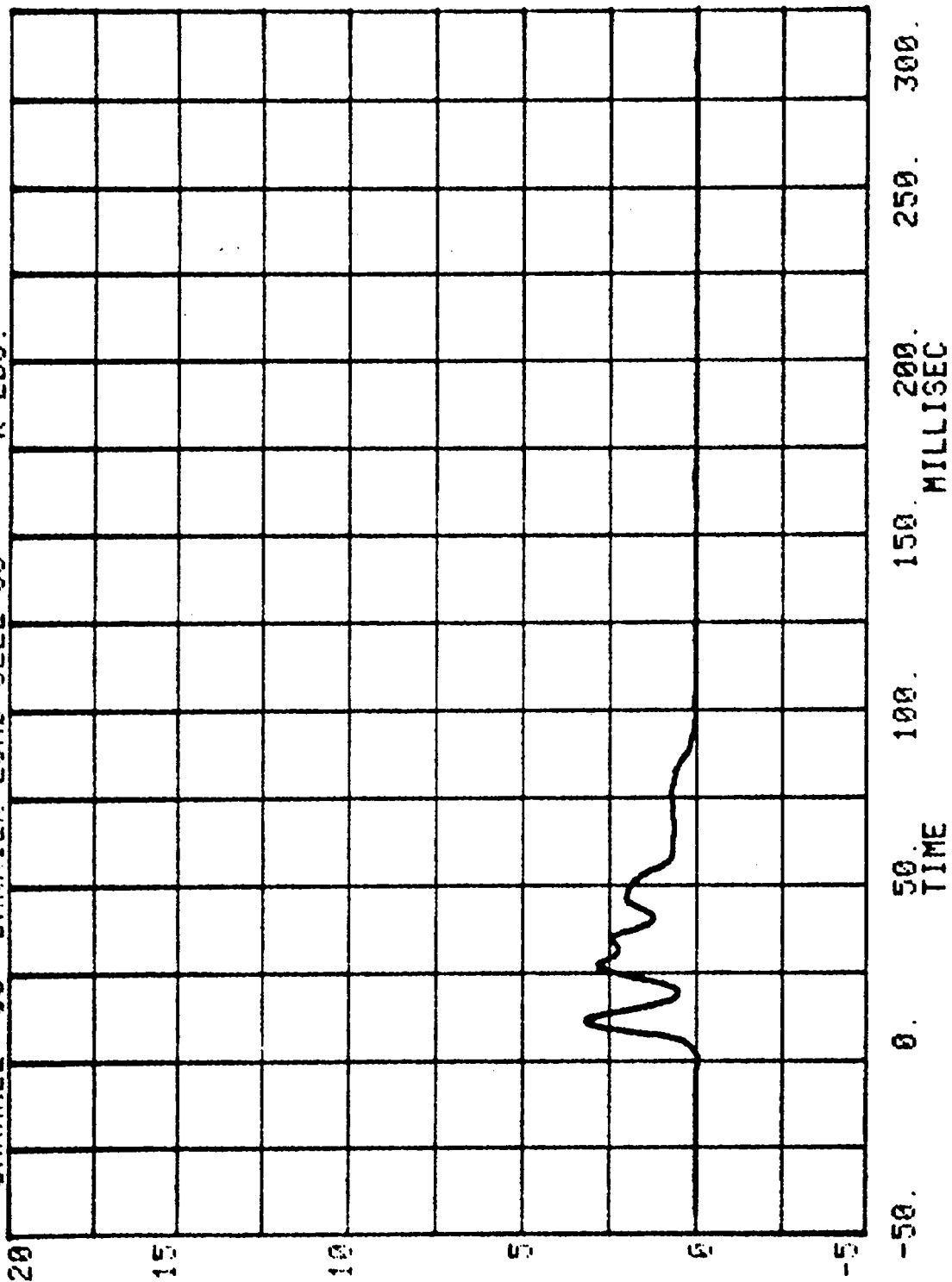


CHANNEL 55 BARRIER LOAD CELL C4 K LBS.

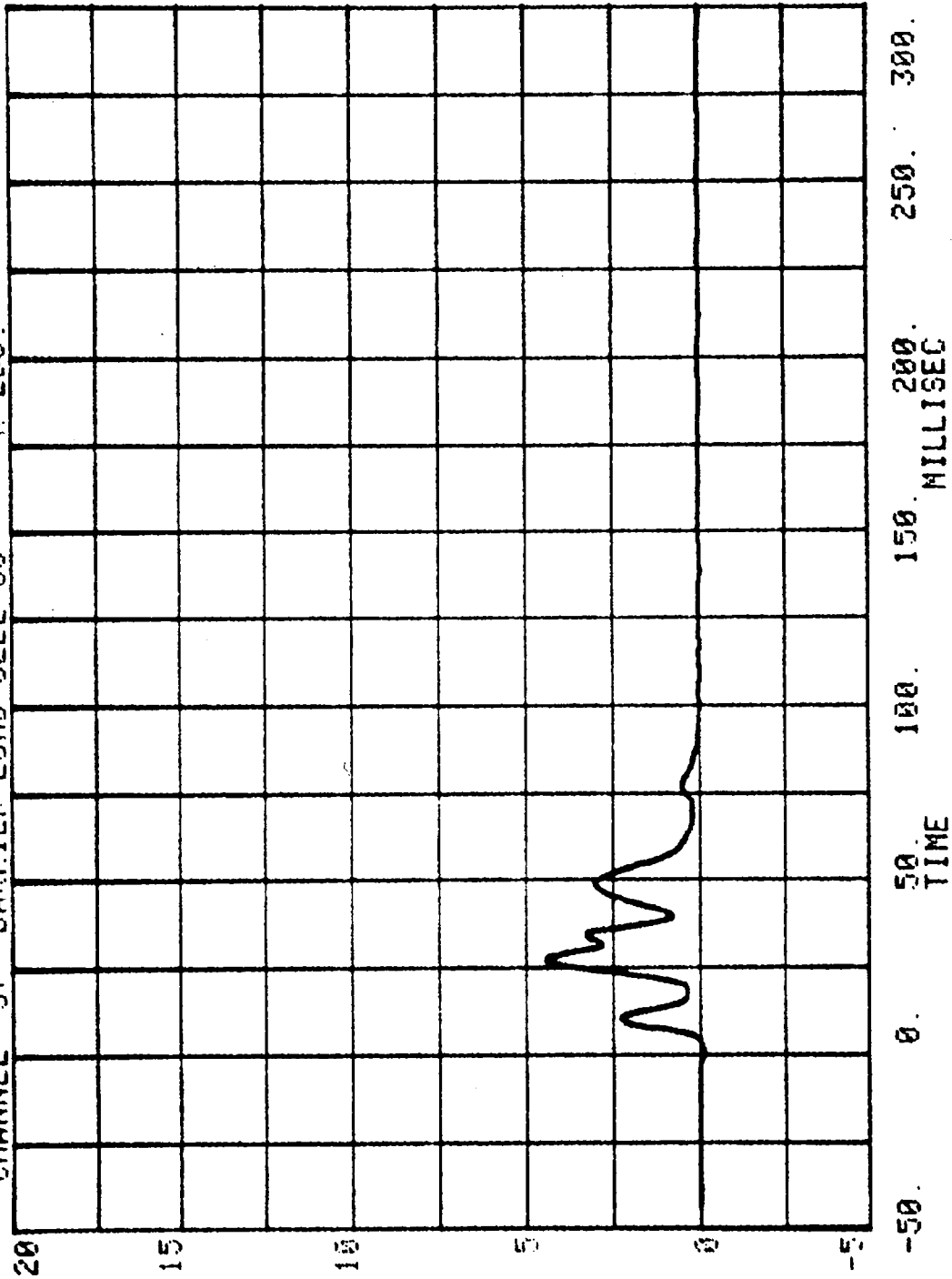
RUN= 947 SERIES= 5203



RUN= 947 SERIES= 5203
CHANNEL 56 BARRIER LOAD CELL C5 K LBS.

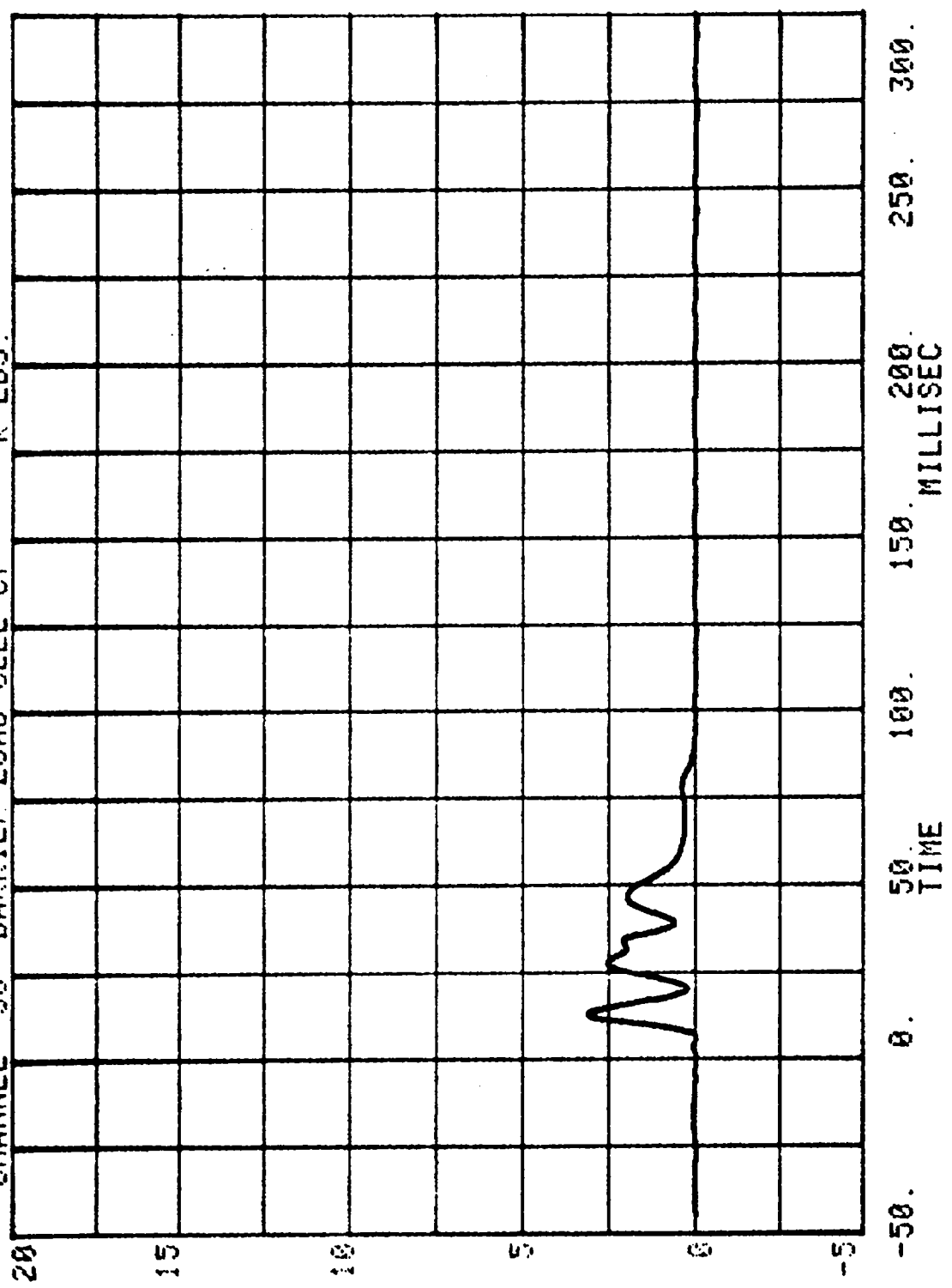


CHANNEL 57 BARRIER LOAD CELL C6
RUN= 947 SERIES= 5203 K LBS.



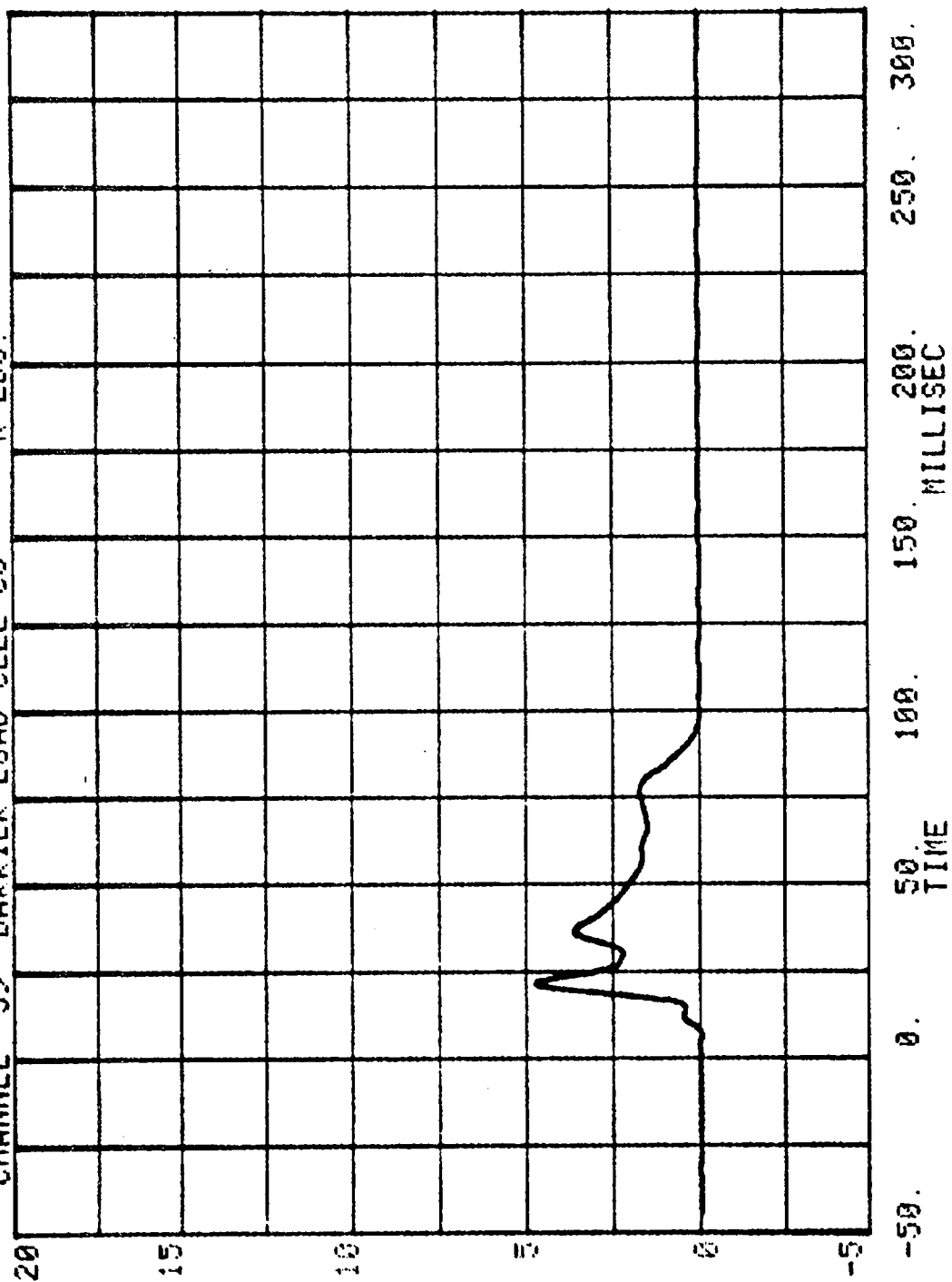
CHANNEL 58 BARRIER LOAD CELL C7 K LBS.

RUN= 947 SERIES= 5203

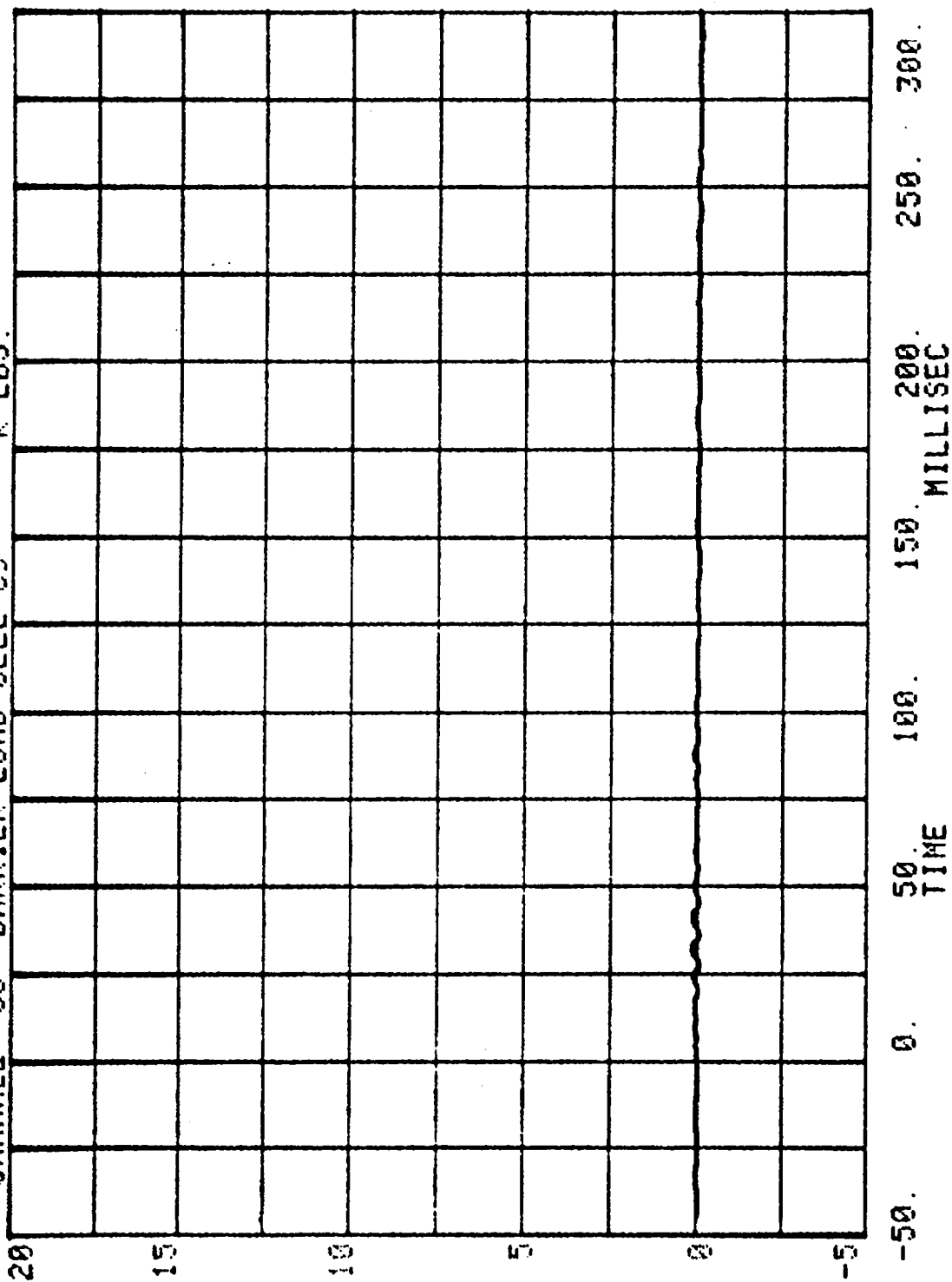


CHANNEL 59 BARRIER LOAD CELL C8 K LBS.

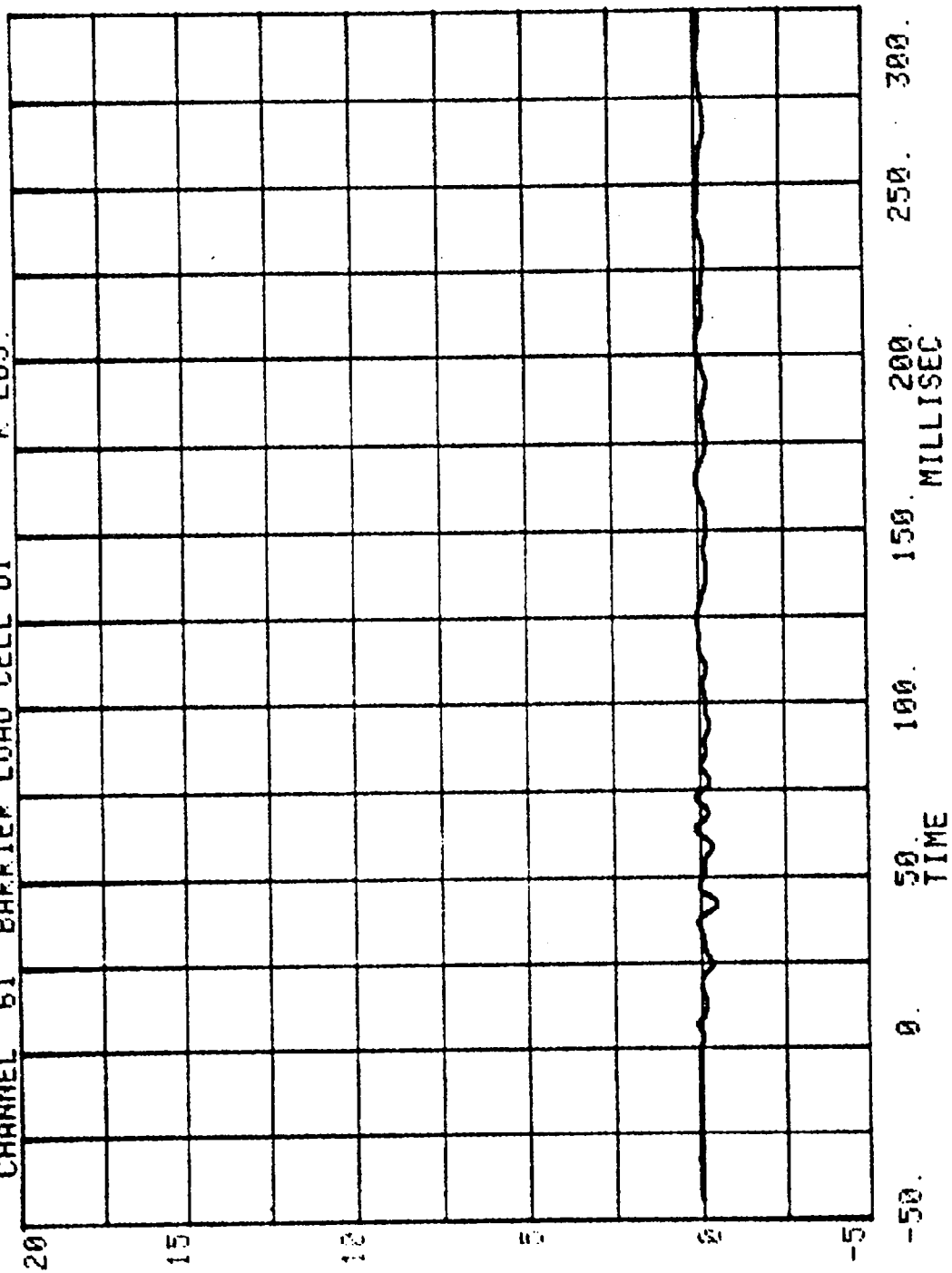
RUN= 947 SERIES= 5203



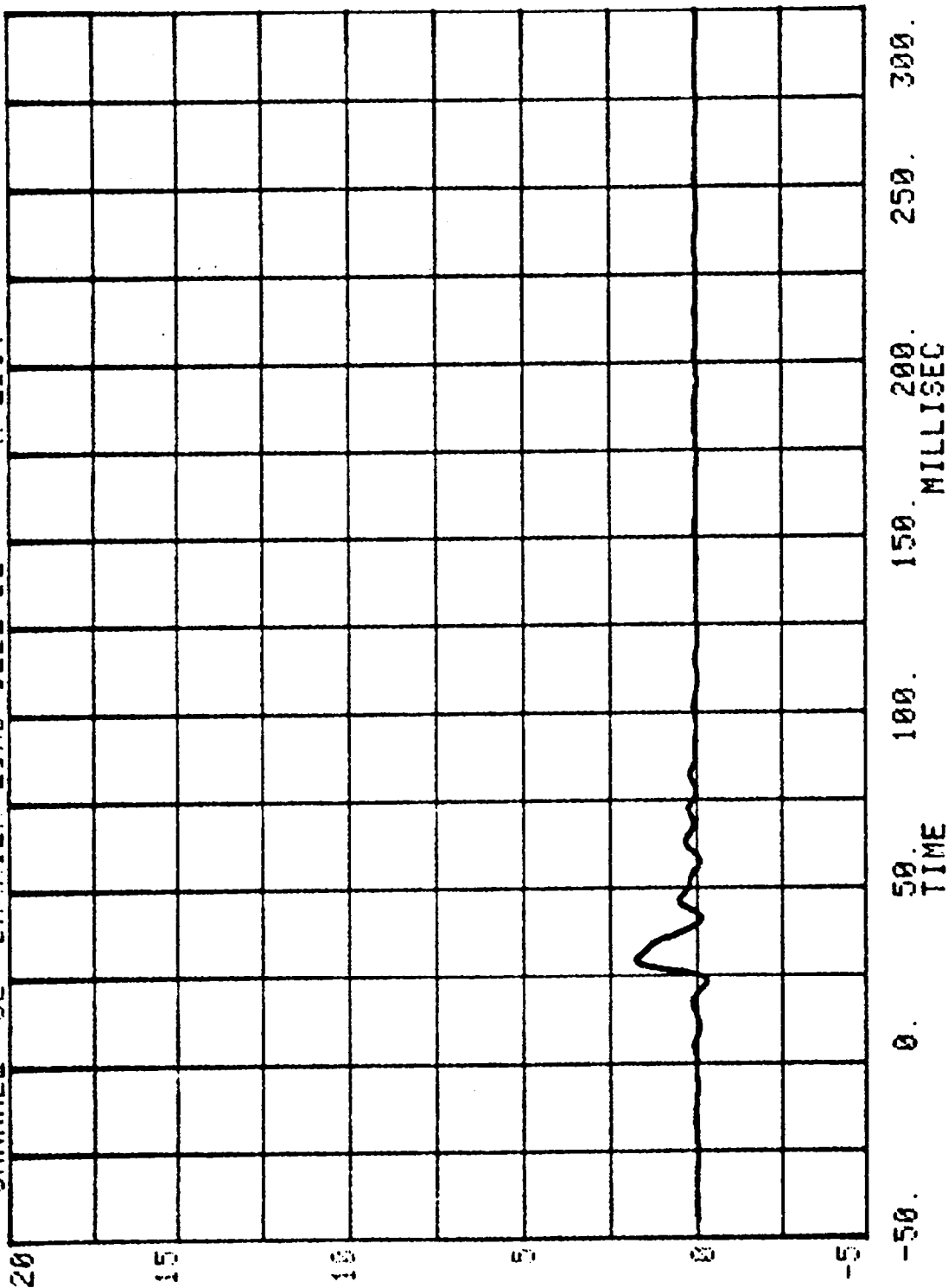
CHANNEL 60 BARRIER LOAD CELL C9 RUH= 947 SERIES= 5203 K LBS.



RUN= 947 SERIES= 5203
CHANNEL 61 BARRIER LOAD CELL 01 K LBS.

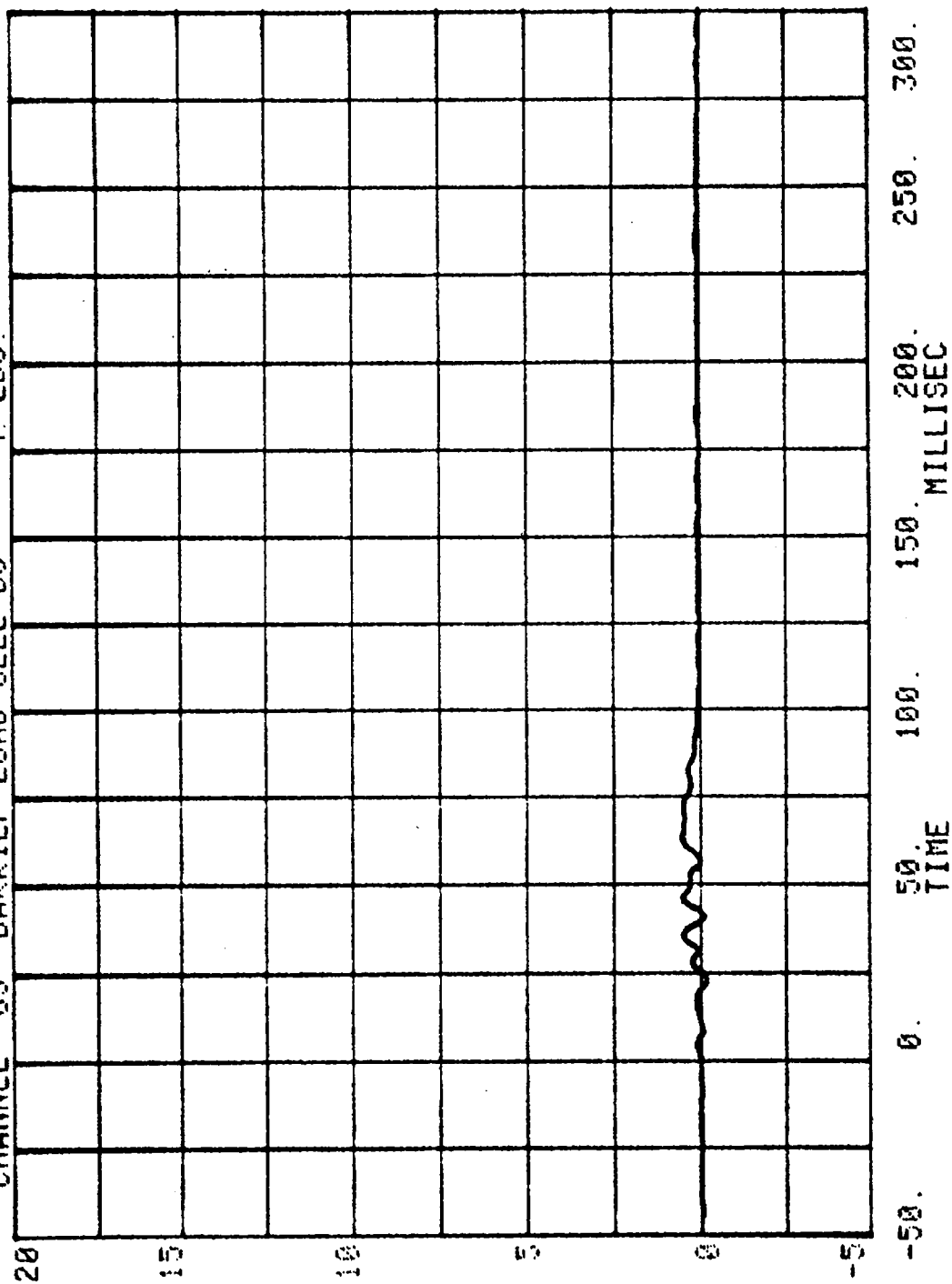


CHANNEL 62 BARRIER LOAD CELL 02 K LBS.
RUN= 947 SERIES= 5203

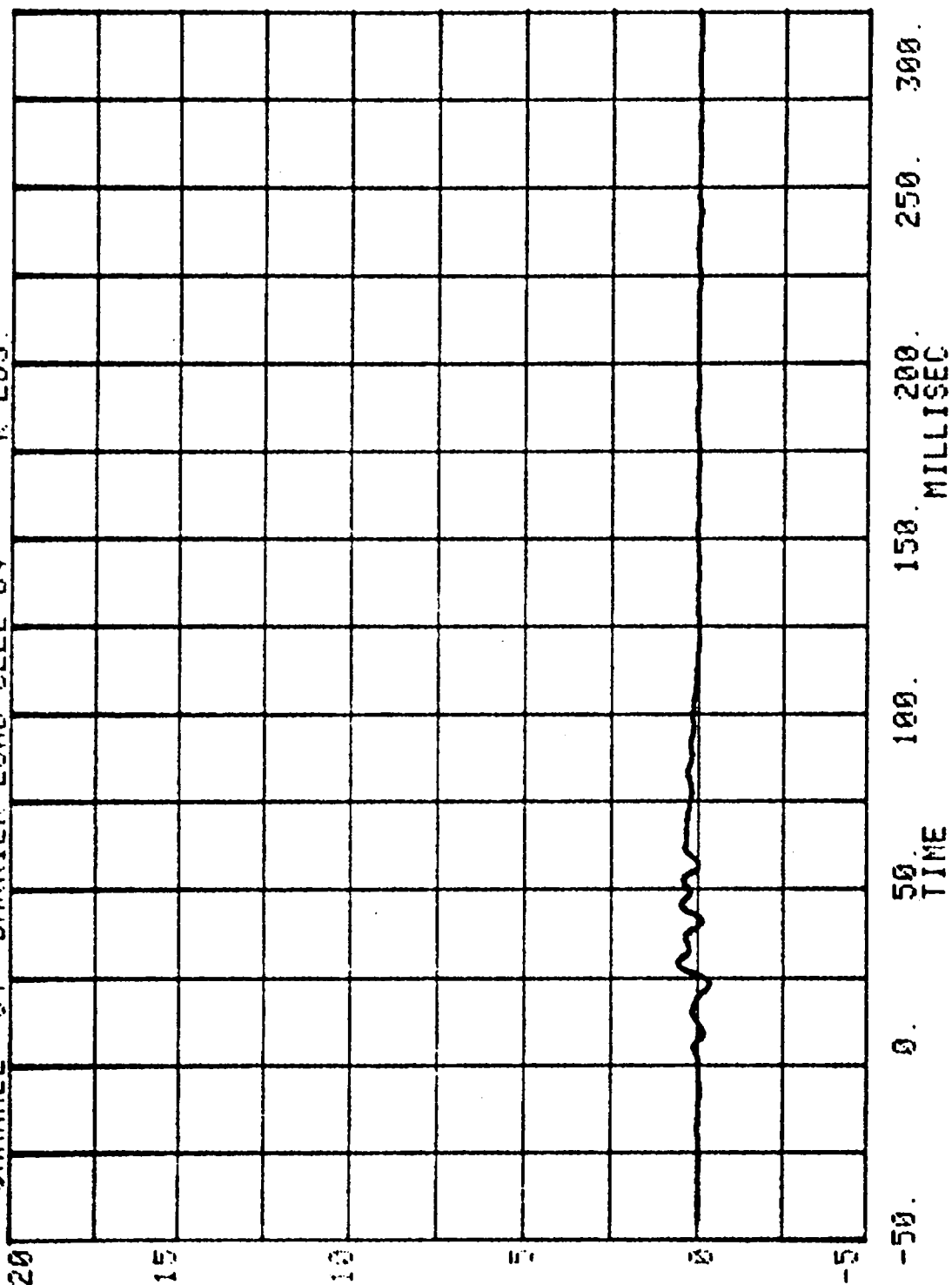


CHANNEL 63 BARRIEP LOAD CELL 03 K LBS.

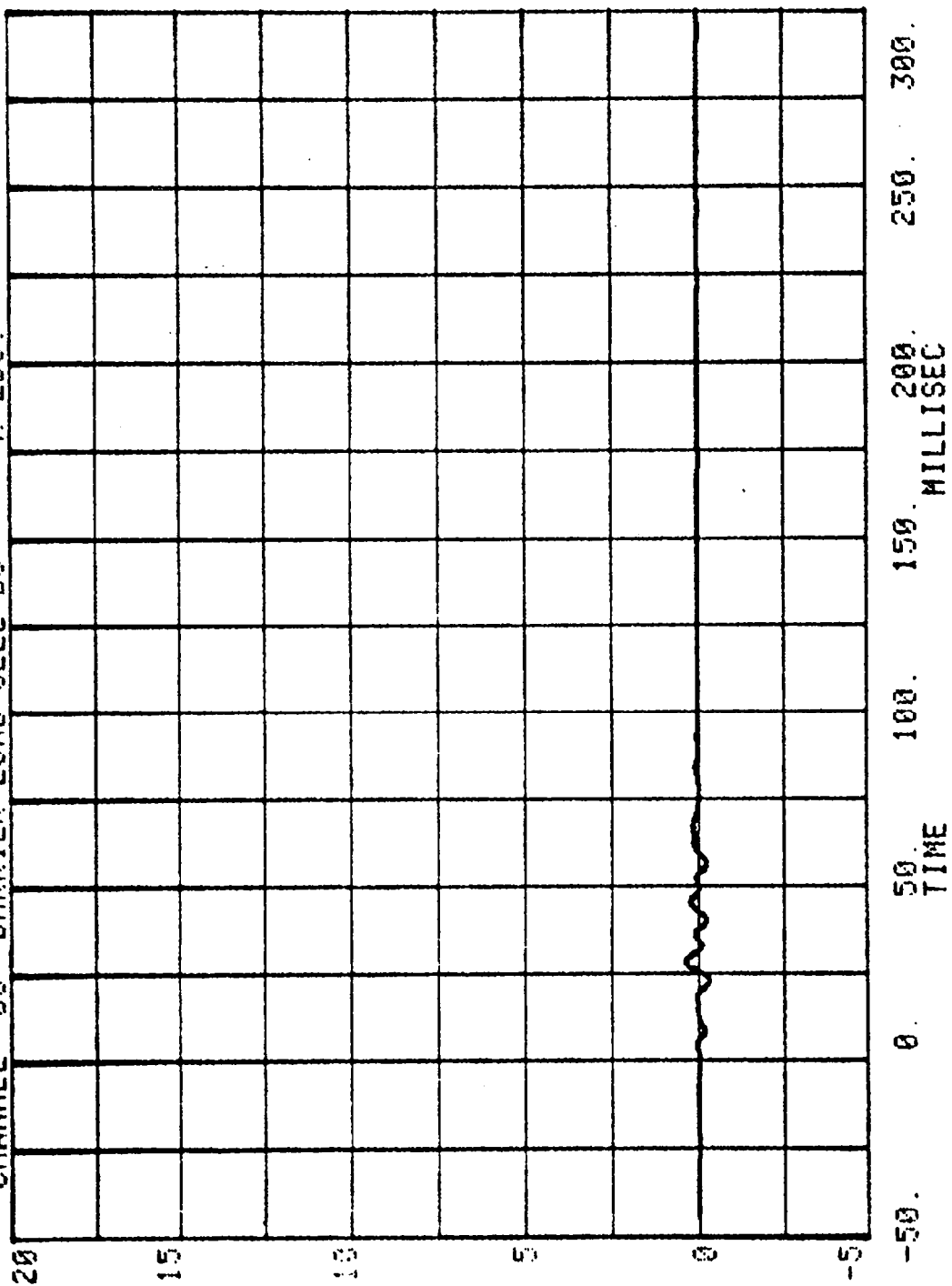
RUN= 947 SERIES= 5203



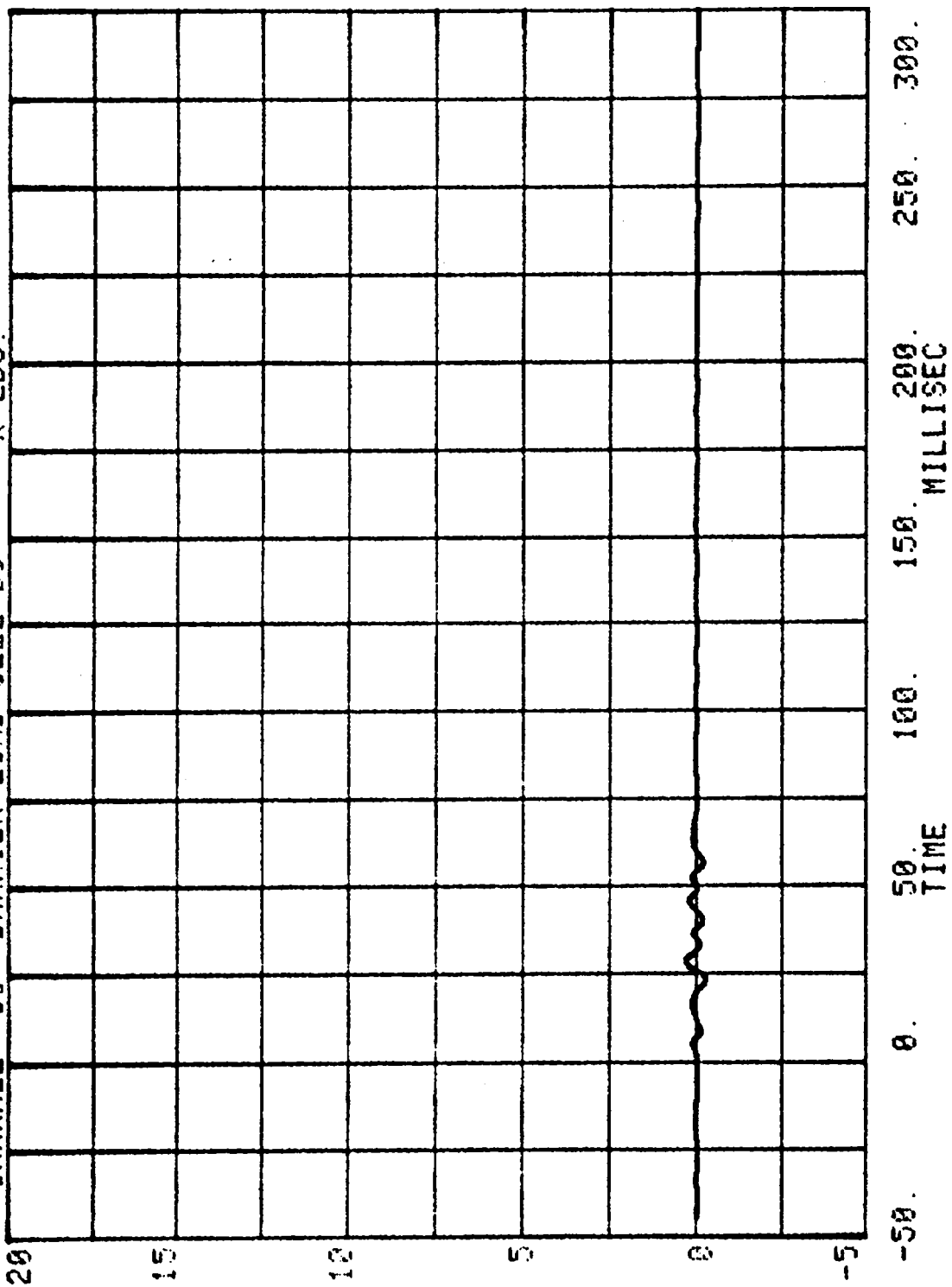
CHANNEL 64 BARRIER LOAD CELL 04 K LBS
RUH= 947 SERIES= 5203



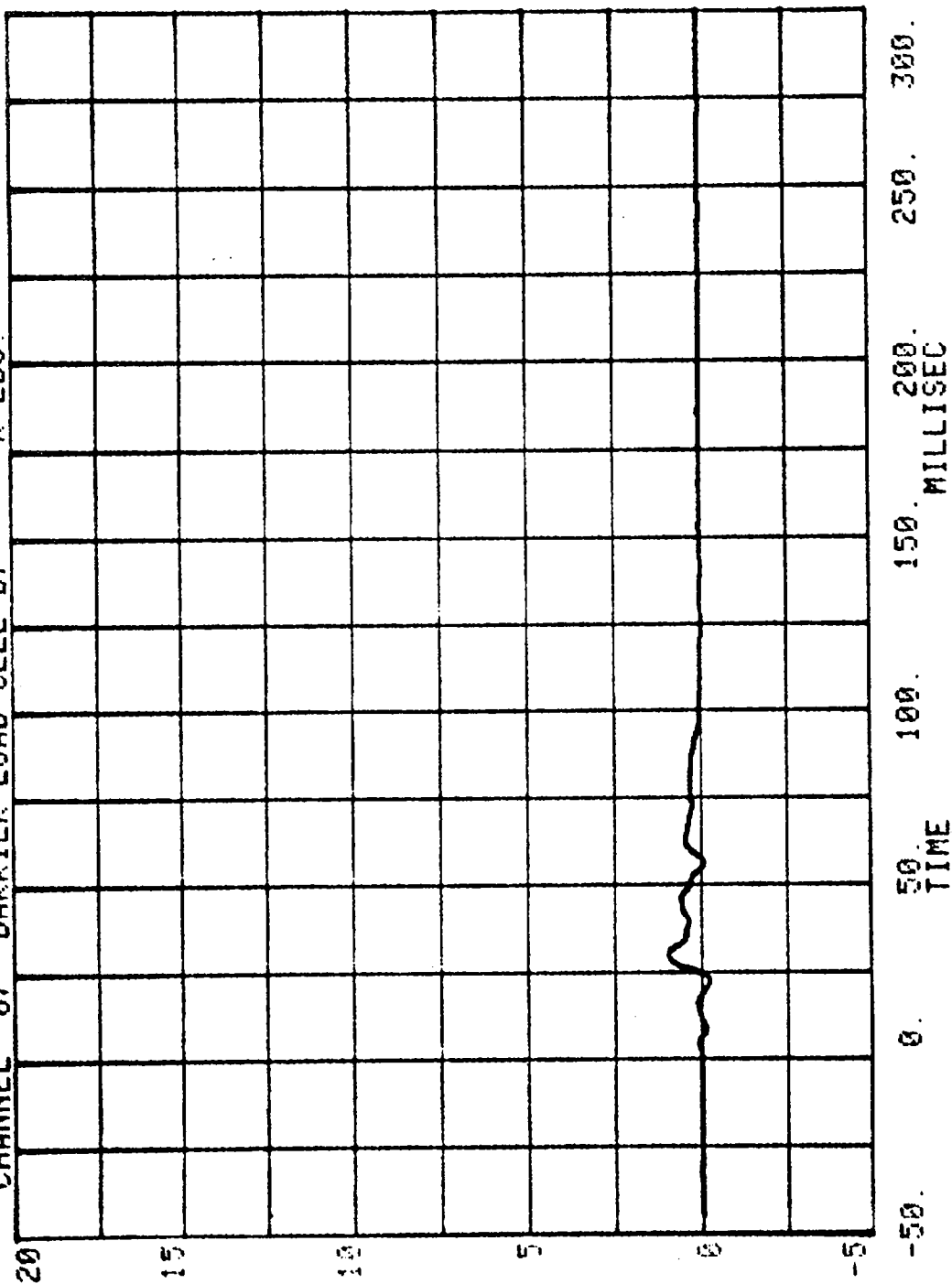
RUN= 947 SERIES= 5203
CHANNEL 65 BARRIER LOAD CELL D5 K LBS.



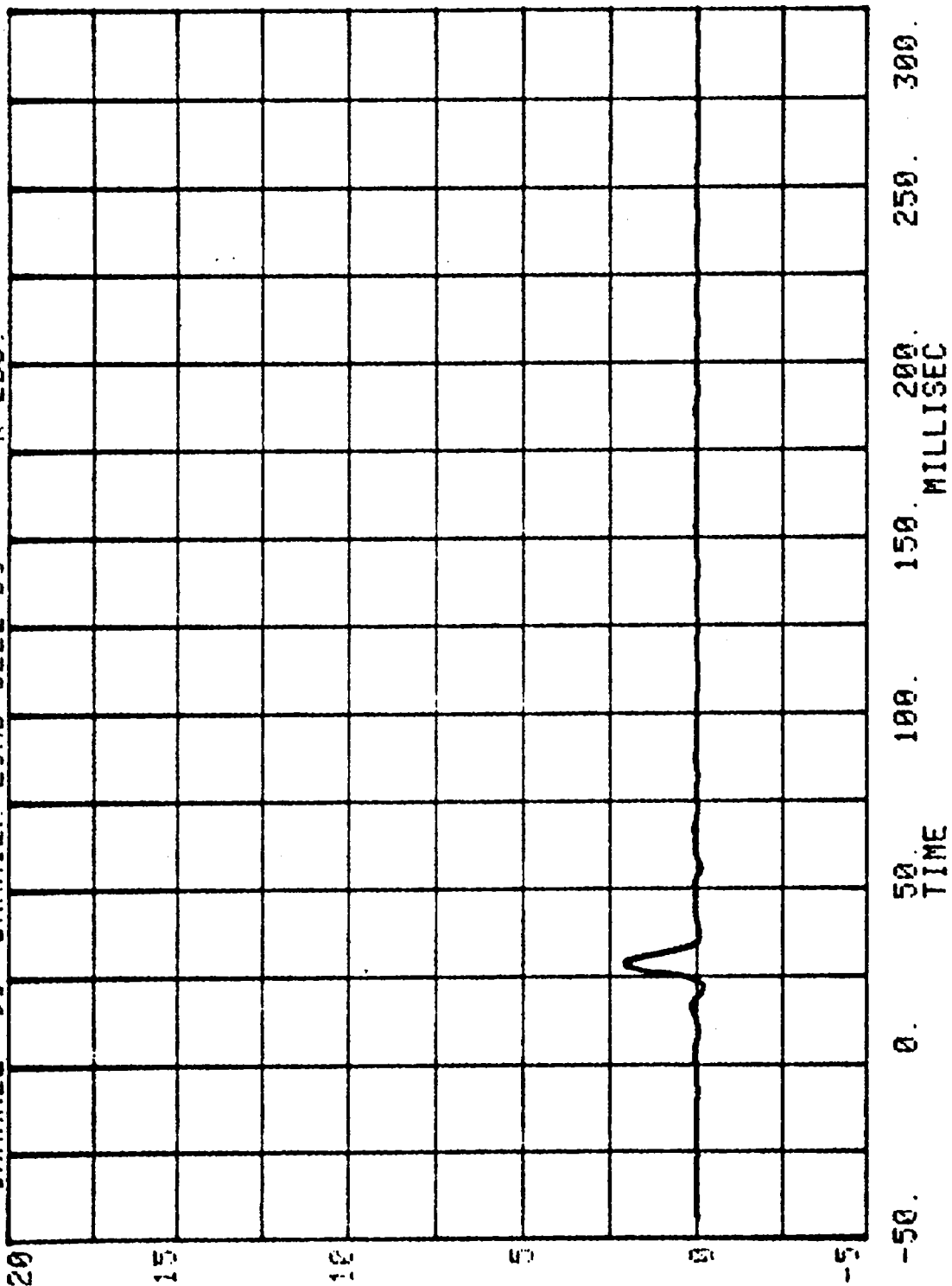
RUN= 947 SERIES= 5203
CHANNEL 66 BARRIER LOAD CELL D6 K LBS.



CHANNEL 67 RUN= 947 SERIES= 5283 K LBS.
BARRIER LOAD CELL D7

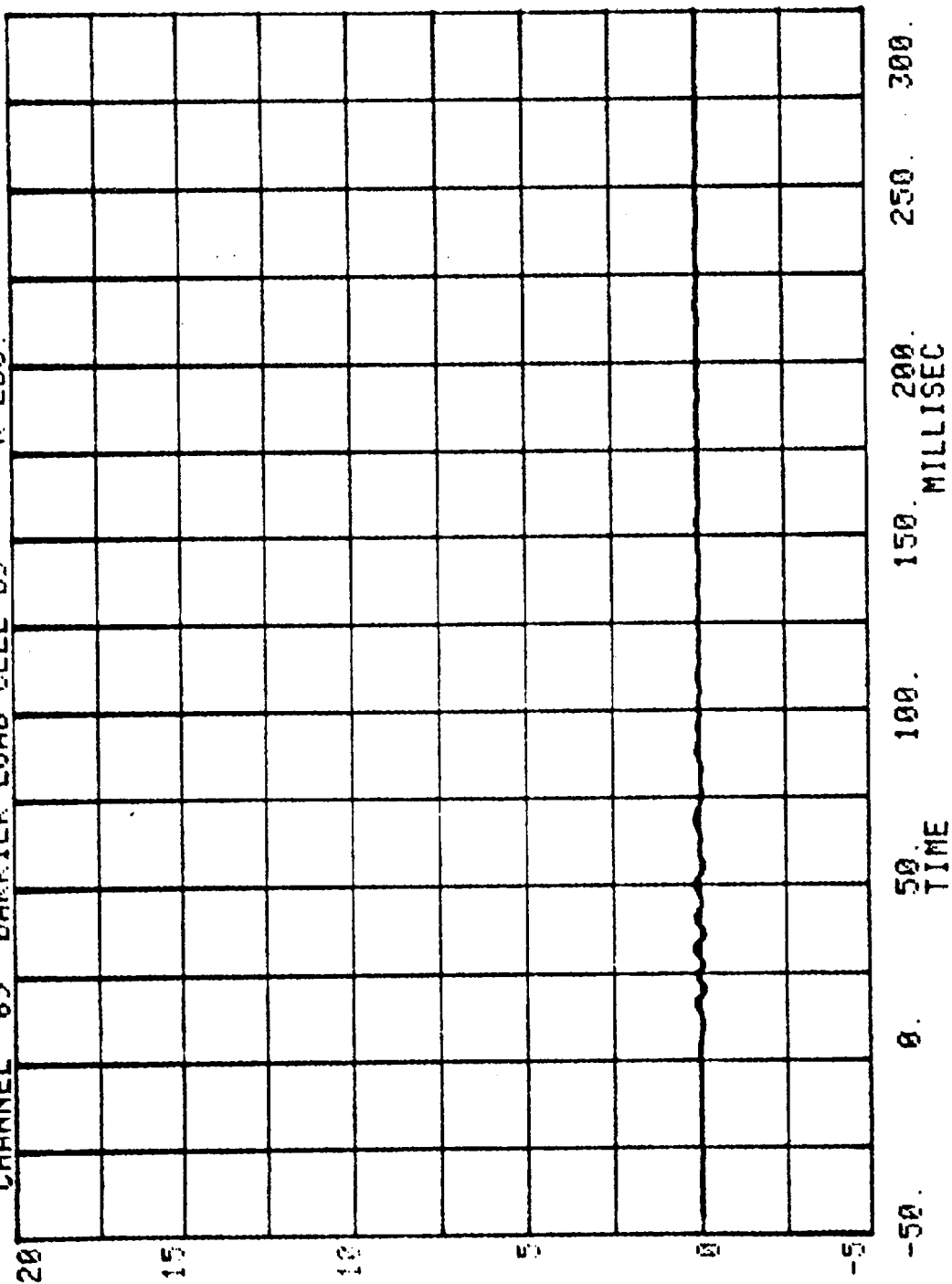


CHANNEL 68 BARRIER LOAD CELL D8 RUN= 947 SERIES= 5203 K LBS.



CHANNEL 69 BARRIER LOAD CELL 09 K LBS.

RUN= 947 SERIES= 5203



NEW CAR ASSESSMENT PROGRAM - 1990

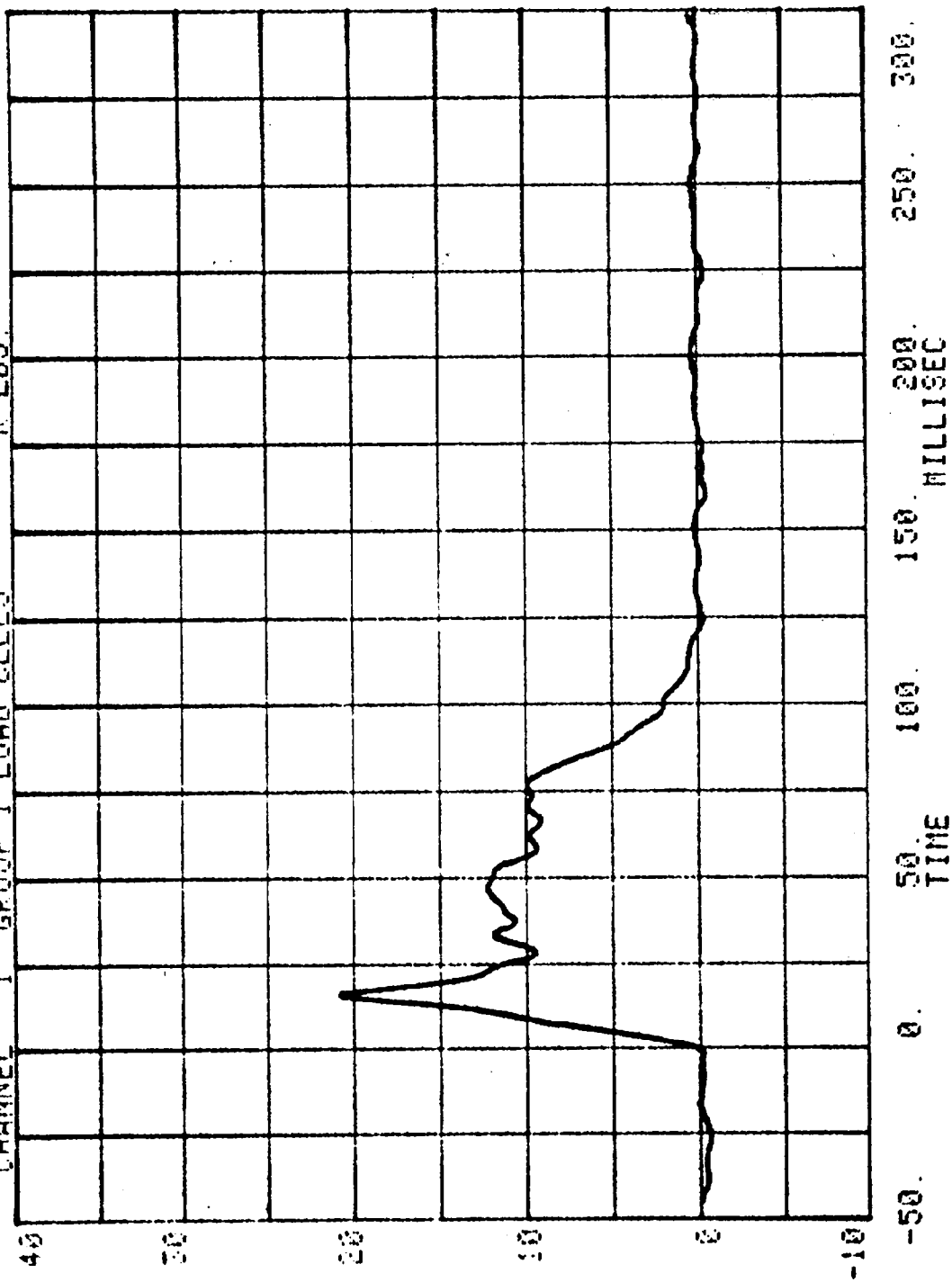
RUN # 947

SERIES # 5203

CHAN	TITLE	MINIMUM/MAXIMUM	AT	TIME
1	GROUP 1 LOAD CELLS	- 444 K LBS 21.920 K LBS		-25.87 MS 18.50 MS
2	GROUP 2 LOAD CELLS	- 377 K LBS 59.251 K LBS		-5.33 MS 32.55 MS
3	GROUP 3 LOAD CELLS	- 318 K LBS 26.764 K LBS		-1.95 MS 25.57 MS
4	GROUP 4 LOAD CELLS	- 354 K LBS 7.359 K LBS		239.95 MS 48.00 MS
5	GROUP 5 LOAD CELLS	- 319 K LBS 10.574 K LBS		52 MS 27.67 MS
6	GROUP 6 LOAD CELLS	- 137 K LBS 7.676 K LBS		239.85 MS 28.87 MS
7	TOTAL LOAD CELL SUM	- 793 K LBS 112.264 K LBS		-25.35 MS 27.97 MS

CHANNEL 1 GROUP 1 LOAD CELLS K LBS.

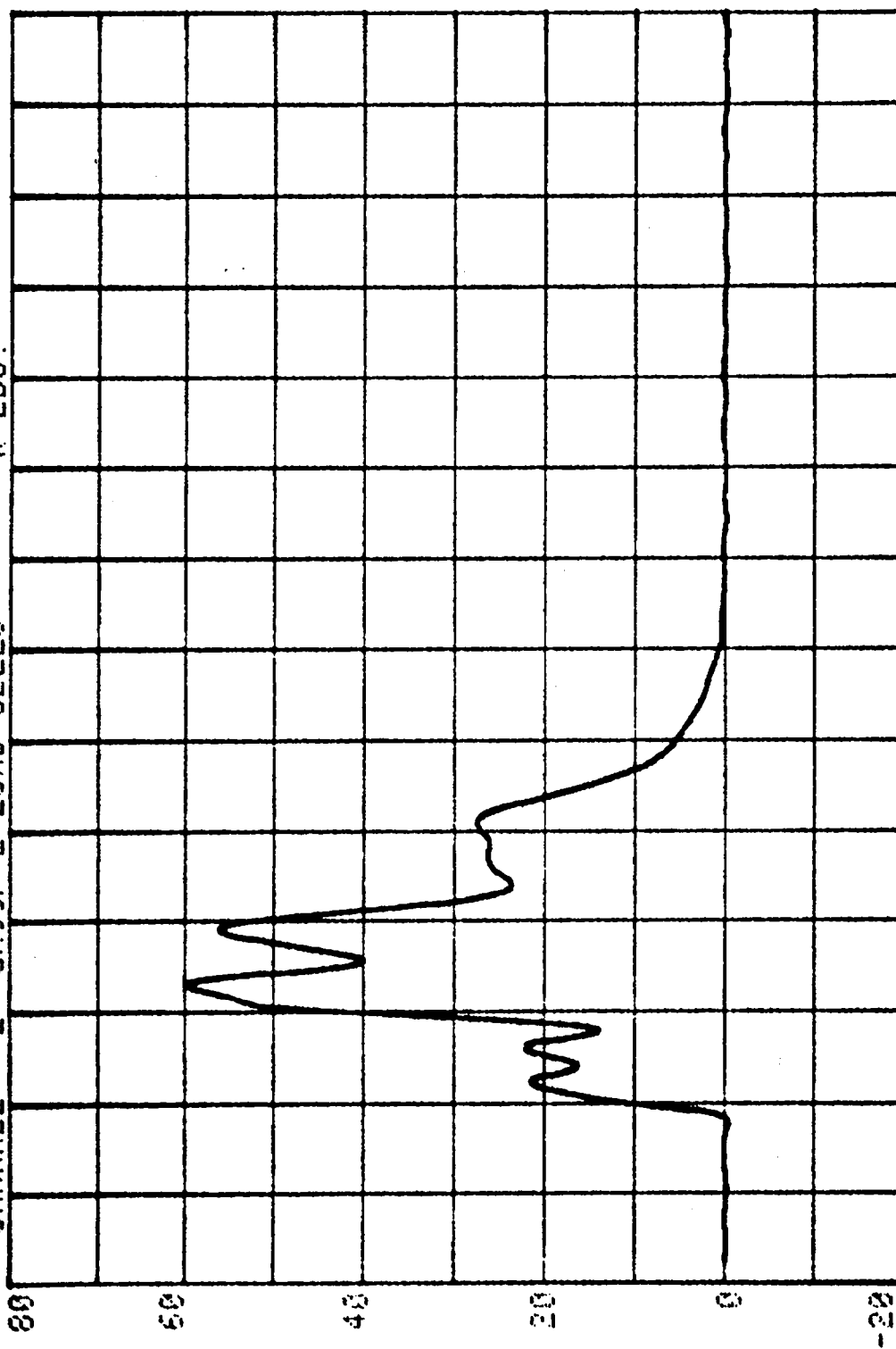
RUN= 947 SERIES= 5283



CHANNEL 2 GROUP 2 LOAD CELLS

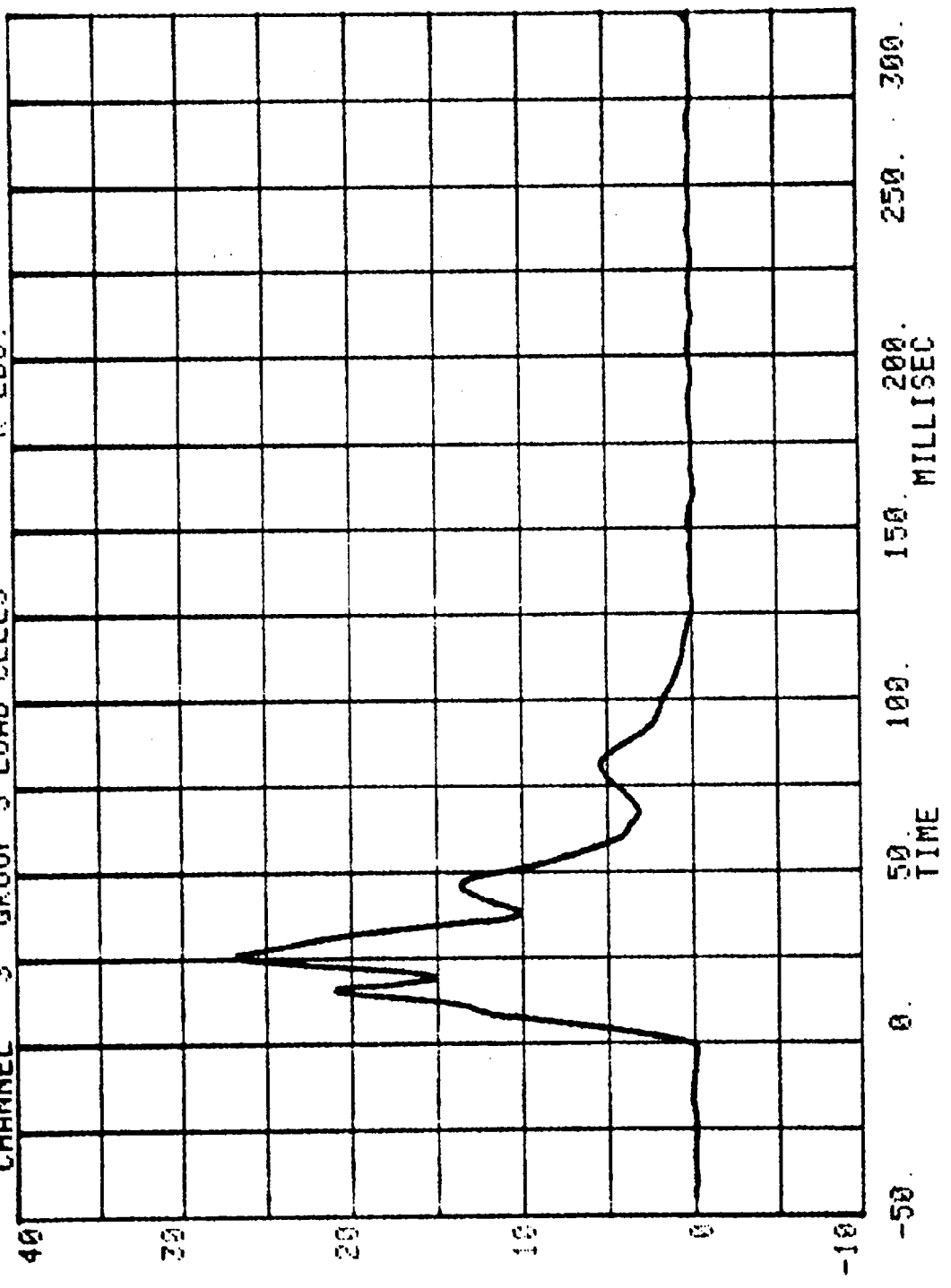
RUN= 947 SERIES= 5203

K LBS.

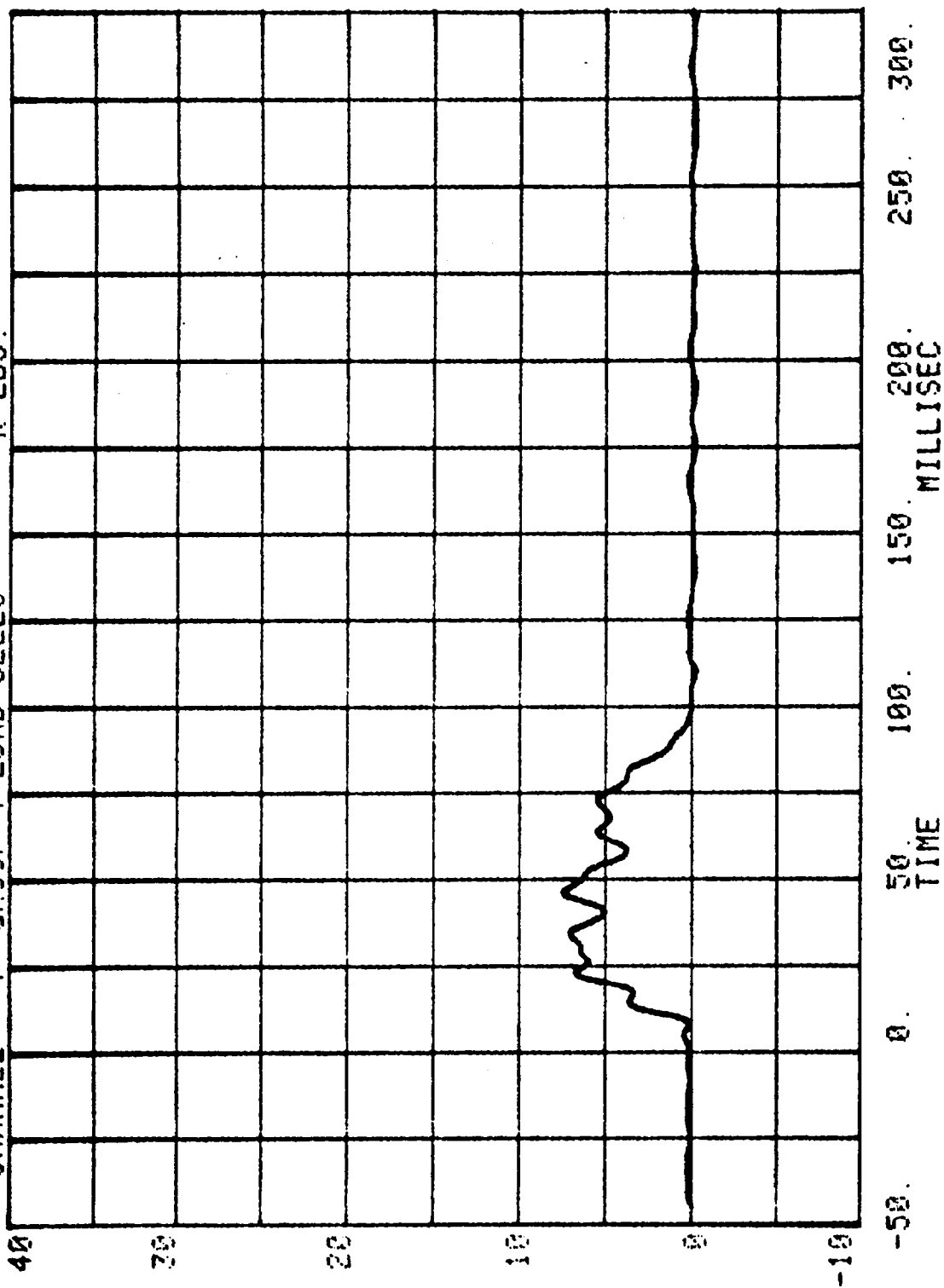


CHANNEL 3 GROUP 3 LOAD CELLS K LBS.

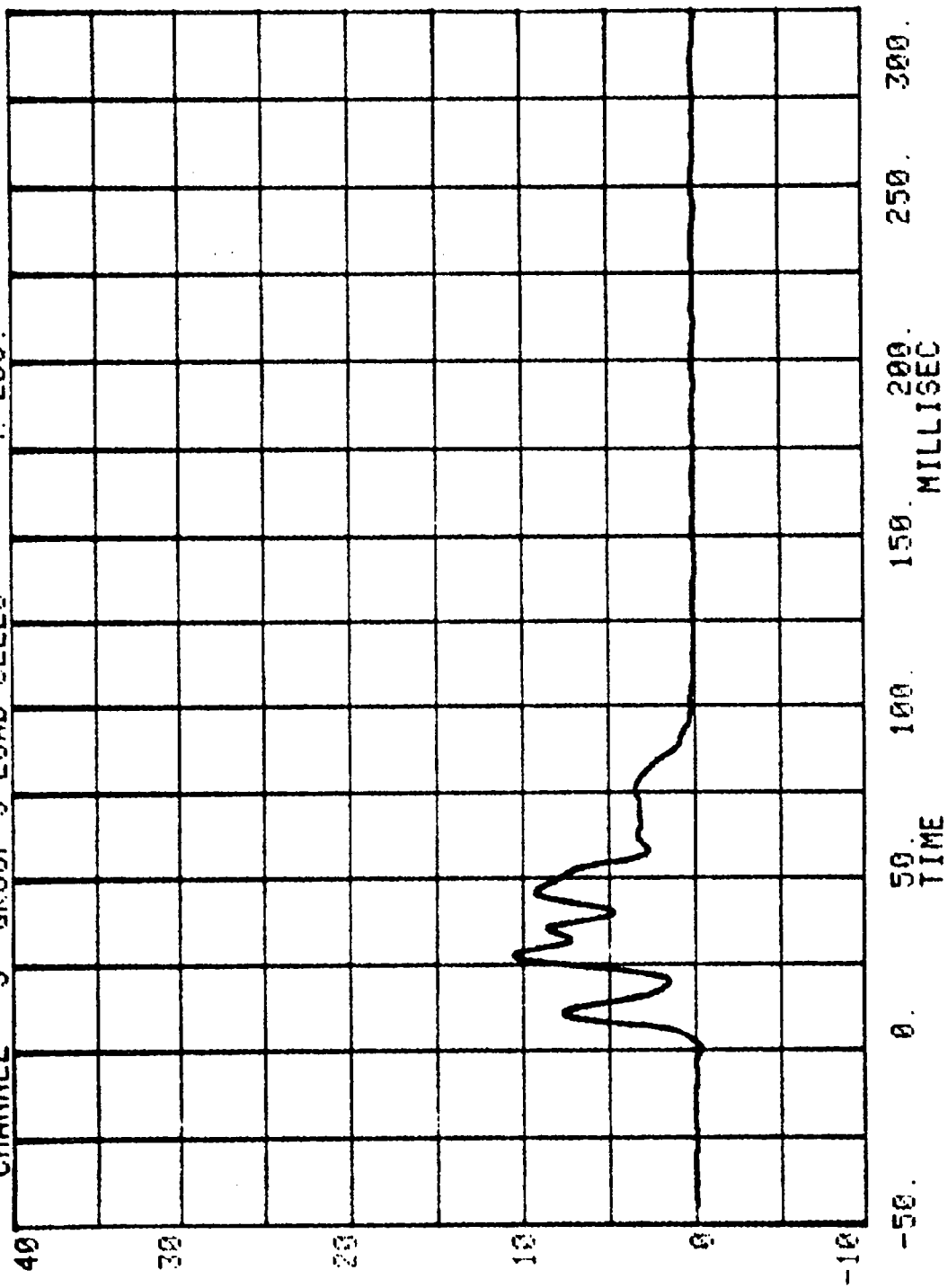
RUN= 947 SERIES= 5293



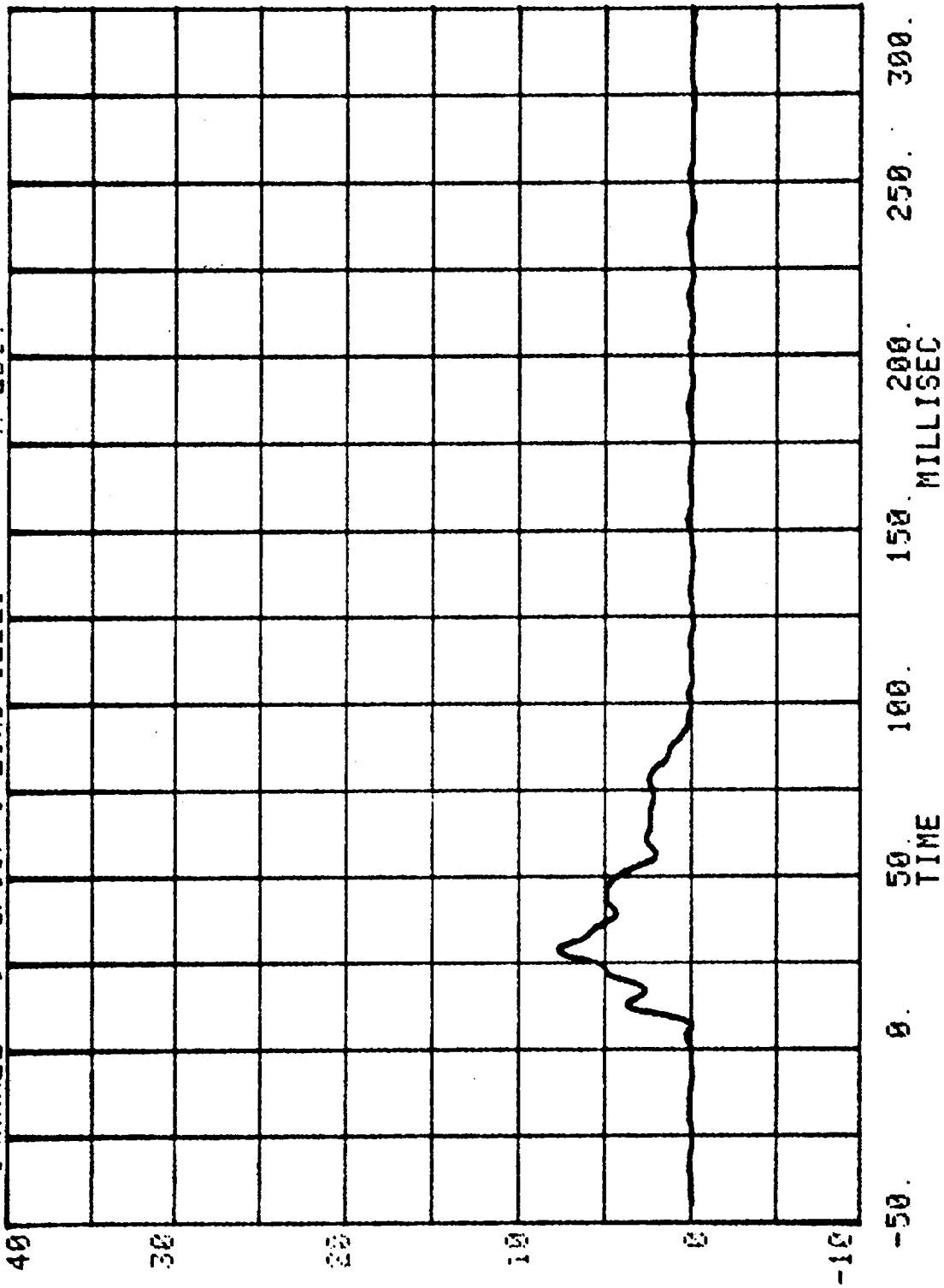
CHANNEL 4 GROUP 4 LOAD CELLS
RUN= 947 SERIES= 5293 K LBS.



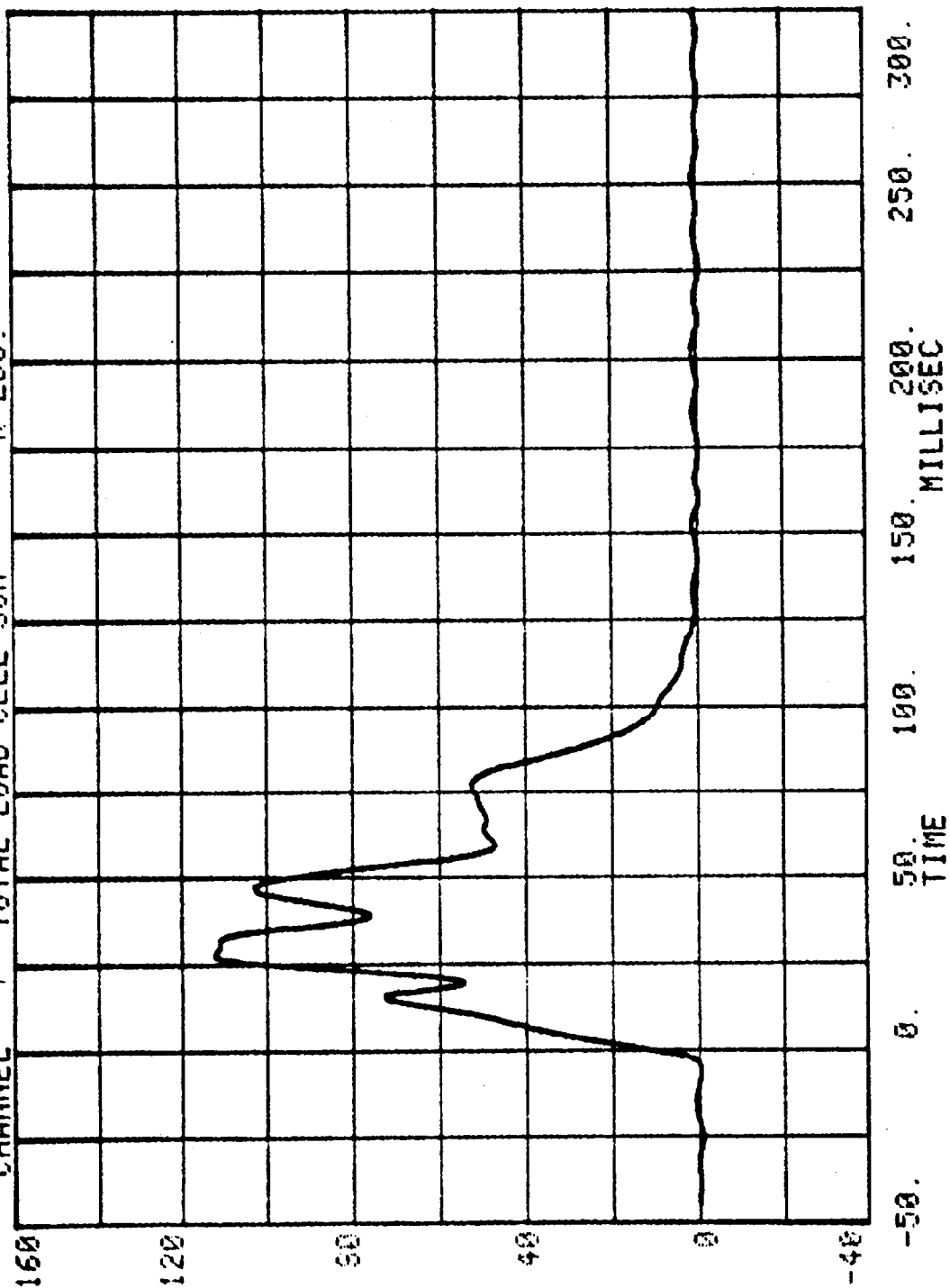
RUN= 947 SERIES= 5203 K LBS.
CHANNEL 5 GROUP 5 LOAD CELLS



RUN= 947 SERIES= 5203
CHANNEL 6 GROUP 6 LOAD CELLS K LBS.



CHANNEL 7 TOTAL LOAD CELL SUM RUN= 947 SERIES= 5203 K LBS.



TEST NO. ML5203

DUMMY DATA

CLASS	FILTER CHANNEL
Head Accelerations	1000
Chest Accelerations	180
Femur Forces	600
Belt Loads	60

HEAD INJURY CRITERION
HEAD SEVERITY INDEX
75MS. MAXIMUM DURATION

NEW CAR ASSESSMENT PROGRAM - 1990

PUN= 947

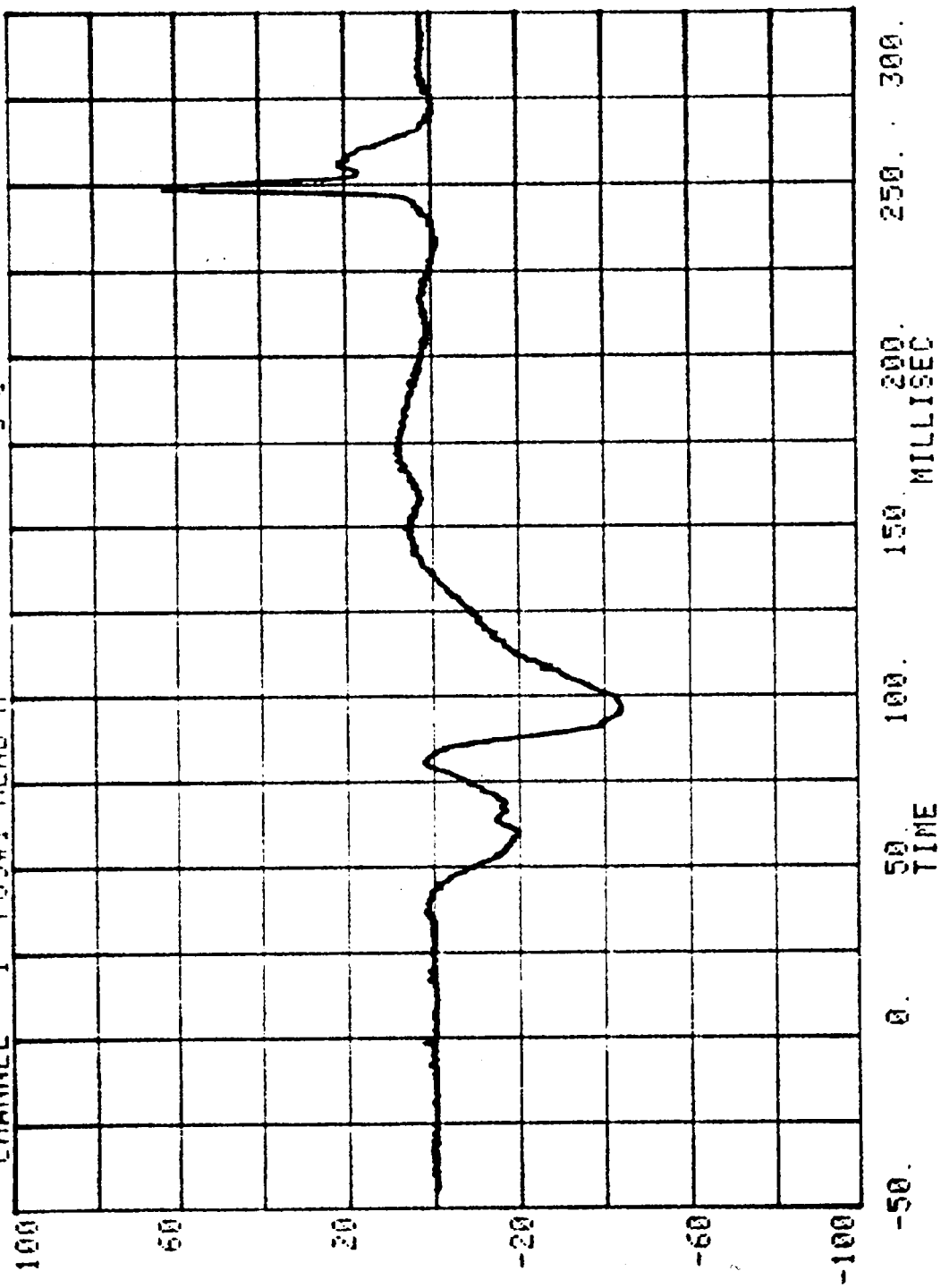
POS#1 HEAD R

HIC=1105.2 FROM T1= .06390 TO T2= .09990
AVERAGE ACCELERATION BETWEEN T1 AND T2= 62.4G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX=1490.7

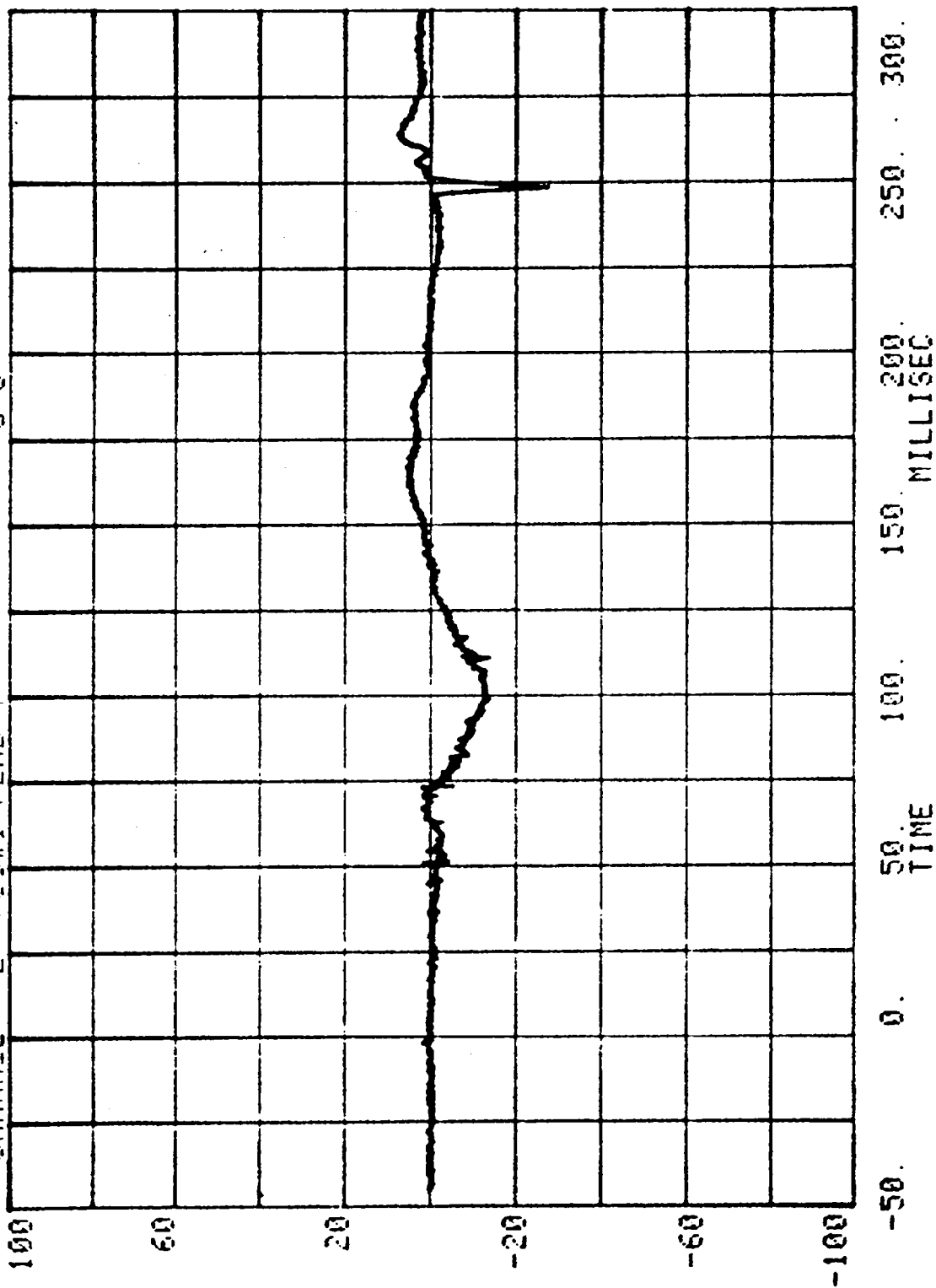
NEW CAR ASSESSMENT PROGRAM - 1990

CHANNEL	RUN #	TITLE	SERIES #	3 MS. CLIPPED PEAK
2	POS#1	CHEST R	5203	59.042 G'S
4	POS#2	CHEST R		46.746 G'S

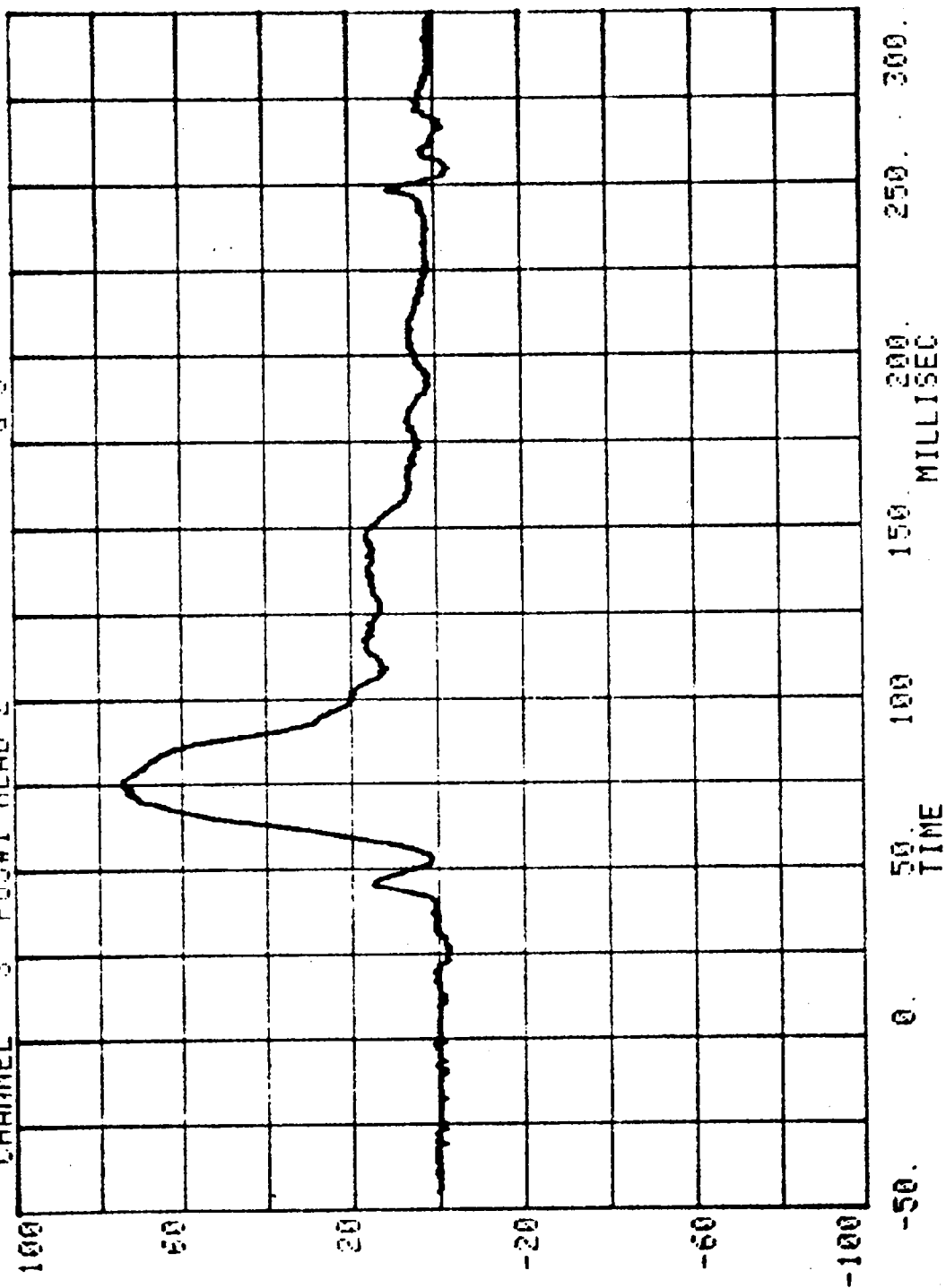
CHANNEL 1 POS#1 HEAD X RUN# 947 SERIES= 5203 G'S



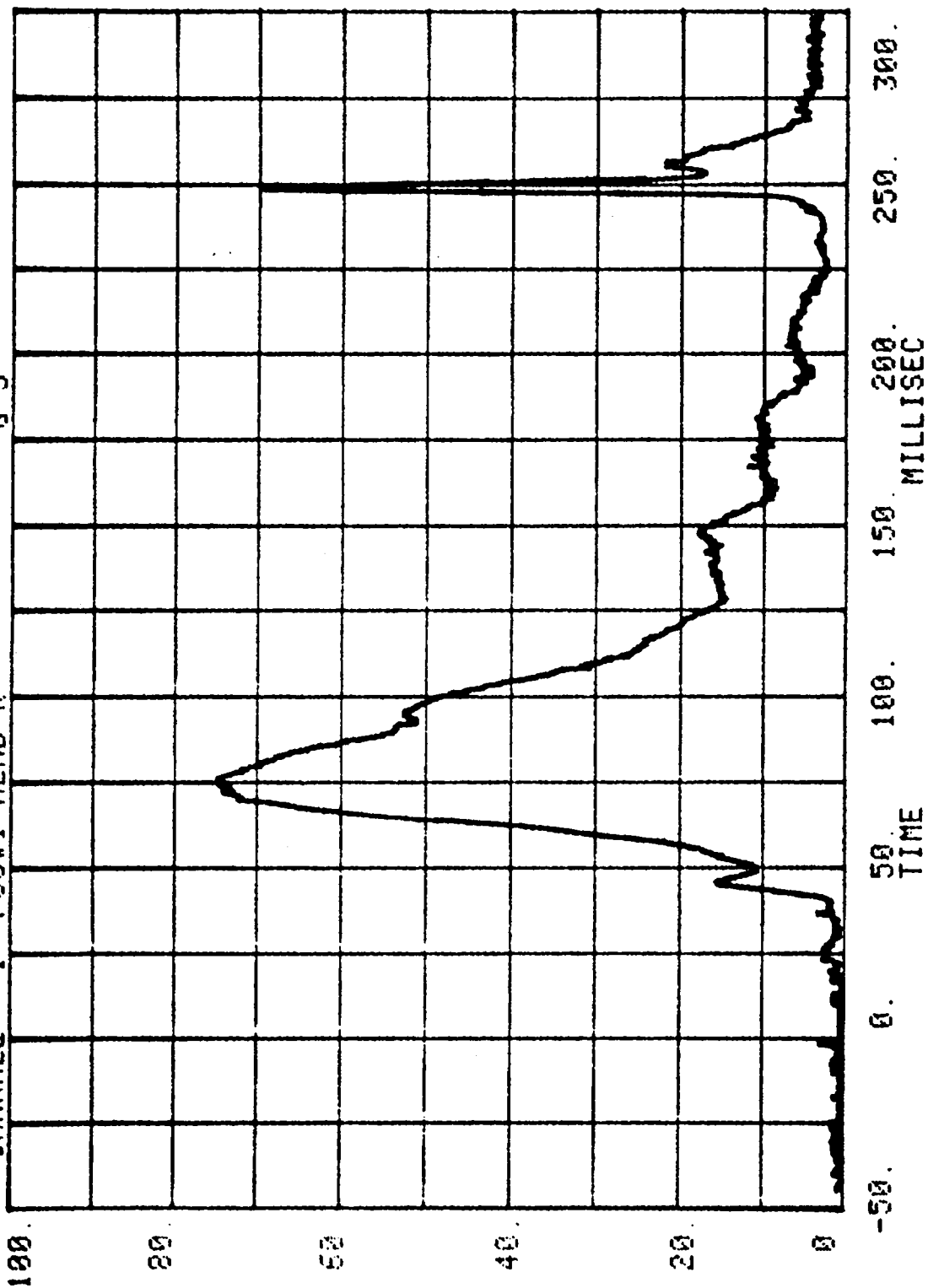
CHANNEL 2 FDS#1 HEAD Y
RUN= 947 SERIES= 5203 G'S



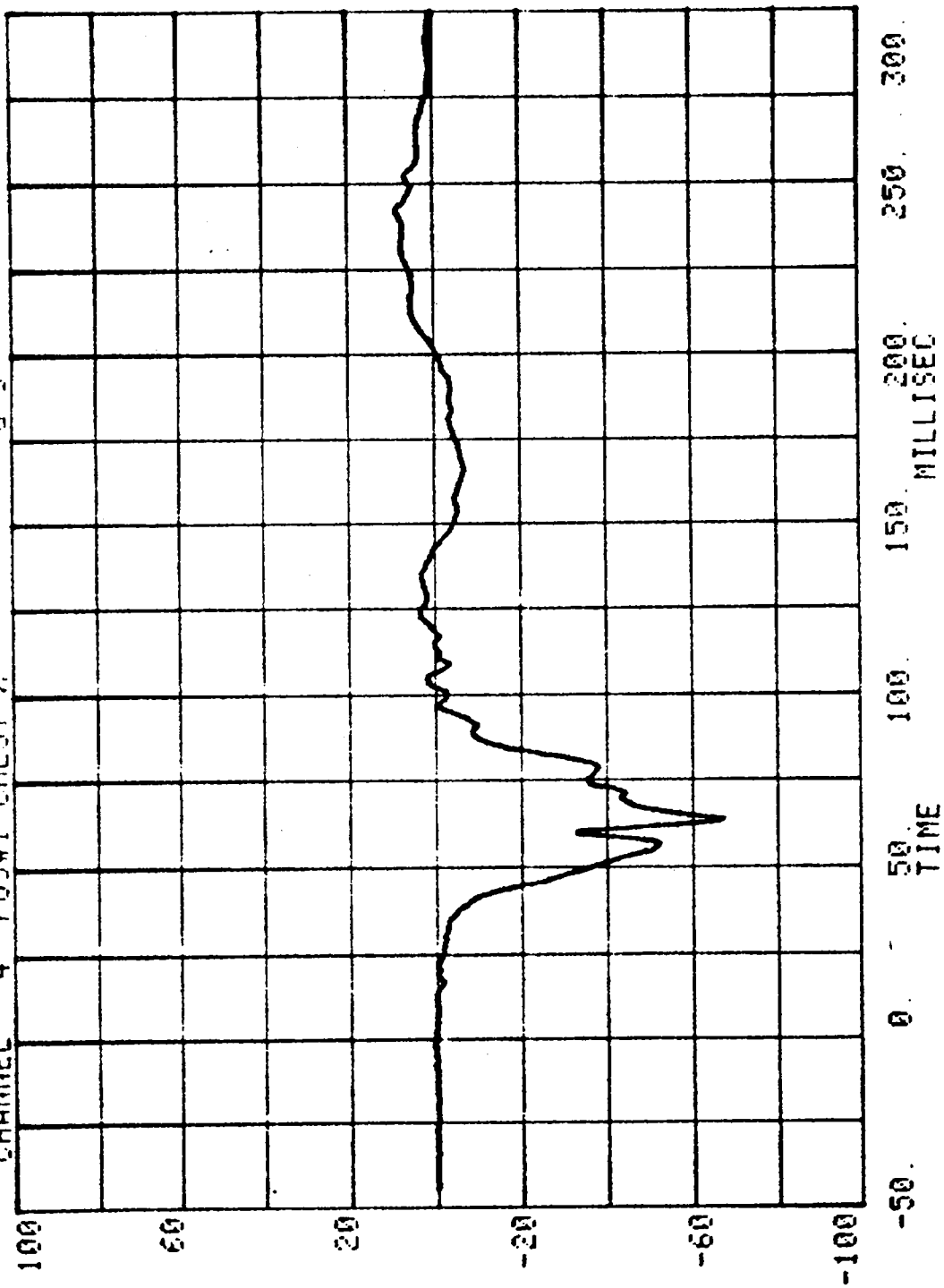
CHANNEL 3 POS#1 HEAD 2 RUN= 947 SERIES= 5203 G'S



CHANNEL 1 POS#1 HEAD R RUN= 947 SERIES= 5203 G'S

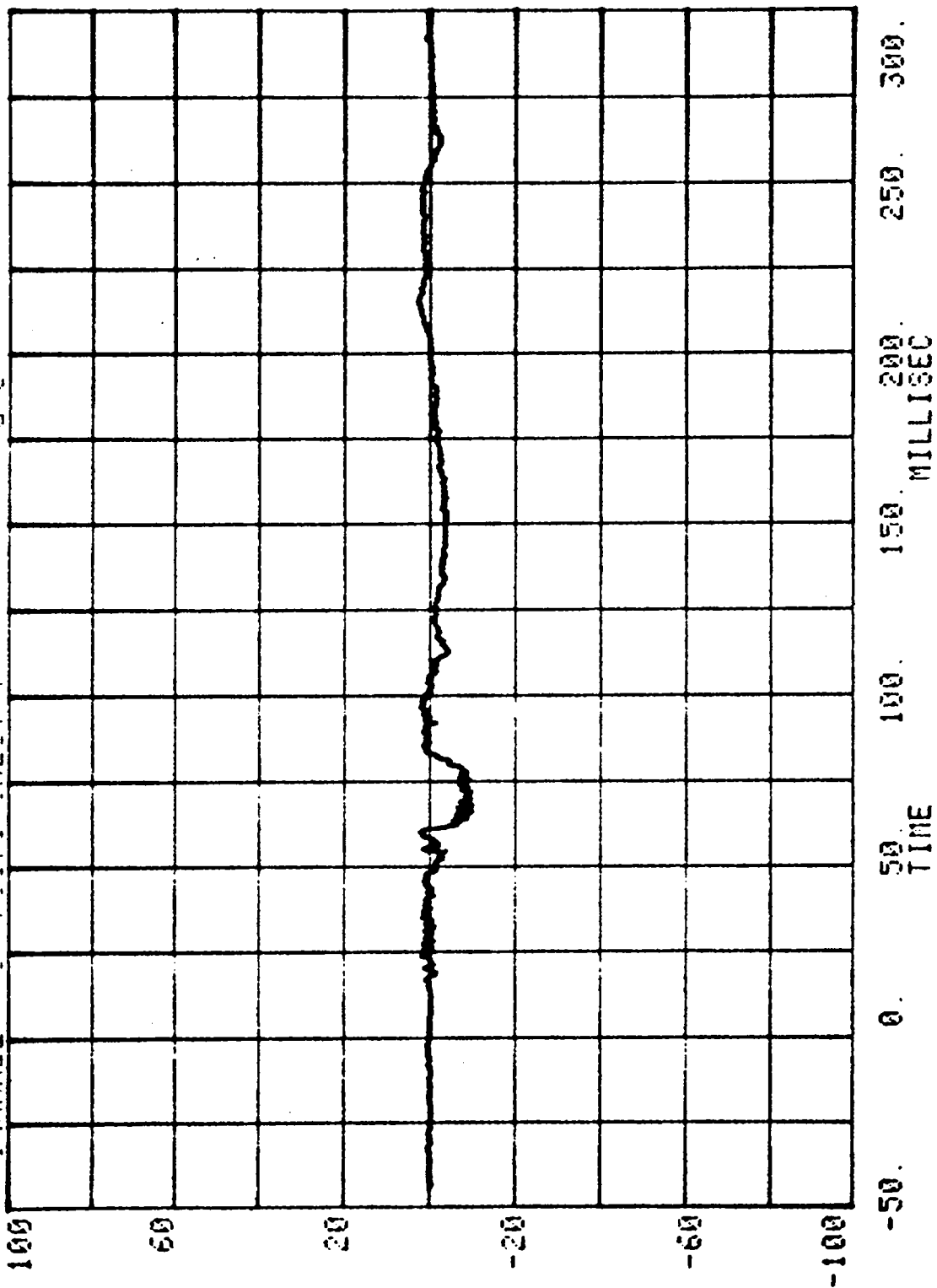


CHANNEL 4 POS#1 CHEST X
PUH= 247 SERIES= 5203
G'S

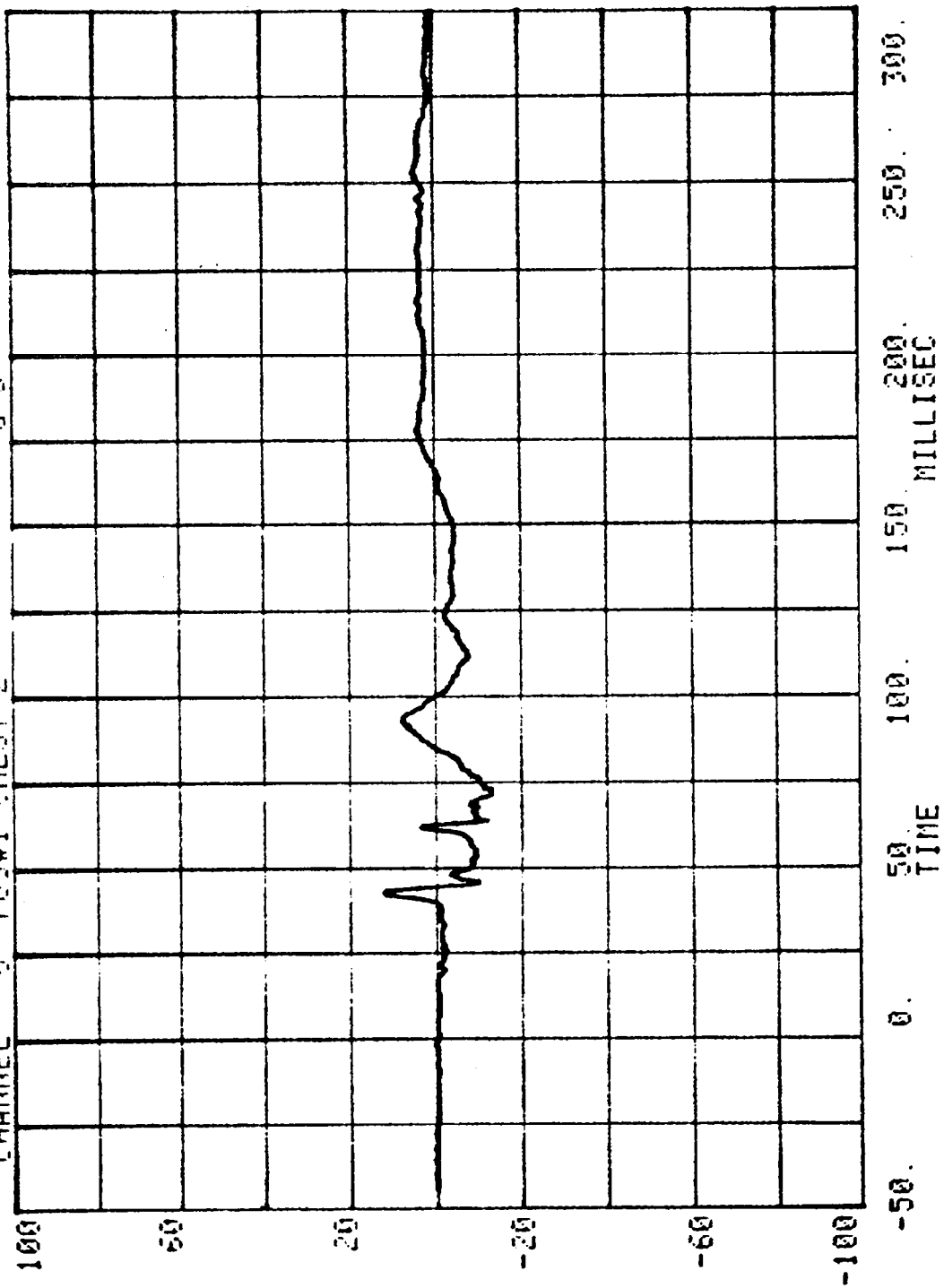


CHANNEL 5 POS#1 CHEST " G'S

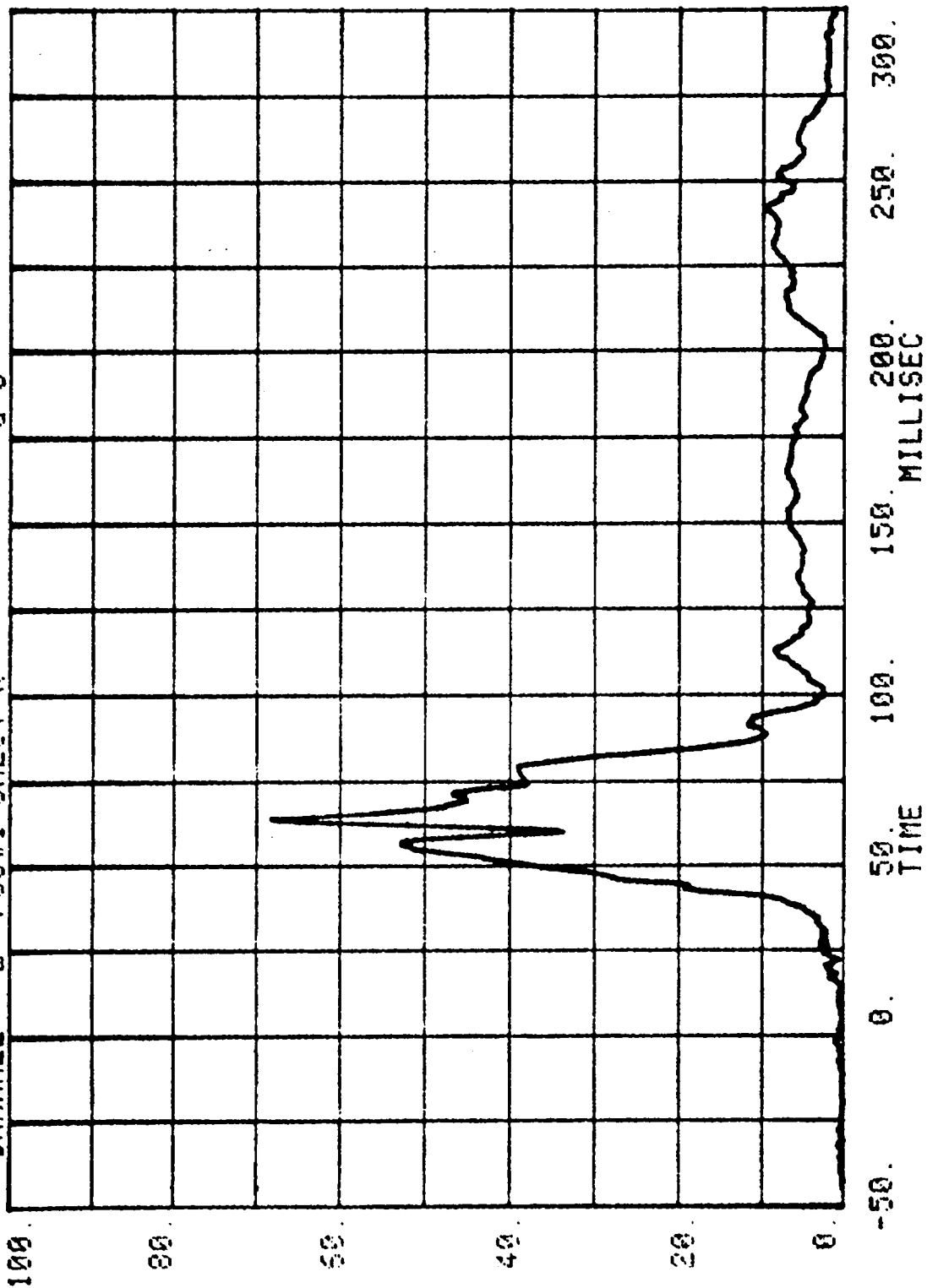
RUN= 947 SERIES= 5203



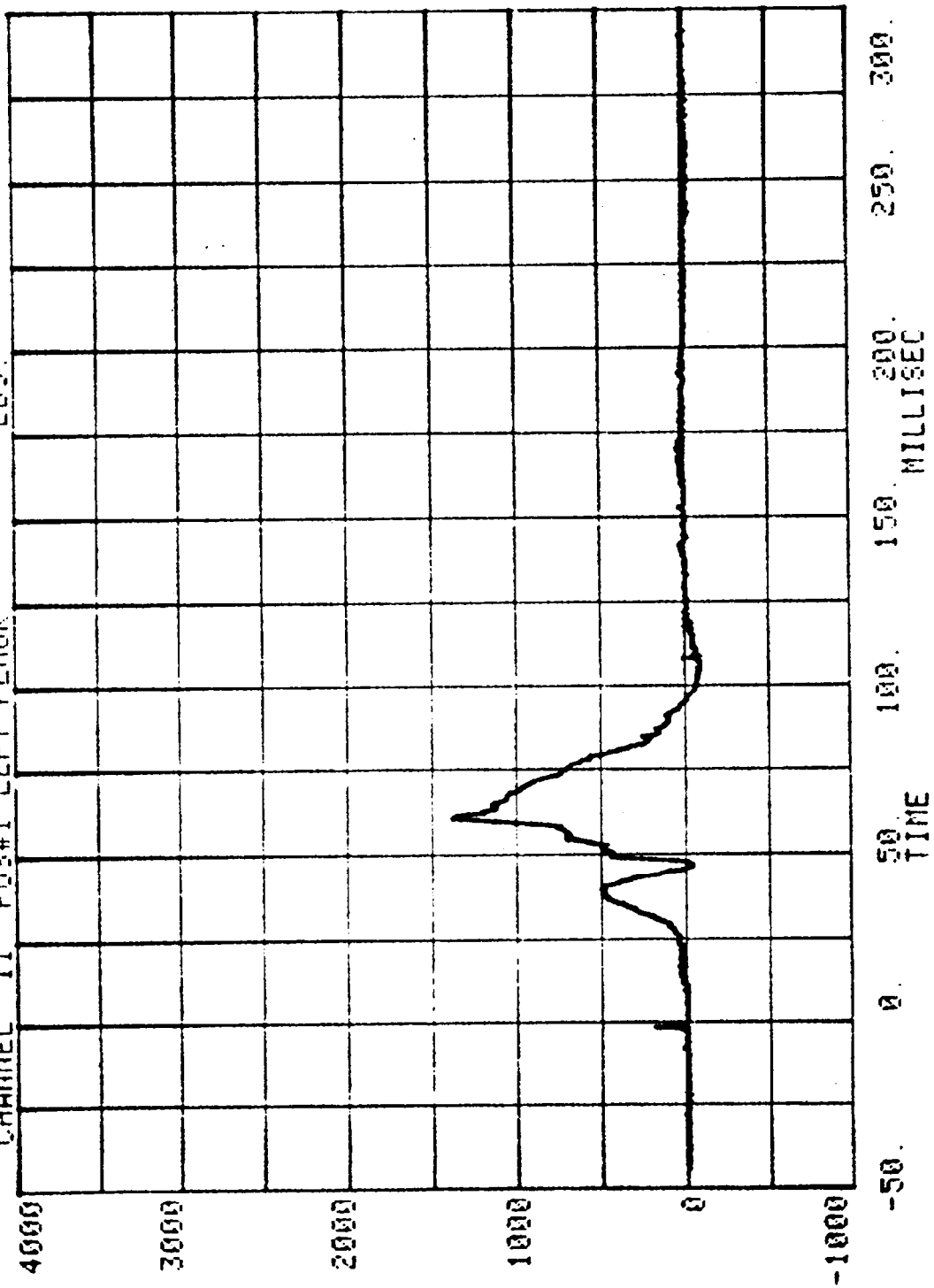
CHANNEL 5 POS#1 CHEST Z RUH= 947 SERIES= 5203 G'S



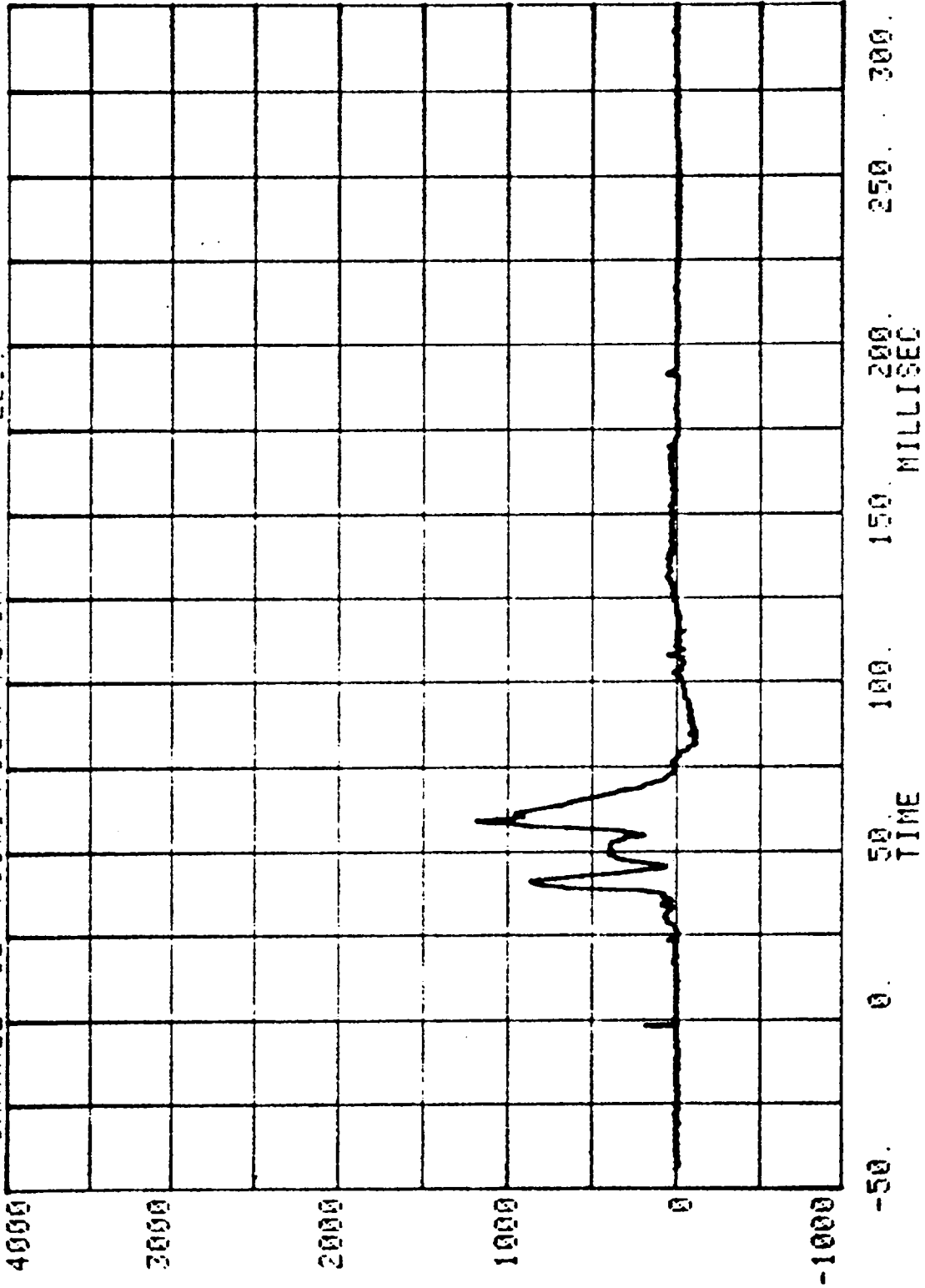
CHANNEL 2 POS#1 CHEST R RUH= 947 SERIES= 5203 G'S



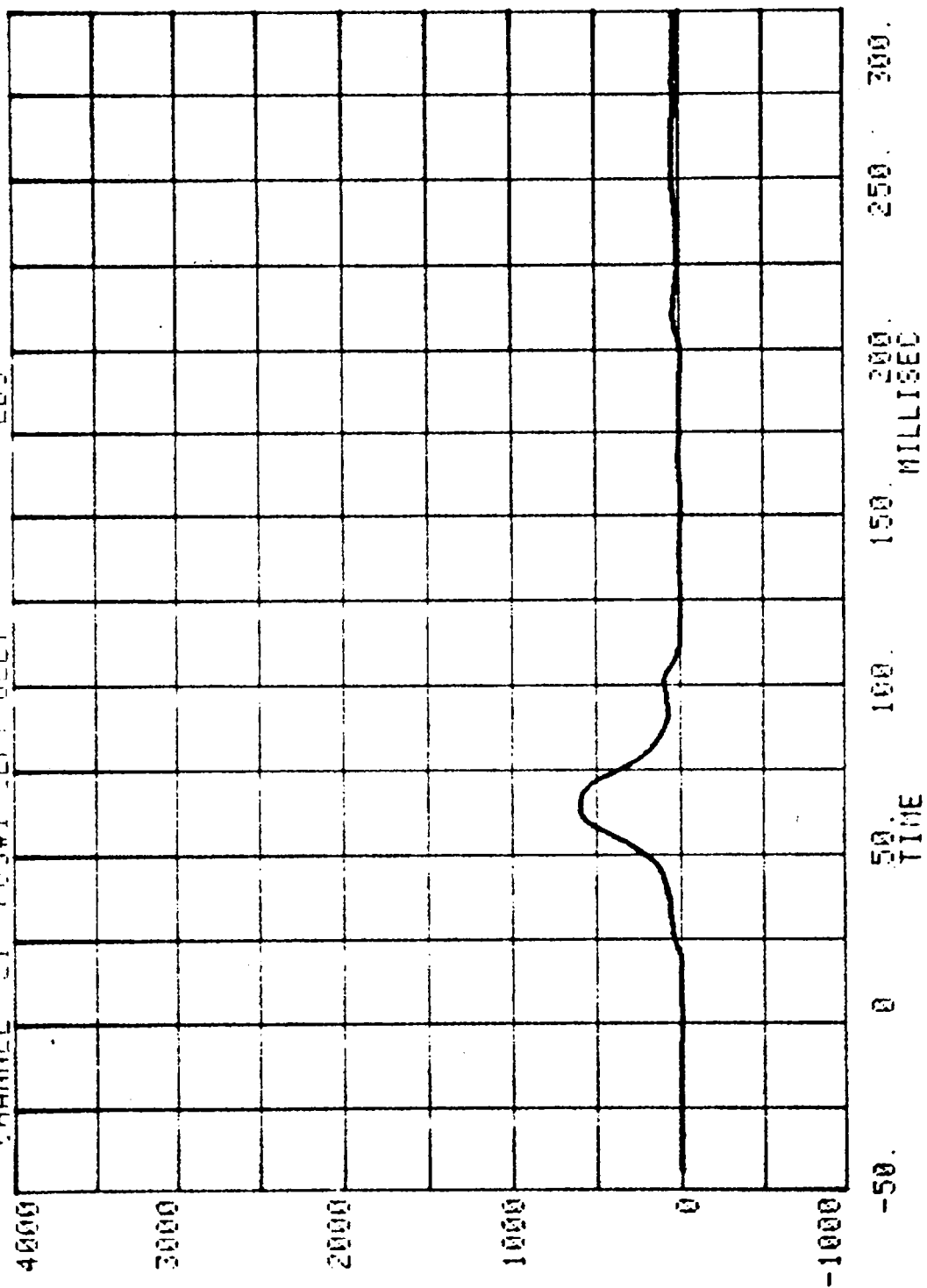
CHANNEL 11 PUN= 947 SERIES= 5203 LBS.
POS#1 LEFT FEMUR



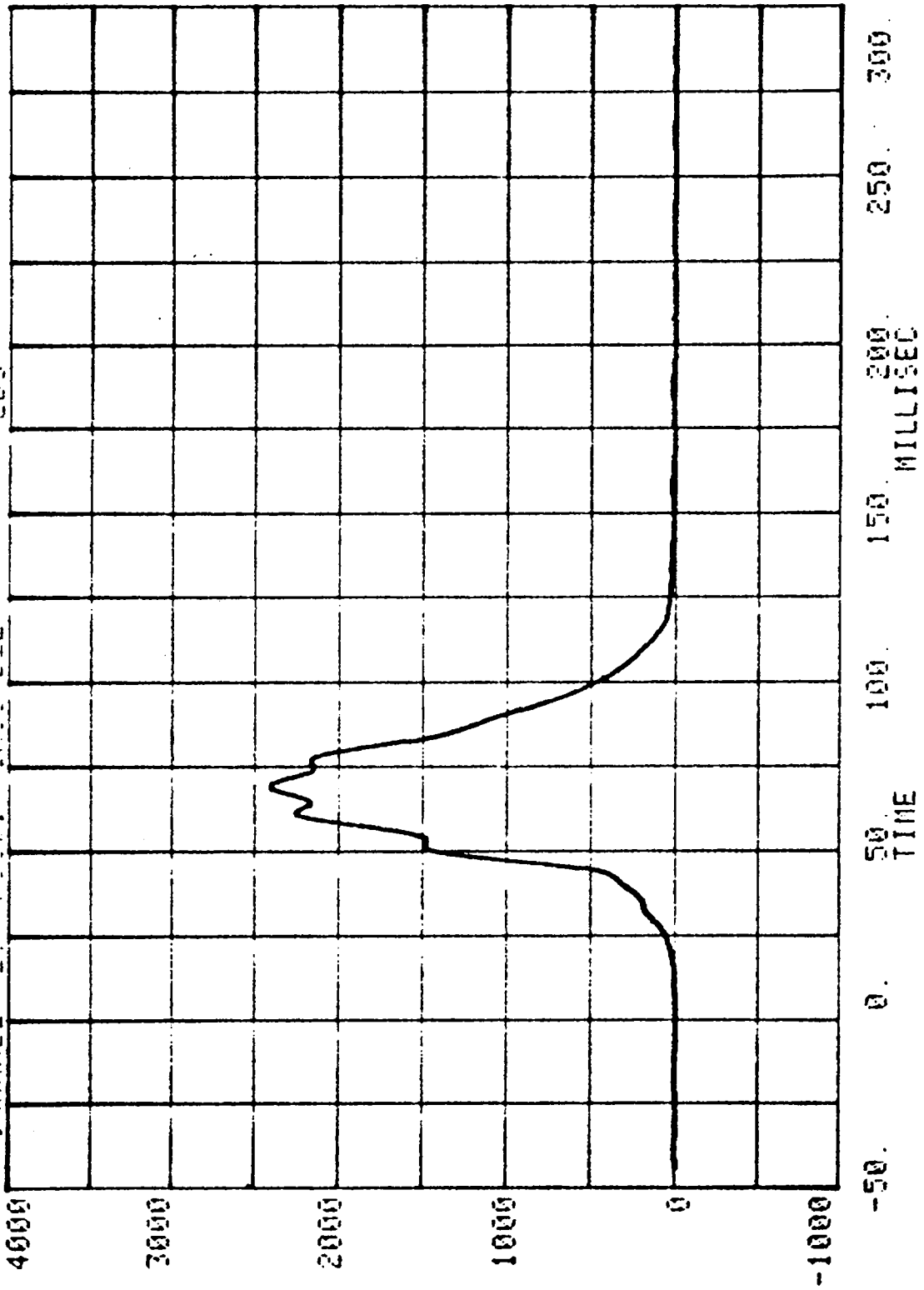
CHANNEL 12 RUN= 947 SERIES= 5203
POS#1 FIGHT FEMUR LBS.

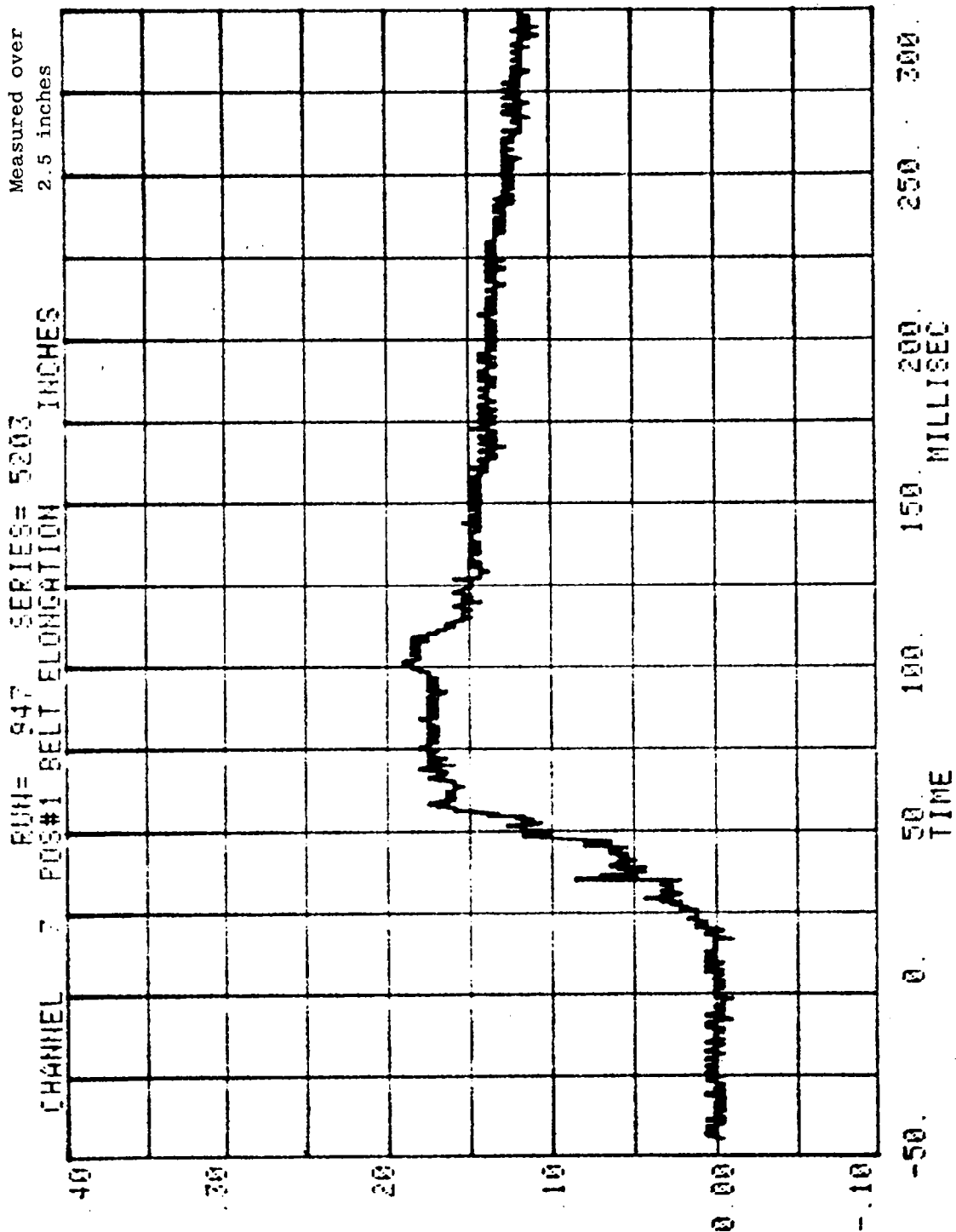


SUN= 947 SERIES= 5203 LBS
CHANNEL 21 POS#1 LEFT BELT



CHANNEL 27 POS#1 TORSO BELT
PUH= 947 SERIES= 5203 LBS





HEAD INJURY CRITERION
HEAD SEVERITY INDEX
36MS. MAXIMUM DURATION

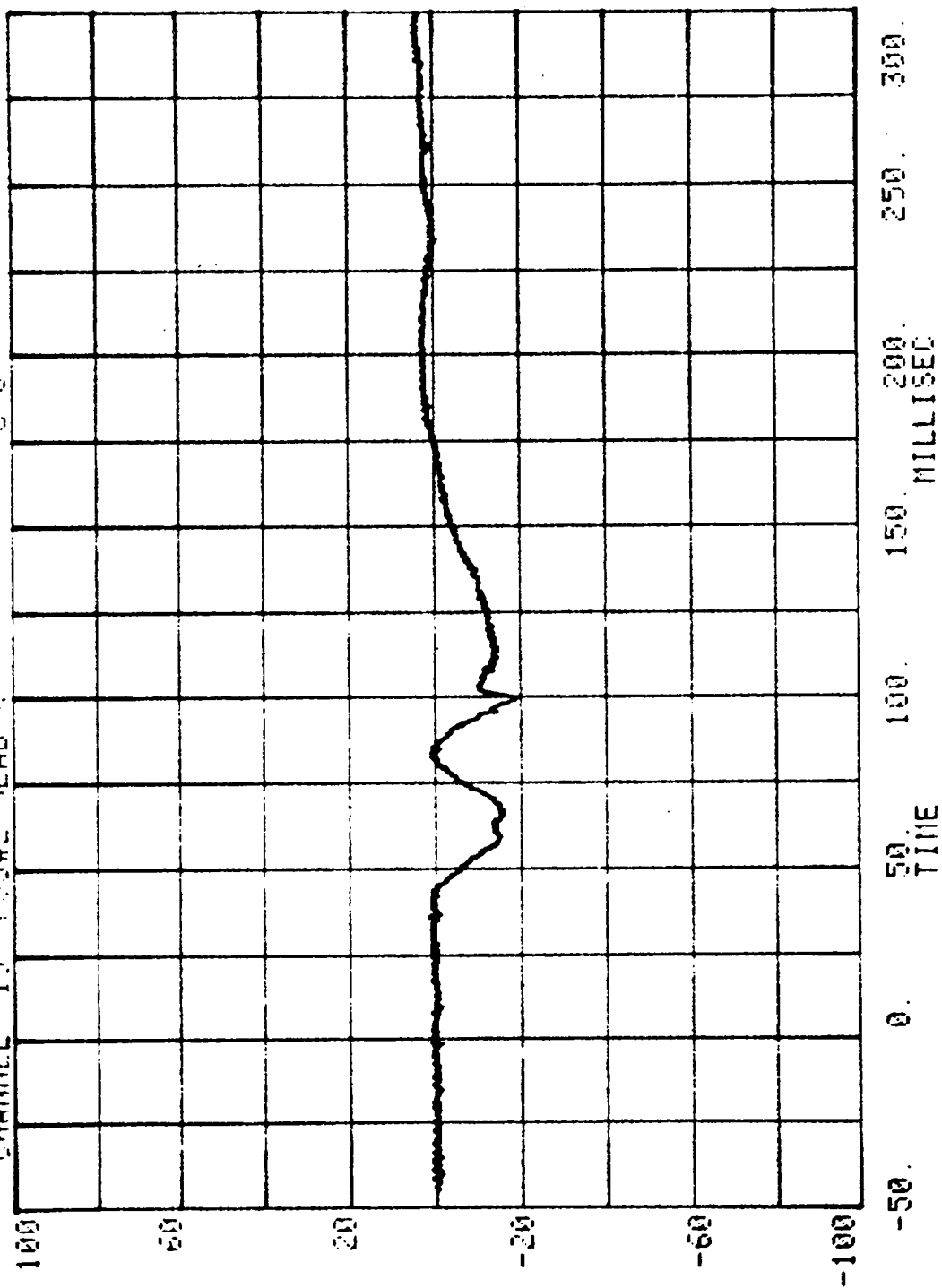
NEW CAR ASSESSMENT PROGRAM - 1990

PUN= 947

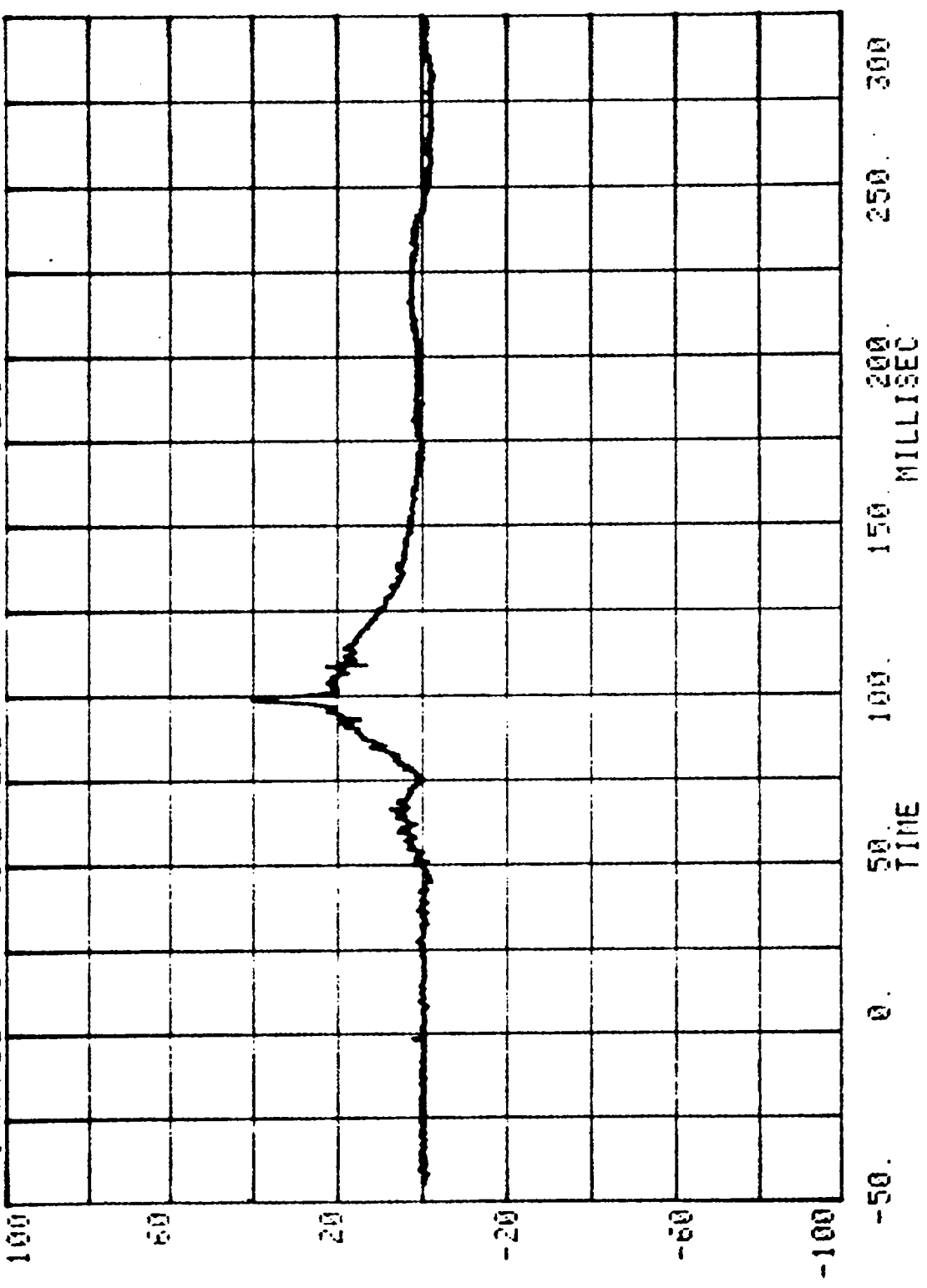
POS#2 HEAD R

HIC= 629.2 FROM T1= .06442 TO T2= .10042
AVERAGE ACCELERATION BETWEEN T1 AND T2= 49.85'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX= 309.4

CHANNEL 13 POS#2 HEAD X RUN# 947 SERIES# 5203 5'S

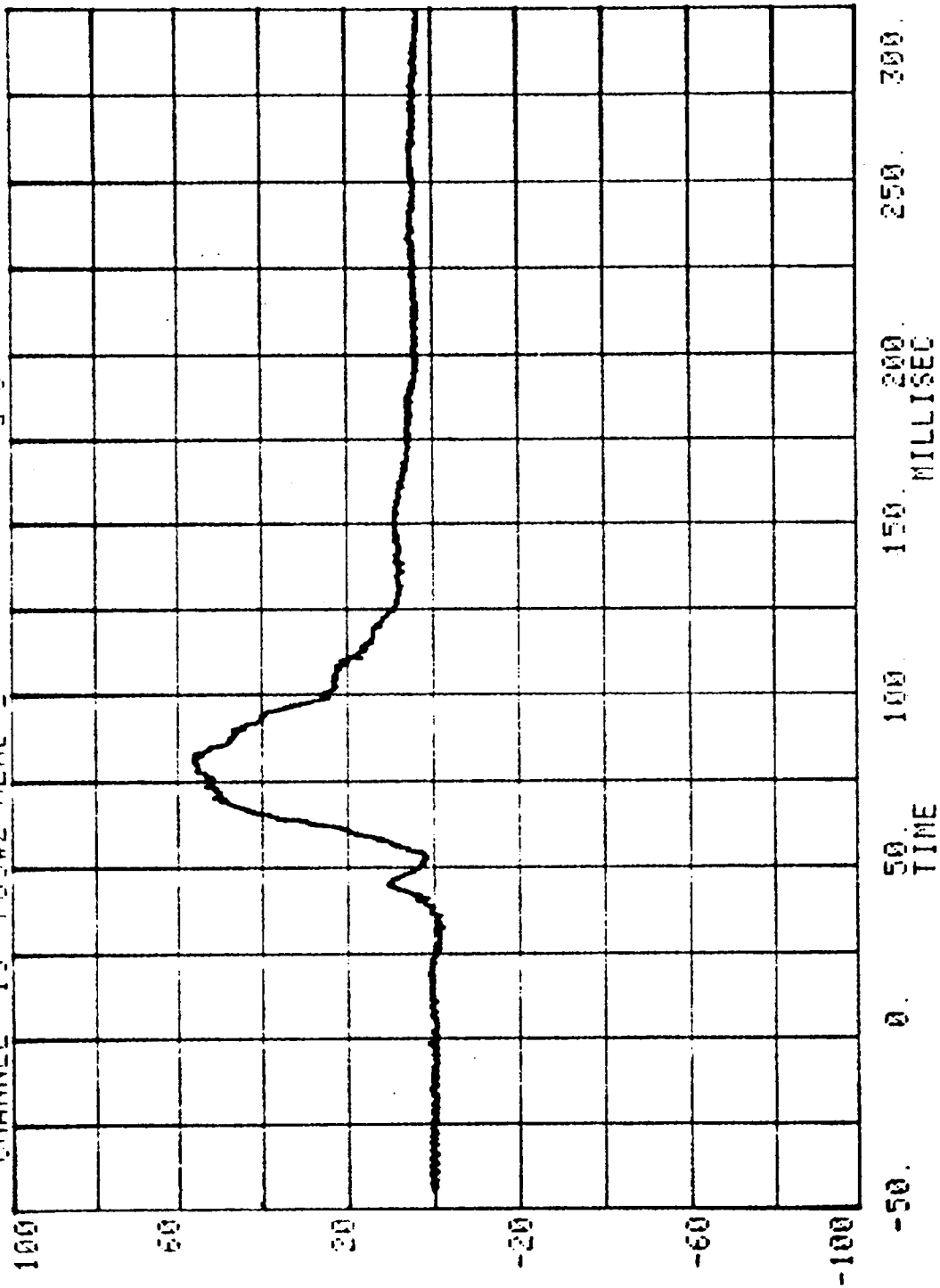


CHANNEL 14 RUN= 947 SERIES= 5203
POS#2 HEAD Y G'S

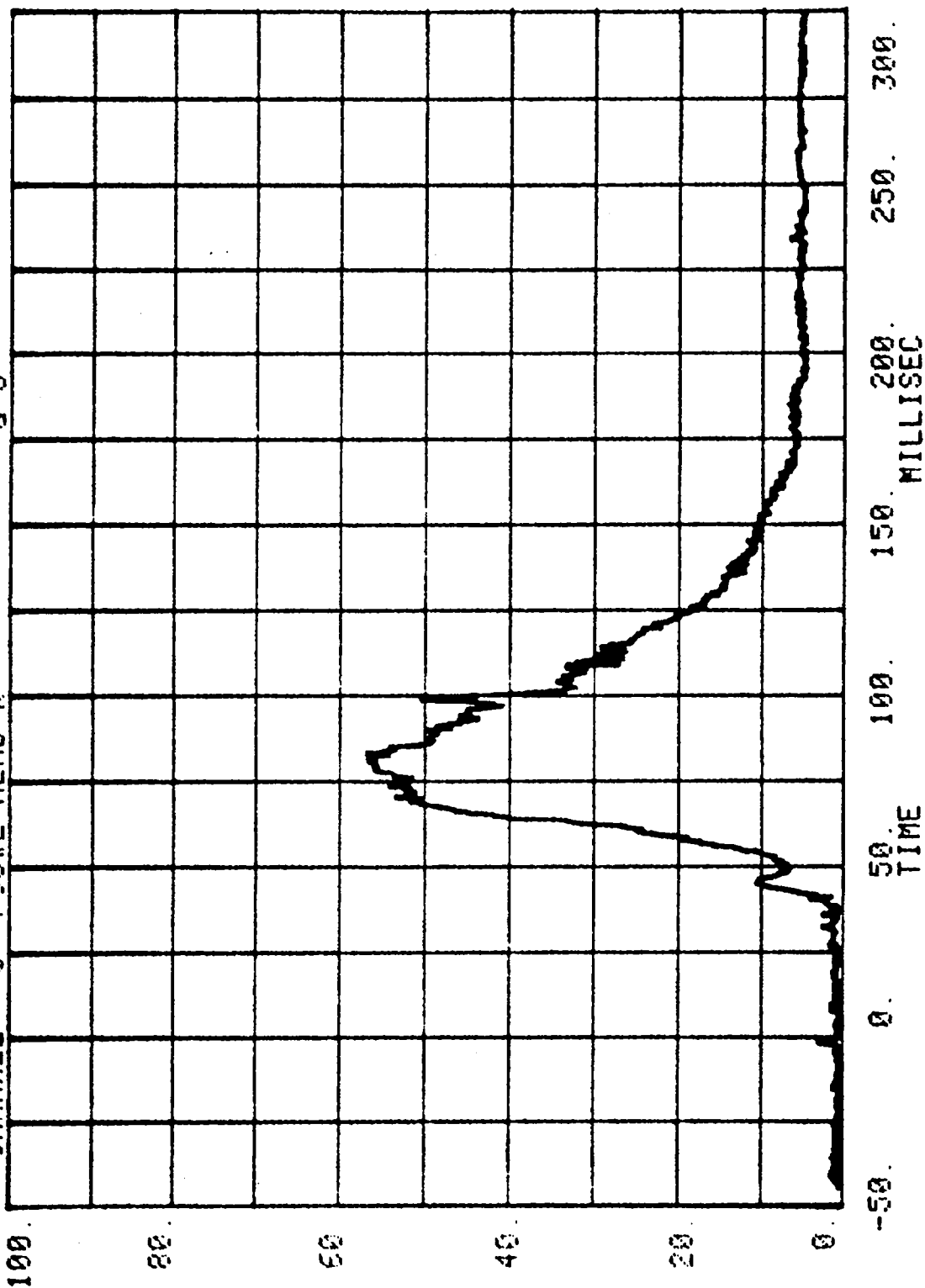


CHANNEL 15 RUN= 247 SERIES= 5203 G'S

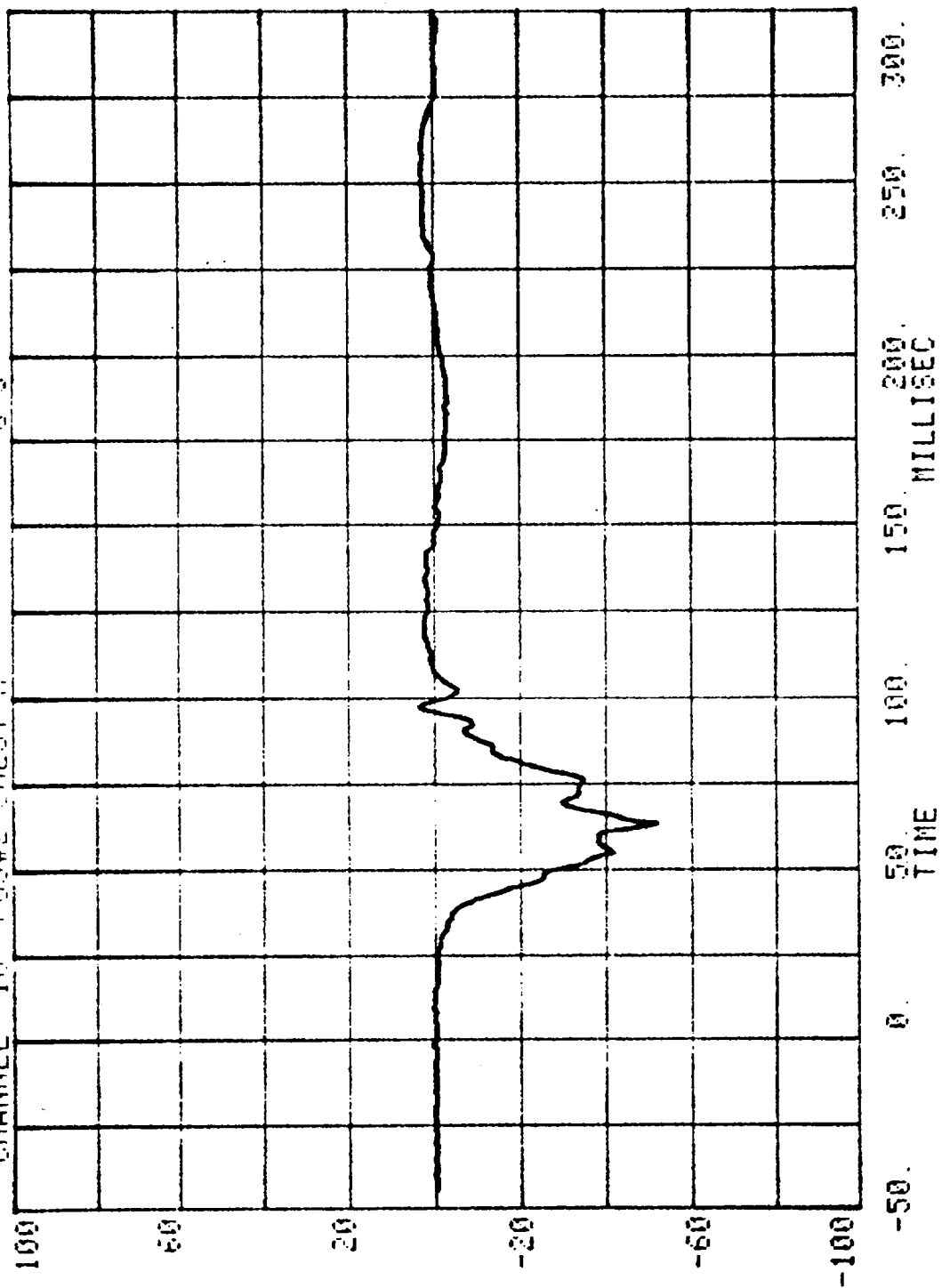
POS#2 HEAD 2



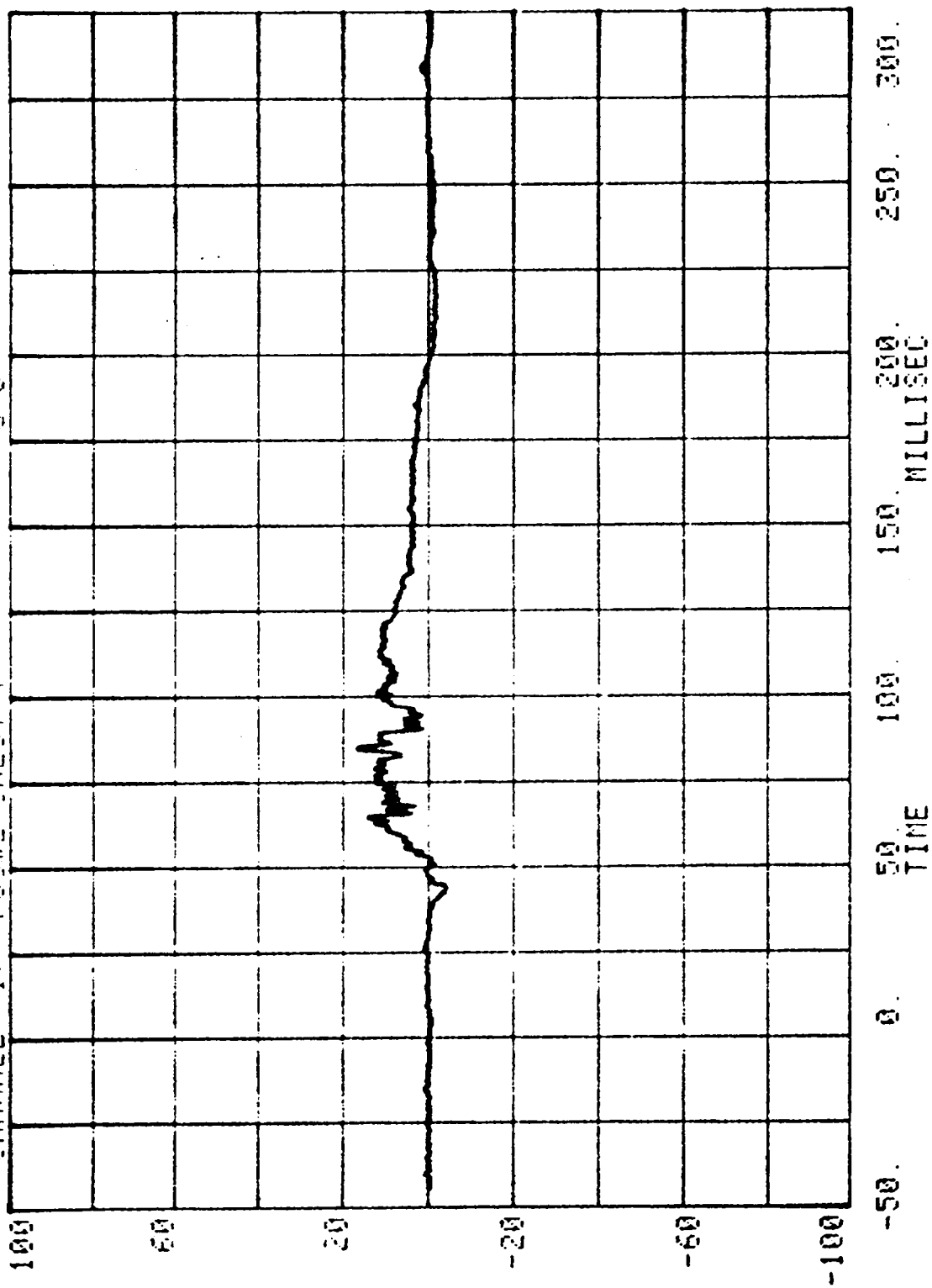
CHANNEL 3 POS#2 HEAD R RUN= 947 SERIES= 5203 G'S



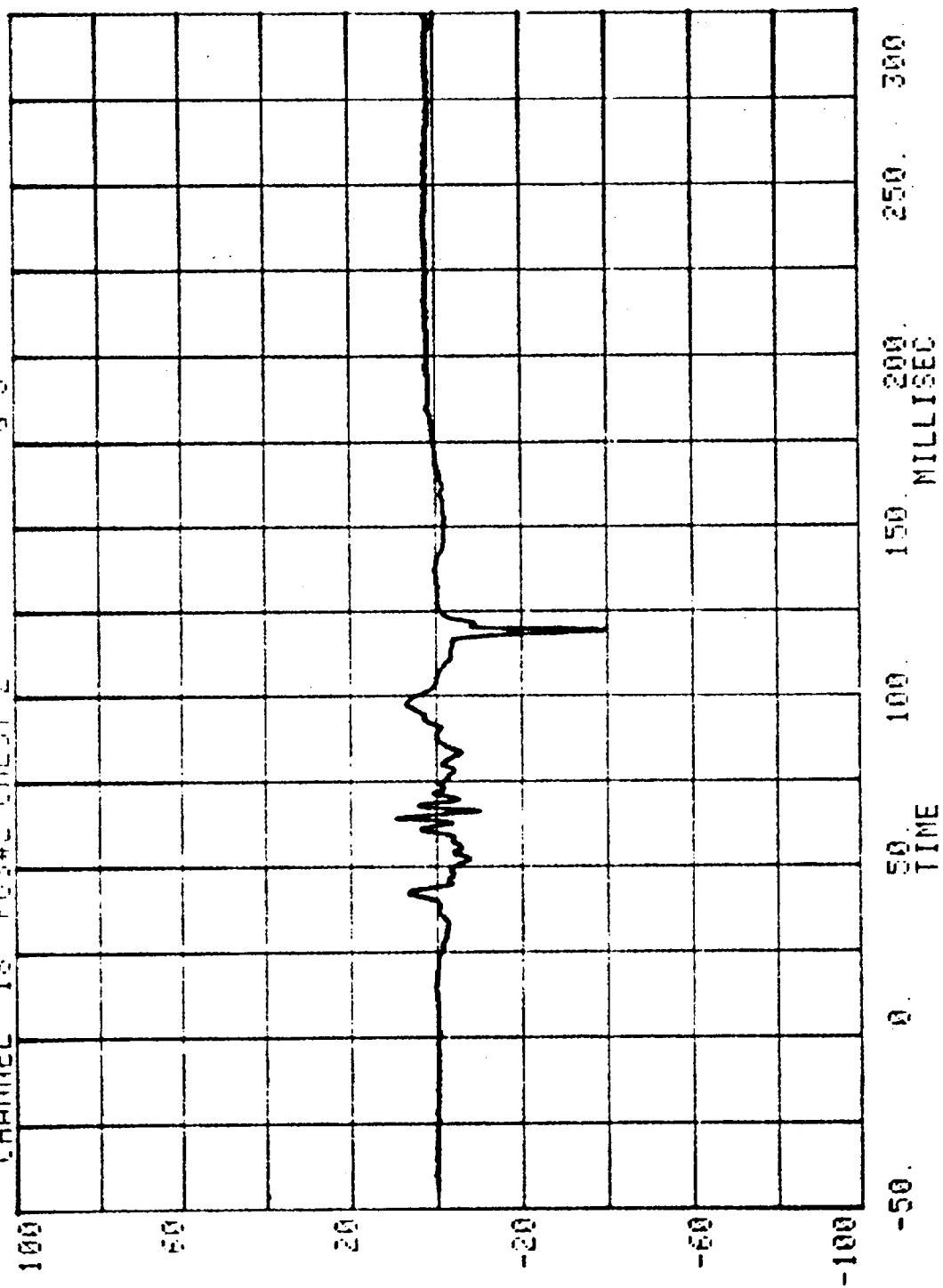
CHANNEL 16 RUN= 347 SERIES= 5203
POS#2 CHEST N G'S



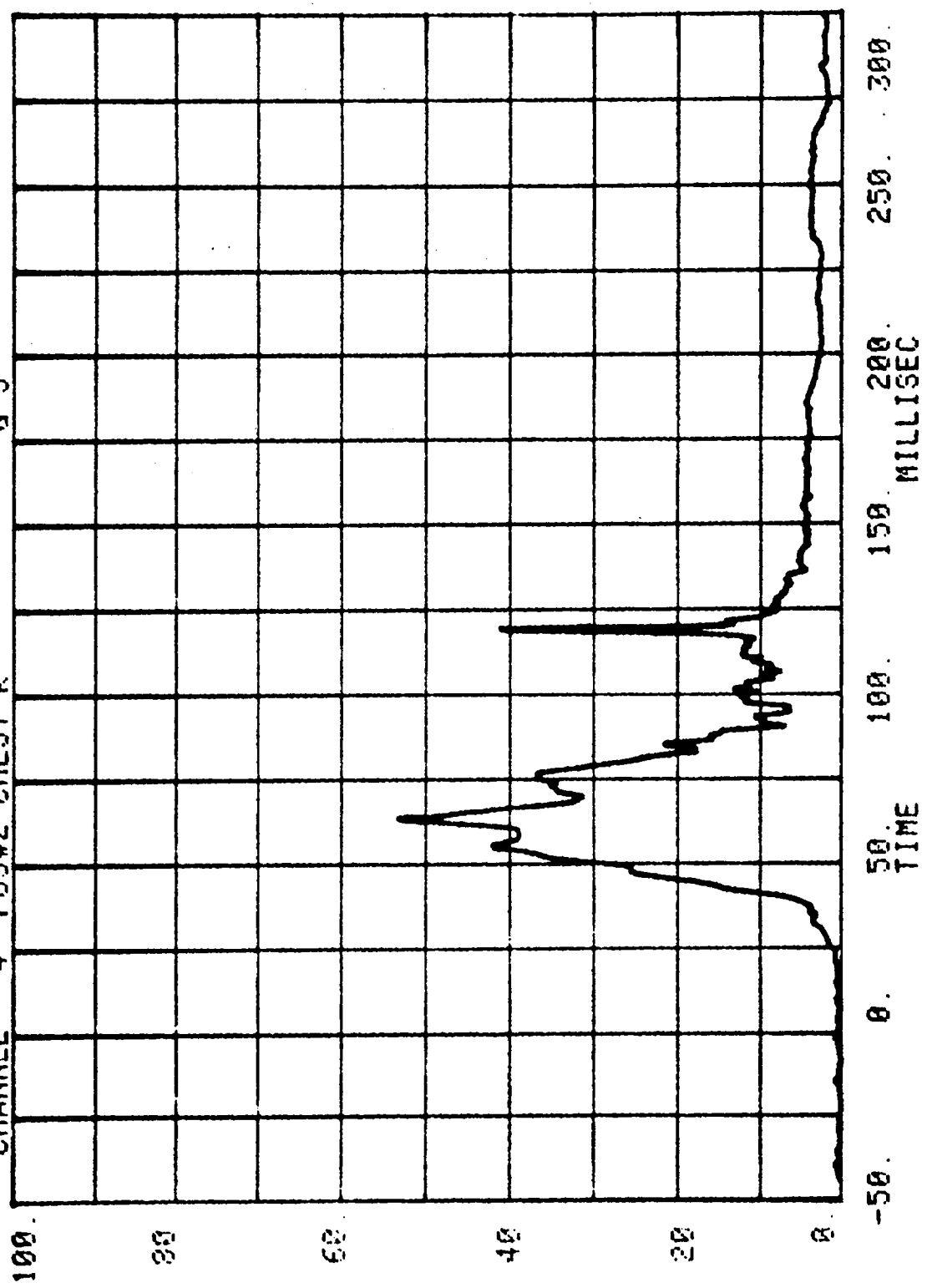
CHANNEL 17 POS#2 CHEST T FUR# 247 SERIES= 5203 C'S



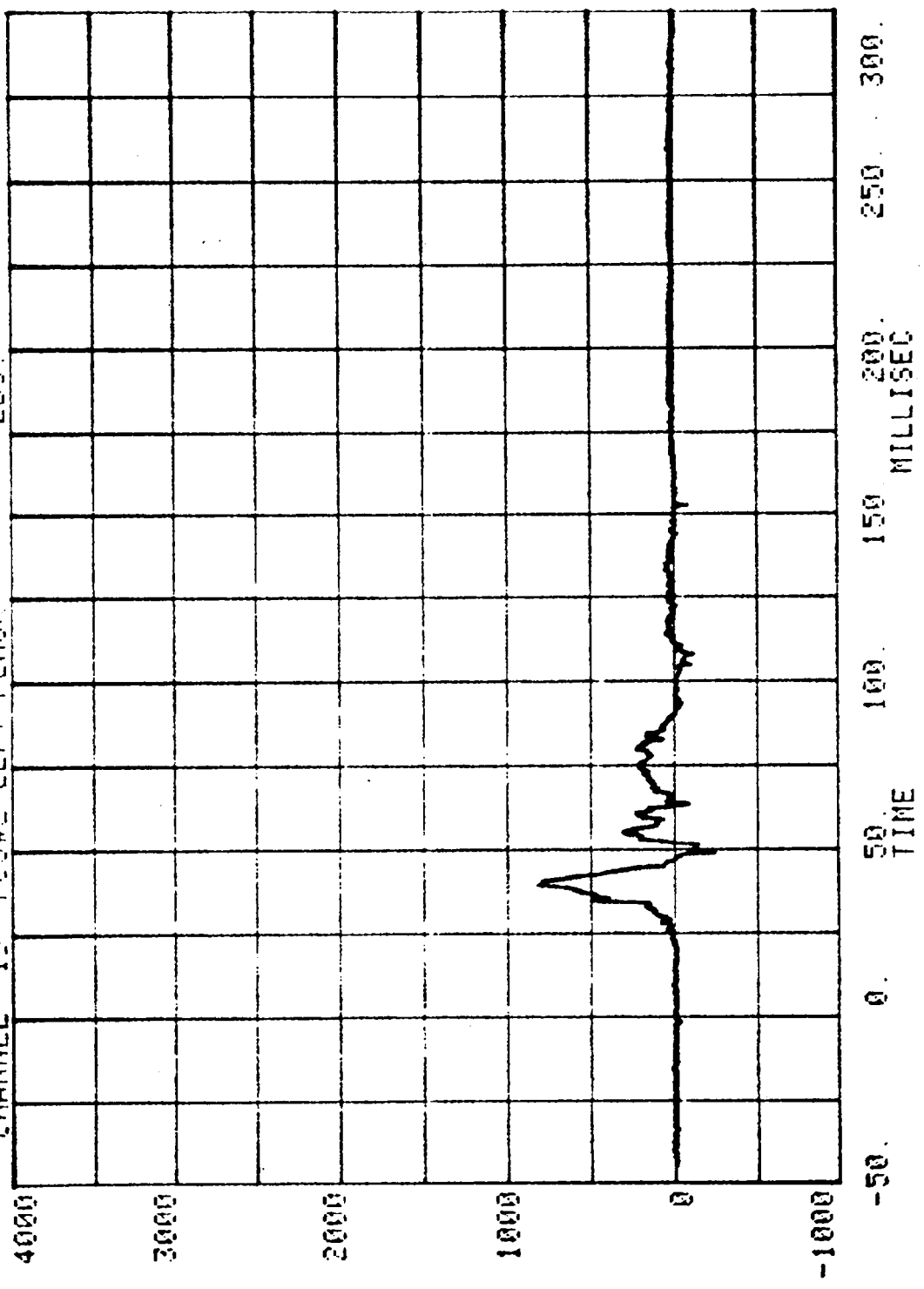
CHANNEL 18 POS#2 CHEST 2 RUN= 947 SERIES= 5203 5'S



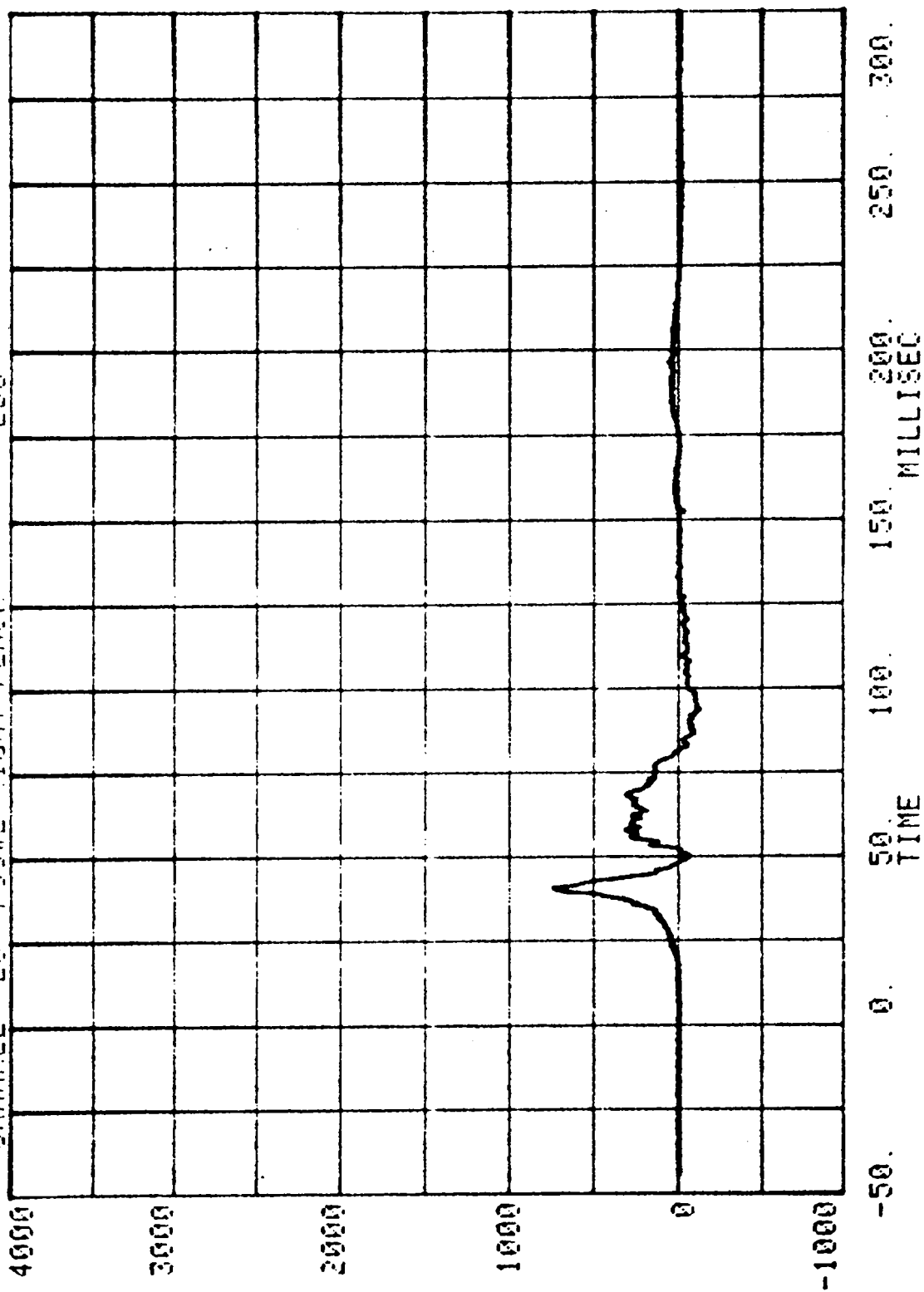
CHANNEL 4 POS#2 CHEST R RUN= 947 SERIES= 5203 G'S



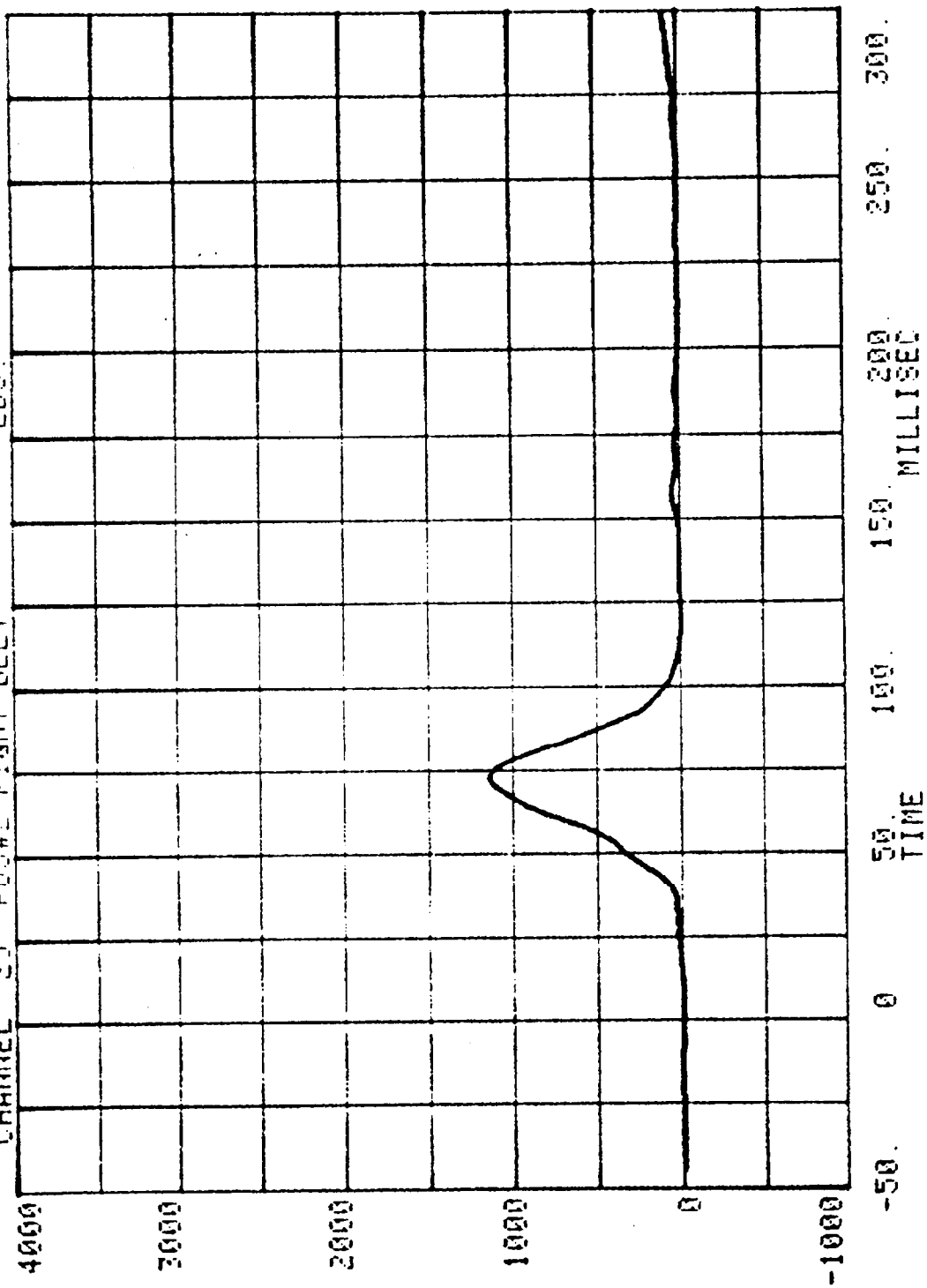
CHANNEL 12 POS#2 LEFT FEMUR
RUN= 947 SERIES= 5203 LBS.



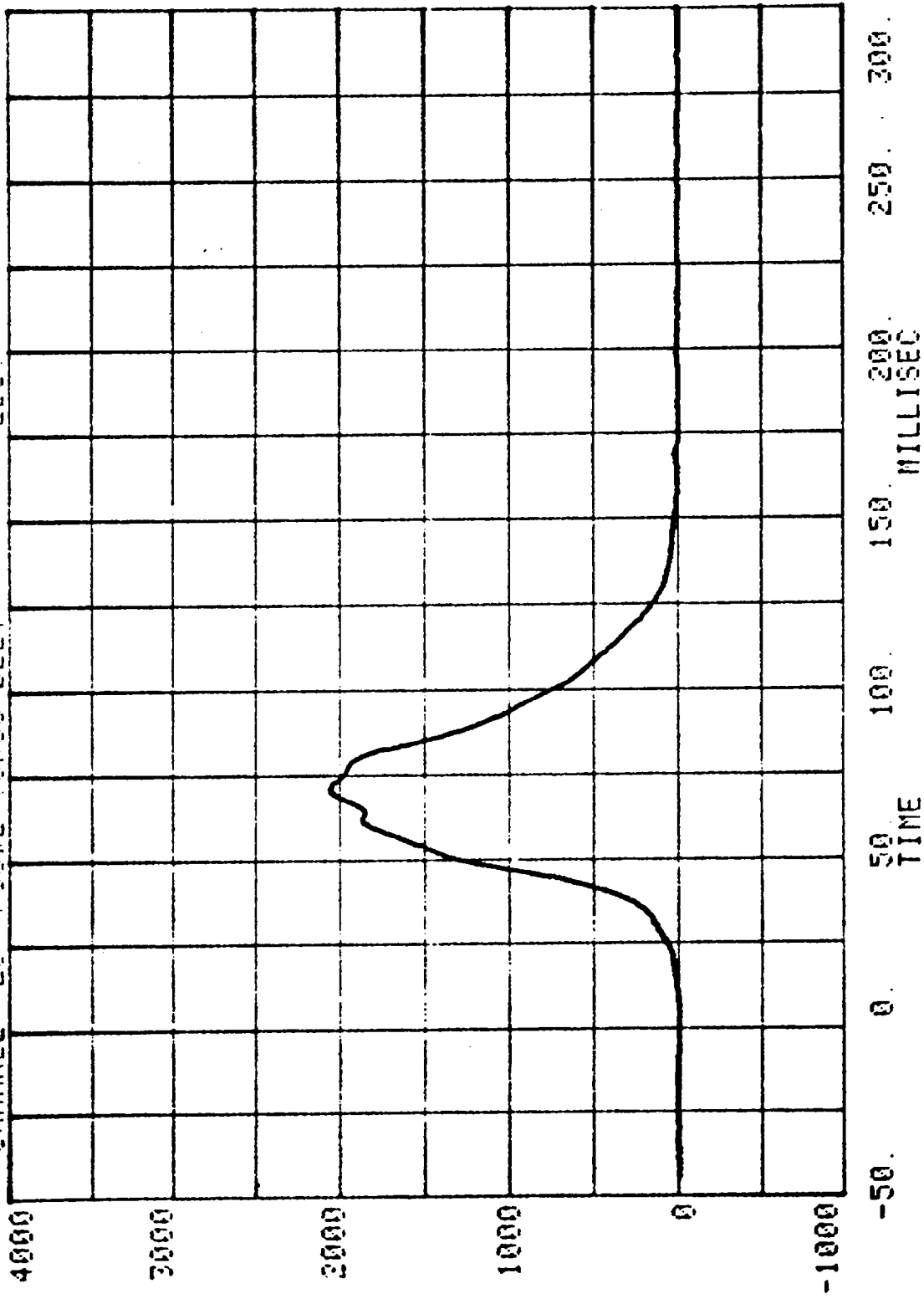
CHANNEL 20 POS#2 RIGHT FEMUR RUN# 947 SERIES= 5203 LBS

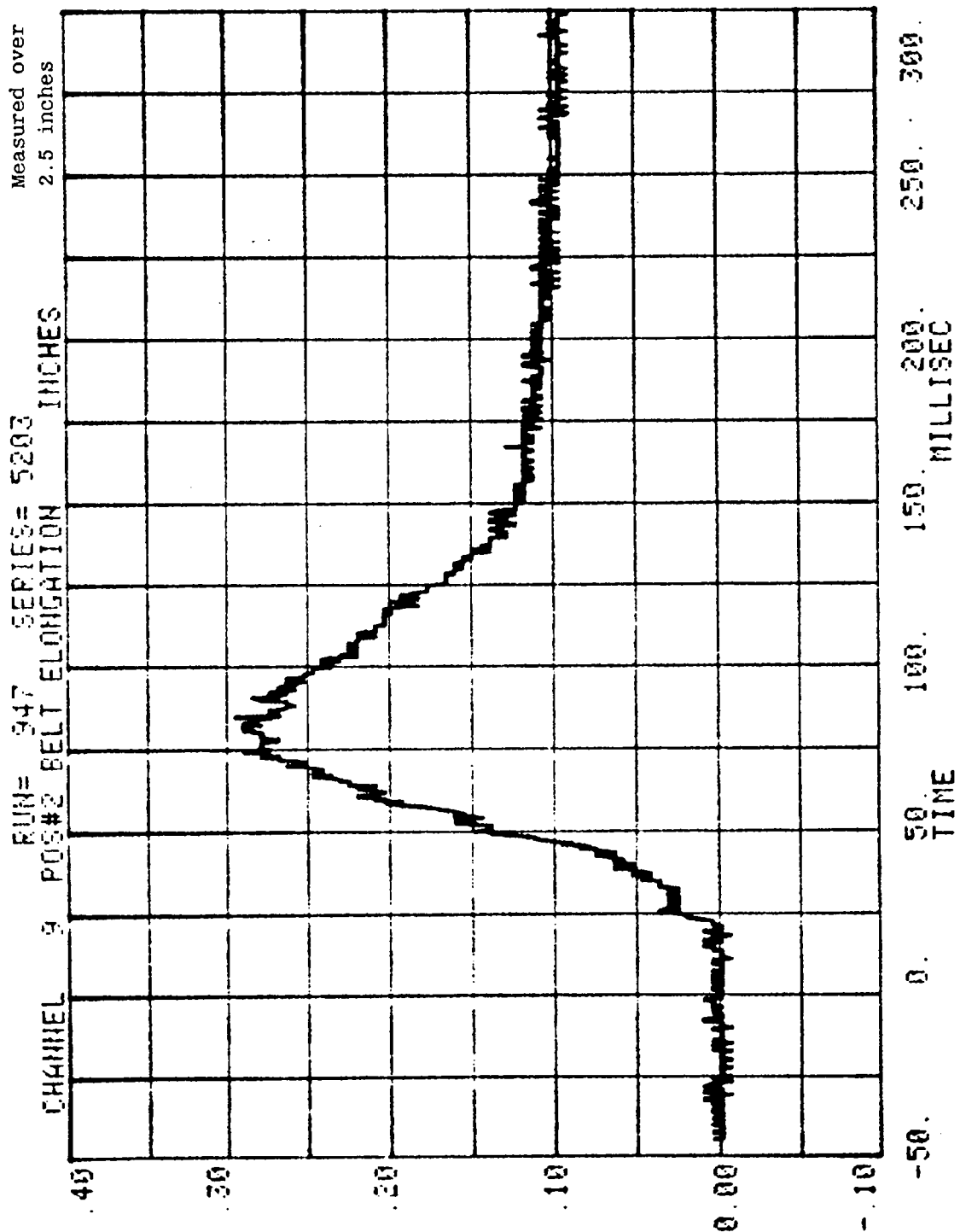


CHANNEL 35 P08#2 FIGHT BELT
FUN= 347 SERIES= 5203 LBS.



RUN= 947 SERIES= 5203
CHANNEL 26 POS#2 TOR30 BELT LES





Appendix C

DUMMY CERTIFICATION TESTS

Appendix C contains the results from certification tests performed on the 50th percentile male anthropomorphic 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 CFR Part 572, Federal Register, Volume 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.

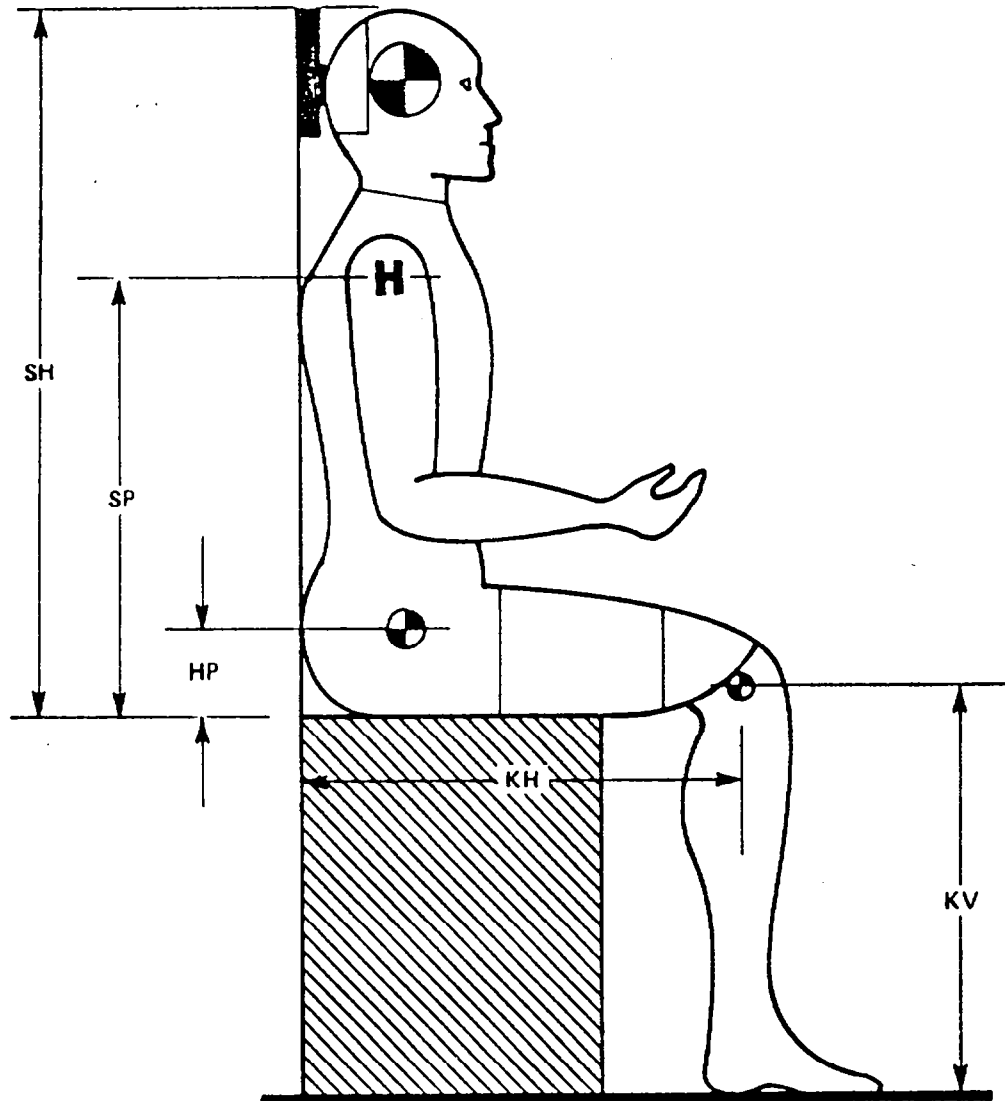
Dummy serial numbers and certification dates are:

<u>Serial No.</u>	<u>Completion Data</u>
1021	11-28-89
1022	11-22-89

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 No. 6525-V-1.

Figure 10
DUMMY CONFIGURATION DIMENSIONS



PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NUMBER.: 1021

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXXX	11-28-89	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXXX	1	
SH - Seated Height	35.6 to 35.8"	35.7 "	"
SP - Shoulder Pivot Height	21.8 to 22.4"	21.9 "	"
HP - Hip Pivot Height	3.9" ref.	3.9 "	"
KH - Knee Pivot from Back Line	20.1 to 20.7"	20.4 "	"
KV - Knee Pivot from floor	19.3 to 19.9"	19.8 "	"
SW - Shoulder Width	17.8 to 18.4"	18.3 "	"
HW - Hip Width	14.0 to 15.4"	14.9 "	"

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		11-28-89	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		1	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		69-71 deg	deg
VERIFICATION LAB HUMIDITY (10 TO 70 %)		25-40 %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	216.6 G's	G's
b. peak lateral accel.	<= 10 G's	1.3 G's	G's
c. Time above 100 G's	0.9 to 1.5 ms.	1.25 ms	ms

* Sequential number beginning with "1" at the start of each fiscal years's crash test program.

TECHNICIAN'S NAME: IVAN MINKEWICZ

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST				
a. Pendulum Speed		21.5 to 25.5 fps.	23.4 fps	
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	23.9 G's	
c. Peak Resultant Head Acceleration		26 G's max.	25.47 G's	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2.36 ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	26.54 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	4.34 ms	
g. Max. Head Rotation		63 to 73 deg.	71.59 deg	
h. Chordal Displacement				
HEAD ROTATION ANGLE				
0 deg.	Time	-2 to 2 ms.	0.0 ms	
	Displ.	-.5 to .5"	0.0 "	
30 deg.	Time	25.6 to 34.4 ms.	27.41 ms	
	Displ.	2.1 to 3.1"	2.45 "	
60 deg.	Time	40.3 to 51.7 ms.	41.54 ms	
	Displ.	4.3 to 5.3"	4.77 "	
Maximum	Time	53.2 to 66.8 ms.	53.32 ms	
	Displ.	5.0 to 6.0"	5.57 "	
60 deg.	Time	67.0 to 83.0 ms.	74.53 ms	
	Displ.	4.3 to 5.3"	4.43 "	
30 deg.	Time	85.4 to 104.6 ms.	89.04 ms	
	Displ.	2.1 to 3.1"	2.12 "	
0 deg.	Time	101.0 - 123.0 ms.	103.17 ms	
	Displ.	-.5 to 0.5"	0.0 "	

TECHNICIANS NAME: IVAN MINKEWICZ

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
3. ABDOMINAL COMPRESSION			
TEST: (preload = 50 lbs.)			
a. Force @ 0.5"	23 to 36 lbs.	26.5 lbs	
b. Force @ 0.75"	36 to 50 lbs.	41 lbs	
c. Force @ 1.0"	50 to 63 lbs.	57 lbs	
d. Force @ 1.3"	73 to 88 lbs.	83 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	26.5 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	39 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	50.5 lbs	
d. Return Angle	12 deg. maximum	10 deg	
5. CHEST IMPACT TESTS:			
A. High Speed			
(1) Probe Speed	21.78-22.22 fps.	21.9 fps	
(2) Peak Deflection	1.7" maximum	1.61 "	
(3) Peak Resistive Force	2250 lbs maximum	2087 lbs	
(4) Internal Hysteresis	50 to 70%	53.7 %	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	14.1 fps	
(2) Peak Deflection	1.1" maximum	1.09 "	
(3) Peak Resistive Force	1450 lbs maximum	1284 lbs	
(4) Internal Hysteresis	50 to 70%	51.7 %	

TECHNICIAN'S NAME: IVAN MINKEWICZ

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1021

		PRE-TEST (if required)	POST-TEST (if required)
TEST PARAMETER	SPECIFICATION		
6. KNEE IMPACT TEST			
A. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	1954 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	2.0 ms	
B. Right Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2493 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.75 ms	

REMARKS:

TECHNICIAN'S NAME: IVAN MINKEWICZ

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER 1021

DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	CX42	6-89	12-89
HY LATERAL--	ENDEVCO	CS41	11-89	5-90
HZ VERTICAL--	ENDEVCO	CH31	5-89	11-89
2. CHEST ACCELEROMETER--				
CX LONGITUDINAL--	CEC	A73	11-89	5-90
CY LATERAL--	ENDEVCO	CE06	11-89	5-90
CZ VERTICAL--	CEC	A44	11-89	5-90
3. FEMUR LOAD CELLS				
LEFT SIDE	GSE	551	6-89	12-89
RIGHT SIDE	GSE	552	6-89	12-89
CALIBRATION LABORATORY INSTRUMENTS--				
1. PENDULUM ACC.--	CEC	A144	6-89	12-89
2. TEST PROBE ACCELEROMETER--	CEC	A154	6-89	12-89
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS- DUCER INC	20051	7-89	1-90
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	7-89	1-90
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	7-89	1-90

NHTSA DUMMY I.D. NUMBER.: 1022

I. CONFIGURATION VERIFICATION DATA

	P. 572 SPECIFICATION	PRE-TEST if required	POST-TEST if required
DATE OF CONFIGURATION VERIFICATION	XXXXXXXXXXXXXX	11-22-89	
VERIFICATION NUMBER FOR DUMMY (*)	XXXXXXXXXXXXXX	1	
SH - Seated Height	35.6 to 35.8"	35.6 "	"
SP - Shoulder Pivot Height	21.8 to 22.4"	22.1 "	"
HP - Hip Pivot Height	3.9" ref.	3.9 "	"
KH - Knee Pivot from Back Line	20.1 to 20.7"	20.4 "	"
KV - Knee Pivot from floor	19.3 to 19.9"	19.7 "	"
SW - Shoulder Width	17.8 to 18.4"	18.3 "	"
HW - Hip Width	14.0 to 15.4"	15.0 "	"

II. PERFORMANCE VERIFICATION DATA:

		PRE-TEST (if required)	POST-TEST (if required)
DATE OF PERFORMANCE VERIFICATION		11-22-89	
SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)		1	
VERIFICATION LAB TEMPERATURE (66 to 78 deg.)		69-71 deg	deg
VERIFICATION LAB HUMIDITY (10 TO 70 %)		26-50 %	%
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST			
a. peak resultant accel.	210 to 260 G's	239.9 G's	G's
b. peak lateral accel.	<= 10 G's	2.4 G's	G's
c. Time above 100 G's	0.9 to 1.5 ms.	1.13 ms	ms

* Sequential number beginning with "1" at the start of each fiscal years's crash test program.

TECHNICIAN'S NAME: IVAN MINKEWICZ

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

TEST PARAMETER		SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
2. NECK BENDING TEST				
a. Pendulum Speed		21.5 to 25.5 fps.	22.0 fps	
b. Pend. Avg. Decel. over t3 to t2		20 to 24 G's	23.2 G's	
c. Peak Resultant Head Acceleration		26 G's max.	24.65 G's	
d. Pendulum Decel. (t2-t1)		<= 3 ms.	2.48 ms	
e. Pendulum Decel. (t3-t2)		25 to 30 ms.	26.17 ms	
f. Pendulum Decel. (t4-t3)		<= 10 ms.	5.46 ms	
g. Max. Head Rotation		63 to 73 deg.	69.17 deg	
h. Chordal Displacement				
HEAD ROTATION ANGLE				
0 deg.	Time	-2 to 2 ms.	0.12 ms	
	Displ.	-.5 to .5"	0.0 "	
30 deg.	Time	25.6 to 34.4 ms.	28.03 ms	
	Displ.	2.1 to 3.1"	2.4 "	
60 deg.	Time	40.3 to 51.7 ms.	42.78 ms	
	Displ.	4.3 to 5.3"	4.55 "	
Maximum	Time	53.2 to 66.8 ms.	53.7 ms	
	Displ.	5.0 to 6.0"	5.2 "	
60 deg.	Time	67.0 to 83.0 ms.	74.16 ms	
	Displ.	4.3 to 5.3"	4.38 "	
30 deg.	Time	85.4 to 104.6 ms.	91.27 ms	
	Displ.	2.1 to 3.1"	2.11 "	
0 deg.	Time	101.0 - 123.0 ms.	106.52 ms	
	Displ.	-.5 to 0.5"	0.0 "	

TECHNICIANS NAME: IVAN MINKEWICZ

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

TEST PARAMETER	SPECIFICATION	PRE-TEST (if required)	POST-TEST (if required)
3. ABDOMINAL COMPRESSION			
TEST: (preload = 50 lbs.)			
a. Force @ 0.5"	23 to 36 lbs.	29 lbs	
b. Force @ 0.75"	36 to 50 lbs.	36.5 lbs	
c. Force @ 1.0"	50 to 63 lbs.	62 lbs	
d. Force @ 1.3"	73 to 88 lbs.	86 lbs	
4. LUMBAR FLEXION TEST:			
a. Force @ 20 deg.	22 to 34 lbs.	27 lbs	
b. Force @ 30 deg.	34 to 46 lbs.	39 lbs	
c. Force @ 40 deg.	46 to 58 lbs.	52 lbs	
d. Return Angle	12 deg. maximum	10.5 deg	
5. CHEST IMPACT TESTS:			
A. High Speed			
(1) Probe Speed	21.78-22.22 fps.	21.8 fps	
(2) Peak Deflection	1.7" maximum	1.69 "	
(3) Peak Resistive Force	2250 lbs maximum	2015 lbs	
(4) Internal Hysteresis	50 to 70%	59.7 %	
B. Low Speed			
(1) Probe Speed	13.86-14.14 fps.	14.1 fps	
(2) Peak Deflection	1.1" maximum	1.07 "	
(3) Peak Resistive Force	1450 lbs maximum	1231 lbs	
(4) Internal Hysteresis	50 to 70%	52.9 %	

TECHNICIAN'S NAME: IVAN MINKEWICZ

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

		PRE-TEST (if required)	POST-TEST (if required)
TEST PARAMETER	SPECIFICATION		
6. KNEE IMPACT TEST			
A. Left Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	2085 lbs	
(3) Time above 1000 lbs.	1.7 ms. minimum	2.0 ms	
B. Right Knee			
(1) Probe Speed	6.76 to 7.04 fps	7.0 fps	
(2) Maximum Force	1850 to 2500 lbs	1901 lbs	
(3) Time Above 1000 lbs.	1.7 ms. minimum	1.75 ms	

REMARKS:

TECHNICIAN'S NAME: IVAN MINKEWICZ

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER 1022

DUMMY INSTRUMENT--	MFG	SERIAL NUMBER	DATE LAST CALIBRATED	DATE OF NEXT CALIBRATION
1. HEAD ACCELEROMETER--				
HX LONGITUDINAL--	ENDEVCO	CP30	9-89	3-90
HY LATERAL--	ENDEVCO	CX05	9-89	3-90
HZ VERTICAL--	ENDEVCO	DB47	9-89	3-90
2. CHEST ACCELEROMETER--				
CX LONGITUDINAL--	CEC	A90	6-89	12-89
CY LATERAL--	ENDEVCO	FH01	9-89	3-90
CZ VERTICAL--	CEC	A128	11-89	5-90
3. FEMUR LOAD CELLS				
LEFT SIDE	GSE	548	6-89	12-89
RIGHT SIDE	GSE	549	6-89	12-89
CALIBRATION LABORATORY INSTRUMENTS--				
1. PENDULUM ACC.--	CEC	A144	6-89	12-89
2. TEST PROBE ACCELEROMETER--	CEC	A154	6-89	12-89
3. LUMBAR FLEXION TEST PUSH FORCE GAUGE--	TRANS- DUCER INC	20051	7-89	1-90
4. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	BLH	72952	7-89	1-90
5. ABDOMINAL COMPRESS. TEST FORCE GAUGE--	CIC	567-11	7-89	1-90

Appendix D

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

SEAT BELTS

PRECAUTIONS ON SEAT BELT USAGE

Your chances of being injured in an accident and/or the severity of injury may be greatly reduced if you are wearing your seat belt and it is properly adjusted. NISSAN strongly encourages you and all of your passengers to buckle up every time you drive.

Some states, provinces or territories require that seat belts be worn at all times when a vehicle is being driven.

WARNING:

- The belt should be adjusted to a snug fit. Slack in the lap-shoulder belt will reduce the effectiveness of the entire restraint system.
- Never wear the belt inside out or twisted.
- Do not allow more than one person to use the same belt.
- All seat belt assemblies including retractors and attaching hardware should be inspected after any collision by your NISSAN dealer. NISSAN recommends that all seat belt assemblies in use during a collision be replaced unless the collision was minor and the belts show no damage and continue to operate properly. Seat belt assemblies not

In use during a collision should also be inspected and replaced if either damage or improper operation is noted.

Be sure to observe the following cautions when using seat belts. Failure to do so could increase the chance and/or severity of injury in an accident.

- Always pass the shoulder belt over your shoulder and across your chest. Never run the belt under your arm.
- Position the lap belt as low as possible AROUND THE HIPS, NOT THE WAIST.

Infant or small child

Nissan recommends that infants or small children be seated in a child restraint system. You should choose a child restraint system which fits your vehicle and always follow the manufacturer's instructions for installation and use.

Children

Children who are too large for child restraint systems should be seated and restrained by the seat belts which are provided.

NISSAN recommends that children sit in the rear seat if available. According to accident statistics, children are safer when properly restrained in the rear seat than in the front seat.

If the child's seating position has a shoulder belt which is very close to the face or neck, move the child to a position without a shoulder belt if possible, or move the child toward the center of the vehicle, away from the shoulder belt. Once a child has grown enough so the shoulder belt is no longer on or close to the neck or face, choose a position for the child with a shoulder belt whenever possible.

Never let a child stand or kneel on any seat and do not allow a child in the cargo areas while the vehicle is moving.

Pregnant women

Nissan recommends that pregnant women use seat belts. Contact your doctor for specific recommendations. The lap belt should be worn snug and positioned as low as possible around the hips, not the waist.

Injured persons

Nissan recommends that injured persons use seat belts, depending on the injury. Check with your doctor for specific recommendations.

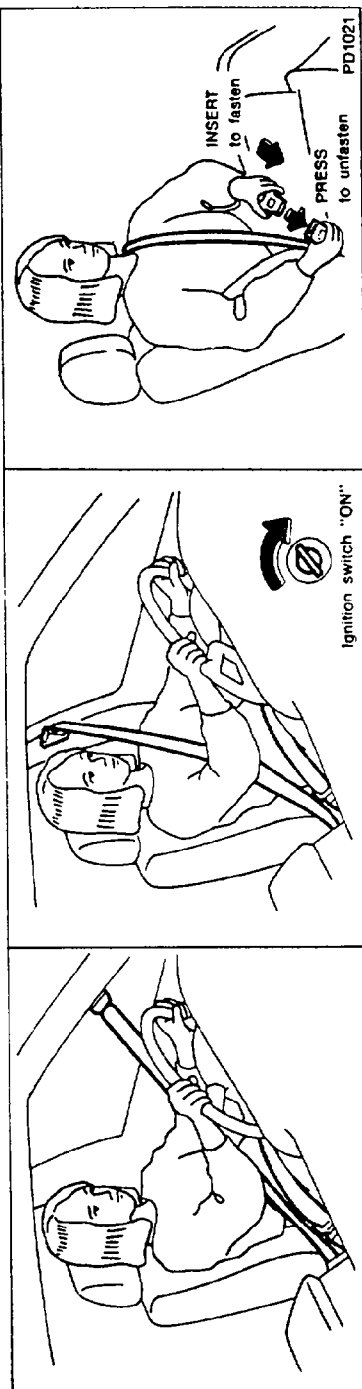
AUTOMATIC SEAT BELT SYSTEM (For U.S.A.)

The Automatic Seat Belt system consists of an automatic shoulder belt and a manual lap belt for the driver and front passenger seat positions. The shoulder belts automatically adjust to the body and seating positions when the door is closed and the ignition key is turned "ON".

- For most effective protection, always fasten the manual lap belt in addition to the automatic shoulder belt.
- To properly operate the automatic seat belt system, the shoulder belt tongue should always remain inserted in the shoulder belt buckle, located in the rail of the door opening.
- NISSAN recommends that children be seated in the rear seats. See Precautions on Seat Belt Usage earlier in this Section.

System malfunction

If, while the ignition switch is turned "ON" with either front door open, the warning light flickers and the chime sounds faster than usual for about 6 seconds, it may indicate a malfunction in the system. Have the system checked by your NISSAN dealer.



Fastening the belts

1. Open the door and make sure that the shoulder buckle is in the forward position. Then get into the vehicle and close the door.

If the ignition switch is in the "ON" position, the shoulder buckle will move to the rear position when closing the door.

2. Adjust the seat.

The seatback should not be in a reclining position any more than needed for comfort. Seat belts are most effective when the passenger sits well back and straight up in the seat.

3. Turn the ignition switch ON. The shoulder buckle will move to the rear position and will fit across your chest. Pull the shoulder belt toward the retractor to take up extra slack.

● Do not touch the door guide rail while the shoulder buckle is moving.

● Do not wear the shoulder belt across the neck or under your outer arm. The shoulder belt should be positioned midway over the shoulder for the most effective protection.

4. Slowly pull the lap belt out of the retractor and insert the tongue into the lap buckle until it snaps. Position the lap belt low on the hips and pull the belt toward the retractor to take up extra slack.

● Do not wear the lap belt across the shoulder belt.

● The retractors are designed to lock during a sudden stop or on impact. A slow pulling motion will permit the belt to move, and allow you some freedom of movement in the seat.

Unfastening the belts

1. To unfasten the lap belt, press the button on the lap buckle. The seat belt will automatically retract.

2. Open the door. The shoulder belt buckle will move to the forward position and the shoulder belt will move away from your chest.

- Do not touch the door guide rail while the shoulder buckle is moving.
- Do not unfasten the shoulder belt tongue from the buckle except in emergency. See "Operation in emergency" later in this Section.

How the automatic shoulder belt works

While the Ignition switch is on:

The shoulder buckle will move to the forward position when the door is opened, and it will move to the rear position when the door is closed.

While the Ignition switch is off:

The shoulder buckle will remain or move to the front position when the door is opened, and it will remain in the front position when the door is closed until the ignition switch is turned "ON".

If the shoulder buckle operates abnormally, have the system checked by your NISSAN dealer.

Seat belt warning light "  " and warning chime

When the Ignition switch is turned on with the door open (the shoulder buckle is at the front position):

The chime will sound for about 6 seconds, and the warning light will flicker continuously. The warning light will go off when the door is closed and the shoulder buckle reaches the rear position.

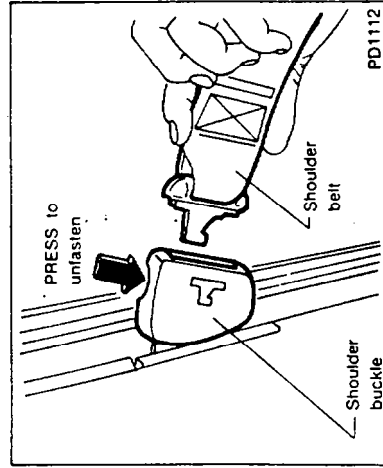
When the Ignition switch is turned on with the door closed:

The chime will sound and the warning light will flicker until the shoulder buckle reaches the rear position. The warning light will come on for several seconds after the shoulder buckle reaches the rear position. **If the shoulder belt tongue is disconnected from the buckle:**

When the ignition switch is turned on and the shoulder buckle reaches the rear position, the warning light will come on for about 100 seconds and the chime will sound for about 6 seconds until the shoulder belt is connected to the shoulder buckle. Insert the shoulder belt tongue into the shoulder buckle before driving.

If the driver side lap belt is not fastened:

When the ignition switch is turned ON and the shoulder buckle reaches the rear position, the warning light will come on for about 6 seconds and the chime will sound for about 6 seconds until the lap belt is fastened. Fasten the lap belt before driving.

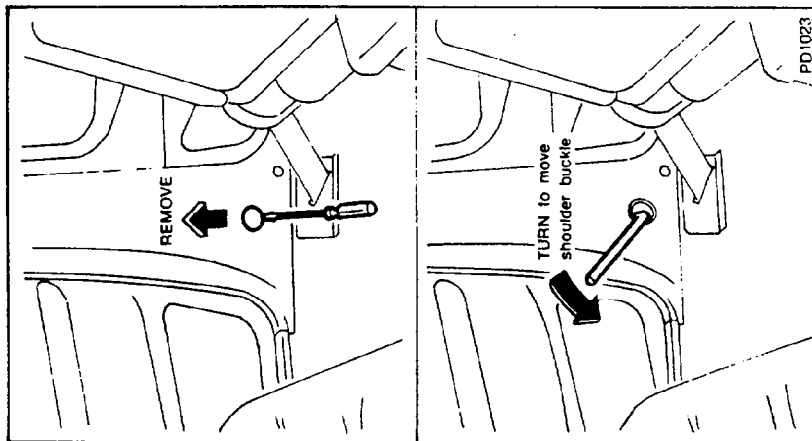


Operation in an accident

Emergency release

If you need to release the shoulder belt from the shoulder belt buckle in an emergency, press the buckle marked with "PRESS EMERGENCY". Use this feature only when the shoulder belt keeps you from leaving the vehicle in an accident.

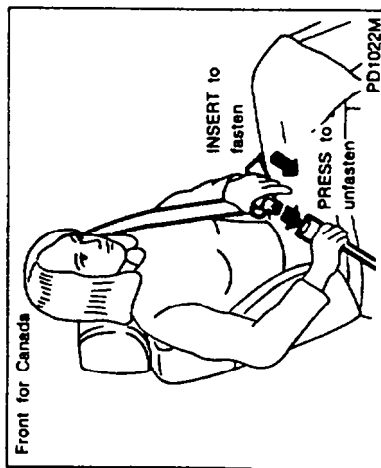
For normal use, the shoulder belt should always be connected to the buckle.



If either shoulder belt buckle does not operate

1. Slide the seat forward as far as possible.
2. Remove the blind cap in the lower portion of the center pillar with the screwdriver. The shaft end of the motor will be visible.
3. Using the wrench supplied in the tool bag, turn the shaft of the motor counterclockwise to move the shoulder buckle to the rear position.

Have the automatic seat belt system checked and repaired by your NISSAN dealer.



3-POINT TYPE WITH RETRACTOR

Every person who drives or rides in this vehicle should wear a seat belt at all times.

Fastening the belts

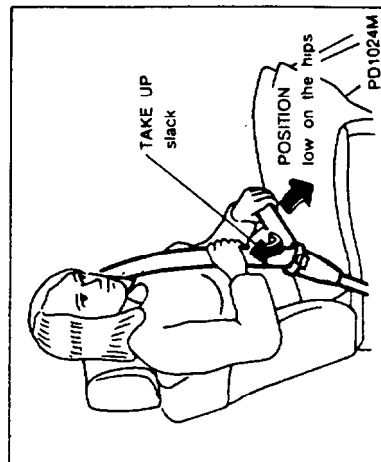
1. Adjust the seat.

The seatback should not be in a reclining position any more than needed for comfort. Seat belts are most effective when the passenger sits well back and straight up in the seat.

2. Slowly pull the seat belt out of the retractor and insert the tongue into the buckle until it snaps.



The retractor is designed to lock during a sudden stop or on impact. A slow pulling motion will permit the belt to move, and allow you some freedom of movement in the seat.



3. Position the lap belt portion low on the hips as shown.
4. Pull the shoulder belt portion toward the retractor to take up extra slack.

Unfastening the belts

To unfasten the belt, press the button on the buckle. The seat belt will automatically retract.

Checking seat belt operation (3-point type with retractor)

Your seat belt retractors are designed to lock belt movement by two separate methods:

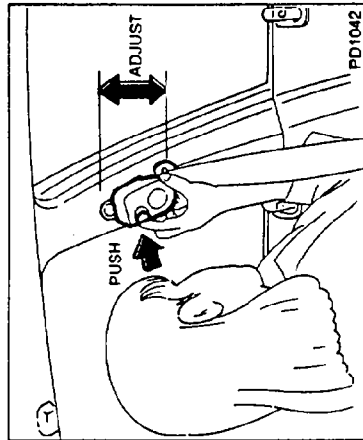
1) When the belt is pulled quickly from the retractor.

2) When the vehicle slows down rapidly.

To increase your confidence in the belts, check the operation as follows:

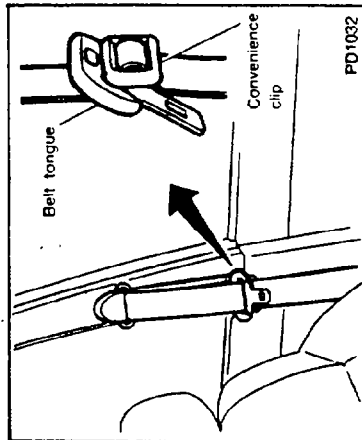
- Grasp the shoulder belt and pull quickly forward. The retractor should lock and restrict further belt movement.

If the retractor does not lock during this check or if you have any question about belt operation, see your NISSAN dealer.



Shoulder belt height adjustment (For front seats of Canada models)

The shoulder belt anchor height should be adjusted to the position best for you. To adjust, push the release button, then move it to the desired position, so that the belt passes over the shoulder.

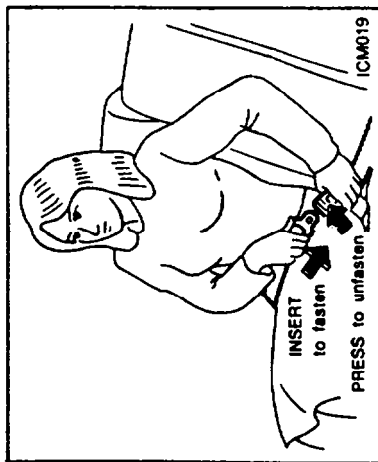


Convenience clip

The convenience clip is provided to keep the belt tongue in an accessible position when not being used.

Slide the convenience clip down if the clip prevents the belt from being retracted into the retractor.

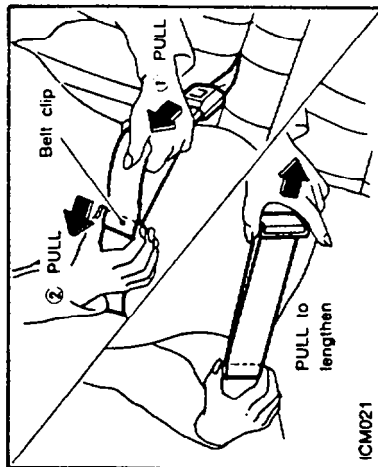
Slide it away from the buckle if the convenience clip contacts the belt tongue when the belt is in use.



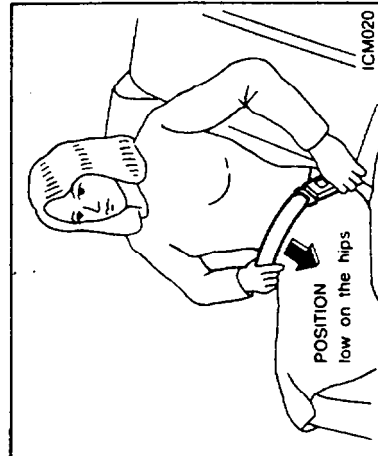
2-POINT TYPE WITHOUT RETRACTOR

Fastening the belts

1. Insert the tongue into the buckle until it snaps.



2. To lengthen, hold the tongue at a right angle to the belt and pull on the belt. To shorten, pull the free end of the belt away from the tongue, then pull the belt clip to take up the slack.



3. Position the lap belt low on the hips as illustrated.

Unfastening the belts

To unfasten the belt, press the button on the buckle.

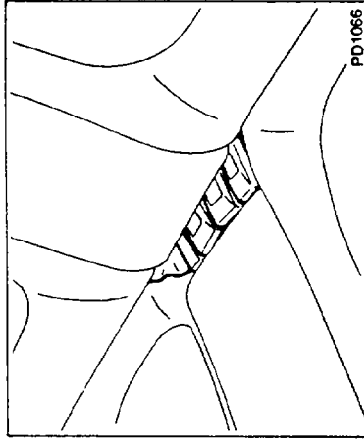
Fasten the seat belts when not in use to prevent them from being caught in the door.

SEAT BELT EXTENDERS (Except for the automatic seat belt)

If, because of body size or driving position, it is not possible to properly fit the lap-shoulder belt and fasten it, an extender is available which is compatible with the installed seat belts. The extender adds approximately 8 inches (200 mm) of length and may be used for either the driver or front passenger seating position. See your NISSAN dealer for assistance if the extender is required.

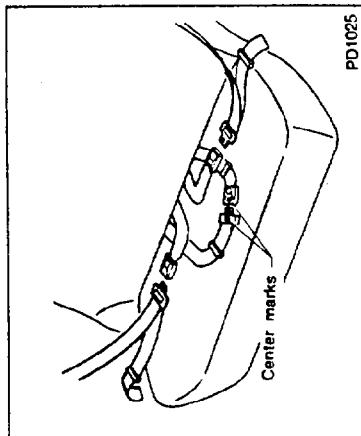
WARNING:

- Only NISSAN belt extenders, made by the same company which made the original equipment belts, should be used with NISSAN belts.
- Persons who can use the standard seat belt should not use an extender. Such unnecessary use could result in serious personal injury in the event of an accident.



Rear seat belt buckles

Rear seat belt buckles can be stored, if there are no people riding in the rear seat.



Selecting correct set of belts

The center seat belt buckle and tongue are identified by the "CENTER" label. The center seat belt tongue can be fastened only into the center seat belt buckle.