

2014 0000
REPORT NOS. 212-CAL-84-150
301-CAL-84-150

NHTSA NEW VEHICLE ASSESSMENT AND
STANDARDS ENFORCEMENT INDICANT TESTING

FMVSS 212 AND 301-75

NISSAN MOTOR COMPANY, LTD.
1984 NISSAN 300ZX
2-DOOR COUPE

NHTSA NO. CE5202
CALSPAN TEST NO. 7209-15

CALSPAN CORPORATION
ADVANCED TECHNOLOGY CENTER
P. O. BOX 400
BUFFALO, NEW YORK 14225

FEBRUARY 1984



FINAL REPORT

Prepared for:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, S.W., NASSIF BUILDING
WASHINGTON, DC 20590

This Final Test Report was prepared for the U. S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-82-C-01140. 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.

Prepared by: Walter E. Levan
W. E. Levan, Test Engineer

Approved by: A. L. Russo
A. L. Russo
Transportation Research
Physical Sciences Department

FINAL REPORT ACCEPTED BY:

Contract Technical Manager

Date of Report Acceptance

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 212-CAL-84-150 301-CAL-84-150		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle NHTSA New Vehicle Assessment and Standards Enforcement Indicant Testing				5. Report Date February 1984	
7. Author(s)				6. Performing Organization Code	
9. Performing Organization Name and Address Calspan Advanced Technology Center P.O. Box 400 Buffalo, NY 14225				8. Performing Organization Report No.	
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance 400 Seventh Street, S.W., Washington, DC 20590				10. Work Unit No. 961 Series	
				11. Contract or Grant No. DTNH22-82-C-01140	
				13. Type of Report and Period Covered Final Report January-February 1984	
15. Supplementary Notes				14. Sponsoring Agency Code	
16. Abstract A frontal load cell barrier test of a 1984 Nissan 300ZX 2-door coupe was performed at Calspan Corporation, Advanced Technology Center, Transportation Research/Physical Sciences Department facility, for the New Car Assessment and Standards Enforcement Testing of FMVSS 212, "Windshield Mounting" and FMVSS 301-75, "Fuel System Integrity" for the Office of Vehicle Safety Compliance, the Office of Market Incentives (OMI) and for Research and Development. Impact speed was 34.97 mph. Ambient temperature on the test date was 18°F. The post-test vehicle crush was 25.9 inches and intrusion of the firewall into compartment was 4.4 inches. The test vehicle appeared to comply with the following vehicle performance standards: FMVSS 212 - Windshield Retention (81.8%) FMVSS 301-75 - Fuel System Integrity With regard to occupant restraint performance (FMVSS 208 Injury Criteria), the driver met all the criteria. The right-front passenger did not meet the head criteria: HIC = 1037.9.					
17. Key Words Load Cell Barrier Frontal Impact FMVSS Compliance Testing FMVSS 212 FMVSS 301-75			18. Distribution Statement Copies of this report are available from: 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	

TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	PURPOSE AND TEST PROCEDURE	1-1
2	SUMMARY OF TEST NO. CE5202	2-1
3	SUMMARY OF RESULTS OF FMVSS NOS. 212 AND 301-75	3-1
4	OCCUPANT AND VEHICLE INFORMATION (OMI AND AID DATA)	4-1
APPENDIX A	PHOTOGRAPHS	A-1
APPENDIX B	VEHICLE AND DUMMY RESPONSE DATA	B-1
APPENDIX C	DUMMY CERTIFICATION TESTS	C-1

LIST OF FIGURES

<u>Figure No.</u>		<u>Page No.</u>
1	Windshield Retention, FMVSS No. 212	3-5
2	Pre-Test and Post-Test Measurement Points	4-2
3	Vehicle Accelerometer Locations	4-4
4	Fixed Load Cell Barrier-Load Cell Locations	4-5
5	Test Vehicle Damage Details	4-8
6	Camera Positions for Frontal Impact	4-9
7	Owner's Manual Seat Belt Instructions	4-11
8	Part 572 Dummy In-Vehicle Position	4-12
9	Occupant Clearance Dimensions	4-13

LIST OF TABLES

<u>Table No.</u>		<u>Page No.</u>
1	Crash Test Summary	2-2
2	General Test and Vehicle Parameter Data	2-4
3	Summary of Results of FMVSS Nos. 212 and 301-75	3-2
4	Post-Impact Data -- FMVSS Nos. 212 and 301-75	3-4
5	"Fuel System Integrity" Post-Impact Test Data, FMVSS No. 301-75	3-6
6	FMVSS No. 301-75 Static Rollover Data Sheet	3-7
7	Vehicle Measurements	4-3
8	Accident Investigation Division, Data Summary	4-6
9	High-Speed Camera Locations	4-10
10	Dummy Injury Criteria Values	4-14
11	Belt Related Data	4-15

SECTION 1
PURPOSE AND TEST PROCEDURE

This frontal barrier test is part of the Composite FY 84 Vehicle Barrier Impact Testing, sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract DTNH22-82-C-01140. The purpose of this test was to obtain crashworthiness and occupant restraint performance data for impact speeds in excess of the current FMVSS requirements.

The test was performed in accordance with the Office of Automotive Ratings Laboratory Procedure No. IP-212-02 dated April 4, 1980. Indicant test data for FMVSS 212, "Windshield Mounting," and FMVSS 301-75, "Fuel System Integrity," as well as occupant performance data for a nominally 35 mph impact are provided herein.

SECTION 2
SUMMARY OF TEST NUMBER CE5202

A load cell barrier consisting of 36 load cells (Figure 4) was impacted by a 1984 Nissan 300ZX 2-door coupe at a velocity of 34.97 mph. The test was performed at the Calspan Corporation Advanced Technology Center on January 18, 1984. Pre- and post-test photographs of the vehicle and occupants can be found in Appendix A. Table 1 presents pertinent crash test information.

Two Part 572, 50th percentile male anthropomorphic test devices (ATD's) were placed in the driver and right-front passenger seating positions, according to dummy placement procedures specified in Laboratory Procedure for Vehicle Assessment IP-212-02.

The occupant dummies were instrumented with head and chest triaxial accelerometers and femur load cells. Load cells were also placed on the lap and shoulder belts to measure dummy torso and lap loading. Each of the dummies had been certified and had been used in previous tests. The driver ATD (Serial No. 1019) had been used in Test CE5102 and the right-front passenger (Serial No. 162) was used in Test CE5101. The FMVSS Injury Criterial Values were not exceeded in these tests. Certification details, along with instrumentation calibration data, are found in Appendix C.

The crash test was recorded by one real-time camera and 15 high-speed cameras. Camera locations and other pertinent camera information are found in Section of this report.

The 67 channels of data were recorded on six 14-channel FM tape recorders. There were no data losses experienced during the test. Appendix B contains the vehicle and dummy response data traces. The Injury Criteria Values are presented in summary form in Table 10.

Table 1

CRASH TEST SUMMARY

TEST NO. CE5202 PROJECT: FY84 New Car Assessment Program
FMVSS Nos. 208/212/301-75

DATE: 1/18/84 TIME: 1242 hrs. TEMP: 18°F.

VEHICLE 1984 Nissan 300ZX 2-door coupe
 TEST WEIGHT (lbs) 3370
 IMPACT ANGLE (deg)* 0
 IMPACT VELOCITY (mph)** 34.97
 MAX. CRUSH (in) static 25.9
 MAX. INTRUSION (in) 4.4

DUMMIES

TYPE	<u>Hybrid II Part 572</u>	<u>Hybrid II Part 572</u>
LOCATION	<u>LF (1) Serial 1019</u>	<u>RF (2) Serial 162</u>
RESTRAINT	<u>production 3-point</u> <u>belt system</u>	<u>production 3-point</u> <u>belt system</u>
NUMBER OF DATA CHANNELS	<u>67</u>	
NUMBER OF HIGH SPEED CAMERAS	<u>15 + 1 real time</u>	

*With respect to tow track Centerline

**Speed trap measurement (± .05% accuracy)

GENERAL COMMENTS

The 1984 Nissan 300ZX 2-door coupe was equipped with a 180.6 cubic inch, 6-cylinder engine, five-speed manual transmission, power brakes, power steering and air conditioner. The total test weight with two 50th percentile male dummies, instrumentation and two on-board cameras was 3370 pounds.

The 1984 Nissan 300ZX which was involved in a frontal load cell barrier crash at a velocity of 34.97 mph appeared to comply with FMVSS Nos. 212, "Windshield Mounting" and 301-75, "Fuel System Integrity." There was 81.8 percent windshield retention and no fuel leakage after impact or any phase of the rollover test.

The vehicle sustained 25.9 inches of static crush and approximately 33.0 inches of dynamic crush. Maximum fire wall intrusion into the occupant compartment was 4.4 inches. The maximum load cell barrier force measured by the 36 load cells was 98,000 pounds at 52 milliseconds.

The driver's head struck the dash panel and steering wheel rim. The femurs contacted the dash panel. The driver did comply with all FMVSS 208, "Injury Criteria" with a HIC of 788.8, maximum chest deceleration over 3 milliseconds of 45.2 g's and femur loads of 2085 and 1140 pounds.

The right-front passenger head struck the upper edge of the dash panel and thus did not meet FMVSS 208, "Injury Criteria" (HIC was 1037.9). The remaining injury criteria were satisfactory as demonstrated by a maximum chest deceleration over 3 milliseconds of 39.3 g's and femur loads of 1775 and 720 pounds.

Belt related data for each occupant are presented in Table 11 of this report.

GENERAL TEST AND VEHICLE PARAMETER DATA

Make/Model Nissan 300ZX Body Style 2-door coupe
Model Year 1984 NHTSA No. CE5202 Color Brown
Engine Data: 6 cylinders, 180.6 cubic inches
Transmission Data: 5 speed, (X) manual () automatic
Date Rec'd 12/20.83 Air Cond. yes Pw. Str. yes Pw. Brks. yes
Dealer's Name & Address Mike Barney's, 3676 Sheridan Drive, Amherst, NY 14226
Odometer Reading 147

Vehicle Manufactured by: Nissan Motor Co. Ltd.
Date of Manufacture 9/83 VIN JN1HZ1450EX004531
GVRW 3490 lbs., GAWR: front 1630 lbs., rear 1860 lbs.

Vehicle Load (up to capacity): front 32 psi
rear 32 psi

Recommended Tire Size P215/60R15 Load Range B C D

Recommended Cold Tire Pressure: front 28 psi, rear 28 psi

Tires on Vehicle P215/60R15

Is Spare Tire a "Space Saver?" X yes no

Is Spare Tire Standard Equipment? X yes no

Vehicle Capacity: Types of Seats: bench, X bucket, split bench

Number of Occupants (Designated Seating Capacity): 2 front
- rear
2 TOTAL

RCLW Cargo Load: 120 lbs.

VCW TOTAL = 420 lbs.

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

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

Right Front = 730 lbs. Right Rear = 730 lbs.
 Left Front = 710 lbs. Left Rear = 740 lbs.
 TOTAL FRONT WEIGHT = 1440 lbs. (49.5 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1470 lbs. (50.5 % of Total Vehicle Weight)
 TOTAL DELIVERY WEIGHT = 2910 lbs.

CALCULATION FOR TARGET TEST WEIGHT

RCLW = Rated Cargo and Luggage Weight
 UDW = Unloaded Delivered Weight (2910 lbs.)
 VCW = Vehicle Capacity Weight (420 lbs.)
 DSC = Designated Seating Capacity (2)
 RCLW = VCW - 150 (DSC) = 120 lbs.
 Target Test Weight = UDW + RCLW + (2 dummies X 164 lbs./dummy)
 Target Test Weight = 3358 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 132 POUNDS CARGO

Right Front = 780 lbs. Right Rear = 900 lbs.
 Left Front = 760 lbs. Left Rear = 930 lbs.
 TOTAL FRONT WEIGHT = 1540 lbs. (45.7 % of Total Vehicle Weight)
 TOTAL REAR WEIGHT = 1830 lbs. (54.3 % of Total Vehicle Weight)
 TOTAL TEST WEIGHT = 3370 lbs.
 Weight of ballast secured in vehicle trunk area = 0 lbs.

VEHICLE ATTITUDE (all dimensions in inches)

Delivered Attitude:	RF	<u>27.5</u>	LF	<u>27.7</u>	RR	<u>28</u>	LR	<u>28.1</u>
Test Attitude:	RF	<u>27.3</u>	LF	<u>27.4</u>	RR	<u>26.1</u>	LR	<u>26.0</u>

Remarks: Wheelbase = 91.5 inches
CG = 49.7 inches aft of front wheel C/L

Table 2

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)POST-IMPACT DATA

Type of Test Frontal Impact Impact Angle 0 °
 Date of Test 1/18/84 Time of Test 1242 hrs.
 Ambient Temperature 18 °F at impact area
 Temperature in Occupant Compartment 72 °F
 Windshield Molding Temperature 59 °F
 Required Impact Velocity Range: 34.5 to 35.5 mph
 Impact Velocity: primary = 34.97 mph, secondary 34.98 mph

VEHICLE REBOUND AND CRUSH (inches)

Vehicle Length: Pre-test = R 169.0 C 170.6 L 169.0
 Post-test = R 144.1 C 144.7 L 148.1
 Crush = R 24.9 C 25.9 L 20.9
 Distance from front of test vehicle to point of impact:
 R 14.2 C/L 15.5 L 14.7

VISIBLE DUMMY CONTACT POINTS

	<u>Driver</u>	<u>Passenger</u>
Head	<u>Dash panel and steering</u>	<u>Dash panel</u>
Chest	<u>wheel rim</u> <u>None</u>	<u>None</u>
Abdomen	<u>None</u>	<u>None</u>
Left Knee	<u>Dash panel</u>	<u>Glove box door</u>
Right Knee	<u>Dash pnael</u>	<u>Glove box door</u>

	<u>Front</u>	
	<u>Left</u>	<u>Right</u>
Door Opening	<u>Operable</u>	<u>Operable</u>

Table 2 (cont'd)

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

	<u>Front</u>	
<u>Seat Movement</u>	<u>Left</u>	<u>Right</u>
Seat Back Failure	<u>Intact</u>	<u>Intact</u>
Seat Shift (in.)	<u>Forward .7"</u>	<u>--</u>

Glazing Damage

Backlight/Windshield Windshield cracked

Other notable impact effects: There was 18.2% windshield retention loss
along the lower portion of the windshield. Figure 1 and A-13.

SECTION 3

SUMMARY OF RESULTS OF FMVSS NOS. 212 AND 301-75

- Summary of FMVSS 212 and 301 Data
- Post-Impact Data for FMVSS Nos. 212 and 301-75
- Windshield Retention, FMVSS No. 212 Data
- Fuel System Integrity, FMVSS No. 301-75 Data

Table 3
SUMMARY OF FMVSS 212 AND 301 DATA

PRE-IMPACT DATA

Make/Model: Nissan 300ZX
Body Style: 2-door coupe Model Year: 1984
NHTSA No.: CE5202 Color: Brown

DATA FROM CERTIFICATION LABEL

Vehicle Manufacturer: Nissan Motor Company Ltd.
Date of Manufacture: 9/83 VIN: JN1HZ14SOEX004531
GVWR: 3490 lbs., GAWR: Front 1630 lbs., Rear 1860 lbs.

POST-IMPACT DATA

Type of Test: Frontal load cell barrier impact
Date of Test: 1/18/84 Time: 1242 hrs. Temp.: 18 °F
Required Impact Velocity Range: 34.5 to 35.5 mph
Impact Velocity: Primary = 34.97 mph, Secondary = 34.98 mph
Test Weight 3370 lbs., Static Crush Max. 25.9 in., Rebound 15.5 in.

FUEL SYSTEM DATA

Test Fluid Type: Red Stoddard Solvent #2, Spec. Grav.: 0.764
Kinematic Viscosity 0.96 Centistokes
EPA Capacity* 17.97 gal.
Test Volume 16.7 gal. (93% of EPA Capacity)
Fuel System Capacity (data from Owner's Manual) 19.0 gal.
Electric Fuel Pump? X yes no, Fuel Injection? X yes no
Does electric fuel pump operate with ignition switch "on" and the engine
not operating? yes X no

Test vehicle fuel tank filled to 93% of "usable" capacity with
Stoddard Solvent and with electric fuel pump operating (if it will
operate without engine operation) until start of static roll.

*with entire fuel system filled from fuel tank through carburetor bowl

Table 3

SUMMARY OF FMVSS 212 AND 301 DATA (cont'd)

Details of fuel system: Fuel tank is located aft of rear wheels and held
in place with two tank straps. The filler tube is on the right side of
vehicle and is sealed by a screw-type cap which is concealed by a hinged
door.

POST-IMPACT DATA - FMVSS NOS. 212, AND 301-75

[illegible]

VEHICLE NHTSA NO. CE5202 VIN JN1HZ14SOEX004531

IMPACT VELOCITY (traps within 5 feet of impact event)

Trap No. 1 = 34.97 mph Trap No. 2 = 34.98 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

Driver's Side = 20.9 in Passenger's Side = 24.9 in

C/L = 25.9 in. Average = 23.9 in.

Crush Details:

Amount of Crush = -- inches on -- side

Crush Details:

Driver's Side = 14.7 in Passenger's Side = 14.2 in

C/L = 15.5 in. Average = 14.8 in.

3-4

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

Windshield is bonded in place and has a .6 inch chrome strip along the top and sides, and a 1.6 inch chrome piece along the bottom.

	Windshield Periphery		Retention %
	Pre-Test (in.)	Post-Test (in.)	
Right Side	79.9	67.65	84.7
Left Side	79.9	63.1	78.9
TOTAL	159.8	130.75	81.8

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

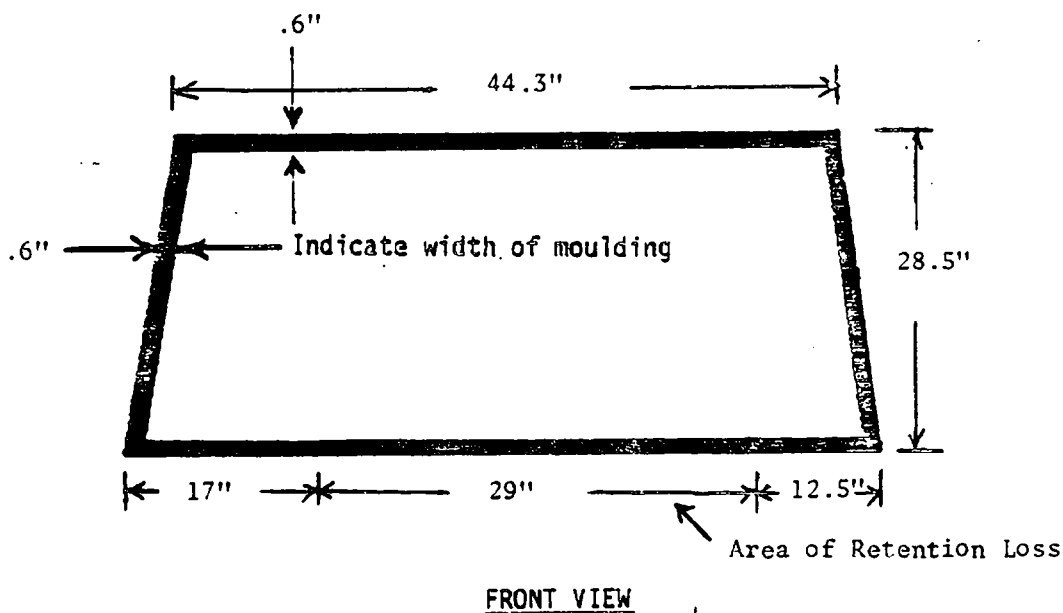


Figure 1 WINDSHIELD RETENTION, FMVSS NO. 212 DATA

Table 5

"FUEL SYSTEM INTEGRITY" POST-IMPACT TEST DATA

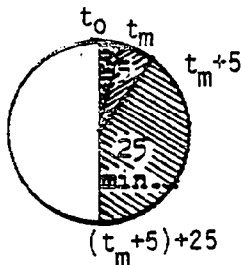
FMVSS No. 301-75

TEST VEHICLE NHTSA NO. CE5202 Test Date 1/18/84Vehicle Manufacture/Make/Model 1984 Nissan 300ZX

Test vehicle fuel tank filled to 90-91% of capacity with Stoddard Solvent and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

TEST VEHICLE IMPACT TYPE

- ☒ Frontal (35 mph)
☐ Oblique (30 mph) with _____° barrier face first contacting
 _____ driver _____ passenger side
☐ Rear Moving Barrier (35 mph)
☐ Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT

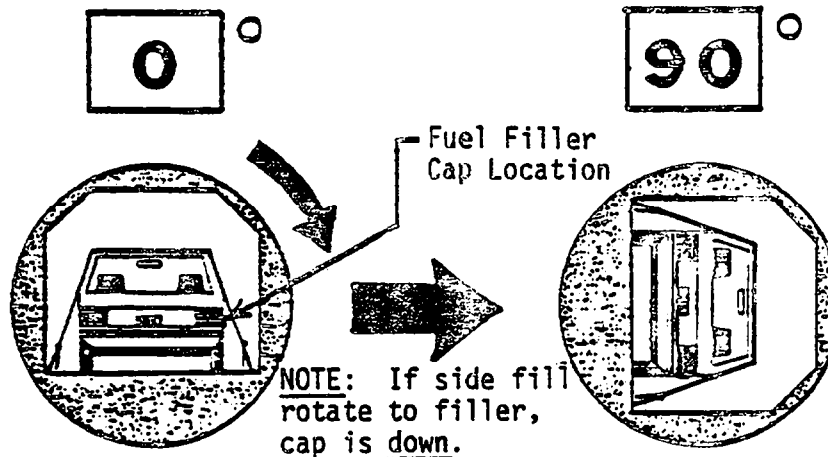
	Actual	Max. Allow.
From impact until vehicle motion ceases	0	1 oz
For 5 min. period after vehicle motion ceases	0	5 oz
For next 25 min.	0	1 oz/1 min

SOLVENT SPILLAGE DETAILS

None

Table 6
FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 52 seconds
 (Spec. Range = 1 to 3 min.)
 FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
 TOTAL = 7 minutes 52 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
----------	---------	---------	---------

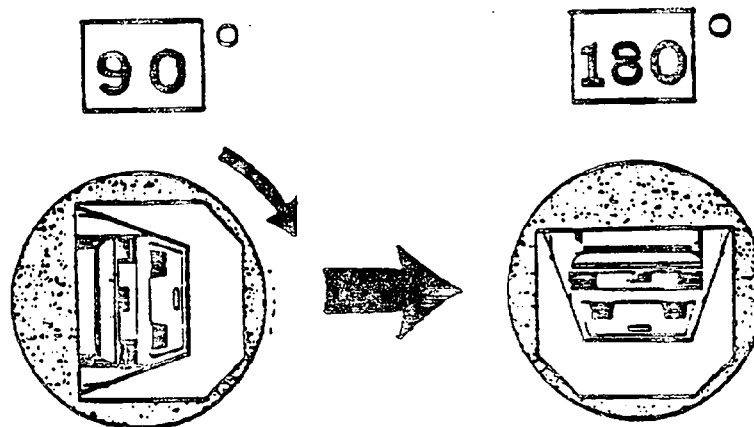
ACTUAL TEST VEHICLE SOLVENT SPILLAGE

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 47 seconds
 (Spec. Range = 1 to 3 min.)
 FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
 TOTAL = 7 minutes 47 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
----------	---------	---------	---------

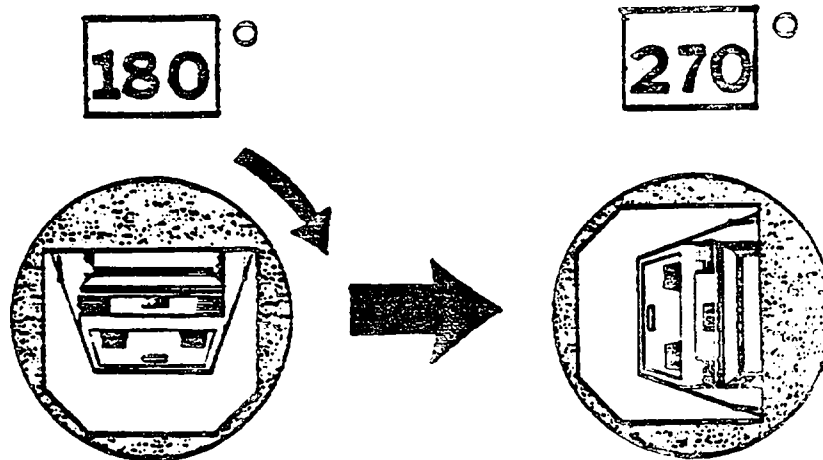
ACTUAL TEST VEHICLE SOLVENT SPILLAGE

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 SHEETTEST PHASEDETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 57 seconds
 (Spec. Range = 1 to 3 min.)
 FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
 TOTAL = 7 minutes 57 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)

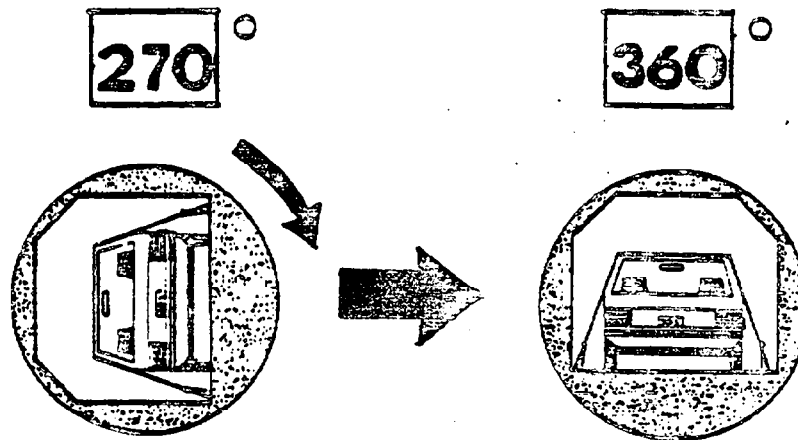
None

VEHICLE NHTSA ID NO. CE5202

Table 6 (cont'd)

FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST PHASE



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD

Rollover Fixture 90° Rotation Time = 2 minutes 49 seconds
 (Spec. Range = 1 to 3 min.)
 FMVSS 301-75 Position Hold Time = 5 minutes 00 seconds
 TOTAL = 7 minutes 49 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 (OMI AND AID DATA)

- Vehicle Measurements
- Vehicle Accelerometer Locations
- Load Cell Barrier-Load Cells Locations
- AID Data Summary
- Camera Positions and Locations
- Owner's Manual Seat Belt Instructions
- Dummy In-Vehicle Positioning
- Dummy Injury Criteria Values
- Belt Related Data

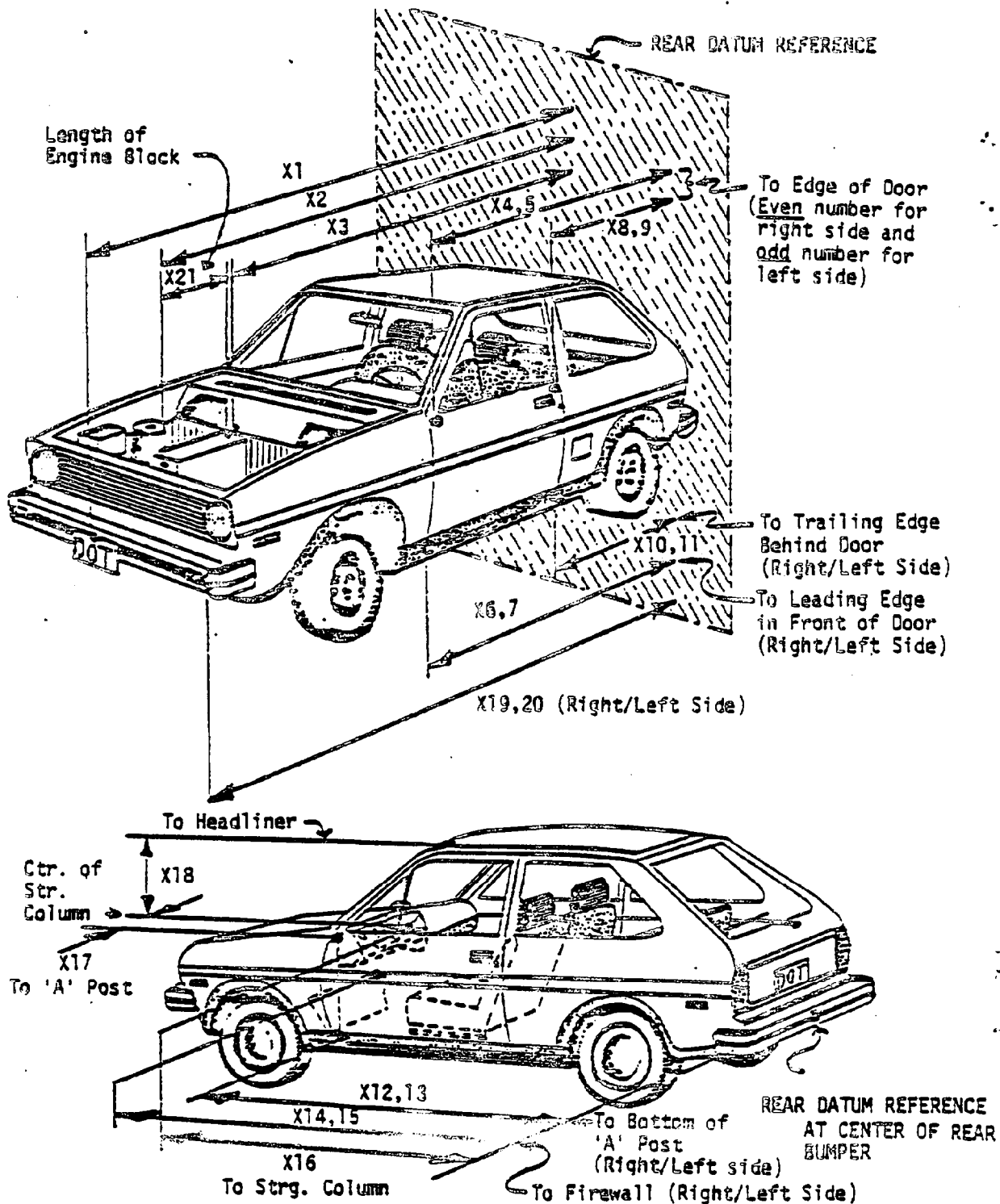
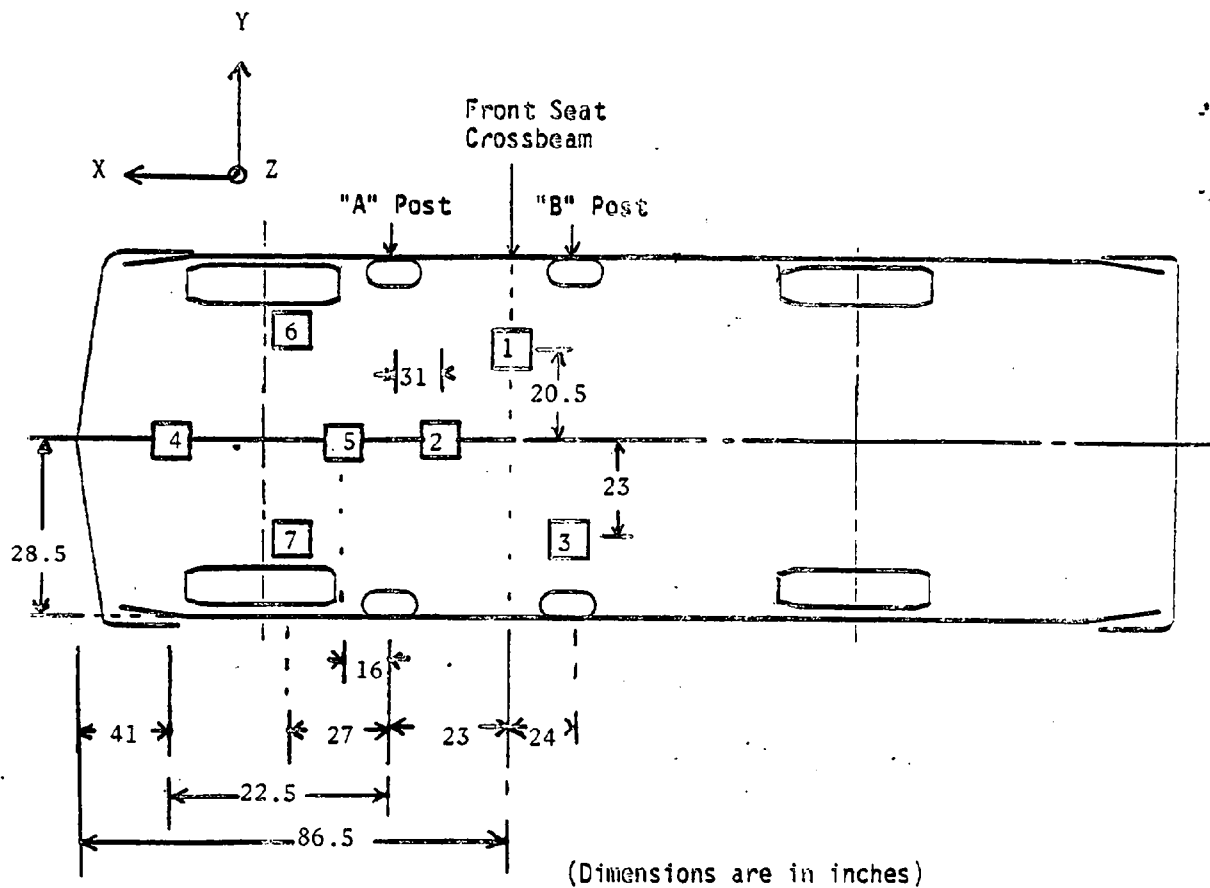


Figure 2 PRE- AND POST-TEST MEASUREMENT POINTS

Table 7

VEHICLE MEASUREMENTS

No.		All Dimensions in Inches		
		Pre-Test	Post-Test	Difference
X1	Total Length of Vehicle at Centerline	170.6	144.7	25.9
X2	Rear Surface of Vehicle to Front of Engine	136.1	129.6	6.5
X3	Rear Surface of Vehicle to Firewall	104.1	108.5	-4.4
X4	Rear Surface of Vehicle to Upper Leading Edge of Right Door	104.2	103.5	.7
X5	Rear Surface of Vehicle to Upper Leading Edge of Left Door	104.1	103.4	.7
X6	Rear Surface of Vehicle to Lower Leading Edge of Right Door	104.5	103.4	1.1
X7	Rear Surface of Vehicle to Lower Leading Edge of Left Door	104.4	103.6	.8
X8	Rear Surface of Vehicle to Upper Trailing Edge of Right Door	57.9	57.4	.5
X9	Rear Surface of Vehicle to Upper Trailing Edge of Left Door	58.0	57.5	.5
X10	Rear Surface of Vehicle to Lower Trailing Edge of Right Door	61.8	61.3	.5
X11	Rear Surface of Vehicle to Lower Trailing Edge of Left Door	61.9	61.2	.7
X12	Rear Surface of Vehicle to Bottom of "A" Post of Right Side	103.9	103.5	.4
X13	Rear Surface of Vehicle to Bottom of "A" Post of Left Side	103.9	102.9	1.0
X14	Rear Surface of Vehicle to Firewall, Right Side	113.9	109.5	4.4
X15	Rear Surface of Vehicle to Firewall, Left Side	114.0	110.5	3.5
X16	Rear Surface of Vehicle to Steering Column	87.0	84.1	2.9
X17	Center of Steering Column to "A" Post	14.5	14.5	0
X18	Center of Steering Column to Headliner	16.5	20.1	-3.6
X19	Rear Surface of Vehicle to Right Side of Front Bumper	169.0	144.1	24.9
X20	Rear Surface of Vehicle to Left Side of Front Bumper	169.0	148.1	20.9
X21	Length of Engine Block	15.1	15.1	0



ACCELEROMETER NUMBER *	ACCELEROMETER LOCATION	DIRECTION		
		X	Y	Z
1	Front Seat Crossmember	X		
2	Vehicle C.G.	X		
3	Rear Seat Crossmember	X		
4	Top of Engine	X		
5	Bottom of Engine	X		
6	Right Front Brake Caliper	X		
7	Left Front Brake Caliper	X		

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

FIGURE 3 VEHICLE ACCELEROMETER LOCATIONS

36 LOAD CELLS
4 ROWS
9 COLUMNS

FRONT VIEW

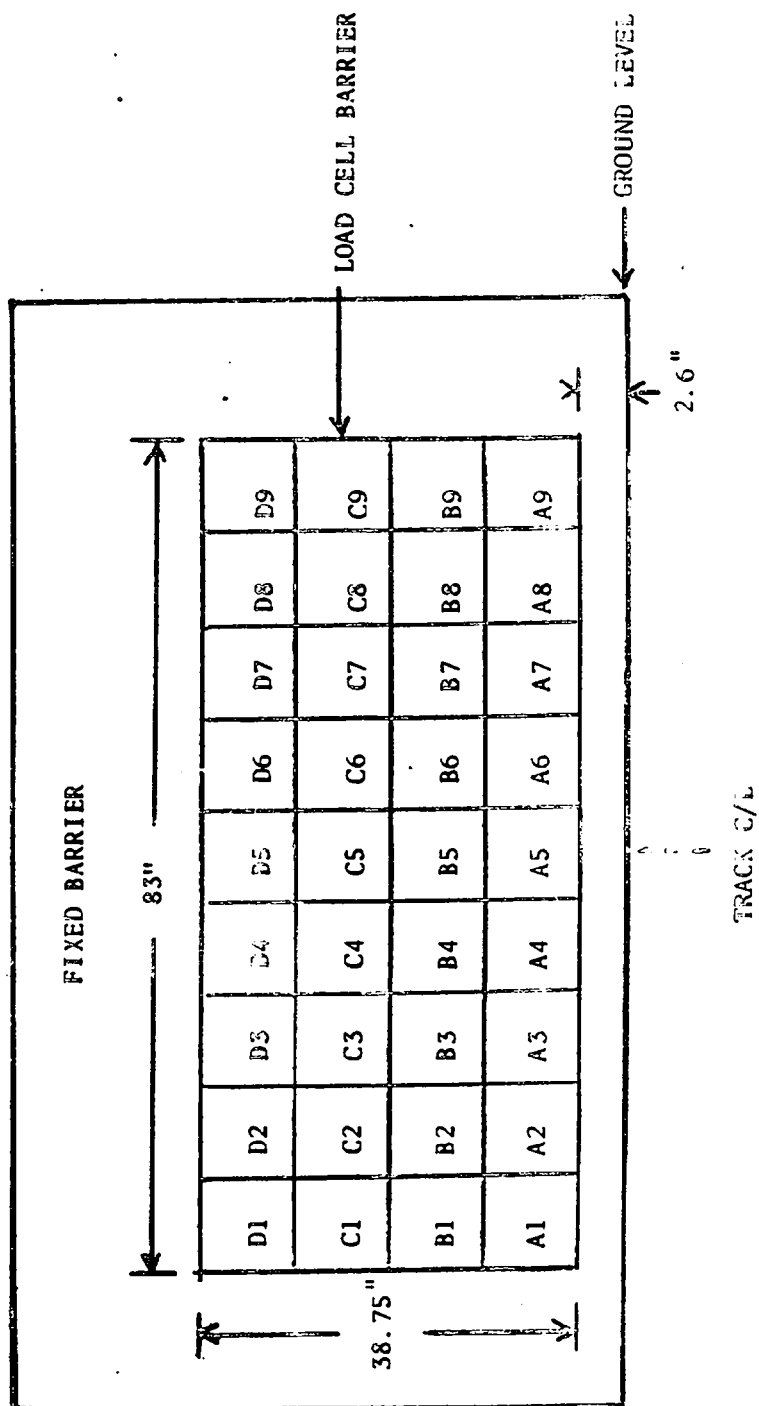


Figure 4 FIXED LOAD CELL BARRIER-LOAD CELL LOCATIONS

Table 8
ACCIDENT INVESTIGATION DIVISION
Data Summary

Test No. CE5202
Date 1/18/84

Vehicle No. 1

Impact Description	<u>Frontal load cell barrier</u>
Make	<u>Nissan 300ZX</u>
Model	<u>2-door coupe</u>
Year	<u>1984</u>
Size Category	<u>Compact</u>
Test Weight (lb.)	<u>3370</u>
Wheelbase (in.)	<u>91.5</u>
Front Overhang (in.)	<u>35.2</u>
Overall Width (in.)	<u>67.9</u>
Accelerometer Location	<u>49.7 inches aft of front wheel C/L</u>
Calibration Procedure	<u>shaker table/least squares</u>
Accelerometer Linearity	<u>± 0.75%</u>
Integration Algorithm	<u>Hybrid Simpson-Newton 3/8</u>
Impact Speed (mph)	<u>34.97</u>
Time of Separation (msec)	<u>187.05</u>
Velocity Change (mph)	<u>40.18</u>
CDC	<u>12 FDEW3</u>
Damage Length (in.)	L: <u>53.2</u>
Crush Dimensions (in.)	C1: <u>20.6</u>
	C2: <u>26.0</u>
	C3: <u>25.8</u>
	C4: <u>25.4</u>
	C5: <u>25.4</u>
	C6: <u>24.6</u>
Midpoint of Damage	D: <u>0</u>

National Accident Sampling System -- Continuous Sampling Subsystem: Vehicle Data

FIELD MEASUREMENTS

1984 NISSAN 300ZX JN143 1450 3X00 4531

Complete When Applicable

End Damage	Side Damage
Undeformed end width <u>53.3</u>	Bowing: B1 _____ X1 _____
Corner shift: A1 _____	B2 _____ X2 _____
A2 _____	Bowing constant
End shift at frame (CDC), (check one)	$\frac{X1 + X2}{2} =$ _____
< 4 inches _____	
≥ 4 inches _____	<u>12 FDEW3</u>

Note: Measure C1 to C6 from Driver to Passenger side in Front or Rear impacts--
Rear to Front in Side impacts.

Specific Impact Number	Plane* of C-Measurements	Direct Damage		Field L**	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	±D
		Width** (CDC)	Max*** Crush								
1	Bumper	53.25	26.5	53.25	23.7	26.5	25.8	25.4	25.9	26.2	
	Free space		1.5		1.6	.5	8	6	.5	1.6	
1	ACTUAL CRUSH		26.0		20.6	26.0	25.8	25.4	25.4	24.6	

*Identify the plane at which the C-measurements are taken (e.g., at bumper, above bumper, at sill, above sill, at beltline, etc.) or label adjustments (e.g., free space).

Free space value is defined as the distance between the baseline and the original body contour taken at the individual C locations. This may include the following: bumper lead, bumper taper, side protrusion, side taper, etc. Record the value for each C-measurement and maximum crush.

**Measure and document on the vehicle diagram the beginning or end of the direct damage width and field L (e.g., side damage with respect to undamaged axle).

***Measure and document on the vehicle diagram the location of the maximum crush.

Note: Use as many lines/columns as necessary to describe each damage profile.

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

NATIONAL ACCIDENT SAMPLING SYSTEM—CONTINUOUS SAMPLING SUBSYSTEM: VEHICLE

Page 3D

DAMAGE DESCRIPTION		TYPE OF TRANSMISSION	WHEEL STEER ANGLES
Tire - Wheel Damage		☒ Manual ☐ Automatic	(For locked front wheels or displaced rear axles only)
a. Rotation physically restricted	b. Tire deflated	Average Track: <u>5/8</u>	RF ± <u> </u> °
RF <u>2</u>	RF <u>2</u>	Maximum Width: <u>5/8</u>	LF ± <u> </u> °
LF <u>2</u>	LF <u>2</u>	Curb Weight: <u> </u>	RR ± <u> </u> °
RR <u>2</u>	RR <u>2</u>	Overall Length: <u>170.6</u>	LR ± <u> </u> °
LR <u>2</u>	LR <u>2</u>		Within ± 5 degrees
(1) Yes, (2) No, (3) NA, (9) Unk.			
1984 DATSUN 300 ZX			
JN1H214503X004531			

Note: Sketch new perimeter and cross hatch direct damage and single hatch induced damage on all views. Annotate observations which might be useful in reconstructing the accident (e.g., grass in tire bead, direction of striations, scuff on sidewall, etc.)

If pulling trailer sketch type of trailer and damage received on reverse side.

Annotate any damage caused by extrication such as component removal by torching, prying or hydraulic shears.

The diagram is a top-down view of a test facility. At the top is a large rectangular area labeled "FIXED COLLISION BARRIER". Below this barrier, a "Test Vehicle" is positioned on a "Concrete Test Pad". The vehicle is cylindrical with a central vertical axis. A "Monorail & Tow Cable" runs vertically from the vehicle down to a jagged line at the bottom representing the ground. Various cameras are labeled: Camera #5 and Camera #11 are on the barrier; Camera #14 (Pit) is above the vehicle; Camera #13 Overhead is directly above the vehicle; Camera #15 (Pit) is below the vehicle; Camera #6 is on the left side of the vehicle; Camera #12 is on the right side of the vehicle; Camera #4 is on the left side of the vehicle; Camera #10 is on the right side of the vehicle; Camera #3, #1, and #2 are on the far left; Camera #9, #7, and #8 are on the far right. A coordinate system is shown on the right with Y pointing up, X pointing left, and Z pointing right. A note at the bottom states: "* Stadia Pole 72 inches from Barrier Face".

4-9

7209-15

Table 9

HIGH-SPEED CAMERA LOCATIONS

Test No. CE5202 Vehicle 1984 Nissan 300ZX 2-door coupe

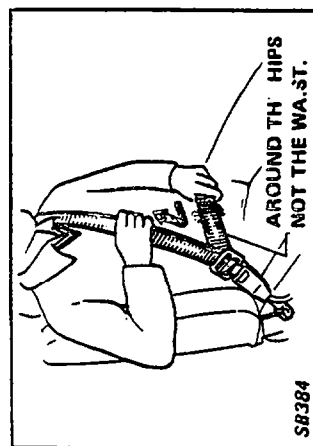
CAMERA NO.	VIEW	CAMERA POSITIONS (in)*			ANGLE** (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Vehicle Left Side	230	54	56	-6	-	13	880
2	Driver	246	72	48	-0	208	35	880
3	Driver	315	26	59	-3	277	50	890
4	Driver	90	108	72	-22	-	13	890
5	Driver (Barrier)	20	0	70	-30	85	13	NO TIMING
6	Left Belt Retractor	-	-	-	-	-	8	1510
7	Vehicle Right Side	281	41	48	-2	-	13	880
8	Passenger	263	66	45	-3	230	35	1020
9	Passenger	223	24	44	-3	274	50	960
10	Passenger	90	104	69	-21	-	13	NO TIMING
11	Passenger (Barrier)	20	0	70	-30	85	13	NO TIMING
12	Right Belt Retractor	-	-	-	-	-	8	NO TIMING
13	Overhead	0	40	216	-90	-	25	1000
14	Engine (Pit)	0	36	-120	90	-	25	920
15	Fuel Tank (Pit)	0	140	-120	90	-	25	900

*X = film plane to monorail centerline

Y = film plane to impact location

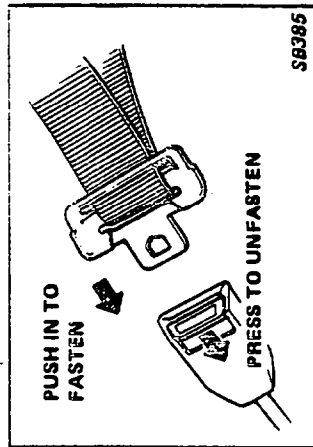
Z = film plane to ground

** = referenced to horizontal plane



FRONT SEAT BELTS

1. Adjust the seat forward or back to the preferred driving position. Adjust the seat back to a comfortable upright position, the seat belts will be less effective if the seat is reclined. Sit upright and well back in the seat; your seat belts are more effective when you sit up and face forward.
2. Take hold of the tongue and slowly pull out the lap-shoulder belt. Remove any twists in the belt and insert the tongue into the buckle until you hear a snapping sound.
3. Position the lap portion of the belt across the lap as low on the hips as possible.



4. If the lap-shoulder belt is slack after you have buckled it, pull the shoulder belt portion toward the retractor to take up the slack.

The front seat belts have an emergency locking retractor which is designed to lock during a sudden stop or in certain kinds of accidents. Under normal circumstances the belt retractor permits the belt to move, allowing you some freedom of movement in the seat.

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

CAUTION:

Be sure to observe the following cautions. 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 as shown in the illustration. Never run the belt under your arm.
- Position the lap belt as low as possible **AROUND THE HIPS, NOT THE WAIST.**
- 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 at the same time.

Figure 7 OWNER'S MANUAL SEAT BELT INSTRUCTIONS

Figure 8
PART 572 DUMMY IN-VEHICLE POSITION

Test No. CE5202

Vehicle 1984 Nissan 300ZX

SEAT TYPE:

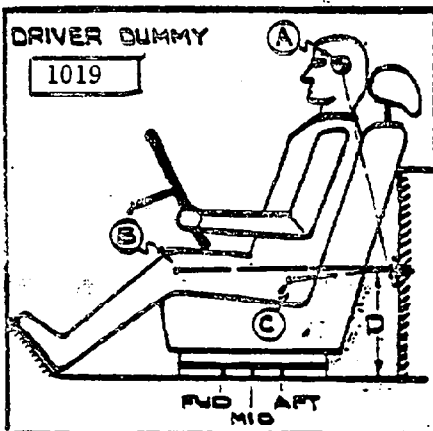
☐ Bench
☒ Bucket
☐ Split Bench

ADJUSTER TYPE:

☒ Manual
☐ Power

BUCKET SEAT BACK TYPE:

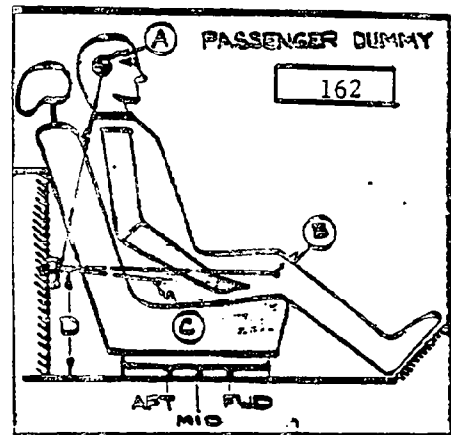
☐ Fixed
☒ Adjustable Reclining



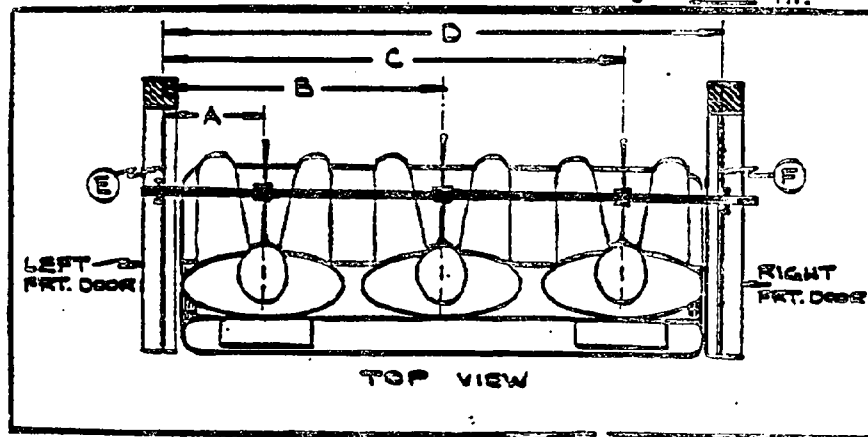
A = 19.5 in. 16 Degrees
B = 29.7 in. 97 Degrees
C = 14.5 in. 115 Degrees
D = 13.5 in.

MEASUREMENT
LOCATION

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



A = 19.6 in. 16 Degrees
B = 29.6 in. 100 Degrees
C = 14.7 in. 114 Degrees
D = 13.5 in.



TOP VIEW

DUMMY ID

1019

162

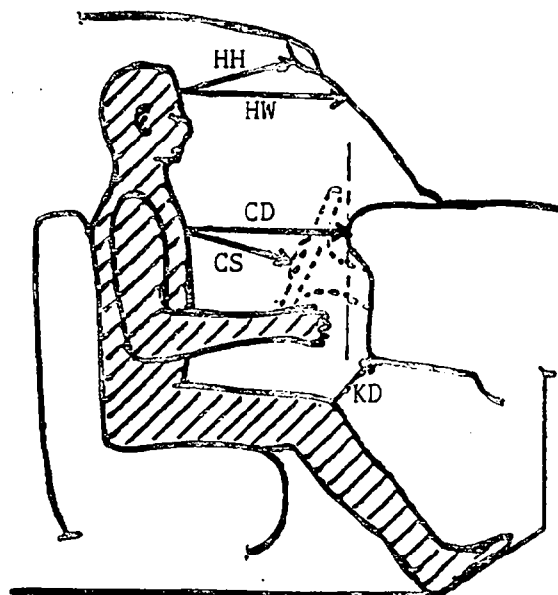
162

A = Left Door to Driver Centerline
B = Left Door to Center Passenger Centerline
C = Left Door to Right Passenger Centerline
D = Left Door to Right Door
E, F = Window Glass Height (Right and Left Must be Equal)

10.1 in.
- in.
40.1 in.
50.3 in.
9.5 in.

Note: SEAT BACK ADJUSTED TO THE 3RD POSITION FROM THE FIRST FOREMOST LATCH POSITION

	DRIVER	PASSENGER
HH	14.5"	14.2"
HW	21.3"	21.0"
CD	21.5"	23.0"
CS	15"	--
KDL	4.5"	6.5"
KDR	5.6"	6.5"
SA	Note	Note
TA	24°	24°



HH = Head to Windshield Header
HW = Head to Windshield
CD = Chest to Dash
CS = Chest to Steering Wheel
KD = Knee to Dash
SA = Seat Back Angle
TA = Torso Angle

HR = Head to Side Roof
HS = Head to Side Window
AD = Arm to Door
HD = Hip to Door

	DRIVER	PASSENGER
HR	4.1"	4.2"
HS	7.2"	7.2"
AD	2.2"	3.5"
HD	6.1"	6.5"

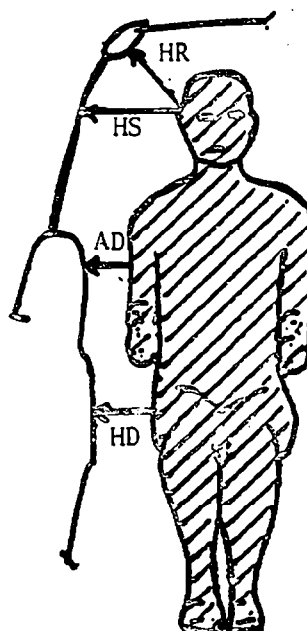


Figure 9 OCCUPANT CLEARANCE DIMENSIONS

Table 10
DUMMY INJURY CRITERIA VALUES

	MAXIMUM ACCELERATION ("G")							
	HEAD				CHEST			
	X	Y	Z	R	X	Y	Z	R*
DUMMY (1)	-101	-37	62	122	-47	-8	-14	45.2
DUMMY (2)	-108	-17	65	115	-39	13	-21	39.3
DUMMY (3)								
DUMMY (4)								

	MAXIMUM FORCE-FEMUR LOAD (LBS)	
	RIGHT FEMUR	LEFT FEMUR
DUMMY (1)	2085	1140
DUMMY (2)	1775	720
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)	1440	--	1255
DUMMY (2)	1800	1375	--
DUMMY (3)			
DUMMY (4)			

	HEAD INJURY CRITERIA**				SEVERITY INDEX
	HIC	S ₁ (SEC)	S ₂ (SEC)	AVE. ACC. (g) t ₁ TO t ₂	HEAD
DUMMY (1)	788.8	.07140	.12030	48.2	1112.6
DUMMY (2)	1037.9	.07500	.12180	54.7	1518.2
DUMMY (3)					
DUMMY (4)					

*DEFINED AS EXCEEDING 0.003 SEC. DURATION

**AS DEFINED IN FMVSS NO. 208

Table 11
BELT RELATED DATA

	<u>Driver</u>	<u>Passenger</u>
Belt Spool-off (in.)		
film	4.0	5.0
electronic	3.4	3.6
Belt Strain ⁽¹⁾	.28 in./ft.	.4 in./ft.
Belt Length Data (in.)		
total length (2)	--	--
retractor to "D" ring (2)	covered	covered
torso belt (3)	38.2	38.2
lap belt (3)	30.2	30.0
remainder on spool	covered	covered

(1) as measured between retractor and "D" ring

(2) retractor spool to bolt hole anchor point for unibelts

(3) as measured on Part 522 dummy

APPENDIX A
PHOTOGRAPHS

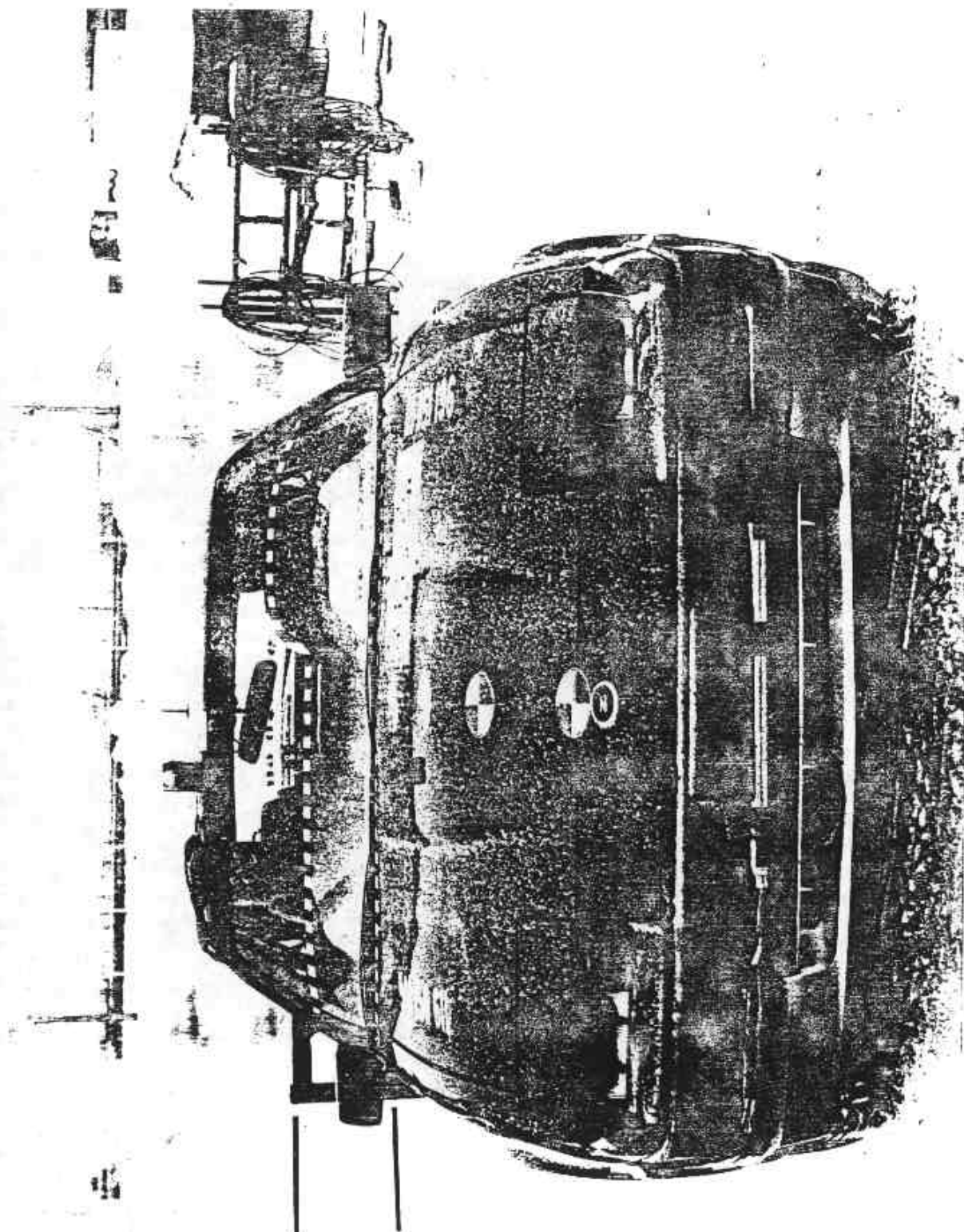


Figure A-1 PRE-TEST FRONT VIEW

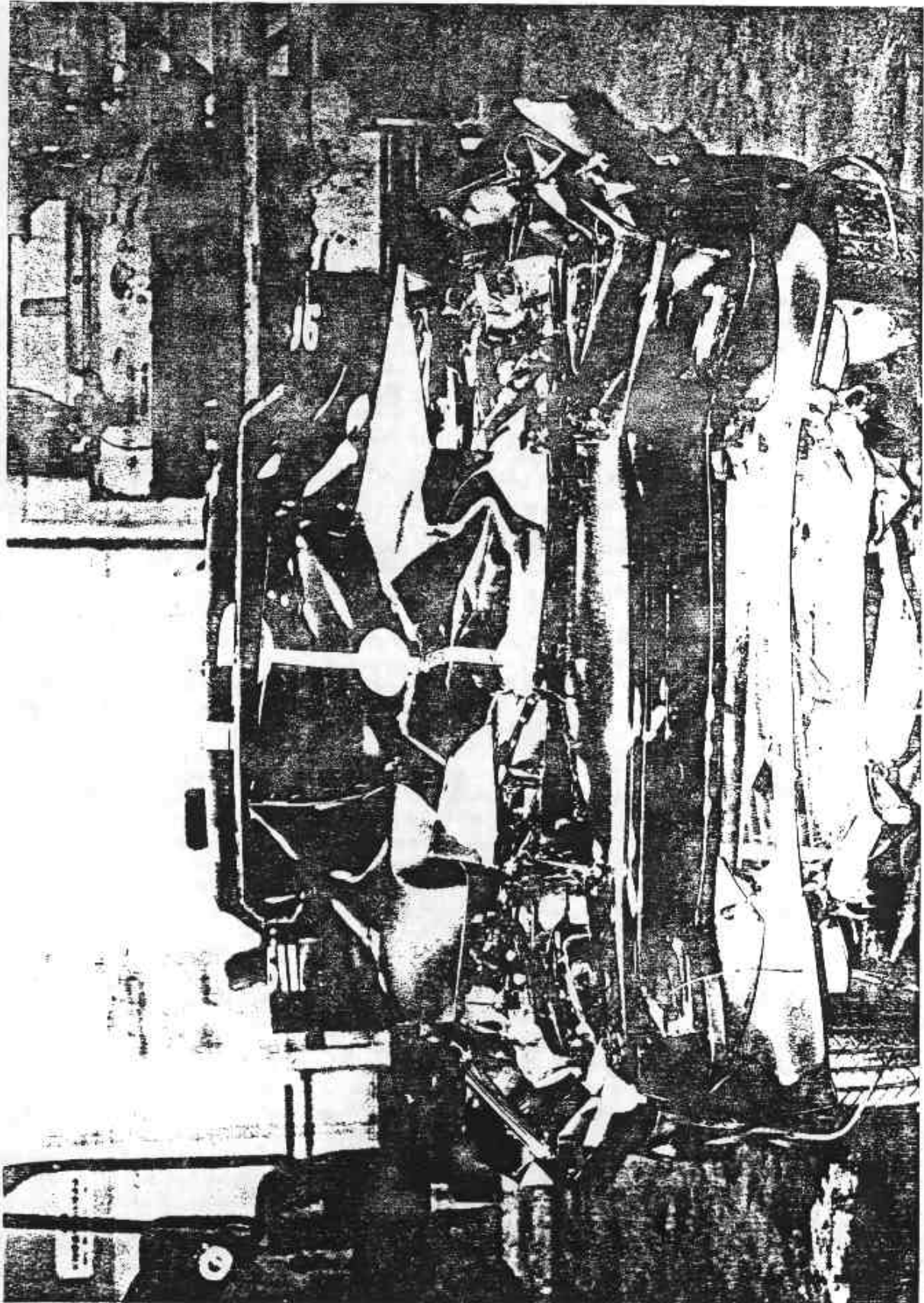


Figure A-2 POST-TEST FRONT VIEW

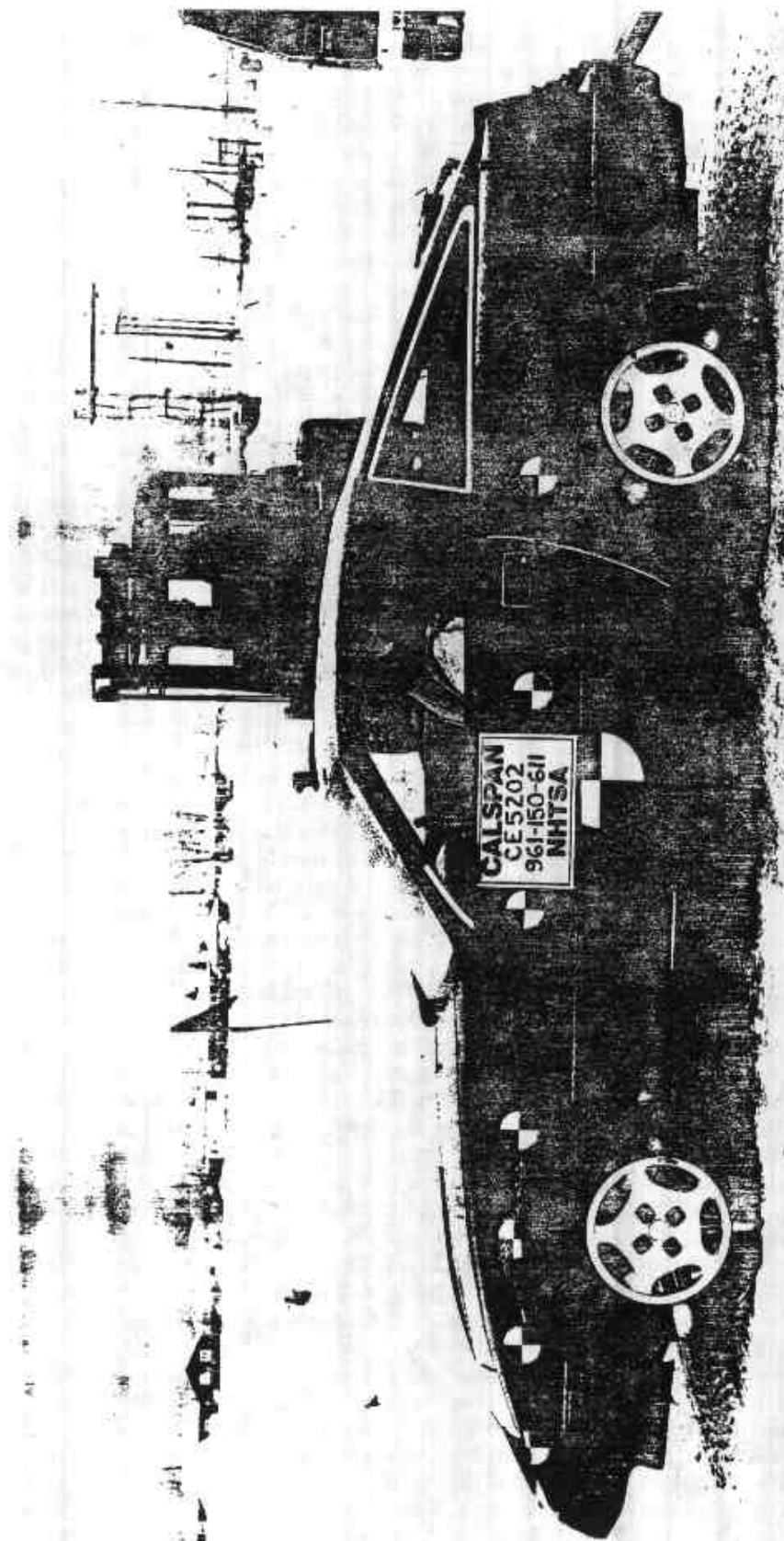


Figure A-3 PRE-TEST LEFT SIDE VIEW

A-4

7209-15

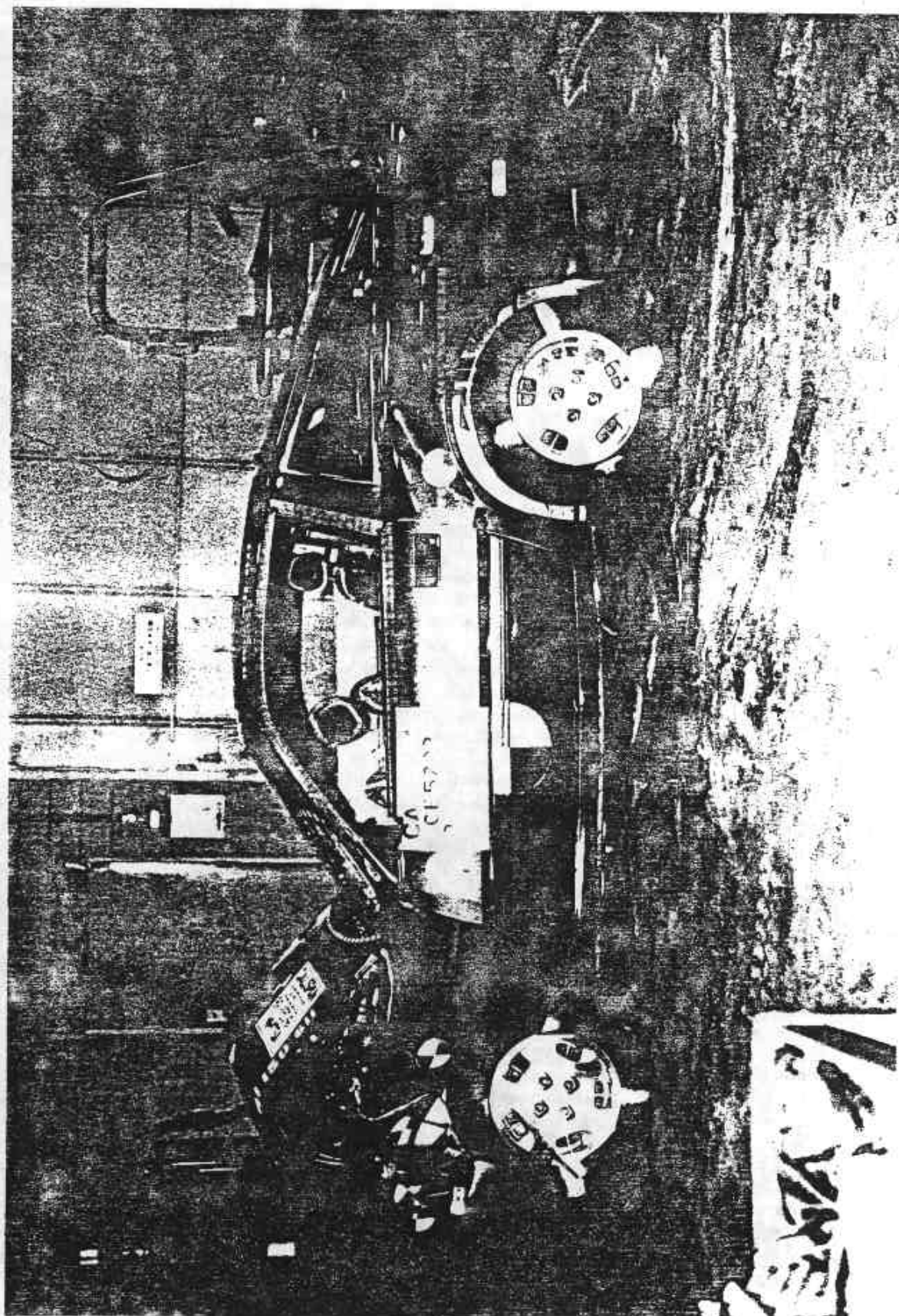
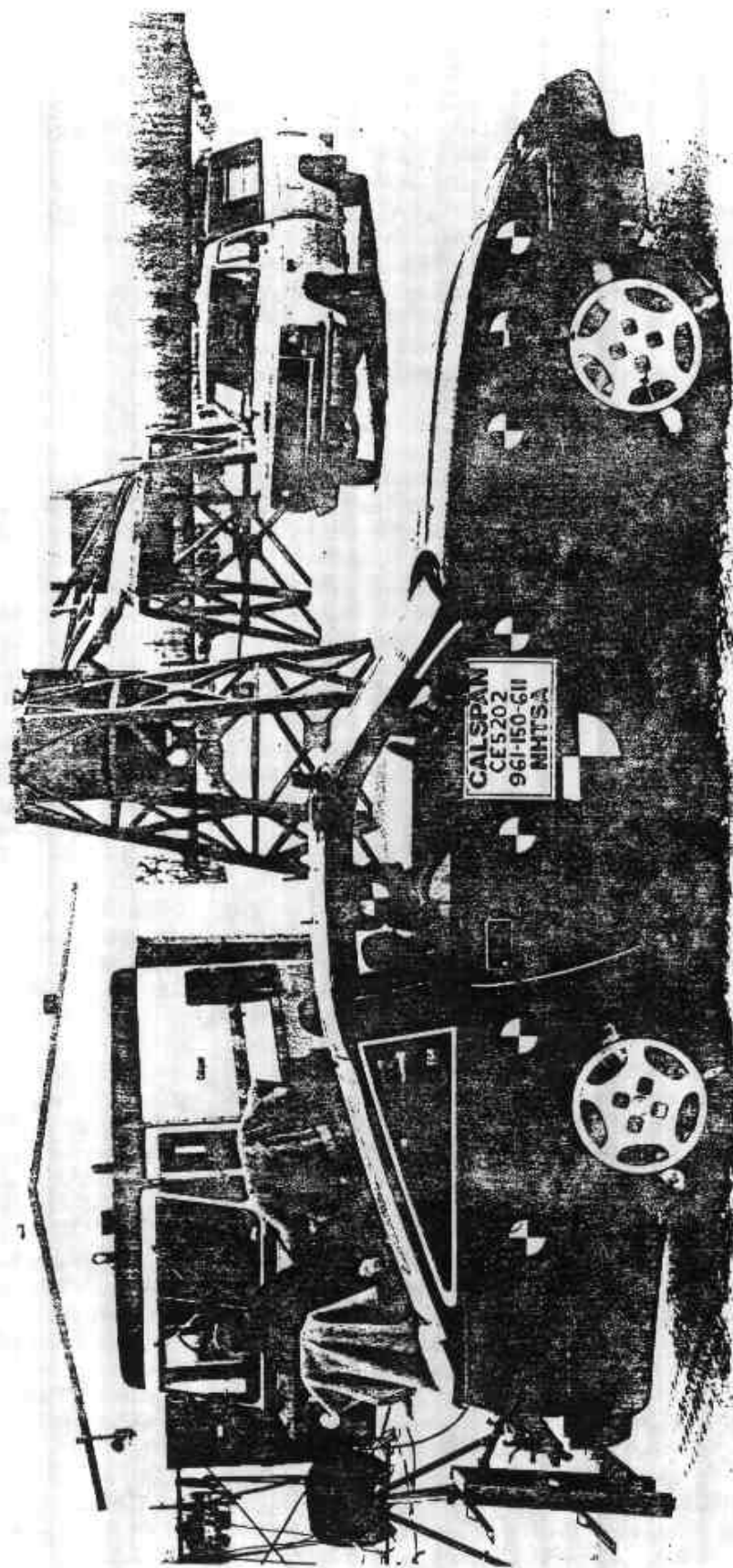


Figure A-4 POST-TEST LEFT SIDE VIEW



A-6

7209-15

Figure A-5 PRE-TEST RIGHT SIDE VIEW

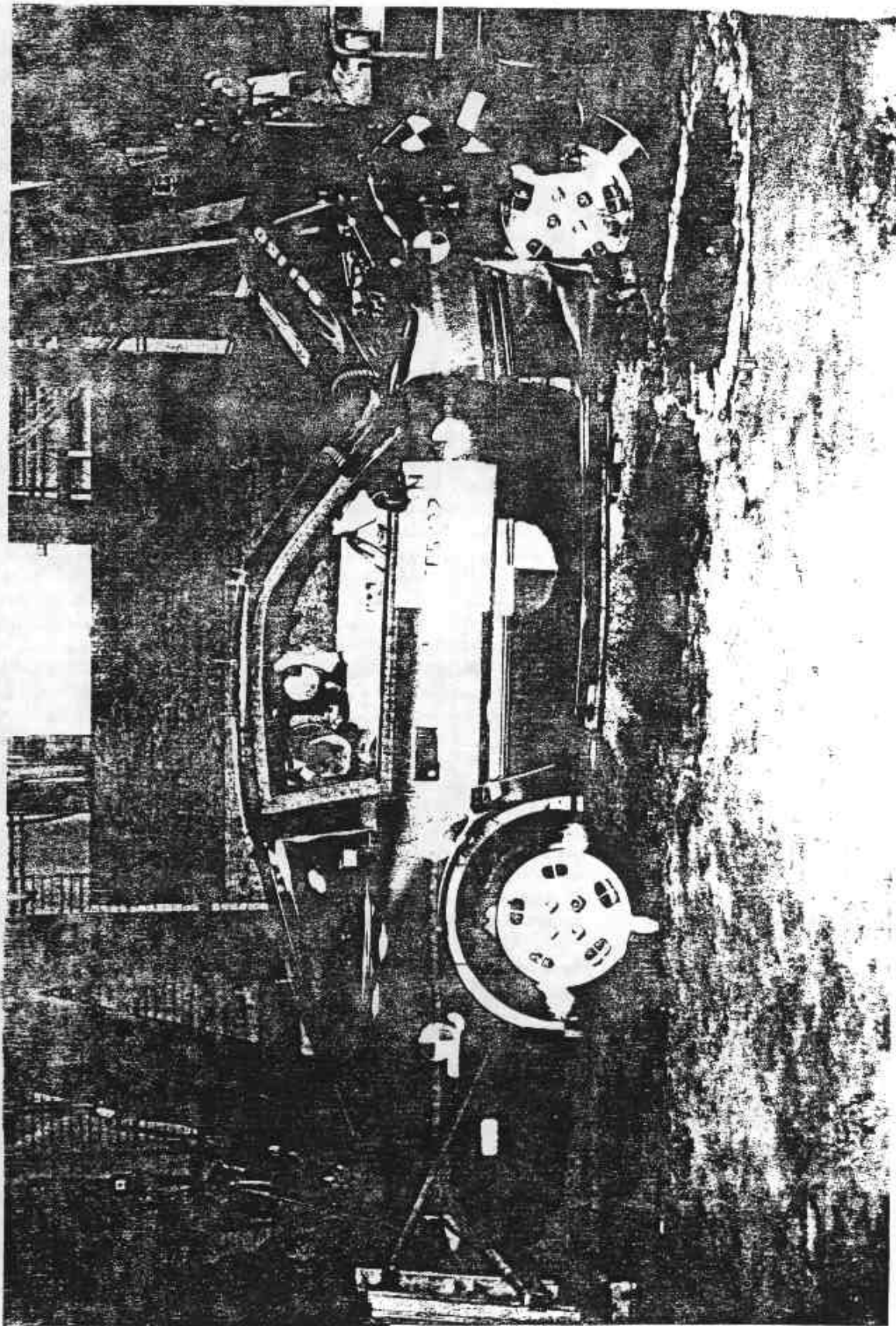


Figure A-6 POST-TEST RIGHT SIDE VIEW

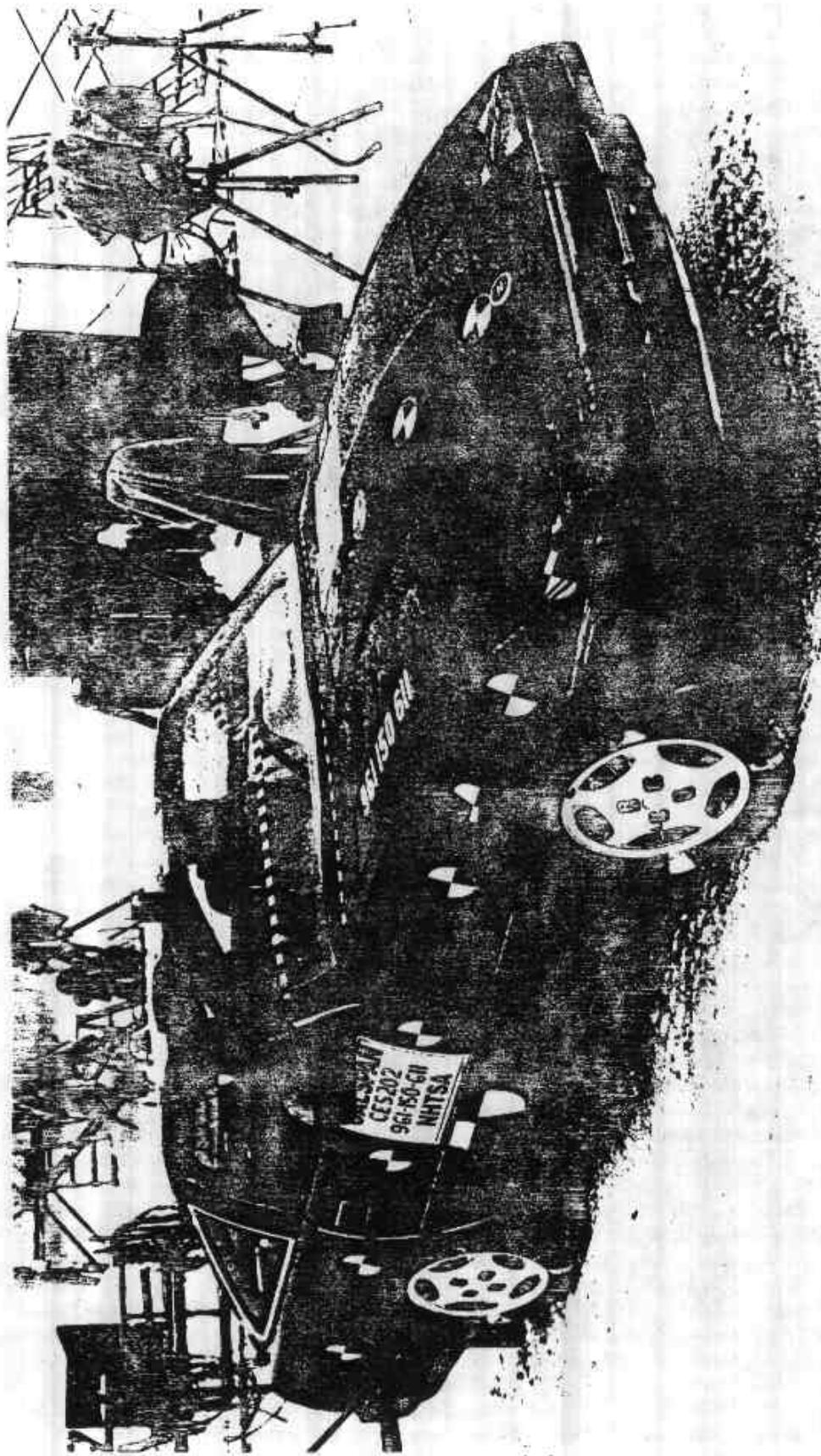


Figure A-7 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

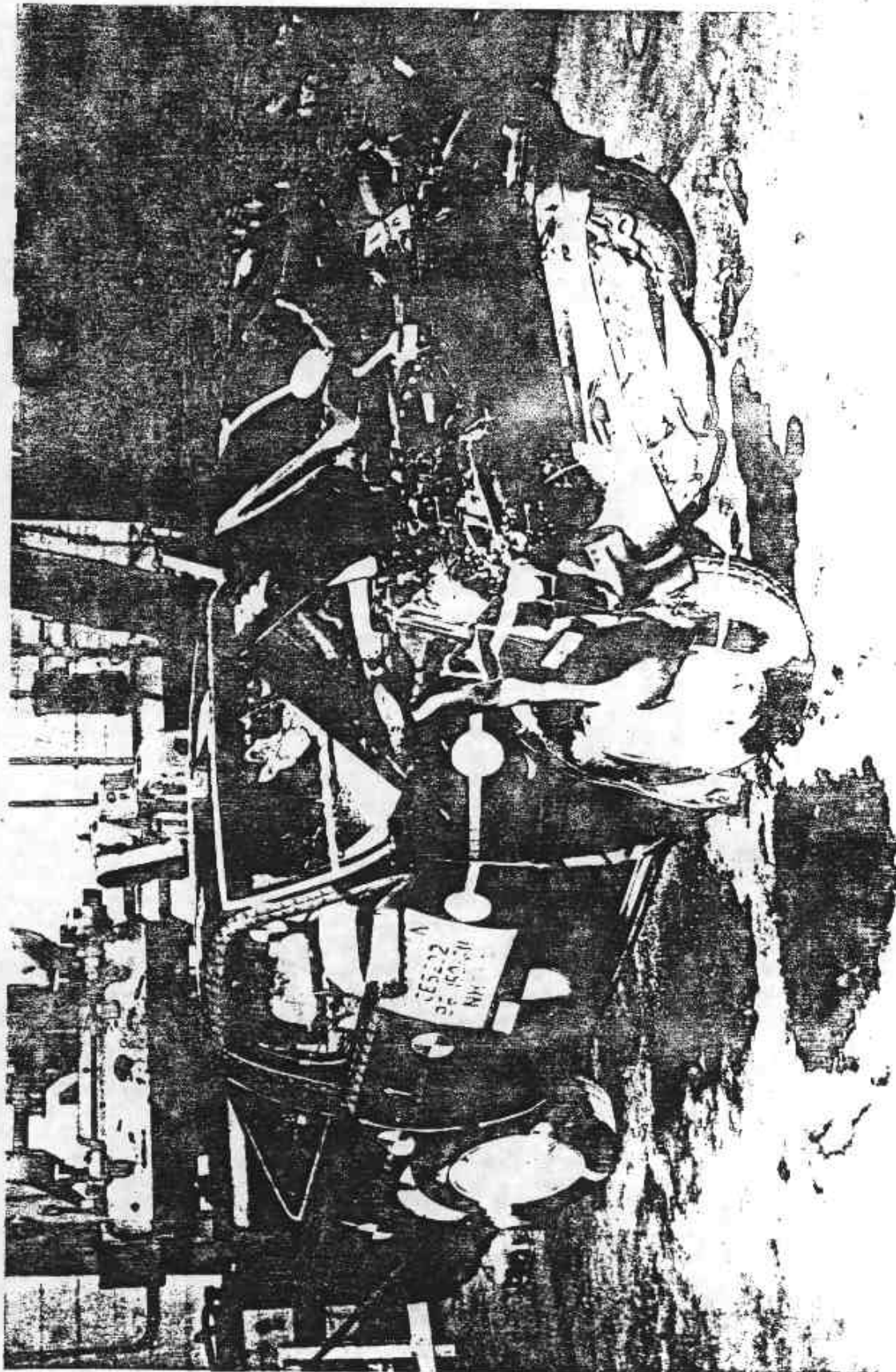


Figure A-8 POST-TEST RIGHT FRONT THREE-QUARTER VIEW

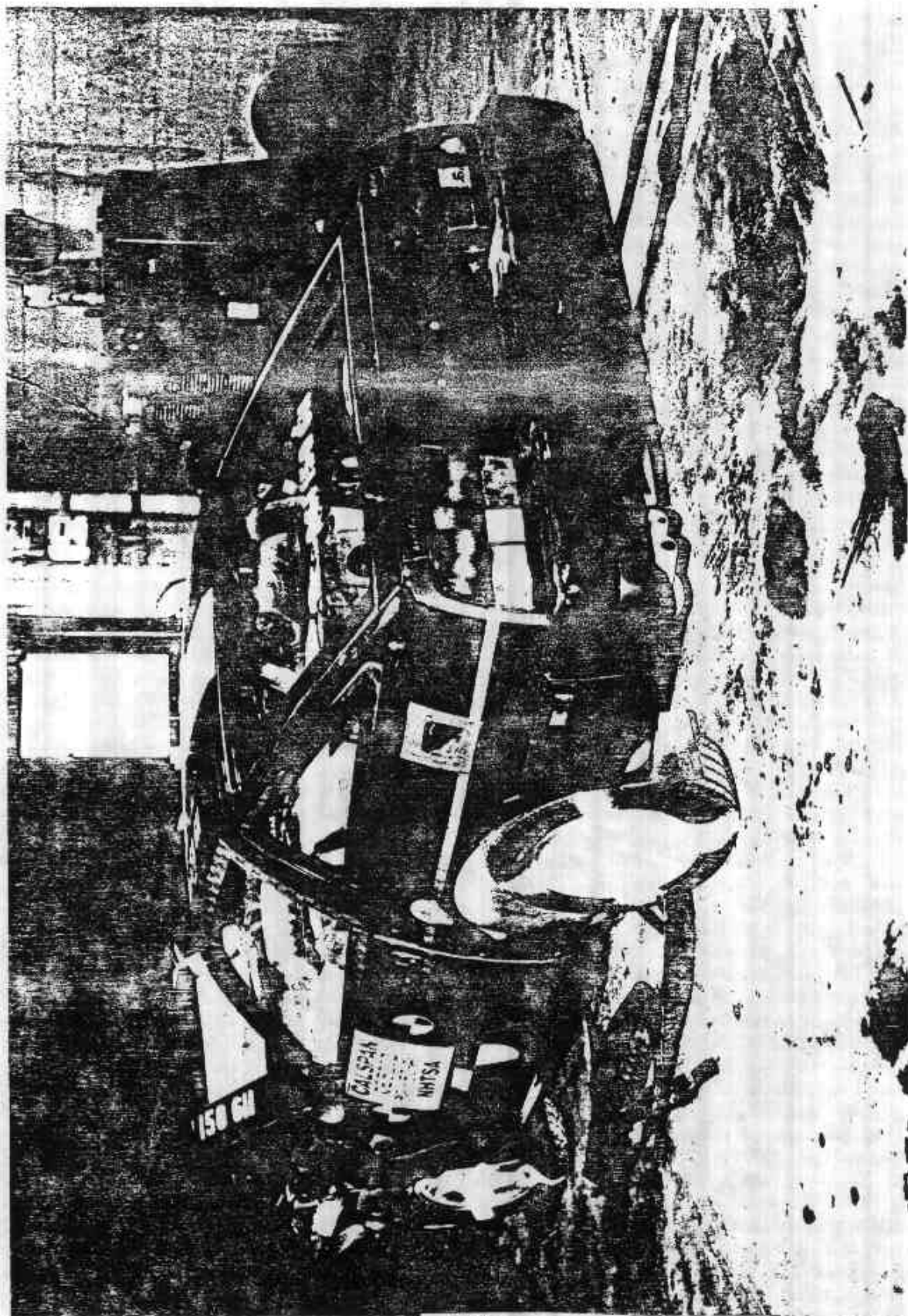


Figure A-9 PRE-TEST LEFT REAR THREE-QUARTER VIEW

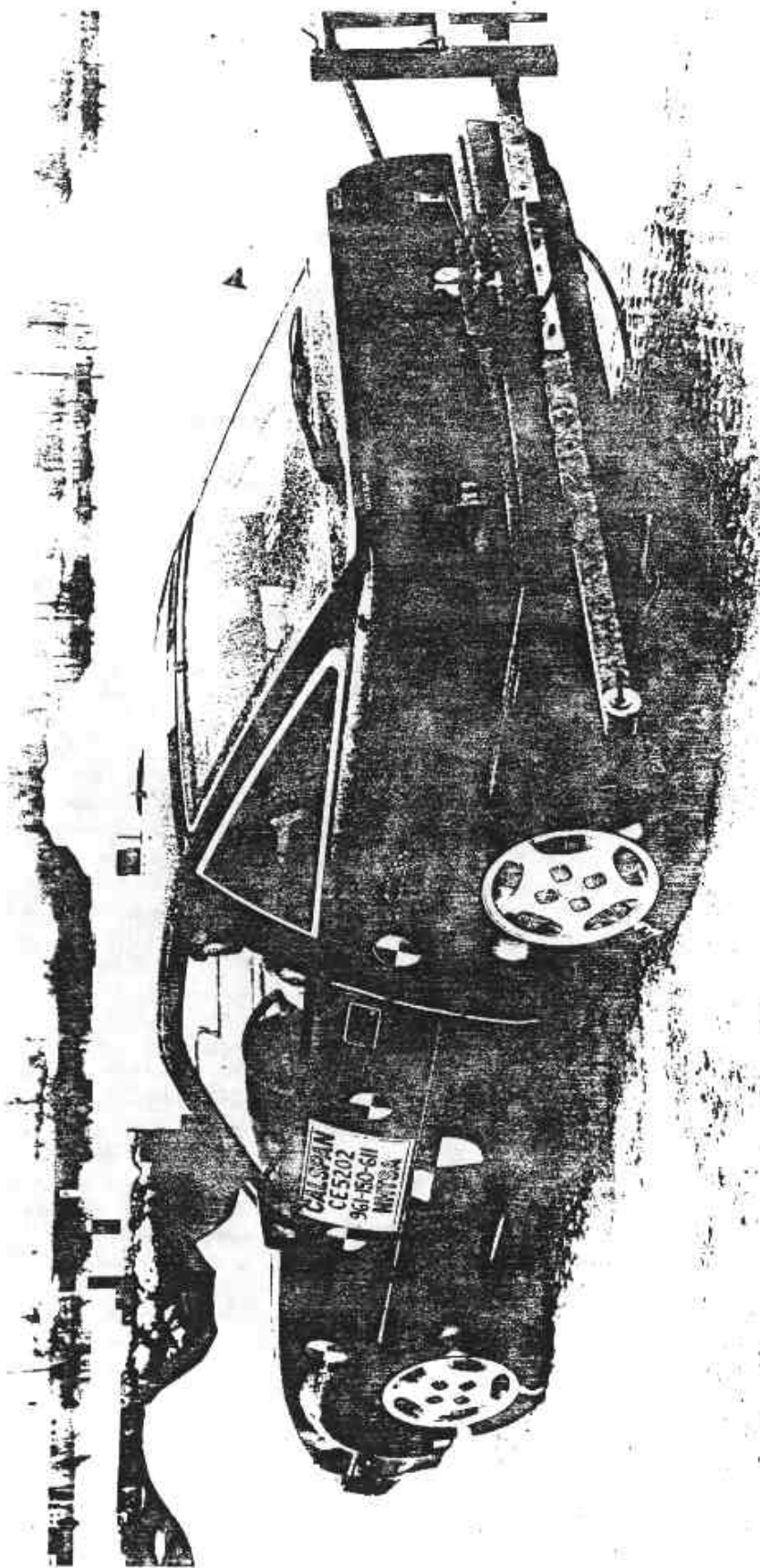


Figure A-10 POST-TEST LEFT REAR THREE-QUARTER VIEW

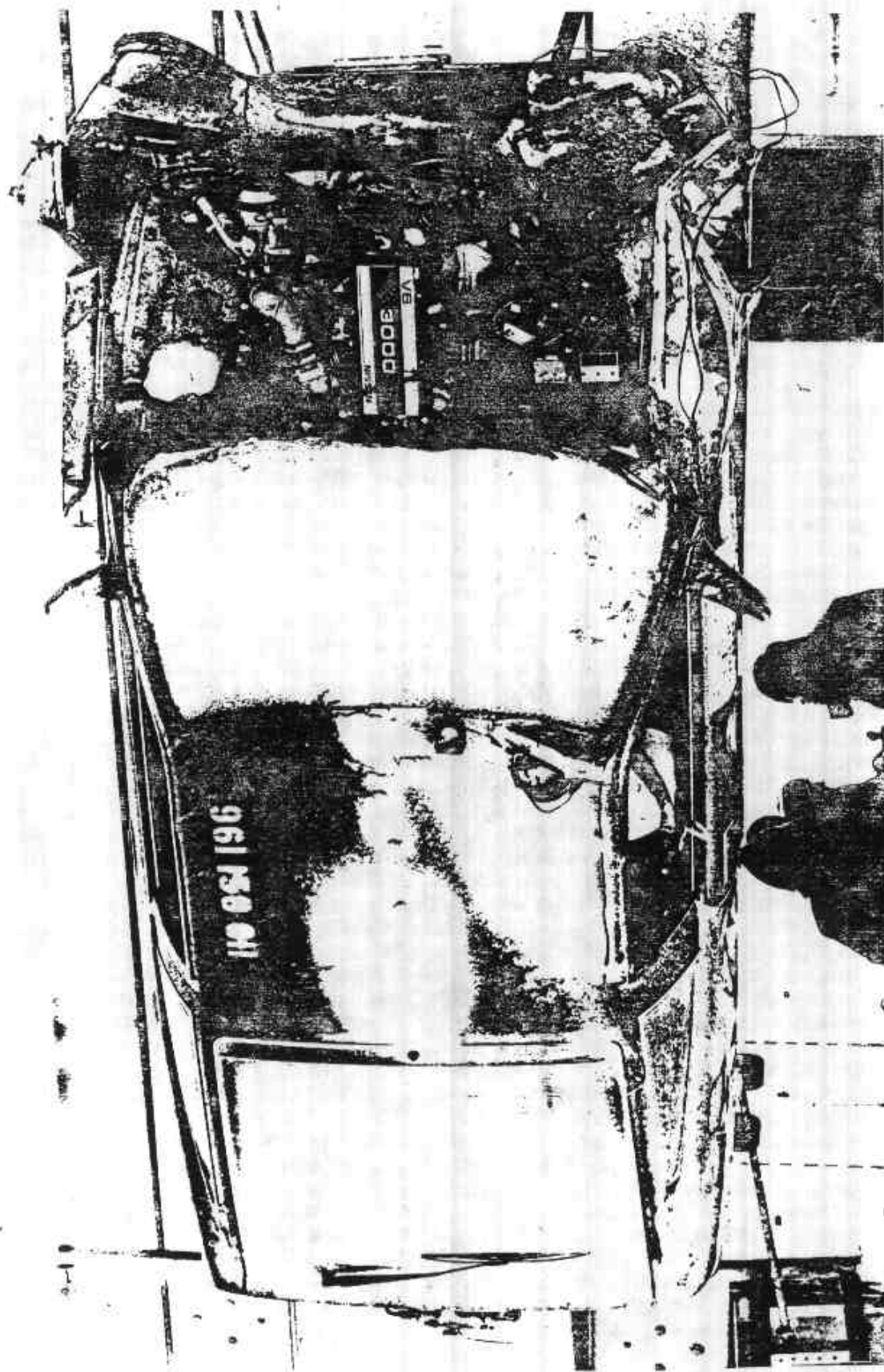


Figure A-11 POST-TEST TOP VIEW

A-12

7209-15

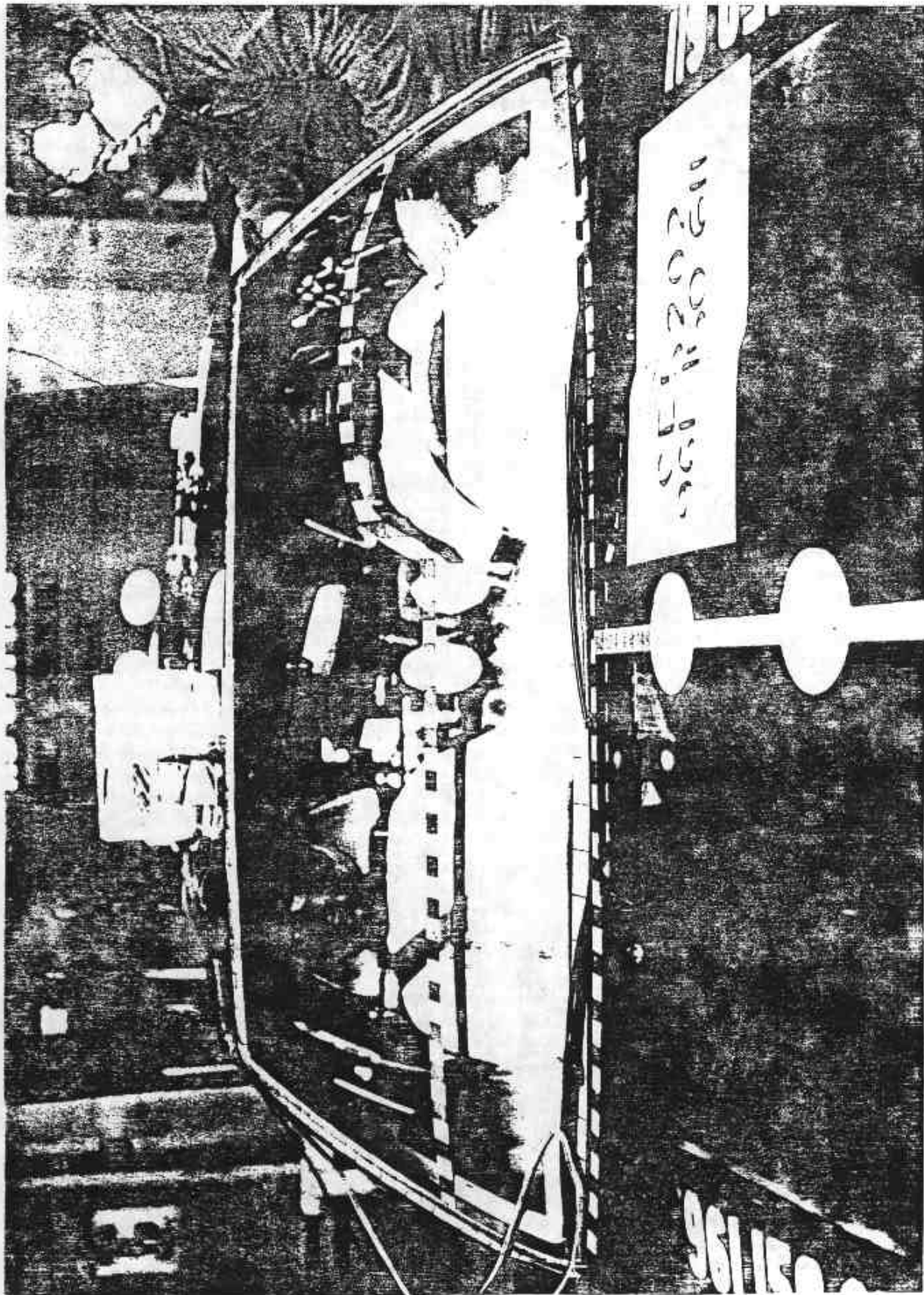


Figure A-12 PRE-TEST WINDSHIELD VIEW

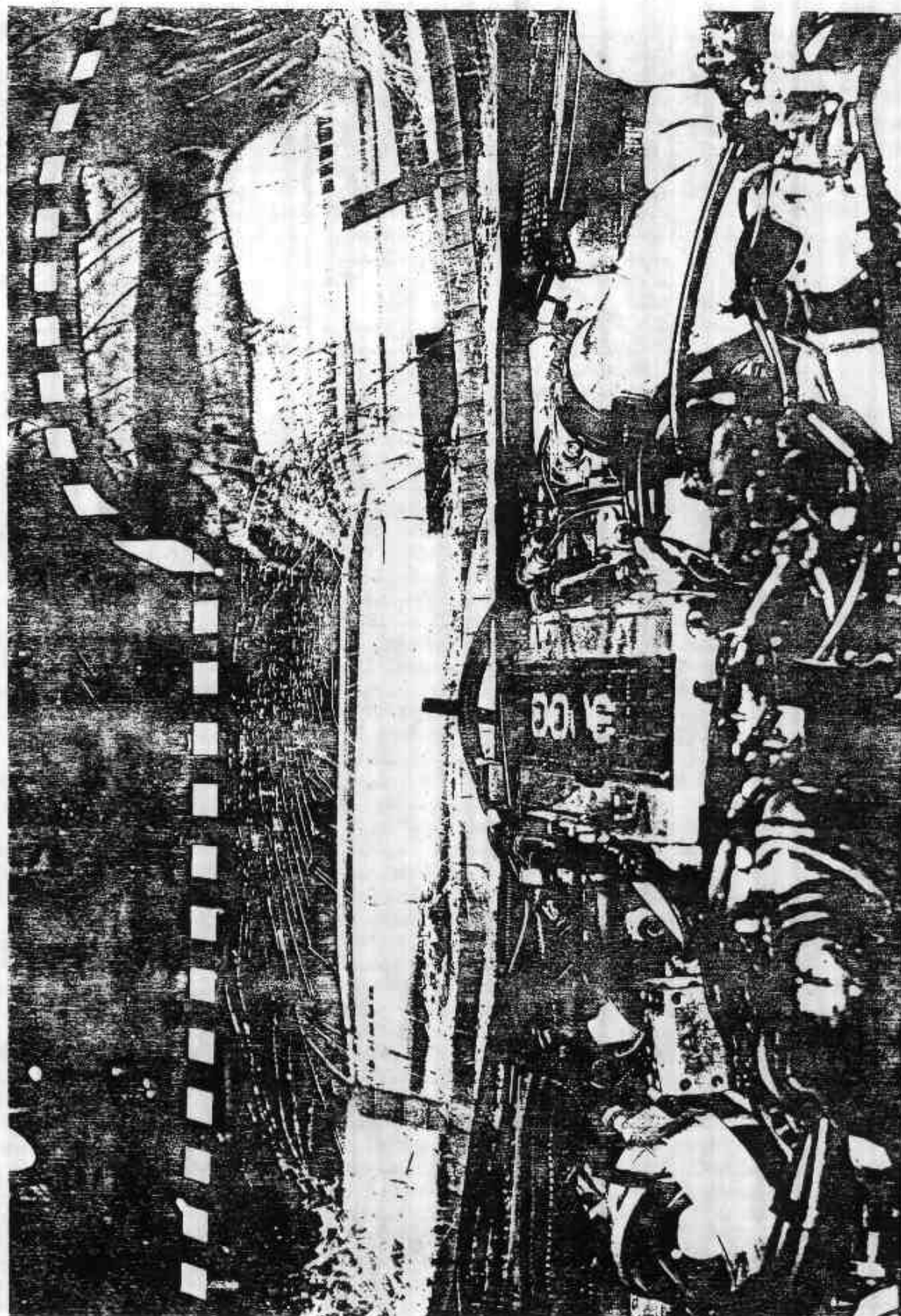


Figure A-13 POST-TEST WINDSHIELD VIEW

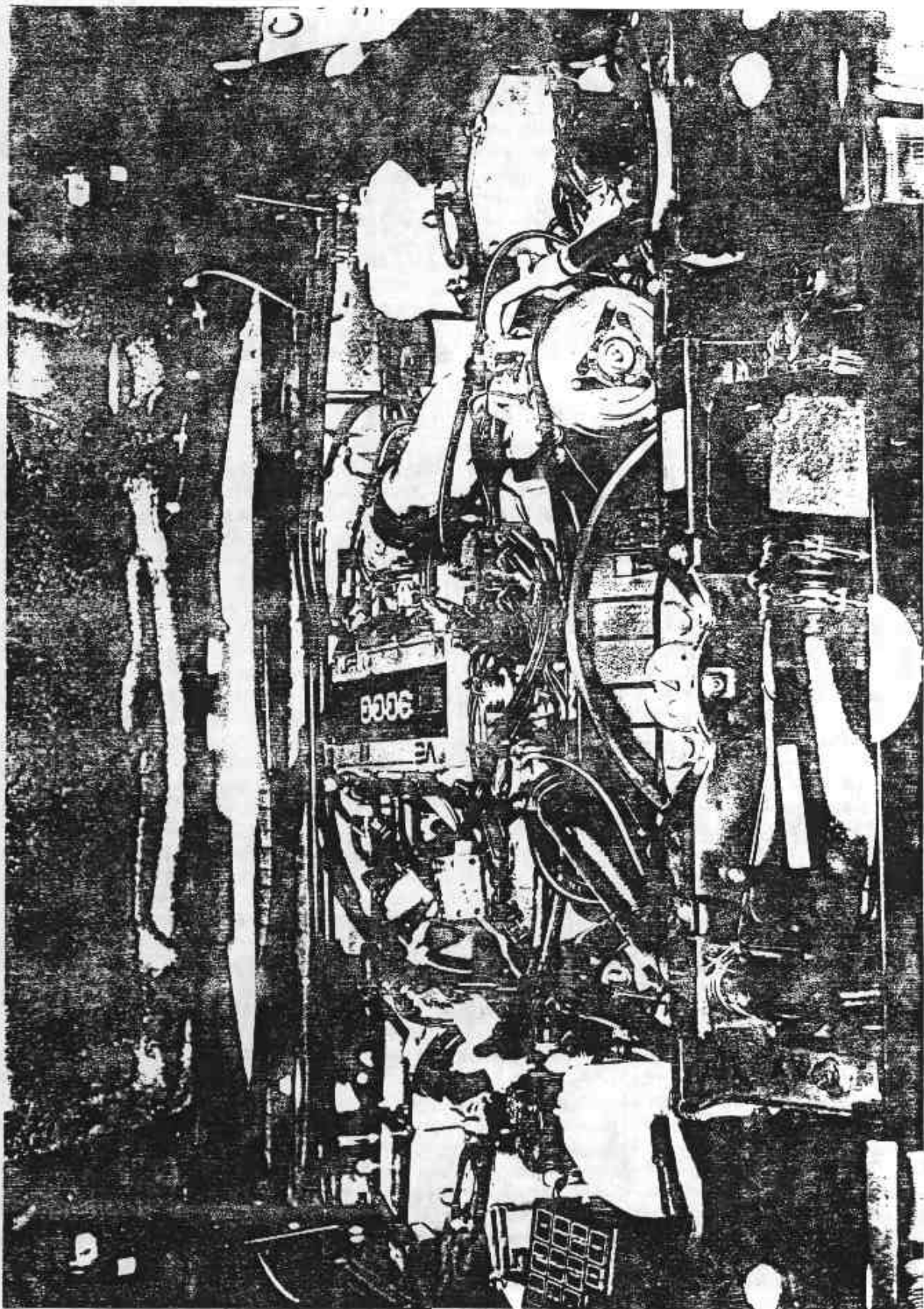


Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

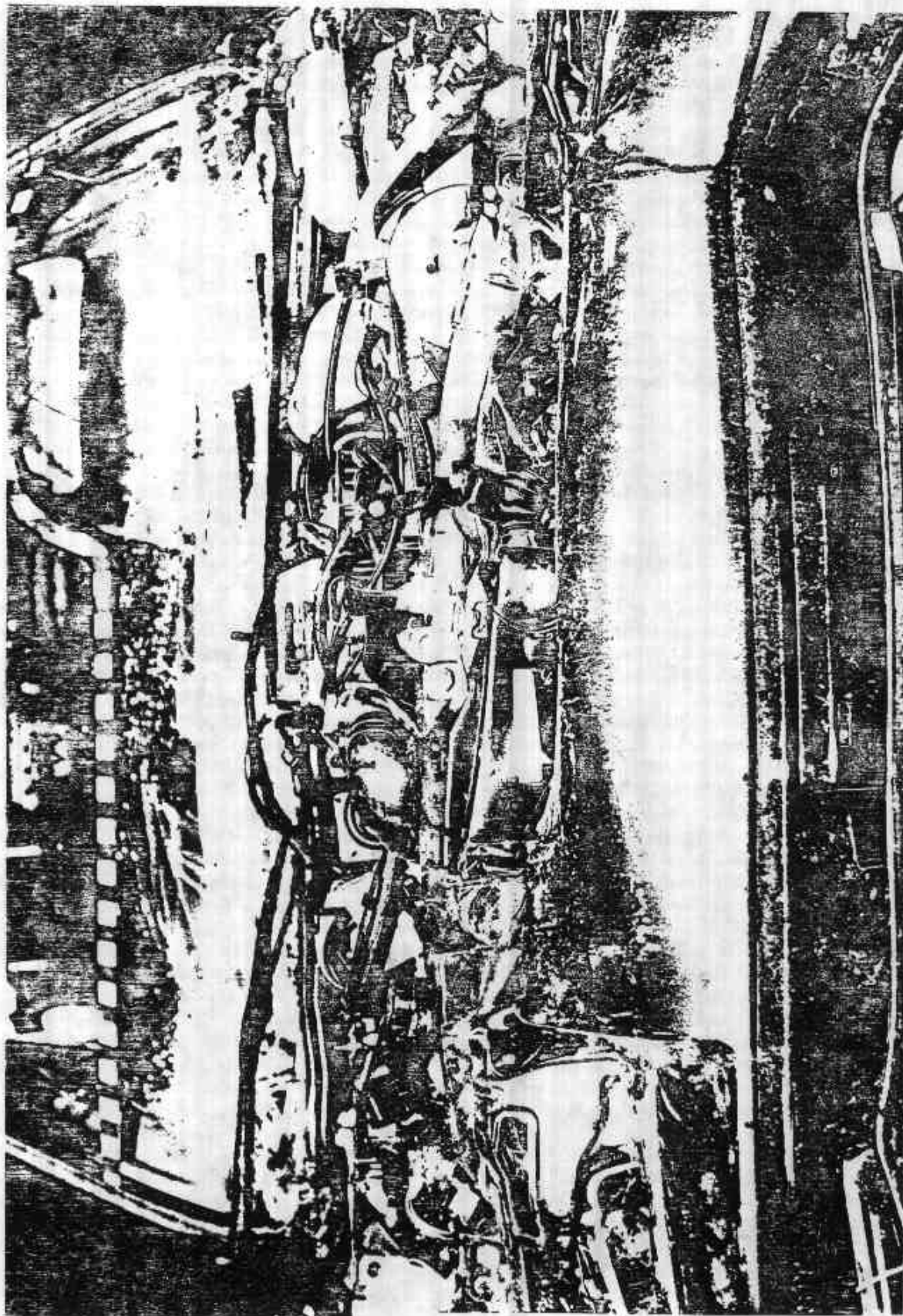


Figure A-15 POST-TEST ENGINE COMPARTMENT VIEW

A-16

7209-15

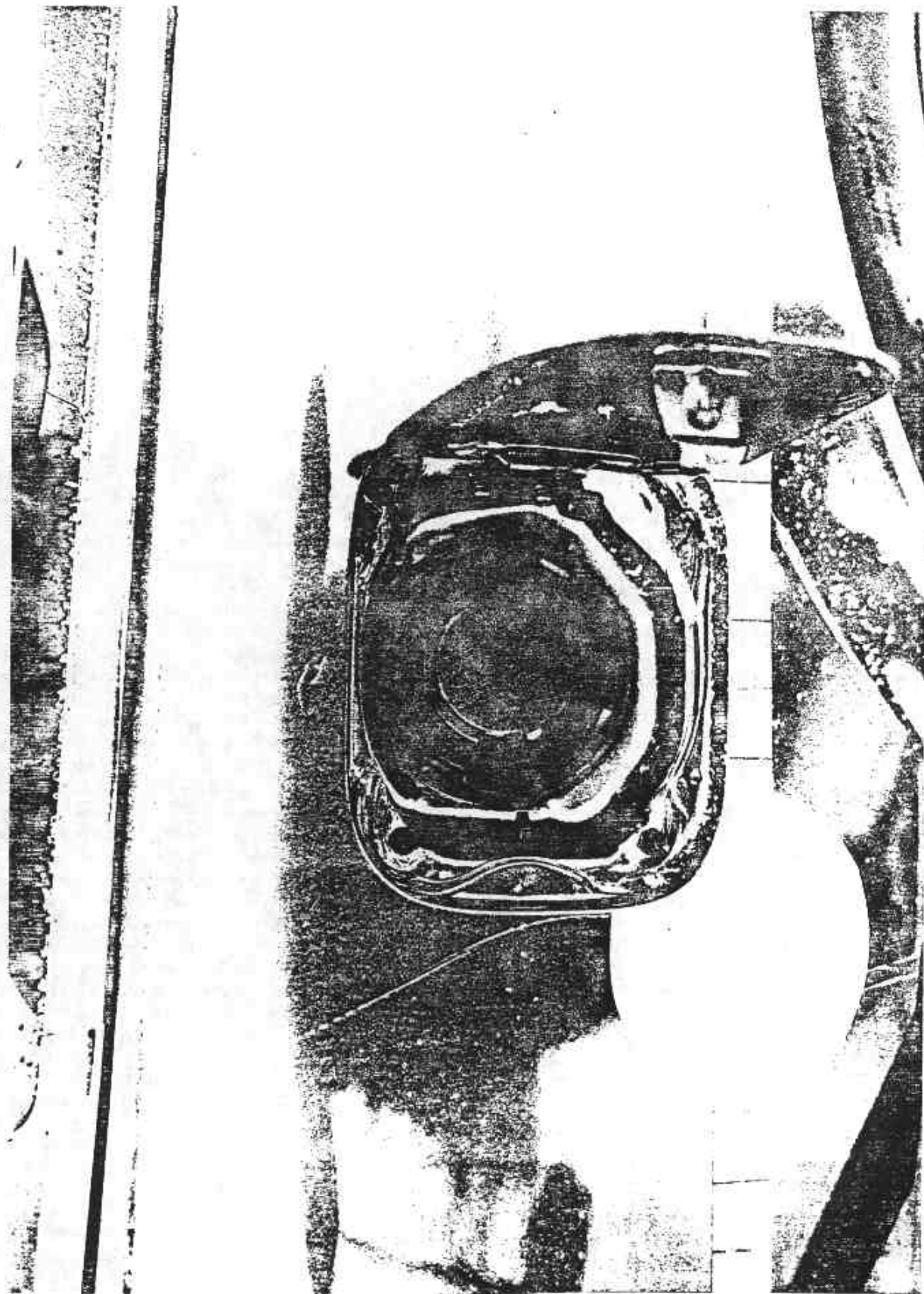


Figure A-16 PRE-TEST FUEL CAP VIEW

A-17

7209-15

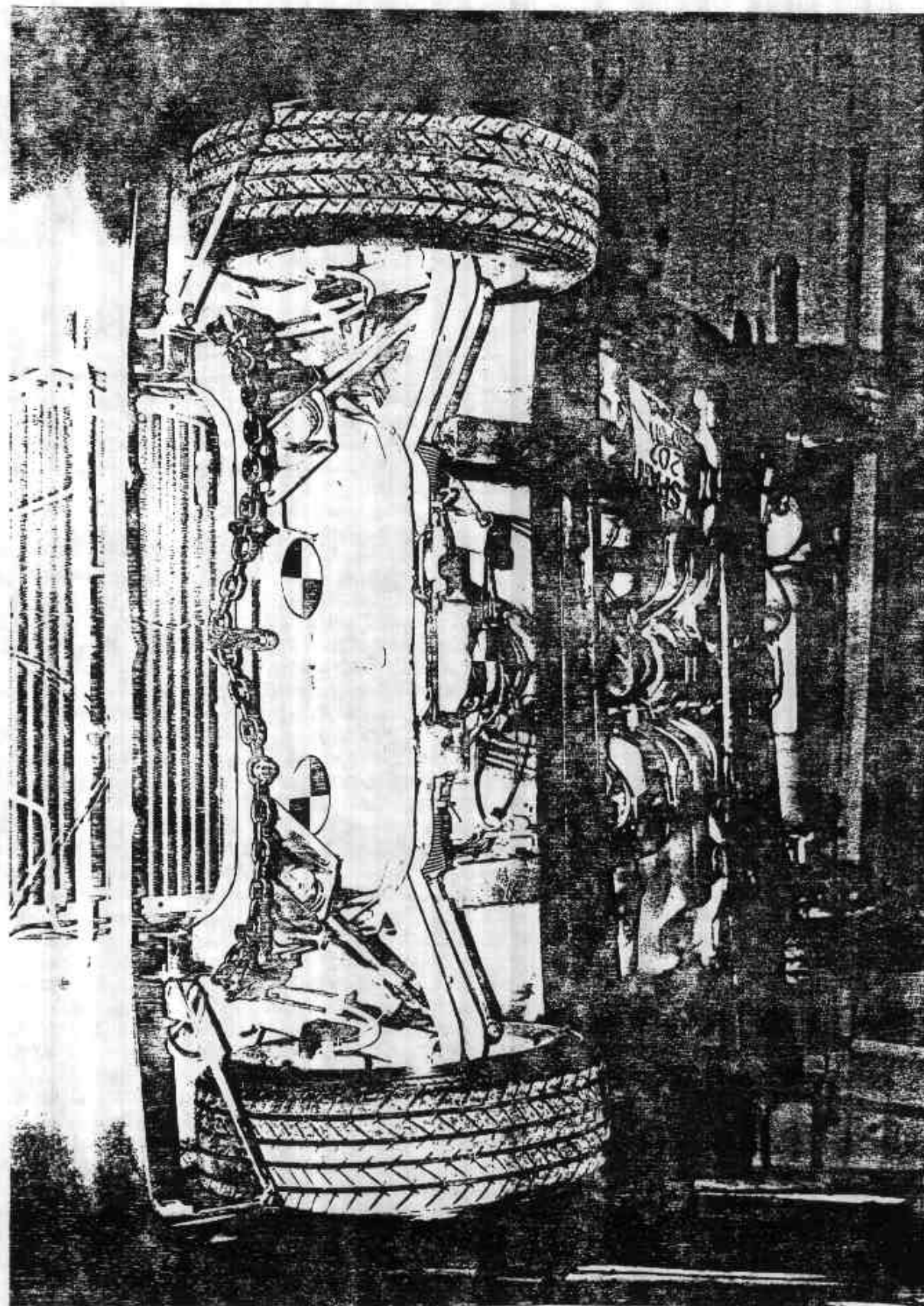


Figure A-17 PRE-TEST FRONT UNDERBODY VIEW

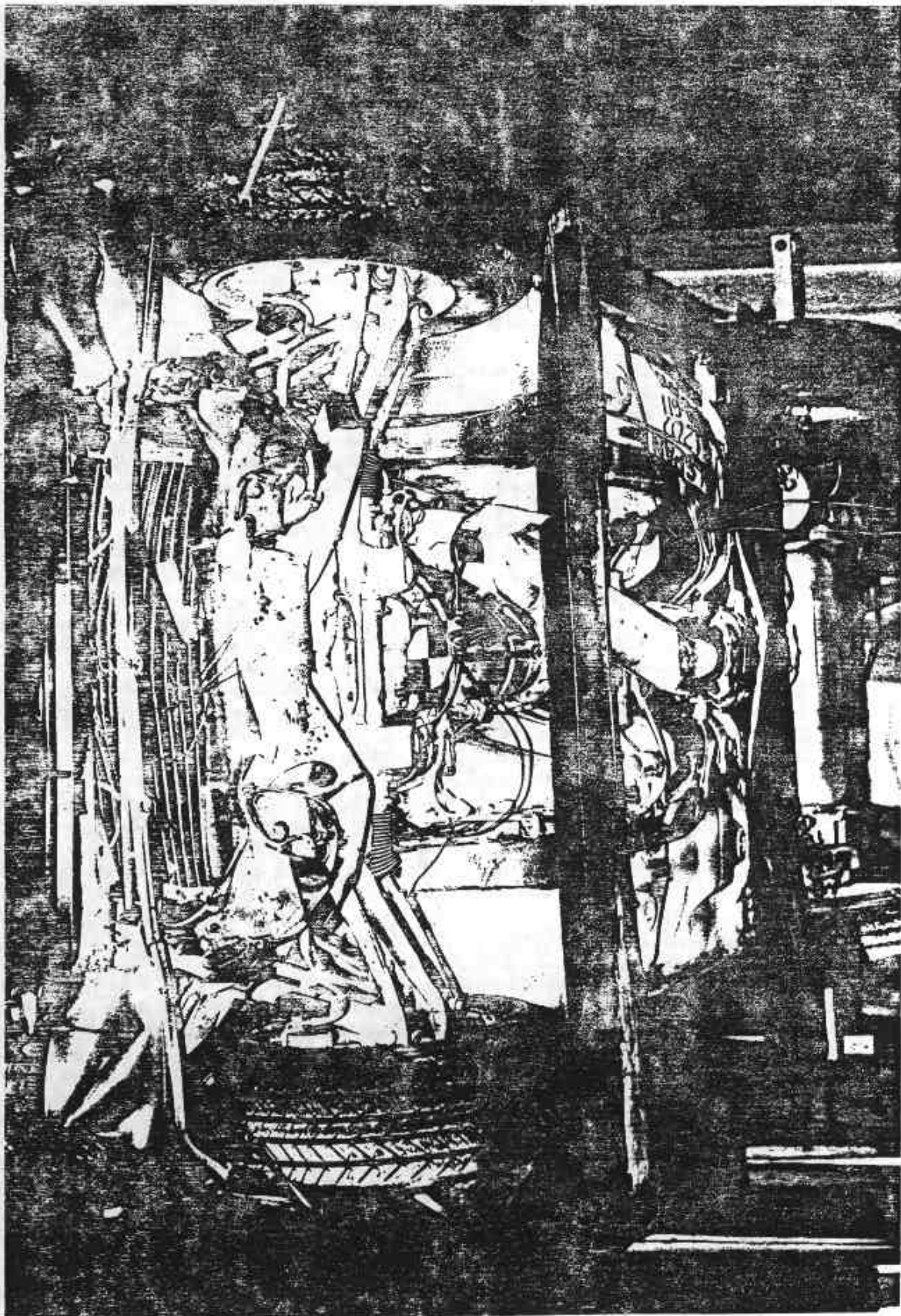


Figure A-18 POST-TEST FRONT UNDERBODY VIEW

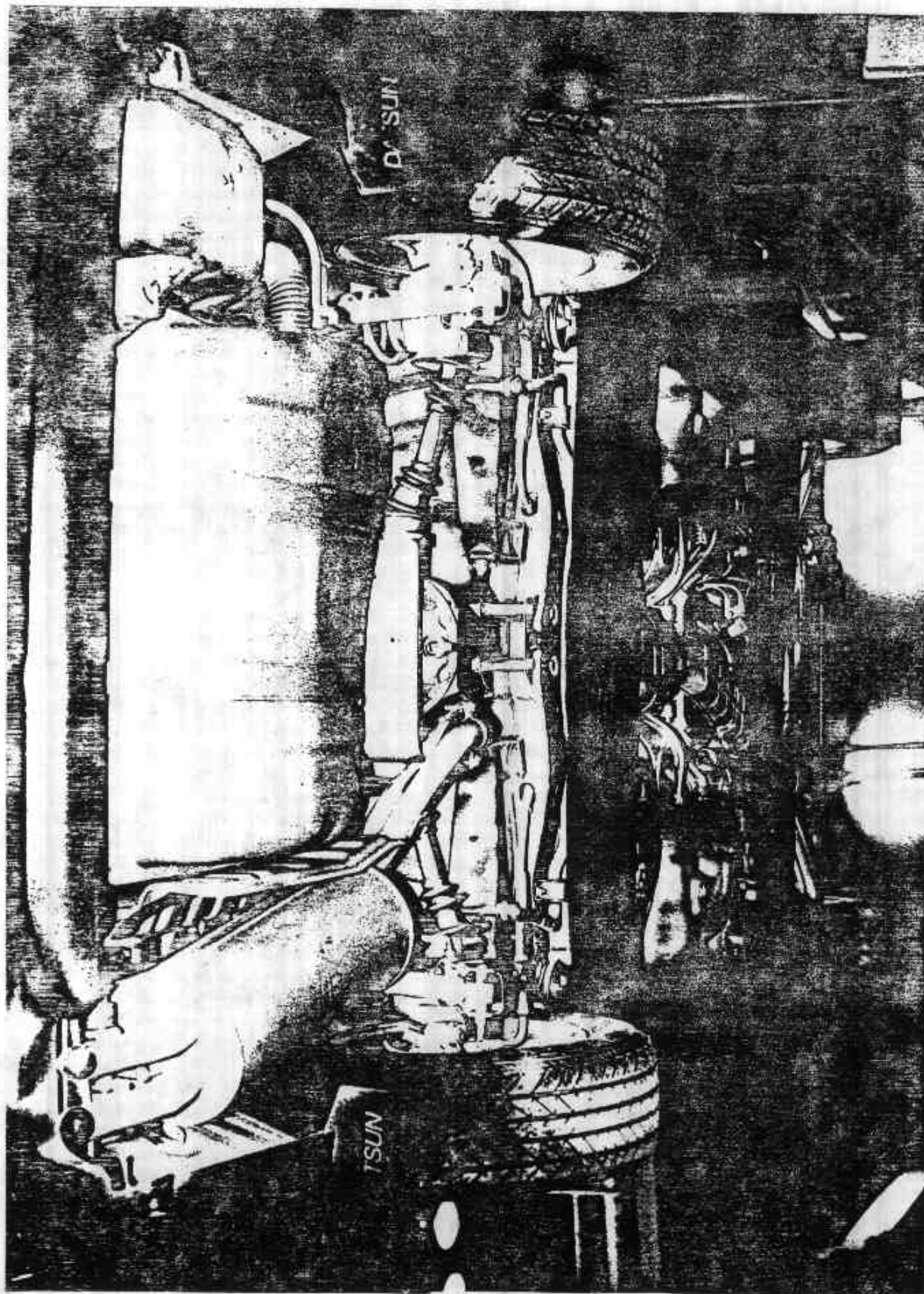


Figure A-19 PRE-TEST REAR UNDERBODY VIEW

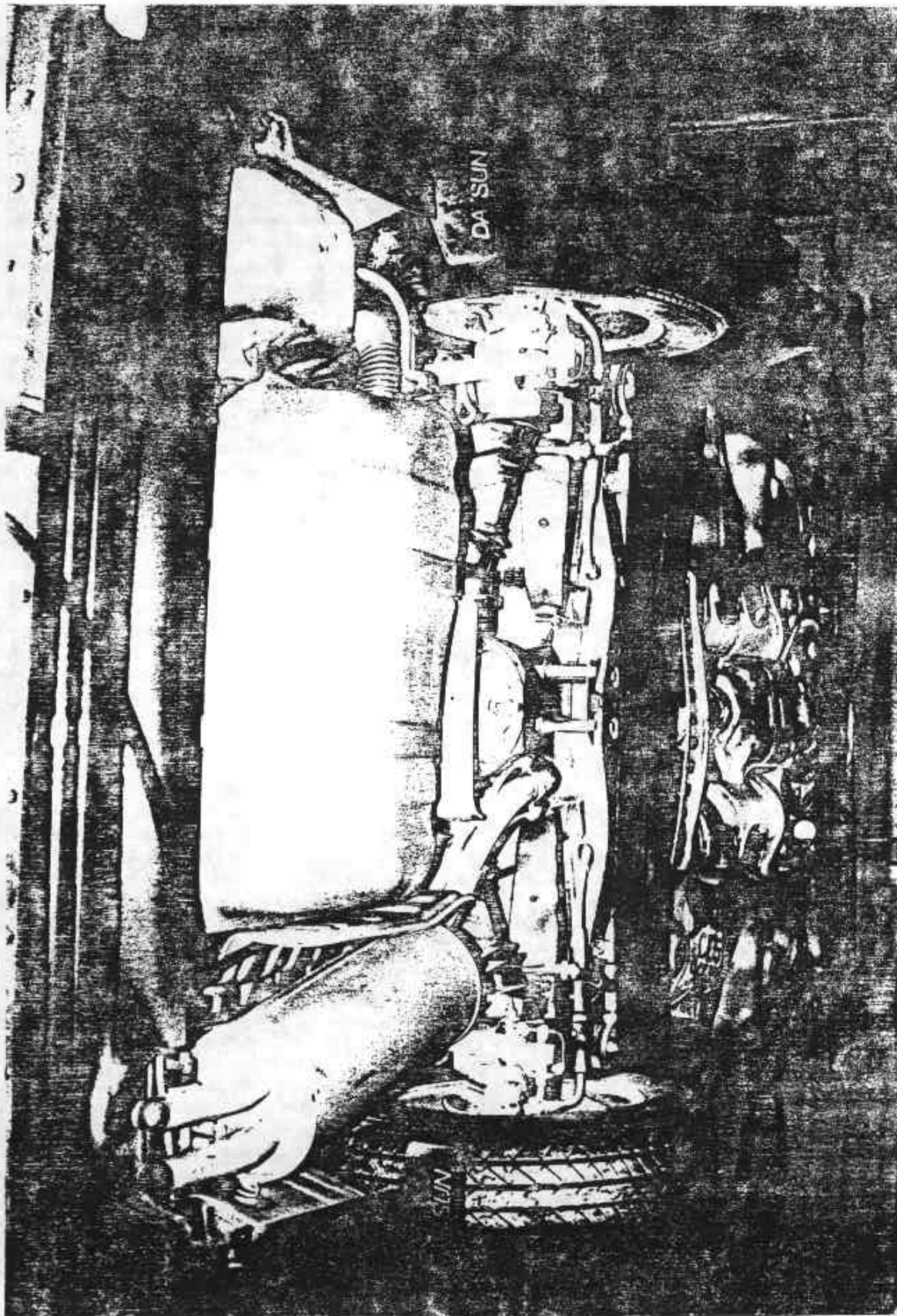


Figure A-20 POST-TEST REAR UNDERBODY VIEW

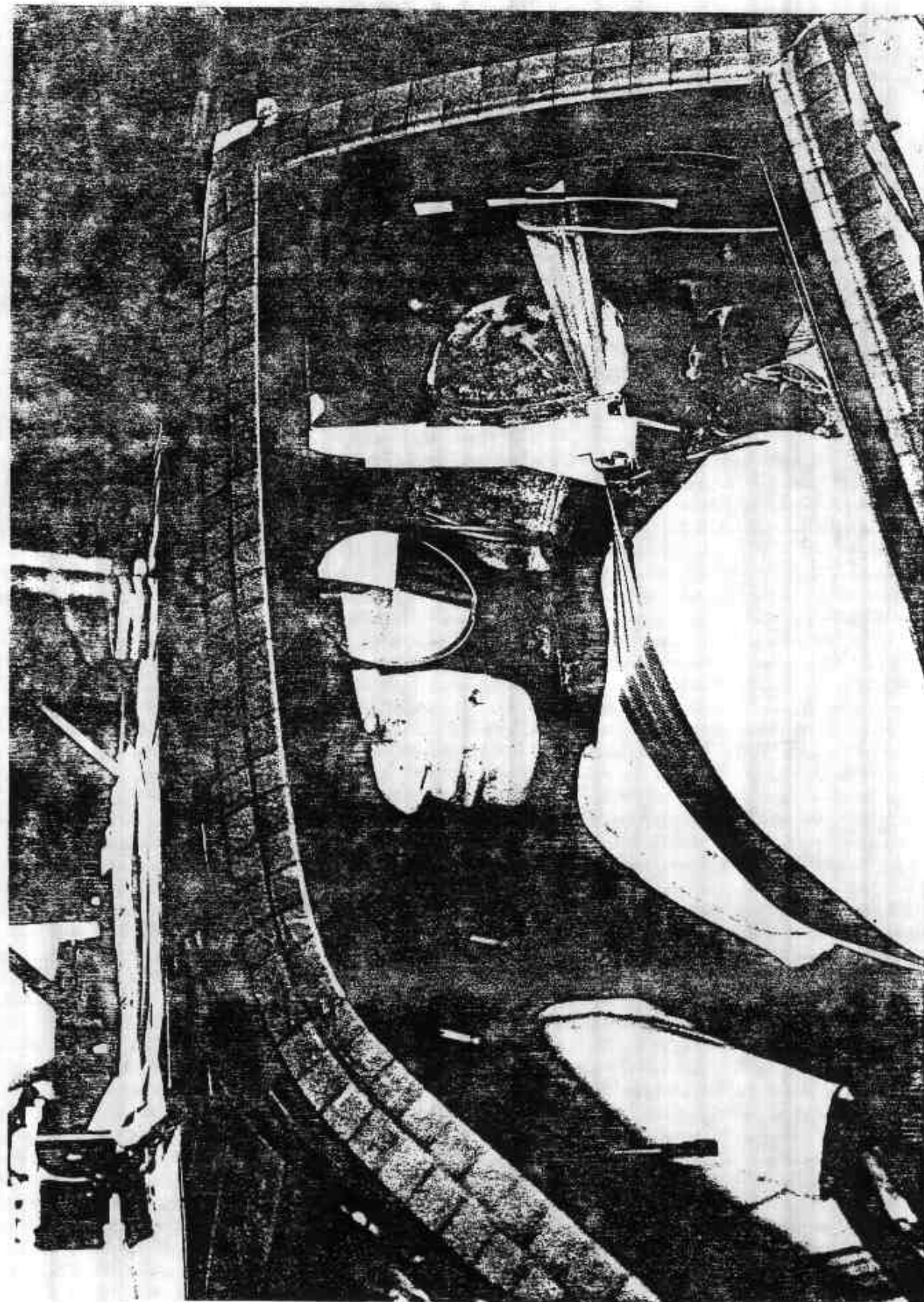


Figure A-21 PRE-TEST DRIVER POSITION VIEW

A-22

7209-15

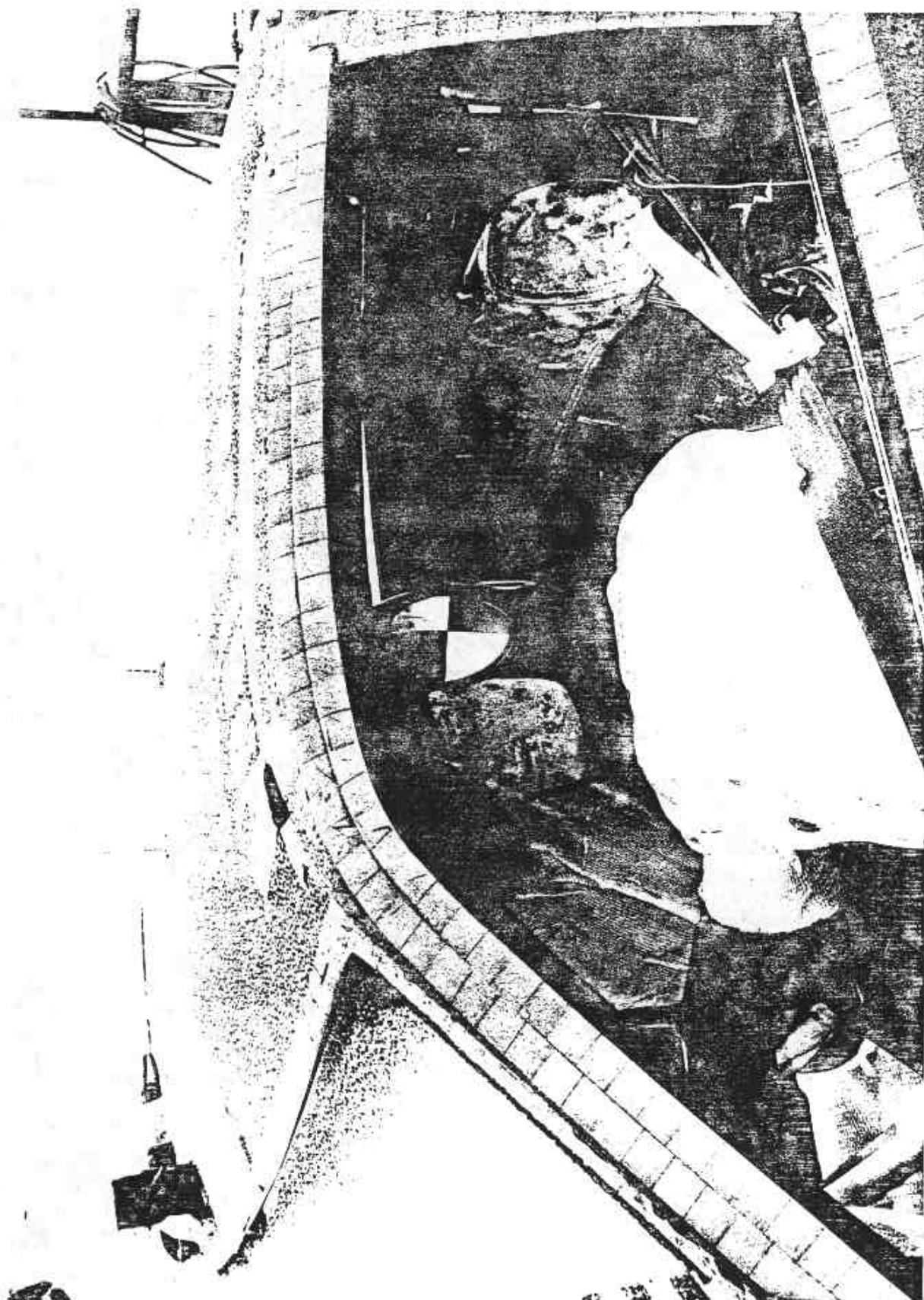


Figure A-22 POST-TEST DRIVER POSITION VIEW

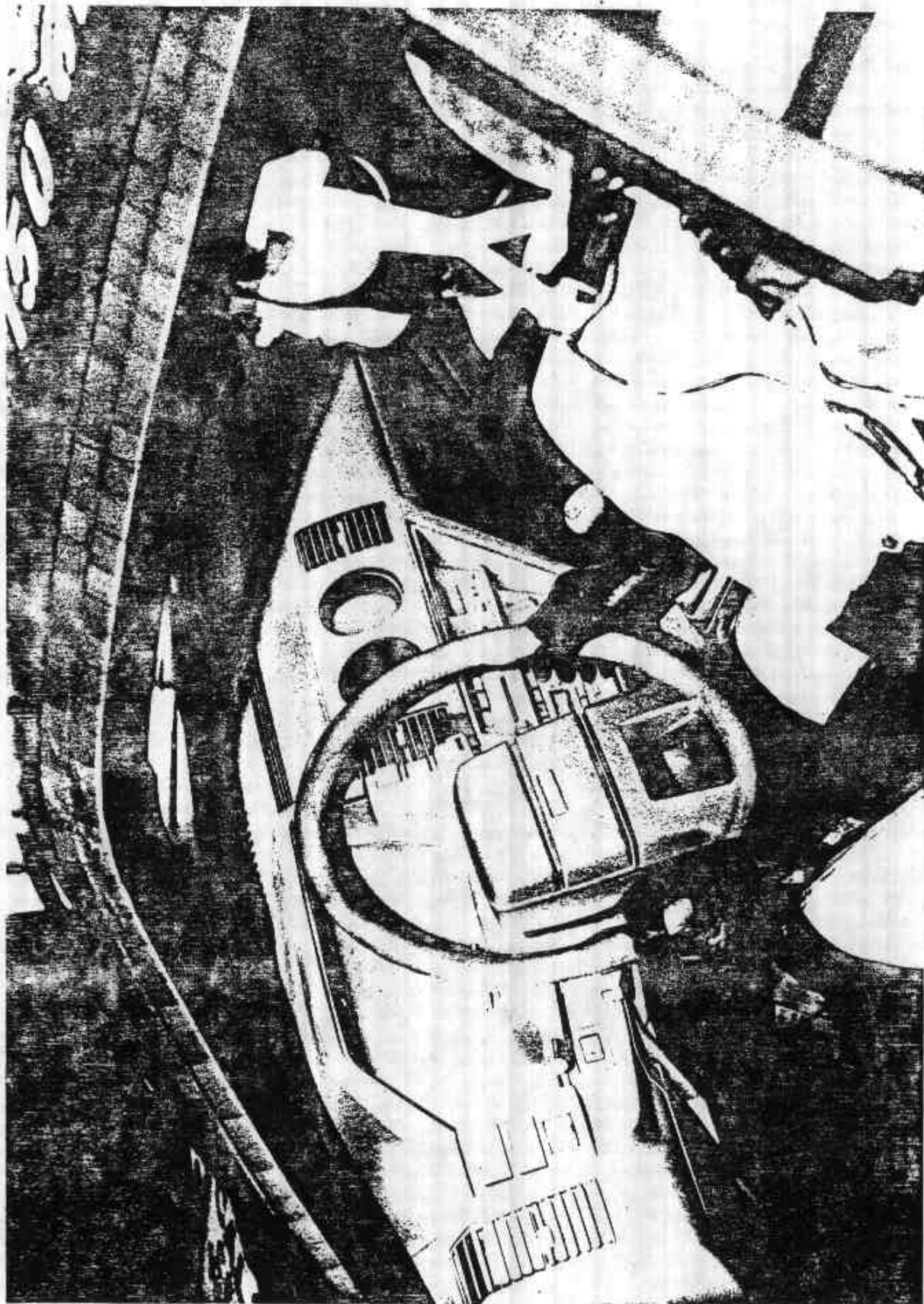


Figure A-23 PRE-TEST DRIVER AND INTERIOR VIEW

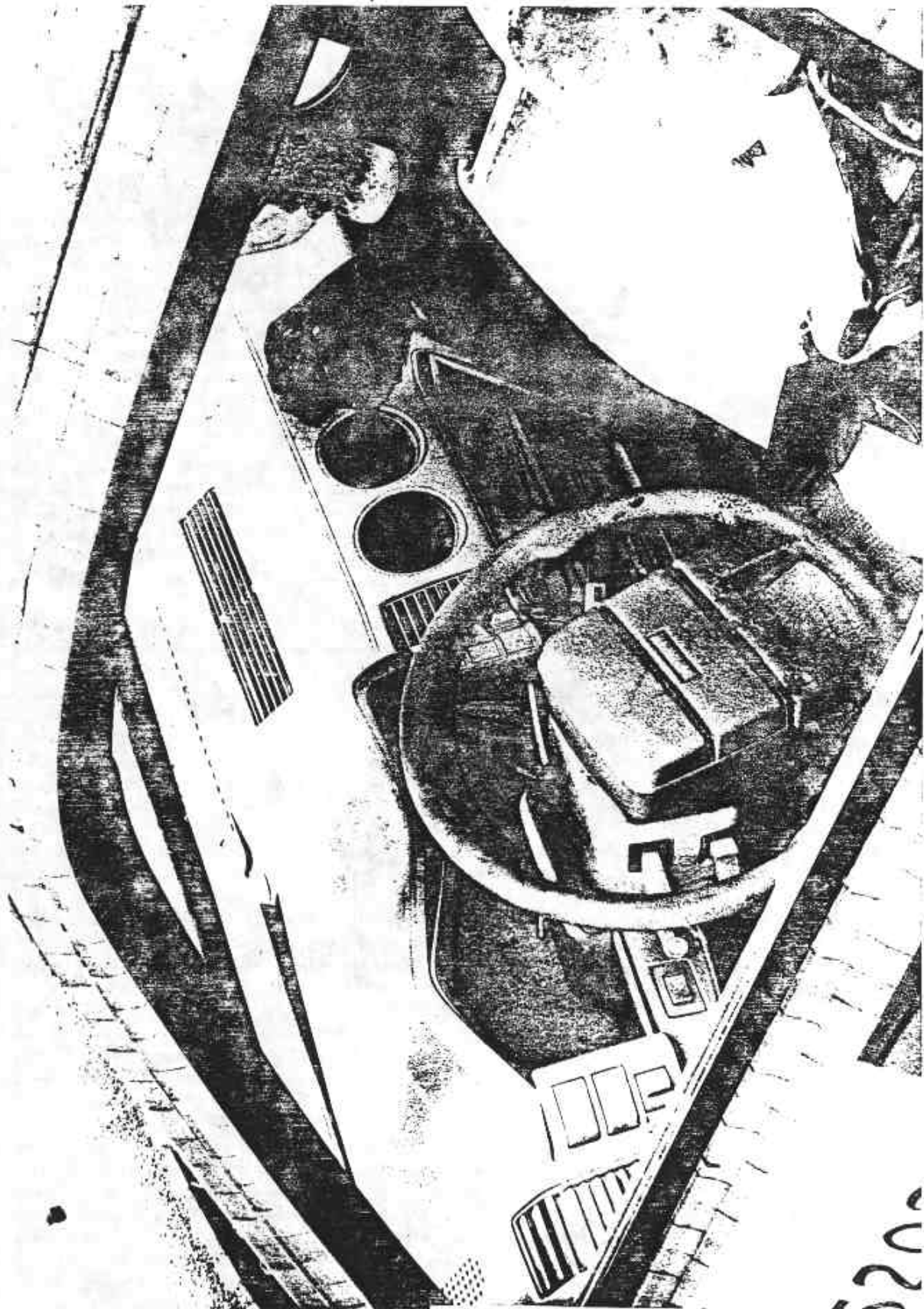


Figure A-24 POST-TEST DRIVER AND INTERIOR VIEW

A-25

7200

7209-15

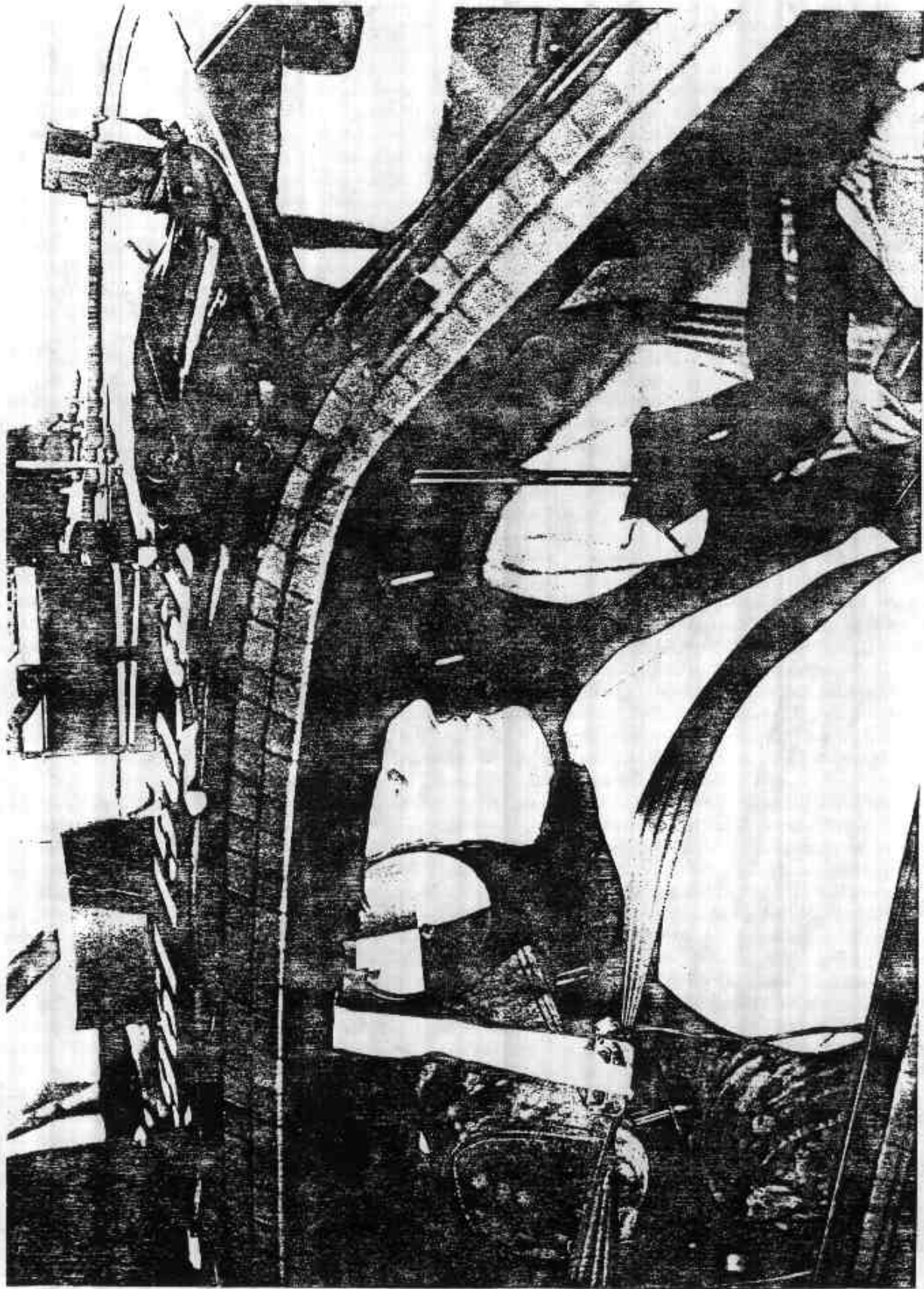


Figure A-25 PRE-TEST PASSENGER VIEW



Figure A-26 POST-TEST PASSENGER VIEW

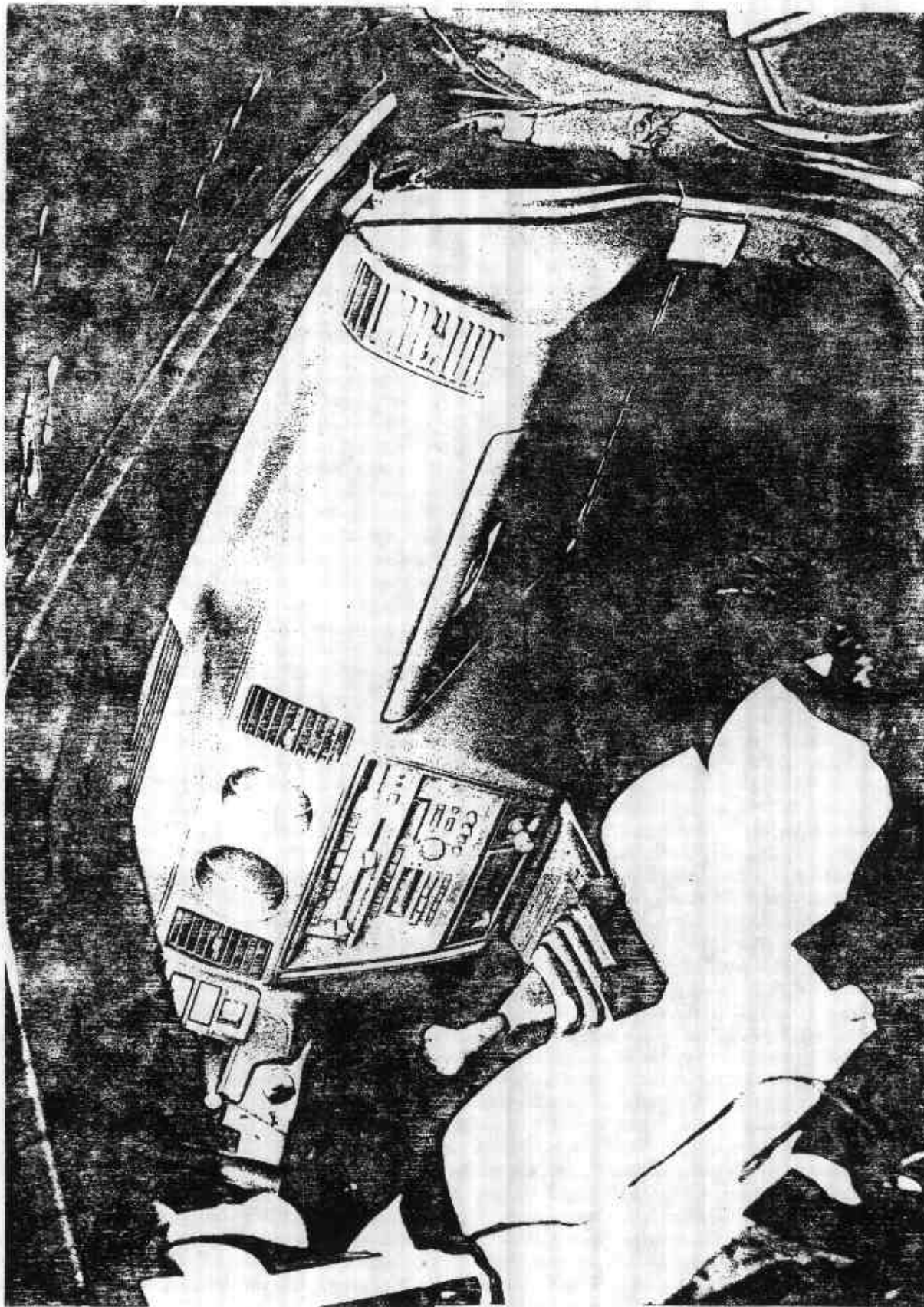


Figure A-27 PRE-TEST PASSENGER AND INTERIOR VIEW

A-28

7209-15

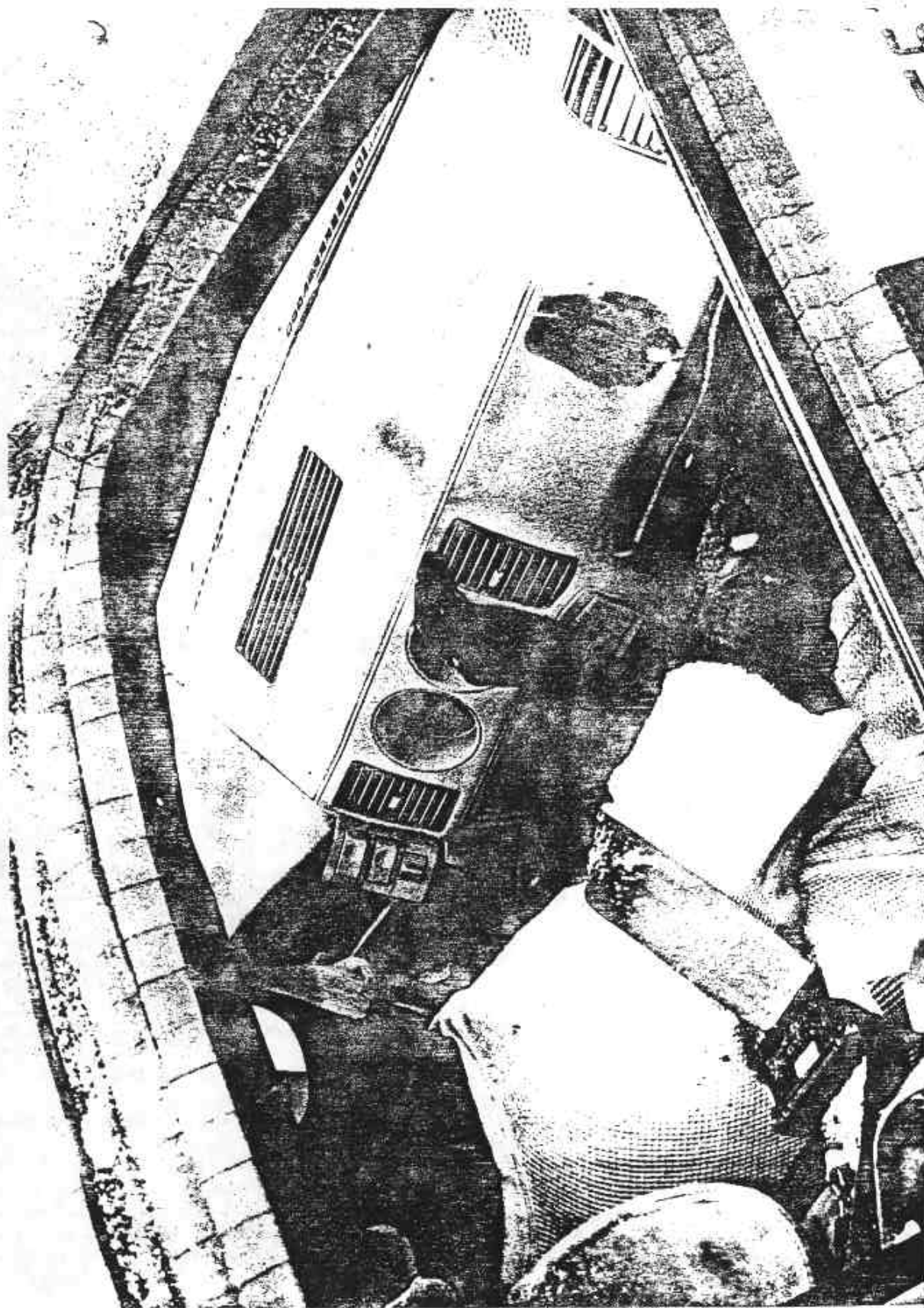


Figure A-28 POST-TEST PASSENGER AND INTERIOR VIEW

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA

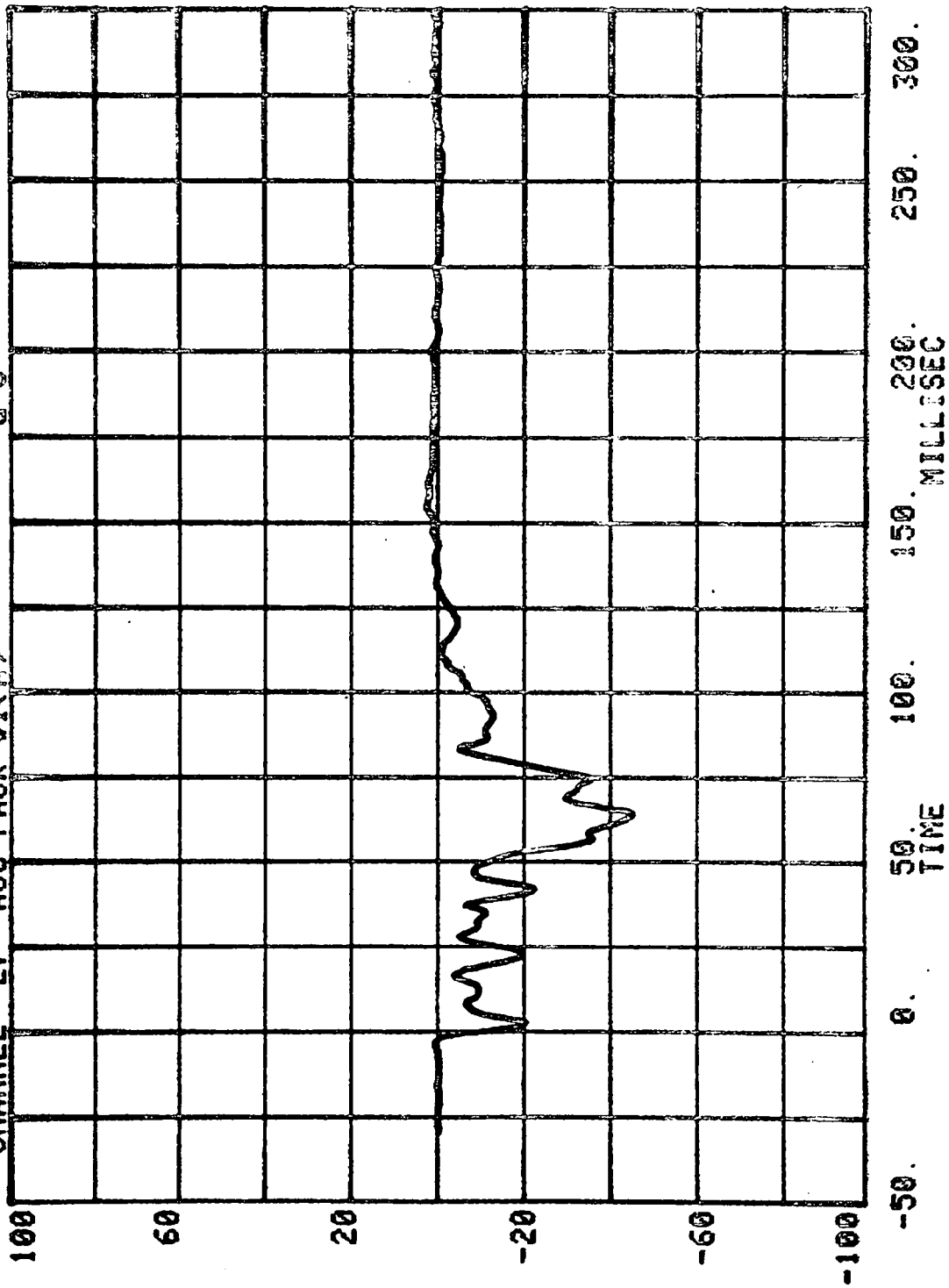
TEST NO. CE5202

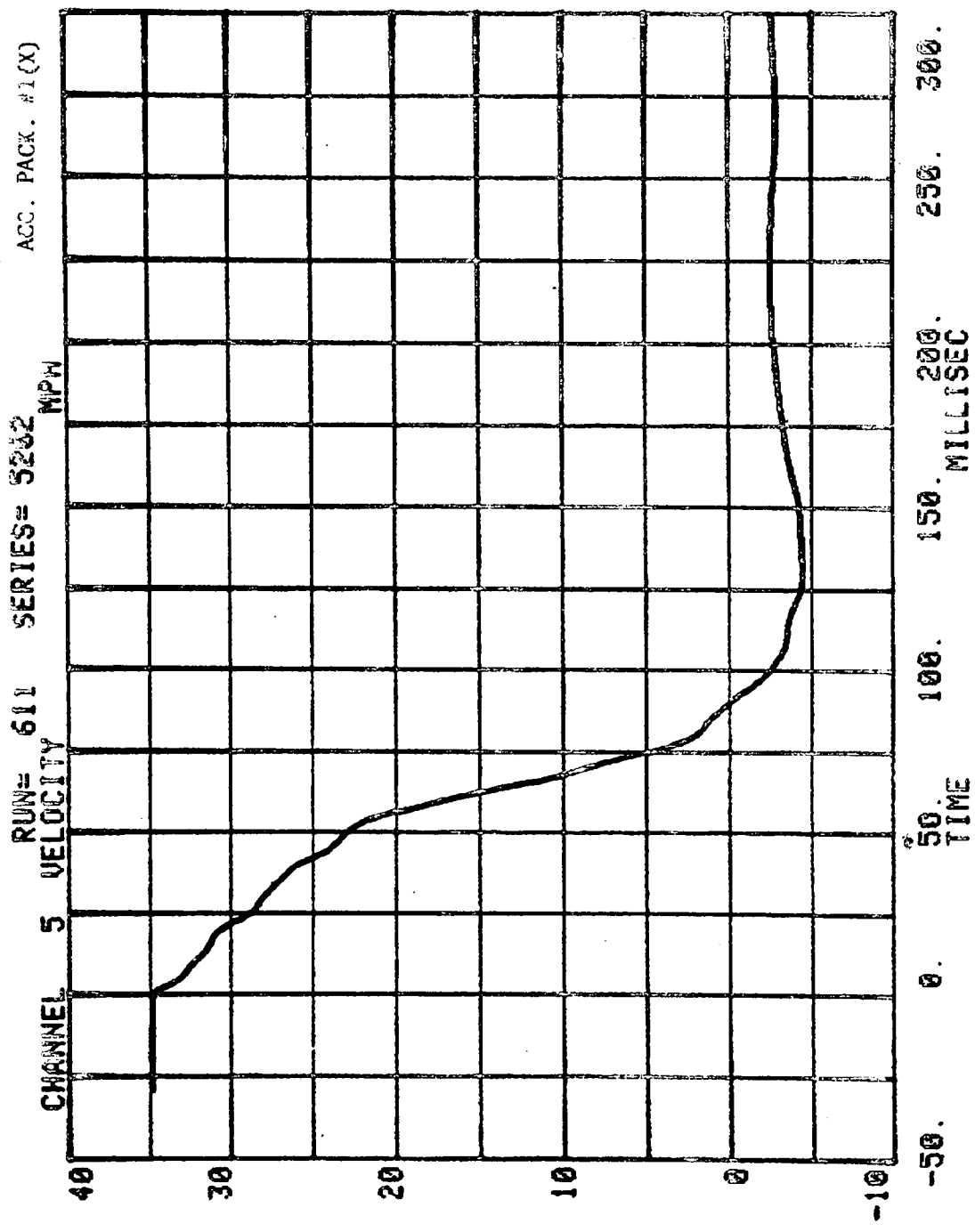
VEHICLE DATA

FILTER CHANNEL CLASS

60

CHANNEL 27 ACC PACK #1(X) RUN= 611 SERIES= 5202 G'S



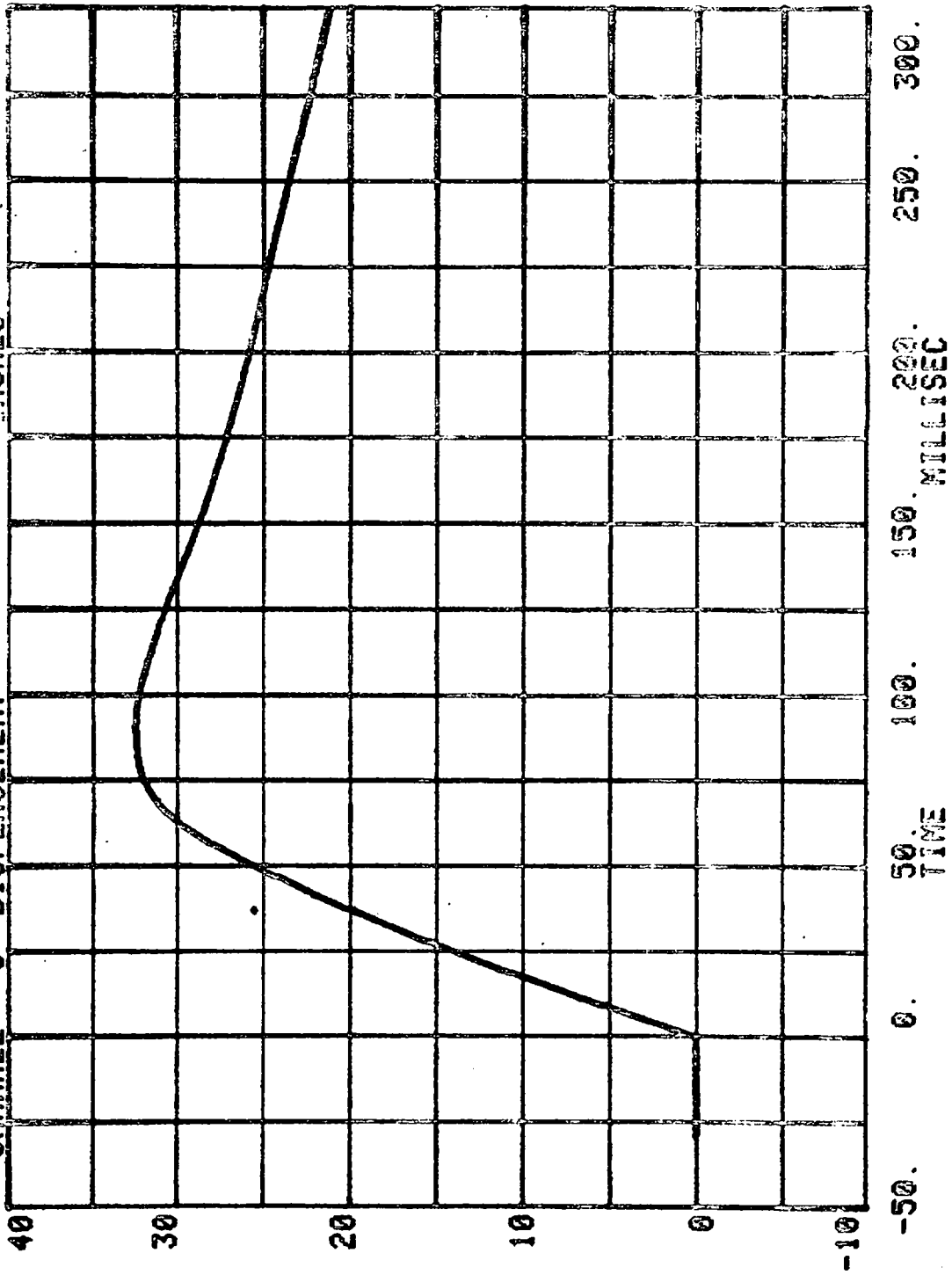


ACC. PACK. #1(X)

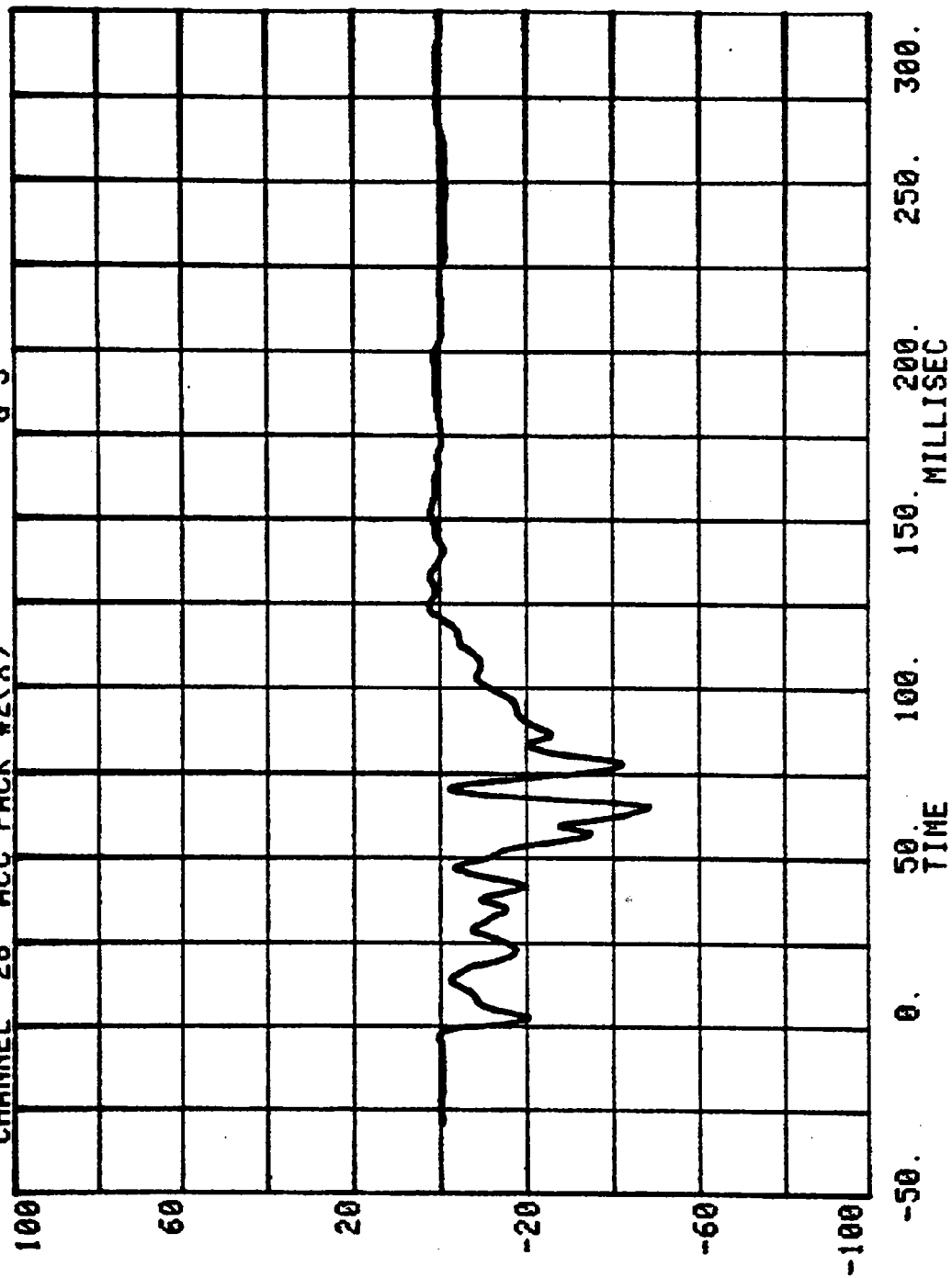
SERIES= 5202 INCHES

RUN= 611

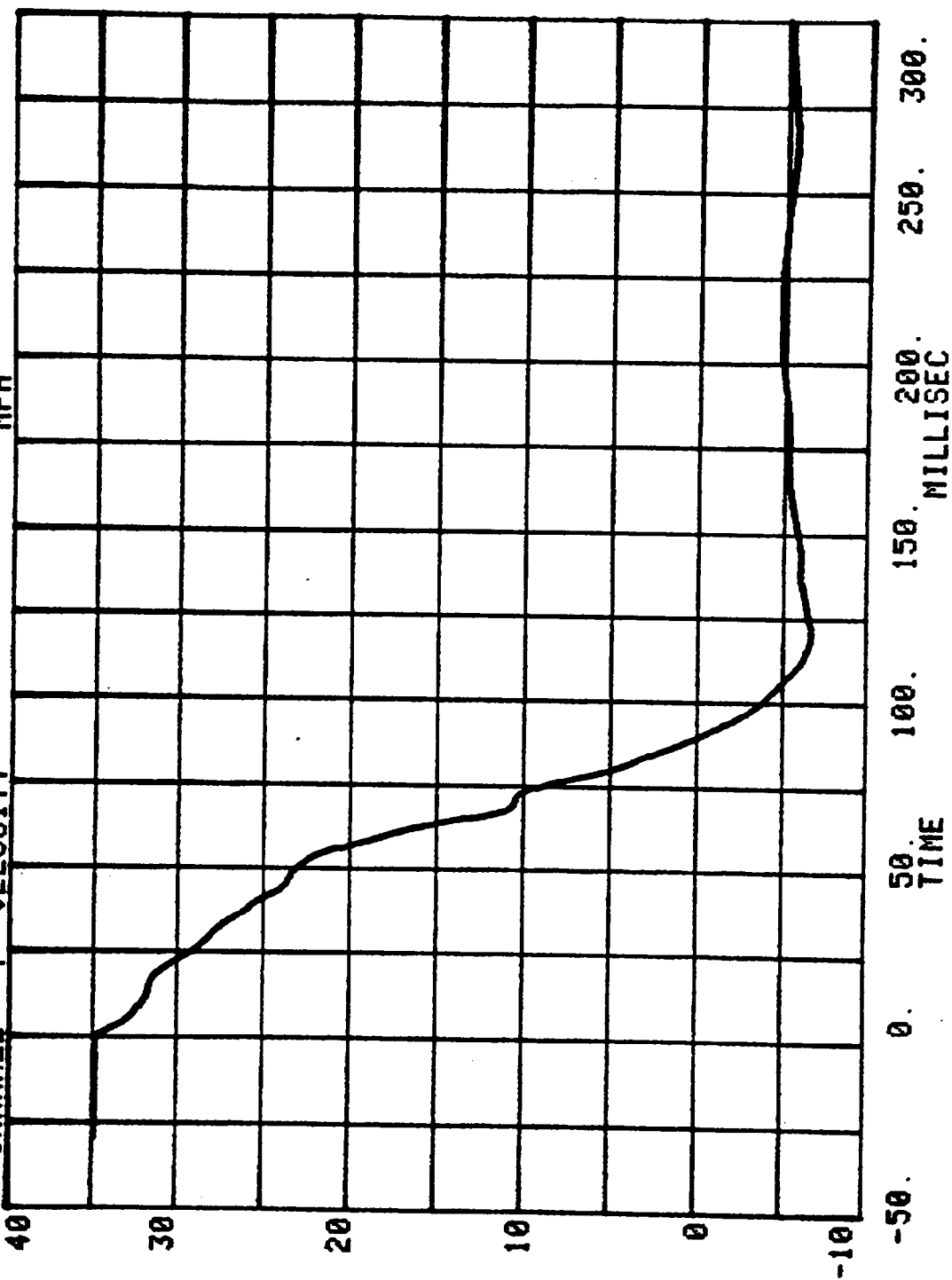
CHANNEL 6 DISPLACEMENT



RUN= 611 SERIES= 5202 G'S
CHANNEL 28 ACC PACK #2(X)

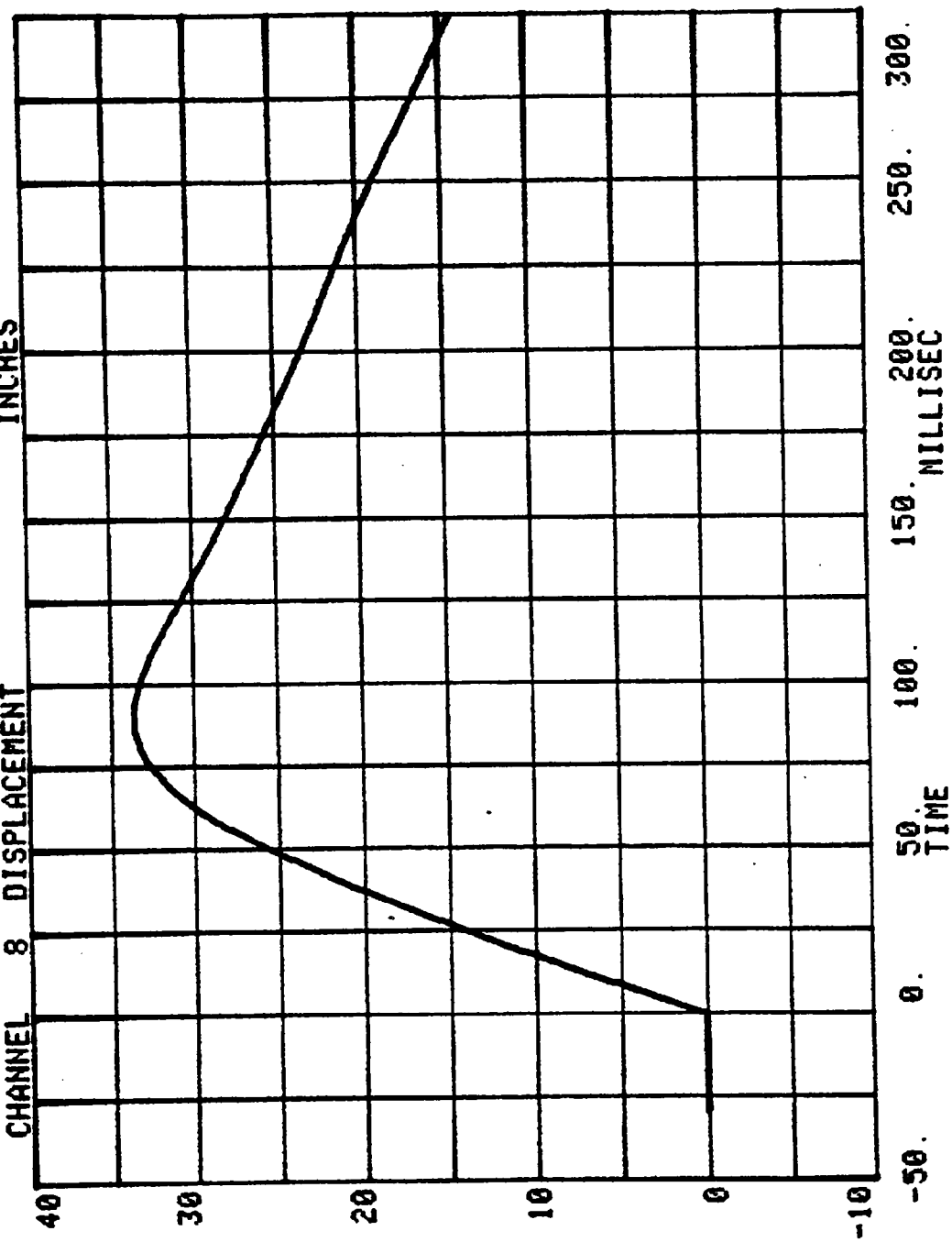


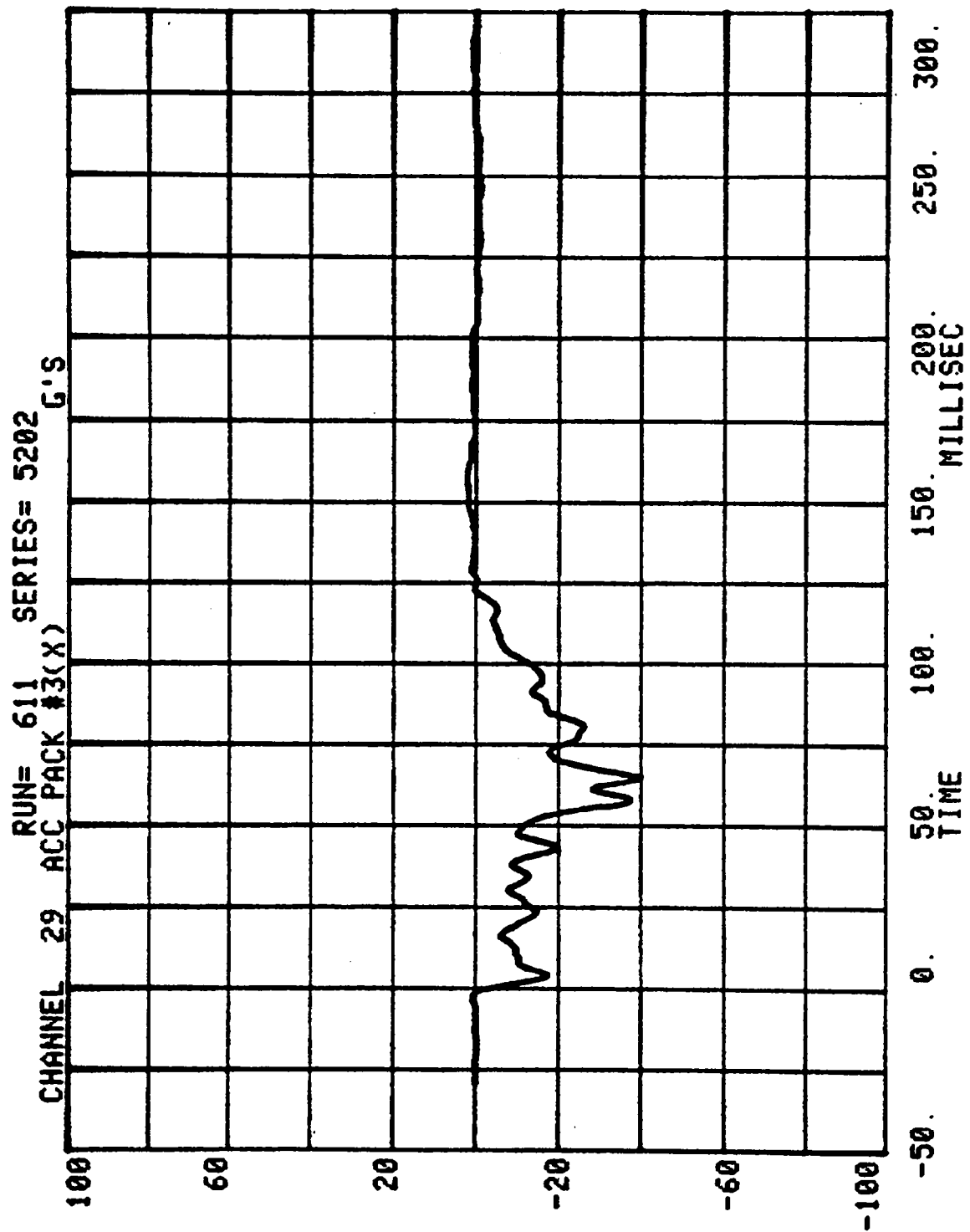
CHANNEL 7 VELOCITY
RUN= 611 SERIES= 5202 MPH
ACC. PACK. #2(X)

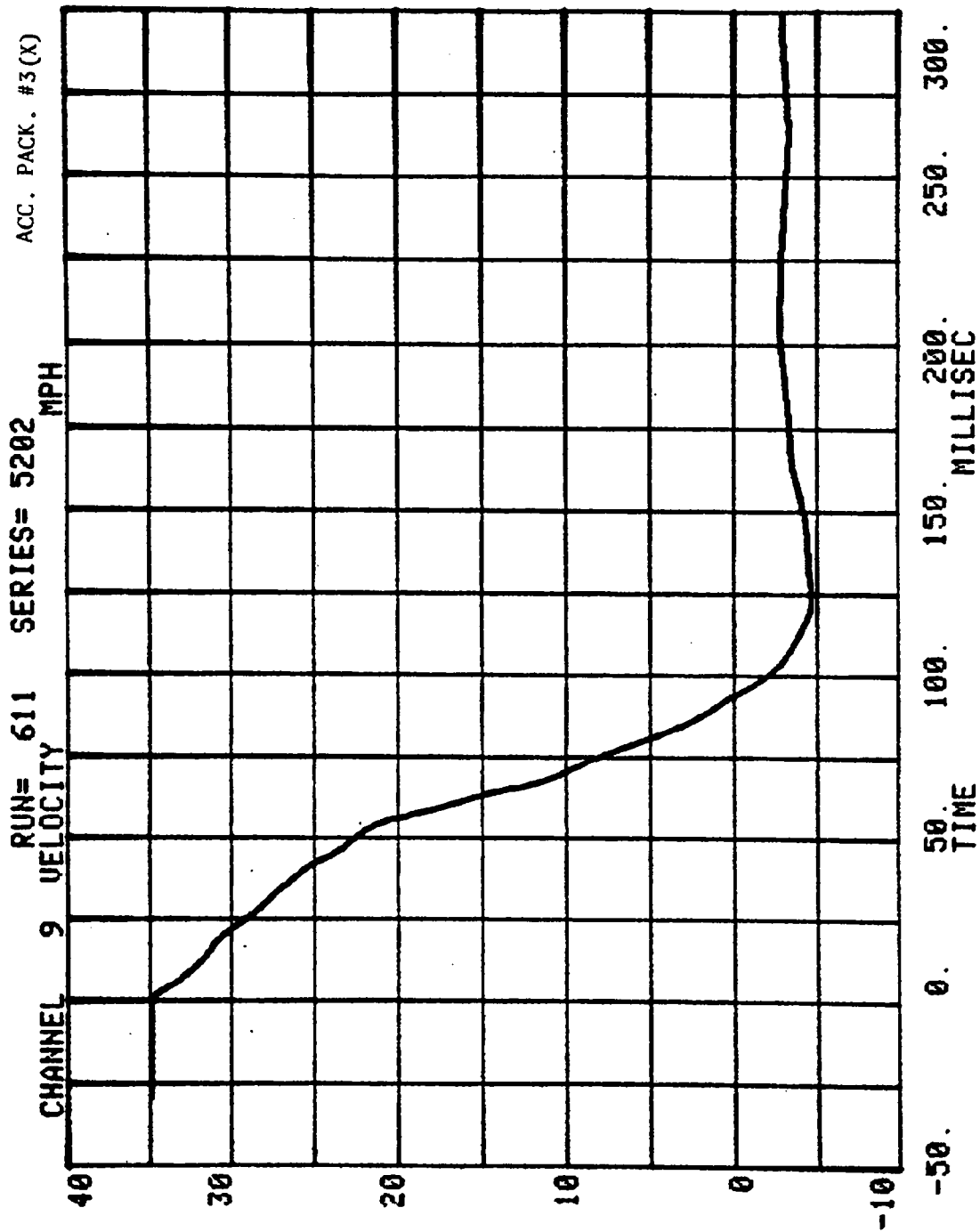


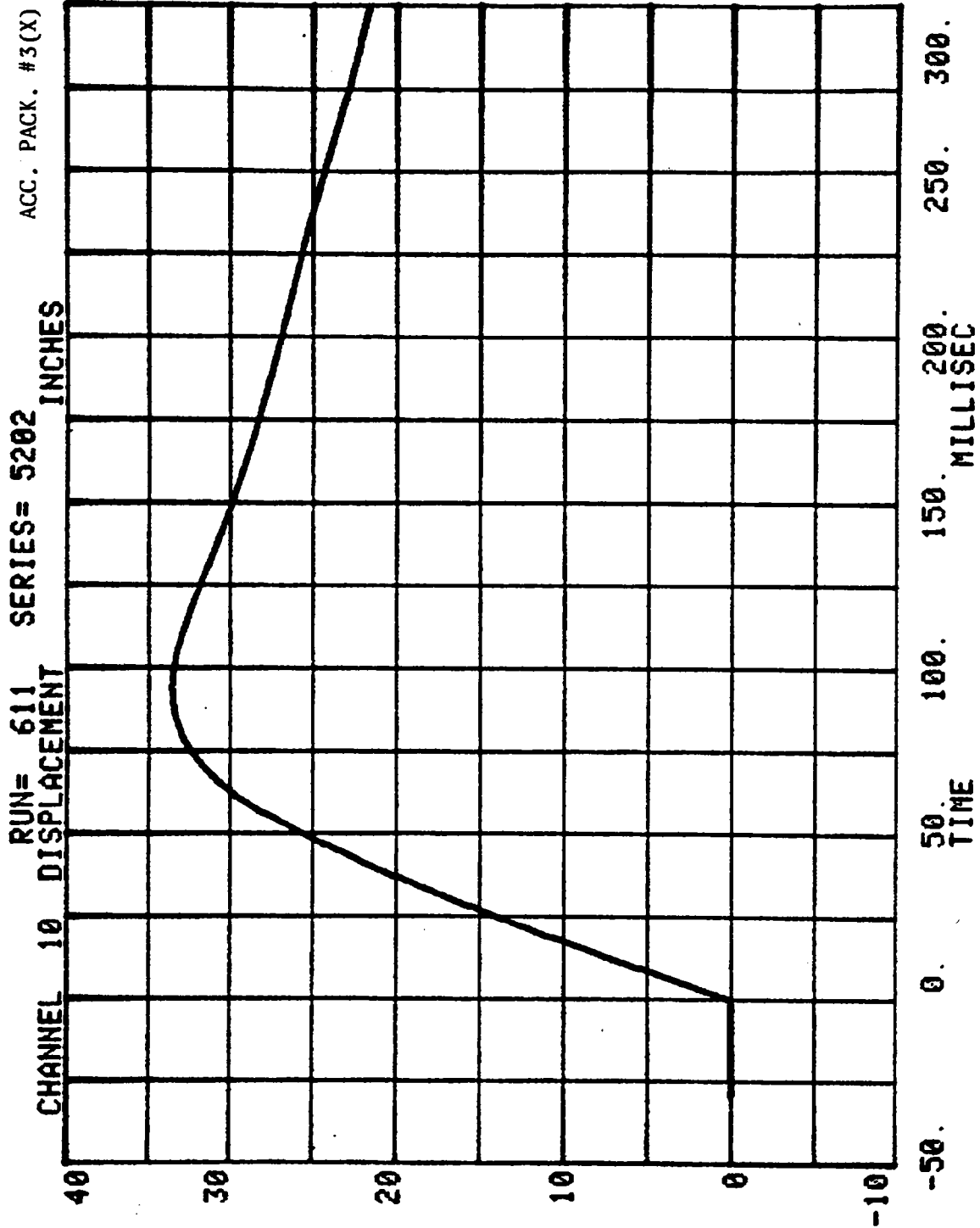
ACC. PACK. #2(X)

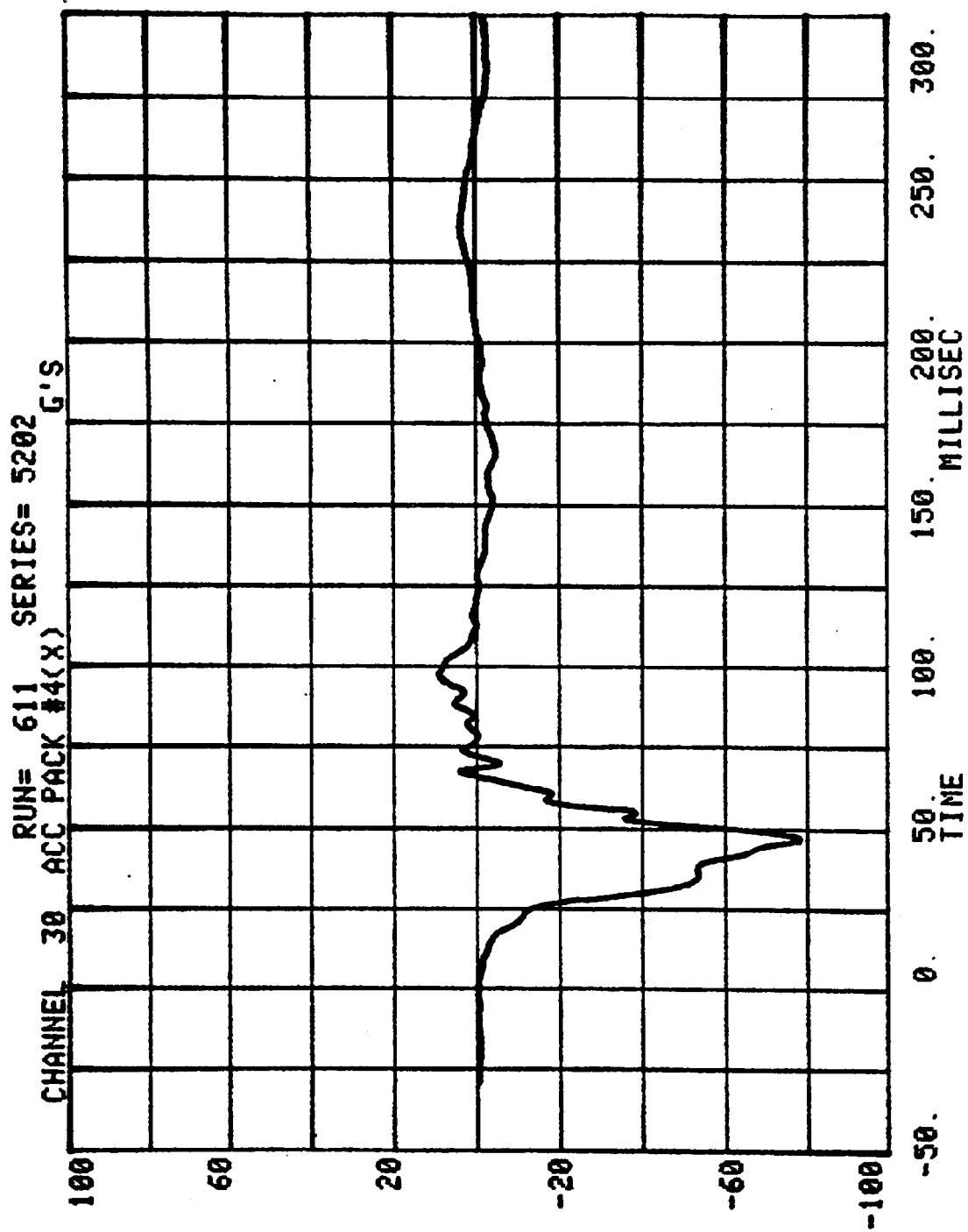
RUN= 611 SERIES= 5202 INCHES
CHANNEL 8 DISPLACEMENT

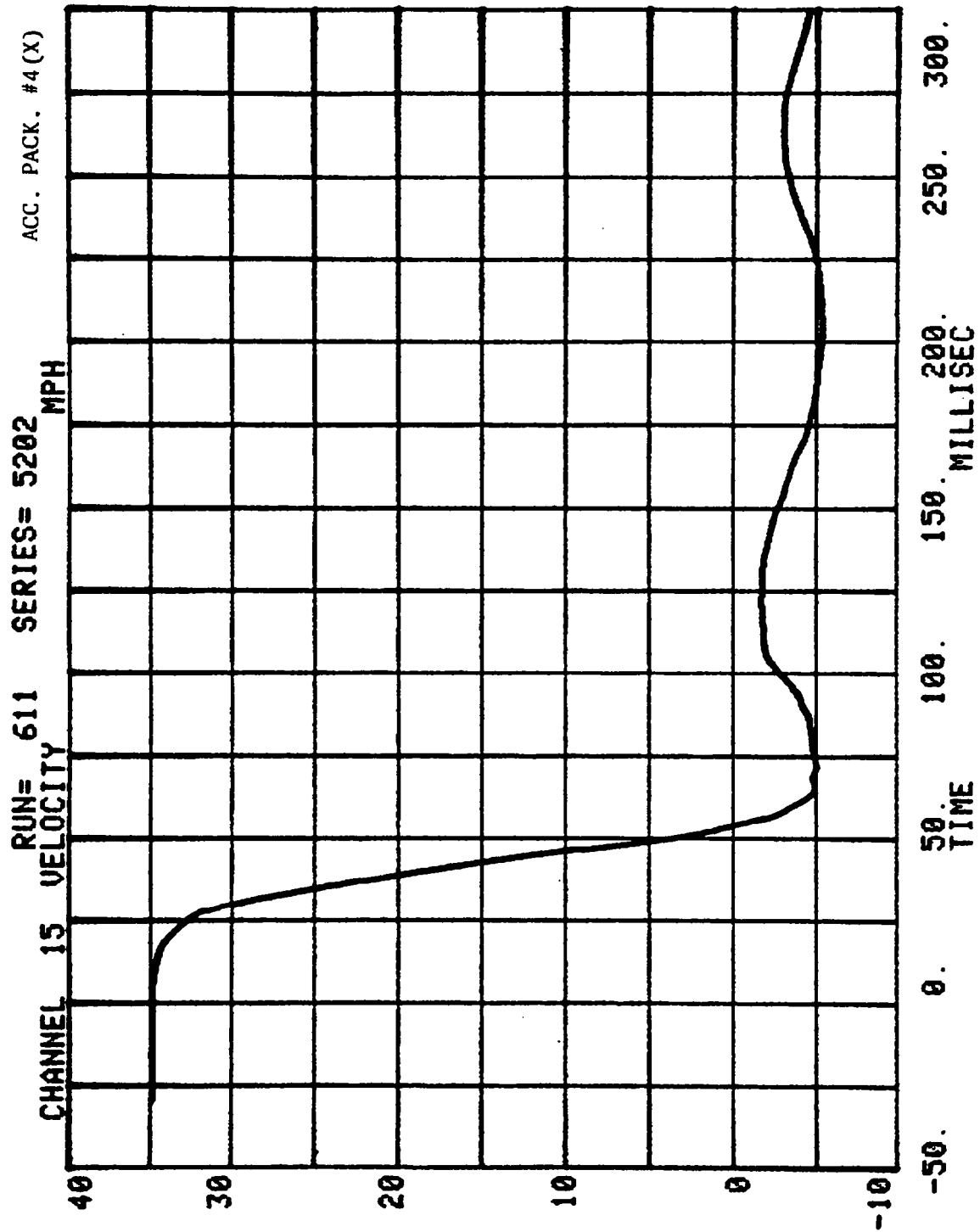


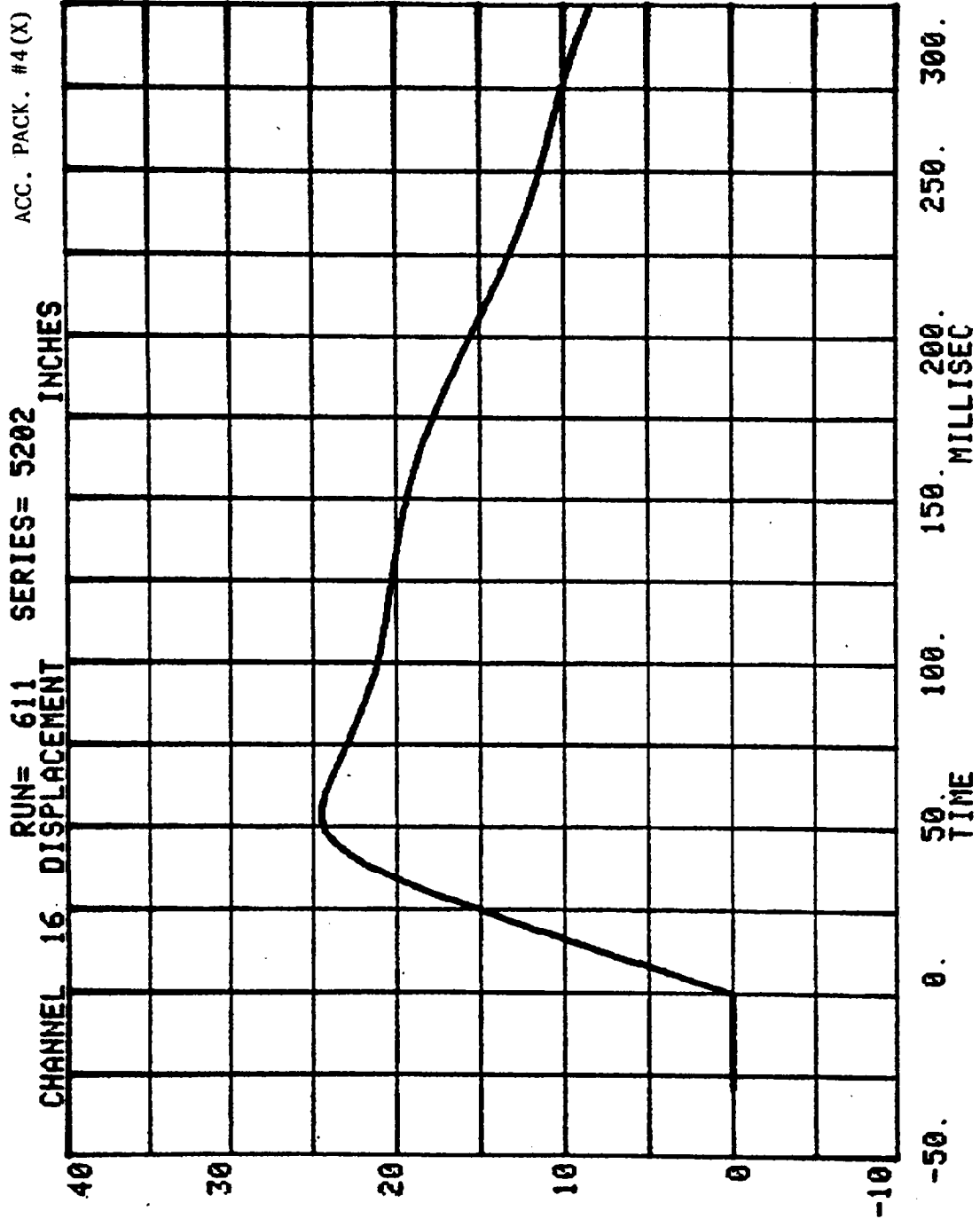




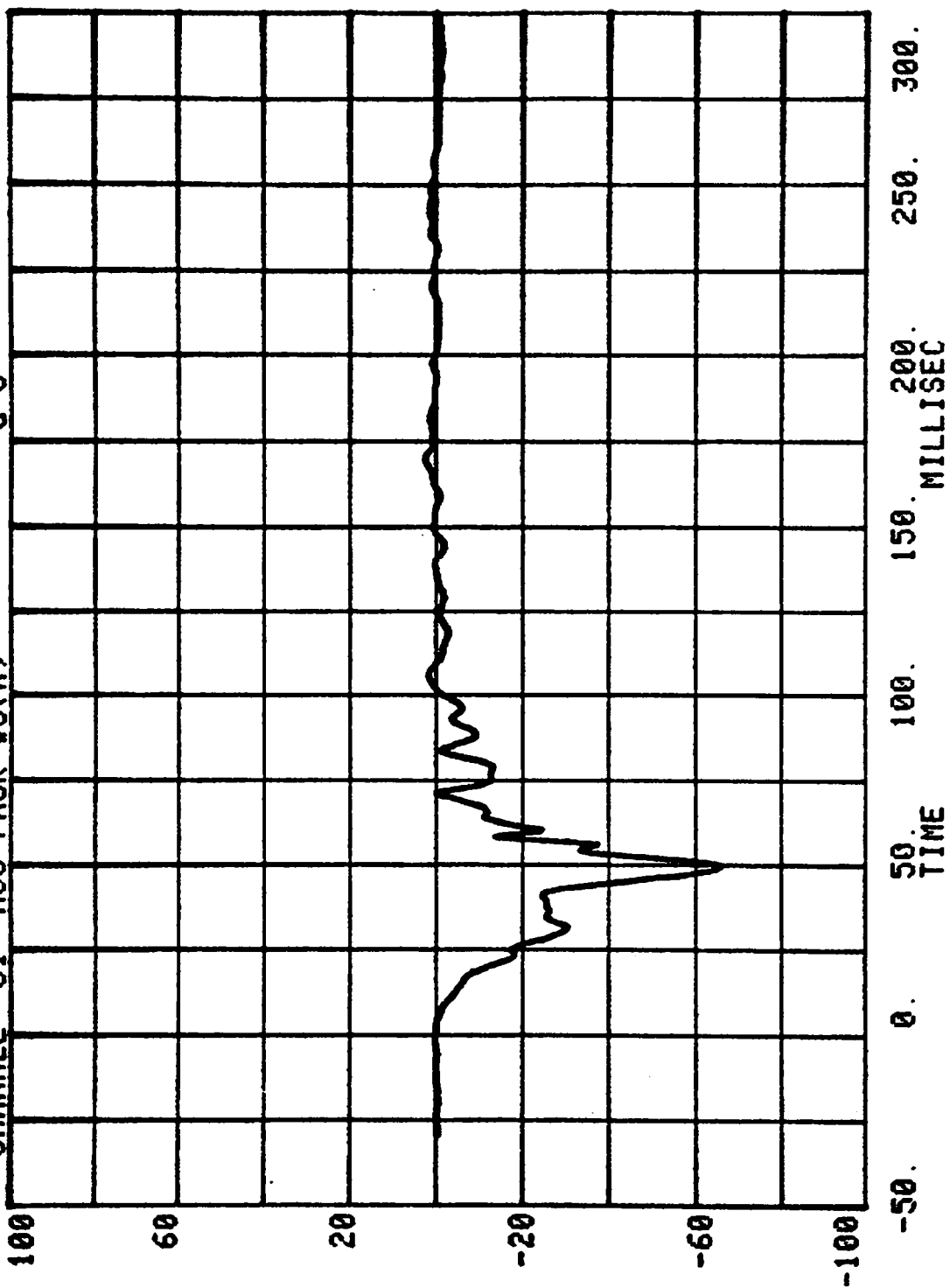






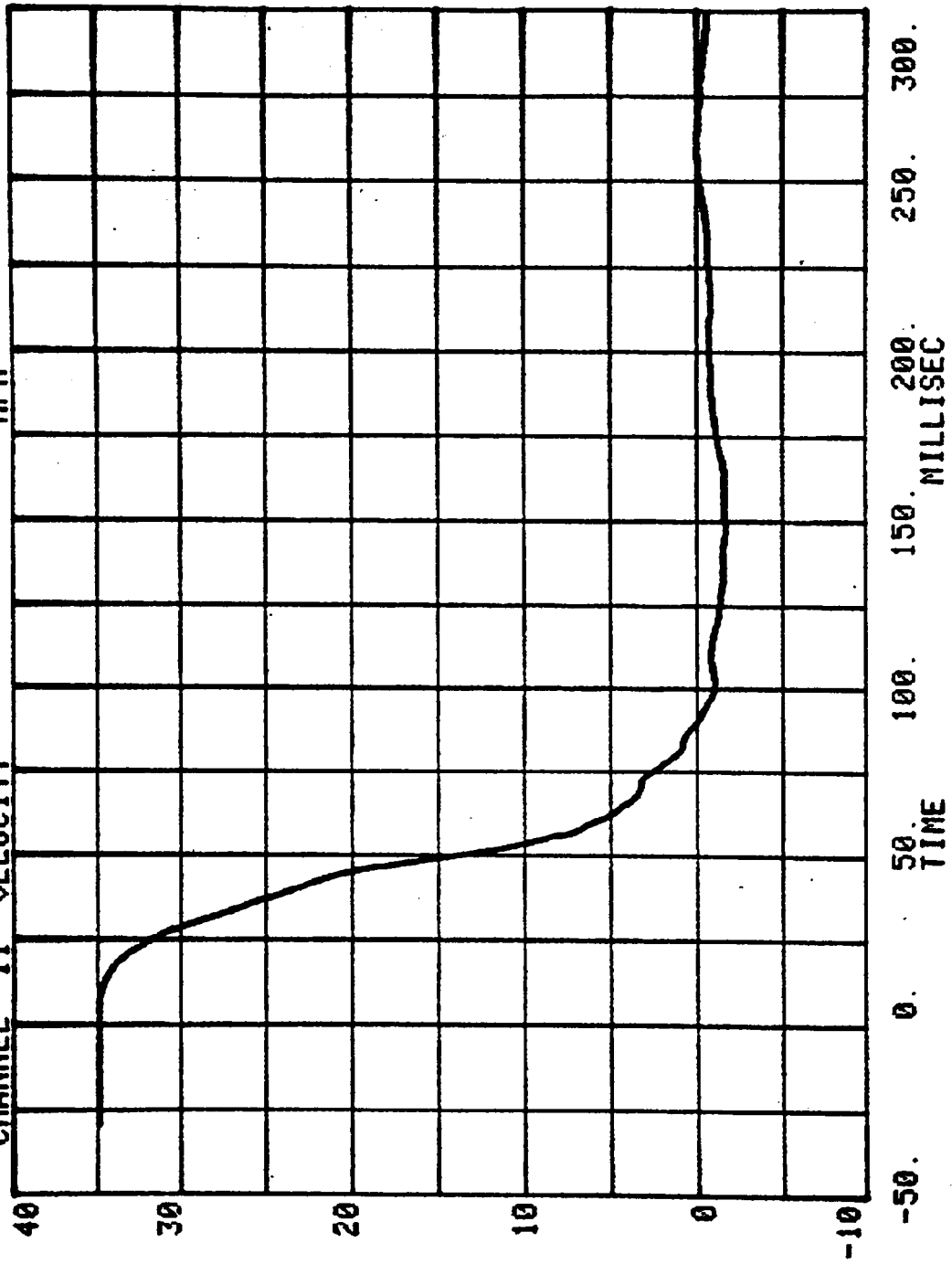


RUN= 611 SERIES= 5202 G'S
CHANNEL 31 ACC PACK #5(X)



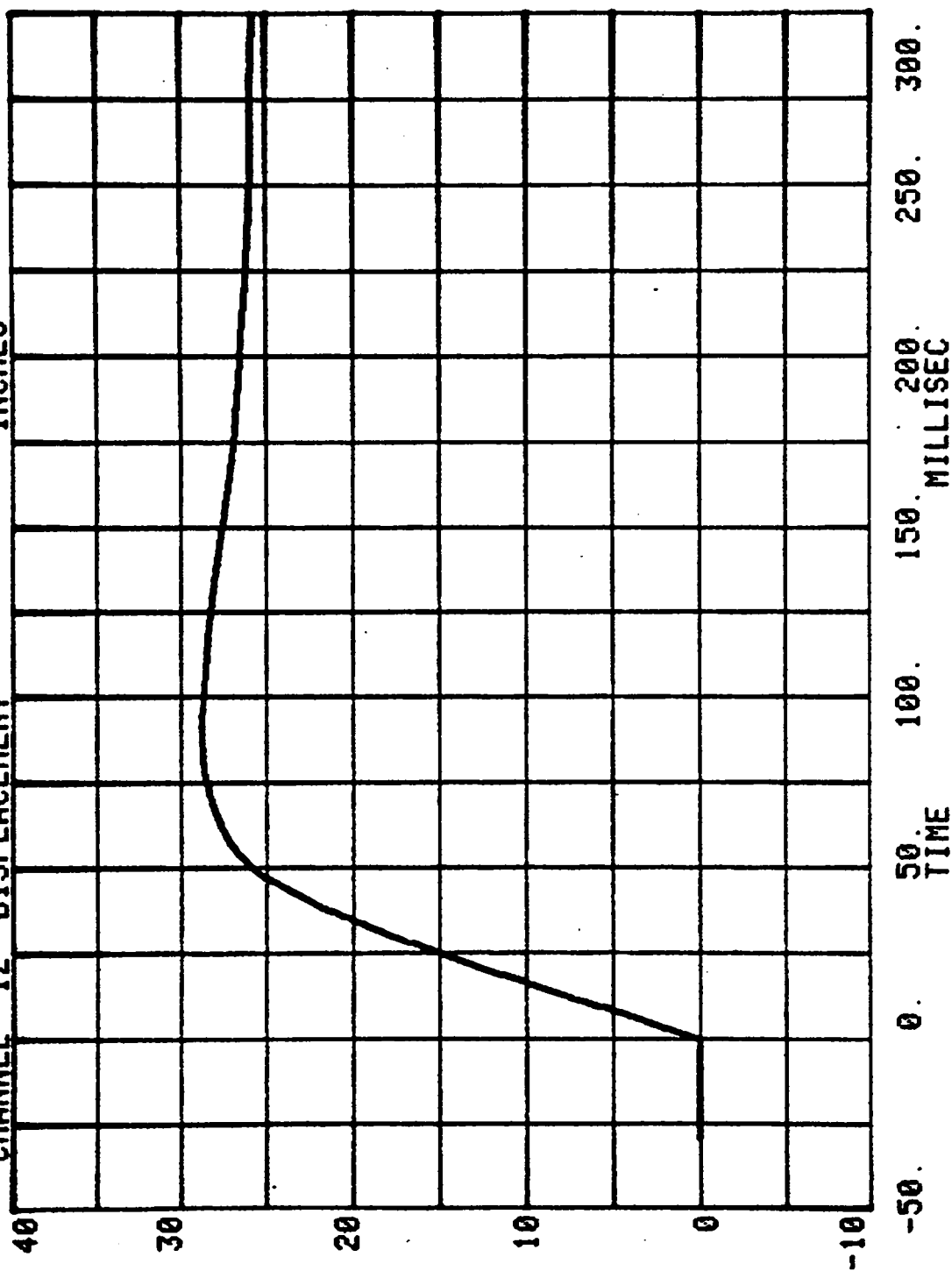
ACC. PACK. #5(X)

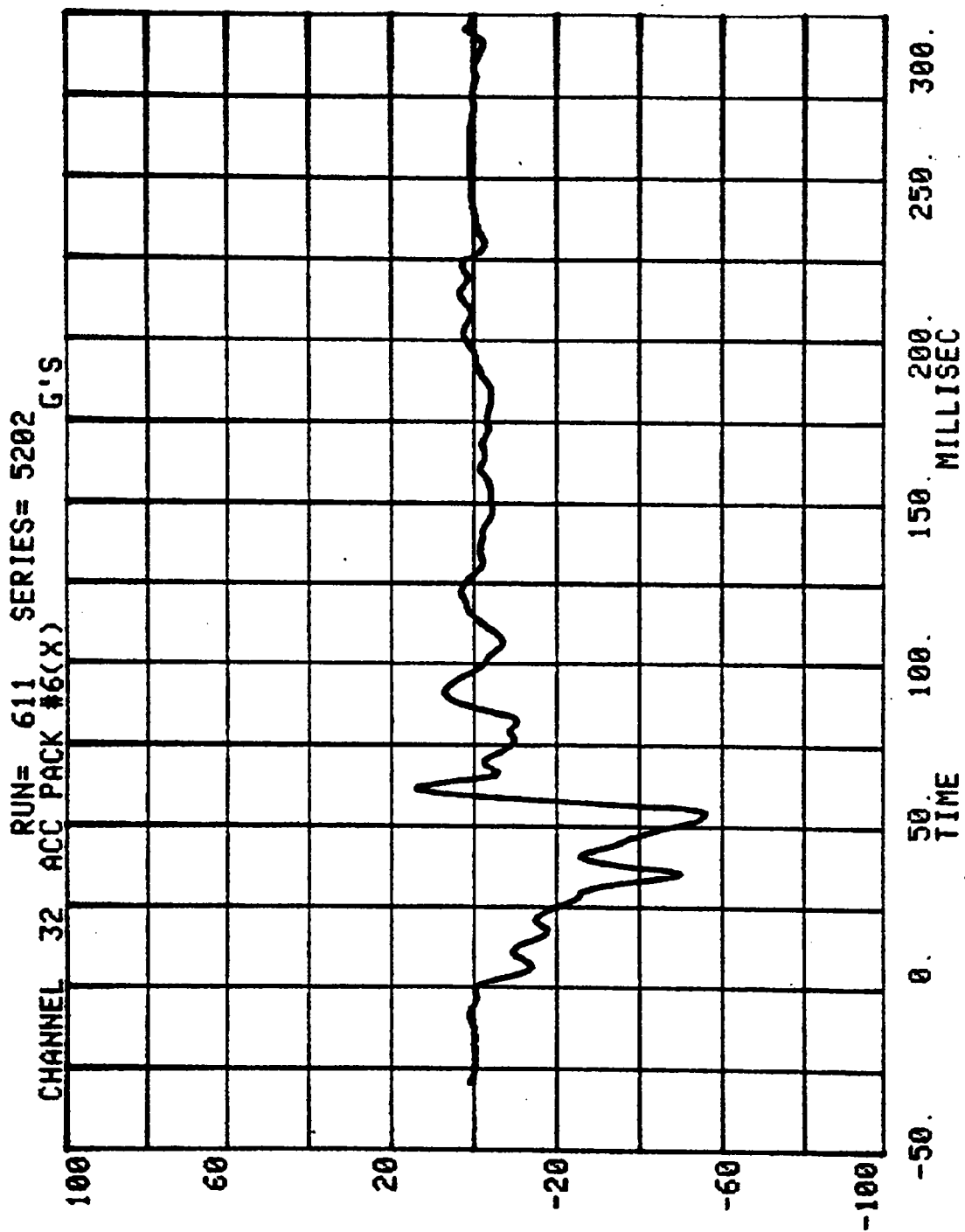
RUN= 611 SERIES= 5202 MPH
CHANNEL 11 VELOCITY



ACC. PACK. #5(X)

RUN= 611 SERIES= 5202 INCHES
CHANNEL 12 DISPLACEMENT



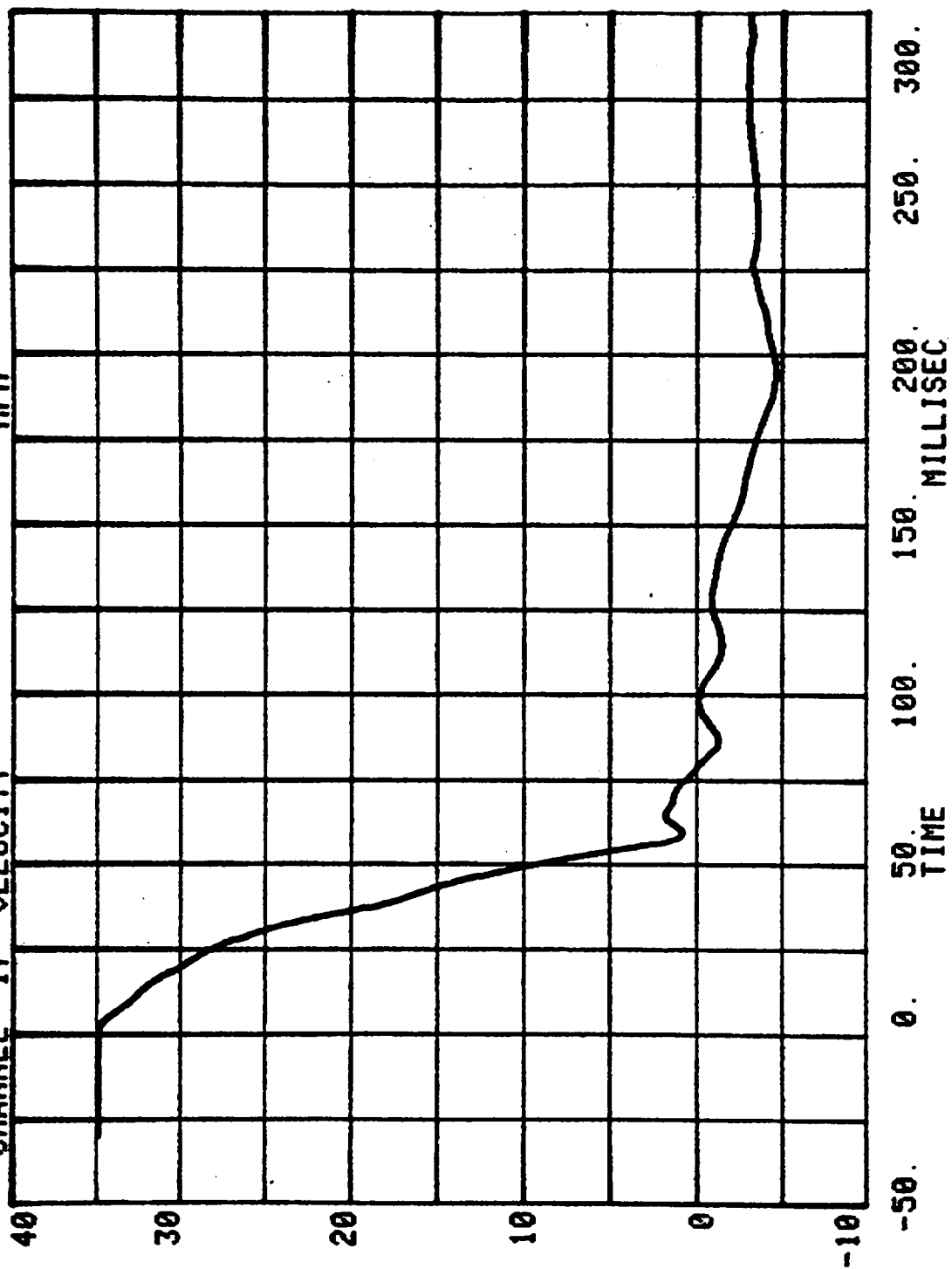


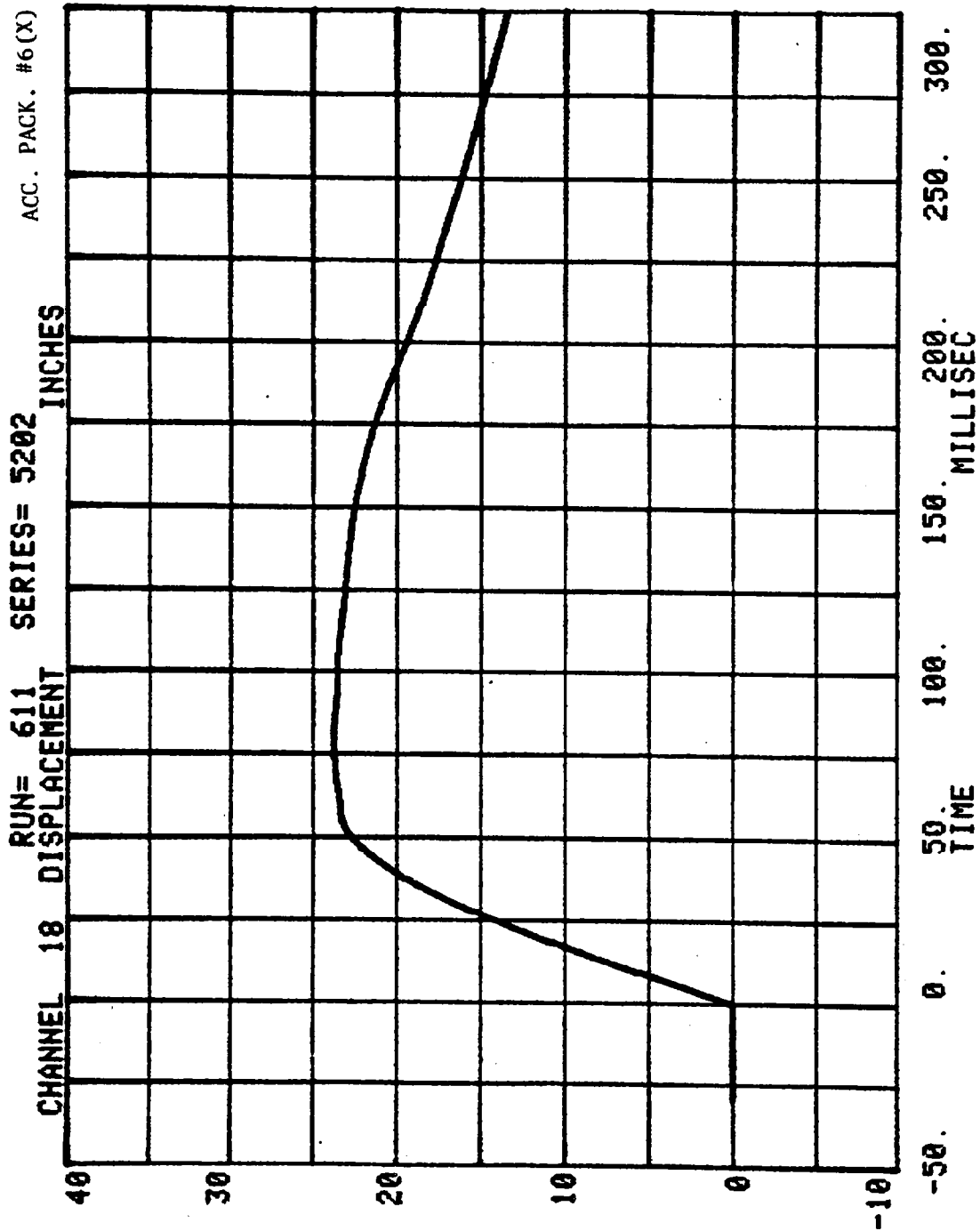
ACC. PACK. #6(X)

RUN= 611 SERIES= 5202

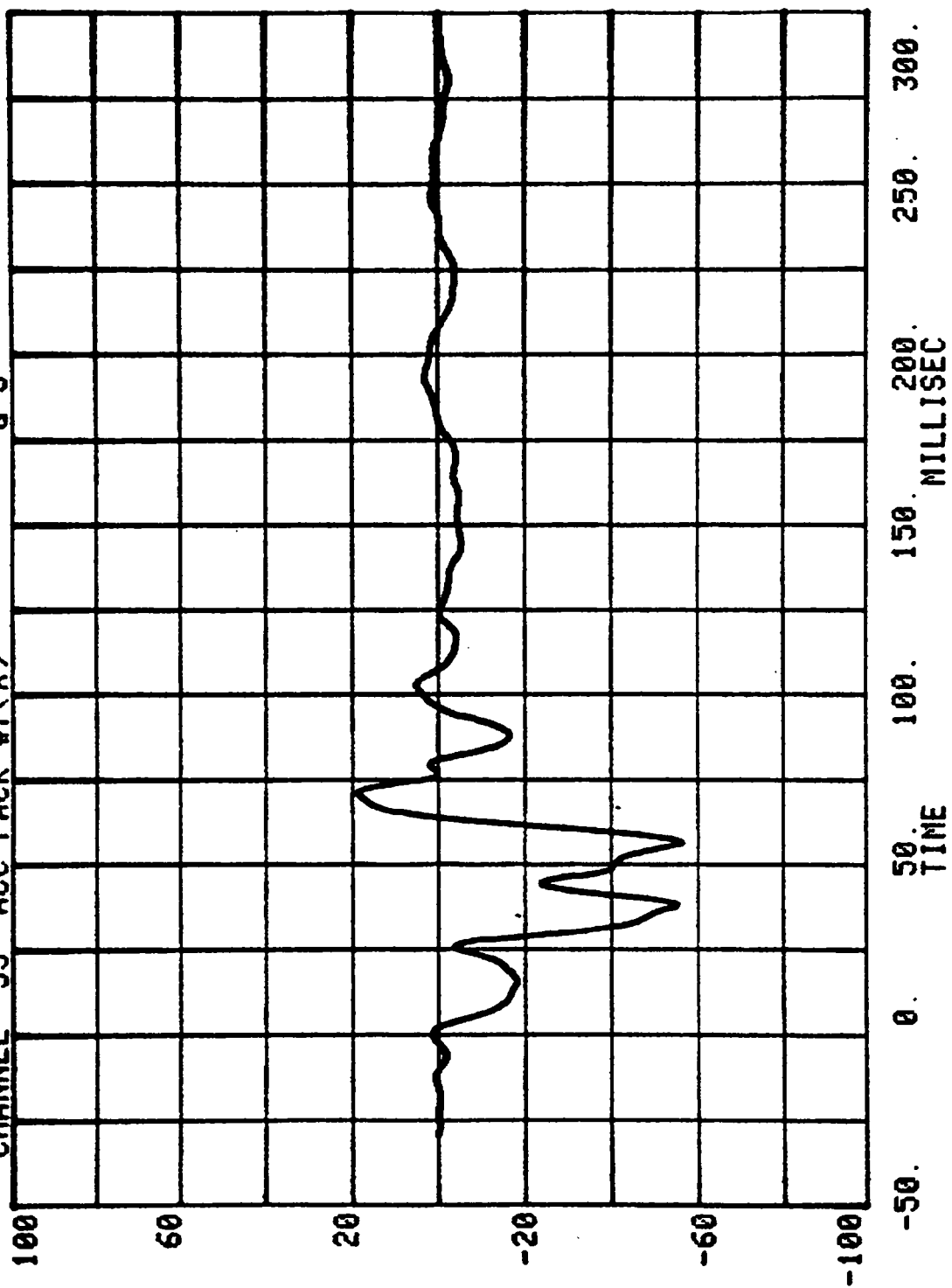
CHANNEL 17 VELOCITY

MPH



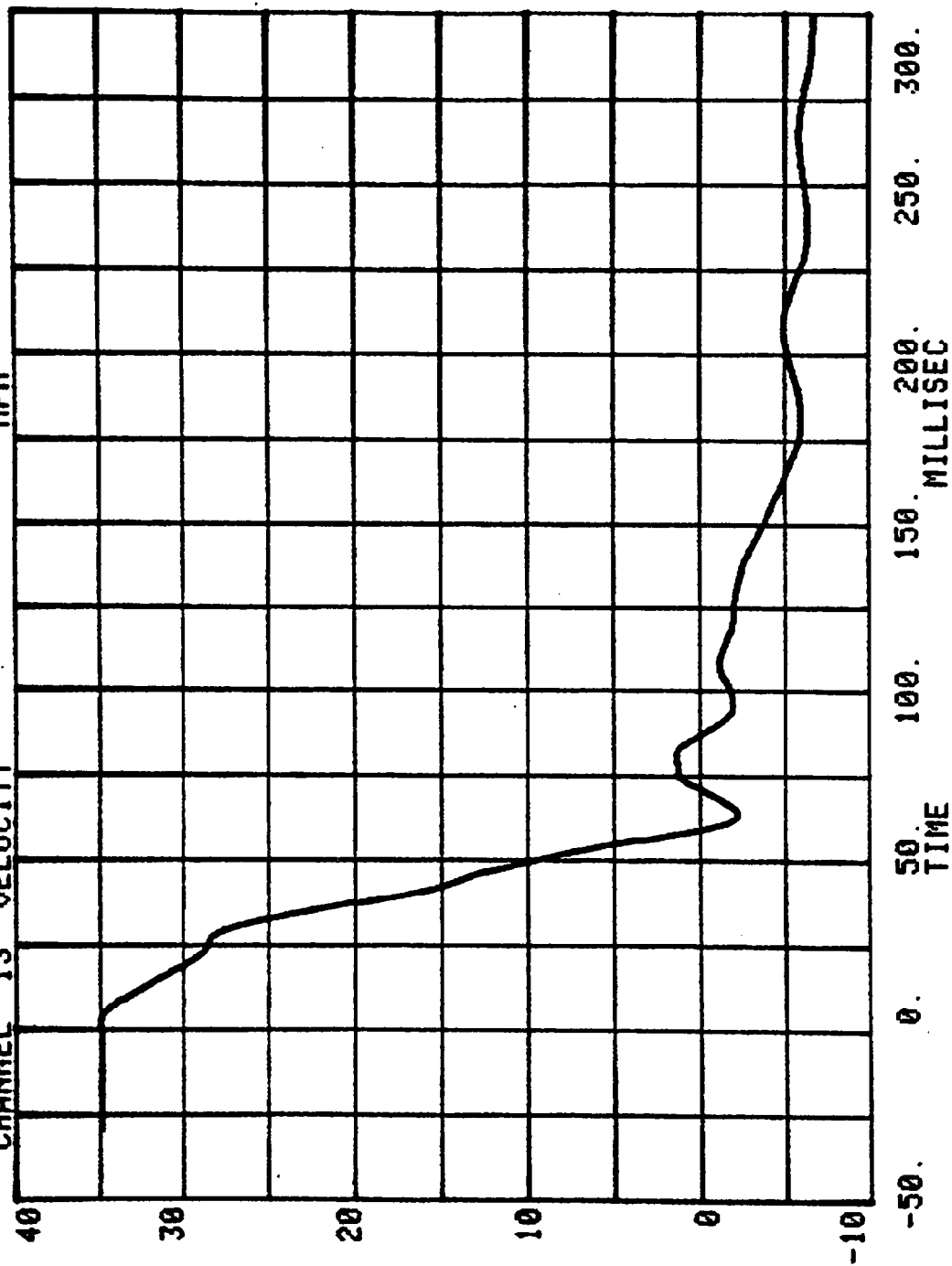


RUN= 611 SERIES= 5202
CHANNEL 33 ACC PACK #7(X) G'S



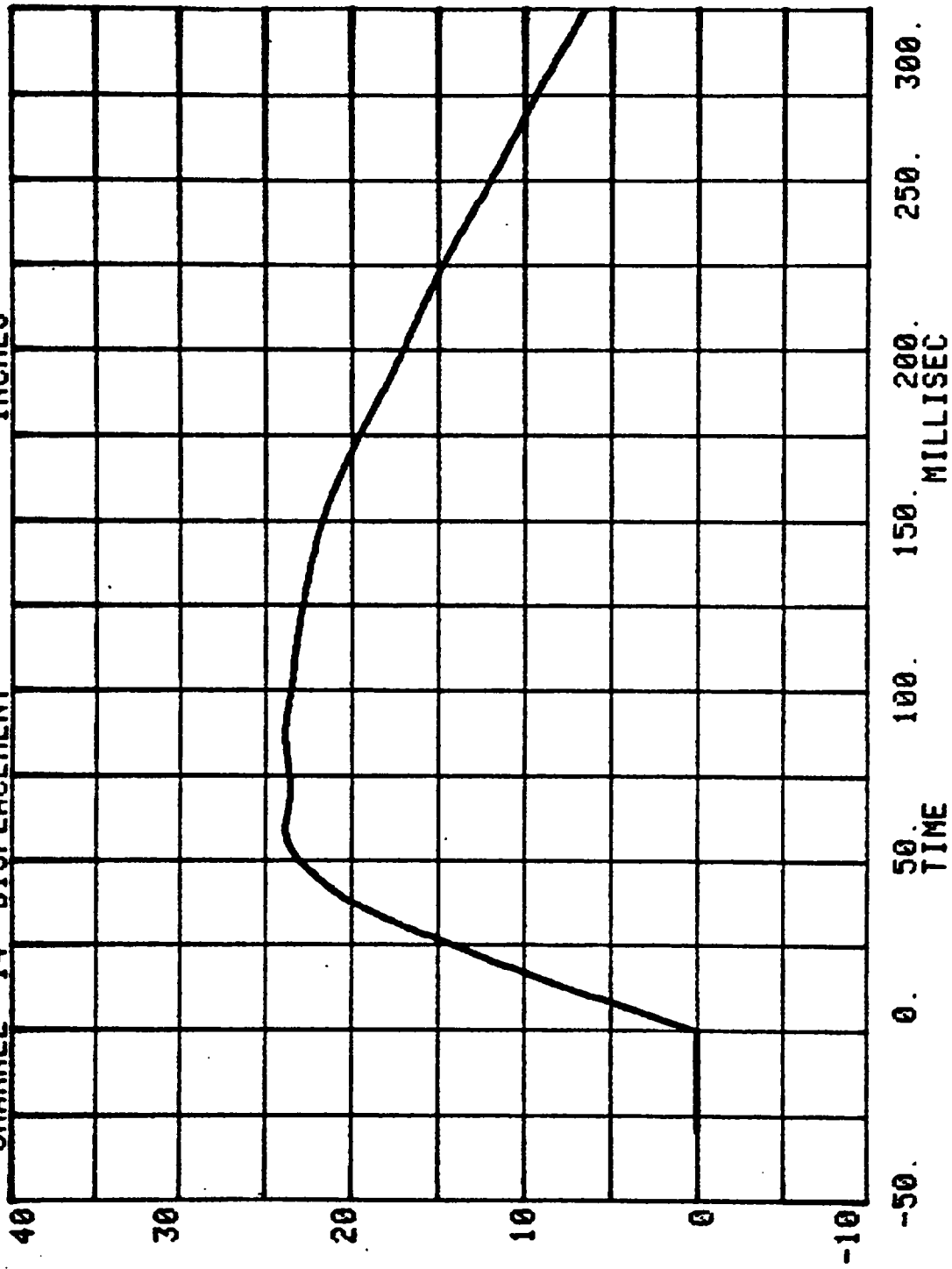
ACC. PACK. #7(X)

RUN= 611 SERIES= 5202 MPH
CHANNEL 13 VELOCITY



ACC. PACK. #7(X)

RUN= 611 SERIES= 5202
CHANNEL 14 DISPLACEMENT INCHES

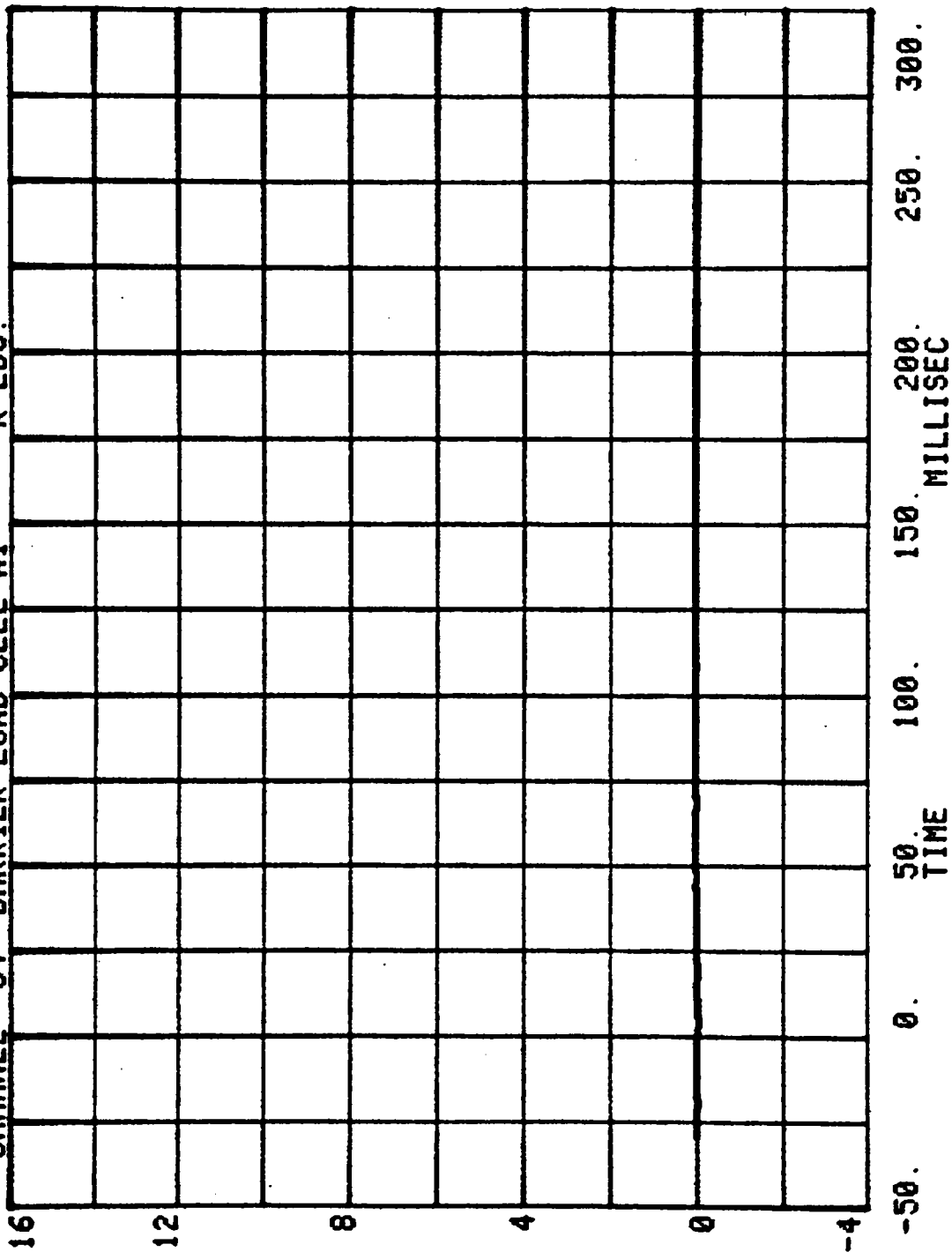


TEST NO. CE5202

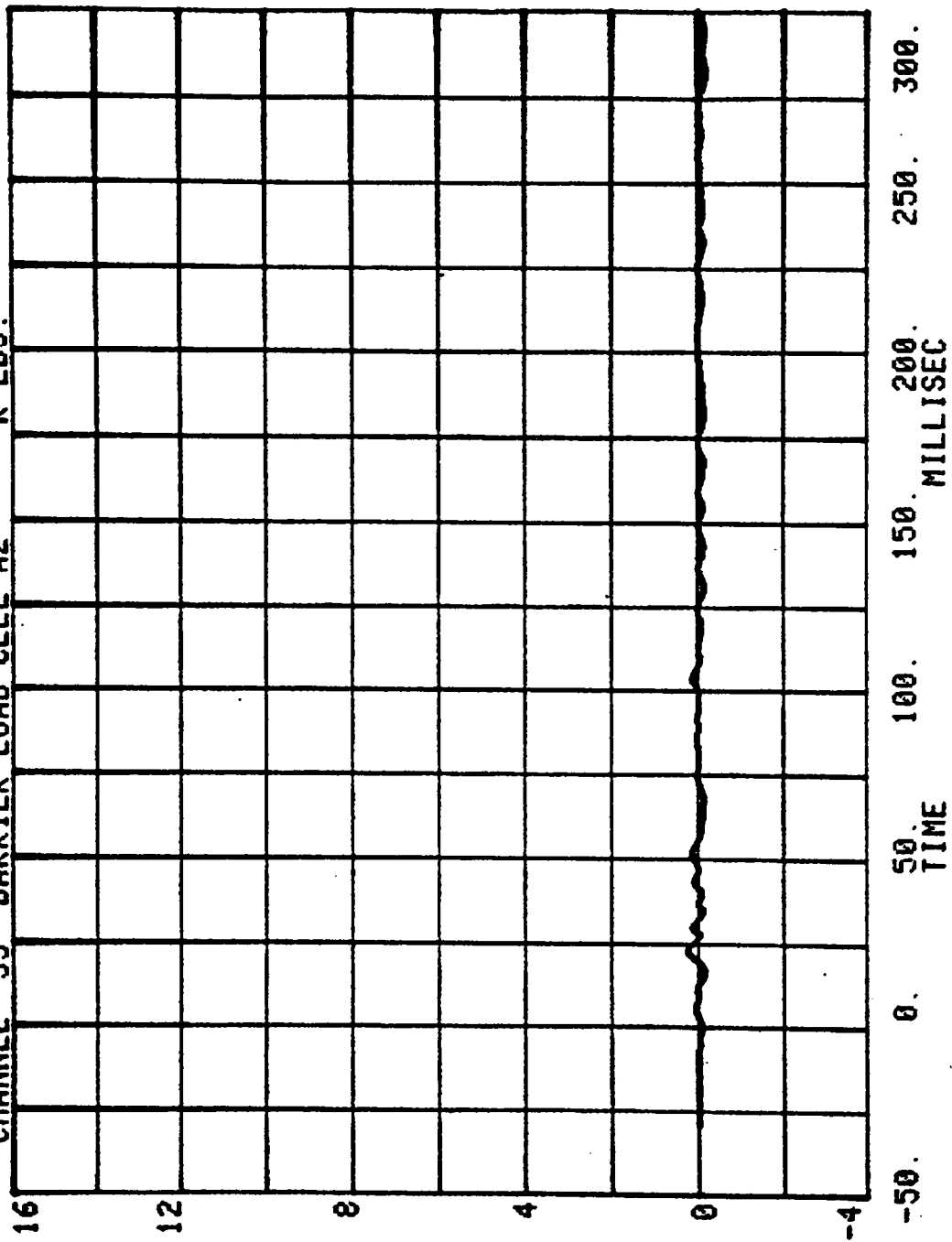
LOAD CELL BARRIER DATA
FILTER CHANNEL CLASS

60

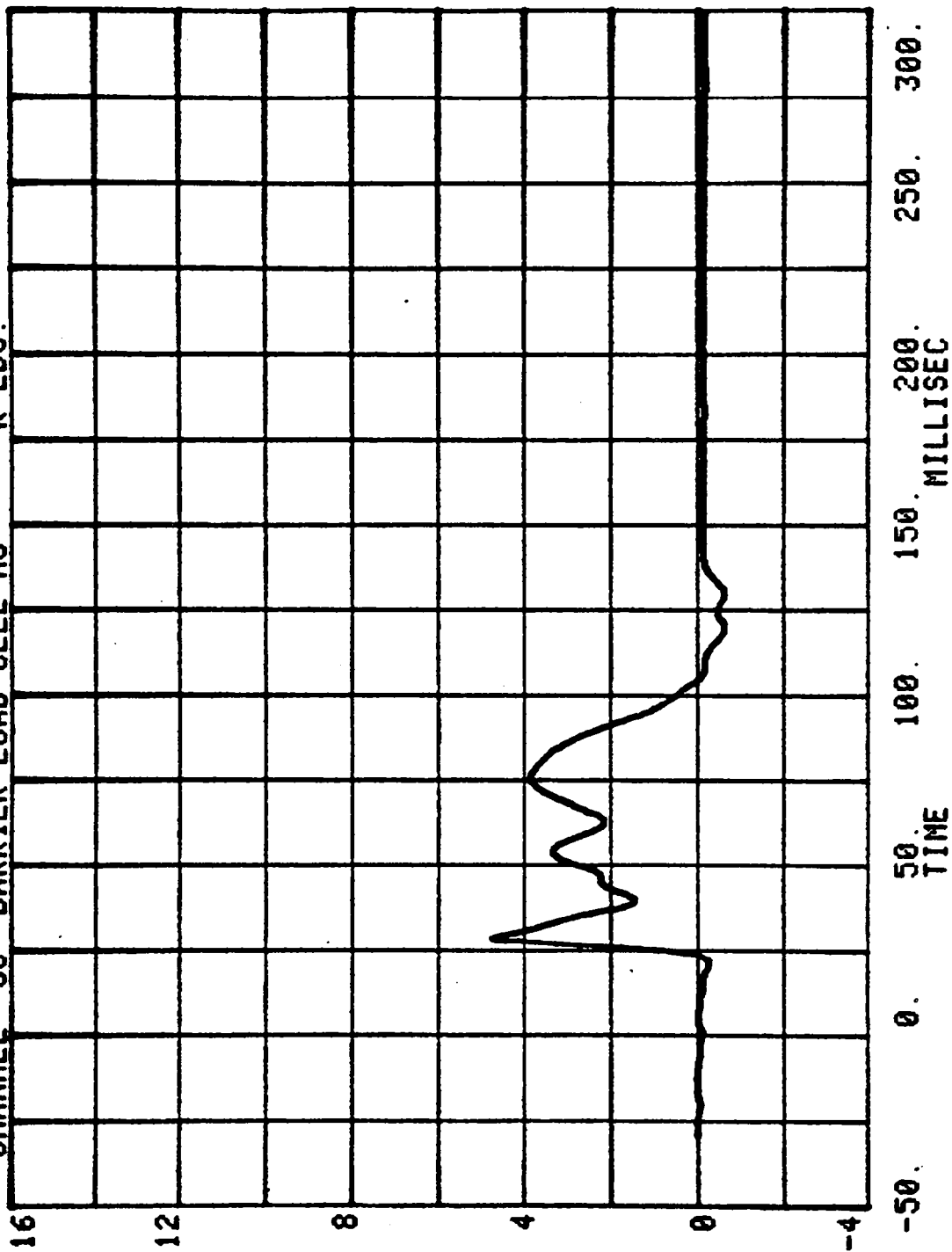
CHANNEL 34 BARRIER LOAD CELL A1 RUN= 611 SERIES= 5202 K LBS.



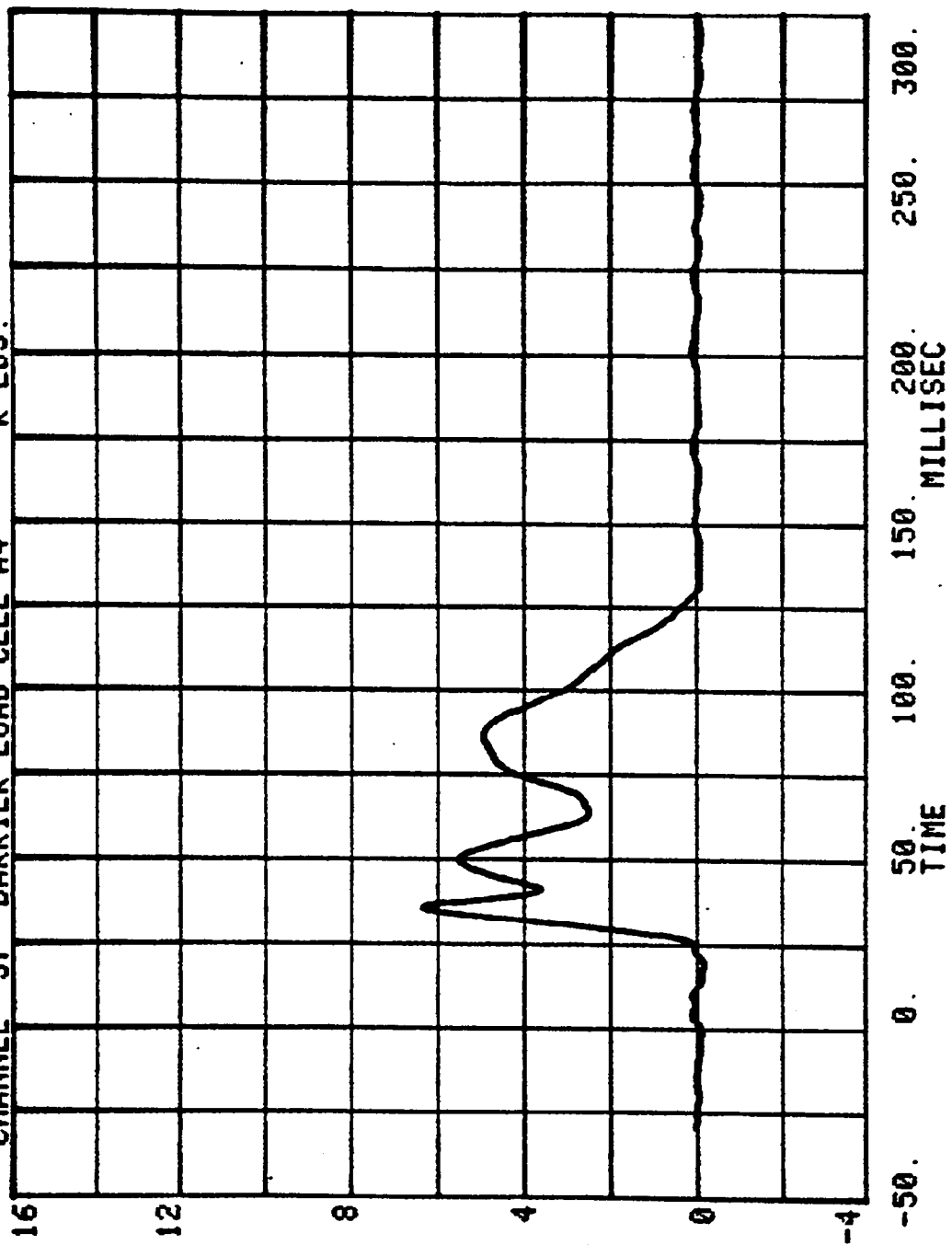
RUN= 611 SERIES= 5202
CHANNEL 35 BARRIER LOAD CELL A2 K LBS.



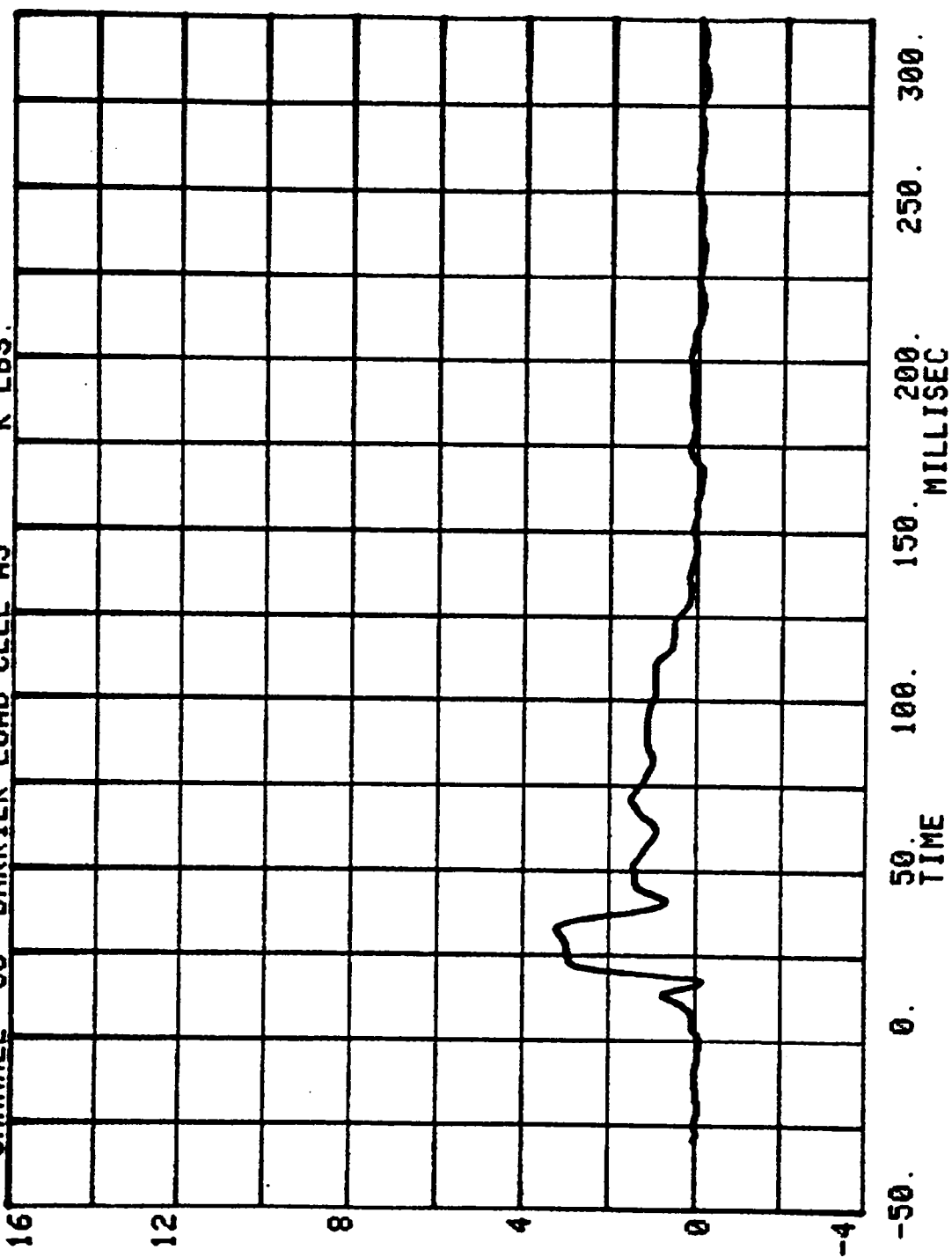
CHANNEL 36 BARRIER LOAD CELL A3 RUN= 611 SERIES= 5202 K LBS.



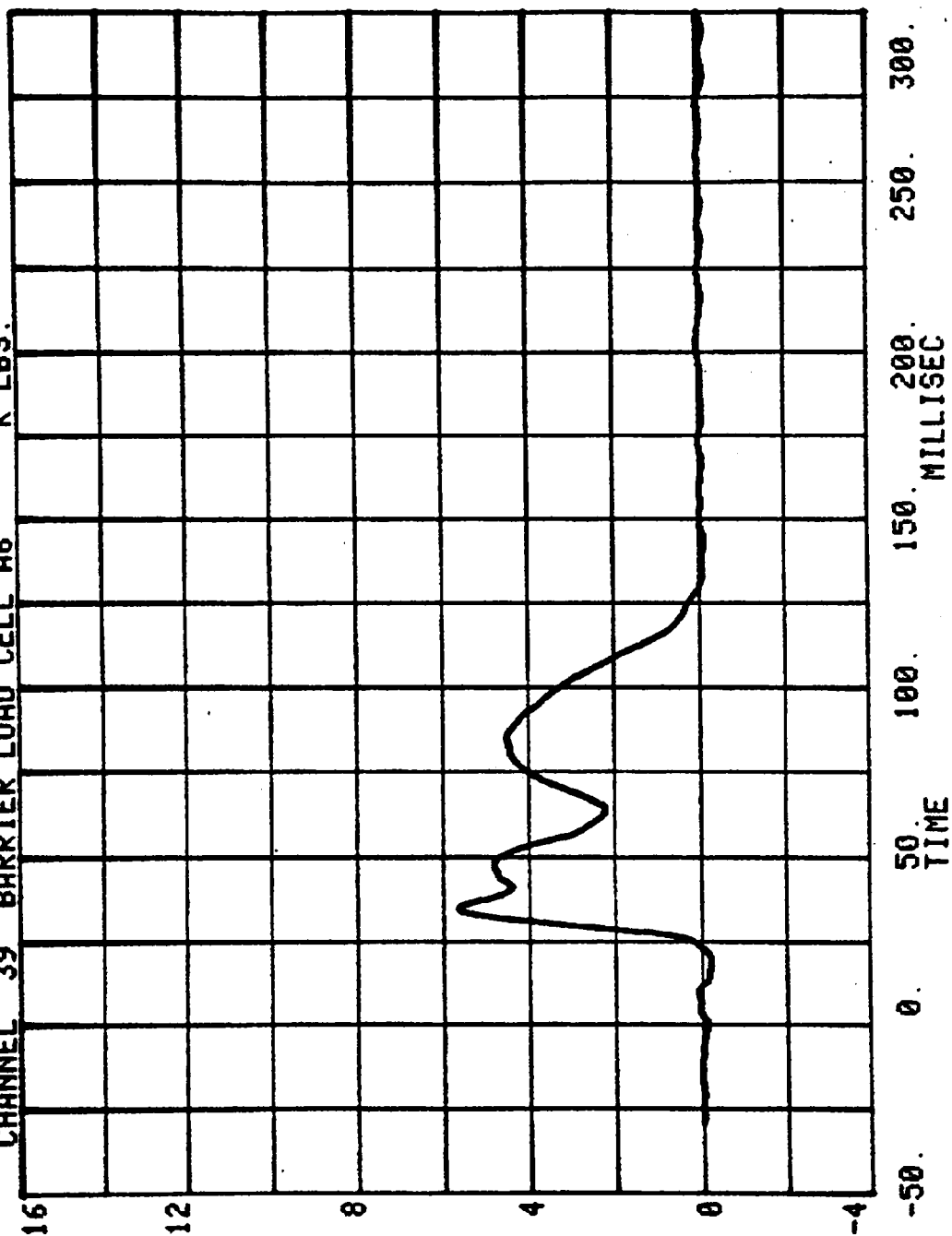
RUN= 611 SERIES= 5202
CHANNEL 37 BARRIER LOAD CELL A4 K LBS.



RUN= 611 SERIES= 5202
CHANNEL 38 BARRIER LOAD CELL A5 K LBS.

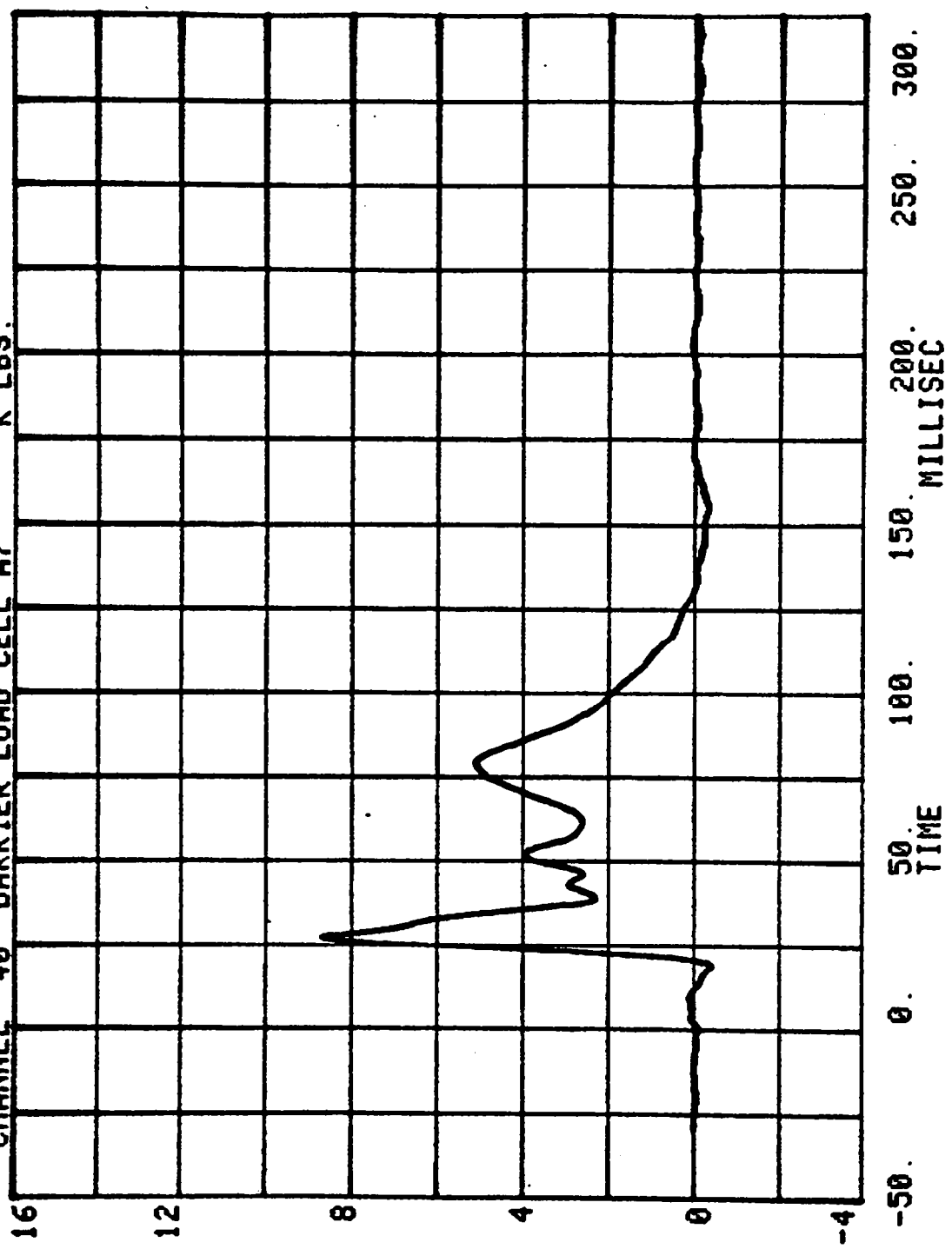


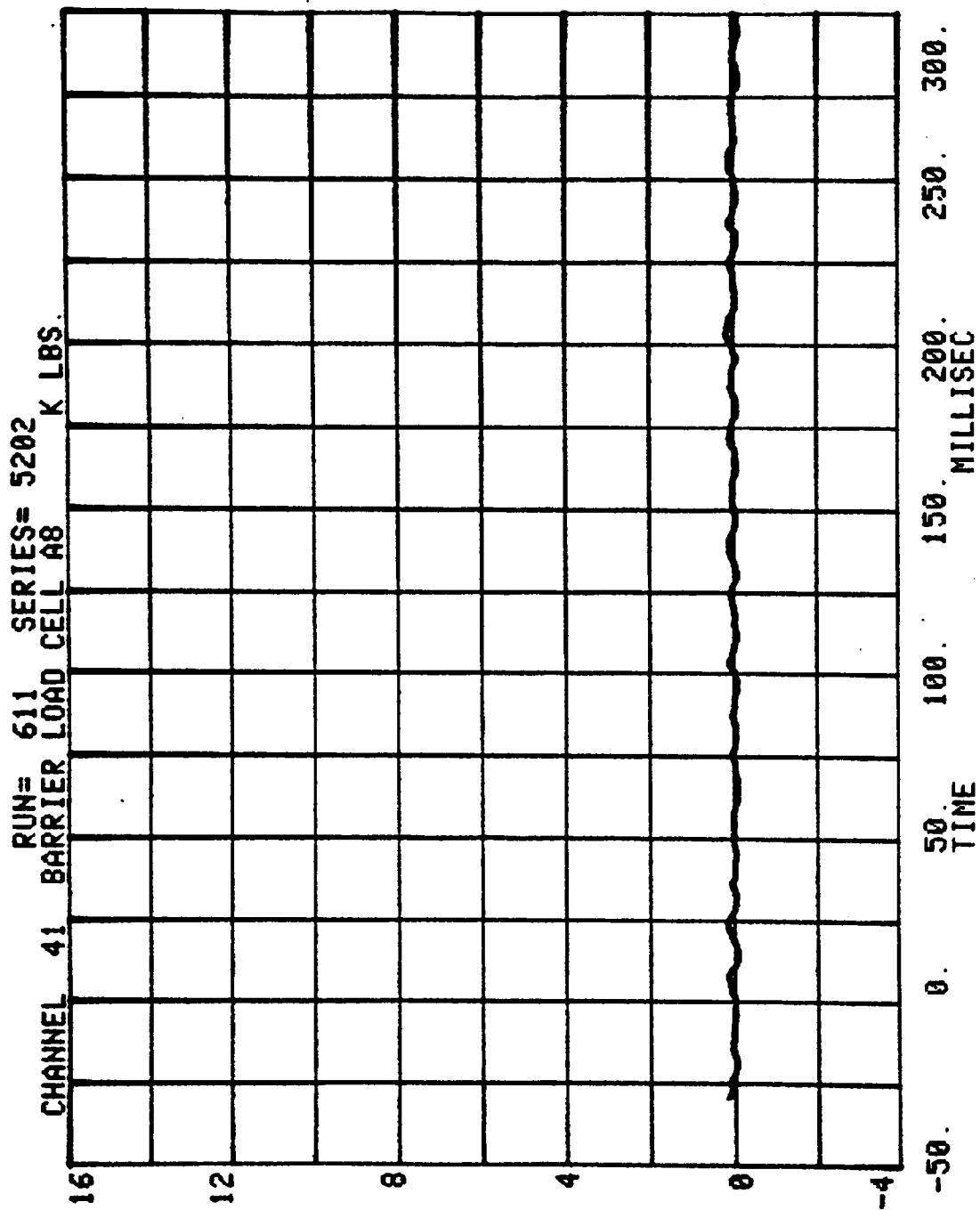
CHANNEL 39 BARRIER LOAD CELL A6
RUN= 611 SERIES= 5202 K LBS.



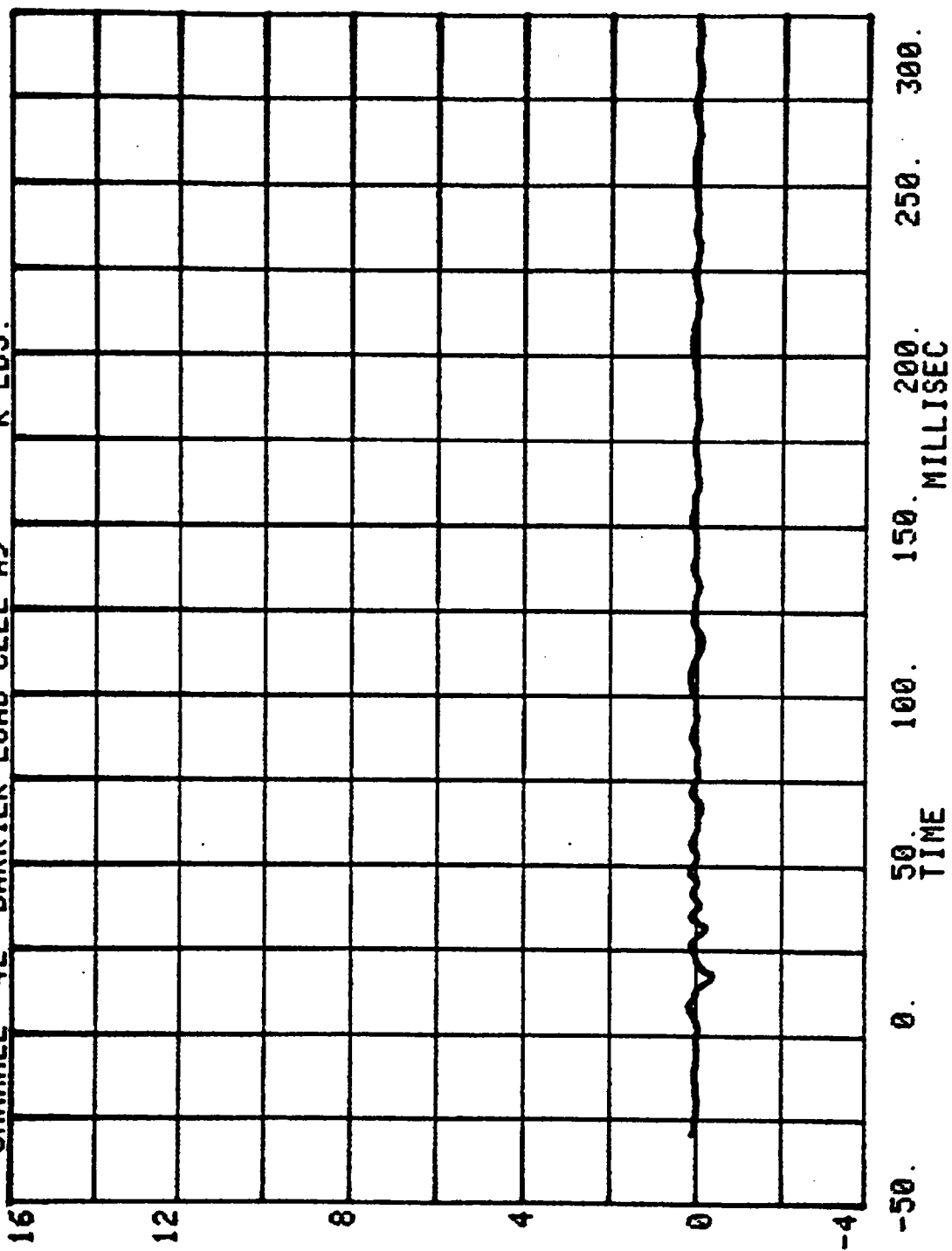
CHANNEL 40 BARRIER LOAD CELL A7 K LBS.

RUN= 611 SERIES= 5202



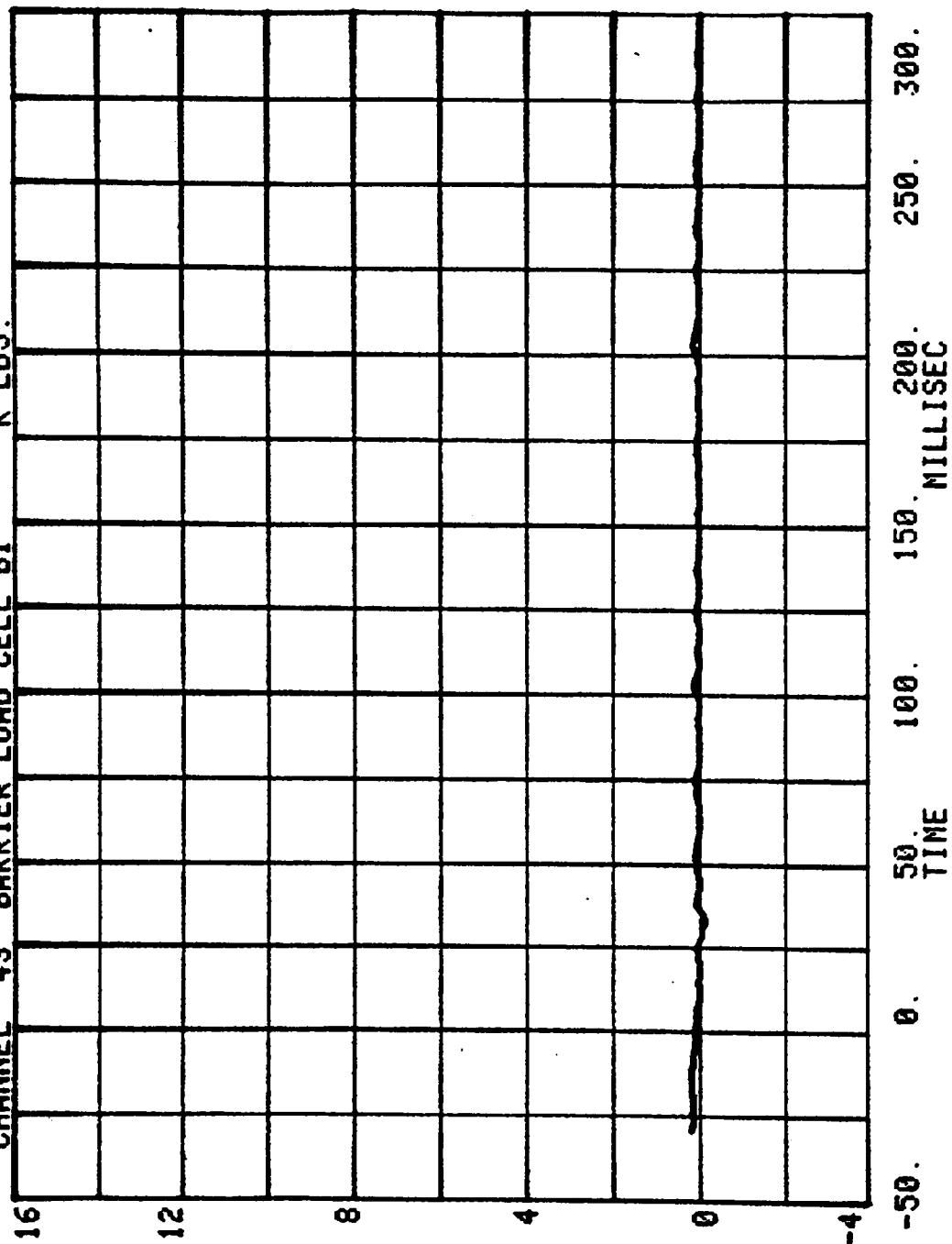


RUN= 611 SERIES= 5202
CHANNEL 42 BARRIER LOAD CELL A9 K LBS.



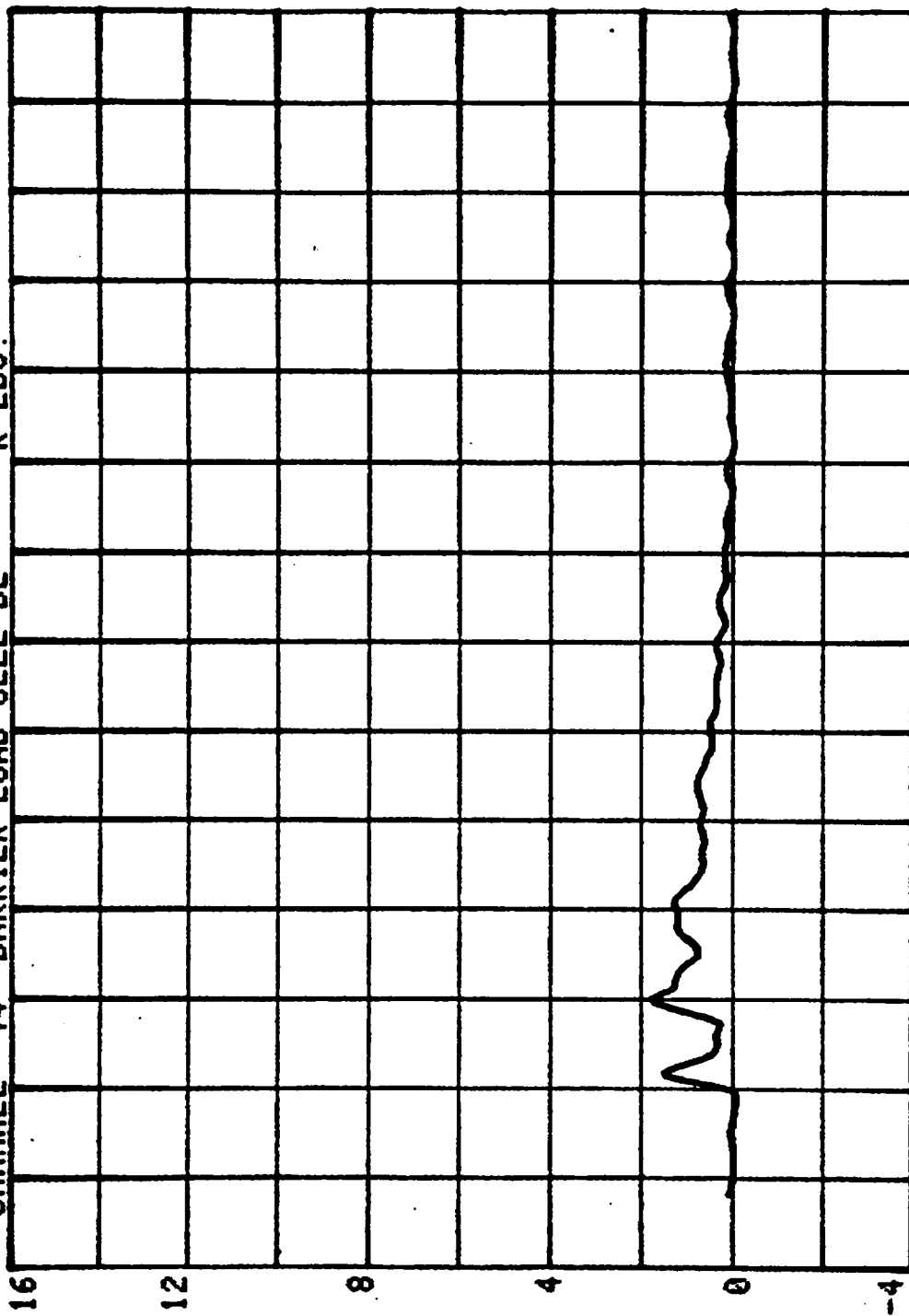
CHANNEL 43 BARRIER LOAD CELL B1 K LBS.

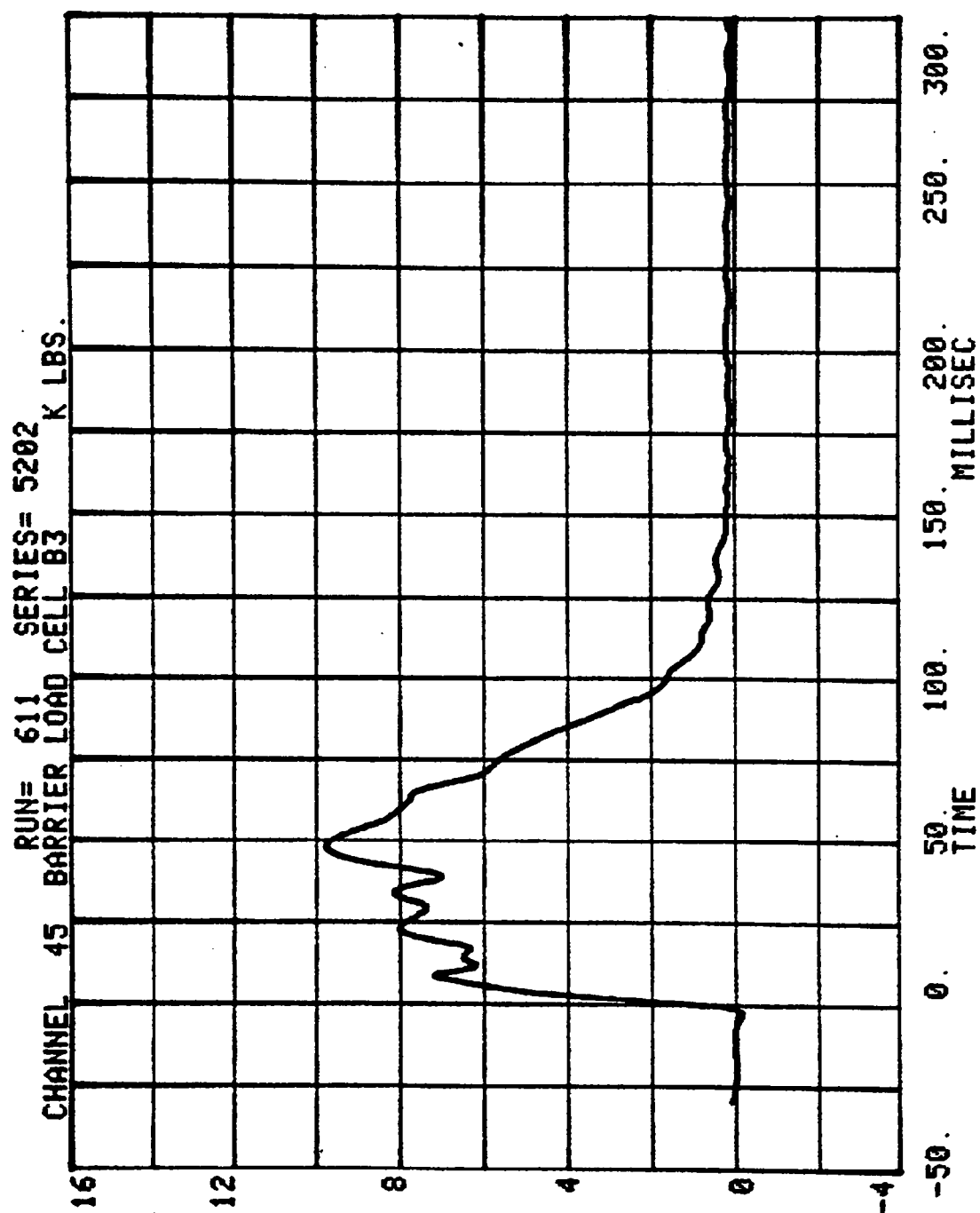
RUN= 611 SERIES= 5202



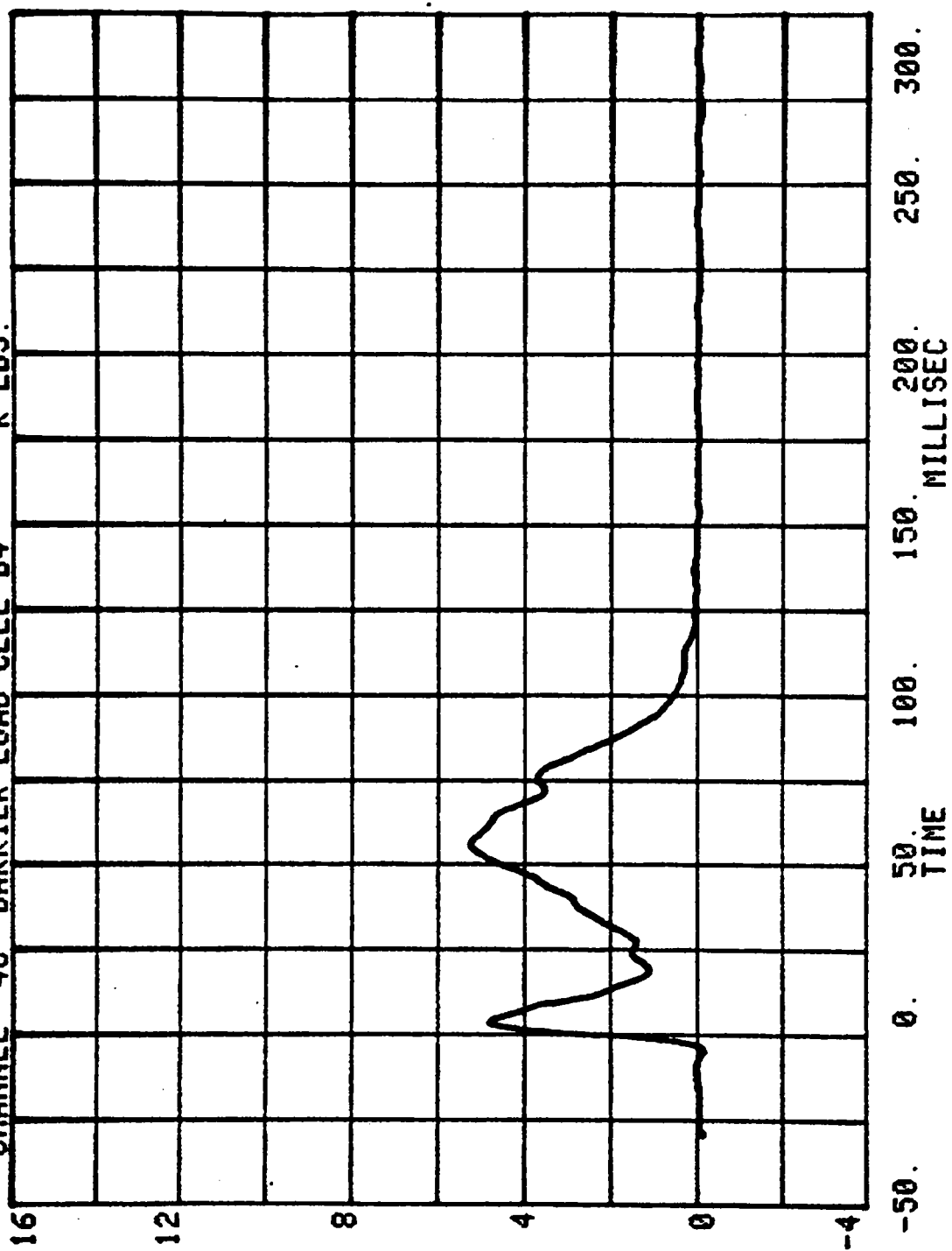
CHANNEL 44 BARRIER LOAD CELL B2 K LBS.

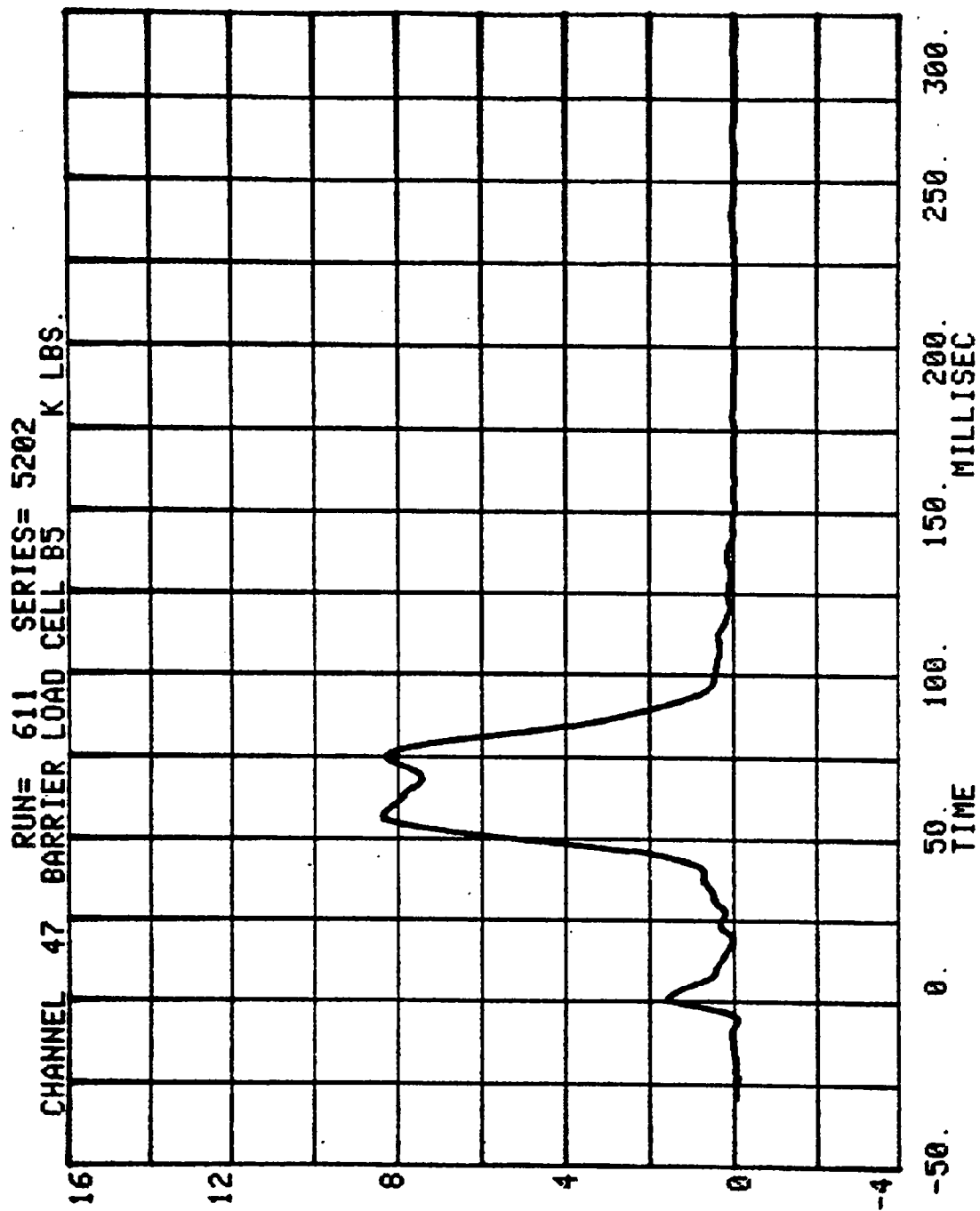
RUN= 611 SERIES= 5202





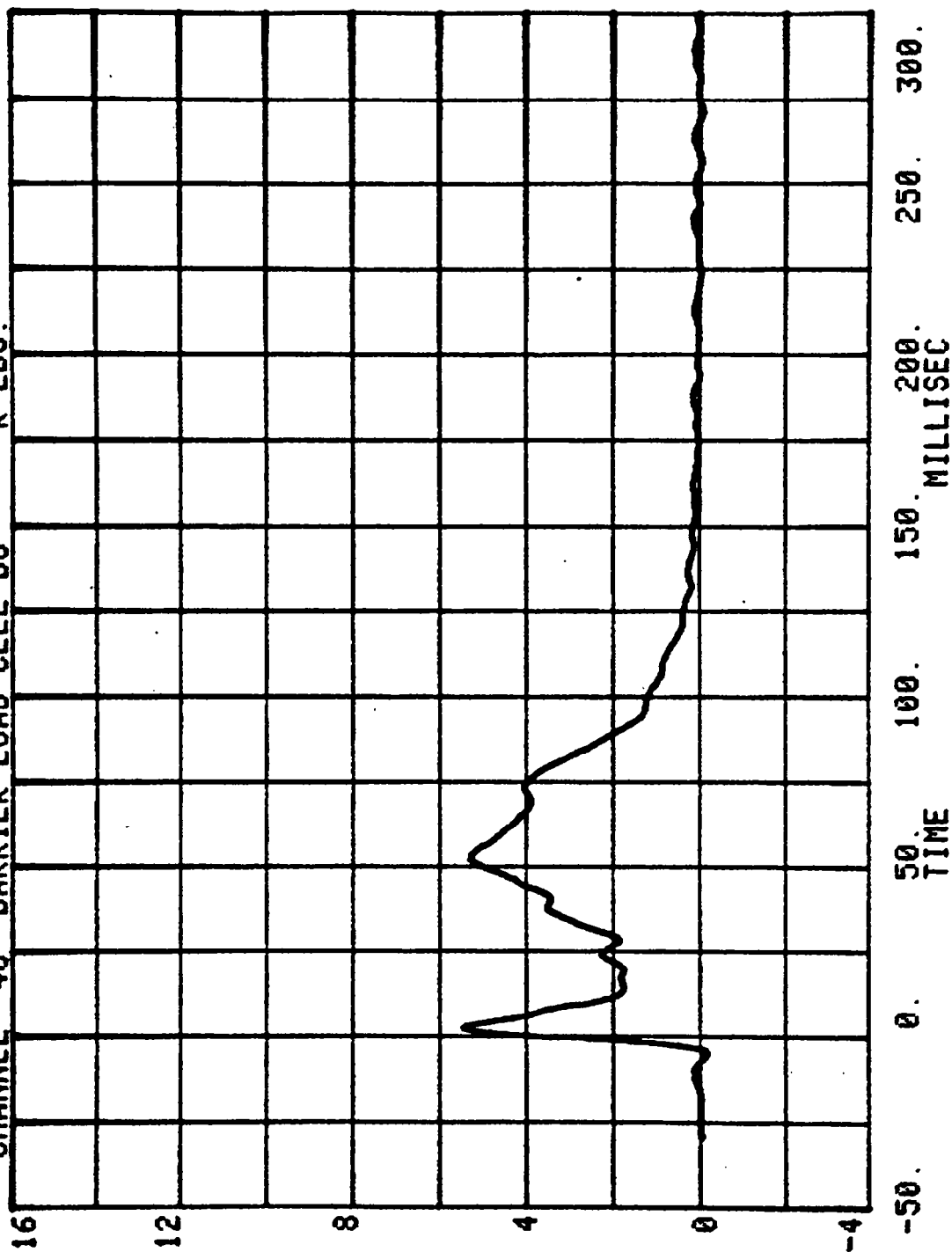
RUN= 611 SERIES= 5202
CHANNEL 46 BARRIER LOAD CELL B4 K LBS.



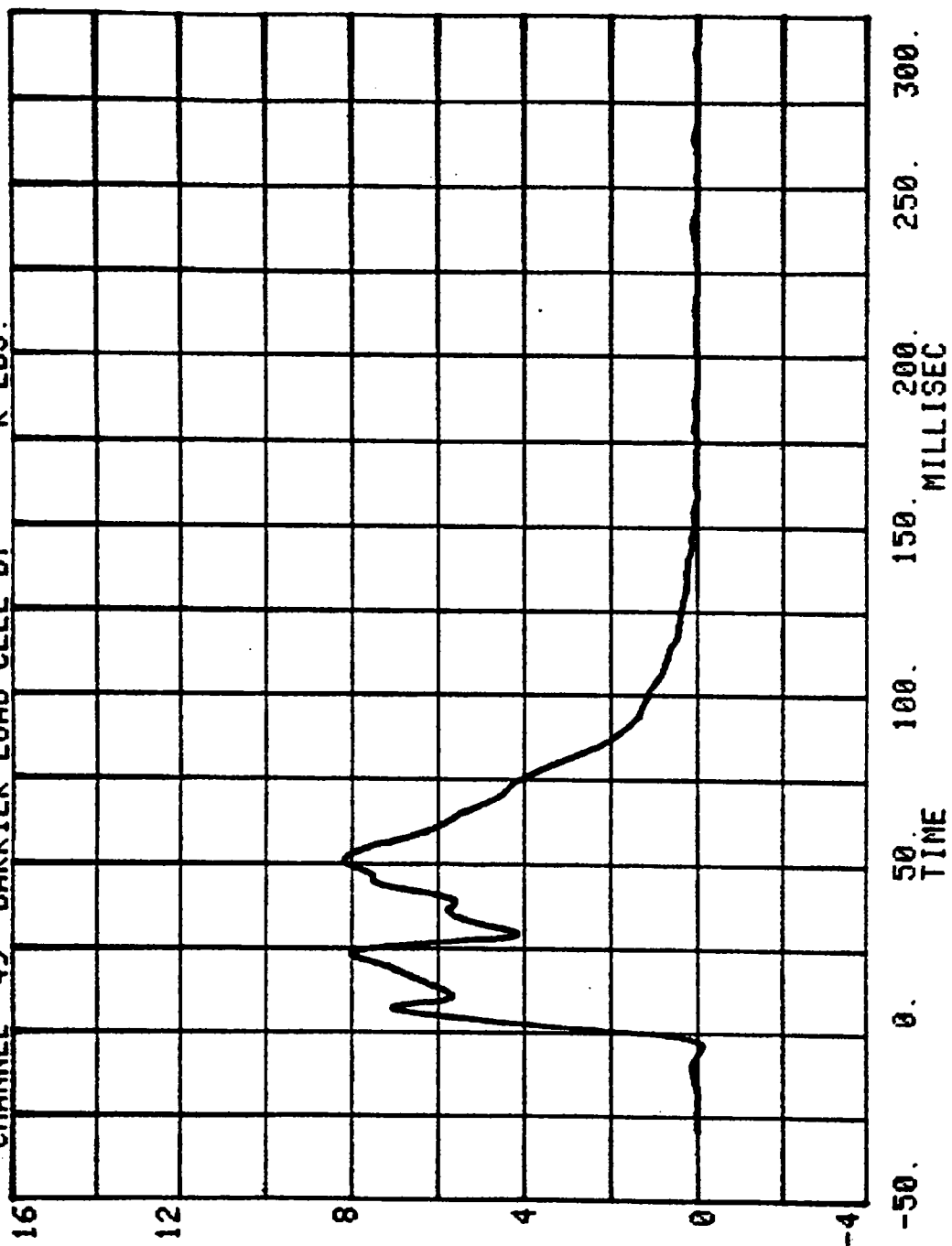


CHANNEL 48 BARRIER LOAD CELL B6 K LBS.

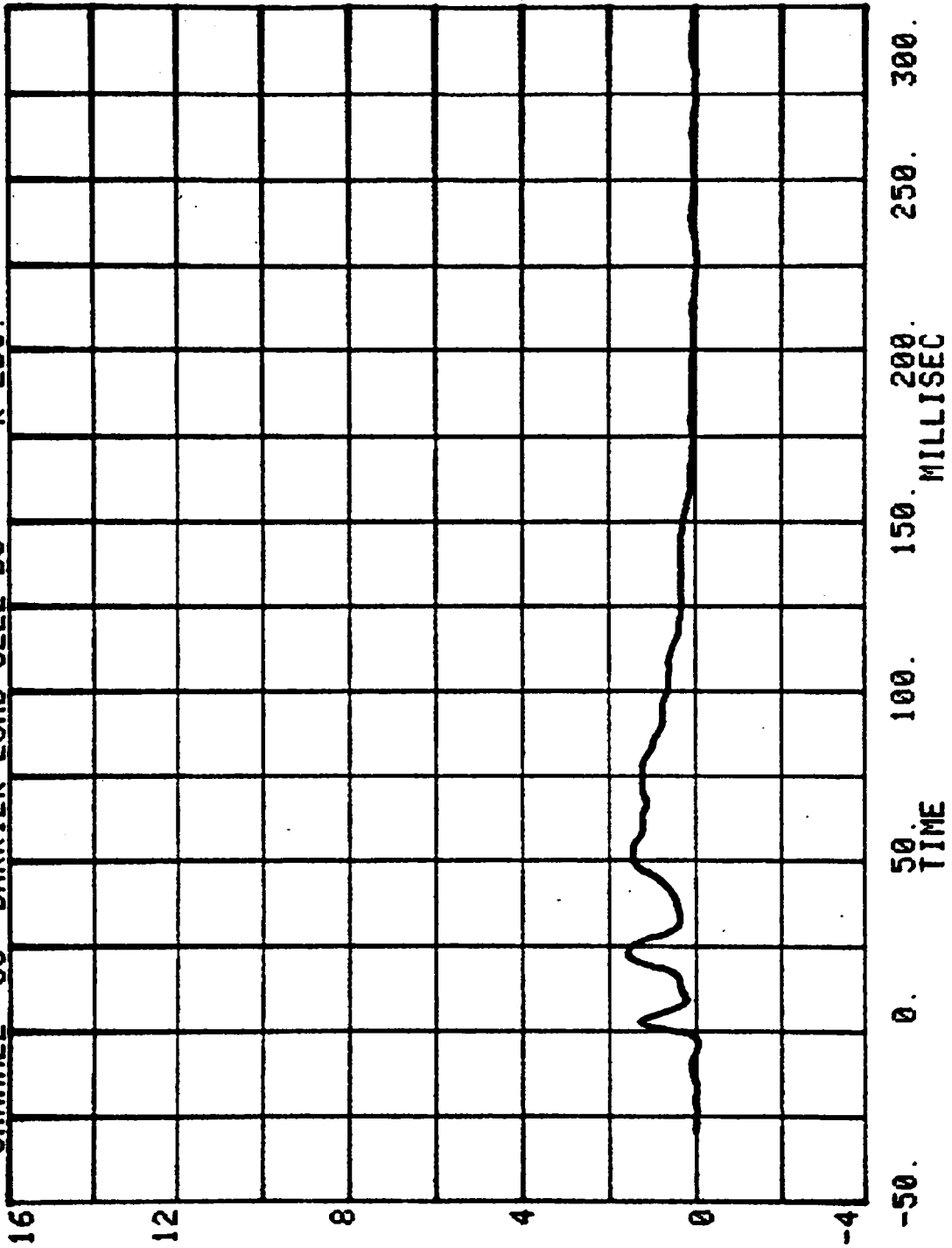
RUN= 611 SERIES= 5202

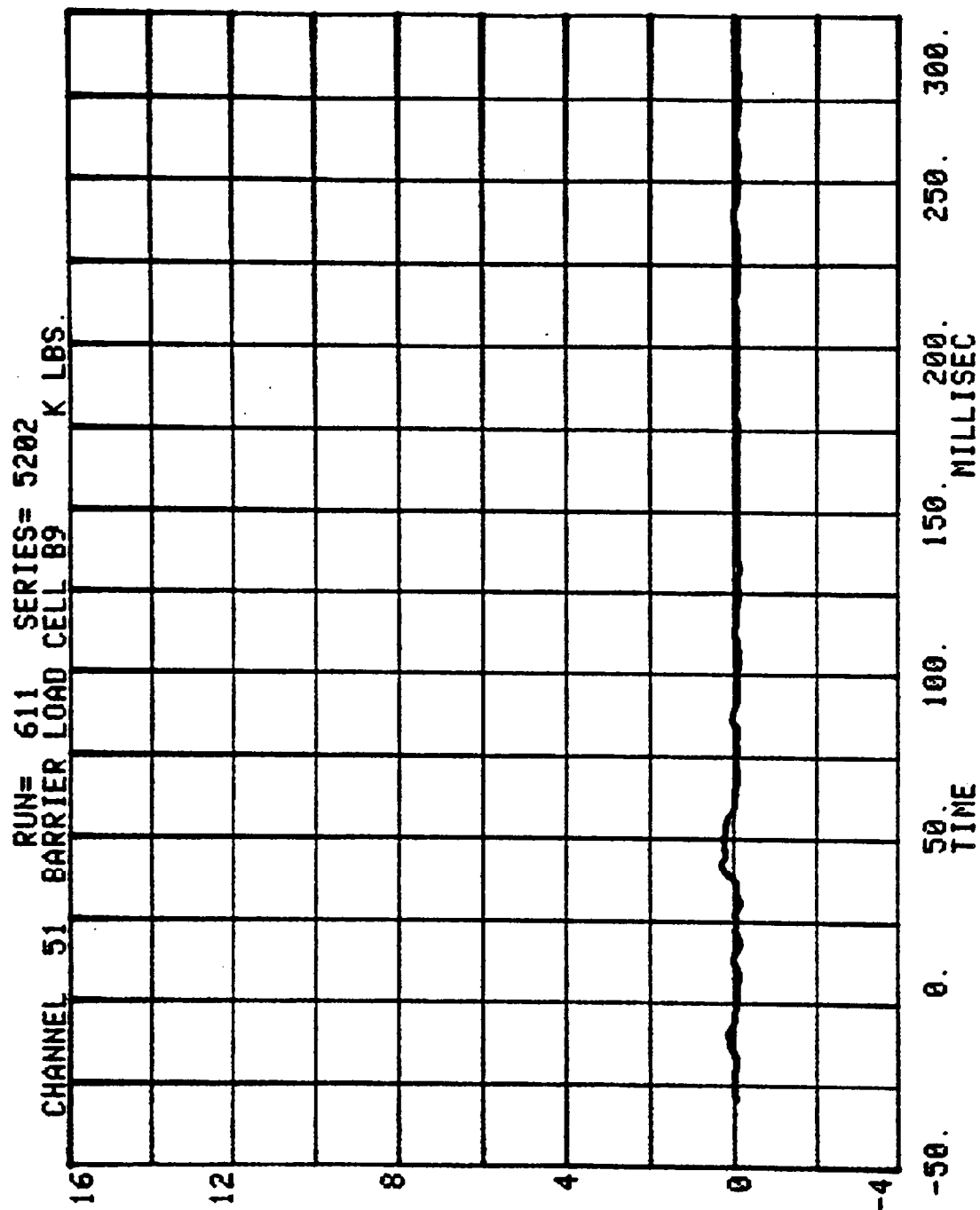


RUN= 611 SERIES= 5202
CHANNEL 49 BARRIER LOAD CELL B7 K LBS.

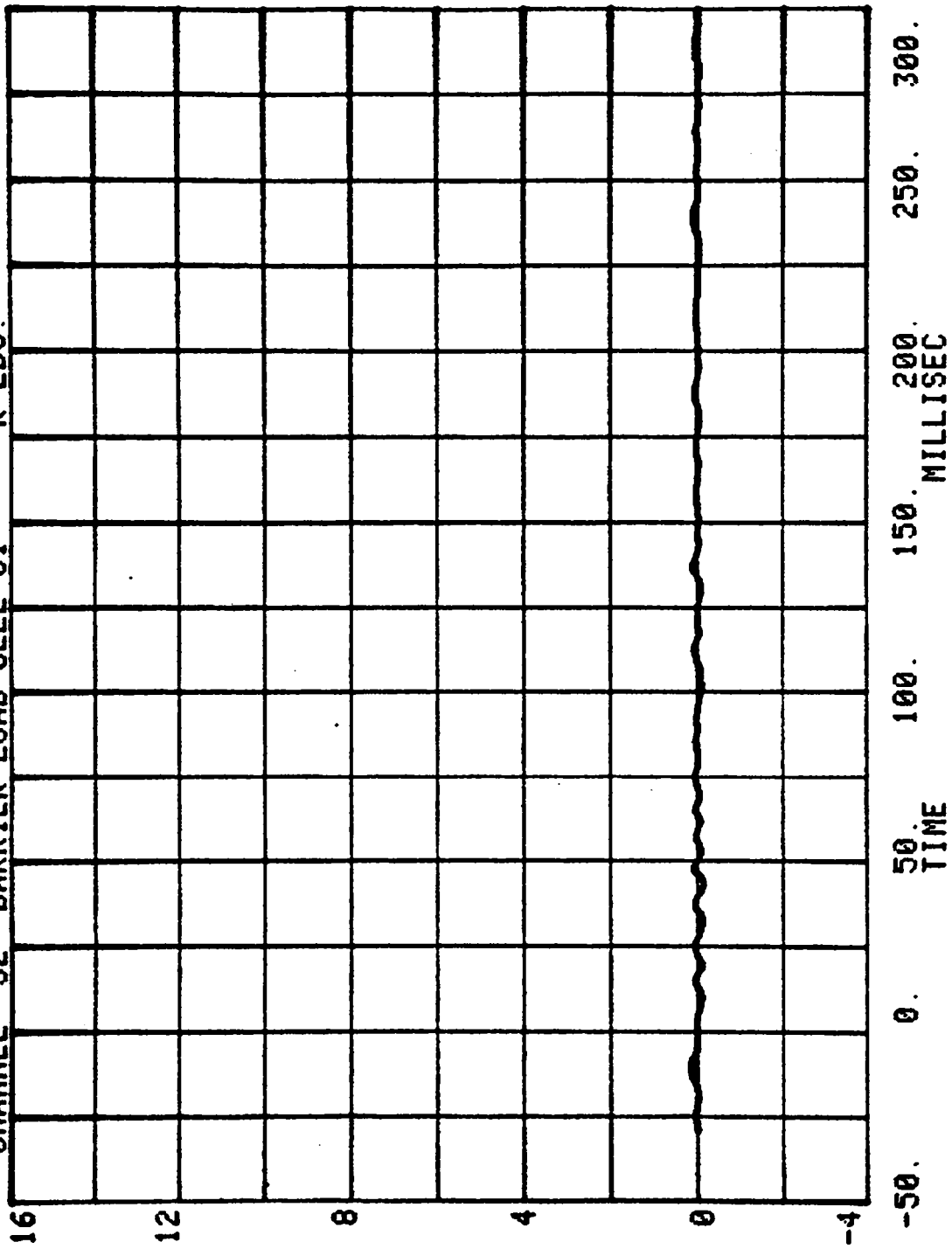


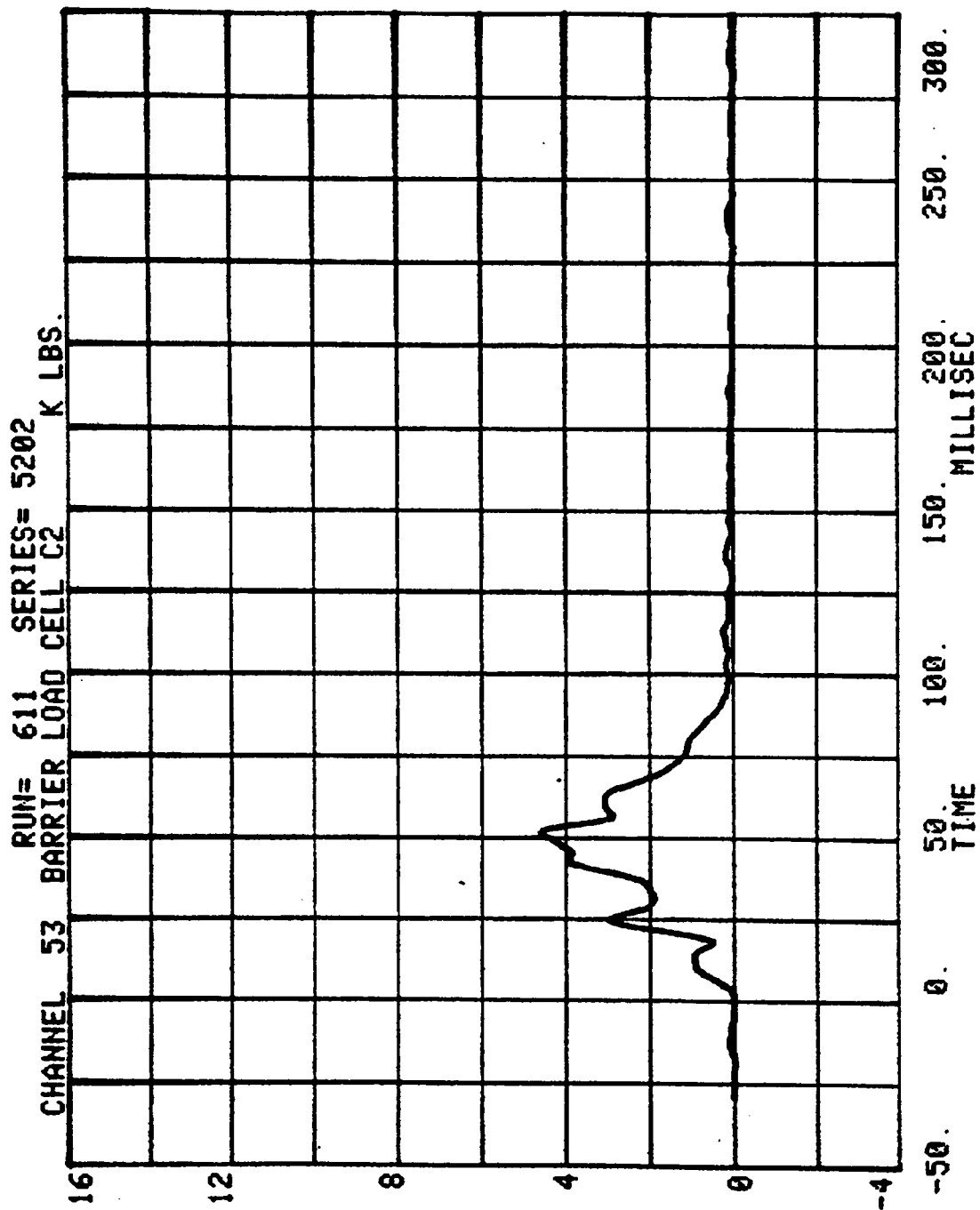
CHANNEL 50 BARRIER LOAD CELL B8 RUN= 611 SERIES= 5202 K LBS.





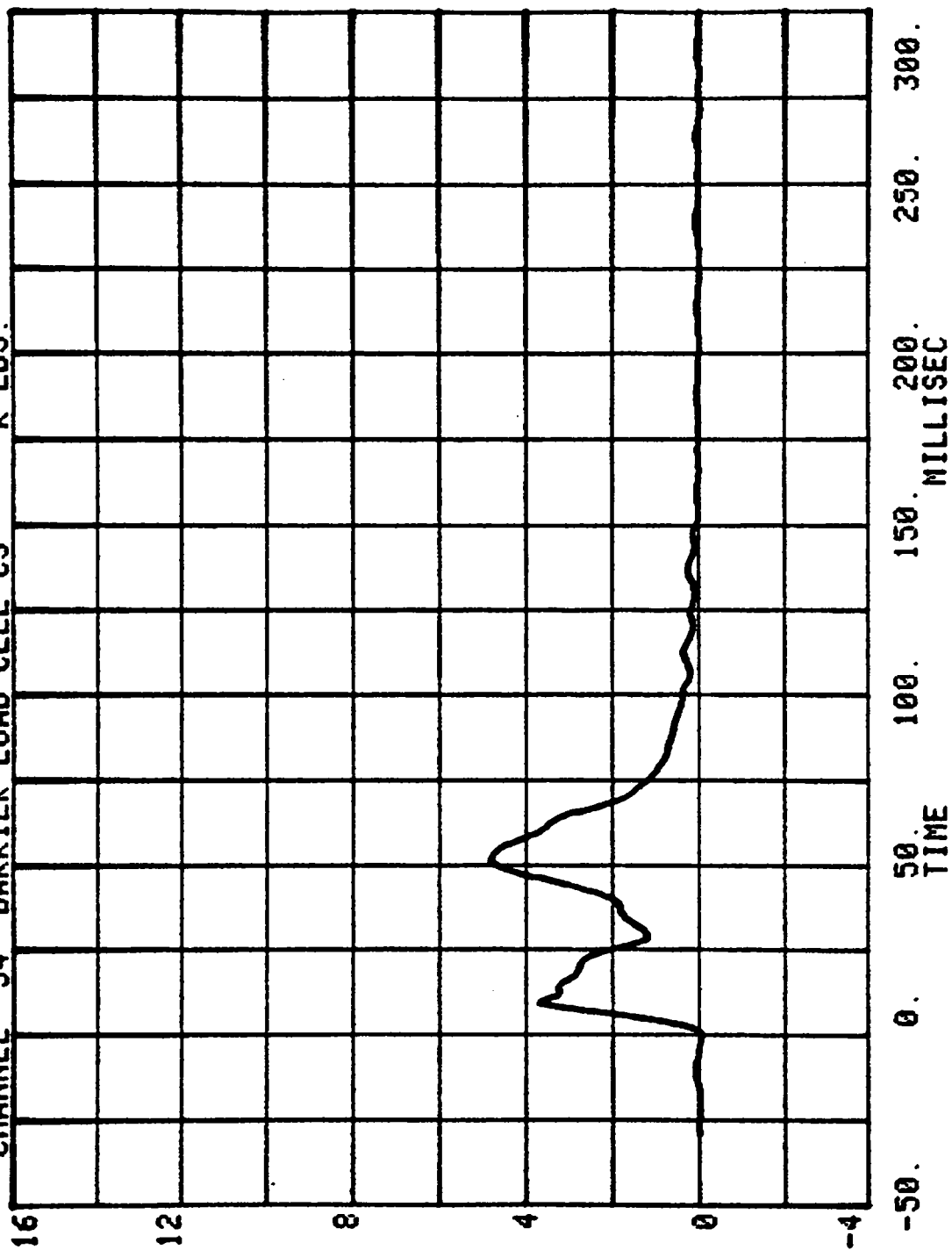
CHANNEL 52 BARRIER LOAD CELL C1
RUN= 611 SERIES= 5202 K LBS.

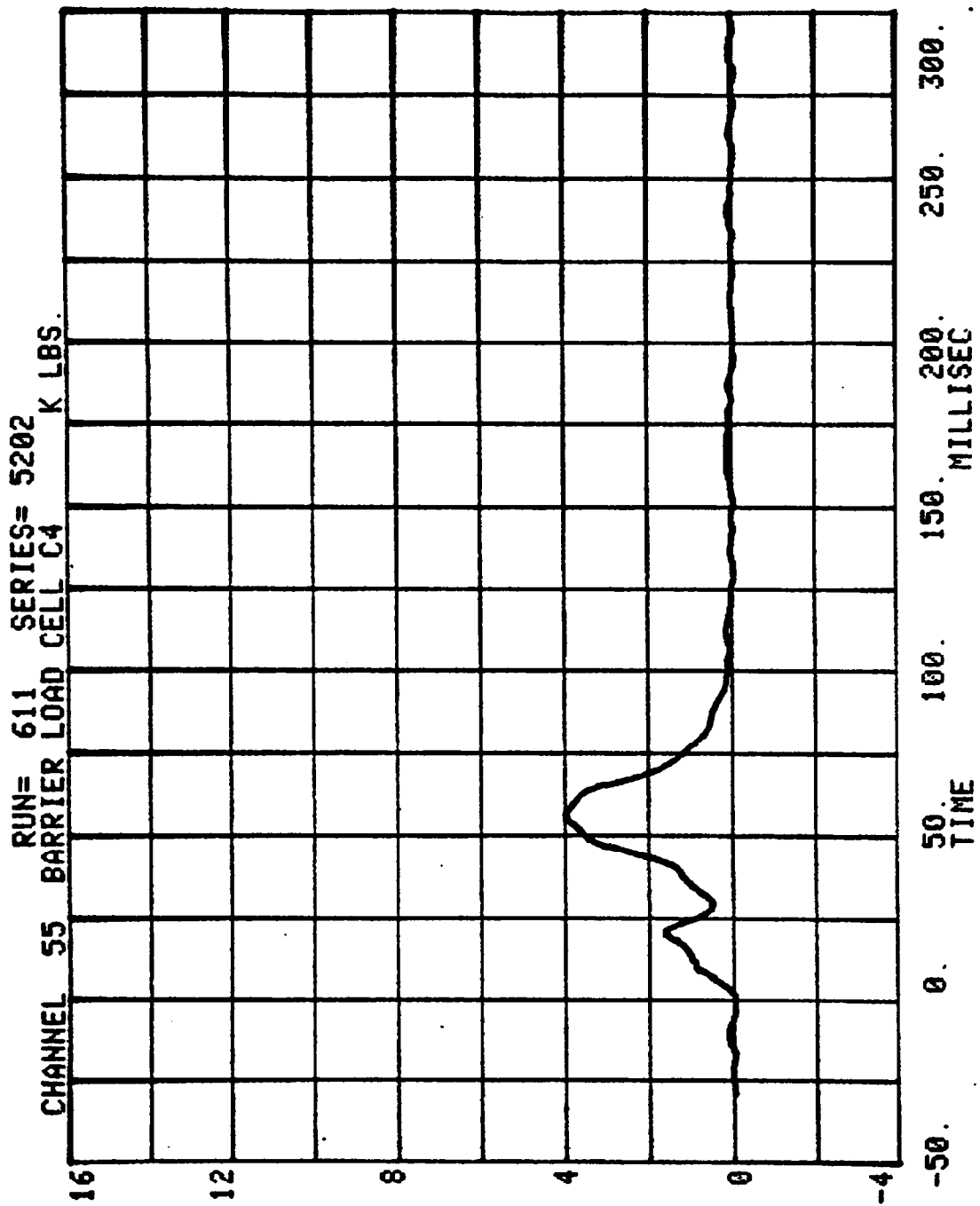




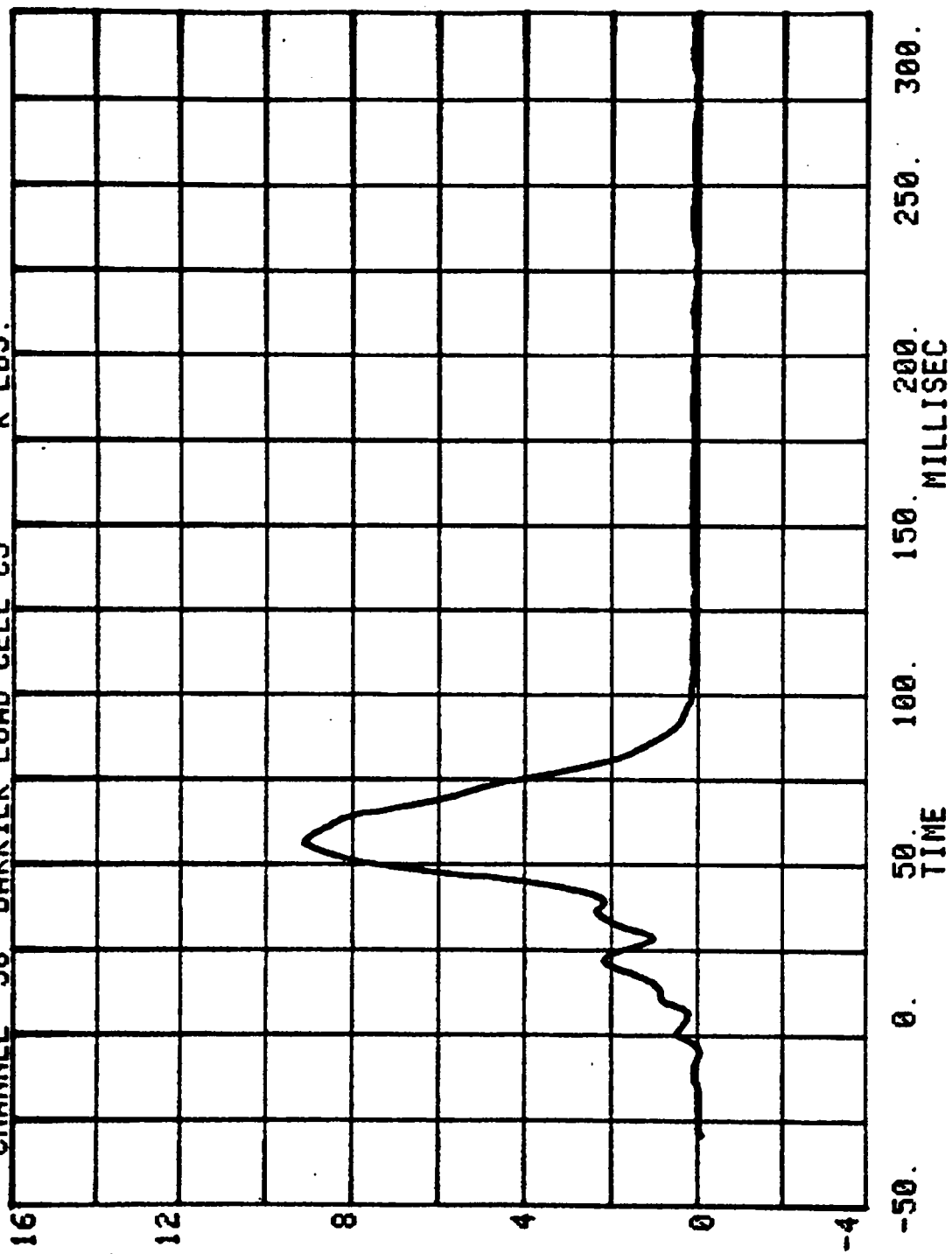
CHANNEL 54 BARRIER LOAD CELL C3 K LBS.

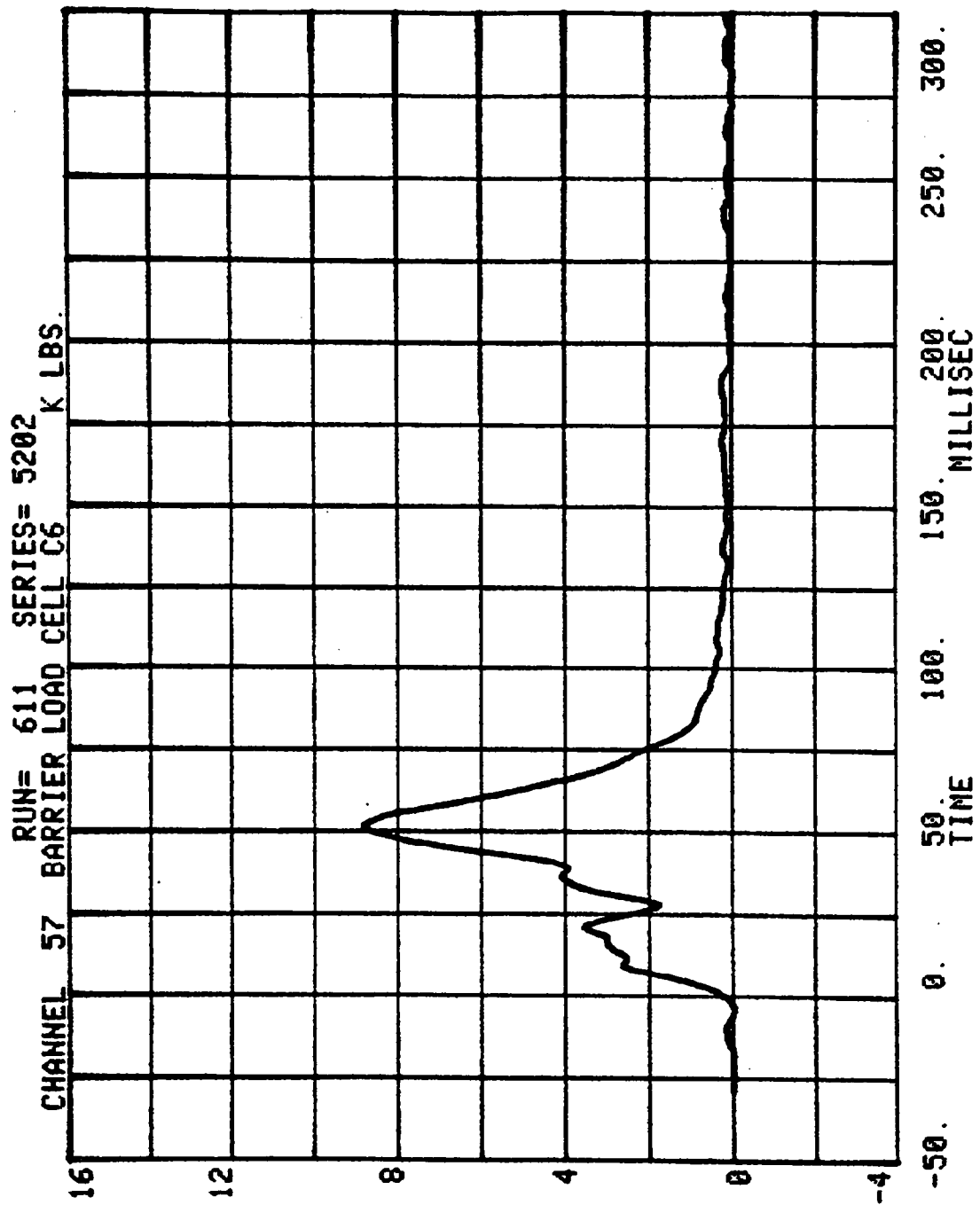
RUN= 611 SERIES= 5202



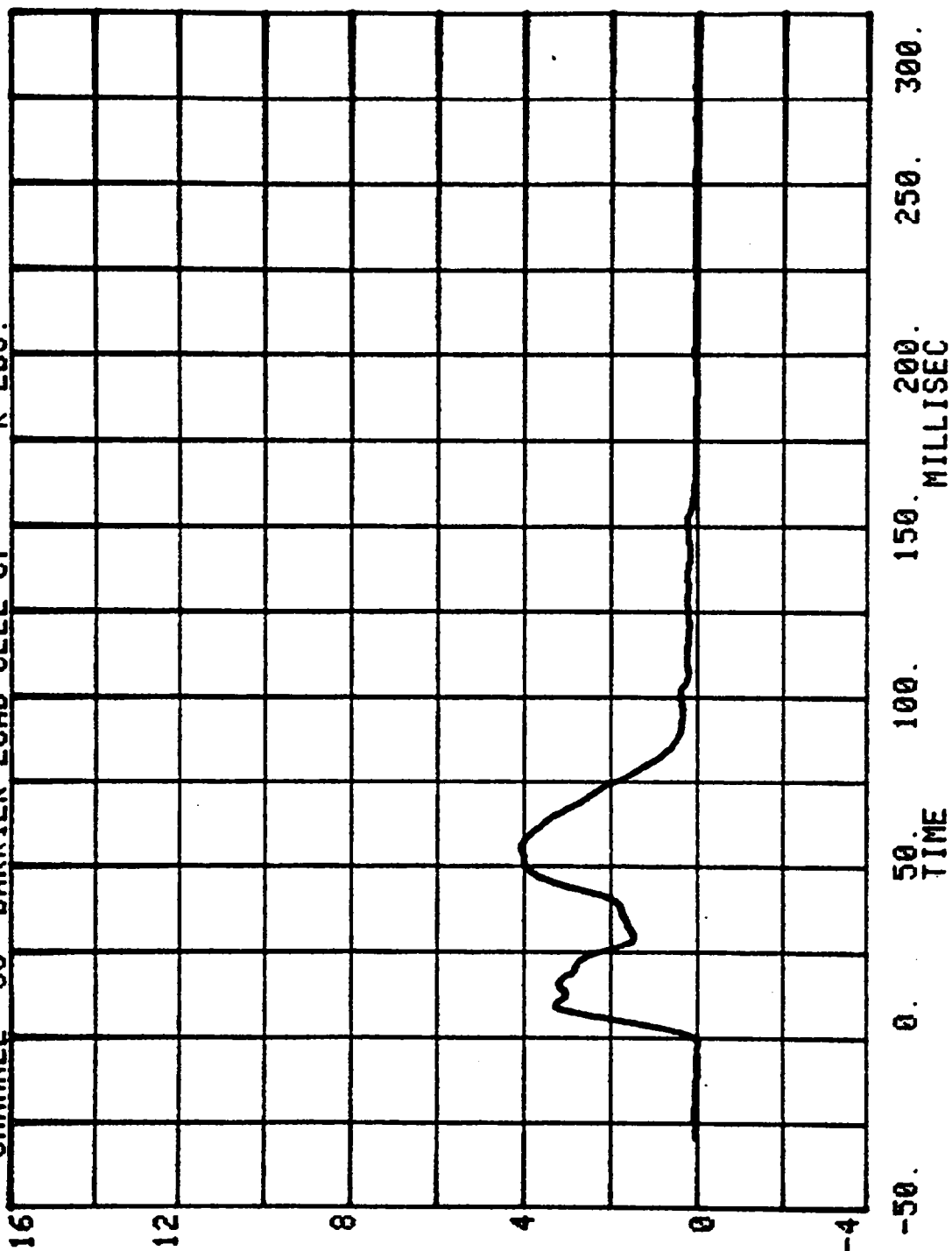


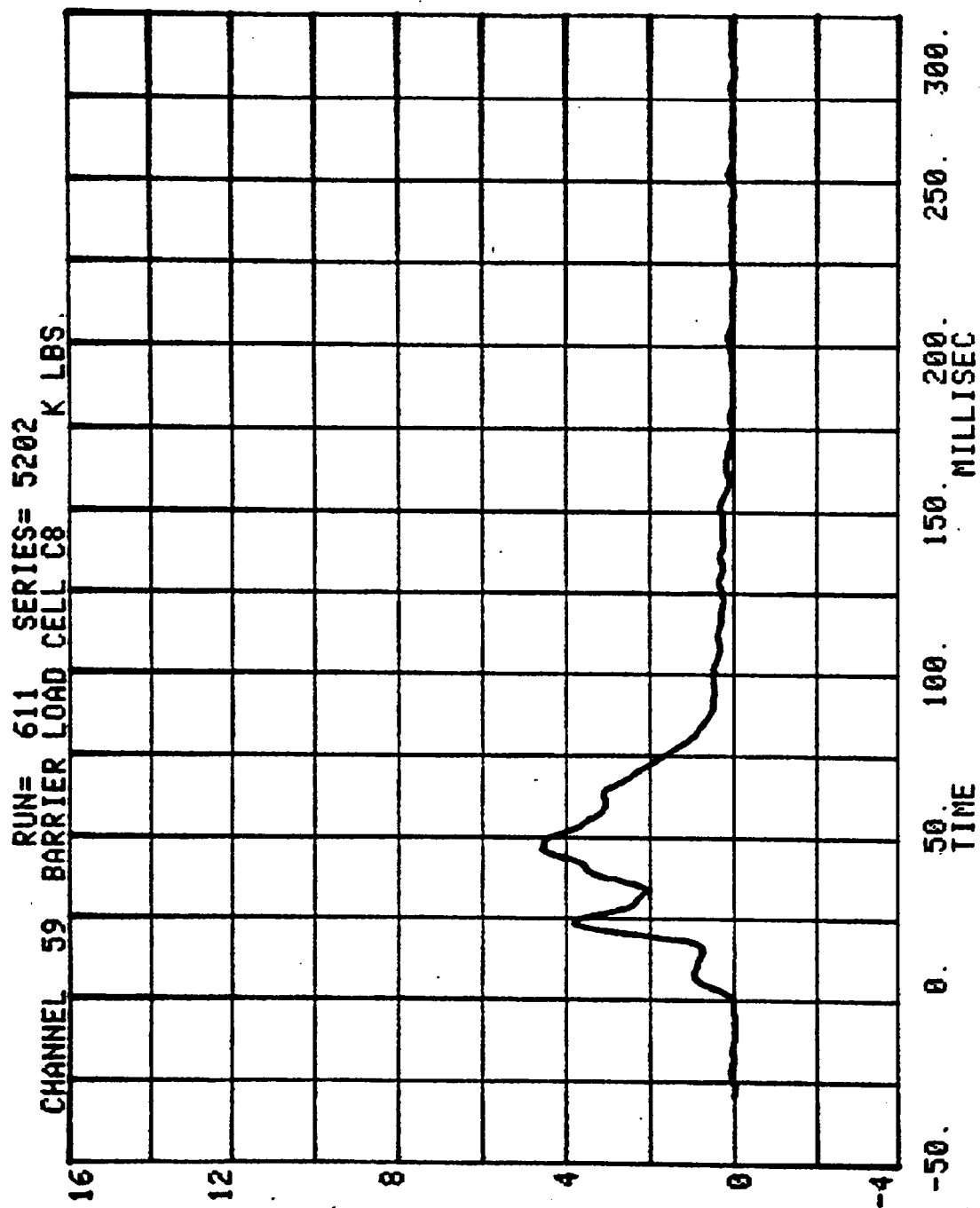
RUN= 611 SERIES= 5202
CHANNEL 56 BARRIER LOAD CELL C5 K LBS.



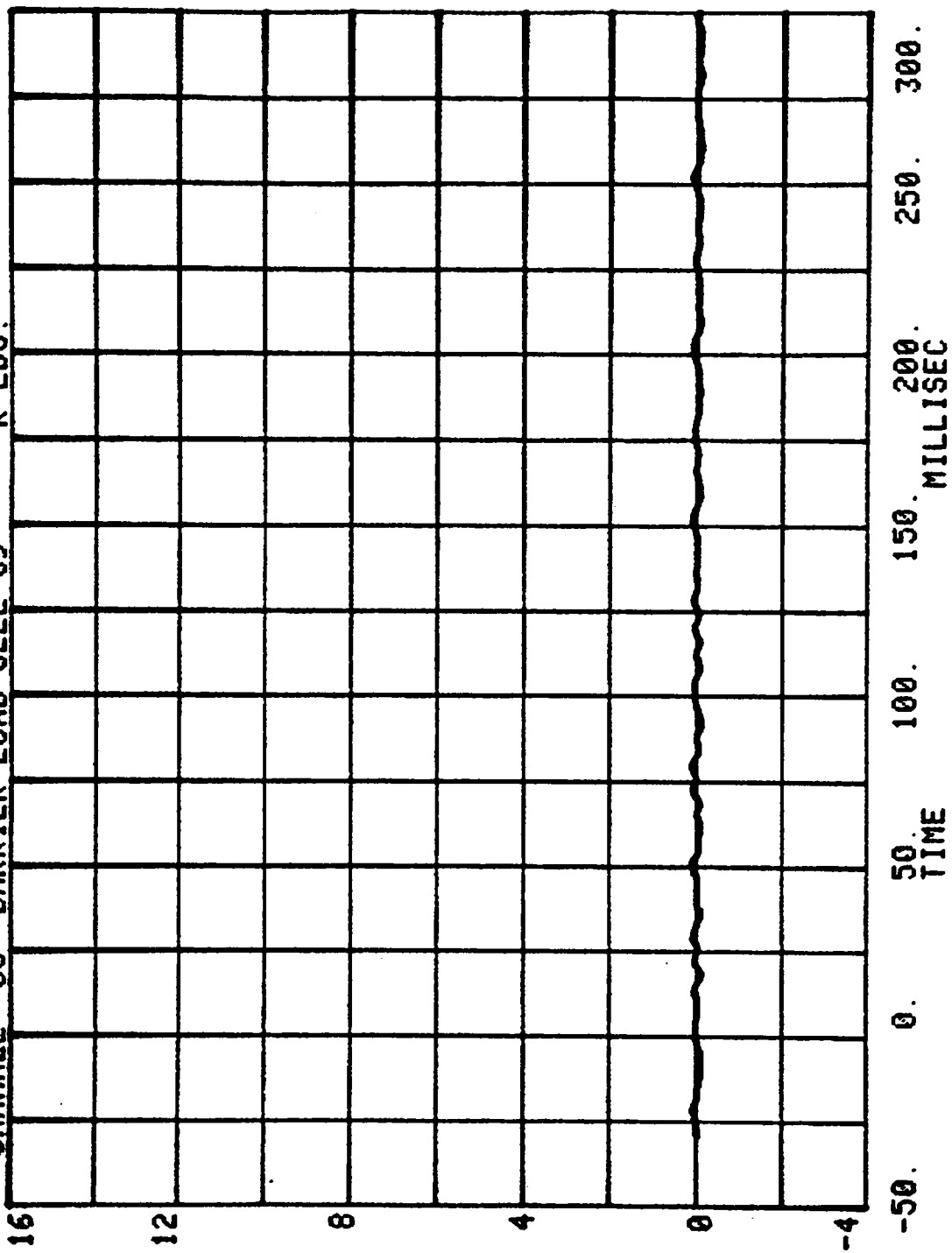


RUN= 611 SERIES= 5202
CHANNEL 58 BARRIER LOAD CELL C7 K LBS.



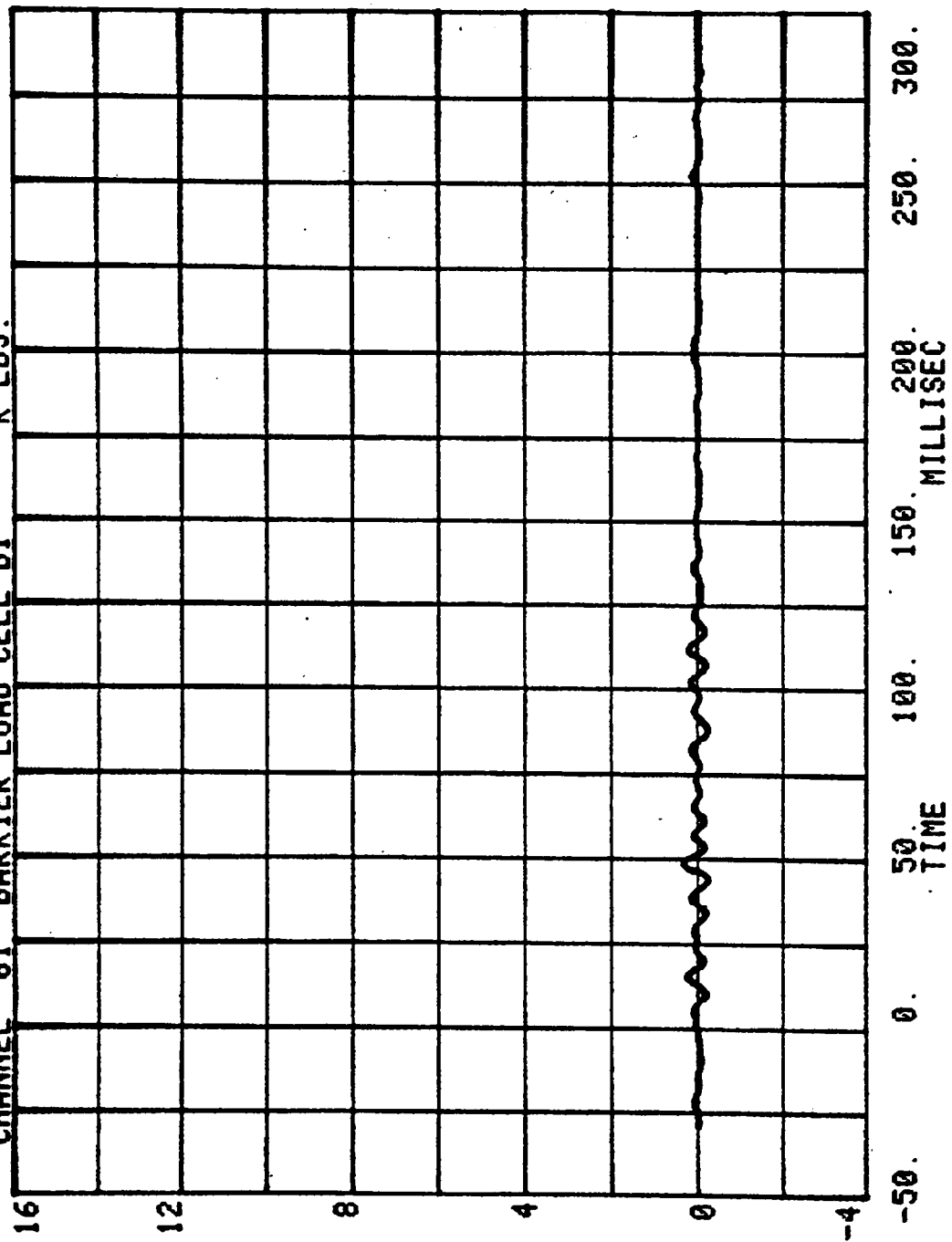


RUN= 611 SERIES= 5202
CHANNEL 60 BARRIER LOAD CELL C9 K LBS.

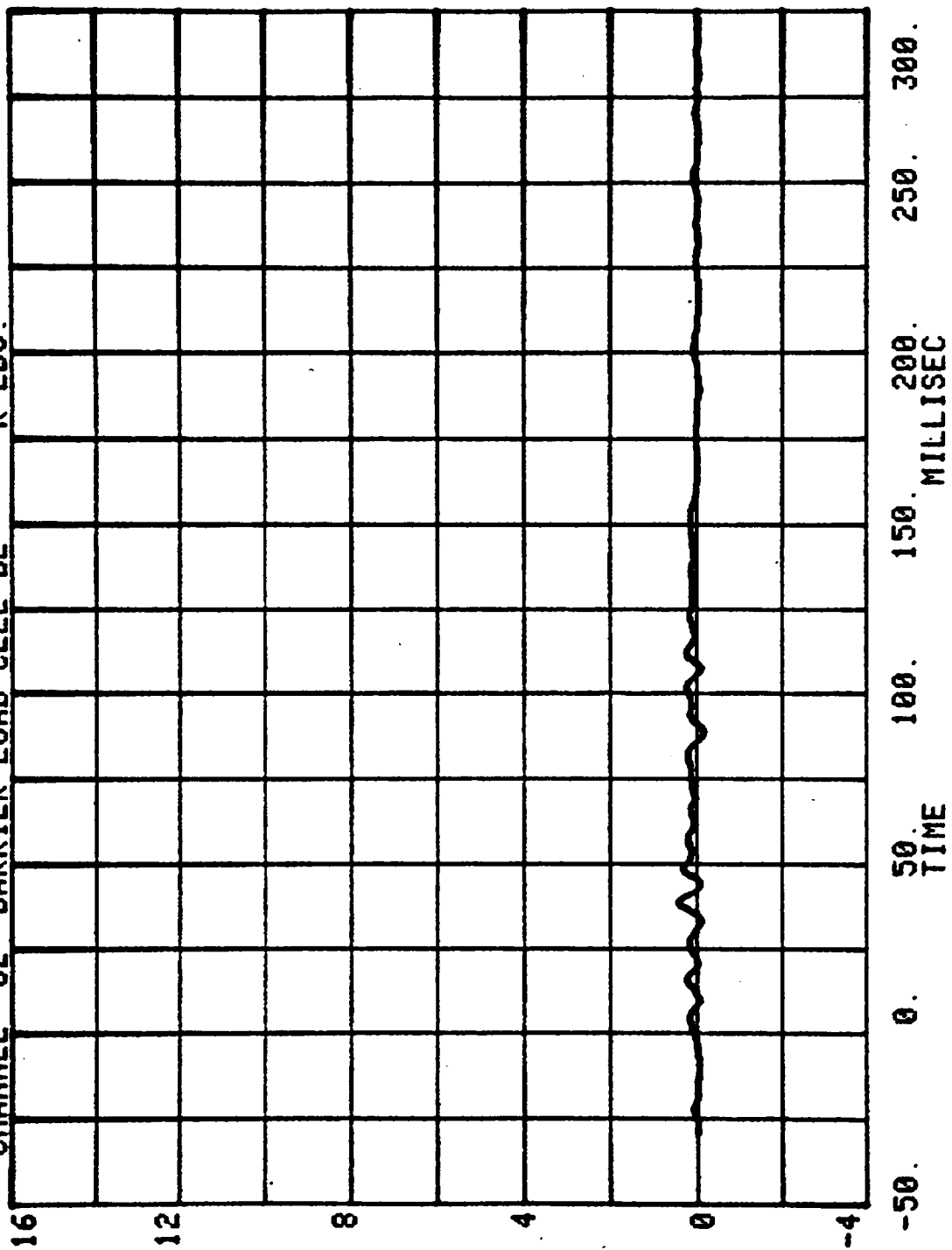


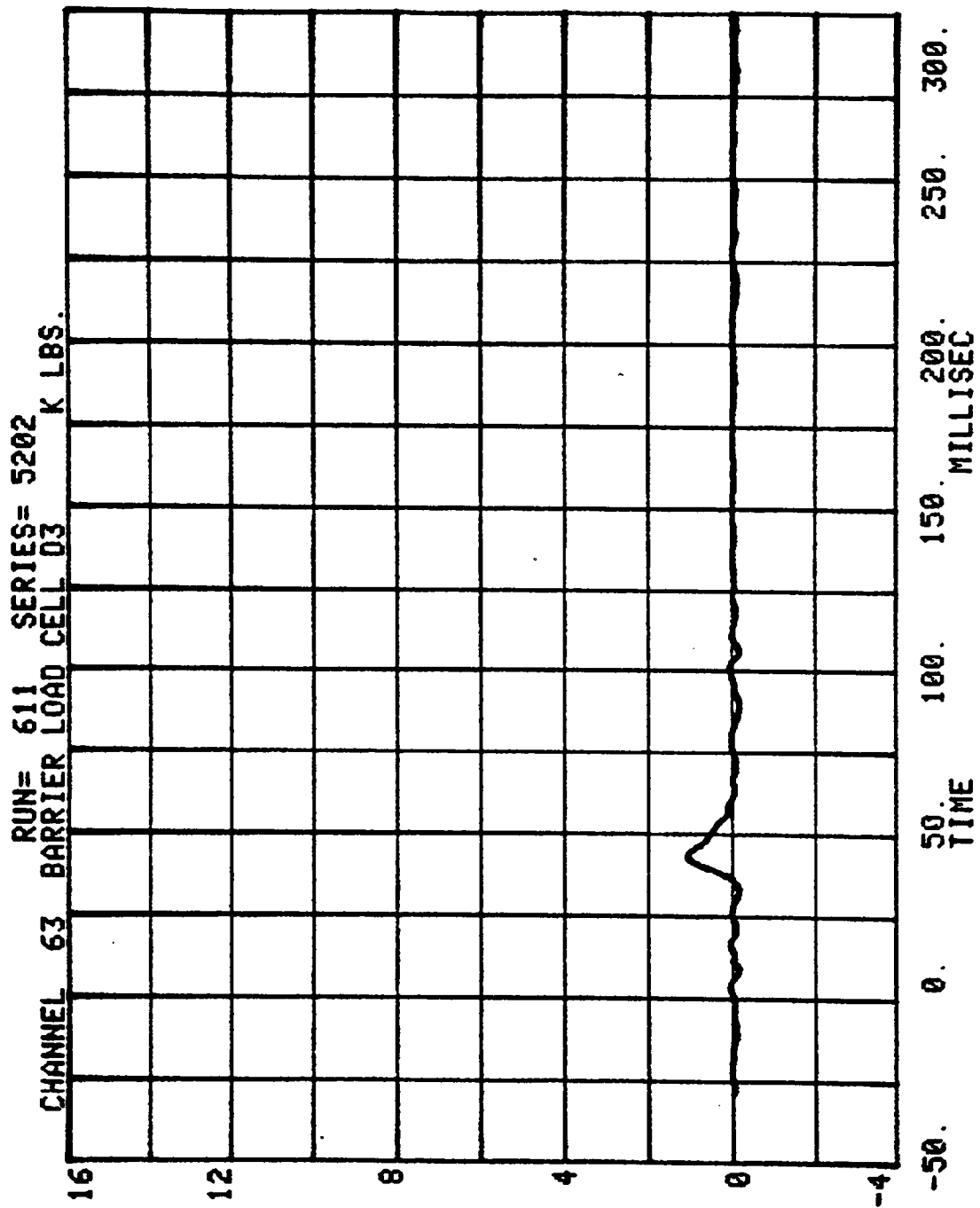
7

CHANNEL 61 BARRIER LOAD CELL D1 RUN= 611 SERIES= 5202 K LBS.



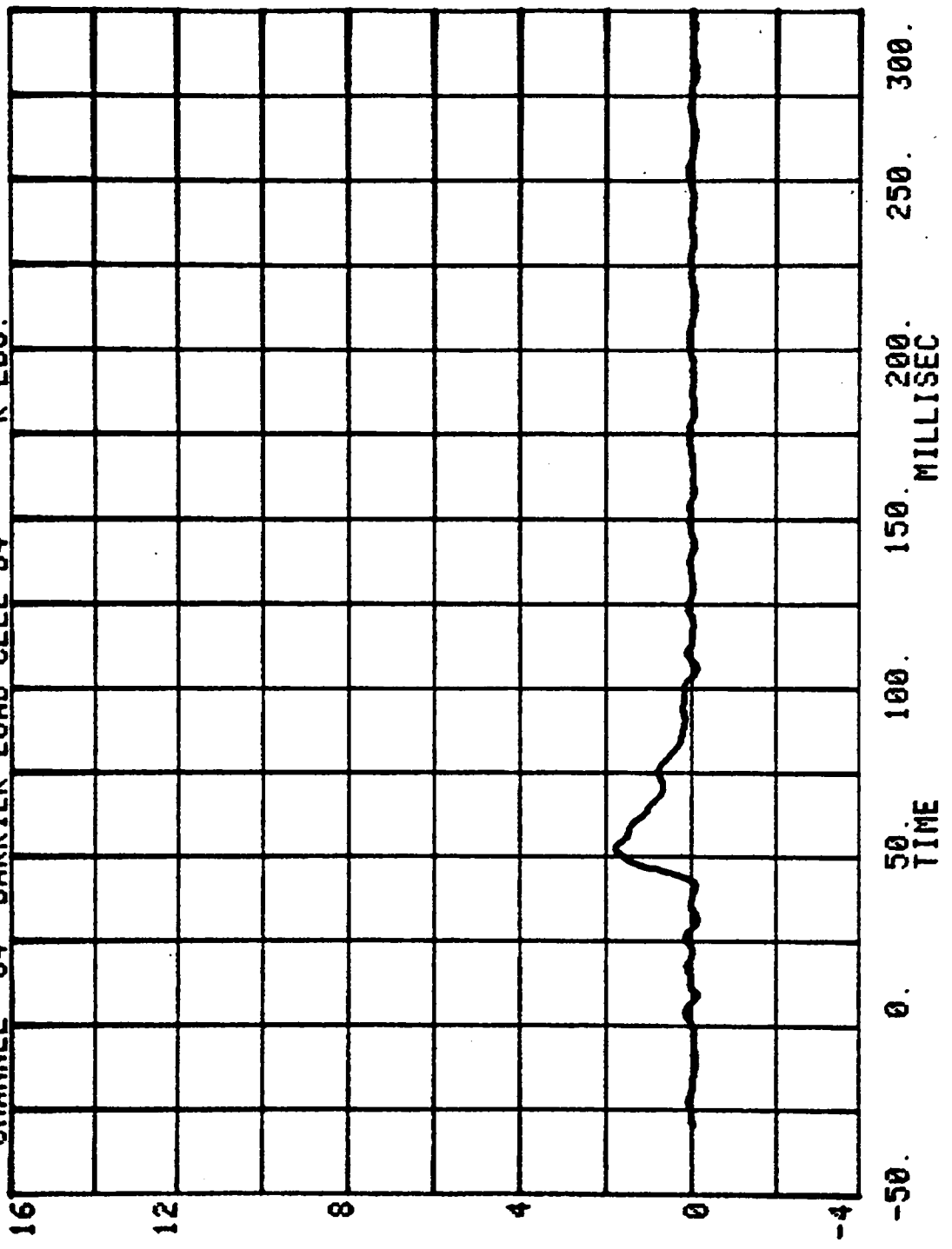
RUN= 611 SERIES= 5202
CHANNEL 62 BARRIER LOAD CELL D2 K LBS.

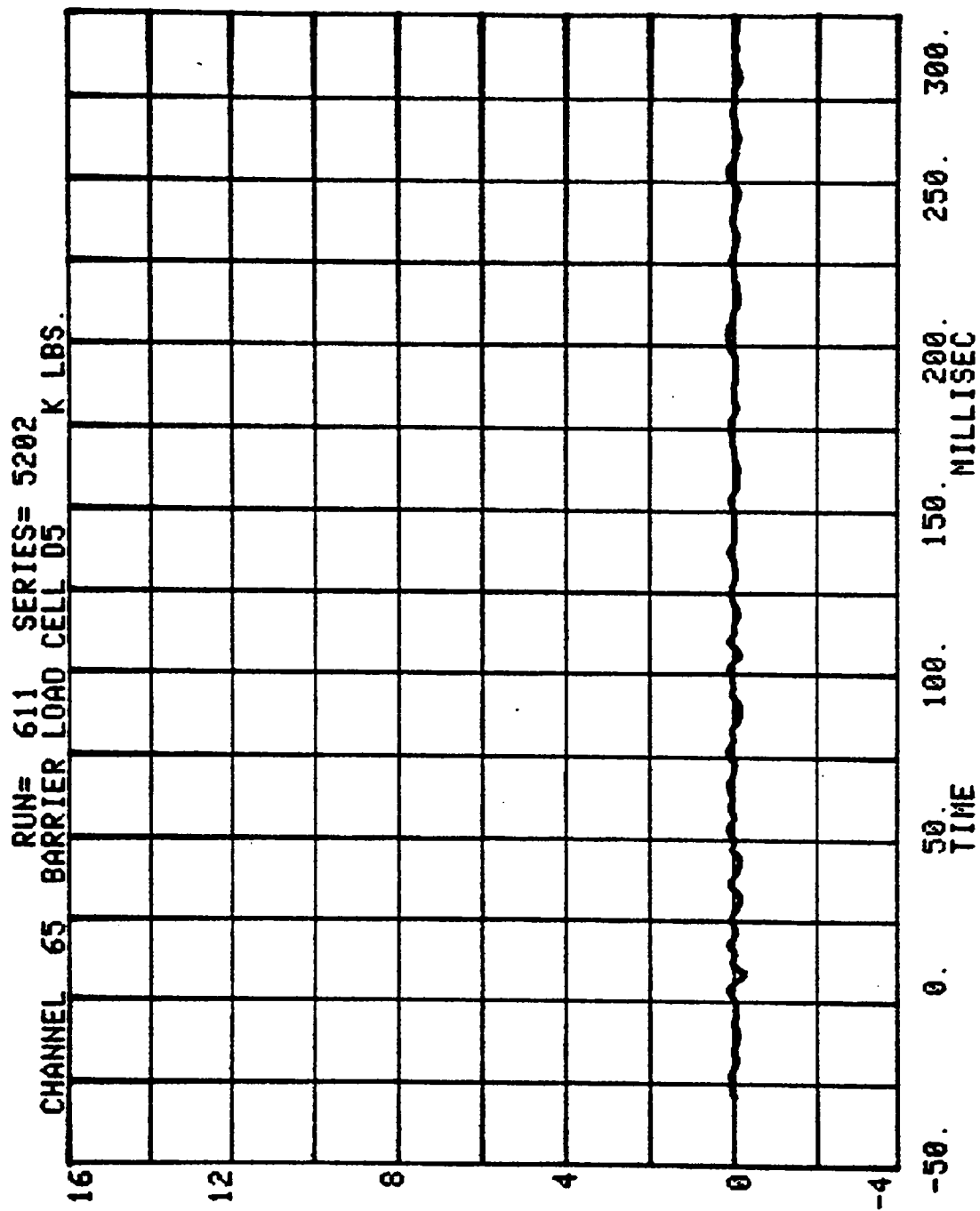




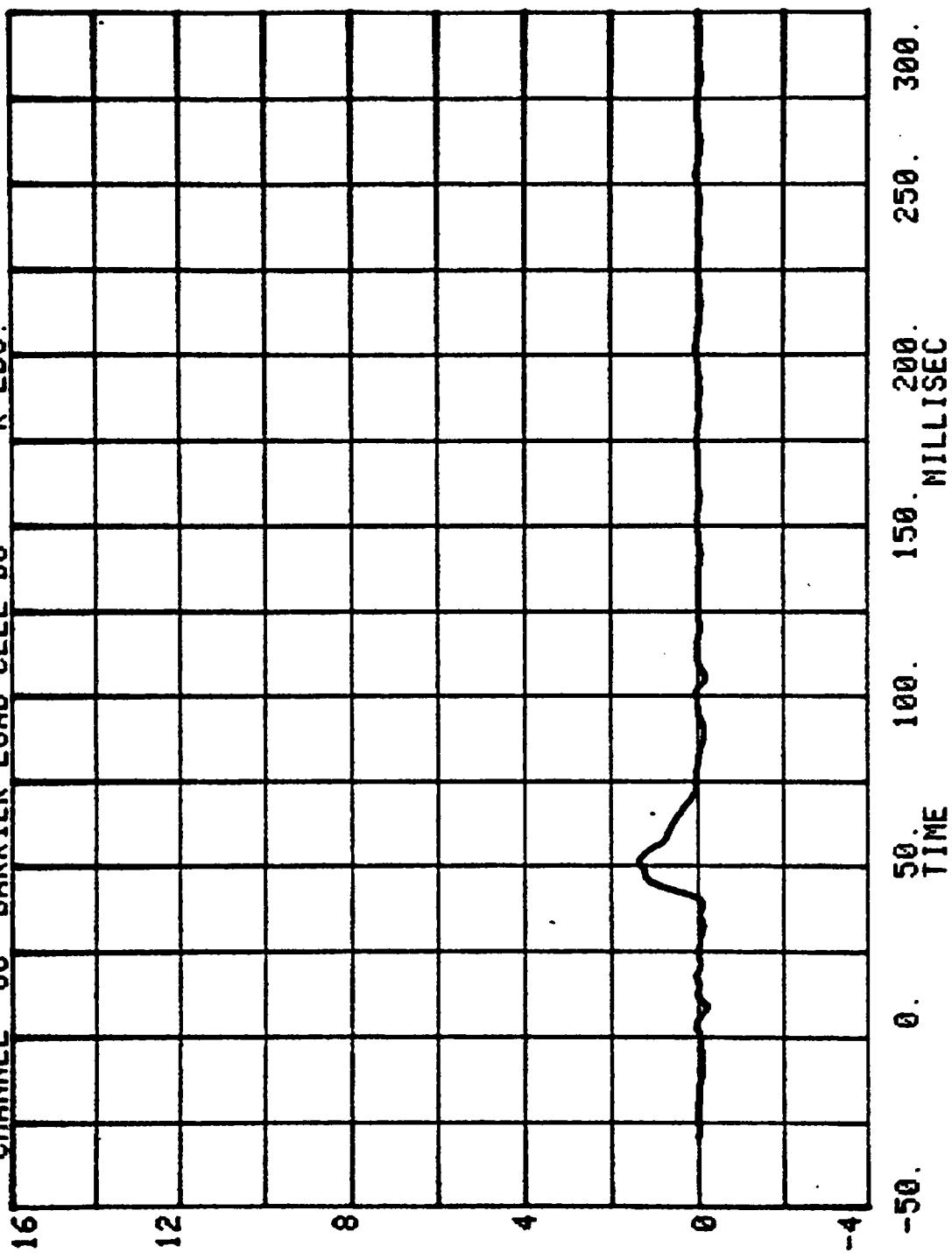
CHANNEL 64 BARRIER LOAD CELL 04 K LBS.

RUN= 611 SERIES= 5202

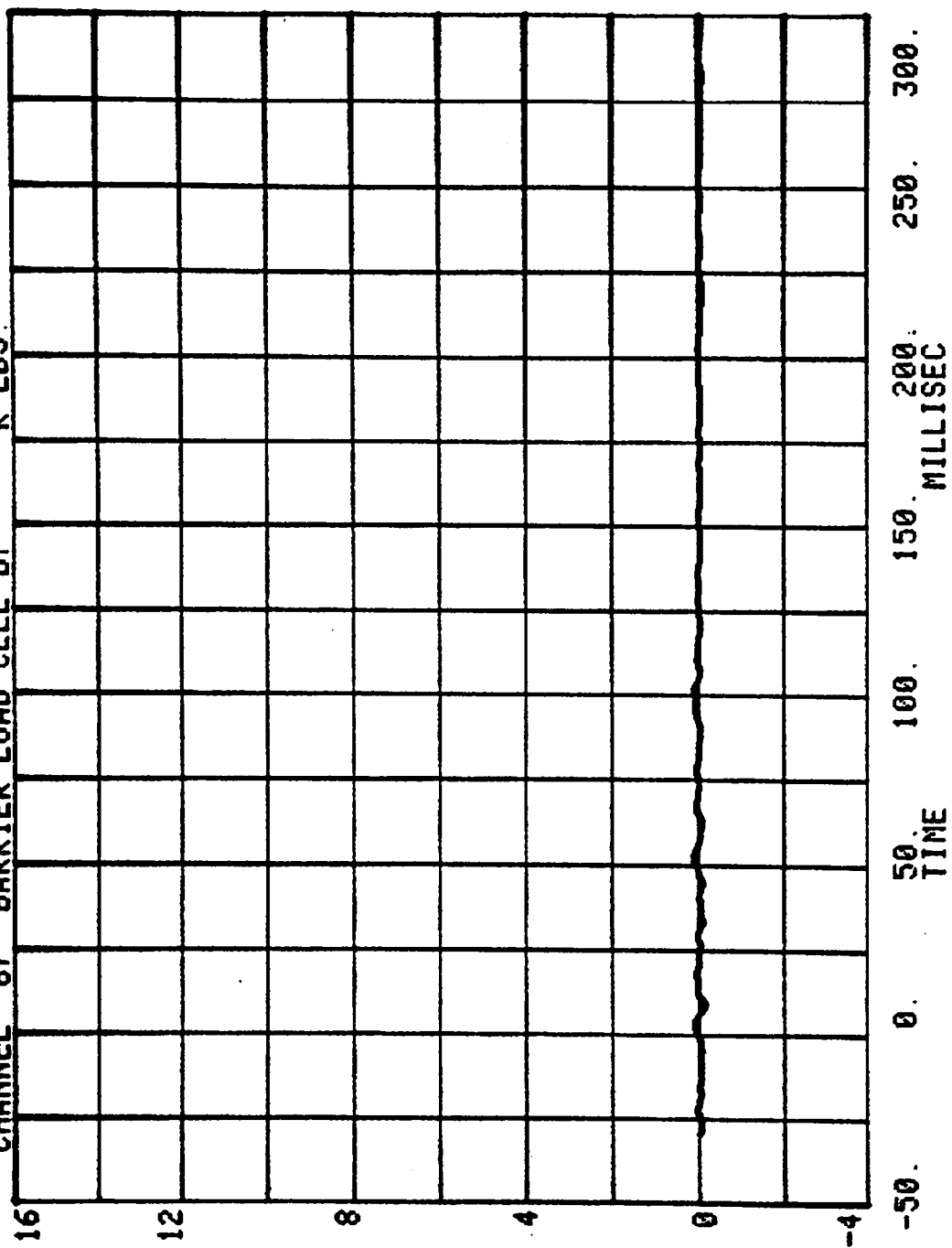




RUN= 611 SERIES= 5202
CHANNEL 66 BARRIER LOAD CELL 06 K LBS.

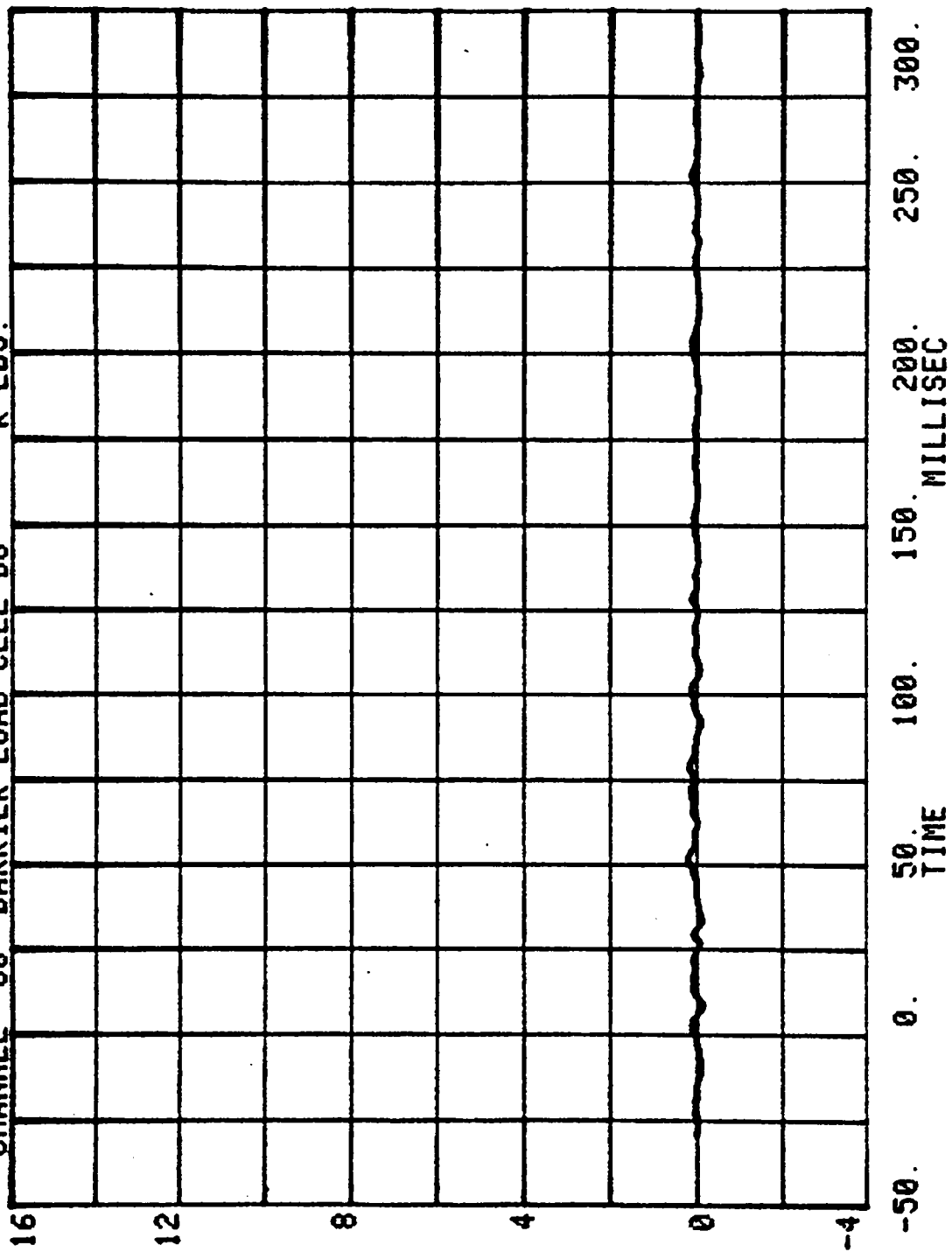


RUN= 611 SERIES= 5202
CHANNEL 67 BARRIER LOAD CELL D7 K LBS

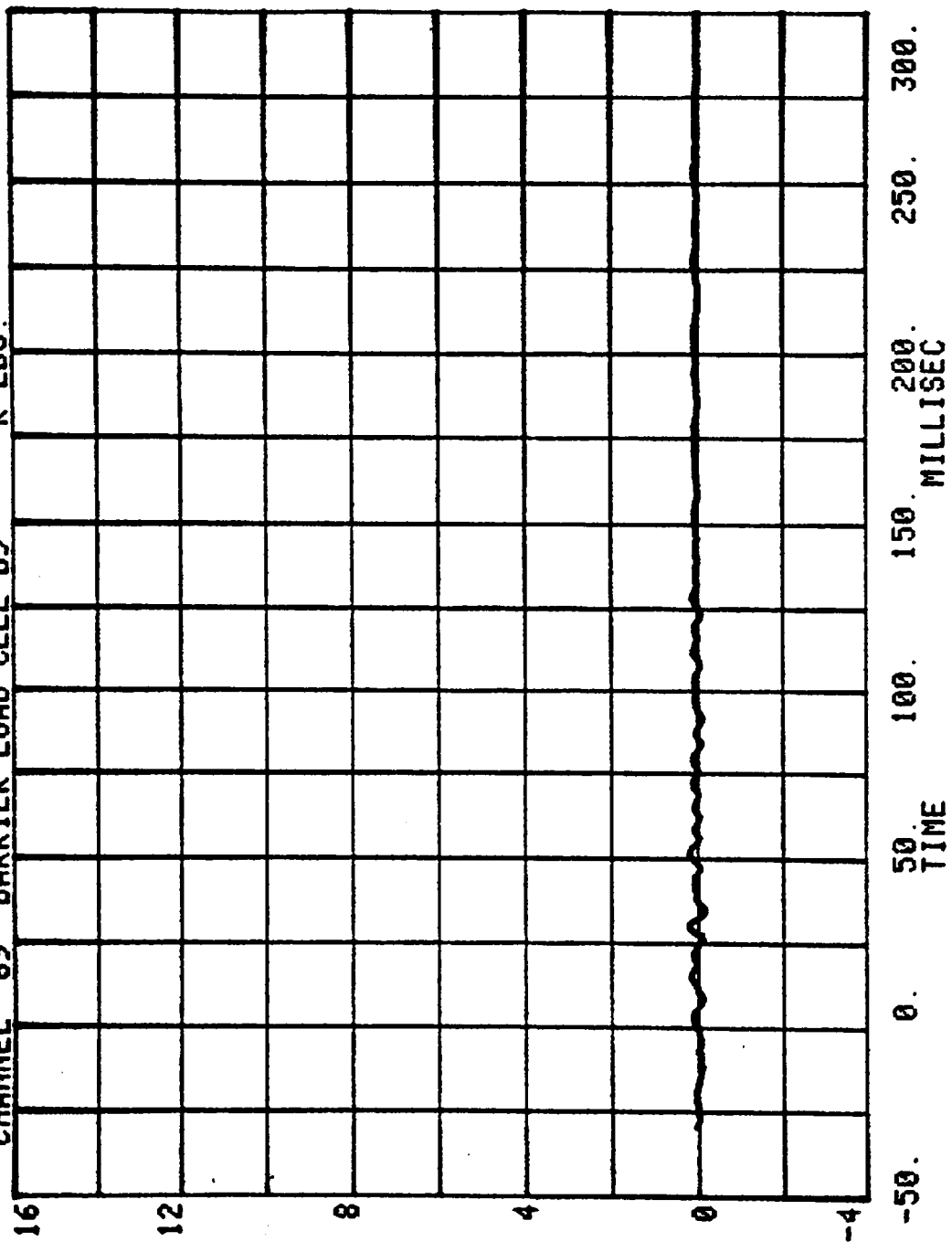


CHANNEL 68 BARRIER LOAD CELL 08 K LBS.

RUN= 611 SERIES= 5202



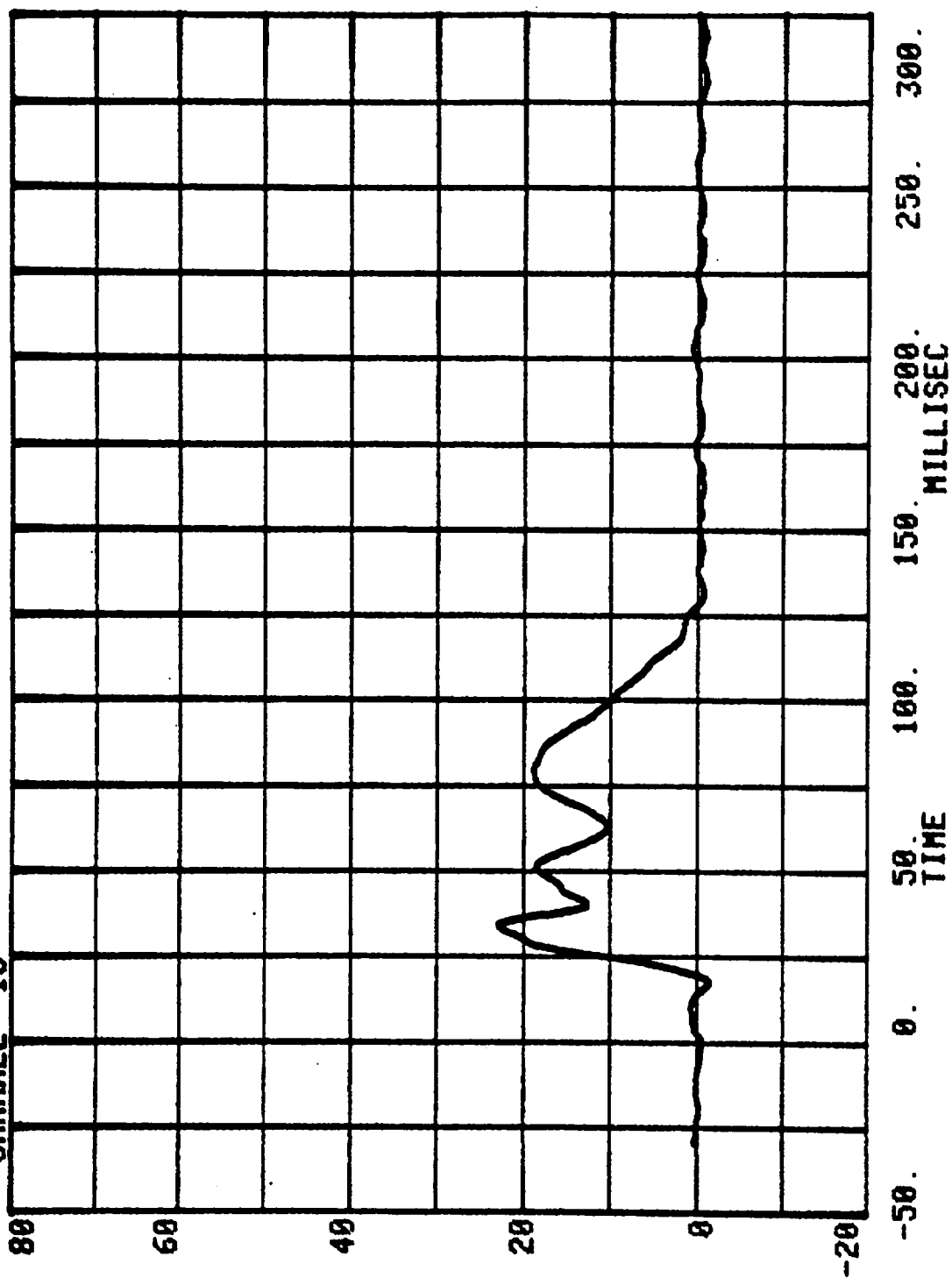
RUN= 611 SERIES= 5202
CHANNEL 69 BARRIER LOAD CELL D9 K LBS.

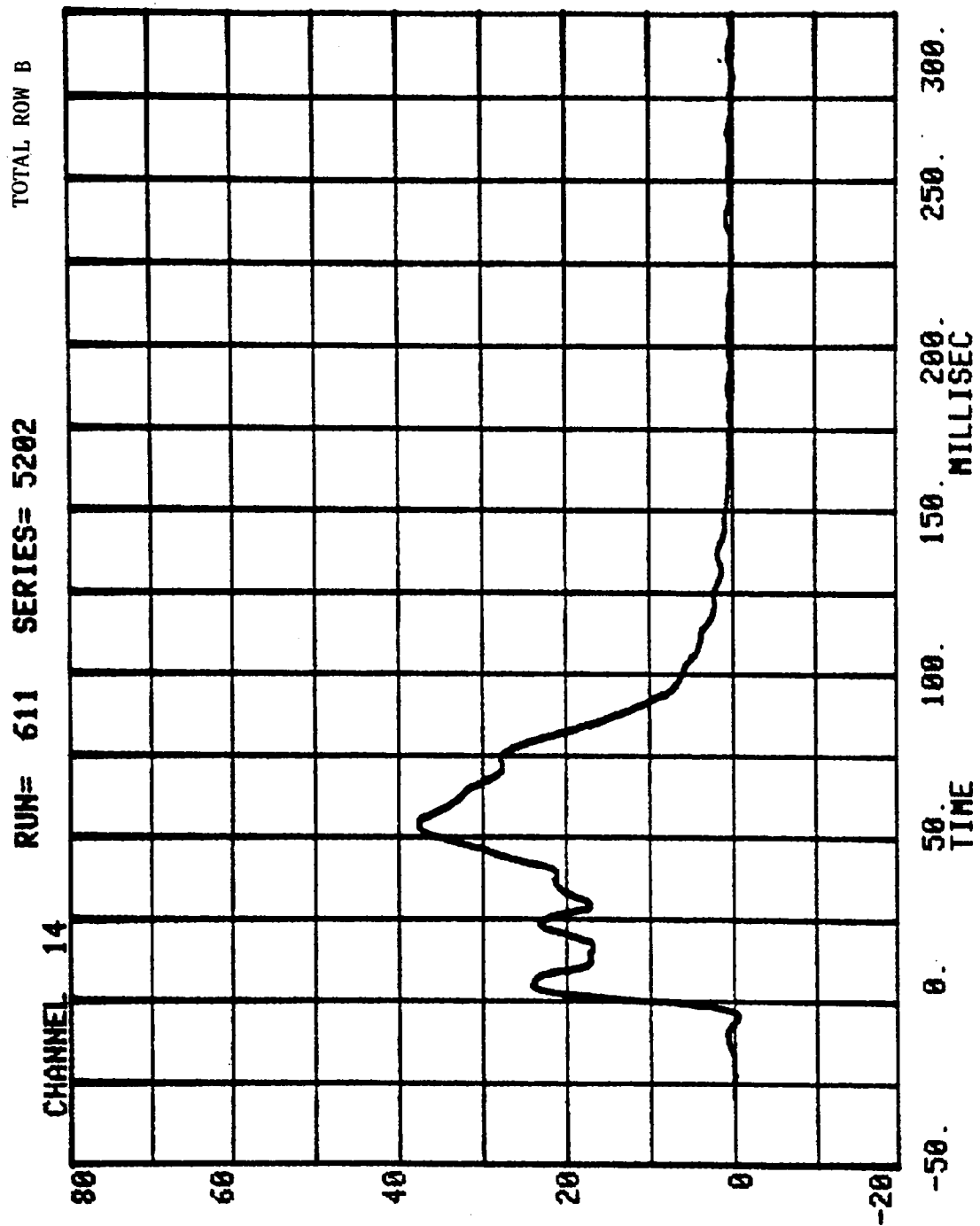


TOTAL ROW A

RUN= 611 SERIES= 5202

CHANNEL 13

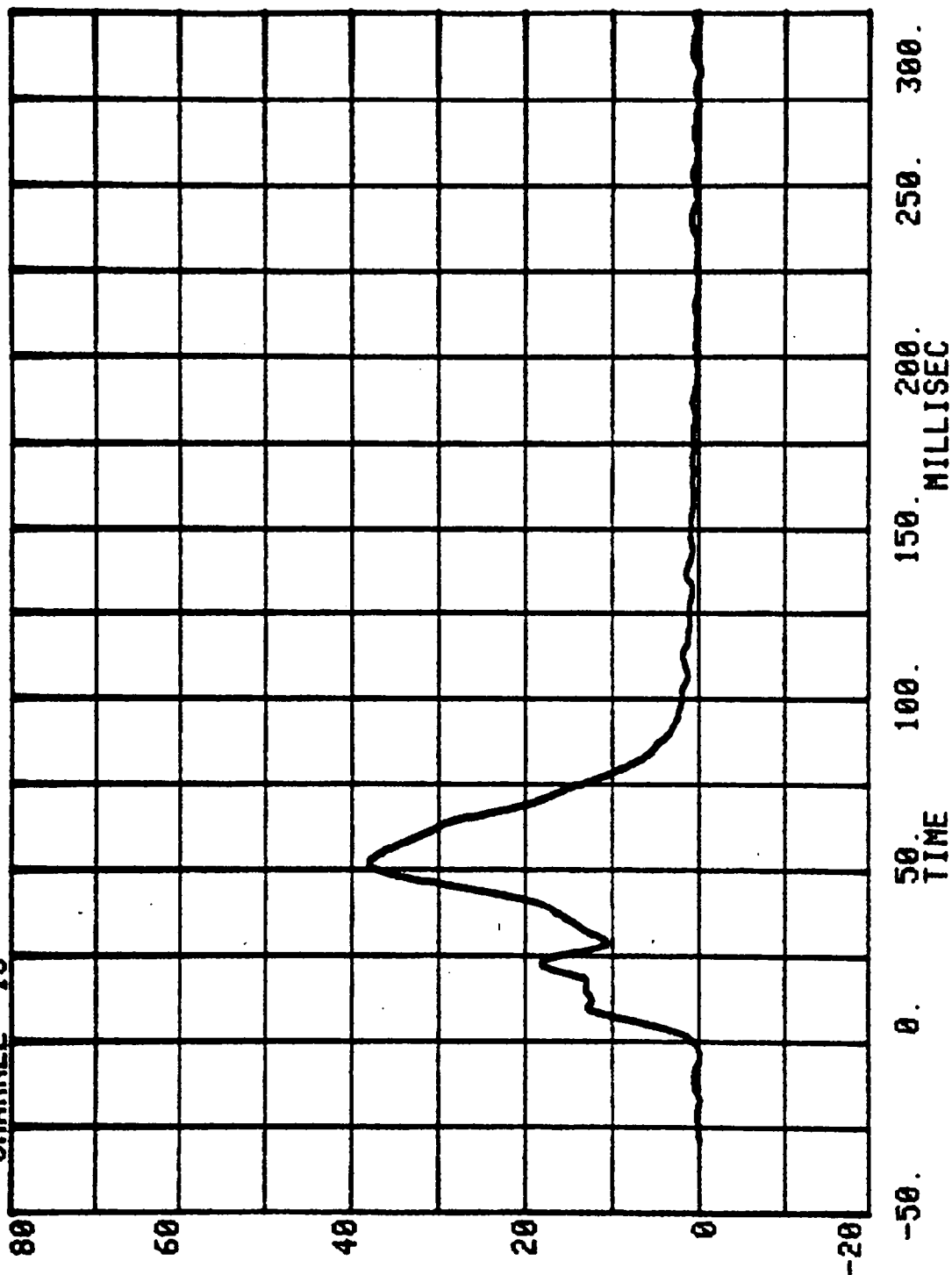


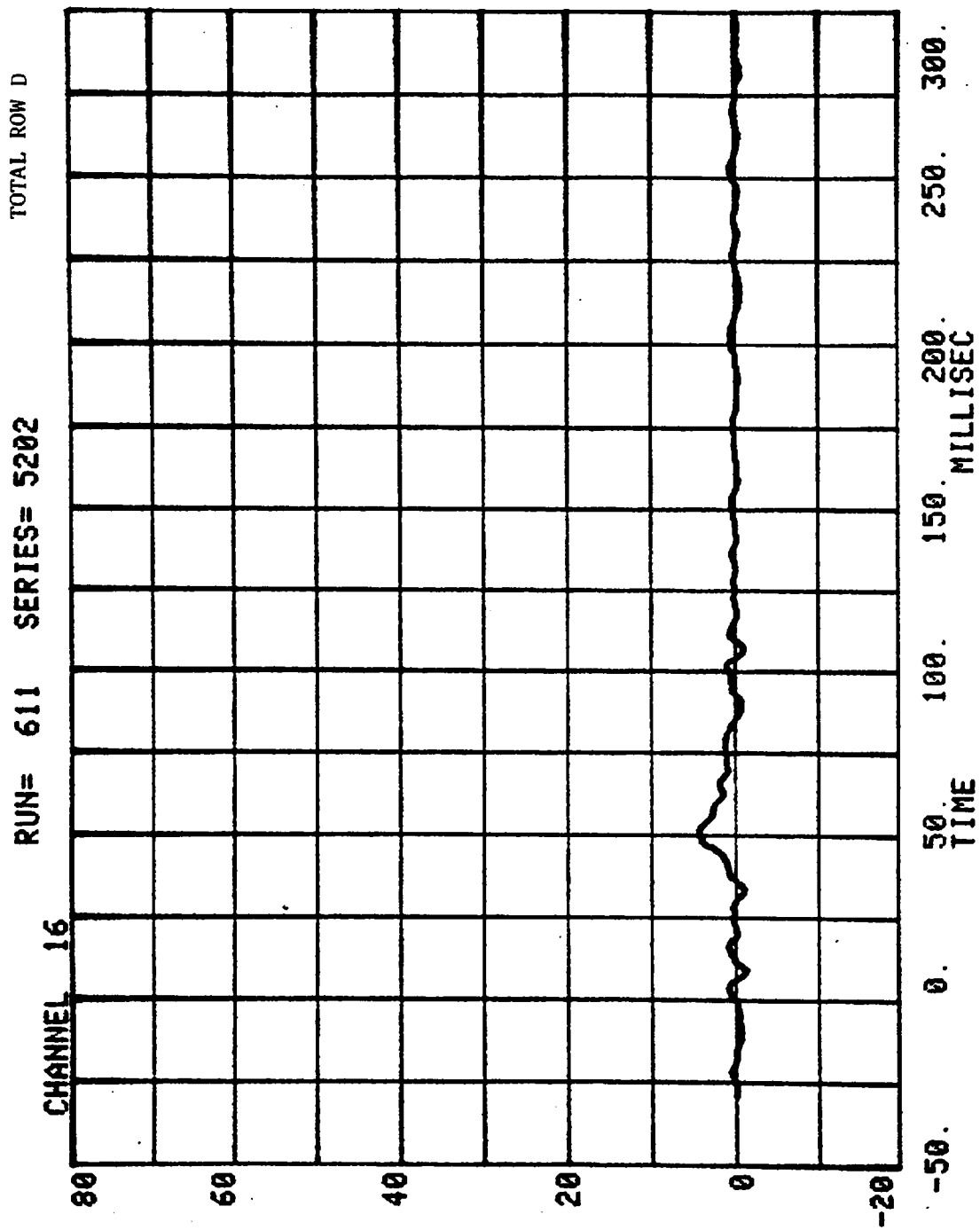


TOTAL ROW C

RUN= 611 SERIES= 5202

CHANNEL 15

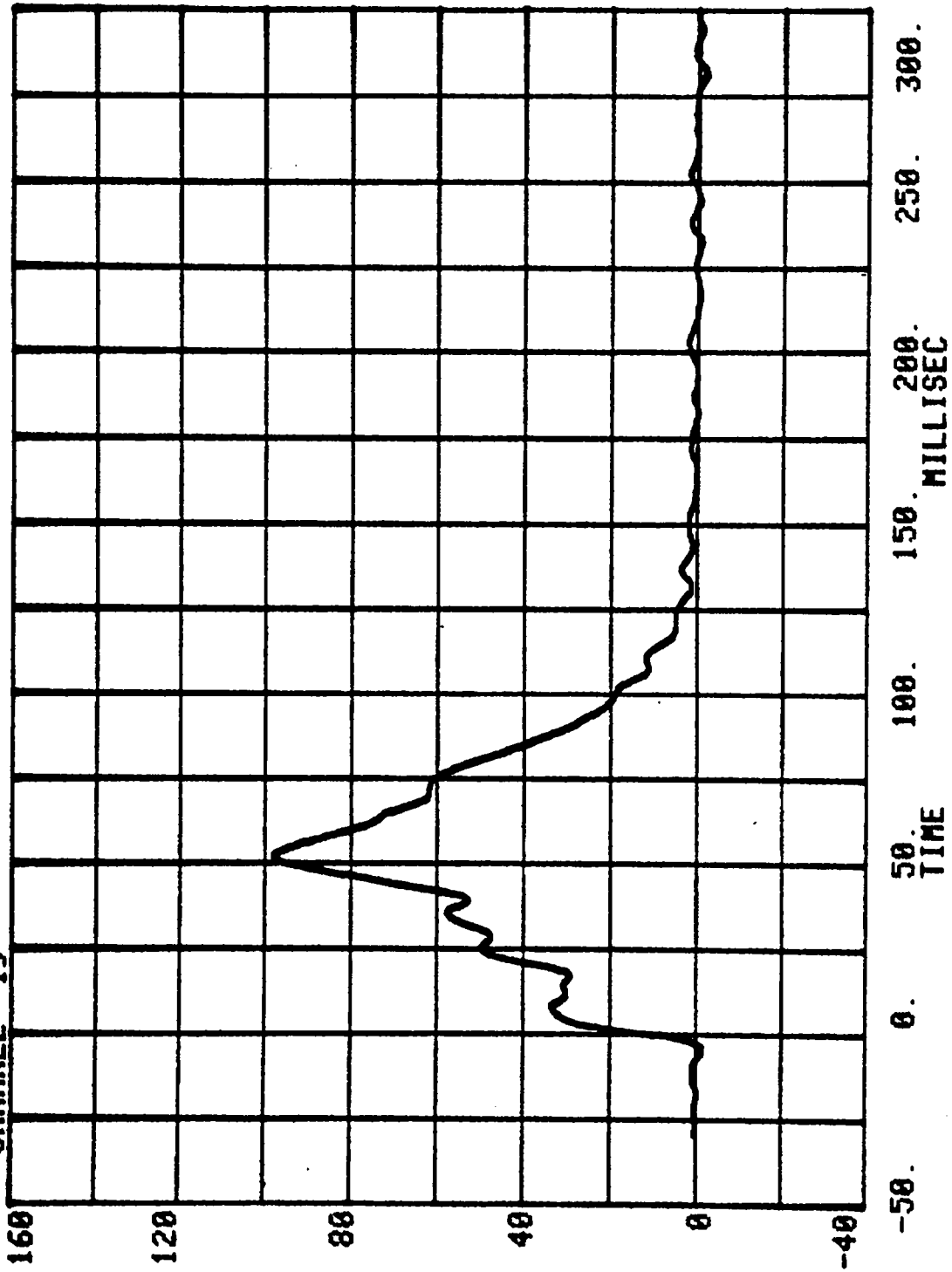




TOTAL ROW A+B+C+D

RUN= 611 SERIES= 5202

CHANNEL 19



TEST NO. CE5202

DUMMY DATA

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

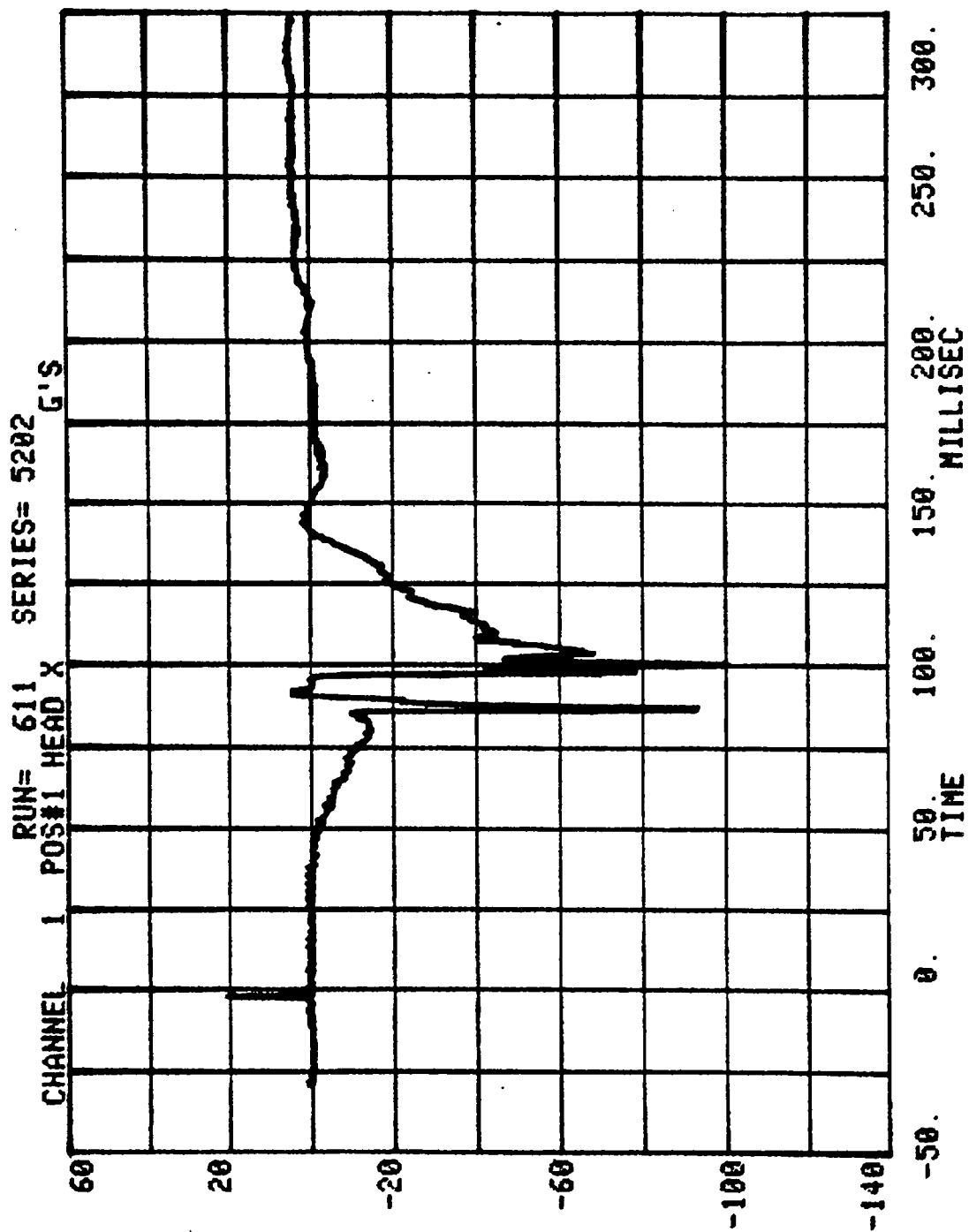
HEAD INJURY CRITERION
HEAD SEVERITY INDEX

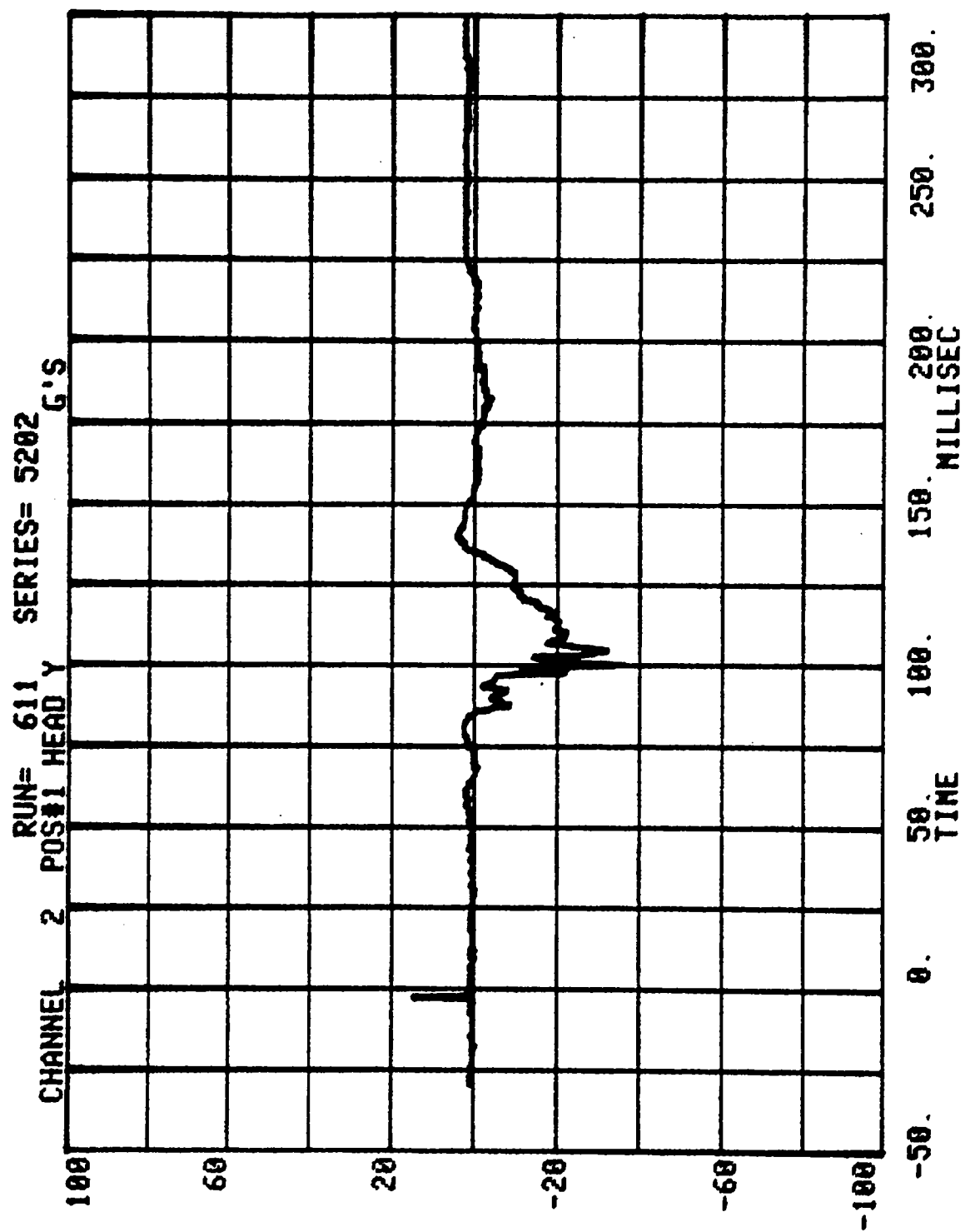
CAR TO LOAD CELL BARRIER

RUN= 611

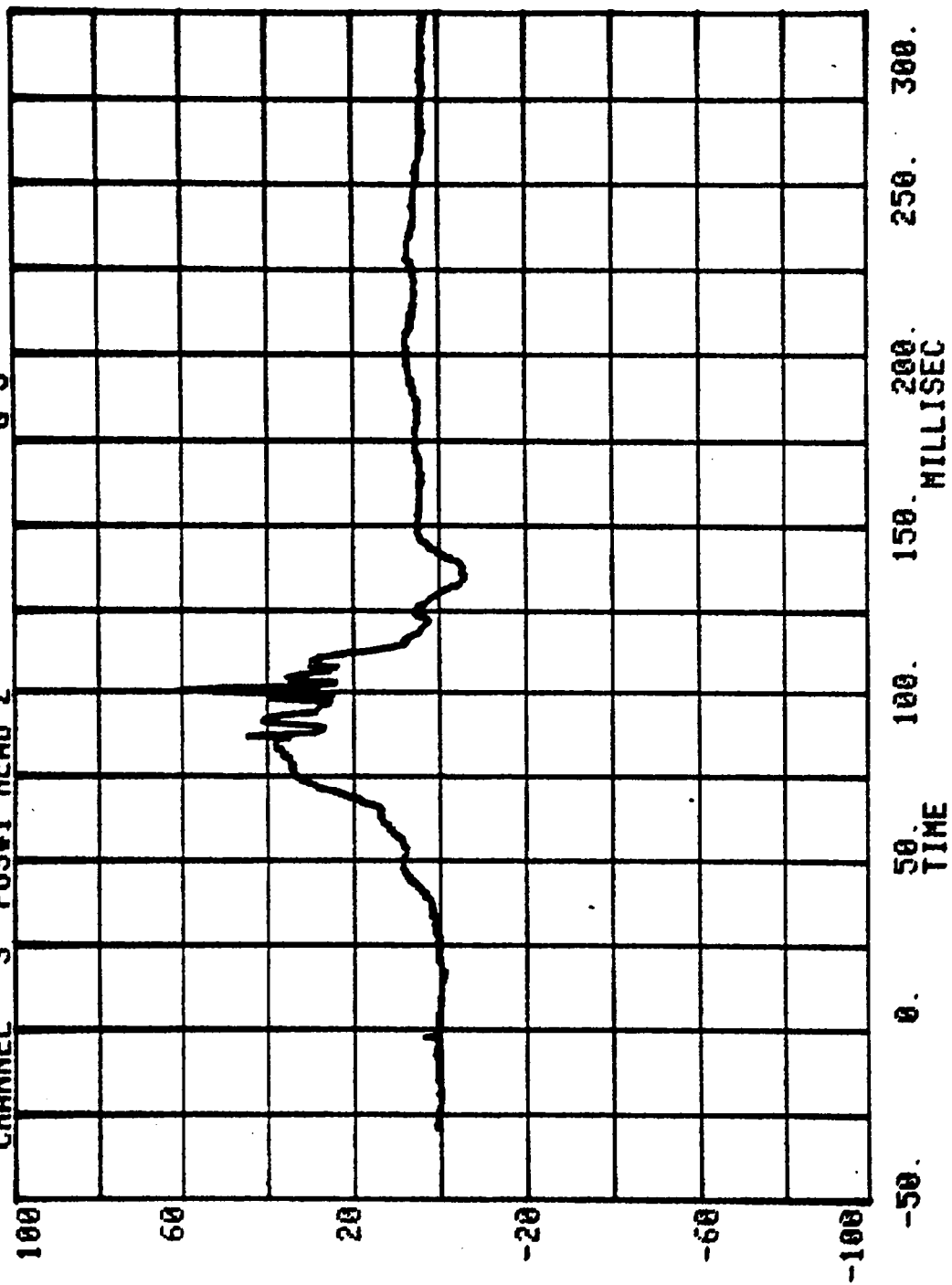
POS#1 HEAD RESULTANT

HIC= 788.8 FROM T1= .07140 TO T2= .12030
AVERAGE ACCELERATION BETWEEN T1 AND T2= 48.2G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX=1112.6

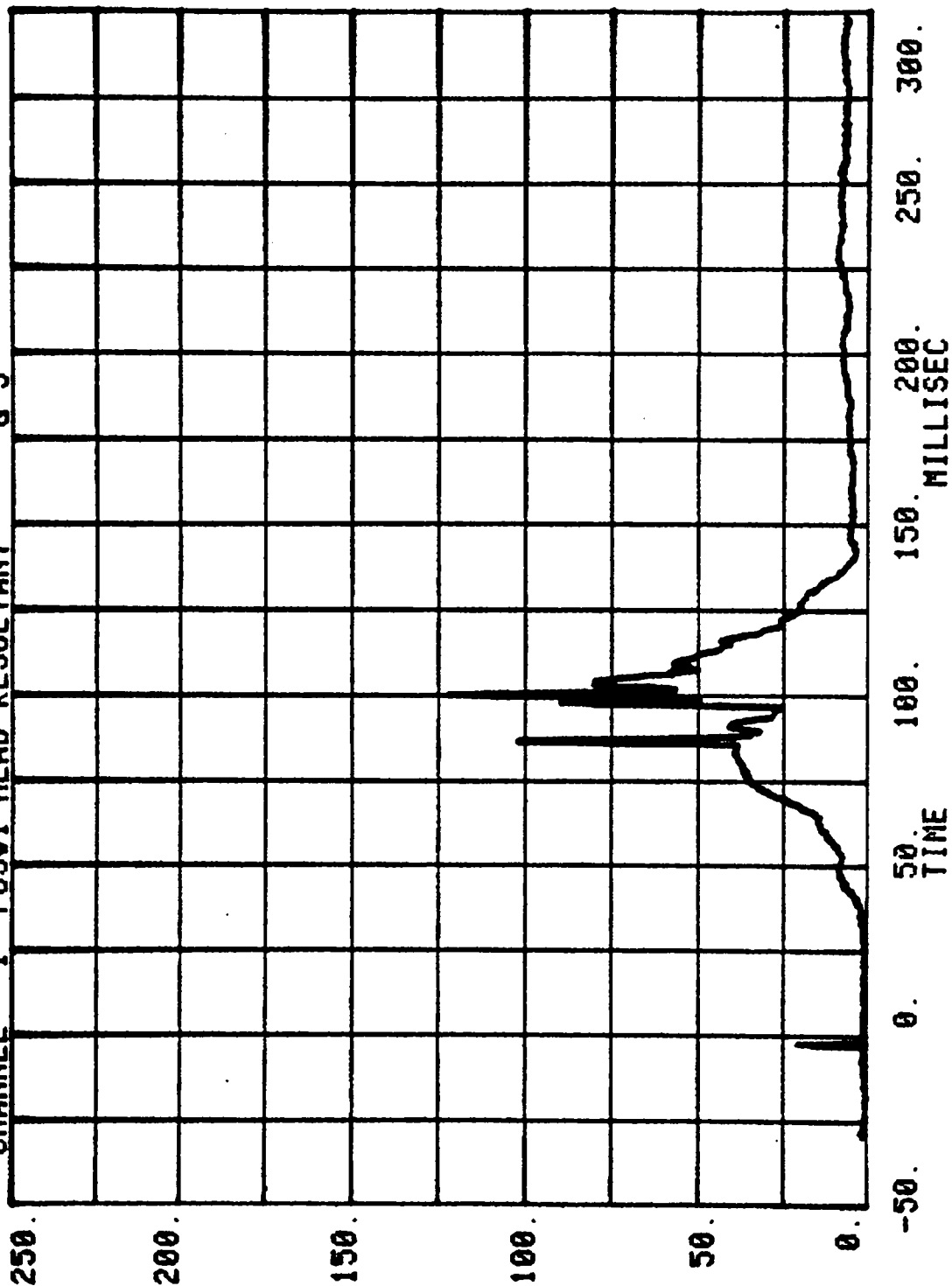


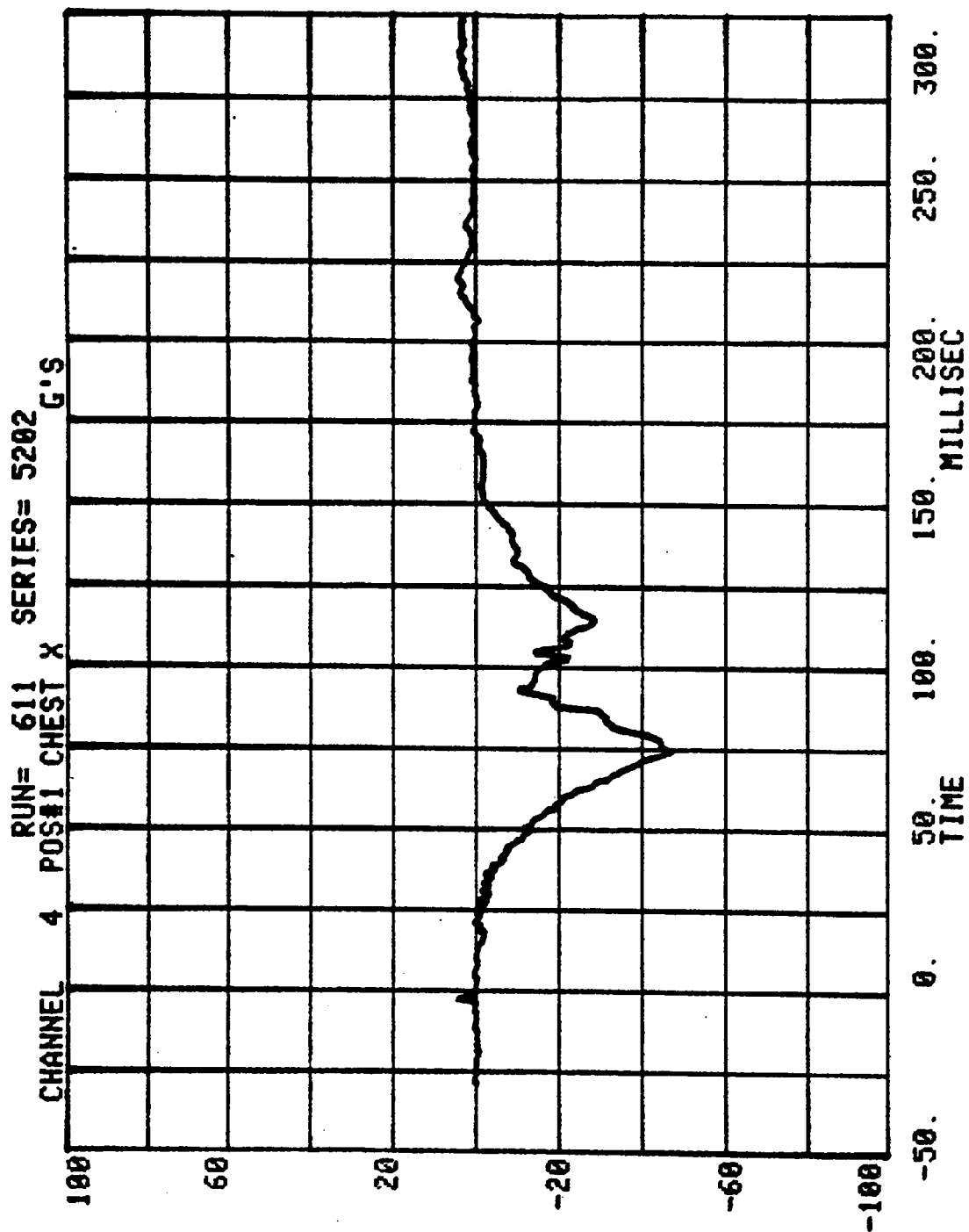


CHANNEL 3 POS#1 HEAD Z RUN= 611 SERIES= 5202 G'S

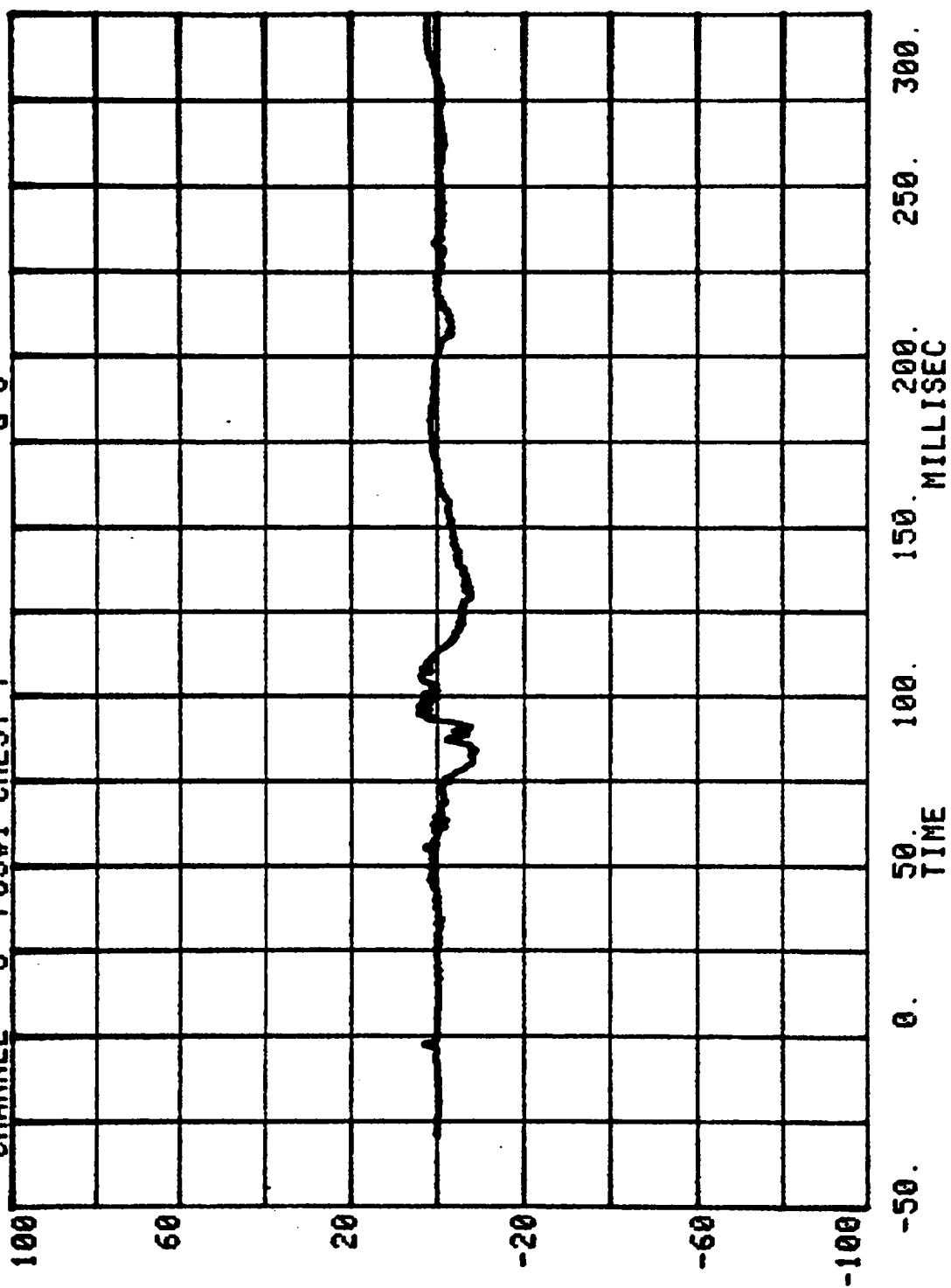


CHANNEL 1 RUN= 611 SERIES= 5202
POS#1 HEAD RESULTANT G'S

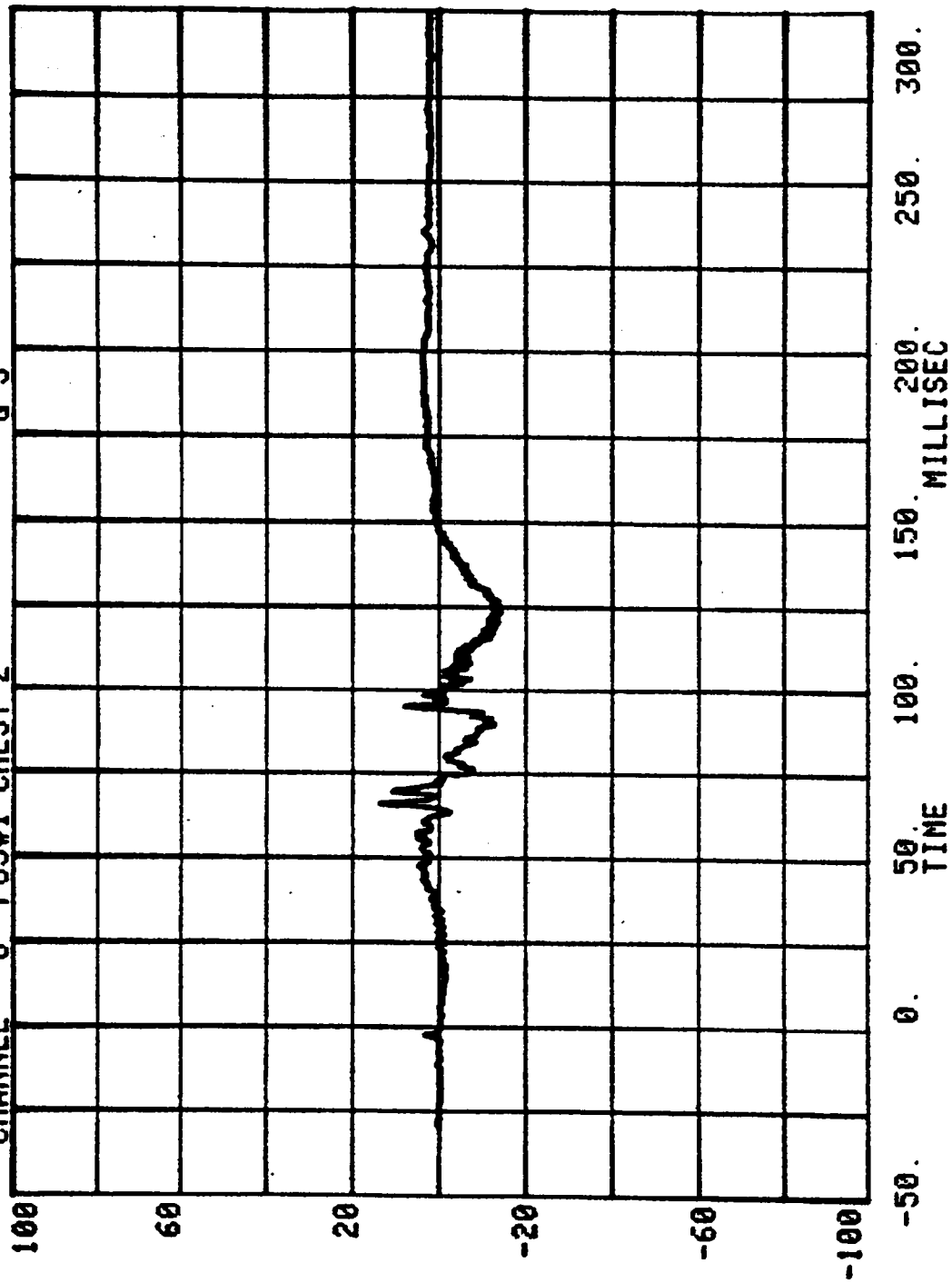




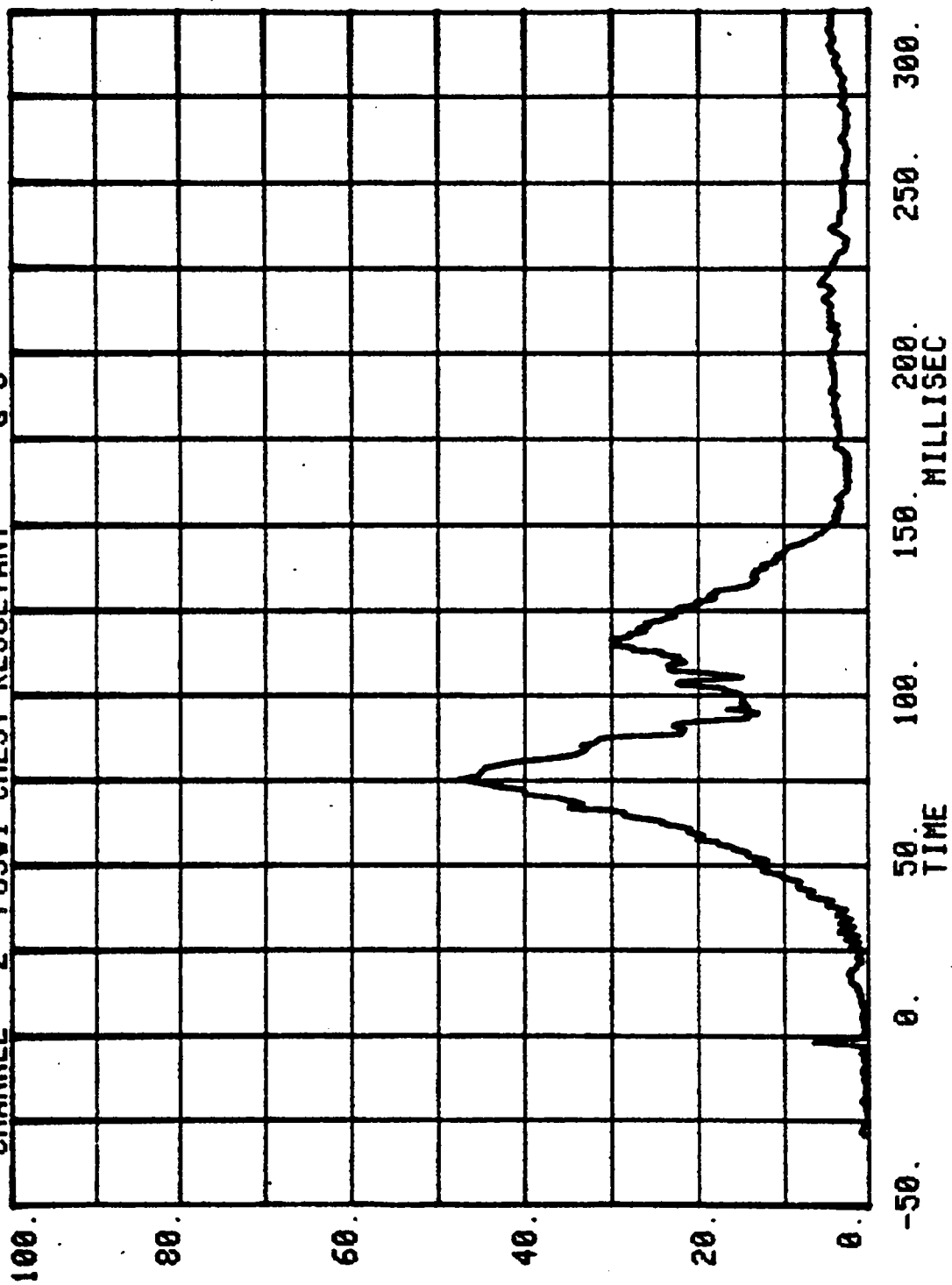
RUN= 611 SERIES= 5202
CHANNEL 5 POS#1 CHEST Y G'S

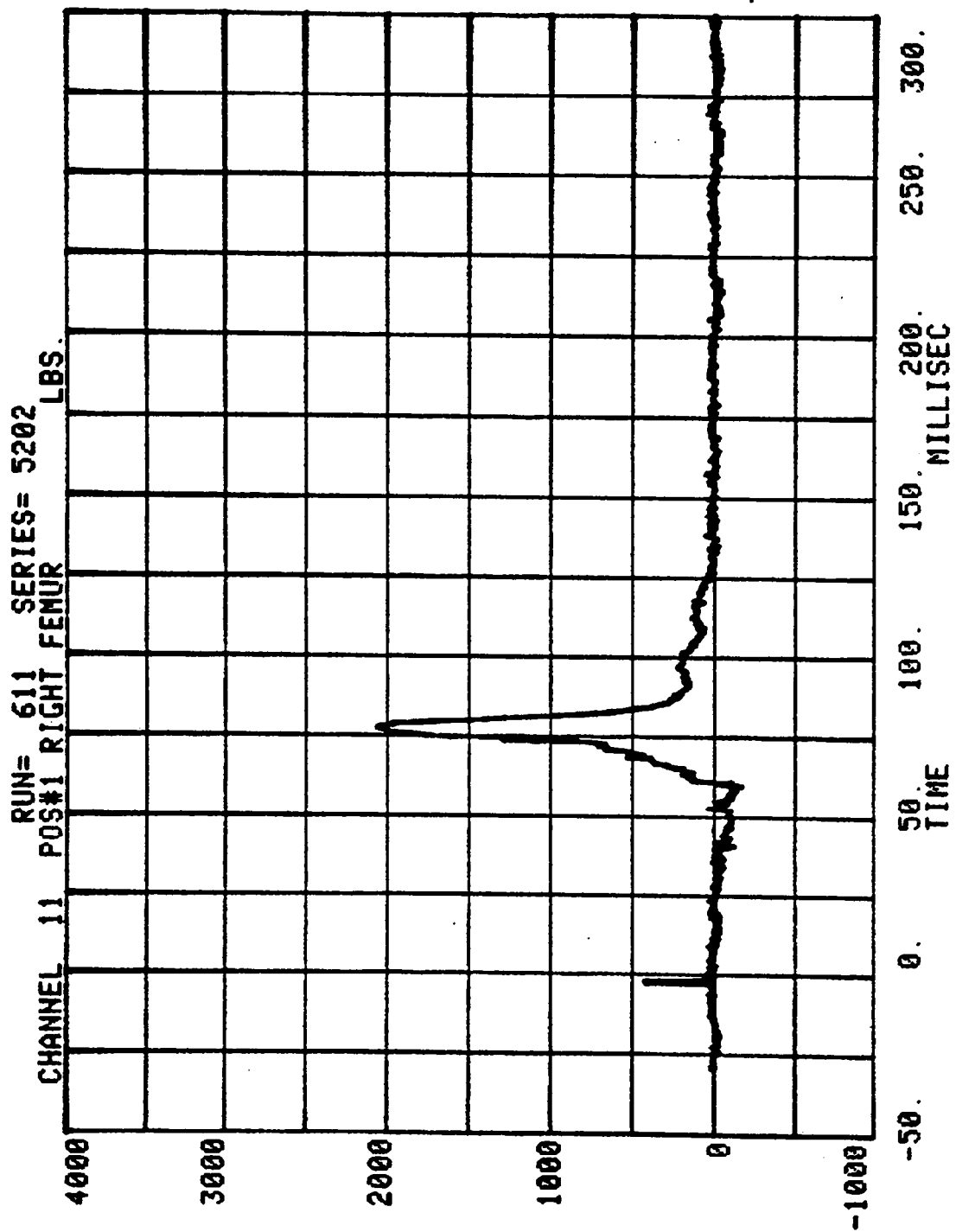


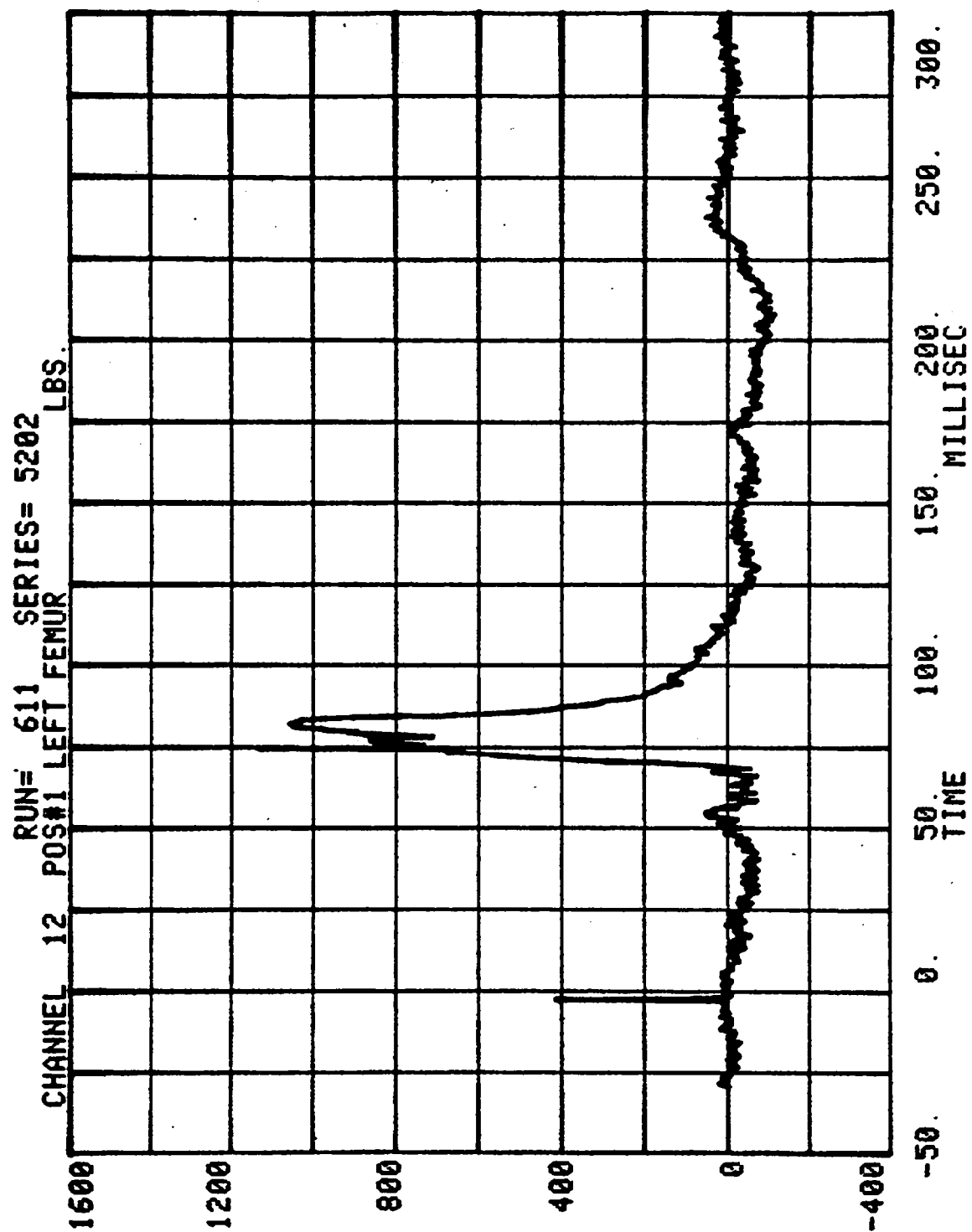
CHANNEL 6 POS#1 CHEST Z RUN= 611 SERIES= 5202 G'S

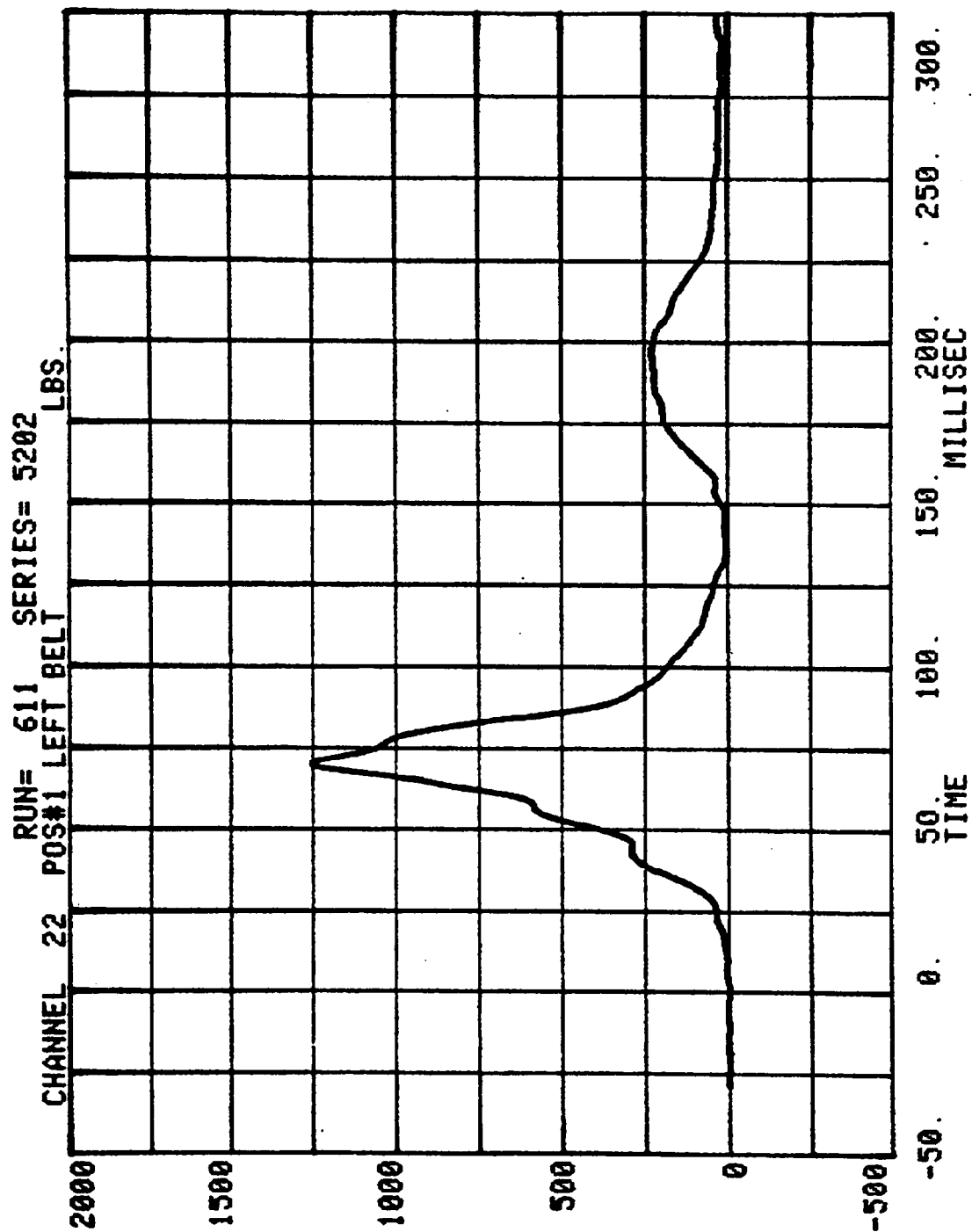


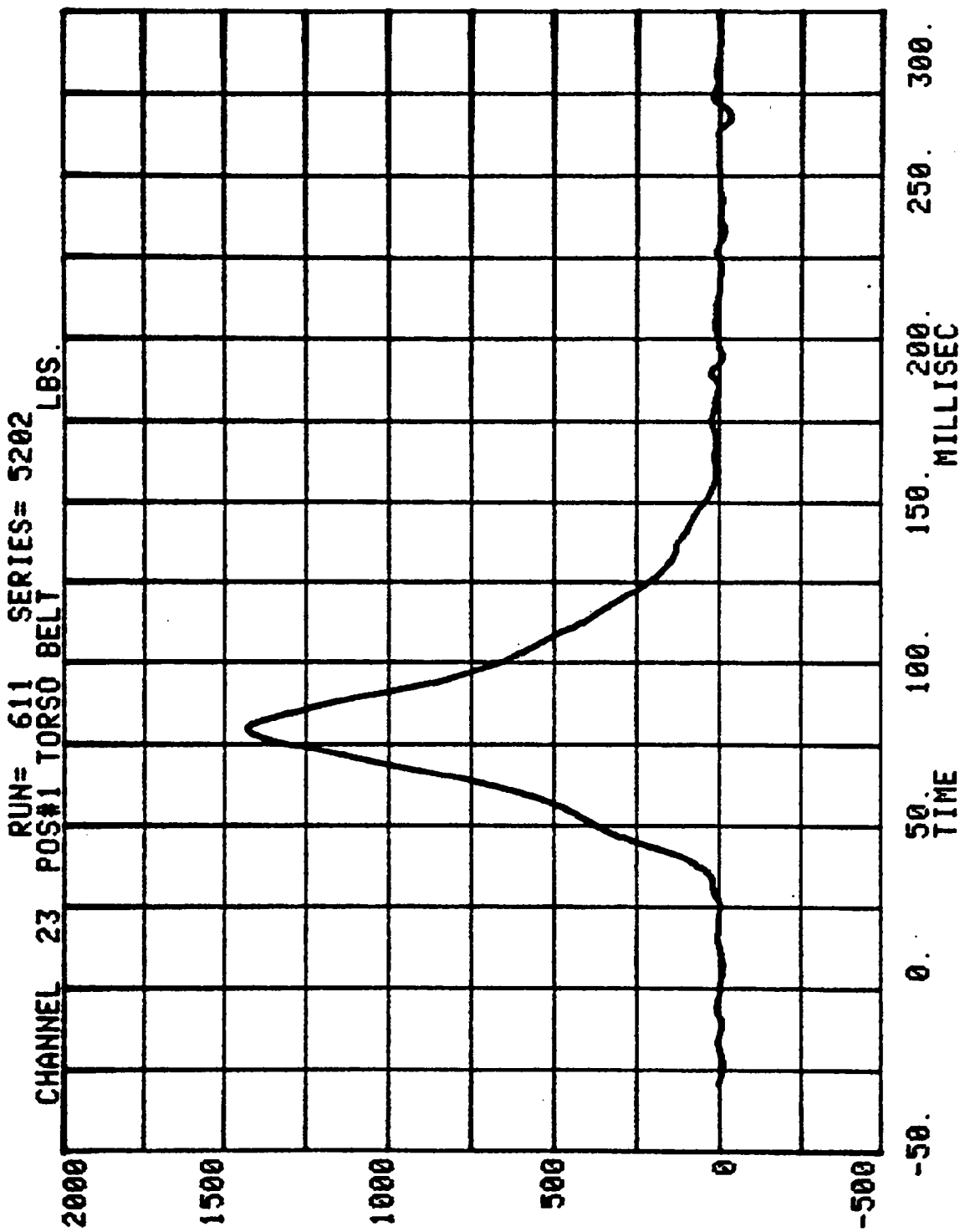
RUN= 611 SERIES= 5202
CHANNEL 2 POS#1 CHEST RESULTANT G'S

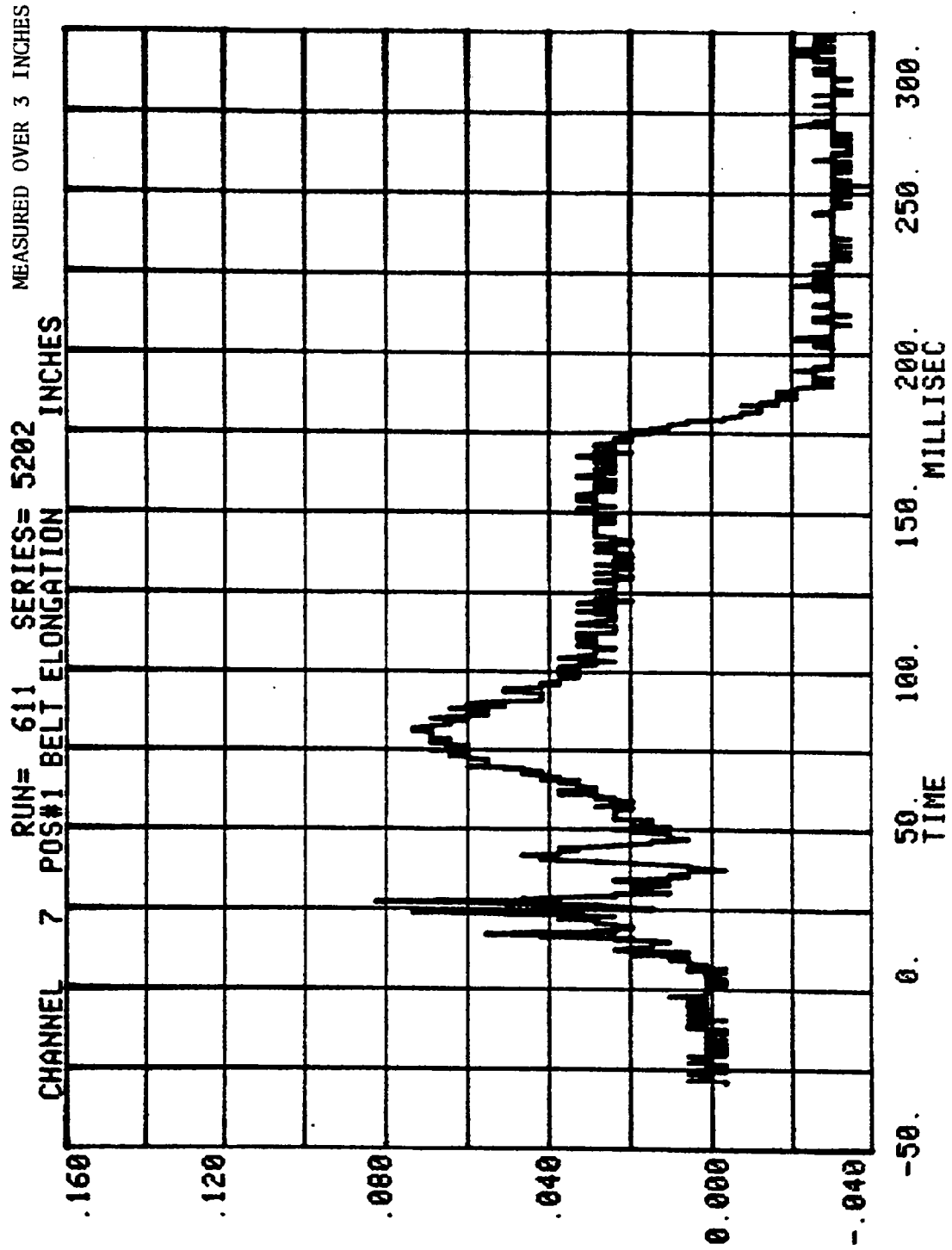


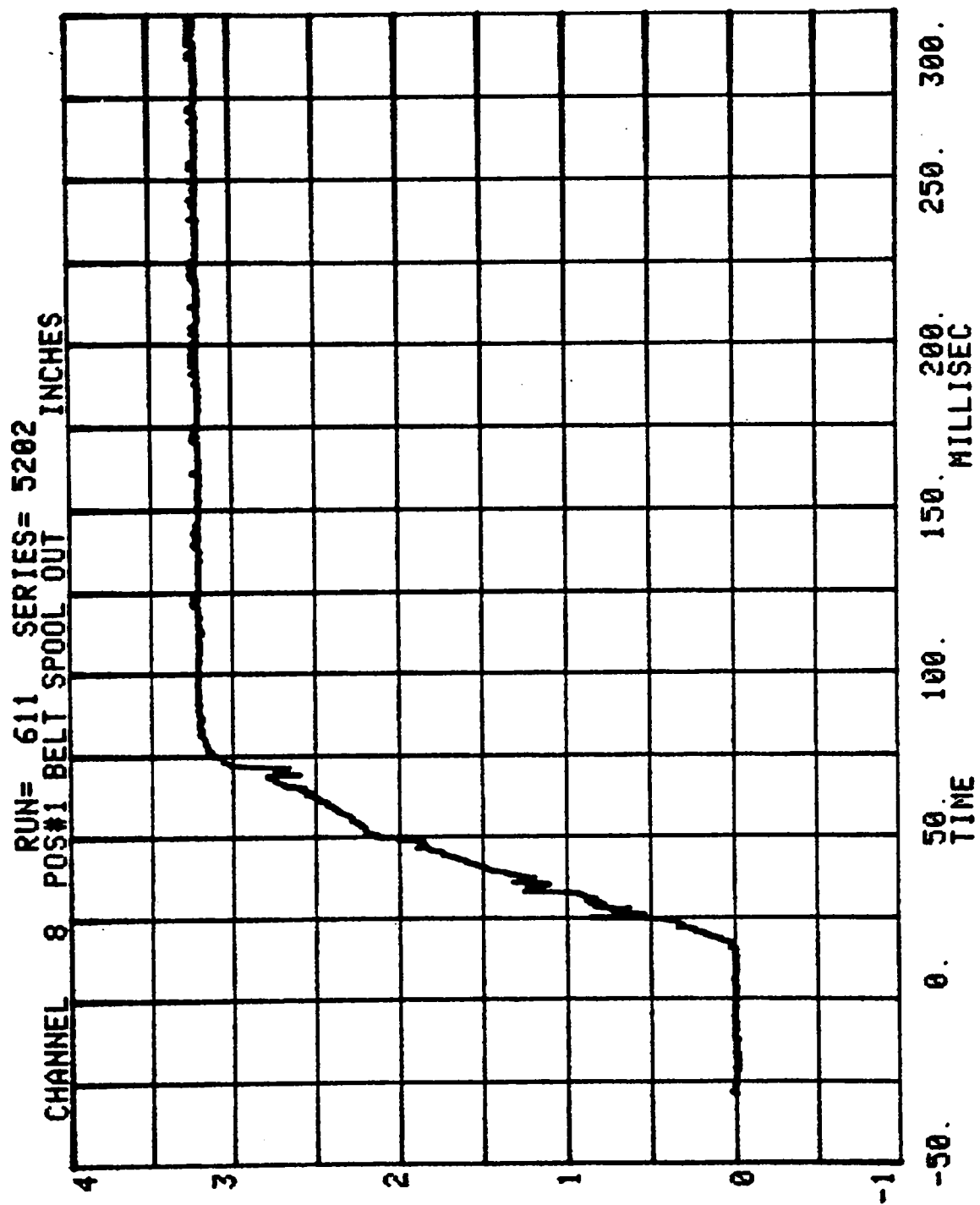












HEAD INJURY CRITERION
HEAD SEVERITY INDEX

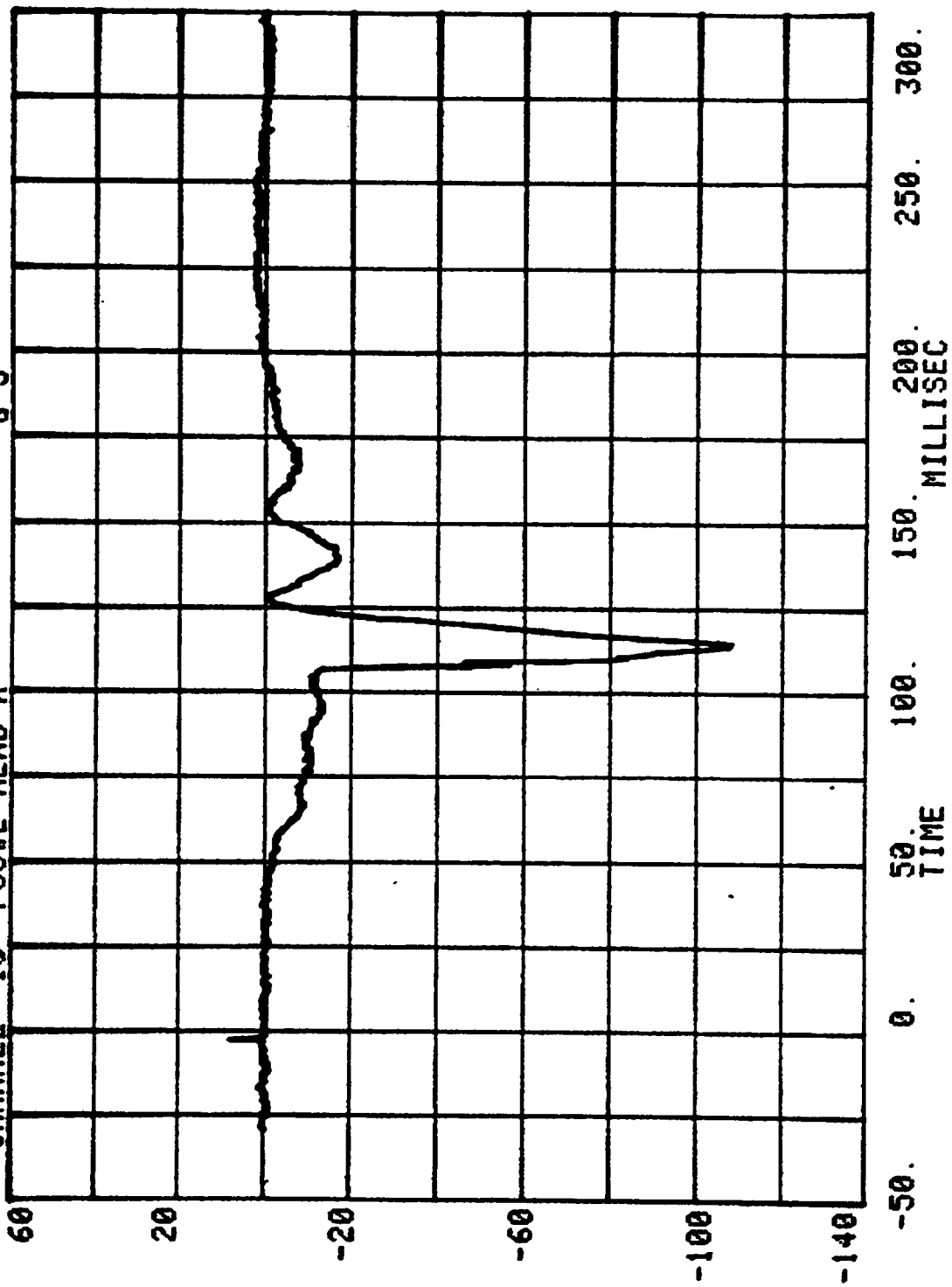
CAR TO LOAD CELL BARRIER

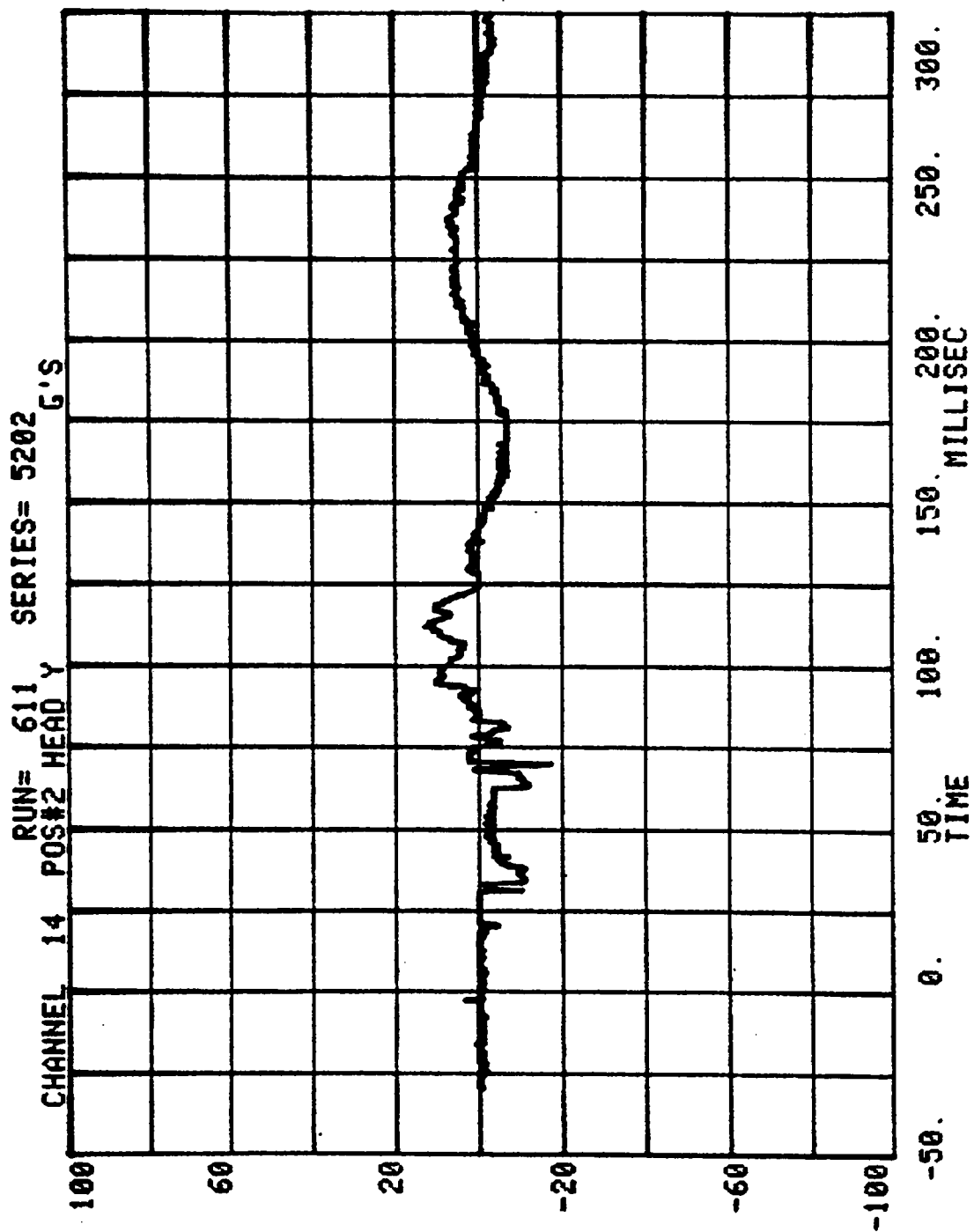
RUN= 611

POS#2 HEAD RESULTANT

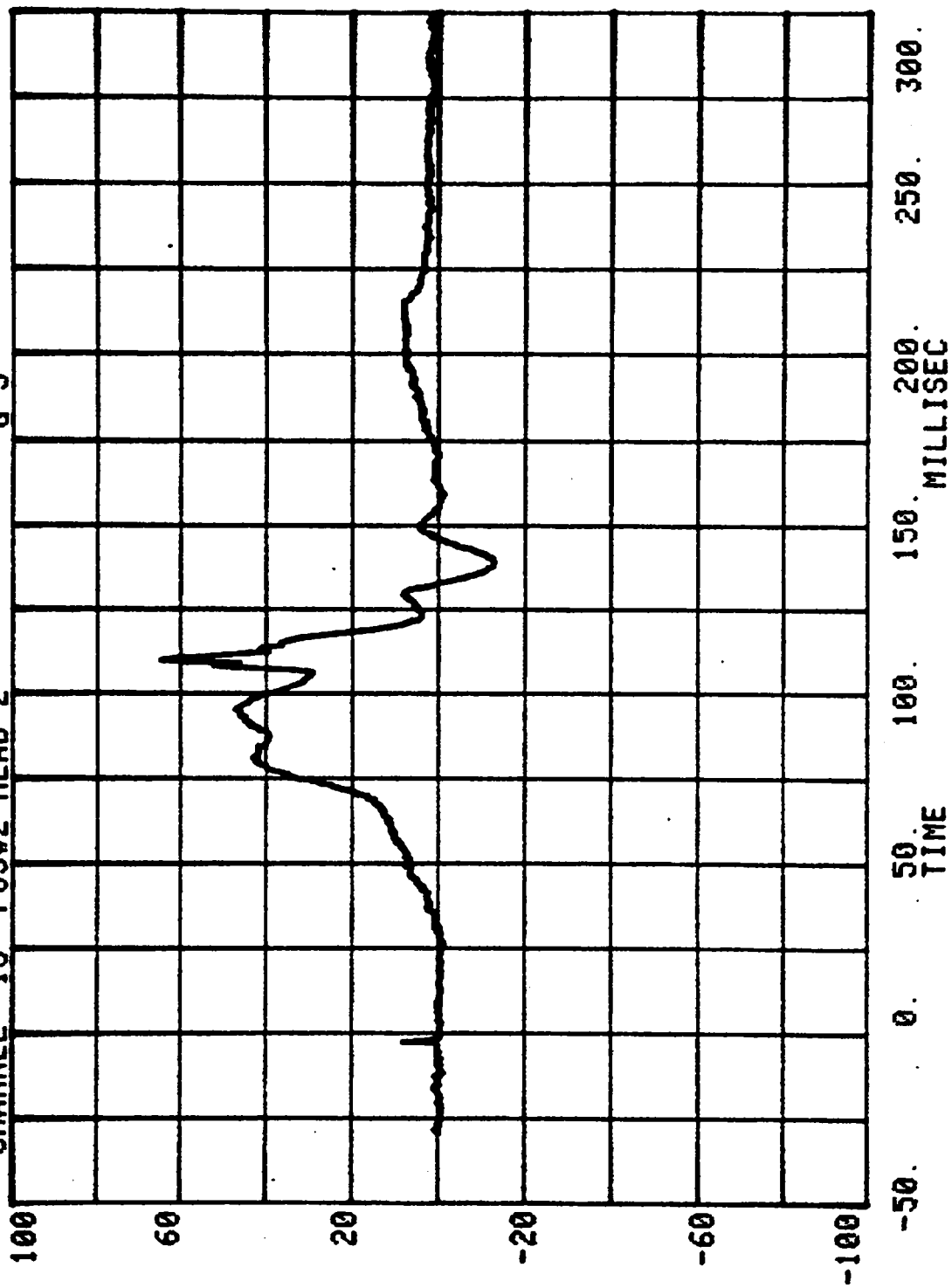
HIC=1037.9 FROM T1= .07500 TO T2= .12180
AVERAGE ACCELERATION BETWEEN T1 AND T2= 54.7G'S
EVENT TIME= 300.0 MSEC
SEVERITY INDEX=1518.2

CHANNEL 13 POS#2 HEAD X
RUN= 611 SERIES= 5202 G'S



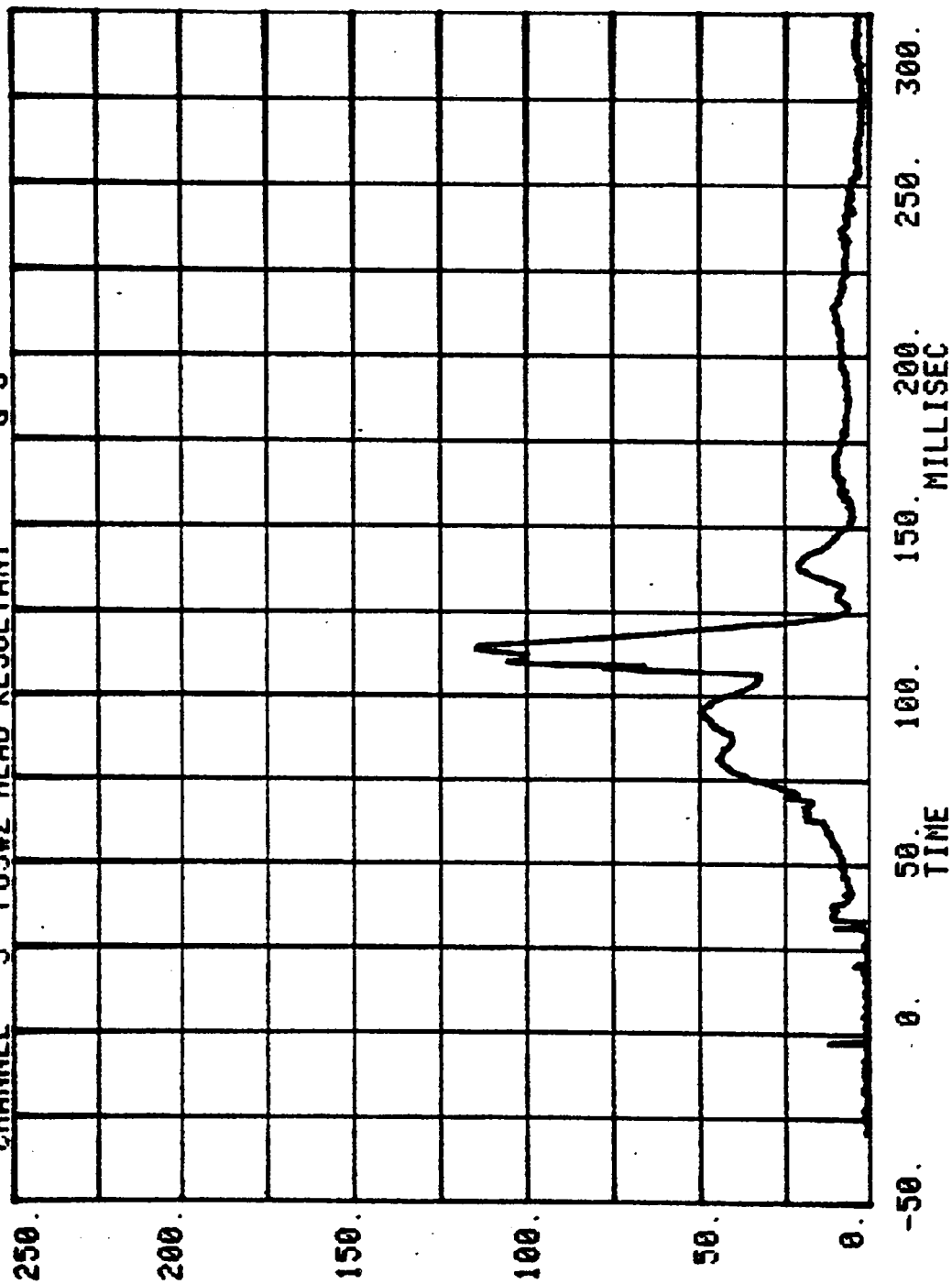


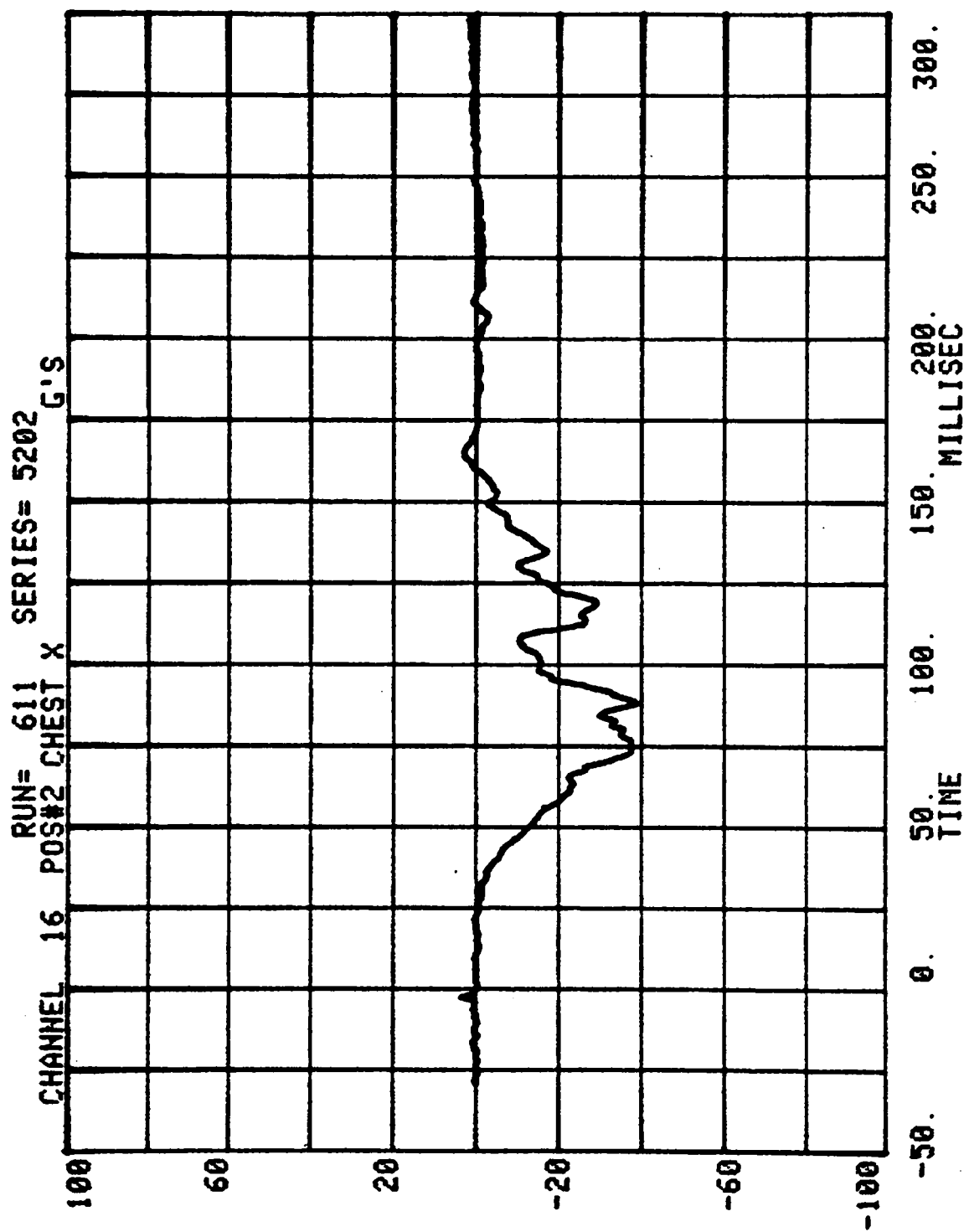
RUN= 611 · SERIES= 5202
CHANNEL 15 POS#2 HEAD Z G'S

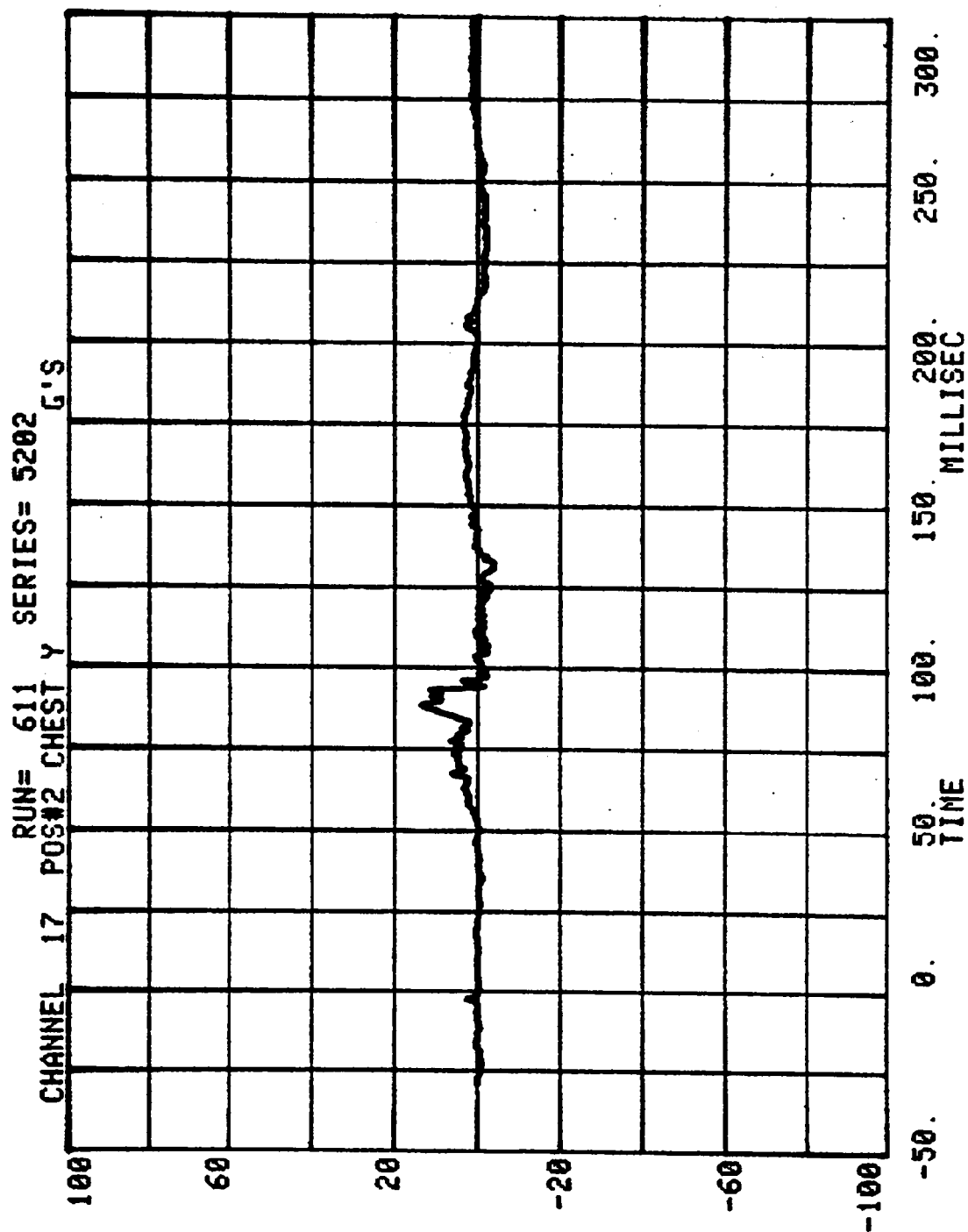


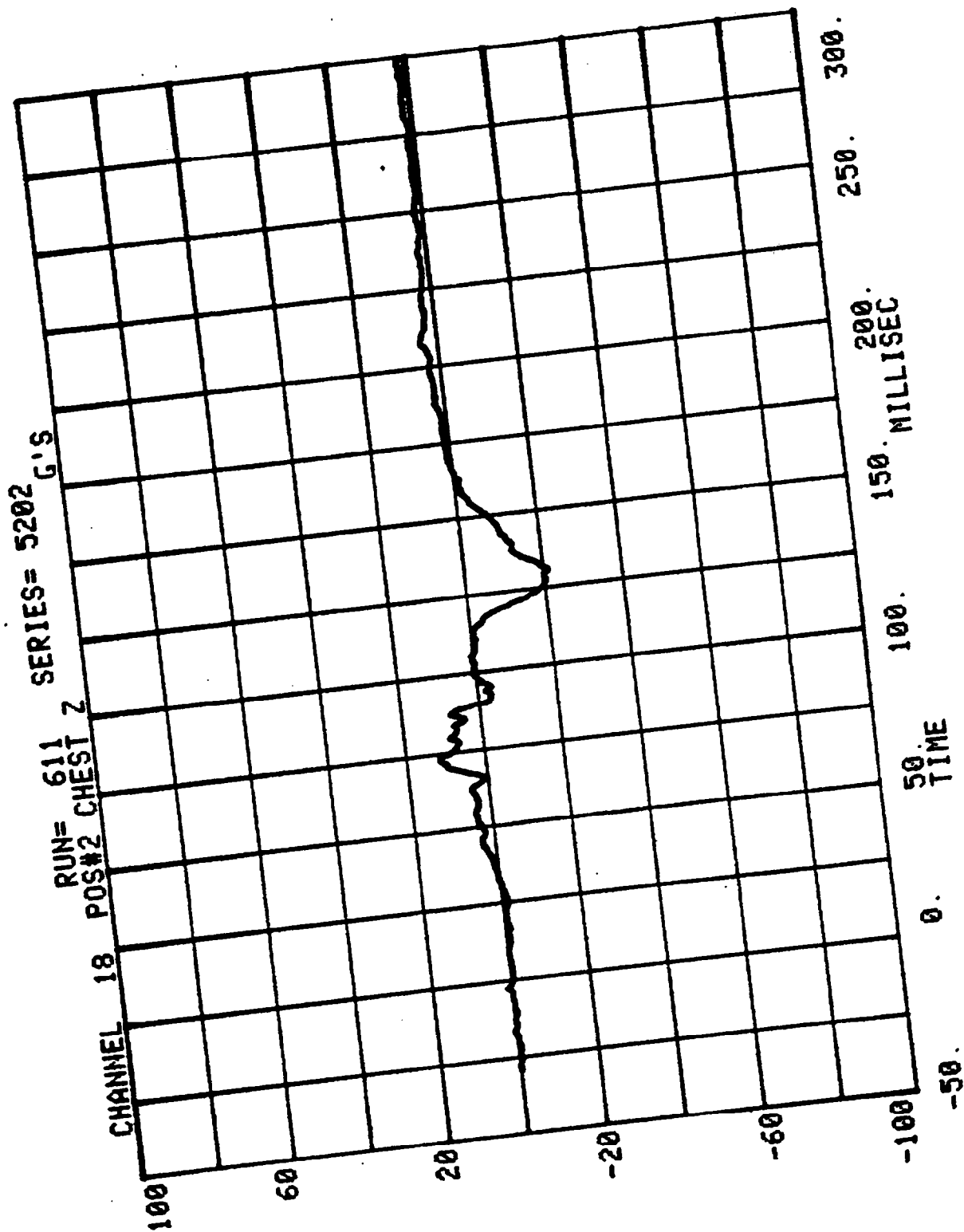
CHANNEL 3 POS#2 HEAD RESULTANT G'S

RUN= 611 SERIES= 5202



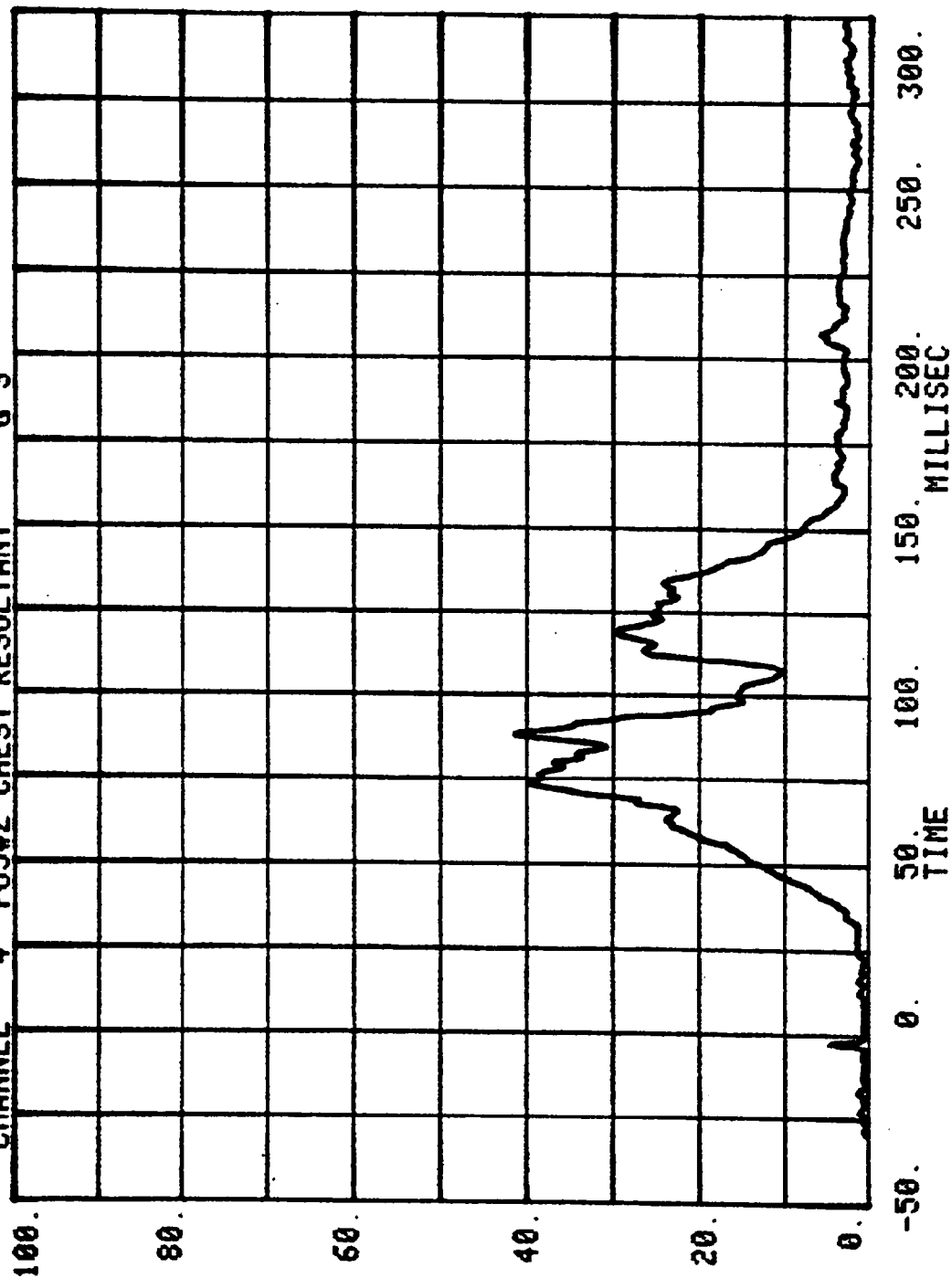


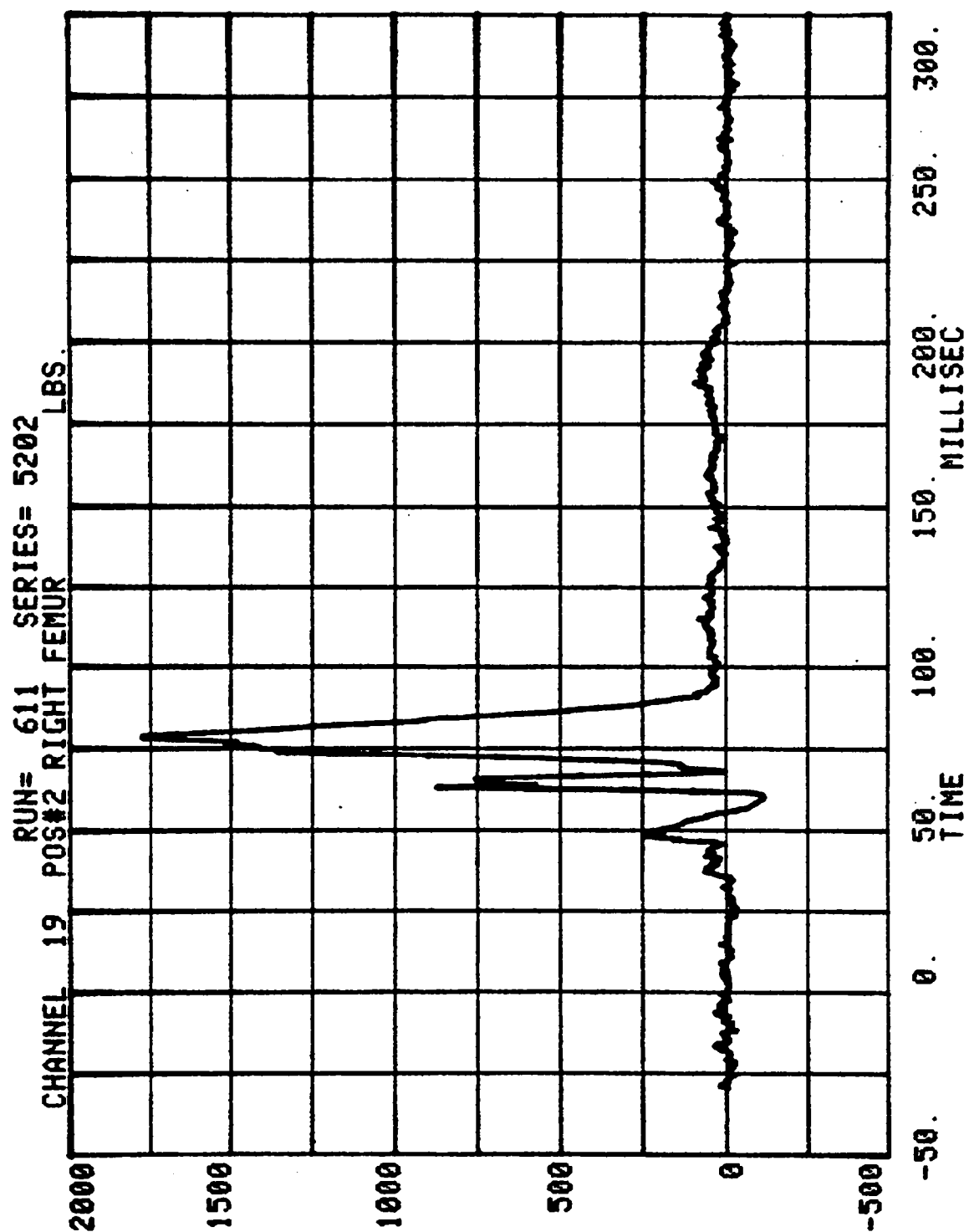


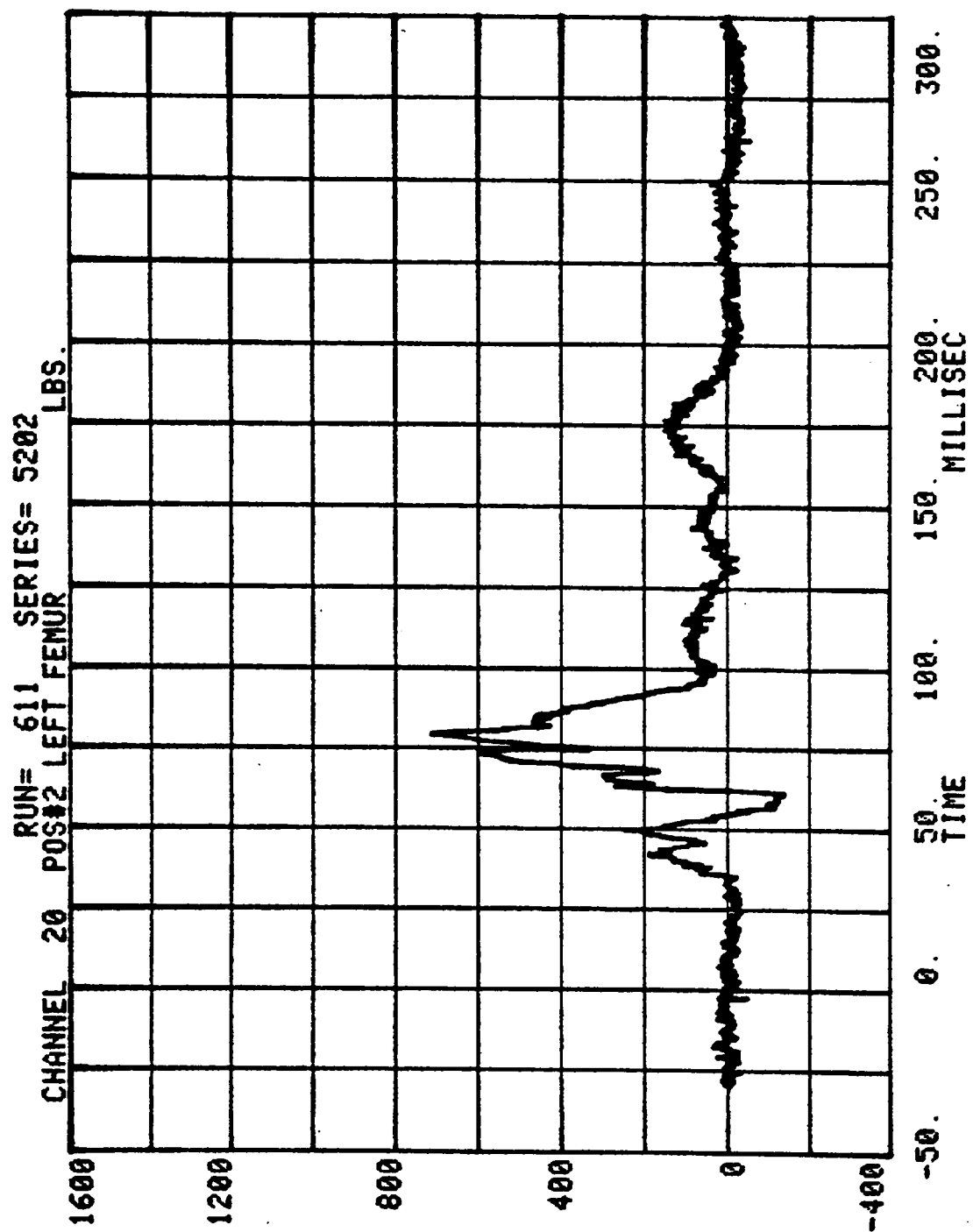


CHANNEL 4 POS#2 CHEST RESULTANT G'S

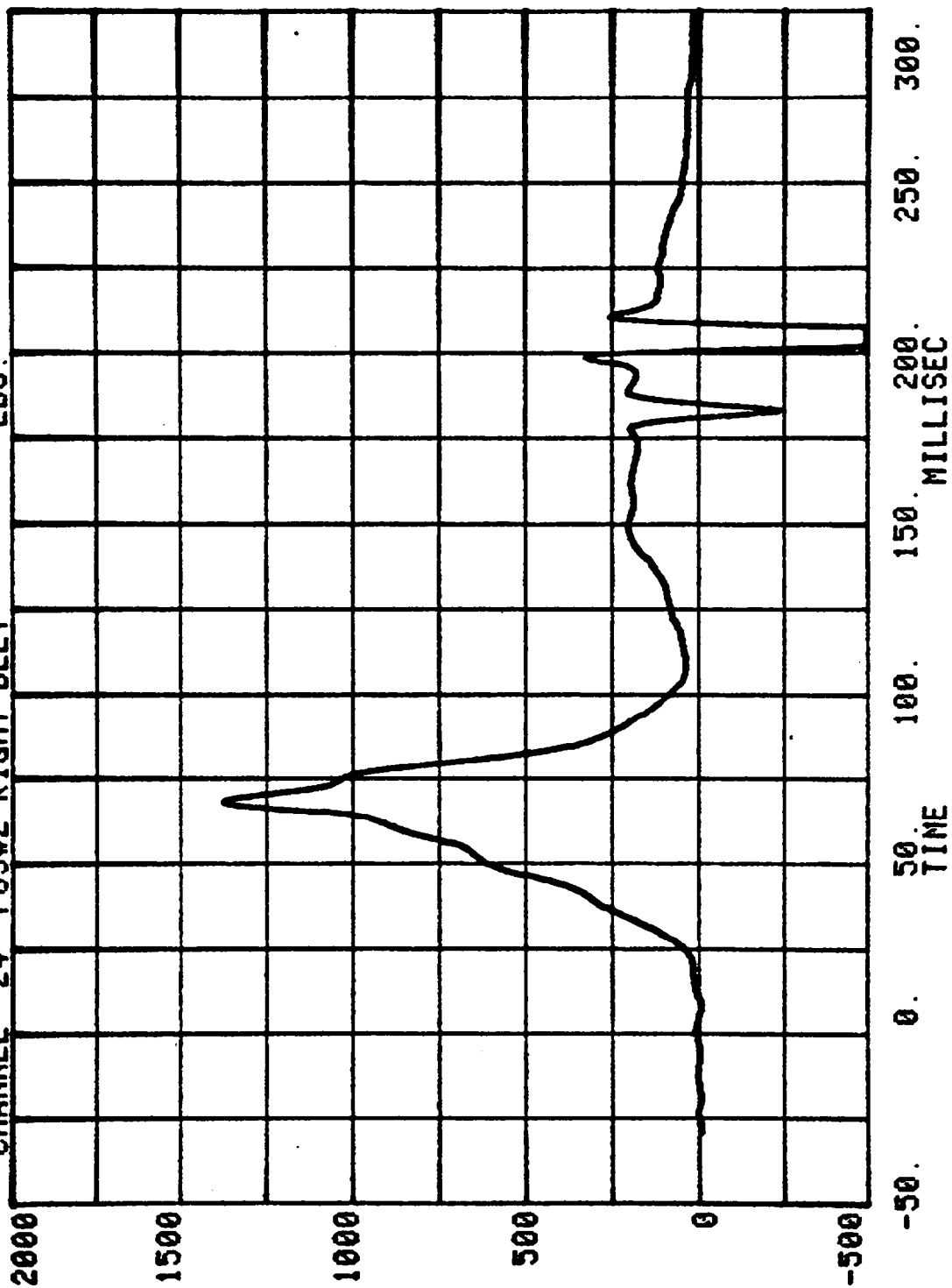
RUN= 611 SERIES= 5202

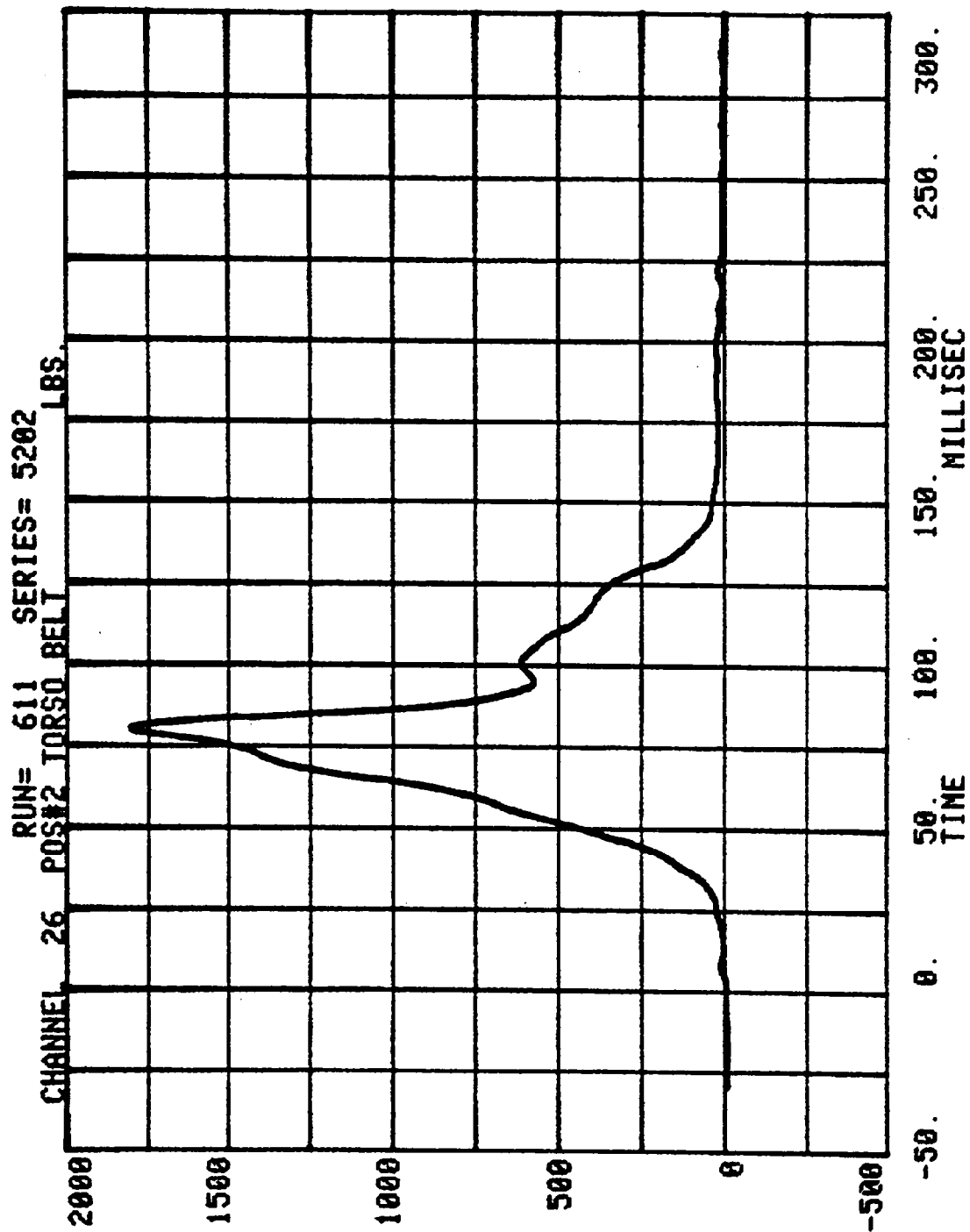






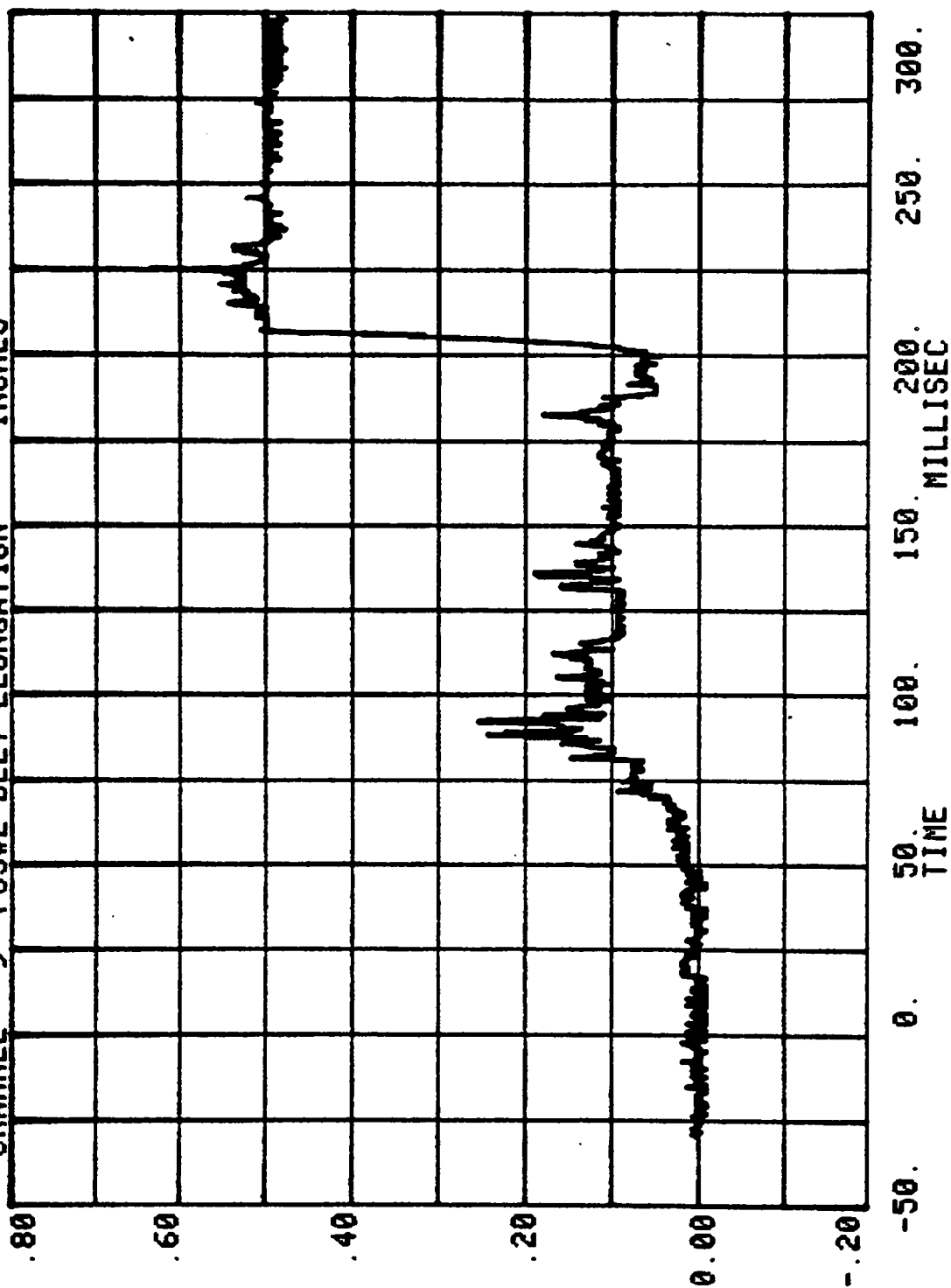
CHANNEL 24 POS#2 RIGHT BELT
RUN= 611 SERIES= 5202 LBS.

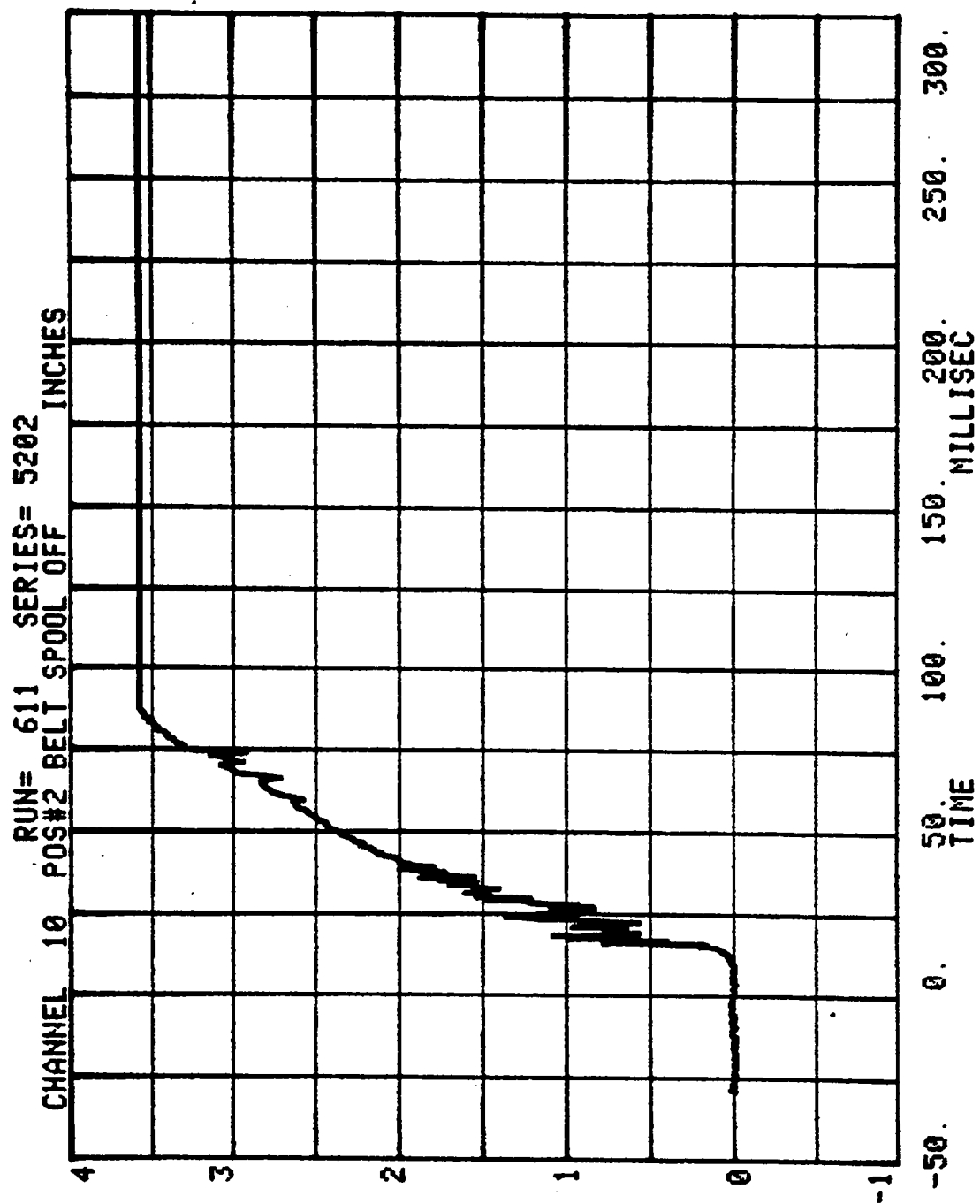




MEASURED OVER 3 INCHES

CHANNEL 9 POS#2 BELT ELONGATION SERIES= 5202 INCHES





APPENDIX C
DUMMY CERTIFICATION TESTS

Appendix C contains the results from certification tests performed on the 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 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 Date</u>
162	11/30/83
1019	1/9/84

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 Inducant Testing Final Report, Report No. 6525-V-1.

P.572 DUMMY CALIBRATION TEST DATA

NHTSA DUMMY ID NO. 162

LABORATORY TECHNICIAN: Gary Gestwick

APPROVED BY: *[Signature]*

		Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - -		11/28/83 - 11/30/83	
Calibration Sequential Number for Dummy - - -		11	
Temperature in Lab. (Spec. = 66 to 78°F) - - -		68° - 70°	
Relative Humidity in Lab. (Spec. = 10 to 70%) -		36% - 38%	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST:			
a. Peak Resultant Accel. -	210 to 260G	240 g	
b. Peak Lateral Accel. - -	≤10G	9 g	
c. Time above 100G - - - -	0.9 to 1.5 ms	1.2 ms.	
2. NECK BENDING TEST:			
a. Pendulum Speed - - - -	21.5 to 25.5 fps	22.6 fps	
b. Pendulum Avg. Decel. (over t ₃ - t ₂) - - - -	20 to 24G	23 g	
c. Peak Resultant Head Acceleration - - - -	26G maximum	22 g	
d. Pendulum Decel. (t ₂ -t ₁)	≤ 3 ms	2.9 ms.	
e. Pendulum Decel. (t ₃ -t ₂)	25 to 30 ms	26.9 ms.	
f. Pendulum Decel. (t ₄ -t ₃)	≤10 ms	8.1 ms.	
g. Pendulum Direction Reversal Time - - - -		105.5 ms.	
h. Max. Head Rotation - -	63 to 73°	66°	
i. Chordal Displacement:			
Head Rotation Angle - -			
0°	Time	-2 to 2 ms	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.	2.6 in.
60°	Time	40.3 to 51.7 ms	47 ms.
	Displ.	4.3 to 5.3 in.	4.8 in.
Maximum (66°)	Time	53.2 to 66.8 ms	56 ms.
	Displ.	5.0 to 6.0 in.	5.1 in.

Continued

P. 572 DUMMY CALIBRATION TEST DATA Continued:

NHTSA DUMMY ID NO. 162

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	67 ms.
	Displ.	4.3 to 5.3 in.	4.6 in.
30°	Time	85.4 to 104.6 ms	87 ms.
	Displ.	2.1 to 3.1 in.	2.5 in.
0°	Time	101.0 to 123.0 ms	101.5 ms.
	Displ.	-.5 to 0.5 in.	0.0 in.
3. ABDOMINAL COMPRESSION TEST:			
(Preload = 10 pounds)			
a. Force @ 1" - - - - -	50 to 63 lbs.	57 lbs.	
b. Force @ 1.3" - - - - -	73 to 88 lbs.	88 lbs.	
4. LUMBAR FLEXION TEST:			
a. Force @ 20° - - - - -	22 to 34 lbs.	31 lbs.	
b. Force @ 30° - - - - -	34 to 46 lbs.	42.5 lbs.	
c. Force @ 40° - - - - -	46 to 58 lbs.	54 lbs.	
d. Return Angle - - - - -	12° maximum	3°	
5. CHEST IMPACT TESTS:			
a. High Speed			
(1) Probe Speed - - - - -	21.78-22.22 fps	22.02 fps	
(2) Peak Deflection - - - - -	1.7" maximum	1.6 in.	
(3) Peak Resistive Force - - - - -	2250 lbs. maximum	2020 lbs.	
(4) Internal Hysteresis - - - - -	50 to 70%	56.4%	
b. Low Speed			
(1) Probe Speed - - - - -	13.86-14.14 fps	14.00 fps	
(2) Peak Deflection - - - - -	1.1" maximum	1.0 in.	
(3) Peak Resistive Force - - - - -	1450 lbs. maximum	1240 lbs.	
(4) Internal Hysteresis - - - - -	50 to 70%	56.7%	

P.572 DUMMY CALIBRATION TEST DATAContinued:

NHTSA DUMMY ID NO. 162

TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
6. <u>KNEE IMPACT TESTS:</u>			
a. Right Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.90 fps	
(2) Maximum Force - -	1850 to 2500 lbs	2050 lbs.	
(3) Time Above 1000#	1.7 ms minimum	2.1 ms.	
b. Left Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.96 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2250 lbs.	
(3) Time Above 1000#	1.7 ms minimum	1.9 ms.	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 162

CALIB. SEQ. NOS. FOR DUMMY: 11 &

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	DB47	7/83	1/84
ENDEVCO	CX05	7/83	1/84
ENDEVCO	CJ54	7/83	1/84
GSE	312	7/83	1/84
GSE	311	7/83	1/84
CEC	22707	7/83	1/84
CEC	22958	7/83	1/84
TRANSDUCER INC	20051	7/83	1/84
BLH	72952	7/83	1/84
CIC	567-11	7/83	1/84

P.572 DUMMY CALIBRATION TEST DATA

NHTSA DUMMY ID NO. 1019

LABORATORY TECHNICIAN: Gary Gestwick

APPROVED BY: *[Signature]*

		Pre-Test Calibration	Post-Test Calibration
Date of Dummy Calibration - - - - -		1/1/84 - 1/9/84	
Calibration Sequential Number for Dummy - - -		4	
Temperature in Lab. (Spec. = 66 to 78°F) - - -		68° - 76°	
Relative Humidity in Lab. (Spec. = 10 to 70%) -		.20% - 32%	
TEST PARAMETER	SPECIFICATION		
1. HEAD DROP TEST:			
a. Peak Resultant Accel. -	210 to 260G	240 g	
b. Peak Lateral Accel. - -	≤10G	5 g	
c. Time above 100G - - -	0.9 to 1.5 ms	1.2 ms.	
2. NECK BENDING TEST:			
a. Pendulum Speed - - - -	21.5 to 25.5 fps	23.9 fps	
b. Pendulum Avg. Decel. (over $t_3 - t_2$) - - - -	20 to 24G	23.5 g	
c. Peak Resultant Head Acceleration - - - -	26G maximum	23.5 g	
d. Pendulum Decel. ($t_2 - t_1$)	≤3 ms	2.5 ms.	
e. Pendulum Decel. ($t_3 - t_2$)	25 to 30 ms	26.9 ms.	
f. Pendulum Decel. ($t_4 - t_3$)	≤10 ms	5.6 ms.	
g. Pendulum Direction Reversal Time - - - -		114.5 ms.	
h. Max. Head Rotation - -	63 to 73°	72°	
i. Chordal Displacement:			
Head Rotation Angle - -			
0°	Time	-2 to 2 ms	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	43 ms.
	Displ.	4.3 to 5.3 in.	4.8 in.
Maximum (72°)	Time	53.2 to 66.8 ms	56 ms.
	Displ.	5.0 to 6.0 in.	5.5 in.

Continued

P. 572 DUMMY CALIBRATION TEST DATA Continued:

NHTSA DUMMY ID NO. 1019

TEST PARAMETER		SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
2. NECK BENDING TEST				
<u>Continued</u>				
1. Chordal Displacement:				
Head Rotation Angle --				
60°	Time	67.0 to 83.0 ms	76 ms.	
	Displ.	4.3 to 5.3 in.	4.6 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	108 ms.	
	Displ.	-.5 to 0.5 in.	0.0 in.	
3. ABDOMINAL COMPRESSION TEST:				
(Preload = 10 pounds)				
a. Force @ 1" - - - - -		50 to 63 lbs.	57 lbs.	
b. Force @ 1.3" - - - - -		73 to 88 lbs.	81 lbs.	
4. LUMBAR FLEXION TEST:				
a. Force @ 20° - - - - -		22 to 34 lbs.	33.0 lbs.	
b. Force @ 30° - - - - -		34 to 46 lbs.	40.5 lbs.	
c. Force @ 40° - - - - -		46 to 58 lbs.	49.0 lbs.	
d. Return Angle - - - - -		12° maximum	5°	
5. CHEST IMPACT TESTS:				
a. High Speed				
(1) Probe Speed - - -		21.78-22.22 fps	21.92 fps	
(2) Peak Deflection - -		1.7" maximum	1.6 in.	
(3) Peak Resistive Force - - - - -		2250 lbs. maximum	1970 lbs.	
(4) Internal Hysteresis - - - - -		50 to 70%	53.1%	
b. Low Speed				
(1) Probe Speed - - -		13.86-14.14 fps	14.01 fps	
(2) Peak Deflection - -		1.1" maximum	1.08 in.	
(3) Peak Resistive Force - - - - -		1450 lbs. maximum	1240 lbs.	
(4) Internal Hysteresis - - - - -		50 to 70%	50.5%	

P.572 DUMMY CALIBRATION TEST DATAContinued:

NHTSA DUMMY ID NO. 1019

TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
6. <u>KNEE IMPACT TESTS:</u>			
a. Right Side --			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.92 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	6.82 fps	
(2) Maximum Force - -	1850 to 2500 lbs.	2350 lbs.	
(3) Time Above 1000#	1.7 ms minimum	1.85 ms.	

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NO. 1019

CALIB. SEQ. NOS. FOR DUMMY: 4 &

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	DB47	1/84	7/84
ENDEVCO	CX05	1/84	7/84
ENDEVCO	CJ54	1/84	7/84
GSE	312	1/84	7/84
GSE	311	1/84	7/84
CEC	22707	1/84	7/84
CEC	22958	1/84	7/84
TRANSDUCER INC	20051	1/84	7/84
BLH	72952	1/84	7/84
CIC	567-11	1/84	7/84