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REPORT NO. CAL-88-N08

NEW CAR ASSESSMENT PROGRAM (NCAP)  
FRONTAL BARRIER IMPACT TEST

NISSAN MOTOR CO.  
1988 NISSAN PULSAR NX XE HATCHBACK

NHTSA NO. MJ5201  
CALSPAN TEST NO. 7626-8

CALSPAN CORPORATION  
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FEBRUARY 11, 1988



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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APR 29 1988

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Date of Report Acceptance

**TECHNICAL REPORT STANDARD TITLE PAGE**

|  |  |  |  |                            |           |
|--|--|--|--|----------------------------|-----------|
| 1. Report No.<br>CAL-88-N08  |  | 2. Government Accession No.                          |  | 3. Recipient's Catalog No. |           |
| 4. Title and Subtitle<br>NHTSA New Car Assessment Program (NCAP)<br>Frontal Barrier Impact Test on 1988 Nissan Pulsar NX<br>XE Hatchback to Indicant Requirements of FMVSS 212,<br>219 (Partial) and 301-75.   |  |  | 5. Report Date<br>February 11, 1988  |                            |           |
|  |  |  | 6. Performing Organization Code<br>CAL   |                            |           |
| 7. Author(s)<br>Michael J. Kilgallon, Project Engineer<br>Walter E. Levan, Program Manager   |  |  | 8. Performing Organization Report No.<br>7626-8  |                            |           |
| 8. Performing Organization Name and Address<br>Calspan Advanced Technology Center<br>P.O. Box 400<br>Buffalo, NY 14225   |  |  | 10. Work Unit No.<br>296-08-810  |                            |           |
|  |  |  | 11. Contract or Grant No.<br>DTNH22-87-D-02012   |                            |           |
| 12. Sponsoring Agency Name and Address<br>U.S. Department of Transportation<br>National Highway Traffic Safety Administration<br>Office of Market Incentives (NRM-20)<br>400 Seventh Street, S.W., Washington, DC 20590  |  |  | 13. Type of Report and Period Covered<br>Final Report<br>February - March  |                            |           |
|  |  |  | 14. Sponsoring Agency Code<br>DOT/NHTSA/RM/OMI   |                            |           |
| 15. Supplementary Notes  |  |  |  |                            |           |
| 16. Abstract<br><p>A frontal load cell barrier test of a 1988 Nissan Pulsar NX XE 2-door Hatchback was performed at the Calspan Corporation, Advanced Technology Center crash test facility in Buffalo, New York, on February 11, 1988.</p> <p>Impact speed was 34.7 mph, and the ambient temperature at the barrier face at the time of impact was 28°F. The maximum post-test vehicle crush was 25.0 inches.</p> <p>The test vehicle appeared to comply with the indicant requirements of the following Federal Motor Vehicle Safety Standard.</p> <ol style="list-style-type: none"> <li>1. FMVSS No. 212, "Windshield Monitoring"</li> <li>2. FMVSS No. 219 (Partial), "Windshield Zone Intrusion"</li> <li>3. FMVSS No. 301-75, "Fuel System Integrity"</li> </ol> <p><u>Type of Restraint System</u> 3-point continuous webbing manual system at each front outboard seating position.</p> |  |  |  |                            |           |
| 17. Key Words<br>35 mph Frontal Barrier Impact Test<br>New Car Assessment Program (NCAP)<br>FMVSS 212 Indicant Testing<br>FMVSS 219 (Partial) Indicant Testing<br>FMVSS 301-75 Indicant Testing  |  |  | 18. Distribution Statement<br>Copies of this report are available from:<br>Technical Reference Division<br>National Highway Traffic Safety Admin.<br>Nassif Building, Room 5108<br>400 Seventh St., S.W., Washington, DC 20590 |                            |           |
| 19. Security Classif. (of this report)<br>Unclassified   |  | 20. Security Classif. (of this page)<br>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 FRONTAL BARRIER IMPACT TEST                        | 2-1             |
| 3              | SUMMARY RESULTS FOR FMVSS NOS. 212, 219, & 301-75             | 3-1             |
| 4              | OCCUPANT AND VEHICLE INFORMATION                              | 4-1             |
| APPENDIX A     | PHOTOGRAPHS   | A-1             |
| APPENDIX B     | VEHICLE, LOAD CELL BARRIER DATA AND DUMMY RESPONSE DATA       | B-1             |
| APPENDIX C     | DUMMY CONFIGURATION TESTS                                     | C-1             |
| APPENDIX D     | VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS | D-1             |

## LIST OF FIGURES

| <u>Figure No.</u> |  | <u>Page No.</u> |
|-------------------|--|-----------------|
| 1                 | FMVSS No. 212, "Windshield Mounting" Data                | 3-2             |
| 2                 | FMVSS No. 219 (Partial) "Windshield Zone Intrusion" Data | 3-3             |
| 3                 | FMVSS No. 301-75, "Fuel System Integrity" Data           | 3-4             |
| 4                 | Part 572 Dummy In-Vehicle Position                       | 4-3             |
| 5                 | Occupant Clearance Dimensions                            | 4-4             |
| 6                 | Seat Belt Positioning Data                               | 4-5             |
| 7                 | Driver Dummy to Steering Column/Wheel Dimensions         | 4-7             |
| 8                 | Camera Positions for Frontal Impacts                     | 4-8             |
| 9                 | Vehicle Target Locations                                 | 4-10            |
| 10                | Load Cell Locations on Fixed Barrier                     | 4-11            |
| 11                | Vehicle Accelerometer Locations                          | 4-12            |
| 12                | Test Vehicle Measurements                                | 4-13            |
| 13                | Dummy Configuration Dimensions                           | C-3             |

LIST OF TABLES

| <u>Table No.</u> |  | <u>Page No.</u> |
|------------------|--|-----------------|
| 1                | General Test and Vehicle Data              | 2-3             |
| 2                | Dummy Injury Criteria Values               | 4-2             |
| 3                | Seat Belt Performance Assessment Test Data | 4-6             |
| 4                | High Speed Camera Locations                | 4-9             |
| 5                | Vehicle Measurements                       | 4-14            |

**Section 1**  
**PURPOSE AND TEST PROCEDURE**

This 35 mph frontal barrier impact test is part of the Composite FY 88 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 FMVSS 212/219/301-75 requirements.

The 35 mph frontal barrier impact test was conducted in accordance with the Office of Market Incentives (OMI) Laboratory Indicant Test Procedure. Standards Enforcement Indicant Test Program data for FMVSS No. 212, "Windshield Mounting," FMVSS No. 219 (Partial), "Windshield Zone Intrusion " FMVSS No. 301-75, "Fuel System Integrity " as well as occupant performance data are provided herein.

**Section 2**  
**SUMMARY OF TEST NUMBER MJ5201**

A load cell barrier consisting of 36 load cells was impacted by a 1988 Nissan Pulsar NX XE Hatchback at a velocity of 34.7 mph. The test was performed at the Calspan Corporation Advanced Technology Center on February 11, 1988. 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 16 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 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. 1019) and the passenger ATD (Serial 1022) were certified prior to the test. Certification details along with instrumentation calibration data are found in Appendix C.

The 66 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. All data channels checked out correctly prior to the test. The only questionable data loss experienced during impact was Position #1 Left Femur Load Cell. This data appears to be inaccurate approximately 65 milliseconds after time of impact.

The driver's head struck the steering wheel hub and his HIC was 1134. The maximum chest deceleration over 3 milliseconds was 40 g's and his right femur load was 122 pounds.

The right front passenger's HIC was 430. The maximum chest deceleration over 3 milliseconds was 31 g's and femur loads were 1742 and 226 pounds.

**Table 1**

**GENERAL TEST AND VEHICLE DATA**

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1988 Nissan Pulsar NX XE Hatchback

NHTSA NO.: MJ5201 VIN.: JN1PN34S6JM-001518

BODY COLOR: White DATE OF MANUFACTURE: 8/87

Engine: 4 cylinders; - C.I.D.; 1.6 Liters; - CC  
x Gas; - Diesel; - Turbocharged  
- Longitudinal; x Transverse

Transmission: 5 Speed x Manual; - Automatic; - Overdrive  
 Final Drive: x Front Wheel; - Rear Wheel; - Four Wheel

Date Received: 11/17/87 Odometer Reading: 15  
- A/C; x P/S; x P/B; - P/wdo.; x Tilt Wheel  
- P/seats; - Cruise Control

Type of Occupant Restraint: 3-point continuous belt

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 29 psi, Rear 29 psi

Recommended Tire Size: P185/70R13

Recommended Cold Tire Pressure: Front 29 psi, Rear 29 psi

Tires on Vehicle: P185/70R13; Manufacturer: TOYO

Number of Occupants: 2 Front; 2 Rear; - 3rd Seat; 4 TOTAL

Type of Front Seats: x Bucket; - Bench; - Split Bench

Type of Front Seat Back: - Fixed; x Adj. With x Lever - Rot. Knot

Vehicle Capacity Weight (VCW) = 600 lbs. (A)

No. of Occupants x 150 lbs. = 600 lbs. (B)

Rated Cargo and Luggage Weight (RCLW) A-B = 0 lbs.

GVWR 3109 lbs. GAWR: Front 1940 lbs. Rear 1786 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 = 750 lbs.      Right Rear = 490 lbs.  
 Left Front = 760 lbs.      Left Rear = 480 lbs.  
 TOTAL FRONT WEIGHT = 1510 lbs. ( 61 % of Total Vehicle Weight)  
 TOTAL REAR WEIGHT = 970 lbs. ( 39 % of Total Vehicle Weight)  
 TOTAL DELIVERY WEIGHT = 2480 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight ( 2480 lbs.)  
 VCW = Vehicle Capacity Weight ( 600 lbs.)  
 DSC = Designated Seating Capacity (4)  
 RCLW = VCW - 150 (DSC) = 0 lbs.  
 Target Test Weight = UDW + RCLW + (2 dummies x 164 lbs./dummy)  
 Target Test Weight = 2808 lbs.

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 32 POUNDS CARGO:

Right Front = 810 lbs.      Right Rear = 670 lbs.  
 Left Front = 760 lbs.      Left Rear = 600 lbs.  
 TOTAL FRONT WEIGHT = 1570 lbs. ( 55 % of Total Vehicle Weight)  
 TOTAL REAR WEIGHT = 1270 lbs. ( 45 % of Total Vehicle Weight)  
 TOTAL TEST WEIGHT = 2840 lbs.  
 Weight of ballast secured in vehicle trunk area = 0 lbs.

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude:    RF 25.2    LF 25.3    RR 25.6    LR 25.6  
 Test Attitude:        RF 25.7    LF 25.7    RR 24.0    LR 24.0  
 Wheel Base: 95.5 in.; C.G. = 42.7 in. rearward of front wheel C/L  
 Remarks:              None

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

**POST-IMPACT DATA:**

Type of Test: Frontal Barrier Impact Angle: 0 °  
 Date of Test: 2/11/88 Time of Test: 12:30  
 Ambient Temperature: 28 °F at impact area  
 Temperature in Occupant Compartment: 70 °F.  
 Windshield Molding Temperature: 70 °F.  
 Required Impact Velocity Range: 34.5 to 35.5 mph  
 Impact Velocity: primary = 34.7 mph, secondary = 34.6 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: |  | = R | <u>163.0</u> | C <sub>L</sub> | <u>166.6</u> | L | <u>163.4</u> |
|                 |  | = R | <u>141.0</u> | C <sub>L</sub> | <u>141.6</u> | L | <u>141.3</u> |
|                 |  | = R | <u>22.0</u>  | C <sub>L</sub> | <u>25.0</u>  | L | <u>22.1</u>  |

Distance from front of test vehicle to point of impact:

R 16.7      C/L 16.2      L 16.8

**VISIBLE DUMMY CONTACT POINTS:**

|            | <u>Driver</u>       | <u>Passenger</u> |
|------------|---------------------|------------------|
| Head       | <u>Steering Hub</u> | <u>None</u>      |
| Chest      | <u>None</u>         | <u>None</u>      |
| Abdomen    | <u>None</u>         | <u>None</u>      |
| Left Knee  | <u>Dash</u>         | <u>Dash</u>      |
| Right Knee | <u>Dash</u>         | <u>Dash</u>      |

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

|              | <u>Front</u>    |                 |
|--------------|-----------------|-----------------|
|              | <u>Left</u>     | <u>Right</u>    |
| Door Opening | <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>Yes</u><br>(see Note) | <u>None</u>  |

Note: Driver's seat shifted 3 detents forward (see Figure A-29).

Section 3

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

- o "Windshield Mounting," FMVSS No. 212 Data
- o "Windshield Zone Intrusion," FMVSS No. 219 (Partial) Data
- o "Fuel System Integrity," FMVSS No. 301-75

Figure 1

FMVSS NO. 212, "WINDSHIELD MOUNTING", DATA SHEET

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

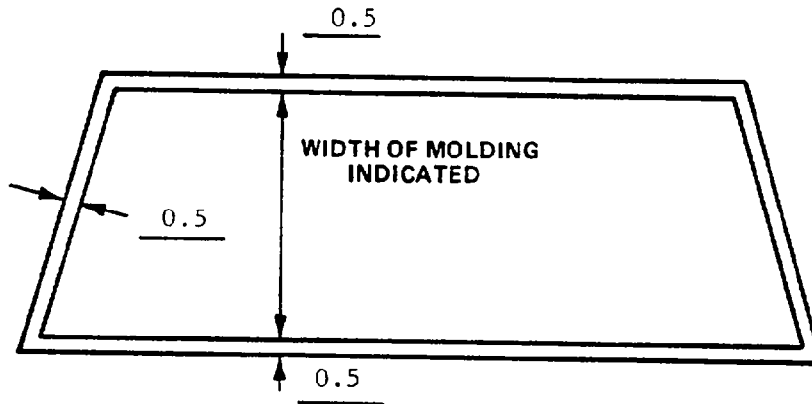
Windshield is bonded in place and covered with 0.5 inch molding.

FMVSS 212 REQUIREMENTS: The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

FMVSS 212 TEST DATA:

| WINDSHIELD PERIPHERY |                |                 |                   |
|----------------------|----------------|-----------------|-------------------|
|                      | PRE-TEST (in.) | POST-TEST (in.) | PERCENT RETENTION |
| RIGHT SIDE           | 80.55          | 80.55           | 100%              |
| LEFT SIDE            | 80.55          | 80.55           | 100%              |
| TOTAL                | 161.1          | 161.1           | 100%              |

AREA OF RETENTION FAILURE:



FRONT VIEW

FAILURE DETAILS:

NONE

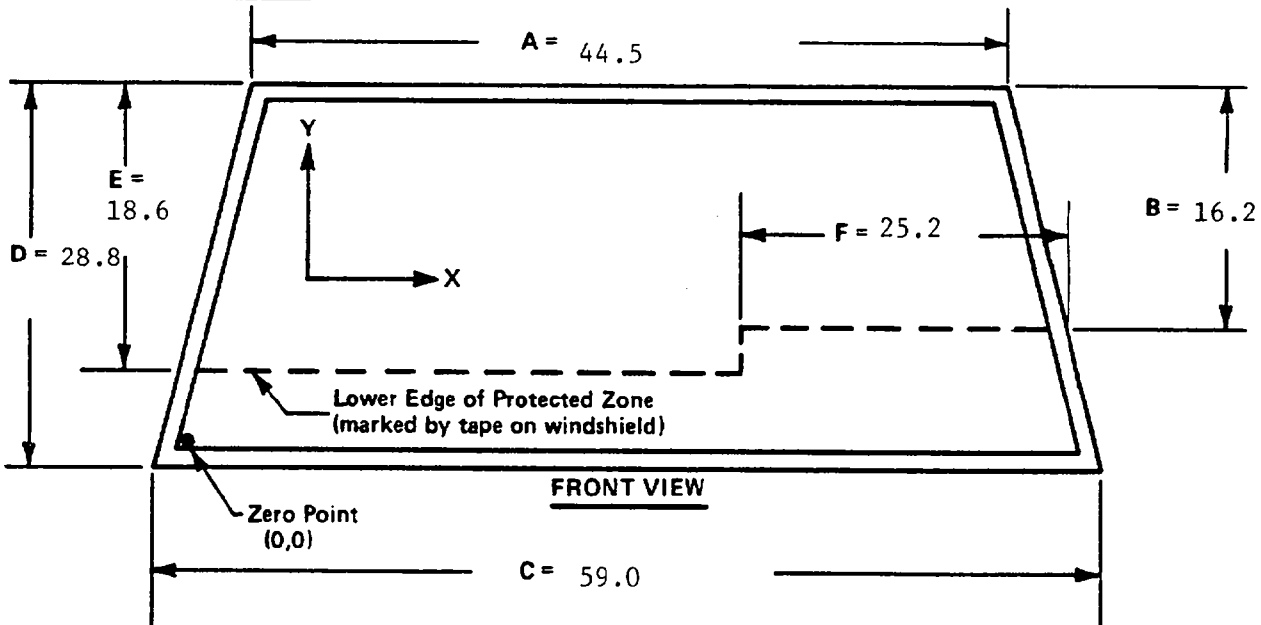
Figure 2

FMVSS NO. 219, (PARTIAL) "WINDSHIELD ZONE INTRUSION," DATA SHEET

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 6.5" dia. rigid sphere weighing 15 pounds in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. The locus of points is drawn on the inner surface of the windshield contacted by the sphere across the width of the instrument panel. From the outermost contactable points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and 1/2" distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection of this line onto the outer surface of the windshield.

FMVSS 219 TEST DATA:



DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4":  
 (Show location of penetration on above sketch)

None

|    | COORDINATES |   |
|----|-------------|---|
|    | X           | Y |
| 1. |             |   |
| 2. |             |   |
| 3. |             |   |
| 4. |             |   |

Figure 3

FMVSS NO. 301-75, "FUEL SYSTEM INTEGRITY," DATA SHEETS

TEST VEHICLE NHTSA NO.: MJ5201 ; TEST DATE: February 11, 1983

VEHICLE MAKE/MODEL/BODY STYLE: 1988 Nissan Pulsar NX XE

USABLE CAPACITY OF VEHICLE'S FUEL TANK: 12.2 Gallons (figure furnished by vehicle manufacturer)

TEST REQUIREMENTS:

Test vehicle's engine operated to "run dry" condition, and then a small amount of Stoddard solvent which has been dyed RED shall be added to the vehicle's fuel tank. Operate the fuel pump enough to completely fill the fuel system ahead of the fuel tank, and add 92 to 94% of the stated USABLE CAPACITY to the fuel tank.

AMOUNT OF STODDARD SOLVENT ADDED TO VEHICLE'S FUEL TANK:

11.3 Gallons which is 93 % of the Stated USABLE CAPACITY.

SOLVENT SPILLAGE MEASUREMENT AFTER 35 MPH FRONTAL BARRIER IMPACT TEST:

|  | <u>Actual</u> | <u>Maximum Allowable</u> |
|--|---------------|--------------------------|
| From impact until vehicle motion ceases .....  | <u>0</u>      | 1 oz.                    |
| For 5 min. period after vehicle motion ceases. | <u>0</u>      | 5 oz.                    |
| For next 25 minutes at barrier face.....       | <u>0</u>      | 1 oz./1 minute           |

SOLVENT SPILLAGE DETAILS:

NONE

STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1 to 3 minutes)

Time reqd. for machine to rotate 90° = 2 minutes, 58 seconds  
FMVSS 301-75 Position Hold Time = 5 minutes, 0 seconds  
TOTAL ..... = 7 minutes, 58 seconds  
Next Whole Minute Interval.... = 8 minutes

Figure 3

FMSS NO. 301-75 TEST DATA....Continued:

VEHICLE STATIC ROLLOVER DATA:

|  | First 5 Minutes<br>FROM ONSET OF<br>ROTATION | 6th.<br>Minute | 7th.<br>Minute | 8th.<br>Minute |
|--|--|----------------|----------------|----------------|
| Maximum Allowable Solvent<br>Spillage..... | 5 oz.  | 1 oz.          | 1 oz.          | 1 oz.          |
| 0 to 90° (filler cap down).                | 0  | 0              | 0              | 0              |
| 90 to 180° .....                           | 0  | 0              | 0              | 0              |
| 180 to 270°.....                           | 0  | 0              | 0              | 0              |
| 270 to 360°.....                           | 0  | 0              | 0              | 0              |

SOLVENT SPILLAGE LOCATION(S):

NONE



**Section 4**  
**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

|           | MAXIMUM ACCELERATION ("G") |     |    |     |       |     |     |    |
|-----------|----------------------------|-----|----|-----|-------|-----|-----|----|
|           | HEAD                       |     |    |     | CHEST |     |     |    |
|           | X                          | Y   | Z  | R   | X     | Y   | Z   | R* |
| DUMMY (1) | -108                       | -36 | 85 | 144 | -41   | -11 | -14 | 40 |
| DUMMY (2) | -21                        | 21  | 48 | 49  | -31   | -14 | 17  | 31 |
| DUMMY (3) |                            |     |    |     |       |     |     |    |
| DUMMY (4) |                            |     |    |     |       |     |     |    |

|           | MAXIMUM FORCE - FEMUR LOAD (LBS) |            |
|-----------|----------------------------------|------------|
|           | RIGHT FEMUR                      | LEFT FEMUR |
| DUMMY (1) | 122                              | No data    |
| DUMMY (2) | 1742                             | 226        |
| DUMMY (3) |                                  |            |
| DUMMY (4) |                                  |            |

|           | MAXIMUM FORCE - SEAT BELTS LOADS (LBS) |                              |                             |
|-----------|--|------------------------------|-----------------------------|
|           | SHOULDER STRAP<br>UPPER BELT LOAD      | LAP STRAP<br>RIGHT BELT LOAD | LAP STRAP<br>LEFT BELT LOAD |
|           | DUMMY (1)                              | 1599                         | -                           |
| DUMMY (2) | 1605                                   | 1212                         | -                           |
| DUMMY (3) |  |                              |                             |
| DUMMY (4) |  |                              |                             |

|           | HEAD INJURY CRITERIA** |                      |                      |   |
|-----------|------------------------|----------------------|----------------------|---|
|           | HIC                    | 36 millisecond max.  |                      | AVE. ACC. (g)<br>t <sub>1</sub> TO t <sub>2</sub> |
|           |                        | t <sub>1</sub> (SEC) | t <sub>2</sub> (SEC) |   |
| DUMMY (1) | 1134                   | .09097               | .09885               | 116   |
| DUMMY (2) | 430                    | .06967               | .10567               | 43  |
| DUMMY (3) |                        |                      |                      |   |
| DUMMY (4) |                        |                      |                      |   |

\*DEFINED AS EXCEEDING 0.003 SEC. DURATION

\*\*AS DEFINED IN FMVSS NO. 208

Figure 4

**PART 572 DUMMY IN-VEHICLE POSITION**

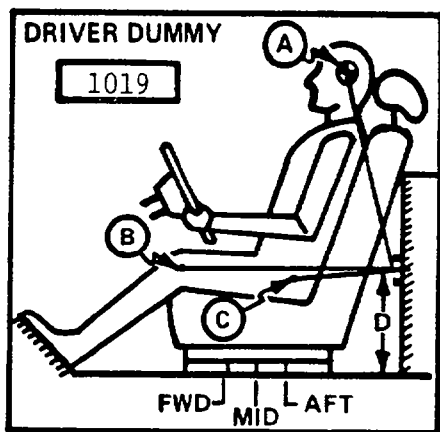
TEST NO.:       MJ5201      

VEHICLE:       1988 Nissan Pulsar      

**SEAT TYPE:**  
       Bench  
  x   Bucket  
       Split Bench

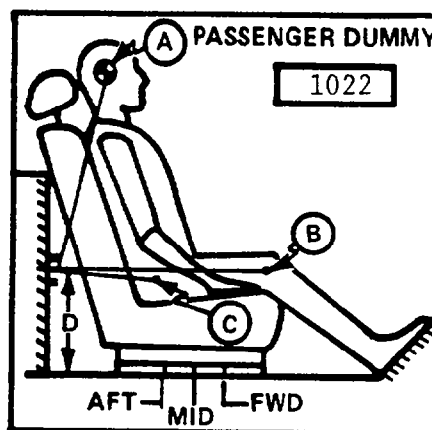
**ADJUSTER TYPE:**  
  x   Manual  
       Power

**BUCKET SEAT BACK TYPE:**  
       Fixed  
  x   Adjustable Reclining



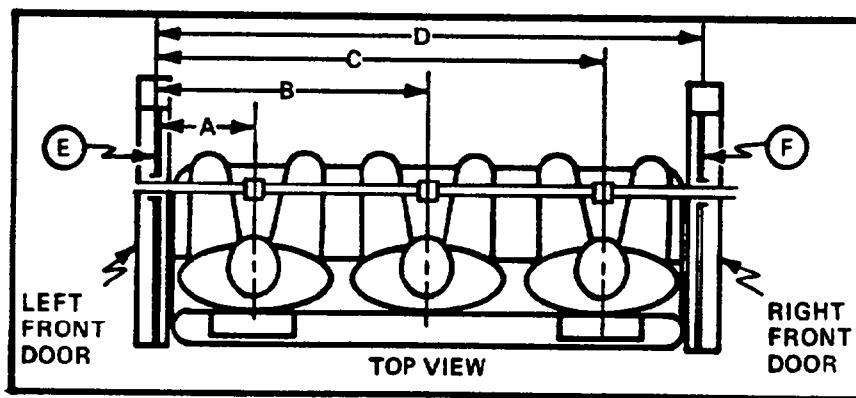
**MEASUREMENT LOCATION**

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



A = 21.4 in. 18 Degrees  
 B = 30.7 in. 96 Degrees  
 C = 15.7 in. 113 Degrees  
 D = 12.5 in.

A = 20.8 in. 17 Degrees  
 B = 30.1 in. 98 Degrees  
 C = 15.0 in. 116 Degrees  
 D = 12.5 in.



TOP VIEW

DUMMY ID

1019

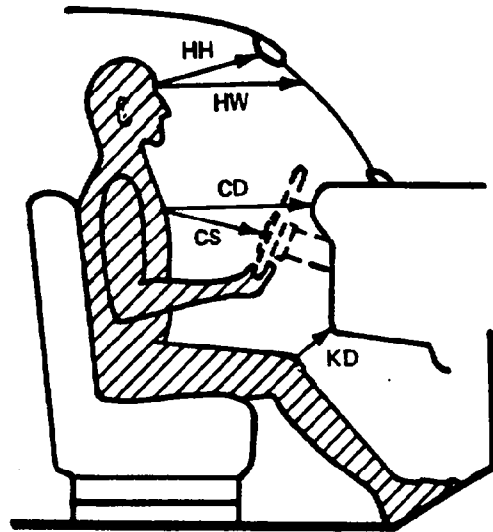
1022

A = Left Door to Driver Centerline 12.1 in.  
 B = Left Door to Center Passenger Centerline        in.  
 C = Left Door to Right Passenger Centerline 38.1 in.  
 D = Left Door to Right Door 50.0 in.  
 E, F = Window Glass Height (Right and Left Must Be Equal) 11.0 in.

Figure 5

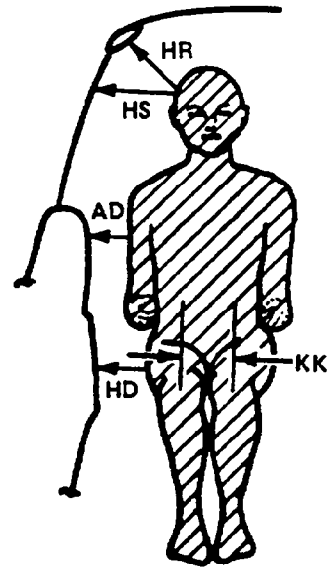
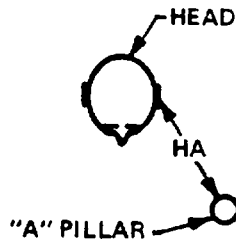
OCCUPANT CLEARANCE DIMENSIONS

|     | DRIVER | PASSENGER |
|-----|--------|-----------|
| HH  | 15.7   | 15.5      |
| HW  | 20.9   | 20.5      |
| CD  | 24.2   | 24.8      |
| CS  | 15.6   | ---       |
| KDL | 6.7    | 6.9       |
| KDR | 7.0    | 6.3       |
| SA  | 25°    | 25°       |
| TA  | 26°    | 25°       |



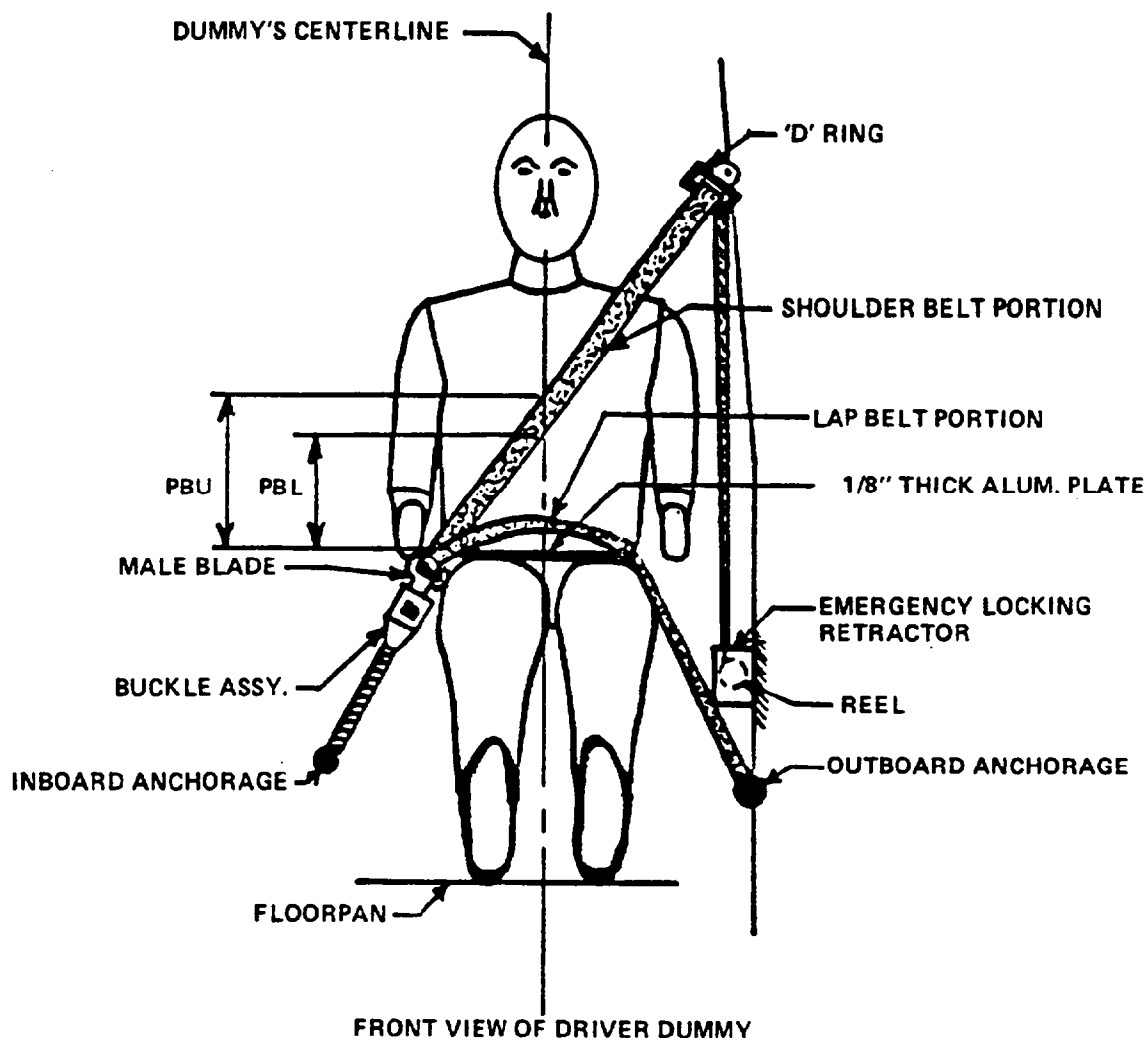
- HH = Head to Windshield Header
- HW = Head to Windshield
- CD = Chest to Dash
- CS = Chest to Steering Wheel
- KD(L/R) = Knee to Dash (Left/Right)
- SA = Seat Back Angle
- TA = Torso Angle

- 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 | 5.0    | 5.0       |
| HS | 9.3    | 9.3       |
| AD | 3.5    | 4.1       |
| HD | 8.0    | 7.8       |
| KK | 9.5    | 9.5       |
| HA | 20.2   | 19.9      |

Figure 6  
SEAT BELT POSITIONING DATA



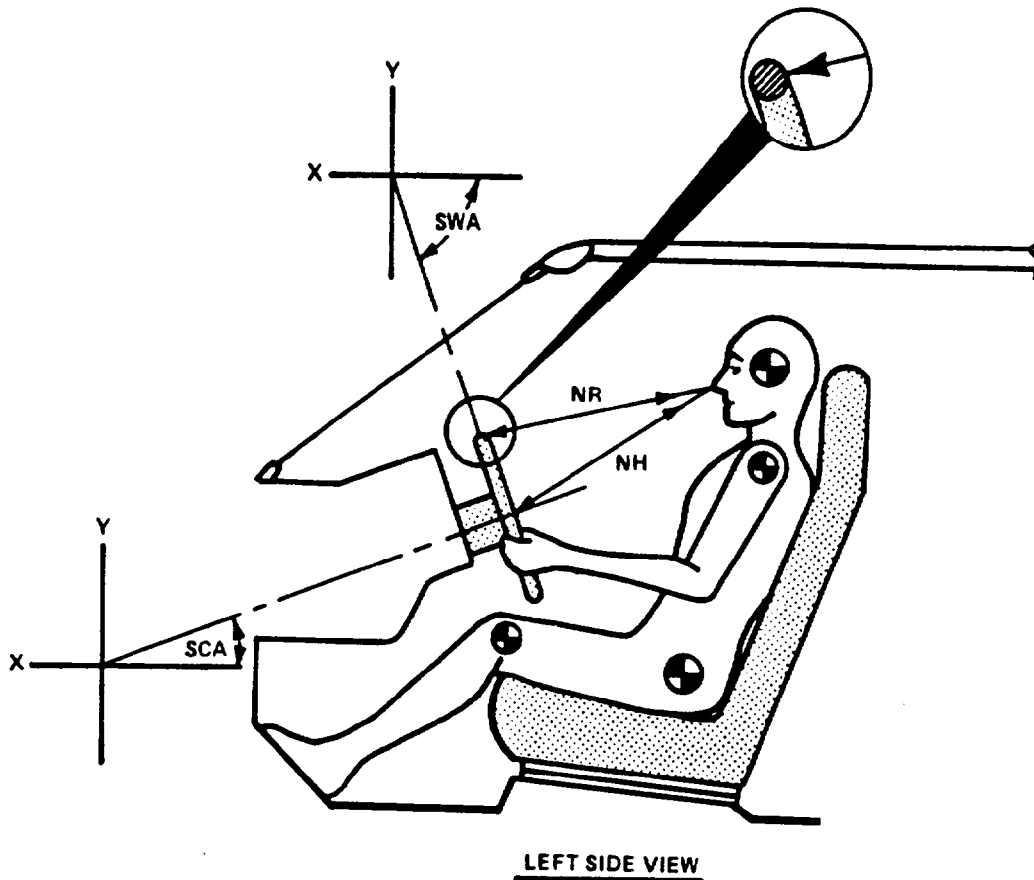
|   | DRIVER DUMMY<br>(inches) | PASSENGER DUMMY<br>(inches) |
|---|--------------------------|-----------------------------|
| <u>PBU</u> -- Top surface of alum. plate to upper edge      | 15                       | 14.5                        |
| <u>PBL</u> -- Top surface of alum. plate to belt lower edge | 11.5                     | 11.0                        |
| <u>LAP BELT TENSION</u>                                     | --                       | --                          |
| <u>SHOULDER BELT TENSION</u>                                | 2.0 lbs                  | 2.0 lbs                     |

Table 3

**SEAT BELT PERFORMANCE ASSESSMENT TEST DATA**

| <u>BELT LENGTH DATA:</u>   | <u>Driver</u>    | <u>Passenger</u> |
|--|------------------|------------------|
| Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems. | <u>76.0"</u>     | <u>76.8"</u>     |
| Should belt length as measured on Part 572 Dummy.  | <u>37.5"</u>     | <u>38.0"</u>     |
| Lap belt length as measured on Part 572 Dummy.   | <u>31.0"</u>     | <u>31.2"</u>     |
| <u>BELT SPOOL-OFF DATA:</u>  |                  |                  |
| As determined by film analysis.  | <u>2.0"</u>      | <u>1.5"</u>      |
| As determined mechanically.  | <u>1.5"</u>      | <u>1.3"</u>      |
| As determined electronically.  | <u>1.2"</u>      | <u>0.9"</u>      |
| <u>BELT STRETCH DATA:</u>  |                  |                  |
| Measured electronically between shoulder belt load cell and the "D" ring.                  | <u>1.2 in/ft</u> | <u>1.2 in/ft</u> |
| Measured Mechanically  | <u>0.1"</u>      | <u>0.2"</u>      |

Figure 7  
**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 | 20.4         | Inches  |
| <u>NH</u> -- Distance from tip of dummy's nose to center of steering column hub          | 21.3         | Inches  |
| <u>SCA</u> -- Angle of steering column relative to the horizontal X axis                 | 21           | Degrees |
| <u>SWA</u> -- Angle of steering wheel relative to the horizontal X axis                  | -69          | Degrees |

Figure 8

CAMERA POSITIONS FOR FRONTAL IMPACTS

NOTE: Camera Information Shown on Table 4

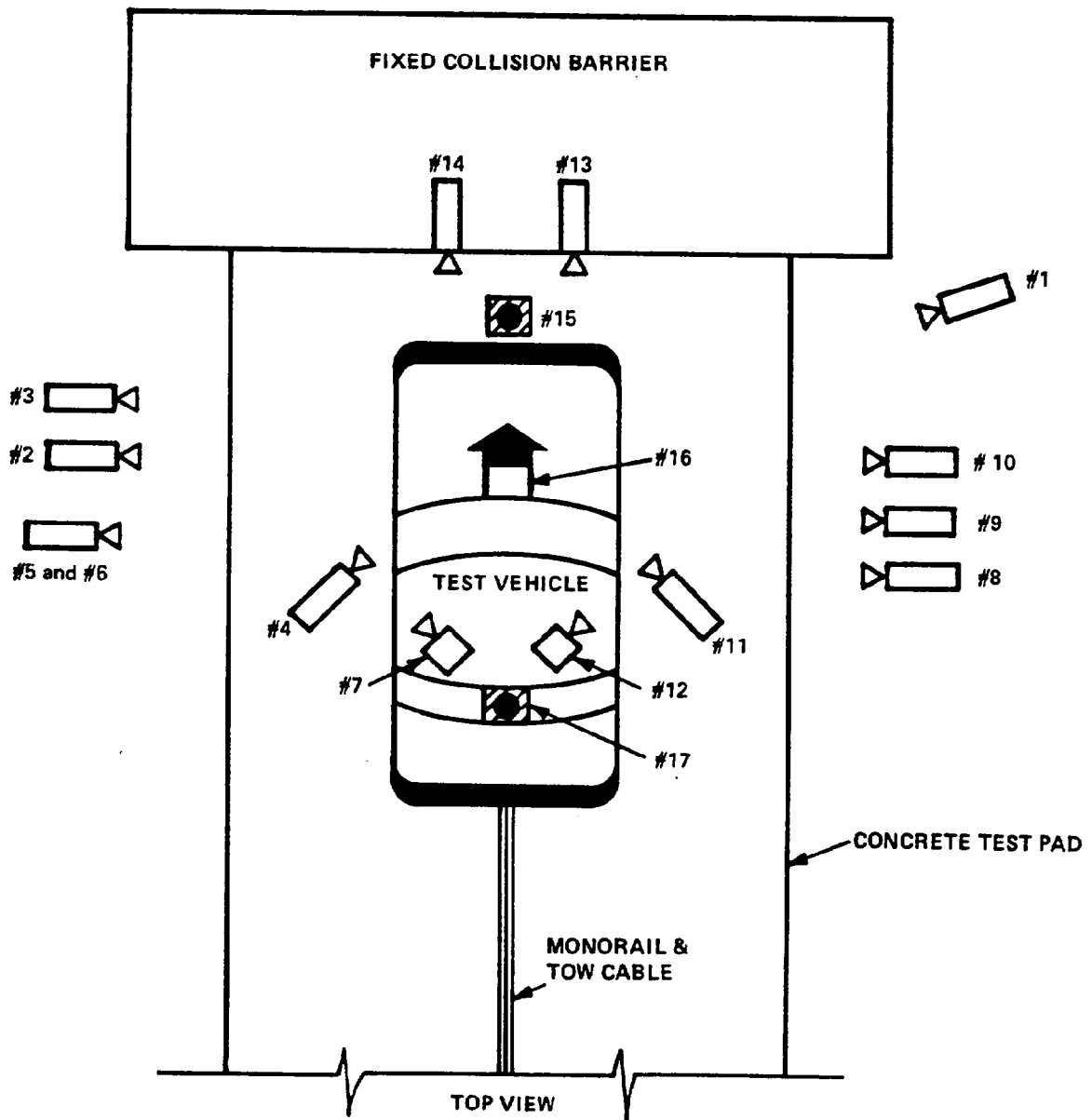


Table 4  
HIGH-SPEED CAMERA LOCATIONS

Test No. MJ5201

Vehicle 1988 Nissan Pulsar NX XE Hatchbac

| 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           | 279                    | 57 | 42   | 5             | 13                        | 540       |             |
| 3          | Left Side View              | 224                    | 38 | 41   | 5             | 25                        | 530       |             |
| 4          | Driver and Interior View    | 81                     | 82 | 71   | 19            | 13                        | 800       |             |
| 5          | Steering Column (Bottom)    | 291                    | 82 | 49   | 4             | 25                        | 550       |             |
| 6          | Steering Column (Top)       | 291                    | 94 | 73   | 10            | 25                        | 550       |             |
| 7          | Left Belt                   | -                      | -  | -    | -             | 8                         | 1075      |             |
| 8          | Overall Right Side          | 232                    | 64 | 43   | 1             | 13                        | 800       |             |
| 9          | Right Side View             | 248                    | 42 | 44.5 | 3             | 25                        | 850       |             |
| 10         | Right Passenger View        | 276                    | 65 | 54.5 | 5             | 35                        | 800       |             |
| 11         | Passenger and Interior View | 72                     | 95 | 71   | 21            | 25                        | 600       |             |
| 12         | Right Belt                  | -                      | -  | -    | -             | 8                         | 830       |             |
| 13         | Passenger Front View        | 24                     | -5 | 73   | 42            | 13                        | 550       |             |
| 14         | Driver Front View           | 24                     | -5 | 73   | 38            | 13                        | 540       |             |
| 15         | Windshield View             | 0                      | 0  | 126  | -55           | 13                        | 540       |             |
| 16         | Pit View of Engine          | 0                      | 32 | 120  | 90            | 13                        | 900       |             |
| 17         | Pit View of Fuel Tank       | 0                      | 60 | 120  | 90            | 13                        | 840       |             |

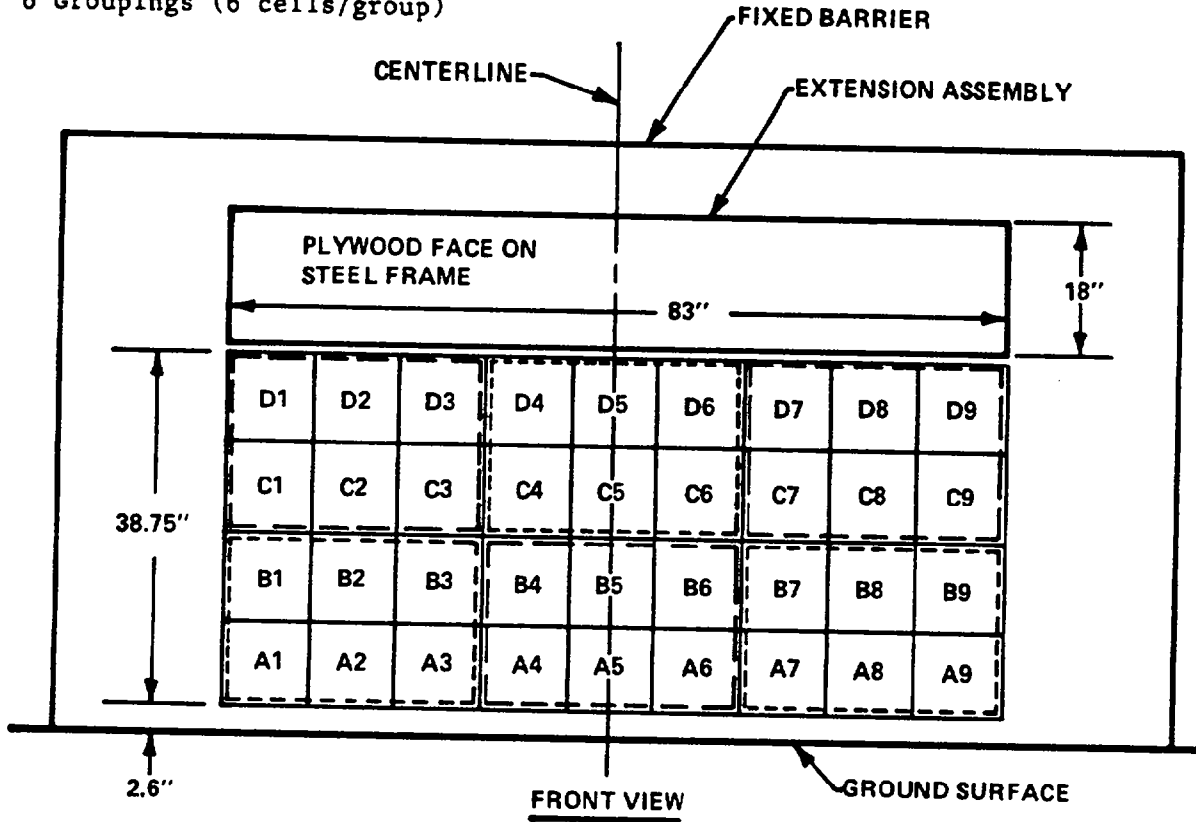
\* X = film plane to monorail centerline  
 Y = film plane to impact location  
 Z = film plan to ground  
 \*\* = referenced to horizontal plane



Figure 10

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

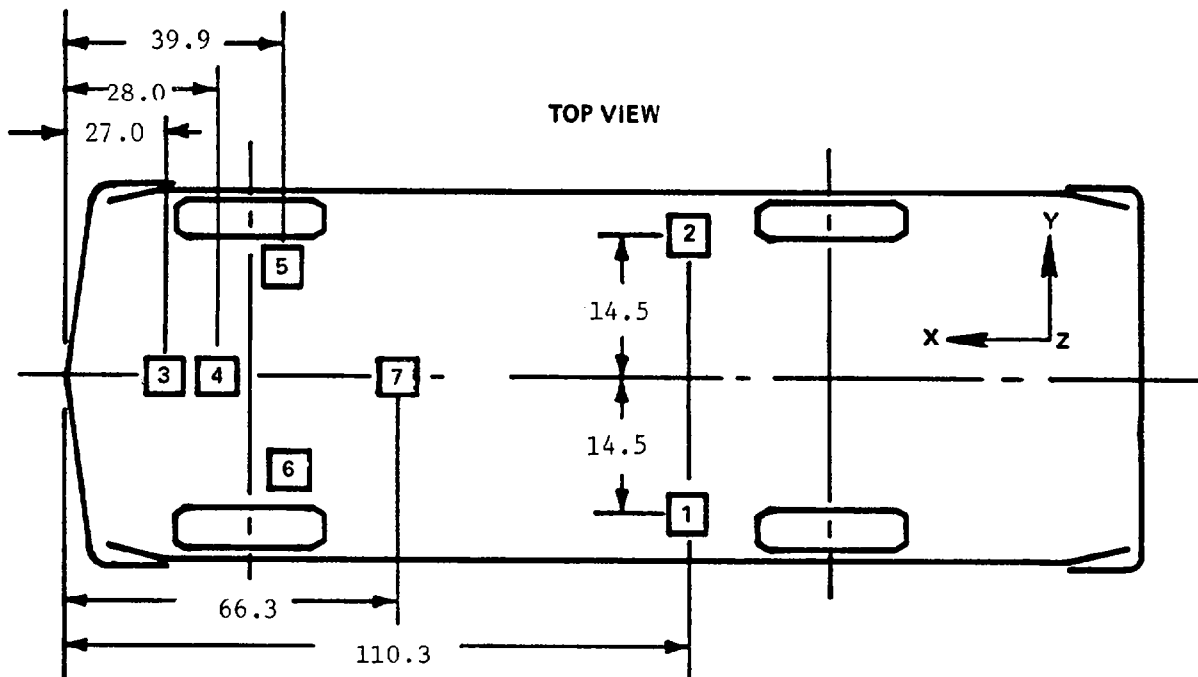
|                       |                       |                       |
|-----------------------|-----------------------|-----------------------|
| Group 4<br>C1 thru D3 | Group 5<br>C4 thru D6 | Group 6<br>C7 thru D9 |
| Group 1<br>A1 thru B3 | Group 2<br>A4 thru B6 | Group 3<br>A7 thru B9 |

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 11

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                     | Left Disc Brake Caliper     | X         |   |   |
| 7                     | Instrument Panel            | X         |   |   |

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

Figure 12

TEST VEHICLE MEASUREMENTS

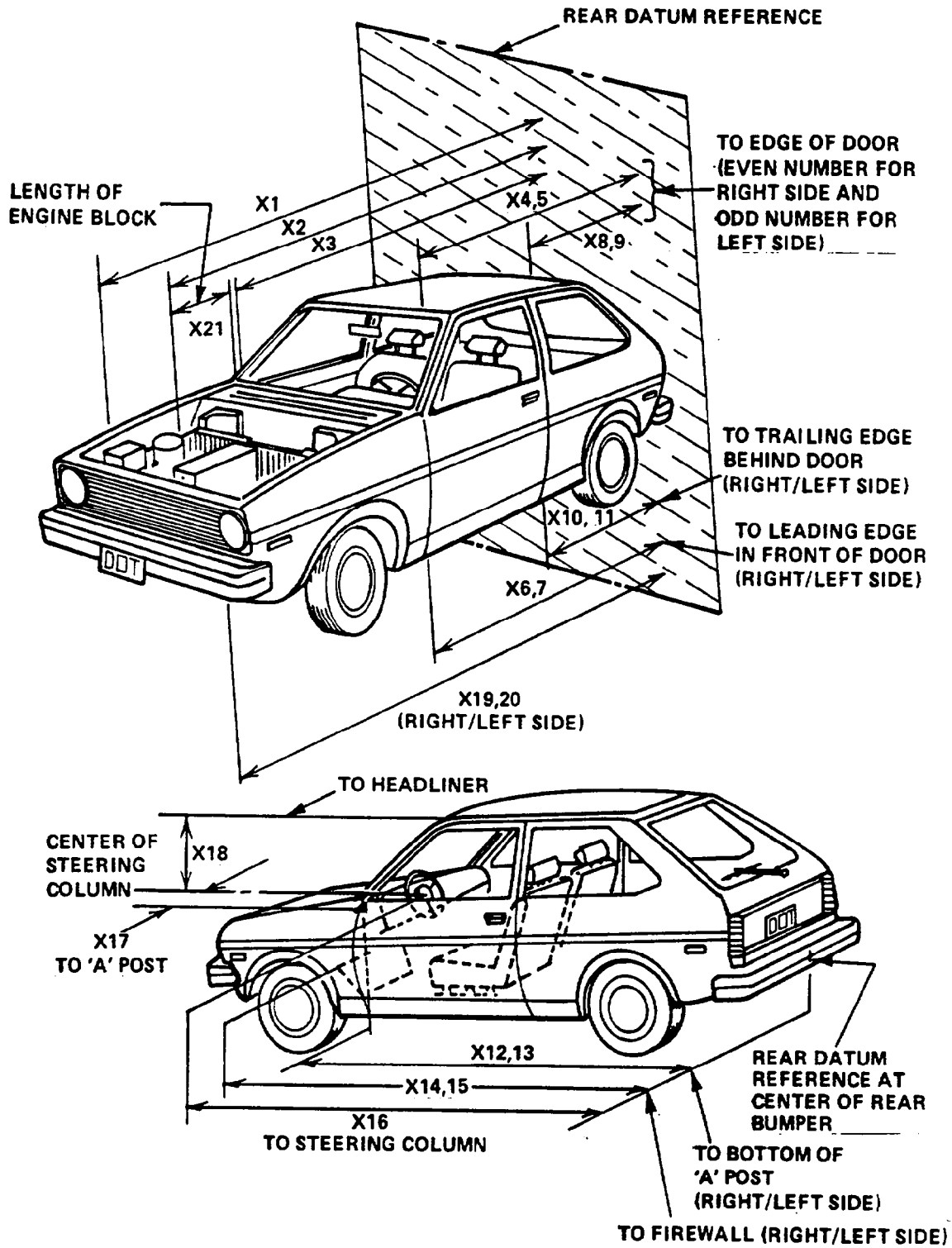


Table 5

## VEHICLE MEASUREMENTS

| No. |  | All Dimensions in Inches |           |             |
|-----|--|--------------------------|-----------|-------------|
|     |  | Pre-Test                 | Post-Test | Differences |
| X1  | Total Length of Vehicle at Centerline                        | 166.6                    | 141.6     | 25.0        |
| X2  | Rear Surface of Vehicle to Front of Engine                   | 141.6                    | 131.1     | 10.5        |
| X3  | Rear Surface of Vehicle to Firewall                          | 121.7                    | 115.0     | 6.7         |
| X4  | Rear Surface of Vehicle to Upper Leading Edge of Right Door  | 110.9                    | 110.5     | 0.4         |
| X5  | Rear Surface of Vehicle to Upper Leading Edge of Left Door   | 110.7                    | 110.3     | 0.4         |
| X6  | Rear Surface of Vehicle to Lower Leading Edge of Right Door  | 109.8                    | 109.3     | 0.5         |
| X7  | Rear Surface of Vehicle to Lower Leading Edge of Left Door   | 109.6                    | 108.9     | 0.7         |
| X8  | Rear Surface of Vehicle to Upper Trailing Edge of Right Door | 60.5                     | 60.5      | 0.0         |
| X9  | Rear Surface of Vehicle to Upper Trailing Edge of Left Door  | 60.1                     | 59.6      | 0.5         |
| X10 | Rear Surface of Vehicle to Lower Trailing Edge of Right Door | 64.2                     | 63.7      | 0.5         |
| X11 | Rear Surface of Vehicle to Lower Trailing Edge of Left Door  | 64.0                     | 63.4      | 0.6         |
| X12 | Rear Surface of Vehicle to Bottom of "A" Post of Right Side  | 109.8                    | 109.3     | 0.5         |
| X13 | Rear Surface of Vehicle to Bottom of "A" Post of Left Side   | 109.6                    | 108.9     | 0.7         |
| X14 | Rear Surface of Vehicle to Firewall, Right Side              | 119.5                    | 114.5     | 5.0         |
| X15 | Rear Surface of Vehicle to Firewall, Left Side               | 119.8                    | 113.0     | 6.8         |
| X16 | Rear Surface of Vehicle to Steering Column                   | 92.5                     | 91.3      | 1.2         |
| X17 | Center of Steering Column to "A" Post                        | 16.0                     | 17.1      | -1.1        |
| X18 | Center of Steering Column to Headliner                       | 16.2                     | 14.8      | 1.4         |
| X19 | Rear Surface of Vehicle to Right Side of Front Bumper        | 163.0                    | 141.0     | 22.0        |
| X20 | Rear Surface of Vehicle to Left Side of Front Bumper         | 163.4                    | 141.3     | 22.1        |
| X21 | Length of Engine Block                                       | 15.3                     | 15.3      | 0.0         |

**Appendix A**  
**PHOTOGRAPHS**

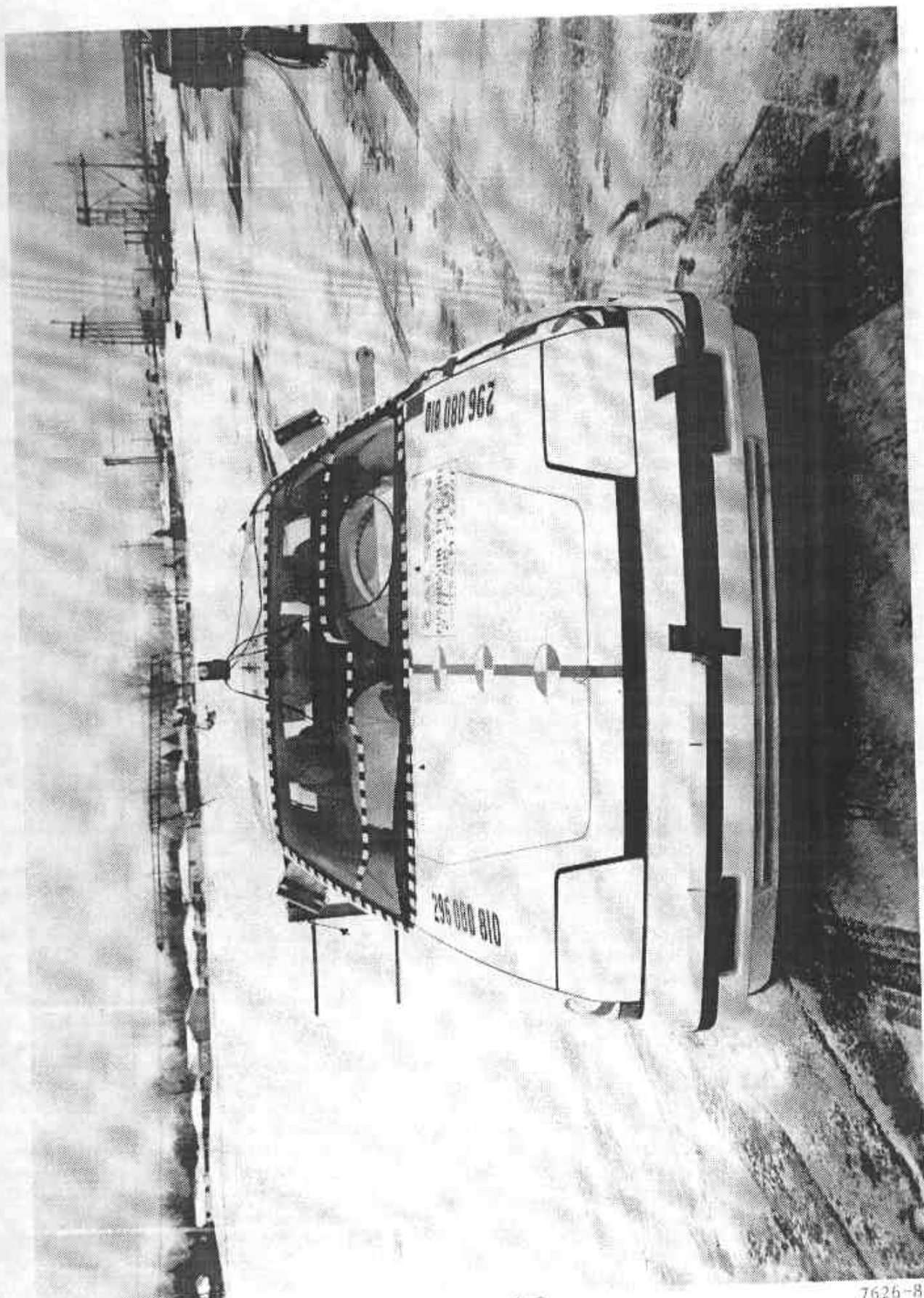


Figure A-1 PRE-TEST FRONT VIEW

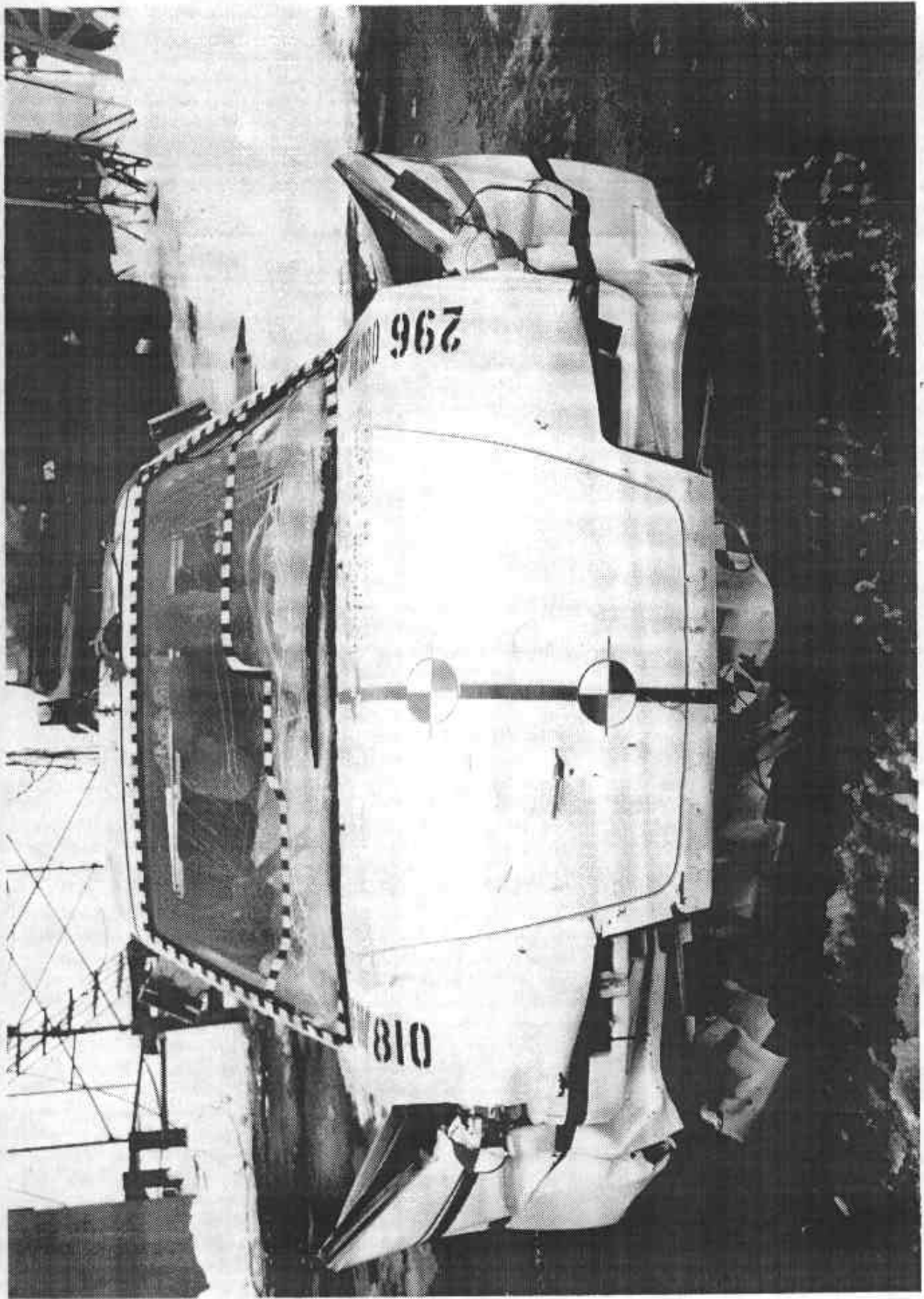


Figure A-2 POST-TEST FRONT VIEW

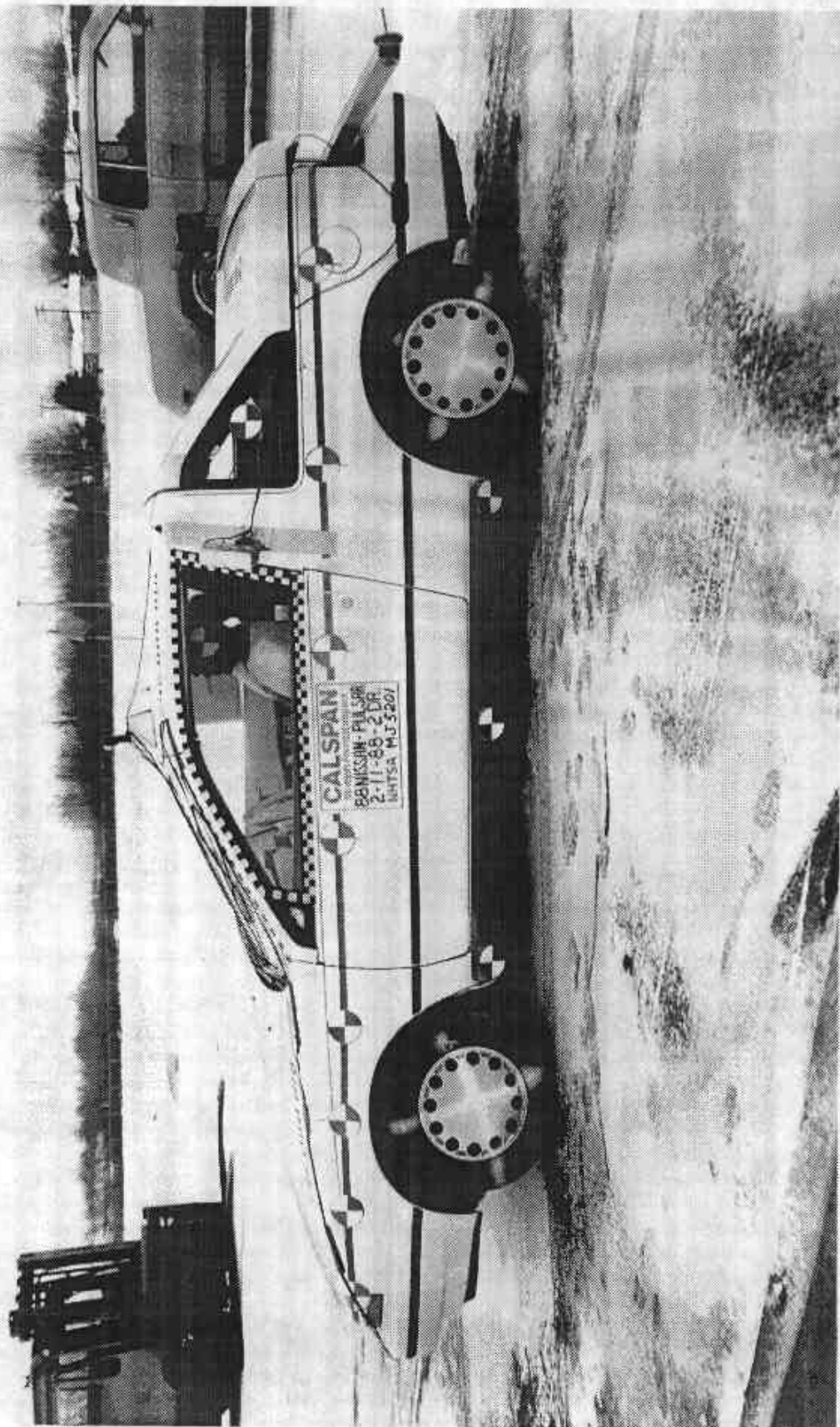


Figure A-3 PRE-TEST LEFT SIDE VIEW

A-4

7626-8

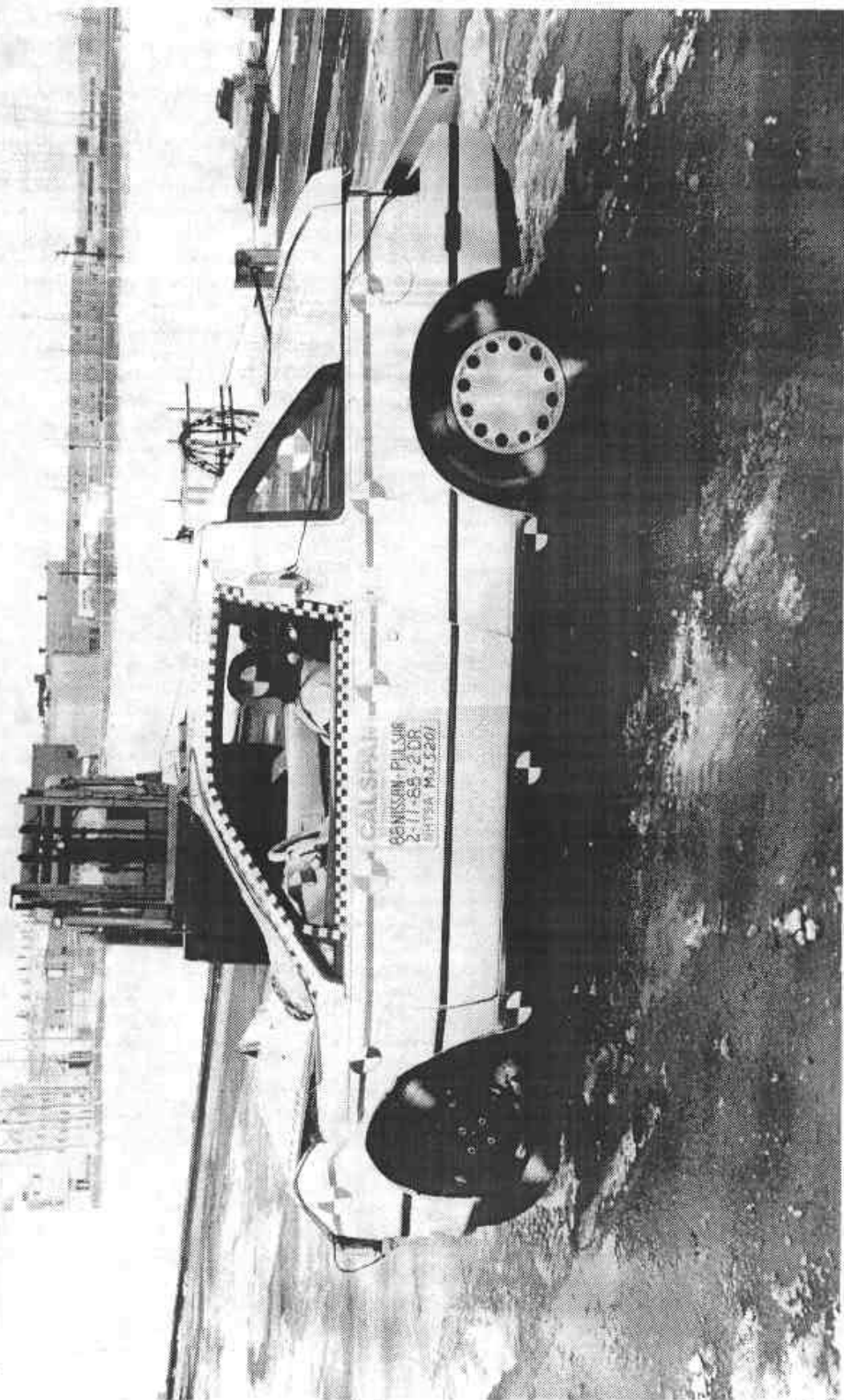


Figure A-4 POST-TEST LEFT SIDE VIEW

A-5

7626-B

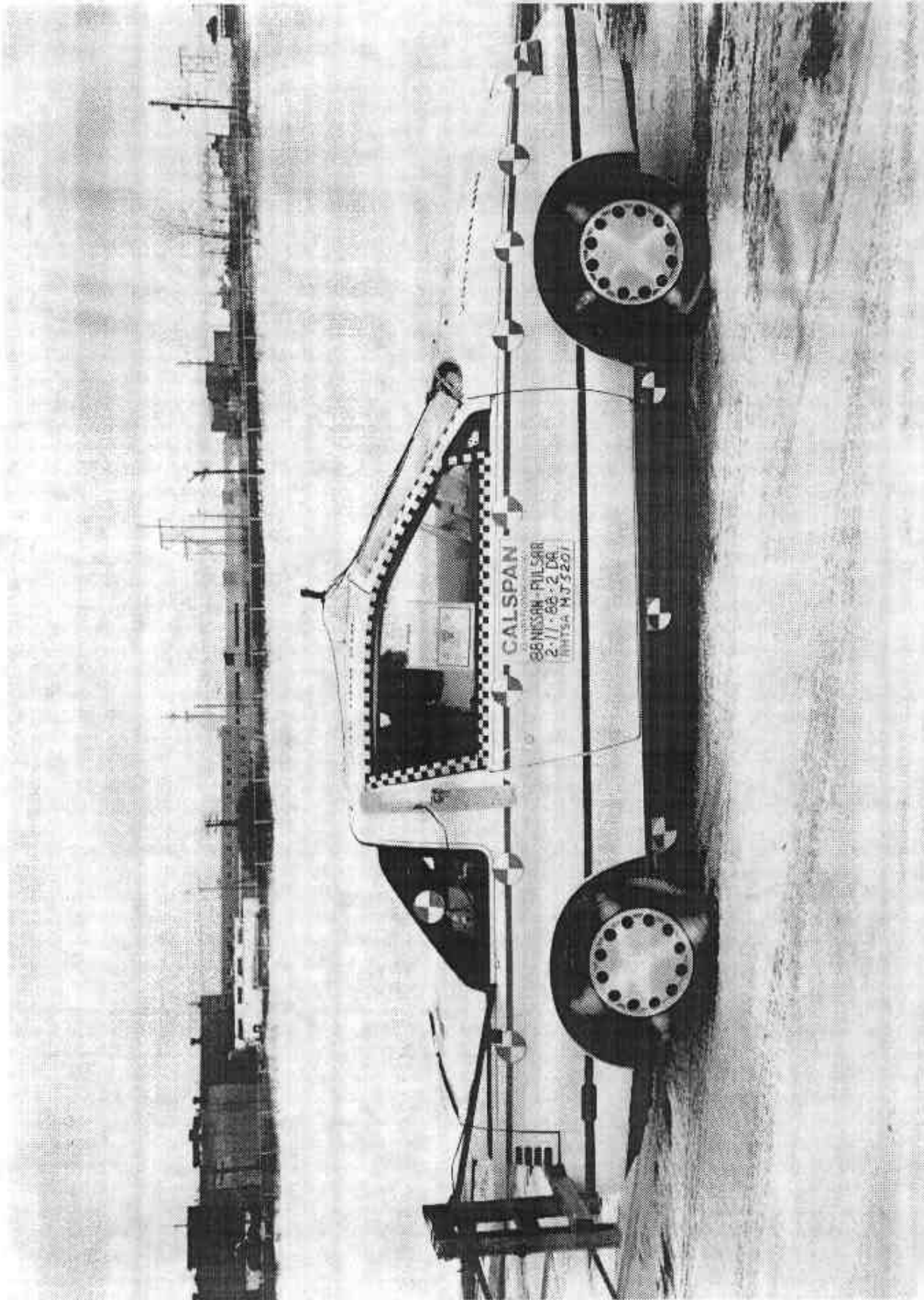


Figure A-3 PRE-TEST RIGHT SIDE VIEW

A-6

7526-8

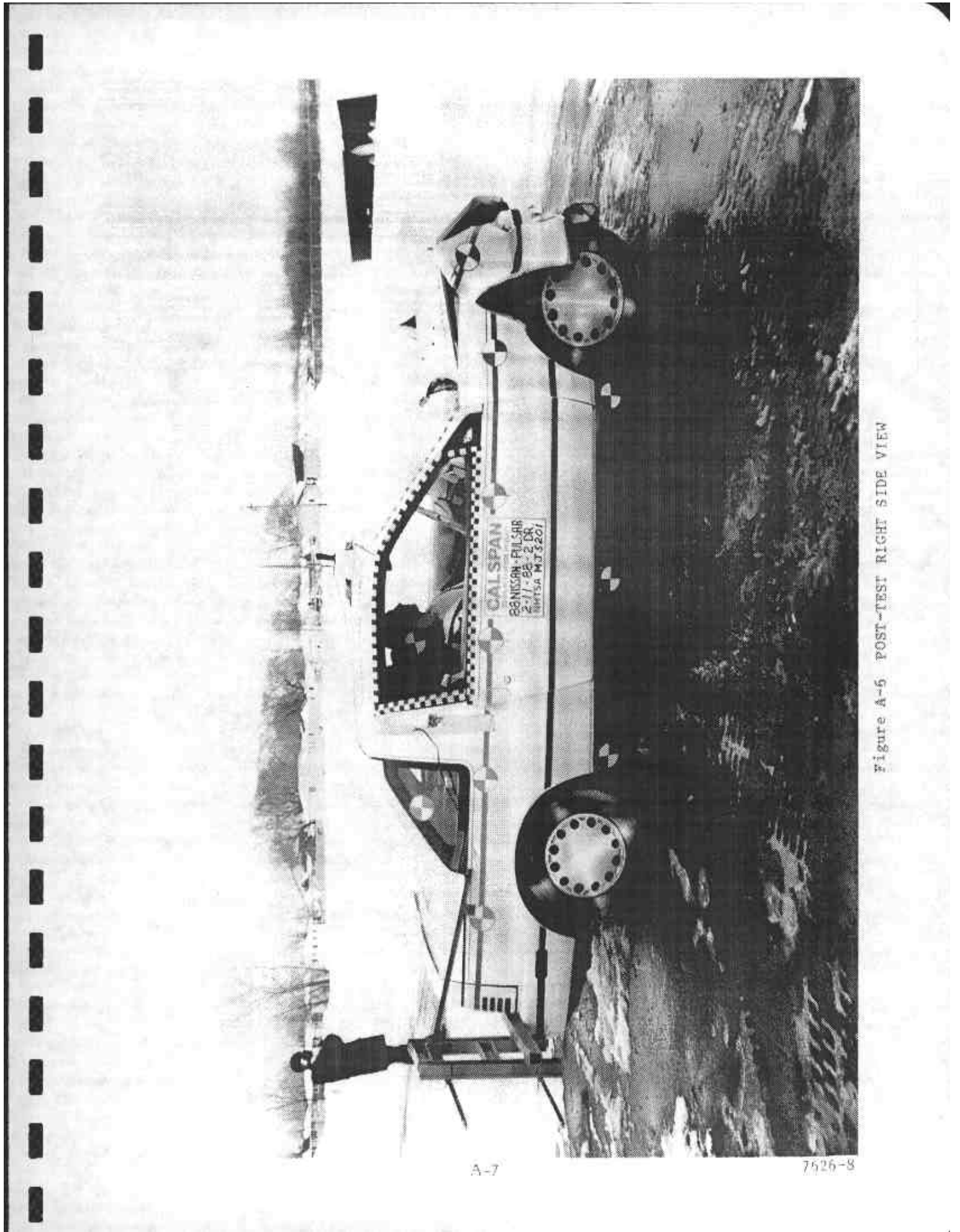


Figure A-5 POST-TEST RIGHT SIDE VIEW

A-7

7626-8

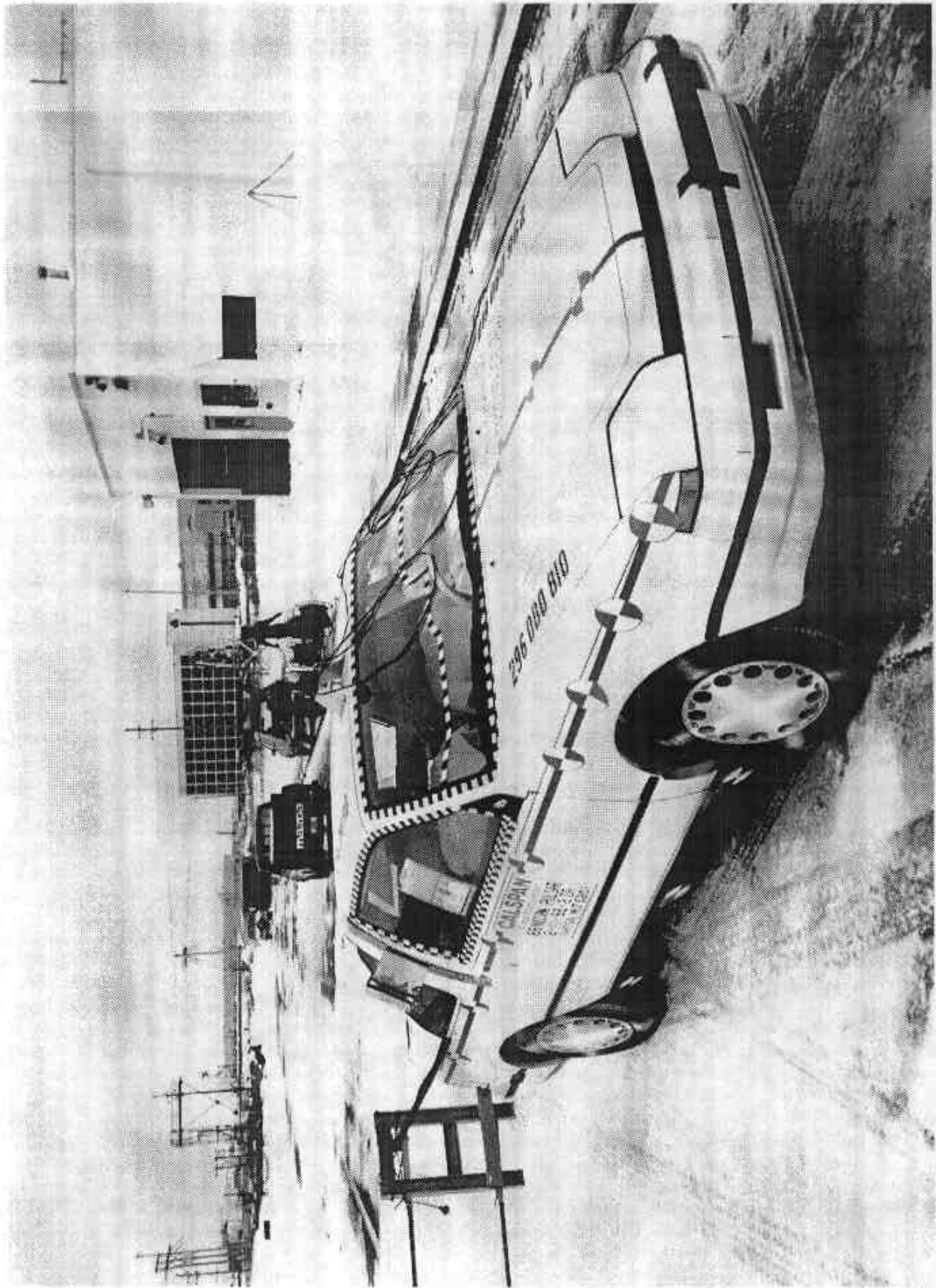


Figure A-7 PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

A-8

7626-8

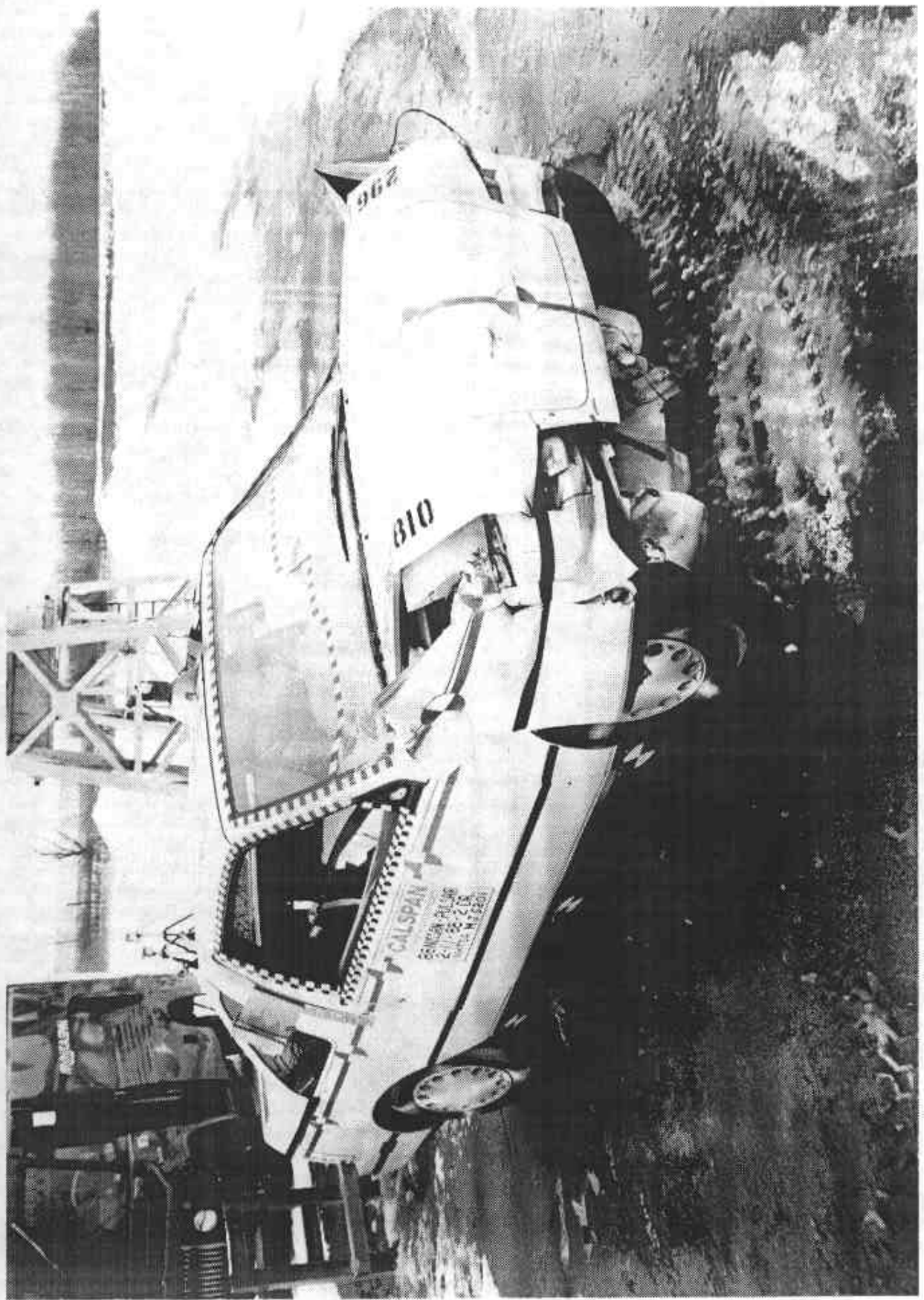


Figure A-8 POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-9

7626-8



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

A-10

7626-8

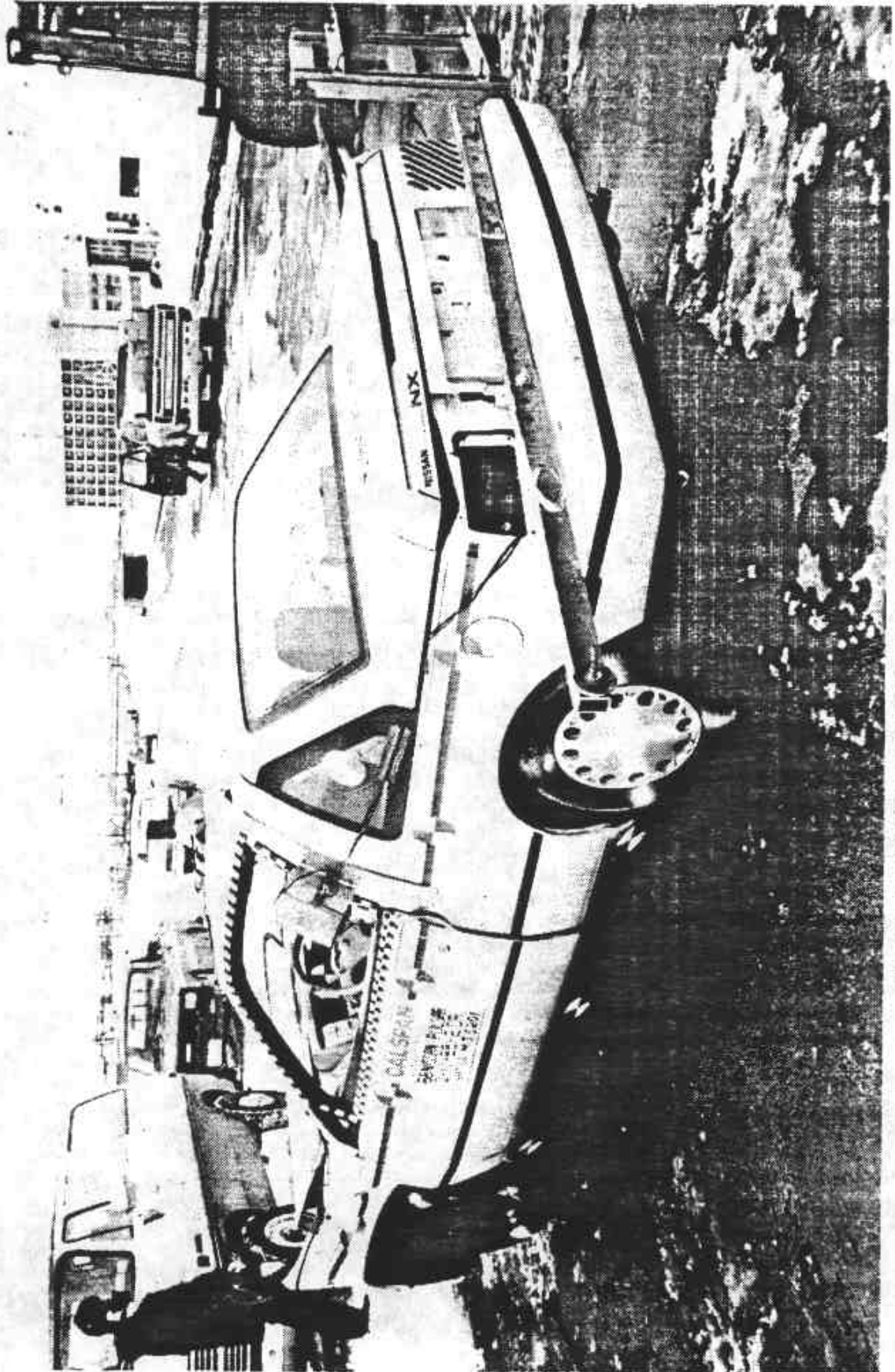
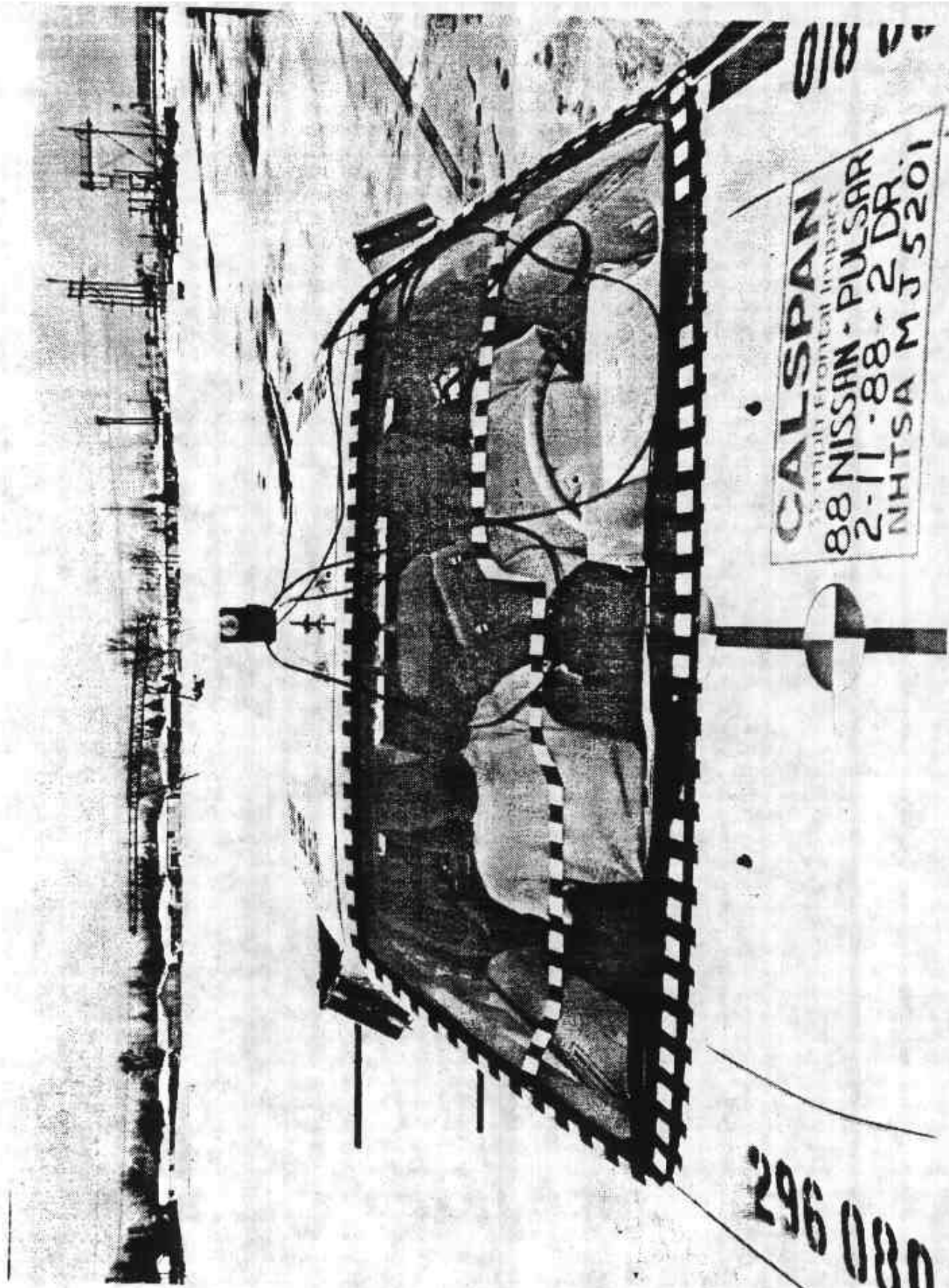


Figure A-10 POST-TEST REAR FRONT THREE-QUARTER VIEW



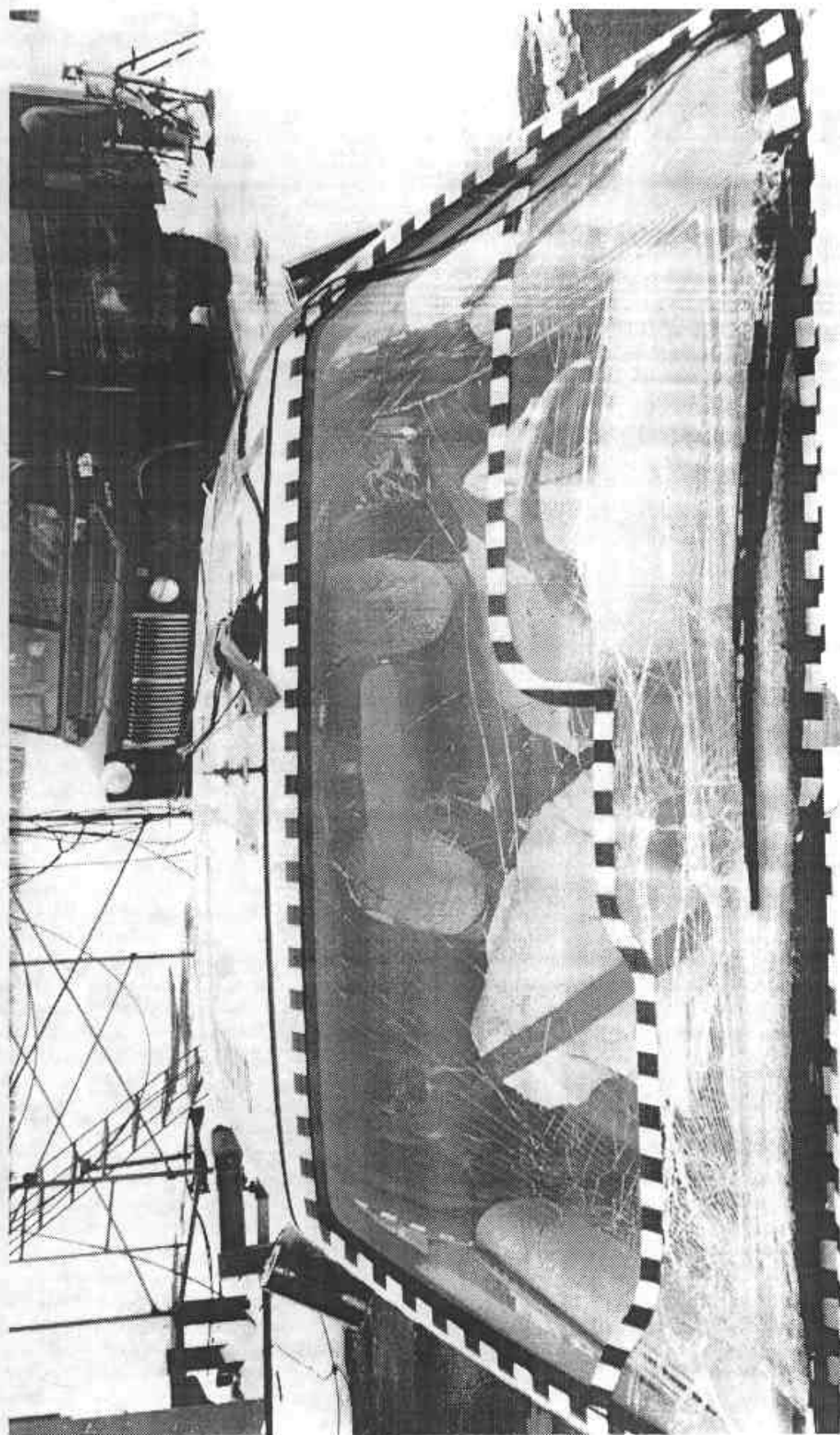
CALSPAN  
BY THE UNIVERSITY OF CALIFORNIA  
88 NISSAN - PULSAR  
2-11-88-2 DR.  
NHTSA MJ 5201

296 080

7626-8

A-12

Figure A-11 PRE-TEST WINDSHIELD VIEW



88 NISSAN - PULSAR

A-13

Figure A-12 POST-TEST WINDSHIELD VIEW

7626-8

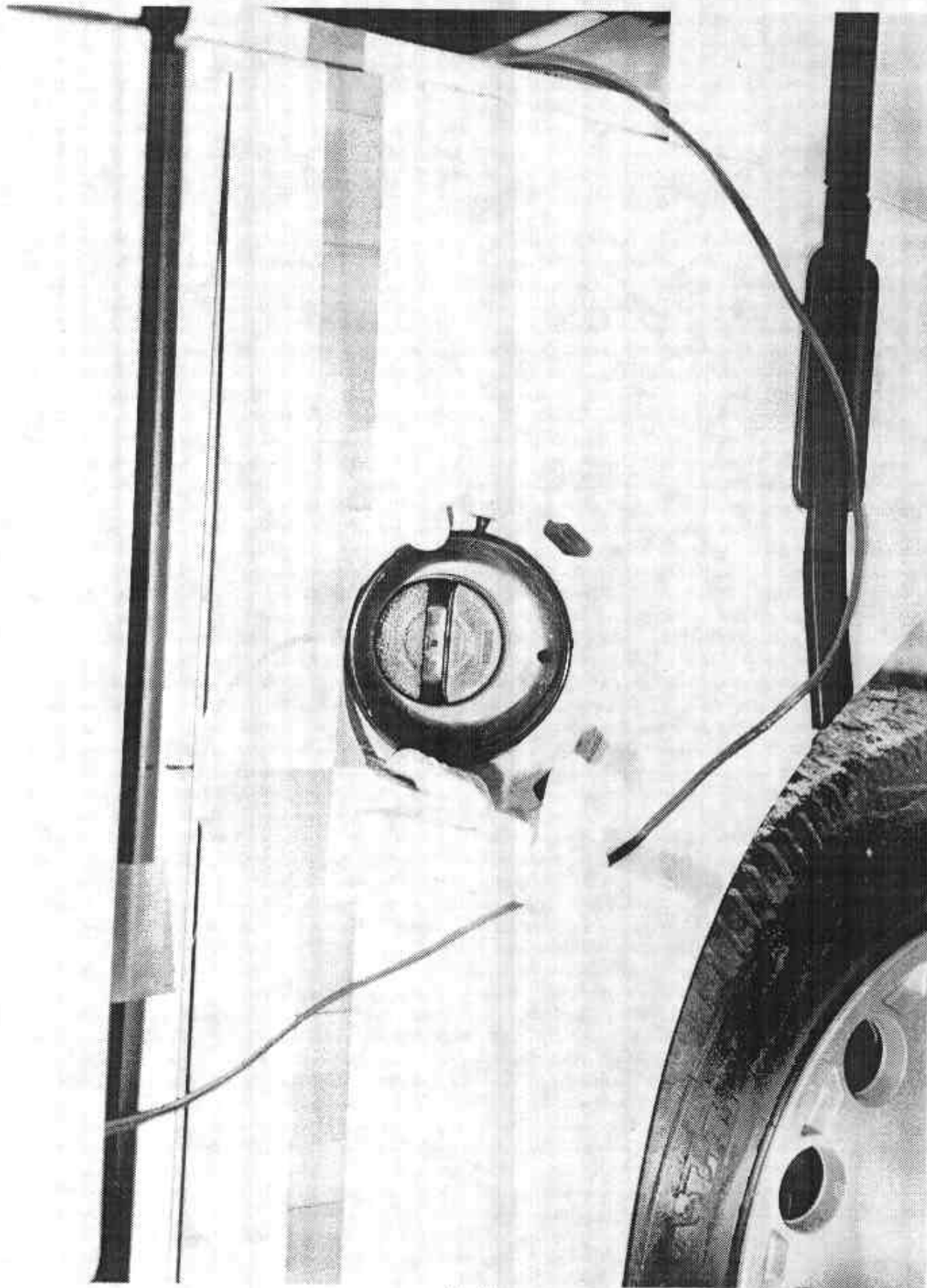
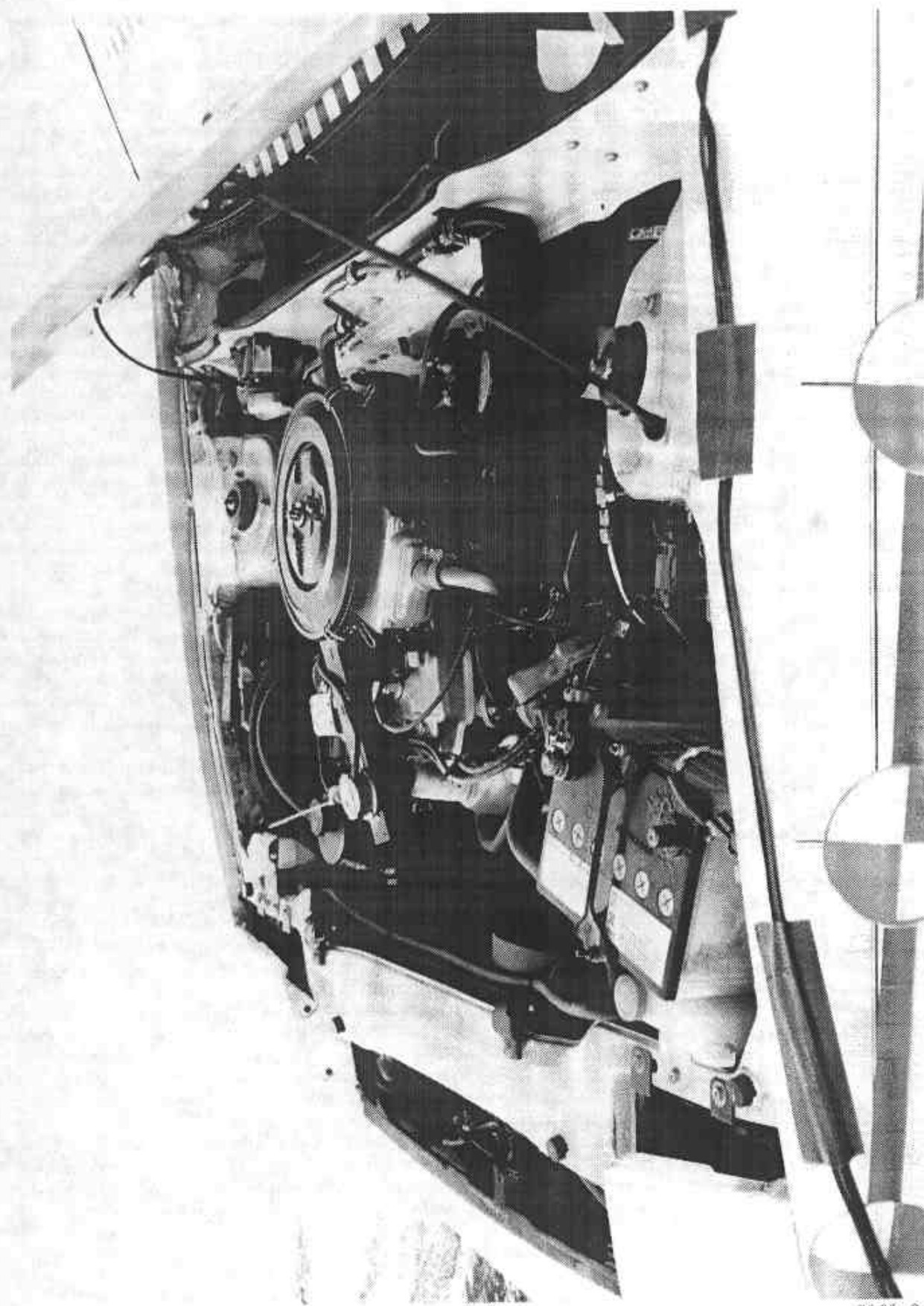


Figure A-13 PRE-TEST FUEL CAP VIEW

A-14

7626-8



A-15

7626-8

Figure A-14 PRE-TEST ENGINE COMPARTMENT VIEW

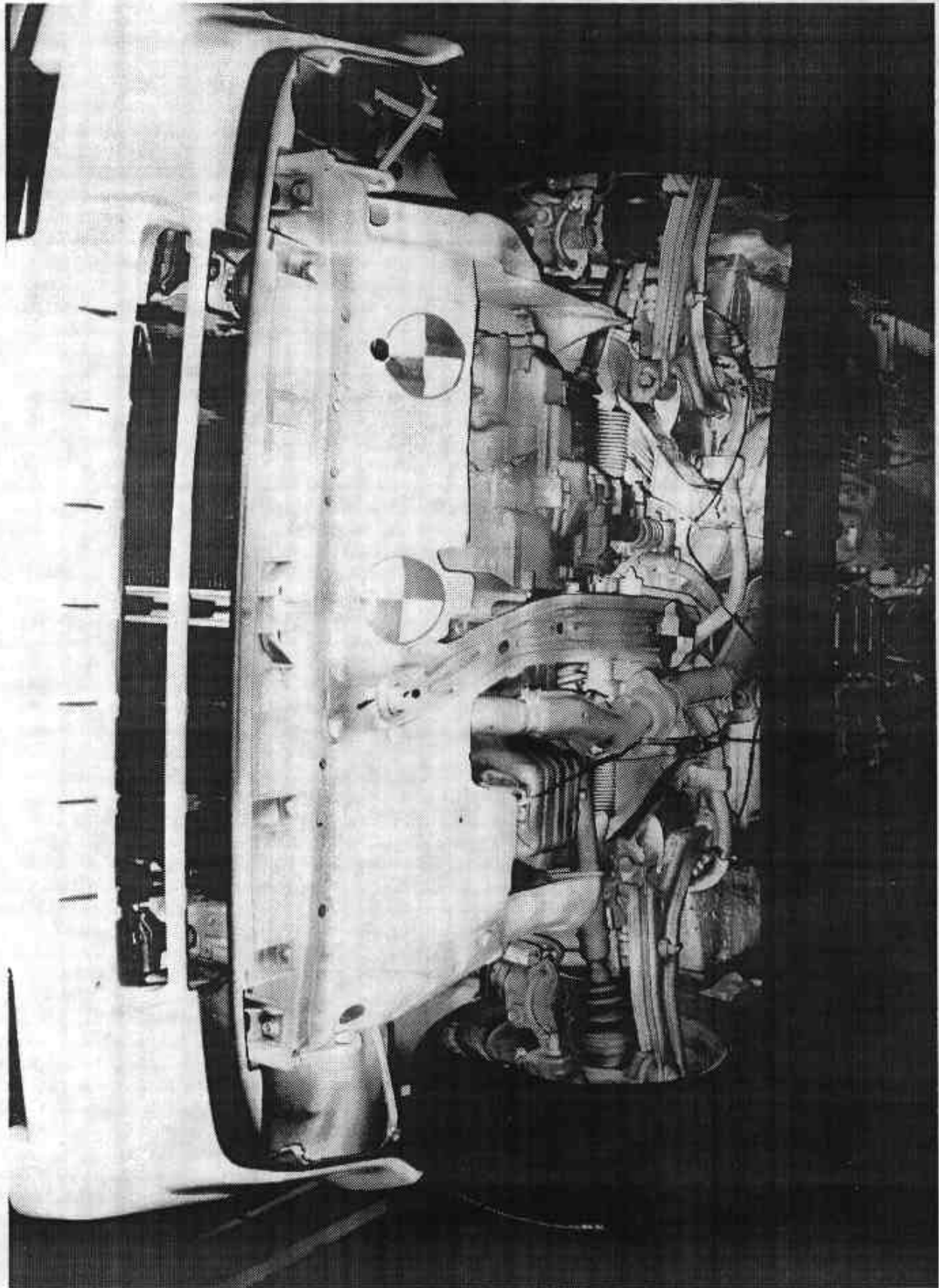


Figure A-15 PRE-TEST FRONT UNDERBODY VIEW

A-16

7626-8

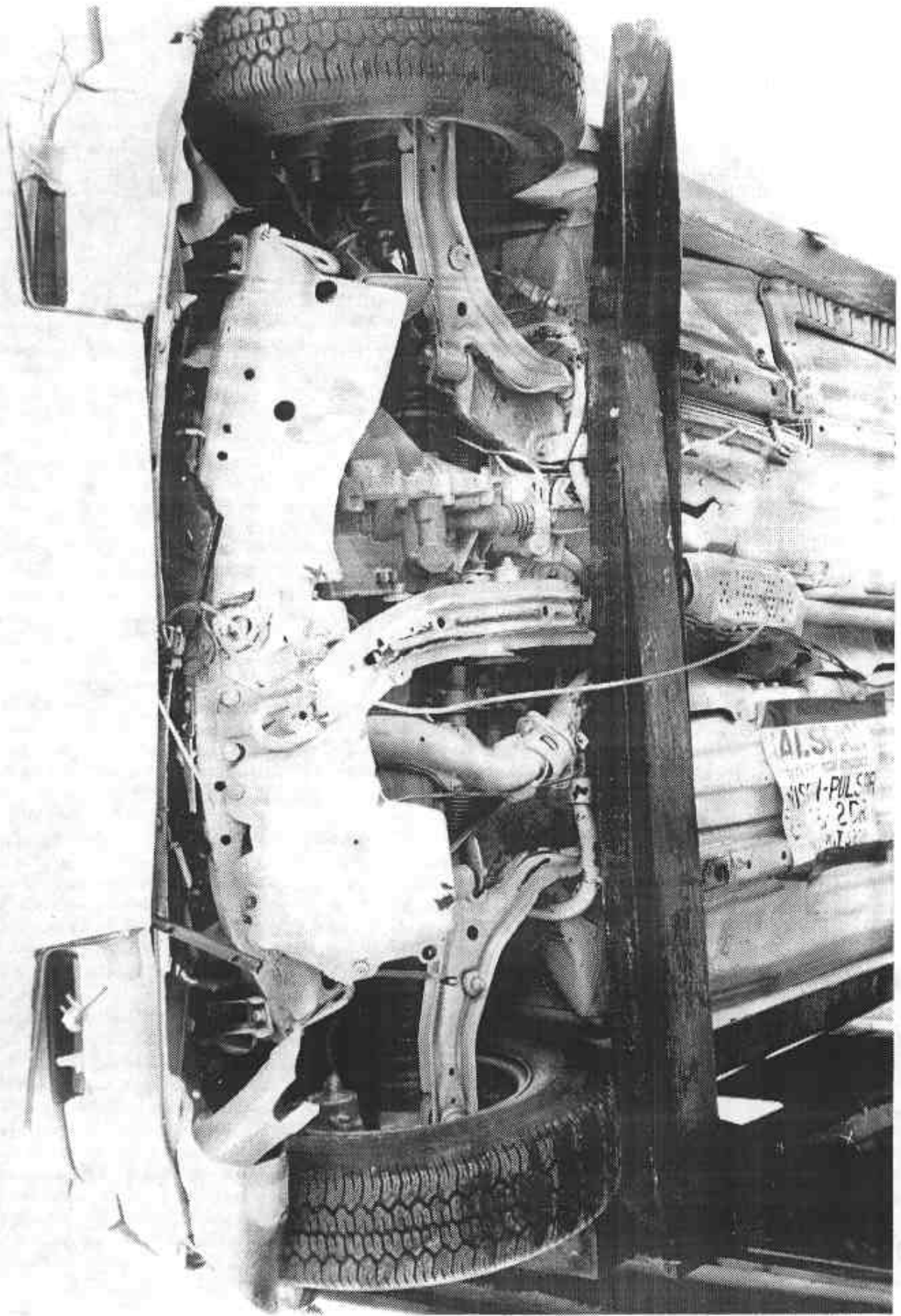


Figure A-16 POST-TEST FRONT UNDERBODY VIEW

A-17

7626-8

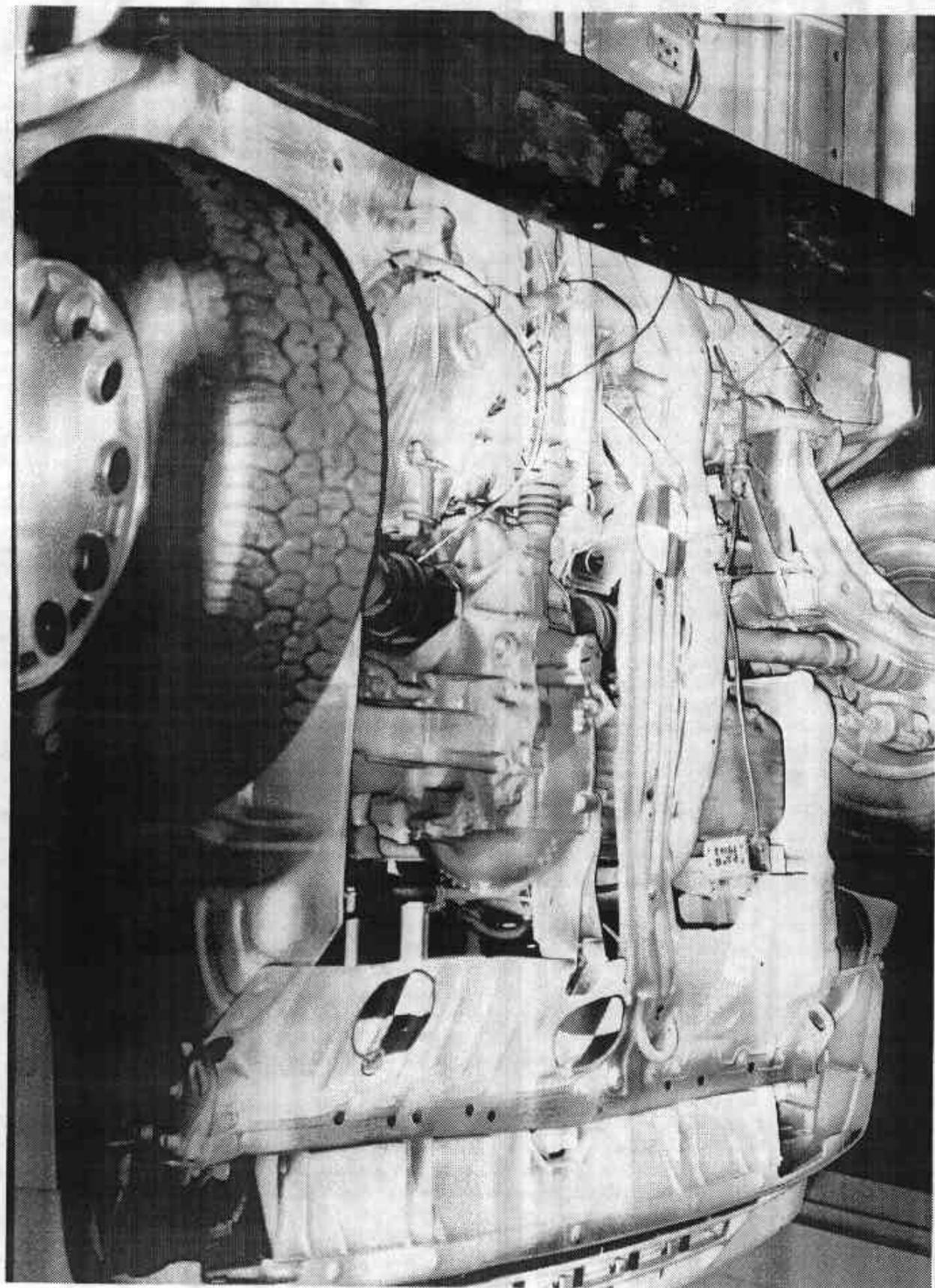


Figure A-17 PRE-TEST FRONT-SIDE UNDERBODY VIEW

A-18

7626-8

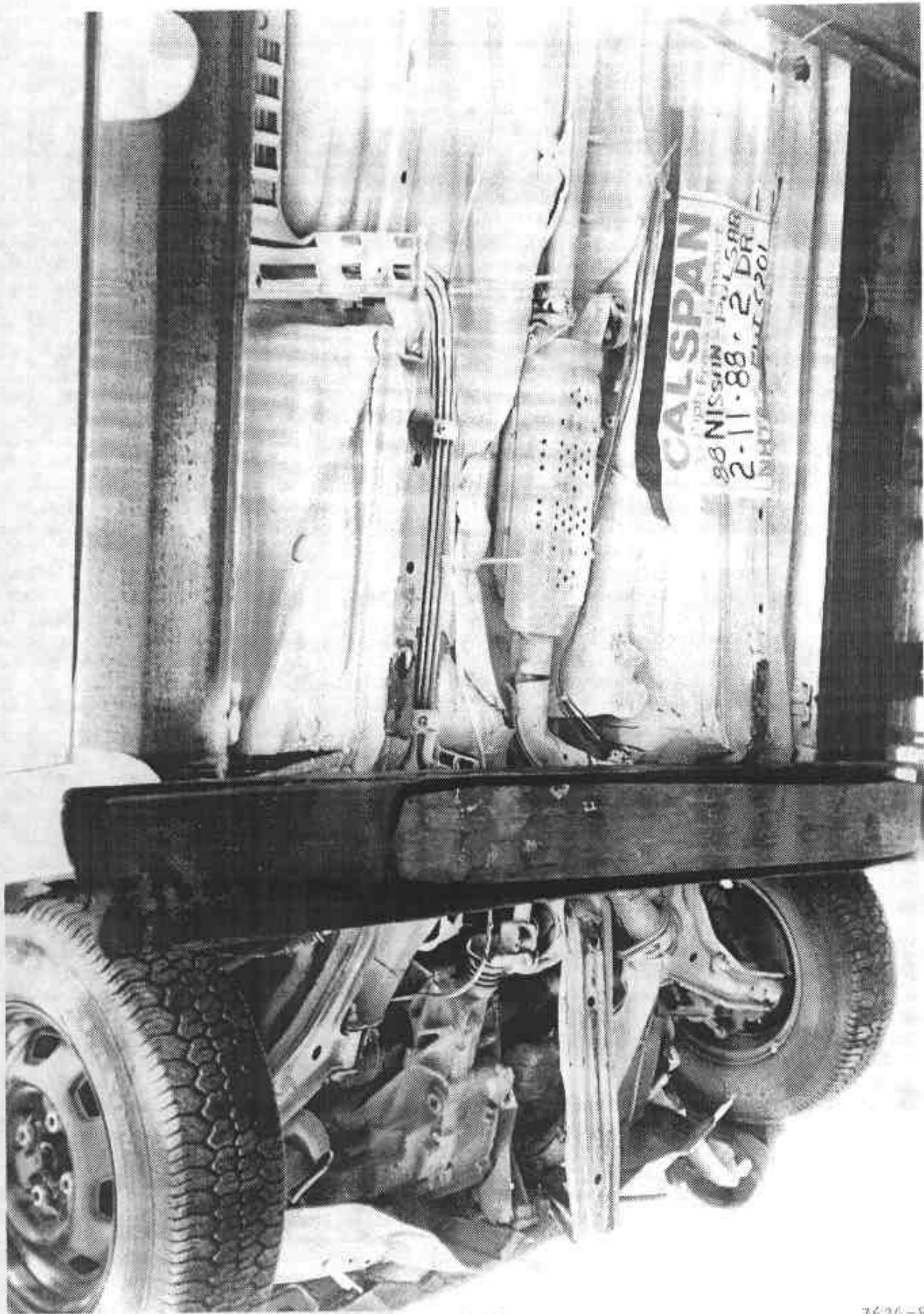


Figure A-18 POST-TEST FRONT-SIDE UNDERBODY VIEW

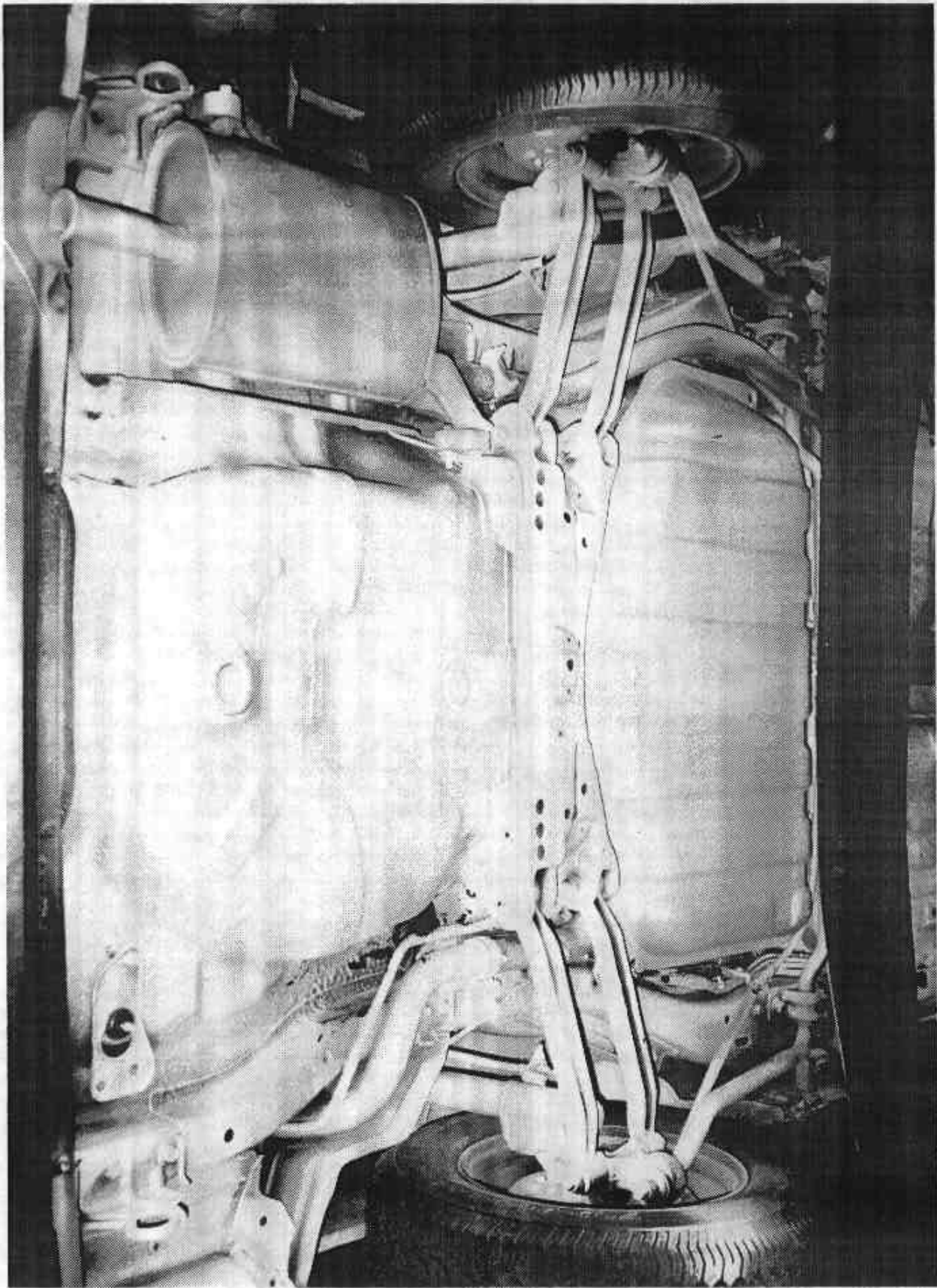


Figure A-19 PRE-TEST REAR UNDERSOYD VIEW

A-20

7626-8



A-22

7626-8

Figure A-21 PRE-TEST DRIVER POSITION VIEW

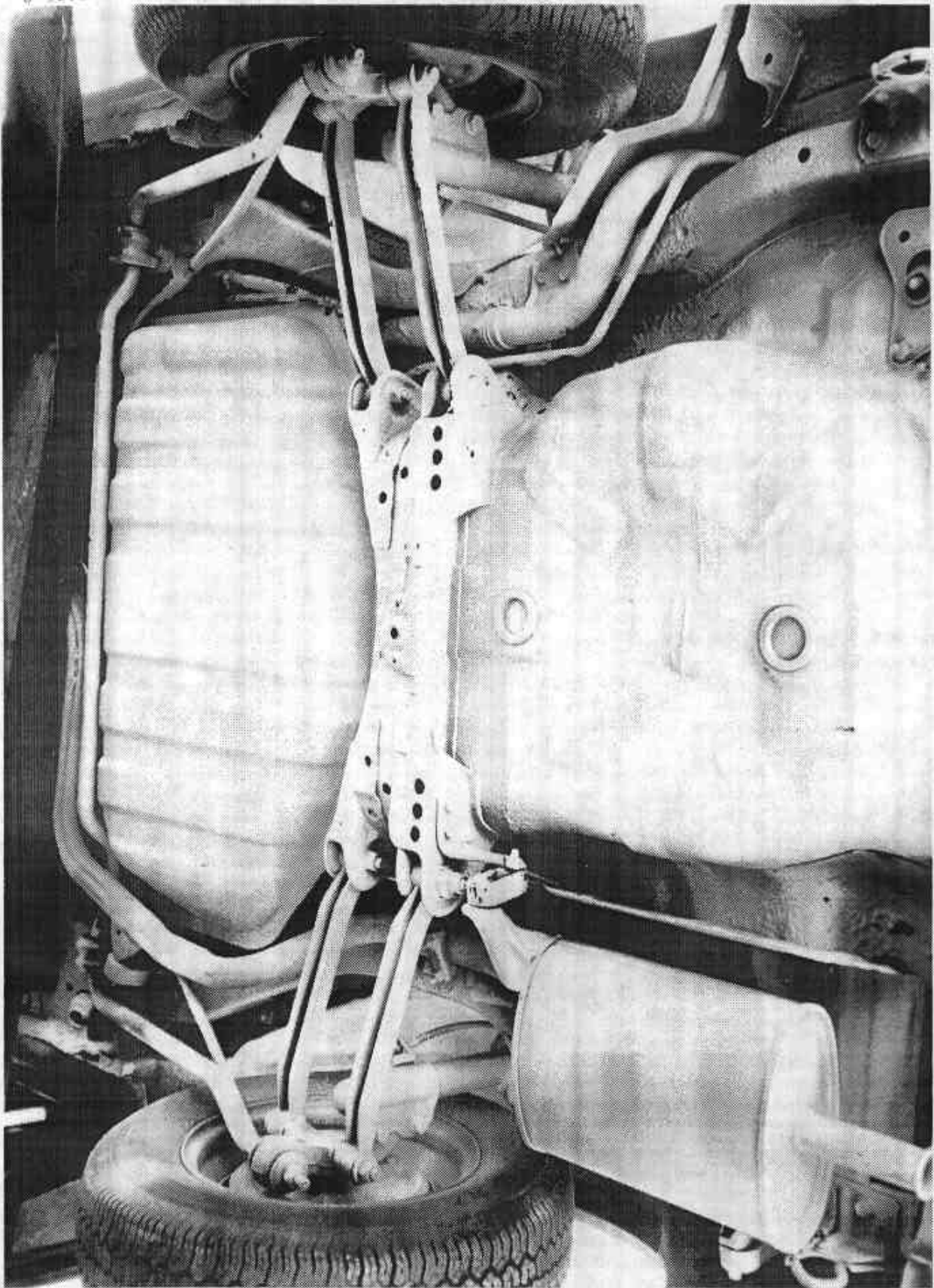


Figure A-20 POST-TEST REAR UNDERBODY VIEW



Figure A-22. POST-TEST DRIVER POSITION VIEW

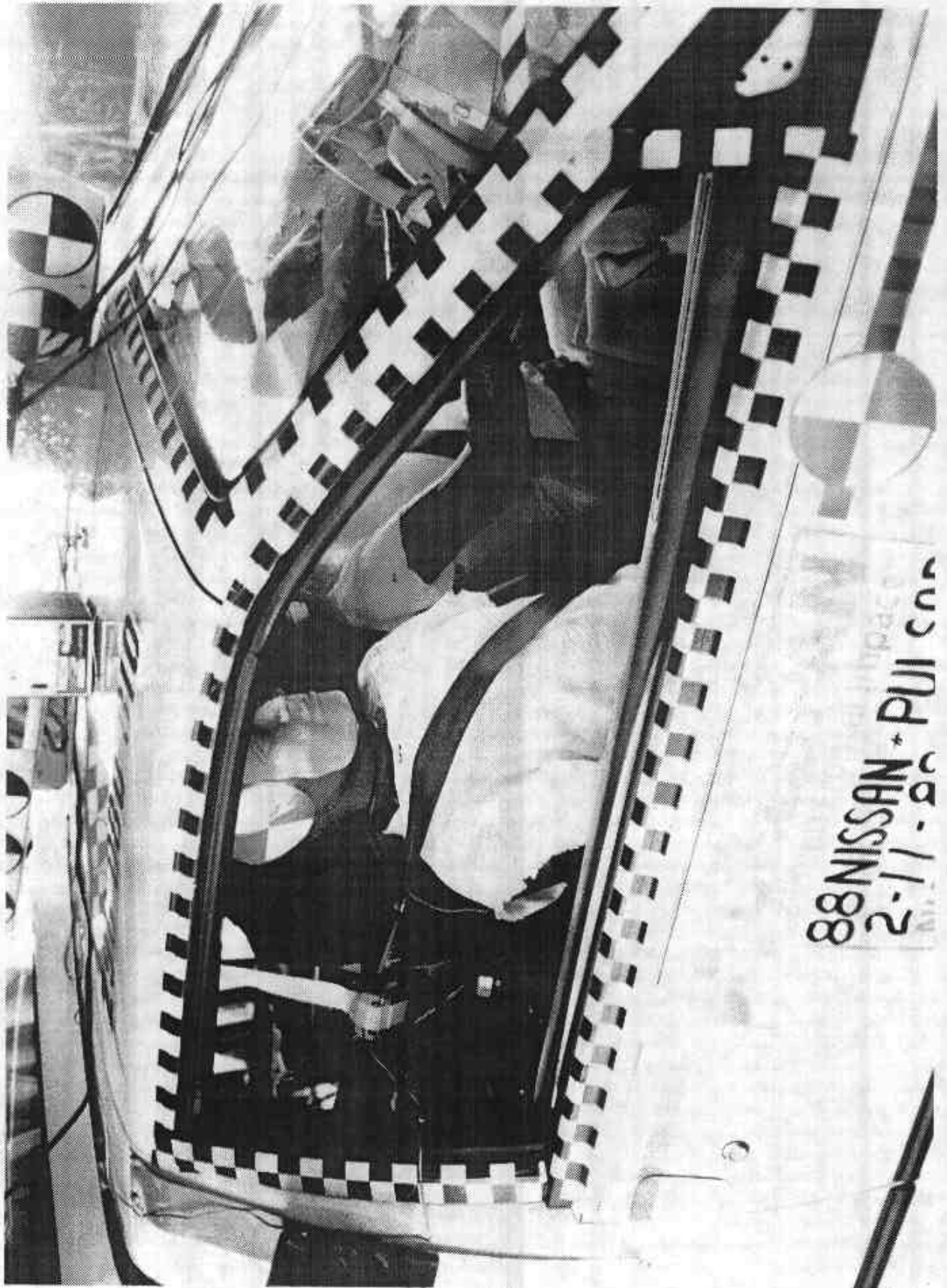


Figure A-23 PRE-TEST PASSENGER POSITION VIEW

A-24

7626-8



Figure A-24 POST-TEST PASSENGER POSITION VIEW

A-25

7626-8

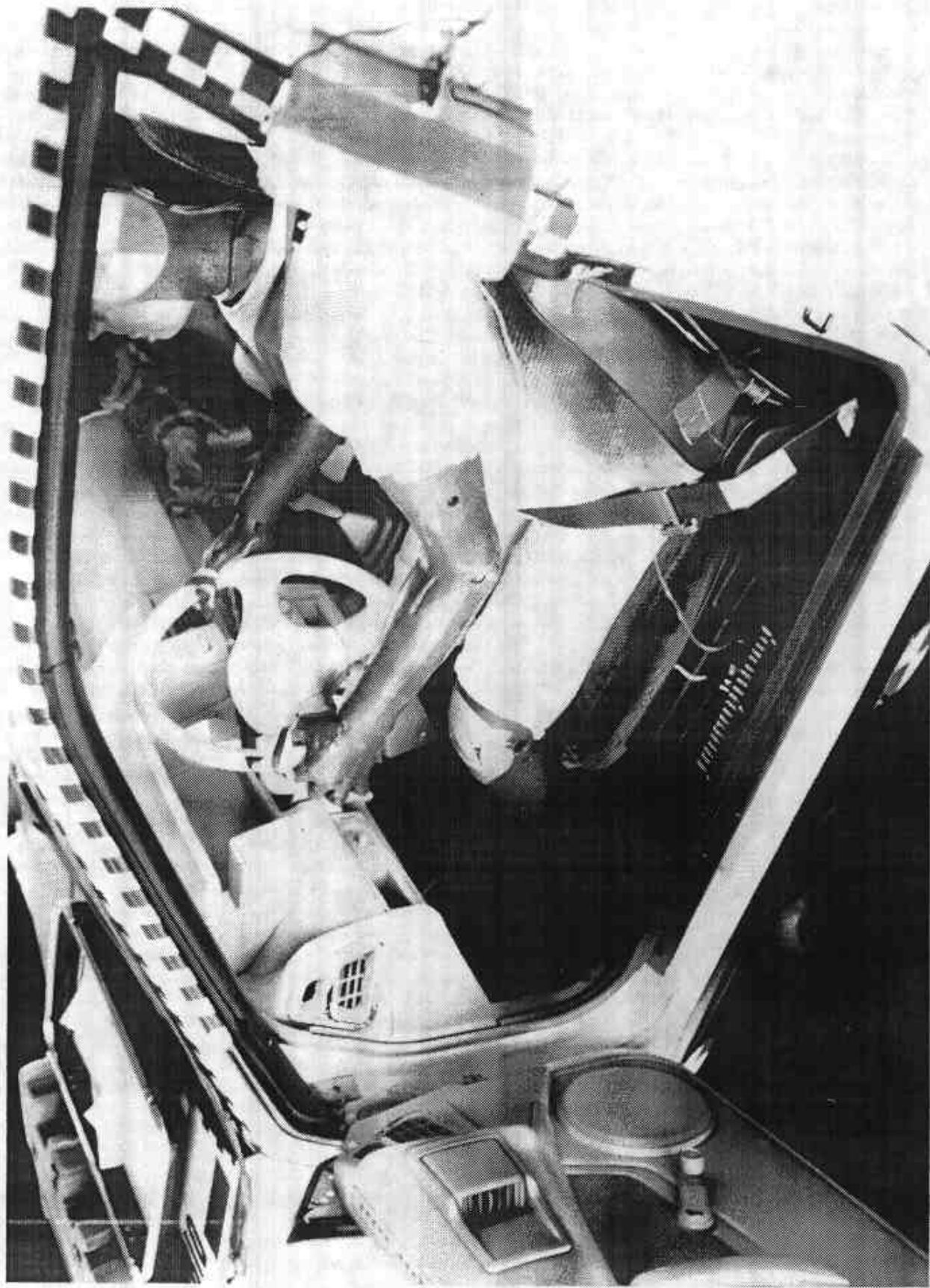


Figure A-25 PRE-TEST DRIVER AND INTERIOR VIEW

A-26

7626-8



Figure A-26 POST-TEST DRIVER AND INTERIOR VIEW

A-27

7626-8



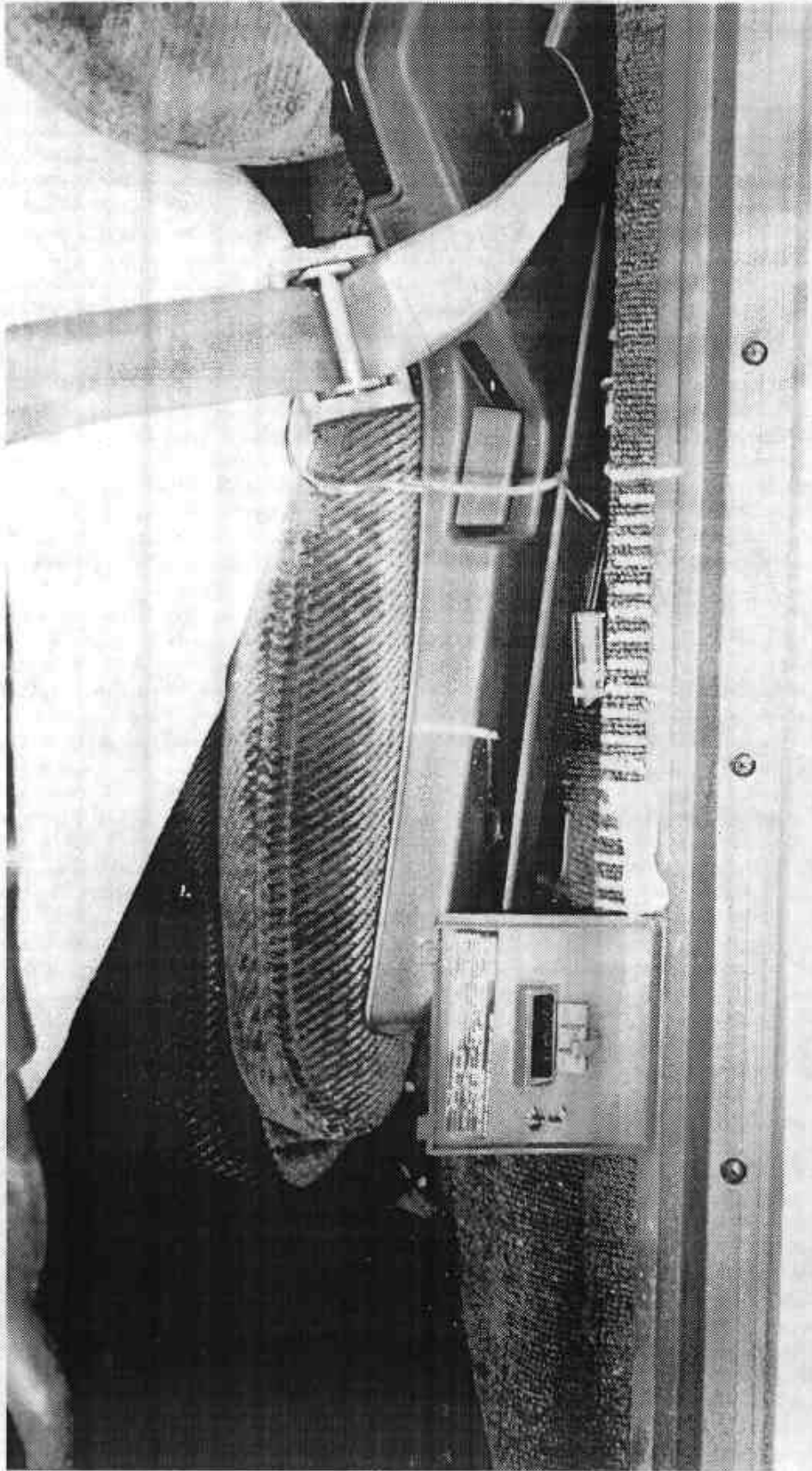
FIGURE A-27 PRE-TEST PASSENGER AND INTERIOR VIEW

A-28

7626-8



Figure A-28 POST-TEST PASSENGER AND INTERIOR VIEW



A-30



7626-8

Figure A-29 POST-TEST DRIVER'S SEAT POSITION VIEW

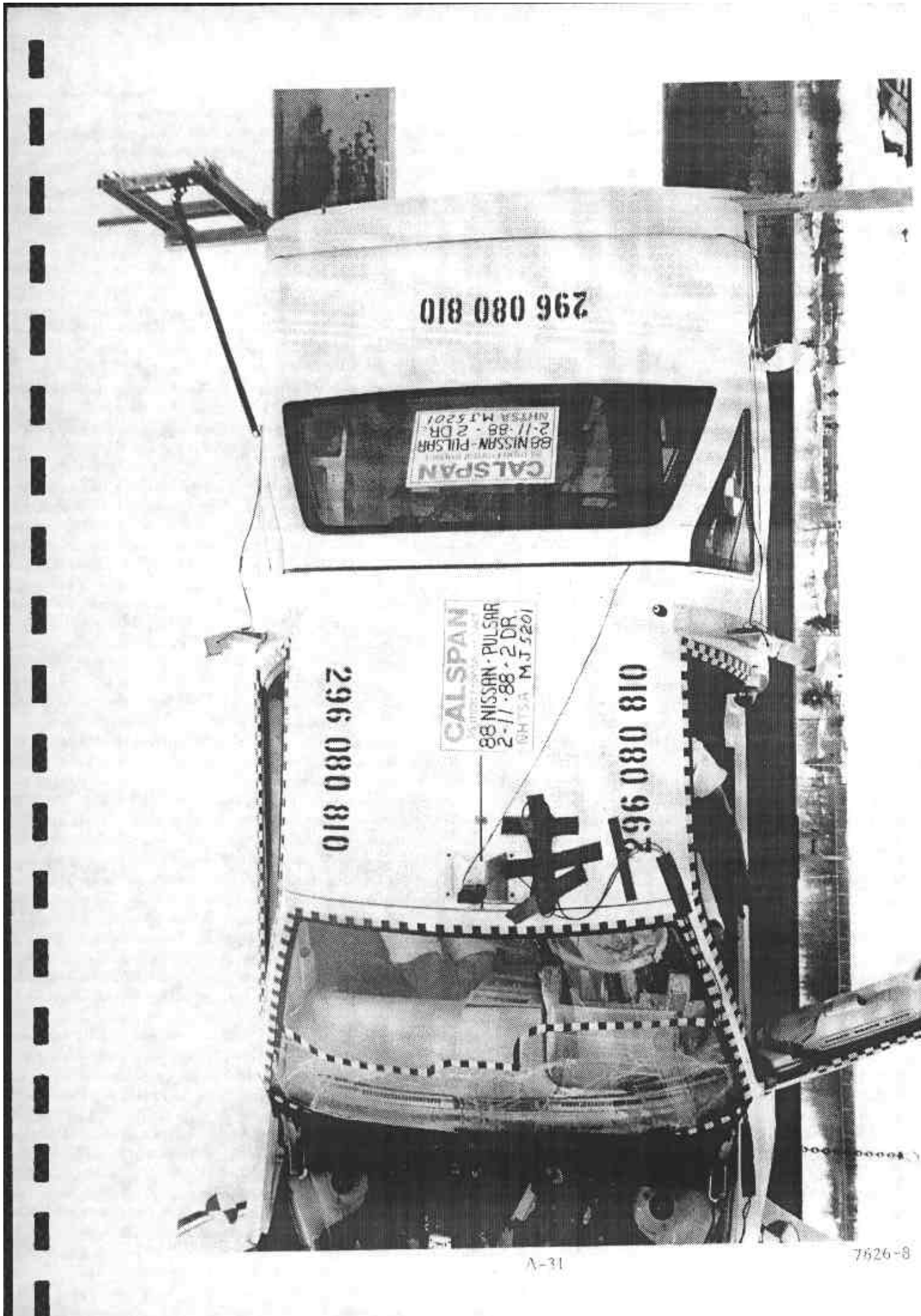
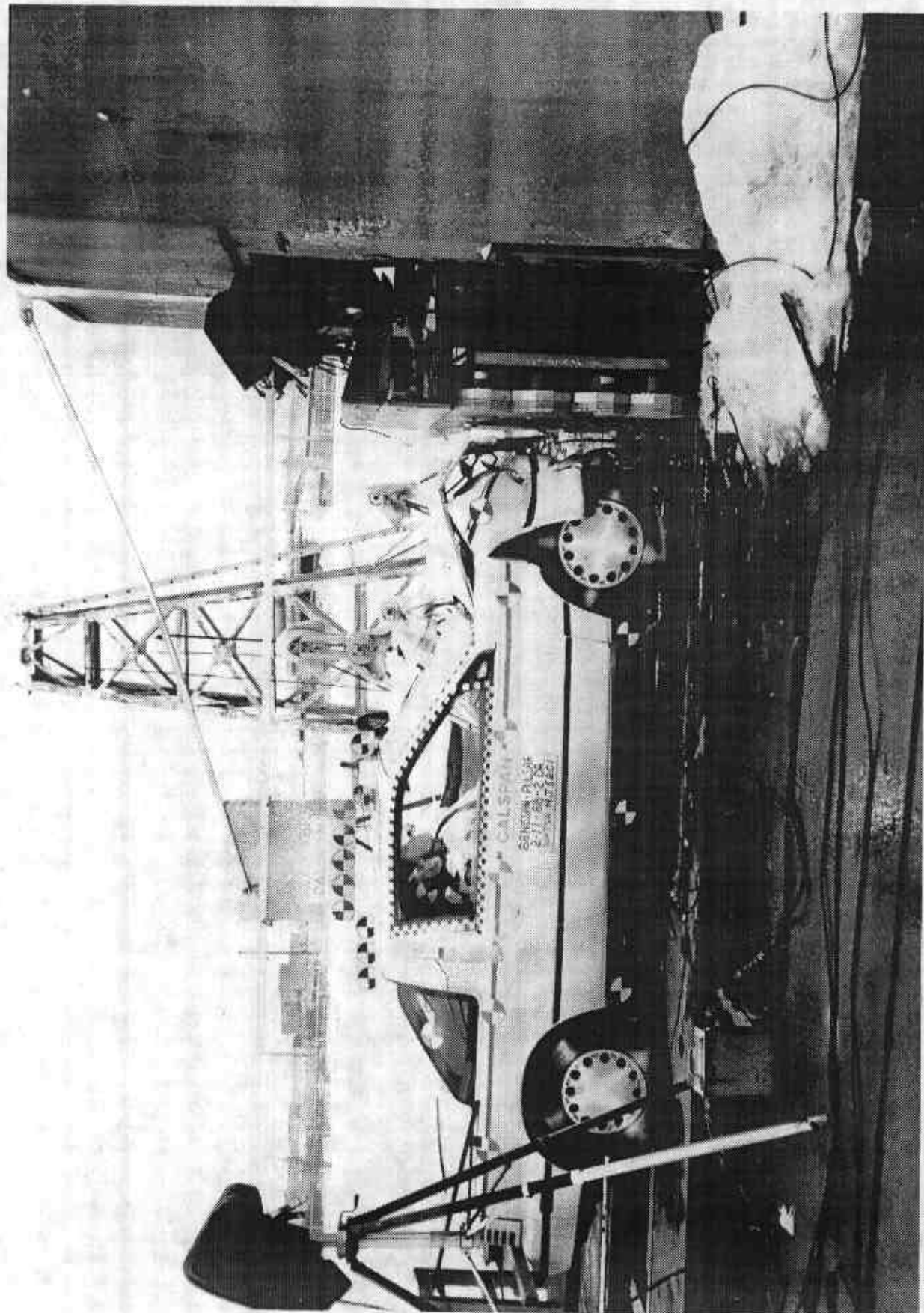


Figure A-30 POST-TEST TOP VIEW



A-32

7626-8

Figure A-31 IMPACT VIEW

**Appendix B**

**VEHICLE, LOAD CELL BARRIER AND DUMMY RESPONSE DATA**

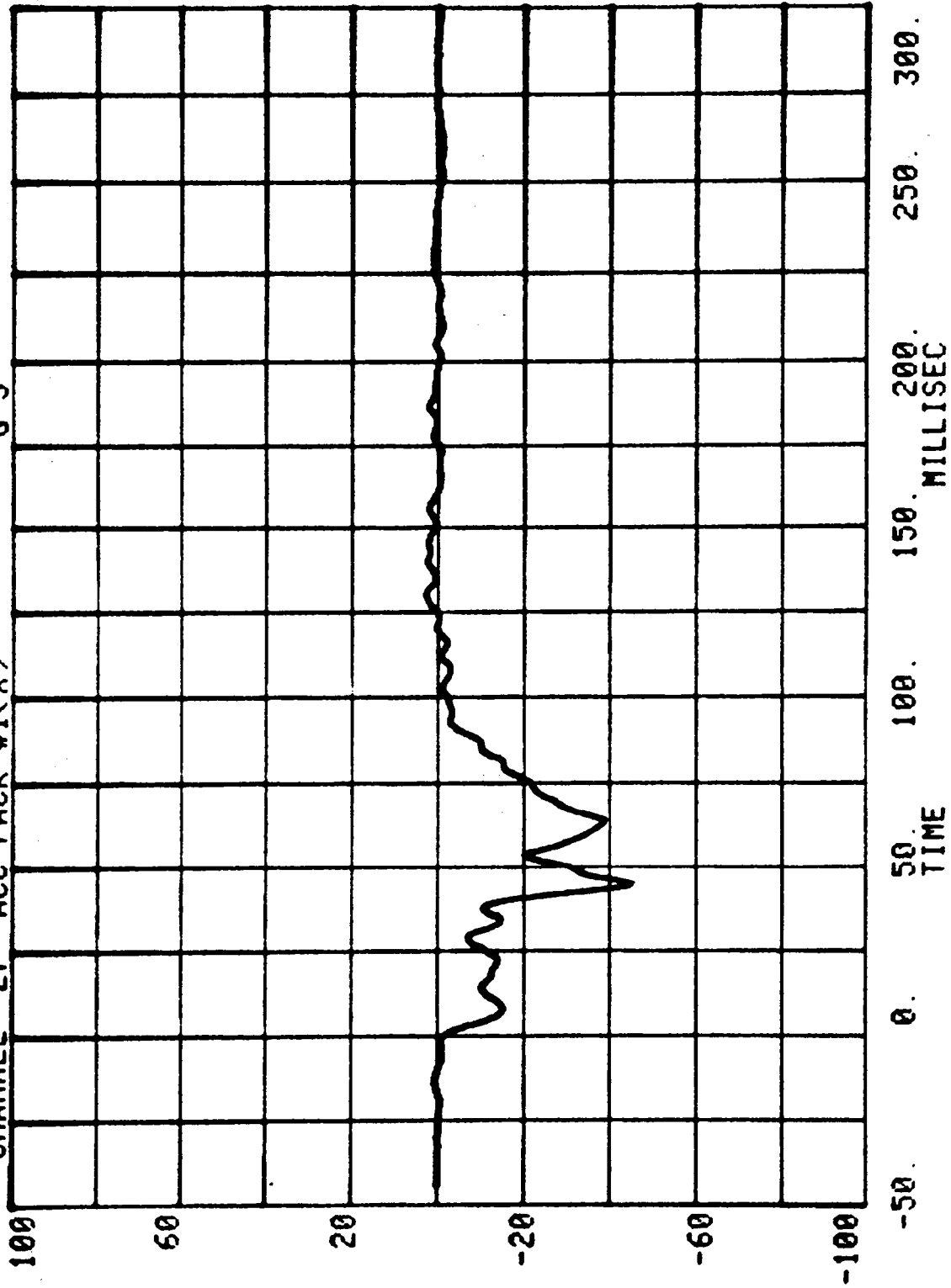
TEST NO. MJ5201

VEHICLE DATA

FILTER CHANNEL CLASS

60

CHANNEL 27 ACC PACK #1(X) RUN= 810 SERIES= 5201 G'S



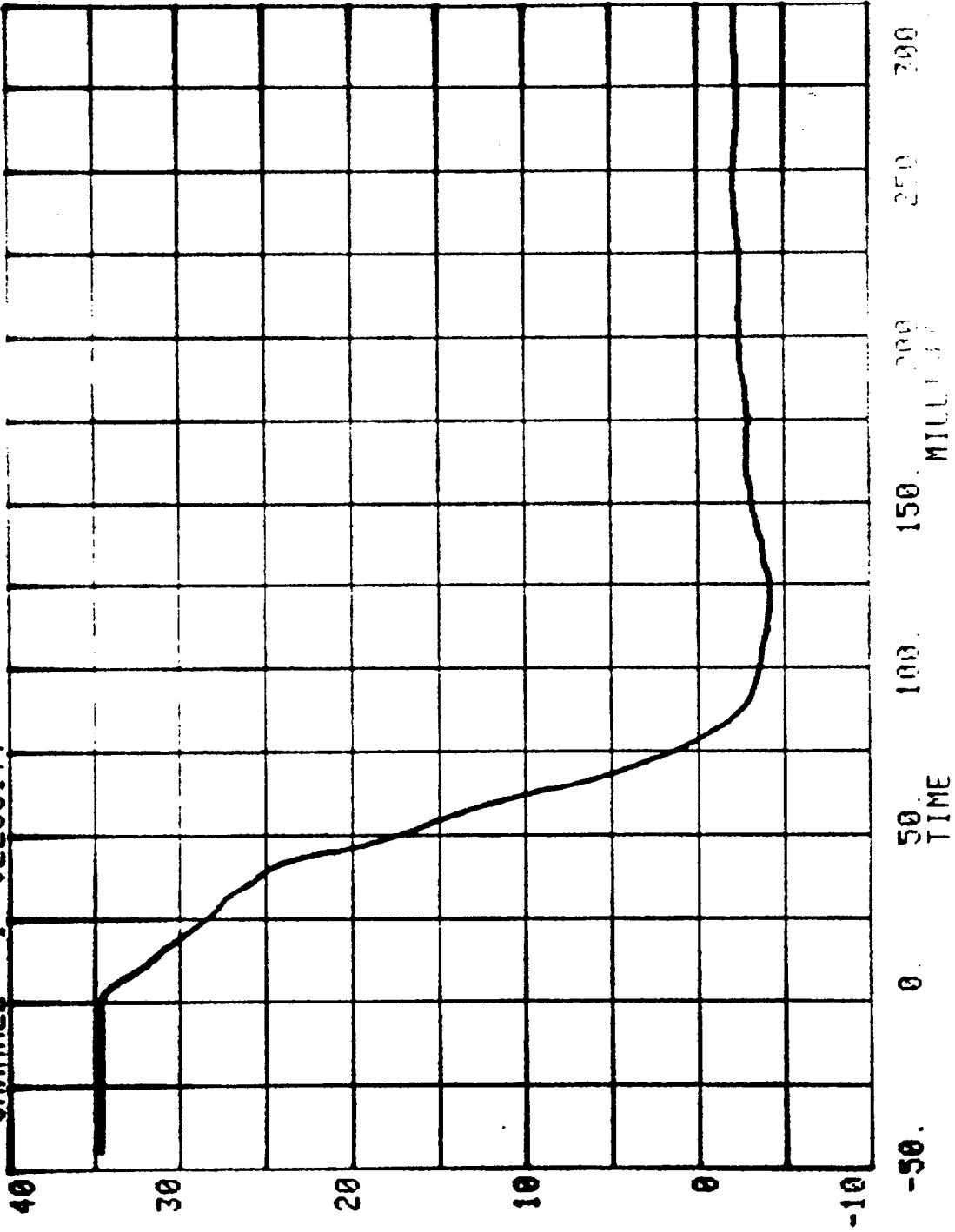
ACC#1(X)

MPH

SERIES= 5201

RUN= 810

CHANNEL 1 VELOCITY



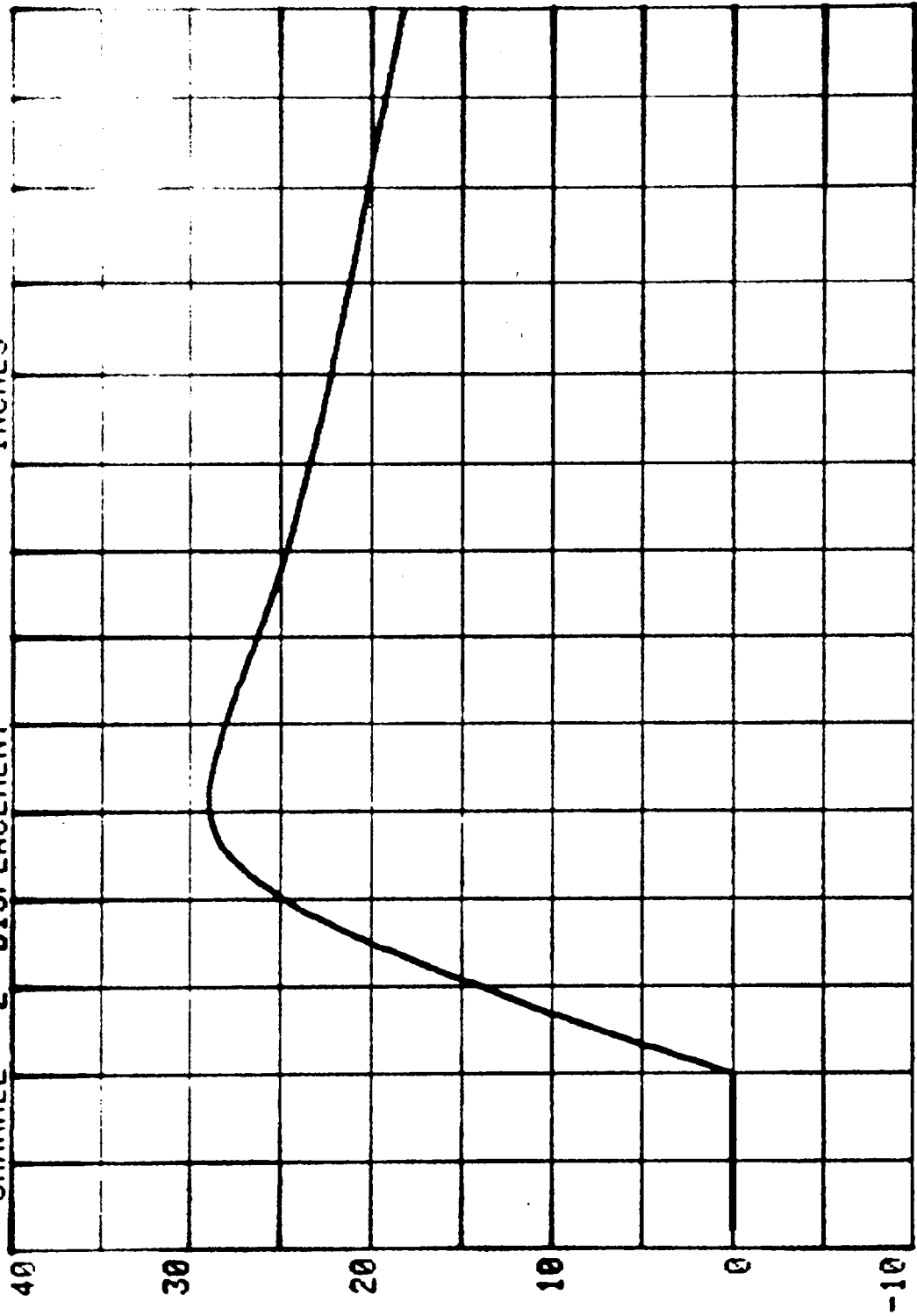
ACC#1(X)

INCHES

SERIES= 5201

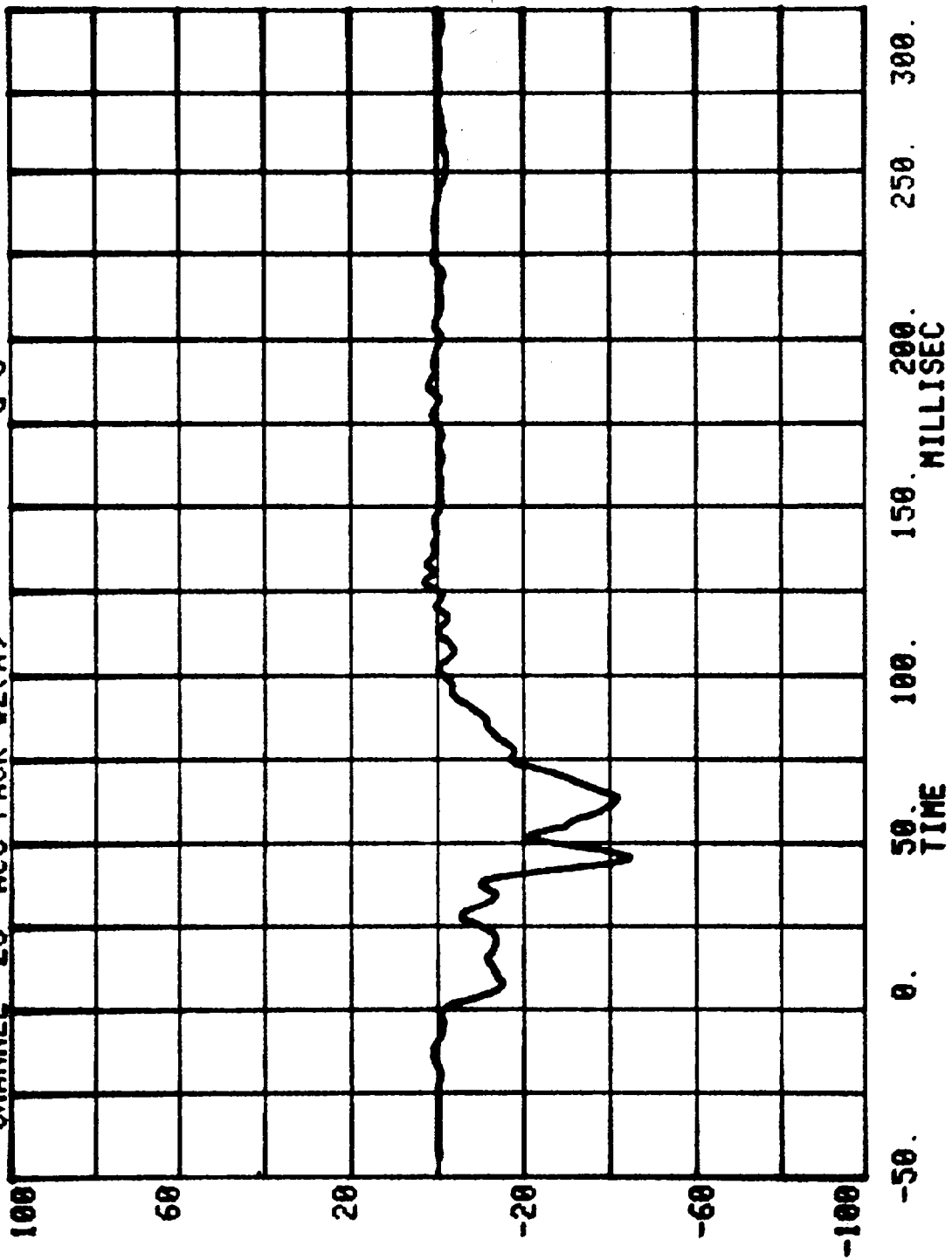
RUN= 810

CHANNEL 2 DISPLACEMENT



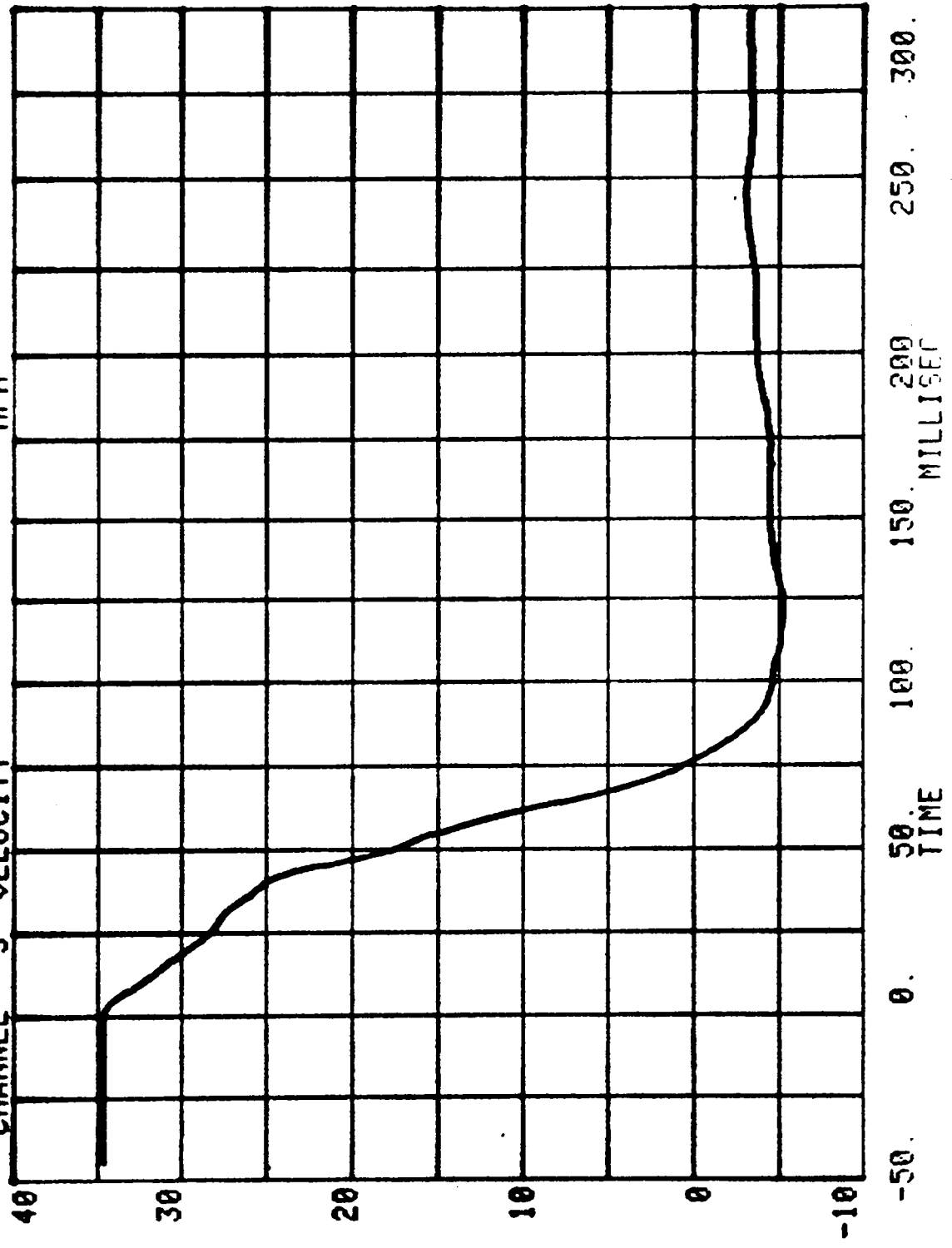
700  
350  
200  
150  
100  
50  
0  
-50  
TIME

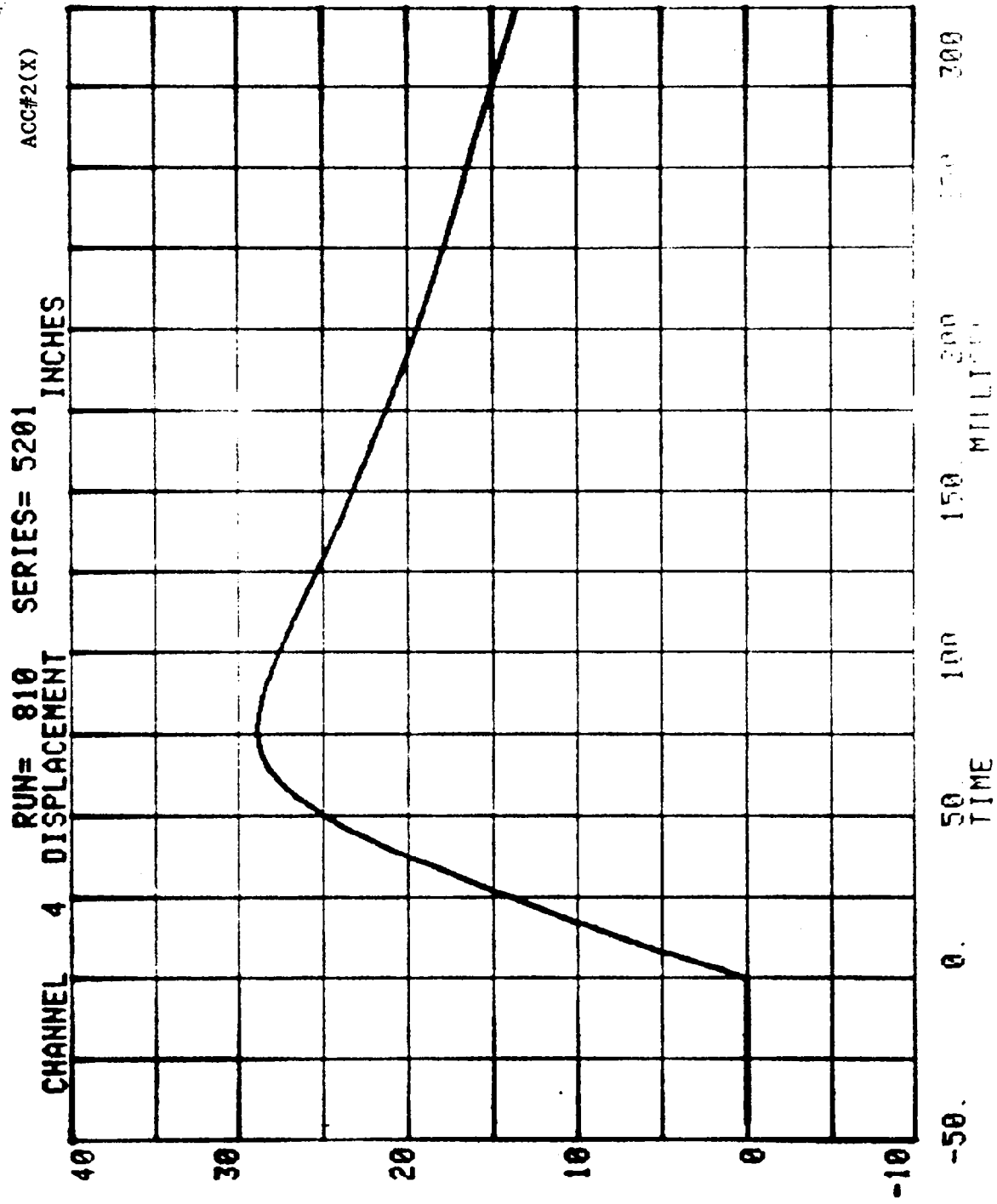
CHANNEL 28 ACC PACK #2(X) RUN= 810 SERIES= 5201 G'S



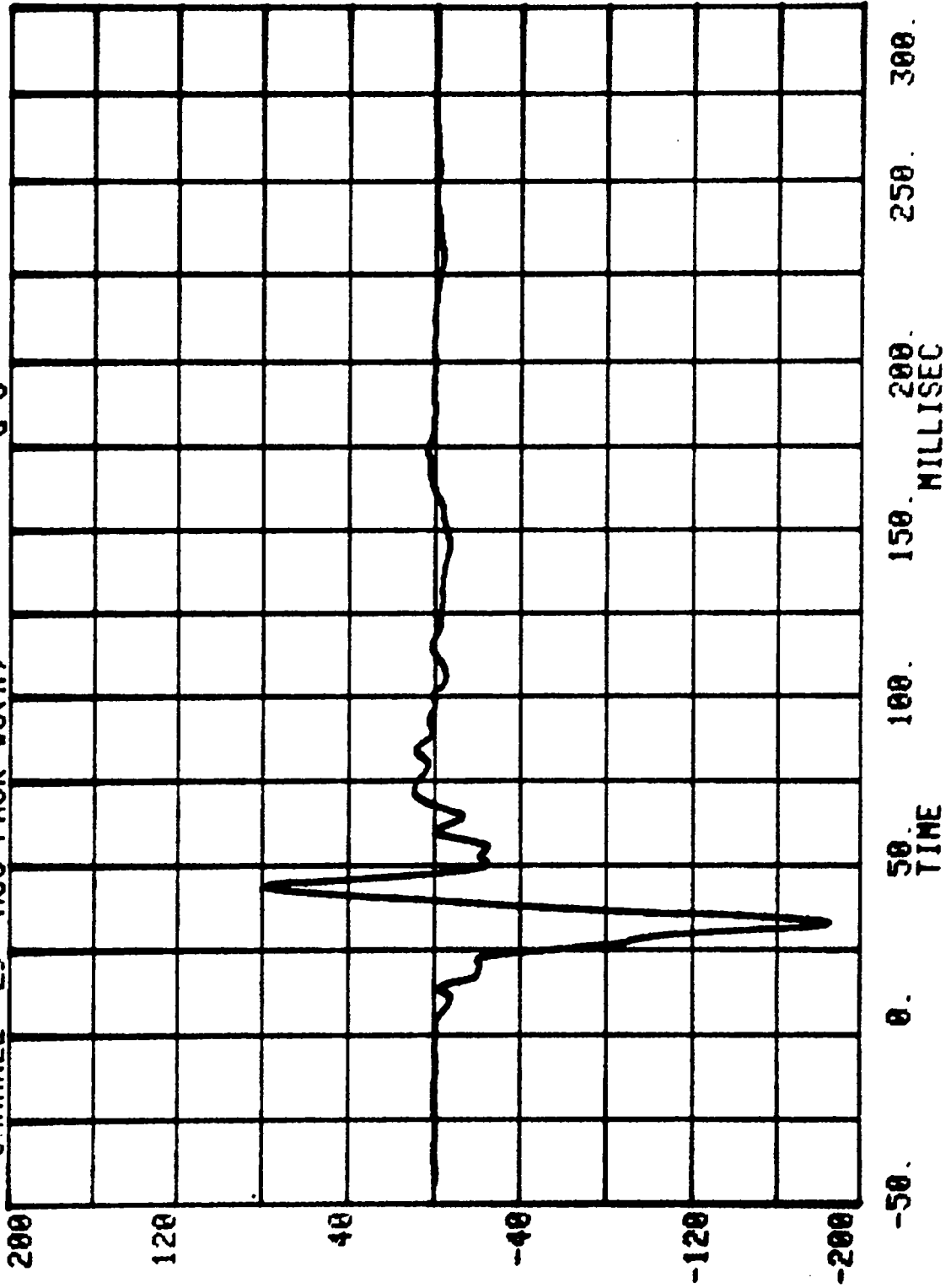
ACC#2 (X)

CHANNEL 3 VELOCITY  
RUN= 810 SERIES= 5201 MPH





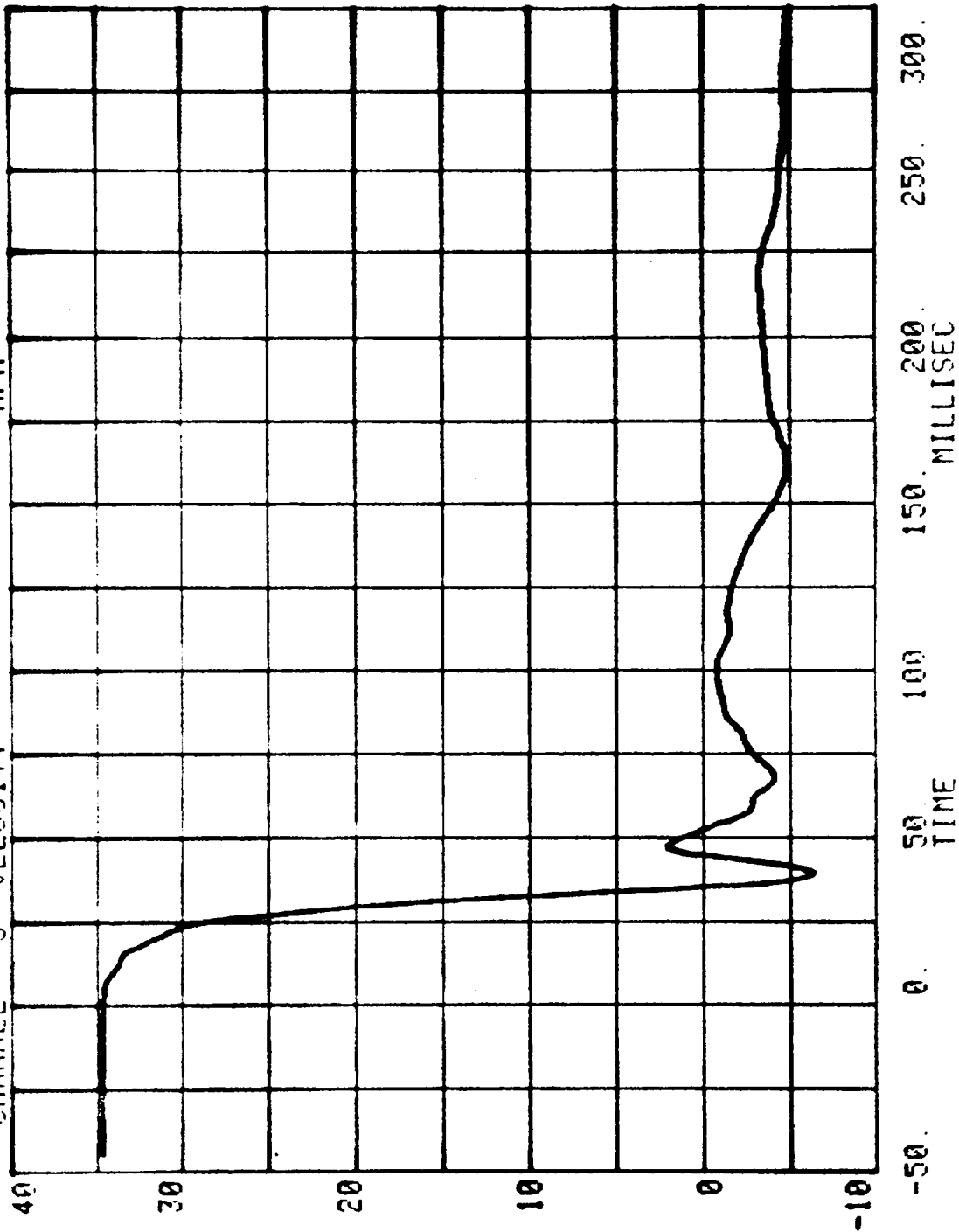
CHANNEL 29 ACC PACK #3(X) RUN= 810 SERIES= 5201 G'S

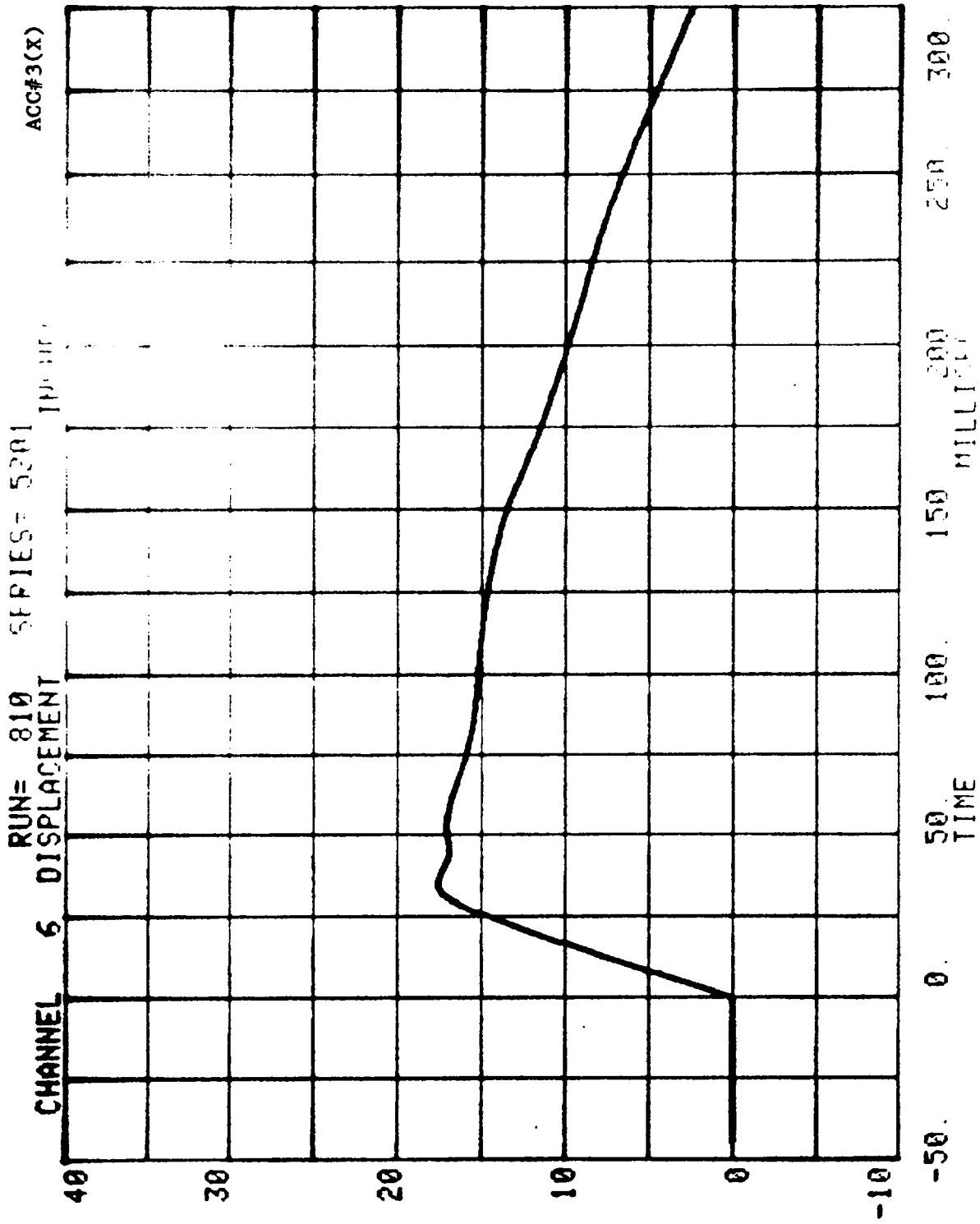


ACG#3(X)

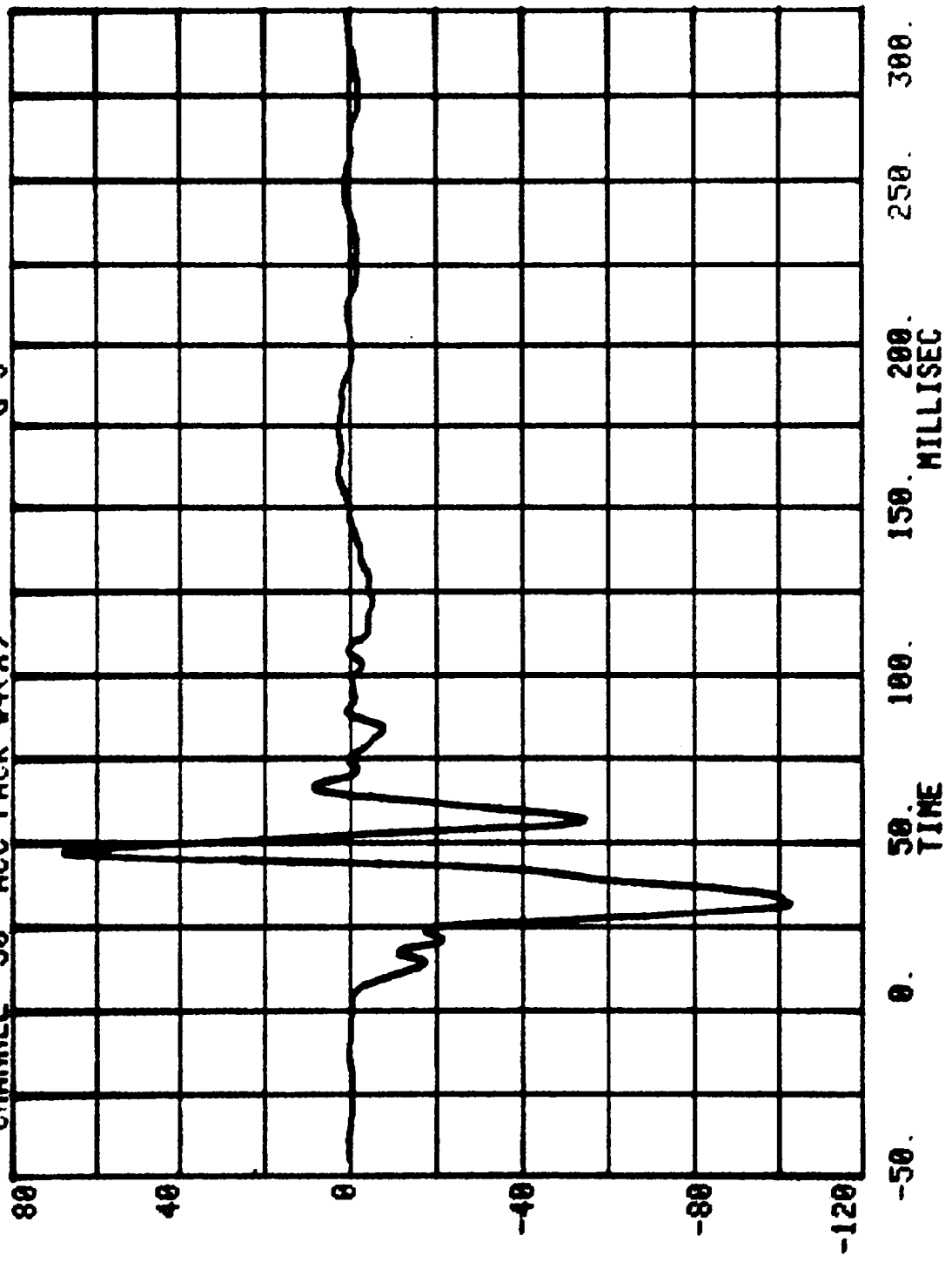
CHANNEL 5 VELOCITY SERIES= 5201 MPH

RUN= 810





RUN= 810 SERIES= 5201 G'S  
CHANNEL 30 ACC PACK #4(X)



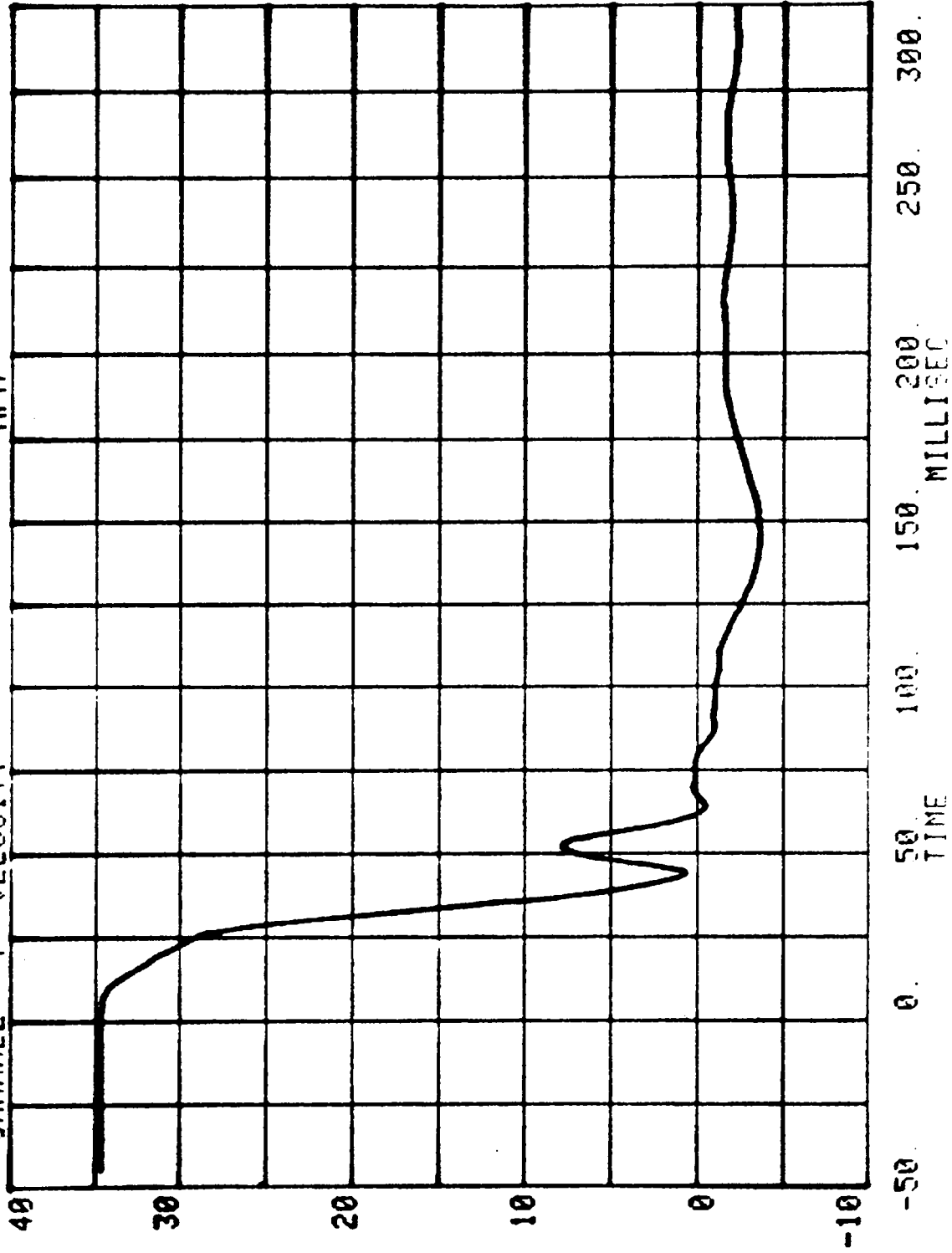
CHANNEL 7 VELOCITY

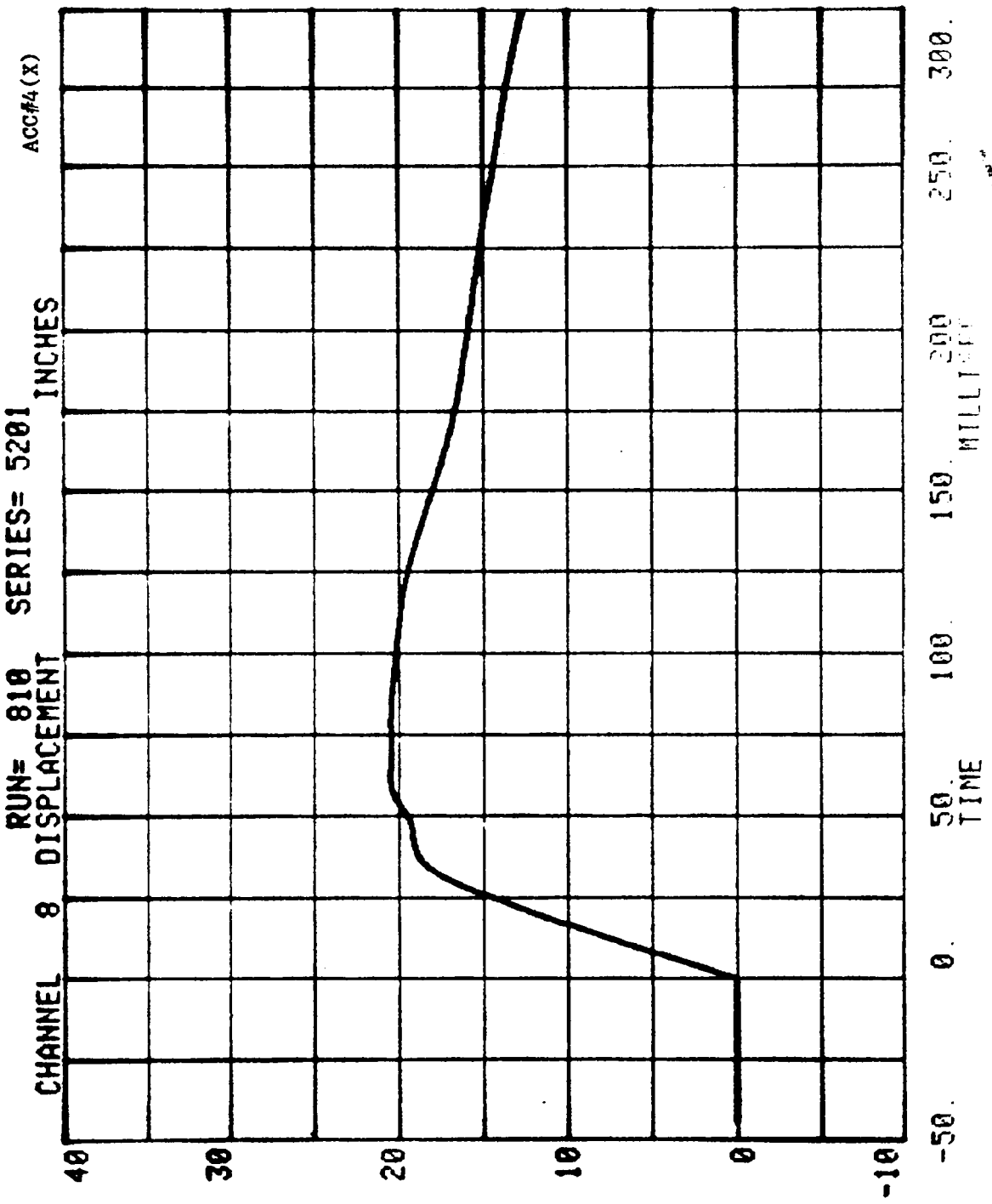
RUN= 810

SERIES= 5201

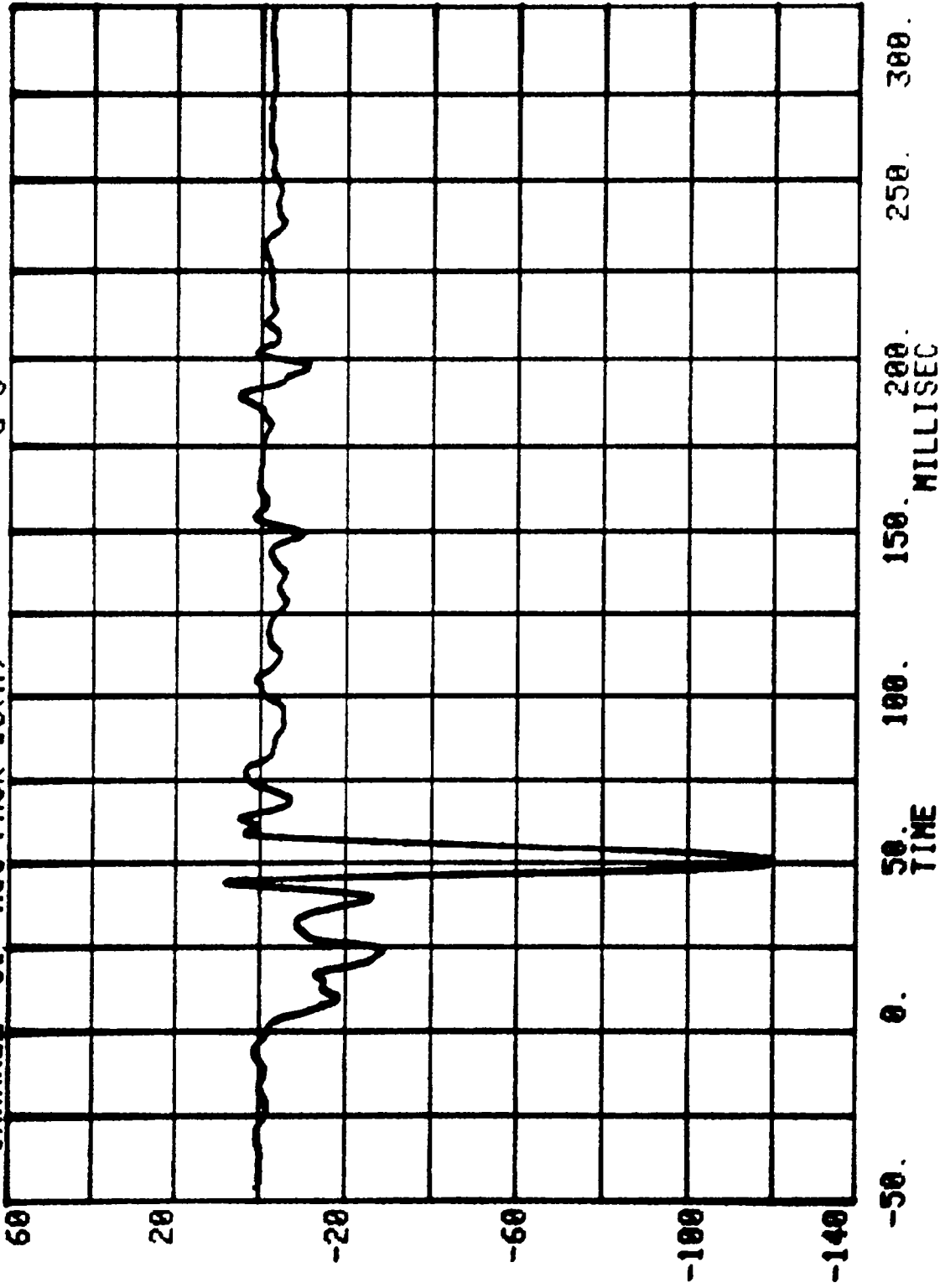
MPH

ACG#4 (X)

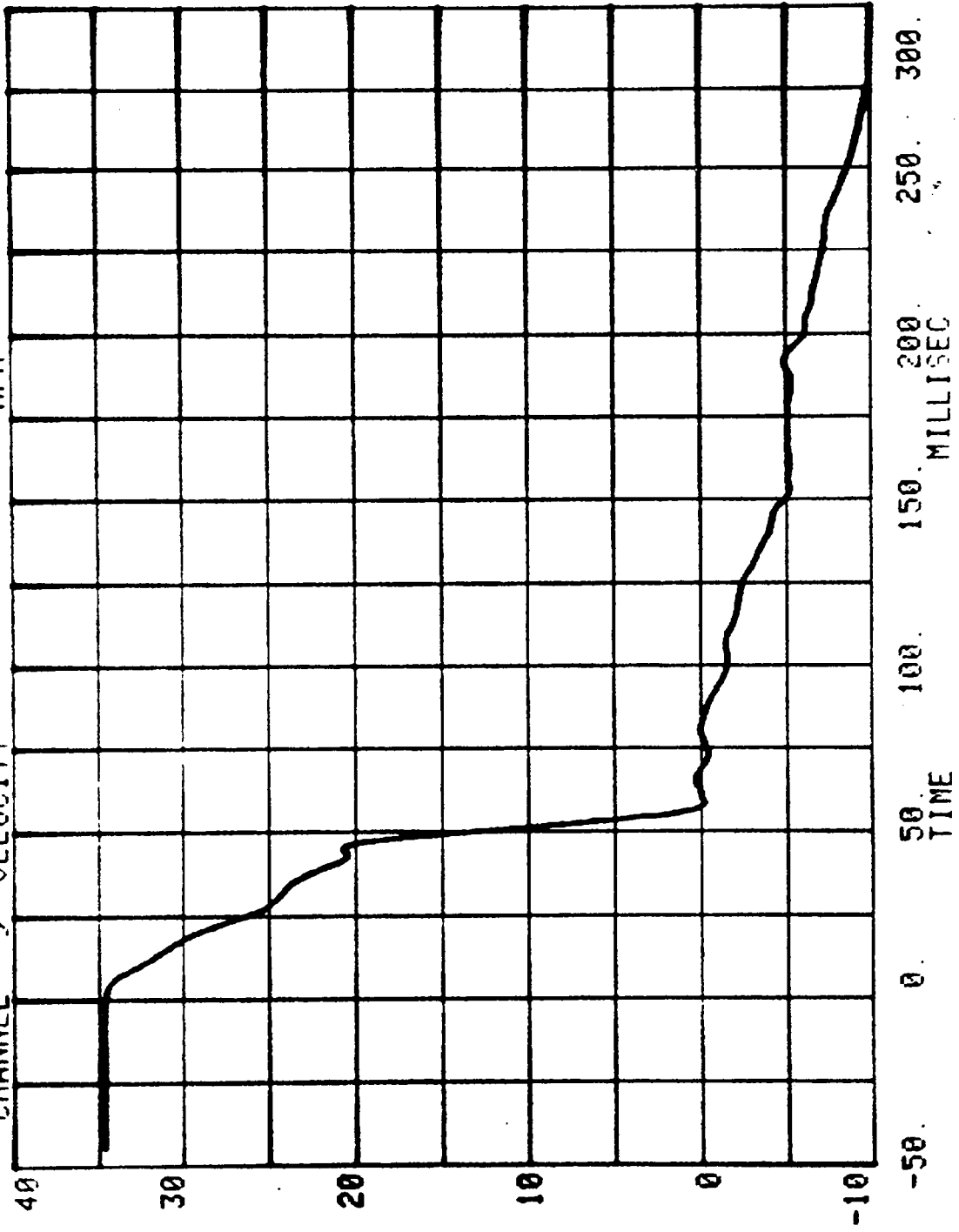


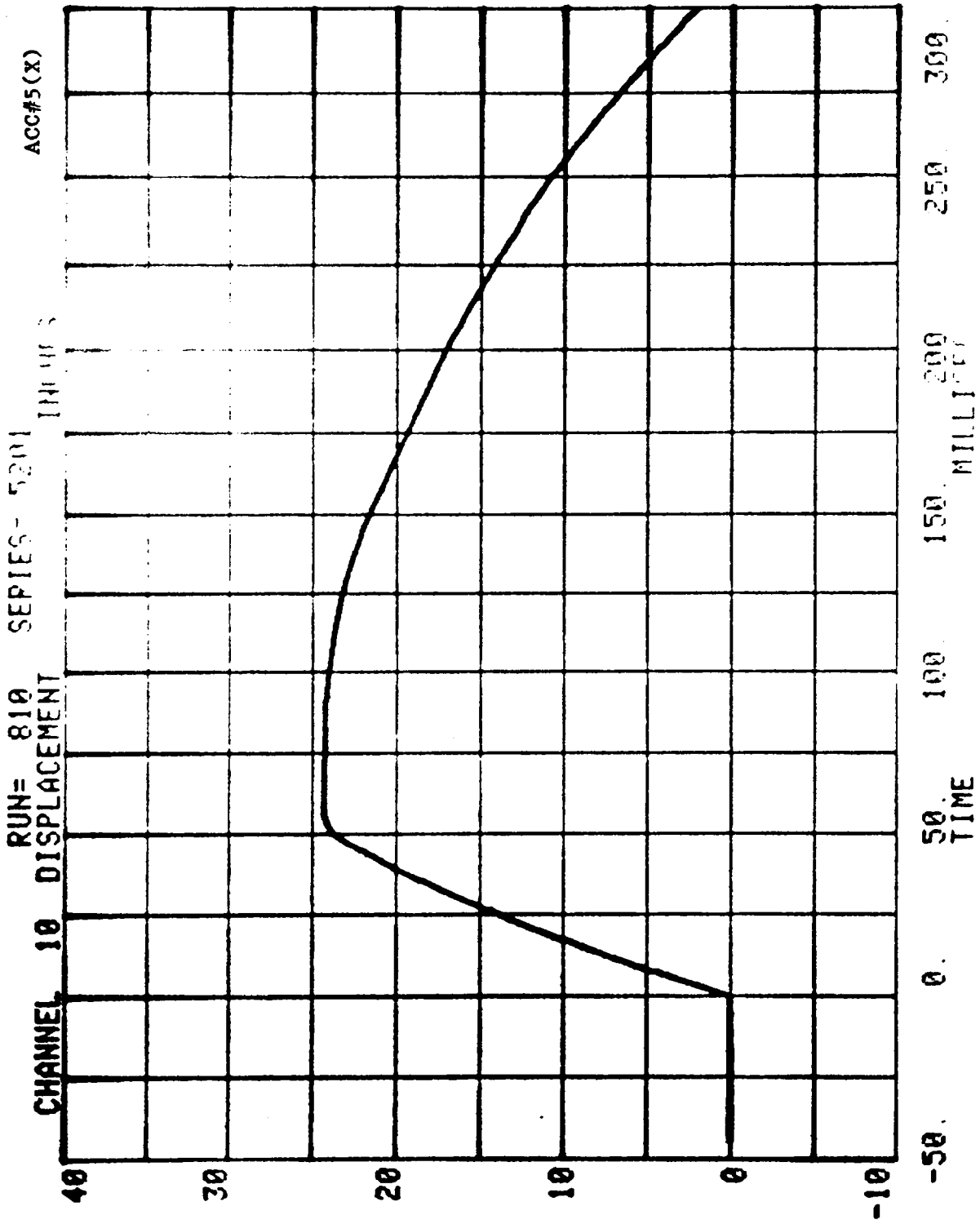


CHANNEL 31 ACC PACK #5(X) RUN= 810 SERIES= 5201 G'S

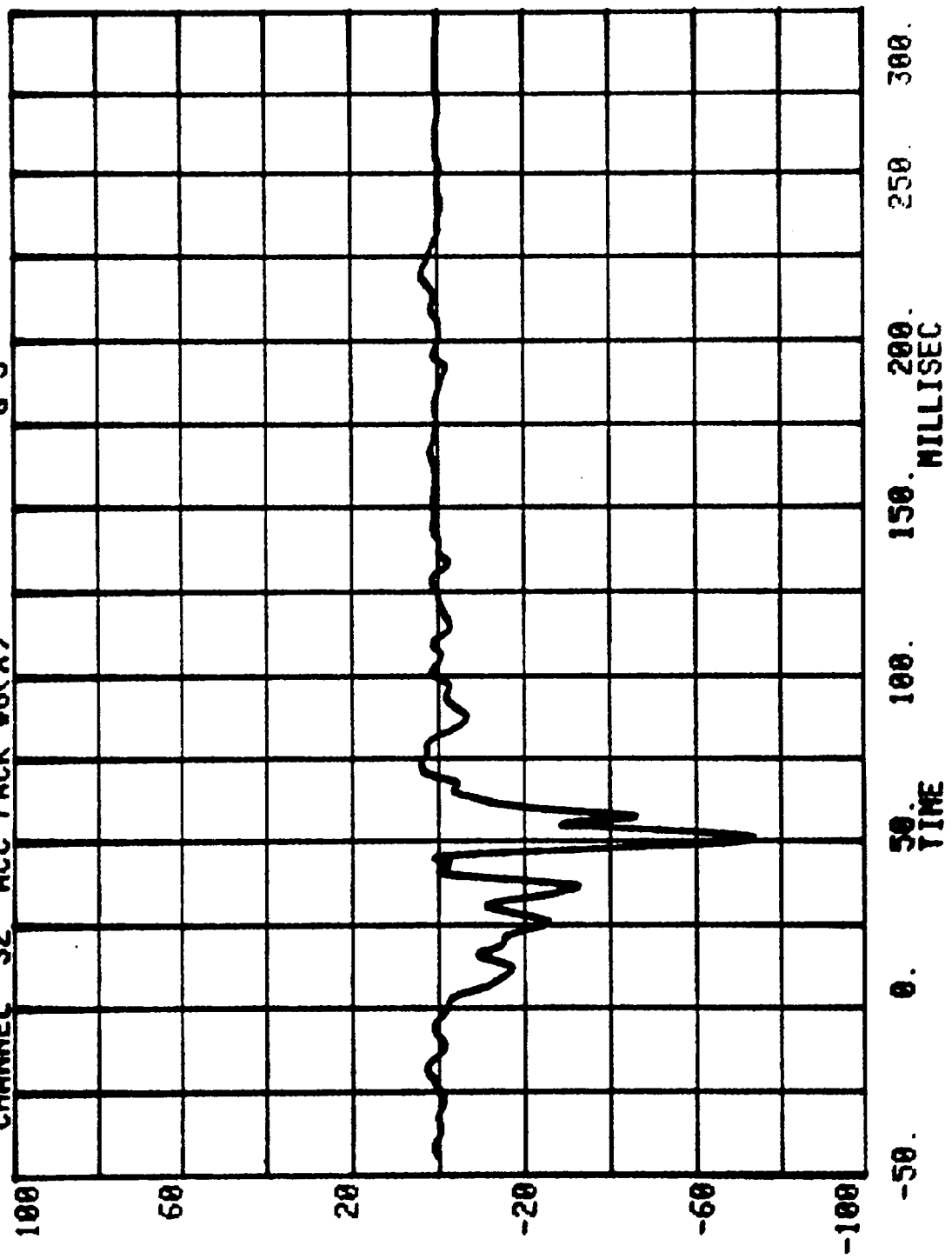


CHANNEL 9 VELOCITY  
RUN= 810 SERIES= 5201  
ACC#5(X)

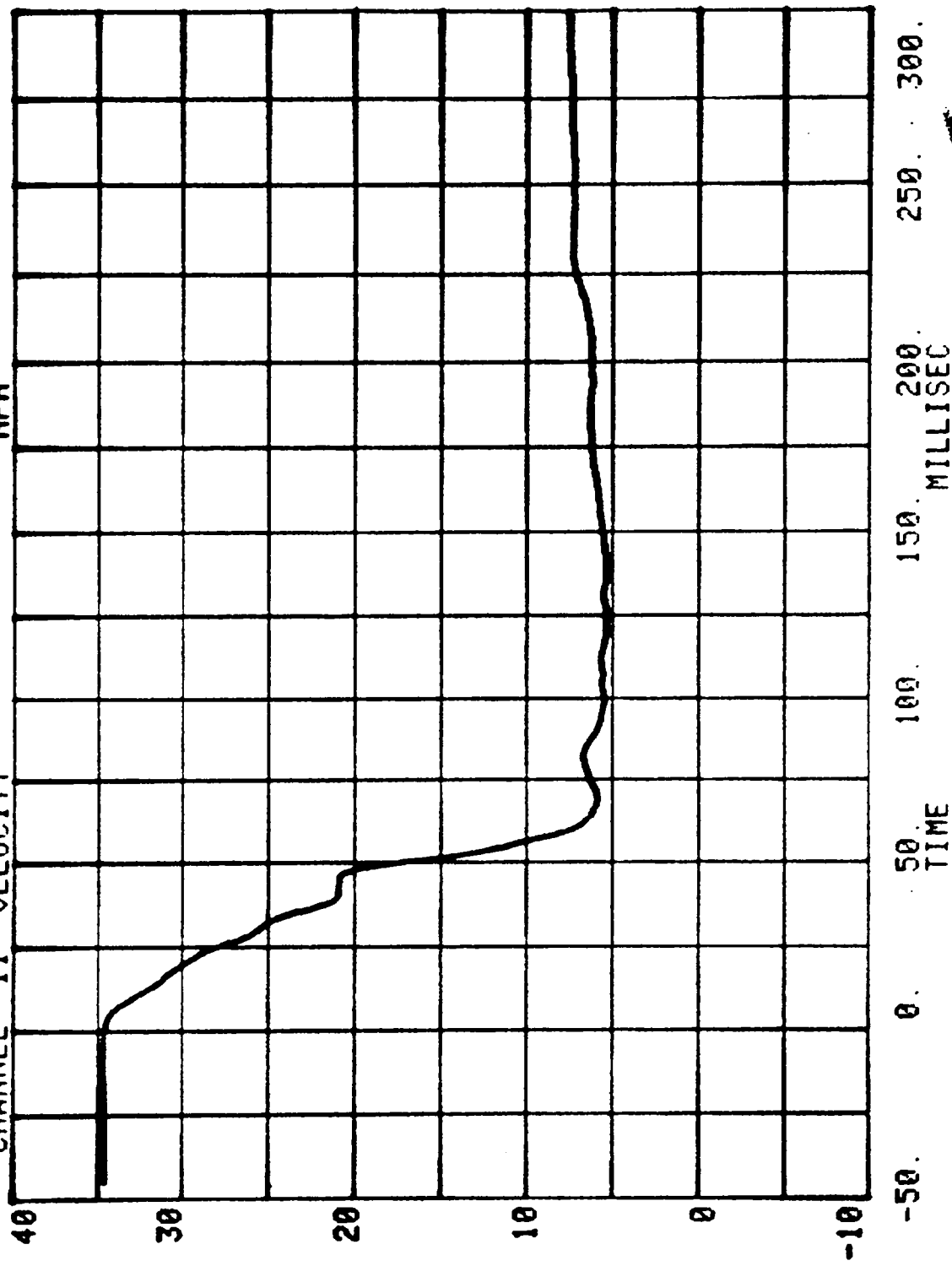




RUN= 810 SERIES= 5201  
CHANNEL 32 ACC PACK #6(X) G'S



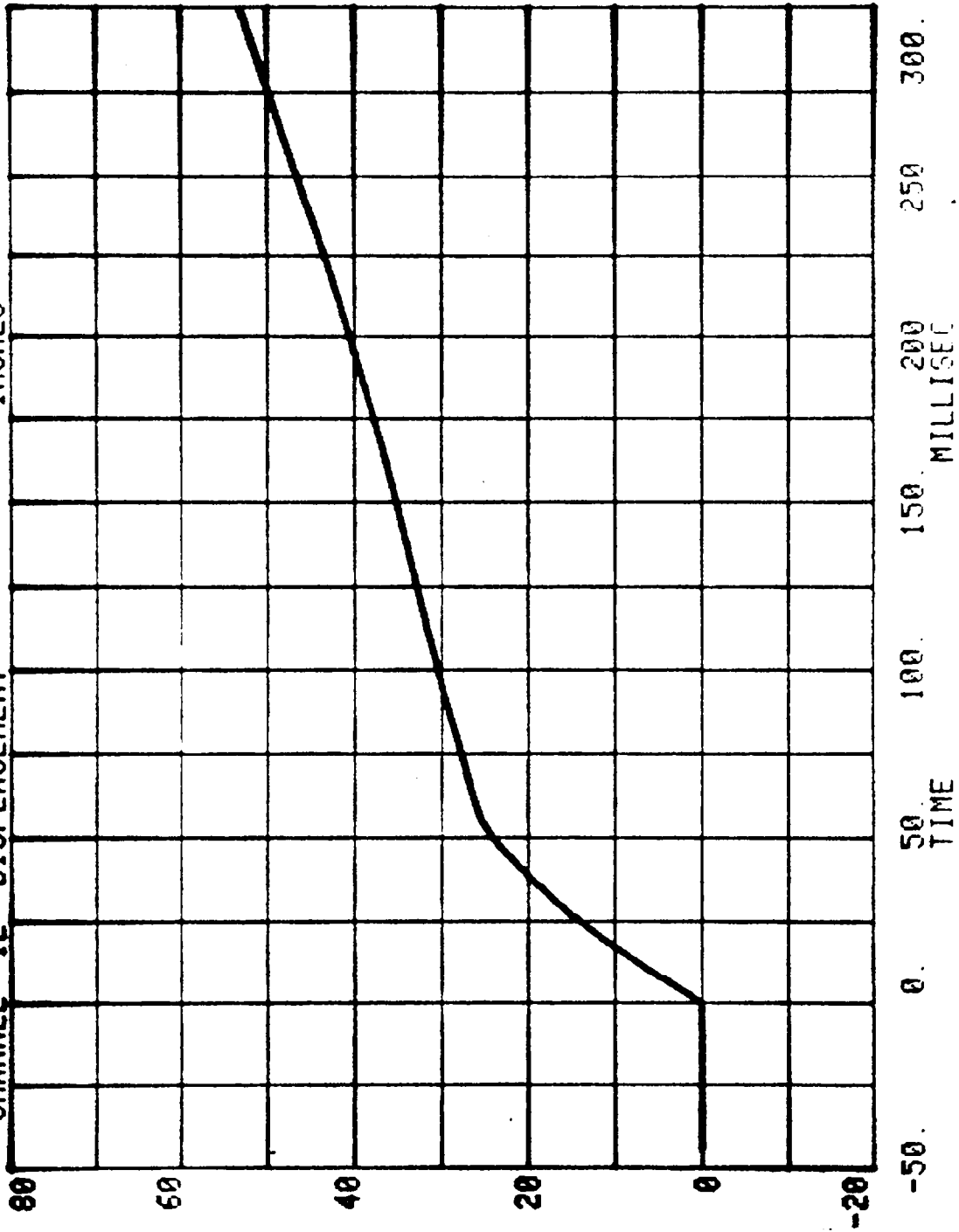
CHANNEL 11 VELOCITY  
RUN= 810 SERIES= 5201 MPH  
ACC #6X



ACC #6X

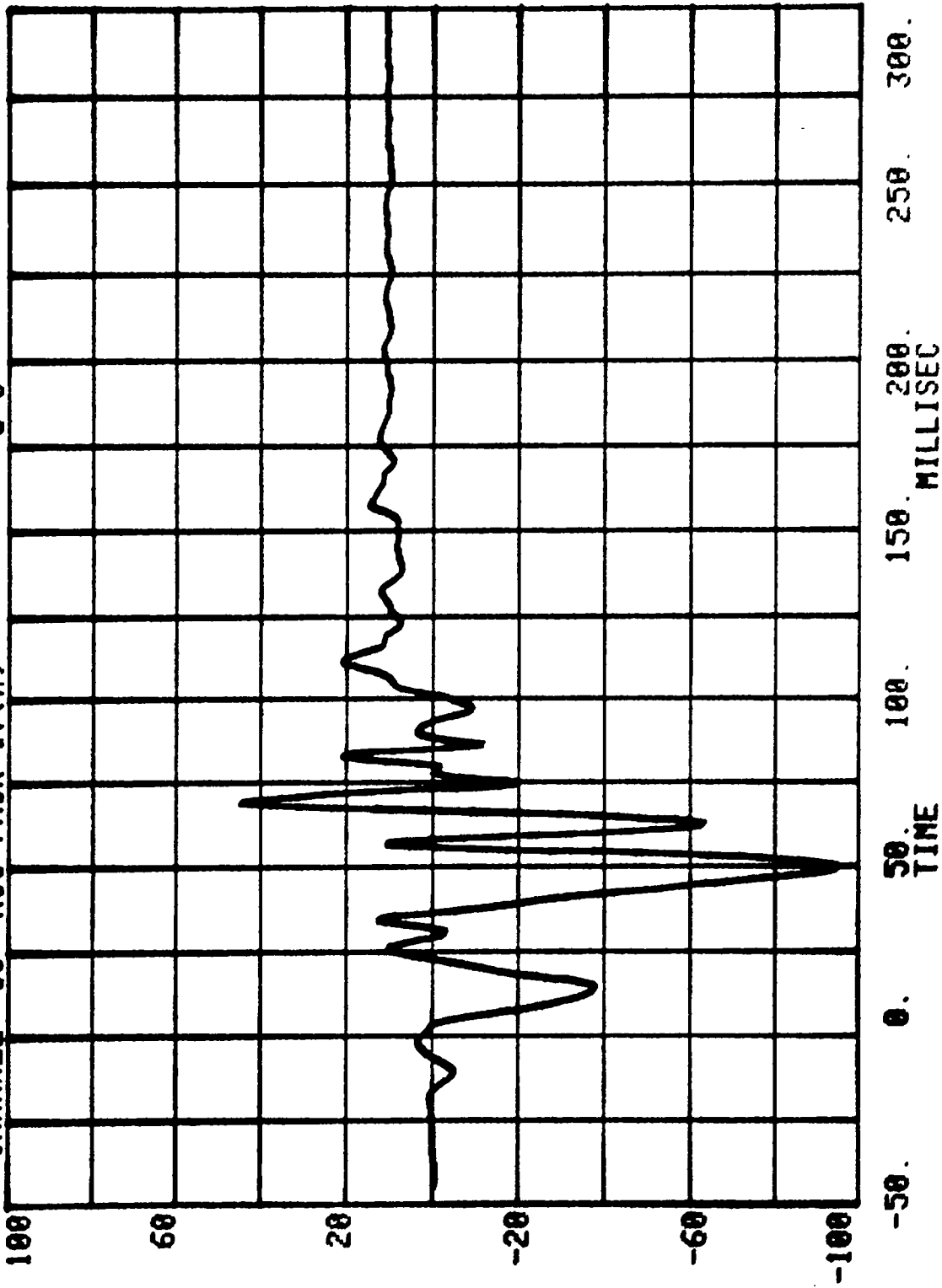
CHANNEL 12 DISPLACEMENT SERIES= 5201 INCHES

RUN= 810



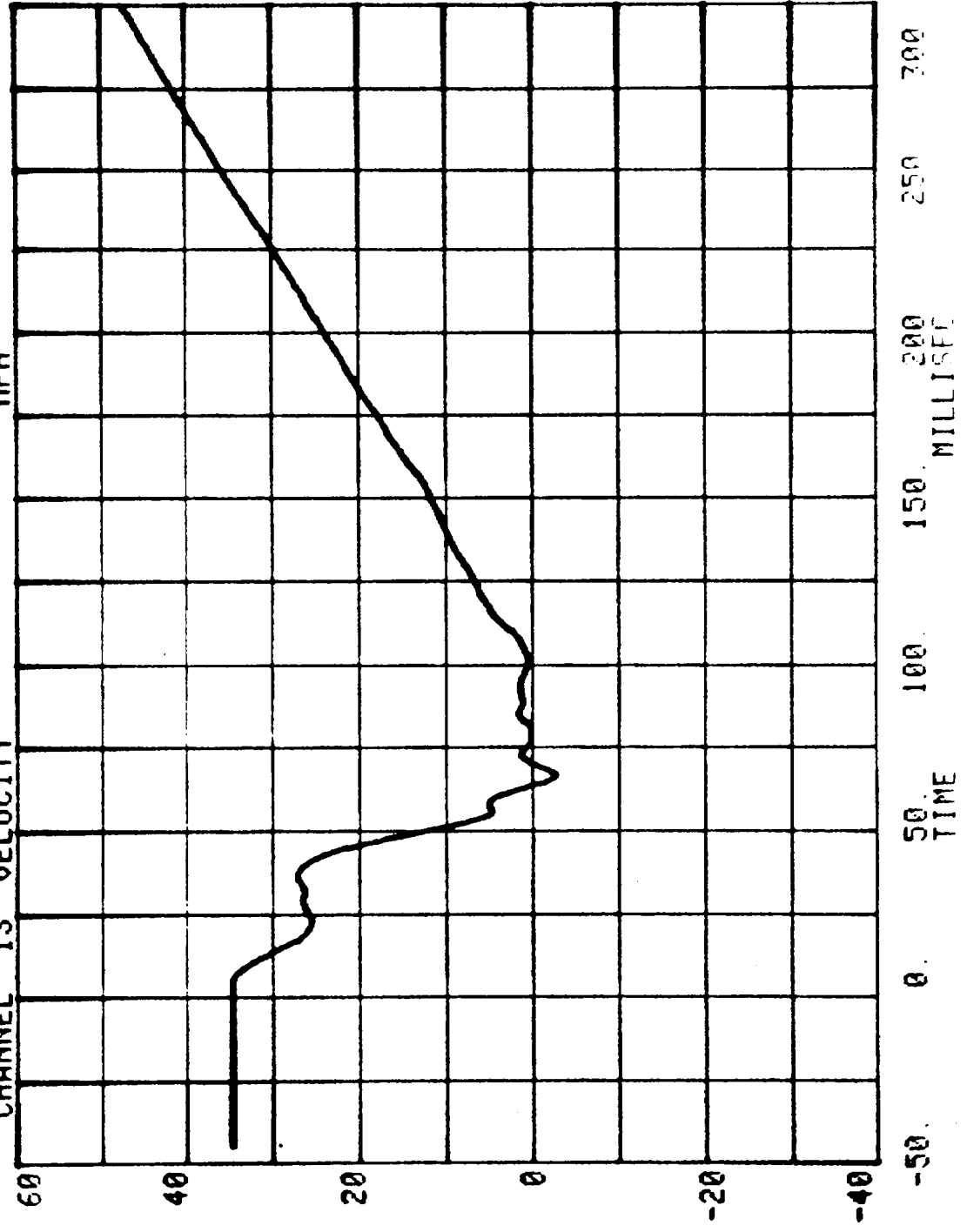
CHANNEL 33 ACC PACK #7(X) G'S

RUN= 810 SERIES= 5201



ACG#7 (X)

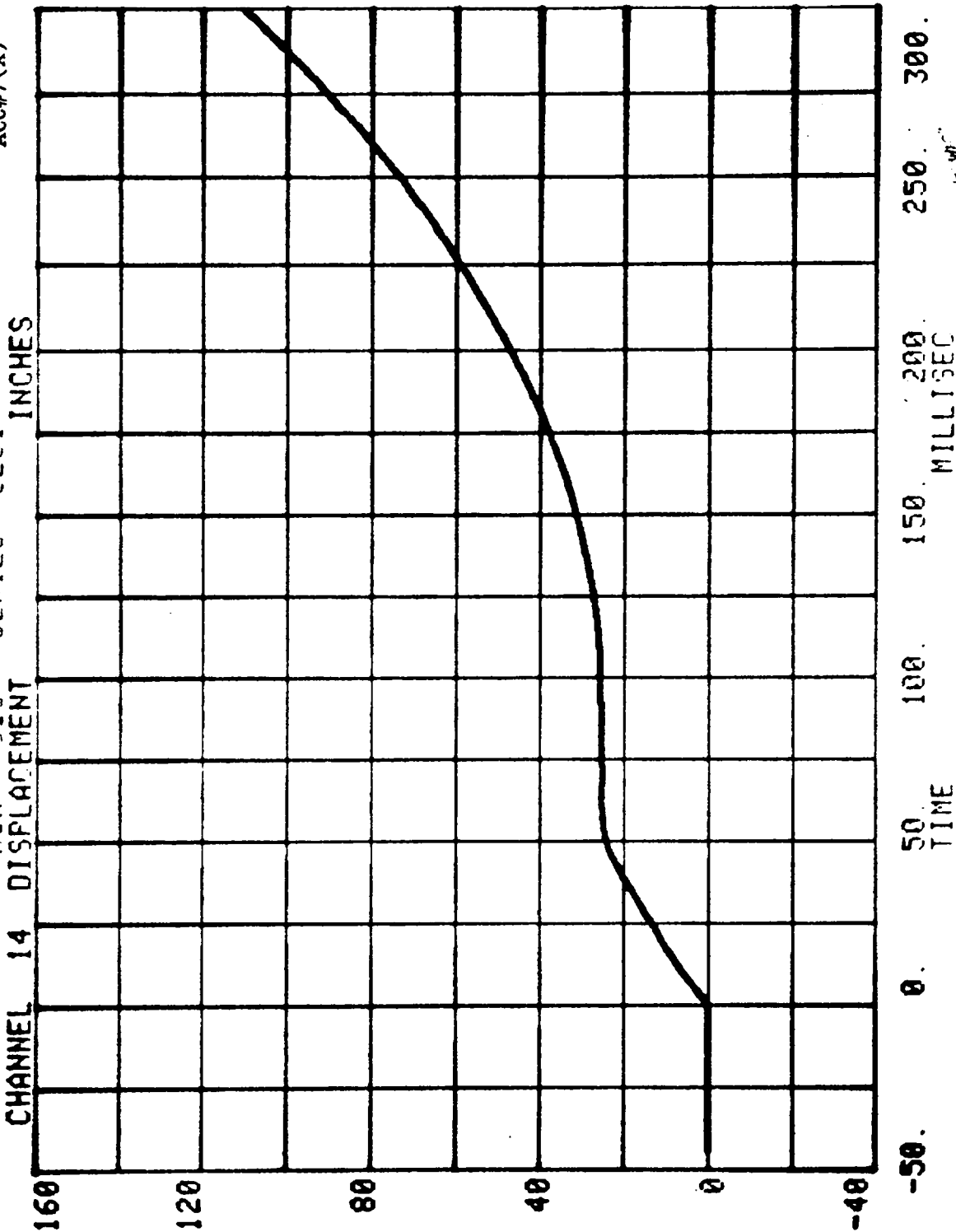
CHANNEL 13 VELOCITY  
RUN= 810 SERIES= 5201 MPH



ACC#7(X)

RUN= 810 SERIES= 5201

CHANNEL 14 DISPLACEMENT



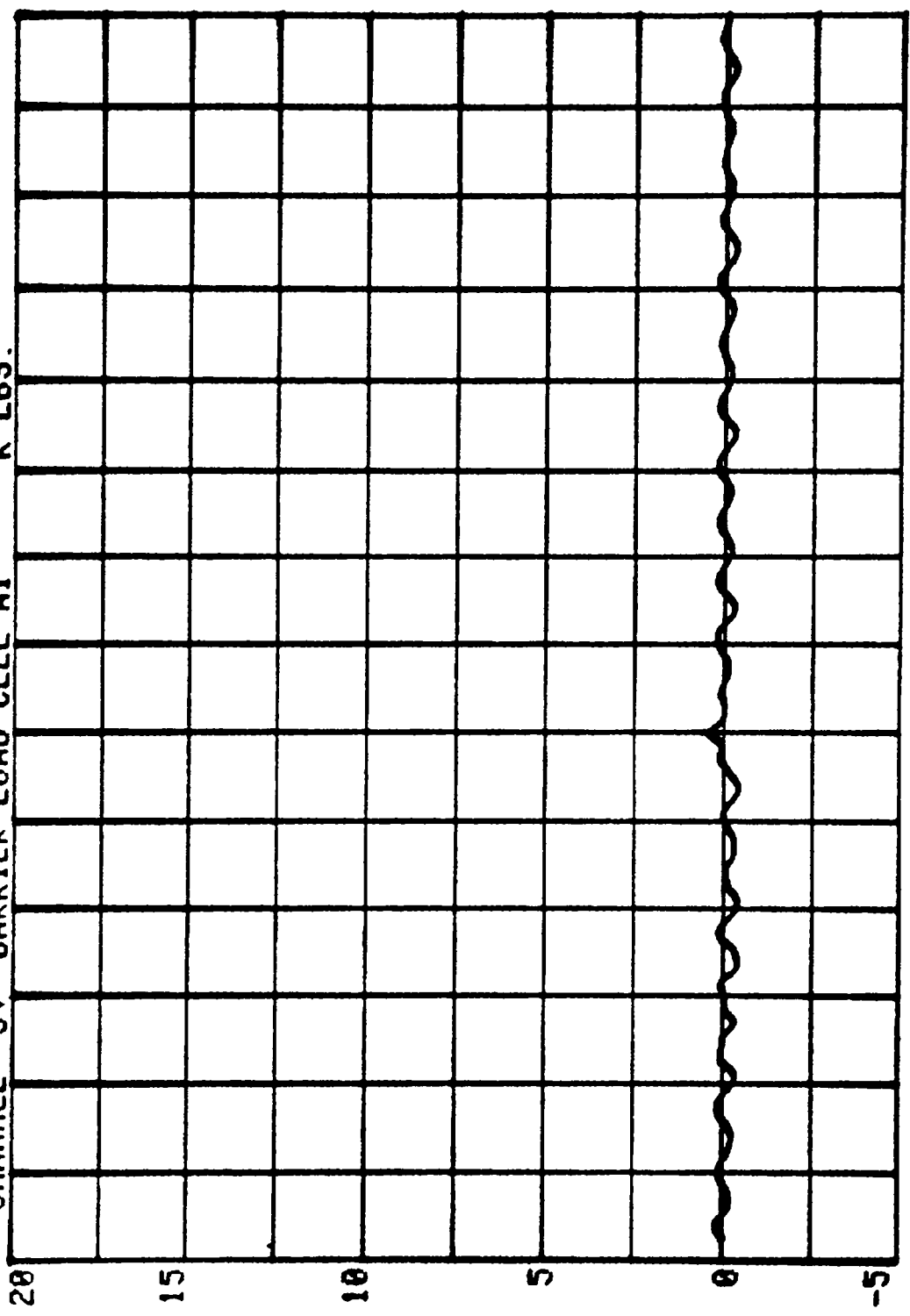
TEST NO. MJ5201

LOAD CELL BARRIER DATA

FILTER CHANNEL CLASS

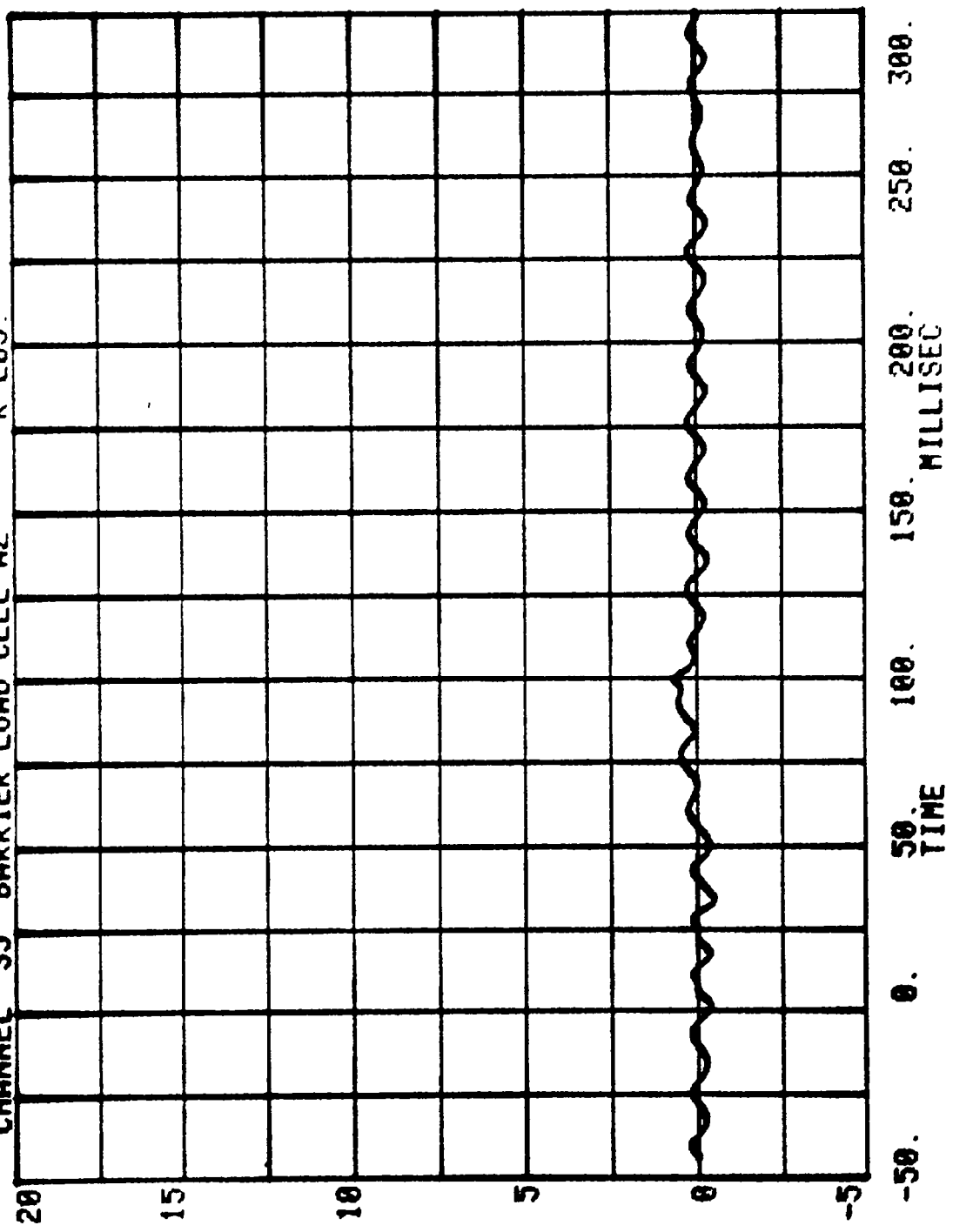
60

CHANNEL 34 BARRIER LOAD CELL A1  
RUN= 810 SERIES= 5201 K LBS.



20  
15  
10  
5  
0  
-5  
-50. 0. 50. 100. 150. 200. 250. 300.  
TIME  
MILLISEC

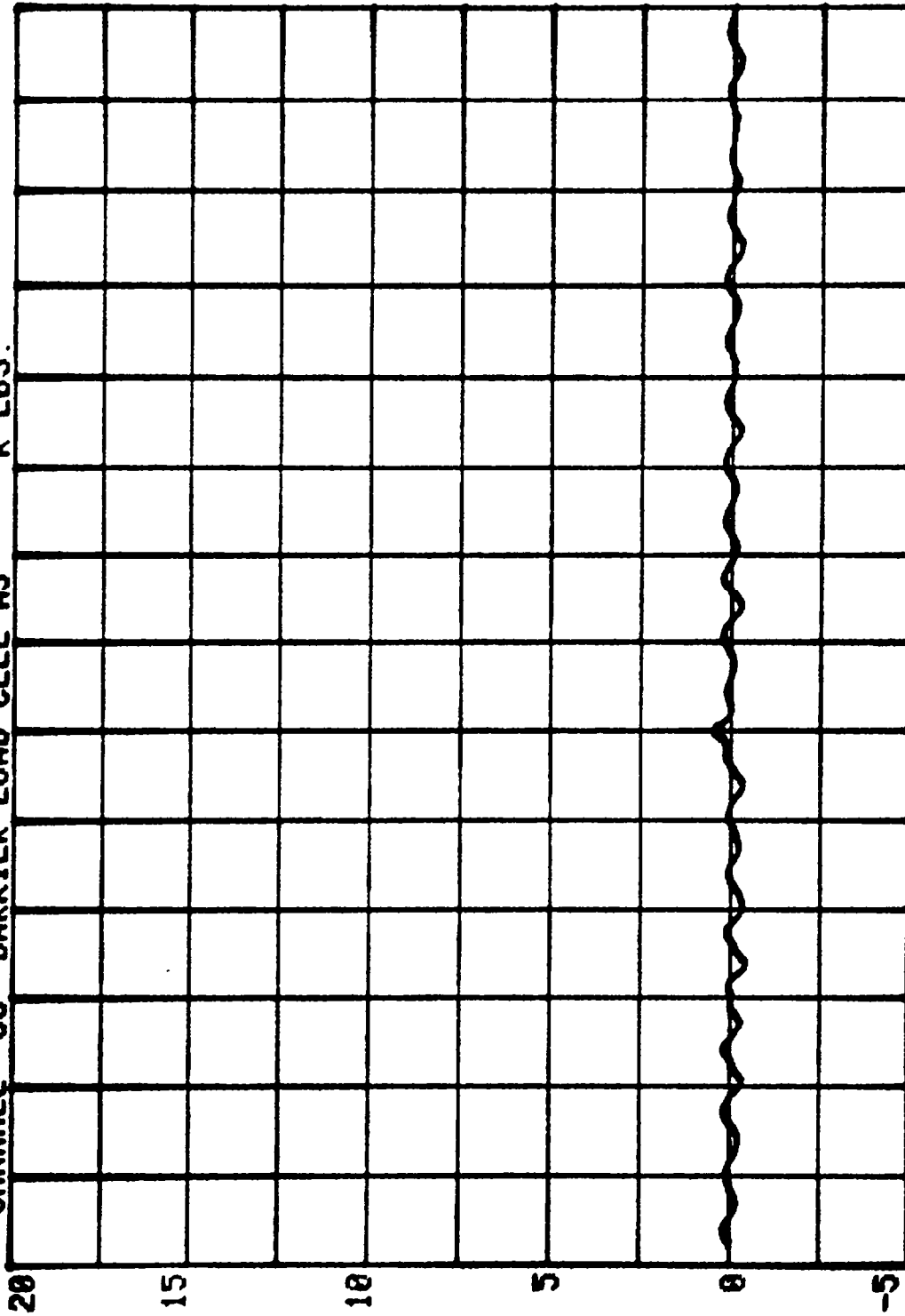
CHANNEL 35 BARRIER LOAD CELL A2  
RUN= 810 SERIES= 5201 K LBS.



CHANNEL 36 BARRIER LOAD CELL A3

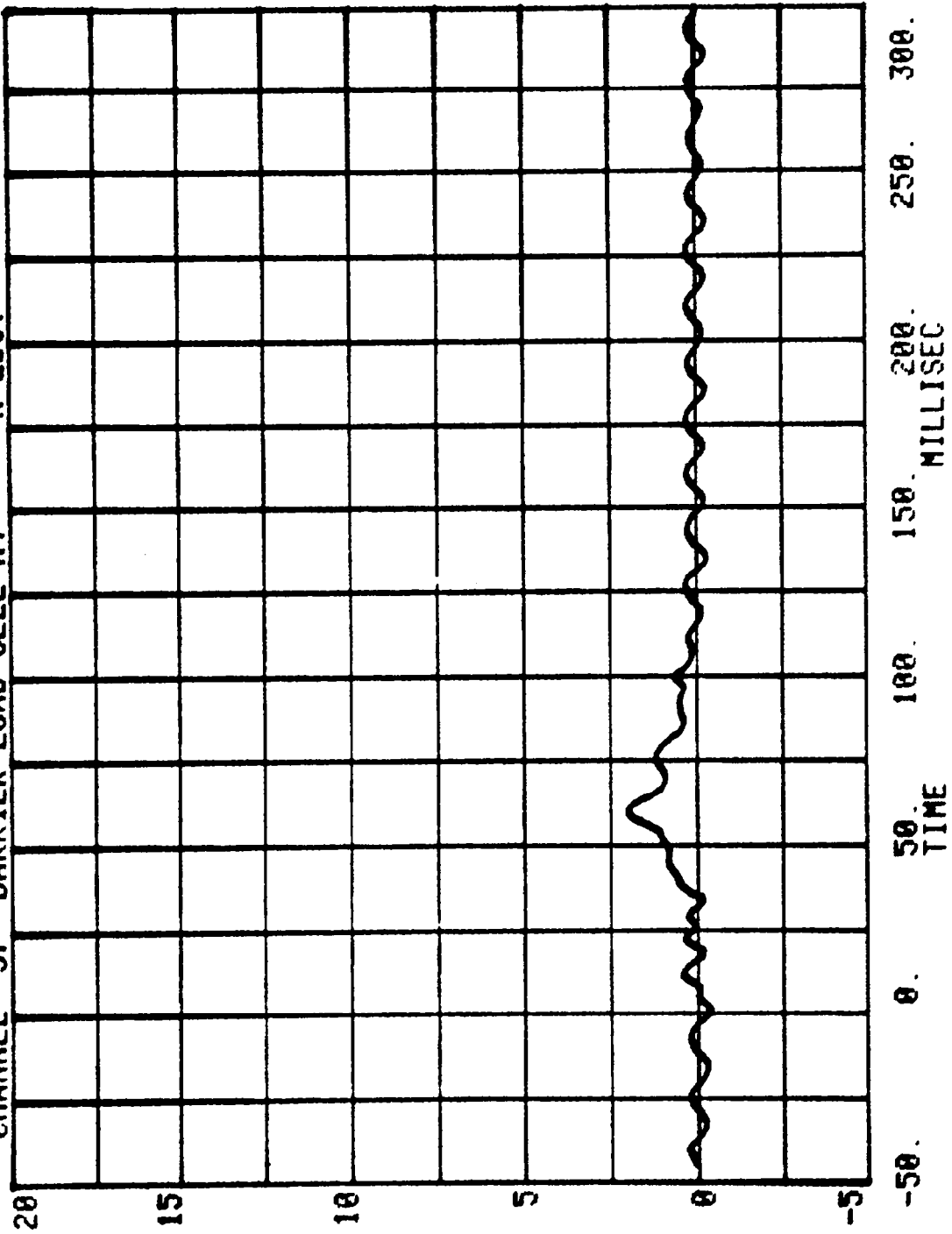
RUN= 810 SERIES= 5201

K LBS.

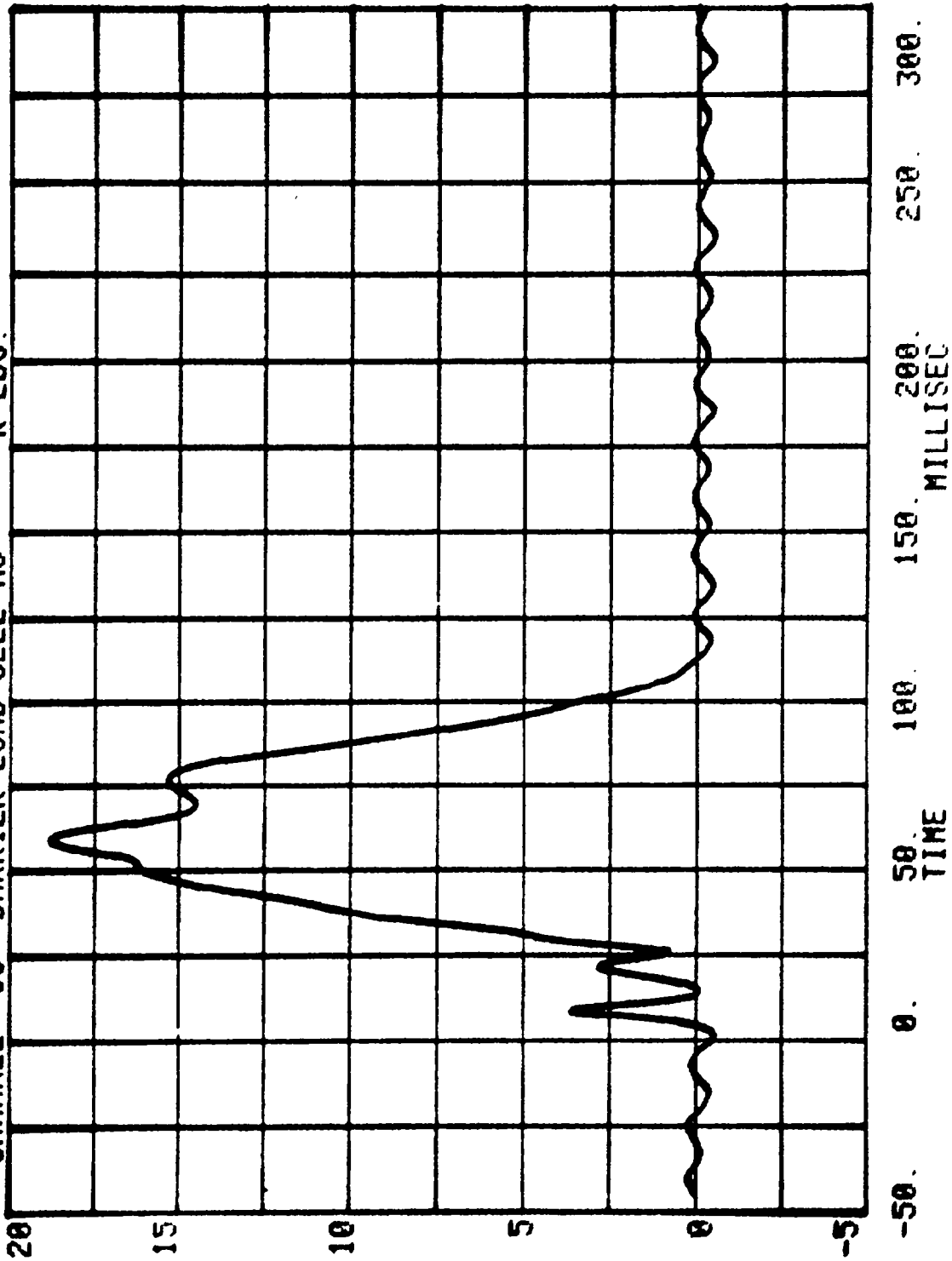


-50. 0. 50. 100. 150. 200. 250. 300.  
TIME MILLISEC

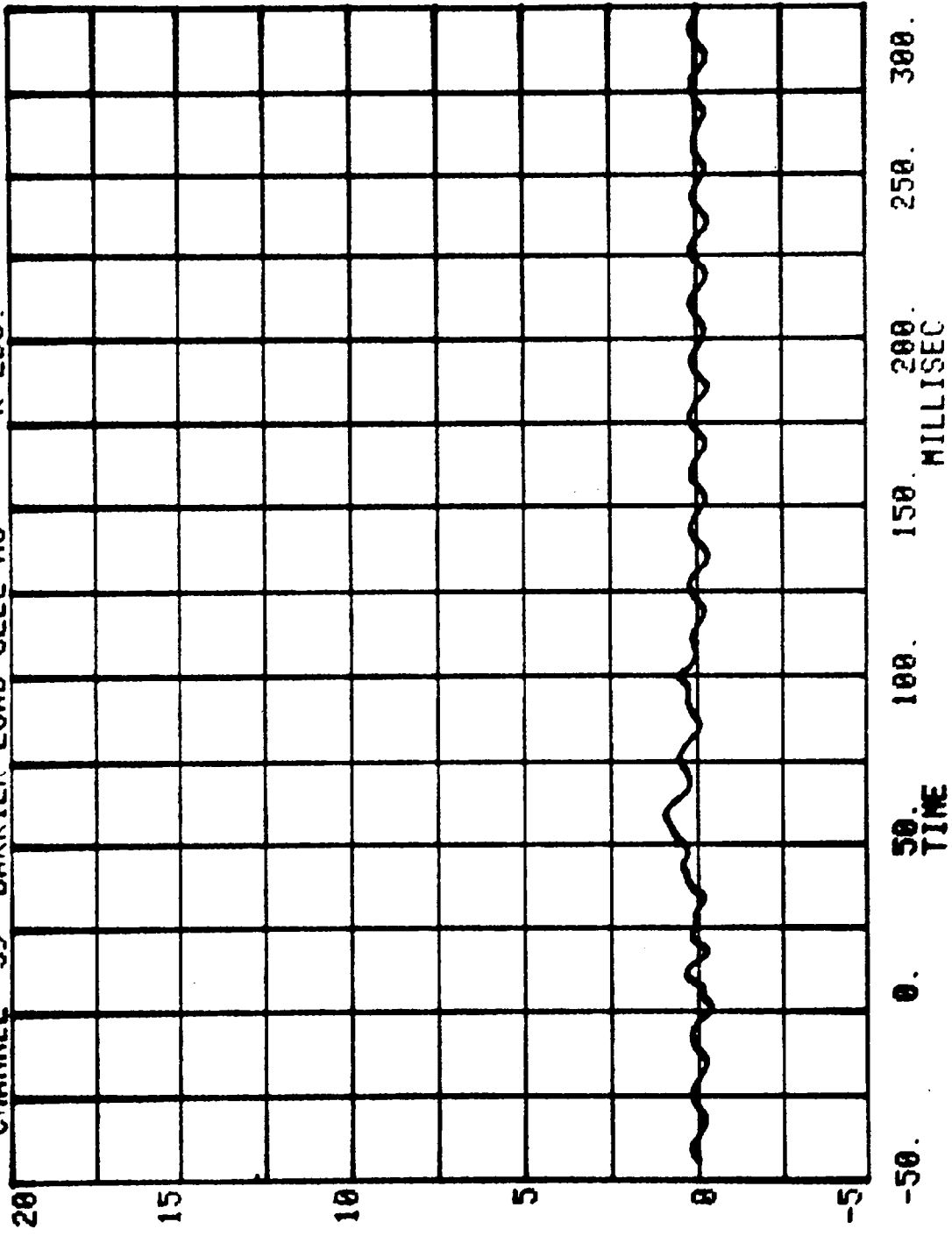
RUN= 810 SERIES= 5201 K LBS.  
CHANNEL 37 BARRIER LOAD CELL A4



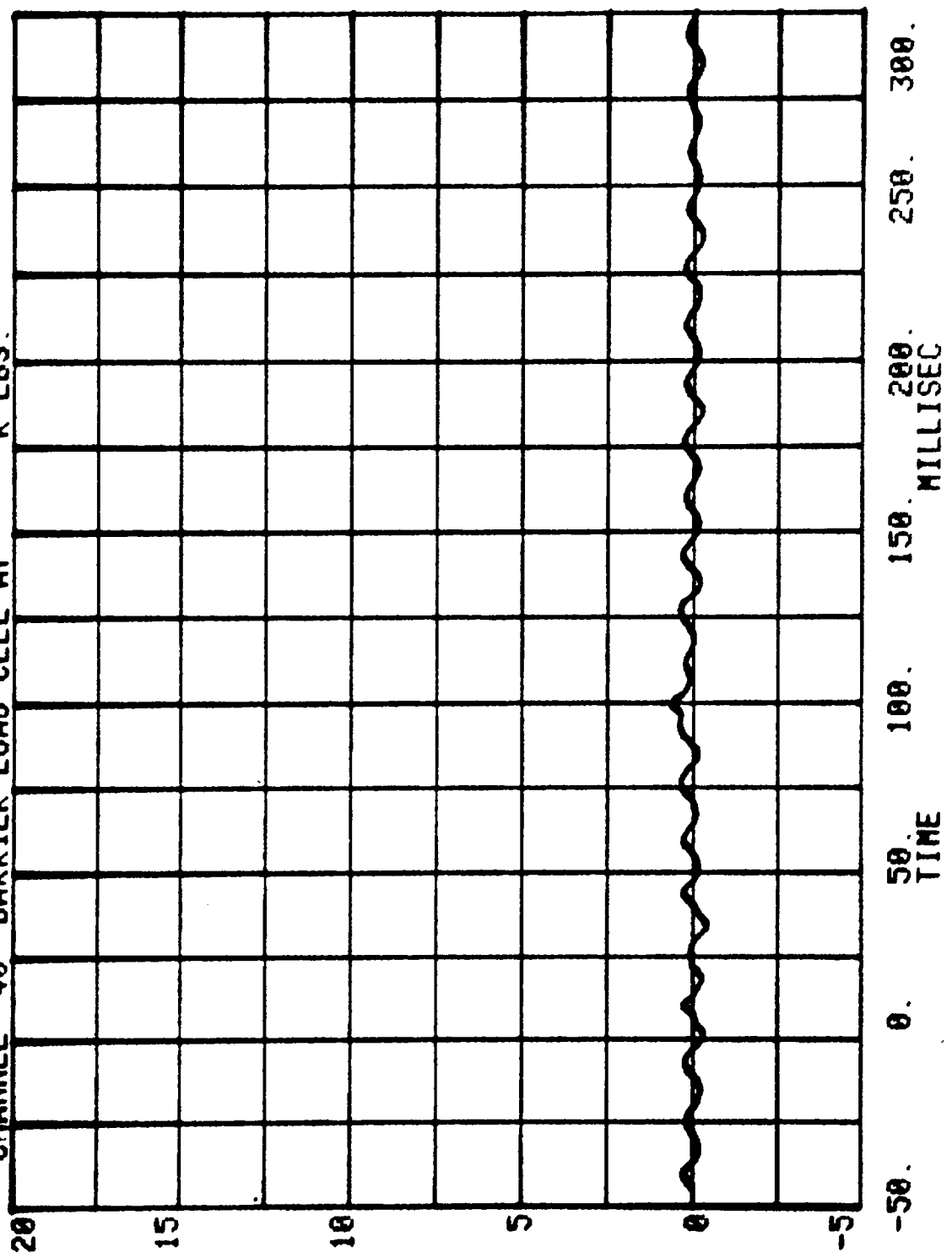
CHANNEL 38 BARRIER LOAD CELL A5  
RUN= 810 SERIES= 5201 K LBS.



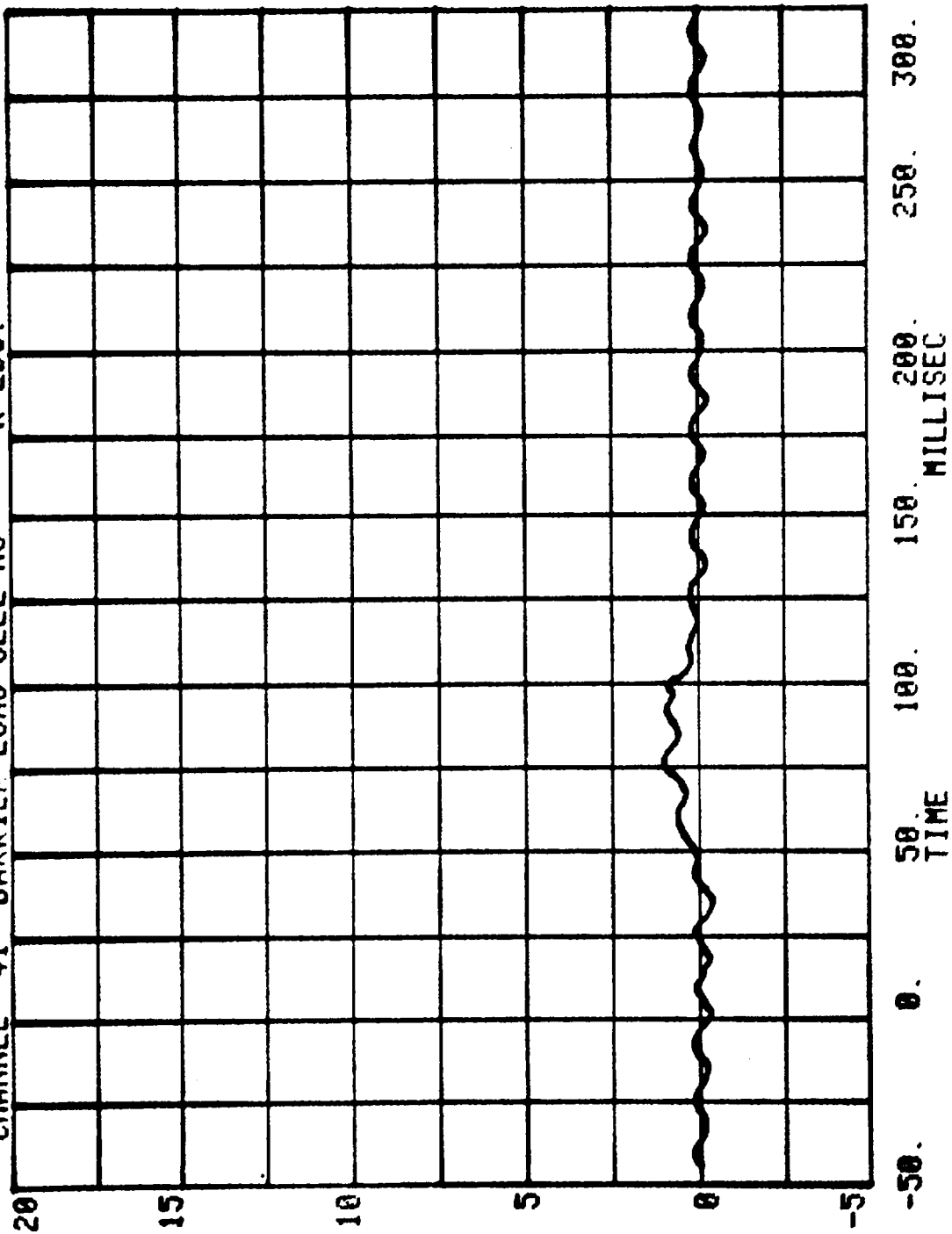
CHANNEL 39 BARRIER LOAD CELL A6 K LBS.  
RUN= 810 SERIES= 5201



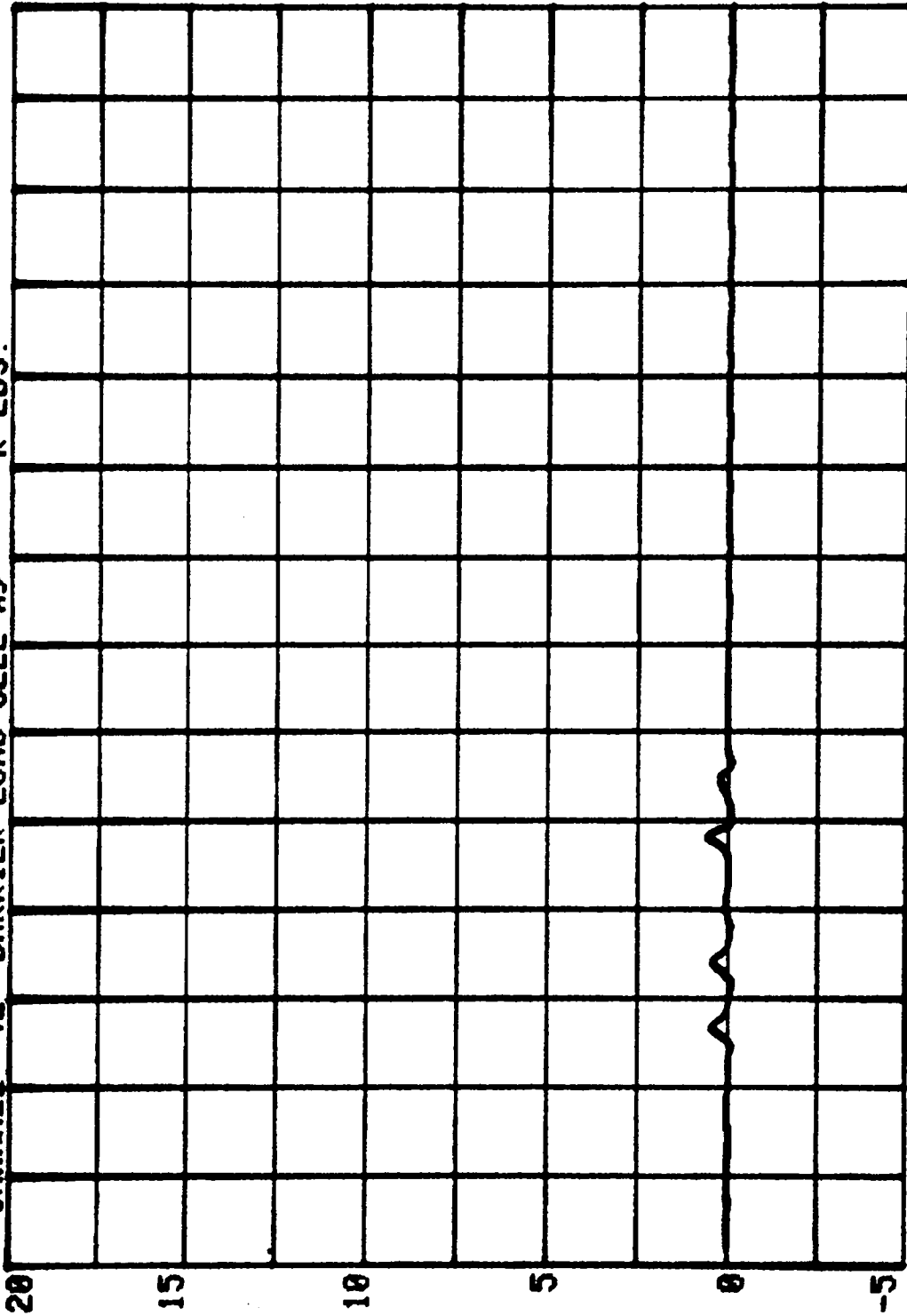
CHANNEL 40 BARRIER LOAD CELL A7  
RUN= 810 SERIES= 5201 K LBS.



CHANNEL 41 BARRIEP LOAD CELL A8  
RUN= 810 SERIES= 5201 K LBS.

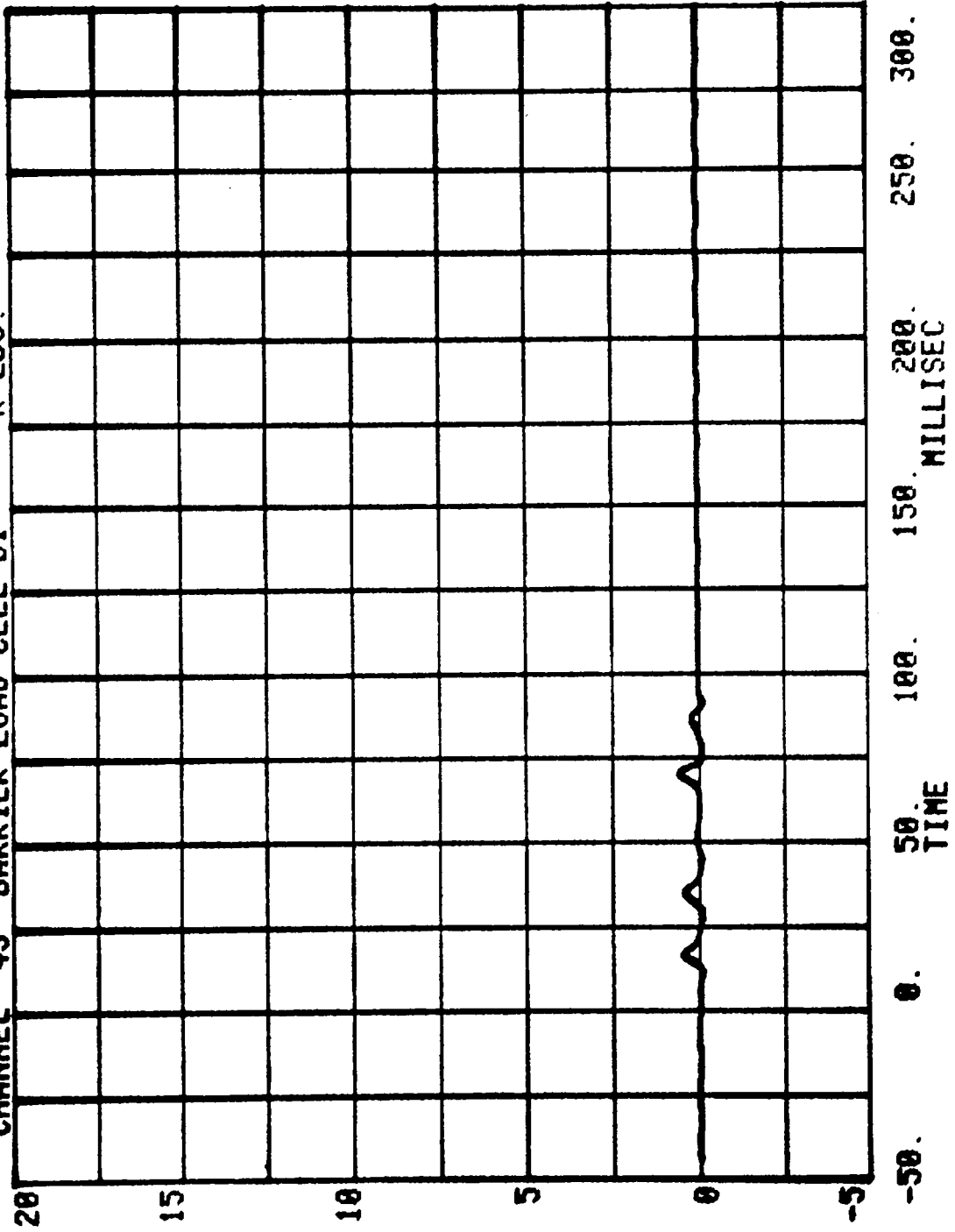


CHANNEL 42 BARRIER LOAD CELL A9  
RUN= 810 SERIES= 5201 K LBS.

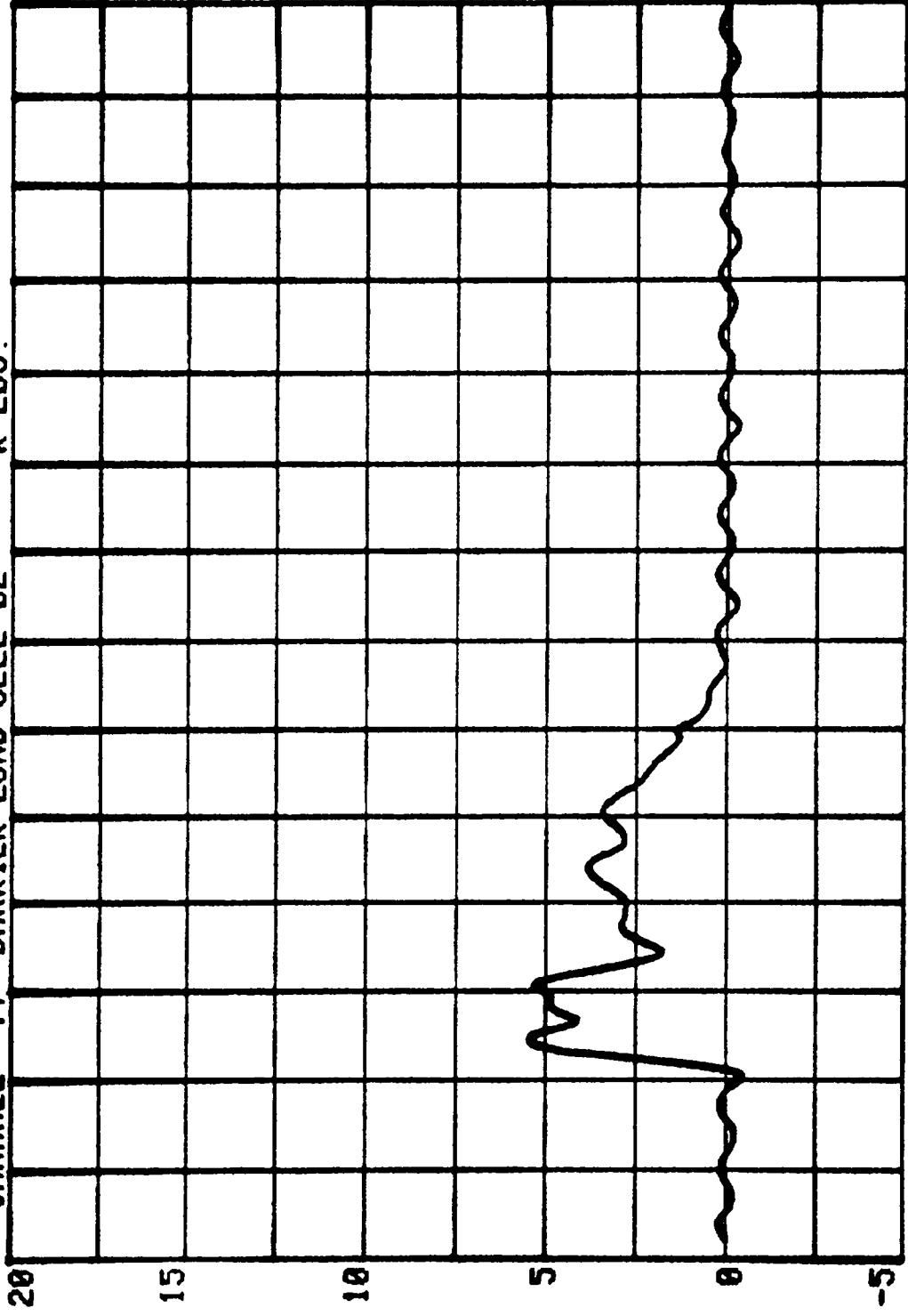


-50. 0. 50. 100. 150. 200. 250. 300.  
TIME MILLISEC.

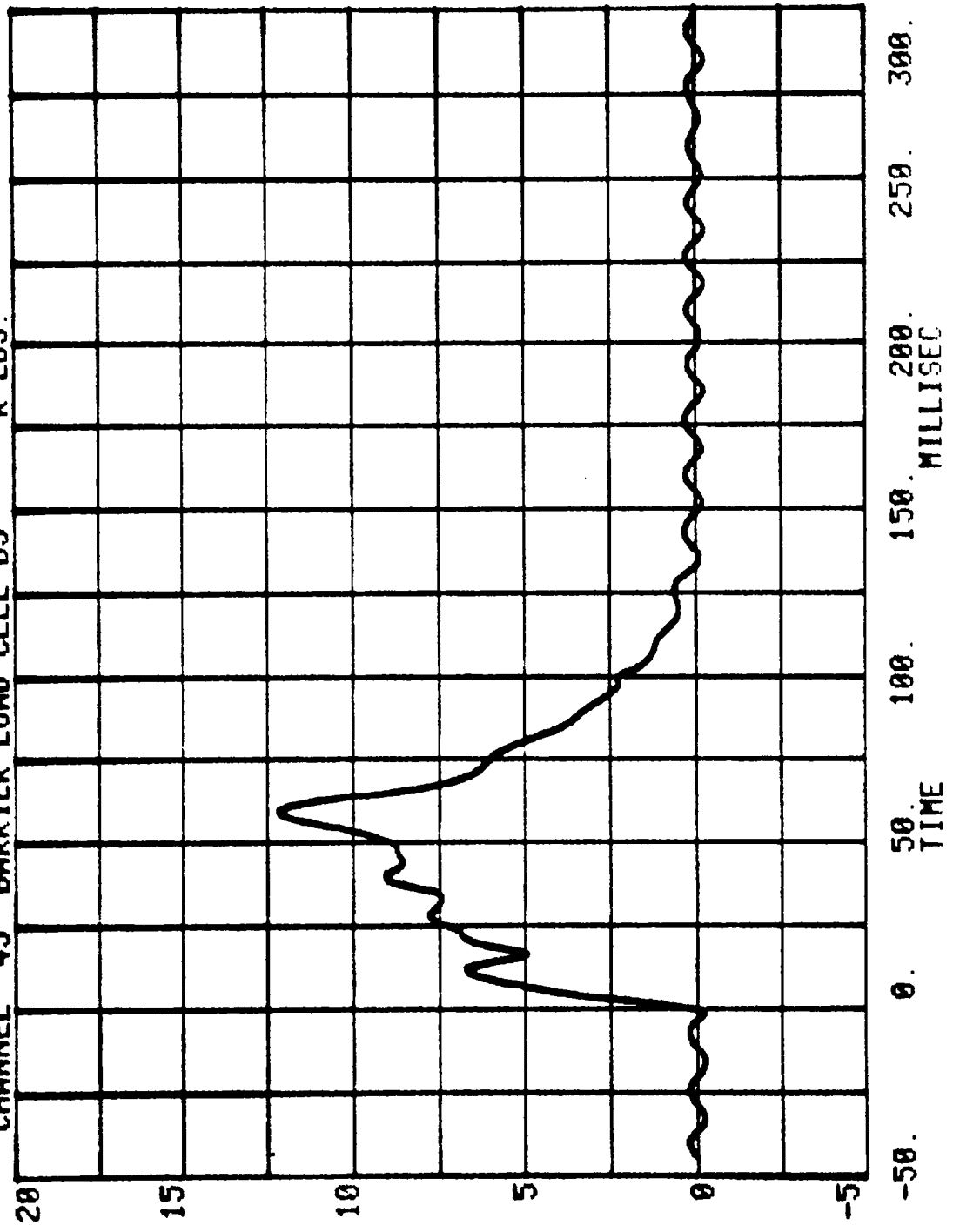
RUN= 810 SERIES= 5201 K LBS.  
CHANNEL 43 BARRIER LOAD CELL B1



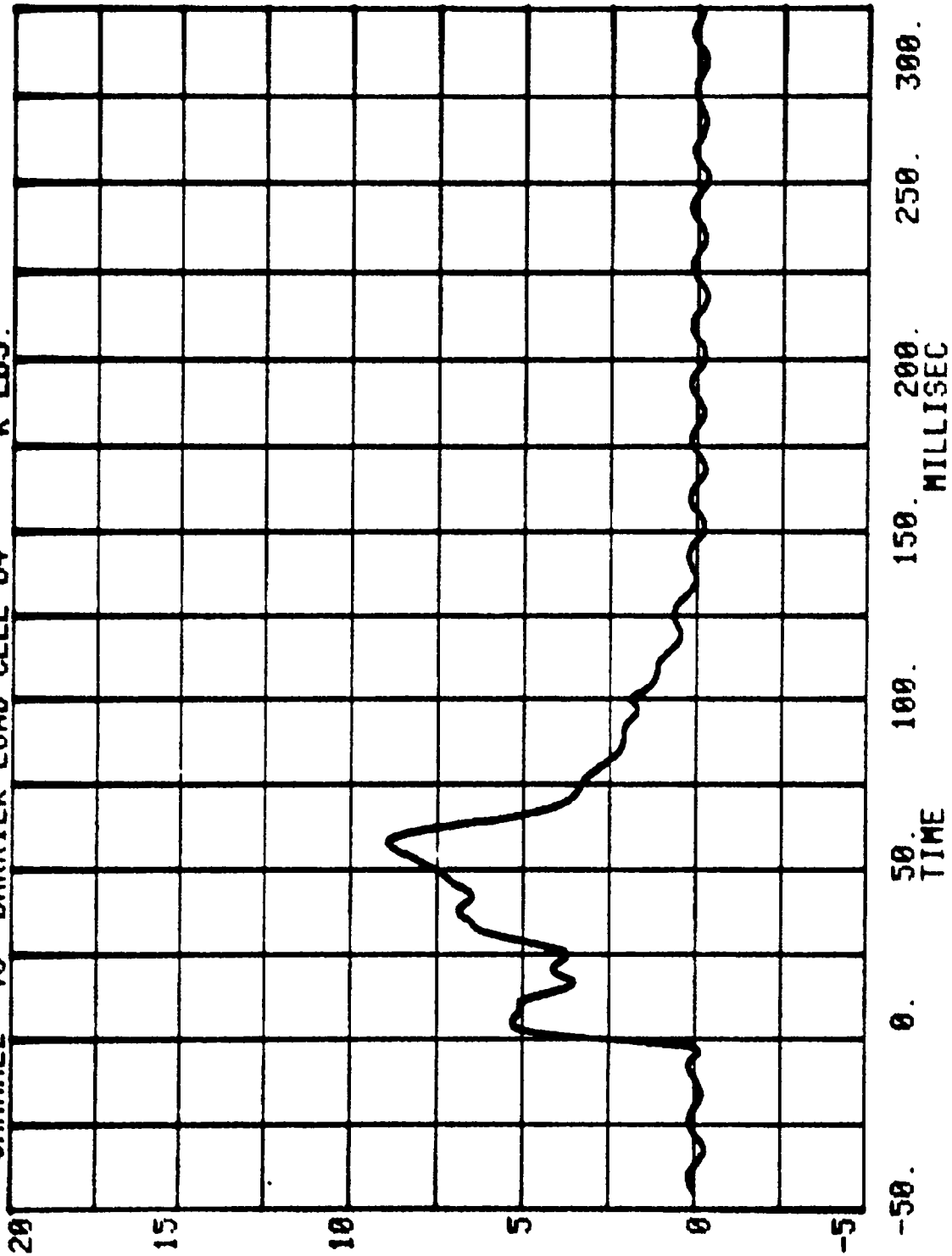
CHANNEL 44 RUN= 810 SERIES= 5201 BARRIER LOAD CELL B2 K LBS.



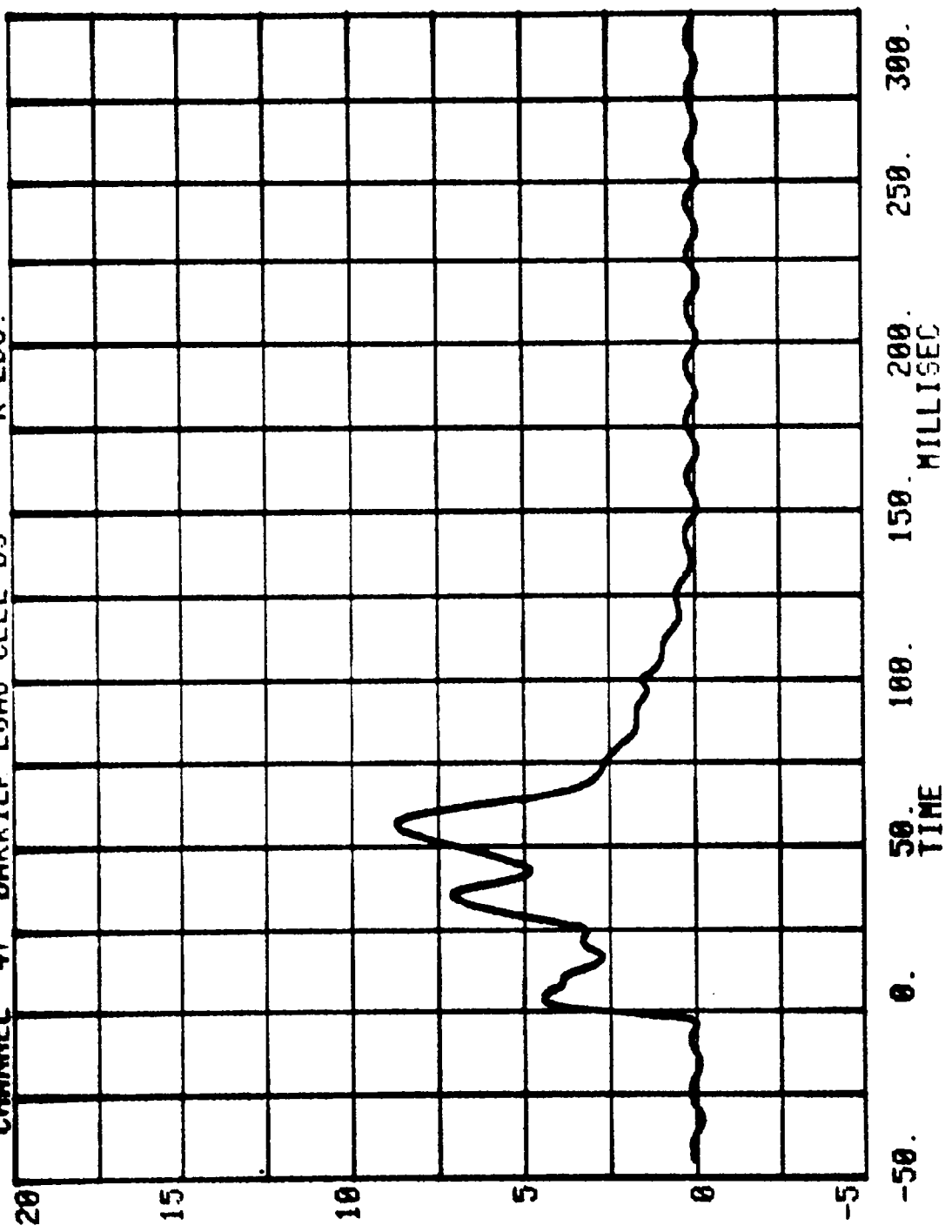
RUN= 810 SERIES= 5201  
CHANNEL 45 BARRIER LOAD CELL B3 K LBS.



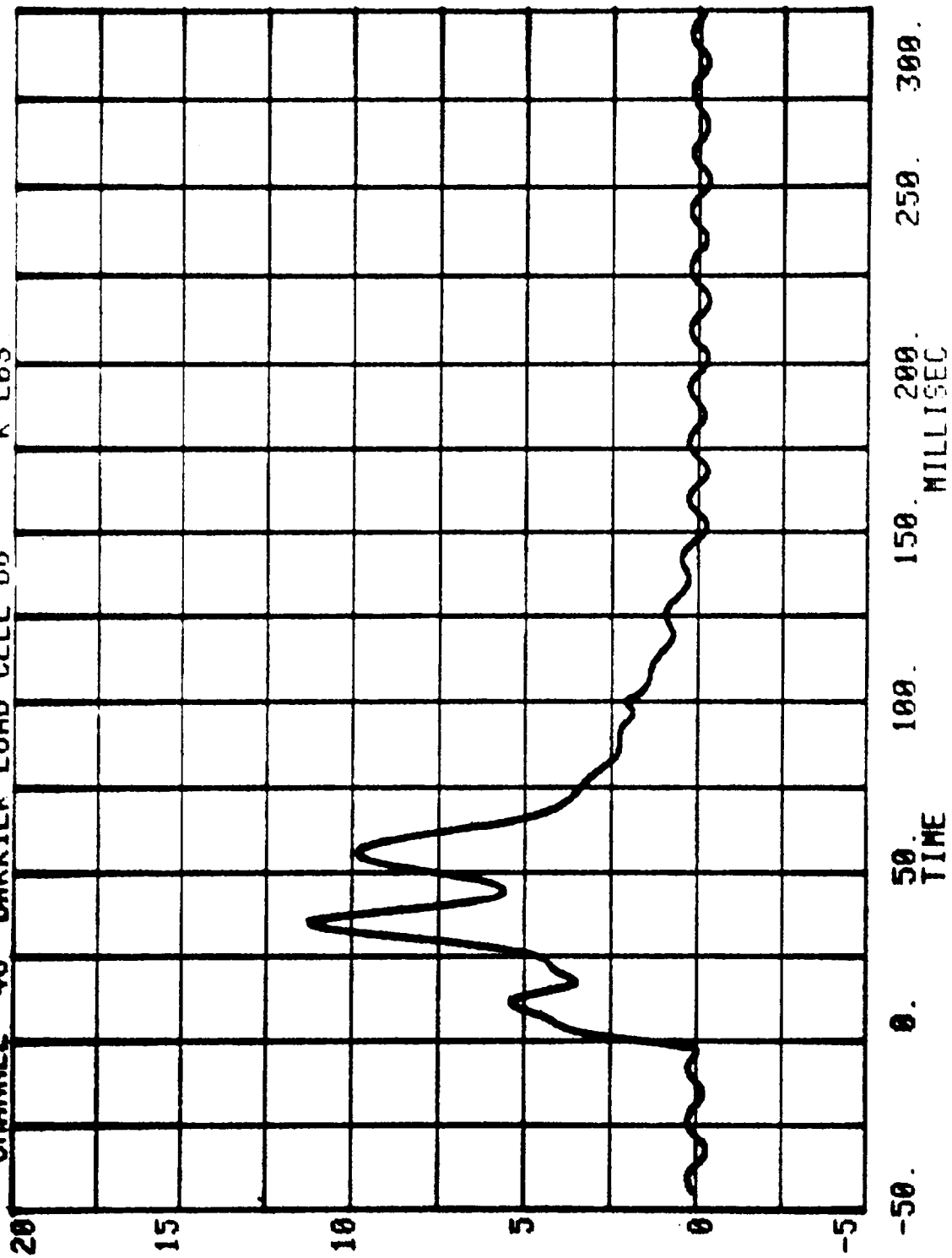
CHANNEL 46 BARRIER LOAD CELL 84  
RUN= 810 SERIES= 5201 K LBS.



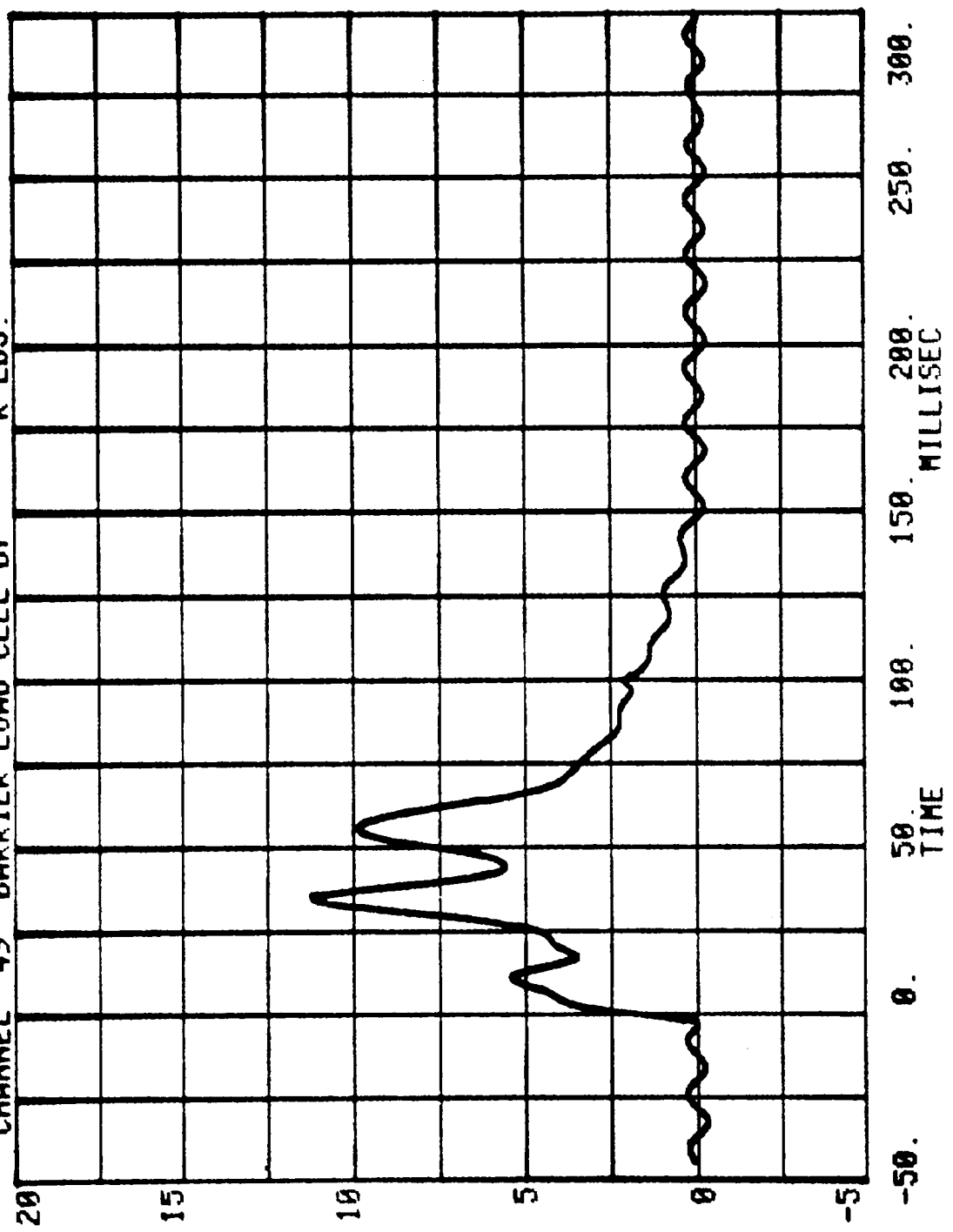
CHANNEL 47 BARRIEP LOAO CELL B5  
RUN# 810 SERIES= 5201 K LBS.



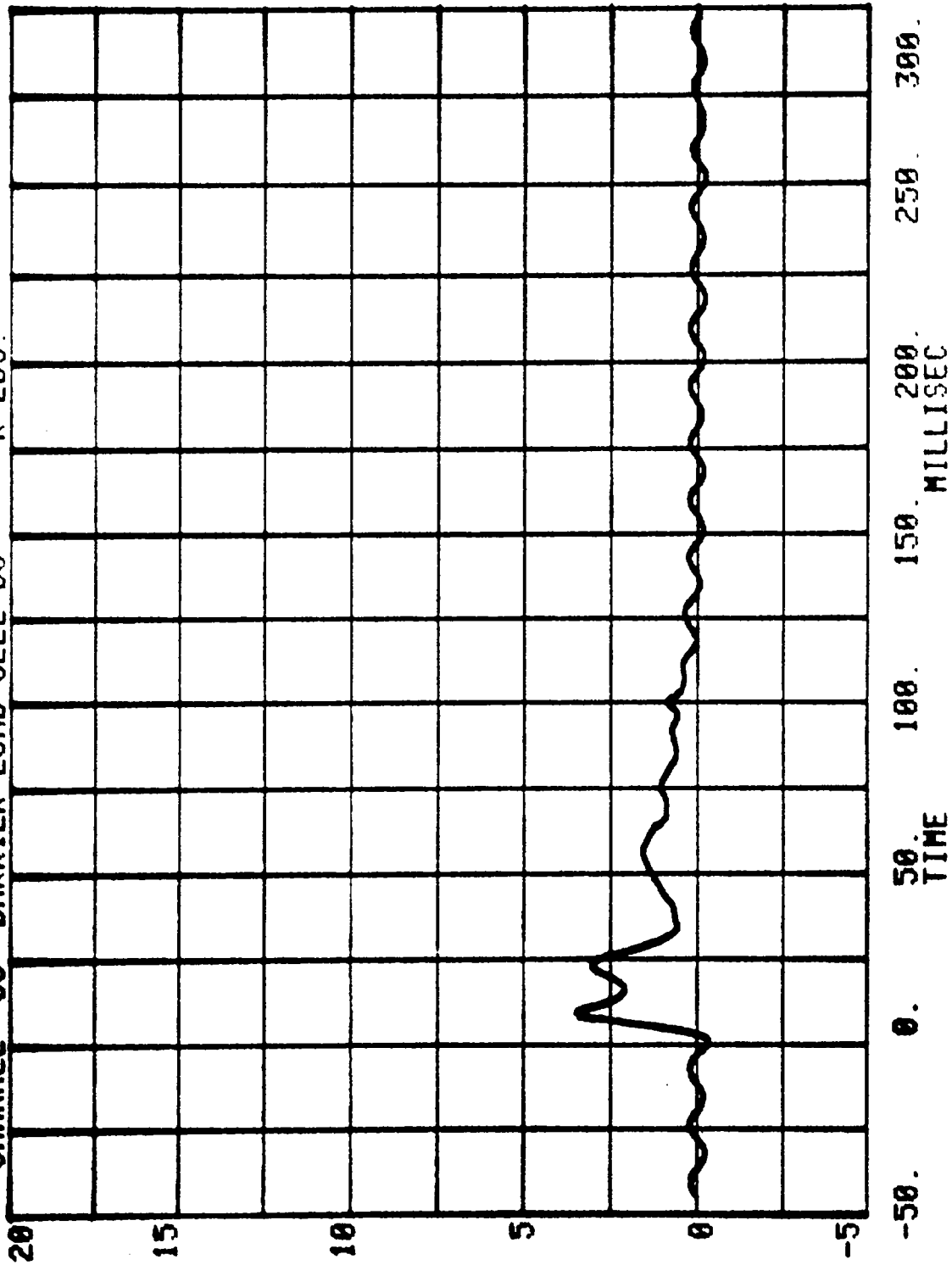
CHANNEL 48 BARRIER LOAD CELL 85 K LBS  
RUN= 810 SERIES= 5201



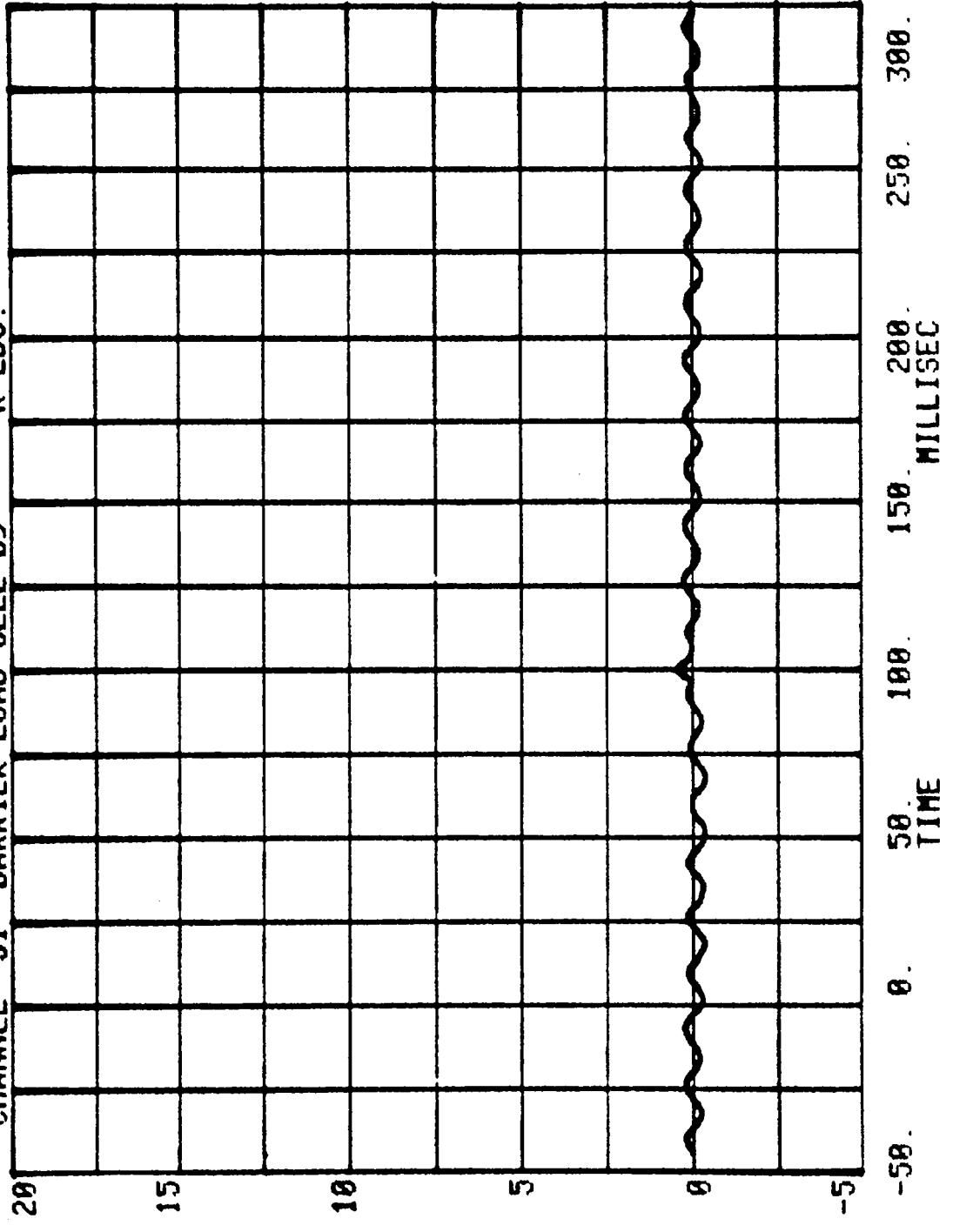
CHANNEL 49 BARRIER LOAD CELL B7  
RUN= 810 SERIES= 5201  
K LBS.



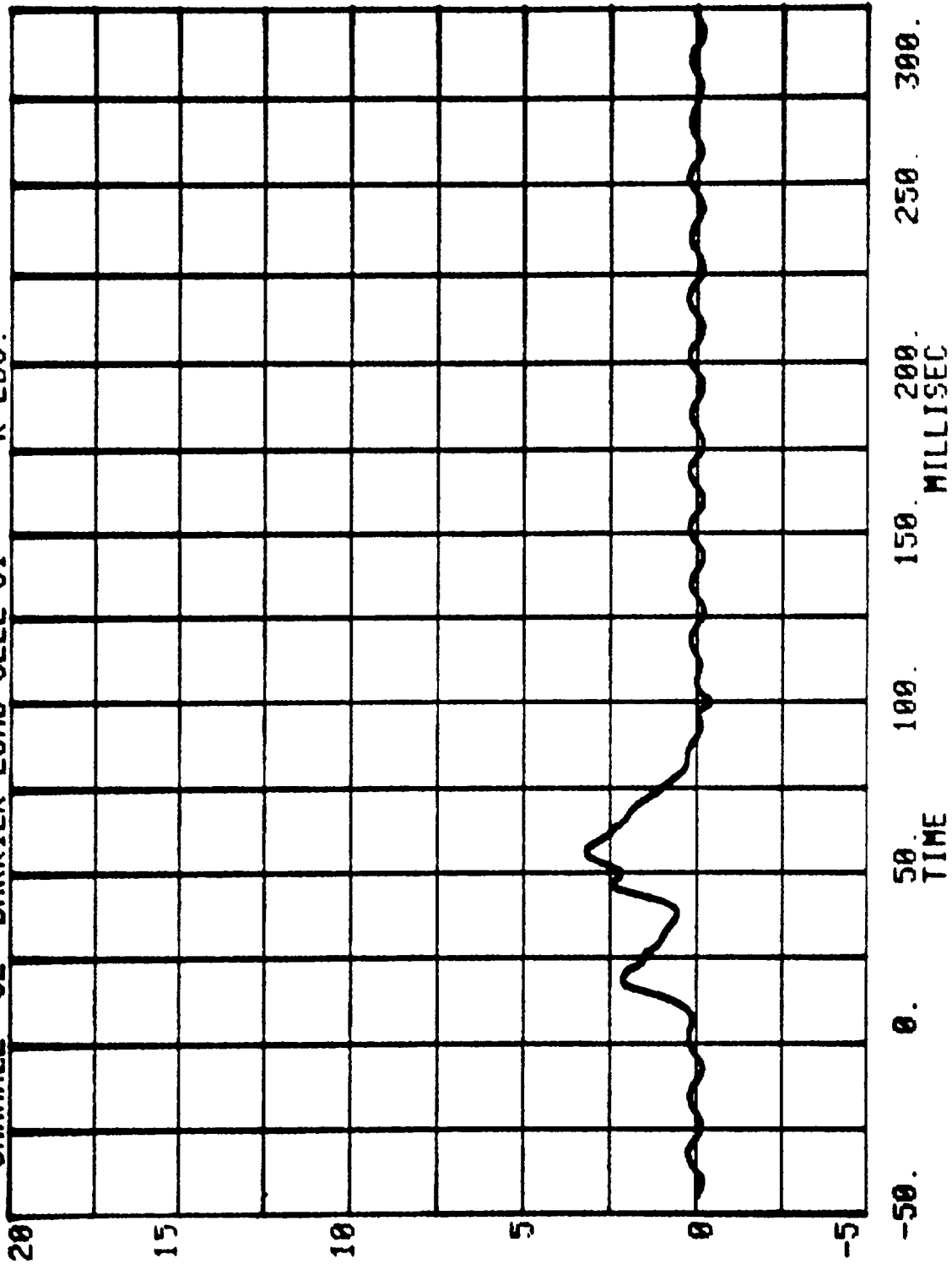
CHANNEL 50 BARRIER LOAD CELL 88 K LBS.  
RUN= 810 SERIES= 5201



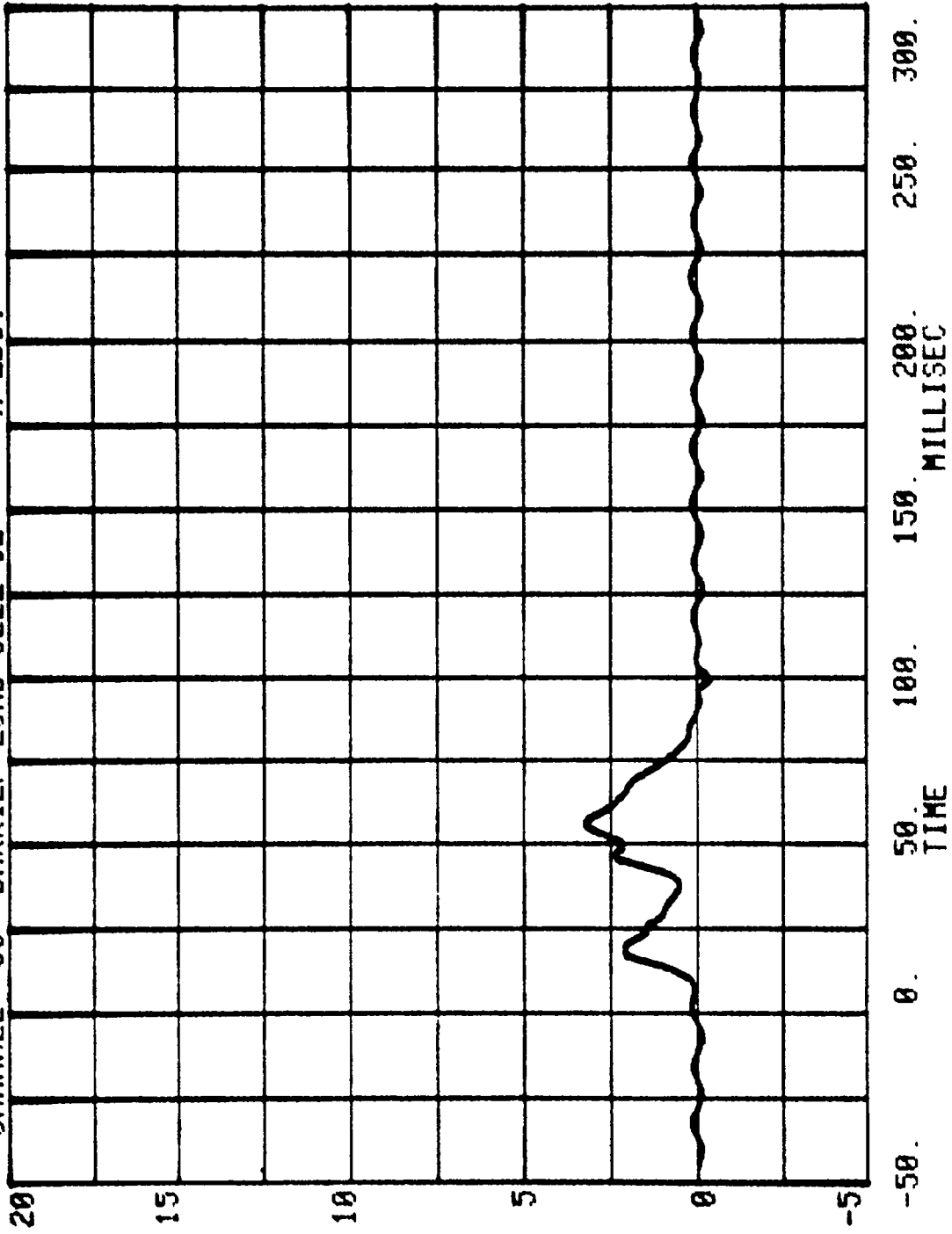
CHANNEL 51 BARRIER LOAD CELL B9  
RUN= 810 SERIES= 5201 K LBS.



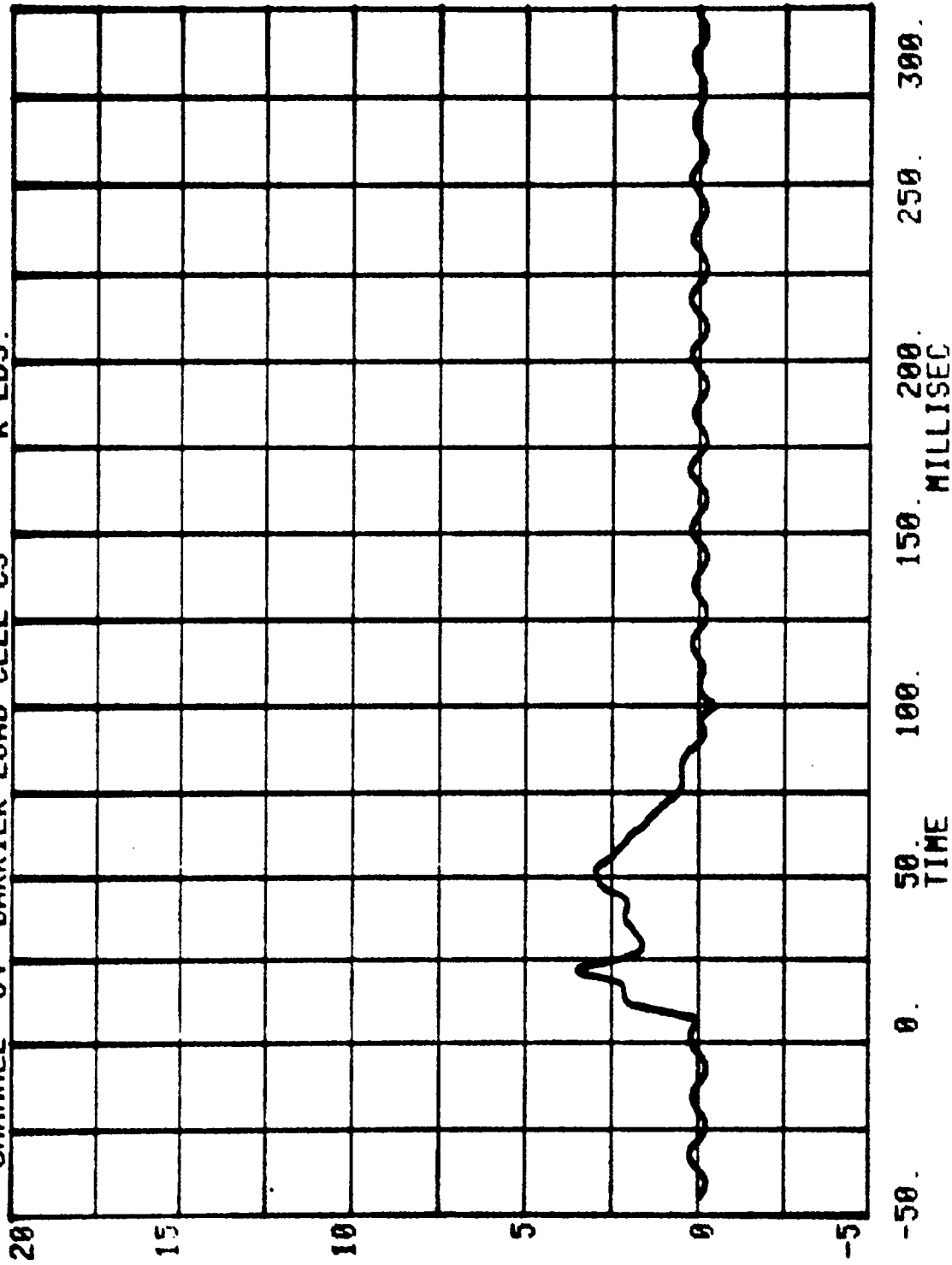
CHANNEL 52 BARRIER LOAD CELL C1  
RUN= 810 SERIES= 5201 K LBS.



CHANNEL 53 BARRIER LOAD CELL C2  
RUN= 810 SERIES= 5201 K LBS.



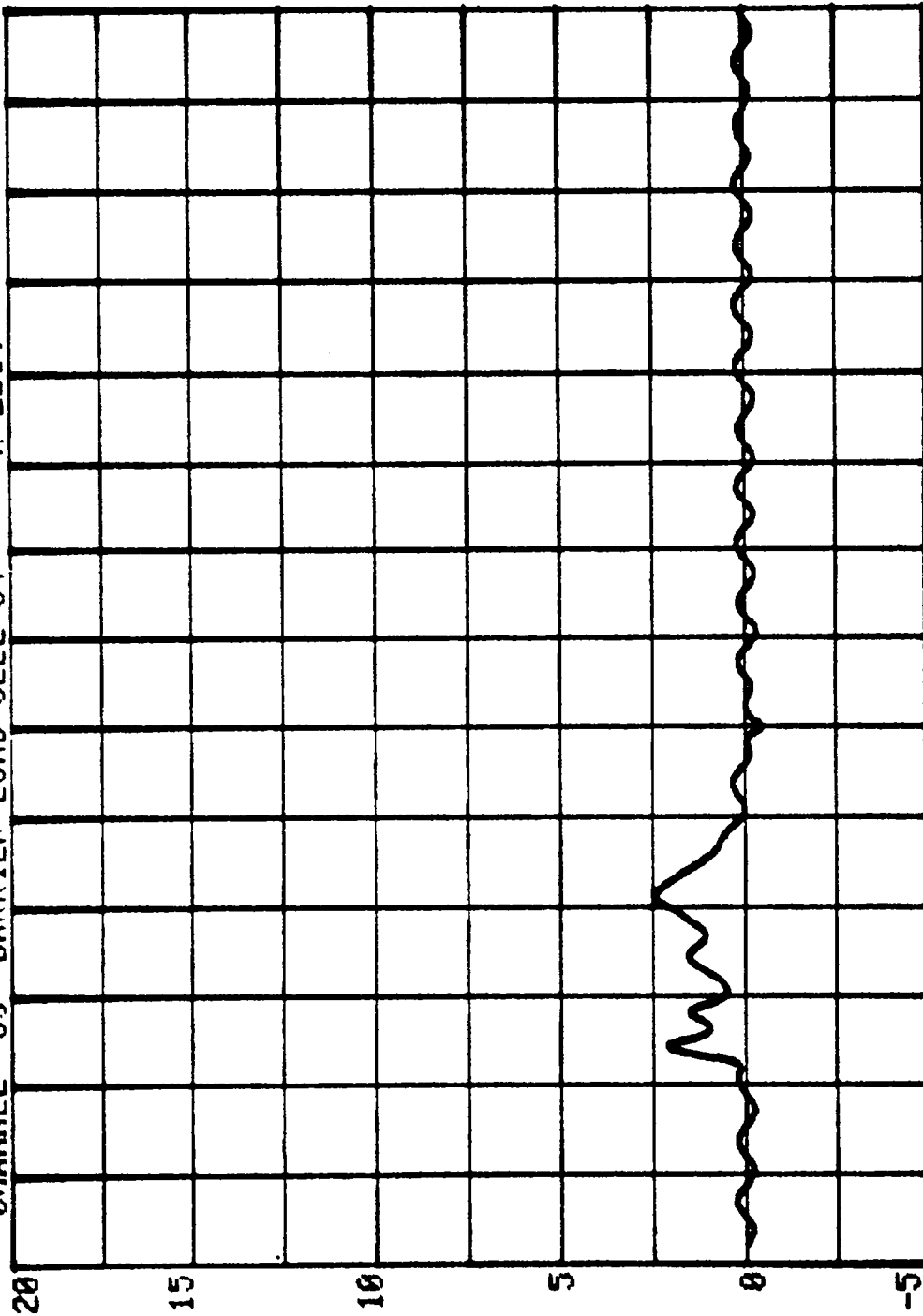
CHANNEL 54 BARRIER LOAD CELL C3 K LBS.  
RUN= 810 SERIES= 5201



CHANNEL 55 BARRIER LOAD CELL C4

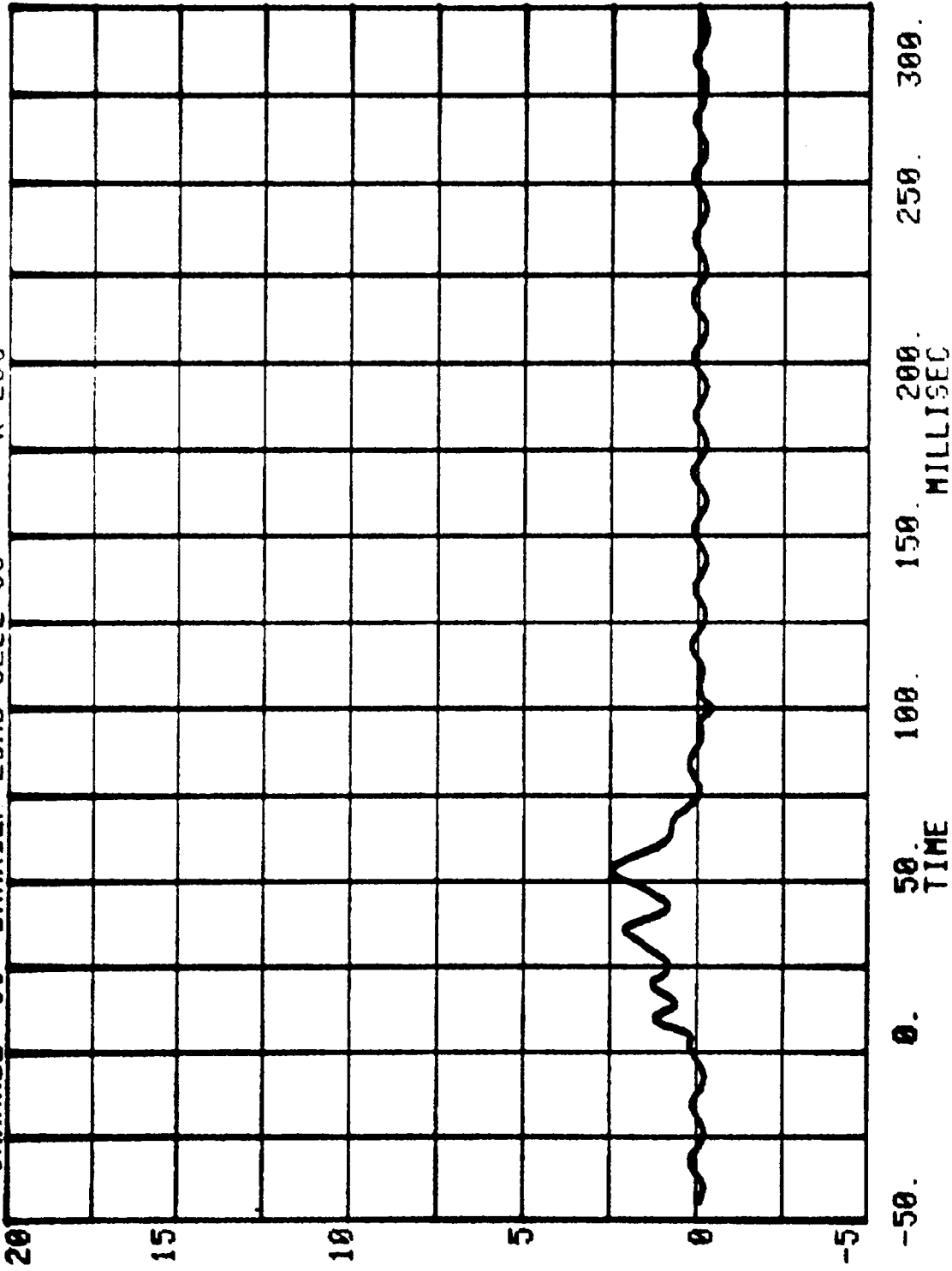
RUN= 810 SERIES= 5201

K LBS.

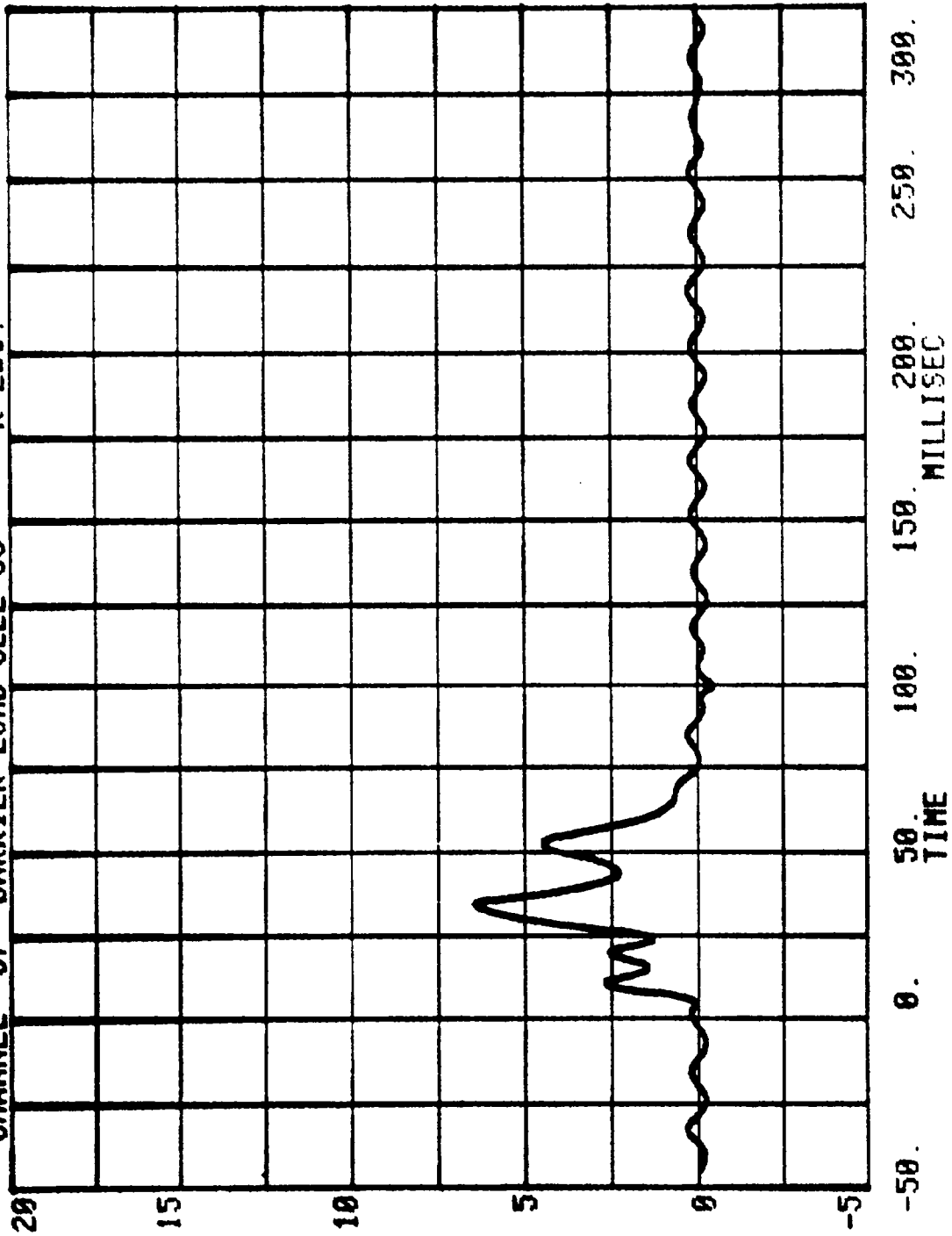


TIME  
-50. 0. 50. 100. 150. 200. 250. 300.  
MILLISEC

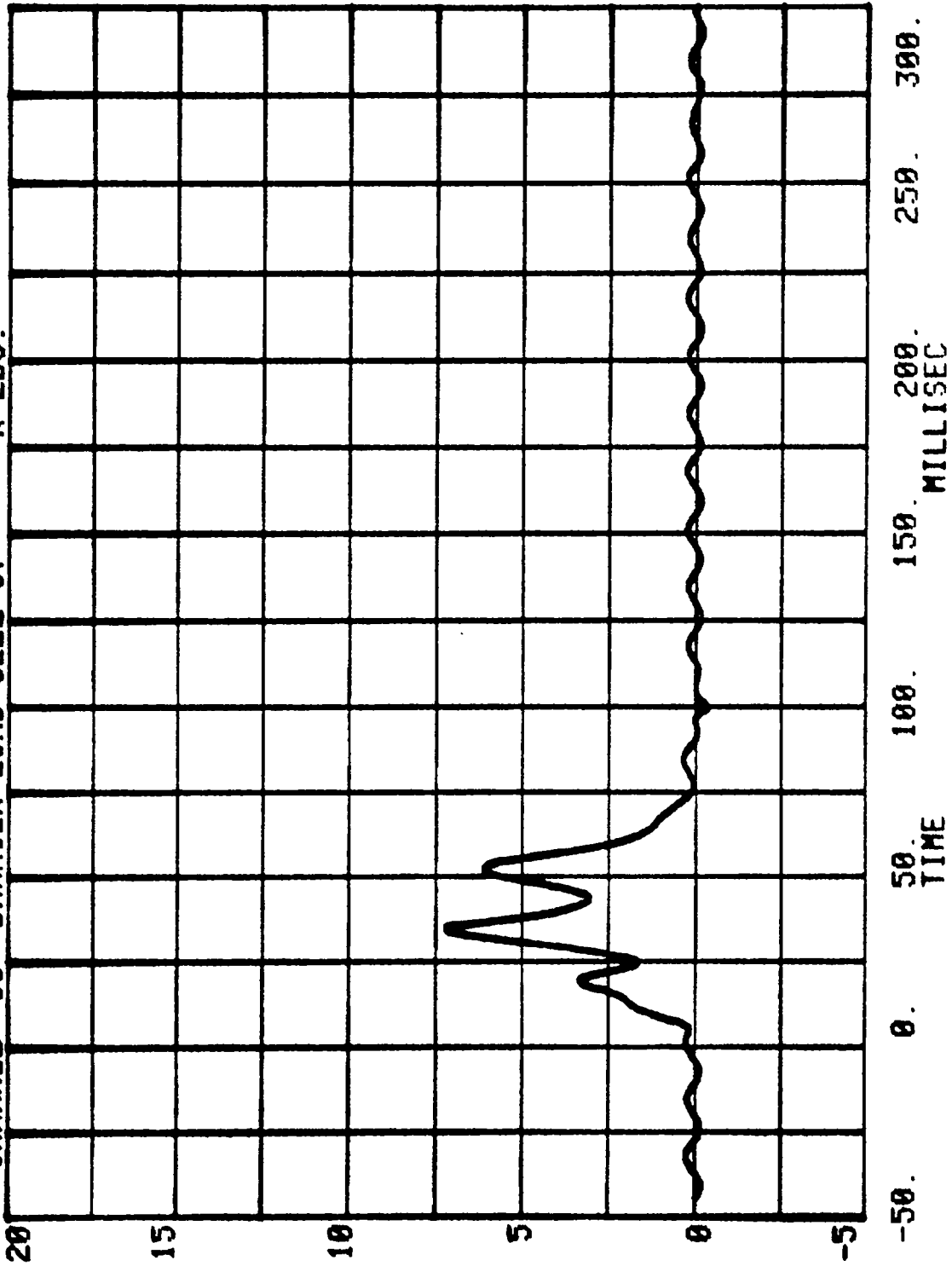
CHANNEL 56 BARRIER LOAD CELL C5  
RUN= 810 SERIES= 5201 K LBS



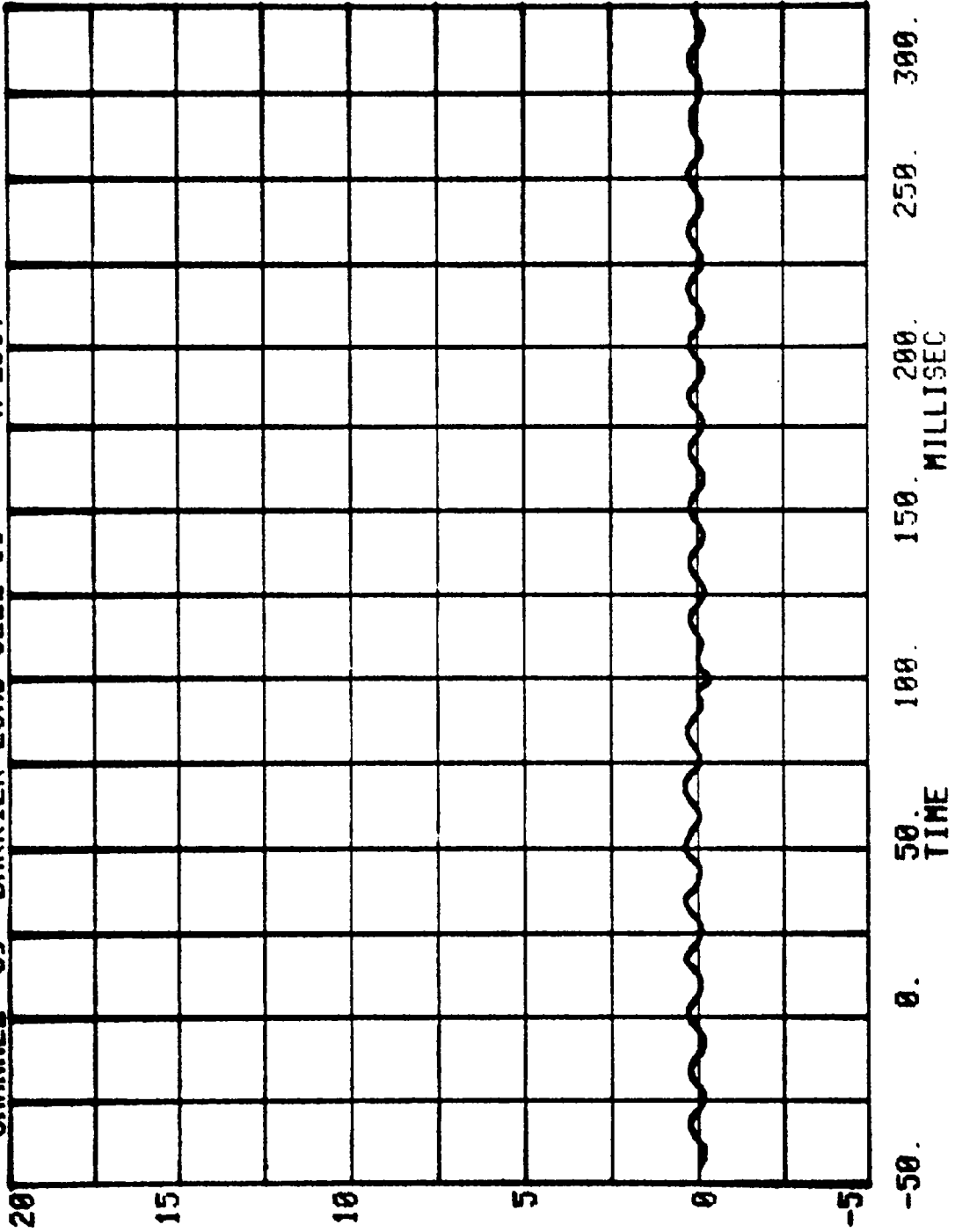
CHANNEL 57 BARRIER LOAD CELL C6  
RUN= 810 SERIES= 5201 K LBS.



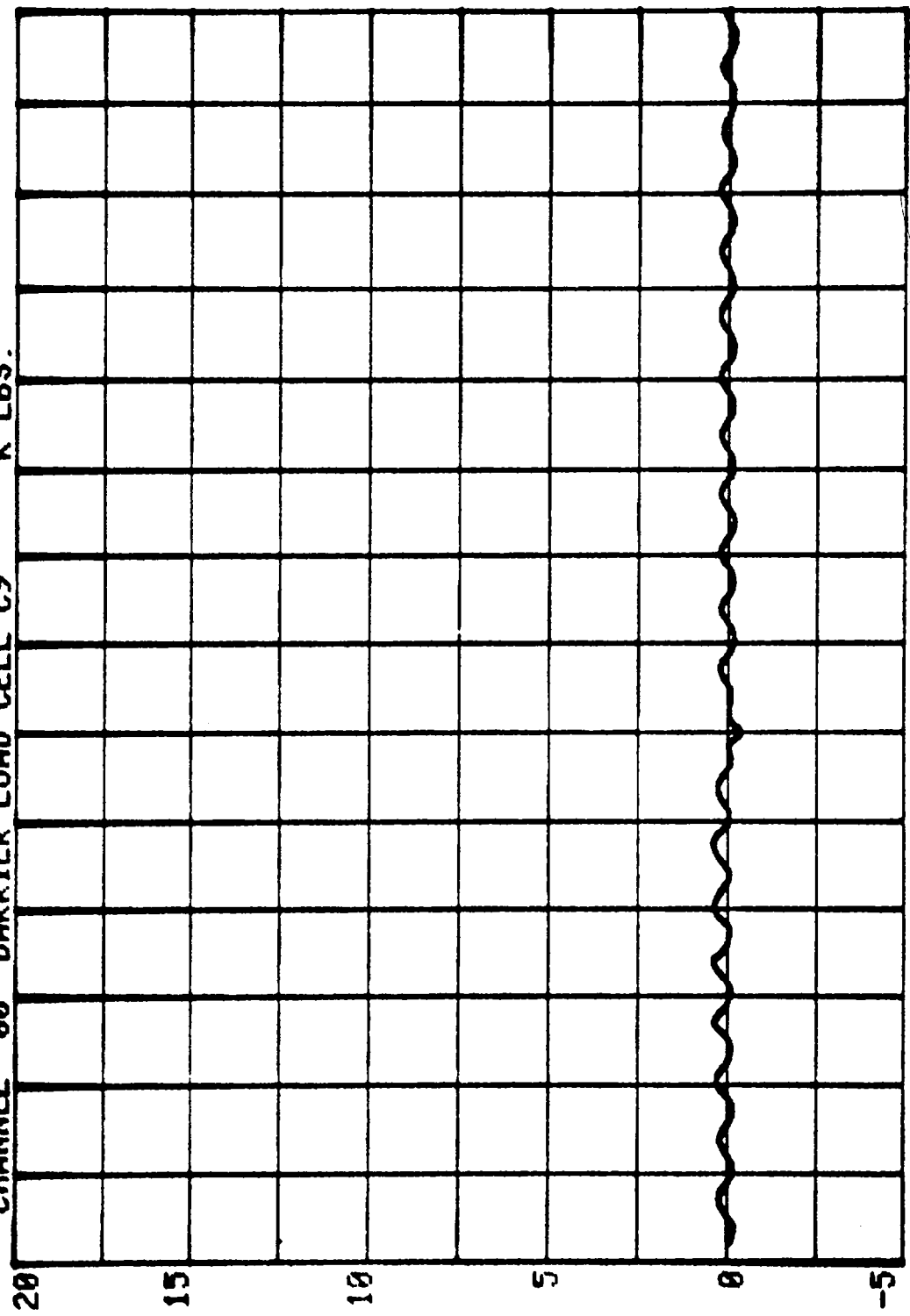
RUN= 810 SERIES= 5201 K LBS.  
CHANNEL 58 BARRIER LOAD CELL C7



CHANNEL 59 BARRIER LOAD CELL C8  
RUN= 810 SERIES= 5201 K LBS.

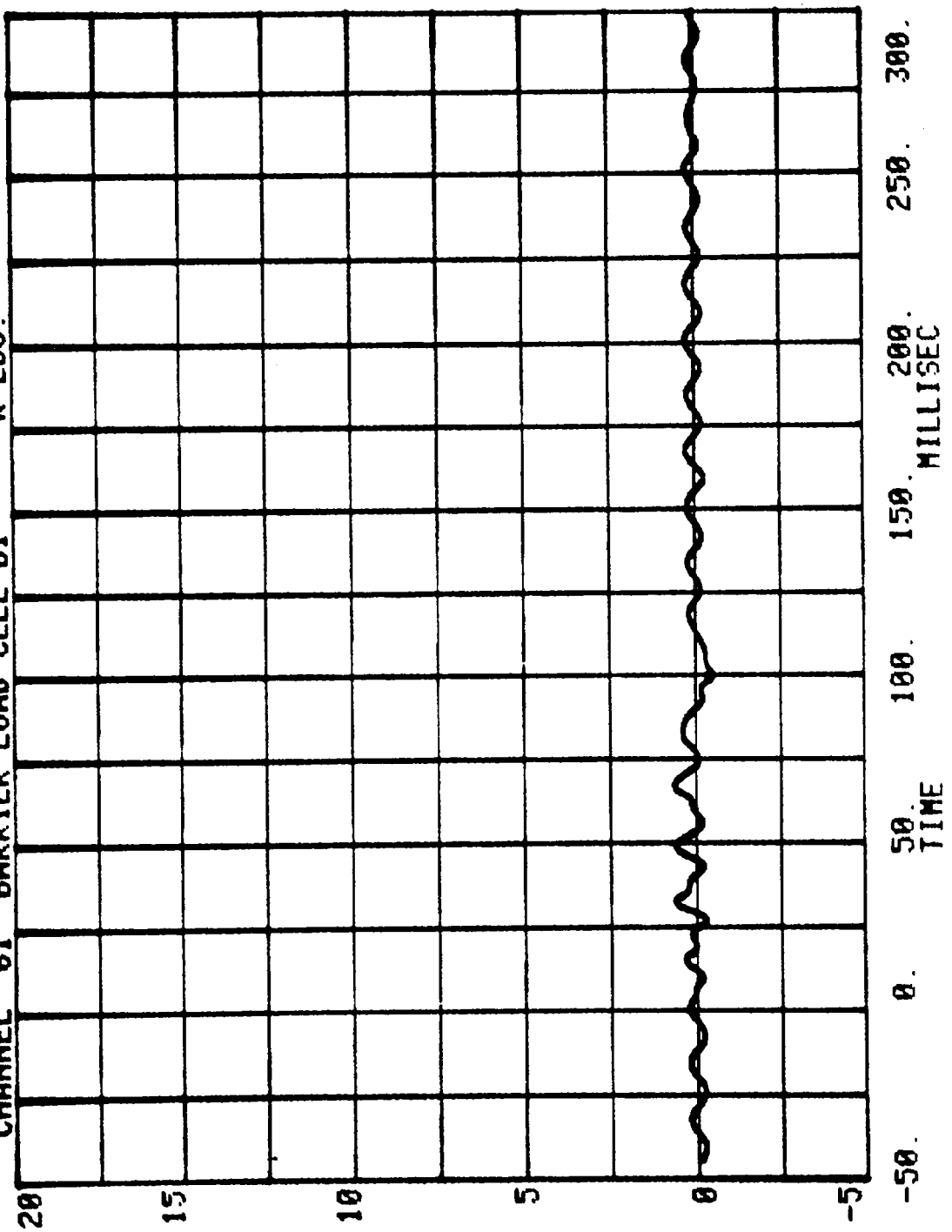


CHANNEL 60 BARRIER LOAD CELL C9 K LBS.  
RUN= 810 SERIES= 5201

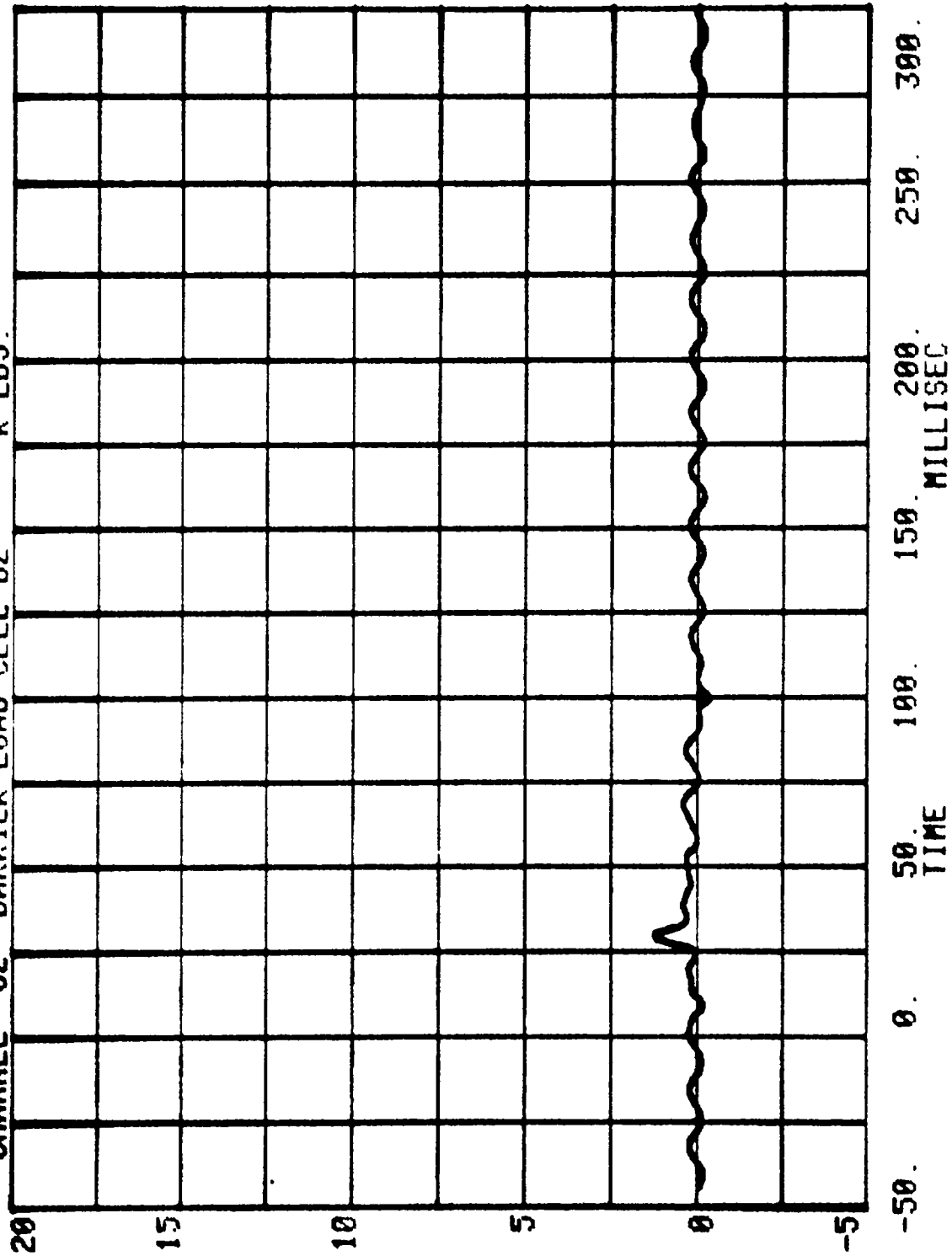


-50. 0. 50. 100. 150. 200. 250. 300.  
MILLISEC  
TIME

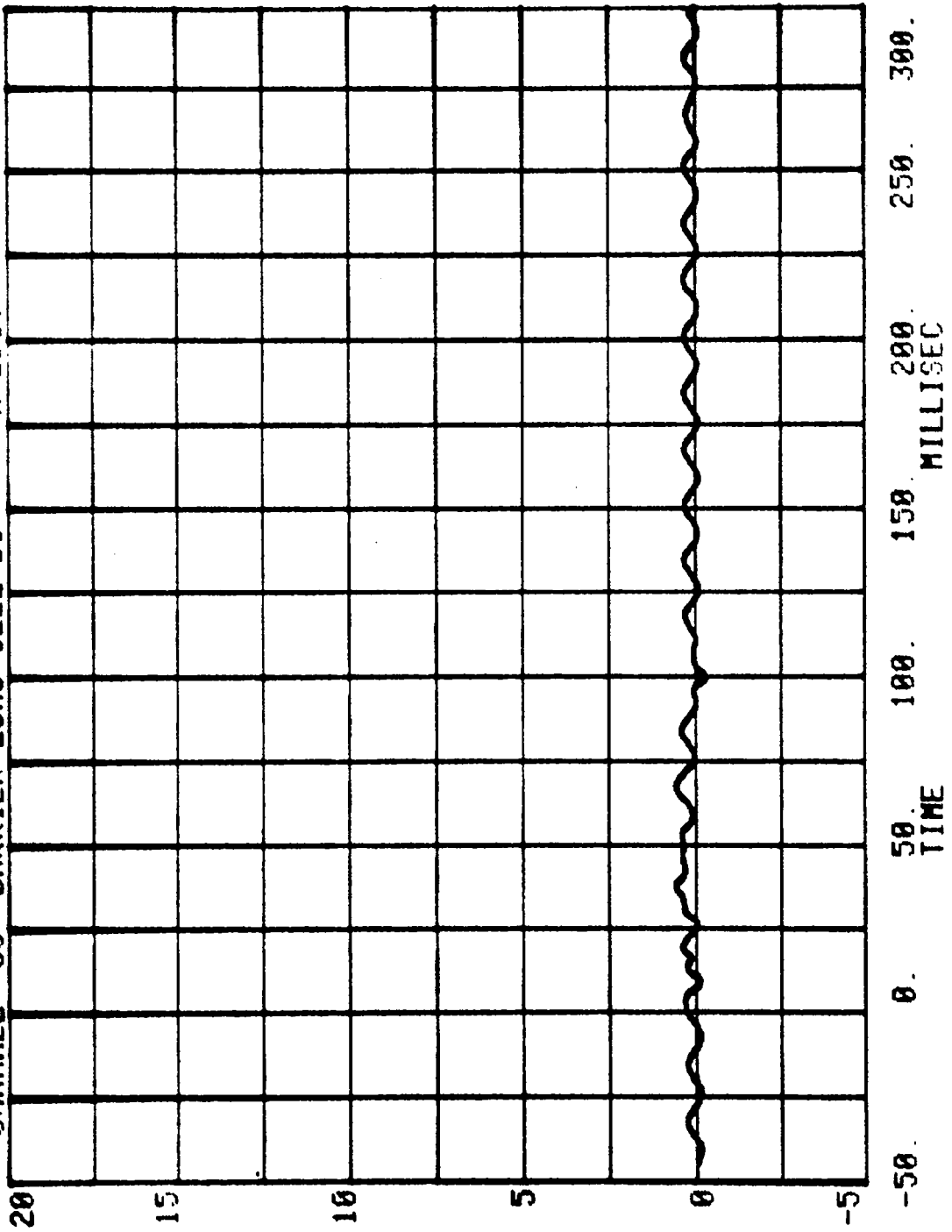
CHANNEL 61 BARRIER LOAD CELL D1  
RUN= 810 SERIES= 5201 K LBS.



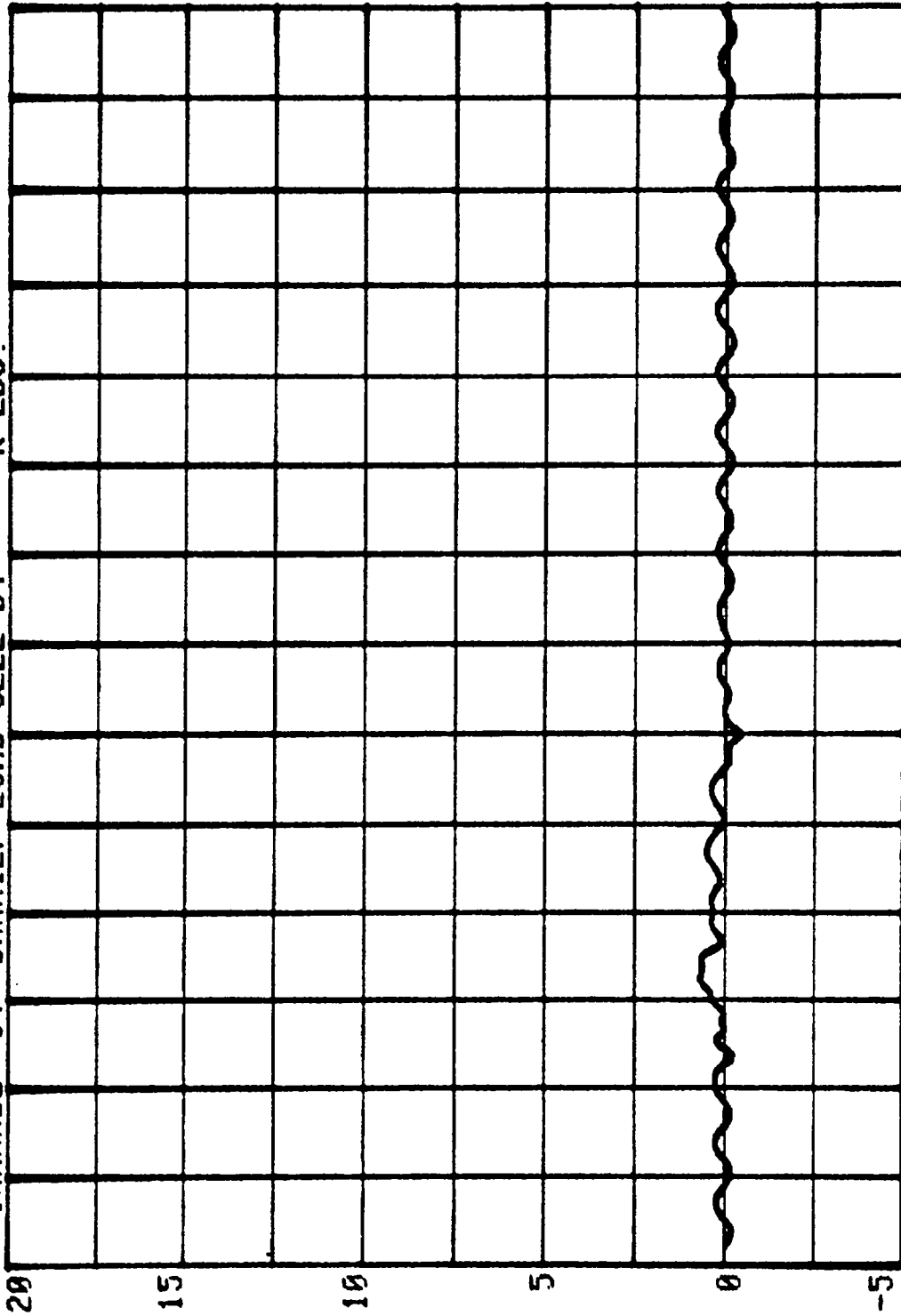
RUN= 810 SERIES= 5201  
CHANNEL 62 BARRIER LOAD CELL D2 K LBS.



CHANNEL 63 BARRIER LOAD CELL D3  
RUN= 810 SERIES= 5201 K LBS.

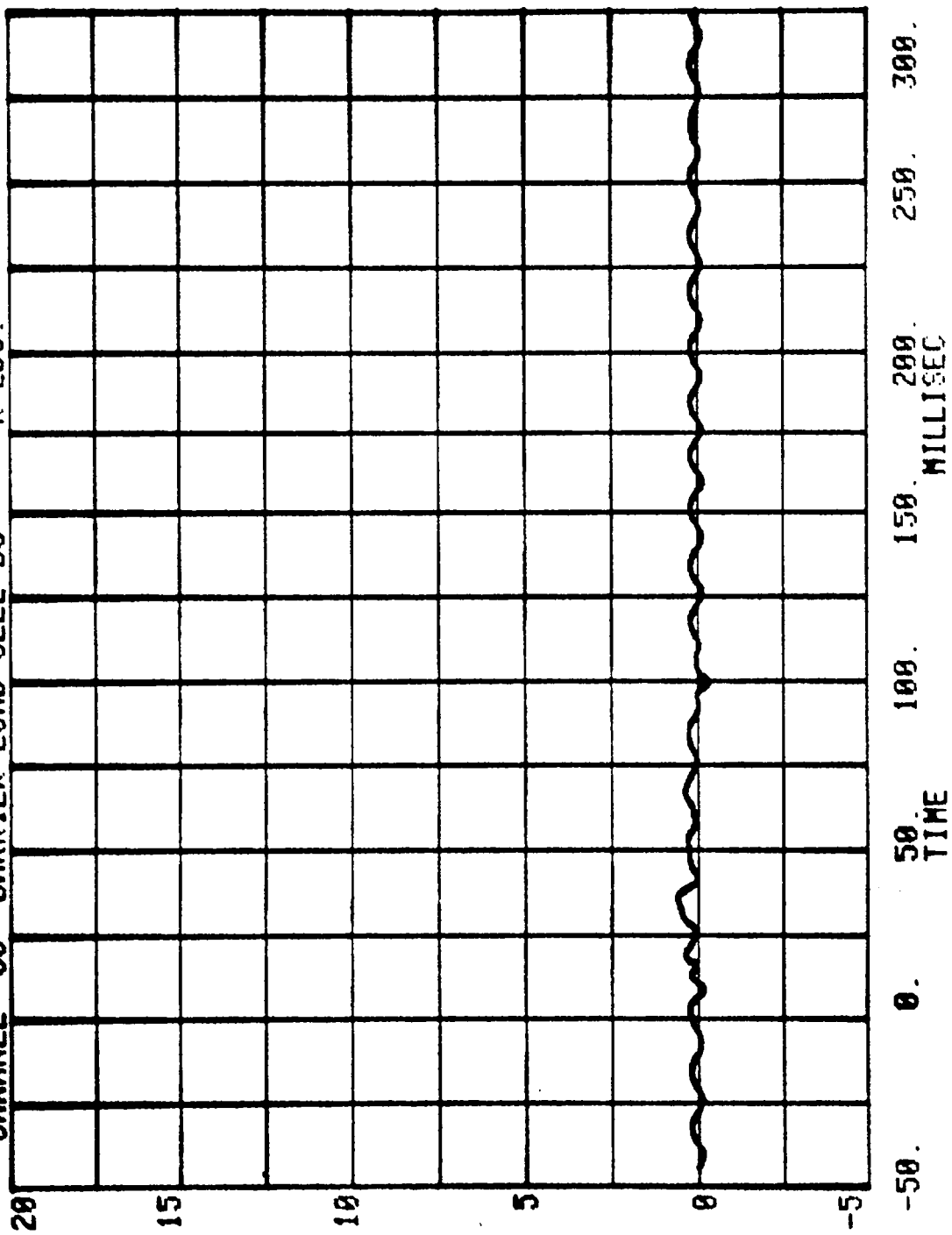


CHANNEL 64 BARRIER LOAD CELL D4 K LBS.  
RUN= 810 SERIES= 5201

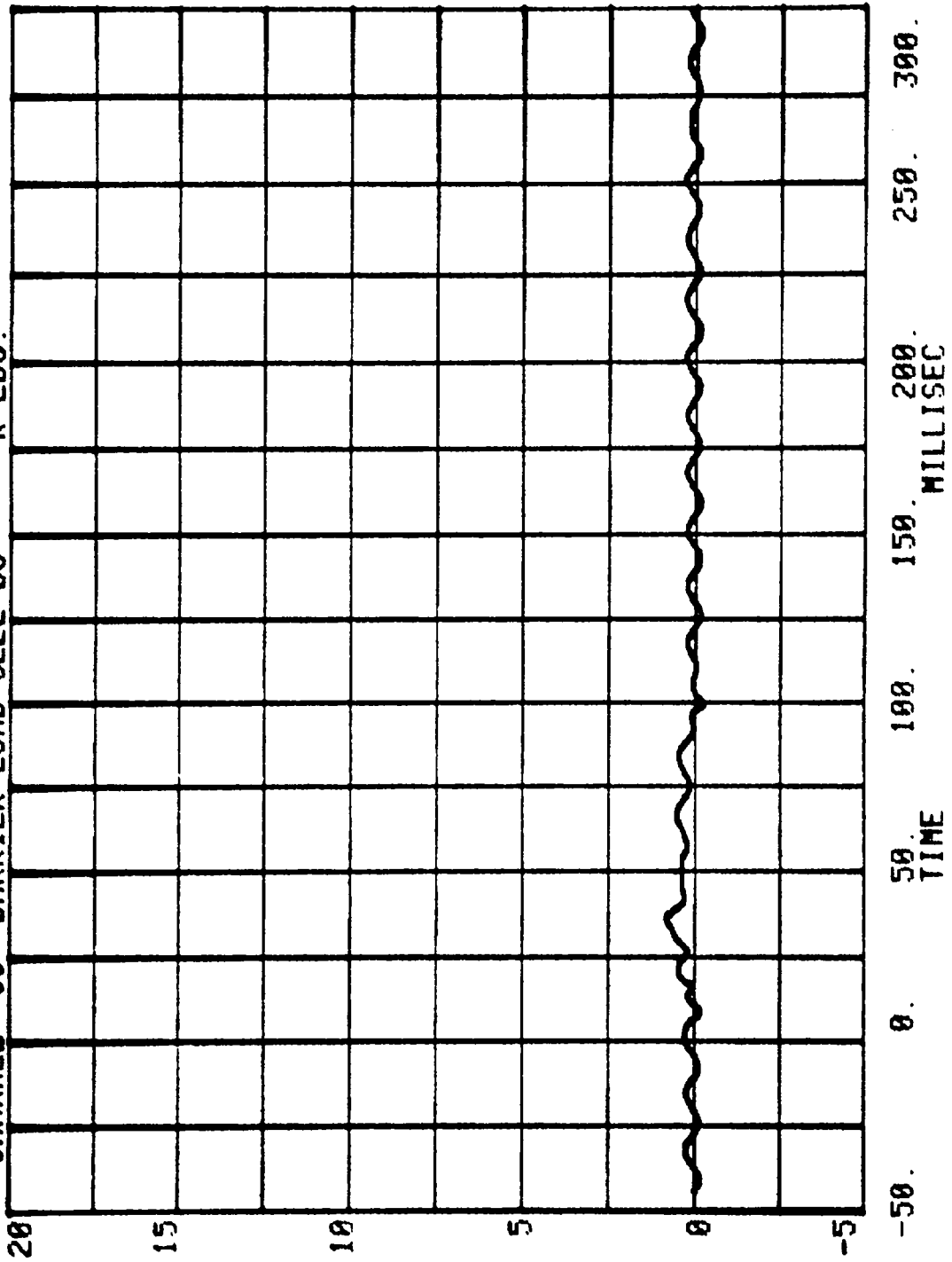


-50. 0. 50. 100. 150. 200. 250. 300.  
MILLISEC  
TIME

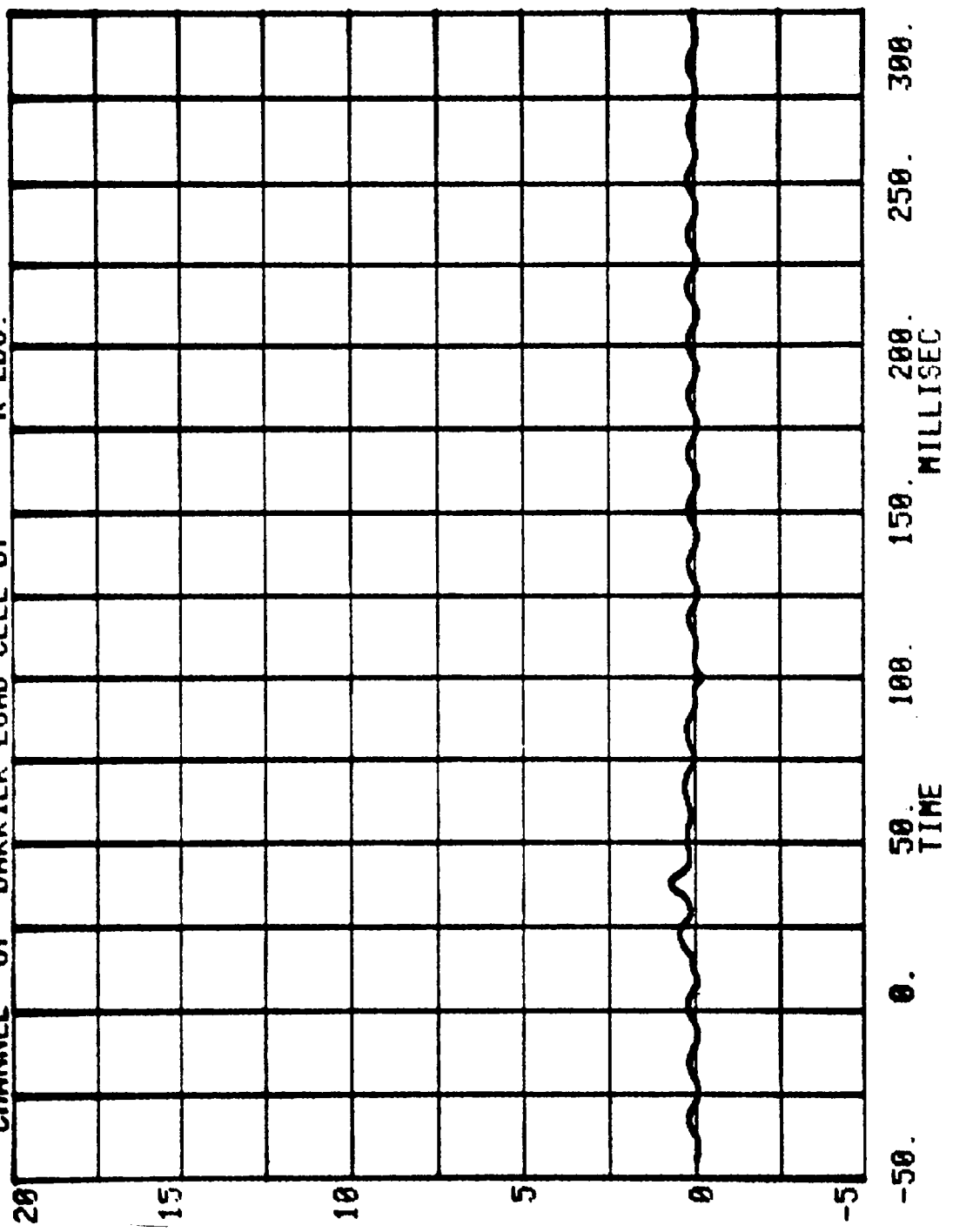
CHANNEL 65 BARRIER LOAD CELL D5  
RUN= 810 SERIES= 5201 K LBS.



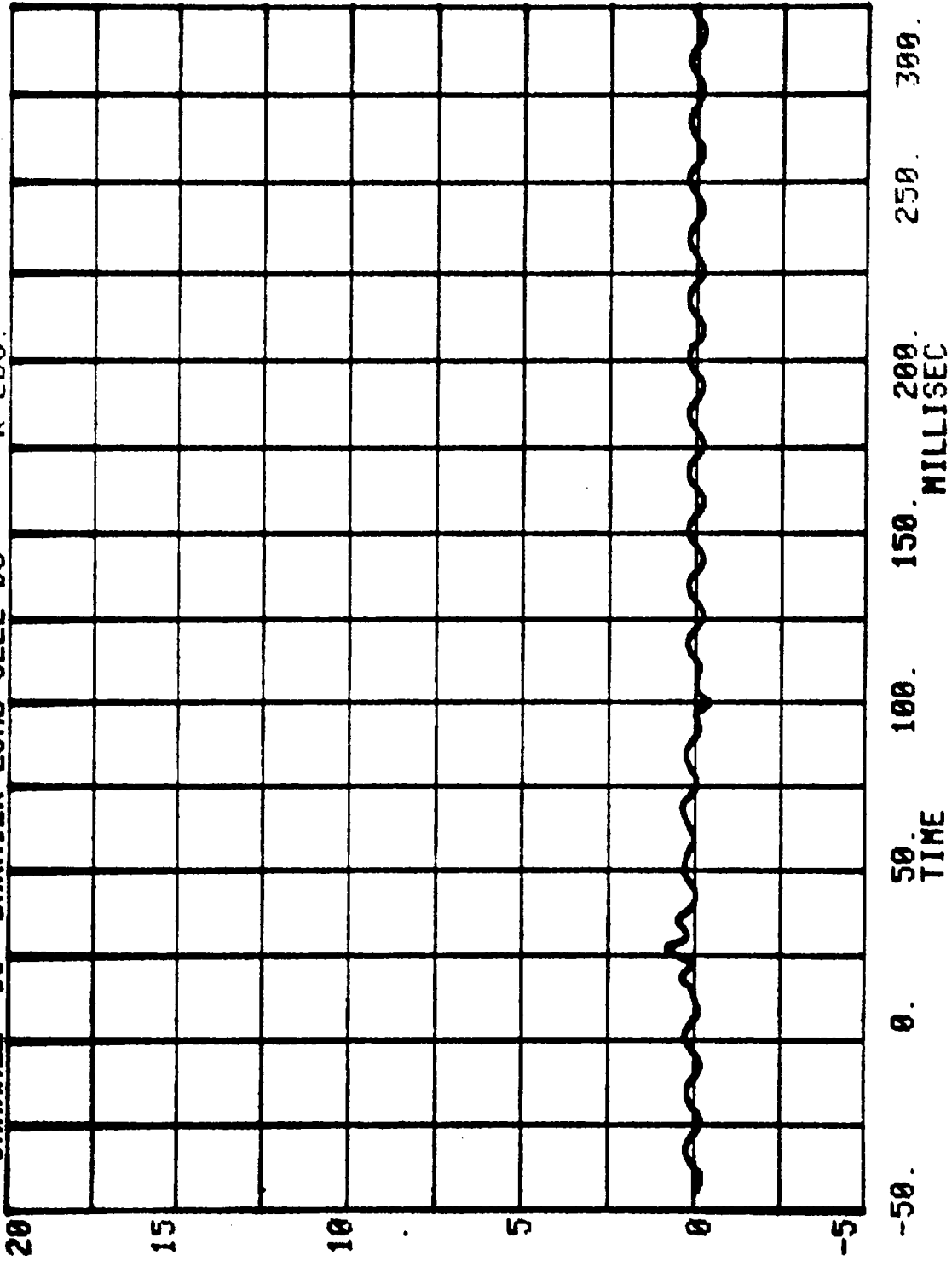
RUN= 810 SERIES= 5201  
CHANNEL 66 BARRIER LOAD CELL D6 K LBS.



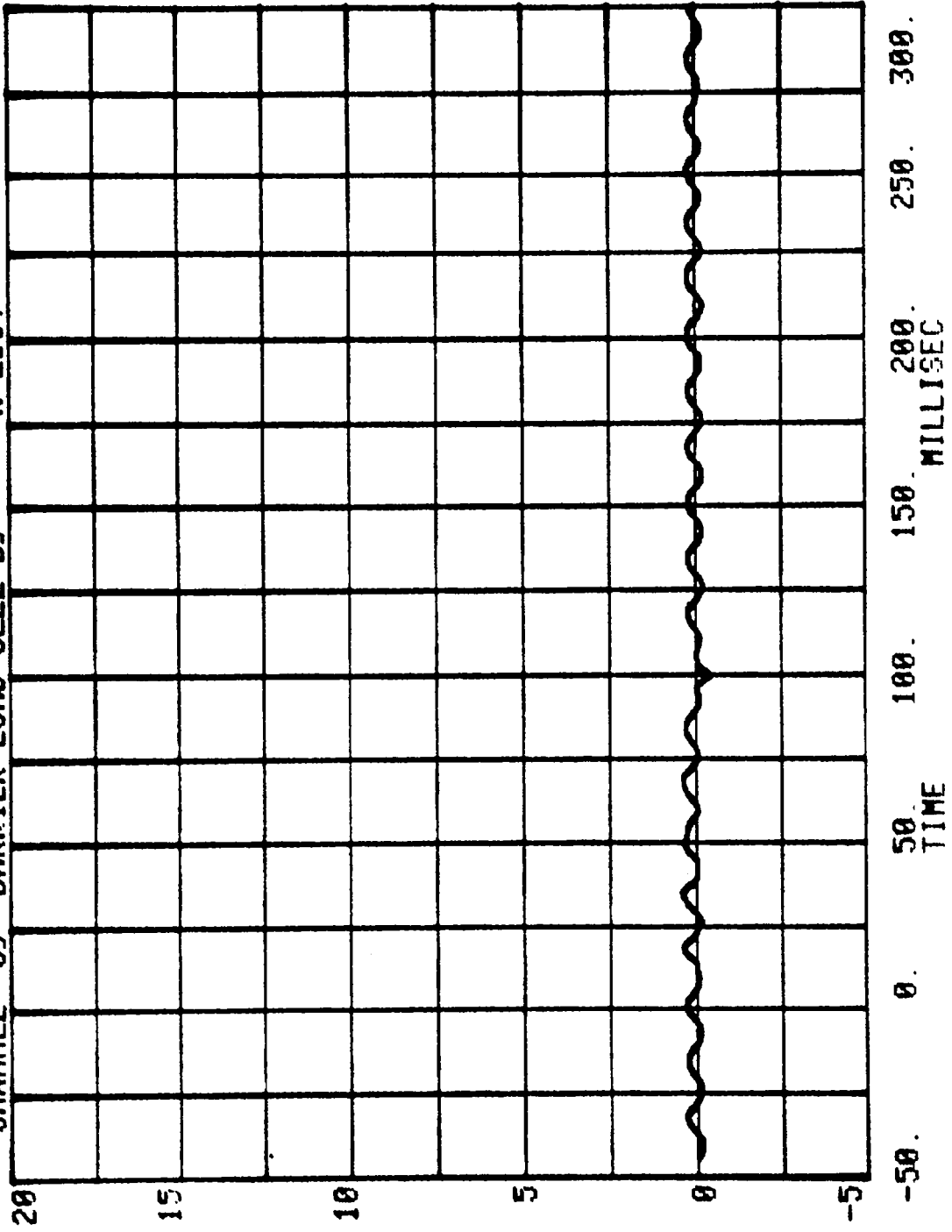
CHANNEL 67 BARRIER LOAD CELL D7  
RUN= 810 SERIES= 5201 K LBS.



CHANNEL 68 BARRIER LOAD CELL D8 RUN= 810 SERIES= 5201 K LBS.



CHANNEL 69 BARRIER LOAD CELL D9  
RUN= 810 SERIES= 5201 K LBS.



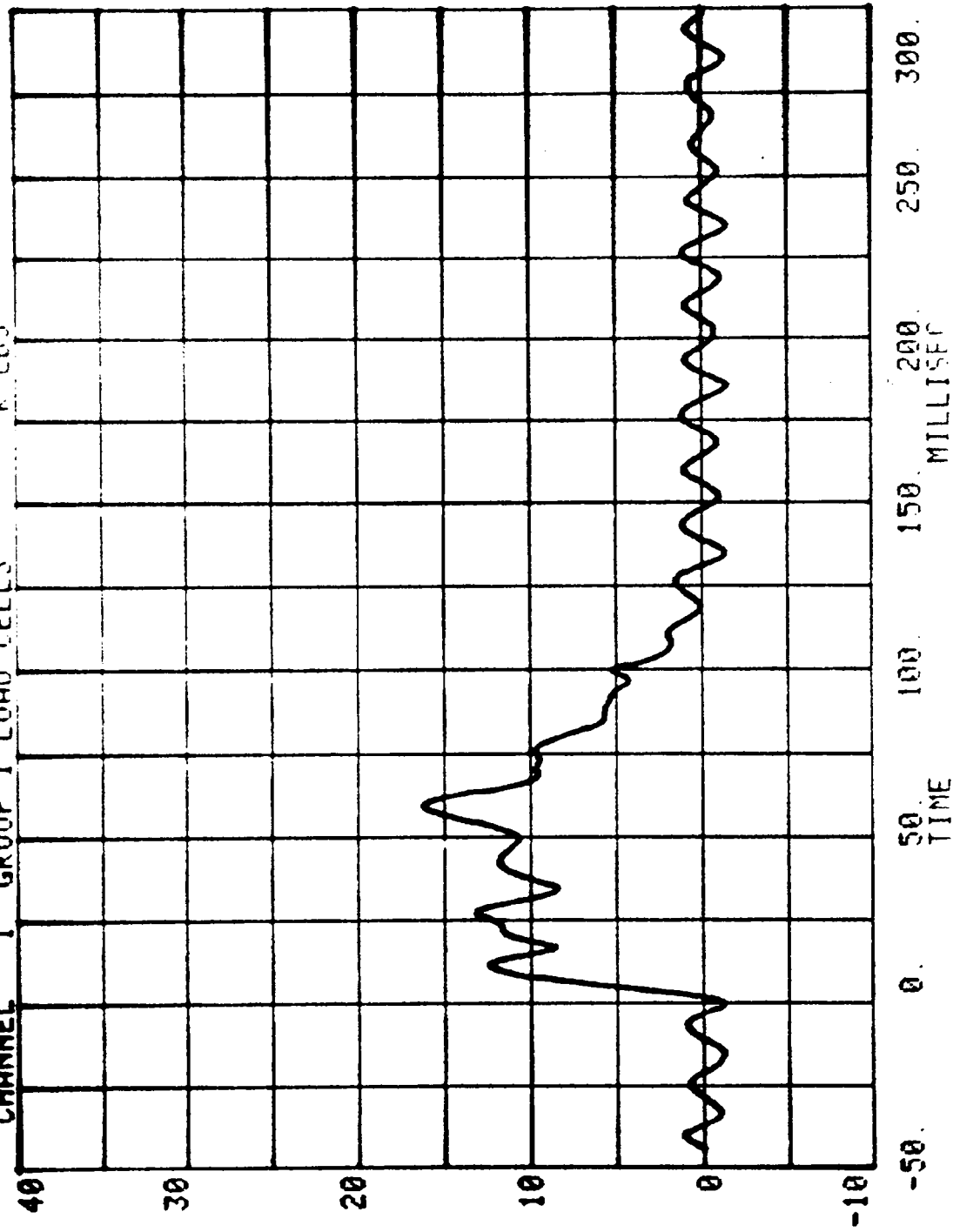
NEW CAR ASSESSMENT BARRIER TEST - 1988

RUN # 810                      SERIES # 52A1

| CHAN | TITLE               | MINIMUM | MAXIMUM       |
|------|---------------------|---------|---------------|
| 1    | GROUP 1 LOAD CELLS  | -1.487  | 16.216 K LBS. |
| 2    | GROUP 2 LOAD CELLS  | -1.657  | 48.555 K LBS. |
| 3    | GROUP 3 LOAD CELLS  | -1.165  | 11.970 K LBS. |
| 4    | GROUP 4 LOAD CELLS  | -2.431  | 9.306 K LBS.  |
| 5    | GROUP 5 LOAD CELLS  | -2.349  | 11.844 K LBS. |
| 6    | GROUP 6 LOAD CELLS  | -2.152  | 9.262 K LBS.  |
| 7    | TOTAL LOAD CELL SUM | -1.001  | 96.457 K LBS. |

CHANNEL 1 GROUP 1 LOAD CELLS K LBS

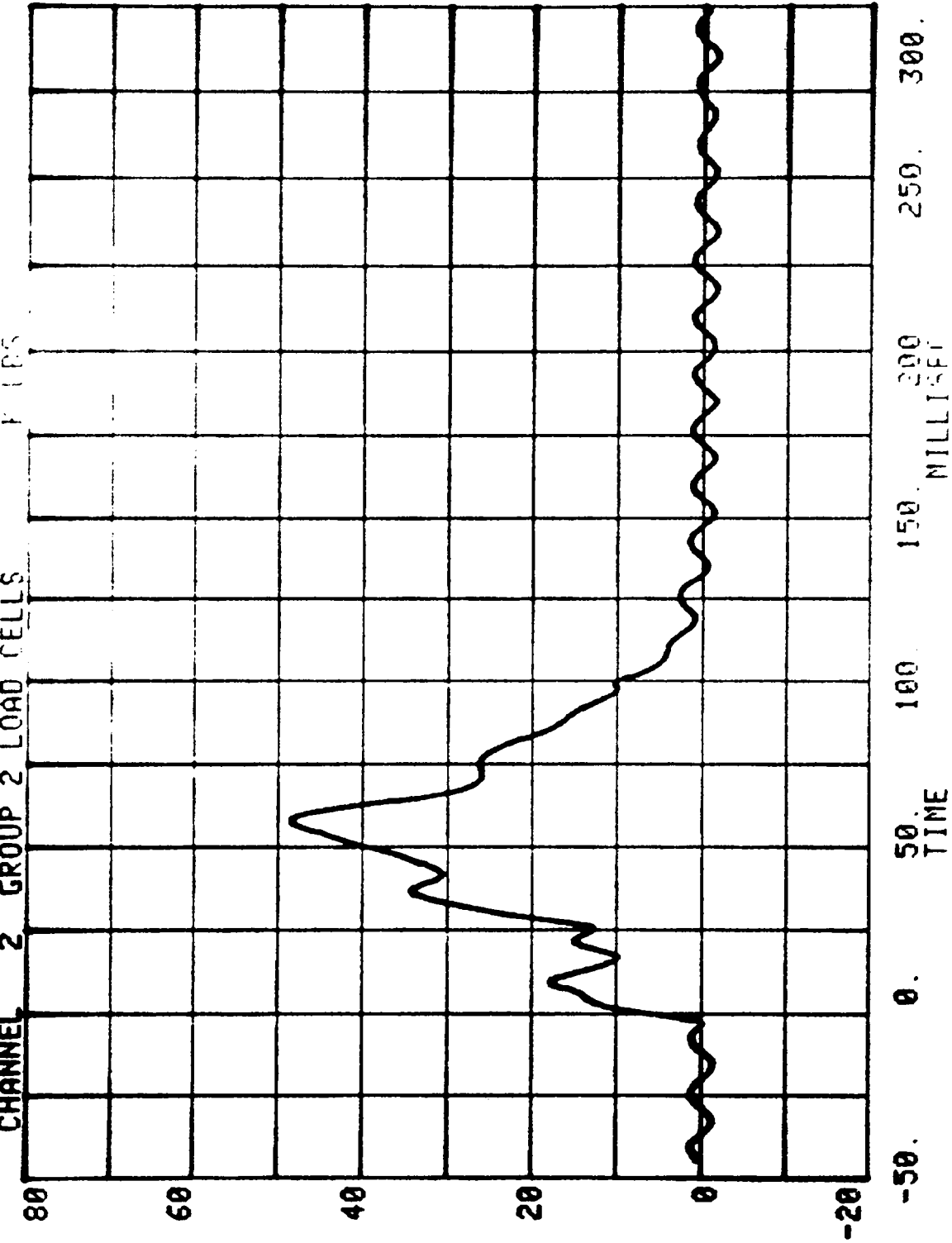
RUN= 810 SERIES= 5201



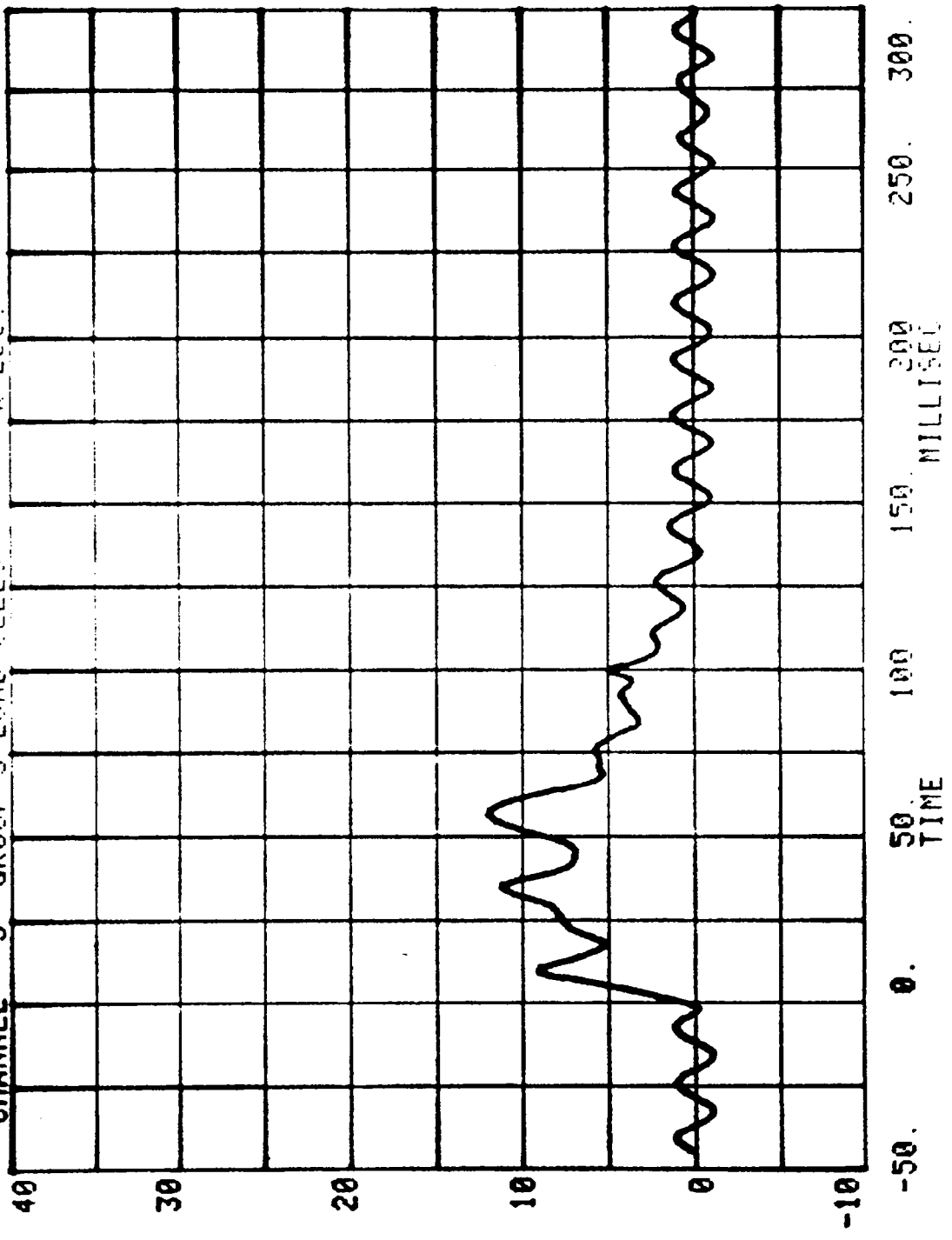
1000

CHANNEL 2 GROUP 2 LOAD CELLS

RUN= 810 SERIES= 5201

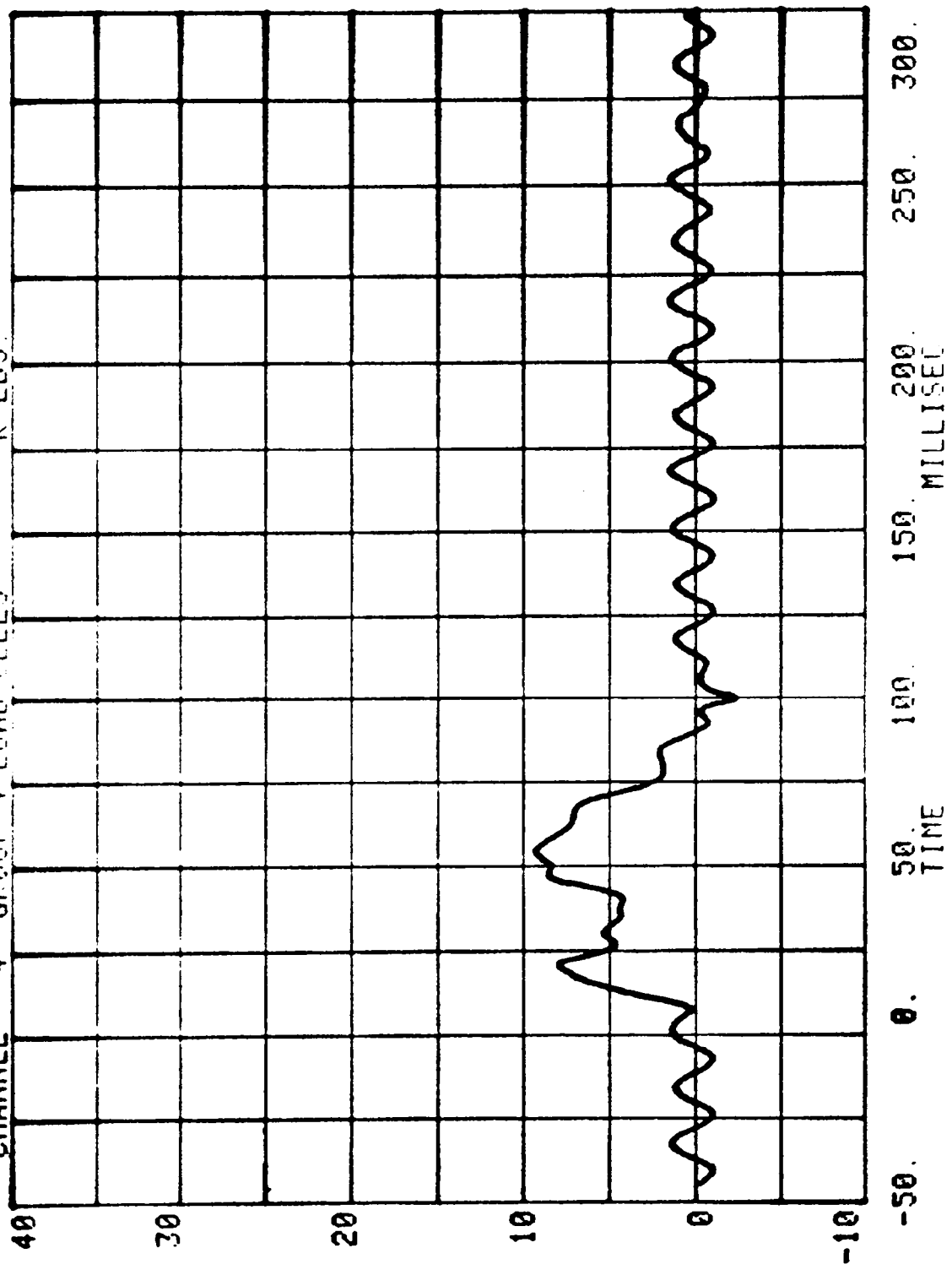


CHANNEL 3 GROUP 3 LOAD CELLS  
RUN= 810 SERIES= 5201 K LBS.



...NINE

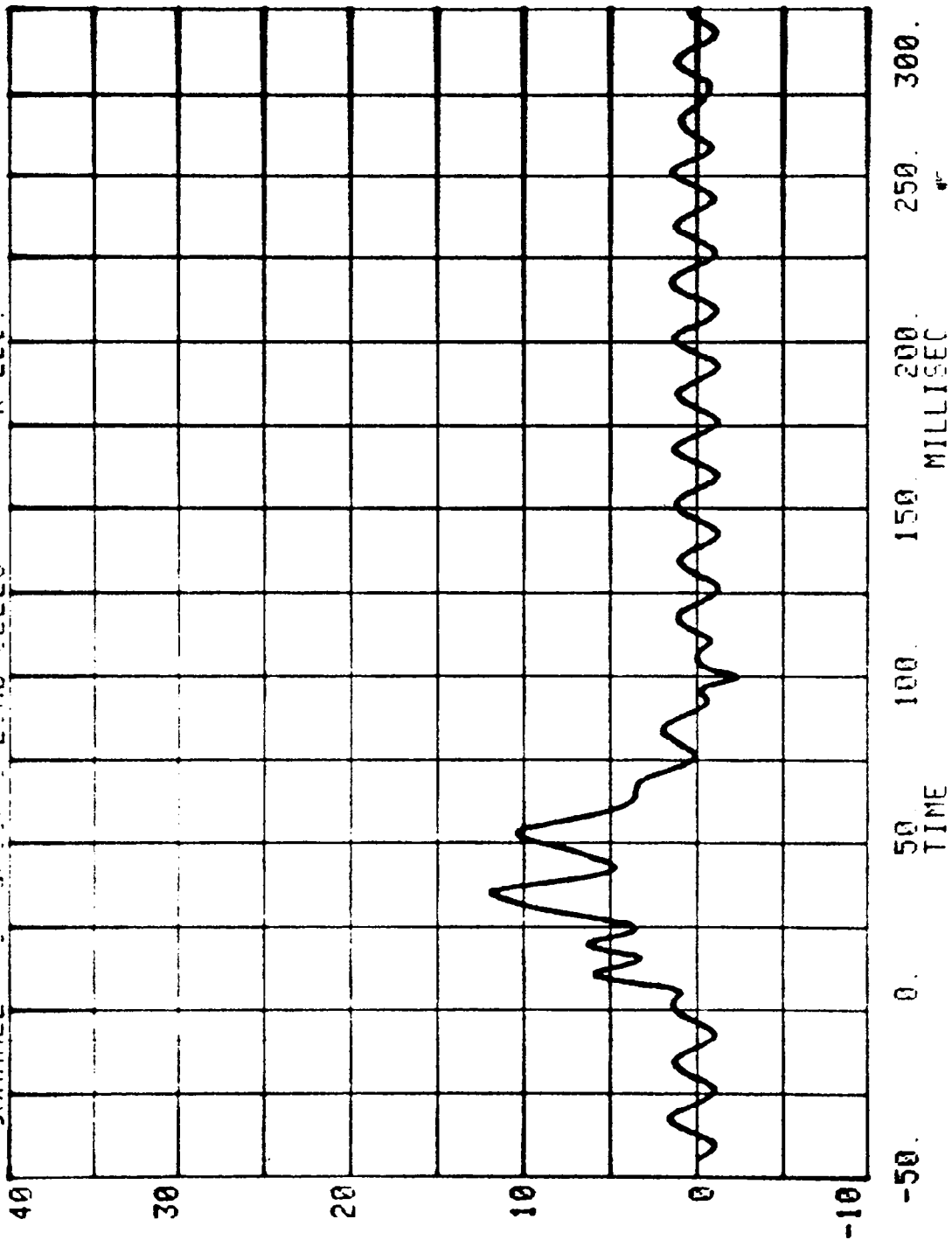
CHANNEL 4 GROUP 4 LOAD CELLS  
RUN= 810 SERIES= 5201 K LBS.



CHANNEL 5 GROUP 5 LOAD CELLS

PUMP 810 SERIES= 5201

K LBS.

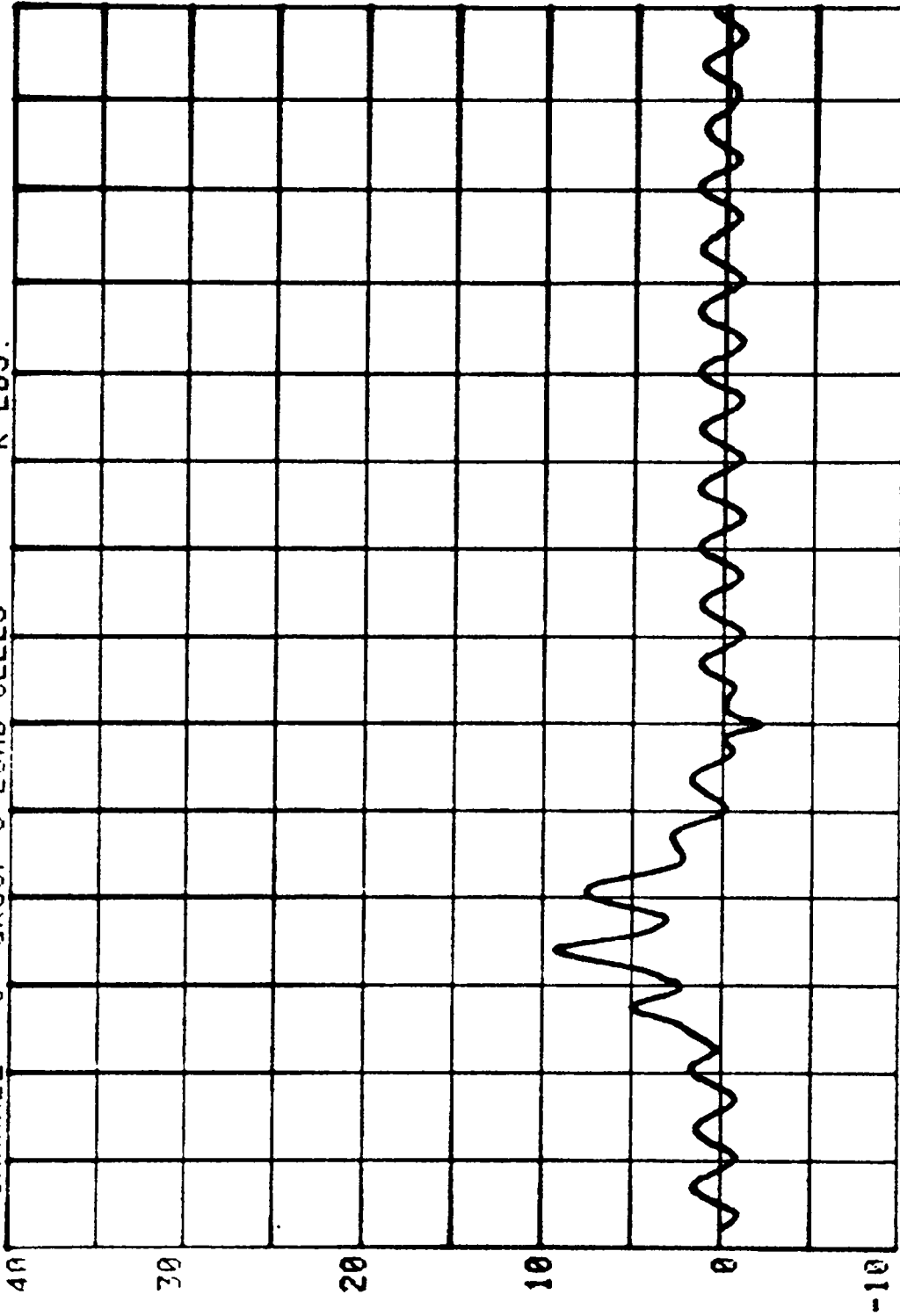


CHANNEL 6 GROUP 6 LOAD CELLS

RUN= 810

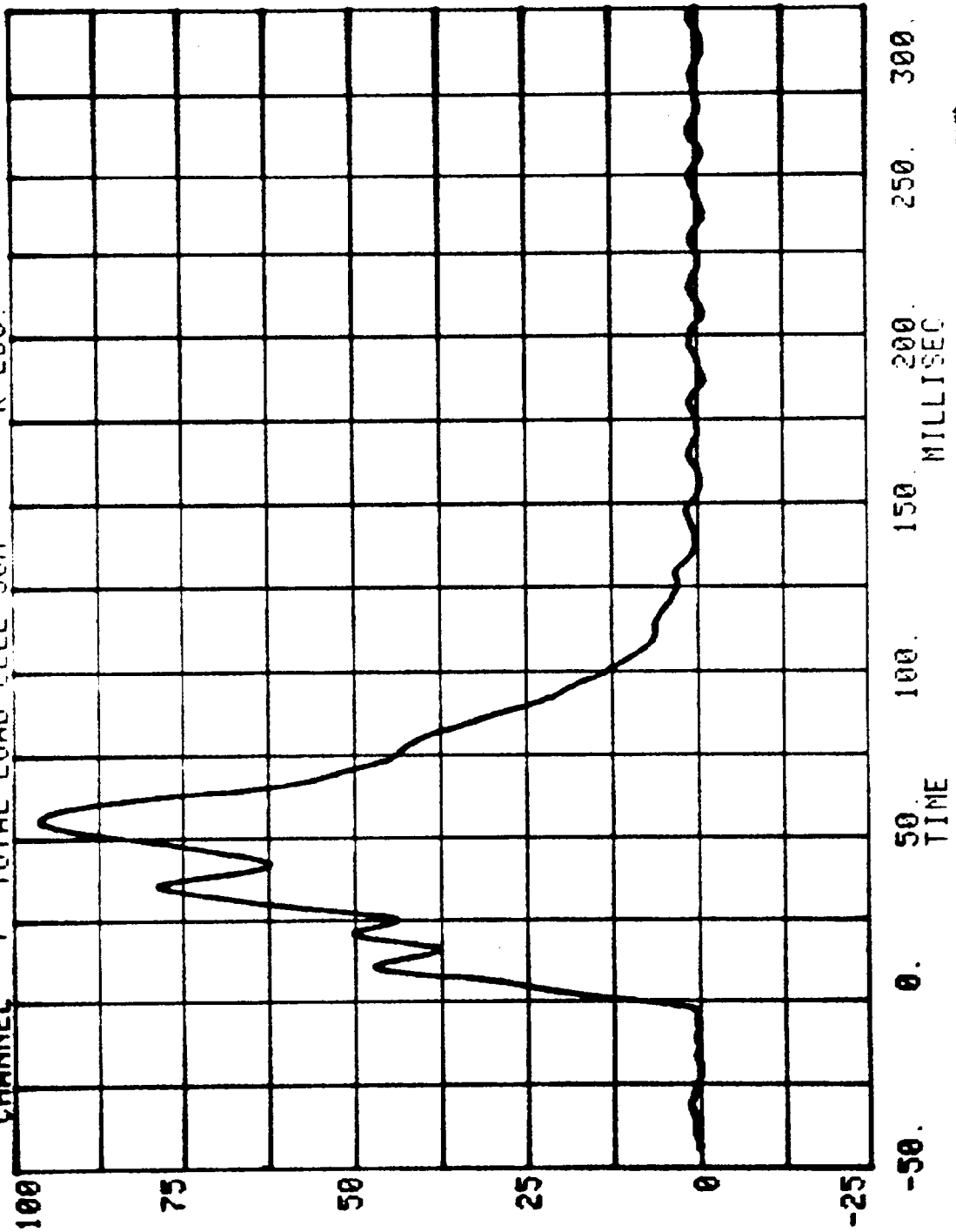
SERIES= 5201

K LBS.



CHANNEL 7 TOTAL LOAD CELL SUM K LBS.

RUN= 810 SERIES= 5201



TEST NO. MJ 5201

DUMMY DATA

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

HEAD INJURY CRITERION  
HEAD SEVERITY INDEX  
36MS. MAXIMUM DURATION

NEW CAR ASSESSMENT BARRIER TEST - 1988

RUN= 810

POS#1 HEAD R

HIC=1133.7 FROM T1= .09997 TO T2= .09885

AVERAGE ACCELERATION BETWEEN T1 AND T2= 115.7G'S

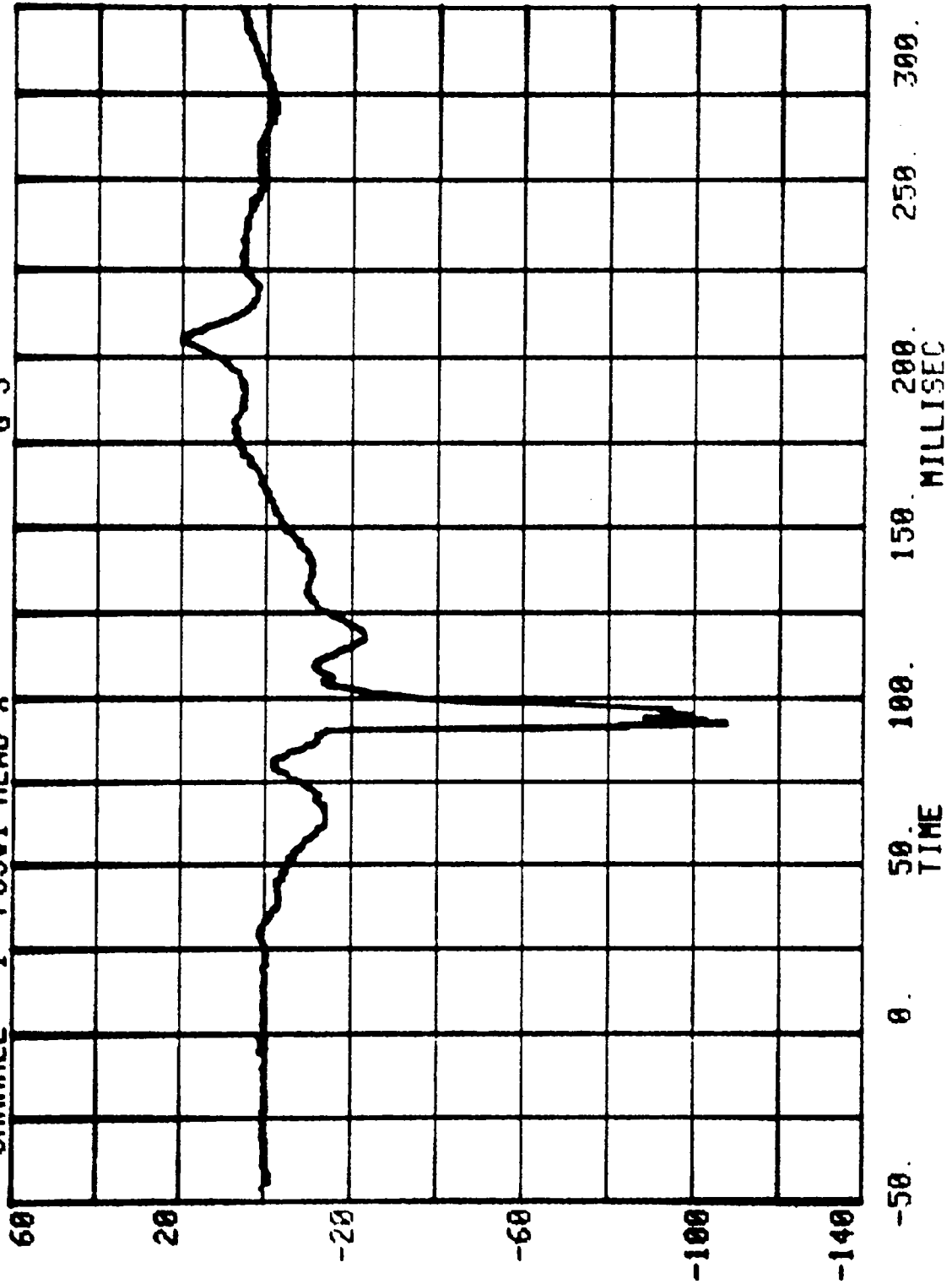
EVENT TIME= 300.0 MSEC

SEVERITY INDEX=1601.2

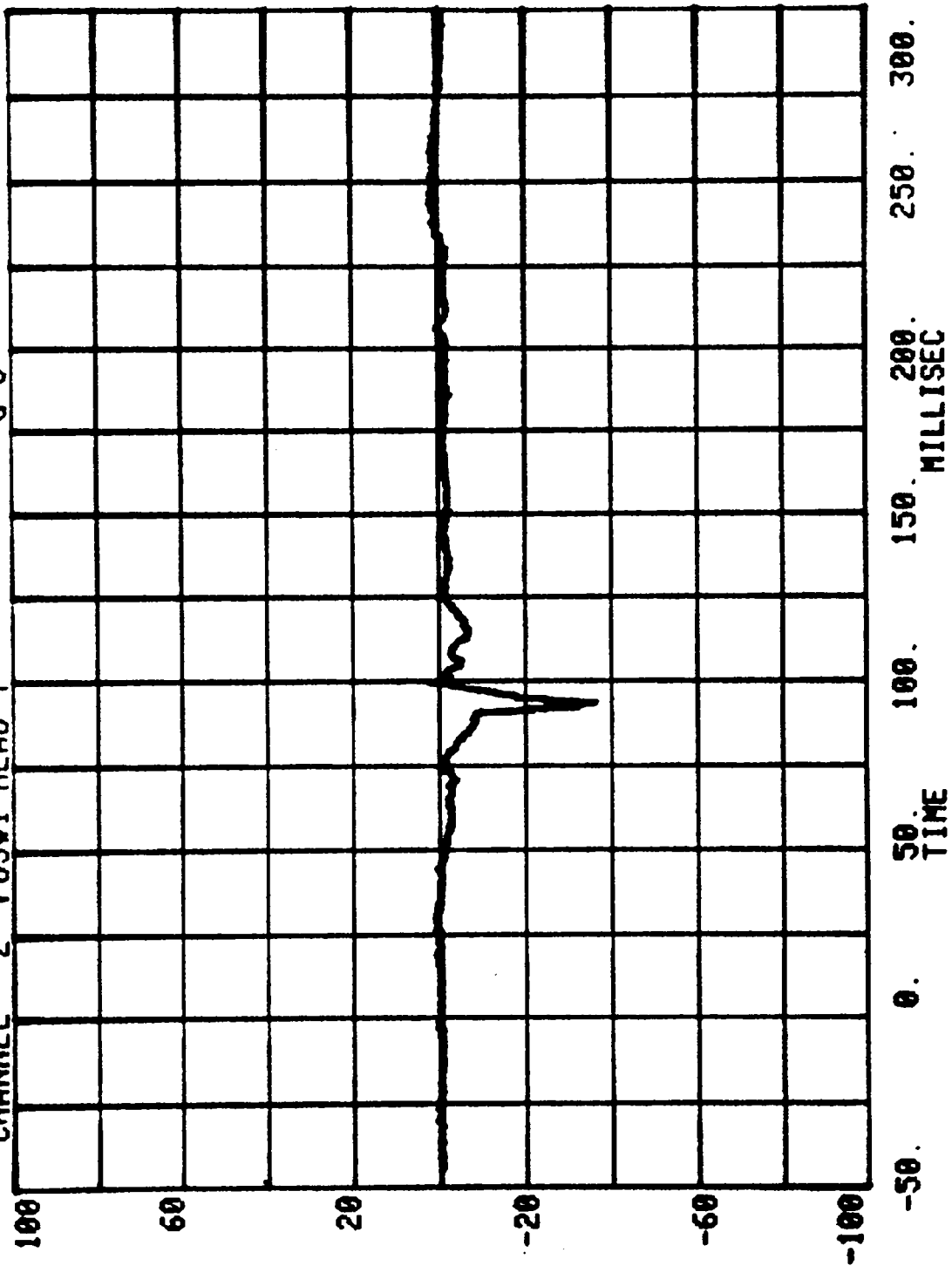
B-70

7626-8

CHANNEL 1 POS#1 HEAD X  
RUN= 810 SERIES= 5201 G'S



CHANNEL 2 POS#1 HEAD Y  
RUN= 810 SERIES= 5201 G'S

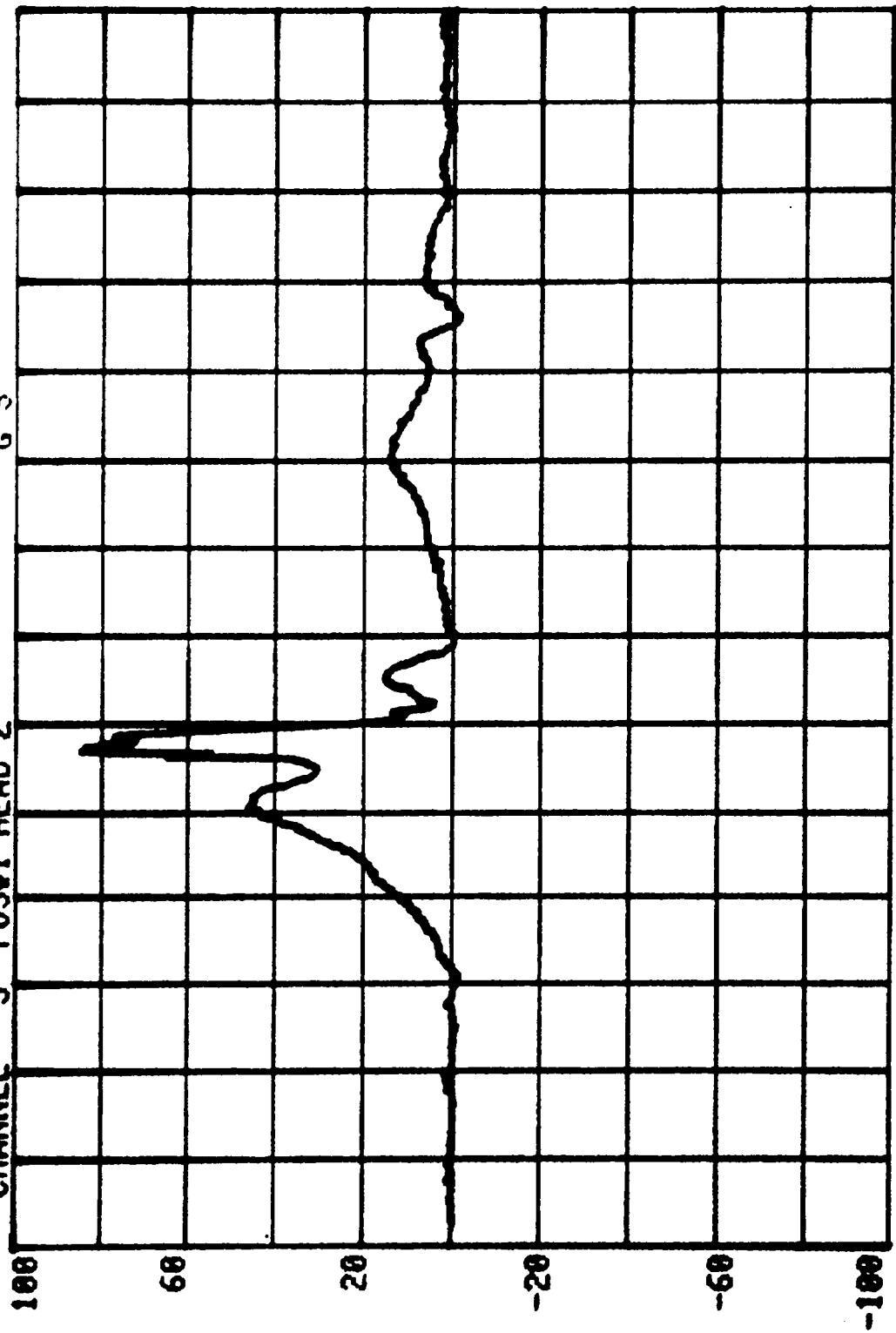


CHANNEL 3 POS#1 HEAD Z

RUN= 810

SERIES= 5201

G'S

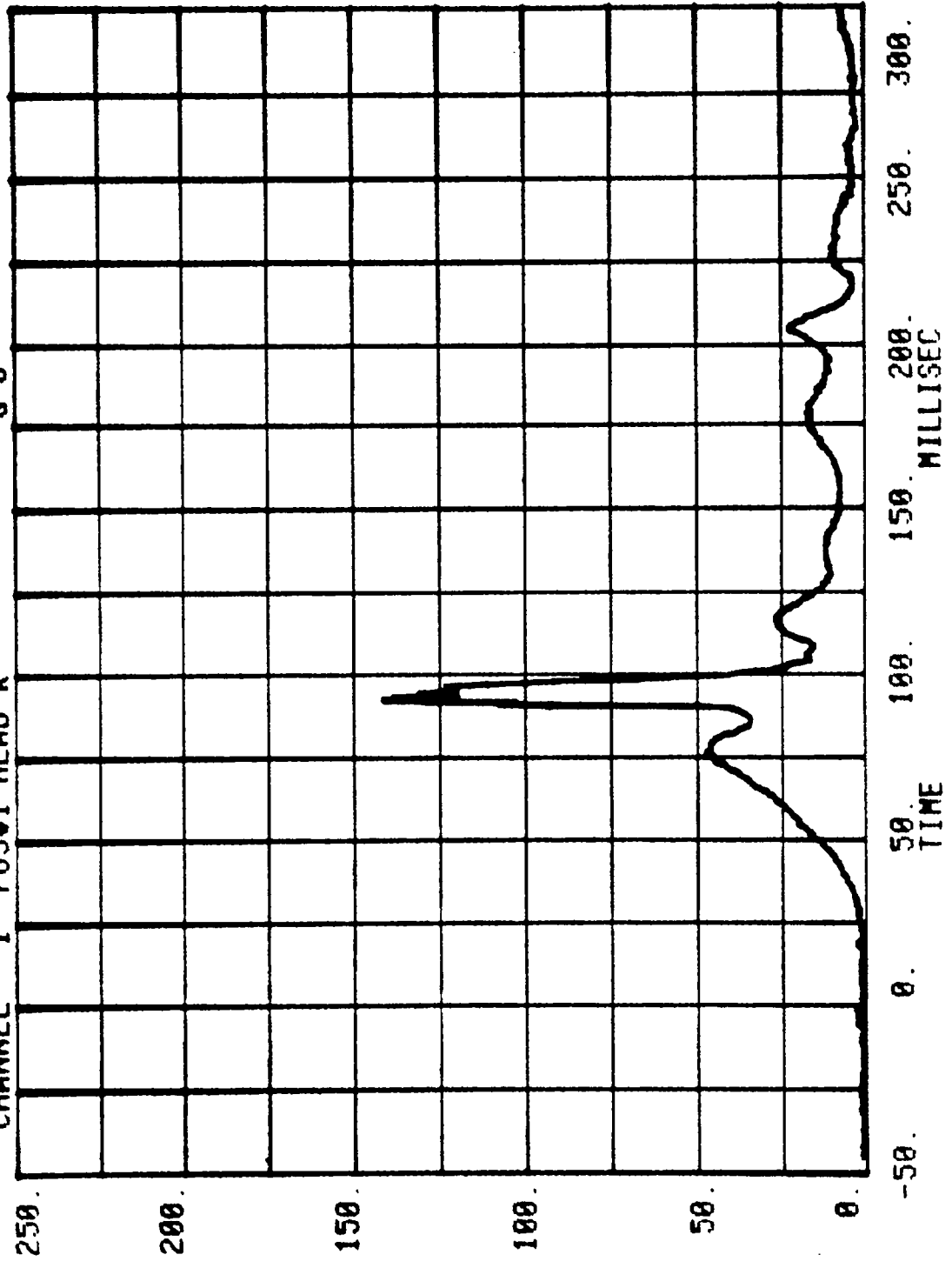


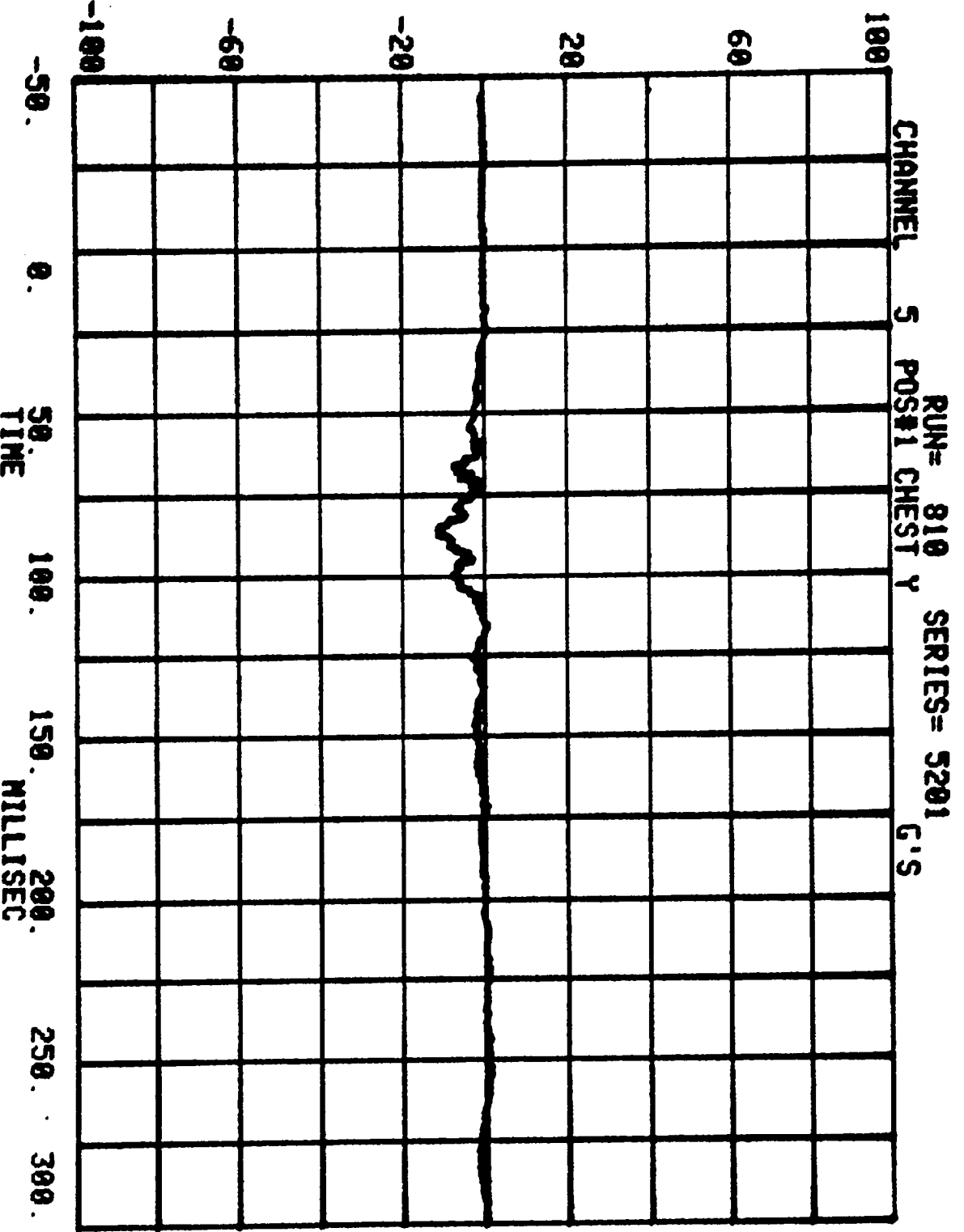
100  
60  
20  
-20  
-60  
-100

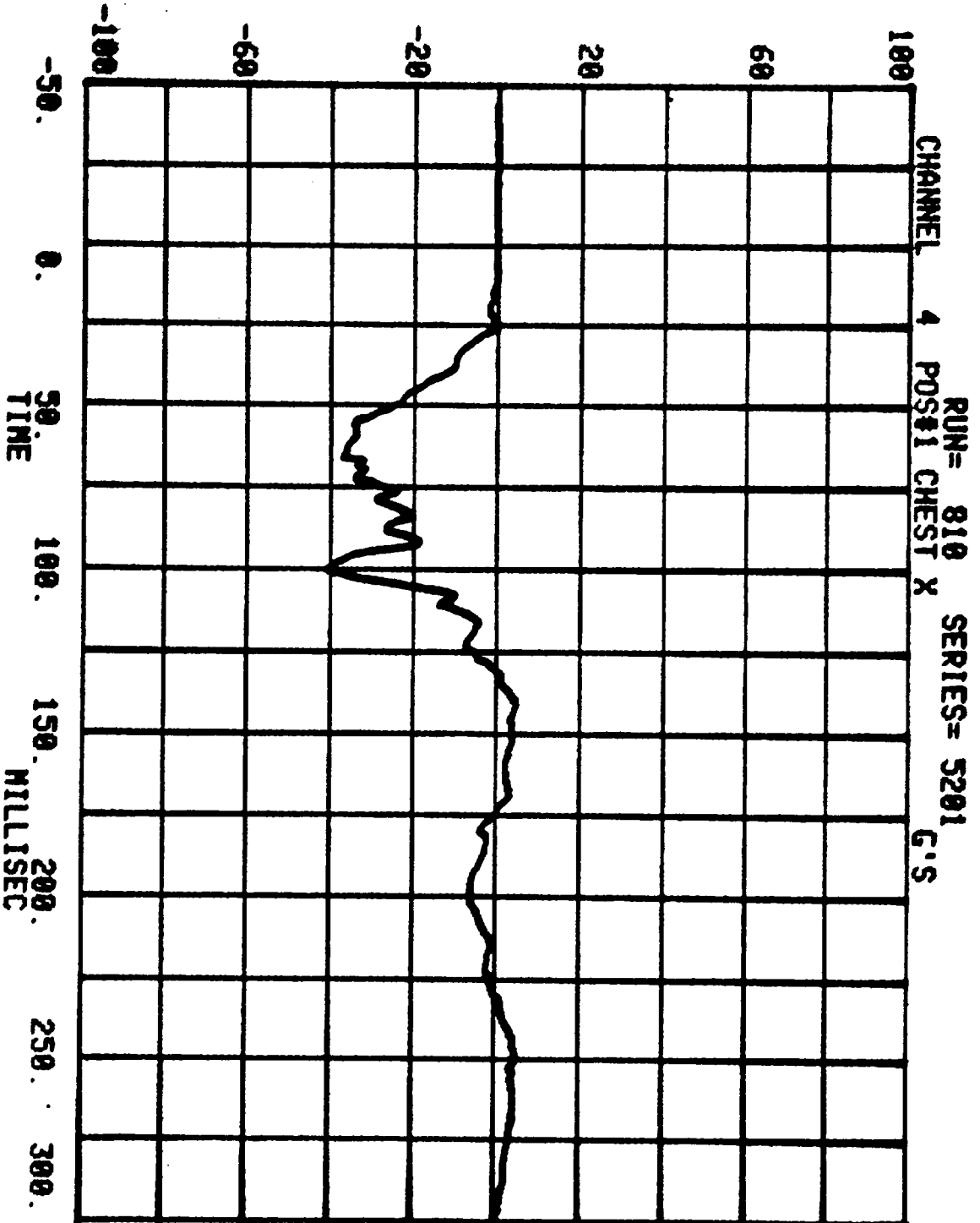
0. 50. 100. 150. 200. 250. 300.

TIME  
MILLISEC

CHANNEL 1 POS#1 HEAD R RUN= 810 SERIES= 5201 G'S







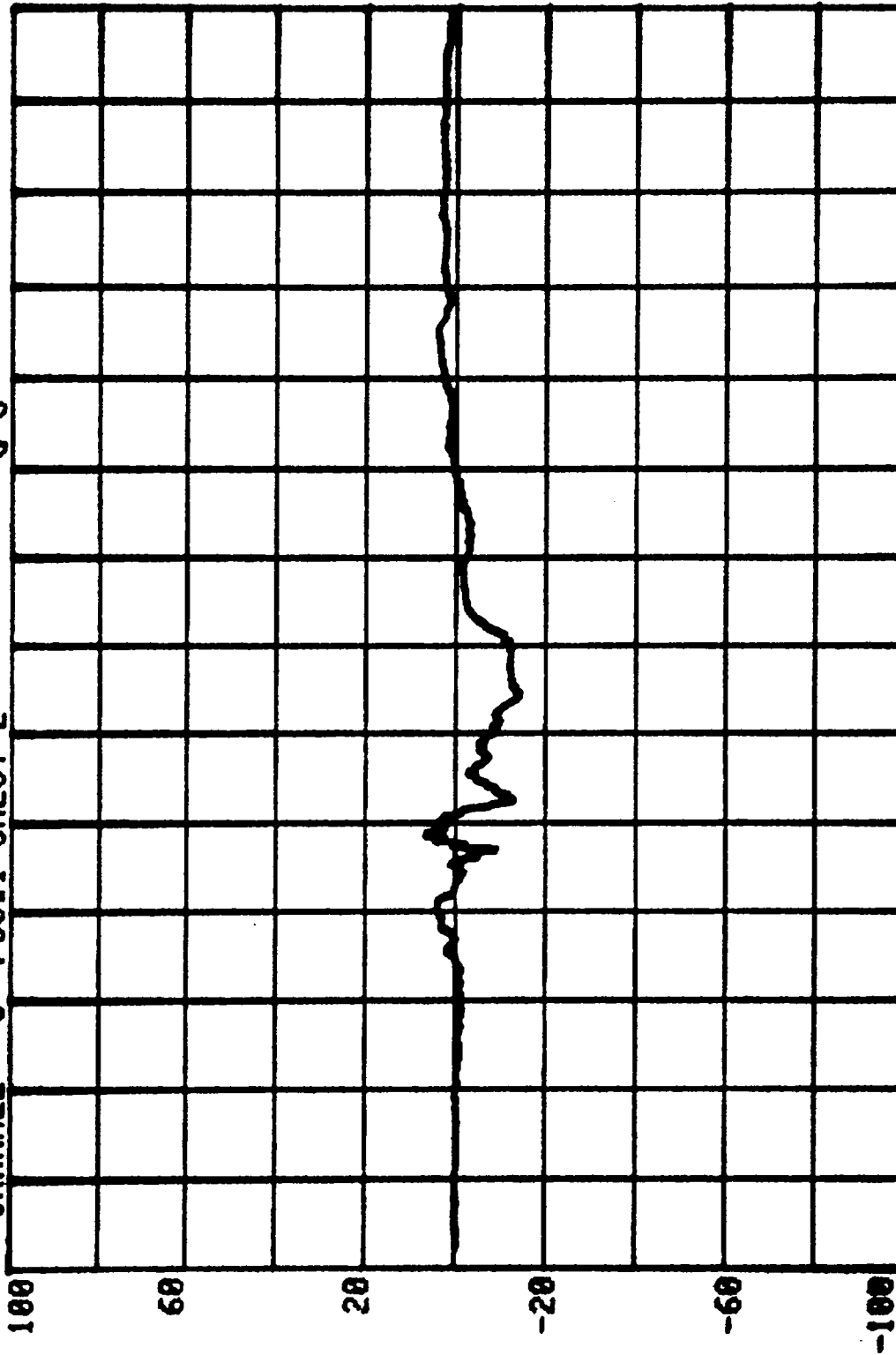
B-75

7626-8

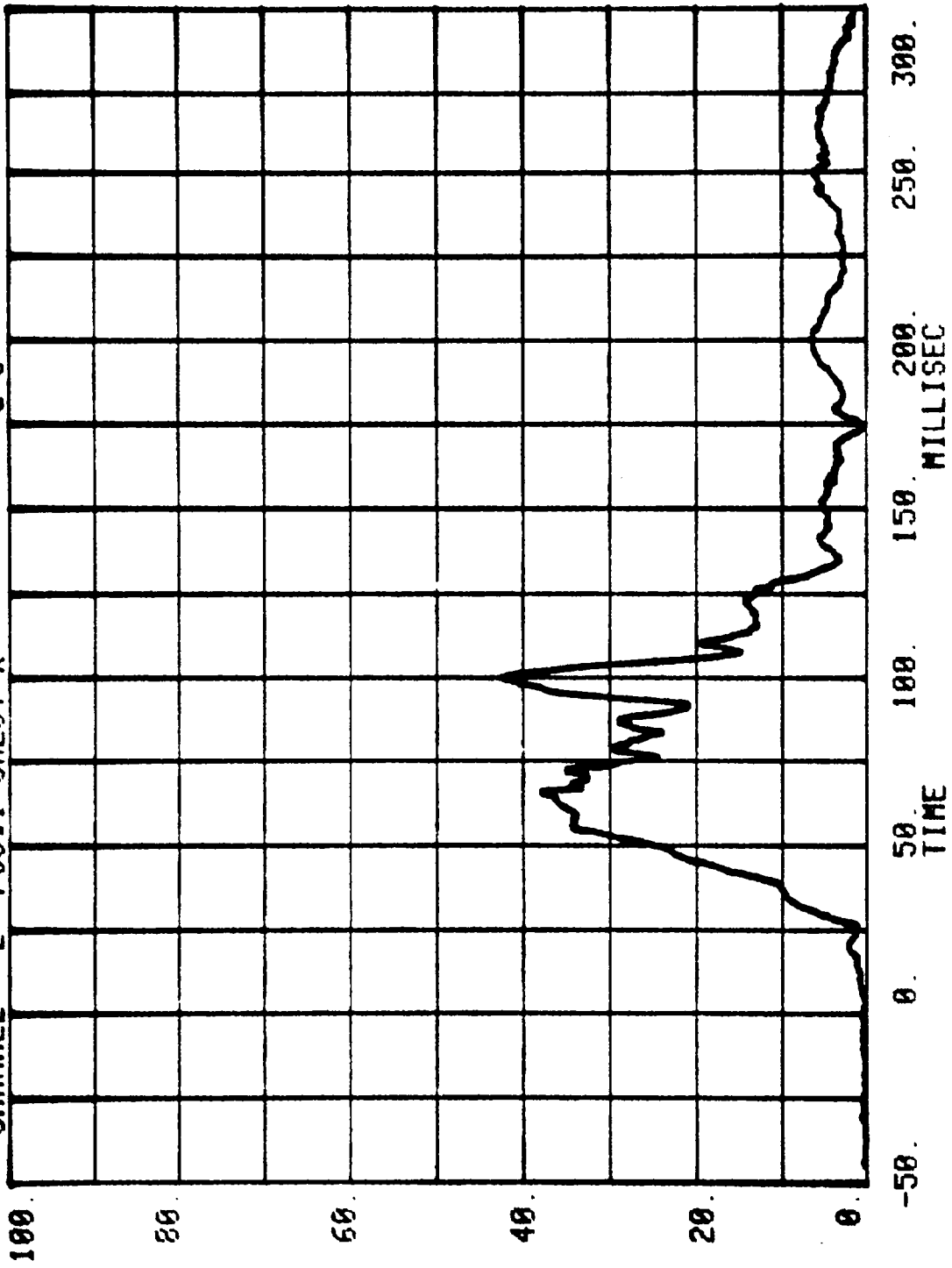
CHANNEL 6 POS#1 CHEST Z G'S

RUN= 810

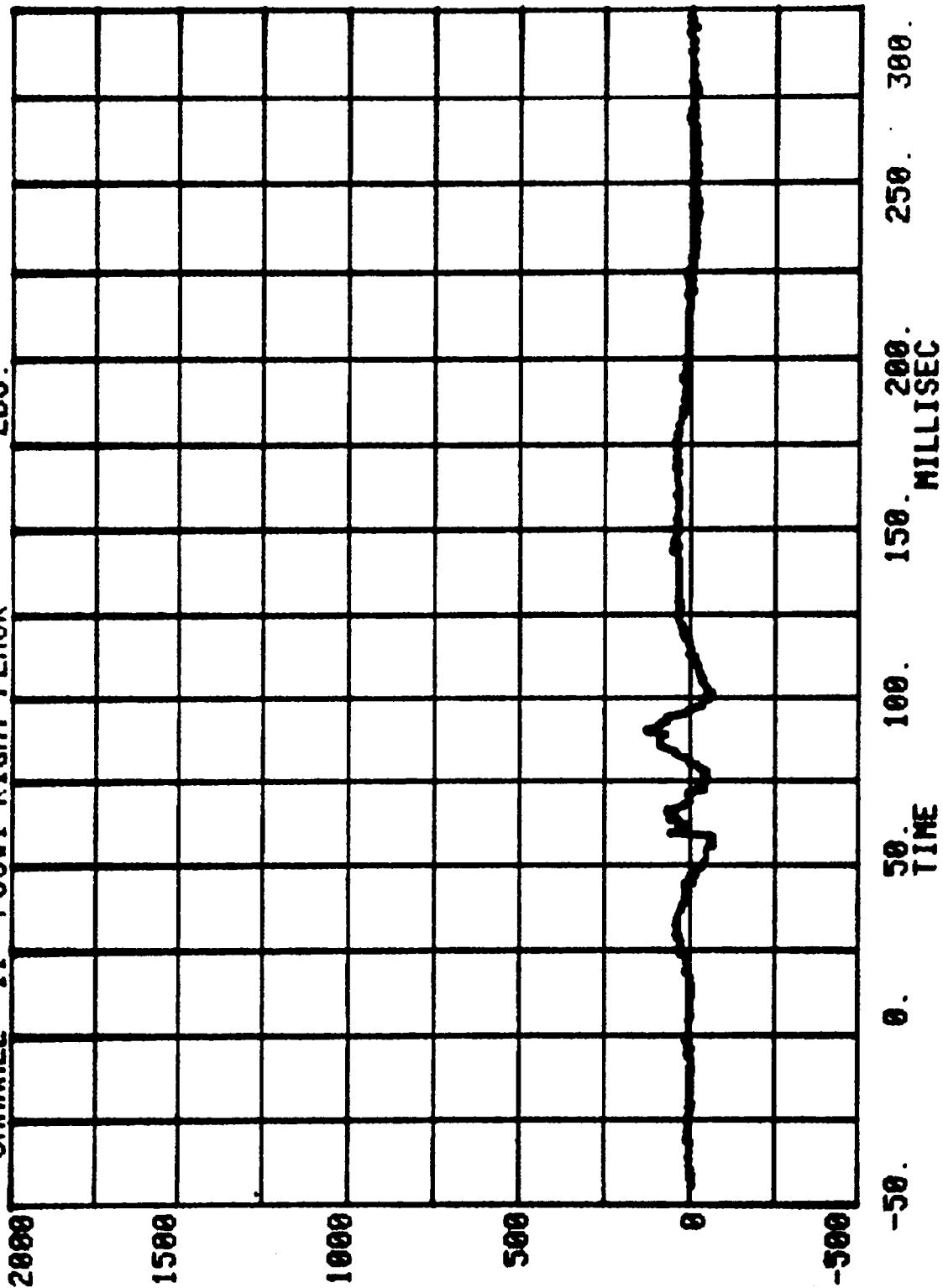
SERIES= 5201



CHANNEL 2 POS#1 CHEST R  
RUN= 810 SERIES= 5201 G'S



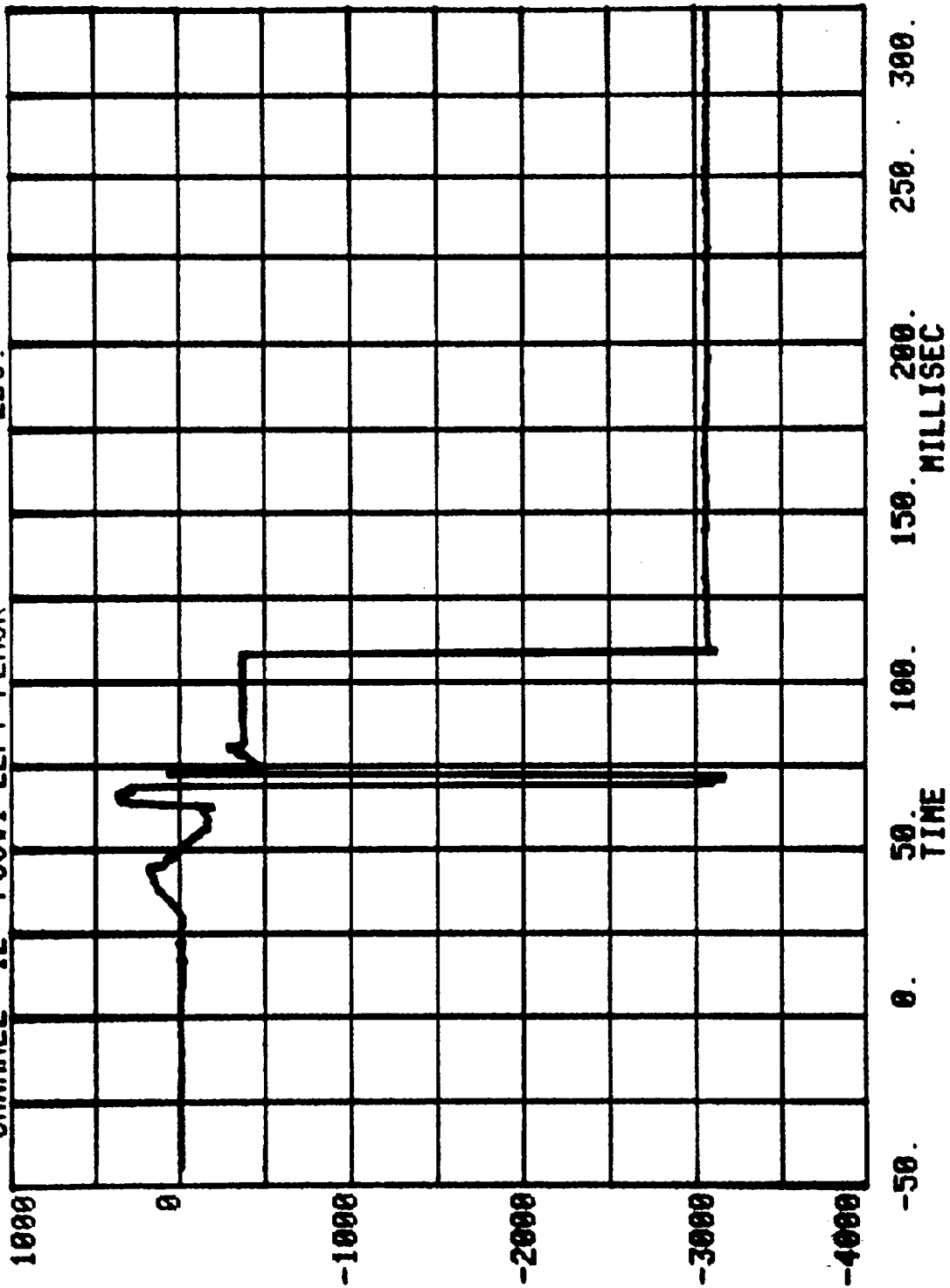
CHANNEL 11 POS#1 RIGHT FEMUR  
RUN= 810 SERIES= 5201 LBS.



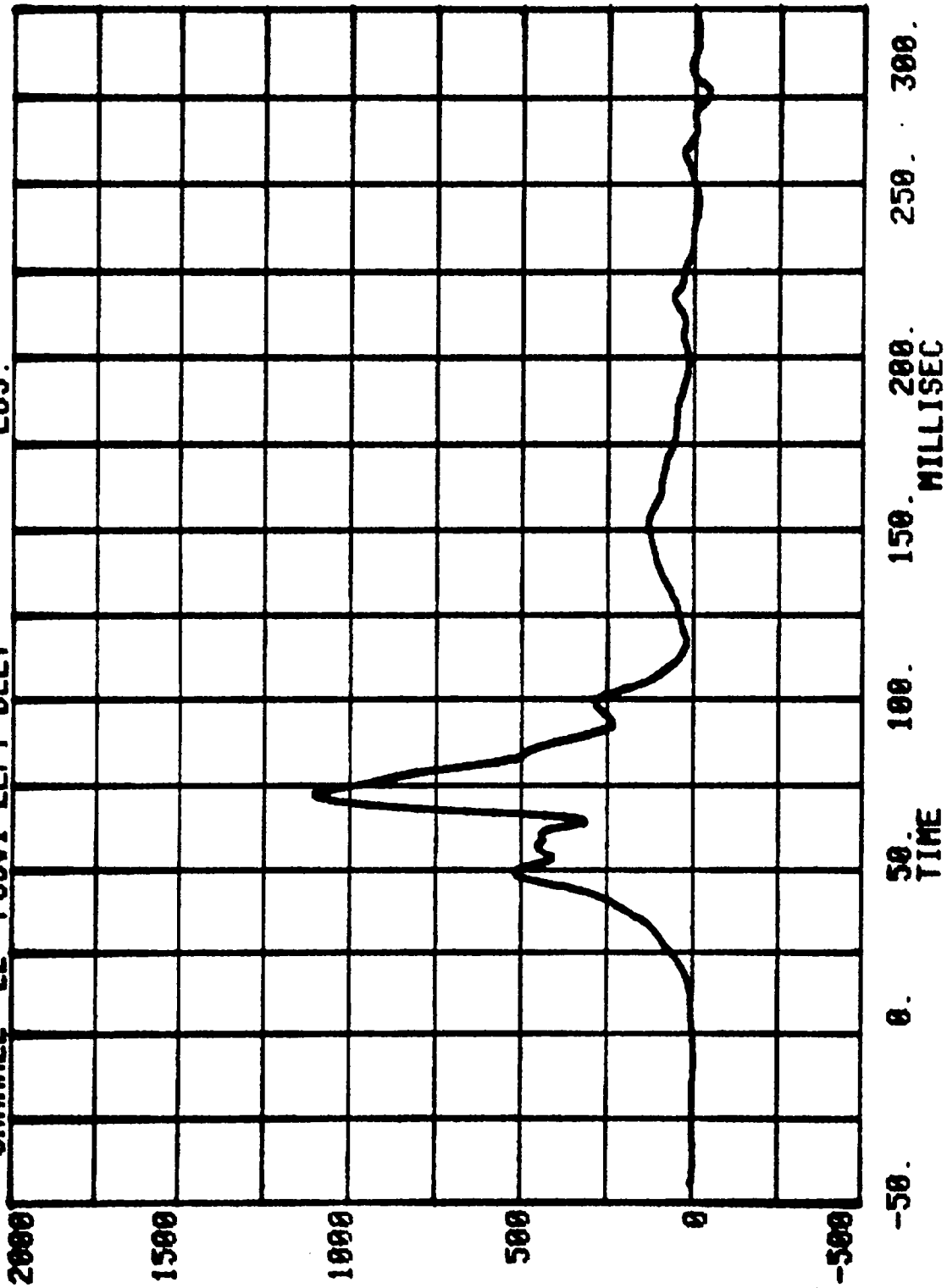
Data not accurate after 65 milliseconds

CHANNEL 12 POS#1 LEFT FEMUR LBS.

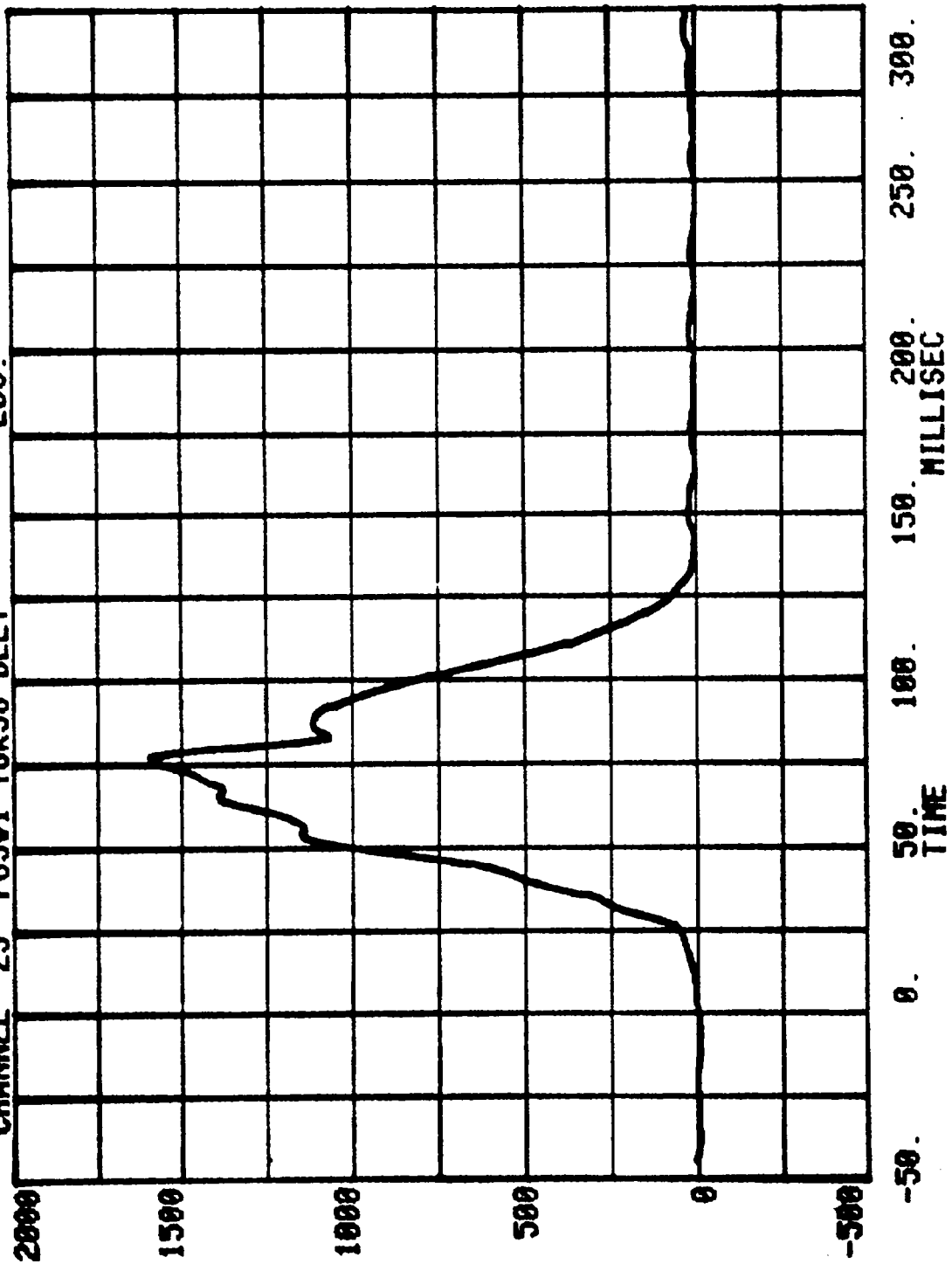
RUN= 810 SERIES= 5201



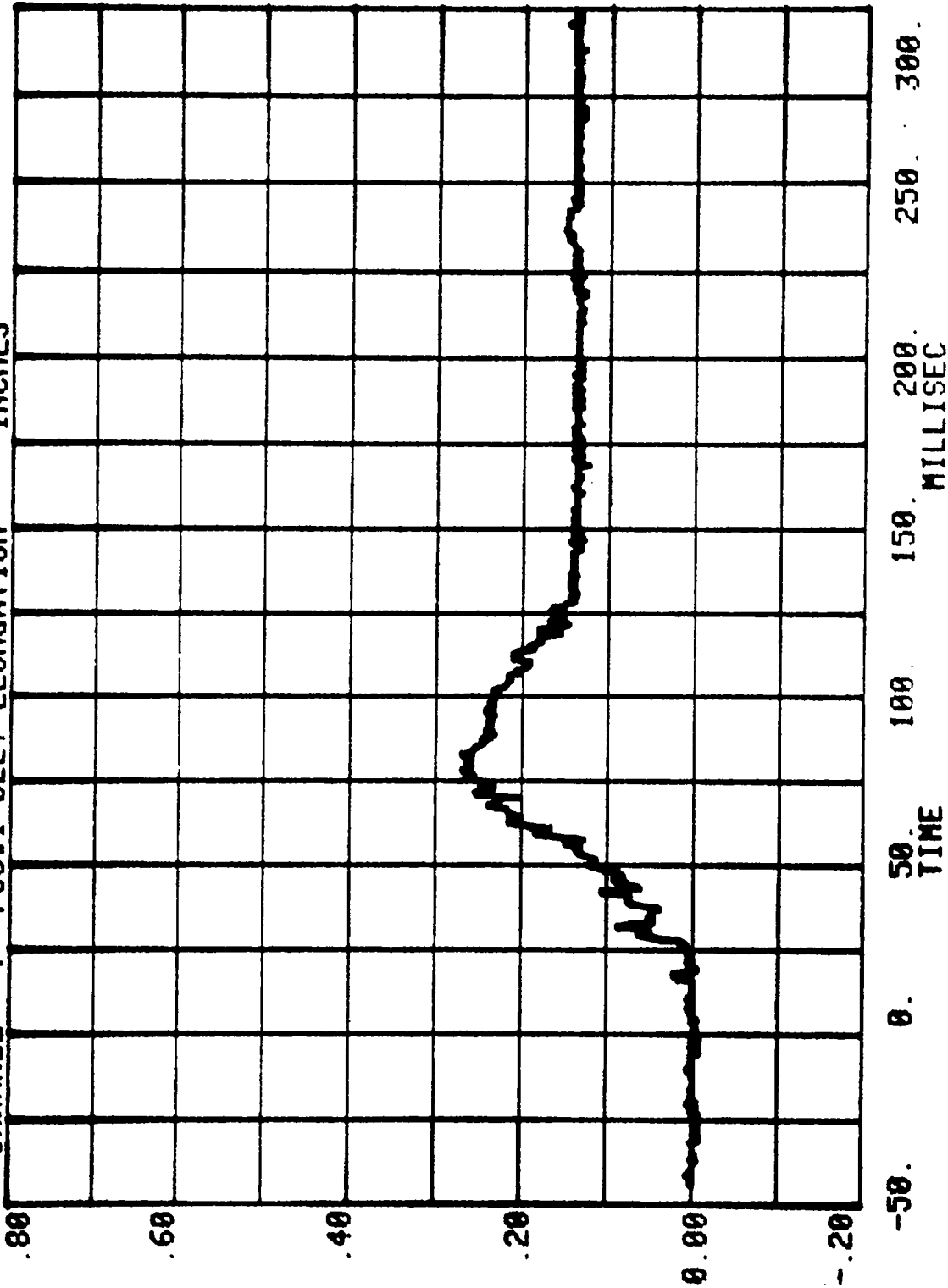
CHANNEL 22 POS#1 LEFT BELT  
RUN= 810 SERIES= 5201 LBS.



CHANNEL 23 POS#1 TORSO BELT  
RUN= 810 SERIES= 5201 LBS.

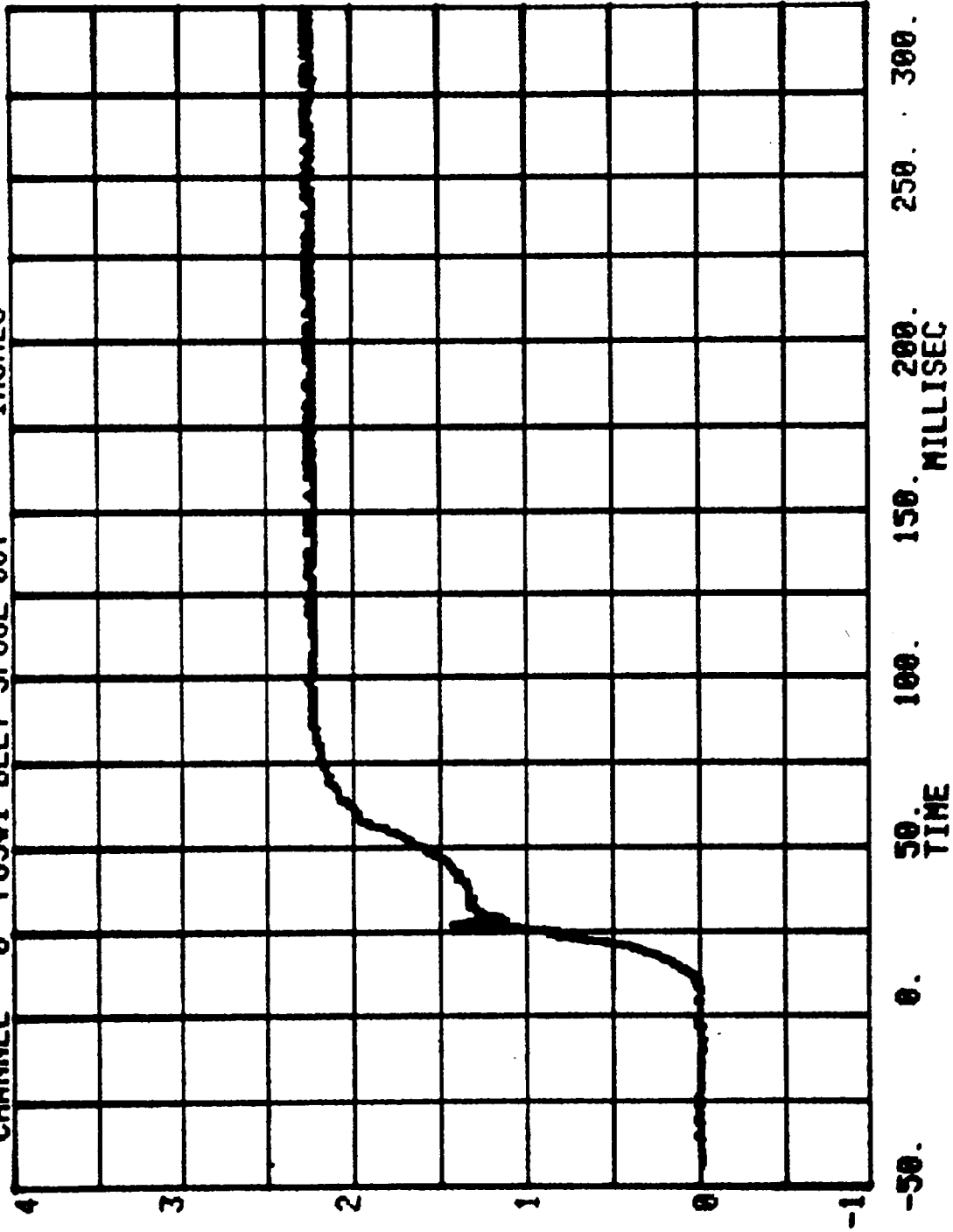


CHANNEL 7 POS#1 BELT ELONGATION SERIES= 5201 Measured over 2.5 inches



CHANNEL 8 POS#1 BELT SPOOL OUT

RUN= 810 SERIES= 5201 INCHES



HEAD INJURY CRITERION  
HEAD SEVERITY INDEX  
36MS. MAXIMUM DURATION

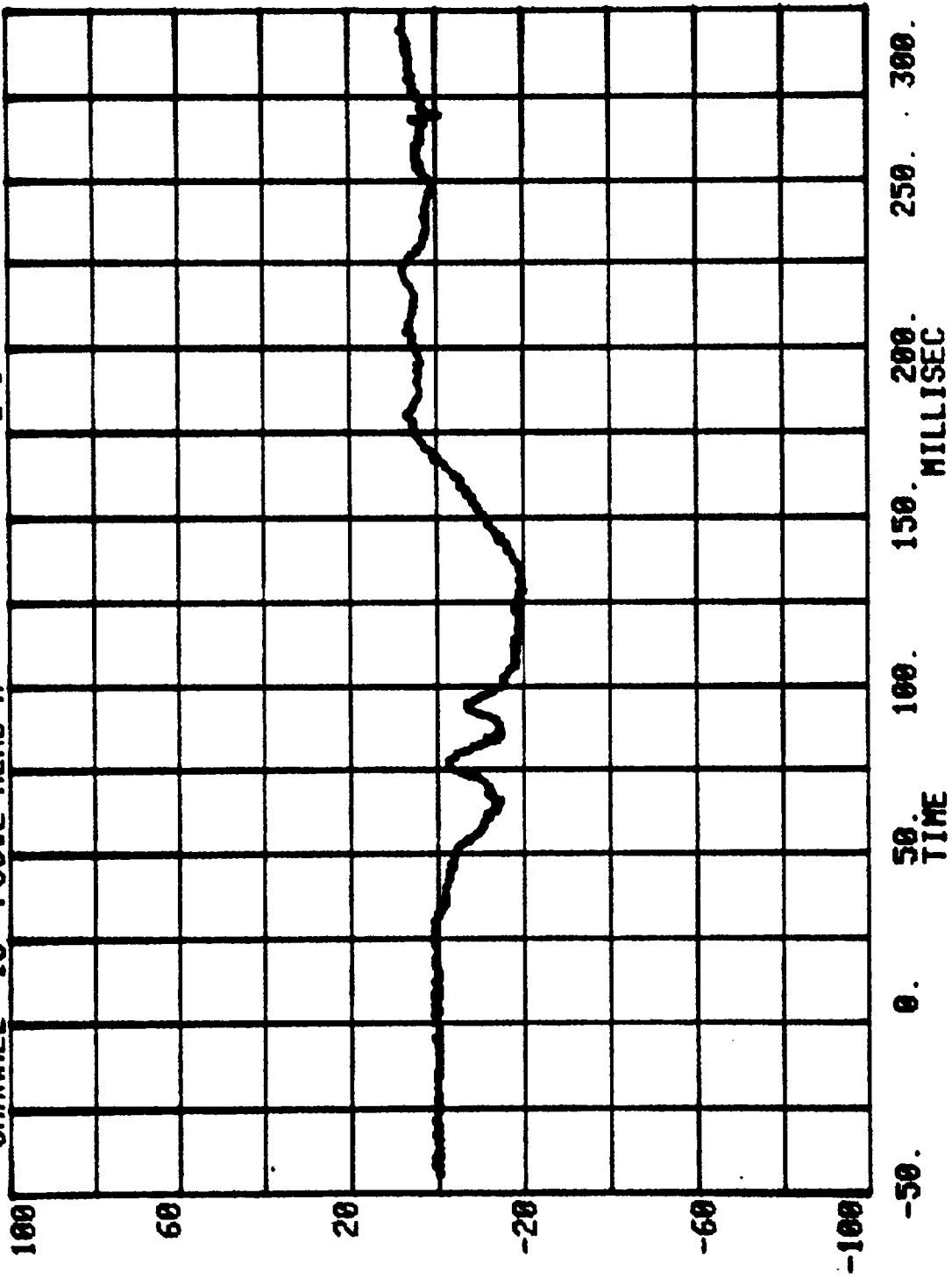
NEW CAR ASSESSMENT BARRIER TEST - 1988

RUN= 810

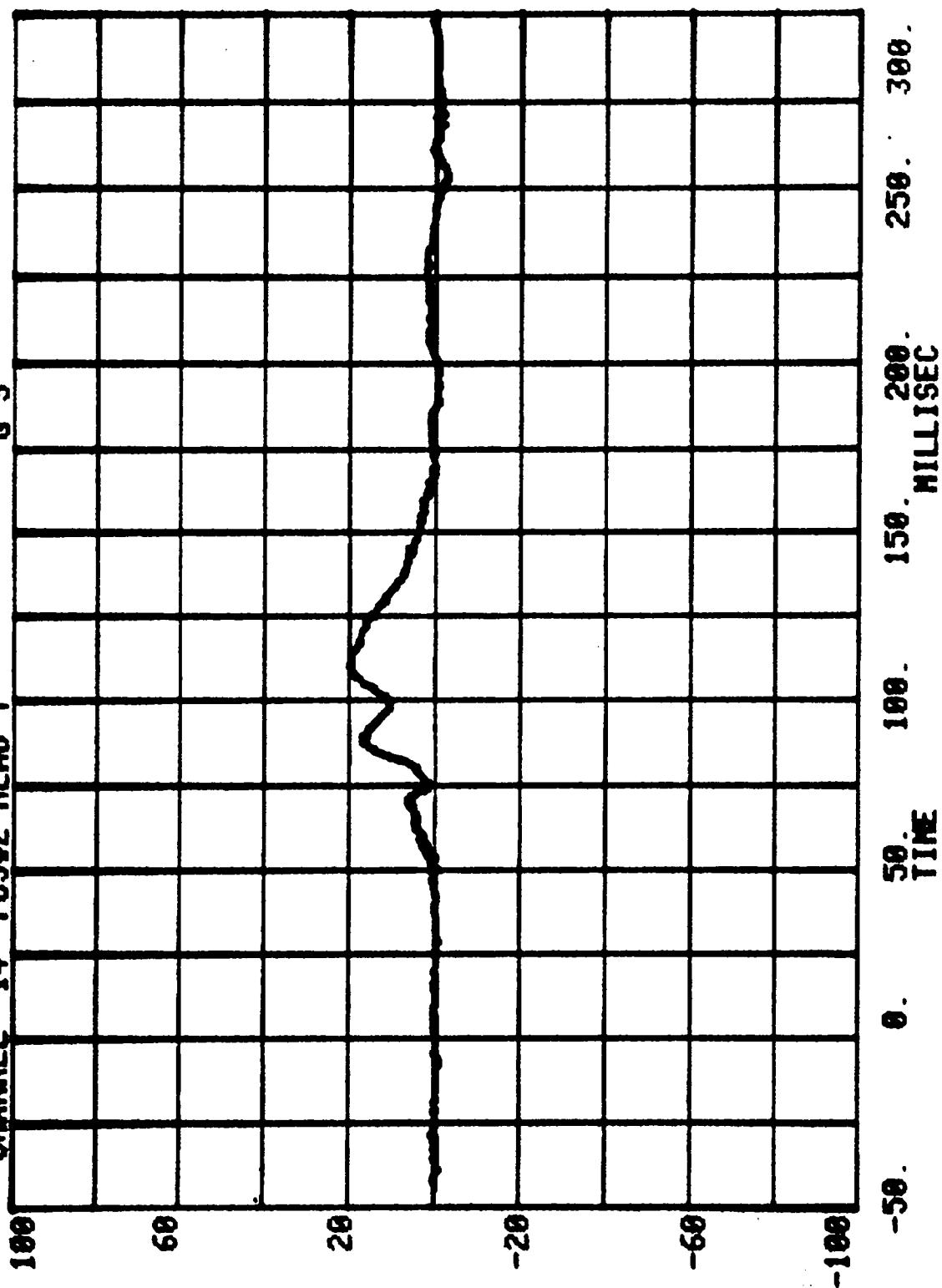
POS#2 HEAD R

HIC= 430.1 FROM T1= .06967 TO T2= .10567  
AVERAGE ACCELERATION BETWEEN T1 AND T2= 42.7G'S  
EVENT TIME= 300.0 MSEC  
SEVERITY INDEX= 793.7

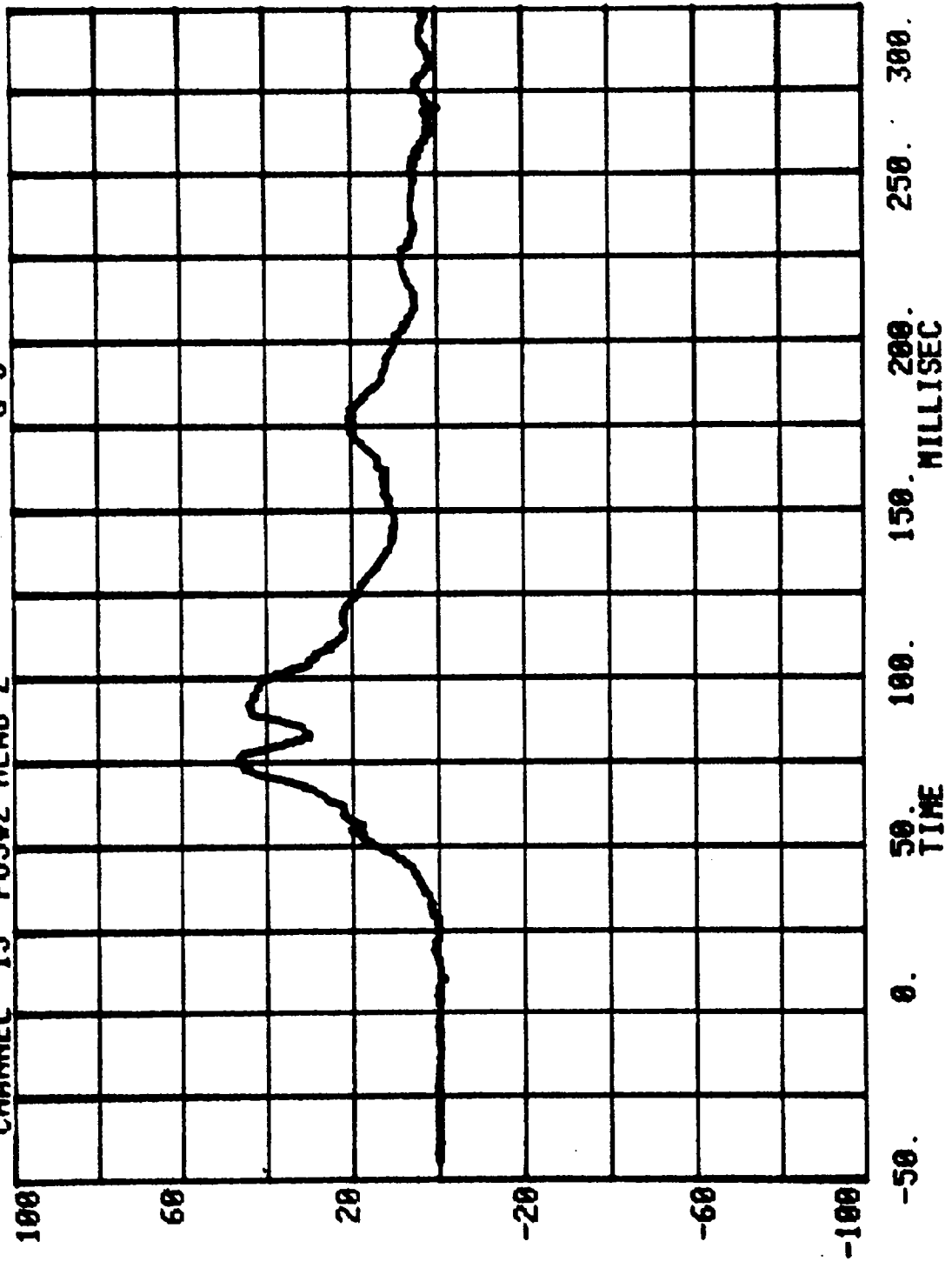
CHANNEL 13 POS#2 HEAD X  
RUN= 818 SERIES= 5201 G'S



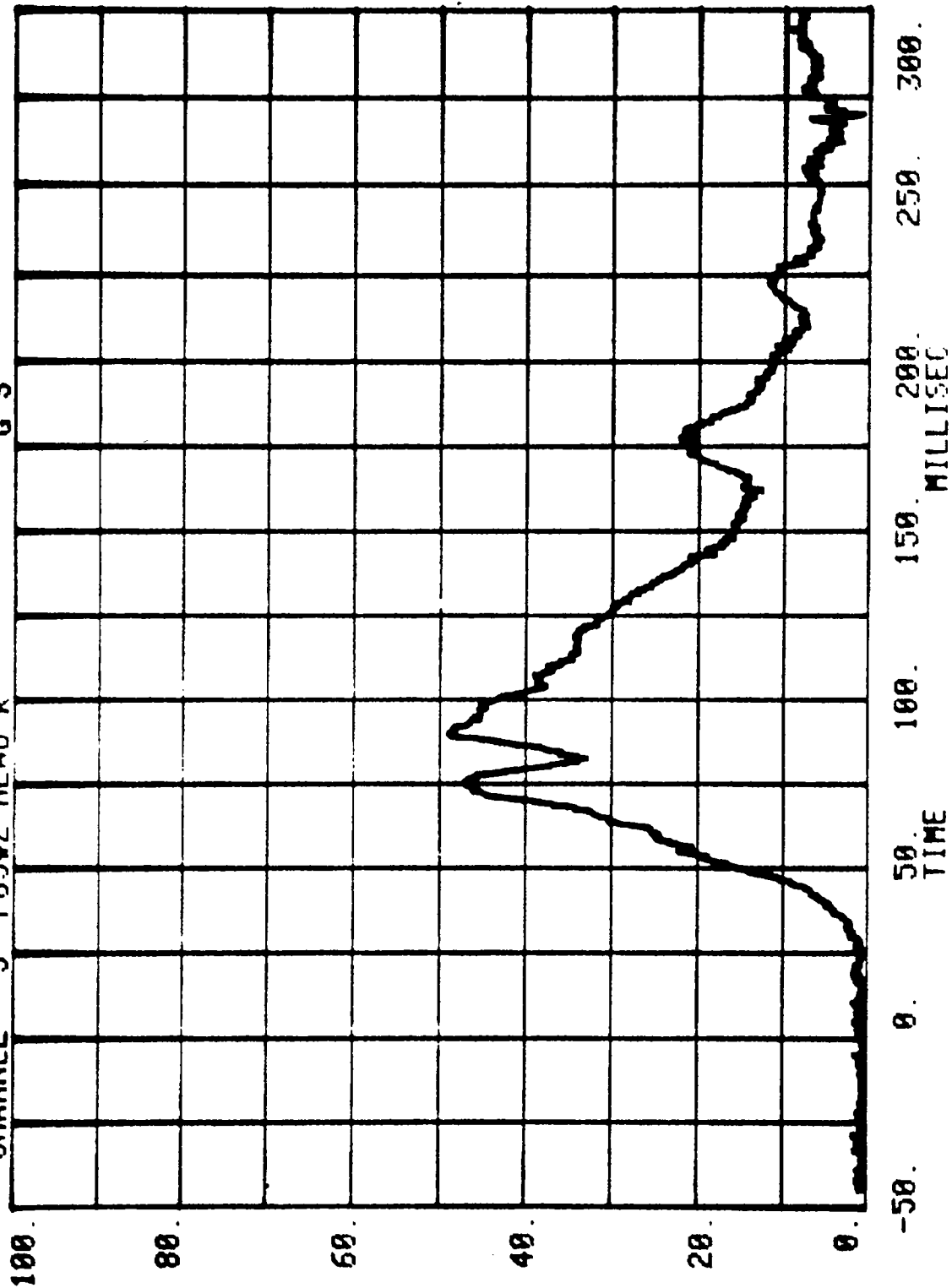
CHANNEL 14 POS#2 HEAD Y  
RUN= 810 SERIES= 5201 G'S



CHANNEL 15 POS#2 HEAD Z  
RUN= 810 SERIES= 5201 G'S



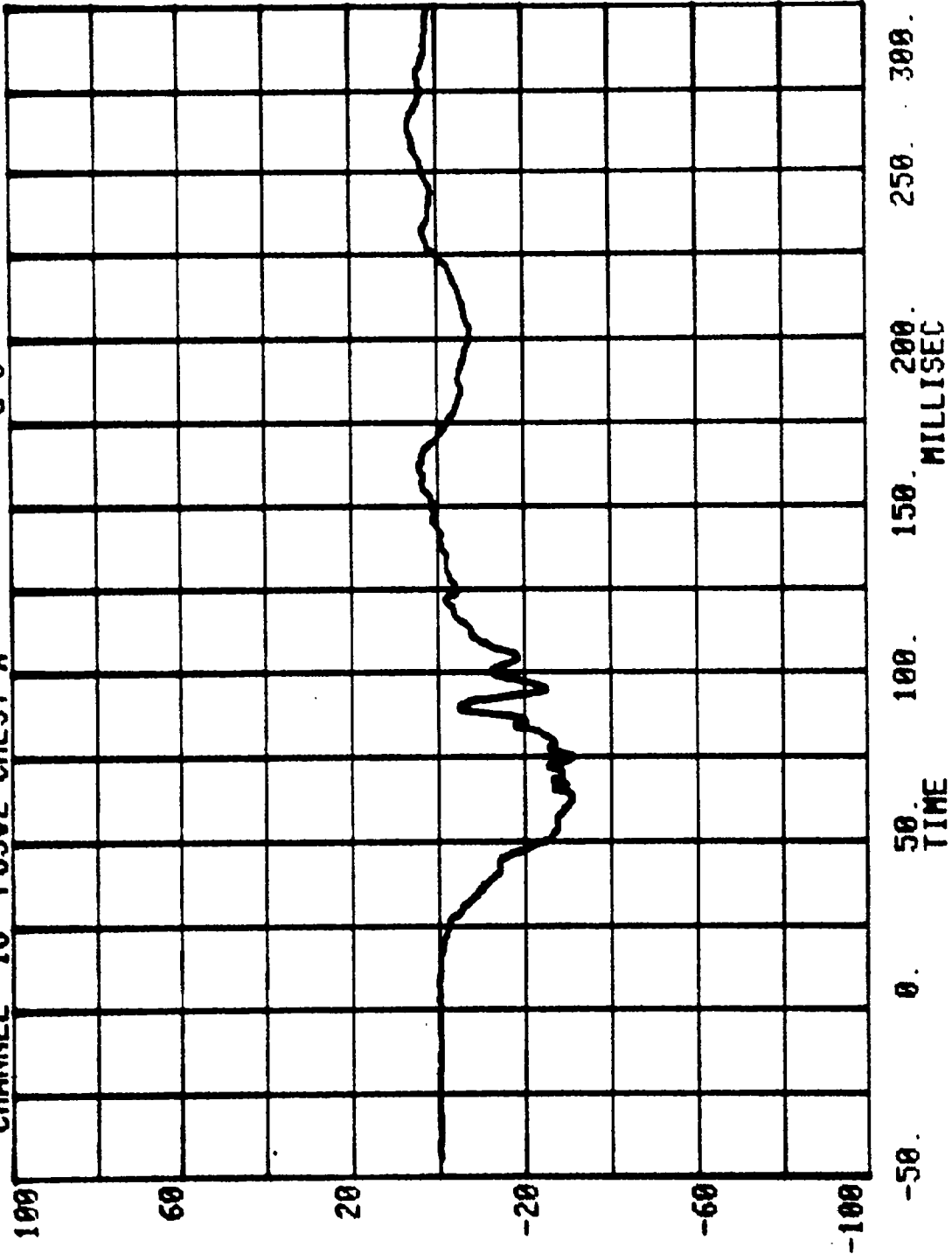
CHANNEL 3 POS#2 HEAD R  
RUN= 810 SERIES= 5201 G'S



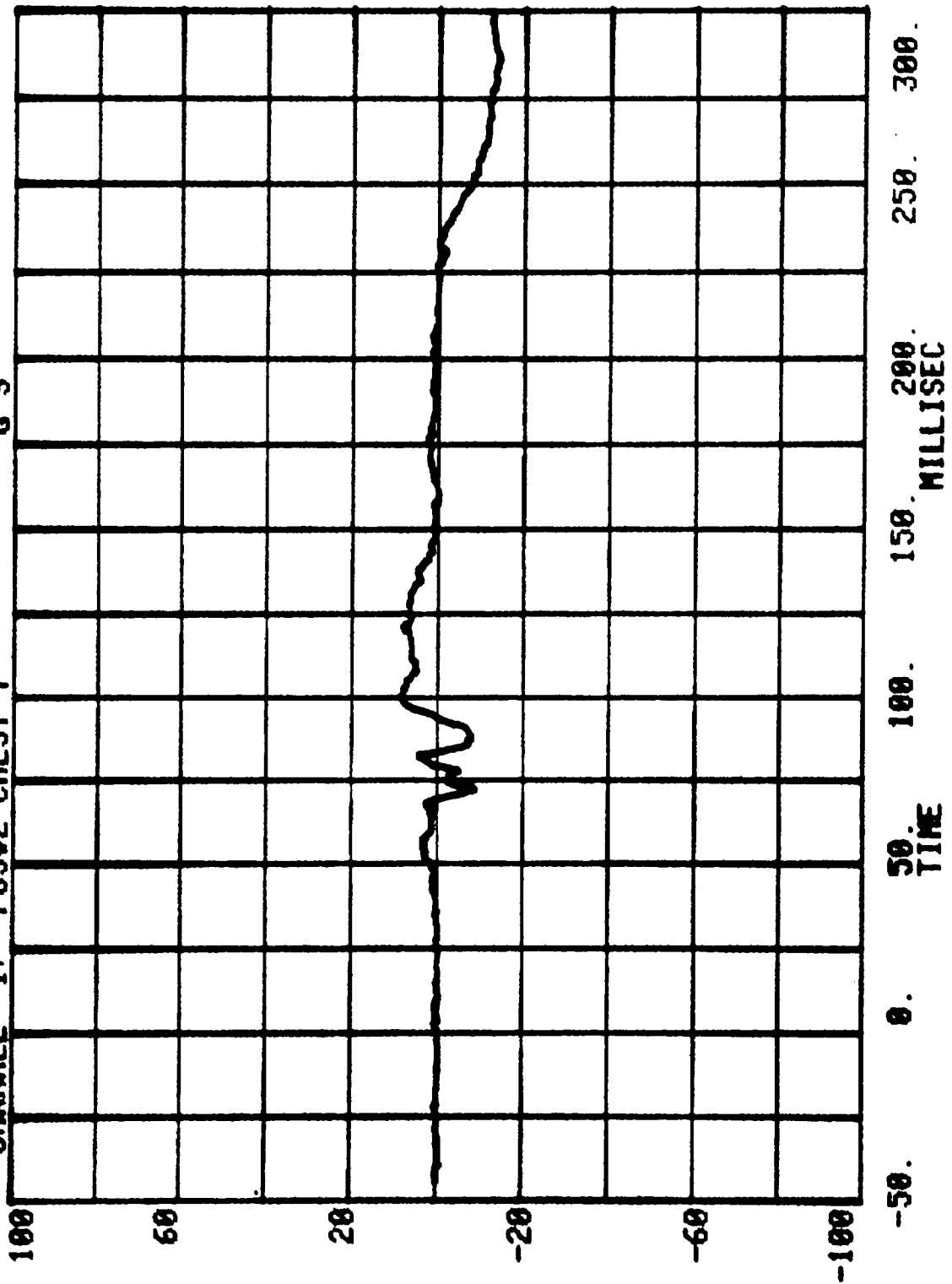
CHANNEL 16 POS#2 CHEST X G'S

RUN= 810

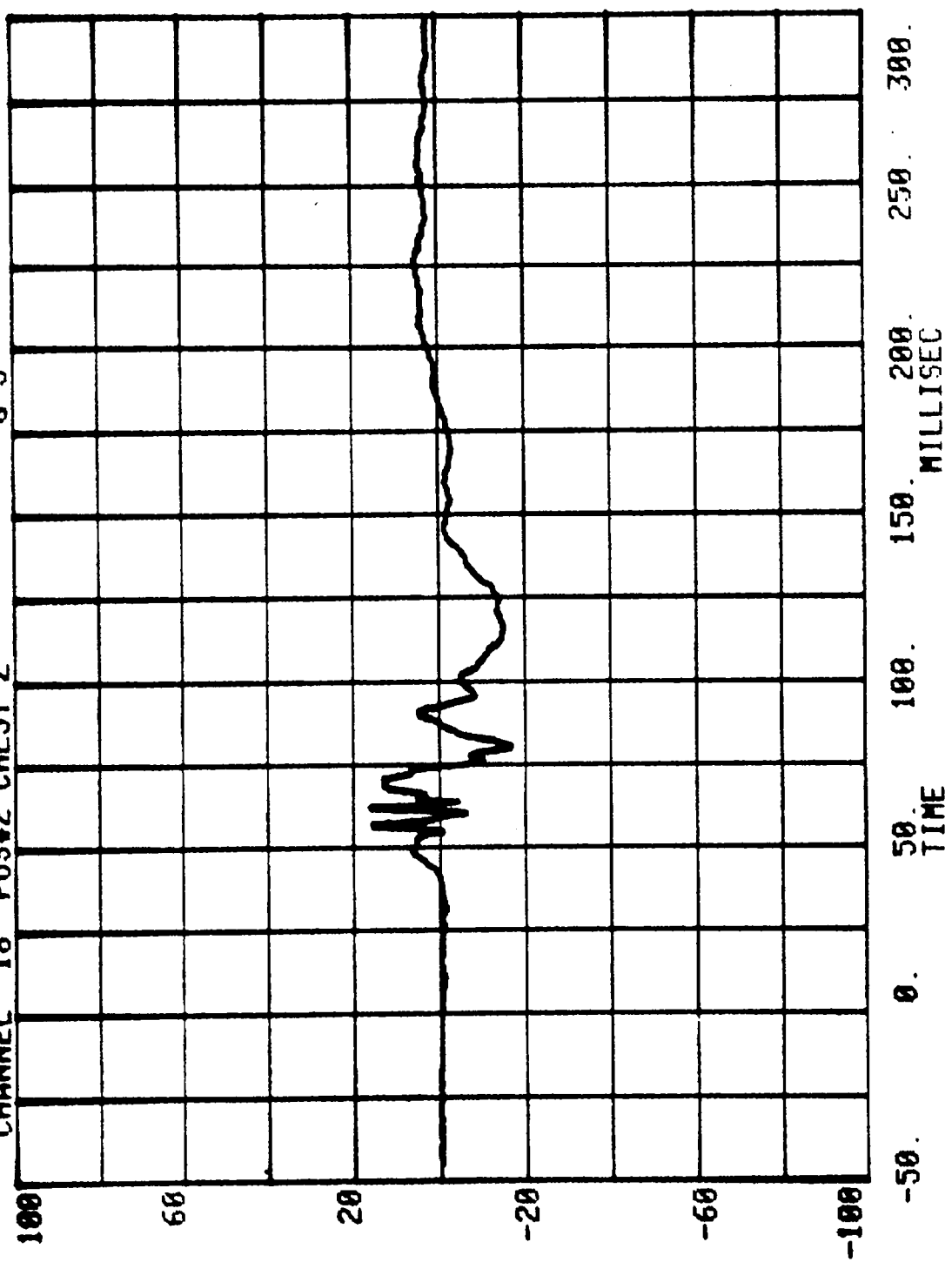
SERIES= 5201



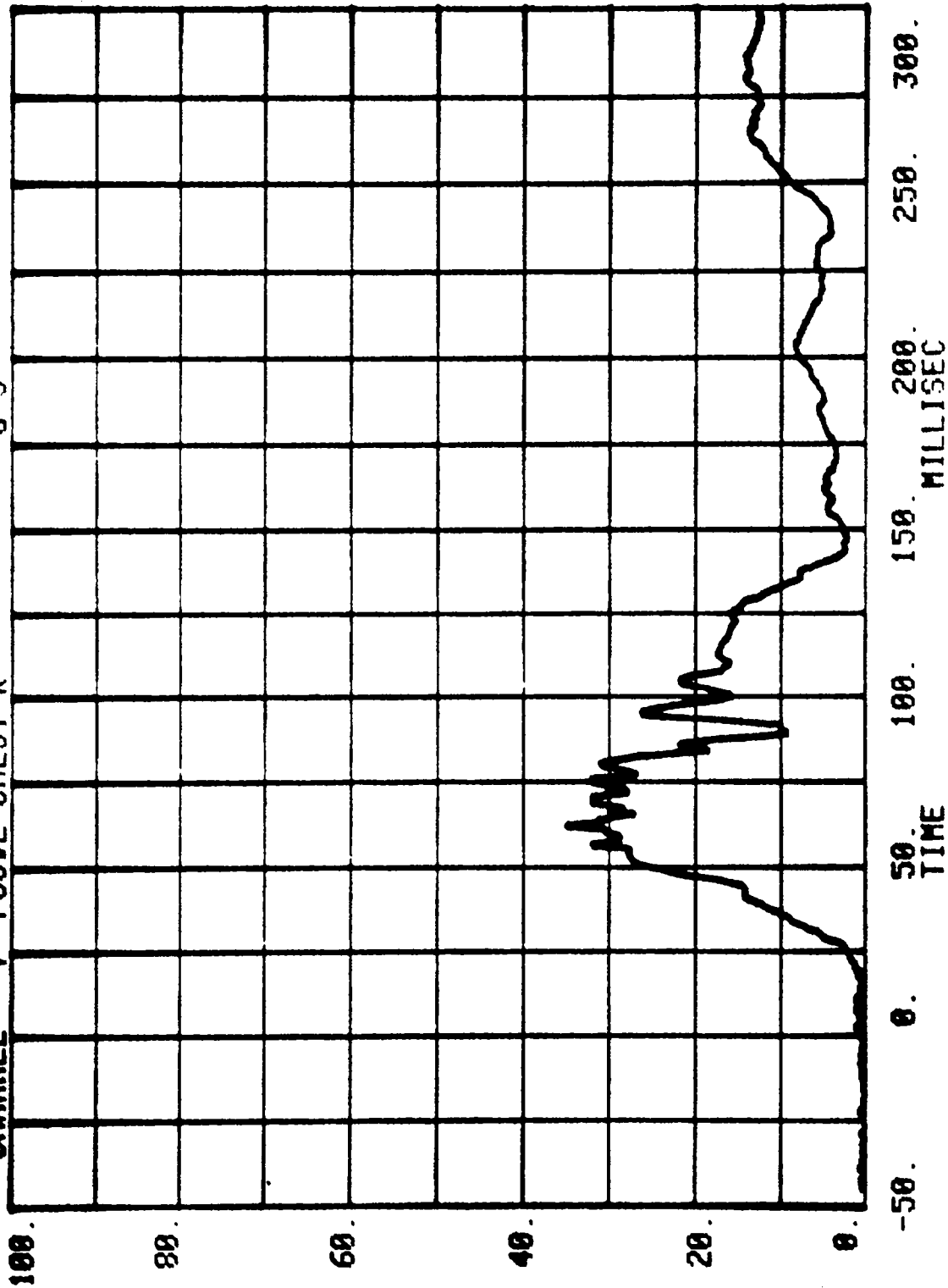
CHANNEL 17 POS#2 CHEST Y  
RUN= 810 SERIES= 5201 G'S



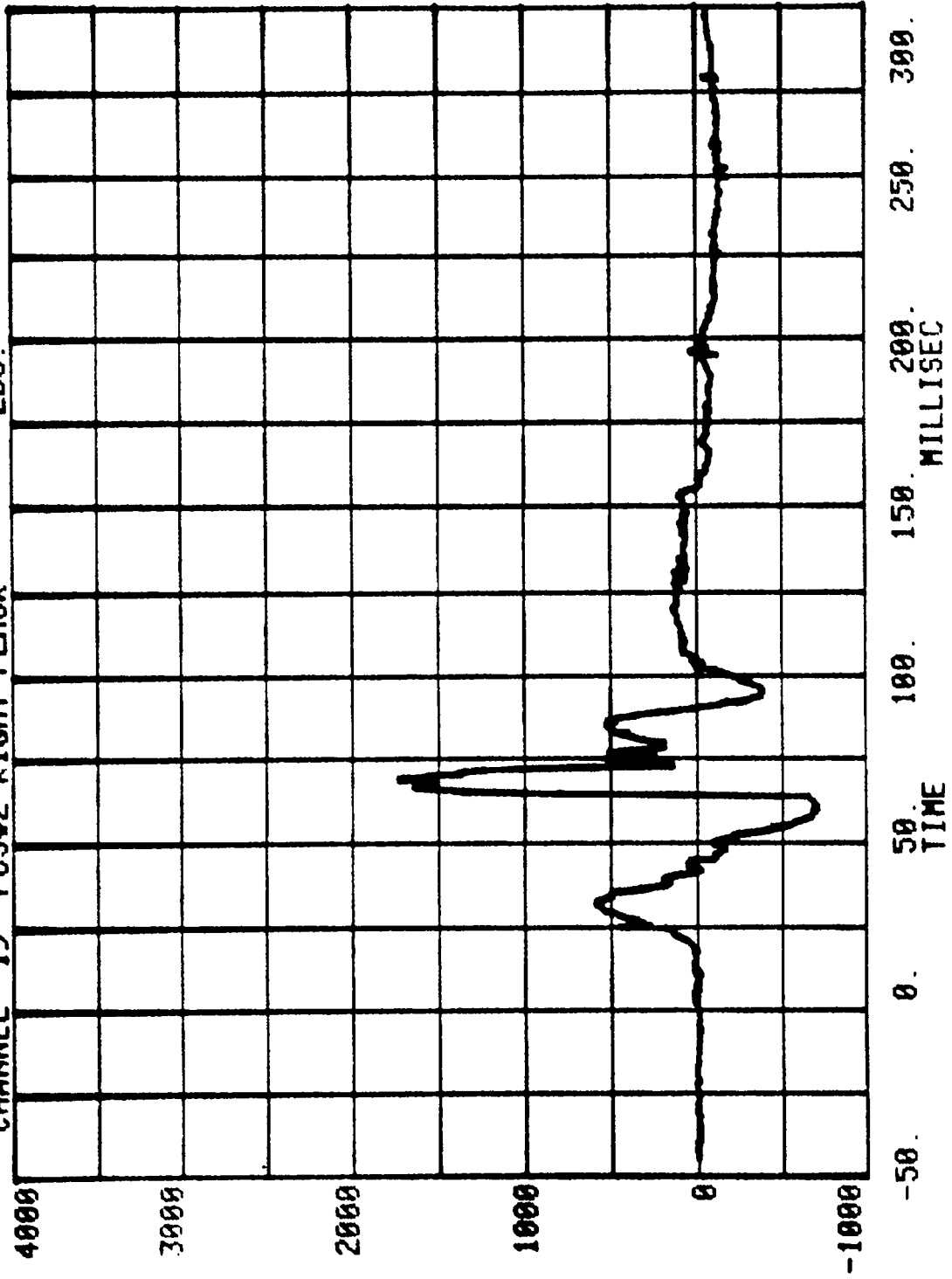
CHANNEL 18 POS#2 CHEST Z  
RUN= 810 SERIES= 5201 G'S



CHANNEL 4 POS#2 CHEST R  
RUN= 810 SERIES= 5201 G'S



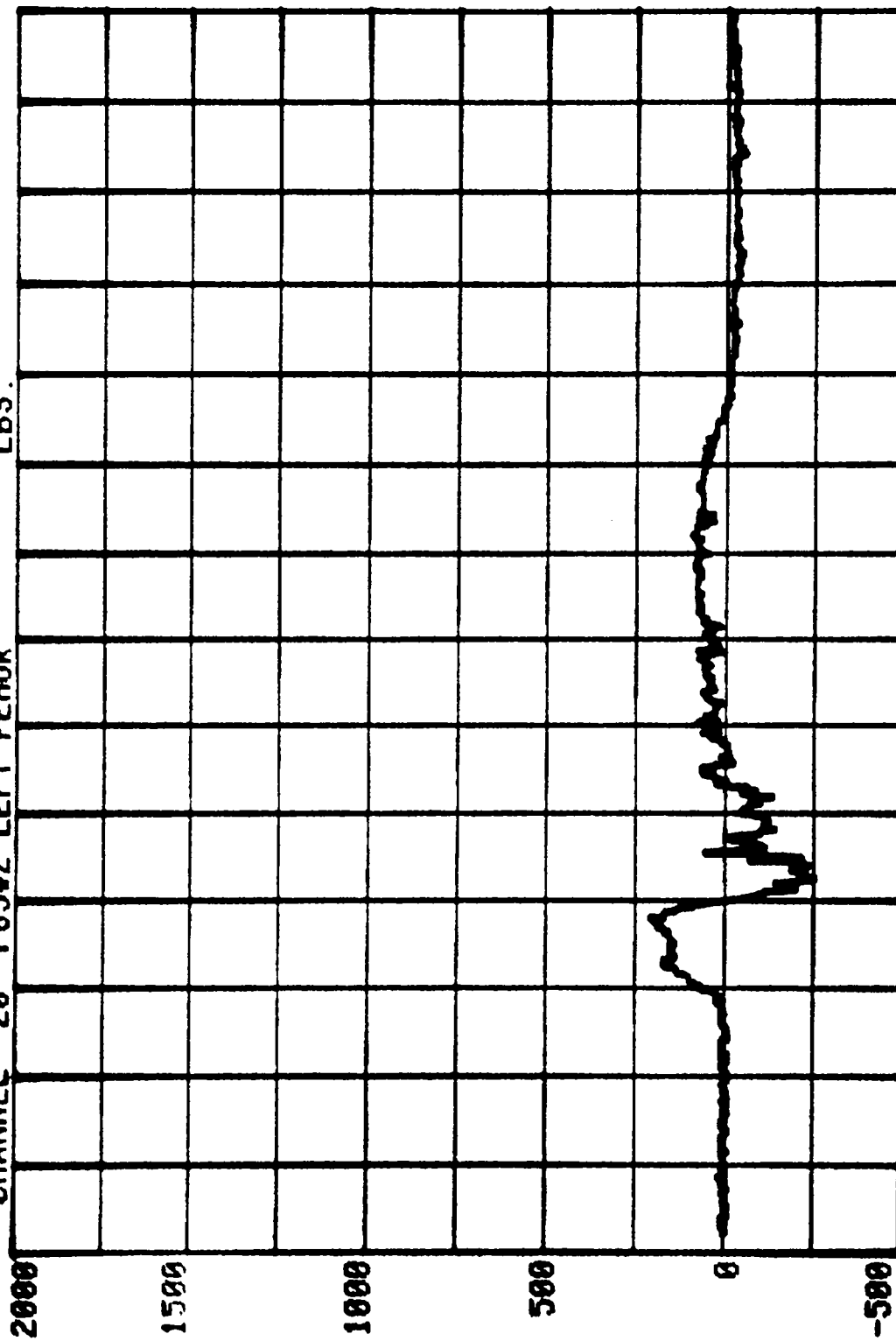
CHANNEL 19 POS#2 RIGHT FEMUR  
RUN= 810 SERIES= 5201 LBS.



CHANNEL 20 POS#2 LEFT FEMUR

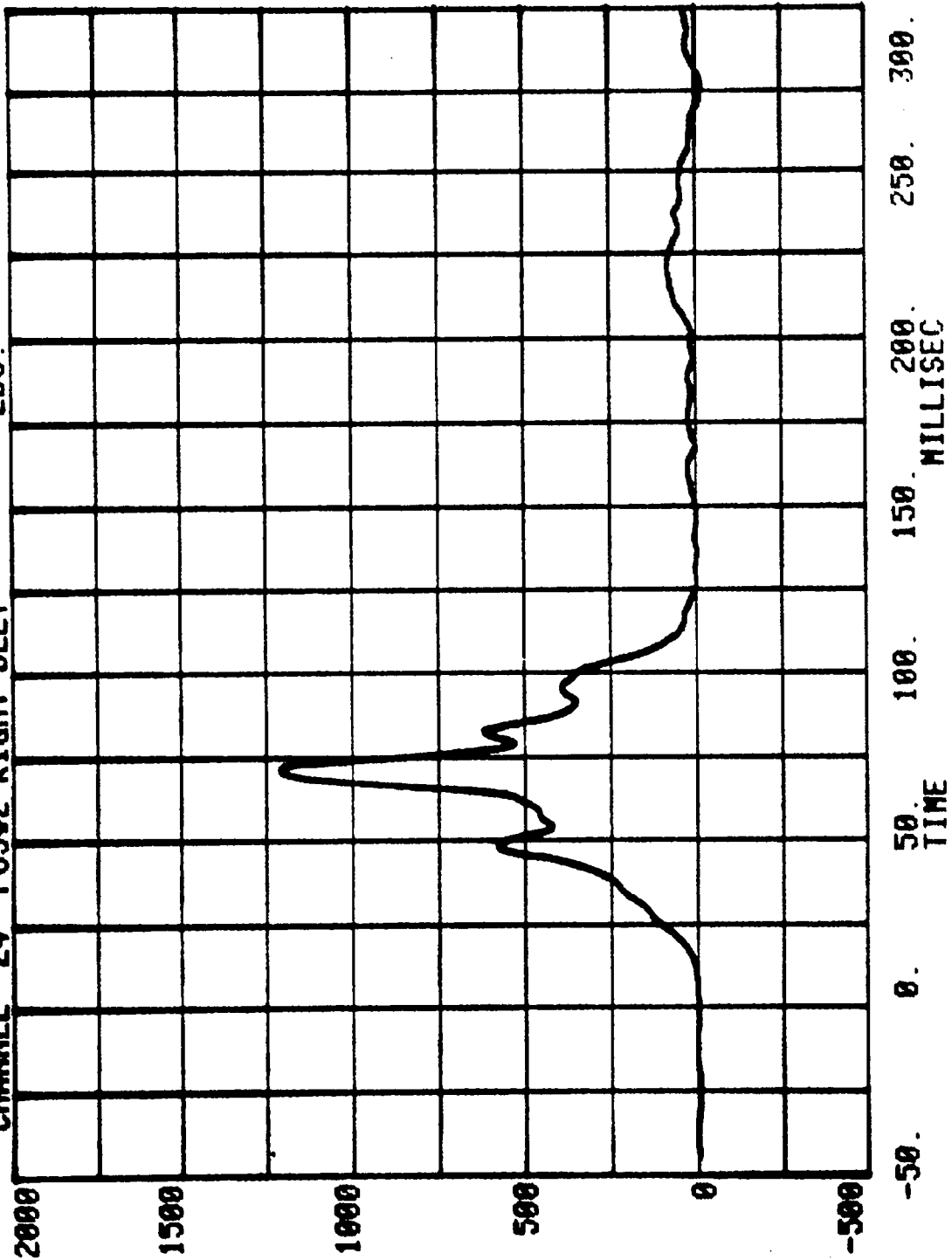
RUN= 810 SERIES= 5201

LBS.

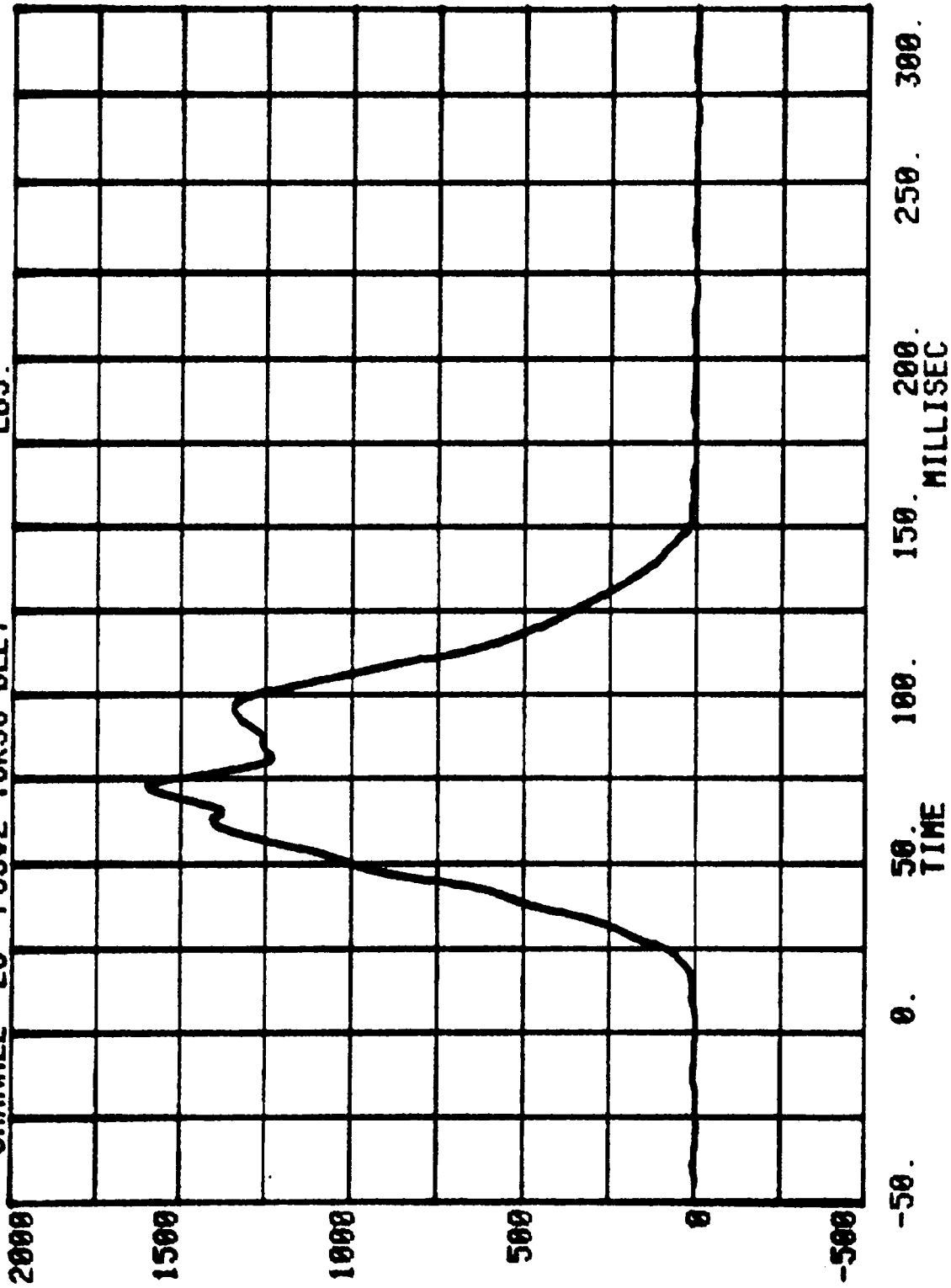


TIME  
MILLISEC

CHANNEL 24 POS#2 RIGHT BELT  
RUN= 810 SERIES= 5201 LBS.



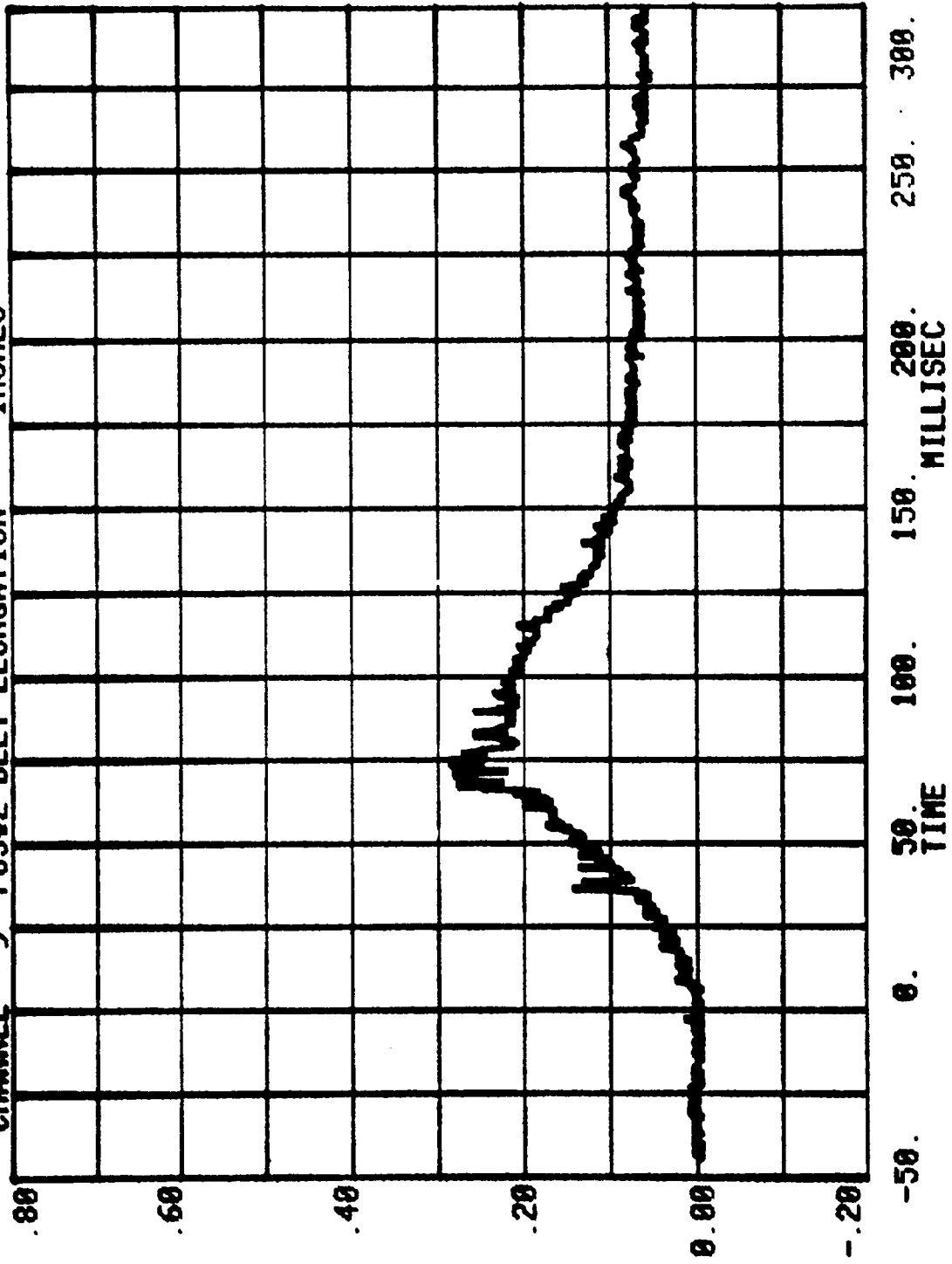
CHANNEL 26 POS#2 TORSO BELT  
RUN= 810 SERIES= 5201 LBS.



Measured over 2.5 inches

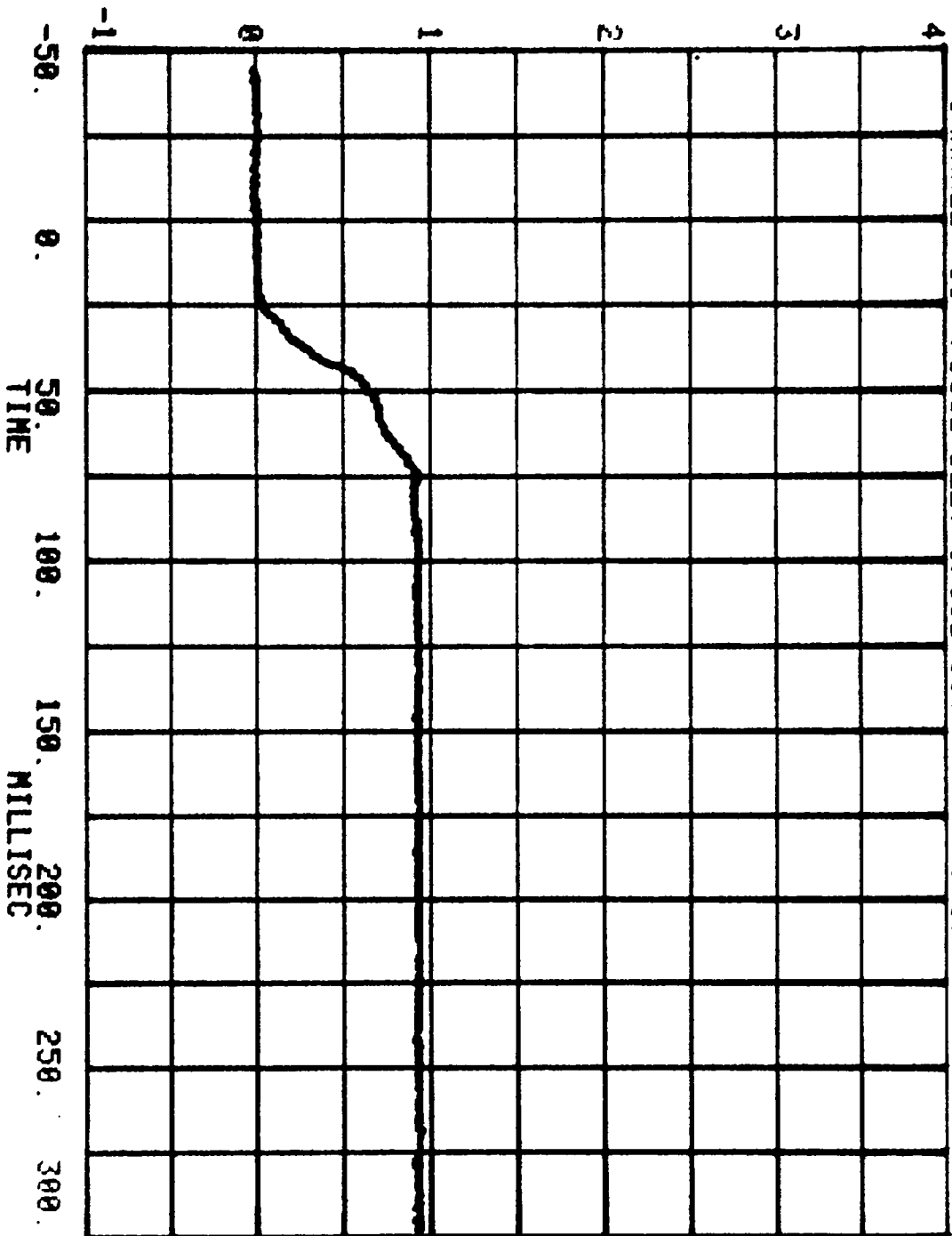
CHANNEL 9 POS#2 BELT ELONGATION INCHES

RUN= 810 SERIES= 5201





CHANNEL 19 POS#2 BELT SPOOL OUT INCHES



B-99

7626-8

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.

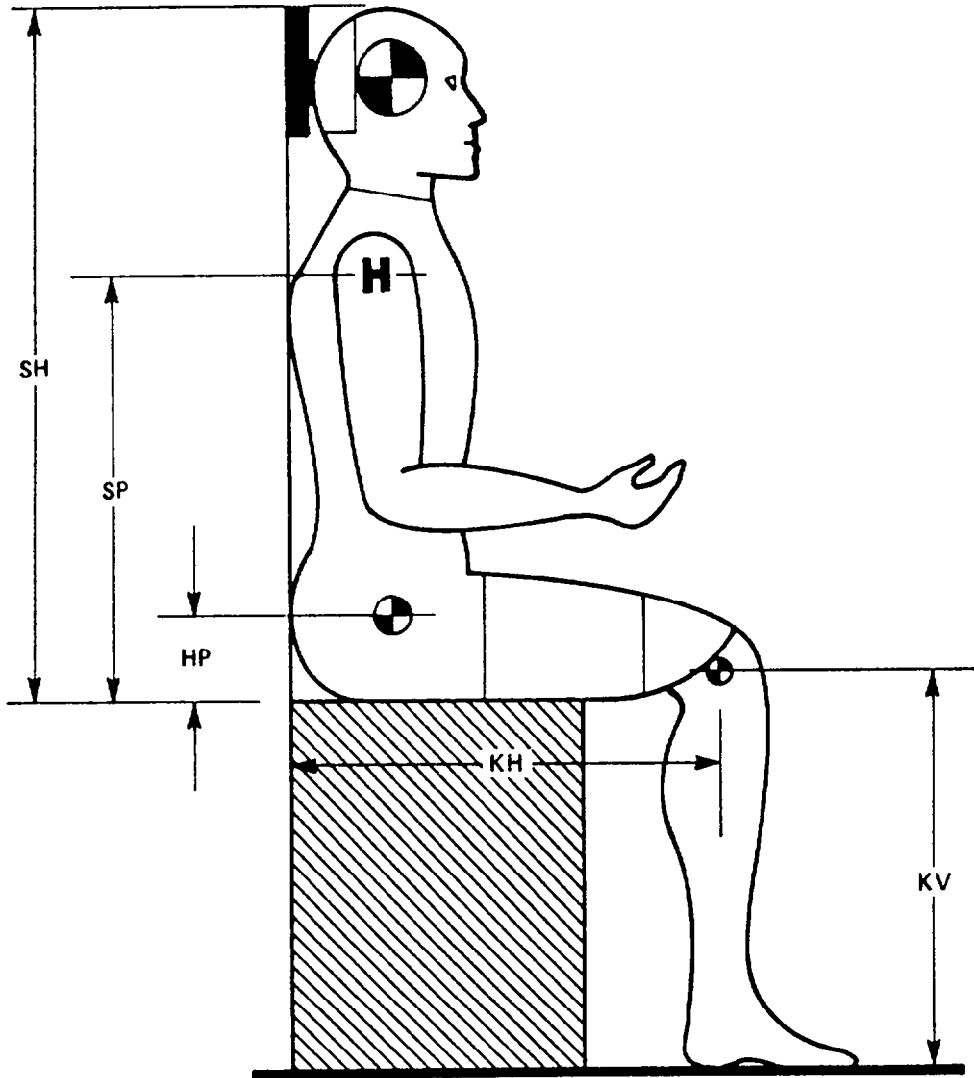
Dummy serial numbers and certification dates are:

| <u>Serial No.</u> | <u>Completion Date</u> |
|-------------------|------------------------|
| 1019              | 2- 8-88                |
| 1022              | 2- 5-88                |

#### Electronic Test Equipment

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

Figure 13 DUMMY CONFIGURATION DIMENSIONS



PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

NHTSA DUMMY I.D. NUMBER.: 1019

I. CONFIGURATION VERIFICATION DATA

|                                    | P. 572 SPECIFICATION | PRE-TEST if required | POST-TEST if required |
|------------------------------------|----------------------|----------------------|-----------------------|
| DATE OF CONFIGURATION VERIFICATION | XXXXXXXXXXXXXX       | 2-8-88               |                       |
| VERIFICATION NUMBER FOR DUMMY (*)  | XXXXXXXXXXXXXX       | 2                    |                       |
| SH - Seated Height                 | 35.6 to 35.8"        | 35.6"                |                       |
| SP - Shoulder Pivot Height         | 21.8 to 22.4"        | 22.3"                |                       |
| 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"        | 19.5"                |                       |
| SW - Shoulder Width                | 17.8 to 18.4"        | 18.1"                |                       |
| HW - Hip Width                     | 14.0 to 15.4"        | 14.8"                |                       |

II. PERFORMANCE VERIFICATION DATA:

|  |                | PRE-TEST (if required) | POST-TEST (if required) |
|--|----------------|------------------------|-------------------------|
| DATE OF PERFORMANCE VERIFICATION               |                | 2-8-88                 |                         |
| SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)   |                | 2                      |                         |
| VERIFICATION LAB TEMPERATURE ( 66 to 78 deg. ) |                | 70-72 deg              |                         |
| VERIFICATION LAB HUMIDITY (10 TO 70 %)         |                | 20-22%                 |                         |
| TEST PARAMETER                                 | SPECIFICATION  |                        |                         |
| 1. HEAD DROP TEST                              |                |                        |                         |
| a. peak resultant accel.                       | 210 to 260 G's | 260 G's                |                         |
| b. peak lateral accel.                         | <= 10 G's      | 4 G's                  |                         |
| c. Time above 100 G's                          | 0.9 to 1.5 ms. | 1.1 ms                 |                         |

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

TECHNICIAN'S NAME:

*DW Hess*

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1019

| TEST PARAMETER                         | SPECIFICATION     | PRE-TEST<br>(if required) | POST-TEST<br>(if required) |
|--|-------------------|---------------------------|----------------------------|
| <b>2. NECK BENDING TEST</b>            |                   |                           |                            |
| a. Pendulum Speed                      | 21.5 to 25.5 fps. | 21.8 fps                  |                            |
| b. Pend. Avg. Decel. over<br>t3 to t2  | 20 to 24 G's      | 23.5 G's                  |                            |
| c. Peak Resultant Head<br>Acceleration | 26 G's max.       | 24.5G's                   |                            |
| d. Pendulum Decel. (t2-t1)             | <= 3 ms.          | 2.2 ms                    |                            |
| e. Pendulum Decel. (t3-t2)             | 25 to 30 ms.      | 28.1 ms                   |                            |
| f. Pendulum Decel. (t4-t3)             | <= 10 ms.         | 5.4 ms                    |                            |
| g. Max. Head Rotation                  | 63 to 73 deg.     | 72 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.  | 27.1 ms  |
|                      | Displ. | 2.1 to 3.1"       | 2.6"     |
| 60 deg.              | Time   | 40.3 to 51.7 ms.  | 41.8 ms  |
|                      | Displ. | 4.3 to 5.3"       | 4.9"     |
| Maximum<br>( 72 deg) | Time   | 53.2 to 66.8 ms.  | 57.8 ms  |
|                      | Displ. | 5.0 to 6.0"       | 5.8"     |
| 60 deg.              | Time   | 67.0 to 83.0 ms.  | 74.9 ms  |
|                      | Displ. | 4.3 to 5.3"       | 4.8"     |
| 30 deg.              | Time   | 85.4 to 104.6 ms. | 91.3 ms  |
|                      | Displ. | 2.1 to 3.1"       | 2.2"     |
| 0 deg.               | Time   | 101.0 - 123.0 ms. | 105.9 ms |
|                      | Displ. | -.5 to 0.5"       | 0.0"     |

TECHNICIANS NAME: *DW Hood*

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1019

| TEST PARAMETER                  | SPECIFICATION    | PRE-TEST<br>(if required) | POST-TEST<br>(if required) |
|---------------------------------|------------------|---------------------------|----------------------------|
| <b>3. ABDOMINAL COMPRESSION</b> |                  |                           |                            |
| TEST: (preload = 50 lbs.)       |                  |                           |                            |
| a. Force @ 0.5"                 | 23 to 36 lbs.    | 27 lbs                    |                            |
| b. Force @ 0.75"                | 36 to 50 lbs.    | 41.5 lbs                  |                            |
| c. Force @ 1.0"                 | 50 to 63 lbs.    | 58 lbs                    |                            |
| d. Force @ 1.3"                 | 73 to 88 lbs.    | 83 lbs                    |                            |
| <b>4. LUMBAR FLEXION TEST:</b>  |                  |                           |                            |
| a. Force @ 20 deg.              | 22 to 34 lbs.    | 24.5 lbs                  |                            |
| b. Force @ 30 deg.              | 34 to 46 lbs.    | 37 lbs                    |                            |
| c. Force @ 40 deg.              | 46 to 58 lbs.    | 49 lbs                    |                            |
| d. Return Angle                 | 12 deg. maximum  | 11 deg                    |                            |
| <b>5. CHEST IMPACT TESTS:</b>   |                  |                           |                            |
| A. High Speed                   |                  |                           |                            |
| (1) Probe Speed                 | 21.78-22.22 fps. | 21.9 fps                  |                            |
| (2) Peak Deflection             | 1.7" maximum     | 1.66"                     |                            |
| (3) Peak Resistive Force        | 2250 lbs maximum | 2132 lbs                  |                            |
| (4) Internal Hysteresis         | 50 to 70%        | 51.6%                     |                            |
| B. Low Speed                    |                  |                           |                            |
| (1) Probe Speed                 | 13.86-14.14 fps. | 14.0 fps                  |                            |
| (2) Peak Deflection             | 1.1" maximum     | 1.02"                     |                            |
| (3) Peak Resistive Force        | 1450 lbs maximum | 1300 lbs                  |                            |
| (4) Internal Hysteresis         | 50 to 70%        | 63.5%                     |                            |

TECHNICIAN'S NAME: *DW Hess*

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1019

| TEST PARAMETER             | SPECIFICATION    | PRE-TEST<br>(if required) | POST-TEST<br>(if required) |
|----------------------------|------------------|---------------------------|----------------------------|
| <b>6. KNEE IMPACT TEST</b> |                  |                           |                            |
| <b>A. Right Side</b>       |                  |                           |                            |
| (1) Probe Speed            | 6.76 to 7.04 fps | 6.8 fps                   |                            |
| (2) Maximum Force          | 1850 to 2500 lbs | 2100 lbs                  |                            |
| (3) Time above 1000 lbs.   | 1.7 ms. minimum  | 1.75"                     |                            |
| <b>B. Left Knee</b>        |                  |                           |                            |
| (1) Probe Speed            | 6.76 to 7.04 fps | 6.8 fps                   |                            |
| (2) Maximum Force          | 1850 to 2500 lbs | 2250 lbs                  |                            |
| (3) Time Above 1000 lbs.   | 1.7 ms. minimum  | 1.7"                      |                            |

REMARKS:

TECHNICIAN'S NAME: DW Hertz

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER 1019

| DUMMY INSTRUMENT--                        | MFG             | SERIAL NUMBER | DATE LAST CALIBRATED | DATE OF NEXT CALIBRATION |
|---|-----------------|---------------|----------------------|--------------------------|
| 1. HEAD ACCELEROMETER--                   |                 |               |                      |                          |
| HX LONGITUDINAL--                         | ENDEVCO         | CH83          | 9-87                 | 3-88                     |
| HY LATERAL--                              | ENDEVCO         | CU62          | 9-87                 | 3-88                     |
| HZ VERTICAL--                             | ENDEVCO         | CM86          | 9-87                 | 3-88                     |
| 2. CHEST ACCELEROMETER--                  |                 |               |                      |                          |
| CX LONGITUDINAL--                         | CEC             | A143          | 12-87                | 6-88                     |
| CY LATERAL--                              | ENDEVCO         | CE18          | 2-88                 | 8-88                     |
| CZ VERTICAL--                             | CEC             | A86           | 2-88                 | 8-88                     |
| 3. FEMUR LOAD CELLS                       |                 |               |                      |                          |
| RIGHT SIDE                                | GSE             | 1707          | 10-87                | 4-88                     |
| LEFT SIDE                                 | GSE             | 1927          | 10-87                | 4-88                     |
| CALIBRATION LABORATORY INSTRUMENTS--      |                 |               |                      |                          |
| 1. PENDULUM ACC.--                        | CEC             | A144          | 12-87                | 6-88                     |
| 2. TEST PROBE ACCELEROMETER--             | CEC             | A142          | 12-87                | 6-88                     |
| 3. LUMBAR FLEXION TEST PUSH FORCE GAUGE-- | TRANS-DUCER INC | 20051         | 11-87                | 5-88                     |
| 4. ABDOMINAL COMPRESS. TEST FORCE GAUGE-- | BLH             | 72952         | 11-87                | 5-88                     |
| 5. ABDOMINAL COMPRESS. TEST FORCE GAUGE-- | CIC             | 567-11        | 11-87                | 5-88                     |

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       | 2-5-88               |                       |
| VERIFICATION NUMBER FOR DUMMY (*)  | XXXXXXXXXXXXXX       | 3                    |                       |
| SH - Seated Height                 | 35.6 to 35.8"        | 35.7"                |                       |
| 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"        | 20.5"                |                       |
| KV - Knee Pivot from floor         | 19.3 to 19.9"        | 19.6"                |                       |
| SW - Shoulder Width                | 17.8 to 18.4"        | 18.1"                |                       |
| HW - Hip Width                     | 14.0 to 15.4"        | 14.7"                |                       |

II. PERFORMANCE VERIFICATION DATA:

|  |                | PRE-TEST (if required) | POST-TEST (if required) |
|--|----------------|------------------------|-------------------------|
| DATE OF PERFORMANCE VERIFICATION               |                | 2-5-88                 |                         |
| SEQUENTIAL VERIFICATION NUMBER FOR DUMMY (*)   |                | 3                      |                         |
| VERIFICATION LAB TEMPERATURE ( 66 to 78 deg. ) |                | 70-72 deg              |                         |
| VERIFICATION LAB HUMIDITY (10 TO 70 %)         |                | 22-39%                 |                         |
| TEST PARAMETER                                 | SPECIFICATION  |                        |                         |
| 1. HEAD DROP TEST                              |                |                        |                         |
| a. peak resultant accel.                       | 210 to 260 G's | 240 G's                |                         |
| b. peak lateral accel.                         | <= 10 G's      | 2 G's                  |                         |
| c. Time above 100 G's                          | 0.9 to 1.5 ms. | 1.2 ms                 |                         |

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

TECHNICIAN'S NAME: DW Hess

PART 572 DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA...continued

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

| TEST PARAMETER                      |        | SPECIFICATION     | PRE-TEST<br>(if required) | POST-TEST<br>(if required) |
|-------------------------------------|--------|-------------------|---------------------------|----------------------------|
| <b>2. NECK BENDING TEST</b>         |        |                   |                           |                            |
| a. Pendulum Speed                   |        | 21.5 to 25.5 fps. | 22.3 fps                  |                            |
| b. Pend. Avg. Decel. over t3 to t2  |        | 20 to 24 G's      | 24 G's                    |                            |
| c. Peak Resultant Head Acceleration |        | 26 G's max.       | 25 G's                    |                            |
| d. Pendulum Decel. (t2-t1)          |        | <= 3 ms.          | 2 ms                      |                            |
| e. Pendulum Decel. (t3-t2)          |        | 25 to 30 ms.      | 26.4 ms                   |                            |
| f. Pendulum Decel. (t4-t3)          |        | <= 10 ms.         | 8.5 ms                    |                            |
| g. Max. Head Rotation               |        | 63 to 73 deg.     | 69 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.  | 27.9 ms                   |                            |
|                                     | Displ. | 2.1 to 3.1"       | 2.4"                      |                            |
| 60 deg.                             | Time   | 40.3 to 51.7 ms.  | 43.4 ms                   |                            |
|                                     | Displ. | 4.3 to 5.3"       | 4.9"                      |                            |
| Maximum<br>( 69 deg)                | Time   | 53.2 to 66.8 ms.  | 56.7 ms                   |                            |
|                                     | Displ. | 5.0 to 6.0"       | 5.4"                      |                            |
| 60 deg.                             | Time   | 67.0 to 83.0 ms.  | 71 ms                     |                            |
|                                     | Displ. | 4.3 to 5.3"       | 4.7"                      |                            |
| 30 deg.                             | Time   | 85.4 to 104.6 ms. | 88.9 ms                   |                            |
|                                     | Displ. | 2.1 to 3.1"       | 2.2"                      |                            |
| 0 deg.                              | Time   | 101.0 - 123.0 ms. | 103.1 ms                  |                            |
|                                     | Displ. | -.5 to 0.5"       | 0.0"                      |                            |

TECHNICIANS NAME: *DW Hess*

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

| TEST PARAMETER                  | SPECIFICATION    | PRE-TEST<br>(if required) | POST-TEST<br>(if required) |
|---------------------------------|------------------|---------------------------|----------------------------|
| <b>3. ABDOMINAL COMPRESSION</b> |                  |                           |                            |
| TEST: (preload = 50 lbs.)       |                  |                           |                            |
| a. Force @ 0.5"                 | 23 to 36 lbs.    | 25.5 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.    | 82 lbs                    |                            |
| <b>4. LUMBAR FLEXION TEST:</b>  |                  |                           |                            |
| a. Force @ 20 deg.              | 22 to 34 lbs.    | 24.5 lbs                  |                            |
| b. Force @ 30 deg.              | 34 to 46 lbs.    | 37 lbs                    |                            |
| c. Force @ 40 deg.              | 46 to 58 lbs.    | 50 lbs                    |                            |
| d. Return Angle                 | 12 deg. maximum  | 9.5 deg                   |                            |
| <b>5. CHEST IMPACT TESTS:</b>   |                  |                           |                            |
| A. High Speed                   |                  |                           |                            |
| (1) Probe Speed                 | 21.78-22.22 fps. | 22.0 fps                  |                            |
| (2) Peak Deflection             | 1.7" maximum     | 1.48"                     |                            |
| (3) Peak Resistive Force        | 2250 lbs maximum | 2158 lbs                  |                            |
| (4) Internal Hysteresis         | 50 to 70%        | 60%                       |                            |
| B. Low Speed                    |                  |                           |                            |
| (1) Probe Speed                 | 13.86-14.14 fps. | 14.1 fps                  |                            |
| (2) Peak Deflection             | 1.1" maximum     | .88"                      |                            |
| (3) Peak Resistive Force        | 1450 lbs maximum | 1248 lbs                  |                            |
| (4) Internal Hysteresis         | 50 to 70%        | 57.3%                     |                            |

TECHNICIAN'S NAME: DW Hess

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA (continued)

II. PERFORMANCE VERIFICATION DATA (continued)

NHTSA DUMMY I.D. NUMBER: 1022

| TEST PARAMETER             | SPECIFICATION    | PRE-TEST<br>(if required) | POST-TEST<br>(if required) |
|----------------------------|------------------|---------------------------|----------------------------|
| <b>6. KNEE IMPACT TEST</b> |                  |                           |                            |
| <b>A. Right Side</b>       |                  |                           |                            |
| (1) Probe Speed            | 6.76 to 7.04 fps | 7.0 fps                   |                            |
| (2) Maximum Force          | 1850 to 2500 lbs | 2400 lbs                  |                            |
| (3) Time above 1000 lbs.   | 1.7 ms. minimum  | 1.75 ms                   |                            |
| <b>B. Left Knee</b>        |                  |                           |                            |
| (1) Probe Speed            | 6.76 to 7.04 fps | 7.0 fps                   |                            |
| (2) Maximum Force          | 1850 to 2500 lbs | 1900 lbs                  |                            |
| (3) Time Above 1000 lbs.   | 1.7 ms. minimum  | 1.96 ms                   |                            |

REMARKS:

TECHNICIAN'S NAME: DW Herz

INSTRUMENT CALIBRATION INFORMATION

NHTSA DUMMY ID NUMBER 1022

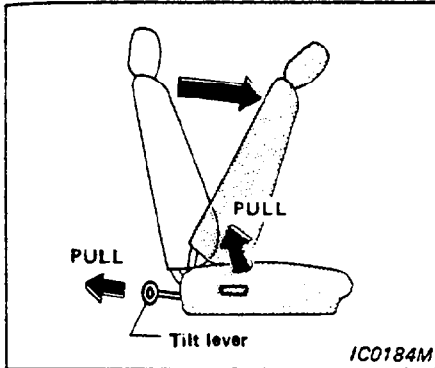
| DUMMY INSTRUMENT--                        | MFG             | SERIAL NUMBER | DATE LAST CALIBRATED | DATE OF NEXT CALIBRATION |
|---|-----------------|---------------|----------------------|--------------------------|
| 1. HEAD ACCELEROMETER--                   |                 |               |                      |                          |
| HX LONGITUDINAL--                         | ENDEVCO         | CK54          | 2-88                 | 8-88                     |
| HY LATERAL--                              | ENDEVCO         | CK78          | 2-88                 | 8-88                     |
| HZ VERTICAL--                             | ENDEVCO         | CD75          | 2-88                 | 8-88                     |
| 2. CHEST ACCELEROMETER--                  |                 |               |                      |                          |
| CX LONGITUDINAL--                         | CEC             | A115          | 9-87                 | 3-88                     |
| CY LATERAL--                              | ENDEVCO         | CS09          | 9-87                 | 3-88                     |
| CZ VERTICAL--                             | CEC             | A29           | 9-87                 | 3-88                     |
| 3. FEMUR LOAD CELLS                       |                 |               |                      |                          |
| RIGHT SIDE                                | GSE             | 077           | 10-87                | 4-88                     |
| LEFT SIDE                                 | GSE             | 076           | 10-87                | 4-88                     |
| CALIBRATION LABORATORY INSTRUMENTS--      |                 |               |                      |                          |
| 1. PENDULUM ACC.--                        | CEC             | A144          | 12-87                | 6-88                     |
| 2. TEST PROBE ACCELEROMETER--             | CEC             | A142          | 12-87                | 6-88                     |
| 3. LUMBAR FLEXION TEST PUSH FORCE GAUGE-- | TRANS-DUCER INC | 20051         | 11-87                | 5-88                     |
| 4. ABDOMINAL COMPRESS. TEST FORCE GAUGE-- | BLH             | 72952         | 11-87                | 5-88                     |
| 5. ABDOMINAL COMPRESS. TEST FORCE GAUGE-- | CIC             | 567-11        | 11-87                | 5-88                     |



APPENDIX D

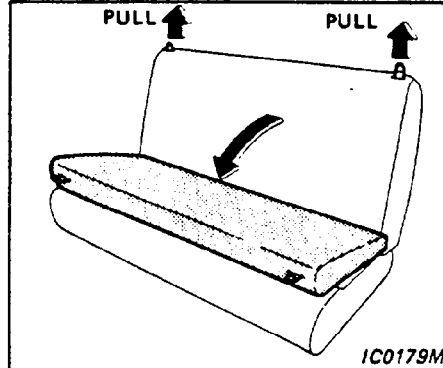
VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT SYSTEM INSTRUCTIONS

## TILTING FRONT SEAT



The front passenger's seat can be tilted to make it easier for the rear seat passengers to get in and out.

To tilt the front seat back, pull the reclining lever up or pull the tilt lever.

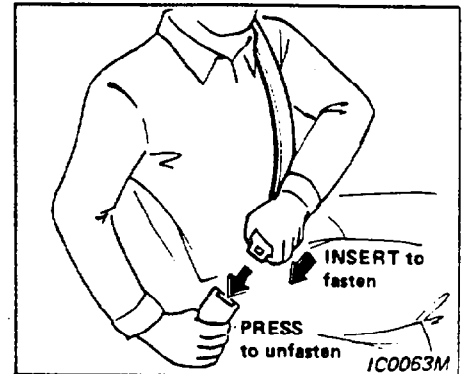


## Folding

Pull both levers and pull the seat back forward to fold it down.

**Never allow anyone to ride in the luggage area or on the folded down rear seat. A sudden stop or accident may cause risk of injury.**

## SEAT BELTS 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

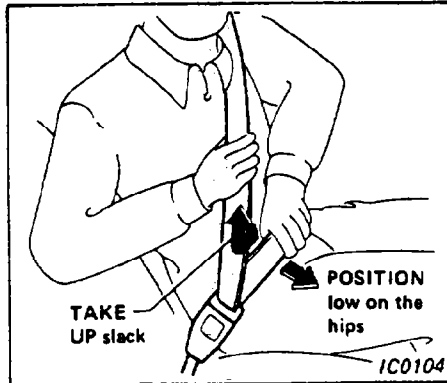
1. Adjust the seat.

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

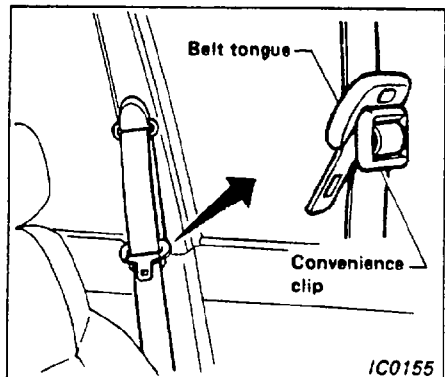
Your seat belt retractors are designed to lock belt movement **only** when the vehicle slows down rapidly. Pulling on the belt will not cause the retractor to lock, no matter how fast you pull.

If you wish to have the locking operation of your seat belts checked for you, or if you have any question about belt operation, see your NISSAN dealer.

#### Replacing front seat belt

The front seat belts are shock absorber type. Replace the belt when the loop has been pulled out and "REPLACE BELT" is visible as this indicator means the seat belt has been overstressed.

## 2-POINT TYPE WITH RETRACTOR

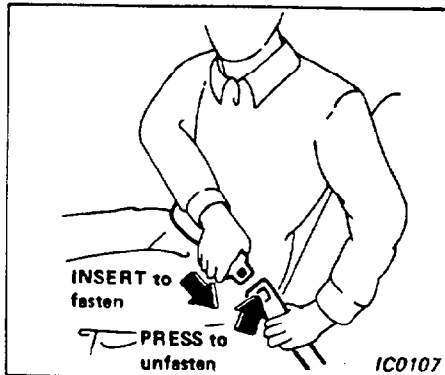


### Convenience clip

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.

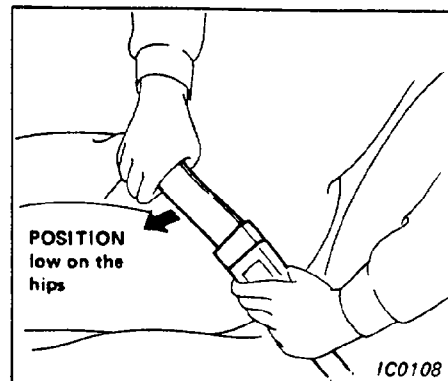
Slide it away from the buckle if the convenience clip contacts the belt tongue when the belt is worn.



### Fastening the belts

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

If the retractor locks and restricts further movement, let the belt rewind into the retractor, then slowly pull the belt out.



2. Position the lap belt low on the hips as shown.

3. Pull the belt 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.